

MGG15055021

INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEGS 51-53

BERMUDA RISE



100 cm

120 cm

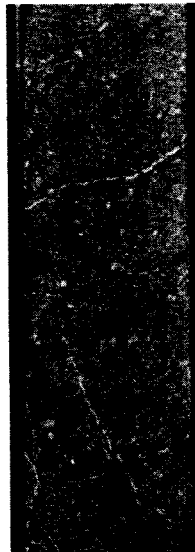
1



45 cm

65 cm

2



100 cm

120 cm

3



90 cm

110 cm

4



60 cm

80 cm

5

Prepared for the
NATIONAL SCIENCE FOUNDATION
National Ocean Sediment Coring Program
Under Contract C-482

By the
UNIVERSITY OF CALIFORNIA
Scripps Institution of Oceanography
Prime Contractor for the Project

Captions to Cover Photos

1. 417A-24-2, 100-120 cm:

Section through pillow margin showing 2 cm thick altered rim cut by radial veins filled by calcite, hematite and green smectite extending into pillow interior. Interpillow hyaloclastite matrix composed of green palagonite shards, elongate parallel to margins, in a fine-grained self-matrix cemented by calcite.

2. 417D-12-4, 45-65 cm:

Brown to pale blue-green, zeolitic multicolor clay.

3. 417D-34-2, 100-120 cm:

Massive, coarse-grained basalt containing phenocrysts of plagioclase and olivine in a holocrystalline, subophitic groundmass.

4. 418A-73-6, 90-110 cm:

Coarse breccia composed of clasts of fine-grained basalt in a matrix of smectite and calcite.

5. 418A-79-4, 60-80 cm:

Fine-grained, nearly aphyric basalt dike with chilled glassy margins, cutting massive, coarse-grained basalt. Dike contact with country rock marked by calcite-filled veins.



SCRIPPS INSTITUTION OF OCEANOGRAPHY

LA JOLLA, CALIFORNIA 92093

Dear Colleague:

This document has been printed and distributed by the Deep Sea Drilling Project for the purpose of sample selection by interested earth scientists. Sample requests are honored two months after publication of the Initial Core Descriptions or no later than one year following completion of the cruise on which the samples were collected. It is an interim and informal document consisting of site data and sedimentologic and paleontologic data and interpretations as known six (6) months post-cruise. These data, while adequate for most sample selection needs, are subject to slight revision by the time of issue of the corresponding volume of the Initial Reports of the Deep Sea Drilling Project.

The information contained herein is preliminary and privileged, consequently this document is not to be cited or used as the basis of other publications. Data cited or used in a manuscript will be considered a breach of professional ethics.

Thank you for your interest in the Deep Sea Drilling Project.

Sincerely,

A handwritten signature in cursive script that reads "David G. Moore".

David G. Moore
Chief Scientist

Deep Sea Drilling Project

INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEGS 51-53

November 20, 1976 - April 21, 1977

A Project Planned by and Carried Out With the Advice of the
JOINT OCEANOGRAPHIC INSTITUTIONS FOR DEEP EARTH SAMPLING (JOIDES)

MEMBER ORGANIZATIONS

Institute of Geophysics, University of Hawaii
Lamont-Doherty Geological Observatory, Columbia University
School of Oceanography, Oregon State University
Graduate School of Oceanography, University of Rhode Island
Rosenstiel School of Marine and Atmospheric Sciences, University of Miami
Scripps Institution of Oceanography, University of California
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University of Washington
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PARTICIPATING SCIENTISTS

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Scientists aboard for Leg 52: W. B. Bryan, Paul T. Robinson, Claire Bollinger, Gary Byerly, Rolf Emmermann, Yozo Hamano, Shaul Levi, Gregory A. Miles, Nikolai Pertsev, Luc-Emmanuel Ricou, William G. Siesser, Ralph A. Stephen, and Donald A. Swanson

Scientists aboard for Leg 53: Martin F. J. Flower, Matthew Salisbury, Dennis Bohrer, Michael Hobart, Douglas Johnson, Edmond Mathez, Catherine Mevel, Nikolai Pertsev, R. Gary Pritchard, Harold Puchelt, Peter A. Rigotti and Hubert Staudigel

INITIAL CORE DESCRIPTIONS

LEGS 51-53

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LEGS 51-53

CRUISE OBJECTIVES

Prior to Legs 51-53, four legs in the Atlantic Ocean (37, 45, 46, and 49) had been devoted primarily to basement drilling. The prime objective of all these legs, except for Leg 49, was to drill a deep hole in the ocean crust in order to sample layer 2 and, if possible, the upper part of layer 3.

Although basement drilling in the Atlantic Ocean completed thus far had answered some important questions regarding the nature and origin of the oceanic crust, many questions remained to be studied:

1) The structure and stratigraphy of layer 2. The upper part of layer 2 (2a) consists largely of extrusive basalt with a high proportion of low velocity material, including voids, breccias, and interlayered sediments. Is the lower part of layer 2 (2b) basically the same as 2a but with smaller proportions of low velocity material, or does it contain a high proportion of dikes and sills? At what levels do plutonic bodies become important in the make up of the oceanic crust? How long does it take to build a section of oceanic crust and is the construction continuous or episodic? Can a section through the oceanic crust be correlated with ophiolite stratigraphy?

2) The petrology of layer 2 and the nature of evolutionary changes in the oceanic crust. Layer 2a consists chiefly of mid-ocean ridge tholeiitic basalts showing evidence of extensive low pressure crystal fractionation. Does layer 2b consist of the same material, or can shallow magma chambers be maintained only after most of the crust has been formed? Are there systematic secular variations in the nature of mid-ocean ridge basalts as suggested by earlier studies, or have geochemical variations observed at present along the Mid-Atlantic Ridge persisted through time? A knowledge of the petrography and geochemistry of layers 2 and 3 will also provide indirect evidence regarding the nature of the upper mantle beneath oceanic spreading centers.

3) The source of linear seafloor magnetic anomalies. Basement sections drilled thus far generally do not have the necessary magnetic intensities to account for the observed surface anomalies. Hence, the source of the anomalies must lie in the lower part of layer 2 or the upper part of layer 3. Do the anomalies reflect great thicknesses of low intensity material or are they related to highly magnetic bodies as yet undiscovered? If the latter, what is the geometry of these bodies and how are they formed?

4) The extent and nature of alteration and metamorphism in the oceanic crust. Generally, measured heat flow values near spreading ridges are much below theoretical values suggesting the presence of large scale hydrothermal circulation in the crust. However, little evidence of hydrothermal alteration or metamorphism has been found in the layer 2a sections sampled thus far. This suggests that downwelling of cold sea water takes place over large areas but that upwelling of hot water is areally restricted. Has more extensive hydrothermal alteration occurred at depth or have the rocks been subjected to a low grade metamorphism? Is there a metamorphic gradient with depth in the crust and if so, what chemical and mineralogical changes have occurred?

To answer these questions, a series of holes was drilled during Legs 51-53 at the southern end of the Bermuda Rise in an area only a few tens of kilometers horizontally and a few tens of meters vertically from the Vema Gap, which connects the Hatteras and Nares Abyssal Plains (Figure 1). The closest fracture zones are at a distance of about 20 and 80 km. The sites are located on or near magnetic anomaly MO, which has been considered to be 108-109 m.y. of age.

Still other objectives specific to the area dealt with the sediment section above basement.

1) One objective of the legs was to investigate the thick Cretaceous Tertiary sediment section above the crust. Sites 417 and 418 are located about 600 miles south of DSDP Site 105, 450 miles south of Site 387, 450 miles SSW of Site 386, and 300 miles east of Site 101. These sites found dominantly sub-lysocline clay-rich sections in the Tertiary and Late Cretaceous, grading downward to more carbonate-rich middle and lower Cretaceous strata. Features of special interest at these earlier sites include sedimentary hiatuses in the Paleogene and Late Cretaceous, mineralogically interesting Paleogene and upper Cretaceous clays with abundant zeolites and local metalliferous mineralization, and a variably organic "euxinic" middle Cretaceous section.

Sites 417 and 418 were located to examine oceanic crust formed during a period when the Atlantic Ocean was euxinic. An objective was to find out what consequence—if any—results from the eruption of basaltic magmas into stagnant, organic muds. For example, would highly reduced alteration mineral suites develop?

2) A further objective was to recover a complete Neogene section in the western Atlantic. A specific request of the Paleoenvironment Panel noted that the drilling on previous legs in this area (Legs 1, 2, 4, 11, and 43) had spot-cored this interval, and one complete section was desired, mainly to examine the transition from siliceous, Pacific-type Eocene sedimentation to non-siliceous younger sedimentation which resulted from the gradual emergence of the Central American isthmus.

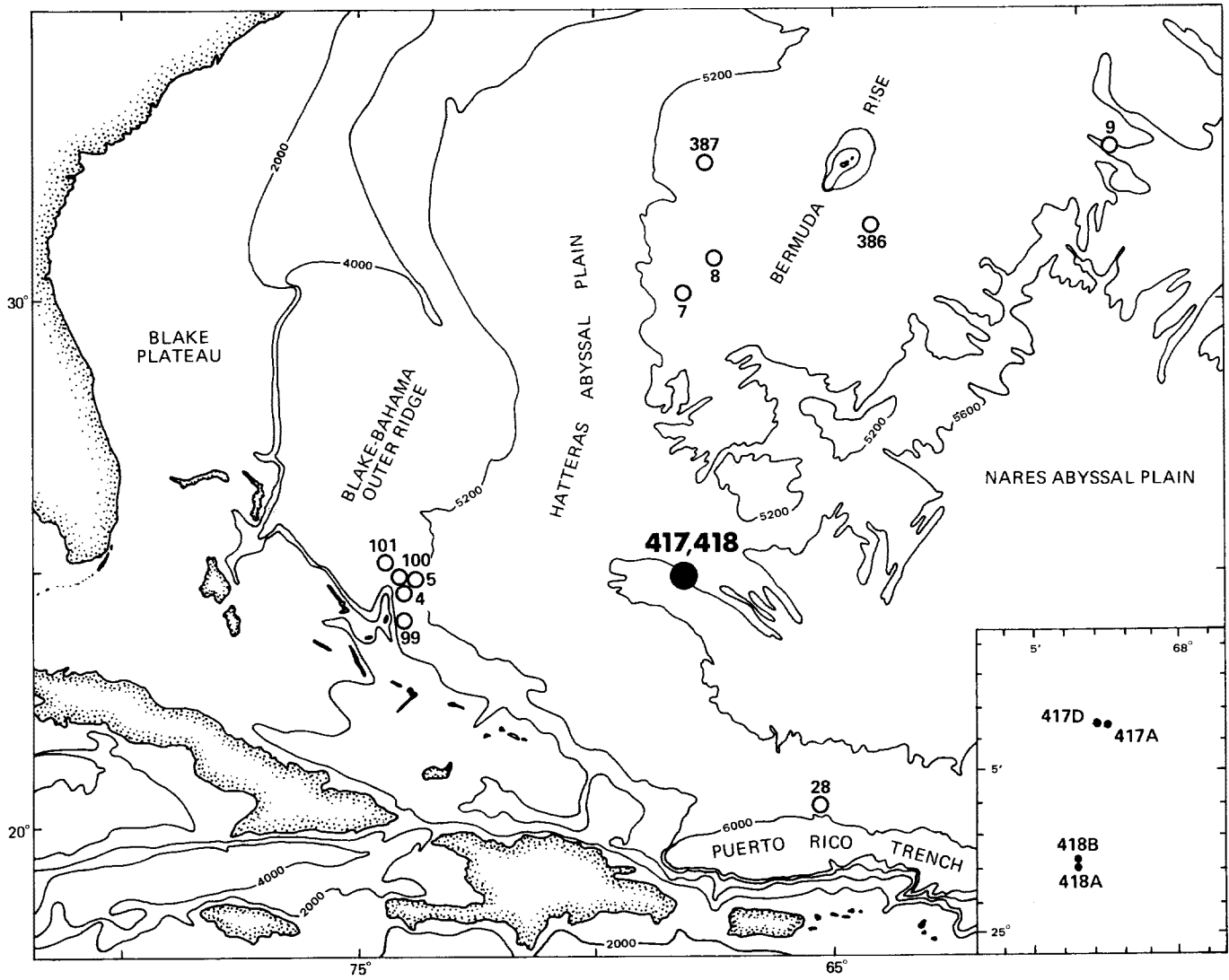


Figure 1. Location of Sites 417, 418, Legs 51-53

OPERATIONAL SUMMARIES

LEG 51

Leg 51 departed San Juan, Puerto Rico on November 20 for a deep re-entry attempt at Site 417. After a mudline core and washing test (Site 417), the ship offset about 700 feet and re-drilled a single-bit pilot hole (Hole 417A). The pilot hole was drilled in 5468 meters of water and penetrated 417 meters, of which 208 meters was sediment and 209 meters was basaltic basement. The hole was continuously cored with 60 per cent overall recovery almost evenly divided between the sediment and basalt. After the pilot hole was completed, the ship was offset another 450 meters, a re-entry cone set and multiple re-entry drilling begun at Hole 417D. A total of 533 meters were penetrated, of which 190 meters were in basaltic basement (Table 1). The hole was logged and left open for continued drilling on Leg 52. Two other holes (Holes 417B and C) were attempted prior to the deep penetration attempt at Hole 417D. These attempts were aborted, however, in favor of drilling at the location of Hole 417D. The *Glomar Challenger* returned to San Juan on January 17 to terminate the Leg 51 phase of this deep penetration attempt.

LEG 52

Leg 52 left San Juan, Puerto Rico on January 22 and returned to Site 417, re-entered the hole (417D) and continued drilling to a sub-bottom depth of 708.5 meters before the hole had to be abandoned because of the loss of the bottom-hole assembly (Table 1).

The rapid basement penetration and ease of drilling at this site indicated that a deep hole was technically feasible, and the extraordinarily high core recovery achieved by both Legs 51 and 52 indicated the possibility of recovering a nearly complete section of layer 2. Consequently, it was decided to make a second attempt at a very deep hole, this time in collaboration with Leg 53. A second site (Site 418) was selected about four nautical miles SSW of Site 417 at 25° 02.08'N, 68° 03.45'W (Figure 1). After setting a re-entry cone, Leg 52 drilled this hole to a sub-bottom depth of 570.5 meters, of which 246.5 meters were in basalt (Table 1). Leg 52 terminated in San Juan, Puerto Rico on March 8, 1977.

LEG 53

Leg 53 began in San Juan, Puerto Rico on March 12 and returned to the hole started during Leg 52. Hole 418A was re-entered and deepened to 868 meters sub-bottom for a total basement penetration of 544 meters, 45 meters short of the basement penetration record obtained on Leg 37 in Hole 332B (Table 1). As in Holes 417A and 417D to the north, the basalt recovery in Hole 418A (72%) was much higher than the sediment recovery (42%), in part because cherts jammed in the bit often prevented sediments from entering the core barrel, but more importantly, because voids and joints in the basalts had become sealed with smectite, calcite and zeolites since their formation on the ridge crest, causing the rock to become mechanically homogeneous to drilling.

A second hole (418B) was drilled in an attempt to recover portions of the sediment section not recovered during the drilling of 418A by Leg 52. Leg 53 ended on April 21st at Balboa, The Canal Zone.

TABLE 1. Coring Summary for Sites 417 and 418

Core No.	Date	Time	Depth From Drill Floor (m)		Depth Below Sea Floor (m)		Length Cored (m)	Length Recovered (m)	Percent Recovery
			Top	Bottom	Top	Bottom			
LEG 51									
HOLE 417									
1	12/3/76	1613	5478.2	-5486.7	0.00	-8.5	8.5	3.61	42
HOLE 417A									
1	12/3/76	2113	5478.2	-5486.7	0.0	-8.5	8.5	8.6	101
2	12/3/76	2320	5486.7	-5496.2	8.5	-18.0	9.5	5.1	54
3	12/4/76	0055	5496.2	-5505.7	18.0	-27.5	9.5	8.3	87
4	12/4/76	0225	5505.7	-5515.2	27.5	-37.0	9.5	0.0	0
5	12/4/76	0350	5515.2	-5524.7	37.0	-46.5	9.5	1.7	18
6	12/4/76	0530	5524.7	-5534.2	46.5	-56.0	9.5	8.2	86
7	12/4/76	0815	5534.2	-5543.7	56.0	-65.5	9.5	0.0	0
8	12/4/76	0945	5543.7	-5553.2	65.5	-75.0	9.5	6.8	72
9	12/4/76	1115	5553.2	-5562.7	75.0	-84.5	9.5	6.9	73
10	12/4/76	1416	5562.7	-5572.2	84.5	-94.0	9.5	5.3	56
11	12/4/76	1545	5572.2	-5581.7	94.0	-103.5	9.5	7.6	80
12	12/4/76	1714	5581.7	-5591.2	103.5	-113.0	9.5	5.9	62
13	12/4/76	2022	5591.2	-5600.7	113.0	-122.5	9.5	8.2	86
14	12/4/76	2158	5600.7	-5610.2	122.5	-132.0	9.5	5.9	62
15	12/4/76	0249	5610.2	-5619.7	132.0	-141.5	9.5	4.5	47
16	12/5/76	0730	5619.7	-5629.2	141.5	-151.0	9.5	9.2	97
17	12/5/76	0910	5629.2	-5638.7	151.0	-160.5	9.5	1.6	17
18	12/5/76	1238	5638.7	-5648.2	160.5	-170.0	9.5	6.1	64
19	12/5/76	1431	5648.2	-5657.7	170.0	-179.5	9.5	8.5	89
20	12/5/76	1802	5657.7	-5667.2	179.5	-189.0	9.5	7.1	75
21	12/6/76	0715	5667.2	-5676.7	189.0	-198.5	9.5	3.6	38
22	12/6/76	0920	5676.7	-5686.2	198.5	-208.0	9.5	1.3	14
23	12/6/76	1150	5686.2	-5695.7	208.0	-217.5	9.5	0.75	8
24	12/6/76	1535	5695.7	-5705.2	217.5	-227.0	9.5	5.71	60
25	12/6/76	1858	5705.2	-5714.7	227.0	-236.5	9.5	1.114	12
26	12/6/76	2202	5714.7	-5724.2	236.5	-246.0	9.5	6.15	65
27	12/7/76	0057	5724.2	-5733.7	246.0	-255.5	9.5	1.5	16
28	12/7/76	0445	5733.7	-5743.2	255.5	-265.0	9.5	6.34	67
29	12/7/76	0910	5743.2	-5752.7	265.0	-274.5	9.5	7.3	77
30	12/7/76	1244	5752.7	-5762.2	274.5	-284.0	9.5	6.31	66
31	12/7/76	1620	5762.2	-5771.7	284.0	-293.5	9.5	6.87	72
32	12/7/76	2002	5771.7	-5781.2	293.5	-303.0	9.5	5.9	62
33	12/8/76	0001	5781.2	-5790.7	303.0	-312.5	9.5	5.8	61
34	12/8/76	0328	5790.7	-5800.2	312.5	-322.0	9.5	6.8	72
35	12/8/76	0800	5800.2	-5809.7	322.0	-331.5	9.5	6.7	71
36	12/8/76	1142	5809.7	-5819.2	331.5	-341.0	9.5	7.17	75
37	12/8/76	1453	5819.2	-5826.7	341.0	-348.5	7.5	5.7	76
38	12/8/76	1908	5826.7	-5835.56	348.5	-357.36	8.86	8.86	100
39	12/8/76	2154	5835.56	-5841.7	357.36	-363.5	6.14	4.75	77
40	12/9/76	0053	5841.7	-5847.7	363.5	-369.5	6.0	5.04	84
41	12/9/76	0515	5847.7	-5857.2	369.5	-379.0	9.5	7.68	81
42	12/9/76	1015	5857.2	-5866.7	379.0	-388.5	9.5	8.5	89
43	12/9/76	1607	5866.7	-5872.7	388.5	-394.5	6.0	5.59	93
44	12/9/76	1940	5872.7	-5876.95	394.5	-398.75	4.25	4.25	100
45	12/10/76	0028	5876.95	-5885.7	398.75	-407.5	8.75	0.0	0
46	12/10/76	0506	5885.7	-5895.2	407.5	-417.0	9.5	3.4	36
HOLE 417B									
1	12/26/76	1000	5489.0	-5494.5	0.0	-5.5	5.5	5.20	94.5
HOLE 417C									
	12/29/76	Hole was not cored							
HOLE 417D									
1	12/31/76	1805	5489.0	-5496.5	0.0	-7.5	7.5	5.53	73.7

TABLE 1. Coring Summary for Sites 417 and 418 continued

Core No.	Date	Time	Depth From Drill Floor (m)		Depth Below Sea Floor (m)		Length Cored (m)	Length Recovered (m)	Percent Recovery
			Top	Bottom	Top	Bottom			
2	1/1/77	0120	5489.0	-5614.4	0.0	-125.4	WASH	(2.68)	NA
3	1/1/77	0330	5614.4	-5624.0	125.4	-135.0	9.6	0.20	2.1
4	1/1/77	0555	5624.0	-5633.5	135.0	-144.5	9.5	0.00	0
5	1/1/77	0900	5633.5	-5681.0	144.5	-192.0	WASH	(0.89)	NA
6	1/1/77	1045	5681.0	-5690.5	192.0	-201.5	9.5	0.00	0
7	1/1/77	1315	5690.5	-5700.1	201.5	-211.1	9.6	3.20	33.3
8	1/1/77	1535	5700.1	-5709.5	211.1	-220.5	9.4	0.90	9.5
9	1/1/77	1745	5709.5	-5718.9	220.5	-229.9	9.4	2.70	28.7
10	1/1/77	2040	5718.9	-5728.2	229.9	-239.2	9.3	4.60	49.5
11	1/1/77	2325	5728.2	-5736.6	239.2	-247.6	8.4	0.40	4.8
Washed one meter									
12	1/2/77	0130	5737.6	-5747.2	248.6	-258.2	9.6	6.26	65.2
13	1/2/77	0350	5747.2	-5756.7	258.2	-267.7	9.5	2.03	21.4
14	1/2/77	0600	5756.7	-5766.3	267.7	-277.3	9.6	7.77	80.9
15	1/2/77	0830	5766.3	-5775.8	277.3	-286.8	9.5	2.33	24.5
16	1/2/77	1030	5775.8	-5785.3	286.8	-296.3	9.5	1.20	12.6
17	1/2/77	1245	5785.3	-5794.9	296.3	-305.9	9.6	6.36	66.3
18	1/2/77	1514	5794.9	-5804.4	305.9	-315.4	9.5	3.10	32.6
19	1/2/77	1750	5804.4	-5814.0	315.4	-325.0	9.6	3.00	31.3
20	1/2/77	2030	5814.0	-5823.5	325.0	-334.5	9.5	3.06	32.2
21	1/2/77	2320	5823.5	-5833.0	334.5	-344.0	9.5	5.14	54.1
22	1/3/77	0545	5833.0	-5842.5	344.0	-353.5	9.5	6.60	69.5
23	1/3/77	1105	5842.5	-5846.1	353.5	-357.1	3.6	0.23	5.6
24	1/3/77	1315	5846.1	-5246.3	357.1	-357.3	0.2	0.16	100
25	1/3/77	1730	5846.3	-5846.5	357.3	-357.5	0.2	0.20	100
1/4/77 Pulled out of hole and made first re-entry									
26	1/5/77	0720	5846.5	-5855.6	357.5	-366.6	9.1	7.27	79.9
27	1/5/77	1145	5855.6	-5864.7	366.6	-375.7	9.1	7.38	81.1
28	1/5/77	1715	5864.7	-5873.8	375.7	-384.8	9.1	8.40	92.3
29	1/5/77	2205	5873.8	-5882.9	384.8	-393.9	9.1	7.95	87.4
30	1/6/77	0700	5882.9	-5892.0	393.9	-403.0	9.1	8.75	96.2
31	1/6/77	1135	5892.0	-5901.1	403.0	-412.1	9.1	6.15	67.6
32	1/6/77	1625	5901.1	-5910.1	412.1	-421.1	9.0	7.90	87.8
33	1/6/77	2045	5910.1	-5918.5	421.1	-429.5	8.4	6.85	81.5
34	1/7/77	0415	5918.5	-5926.8	429.5	-437.8	8.3	8.34	100
35	1/7/77	0920	5926.8	-5934.5	437.8	-445.5	7.7	7.70	100
36	1/7/77	1725	5934.5	-5940.0	445.5	-451.0	5.5	5.52	100
37	1/7/77	2250	5940.0	-5947.3	451.0	-458.3	7.3	7.32	100
38	1/8/77	0335	5947.3	-5953.7	458.3	-464.7	6.4	6.36	100
39	1/8/77	1900	5953.7	-5960.0	464.7	-471.0	6.3	6.33	100
1/8/77 Pulled out of hole									
1/9/77 Made second re-entry and performed downhole measurements									
1/12/77 Made third re-entry									
40	1/13/77	0355	5960.0	-5964.6	471.0	-475.6	4.6	3.33	72.4
41	1/13/77	0920	5964.6	-5973.7	475.6	-484.7	9.1	9.10	100
42	1/13/77	1425	5973.7	-5982.8	484.7	-493.8	9.1	7.49	82.3
43	1/13/77	2015	5982.8	-5991.9	493.8	-502.9	9.1	8.50	93.4
44	1/14/77	0050	5991.9	-6001.0	502.9	-512.0	9.1	5.30	58.2
45	1/14/77	0600	6001.0	-6010.1	512.0	-521.1	9.1	2.51	27.6
46	1/14/77	1140	6010.1	-6019.2	521.1	-530.2	9.1	0.00	0
47	1/14/77	1445	6019.2	-6021.5	530.2	-532.5	2.3	0.00	0
LEG 52									
48	1/25/77	1627	6021.5	-6028.0	532.5	-539.0	6.5	3.28	50.5
49	1/25/77	2037	6028.0	-6034.0	539.0	-545.0	6.0	3.45	57.5
50	1/27/77	2341	6034.0	-6037.5	545.0	-548.5	3.5	2.29	65.6
51	1/28/77	0551	6037.5	-6047.0	548.5	-588.0	9.5	0.12	1.3
52	1/28/77	1140	6047.0	-6056.5	558.0	-567.5	9.5	9.01	94.8
53	1/28/77	1624	6056.5	-6066.0	567.5	-577.0	9.5	2.50	26.3
54	1/28/77	2148	6066.0	-6075.5	577.0	-586.5	9.5	8.07	84.9
55	1/29/77	0323	6075.5	-6085.0	586.5	-596.0	9.5	5.59	58.8
56	1/29/77	0818	6085.0	-6094.5	596.0	-605.5	9.5	0.43	5.0
57	1/29/77	1411	6094.5	-6104.0	605.5	-615.0	9.5	5.0	52.6
58	1/29/77	1935	6104.0	-6113.0	615.0	-624.0	9.0	5.23	58.1
59	1/30/78	0102	6113.0	-6122.0	624.0	-633.0	9.0	7.91	87.9

TABLE 1. Coring Summary for Sites 417 and 418 continued

Core No.	Date	Time	Depth From Drill Floor (m)		Depth Below Sea Floor (m)		Length Cored (m)	Length Recovered (m)	Percent Recovery
			Top	Bottom	Top	Bottom			
60	1/30/77	0740	6122.0	-6128.0	633.0	-639.0	6.0	7.18	120
61	1/31/77	1632	6128.0	-6131.0	639.0	-642.0	3.0	0.85	28.3
62	1/31/77	2128	6131.0	-6140.0	642.0	-651.0	9.0	9.0	100
63	2/1/77	0148	6140.0	-6149.0	651.0	-660.0	9.0	7.6	84.4
64	2/1/77	0600	6149.0	-6158.0	660.0	-669.0	9.0	7.61	84.5
65	2/1/77	0920	6158.0	-6167.0	669.0	-678.0	9.0	7.24	80.4
66	2/1/77	1338	6167.0	-6176.0	678.0	-687.0	9.0	7.10	79.0
67	2/1/77	1808	6176.0	-6185.0	687.0	-696.0	9.0	8.48	95.2
68	2/2/77	0200	6185.0	-6194.0	696.0	-705.0	9.0	7.70	85.6
69	2/2/77	1622	6194.0	-6197.5	705.0	-708.5	3.5	1.77	50.6
HOLE 418									
1	2/11/77	0800	5519.0	-5525.0	0.0	-6.0	6.0	6.0	100
HOLE 418A									
1	2/14/77	0938	5630.0	-5639.5	111.0	-120.5	9.5	4.56	48.0
2	2/14/77	1115	5639.5	-5649.0	120.5	-130.0	9.5	2.13	22.4
3	2/14/77	1250	5649.0	-5658.5	130.0	-139.5	9.5	9.5	100
4	2/14/77	1431	5658.5	-5668.0	139.5	-149.0	9.5	6.73	70.8
5	2/14/77	1615	5668.0	-5677.5	149.0	-158.5	9.5	7.85	82.6
6	2/14/77	1750	5677.5	-5687.0	158.5	-168.0	9.5	6.66	70.1
7	2/14/77	2000	5687.0	-5695.5	168.0	-177.5	9.5	8.00	84.2
	2/14/77	2100	5695.5	-5715.5	177.5	-196.5	WASH	(0.00)	NA
8	2/14/77	2214	5715.5	-5725.0	196.5	-206.0	9.5	0.75	7.9
	2/14/77	2300	5725.0	-5753.5	206.0	-234.5	WASH	(0.00)	NA
9	2/15/77	0132	5753.5	-5763.0	234.5	-244.0	9.5	0.18	1.8
10	2/15/77	0503	5791.5	-5801.0	272.5	-282.0	9.5	1.83	19.3
11	2/15/77	0715	5801.0	-5810.5	282.0	-291.5	9.5	0.23	2.4
12	2/15/77	0855	5810.5	-5820.0	291.5	-301.0	9.5	1.95	20.5
13	2/15/77	1045	5820.0	-5829.5	301.0	-310.5	9.5	2.58	27.2
14	2/15/77	1240	5829.5	-2839.0	310.5	-320.0	9.5	0.2	2.1
15	2/15/77	1607	5839.0	-5848.5	320.0	-329.5	9.5	4.8	50.5
16	2/15/77	2014	5848.5	-5851.0	329.5	-332.5	3.0	3.55	118.3
17	2/16/77	0058	5851.0	-5858.0	332.5	-339.0	6.5	5.63	86.6
18	2/16/77	0725	5858.0	-5867.0	339.0	-348.0	9.0	7.7	85.6
19	2/16/77	1515	5867.0	-5876.0	348.0	-357.0	9.0	9.7	108.0
20	2/16/77	2010	5876.0	-5885.0	357.0	-366.0	9.0	8.8	98.0
21	2/17/77	0910	5885.0	-5886.0	366.0	-367.0	1.0	0.85	85.0
22	2/18/77	2037	5886.0	-5894.5	367.0	-375.5	8.5	1.91	22.5
23	2/20/77	2058	5894.5	-5895.0	375.5	-376.0	0.5	0.24	48.0
24	2/21/77	0220	5895.0	-5900.5	376.0	-381.5	5.5	1.95	35.5
25	2/21/77	0630	5900.5	-5903.5	381.5	-384.5	3.0	3.5	117.0
26	2/21/77	1255	5903.5	-5912.5	384.5	-393.5	9.0	5.18	57.6
27	2/21/77	1857	5912.5	-5921.5	393.5	-402.5	9.0	3.05	33.9
28	2/22/77	0056	5921.5	-5930.5	402.5	-411.5	9.0	5.22	61.7
29	2/22/77	0658	5930.5	-5933.5	411.5	-414.5	3.0	1.95	65.0
30	2/23/77	2355	5933.5	-5941.0	414.5	-422.0	7.5	4.80	68.6
31	2/24/77	0527	5941.0	-5950.0	422.0	-431.0	9.0	3.32	36.8
32	2/24/77	1555	5950.0	-5959.0	431.0	-440.0	9.0	0.1	1.1
33	2/24/77	2122	5959.0	-5968.0	440.0	-449.0	9.0	7.86	87.3
34	2/25/77	0208	5968.0	-5977.0	449.0	-458.0	9.0	7.15	79.4
35	2/25/77	0650	5977.0	-5986.0	458.0	-467.0	9.0	5.67	63.0
36	2/25/77	1120	5986.0	-5995.0	467.0	-476.0	9.0	6.36	70.6
37	2/25/77	1511	5995.0	-5998.5	476.0	-479.5	3.5	1.94	55.4
38	2/25/77	2037	5998.5	-6007.5	479.5	-488.5	9.0	7.10	78.8
39	2/26/77	0100	6007.5	-6016.5	488.5	-497.5	9.0	1.60	17.8
40	2/27/77	1228	6016.5	-6017.5	497.5	-498.5	1.0	3.24	32.4
41	2/27/77	1637	6017.5	-6026.5	498.5	-507.5	9.0	5.80	64.4
42	2/27/77	2118	6026.5	-6035.5	507.5	-516.5	9.0	5.62	62.4
43	2/28/77	0203	6035.5	-6044.5	516.5	-525.5	9.0	4.06	45.1
44	2/28/77	0715	6044.5	-6053.5	525.5	-534.5	9.0	6.13	68.1
45	2/28/77	1813	6053.5	-6062.5	534.5	-543.5	9.0	5.91	65.7
46	3/1/77	0042	6062.5	-6071.5	543.5	-552.5	9.0	5.84	64.9
47	3/1/77	0630	6071.5	-6080.5	552.5	-561.5	9.0	6.23	69.2

TABLE 1. Coring Summary for Sites 417 and 418 continued

Core No.	Date	Time	Depth From Drill Floor (m)		Depth Below Sea Floor (m)		Length Cored (m)	Length Recovered (m)	Percent Recovery
			Top	Bottom	Top	Bottom			
48	3/1/77	1310	6080.5	-6089.5	561.5	-570.5	9.0	5.64	62.7
LEG 53									
49	3/17/77	1040	6089.5	-6092.5	570.5	-573.5	3.00	2.82	94.0
50	3/17/77	1552	6092.5	-6101.9	573.5	-582.9	9.40	6.01	62.6
51	3/17/77	2238	6101.9	-6111.2	582.9	-592.2	9.30	5.62	60.4
52	3/19/77	2114	6111.2	-6120.6	592.2	-601.6	9.40	7.86	83.6
53	3/20/77	0150	6120.6	-6130.0	601.6	-611.0	9.40	3.45	36.7
54	3/20/77	0910	6130.0	-6139.4	611.0	-620.4	9.38	1.62	17.2
55	3/20/77	1420	6139.4	-6148.8	620.4	-629.8	9.40	7.24	77.0
56	3/20/77	1935	6148.8	-6158.0	629.8	-639.0	9.20	7.60	82.6
57	3/21/77	0028	6158.0	-6167.2	639.0	-648.2	9.20	6.94	75.2
58	3/21/77	0540	6167.2	-6176.4	648.2	-657.4	9.20	4.85	52.6
59	3/21/77	1030	6176.4	-6186.0	657.4	-667.0	9.60	8.21	85.5
60	3/22/77	0245	6186.0	-6195.5	667.0	-676.5	9.50	7.50	79.0
61	3/23/77	1454	6195.5	-6205.0	676.5	-686.0	9.50	1.81	19.1
62	3/25/77	1355	6205.0	-6209.0	686.0	-690.0	4.00	5.40	135.0
63	3/25/77	1905	6209.0	-6214.5	690.0	-695.5	5.50	5.86	106.5
64	3/26/77	0147	6214.5	-6224.1	695.5	-705.1	9.60	8.28	86.3
65	3/26/77	0900	6224.1	-6233.5	705.1	-714.6	9.50	7.10	74.7
66	3/26/77	1442	6233.5	-6243.1	714.6	-724.1	9.50	7.54	78.5
67	3/26/77	1947	6243.1	-6248.1	724.1	-729.1	5.00	4.30	86.0
68	3/26/77	0059	6248.1	-6252.6	729.1	-733.6	4.50	3.31	73.6
69	3/27/77	0759	6252.6	-6262.1	733.6	-743.1	9.50	8.03	84.4
70	3/28/77	0050	6262.1	-6271.7	743.1	-752.7	9.60	7.48	77.9
71	3/29/77	1615	6271.7	-6277.8	752.7	-758.8	6.10	4.75	77.9
72	3/29/77	2048	6277.8	-6283.8	758.8	-764.8	6.00	5.07	84.5
73	3/30/77	0436	6283.8	-6293.3	764.8	-774.3	9.50	8.44	88.8
74	3/31/77	2055	6293.3	-6300.7	774.3	-781.7	7.40	7.90	106.8
75	4/1/77	0218	6300.7	-6306.1	781.7	-787.1	5.40	5.44	100.7
76	4/1/77	0615	6306.1	-6312.1	787.1	-793.1	6.00	4.05	67.5
77	4/1/77	1238	6312.1	-6321.4	793.1	-802.4	9.30	7.38	79.4
78	4/1/77	1840	6321.4	-6331.0	802.4	-812.0	9.60	8.50	88.5
79	4/2/77	0200	6331.0	-6340.5	812.0	-821.5	9.50	9.26	97.5
80	4/2/77	0935	6340.5	-6350.0	821.5	-831.0	9.50	8.50	89.5
81	4/2/77	1750	6350.0	-6356.5	831.0	-837.5	6.50	6.87	105.7
82	4/3/77	0805	6356.5	-6359.5	837.5	-840.5	3.00	2.99	100.0
83	4/5/77	0845	6359.5	-6364.5	840.5	-845.5	5.00	5.43	108.6
84	4/5/77	1240	6364.5	-6369.0	845.5	-850.0	4.50	4.95	108.8
85	4/5/77	2045	6369.0	-6378.5	850.0	-859.5	9.50	8.38	88.2
86	4/8/77	0332	6378.5	-6387.0	859.5	-868.0	8.50	6.39	75.2
HOLE 418B									
1	4/15/77	1445	5523.0	-5529.8	0.0	-6.8	6.8	0.5	7.3
2	4/15/77	1620	5529.8	-5539.3	6.8	-16.3	9.5	3.9	41.1
3	4/15/77	1800	5539.3	-5548.9	16.3	-25.9	9.6	9.15	95.3
4	4/15/77	1922	5548.9	-5558.4	25.9	-35.4	9.5	9.15	96.3
5	4/15/77	2100	5558.4	-5567.9	35.4	-44.9	9.5	9.25	97.4
6	4/15/77	2225	5567.9	-5577.4	44.9	-54.4	9.5	8.25	86.8
7	4/15/77	2359	5577.4	-5586.9	54.4	-63.9	9.5	9.00	94.7
8	4/16/77	0140	5586.9	-5596.3	63.9	-73.3	9.4	9.62	102.3
9	4/16/77	0325	5596.3	-5605.7	73.3	-82.7	9.4	9.15	97.3
10	4/16/77	0500	5605.7	-5615.1	82.7	-92.1	9.4	9.08	96.6
11	4/16/77	0640	5615.1	-5624.5	92.1	-101.5	9.4	9.57	101.8
12	4/16/77	0810	5624.5	-5633.9	101.5	-110.9	9.4	5.7	60.6
13	4/16/77	0950	5633.9	-5643.3	110.9	-120.3	9.4	6.3	67.0
14	4/16/77	1120	5643.3	-5652.6	120.3	-129.6	9.3	0.0	0.0
15	4/16/77	1305	5652.6	-5662.1	129.6	-139.1	9.5	5.17	54.4
16	4/16/77	1435	5662.1	-5671.6	139.1	-148.6	9.5	1.32	13.9
17	4/16/77	1630	5671.6	-5681.2	148.6	-158.2	9.6	4.23	49.3
18	4/16/77	1755	5681.2	-5690.7	158.2	-167.7	9.5	1.5	15.8
19	4/16/77	1935	5690.7	-5700.2	167.7	-177.2	9.5	2.01	21.2
20	4/16/77	2120	5700.2	-5709.7	177.2	-186.7	9.5	7.24	76.2
21	4/16/77	2310	5709.7	-5719.3	186.7	-196.3	9.6	9.66	100.6
22	4/17/77	0105	5719.3	-5728.8	196.3	-205.8	9.5	5.63	59.3

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TABLE 1. Coring Summary for Sites 417 and 418 concluded

Core No.	Date	Time	Depth From Drill Floor (m)		Depth Below Sea Floor (m)		Length Cored (m)	Length Recovered (m)	Percent Recovery
			Top	Bottom	Top	Bottom			
23	4/17/77	0307	5728.8	-5738.3	205.8	-215.3	9.5	8.06	84.8
24	4/17/77	0450	5738.3	-5747.9	215.3	-224.9	9.6	1.91	19.9
25	4/17/77	0650	5747.9	-5757.4	224.9	-234.4	9.5	2.43	25.6
26	4/17/77	0845	5757.4	-5767.0	234.4	-244.0	9.6	1.07	11.1
27	4/17/77	1025	5767.0	-5776.4	244.0	-253.4	9.4	1.38	14.7
28	4/17/77	1200	5776.4	-5785.9	253.4	-262.9	9.5	3.77	39.7
29	4/17/77	1417	5785.9	-5795.4	262.9	-272.4	9.5	2.17	22.8
30	4/17/77	1550	5795.4	-5804.9	272.4	-281.9	9.5	3.80	40.0
31	4/17/77	1730	5804.9	-5814.4	281.9	-291.4	9.5	3.08	32.4
32	4/17/77	1910	5814.4	-5824.0	291.4	-301.0	9.6	1.30	13.5
33	4/17/77	2054	5824.0	-5833.5	301.0	-310.5	9.5	1.50	15.8
34	4/17/77	2247	5833.5	-5843.0	310.5	-320.0	9.5	0.60	6.3
35	4/18/77	0445	5843.0	-5852.6	320.0	-329.6	9.6	5.71	59.5

GEOLOGIC SUMMARIES

LEG 51

In a complex basement terrain, the *Glomar Challenger* drilled 2 holes at one site; a pilot hole (417A), and a re-entry hole (417D) that was later occupied during Leg 52. These holes, about 450 meters apart, penetrated near the top of and very close to the base of a small buried hill; average basement slope between the holes was 16°.

Sediments recovered at these sites are similar to those found on previous western Atlantic legs: nearly barren Tertiary clays (but with a radiolarian-rich middle Eocene section) resting on zeolitic multicolored upper Cretaceous clays with poorly preserved radiolarians overlying green and black middle Cretaceous claystones, highly burrowed nanofossil marls and chalks, and radiolarian sandstones. The black claystones are organic, pyritic, and phosphatic, and contain several occurrences of sphalerite crystals (Figure 2). A thin, finely laminated chalk immediately above the basalt in Hole 417D yielded lower Aptian nanofossils, confirming the extrapolated age of MO.

The basalts drilled at the 2 sites 209 m penetrated in Hole 417A (Table 2) and 190 m, later lengthened to 366 m on Leg 52, in Hole 417D) are essentially identical, and consist of pillow lavas separated by green, smectite-rich hyaloclastic pillow breccias and intruded by thin massive basalts (Figure 2). The basalt is a rather uniform plagioclase-phyric rock with minor olivine and variable amounts of clinopyroxene, much of which occurs as extremely rounded phenocrysts. The massive basalts are coarser grained with plagioclase and clinopyroxene. Olivine occurs throughout as scarce pseudomorphs; only a few fresh grains were found in Hole 417D. The upper part of the basalt section from Hole 417A consists largely of alteration minerals, including smectite, celadonite, K-feldspar, montmorillonite, hematite, calcite, analcime, natrolite, and, tentatively, mordenite and scolecite. By contrast, the basalt from Hole 417D contains only limited alteration minerals, and has widespread fresh glass (one of the few known instances of fresh Cretaceous glass).

The chemistry of the basalt, as determined by shipboard X-ray fluorescence measurements, is fairly uniform, and represents a plagioclase-rich variety of mid-ocean-ridge basalt, with these average oxide contents, based on the fresher examples from Hole 417D:

SiO ₂	49.6	FeO ₃	10.7
TiO ₂	1.45	MgO	6.2
Al ₂ O ₃	16.7	CaO	13.0
		K ₂ O	0.15

The basalts of Hole 417A show a degree of alteration that far exceeds any previously seen by the Deep Sea Drilling Project. Even at a depth of 200 meters sub-basement, the basalts show a rich variety of alteration minerals, including celadonite, smectite, K-feldspar, hematite, montmorillonite, calcite, and numerous zeolites.

Paleomagnetic results of this leg are among the most successful of the entire Deep Sea Drilling Project. Drilling in a negatively magnetized block, the rocks showed mainly a strong, stable, reversed remanent magnetization (NRM). The average NRM intensities of about 8×10^{-3} electromagnetic units/cm³ in the very altered material of Hole 417A and about 10^{-2} emu/cm³ in the fresh rocks of Hole 417D are among the highest ever recorded in dredged and drilled oceanic basalts, even at sites on the axis of the mid-ocean ridge. The inclination of -22° at Hole 417A is within six degrees of that predicted for a Cretaceous date at the site, and a 500-m-thick basaltic layer with such an intensity and direction of magnetization would produce the observed MO anomaly.

The consistently stable steep magnetic inclination of -65° in the upper 20 basement cores of Hole 417D suggests that the basaltic section has been tectonically rotated relative to the lowermost part of the section, where again shallow inclinations comparable to those of Hole 417A were recorded.

A program of basement logging undertaken during this leg was the most successful yet for the Deep Sea Drilling Project. About 300 meters at Hole 417D were logged using natural gamma ray, formation density (gamma-ray source), porosity (neutron source), sonic velocity, and resistivity techniques.

LEG 52

On Leg 51, Hole 417D was drilled to a sub-bottom depth of 533 meters. On Leg 52, we deepened the hole to 708.5

TABLE 2. Basement Lithologic Units - Hole 417A

Unit	Top ¹ (m)	Base ¹ (m)	Thickness (m)	Type Cooling Unit	Phenocryst Assemblage	Core - Section - cm.
1A	208.0	208.8	0.8	Pebbles	Plag - Oliv	22 23-1, 80
1B	217.5	218.8	1.3	Pillow basalt	Plag - Oliv	24-1, 0 to 24-1, 130
2A	218.8	220.1	1.3	Breccia	Plag - Oliv	24-1, 130 to 24-2, 110
2B	220.1	237.3	17.2	Pillow basalt	Plag - Oliv	24-2, 110 to 26-1, 75
3A	237.3	237.5	0.2	Breccia (thin)	Plag - Oliv	26-1, 75 to 26-1, 95
3B	237.5	238.8	1.3	Pillow basalt	Plag - Oliv	26-1, 95 to 26-2, 75
4	238.8	243.4	4.6	Breccia	Plag - Oliv	26-2, 75 to 26-5, 85
				(includes 0.5 m of basalt between 240.6-241.2 m in Core 26-3, 105 to 26-4, 15)		
5	243.4	255.5	12.1	Pillow basalt	Plag - Oliv	26-5, 85 to 28-1, 0
6A	255.5	255.9	0.4	Breccia	Plag - Oliv	28-1, 0 to 28-1, 40
6B	255.9	257.4	1.5	Pillow basalt	Plag - Oliv	28-1, 40 to 28-2, 35
7	257.4	258.5	1.1	Breccia	Plag - Oliv	28-2, 35 to 28-2, 150
8	258.5	274.5	16.0	Pillow basalt	Plag - Oliv	28-2, 0 to 29-7, 45
9	274.5	277.2	2.7	Breccia	Plag - Oliv	30-1, 0 to 30-2, 115
10	277.5	279.8	2.3	Pillow basalt	Plag - Oliv	30-3, 0 to 30-4, 75
11	279.8	288.0	8.2	Breccia	Plag - Oliv	30-4, 75 to 31-3, 100
				(includes 1.0 m of basalt between 282.9-284.8 m in Cores 30-6, 90 to 31-1, 75)		
12	288.0	298.8	10.8	Pillow basalt	Plag - Oliv ± Cpx	31-3, 100 to 32-4, 80
13	298.8	306.1	7.3	Breccia	Plag - Cpx - Oliv	32-4, 80 to 33-3, 50
				(includes .7 m of basalt between 303.0-303.7 m in Core 33-1, 0 to 33-1, 70)		
14	306.1	319.5	13.4	Pillow basalt	Plag - Cpx - Oliv	33-3, 5 to 34-5, 100
15	319.5	322.7	3.2	Breccia	Plag - Cpx - Oliv	34-5, 100 to 35-1, 65
16A	322.7	353.6	30.9	Pillow basalt	Plag - Cpx - Oliv	35-1, 65 to 38-5, 80
16B	353.5	364.3	10.8	Pillow basalt	Plag - Cpx - Oliv	38-5, 80 to 40-1, 90
16C	364.3	379.7	15.4	Pillow basalt	Plag - Cpx - Oliv	40-1, 90 to 42-1, 75
16D	379.7	385.6	5.9	Pillow basalt	Plag - Cpx - Oliv	42-1, 75 to 42-5, 105
17A	385.6	385.7	0.1	Breccia	Plag - Cpx - Oliv	42-5, 105 to 42-5, 125
17B	385.7	389.9	4.2	Pillow basalt	Plag - Cpx - Oliv	42-6, 0 to 43-2, 0
18A	389.9	394.7	4.8	Massive basalt	Plag - Cpx - Oliv	43-2, 0 to 44-1, 25
18B	394.8	407.9	13.1	Massive basalt	Plag - Cpx - Oliv	44-1, 25 to 46-1, 40
				(includes thin veined unit in Core 44-1, 25 to 44-1, 40)		
19	407.9	412.8	4.9	Breccia	Plag - Cpx - Oliv	46-1, 40 to 46-4, 80

¹ Depths corrected for spacers

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meters, 365.5 meters of which is in basalt. A 343-m-thick sedimentary sequence overlies acoustic basement at this site, and was described by the Leg 51 shipboard scientific party (Figure 2).

Basement rocks drilled on Legs 51 and 52 consist almost entirely of porphyritic basalt and basalt breccia; only minor quantities of interlayered sediment occur in the upper part of the hole. Pillow basalts predominate, but massive units make up about 30% of the section, and generally become somewhat more abundant with depth. Broken-pillow breccias are abundant in the interval from 605 to 642 meters, and are present in small quantities at several other levels. Two dikes, each about 20 cm wide, occur in the lowest core. These are mineralogically and chemically similar to flows higher in the hole, and may be feeder dikes.

We recognized 14 stratigraphic units in the sequence drilled by Legs 51 and 52, largely on the basis of variations in lithology and phenocrysts assemblages (Table 3 and Figure 2).

Pillow sequences are up to 65 meters thick and are interlayered with thinner units of massive basalts and basalt breccias. The pillow basalts are characterized by abundant glassy selvages, quench textures, and radial fractures. Spacing between glass rinds suggests a maximum pillow thickness of about 0.7 meters and an average thickness of about 0.45 meters. Breccias are locally interlayered with pillow basalts, and commonly grade into them.

Stratigraphic units comprised of massive basalt flows range from about 6 to 30 meters thick. Single cooling units within these sequences are generally between 3 and 15 meters thick and are characterized by relatively coarse-grained groundmass texture. Glassy selvages are commonly present at the tops and bottoms of the units, and the grain size becomes finer toward the margins.

Nearly all of the basalts recovered in this hole are porphyritic, and contain 5 to 15% phenocrysts. Three common phenocryst assemblages are present: plagioclase-olivine-clinopyroxene, plagioclase-olivine, and plagioclase alone; these occur in a crude stratigraphic sequence. The two dikes at the bottom of the drilled section are both plagioclase-olivine-clinopyroxene-phyric basalt.

Chemically, the basalts show a narrow range of composition. Analyses of 14 'fresh' Leg 52 specimens yield this average composition (%): $\text{SiO}_2 = 50.0$, $\text{TiO}_2 = 1.45$, $\text{Al}_2\text{O}_3 = 16.0$, FeO (total iron) = 10.0, $\text{MgO} = 7.0$, $\text{CaO} = 12.5$, and $\text{K}_2\text{O} = 0.02$. This average composition is slightly fractionated, compared with some ocean-ridge tholeiites, but is similar to modern Mid-Atlantic Ridge basalt erupted at about the same latitude as Site 417. The chemical variation correlates well with the stratigraphic sequence.

Considering their age of over 100×10^6 years, the basalts at this site are remarkably fresh. A weathering zone 1 to 2 meters thick occurs at the top of the section, but disappears rapidly downward, in marked contrast to nearby Hole 417A. Fresh glass persists in many selvages throughout the section, and crystalline basalts also show little modification. Olivine is the only phenocryst phase that is commonly altered. The most common secondary minerals are smectite, carbonate, pyrite, zeolite, and silica. These most often occur in vesicles, veins and in glassy selvages, but they also replace olivine and interstitial groundmass material in many basalts. Variations in alteration intensity correlate positively with the presence of fractures and breccias. The nature of the alteration and the observed secondary mineral assemblages indicate low-temperature seawater-rock interaction rather than hydrothermal alteration.

Three magnetic lithologies occur in the basement part of the hole: 1) pillow lavas with negative natural-remanent-magnetization inclinations and relatively high magnetic intensities (average 14×10^{-3} gauss); 2) massive flows with positive NRM inclinations and low intensities (average 3.5×10^{-3} gauss); and 3) breccias with high variable NRM inclinations. Stable ('cleaned') inclinations in all rocks except for a few breccias are negative, in accord with the sense of the MO anomaly. Stable inclinations are relatively uniform in the upper 148 meters of the section, and average -65° . Below 148 meters the basalts have a mean stable inclination of -27° , which is almost identical to the predicted inclination for the site. However, the inclinations in the lower part of the hole systematically increase from -18.8° at 302 meters sub-basement to about -54° at 339 meters sub-basement, suggesting significant secular variation.

Measured sonic velocities (V_p) in the basalts range from 4.21 to 6.13 km/second, and average about 5.5 km/second. The lowest values are from highly altered pillow lavas and pillow breccias, and the highest are from fresh, massive flows. Wet-bulk densities range from 2.43 to 2.93 g/cm³; the average is 2.80 g/cm³. Porosities range from a low of 2.6% to over 20% in some breccias. None of the basalts are highly vesicular, and the porosities probably result largely from fracturing and alteration.

Hole 418A: We occupied Site 418 from Feb. 10 to Mar. 2. We penetrated 324 meters of sediment, from which 138 meters were cored and 58 meters recovered (42%). A total of 246.5 meters of basalt were penetrated and cored, to a total sub-bottom depth of 570.5 meters, from which 158.4 meters were recovered (64%).

In general, the sedimentary section at Site 418 is similar to that drilled at Site 417. The entire section consists of pelagic sediments, chiefly clays with minor nannofossil and radiolarian ooze (Figure 2). The section was divided into 8

TABLE 3. Basement Lithologic Units - Hole 417D

Unit	Top ¹ (m)	Base ¹ (m)	Thickness (m)	Type Cooling Unit	Phenocryst Assemblage	Core - Section - cm
1A	343	367.3	24.3	Pillow basalt	Plag - Oliv	21CC, 46 to 27-1, 75
1B	367.3	384.8	17.5	Pillow basalt	Plag - Oliv - (Cpx)	27-1, 75 to 28-7, 98
1C	384.8	407.5	22.7	Pillow basalt	Plag - Oliv - (Cpx)	29-1, 0 to 31-3, 148
2	407.5	412.8	5.3	Pillow basalt	Plag - Oliv - (Cpx)	31-4, 0 to 32-1, 66
3	412.8	435.4	22.6	Massive basalt	Plag - Cpx - Oliv	32-1, 66 to 34-5, 112
4	435.4	488.4	53.0	Pillow basalt	Plag - Oliv - Cpx	34-5, 112 to 42-3, 75
5	488.4	495.0	6.6	Pillow basalt	Plag - Oliv - Cpx	42-3, 75 to 43-1, 127
6	495.0	500.6	5.6	Massive basalt	Plag - Oliv - Cpx	43-1, 127 to 43-5, 127
7	500.6	538.0	37.4	Pillow basalt	Plag - Oliv - Cpx	43-5, 127 to 47CC
8A	538.0	539.0	1.0	Massive basalt	Plag - Cpx - Oliv	48-5, 0 to 48-7, 98
8B	539.0	562.5	23.5	Massive basalt	Plag - Cpx - Oliv	49-1, 0 to 52-4, 27
9A	562.5	624.0	61.5	Pillow basalt and breccia	Plag - Cpx - Oliv	52-4, 27 to 58-5, 28
9B	624.0	633.0	9.0	Breccia	Plag - Cpx - Oliv	59-1, 0 to 59-7, 37
9C	633.0	642.0	9.0	Breccia	Plag - Cpx - Oliv	60-1, 0 to 61-1, 93
9D	642.0	665.8	23.8	Pillow basalt	Plag - Oliv - (Cpx)	62-1, 0 to 64-4, 127
10A	665.8	672.6	6.8	Massive basalt	Plag - Oliv	64-4, 127 to 65-3, 64
10B	672.6	678.0	5.4	Massive basalt	Plag - Oliv	65-3, 64 to 65-6, 92
11	678.0	687.0	9.0	Pillow basalt	Plag - Oliv	66-1, 0 to 66-6, 76
12	687.0	694.1	7.1	Massive basalt	Plag - Oliv	67-1, 0 to 67-6, 35
13	694.1	708.5	14.4	Massive basalt	Plag - (Oliv)	67-6, 35 to 69-2, 38
14A		undetermined		Basalt dike	Plag - Oliv - Cpx	68-1, 120 to 68-2, 55
14B		undetermined		Basalt dike	Plag - Oliv - Cpx	68-4, 5 to 68-4, 49

¹ Depths corrected for spacers

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lithologic units on the basis of composition, mineralogy, and fossil content. The lower 117.5 meters (Units VI-VIII) consist of interbedded dark gray, non-fossiliferous, pyrite-bearing clays and light blue nannofossil-rich clay and clayey ooze, all Cretaceous (lower Aptian to lower Cenomanian). The upper 206.5 meters (Units I-V) consist chiefly of uniform brown to gray pelagic clay with a layer of nannofossil clay at the top. Middle Eocene radiolarian clays occur in the interval between 159 and 177 meters.

Fossiliferous zones are sparse in the cored section. An early Aptian date for Core 15, just above basalt, is based on a diverse and moderately well-preserved assemblage of nannofossils. Minor planktonic foraminifers and poorly preserved Cretaceous radiolarians are also present. The contact with the underlying basalt was not recovered but is in the inferred age bracket for magnetic anomaly MO.

We defined 6 major stratigraphic units in the basalts drilled on Leg 52. Pillow basalt and broken-pillow breccia make up about 80% of the recovered material, and massive flows about 20%. Minor calcareous sedimentary deposits occur between pillows throughout the section. Pillow sequences, including broken-pillow breccias, are from about 5 to 112 m thick and are interlayered with massive flows. The average pillow thickness is about 0.45 meters, the maximum about 1.1 meters. Dips of pillow margins range from 0° to 90°.

All massive cooling units are interpreted as flows. In Hole 418A, massive flows occur near the top of the sequence, where they are grouped into 2 stratigraphic units 47 and 3.5 meters thick; single cooling units are between about 2 and 24 blue nannofossil-rich clay and clayey ooze, all Cretaceous (upper Aptian to lower Cenomanian). The upper 206.5 meters (Units 1-3) consist chiefly of uniform brown to gray pelagic clay, with a layer of nannofossil clay at the top. Middle Eocene radiolarian clays occur in the interval between 159 and 177 meters.

In general, the sedimentary section at Site 418 is similar to that drilled at Site 417. The entire section consists of pelagic sediments, chiefly clays with minor nannofossil and radiolarian ooze (Figure 2).

Fossiliferous zones are sparse in the cored section. A late Aptian date for Core 15, just above basalt, is based on a diverse and moderately well-preserved assemblage of nannofossils. Minor planktonic foraminifers and poorly preserved Cretaceous radiolarians are also present. The contact with the underlying basalt was not recovered but is in the inferred age bracket for magnetic anomaly MO.

We defined 6 major stratigraphic units in the basalts. Pillow basalt and broken-pillow breccia make up about 80% of the recovered material, and massive flows about 20%. Minor calcareous sedimentary deposits occur between pillows throughout the section. Pillow sequences, including broken-pillow breccias, are from about 5 to 112 cm thick, and are interlayered with massive flows. The average pillow thickness is about 0.45 meters, the maximum about 1.1 meters. Dips of pillow margins range from 0° to 90°.

All massive cooling units are interpreted as flows. In Hole 418A, massive flows occur near the top of the sequence, where they are grouped into 2 stratigraphic units 3.5 to 47 meters thick; single cooling units are between about 2 and 24 meters thick. No sills or dikes were recognized in the drilled sequence (Table 4, Figure 2).

Most of the recovered basalts are sparsely to moderately phyrlic and contain 5 to 10% phenocrysts. Aphyric zones occur in some pillows, but these grade into phyrlic basalt over a distance of a few centimeters. Plagioclase is the dominant phenocryst, and is commonly 6 to 8 times as abundant as olivine. Small olivine phenocrysts generally form less than 1% of the rock, except in the lowermost unit where they form as much as 3%. Clots or glomerocrysts of plagioclase and olivine are common, particularly in Unit 6. Clinopyroxene phenocrysts, much less abundant than in Hole 417D, occur only in trace amounts. Spinel is a minor but ubiquitous phase in Unit 6, where it forms red-brown to green-brown microphenocrysts or inclusions in plagioclase and olivine.

Pillow basalts have fine-grained, glassy, quench textures in which poorly crystallized clinopyroxene, intergrown with magnetite, forms plumose aggregates and radiating sheaves. Massive flows in this hole do not have the characteristic mottled texture displayed by massive flows in Hole 417D. Generally, the flows of Hole 418A are much finer grained than those of 417D, and much of the groundmass is quench textured.

Compared with many basalts previously drilled (for example, Holes 332A and 332B), the basalts of 418A show only minor chemical variation. An average of 24 'fresh' samples is an olivine tholeiite with these oxide percentages: $\text{SiO}_2 = 50.2$, $\text{TiO}_2 = 1.15$, $\text{Al}_2\text{O}_3 = 16.8$, FeO (total iron) = 9.1, $\text{MgO} = 7.0$, $\text{CaO} = 12.9$, and $\text{K}_2\text{O} = 0.05$.

Alteration of Hole 418A basalts is similar to that observed in Hole 417D, and is likewise interpreted as being caused by low-temperature interaction of basalts with sea water. Smectite, carbonate, pyrite, zeolite, and silica occur chiefly in veins and vesicles, or as alteration products of glassy selvages or replacement of once glassy detritus in broken-pillow breccia. Olivine and interstitial groundmass material are typically replaced by smectite and carbonate, but about half the olivine is fresh in the lower part of Unit 6, below about 525 meters. Plagioclase shows minor replacement along cleavage planes, usually by smectite. Glass occurs throughout the drilled section.

TABLE 4. Basement Lithologic Units - Hole 418A (compiled from results of Legs 52 and 53)

Unit	Top ¹ (m)	Base ¹ (m)	Thickness (m)	Type Cooling Unit	Phenocryst Assemblage	Core - Section - cm
1	324.0	329.6	5.6	Pillow basalt	Plag - (Oliv)	15-1, 20 to 16-1, 10
2A	329.6	331.7	2.1	Massive basalt	Plag - (Oliv)	16-1, 10 to 16-2, 105
2B	331.7	339.0	7.3	Massive basalt	Plag - (Oliv)	16-2, 105 to 17-4, 150
2C	339.0	363.1	24.1	Massive basalt	Plag - (Oliv)	18-1, 0 to 20-5, 81
2D	363.1	376.6	13.5	Massive basalt	Plag - (Oliv) - [Cpx]	20-5, 81 to 24-1, 57
3	376.6	383.3	6.7	Pillow basalt	Plag - (Oliv) - [Cpx]	24-1, 57 to 25-2, 60
4	383.3	387.1	3.8	Massive basalt	Plag - (Oliv) - [Cpx]	25-2, 60 to 26-2, 110
5	387.1	498.5	111.4	Pillow basalt and breccia	Plag - (Oliv) - [Cpx]	26-2, 110 to 40-3, 47
6A	498.5	510.5	12.0	Breccia	Plag - Oliv - (Sp) - [Cpx]	41-1, 0 to 42-2, 150
6B	510.5	611.0	100.5	Pillow basalt	Plag - Oliv - (Sp) - [Cpx]	42-3, 0 to 53-3, 150
7	611.0	629.2	18.2	Pillow basalt	Plag - Oliv - Cpx	54-1, 0 to 55-7, 70
8A	629.2	632.9	3.7	Pillow basalt	Plag - Oliv - Cpx	55-7, 70 to 56-3, 45
8B	632.9	636.3	3.4	Massive(?) basalt	Plag - Oliv - Cpx	56-3, 45 to 56-5, 125
8C	636.3	671.8	35.5	Pillow basalt	Plag - Oliv - Cpx	56-5, 125 to 60-4, 33
9	671.8	676.5	4.7	Massive, vesicular basalt	Plag	60-4, 33 to 60-6, 66
10	676.5	686.0	9.5	Massive basalt	Plag	61-1, 0 to 61 bit, 95
11	686.0	695.5	9.5	Pillow basalt	Plag - Cpx - Oliv	62-1, 0 to 63-5, 119
12	695.5	698.2	2.7	Massive(?) basalt	Plag - Cpx - Oliv	64-1, 0 to 64-2, 122
13	698.2	786.5	88.3	Pillow basalt and breccia	Plag - Cpx - Oliv	64-2, 122 to 75-4, 150
14A	786.5	393.6	7.1	Massive basalt	Plag - Cpx - Oliv	75-5, 0 to 77-1, 50
14B	793.6	821.5	27.9	Massive basalt	Plag - Cpx - Oliv	77-1, 50 to 79-7, 124
14C	821.5	859.8	38.3	Massive basalt	Plag - Cpx - Oliv	80-1, 0 to 86-1, 25
15A		undetermined		Basalt dikes	Plag - Oliv - Cpx	79-1, 75 to 79-1, 110 79-2, 78 to 79-2, 105 79-3, 105 to 79-4, 95
15B		undetermined		Basalt dikes	Plag - Oliv	80-2, 117 to 80-3, 127 80-4, 2 to 80-4, 42 80-4, 107 to 80-5, 110
16	859.8	868.0	8.2	Pillow basalt and breccia	Plag - Oliv - Cpx - Sp	86-1, 25 to 86-6, 55

¹ Depths corrected for spacers

Oxidation is more pronounced in basalts from this hole than in those from the lower part of Hole 417D. It is localized along fractures and breccia zones, and appears to postdate the more widespread and pervasive alteration.

On the basis of magnetic profiles made by the *Glomar Challenger*, Site 418 is believed to lie near or on the eastern boundary of magnetic anomaly MO. Except in a few breccias, both natural remanent magnetization and stable inclinations of basalts for the upper part of the hole (above 510 m) are positive. NRM inclinations in this part of the section average 23.4°; stable inclinations are usually within 1° or 2° of the NRM values. Below 510 meters, NRM and stable inclinations are negative. NRM inclinations average -31° in this part of the section, and stable inclinations are close to the NRM values.

NRM intensities of pillow basalts and massive flows in Hole 418A are similar, unlike those in Hole 417D. The mean NRM intensity is 16.9×10^{-3} gauss, on the basis of 24 data points averaging the NRM intensities over 10-meter intervals. These are the most intensely magnetized basalts thus far cored by the *Glomar Challenger*.

Measured sonic velocities (V_p) of pillow basalts and massive flows, 5.48 and 5.53 km/second, respectively, are distinguishable at one standard deviation. These means correspond to a mean of 5.47 km/second for velocities of basalts from the lower part of Hole 417D.

The wet-bulk density ranges from 2.29 g/cm³ to 2.91 g/cm³; the mean is 2.72 g/cm³. Porosities range from 2 to 30%; the lowest values are from fresh massive basalts and the highest from altered breccias. Density correlates positively with sonic velocity and negatively with porosity. Variations in all these properties are related largely to the occurrence of breccias in the sections. Stratigraphic Unit 6B, an unbrecciated pillow-basalt sequence, has fairly uniform physical properties, but all other units are highly variable.

One part of the scientific program for Leg 52 was an oblique seismic experiment. The experiment was designed to obtain in situ measurements of the seismic properties of crustal rocks exposed by the drill hole; to evaluate mesoscopic properties which affect seismic measurements determined by conventional means; such as attenuation and the role of fractures and to permit characterization of the oceanic crust, thus allowing a comparison with typical sonic-velocity logs obtained by other means.

This experiment, similar to one planned for Leg 46, was made in Hole 417D on March 5-6, on completion of Leg 52 drilling.

LEG 53

Drilling at Site 418A continued with the coring of a sequence of interlayered pillow and massive basalt eruptions that we divided into a further 10 lithologic units, making a total of 16 major divisions within the 544 meters of basement drilled at the site (Table 4, Figure 2). All basaltic lithologies are porphyritic. Phenocryst assemblages are dominated by plagioclase (5-15 modal %) with subsidiary amounts of olivine plus or minus clinopyroxene and spinel.

The thickness of individual cooling units, ranging from 0.5 to 40 meters, shows a rough cyclic variation with depth and appears to reflect a pattern of major eruptive episodes interspersed by lengthy quiescent intervals. Massive eruptions are less common than pillowed sequences and, in most cases, appear directly or very shortly after major non-eruptive periods, inferred from breccia zones and paleomagnetic breaks. Three massive cooling units low in the section (lithologic unit 14) are traversed by 6 high-angle dikes.

The Hole 418A section is not intensely altered and, in part, is extremely fresh (in contrast with our expectations). Phenocryst and groundmass olivine is largely replaced by smectite and minor calcite. Vesicles are lined with smectite and often have calcite cores. Fractures are for the most part filled by calcite, smectite and silica, with or without pyrite. Rare alteration products such as orthoclase and mordenite indicate more extreme alteration. All these effects are interpreted as caused by interaction of the basalts with cold sea-water.

Magma chemistry was studied by observing variation of 'fresh' rock analyses (i.e., corrected for carbonate contamination and with K₂O less than 0.2 weight %; H₂O⁺ less than 1.25 weight %) normalized to dry weight, both within and between distinct eruptive cooling units. The most diagnostic oxides are TiO₂, FeO (total Fe oxide) and Al₂O₃. The chemistry of the basalts is that of a typical low K tholeiite. From the oxide variation it was possible to define, on a provisional basis, 7 erupted magma 'batches', each with a chemical or stratigraphic identity, or both. These may be related to 3 main chemical groups:

- (a) low TiO₂: TiO₂ = 1.0-1.15%; Mg/(Mg + Fe⁺²) = 0.53-0.70
- (b) moderate TiO₂: TiO₂ = 1.2-1.4%; Mg/(Mg + Fe⁺²) = 0.54-0.66
- (c) high TiO₂: TiO₂ = 1.5-1.7%; Mg/(Mg + Fe⁺²) = 0.49-0.61

Differences between these types are probably due to fractional crystallization, accumulation of phenocrysts (especially

plagioclase), different degrees of partial melting, magma mixing, or combinations of those processes.

Preliminary comparison with Leg 52 rock chemistry for this site (Lithologic Units I to VIb) suggests a similar chemical stratigraphy for the upper part of Hole 418A, with lavas conforming mainly to 'low' and 'moderate' TiO_2 content types and only rare interlayering of high TiO_2 magma. On the broader scale, perhaps the most significant observation is the difference in the range of TiO_2 and other oxides for equivalent MgO content and $\text{Mg}/(\text{Mg} + \text{Fe}^{+2})$ between fresh basalts cored in Cretaceous-age crust at Sites 417D and 418A and those recovered at Sites 395 and 396 by Legs 45 and 46 in young crust to the west and east (respectively) of the Mid-Atlantic Ridge at 22°N .

Paleomagnetic data for Site 418A from both Legs 52 and 53 reflect complex magnetic stratigraphy. Although the major part of the hole has negative inclinations, at least 5 polarity reversals appear to have taken place during formation of the drilled section. As at several other drill sites in the Atlantic, we found intervals of steep NRM inclination ($60\text{-}80^\circ$) inappropriate to the site paleolatitude. These anomalous inclinations are outside the range of normal secular variations and seem unlikely to be due to excursions of the Earth's field. In Hole 418A, dikes of normal polarity ($+53.2 \pm 3.7^\circ$) traverse massive, reversely magnetized flows ($-54.3 \pm 8.7^\circ$) in unit 14 and have steep NRM inclinations almost identical to that of the intruded lava sequence. The possibility of this entire sequence having formed during an excursion is unlikely and we have interpreted this sequence as evidence for tectonic rotation of the deeper part of the eruptive pile before completion of the crustal section by later eruptions.

By equating magnetic reversals with unconformities and major NRM inclination changes with angular unconformities (rotation), we identified 9 major time breaks within the Hole 418A section. Six of these correspond to breccia zones and 5 are marked by significant changes in basalt lithology. NRM intensities decrease with depth at lower levels in the hole but are for the most part so high (mean intensity = $12.0 \pm 8.1 \times 10^{-3}$ gauss) that the strength of negative anomaly MO can be completely accounted for by magnetization within layer 2 alone.

Hole 418B was drilled at the end of Leg 53 at a site 400 feet to the north of Hole 418A in an attempt to obtain a complete sediment record in the immediate vicinity of the deep penetration site drilled on Legs 52 and 53. The hole was drilled to a sub-bottom depth of 329.6 meters of which 10 meters were in basalt. Although the hole was continuously cored, the objective was not completely fulfilled because of low recovery (52.4%) (Table 1).

Preliminary examination of the recovered material indicates that Hole 418B is virtually indistinguishable from Hole 418A (Figure 2). The basalts cored consist of fresh, fine-grained, plagioclase-phyric pillows having a stable NRM inclination of approximately plus 35° . These, in turn, are overlain by pyrite-bearing multicolored clay, a thick unit of brown to gray, barren pelagic clay and a thin cap of nanno-ooze (Figure 2).

EXPLANATORY NOTES

INTRODUCTION

Persons wishing to obtain samples are directed to the DSDP-NSF sample distribution policy (p. 36). Sample requests must be submitted on standard DSDP request forms which may be obtained from:

The Curator
 Deep Sea Drilling Project, A-031
 University of California, San Diego
 La Jolla, California 92093

The following material is intended as an aid in understanding:

- (1) the terminology, labeling, and numbering conventions used by the Deep Sea Drilling Project;
- (2) the sedimentary, igneous, and metamorphic classification used on Legs 51-53; and
- (3) the presentation of the lithologic and paleontologic data on the core forms which make up much of this publication.

NUMBERING OF SITES, HOLES, CORES, SAMPLES

Drill site numbers run consecutively from the first site drilled by *Glomar Challenger* in 1968; the site number is thus unique. The first (or only) hole drilled at a site takes the site number. Additional holes at the same site are further distinguished by a letter suffix. The first hole has only the site number; the second has the site number with suffix A; the third has the site number with suffix B; and so forth. It is important, for sampling purposes, to distinguish the holes drilled at a site, since recovered sediments or rocks usually do not come from equivalent positions in the stratigraphic column at different holes.

Cores are numbered sequentially from the top down (Figure 3). In the ideal case, each core consists of 9.3 meters of sediment or rock in a plastic liner 6.6 cm in diameter. In addition, a short, ideally 20 cm, sample is obtained from the core catcher (a multi-fingered device at the bottom of the core barrel which prevents cored materials from sliding out during core-barrel recovery. The core catcher sample was split, described, and placed at the bottom of the material recovered in the core barrel, taking care to maintain its proper vertical orientation. This sample represents the lowest sample recovered in a particular cored interval.

The cored interval is the interval in meters below the sea floor measured from the point at which coring for a particular core was started to the point at which it was terminated. This interval is generally about 9.5 meters (nominal length of a core barrel) but may be shorter or longer if conditions dictate.

When a core is brought aboard the *Glomar Challenger* it is labeled and the plastic liner and core cut into 1.5 meter sections. A full, 9.5 meter core consists of seven sections, numbered 1 to 7 from the top down (Figure 3). Generally, something less than 9.5 meters is recovered. In this case, the sections are still numbered starting with 1 at the top, but the number of sections is the number of 1.5 meter intervals needed to accommodate the length of core recovered. If a core contains a length of material less than the length of the cored interval, the recovered material is measured from the top of the recovered material, with the top of Section 1 equal to the top of the cored interval. Figures 3 and 4 illustrate the possible core configurations and the section labeling procedure. For basalts the voids in the core are closed and styrofoam spacers put between pieces which cannot be fit together (see section on "Basement Description").

In the core laboratory on the *Glomar Challenger*, after routine processing, the 1.5 meter sections of cored material and liner are split in half lengthwise. One half is designated the "archive" half, which is photographed; and the other is the "working" half, which is sampled by the shipboard scientists for further shipboard and shorebased analysis.

Samples taken from core sections are designated by the interval in centimeters from the top of the core section from which the sample was extracted; the sample size, in cc, is also given. Thus, a full sample designation would consist of the following information:

Leg (Optional)
 Site
 Hole
 Core Number

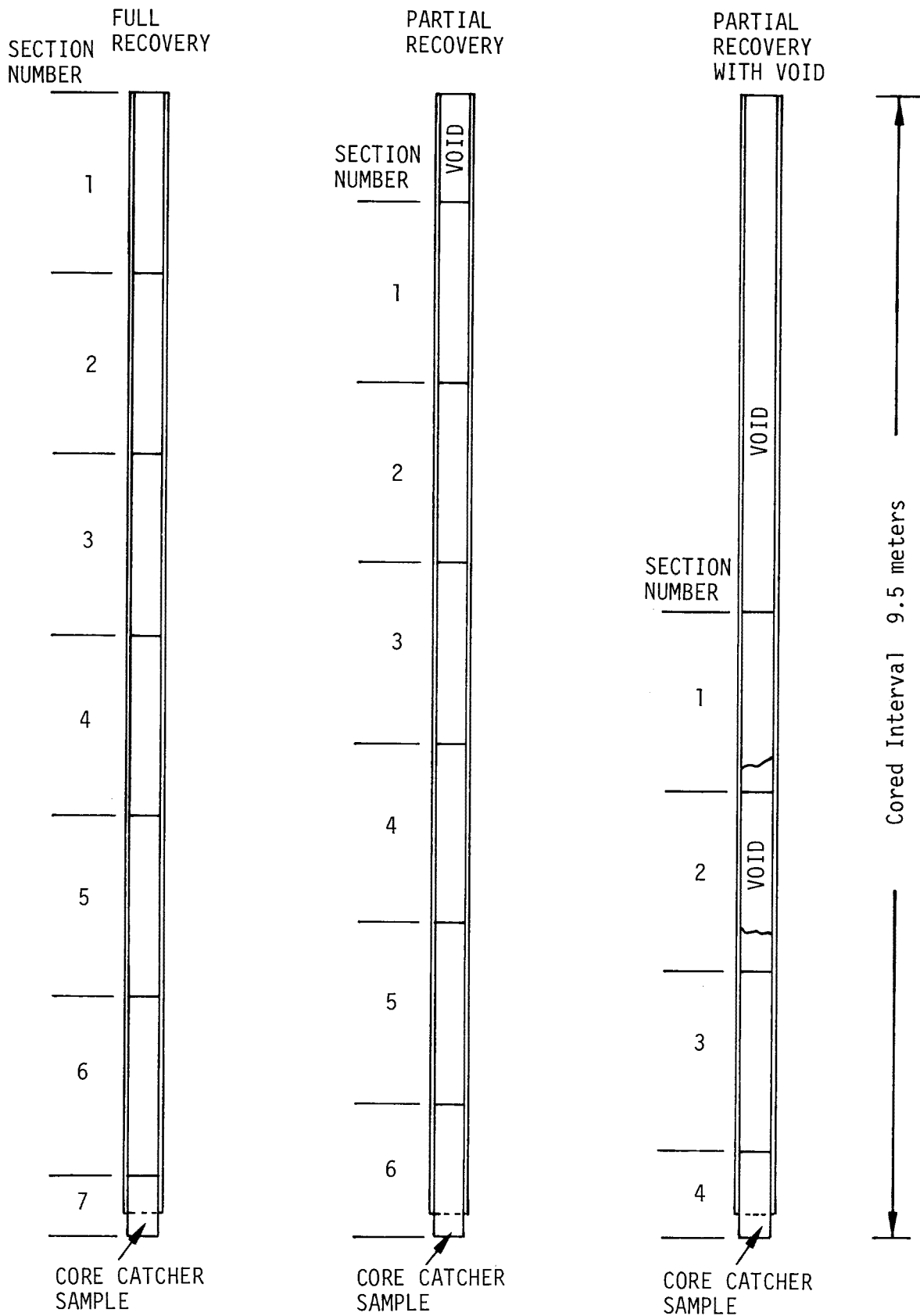


Figure 3. Labeling of sections for various kinds of recovery.

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SITE		HOLE			CORE		CORED INTERVAL: (meters below the sea floor)				
TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS							
	Nannofossil Zone										
		ABUNDANCE: A- abundant, C-common, F-frequent, R-rare, --absent									
		PRESERVATION: G-good, M-moderate, P-poor									
					1	0.5					Lithologic Description
					2	1.0					Smear Slide Description Section-Depth (cm) % Components
					3						Grain Size
					4						
					5						
					6						
					7						
					CC						

See key to graphic lithology symbols (Figure 5).

----- slight; --- moderate; ~~~~~ severe;

S=smear slide V=sonic velocity

Figure 4. Sample core form (sediment).

Section Number

Interval in centimeters from top of section

Site 418A-1-3, 122-124 cm (10cc) designates a 10cc sample taken from Section 3 of Core 1 from the second hole drilled at Site 418, Hole A. The depth below the sea floor for this sample would then be the depth to the top of the cored interval plus 3 meters for Sections 1 and 2, plus 122 cm (depth below the top of Section 3), or 4.2 meters. Note, however, that subsequent sample requests should refer to a specific interval within a core section (centimeters) rather than depth in meters below the sea floor.

SEDIMENT DESCRIPTION CONVENTIONS

Sediment descriptions are given on sediment core description sheets. (Figure 4 is an example.) Conventions for descriptions are discussed below. The symbols used are presented in Figures 4, 5 and 6.

Core Disturbance

Unconsolidated sediments are often quite disturbed by the rotary drilling/coring technique, and there is a complete gradation of disturbance style with increasing sediment induration. An assessment of degree and style of drilling deformation is made on board ship for all cored material, and shown graphically on the core description sheets. The following symbols are shown in Figure 4:

Slightly deformed; bedding contacts slightly bent.

Moderately deformed; bedding contacts have undergone extreme bowing.

Severely deformed; bedding completely disturbed, often showing symmetrical diapir-like structures, or water-saturated intervals that have lost all aspects of original bedding and sediment cohesiveness.

Smear Slides

The lithologic classification of sediments is based on visual estimates of texture and composition in smear slides made on board ship. These estimates are of areal abundances on the slide and may differ somewhat from the more accurate laboratory analyses of grain size, carbonate content, and mineralogy. Experience has shown that distinctive minor components can be accurately estimated ($\pm 1\%$ or 2%), but that an accuracy of $\pm 10\%$ for major constituents is rarely attained. Carbonate content is especially difficult to estimate in smear slides, as is the amount of clay present. The locations of smear slides made are given on the core description sheets.

Sediment Induration

The determination of induration is highly subjective, but field geologists have successfully made similar distinctions for many years. The criteria of Moberly and Heath (1971) are used for calcareous deposits; subjective estimate or behavior in core cutting is used for others.

a). **Calcareous sediments**

Soft: Oozes have little strength and are readily deformed under the finer or the broad blade of a spatula.

Firm: Chalks are partly indurated oozes; they are friable limestones that are readily deformed under the fingernail or the edge of a spatula blade.

Hard: Cemented rocks are termed limestones.

b). **The following criteria are used for other sediments:**

If the material is soft enough for the core to be split with a wire cutter, the sediment name only is used (e.g. silty clay; sand).

If the core must be cut on the band saw or diamond saw, the suffix 'stone' is used (e.g. silty claystone; sandstone).

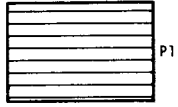
Color

Core is assigned according to standard Munsell or GSA color charts.

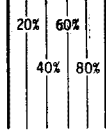
Pelagic

Non-biogenic

Pelagic Clay



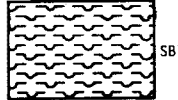
Vertical bar percent (%) Designation for Graphic Log.



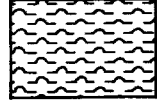
Siliceous Biogenic

Pelagic Siliceous Biogenic - Soft

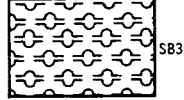
Diatom Ooze



Radiolarian Ooze

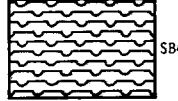


Diatom-Rad or Siliceous Ooze

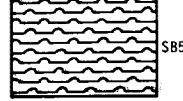


Pelagic Siliceous Biogenic - Hard

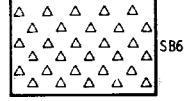
Diatomite



Radiolariate



Porcellanite

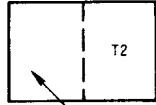


Chert

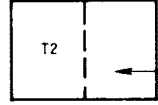


Transitional Biogenic Siliceous Sediments

Siliceous Component <50%



Siliceous Component >50%

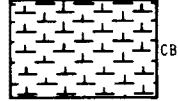


Siliceous Modifier Symbol and According to Hard or Soft.

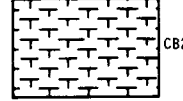
Calcareous Biogenic

Pelagic Biogenic Calcareous - Soft

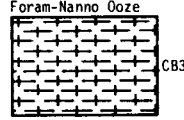
Nannofossil Ooze



Foraminiferal Ooze



Nanno-Foram or Foram-Nanno Ooze

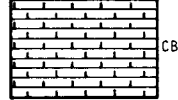


Calcareous Ooze



Pelagic Biogenic Calcareous - Firm

Nannofossil Chalk



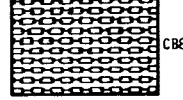
Foraminiferal Chalk



Nanno-Foram or Foram Nanno Chalk

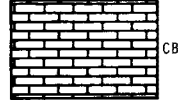


Calcareous Chalk



Pelagic Biogenic Calcareous - Hard

Limestone



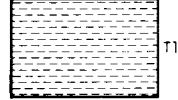
Marl



Terrigenous Sediments

Qualifiers Letter Overprint (as per examples) Zeolite A1 Glauconite A3 Siderite A4 (other may be designated)

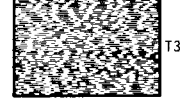
Clay/Claystone



Mud/Mudstone



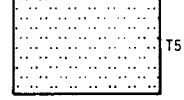
Shale (Fissile)



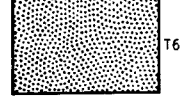
Sandy mud/Sandy mudstone



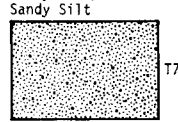
Silt/Siltstone



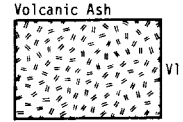
Sand/Sandstone



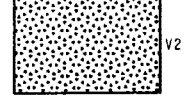
Silty Sand/Sandy Silt



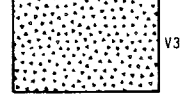
Pyroclastic



Volcanic Ash



Volcanic Lapilli

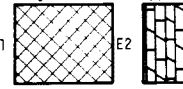


Evaporites

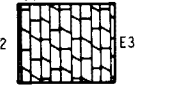
Halite



Anhydrite



Gypsum



Concretions

Drawn Circle with Symbol (others may be designated)

Mn = Manganese

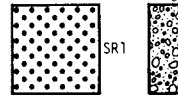
B = Barite

P = Pyrite

Z = Zeolite

Special Rock Types

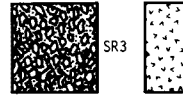
Gravel



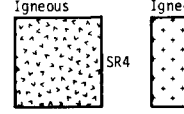
Conglomerate



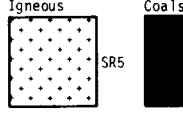
Breccia



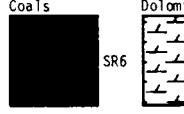
Basic Igneous



Acid Igneous



Coals



Dolomite

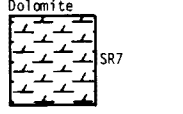


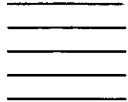



Figure 5. Graphic symbols to accompany the lithologic classification scheme.

Bioturbation 


Wavy laminations 


Parallel laminations 


Massive or homogeneous
(no symbol necessary)


Contorted bedding
(not artificial) 

Load casts (HAND DRAWN) 

Graded bed 

Sharp contact
(HAND DRAWN) 

Cross stratification 

Sedimentary clasts 

Burrows 


Gradational contact
(HAND DRAWN) 

Figure 6. Sedimentary structure symbols

Sediment Classification

The sediment classification scheme used is basically that devised by the JOIDES Panel on Sedimentary Petrology and Physical Properties and adopted for use by the JOIDES Planning Committee in March, 1974, with minor modifications. The general classification scheme is outlined below. A compilation of symbols is given in Figures 5 and 6.

I. General rules for class limits and order of components in a sediment name.

- A. Sediment assumes the names of those components present only in quantities greater than 15 per cent.
- B. Where more than one component is present, the component in greatest abundance is listed farthest to the right, and other components are listed progressively to the left in order of decreasing abundance.
- C. The class limits are based on percentage intervals given below for various sediment types.

II. Compositional Class Boundaries

A. CaCO₃ content (determined by CaCO₃ bomb)

30% and 60%. With a 5% precision and given the natural frequency distribution of CaCO₃ contents in oceanic sediments, these boundaries can be reasonably ascertained.

B. Biogenic Opal Abundance

Expressed as per cent siliceous skeletal remains in smear slides: 10, 30, and 50%. Smear slide estimates of identifiable siliceous skeletal material generally imply a significantly higher total opal abundance. The boundaries have been set to take this into account.

C. Abundance of Authigenic Components

Zeolites, Fe and Mn micronodules, etc., fish bones, and other indicators of very slow sedimentation (estimated in smear slides); semiquantitative boundary: common 10%. These components are quite conspicuous and a semiquantitative estimate is adequate. Even a minor influx of calcareous, siliceous, or terrigenous material will, because of the large difference in sedimentation rate, dilute them to insignificance.

D. Abundance of Terrigenous Detrital Material

Estimated from smear slides: 30 per cent.

E. Qualifiers

Numerous qualifiers are suggested; the options should be used freely. However, components of less than 5% (in smear slide) should not be used as a qualifier except in special cases.

III. Description of Sediment Types (Figure 5)

A. Pelagic Clay

Principally authigenic pelagic deposits that accumulate at very slow rates. The class is often termed brown clay, or red clay, but since these terms are confusing, they are not recommended.

1. Boundary With Terrigenous Sediments

32
Radiolarian equivalents in this category are rare and can be specifically described.

C. Pelagic Biogenous Calcareous Sediments

These are distinguished from the previous categories by a CaCO_3 content in excess of 30%. There are two classes: Pelagic biogenic calcareous sediments (containing less than 30% silt and clay); and transitional biogenic calcareous sediments (containing more than 30% silt and clay).

1. Pelagic Biogenic Calcareous Sediments

- (a) Soft: calcareous ooze
- (b) Firm: chalk
- (c) Hard: indurated chalk

The term limestone should preferably be restricted to cemented rocks.

- (d) Compositional Qualifiers:

Principal components are: nannofossils and foraminifera. One or two qualifiers may be used, for example:

Foram %	Name
<10	Nannofossil ooze, chalk, limestone
10-25	Foraminiferal-nannofossil ooze
25-50	Nannofossil-foraminiferal ooze
>50	Foraminiferal ooze

Calcareous sediment containing more than 10-20% identifiable siliceous fossils carry the qualifier radiolarian, diatomaceous, or siliceous depending on the quality of the identification. For example, radiolarian-foraminiferal ooze.

2. Transitional Biogenic Calcareous Sediments

- (a) CaCO_3 30-60%: Marly calcareous pelagic sediments.
 - Soft: Marly calcareous (or nannofossil, foraminifera, etc., ooze (see below).
 - Firm: Marly chalk.
 - Hard: Marly limestone.
- (b) CaCO_3 >60%: Calcareous pelagic sediments.
 - Soft: Calcareous (or nannofossil, foraminiferal, etc.) ooze (see below).
 - Firm: Chalk
 - Hard: Limestone

NOTE: Sediments containing 10-30% CaCO_3 fall in other classes where they are denoted with the adjective "calcareous". Less than 10% CaCO_3 is ignored.

Biostratigraphy

At the time of this compilation biostratigraphic studies of Legs 51-53 sediments are still in progress. Age boundaries shown on Figure 2 and on core forms are preliminary.

DATA PRESENTATIONS

Carbon-Carbonate Data

Sediment samples are analyzed on a Leco 70-Second Analyzer at DSDP following procedures outlined in Volumes 9 and 18 of the Initial Reports of the Deep Sea Drilling Project. Accuracy and precision of the results are as follows:

Total carbon	±0.3% (absolute)
Organic carbon	±0.06% (absolute)
CaCO ₃	±3% (absolute)

Grain Size Analyses

The DSDP grain size analyses presented on the core logs are performed by standard sieve and pipette techniques, described in detail in Appendix III of Volume 4 of the Initial Reports (p. 745), with modified settling times as in Volume 9. The results are preliminary for the publication of the ICD.

X-ray Data

Methods

X-ray Conditions

The mineralogical data shown in Tables 5 and 6 were obtained on samples dried at 70°C, powdered and x-rayed under the following conditions: CuK_α radiation, nickel filter, 35 KV/24mA, 1° detection slit. Goniometer speed was 0.5° = 2θ/min., paper speed 10 mm/min. All samples were x-rayed from 3 to 40° = 2θ.

For identification of the clay minerals, smear slides were made. To get optimal texture, the <2 μm fraction was first disintegrated with a KLN 582 ultrasonic generator and then centrifuged to clearness. The residue was mixed to a homogeneous paste and finally placed on the glass slide. It was x-rayed in an untreated state, glycolated and when necessary, heated.

Factor Analysis

For the bulk mineralogy, the factors of Table 7 were used. When multiplied by their peak heights, they made up 100%. Because of the large amount of amorphous material, i.e. volcanic glass, opal and amorphous clay minerals, and without using the monochromator, diffuse scattering was relatively high. This means that if these components vary, the factors have to be determined again. These factors can only be used for sedimentary types which are very similar to those above, i.e. they cannot be applied to near shore sediments, because of their higher crystallinity.

For the clay mineralogy, the method discussed by Biscaye (1965) was used. The factors given in Table 8 were multiplied by the peak area. The sum of these was 100%. The peak area was determined by planimetry. The kaolinite/chlorite peak at 12.3 = 2θ was divided by peak splitting at 24-25° = 2θ, i.e. a factor obtained from the ratio:

$$\frac{3.57 \text{ \AA peak area}}{3.58 \text{ \AA} + 3.54 \text{ \AA peak area}}$$

Total Carbonate

The carbonate contents were determined gasometrically by carbonate bomb (Müller and Gastner, 1971).

All X-ray mineralogical data for all drill holes is presented in table form immediately following the Site Summary Sheets.

TABLE 7. Factor Table for Minerals Under Investigation, Bulk Mineralogy

Mineral	Peak	d (in Å)	Factor
	2 θ (in degrees)		
Quartz	26.7	3.34	1.3
Feldspar	27.4-28.0	3.25-3.18	2.0
Pyroxene	29.9	2.99	2.0
Hornblende	10.5	8.42	2.0
Cristobalite	21.5-21.9	4.15-4.05	1.5
Clinoptilolite	9.8	8.99	2.0
Pyrite	33.0	2.71	2.0
Gypsum	11.7	7.56	2.0
Rhodochrosite	31.4	2.85	2.0
Barite	25.9	3.44	2.0
Apatite	32.2	2.78	2.0

TABLE 8. Factor Table for Investigated Minerals, Clay Mineralogy

Mineral	Peak	d (in Å)	Factor
	2 θ (in degrees)		
Smectite	5.2	17.0	1
Chlorite	12.3	7.2	2
Illite	8.8	10.0	4
Kaolinite	12.3	7.2	2
Palygorskite	8.4	10.5	1
Talc	9.4	9.3	1
Sepiolite	7.4	12.0	1
Mixed layer	same as its parts		

BASEMENT DESCRIPTION CONVENTIONS

Core Forms

Initial Core Description forms for igneous and metamorphic rocks are not the same as those used for sediments. The sediment barrel sheets are substantially those published in previous Initial Reports. Igneous rock representation on barrel sheets, however, is too compressed to provide adequate information for rock sampling. Consequently, Visual Core Description forms, modified from those used on board ship, are used here for more complete graphic representation. Each of these forms covers one 1.5 meter section. All shipboard chemical and physical property data, as well as summary hand-specimen and thin section descriptions are presented for each section.

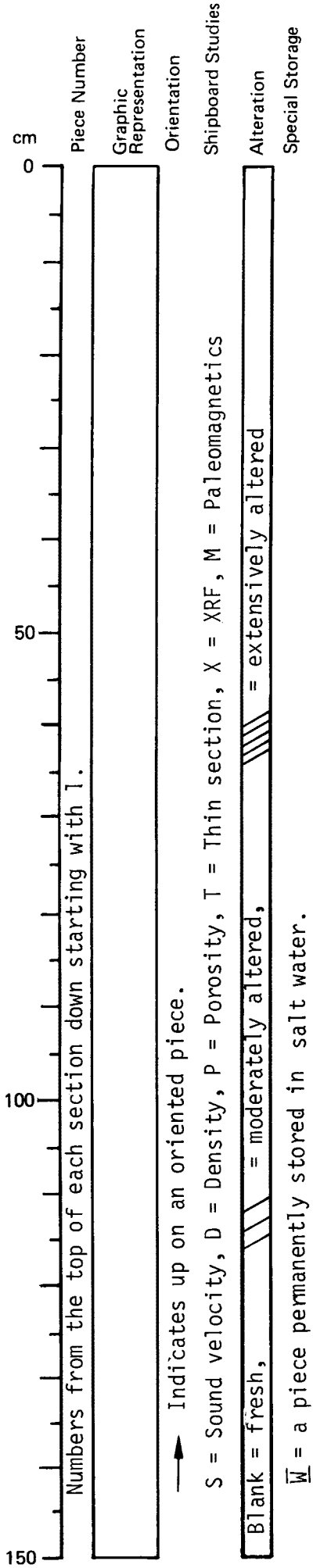
All basalts were split using a rock saw into archive and working halves. The latter was described and sampled on board ship. In a typical basalt description form (Figure 7), the left box is a visual representation of the working half. Two closely spaced horizontal lines in this column indicate the location of styrofoam spacers taped between basalt pieces inside the liner. Each piece is numbered sequentially from the top of each section, beginning with the number 1. Pieces are labeled on the rounded, not the sawed surface. Pieces which could be fit together before splitting are given the same number, but are separately consecutively lettered, as 1A, 1B, 1C, etc. Spacers were placed between pieces with different numbers, but not between those with different letters and the same number. In general, addition of spacers represents a drilling gap (no recovery). All pieces which are cylindrical and longer than the liner diameter have orientation arrows pointing up, both on the archive and working halves. Special procedures were adopted to ensure that orientation was preserved through every step of the sawing and labeling process. All orientable pieces are indicated by upward-pointing arrows to the right of the graphic representation on the description forms. Since the pieces were rotated during drilling it is not possible to sample for declination studies.

Samples were taken for various measurements on board ship. The type of measurement and approximate location are indicated in the column headed "Shipboard Studies" using the following notation:

- X = X-ray fluorescene and CHN chemical analysis
- M = magnetics measurement
- S = sonic velocity measurements
- T = thin section
- D = density measurements
- P = porosity measurements

The state of alteration (see Figure 7 for symbols) is shown in the column labeled "Alteration."

On Legs 51-53 some pieces were stored permanently in salt water. These are labeled with a "W" in the "Special Storage" column.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.

Summary of Visual Description

Summary of Thin Section Description

Shipboard Chemical, paleomagnetic and Physical Property Data

Figure 7. Sample core form (basement).

D. Terrigenous Sediments

1. Sediment falling in this portion of the classification scheme are subdivided into textural groups on the basis of the relative proportions of three grain-size constituents, i. e. clay, silt, and sand. Rocks coarser than sand size are treated as "Special Rock Types". The size limits for these constituents are those defined by Wentworth (1922).

Five major textural groups are recognized. These groups are defined according to the abundance of clay (>90%, 90-10%, <10%) and the ratio of sand to silt (>1 or <1). Sands and sandstones may be subdivided further into very fine-, fine-, medium-, coarse-, or very coarse-grained sands and sandstones according to their median grain size.

(a) Qualifiers

In this group numerous qualifiers are possible, usually based on minor constituents, for example: glauconitic, pyritic, feldspathic.

In the sand and sandstone category, conventional divisions such as arkose, graywacke, etc., are, of course, acceptable, providing the scheme is properly identified. Clays, muds, silts, and sands containing 10-30% CaCO₃ are called calcareous.

2. Volcanogenic Sediments

Pyroclastic rocks are described according to the textural and compositional scheme of Wentworth and Williams (1932). The textural groups are:

Volcanic breccia	=	>32 mm
Volcanic lapilli	=	<32 mm
Volcanic ash (tuff, if indurated)	=	< 4 mm

Compositionally, these pyroclastic rocks are described as vitric (glass), crystalline or lithic.

3. Clastic sediments of volcanic provenance are described in the same fashion as the terrigenous sediments, noting the dominant composition of the volcanic grains where possible.

E. Special Rock Types

The definition and nomenclature of sediment and rock types not included in the system described above are left to the discretion of shipboard scientists with the recommendation that they adhere as closely as practical to conventional terminology.

In this category fall such rocks as:

Intrusive and extrusive igneous rocks.

Evaporites, halite, anhydrite, gypsum (as a rock), etc.

Shallow water limestone (biostromal, biohermal, coquina, oolite, etc.).

Dolomite.

Gravels, conglomerates, breccias.

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SAMPLE DISTRIBUTION POLICY

Deep Sea Drilling Project/International Phase of Ocean Drilling

Distribution of Deep Sea Drilling samples for investigation will be undertaken in order to (1) provide supplementary data to support GLOMAR CHALLENGER scientists in achieving the scientific objectives of their particular cruise, and in addition to serve as a mechanism for contributions to the INITIAL REPORTS; (2) provide individual investigators with materials to conduct detailed studies beyond the scope of the Initial Reports; and (3) provide the reference centers where paleontologic materials are stored with samples for reference and comparison purposes.

The National Science Foundation has established a Sample Distribution Panel to advise on the distribution of core materials. This panel is chosen in accordance with usual Foundation practices, in a manner that will assure advice in the various disciplines leading to a complete and adequate study of the cores and their contents. Funding for the proposed research must be secured separately by the investigator. It cannot be provided through the Deep Sea Drilling Project.

The Deep Sea Drilling Project's Curator is responsible for distributing the samples and controlling their quality, as well as preserving and conserving core material. He also is responsible for maintaining a record of all samples that have been distributed, shipboard and subsequent, indicating the recipient, and the natures of the proposed investigation. This information is made available to all investigators of DSDP materials as well as other interested researchers on request.

The distribution of samples is made directly from one of the two existing repositories, Lamont-Doherty Geological Observatory and Scripps Institution of Oceanography, by the Curator or his designated representative.

1. Distribution of Samples for Research Leading to Contributions to Initial Reports

Any investigator who wishes to contribute a paper to a given volume of the Initial Reports may write to the Chief Scientist, Deep Sea Drilling Project (A-031), Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A., requesting samples from a forthcoming cruise. Requests for a specific cruise should be received by the Chief Scientist TWO MONTHS in advance of the departure of the cruise in order to allow time for the review and consideration of all requests and to establish a suitable shipboard sampling program. The request should include a statement of the nature of the study proposed, size and approximate number of samples required to complete the study, and any particular sampling technique or equipment that might be required. The requests will be reviewed by the Chief Scientist of the Project and the cruise co-chief scientists; approval will be given in accordance with the scientific requirements of the cruise as determined by the appropriate JOIDES Advisory Panel(s). If approved, the requested samples will be taken, either by the shipboard party if the workload permits, or by the curatorial staff shortly following the return of the cores to the repository. Proposals must be of a scope to ensure that samples can be processed and a contribution completed in time for publication in the Initial Reports. Except for rare, specific instances involving ephemeral properties, sampling will not exceed one-quarter of the volume of core recovered, with no interval being depleted and one-half of all core being retained as an archive. Shipboard sampling shall not exceed approximately 100 igneous samples per investigator; in all cases co-chief scientists are requested to keep sampling to a minimum.

The co-chief scientists may elect to have special studies of selected core samples made by other investigators. In this event the names of these investigators and complete listings of all materials loaned or distributed must be forwarded, if possible, prior to the cruise or, as soon as possible following the cruise, to the Chief Scientist

through the DSDP Staff Science Representative for that particular cruise. In such cases, all requirements of the Sample Distribution Policy shall also apply.

If a dispute arises or if a decision cannot be reached in the manner prescribed, the NSF Sample Distribution Panel will conduct the final arbitration.

Any publication of results other than in the Initial Reports within twelve (12) months of the completion of the cruise must be approved and authored by the whole shipboard party and, where appropriate, shore-based investigators. After twelve months, individual investigators may submit related papers for open publication provided they have submitted their contributions to the Initial Reports. Investigations not completed in time for inclusion in the Initial Reports for a specific cruise may not be published in other journals until final publication of that Initial Report for which it was intended. Notice of submission to other journals and a copy of the article should be sent to the DSDP Chief Science Editor.

2. Distribution of Samples for Research Leading to Publication other than in Initial Reports

A. Researchers intending to request samples for studies beyond the scope of the Initial Reports should first obtain sample request forms from the Curator, Deep Sea Drilling Project (A-031), Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A. On the forms the researcher is requested to specify the quantities and intervals of the core required, make a clear statement of the proposed research, state time required to complete and submit results for publication, specify the status of funding and the availability of equipment and space foreseen for the research.

In order to ensure that all requests for highly desirable but limited samples can be considered, approval of requests and distribution of samples will not be made prior to 2 months after publication of the Initial Core Descriptions (I.C.D.). ICD's required to be published within 10 months following each cruise. The only exceptions to this policy will be for specific instances involving ephemeral properties. Requests for samples can be based on the Initial Core Descriptions, copies of which are on file at various institutions throughout the world. Copies of original core logs and data are kept on file at DSDP and at the Repository at Lamont-Doherty Geological Observatory, Palisades, New York. Requests for samples from researchers in industrial laboratories will be handled in the same manner as these from academic organizations, with the same obligation to publish results promptly.

B. (1) The DSDP Curator is authorized to distribute samples up to 50 ml per meter of core. Requests for volumes of material in excess of this amount will be referred to the NSF Sample Distribution Panel for review and approval. Experience has shown that most investigations can be accomplished with 10ml sized samples or less. All investigators are encouraged to be as judicious as possible with regard to sample size and, especially, frequency within any given core interval. The Curator will not automatically distribute any parts of the cores which appear to be in particularly high demand; requests for such parts will be referred to the Sample Distribution Panel for review. Requests for samples from thin layers or important stratigraphic boundaries will also require Panel review.

(2) If investigators wish to study certain properties which may deteriorate prior to the normal availability of his samples, they may request that the normal waiting period not apply. All such requests must be reviewed by the curators and approved by the NSF Sample Distribution Panel.

C. Samples will not be provided prior to assurance that funding for sample studies either exists or is not needed. However, neither formal approval of sample

requests nor distribution of samples will be made until the appropriate time (Item A). If a sample request is dependent, either wholly or in part, on proposed funding, the organization to whom the funding proposal has been submitted any information on the availability (or potential availability) of samples that it may request.

D. Investigators receiving samples are responsible for:

(1) publishing significant results; however contributions shall not be submitted for publication prior to 12 months following the termination of the appropriate leg;

(2) acknowledging, in publications, that samples were supplied through the assistance of the U.S. National Science Foundation and others as appropriate;

(3) submitting five (5) copies (for distribution to the Curator's file, the DSDP Repositories, the GLOMAR CHALLENGER's Library, and the National Science Foundation) of all reprints of published results to the Curator, Deep Sea Drilling Project (A-012), Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A.;

(4) returning, in good condition, the remainders of samples after termination of research, if requested by the Curator.

E. Cores are made available at repositories for investigators to examine and to specify exact samples in such instances as may be necessary for the scientific purposes of the sampling, subject to the limitations of B (1 and 2) and D, above, with specific permission of the Curator or his delegate.

F. Shipboard-produced smear slides of sediments and thin sections of indurated sediments, igneous and metamorphic rocks, will be returned to the appropriate repository at the end of each cruise or at the publication of the Initial Reports for that cruise. These smear slides and thin sections will form a reference collection of the cores stored at each repository and may be viewed at the respective repositories as an aid in the selection of core samples.

G. The Deep Sea Drilling Project routinely processes by computer most of the quantitative data presented in the Initial Reports. Space limitations in the Initial Reports preclude the detailed presentation of all such data. However, copies of the computer readout are available for those who wish the data for further analysis or as an aid in selecting samples. A charge will be made to recover expenses in excess of \$50.00 incurred in filling requests.

3. Other Records

Magnetics, seismic reflection, down-hole logging, and bathymetric data collected by the GLOMAR CHALLENGER will also be available for distribution at the same time samples become available.

Requests for data may be made to:

Associate Chief Scientist,
Science Services
Deep Sea Drilling Project (A-031)
Scripps Institution of
Oceanography
University of California
at San Diego
La Jolla, California 92093

A charge will be made to recover the expenses in excess of \$50.00 in filling individual requests. If required, estimated charges can be furnished before the request is processed.

4. Reference Centers

As a separate and special category samples will be distributed for the purpose of establishing up to five reference centers where paleontologic materials will be available for reference and comparison purposes. The first of these reference centers has been approved at Basel, Switzerland.
Revised 9/28/76

SITE SUMMARY SHEET

SITE 417, HOLE 417A

LEG 51

Date occupied	3 December 1976 2015 LCT	
Date departed	10 December 1976 1900 LCT	
Time on hole	6 days, 22 hours, 45 minutes	
Position: latitude	25° 06.63'N	
longitude	68° 02.48'W	
Water depth (sea level)	5468 corrected meters, echo sounding	
Water depth (rig floor)	5478 corrected meters, echo sounding	
Bottom felt at	5478.2 meters, drill pipe	
Penetration	417 meters	
Number of holes	1	
Number of cores	46	
Total length of cored section	417 meters	In sediment: 208 meters
		In igneous rocks: 209 meters
Total core recovered	249.5 meters	In sediment: 121 meters
		In igneous rocks: 128.5 meters
Percentage core recovery	59.8 per cent	In sediment: 58 per cent
		In igneous rocks: 61 per cent

Oldest Sediment Cored

Depth sub-bottom	189-198.5 meters
Nature	clay (with sand?)
Age	Late Cretaceous
Measured velocity	1.6 km/sec

Basement

Depth sub-bottom	208 meters
Nature	Basalt lavas and breccias
Velocity range	4-6 km/sec

SITE #17	HOLE	CORE 1		CORED INTERVAL: 0.0-8.5 m		LITHOLOGIC DESCRIPTION
		FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	
TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	ORILLING DISTURBANCE	LITHOLOGIC SAMPLE
PLEISTOCENE		R-P	P-M			30
		F-M	R-P	0.5 1	VOID	10YR 4/4
		R-P		2	VOID	10YR 4/4
						34
						CC

10YR 4/4	MANNOFOSSIL-BEARING CLAY Highly disturbed, brown to dark brown, dark yellow to brown (10YR 4/4, 10YR 4/3); completely homogeneous. Nanno-bearing Clay Smears: Average of 3 71% clay min., 10% nannofossils 18% fish debris 4% silt, 5% silt 1% peelite 5% accessory heavies 3% ferruginous blebs 1% palagonite
10YR 4/3	Grain Size 3-4 0.2% sand 10.4% silt 89.4% clay Carbon, Carbon-Carbonate 3-2 (0.3, 0.1, 1)

SITE 417 HOLE A CORE 1 CORED INTERVAL: 0.0-8.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION	
										FORMS
MIDDLE TO LOWER PLEISTOCENE (Mixed)	C-M	C-G	1	0.5						<p>MANNOFOSSIL-BEARING CLAY Highly disturbed, dark yellowish brown (10YR 4/4) with minor yellowish brown (10YR 5/4) clay; color boundaries are diffuse.</p> <p>Mann-bearing Clay Smears: Average of 6 82% clay min. 6% nannofossils 1% forams 1% fish debris 2% qtz. 2% feld. 1% zeolites? 2% accessory heavies 1% ferrous blebs 1% pyroxenite</p> <p>CO₂ Bomb Results 1-1, 59-37% 1-1, 136-0% 1-3, 83-0% 1-5, 82-0%</p> <p>Carbon, Carbon-Carbonate 1-71 (4.4, 0.1, 36) 1-72 (0.4, 0.1, 1) 2-80 (0.1, 0.1, 0)</p>
			2	1.0						
			3							
			4							
			5							
			6							
			7							
CC										

SITE 417 HOLE A CORE 2 CORED INTERVAL: 8.5-16.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION	
										FORMS
PLEISTOCENE (contaminated)	F-4	F-4	1	0.5						<p>CLAY Highly disturbed, brown to dark brown (10YR 4/3, 10YR 3/3) streaked with light yellowish brown (10YR 6/4); light spots: Section 3, 36-40 cm, 93-110 cm; and 127-131 cm.</p> <p>Smears: Average of 2 84% clay min. 2% nannofossils 1% fish debris 5% qtz. 2% feld. 2% accessory heavies 2% ferrous blebs 1% dolomite</p> <p>CO₂ Bomb Results 2-1, 80-0% 2-3, 116-0%</p> <p>Grain Size 1-70 70% sand 7.5% silt 92.5% clay</p> <p>Carbon, Carbon-Carbonate 1-77 (0.1, 0.1, 0) 3-120 (0.1, 0.1, 0)</p>
			2							
			3							
			4							
			5							
			6							
			7							
CC										

SITE 417 HOLE A CORE 5 CORED INTERVAL: 37.0-46.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	LITHOLOGIC SAMPLE STRUCTURES	LITHOLOGIC DESCRIPTION
			1	0.5			32	CLAY Highly disturbed, brown, yellowish brown, light yellowish brown (10YR 5/3, 10YR 5/4, 10YR 6/4). Sharp contact between color zones in Section 2 at 15 cm. VOLCANIC ASH: Section 2, 56-70 cm. Light blue gray to greenish gray, finely banded with medium gray (5B-7T to 5B-6/7) zeolitic clay.
			2	1.0	VOID		161 62.5 89	Major Lithology Smears: Average of 2 92% clay min. 1% fish debris 4% silt 1% Fe-Mn nodules 2% accessory heavies 1% ferruginous blebs 1% clear glass
			3					Minor Lithology Smears: Average of 3, Sect. 2, 61, 62.5, 69 cm 70% clay min. 5% silt 15% zeolites (phillipsite) 1% palagonite 2% clear glass 1% biotite 1% zircon
			4		VOID			Grain Size 1-18 0.0% sand 7.3% silt 92.7% clay Carbon, Carbon-Carbonate 1-26 (0.1, 0.1, 0)
			5					
			6					
			7					
			CC					

SITE 417 HOLE A CORE 3 CORED INTERVAL: 18.0-27.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	LITHOLOGIC SAMPLE STRUCTURES	LITHOLOGIC DESCRIPTION
			1	0.5			50	CLAY Highly deformed, dark brown, brown, dark yellowish brown (10YR 4/4, 10YR 4/3) with streaks of lighter colors (yellowish brown (10YR 5/4, 10YR 4/4)) representing highly disturbed bedding.
			2	1.0			126	Smears: Average of 4 88% clay min. 1% fish debris 2% silt 2% Fe-Mn nodules 5% accessory heavies 1% ferruginous 1% Fe-Mn nodules 1% dolomite
			3					CO ₂ Bomb Results 3-1, 103-01 3-3, 41-01 Grain Size 1-39 0% sand 6% silt 94% clay Carbon, Carbon-Carbonate 1-100 (0.1, 0.1, 0) 3-34 (0.1, 0.1, 0) 5-30 (0.1, 0.1, 0)
			4				103	
			5					
			6		VOID			
			7					NO RECOVERY IN CORE 4
			CC					

SITE 417 HOLE A CORE 6 CORED INTERVAL: 46.5-56.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
					1	0.5	CLAY slightly deformed, dominantly yellowish brown to dark yellowish brown, dark brown to brown (10YR 5/4, 10YR 6/4, 10YR 3/3, 10YR 4/3); light mottles occur with sharp boundaries, pale brown (10YR 6/3) more conspicuous in lower sections.	
						1.0	VOID	
					2		VOLCANIC ASH: Spot in Section 3, 55 cm, light pale green (10B 8/2). Major Lithology Smear: CC 93% clay min. 5% Qtz. 2% Ferruginous blebs	
							Minor Lithology Smear: 1-55 30% clay min. 10% Qtz. 10% Feid. 40% zeolites 10% altered volcanics	
					3	55	CLAY Highly disturbed; dominantly dark yellow brown, yellow brown, light yellow brown (10YR 4/4, 10YR 5/4, 10YR 6/4, 10YR 5/3) streaked with light brown and light yellow brown (10YR 5/4, 10YR 6/4) layers, minor clay in section 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.	
					4		CO ₂ Bomb Results 5-1, 63-0% 6-1, 49-0% 6-3, 27-0% 6-4, 39-0% 6-5, 50-0%	
							Grain Size 1-46 0-1% sand 6-2% silt 93.8% clay	
					5		Carbon, Carbon-Carbonate 1-38 (0.1, 0.1, 0) 3-10 (0.1, 0.1, 0) 4-56 (0.1, 0.1, 0) 5-59 (0.1, 0.1, 0)	
					6		IM SAMPLE	
					7		NO RECOVERY IN CORE 7	
					CC			

SITE 417 HOLE A CORE 8 CORED INTERVAL: 65.5-75.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
					1	0.5	CLAY Highly disturbed; dominantly dark yellow brown, yellow brown, light yellow brown (10YR 4/4, 10YR 5/4, 10YR 6/4, 10YR 5/3) streaked with light brown and light yellow brown (10YR 5/4, 10YR 6/4) layers, minor clay in section 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.	
					2		Major Lithology Smears: Average of 4 76% clay min. 7% fish debris 3% Qtz. 2% Feid. 1% zeolites 5% accessory heavies 10% Ferruginous blebs 17% Fe-Mn nodules 4% palagonite 1% clear glass	
							Minor Lithology Smears: 1-18 60% clay min. 6% Feid. 10% zeolites 2% Feid. 25% clear glass	
					4		CO ₂ Bomb Results 8-1, 91-0% 8-3, 52-0% 8-5, 32-0%	
					5		Carbon, Carbon-Carbonate 1-88 (0.1, 0.1, 0) 3-50 (0.1, 0.1, 0) 5-30 (0.1, 0.1, 0)	
					6		VOID	
					7			
					CC			

SITE 417 HOLE A CORE 10 CORED INTERVAL: 84.5-94.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
					0.5		CLAY Highly disturbed; brown, yellow, brown, light yellowish brown (10YR 6/3, 10YR 5/3, 10YR 6/4); streaked with dark brown to brown and dark grayish brown (10YR 4/3, 10YR 4/2); volcanic ash spots in Section 1, largest at 60 and 130 cm, light olive gray (5Y 6/2); less deformed in lower part of Section 2; dark streaks show suggestion of stratification in Section 1; Fe-Mn nodules concentrated in Section 1, 94 and 115 cm.	
					1		10YR 6/3 to 10YR 5/3	
					2		Major Lithology Smears: Average of 3 84% clay min. 12% K-feldspar 2% zeolites 1% accessory heavies	
					3		Minor Lithology Smear: 1-57 94% clay min. 2% zeolites 3% accessory heavies 3% biotite	
					4		CO ₂ Bomb Results 10-1, 45-0% 10-3, 42-0% Grain Size 1-40 0.4% sand 3.5% silt 96.1% clay Carbon, Carbon-Carbonate 1-43 (0.1, 0.1, 0) 3-40 (0.3, 0.1, 1)	
					5		VOID	
					6			
					7			
					CC			

SITE 417 HOLE A CORE 9 CORED INTERVAL: 75.0-84.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
					0.5		CLAY Highly disturbed; dominantly pale colors; brown, yellow brown, very pale brown, pale brown (10YR 5/3, 10YR 5/4, 10YR 7/3, 10YR 6/3) streaked with very dark grayish brown, dark brown, dark grayish brown, and brown (10YR 3/2, 10YR 3/3, 10YR 4/2, 10YR 5/3). Colors subdued in Section 1, pale dominant in lower section. Ash spots in Section 4 at 120 and 130 cm, olive (5Y 5/3).	
					1		10YR 5/3 to 10YR 5/4	
					2		Major Lithology Smears: Average of 5 95% clay min. 10% qtz. 1% feld. 1% zeolites 2% accessory heavies 1% Fe-Mn nodules	
					3		CO ₂ Bomb Results 9-1, 75-0% 9-1, 42-0% 9-2, 23-0% Grain Size 1-70 0.2% sand 3.7% silt 96.1% clay Carbon, Carbon-Carbonate 1-73 (0.1, 0.1, 0) 3-40 (0.1, 0.1, 0) 5-20 (0.1, 0.1, 0)	
					4		VOID	
					5			
					6			
					7			
					CC			

SITE 417 HOLE A CORE 12 CORED INTERVAL: 103.5-113.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			1	0.5	VOID			10YR 5/3	CLAY in Section 1 and top of Section 2, with ZEOLITIC CLAY in lower part of Section 2, and Sections 3 and 4 contact reasonably abrupt; CLAY is highly disturbed, brown (10YR 5/3) with diffuse streaks of paler clay. ASH spot in Section 1, 34.5 and 39 cm.
			2	1.0	VOID			10YR 3/2	ZEOLITIC CLAY below Section 2, 70 cm, is highly to moderately disturbed, very dark grayish brown, mottled with brown clay (10YR 5/3) throughout. This clay resembles clay of upper unit. Becomes dark yellow brown (10YR 4/2) with pods of lighter pale brown (10YR 7/4) in Section 4.
			3		VOID			10YR 3/2	CLAY (Major lithology) Smear: 1-100 80% clay min. 10% K-feldspar 3% accessory heavies 2% ferruginous TR: dolomite and rhodochrosite
			4		VOID			10YR 4/2	ZEOLITIC CLAY (Major lithology) Smear: Average of 4 75% clay min. 3% qtz. 5% K-feldspar 11% zeolites 2% accessory heavies 2% ferruginous 1% Fe-Mn nodules TR: dolomite and rhodochrosite
			5		VOID				CO ₂ Bomb Results 12-1, 96-0% 12-3, 34-0% Grain Size 1-4 0.7% sand 3.9% silt 95.7% clay Carbon, Carbon-Carbonate 1-95 (0.3, 0.1, 2) 3-33 (0.1, 0.1, 0)
			7		VOID				
			CC						

SITE 417 HOLE A CORE 11 CORED INTERVAL: 95.0-103.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			1	0.5	VOID			10YR 6/3	CLAY Highly disturbed, mainly pale brown (10YR 6/3). Also brown, light yellow brown (10YR 5/3, 10YR 6/4) streaked and mottled in Sections 3-6 with light yellowish brown (10YR 5/3) in subequal amounts; color contacts in Sections: mottled at 31 and 42 cm; sharp at 96 cm.
			2	1.0	VOID			10YR 6/3	Major Lithology Smear: Average of 2 94% clay min. 1% qtz. 5% K-feldspar 1% unspecified feld. 2% accessory heavies 6% ferruginous blebs 6% palagonite 18% dolomite and rhodochrosite
			3		VOID			10YR 6/3 10YR 6/4 10YR 5/3	CO ₂ Bomb Results 11-1, 42-0% 11-3, 85-0% Grain Size 1-40 1.0% sand 4.2% silt 94.8% clay
			4		VOID			10YR 6/3 10YR 6/4	Carbon, Carbon-Carbonate 1-40 (0.2, 0.1, 1) 3-34 (0.2, 0.1, 1) 5-64 (0.1, 0.1, 0)
			5		VOID			10YR 6/3	
			6		VOID			10YR 6/3 10YR 6/3	
			7		VOID				
			CC						

SITE - ROCK	TIME - UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	CORE 14			LITHOLOGIC DESCRIPTION	
				SECTION	METERS	GRAPHIC LITHOLOGY		
SITE 417	HOLE A	MIDDLE EOCENE	Podocrits	A, P	1	0.5	10YR 3/2	RADIOLARIAN RICH SILICEOUS ZEOLITIC CLAY with beds of RADIOLARIAN OOZE, highly disturbed, firm. Dominant lithology: very dark grayish brown, yellow brown, dark grayish brown, dark yellow brown clay (10YR 3/2, 10YR 4/3, 10YR 5/2, 10YR 5/3, and 10YR 4/2).
					2	1.0	10YR 3/2 to 10YR 4/3	Beds of RADIOLARIAN OOZE, gritty, are pale brown, light yellow brown, medium yellow brown (10YR 6/3, 10YR 5/3, 10YR 7/4, 10YR 6/4).
					3	1.0	10YR 4/2	Small spots of reddish yellow (7.5YR 5/4 to 7.5YR 7/4) clay occur. Major Lithology: Smears: Average of 8 52% clay min. 28% radiolaria 4% sponge spicules 2% silicoflagellates 1% qtz. 1% radiolites 1% accessory heavies 1% ferruginous blebs
					4	1.0	10YR 5/2	CO ₂ Bomb Results 14-2, 53-0; 14-3, 72-0. Grain Size 2-50 72.5% sand 14.2% silt 83.5% clay Carbon, Carbon-Carbonate 2-52 (0.1, 0.1, 0)
					5	1.0	10YR 5/3 to 10YR 4/2	
					6	1.0	10YR 5/2	
					7	1.0	10YR 5/2	

SITE - ROCK	TIME - UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	CORE 13			LITHOLOGIC DESCRIPTION	
				SECTION	METERS	GRAPHIC LITHOLOGY		
SITE 417	HOLE A	MIDDLE EOCENE	Podocrits	A, P	1	0.5	10YR 3/3	ZEOLITIC CLAY, highly deformed, firm; dark brown, dark grayish brown, brown to dark brown, very dark grayish brown, dark yellow brown (10YR 3/3, 10YR 4/2, 10YR 4/3, 10YR 3/2) with light yellow brown, and grayish orange (10YR 6/4, 10YR 7/4) streaks.
					2	1.0	10YR 4/2	Spots of light bluish (5B 7/1) volcanic ash in Section 2 and light gray beds are apparently diffuse. Impaction on a 1 cm scale in top of Section 4. Core Catcher has olive brown clay (2.5Y 4/4).
					3	1.0	10YR 4/3 to 10YR 3/2	Major Lithology Smears: Average of 4 61% clay m.n. 1% qtz. 1% K-feldspar 32% zeolites 2% accessory heavies 1% ferruginous blebs TRK Fe-Mn nodules
					4	1.0	10YR 3/2	Minor Lithology Smear: 4-72 49% clay min. 2% qtz. 2% feld. 45% zeolites 1% accessory heavies 1% ferruginous blebs
					5	1.0	10YR 4/2	CO ₂ Bomb Results 3-30 0.7% sand 1.3% silt 98.6% clay Carbon, Carbon-Carbonate 3-32 (0.0, 0.1, 0) 5-80 (0.1, 0.1, 0)
					6	1.0	2.5Y 4/4	

SITE 417 HOLE A CORE 16 CORED INTERVAL: 141.5-151.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	SEDIMENTARY DISTURBANCE	LITHOLOGIC SAMPLE STRUCTURES	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS						
MIDDLE EOCENE	Podocyrptis ampla Zone				1	0.5			10YR 5/3	SILICEOUS CLAY with minor RADICULARIAN ooze, highly disturbed, firm. Dominant lithology: olive to yellow brown, yellow brown, light brown, 10YR 5/3, 10YR 4/2, 10YR 7/4, 10YR 6/4 clay. Minor lithology, as streaks and mottles in major lithology: grayish orange, yellow brown, light yellow brown (10YR 7/4, 10YR 2/2, 10YR 6/4) clayey radiolarian ooze. Reddish yellow (5YR 6/6) clay spots in Section 5, 46 cm. Magnetite micromodules in Section 5, 120 cm. Magnetic micromodules in Section 6, 120 cm.
					2	1.0	VOID		10YR 4/2 10YR 7/4	Major Lithology Smears: Average of 2 60% clay min. 25% radiolaria 7% sponge spicules 2% qtz. 2% feld. 4% ferruginous blebs
					3				10YR 4/2	Minor Lithology Smear: 5-145 53% clay min. 10% radiolaria 3% sponge spicules 2% qtz. 2% feld. 30% manganite
					4				10YR 5/3	CO ₂ Bomb Results 16-1, 83-0% 16-2, 8-0% 16-5, 58-0%
					5		VOID		10YR 6/4	Grain Size 1-78 2-78 28-28 silt 69-1% clay
					6				10YR 4/2	Carbon, Carbon-Carbonate 1-81 (0.0, 0.1, 0) 1-66 (0.1, 0.1, 0) 5-62 (0.1, 0.1, 0)
					7				117 118	
				CC						

SITE 417 HOLE A CORE 15 CORED INTERVAL: 132.0-141.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	SEDIMENTARY DISTURBANCE	LITHOLOGIC SAMPLE STRUCTURES	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS						
MIDDLE EOCENE	Podocyrptis mitra Zone				1	0.5			5Y 4/4	RADICULARIAN-BEARING SILICEOUS ZEOLITIC CLAY (Sections 1-3) highly disturbed, firm. Dominant lithology: olive to brown (5Y 4/4 and 5Y 5/3 to 10YR 5/3). Irregularly streaked with very pale brown (10YR 7/4), yellowish orange (10YR 7/6), dusky yellow brown (10YR 3/7), light yellowish brown (10YR 6/4), sharp conchoidal lithology between 10 and 40 cm is dark brown siliceous zeolitic clay. Below 40 cm is a dark brown (10YR 3/3) siliceous zeolitic clay. Zeolite far less prominent in Section 4. Light streaks are gritty and contain more radiolaria.
					2	1.0	VOID		5Y 5/3	Zeolite-rich (Major lithology) Smear: 3-120 43% clay min. 10% radiolaria 5% sponge spicules 5% qtz. 2% feld. 25% zeolites
					3				10YR 5/3 10YR 3/3 and 4/3 10YR 3/3	Zeolite-poor (Major lithology) Smears: Average of 5 56% clay min. 28% radiolaria 6% sponge spicules 2% siliceoflagellates 2% qtz. 1% feld. 1% accessory heavies 1% ferruginous blebs
					4				120 8 25 75 76	CO ₂ Bomb Results 15-1, 77-0% 15-3, 30-0%
					5		VOID			Grain Size 1-19 2-19 11-5% silt 86-5% clay
					6					Carbon, Carbon-Carbonate 1-21 (0.1, 0.1, 0) 3-28 (0.1, 0.1, 0)
					7					
				CC						

SITE 417 HOLE A CORE 19 CORED INTERVAL: 170.0-179.5 m

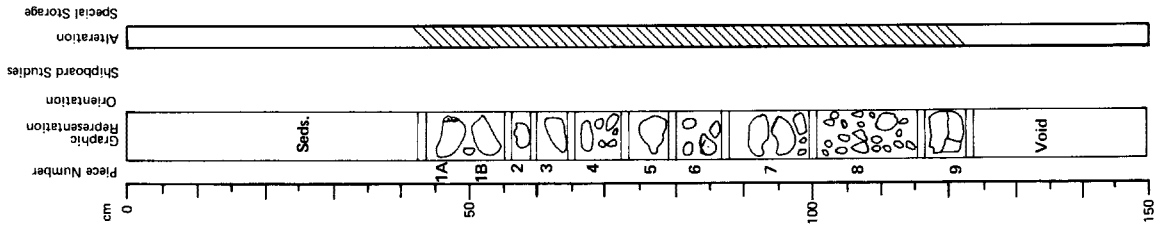
SITE 417 HOLE A CORE 20 CORED INTERVAL: 179.5-189.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
					FORAMNIFERA	RADIIAN						
							1	0.5			50	<p>10YR 3/2 10YR 4/2</p> <p>CLAY Multicolored; highly to moderately deformed, firm.</p> <p>Dominant lithology: very dark grayish brown to dark grayish brown and dark brown (10YR 3/2 to 10YR 4/2 and 4/3).</p> <p>Streaked with brown (10YR 5/3) to light brown (10YR 6/2). Nodules of brown (7.5YR 5/3) in Section 3, 20-30 cm, 65-70 cm. Spots of pale olive (5Y 6/3) Volcanic Ash in Section 1, 90-100 cm.</p> <p>Smears: Average of 4 8% clay min. 6% K-feldspar 1% zeolites 2% accessory heavies TR% ferruginous blebs TR% chert TR% mica</p> <p>Grain Size 1-30% sand 0% silt 90.4% clay</p> <p>Carbon, Carbon-Carbonate 1-32 (0.1, 0.1, 0) 3-28 (0.1, 0.1, 0) 5-81 (0.1, 0.1, 0)</p>
							2	1.0			44	<p>10YR 4/2 10YR 5/4</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							3	1.0			130	<p>10YR 3/2 10YR 4/2</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							4	1.0				<p>10YR 3/1</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							5	1.0				<p>10YR 3/1</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							6	1.0				<p>10YR 3/1</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							7	1.0				<p>10YR 3/1</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
					FORAMNIFERA	RADIIAN						
							1	0.5			35	<p>10YR 3/1</p> <p>ZEOLITIC CLAY Multicolored; highly disturbed, firm.</p> <p>Dominant lithology: very dark gray to moderate yellow brown (10YR 3/1 to 10YR 4/4 and 4/2) clay, streaked with (1) yellowish brown to light brown (10YR 5/4 to 5YR 6/4) and, (2) yellowish red (7.5YR 5/6). Section 1, 56 cm. Pods of pale blue (5B 6/2) Volcanic Ash in Section 1, 62 cm.</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							2	1.0			87	<p>10YR 4/4 10YR 4/2</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							3	1.0				<p>10YR 3/1</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							4	1.0				<p>10YR 3/1</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							5	1.0				<p>10YR 3/1</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							6	1.0				<p>10YR 3/1</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>
							7	1.0				<p>10YR 3/1</p> <p>ZEOLITIC CLAY (Major lithology) Smears: Average of 3 76% clay min. 1% fish debris 7% qtz. 4% K-feldspar 9% zeolites 1% accessory heavies 1% ferruginous blebs 1% Fe-Mn nodules</p> <p>VOLCANIC ASH (Minor lithology) Smear: 1-56 53% clay min. 5% qtz. 4% K-feldspar 35% zeolites 1% accessory heavies 1% ferruginous blebs 2% altered volcanic</p>

LEG	SITE	H O L	CORE	SECT.
51	417A	23	1	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

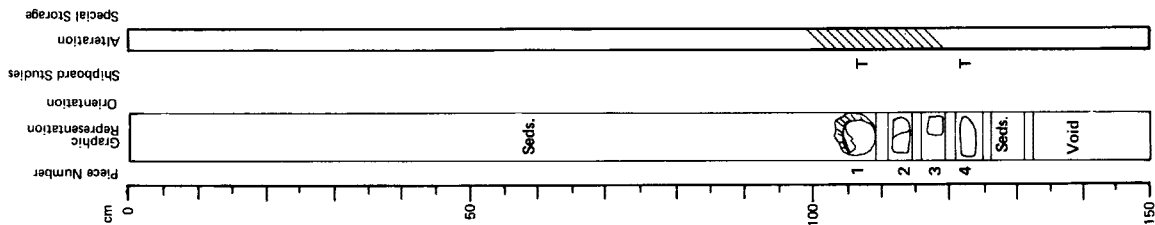


Visual Description

0-43 cm interval: clay (described under sediments).
 Pieces 1-9: altered plagioclase-phyric basalt fragments, many with fine-grained, aphyric chilled margins. Basalt dark gray, altered to yellow-brown near cracks and margins. Groundmass aphanitic to microlitic. Plagioclase phenocrysts 3-10%, <4 mm, replaced by calcite and zeolites(?); clay: mafic phenocrysts replaced by smectite + celadonite(?) 2%, <2 mm. Veins filled by smectite. Piece 1A contains a thin Mn crust and traces of palagonite.

LEG	SITE	H O L	CORE	SECT.
51	417A	22	1	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

0-104, 125-132 cm intervals: dark brown clay (described under sediments).
 Pieces 1-4: strongly altered, sparsely phyric basalt cobbles. Basalt dark gray, altered to yellow-gray, yellow-brown near margins; margins of piece 1 altered to blue-gray to blue-green clay. Groundmass aphanitic to hyalopilitic. Plagioclase phenocrysts 10%, <3 mm, completely replaced by calcite and zeolites; olivine phenocrysts completely replaced by smectite and celadonite 1-2%, <2 mm. Vesicles 1-2%, <3 mm, filled either by green smectite or by white zeolite needles around a calcite core. Veins filled by calcite.

Thin Section Description

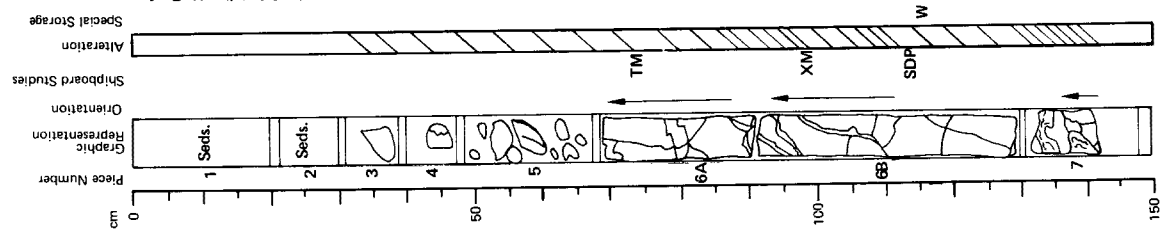
Location: basalt fragment, 107 cm
 Texture: porphyritic, hyalopilitic
 Phenocrysts: altered olivine 2-5%, 1-2 mm, idiomorphic; altered plagioclase, An <65, <3 mm, idiomorphic with oscillatory zoning
 Groundmass: olivine pseudomorphs(?); skeletal plagioclase microlites, An 33, 15%, 0.03-1 mm; plumeose clinopyroxene pseudomorphs, 5-10%; altered glass 50%; hematite 10-20%
 Vesicles: 1%, 0.05-0.5 mm, filled by smectite + celadonite, round, occasionally compound
 Alteration: plagioclase altered to clay and zeolites (analcite); olivine completely altered to iddingsite; glass devitrified, altered to smectite

Thin Section Description

Location: 123 cm
 Texture: porphyritic, hyalopilitic
 Phenocrysts: altered olivine 1-2%, 3-8 mm, idiomorphic; plagioclase An >50, 15%, 0.5-3.0 mm; altered clinopyroxene <1%, 0.1-0.3 mm
 Groundmass: skeletal plagioclase microlites 20%, 0.1-0.5 mm; plumeose clinopyroxene pseudomorphs 26-30%, 0.2-0.7 mm; altered glass 30-40%
 Vesicles: <1%, 0.2 mm, filled by smectite + celadonite, round
 Alteration: plagioclase phenocrysts altered to clay, zeolites(?); clinopyroxene altered to smectite; olivine replaced by smectite, opaques; glass devitrified, altered to palagonite(?)

LEG	SITE	H O	CORE	SECT.
5	1417A	E	24	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 0-30 cm interval: clayey to silty sand (described under sediments).
 30-150 cm interval: strongly altered plagioclase-phyric basalt with minor palagonite breccia. Basalt dark gray, altered to yellow-green or pale brown near margins and along numerous cracks and veins. Alteration often one-sided along veins filled by calcite. Plagioclase phenocrysts 10%, <3 mm. Local vesicles filled by calcite, smectite and zeolites. Breccia composed of strongly altered basalt fragments (locally auto-brecciated) in a matrix of clear green palagonite, smectite, celadonite and zeolites. Breccia in piece 7 contains native copper.

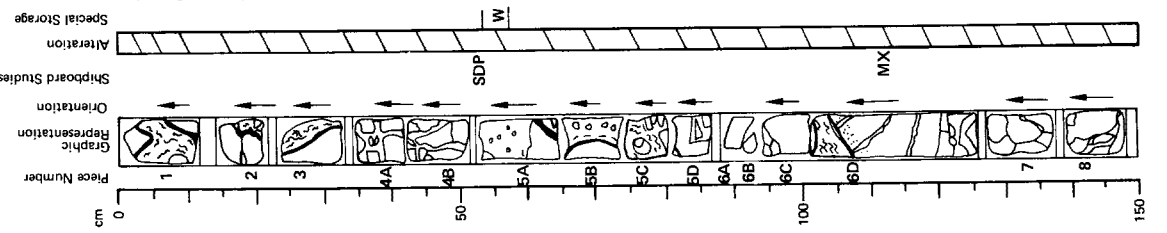
Thin Section Description
 Location: pillow interior, 76 cm
 Texture: porphyritic
 Phenocrysts: altered plagioclase 10-15%
 Groundmass: clay and smectite 65%; magnetite 10-15%
 Vesicles: 2-3%, filled by calcite and celadonite
 Alteration: plagioclase completely altered to clay, k-spar and zeolites(?); glass devitrified, altered in part to clay

Shipboard Data

Bulk Analysis: 98-100 cm	Magnetic Data:	75-77 cm	99-101 cm
SiO ₂ 54.19	NRM Intensity (emu/cc)	0.423 x 10 ⁻³	0.736 x 10 ⁻³
Al ₂ O ₃ 20.64	NRM Inclination	-8.9°	-22.0°
Fe ₂ O ₃ 10.19	Stable Inclination	-35.8°	-20.9°
MgO 3.06			
CaO 2.66	Physical Property Data:	114-117 cm	
Na ₂ O N.D.	Vp (km/sec)	3.79	
K ₂ O 6.38	Porosity (%)	16.74	
TiO ₂ 1.80	Wet Bulk Density (g/cc)	2.44	
P ₂ O ₅ N.D.	Grain Density (g/cc)	2.73	
MnO N.D.			
LOI 4.75			
H ₂ O ⁺ 4.19			
H ₂ O ⁻ N.D.			
CO ₂ 0.80			
Cr N.D.			
Ni N.D.			
Sr N.D.			
Zr N.D.			

LEG	SITE	H O	CORE	SECT.
5	1417A	E	24	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Plagioclase-phyric pillow basalt with palagonite breccia. Basalt dark gray with margins altered to gray-brown, yellow-brown or yellow to a depth of 15 mm; outermost rims dark gray. Groundmass microlitic to aphanitic. Plagioclase phenocrysts <10%, <4 mm. No mafic phenocrysts or vesicles. Veins filled by calcite, clay and zeolites. In piece 4, the margins of the veins are stained by hematite and fragments of green material are present in the veins. Breccia consists of basalt fragments and glass altered to banded green material. Minor red alteration products also present.

Shipboard Data

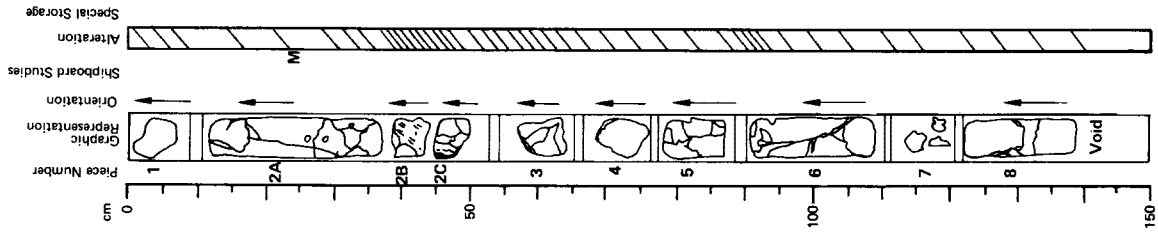
Bulk Analysis: 113-115 cm	Magnetic Data:	113-115 cm
SiO ₂ 51.86	NRM Intensity (emu/cc)	6.837 x 10 ⁻³
Al ₂ O ₃ 19.97	NRM Inclination	-15.6°
Fe ₂ O ₃ 11.92	Stable Inclination	-21.4°
MgO 3.33		
CaO 5.52	Physical Property Data:	54-56 cm
Na ₂ O N.D.	Vp (km/sec)	2.87
K ₂ O 4.26	Porosity (%)	34.2
TiO ₂ 1.69	Wet Bulk Density (g/cc)	2.20
P ₂ O ₅ N.D.	Grain Density (g/cc)	2.83
MnO N.D.		
LOI 3.75		
H ₂ O ⁺ 3.66		
H ₂ O ⁻ N.D.		
CO ₂ 0.43		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

LEG	SITE	HOLE	CORE	SECT.
51	417	A	24	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Plagioclase-phyric pillow basalt. Basalt dark gray; altered to light gray-brown or yellow-brown; margins dark gray to a depth of 2-3 mm. Groundmass microlitic to aphanitic. Plagioclase phenocrysts $\leq 10\%$, ≤ 2 mm. No mafic phenocrysts or vesicles are present except in piece 8 where both are present in small amounts ($\leq 2\%$ and $\leq 1\%$, respectively). Thin (1-2 mm) veinlets filled by calcite \pm clay and zeolites(?) are present in pieces 2C, 3, 5, 6 and 8. In piece 5, the calcite-filled veins have pale, 10-20 mm wide alteration halos. In piece 6, some of the veinlets have black rims. Pieces 2B and C also contain breccias composed of fragments of palagonitized glass, smectite and zeolite(?) cemented by calcite. The fragments tend to be elongate parallel to basalt chill margins.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 21-23 cm 6.762 x 10⁻³
 NRM Inclination -27.3°
 Stable Inclination -26.6°

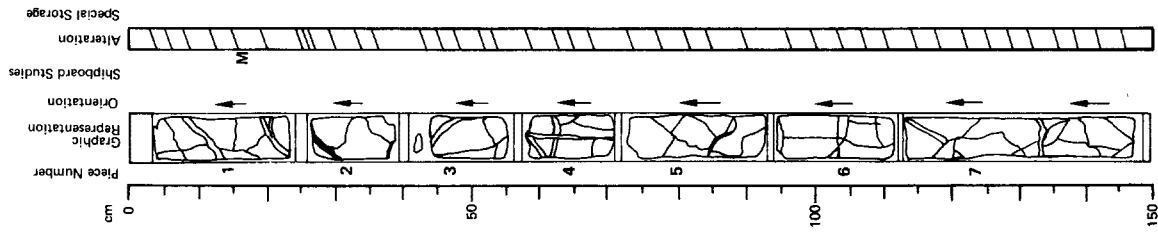


LEG	SITE	HOLE	CORE	SECT.
51	417	A	24	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered plagioclase-phyric pillow basalt. Groundmass dark gray; altered to gray-brown, yellow-brown and dark brown in 2 cm thick alteration halos along veins, chill margins. Groundmass microlitic. Plagioclase phenocrysts $\leq 10\%$, ≤ 4 mm; mafic phenocrysts $\leq 5\%$, ≤ 1 mm. Veinlets filled by calcite \pm clay and hematite(?). Piece 2 composed in part, of palagonite breccia.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 18-20 cm 8.090 x 10⁻³
 NRM Inclination -16.2°
 Stable Inclination -16.2°

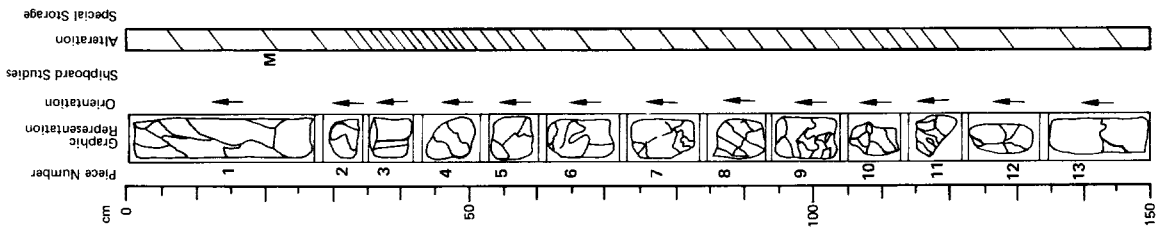


LEG	SITE	H O E	CORE	SECT.
5	14	17A	24	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Plagioclase-phyric pillow basalt. Groundmass dark gray; altered to green, gray-brown, yellow-brown and dark brown in patches and halos (2 cm wide) along veins and chill margins. Groundmass microfolitic to aphanitic. Plagioclase phenocrysts < 10%, < 2 mm; mafic phenocrysts < 10%, < 3 mm. Veins filled by calcite = hematite(?) form local intrusion microbreccias. Pieces 8, 9 and 10 are moderately altered and 3, 4 and 5 strongly altered.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 22.25 cm 2.518 x 10⁻³
 NRM Inclination -19.6°
 Stable Inclination -18.7°

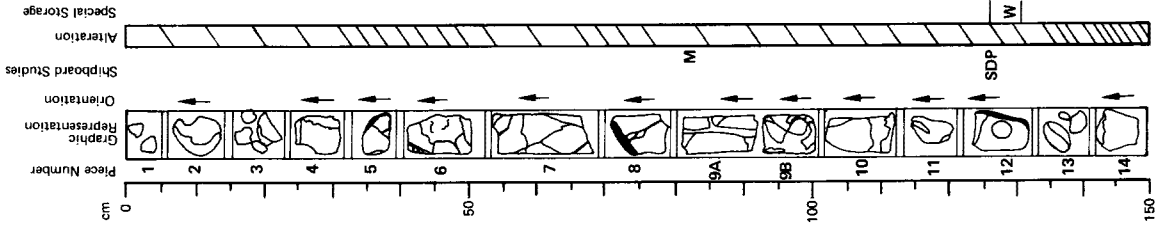


LEG	SITE	H O E	CORE	SECT.
5	14	17A	25	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Pieces 1-4, 7, 9 and 11: Altered, highly fractured plagioclase-phyric pillow basalt. Gray groundmass altered to yellow-brown and brown along chill margins. Plagioclase phenocrysts < 10%, < 3 mm; mafic phenocrysts < 3%, < 1 mm. Pieces 5, 6, 8, 10, 12, 13 and 14: nearly aphyric basalt with plagioclase-filled veins are common in gray. Plagioclase and mafic phenocrysts exsolved to chill margins and to be lined with hematite(?) and/or magnetite(?). Veins in piece 9A are filled by calcite and green hematite. Pieces 3 and 14 are composed in part of palagonite; piece 14 is strongly zoned with bands of green palagonite, celadonite(?) and smectite (hematite?).

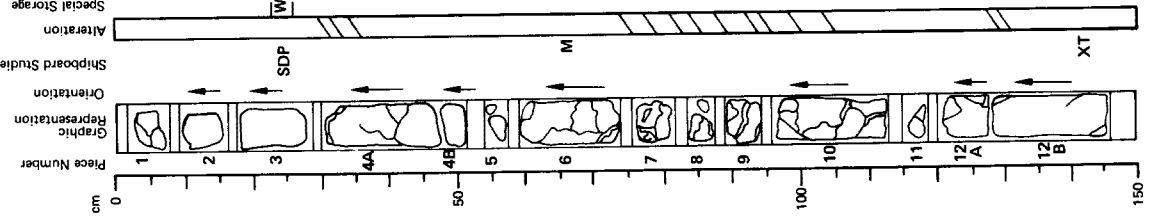
Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 82.85 cm 6.819 x 10⁻³
 NRM Inclination -31.0°
 Stable Inclination -30.8°



LEG	SITE	H O L E	CORE	SECT.
5	1417A	2	5	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Piece 1 - Brown to green palagonite cut by red veinlet. Pieces 2-5: altered phryic pillow basalt. Dark gray groundmass altered to gray-green, gray-brown and yellow-brown. Both plagioclase and mafic phenocrysts are present, the latter altered to smectite. A thin calcite-filled vein is present in piece 2.



LEG	SITE	H O L E	CORE	SECT.
5	1417A	2	5	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic pillow basalt: with chilled margins and interflow breccia. Basalt gray, altered to gray-brown along pillow margins. Groundmass microlitic to aphanitic. Mafic phenocrysts (clinopyroxene and olivine replaced by smectite) <5%; plagioclase phenocrysts 2-5%. Calcite-filled veins common. Breccia composed of basalt clasts partially altered to palagonite and smectite in a banded green matrix of palagonite smectite, hematite and zeolites(?).



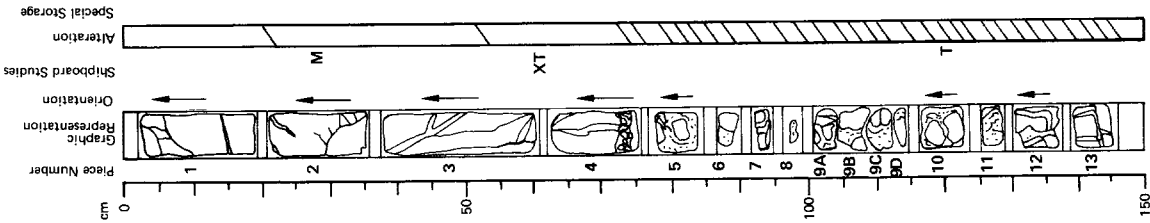
Thin Section Description
 Location: pillow interior, 141 cm
 Texture: hyalopilitic
 Phenocrysts: altered plagioclase, An >40, 1%, 0.5 mm, euhedral; zoned
 Groundmass: plagioclase laths 35%, 0.3 mm, occasionally skeletal; colorless clinopyroxene 20-25%, 0.1 mm; prismatic; magnetite 20-25%, 0.2 mm, idiomorphic; altered glass 10%; minor calcite
 Vesicles: 1-2%, 0.3 mm, round, filled by calcite and minor smectite, celadonite
 Alteration: plagioclase replaced by calcite, clay and zeolites; glass altered to palagonite, celadonite (?); zeolites, celadonite and calcite present in veins

Shipboard Data
 Bulk Analysis: 140-143 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 64.67 cm
 NRM Inclination 3.812 x 10⁻³
 Stable Inclination - 8.0°
 - 8.4°
 Physical Property Data:
 Vp (km/sec) 23-25 cm
 Porosity (%) 4.81
 Wet Bulk Density (g/cc) 8.46
 Grain Density (g/cc) 2.65
 2.80

SiO ₂	48.64	Na ₂ O	N.D.
Al ₂ O ₃	15.90	K ₂ O	2.89
Fe ₂ O ₃	13.35	TiO ₂	1.87
MgO	6.58	P ₂ O ₅	N.D.
CaO	8.08	MnO	N.D.
Na ₂ O	N.D.	LOI	4.35
K ₂ O	2.89	H ₂ O ⁺	3.34
TiO ₂	1.87	H ₂ O ⁻	N.D.
P ₂ O ₅	N.D.	CO ₂	0.73
MnO	N.D.	Cr	N.D.
LOI	4.35	Ni	N.D.
H ₂ O ⁺	3.34	Sr	N.D.
H ₂ O ⁻	N.D.	Zr	N.D.

LEG	SITE	HOLE	CORE	SECT.
51417A			26	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

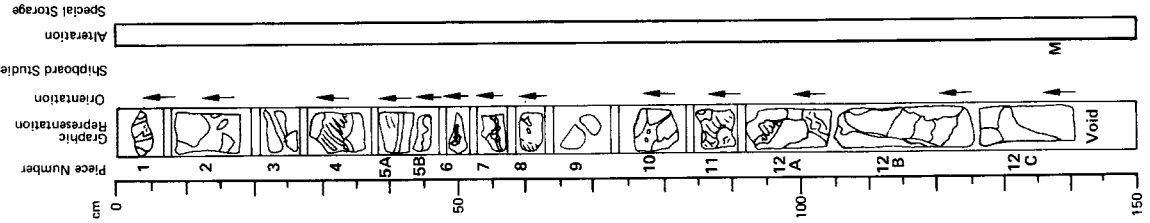


Visual Description
 Phryic pillow basalt with palagonite breccia. Interval from 0.70 cm probably represents a single pillow with a chilled lower margin. Basalt gray, altered to gray-brown along margins. Groundmass microlitic to aphanitic. Altered mafic phenocrysts 5-10%, <1 mm; plagioclase phenocrysts common in pieces 12, 13, variably altered to clay, zeolites; glass altered to smectite. Veins filled by calcite, smectite and hematite. Breccia composed of altered plagioclase-phryic basalt in a cemented matrix of palagonite, smectite, zeolites, celadonite(?), calcite and hematite or limonite(?).

Thin Section Description
 Location: 80 cm, close to chill margin
 Texture: hyalopilitic
 Phenocrysts: euhedral plagioclase laths 1%, 0.2-0.6 mm
 Groundmass: plagioclase microlites 25-30%, 0.1 mm; magnetite (and ilmenite?) 10%, <0.1 mm; devitrified glass 60-65%
 Vesicles: <1%, 0.2 mm, round, filled by celadonite
 Alteration: Glass altered to palagonite, zeolites, celadonite

Shipboard Data

Bulk Analysis:	58-61 cm	Magnetic Data:	26-29 cm
SiO ₂	47.70	NRM Intensity (emu/cc)	2.924 x 10 ⁻³
Al ₂ O ₃	16.85	NRM Inclination	-20.5°
Fe ₂ O ₃	14.71	Stable Inclination	-21.2°
MgO	5.41		
CaO	6.68		
Na ₂ O	N.D.		
K ₂ O	3.19		
TiO ₂	1.92		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	3.20		
H ₂ O ⁺	3.48		
H ₂ O ⁻	N.D.		
CO ₂	0.28		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51417A			26	3

Visual Description
 Pieces 1-11: Altered plagioclase-phryic pillow basalt in matrix of green palagonite breccia. Basalt gray, altered in patches to yellow-brown; margins slightly hematitic. Groundmass microlitic to aphanitic. Plagioclase phenocrysts 10%, <2 mm; ilmenite phenocrysts <5%. Vesicles and vugs, the latter ranging up to 10 mm, filled by calcite and hematite. Breccia composed of altered plagioclase-phryic basalt in a cemented matrix of palagonite, smectite, zeolites and hematite(?). Veins in pieces 1 and 6 filled by calcite, smectite. Breccia composed of altered plagioclase-phryic basalt in a matrix of palagonite, smectite, calcite, celadonite(?) and hematite(?). Piece 12: fractured, phryic basalt. Gray to gray-violet; altered to yellow-brown along veins. Mafic phenocrysts 15%, <1.5 mm; plagioclase phenocrysts <5%, <0.5 mm.

Shipboard Data

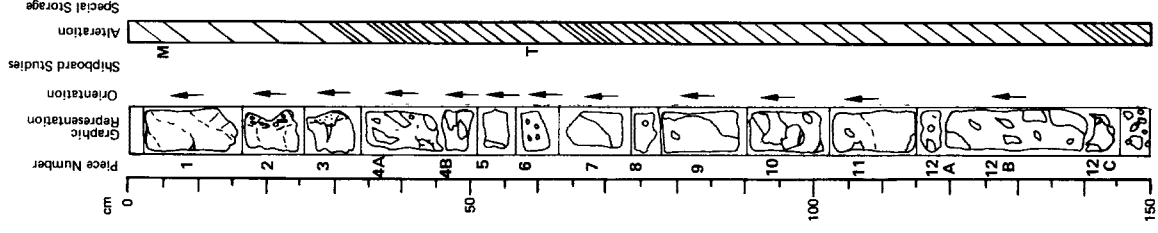
Magnetic Data:	137-140 cm
NRM Intensity (emu/cc)	5.223 x 10 ⁻³
NRM Inclination	-13.7°
Stable Inclination	-14.4°

LEG	SITE	H O L	CORE	SECT.
51	417A	26	4	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered pyroxene- and plagioclase-phyric pillow basalt with hyaloclastic(?) breccia. Basalt altered to yellow-brown. Groundmass microcritic. Pyroxene phenocrysts < 10%, < 3 mm; plagioclase phenocrysts 5-10%, < 1.5 mm, largely replaced by ksp and clay. Amygdules filled by smectite, calcite and hematite (analcite, celadonite?); calcite-filled vesicles locally coalesce to form network veins (pieces 7-9). Veins filled by calcite, smectite; calcite-filled veins in piece 1 locally micro-brecciated. Basalt composed of highly altered basalt fragments displaying spheroidal weathering in a green matrix of palagonite, smectite, calcite, zeolites(?) and hematite(?).

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 2.010 x 10⁻³
 NRM Inclination + .9°
 Stable Inclination - 3.3°



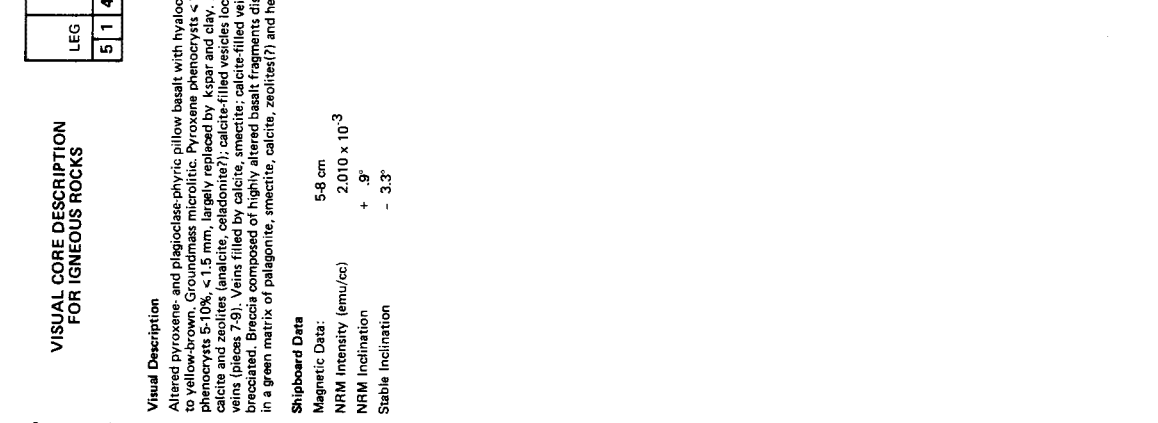
LEG	SITE	H O L	CORE	SECT.
51	417A	26	5	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Pieces 1-6: phyric pillow basalt. Dark gray, altered to gray-violet, yellow-brown. Groundmass microcritic to aphanitic. Mafic phenocrysts (replaced by smectite) 10%, < 0.5 mm; plagioclase phenocrysts 5-10%, < 0.5 mm. Amygdules calcite, smectite-filled, increase in size from 1-2 mm in piece 1 to < 10 mm in pieces 4-6. Veinlets filled by calcite and smectite(?).
 Pieces 7-10: Volcanoclastic breccia composed of altered fragments of basalt in a green matrix of palagonite, smectite, calcite and minor hematite. Calcite present in veins. Hematite present in veins and along outermost surface of basalt fragments. Piece 9 contains a large inclusion of celadonite.
 Pieces 11 and 12: phyric basalt. Gray, altered to yellow-brown near chill margin. Plagioclase phenocrysts 15%, < 7 mm; mafic phenocrysts 10%, < 2 mm. Veinlets filled by calcite.

Thin Section Description
 Location: near chilled margin, 29 cm
 Texture: porphyritic
 Phenocrysts: altered olivine < 10%, 1 mm, euhedral; altered plagioclase 10%, 3 mm, subhedral; altered clinopyroxene 2%, 1 mm, euhedral
 Groundmass: partially altered plagioclase 10%, 0.2 mm, tabular; altered glass > 70%
 Vesicles: < 1%, round, filled by smectite
 Alteration: plagioclase largely altered to ksp and clay; clinopyroxene replaced by smectite; olivine phenocrysts completely replaced by smectite and iddingsite(?)

Shipboard Data
 Bulk Analysis: 28-30 cm
 SiO₂ 49.86
 Al₂O₃ 19.13
 Fe₂O₃ 12.06
 MgO 4.79
 CaO 7.68
 Na₂O N.D.
 K₂O 3.03
 TiO₂ 1.61
 P₂O₅ N.D.
 MnO N.D.
 LOI 5.25
 H₂O⁺ 3.54
 H₂O⁻ N.D.
 CO₂ 0.83
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

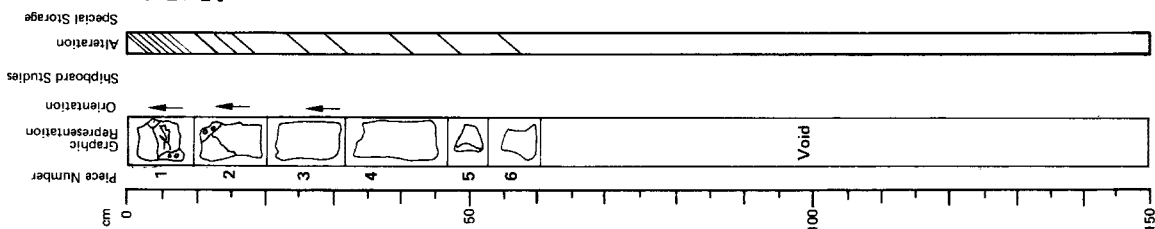


LEG	SITE	HO	CORE	SECT.
5	1417A	2	6	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Porphyritic pillow basalt with minor breccia. Pyroxene phenocrysts (replaced by smectite) 15%, 1.4 mm; olivine(?) phenocrysts (replaced by idd) 12%, 1.2 mm; plagioclase micro-phenocrysts <2%, <1 mm. Piece 1 is fine-grained, but by calcite veins. Pieces 2-6 are more coarse-grained and contain 1-3 mm calcite-filled amygdalites.



LEG	SITE	HO	CORE	SECT.
5	1417A	2	7	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

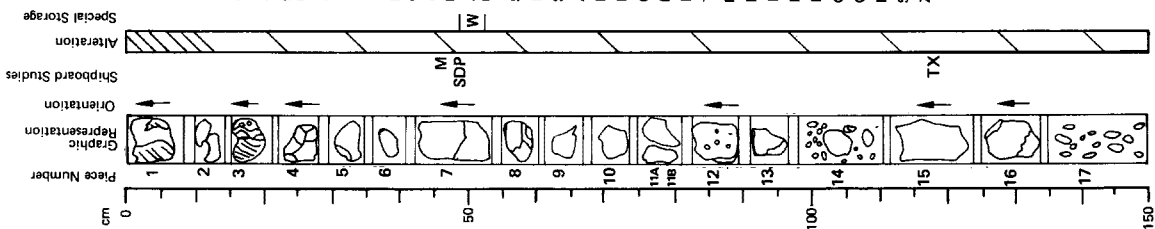
Altered phric pillow basalt with minor palagonite breccia. Basalt dark gray, altered to yellow-brown, red-brown along contacts with breccia. Mgic phenocrysts (replaced by smectite) 15%, <2 mm in piece 1; increase downward to 20-25%, <4.5 mm in piece 16; plagioclase (partially replaced in piece 1) and amphiboles present throughout, also increase in size and quantity downward to nearly 5 mm and 25% in piece 5; these are filled by smectite (redodontite?) + an inner core of calcite and zeolites. Pieces 1 and 2 are filled by smectite and basal veinlets are present in pieces 7. Breccia in pieces 1-6 composed of fragments of basalt in green matrix of palagonite, smectite, celadonite(?) and calcite cut by a network of hematite or red smectite(?). The matrix in piece 3 is banded in green and violet.

Thin Section Description

Location: pillow interior, 119 cm
 Texture: porphyritic, hyaloophitic
 Phenocrysts: altered olivine(?) 1-2%, 0.5 mm, euhedral; altered plagioclase 5-10%, 3 mm, euhedral; clinopyroxene 1-2%, 1 mm, euhedral
 Groundmass: plagioclase 30%, 0.4 mm, long, tabular; granular clinopyroxene 10%, <0.1 mm, partially altered; devitrified glass 50%
 Alteration: plagioclase partially replaced by calcite and albite or ksp; olivine, clinopyroxene replaced by clay

Shipboard Data

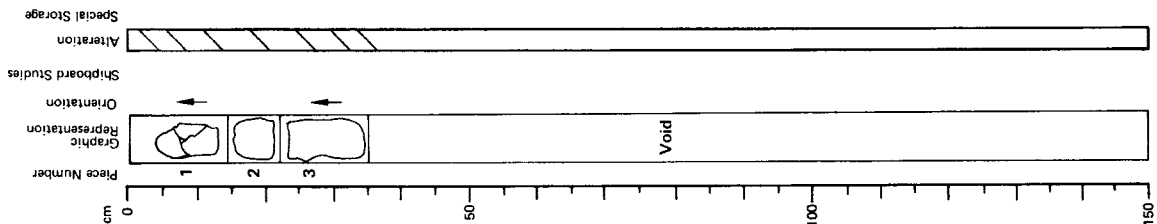
Bulk Analysis: 118-120 cm	Magnetic Data:	45-48 cm
SiO ₂ 50.91	NRM Intensity (emu/cc)	7.068 x 10 ⁻³
Al ₂ O ₃ 19.81	NRM Inclination	-26.1°
Fe ₂ O ₃ 9.95	Stable Inclination	-26.2°
MgO 4.10		
CaO 9.91	Physical Property Data:	49-51 cm
Na ₂ O N.D.	V _p (km/sec)	5.01
K ₂ O 2.89	Porosity (%)	6.23
TiO ₂ 1.58	Wet Bulk Density (g/cc)	2.74
P ₂ O ₅ N.D.	Grain Density (g/cc)	2.85
MnO N.D.		
LOI 5.75		
H ₂ O ⁺ 2.08		
H ₂ O ⁻ N.D.		
CO ₂ 1.10		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417A	27	2	2

Visual Description
 Altered plagioclase-phyric basalt. Groundmass microlitic. Plagioclase phenocrysts (partially replaced by calcite, clay) 1.0%, <3 mm; mafic phenocrysts (olivine replaced by iddingsite?) 1-2%. Vesicles <4 mm filled by calcite, smectite. Veins filled by calcite (piece 1). Phenocryst and groundmass grain size variable.



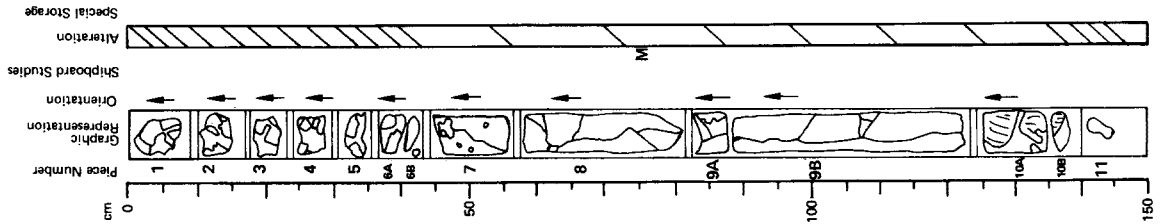
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417A	28	1	1

Visual Description
 Pieces 1-6, 10, 11: altered phyric basalt in breccia. Basalt fragments altered to yellow-gray, gray-brown and yellow-brown; contact with breccia altered red-brown. Plagioclase phenocrysts 10%, <1 mm; mafic phenocrysts (pyroxene, olivine replaced by smectite) 5%, <0.3 mm. Breccia matrix composed of green palagonite and smectite, calcadonite(?), calcite, minor hematite. Veinlets filled by calcite. Pieces 7-9: single pillow with chill margins at 45 and 130 cm; composed of light gray phyric basalt altered to yellow-gray in piece 7. Mafic minerals replaced by smectite 10%, <3 mm; plagioclase phenocrysts 5%, <2 mm. Amygdules <5 mm in pieces 7, 9 filled by smectite, calcadonite(?) and calcite. Veinlets filled by calcite, smectite.

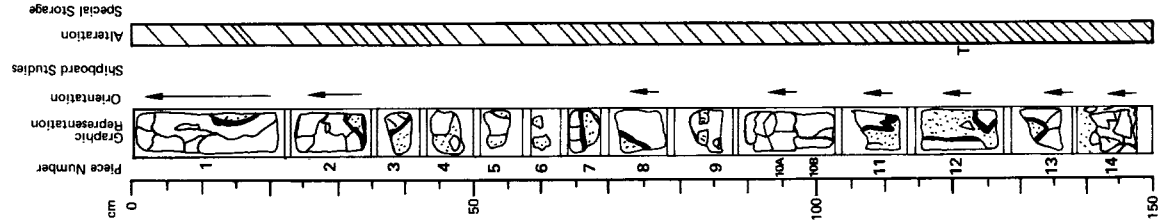
Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 75-77 cm 1.284 x 10⁻³
 NRM Inclination -30.5°
 Stable Inclination -31.1°



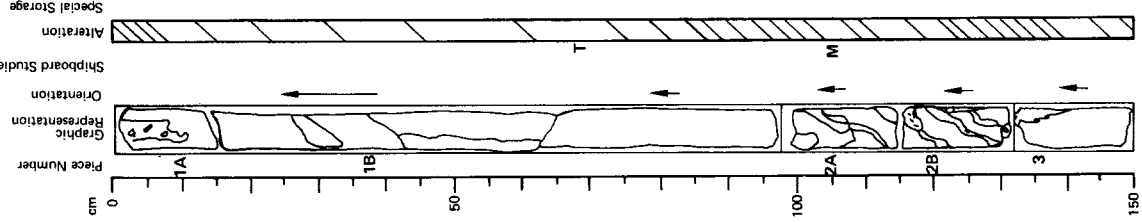
LEG	SITE	HOLE	CORE	SECT.
51417A	28			2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Pieces 1-14: Altered plagioclase-phyric pillow basalt fragments cemented by green palagonite matrix. Basalt altered to yellow-brown and brown along margins. Plagioclase phenocrysts 5-10% <2 mm. Local amygdules <10%, <5 mm, filled by calcite, smectite. Calcite veins abundant. Matrix composed of small brown basalt fragments and particles of green, spheroidally-zoned palagonite and smectite after glass, cemented by calcite, and hematite. Basalts surfaces in contact with calcite (pieces 8 and 9) do not show brown alteration.

Thin Section Description
 Location: volcanic breccia matrix, 123 cm
 Texture: breccia
 Groundmass: palagonite and smectite 70%; orthoclase (Or 85) after plagioclase 10%; ilmenite 5-10%; hematite 5-7%; calcite 5%



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51417A	28			3

Visual Description
 Plagioclase-phyric pillow basalt, with minor interpillow breccia, intervals 0-95, 98-130 and 132-150 each represent individual pillows or parts of pillows. The first two are chilled on both top and bottom with minor breccia at either end. The pillows are oxidized near the margins. Plagioclase phenocrysts range in size from 5-6 mm in the centers of pillows to 1-2 mm at either end. Mafic phenocrysts are subordinate. Amygdules rare in centers of pillows, but increase outward, especially toward tops where they may reach 5 mm in diameter. Amygdules filled by smectite. Veins in piece 2 filled by calcite. Breccia composed of altered basalt clasts in green matrix of smectite, palagonite, calcite and hematite.

Thin Section Description
 Location: pillow interior, 70 cm
 Texture: porphyritic, hyalopilitic
 Phenocrysts: altered olivine 1%, 0.5 mm, euhedral; plagioclase 20%, 1-3 mm, euhedral with rims replaced by kspar, adularia or albite and cores replaced by clay
 Groundmass: altered olivine(?) 1%, 0.2 mm; plagioclase laths 35%, 0.5 mm. An 40; fresh to altered clinopyroxene 20-25%; altered magnetite 10-15%; devitrified glass 5%; calcite 1%
 Alteration: plagioclase altered to clay and kspar; olivine completely replaced by smectite; glass altered to smectite, palagonite and celadonite (<1%)

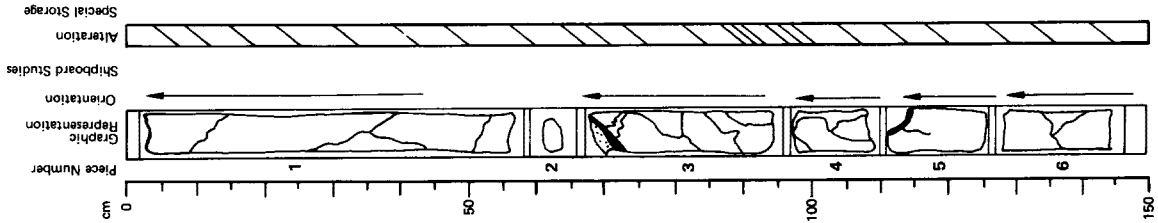
Shipboard Data
 Magnetic Data: 103-106 cm
 NRM Intensity (emu/cc) 9.503 x 10⁻³
 NRM Inclination -17.3°
 Stable Inclination -20.6°

66

LEG	SITE	HOLE	CORE	SECT.
514	17A	2B	4	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Phyric basalt pillows with chill margins and minor green breccia. Basalts gray with 1-2 cm yellow-gray alteration halo along margins; halo brown adjacent to margin. Plagioclase phenocrysts strongly altered to smectite, calcite + zeolites 10-15%, <5 mm; mafic phenocrysts (smectite after pyroxene) <5%, <2 mm. Vesicles abundant, 10%, <6 mm. Calcite veins thin (1 mm) and uncommon.



LEG	SITE	HOLE	CORE	SECT.
514	17A	2B	5	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

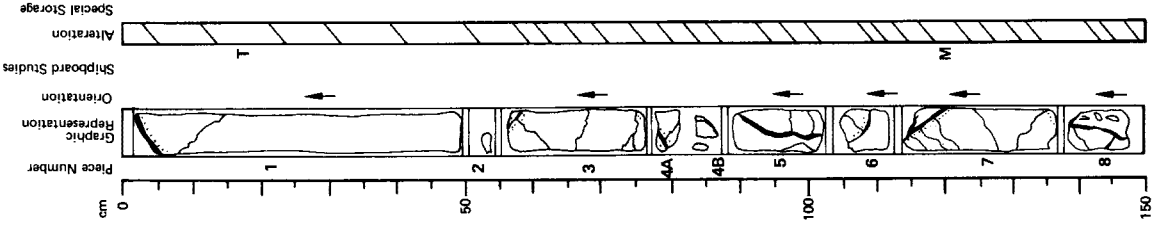
Visual Description
Plagioclase-phyric basalt pillows with chill margins and cemented interpillow breccia. Basalt dark gray, altered to pale brown near margins, but rim (3 mm thick) remains gray. Groundmass micro-litic to aphanitic. Plagioclase phenocrysts partially replaced by calcite, 10%, <5 mm; mafic phenocrysts replaced by smectite 5%, <2 mm. Locally amygdaloid <1% filled by smectite, calcite and/or zeolites. Veinlets of calcite tend to be perpendicular to chill margins. Breccia consists of small, altered basalt clasts in matrix of green plagioclase and smectite coated by hematite and cemented by calcite.

Thin Section Description

Location: pillow interior, 18 cm
Texture: porphyritic, hyaloophitic.
Phenocrysts: altered olivine 1%, 1 mm, euhedral; altered plagioclase 10%, 5 mm, euhedral; altered clinopyroxene 1%, 1 mm, euhedral.
Groundmass: plagioclase 20%, 0.5 mm; tabular clinopyroxene 5%, 0.2 mm; devitrified glass 50-60%.
Alteration: plagioclase phenocrysts partially replaced by calcite and clay; olivine and clinopyroxene phenocrysts completely replaced by smectite.

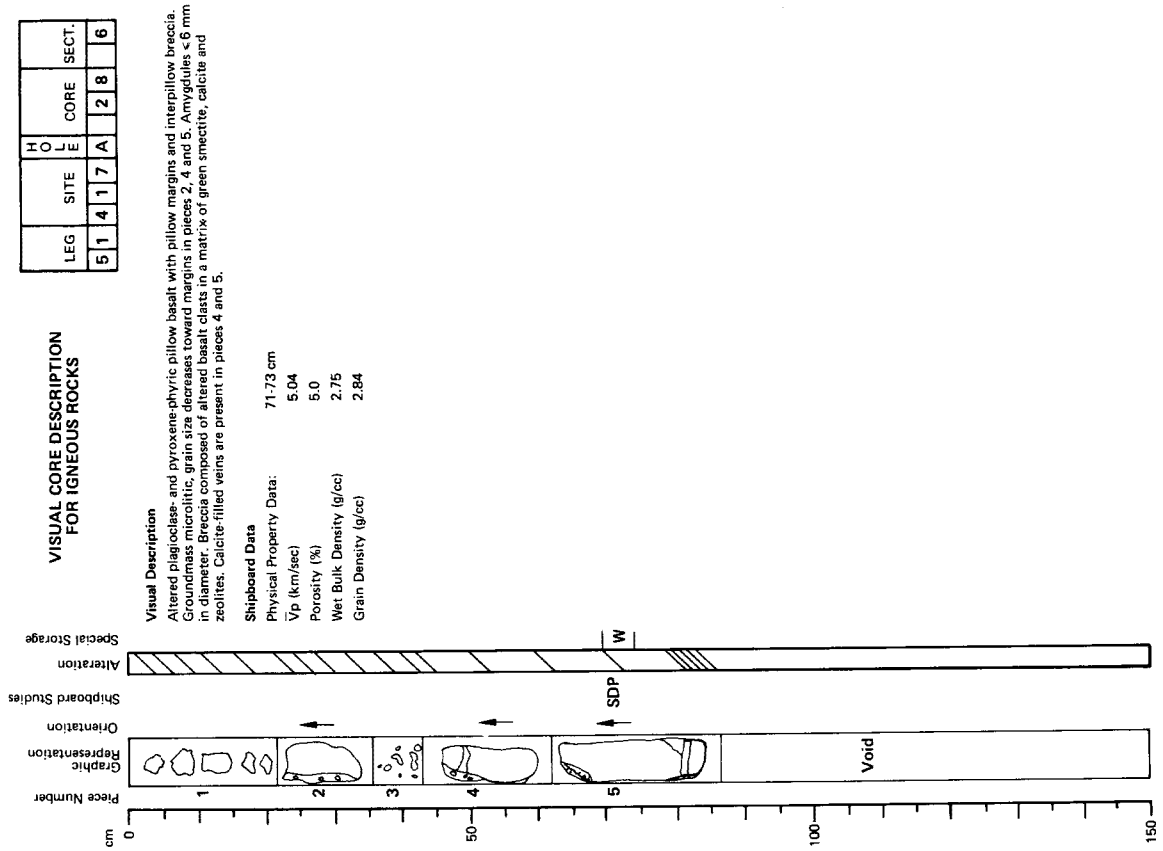
Shipboard Data

118-121 cm
Magnetic Data: 10.770 x 10⁻³
NRM Intensity (emu/cc) -29.9°
NRM Inclination -30.2°
Stable Inclination



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417A		28	6

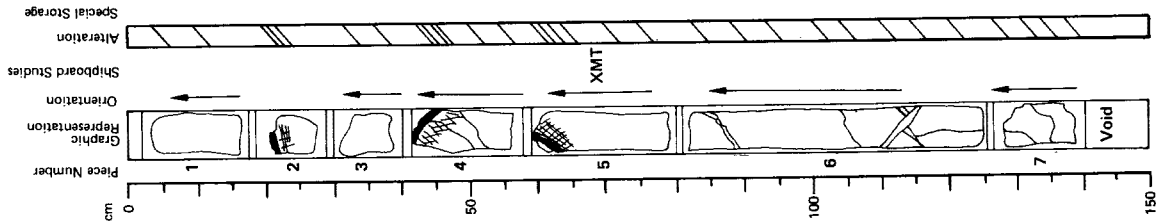


Visual Description
 Altered plagioclase- and pyroxene-phyric pillow basalt with pillow margins and interpillow breccia. Groundmass microclitic, grain size decreases toward margins in pieces 2, 4 and 5. Amygdules < 6 mm in diameter. Breccia composed of altered basalt clasts in a matrix of green smectite, calcite and zeolites. Calcite-filled veins are present in pieces 4 and 5.

Shipboard Data
 Length: 71.73 cm
 Physical Property Data:
 Vp (km/sec): 5.04
 Porosity (%): 5.0
 Wet Bulk Density (g/cc): 2.75
 Grain Density (g/cc): 2.84

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417A		29	1



Visual Description
 Plagioclase-phyric pillow basalt with chill margins. Basalt dark gray, altered to yellow-brown in 1.2 cm thick halo along chill margin; outermost 1.2 mm altered dark brown. Plagioclase phenocrysts strongly altered (to clay, zeolites?) 15%, < 1 mm, decrease in size and number toward margins. Amygdules scarce, small (1.3 mm), filled by calcite, celadonite? Thin calcite-filled veins present but scarce. Traces of green interpillow breccia present along margins.

Thin Section Description
 Location: pillow interior, 73 cm
 Texture: porphyritic, sub-ophitic
 Phenocrysts: zoned plagioclase 15-20%, 1.6 mm, An 53-63, euhedral.
 Groundmass: plagioclase laths 25%, 1.5 mm, An 45-50, occasionally skeletal, clinopyroxene 25%, V_z = 35%; magnetite 15%; celadonite 2%; calcite 1%.
 Alteration: plagioclase replaced by clay (1-2%) and kspar (1%).

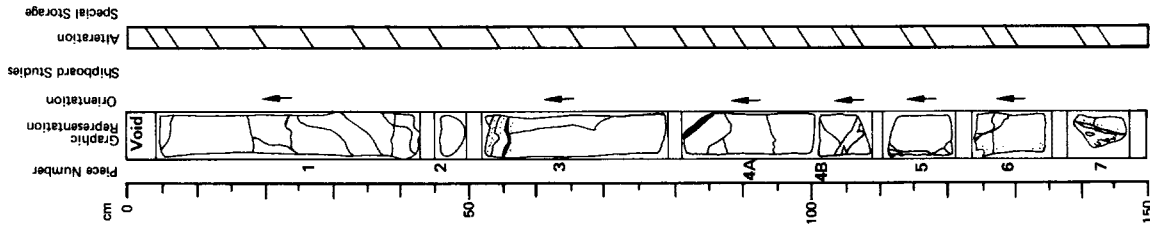
Shipboard Data
 Bulk Analysis: 72.74 cm
 Magnetic Data: 72.74 cm
 SiO₂: 49.75 NRM Intensity (emu/cc): 3.566 x 10⁻³
 Al₂O₃: 17.66 NRM Inclination: -23.2°
 Fe₂O₃: 8.93 Stable Inclination: -23.2°
 MgO: 5.49
 CaO: 12.53
 Na₂O: N.D.
 K₂O: 1.16
 TiO₂: 1.48
 P₂O₅: N.D.
 MnO: N.D.
 LOI: 2.25
 H₂O⁺: 1.69
 H₂O⁻: N.D.
 CO₂: 1.28
 Cr: N.D.
 Ni: N.D.
 Sr: N.D.
 Zr: N.D.

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5	1417A	29	2	2

Visual Description

Phyric basalt pillows with chill margins and minor interpillow breccia. Basalt dark grey, grades to pale brown, dark brown at chilled surface. Plagioclase phenocrysts 10%, <6 mm, increase in size downward; mafic phenocrysts 5%, <2 mm. Vains filled by calcite. Breccia composed of altered basalt fragments in green matrix of palagonite, smectite and celadonite(?) cemented by calcite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5	1417A	29	3	3

Visual Description

Plagioclase-phyric basalt pillows with chilled margins and traces of interpillow breccia. Basalt dark grey, grades to yellow-brown within 2 cm of margin and to dark brown within 2 mm of margin. Plagioclase phenocrysts completely altered to zoisite(?), 15%, <6 mm; clinopyroxene and olivine phenocrysts altered to smectite, 5-10%. Phenocrysts decrease in size (to <1 mm) and number near margins. Glass grain sizes show a complementary variation. Calcite-filled veins rare. Traces of green interpillow breccia coat pillow margins. A large cavity between 128-135 cm is filled by dark green to black smectite(?).

Thin Section Description

Location: next to chilled margin, 5 cm
 Texture: porphyritic
 Phenocrysts: plagioclase 20%, 1-4 mm, An 60, euhedral with oscillatory zoning, cores occasionally contain high refractive index inclusions.
 Groundmass: plagioclase laths 30%, 0.1-1.0 mm, An 45; stubby clinopyroxene (augite?) prisms 25-30%, 0.1 mm, 2V > +40; octahedral magnetite dendrites 15%, <0.2 mm; calcite 2%; smectite and celadonite 1%.
 Vesicles: 1%; irregular with glauconite fillings.
 Alteration: plagioclase replaced by calcite (1-2%) and clay (2%).

Thin Section Description

Location: chilled margin, 135 cm
 Texture: porphyritic, hyaloophitic
 Phenocrysts: altered olivine 2%, 1 mm, euhedral; partially altered plagioclase 15%, 4 mm, An >68; euhedral; altered clinopyroxene 5%, 2 mm, euhedral.
 Groundmass: plagioclase 20%, 0.2 mm; tabular, granular to subhedral clinopyroxene 10%, 0.1 mm; euhedral to dendritic magnetite 2%, 0.01 mm; devitrified glass 50%.
 Alteration: plagioclase phenocrysts largely replaced by calcite and clay; clinopyroxene phenocrysts completely replaced by smectite; olivine phenocrysts completely replaced by calcite.

Shipboard Data

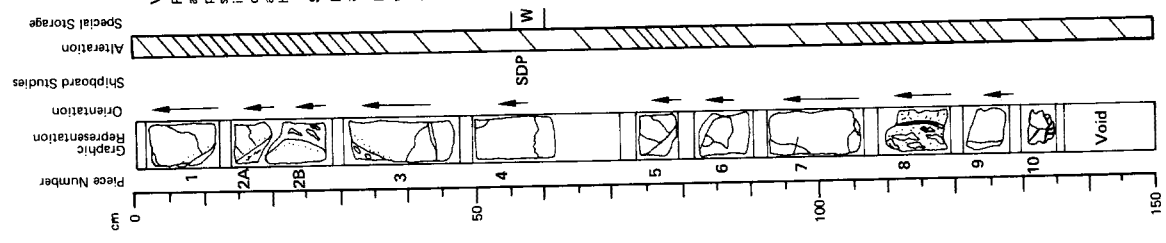
Bulk Analysis:	4.6 cm	Magnetic Data:	4.6 cm
SiO ₂	48.79	NRM Intensity (emu/cc)	6.434 x 10 ⁻³
Al ₂ O ₃	17.64	NRM Inclination	-25.0°
Fe ₂ O ₃	9.48	Stable Inclination	-26.3°
MgO	5.32		
CaO	12.39		
Na ₂ O	N.D.		
K ₂ O	0.70		
TiO ₂	1.42		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	1.85		
H ₂ O ⁺	1.48		
H ₂ O ⁻	N.D.		
CO ₂	0.51		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	A	29	4

Visual Description
 Phryic basalt pillows with chilled margins and cemented interpillow breccia. Basalt dark gray, altered to yellow-brown near margins and to dark brown within 3 mm of margin. Plagioclase phenocrysts partially altered to calcite, clay, 10%, <2 mm; mafic phenocrysts replaced by smectite 5%, <2 mm. Plagioclase phenocrysts increase in size to as much as 5 mm (ave. 2 mm) in pillow interiors (piece 4). Thin (<1 mm) calcite-filled veinlets present. Aggregates of zeolite(?) crystals are found in cavities and on chilled basalt surfaces in piece 9. Breccia composed of highly altered basalt fragments in a green to red-brown matrix of palagonite, smectite, celadonite (?) and hematite cemented by calcite.

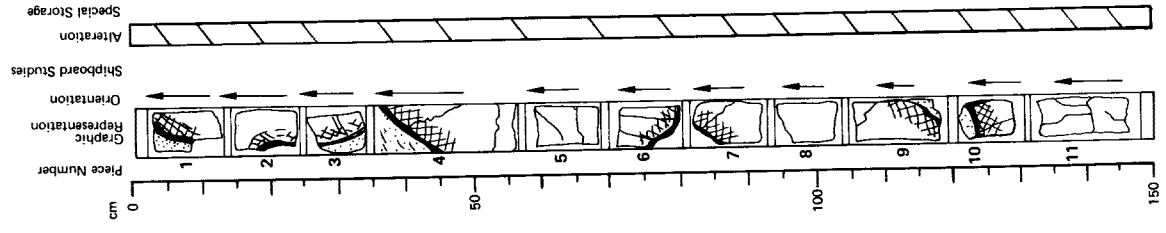
Shipboard Data
 Physical Property Data:
 Vp (km/sec) 5.27
 Porosity (%) 5.5
 Wet Bulk Density (g/cc) 2.76
 Grain Density (g/cc) 2.86

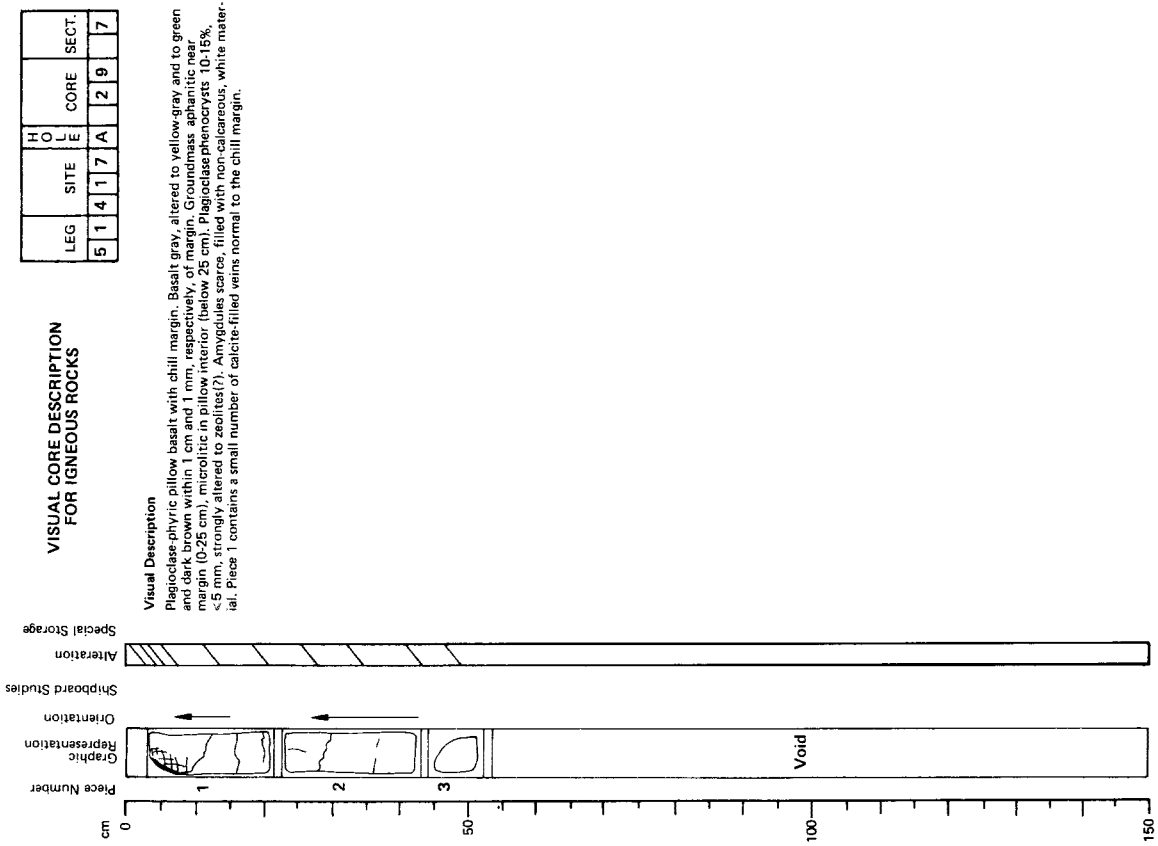


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	A	29	5

Visual Description
 Plagioclase-phryic pillow basalt with chill margins and minor interpillow breccia. Intervals 0-35, 35-80, 80-120 and 120-150 represent individual pillows or parts of pillows. Basalt gray, altered to yellow-brown and finally to dark brown within 2 cm and 2 mm, respectively, of margins adjacent to green breccia. Plagioclase phenocrysts strongly altered to zeolites(?) 15%, <6 mm. Phenocrysts decrease in size and number, groundmass becomes aphanitic near margins. Amygdalites seen in pillows filled with non-calcareous white material. Calcite veins normal to pillow margins. Pieces 3, 4, 9 and 10 contain interpillow breccias composed of green to brown smectite, palagonite and minor hematite in the form of delicate, elongate shards parallel to pillow margins. In some samples, cracks normal to the margin are filled by green to brown palagonitic material and/or calcite.

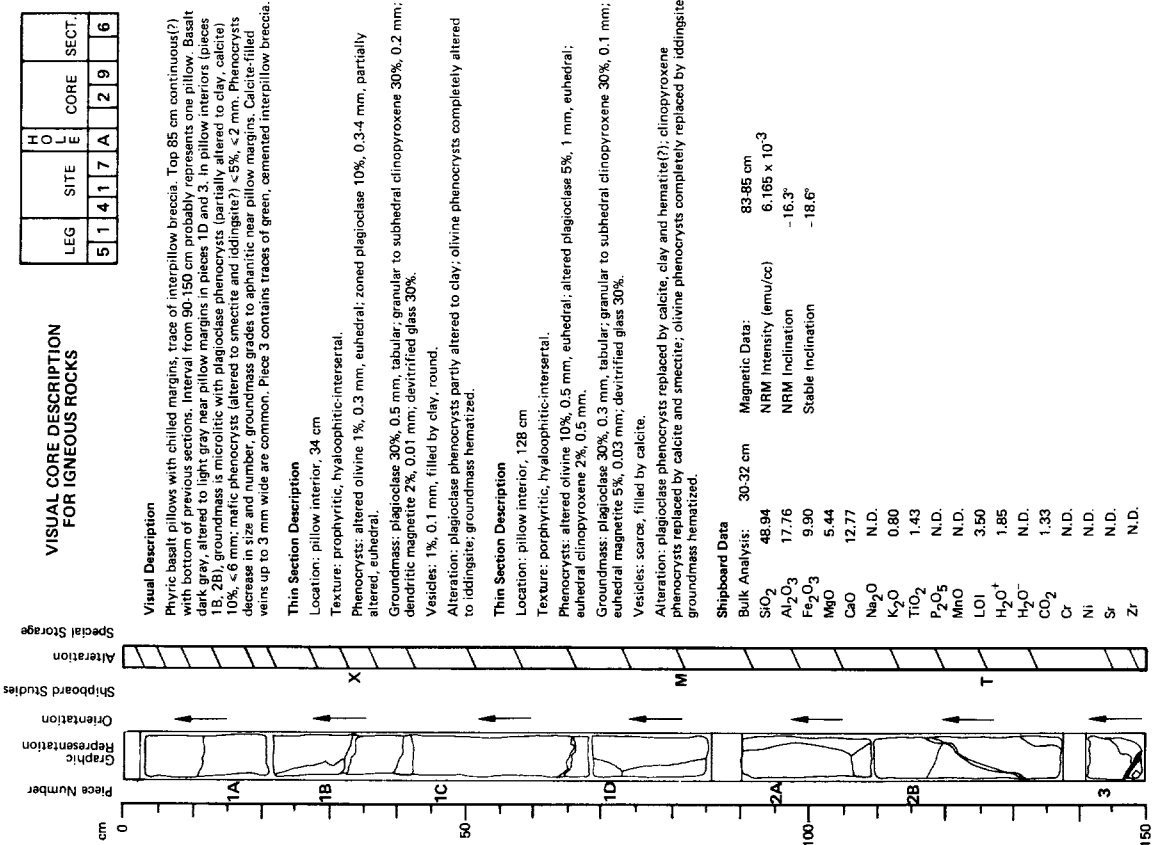




VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Plagioclase-chryic pillow basalt with chill margin. Basalt gray, altered to yellow-gray and to green and dark brown within 1 m; respectively, margin. Groundmass aphanitic near margin (0.25 cm); microlitic in pillow. Plagioclase phenocrysts 10-15%, <5 mm, strongly altered to zeolites(?). Amygdules scarce, filled with non-calcareous, white material. Piece 1 contains a small number of calcite-filled veins normal to the chill margin.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Phyric basalt pillows with chilled margins, trace of inter-pillow breccia. Top 85 cm continuous(?) with bottom of previous section. Int. 90-150 cm in baby prints one pillow. Basalt dark gray, altered to light gray near pillow margins in piece 1D. 3 m below to colors 1B, 2B) groundmass is microlitic with plagioclase phenocrysts (partially altered to clay, zeolites 10%, <6 mm; mafic phenocrysts (altered to smectite and iddingsite?) <5%, <2 mm. Phenocrysts decrease in size and number, groundmass grades to aphanitic near pillow margins. Calcite-filled veins up to 3 mm wide are common. Piece 3 contains traces of green, cemented inter-pillow breccia.

Thin Section Description

Location: pillow interior, 34 cm
 Texture: porphyritic, hyaloophitic-interstitial.
 Phenocrysts: altered olivine 1%, 0.3 mm, euhedral; zoned plagioclase 10%, 0.3-4 mm, partially altered, euhedral.
 Groundmass: plagioclase 30%, 0.5 mm, tabular; granular to subhedral clinopyroxene 30%, 0.2 mm; dendritic magnetite 2%, 0.01 mm, devitrified glass 30%.
 Vesicles: 1%, 0.1 mm, filled by clay, round.
 Alteration: plagioclase phenocrysts partly altered to clay; olivine phenocrysts completely altered to iddingsite; groundmass hematized.

Thin Section Description

Location: pillow interior, 128 cm
 Texture: porphyritic, hyaloophitic-interstitial.
 Phenocrysts: altered olivine 10%, 0.5 mm, euhedral; altered plagioclase 5%, 1 mm, euhedral; euhedral clinopyroxene 2%, 0.5 mm.
 Groundmass: plagioclase 30%, 0.3 mm, tabular; granular to subhedral clinopyroxene 30%, 0.1 mm; euhedral magnetite 5%, 0.03 mm, devitrified glass 30%.
 Vesicles: scarce, filled by calcite.
 Alteration: plagioclase phenocrysts replaced by calcite, clay and hematite(?); clinopyroxene phenocrysts replaced by calcite and smectite; olivine phenocrysts completely replaced by iddingsite; groundmass hematized.

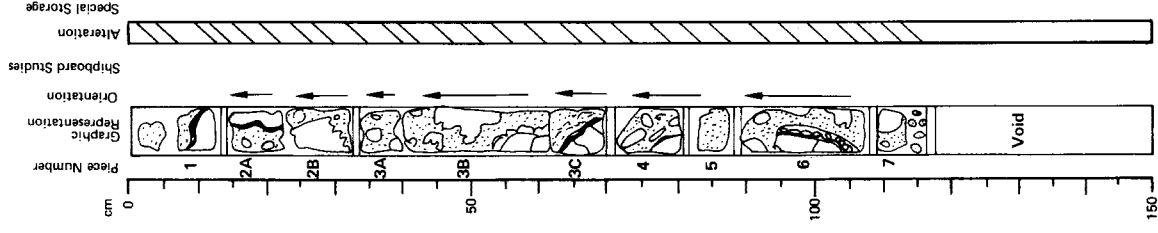
Shipboard Data

Bulk Analysis:	30-32 cm	Magnetic Data:	83-85 cm
SiO ₂	48.94	NRM Intensity (emu/cc)	6.165 x 10 ⁻³
Al ₂ O ₃	17.76	NRM Inclination	-16.3°
Fe ₂ O ₃	9.90	Stable Inclination	-18.6°
MgO	5.44		
CaO	12.77		
Na ₂ O	N.D.		
K ₂ O	0.80		
TiO ₂	1.43		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	3.50		
H ₂ O ⁺	1.85		
H ₂ O ⁻	N.D.		
CO ₂	1.33		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

LEG	SITE	HOLE	CORE	SECT.
51	417A		310	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Volcanic breccia containing strongly altered basalt fragments in a green palagonite matrix. Basalt yellow-brown with a 2 mm thick dark brown crust. Groundmass aphanitic. Plagioclase phenocrysts (altered to clay) < 10%, < 1 mm. Calcite-filled amygdulites and cavities (< 1 cm) present but uncommon. Basalt fragments rounded, exhibit chilled margins. Original glass completely altered to palagonite. Elongate green palagonite shards are being detached from basalt fragments parallel to their margins. All transitions visible from palagonite rims still attached to the basalt to shards entirely separated from "mother" pillow. Detached shards in self-matrix of finely granulated (1-2 mm) palagonite fragments cemented by calcite. Larger fragments have thin brown margins, perfitic internal structure.



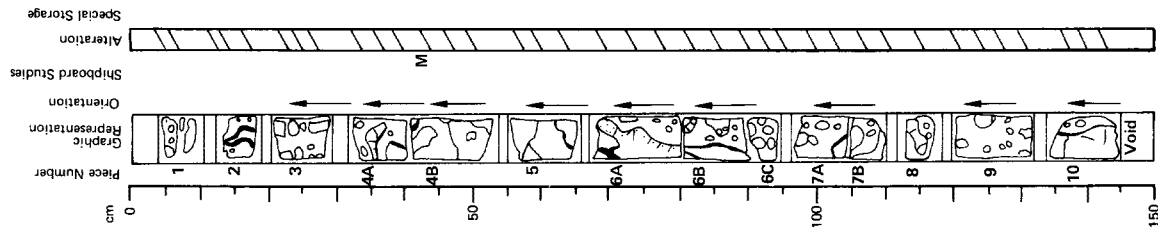
LEG	SITE	HOLE	CORE	SECT.
51	417A		310	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Volcanic breccia containing strongly altered basalt fragments in a green palagonite matrix. Basalt gray; altered near margins to pale brown and brown with a 2 mm thick dark brown crust. Groundmass aphanitic. Plagioclase phenocrysts (largely replaced) 10%, < 2 mm; mafic phenocrysts (also replaced) 5%, < 2 mm. Veins and cavities filled by calcite. Basalt fragments are rounded and exhibit cracked chill margins. Matrix composed of glass fragments completely altered to palagonite in a fine-grained self-matrix.

Shipboard Data

Magnetic Data:
 44.47 cm
 NRM Intensity (emu/cc) 5.980 x 10⁻³
 NRM Inclination -19.5°
 Stable Inclination -20.1°



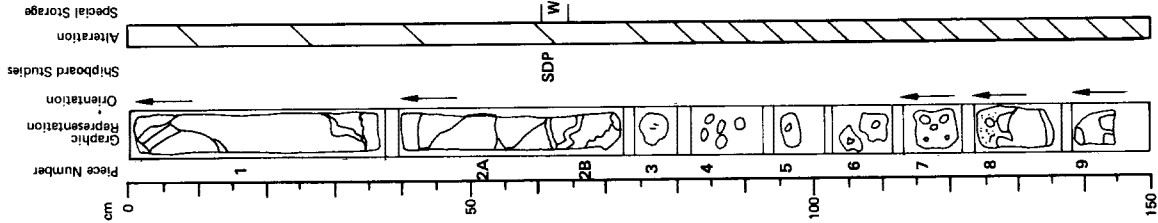
LEG	SITE	HOLE	CORE	SECT.
51	417	A	30	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phric pillow basalt with palagonite breccia. Basalt gray, altered to yellow-brown near margins and to brown within 2.3 mm of pillow rims. Glass entirely palagonitized. Plagioclase phenocrysts (partially replaced by clay) 10%, <3 mm; mafic phenocrysts 15%, <0.5 mm. Veins filled by calcite, celadonite(?) and soft yellow-brown material; veins normal to pillow margin in piece 1 filled by calcite. Breccia in pieces 3-9 composed of altered basalt clasts in a green matrix of palagonite, smectite, celadonite(?) and calcite. Phenocryst in large basalt fragment in piece 8 entirely replaced by gray-green to white clay mineral. Chill margin in piece 8 contains small amygdules filled by zeolites and clay.

Shipboard Data
 Bulk Analysis: 92.95 cm
 SiO₂ 48.94
 Al₂O₃ 16.88
 Fe₂O₃ 11.24
 MgO 5.63
 CaO 12.15
 K₂O 0.72
 TiO₂ 1.41
 P₂O₅ N.D.
 MnO N.D.
 LOI 2.60
 H₂O⁺ 1.69
 H₂O⁻ N.D.
 CO₂ 0.65
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Physical Property Data:
 Vp (km/sec) 63-65 cm
 Porosity (%) 5.27
 Wet Bulk Density (g/cc) 4.6
 Grain Density (g/cc) 2.81
 2.90



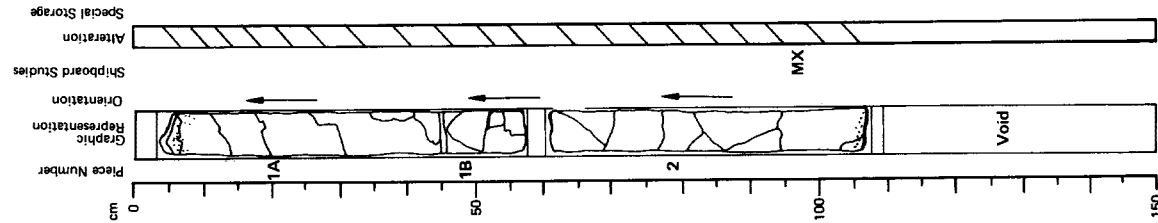
LEG	SITE	HOLE	CORE	SECT.
51	417	A	30	3

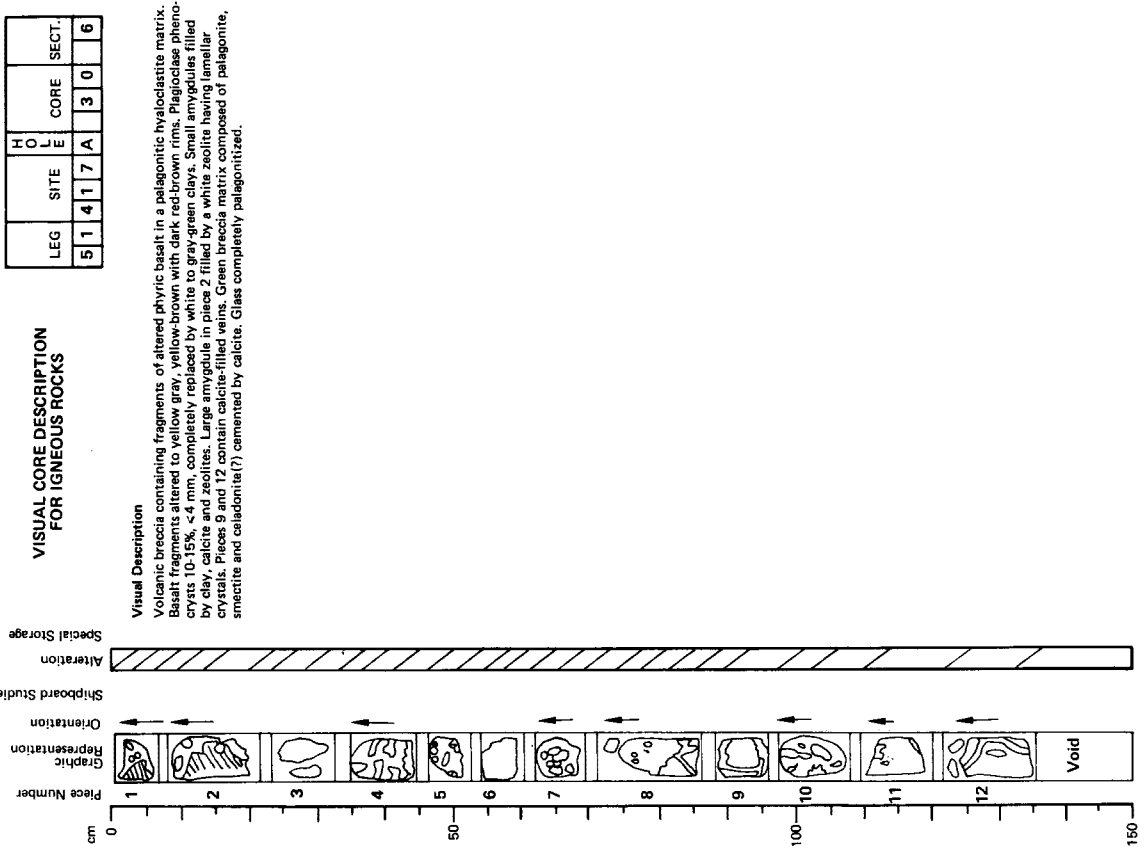
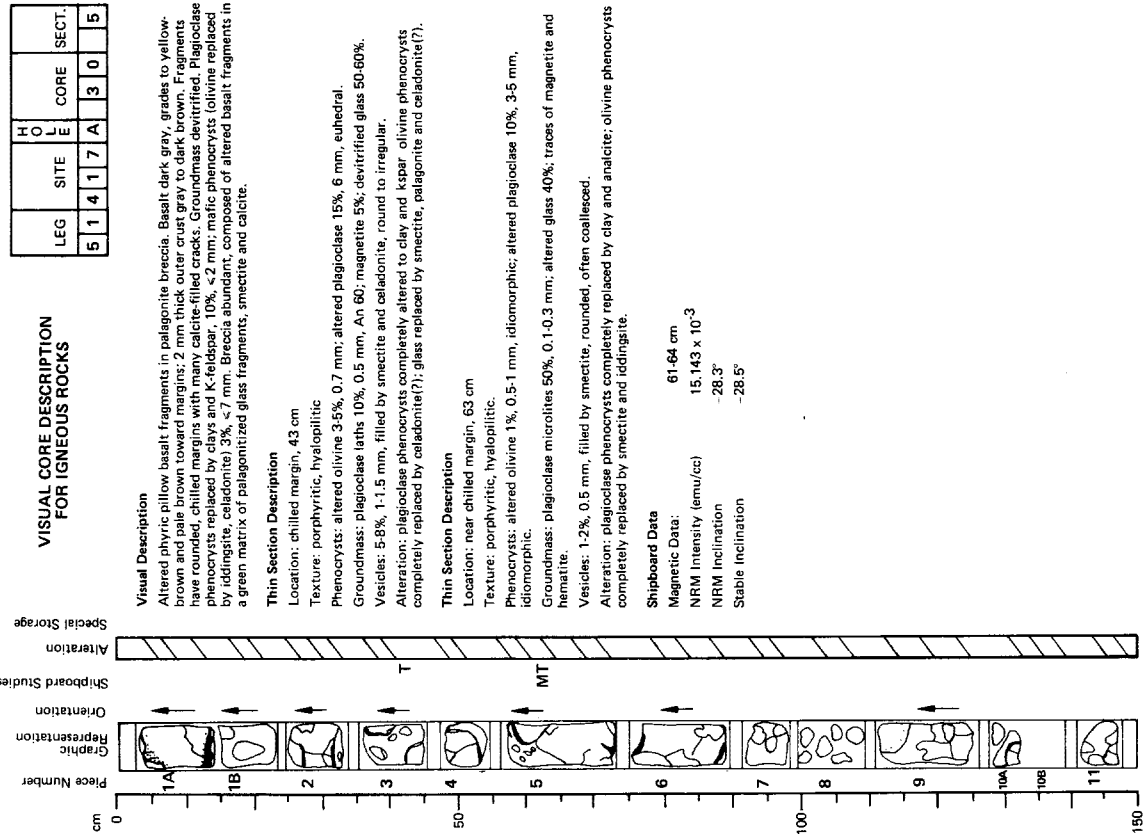
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

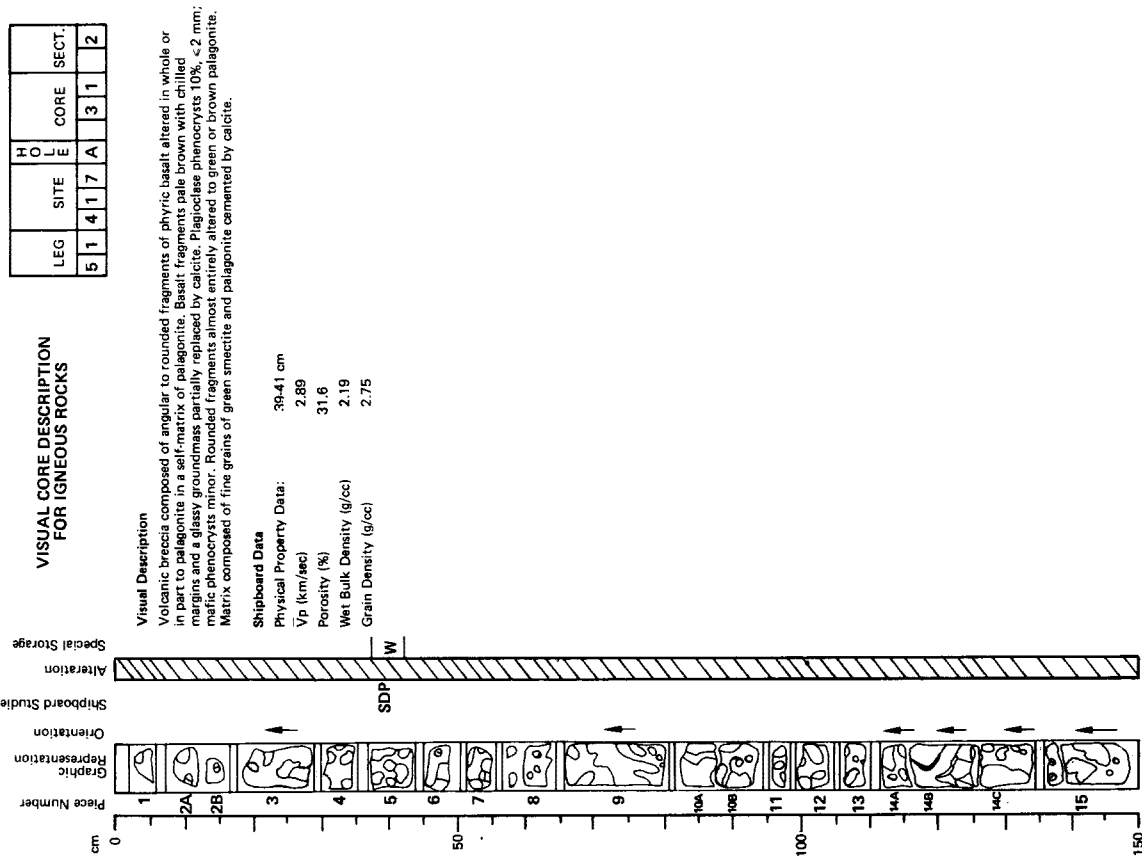
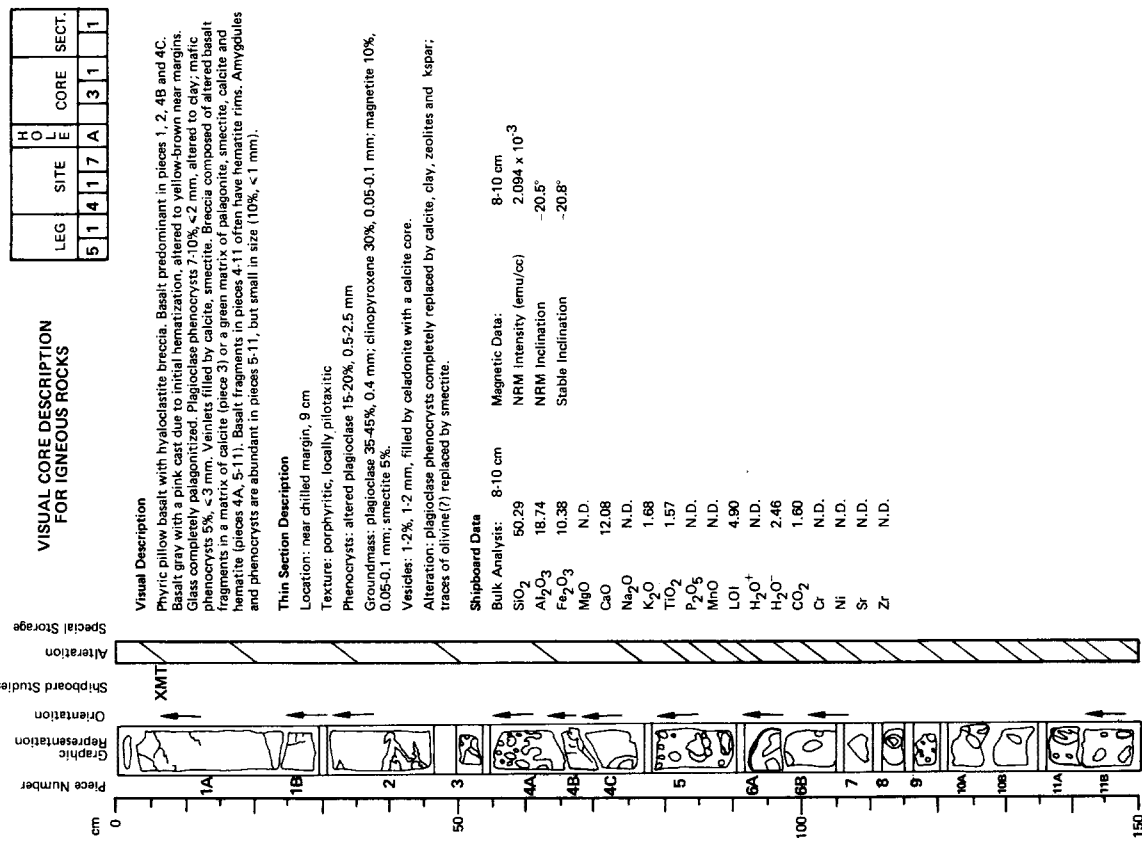
Visual Description
 Phric pillow basalt with chilled margins at 5, 60 and 105 cm. Basalt dark gray, altered to gray-brown within 2 to 10 cm of margins and to dark brown within 1 cm of rim. Plagioclase phenocrysts 10%, <5 mm (ave. 2 mm); mafic phenocrysts 5%, <2 mm. Calcite-filled veins common. Traces of green palagonite breccia are found at top of piece 1A.

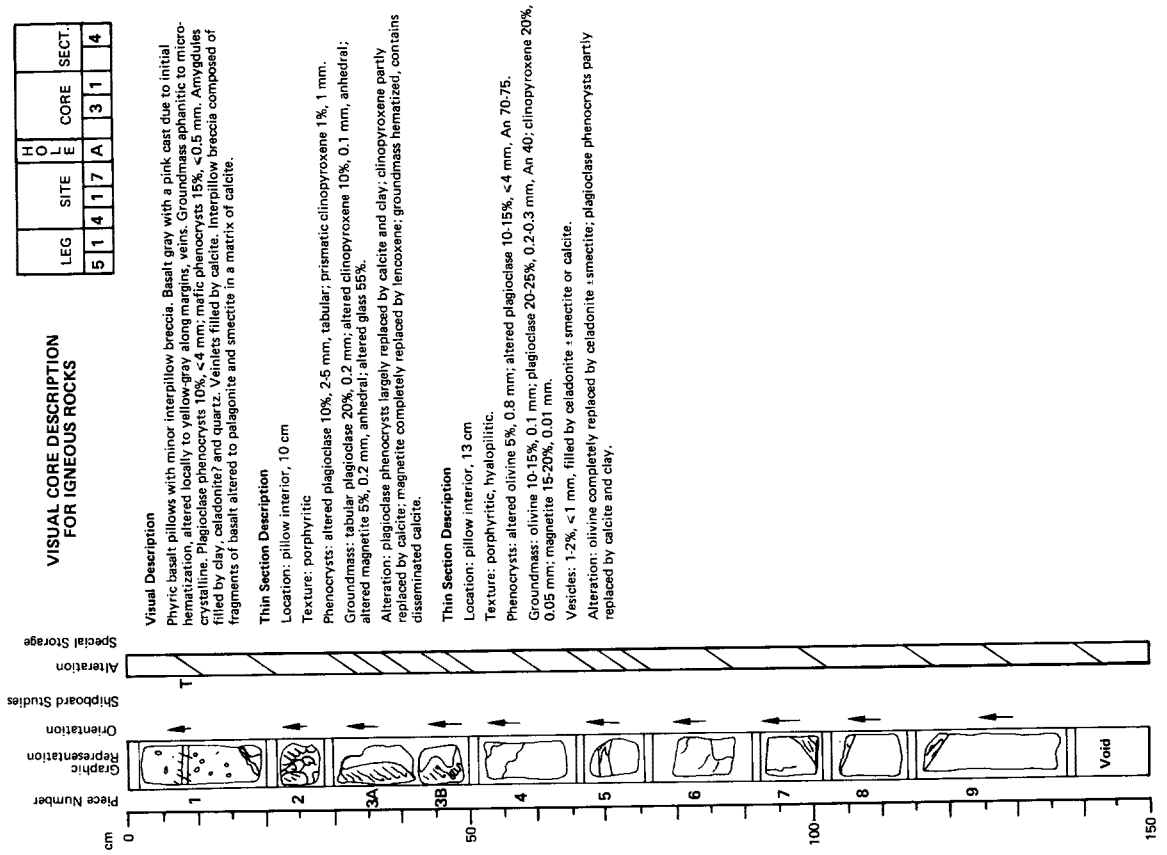
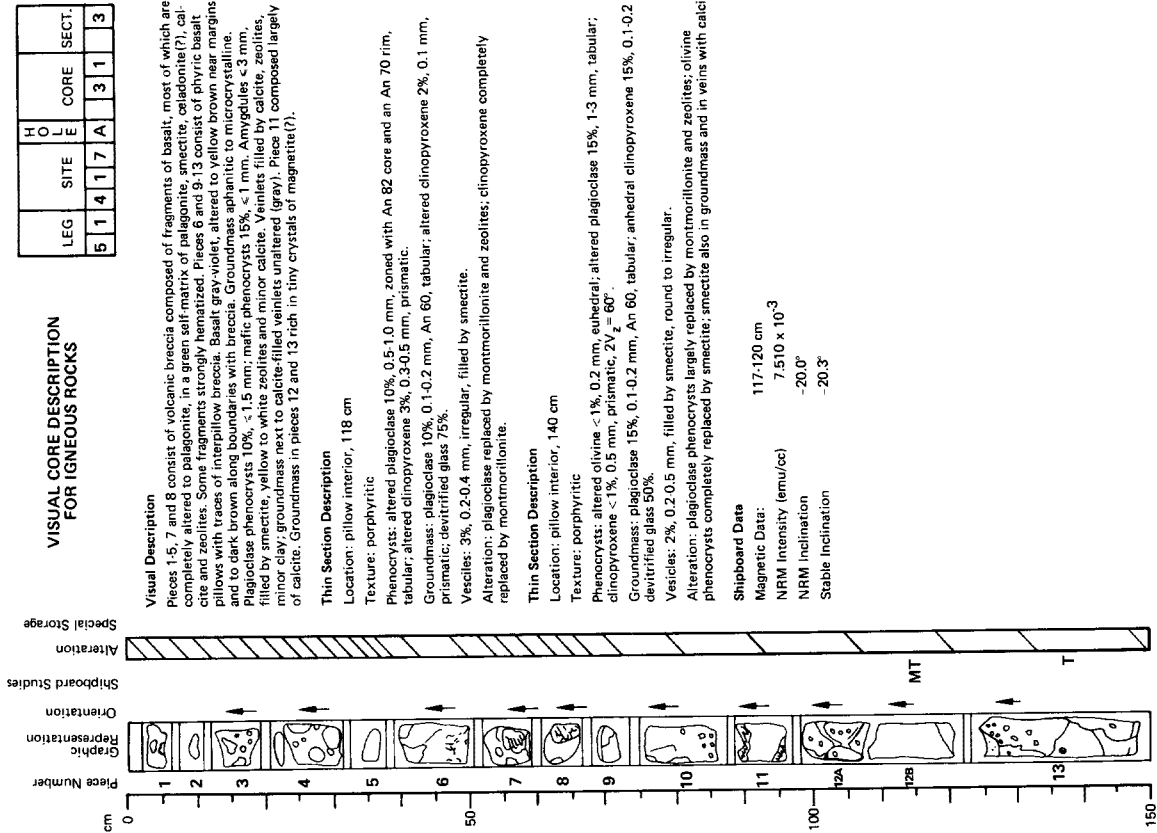
Shipboard Data
 Bulk Analysis: 92.95 cm
 SiO₂ 48.94
 Al₂O₃ 16.88
 Fe₂O₃ 11.24
 MgO 5.63
 CaO 12.15
 K₂O 0.72
 TiO₂ 1.41
 P₂O₅ N.D.
 MnO N.D.
 LOI 2.60
 H₂O⁺ 1.69
 H₂O⁻ N.D.
 CO₂ 0.65
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 NRM Intensity (emu/cc) 10.010 x 10⁻³
 NRM Inclination -13.1°
 Stable Inclination -17.6°



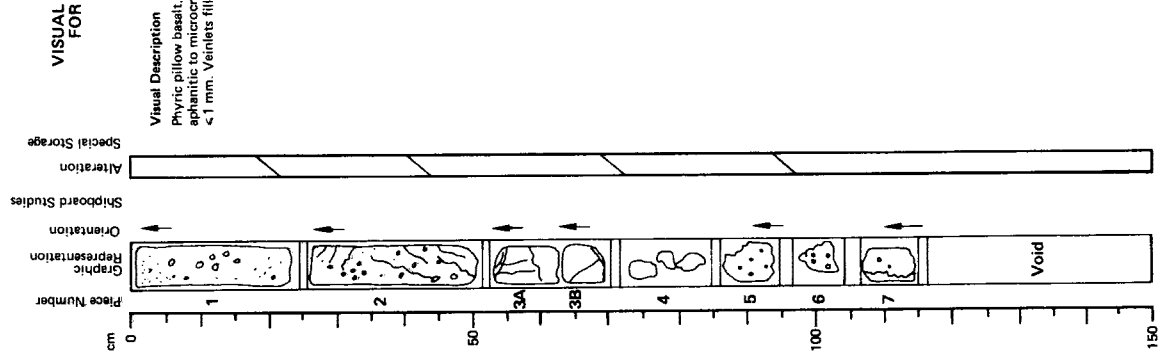






LEG	SITE	HOLE	CORE	SECT.
51	417A	31	31	6

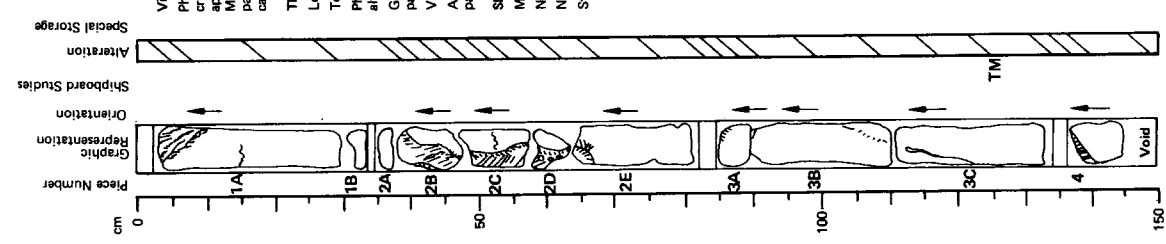
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Phryic pillow basalt. Basalt gray-violet, altered to yellow-brown near margins. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts < 15%, < 4 mm; mafic phenocrysts < 20%, < 1 mm. Veinlets filled by calcite.

LEG	SITE	HOLE	CORE	SECT.
51	417A	31	31	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



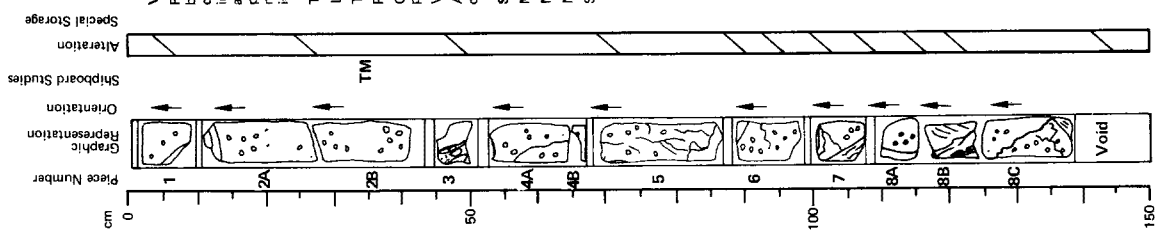
Visual Description
 Phryic basalt pillows with minor inter-pillow breccia. Basalt gray-violet, altered to gray-brown along cracks and yellow-brown near margins; pillow rims altered red-brown against breccia. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 15%, < 4 mm; mafic phenocrysts 15%, < 2 mm. Minor zeolites. Veinlets filled by calcite. Breccia composed of elongate fragments of basalt aligned parallel to pillow rims in a green matrix of pargasite, amectite, celadonite(?), hematite and minor calcite.

Thin Section Description
 Location: pillow interior, 124 cm
 Texture: porphyritic, hyaloophitic
 Phenocrysts: altered olivine 1%, 0.5 mm, euhedral; altered plagioclase 15%, 0.5-4 mm, euhedral; altered clinopyroxene 3%, 1 mm, euhedral.
 Groundmass: plagioclase 15%, 0.1 mm, tabular; granular to subhedral clinopyroxene 30%, 0.05 mm, partly altered; dendritic to euhedral magnetite 10%, 0.01 mm; devitrified glass 20%.
 Veinlets: 1%, 0.01 mm, filled by clay.
 Alteration: olivine phenocrysts completely replaced by iddingsite(?); plagioclase and clinopyroxene partially replaced by calcite and clay; groundmass contains disseminated calcite.

Shipboard Data
 Magnetic Date: 123:126 cm
 NRM Intensity (emu/cc): 2.706 x 10⁻³
 NRM Inclination: -15.7°
 Stable Inclination: -17.4°

LEG	SITE	HOLE	CORE	SECT.
5	1417A	3	2	1

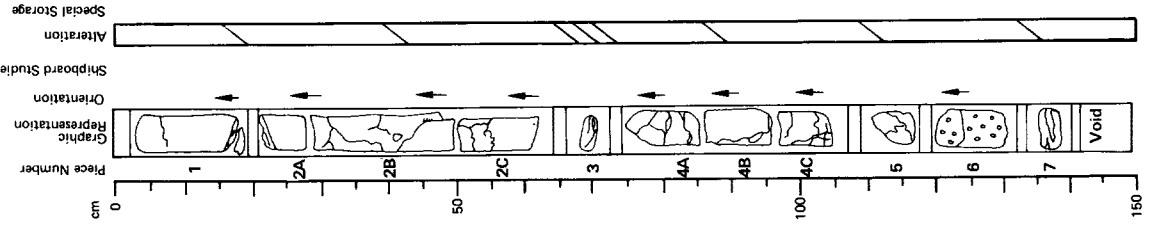
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Phyric basalt pillows with interpillow breccia. Basalt gray violet, altered to gray-brown, yellow brown along margins and cracks. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 10%, increase in size from <2 mm in pieces 1 to <4 mm in pieces 4. Olivine phenocrysts increase in abundance from 3-5% in piece 1 to 10% in pieces 4, 5. Glass is filled by calcite and brown smectite(?). Veinlet in piece 3 contains magnetite(?). Pieces 1, 3, 7 and 8 contain inter-pillow breccia composed of elongate fragments of altered basalt oriented subparallel to pillow margins. In a light gray-brown matrix, fragments of calcite and zoisite(?). Cracks in breccia contain iron oxides. Piece 8B contains pure inclusions of a soft, pale yellow-green mineral.

Thin Section Description
 Location: pillow interior, 37 cm
 Texture: porphyritic, hyalopilitic
 Phenocrysts: altered olivine(?) 1-2%; altered plagioclase 20%, <3 mm.
 Groundmass: altered olivine 5%, 0.05 mm; plagioclase 15%, 0.2 mm, An 55, often skeletal; clinopyroxene 10%; magnetite 15-20%; devitrified, altered glass 20-30%; calcite (in veins) <1%.
 Vesicles: <1%, filled by celadonite and clay + smectite, calcite.
 Alteration: olivine replaced by celadonite + smectite; plagioclase replaced by clay; glass altered to clay and celadonite(?).

Shipboard Data
 Magnetic Data: 35-38 cm
 NRM Intensity (emu/cc) 6.208 x 10⁻³
 NRM Inclination -24.3°
 Stable Inclination -25.1°



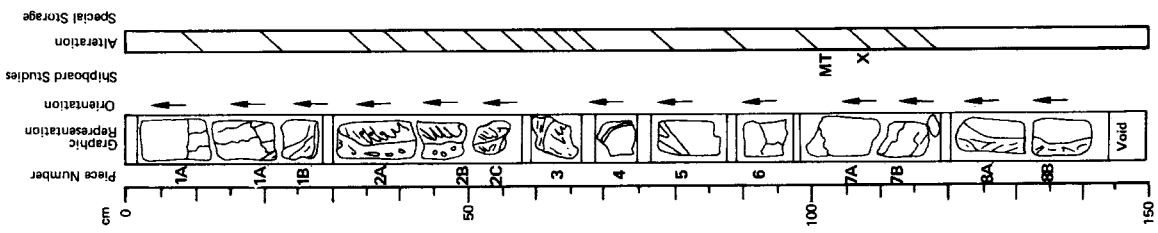
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	1417A	3	2	2

Visual Description
 Phyric basalt pillows with pillow margins and traces of interpillow breccia. Intervals 0-20, 20-70, 70-110, 110-135 each represent individual pillows or parts of pillows. Basalt in pieces 1-4 gray-violet, altered to yellow-brown near margins. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 10%, <2 mm; mafic phenocrysts 15%, <0.5 mm. Veinlets filled by calcite. Basalt in pieces 5 and 6 gray, altered to light gray-brown near margins. Plagioclase phenocrysts 25%, <3 mm. Piece 7 consists of interpillow breccia composed of altered basalt fragments in a calcite matrix.

LEG	SITE	H O I E	CORE	SECT.
5	1417A		32	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Phryic pillow basalt with pillow margins and inter-pillow breccia. Basalt gray, altered to light gray-brown, yellow-brown near margins. Pillow rims brown immediately adjacent to breccia. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 2% to 10%, ≤ 3 mm (piece 8). Olivine phenocrysts 2.3% to 10%, ≤ 1 mm over thin internal. Veinlets filled by calcite, green or brown smectite(?). Piece 5 contains smectite-filled vesicles. Breccia in pieces 1, 2, 3 and 8 composed of elongate yellow-green fragments of altered basalt (originally glass?) oriented subparallel to pillow margins in a matrix of calcite and analcime(?).

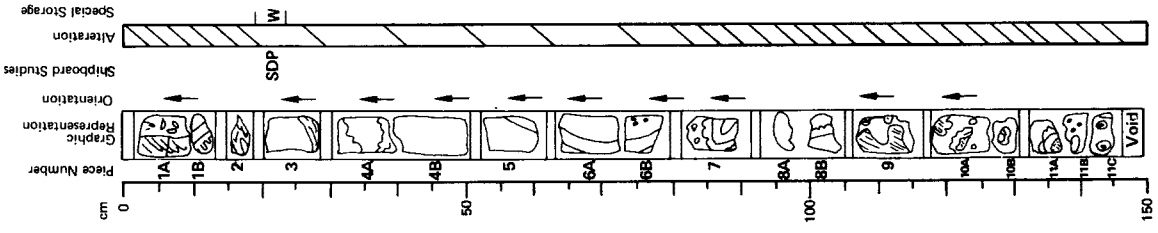
Thin Section Description
 Location: pillow interior, 104 cm
 Texture: porphyritic, hyaloophitic
 Phenocrysts: altered olivine 2%, 1 mm, subhedral; plagioclase 15%, 4 mm, subhedral.
 Groundmass: plagioclase 20%, 0.1 mm, tabular; altered clinopyroxene 30%; devitrified glass 30%.
 Vesicles: <math>< 1\%</math>, 0.1 mm, filled by clay, round.
 Alteration: plagioclase partially replaced by calcite and clay; olivine phenocrysts completely replaced; glass partially replaced by clay.

Shipboard Data

Bulk Analysis: 105-108 cm	Magnetic Data:
SiO ₂ 52.54	NRM Intensity (emu/cc) 103-105 cm
Al ₂ O ₃ 19.61	NRM Inclination 3,595 x 10 ⁻³
Fe ₂ O ₃ 9.74	Stable Inclination -24.3°
MgO 4.21	-25.1°
CaO 9.86	
Na ₂ O N.D.	
K ₂ O 2.14	
TiO ₂ 1.68	
P ₂ O ₅ N.D.	
MnO N.D.	
LOI 3.75	
H ₂ O ⁺ 4.24	
H ₂ O ⁻ N.D.	
CO ₂ 2.06	
Cr N.D.	
Ni N.D.	
Sr N.D.	
Zr N.D.	

LEG	SITE	H O I E	CORE	SECT.
5	1417A		32	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



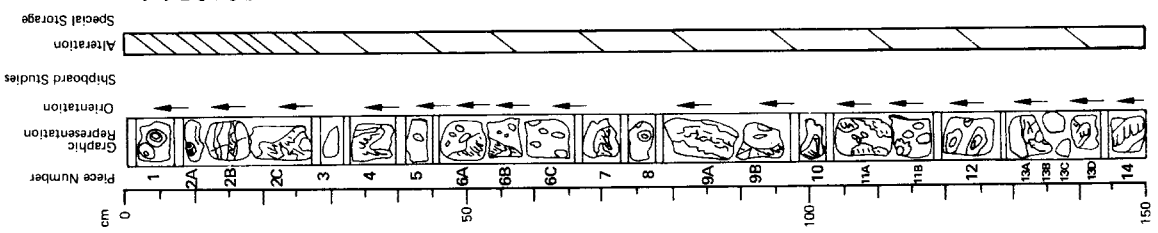
Visual Description
 Phryic pillow basalt with well-preserved chilled margins and volcanic breccia. Basalt, gray-violet; pillow margins, fragments altered to yellow-brown with brown hematized rims. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 10-15%, ≤ 3 mm; mafic phenocrysts abundant in pieces 4 and 5 (15%, ≤ 0.3 mm), limited to pillow margins in piece 6. Veinlets filled by calcite, light yellow or dark green smectite(?). Breccia composed of light green, elongate fragments of altered basalt, often attached or oriented subparallel to pillow margins, in a green to light red-brown matrix of smectite. This breccia is cut in piece 2 by a vein filled by yellow-green clay, calcite and zeolites(?). A large grain of analcime(?) is present in piece 7.

Shipboard Data

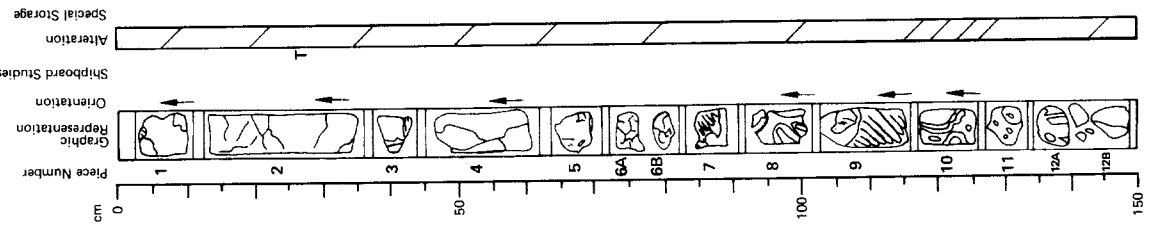
Physical Property Data:	21-23 cm
Vp (km/sec)	4.87
Porosity (%)	8.2
Wet Bulk Density (g/cc)	2.67
Grain Density (g/cc)	2.82

LEG	SITE	H O L E	CORE	SECT.
5	14	17	A	3 2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Volcanic breccia composed of altered fragments of phyrlic basalt in a green palagonite matrix. Basalt fragments gray, altered to yellow-gray; smaller fragments concentrically zoned with brown cores and green rims altered to palagonite. Groundmass aphanitic. Plagioclase phenocrysts 5%, < 1.5 mm; mafic phenocrysts < 3%, < 0.4 mm. Pieces 9,14 contain tiny vesicles. Veinlets filled by calcite. Breccia matrix yellow green to dark green, composed of palagonite, smectite, celadonite(?), analcime and hematite.



Visual Description
 Phyrlic pillow basalt (0.70 cm) with volcanic breccia (70-150 cm). Basalt gray-violet, altered to gray-brown along calcite-filled veins, yellow-brown near margins. Groundmass aphanitic to micro-crystalline. Plagioclase phenocrysts < 15%, < 3 mm; clinopyroxene phenocrysts 5%, < 2 mm; olivine phenocrysts 1%, < 1 mm. Breccia composed of fragments of basalt altered in part to palagonite in a green matrix of smectite, palagonite, celadonite and calcite. Pillow margins and breccia both contain hematite.

Thin Section Description
 Location: pillow interior, 27 cm
 Texture: porphyritic, hyaloophitic
 Phenocrysts: altered olivine 5%, 1 mm, euhedral; altered plagioclase 15%, 0.5-3 mm, euhedral; altered clinopyroxene 5%, 2 mm, euhedral.
 Groundmass: plagioclase 20%, tabular; undifferentiated groundmass 40%, includes devitrified glass, altered olivine(?) and altered clinopyroxene(?); magnetite 10%, dendritic, anhedral.
 Vesicles: trace, 0.5 mm, filled by clay
 Alteration: olivine and clinopyroxene completely replaced by calcite and clay; plagioclase phenocrysts partially replaced by calcite and clay; veins filled by calcite and zeolites.

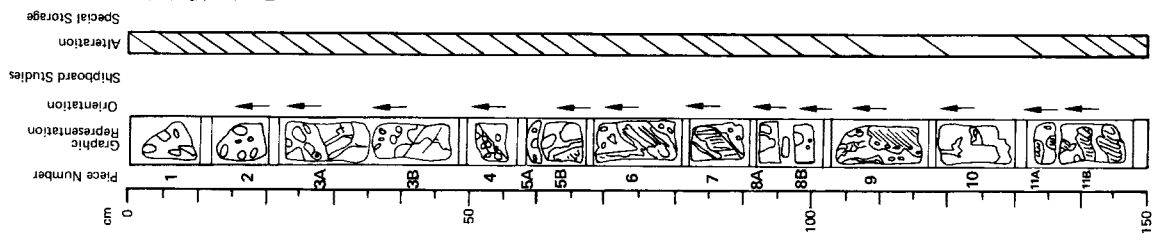
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L E	CORE	SECT.
5	14	17	A	3 3

LEG	SITE	HOLE	CORE	SECT.
5	1417A	3	3	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Volcanic breccia composed of strongly altered phryic basalt fragments (20%) in a green palagonite self-matrix (80%). Basalt, yellow brown; smaller fragments zoned with light brown to green cores and brown to dark green rims cut by thin veins of hematite. Groundmass aphanitic. Plagioclase phenocrysts 5%, <1 mm; mafic phenocrysts 2%, <0.5 mm; phenocrysts in smaller fragments completely altered. Vesicles filled by calcite, smectite. Vainlets filled by zeolites (analcime?) and blue-green smectite (piece 3A) or by calcite (piece 3B). Dark green matrix composed of smectite, palagonite, calcite, zeolites(?) and shards of altered basalt.



LEG	SITE	HOLE	CORE	SECT.
5	1417A	3	3	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

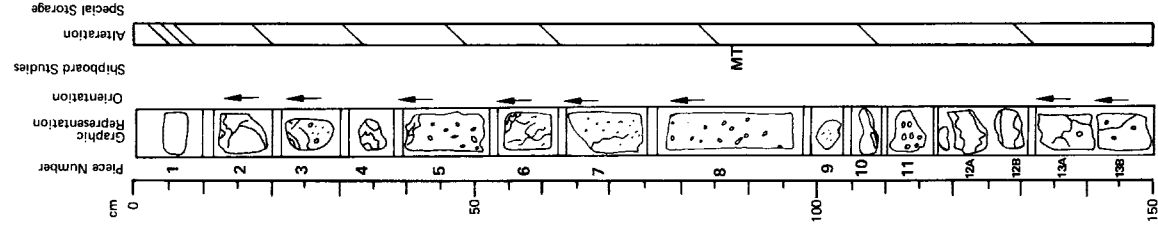
Visual Description
 Phryic pillow basalt with traces of interpillow breccia. Basalt groundmass light gray, altered to yellow-gray, gray-violet with yellow-brown, partially hematized pillow margins. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 10-20%, <5 mm; piece 8 also contains phenocrysts of olivine (5%, <3 mm) and clinopyroxene (2%, <2 mm); pillow margins in pieces 6, 7, 9 and 11 nearly aphyric. Vesicles 5%, <1 mm. Veins filled by calcite, smectite. Breccia composed of altered basalt fragments in a green matrix of smectite, palagonite(?), zeolites and hematite.

Thin Section Description

Location: pillow interior, 85 cm
 Texture: porphyritic, intersertal
 Phenocrysts: altered olivine 5%, 3 mm, subhedral to euhedral; zoned plagioclase 20%, 1.4 mm, euhedral, relatively fresh; altered clinopyroxene 2%, 2 mm, euhedral.
 Groundmass: plagioclase 20%, 0.2 mm, tabular; clinopyroxene 30%, <0.1 mm, anhedral to subhedral; magnetite 5%, 0.01 mm, euhedral, dendritic; altered glass 10%.
 Vesicles: trace, 0.5-0.8 mm, filled by clay.
 Alteration: olivine phenocrysts completely replaced by calcite, clay and smectite; clinopyroxene phenocrysts completely replaced by calcite and clay; glass altered to clay and zeolites.

Shipboard Data

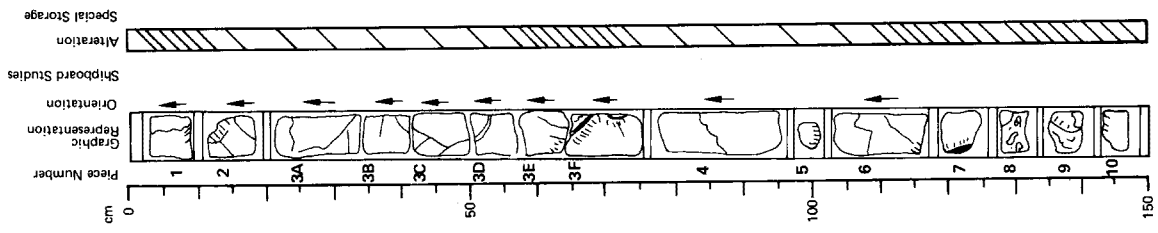
Magnetic Data:
 NRM Intensity (emu/cc) 84-87 cm 13.505
 NRM Inclination -19.2°
 Stable Inclination -19.4°



LEG	SITE	H O	CORE	SECT.
51	417A	E	33	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phric pillow basalt with minor interpillow breccia. Basalt dark gray, altered to pale brown near margins, dark brown along hornitized rims. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts <5%, <5 mm; mafic phenocrysts <1%, <1 mm. Veins filled by calcite. Breccia composed of fragments of altered basalt in a matrix of calcite, smectite and palagonite(?).



LEG	SITE	H O	CORE	SECT.
51	417A	E	33	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phric to sparsely phric pillow basalt with tracts of interpillow breccia. Basalt gray-brown with aphanitic to microcrystalline groundmass. Plagioclase phenocrysts 5-20%, <5 mm; clinopyroxene phenocrysts <5%, <3 mm; olivine phenocrysts <3-0.5 mm; magnetite <0.8 and 80-86 cm intervals sparsely phric. Vesicles 1%, <1%. Cavities at 94 and 119 cm lined by calcite, zeolites, filled by dark green smectite. Breccia composed of altered basalt fragments in a matrix of calcite, smectite and palagonite(?).

Thin Section Description

Location: pillow interior, 84 cm
Texture: porphyritic, hyaloophitic
 Phenocrysts: altered olivine 2%, 1 mm, euhedral; altered plagioclase 20%, 4 mm, euhedral; partly altered clinopyroxene <5%, 2 mm, euhedral to subhedral.
 Groundmass: altered olivine 10%, 0.05 mm, euhedral to subhedral; plagioclase 20%, 0.2 mm, tabular; granular to subhedral clinopyroxene 25%, 0.05 mm, relatively fresh, dendritic magnetite 5%, 0.02 mm; devitrified glass <10%.
 Vesicles: trace, 0.2-0.6 mm, filled by clay, smectite, round.
 Alteration: clinopyroxene phenocrysts altered to clay and smectite; olivine and glass altered to clay; veins filled by calcite and smectite.

Thin Section Description

Location: pillow interior, 92 cm
Texture: porphyritic, hyaloophitic
 Phenocrysts: altered olivine 5%, 0.5 mm, euhedral; plagioclase 20%, 0.5-4 mm, euhedral to subhedral; altered clinopyroxene 5%, 3 mm, euhedral to subhedral.
 Groundmass: altered olivine 10%, 0.02 mm; plagioclase 20%, 0.2 mm, tabular; altered clinopyroxene 20%, 0.02 mm; granular; dendritic magnetite 5%, <0.01 mm; devitrified glass 10%.
 Alteration: olivine completely replaced by iddingsite, clay and smectite; clinopyroxene largely replaced by smectite; plagioclase phenocrysts partly replaced by calcite; glass altered to clay.

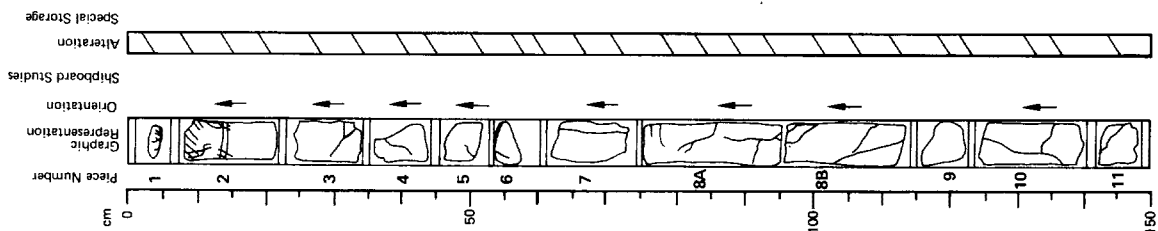
Shipboard Data

Bulk Analysis:	90-93 cm	Magnetic Data:	90-93 cm
SiO ₂	50.20	NRM Intensity (emu/cc)	9.691 x 10 ⁻³
Al ₂ O ₃	18.15	NRM Inclination	-22.3°
Fe ₂ O ₃	7.78	Stable Inclination	-21.8°
MgO	5.45		
CaO	12.92	Physical Property Data:	
Na ₂ O	N.D.	Vp (km/sec)	18-20 cm
K ₂ O	1.43	Porosity (%)	5.07
TiO ₂	1.54	Wet Bulk Density (g/cc)	7.2
P ₂ O ₅	N.D.	Grain Density (g/cc)	2.71
MnO	N.D.		2.84
LOI	3.35		
H ₂ O ⁺	1.60		
H ₂ O ⁻	N.D.		
CO ₂	1.36		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

LEG	SITE	HOLE	CORE	SECT.
51	4117	A	34	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyrlic pillow basalt. Basalt dark gray, locally altered to pale brown near hematized pillow margins. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 5-20%, 3-8 mm; clinopyroxene phenocrysts < 3%, < 2 mm; olivine phenocrysts < 2%, < 2 mm. Piece 2 contains flattened vesicles. Veins filled by calcite and locally by sulfides (piece 8).



LEG	SITE	HOLE	CORE	SECT.
52	4117	A	34	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

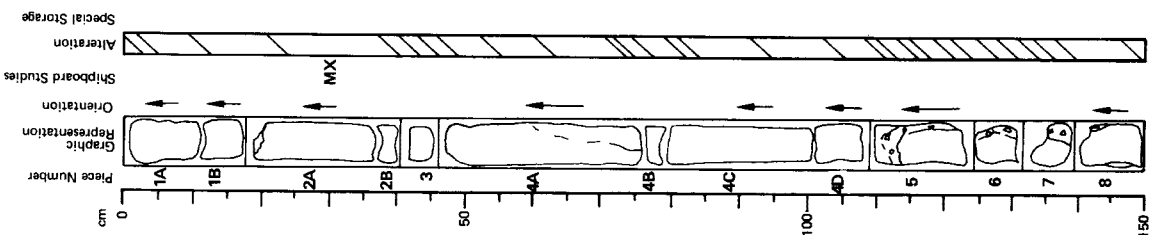
Visual Description
 Phyrlic pillow basalt with minor inter-pillow breccia. Groundmass aphanitic to microcrystalline. Pieces 1-3, fine to very fine-grained, with mafic phenocrysts (at least some of which are pseudomorphs after olivine); > plagioclase phenocrysts. Pieces 4-8, plagioclase phenocrysts < 8 mm, mafic phenocrysts < 1 mm. Pieces 5-8 are moderately to highly altered and contain breccia composed of elongate fragments of altered basalt aligned parallel to pillow margins in a green matrix of smectite, pargasite(?), celadonite and calcite. Veins filled by calcite, smectite.

Shipboard Data

Bulk Analysis:	28-31 cm
SiO ₂	49.23
Al ₂ O ₃	16.54
Fe ₂ O ₃	10.89
MgO	6.09
CaO	12.45
Ni ₂ O	N.D.
K ₂ O	0.59
TiO ₂	1.41
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.15
H ₂ O ⁺	1.06
H ₂ O ⁻	N.D.
CO ₂	0.37
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

Magnetic Data:

NRM Intensity (emu/cc)	28-31 cm
NRM Inclination	6.674 x 10 ⁻³
Stable Inclination	-19.8°
	-19.9°



LEG	SITE	H O E	CORE	SECT.
5 1	4 1 7 A		3 4	3

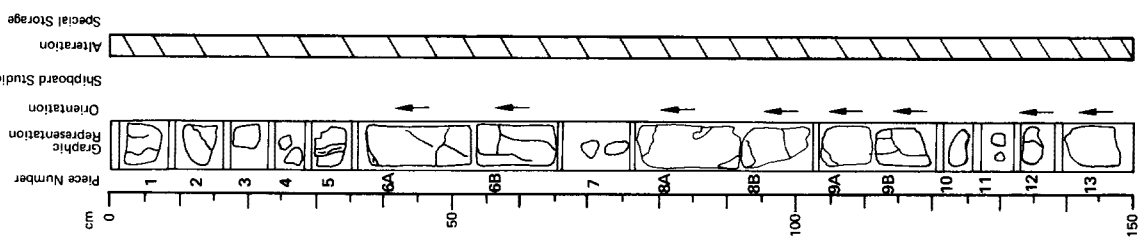
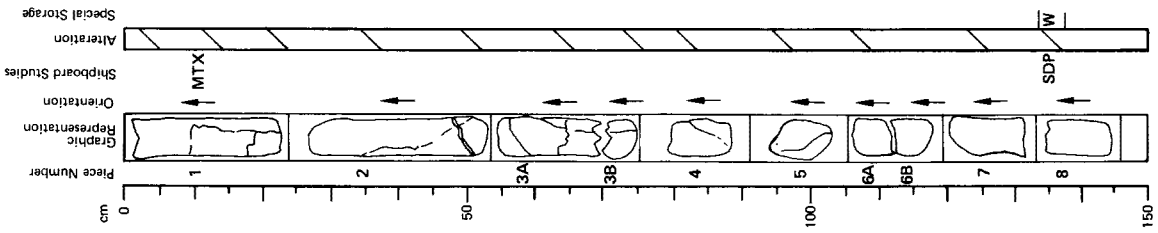
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered aphyric pillow basalt. Groundmass aphanitic. Plagioclase phenocrysts 5-10%, <5 mm; altered olivine phenocrysts <3%, 1 mm; clinopyroxene phenocryst 1%, 1 mm. Veins filled by calcite. Piece 8 contains vesicles lined with analcrite(?).

Thin Section Description
 Location: near chilled margin, 12 cm
 Texture: porphyritic, variolitic
 Phenocrysts: altered olivine 3%, euhedral; plagioclase 20%, 1-5 mm, euhedral to anhedral; altered clinopyroxene 1%, anhedral.
 Groundmass: plagioclase 30%, 0.1 mm, euhedral to subhedral; clinopyroxene 30%, 0.1 mm, anhedral to subhedral; magnetite 10%, 0.01 mm, euhedral, dendritic; devitrified glass 5-60%.
 Vesicles: trace, 0.2 mm, filled by clay, round.
 Alteration: olivine and clinopyroxene phenocrysts replaced by clay.

Shipboard Data

Bulk Analysis: 10-13 cm	Magnetic Data:	10-13 cm
SiO ₂ 49.66	NRM Intensity (emu/cc)	9.202 x 10 ⁻³
Al ₂ O ₃ 17.07	NRM Inclination	-22.8°
Fe ₂ O ₃ 10.19	Table Inclination	-23.0°
MgO 7.05	Physical Property Data:	
CaO 13.41	Vp (km/sec)	5.40
Na ₂ O N.D.	Porosity (%)	4.7
K ₂ O 0.76	Wet Bulk Density (g/cc)	2.78
TiO ₂ N.D.	Grain Density (g/cc)	2.86
P ₂ O ₅ N.D.		
MnO N.D.		
LOI 2.30		
H ₂ O ⁺ 1.02		
H ₂ O ⁻ N.D.		
CO ₂ 0.68		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



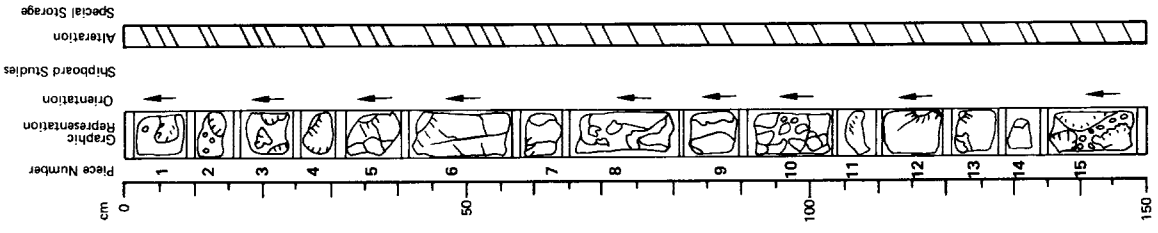
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Aphyric pillow basalt. Groundmass gray. Plagioclase phenocrysts 10%, <5 mm; olivine phenocrysts <3%, <2 mm; clinopyroxene phenocrysts 2%, <2 mm. Veins filled by calcite.

LEG	SITE	H O E	CORE	SECT.
5 1	4 1 7 A		3 4	4

LEG	SITE	HOLE	CORE	SECT.
5	1417	A	34	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

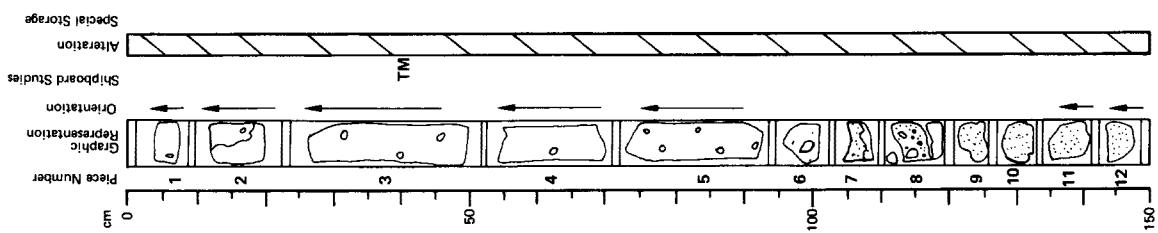


Visual Description

Altered phryic pillow basalt with volcanic breccia. Basalt gray, altered to yellow-brown near margins. Groundmass aphanitic to microcrystalline. Altered plagioclase phenocrysts 10%, <5 mm; mafic phenocrysts 5%, <2 mm, largely replaced by smectite. Vesicles <1%, filled by smectite. Veins filled by calcite. Breccia composed of fragments of basalt in a matrix of smectite and palagonite(?).

LEG	SITE	HOLE	CORE	SECT.
5	1417	A	34	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Phryic pillow basalt (pieces 1-6) underlain by hyaloclastite breccia (pieces 7-12). Basalt gray, altered to yellow-gray along scarce calcite-filled veins. Plagioclase phenocrysts altered to analcite(?), opal(?) and white fibrous zeolites <12%, <2 mm; olivine phenocrysts altered to iddingsite <3%, <3 mm; clinopyroxene phenocrysts altered to smectite(?) 3%. Amygdulites filled by calcite, analcite, zeolites <10%, <1 cm, locally coalesce (as in piece 6) to form filled cavities <2 cm across. Breccia composed of fragments of green palagonitic glass in a finely granulated (1 mm grain size) self-matrix cemented by calcite, hematite. Each fragment has a spherulitic structure composed of delicate, concentric alteration zones surrounding a core of brown residual glass. Spherulites separated from the larger basalt fragments appear to have been progressively granulated in the matrix. Relict plagioclase phenocrysts are present (5%, <2 mm) in the palagonite fragments.

Thin Section Description

Location: pillow interior, 42 cm
 Texture: porphyritic, ophitic
 Phenocrysts: altered olivine 2%, 0.5-1 mm, euhedral; partly altered plagioclase 20%, 1-3 mm, euhedral; altered clinopyroxene 5%, 0.5-2 mm, subhedral.
 Groundmass: olivine <10%, 0.1 mm; plagioclase 20%, 0.3 mm, tabular; clinopyroxene 30%, 0.1 mm, granular, subhedral to anhedral; magnetite 10%, 0.05 mm, euhedral.
 Alteration: plagioclase partly replaced by clay; clinopyroxene replaced by smectite.

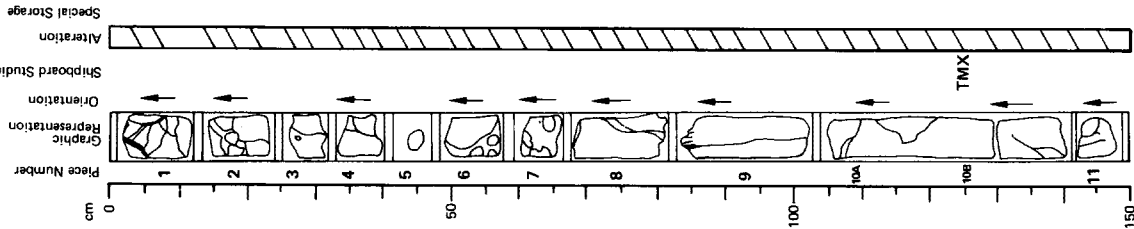
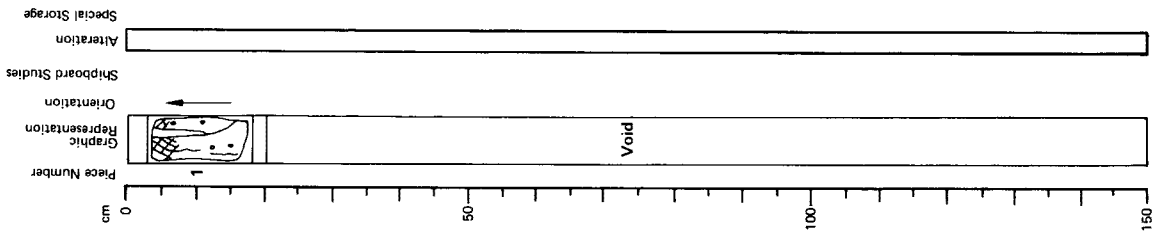
Shipboard Data

Magnetic Data:
 40-43 cm
 NRM Intensity (emu/cc) .281 x 10⁻³
 NRM Inclination +52.8°
 Stable Inclination -24.2°

LEG	SITE	HOLE	CORE	SECT.
514	17A	34	7	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phryic pillow basalt with chilled margin between 0.7 cm. Basalt gray, altered to gray near margin. Groundmass microcrystalline. Plagioclase phenocrysts largely replaced by white alteration mineral, small to absent in margin, but increase to 5%, <3 mm in base of piece 1; olivine phenocrysts (replaced by iddingsite) and clinopyroxene phenocrysts (replaced by dark green smectite) similarly increase to 5%, <2 mm and 1%, <2 mm, respectively. Amygdules 5-8%, <1 cm, filled by calcite, analcite and zeolites. Calcite-filled veins normal to the margin are present in the top of piece 1.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
514	17A	35	1	

Visual Description
 Altered phryic pillow basalt with chilled margins and volcanic breccia. Basalt gray, altered to pale brown, dark brown along hematized margins. Groundmass aphanitic to microcrystalline. Altered plagioclase phenocrysts 10%, <3 mm in pieces 1-7; increase to <7 mm in pieces 8-11; mafic phenocrysts replaced by smectite, iddingsite 3%, <2 mm. Rounded to elongate vesicles <1%, <1 mm; piece 3 contains a 4 mm-long flattened vesicle the long axis of which dips 60° with respect to the core. Veins <4 mm wide, filled by calcite, smectite. Breccia composed of fragments of altered basalt in a fine-grained, green matrix of smectite, palagonite (?) and calcite.

Thin Section Description

Location: pillow interior, 127 cm
 Texture: porphyritic, hyalopilitic
 Phenocrysts: altered plagioclase 15%, <6 mm, An 70, glomeroporphyritic; augitic clinopyroxene 2-3%, 5 mm, elongate.
 Groundmass: plagioclase 25%, 0.5 mm, An 53; clinopyroxene 45%; magnetite 10-15%; calcite (in veins) 1%.

Vesicles: 2-3%, 0.8 mm, filled by calcite

Alteration: plagioclase partially replaced by calcite.

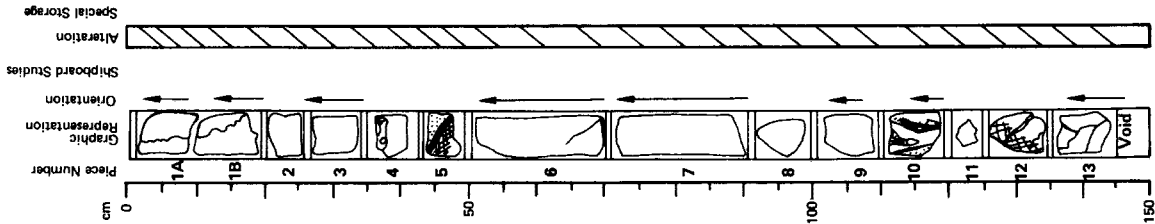
Shipboard Data

Bulk Analysis:	125-128 cm	Magnetic Data:	125-128 cm
SiO ₂	47.97	NRM Intensity (emu/cc)	5.429 x 10 ⁻³
Al ₂ O ₃	19.11	NRM Inclination	-20.7°
Fe ₂ O ₃	6.38	Stable Inclination	-20.5°
MgO	3.57		
CaO	18.53		
Ni ₂ O	N.D.		
K ₂ O	1.20		
TiO ₂	1.53		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	7.49		
H ₂ O ⁺	1.13		
H ₂ O ⁻	N.D.		
CO ₂	1.69		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	A	35	2

Visual Description
 Altered phryic pillow basalt with chilled margins and minor interpillow palagonite breccia. Basalt gray to yellow-gray, altered to yellow-brown and dark brown within 2 cm and 2 mm, respectively, of margins against breccia. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 10%, <3 mm, largely replaced by zoofides; olivine phenocrysts replaced by red-brown iddingsite 5%, <4 mm; laths of clinopyroxene replaced by dark green smectite 3%, <2 mm. Amygdalites 10%, <6 mm, often concentrically lined with zeolites, analcite, calcite and smectite(?). Calcite-filled veins. Breccia (pieces 5, 10, 12) composed of delicate, elongate palagonite fragments aligned parallel to pillow margins in a fine-grained green self-matrix. The larger fragments display concentric alteration zones.

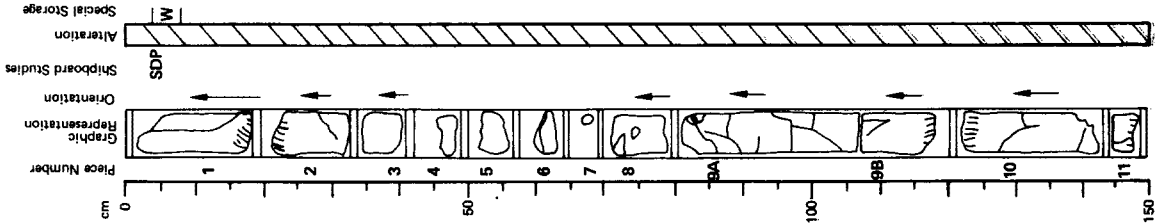


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	A	35	3

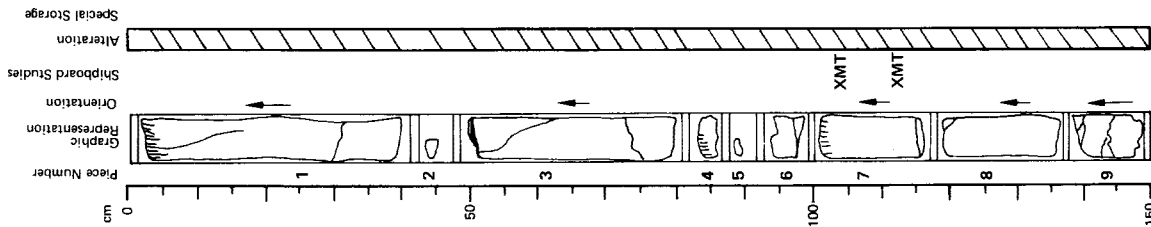
Visual Description
 Altered phryic pillow basalt. Basalt gray to gray-brown with an aphanitic groundmass. Altered plagioclase phenocrysts 10%, <4 mm in pieces 1-7, <12 mm in pieces 8-10; clinopyroxene phenocrysts 5%, <3 mm; olivine phenocrysts 4%, <3 mm; plagioclase phenocrysts largely replaced. Vesicles 4%; Veins filled by calcite and smectite(?). Pieces 8 and 9 contain large (1.5-2.5 cm) cavities filled by transparent white apatite(?) on a yellow-green lining.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 3.5 cm
 Porosity (%) 5.44
 Wet Bulk Density (g/cc) 4.4
 Grain Density (g/cc) 2.77
 2.85



LEG	SITE	HOLE	CORE	SECT.
5	1417	A	3	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Altered phric pillow basalt. Basalt dark gray with an aphanitic to microcrystalline groundmass. Altered plagioclase phenocrysts 10%, < 8 mm in pieces 1-8, < 3 mm in piece 9; mafic phenocrysts 3%, < 2 mm, entirely replaced by alteration products. Vesicles 1%, < 1 mm. Vains filled by calcite and smectite(?).

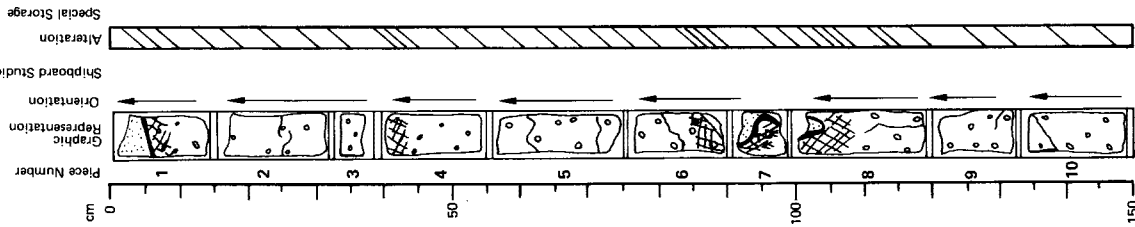
Thin Section Description
 Location: near chilled margin, 102 cm
 Texture: porphyritic
 Phenocrysts: olivine < 1%, 2 mm, anhedral; zoned plagioclase 15%, 0.5-5.0 mm, An 76-84, tabular, partly altered; clinopyroxene 1%, 0.3-2.0 mm, prismatic.
 Groundmass: plagioclase 2.3%, < 0.1 mm, prismatic; altered glass 80%.
 Vesicles: 2%, 0.1-0.2 mm, filled by smectite with an opaque core, round.
 Alteration: plagioclase partly replaced by montmorillonite and zeolites; clinopyroxene replaced by montmorillonite.

Thin Section Description
 Location: pillow interior, 112 cm
 Texture: porphyritic
 Phenocrysts: altered olivine < 1%, 0.2-0.5 mm, euhedral; altered plagioclase 10%, 0.3-1.5 mm, tabular with liquid inclusions; fresh clinopyroxene 2%, 0.1-1.0 mm, prismatic.
 Groundmass: plagioclase 25%, 0.1-0.5 mm, An 50-55; tabular; altered clinopyroxene 3-5%, 0.1 mm, anhedral; altered glass 60%.
 Alteration: plagioclase partly replaced by calcite and montmorillonite; clinopyroxene partly replaced by calcite and smectite; olivine and glass replaced by montmorillonite.

Shipboard Data

Bulk Analysis:	100-103 cm	111-113 cm	Magnetic Data:	100-103 cm	111-113 cm
SiO ₂	49.40	49.11	NRM Intensity (emu/cc)	9,131 x 10 ⁻³	5,600 x 10 ⁻³
Al ₂ O ₃	17.97	17.76	NRM Inclination	-26.2°	-28.3°
Fe ₂ O ₃	13.18	10.39	Stable Inclination	-25.0°	-28.3°
MgO	3.57	4.21			
CaO	7.67	13.32			
Ni ₂ O	N.D.	N.D.			
K ₂ O	2.04	0.88			
TiO ₂	1.66	1.44			
P ₂ O ₅	N.D.	N.D.			
MnO	N.D.	N.D.			
LOI	5.10	3.60			
H ₂ O ⁺	4.29	1.86			
H ₂ O ⁻	N.D.	N.D.			
CO ₂	0.31	1.28			
Cr	N.D.	N.D.			
Ni	N.D.	N.D.			
Sr	N.D.	N.D.			
Zr	N.D.	N.D.			

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Altered phric pillow basalt with chilled margins and traces of interpillow breccia. Basalt gray, altered to yellow-brown and dark brown within 2 cm and 2 mm, respectively, of margins against breccia. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 10%, < 4 mm, largely replaced by zeolites(?); iddingsite after phenocrysts of olivine 5%, < 4 mm; black clinopyroxene laths 5%, < 3 mm. Amygdules 10%, 1-6 mm, often concentrically lined with calcite, analcite, zeolites and smectite(?). Minor calcite-filled veins. Breccia (pieces 1, 7 and 8) composed of delicate, elongate fragments of plagioclase aligned parallel to pillow margins in a green, fine-grained (< 1 mm) self-matrix containing both plagioclase and smectite. The larger (1 cm) fragments display delicate, concentric alteration zones.

LEG	SITE	HOLE	CORE	SECT.
5	1417	A	3	5

LEG	SITE	HOLE	CORE	SECT.
51	417A	316	1	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

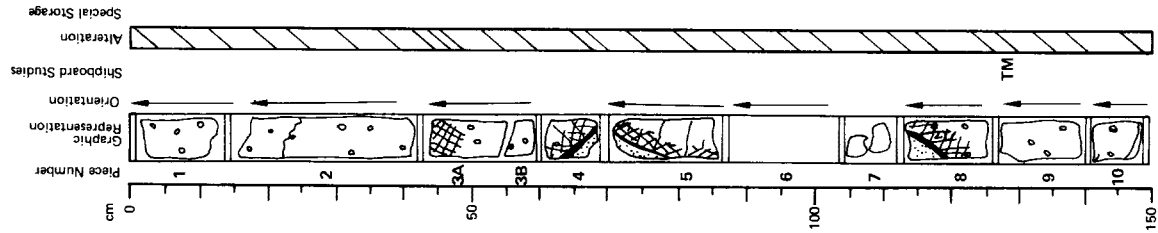
Visual Description
 Altered phryic basalt pillows with chilled margins and minor inter-pillow breccia. Intervals 0-70, 70-103 and 113-150 each represent individual pillows or parts of pillows bounded by hematized chill margins. Basalt gray to slightly yellow-gray, altered to yellow and dark brown within 2 cm and 2 mm, respectively, of margins against breccia. Groundmass aphanitic to micro-litic; contains disseminated hematite. Plagioclase phenocrysts 10%, < 5 mm, largely replaced by zeolite(?) and calcite; olivine phenocrysts replaced by iddingsite 4%, < 5 mm; black clinopyroxene 1% to smectite 1%. Scarce anhydrides, filled by smectite, calcite and zeolites. Minor calcite fillings to chilled margins. Breccia (in pieces 4-6, 8 and 10) composed of elongate fragments of pale green aligned parallel to pillow margins in a green matrix of smectite, calcite, hematite and analcite(?).

Thin Section Description

Location: pillow interior, 130 cm
Texture: porphyritic, hyalopilitic to intersertal
Phenocrysts: altered olivine 1-3%, 0.9 mm; altered plagioclase 10%, < 3 mm, An 70
Groundmass: altered olivine 5-10%, 0.1 mm; plagioclase 15-20%, 0.3 mm, An 53, occasionally skeletal, clinopyroxene 20-25%, 0.1 mm, quenched, locally skeletal with ladder structures; magnetite 10-15%; devitrified glass 20-25%.
Vesicles: 1-2%, filled by calcite and saponite(?), round.
Alteration: plagioclase partially replaced by calcite, clay and zeolites; olivine and glass replaced by clay and smectite.

Shipboard Data

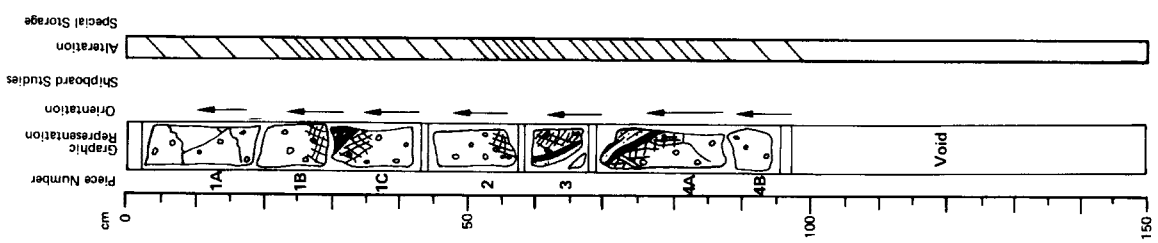
Magnetic Data: 129-132 cm
 5.912 x 10⁻³
NRM Inclination -32.8°
Stable Inclination -33.1°



LEG	SITE	HOLE	CORE	SECT.
51	417A	315	6	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phryic basalt pillows with chilled margins and minor inter-pillow breccia. Intervals 0-31, 31-70 and 70-96 cm each represent individual pillows or parts of pillows bounded by hematized chill margins. Basalt gray to light brown and dark brown within 2 cm and 2 mm, respectively, of margins against breccia. Groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 10%, 5 mm, largely replaced by zeolite(?) and analcite. Clinopyroxene laths < 5%, < 3 mm; iddingsite after phenocrysts of olivine < 1%, < 5 mm. Anhydride 5-8%, 1-6 mm, often concentrically lined with calcite, analcite, zeolites and smectite(?). Minor calcite-filled veins normal to pillow margins. Breccia (pieces 1C, 3 and 4A) composed of fragments of paleogreen aligned parallel to pillow margins in a matrix of smectite and paleogreen.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

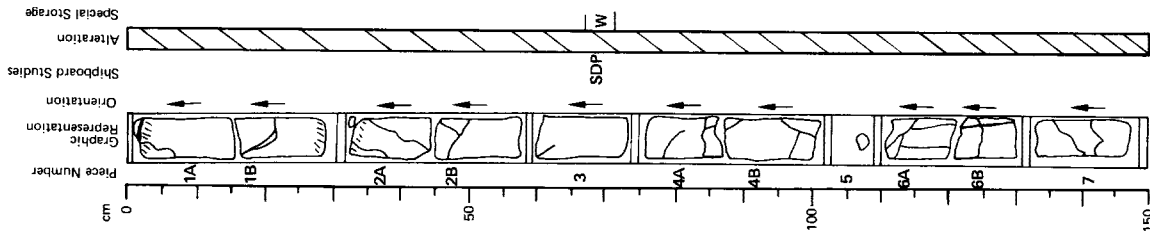
LEG	SITE	H O	CORE	SECT.
5 1	4 1 1 7 A	L	3 6	2

Visual Description

Altered phryic pillow basalt with infrequent chilled margins. Basalt dark gray, altered to pale brown near margins; pillow rims, gray-brown. Groundmass microfolitic. Plagioclase phenocrysts 10% < 3 mm, partially altered; olivine phenocrysts completely altered to iddingsite < 1%, < 2 mm; clinopyroxene phenocrysts altered to smectite(?) 3%, < 2 mm. Minor veins filled by calcite, smectite.

Shipboard Data

Physical Property Data: 67.89 cm
 Vp (km/sec) 5.48
 Porosity (%) 4.0
 Wet Bulk Density (g/cc) 2.84
 Grain Density (g/cc) 2.92



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5 1	4 1 1 7 A	L	3 6	3

Visual Description

Altered phryic pillow basalt with chilled margins and minor inter-pillow breccia. Basalt gray, altered to yellow-gray and dark brown within 2 cm and 2 mm, respectively, of margins; pillow breccia. Groundmass aphanitic. Plagioclase phenocrysts 15%, < 5 mm, largely altered to zeolites (?); olivine phenocrysts replaced by iddingsite 4-5%, < 5 mm; altered black clinopyroxene phenocrysts < 1%, < 5 mm. Calcite-filled amygdulites scarce to absent. Minor calcite-filled veins. Breccia (in pieces 3, 4A and 8) composed of elongate palagonite fragments (< 2-3 cm) aligned parallel to pillow margins in a green, fine-grained (< 1 mm) self-matrix of palagonite, smectite, calcite and hematite. Green smectite abundant as interstitial filling between pillows in pieces 3 and 4A.

Thin Section Description

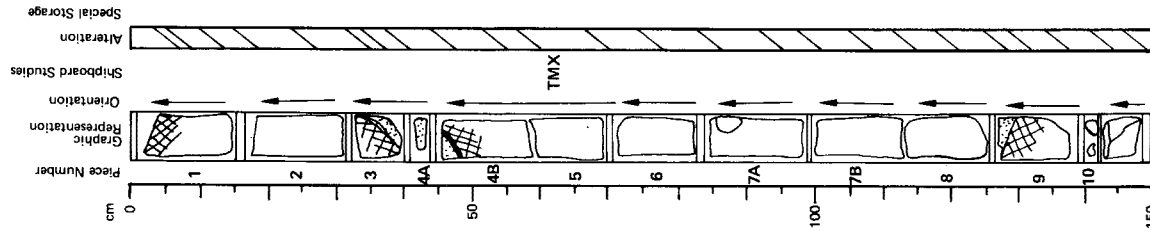
Location: pillow interior, 64 cm
 Texture: porphyritic, intersertal
 Phenocrysts: altered olivine 5%, 2 mm, euhedral; altered plagioclase 20%, 3 mm, euhedral; altered clinopyroxene 5%.
 Groundmass: altered olivine < 5%; plagioclase 20%, 0.4 mm, tabular; clinopyroxene 20%, 0.1 mm, anhedral to granular; magnetite 5%, 0.03, euhedral; altered glass < 15%.

Vesicles: trace, 0.1 mm, filled by smectite, round.

Alteration: olivine replaced by calcite, zeolites and smectite; clinopyroxene replaced by calcite and smectite; plagioclase partly altered to clay.

Shipboard Data

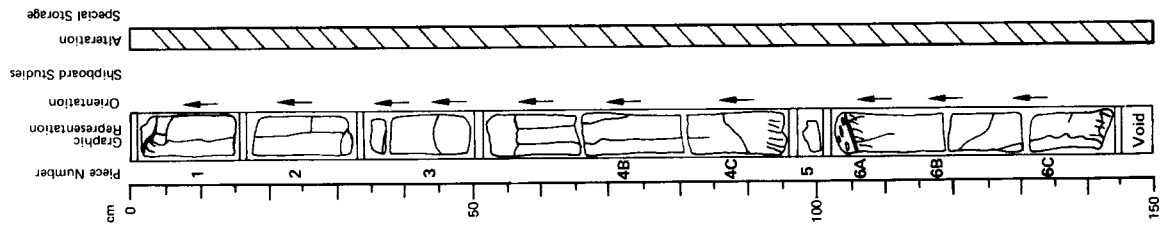
Bulk Analysis: 63-65 cm
 Magnetic Data: 63-65 cm
 SiO₂ 48.90
 Al₂O₃ 17.54
 Fe₂O₃ 10.63
 MgO 5.53
 CaO 12.57
 Na₂O N.D.
 K₂O 0.78
 TiO₂ 1.47
 P₂O₅ N.D.
 MnO N.D.
 LOI 2.20
 H₂O⁺ 1.76
 H₂O⁻ N.D.
 CO₂ 0.86
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	1417A		36	4

Visual Description
 Altered phryic pillows with chilled margins and minor interpillow breccia. Intervals 0-100 and 100-145 cm each represent individual pillows or parts of pillows. Basalt gray altered to yellow brown near margins. Groundmass aphanitic to microlitic, contains disseminated hematite. Plagioclase phenocrysts 10%, ≤ 6 mm, partially altered to zeolites(?) and clay; olivine phenocrysts altered to iddingsite 3%, ≤ 4 mm; clinopyroxene phenocrysts altered to smectite 2%, ≤ 2 mm. Calcite-filled vesicles 1%. Score calcite-filled veins. White cavity filling between 131-137 cm. Breccia (in pieces 1 and 6A) composed of elongate fragments of altered basalt aligned parallel to pillow margins in a matrix of smectite, palagonite and calcite.



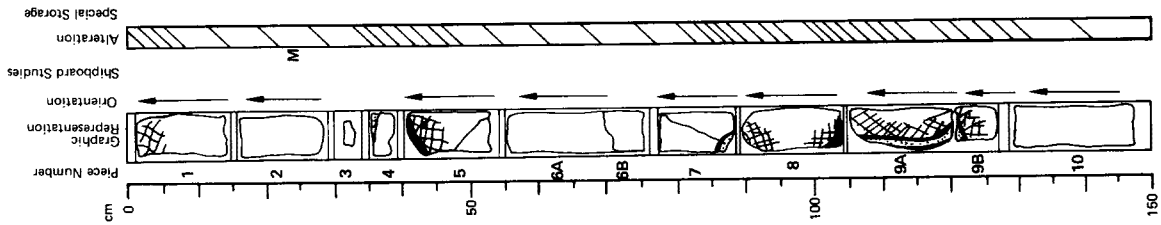
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	1417A		36	5

Visual Description
 Altered phryic pillow basalt with chilled margins and minor interpillow hyaloclastite breccia. Basalt gray, altered to yellow gray and dark brown within 2 cm and 2 mm, respectively, of chilled margins. Groundmass aphanitic to microlitic, contains olivine, hematite. Plagioclase phenocrysts largely altered to clay, zeolites 15%, ≤ 8 mm; iddingsite after phenocrysts of olivine 5-8%, ≤ 3 mm; clays of clinopyroxene 1%, ≤ 2 mm; hematite after phenocrysts of olivine 4-7 mm; calcite-filled veins. Minor calcite-filled veins. Breccia (in pillow 4) composed of elongate (≤ 2 cm) palagonite fragments aligned parallel to pillow margins in a green fine-grained (≤ 1 mm) matrix consisting of palagonite shards, smectite, calcite and hematite.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 8.845 x 10⁻³
 NRM Inclination -24.0°
 Stable Inclination -23.2°

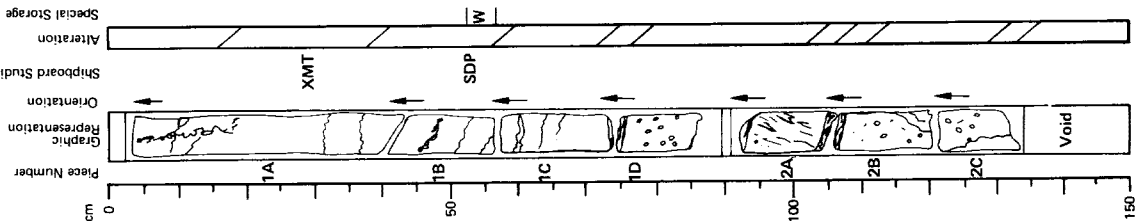
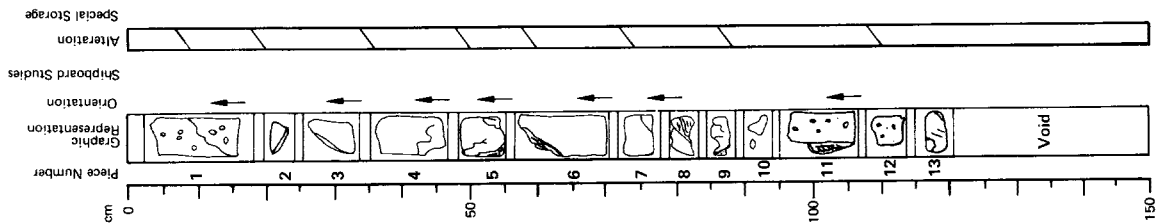


LEG	SITE	HOLE	CORE	SECT.
51	417	A	36	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Altered phryic pillow basalt with chilled margins and interpillow breccia. Basalt gray to gray-violet, altered to gray-brown near margins. Groundmass aphanitic. Plagioclase phenocrysts partly to completely altered to clay, zeolites(?) 10-15%, <5 mm, rarely 1 cm (piece 9); olivine phenocrysts replaced by iddingsite <2%, <1 mm; dark green clinopyroxene phenocrysts 10%, <0.3 mm, rarely 6.8 mm (piece 11). Veins filled by calcite and hematite. Breccia composed of elongate green fragments of basaltic glass(?) altered to palagonite in a banded matrix of calcite and blue-green smectite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	A	37	1

Visual Description

Altered phryic pillow basalt with pillow margins and traces of interpillow breccia. Basalt dark gray; pieces 1D and 2 altered to gray-violet with yellow-gray margins. Groundmass aphanitic to microitic. Plagioclase phenocrysts 5-10%, <5 mm, partially to completely altered to clay, zeolites(?); clinopyroxene phenocrysts 20%, <5 mm, partially to completely altered to smectite; pieces 1D and 2 contain olivine phenocrysts replaced by iddingsite 1%, <3 mm; clinopyroxene partially altered in pieces 1A-1C, completely altered in pieces 1D and 2. Veins filled by calcite and smectite. Piece 2A contains numerous calcite-filled tension(?) cracks normal to pillow margin.

Thin Section Description

Location: pillow interior, 32 cm

Texture: porphyritic, ophitic

Phenocrysts: altered olivine 5%, 0.3-1.0 mm, subhedral; plagioclase 20%, 1-3 mm, euhedral to anhedral; clinopyroxene 5%, 1-2 mm, euhedral to subhedral.

Groundmass: altered olivine 5%, 0.1 mm, anhedral; plagioclase 20%, 0.1 mm, tabular; clinopyroxene 30%, 0.5 mm, anhedral; magnetite 5%, 0.02 mm, euhedral; altered glass 5%.

Alteration: olivine and glass partly altered to smectite; groundmass contains disseminated calcite.

Shipboard Data

Bulk Analysis: 31-34 cm

SiO ₂	48.74	Magnetic Data:	31-34 cm
Al ₂ O ₃	16.75	NRM Intensity (emu/cc)	19.476 x 10 ⁻³
Fe ₂ O ₃	10.81	NRM Inclination	-12.2°
MgO	6.80	Stable Inclination	-12.5°

Physical Property Data:

Vp (km/sec)	5.74
Porosity (%)	3.4
Wet Bulk Density (g/cc)	2.88
Grain Density (g/cc)	2.94

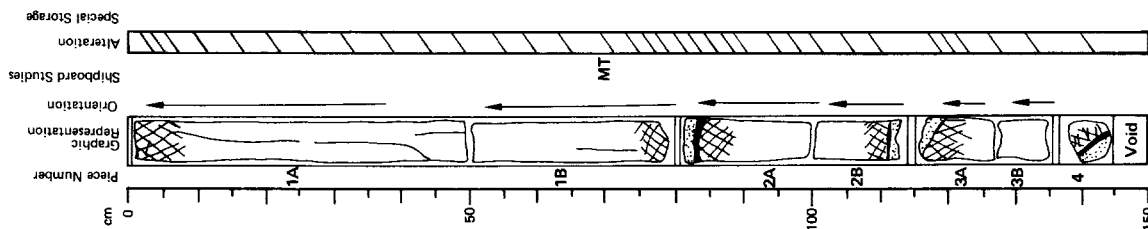
LEG	SITE	H O I	CORE	SECT.
51	417A		37	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phytic basalt with chilled margins and minor interpillow hyaloclastite breccia. Intervals 0-80, 80-115 and 115-145 cm represent individual pillows or parts of pillows bounded by chilled margins. Basalt gray, altered to yellow-gray and dark brown within 5 cm and 2 mm, respectively, of margins against breccia. Groundmass aphanitic to microlitic. Plagioclase phenocrysts 15%, <8 mm, altered to zeolites, clay and calcite; olivine phenocrysts replaced by iddingsite 8%, <5 mm; black augitic clinopyroxene laths <5%, <4 mm. Amygdules scarce, <1 mm, filled by calcite, smectite. Veins filled by calcite. Breccia (in pieces 2, 3A and 4) composed of elongate, green palagonite fragments aligned parallel to pillow margins in a fine-grained (<1 mm) self-matrix of palagonite and smectite cemented by calcite and hematite.

Thin Section Description
 Location: pillow interior, 72 cm
 Texture: porphyritic, hyaloplitic
 Phenocrysts: altered olivine 2-3%, 0.5-4.0 mm, idiomorphic; zoned plagioclase 10%, 0.7-4.0 mm, altered, idiomorphic; fresh clinopyroxene 1-2%, 1 mm, idiomorphic, occasional twinning.
 Groundmass: plagioclase microlites 50%, 0.1-0.3 mm, skeletal; plumose clinopyroxene 5%; magnetite and hematite 30%; clinopyroxene, magnetite and hematite interstitial between plagioclase microlites.
 Alteration: plagioclase replaced by calcite, clay and analcite; olivine replaced by calcite and iddingsite.

Shipboard Data
 Magnetic Data: 70-73 cm
 NRM Intensity (emu/cc) 6.516 x 10⁻³
 NRM Inclination -20.6°
 Stable Inclination -20.5°

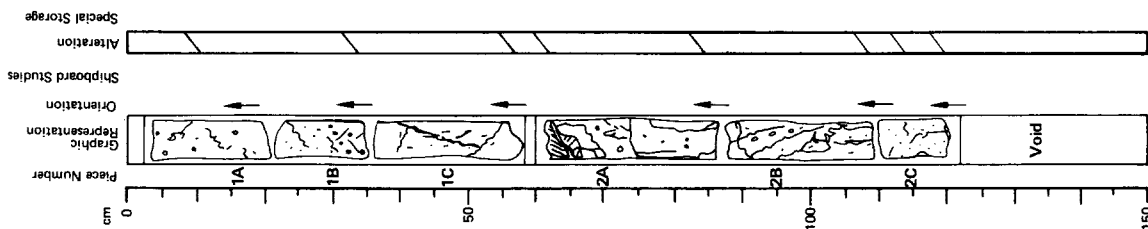


LEG	SITE	H O I	CORE	SECT.
51	417A		37	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phytic basalt with a gray to gray-brown, aphanitic groundmass. Plagioclase phenocrysts 10-20%, <3 mm, occasionally as large as 7 mm (piece 2A), altered to clay; dark green clinopyroxene phenocrysts partially altered to smectite 20%, <0.5 mm; olivine phenocrysts replaced by iddingsite 1%, <2 mm. Veinlets filled by calcite, brown smectite(?).

Shipboard Data

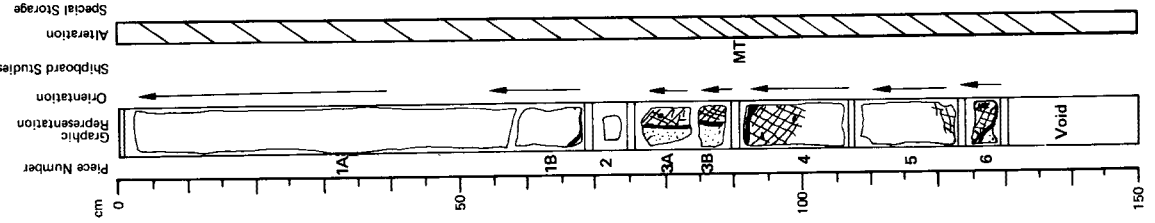
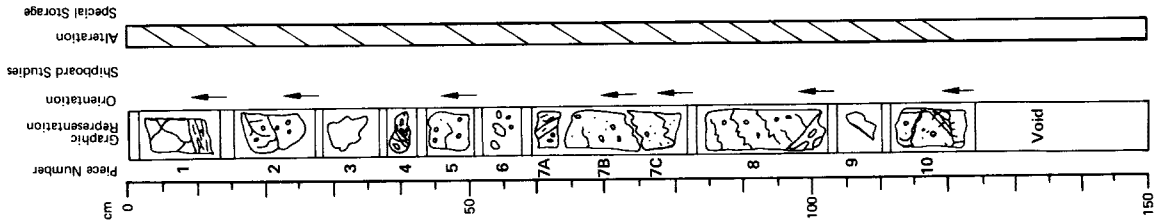


LEG	SITE	HOLE	CORE	SECT.
51	4117A		37	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Altered phryic pillow basalt with chilled margins and interpillow breccia. Basalt altered to yellow-brown with a dark brown rim along margins against breccia. Groundmass aphanitic. Plagioclase phenocrysts 10-15%, < 5 mm, partially altered to clays; clinopyroxene phenocrysts 5-10%, < 1.5 mm. Veins normal to pillow margins, filled by calcite. Breccia composed of pale yellow-green fragments of altered basaltic glass, elongate parallel to pillow margins in a green to blue-green matrix of smectite, palagonite and calcite.



LEG	SITE	HOLE	CORE	SECT.
51	4117A		37	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Altered phryic pillow basalt with pillow margins and interpillow hyaloclastite breccia. Basalt gray, altered to yellow-gray and dark brown with in 3 cm and 2 mm respectively, of margins against breccia. Groundmass aphanitic. Plagioclase phenocrysts, 15-20%, < 8 mm, replaced by calcite, clay and smectite. Olivine phenocrysts replaced by iddingsite, calcite 5-9%, < 5 mm; clinopyroxene paths 2-4%, < 4 mm. Amygdules scarce, < 1 mm, filled by calcite, smectite. Minor calcite-filled veins. Breccia (in pieces 3, 4 and 6) composed of elongate, green palagonite fragments aligned parallel to pillow margins in a fine-grained (< 1 mm) self-matrix of palagonite and smectite cemented by calcite and hematite.

Thin Section Description

Location: near chilled margin, 95 cm
 Texture: prophyritic, hyaloophitic
 Phenocrysts: altered olivine 3%, 0.5-2 mm, euhedral; plagioclase 20%, 6 mm, euhedral; altered clinopyroxene 5%, 1 mm, euhedral.
 Groundmass: plagioclase 15%, 0.2 mm, tabular, skeletal; altered clinopyroxene or olivine(?) 1%, 0.1 mm, devitrified glass 60%.

Vesicles: Trace, 0.05 mm, filled by chlorite

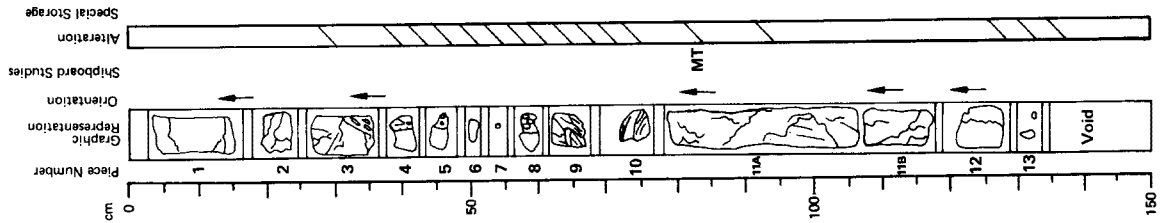
Alteration: olivine phenocrysts replaced by iddingsite; clinopyroxene phenocrysts replaced by calcite; groundmass clinopyroxene, olivine replaced by smectite.

Shipboard Data

Magnetic Data:
 93-96 cm
 NRM Intensity (emu/cc) 4.859 x 10⁻³
 NRM Inclination -23.1°
 Stable Inclination -23.3°

LEG	SITE	HOLE	CORE	SECT.
51	417A		38	1

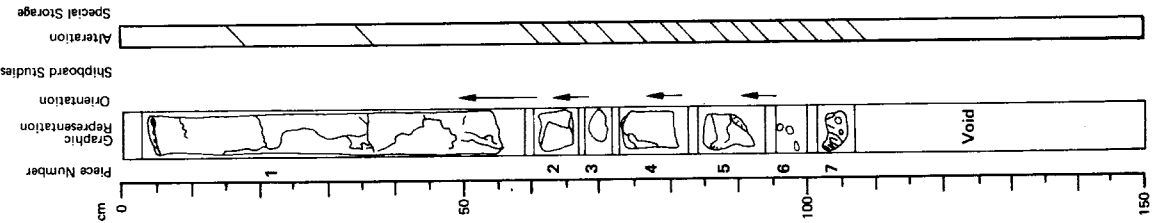
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Altered phryic pillow basalt with chilled margins and palagonitic interpillow breccia. Basalt dark gray, altered to gray-violet, gray-brown, yellow-brown or brown depending on degree of alteration and proximity to margins. Groundmass aphanitic. Plagioclase phenocrysts 20%, <9 mm, fresh in piece 1, largely replaced by zeolites or clay(?) in pieces 2-8 and 8-12; pyroxene phenocrysts 15%, <2 mm, replaced by calcite or smectite. Veins filled by fine- to coarse-grained calcite; pillow margins locally cut by randomly oriented fractures. Breccia in pieces 3-5, 7-10, and 13 consists of pale yellow-green fragments of altered basaltic glass in a banded green to brown self-matrix composed of palagonite, smectite and calcite.

Thin Section Description
 Location: pillow interior, 85 cm
 Texture: porphyritic, hyalopilitic
 Phenocrysts: altered olivine 1-2%, 0.4 mm; plagioclase 20%, 5.5 mm, An 65; clinopyroxene 3-5%, 2.5 mm, twinned.
 Groundmass: olivine 5-10%, 0.05 mm; plagioclase 15-20%, 0.4 mm, An 60, often skeletal; clinopyroxene 15%, 0.03; magnetite 5-10%; devitrified glass 25%; calcite in veins.
 Vesicles: 1-5%, 0.4 mm, filled by calcite.
 Alteration: plagioclase partly replaced by calcite; olivine completely replaced by iddingsite, smectite and celadonite.

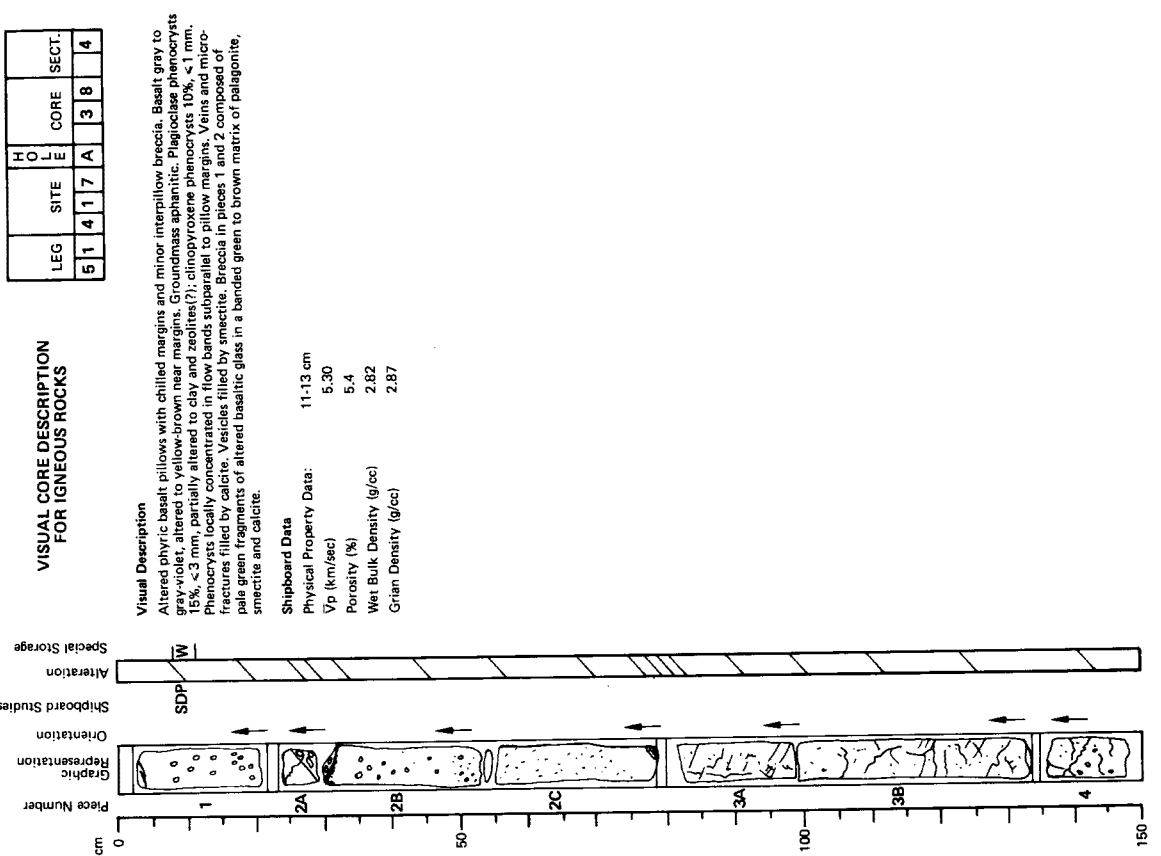
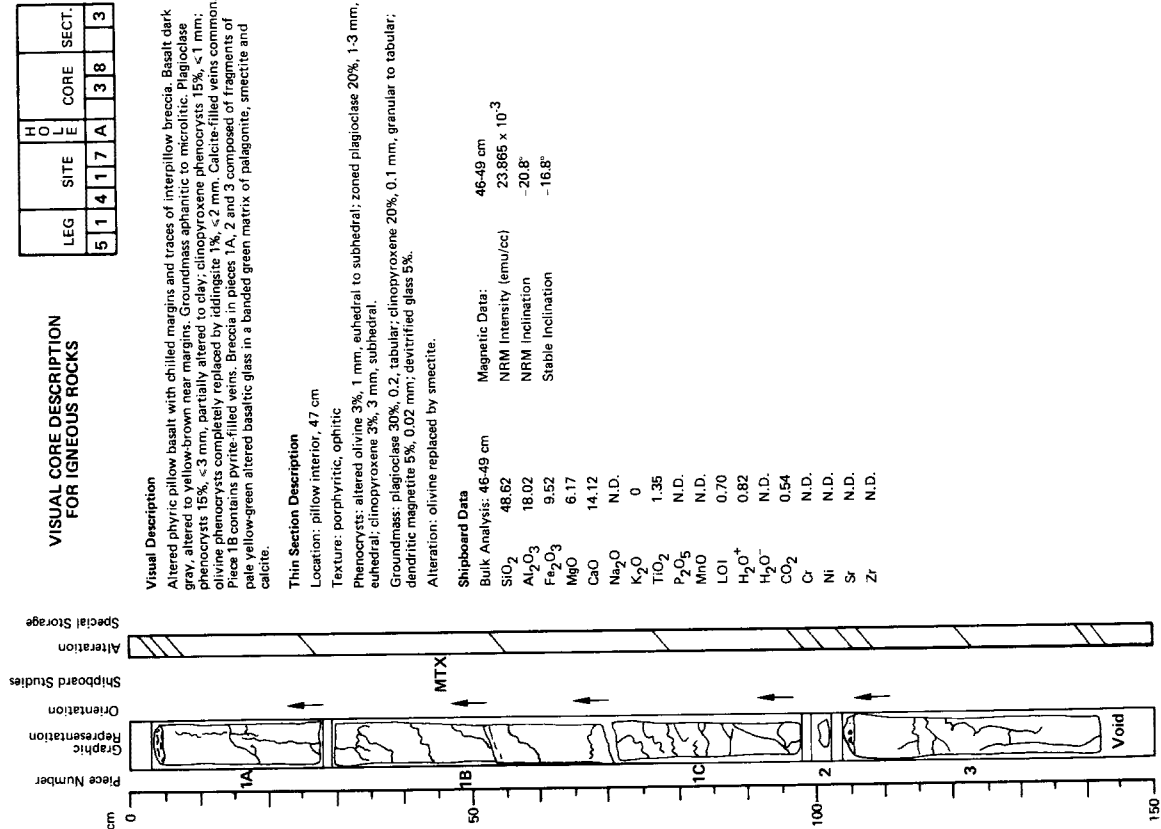
Shipboard Data
 Magnetic Data: 84-87 cm
 NRM Intensity (emu/cc) 5.670 x 10⁻³
 NRM Inclination -23.7°
 Stable Inclination -24.5°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417A		38	2

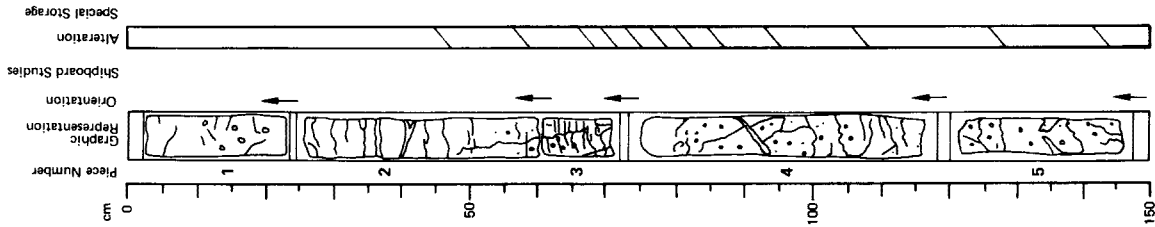
Visual Description
 Altered phryic pillow basalt with chilled margins and minor interpillow breccia. Basalt dark gray to gray violet, altered to gray-brown, yellow-brown and red-brown near margins. Groundmass aphanitic to microclitic; plagioclase phenocrysts 20-25%, <4 mm, altered to clay and zeolite(?); clinopyroxene phenocrysts 5-10%, <1 mm; olivine phenocrysts 1%, <1.5 mm, replaced by iddingsite. Veins filled by calcite. Breccia composed of light yellow-green fragments of altered basaltic glass in a banded self-matrix of palagonite, smectite, calcite and hematite.



LEG	SITE	HOLE	CORE	SECT.
51	417A	3B	6	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phyrlic basalt with a gray microlitic groundmass altered to gray-brown along cracks. Plagioclase phenocrysts 15%, <7 mm, partially altered to clay; clinopyroxene phenocrysts 10-15%, <4 mm. Calcite-filled veins common; in pieces 2 and 3 these are strongly aligned normal to the core axis.



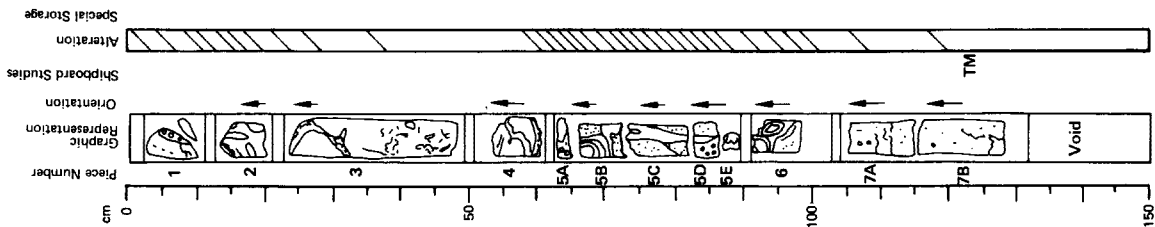
LEG	SITE	HOLE	CORE	SECT.
51	417A	3B	5	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phyrlic pillow basalt with aphyric chilled margins in a cemented interpillow breccia. Basalt altered to yellow-brown and red-brown. Groundmass aphanitic. Plagioclase phenocrysts 10%, <3 mm, altered to zeolites and clay; clinopyroxene 5%, <0.4 mm. Sealed by large veins of calcite and pale green smectite. Breccia in pieces 1-3; 5 and 6 composed of elongate, pale yellow-green fragments of altered basaltic glass, either randomly oriented or aligned parallel to pillow margins, in a banded green matrix of palagonite, smectite and calcite. Vesicles filled by clay, zeolites and calcite are present in both basalt and breccia shards.

Thin Section Description
 Location: pillow interior, 123 cm
 Texture: porphyritic, ophitic
 Phenocrysts: altered olivine 3%, 2 mm, euhedral; plagioclase 20%, 1-4 mm, euhedral; clinopyroxene 3%, 1 mm, euhedral.
 Groundmass: altered olivine <10%; plagioclase 30%, 0.2 mm, tabular; granular clinopyroxene 20%, 0.05 mm; magnetite 5%, 0.02 mm; devitrified glass <5%; calcite in veins.
 Alteration: olivine phenocrysts replaced by calcite.

Shipboard Data
 Magnetic Data: 122-124 cm
 NRM Intensity (amu/cc) 2.833 x 10⁻³
 NRM Inclination -14.8°
 Stable Inclination -15.1°



LEG	SITE	HOLE	CORE	SECT.
51	417A	38	7	

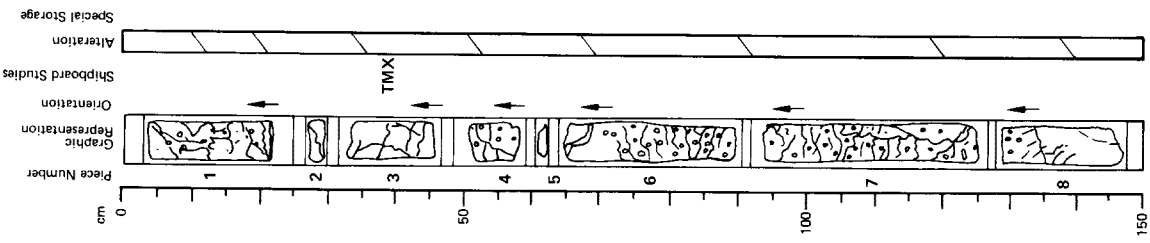
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phryic basalt with a gray, aphanitic groundmass. Plagioclase phenocrysts partially groundmass. Plagioclase phenocrysts partially altered to clay and analcite (?). 3 mm in pieces 3 and 8, 15-20% in pieces 1, 2 and 4-7; clinopyroxene phenocrysts 15% in pieces 1, 2 and 4-7. Veins filled by calcite and analcite (?), between 70-110 cm, these are aligned normal to the core axis.

Thin Section Description
 Location: pillow interior, 37 cm
 Texture: porphyritic, ophitic
 Phenocrysts: altered olivine 3%, 2 mm, euhedral; altered plagioclase 10%, 3%, euhedral; altered clinopyroxene 10%, 2 mm, euhedral.
 Groundmass: altered olivine 10%, 0.1 mm, euhedral; plagioclase 30%, 0.5 mm, tabular; anhedral clinopyroxene 25%, 0.1 mm, dendritic to euhedral magnetite 5%, 0.02 mm; devitrified glass <5%.
 Alteration: plagioclase phenocrysts partly altered to clay; olivine replaced by smectite.

Shipboard Data
 Bulk Analysis: 35-38 cm
 SiO₂ 49.67
 Al₂O₃ 17.39
 Fe₂O₃ 10.69
 MgO 5.38
 CaO 11.60
 Na₂O N.D.
 K₂O 0.83
 TiO₂ 1.50
 P₂O₅ N.D.
 MnO N.D.
 LOI 3.35
 H₂O⁺ 0.68
 H₂O⁻ N.D.
 CO₂ 0.80
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

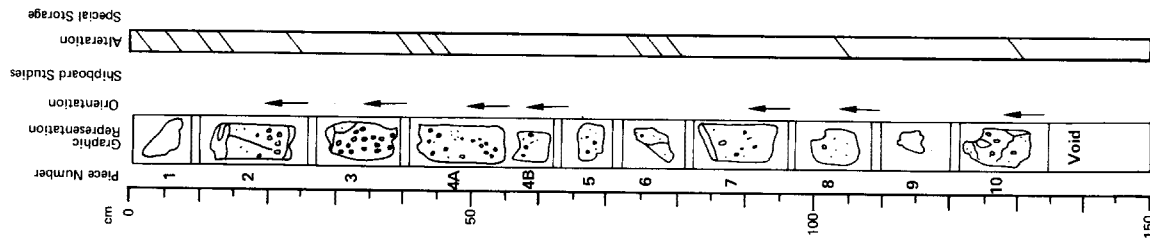
Magnetic Data:
 NRM Intensity .855 x 10⁻³
 NRM Inclination -18.3°
 Stable Inclination -20.0°



LEG	SITE	HOLE	CORE	SECT.
51	417A	38	8	B

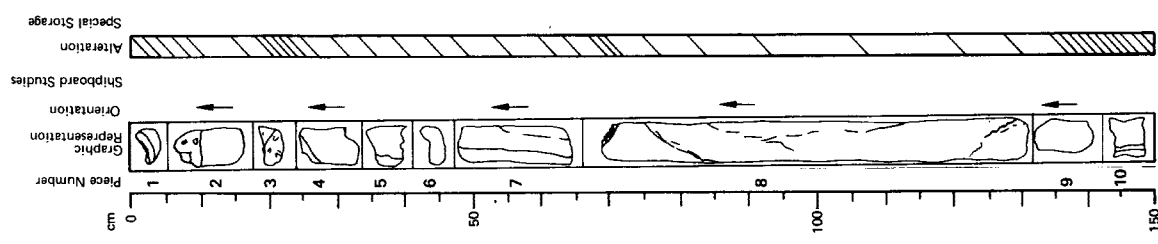
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phryic pillow basalt with chilled margins and minor interpillow breccia. Basalt gray-violet, altered to yellow-brown near margins, red-brown against breccia. Groundmass aphanitic, plagioclase phenocrysts partly altered to clay and analcite (?). 10-20%, <3 mm; clinopyroxene phenocrysts 15%, <0.5 mm. Veins filled by calcite or analcite. Breccia composed of pale yellow-green, partially hematized fragments of altered basaltic glass in a banded pale to yellow-green matrix of paleogranite, smectite, calcite and hematite.



LEG	SITE	HOLE	CORE	SECT.
51	417A		39	2

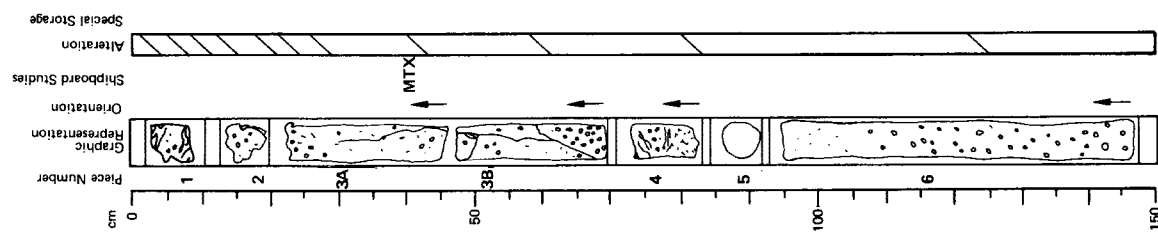
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Altered phryic basalt. Groundmass microlitic, contains disseminated hematite. Plagioclase phenocrysts 5-10%, <8 mm, partially replaced by clay, calcite and analcite; olivine phenocrysts 1-2%, <3 mm, completely replaced. Pieces 7 amygduloidal. Veins filled by smectite (pieces 1 and 2) or by calcite, analcite and natrolite + calcite (piece 3). Piece 8 contains a vein filled with large analcite crystals.

LEG	SITE	HOLE	CORE	SECT.
51	417A		39	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Phryic basalt, altered to yellow-brown in pieces 1 and 2 but gray and increasingly fresh in pieces 3-6. Basalt locally aphyric, hematized in vicinity of cracks (piece 4). Groundmass microlitic, contains disseminated hematite. Plagioclase phenocrysts 20-25%, <5 mm, partly altered to white clay(?); clinopyroxene 5%, <0.4 mm; olivine phenocrysts <1%, <1 mm, completely altered. Pieces 1 and 5 contain veins filled by calcite and analcite + natrolite(?).

Thin Section Description
 Location: pillow interior, 38 cm
 Texture: porphyritic, intersertal
 Phenocrysts: altered olivine 1-2%, 0.5-4.0 mm, idiomorphic; altered plagioclase 10%, 0.8-2.5 mm, idiomorphic.
 Groundmass: altered plagioclase microlites 50%, 0.2-0.5 mm; fresh augite, clinopyroxene 15%, 0.2-0.4 mm, intersertal between microlites; magnetite 5%; undifferentiated altered groundmass 15%.
 Vesicles: <1%, <1 mm, filled by calcite.
 Alteration: olivine replaced by calcite; groundmass contains smectite and disseminated hematite.

Shipboard Data
 Bulk Analysis: 37.40 cm
 Magnetic Data: 37.40 cm
 SiO₂ 49.16 NRM Intensity (emu/cc) 5.199 x 10⁻³
 Al₂O₃ 17.60 NRM Inclination -20.1°
 Fe₂O₃ 11.54 Stable Inclination -20.6°
 MgO 4.59
 CaO 11.55
 Na₂O N.D.
 K₂O 1.15
 TiO₂ 1.52
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.70
 H₂O⁺ 2.64
 H₂O⁻ N.D.
 CO₂ 1.10
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

LEG	SITE	H O	CORE	SECT.
514	17A	E	39	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

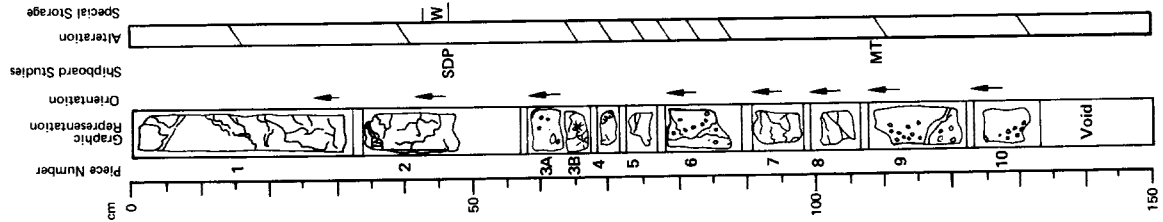
Visual Description
 Altered phryic to aphyric basalt, locally fractured. Basalt gray, altered to yellow-gray, yellow-brown along veins. Groundmass microlitic. Plagioclase phenocrysts 20%, <3 mm, altered to clay, analcite; clinopyroxene phenocrysts 5.7%, <0.2 mm. Veins filled by pale green smectite and calcite (pieces 1-3A) or by crystals of analcite and natrolite (pieces 3B-5).

Thin Section Description

Location: pillow interior, 111 cm
 Texture: porphyritic, intersertal
 Phenocrysts: altered olivine, trace, 2 mm, idiomorphic; altered plagioclase 10%, 1.2.5 mm, idiomorphic.
 Groundmass: altered plagioclase microlites 50%, 0.1-0.5 mm; fresh augitic clinopyroxene microlites 20%; 0.1-0.4 mm; undifferentiated altered groundmass 20%.
 Vesicles: 1%, 1 mm, crescentic calcite fillings.
 Alteration: plagioclase replaced by calcite, clay and natrolite; olivine replaced by calcite and clay.

Shipboard Data

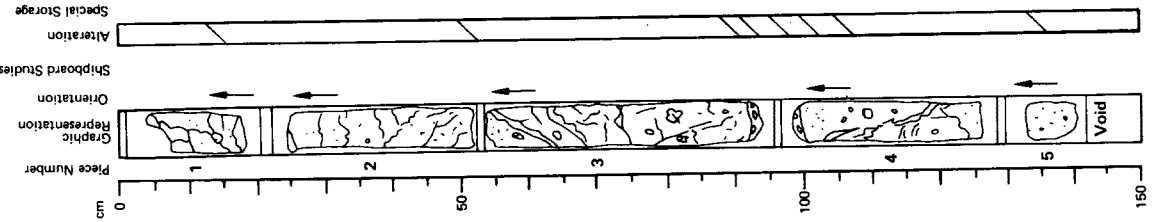
Magnetic Data:
 NRM Intensity (emu/cc) 1.794 x 10⁻³
 NRM Inclination -9.3°
 Stable Inclination -9.3°
 Physical Property Data:
 Vp (km/sec) 43-45 cm
 Porosity (%) 5.7
 Wet Bulk Density (g/cc) 2.76
 Grain Density (g/cc) 2.87



LEG	SITE	H O	CORE	SECT.
514	17A	E	39	4

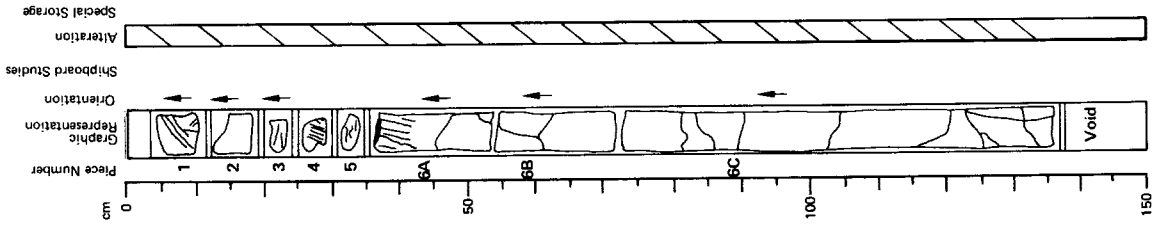
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phryic pillow basalt with chilled margins and traces of interpillow breccia between 92-98 cm. Basalt gray, altered to yellow-brown near margins. Groundmass microlitic. Plagioclase phenocrysts partially altered to clay 15-20%, <5 mm in pieces 1, 2 and 5; <12 mm in pieces 3 and 4; clinopyroxene phenocrysts 7%, <0.2 mm. Veins filled by brown smectite and calcite.



LEG	SITE	H	O	L	CORE	SECT.
5	1417A	4	0	0	2	2

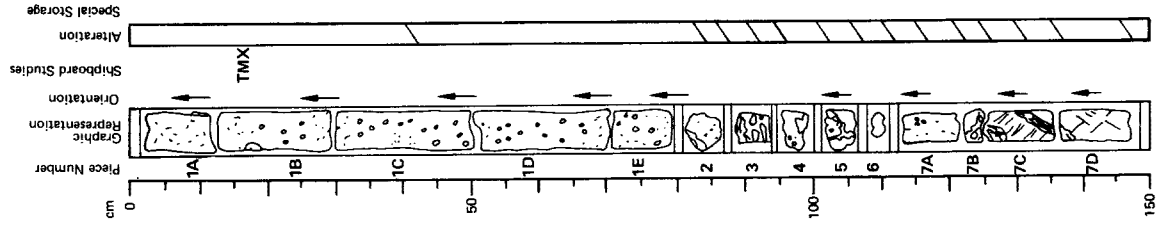
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Altered phyrlic basalt with a chilled margin at the top of piece 6A and traces of interpillow or interflow breccia in piece 5. Basalt dark gray with a microlitic groundmass, altered to pale brown in piece 4 and to pale yellow-brown near aphanitic margin in piece 6A. Plagioclase phenocrysts 10%, <7 mm, largely replaced; altered clinopyroxene phenocrysts 2-3%, <3 mm; olivine phenocrysts replaced by iddingsite, <2%, <2 mm. Calcite and smectite-filled vesicles 1%. Vains filled by calcite and dark green smectite. Breccia in piece 5 composed of fragments of basalt altered to palagonite(?) in a green self-matrix of palagonite, red brown smectite or hematite and calcite.

LEG	SITE	H	O	L	CORE	SECT.
5	1417A	4	0	1	1	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Altered phyrlic basalt with chilled margins and minor breccia. Basalt gray, altered to yellow-brown in pieces 2, 4-7C and the top of 7D. Groundmass microlitic. Plagioclase phenocrysts 15%, <7 mm, partially replaced by clay; analcite; clinopyroxene phenocrysts 10%, <0.5 mm. Vains filled by brown smectite and analcite. Piece 1B contains a small analcite-filled vug. Breccia composed of yellow to yellow-brown fragments of altered basalt or basaltic glass cut by veins of hematite in a banded matrix of calcite, analcite and black shards of relatively fresh glass (piece 3) or of green palagonite, smectite, calcite and hematite (pieces 7B and 7C).

Thin Section Description
 Location: pillow interior, 15 cm
 Texture: porphyritic, intersertal
 Phenocrysts: altered olivine <1%, 1 mm, idiomorphic; plagioclase 15%, 1.5 mm, idiomorphic; fresh clinopyroxene <1%, 1 mm, twinned, rounded and corroded.
 Groundmass: plagioclase 40%; interstitial clinopyroxene 5%; undifferentiated, altered groundmass 40%.
 Vesicles: <1%, <0.5 mm, filled by calcite and smectite.
 Alteration: plagioclase phenocrysts partly replaced by calcite, montmorillonite, analcite and natrolite; olivine phenocrysts replaced by calcite.

Shipboard Data

Bulk Analysis:	14.17 cm	Magnetic Data:	14.17 cm
SiO ₂	48.67	NRM Intensity (emu/cc)	6.7000 x 10 ⁻³
Al ₂ O ₃	18.35	NRM Inclination	-24.5°
Fe ₂ O ₃	9.54	Stable Inclination	-25.1°
MgO	4.40		
CaO	13.30		
Na ₂ O	N.D.		
K ₂ O	0.89		
TiO ₂	1.97		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	5.25		
H ₂ O ⁺	4.24		
H ₂ O ⁻	N.D.		
CO ₂	2.06		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

TMX

LEG	SITE	HOLE	CORE	SECT.
51417A	40			3

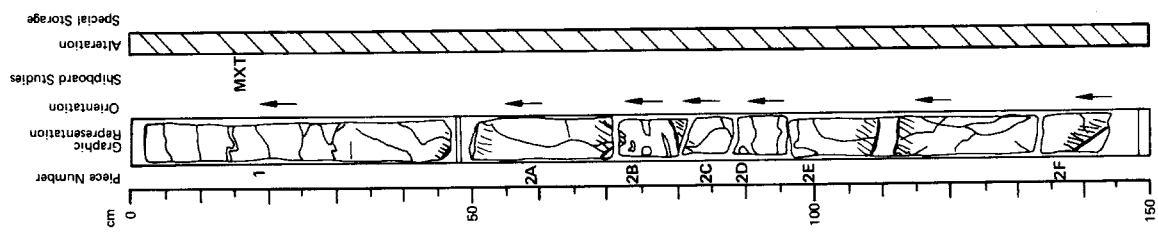
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phryic pillow basalt with chilled margins and minor interpillow breccia. Intervals 0-48, 48-71, 78-100 and 110-143 represent individual pillow or parts of pillows bounded by thick, glassy margins. Basalt gray with a microclitic groundmass, altered to yellow-brown near margins. Plagioclase phenocrysts 10%, < 6 mm, partly altered to clay; altered clinopyroxene phenocrysts 2%, < 3 mm; olivine phenocrysts 2%, < 2 mm, completely replaced. Veins, cavity fillings 2B, 2E and 2F) composed of calcite, smectite and zeolites.

Thin Section Description
 Location: pillow interior, 18 cm
 Texture: porphyritic, hyalophitic
 Phenocrysts: plagioclase 20%, 6 mm, euhedral
 Groundmass: plagioclase 20%, 0.1 mm, tabular; clinopyroxene 10%, 0.03 mm, granular to anhedral; devitrified glass 45%
 Vesicles: traces, 0.03 mm, filled by clay.

Shipboard Data

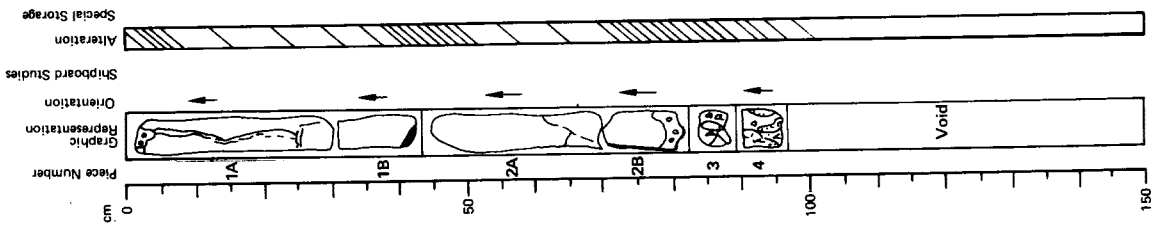
Bulk Analysis:	17-19 cm	Magnetic Data:	17-19 cm
SiO ₂	48.75	NRM Intensity (emu/cc)	16.114 x 10 ⁻³
Al ₂ O ₃	17.73	NRM Inclination	-23.1°
Fe ₂ O ₃	8.87	Stable Inclination	-23.7°
MgO	6.51		
CaO	14.41		
Ni ₂ O	N.D.		
K ₂ O	0.07		
TiO ₂	1.27		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	2.05		
H ₂ O ⁺	0.90		
H ₂ O ⁻	N.D.		
CO ₂	0.94		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



LEG	SITE	HOLE	CORE	SECT.
51417A	40			4

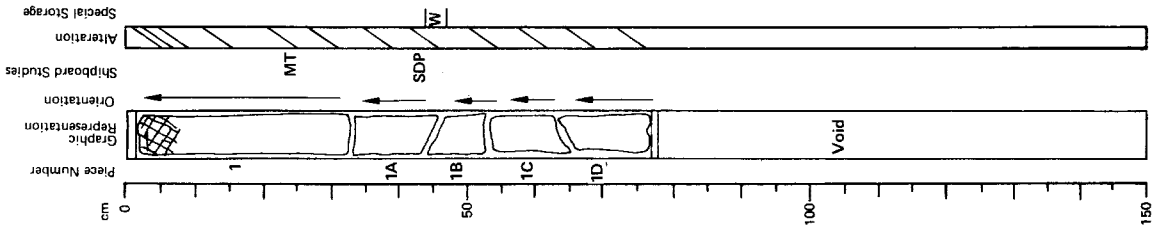
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phryic pillow basalt with chilled margin between 70-75 cm and interpillow breccia between 0-3 and 75-95 cm. Groundmass microclitic. Plagioclase phenocrysts with cores preferentially altered to calcite, zeolites; olivine phenocrysts replaced by iddingsite 5-10%, 1-3 mm. Veins filled by calcite. Breccia composed of clasts of basaltic glass altered to palagonite in a matrix of smectite, celadonite, calcite and zeolites. Clasts in pieces 3 and 4 are aligned parallel to margins.



LEG	SITE	HOLE	CORE	SECT.
51	417	A	40	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



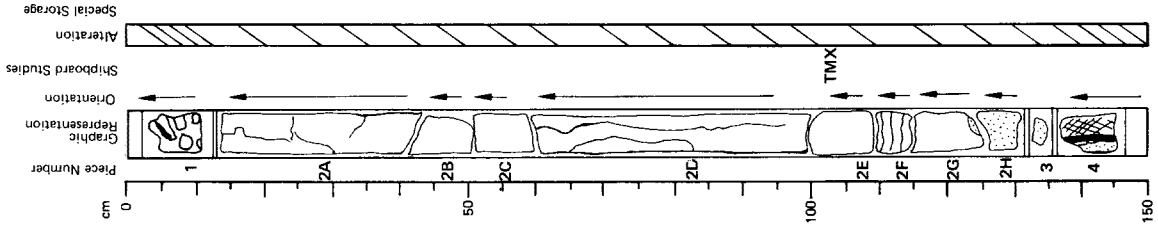
Visual Description
 Altered phryic basalt with a chilled margin at the top of piece 1. Basalt gray, altered to yellow-gray near margin. Groundmass microlitic. Plagioclase phenocrysts 15-20%, < 1 cm, partially replaced by calcite, analcite(?); olivine phenocrysts replaced by iddingsite and calcite 3-4%, < 3 mm; black augitic clinopyroxene laths 1-2%, < 3 mm. Small (< 1 mm) vesicles filled by calcite or smectite. Veins filled by calcite, calcitonite.

Thin Section Description
 Location: near chilled margin, 27 cm
 Texture: porphyritic, hyaloophitic
 Phenocrysts: altered olivine 2%, 1 mm, subhedral; plagioclase 25%, 1-4 mm, euhedral; clinopyroxene 3%, 0.1-1 mm, euhedral to subhedral.
 Groundmass: plagioclase 10%, 0.4 mm, skeletal needles, tabular; devitrified glass 60%.
 Vesicles: trace, 1 mm, filled by smectite, clay.
 Alteration: olivine replaced by smectite, clay; veins filled by calcite, smectite and hematite.

Shipboard Data
 Magnetic Data:
 NRM Intensity 26-28 cm 25.415 x 10⁻³
 NRM Inclination -18.1°
 Stable Inclination -17.9°
 Physical Property Data:
 Vp (km/sec) 45-47 cm 5.37
 Porosity (%) 5.4
 Wet Bulk Density (g/cc) 2.80
 Grain Density (g/cc) 2.91

LEG	SITE	HOLE	CORE	SECT.
51	417	A	41	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



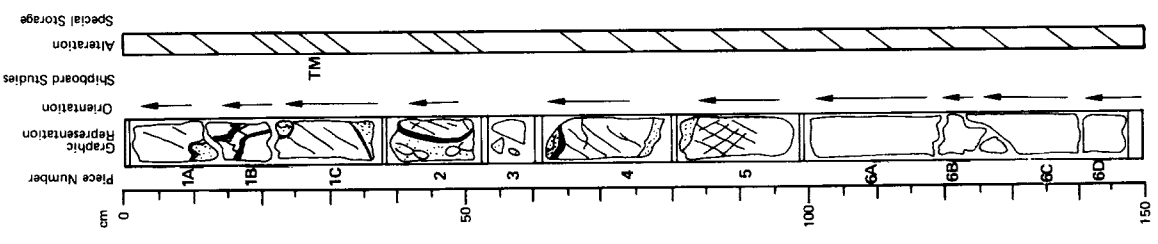
Visual Description
 Altered phryic pillow basalt with a chilled margin in piece 4 and interpillow breccia in pieces 1, 2H and 3. Basalt gray, altered to yellow-gray and brown within 3 cm and 2mm, respectively, of margin against breccia. Groundmass microlitic. Plagioclase phenocrysts 20%, < 1 cm, partially altered to smectite 2-3%, < 4 mm; olivine phenocrysts replaced by iddingsite, calcite 1%, < 3 mm. Vesicles filled by calcite, smectite < 1%, < 1 mm. Veins filled by calcite, smectite and pyrite. Breccia consists of yellow-brown to green fragments of altered basalt in a fine-grained, banded green matrix composed of palagonite and smectite cemented by calcite.

Thin Section Description
 Location: pillow interior, 104 cm
 Texture: porphyritic, hyaloophitic
 Phenocrysts: altered olivine 10%, 1-4 mm, euhedral; plagioclase 20%, 1-5 mm, euhedral to subhedral; clinopyroxene 5%, 1-3 mm, subhedral
 Groundmass: skeletal plagioclase 20%, 1 mm; clinopyroxene 20%, 0.5 mm, anhedral; magnetite 5%, 0.02 mm, euhedral; devitrified glass 20%.
 Alteration: olivine replaced by clay and smectite; glass altered to clay.

Shipboard Data
 Bulk Analysis: 103-105 cm Magnetic Data:
 SiO₂ 49.28 NRM Intensity (emu/cc) 103-105 cm 12.652 x 10⁻³
 Al₂O₃ 16.97 NRM Inclination -11.8°
 Fe₂O₃ 10.57 Stable Inclination -17.9°
 MgO 6.27
 CaO 13.47
 Na₂O N.D.
 K₂O 0
 TiO₂ 1.40
 P₂O₅ N.D.
 MnO N.D.
 LOI 0.75
 H₂O⁺ 0.77
 H₂O⁻ N.D.
 CO₂ 0.30
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

LEG	SITE	HOLE	CORE	SECT.
51	417	A	41	2

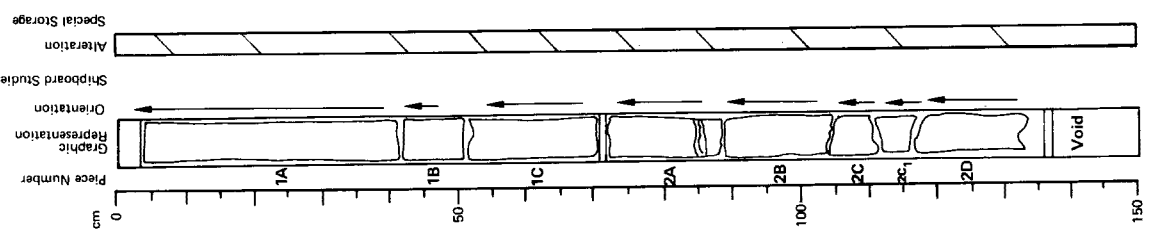
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Altered phryic pillow basalt with chilled margins against interpillow breccia in pieces 1-5. Basalt gray in piece 6, altered to yellow-brown near margins in pieces 1-5. Groundmass microlitic plagioclase phenocrysts 15-20%, <5 mm, largely replaced by calcite and analcite; olivine phenocrysts replaced by iddingsite 4-5%, <5 mm; laths of augitic clinopyroxene 2-3%, <5 mm, partly altered to smectite. Scarce vesicles filled by calcite or smectite <1 mm. Vains filled by calcite. Breccia in pieces 1 and 3.5 composed of elongate fragments of palagonite aligned parallel to pillow margins in a green, fine-grained (<1 mm) self-matrix of palagonite and smectite cemented by calcite and hematite. The breccia in piece 2 is composed of altered basalt fragments a calcite-rich matrix.

Thin Section Description
 Location: near chilled margin, 29 cm
 Texture: porphyritic, hyalophitic
 Phenocrysts: altered olivine 1%, euhedral; plagioclase 25%, 1-5 mm, euhedral; clinopyroxene 3%, rounded, partially resorbed.
 Groundmass: skeletal plagioclase 20%, 0.5 mm; devitrified glass 50%
 Alteration: olivine replaced by clay; glass altered to clay with disseminated hematite; veins filled by calcite, zeolites and sericite(?).

Shipboard Data
 Magnetic Data: 28-30 cm
 NRM Intensity (emu/cc) 6.774 x 10⁻³
 NRM Inclination -29.8°
 Stable Inclination -29.3°



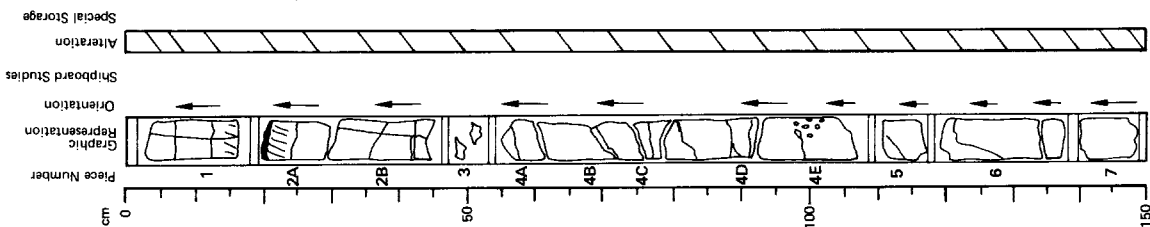
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	A	41	3

Visual Description
 Weakly altered phryic basalt with a gray, interstitial groundmass. Plagioclase phenocrysts 20%, <1 cm, partly replaced by calcite, analcite and zeolites(?); augitic clinopyroxene laths 4-5%, <4 mm; olivine phenocrysts (in piece 2D) 3-4%, <5 mm, replaced by iddingsite and calcite. Vesicles uncommon and small (<1 mm), filled by calcite and smectite. Vains filled by calcite and smectite or by pyrite (piece 2A).

LEG	SITE	HOLE	CORE	SECT.
51	417A	41	41	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

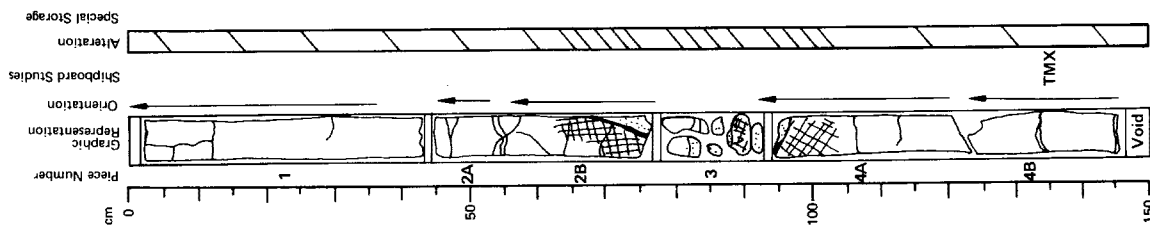


Visual Description

Altered phryic pillow basalt with glassy chilled margins between 15-25 cm. Groundmass micro-litic. Altered plagioclase phenocrysts 20%, < 3 mm in pieces 1-4D, < 10 mm in pieces 4E-7; altered clinopyroxene phenocrysts 5%, < 2 mm; olivine phenocrysts completely replaced by iddingsite 2%, < 1 mm. Veins filled by calcite, dark green smectite and sulfides. Piece 4E contains irregular smectite-filled vugs.

LEG	SITE	HOLE	CORE	SECT.
51	417A	41	41	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Altered phryic pillow basalt with chilled margins against palagonitic interpillow breccia in pieces 2B and 4A. Basalt gray, altered to yellow-gray near margins; fragments in piece 3 altered to brown against breccia. Groundmass micro-litic. Plagioclase phenocrysts 15-20%, < 5 mm, altered to clay; augitic clinopyroxene laths 3-4%, < 4 mm, partly altered to smectite; iddingsite pseudomorphs after olivine in piece 2B, 5%, < 5 mm. Vesicles scarce, 1-2 mm, filled by calcite or smectite. Veins filled by calcite. Breccia composed of elongate fragments of palagonite in a banded green matrix of palagonite and smectite cemented by calcite.

Thin Section Description

Location: pillow interior, 137 cm
 Texture: porphyritic, ophitic
 Phenocrysts: altered olivine 5%, 0.5 mm, euhedral to subhedral; plagioclase 20%, 1-3 mm, euhedral, clinopyroxene 5%, 2 mm, euhedral.
 Groundmass: olivine < 5%; plagioclase 20%, 0.1-0.5 mm, skeletal, tabular; dendritic magnetite 5%, 0.02 mm; glass < 5%.
 Alteration: olivine replaced by clay.

Shipboard Data

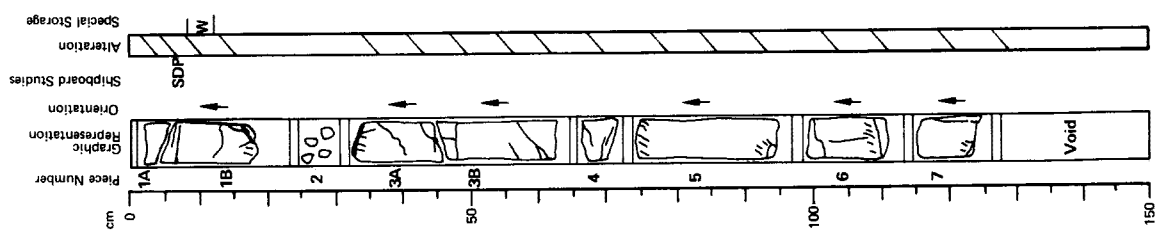
Bulk Analysis: 136-139 cm	Magnetic Data: 136-139 cm
SiO ₂ 49.61	NRM Intensity (emu/cc) 37.597 x 10 ⁻³
Al ₂ O ₃ 17.39	NRM Inclination -24.8°
Fe ₂ O ₃ 9.94	Stable Inclination -25.3°
MgO 5.37	
CaO 13.89	
Ni ₂ O N.D.	
K ₂ O 0	
TiO ₂ 1.49	
P ₂ O ₅ N.D.	
MnO N.D.	
LOI 1.55	
H ₂ O ⁺ 0.86	
H ₂ O ⁻ N.D.	
CO ₂ 0.52	
Cr N.D.	
Ni N.D.	
Sr N.D.	
Zr N.D.	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	A	41	6

Visual Description
Weakly altered phyrlic pillow basalt with chilled margins at the top of pieces 3A and 5 and at the bottom of pieces 1B and 5-7. Piece 2 contains traces of interpillow breccia. Groundmass microlitic with aphanitic to glassy margins. Plagioclase phenocrysts 20%, <6 mm, partly altered to clay; olivine phenocrysts 10%, <3 mm, completely replaced by iddingsite. Veins filled by calcite and zeolites. Breccia in piece 2 contains calcite and zeolites.

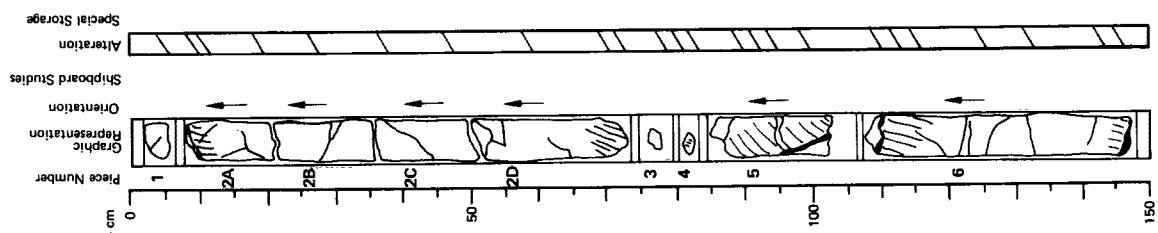
Shipboard Data
Physical Property Data:
Vp (km/sec) 9.11 cm
Porosity (%) 5.80
Wet Bulk Density (g/cc) 2.8
Grain Density (g/cc) 2.86
2.82



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	A	42	1

Visual Description
Altered phyrlic basalt pillows with chilled margins in pieces 5 and the top and bottom of pieces 2 and 6. Piece 3 is composed of interpillow breccia. Basalt gray, altered to yellow-brown with 1-2 mm-thick dark brown stain along margins. Groundmass crystalline, grades to microcrystalline, aphanitic and partly glassy toward margins. Plagioclase phenocrysts 20%, <1 cm; olivine phenocrysts replaced by iddingsite 5%, <4 mm. Veins filled by calcite and dark green smectite.

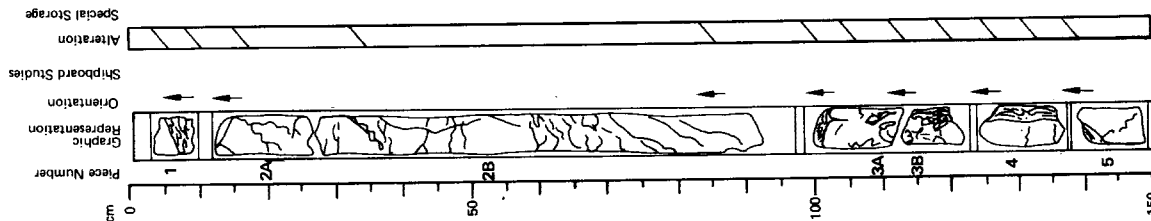


106

LEG	SITE	HOLE	CORE	SECT.
51	417A	4	2	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phytic pillow basalt with chilled margins and minor interpillow breccia. Basalt in piece 3 fractured, cemented by calcite. Basalt gray-violet, altered to yellow-brown near margins. Altered plagioclase phenocrysts 10-15%, <3 mm; altered mafic phenocrysts 5-7%, <0.4 mm. Calcite-filled veins common. Breccia in pieces 1 and 3-5 consists of small, pale green fragments of basalt glass altered to palagonite, the larger of which are aligned subparallel to pillow margins, in a green matrix of smectite, celadonite and palagonite cemented by veins of calcite and hematite.



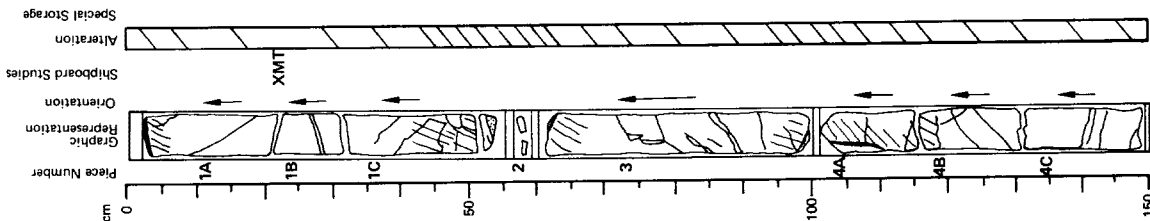
LEG	SITE	HOLE	CORE	SECT.
51	417A	4	2	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phytic basalt pillows. Intervals 0-55, 55-100 and 100-150 cm represent individual pillows or parts of pillows bounded by chilled margins. Groundmass crystalline with aphanitic pyroxene 20%, <10 mm; altered olivine phenocrysts 5%, <4 mm. Veins and vesicles (the latter common between 27-30 cm) filled by calcite and smectite.

Thin Section Description
 Location: pillow interior, 21 cm
 Texture: porphyritic, hyaloophitic
 Phenocrysts: altered olivine 5%, 0.5-1.0 mm, euhedral; plagioclase 20%, 1-4 mm, euhedral; clinopyroxene 20%, 1-2 mm, rounded, glomerophyritic with plagioclase.
 Groundmass: plagioclase 20%, 0.5 mm, dendritic to tabular; clinopyroxene 20%, 0.1 mm, granular to prismatic; magnetite 5%, 0.02 mm, dendritic, euhedral; devitrified glass 10%.
 Alteration: olivine replaced by clay.

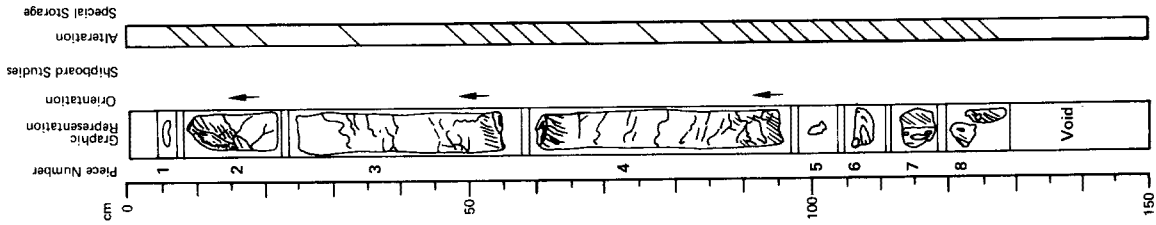
Shipboard Data
 Bulk Analysis: 20-22 cm
 Magnetic Data: 20-22 cm
 SiO₂ 49.66 NRM Intensity (emu/cc) 23,962 x 10⁻³
 Al₂O₃ 17.65 NRM Inclination -18.2°
 Fe₂O₃ 9.68 Stable Inclination -22.0°
 MgO 6.28
 Na₂O N.D.
 K₂O 0.01
 TiO₂ 1.53
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.00
 H₂O⁺ 0.94
 H₂O⁻ N.D.
 CO₂ 0.28
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



LEG	SITE	HOLE	CORE	SECT.
51	417	A	42	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phryic basalt pillows with chilled margins and minor inter-pillow breccia. Intervals 8-55 and 55-95 represent individual pillows bounded by chilled margins. Basalt gray, altered to gray-violet, yellow-brown along veinlets and margins. Altered plagioclase phenocrysts 20%, <3 mm; altered clinopyroxene phenocrysts 10%, <1 mm; olivine phenocrysts replaced by iddingsite 1%, <1 mm. Veins filled by calcite. Breccia in pieces 1, 6 and 7 consists of yellow-brown to yellow-green fragments of altered basalt (the latter altered to palagonite) in a green matrix of palagonite fragments cemented by smectite and calcite.



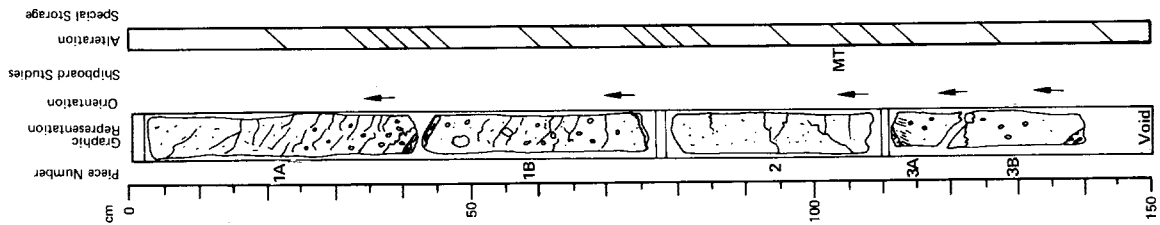
LEG	SITE	HOLE	CORE	SECT.
51	417	A	42	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Altered phryic basalt pillows, intervals 0-42, 42-75, 75-110 and 110-140 represent individual pillows bounded by locally aphyric, 2 cm-wide chilled margins. Basalt gray to gray-violet, altered to yellow-brown or light gray-brown near margins. Altered plagioclase phenocrysts range from 0.5-1.0 mm near margins to <10 mm in pillow interiors; altered mafic phenocrysts 7%, <1 mm. Veins filled by calcite.

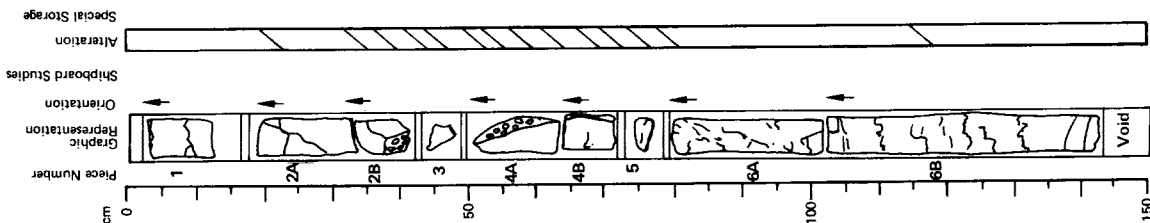
Thin Section Description
 Location: near chilled margin, 104 cm
 Texture: porphyritic, variolitic
 Phenocrysts: altered olivine 10%, 0.5-1.0 mm, euhedral; plagioclase 20%, 0.5-2.0 mm, euhedral, some showing overgrowth on partially resorbed grains; clinopyroxene <5%, 0.5-1.0 mm, partially resorbed.
 Groundmass: plagioclase 10%, 0.3 mm, skeletal laths, tabular; devitrified glass 55%.
 Vesicles: trace, 0.1-1 mm, filled by calcite, smectite.
 Alteration: olivine replaced by iddingsite, clay and calcite; glass altered to clay with disseminated hematite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 103-106 cm 7.059 x 10⁻³
 NRM Inclination -23.6°
 Stable Inclination -22.9°



LEG	SITE	HOLE	CORE	SECT.
514	17A	4	2	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

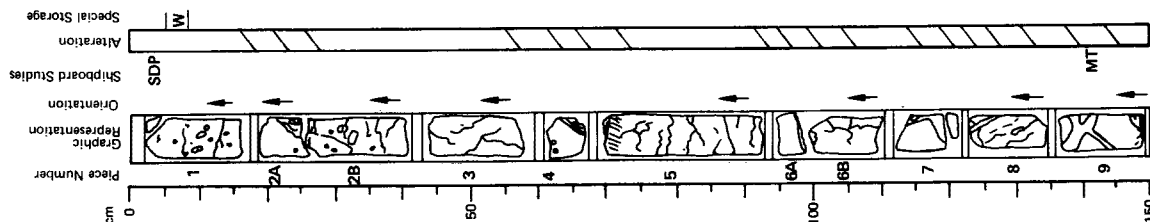


Visual Description

Altered pyroxene-phyric pillow basalt with chilled margins and minor breccia in pieces 2B, 4 and 5. Basalt gray to gray-violet, altered to yellow-brown near margins. Pyroxene phenocrysts altered to smectite 25%, <2 mm; plagioclase phenocrysts rare except at the base of piece 6B; altered olivine phenocrysts? 1%, <1 mm. Veins filled by calcite. Breccia composed of green palagonite fragments in a matrix of calcite and green smectite.

LEG	SITE	HOLE	CORE	SECT.
514	17A	4	2	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Altered phyric basalt with chilled margins and minor breccia in pieces 2A, 4 and 7-9. Pieces 1-4 and 8: basalt gray-brown; altered plagioclase phenocrysts 15%, <5 mm; altered mafic phenocrysts 10%, <0.4 mm. Pieces 5-7 and 9: basalt gray-violet, locally (piece 6A) altered to yellow-brown; plagioclase phenocrysts rare; altered mafic phenocrysts 20-25%, <3 mm. Veins filled by calcite + analcite. Breccia composed of green fragments of basaltic glass altered to palagonite in a matrix of calcite and analcite.

Thin Section Description

Location: near chilled margin, 145 cm
 Texture: porphyritic, variclitic
 Phenocrysts: altered olivine 1%, 0.5 mm, euhedral; altered plagioclase phenocrysts 20%, 1-3 mm, euhedral; clinopyroxene 3%, 3 mm, partially resorbed.
 Groundmass: skeletal plagioclase laths 20%, 0.5 mm; altered clinopyroxene and olivine 20%; devitrified glass <35%.
 Vesicles: trace, 0.05 mm, filled by smectite, clay and hematite.
 Alteration: plagioclase largely altered to clay; olivine replaced by clay, smectite and hematite; veins filled by smectite; groundmass contains disseminated hematite.

Shipboard Data

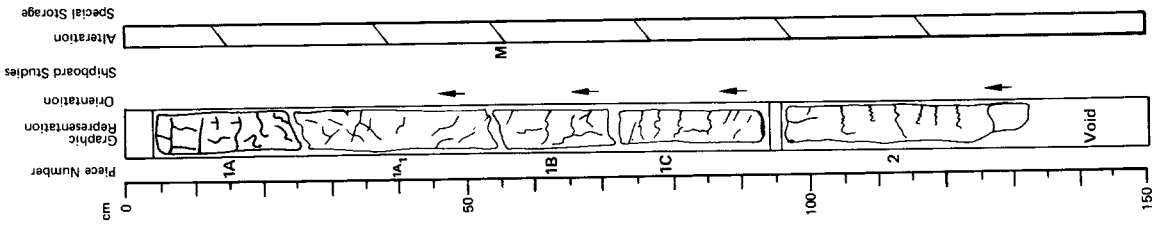
Magnetic Data: 143-146 cm
 NRM Intensity (emu/cc) 5.396 x 10⁻³
 NRM Inclination -17.9°
 Stable Inclination -17.8°
 Physical Property Data:
 Vp (km/sec) 4.6 cm
 Vp (km/sec) 5.06
 Porosity (%) 6.0
 Wet Bulk Density (g/cc) 2.72
 Grain Density (g/cc) 2.83

LEG	SITE	H O L	CORE	SECT.
5 1	4 1 7	A	4 3	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Massive phryic basalt with a gray, holocrystalline groundmass. Plagioclase phenocrysts, 7% < 5 mm; mafic phenocrysts 10%, < 3 mm. Mafic phenocrysts in Piece 2 composed in part (1-2%) of olivine. Veins filled by calcite + green to brown smectite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 59.62 cm
 NRM Inclination -21.0°
 Stable Inclination -21.5°

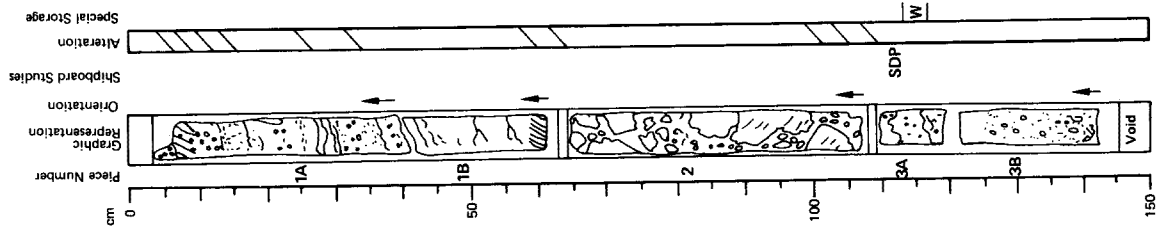


LEG	SITE	H O L	CORE	SECT.
5 1	4 1 7	A	4 3	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Piece 1 consists of a single phryic basalt pillow or thin flow with strongly altered margins and prominent flow banding. The rest of the section represents a massive phryic basalt unit, the top of which (piece 2) consists of a coarse breccia composed of large angular basalt fragments in a basalt matrix, both cut by calcite veins. Basalt gray-violet, altered to yellow-brown or gray-brown along veins and pillow margins. Groundmass aphanitic at the top and bottom of piece 1 and in piece 3A. Plagioclase phenocrysts irregularly distributed, 15%, < 4 mm; mafic phenocrysts 7-10%, < 0.5 mm. Veins in piece 3 filled by calcite, smectite and hematite.

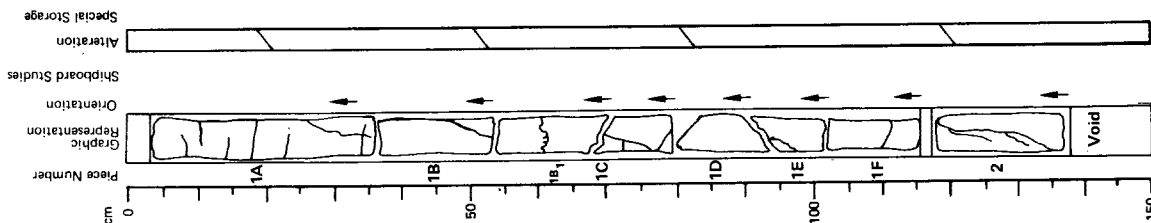
Shipboard Data
 Physical Property Data:
 Vp (km/sec) 112-114 cm
 Porosity (%) 5.12
 Wet Bulk Density (g/cc) 5.14
 Grain Density (g/cc) 2.75
 Grain Density (g/cc) 2.84



LEG	SITE	HOLE	CORE	SECT.
51	417	A	4	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Massive dolerite with a gray, sparsely-phryic holocrystalline groundmass which increases in grain size from fine to medium-grained with depth. Plagioclase phenocrysts <5%, <2 mm; clinopyroxene and olivine phenocrysts, the latter replaced by smectite <2%, <2 mm. Veins filled by calcite.



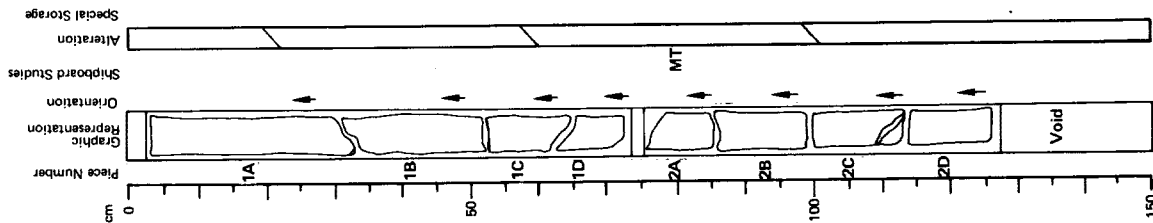
LEG	SITE	HOLE	CORE	SECT.
51	417	A	4	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Massive phryic basalt, grading downward through dolerite. Groundmass gray, increasingly coarse-grained with depth, locally glomerophyritic. Plagioclase phenocrysts 15-20%, <4 mm in piece 1A, decrease with depth to 7% in piece 2; piece 1 contains clinopyroxene and olivine phenocrysts, the latter replaced by smectite, 10-20%, <1 mm. Veins filled by calcite + green to brown smectite.

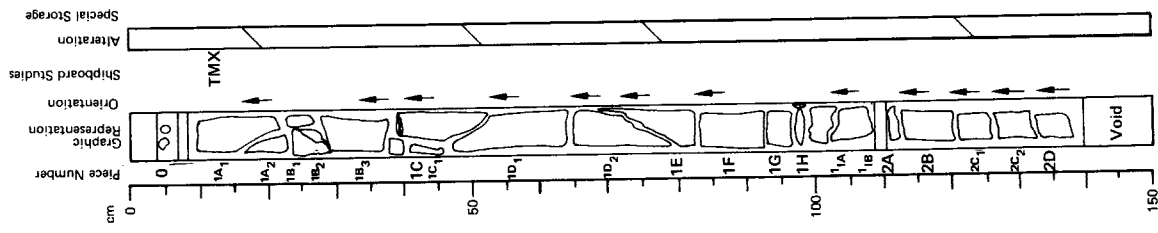
Thin Section Description
 Location: flow interior, 82 cm
 Texture: porphyritic, ophitic
 Phenocrysts: plagioclase 15-20%, 2.5 mm, zoned An 73-86, tabular, glomerophyritic.
 Groundmass: plagioclase 35%, 0.3-0.5 mm, An 68; tabular; clinopyroxene 25%, 0.1-0.2 mm, anhedral; altered magnetite 10%, 0.2 mm, anhedral; altered glass 10%.
 Vesicles: 2-4%, 0.5-1.0 mm, round, filled by celadonite(?).
 Alteration: insttial glass completely altered to clay (celadonite?); magnetite completely altered.

Shipboard Data
 Magnetic Data: 80-83 cm
 NRM Intensity (emu/cc): 19,701 x 10⁻³
 NRM Inclination: -12.4°
 Stable Inclination: -14.7°



LEG	SITE	H O L	CORE	SECT.
51	417A	4	4	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Massive, locally plagioclase-phryic dolerite with a gray, holocrystalline groundmass which increases in grain size from fine- to medium-grained with depth. Plagioclase phenocrysts 5% < 4 mm; groundmass contains plagioclase, clinopyroxene and minor olivine, the latter replaced by smectite. Vains filled by smectite and calcite + pyrite. Interval between 25-35 cm contains smectite and natrolite(?). Three well-rounded pebbles at top of section altered to pale brown, yellow-brown or olive-gray.

Thin Section Description

Location: flow interior, 13 cm
 Texture: porphyritic, optitic
 Phenocrysts: olivine 3%, 1 mm, euhedral; plagioclase 20%, 1-2 mm, euhedral to anhedral, glomeroporphyritic; clinopyroxene 3%, 1%, euhedral
 Groundmass: olivine 5%, 0.1 mm, subhedral to euhedral; plagioclase 20%, 0.7 mm; subhedral to euhedral, prismatic; clinopyroxene 30%, 0.7 mm, granular, anhedral, tabular; euhedral magnetite 10%, 0.1 mm; altered glass < 5%.

Alteration: olivine replaced by smectite.

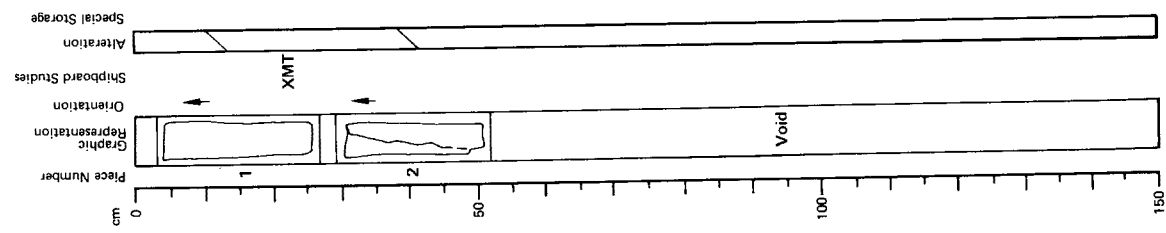
Shipboard Data

Bulk Analysis: 12.15 cm
 Magnetic Data: 12.15 cm
 NRM Intensity (emu/cc) 25,115 x 10⁻³
 NRM Inclination -21.8°
 Stable Inclination -22.8°

SiO ₂	48.19	
Al ₂ O ₃	16.23	
Fe ₂ O ₃	11.56	
MgO	6.37	
CaO	12.59	
Na ₂ O	N.D.	
K ₂ O	0.04	
TiO ₂	1.44	
P ₂ O ₅	N.D.	
MnO	N.D.	
LOI	0.30	
H ₂ O ⁺	0.77	
H ₂ O ⁻	N.D.	
CO ₂	0.03	
Cr	N.D.	
Ni	N.D.	
Sr	N.D.	
Zr	N.D.	

LEG	SITE	H O L	CORE	SECT.
51	417A	4	3	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Massive, sparsely-phryic dolerite with a gray, fine- to medium-grained, holocrystalline groundmass. Labradorite phenocrysts 3%, < 6 mm; mafic phenocrysts composed of clinopyroxene and olivine, the latter replaced by smectite.

Thin Section Description

Location: flow interior, 24 cm
 Texture: porphyritic, subophitic
 Phenocrysts: fresh zoned plagioclase 10%, 2-5 mm, An > 86, tabular.
 Groundmass: altered olivine 1%, 0.3-0.4 mm, euhedral; fresh plagioclase microclites 50%, 0.3-1.0 mm, An > 45; clinopyroxene (Ti-augite) 30%, 0.5 mm, intergranular to poikilitic; magnetite 5%, 0.1-0.3 mm; devitrified glass 1-2%.

Alteration: olivine replaced by clay and smectite; plagioclase shows incipient alteration to clay.

Shipboard Data

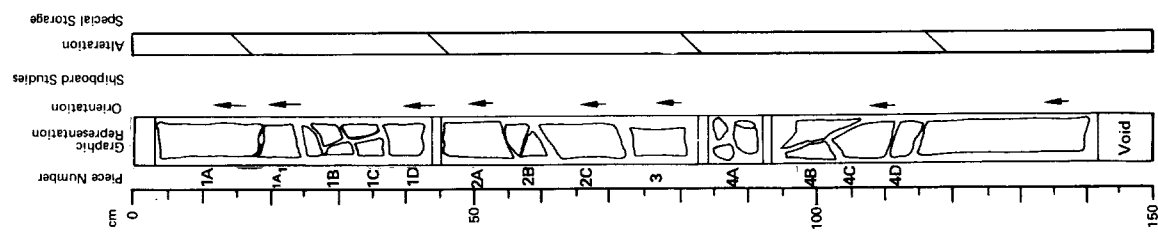
Bulk Analysis: 22-25 cm
 Magnetic Data: 22-25 cm
 NRM Intensity (emu/cc) 23,650 x 10⁻³
 NRM Inclination -25.3°
 Stable Inclination -25.6°

SiO ₂	49.64	
Al ₂ O ₃	16.47	
Fe ₂ O ₃	11.13	
MgO	6.41	
CaO	12.69	
Na ₂ O	N.D.	
K ₂ O	0.02	
TiO ₂	1.41	
P ₂ O ₅	N.D.	
MnO	N.D.	
LOI	0.75	
H ₂ O ⁺	0.74	
H ₂ O ⁻	N.D.	
CO ₂	0.03	
Cr	N.D.	
Ni	N.D.	
Sr	N.D.	
Zr	N.D.	

LEG	SITE	H O	J E	CORE	SECT.
5 1	4 1 7 A	4 4	4 4	4 4	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

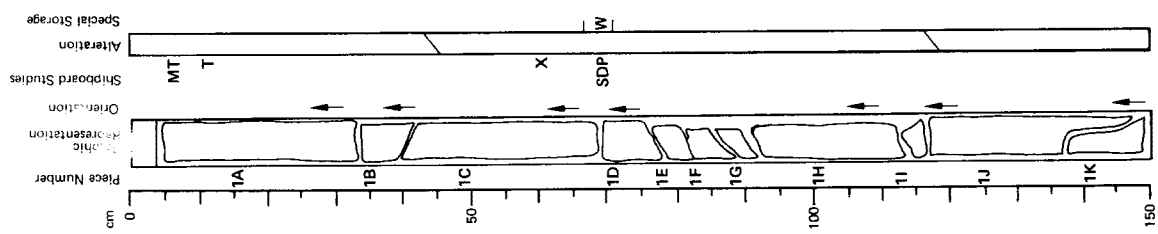
Visual Description
 Massive, locally phyrlic dolerite with a gray, holocrystalline groundmass which increases in grain size from fine- to medium-grained with depth. Plagioclase phenocrysts 1-3%, < 4 mm; groundmass contains plagioclase, clinopyroxene and minor olivine, the latter replaced by smectite. Veins filled by calcite; large vein between 95-105 cm filled by calcite, smectite and pyrite.



LEG	SITE	H O	J E	CORE	SECT.
5 1	4 1 7 A	4 4	4 4	4 4	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Massive, locally plagioclase-phyric dolerite with a gray, medium-grained groundmass which increases in grain size with depth. Plagioclase phenocrysts 2%, < 7 mm; groundmass contains plagioclase, clinopyroxene and minor olivine, the latter replaced by smectite. Veins in pieces 1E, 1J and 1K filled by dark green smectite and pyrite + calcite.



Thin Section Description
 Location: flow interior, 6 cm
 Texture: ophitic
 Phenocrysts: fresh plagioclase 2%, 2.5 mm, zoned with An 55-60 cores and An 35 rims, idiomorphic.

Groundmass: altered olivine(?) 1%, 0.3 mm; plagioclase 50%, 0.2-1.0 mm, An 50, idiomorphic; clinopyroxene (Ti-augite) 40%, 0.1-0.2 mm, poikilitic, light pink; magnetite 5%.
Alteration: olivine(?) completely altered to hematite and smectite.

Thin Section Description
 Location: flow interior, 10 cm
 Texture: porphyritic, ophitic
 Phenocrysts: plagioclase 25%, 2 mm, subhedral to anhedral, tabular; clinopyroxene 25%, 2 mm, anhedral, plagioclase inclusions common.

Groundmass: altered olivine < 5%, anhedral; plagioclase 15%, 0.05 mm, anhedral to subhedral; clinopyroxene 15%, 0.02 mm, anhedral; magnetite 10%, 0.05 mm, euhedral to anhedral, devitrified glass < 5%.
Alteration: olivine altered to clay

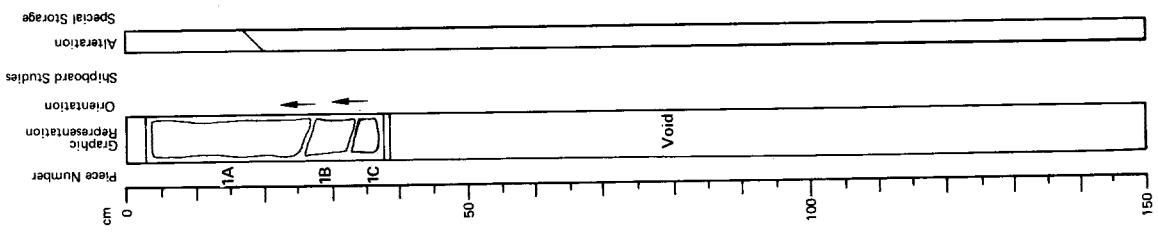
Shipboard Data

Bulk Analysis:	58-68 cm	Magnetic Data:	8-11 cm
SiO ₂	49.73	NRM Intensity (emu/cc)	3.517 x 10 ⁻³
Al ₂ O ₃	16.02	NRM Inclination	-19.9°
Fe ₂ O ₃	11.08	Stable Inclination	-30.5°
MgO	6.92	Physical Property Data:	
CaO	12.47	Vp (km/sec)	68-70 cm
Na ₂ O	N.D.	Porosity (%)	5.80
K ₂ O	0.08	Wet Bulk Density (g/cc)	2.16
TiO ₂	1.45	Grain Density (g/cc)	2.93
P ₂ O ₅	N.D.		2.97
MnO	N.D.		
LOI	0.25		
H ₂ O ⁺	N.D.		
H ₂ O ⁻	N.D.		
CO ₂	N.D.		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

LEG	SITE	HOLE	CORE	SECT.
51	417A	44	44	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Massive dolerite with a gray, medium-grained groundmass composed of plagioclase, clinopyroxene and minor olivine, the latter replaced by smectite. Groundmass contains irregular patches of calcite and smectite.

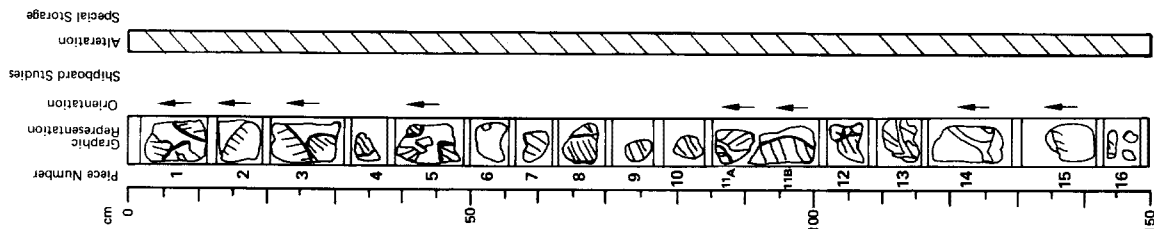


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LEG	SITE	HOLE	CORE	SECT.
51	417A	46	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Volcanic breccia composed of phryic pillow basalt fragments, often with chilled margins, in a matrix of calcite and green smectite. Basalt groundmass microcrystalline, locally glassy. Plagioclase phenocrysts 20%, <3 mm; mafic phenocrysts 5%, <2 mm. Calcite in matrix locally coarsely crystalline.



LEG	SITE	HOLE	CORE	SECT.
51	417A	46	1	

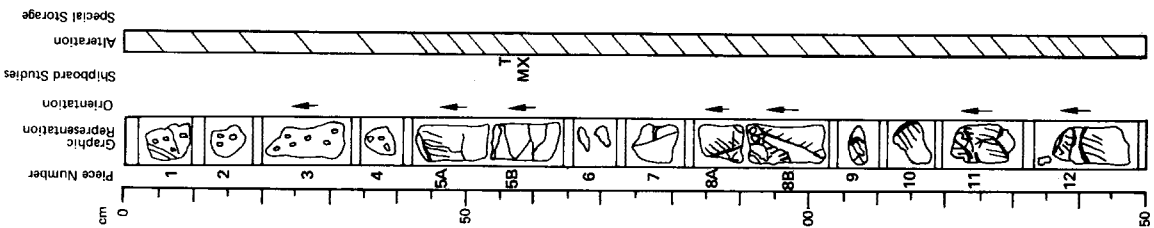
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Pieces 1-4: massive, locally phryic dolerite with a fresh, medium-grained groundmass. Plagioclase phenocrysts 30%, <7 mm; clinopyroxene phenocrysts 20%, <3 mm. Groundmass contains plagioclase, clinopyroxene and fresh olivine. Pieces 5-12: altered phryic pillow basalt with chilled margins and intrusion(?) breccia. Basalt groundmass in both phryic and breccia fragments aphanitic to microclitic. Plagioclase phenocrysts 10%, <3 mm; mafic phenocrysts (clinopyroxene and olivine) 3%, <2 mm; phenocrysts in breccia strongly altered. Breccia matrix composed of calcite (locally scalenohedral) and green smectite. Veins filled by calcite and smectite.

Thin Section Description
 Location: pillow interior, 57 cm
 Texture: porphyritic, varietic
 Phenocrysts: plagioclase 5%, 0.5 mm, euhedral; clinopyroxene 2%, 0.5 mm, partially resorbed. Groundmass: skeletal plagioclase laths 20%, 0.4 mm; granular clinopyroxene 20%, 0.2 mm; devitrified glass 50%.
 Alteration: veins filled by calcite, smectite and hematite.

Shipboard Data

Bulk Analysis:	56-59 cm	Magnetic Data:	56-59 cm
SiO ₂	48.70	NRM Intensity (emu/cc)	5.963 x 10 ⁻³
Al ₂ O ₃	15.92	NRM Inclination	-14.8°
Fe ₂ O ₃	11.23	Stable Inclination	-15.7°
MgO	6.46		
CaO	13.82		
Na ₂ O	N.D.		
K ₂ O	0.22		
TiO ₂	1.44		
P ₂ O ₅	N.D.		
MnO	N.D.		
H ₂ O ⁺	1.31		
H ₂ O ⁻	N.D.		
CO ₂	1.05		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



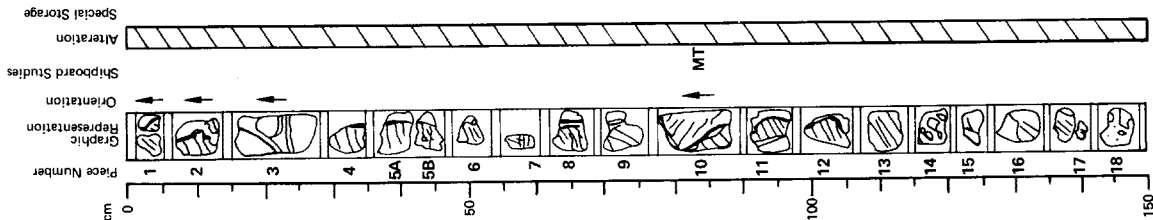
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	A	46	3

Visual Description
 Volcanic breccia composed of chilled, phryic pillow basalt fragments, often with strongly altered margins, in a matrix of calcite and green smectite. Basalt groundmass microcrystalline to aplinitic. Plagioclase phenocrysts 20%, <4 mm; mafic phenocrysts 5%, <2 mm.

Thin Section Description
 Location: near chilled margin, 84 cm
 Texture: porphyritic, variolitic
 Phenocrysts: altered olivine 3%, 0.5 mm, euhedral; altered plagioclase 15%, 1.2 mm, euhedral; altered clinopyroxene 3%, 0.5 mm, euhedral.
 Groundmass: plagioclase laths 20%, 0.2 mm; altered olivine or clinopyroxene 20%, 0.05 mm, anhedral to granular; dendritic magnetite 10%, 0.03 mm; devitrified glass.
 Alteration: plagioclase replaced by smectite and zeolites; olivine and clinopyroxene replaced by smectite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 82.85 cm
 NRM Inclination 1.526 x 10⁻³
 Stable Inclination -31.8°
 -39.3°

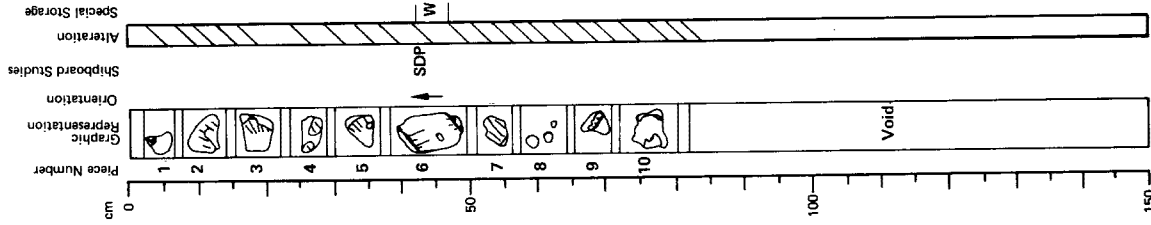


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	A	46	4

Visual Description
 Volcanic breccia composed of phryic pillow basalt fragments, often with strongly altered chilled margins, in a matrix of calcite and green smectite. Basalt groundmass aphanitic to microcrystalline. Plagioclase phenocrysts 10%, <2 mm; clinopyroxene phenocrysts 5-10%, <1 mm. Calcite-filled vesicles 10%, <8 mm. Piece 10 contains a large cavity filled by calcite and zeolites.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 43.45 cm
 Porosity (%) 5.29
 Wet Bulk Density (g/cc) 4.67
 Grain Density (g/cc) 2.71
 2.79



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MGG 15 0 5 5 0 2 1

SITE SUMMARY SHEET

SITE 417, HOLES 417B AND 417D

	LEG 51	LEG 52
Date occupied	30 December 1976 2130 LCT	January 24, 1977 1337Z
Date departed	15 January 1977 0230 LCT	February 10, 1977 0817Z
Time on hole	15 days, 5 hours	17 days, 18 hours, 40 minutes
Position: latitude	25° 06.69'N	25° 06.69'N
longitude	68° 02.82'W	68° 02.82'W
Water depth (sea level)	5482 corrected meters, echo sounding	5480 corrected meters, echo sounding
Water depth (rig floor)	5492 corrected meters, echo sounding	5490 corrected meters, echo sounding
Bottom felt at	5489 meters, drill pipe	5489 meters, drill pipe
Penetration	532.5 meters	708.5 meters
Number of holes	1	1
Number of cores	47	22
Total length of cored section	366.1 meters	In sediment: 176.6 m In basalt: 189.5 m
Total core recovered	203.42 meters	In sediment: 57.64 m In basalt: 145.78 m
Percentage core recovery	55.6 per cent	In sediment: 32.6% In basalt: 76.9%
Oldest Sediment Cored		
Depth sub-bottom	343 meters	343 meters
Nature	nanno chalk	nanno chalk (Per Leg 51B results)
Age	Early Aptian	Early Aptian
Measured velocity	1.8 km/sec	1.8 km/sec
Basement		
Depth sub-bottom	343 meters	708.5 meters
Nature	Basalt	Basalt
Velocity range	5.4 km/sec	4.5-6.1 km/sec

SITE 417	HOLE B	CORE 1	CORED INTERVAL: 0.0-5.2 m		LITHOLOGIC SAMPLE STRUC/STRUC/SEDIMENTARY LITHOLOGIC	LITHOLOGIC DESCRIPTION	
			SECTION	METERS			
TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER	GRAPHIC LITHOLOGY	
EARLY QUATERNARY		Ra	Cg		10	MANIFOSSIL BEARING CLAY highly to moderately disturbed, dark yellowish brown to yellowish brown (10YR 4/4, 10YR 5/4). Nannofossil bearing Clay (Major Lithology) Smears: 1-48, 1-50, 1-63, 3-90 75% clay min. 8% qtz. 2% feld. 11% heavies and opaques 2% micarb 1% nannofossil 1% fish remains 1% biotite, chlorite	
		Ra			82	Nanno Marl (Minor Lithology) Smears: 1-10, 1-50 24% clay min. 8% qtz. 1% feld. 8% heavies and opaques 4% micarb 5% foraminifera 50% nannofossil	
		Ra			90	Volcanic(?) Ash (Minor Lithology) Smear: 2-82 70% clay min. 15% zeolites 15% chert(?)	
		Ra				VOID	
		Ra				VOID	
					CC	Carbon, Carbon-Carbonate 1-30 (0.3, 0.1, 1) 1-80 (0.2, 0.1, 1)	

SITE 417 HOLE D CORE 9 CORED INTERVAL: 220.5-229.9 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURE MARKS	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION							
					BIOSTRAT ZONE	FORAMS													
LATE CRETACEOUS							1	0.5	Z		10YR 5/6	ZEOLITIC CLAY Firm, slightly disturbed; dominantly (66%) yellowish brown (10YR 5/6) interlayered with pale blue green (5B6 7/2) on scale of 1-5 cm; layering apparently secondary. Very dark gray-brown (10YR 3/2) zone from 56-73 m in Section 1; slightly silty throughout.							
							2								10YR 5/6 with minor 5B6 7/2	Zeolitic clay, brown color (Major Lithology) Smears: Average of 4 67% clay min. 1% fish remains 2% Qtz. 1% plagioclase 1% pyrite 26% clinoptilolite 1% heavy minerals and opaques 1% volc. glass 18% reeds, mica			
							3									10YR 5/6 with minor 5B6 7/2	Pale blue green color (Minor Lithology) Smears: Average of 5 55% clay min. 44% Qtz. 18% clinoptilolite 18% plagioclase, mica, volc. glass		
							4										Dark spots and laminae (Minor Lithology) Smears: Average of 2 75% clay min. 28% clinoptilolite 5% heavy minerals and opaques		
							5											Carbon, Carbon-Carbonate 1-74 (0.1, 0.1, 0) 2-52 (0.1, 0.1, 0)	
							6											Carbon, Carbon-Carbonate 1-86 (0.1, 0.1, 0) 3-11 (0.1, 0.1, 0) 3-66 (0.1, 0.1, 0)	
							7												
							CC												

SITE 417 HOLE D CORE 10 CORED INTERVAL: 229.9-239.2 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURE MARKS	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION							
					BIOSTRAT ZONE	FORAMS													
LATE CRETACEOUS							1	1.0	Z		10YR 5/6 with minor 5B6 7/2	ZEOLITIC CLAY Firm, slightly disturbed; dominantly (66%) yellowish brown (10YR 5/6) interlayered with pale blue green (5B6 7/2) on scale of 1-5 cm; layering apparently secondary. Very dark gray-brown (10YR 3/2) zone from 56-73 m in Section 1; slightly silty throughout.							
							2								10YR 5/6 with minor 5B6 7/2	Zeolitic clay, brown color (Major Lithology) Smears: Average of 4 67% clay min. 1% fish remains 2% Qtz. 1% plagioclase 1% pyrite 26% clinoptilolite 1% heavy minerals and opaques 1% volc. glass 18% reeds, mica			
							3									10YR 5/6 with minor 5B6 7/2	Pale blue green color (Minor Lithology) Smears: Average of 5 55% clay min. 44% Qtz. 18% clinoptilolite 18% plagioclase, mica, volc. glass		
							4										Dark spots and laminae (Minor Lithology) Smears: Average of 2 75% clay min. 28% clinoptilolite 5% heavy minerals and opaques		
							5											Carbon, Carbon-Carbonate 1-74 (0.1, 0.1, 0) 2-52 (0.1, 0.1, 0)	
							6											Carbon, Carbon-Carbonate 1-86 (0.1, 0.1, 0) 3-11 (0.1, 0.1, 0) 3-66 (0.1, 0.1, 0)	
							7												
							CC												

SITE 417 HOLE D CORE 11 CORED INTERVAL: 239.2-247.6 m

SITE 417 HOLE D CORE 12 CORED INTERVAL: 248.6-256.2 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION	
		FORAMS	NANNOS	RADS								
LATE CRETACEOUS					1	0.5		0000000000		8	ZEOLITIC CLAY and CLAYSTONE Highly disturbed, drilling breccia; dominantly brown to yellowish brown (7.5YR 5/4, 10YR 5/4) clay and claystone with pieces of pale blue green (5B6 7/2) claystone.	
					2	1.0					ZEOLITIC CLAY (Major Lithology) Smears: Average of 2 71% clay min. 28% clinoptilolite 1% heavies and opaques 1R% plagioclase, chlorite	
					3							Carbon, Carbon-Carbonate 1-5% (0.1, 0.1, 0)
					4							
					5							
					6							
					7							
			CC									

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION	
		FORAMS	NANNOS	RADS								
LATE CRETACEOUS					1	0.5				7.5YR 5/6 with minor 5B6 7/2	ZEOLITIC CLAY Firm, slightly disturbed/ dark brown to brown (7.5YR 5/6, 7.5YR 5/6) clay with interlayered 23% pale blue green (5B6 7/2) on a scale of 1/2 to 3 cm.	
					2	1.0				120	Zeolitic Clay (Major Lithology) Smears: Average of 2 69% clay min. 5% qtz. 18% clinoptilolite 8% heavies and opaques TR: apatite, mica	
					3						115	Pale blue green sediment (Minor Lithology) Smears: Average of 2 67% clay min. 5% qtz. 4% plagioclase 24% clinoptilolite TR: FeIld., mica
					4							White bed (Minor Lithology) Smear: 4-10Z 96% clay min. 3% clinoptilolite 1% (?) dolomite 1R% qtz., plagioclase
					5							
					6							
					7							
			CC								Carbon, Carbon-Carbonate 3-19 (0.1, 0.1, 0)	

SITE 417 HOLE D CORE 16 CORED INTERVAL: 286.8-296.3 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORMAS	NANNOS	RADS				
LATE CRETACEOUS	B				1	0.5	<p>ZEOLITIC, (?) DOLOMITIC, PHOSPHATIC CLAYSTONE</p> <p>Hard, undisturbed; pale blue green (586 7/2) laminated with darker shades (586 6/2 to 586 3/2) and black (586 2/2); scattered pyrite crystals.</p> <p>Claystone (Major Lithology)</p> <p>Smears: Average of 5</p> <p>52% clay min. 20% clinoptilolite 25% dolomite 3% heavies and opaques (largely pyrite)</p> <p>Black laminae (Minor Lithology)</p> <p>Smear: 1-77</p> <p>25% clay min. 5% dolomite 70% fish remains</p> <p>The Core Catcher contains a chalcadonic, brown/black lustrous chert with prouel-lentic like edges adding to one side, and with sulfide crystals.</p> <p>CaCO₃ Bomb: 1-106 = 6% 1-42 = 2%</p> <p>Carbon, Carbon-Carbonate 1-105 (0.4, 0.2, 2)</p>	

SITE 417 HOLE D CORE 15 CORED INTERVAL: 277.3-286.8 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORMAS	NANNOS	RADS				
LATE CRETACEOUS	B				1	0.5	<p>ZEOLITIC CLAY</p> <p>Very firm, slightly to moderately disturbed; 70% grayish brown (10VR 5/2), 20% brown (7.5VR 4/4) and 5% grayish blue green (586 5/2), layered on a 1-2 cm sediment, irregularly lithified; a great deal is claystone.</p> <p>Zeolitic Clay (Major Lithology)</p> <p>Smear: 2-43</p> <p>40% clay min. 5% clinoptilolite 3% heavies and opaques</p> <p>CaCO₃ Bomb: 1-72% = 0% 2-28% = 0%</p> <p>Smear: brown claystone</p> <p>35% clay min. 65% clinoptilolite</p>	
MIDDLE CENOMANIAN	B				2	2	<p>ZEOLITIC CLAYSTONE</p> <p>Lithified, disturbed, laminated; olive gray to grayish brown (5Y 5/2, 10VR 5/2), brown (10VR 5/3), and brown and blue green (7.5VR 5/2 and 586 6/2).</p> <p>Carbon, Carbon-Carbonate 1-74 (0.1, 0.1, 0) 2-36 (0.1, 0.1, 0)</p>	
					3	3		
					4	4		
					5	5		
					6	6		
					7	7		
					CC	CC		

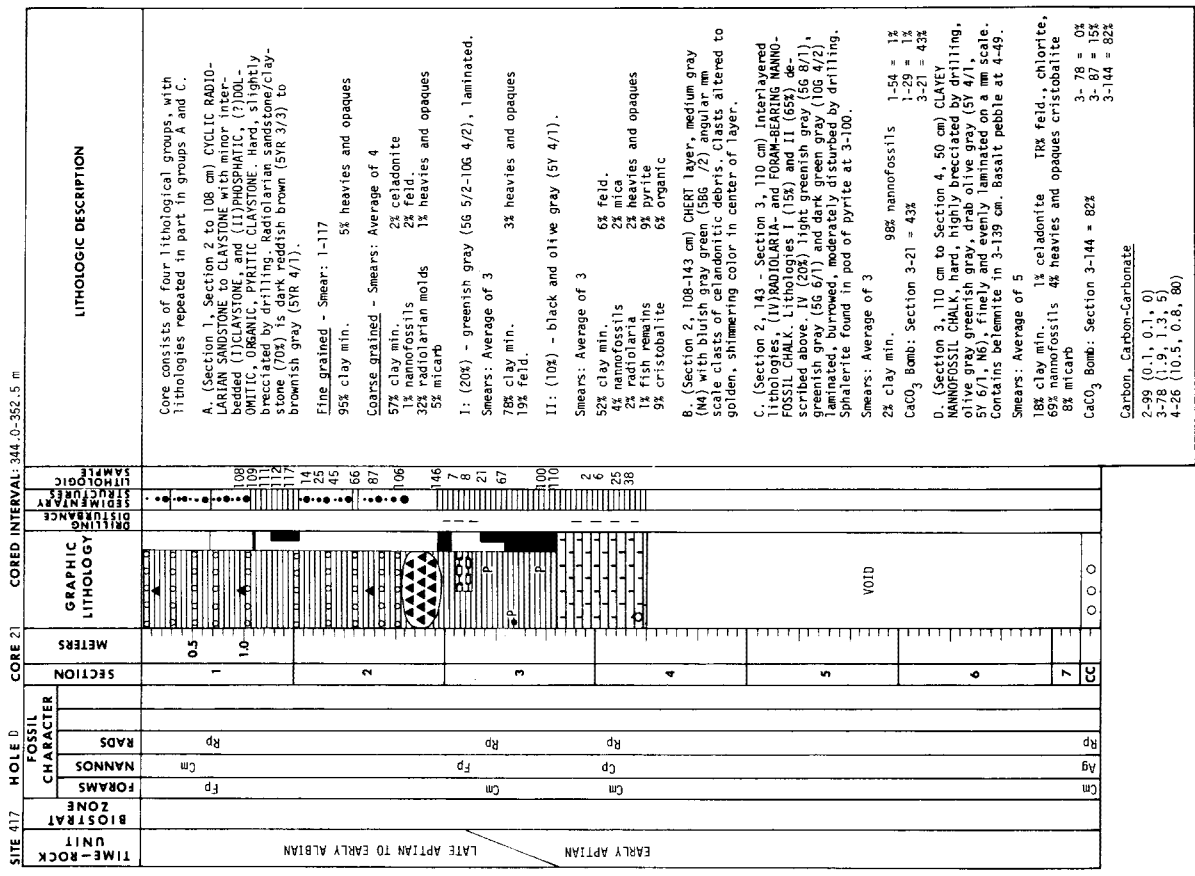
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SITE 417 HOLE D CORE 18 CORED INTERVAL: 305.9-315.4 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
MIDDLE CENOMANIAN	B	B	B	1	0.5		INTERLAYERED (I) CLAYSTONE; (II) PHOSPHATIC, (?) DIOLOMITIC PYRITIC CLAYSTONE. (III) CLAYEY NANNOFOSSIL CHALK; (IV) RADOLARIAN- and FORAM-BEARING NANNOFOSSIL CHALK. All sediments hard, slightly brecciated by drilling.	
				2	1.0		NOTE: Position of black, organic layers shown by markings in right-hand column. Entire section interlayered on a scale of 1-15 cm and further laminated on a mm scale.	
				3			I: (69%) - pale blue green to grayish blue; green (586 7-5/2); contacts sharp on top, gradational on bottom; burrowed, including "chondrites"; noncalcareous. Smear: 1-2 93% clay min. 5% pyrite 2% fish remains CaCO ₃ Bomb: 2-91 = 7%	
				4			II: (31%) - black to brownish black (5YR 2/1); faint laminae present but not common; burrows not common. Pods of pyrite present. CaCO ₃ Bomb: 2-68 = 8% 2-9 = 7% Pyrite Pod (Minor Lithology) Smear: 1-47 5% feld. 2% fish remains 93% pyrite 18% sphalerite Carbon, Carbon-Carbonate	
				5			VOID	
				6			VOID	
				7			VOID	
				CC			1-57 (0.1, 0.1, 0) 2-70 (2.3, 2.1, 2)	

SITE 417 HOLE D CORE 17 CORED INTERVAL: 296.3-305.9 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
LATE ALBAIN TO CENOMANIAN	B	Ag	Ca	1	0.5		INTERLAYERED (I) CLAYSTONE; (II) PHOSPHATIC, (?) DIOLOMITIC ORGANIC PYRITIC CLAYSTONE. (III) CLAYEY NANNOFOSSIL CHALK; (IV) RADOLARIAN- and FORAM-BEARING NANNOFOSSIL CHALK. All sediments hard, slightly brecciated by drilling.	
				2	1.0		NOTE: Position of black, organic layers shown by markings in right-hand column. Entire section interlayered on a scale of 1-15 cm and further laminated on a mm scale. In CC with 65% micarb, 5% fish remains; 28% clinoptilolite, and 2% heavies and opaques; sphalerite noted in CC.	
				3			I: (27%) - grayish, bluish green (586 5/2-5/1) gradational contact, mottled with II and, rarely, with IV. Burrowed, not calcareous. Smear: 1-36 84% clay min. 5% (?) dolomite 10% nannofossils 1% micarb II: (36%) black to very dark gray, finely layered (2.5:4.5-3/0), lustrous, crumbly, slightly calcareous. Smears: Average of 2 18% clay min. 5% qtz. 4% nannofossils 25% heavy and opaque 8% radiolaria molds (mainly pyrite) 10% fish remains 1% mica, apatite 1% micarb 29% (?) dolomite CaCO ₃ Bomb: 3-140 = 7%	
				4			III: (30%) - very dark gray brown, dark gray (2.5Y 3/2, 2.5Y 4/0) laminated with light gray (2.5Y 0/0). Smear: Average of 4 20% clay min. 1% (?) dolomite 74% nannofossils 2% heavies and opaques 2% foraminifera 1% fish remains 1% micarb IV: (7%) - whitish to light gray (5Y 6/1) mottled and laminated. Smears: Average of 3 2% clay min. 43% nannofossils 7% foraminifera 10% radiolarian molds CaCO ₃ Bomb: 1-40 = 43% 1-46 = 1% 3-57 = 53% 3-85 = 33% 3-133 = 0% Carbon, Carbon-Carbonate	
				5			VOID	
				6			VOID	
				7			VOID	
				CC			1-90 (5.9, 1.6, 36) 4-5 (6.4, 5.5, 6)	



LEG	SITE	H	O	L	CORE	SECT.
5	1417D				2	1

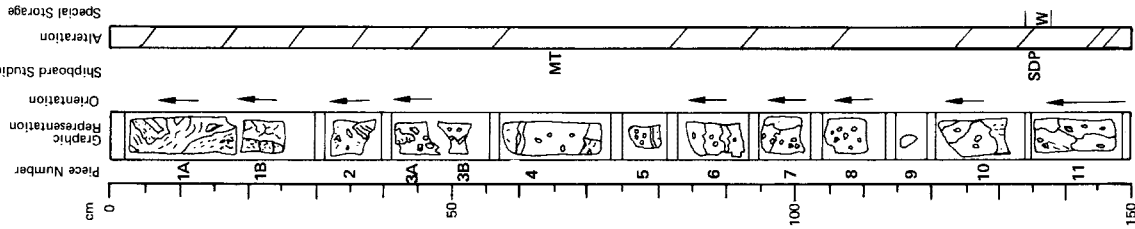
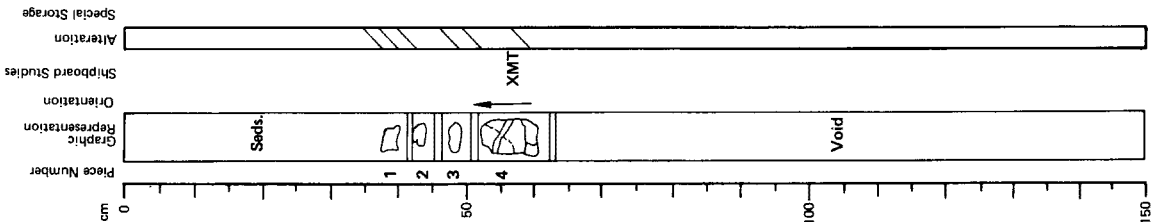
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
0-37 cm interval: clayey nanno chalk (described under sediments).
37-62 cm interval: altered plagioclase-phyric basalt. Basalt gray with an alteration halo along veins and margins. Plagioclase phenocrysts <2 mm. Vesicles <4 mm. Veins filled by calcite with inclusions of smectite.

Thin Section Description
Location: 57 cm
Texture: porphyritic
Phenocrysts: altered olivine 2-5%, 2 mm; altered plagioclase 15-20%, <5 mm, euhedral.
Groundmass: olivine 5%, 0.1-0.2 mm; plagioclase 30%, 0.3-0.5 mm, microclitic, locally skeletal; altered clinopyroxene 25%, 0.1-0.2 mm, sheaves, magnetite <5%, 0.05-0.1 mm, dendritic, traces of alkali feldspar, sulfides <1%.
Vesicles: 1%, 0.3 mm, round, shrinkage.
Alteration: olivine replaced by calcite, green smectite; plagioclase partially replaced by ksparr, zeolites(?); veins filled by clay.

Shipboard Data

Bulk Analysis: 57 cm		Magnetic Data:	
SiO ₂	50.29	NRM Intensity (emu/cc)	15.469 x 10 ⁻³
Al ₂ O ₃	19.84	NRM Inclination	-79.2°
Fe ₂ O ₃	10.53	Stable Inclination	-79.2°
MgO	5.22		
CaO	9.01		
Na ₂ O	N.D.		
K ₂ O	1.31		
TiO ₂	1.99		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	4.25		
H ₂ O ⁺	2.43		
H ₂ O ⁻	N.D.		
CO ₂	1.37		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



LEG	SITE	H	O	L	CORE	SECT.
5	1417D				2	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately aphyric basalt and basalt breccia. Basalt dark gray with light gray-brown chilled margins in pieces 1-3a. Groundmass microclitic. Plagioclase phenocrysts 5-10%, increase in size from <2 mm in pieces 1 to <5 mm in pieces 10 and 11, partly replaced by clay(?) or calcite in pieces 1-3, extremely fresh in pieces 4-11; fresh clinopyroxene phenocrysts <10%, <1 mm, partly replaced by green smectite and calcite. Veins filled by calcite and yellow-green to dark green smectite. Pieces 10, 11 contain disseminated calcite. Breccia in pieces 1-3a composed of fragments of basalt and altered glass in a banded matrix of green, yellow-green and blue-green smectite with minor pyrite and veins of calcite; smaller fragments often concentrically zoned, completely replaced by smectite + calcite. Inter-pillow breccia in piece 4 composed of calcite, spherules and angular shards of devitrified glass in a fine-grained mosaic matrix of calcite, green smectite and calcadonite. Glass shards, basalt rimmed by coarse-grained (1 mm) spar calcite.

Thin Section Description
Location: pillow interior, 65 cm
Texture: porphyritic
Phenocrysts: olivine 2-5%, 0.5 mm; plagioclase 10-15%, 2-3 mm, An 65-85, euhedral, locally glomeroporphyritic.
Groundmass: olivine(?) 1-2%; plagioclase 40%, 0.5 mm, An >40, locally skeletal; clinopyroxene 30% quenched; magnetite, 1-5%, quenched.
Vesicles: 1-2%, shrinkage.
Alteration: olivine replaced by calcite; plagioclase replaced by calcite, clay and ksparr; veins and vesicles filled with calcite and calcadonite.

Shipboard Data

Bulk Analysis: 63-67 cm		Magnetic Data:	
SiO ₂	50.68	NRM Intensity (emu/cc)	25.527 x 10 ⁻³
Al ₂ O ₃	18.55	NRM Inclination	-73.6°
Fe ₂ O ₃	12.74	Stable Inclination	-74.0°
MgO	5.02		
CaO	9.50		
Na ₂ O	N.D.		
K ₂ O	1.59		
TiO ₂	1.77		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	4.35		
H ₂ O ⁺	1.59		
H ₂ O ⁻	N.D.		
CO ₂	1.33		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

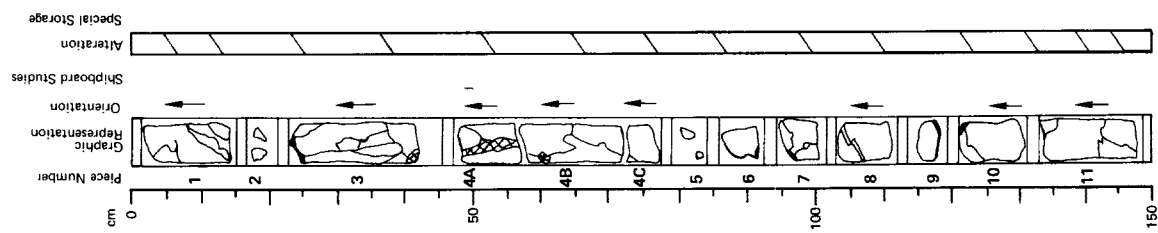
Physical Property Data:

Vp (km/sec)	5.38
Porosity (%)	7.02
Wet Bulk Density (g/cc)	2.80
Grain Density (g/cc)	2.94

LEG	SITE	H O L	CORE	SECT.
51	417	D	2	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

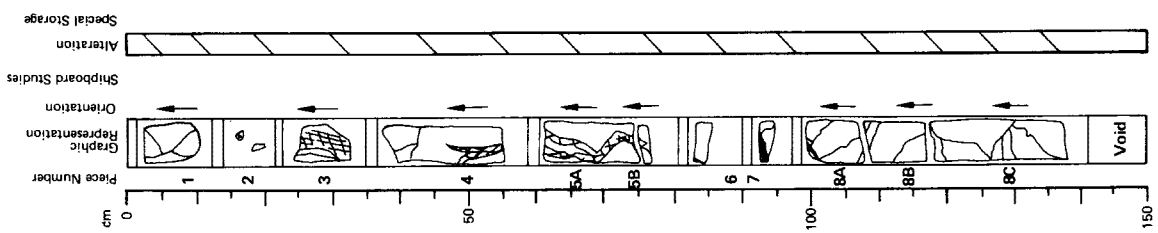
Visual Description
 Phyric pillow basalt with chilled margins in pieces 3, 6, 7, 9 and 10 and traces of fresh glass in piece 6. Basalt dark gray with an aphanitic to intersertal groundmass. Euhedral plagioclase crystals 10-15%, < 5 mm, partially replaced by calcite; mafic phenocrysts < 2%, < 1 mm, replaced by green or pale brown secondary minerals. Vesicles < 0.5 mm, filled by calcite and green smectite. Veins filled by calcite - green smectite, sulfides. Piece 3 contains radial cooling cracks.



LEG	SITE	H O L	CORE	SECT.
51	417	D	2	3

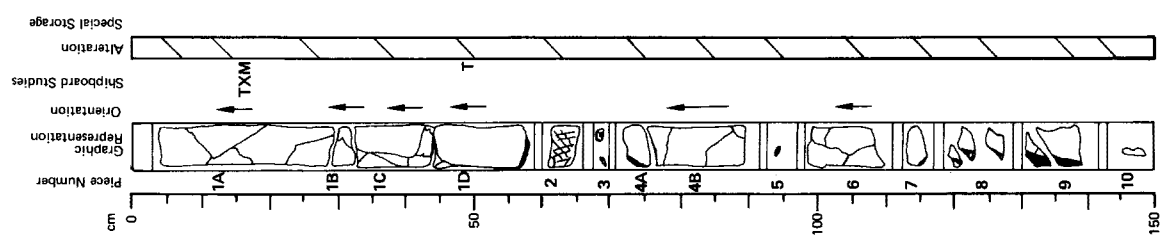
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyric pillow basalt with chilled margins and fresh to partially devitrified glass in pieces 3, 7 and 8. Basalt dark gray with an aphanitic to intersertal groundmass. Euhedral plagioclase phenocrysts 20%, < 5 mm; mafic phenocrysts < 2%, replaced by green to pale brown secondary minerals; euhedral mafic phenocrysts (olivine?) in piece 4, replaced by calcite and pale brown iddingsite(?). Veins filled by calcite + dark green smectite, sulfides. Glassy margin in piece 3 20 mm thick, coated with dark gray film against calcite-cemented interpillow filling.



LEG	SITE	HOLE	CORE	SECT.
5	1417	D	2	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



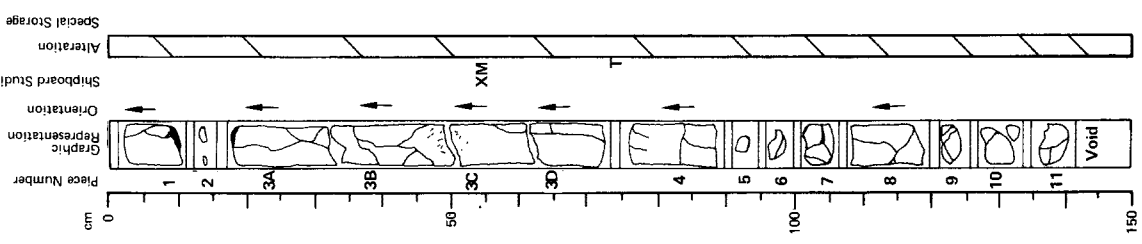
Visual Description
Phyric pillow basalt with chilled margins (pieces 1D, 4A and 7-9, traces of fresh glass (pieces 2, 3, 5) and interpillow limestone (piece 2). Basalt dark gray with an aphanitic to interstitial groundmass. Euhedral plagioclase phenocrysts 20%, < 8 mm, fresh to partially replaced by calcite; mafic phenocrysts < 2%. Calcite-filled vesicles < 1 mm. Veins filled by calcite, sulfides and green smectite.

Thin Section Description
Location: pillow interior 20 cm
Texture: porphyritic, interstitial
Phenocrysts: olivine 5-6%, < 4 mm; plagioclase 10%, < 4 mm, An 72; clinopyroxene, 0.1%, 0.3 mm
Groundmass: olivine 5%; plagioclase 35-40%, 0.7 mm, An 80, locally skeletal; clinopyroxene 40%; magnetite, 1.4%; sulfides < 1%.
Vesicles: 1.2%, 0.2 mm, round, shrinkage.
Alteration: olivine replaced by clay, vesicles filled by clay.

Thin Section Description
Location: glassy margin, 47 cm
Texture: hyaloporphyritic
Phenocrysts: plagioclase 10%, 4 mm, An 55-70; clinopyroxene < 1%, 0.5 mm
Groundmass: olivine 1-2%, 0.1-0.3 mm; plagioclase 5-15%, 0.2 mm, skeletal with fibrous shaves; glass 70%, devitrified from margin; calcite 2-3%; celadonite 2-3%.
Vesicles: 1.2%, round.
Alteration: olivine replaced by calcite and iddingsite; veins and vesicles filled with calcite and celadonite.

Shipboard Data
Bulk Analysis: 18.21 cm
SiO₂ 48.77
Al₂O₃ 16.32
Fe₂O₃ 10.85
MgO 7.13
CaO 12.81
Na₂O N.D.
K₂O 0.06
TiO₂ 1.41
P₂O₅ N.D.
MnO N.D.
LOI 1.55
H₂O⁺ 1.21
H₂O⁻ N.D.
CO₂ 0.75
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.

Magnetic Data:
NRM Intensity (emu/cc) 10.223 x 10⁻³
NRM Inclination -58.6°
Stable Inclination -63.1°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	1417	D	2	5

Visual Description
Plagioclase-phyric pillow basalt with glassy chilled margins (pieces 1, 3A and 3D) and fragments of interpillow limestone (pieces 2, 6 and 11). 0-10 and 17-71 cm intervals represent individual pillows or parts of pillows with chilled margins and porphyritic, crystalline interiors. Basalt dark gray with an aphanitic to interstitial groundmass. Euhedral plagioclase phenocrysts 20%, < 7 mm; long black tabular mafic phenocrysts rare. Veins, rare vesicles filled with calcite, green smectite.

Thin Section Description
Location: pillow interior, 68 cm
Texture: porphyritic
Phenocrysts: plagioclase 15%, < 3.5 mm, An 85
Groundmass: plagioclase 40%, 0.5 mm, An > 50, skeletal; clinopyroxene 40%, quenched; magnetite 1-3%; celadonite 1-3%.
Vesicles: 1%, 0.2 mm, round
Alteration: vesicles filled by calcite

Shipboard Data
Bulk Analysis: 57.60 cm
SiO₂ 48.85
Al₂O₃ 16.39
Fe₂O₃ 10.80
MgO 6.97
CaO 13.46
Na₂O N.D.
K₂O 0.09
P₂O₅ N.D.
MnO N.D.
LOI 2.30
H₂O⁺ 0.76
H₂O⁻ N.D.
CO₂ 1.03
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.

Magnetic Data:
NRM Intensity (emu/cc) 11.794 x 10⁻³
NRM Inclination -61.4°
Stable Inclination -67.6°

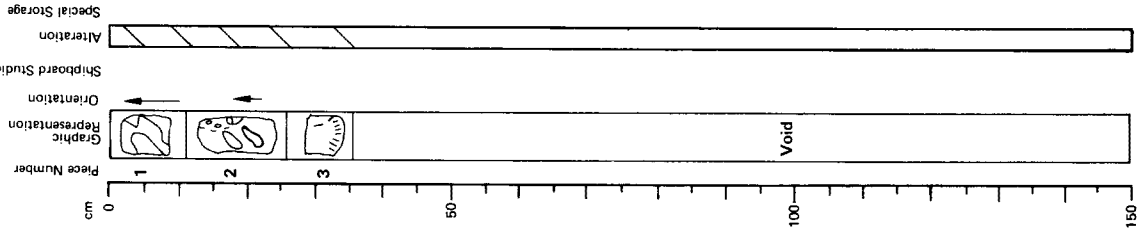
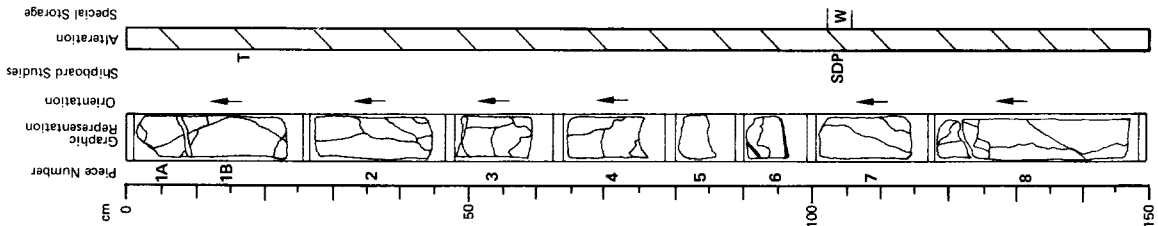
LEG	SITE	HOLE	CORE	SECT.
51	417	D	22	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Dark grey phyrlic basalt with an intersertal groundmass. Euhedral plagioclase phenocrysts 15-20%, ≤ 7 mm (rarely to 12 mm); mafic phenocrysts $< 2\%$, ≤ 1 mm, replaced either by green smectite or by calcite and pale brown secondary mineral; euhedral olivine phenocrysts in piece B, ≤ 1 mm, completely replaced by iddingsite(?) and green smectite. Vesicles common in pieces 7 and 8, < 0.3 mm, filled by calcite or green smectite. Veins filled by calcite, green smectite.

Thin Section Description
 Location: pillow interior, 20 cm
 Texture: porphyritic
 Phenocrysts: olivine 3%, ≤ 1 mm, euhedral; plagioclase 15%, 2 mm, euhedral
 Groundmass: olivine 5%, 0.04 mm, euhedral-subhedral; plagioclase 40%, 0.5 mm, prismatic; clinopyroxene 30%, 0.2 mm, anhedral, quenched; magnetite 5%, 0.01 mm, quenched; glass $< 5\%$.
 Vesicles: 1%, < 0.5 mm, round.
 Alteration: olivine replaced by calcite and clay; veins and vesicles filled with calcite and clay.

Shipboard Data
 Physical Property Data:
 V_p (km/sec) 104-107 cm
 Wet Bulk Density (g/cc) 5.40
 Grain Density (g/cc) 2.83
 2.92



LEG	SITE	HOLE	CORE	SECT.
51	417	D	22	7

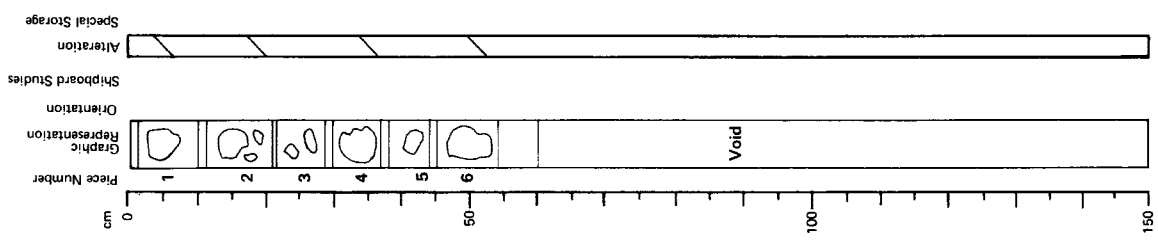
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyrlic pillow basalt with fresh glassy chilled margins (piece 3) and interpillow limestone (piece 2). Plagioclase phenocrysts variably altered to clay; clinopyroxene(?) phenocrysts < 2 mm; altered olivine phenocrysts 1 mm. Shrinkage vesicles and minor sulfides present in piece 3. Veins filled by calcite. Limestone in piece 2 contains green smectite and fragments of altered glass.

LEG	SITE	HOLE	CORE	SECT.
51	417	D	23	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

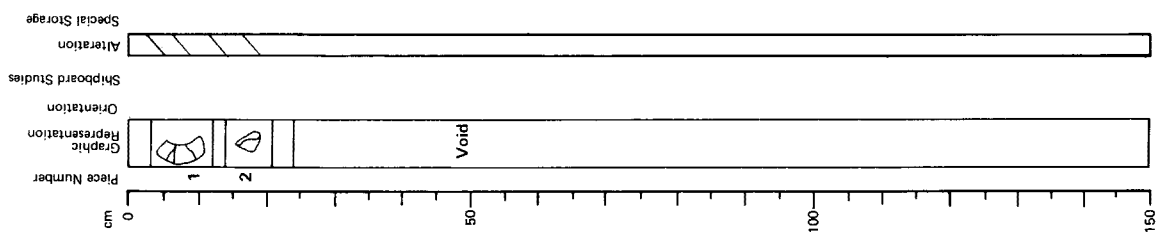
Visual Description
 Altered plagioclase-phyric basalt. Basalt gray with an intersertal groundmass. Plagioclase phenocrysts 15%, < 5 mm, replaced by calcite and dark green smectite. Calcite-filled vesicles rare, < 1 mm. Veins filled by calcite.



LEG	SITE	HOLE	CORE	SECT.
51	417	D	24	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

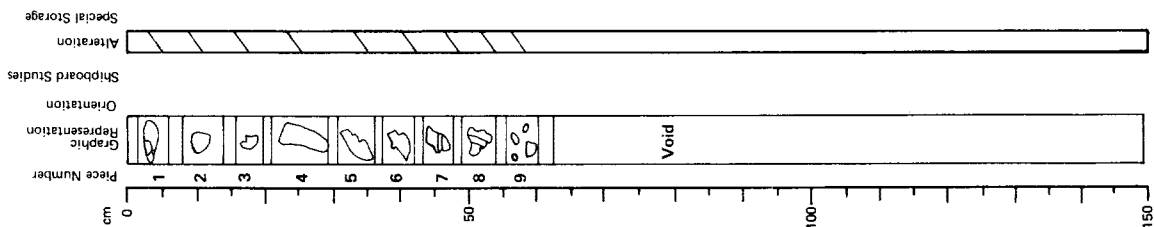
Visual Description
 Plagioclase-phyric basalt. Basalt gray with an intersertal groundmass. Euhedral plagioclase phenocrysts 10-15%, < 3 mm, partly replaced by calcite. Vesicles common, < 0.5 mm, filled by calcite, green smectite and pyrite (?). Veins filled by calcite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	25	1

Visual Description
 Dark gray, phyrlic basalt. Euhedral plagioclase phenocrysts 10-15%, <5 mm; mafic phenocrysts <2%, 3 mm, replaced by green smectite; calcite. Calcite-filled vesicles 1%, <0.5 mm. Veins filled by calcite and green smectite.

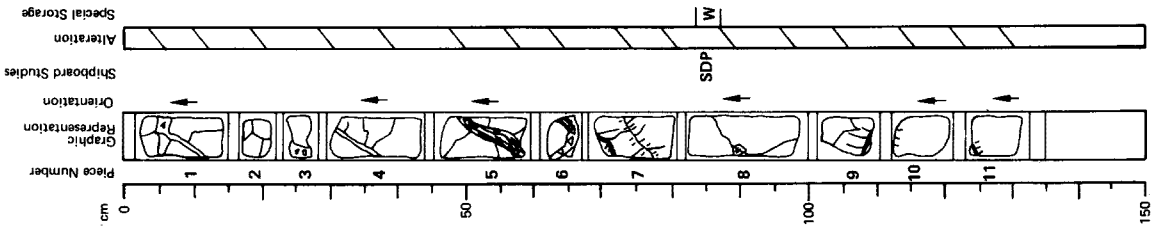


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	26	1

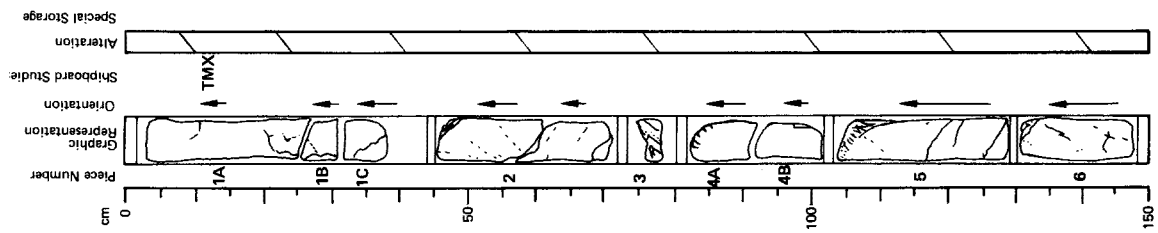
Visual Description
 Moderately altered phyrlic pillow basalt with 1.2 cm thick chilled glassy margins (pieces 5 and 6) and traces of trachoid (piece 9). Basalt, dark gray, altered to green smectite with 5% of plagioclase and 20% of mafic phenocrysts replaced by green smectite. Euhedral to subhedral plagioclase phenocrysts 20%, <6 mm, partially replaced by calcite; subhedral olivine phenocrysts 5%, <2 mm, completely replaced by green smectite. Vesicles <1%, <0.5 mm, filled by calcite, green smectite. Veins filled by calcite, green smectite. Basalt in piece 7 contains multiple chill surfaces, two of which are internal.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 84-87 cm
 Porosity (%) 5.25
 Wet Bulk Density (g/cc) 8.68
 Grain Density (g/cc) 2.77
 2.94



LEG	SITE	H O L E	CORE	SECT.
5	1417	D	26	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Phryic pillow basalt with glassy chilled margins (pieces 2, 4a, 5 and 6), well-developed radial cracks (pieces 2) and minor breccia (pieces 3). Groundmass crystalline, euhedral plagioclase phenocrysts 10%, < 8 mm; olivine phenocrysts 10%; mafic phenocrysts: pieces 1, 2, 4a, < 3 mm, partially altered. Olivine altered olivine in pieces 2 and 4a. Vesicles 3-5% filled by calcite and celadonite(?). Veins filled by calcite. Breccia in piece 3 composed of small shards of glass in a matrix of smectite, celadonite(?) and calcite cut by calcite-filled veins. Piece 1 continuous with preceding section.

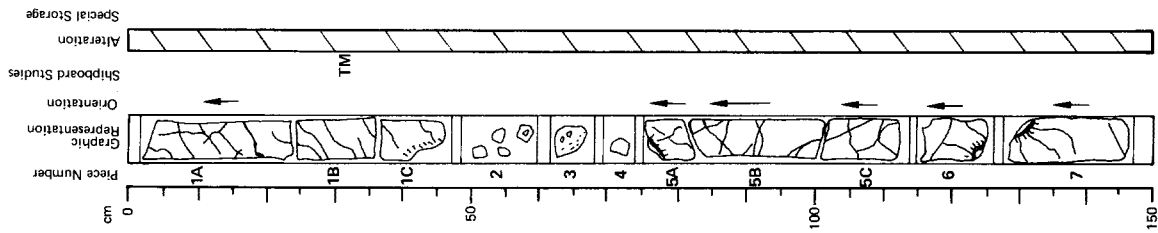
Thin Section Description
 Location: pillow interior, 10 cm
 Texture: porphyritic
 Phenocryst: olivine 5%, 1.5 mm; plagioclase 15%, < 8 mm, An 85-55.
 Groundmass: olivine 5%, plagioclase 35-40%, 0.5 mm, An < 60, skeletal; clinopyroxene 30%, 0.2 mm; magnetite 5%, 0.01 mm; sulfides < 1%, 0.1 mm
 Vesicles: 2%
 Alteration: olivine replaced by calcite and iddingsite; veins and vesicles filled with calcite and celadonite.

Shipboard Data

Bulk Analysis:	9-12 cm	Magnetic Data:	9-12 cm
SiO ₂	49.03	NRM Intensity (emu/cc)	15.812 x 10 ⁻³
Al ₂ O ₃	16.45	NRM Inclination	-66.1°
Fe ₂ O ₃	10.78	Stable Inclination	-66.9°
MgO	6.22		
CaO	13.41		
Na ₂ O	N.D.		
K ₂ O	0.25		
TiO ₂	1.49		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	2.15		
H ₂ O ⁺	1.52		
H ₂ O ⁻	N.D.		
CO ₂	1.39		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

LEG	SITE	H O L E	CORE	SECT.
5	1417	D	26	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Phryic pillow basalt with fresh glassy chilled margins (pieces 1C, 5A, 6 and 7) and minor breccia (pieces 2, 4). Groundmass crystalline. Euhedral plagioclase phenocrysts 20%, < 8 mm; olivine phenocrysts 2.5%, < 2 mm, replaced by green smectite, calcite. Vesicles 2%, filled by calcite, zeolites, calcite, green smectite and pyrite(?). Breccia in pieces 2, 4 composed of glass fragments in a matrix of calcite and green smectite.

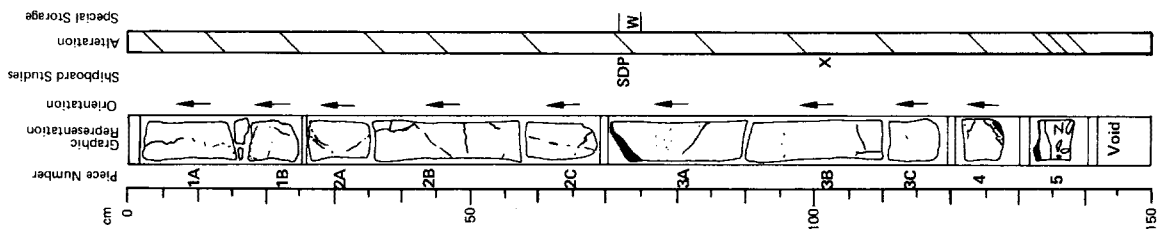
Thin Section Description
 Location: 30 cm
 Texture: porphyritic to glomeroporphyritic
 Phenocrysts: olivine 5-7%, < 1 mm; plagioclase 15-20%, < 4 mm, An 55
 Groundmass: olivine 10%; plagioclase 35%, 0.1-0.5 mm, An 45; clinopyroxene 25-30%, 0.05-0.2 mm, skeletal with some plumose and sheaf structures; magnetite 1-3%.
 Vesicles: shrinkage.
 Alteration: olivine replaced by clay; veins and vesicles filled with calcite and clay.

Shipboard Data

Magnetic Data:	28-31 cm
NRM Intensity (emu/cc)	15.958 x 10 ⁻³
NRM Inclination	-64.9°
Stable Inclination	-65.3°

LEG	SITE	H O	CORE	SECT.
5	1 4 1 7 D	E	2 6	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

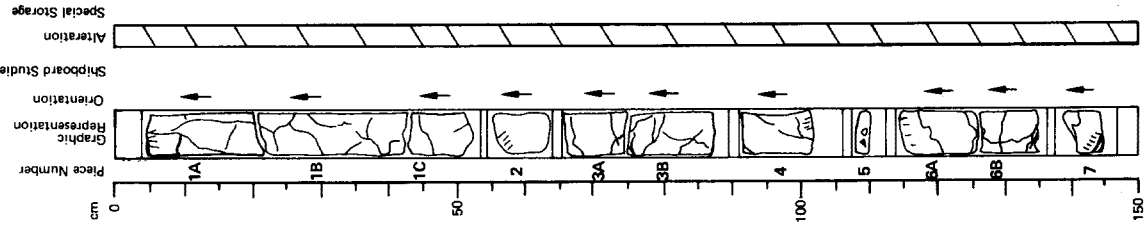
Phyric pillow basalt with glassy chilled margins (pieces 3A, 4 and 5) and minor interpillow limestone breccia. Groundmass aphanitic to holocrystalline. Plagioclase phenocrysts 5-10%; phenocrysts 5-10%, replaced by calcite, green smectite. Calcite-filled veins common. Piece 5 consists of shards of calcite, green smectite and altered glass in a banded self-matrix of calcite and green smectite.

Thin Section Description

Location: next to glassy margin, 76 cm
 Texture: porphyritic
 Phenocryst: olivine 5-10%, 0.2-1.0 mm; plagioclase 10-15%, <4.5 mm, An 45
 Groundmass: olivine 15%; plagioclase 30-40%; clinopyroxene 30-35%; magnetite <1%
 Vesicles: 1-2%, shrinkage.
 Alteration: olivine replaced by iddingsite; veins and vesicles filled with calcite, celadonite and clay

Shipboard Data

Bulk Analysis: 76-77 cm	Magnetic Date:	76-77 cm
SiO ₂ 49.16	NRM Intensity (emu/cc)	9.916 x 10 ⁻³
Al ₂ O ₃ 16.64	NRM Inclination	-45.2°
Fe ₂ O ₃ 11.26	Stable Inclination	-47.4°
MgO 6.55	Physical Property Data:	
Na ₂ O N.D.	Vp (km/sec)	72-75 cm
K ₂ O 0.13	Porosity (%)	5.46
TiO ₂ 1.53	Wet Bulk Density (g/cc)	6.74
P ₂ O ₅ N.D.	Grain Density (g/cc)	2.80
MnO N.D.		2.93
LOI 0.90		
H ₂ O ⁺ 1.60		
H ₂ O ⁻ N.D.		
CO ₂ 0.44		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5	1 4 1 7 D	E	2 6	5

Visual Description

Moderately altered phyric basalt pillows with traces of interpillow breccia (piece 5), 0-53, 53-102, 114-115 cm intervals represent individual pillows bounded by aphanitic to glassy chilled margins. Basalt dark gray, altered to pale brown or gray-green near margins. Groundmass aphanitic to crystalline. Euhedral plagioclase phenocrysts 20%, <8 mm; euhedral olivine phenocrysts 2%, <2 mm, replaced by green smectite. Vesicles 3%, filled by calcite, green smectite. Veins filled by calcite, green smectite and zeolites. Breccia in piece 5 composed of fragments of glass in a matrix of calcite and green smectite.

LEG	SITE	H O	CORE	SECT.
51	417	D	26	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

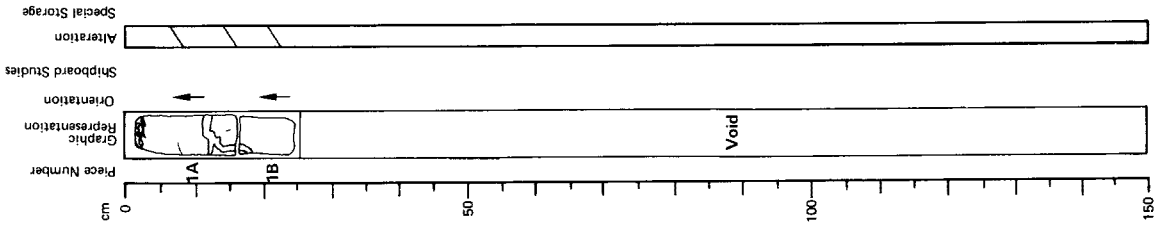
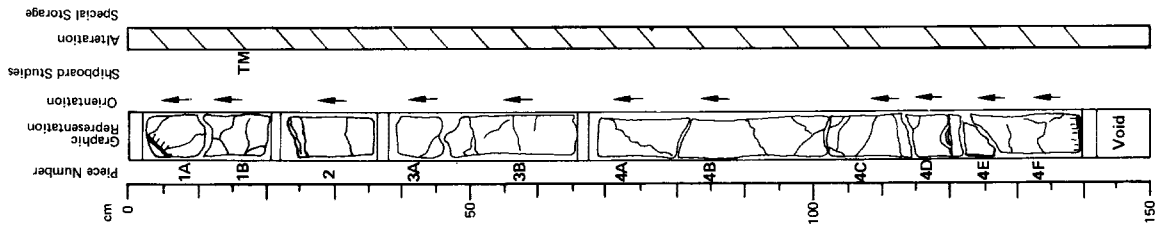
Visual Description
 Phyric pillow basalt with fresh to partially devitrified glassy chilled margins (pieces 1A and 4F). Basalt dark gray with an aphanitic to crystalline groundmass. Unimodal plagioclase phenocrysts 20% of volume; altered olivine phenocrysts 3-5%, 1-3 mm, replaced by green smectite and calcite. Vesicles <2%, filled with green smectite, calcite. Veins filled by green smectite, calcite and zeolites.

Thin Section Description

Location: pillow interior, 17 cm
 Texture: porphyritic
 Phenocrysts: plagioclase 15%, 3 mm, An 65
 Groundmass: olivine 10%; plagioclase 36%, 0.5-1.0 mm, skeletal and in sheaves; clinopyroxene 3%; 0.5 mm, sheaves; magnetite <1%
 Vesicles: 2%
 Alteration: vesicles filled by calcite and clay

Shipboard Data

Magnetic Data: 16-18 cm
 NRM Intensity (emu/cc) 12.679 x 10⁻³
 NRM Inclination -60.2°
 Stable Inclination -61.8°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
51	417	D	26	7

Visual Description
 Phyric pillow basalt with glassy chilled margin (piece 1A). Groundmass aphanitic to holocrystalline. Plagioclase phenocrysts 10%, <7 mm; altered olivine phenocrysts <5%, 1-2 mm. Veins filled by calcite and celadonite.

LEG	SITE	HOLE	CORE	SECT.
51	417D		27	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

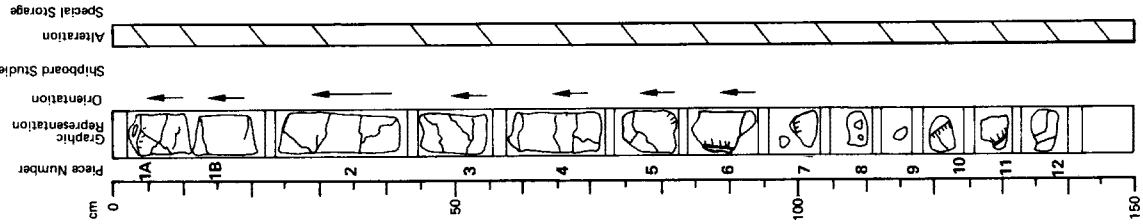
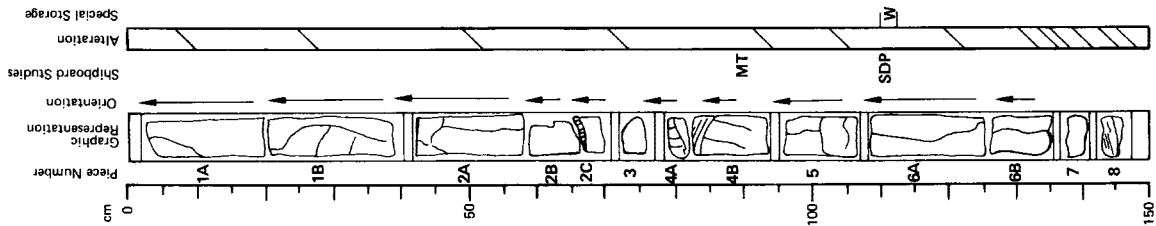
Phyric pillow basalt with thick glassy chilled margins (pieces 4B and 8) and minor interpillow sediments (pieces 4A, 4B and 8). Basalt dark gray with an aphanitic to holocrystalline groundmass. Plagioclase phenocrysts 15-20%, <4.5 mm; mafic phenocrysts 3-4%, <4.5 mm. Vesicles scarce, <1 mm, round, filled with calcite. Veins common, filled with calcite and green smectite. Sediments in piece 4A composed of white to pink limestone with small shards of glass. Sediments in contact with chilled margins in pieces 4B and 8 composed of talgonite fragments in a matrix of calcite.

Thin Section Description

Location: next to glassy margin, 86 cm
 Texture: porphyritic
 Phenocrysts: olivine 5%, <2 mm; plagioclase 7-10%, <4 mm, An 60
 Groundmass: olivine 5-10%; plagioclase 30%, 0.5 mm; clinopyroxene 10-25%; magnetite <1%; glass 15-30%; devitrified
 Vesicles: 2-5%, round
 Alteration: olivine replaced by calcite; veins and vesicles filled with celadonite, calcite and clay

Shipboard Data

Magnetic Data: 85-87 cm
 NRM Intensity (emu/cc) 10.696 x 10⁻³
 NRM Inclination -73.0°
 Stable Inclination -71.8°
 Physical Property Data: 111-113 cm
 Vp (km/sec) 5.56
 Porosity (%) 5.76
 Wet Bulk Density (g/cc) 2.83
 Grain Density (g/cc) 2.94



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417D		27	2

Visual Description

Phyric pillow basalt with chilled margins (pieces 1A, 5, 6, 10 and 11) and traces of interpillow breccia (pieces 1, 8 and 9). Basalt dark gray, locally altered to pale brown. Groundmass aphanitic to crystalline. Euhedral plagioclase phenocrysts 20%, <8 mm; euhedral to subhedral olivine phenocrysts 3%, <2 mm, replaced by green smectite. Vesicles <0.5 mm, filled with calcite, green smectite. Veins filled by green smectite, calcite and zircon. Interpillow breccia composed of glass shards in a matrix of green smectite and calcite.

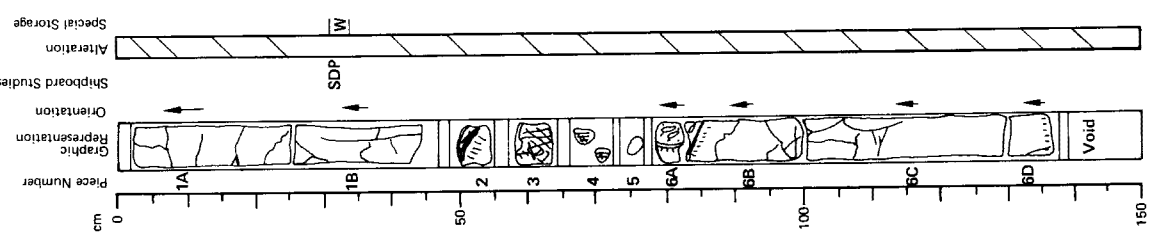
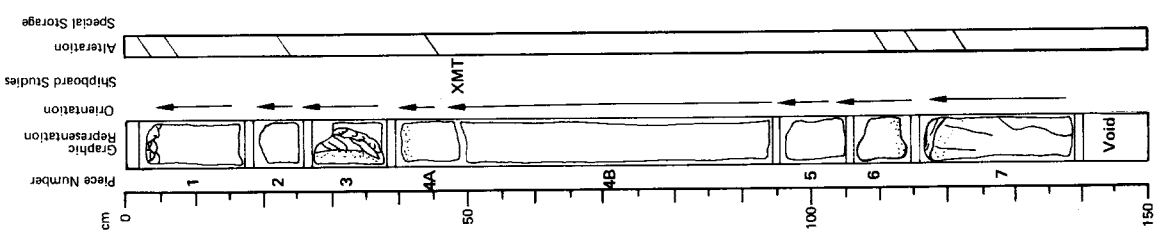
LEG	SITE	H O	CORE	SECT.
5	1417D		27	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Phyric pillow basalt with glassy chilled margins (pieces 1, 3, 4A, 6 and 7) and traces of inter-pillow limestone (piece 3). 39-115 and 115-140 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt dark gray with an aphanitic to porphyritic line groundmass. Plagioclase phenocrysts 20%, <5 mm; olivine phenocrysts 5%, <3 mm; replaced by green smectite. Scarce vesicles and calcite-filled veins. Piece 3 contains an 8x-foliated glassy chilled margin in a limestone matrix.

Thin Section Description
Location: next to glassy margin, 44 cm
Texture: porphyritic
Phenocrysts: olivine 4.6%, <2 mm; plagioclase 10-15%, <5 mm, An 55, glass inclusions; clinopyroxene <1% 1.2 mm, subhedral
Groundmass: olivine 5-10%; plagioclase 20-25%; clinopyroxene 10-20%; magnetite <1%; glass 30-35%, devitrified
Vesicles: 3.5%
Alteration: olivine replaced by calcite and clay; veins and vesicles filled with calcite and analcite

Shipboard Data
Bulk Analysis: 43-45 cm
Magnetic Data: 43-45 cm
SiO₂ 49.79 NRM Intensity (emu/cc) 14.769 x 10⁻³
Al₂O₃ 17.17 NRM Inclination -78.2°
Fe₂O₃ 10.04 Stable Inclination -77.8°
MgO 5.82
CaO 13.75
Ni₂O N.D.
K₂O 0.04
TiO₂ 1.44
P₂O₅ N.D.
MnO N.D.
LOI 1.55
H₂O⁺ 0.89
H₂O⁻ N.D.
CO₂ 0.74
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.



LEG	SITE	H O	CORE	SECT.
5	1417D		27	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

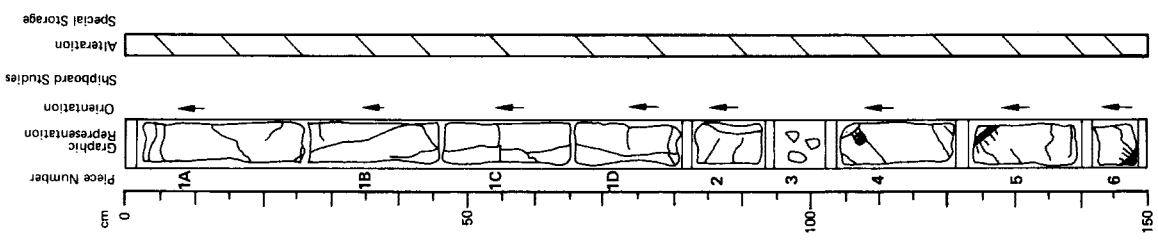
Visual Description
Phyric basalt pillows with chilled margins (pieces 2, 6A, 6B and 6D) and interpillow breccia (pieces 2, 4, 6A and 6B). Basalt dark gray, locally altered to gray-brown. Groundmass aphanitic to crystalline. Euhedral plagioclase phenocrysts 20%, <7 mm; euhedral to subhedral olivine phenocrysts 5%, <3 mm, replaced by green smectite and calcite. Vesicles filled with green smectite, calcite. Veins filled by calcite, green smectite and zeolites. Interpillow breccia composed of glass shards in a matrix of zeolites, calcite and green smectite.

Shipboard Data
Physical Property Data: 30-33 cm
Vp (km/sec) 5.16
Porosity (%) 9.38
Wet Bulk Density (g/cc) 2.77
Grain Density (g/cc) 2.96

LEG	SITE	HOLE	CORE	SECT.
51	417D		27	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic pillow basalt with glassy chilled margins (pieces 5 and 6) and traces of interpillow breccia (pieces 5 and 6). Basalt dark gray with aphanitic to crystalline groundmass. Euhedral plagioclase phenocrysts 20%, < 9 mm; subhedral olivine phenocrysts 5%, < 3 mm, replaced by green smectite. Vesicles filled by green smectite. Veins filled by green smectite and calcite. Interpillow breccia composed of fragments of glass partially altered to green smectite or palagonite(?) in a matrix of calcite and zeolites.



LEG	SITE	HOLE	CORE	SECT.
51	417D		27	5

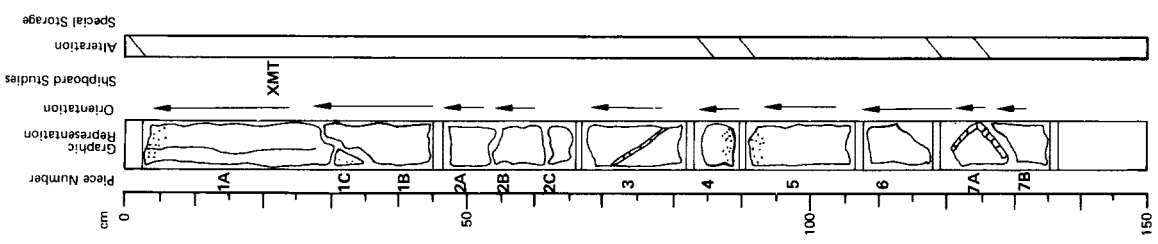
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic pillow basalt with chilled glassy margins (pieces 1A, 4 and 5). Basalt dark gray with an aphanitic to holocrystalline groundmass. Altered plagioclase phenocrysts 20%, < 8 mm; mafic phenocrysts (olivine, clinopyroxene) 2-3%, < 5 mm, replaced by green smectite. Calcite-filled vesicles scarce, < 1 mm. Veins filled by calcite.

Thin Section Description
 Location: pillow interior, 25 cm
 Texture: porphyritic
 Phenocrysts: olivine 5-10%, < 2.5 mm; plagioclase 15%, < 4.0 mm, An 60-65, zoned with glass inclusions; clinopyroxene < 1%, 0.3 mm
 Groundmass: olivine 10%, 0.05-0.2 mm; plagioclase 30%, < 1.0 mm, skeletal; clinopyroxene 30%, < 0.7 mm, skeletal, plumose with shear structures; magnetite 1-3%, 0.05-0.1 mm; glass < 3%, devitrified
 Vesicles: 1-3%

Alteration: olivine replaced by calcite, clay and iddingsite; vesicles filled by calcite and opal(?)

Shipboard Data
 Bulk Analytists: 25-27 cm
 Magnetic Data: 25-27 cm
 SiO₂ 49.34 NRM Intensity (emu/cc) 16,248 x 10⁻³
 Al₂O₃ 17.27 NRM Inclination -67.6°
 Fe₂O₃ 9.97 Stable Inclination -66.1°
 MgO 6.38
 CaO 13.48
 Na₂O N.D.
 K₂O 0.03
 TiO₂ 1.36
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.95
 H₂O⁺ 0.79
 H₂O⁻ N.D.
 CO₂ 0.82
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



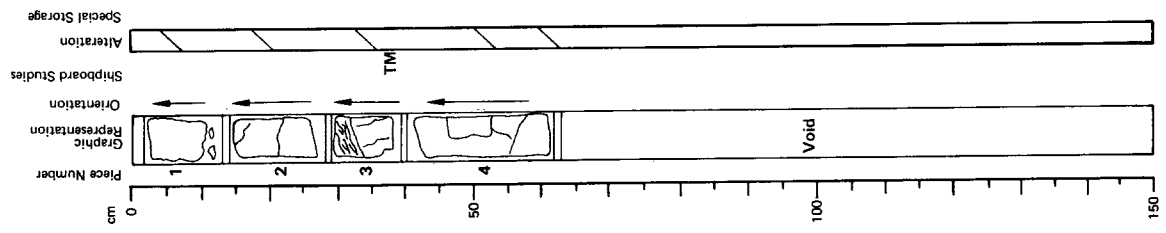
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	1	4	1	7
			D	2
			7	7

Visual Description
 Phytic pillow basalt with glassy chilled margins (pieces 2 and 3) and interpillow breccia (pieces 2 and 3). Basalt dark gray with an aphanitic to crystalline groundmass. Altered plagioclase phenocrysts 20%, < 5 mm; olivine phenocrysts 2%, < 5 mm, replaced by green smectite. Vesicles scarce. Veins normal to pillow margins, filled by calcite. The 1 cm-thick glassy margin in piece 3, composed of hyaloclastite shards cemented by calcite, is partially detached from the underlying pillow.

Thin Section Description
 Location: next to glassy margin, 32 cm
 Texture: porphyritic
 Phenocrysts: plagioclase 15-20%, 3.5 mm, An 85, some partially resorbed; clinopyroxene megacrysts < 1%, 0.3 mm, anhedral, partially resorbed
 Groundmass: plagioclase 25%, 0.5 mm; magnetite < 0.5%; glass 50%, devitrified
 Vesicles: 3-4%, round
 Alteration: vesicles filled by calcite, celadonite

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 30-33 cm 9.082 x 10⁻³
 NRM Inclination -70.8°
 Stable Inclination -69.8°

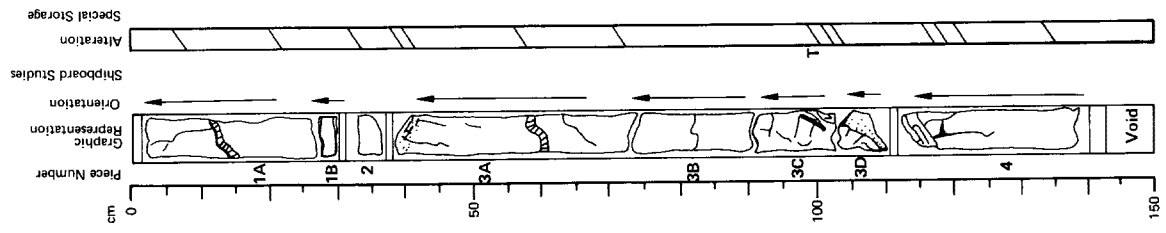


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	1	4	1	7
			D	2
			8	1

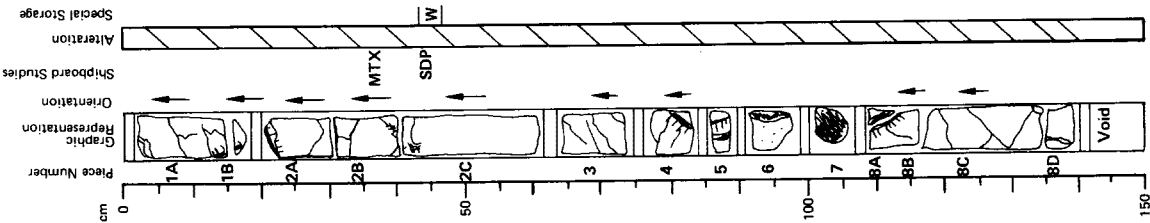
Visual Description
 Phytic basalt pillows with 1-2 cm thick glassy chilled margins (pieces 2, 3A, 3C, 3D and 4) and minor interpillow breccia (pieces 3C, 4). 0.37-1.10 and 110-140 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt dark gray with an aphanitic to crystalline groundmass. Plagioclase phenocrysts 20%, < 10 mm; olivine phenocrysts < 1%, replaced by green smectite. Vesicles scarce, < 1 mm, filled with green smectite. Veins common normal to pillow margins, filled by calcite, minor pyrite.

Thin Section Description
 Location: 103 cm
 Texture: glomeroporphyritic, intersertal
 Phenocrysts: olivine 5%, < 3.5 mm, plagioclase 15-20%, An 55, glass inclusions; clinopyroxene 1-2%, 0.5 mm, ZV > 50°, glomerocrysts with olivine and plagioclase
 Groundmass: olivine 10%; plagioclase 35%; clinopyroxene 20-25%; skeletal, plumose; magnetite 2-4%, dendritic; sulfides 1%, 1 mm, irregular
 Vesicles: 5-7%
 Alteration: olivine replaced by calcite and loddingsite; vesicles filled by calcite



LEG	SITE	H O L	CORE	SECT.
5	1417	D	28	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



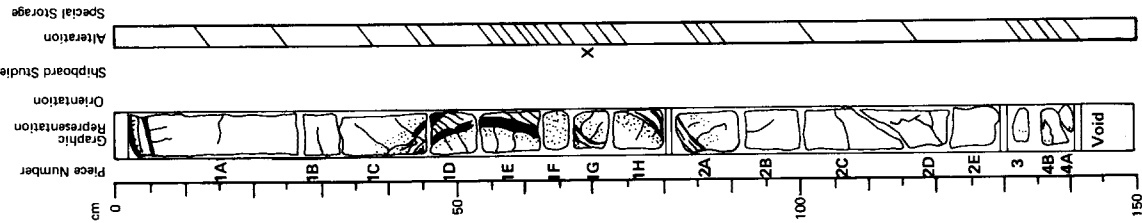
Visual Description
 Phryic basalt pillows with glassy chilled margins (pieces 1A, 1B, 2A and 4.8B), interpillow breccia (pieces 4-8B) and interpillow limestone (piece 6). 0-20, 20-80 and 100-140 represent individual pillows or parts of pillows bounded by chilled margins. Basalt dark gray, gray, red to gray-brown along veins. Groundmass aphanitic to 20%, 15 mm, olivine phenocrysts, microclitic in pillow interiors. Euhedral plagioclase phenocrysts 20%, < 1 mm, olivine phenocrysts 5%, < 2 mm, replaced by calcite and green smectite. Veins 1-2 mm, filled with calcite and green smectite. Breccia composed of fragments of basalt partially altered to palagonite(?) or green smectite in a matrix of calcite and zeolites. Fine-grained limestone in piece 6 composed of calcite and green smectite.

Thin Section Description

Location: pillow interior, 38 cm
 Texture: porphyritic
 Phenocrysts: olivine < 0.2%, < 1 mm, idiomorphic; plagioclase 15%, 2.5 mm, idiomorphic, zoned
 Groundmass: plagioclase microclites 40%, 0.1-0.5 mm, augitic clinopyroxene 30%, 0.2-0.5 mm, interstitial; titanomagnetite 15%, < 0.2 mm
 Vesicles: < 1%, < 1 mm
 Alteration: calcite and clay pseudomorphs after olivine

Shipboard Data

Bulk Analysis: 37.39 cm	Magnetic Data:	37.39 cm
SiO ₂ 49.37	NRM Intensity (emu/cc)	16.915 x 10 ⁻³
Al ₂ O ₃ 17.36	NRM Inclination	-71.6°
Fe ₂ O ₃ 10.45	Stable Inclination	-71.0°
MgO 6.07	Physical Property Data:	
CaO 14.08	V _p (km/sec)	44.46 cm
N ₂ O N.D.	Porosity (%)	5.41
K ₂ O 0.14	Wet Bulk Density (g/cc)	6.99
TiO ₂ 1.42	Grain Density (g/cc)	2.79
P ₂ O ₅ N.D.		2.93
MnO N.D.		
LOI 1.00		
H ₂ O ⁺ 0.79		
H ₂ O N.D.		
CO ₂ 1.21		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
5	1417	D	28	3

Visual Description
 Phryic basalt pillows with 1-2 cm thick, aphyric chilled margins (pieces 1A, 1C-2A) and 0.5-1.0 cm thick glassy rims (pieces 1A, 1C-1E and 1G-2A) against interpillow limestone (pieces 1A, 1D and 4). 0-45, 45-65, 65-80 and 80-140 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt dark gray with aphanitic to hyalopititic chilled margins and microclitic pillow interiors. Altered plagioclase phenocrysts 15%, < 8 mm; olivine phenocrysts 1-2%, < 5 mm, replaced by green smectite. Vesicles scarce. Veins common normal to glassy margins, filled with calcite, green smectite caladonite(?) and minor pyrite. Glassy rims locally detached from adjacent pillows, partially replaced by green smectite, palagonite(?) and calcite. Fine-grained, white to gray-green interpillow limestone composed of calcite and green smectite with occasional shards of glass.

Shipboard Data

Bulk Analysis: 66-68 cm
SiO ₂ 50.95
Al ₂ O ₃ 16.31
Fe ₂ O ₃ 11.92
MgO 6.16
CaO 9.98
Na ₂ O N.D.
K ₂ O 1.04
TiO ₂ 1.39
P ₂ O ₅ N.D.
MnO N.D.
LOI 3.45
H ₂ O ⁺ 3.00
H ₂ O ⁻ N.D.
CO ₂ 1.38
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.

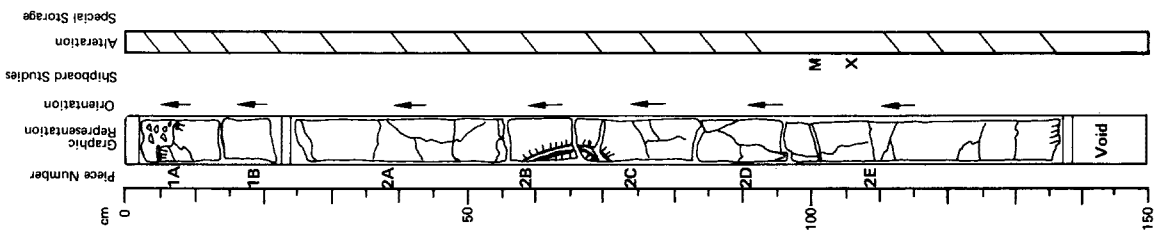
LEG	SITE	HOLE	CORE	SECT.
514	17D	28	4	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic basalt pillow with glassy chilled margins (pieces 1A, 2B and 2C) and minor interpillow limestone and limestone breccia (piece 1A). 0-135 cm interval represents one pillow bounded by chilled margins (including a lateral margin between 55-70 cm). Basalt dark gray with an aphanitic to microcrystic groundmass. Euhedral plagioclase phenocrysts 20%, < 3 mm, occasionally to 15 mm with Carlsbad twins; euhedral olivine phenocrysts < 5%, < 2 mm, replaced by green smectite. Veins filled by calcite + green smectite. Interpillow breccia in piece 1A composed of fragments of glass partially altered to palagonite(?) or green smectite in a fine-grained matrix of calcite and green smectite.

Shipboard Data

Bulk Analysis:	107-109 cm	Magnetic Data:	102-104 cm
SiO ₂	49.34	NRM Intensity (emu/cc)	10,244 x 10 ⁻³
Al ₂ O ₃	17.16	NRM Inclination	-54.8°
Fe ₂ O ₃	10.05	Stable Inclination	-63.1°
MgO	6.23		
CaO	14.52		
Ni ₂ O	N.D.		
K ₂ O	0.04		
TiO ₂	1.27		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	1.25		
H ₂ O ⁺	0.76		
H ₂ O ⁻	N.D.		
CO ₂	1.30		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



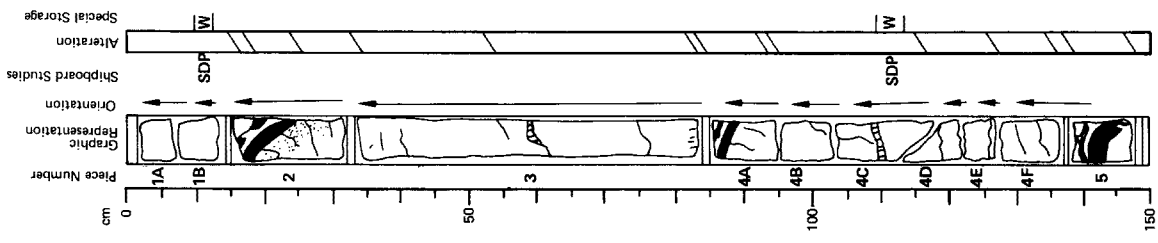
LEG	SITE	HOLE	CORE	SECT.
514	17D	28	5	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic basalt pillows with well-developed glassy chilled margins (pieces 2, 4A and 5) against interpillow limestone (pieces 1A, 1B, 2, 4A and 5), 15-85, 85-135 and 140-150 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt dark gray with an aphanitic to microcrystic groundmass. Altered plagioclase phenocrysts 20-25%, < 10 mm; olivine phenocrysts 2-3%, < 5 mm, replaced by green smectite. Veins common normal to glassy margins, filled by calcite and celadonite(?). Gray-green interpillow limestone layered to massive, composed of fine-grained calcite and green smectite with occasional shards of glass partially replaced by calcite, green smectite and palagonite(?).

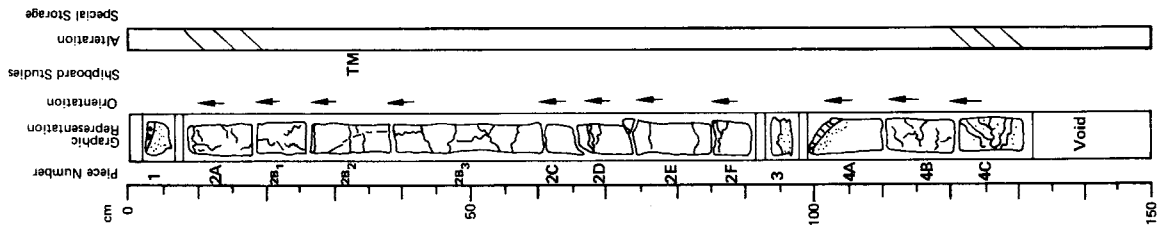
Shipboard Data

Physical Property Data:	14-16 cm	110-112 cm
Vp (km/sec)	5.88	5.35
Porosity (%)	7.34	
Wet Bulk Density (g/cc)	2.80	
Grain Density (g/cc)	2.94	



LEG	SITE	HOLE	CORE	SECT.
5	14	17	D	6

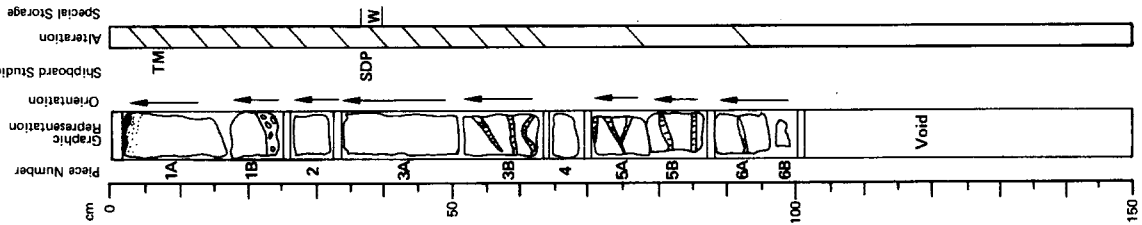
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Phryic basalt pillows with chilled margins (pieces 2A, 2F, 4A and 4C) and interpillow limestone (pieces 1 and 3). 8-92 and 99-130 cm intervals represent individual pillows. Chilled pillow margins locally display 0.5-1.0 cm thick, sparsely phryic, slightly brecciated glassy rims containing fragments of dark gray basalt and 3% plagioclase phenocrysts (<2 mm). These are underlain by a 3 mm thick zone containing spheres of devitrified glass. Pillow interiors dark gray with a microlitic groundmass, altered to light gray, gray-brown or brown near veins in pieces 2A and 4C. Plagioclase phenocrysts 7-15%, <5 mm, partially replaced by clay, calcite; clinopyroxene phenocrysts 3-5%, <2 mm; olivine phenocrysts <1%, <1 mm, partially replaced by green smectite. Veins filled by calcite, green smectite. Fine-grained, gray-green to pink interpillow limestone finely layered to massive, composed of calcite and green smectite with occasional shards of glass partially replaced by calcite, green smectite and palygornite(7).

Thin Section Description
 Location: pillow interior, 32 cm
 Texture: porphyritic, intersertal
 Phenocrysts: olivine <0.5%, <1 mm, idiomorphic; plagioclase 15%, 2-6 mm, idiomorphic, strongly zoned.
 Groundmass: plagioclase 40%, 0.5-2 mm, plumose; clinopyroxene 35%, titanomagnetite 10%
 Vesicles: <0.5%, <0.05 mm, round
 Alteration: calcite pseudomorphs after olivine; plagioclase replaced by calcite; veins filled with calcite; vesicles filled by calcite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 30-33 cm 6.332 x 10⁻³
 NRM Inclination -62.5°
 Stable Inclination -68.2°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	14	17	D	7

Visual Description
 Altered phryic pillow basalt with chilled margins (piece 1A) and minor breccia (piece 1B). Basalt dark gray, strongly oxidized to shades of brown and orange in pieces 1-3B. Groundmass aphanitic to microlitic. Altered plagioclase phenocrysts 15-20%, <5 mm; mafic phenocrysts 2-3%, <5 mm, replaced by green smectite. Numerous wide veins filled by calcite + hematite and green smectite. Breccia composed of basalt fragments in a calcite matrix.

Thin Section Description
 Location: next to glassy margin, 6 cm
 Texture: porphyritic
 Phenocrysts: olivine 2-3%, 1-2 mm, idiomorphic; plagioclase 15% 1-5 mm, idiomorphic, glass inclusions
 Groundmass: plagioclase microlites 40%, 0.1-0.5 mm; interstitial clinopyroxene 20%, 0.3-0.5 mm, quenched, plumose; titanomagnetite 20%, interstitial
 Vesicles: <1%, <1 mm, round
 Alteration: calcite pseudomorphs after olivine; plagioclase phenocrysts partially replaced by calcite; vesicles filled by calcite

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 5-7 cm 6.813 x 10⁻³
 NRM Inclination -70.0°
 Stable Inclination -69.2°

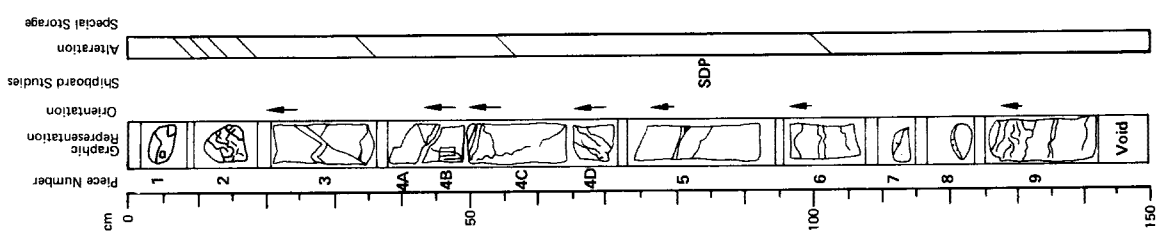
Physical Property Data:
 Vp (km/sec) 37.39 cm 5.52
 Porosity (%) 5.37
 Wet Bulk Density (g/cc) 2.81
 Grain Density (g/cc) 2.91

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	29	1

Visual Description
 Moderately altered phryic pillow basalt with glassy chilled margins (pieces 2, 4D and 7) and minor breccia (pieces 1, 2 and 4D). 10-85, 70-105 and 120-140 cm intervals represent individual pillows. Basalt dark gray, altered to light gray, light brown, red-brown or brown near margins or veins in pieces 2 and 6. Groundmass hyalopilitic near margins, microclitic in pillow interiors. Plagioclase phenocrysts 10%, <5 mm, occasionally to 18 mm, partially replaced by calcite and clay; clinopyroxene phenocrysts <5%, <2 mm, partly replaced by calcite, green smectite; olivine phenocrysts <1%, <1 mm, partially replaced by calcite, green smectite. Veins filled by calcite; green smectite; veins in piece 2 also contain yellow to pink secondary minerals. Breccia composed of fragments of glass replaced by calcite, green smectite, and palagonite(?) in a calcite matrix.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 80-82 cm
 5.02
 Porosity (%) 7.70
 Wet Bulk Density (g/cc) 2.72
 Grain Density (g/cc) 2.86



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

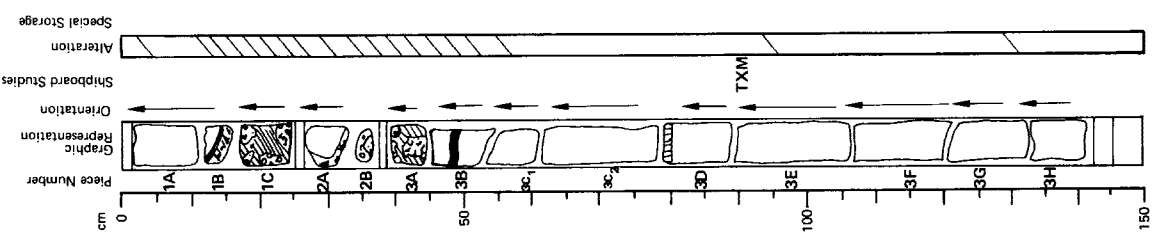
LEG	SITE	HOLE	CORE	SECT.
51	417	D	29	2

Visual Description
 Phryic basalt pillows with chilled glassy margins (pieces 1B and 3B) and hyaloclastic breccia (pieces 1B-3B). 0-13 and 46-140 cm intervals represent individual pillows. Basalt dark gray, with an aphanitic to hyalopilitic groundmass near margins and a glassy matrix in pillow interiors. Plagioclase phenocrysts 20%, 10-15 mm, partly replaced by calcite and clay; olivine phenocrysts 5%, <5 mm. Veins filled by calcite and minor pyrite. Breccia (pieces 1B-3B) composed of fragments of basalt and basaltic glass in a dark fine-grained matrix of green smectite. Glass in breccia and pillow margins replaced along cracks by calcite, green smectite and palagonite(?).

Thin Section Description
 Location: pillow interior, 85 cm
 Texture: porphyritic
 Phenocrysts: olivine 2.3%, 1-3 mm, idiomorphic; plagioclase 10-15%, 2-6 mm, idiomorphic, zoned; clinopyroxene <0.5%, 1 mm, anhedral
 Groundmass: plagioclase 40%, 0.2-1 mm, skeletal; augitic clinopyroxene 20%, 0.2-0.5 mm, interstitial; titanomagnetite 15%, 0.3 mm, granular; glass 5%; interstitial, devitrified
 Vesicles: <1%, <1 mm, round
 Alteration: olivine replaced by calcite, celadonite and clay, vesicles filled by calcite

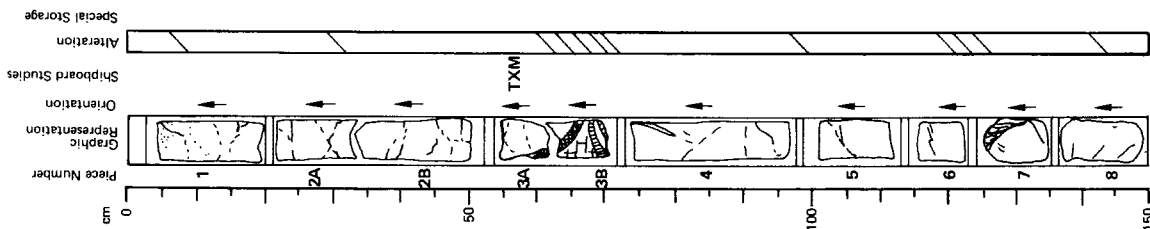
Shipboard Data
 Bulk Analysis: 83-86 cm
 SiO₂ 50.85
 Al₂O₃ 17.54
 Fe₂O₃ 9.70
 MgO 5.44
 CaO 13.00
 Na₂O N.D.
 K₂O 0.04
 TiO₂ 1.39
 P₂O₅ N.D.
 MnO N.D.
 LOI 0.75
 H₂O⁺ 1.14
 H₂O⁻ N.D.
 CO₂ 0.20
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 NRM Intensity (emu/cc) 83-86 cm
 10.789 x 10⁻³
 NRM Inclination -64.3°
 Stable Inclination -66.3°



LEG	SITE	CORE	SECT.
51	417D	29	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

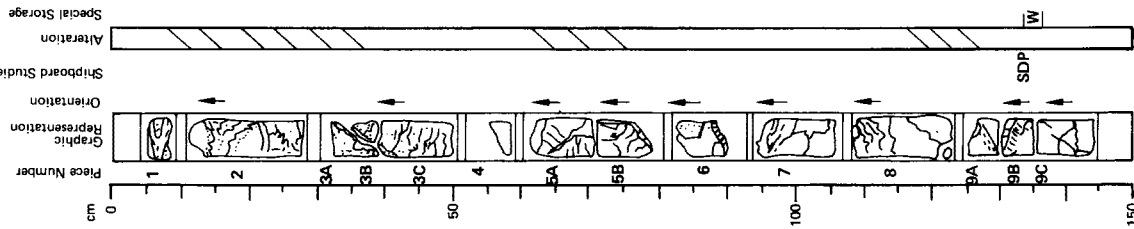


Visual Description
 Phyric basalt pillows with glassy chilled margins (pieces 1, 3 and 6-8), radial cracks (pieces 6-8) and interpillow limestone (piece 3B). 0.65-125 and 125-150 cm intervals represent individual pillows bounded by chilled margins. Basalt dark gray with an aphanitic to hyalopilitic groundmass near margins and a microlitic groundmass in pillow interiors. Plagioclase phenocrysts 10-15%, <5 mm; olivine (± clinopyroxene) phenocrysts 3-5%, 1-3 mm. Groundmass in piece 2 contains disseminated sulfides. Veins filled by calcite. Interpillow limestone composed of calcite and minor green smectite. Glass adjacent to sediments and veins partially replaced by calcite, green smectite and palagonite(?).

Thin Section Description
 Location: next to glassy margin, 56 cm
 Texture: porphyritic
 Phenocrysts: olivine 3-4%, 1-3 mm, idiomorphic; plagioclase 8%, 2-4 mm, idiomorphic, zoned; clinopyroxene < 1%, 1-2 mm, anhedral
 Groundmass: plagioclase microlites 50%, 0.2-0.6 mm, skeletal; clinopyroxene 15%, plumose or radiating; titanomagnetite 10%; hematite 10%
 Vesicles: < 1%, < 1 mm, round
 Alteration: olivine replaced by calcite or by clay and iron oxides; vesicles replaced by calcite and clay

Shipboard Data
 Bulk Analysis: 57-60 cm
 Magnetic Data: 57-60 cm

SiO ₂	50.00	NRM Intensity (emu/cc)	11,768 x 10 ⁻³
Al ₂ O ₃	17.25	NRM Inclination	-70.9°
Fe ₂ O ₃	10.33	Stable Inclination	-70.3°
MgO	5.65		
CaO	13.66		
Ni ₂ O	N.D.		
K ₂ O	0.04		
TiO ₂	1.39		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	1.80		
H ₂ O ⁺	0.82		
H ₂ O ⁻	N.D.		
CO ₂	0.59		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



Visual Description
 Phyric pillow basalt with glassy chilled margins (pieces 2-7, 9A and 9B) and cemented pillow breccia (pieces 1-3A, 6, 9A and 9B). Basalt dark gray, altered to yellow-brown along veins. Groundmass hyalopilitic to microlitic. Plagioclase phenocrysts 10-15%, < 7 mm, partly replaced by calcite, clay; clinopyroxene phenocrysts 1%, < 2 mm, partly replaced by calcite, green smectite; olivine phenocrysts < 1%, < 1 mm. Veins filled by calcite; small shards of glass, locally normal to margins. Breccia composed of fragments of basalt and fractured glass in a matrix of calcite and green smectite. Basalt fragments altered to green smectite and palagonite(?) along veins, fractures and contacts with breccia.

Shipboard Data
 Physical Property Data: 134-136 cm
 Vp (km/sec) 5.20
 Porosity (%) 8.48
 Wet Bulk Density (g/cc) 2.72
 Grain Density (g/cc) 2.88

LEG	SITE	CORE	SECT.
51	417D	29	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	29	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

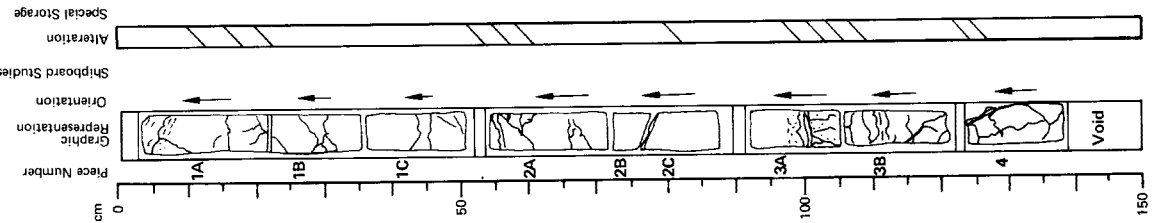
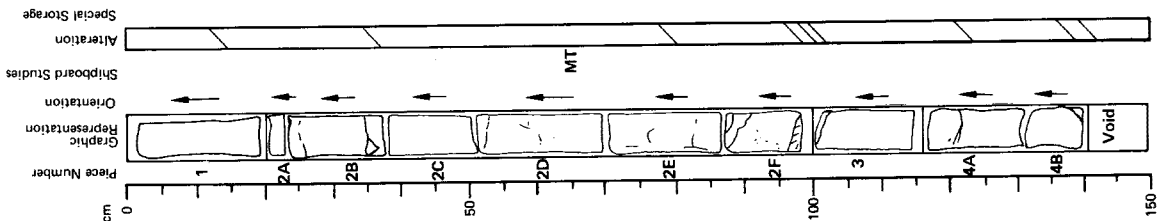
Visual Description

Phyric basalt pillows with glassy chilled margins (pieces 2E, 2F and 4B). 0-100 and 100-140 cm intervals represent individual pillows or parts of pillows. Basalt dark gray with a hyalopilitic to microlitic groundmass. Plagioclase phenocrysts 10-15%, <10 mm; olivine phenocrysts 3-7%, <2 mm, partly replaced by calcite; clinopyroxene phenocrysts 2%, <2 mm. Veins filled by calcite.

Thin Section Description

Location: pillow interior, 65 cm
 Texture: ophitic
 Phenocrysts: olivine 2%, 1 mm, euhedral; plagioclase 20%, 4 mm, euhedral to subhedral; clinopyroxene, 0.5%, 1 mm, partially resorbed.
 Groundmass: plagioclase 30%, 1 mm, prismatic; clinopyroxene 30%, 0.5 mm, anhedral; magnetite 5%, euhedral and dendritic; glass <5%
 Vesicles: round
 Alteration: glass and part of plagioclase replaced by clay; vesicles filled by calcite and clay

Shipboard Data
 Magnetic Data: 64-67 cm
 NRM Intensity (emu/cc) 5.601 x 10⁻³
 NRM Inclination -54.7°
 Stable Inclination -64.0°



LEG	SITE	HOLE	CORE	SECT.
51	417	D	29	6

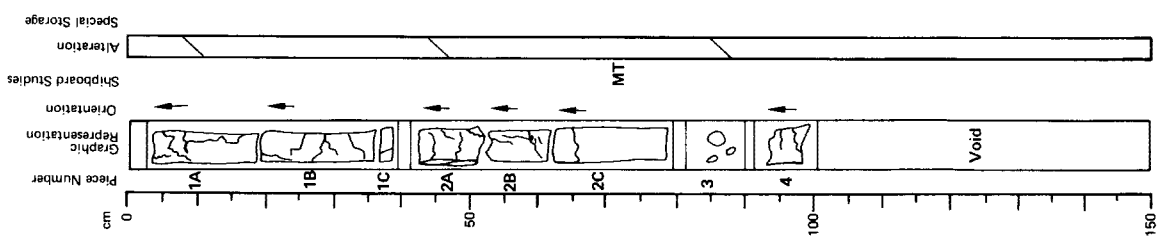
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Phyric basalt pillows with glassy chilled margins (pieces 1A and 3A) and interpillow limestone (piece 1A). 5-100 and 100-140 cm intervals represent individual pillows or parts of pillows. Basalt dark gray with a hyalopilitic to microlitic groundmass. Plagioclase phenocrysts 20%, <5 mm, fresh to partly replaced by calcite; clinopyroxene and olivine phenocrysts 2.5%, 1-3 mm and <1 mm respectively, replaced by calcite. Veins filled by calcite. Interpillow limestone finely layered, composed of calcite, minor green smectite. Well-preserved chilled margin in piece 1A displays a 6-7 mm rim of green, devitrified glass in contact with the sediments. This is underlain, in turn, by a 15 mm thick layer of fresh black glass and a 2 mm thick, light gray zone marking the transition to the sparsely phyric to microlitic basalt of the pillow interior. The devitrified to fresh glass transition is marked by a thin zone of fractured glass. Glass along veins and sediment contacts partially replaced by calcite, green smectite and palagonite.

LEG	SITE	HOLE	CORE	SECT.
514	17D	29	7	

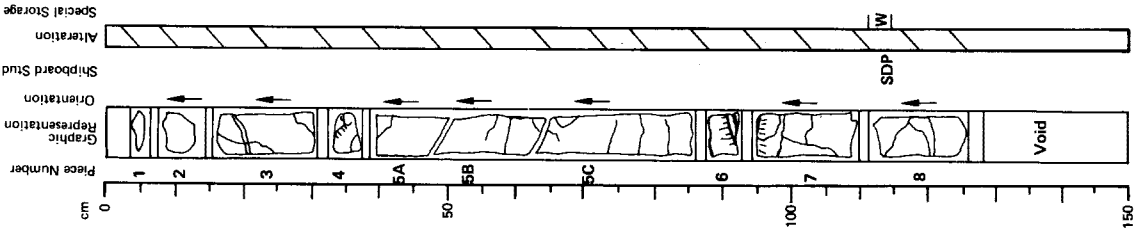
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Phytic, dark gray basalt with a microlitic groundmass. Plagioclase phenocrysts 15%, <3 mm, fresh to partially replaced by calcite; clinopyroxene and olivine phenocrysts 1.2%, <2 mm, replaced by green smectite. Veins filled by calcite, green smectite and pyrite.

Thin Section Description
 Location: pillow interior, 72 cm
 Texture: porphyritic, intersertal
 Phenocrysts: olivine 1%, 1 mm, idiomorphic; plagioclase 15%, 2.5 mm, An 60, idiomorphic, zoned margins
 Groundmass: plagioclase laths 40%, 0.2-2 mm; augitic clinopyroxene 35% intergranular, sometimes poikilitic; titanomagnetite 5-10%, 0.2-0.3 mm; glass 1.2%, interstitial
 Vesicles: 1%, <1 mm, round
 Alteration: olivine replaced by calcite or by clay and celadonite; vesicles replaced by calcite and celadonite

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 70.73 cm 9.171 x 10⁻³
 NRM Inclination -42.5°
 Stable Inclination -64.3°



Visual Description
 Phytic basalt pillows with 10 mm thick, chilled glassy margins (pieces 4, 6 and 7) and traces of interpillow breccia (pieces 1, 4 and 6). 30-92 and 94-130 cm intervals represent individual pillows or parts of pillows. Basalt dark gray, altered to gray brown along veins. Groundmass aphanitic to crystalline. Euhedral plagioclase phenocrysts 30%, 6 mm, partially replaced by green smectite; euhedral olivine phenocrysts 5%, 2 mm, completely replaced by iddingsite, green smectite and calcite. Phenocrysts show evidence of crystal settling. Vesicles <1%, 0.5 mm, filled by green smectite. Veins filled by calcite and green smectite; veins in piece 2 have calcite linings and iron hydroxide (goethite) cores. Interpillow breccia composed of shards of glass in a matrix of calcite and green smectite.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 112-114 cm 5.67
 Porosity (%) 4.32
 Wet Bulk Density (g/cc) 2.86
 Grain Density (g/cc) 2.94

LEG	SITE	HOLE	CORE	SECT.
514	17D	30	1	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	30	2

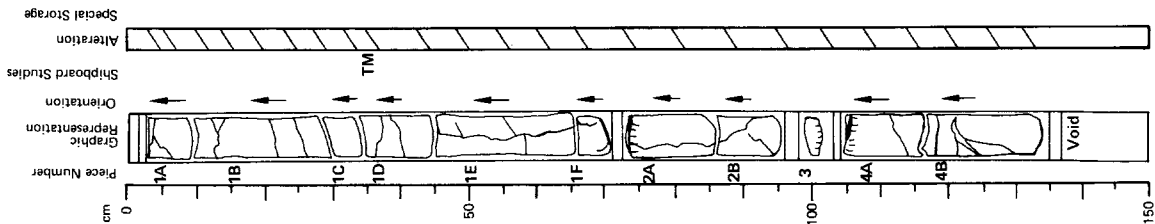
Visual Description
 Phyric basalt pillows with 15 mm thick, glassy chilled margins (pieces 1F, 2A, 3 and 4) delineating individual pillows or parts of pillows between 0-71, 72-101 and 102-132 cm. Basalt dark gray, altered to gray with near margins. Groundmass aphanitic crystalline. Euhedral plagioclase phenocrysts 30%, 0.5 mm, as partially resorbed inclusions in plagioclase. Increase in size of plagioclase phenocrysts and increase in abundance of olivine phenocrysts (from 0 to 10%) with depth within individual pillows suggests crystal settling. Vesicles 2%, filled by calcite, green smectite. Veins filled by calcite, green smectite and zeolites.

Thin Section Description

Location: 38 cm, pillow interior
Texture: hyaloophitic, porphyritic
Phenocrysts: olivine 3%, 0.5 mm, euhedral; plagioclase 20%, 2 mm, euhedral-subhedral; clinopyroxene <0.5%, 0.2 mm, as partially resorbed inclusions in plagioclase
Groundmass: olivine 10%, <0.2 mm, euhedral; plagioclase 30%, <0.5 mm, tabular, quenched; clinopyroxene 30%, <0.5 mm, quenched; magnetite 5%, quenched, dendritic; glass <5%
Vesicles: none
Alteration: veins filled with calcite, aragonite, zeolites and hematite

Shipboard Data

Magnetic Data:
 36-39 cm
 NRM Intensity (emu/cc) 6.301 x 10⁻³
 NRM Inclination -64.2°
 Stable Inclination -64.0°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	30	3

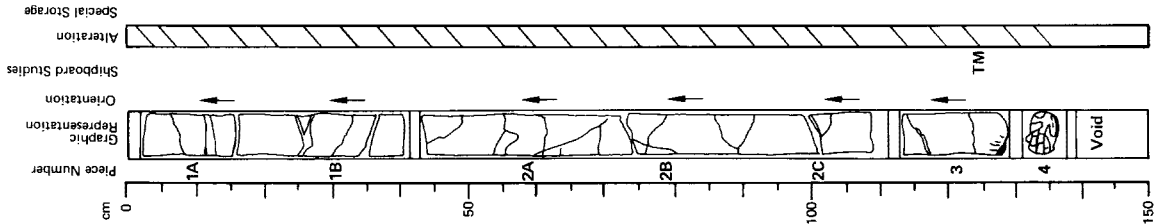
Visual Description
 Phyric pillow basalt with chilled margin (piece 3) and minor, inter-pillow breccia, 0-130 cm interval, represents part of an individual pillow. Basalt dark gray with aphanitic groundmass. Euhedral plagioclase phenocrysts 10-30%, <8 mm with occasional megacrysts to 12 mm, locally replaced by calcite and zeolites; euhedral olivine phenocrysts 1-10%, <2 mm, completely replaced by green smectite. Vesicles 3%, filled by green smectite, calcite and zeolites. Veins filled by calcite and green smectite. Breccia in piece 4 composed of elongate fragments of basaltic glass in a calcite matrix cut by veins of sparry calcite, zeolites and clay.

Thin Section Description

Location: 125 cm, next to glassy margin
Texture: hyaloophitic, variolitic
Phenocrysts: plagioclase 15%, 2 mm, euhedral, partially resorbed; clinopyroxene 2%, 0.5 mm, partially resorbed
Groundmass: plagioclase 10%, 0.5 mm, tabular; clinopyroxene 5%, 0.3 mm, quenched; glass >80%, devitrified
Vesicles: none
Alteration: veins and vesicles filled with calcite and clay; plagioclase partially altered to calcite

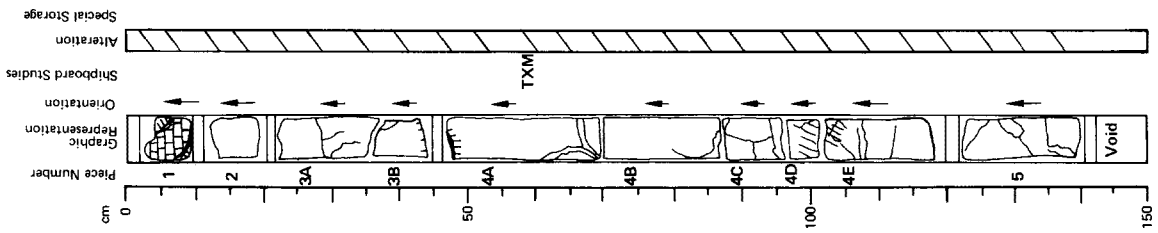
Shipboard Data

Magnetic Data:
 123-126 cm
 NRM Intensity (emu/cc) 8.400 x 10⁻³
 NRM Inclination -68.1°
 Stable Inclination -67.4°



LEG	SITE	HOLE	CORE	SECT.
5	1417D	3	0	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

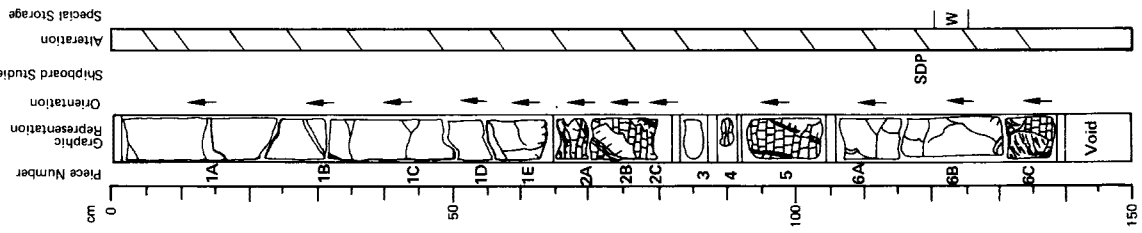


Visual Description
Phyric basalt pillows with chilled margins (pieces 1, 3B, 4A, 4D and 4E) and minor interpillow limestone breccia. 5-45, 45-102 and 102-140 cm intervals represent individual pillows or parts of pillows. Basalt dark gray with an aphanitic to crystalline groundmass. Euhedral plagioclase phenocrysts 30%, 5-10 mm, fresh to partially replaced by green smectite; olivine phenocrysts < 1%, completely replaced by green smectite. Calcite-filled vesicles < 1%. Veins filled by calcite, green smectite. Interpillow breccia composed of fragments of basalt and basaltic glass partially altered to green smectite and palagonite(?) in a calcite matrix.

Thin Section Description
Location: 58 cm, pillow interior
Texture: intersertal
Phenocrysts: olivine 5%, 1.5 mm, euhedral; plagioclase 20%, 4 mm, euhedral; clinopyroxene 0.5%, 1 mm, partially resorbed.
Groundmass: olivine 5%, euhedral-subhedral; plagioclase 30%, 1 mm, prismatic, quenched; clinopyroxene 30%, 0.5 mm, quenched; magnetite, 5%, euhedral-dendritic.
Vesicles: filled by calcite
Alteration: olivine replaced by clay

Shipboard Data

Bulk Analysis: 57-60 cm	Magnetic Data:
SiO ₂ 49.14	NRM Intensity (emu/cc) 11.130 x 10 ³
Al ₂ O ₃ 17.09	NRM Inclination -65.6°
Fe ₂ O ₃ 10.53	Stable Inclination -65.6°
MgO 5.54	
CaO 13.19	
Ni ₂ O N.D.	
K ₂ O 0.17	
TiO ₂ 1.41	
P ₂ O ₅ N.D.	
MnO N.D.	
LOI 1.90	
H ₂ O ⁺ 1.06	
H ₂ O ⁻ N.D.	
CO ₂ 1.01	
Cr N.D.	
Ni N.D.	
Sr N.D.	
Zr N.D.	



Visual Description
Phyric pillow basalt with chilled margins (pieces 1E, 2A, 2B, 5, 6B and 6C) and interpillow limestone (pieces 2, 4, 5 and 6C). Basalt dark gray with an aphanitic to crystalline groundmass. Euhedral plagioclase phenocrysts 30%, 4 mm; euhedral olivine phenocrysts 5%, 3 mm, completely altered to green smectite. Veins filled by calcite and green smectite. Spaces between pillows filled by recrystallized calcite or by a mixture of calcite and green smectite with smectite and fragments of glass along pillow margins. Piece 4 contains analcite.

Shipboard Data

Physical Property Data:
 Vp (km/sec) 118-121 cm
 Porosity (%) 5.18
 Wet Bulk Density (g/cc) 8.51
 Grain Density (g/cc) 2.74
 2.91

LEG	SITE	HOLE	CORE	SECT.
5	1417D	3	0	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O I E	CORE	SECT.
5	1417D		30	6

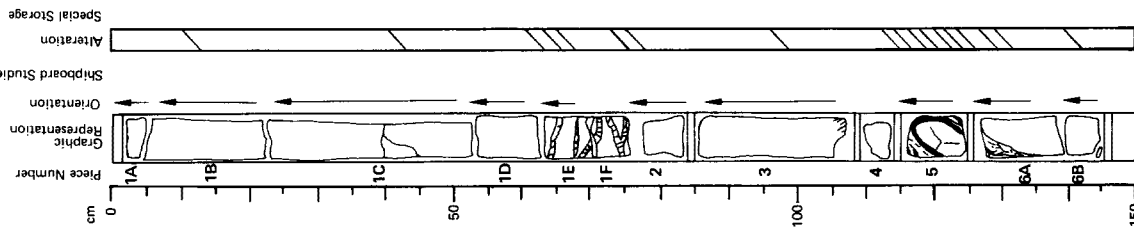
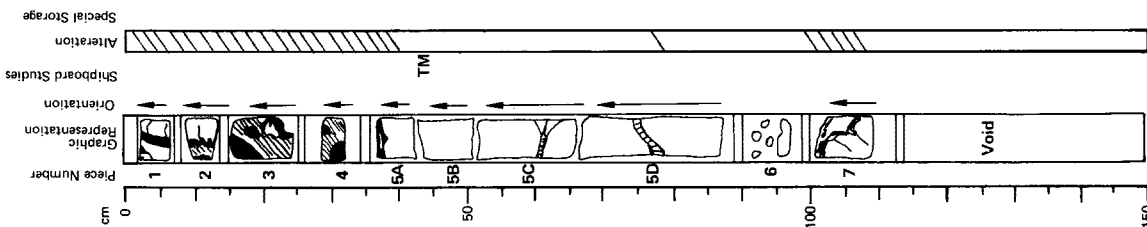
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Phyric pillow basalt with chilled glassy margins (pieces 5A and 7) and volcanic breccia (pieces 1-4). Basalt dark gray, altered to gray-brown within 1 cm of margins. Groundmass aphanitic to crystalline. Altered plagioclase phenocrysts 20%, <5 mm; clinopyroxene phenocrysts 2.3%, <5 mm; olivine phenocrysts 1%, replaced by green smectite. Veins abundant, filled by calcite, green smectite. Breccia composed of fragments of basaltic glass and phyric basalt with glassy margins in a white to green matrix of calcite and green smectite.

Thin Section Description

Location: 46 cm, next to glassy margin
Texture: hyaloophitic
Phenocrysts: olivine 2%, 1 mm, euhedral; plagioclase 20%, 4 mm, euhedral; clinopyroxene 0.5%, 0.5 mm, partially resorbed
Groundmass: plagioclase 10%, 0.5 mm, quenched; clinopyroxene 20%, 0.5 mm, quenched; glass 50%, devitrified
Vesicles: 2%, 0.2 mm, filled by calcite and clay
Alteration: veins and vesicles filled with calcite

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 45-48 cm 6.394 x 10⁻³
NRM Inclination -75.2°
Stable Inclination -73.1°



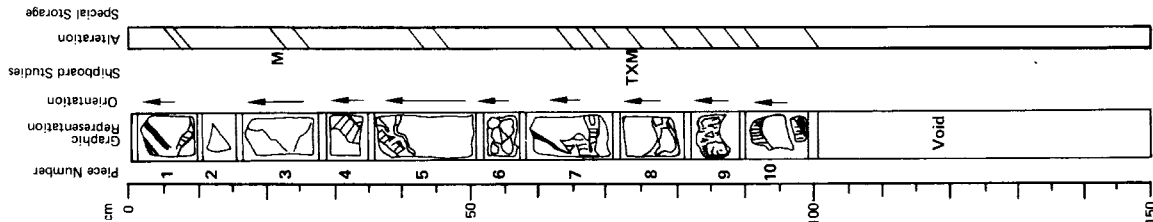
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O I E	CORE	SECT.
5	1417D		30	7

Visual Description
Phyric pillow basalt with glassy chilled margins (pieces 3, 5 and 6A) and minor hyaloclastite breccia (pieces 5 and 6A). Basalt dark gray with an aphanitic to intersertal texture. Altered plagioclase phenocrysts 20-25%; euhedral clinopyroxene phenocrysts 5%, <5 mm; olivine phenocrysts 2%, <5 mm, replaced by calcite, green smectite. Veins abundant, <6 mm wide, filled by calcite.

LEG	SITE	HOLE	CORE	SECT.
51	417	D	30	8

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

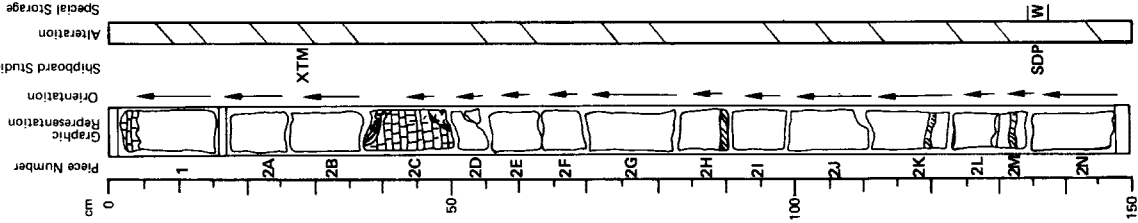
Phyric pillow basalt with chilled glassy margins (pieces 1, 5 and 7) and hyaloclastite breccia in a dark green, fine-grained matrix (pieces 1, 6, 7, 9 and 10). Basalt dark gray with an aphanitic to fine-grained, crystalline matrix. Altered, euhedral plagioclase phenocrysts 25%, < 10 mm; mafic (olivine?) phenocrysts 1%, < 3 mm, replaced by green smectite. Veins and cavities filled by coarse-grained calcite (pieces 1, 4, 5 and 7).

Thin Section Description

Location: 72 cm, next to glassy margin
 Texture: hyalophytic
 Phenocrysts: olivine 5%, 1 mm, euhedral; plagioclase 20%, 2 mm, euhedral, partially resorbed; clinopyroxene 3%, 0.5 mm, partially resorbed.
 Groundmass: olivine 5%; plagioclase 20%, 0.5 mm, quenched, prismatic with swallow tail crystals; clinopyroxene 20%, quenched; magnetite 5%; glass 20%, fresh to partially devitrified.
 Vesicles: round, filled with clay
 Alteration: olivine replaced by clay

Shipboard Data

Bulk Analysis:	70-73 cm	Magnetic Data:	70-73 cm
SiO ₂	50.42	NRM Intensity (emu/cc)	8.593 x 10 ⁻³
Al ₂ O ₃	18.16	NRM Inclination	-52.3°
Fe ₂ O ₃	9.73	Stable Inclination	-53.7°
MgO	5.50		
CaO	11.17		
Na ₂ O	N.D.		
K ₂ O	0.40		
TiO ₂	1.54		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	1.50		
H ₂ O ⁺	1.25		
H ₂ O ⁻	N.D.		
CO ₂	0.33		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



Visual Description

Plagioclase-phyric pillow basalt with brecciated glassy margins (piece 2) and gray-green, fine-grained inter-pillow limestone (pieces 1 and 2C). Basalt dark gray with an aphanitic to halo-crystalline groundmass. Altered euhedral plagioclase phenocrysts 25%, < 10 mm; mafic phenocrysts rare. Veins numerous, filled by calcite and green smectite. Limestone composed of calcite with green smectite and shards of glass; celadonite.

Thin Section Description

Location: 30 cm, pillow interior
 Texture: porphyritic
 Phenocrysts: olivine 2%, 2.3 mm, idiomorphic; plagioclase 10%, 2.4 mm, idiomorphic; clinopyroxene < 1%, 1-2 mm, corroded
 Groundmass: plagioclase 40%, 0.2-1 mm, hollow and skeletal; clinopyroxene 20%, plumose; magnetite, hematite and altered glass 30%, subopaque
 Vesicles: 1%, < 1 mm, filled by calcite and clay, some shrinkage vesicles
 Alteration: olivine replaced by calcite, clay and celadonite

Shipboard Data

Bulk Analysis:	29-31 cm	Magnetic Data:	29-31 cm
SiO ₂	49.01	NRM Intensity (emu/cc)	11.847 x 10 ⁻³
Al ₂ O ₃	17.04	NRM Inclination	-73.4°
Fe ₂ O ₃	11.75	Stable Inclination	-73.3°
MgO	5.11		
CaO	11.86		
Na ₂ O	N.D.		
K ₂ O	0.84		
TiO ₂	1.39		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	2.85		
H ₂ O ⁺	1.86		
H ₂ O ⁻	N.D.		
CO ₂	1.25		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

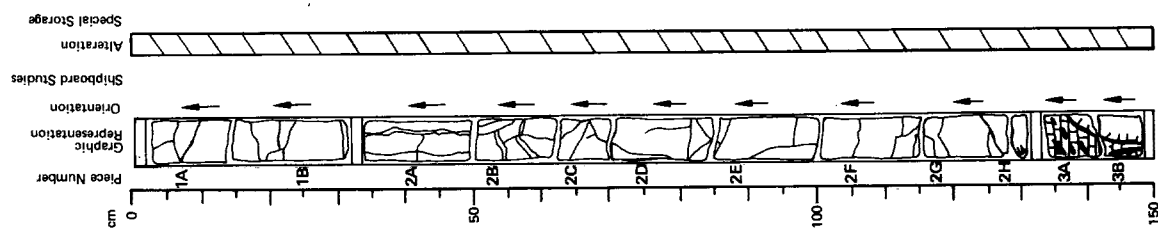
LEG	SITE	HOLE	CORE	SECT.
51	417	D	31	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
514	17D	31	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic pillow basalt with chilled margins (pieces 2H and 3) and interpillow limestone breccia (piece 3). 0-130 and 135-150 cm intervals represent parts of individual pillows. Basalt dark gray, locally altered to gray-brown. Groundmass aphanitic to crystalline. Euhedral plagioclase phenocrysts 25%, <5 mm, fresh to partially replaced by green smectite; euhedral olivine phenocrysts 2-5%, 1-3 mm, replaced by green smectite; anhedral clinopyroxene(?) phenocrysts <1%, 0.5 mm. Veins filled by calcite, green smectite and quartz (piece 3). Breccia composed of fragments of glass partially altered to green smectite in a calcite matrix.



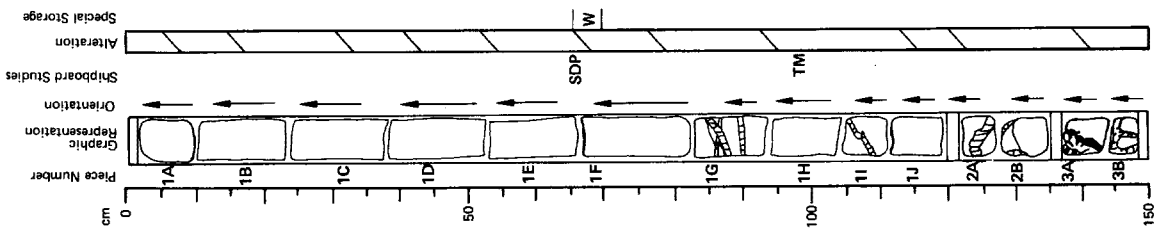
LEG	SITE	HOLE	CORE	SECT.
514	17D	31	3	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic pillow basalt with glassy chilled margins (piece 3A) and minor intercalated limestone cores of calcite and minor green smectite (pieces 2 and 3). Basalt dark gray with an aphanitic to crystalline groundmass. Altered euhedral plagioclase phenocrysts 20%, <10 mm; dark green mafic phenocrysts 2%, <15 mm. Veins common, <5 mm wide, filled by calcite, green smectite. Basalt in contact with fine-grained, gray-green limestone in pieces 2A and 2B displays no chilled margins. Basalt in piece 3 displays glassy chilled margins in contact with limestone containing coarse-grained sparry calcite.

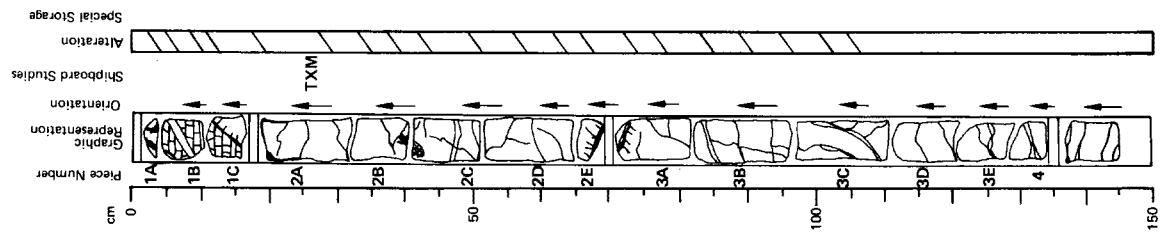
Thin Section Description
 Location: 46 cm, pillow interior
 Texture: intersertal
 Phenocrysts: olivine 3%, 2 mm; euhedral; plagioclase 20%, 3 mm, euhedral-subhedral; clinopyroxene 0.5%, 1 mm, partially resorbed
 Groundmass: plagioclase 30%, 1 mm, prismatic; clinopyroxene 30%, 0.5 mm. Anhedral; magnetite 5%, 0.02 mm, prismatic-dendritic; glass <5%.
 Vesicles: filled by calcite
 Alteration: olivine replaced by calcite and clay; glass replaced by clay

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 95-98 cm 10.300 x 10⁻³
 NRM Inclination -54.8°
 Stable Inclination -57.3°
 Physical Property Data:
 Vp (km/sec) 67-69 cm 5.18
 Porosity (%) 6.8
 Wet Bulk Density (g/cc) 2.75
 Grain Density (g/cc) 2.87



LEG	SITE	HOLE	CORE	SECT.
5	1417	D	31	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

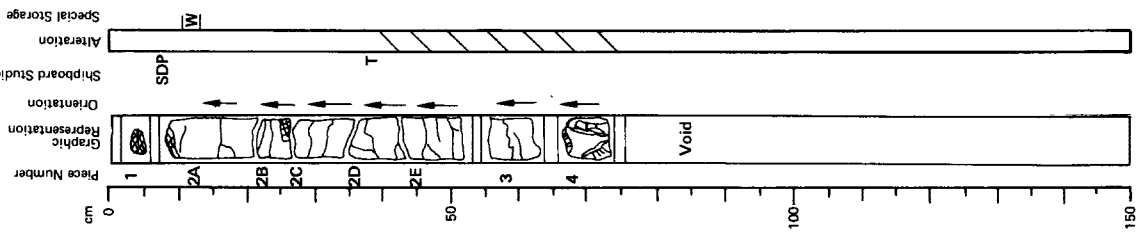


Visual Description
 Phryic basalt pillows with chilled glassy margins (pieces 1C, 2E and 3A) and a well-preserved interval of interpillow (interlayered?) limestone (piece 1), 10-70 and 70-145 cm intervals represent individual pillows. Basalt dark gray, altered to pale brown or red-brown in pieces 3C-4. Groundmass aphanitic to crystalline, often microclitic. Euhedral plagioclase phenocrysts 25%, <5 mm; olivine phenocrysts 3%, <1 mm, replaced by green smectite; anhedral clinopyroxene phenocrysts rare. Veins common, filled by calcite, green smectite, plagioclase and clinopyroxene. Limestone in pieces 1C composed of calcite and minor green clay cut in piece 1B, by the upper of the chilled pillow margins. Smectite and minor green clay cut in piece 1B, by the upper of the chilled pillow margins, the upper of which is fragmented and entrained in the sediments next to the margin while the lower is hydrated against the sediments. Limestone may separate two distinct flows.

Thin Section Description
 Location: 28 cm, next to glassy margin
 Texture: porphyritic
 Phenocrysts: olivine 1%, 1-2 mm, idiomorphic; plagioclase 15%, 1-2 mm, idiomorphic, zoned; augitic clinopyroxene <1%, 2-3 mm, rounded.
 Groundmass: plagioclase 35%, <1 mm, hollow, skeletal; clinopyroxene 15%, plumose; titanomagnetite 20%, <0.3 mm, skeletal; glass 15%, devitrified; calcite vein, 5 mm wide contains glassy shards.
 Vesicles: <1%, <0.3 mm, round, shrinkage, filled by clay
 Alteration: olivine replaced by calcite

Shipboard Data

Bulk Analysis: 27-29 cm	Magnetic Data:
SiO ₂ 49.76	NRM Intensity (emu/cc) 27-29 cm
Al ₂ O ₃ 17.36	NRM Inclination 13.755 x 10 ⁻³
Fe ₂ O ₃ 10.42	Stable Inclination -71.0°
MgO 5.70	
CaO 13.14	
Na ₂ O N.D.	
K ₂ O 0.18	
TiO ₂ 1.43	
P ₂ O ₅ N.D.	
MnO N.D.	
LOI 0.85	
H ₂ O ⁺ 1.79	
H ₂ O ⁻ N.D.	
CO ₂ 0.53	
Cr N.D.	
Ni N.D.	
Sr N.D.	
Zr N.D.	



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	1417	D	31	5

Visual Description
 Phryic pillow basalt with chilled margins and well-preserved interpillow fillings (piece 4). Basalt dark gray with an aphanitic to crystalline, often microclitic groundmass. Euhedral plagioclase phenocrysts 25%, 4 mm, partially replaced by green smectite; euhedral olivine phenocrysts 5%, 2 mm, replaced by green smectite. Veins filled by calcite. Piece 1 consists entirely of white secondary minerals. Interpillow filling in piece 4 composed of green smectite. Chilled margins in piece 4 devitrified, partially replaced by green smectite.

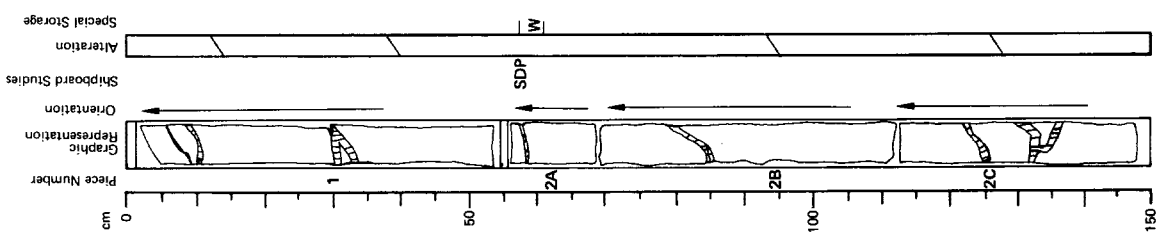
Thin Section Description
 Location: 41 cm, pillow interior
 Texture: hyaloophitic
 Phenocrysts: olivine 1%, 2 mm, euhedral; plagioclase 15%, 1-4 mm, euhedral, fresh; clinopyroxene 1%, 2 mm, 2V = 50°, partially resorbed
 Groundmass: olivine 5%, 0.1 mm; plagioclase 25%, 0.5 mm, quenched; clinopyroxene 40%, 0.3 mm, quenched; glass
 Vesicles: none
 Alteration: olivine and glass replaced by clay

Shipboard Data

Physical Property Data:	12.14 cm
V _p (km/sec)	4.56
Porosity (%)	10.2
Wet Bulk Density (g/cc)	2.52
Grain Density (g/cc)	2.69

LEG	SITE	HOLE	CORE	SECT.
51	417	D	32	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

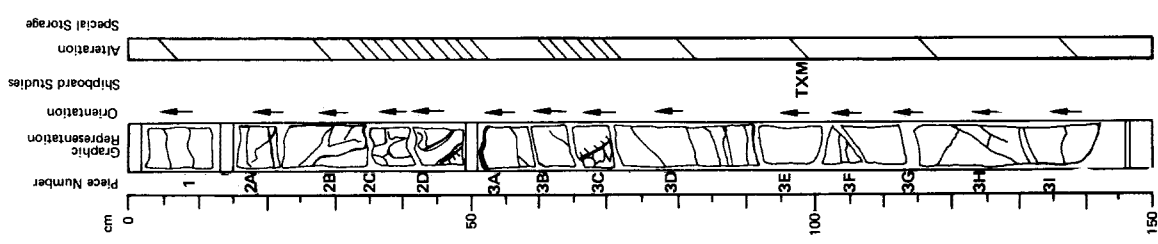
Massive, moderately phryic basalt with a gray, subophitic groundmass containing plagioclase microlites in augite, disseminated calcite and minor pyrite. Piece 1 continuous with piece 31 of previous section. Plagioclase phenocrysts 10%, 2-3 mm. Vesicles common, filled by calcite or green smectite (i.pyrite) or zoned with green smectite linings and cores of calcite. Basalt zoned on basis of vesicle fillings. Veins filled by calcite and green smectite.

Shipboard Data

Physical Property Data:
 Vp (km/sec) 58.61 cm
 Porosity (%) 5.04
 Wet Bulk Density (g/cc) 2.3
 Grain Density (g/cc) 6.5
 2.76

LEG	SITE	HOLE	CORE	SECT.
51	417	D	32	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

0-70 cm: phryic pillow basalt and pillow breccia (pieces 2B-2D and 3C) with chilled margins (pieces 2D, 3A and 3C). Basalt dark gray with an aphanitic to holocrystalline, often microclitic groundmass. Euhedral plagioclase phenocrysts 25%, < 10 mm; euhedral olivine phenocrysts 5%, < 2 mm, replaced by green smectite. Veins and rare vesicles filled by calcite.
 Breccia composed of angular clasts and fragments of basalt and glass in a matrix of calcite and green smectite. Fragments of glass and basalt and surfaces of larger clasts devitrified, partially replaced by green smectite. Breccia matrix in contact with basalt along both holocrystalline and aphanitic surfaces.

70-140 cm: massive phryic basalt with a chilled margin in the top of piece 3D. Basalt gray with an aphanitic groundmass near the margin and an interstitial to subophitic groundmass which increases in grain size with depth between 75-140 cm. Euhedral plagioclase phenocrysts 15%, 5 mm; anhedral clinopyroxene phenocrysts < 5%; olivine phenocrysts replaced by green smectite. Minor calcite-filled veins.

Thin Section Description

Location: 96 cm, marginal part of massive basalt
 Texture: ophitic, porphyritic
 Phenocrysts: olivine 2%, 0.3 mm, euhedral-anhedral; plagioclase 15%, 3 mm, euhedral-subhedral; clinopyroxene 2%, 0.5 mm, partially resorbed
 Groundmass: olivine 10%, 0.2 mm, euhedral; plagioclase 20%, 0.8 mm, tabular, quenched; clinopyroxene 35%, 0.5 mm, anhedral, quenched; magnetite 5%, 0.02 mm, granular, quenched
 Vesicles: none
 Alteration: olivine replaced by clay

Shipboard Data

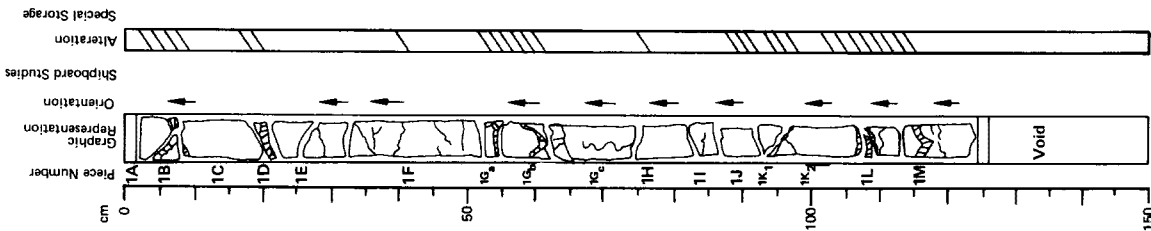
Bulk Analysis: 96-98 cm
 SiO₂ 50.63
 Al₂O₃ 16.17
 Fe₂O₃ 10.80
 MgO 5.79
 CaO 12.54
 Na₂O N.D.
 K₂O 0.06
 TiO₂ 1.44
 P₂O₅ N.D.
 MnO N.D.
 LOI 0.25
 H₂O⁺ 0.94
 H₂O⁻ N.D.
 CO₂ 0.22
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 NRM Intensity (emu/cc) 2.738 x 10³
 NRM Inclination - 4.1°
 Stable Inclination -55.6°

LEG	SITE	HOLE	CORE	SECT.
51	417	D	32	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Massive, slightly phyrlic basalt with a gray, subophitic groundmass containing plagioclase micro-lites in augite. Plagioclase phenocrysts 5-7%, < 7 mm; clinopyroxene phenocrysts 3%, 1-2 mm; olivine phenocrysts < 1%, < 0.5 mm, replaced by green smectite. Vesicles < 2%, 0.5-1.0 mm, filled by calcite. Veins filled by calcite and green to brown smectite. Groundmass along veins locally contains disseminated sulfides.



LEG	SITE	HOLE	CORE	SECT.
51	417	D	32	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

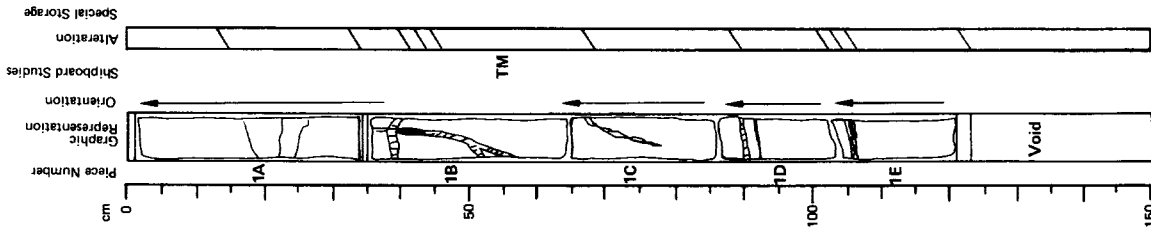
Visual Description
 Massive plagioclase-phyric basalt with a gray, subophitic groundmass containing plagioclase micro-lites in augite and disseminated pyrite. Euhedral plagioclase phenocrysts 10-15%, < 5 mm, 0-20 cm interval contains a small number of vesicles filled by calcite and green smectite. Veins filled by green smectite followed by calcite.

Thin Section Description

Location: 57 cm
Texture: porphyritic, subophitic
Phenocrysts: olivine 2.3%, 1 mm, idiomorphic; plagioclase 10%, 2.3 mm, An 60, idiomorphic with zoned margins and glassy inclusions
Groundmass: plagioclase laths 40%, 0.5-1 mm, 0.2 mm; augitic clinopyroxene 40%, 0.5-1 mm, intergranular; titanomagnetite 5%, 0.2 mm; interstitial clay 2.3%
Vesicles: none
Alteration: olivine replaced by calcite, clay and celadonite

Shipboard Data

Magnetic Data:
 56-58 cm
 NRM Intensity (emu/cc) 4.560 x 10⁻³
 NRM Inclination - 7.7°
 Stable Inclination - 62.1°

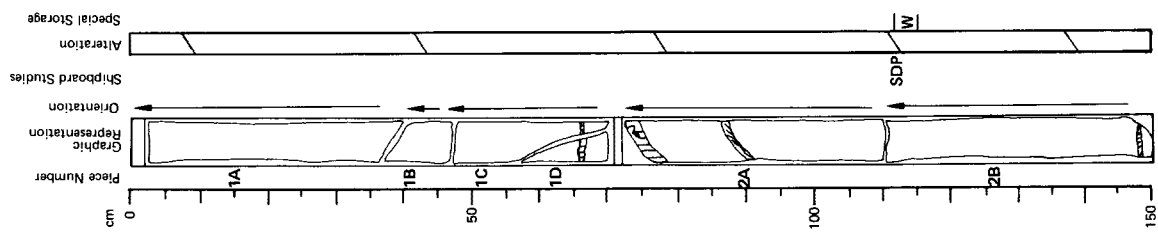


LEG	SITE	HOLE	CORE	SECT.
51	417	D	32	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Massive plagioclase-phyric basalt with a gray, subophitic groundmass containing plagioclase microclites in augite. Euhedral plagioclase phenocrysts 15%, <5 mm, slightly altered. Veins, rare vesicles filled by calcite, green smectite.

Shipboard Data
 Physical Property Data: 113.116 cm
 Vp (km/sec) 5.79
 Porosity (%) 2.3
 Wet Bulk Density (g/cc) 2.9
 Grain Density (g/cc) 2.95



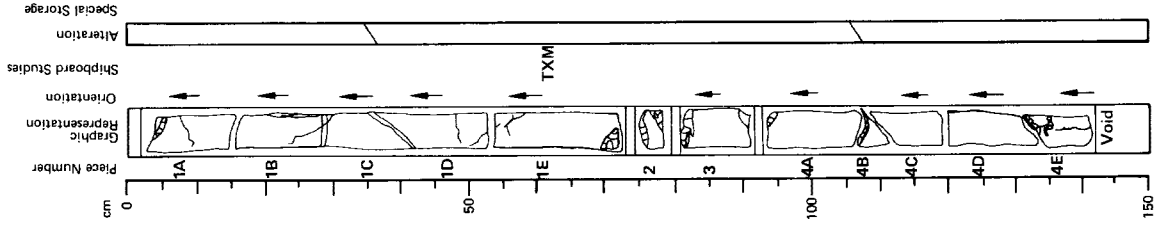
LEG	SITE	HOLE	CORE	SECT.
51	417	D	32	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Massive, phyric basalt with a gray, subophitic groundmass containing minor disseminated calcite and pyrite. Basalt displays 1-2 cm wide, dark green to yellow-brown, zoned alteration halos along veins due to partial replacement by calcite and green to brown smectite. Plagioclase phenocrysts 15%, <5 mm; augitic clinopyroxene phenocrysts 7%, <1 mm, partially replaced by green smectite; olivine phenocrysts <1%, <0.5 mm, completely replaced by green smectite. Veins filled by calcite + white clay.

Thin Section Description
 Location: 60 cm, flow interior
 Texture: ophitic
 Phenocrysts: plagioclase 15%, 4 mm, euhedral-subhedral
 Groundmass: olivine 10%, 0.2 mm, euhedral; plagioclase 30%, 1 mm, prismatic; clinopyroxene 30%, 0.4 mm, anhedral; magnetite 5%, 0.1 mm, granular-tabular; glass 5%
 Vesicles: none
 Alteration: olivine and glass replaced by clay

Shipboard Data
 Bulk Analysis: 60-62 cm
 Magnetic Data: 60-62 cm
 SiO2 51.01 NRM Intensity (emu/cc) 7.022 x 10⁻³
 Al2O3 16.78 NRM Inclination +50.9°
 Fe2O3 10.01 Stable Inclination 65.8°
 MgO 5.85
 CaO 12.33
 Na2O N.D.
 K2O 0.07
 TiO2 1.49
 P2O5 N.D.
 MnO N.D.
 LOI 0.25
 H2O+ 0.79
 H2O- N.D.
 CO2 0.43
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

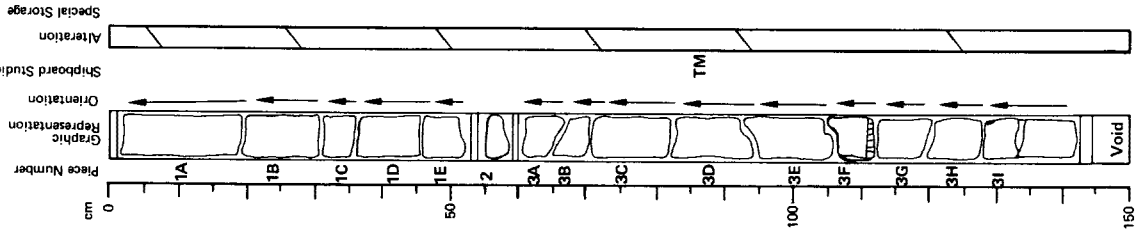
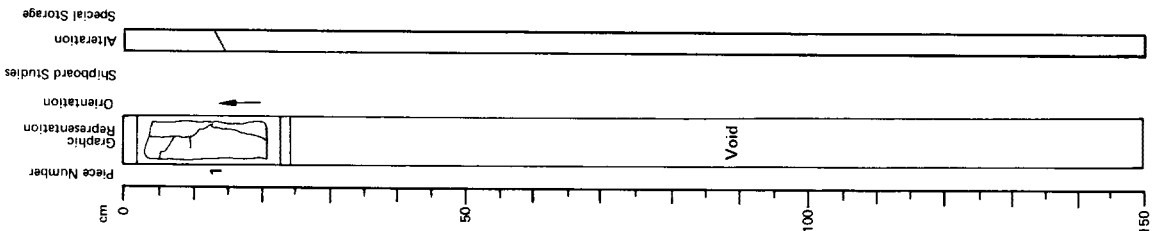


LEG	SITE	HOLE	CORE	SECT.
5	14	17D	3	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Massive, phryic basalt with a gray, subophitic groundmass. Basalt altered to gray-green or yellow-brown along veins due to partial replacement by calcite and green to brown smectite. Plagioclase phenocrysts 5-7%, <4 mm, slightly altered; clinopyroxene phenocrysts 10%, <0.5 mm, fresh to partially replaced by green smectite. Veins filled by green to brown smectite, minor calcite.



LEG	SITE	HOLE	CORE	SECT.
5	14	17D	3	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Massive, plagioclase-phryic basalt with a gray, subophitic groundmass containing plagioclase microclots in augite-olivine and minor opaques. Euhedral plagioclase phenocrysts 15%, <4 mm, slightly altered. Veins scarce, filled by calcite.

Thin Section Description

Location: 85 cm, massive basalt
 Texture: ophitic, porphyritic
 Phenocrysts: plagioclase 10%, 3 mm, euhedral-subhedral; clinopyroxene 2%, 2 mm; subhedral-anhedral
 Groundmass: olivine 10%, 0.2 mm, euhedral-subhedral; plagioclase 30%, 0.5 mm, anhedral-subhedral; clinopyroxene 30%, 0.5 mm, anhedral-subhedral; magnetite 3%, 0.05 mm, anhedral
 Vesicles: none
 Alteration: olivine replaced by clay

Shipboard Data

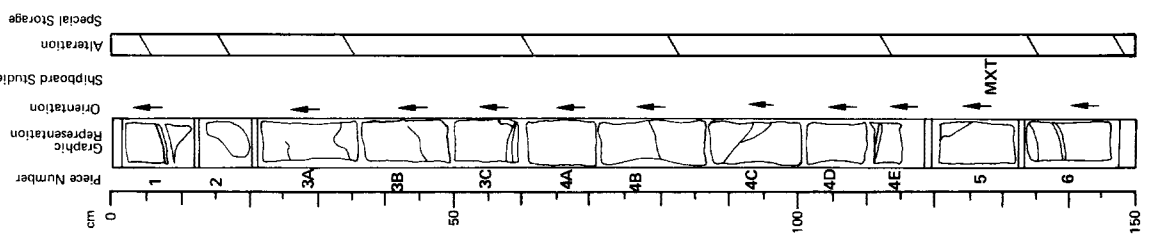
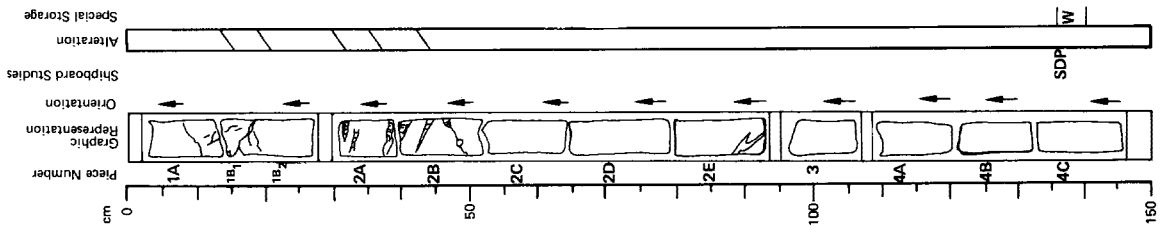
Magnetic Data: 84-86 cm
 NRM Intensity (emu/cc) 5.066 x 10⁻³
 NRM Inclination +46.9°
 Stable Inclination -66.1°

LEG	SITE	H O E	CORE	SECT.
5 1	4 1 7 D		3 3	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Massive, phyrlic basalt with a gray, holocrystalline groundmass composed of plagioclase, clinopyroxene and minor olivine with trails of interstitial calcite and sulfides. Basalt altered to light yellow-brown along veins; piece 2E displays a thick, light green to brown, zoned alteration halo along veins due to partial replacement of groundmass by green to brown amebite. Plagioclase phenocrysts 15%, < 0.5 mm; clinopyroxene phenocrysts 10%, < 0.5 mm, partially replaced by green amebite. Veins filled by calcite and green to yellow-green or brown amebite.

Shipboard Data
 Physical Property Data: 137-139 cm
 Vp (km/sec) 5.65
 Porosity (%) 2.8
 Wet Bulk Density (g/cc) 2.86
 Grain Density (g/cc) 2.92



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5 1	4 1 7 D		3 3	3

Visual Description
 Massive, phyrlic basalt with a gray, medium-grained, subophitic groundmass composed of plagioclase and clinopyroxene; olivine and minor oxides. Plagioclase phenocrysts < 10%, < 0.7 mm, partly replaced by zeolites(?) ; altered olivine phenocrysts < 1%, 1-2 mm. Veins filled by calcite and green amebite.

Thin Section Description
 Location: 130 cm, massive basalt
 Texture: ophitic, porphyritic
 Phenocrysts: plagioclase 10%, 6 mm, subhedral; clinopyroxene 10%, 2 mm, anhedral
 Groundmass: olivine 10%, 0.2 mm; plagioclase 30%, 2 mm, euhedral-subhedral; clinopyroxene 30%, 0.5 mm, anhedral; magnetite 3%, 0.1 mm, euhedral-subhedral
 Vesicles: none
 Alteration: olivine replaced by clay

Shipboard Data
 Bulk Analysis: 128-131 cm
 SiO2 49.42
 Al2O3 16.62
 Fe2O3 10.92
 MgO 6.16
 CaO 12.47
 Na2O N.D.
 K2O 0.12
 TiO2 1.36
 P2O5 N.D.
 MnO N.D.
 LOI 0.60
 H2O+ 0.53
 H2O- N.D.
 CO2 0.10
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

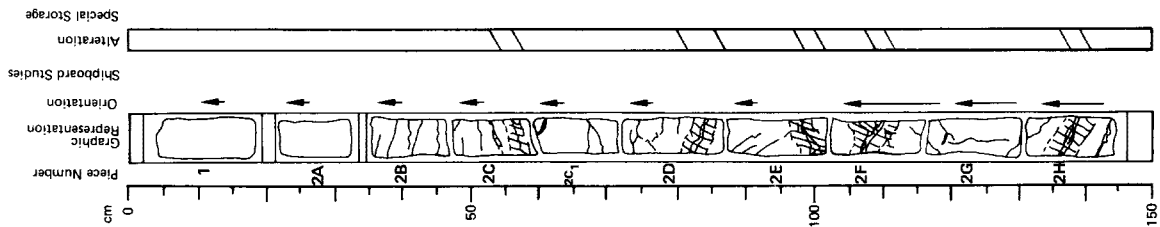
Magnetic Data:
 128-131 cm
 NRM Intensity (emu/cc) 3.703 x 10⁻³
 NRM Inclination +79.7
 Stable Inclination 59.4°

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H	O	CORE	SECT.
5	1417D	3	3	4	

Visual Description

Massive, phyrlic basalt with a gray, subophitic groundmass containing minor olivine and traces of disseminated calcite. Basalt displays yellow-brown or green to brown, zoned alteration. Olivine and plagioclase phenocrysts replaced by green to brown smectite. Plagioclase phenocrysts 15% < 8 mm, clinopyroxene phenocrysts 15-20%, < 1 mm, partially replaced by green smectite. Veins filled by green to brown smectite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H	O	CORE	SECT.
5	1417D	3	3	5	

Visual Description

Massive phyrlic basalt with a gray, medium-grained, holocrystalline groundmass containing plagioclase, abundant olivine (20%), clinopyroxene and minor sulfides and oxides. Plagioclase phenocrysts 15-20%; olivine and clinopyroxene microphenocrysts common. Olivine largely replaced by calcite and iddingsite in pieces 1-4, but relatively fresh in piece 5. Veins filled by calcite and green smectite.

Thin Section Description

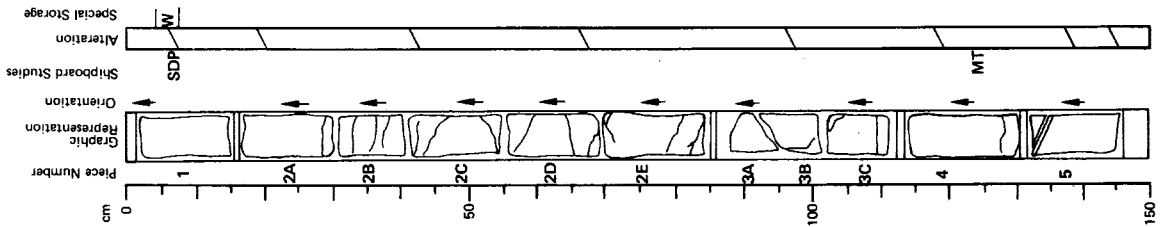
Location: 123 cm, massive basalt
 Texture: ophitic, porphyritic
 Phenocrysts: plagioclase 20%, 3 mm, euhedral-subhedral
 Groundmass: olivine 10%, 0.2 mm, euhedral; plagioclase 30%, 1 mm, euhedral, tabular; clinopyroxene 30%, 0.5 mm, subhedral-anhedral; magnetite 0.1 mm
 Vesicles: none
 Alteration: olivine and plagioclase replaced by clay

Shipboard Data

Magnetic Data: 122-124 cm
 NRM Intensity (emu/cc) 1.622 x 10⁻³
 NRM Inclination +49.6°
 Stable Inclination -60.7°

Physical Property Data:

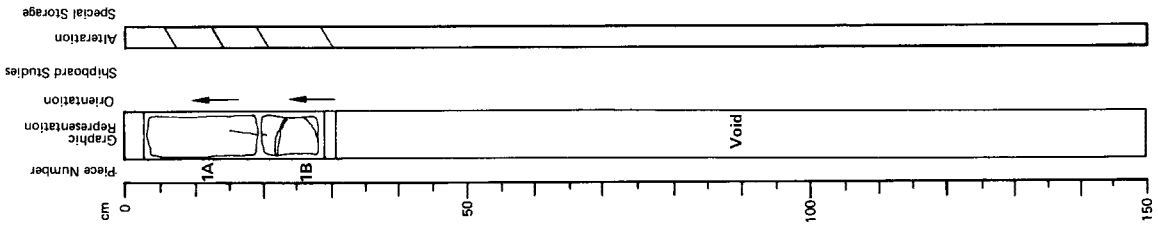
\bar{V}_p (km/sec) 4-6 cm
 Porosity (%) 5.67
 Wet Bulk Density (g/cc) 2.4
 Grain Density (g/cc) 2.87
 Grain Density (g/cc) 2.92



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	33	6

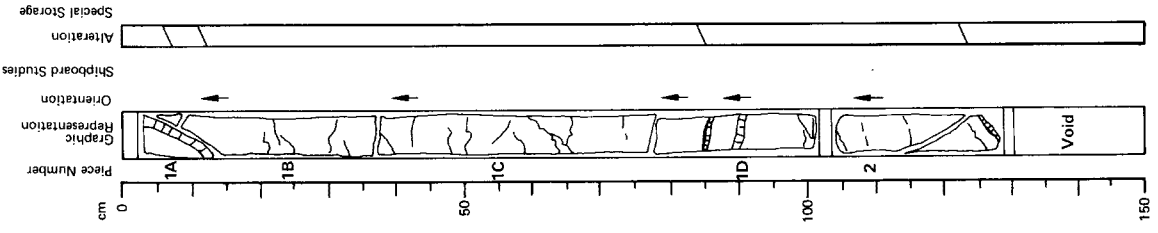
Visual Description
 Massive phyric basalt with a gray, holocrystalline groundmass composed of plagioclase (30-40%), clinopyroxene (25%) and iddingsite after olivine (20-30%). Plagioclase phenocrysts 15%, < 7 mm, partially altered. Veins filled by calcite and green smectite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	34	1

Visual Description
 Massive, phyric basalt with a gray, subophitic groundmass. Basalt altered to green or brown along veins due to partial replacement by green to brown smectite. Plagioclase phenocrysts 7%, < 4 mm, fresh to partially replaced by calcite; clinopyroxene phenocrysts 5%, < 1 mm, fresh to partially replaced by green smectite; olivine phenocrysts < 3%, < 0.5 mm, replaced by green smectite or serpentine(?). Vascular scars, filled by calcite. Veins filled by dark green to brown smectite.

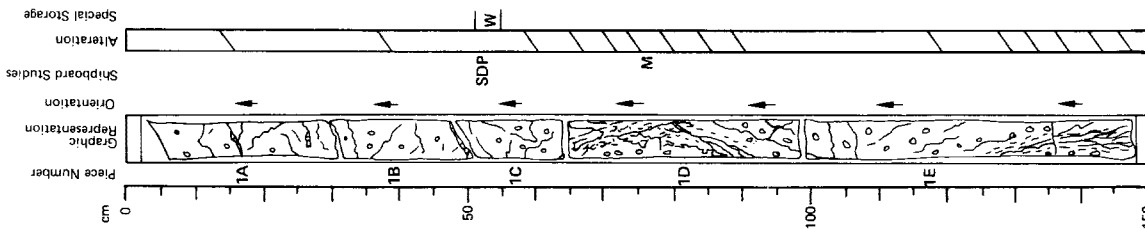


LEG	SITE	H O E	CORE	SECT.
51	417D		34	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Massive, phyrlic basalt with a gray, coarse-grained, subophitic groundmass containing traces of disseminated sulfides. Fine-grained, moderately phyrlic basalt along veins in pieces 1D and 1E altered to gray-green and brown due to partial replacement by calcite and green to brown smectite. Plagioclase phenocrysts 10%, <4 mm; clinopyroxene phenocrysts 8-10%, <2 mm; olivine phenocrysts 1%, <0.5 mm, replaced by green smectite. Veins filled by calcite and green to yellow-brown or brown smectite.

Shipboard Data
 Location: 77-80 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 2.572 x 10⁻³
 NRM Inclination +70.1°
 Stable Inclination -59.5°
 Physical Property Data:
 Vp (km/sec) 5.87
 Porosity (%) 2.1
 Wet Bulk Density (g/cc) 2.89
 Grain Density (g/cc) 2.93



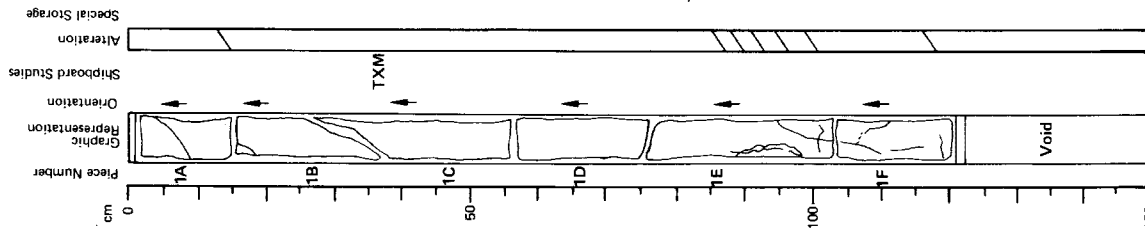
LEG	SITE	H O E	CORE	SECT.
51	417D		34	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Massive, phyrlic basalt with a gray, medium-grained subophitic groundmass containing plagioclase, clinopyroxene and olivine. Plagioclase phenocrysts <5 mm; olivine phenocrysts locally abundant, <3 mm, replaced by iddingsite and calcite. Veins filled by calcite + green smectite.

Thin Section Description
 Location: 38 cm, massive basalt
 Texture: ophitic, porphyritic
 Phenocrysts: plagioclase 20%, 4 mm, euhedral-subhedral
 Groundmass: olivine 10%, 0.02 mm, euhedral; plagioclase 30%, 1 mm, euhedral, prismatic; clinopyroxene 30%, 0.5 mm, euhedral-anhedral, partially quenched; magnetite 5%, 0.01 mm, euhedral, dendritic
 Vesicles: filled by calcite and clay
 Alteration: olivine replaced by calcite and clay

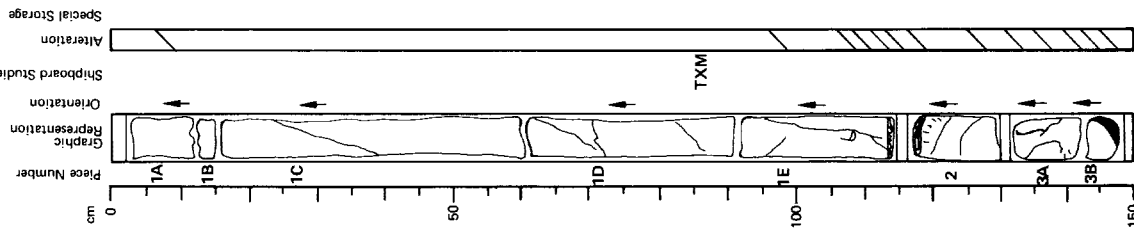
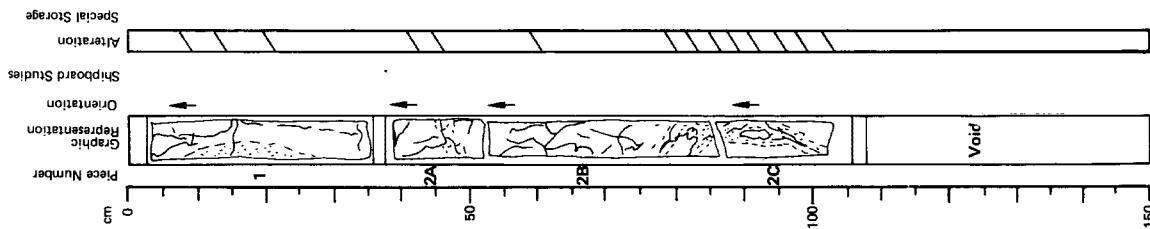
Shipboard Data
 Bulk Analysis: 37-40 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 2.059 x 10⁻³
 NRM Inclination +16.3°
 Stable Inclination -58.3°



LEG	SITE	HOLE	CORE	SECT.
5	1417	D	34	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Massive, phryic basalt with a gray, coarse-grained subophitic groundmass. Basalt along curved fracture sets in pieces 1, 2B and 2C locally fine- to medium-grained, altered green to yellow brown due to partial replacement of groundmass by calcite, green to brown smectite and minor sulfides. Plagioclase phenocrysts 20%, 5-7 mm, partially replaced along fractures by calcite and clay; clinopyroxene phenocrysts 15%, <2 mm, partially replaced along fractures by green smectite and iron hydroxide(?); olivine phenocrysts 1-2%, <0.5 mm, replaced by green smectite. Veins filled by calcite and green to brown smectite.



LEG	SITE	HOLE	CORE	SECT.
5	1417	D	34	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 0-113 cm interval: Massive, phryic basalt with a glassy chilled margin at the base of piece 1E. Basalt gray with a medium- to coarse-grained, subophitic groundmass containing plagioclase, olivine and clinopyroxene; piece 1E increasingly fine-grained, altered toward margin. Plagioclase phenocrysts 15-20%; olivine phenocrysts replaced by iddingsite and calcite, partially aligned with long axis subperpendicular to core axis due to crystal settling(?). Veins filled by calcite and green smectite.
 113-150 cm interval: Phryic basalt pillow with glassy chilled margins (pieces 2 and 3B) and minor pillow breccia (piece 3B). Plagioclase phenocrysts 15-20%; olivine phenocrysts 5-10%. Veins filled by calcite and green to brown smectite. Breccia in piece 3B composed of fragments of basalt in a matrix of green smectite.

Thin Section Description

Location: 85 cm, 28 cm from bottom margin of chilled zone
 Texture: porphyritic, interstitial
 Phenocrysts: olivine 1-2%, 2-3 mm, idiomorphic; plagioclase 10%, 3-8 mm, idiomorphic
 Groundmass: plagioclase 50%, microclites 0.2-0.8 mm, euhedral laths 2-4 mm; augitic clinopyroxene 35%, 0.3-4.0 mm, intergranular, radiating; titanomagnetite 5% 0.2-0.5 mm; interstitial calcite and clay
 Vesicles: none
 Alteration: olivine replaced by calcite and clay

Shipboard Data

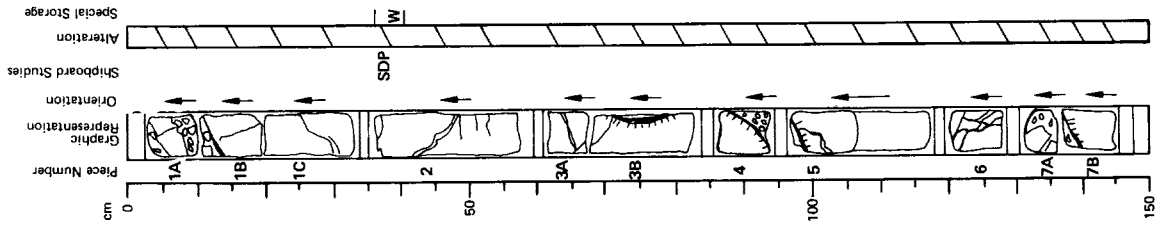
Bulk Analysis:	83-86 cm	Magnetic Date:	83-86 cm
SiO ₂	48.76	NRM Intensity (emu/cc)	9.863 x 10 ³
Al ₂ O ₃	16.79	NRM Inclination	-48.9°
Fe ₂ O ₃	11.03	Stable Inclination	-56.6°
MgO	5.75		
CaO	13.57		
Na ₂ O	N.D.		
K ₂ O	0.14		
TiO ₂	1.45		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	1.00		
H ₂ O ⁺	1.13		
H ₂ O ⁻	N.D.		
CO ₂	1.14		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
54	417	D	34	6

Visual Description
 Phryic pillow basalt with locally glassy chilled margins (pieces 1B, 3B-5 and 7B) and interpillow breccia (pieces 1A, 1B, 4 and 6-7B). Basalt gray with an aphanitic groundmass. Glass partially replaced by green smectite. Euhedral plagioclase phenocrysts 10-15%, locally 30% (pieces 1C and 2), <5 mm; euhedral olivine phenocrysts 5-10%, 3 mm, replaced by green smectite; euhedral to subhedral clinopyroxene phenocrysts <3%, 1 mm. Vesicles and veins filled by calcite and green smectite. Breccia composed of fragments of basalt and altered glass in a matrix of green smectite and calcite.

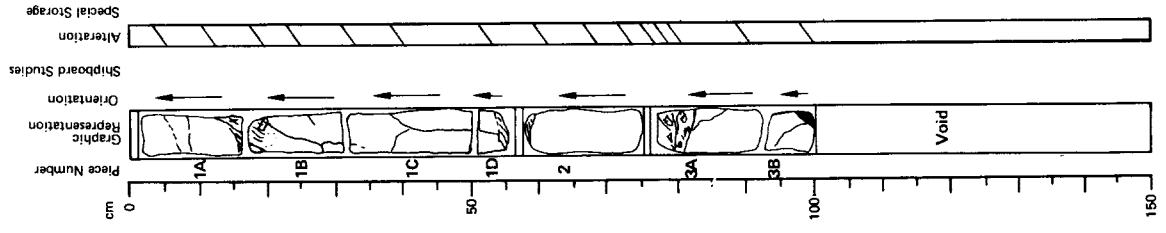
Shipboard Data
 Physical Property Data: 39-41 cm
 Vp (km/sec) 5.666
 Porosity (%) 3.5
 Wet Bulk Density (g/cc) 2.83
 Grain Density (g/cc) 2.89



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	34	7

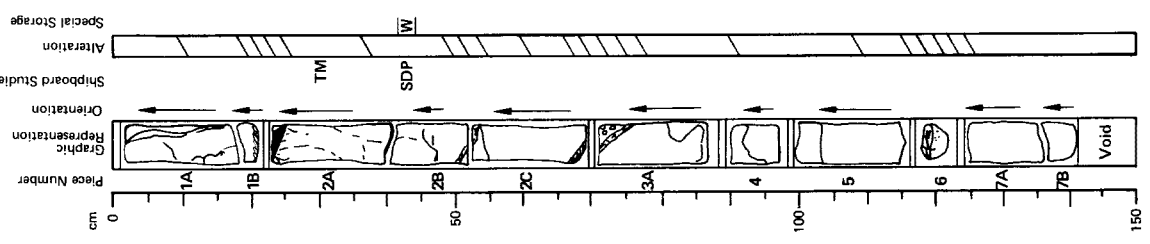
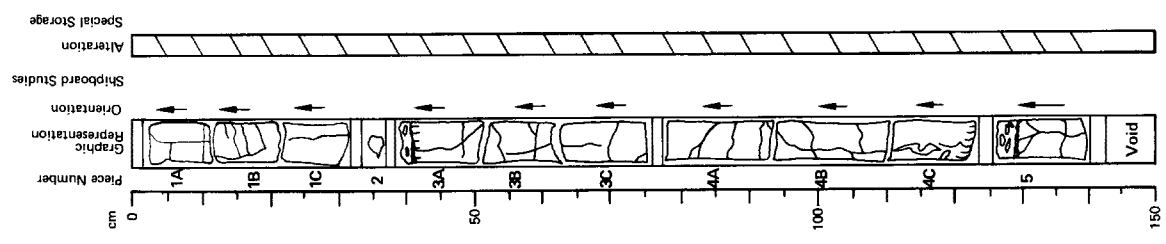
Visual Description
 Phryic basalt pillows with glassy chilled margins (pieces 1A, 1B, 1D, 2 and 3B) and traces of interpillow breccia. Basalt gray with an aphanitic groundmass. Plagioclase phenocrysts 10-15%, <7 mm; olivine phenocrysts 10%, <5 mm, replaced by iddingsite and green smectite. Olivine phenocrysts > plagioclase phenocrysts near chilled margins. Veins and vesicles filled by calcite.



LEG	SITE			CORE			SECT.
51	4	1	7	D	3	5	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic pillow basalt with locally glassy chilled margins (pieces 3A, 4C and 5) and minor inter-pillow breccia (pieces 3A and 5). 4B-125 cm interval represents a complete pillow. Basalt gray with an aphanitic to crystalline groundmass. Euhedral plagioclase phenocrysts 10-20%, <4 mm; euhedral olivine phenocrysts 2-10%, 3 mm, replaced by green smectite; clinopyroxene <1%, locally as inclusions in plagioclase. Plagioclase and olivine phenocrysts tend to be more abundant near the top and bottom, respectively, of individual pillows. Glass partially devitrified, altered to green smectite. Vesicles filled by calcite. Veins filled by calcite, green smectite and zeolites.



LEG	SITE			CORE			SECT.
51	4	1	7	D	3	5	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic, gray pillow basalt with glassy margins (pieces 1B, 2A, 2C, 3A and 6) and traces of inter-pillow breccia. 0-21 and 21-70 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Groundmass varies from aphanitic near margins to interstitial in pillow interiors. Plagioclase phenocrysts 10%, <5 mm; olivine phenocrysts 10%, <5 mm, replaced by iddingsite and calcite. Olivine phenocrysts tend to be more abundant than plagioclase near margins. Vesicles 1-2%, filled by calcite + celadonite. Veins filled by calcite + green smectite.

Thin Section Description
 Location: 31 cm, next to glassy margin

Texture: porphyritic
Phenocrysts: olivine 1.2%, 2.6 mm, idiomorphic; plagioclase 15%, 3-10 mm, idiomorphic, zoned with devitrified glass inclusions; augite <1%, 2.3 mm
Groundmass: plagioclase microlites 50%, 0.1-0.5 mm, skeletal, hollow; augite 25%, interstitial, plumose, quenched; magnetite 5%, <0.1-0.2 mm; interstitial smectite 5%

Vesicles: none
Alteration: calcite and iron oxide pseudomorphs after olivine. Veins filled by calcite, celadonite and iron oxides

Shipboard Data

Magnetic Data:
 30-33 cm
 NRM Intensity (emu/cc) 10.261 x 10⁻³
 NRM Inclination -67.8°
 Stable Inclination -67.0°

Physical Property Data:

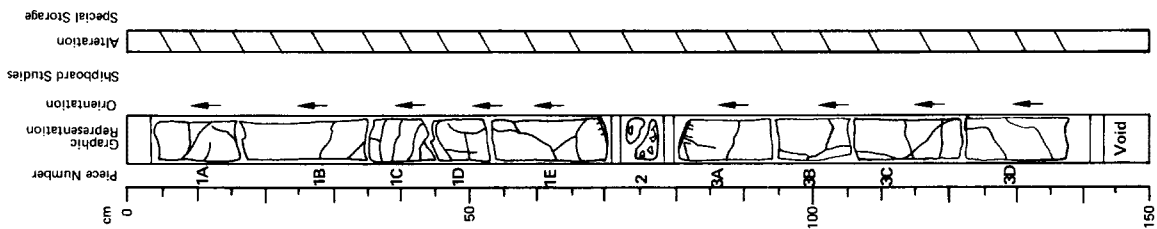
Vp (km/sec) 42.45 cm
 Porosity (%) 5.31
 Wet Bulk Density (g/cc) 5.6
 Grain Density (g/cc) 2.77
 2.87

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5 1	4 1 7 D	E	3 5	3

Visual Description

Phyric pillow basalt with locally glassy chilled margins (pieces 1E and 3A) and traces of inter-pillow breccia (pieces 2). 0.70-1.40 cm intervals represent parts of individual pillows bounded by chilled basaltic glass. Basalt grains are mostly equiaxed. Olivine phenocrysts 5-30%, < 6 mm; olivine phenocrysts 1-5%, locally 15% < 2 mm, replaced by green smectite. Phenocrysts locally variable with plagioclase and olivine tending to concentrate at the top and bottom, respectively, of individual pillows. Vesicles < 1%, < 0.5 mm, filled by calcite and green smectite. Veins filled by calcite, green smectite and zeolites. Breccia in piece 2 composed of fragments basalt and glass partially replaced by green smectite in a self-matrix of green smectite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5 1	4 1 7 D	E	3 5	4

Visual Description

Phyric pillow basalt with glassy chilled margins (pieces 1-3A, 4, 6A, 7, 9, 11 and 12), hyaloclastite breccia (pieces 7 and 9) and minor interpillow limestone (pieces 8 and 11). Basalt grains are mostly equiaxed. Olivine phenocrysts 5-20%, locally 15-20%, < 5 mm, locally 15% < 2 mm, replaced by green smectite. Phenocrysts locally variable with plagioclase and olivine tending to concentrate at the top and bottom, respectively, of individual pillows. Vesicles < 1%, < 0.5 mm, filled by calcite and green smectite. Minor veins filled by calcite and zeolites (?). Inter-pillow breccia composed of fragments of black glass partially altered to palagonite in a matrix of dark green smectite and minor calcite. Fine-grained interpillow limestone contains numerous shards of green, devitrified glass.

Thin Section Description

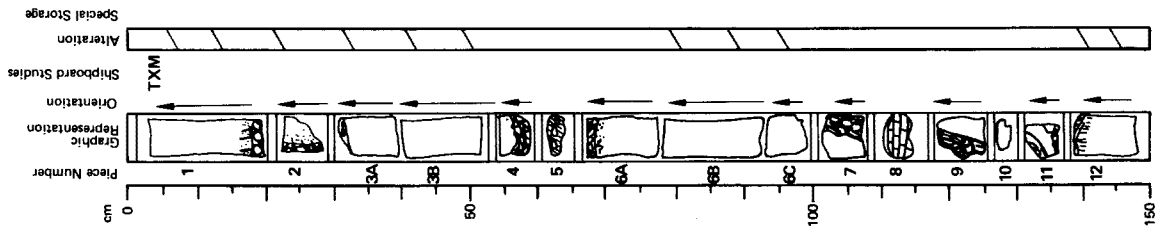
Location: 5 cm, pillow interior
 Texture: porphyritic
 Phenocrysts: olivine 2-3%, 1-4 mm, idiomorphic; plagioclase 15%, 2-3 mm, idiomorphic, zoned with glass inclusions; augite < 1%, 1-3 mm, partially resorbed
 Groundmass: plagioclase microlites 45%, 0.2-0.5 mm, hollow, quenched; clinopyroxene 30%, 0.2-0.5 mm, plumose, quenched, intergranular; magnetite 5%, 0.2 mm; interstitial smectite 2-3%
 Vesicles: < 1%, 1 mm, round, filled with calcite and clay
 Alteration: serpentine pseudomorphs after olivine

Shipboard Data

Bulk Analysis: 3.9 cm
 SiO₂ 49.33
 Al₂O₃ 17.23
 Fe₂O₃ 10.22
 MgO 6.40
 CaO 12.66
 Na₂O N.D.
 K₂O 0.04
 TiO₂ 1.39
 P₂O₅ N.D.
 MnO N.D.
 LOI 0.25
 H₂O⁺ 3.12
 H₂O⁻ N.D.
 CO₂ 0.96
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

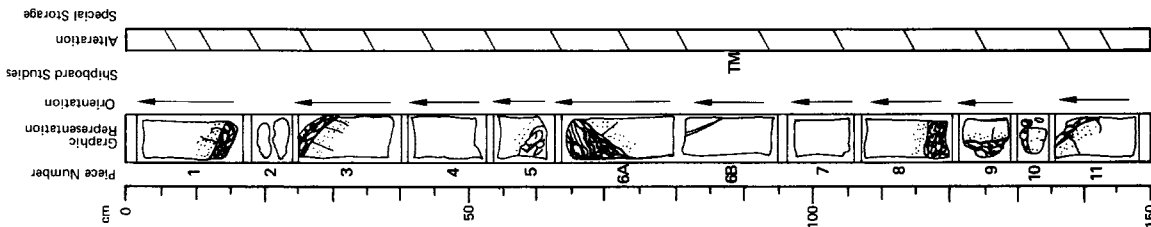
Magnetic Data:

3.6 cm
 NRM Intensity (emu/cc) 9.462 x 10⁻³
 NRM Inclination -50.3°
 Stable Inclination -53.6°



LEG	SITE	H O E	CORE	SECT.
51	417	D	35	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Phryic pillow basalt with cemented hyaloclastite margins (pieces 1-3, 5, 6A, and 8-11) and minor dark green, fine-grained interpillow fillings (piece 6A). Basalt gray with an aphanitic groundmass. Chilled margins zoned with an outer, partially exfoliated rim composed of fragments of glass 50% altered to green patagonite in a matrix of green smectite underlain by a 2-3 cm wide zone of aphanitic, moderately phryic basalt. Altered, subhedral plagioclase phenocrysts 15-20%, <5 mm; euhedral olivine phenocrysts 5%, <5 mm, replaced by green smectite and minor calcite. Vesicles 1%, <1 mm, filled with green smectite and calcite. Minor veins filled by calcite and green smectite.

Thin Section Description

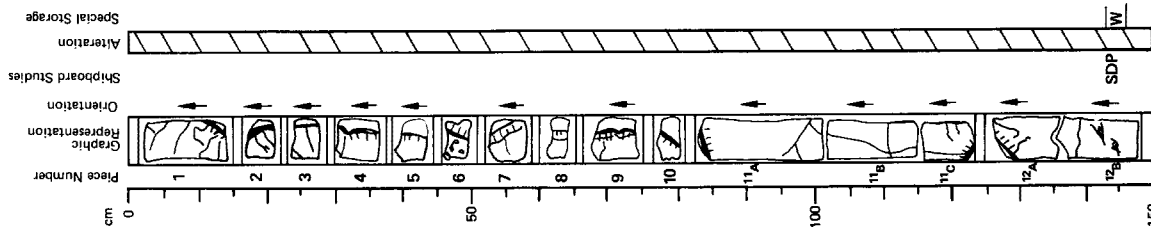
Location: 88 cm, pillow interior
Texture: porphyritic
Phenocrysts: olivine 1-2%, 1-2 mm, idiomorphic; plagioclase 10%, 2-4 mm, idiomorphic, zoned; augite <1%, 1-2 mm, partially resorbed
Groundmass: plagioclase microlites 40%, hollow, skeletal, clinopyroxene 45%, plumose, radiating and curved, quenched; titanomagnetite 3-5%, 0.2-0.3 mm; clay 1-2%; interstitial calcite <1%
Vesicles: <1%, 1 mm, round, filled by calcite
Alteration: calcite, clay and serpentine pseudomorphs after olivine

Shipboard Data

Magnetic Data: 87.90 cm
 NRM Intensity (emu/cc) 21,395 x 10⁻³
 NRM Inclination -66.8°
 Stable Inclination -67.5°

LEG	SITE	H O E	CORE	SECT.
51	417	D	35	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Phryic pillow basalt with chilled margins (pieces 1-11A, 11C and 12A) and interpillow breccia (pieces 2-10). 82-125 and 125-150 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt gray with an aphanitic to crystalline groundmass. Euhedral plagioclase phenocrysts 15-20%, <10 mm; euhedral olivine phenocrysts 5%, <3 mm, replaced by iddingsite, green smectite and calcite. Plagioclase phenocrysts tend to be concentrated toward tops of individual pillows. Veins and vesicles filled by calcite and green smectite. Matrix composed of fragments of glass altered to green smectite in a self-matrix of green smectite.

Shipboard Data

Physical Property Data: 141-143 cm
 Vp (km/sec) 5.67
 Porosity (%) 3.2
 Wet Bulk Density (g/cc) 2.83
 Grain Density (g/cc) 2.80

LEG	SITE	HOLE	CORE	SECT.
51	417	D	36	1

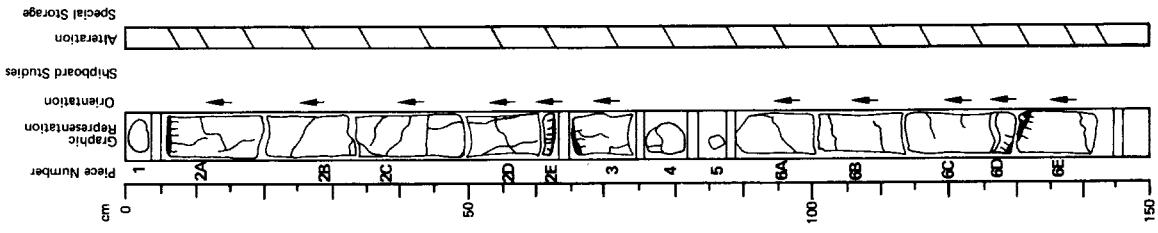
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyric basalt pillows with chilled margins (pieces 2A, 2E, 3, 6D and 6E), 5-63, 63-130 and 130-145 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Chert pebble (piece 1) probably from sediments above basement. Basalt pale reddish-gray with an aphanitic groundmass. Euhedral plagioclase phenocrysts 20%, <4 mm; euhedral olivine phenocrysts 5%, <3 mm, replaced by green smectite and calcite; euhedral to subhedral clinopyroxene 3-5%, <2 mm. Olivine and clinopyroxene phenocrysts tend to concentrate near the base of each pillow. Veins filled with calcite and green smectite. Glass largely devitrified.

Thin Section Description

Location: 45 cm, pillow interior
 Texture: porphyritic
 Phenocrysts: olivine 2-3%, 1-5 mm; idiomorphic; plagioclase 15%, 2-4 mm, idiomorphic, zoned; augite 1-2%, 1-2 mm, rounded
 Groundmass: plagioclase microclites 35%, 0.2-0.6 mm, hollow; augite 40%, 0.3-0.6 mm, plumose, curved, intergranular; magnetite 5%, 0.1-0.3, granular; interstitial clay 3-4%
 Vesicles: <1%, 1 mm, round, filled by calcite
 Alteration: serpentine pseudomorphs after olivine

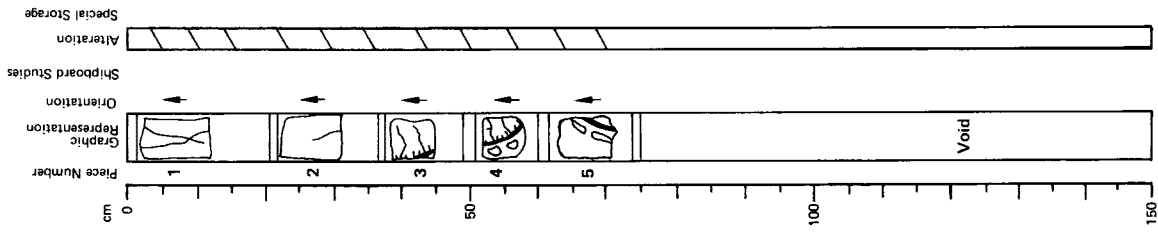
Shipboard Data
 Magnetic Data
 NRM Intensity (emu/cc) 46-48 cm 7.325 x 10³
 NRM Inclination -54.7°
 Stable Inclination -69.5°
 Physical Property Data:
 Vp (km/sec) 115-117 cm 5.64
 Porosity (%) 3.7
 Wet Bulk Density (g/cc) 2.84
 Grain Density (g/cc) 2.91



LEG	SITE	HOLE	CORE	SECT.
51	417	D	35	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyric pillow basalt with chilled margins (pieces 3-5) and interpillow breccia (pieces 3-5). Basalt gray with an aphanitic groundmass. Euhedral plagioclase phenocrysts 20%, <6 mm; euhedral olivine phenocrysts 5%, <2 mm, replaced by green smectite. Vesicles and veins filled by calcite and green smectite. Interpillow breccia composed of fragments of basalt and basaltic glass altered to green smectite.

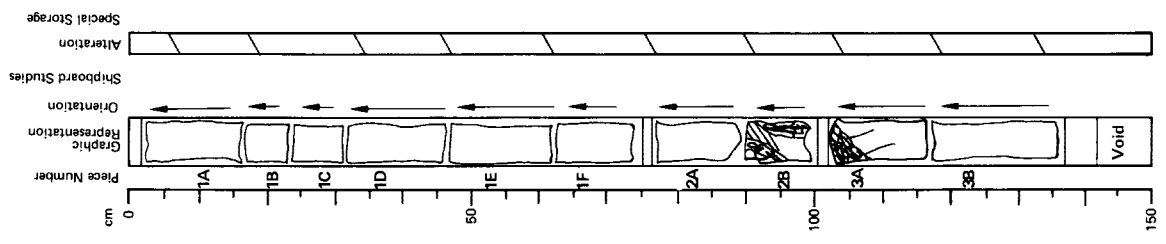


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	36	2

Visual Description

Phyric basalt pillows with cemented hyaloclastite margins (pieces 2B and 3A) and minor dark green, fine-grained interpillow fillings (pieces 2B and 3A). Basalt dark gray with an aphanitic groundmass. Euhedral plagioclase phenocrysts 15%, <5 mm; euhedral olivine phenocrysts 8%, <8 mm, replaced by green smectite and celadonite(?); elongate augite phenocrysts 5%, <8 mm, (100) twins common. Vesicles 3-4%, 1 mm, filled with calcite, zeolites, green smectite and minor sulfides; coalesced vesicles form cavities <1 cm. Veins filled by calcite, minor sulfides. Hyaloclastite margins in pieces 2B and 3A composed of fragments of black glass in a matrix of dark green smectite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	36	3

Visual Description

Phyric pillow basalt with chilled margins (pieces 1, 2A, 2C, 3, 5 and 6) and traces of calcite-cemented breccia (piece 6). 0.20, 20-65, 65-125 and 125-141 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt gray with an aphanitic groundmass. Euhedral plagioclase phenocrysts 15-20%, <4 mm; subhedral clinopyroxene phenocrysts 5%, <2 mm; subhedral olivine phenocrysts 5%, <2 mm, replaced by green smectite. Plagioclase phenocrysts tend to concentrate near the top of each pillow, where they are partially replaced by calcite. Veins filled by calcite, zeolites, green smectite and pyrite. Glass largely devitrified or altered to green smectite.

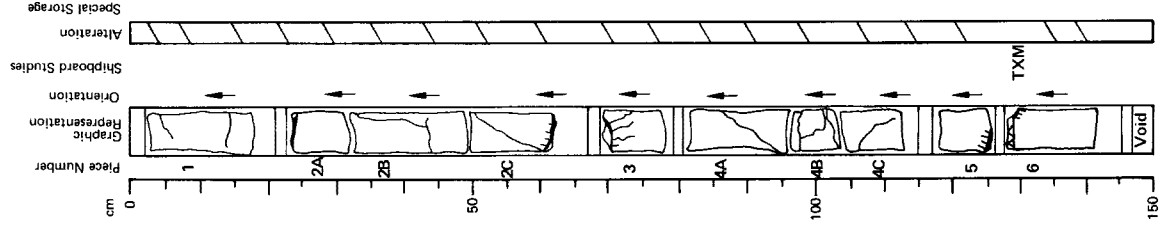
Thin Section Description

Location: 131 cm, next to glassy margin
 Texture: porphyritic
 Phenocrysts: olivine 2.3%, 1-3 mm, idiomorphic; plagioclase 15%, 2-5 mm, idiomorphic, zoned with numerous glass inclusions; clinopyroxene 1.2%, 2-4 mm, partially resorbed, poikilitic
 Groundmass: plagioclase microlites 20%, 0.1-0.4 mm, hollow, skeletal; magnetite 5%, <0.2 mm; devitrified glass 95%
 Vesicles: 1%, 0.5-2 mm, round, filled by calcite
 Alteration: calcite and clay pseudomorphs after olivine

Shipboard Data

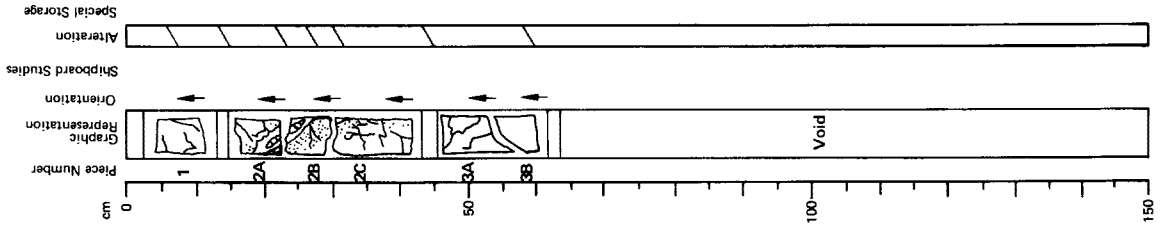
Bulk Analysis: 130-132 cm
 SiO₂ 49.57
 Al₂O₃ 16.74
 Fe₂O₃ 11.04
 MgO 5.94
 CaO 14.07
 Na₂O N.D.
 K₂O 0.27
 TiO₂ 1.40
 P₂O₅ N.D.
 MnO N.D.
 LOI 0.65
 H₂O⁺ N.D.
 H₂O⁻ N.D.
 CO₂ N.D.
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 130-132 cm
 NRM Intensity (emu/cc) 15.077 x 10⁻³
 NRM Inclination -68.0°
 Stable Inclination -69.7°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

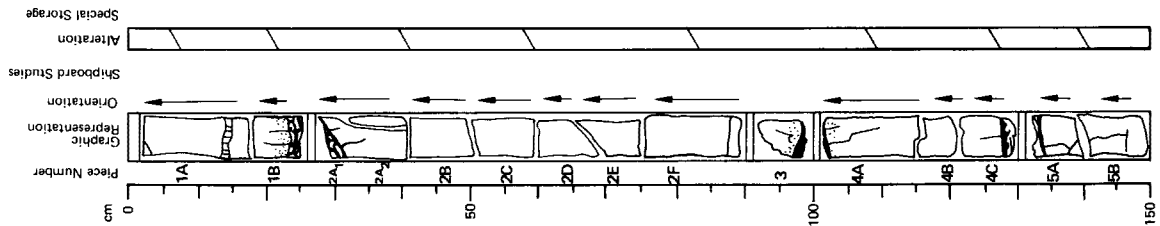
LEG	SITE	HOLE	CORE	SECT.
51	417D		36	5



Visual Description
 Phyrlic, gray pillow basalt with altered, sparsely phyrlic margins (piece 2). 0.23 and 23-60 cm intervals represent individual pillows bounded by chilled margins. Groundmass ranges from aphanitic in pillow margins to microclitic or subophitic in pillow interiors. Plagioclase phenocrysts 7-20%, <8 mm, partially replaced along margins by calcite and green smectite(?); clinopyroxene phenocrysts 2-7%, <3 mm, partially replaced by green smectite; olivine phenocrysts 1-3%, <2 mm, replaced by calcite, green smectite and iron hydroxides. Groundmass contains minor disseminated sulfides. Glassy margins devitrified along veins, partially replaced by green smectite and calcite. Veins normal to pillow margins, filled by calcite.

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417D		36	4



Visual Description
 Phyrlic basalt pillows with fragmented glassy margins (pieces 1B, 2A, 3, 4A, 4C and 5A). 0.25, 25-100, 100-130 and 130-150 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Pillow interiors dark gray with a microclitic groundmass; chilled margins zoned with an outer, partially exfoliated rim composed of fragmented glass underlain by a 2-3 cm wide zone of moderately phyrlic, dark brown altered basalt with an aphanitic groundmass. Euhedral plagioclase phenocrysts 10-15%, <6 mm; anhedral olivine phenocrysts 4.5%, <4 mm, replaced by green smectite and celadonite(?); augite phenocrysts 1.2%, 2.3 mm. Vesicles 1-2%, 1 mm, filled with calcite or green smectite, some zoned with calcite cores and lining of green smectite. Veins filled by green smectite and disseminated pyrite.

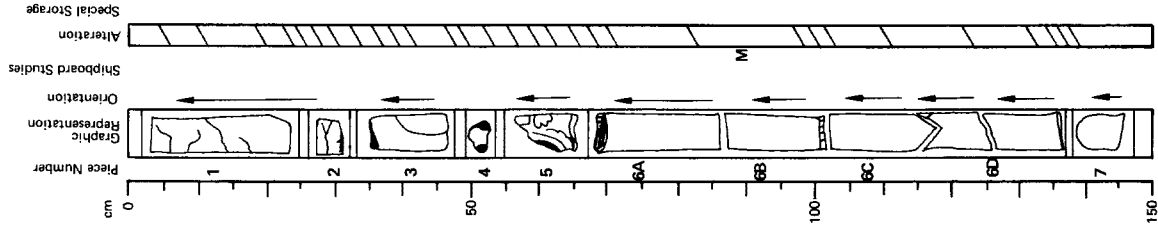
Shipboard Data
 Physical Property Data:
 Vp (km/sec) 5.58
 Porosity (%) 3.9
 Wet Bulk Density (g/cc) 2.84
 Grain Density (g/cc) 2.92

LEG	SITE	HOLE	CORE	SECT.
51	417D	37	1	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyric basalt pillows with chilled glassy margins (pieces 2, 6A and 7), minor interpillow breccia (pieces 3, 5) and minor interpillow sediments (piece 3). 0-32 and 7-130 cm intervals represent chilled margins on parts of pillows bounded by chilled margins. Basalt gray with an aphanitic to subophitic groundmass. Olivine phenocrysts 7%, <3 mm; clinopyroxene phenocrysts <1%, <4 mm, partially replaced by calcite; augite phenocrysts 1%, <3 mm; olivine phenocrysts <1%, <2 mm, replaced by green smectite. Vesicles 2%, <0.3 mm, filled with calcite. Thin veins filled by calcite and brown smectite. Glassy margins partially devitrified, replaced by gray to green smectite and calcite. Fine-grained, weakly layered interpillow sediments in piece 5 composed of calcite and green smectite, contain elongate shards of dark green devitrified glass aligned sub-parallel to pillow margins.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 90-93 cm 8.503 x 10⁻³
 NRM Inclination -50.7°
 Stable Inclination -61.4°

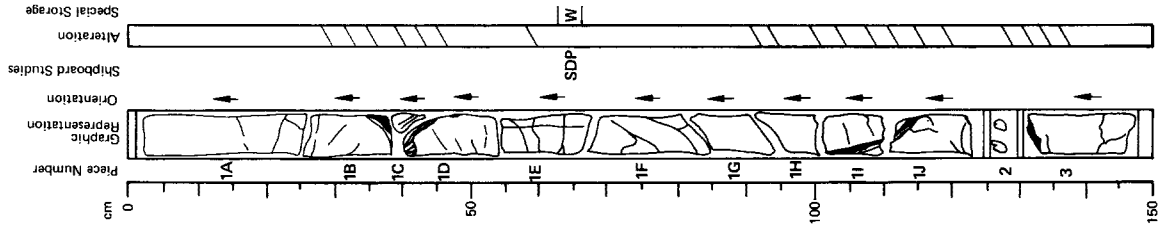


LEG	SITE	HOLE	CORE	SECT.
51	417D	37	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

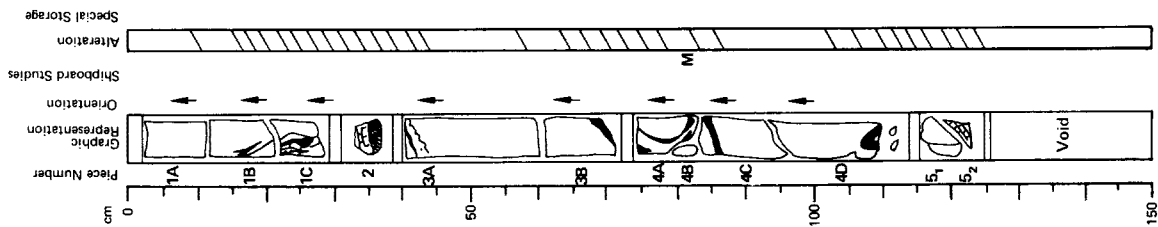
Visual Description
 Phyric pillow basalt with chilled glassy margins (pieces 1B-1D, 1I, 1J and 3). 0-40, 40-110, 110-125 and 130-150 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt gray with an aphanitic to microclitic groundmass. Plagioclase phenocrysts 10%, <7 mm; augite phenocrysts 5%, <5 mm; olivine phenocrysts 5%, <7 mm, replaced by reddish-brown calcite. Vesicles 1-2%, filled with calcite, green smectite and/or calcadonite. Veins filled by calcadonite and/or calcite.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 64-66 cm 5.51
 Porosity (%) 4.6
 Wet Bulk Density (g/cc) 2.80
 Grain Density (g/cc) 2.89



LEG	SITE	HOLE	CORE	SECT.
51	417	D	37	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

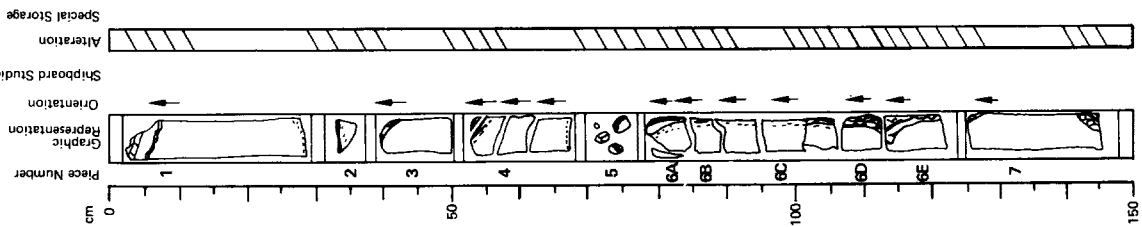


Visual Description
 Phryic pillow basalt with chilled glassy margins (pieces 1B, 1C, 3 and 4) and minor interpillow limestone (pieces 2 and 5). 0-30, 40-72, 72-82 and 82-110 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt gray with an aphanitic to micro-litic to subophitic groundmass. Plagioclase phenocrysts 15%, < 9 mm, weakly altered; augite phenocrysts 1-2%, < 2 mm, weakly altered; olivine phenocrysts < 1%, < 2 mm, replaced by green smectite. Rare vesicles filled by calcite. Veins filled by calcite and brown smectite. Glassy margins partially devitrified, partially replaced by green smectite and calcite. Fine-grained, layered inter-pillow limestone, light to dark green or blue-green, composed of calcite and green smectite with shards of altered glass.

Thin Section Description

Location: 90 cm, next to glassy margin
Texture: porphyritic, variolitic
Phenocrysts: olivine 3%, 0.7 mm, euhedral; plagioclase 15%, 2 mm, euhedral; clinopyroxene 3%, 0.7 mm, partially resorbed
Groundmass: plagioclase 5%, 0.1 mm, prismatic, partially quenched; clinopyroxene > 20%, 0.05 mm, quenched; magnetite < 5%, < 0.01 mm, dendritic; glass > 30%
Vesicles: round, filled by calcite and clay
Alteration: olivine replaced by calcite; groundmass replaced by brown microcrystalline material

Shipboard Data
Magnetic Data: 88-91 cm
 NRM Intensity (emu/cc) 11.100 x 10⁻³
 NRM Inclination -74.5°
 Stable Inclination -74.1°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	37	4

Visual Description
 Phryic pillow basalt with nearly aphyric chilled glassy margins (pieces 1-7) and traces of inter-pillow limestone (piece 1). Basalt gray with an aphanitic to hyalopilitic groundmass in pieces 1-6C and an aphanitic to subophitic groundmass in pieces 6D-7. Plagioclase phenocrysts range from 7%, < 0.8 mm near margins to 15%, < 5 mm in pillow interiors; olivine phenocrysts absent near margins, increase to 1%, < 1 mm in pillow interiors; augite phenocrysts 5-7%, < 2 mm. Piece 1 anomalously rich in augite and olivine phenocrysts (10%, < 5 mm and 1-2%, < 3 mm, respectively) and poor in plagioclase phenocrysts (2%, < 3 mm). Plagioclase, augite and olivine partly completely replaced by green smectite. Glassy margins partially devitrified, replaced by green smectite and calcite. Minor veins filled by calcite. Fine-grained interpillow limestone composed of calcite and green smectite.

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

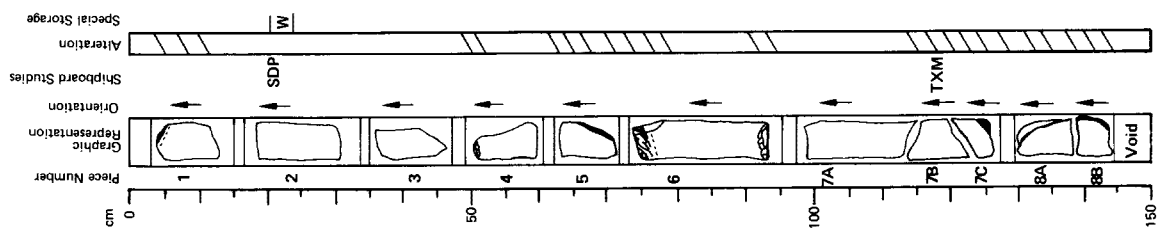
LEG	SITE	H O L	CORE	SECT.
51417D			37	5

Visual Description
Phyric pillow basalt with glassy chilled margins (pieces 1, 4-6 and 7C-8B), 73-127 and 127-146 cm intervals represent individual pillows bounded by chilled margins. Basalt gray with an aphanitic to microitic groundmass. Plagioclase phenocrysts <25%, <3 mm, locally <2 mm, replaced by green smectite. Piece 7 anomalously rich in augite phenocrysts (10%, <3 mm). Chilled margins sparsely phyric in piece 6, locally devitrified, replaced by green smectite and calcite. Veins filled by calcite.

Thin Section Description
Location: 117 cm, next to glassy margin
Texture: porphyritic
Phenocrysts: olivine 5%, 1 mm, euhedral; plagioclase 15%, 2 mm, subhedral-subhedral; clinopyroxene 5%, 1 mm, partially resorbed
Groundmass: olivine 5%, 0.02 mm, euhedral; plagioclase 20%, 0.1 mm, euhedral; clinopyroxene 30%, 0.05 mm, quenched; magnetite <5%, 0.01 mm, dendritic; devitrified glass < 10%
Vesicles: none
Alteration: olivine replaced by calcite and clay

Shipboard Data

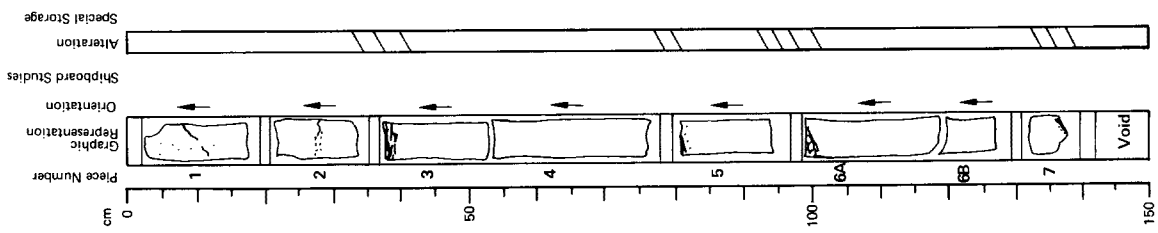
Bulk Analysis: 116-119 cm	Magnetic Data:	116-119 cm
SiO ₂ 49.37	NRM Intensity (emu/cc)	16.340 x 10 ⁻³
Al ₂ O ₃ 17.01	NRM inclination	-63.2°
Fe ₂ O ₃ 10.75	Stable Inclination	-63.4°
MgO 6.75	Physical Property Data:	
CaO 12.84	V _p (km/sec)	20-22 cm
Na ₂ O N.D.	Porosity (%)	5.50
K ₂ O 0.06	Wet Bulk Density (g/cc)	2.79
TiO ₂ 1.47	Grain Density (g/cc)	2.86
P ₂ O ₅ N.D.		
MnO N.D.		
LOI 1.36		
H ₂ O ⁺ 0.75		
H ₂ O ⁻ N.D.		
CO ₂ 0.61		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
51417D			37	6

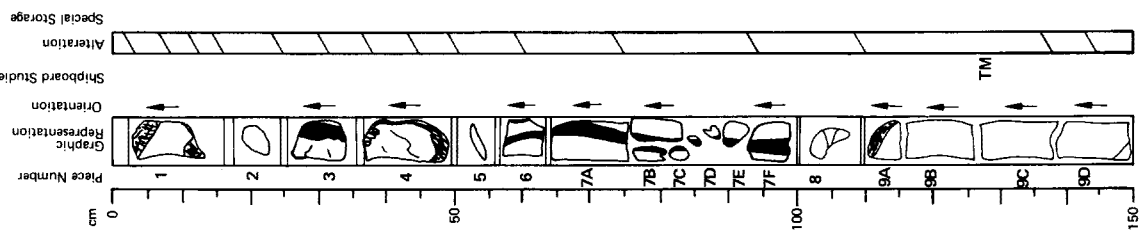
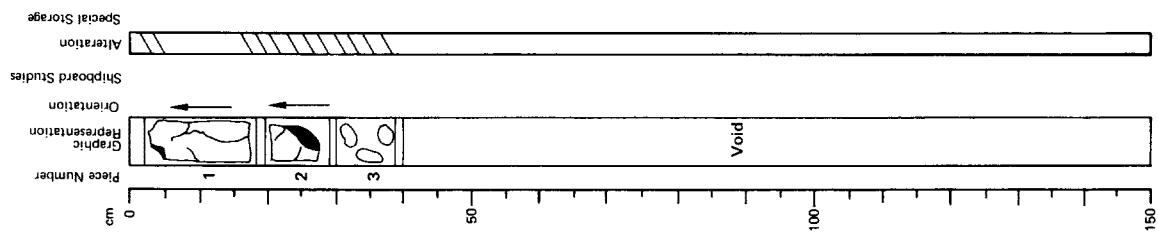
Visual Description
Phyric to slightly phyric pillow basalt with glassy chilled margins (pieces 3, 5, 6A and 7) and traces of interpillow limestone (piece 6A). Basalt gray with an aphanitic to microitic, locally subophitic groundmass. Plagioclase phenocrysts 3-15%, 1-5 mm, range from nearly absent in chilled margin of piece 3 to quite abundant in pieces with a subophitic groundmass (pieces 1, 2, 5 and 7); clinopyroxene phenocrysts 3-5%, 2-3 mm, locally <7 mm (piece 1); replaced by green smectite; olivine phenocrysts 1%, 2-3 mm, replaced by green smectite. Piece 5 anomalously rich in clinopyroxene phenocrysts (7-10%, 2-3 mm). Vesicles <3%, 0.3 mm locally coalesced to form large vugs (pieces 4 and 6A), filled with calcite, green smectite and white clay. Veins filled by green smectite, calcite and pyrite.



LEG	SITE	HOLE	CORE	SECT.
51	417	D	37	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic pillow basalt with glassy chilled margins (pieces 1 and 2). Basalt gray with an aphanitic to microlitic groundmass. Plagioclase phenocrysts 10-15%, <10 mm; olivine phenocrysts 5-7%, <1 mm, altered to iddingsite; clinopyroxene phenocrysts 3.5%, <3 mm. Veins common near margins, filled by calcite, green smectite and celadonite(?).



LEG	SITE	HOLE	CORE	SECT.
51	417	D	38	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic pillow basalt with glassy chilled margins (pieces 1 and 3-9A) and minor interpillow hyaloclastic breccia (pieces 1, 6 and 8). Basalt gray with an aphanitic to variolitic groundmass along pillow margins and a microlitic groundmass in pillow interiors. Plagioclase phenocrysts 15%, <4 mm; augite phenocrysts 5-10%, 1-2 mm; olivine phenocrysts 5%, 1-2 mm, replaced by green smectite and calcite. Veins filled by calcite, green smectite and pyrite. Hyaloclastic breccia composed of fragments of basalt and devitrified glass partially replaced by palagonite, green smectite and calcite in a matrix of calcite and green smectite.

Thin Section Description

Location: 130 cm, pillow interior
 Texture: porphyritic
 Phenocrysts: olivine 3%, 0.5 mm, euhedral; plagioclase 20%, 3 mm, euhedral to subhedral; clinopyroxene 5%, 1 mm, partially resorbed
 Groundmass: olivine 6%, 0.05 mm, euhedral to subhedral; plagioclase 20%, 0.1 mm, euhedral, tabular; clinopyroxene 30%, 0.05 mm; magnetite 5%, 0.01 mm, dendritic; devitrified glass <10%
 Vesicles: 0.01 mm, filled by green smectite
 Alteration: olivine replaced by green smectite

Shipboard Data

Magnetic Data
 NRM Intensity (emu/cc) 129-132 cm 16,501 x 10⁻³
 NRM Inclination -86.4°
 Stable Inclination -71.6°

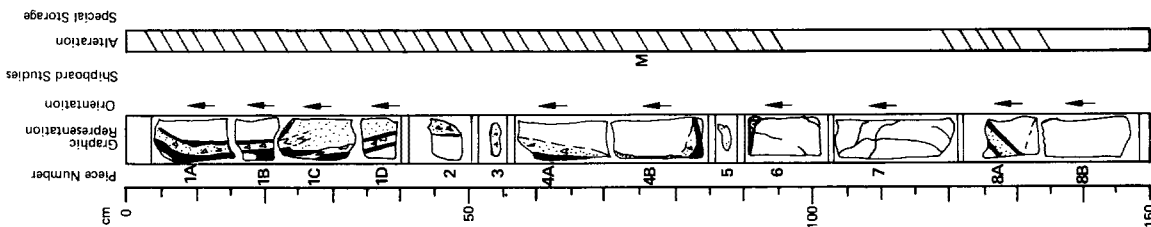
LEG	SITE	HOLE	CORE	SECT.
51	417D		38	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyrlic pillow basalt with altered margins (pieces 1-6 and 8A) and palagonite breccia (pieces 1-6 and 8A). Basalt gray with an aphanitic to microlitic groundmass. Plagioclase phenocrysts 15%, < 10 mm; clinopyroxene phenocrysts 5-10%, < 5 mm; olivine phenocrysts 1-2%, locally to 5%, replaced by green smectite. Glass largely replaced by dark green smectite, palagonite and calcite. Palagonite breccia composed of strongly altered pillow margin fragments in a locally colliform matrix of calcite and green smectite.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 30,983 x 10⁻³
 NRM Inclination -70.7°
 Stable Inclination -68.2°



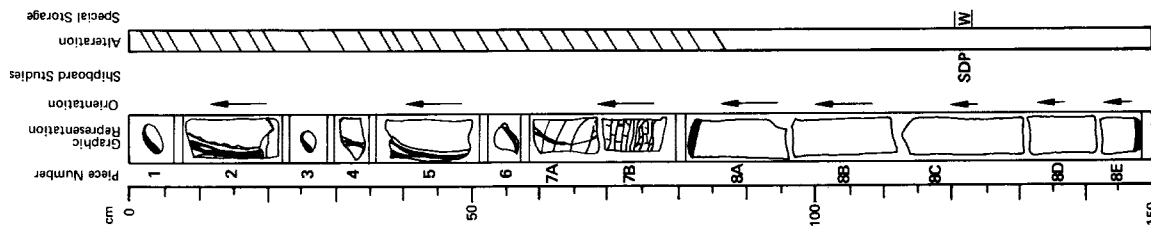
LEG	SITE	HOLE	CORE	SECT.
51	417D		38	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyrlic pillow basalt with aphyric, glassy chilled margins (pieces 1-6, 8A and 8E) and minor inter-pillow limestone (pieces 7A and 7B). Basalt gray with an aphanitic groundmass along pillow margins and a microlitic to subophitic groundmass in pillow interiors. Plagioclase phenocrysts 1-15%, < 5 mm; clinopyroxene phenocrysts 2-10%, < 3 mm, replaced by green smectite; olivine phenocrysts < 1%, < 0.5 mm, replaced by green smectite. Phenocrysts variable from pillow margins to interiors and from pillow to pillow with margins tending to be aphyric or rich in clinopyroxene and interiors rich in plagioclase. Vesicles < 3%, < 2 mm, filled by calcite and green smectite. Veins filled by green smectite and calcite. Glassy margins partially devitrified, replaced by green smectite and calcite. Inter-pillow limestone in piece 7 crudely layered with a brown upper layer composed of fragments of devitrified glass altered to green smectite in a matrix of calcite and brown to green smectite underlain by a 2-3 cm thick layer of calcite and dark green smectite.

Shipboard Data

Physical Property Data:
 V₀ (km/sec) 127-128 cm
 Porosity (%) N.D.
 Wet Bulk Density (g/cc) 4.1
 Grain Density (g/cc) 2.67
 Grain Density (g/cc) 2.86

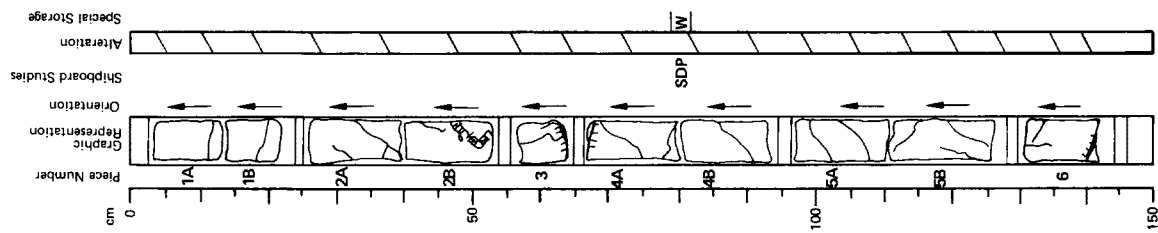


LEG	SITE	H O	CORE	SECT.
51	417	D	38	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Phyric pillow basalt with partially altered glassy margins (pieces 3, 4A and 6). 0-65 and 65-140 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt gray with an aphanitic to crystalline groundmass. Euhedral to subhedral plagioclase phenocrysts 20%, < 7 mm; subhedral clinopyroxene phenocrysts 5%, 3 mm; anhedral olivine phenocrysts 2%, 2 mm, replaced by green smectite. Glass partially devitrified, replaced by green smectite. Veins filled by calcite, green smectite and zeolites.

Shipboard Data
Physical Property Data:
Vp (km/sec) 80-82 cm
Porosity (%) 5.71
Wet Bulk Density (g/cc) 2.7
Grain Density (g/cc) 2.89
2.94



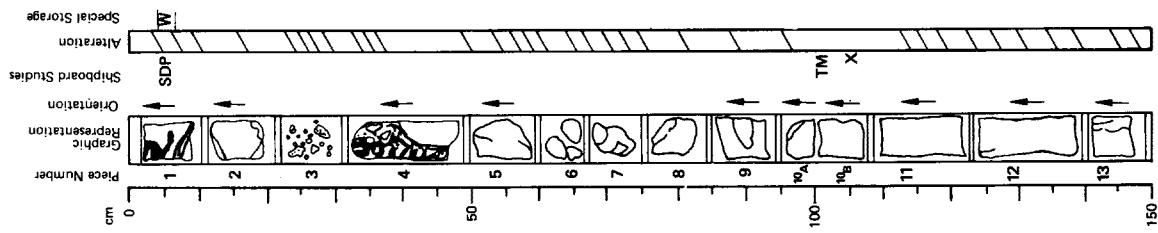
LEG	SITE	H O	CORE	SECT.
51	417	D	38	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Phyric to sparsely phyric pillow basalt with chilled margins (pieces 5, 8, 9 and 10) and altered hyaloclastite breccia (pieces 1-10A). Basalt gray with an aphanitic to microclitic groundmass. Plagioclase phenocrysts 20%, < 8 mm; olivine phenocrysts 5%, < 2 mm, replaced by green smectite; augite phenocrysts 5%, < 2 mm. Glass devitrified, replaced by calcite and green smectite. Breccia composed of angular clasts of altered basalt, devitrified glass and palagonite(?) in a matrix of dark green smectite and calcite. Veins filled by green smectite.

Thin Section Description
Location: 104 cm, pillow interior
Texture: microcrystalline
Phenocrysts: olivine 1%, < 0.5 mm, euhedral; plagioclase 30%, < 0.5 mm, euhedral; clinopyroxene < 0.5%, < 1 mm, partially resorbed
Groundmass: olivine < 10%, < 0.01 mm; plagioclase 20%, 0.03 mm, tabular; clinopyroxene 30%, < 0.01 mm, anhedral; magnetite < 5%, < 0.005 mm, dendritic; devitrified glass < 10%
Vesicles: filled by green smectite
Alteration: olivine replaced by green smectite. Veins filled by green smectite.

Shipboard Data
Bulk Analysis: 106.107 cm
Magnetic Data: 102-105 cm
SiO₂ 49.10 NRM Intensity (emu/cc) 8.096 x 10⁻³
Al₂O₃ 14.69 NRM Inclination -40.5°
Fe₂O₃ 14.28 Stable Inclination -43.6°
MgO 6.32
CaO 10.83
Na₂O N.D.
K₂O 0.68
TiO₂ 1.71
P₂O₅ N.D.
MnO N.D.
LOI 0.85
H₂O⁺ 1.24
H₂O⁻ N.D.
CO₂ 0.18
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.



LEG	SITE			CORE			SECT.
51	4	1	7	D	3	9	1

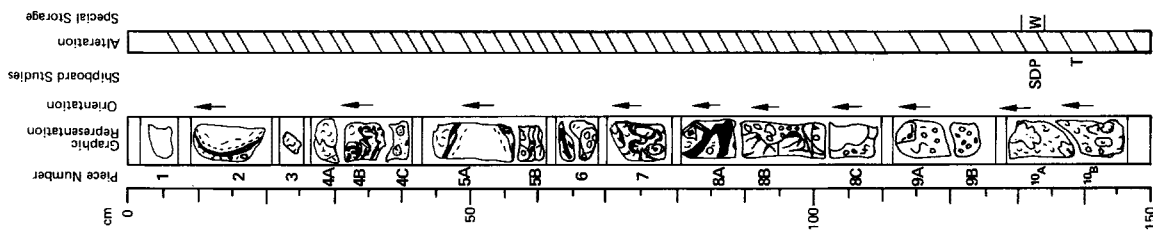
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Volcanic breccia composed of pillow basalt fragments, often with glassy chilled margins or with devitrified margins partially replaced by green smectite, in a matrix of calcite, green smectite and devitrified glass replaced by calcite and green smectite. Basalt gray with an aphanitic to micro-litic groundmass. Plagioclase phenocrysts 7%, <3 mm, fresh to weakly altered; augite phenocrysts 2-3%, <2 mm, partly replaced by green smectite; olivine phenocrysts <1%, <1 mm, completely replaced by green smectite and calcite. Veins filled by green smectite.

Thin Section Description

Location: 138 cm, hyaloclastite breccia
 Texture: brecciated
 Phenocrysts: olivine <1%, 1 mm, euhedral; plagioclase 2-3%, 1-2 mm, euhedral with numerous glass inclusions; augite 1%, as partially resorbed megacrysts or in clusters with plagioclase
 Groundmass: plagioclase microlites 1-2%; concentric layers of pale green glass and fibrous green palagonite 95%; minor calcite
 Vesicles: none
 Alteration: olivine replaced by green smectite

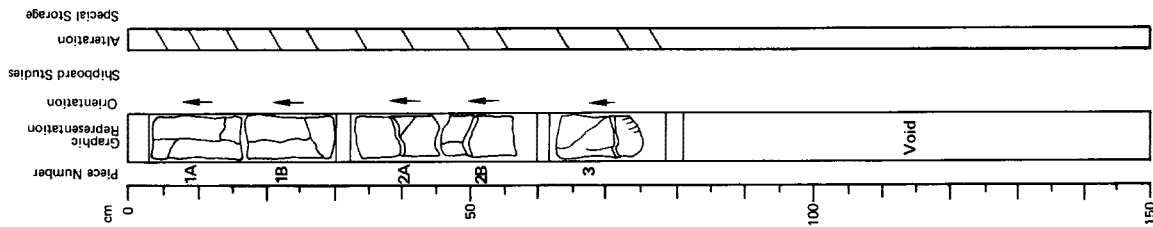
Shipboard Data
 Physical Property Data:
 Vp (km/sec) 130-132 cm
 Wet Bulk Density (g/cc) 3.67
 2.38



LEG	SITE			CORE			SECT.
51	4	1	7	D	3	8	6

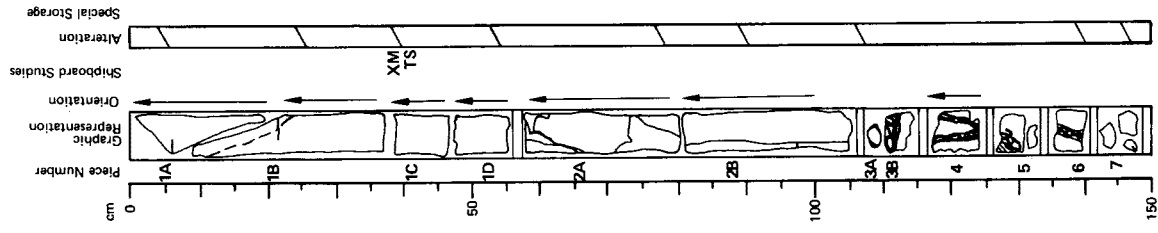
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyrlic to sparsely phyrlic pillow basalt with an altered margin at the base of piece 3. 0-75 cm interval represents part of an individual pillow bounded by chilled margins. Basalt gray with an aphanitic to crystalline groundmass. Euhedral plagioclase phenocrysts 20%, <6 mm, euhedral clinopyroxene phenocrysts 10%, <5 mm. Clinopyroxene phenocrysts tend to be concentrated near margin in piece 3 and adjacent to interval aphyric zone in piece 2B. Vesicles filled with zeolites, green smectite and calcite. Veins filled by calcite and green smectite.



LEG	SITE	HOLE	CORE	SECT.
51	417	D	39	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



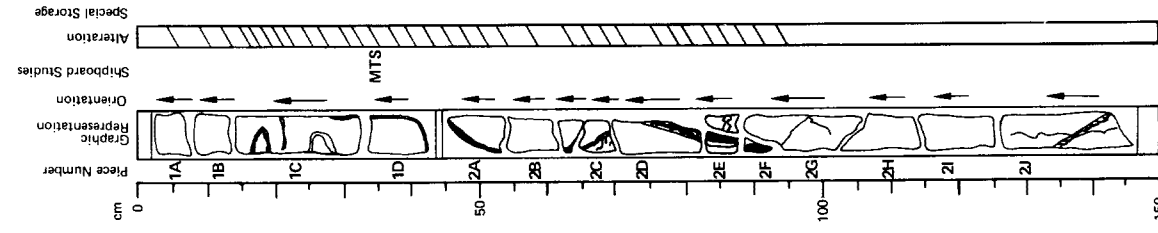
Visual Description
 Aphyrlic to phyrlic basalt with minor volcanic breccia in pieces 3A-7. Basalt gray with a micro-litic groundmass. 25-45 and 95-105 cm intervals phyrlic with plagioclase phenocrysts < 10%, < 4 mm; mafic phenocrysts (olivine and clinopyroxene) < 10%, < 4 mm; olivine phenocrysts replaced by green smectite. 0-25 cm and 45-95 cm intervals contain small vesicles (< 1 mm) with calcite or green smectite fillings. 0-25 cm interval displays a sharp, steeply inclined transition, parallel to a major crack, between a zone of green smectite fillings and an underlying zone with calcite fillings; 45-95 cm interval contains only calcite-filled vesicles. Breccia in pieces 3A-7 composed of fragments of pillow basalt with hyaloclastite margins and shards of glass partially replaced by palagonite, green smectite and calcite in a matrix of green smectite and calcite.

Thin Section Description

Location: 40 cm, flow interior
Texture: porphyritic, intergranular
Phenocrysts: olivine 3-5%, < 1.5 mm; plagioclase 15%, < 3 mm, An 60; clinopyroxene 1%, 1 mm, wavy extinction
Groundmass: olivine 5%, 0.1 mm; plagioclase 30%, 0.2 mm, An 52-60; clinopyroxene 35%, 0.1 mm; magnetite 5-10%, 0.2 mm, partially altered
Vesicles: 1-2%, filled with green smectite
Alteration: olivine replaced by green smectite. Veins filled by calcite, vesicles by green smectite

LEG	SITE	HOLE	CORE	SECT.
51	417	D	39	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 0-22 cm: volcanic breccia composed of fragments of basalt with chilled to glassy margins in a matrix of calcite, green smectite and devitrified glass.
 22-95 cm: phyrlic basalt with glassy chilled margins partially replaced by green smectite and calcite (pieces 2A and 2C-2F). Basalt gray with an aphanitic to micro-litic groundmass. Plagioclase phenocrysts < 10%, < 9 mm; augite phenocrysts 7%, < 2 mm, partially replaced by green smectite and calcite, common along flow margins; olivine phenocrysts < 1%, < 2 mm, completely replaced by green smectite. Veins filled with green smectite. Piece 1C contains a large calcite-filled vesicle with a large green smectite inclusion.
 95-150 cm: aphyric to phyrlic basalt with a gray, aphanitic groundmass containing micro-phenocrysts of clinopyroxene. Vesicles 2%, < 0.3 mm; fillings alternate between calcite and green smectite with depth. Piece 2I contains a sharp, steeply inclined transition (dip = 60°) between a zone of calcite vesicle fillings and an underlying zone with green smectite fillings. Veins filled with calcite or green to brown smectite.

Thin Section Description

Location: 37 cm, next to glassy margin
Texture: porphyritic
Phenocrysts: olivine 5-7%, < 4 mm; plagioclase 10-15%, < 4 mm, An 70-75; clinopyroxene 3%, < 3 mm, 2 V, > 50°, rounded with sector zoning and wavy extinction, occurs as isolated crystals or with plagioclase in glomerocrysts
Groundmass: plagioclase 10%, 0.2 mm, skeletal; devitrified glass 70%
Vesicles: 1%, < 0.4 mm, filled by calcite
Alteration: olivine replaced by calcite and clay

Shipboard Data

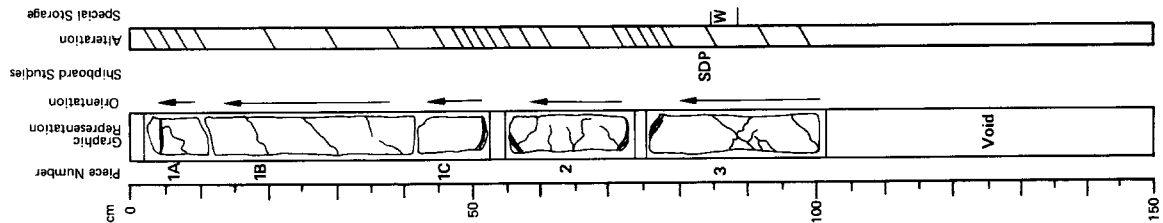
Magnetic Data: 35-38 cm
 NRM Intensity (emu/cc) 18.758 x 10⁻³
 NRM Inclination -72.6°
 Stable Inclination -72.2°

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	41	7D	39	4

Visual Description
 Phryic pillow basalt with chilled margins (pieces 1A, 1C, 2 and 3) and traces of interpillow breccia (piece 1A). 0-53, 53-75 and 75-100 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt gray with an aphanitic to microclitic or locally subophitic groundmass. Plagioclase phenocrysts variable between 3-20%, < 6 mm; clinopyroxene phenocrysts 2-7%, < 2 mm, partially replaced by green smectite and calcite, common along pillow margins; olivine phenocrysts 1%, < 2 mm, replaced by green smectite and calcite. Vesicles 1%, < 0.2 mm, locally coalesced to form vugs < 7 mm, filled by calcite. Veins filled by calcite and dark green smectite.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 84-86 cm
 Po (km/sec) 5.85
 Porosity (%) 2.6
 Wet Bulk Density (g/cc) 2.86
 Grain Density (g/cc) 2.92



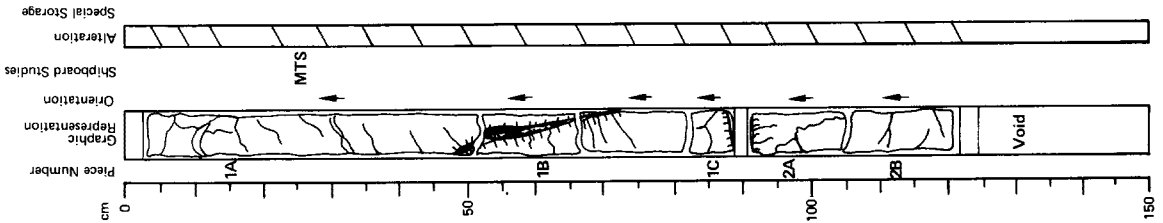
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	41	7D	39	5

Visual Description
 Phryic, gray pillow basalt with locally glassy chilled margins (pieces 1 and 2A) and traces of interpillow breccia (piece 1E). 0-60, 60-90 and 90-121 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Euhedral plagioclase phenocrysts 20%, < 6 mm; euhedral clinopyroxene phenocrysts 3-10%, < 6 mm, partially replaced by green smectite; euhedral olivine phenocrysts < 1%, < 2 mm, replaced by iddingsite and green smectite. Glass largely devitrified, replaced by green smectite. Vesicles < 2 mm, filled with green smectite, calcite and zeolite(?). Veins filled by calcite and green smectite.

Thin Section Description
 Location: 26 cm
 Texture: none
 Phenocrysts: olivine 2%, 3 mm, prismatic; plagioclase 50%, 1-3 mm, zoned with An 75 cores and An 88 rims, tabular; clinopyroxene 1%, 0.3-0.5 mm, prismatic
 Groundmass: plagioclase 15%, < 0.75 mm, An 43, tabular, quenched; clinopyroxene 25%, 0.25 mm, spherulitic, quenched; magnetite 7%, 0.05 mm
 Vesicles: none
 Alteration: olivine replaced by calcite. Veins filled by calcite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 25-27 cm
 NRM Intensity (emu/cc) 16,300 x 10⁻³
 NRM Inclination -63.8°
 Stable Inclination -64.5°

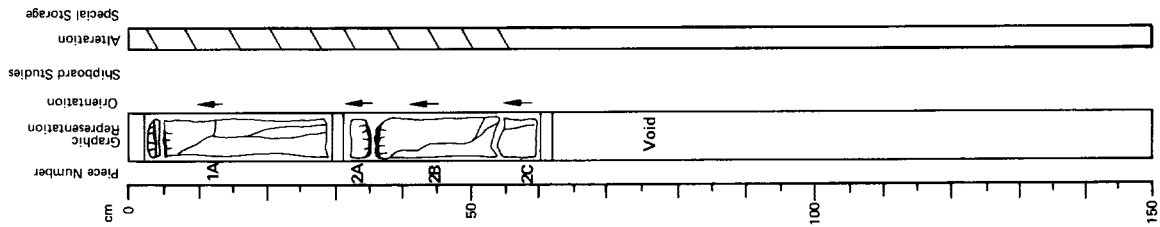


LEG	SITE	HOLE	CORE	SECT.
51	417	D	39	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Phyric basalt pillows with haloclastite margins, 0.35 and 35-60 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt groundmass dark gray. Euhedral plagioclase phenocrysts 20%, < 5 mm; euhedral clinopyroxene phenocrysts 5%, < 4 mm; olivine phenocrysts 5%, completely replaced by green smectite and calcite. Vesicles < 1 mm, filled with calcite. Veins filled by calcite and green smectite.



LEG	SITE	HOLE	CORE	SECT.
51	417	D	40	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Phyric to sparsely phyric pillow basalt with altered chilled margins (pieces 4B, 5 and 6), 0-105 and 105-150 cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Basalt gray, locally altered to yellow-brown along fractured pillow margins (pieces 4A and 4B). Groundmass aphanitic to microlitic or fine-grained. Plagioclase phenocrysts 3-25%, 2-7 mm; clinopyroxene phenocrysts 1-3%, 1.5-4 mm; olivine phenocrysts 1-15%, < 5 mm, replaced by dark green smectite or by montmorillonite and calcite. Phenocrysts extremely variable with plagioclase tending to be concentrated in pieces 4 and 6 (near lower pillow margins) while olivine and clinopyroxene are concentrated in pieces 3A, 3B, 5 and 6. Glass partially devitrified, replaced by green smectite, montmorillonite, palagonite(?) and calcite. Vesicles filled by calcite or green smectite, range from 0.2%, < 1.5 mm, locally coalesce to form calcite-filled vugs (piece 2). Veins filled by calcite and/or green smectite + pyrite, locally perpendicular to margins (piece 4). Light brown, finely-layered chert (piece 1) probably from sediment overlying basement.

Thin Section Description

Location: 115 cm, pillow interior

Texture: phyric, microlitic

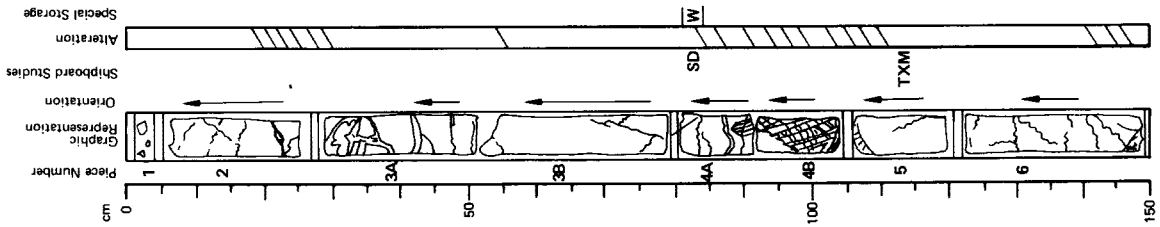
Phenocrysts: olivine 3%, 0.25-0.50 mm, prismatic; fresh plagioclase 25%, 0.25-0.50 mm, An 68-80, normally zoned; clinopyroxene < 1%, 0.25-1.00 mm, prismatic
Groundmass: plagioclase 7%, 0.02-0.25 mm, An 55, tabular, quenched; clinopyroxene 54%, 0.1-0.2 mm, spherulitic, quenched; magnetite 10%, 0.05-0.1 mm

Vesicles: none

Alteration: calcite 4%, in veins and as pseudomorphs after olivine

Shipboard Data

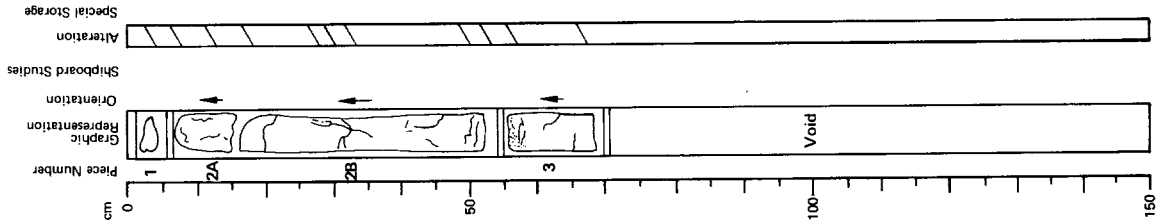
Bulk Analysis:	114.117 cm	Magnetic Data:	114-117 cm
SiO ₂	48.68	NRM Intensity (emu/cc)	11,687 x 10 ⁻³
Al ₂ O ₃	17.02	NRM Inclination	-67.2°
Fe ₂ O ₃	9.99	Physical Property Data:	
MgO	6.39	Vp (km/sec)	82-84 cm
CaO	13.70	Wet Bulk Density (g/cc)	5.46
Na ₂ O	N.D.		2.77
K ₂ O	0.04		
TiO ₂	1.36		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	1.30		
H ₂ O ⁺	.65		
H ₂ O ⁻	N.D.		
CO ₂	1.06		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



LEG	SITE	HOLE	CORE	SECT.
51	417	D	40	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phryic pillow basalt with altered margins (piece 2A). Basalt gray with an aphanitic groundmass. Plagioclase phenocrysts 10-15%; clinopyroxene phenocrysts 2.3%; olivine phenocrysts 5-7%, <5 mm, replaced by green smectite. Glass replaced by green smectite and patagonite(?). Veins and vesicles filled by clay and calcite.



LEG	SITE	HOLE	CORE	SECT.
51	417	D	40	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

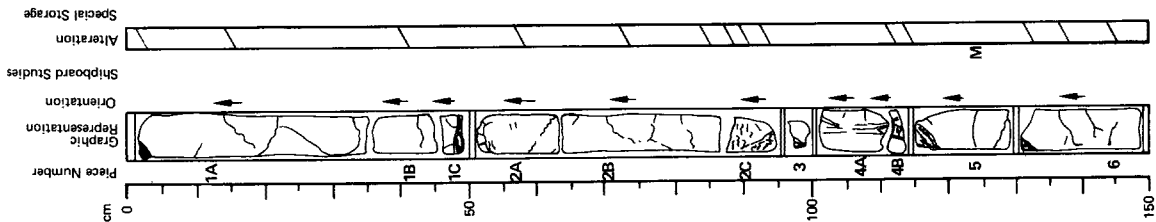
Visual Description
 Phryic pillow basalt with glassy chilled margins (pieces 1A, 1C, 2A, and 3-5). Basalt gray with a vesicular groundmass. Plagioclase phenocrysts 10-15%; clinopyroxene phenocrysts 1-5%, <0.5 mm; olivine phenocrysts 5-7%, <3 mm, replaced by iddingsite + calcite. Mafic phenocrysts tend to be concentrated near margins. Veins and vesicles filled by calcite.

Thin Section Description

Location: 25 cm, next to glassy margin
 Texture: porphyritic, subvolcanic
 Phenocrysts: olivine 5-6%, 0.5 mm; plagioclase 10-15%, 0.4 mm, An 65, contains devitrified glass inclusions; clinopyroxene 3-4%, 0.3-2 mm, 2V = 55°, zoned
 Groundmass: olivine 5%, 0.05-0.1 mm; plagioclase 30-35%, 0.2-0.3 mm, skeletal; clinopyroxene 35-40%, 0.1 mm, skeletal with plagioclase sprays; magnetite 1-2%, 0.02 mm
 Vesicles: 1-2%, filled by celadonite
 Alteration: olivine replaced by calcite, iddingsite and clay

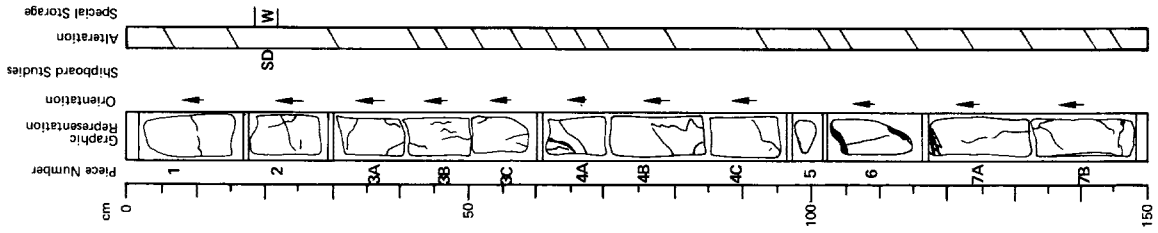
Shipboard Data

Magnetic Data:
 124-127 cm
 NRM Intensity (emu/cc) 15.532 x 10⁻³
 NRM Inclination -70.2°
 Stable Inclination -69.3°



LEG	SITE	H O	CORE	SECT.
51	417D	41	1	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

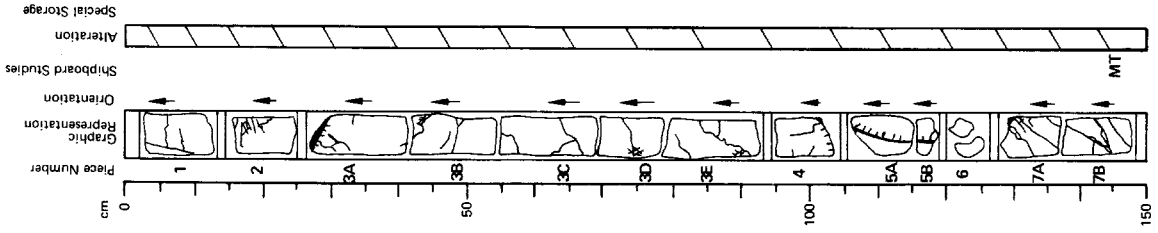
Phyric to sparsely phyric pillow basalt with altered chilled margins (pieces 4A, 6 and 7A) and traces of breccia (piece 4A). Basalt gray with aphanitic to variolitic margins. Plagioclase phenocrysts 10%; olivine phenocrysts 5-8%, common in piece 3C and 4C; replaced by iddingsite to 5%; pyroxene phenocrysts 1%; increase to 3-5%, 0.3 mm in piece 3. Vesicles 1-2%, increase to 5% in piece 4B. Filled by calcite and green smectite. Veins filled by calcite and green smectite. Breccia in piece 4A, composed of fragments of strongly altered glass. Piece 4B contains a small sulfide globule. Pillow margins in piece 6 and 7A dip, respectively, at an angle of 27° and 32° to the horizontal.

Shipboard Data

Physical Property Data:
 Vp (km/sec) 20-22 cm
 Wet Bulk Density (g/cc) 5.80
 2.82

LEG	SITE	H O	CORE	SECT.
51	417D	41	1	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Phyric pillow basalt with devitrified margins (pieces 3A, 4, 5 and 7A) and minor interpillow breccia (piece 5). Basalt gray with a crystalline groundmass. Euhedral plagioclase phenocrysts 15%, < 5 mm; euhedral to subhedral clinopyroxene phenocrysts 5%, < 2 mm; increase to 15% in piece 3D; olivine phenocrysts rare. Mafic phenocrysts and devitrified glass partially to completely replaced by green smectite and calcite. Calcite-filled vesicles < 1%, < 0.5 mm. Veins filled by calcite and green smectite. Cavity in piece 3D filled by zeolites. Breccia in piece 5 composed of glass fragments replaced by green smectite in a matrix of calcite, green smectite and zeolites.

Thin Section Description

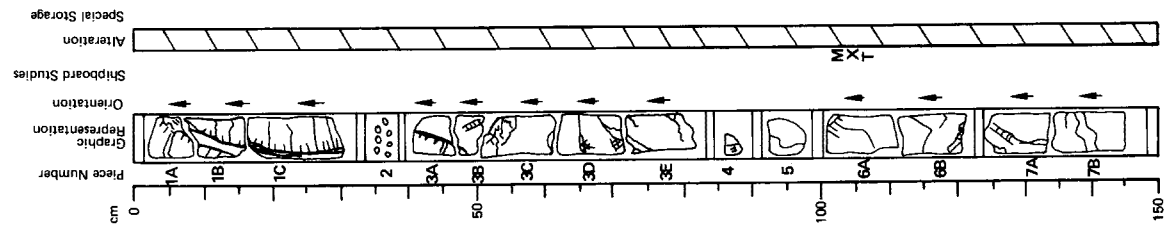
Location: 145 cm, next to glassy margin
 Texture: porphyritic
 Phenocrysts: olivine 5%, 2 mm, euhedral; plagioclase 20%, 3 mm, euhedral; clinopyroxene 2%, 1 mm, partially resorbed
 Groundmass: olivine 5%, 0.2 mm, subhedral; plagioclase 20%, 0.3 mm, quenched; clinopyroxene 30%, 0.2 mm, quenched; magnetite 5%, 0.05 mm, glass < 5% , devitrified
 Vesicles: 3%, filled by calcite
 Alteration: olivine replaced by zeolites and clay

Shipboard Data

Magnetic Data:
 144, 146 cm
 NRM Intensity (emu/cc) 9.366 x 10⁻³
 NRM Inclination -71.8°
 Stable Inclination -73.0°

LEG	SITE	H O	CORE	SECT.
5	1417D	4	1	3

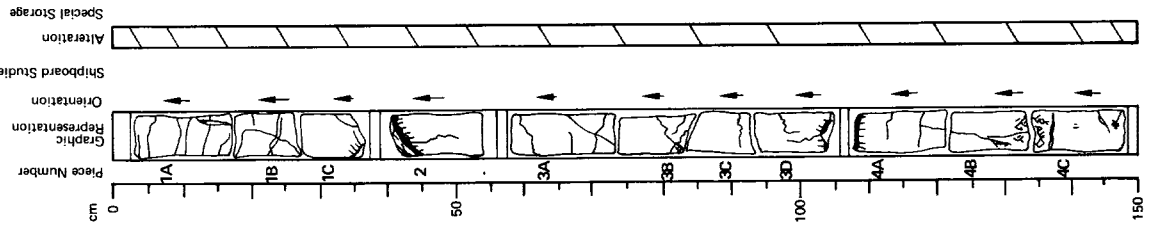
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Altered phytic pillow basalt with strongly altered chilled margins (pieces 1, 3A, 3C and 6A) and minor inter-pillow breccia (pieces 1, 3A and 3B). Groundmass aphanitic to microplitic, partially replaced by calcite and green smectite. Euhedral clinopyroxene phenocrysts 20%, 5 mm, partially replaced by calcite; euhedral olivine phenocrysts 5%, 3 mm, partially replaced by green smectite, calcite; euhedral olivine phenocrysts 1%, 2 mm, completely replaced by iddingsite and green smectite. Glass partially devitrified, largely replaced by green smectite. Vesicles < 1%, < 0.5 mm, filled with calcite, green smectite. Minor veins filled by calcite, green smectite. Breccia composed of devitrified glass and green smectite.

Thin Section Description
 Location: 102 cm, next to glassy margin
 Texture: porphyritic
 Phenocrysts: olivine 5%, 1 mm, euhedral; plagioclase 15%, 3 mm, euhedral; zones: clinopyroxene 2%, 0.2 mm, partially resorbed
 Groundmass: plagioclase 5%, 0.05 mm, quenched; glass 70%, varifolitic
 Vesicles: filled by calcite
 Alteration: olivine replaced by clay

Shipboard Data
 Bulk Analysis: 102-105 cm
 Magnetic Data: 102-105 cm
 SiO₂ 49.90 NRM Intensity (emu/cc) 12,931 x 10⁻³
 Al₂O₃ 17.61 NRM Inclination -76.8°
 Fe₂O₃ 10.19 Stable Inclination -77.3°
 MgO 6.57
 CaO 10.92
 Na₂O N.D.
 K₂O 0.21
 TiO₂ 1.61
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.70
 H₂O⁺ N.D.
 H₂O⁻ N.D.
 CO₂ N.D.
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



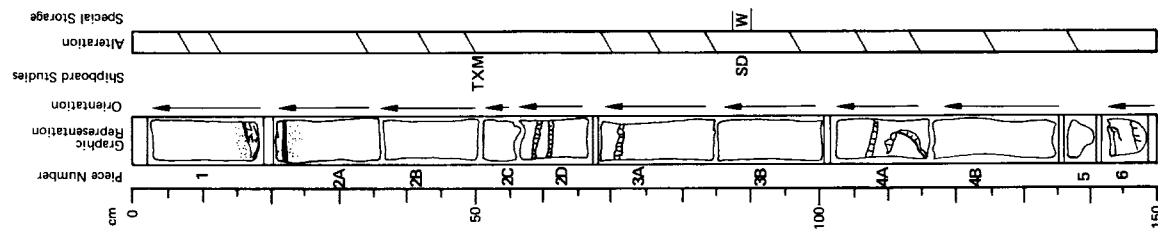
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5	1417D	4	1	4

Visual Description
 Altered phytic basalt pillows with strongly altered chilled margins (pieces 1C, 2, 3D and 4A). 0-3B, 3B-10B and 10B-15B cm intervals represent individual pillows or parts of pillows bounded by chilled margins. Groundmass aphanitic to crystalline, partially replaced by green smectite, rarely by pyrite. Euhedral plagioclase phenocrysts 15-20%, 4 mm, partially replaced by calcite, green smectite; euhedral clinopyroxene phenocrysts 5%, 3 mm, largely replaced by green smectite; euhedral olivine phenocrysts 1%, < 2 mm, replaced by green smectite, iddingsite and pyrite. Glass partially devitrified, largely replaced by green smectite. Vesicles < 1%, < 0.5 mm, filled with calcite, green smectite. Minor vesicles in pieces 3B, 4B filled with calcite. Veins filled by calcite, zeolites, pyrite and green to brown smectite.

LEG	SITE	H O L E	CORE	SECT.
51	417D		41	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

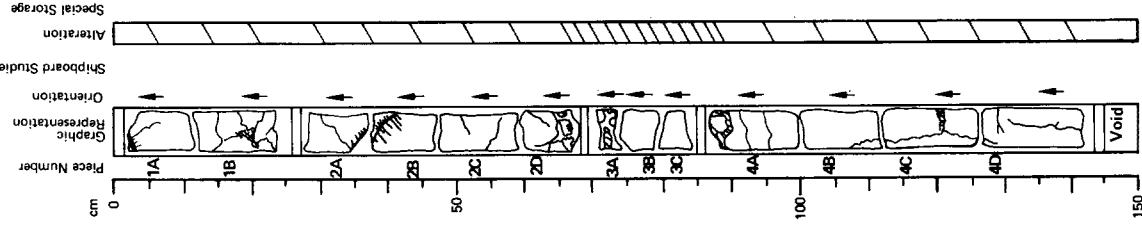
Phyric pillow basalt with glassy chilled margins (pieces 1, 2A and 6) and minor interpillow hyaloclastite breccia (piece 6). Basalt dark gray, altered to gray-brown near margins. Altered euhedral plagioclase phenocrysts 15-20%, <5 mm; euhedral olivine phenocrysts 5-8%, <4 mm, replaced by green smectite and talc(?) or calcite and iddingsite; euhedral pyroxene phenocrysts 2-3%, <3 mm. Calcite-filled vesicles 1-2%, 1-2 mm. Veins filled by calcite, green smectite, minor sulfides. Hyaloclastite breccia in piece 6 composed of shards of glass (altered to palagonite near the margins) in a matrix of calcite and clay.

Thin Section Description

Location: 50 cm, pillow interior
 Texture: ophitic
 Phenocrysts: olivine 3%, 2 mm, euhedral; plagioclase 25%, 4 mm, euhedral-subhedral; clinopyroxene 5%, 3 mm, anhedral
 Groundmass: olivine 5%, 0.1 mm, euhedral-subhedral; plagioclase 20%, 0.5 mm, euhedral; clinopyroxene 35%, 0.2 mm; magnetite 3%, 0.03 mm; glass <5%
 Vesicles: filled by calcite and clay
 Alteration: olivine replaced by calcite and clay

Shipboard Data

Bulk Analysis: 50-52 cm	Magnetic Data:	50-52 cm
SiO ₂ 50.07	NRM Intensity (emu/cc)	7.992 × 10 ⁻³
Al ₂ O ₃ 17.13	NRM Inclination	-65.1°
Fe ₂ O ₃ 9.98	Stable Inclination	-71.7°
MgO 6.85	Physical Property Data:	
CaO 13.60	Vp (km/sec)	87-89 cm
Na ₂ O N.D.	Wet Bulk Density (g/cc)	5.97
K ₂ O 0.01		2.74
TiO ₂ 1.16		
P ₂ O ₅ N.D.		
MnO N.D.		
LOI 0.90		
H ₂ O ⁺ .67		
H ₂ O ⁻ N.D.		
CO ₂ .45		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

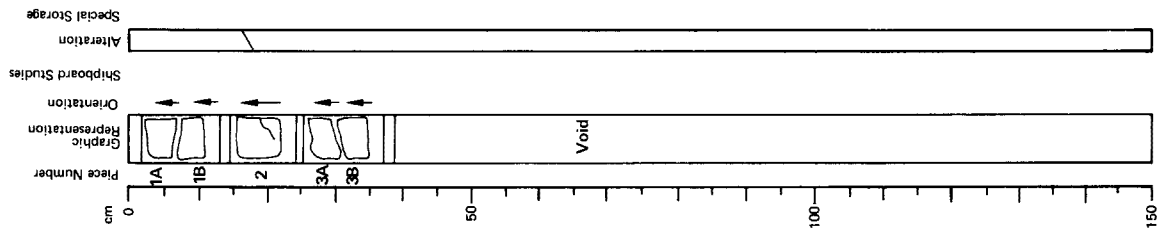
LEG	SITE	H O L E	CORE	SECT.
51	417D		41	6

Visual Description

0-85 cm: phyric pillow basalt with strongly altered chilled margins (pieces 1A, 2A and 2B) and minor breccia (piece 3). Euhedral plagioclase phenocrysts 15%, 4 mm, partially replaced by green smectite; euhedral clinopyroxene phenocrysts 10%, 3 mm, partially replaced by green smectite; euhedral olivine phenocrysts 5%, 3 mm, increase to 10%, 4 mm in piece 2D, completely replaced by green smectite, iddingsite and calcite. Rare vesicles filled with calcite. Veins filled with green smectite. Glass devitrified, replaced by green smectite. Large vug in piece 1B filled with calcite and green to brown smectite. Breccia in piece 3 composed of fragments devitrified glass altered to green smectite in a matrix of green to brown smectite, hematite(?) and minor calcite. 83-145 cm: massive, phyric basalt with a fractured, fine-grained margin in piece 4A. Basalt groundmass crystalline. Plagioclase phenocrysts <15%, <4 mm, common in pieces 4B and 4C; altered mafic phenocrysts 5-10%, 3 mm in pieces 4A and 4D, decrease to <1 mm in pieces 4B, 4C. Piece 4C contains vesicles filled by calcite and green smectite.

LEG	SITE	HOLE	CORE	SECT.
51	417	D	41	8

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

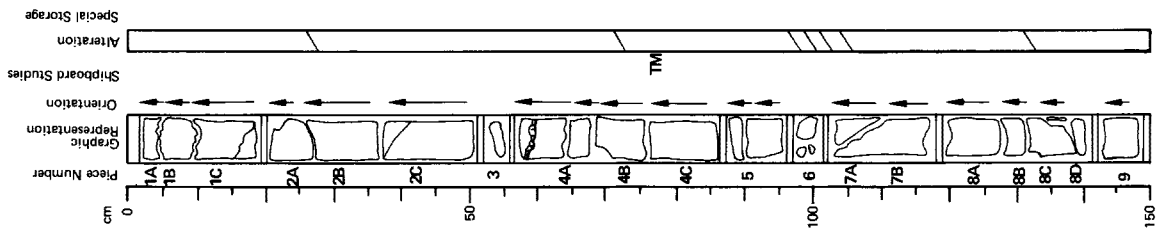


Visual Description

Massive phyrlic basalt with a dark gray, ophitic groundmass. Euhedral plagioclase phenocrysts 20%, 4 mm; euhedral olivine and clinopyroxene phenocrysts 10%, 3 mm, completely replaced by green smectite and zeolites. Veins filled by green smectite and zeolites.

LEG	SITE	HOLE	CORE	SECT.
51	417	D	41	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Massive phyrlic basalt with a dark gray, subophitic groundmass. Altered euhedral plagioclase phenocrysts 15%, <5 mm; euhedral olivine phenocrysts 5%, replaced by green smectite or by opal(?) in association with pyrite; clinopyroxene laths 2%, <6 mm. Minor veins filled by calcite.

Thin Section Description

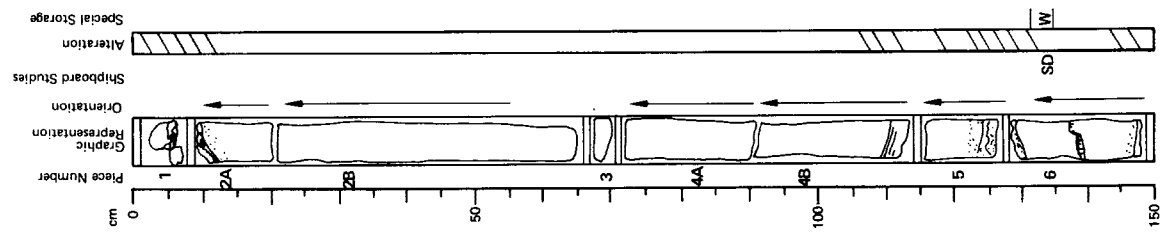
Location: 76 cm, pillow interior
 Texture: hyaloophitic
 Phenocrysts: olivine 10%, euhedral-subhedral; plagioclase 25%, 3 mm, subhedral, zoned; clinopyroxene 5%, partially resorbed
 Groundmass: olivine 10%, 0.1 mm, euhedral; plagioclase 20%, 0.5 mm, euhedral; clinopyroxene 30%, 0.2 mm, quenched; magnetite <5%, 0.03 mm, dendritic; glass 10%
 Vesicles: <1%; 0.02 mm, filled by clay
 Alteration: olivine replaced by clay

Shipboard Data:

Magnetic Data: 76-78 cm
 NRM Intensity (emu/cc) 20.325 x 10⁻³
 NRM Inclination -61.4°
 Stable Inclination -54.8°

LEG	SITE	HOLE	CORE	SECT.
51	417D	4	2	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



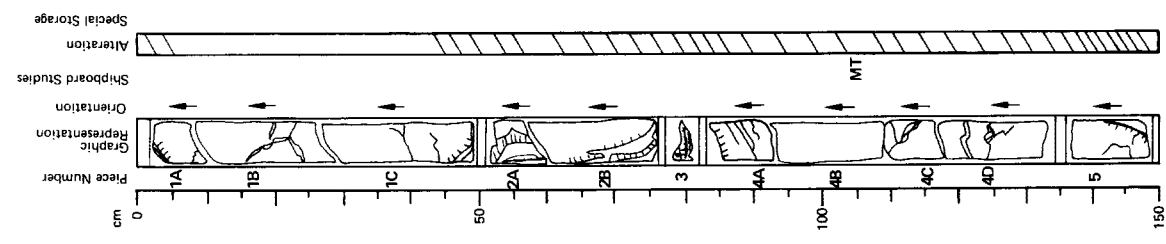
Visual Description
 Phyric pillow basalt with altered chilled margins (pieces 1, 2A, 4B, 5 and 6). 8-113 and 127-150 cm intervals represent individual pillows bounded by chilled margins. Basalt dark gray, altered to gray-brown along pillow margins. Euhedral plagioclase phenocrysts 20%, <5 mm; partially replaced by calcite and green smectite; euhedral olivine phenocrysts 3-5%, replaced by calcite and iddingsite near pillow margins and by green smectite in pillow interiors; pyroxene laths, 2%, <5 mm. Glass largely devitrified, altered to talagonite. Vesicles 1%, 1-2 mm, filled by calcite or green smectite. Minor veins filled by calcite and green smectite.

Shipboard Data

Physical Property Data: 131-133 cm
 Vp (km/sec) 5.30
 Wet Bulk Density (g/cc) 2.72

LEG	SITE	HOLE	CORE	SECT.
51	417D	4	2	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Altered phyric pillow basalt with strongly altered chilled margins (pieces 1A, 1C, 2, 4A, and 5) and minor interpillow limestone (piece 3). 0-50 and 83-150 cm intervals represent individual pillows bounded by chilled margins. Euhedral plagioclase phenocrysts 20-25%, 4-6 mm; euhedral to partially resorbed clinopyroxene phenocrysts 5%, 4 mm, largely replaced by green smectite and calcite; euhedral olivine phenocrysts 3-5%, 3 mm, completely replaced by green smectite and calcite. Groundmass in pieces 4 and 5 and glass throughout section partially replaced by green smectite. Piece 4D contains a 2 cm-long vug filled by calcite. Veins filled by calcite, green smectite and pyrite. Gray-green interpillow limestone in piece 3 contains fragments of altered glass.

Thin Section Description

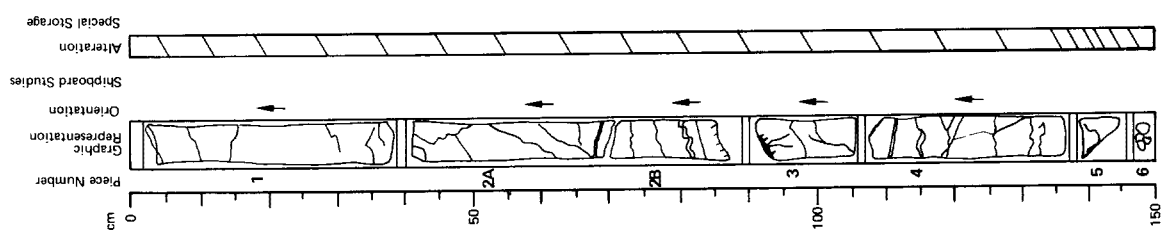
Location: 106 cm, pillow interior
 Texture: porphyritic
 Phenocrysts: olivine 2%, 3 mm, euhedral; plagioclase 30%, 4 mm, euhedral; clinopyroxene 0.5%, 0.5 mm, anhedral
 Groundmass: olivine 5%, 0.1 mm, euhedral; plagioclase 20%, 0.5 mm, euhedral, tabular, partially quenched; clinopyroxene 30%, 0.2 mm, euhedral, quenched; magnetite <5%
 Vesicles: <1%, <0.5 mm, filled by clay
 Alteration: olivine replaced by clay

Shipboard Data

Magnetic Data: 105-107 cm
 NRM Intensity (emu/cc) 11,894 x 10⁻³
 NRM Inclination -68.4°
 Stable Inclination -69.5°

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

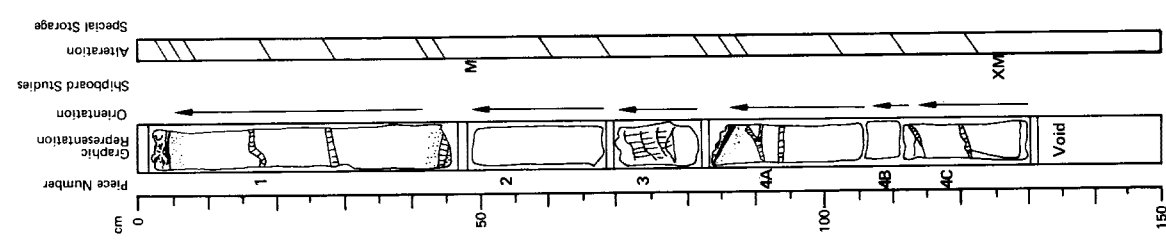
LEG	SITE	HOLE	CORE	SECT.
51	417	D	42	4



Visual Description
 Phryic pillow basalt with altered margins (pieces 2B, 3 and 5), and traces of breccia (piece 6).
 Euhedral plagioclase phenocrysts 15%, 4 mm; euhedral to subhedral clinopyroxene phenocrysts
 10-15%, 4 mm, partially replaced by green smectite and calcite; euhedral olivine phenocrysts
 5%, 3 mm, completely replaced by green smectite and calcite; euhedral pyroxene phenocrysts concentrated
 in 21-34 cm interval; Vesicles filled with calcite or green smectite. Veins filled by calcite and
 green smectite. Breccia in piece 6. Glass and groundmass in piece 5 altered to green smectite.
 Breccia in piece 6 composed of fragments of basalt altered to green to brown smectite (or hematite?)
 in a matrix of calcite.

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
51	417	D	412	3



Visual Description
 Phryic, dark gray pillow basalt with chilled glassy margins (pieces 1, 3 and 4A). Euhedral plagioclase
 phenocrysts 15%, <6 mm; euhedral olivine phenocrysts 2.3%, <5 mm, replaced by green
 smectite; pyroxene laths <1%, <4 mm. Vesicles 1%, 1-2 mm, filled by calcite or green smectite.
 Veins filled by calcite, green smectite and sulfides. Piece 3 contains slickensides.

Shipboard Data

Bulk Analysis:	125-127 cm	Magnetic Data:	48-51 cm	125-127 cm
SiO ₂	50.81	NRM Intensity (emu/cc)	7.935 x 10 ⁻³	3.171 x 10 ⁻³
Al ₂ O ₃	17.12	NRM Inclination	-44.2°	-56.7°
Fe ₂ O ₃	10.22	Stable Inclination	-53.5°	-61.8°
MgO	6.46			
CaO	13.77			
Na ₂ O	N.D.			
K ₂ O	0.04			
TiO ₂	1.17			
P ₂ O ₅	N.D.			
MnO	N.D.			
LOI	1.25			
H ₂ O ⁺	.66			
H ₂ O ⁻	N.D.			
CO ₂	.13			
Cr	N.D.			
Ni	N.D.			
Sr	N.D.			
Zr	N.D.			

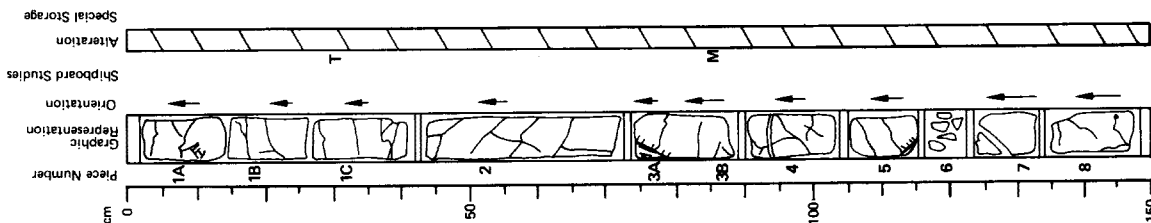
LEG	SITE	HOLE	CORE	SECT.
51	417	D	42	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyric pillow basalt with chilled margins in pieces 3A and 5. Groundmass crystalline, partially replaced by green smectite and calcite. Euhedral plagioclase phenocrysts 5-10%, <3 mm; euhedral to subhedral clinopyroxene phenocrysts 5%, 2 mm, partially replaced by green smectite; olivine phenocrysts rare, increase to 20% in piece 2, complexly replaced by iddingsite. Vesicles 2%, <1 mm, filled with calcite, green smectite and zeolites. Veins calcite, green smectite and pyrite.

Thin Section Description
 Location: 21 cm, pillow interior
 Texture: ophitic, hyaloophitic
 Phenocrysts: olivine 2%, 0.5 mm, euhedral; plagioclase 5%, 4 mm, euhedral; clinopyroxene 2%, 0.5 mm, euhedral
 Groundmass: olivine 5-10%, 0.02 mm, euhedral; plagioclase 30%, 0.1 mm, euhedral, prismatic; clinopyroxene 40%, 0.03 mm, euhedral-anhedral, quenched; magnetite <5%, 0.01 mm; glass 5%
 Vesicles: 1%, filled by calcite and clay
 Alteration: olivine and glass altered

Shipboard Data
 Magnetic Data: 86-88 cm
 NRM Intensity (emu/cc) 7.045 x 10⁻³
 NRM Inclination - 8.7°
 Stable Inclination -31.3°



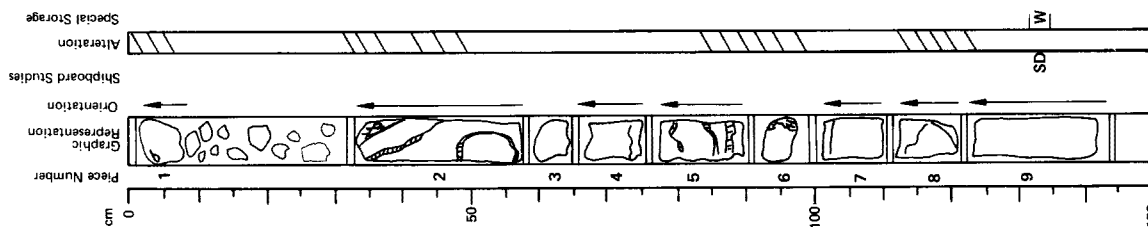
LEG	SITE	HOLE	CORE	SECT.
51	417	D	42	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phyric, dark gray pillow basalt with chilled glassy margins (pieces 2 and 8). Euhedral plagioclase phenocrysts 10%, <3 mm; olivine phenocrysts 1%, <3 mm, replaced by green smectite and calcite; clinopyroxene phenocrysts <7%, 2-3 mm. Vesicles 2-3%, 1-3 mm, filled with green smectite and calcite. Minor vesicles filled by calcite and green smectite; pyrite.

Shipboard Data
 Physical Property Data: 131-133 cm
 Vp (km/sec) 5.56
 Wet Bulk Density (g/cc) 2.84

Shipboard Data
 Magnetic Data: 86-88 cm
 NRM Intensity (emu/cc) 7.045 x 10⁻³
 NRM Inclination - 8.7°
 Stable Inclination -31.3°

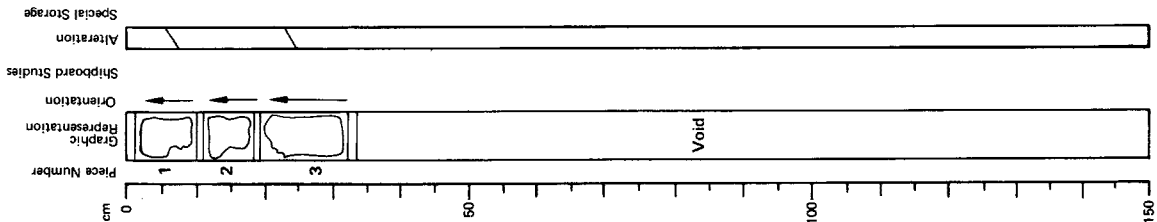


LEG	SITE	H O L E	CORE	SECT.
5 1	4 1 7 D	4 2	7	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Dark gray, phytic pillow basalt. Euhedral plagioclase phenocrysts 10%, <3 mm; euhedral olivine phenocrysts 1-2%, <3 mm, replaced by green smectite; clinopyroxene laths 1%, <3 mm. Vesicles 2%, 1-2 mm, filled with calcite and/or green smectite, occasionally lined with sulfides. Minor veins filled with green smectite and/or calcite + sulfides.



LEG	SITE	H O L E	CORE	SECT.
5 1	4 1 7 D	4 3	1	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

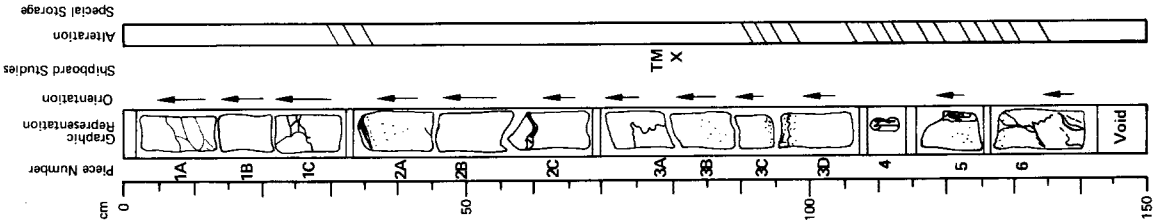
Moderately phytic pillow basalt with strongly altered chilled margins (pieces 2A and 3C-5) and traces of interpillow breccia (piece 5). Basalt gray with a fine- to coarse-grained, microclitic to subophitic groundmass. Plagioclase phenocrysts 1-2%, <1.5 mm, increase to 10%, <2 mm in piece 6; olivine phenocrysts 1-3%, <2 mm, replaced by green smectite and calcite; clinopyroxene phenocrysts 1-2%, <1 mm. Vesicles 1-3%, <0.5 mm, filled with calcite and green smectite. Veins filled by calcite or green smectite. Glass devitrified, replaced by green smectite, palagonite(?) and calcite.

Thin Section Description

Location: 80 cm, next to glassy margin
 Texture: porphyritic
 Phenocrysts: olivine 5%, 2 mm, euhedral; plagioclase 3%, 2 mm, euhedral; clinopyroxene 2%, 2 mm, partially resorbed
 Groundmass: plagioclase 15%, 0.5 mm, quenched; clinopyroxene 20%, 0.3 mm, quenched; magnetite <3%, dendritic; glass 50%, variolitic
 Vesicles: <1%, <0.5 mm, filled by calcite
 Alteration: olivine replaced by clay

Shipboard Data

Bulk Analysis: 78.81 cm
 Magnetic Data:
 SiO₂ 49.38 NRM Intensity (emu/cc) 5.714 x 10⁻³
 Al₂O₃ 15.75 NRM Inclination -11.3°
 Fe₂O₃ 11.40 Stable Inclination -23.1°
 MgO 6.71
 CaO 12.77
 Na₂O N.D.
 K₂O 0.07
 TiO₂ 1.58
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.05
 H₂O⁺ .83
 H₂O⁻ N.D.
 CO₂ .53
 Cl N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



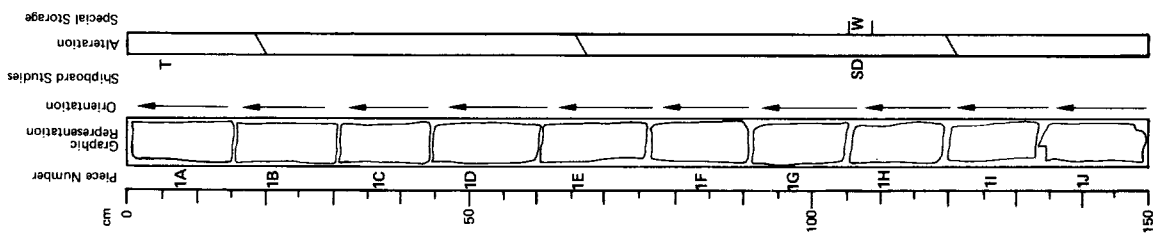
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
51	417D	43	2	

Visual Description
 Massive phyrlic basalt with a dark gray, interstitial to subophitic groundmass. Euhedral plagioclase phenocrysts 10%, <3 mm; euhedral olivine phenocrysts 2%, <3 mm, replaced by green smectite; clinopyroxene laths <1%, <3 mm. Vesicles 3-4% in pieces 1A-1D, 1-2% in pieces 1D-1J, 1-3 mm, filled by calcite and green smectite. Minor veins filled by calcite and green smectite.

Thin Section Description
 Location: 5 cm, pillow interior
 Texture: phyrlic, microclitic
 Phenocrysts: olivine 2%, 0.2-0.4 mm, prismatic; plagioclase 15%, 0.2-1.0 mm, An 68-An 63, tabular; clinopyroxene 5%, 0.3-2.0 mm, prismatic
 Groundmass: plagioclase 20%, 0.1-0.3 mm, An 53, quenched; clinopyroxene 50%, 0.1 mm, quenched; magnetite 6%, 0.02-0.04 mm, euhedral
 Vesicles: <1%, 0.1-0.5 mm, filled by calcite and clay
 Alteration: olivine replaced by calcite, clay and serpentine

Shipboard Data
 Physical Property Date: 106-108 cm
 Vp (km/sec) 5.61
 Wet Bulk Density (g/cc) 2.84

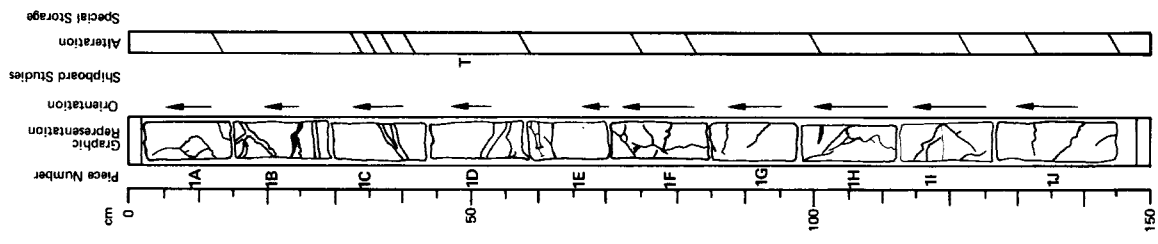


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
51	417D	43	3	

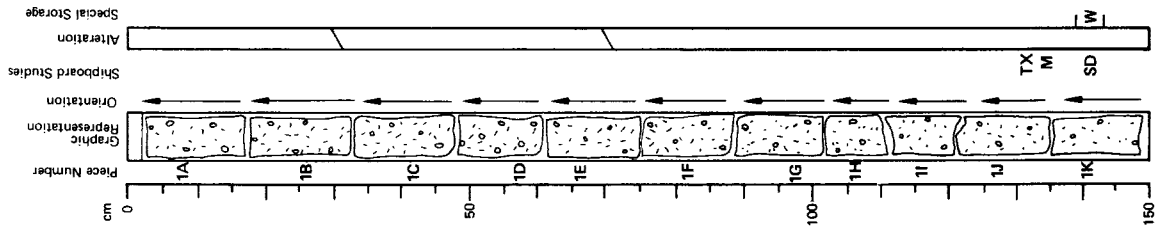
Visual Description
 Sparingly phyrlic massive basalt with a coarse-grained, subophitic groundmass. Basalt dark gray, altered to greenish-brown along veins, filled with green smectite. Plagioclase phenocrysts <1%, <3 mm; olivine phenocrysts <1%, 1-2 mm, replaced by green smectite. Vesicles 2%, <0.5 mm, filled with calcite or green smectite. Veins filled by green smectite and calcite.

Thin Section Description
 Location: 50 cm, next to glassy margin
 Texture: porphyritic
 Phenocrysts: olivine 10%, 3 mm, euhedral; plagioclase 25%, 4 mm, euhedral; clinopyroxene 5%, 4 mm, subhedral
 Groundmass: olivine 5%, 0.1 mm; plagioclase 20%, 0.4 mm, prismatic, quenched; clinopyroxene 30%, 0.2 mm, quenched; magnetite <5%, dendritic; glass 20%
 Vesicles: <1%, 0.3 mm, filled by calcite
 Alteration: olivine replaced by clay



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
51	417D	E	43	4



Visual Description
 Massive phryic basalt with a dark gray, subophitic groundmass. Euhedral plagioclase phenocrysts 5-8%, < 5 mm; olivine phenocrysts < 1%, < 3 mm, replaced by green smectite; clinopyroxene laths < 1%, < 10 mm. Calcite-filled vesicles 2%, 1-2 mm. Minor veins filled with calcite and green smectite.

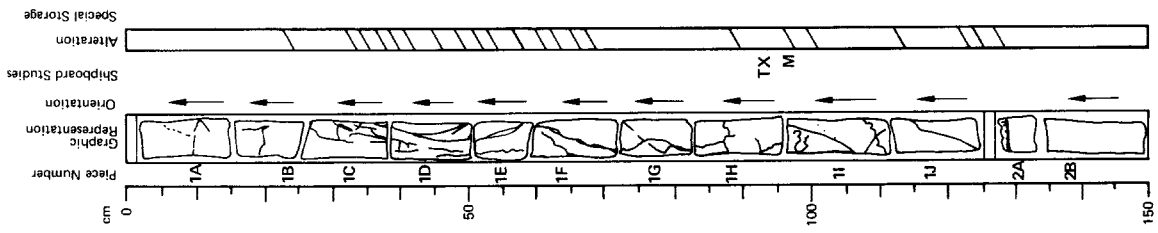
Thin Section Description
 Location: 130 cm, interior of massive basalt
 Texture: ophitic
 Phenocrysts: olivine 5%, 0.5 mm, euhedral; plagioclase 15%, 0.5-3 mm, euhedral; clinopyroxene 5%, 0.5 mm, anhedral
 Groundmass: olivine 15%, 0.2 mm, euhedral-subhedral; plagioclase 35%, 0.5 mm, prismatic; clinopyroxene 25%, 0.2 mm, anhedral; magnetite < 2%, 0.03 mm, dendritic
 Vesicles: 1%, 0.02 mm, filled by calcite
 Alteration: olivine replaced by clay

Shipboard Data
 Bulk Analysis: 130-132 cm
 SiO₂ 49.57
 Al₂O₃ 15.79
 Fe₂O₃ 12.25
 MgO 6.65
 CaO 13.35
 Na₂O N.D.
 K₂O 0.14
 TiO₂ 1.49
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.15
 H₂O⁺ .85
 H₂O⁻ N.D.
 CO₂ .72
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 NRM Intensity (emu/cc) 130-132 cm
 NRM Inclination 2.213 x 10⁻³
 Stable Inclination +59.0°
 Physical Property Data:
 Vp (km/sec) 140-142 cm
 Wet Bulk Density (g/cc) 5.72
 2.89

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
51	417D	E	43	5



Visual Description
 0.125 cm; sparsely phryic, massive gray basalt with brown alteration halos along veins filled by green smectite and calcite. Groundmass composed of olivine phenocrysts 1A, 1H, (fine-grained microlitic) in pieces 1I, 1J. Plagioclase phenocrysts 2%, 2 mm, olivine phenocrysts 2-5%, < 3 mm, replaced by green smectite, calcite. Veins in pieces 1D-1E gradually curved.
 125-150 cm; phryic pillow basalt with altered chilled margins and traces of breccia (piece 2A).
 Basalt light gray with an aphanitic to fine-grained, microlitic groundmass. Plagioclase phenocrysts 5%, 1.5 mm, increase in size with depth; olivine phenocrysts 5-7%, < 2 mm, replaced by green smectite. Calcite-filled vesicles 3%, < 0.3 mm in piece 2B. Veins filled by green smectite. Breccia composed of fragments of devitrified glass replaced by green smectite, palagonite(?) and calcite.

Thin Section Description
 Location: 94 cm, interior of massive basalt
 Texture: ophitic
 Phenocrysts: olivine 5%, 0.3-2 mm, euhedral; plagioclase 10%, 0.5-3 mm, euhedral; clinopyroxene 2%, 0.5 mm, anhedral
 Groundmass: olivine 15%, 0.1 mm, euhedral; plagioclase 25-30%, 0.5 mm, prismatic; clinopyroxene 35%, 0.3 mm, anhedral; magnetite < 5%, 0.02 mm, dendritic
 Vesicles: < 1%
 Alteration: olivine replaced by calcite and clay. Veins filled by calcite.

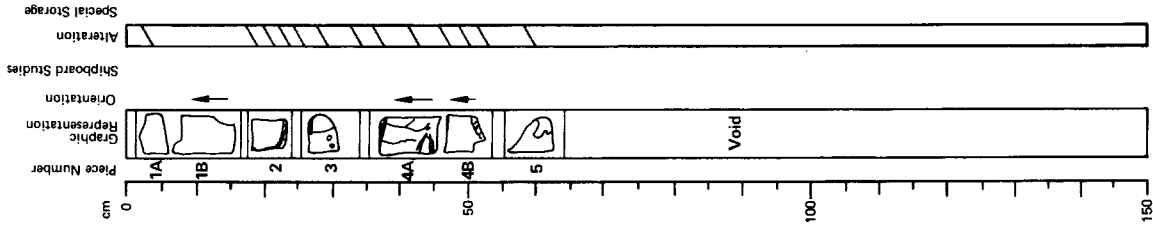
Shipboard Data
 Bulk Analysis: 93-95 cm
 SiO₂ 49.65
 Al₂O₃ 15.55
 Fe₂O₃ 10.34
 MgO 6.10
 CaO 15.12
 Na₂O N.D.
 K₂O 0.21
 TiO₂ 1.50
 P₂O₅ N.D.
 MnO N.D.
 LOI 2.60
 H₂O⁺ 0.61
 H₂O⁻ N.D.
 CO₂ 2.43
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 NRM Intensity (emu/cc) 93-95 cm
 NRM Inclination 5.248 x 10⁻³
 Stable Inclination +75.2°
 -31.2°

LEG	SITE	HOLE	CORE	SECT.
51	417D	43	7	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phytic pillow basalt with altered chilled margins (pieces 2 and 4). Basalt, gray with an aphanitic to fine-grained, microclitic groundmass. Plagioclase phenocrysts 10%, <2 mm; olivine phenocrysts 10%, <2 mm, replaced by green smectite; clinopyroxene phenocrysts 3%, <1.5 mm. Glass devitrified, replaced by green smectite, palagonite(?) and calcite. Vesicles in pieces 1 and 2, <4%, <0.3 mm, filled by calcite or green smectite. Piece 4A contains a large cavity with a lining of green smectite and a calcite core. Minor veins filled by green smectite. Piece 5 contains slickensides(?) in green smectite.

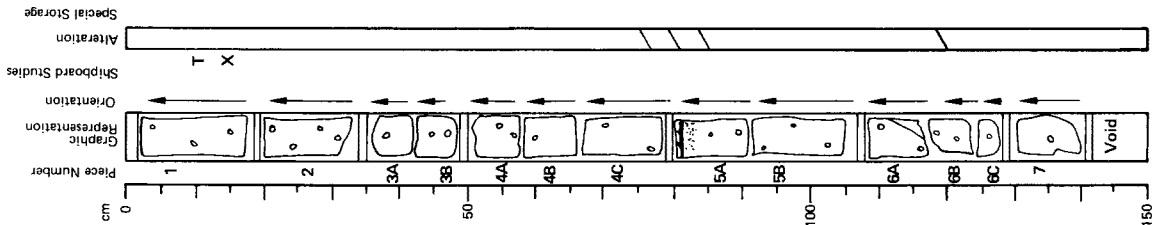


LEG	SITE	HOLE	CORE	SECT.
51	417D	43	6	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Phytic, dark gray pillow basalt with glassy chilled margins (piece 5A). Altered euhedral plagioclase phenocrysts 7-10%, <5 mm; olivine phenocrysts 3-4%, <10 mm, replaced by green smectite, liddingsite and calcite; altered clinopyroxene laths 3%, <3 mm. Vesicles 2%, 1-3 mm, filled with calcite or green smectite. Minor veins filled by green smectite, calcite.

Thin Section Description
 Location: 13 cm, pillow interior
 Texture: porphyritic
 Phenocrysts: olivine 5%, 0.2-1 mm, euhedral; plagioclase 10%, 0.5-3 mm, euhedral with prismatic micro-phenocrysts; clinopyroxene 3%, 0.2-0.5 mm, anhedral, zoned
 Groundmass: olivine <5%, 0.05 mm, euhedral; plagioclase 10%, 0.3 mm, quenched needles; clinopyroxene 20%, 0.05 mm, quenched; glass 50%, devitrified, variolitic
 Vesicles: 0.4 mm, filled by clay
 Alteration: olivine replaced by calcite and clay. Veins filled by calcite.

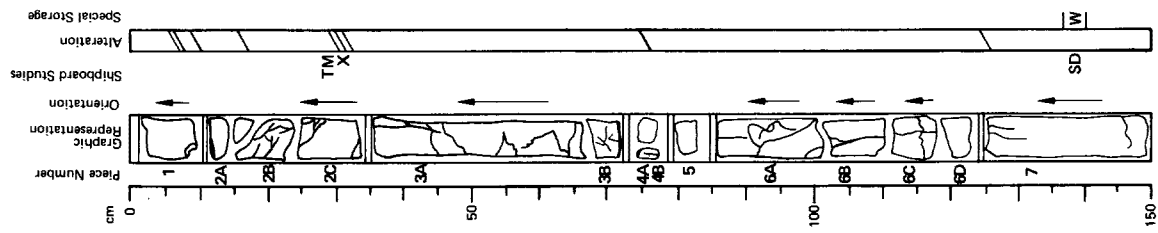


Shipboard Data
 Bulk Analysis: 13-15 cm

SiO ₂	48.83
Al ₂ O ₃	15.75
Fe ₂ O ₃	11.23
MgO	6.77
CaO	12.54
Na ₂ O	N.D.
K ₂ O	0.04
TiO ₂	1.52
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.25
H ₂ O ⁺	0.82
H ₂ O ⁻	N.D.
CO ₂	0.71
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

LEG	SITE	H O L	CORE	SECT.
51	417	D	44	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

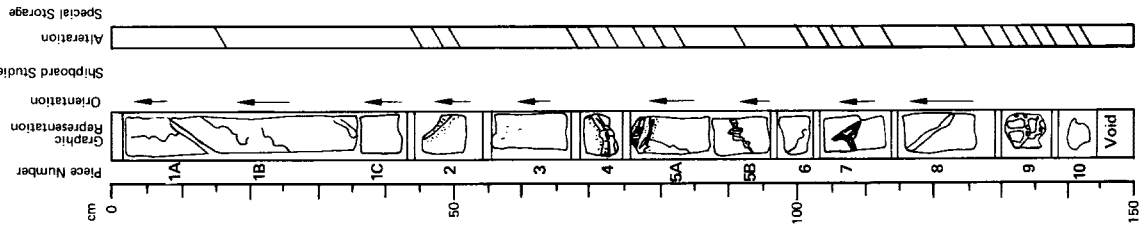
Phyric basalt with possible chilled margin in piece 6A and traces of hyaloclastite breccia in pieces 1 and 2. Groundmass fine- to medium-grained. Plagioclase phenocrysts 5-10%, <3 mm; olivine phenocrysts 5%, <1 mm, replaced by iddingsite; pyroxene phenocrysts 3-5%, <1 mm; vesicles 1-2%, filled by calcite and celadonite. Veins common in pieces 1-3 and 6, filled by dark green smectite and calcite.

Thin Section Description

Location: 30 cm, pillow interior
 Texture: phyric, microlitic
 Phenocrysts: olivine 1%, 0.3-0.6 mm, prismatic; plagioclase 10%, 0.6-5.0 mm, An 80, margins An 70-72, partially sericitized; clinopyroxene 2%, 0.2-0.5 mm, prismatic
 Groundmass: plagioclase 20%, 0.1-0.3 mm, An 65-70, quenched; clinopyroxene 60%, 0.1-0.2 mm, quenched; magnetite 5%, 0.02-0.04 mm
 Vesicles: 1%, 0.05-0.8 mm, filled by calcite and clay
 Alteration: carbonate 4%, in vesicles, groundmass and pseudomorphs replacing plagioclase, augite and olivine; clays and sericite 3%, in vesicles and pseudomorphs replacing plagioclase, augite, and olivine

Shipboard Data

Bulk Analysis:	28-31 cm	Magnetic Data:	28-31 cm
SiO ₂	50.27	NRM Intensity (emu/cc)	2.434 x 10 ⁻³
Al ₂ O ₃	17.44	NRM Inclination	+66.5°
Fe ₂ O ₃	10.54	Stable Inclination	-36.9°
MgO	6.83	Physical Property Data:	
CaO	12.60	Vp (km/sec)	139-141 cm
N ₂ O	N.D.	Wet Bulk Density (g/cc)	5.08
K ₂ O	0.08		2.76
TiO ₂	1.75		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	2.00		
H ₂ O ⁺	1.54		
H ₂ O ⁻	N.D.		
CO ₂	1.02		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



Visual Description

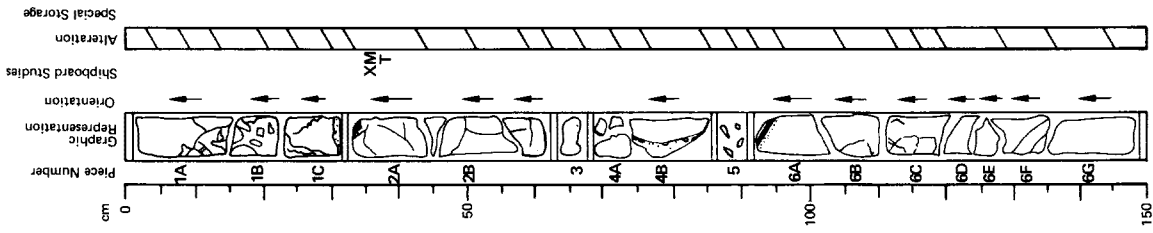
0-43 cm: sparsely phyric basalt with a coarse grained, subophitic groundmass which decreases in grain size downward. Plagioclase phenocrysts 2%, <1.5 mm; olivine phenocrysts 3%, <3 mm, replaced by green smectite and calcite; clinopyroxene phenocrysts 1%, <1 mm. Piece 1C contains a small number of large (<4 mm) calcite-filled vesicles. Veins filled by brown to green smectite or by calcite and pyrite. 8-15 cm interval contains slickensides with a dip of 55° and a 45° pitch. 43-145 cm: phyric pillow basalt with altered chilled margins (pieces 2, 4, 5A, and 9) and minor interpillow breccia (pieces 4 and 9). Basalt gray, altered to brown along veins filled by green smectite and calcite. Groundmass aphanitic to hyalophritic along margins, fine- to medium-grained microlitic in pillow interiors. Plagioclase phenocrysts 5-7%, <2 mm; olivine phenocrysts 7-10%, <3 mm; clinopyroxene phenocrysts 1-2%, <1 mm; magnetite phenocrysts 5%, <1 mm. Minor vesicles in pieces 5-10, <0.3 mm, filled by calcite. Clay replaced by pyrite, magnetite, palagonite (?) and calcite. Breccia composed of fragments of basalt in a matrix of altered glass.

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
51	417	D	44	2

LEG	SITE	HOLE	CORE	SECT.
51	417	D	45	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



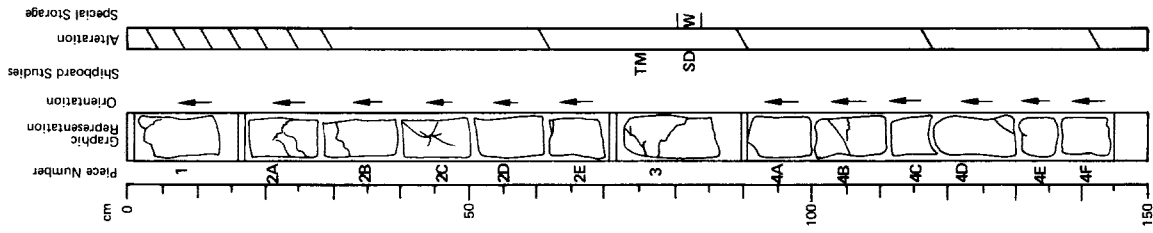
Visual Description
 Sparsely to moderately phryic pillow basalt with altered, beccated margins (pieces 1, 2A and 3-6A) and locally beccated pillow interiors (pieces 1) in a matrix of clay and minor calcite. Plagioclase phenocrysts 10%, <5 mm; olivine phenocrysts 5%, <4 mm; clinopyroxene phenocrysts 2%, 2 mm. Vesicles <5%, filled with calcite or green smectite. Shrinkage vesicles indicate tilting. Pieces 6B, 6C and 6F contain large veins and patches filled by calcite and clay. Pieces 2A, 2B and 4B contain slickensides, the latter in devitrified glass.

Thin Section Description
 Location: 36 cm, pillow interior
 Texture: phryitic, microclitic
 Phenocrysts: olivine 2%, 0.2-1.0 mm, prismatic; plagioclase 25%, 0.1-1.0 mm, An 40-45, tabular; clinopyroxene 3%, 0.2-0.6 mm, irregular prismatic
 Groundmass: plagioclase 20%, 0.05-0.1 mm, An 36, quenched; clinopyroxene 43%, 0.1 mm, quenched; magnetite 5%, 0.02-0.04 mm
 Vesicles: 1%
 Alteration: carbonate 2%, in vesicles and pseudomorphs after augite, plagioclase and olivine; clays and sercite 1%, in pseudomorphs after augite, plagioclase and olivine

Shipboard Data
 Bulk Analysis: 35.41 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 9.738 x 10⁻³
 NRM Inclination -24.6°
 Stable Inclination -26.6°

LEG	SITE	HOLE	CORE	SECT.
51	417	D	44	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



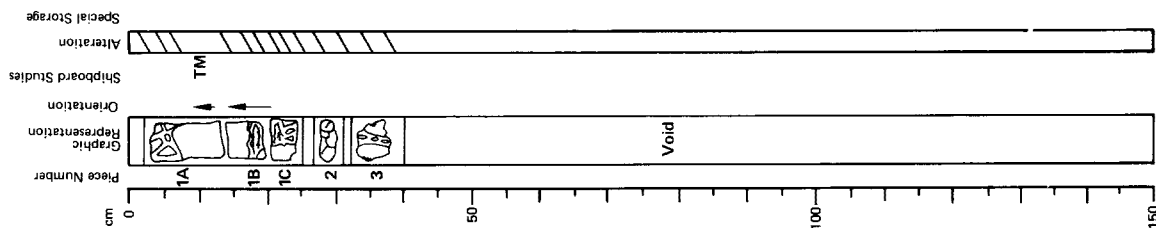
Visual Description
 Sparsely to moderately phryic basalt with chilled margins(?) in pieces 1 and 4F and minor breccia in piece 1. Plagioclase phenocrysts 5-10%, <6 mm; olivine phenocrysts 5-7%, <3 mm, replaced by iddingsite; pyroxene phenocrysts 1-3%, 1 mm. Calcite-filled vesicles 2%. Piece 2A contains a network of interconnected veins filled by calcite and clay. Breccia composed of altered basalt fragments in a matrix of calcite and clay.

Thin Section Description
 Location: 80 cm, pillow interior
 Texture: porphyritic
 Phenocrysts: olivine 5%, 0.5 mm, euhedral; plagioclase 10%, 0.5 mm, euhedral; clinopyroxene 3%, 0.5 mm, subhedral, in aggregates with plagioclase
 Groundmass: olivine 10%, subhedral; plagioclase 20%, 0.2 mm, euhedral, quenched; clinopyroxene 10%, quenched; magnetite 5%, 0.02 mm, dendritic; glass 40%, devitrified, variolitic
 Vesicles: <0.2%
 Alteration: olivine replaced by clay

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 2.608 x 10⁻³
 NRM Inclination +42.5°
 Stable Inclination -24.2°
 Physical Property Data:
 Vp (km/sec) 80-82 cm
 Wet Bulk Density (g/cc) 5.79
 2.89

LEG	SITE	HOLE	CORE	SECT.
51	417	D	4	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

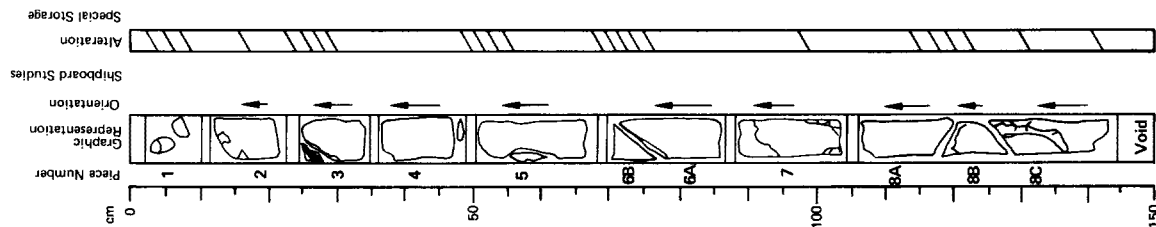


Visual Description

Sparsely phyrlic, brecciated basalt. Groundmass microlitic to subophitic. Plagioclase phenocrysts 1%, ≤ 1.5 mm; olivine phenocrysts 2%, ≤ 2 mm, replaced by green smectite; augitic clinopyroxene phenocrysts $< 1\%$, ≤ 0.5 mm. Calcite-filled vesicles $< 1\%$, ≤ 0.6 mm. Numerous veins contain fragments of basalt in a matrix of green smectite.

LEG	SITE	HOLE	CORE	SECT.
51	417	D	4	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Phyrlic to sparsely phyrlic pillow basalt with altered chilled margins (pieces 1, 3 and 5). Basalt gray with an aphanitic groundmass along margins and a fine- to medium-grained or microlitic groundmass in pillow interiors. Plagioclase phenocrysts 3%, ≤ 2 mm; increase to 15%, < 0.5 mm in piece 8; olivine phenocrysts 3%, ≤ 2 mm, replaced by green smectite and calcite; augitic clinopyroxene phenocrysts $< 1\%$, ≤ 1 mm. Calcite-filled vesicles increase in abundance with depth to 5%, ≤ 0.6 mm in pieces 5 and 6. Veins filled by green smectite and calcite. Glass devitrified, replaced by green smectite, calcite and palagonite(?). Piece 8A contains slickensides with a 45° pitch.

Thin Section Description

Location: 5 cm, pillow interior

Texture: porphyritic

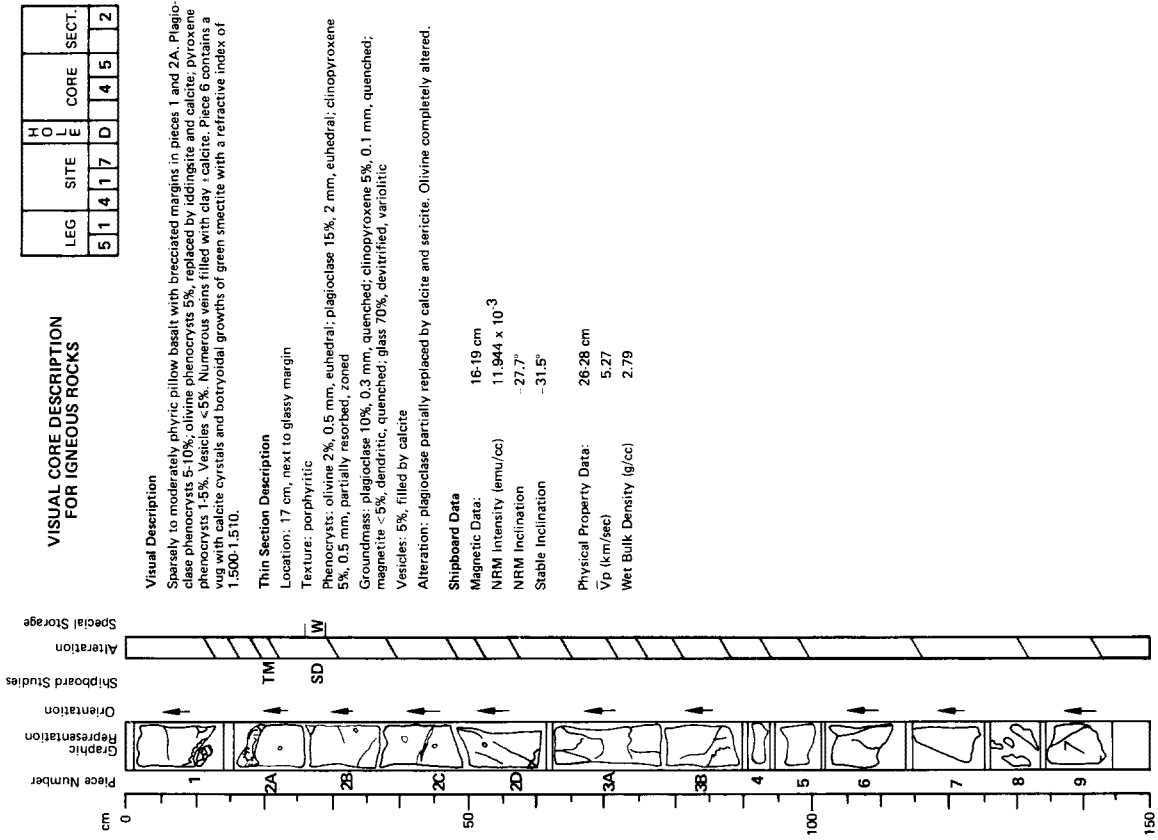
Phenocrysts: olivine 2%, 0.5 mm, euhedral; plagioclase 20%, 4 mm, euhedral; clinopyroxene 5.7%, 3 mm, subhedral

Groundmass: olivine 20%, 0.02 mm, euhedral; plagioclase 30%, 0.05 mm, euhedral, prismatic, quenched; clinopyroxene 20%, 0.02 mm, quenched; magnetite $< 5\%$, 0.02 mm, dendritic

Vesicles: $< 1\%$, 0.2 mm, filled by calcite

Alteration: plagioclase and olivine replaced by sericite and clay

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



LEG	SITE	HOLE	CORE	SECT.
5	1	4	17	D
			4	5
			2	

Visual Description
 Sparsely to moderately phytic pillow basalt with brecciated margins in pieces 1 and 2A. Plagioclase phenocrysts 5-10%, olivine phenocrysts 5%, replaced by iddingsite and calcite; pyroxene phenocrysts 1-5%. Vesicles 1-5%. Numerous veins filled with clay, calcite. Piece 8 contains a vug with calcite crystals and botryoidal growths of green smectite with a refractive index of 1.500-1.510.

Thin Section Description
 Location: 17 cm, next to glassy margin
 Texture: porphyritic
 Phenocrysts: olivine 2%, 0.5 mm, euhedral; plagioclase 15%, 2 mm, euhedral; clinopyroxene 5%, 0.5 mm, partially resorbed, zoned
 Groundmass: plagioclase 10%, 0.3 mm, quenched; clinopyroxene 5%, 0.1 mm, quenched; magnetite <5%, dendritic, quenched; glass 70%, devitrified, variolitic
 Vesicles: 5%, filled by calcite
 Alteration: plagioclase partially replaced by calcite and sericite. Olivine completely altered.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 16-19 cm 11,944 x 10⁻³
 NRM Inclination -27.7°
 Stable Inclination -31.5°
 Physical Property Data:
 Vp (km/sec) 26-28 cm 5.27
 Wet Bulk Density (g/cc) 2.79

NOTE: Cores 45-3 through 47-6 = NO RECOVERY and Core 48-1 through 48-4 = CAVINGS.

LEG	SITE	HOLE	CORE	SECT.
5	2	4	1	7

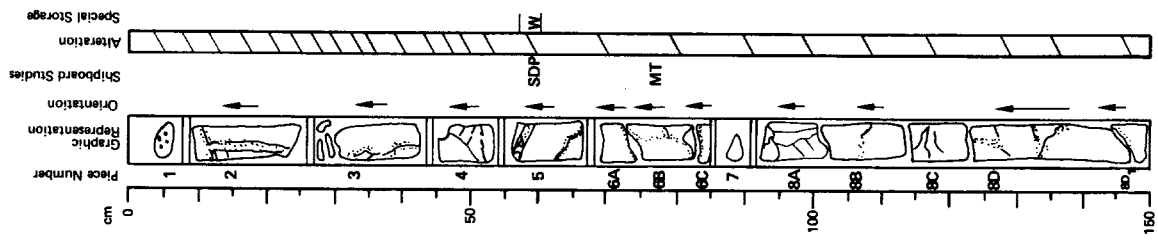
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phytic, massive basalt with traces of breccia (piece 4). Groundmass coarse-grained with a mottled intergranular to subophitic texture. Plagioclase phenocrysts <5%, <6 mm; olivine phenocrysts 1-2%, <4 mm, replaced by green smectite; clinopyroxene phenocrysts 1-2%, <4 mm; pyroxene occur in glomerules <10 mm wide. Calcite-filled vesicles 1-2%, 1 mm. Voids filled by calcite or by calcite with a green smectite lining. Basalt in piece 4 fine-grained, non-vesicular adjacent to breccia composed of basalt fragments in a matrix of calcite and green smectite.

Thin Section Description
 Location: 54 cm, flow interior
 Texture: glomerophyritic/aphanitic
 Phenocrysts: olivine 0.2-0.5 mm; plagioclase 0.5-4.0 mm; clinopyroxene 0.2-3.0 mm
 Groundmass: plagioclase, clinopyroxene and magnetite all cryptocrystalline; section contains a 1.5 cm wide dike containing plagioclase microlites
 Vesicles: <1%, 2 mm, round, filled with zeolites and undifferentiated silicates
 Alteration: olivine replaced by calcite

Shipboard Data
 Bulk Analysis: 84-86 cm
 SiO₂ 50.3
 Al₂O₃ 16.5
 Fe₂O₃ 9.74
 MgO 7.25
 CaO 12.6
 Na₂O N.D.
 K₂O 0.03
 TiO₂ 1.54
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.9
 H₂O⁺ 0.90
 H₂O⁻ N.D.
 CO₂ 0.08
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 NRM Intensity (emu/cc) 4.28 x 10⁻³
 NRM Inclination +27.3°
 Stable Inclination -16.2°



LEG	SITE	HOLE	CORE	SECT.
5	2	4	1	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

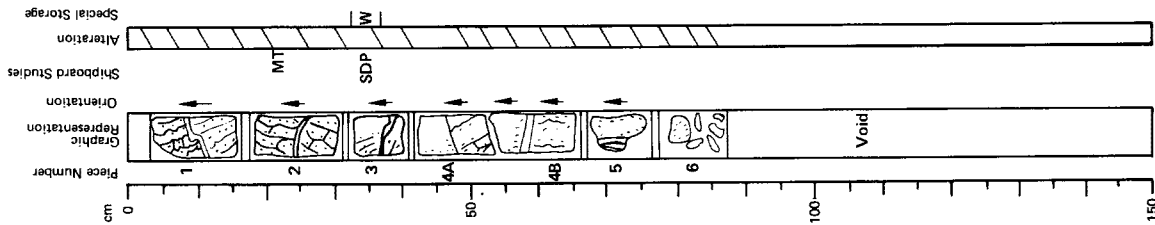
Visual Description
 Aphyric to sparsely phytic, massive basalt. Groundmass medium-grained, partially replaced by green smectite in pieces 1-4, altered to a depth of 1 cm along veins in pieces 1-8. Plagioclase phenocrysts <5%, <5 mm; olivine phenocrysts <5%, 1-2 mm, replaced by green to brown smectite or iddingsite(?); clinopyroxene phenocrysts <3%, <5 mm. Vesicles <5%, filled by calcite or green smectite. Veins filled with green to brown smectite.

Thin Section Description
 Location: 77 cm, flow interior
 Texture: ophi-mottled
 Phenocrysts: olivine 3%, 0.5 mm, euhedral; plagioclase laths 10%, 0.5-4 mm; clinopyroxene 6%, 0.5-1 mm, subophitic
 Groundmass: composed of olivine, plagioclase, clinopyroxene, magnetite and glass
 Vesicles: <1%, <0.1 mm, filled by smectite and calcite
 Alteration: olivine and plagioclase replaced by calcite and clay; veins filled with pyrite and iron oxides.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 1.44 x 10⁻³
 NRM Inclination +70.9°
 Stable Inclination +12.4°
 Physical Property Data:
 Vp (km/sec) 5.06
 Porosity (%) 7.7
 Wet Bulk Density (g/cc) 2.73
 Grain Density (g/cc) 2.88

LEG	SITE	H O L E	CORE	SECT.
5 2	4 1 7	D	4 9	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



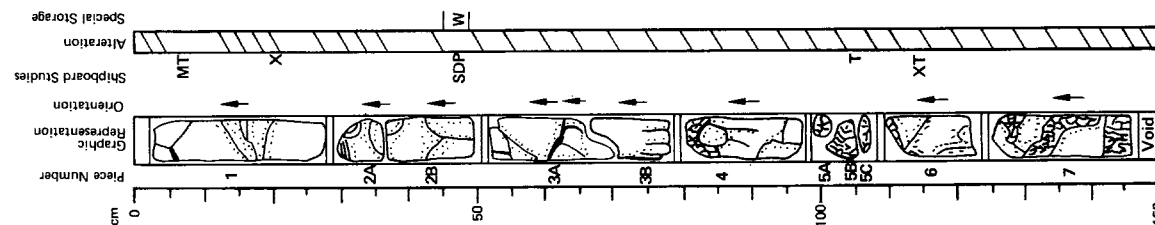
Visual Description
 Sparingly phyrlic, massive basalt with numerous fractures. Basalt gray, altered to gray-brown along veins. Groundmass coarse-grained. Plagioclase phenocrysts <5%, <3 mm; augite phenocrysts <2%, <3 mm; altered olivine phenocrysts <2%, <3 mm; phenocrysts often occur in glomerocrysts. Vesicles rare. Numerous thin veins filled by green smectite and minor calcite; larger veins filled by calcite with a lining of light to dark green or yellow to brown smectite.

Thin Section Description
 Location: 21 cm, flow interior to flow margin
 Texture: intergranular, quenched, glomerophyric
 Phenocrysts: olivine <5%, <1.5 mm, euhedral; plagioclase 15%, <3%, laths with normal, oscillatory, and sector zoning; clinopyroxene 5%, <1.5 mm, euhedral to granular
 Groundmass: olivine 10%, seriate, intergranular, quenched; plagioclase 25%, seriate, intergranular, quenched; clinopyroxene 30%, seriate, intergranular, quenched; magnetite 5%, <0.05 mm, euhedral; glass 5%, devitrified
 Vesicles: none
 Alteration: olivine phenocrysts replaced by calcite and clay. Veins filled by calcite and clay.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 20-22 cm 2.50 x 10³
 NRM Inclination -37.5°
 Stable Inclination -25.0°
 Physical Property Data:
 Vp (km/sec) 32.34 cm 5.43
 Porosity (%) 5.4
 Wet Bulk Density (g/cc) 2.815
 Grain Density (g/cc) 2.92

LEG	SITE	H O L E	CORE	SECT.
5 2	4 1 7	D	4 9	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Sparingly phyrlic, massive basalt with volcanic breccia in pieces 4-7. Basalt gray, altered to gray brown to a lath, <1 cm along veins and fractures. Groundmass coarse-grained with a mottled, phyrlic texture. Plagioclase phenocrysts <5%, <5 mm; augite phenocrysts <3%, <5 mm; olivine (?) phenocrysts <2%, replaced by green to brown smectite or iddingsite(?); plagioclase and augite phenocrysts tend to occur in glomerocrysts. Minor vesicles filled with calcite. Thin veins filled by green to brown smectite. Breccia in pieces 4-7 composed of basalt fragments in a matrix of green smectite and minor calcite. Pieces 2A and 3A contain gouged slickensides.

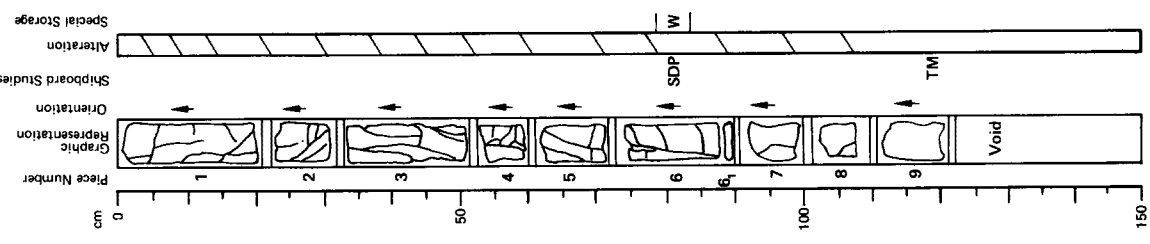
Thin Section Description
 Location: 8 cm, flow interior to flow margin
 Texture: intergranular, quenched, glomerophyric
 Phenocrysts: olivine 3%, <0.7 mm, euhedral; plagioclase laths 15%, <2 mm, zoned; clinopyroxene 7%, <1 mm, anhedral, mosaic
 Groundmass: olivine 10%, intergranular, quenched; plagioclase 13%, intergranular, quenched; clinopyroxene 35%, euhedral; magnetite 2%, 0.005 mm, anhedral; euhedral pyrite 7%, 0.05 mm, in veins
 Vesicles: 2%, <1 mm, filled by calcite, zeolites and smectite
 Alteration: olivine phenocrysts replaced by calcite and clay; veins filled by calcite and clay; plagioclase replaced by clay.

Shipboard Data
 Bulk Analysis: 20-22 cm 114-116 cm
 SiO₂ 49.7 51.6 Magnetic Data: 7-9 cm 0.926 x 10³
 Al₂O₃ 16.5 17.7 NRM Intensity (emu/cc) +28.4°
 Fe₂O₃ 9.12 8.86 NRM Inclination -24.6°
 MgO 7.23 6.39 Stable Inclination
 CaO 11.3 10.1 Physical Property Data: 43-45 cm
 Na₂O N.D. N.D. Vp (km/sec) 5.07
 K₂O 0.13 0.80 Porosity (%) 8.3
 TiO₂ 1.65 1.67 Wet Bulk Density (g/cc) 2.80
 P₂O₅ N.D. N.D. Grain Density (g/cc) 2.94
 MnO N.D. N.D.
 LOI 1.6 2.1
 H₂O⁺ 1.15 1.50
 H₂O⁻ N.D. N.D.
 CO₂ 0.07 0.10
 Cr N.D. N.D.
 Ni N.D. N.D.
 Sr N.D. N.D.
 Zr N.D. N.D.

Alteration: olivine and glass replaced by smectite and minor calcite
 Location: 115 cm, flow interior
 Texture: highly phyrlic, interstitial
 Phenocrysts: olivine 3%, 0.1-0.8 mm, euhedral; plagioclase 10%, 0.2-2 mm, euhedral-subhedral; clinopyroxene 2%, 0.1-0.5 mm, anhedral-subhedral
 Groundmass: 85%, largely and interstitial mat of altered glass and fine-grained (<0.05 mm) plagioclase, clinopyroxene and olivine
 Vesicles: none
 Alteration: olivine glass and plagioclase replaced by calcite, clay and zeolites

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H	O	L	CORE	SECT.
5	2	4	1	7	D	5 0 1



Visual Description
 Highly phytic, massive basalt with numerous fractures. Groundmass microlitic, altered to gray-brown. Plagioclase phenocrysts 15%, <5 mm; olivine phenocrysts 10-15% (pieces 4,6). Vesicles <5 mm; rarely to 8 mm. Olivine phenocrysts <2 mm, 5%, locally 10-15% (pieces 4,6). Vesicles <10 mm wide. Vesicles filled with green to brown smectite, commonly dip 60° to the horizontal. Piece 4 contains horizontal slickensides; piece 5 displays slickensides which dip 65°, pitch 45° and suggest normal and right lateral components of motion. Piece 9 contains pyrite.

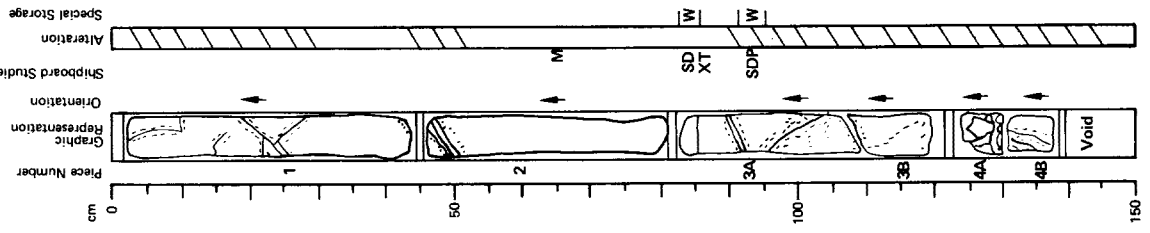
Thin Section Description
 Location: 117 cm, flow interior
 Texture: glomeroporphyritic, intersertal
 Phenocrysts: Olivine 6%, <2.0 mm, euhedral; plagioclase 10%, <3.0 mm, euhedral-subhedral; clinopyroxene 4%, <1.5 mm, anhedral, in clusters with plagioclase
 Groundmass: olivine 5%, plagioclase 20%; clinopyroxene 30%, skeletal, subhedral; magnetite 15%
 Vesicles: <1%

Alteration: olivine replaced by calcite and clays

Shipboard Data
 Magnetic Data: 115-117 cm
 NRM Intensity (emu/cc) 1.85 x 10⁻³
 NRM Inclination +36.9°
 Stable Inclination -33.6°
 Physical Property Data:
 Vp (km/sec) 81-83 cm
 Porosity (%) 5.59
 Wet Bulk Density (g/cc) 5.1
 Grain Density (g/cc) 2.865
 2.97

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

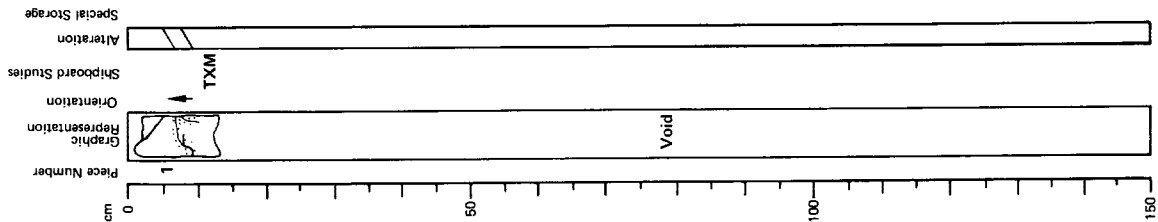
LEG	SITE	H	O	L	CORE	SECT.
5	2	4	1	7	D	5 0 2



Visual Description
 Highly phytic, massive basalt with traces of breccia in pieces 1 and 4A. Basalt gray, altered to gray-brown to a depth of 10 mm along veins. Groundmass inter-granular to intersertal. Plagioclase phenocrysts 15%, <5 mm; augite phenocrysts 5%, <3 mm; olivine phenocrysts 5%, <3 mm, replaced by smectite or calcite; phenocrysts commonly seriate, tend to occur in glomerocrysts <10 mm wide. Vesicles <1%, 1 mm; crescentic fillings common but vary randomly (<180°) in orientation within single pieces. Veins contain locally complex filling of calcite and smectite, minor breccia and numerous stickensides. Piece 4A contains a brecciated band of aphyric basalt.

Thin Section Description
 Location: 89 cm
 Texture: Glomeroporphyritic, intersertal to subophitic
 Phenocrysts: olivine 5%, <2.0 mm, euhedral; plagioclase 20%, 4 mm, euhedral-subhedral; clinopyroxene 15%, <1.5 mm, anhedral, commonly in subophitic clots
 Groundmass: olivine 5%, seriate; plagioclase 25%, seriate, laths and swallow tail aggregates; clinopyroxene 20%, seriate, anhedral; magnetite 5%, euhedral; glass 5%
 Vesicles: <1%, <2.0 mm, filled with calcite and smectite
 Alteration: olivine replaced by calcite and clays; vesicles filled by calcite and clay

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 65-67 cm
 NRM Inclination 2.28 x 10⁻³
 Stable Inclination +71.8°
 -16.4°
 Physical Property Data:
 Vp (km/sec) 83-85 cm
 Porosity (%) 5.57
 Wet Bulk Density (g/cc) 2.84
 Grain Density (g/cc) 93-95 cm
 5.67
 5.0
 2.905
 2.99



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	CORE	SECT.
5	2417	D	51C

Visual Description
 Sparsely phyrlic, massive gray basalt with narrow alteration halos along veins. Groundmass halo crystalline, locally aphanitic with plagioclase microphenocrysts. Plagioclase, pyroxene and altered olivine(?) phenocrysts minor; rare, partially resorbed plagioclase megacrysts contain inclusions of euhedral spinel. Veins filled with green smectite and calcite. Sulfides present as rare, anhedral granules.

Thin Section Description
 Location: 13 cm, flow interior
 Texture: subophitic to intersertal
 Phenocrysts: olivine 5%, < 1.5 mm, euhedral; plagioclase 25%, < 2.0 mm, euhedral laths; clinopyroxene 20%, < 1.5, subophitic clots
 Groundmass: olivine 5%, seriate; plagioclase 15%, seriate; clinopyroxene 20%, seriate; magnetite 5%, < 0.5 mm, euhedral; glass 5%, altered to smectite
 Vesicles: none
 Alteration: olivine replaced by calcite and clays; zeolites < 1%; iron hydroxides < 1%

Shipboard Data

Bulk Analysis: 10-12 cm	Magnetic Data:	10-12 cm
SiO ₂ 49.4	NRM Intensity (emu/cc)	1.54 x 10 ⁻³
Al ₂ O ₃ 15.5	NRM Inclination	+45.0°
Fe ₂ O ₃ 11.1	Stable Inclination	-15.6°
MgO 6.78		
CaO 12.4		
Na ₂ O N.D.		
K ₂ O 0.26		
TiO ₂ 1.46		
P ₂ O ₅ N.D.		
MnO N.D.		
LOI 2.0		
H ₂ O ⁺ 0.93		
H ₂ O ⁻ N.D.		
CO ₂ 0.07		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5 2	4 1 7 D	E	5 2	1

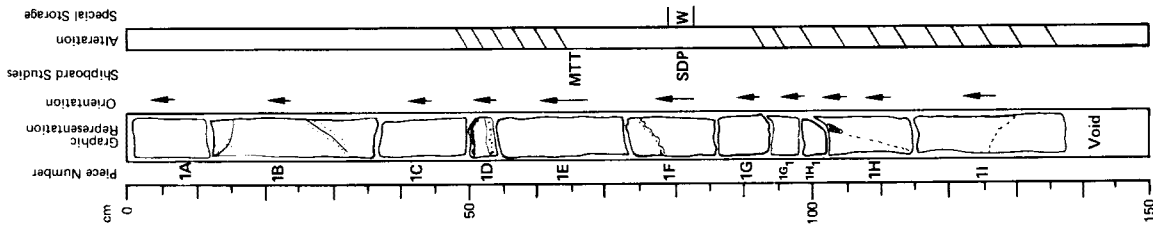
Visual Description
Moderately to sparsely phyrlic, massive basalt with an intersertal groundmass. Basalt gray, altered to gray-brown to a depth of 5 mm along veins (pieces 1D, 1E and 1G-1I). Plagioclase phenocrysts 1-5 mm, augite phenocrysts <5 mm, olivine phenocrysts <4 mm, replaced by green smectite and calcite; tend to be concentrated in pieces 1C-1F; plagioclase commonly seriate. Vesicles rare. Veins filled by calcite and/or green smectite + sulfides. Sulfides also present as rare, anhedral granules.

Thin Section Description
Location: 85 cm, flow interior
Texture: highly phyrlic, ophitic
Phenocrysts: olivine 10%, 1 mm, euhedral; plagioclase 25%, 1-3.5 mm, laths; clinopyroxene 25%, 1-2.5 mm
Groundmass: plagioclase 15%, 0.5 mm, laths; magnetite 10%, euhedral; glass 25%
Vesicles: none
Alteration: glass altered to smectite; olivine and pyroxene replaced by clay

Thin Section Description
Location: 85 cm, flow interior
Texture: glomeroporphyritic, quenched, intersertal
Phenocrysts: olivine 5%, <4 mm, euhedral; plagioclase 30%, 4 mm, laths with normal and complex zoning; clinopyroxene 30%, <4 mm, subophitic clots
Groundmass: plagioclase 10%, seriate, quenched; clinopyroxene 5%, seriate, quenched; magnetite 5%, <0.2 mm, skeletal; glass 15%
Vesicles: none
Alteration: olivine replaced by calcite and clay; veins filled by calcite and clay

Shipboard Data
Magnetic Data: 64-86 cm
NRM Intensity (emu/cc) 4.33 x 10⁻³
NRM Inclination +78.2°
Stable Inclination - 9.9°

Physical Property Data:
Vp (km/sec) 80-82 cm
5.89
Porosity (%) 3.3
Wet Bulk Density (g/cc) 2.905
Grain Density (g/cc) 2.98

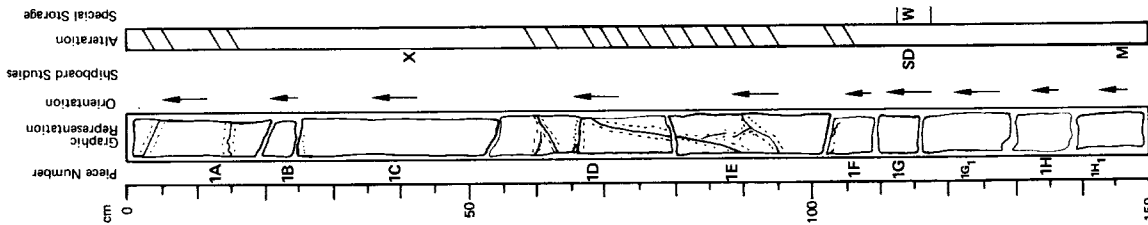


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5 2	4 1 7 D	E	5 2	2

Visual Description
Moderately phyrlic, massive basalt with a medium- to coarse-grained groundmass. Plagioclase phenocrysts 5% <5 mm; clinopyroxene phenocrysts 3%, olivine phenocrysts replaced by green smectite, 2-3%, <3 mm, increase to 5-8%, in 19, 36, 40-60, 95-98, 112-114 and 128-135 cm intervals; phenocrysts commonly occur in glomerocrysts. Veins steeply dipping, filled by smectite and/or fine to coarsely crystalline calcite. Sulfides present throughout groundmass, concentrated in piece 1A along vein at 16 cm. Section continuous with previous section.

Shipboard Data
Magnetic Data: 144-146 cm
Bulk Analysis: 49.7
NRM Intensity (emu/cc) 4.06 x 10⁻³
NRM Inclination +36.7°
Stable Inclination -17.3°
Physical Property Data: 113-115 cm
Vp (km/sec) 5.97
Wet Bulk Density (g/cc) 2.92

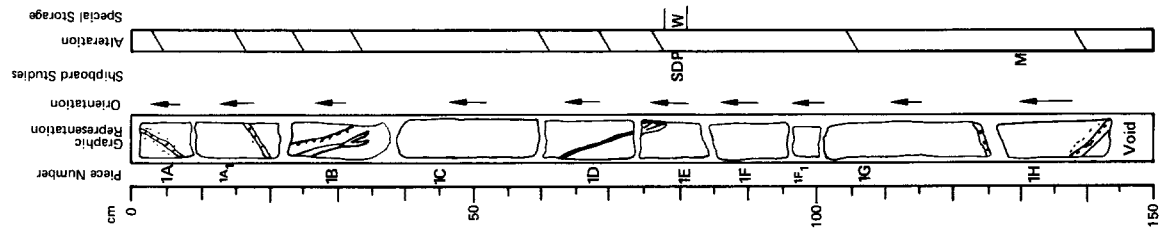


LEG	SITE	H O L	CORE	SECT.
52	417	D	52	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic, massive basalt with a fine-grained, aphyric interval between 30-37 cm. Groundmass fine-grained between 108-150 cm, medium-grained with subophitic clots between 0-108 cm. Plagioclase phenocrysts 5-7%, 3-6 mm, locally to 8 mm; clinopyroxene phenocrysts 2-3%, 2-3 mm; olivine phenocrysts 3-4%, < 7 mm, replaced by green smectite, concentrated as single crystals or glomerocrysts in 15-21, 48-62 and 118-122 cm intervals, rare between 127-148 cm. Vains filled by calcite, lined with green smectite. Sulfides (pyrite?) disseminated throughout section.

Shipboard Data
 Location: 131-133 cm
 NRM Intensity (emu/cc): 3.92 x 10⁻³
 NRM Inclination: +71.1°
 Stable Inclination: - 8.5°
Physical Property Data:
 Vp (km/sec): 77-79 cm
 Porosity (%): 6.01
 Wet Bulk Density (g/cc): 2.8
 Grain Density (g/cc): 2.93
 2.99



LEG	SITE	H O L	CORE	SECT.
52	417	D	52	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

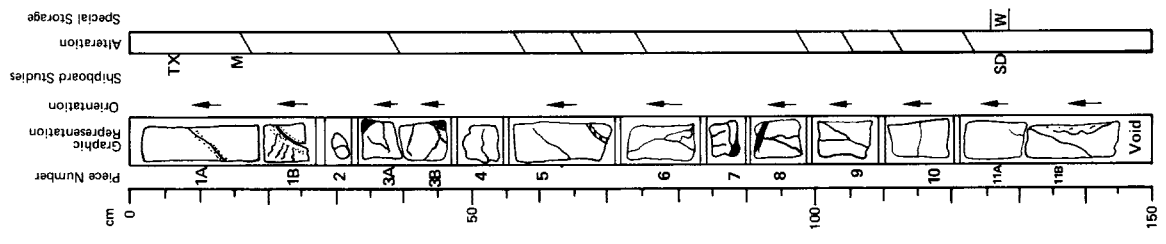
Visual Description
 0-27 cm: moderately phyrlic, fine-grained, massive basalt with a chilled glassy margin and minor breccia in piece 1B.
 27-150 cm: moderately to highly phyrlic pillow basalt with chilled glassy margins in pieces 3, 7, and 8. 33-48 cm interval represents a complete pillow bounded by chilled margins. Groundmass fine-grained. Plagioclase phenocrysts < 5 mm; clinopyroxene phenocrysts < 5 mm; olivine phenocrysts 1-1.5 mm; pyroxenes occur singly and in subophitic intergrowths < 8 mm across, total 20-35%. Vesicles 10% in piece 10, filled by calcite and green smectite. Vains filled by green smectite and calcite.

Thin Section Description
 Location: 8 cm, next to glassy margin
 Texture: phyrlic, intergranular
 Phenocrysts: olivine 3%, 0.3-3 mm, euhedral; plagioclase 10%, 1.5-5 mm, euhedral-subhedral; clinopyroxene 2%, 0.1-0.6 mm, subhedral, ophitic-subophitic clots
 Groundmass: olivine 2%, 0.02 mm, euhedral; plagioclase 35%, 0.02-0.03 mm, subhedral; clinopyroxene 35%, 0.02-0.03 mm, anhedral; magnetite 3%, 0.02-0.03 mm, dendritic, 150 metric, glass 10%
 Vesicles: < 1%, 1 mm, round, filled by calcite and smectite
 Alteration: veins filled by calcite and clay. Olivine and glass replaced by calcite and clay

Shipboard Data
 Bulk Analysis: 07.09 cm
 SiO₂: 48.2
 Al₂O₃: 14.8
 Fe₂O₃: 10.8
 MgO: 6.96
 CaO: 13.9
 Ni₂O: N.D.
 K₂O: 0.28
 TiO₂: 1.43
 P₂O₅: N.D.
 MnO: N.D.
 LOI: 2.8
 H₂O⁺: 0.80
 H₂O: N.D.
 CO₂: 1.44
 Cr: N.D.
 Ni: N.D.
 Sr: N.D.
 Zr: N.D.

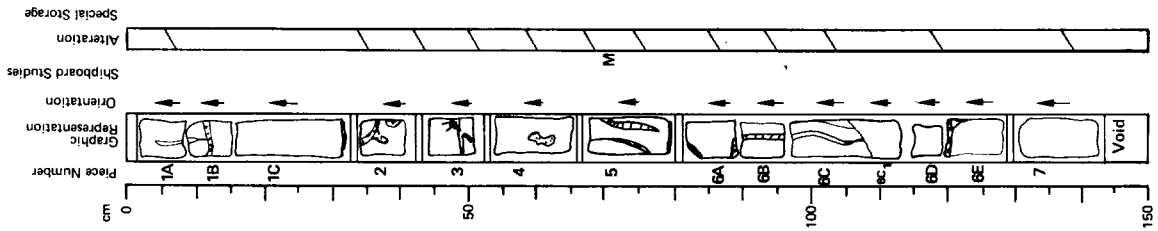
Magnetic Data:
 NRM Intensity (emu/cc): 4.46 x 10⁻³
 NRM Inclination: +25.1°
 Stable Inclination: - 9.0°

Physical Property Data:
 Vp (km/sec): 125-127 cm
 Wet Bulk Density (g/cc): 5.44
 2.84



LEG	SITE	HOLE	CORE	SECT.
52	417	D	52	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



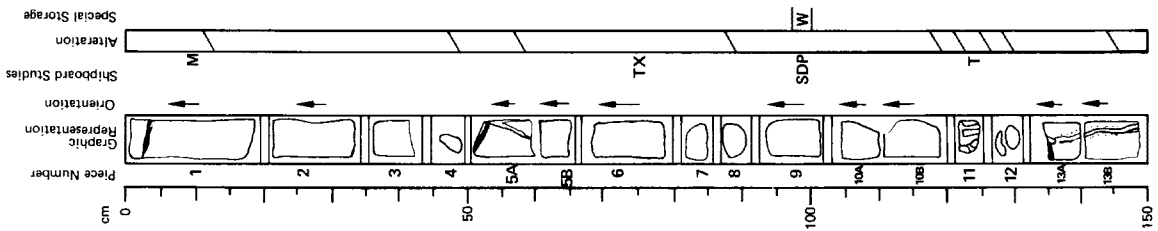
Visual Description
 Sparsely to moderately phryic pillow basalt with altered chilled margins containing traces of glass in pieces 5 and 6A. Fine- to medium-grained groundmass moderately altered along numerous veins. Plagioclase, clinopyroxene and olivine phenocrysts (the latter replaced by green smectite) tend to occur in intergrowths <5 mm across. Veins filled by calcite, lined with green smectite. Piece 2 contains vugs filled by green smectite and euhedral calcite.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 69.71 cm
 NRM Intensity (emu/cc) 8.73 x 10⁻³
 NRM Inclination - 7.6°
 Stable Inclination -12.2°

LEG	SITE	HOLE	CORE	SECT.
52	417	D	52	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Sparsely to moderately phryic pillow basalt with altered chilled margins in pieces 1, 5A, 10 and 13A and traces of hyaloclastite breccia containing fragments of baked(?) clay (piece 11). Groundmass fine- to medium-grained. Plagioclase phenocrysts <4 mm; clinopyroxene phenocrysts <3 mm; olivine phenocrysts <3 mm, replaced by green smectite + calcite; phenocrysts occur singly or in subophitic, occasionally stellate, intergrowths <6 mm across, total 10-15%. Veins filled by brown smectite. Chilled margins largely replaced by green smectite and calcite, locally contain traces of fresh glass. Basalt in pieces 2 and 13B contains patches of calcite.

Thin Section Description

Location: 74 cm
 Texture: porphyritic - intersertal
 Phenocrysts: olivine 2-3%, 0.2-0.5 mm; plagioclase 9%, 0.3-1.5 mm, laths, euhedral - subhedral; clinopyroxene 3-4%, 0.5 mm, intergrowths in plagioclase
 Groundmass: plagioclase 35%, <0.1 mm, acicular; clinopyroxene 35%, <0.05 mm, granular; magnetite 10%; glass 5%
 Vesicles: <1%, 0.1-0.3 mm, spherical, filled by calcite
 Alteration: veins filled with pyrite; glass in groundmass replaced by clay
 Location: 126 cm, glassy margin
 Texture: hyalophyitic
 Phenocrysts: olivine <1%; plagioclase 5%, 0.1-1.5 mm, laths; clinopyroxene <1%
 Groundmass: glass 85%
 Vesicles: none
 Alteration: glass replaced by calcite and clay

Shipboard Data

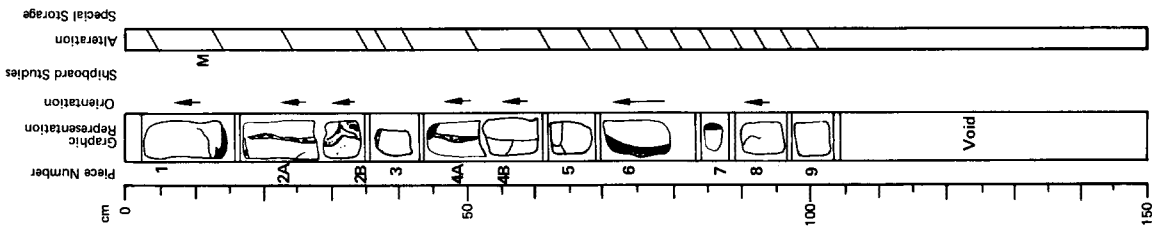
Bulk Analysis: 73.75 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 8.10 cm
 NRM Intensity (emu/cc) 14.24 x 10⁻³
 NRM Inclination -10.1°
 Stable Inclination -14.3°
 Physical Property Data:
 Vp (km/sec) 96.98 cm
 Vp (km/sec) 5.45
 Porosity (%) 6.3
 Wet Bulk Density (g/cc) 2.85
 Grain Density (g/cc) 2.95

LEG	SITE	HOLE	CORE	SECT.
52	417	D	52	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely to moderately phryic pillow basalt with altered chilled margins in pieces 1, 2A, 4A, 6 and 7. Fine-grained groundmass moderately to strongly altered along numerous veins and margins. Plagioclase, clinopyroxene and olivine phenocrysts (the latter replaced by green smectite) 2.5 mm. Piece 2 contains vesicles <2 mm across. Veins <1 cm wide, filled by calcite and green smectite.

Shipboard Data
 Location: 110-112 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 17.34 x 10⁻³
 NRM Inclination -11.2°
 Stable Inclination -16.2°



LEG	SITE	HOLE	CORE	SECT.
52	417	D	53	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

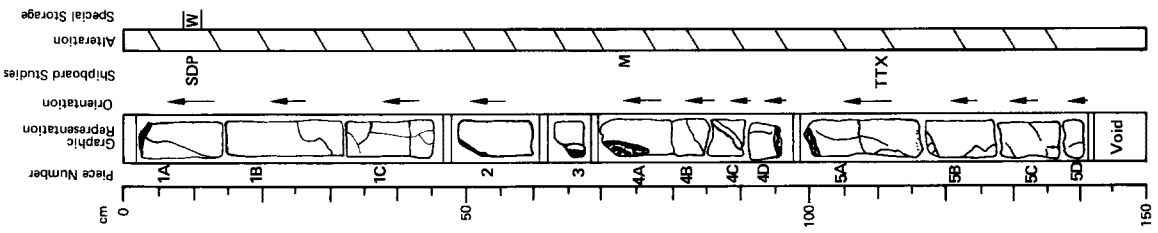
Visual Description
 Moderately to highly phryic, fine-grained pillow basalt with chilled glassy margins and minor inter-pillow breccia in pieces 1A, 2, 3, 4A, 4B and 5A. Plagioclase phenocrysts 10-15%, <5 mm; euhedral to anhedral clinopyroxene phenocrysts 10%, <5 mm, often as intergrowths with plagioclase; euhedral olivine phenocrysts 5%, <2 mm, replaced by green smectite. Vesicles 5%, 1-3 mm; the smaller vesicles (1 mm) tend to be filled by calcite or green smectite, while the larger (and more irregular) are filled by calcite and lined by green smectite. Veins filled by calcite.

Thin Section Description
 Location: 111 cm, next to glassy margin
 Texture: phryic, intersertal, quenched
 Phenocrysts: olivine 2%, 2.0 mm, euhedral-subhedral; plagioclase 8%, 4 mm, subhedral; clinopyroxene 4%, 2.0 mm, anhedral
 Groundmass: olivine 4%, quenched; plagioclase 25%; clinopyroxene 50%, plumose; magnetite 5%
 Vesicles: 2%, 1.0 mm, filled with smectite
 Alteration: olivine replaced by calcite and clay

Location: 111 cm, pillow interior
Texture: porphyritic, intersertal, quenched
Phenocrysts: olivine 5%, 0.5-1 mm, euhedral; plagioclase 10%, 1-5 mm, laths, tablets; clinopyroxene 5%, 0.5-1 mm, anhedral
Groundmass: plagioclase 25%, <0.5-1 mm, laths; clinopyroxene 25%, plumose; magnetite 20%, 0.1 mm, euhedral; glass 10%
Vesicles: none
Alteration: olivine and glass replaced by clay

Shipboard Data

Bulk Analysis:	110-112 cm	Magnetic Data:	73-75 cm
SiO ₂	48.6	NRM Intensity (emu/cc)	12.49 x 10 ⁻³
Al ₂ O ₃	15.5	NRM Inclination	-20.8°
Fe ₂ O ₃	10.6	Stable Inclination	-23.5°
MgO	6.34		
CaO	13.2	Physical Property Data:	10-12 cm
Na ₂ O	N.D.	Vp (km/sec)	5.55
K ₂ O	0.37	Porosity (%)	5.8
TiO ₂	1.56	Wet Bulk Density (g/cc)	2.86
P ₂ O ₅	N.D.	Grain Density (g/cc)	2.94
MnO	N.D.		
LOI	2.4		
H ₂ O ⁺	0.95		
H ₂ O ⁻	N.D.		
CO ₂	0.95		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

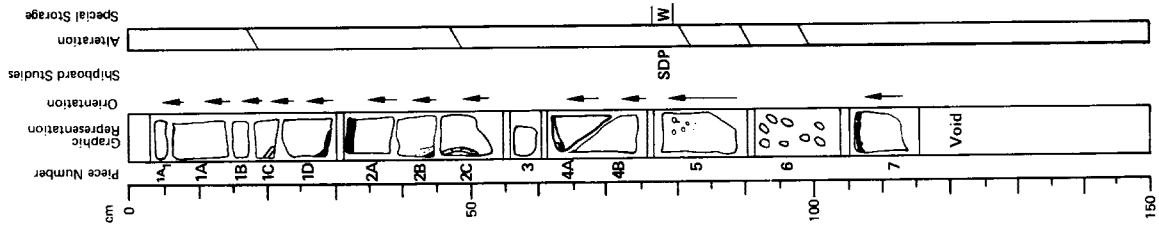


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H	O	LEG	SITE	H	O
52	417	D	53	2	53	2	2

Visual Description
 Moderately phryic pillow basalt with altered chilled margins in pieces 1D, 2A, 4A and 7 and traces of fresh glass in piece 4A. Groundmass fine-grained to glassy. Plagioclase phenocrysts 4.8%, <2 mm; clinopyroxene phenocrysts 1.2%, present in glomerocrysts with plagioclase; olivine phenocrysts 1.2%, <1 mm, replaced by green smectite. Calcite occurs in patches between 78-82 cm and as possible vesicle fillings in pieces 1B, 1C and 2A. Veins filled by smectite and calcite. Basalt fragments in piece 6 strongly altered.

Shipboard Data
 Location: 8-10 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 13.16 x 10⁻³
 NRM Inclination -20.3°
 Stable Inclination -22.2°
 Physical Property Data:
 Vp (km/sec) 82-84 cm
 5.54
 Wet Bulk Density (g/cc) 2.865



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

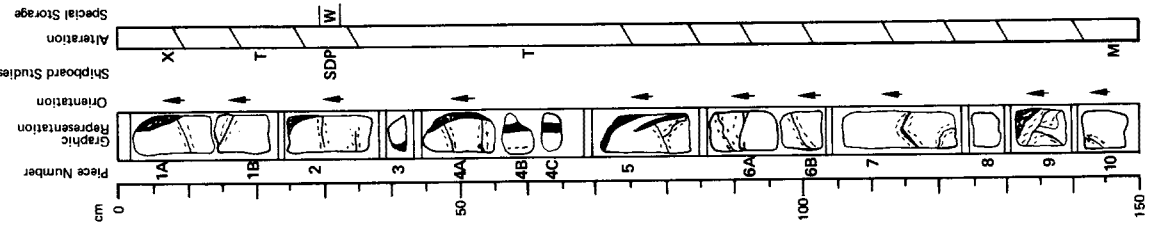
LEG	SITE	H	O	LEG	SITE	H	O
52	417	D	54	1	54	1	1

Visual Description
 Moderately to highly phryic pillow basalt with altered chilled margins in pieces 1-5 and 9 and traces of fresh glass in pieces 1, 4A, 5 and 9. Fine-grained groundmass moderately altered with brown alteration halos extending to a depth of 1 cm along veins filled by calcite and lined with brown smectite. Glass largely replaced by green smectite. Plagioclase phenocrysts 10-15%; olivine phenocrysts 5%; olivine phenocrysts 5%, replaced by green smectite and calcite(?); phenocrysts commonly occur in subophitic clots <5 mm across. Calcite-filled vesicles common, <0.5 mm. Piece 1 contains a vein filled by sulfides and calcite. Piece 4B contains a large (2 cm) vug filled by olivine-green zeolites(?).

Thin Section Description
 Location: 19 cm, pillow interior
 Texture: phryic, variolitic
 Phenocrysts: olivine 1%, 0.3-0.4 mm, euhedral; plagioclase 6%, 0.6-0.8 mm, euhedral; subhedral; clinopyroxene 3%, 0.3-0.4 mm, subhedral
 Groundmass: plagioclase and pyroxene laths in altered glass 88%
 Vesicles: 2%, 0.05-1 mm, round, filled by calcite and minor smectite
 Alteration: olivine and glass replaced by clay. Clays associated with sulfides
 Location: 80 cm, glassy margin
 Texture: fine; glassy
 Phenocrysts: plagioclase 5-10%, 0.3-0.5 mm, euhedral; clinopyroxene 5%, 0.3-1 mm, euhedral, oscillatory zoned
 Groundmass: glass 85-90%
 Vesicles: none
 Alteration: veins and interpillow voids filled by clay

Shipboard Data
 Bulk Analysis: 7.9 cm
 SiO₂ 49.4
 Al₂O₃ 15.7
 Fe₂O₃ 10.8
 MgO 6.41
 CaO 12.5
 Na₂O N.D.
 K₂O 0.20
 TiO₂ 1.59
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.9
 H₂O⁺ 0.96
 H₂O⁻ N.D.
 CO₂ 0.44
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 NRM Intensity (emu/cc) 144-146 cm
 25.59 x 10⁻³
 NRM Inclination 20.9
 Stable Inclination 21.0
 Physical Property Data:
 Vp (km/sec) 30-32 cm
 5.03
 Porosity (%) 10.8
 Wet Bulk Density (g/cc) 2.75
 Grain Density (g/cc) 2.96



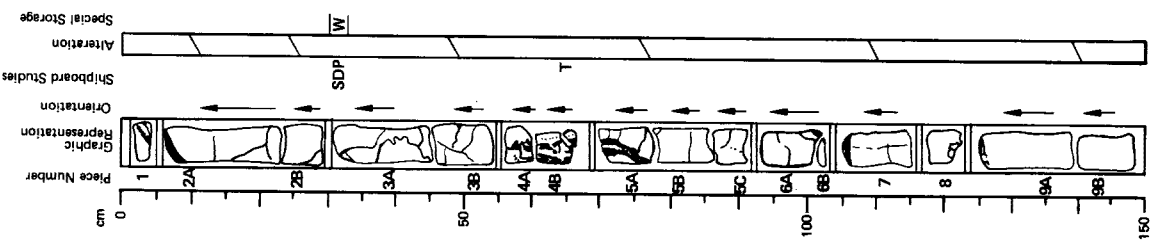
LEG	SITE	HOLE	CORE	SECT.
52	417	D	54	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately to highly phryic pillow basalt with glassy chilled margins in pieces 1, 2A, 4, 5A, 6 and 7 and interpillow breccia in piece 4 and 5A. Groundmass aphanitic to fine-grained. Euhedral plagioclase phenocrysts 10-15%, 2-8 mm across; euhedral pyroxene phenocrysts 3-5%, <4 mm, commonly with plagioclase in glomerocrysts <8 mm across; euhedral olivine phenocrysts <5%, 1-2 mm, replaced by green smectite. Large (<1 cm) irregular vesicles filled with calcite and dark green smectite; small round vesicles filled by calcite. Piece 8 contains a large (2 cm) calcite filled vesicle. Breccia in pieces 4 and 5A composed of fragments of glass replaced by green smectite in a dark brown matrix of altered glass and smectite.

Thin Section Description
 Location: 65 cm, glassy margin
 Texture: glassy
 Phenocrysts: olivine 1%, 0.5 mm, euhedral; plagioclase laths 10%, 0.5-1.5 mm; clinopyroxene 3%, 0.5 mm, intergrown with plagioclase
 Groundmass: altered glass 85%
 Vesicles: none
 Alteration: glass replaced by smectite and calcite

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 39.41 cm
 Porosity (%) 5.43
 Wet Bulk Density (g/cc) 7.3
 Grain Density (g/cc) 2.80
 2.90

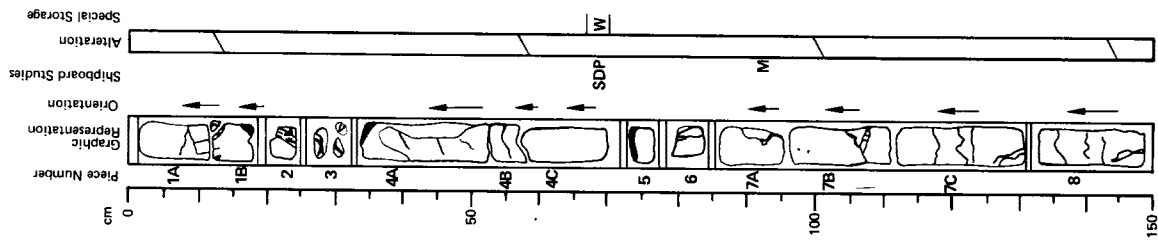


LEG	SITE	HOLE	CORE	SECT.
52	417	D	54	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt with chilled margins in pieces 1B, 2, 4A and 5, and minor inter-pillow breccia in piece 3. Groundmass aphanitic to fine-grained. Plagioclase phenocrysts and micro-lites 5-10%, 5-9 mm and <5%, 2-4 mm respectively; euhedral pyroxene phenocrysts 5-8%, 1-4 mm, commonly with plagioclase in glomerocrysts; olivine phenocrysts <5%, 1-2 mm. Vesicles 1-3%, filled with calcite and dark green smectite. Minor veins filled by calcite and dark green smectite. Breccia in piece 3 composed of fragments of glass cemented by glass, olive-green smectite(?) and calcite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 92.94 cm
 15.22 x 10⁻³
 NRM Inclination + 6.2°
 Stable Inclination +13.9°
 Physical Property Data:
 Vp (km/sec) 71-73 cm
 Porosity (%) 5.55
 Wet Bulk Density (g/cc) 6.7
 Grain Density (g/cc) 2.865
 3.00



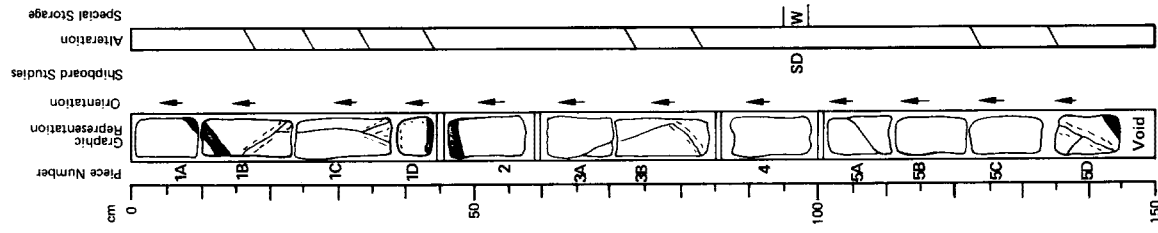
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LEG	SITE	HOLE	CORE	SECT.
5	2417D		54	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately to highly phryic pillow basalt with chilled glassy margins in pieces 1A, 1B, 1D, 2 and 5D. Glass partially replaced by smectite. Plagioclase phenocrysts 10%; augite phenocrysts 5%; olivine phenocrysts 5%, replaced by smectite; phenocrysts tend to occur in subophitic clots <5 mm across. Vesicles common, <.05 mm, filled by calcite, minor smectite. Veins filled by calcite and lined with green to brown smectite. Sulfides present as vein fillings and as small (<.05 mm) disseminated grains.

Shipboard Data
 Location: 98-100 cm
 Physical Property Data:
 Vp (km/sec) 5.76
 Wet Bulk Density (g/cc) 2.865



LEG	SITE	HOLE	CORE	SECT.
5	2417D		54	5

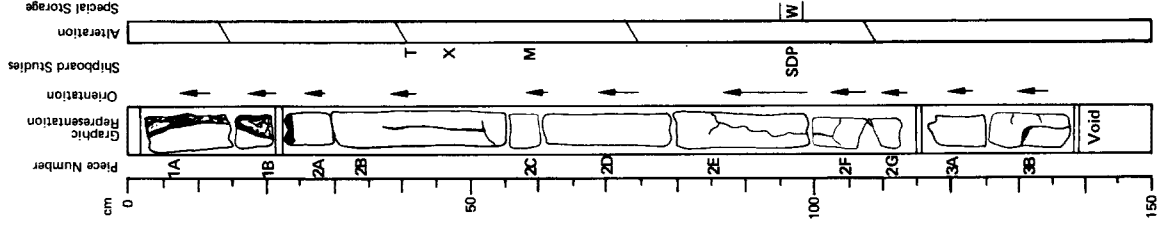
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt with chilled glassy margins in pieces 1 and 2. 0.22 cm interval represents a complete pillow bounded by well-preserved margins. Groundmass aphanitic to fine-grained. Plagioclase phenocrysts 10%, <1 cm; euhedral pyroxene phenocrysts 3.5%, 2-3 mm, tend to occur in glomerocrysts with plagioclase; olivine phenocrysts <5%. Minor veins filled by calcite and dark green smectite. Large interpillow filling in piece 1 contains calcite and zeolites(?).

Thin Section Description
 Location: 42 cm
 Texture: intergranular
 Phenocrysts: olivine 3%, <2.0 mm, euhedral; plagioclase 6%, <3.0 mm, laths with prominent zoning; clinopyroxene 3%, <2.0 mm
 Groundmass: olivine 8%, euhedral; plagioclase laths, 35%; clinopyroxene 25%, fibrous bundles; magnetite 5%, <0.02 mm, euhedral; glass 15%, devitrified
 Vesicles: 2%, <0.2 mm, filled by smectite with minor calcite
 Alteration: calcite <1%, mostly in thin veins; clays replacing olivine 10%; sulfides in veins <1%

Shipboard Data
 Bulk Analysis: 47.49 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 58-60 cm
 NRM Inclination 19.34 x 10⁻³
 Stable Inclination -0.3°
 -21.4°

Physical Property Data:
 Vp (km/sec) 97.99 cm
 Porosity (%) 5.88
 Wet Bulk Density (g/cc) 3.1
 Grain Density (g/cc) 2.91
 2.96



LEG	SITE	HOLE	CORE	SECT.
52	417	D	55	1

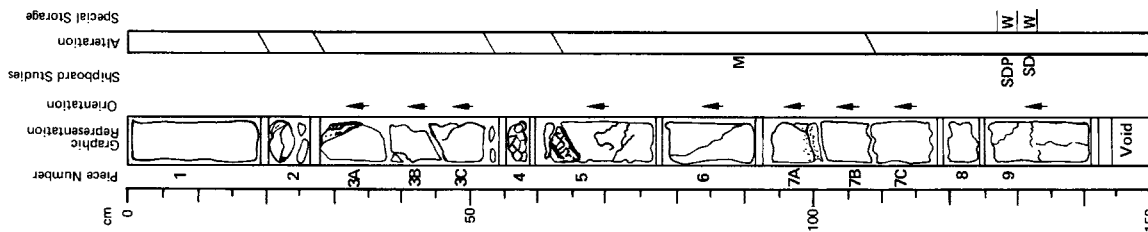
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt with minor breccia in pieces 4 and 5 and glassy chilled margins partially replaced by dark green smectite in pieces 2 and 3A. Basalt groundmass composed of plagioclase microlites, pyroxene and altered olivine in a matrix of fresh to altered glass. Glass and olivine in groundmass partially to completely replaced by green smectite. Euhedral plagioclase phenocrysts 8%, <5 mm; anhedral augite phenocrysts 3%, <2 mm; euhedral olivine phenocrysts 2%, <3 mm, replaced by green smectite. Vesicles rare, <1 mm, filled by green to brown smectite and/or calcite. Veins common, <1 mm, filled by smectite + calcite. Breccia in pieces 4 and 5 contains calcite, montmorillonite(?) and green smectite.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 88.90 cm
 NRM Intensity (emu/cc) 17.93×10^{-3}
 NRM Inclination -14.5°
 Stable Inclination -16.8°

Physical Property Data:
 Vp (km/sec) 128-130 cm
 Porosity (%) 5.53
 Wet Bulk Density (g/cc) 6.0
 Grain Density (g/cc) 2.875
 Grain Density (g/cc) 2.98



LEG	SITE	HOLE	CORE	SECT.
52	417	D	54	6

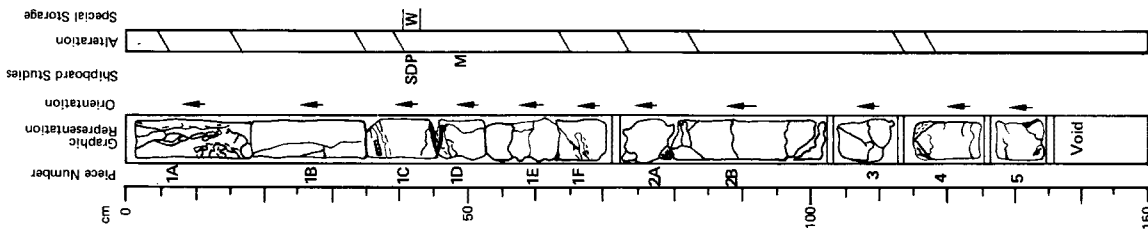
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately to highly phryic pillow basalt with chilled glassy margins in pieces 1C and 1D. Groundmass weakly to moderately altered. Plagioclase phenocrysts 10%, <6 mm, increase to 15% toward base of section; augite phenocrysts 5%, 2-3 mm; olivine phenocrysts 3-7%, 2-3 mm, replaced by smectite + calcite. Vesicles 1%, <1 mm, filled by calcite, green smectite and zeolites. Veins filled by calcite and lined with dark green to brown smectite.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 49.61 cm
 NRM Intensity (emu/cc) 34.51×10^{-3}
 NRM Inclination -16.2°
 Stable Inclination -19.2°

Physical Property Data:
 Vp (km/sec) 41-43 cm
 Porosity (%) 5.61
 Wet Bulk Density (g/cc) 5.9
 Grain Density (g/cc) 2.85
 Grain Density (g/cc) 2.97



LEG	SITE	HOLE	CORE	SECT.
52	417D	5	5	3

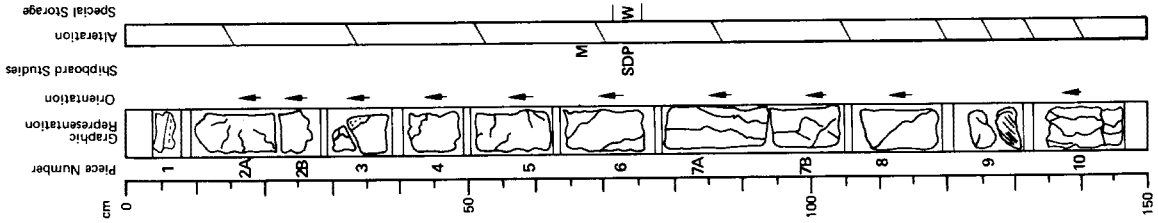
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt with glassy chilled margins in pieces 1 and 3. Moderately altered groundmass composed of plagioclase microites, augite and olivine replaced by smectite. Euhedral plagioclase phenocrysts 10%, <5 mm, occasionally to 8 mm; anhedral augite phenocrysts 3%, <2 mm; euhedral olivine phenocrysts 2%, <2 mm, replaced by green smectite. Vesicles < 1%, <1 mm, filled by calcite and green to brown smectite. Glassy margins and groundmass locally oxidized along veins filled by green smectite or lined by smectite with a core of calcite.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 67.89 cm
 NRM Intensity (emu/cc) 16.79 x 10⁻³
 NRM Inclination + 2.6°
 Stable Inclination - 9.8°

Physical Property Data:
 Vp (km/sec) 73.75 cm
 Porosity (%) 5.53
 Wet Bulk Density (g/cc) 6.2
 Grain Density (g/cc) 2.885
 Grain Density (g/cc) 2.98



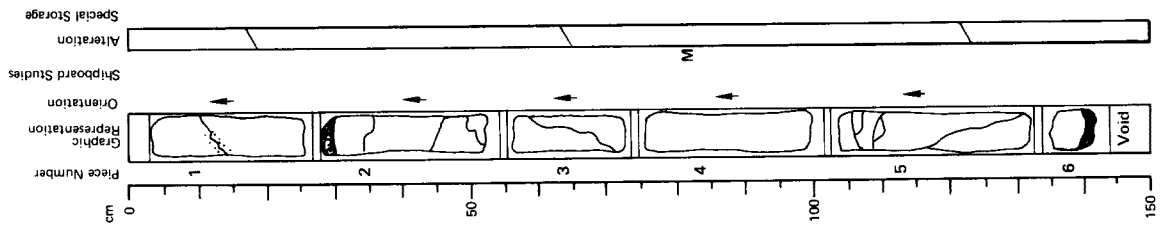
LEG	SITE	HOLE	CORE	SECT.
52	417D	5	5	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Highly phryic, slightly altered pillow basalt with glassy chilled margins in pieces 2 and 6. Groundmass glassy to fine-grained with glomerophryic or subophitic clots. Glass partially replaced by calcite and green smectite. Plagioclase phenocrysts 15%, <10 mm; subophitic augite clots 5%, <7 mm across; olivine phenocrysts 5%, replaced by calcite and smectite. Vesicles common, 0.5 mm, filled by calcite, occasionally by smectite. Sulfides occur as vein fillings and as small (0.5 mm) discrete grains. Piece 5 contains a large complex vein filled by sulfides, calcite and smectite.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 86.88 cm
 NRM Intensity (emu/cc) 19.64 x 10⁻³
 NRM Inclination - 2.6°
 Stable Inclination -20.9°



LEG	SITE			CORE			SECT.
52	41	7D	55	5	5	5	5

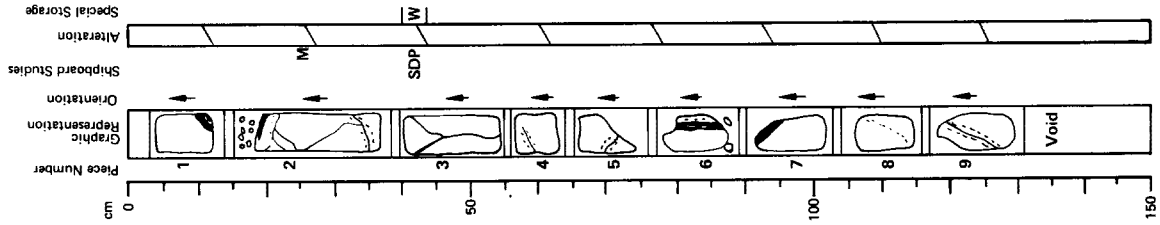
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately to highly phryic pillow basalt with altered chilled margins in pieces 1, 2, 6 and 7. Groundmass glassy to fine grained, moderately altered. Plagioclase phenocrysts 7-10%, augite phenocrysts 3-5%, olivine phenocrysts 3-5%, replaced by smectite and minor calcite; phenocrysts < 5 mm, usually 1-2 mm, commonly in subophitic glomerocrysts < 10 mm across. Vesicles common, 0.5 mm, filled by smectite and calcite. Sulfides occur as discrete grains 0.5 mm across. Glass in margins and groundmass largely replaced by smectite.

Shipboard Data

Magnetic Data:
 24-26 cm
 NRM intensity (emu/cc) 21.44 x 10⁻³
 NRM inclination -21.0°
 Stable inclination -24.0°

Physical Property Data:
 Vp (km/sec) 41-43 cm
 Porosity (%) 5.8
 Wet Bulk Density (g/cc) 2.875
 Grain Density (g/cc) 2.96



LEG	SITE			CORE			SECT.
52	41	7D	55	5	5	4	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

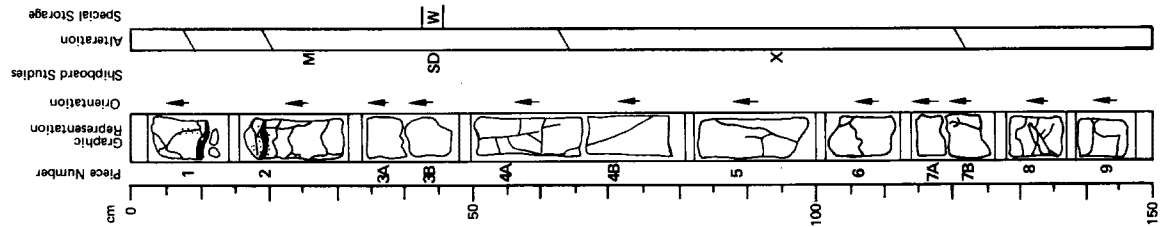
Visual Description
Sparsely phryic pillow basalt with altered glassy margins intermixed with calcite in pieces 1 and 2. Groundmass holocrystalline with occasional glomerocrysts or plagioclase and pyroxene. Euhedral plagioclase, pyroxene and olivine(?) phenocrysts total 15%; pyroxene phenocrysts large (< 7 mm) and abundant in piece 4B. Groundmass relatively fresh even along veins filled with calcite and minor sulfides.

Shipboard Data

Bulk Analysis: 96.98 cm
 SiO₂ 48.2
 Al₂O₃ 14.9
 Fe₂O₃ 10.9
 MgO 6.62
 CaO 13.2
 Na₂O N.D.
 K₂O 0.03
 TiO₂ 1.48
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.9
 H₂O⁺ 0.84
 H₂O⁻ N.D.
 CO₂ 0.36
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 28-30 cm
 NRM intensity (emu/cc) 12.52 x 10⁻³
 NRM inclination -4.5°
 Stable inclination -18.3°

Physical Property Data:
 Vp (km/sec) 43-45 cm
 Wet Bulk Density (g/cc) 5.71
 2.89

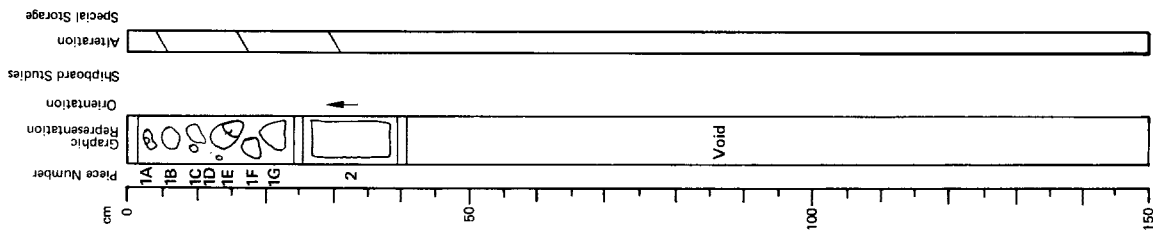


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	417	D	56	1

Visual Description

Moderately phryic pillow basalt. Plagioclase, clinopyroxene and olivine phenocrysts tend to occur in glomerophyric clots 2-3 mm across. Veins filled by calcite + smectite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	417	D	57	1

Visual Description

Sparsely to moderately phryic, fine-grained pillow basalt with a chilled margin in pieces 2A and breccia in pieces 7 and 8. Plagioclase phenocrysts and glomerophyric clots <5 mm; clinopyroxene phenocrysts <2 mm; altered olivine phenocrysts <4 mm. Contains vesicles <2 mm across filled with calcite and smectite. Veins common, filled by calcite and green smectite. Breccia in pieces 7 and 8 composed of fragments of basalt in a matrix of green smectite after glass.

Thin Section Description

Location: 69 cm, pillow interior

Texture: subophitic, intersertal

Phenocrysts: olivine 4%, 1.5 mm, euhedral; plagioclase 9%, 2 mm, euhedral-subhedral; clinopyroxene 7%, 1.0 mm, anhedral, subophitic

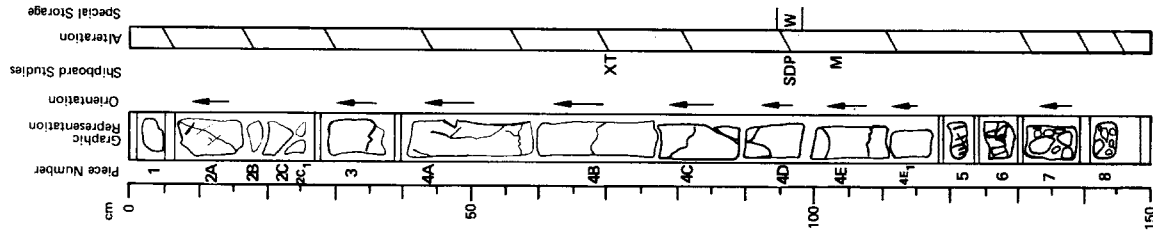
Groundmass: olivine <1%; plagioclase 30%, swallow-tail laths; clinopyroxene 45%, anhedral, plumes; magnetite 5%.

Vesicles: <1%, 1 mm, filled with calcite and smectite

Alteration: olivine replaced by calcite and clays; some veinlets contain sulfides

Shipboard Data

Bulk Analysis:	70-72 cm	Magnetic Data:	101-103 cm
SiO ₂	48.6	NRM Intensity (emu/cc)	22.46 x 10 ⁻³
Al ₂ O ₃	15.3	NRM Inclination	12.8
Fe ₂ O ₃	11.1	Stable Inclination	15.3
MgO	7.02	Physical Property Data:	96.98 cm
CaO	13.9	Vp (km/sec)	5.40
Na ₂ O	N.D.	Porosity (%)	7.7
K ₂ O	0.03	Wet Bulk Density (g/cc)	2.845
TiO ₂	1.56	Grain Density (g/cc)	2.97
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	1.8		
H ₂ O ⁺	0.83		
H ₂ O ⁻	N.D.		
CO ₂	0.90		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



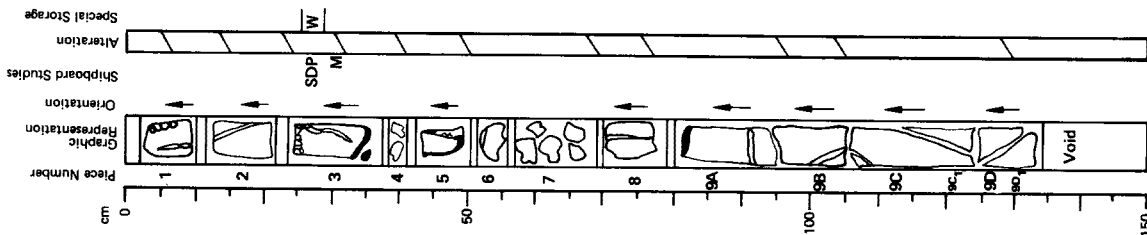
LEG	SITE	HOLE	CORE	SECT.
524	17D	57	57	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately to highly phyrlic pillow basalt with altered chilled margins in pieces 3 and 9A and traces of hyaloclastite(?), breccia in pieces 1, 3, and 6. Groundmass aphanitic to fine-grained, increases to medium-grained (small glomerocrysts in a fine-grained matrix) toward pillow interior in piece 9. Glass in pillow margins and groundmass entirely replaced by smectite. Plagioclase phenocrysts 10%, <4 mm, usually 2-3 mm; clinopyroxene phenocrysts 4%, occasionally with plagioclase in glomerocrysts or subophitic clots <8 mm across; olivine phenocrysts <2 mm, 2% increase to 3-5% in pieces 9B and 9C, replaced by brown smectite. Veins filled by brown smectite or by calcite (pieces 9B and 9C). Piece 6 contains a calcite-filled vug. Breccia composed of altered basalt fragments in a green smectite matrix derived from sideromelane glass?

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 29-31 cm 12.07 x 10⁻³
NRM Inclination -72.1°
Stable Inclination -72.1°

Physical Property Data:
Vp (km/sec) 26-28 cm 5.24
Porosity (%) 9.0
Wet Bulk Density (g/cc) 2.71
Grain Density (g/cc) 2.91

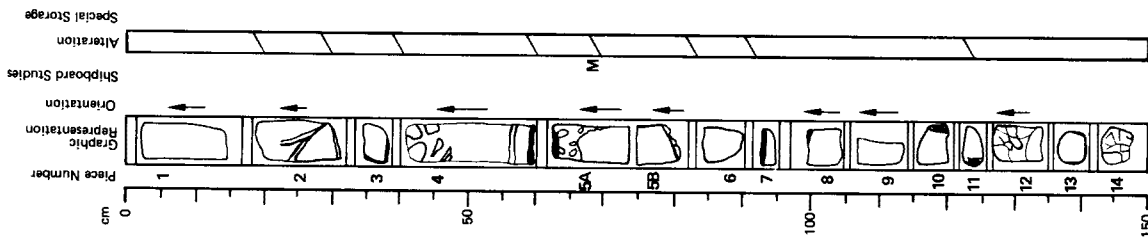


LEG	SITE	HOLE	CORE	SECT.
524	17D	57	57	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phyrlic, fine- to medium-grained pillow basalt with altered hyaloclastite breccia in pieces 2, 5, 7-12 and 14 and an altered glass margin(?) in piece 6. Plagioclase and clinopyroxene in glomerocrysts and subophitic clots <5 mm across; olivine phenocrysts <2 mm, replaced by green smectite and hematite, iddingsite or brown smectite(?). Veins filled by green smectite. Breccia composed of fragments of slightly to moderately altered basalt in a matrix of green smectite and minor calcite.

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 67-69 cm 14.29 x 10⁻³
NRM Inclination -26.2°
Stable Inclination +26.6°

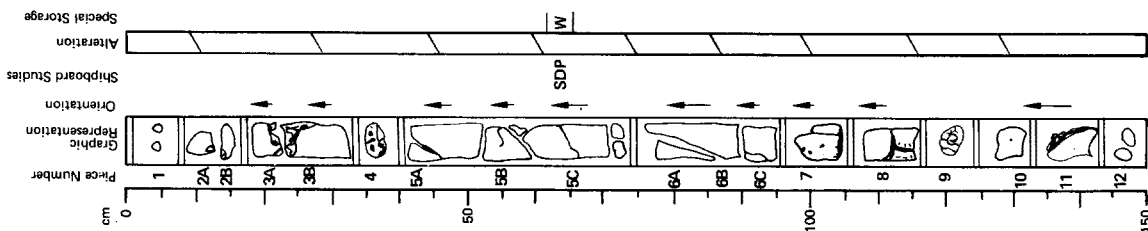


LEG	SITE	HOLE	CORE	SECT.
52	417	D	58	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phryic pillow basalt with glassy chilled margins in pieces 7, 8 and 11, and altered hyaloclastite breccia in pieces 2-4 and 8. Pyroxene phenocrysts <5%, <4 mm, usually <2 mm; plagioclase phenocrysts in rare glomerocrysts with pyroxene; olivine(?) phenocrysts <1 mm, replaced by green smectite. Minor vesicles filled by dark green smectite. Breccia along pillow margins (piece 8) or cutting through pillow interiors (piece 3) composed of coarse (0.5-3.0 cm) fragments of basalt or glass altered to green smectite in a matrix of dark, altered glass.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 64.66 cm
 Porosity (%) 5.15
 Wet Bulk Density (g/cc) 10.3
 Grain Density (g/cc) 2.785
 2.98

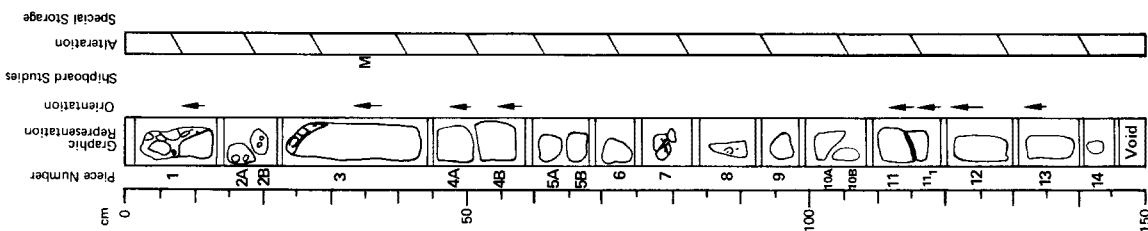


LEG	SITE	HOLE	CORE	SECT.
52	417	D	57	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely to moderately phryic pillow basalt with altered hyaloclastite breccia in piece 1. Groundmass fine-grained, moderately altered. Plagioclase phenocrysts and subophitic clots <5 mm; clinopyroxene phenocrysts <5 mm; olivine phenocrysts <7 mm, replaced by calcite and smectite. Numerous veins filled by calcite and green smectite. Breccia composed of basalt fragments cut by veins of green smectite, montmorillonite and calcite in a matrix of calcite and green smectite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 34-36 cm
 NRM Intensity (emu/cc) 20.03×10^{-3}
 NRM Inclination +62.9°
 Stable Inclination +61.7°

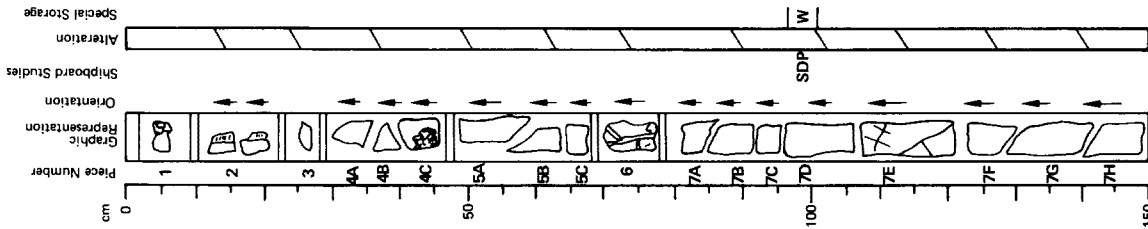


LEG	SITE	H O L E	CORE	SECT.
52	417D		58	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Aphritic to sparsely phyrlic basalt with minor breccia-filled veins in pieces 1, 4C and 5A. Pyroxene phenocrysts <3%; 2.3 mm; altered olivine phenocrysts <1%, 1-2 mm. Minor vesicles filled by calcite. Breccia composed of fragments of basalt and glass altered to green smectite in a matrix of dark altered glass and minor calcite. Pieces 2, 3 and 7 contain veins filled by dark green smectite with well-preserved slickensides indicating strike-slip and normal faulting.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 99-101 cm
 4.73
 Wet Bulk Density (g/cc) 2.695

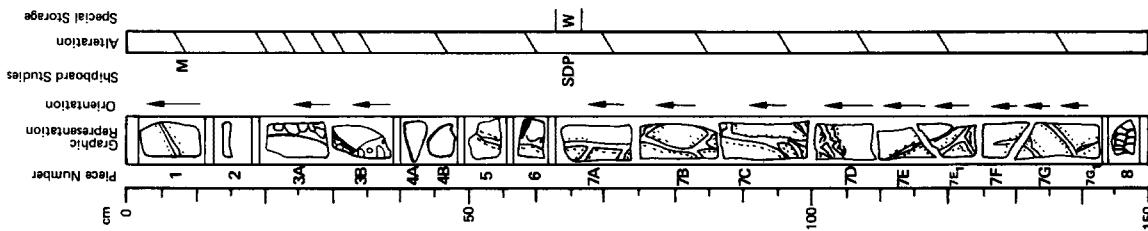


LEG	SITE	H O L E	CORE	SECT.
52	417D		58	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

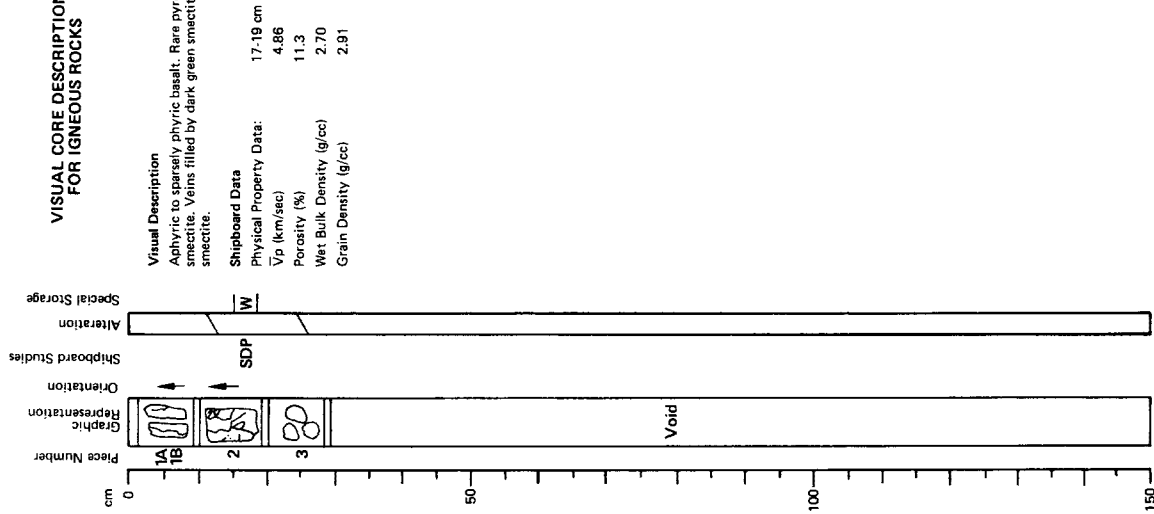
Visual Description
 Sparsely to moderately phyrlic pillow basalt with altered chilled margins in pieces 3 and 6 and broken pillow breccia in piece 3. Groundmass aphanitic to medium-grained, oxidized to a depth of 0.5-3.0 mm along veins filled by brown smectite and minor calcite. Subophitic clots and glomerocrysts of plagioclase, clinopyroxene 10%, 2.3 mm; olivine phenocrysts <1 mm, replaced by green smectite altered to red-brown along oxidized veins. Breccia composed of angular to subrounded fragments of moderately altered or oxidized basalt and glass, 0.20 mm across, in a matrix of dark green to brown smectite and minor calcite. Tabular shards of altered glass aligned subparallel to pillow margins in piece 3 represent extoliated pillow margins. Piece 8 contains a large calcite-filled vug.

Shipboard Data
 Magnetic Data:
 8-10 cm
 NRM Intensity (emu/cc) 12.49×10^{-3}
 NRM Inclination -79.2°
 Stable Inclination -76.8°
 Physical Property Data:
 Vp (km/sec) 64-66 cm
 5.03
 Porosity (%) 10.2
 Wet Bulk Density (g/cc) 2.755
 Grain Density (g/cc) 2.83



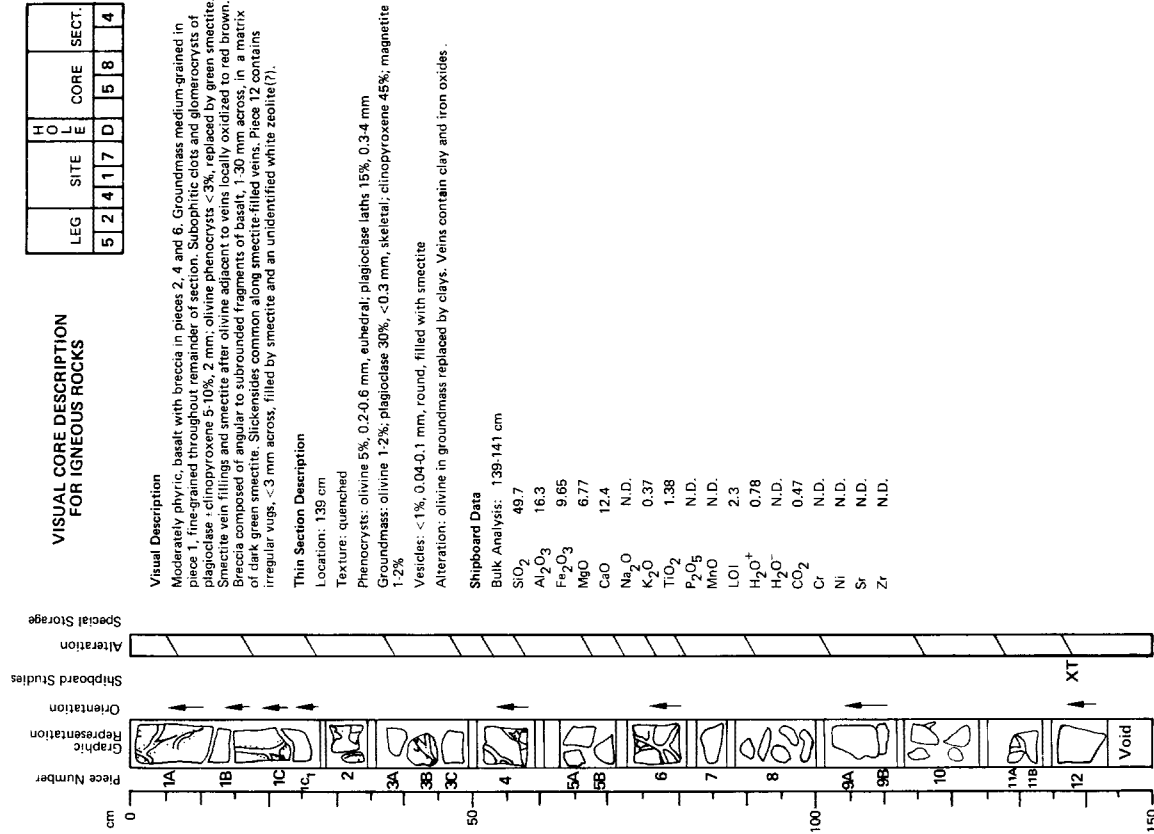
LEG	SITE	HOUE	CORE	SECT.
5	2417D		58	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



LEG	SITE	HOUE	CORE	SECT.
5	2417D		58	4

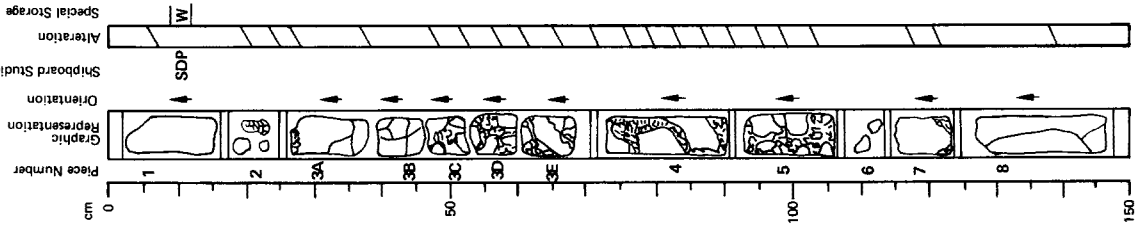
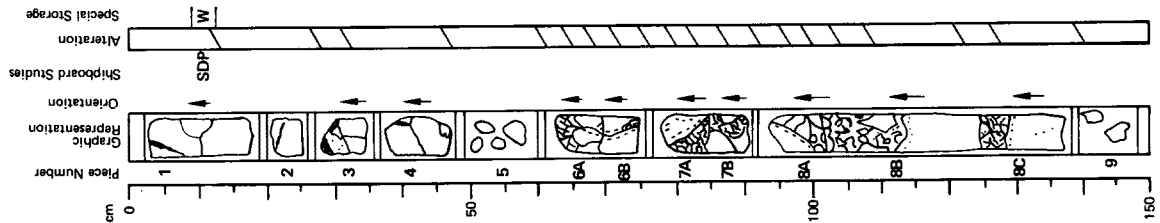
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



LEG	SITE	HOLE	CORE	SECT.
52	417	D	59	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately to highly phyrlic pillow basalt with a chilled pillow margin completely replaced by green smectite in piece 3 and strongly altered breccia in pieces 6-8. Groundmass fine to medium-grained locally oxidized along veins filled by smectite. Plagioclase phenocrysts 10-20% occur as laths \leq 1 mm across and in subophitic clots. Olivine phenocrysts 5% occur as small (1 mm) euhedral crystals. Vesicles 5% occasionally in glomerophyric clots, but usually as small (1 mm) euhedral crystals. Vesicles common, \leq 0.5 mm. Veins filled by smectite, locally by calcite (102 cm). Breccia composed of basalt fragments in a matrix of green smectite (oxidized to red, yellow or brown in piece 7) and minor calcite. Slickensides common along smectite-filled veins.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	417	D	59	2

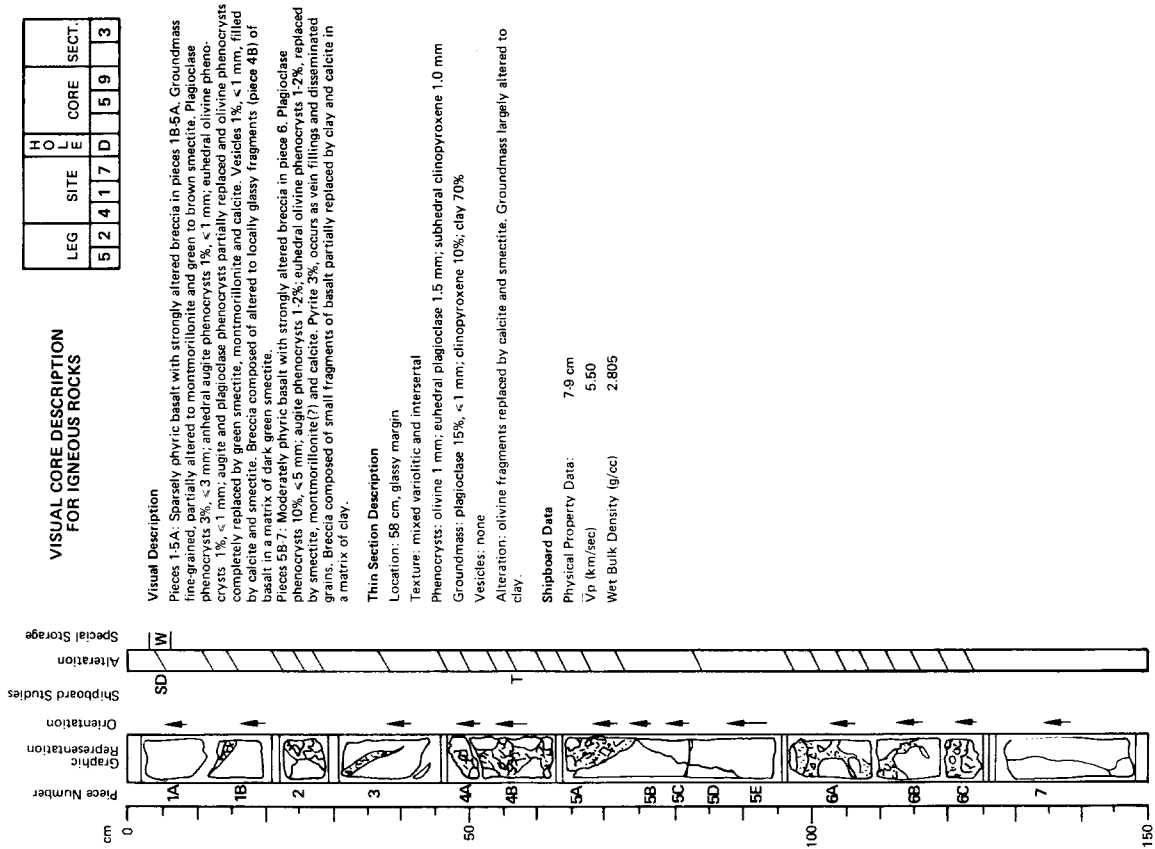
Visual Description
 Moderately to highly phyrlic pillow basalt with an altered breccia zone between 50-110 cm and minor brecciation throughout, the rest of the section. Groundmass fine to medium-grained locally oxidized along veins filled by smectite. Plagioclase phenocrysts 10-20%; augite phenocrysts 5%; altered olivine phenocrysts \leq 4 mm, tend to occur in subophitic clots, but plagioclase and olivine also occur respectively, as isolated laths and euhedral crystals. Calcite-filled vesicles \leq 2% in pieces 4 and 7. Breccia composed of basalt fragments in a matrix of smectite and minor calcite.

Shipboard Data

Physical Property Data:
 Vp (km/sec) 10-12 cm
 Porosity (%) 5.26
 Wet Bulk Density (g/cc) 8.1
 Grain Density (g/cc) 2.785
 2.94

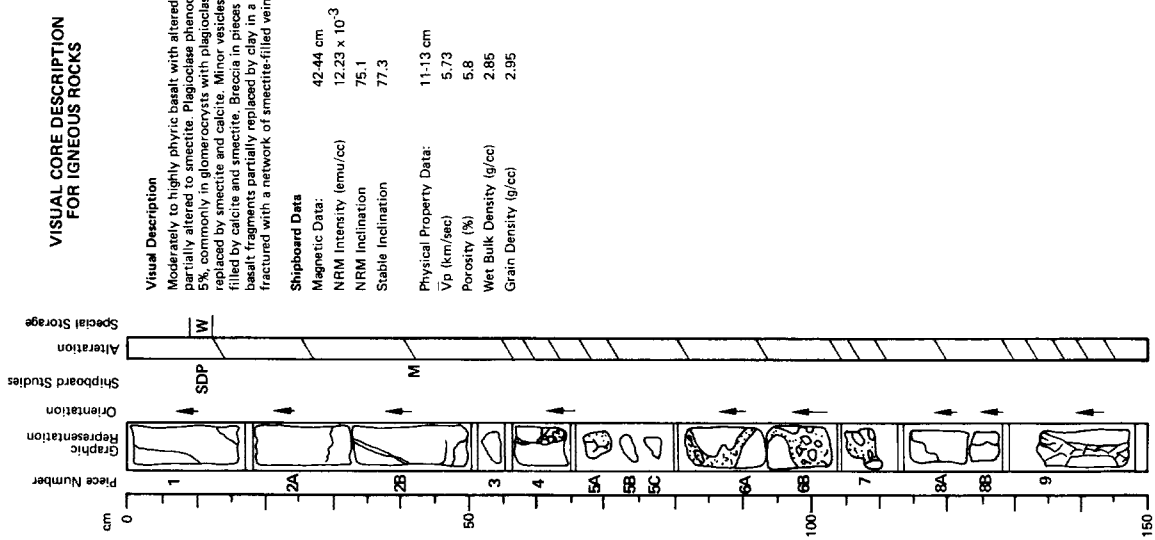
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H	L	CORE	SECT.
52	417D	5	9	3	



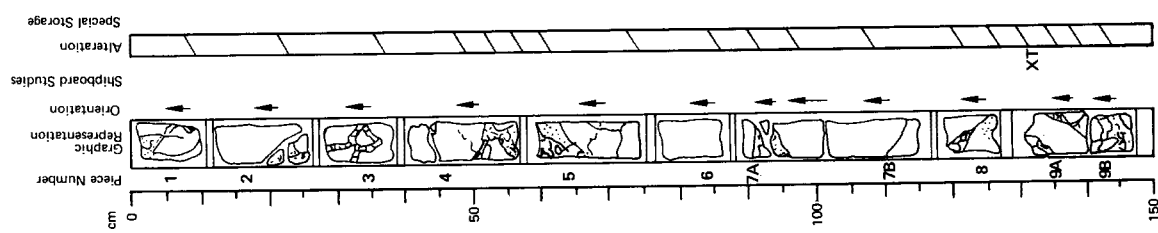
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H	L	CORE	SECT.
52	417D	5	9	4	



LEG	SITE	H O L E	CORE	SECT.
5	2	4	1	7
5	2	4	1	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

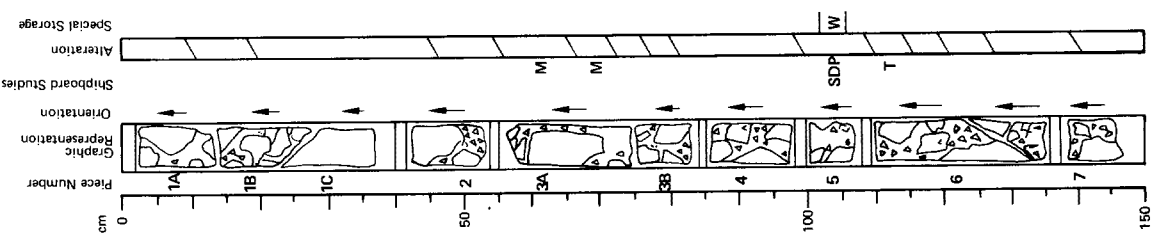


Visual Description
 Sparsely to moderately phryic basalt with altered breccia in pieces 1-5, 7A, 8 and 9. Groundmass moderately altered, locally oxidized along veins filled by smectite. Plagioclase phenocrysts < 10%, < 5 mm; subhedral augite phenocrysts < 5%, < 2 mm; olivine phenocrysts 1.2%, < 2 mm, replaced by calcite. Vesicles 1%, 0.5 mm, filled by calcite. Breccia composed of fragments of basalt partially replaced by clay in a matrix of clay and minor calcite.

Thin Section Description
 Location: 136 cm
 Texture: quenched
 Phenocrysts: olivine 3%, 0.1-0.3 mm, euhedral; plagioclase laths 10%, 0.3-1.3 mm; clinopyroxene 2%, intergrown with plagioclase
 Groundmass: plagioclase; clinopyroxene, poorly crystallized; devitrified glass
 Vesicles: < 1%, 0.15 mm, filled with smectite
 Alteration: olivine and plagioclase partially replaced by clay and calcite. Groundmass partially replaced by clay.

Shipboard Data
 Bulk Analysis: 134-136 cm

SiO ₂	50.5
Al ₂ O ₃	15.2
Fe ₂ O ₃	12.1
MgO	6.74
CaO	10.7
Na ₂ O	N.D.
K ₂ O	1.26
TiO ₂	1.36
P ₂ O ₅	N.D.
MnO	N.D.
LOI	3.5
H ₂ O ⁺	1.06
H ₂ O ⁻	N.D.
CO ₂	0.06
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.



Visual Description
 Basalt breccia composed of angular to subangular fragments of aphanitic to fine-grained, moderately phryic basalt in a matrix of green smectite. Groundmass of basalt regions relatively free of vesicles, locally altered, locally oxidized along veins filled by yellow to yellowish smectite. Olivine phenocrysts and 3B) and 4B) are replaced by yellow to yellowish smectite. Olivine phenocrysts 1.2%, < 2 mm, replaced by calcite. Vesicles 1%, 0.5 mm, filled by calcite. Breccia composed of fragments of basalt partially replaced by clay in a matrix of clay and minor calcite.

Thin Section Description
 Location: 117 cm
 Texture: quenched
 Phenocrysts: olivine 3%, 0.2-0.5 mm, euhedral; plagioclase laths 10%, 0.3-1 mm; clinopyroxene < 1%, 0.5 mm, subophitic
 Groundmass: plagioclase 3-5%, 0.3 mm; glass 80%, partially devitrified
 Vesicles: 1%, 0.05 mm, round, filled with smectite
 Alteration: olivine replaced by calcite and clay

Shipboard Data

Magnetic Data:	62.64 cm	70.72 cm
NRM Intensity (emu/cc)	9.90 x 10 ⁻³	0.646 x 10 ⁻³
NRM Inclination	+46.2°	-14.3°
Stable Inclination	+43.6°	
Physical Property Data:	101-103 cm	
Vp (km/sec)	4.21	
Porosity (%)	20.3	
Wet Bulk Density (g/cc)	2.525	
Grain Density (g/cc)	2.92	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

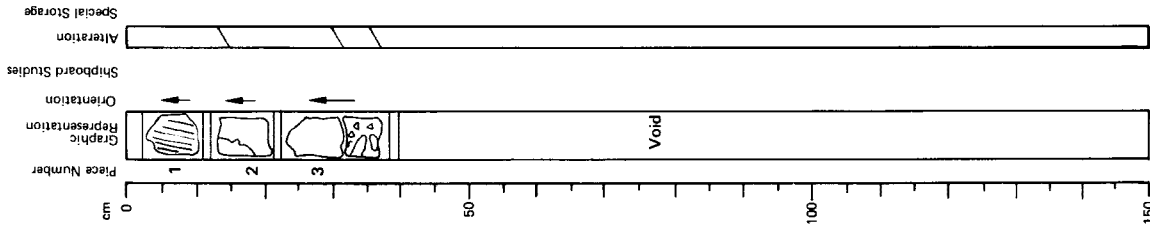
LEG	SITE	H O L E	CORE	SECT.
5	2	4	1	7
5	2	4	1	7

219

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	417	D	59	7

Visual Description
 Basalt breccia composed of fragments of moderately phyrlic basalt in a matrix of green smectite. Groundmass aphanitic to fine-grained, locally oxidized to pinkish gray. Plagioclase and pyroxene phenocrysts total 10%; relative abundance variable in small aphanitic fragments. Pieces 1 and 2 contain vertical stickensidals in smectite.

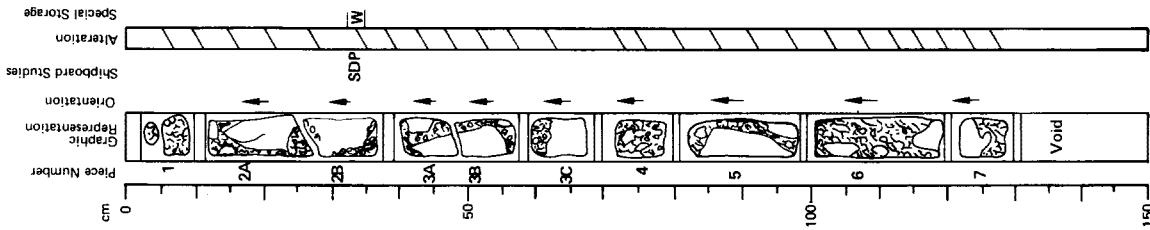


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	417	D	60	1

Visual Description
 Basalt breccia composed of fragments of moderately to highly phyrlic pillow basalt in a matrix of dark green smectite and calcite. Groundmass fine to medium-grained; alteration confined to small, fine-grained clasts. Plagioclase phenocrysts 10-15%, <3 mm; augite phenocrysts 5%, <3 mm; olivine phenocrysts 5%, <1.5 mm, replaced by smectite, plagioclase and olivine occur both as subhedral phenocrysts and as glomerocrysts with pyroxene. Calcite is abundant in the matrix at 5, 28, 48, 100 and 120 cm.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 32.34 cm
 Porosity (%) 5.11
 Wet Bulk Density (g/cc) 11.5
 Grain Density (g/cc) 2.87

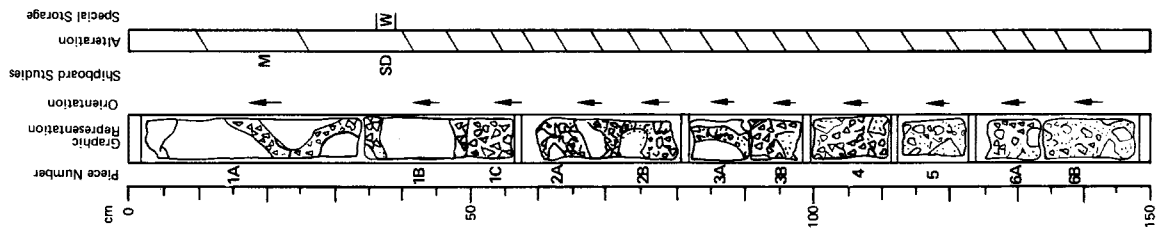


LEG	SITE	HOLE	CORE	SECT.
52417D			60	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Basalt breccia composed of sparsely to highly phryic basalt fragments in a matrix of clay. Groundmass relatively fresh to moderately altered, the smallest clasts being the most altered. Plagioclase phenocrysts 8%, <4 mm; augite phenocrysts 4%, <2 mm, occur as isolated subhedral crystals and in glomerocrysts with plagioclase; olivine phenocrysts replaced by smectite and calcite. Thin veins cutting breccia matrix and outlining basalt fragments (pieces 5 and 6A) filled by calcite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 18.20 cm
 NRM Inclination 5.12 x 10⁻³
 Stable Inclination +74.5°
 Physical Property Data:
 Vp (km/sec) 37.39 cm
 Wet Bulk Density (g/cc) 5.39
 2.80

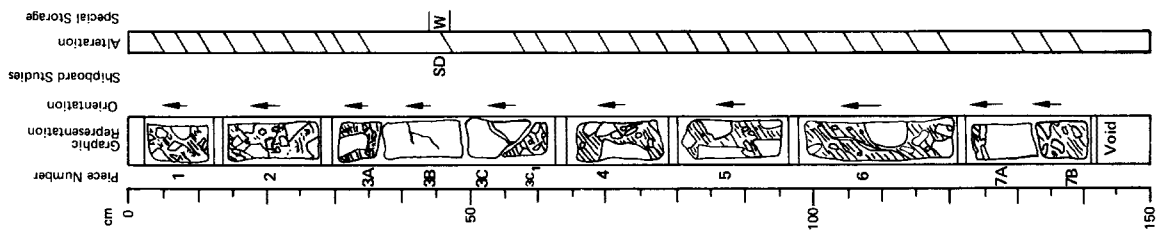


LEG	SITE	HOLE	CORE	SECT.
52417D			60	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Basalt breccia composed of fragments of aphyric to moderately phryic basalt and basaltic glass ranging in size from 1.20 mm in a matrix of dark green smectite mixed with small amounts (<10%) of calcite in pieces 3-7. Groundmass aphanitic to microlitic. Plagioclase phenocrysts 8%, <4 mm; pyroxene phenocrysts 10%, <3 mm. Vesicles 2%, filled by calcite and green smectite. Veins filled by calcite. Pieces 3 and 6 display slickensides, the latter consisting of a normal fault in a calcite vein.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 47.49 cm
 Wet Bulk Density (g/cc) 5.43
 2.835

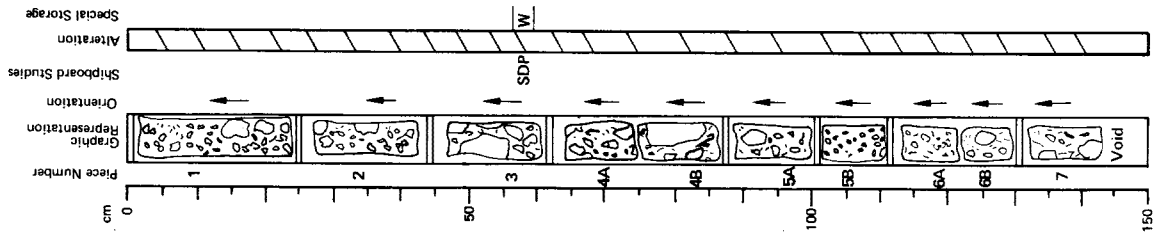


LEG	SITE	HOLE	CORE	SECT.
524	17D	60	60	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Basalt breccia composed of angular to subrounded fragments of basalt, ranging in size from 0.1-90 mm, in a matrix of smectite containing traces of fresh glass(?). Basalt groundmass fine-grained with an intersertal texture. Plagioclase phenocrysts <3 mm; clinopyroxene phenocrysts <1.5 mm; altered olivine phenocrysts <2 mm; total phenocrysts <5% to >10%. Breccia matrix contains sulfides, cavities lined or filled with smectite (pieces 5-7) and numerous small black spherules of fresh(?) glass toward the base of the section.

Physical Property Data: 57.59 cm
 Vp (km/sec) 4.20
 Porosity (%) 19.1
 Wet Bulk Density (g/cc) 2.52
 Grain Density (g/cc) 2.91



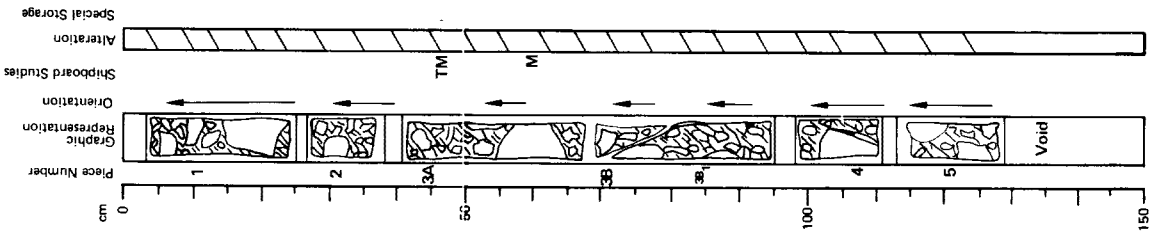
LEG	SITE	HOLE	CORE	SECT.
524	17D	60	60	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Basalt breccia composed of angular to subrounded fragments of moderately phryic basalt, ranging in size from 0.1-90 mm, in a matrix of smectite containing minor calcite and traces of fresh glass. Groundmass fine- to medium-grained. Plagioclase phenocrysts, glomerocrysts of plagioclase and clinopyroxene and phenocrysts of olivine replaced by smectite total 5-10% of basalt and range in size from 1-3 mm. Basalt fragments commonly outlined by calcite-filled veins. Breccia matrix appears to be composed of smectite pseudomorphs after fine shards and spherules of glass or sideromelane sand(?).

Thin Section Description
 Location: 47 cm, breccia zone in pillow complex
 Texture: brecciated
 Phenocrysts: plagioclase, pyroxene and olivine
 Groundmass: plagioclase 10%, 0.3 mm; altered clinopyroxene and olivine(?); glass
 Vesicles: none
 Alteration: olivine and glass replaced by calcite and clay

Shipboard Data
 Magnetic Data: 46-48 cm 59-61 cm
 NRM Intensity (emu/cc) 1.15 x 10⁻³ 7.04 x 10⁻³
 NRM Inclination +53.1° -10.7°
 Stable Inclination +53.5° +7.9°

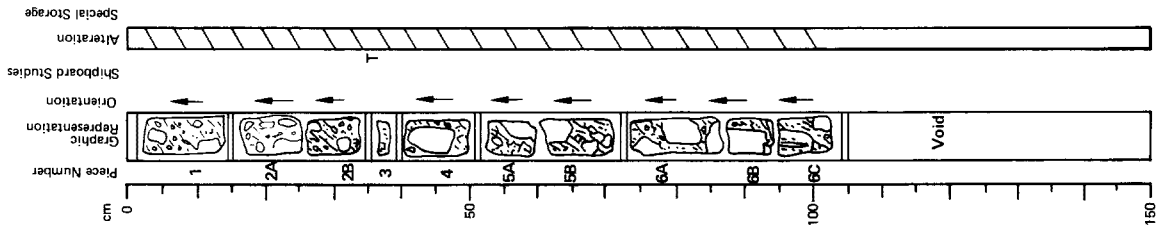


LEG	SITE	HOLE	CORE	SECT.
52	417	D	60	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Basalt breccia composed of fragments of fine grained, moderately phryic basalt and fresh basaltic glass in a matrix of smectite. Plagioclase, clinopyroxene and occasional olivine phenocrysts altered to smectite (total 5-15% with plagioclase and clinopyroxene). Calcite filled vesicles in subophitic clots, <5 mm across, of plagioclase, clinopyroxene. Calcite filled vesicles are subparallel to the larger basalt clasts but diffuse through the matrix, are increasingly common toward the base of the section. Breccia matrix composed of smectite after sideromelane sand(?).

Thin Section Description
Location: 35 cm, breccia
Texture: clastic
Phenocrysts: none
Groundmass: quenched basalt fragments; plagioclase; glass
Vesicles: none
Alteration: glass partially replaced by calcite

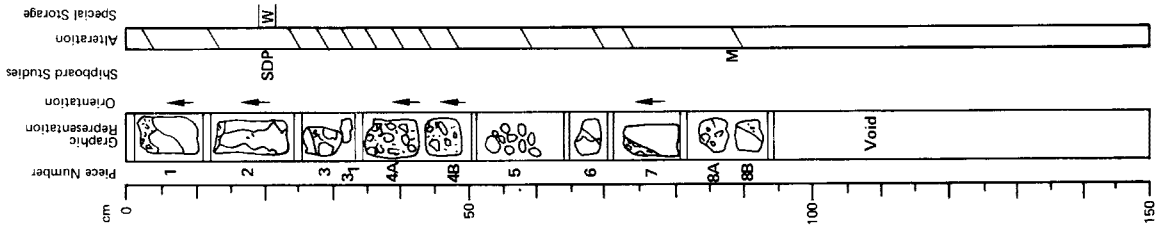


LEG	SITE	HOLE	CORE	SECT.
52	417	D	61	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Basalt breccia composed of fragments of highly phryic basalt, some with glassy chilled margins (pieces 5 and 7), in a matrix of smectite and calcite. Basalt groundmass aphanitic to medium-grained. Phenocrysts consist of plagioclase, clinopyroxene and olivine replaced by smectite; plagioclase and clinopyroxene phenocrysts commonly occur in subophitic clots. Calcite-filled vesicles 1-2%, 0.5-1 mm. Veins and vugs filled by calcite. Sulfides common throughout section.

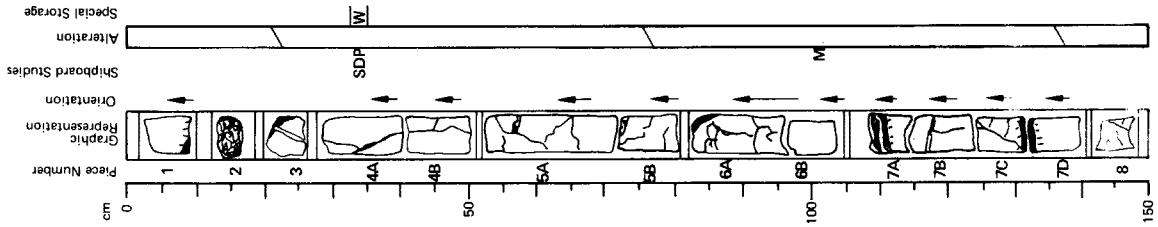
Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 88-90 cm 9.71 x 10⁻³
NRM Inclination +43.3°
Stable Inclination +36.0°
Physical Property Data:
Vp (km/sec) 20-22 cm 5.46
Porosity (%) 8.6
Wet Bulk Density (g/cc) 2.795
Grain Density (g/cc) 2.95



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LEG	SITE	HOLE	CORE	SECT.
52	417D	6	2	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Highly phyrlic pillow basalt with glassy chilled margins in pieces 1-3, 6A, 7A, 7C and 7D. Groundmass mottled. Subhedral plagioclase phenocrysts 15-20%, <10 mm; pyroxene phenocrysts 5%; altered olivine phenocrysts 5%. Round vesicles 1%, filled by calcite and green smectite. Veins and small vugs filled with calcite, clay and pyrite.

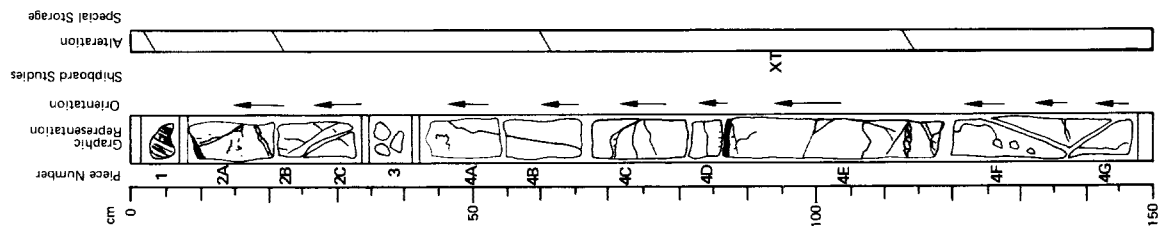
Shipboard Data

Magnetic Data:
NRM Intensity (emu/cc) 1.38 x 10³
NRM Inclination -19.9°
Stable Inclination -18.8°

Physical Property Data:
Vp (km/sec) 33.35 cm
Porosity (%) 5.49
Wet Bulk Density (g/cc) 7.4
Grain Density (g/cc) 2.775
2.91

LEG	SITE	HOLE	CORE	SECT.
52	417D	6	2	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Highly phyrlic pillow basalt with glassy chilled margins in pieces 1, 2A and 4E. Groundmass mottled, anhedral to microlitic. Euhedral plagioclase phenocrysts 25%, <10 mm; pyroxene phenocrysts 5%, 2-3 mm; olivine phenocrysts 5-10%, replaced by clay or calcite. Vesicles 1-2%, filled with calcite or dark clay. Vugs and veins filled by calcite, dark clay and pyrite. Piece 1 contains fresh perlitic gray glass, fresh to altered dark glass with plagioclase phenocrysts <4 mm across and fresh to altered green glass, the former containing numerous pyrite crystals <1 mm across.

Thin Section Description

Location: 95 cm, pillow interior
Texture: highly phyrlic, quenched
Phenocrysts: olivine 3%, 0.5-1 mm, euhedral; plagioclase 30%, 1.8 mm, euhedral, zoned with inclusions; clinopyroxene 1%
Groundmass: plagioclase 30%, 0.2-0.5 mm, skeletal; clinopyroxene 20%, 0.2-0.5 mm, plumose; magnetite 5%, 0.1 mm, euhedral; glass 5%; brown clay after plumose pyroxene(?) 10%
Vesicles: 2%, 0.2-1 mm, filled by clay and calcite
Alteration: olivine replaced by clay

Shipboard Data

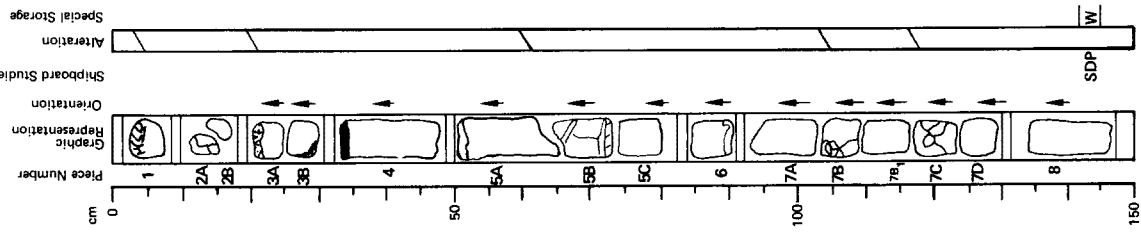
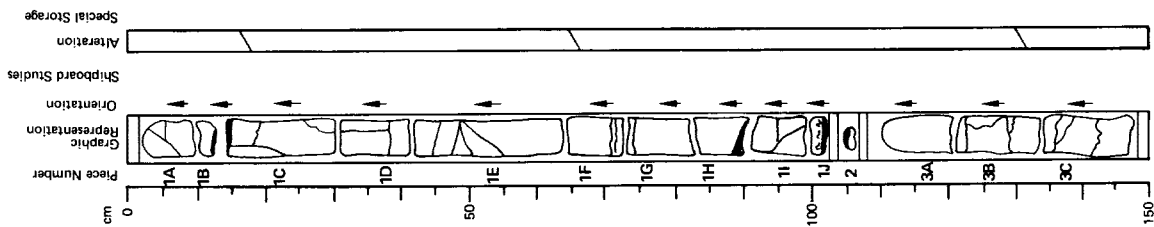
Bulk Analysis: 94.96 cm

SiO ₂	50.1
Al ₂ O ₃	16.5
Fe ₂ O ₃	10.2
MgO	6.07
CaO	13.8
Na ₂ O	N.D.
K ₂ O	0.04
TiO ₂	1.47
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.9
H ₂ O ⁺	0.85
H ₂ O	N.D.
CO ₂	0.66
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

LEG	SITE	HOLE	CORE	SECT.
52	417	D	62	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately to highly phyric pillow basalt with glassy chilled margins locally replaced by smectite in pieces 1B, 1C, 1H, 1I and 2. Groundmass mottled with glomerocrysts and patches of glass. Plagioclase phenocrysts 8-10%, <4 mm; augite phenocrysts 2-4%, olivine phenocrysts 2-4%, <2 mm, replaced by smectite; plagioclase and olivine phenocrysts commonly occur, and augite phenocrysts exclusively occur, in glomerocrysts <8 mm across. Vesicles 1-2%, filled by calcite or by calcite with a smectite lining. Veins in pieces 1A, 1F, 3A and 3C filled by smectite, calcite and sulfides. Sulfides also occur as dispersed grains <5 mm across.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	417	D	62	4

Visual Description
 Highly phyric pillow basalt with glassy chilled margins in pieces 3B and 4. Groundmass mottled due to presence of glass and vesicles. Plagioclase phenocrysts 10-14 mm, replaced by smectite; plagioclase and olivine phenocrysts commonly occur in glomerocrysts <8 mm across but plagioclase and olivine also occur as isolated phenocrysts. Veins filled by smectite, calcite and sulfides. Sulfides also occur as disseminated grains.

Shipboard Data

Magnetic Data:
 42.44 cm
 NRM Intensity (emu/cc) 9.69 x 10⁻³
 NRM Inclination -17.8°
 Stable Inclination -23.5°

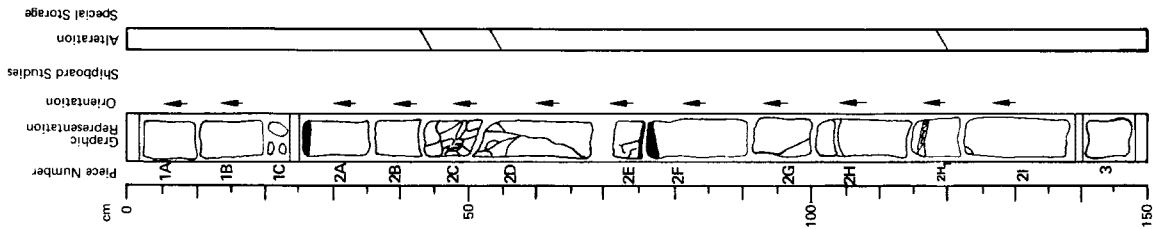
Physical Property Data:
 Vp (km/sec) 5.96
 Porosity (%) 4.8
 Wet Bulk Density (g/cc) 2.865
 Grain Density (g/cc) 2.97

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VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5 2	4 1 7 D		6 2	5

Visual Description
 Highly phryic pillow basalt with glassy chilled margins in pieces 2A, 2E and 2F. Groundmass mottled due to presence of glomerocrysts patches of glass and vesicles in extent of crystallization. Plagioclase phenocrysts 10%, <4 mm; augite phenocrysts 3%; olivine phenocrysts 3%, <4 mm, replaced by smectite; plagioclase, augite and olivine phenocrysts commonly occur in subophitic glomerocrysts <12 mm across but plagioclase and olivine also occur as isolated phenocrysts. Calcite-filled vesicles 1%. Veins in pieces 2H and 2I, filled by smectite and calcite - sulfides. Interval between 45-55 cm display incipient brecciation.



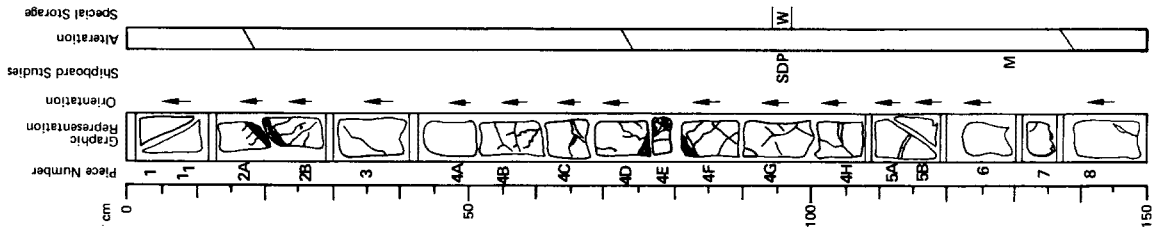
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5 2	4 1 7 D		6 2	6

Visual Description
 Highly phryic basalt pillows with glassy chilled margins in piece 2 and 4D-4F. 0-20, 20-80 and 80-150 mm in size. Interval complete pillow or parts of pillows. Groundmass mottled. Plagioclase phenocrysts 15%, <8 mm; augite phenocrysts 3%; olivine phenocrysts 6%, <5 mm; olivine phenocrysts with spinel inclusions or as isolated crystals, altered to clivine phenocrysts 3%, <4 mm. Vesicles 3.5%, 1 mm, filled by calcite and green amebrite. Veins filled by clay, calcite and pyrite.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 128-130 cm
 NRM Inclination 4.71 x 10⁻³
 Stable Inclination -23.2°
 Physical Property Data:
 Vp (km/sec) 96-98 cm
 Porosity (%) 5.38
 Wet Bulk Density (g/cc) 8.4
 Grain Density (g/cc) 2.815
 2.94

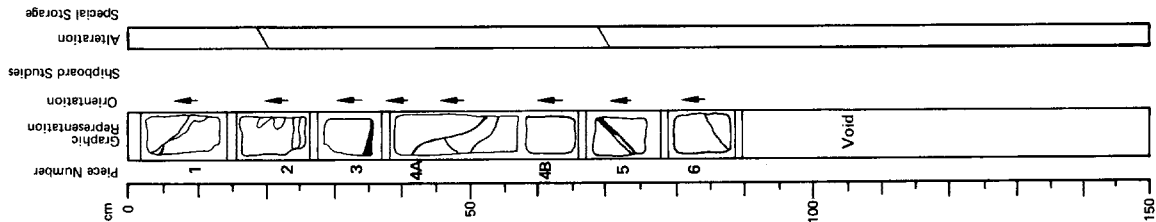


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	417	D	62	7

Visual Description

Highly phryic pillow basalt with a glassy chilled margin in piece 3. Groundmass mottled due to presence of subophitic gneissocrysts, patches of glass and variations in extent of crystallization. Plagioclase phenocrysts 10%, augite phenocrysts 3%, altered olivine phenocrysts 2%, epidote by calcite, augite, hornblende, plagioclase and olivine as isolated phenocrysts and oligoclase. Piece 6 contains numerous (2%) vesicles filled by calcite or smectite. Sulfides are common throughout section as disseminated grains as large as 8 mm in diameter (piece 2) and in locally complex veins with calcite and smectite (pieces 1 and 1).



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

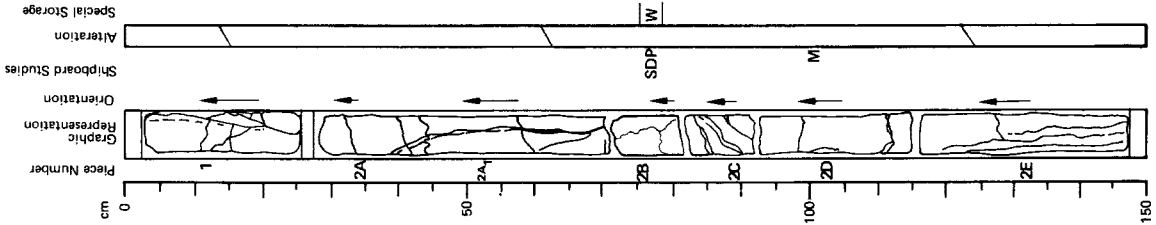
LEG	SITE	HOLE	CORE	SECT.
52	417	D	63	1

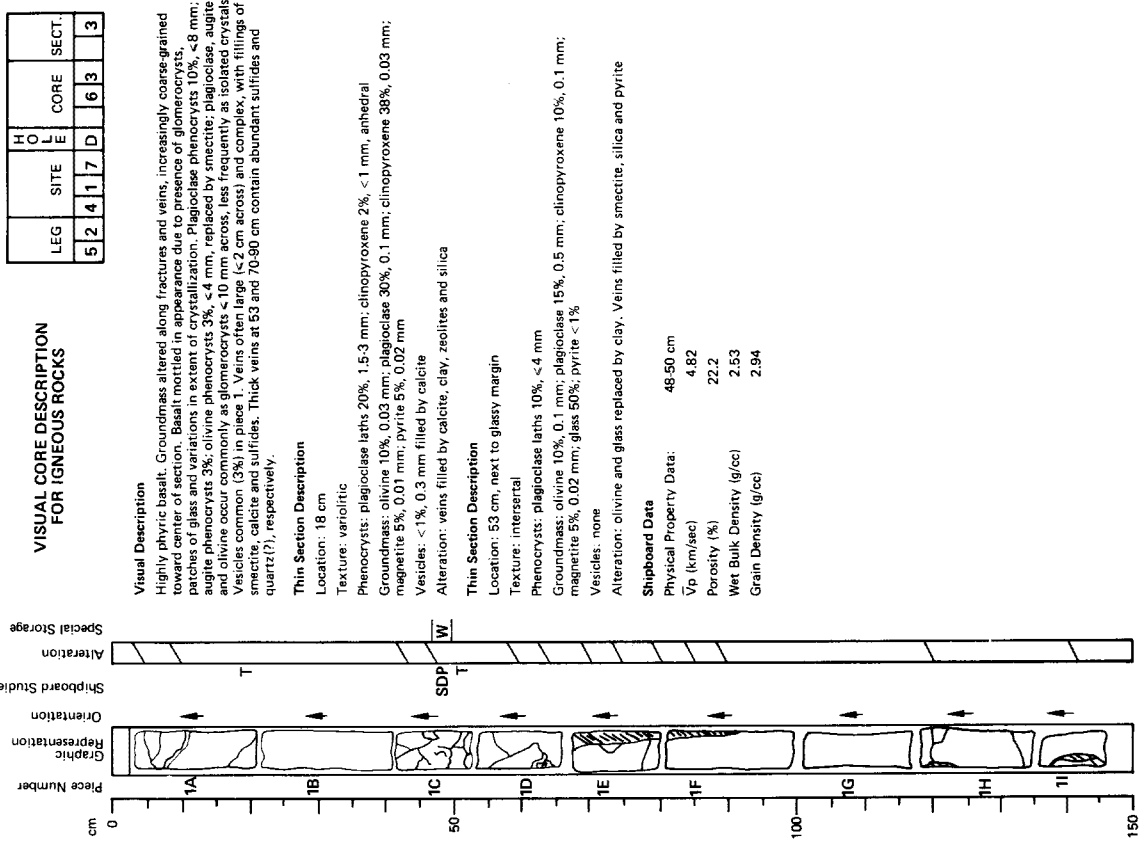
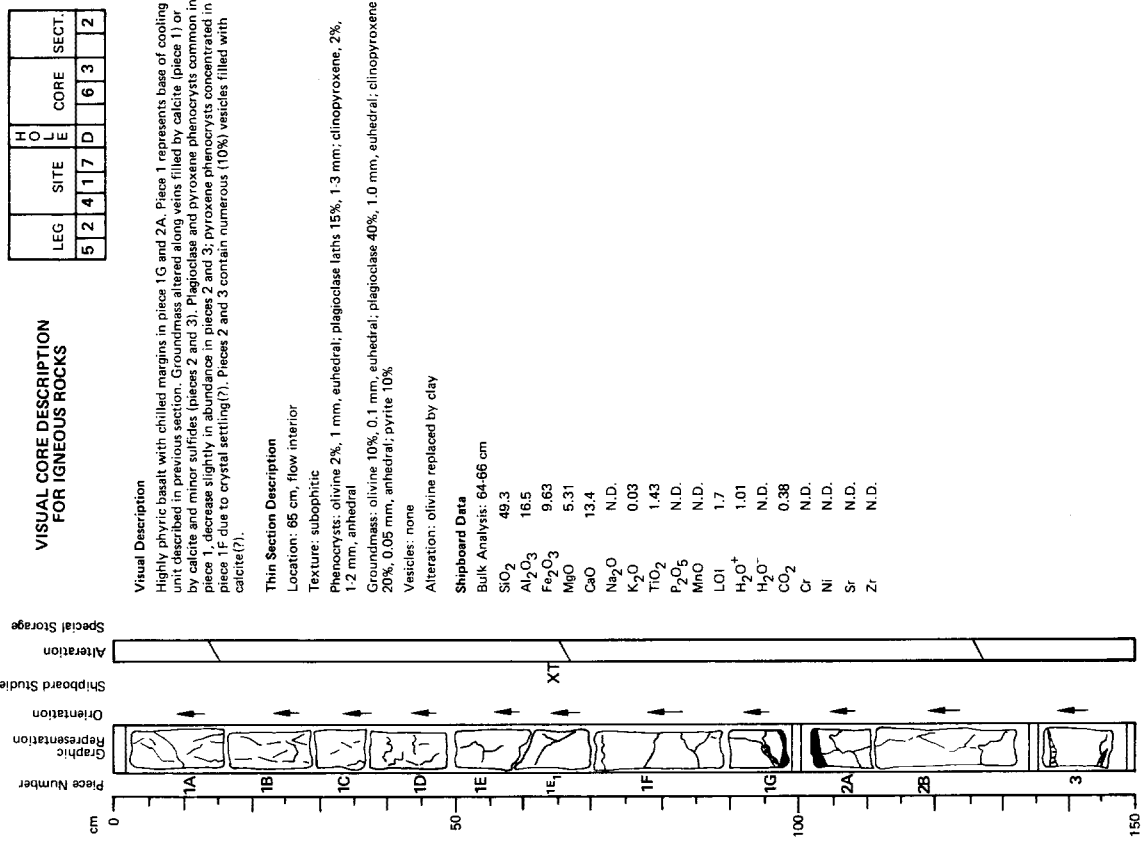
Visual Description

Moderately to highly phryic basalt. Groundmass increases in grain size from fine grained in pieces 1 and 2A to medium- or coarse-grained in pieces 2A₁-2E. Plagioclase phenocrysts 8-15%, 4-7 mm; augite phenocrysts 1-5%, 1-4 mm; altered olivine phenocrysts 1-5%, 1-8 mm; phenocrysts subhedral to euhedral, increase in size and abundance in pieces 2A₁-2E. Pieces 1 and 2A contain 3% vesicles < 2 mm across filled by calcite, opal and zeolites. Veins filled by natroite, by calcite with a lining of dark green smectite containing small (< 1 mm) grains of pyrite, or by calcite and yellow montmorillonite (piece 2C).

Shipboard Data

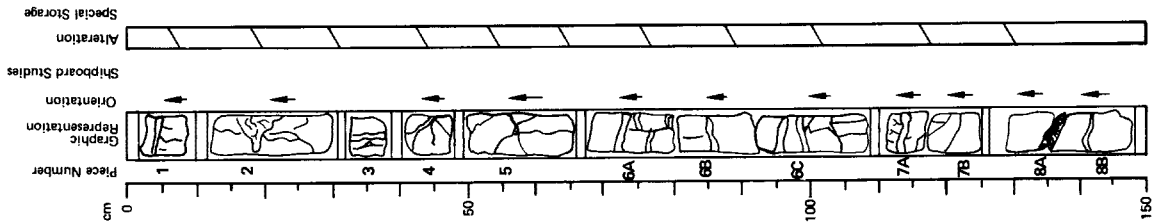
Magnetic Data:
 NRM Intensity (emu/cc) 104-106 cm
 NRM Intensity (emu/cc) 8.57 x 10⁻³
 NRM Inclination +35.7°
 Stable Inclination -34.5°
 Physical Property Data:
 Vp (km/sec) 75.77 cm
 Porosity (%) 5.94
 Wet Bulk Density (g/cc) 4.6
 Grain Density (g/cc) 2.817
 Grain Density (g/cc) 2.95





LEG	SITE	HOLE	CORE	SECT.
52	417	D	63	4

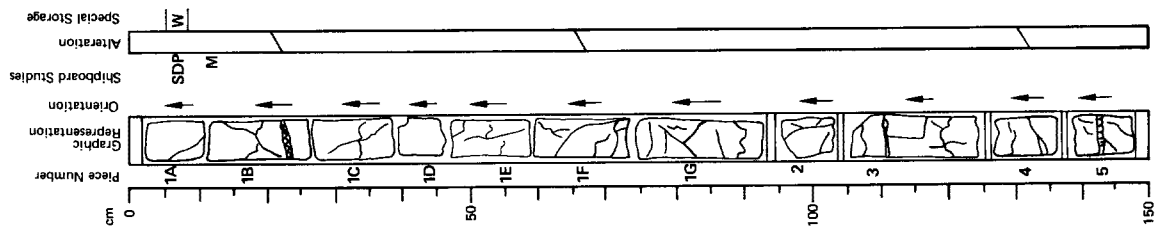
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Highly phyrlic basalt with glassy chilled margins in pieces 8A and 8B. Basalt moderately altered with an aphanitic to fine-grained, groundmass. Plagioclase, augite and altered olivine phenocrysts 15%, 3% and 4%, respectively; augite phenocrysts occur exclusively in glomerocrysts with plagioclase, while plagioclase and olivine occur both in glomerocrysts and as isolated euhedral phenocrysts. Vesicles 1-2%, <2 mm, filled with calcite, opal(?) and zeolites and occasionally lined with pyrite. Veins <2 cm wide, filled by calcite with linings of smectite and inclusions of pyrite and chalcopyrite (piece 5).

LEG	SITE	HOLE	CORE	SECT.
52	417	D	63	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Highly phyrlic basalt. Phenocrysts consist of plagioclase and pyroxene with pyroxene tending to be concentrated in pieces 3 and 4. Vesicles rare below pieces 1. Thin veins filled by calcite and sulfides.

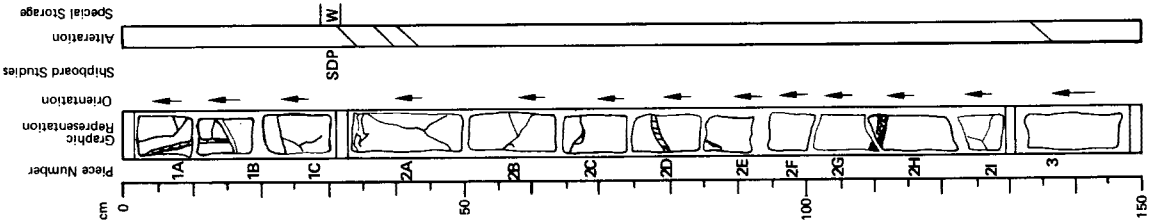
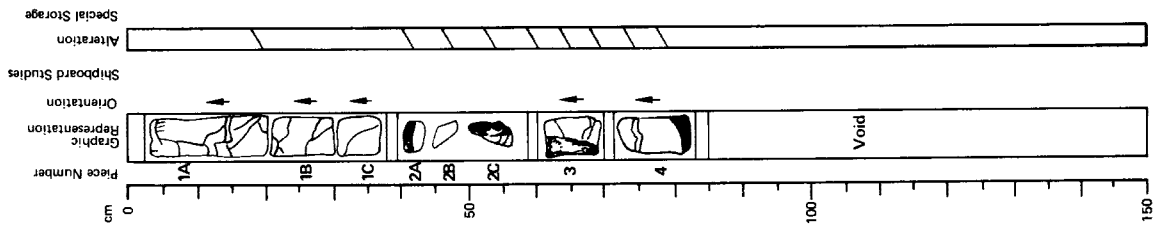
Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 12.14 cm
NRM Inclination 22.37 x 10⁻³
Stable Inclination -38.6°
-39.9°

Physical Property Data:
Vp (ftm/sec) 6-8 cm
Porosity (%) 5.30
Wet Bulk Density (g/cc) 10.1
Grain Density (g/cc) 2.775
2.96

LEG	SITE	HOLE	CORE	SECT.
5	2417	D	63	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Highly phyrlic pillow basalt with thick glassy chilled margins in pieces 2A, 2C, 3 and 4. Pillow margin highly phyrlic, partially (50%) replaced by smectite. Groundmass mottled due to presence of subophitic clots. Plagioclase phenocrysts 10%, < 15 mm; augite phenocrysts 3%, < 5 mm; altered olivine phenocrysts 3%, < 5 mm. Complex veins filled by smectite, calcite and minor sulfides.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Highly phyrlic pillow basalt with prophyritic, glassy margins in pieces 2G and 2H. Groundmass mottled in appearance due to presence of subophitic glomerocrysts, patches of glass and variations in extent of crystallization. Plagioclase phenocrysts 10%, < 15 mm; augite phenocrysts 3%, < 5 mm; altered olivine phenocrysts 3%, < 5 mm. Calcite-filled vesicles common at top and bottom of section. Complex veins filled by smectite, calcite and sulfides.

Shipboard Data
Physical Property Data: 30-32 cm
Vp (km/sec) 5.20
Porosity (%) 10.0
Wet Bulk Density (g/cc) 2.76
Grain Density (g/cc) 2.93

LEG	SITE	HOLE	CORE	SECT.
5	2417	D	64	1

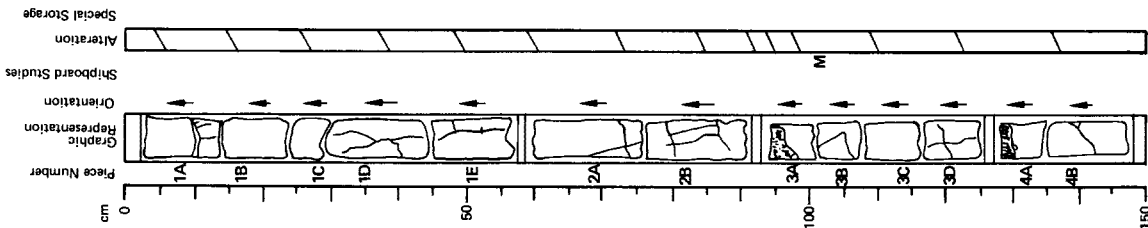
LEG	SITE	HOLE	CORE	SECT.
52417	D	64	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Highly phyrlic pillow basalt with a 2 cm-thick, glassy chilled margin in piece 4A. Groundmass moderately altered. Plagioclase phenocrysts 15%; anhedral augite phenocrysts 3%, commonly in glomerocrysts with plagioclase; altered olivine phenocrysts 2%. Vesicles <1% in pieces 1-3, increase to 3% in piece 4. Veins filled by pyrite or by calcite with smectite margins containing pyrite grains and crystal <3 mm across. Piece 3A contains a large filling of montmorillonite with calcite inclusions.

Shipboard Data

Magnetic Data:
NRM Intensity (emu/cc) 102-104 cm
NRM Inclination -25.8°
Stable Inclination -43.2°



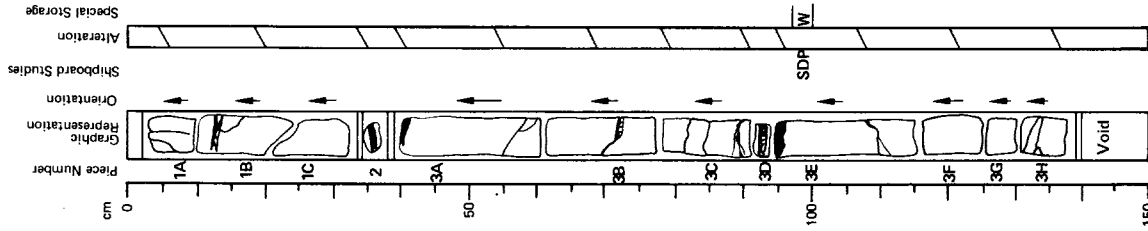
LEG	SITE	HOLE	CORE	SECT.
52417	D	64	3	

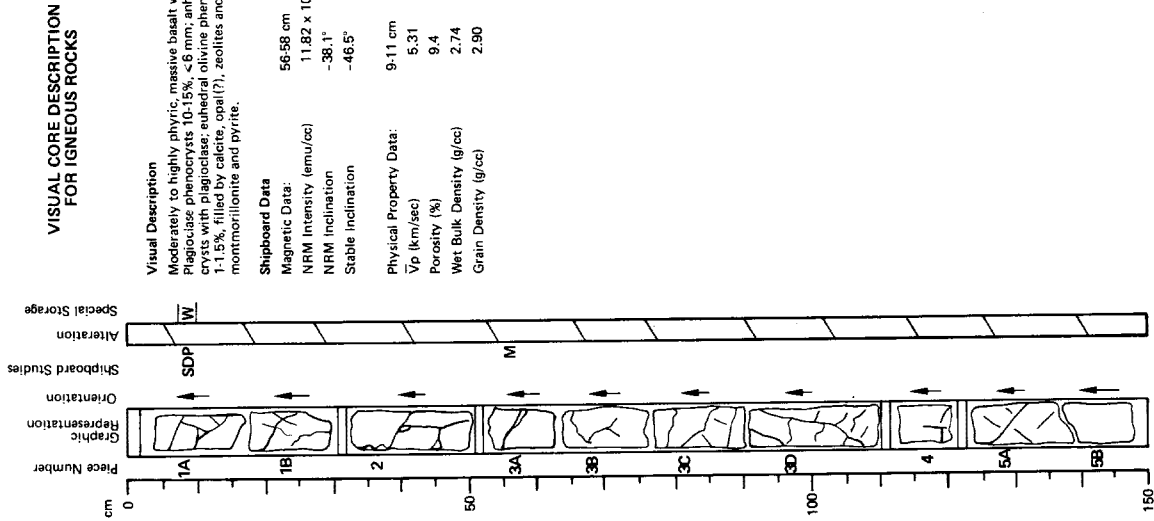
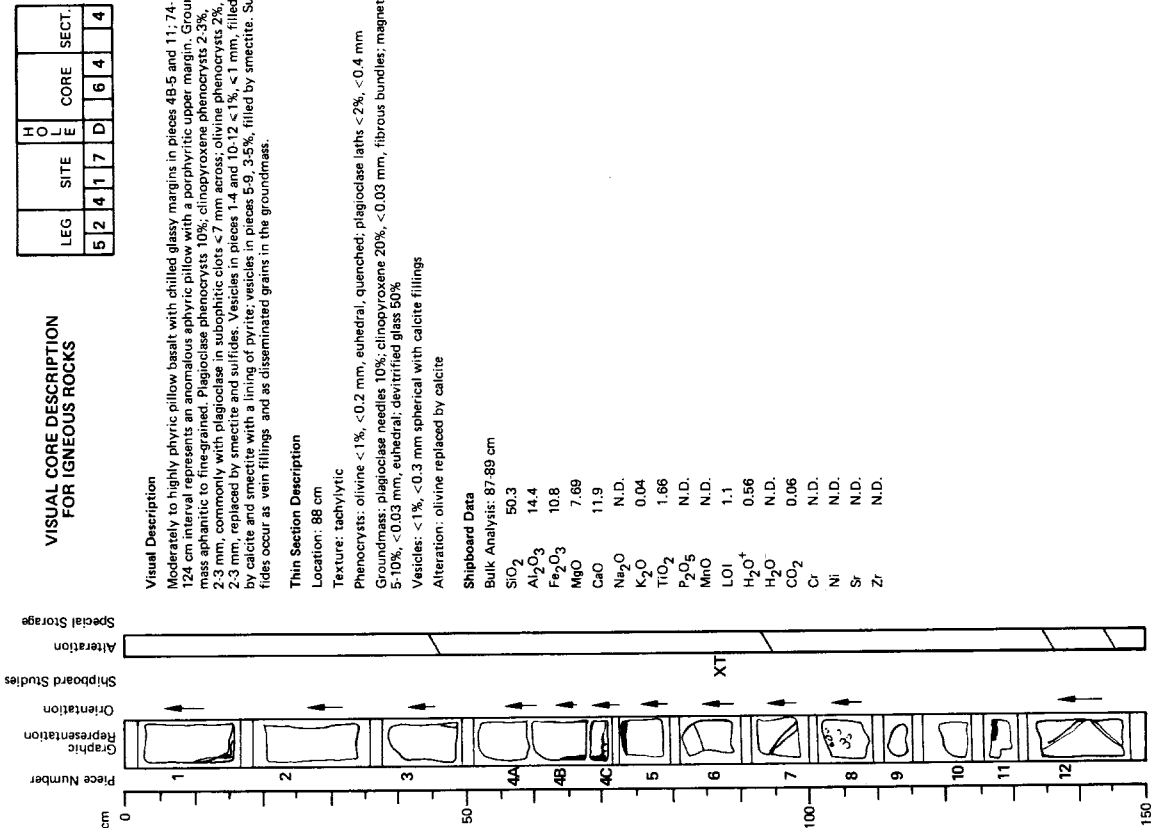
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Highly phyrlic pillow basalt with porphyritic, glassy chilled margins in pieces 2, 3A, 3D and 3E. Pillow interiors moderately altered, margins partially (50%) replaced by smectite. Basalt modified in appearance due to presence of glomerocrysts <15 mm across, patches of glass and vesicles in extent of crystallization. Plagioclase phenocrysts 10-15%, <15 mm; augite phenocrysts 3%; olivine phenocrysts 3%, replaced by smectite. Numerous complex veins filled by calcite, smectite, sulfides and quartz. Piece 3F consists entirely of a large vein filling.

Shipboard Data

Physical Property Data:
Vp (km/sec) 99-101 cm
Porosity (%) 5.39
Wet Bulk Density (g/cc) 7.8
Grain Density (g/cc) 2.81
2.93





LEG	SITE	HOLE	CORE	SECT.
524	17D	64	6	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phyrlic, massive basalt with a moderately altered groundmass. Plagioclase and pyroxene phenocrysts total 15% with plagioclase predominating over pyroxene. Vesicles 2-3%, decrease slightly in abundance with depth. Veins filled by calcite, green smectite and minor sulfides.

Thin Section Description
Location: 16 cm, flow interior

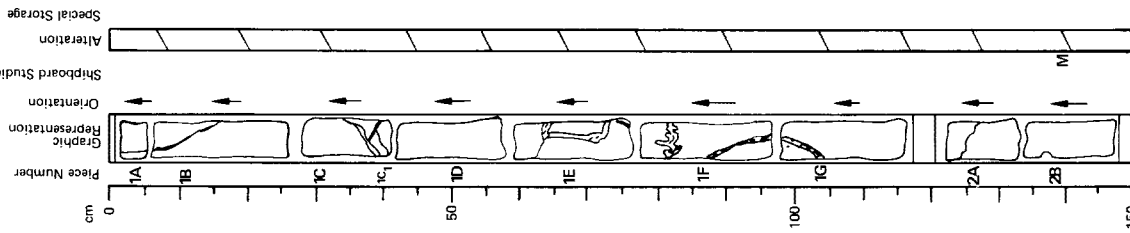
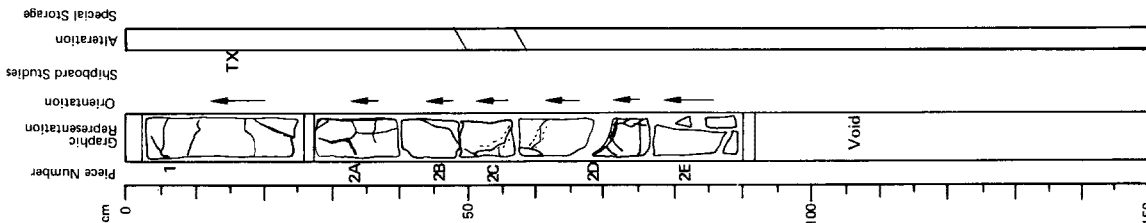
Texture: intersertal, quenched
Phenocrysts: olivine 3%, <2 mm, euhedral to skeletal; plagioclase 12%, <5 mm, euhedral laths with altered glass inclusions

Groundmass: plagioclase 35%, seriate laths; clinopyroxene 35%, <0.1 mm; magnetite 5%, <0.05 mm, euhedral; glass 10%

Vesicles: 1%, <1.0 mm, complex 3-phase fillings
Alteration: olivine and glass replaced by calcite and clay

Shipboard Data
Bulk Analysis: 15-17 cm

SiO ₂	50.1
Al ₂ O ₃	16.4
Fe ₂ O ₃	9.77
MgO	6.63
CaO	12.9
Na ₂ O	N.D.
K ₂ O	0.02
TiO ₂	1.39
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.7
H ₂ O ⁺	0.70
H ₂ O ⁻	N.D.
CO ₂	0.11
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

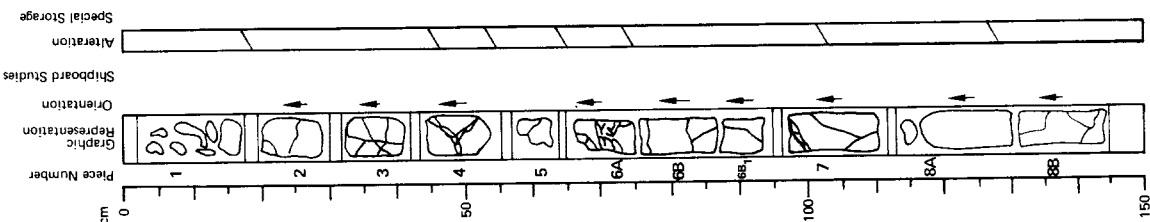
Visual Description
Moderately to highly phyrlic, massive basalt. Basalt moderately altered with a fine-grained, intersertal groundmass containing glomerocrysts of plagioclase and clinopyroxene. Plagioclase and clinopyroxene phenocrysts total 10%, <5 mm and <2 mm, respectively; altered olivine phenocrysts 5%. Vesicles <1 mm, filled with calcite and smectite. Numerous veins filled by calcite, smectite and sulfides. Sulfides also occur as disseminated grains.

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 5.58 x 10⁻³
NRM Inclination +22.1°
Stable Inclination 46.3°

LEG	SITE	HOLE	CORE	SECT.
524	17D	65	5	1

LEG	SITE	HOLE	CORE	SECT.
52	417	D	65	3

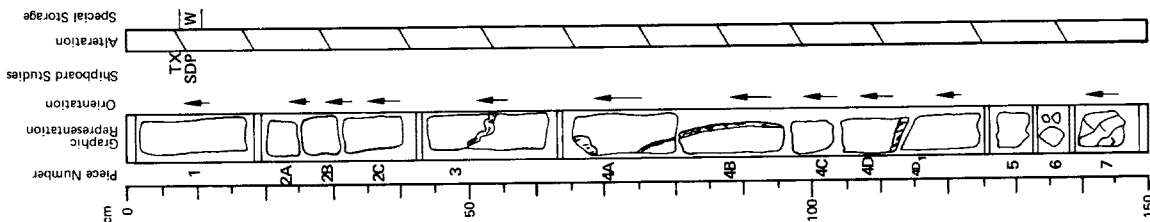
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Highly phyrlic, massive(?) basalt. Groundmass fine-grained, moderately altered along veins. Basalt mottled in appearance due to the uneven distribution of glomerocrysts and phenocrysts and to variations in groundmass texture. Plagioclase phenocrysts 10%, <8 mm, occasionally contain small (0.1 mm) inclusions of fresh glass; augite phenocrysts 3%, commonly in glomerocrysts <5 mm across; olivine phenocrysts 3%, <4 mm, replaced by smectite. Vesicles rare. Veins filled by smectite, or less commonly, by smectite, calcite and sulfides. Piece 8 displays incipient(?) brecciation.

LEG	SITE	HOLE	CORE	SECT.
52	417	D	65	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately to highly phyrlic, massive basalt. Basalt moderately altered with a fine-grained, interstitial groundmass. Plagioclase phenocrysts 10%, <4 mm; clinopyroxene phenocrysts 5%, <2 mm, in glomerocrysts with plagioclase; olivine phenocrysts <5%, replaced by smectite and calcite. Numerous veins filled by smectite, calcite and sulfides. Vesicles filled by calcite and lined by smectite present throughout section, increase to 1-2%, 1-2 mm in pieces 4A-4C.

Thin Section Description
Location: 8 cm, flow interior
Texture: highly phyrlic, intergranular, quenched
Phenocrysts: olivine 3%, 0.5-3 mm, euhedral, in glomerocrysts with plagioclase; plagioclase 12%, 0.5-4 mm, euhedral to subhedral; clinopyroxene <1%, 1 mm, anhedral, occasionally in rounded megacrysts with plagioclase
Groundmass: olivine 2%, 0.08-1 mm, euhedral; plagioclase 35%, 0.05 mm, euhedral laths; clinopyroxene 35%, 0.05 mm, anhedral-subhedral; magnetite 3%, 0.03 mm; glass 10%
Vesicles: <1%, 0.1 mm, filled by calcite and smectite
Alteration: veins filled by clay; olivine replaced by smectite and calcite; glass replaced by clay

Shipboard Data

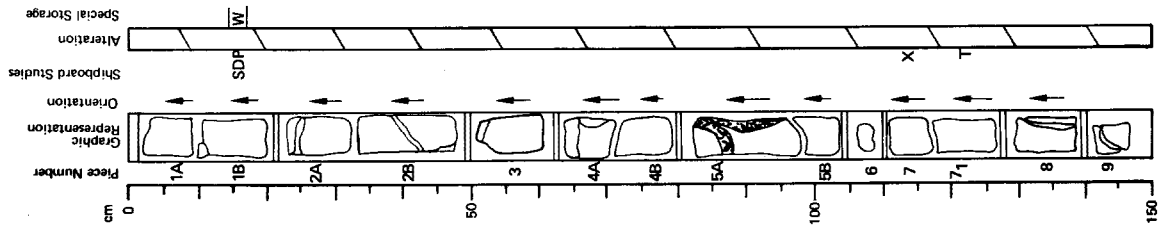
Bulk Analysis:	7.9 cm
SiO ₂	50.3
Al ₂ O ₃	16.1
Fe ₂ O ₃	9.75
MgO	6.43
CaO	13.8
Na ₂ O	N.D.
K ₂ O	0.03
TiO ₂	1.87
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.8
H ₂ O ⁺	0.51
H ₂ O ⁻	N.D.
CO ₂	0.92
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

Physical Property Data:

Vp (km/sec)	5.93
Porosity (%)	5.2
Wet Bulk Density (g/cc)	2.875
Grain Density (g/cc)	2.97

LEG	SITE	HOLE	CORE	SECT.
52	417	D	65	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

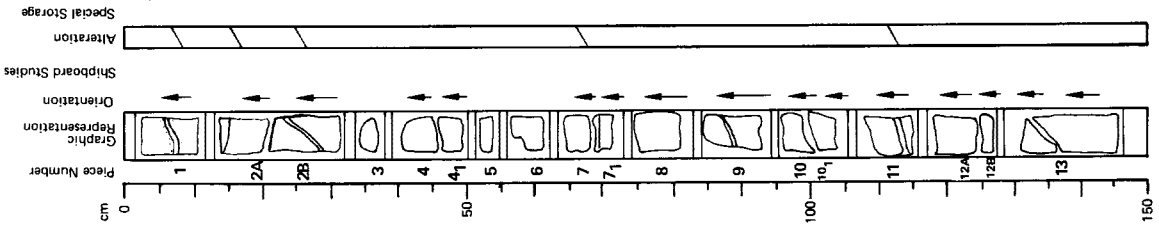
Highly phyrlic, moderately altered pillow(?) basalt with an aphyric chilled margin in piece 5A. Groundmass ranges from fine-grained with an intersertal texture in pieces 1-3 and 56.9 to very fine-grained in pieces 4A-5A near pillow margin. Plagioclase, pyroxene and olivine phenocrysts total 20-25%; plagioclase phenocrysts < 5 mm; pyroxene phenocrysts < 2 mm, commonly in glomerocrysts with plagioclase; altered olivine phenocrysts < 4 mm, locally > 5% (piece 2B). Veins filled by smectite, calcite and sulfides.

Thin Section Description

Location: 123 cm, flow interior
 Texture: highly phyrlic, intergranular
 Phenocrysts: olivine 3%, 0.5-1.6 mm, euhedral; plagioclase 16%, 1-1.5 mm, euhedral; clinopyroxene 1%, 0.5-0.8, subhedral, commonly in glomerocrysts with plagioclase
 Groundmass: olivine 2%, 0.06 mm, euhedral; plagioclase 40%, 0.1 mm, euhedral; clinopyroxene 35%, 0.06-0.08 mm, subhedral; glass and opaques 5%
 Vesicles: < 1%, 0.5 mm, filled by smectite
 Alteration: olivine replaced by calcite and smectite; glass replaced by clay

Shipboard Data

Bulk Analysis: 114-116 cm	Physical Property Data:	15.17 cm
SiO ₂ 49.7	Vp (km/sec)	5.96
Al ₂ O ₃ 16.6	Porosity (%)	5.2
Fe ₂ O ₃ 10.1	Wet Bulk Density (g/cc)	2.89
MgO 6.94	Grain Density (g/cc)	2.96
CaO 12.8		
Na ₂ O N.D.		
K ₂ O 0.05		
TiO ₂ 1.36		
P ₂ O ₅ N.D.		
MnO N.D.		
LOI 1.5		
H ₂ O ⁺ 0.51		
H ₂ O ⁻ N.D.		
CO ₂ 0.06		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



Visual Description

Moderately to highly phyrlic, massive basalt. Groundmass medium-grained. Plagioclase phenocrysts and glomerocrysts of plagioclase and clinopyroxene total 10-15%, < 10 mm across with a mean of 2-3 mm; olivine phenocrysts 2-3%, 1-2 mm, replaced by smectite. Vesicles rare, filled by smectite. Veins filled by dark green smectite, sulfides and minor quartz.

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

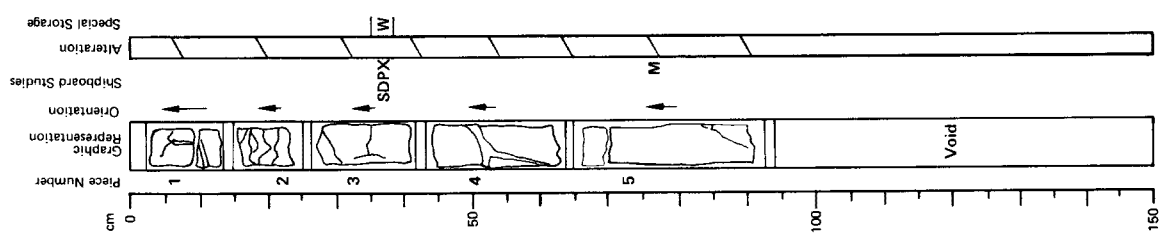
LEG	SITE	HOLE	CORE	SECT.
52	417	D	65	5

LEG	SITE	H O E	CORE	SECT.
5	417	D	6	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Highly phytic, massive basalt with a moderately altered, coarse-grained groundmass. Plagioclase phenocrysts 10%, <7 mm; augite phenocrysts 3%, in glomerocrysts with plagioclase; olivine phenocrysts 5%, <4.5 mm, replaced by smectite. Veins filled by smectite, montmorillonite, calcite and pyrite.

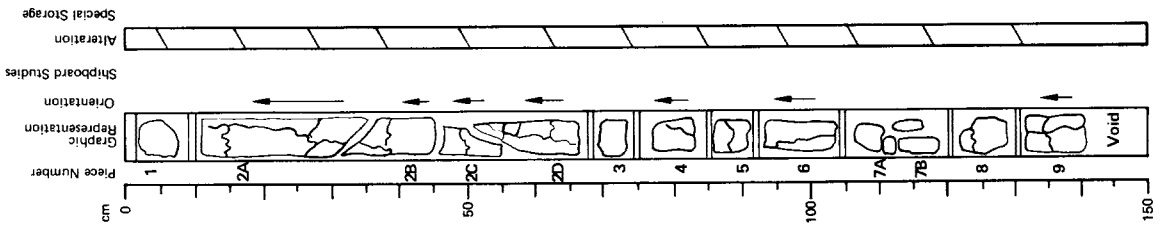
Shipboard Data	Magnetic Data:
Bulk Analysis: 37.39 cm	NRM Intensity (emu/cc) 6.45 x 10 ⁻³
SiO ₂ 48.8	NRM Inclination 460.2°
Al ₂ O ₃ 16.9	Stable Inclination -54.1°
Fe ₂ O ₃ 8.97	
MgO 7.11	
CaO 12.6	Physical Property Data:
Na ₂ O N.D.	V _b (km/sec) 5.72
K ₂ O 0.03	Porosity (%) 8.5
TiO ₂ 1.12	Wet Bulk Density (g/cc) 2.78
P ₂ O ₅ N.D.	Grain Density (g/cc) 2.95
MnO N.D.	
LOI 1.7	
H ₂ O ⁺ 1.09	
H ₂ O ⁻ N.D.	
CO ₂ 0.10	
Cr N.D.	
Ni N.D.	
Sr N.D.	
Zr N.D.	



LEG	SITE	H O E	CORE	SECT.
5	417	D	6	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

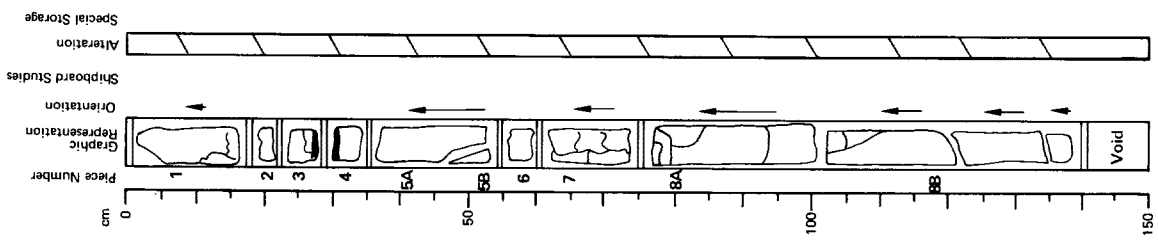
Visual Description
Moderately to highly phytic pillow(?) basalt. Basalt moderately altered with a fine-grained, interstitial groundmass. Plagioclase phenocrysts <5 mm, microphyroxene phenocrysts <1.5 mm, in glomerocrysts. Olivine phenocrysts <5 mm, replaced by smectite and calcite; in places total 10-15% in pieces 1-6, increase to 15-20% in pieces 7-9. Vesicles filled by calcite and smectite range in size from 0.5-2.0 mm, increase from 1% in pieces 1-7 to 2% in pieces 8 and 9. Numerous veins filled by smectite, calcite and minor sulfides.



LEG	SITE	HOLE	CORE	SECT.
524	17D	66	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Highly phytic, moderately altered pillow basalt with chilled margins in pieces 3 and 4. Groundmass ranges from fine-grained with an intersertal texture in pieces 1 and 5-8 to very fine-grained or aphanitic in pieces 2-4. Plagioclase, clinopyroxene and olivine phenocrysts total 15-20%; plagioclase <5 mm, occurs as isolated phenocrysts and in glomerocrysts with clinopyroxene; olivine phenocrysts <3 mm, replaced by smectite and calcite. Vesicles filled by calcite and smectite rare in pieces 1-6, increase to 1-2% in pieces 7 and 8. Numerous veins filled by calcite and smectite. Sulfides common as grains in smectite.



LEG	SITE	HOLE	CORE	SECT.
524	17D	66	3	

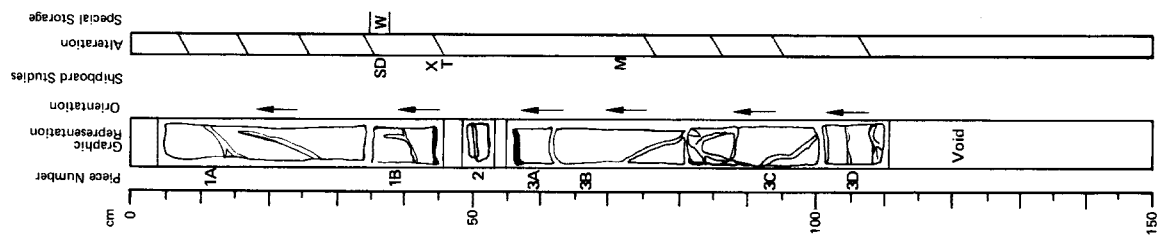
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately to highly phytic pillow basalt with glassy chilled margins in pieces 1B, 2 and 3A. Basalt moderately altered with a fine- to medium-grained groundmass which decreases in grain size with depth. Plagioclase phenocrysts occur as isolated crystals and in glomerocrysts with clinopyroxene <8 mm across; olivine phenocrysts 2-3%, 1 mm, occasionally in glomerocrysts 2-3 mm across. Calcite-filled vesicles 1-2%, 0.5-1.0 mm in piece 3, absent in pieces 1 and 2. Veins filled by calcite; quartz(?) or by smectite and sulfides. Piece 3D contains slickensides in smectite with a plunge of 25-30°.

Thin Section Description
Location: 45 cm, pillow interior
Texture: quenched, variolithic
Phenocrysts: olivine 3%, <3 mm, subhedral to skeletal; plagioclase 12%, <5 mm, skeletal laths with many inclusions (including trails of spinel), commonly in glomerocrysts with olivine
Groundmass: plagioclase 30%, seriate skeletal laths; clinopyroxene 40%, <0.05 mm, fibrous to granular; magnetite 5%, <0.02 mm, euhedral; glass 10%
Vesicles: <1%, filled by calcite and clay
Alteration: olivine and glass replaced by smectite

Shipboard Data

Bulk Analysis: 44-46 cm	Magnetic Data:	70-72 cm
SiO ₂ 50.6	NRM Intensity (emu/cc)	4.75 x 10 ⁻³
Al ₂ O ₃ 16.5	NRM Inclination	19.9
Fe ₂ O ₃ 9.84	Stable Inclination	53.7
MgO 6.72		
CaO 12.9	Physical Property Data:	35-37 cm
Na ₂ O N.D.	Vp (km/sec)	5.94
K ₂ O 0.03	Wet Bulk Density (g/cc)	2.87
TiO ₂ 1.36		
P ₂ O ₅ N.D.		
MnO N.D.		
LOI 1.1		
H ₂ O ⁺ 0.78		
H ₂ O ⁻ N.D.		
CO ₂ 0.03		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

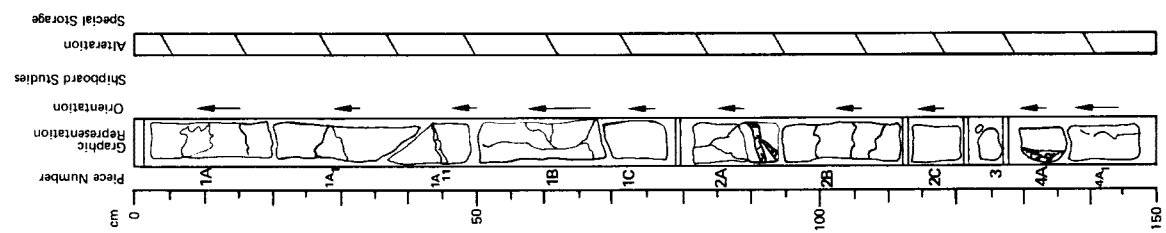


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LEG	SITE	HOLE	CORE	SECT.
52	417	D	66	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Highly phytic, moderately altered pillow basalt with a chilled margin in piece 4A. Groundmass fine-grained with an intersertal texture. Plagioclase, clinopyroxene and olivine phenocrysts total 25%; plagioclase phenocrysts < 5 mm, occur as isolated crystals and in glomerocrysts with clinopyroxene; clinopyroxene phenocrysts < 1.5 mm; olivine phenocrysts < 5 mm, replaced by smectite and calcite. Rare vesicles filled by smectite and calcite. Numerous veins filled by smectite, calcite and sulfides or more rarely, by smectite with a core of calcite. Sulfides occur throughout section as disseminated grains.

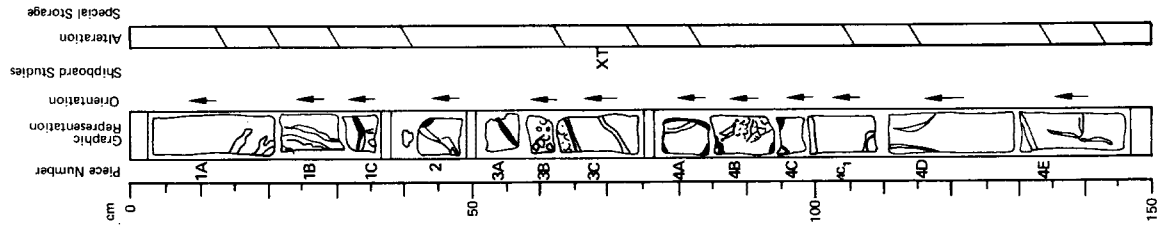


LEG	SITE	HOLE	CORE	SECT.
52	417	D	66	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately to highly phytic pillow basalt with glassy chilled margins in pieces 1C-4C and breccia in pieces 2, 3 and 4B. Groundmass fine-grained. Phenocrysts consist of plagioclase, clinopyroxene and olivine with plagioclase and clinopyroxene commonly occurring in glomerocrysts < 10 mm across. Veins filled by smectite and calcite; quartz and irregular patches of sulfides. Breccia composed of basalt fragments in a network of smectite veins.

Thin Section Description
 Location: 70 cm, pillow interior
 Texture: moderately phytic, pilotaxitic(?)
 Phenocrysts: olivine < 1%, 0.6-1 mm, euhedral; plagioclase 10%, 0.5-4 mm, euhedral-subhedral
 Groundmass: olivine 2%; plagioclase, clinopyroxene and magnetite 88%
 Vesicles: 2%, 0.3-0.5 mm; filled by calcite, smectite and zeolites(?); some filling crescentic
 Alteration: olivine replaced by calcite and clay; glass(?) replaced by clay



Shipboard Data
 Bulk Analysis: 69-71 cm

SiO ₂	49.2
Al ₂ O ₃	17.5
Fe ₂ O ₃	9.07
MgO	5.46
CaO	14.0
Na ₂ O	N.D.
K ₂ O	0.02
TiO ₂	1.37
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.9
H ₂ O ⁺	1.05
H ₂ O ⁻	N.D.
CO ₂	0.48
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

LEG	SITE	HOLE	CORE	SECT.
52	417	D	66	6

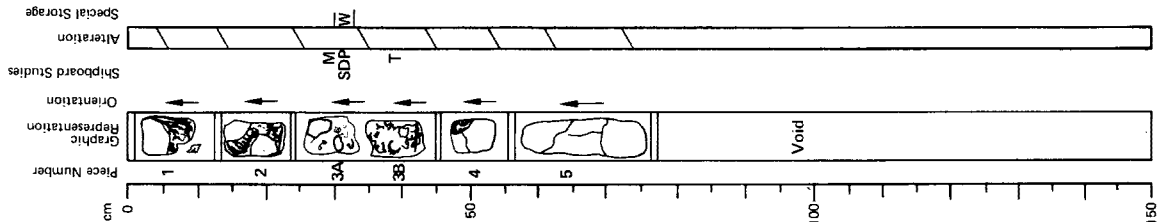
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Highly phyrlic pillow basalt with a chilled glassy margin in piece 4 and a broken pillow breccia containing fragments of fresh glass in pieces 1, 3. Groundmass aphanitic to fine-grained with an intersertal texture. Plagioclase, clinopyroxene and olivine phenocrysts total 20%; plagioclase phenocrysts <5 mm; clinopyroxene phenocrysts <2 mm; olivine phenocrysts <3 mm, replaced by smectite and calcite. Numerous veins filled by smectite and calcite. Breccia composed of fragmented glassy pillow margins in a matrix of clay and calcite.

Thin Section Description
Location: 39 cm, hyaloclastite
Texture: glassy, phyrlic
Phenocrysts: olivine 1%, skeletal; plagioclase 3%, euhedral to skeletal with many glass inclusions
Groundmass: glass 96%, fresh with some palagonite and smectite
Vesicles: none
Alteration: none

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 29-31 cm
NRM Intensity (emu/cc) 10.04 x 10⁻³
NRM Inclination -81.8°
Stable Inclination -80.7°

Physical Property Data:
Vp (km/sec) 30-32 cm
Vp (km/sec) 4.53
Porosity (%) 20.5
Wet Bulk Density (g/cc) 2.41
Grain Density (g/cc) 2.81



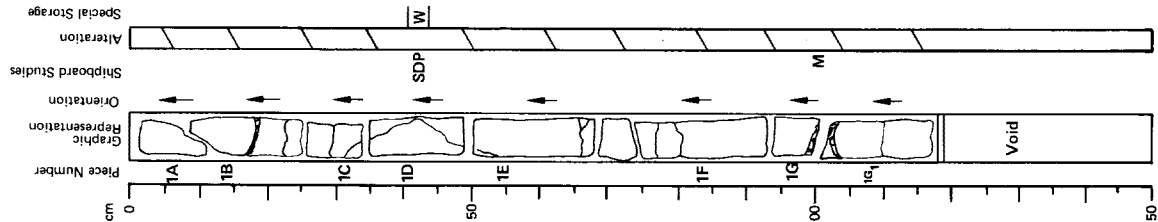
LEG	SITE	HOLE	CORE	SECT.
52	417	D	67	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phyrlic, massive basalt. Basalt moderately altered with a fine-grained, intersertal groundmass. Plagioclase phenocrysts total 13%; plagioclase phenocrysts <5 mm, occur as isolated crystals and in glomerocysts with clinopyroxene; clinopyroxene phenocrysts <4 mm; olivine phenocrysts common, <5 mm, replaced by smectite and calcite. Veins filled by smectite with minor calcite and sulfides.

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 112-114 cm
NRM Intensity (emu/cc) 2.72 x 10⁻³
NRM Inclination +65.2°
Stable Inclination -46.7°

Physical Property Data:
Vp (km/sec) 42-44 cm
Vp (km/sec) 5.92
Porosity (%) 4.0
Wet Bulk Density (g/cc) 2.885
Grain Density (g/cc) 2.96

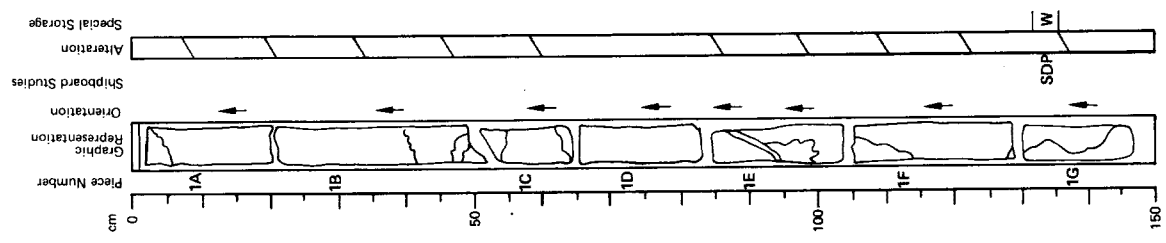


LEG	SITE	HOLE	CORE	SECT.
52	417	D	67	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately to highly phyric, massive basalt. Basalt moderately altered with a fine-grained, interstitial to holocrystalline groundmass. Plagioclase, clinopyroxene and olivine phenocrysts total 15%; plagioclase phenocrysts < 7 mm, occur as isolated crystals and in glomerocrysts with clinopyroxene; subhedral olivine phenocrysts < 5 mm, replaced by smectite and calcite, particularly abundant in pieces 1A, 1B, and 1E. Veins filled by smectite, calcite and sulfides. Section continuous with base of Section 2.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 132.134 cm
 Porosity (%) 5.67
 Wet Bulk Density (g/cc) 6.6
 Grain Density (g/cc) 2.805
 Grain Density (g/cc) 2.93



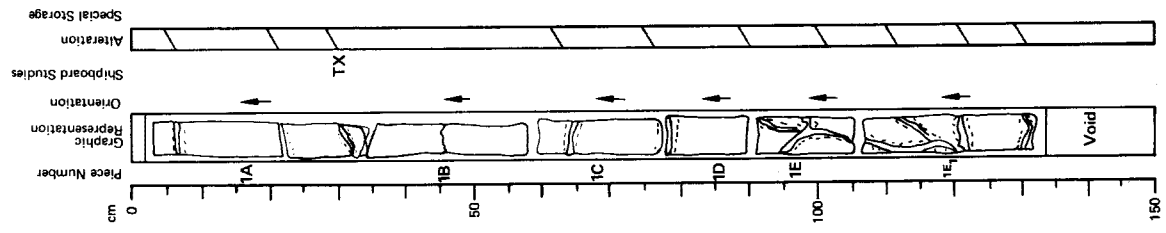
LEG	SITE	HOLE	CORE	SECT.
52	417	D	67	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Highly phyric, massive basalt with a medium-grained groundmass. Plagioclase phenocrysts 12%, < 8 mm, occur as isolated crystals and in glomerocrysts with clinopyroxene; clinopyroxene phenocrysts 3%, 0.5-2.0 mm; olivine phenocrysts replaced by smectite 2.3%, 1-2 mm, particularly abundant in pieces 1A, 1B and 1D. Veins filled by calcite, smectite, quartz and sulfides in decreasing order of abundance. Smectite, calcite and sulfides also present as irregular patches in groundmass. Section continuous with Sections 1 and 3.

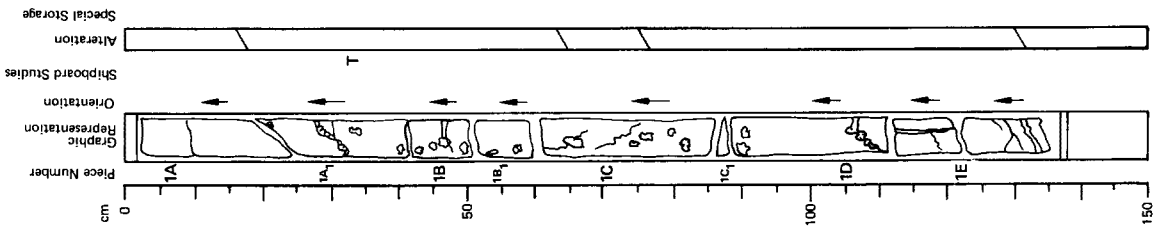
Thin Section Description
 Location: 30 cm, flow interior
 Texture: intersertal
 Phenocrysts: olivine 3%, < 5 mm, skeletal; zoned plagioclase laths 7%, < 5 mm; clinopyroxene < 1%, < 1 mm, granular, commonly in glomerocrysts
 Groundmass: plagioclase 35%, < 0.5 mm, elongate microlites; clinopyroxene 40%, < 0.1 mm, granular, radiating bundles; magnetite 5%, < 0.05 mm, euhedral; glass 10%, devitrified
 Vesicles: < 1%, < 1 mm, filled with devitrified glass and smectite in geopodal structures
 Alteration: glass replaced by clay; olivine replaced by clay and traces of silicat(?)

Shipboard Data
 Bulk Analysis: 29.31 cm
 SiO₂ 49.6
 Al₂O₃ 16.2
 Fe₂O₃ 9.93
 MgO 6.97
 CaO 12.9
 Na₂O N.D.
 K₂O 0.02
 TiO₂ 1.33
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.6
 H₂O⁺ 0.58
 H₂O⁻ N.D.
 CO₂ 0.09
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



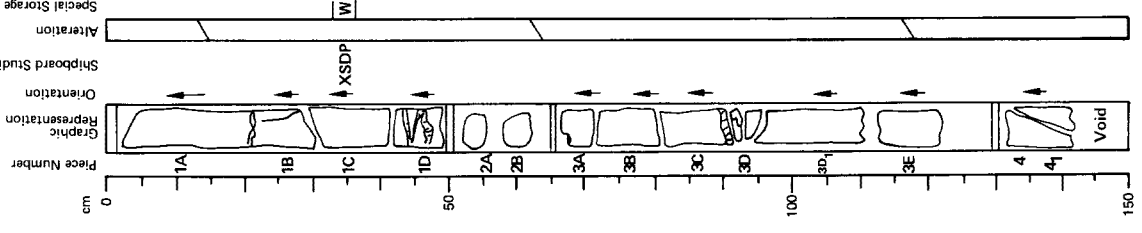
LEG	SITE	HOLE	CORE	SECT.
52	417	D	67	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Highly phytic, massive basalt with numerous vugs and vesicles distributed unevenly throughout section. Plagioclase phenocrysts 15%, < 15 mm with a mean of 5 mm; altered olivine phenocrysts 5-10%; 2.5 mm; pyroxene phenocrysts < 5%. Vesicles and vugs 5-10%, < 2 cm, filled by linings of green smectite and cores of calcite, quartz, sulfides and fibrous yellow zeolites(?). Veins filled by smectite and calcite with minor quartz and zeolites. Section continuous with base of Section 3.

Thin Section Description
 Location: 32 cm, next to glassy margin
 Texture: intersertal
 Phenocrysts: olivine 3%, 1 mm, euhedral; plagioclase laths 15%, 5 mm; clinopyroxene 3%, 1 mm, anhedral, commonly in glomerocrysts with plagioclase
 Groundmass: olivine 10%; plagioclase 10%; clinopyroxene 40%; magnetite 9%; glass 9%
 Vesicles: 1%, up to 3 mm, round to irregular; filled by calcite and smectite
 Alteration: olivine replaced by calcite and clay; glass replaced by clay. Veins filled by calcite and clay.



Visual Description
 Massive basalt with a moderately phytic, fine grained groundmass in pieces 2 and 3 and a highly phytic, medium-grained groundmass in pieces 1 and 4; plagioclase phenocrysts < 15%, < 10 mm; pyroxene phenocrysts < 5%, < 5 mm; altered olivine phenocrysts 1.7%, 2.8 mm. Vesicles 1%, filled by clay. Veins filled by calcite, clay and sulfides. Section continuous with base of Section 4.

Shipboard Data
 Bulk Analysis: 33-35 cm
 SiO₂ 49.2
 Al₂O₃ 16.3
 Fe₂O₃ 10.1
 MgO 7.00
 CaO 12.7
 Na₂O N.D.
 K₂O 0.04
 TiO₂ 1.34
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.4
 H₂O⁺ 0.92
 H₂O⁻ N.D.
 CO₂ 0.09
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Physical Property Data
 Vp (km/sec) 33-35 cm
 Porosity (%) 5.94
 Wet Bulk Density (g/cc) 4.9
 Grain Density (g/cc) 2.89

LEG	SITE	HOLE	CORE	SECT.
52	417	D	67	5

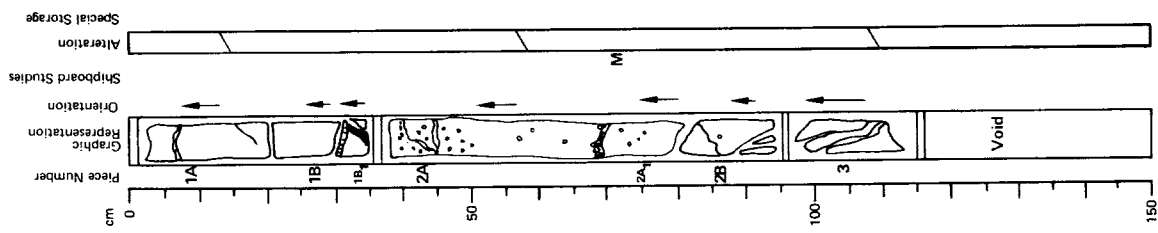
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
5 2 4	1 7 D	6 7	6	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 0.35 cm: highly phyrlic pillow(?) basalt with a chilled margin in pieces 1B and 1B₁. Plagioclase phenocrysts 15% <10 mm; pyroxene phenocrysts to <5%; altered olivine phenocrysts 5%. Voids filled by calcite, zeolites(?) and sulfides.
 35-115 cm: sparsely to moderately phyrlic, massive basalt. Zoned plagioclase phenocrysts 5-7% <7 mm; pyroxene phenocrysts rare. Vesicles 2.5% in piece 2A, filled with calcite, clay and sulfides. Veins filled by calcite, clay and minor sulfides.

Shipboard Data
 Location: 72.74 cm
 Magnetic Data: 1.67 x 10⁻³
 NRM Intensity (emu/cc) +42.4°
 NRM Inclination -52.5°
 Stable Inclination



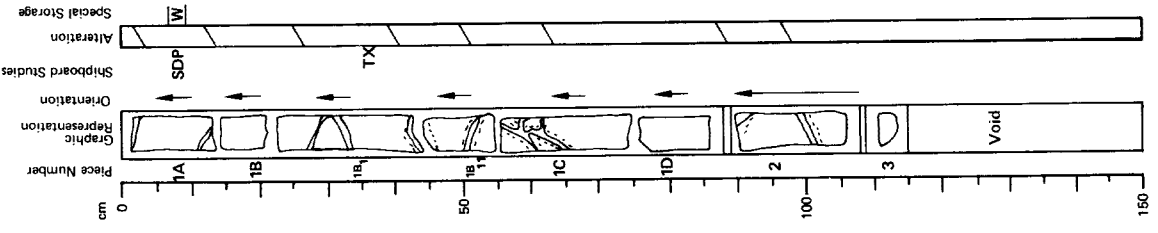
LEG	SITE	H O L	CORE	SECT.
5 2 4	1 7 D	6 7	6	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic, massive basalt. Groundmass medium-grained with a granular texture. Plagioclase phenocrysts and glomerocrysts of plagioclase (± clinopyroxene) 10-15%, <8 mm with a mean of 2.3 mm. Vesicles <1%, 0.5-1.0 mm, filled by calcite, smectite and sulfides. Veins filled by calcite and smectite with minor quartz and sulfides. Sulfides also distributed irregularly throughout groundmass in association with smectite.

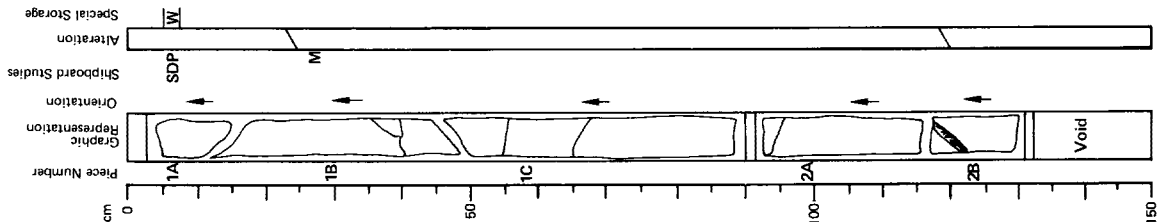
Thin Section Description
 Location: 36 cm, flow interior
 Texture: moderately phyrlic; subophitic to intergranular
 Phenocrysts: plagioclase 10%, 1-5 mm, tablets with inclusions
 Groundmass: olivine 3%, 0.1-0.3 mm, euhedral; plagioclase 40%, 0.2-1 mm, euhedral; clinopyroxene 40%, 0.2-1 mm; magnetite 5%, 0.1-0.2 mm, pyrite 0.1%
 Vesicles: 0.5%, 1 mm, filled by clay and calcite
 Alteration: olivine glass replaced by calcite and clay; glass replaced by clay

Shipboard Data
 Bulk Analysis: 35.37 cm
 Physical Property Data: 7.9 cm
 SiO₂ 50.7 Vp (km/sec) 5.59
 Al₂O₃ 16.0 Porosity (%) 5.8
 Fe₂O₃ 9.48 Wet Bulk Density (g/cc) 2.86
 MgO 6.36 Grain Density (g/cc) 2.94
 CaO 12.8
 Na₂O N.D.
 K₂O 0.04
 TiO₂ 1.42
 P₂O₅ N.D.
 MnO N.D.
 LOI 2.0
 H₂O⁺ 0.47
 H₂O⁻ N.D.
 CO₂ 0.06
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



LEG		SITE		CORE		SECT.	
5	2	4	1	7	D	6	8
1		1		1		1	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

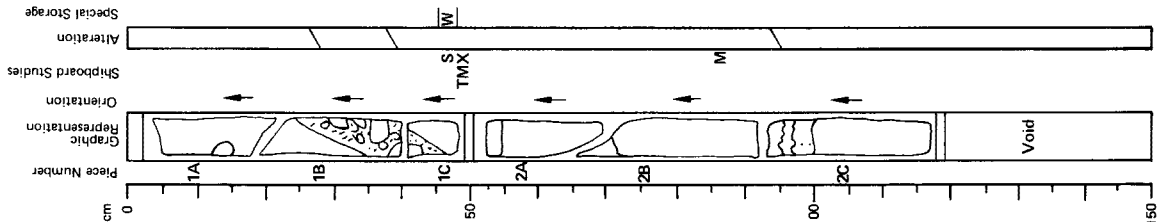


Visual Description
 0-117 cm: moderately phyrlic, massive basalt with a coarse-grained (<0.5 mm), crystalline groundmass composed of plagioclase, augite, altered olivine (rare) and magnetite. Zoned plagioclase phenocrysts 5-10%, <10 mm, commonly with inclusions
 117-130 cm: highly phyrlic basalt dike with an altered glassy margin between 117-123 cm. Dike contact against country rock (basalt described above) well-preserved, steeply inclined. Plagioclase phenocrysts 10%, <4 mm; augite phenocrysts 5%; altered olivine phenocrysts 5%; augite phenocrysts occur exclusively in glomerocrysts <10 mm across with plagioclase and olivine; plagioclase and olivine also occur as isolated crystals.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 27.29 cm 4.91 x 10⁻³
 NRM Inclination +73.6°
 Physical Property Data:
 Vp (km/sec) 7.9 cm 5.84
 Porosity (%) 6.54
 Wet Bulk Density (g/cc) 2.825
 Grain Density (g/cc) 2.95

LEG		SITE		CORE		SECT.	
5	2	4	1	7	D	6	8
2		2		2		2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



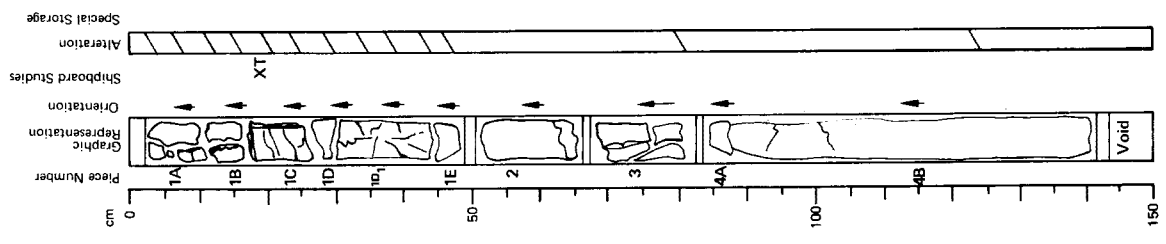
Visual Description
 0-55 cm: highly phyrlic, glassy basalt dike with an altered glassy margin at the top of piece 2A and breccia in pieces 1B and 1C. Dike contact against country rock well-preserved, dips at an angle of 75-80°. Plagioclase phenocrysts in dike rock 10%, <6 mm, strongly zoned; altered skeletal olivine phenocrysts <10%, <4 mm; augite phenocrysts 5%, occur as rounded isolated crystals and in glomerocrysts <12 mm across with plagioclase and olivine. Breccia composed of fragments of basalt country rock, altered basaltic glass (derived from the dike margins) and plagioclase containing traces of fresh glass.
 55-120 cm: moderately phyrlic, massive basalt with a coarse-grained, crystalline groundmass. Strongly zoned plagioclase phenocrysts 5%, <10 mm; olivine microphenocrysts 1%. Sulfides present as dispersed grains throughout piece 2.

Thin Section Description
 Location: 47 cm, dike
 Texture: very fine-grained
 Phenocrysts: olivine 5%, <1 mm, euhedral; plagioclase 35%, <5 mm, occasionally rounded with altered inclusions; clinopyroxene 10%, <2.5 mm, commonly rounded with plagioclase inclusions.
 Groundmass: quenched plagioclase laths 20%, <0.02 mm; clinopyroxene 20%, <0.02 mm, quenched fibrous bundles; magnetite 10%, <0.02 mm, quenched, anhedral
 Vesicles: none
 Alteration: olivine replaced by smectite

Shipboard Data
 Bulk Analysis: 48-50 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 46.48 cm 84.86 cm 2.65 x 10⁻³
 NRM Inclination -62.7° +58.0°
 Stable Inclination -63.5°
 Physical Property Data:
 Vp (km/sec) 46.48 cm 5.27

LEG	SITE	HOLE	CORE	SECT.
52	417	D	68	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Sparsely to highly phyrlic, massive basalt with an aphanitic to coarse-grained groundmass and altered chilled margins in pieces 1A-1C. Pieces 1A and 1B contain a sharp contact between a highly phyrlic, coarsely crystalline basalt and a strongly altered, sparsely phyrlic basalt with a plagioclase phenocryst zone. The groundmass is composed of olivine, pyroxene, and magnetite (in the sparsely phyrlic basalt) and a 5 mm thick vein filled with smectite containing inclusions of altered plagioclase. Pieces 1C-4 represent the upper portion of a massive cooling unit which becomes increasingly coarse-grained and phyrlic with depth below a 3.4 cm thick chilled margin in piece 1C. Groundmass highly fractured, largely replaced by clay in pieces 1C-1E, moderately altered in pieces 2-4. Plagioclase phenocrysts 8-10%, 3.4 mm in pieces 1C-1E, increase to 15%, < 10 mm in pieces 2-4; augite phenocrysts < 10%, 1.2 mm, commonly in glomerocrysts with plagioclase; olivine phenocrysts replaced by clay 8-10%, 3.4 mm in pieces 1C-1E, decrease to 1.2 mm in pieces 2-4. Groundmass in pieces 2-4 contains abundant magnetite and occasional crystals of pyrite. Thin veins in pieces 2 and 3 filled by smectite.

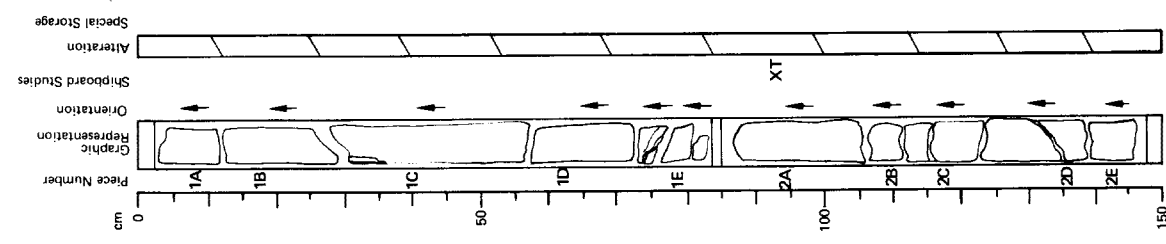
Thin Section Description
 Location: 19 cm, dike interior
 Texture: highly phyrlic, quenched to intergranular
 Phenocrysts: olivine 2%, 1.2 mm, euhedral; plagioclase 15%, 3 mm, euhedral-subhedral; clinopyroxene 3%, 0.5-1 mm, subhedral anhedral, in rounded megacrysts or in subophitic clots with plagioclase and olivine.
 Groundmass: olivine 2%, < 0.05 mm; plagioclase 38%, < 0.05 mm; clinopyroxene 38%, < 0.05 mm; magnetite 2%, < 0.05 mm
 Vesicles: none
 Alteration: olivine replaced by smectite and minor pyrite. Veins filled by clay and pyrite.

Shipboard Data
 Bulk Analysis: 18-20 cm

SiO ₂	50.1
Al ₂ O ₃	15.5
Fe ₂ O ₃	10.8
MgO	7.04
CaO	12.6
Na ₂ O	N.D.
K ₂ O	0.03
TiO ₂	1.50
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.0
H ₂ O ⁺	0.87
H ₂ O ⁻	N.D.
CO ₂	0.09
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

LEG	SITE	HOLE	CORE	SECT.
52	417	D	68	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Moderately to highly phyrlic, massive basalt, with a moderately altered, coarse-grained groundmass. Plagioclase phenocrysts 12-18%, occur as small phenocrysts 2.3 mm across and, more rarely, as zoned megacrysts < 10 mm across; augite phenocrysts 10%, 2.3 mm; altered euhedral olivine phenocrysts 5%, 2.3 mm. Magnetite common in groundmass. Veins < 0.5 mm across, filled by calcite with a smectite lining. Pyrite < 1%, 0.2-0.5 mm, occurs as disseminated grains along veins and throughout groundmass.

Thin Section Description
 Location: 93 cm, flow interior
 Texture: moderately phyrlic, subophitic
 Phenocrysts: plagioclase 8%, 1-10 mm, euhedral with oscillatory zoning
 Groundmass: plagioclase 48%, 0.3-0.5 mm, subophitic; clinopyroxene 40%, 0.3-0.5 mm, subophitic; magnetite 3%; apatite, trace
 Vesicles: none
 Alteration: clinopyroxene replaced by clay

Shipboard Data
 Bulk Analysis: 92-94 cm

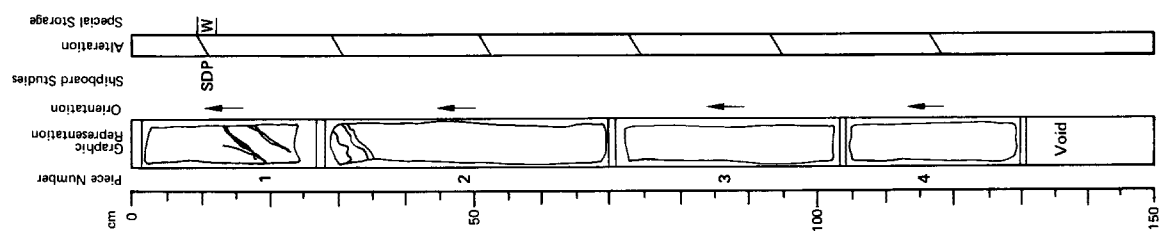
SiO ₂	51.3
Al ₂ O ₃	15.3
Fe ₂ O ₃	10.5
MgO	6.88
CaO	12.1
Na ₂ O	N.D.
K ₂ O	0.07
TiO ₂	1.65
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.4
H ₂ O ⁺	0.89
H ₂ O ⁻	N.D.
CO ₂	0.03
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

LEG	SITE	CORE	SECT.
52	417	D	68
52	417	D	68
52	417	D	68

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Highly phytic, massive basalt. Groundmass partially replaced by smectite. Plagioclase phenocrysts 15% < 10 mm; augite phenocrysts 10% < 3 mm; olivine phenocrysts 10% < 2 mm, replaced by smectite. Magnetite abundant in groundmass as disseminated grains 0.1-0.2 mm across. Veins in pieces 1 and 2 filled by smectite, calcite and occasional grains of pyrite.

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 11-13 cm
NRM Inclination 5.97
Physical Property Data:
Vp (km/sec) 4.6
Porosity (%) 2.90
Wet Bulk Density (g/cc) 2.98
Grain Density (g/cc) 2.98

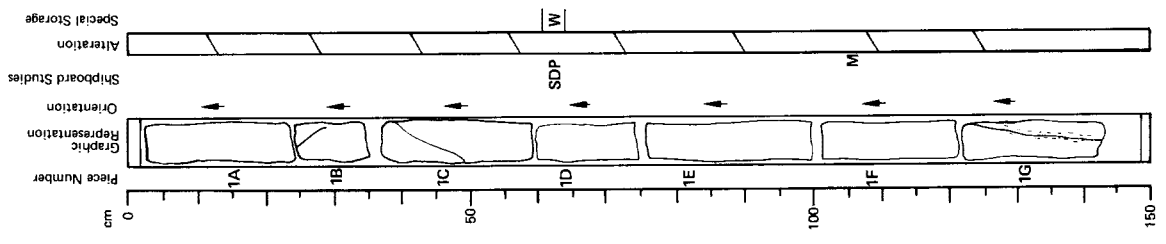


LEG	SITE	CORE	SECT.
52	417	D	68
52	417	D	68
52	417	D	68

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phytic, massive basalt with a doleritic, coarse-grained (0.3-0.8 m) groundmass. Rounded plagioclase phenocrysts 5-10%, 0.5-1.5 mm, commonly display complex oscillatory zoning, numerous white inclusions and intergrowths with pyroxene microphenocrysts. Groundmass composed of plagioclase, pyroxene, olivine-green granules of altered olivine(?), ilmenite(?) and numerous pseudomorphs filled by green or brown smectite(?). Minor veins filled by calcite. Widespread alteration accentuated along veins, appears to be mineral specific, possibly deuteric(?).

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 105-107 cm
NRM Inclination 5.65 x 10⁻³
+78.7°
Physical Property Data:
Vp (km/sec) 62.64 cm
Porosity (%) 6.13
Wet Bulk Density (g/cc) 4.1
Grain Density (g/cc) 2.90

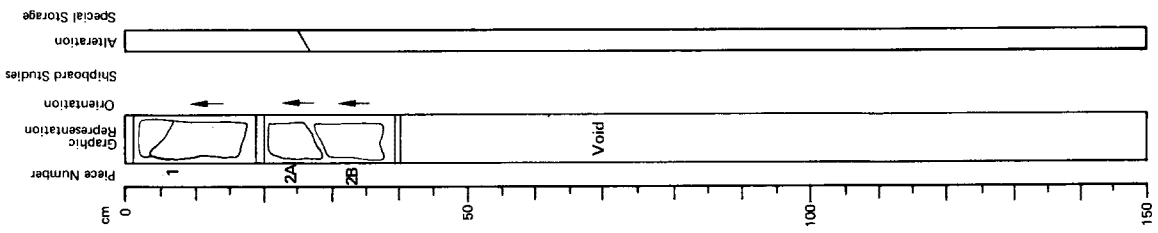


2001

LEG	SITE	HOLE	CORE	SECT.
52	417	D	69	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Highly phyrlic, massive basalt with a coarse-grained (0.5 mm), intersertal to subophitic or holocrystalline groundmass composed of plagioclase, clinopyroxene, partially fresh(?) olivine, magnetite and disseminated sulfides. Zoned plagioclase phenocrysts 15%, < 10 mm; olivine microphenocrysts < 0.8 mm. Vein in piece 1 filled by smectite, calcite and sulfides.



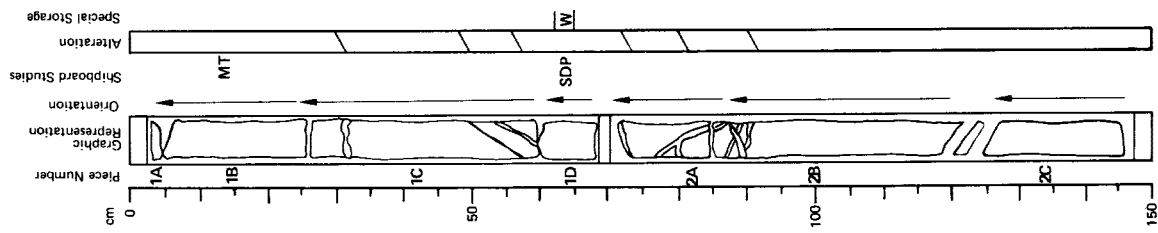
LEG	SITE	HOLE	CORE	SECT.
52	417	D	69	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic, massive basalt with a holocrystalline, coarse-grained (0.5 mm) groundmass composed of plagioclase, clinopyroxene and fresh(?) olivine. Zoned plagioclase phenocrysts < 10 mm long. Veins filled by calcite or smectite. Sulfides present as disseminated grains throughout veins and groundmass.

Thin Section Description
 Location: 13 cm, flow interior
 Texture: ophitic
 Phenocrysts: olivine 3%, 2 mm, euhedral; plagioclase laths 10%, 5 mm; clinopyroxene 7%, 4 mm, commonly in glomerocrysts with plagioclase
 Groundmass: olivine 10%, 0.5 mm; plagioclase 37%, 0.5 mm; clinopyroxene 25%, 0.5 mm; magnetite 8%, 0.5 mm; alkali feldspar < 1%, 0.5 mm; apatite < 1%, as needles in kspar
 Vesicles: none
 Alteration: olivine replaced by clay and calcite; plagioclase and clinopyroxene partially replaced by clay. Thin veins filled by calcite and smectite. Minor pyrite present in clay.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 12-14 cm 5.44 x 10⁻³
 NRM Inclination +72.7°
 Stable Inclination -41.2°
 Physical Property Data:
 Vp (km/sec) 62.64 cm 6.10
 Porosity (%) 2.9
 Wet Bulk Density (g/cc) 2.935
 Grain Density (g/cc) 2.98



SITE SUMMARY SHEET

SITE 418, HOLE A

	LEG 52	LEG 53	Final	
Date occupied	2/10/77	3/15/77		
Date departed	3/2/77	4/14/77		
Time on hole	19 days, 19 hrs.	30 days, 9½ hrs.	50 days, 4½ hrs.	
Position: latitude			25° 02.10'N	
longitude			68° 03.44'W	
Water depth (sea level)			5511	corrected meters, echo sounding
Water depth (rig floor)			5521	corrected meters, echo sounding
Bottom felt at depth			5519	meters, drill pipe
Penetration	570.5	+297.5	868	meters
Number of holes	2 (418, 418A)	1 (418A cont.)	2 (418, 418A)	
Number of cores	49	38	87	
Meters sediment cored	137.5	0	137.5	meters
Meters sediment recovered	58.15	0	58.15	meters
Percentage sediment recovered	42	N.A.	42	per cent
Meters basalt cored	246.5	297.5	544.0	meters
Meters basalt recovered	158.4	231.3	389.7	meters
Percentage basalt recovered	64	78	72	per cent
Total length cored section	384.0	297.5	681.5	meters
Total core recovered	211.8	231.3	443.1	meters
Percentage total core recovered	55.2	78	65.0	per cent

Oldest Sediment Cored

Depth sub-bottom	324	meters
Nature	nanno clay/ooze	
Age	Early Aptian	
Measured velocity	1.6	km/sec

Basement

Depth sub-bottom	324	meters
Nature	Basalt	
Velocity range	2.8-6.3	km/sec

240

SITE 418	HOLE	CORE 1	CORED INTERVAL: 0.0-6.0 m		LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			SECTION	METERS		
TIME-ROCK UNIT	BIOSTRAT	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
QUATERNARY	(F)N22/23					
		RADS				
		NANNOS				
		FORAMS				
		(R)B	1	0.5		Brown (10HR 4/2) pelagic clay. Intense deformation. Sediments have a consistent appearance in all sections and no signs of reworking. There is a narrow ooze streak at 90 cm in Section 4. Smears: 1-75, 2-75, 3-75, 4-75, 4-90, 6-90, CC
		(R)B	2	1.0		70-80% clay TR-10% qtz., feld. 15-30% silt TR- 3% CO ₂ (unspec.) 2- 5% nannofossils =90% clay min. w/Fe-oxide coating or platelets.
		(R)B	3			Grain Size 4-80 1.1% sand 12.9% silt 86.0% clay Carbon, Carbon Carbonate 1-71 (0.1, 2, 0.3) 4-75 (0.1, 9, 1.1)
		(R)B	4			10HR 4/2
		(F)Ag (F)Fm	5			VOID
		(F)B	6			VOID
		(F)Fm	7			VOID
		(F)Cm	CC			VOID

SITE 418 HOLE A CORE 1 CORED INTERVAL: 111.0-120.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION	LITHOLOGIC SAMPLE	DISTURBANCE	DRILLING	SEDIMENTARY	LITHOLOGIC	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION		
																	BIOSSTRAT	FORAMS
			1	0.5		Dominant colors gray orange (10YR 7/4) pale yellow brown (10YR 6/2) Minor colors pale blue green (5BG 7/2)	10YR 7/4 10YR 6/2 5BG 7/2											
			2	1.0		Generally intense deformation to breccia. No structures. Pelagic w/zeolite-rich zones (pale blue green). Pelagic Clay Smears: 1-50, 1-68, 1-80, 2-2, 2-50, 2-61, 2-93, 3-75, CC <10% silt TR- 1% qtz., feld. >90% clay TR- 5% opauques TR- 1% glass (Zeolite-rich = 10% or > zeolites)	10YR 7/4 10YR 6/2 with 5BG 7/2											
			3			Grain Size 0-90% sand 2-4% silt 97-6% clay Carbon, Carbon Carbonate 2-92 (0.1, 0, 0.1)												
			CC															

SITE 418 HOLE A CORE 3 CORED INTERVAL: 130.0-139.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION	LITHOLOGIC SAMPLE	DISTURBANCE	DRILLING	SEDIMENTARY	LITHOLOGIC	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION		
																	BIOSSTRAT	FORAMS
			1	0.5		Pelagic Clay Dominant colors Brown (10YR 5/3) with light yellow brown (10YR 6/4). Minor colors pale blue (5BG 7/2) as patches with nannos. Generally intense deformation. Sticky, firm clay. Some streaks have a greater percent of zeolites.	75											
			2	1.0		Pelagic Clay Smears: 1-75, 2-133 <10% silt TR- 2% zeolites >90% clay Smears: 1-121 has 10% nannofossils	121											
			3			Pelagic Clay Smears: 2-69, 2-133, 3-75, 3-140, 5-75, 6-75, CC <10% silt TR- 1% qtz., feld., vol. glasses >90% clay TR- 5% zeolites 94-98% clay min.	69 75											
			4			Grain Size 2-104 1-5% sand 3-7% silt 94.9% clay Carbon, Carbon Carbonate 2-113 (0.1, 2, 0.3) 6-101 (0.1, 2, 0.3)	140											
			5			olive gray (5Y 5/2) streak	10											
			6			gray green (10GY 5/2) 3-5% zeolites	11											
			7															
			CC															

SITE 418 HOLE A CORE 2 CORED INTERVAL: 120.5-130.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION	LITHOLOGIC SAMPLE	DISTURBANCE	DRILLING	SEDIMENTARY	LITHOLOGIC	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION	
																	BIOSSTRAT
			1	0.5		Colors: Pelagic Clay Dominated moderate olive brown (5Y 4/1) with light olive gray (5Y 4/2) and patches of pale blue green (5BG 7/2). Intense disturbance - no structures.	70										
			2	1.0		Pelagic Clay Smears: 1-70, 1-145, CC <10% silt 90-95% clay >90% clay 0-2% Fe-oxides TR- 5% zeolites TR- qtz., feld., mica, vol. glass (Altered ash noted in smears.)	145										
			CC			Grain Size 1-109 0.7% sand 7.8% silt 91.5% clay Carbon, Carbon Carbonate 1-112 (0.2, 0, 0.2)											

1149

SITE 418 HOLE A CORE 5 CORED INTERVAL: 149.0-158.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE	SEDIMENTARY STRUC. SAMPLE	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			1	0.5					<p><u>Pelagic Clay</u></p> <p>Light olive brown (2.5Y 5/4) with very dark gray brown (2.5Y 3/2) streaks.</p> <p>Drill Breccia to intensely deformed generally a stiff clay.</p> <p>A generally stiff clay; drill Breccia to intensely deformed.</p>
			2	1.0					<p><u>Pelagic Clay</u></p> <p>Light olive brown (2.5Y 5/4) very dark gray brown (2.5Y 3/2) with minor light yellow brown (2.5Y 6/4)</p>
			3					105	<p><u>Pelagic Clay</u></p> <p>Smears: 2-105, 2-145, 5-135, CC</p> <p><10% silt TR% qtz., feld., CO; >90% clay 1-10% zeolites 1-5% opaques/Fe-oxides 90-95% clay min. (Tourmaline present in 1 smear.)</p> <p><u>Grain Size</u></p> <p>4-106 0-10% sand 3-2% silt 94-9% clay</p>
			4						<p>Carbon, Carbon Carbonate</p> <p>4-97 (0.1, 0, 0.1)</p>
			5					100	<p>Zeolite-rich</p> <p>Smear: 5-100 100% clay</p>
			6					135	<p>5% opaques TR% opaques feld. 36% zeolites 58% clay min.</p>
			7						
			CC						2.5Y 3/2

SITE 418 HOLE A CORE 4 CORED INTERVAL: 139.5-149.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE	SEDIMENTARY STRUC. SAMPLE	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			1	0.5					<p><u>Pelagic Clay</u></p> <p>Colors Light olive brown (2.5Y 5/4) with other mottled browns. Lighter/darker olive brown (2.5Y 4/4), dark yellow brown (10YR 4/4).</p> <p><u>Pelagic Clay</u></p> <p>Smears: 1-75, 5-40, 5-60, CC</p> <p><10% silt TR% qtz., feld., dol., glass 2-5% opaques 2-5% zeolites 1-5% nemas 90-95% clay min.</p> <p><u>Grain Size</u></p> <p>5-52 0-5% sand 3-2% silt 95-98% clay</p> <p>Carbon, Carbon Carbonate</p> <p>5-61 (0.1, 1, 0.2)</p>
			2	1.0				75	2.5Y 5/4
			3						10YR 3/3
			4					40	10YR 4/4
			5					60	
			6						
			7						
			CC						

SITE 418 HOLE A CORE 5 CORED INTERVAL: 156.5-168.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORMAMS	NANNOS	RADS				
MIDDLE EOCENE	(R) Podocyclitis chalara Zone	B	B	Ap	1	0.5	Radiolaria-bearing Pelagic Clay Very dark grayish brown (2.5Y 3/2) with streaks of light yellow brown (2.5Y 6/6). dark grayish brown (2.5Y 4/2)	
		B	B	Ag	2	1.0	2.5Y 3/2 with streaks of 2.5Y 6/6	
		B	B	Ag	3	1.0	Rad-bearing Pelagic Clay Smears: 1-50, 1-146, 2-62, 2-106, 3-129, 4-45, 5-21, CC -15% silt TR% qtz., feld., glauconite, sp. spic. -85% clay 1- 2% silt, 1- 2% Fe-oxide plates 0-15% radiolaria 85-90% clay min. (15-30% rads in smears 1-146, 3-68 and sponge spicules also noted.)	
		B	B	Cg	4	1.0	2.5Y 3/2 Grain Size 1-73 1-88% sand 11.4% silt 87.0% clay Carbon, Carbon Carbonate 1-77 (0.1, 0, 0.1)	
		B	B	Cg	5	1.0		
		B	B	Cg	6	1.0		
		B	B	Cg	7	1.0		
		B	B	Cg	CC	2.5Y 3/2		

SITE 418 HOLE A CORE 7 CORED INTERVAL: 168.0-177.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORMAMS	NANNOS	RADS				
MIDDLE EOCENE	(R) Podocyclitis mitra Zone	B	B	Ap	1	0.5	Pelagic Clay (Zeolite/Rad-bearing) Very dark brown (2.5Y 3/2) with streaks of light yellowish brown (2.5Y 6/6). No thin clay lenses observed. No reddish brown (5YR 5/4) or black-nesses; dark grayish brown (10YR 3/2).	
		B	B	Ap	2	1.0	Pelagic Clay (Zeolite/Rad-bearing) Smears: 1-82, 2-44, 2-91, 4-11, 4-77, 5-53, 5-89, 6-50, CC -10% silt TR% qtz., feld. -90% clay 1- 3% rads, 2-10% glauconite, 90% clay min. (Zeolite higher in minor thin layers.)	
		B	B	Ap	3	1.0	2.5Y 3/2 to 2.5Y 4/2 Grain Size 2-60 4-23 0.0% sand 0.0% sand 5-102 -30.0% silt -30.0% silt -70.0% clay -70.0% clay	
		B	B	Ap	4	1.0	2.5Y 3/2 with 5YR 5/4 Carbon, Carbon Carbonate 2-58 (0.1, 0, 0.0) 4-28 (0.0, 0, 0) 5-101 (0.1, 0, 0.0)	
		B	B	Ag	5	1.0		
		B	B	Ag	6	1.0		
		B	B	Ag	7	1.0		
		B	B	Ag	CC			

SITE 418 HOLE A CORE 10 CORED INTERVAL: 272.5-282.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
ALBAIN-DEMONTAIN					0.5		<p><u>Pelagic Clay</u></p> <p>Multicolored drilling breccia in Section 1 composed of:</p> <ul style="list-style-type: none"> A grayish blue green (506 5/2) to green clay B dark gray (N3) clay with nannos C olive gray (5Y 4/1) nanno clay <p>5 mm micro-laminar</p> <p>Tubular pyrite (2 cm) noted at 75-80 cm; burrows common; barite noted.</p> <p>Below the pyrite zones is a black brown clay (Smear 1-87 and 1-90). Barite noted in rosettes(?) (Smear 1-98).</p> <p>Dep. cycle appears to be: B → inc. reducing conditions A</p> <p><u>Green Clay</u> Smear: 1-8, 2-12, 2-27, CC 5% silt 95% clay 5% nannos, rads 0-5% zeolites</p> <p><u>Brown to Dark Gray Clay</u> Smear: 1-34, 1-87, 1-90 30% silt 85% clay min. 70% clay 18% Fe-oxides 18% zeolites, rads 5% nannos (Pyroxenes, phosphate?)</p> <p><u>Olive Gray Clay</u> Smear: 1-63 5% silt 95% clay</p> <p><u>Grain Size</u> 2-127 33.4% silt 64.6% clay</p> <p>Carbon, Carbon Carbonate 1-118 (3.0, 10, 4.1) 2-12 (0.1, 0, 0.1)</p> <p>Rad Chert fragments in Core Catcher.</p>	
					1.0	VOID		
					2			
					3			
					4			
					5			
					6			
				7				
				CC				

SITE 418 HOLE A CORE 11 CORED INTERVAL: 282.0-291.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
					CC		<p>Nannofossil Clay Burrowed, dark gray - laminated with opaques and green clay (gray [506 5/2] to blue green [506 5/2]) pale green (106 6/2)</p> <p>Nanno Clay Smear: CC 50% silt 50% clay 5% rads</p>	

25

SITE 418 HOLE A CORE 13 CORED INTERVAL: 301.0-310.5 m

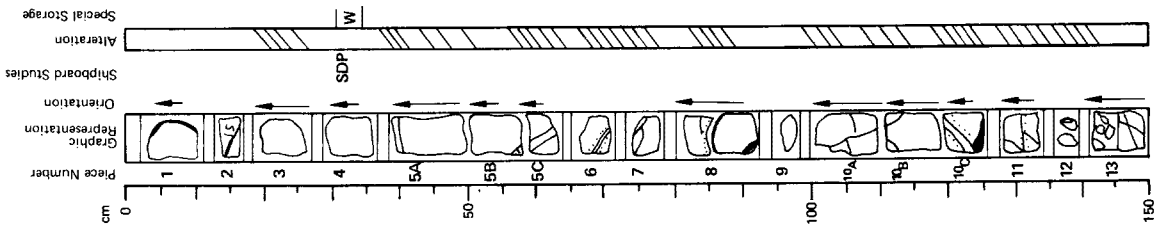
TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
		FORMAS	NANNOS	RADS						
LATE APTIAN - EARLY ALBIAN		B	B	Ap	1	0.5		30	Nannofossil ooze Section 1 0-65 cm = ④ and ⑤, pale, very pale green, moderate brown, with moderate brown (5YR 4/4) = ⑥ and red brown (10R 4/4) = ⑦. Smears: 1-30 = nanno clay, 1-40 = nanno-rich clay, and 1-60 = nanno ooze in clayey nanno ooze (Smear: 1-77) 80-82 cm = yellow streak (clay at 1-81) with moderate, blue green, green red brown clay 84 cm = pale green clay interbedding. Smear: 1-95 = 100 cm = gray bed	
		B	B	Ap	2	1.0	VOID	90		
		B	B	Ap	3			100		
		B	B	Ap	4			108		
		B	B	Ap	5				Section 2 0-82 cm = moderate brown ⑥ with greenish gray, pale green streaks, micro-laminations. Below 82 cm = dark green gray (5GY 4/1) green black (5GY 2/1), olive black (5Y 2/1), and brown black (5YR 2/1). Smears: 2-99 = light green clay, 2-100 = brown clay and 2-108 = green clay.	
		B	B	Ap	6				CC Interbedded - gray brown (5YR 3/2), gray green (5G 5/2), olive black (5Y 2/1), medium gray (N5), dark green gray (5GY 4/1). Smear at 9 cm = brown clay, 15 cm = medium gray clayey nanno ooze, 5 cm = green rad-rich clay, 15 cm = gray green clayey nanno ooze. Grain Size 2-118 7.3% sand 20.2% silt 72.5% clay Carbon, Carbon Carbonate 2-21 (0.1, 7, 0.9) 2-96 (0.2, 0, 0.2)	
		B	B	Ap	7					
		B	B	Ap	CC					

SITE 418 HOLE A CORE 12 CORED INTERVAL: 291.5-301.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
		FORMAS	NANNOS	RADS						
LATE APTIAN - EARLY ALBIAN		B	B	Fp	1	0.5		10	Nannofossil ooze 0-45 cm = brecciated chert and Nannofossil ooze, very pale green (10G 8/2) = ④, pale green (10G 6/2) = ⑤ Section 1 45-48 cm = ⑥ 48-55 cm = ⑥ 55-72 cm = brecciated chert, ⑥ in ④ 70-78 cm = olive gray (5Y 4/1) = ④ grades to 84 cm as mixed ④ to ⑥ 84-90 cm = grayish brown (5Y 3/2), ⑥ and pale brown (5YR 3/2) with faint E 90-117 cm = ④, ⑤, with faint E 117-120 cm = ④ and ⑤ 120-150 cm = ④ and ⑤ ④ = Smears: 1-35, 1-99, clayey nanno ooze barite, nannos. ⑤ = Smear: 1-78, nanno-rich clay with some barite ⑥ = Smear: 1-149, clayey nanno ooze ⑦ = Smear: 1-149, clayey nanno ooze	
		B	B	Fp	2	1.0	VOID	160		
		B	B	Fp	3			20		
		B	B	Fp	4			30		
		B	B	Fp	5				Section 2 0-15 cm = mixed mottled, burrowed ④ and ⑤ 15-25 cm = ④ red-rich nanno ooze (Smear 2-21) 25-30 cm = ④ and ⑤, clayey nanno ooze (Smear 2-30) 30-35 cm = ④ with chalk, chert CC Pink with ④ and ⑤ interbedding. Smear = clayey nanno ooze, nanno clay with Fe-oxide stain. Grain Size 1-60 0.1% sand 16.9% silt 83.0% clay Carbon, Carbon Carbonate 1-64 (0.0, 2, 0.3)	
		B	B	Fp	6					
		B	B	Fp	7					
		B	B	Fp	CC					

LEG	SITE	HOLE	CORE	SECT.
52	418	A	15	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Sparsely phryic pillow basalt. Basalt is gray to greenish gray; moderately altered. Plagioclase phenocrysts 4-5%, < 6 mm, fresh, occur as single crystals and as glomerocrysts; olivine phenocrysts < 1%, < 1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Many veins and veinlets are filled with smectite, carbonate and minor pyrite.

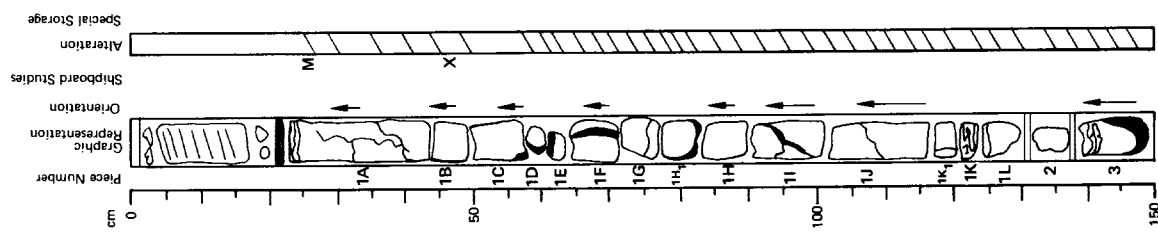
Piece 2 is a limestone fragment in contact with glass selvage. Piece 13 contains minor breccia composed of angular basalt clasts in a matrix of carbonate, smectite, pyrite, iron oxide and zeolite(?).

Shipboard Data

Physical Property Data:
 Vp (km/sec) 33-35 cm
 Porosity (%) 5.00
 Wet Bulk Density (g/cc) 12.0
 Grain Density (g/cc) 2.845
 2.87

LEG	SITE	HOLE	CORE	SECT.
52	418	A	15	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Sparsely phryic pillow basalt. Basalt-sediment contact is at 20 cm. Basalt is gray to greenish gray; moderately altered. Plagioclase phenocrysts 3-5%, < 8 mm, fresh, sometimes in glomerocrysts; olivine phenocrysts 1-2%, < 1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1%, filled with carbonate and smectite. Scattered veins are filled with carbonate, smectite and minor pyrite.

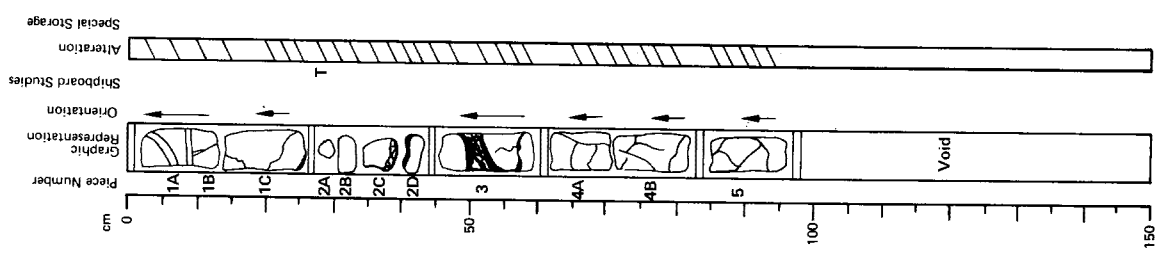
Thin Section Description

Bulk Analysis: 46-48 cm
 Magnetic Data: 26.28 cm
 NRM Intensity (emu/cc) 35.28 x 10⁻³
 Stable Inclination +23.5°

SiO₂ 49.1
 Al₂O₃ 16.5
 Fe₂O₃ 8.93
 MgO 6.88
 CaO 13.2
 Na₂O N.D.
 K₂O 0.04
 TiO₂ 1.12
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.7
 H₂O⁺ 0.79
 H₂O⁻ N.D.
 CO₂ 0.41
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

LEG	SITE	HOLE	CORE	SECT.
5	2418A	15	15	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

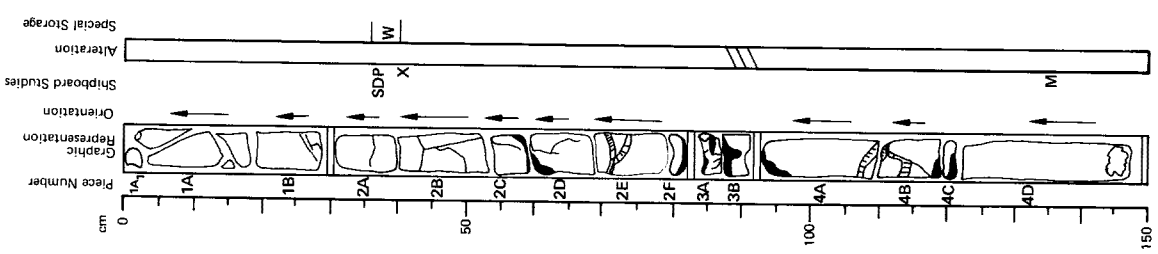


Visual Description
 Sparsely phytic pillow basalt. Basalt is gray to greenish gray; moderately altered. Plagioclase phenocrysts 3%, < 7 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are altered to smectite. Vesicles 1%, filled with carbonate and smectite. Veins and veinlets are filled with carbonate, smectite, and pyrite. Minor breccia occurs between glass selvages in piece 2C.

Thin Section Description
 Location: 32 cm
 Texture: porphyritic - quench
 Phenocrysts: plagioclase, 5%, < 4 mm; olivine, < 1%, < 1 mm
 Groundmass: olivine < 1%, 0.2 mm, euhedral; plagioclase, 35%, seriate < 0.5 mm, skeletal; clinopyroxene, 60%, < 0.5 mm, radiating sheaves, opaque, 5%, < 0.02 mm, euhedral
 Vesicles: 1%, < 0.25 mm, round
 Alteration: olivine to carbonate and smectite; plagioclase partly to zeolite(?); carbonate and smectite fill vesicles and veins; minor sulfide in veins

LEG	SITE	HOLE	CORE	SECT.
5	2418A	15	15	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Sparsely phytic pillow basalt. Basalt is medium to dark gray; slightly altered. Phenocryst content is variable, both within and between pillows; plagioclase phenocrysts 3.7%, < 6 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 2.7%, < 6 mm, fresh either as single crystals or as glomerocrysts with plagioclase. Groundmass is fine-grained to glassy; large areas are altered to smectite. Vesicles 2.3%, filled with smectite, carbonate and quartz. Large, irregular vug occurs in piece 4D. Scattered veinlets also filled with smectite and carbonate. Some pyrite is disseminated in the groundmass. Inter-pillow areas have minor glass breccia or altered sediment.

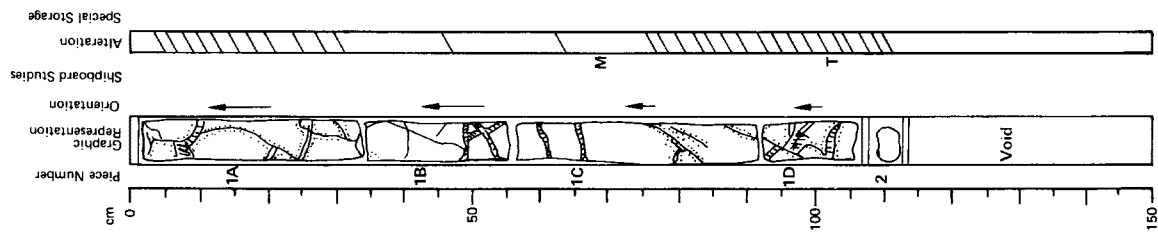
Shipboard Data
 Bulk Analysis: 36.38 cm
 SiO₂ 49.9
 Al₂O₃ 16.5
 Fe₂O₃ 8.50
 MgO 7.44
 CaO 13.1
 Na₂O N.D.
 K₂O 0.04
 TiO₂ 1.11
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.6
 H₂O⁺ 0.82
 H₂O⁻ N.D.
 UO₂ 0.07
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 NRM Intensity 133-135 cm
 Stable Inclination 16.48 x 10⁻³
 +24.4°

Physical Property Data:
 V_p (km/sec) 5.71
 Porosity (%) 5.3
 Wet Bulk Density (g/cc) 2.83
 Grain Density (g/cc) 2.94

LEG	SITE	H O L E	CORE	SECT.
5 2	4 1 8 A	1 6	1	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



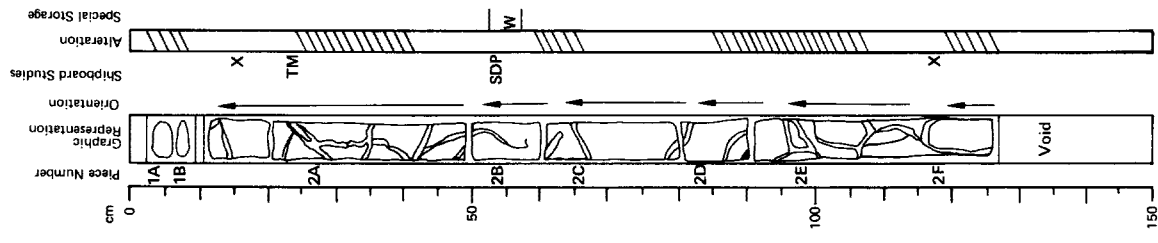
Visual Description
Moderately phytic massive basalt. Basalt is gray, reddish-brown where stained along veins; moderately altered. Plagioclase phenocrysts 12-15%, < 8 mm, often partly altered to smectite. Olivine phenocrysts < 1%, < 1 mm, altered to smectite. Groundmass is holocrystalline, fine-grained, distinct mottling occurs between 40 and 80 cm. Vesicles 5-10%, < 1 mm, filled with smectite, carbonate and pyrite; many veins are partly oxidized. Piece 2 is an altered glass breccia with a carbonate matrix.

Thin Section Description
Location: 100 cm
Texture: porphyritic - quench
Phenocrysts: plagioclase, 15%, < 3 mm, subhedral
Groundmass: olivine, 2%, 0.3 mm, subhedral; plagioclase, 25% < 0.8 mm, laths; clinopyroxene, 68%, poorly crystallized sleeves; opaque 5%, 0.01 mm granular
Vesicles: 3%, < 0.7 mm round
Alteration: olivine to smectite and carbonate; smectite, carbonate and zeolite fill vesicles and veins

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 69-71 cm 4.70 x 10⁻³
Stable Inclination +14.7

LEG	SITE	H O L E	CORE	SECT.
5 2	4 1 8 A	1 6	1	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Pillow basalt breccia and sparsely phytic massive basalt. Piece 1 consists of pillow breccia; the remainder of the section is a single cooling unit of massive basalt. Breccia is reddish-brown; highly altered. Basalt clasts with quench textures occur in a matrix of carbonate, smectite and iron oxide. Massive basalt is gray to greenish-gray, reddish-brown where oxidized along veins in pieces 2C to 2F. Plagioclase phenocrysts 5%, < 2 mm, fresh; olivine phenocrysts 1%, < 3 mm, altered to smectite. Groundmass is holocrystalline, fine-grained at the top but gradually increasing in grain size to medium-grained at 20 cm. Vesicles 1.4%, most in pieces 2A and 2B, filled with carbonate and smectite. Veins occur throughout the section, filled with carbonate, smectite and minor pyrite. Pyrite is also disseminated in the groundmass.

Thin Section Description
Location: 22 cm
Texture: porphyritic - quench
Phenocrysts: olivine, 1%, < 2 mm, euhedral; plagioclase, 8%, < 4 mm, euhedral
Groundmass: plagioclase, 12%, 0.5 mm, acicular; clinopyroxene, 72%, radiating sleeves; opaque, 5%, 0.02 mm, euhedral
Vesicles: 2%, < 0.5 mm, round
Alteration: olivine to smectite, smectite and carbonate fill vesicles

Thin Section Description
Location: 119 cm
Texture: porphyritic - quench
Phenocrysts: olivine, 1%, < 3 mm, euhedral; plagioclase, 7%, < 3 mm, euhedral
Groundmass: olivine, 1%, 0.3 mm, subhedral; plagioclase, 20%, 0.7 mm, laths; clinopyroxene, 67%, radiating sleeves; opaque, 3%, 0.05 mm, euhedral
Vesicles: 1%, 0.2 mm, round
Alteration: olivine to smectite and carbonate; plagioclase partly to zeolite(?); smectite fills vesicles

Shipboard Data

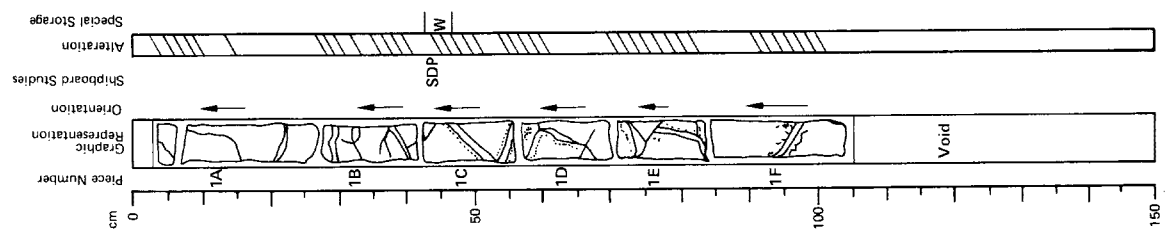
Bulk Analysis:	13-15 cm	118-120 cm	Magnetic Data:	21-23 cm
SiO ₂	50.5	50.0	NRM Intensity (emu/cc)	6.66 x 10 ⁻³
Al ₂ O ₃	17.8	18.4	Stable Inclination	+16.8°
Fe ₂ O ₃	7.43	7.39		
MgO	7.28	7.67	Physical Property Data:	54-56 cm
CaO	11.8	11.0	Vp (km/sec)	4.97
Na ₂ O	N.D.	N.D.	Porosity (%)	9.5
K ₂ O	0.09	0.06	Wet Bulk Density (g/cc)	2.71
TiO ₂	1.28	1.31	Grain Density (g/cc)	2.88
P ₂ O ₅	N.D.	N.D.		
MnO	N.D.	N.D.		
LOI	2.7	3.5		
H ₂ O ⁺	1.50	1.66		
H ₂ O ⁻	N.D.	N.D.		
CO ₂	0.54	0.64		
Cr	N.D.	N.D.		
Ni	N.D.	N.D.		
Sr	N.D.	N.D.		
Zr	N.D.	N.D.		

LEG	SITE	H O L	CORE	SECT.
5	2418	A	16	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic massive basalt. Basalt is gray to greenish gray, reddish-brown along oxidized veins; moderately altered. Plagioclase phenocrysts 5%, < 5 mm, fresh, often in glomerophytic clusters; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 1 mm, fresh. Groundmass is holocrystalline, fine- to medium-grained. Vesicles 0.20%, unevenly distributed in clusters, < 1 mm, filled with smectite and carbonate. Veins are filled with calcite, smectite and minor pyrite. Many veins below 45 cm have oxidized haloes.

Shipboard Data
 Location: 44-46 cm
 Physical Property Data:
 Vp (km/sec) 4.86
 Porosity (%) 11.7
 Wet Bulk Density (g/cc) 2.625
 Grain Density (g/cc) 2.83



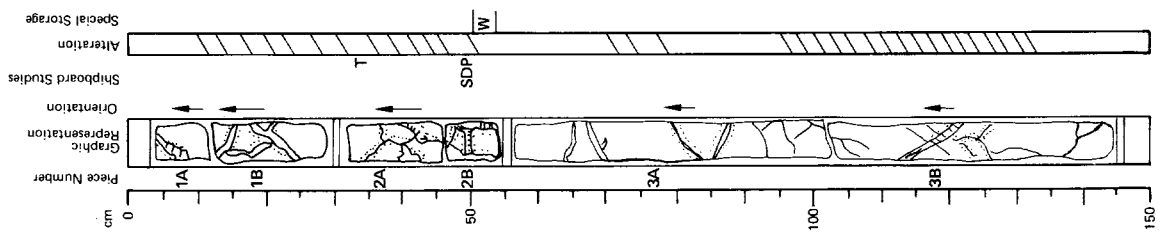
LEG	SITE	H O L	CORE	SECT.
5	2418	A	17	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic massive basalt. A cooling break occurs at 55 cm but the rocks above and below the break are similar. Basalt is gray to greenish-gray, reddish-brown along oxidized veins; moderately altered. Plagioclase phenocrysts 5%, < 4 mm, fresh, often in glomerophytic clusters < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 1 mm, fresh. Groundmass is holocrystalline, fine- to medium-grained. Vesicles 0.20%, unevenly distributed in clusters, < 1 mm, filled with smectite and carbonate. Veins are filled with calcite, smectite and minor pyrite. Many veins below 45 cm have oxidized haloes.

Thin Section Description
 Location: 34 cm
 Texture: porphyritic - quench
 Phenocrysts: plagioclase 5%, < 2.5 mm, euhedral
 Groundmass: olivine 1%, 0.3 mm, subhedral; plagioclase 25%, < 0.7 mm, skeletal; clinopyroxene 64%, poorly crystallized slaves, opaque; 2%, 0.01 mm, euhedral
 Vesicles: 3%, 0.7 mm, round
 Alteration: olivine to smectite; carbonate fills vesicles

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 49.51 cm
 Porosity (%) 5.21
 Wet Bulk Density (g/cc) 10.3
 Grain Density (g/cc) 2.71
 Grain Density (g/cc) 2.88

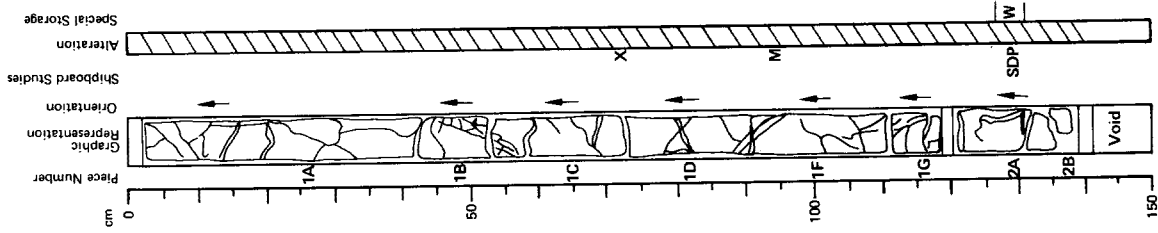


LEG	SITE	HOLE	CORE	SECT.
5	2418A	1	7	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyrlic massive basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 5%, <4 mm, fresh or partly altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, fresh. Groundmass is fine-grained. Vesicles 2-3%, filled with carbonate and smectite. Veins are common throughout, filled with smectite and carbonate.

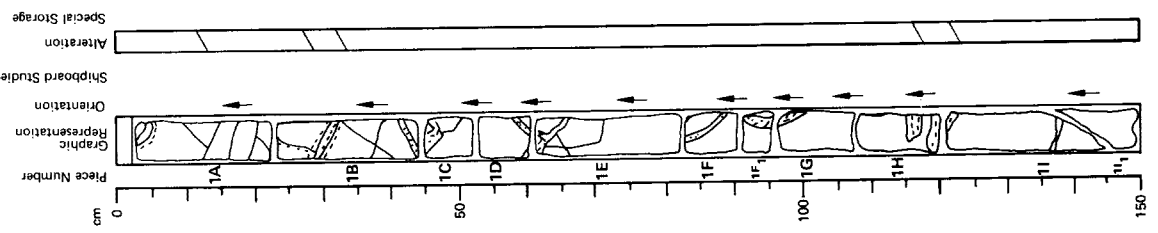
Shipboard Data	Magnetic Data:	93-95 cm
Bulk Analysis: 72-74 cm	NRM Intensity (emu/cc)	10.14 x 10 ⁻³
SiO ₂ 50.8	Stable Inclination	+22.0°
Al ₂ O ₃ 18.2	Physical Property Data:	128-130 cm
Fe ₂ O ₃ 7.86	Vp (km/sec)	4.93
MgO 7.19	Porosity (%)	11.3
CaO 12.0	Wet Bulk Density (g/cc)	2.66
Na ₂ O N.D.	Grain Density (g/cc)	2.86
K ₂ O 0.10		
TiO ₂ 1.28		
P ₂ O ₅ N.D.		
MnO N.D.		
LOI 2.3		
H ₂ O ⁺ 1.18		
H ₂ O ⁻ N.D.		
CO ₂ 0.12		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



LEG	SITE	HOLE	CORE	SECT.
5	2418A	1	7	3

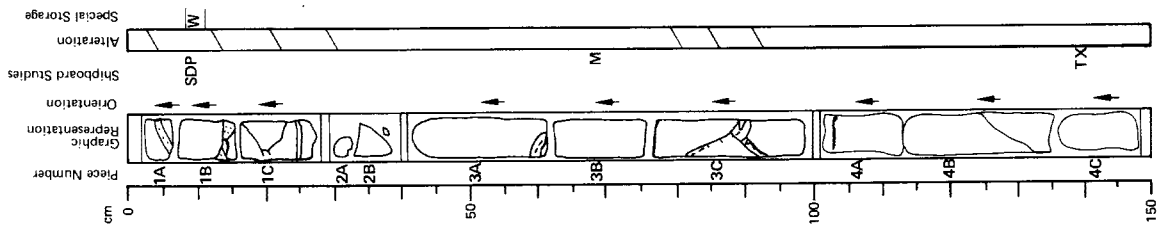
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyrlic massive basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 5-7%, <3 mm, fresh or partly altered to smectite; olivine microphenocrysts <1%, <1 mm, altered to smectite. Groundmass is fine-grained, coarsening somewhat towards bottom of the section. Vesicles 2%, <1 mm, filled with smectite and carbonate. Veins common throughout, filled with carbonate, smectite and minor pyrite.



LEG	SITE	HOLE	CORE	SECT.
5	2418A	1	17	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

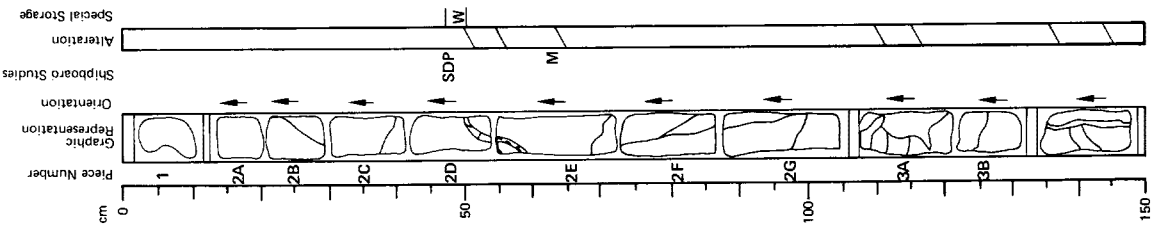


Visual Description
 Sparsely to moderately phryic massive basalt. Basalt is gray to greenish-gray, reddish-brown along oxidized veins; moderately altered. Plagioclase phenocrysts 5-10%, < 3 mm, fresh or partly altered to smectite, often in glomerophryic clusters; olivine microphenocrysts 1%, < 1 mm, altered to smectite. Groundmass is fine-grained, often mottled. Vesicles 2%, < 1 mm, filled with carbonate and some smectite. Veins are common throughout, filled with carbonate, smectite and minor quartz and pyrite. Some veins are oxidized.

Thin Section Description
 Location: 140 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine, < 1%, 0.6 mm, euhedral; plagioclase, 12%, < 3 mm, euhedral
 Groundmass: olivine, 2%, 0.3 mm, subhedral; plagioclase, 30%, 0.5 mm, laths; clinopyroxene, 45%, radiating sleeves; opaque, 3%, 0.01, euhedral; glass, 6%, interstitial, altered
 Vesicles: 2%, < 0.7 mm, round
 Alteration: olivine and glass to smectite; smectite and carbonate fill vesicles

Shipboard Data

Bulk Analysis: 139-141 cm	Magnetic Data:	67.69 cm
SiO ₂ 50.8	NRM Intensity (emu/cc)	15.73 x 10 ⁻³
Al ₂ O ₃ 16.7	Stable Inclination	16.5°
Fe ₂ O ₃ 8.42	Physical Property Data:	9.11 cm
MgO 6.91	Vp (km/sec)	5.09
CaO 12.9	Porosity (%)	9.4
Na ₂ O N.D.	Wet Bulk Density (g/cc)	2.725
K ₂ O 0.05	Grain Density (g/cc)	2.88
TiO ₂ 1.16		
P ₂ O ₅ N.D.		
MnO N.D.		
LOI 1.9		
H ₂ O ⁺ 0.75		
H ₂ O ⁻ N.D.		
CO ₂ 0.11		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



Visual Description
 Moderately phryic massive basalt. Basalt is medium to dark gray, moderately altered. Plagioclase phenocrysts 10-15%, < 3 mm, incipiently altered to smectite; olivine phenocrysts < 1%, < 1 mm, altered to smectite. Groundmass is fine-grained, often mottled due to distribution of plagioclase needles and dark groundmass minerals. Vesicles 2.3%, filled with smectite and carbonate. Piece 1 is a pyrite nodule (5.8 g) with minor smectite on the surface. Veins and veinlets are filled with smectite and carbonate.

Shipboard Data

Magnetic Data:	61.63 cm
NRM Intensity (emu/cc)	38.68 x 10 ⁻³
Stable Inclination	+23.9°
Physical Property Data:	47.49 cm
Vp (km/sec)	5.89
Porosity (%)	3.7
Wet Bulk Density (g/cc)	2.865
Grain Density (g/cc)	2.94

LEG	SITE	HOLE	CORE	SECT.
5	2418A	1	18	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

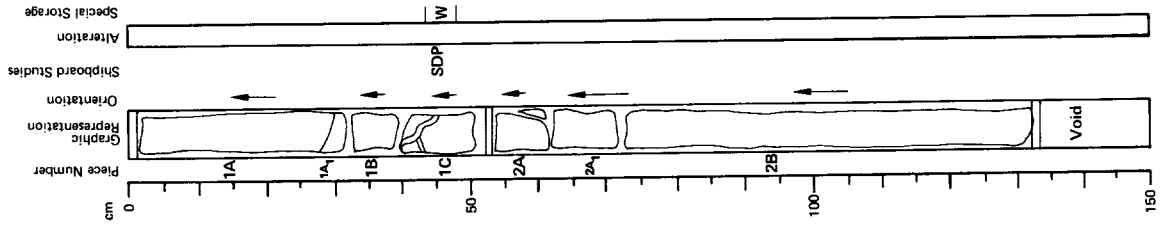
240

LEG	SITE	HOLE	CORE	SECT.
524	18A	1	8	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyrlic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 5-7%, <6 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite. Groundmass is fine-grained, uniform. Vesicles 2.4%, filled with smectite and carbonate. Scattered veins and veinlets are filled with carbonate, smectite and minor pyrite.

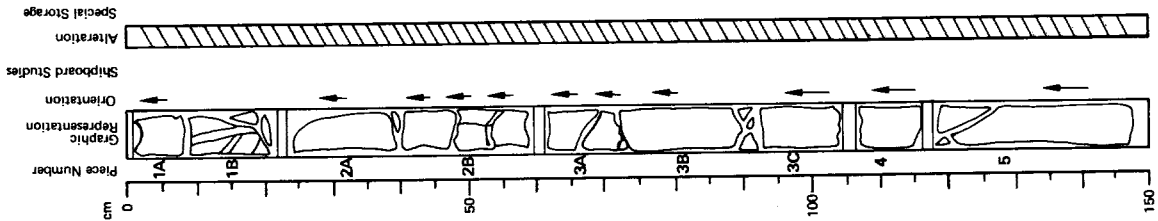
Shipboard Data
 44-46 cm
 Vp (km/sec) 5.93
 Porosity (%) 6.7
 Wet Bulk Density (g/cc) 2.885
 Grain Density (g/cc) 2.99



LEG	SITE	HOLE	CORE	SECT.
524	18A	1	8	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyrlic massive basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 5%, <4 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite. Groundmass is fine-grained. Vesicles 4%, <2 mm, filled with smectite and some carbonate. Veins are filled with smectite and carbonate.



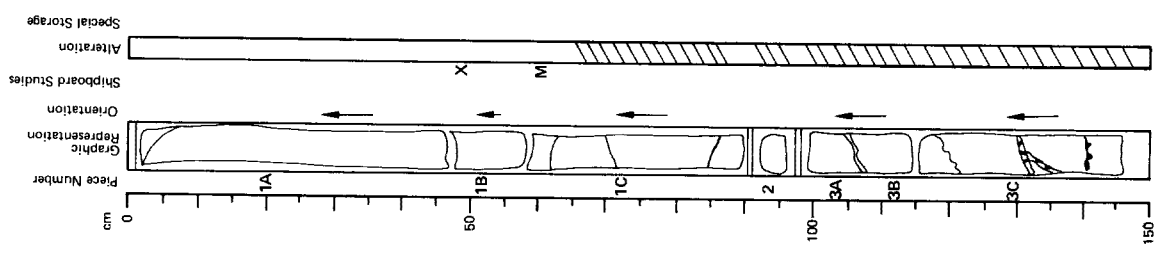
LEG	SITE	HOLE	CORE	SECT.
52	418A	118A	118	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phyrlic massive basalt. Basalt is gray to greenish-gray; relatively fresh to 60 cm, moderately to highly altered in lower part of section. Plagioclase phenocrysts 5-7%, < 7 mm, mostly fresh. Groundmass is fine-grained uniform. Vesicles 2-3%, < 1 mm, filled with smectite and minor pyrite. Veins most common in lower part of section, filled with smectite, carbonate and and carbonate.

Shipboard Data
 Location: 48-50 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 60-62 cm
 Stable Inclination 16.78 x 10⁻³
 +24.2°

SiO₂ 49.5
 Al₂O₃ 15.9
 Fe₂O₃ 9.27
 MgO 7.11
 CaO 12.8
 Na₂O N.D.
 K₂O 0.03
 TiO₂ 1.08
 P₂O₅ N.D.
 LOI 1.7
 H₂O⁺ 0.83
 H₂O⁻ N.D.
 CO₂ 0.10
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



LEG	SITE	HOLE	CORE	SECT.
52	418A	118A	118	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phyrlic massive basalt. Basalt is gray to light gray, greenish-gray or reddish-brown where altered; highly altered in upper 95 cm, moderate alteration in lower part of section. Plagioclase phenocrysts 7%, < 3 mm, most fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite. Groundmass is fine-grained, uniform, highly altered from 0 to 95 cm; altered to smectite, vuggy areas with vugs up to 10 mm, either open or partly filled with smectite, carbonate, silica, pyrite and zeolite(?); locally oxidized. Vesicles in piece 4 are about 1%, filled with smectite and carbonate. Pieces 3 and 4 may fit together but the relationship is not clear.

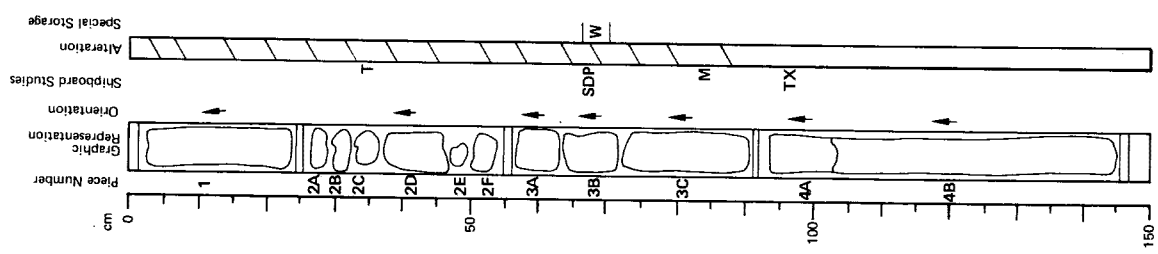
Thin Section Description
 Location: 34 cm
 Texture: porphyritic - quench
 Phenocrysts: plagioclase, 15%, < 3 mm, euhedral
 Groundmass: olivine, 3%, 0.3 mm, subhedral; plagioclase, 25%, < 0.5 mm, acicular; clinopyroxene, 50%, poorly crystallized radiating sleeves, opaque, 6%, 0.02 mm, euhedral
 Vesicles: 1%, < 0.8 mm, round; several large vugs to 2 cm
 Alteration: plagioclase partly to zeolite(?); olivine to smectite; smectite, carbonate and zeolite(?) fill vesicles and vugs

Thin Section Description
 Location: 95 cm
 Texture: quench
 Phenocrysts: plagioclase, < 1%, 0.3 mm, subhedral
 Groundmass: olivine, < 1%, 0.3 mm, subhedral; plagioclase, 12%, < 0.5 mm, acicular; clinopyroxene, 85%, radiating sleeves; opaque, 2%, 0.01 mm, granular
 Vesicles: < 1%, 0.5 mm, round
 Alteration: olivine to carbonate; carbonate fills vesicles

Shipboard Data
 Bulk Analysis: 94-96 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 82-86 cm
 Stable Inclination 16.82 x 10⁻³
 +22.7°

SiO₂ 50.5
 Al₂O₃ 15.9
 Fe₂O₃ 10.3
 MgO 7.81
 CaO 10.3
 Na₂O N.D.
 K₂O 0.10
 TiO₂ 1.55
 P₂O₅ N.D.
 MnO N.D.
 LOI 2.0
 H₂O⁺ 1.29
 H₂O⁻ N.D.
 CO₂ 0.09
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Physical Property Data:
 Vp (km/sec) 3.98
 Porosity (%) 23.5
 Wet Bulk Density (g/cc) 2.405
 Grain Density (g/cc) 2.88



2102

LEG	SITE	HOLE	CORE	SECT.
5241	B A	19	1	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

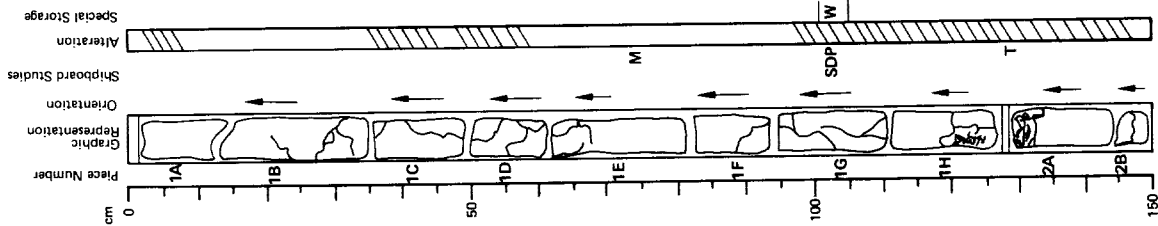
Visual Description
 Sparsely phytic massive basalt. Basalt is gray to greenish-gray; moderately to weakly altered. Plagioclase phenocrysts 5-8% < 3 mm, fresh. Groundmass is fine-grained with irregular patchy appearance. Vesicles < 1% filled with carbonate and smectite. Veins are filled with carbonate, smectite, zeolite(?) and minor silica(?).

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 73.75 cm
 Stable Inclination 13.12 x 10⁻³
 +27.3°

Physical Property Data:

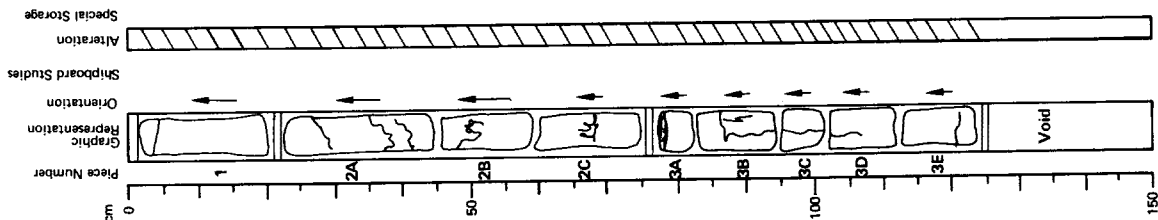
Vp (km/sec) 102.104 cm
 Porosity (%) 5.70
 Wet Bulk Density (g/cc) 4.9
 Grain Density (g/cc) 2.85
 2.95



LEG	SITE	HOLE	CORE	SECT.
5241	B A	18	1	8

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

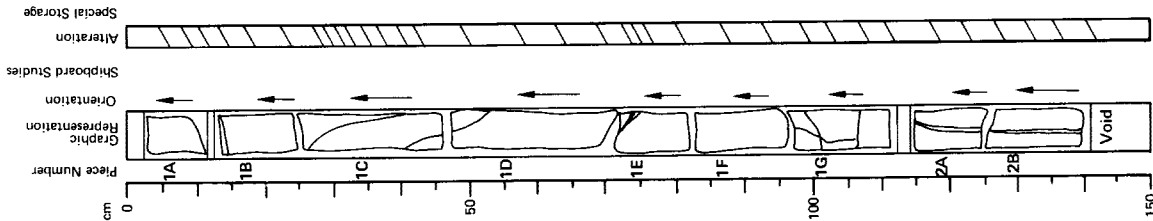
Visual Description
 Sparsely phytic massive basalt. Basalt is gray to greenish-gray with brown staining along veins, particularly in piece 3A. Plagioclase phenocrysts unevenly distributed ranging from 4-7%, < 5 mm, fresh. Groundmass is very fine-grained, uniform. Vesicles < 1% filled with smectite, carbonate and minor pyrite. Veins and veinlets present throughout, filled with carbonate, smectite and pyrite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	418	A	19	2

Visual Description
 Sparsely to moderately phryic massive basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 5-10%, <3 mm, fresh, occur either as single crystals or as glomerocrysts; olivine phenocrysts <1%, <1 mm, altered to smectite. Groundmass is fine- to medium-grained, uniform. Narrow veinlets cut entire section, filled with carbonate and smectite. Minor pyrite is disseminated in groundmass.

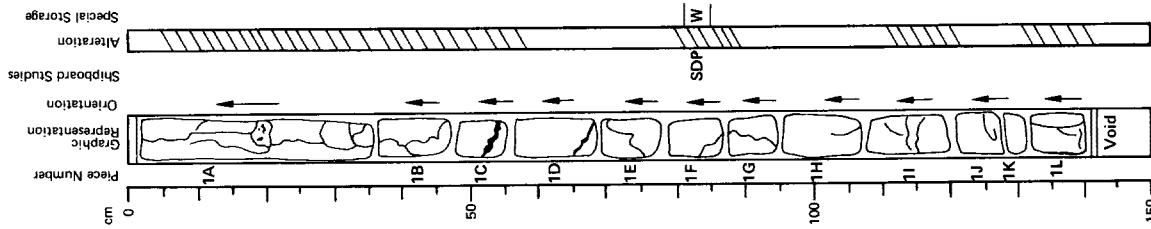


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	418	A	19	3

Visual Description
 Sparsely phryic massive basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 5-8%, <8 mm, fresh; olivine phenocrysts <1%, filled with smectite and carbonate. Veins cut entire section, filled with smectite, carbonate and minor pyrite. Some pyrite is also disseminated in groundmass.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 6.17
 Porosity (%) 2.8
 Wet Bulk Density (g/cc) 2.89
 Grain Density (g/cc) 2.95



LEG	SITE	HOLE	CORE	SECT.
514	118A	19A	19	4

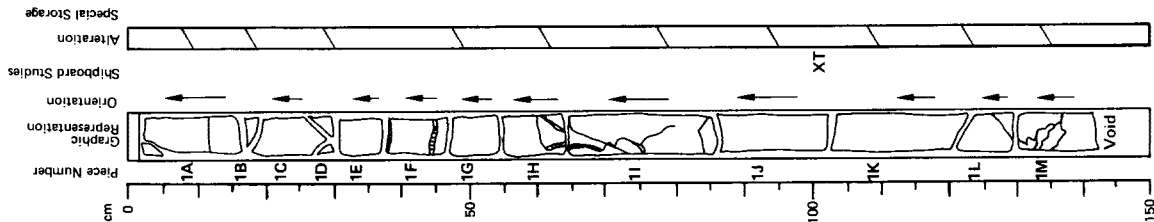
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely to moderately phryic massive basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 7-10%, <5 mm, fresh; olivine phenocrysts <1%, <2 mm, altered to smectite. Groundmass is fine- to medium-grained, uniform, mottled. Vesicles <1%, filled with carbonate. Sparse veins filled with smectite and carbonate.

Thin Section Description
 Location: 104 cm
 Texture: porphyritic - quench
 Phenocrysts: plagioclase, 10%, <3 mm, euhedral
 Groundmass: olivine, 3%, 0.3 mm, euhedral; plagioclase, 10%, <0.5 mm, skeletal laths; clinopyroxene, 72%, radiating sheaves; opaque, 5%, 0.01 mm, granular
 Vesicles: <1%, 0.2 mm, round
 Alteration: olivine to smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 101-103 cm
 SiO₂ 50.5
 Al₂O₃ 15.6
 Fe₂O₃ 9.2
 MgO 7.44
 CaO 12.8
 Na₂O N.D.
 K₂O 0.03
 TiO₂ 1.11
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.2
 H₂O⁺ 0.83
 H₂O⁻ N.D.
 CO₂ 0.07
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



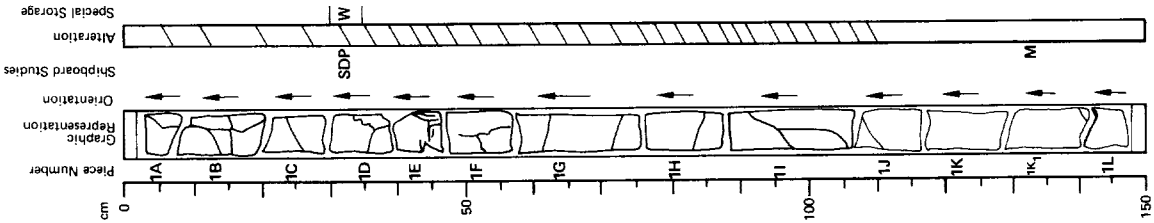
LEG	SITE	HOLE	CORE	SECT.
524	118A	19A	19	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely to moderately phryic massive basalt. Basalt is gray to greenish gray; moderately altered. Plagioclase phenocrysts 7-10%, <3 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite. Groundmass is fine- to medium-grained, uniform. Scattered veins are filled with carbonate and smectite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 131-133 cm
 Stable Inclination 16.23 x 10⁻³
 +27.4°

Physical Property Data:
 Vp (km/sec) 30.32 cm
 Porosity (%) 6.26
 Wet Bulk Density (g/cc) 2.0
 Grain Density (g/cc) 2.93
 2.97

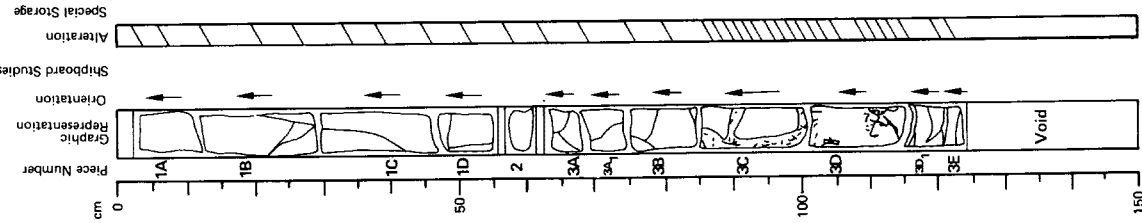
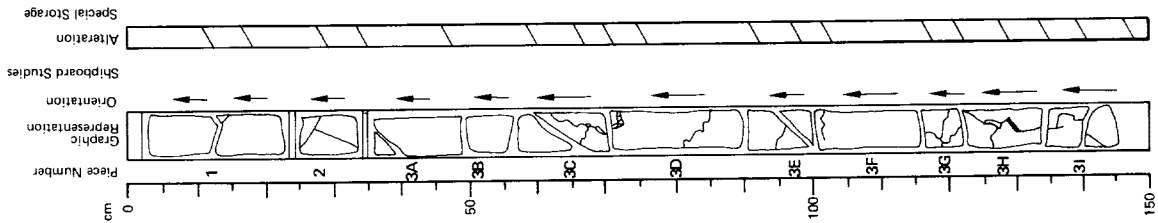


LEG	SITE	HOLE	CORE	SECT.
5	2418	A	19	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Sparsely to moderately phryic massive basalt. Basalt is gray to greenish-gray; relatively fresh. Plagioclase phenocrysts 7-10%, <3 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite. Groundmass is fine- to medium-grained, uniform, somewhat mottled due to variations in phenocrysts content. Vesicles 1%, filled with smectite. Scattered veinlets are filled with smectite, carbonate and minor pyrite.



LEG	SITE	HOLE	CORE	SECT.
5	2418	A	19	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Sparsely phryic massive basalt. Basalt is medium gray to greenish-gray; moderately to highly altered. Plagioclase phenocrysts 5-8%, <3 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite. Groundmass is fine- to coarse-grained, with grain size increasing gradually downward. Scattered veinlets filled with smectite, carbonate and minor pyrite. Pyrite is also disseminated in groundmass. Two highly altered zones occur in pieces 3C and 3D.

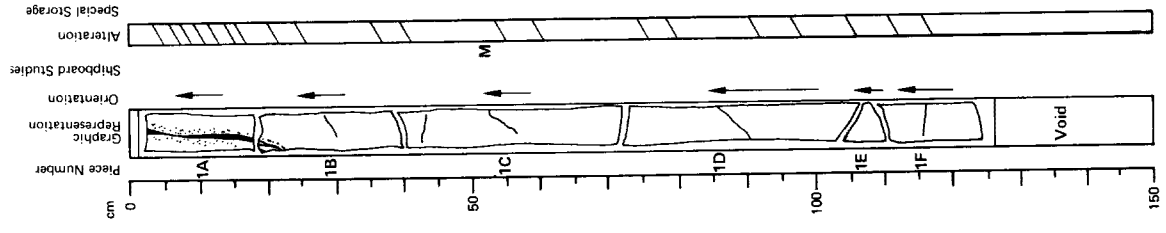
260

LEG	SITE	HOLE	CORE	SECT.
52418A	218A	218A	210	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly to moderately phytic massive basalt. Basalt is gray to greenish-gray; weakly to moderately altered. Olivine phenocrysts 7-10%, ≤ 10 mm, fresh; olivine phenocrysts $< 1\%$, ≤ 1 mm, altered to smectite. Groundmass is fine- to medium-grained, uniform. Vesicles $< 1\%$, filled with carbonate. Scattered veins are also filled with carbonate. Minor smectite occurs in groundmass.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 4.82×10^{-3}
 Stable Inclination $+30.9^\circ$

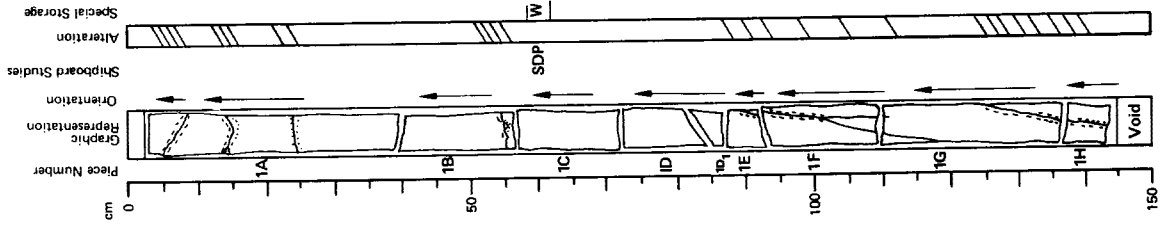


LEG	SITE	HOLE	CORE	SECT.
52418A	218A	218A	210	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly to moderately phytic massive basalt. Basalt is gray to greenish-gray; weakly to moderately altered. Olivine phenocrysts 5-10%, ≤ 3 mm, fresh; olivine phenocrysts $< 1\%$, ≤ 1 mm, altered to smectite. Groundmass is holocrystalline, medium- to coarse-grained, uniform. Scattered veins are filled with smectite and carbonate.

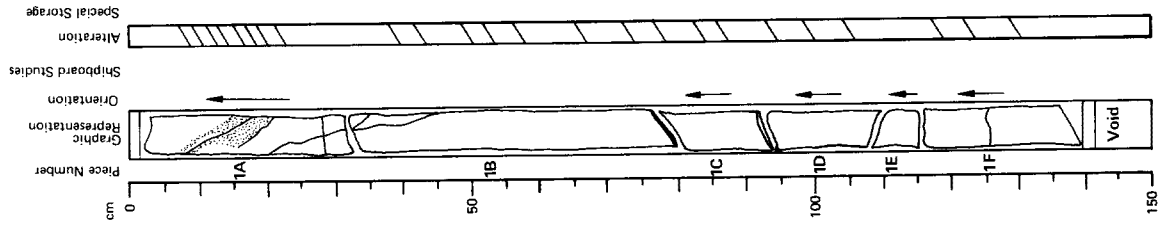
Shipboard Data
 Physical Property Data:
 Vp (km/sec) 6.11
 Porosity (%) 2.5
 Wet Bulk Density (g/cc) 2.905
 Grain Density (g/cc) 2.96



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	418	A	20	4

Visual Description
 Sparsely to moderately phytic massive basalt. Basalt is gray to greenish-gray; weakly to moderately altered. Plagioclase phenocrysts 7-10%, < 8 mm, fresh, olivine phenocrysts 1%, < 5 mm, altered to smectite and carbonate. Groundmass is holocrystalline, medium-grained, uniform. Vesicles < 1%, filled with smectite. Sparse veinlets also filled with smectite; prominent veins in piece 1 filled with smectite and pyrite. Minor smectite also occurs in groundmass.

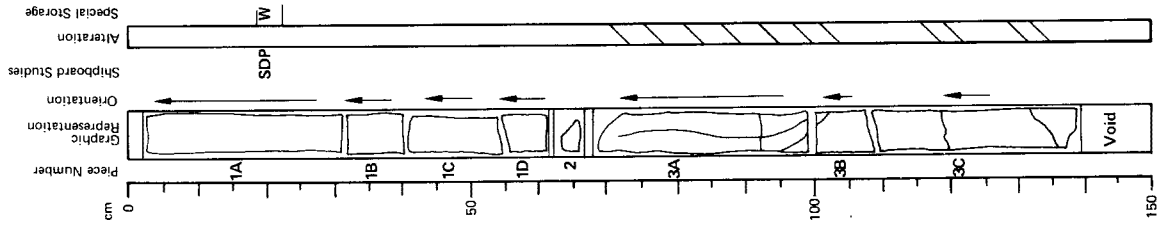


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	418	A	20	3

Visual Description
 Sparsely to moderately phytic massive basalt. Basalt is gray to greenish-gray; weakly altered. Plagioclase phenocrysts 5-10%, < 4 mm, fresh; olivine phenocrysts < 1%, < 1.5 mm, altered to smectite, somewhat irregular in distribution. Groundmass is holocrystalline, medium- to coarse-grained, uniform. Sparse veins are filled with carbonate and smectite. Minor smectite and pyrite occur in groundmass.

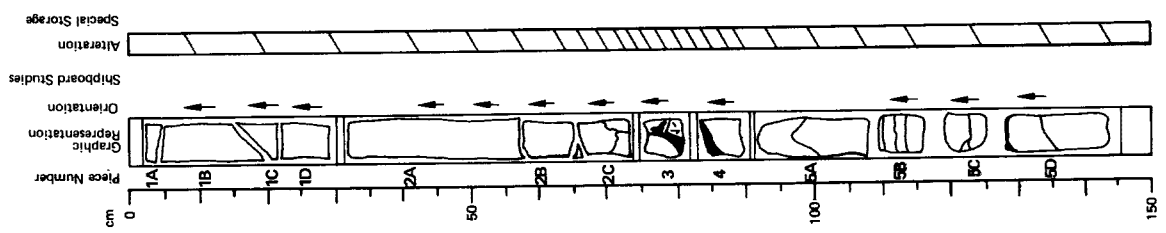
Shipboard Data
 Physical Property Data:
 Vp (km/sec) 5.95
 Porosity (%) 2.3
 Wet Bulk Density (g/cc) 2.925
 Grain Density (g/cc) 2.96



LEG	SITE	HOLE	CORE	SECT.
52	418	A	20	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

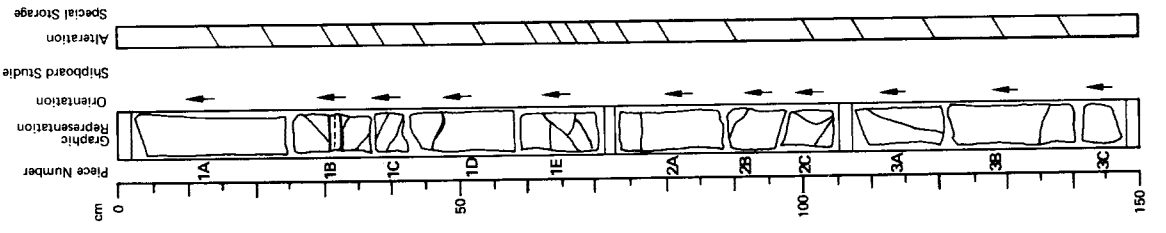
Visual Description
 Sparsely phyrlic massive basalt. A cooling break occurs between pieces 3 and 4 but the basalt above and below is mineralogically similar. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 5-7%, <4 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite. Groundmass is fine- to medium-grained, completely altered to smectite. Vesicles are completely altered to smectite. Vesicles 1-2%, filled with smectite, carbonate and minor pyrite. Sparse veins also are filled with smectite and carbonate.



LEG	SITE	HOLE	CORE	SECT.
52	418	A	20	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyrlic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 5-7%, <3 mm, fresh; olivine phenocrysts <1%, <2 mm, altered to smectite. Groundmass is holocrystalline, fine- to medium-grained, completely altered to smectite. Vesicles 1%, filled with smectite and minor carbonate. Veins are sparse, filled mostly with smectite and minor carbonate and pyrite. Prominent vein in piece 1B also has silica. Pyrite is also disseminated in groundmass.



LEG	SITE	HOLE	CORE	SECT.
52	418	A	20	7

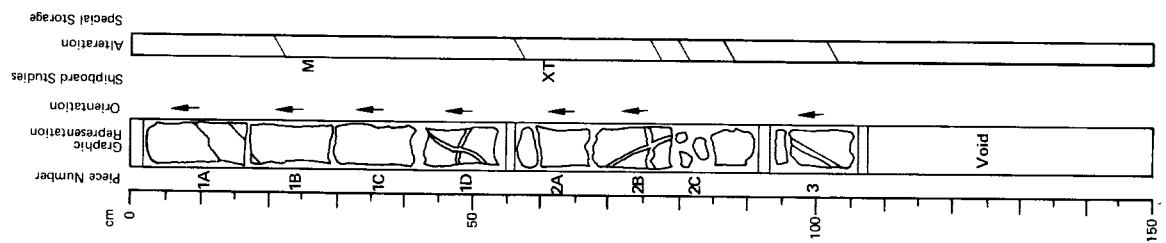
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic massive basalt. Basalt is gray to greenish-gray; weakly altered. Plagioclase phenocrysts 7%, < 5 mm, fresh; olivine phenocrysts 1%, < 3 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite. Groundmass is holocrystalline, fine- to medium-grained, uniform. Vesicles 2%, < 2 mm, filled with smectite and carbonate. Veinlets are common, filled with smectite and carbonate.

Thin Section Description
 Location: 63 cm
 Texture: porphyritic - quench
 Phenocrysts: plagioclase, 7%, < 3 mm, euhedral
 Groundmass: oliv, 6.4%, < 0.5 mm, euhedral; plagioclase, 40%, < 0.5 mm, acicular; clinopyroxene, 42%, 0.1 mm, granular to radiating sheaves, opaque, 2%, 0.02 mm, granular; glass, 3%, devitrified
 Vesicles: 2%, < 0.8 mm, round
 Alteration: olivine to smectite; smectite and carbonate fill vesicles

Shipboard Data

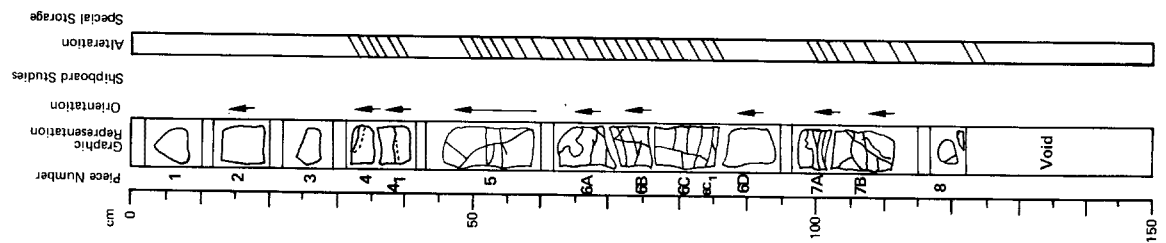
Bulk Analysis: 62.64 cm	Magnetic Data:
SiO ₂ 50.6	NRM Intensity (emu/cc) 41.67 x 10 ⁻³
Al ₂ O ₃ 16.0	Stable Inclination +22.5°
Fe ₂ O ₃ 9.35	
MgO 7.53	
CaO 12.8	
Na ₂ O N.D.	
K ₂ O 0.03	
TiO ₂ 1.13	
P ₂ O ₅ N.D.	
MnO N.D.	
LOI 1.16	
H ₂ O ⁺ 0.79	
H ₂ O ⁻ N.D.	
CO ₂ 0.06	
Cr N.D.	
Ni N.D.	
Sr N.D.	
Zr N.D.	



LEG	SITE	HOLE	CORE	SECT.
52	418	A	21	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic massive basalt. Basalt is gray to greenish-gray; weakly to moderately altered. Plagioclase phenocrysts 5-8%, < 3 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite. Groundmass is holocrystalline, fine- to medium-grained, piece 6D is somewhat coarser grained than the rest of the section but grades into the finer-grained portions. Vesicles 1-2%, < 1 mm, filled with carbonate and smectite. Basalt is heavily veined, especially in pieces 5 through 8; veins are filled with carbonate, smectite, silica(?) and zeolite(?).



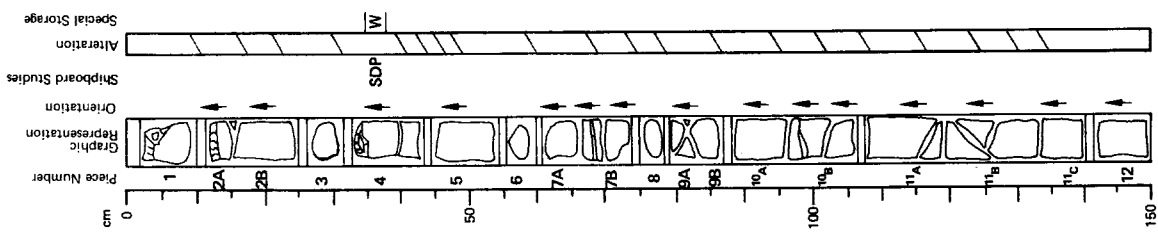
010

LEG	SITE	HOLE	CORE	SECT.
52	418	A	22	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phyrlic massive basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 5% - 15 mm, fresh, though often stained green; olivine phenocrysts < 1 mm, altered to smectite. Groundmass is holocrystalline, fine-grained, often mottled. Vesicles < 1 mm, filled with carbonate and smectite. Veins are common, filled with carbonate, smectite and pyrite. Pyrite is also disseminated in groundmass.

Shipboard Data
 Physical Property Data: 35-37 cm
 Vp (km/sec) 5.59
 Porosity (%) 6.8
 Wet Bulk Density (g/cc) 2.79
 Grain Density (g/cc) 2.93



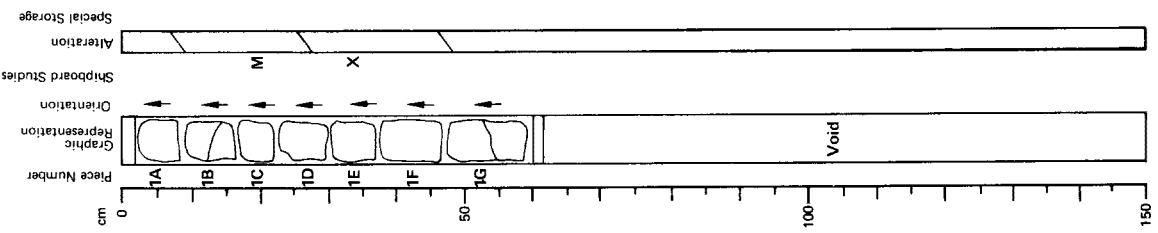
LEG	SITE	HOLE	CORE	SECT.
52	418	A	22	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phyrlic massive basalt. Basalt is medium gray; weakly altered. Plagioclase phenocrysts 7% - 4 mm, fresh or stained along cleavages, often in glomerocrysts; olivine phenocrysts 1% - 1 mm, altered to smectite. Groundmass is holocrystalline, fine-grained, often mottled due to uneven distribution of plagioclase needles. Vesicles 1% - 1 mm, filled with smectite and carbonate. Sparse veins are filled with smectite, carbonate and minor pyrite.

Shipboard Data
 Bulk Analysis: 33-35 cm
 SiO₂ 50.9
 Al₂O₃ 16.2
 Fe₂O₃ 9.88
 MgO 6.28
 CaO 13.4
 Na₂O N.D.
 K₂O 0.05
 TiO₂ 1.15
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.3
 H₂O⁺ 0.82
 H₂O⁻ N.D.
 CO₂ 0.08
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 19.21 cm
 NRM Intensity (emu/cc) 48.25 x 10⁻³
 Stable Inclination +26.0°

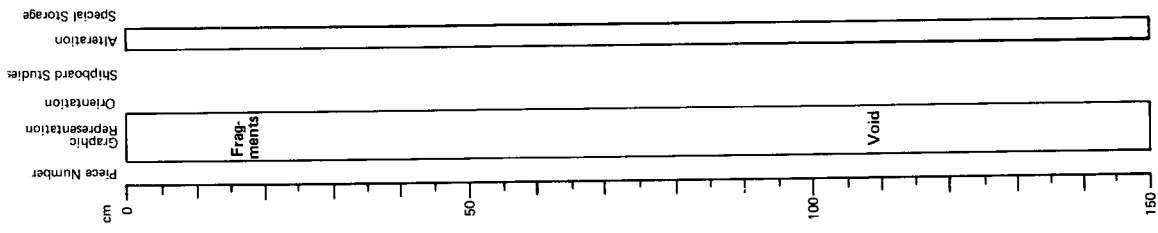


LEG	SITE	H O L E	CORE	SECT.
5	2418A		2	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Sparsely phyrlic massive basalt. Section consists of 9 basalt fragments that stuck in the pipe after pulling Core 22. Two fragments fit together. The fragments are lithologically similar to the remainder of Core 22 and are probably derived from the interval below Core 22, Section 2, 80 cm and above the bit.

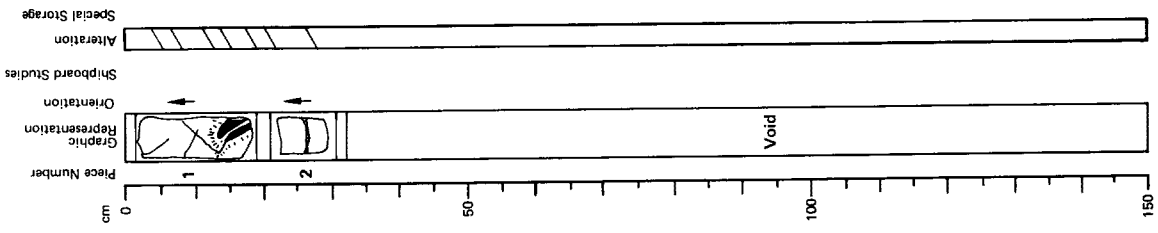


LEG	SITE	H O L E	CORE	SECT.
5	2418A		2	3
5	2418A		2	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

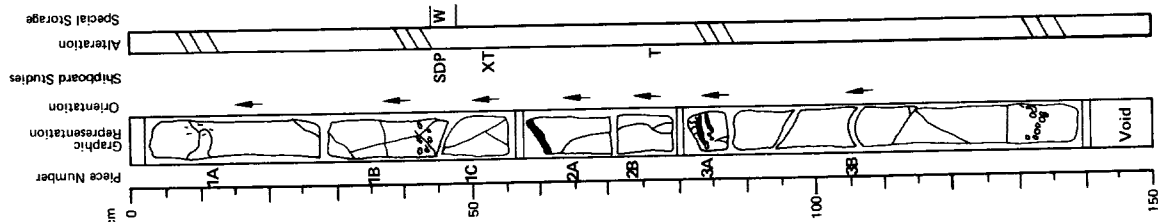
Visual Description

Sparsely phyrlic basalt. Basalt is gray to greenish-gray, slightly altered. Plagioclase phenocrysts 7%, <5 mm, partly altered and stained green, olivine phenocrysts 1%, <3 mm, altered to smectite. Groundmass is fine-grained to glassy; glass zone in piece 1 is surrounded by a fine-grained zone; glass is fresh. Veins filled with carbonate and smectite.



LEG	SITE	H O L	CORE	SECT.
5 2 4 1 8 A			2 4	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Sparingly phyrlic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 5%, <3 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <2 mm, rounded, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly altered to smectite but fresh glass is present in piece 3A. Vesicles <1%, <0.5 mm, filled with smectite and carbonate. Veins are filled with smectite, carbonate and minor pyrite. Vuggy patches of carbonate occur in pieces 1B and 3B.

Thin Section Description
 Location: 54 cm
 Texture: porphyritic - quench
 Phenocrysts: plagioclase, 8%, <3.5 mm, euhedral
 Groundmass: olivine, 3%, 0.2 mm, subhedral; plagioclase, 45%, <0.5 mm, laths; clinopyroxene, 34%, <0.1 mm, granular to radiating sheaves; opaque, 3%, 0.02 mm, granular; glass, 5%, altered
 Vesicles: 2%, 0.5 mm, round
 Alteration: olivine and glass to smectite; smectite and carbonate fill vesicles

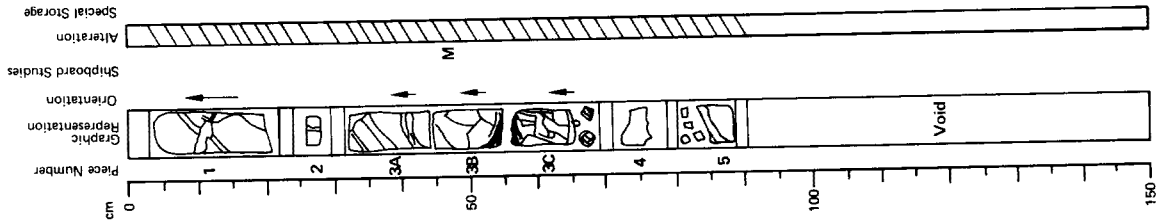
Thin Section Description
 Location: 78 cm
 Texture: porphyritic - quench
 Phenocrysts: plagioclase, 10%, <8 mm, euhedral
 Groundmass: olivine, 4%, 0.5 mm, euhedral; plagioclase, 15%, <0.5 mm, acicular; clinopyroxene, 69%, poorly crystallized, radiating sheaves; opaque, 1%, 0.01 mm, granular
 Vesicles: 1%, 0.2 mm, round
 Alteration: plagioclase partly to smectite; olivine to smectite; smectite and carbonate fill vesicles.

Shipboard Data

Bulk Analysis:	50-52 cm	76 cm	Physical Property Data:	45-47 cm
SiO ₂	50.3	50.4	Vp (km/sec)	5.95
Al ₂ O ₃	16.0	17.0	Porosity (%)	4.8
Fe ₂ O ₃	9.01	8.61	Wet Bulk Density (g/cc)	2.885
MgO	7.30	6.11	Grain Density (g/cc)	2.96
CaO	13.2	12.2		
Ni ₂ O	N.D.	N.D.		
K ₂ O	0.03	0.08		
TiO ₂	1.13	1.18		
P ₂ O ₅	N.D.	N.D.		
MnO	N.D.	N.D.		
LOI	1.8	2.0		
H ₂ O ⁺	0.82	1.13		
H ₂ O ⁻	N.D.	N.D.		
CO ₂	0.07	0.06		
Cr	N.D.	N.D.		
Ni	N.D.	N.D.		
Sr	N.D.	N.D.		
Zr	N.D.	N.D.		

LEG	SITE	H O L	CORE	SECT.
5 2 4 1 8 A			2 4	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

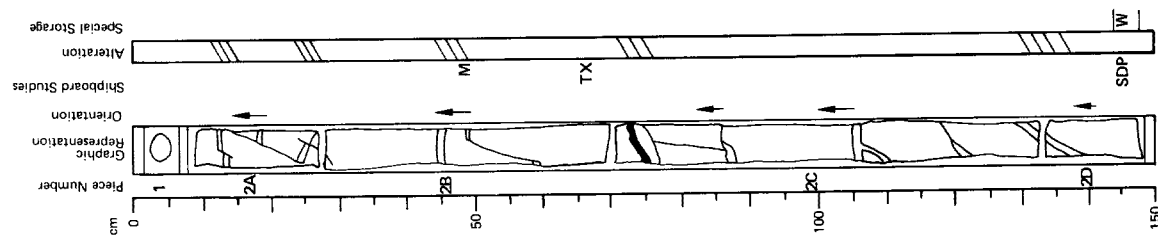


Visual Description
 Moderately phyrlic pillow basalt. Basalt is gray to greenish gray, moderately altered. Plagioclase phenocrysts 10%, <4 mm, fresh; olivine phenocrysts 1%, <2 mm, altered to carbonate and smectite; clinopyroxene phenocrysts <1%, <2 mm, fresh, in glomerocrysts with plagioclase. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1%, <2 mm, filled with carbonate and pyrite. Veins are present throughout, some 1 cm wide, filled with smectite, calcite, pyrite and minor pyrite. Groundmass is partly replaced by smectite in pieces 1 and 2A. Piece 3C is somewhat brecciated.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 14.59 x 10⁻³
 Stable Inclination +31.8°

LEG	SITE			H	O	CORE	SECT.
5	2	4	1	B	A	2	5
							1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

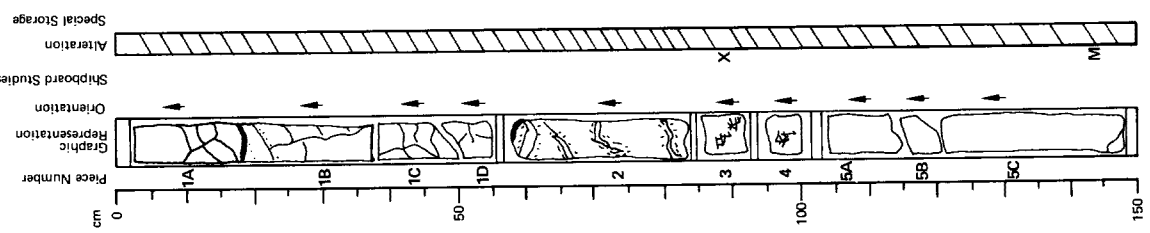


Visual Description
Moderately phryic to aphyric pillow basalt. Phenocrysts distribution is uneven, mostly moderately phryic but with aphyric zones from 8 to 22 cm and 48 to 72 cm. Basalt is medium to dark gray, slightly altered. Plagioclase phenocrysts 0-10%, <3 mm, fresh; olivine phenocrysts 0-1%, <3 mm, fresh; olivine phenocrysts 0-1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 0-1%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite; fresh glass occurs at 75 cm; in aphyric zones groundmass is somewhat granular. Vesicles 0-2%, unevenly distributed, <1 mm, filled with smectite and carbonate. Veins are common, some up to 1 cm wide, filled with smectite and carbonate; some show slight oxidation.

Thin Section Description
Location: 67 cm
Texture: aphyric - quench
Phenocrysts: none
Groundmass: olivine, <1%, <0.2 mm, euhedral; plagioclase, 50%, 0.2 mm, skeletal; clinopyroxene, 45%, radiating sheaves; opaque, 4%, 0.02 mm, granular.
Vesicles: 1%, <0.2 mm, ground
Alteration: olivine and minor interstitial material to smectite; smectite and carbonate fill vesicles

Shipboard Data
Bulk Analysis: 66-68 cm
Magnetic Data: 47.49 cm
NRM Intensity (emu/cc): 13.66 x 10⁻³
Stable Inclination: +35.0°
Physical Property Data: 145-147 cm
Vp (km/sec): 5.63
Porosity (%): 5.8
Wet Bulk Density (g/cc): 2.82
Grain Density (g/cc): 2.91

SiO ₂	50.8
Al ₂ O ₃	15.3
Fe ₂ O ₃	9.29
MgO	7.40
CaO	12.9
Na ₂ O	N.D.
K ₂ O	0.04
TiO ₂	1.31
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.7
H ₂ O ⁺	0.65
H ₂ O	N.D.
CO ₂	0.15
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.



Visual Description
Moderately phryic to aphyric pillow basalt. Most of section is moderately phryic; pieces 3 and 4 are aphyric. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 0-10%, <3 mm, fresh; olivine phenocrysts 0-1%, <2 mm, fresh; olivine phenocrysts 0-1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <2 mm, fresh; olivine phenocrysts 0-1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Veins are common, some up to 1 cm wide, filled with carbonate and smectite. Veins are common, some up to 1 cm wide, filled with carbonate and smectite.

Shipboard Data
Bulk Analysis: 87-89 cm
Magnetic Data: 142-144 cm
NRM Intensity (emu/cc): 9.49 x 10⁻³
Stable Inclination: +33.6°

SiO ₂	50.0
Al ₂ O ₃	15.7
Fe ₂ O ₃	10.0
MgO	7.81
CaO	12.4
Na ₂ O	N.D.
K ₂ O	0.04
TiO ₂	1.39
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.9
H ₂ O ⁺	0.85
H ₂ O	N.D.
CO ₂	0.09
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

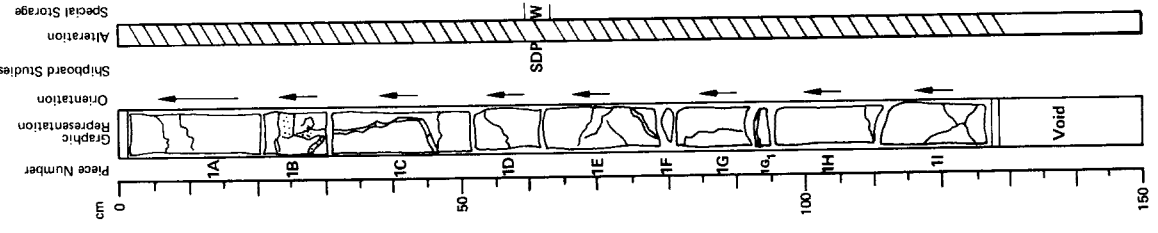
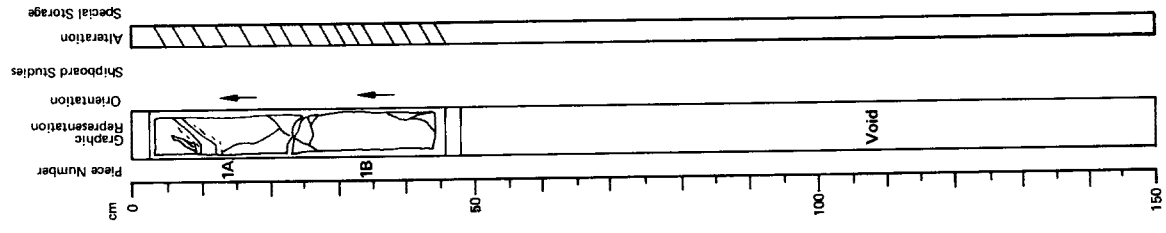
LEG	SITE			H	O	CORE	SECT.
5	2	4	1	B	A	2	5
							2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5	2418	A	25	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyrlic to aphyric basalt. Basalt is aphyric at top of section, gradually becoming sparsely phyrlic in piece 1B. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 0.6%, <4 mm, fresh. Groundmass is fine-grained but no glass selvages are present. Vesicles 1-2%, filled with smectite and carbonate. Veins are filled with carbonate and smectite. Minor pyrite occurs in groundmass.



LEG	SITE	H O	CORE	SECT.
5	2418	A	26	1

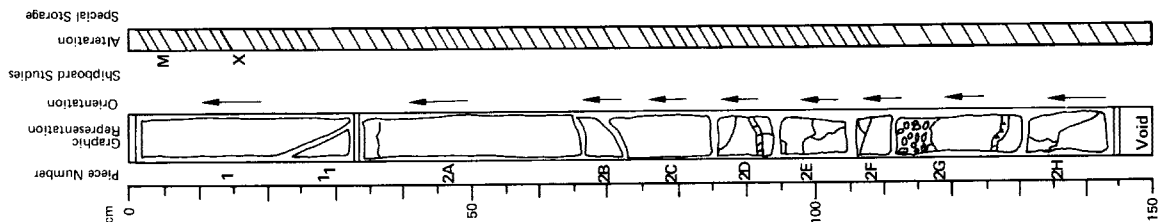
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyrlic massive basalt. Basalt is gray to greenish-gray, reddish-brown along oxidized veins; moderately altered. Plagioclase phenocrysts 5%, <5 mm, fresh, olivine phenocrysts 4.1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <2 mm, fresh. Groundmass is fine-grained, often mottled due to slight variations in grain size. Vesicles <1%, filled with smectite and carbonate. Veins and veinlets are present throughout section, filled with smectite, carbonate and minor silica. Some veins are slightly oxidized.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 60.62 cm
 Porosity (%) 5.88
 Wet Bulk Density (g/cc) 4.3
 Grain Density (g/cc) 2.885
 2.95

LEG	SITE	H	O	L	CORE	SECT.
5	2418A				2	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



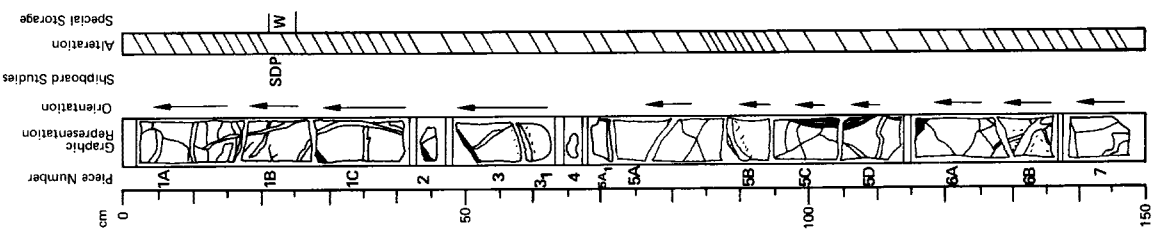
Visual Description
 Sparsely phytic massive basalt and pillow basalt. Massive basalt occurs from top of section to base of piece 2F at 110 cm; pillow basalt extends from 110 cm to base of section. Massive basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 7%, < 5 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 2 mm, fresh. Groundmass is medium-grained to very fine-grained, generally decreasing in grain size downward. Vesicles < 1%, filled with carbonate and smectite. Veins are common between 85 and 110 cm, filled with carbonate and smectite. Pillow basalt is gray to greenish-gray, reddish-brown where stained along oxidized veins; highly altered. Plagioclase phenocrysts 5%, < 4 mm, fresh; olivine 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 2 mm, fresh. Groundmass is very fine-grained. Many veins and veinlets are present, filled with smectite and carbonate. Minor breccia occurs at top of pillow sequence in piece 2G.

Shipboard Data

Bulk Analysis:	14-16 cm	Magnetic Data:	3.5 cm
SiO ₂	50.9	NRM Intensity (emu/cc)	12.01 x 10 ⁻³
Al ₂ O ₃	16.0	Stable Inclination	+23.0°
Fe ₂ O ₃	9.85		
MgO	6.82		
Ni ₂ O	N.D.		
K ₂ O	0.03		
TiO ₂	1.13		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	1.7		
H ₂ O ⁺	0.84		
H ₂ O ⁻	N.D.		
CO ₂	0.41		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

LEG	SITE	H	O	L	CORE	SECT.
5	2418A				2	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

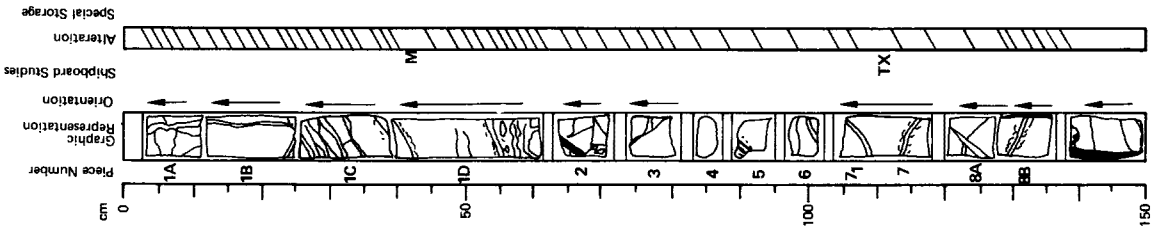


Visual Description
 Moderately phytic pillow basalt. Basalt is gray to greenish-gray, reddish-brown in some oxidized zones, moderately altered. Plagioclase phenocrysts 8-10%, < 4 mm, fresh, occur as large crystals or in glomerocysts; olivine phenocrysts 1%, < 2 mm, fresh, occur as small, dark, highly altered, rounded grains. Groundmass is mostly altered to smectite but some fresh glass is present in pieces 5C and 5D. Veins are common throughout, filled with smectite and carbonate. Minor pyrite is disseminated in groundmass.

Shipboard Data

Physical Property Data:	21-23 cm
Vp (km/sec)	5.22
Porosity (%)	8.0
Wet Bulk Density (g/cc)	2.72
Grain Density (g/cc)	2.86

LEG	SITE	HOLE	CORE	SECT.
5	2418A		216	4



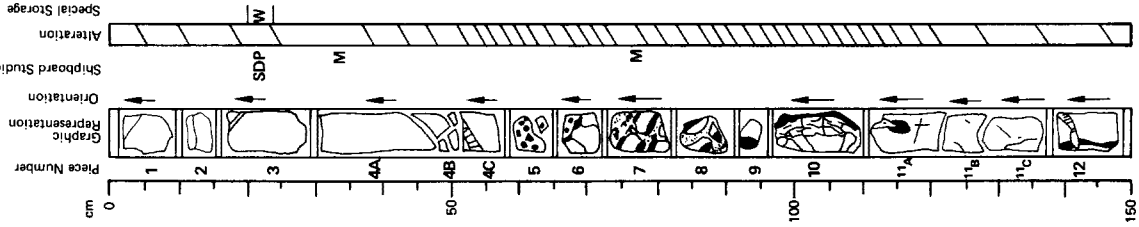
Visual Description
Moderately phryic pillow basalt. Basalt is greenish-gray; moderately to highly altered. Plagioclase phenocrysts 8-10%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly altered to smectite but some fresh glass is present in the core catcher sample. Mostly non-vesicular, but rare vesicles occur in breccia of piece 2; vesicles <1 mm, filled with carbonate. Scattered veins are filled with carbonate, smectite and minor pyrite. Some pyrite is also disseminated in groundmass.

Thin Section Description

Location: 112 cm
Texture: porphyritic - quench
Phenocrysts: olivine, 1%, <1 mm, euhedral; plagioclase, 10%, <2 mm, euhedral
Groundmass: olivine, 2%, <0.2 mm, subhedral, plagioclase, 12%, <0.3 mm, skeletal; clinopyroxene, 69%, very poorly crystallized; opaque, 4%, 0.02 mm, granular
Vesicles: 2%, <0.4 mm, round
Alteration: olivine to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data

Bulk Analysis: 111-113 cm
Magnetic Data: 41.43 cm
SiO₂ 49.7 NRM Intensity (emu/cc) 17.56 x 10⁻³
Al₂O₃ 18.3 Stable Inclination +26.5°
Fe₂O₃ 8.23
MgO 7.03
CaO 12.6
Na₂O N.D.
K₂O 0.07
TiO₂ 1.28
P₂O₅ N.D.
MnO N.D.
LOI 2.5
H₂O⁺ 1.23
H₂O⁻ N.D.
CO₂ 0.50
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.



Visual Description

Scarsely to moderately phryic pillow basalt and broken pillow breccia. Pillow basalt occur in the upper and lower parts of the section and is separated by breccia in the interval between 60 and 95 cm. Pillow basalt is medium to dark gray, relatively fresh. Phenocryst distribution is non-uniform, ranging from 2-5% in the upper part of the section to 15-20% in the lower part. Plagioclase phenocrysts 2-18%, <9 mm, fresh; olivine phenocrysts 0-3%, <4 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Fractures are filled with smectite and carbonate. Piece 11A has glass zone at end of fracture suggesting fracturing during quenching. Breccia is dark greenish-gray, moderately altered. Angular fragments of crystalline basalt and glass are in a matrix of dark green smectite.

Shipboard Data

Magnetic Data: 78-80 cm
NRM Intensity (emu/cc) 12.48 x 10⁻³
Stable Inclination +22.8°

Physical Property Data:
Vp (km/sec) 5.30
Porosity (%) 8.8
Wet Bulk Density (g/cc) 2.74
Grain Density (g/cc) 2.90

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	2418A		217	1

LEG	SITE	HOLE	CORE	SECT.
52	418A	27	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly to moderately phryic pillow basalt. Basalt is gray to greenish-gray, moderately altered. Phenocrysts distribution is variable ranging from 1-2% in pieces 7 and 8 to 15% in pieces 5 and 6. Plagioclase phenocrysts 2-14%, <2 mm, fresh; olivine phenocrysts 0-1%, <1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages partly altered to smectite. Vesicles <1%, <1 mm, filled with carbonate. Veins and veinlets are filled with smectite, carbonate and minor pyrite.

Thin Section Description

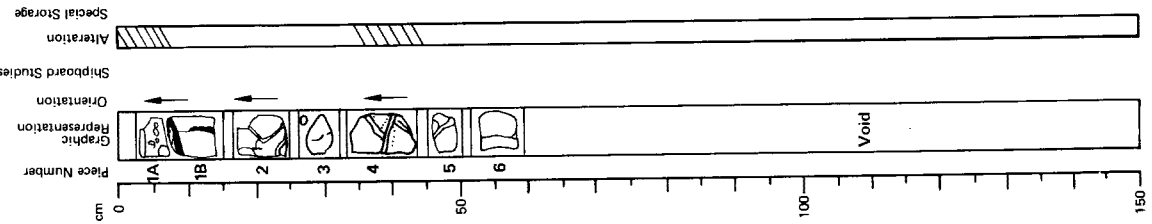
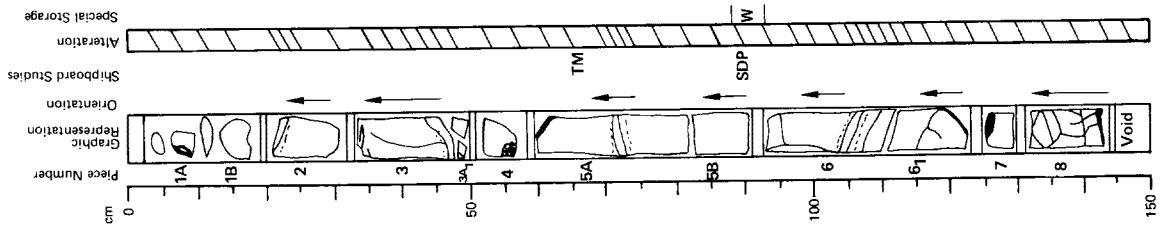
Location: 68 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine, 2%, <0.8 mm, euhedral; plagioclase, 8%, <2.5 mm, subhedral
 Groundmass: plagioclase, 10%, <0.2 mm, acicular; clinopyroxene, 75%, radiating sheaves, opaque, 4% 0.01 mm, granular
 Vesicles: 1%, 0.2 mm, round to ovoid
 Alteration: olivine and minor plagioclase to smectite; smectite fills vesicles

Shipboard Data

Magnetic Data: 67-68 cm
 NRM Intensity (emu/cc) 20.19 x 10⁻³
 Stable Inclination +36.6°

Physical Property Data:

Vp (km/sec) 5.31
 Porosity (%) 8.1
 Wet Bulk Density (g/cc) 2.73
 Grain Density (g/cc) 2.86



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	418A	27	3	

Visual Description
 Moderately phryic pillow basalt. Basalt is gray to greenish-gray; weakly to moderately altered. Plagioclase phenocrysts 10%, <4 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles <1%, <1 mm, filled with carbonate and smectite. Veins are also filled with smectite and carbonate. Piece 1A is sideromelane breccia derived from pillow rinds; partly altered glass fragments are in a green smectite matrix.

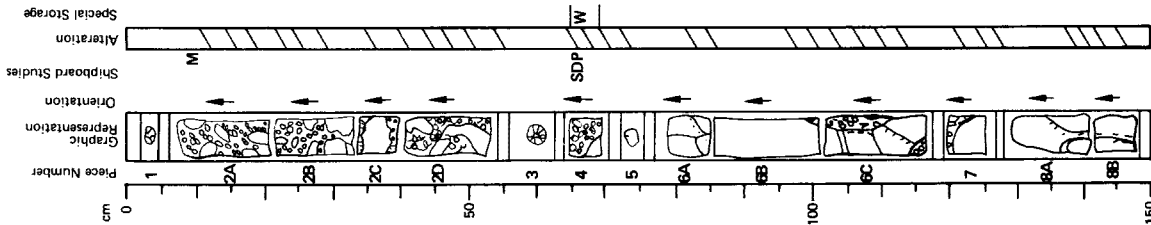
LEG	SITE	HO	CORE	SECT.
52	418A	A	28	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phytic pillow basalt and pillow breccia. Breccia and pillow basalt are intermixed; breccia occur at and between glassy pillow margins. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 5-10%, <6 mm, normally fresh but stained green or yellow near altered breccia zones; olivine phenocrysts 1%, <1 mm, altered to smectite. Groundmass is very fine-grained to glassy; glass selvages are completely altered to smectite. Vesicles <1%, <0.5 mm, filled with smectite and carbonate. Scattered veins are filled with smectite and carbonate. Breccia is dark green to greenish-gray; intensely altered. Breccia consists of angular fragments of crystalline basalt and glass mineralogically similar to the pillow basalts, with a matrix of dark green smectite. All glass fragments are altered to smectite and most smectite in the matrix probably formed by alteration of glass. Carbonate and pink zeolite(?) replace some matrix material.

Shipboard Data

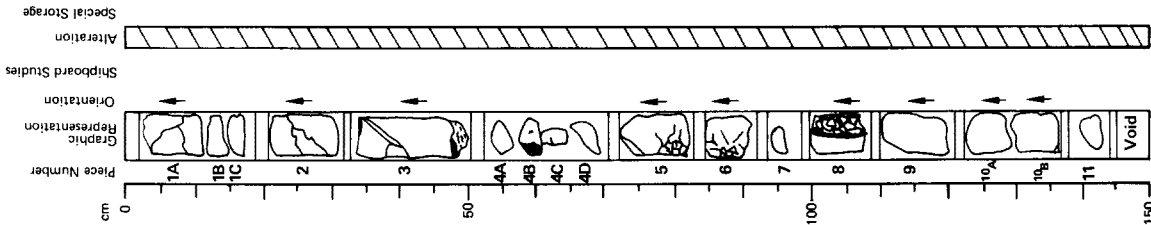
Magnetic Data:
 NRM Intensity (emu/cc) 11-13 cm 0.035 x 10⁻³
 Stable Inclination -35.5°
Physical Property Data:
 Vp (km/sec) 65-67 cm 3.47
 Porosity (%) 30.1
 Wet Bulk Density (g/cc) 2.28
 Grain Density (g/cc) 2.84



LEG	SITE	HO	CORE	SECT.
52	418A	A	28	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately to highly phytic pillow basalt. Basalt is gray to greenish-gray; moderately altered. Phenocryst content is variable ranging from 10-15% in pieces 1 to 8 to about 25% in pieces 9 to 11. Plagioclase phenocrysts 10-20%, <7 mm, fresh; olivine phenocrysts 1-2%, <2 mm, altered to smectite; clinopyroxene phenocrysts 1-3%, <3 mm, fresh, mostly in glomerocrysts with plagioclase. Groundmass is fine-grained to glassy; minor breccia zones are associated with glass selvages; glass selvages are completely altered to smectite. Vesicles 1%, <2 mm, filled with smectite and carbonate. Minor pink zeolite(?) occurs in breccia matrix. Piece 4D contains a fragment of altered sediment.



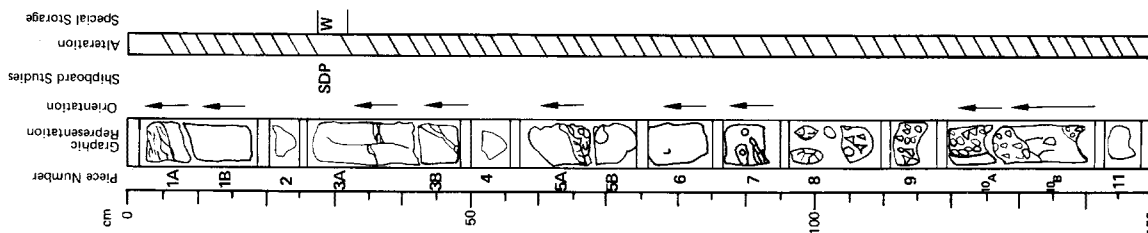
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
5 2 4 1 8	A	2 8	3	

Visual Description
Moderately to highly phryic pillow basalt and breccia. Breccia is abundant only between 85 and 130 cm where it occurs between pillows and consists mostly of broken glass selvages. Pillow basalt is gray to greenish-gray; moderately altered. Phenocryst concentration is 10% near chilled pillow margins to about 20% in pillow interiors. Plagioclase phenocrysts are 1-2 mm, fresh; olivine phenocrysts 1.2 mm, altered to smectite; clinopyroxene phenocrysts 1.2 mm, <2 mm, fresh. Groundmass is fine-grained to glassy, slightly coarser-grained in pillow interiors; glass selvages are completely altered to smectite. Vesicles 1.2 mm, filled with smectite and carbonate. One large vesicle (1 cm diameter) occurs in piece 10B. Veins are also filled with smectite and carbonate. Inter-pillow breccia is composed chiefly of altered glass fragments in a matrix of dark green smectite containing minor carbonate and pink zeolite(?). Pieces 1A and 5B have small inclusions of altered sediment.

Shipboard Data

Location:	27-29 cm
Texture:	porphyritic - quench
Phenocrysts:	olivine, 1%, <1 mm, euhedral; plagioclase, 8%, <3 mm, subhedral
Groundmass:	olivine, 2%, 0.3 mm, euhedral; plagioclase, 45%, 0.2 mm, skeletal; clinopyroxene, radiating sheaves; opaque, 3%, 0.01 mm, granular
Vesicles:	1%, <0.4 mm, round
Alteration:	olivine to smectite and carbonate; smectite and carbonate fill vesicles



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
5 2 4 1 8	A	2 8	4	

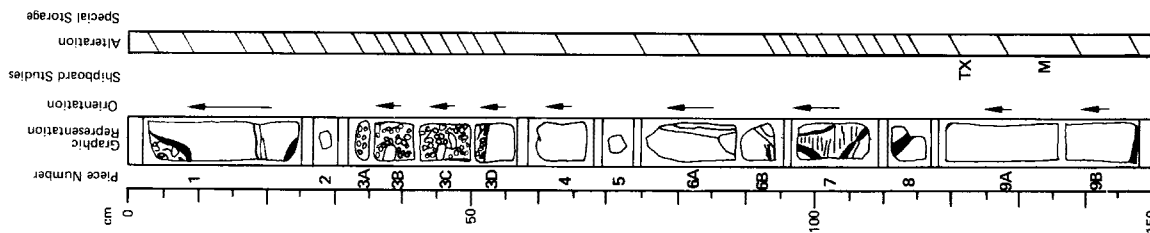
Visual Description
Moderately phryic pillow basalt and pillow breccia. Basalt is medium to dark gray; weakly altered. Breccia is dark green; highly altered. Plagioclase phenocrysts 10-15%, <8 mm, fresh to very slightly altered; olivine phenocrysts 1%, <2 mm, altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite. Vesicles 1%, filled with smectite and carbonate. Sparse veins are also filled with smectite and carbonate. Breccia is mostly in piece 5, composed of angular glass and basalt fragments in a matrix of dark green smectite. Minor carbonate, pyrite and pink zeolite(?) are also present in the matrix.

Thin Section Description

Location: 120 cm
Texture: porphyritic - quench
Phenocrysts: olivine, 1%, <1 mm, euhedral; plagioclase, 8%, <3 mm, subhedral
Groundmass: olivine, 2%, 0.3 mm, euhedral; plagioclase, 45%, 0.2 mm, skeletal; clinopyroxene, radiating sheaves; opaque, 3%, 0.01 mm, granular
Vesicles: 1%, <0.4 mm, round
Alteration: olivine to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data

Bulk Analysis:	120-122 cm	Magnetic Data:	130-132 cm
SiO ₂	50.5	NRM Intensity (emu/cc)	20.79 x 10 ⁻³
Al ₂ O ₃	18.3	Stable Inclination	+21.6°
Fe ₂ O ₃	7.93		
MgO	6.60		
CaO	12.1		
Na ₂ O	N.D.		
K ₂ O	0.12		
TiO ₂	1.27		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	2.2		
H ₂ O ⁺	1.25		
H ₂ O ⁻	N.D.		
CO ₂	0.07		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

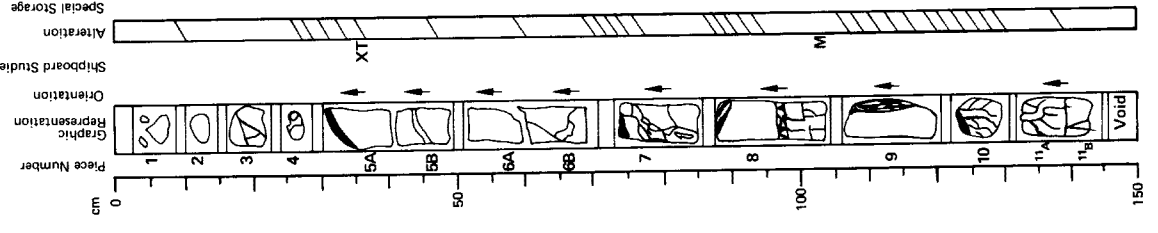
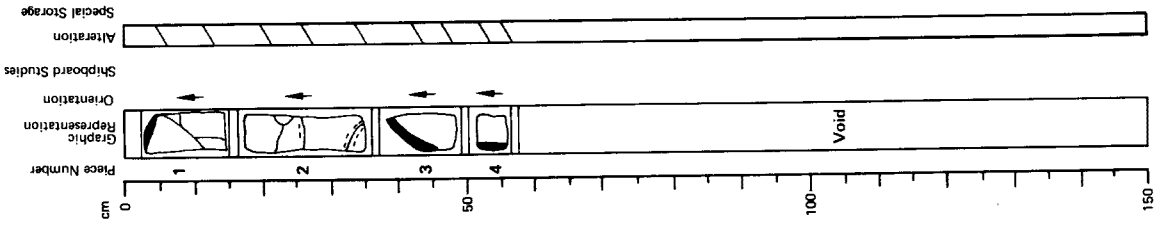


28

LEG	SITE	H O L E	CORE	SECT.
52418A	218A	218A	218	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 10%, <8 mm, fresh; olivine phenocrysts 2%, <2 mm, altered to smectite. Groundmass is fine-grained to glassy; most glass selvages are altered to smectite but some fresh glass is present in piece 1. Vesicles 1%, <0.5 mm, filled with carbonate. Scattered ventlets are filled with smectite, carbonate and minor pyrite.



LEG	SITE	H O L E	CORE	SECT.
52418A	218A	218A	219	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray; relatively fresh except for glass selvages. Plagioclase phenocrysts 8%, <8 mm, fresh; olivine phenocrysts 1.2%, <1 mm, altered to smectite. Groundmass is very fine-grained to glassy; glass selvages are completely altered to smectite. Vesicles <1%, <0.5 mm, filled with carbonate. Veins are common in inconspicuously brecciated zones, filled with smectite, carbonate and minor pink zeolite(?).

Thin Section Description

Location: 36 cm
 Texture: porphyritic quench
 Phenocrysts: olivine 1%, <0.5 mm, euhedral; plagioclase 8%, <3 mm, euhedral
 Groundmass: olivine 1%, 0.1 mm, euhedral; plagioclase 10%, <0.4 mm, acicular; clinopyroxene 75%, poorly crystallized, rotating sheaves; opaques 5%, 0.01 mm; granular
 Vesicles: <1%, <0.7 mm, round
 Alteration: olivine to carbonate; carbonate fills vesicles

Shipboard Data

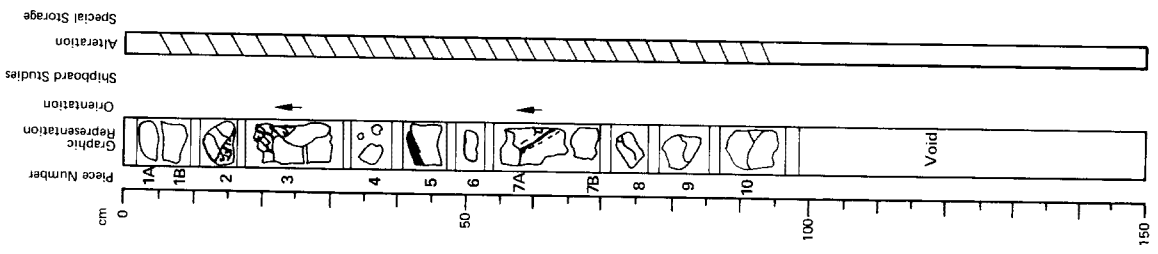
Bulk Analysis: 35.37 cm
 Magnetic Data: 106.108 cm
 NRM Intensity (emu/cc) 19.25 x 10⁻³
 Stable Inclination +12.5

SiO ₂	49.8
Al ₂ O ₃	18.2
Fe ₂ O ₃	7.38
MgO	6.78
CaO	13.2
Na ₂ O	N.D.
K ₂ O	0.36
TiO ₂	1.27
P ₂ O ₅	N.D.
MnO	N.D.
LOI	2.6
H ₂ O ⁺	0.82
H ₂ O ⁻	N.D.
CO ₂	1.13
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

LEG	SITE	HOLE	CORE	SECT.
52	418A	29	2	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

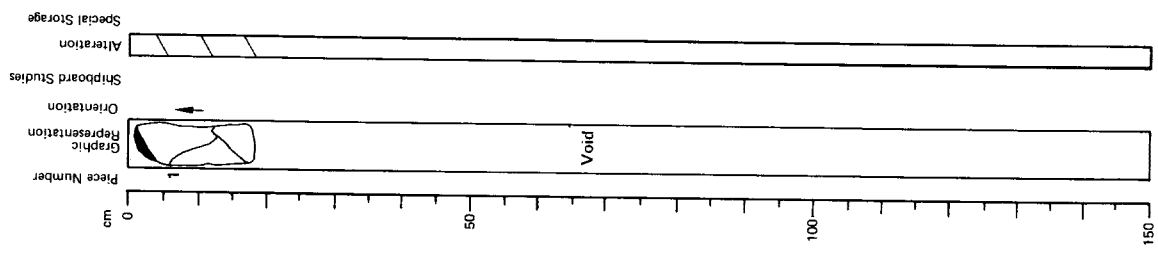
Visual Description
 Moderately phyric pillow basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 15%, < 7 mm, fresh; olivine phenocrysts 1-2%, < 2 mm, altered to smectite. Groundmass is fine-grained to glassy; some glass selvages are brecciated and all are altered to smectite, carbonate and minor silica. Vesicles 1%, filled with smectite and carbonate. Veins are also filled with smectite and carbonate. Groundmass is locally altered to smectite.



LEG	SITE	HOLE	CORE	SECT.
52	418A	29	2	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyric pillow basalt. This fragment was found in the bit during the bit change after Core 29. Basalt is gray to greenish-gray; slightly altered. Plagioclase phenocrysts 8%, < 5 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite. Vesicles 1%, < 0.5 mm, filled with carbonate. Several veins are present, filled with smectite and carbonate.



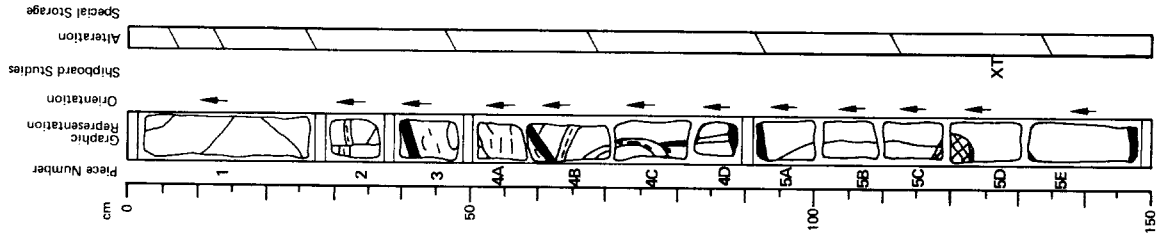
LEG	SITE	H O C E	CORE	SECT.
52	418A		30	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10-15%, < 8 mm, fresh or somewhat altered near fractures; olivine phenocrysts 1%, < 2 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 0.5 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly altered to smectite but fresh glass occurs in piece 4D. Vesicles < 1%, filled with smectite. Numerous veins are present, filled with smectite and carbonate; some veins are oxidized.

Thin Section Description
Location: 128 cm
Texture: porphyritic - quench
Phenocrysts: olivine 1%, < 2 mm, euhedral; plagioclase 15%, < 4 mm, euhedral
Groundmass: olivine 4%, < 0.4 mm, euhedral; plagioclase 30%, < 0.5 mm, laths; clinopyroxene 44%, granular to radiating sheaves; opaques 5%, 0.01 mm, euhedral
Vesicles: 1%, < 0.5 mm, round
Alteration: olivine to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data
Bulk Analysis: 127-129 cm
SiO₂ 49.7
Al₂O₃ 19.5
Fe₂O₃ 7.14
MgO 6.51
CaO 13.4
Na₂O N.D.
K₂O 0.06
TiO₂ 1.06
P₂O₅ N.D.
MnO N.D.
LOI 2.5
H₂O⁺ 0.88
H₂O⁻ N.D.
CO₂ 0.66
C N.D.
Ni N.D.
Sr N.D.
Zr N.D.

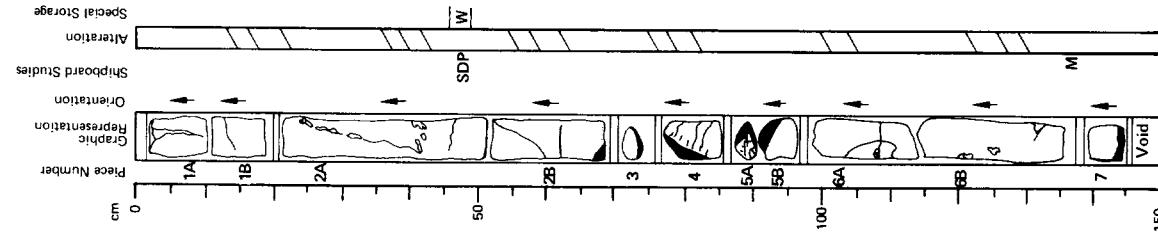


LEG	SITE	H O C E	CORE	SECT.
52	418A		30	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is gray to greenish-gray; weakly altered. Plagioclase phenocrysts 10%, < 5 mm, fresh; olivine phenocrysts 1%, < 2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly altered to smectite. Vesicles < 1%, < 0.5 mm, round and irregular in shape, filled with smectite, carbonate and minor pyrite.

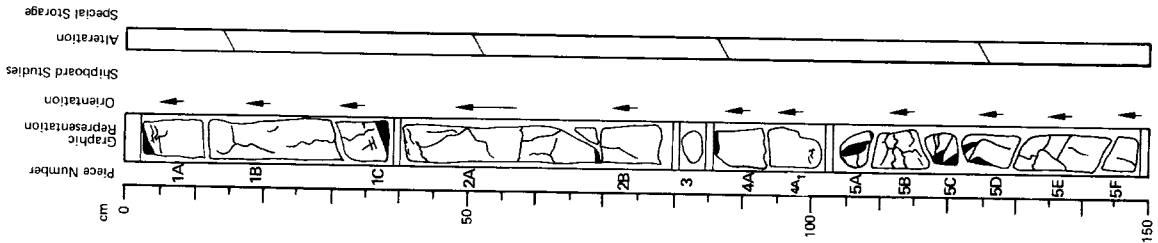
Shipboard Data
Location: 137-139 cm
Magnetic Data:
NRM Intensity (emu/cc) 29.17 x 10⁻³
Stable Inclination +17.3°
Physical Property Data:
Vp (km/sec) 46-48 cm
Porosity (%) 5.72
Wet Bulk Density (g/cc) 4.5
Grain Density (g/cc) 2.835



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
524	18A	30	3	

Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray; relatively fresh. Phenocryst distribution is uneven, more abundant in pillow centers and less abundant in quenched rims. Plagioclase phenocrysts 6-12%, <5 mm, fresh; olivine phenocrysts 1%, <2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite.

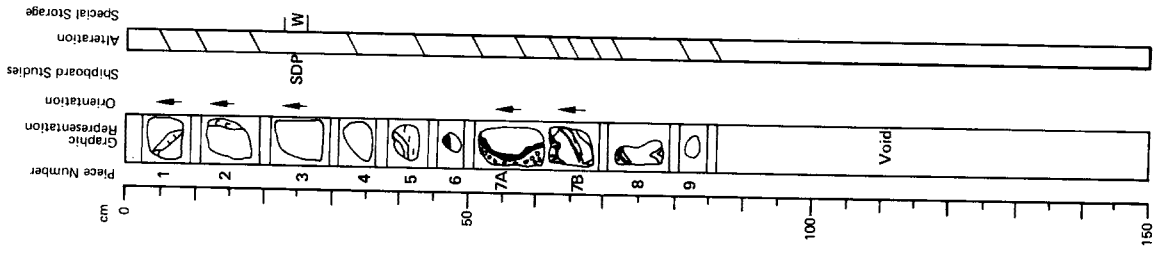


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
524	18A	30	4	

Visual Description
 Moderately phryic pillow basalt. Basalt is gray to greenish-gray, reddish-brown or yellow where oxidized; moderately to weakly altered. Plagioclase phenocrysts 10%, <4 mm, fresh or stained green or yellow near weirs; olivine phenocrysts 1%, <1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite. Veins to 1 cm wide are filled with smectite and carbonate. Minor hyaloclastic breccia occurs in piece 7A.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 24-26 cm
 Porosity (%) 5.38
 Wet Bulk Density (g/cc) 6.2
 Grain Density (g/cc) 2.70
 2.83



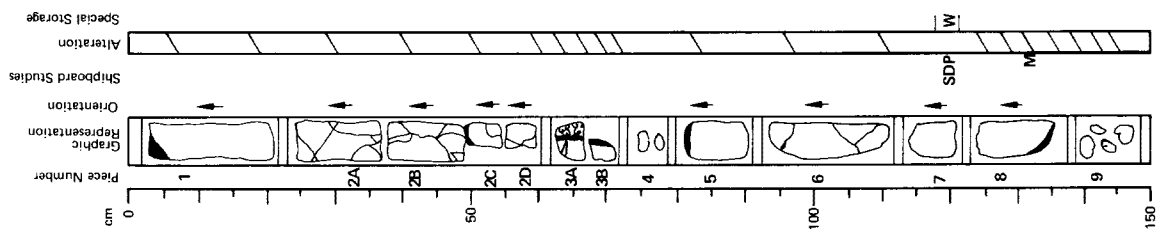
284

LEG	SITE	HOLE	CORE	SECT.
52	418A	31	1	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is grey to greenish-gray, reddish-brown or yellow where oxidized; moderately altered. Plagioclase phenocrysts 10-15%, <6 mm, fresh or stained green or yellow near veins; olivine phenocrysts 1%, <2 mm, altered to smectite; clinopyroxene phenocrysts <1%, <4 mm, subrounded, fresh. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite. Vesicles 1%, filled with smectite and carbonate. Rock is heavily veined and fractured, particularly in piece 2; veins are filled with smectite, carbonate and minor pyrite.

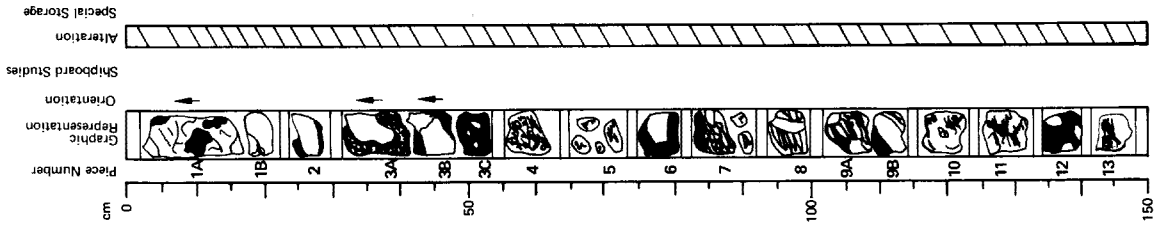
Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 129-131 cm
 20.56 x 10⁻³
 Stable Inclination +34.3°
 Physical Property Data:
 Vp (km/sec) 5.49
 Porosity (%) 6.9
 Wet Bulk Density (g/cc) 2.76
 Grain Density (g/cc) 2.88



LEG	SITE	HOLE	CORE	SECT.
52	418A	31	1	2

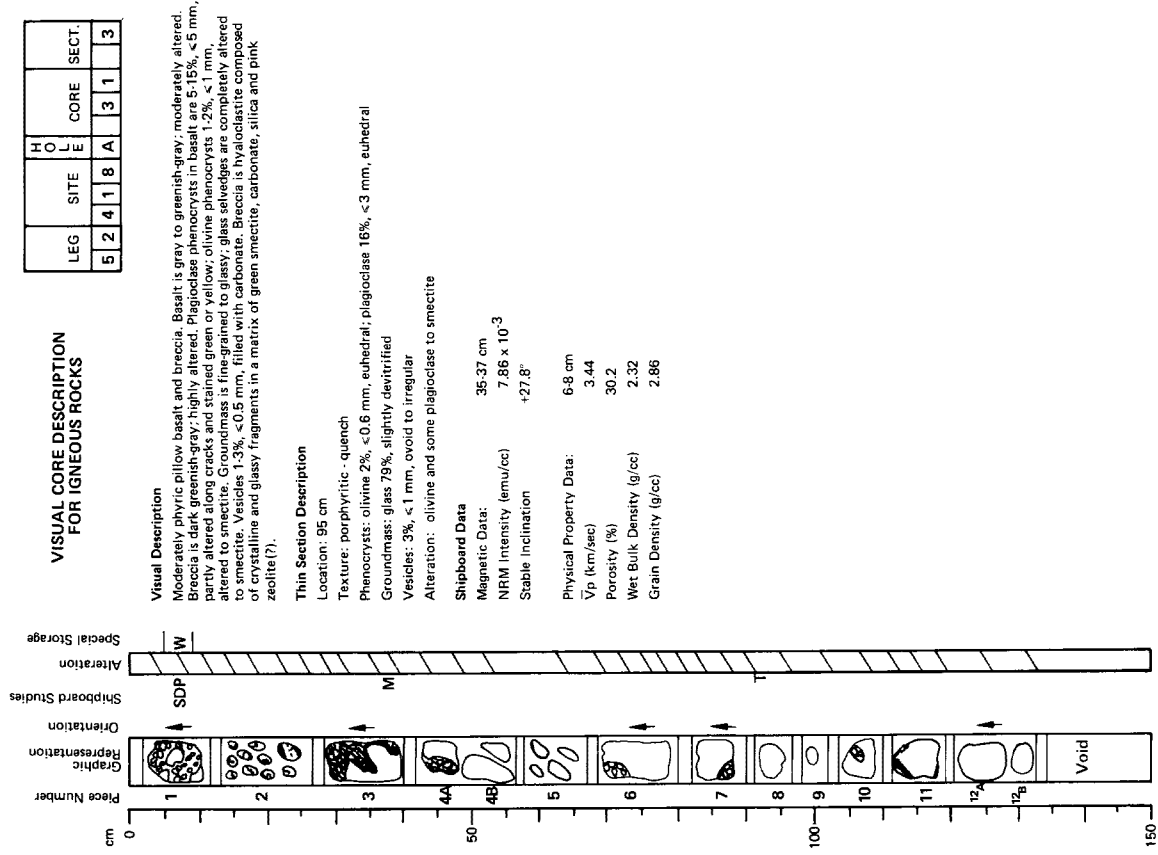
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt breccia. Breccia is dark greenish-grey, highly altered. Angular fragments of crystalline basalt and glass are in a matrix of dark green smectite, carbonate and minor pink zeolite(?). Crystalline fragments have 10-15% phenocrysts. Plagioclase phenocrysts 12-14%, <7 mm, partly altered to smectite; olivine phenocrysts 1-2%, <2 mm, altered to smectite. Glass selvages and glass fragments are completely altered to smectite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	418	A	31	3



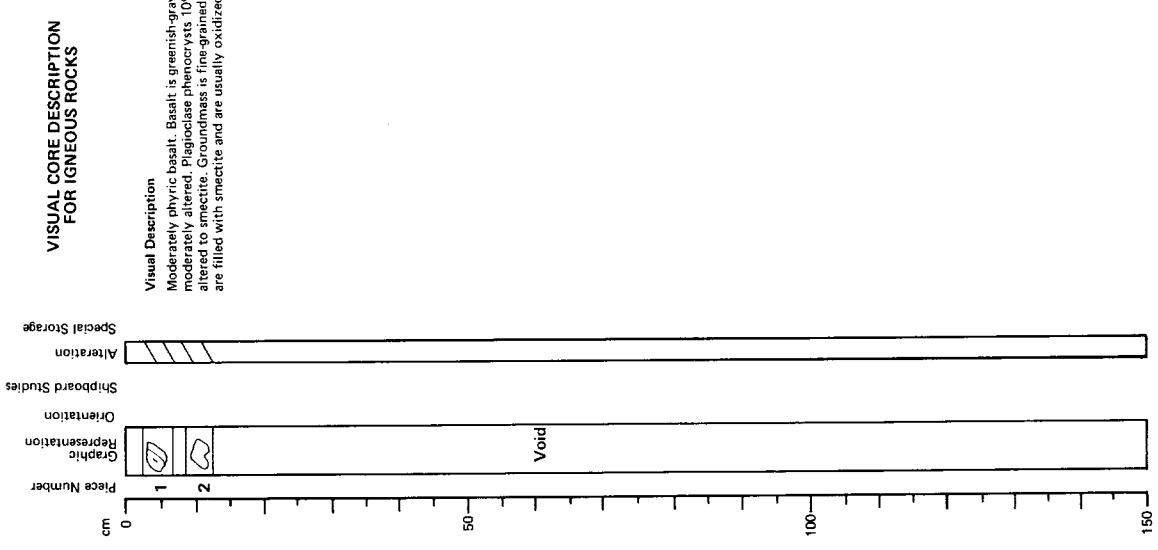
Visual Description
 Moderately phryic pillow basalt and breccia. Basalt is gray to greenish-gray; moderately altered. Breccia is dark greenish-gray; highly altered. Plagioclase phenocrysts in basalt are 5-15%, <5 mm, partly altered along cracks and stained green or yellow; olivine phenocrysts 1-2%, <1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite. Vesicles 1-3%, <0.5 mm, filled with carbonate. Breccia is hyaloclastite composed of crystalline and glassy fragments in a matrix of green smectite, carbonate, silica and pink zeolite(?).

Thin Section Description
 Location: 95 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 2%, <0.6 mm, euhedral; plagioclase 16%, <3 mm, euhedral
 Groundmass: glass 79%, slightly devitrified
 Vesicles: 3%, <1 mm, ovoid to irregular
 Alteration: olivine and some plagioclase to smectite

Shipboard Data
 Magnetic Data: 35-37 cm
 NRM Intensity (emu/cc) 7.86 x 10⁻³
 Stable Inclination +27.8°
 Physical Property Data:
 Vp (km/sec) 6.8 cm
 Porosity (%) 3.44
 Wet Bulk Density (g/cc) 30.2
 Grain Density (g/cc) 2.32
 2.86

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	418	A	32	C



Visual Description
 Moderately phryic basalt. Basalt is greenish-gray to reddish- or yellowish-brown where oxidized; moderately altered. Plagioclase phenocrysts 10%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite. Groundmass is fine-grained. Vesicles 1%, filled with smectite. Minor veins are filled with smectite and are usually oxidized.

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5	2418A	33	1	1

Visual Description
 Moderately phryic pillow basalt. Basalt is gray to greenish-gray, reddish to yellowish-brown where oxidized; moderately altered. Plagioclase phenocrysts 10%, <10 mm, partly altered to smectite and minor pyrite. Olivine phenocrysts 1%, <1 mm, altered to smectite. Groundmass is very fine-grained to glassy, glass shadings like <1 mm, altered to smectite, filled with carbonate and smectite; vein at 50 cm is filled with smectite, calcite, pyrite, and minor pyrite. Scattered veins are filled with smectite, carbonate and minor pyrite.

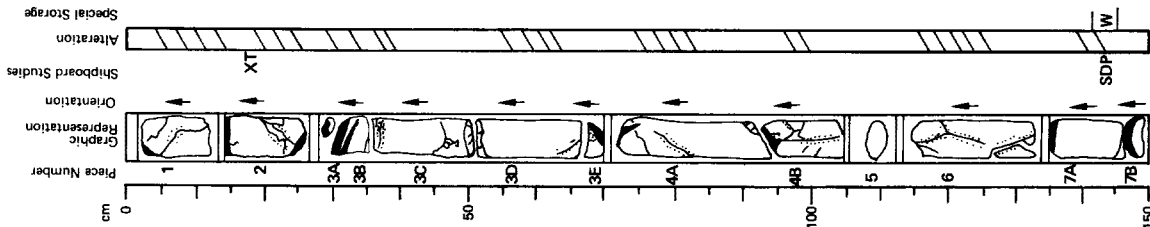
Thin Section Description

Location: 19 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 2%, <1.5 mm, euhedral; plagioclase 13%, <3 mm, euhedral
 Groundmass: olivine 1%, 0.1 mm, euhedral; plagioclase 15%, <0.3 mm, acicular; clinopyroxene 62%, poorly crystallized, radiating sheaves; opaque, 5%, 0.01 mm, granular
 Vesicles: 2%, <0.3 mm, round
 Alteration: olivine to carbonate; plagioclase partly to smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 18.20 cm
 SiO₂ 49.5
 Al₂O₃ 18.9
 Fe₂O₃ 7.45
 MgO 6.81
 CaO 12.3
 Na₂O N.D.
 K₂O 0.60
 TiO₂ 1.25
 P₂O₅ N.D.
 MnO N.D.
 LOI 3.5
 H₂O⁺ 1.39
 H₂O⁻ N.D.
 CO₂ 0.91
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Physical Property Data:
 Vp (km/sec) 4.54
 Porosity (%) 16.9
 Wet Bulk Density (g/cc) 2.505
 Grain Density (g/cc) 2.81



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5	2418A	33	2	2

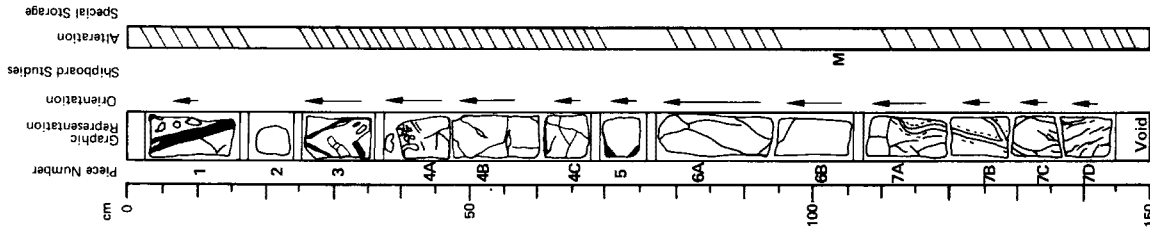
Visual Description
 Moderately phryic pillow basalt. Basalt is greenish-gray, reddish to yellowish-brown where oxidized; moderately altered. Plagioclase phenocrysts 7-10%, <5 mm, partly altered to smectite and minor pyrite. Olivine phenocrysts 1-3%, <1.5 mm, altered to smectite. Groundmass is very fine-grained to glassy, glass shadings like <1 mm, altered to smectite, fractured and minor breccia occurs in pieces 1 to 4A. Breccia consists of crystalline basalt fragments and altered glass chips in a matrix of green smectite, carbonate and zeolite(?).

Shipboard Data

Bulk Analysis: 2.5 cm fresh
 SiO₂ 50.11
 Al₂O₃ 18.19
 Fe₂O₃ 9.10
 MgO 6.69
 CaO 10.9
 Na₂O N.D.
 K₂O 0.91
 TiO₂ 1.29
 P₂O₅ 0.11
 MnO N.D.
 LOI 2.99
 H₂O⁺ 3.00
 H₂O⁻ N.D.
 CO₂ 0.82
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

2.5 cm oxidized
 SiO₂ 51.80
 Al₂O₃ 18.22
 Fe₂O₃ 10.01
 MgO 7.93
 CaO 6.07
 Na₂O N.D.
 K₂O 2.55
 TiO₂ 1.59
 P₂O₅ 0.11
 MnO N.D.
 LOI 4.96
 H₂O⁺ 4.30
 H₂O⁻ N.D.
 CO₂ 0.41
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

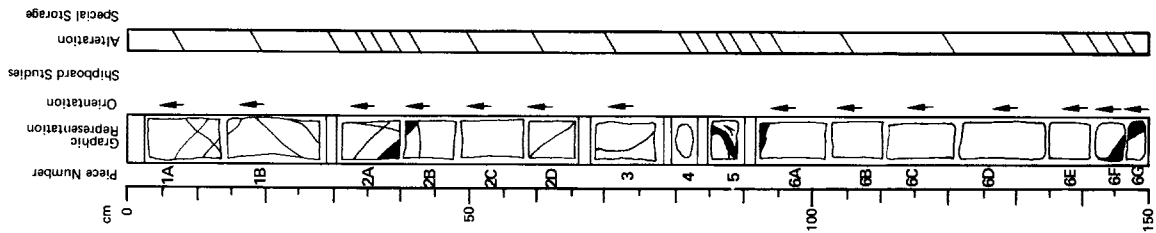
Magnetic Data:
 NRM intensity (emu/cc) 9.84 x 10⁻³
 Stable Inclination +27.9°



LEG	SITE	HOLE	CORE	SECT.
52	418	A	33	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 10-15%, <8 mm, fresh or stained green or yellow; olivine phenocrysts 1%, <1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite and carbonate. Vesicles 1%, <0.5 mm, filled with carbonate and smectite. Veins are filled with smectite, carbonate and minor pyrite; some veins are oxidized.

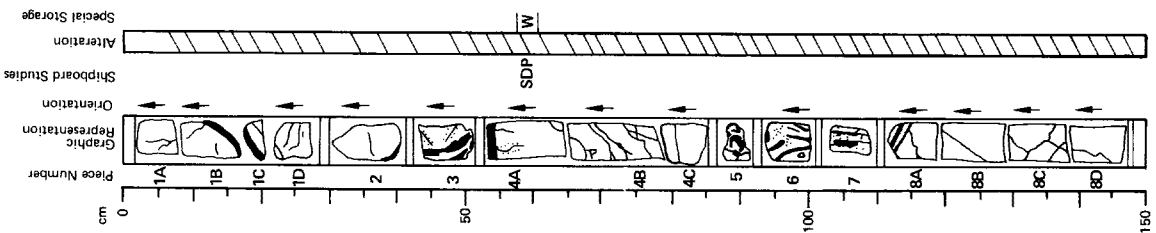


LEG	SITE	HOLE	CORE	SECT.
52	418	A	33	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is grayish-green, yellowish-brown where oxidized; moderately to highly altered. Plagioclase phenocrysts 10%, <8 mm, partly altered to smectite; olivine phenocrysts 1%, <6 mm, altered to smectite. Groundmass is very fine-grained to glassy; glass selvages are altered to smectite. Vesicles <1%, <1 mm, filled with carbonate. Veins are filled with smectite, carbonate and minor pyrite. Minor hyaloclastic breccia consists of altered glass fragments in a matrix of greenish-brown smectite and carbonate.

Shipboard Data
 Physical Property Data: 60.62 cm
 Vp (km/sec) 5.38
 Porosity (%) 6.0
 Wet Bulk Density (g/cc) 2.74
 Grain Density (g/cc) 2.85

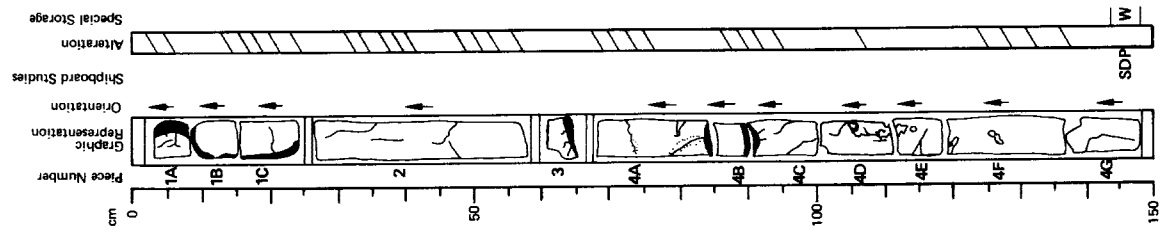


LEG	SITE			H	O	L	E	CORE	SECT.
5	2	4	1	8	A	3	3	5	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is gray to greenish-gray, moderately altered. Plagioclase phenocrysts 10%, <5 mm, fresh or stained green or yellow; olivine phenocrysts 1-2%, <2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite. Vesicles <1%, <0.2 mm, filled with smectite, carbonate and minor pyrite. Veins are filled with smectite, and carbonate; some veins are slightly oxidized.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 145-147 cm
 Porosity (%) 5.66
 Wet Bulk Density (g/cc) 5.7
 Grain Density (g/cc) 2.825
 2.93

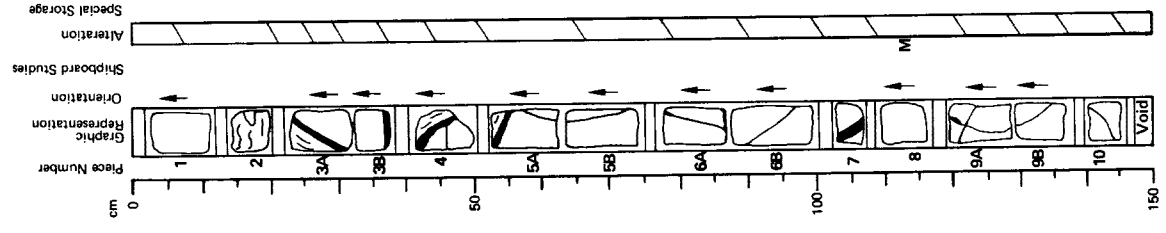


LEG	SITE			H	O	L	E	CORE	SECT.
5	2	4	1	8	A	3	3	6	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is gray to greenish-gray, yellowish-brown where oxidized; moderately to weakly altered. Plagioclase phenocrysts 10%, <4 mm, usually fresh, some are stained green or yellow; olivine phenocrysts 1%, <2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite with minor carbonate, silica and zeolite(?). Vesicles 1%, <0.5 mm, filled with carbonate and smectite. Veins are filled with smectite and carbonate and often oxidized.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 110-112 cm
 Stable Inclination 10.71 x 10⁻³
 +13.0°

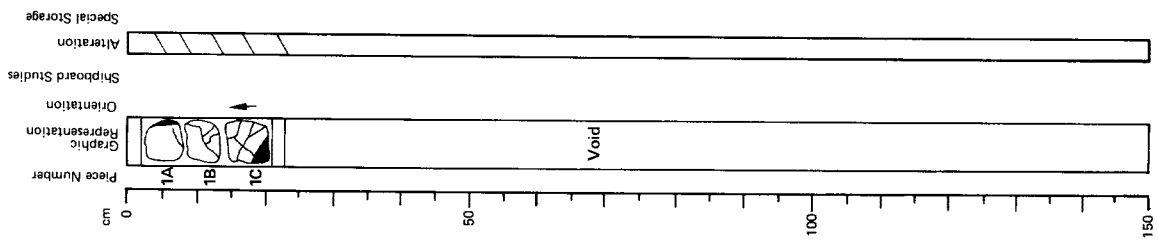


LEG	SITE	H O L	CORE	SECT.
5 2 4	1 8 A	3	3	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phyrlic pillow basalt. Basalt is gray to greenish-gray, yellowish-brown where oxidized; moderately altered. Plagioclase phenocrysts 10%, <6 mm, fresh or stained green, yellow or black; olivine phenocrysts 1%, <2 mm, completely altered to smectite. Groundmass is fine-grained to glassy, glass selvages altered to smectite. Vesicles 1%, <0.5 mm, filled with smectite and carbonate. Veins are filled with smectite and minor pyrite; some are oxidized.



LEG	SITE	H O E	CORE	SECT.
5 2 4	1 8 A	3	4	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

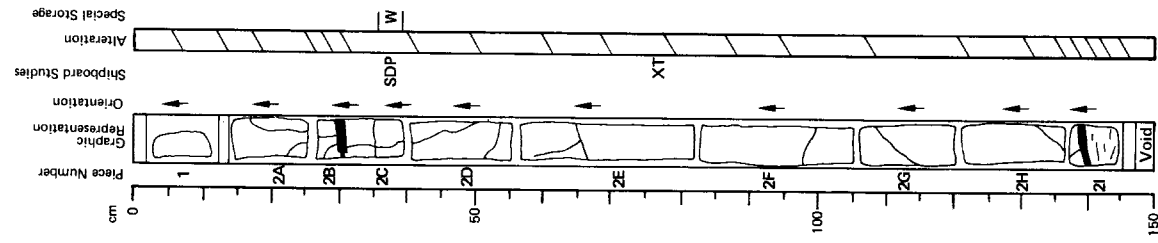
Moderately phyrlic pillow basalt. Basalt is gray to greenish-gray, reddish to yellowish-brown where oxidized; moderately altered. Plagioclase phenocrysts 8-10%, <6 mm, fresh or stained green, yellow or black; olivine phenocrysts 2%, <2 mm, completely altered to smectite and minor zeolite(?). Vesicles 1%, <0.5 mm, filled with smectite and carbonate. Veins are filled with smectite and minor pyrite; some are oxidized.

Thin Section Description

Location: 77 cm
 Texture: porphyritic - intergranular
 Phenocrysts: olivine <1%, <0.8 mm, euhedral; plagioclase 8%, <3.5 mm, subhedral
 Groundmass: olivine 2%, <0.2 mm, euhedral; plagioclase 40%, <0.2 mm, subhedral; clinopyroxene 40%, <0.2 mm, anhedral; opaque 2%, 0.03 mm, granular; glass 8%, interstitial
 Vesicles: <1%, <0.2 mm, round
 Alteration: olivine to smectite and carbonate; smectite fills vesicles

Shipboard Data

Bulk Analysis:	76-78 cm	Physical Property Data:	33-35 cm
SiO ₂	50.2	Vp (km/sec)	5.64
Al ₂ O ₃	18.0	Porosity (%)	5.1
Fe ₂ O ₃	8.13	Wet Bulk Density (g/cc)	2.825
MgO	6.48	Grain Density (g/cc)	2.92
CaO	13.3		
Na ₂ O	N.D.		
K ₂ O	0.02		
TiO ₂	1.18		
P ₂ O ₅	N.D.		
MnO	N.D.		
LOI	2.0		
H ₂ O*	0.88		
H ₂ O ⁻	N.D.		
CO ₂	0.10		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

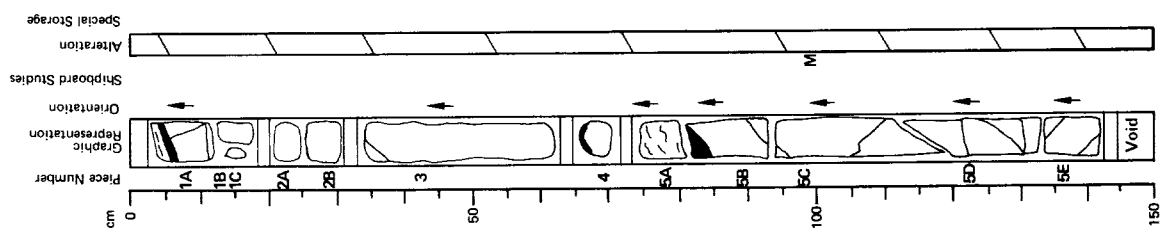


LEG	SITE	H O L E	CORE	SECT.
52	418A		34	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is gray to greenish-gray, weakly altered. Plagioclase phenocrysts 8-10%, <6 mm, fresh, often stained yellow, green or black; olivine phenocrysts 1%, <1.5 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite. Vesicles 1%, <0.5 mm, filled with carbonate and smectite. Veins are filled with smectite, carbonate and minor pyrite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 100-102 cm
 15.77 x 10⁻³
 Stable Inclination +19.6°



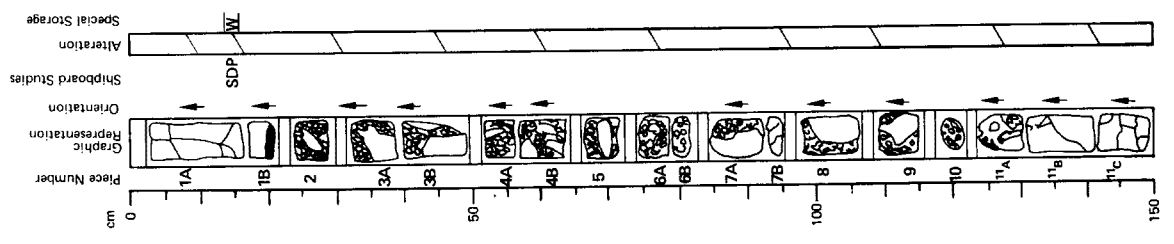
LEG	SITE	H O L E	CORE	SECT.
52	418A		34	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt and pillow breccia. Basalt is gray; weakly altered. Breccia is dark greenish-gray; highly altered. Basalt contains 10-12% of phenocrysts. Plagioclase phenocrysts 10%, <6 mm, fresh, often stained yellow, green or black; olivine phenocrysts 1%, <4 mm, altered to smectite, clinopyroxene phenocrysts <1%, <2 mm, subhedral, fresh. Groundmass is fine-grained to glassy; most glass selvages are altered to smectite but fresh glass is present at 20 cm. Breccia consists of crystalline basalt and altered sideromelane fragments in a matrix of dark green smectite, carbonate and minor zeolite(?).

Thin Section Description
 Location: 5 cm
 Texture: porphyritic - intersertal
 Phenocrysts: olivine 1%, <3.5 mm, euhedral; plagioclase 10%, <7 mm, euhedral, clinopyroxene <1%, <1.5 mm, rounded
 Groundmass: olivine 5%, <0.5 mm, euhedral; plagioclase 40%, <0.6 mm, laths; clinopyroxene 30%, <0.25 mm, subhedral; opaques 5%, 0.01 mm, euhedral; glass 8%
 Vesicles: 1%, <0.4 mm, round
 Alteration: olivine to smectite; smectite fills vesicles

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 13.15 cm
 4.14
 Porosity (%) 22.9
 Wet Bulk Density (g/cc) 2.41
 Grain Density (g/cc) 2.80

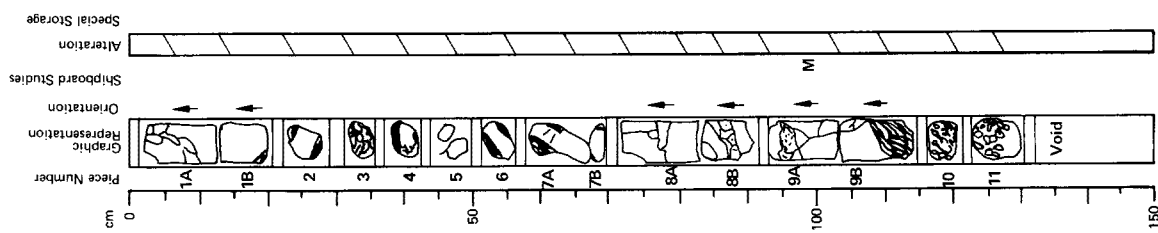


LEG	SITE	HOLE	CORE	SECT.
52	418A		34	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt and pillow breccia. Basalt is green to grayish-green; moderately altered. Breccia is dark greenish-gray; highly altered. Plagioclase phenocrysts 10%, <5 mm, fresh; olivine phenocrysts 3-4%, <1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are altered to smectite. Vesicles 2-3%, <5 mm, filled with carbonate and smectite. Veins are also filled with carbonate and smectite. Breccia consists mostly of altered glass fragments in a matrix of dark green smectite, carbonate and minor zeolite(?).

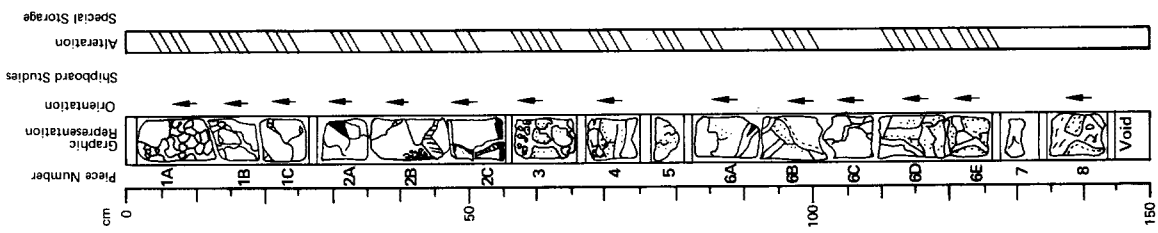
Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 99-101 cm 8.79 x 10⁻³
 Stable Inclination +14.7°



LEG	SITE	HOLE	CORE	SECT.
52	418A		34	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

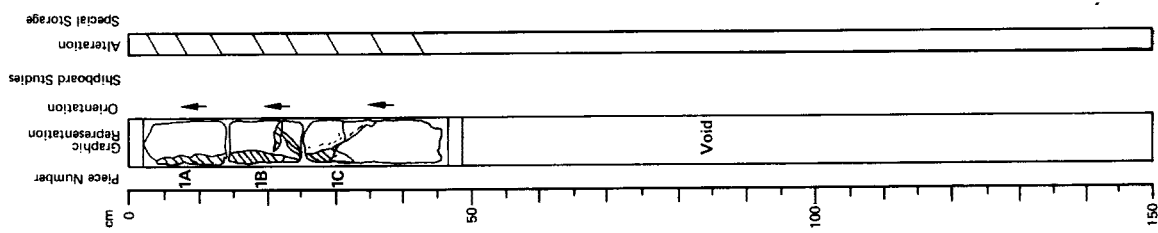
Visual Description
 Sparsely phryic pillow basalt and pillow breccia. Basalt is gray to greenish-gray; moderately altered. Breccia is dark greenish- to brownish-gray; highly altered. Plagioclase phenocrysts 5%, <2 mm, stained and partly altered to smectite; olivine phenocrysts 1%, <2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are altered to smectite. Breccia consists of crystalline basalt and altered sideromelane fragments in a matrix of dark green smectite and carbonate. Veins are also filled with smectite and carbonate.



LEG	SITE	HOLE	CORE	SECT.
52	418	A	34	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic pillow basalt. Basalt is gray to greenish gray; moderately altered. Plagioclase phenocrysts 5-7%, <7 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite. Groundmass is fine-grained. A large vein along the side of the core is filled with smectite and carbonate.

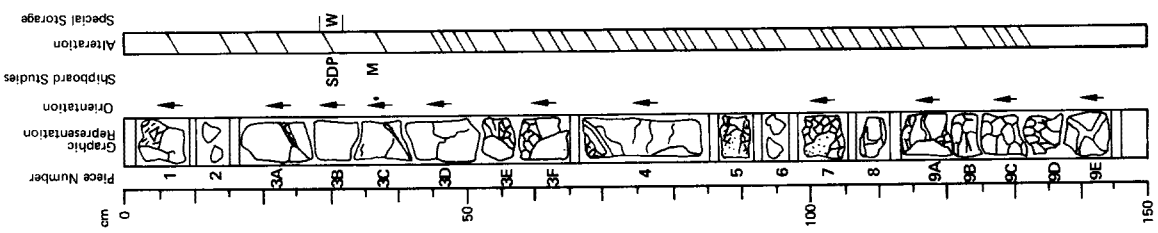


LEG	SITE	HOLE	CORE	SECT.
52	418	A	35	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic basalt and minor breccia. Basalt is dark gray, yellowish-brown where oxidized along fractures and in breccia; moderately altered. Plagioclase phenocrysts 5%, <3 mm, partly altered to smectite; olivine phenocrysts 1%, <3 mm, altered to smectite. Groundmass is finely crystalline in the upper part to aphanitic in the lower. Breccia consists of aphanitic basalt fragments in a matrix of smectite and carbonate. Sparse veins are filled with carbonate and smectite.

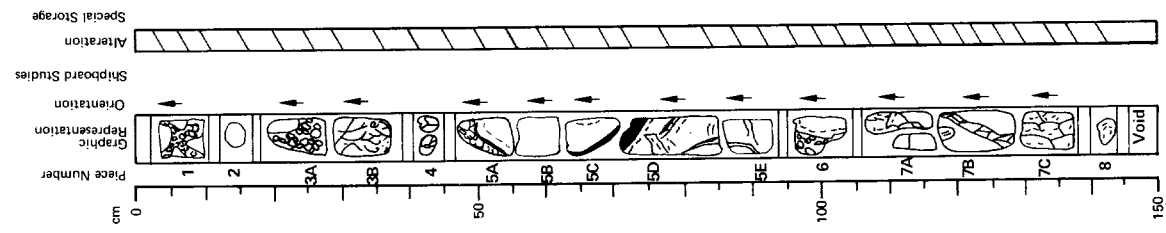
Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 34-36 cm 6.25 x 10⁻³
 Stable Inclination +21.1°
 Physical Property Data:
 Vp (km/sec) 30-32 cm 5.10
 Porosity (%) 9.7
 Wet Bulk Density (g/cc) 2.88
 Grain Density (g/cc) 2.85



LEG	SITE	HOLE	CORE	SECT.
52	418A	A	35	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyric pillow basalt and minor breccia. Basalt is dark gray, brown or yellow where oxidized along veins and in breccias; moderately to highly oxidized. Plagioclase phenocrysts 8%, <6 mm, partly altered to smectite; olivine phenocrysts 1%, <2 mm, completely altered to smectite. Groundmass is aphanitic to glassy; glass selvages are completely altered to smectite. Veins are common throughout, filled with smectite and carbonate. Breccias are broken pillow fragments or hyaloclastites in which the glass has been altered to smectite.

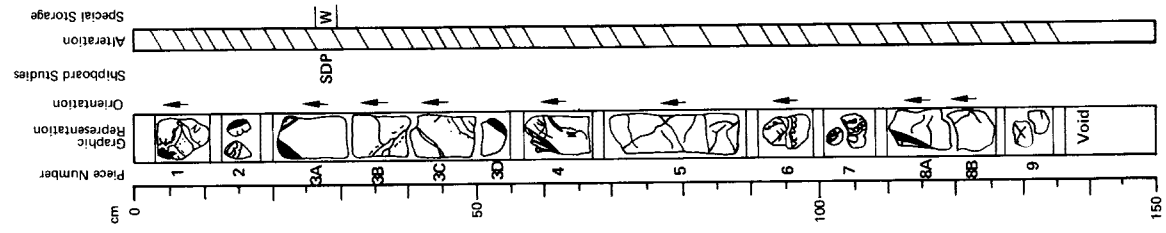


LEG	SITE	HOLE	CORE	SECT.
52	418A	A	35	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyric pillow basalt with minor breccia. Basalt is dark gray, brown to yellowish-brown where oxidized along fractures; highly oxidized and altered. Plagioclase phenocrysts 7%, <6 mm, partly altered to smectite; olivine phenocrysts 1%, <2 mm, completely altered to smectite. Groundmass is aphanitic to glassy; glass selvages are completely altered to smectite, carbonate, silica and zeolite(?). Vesicles 1%, <1 mm, filled with smectite and carbonate. Veins are locally present, filled with smectite. Breccia consists of broken pillow fragments in which the glass has been completely altered to smectite.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 29-31 cm
 Porosity (%) 5.21
 Wet Bulk Density (g/cc) 7.2
 Grain Density (g/cc) 2.72
 2.85



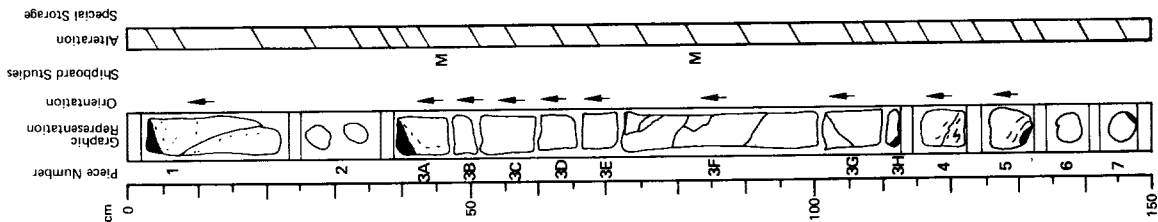
20.3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

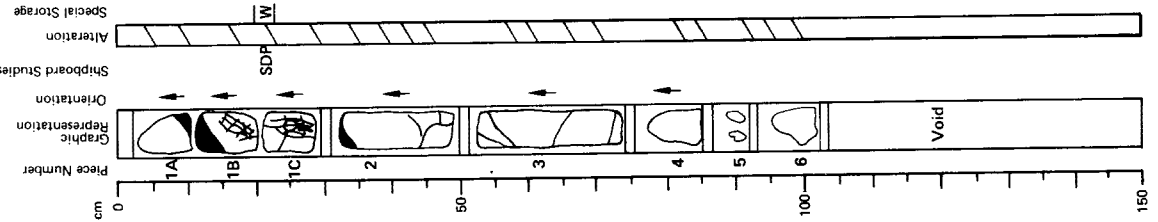
LEG	SITE	HOLE	CORE	SECT.
5	2418A		3	5
			4	

Visual Description
 Moderately phryic pillow basalt. Basalt is dark gray, locally yellowish-brown where oxidized along fractures; moderately altered. Plagioclase phenocrysts 10-15%, <8 mm, locally discolored to blue-green, yellow or brown; olivine phenocrysts 1%, <2 mm, completely altered to smectite. Groundmass is very fine-grained to glassy; glass selvages are completely replaced by smectite, silica and zeolite(?). Vesicles 1%, <0.5 mm, partly filled with smectite and carbonate.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 81-83 cm 13.45 x 10⁻³
 Stable Inclination 8.76 x 10⁻³ +24.9°
 +18.6°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Moderately phryic pillow basalt. Basalt is dark gray to greenish-gray; moderately altered. Plagioclase phenocrysts 10%, <8 mm, sometimes stained green, yellow or brown; olivine phenocrysts 1%, <3 mm, completely altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, subhedral, fresh. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite, silica and zeolite(?). Vesicles 1%, filled with smectite and carbonate.

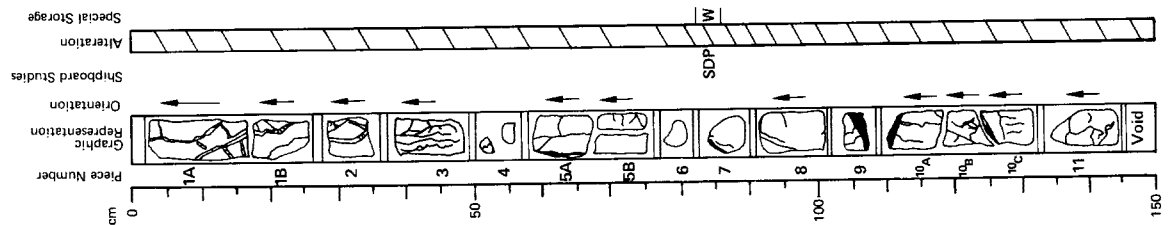
Shipboard Data
 Physical Property Data:
 V₂ (km/sec) 21-23 cm 4.54
 Porosity (%) 13.8
 Wet Bulk Density (g/cc) 2.535
 Grain Density (g/cc) 2.79

LEG	SITE	HOLE	CORE	SECT.
5	2418A		36	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is dark gray except for brown staining along fractures and vesicles. Plagioclase phenocrysts 5% < 10 mm. Fresh; olivine phenocrysts 1%, < 1 mm. Altered to smectite. Groundmass is fine grained to glassy with "blotchy" texture altered to smectite. Vesicles 1% in piece 1, rare elsewhere, filled with smectite and carbonate. Veinlets are scattered throughout, filled with smectite and carbonate; many partly oxidized.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 81.83 cm
 Vp (km/sec) 5.29
 Porosity (%) 7.3
 Wet Bulk Density (g/cc) 2.74
 Grain Density (g/cc) 2.87

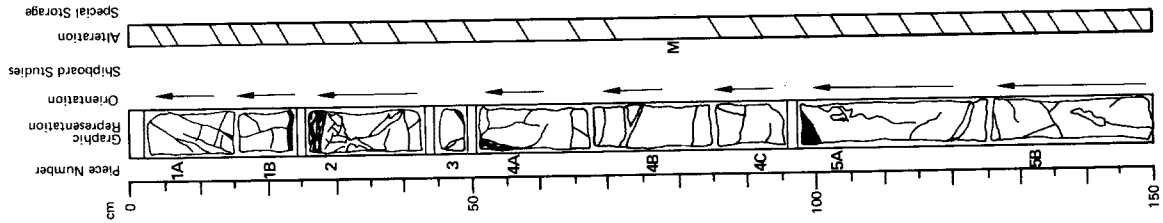


LEG	SITE	HOLE	CORE	SECT.
5	2418A		36	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is dark gray except for brown staining in piece 5A; moderately altered. Plagioclase phenocrysts 5-8% < 4 mm. Fresh; olivine phenocrysts 1%, < 1 mm. Altered to smectite. Groundmass is fine grained to glassy with "blotchy" texture in piece 4; glass selvages are altered to amorphous. Vesicles 1%, < 1 mm, filled with carbonate and zeolite(?); carbonate filled wig occurs in piece 5B.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 75.77 cm
 Stable Inclination 6.03 x 10⁻³
 +19.2°



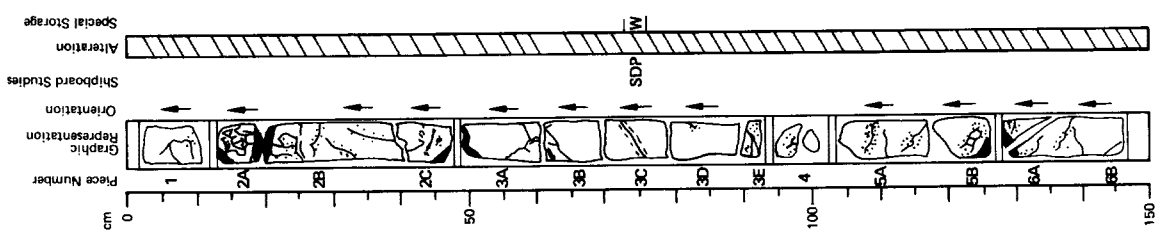
290

LEG	SITE	HOLE	CORE	SECT.
52	418A	LEA	36	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyrlic pillow basalt and minor breccia. Basalt is dark gray except for brown staining along with moderately altered. Plagioclase phenocrysts 6% < 6 mm, fresh, olivine phenocrysts 1-2%, < 5 mm, altered to smectite. Groundmass is fine-grained to glassy, mottled in piece 6; glass selvages are altered to smectite. Vesicles < 1% < 1 mm, filled with carbonate. Numerous veins are filled with brown and green amesbite and carbonate, many somewhat oxidized. Pyrite is present in piece 6. Breccia in piece 2 was formed by close fracturing of the basalt without rotation of the fragments.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 71-73 cm
 Porosity (%) 5.86
 Wet Bulk Density (g/cc) 4.8
 Grain Density (g/cc) 2.815
 2.91



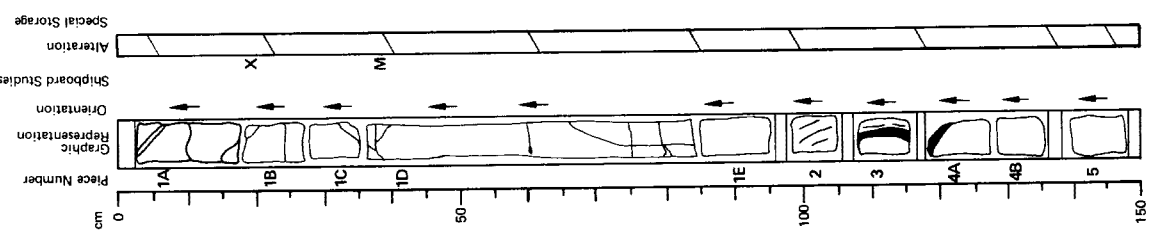
LEG	SITE	HOLE	CORE	SECT.
52	418A	LEA	36	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is dark gray except for brown staining in pieces 3 and 4; weakly altered. Plagioclase phenocrysts 10%, < 6 mm, slightly glassy, otherwise fresh; olivine phenocrysts 1%, < 2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are altered to smectite, carbonate and zeolite(?). Vesicles 1%, filled with amesbite and carbonate.

Shipboard Data
 Bulk Analysis: 18-20 cm
 SiO₂ 49.5
 Al₂O₃ 17.3
 Fe₂O₃ 8.32
 MgO 6.41
 CaO 13.6
 Na₂O N.D.
 K₂O 0.01
 TiO₂ 1.17
 P₂O₅ N.D.
 MnO N.D.
 LOI 2.0
 H₂O⁺ 0.98
 H₂O⁻ N.D.
 CO₂ 0.07
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

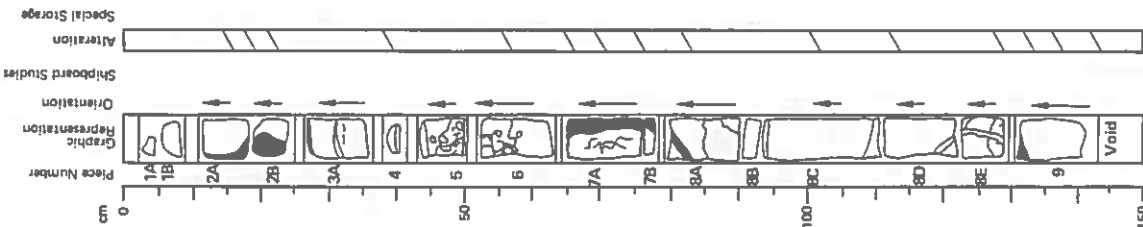
Magnetic Data:
 NRM Intensity (emu/cc) 37-39 cm
 Stable Inclination 25.45 x 10⁻³
 +21.9°



LEG	SITE	HOLE	CORE	SECT.
5	2418	A	3	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phytic pillow basalt and minor breccia. Basalt is dark gray except for brown staining along fractures, particularly in pieces 1-3; weakly to moderately altered. Plagioclase pl. + trocysts 5-8%, <4 mm, fresh, olivine phenocrysts 1%, <1 mm, altered to smectite. Vesicles <1%, <1 mm, filled with smectite. Basalt is highly fractured, veins filled with smectite, carbonate and zeolite(?) are common. Minor interpillow breccia occurs on top of piece 8.

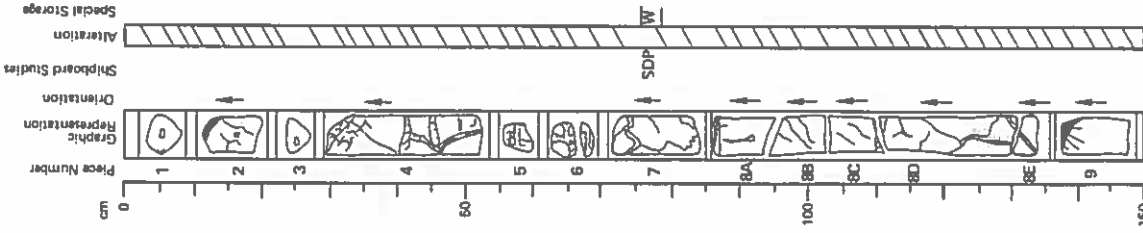


LEG	SITE	HOLE	CORE	SECT.
5	2418	A	3	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly to moderately phytic pillow basalt. Basalt is mostly brown and red, locally medium to dark gray; highly altered. Plagioclase phenocrysts 5%, <8 mm, often chalky; olivine phenocrysts 1%, <1 mm, altered to smectite. Groundmass is fine grained to glassy; glass selvages are altered to smectite and carbonate. Numerous veinlets are present, filled with smectite and carbonate; often oxidized.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 3.37 x 10⁻³
 Stable Inclination +16.1°
 Physical Property Data:
 Vp (km/sec) 4.57
 Porosity (%) 11.8
 Wet Bulk Density (g/cc) 2.545
 Grain Density (g/cc) 2.78

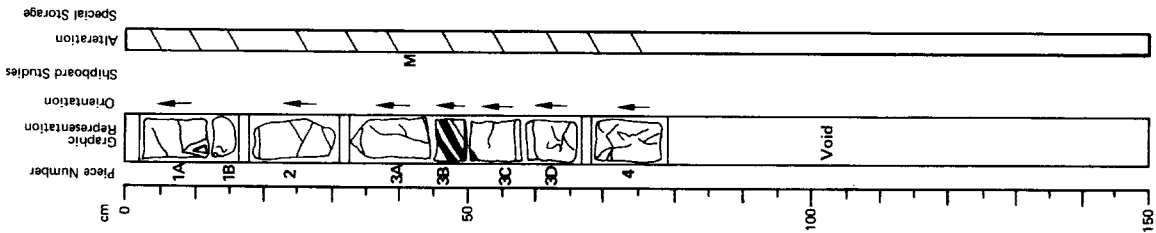


LEG	SITE	HOLE	CORE	SECT.
52	418	A	37	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is dark gray to reddish-brown in oxidized areas; moderately altered. Plagioclase phenocrysts 5-8%, <5 mm, often milky and soft; olivine phenocrysts 1% to 1.5 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are altered to minor carbonate. Numerous veinlets are present, filled with carbonate, iron oxides, smectite and quartz; many are oxidized.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 40-42 cm 10.82 x 10⁻³
 Stable Inclination +23.3°



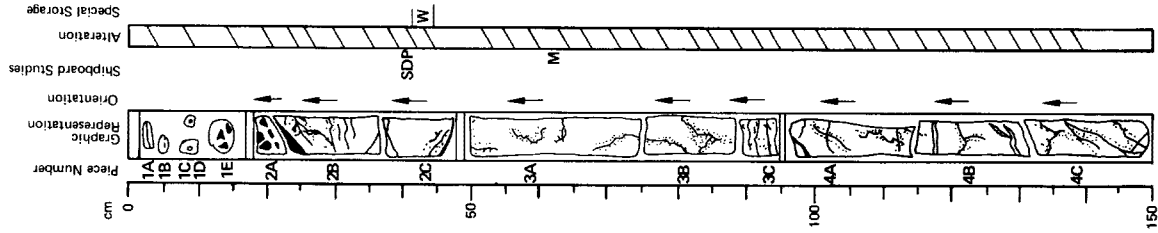
LEG	SITE	HOLE	CORE	SECT.
52	418	A	38	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phryic pillow basalt and minor hyaloclastic breccia. Basalt is dark gray except for brown staining along some fractures; moderately altered. Plagioclase phenocrysts 5%, <8 mm, somewhat chalky; olivine phenocrysts 1%, <2 mm, altered to smectite and iron oxides. Groundmass is fine-grained to glassy; glass selvages are altered to smectite. Vesicles are present in pieces 4A and 4B, <1%, round to irregular, filled with smectite, iron oxides and minor carbonate. Hyaloclastic breccia and some altered sediment occur in piece 1. Glass fragments in the breccia are altered to smectite, carbonate, silica and zeolite(?).

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 63-65 cm 12.26 x 10⁻³
 Stable Inclination +24.6°

Physical Property Data:
 Vp (km/sec) 38-41 cm 4.95
 Porosity (%) 8.7
 Wet Bulk Density (g/cc) 2.63
 Grain Density (g/cc) 2.81



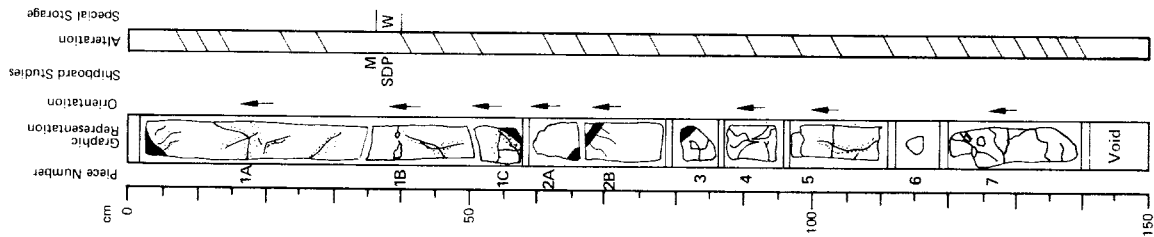
LEG	SITE	HOLE	CORE	SECT.
5	2418A		3	8

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparceyly phryic pillow basalt and minor hyaloclastic breccia. Basalt is dark gray with local mottling; weakly altered. Plagioclase phenocrysts 5% - 15 mm, often stained green, olivine phenocrysts 1% - 1 mm, altered to smectite and iron oxides. Groundmass is fine-grained to glassy; glass mostly altered to smectite but fresh glass locally preserved. Vascles 1% - 0.5 mm filled with carbonate. Veins are filled with smectite, carbonate and minor iron oxides. Glass breccia in piece 2A has matrix of smectite and (oolitic?).

Shipboard Data

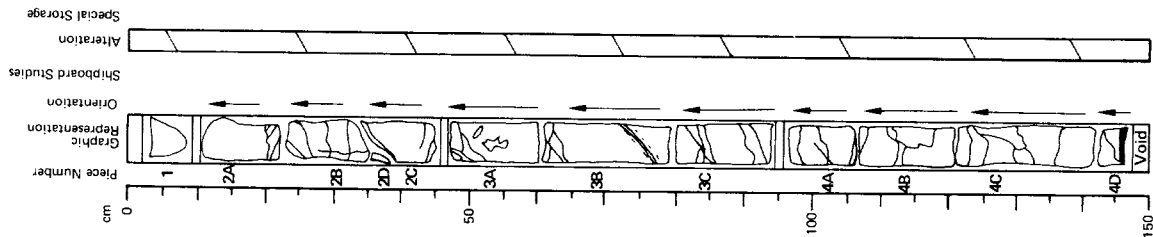
Magnetic Data
 NRM Intensity (emu/cm³) 34.36
 Stable Inclination 18.96°
 Physical Property Data:
 Vp (km/sec) 3.47
 Porosity (%) 1.2
 Wet Bulk Density (g/cm³) 2.27
 Grain Density (g/cm³) 2.65



LEG	SITE	HOLE	CORE	SECT.
5	2418A		3	8

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparceyly to moderately phryic pillow basalt. Basalt is dark gray except for minor staining along fractures; weakly altered. Plagioclase phenocrysts 4-8% - 4 mm, partly altered to green smectite; olivine phenocrysts 1% - 1.5 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages mostly altered to smectite but fresh glass occurs in piece 4D. Vascles 1% - 1 mm, filled with smectite and carbonate. Veinlets are filled with carbonate, smectite and quartz(?)
 Quartz filled vug occurs in pieces 2A and 2B.



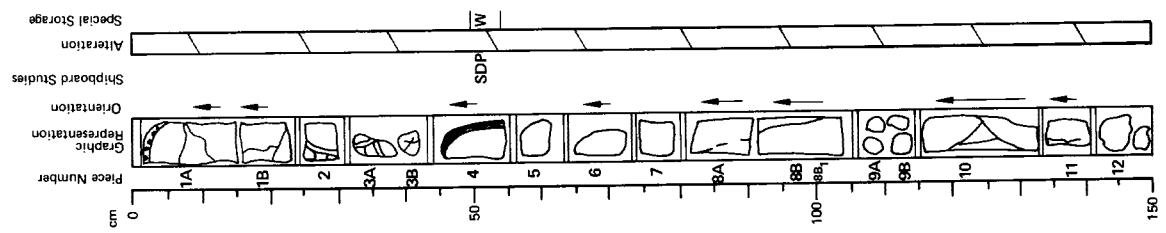
200

LEG	SITE	HOLE	CORE	SECT.
52	418	A	38	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely to moderately phyrlic pillow basalt. Basalt is dark gray except for brown staining along some fractures and veins; weakly altered. Plagioclase phenocrysts 5-7%, < 6 mm, fresh; olivine phenocrysts 1%, < 1 mm, completely altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly fresh. Vesicles 1%, < 0.5 mm, filled with smectite and carbonate. Veinlets are filled with carbonate and minor smectite.

Shipboard Data
 Physical Property Data: 49.51 cm
 γ_p (K/m²sec) 5.24
 Porosity (%) 7.3
 Wet Bulk Density (g/cc) 2.705
 Grain Density (g/cc) 2.83



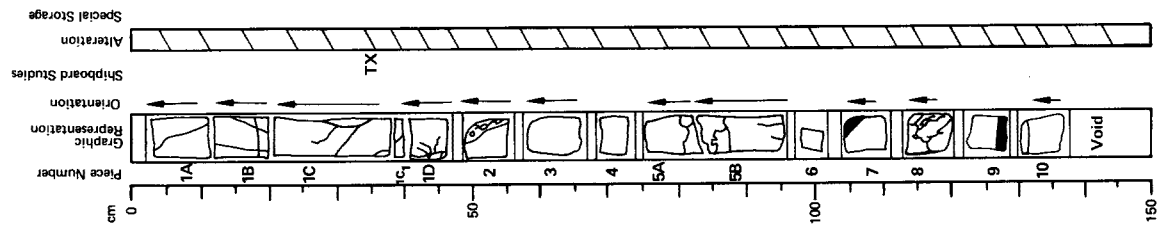
LEG	SITE	HOLE	CORE	SECT.
52	418	A	38	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is dark gray except for minor oxidation along veins; weakly altered. Plagioclase phenocrysts 3.8%, < 6 mm, some partly altered to smectite; olivine phenocrysts 1%, < 1.5 mm, altered to smectite. Groundmass is medium-grained to glassy, piece 1 shows downward decrease in grain size from medium grained at 28 cm to very fine-grained at 45 cm; glass selvages altered to smectite. Vesicles 1%, filled with smectite and carbonate. Veinlets are filled with smectite and minor quartz. Minor carbonate occurs in piece 8. Minor altered hyaloclastic breccia occurs in piece 2.

Thin Section Description
 Location: 35 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 1%, < 0.7 mm, euhedral; plagioclase 7%, < 2.5 mm, euhedral
 Groundmass: olivine 1%, 0.2 mm, subhedral; plagioclase 20%, < 0.3 mm, acicular; clinopyroxene 66%, radiating sheaves; opaques 5%, 0.01 mm, granular
 Vesicles: < 1%, < 0.5 mm, rounded
 Alteration: olivine to smectite and carbonate; smectite and carbonate fill vesicles

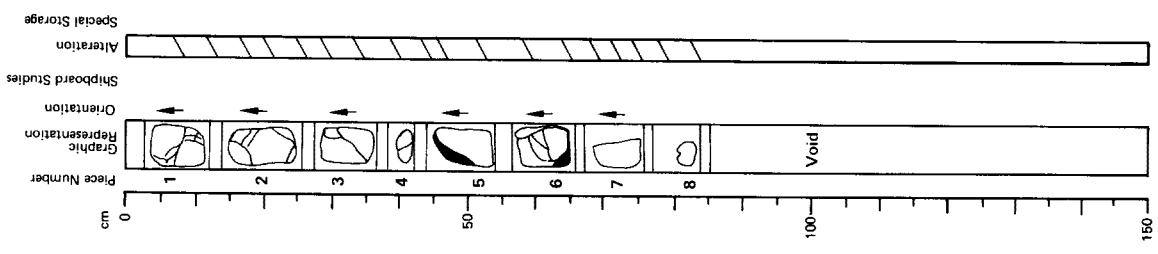
Shipboard Data
 Bulk Analysis: 34.36 cm
 SiO₂ 50.2
 Al₂O₃ 17.5
 Fe₂O₃ 8.90
 MgO 6.98
 CaO 12.7
 Na₂O N.D.
 K₂O 0.04
 TiO₂ 1.24
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.8
 H₂O* 0.88
 H₂O* N.D.
 CO₂ 0.06
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



LEG	SITE	HOLE	CORE	SECT.
52418A	3	8	6	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is dark gray except for brown staining along fractures; moderately altered. Plagioclase phenocrysts 7%, <6 mm, commonly stained yellow, black or blue-green; olivine phenocrysts 1%, <3 mm, completely altered to smectite. Groundmass is fine-grained to glassy; glass selvages are altered to smectite. Vesicles 1%, <0.5 mm, filled with smectite and carbonate. Veinlets are filled with smectite and carbonate.



LEG	SITE	HOLE	CORE	SECT.
52418A	3	9	1	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

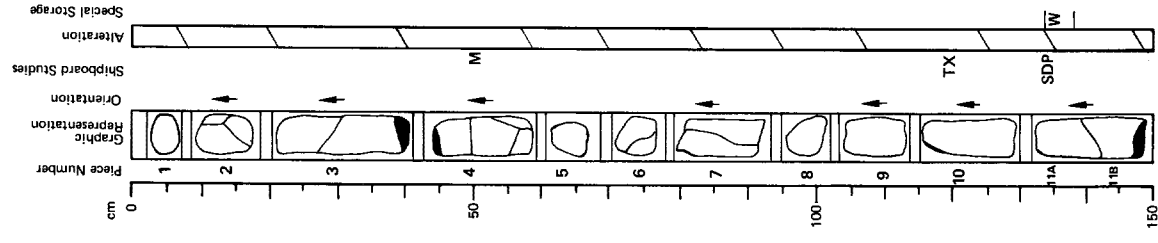
Visual Description
 Moderately phryic pillow basalt. Basalt is dark gray except where oxidized along veins; weakly altered. Plagioclase phenocrysts 10%, <4 mm, often stained black, green or yellow; olivine phenocrysts 1%, <1.5 mm, completely altered to smectite. Groundmass is very fine-grained to glassy; glass selvages are completely altered to smectite, carbonate, zeolite(?) and silica. Some pyrite occurs in pieces 9 and 10.

Thin Section Description

Location: 120 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine <1%, <0.8 mm, euhedral; plagioclase 7%, <3 mm, subhedral
 Groundmass: plagioclase 15%, <0.4 mm, acicular; clinopyroxene 72%, radiating aggregates; opaques 5%, 0.01 mm, granular
 Vesicles: 1%, <0.5 mm, round
 Alteration: olivine to carbonate; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 119-121 cm	Magnetic Data:	49.51 cm
SiO ₂ 50.0	NRM Intensity (emu/cc)	11.10 × 10 ⁻³
Al ₂ O ₃ 17.6	Stable Inclination	+28.2°
Fe ₂ O ₃ 8.84	Physical Property Data:	135-137 cm
MgO 6.99	V _p (km/sec)	5.67
CaO 13.7	Porosity (%)	5.2
N ₂ O N.D.	Wet Bulk Density (g/cc)	2.835
K ₂ O 0.08	Grain Density (g/cc)	2.92
TiO ₂ 1.24		
P ₂ O ₅ N.D.		
MnO N.D.		
LOI 1.7		
H ₂ O ⁺ 0.81		
H ₂ O ⁻ N.D.		
CO ₂ 0.70		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

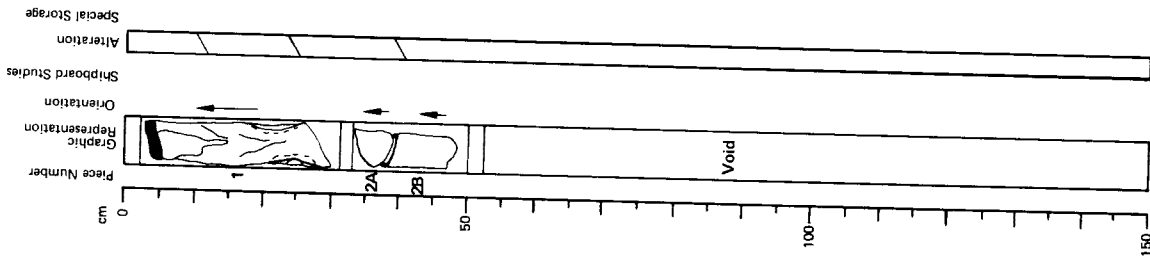


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L E	CORE	SECT.
5 2	4 1 8 A		3 9	2

Visual Description

Moderately phyrlic pillow basalt. Basalt is dark gray except for minor brown staining along oxidized veins; weakly altered. Plagioclase phenocrysts 10-12%, <5 mm, fresh; olivine phenocrysts 3%, <2 mm, altered to smectite. Groundmass is fine grained to glassy; glass spherules are mostly altered to smectite, carbonate and zeolite(?). Vesicles 1-2%, <1 mm, filled with smectite and carbonate.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L E	CORE	SECT.
5 2	4 1 8 A		4 0	1

Visual Description

Moderately phyrlic pillow basalt. Basalt is dark gray except for brown staining along fractures, particularly in piece 6; weakly to moderately altered. Plagioclase phenocrysts 7%, <4 mm, some times stained blue or green; olivine phenocrysts 1%, <2 mm, completely altered to smectite. Groundmass is very fine-grained to glassy; glass spherules are partly altered to smectite. Vesicles are chiefly in piece 4; 2%, filled with smectite and carbonate. Varieties are also filled with smectite and carbonate; one large vein is present in piece 4. A fragment of dark gray, bedded hyaloclastite occurs in piece 1.

Thin Section Description

Location: 35 cm

Texture: porphyritic - quench

Phenocrysts: olivine 1%, <2 mm, euhedral; plagioclase 12%, <2.5 mm, euhedral

Groundmass: olivine 2%, 0.2 mm, subhedral; plagioclase 25%, 0.6 mm, acicular; clinopyroxene 52%, poorly crystallized, radiating sheaves, opaque 7%, 0.01 mm, granular

Vesicles: 1%, 0.5 mm, round

Alteration: plagioclase partly to smectite and carbonate; olivine to smectite; carbonate fills vesicles

Shipboard Data

128-130 cm

36.64 x 10⁻³

+19.6°

NRM Intensity (emu/cc)

Stable Inclination

Physical Property Data:

Vp (km/sec)

Porosity (%)

Wet Bulk Density (g/cc)

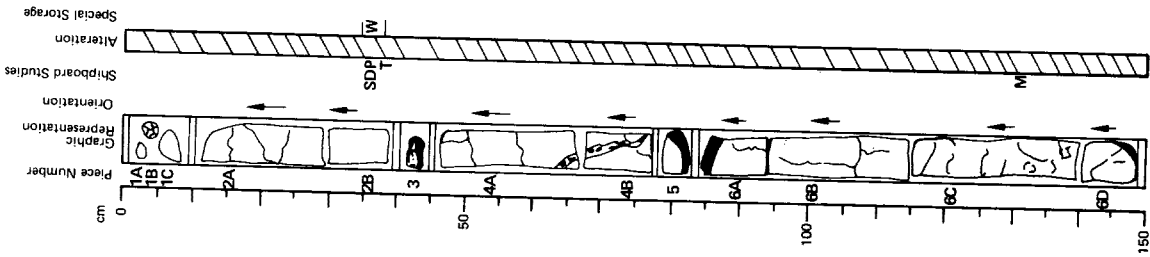
Grain Density (g/cc)

5.21

8.0

2.75

2.89



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5 2	4 1 8 A	E	4 0	2

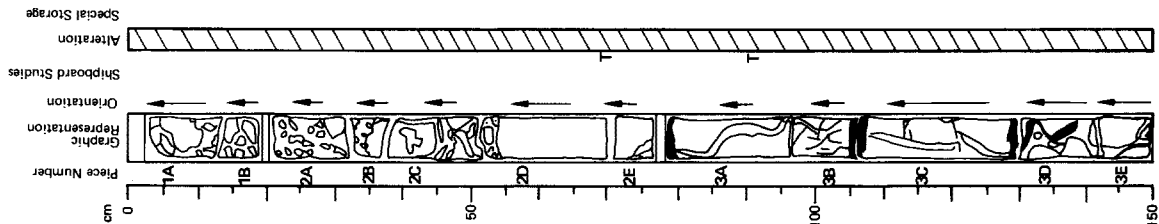
Visual Description
Moderately phryic pillow basalt and pillow breccia. Basalt is dark gray except for brown oxidized glass and brown staining along fractures, weakly to moderately altered. Plagioclase is very fine-grained to glassy; olivine phenocrysts 1%, <1 mm, completely altered to smectite. Olivine phenocrysts are altered to smectite. Vesicles <1%, <1 mm, filled with carbonates and white zeolite(?). A carbonate filled wig occurs in piece 2A. Pillow breccia consists of glassy and oxidized lithic basalt fragments in a dark green matrix of glass altered to smectite.

Thin Section Description

Location: 70 cm
Texture: porphyritic - quench
Phenocrysts: olivine 1%, <0.6 mm, euhedral; plagioclase 15%, <3 mm, euhedral
Groundmass: olivine 2%, <0.3 mm, subhedral; plagioclase 23%, <0.5 mm, acicular; clinopyroxene 52%, poorly crystallized, radiating sheaves; opaques 6%, <0.05 mm, granular
Vesicles: 1%, <0.5 mm, round
Alteration: olivine to smectite; plagioclase partly to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data

Location: 90 cm
Texture: porphyritic - quench
Phenocrysts: olivine 1%, <2 mm, euhedral; plagioclase 15%, <4 mm, euhedral
Groundmass: olivine 5%, <0.4 mm, subhedral; plagioclase 18%, <0.4 mm, acicular; clinopyroxene 61%, radiating sheaves, poorly crystallized
Vesicles: 2%, 0.3 mm, round
Alteration: plagioclase partly to zeolite(?) and carbonate; olivine and some matrix to carbonate and smectite; carbonate fills vesicles



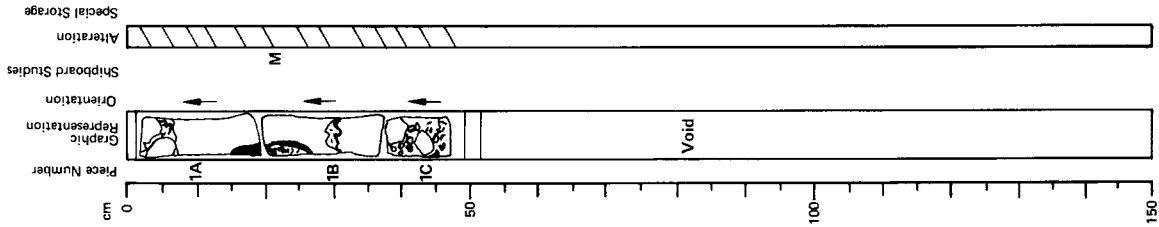
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5 2	4 1 8 A	E	4 0	3

Visual Description
Sparsely phryic pillow basalt and minor breccia. Basalt is dark gray, weakly altered. Plagioclase phenocrysts 5%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, completely altered to smectite. Groundmass is very fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1%, filled with smectite and carbonate. Minor sulfida occurs in piece 1B. Veins and veinlets are also filled with smectite and carbonate. Breccia in piece 1C consists of lithic basalt fragments in a matrix of altered glass.

Shipboard Data

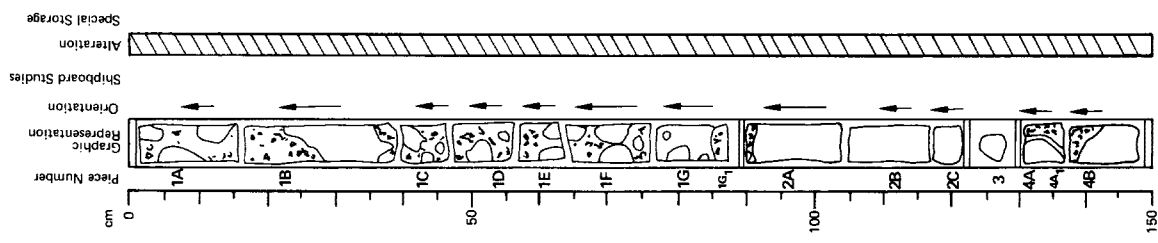
Magnetic Data:
NRM Intensity (emu/gc) 21-23 cm 19.16 x 10⁻³
Stable Inclination -74.0°



2014

LEG	SITE	HOLE	CORE	SECT.
5	2418A	4	1	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

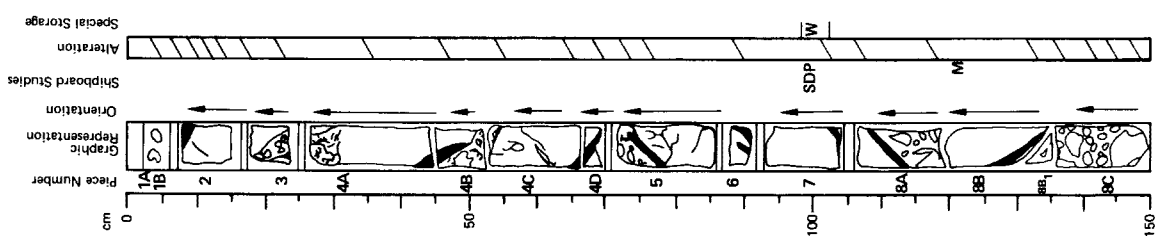


Visual Description

Broken pillow basalt breccia. Breccia clasts are dark gray, weakly altered. Breccia matrix is dark green; highly altered. Clasts are angular and range from a few millimeters to 30 cm across. Clasts consist of moderately phryic basalt with 10% plagioclase phenocrysts, < 5 mm, and 1-2% of olivine phenocrysts, < 1 mm, altered to smectite. Groundmass of the clasts is very fine-grained. Breccia matrix is dark green smectite presumably formed by alteration of glass.

LEG	SITE	HOLE	CORE	SECT.
5	2418A	4	1	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Moderately phryic pillow basalt breccia. Breccia clasts are dark gray, matrix is dark green; rock is weakly to moderately altered. Plagioclase phenocrysts 12-15%, < 6 mm; fresh; olivine phenocrysts 1% < 1.5 mm, altered to smectite. Olivine clasts are fine-grained to glassy; glass is partly altered to smectite. Vesicles < 1% filled with carbonate. Breccia matrix consists of dark green smectite presumably formed by alteration of glass.

Thin Section Description

Location: 40 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine < 1%, < 0.6 mm, euhedral; plagioclase 8%, < 8 mm, euhedral
 Groundmass: olivine 3%, < 0.3 mm, subhedral; plagioclase 40%, < 0.5 mm, acicular; clinopyroxene 43%, radiating sleeves; opaques 2%, 0.01, granular
 Vesicles: 4%, < 0.4 mm, round
 Alteration: olivine to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data

Bulk Analysis: 40-42 cm	Magnetic Data:	122-124 cm
SiO ₂ 49.7	NRM Intensity (emu/cc)	11.14 x 10 ⁻³
Al ₂ O ₃ 18.5	Stable Inclination	-81.3°
Fe ₂ O ₃ 8.82	Physical Property Data:	
MgO 5.50	Vp (km/sec)	98 cm
CaO 14.5	Porosity (%)	5.57
Nb ₂ O ₅ N.D.	Wet Bulk Density (g/cc)	5.9
K ₂ O 0.16	Grain Density (g/cc)	2.77
TiO ₂ 1.09		2.88
P ₂ O ₅ N.D.		
MnO N.D.		
LOI 2.3		
H ₂ O ⁺ 1.14		
H ₂ O ⁻ N.D.		
CO ₂ 0.69		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

LEG	SITE	HOLE	CORE	SECT.
5	418	A	4	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

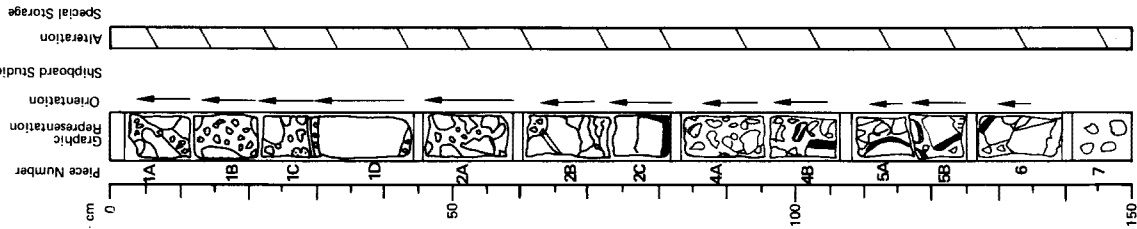
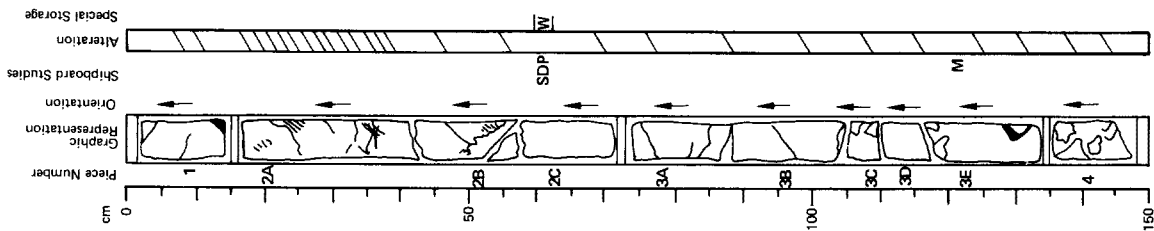
Visual Description

Broken pillow basalt breccia. Breccia clasts are dark gray to brown; weakly altered. Breccia matrix is dark green; highly altered. Clasts are angular, ranging from a few millimeters to 40 cm in diameter. Clasts are predominantly sparsely phryic lithic basalt and some glass. Clasts have 5% plagioclase phenocrysts, < 6 mm, fresh and 1% olivine phenocrysts, < 1 mm, altered to smectite. Groundmass of the clasts is variable, ranging from fine-grained to very fine-grained. Sparse vesicles are filled with carbonate, smectite and quartz. Veins and veinlets are filled with carbonate and smectite; pyrite occurs in piece 3B. Carbonate filled vugs are present in piece 2A. Breccia matrix is dark green smectite presumably formed by alteration of glass.

Shipboard Data

Magnetic Data:
 121.123 cm
 NRM Intensity (emu/cc) 4.09 x 10⁻³
 Stable Inclination +39.7°

Physical Property Data:
 Vp (km/sec) 62.64 cm
 Porosity (%) 4.14
 Wet Bulk Density (g/cc) 2.24
 Grain Density (g/cc) 2.36
 2.75



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	418	A	4	1

Visual Description

Broken pillow basalt breccia. Breccia fragments are various parts of pillows, some with glass rinds. Fragments are dark gray, weakly altered, angular and unsorted, ranging from a few millimeters to 15 cm across. Clasts are composed of moderately phryic basalt with 10-12% plagioclase phenocrysts, < 4 mm, fresh and 1% olivine phenocrysts, < 1 mm, altered to smectite. Groundmass of the clasts is very fine-grained to glassy; glass selvages are partly altered to smectite. Breccia matrix consists of dark green smectite presumably formed by alteration of glass. Matrix contains abundant pyrite.

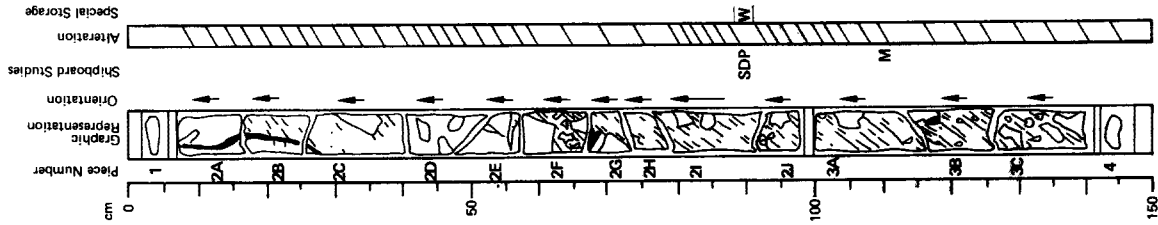
2006

LEG	SITE	H O L E	CORE	SECT.
5 2	4 1 1 8	A	4 2	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Broken pillow basalt breccia. Breccia fragments are various parts of pillows, some with glass rinds. Fragments are dark gray, weakly altered, angular, and range from a few millimeters to 10 cm across. Most fragments are composed of lithoidal basalt with 5% plagioclase phenocrysts and 1% olivine phenocrysts, now altered to smectite. Groundmass of the fragments is fine- to very fine-grained with some glass. Breccia matrix is dark green smectite, presumably formed by alteration of glass, with minor pyrite and carbonate. Veins are filled with smectite, carbonate and pyrite.

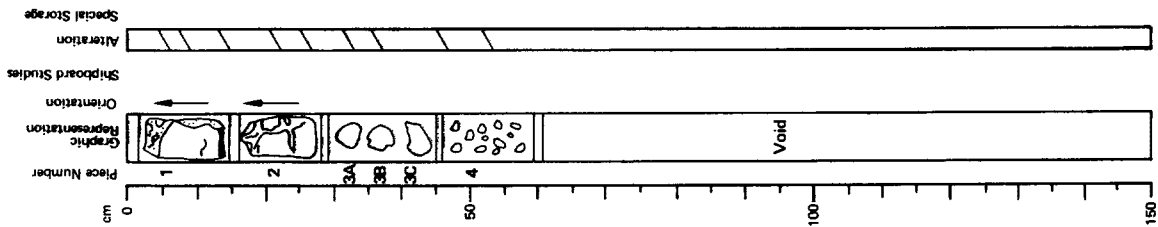
Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 110-112 cm
 Stable Inclination 0.867 x 10⁻³
 +29.3°
 Physical Property Data:
 Vp (km/sec) 88-90 cm
 Wet Bulk Density (g/cc) 4.75
 2.485



LEG	SITE	H O L E	CORE	SECT.
5 2	4 1 1 8	A	4 1	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Broken pillow basalt breccia. Breccia fragments are various parts of pillows, some with glass rinds. Fragments are dark gray, weakly altered, angular pieces of lithic basalt with 5-8% plagioclase phenocrysts and 1% olivine phenocrysts. Piece 1 is aphyric lithic basalt with a glass rind. Breccia matrix consists of dark green smectite, presumably formed from altered glass. Sparse vesicles in fragments are filled with carbonate and quartz. Small veinlets are filled with smectite and minor pyrite.



LEG	SITE	HOLE	CORE	SECT.
52	418	A	4	2

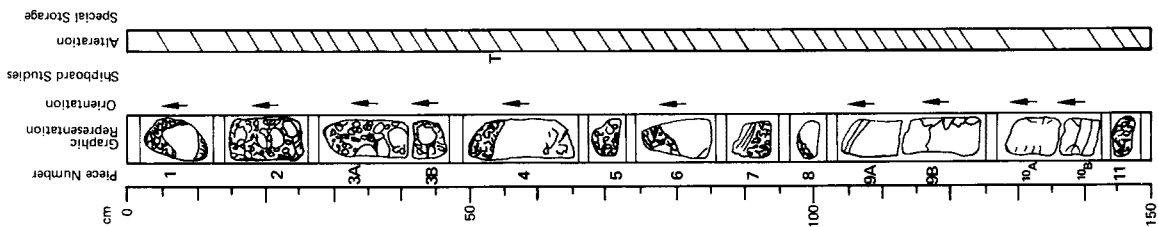
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Broken pillow basalt breccia. Breccia fragments consist of various parts of pillows, some with glass rinds. Fragments are angular, ranging from a few millimeters to 20 cm across. Most fragments are sparsely phytic lithic basalt with 8% plagioclase phenocrysts, <6 mm, and 1% olivine phenocrysts, <2 mm, altered to smectite. Groundmass of the clasts is very fine grained to glassy; all glass is altered to smectite. Breccia matrix consists of dark green smectite with minor carbonate. Thick veins of quartz and carbonate occur in pieces 7 and 9A. Piece 4 is probably a hyaloclastite fragment.

Thin Section Description

Location: 52 cm
 Texture: porphyritic - intergranular to intersertal
 Phenocrysts: plagioclase 20%, <4 mm, euhedral
 Groundmass: olivine 6%, <0.4 mm, subhedral; plagioclase 18%, <0.9 mm, subhedral; clinopyroxene 25%, <0.9 mm, granular; opaques 6%, 0.05 mm, granular; spinel <1%, <0.3 mm euhedral; glass 15%, altered
 Vesicles: 10%, <3 mm, round to irregular
 Alteration: olivine and some matrix to smectite and carbonate; smectite and carbonate fill vesicles



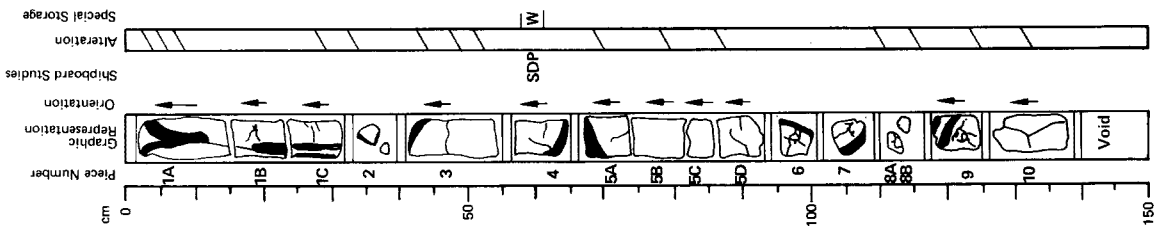
LEG	SITE	HOLE	CORE	SECT.
52	418	A	4	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely to moderately phytic pillow basalt. Basalt is gray to greenish-gray; weakly altered. Plagioclase phenocrysts 7%, <8 mm, slightly altered to smectite; olivine phenocrysts 1%, <2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Occasional veins are filled with carbonate, smectite and minor pyrite. Piece 1 has an internal glassy margin, presumably formed by water entering a fissure in hot rock. Piece 8A is a poorly sorted lithic sandstone with carbonate cement.

Shipboard Data

Physical Property Data:
 Vp (km/sec) 59-61 cm
 Porosity (%) 5.52
 Wet Bulk Density (g/cc) 6.7
 Grain Density (g/cc) 2.775
 2.89



231

LEG	SITE	HOLE	CORE	SECT.
52	418	A	42	5

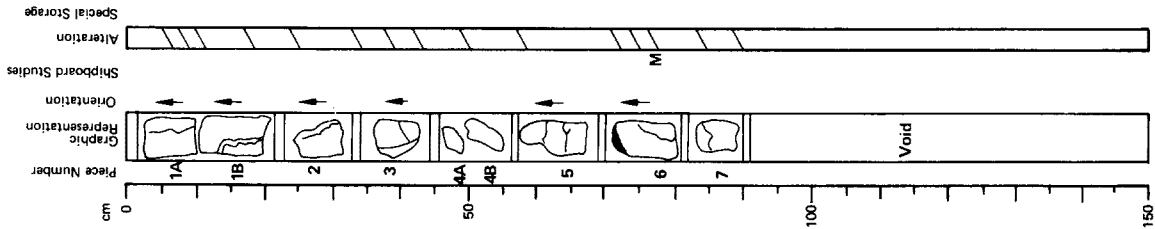
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Sparsely to moderately phyrlic pillow basalt. Plagioclase phenocrysts 5-7%, <10 mm, partly altered to green smectite; olivine phenocrysts 1%, <2 mm, altered to smectite and carbonate. Groundmass is fine-grained to glassy; glass selvages are altered to green smectite. Scattered veinlets are filled with smectite, carbonate, and in piece 6, pyrite.

Shipboard Data

Location: 90 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 3%, <3 mm, euhedral; plagioclase 15%, <5 mm, euhedral
 Groundmass: plagioclase 30%, <0.5 mm, acicular; clinopyroxene 44%, radiating sheaves; opaques 5%, 0.02 mm, granular; spinel <1%, 0.2 mm, euhedral
 Vesicles: 3%, <0.4 mm, round
 Alteration: olivine and groundmass to smectite and carbonate; smectite and carbonate fill vesicles



LEG	SITE	HOLE	CORE	SECT.
52	418	A	42	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

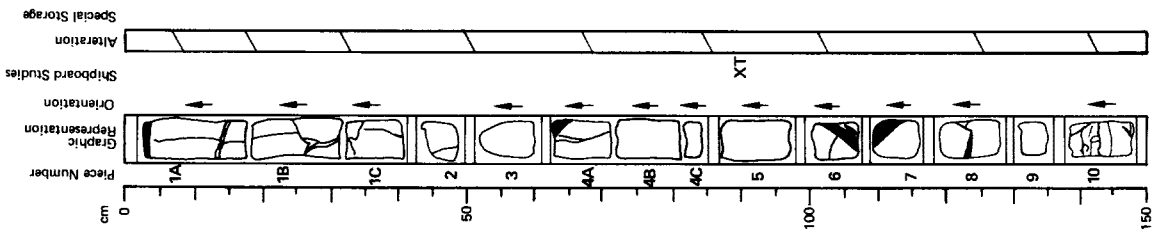
Moderately phyrlic pillow basalt. Basalt is dark gray with little or no staining; weakly altered. Plagioclase phenocrysts 10%, <8 mm, often discolored to blue-green or yellow; olivine phenocrysts 2%, <2 mm, altered to smectite and carbonate. Groundmass is very fine-grained to glassy; fresh glass is present in many selvages. Vesicles 1%, <1 mm, filled with smectite and carbonate. A 3 cm-thick vein of carbonate, smectite and zeolite(?) occurs in piece 10.

Thin Section Description

Location: 90 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 3%, <3 mm, euhedral; plagioclase 15%, <5 mm, euhedral
 Groundmass: plagioclase 30%, <0.5 mm, acicular; clinopyroxene 44%, radiating sheaves; opaques 5%, 0.02 mm, granular; spinel <1%, 0.2 mm, euhedral
 Vesicles: 3%, <0.4 mm, round
 Alteration: olivine and groundmass to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data

SiO₂ 49.8
 Al₂O₃ 18.4
 Fe₂O₃ 9.0
 MgO 5.40
 CaO 14.3
 Na₂O N.D.
 K₂O 0.02
 TiO₂ 0.99
 P₂O₅ N.D.
 MnO N.D.
 LOI 2.0
 H₂O⁺ 0.95
 H₂O⁻ N.D.
 CO₂ 0.13
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

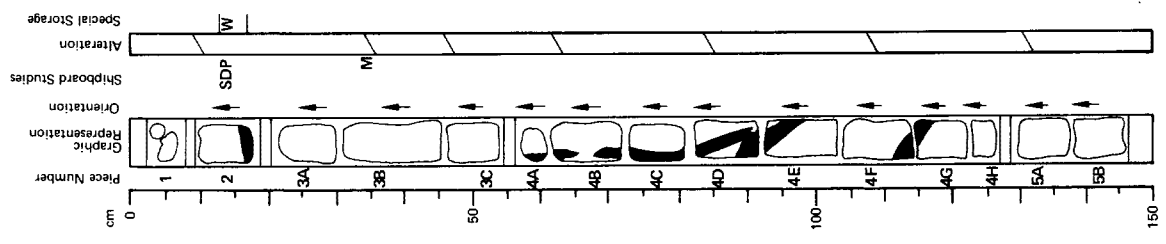


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
52	418A		43	1

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium to dark gray with minor brown staining along veins, weakly altered. Plagioclase phenocrysts 12%, < 6 mm, stained green near veins, olivine phenocrysts 2%, < 2 mm, altered to smectite and carbonate, clinopyroxene phenocrysts 1%, < 1 mm, < 1 mm, fresh. Groundmass is fine-grained to glassy, glass selvages are fresh, < 1% < 1 mm, filled with carbonate. Smectite and carbonate fill fractures, etc. Minor pyrite. A smectite-carbonate vein or fragment of sediment is adjacent to the glass selvage in piece 4D.

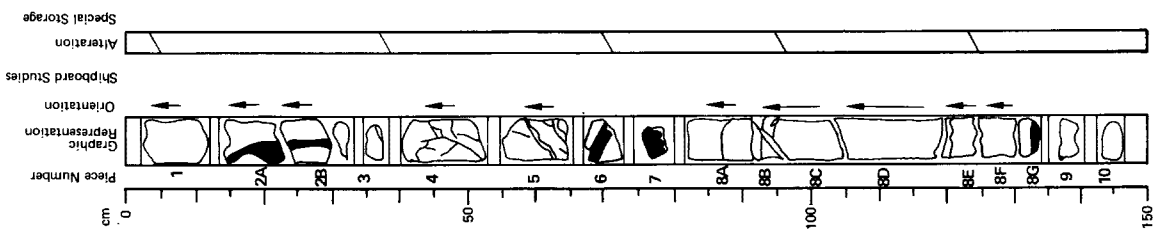
Shipboard Data
 30-32 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 14.43 x 10⁻³
 Stable Inclination -34.7°
 Physical Property Data:
 Vp (km/sec) 5.77
 Wet Bulk Density (g/cc) 2.83



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
52	418A		43	2

Visual Description
 Moderately to highly phyrlic pillow basalt. Basalt is medium to dark gray with little or no staining along fractures, relatively fresh. Plagioclase phenocrysts 15-18%, < 7 mm, fresh, olivine phenocrysts 2%, < 2 mm, altered to smectite. Groundmass is fine-grained to glassy, most glass selvages are altered to smectite but fresh glass is present in pieces 8G and 9. Vesicles < 1%, filled with smectite. Scattered veins are filled with carbonate and quartz. Minor amounts of altered sediment occur next to glass selvages.



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LEG	SITE	HOLE	CORE	SECT.
52	418	A	43	4C

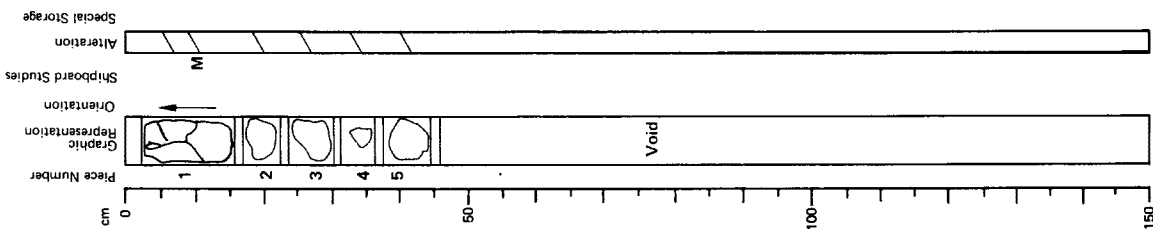
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phryic pillow basalt. Basalt is medium to dark gray with minor staining along fractures; weakly altered. Plagioclase phenocrysts 12-15%, < 7 mm; olivine phenocrysts 3%, < 2 mm, altered to smectite. Groundmass is fine-grained. Occasional veins are filled with carbonate and smectite.

Shipboard Data

Magnetic Data:
 10-12 cm
 NRM Intensity (emu/cc) 23.26 x 10⁻³
 Stable Inclination -31.2°

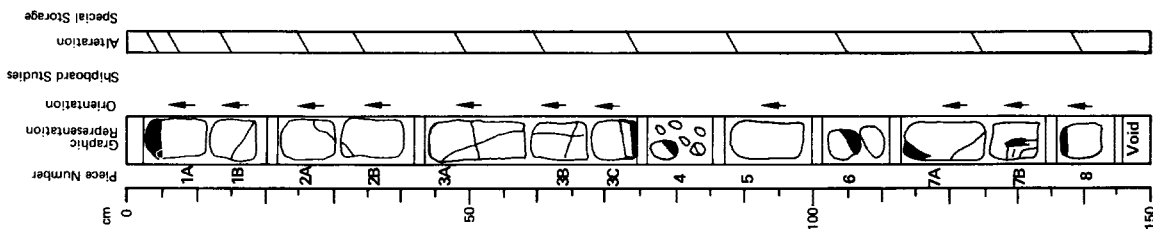


LEG	SITE	HOLE	CORE	SECT.
52	418	A	43	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phryic pillow basalt. Basalt is medium to dark gray with minor brown staining along veins; weakly altered. Plagioclase phenocrysts 12%, < 8 mm, occasionally stained bluish-green; olivine phenocrysts 2%, < 2 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 2 mm, rounded, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly fresh. Vesicles < 1%, < 1 mm, filled with carbonate. Veinlets are filled with smectite and carbonate.

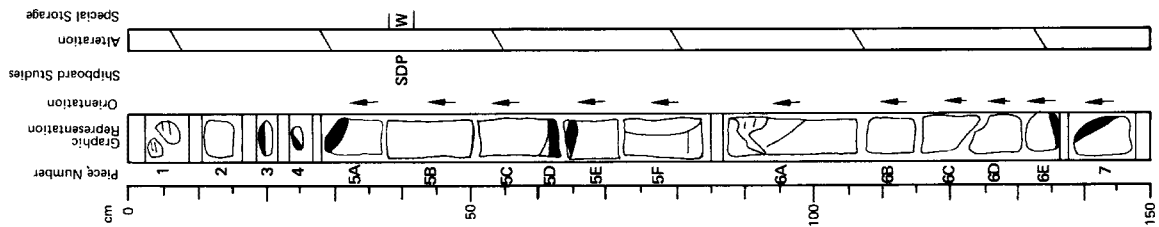


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5 2	4 1 8 A	4 4	4 4	1 1

Visual Description
 Basalt is medium to dark gray with little or no staining along fractures; relatively fresh. Plagioclase phenocrysts 15% < 8 mm, fresh, elongate to subhedral with rounded selvages; olivine phenocrysts 1-2% < 2 mm, altered to smectite; clinopyroxene phenocrysts < 1% < 2 mm, rounded, sometimes in clots with plagioclase, fresh. Groundmass is fine grained to glassy; glass selvages are mostly fresh. Occasional veins are filled with smectite and carbonate.

Shipboard Data
 Physical Property Data: 43.45 cm
 Vp (km/sec) 5.69
 Porosity (%) 4.7
 Wet Bulk Density (g/cc) 2.825
 Grain Density (g/cc) 2.89



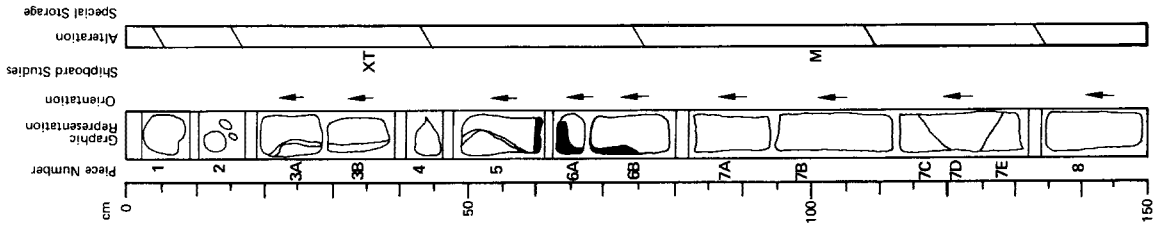
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5 2	4 1 8 A	4 4	4 4	2 2

Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray with very minor staining; relatively fresh. Plagioclase phenocrysts 8-10% < 8 mm, fresh; olivine phenocrysts 1-2% < 2 mm, mostly fresh with minor alteration to smectite; clinopyroxene phenocrysts < 1% < 2 mm, rounded, fresh. Groundmass is fine grained to glassy; glass selvages are mostly fresh. Vesicles < 1%, partly filled with carbonate and smectite. Occasional veins are also filled with carbonate and smectite.

Thin Section Description
 Location: 35 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 3% < 1 mm, euhedral; plagioclase 10% < 2 mm, euhedral
 Groundmass: olivine 5%, 0.2 mm, anhedral; plagioclase 40%, 0.5 mm, acicular; clinopyroxene 37% < 0.3 mm, anhedral to radiating sheaves; opaques 5%, 0.01 mm, granular; spinel < 1%, 0.2 mm, euhedral
 Vesicles: < 1%, < 0.2 mm, round
 Alteration: olivine and minor groundmass to smectite; smectite and carbonate fill vesicles

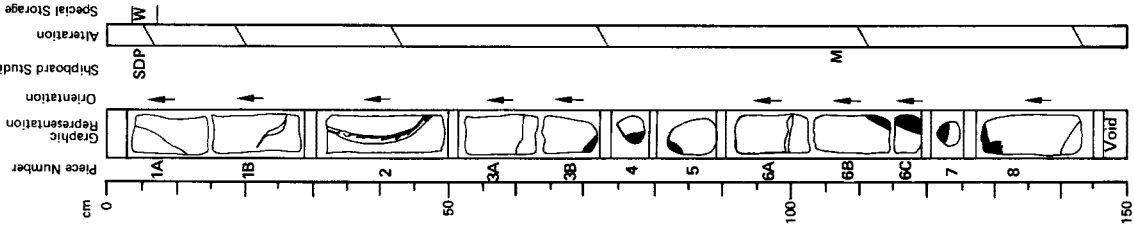
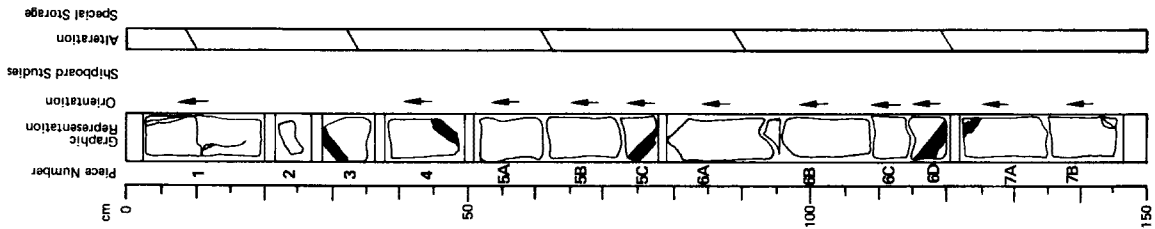
Shipboard Data
 Bulk Analysis: 34.36 cm
 Magnetic Data: 99-101 cm
 SiO₂ 50.1 NRM Intensity (emu/cc) 17.15 x 10⁻³
 Al₂O₃ 16.2 Stable Inclination +27.4°
 Fe₂O₃ 9.54
 MgO 7.87
 CaO 13.2
 Na₂O N.D.
 K₂O 0.03
 TiO₂ 1.07
 P₂O₅ N.D.
 MnO N.D.
 LOI 1.5
 H₂O⁺ 0.77
 H₂O⁻ N.D.
 CO₂ 0.05
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



LEG	SITE			CORE			SECT.
52	41	8A	4	4	4	4	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Highly phryic pillow basalt. Basalt is medium to dark gray with little or no staining along fractures; relatively fresh. Plagioclase phenocrysts 20%, < 10 mm, fresh; olivine phenocrysts 1%, < 2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly fresh with only minor alteration to smectite. Occasional veins are filled with smectite and carbonate. Piece 2 is probably altered sediment composed of smectite, carbonate and quartz.



LEG	SITE			CORE			SECT.
52	41	8A	4	4	4	4	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 10-12%, < 8 mm, fresh, sometimes intergrown with olivine; olivine phenocrysts 2.3%, < 2 mm, partly altered to smectite; clinopyroxene phenocrysts < 1%, < 1 mm, rounded, fresh. Groundmass is fine-grained to glassy; glass selvages are very fresh. Rare vesicles are filled with smectite.

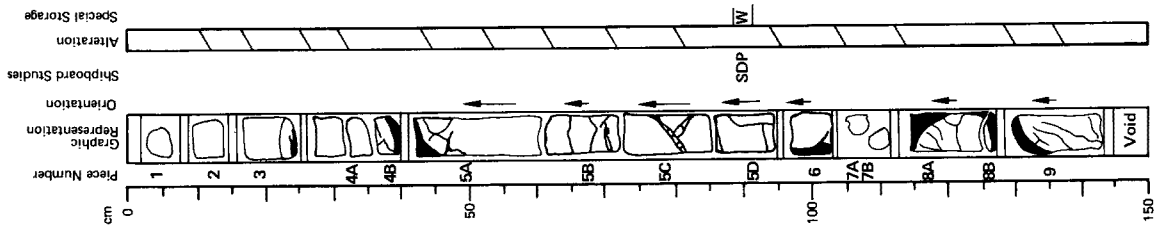
Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 105-107 cm
Stable Inclination 26.28 x 10⁻³
-29.4°
Physical Property Data:
Vp (km/sec) 4.6 cm
Porosity (%) 5.64
Wet Bulk Density (g/cc) 6.2
Grain Density (g/cc) 2.765
2.89

LEG	SITE	HOLE	CORE	SECT.
52	418A	4	5	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyric pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 7%, <6 mm, fresh; olivine phenocrysts 1-2%, <4 mm, partly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly fresh. Veins are filled with carbonate and smectite; minor pyrite in pieces 5 and 9.

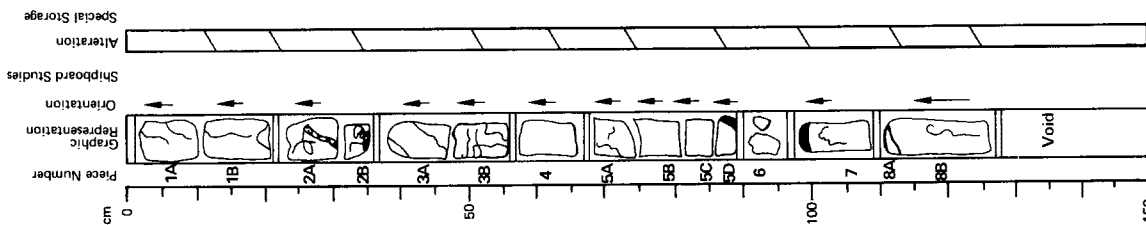
Shipboard Data
 Physical Property Data:
 Vp (km/sec) 86-88 cm
 Wet Bulk Density (g/cc) 5.73
 2.785



LEG	SITE	HOLE	CORE	SECT.
52	418A	4	4	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyric pillow basalt. Basalt is medium to dark gray; moderately altered. Plagioclase phenocrysts 5%, unevenly distributed, <10 mm, fresh; olivine phenocrysts 1-2%, <4 mm, altered to smectite and carbonate; clinopyroxene phenocrysts 1-2%, <4 mm, partly fresh. Groundmass is fine-grained to glassy; glass selvages are altered to smectite. Vesicles <1%, filled with carbonate and smectite. Veins and veinlets are common, filled with smectite and carbonate.



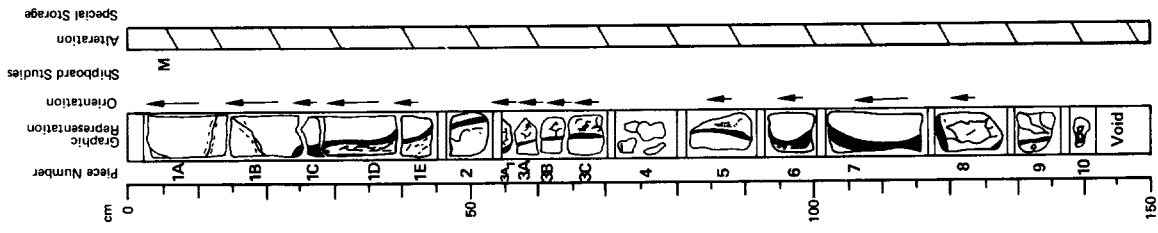
314

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
5	2418	A	4	5
			2	

Visual Description
 Moderately phryic pillow basalt and minor hyaloclastic breccia. Basalt is mostly medium to dark gray, dark green where glass is altered; moderately altered. Plagioclase phenocrysts 10-13%, <7 mm, fresh; olivine phenocrysts 2-3%, <2 mm, mostly altered to smectite but some still fresh; clinopyroxene phenocrysts <1%, <1.5 mm, rounded, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly replaced by smectite but some fresh glass is present. Vesicles <1%, <0.05 mm, filled with smectite. Narrow veinlets are filled with smectite, carbonate and pyrite. Breccia is composed of glass siliers in a dark green smectite matrix.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 4-6 cm 22.42 x 10⁻²
 Stable Inclination -35.0°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

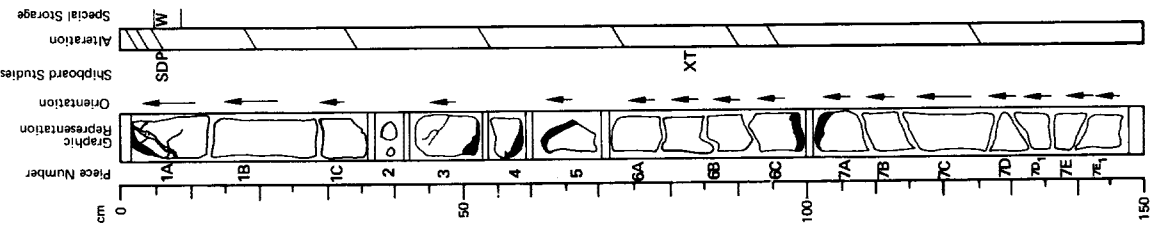
LEG	SITE	H O E	CORE	SECT.
5	2418	A	4	5
			3	

Visual Description
 Aphyric to moderately phryic pillow basalt. Basalt is mostly medium to dark gray; relatively fresh. Plagioclase phenocrysts 0-10%, <13 mm, usually fresh but with minor green staining; olivine phenocrysts 1%, <2 mm, partly altered to smectite. Aphyric zones are cores of pillows. Groundmass is fine-grained to glassy; glass selvages are mostly fresh with only minor alteration to smectite. Occasional veinlets are filled with smectite, carbonate and minor pyrite.

Thin Section Description
 Location: 84 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 2%, 0.6 mm, euhedral; plagioclase 5%, <2 mm, euhedral
 Groundmass: olivine 2%, <0.2 mm, subhedral; plagioclase 20%, 0.2 mm, acicular; clinopyroxene 65%; poorly crystallized, radiating sheaves, opaques 5%, 0.01 mm, granular
 Vesicles: 1%, <0.2 mm, round
 Alteration: olivine and groundmass to smectite and carbonate; carbonate fills vesicles

Shipboard Data
 Bulk Analysis: 82-84 cm
 SiO₂ 49.0
 Al₂O₃ 15.2
 Fe₂O₃ 9.75
 MgO 6.94
 CaO 15.5
 Na₂O N.D.
 K₂O 0.17
 TiO₂ 1.17
 P₂O₅ N.D.
 MnO N.D.
 LOI 3.4
 H₂O⁺ 1.0
 H₂O⁻ N.D.
 CO₂ 2.43
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Physical Property Data:
 Vp (km/sec) 7-9 cm 5.63
 Porosity (%) 5.0
 Wet Bulk Density (g/cc) 2.79
 Grain Density (g/cc) 2.89



LEG	SITE	HOLE	CORE	SECT.
52	418A	4	5	4

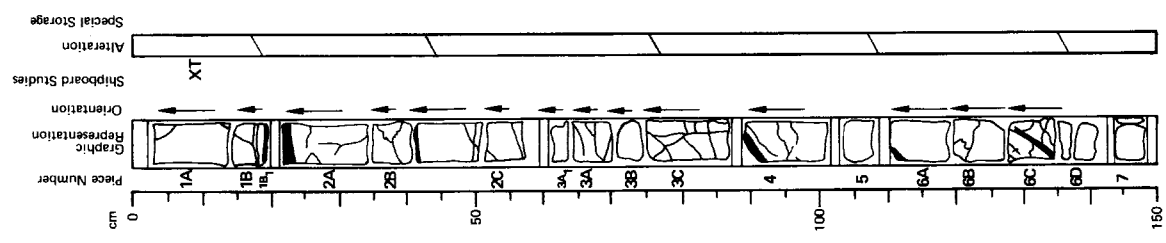
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 8-14%, <6 mm, some partly altered to smectite; olivine phenocrysts 2%, <3 mm, mostly altered to smectite; clinopyroxene phenocrysts <1%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages partly altered to smectite and fresh glass is present in most pieces. Vesicles <1%, <1 mm, filled with carbonate and smectite. Numerous veinlets are filled with smectite, carbonate and minor pyrite.

Thin Section Description
 Location: 10 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 5%, <1 mm, euhedral; plagioclase 16%, <4 mm, euhedral; spinel <1%, 0.7 mm subhedral
 Groundmass: olivine 3%, 0.2 mm, subhedral; plagioclase 25%, 0.4 mm, acicular; clinopyroxene 32%, poorly crystallized sheaves; opaques 3%, 0.02 mm, granular; glass 15%, devitrified
 Vesicles: 1%, 0.2 mm, irregular to round
 Alteration: olivine partly to smectite and carbonate; groundmass to carbonate; carbonate fills vesicles

Shipboard Data
 Bulk Analysis: 9-11 cm

SiO ₂	49.2
Al ₂ O ₃	17.1
Fe ₂ O ₃	9.28
MgO	6.65
CaO	14.2
Na ₂ O	N.D.
K ₂ O	0.03
TiO ₂	1.04
P ₂ O ₅	N.D.
MnO	N.D.
LOI	2.4
H ₂ O ⁺	0.82
H ₂ O ⁻	N.D.
CO ₂	0.72
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

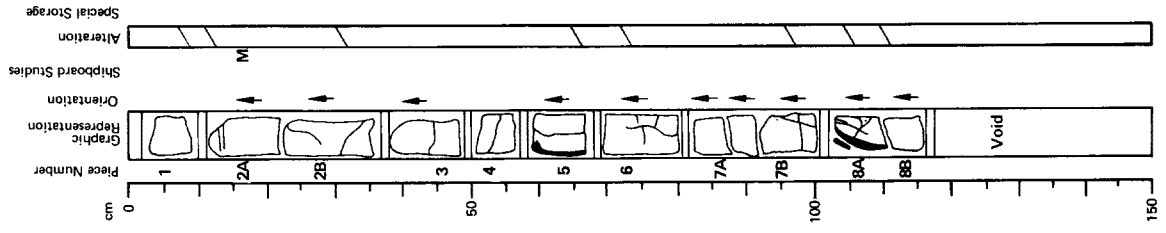


LEG	SITE	HOLE	CORE	SECT.
52	418A	4	5	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium to dark gray with minor green staining; weakly altered. Plagioclase phenocrysts 7%, <12 mm, mostly fresh, some stained green; olivine phenocrysts 1%, <2 mm, mostly altered to smectite, relatively fresh in piece 3. Groundmass is fine-grained to glassy; glass selvages mostly fresh with minor alteration to smectite. Vesicles <1%, chiefly in piece 2, irregularly distributed, filled with smectite and carbonate. Occasional veinlets are filled with smectite and rare pyrite.

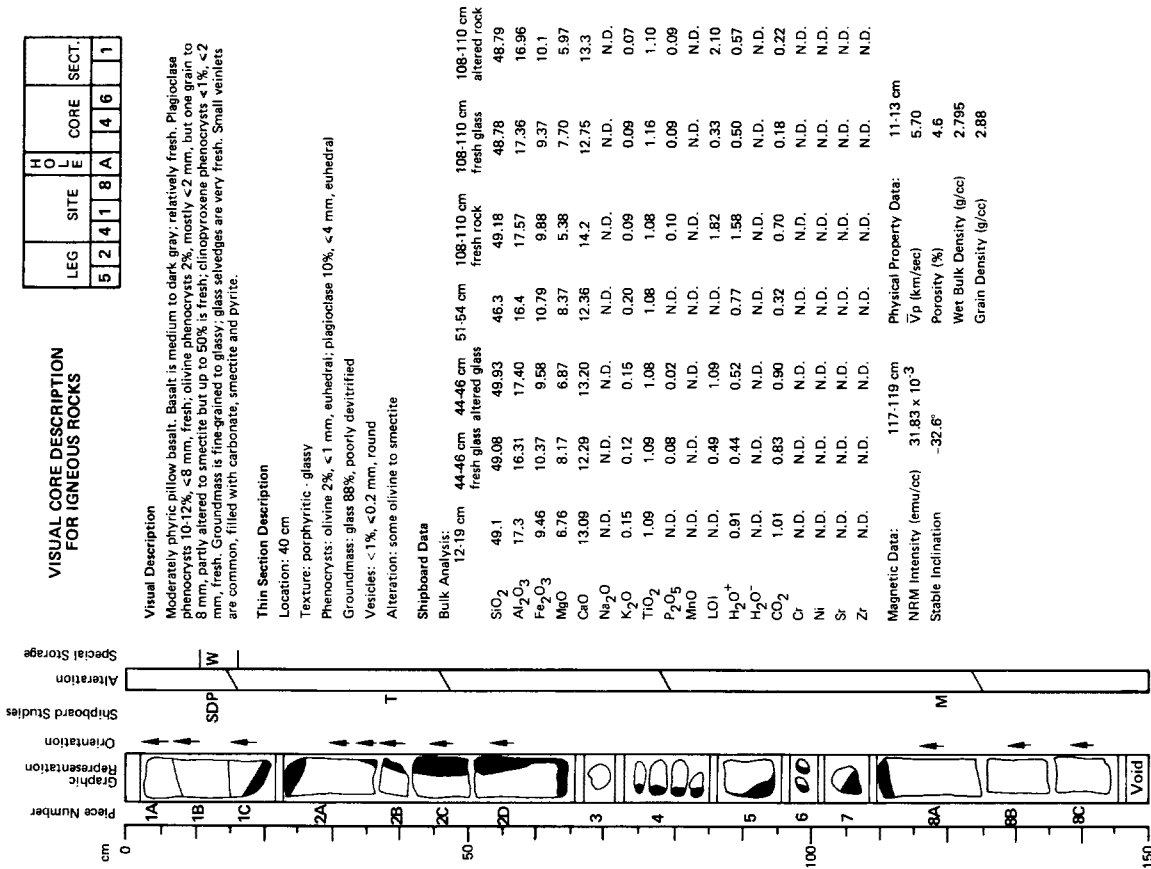
Shipboard Data
 Magnetic Data: 15-17 cm
 NRM Intensity (emu/cc) 21.97 x 10⁻³
 Stable Inclination -33.8°



2360

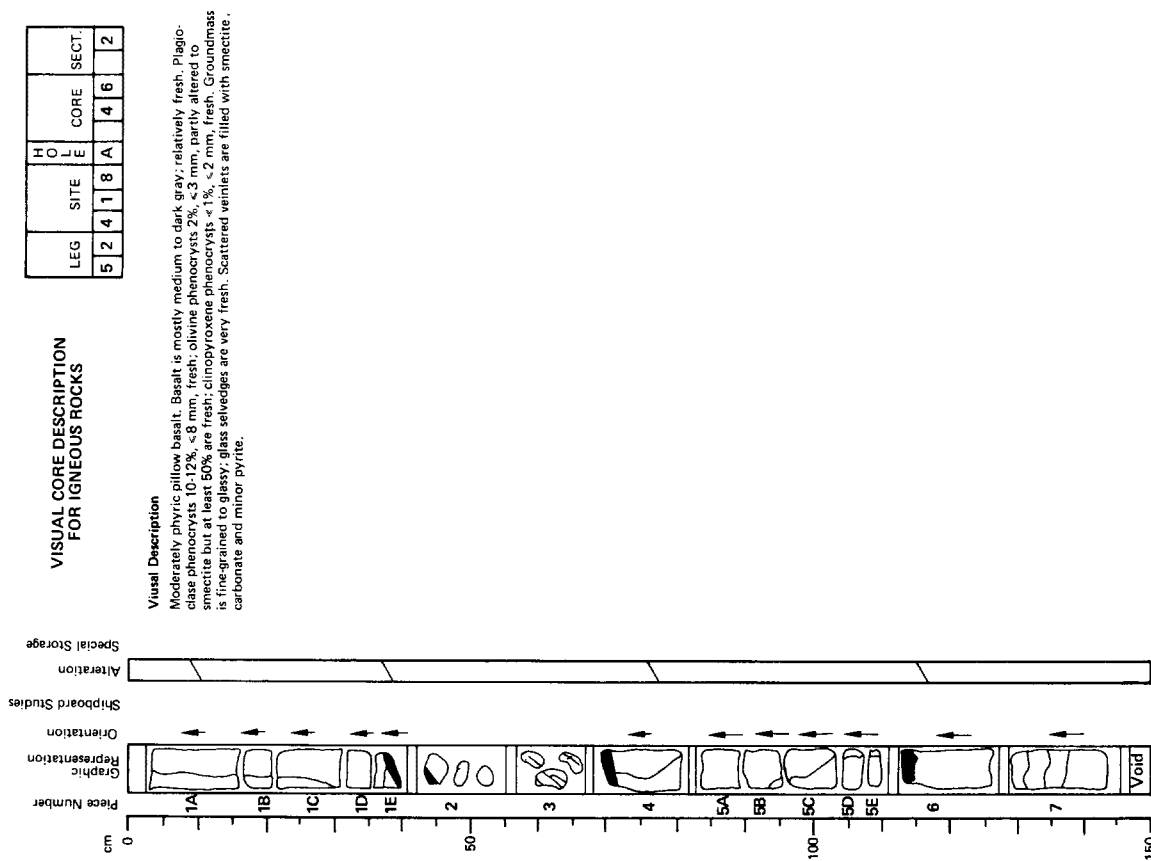
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

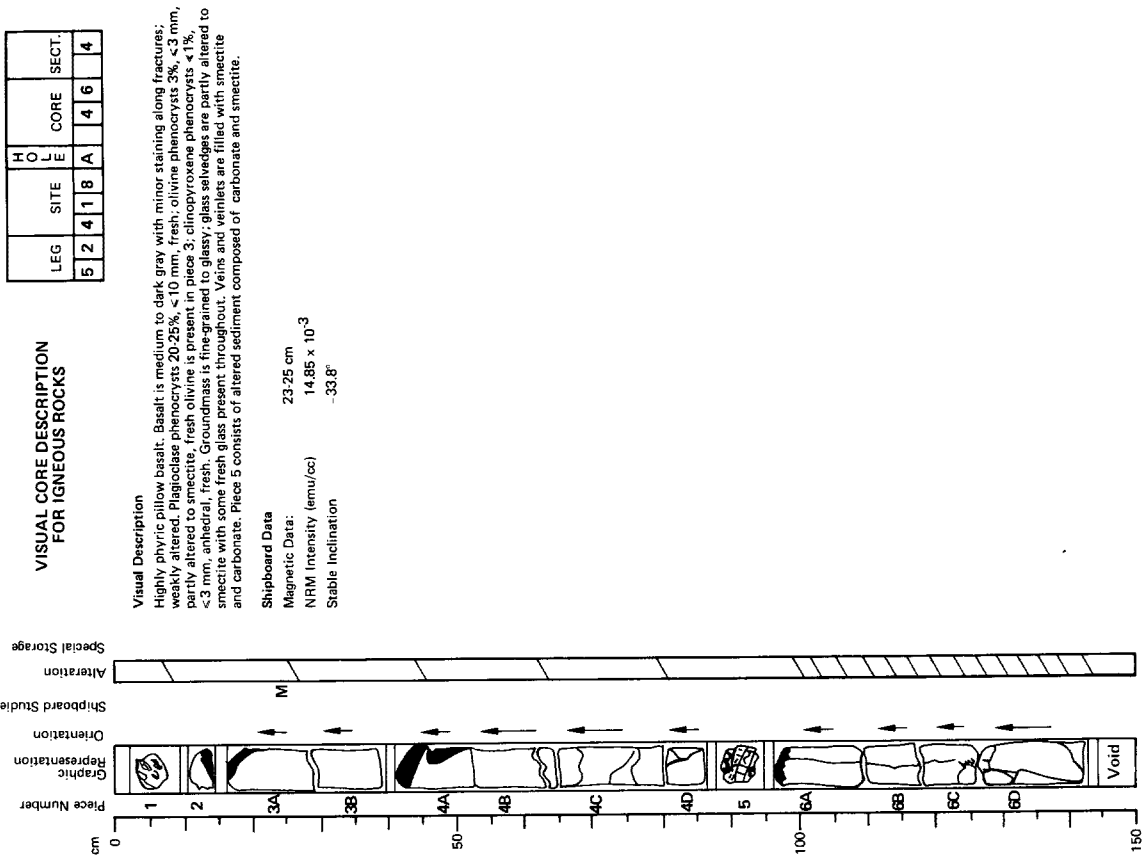
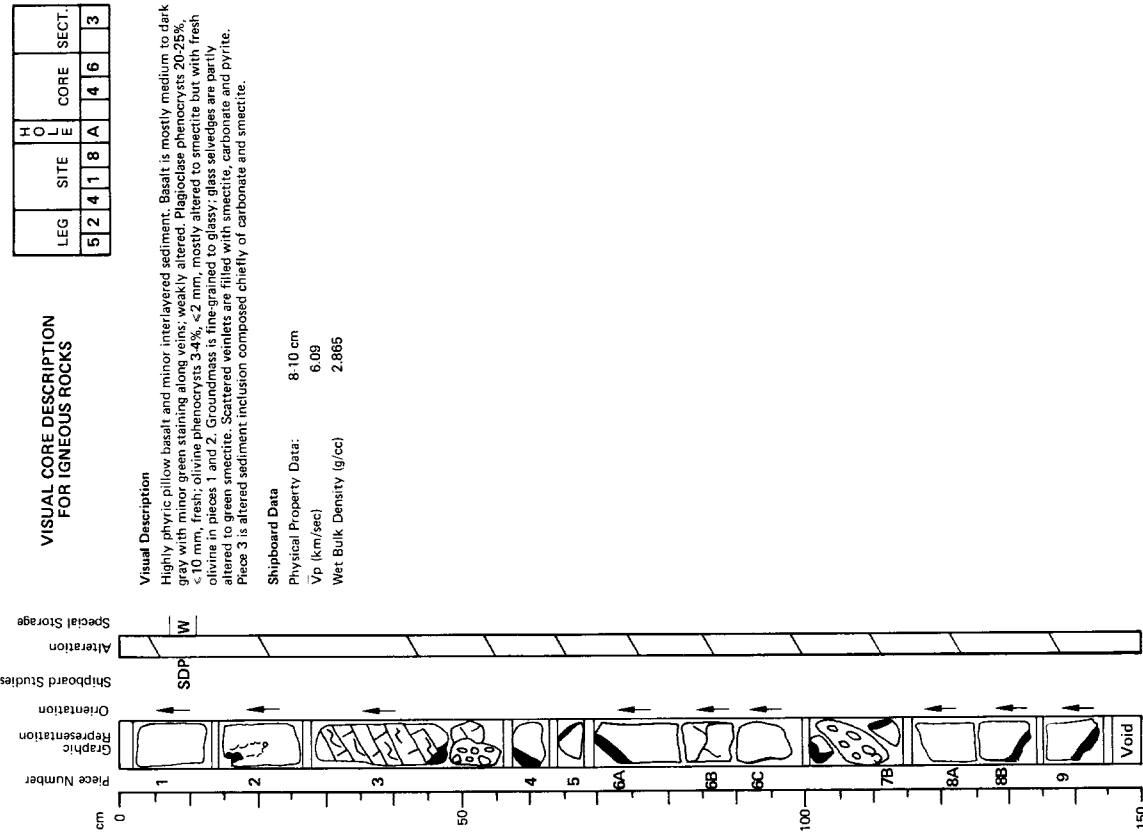
LEG	SITE	H O E	CORE	SECT.
5	2418A		46	1



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5	2418A		46	2



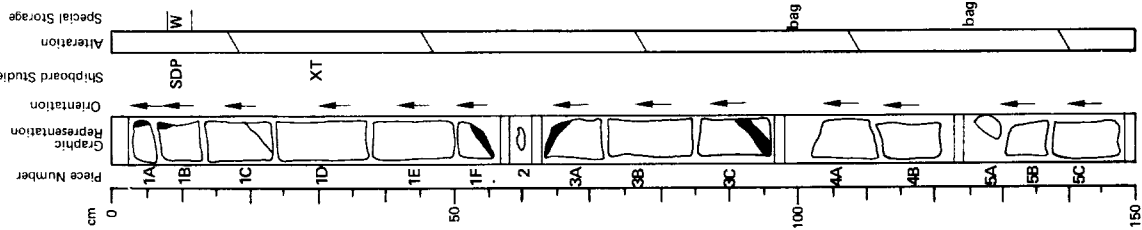
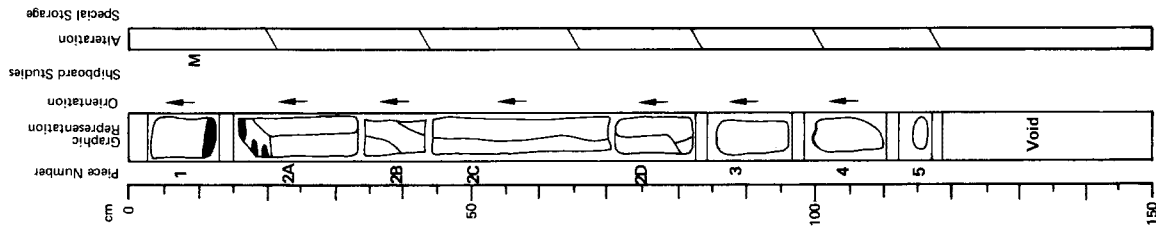


LEG	SITE	H O L E	CORE	SECT.
5	2418A		4	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phyrlic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 10-12%, <8 mm, fresh; olivine phenocrysts 2%, <4 mm, partly altered to smectite but about 50% is fresh. Groundmass is fine-grained to glassy; glass selvages are fresh. Veinlets are common, filled with carbonate, smectite and pyrite.

Shipboard Data
Location: 30 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, <1 mm, euhedral; plagioclase 10%, <3 mm, subhedral; spinel <1%, 0.2 mm, euhedral
Groundmass: olivine 3%, <0.25 mm, euhedral; plagioclase 25%, <0.5 mm, acicular; clinopyroxene 55%, radiating sheaves; opaques 6%, 0.01 mm, granular to lath-shaped
Vesicles: <1%, <0.5 mm, round
Alteration: olivine and groundmass partly to smectite and carbonate; smectite and carbonate fill vesicles



LEG	SITE	H O L E	CORE	SECT.
5	2418A		4	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phyrlic pillow basalt. Basalt is mostly medium to dark gray; relatively fresh. Plagioclase phenocrysts 10-12%, <8 mm, fresh; olivine phenocrysts 2%, <3 mm, partly altered to smectite with some fresh olivine phenocrysts <1%, <3 mm, anhedral. Fresh. Groundmass is fine-grained to glassy; glass selvages are fresh. Small veinlets are common, filled with smectite, carbonate and pyrite.

Thin Section Description
Location: 30 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, <1 mm, euhedral; plagioclase 10%, <3 mm, subhedral; spinel <1%, 0.2 mm, euhedral
Groundmass: olivine 3%, <0.25 mm, euhedral; plagioclase 25%, <0.5 mm, acicular; clinopyroxene 55%, radiating sheaves; opaques 6%, 0.01 mm, granular to lath-shaped
Vesicles: <1%, <0.5 mm, round
Alteration: olivine and groundmass partly to smectite and carbonate; smectite and carbonate fill vesicles

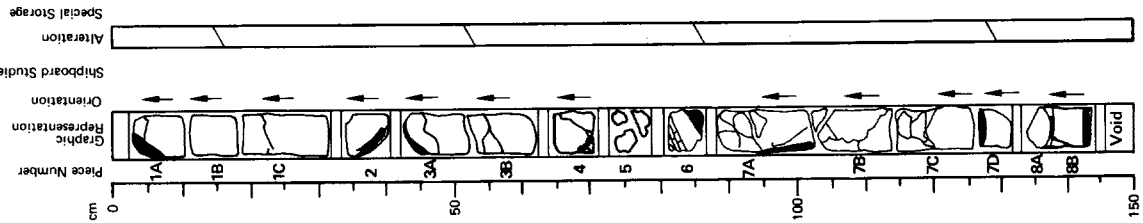
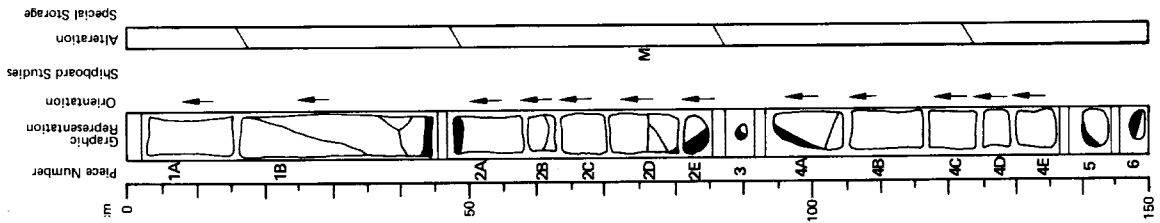
Shipboard Data
Bulk Analysis: 27.29 cm
Magnetic Data:
NRM Intensity (emu/cc) 18.20 cm
Stable Inclination 22.85 x 10⁻³
-29.0°
Physical Property Data:
Vp (km/sec) 7.9 cm
Porosity (β) 5.54
Wet Bulk Density (g/cc) 6.3
Grain Density (g/cc) 2.79
2.90

LEG	SITE	HOLE	CORE	SECT.
5	2418A		47	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 10-12%, <8 mm, fresh; olivine phenocrysts 3%, <2 mm, mostly altered to smectite but some fresh olivine occurs throughout the section; clinopyroxene phenocrysts <1%, <3 mm, rounded, fresh. Groundmass is fine-grained to glassy; glass selvages are very fresh. Minor veins are filled with smectite, carbonate and pyrite.

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 77.79 cm
Stable Inclination 14.36 x 10⁻³
-30.0°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	2418A		47	3

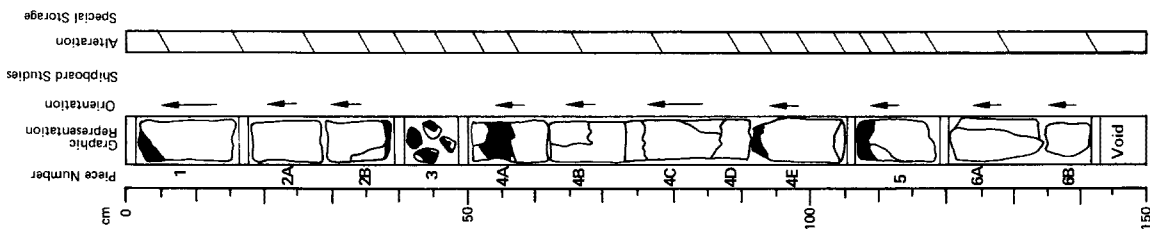
Visual Description
Moderately phryic pillow basalt. Basalt is mostly medium to dark gray; relatively fresh. Plagioclase phenocrysts 12%, <8 mm, fresh; olivine phenocrysts 3%, <5 mm, mostly altered to smectite but with fresh olivine locally present; clinopyroxene phenocrysts <1%, subophitic intergrowths with plagioclase, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite, but fresh glass is present throughout the section. Veinlets are common, filled with smectite and carbonate. In pieces 5 and 6 there are fragments of altered sediment composed of carbonate and smectite.

225

LEG	SITE	HOLE	CORE	SECT.
52	418	A	47	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

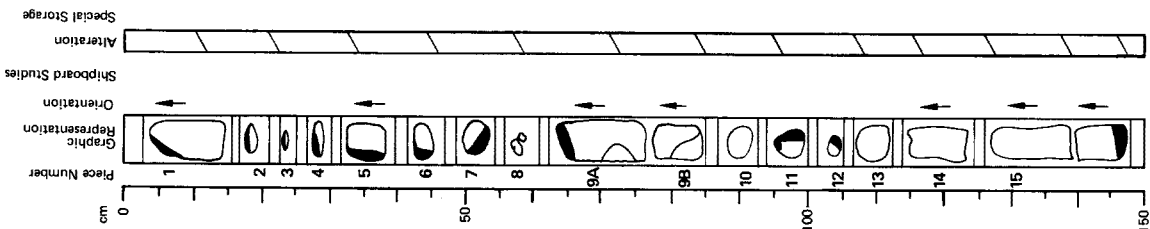
Visual Description
 Moderately phyric pillow basalt. Basalt is medium to dark gray; weakly to moderately altered. Plagioclase phenocrysts 15%, < 8 mm, fresh, olivine phenocrysts 4%, < 4 mm, mostly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite but some fresh glass persists throughout the section. Veinlets are scattered, filled with smectite and carbonate.



LEG	SITE	HOLE	CORE	SECT.
52	418	A	47	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyric pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 12%, < 8 mm, fresh; olivine phenocrysts 3%, < 2 mm, completely altered to smectite; clinopyroxene phenocrysts < 1%, fresh. Groundmass is fine-grained to glassy; glass selvages are generally fresh with minor alteration to smectite. Scattered veinlets are filled with carbonate and smectite.

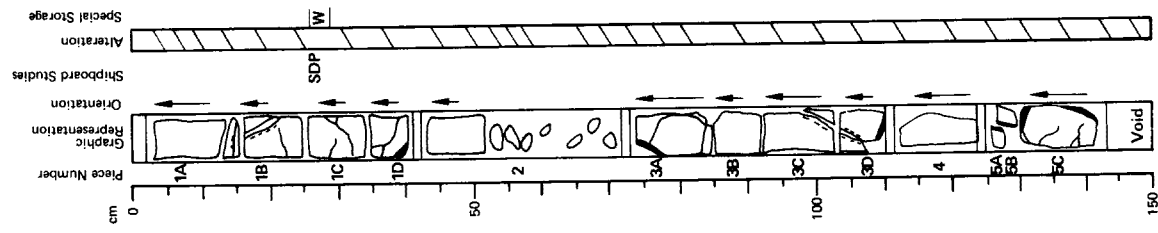


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	4118A	418	1	

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium to dark gray with some alteration to green smectite in pieces 2C through 2G; weakly to moderately altered. Plagioclase phenocrysts 10-12%, <7 mm, fresh; olivine phenocrysts 1-2%, <2 mm, partly altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, anhedral, fresh. Groundmass is fine-grained to glassy; glass selvages all contain fresh glass. Vesicles <1%, <0.5 mm, filled with smectite and carbonate. Veinlets are scattered throughout, filled with smectite, carbonate and pyrite. Zeolite(?) fills a vug in pieces 3A and 3B.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 26.28 cm
 Wet Bulk Density (g/cc) 5.71
 2.805

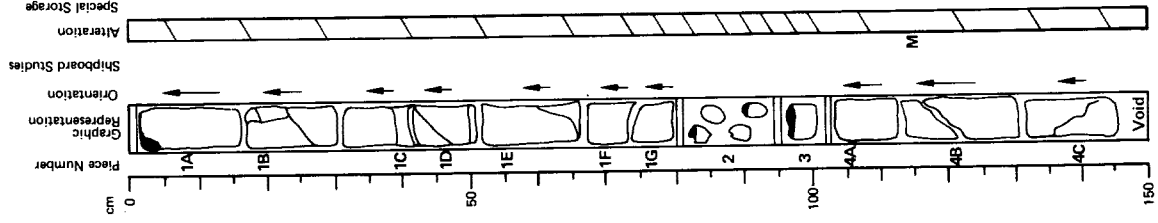


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
52	4118A	418	2	

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium to dark gray; weakly to moderately altered. Plagioclase phenocrysts 9%, <7 mm, fresh; olivine phenocrysts 1%, <2 mm, replaced by smectite and carbonate; clinopyroxene phenocrysts <1%, <1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite but fresh glass persists throughout. Vesicles are rare. Veinlets are scattered throughout, filled with smectite, carbonate and minor pyrite. Some pyrite is also disseminated in the groundmass.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 114-116 cm
 18.37 x 10⁻³
 Stable Inclination -26.7°



227

LEG	SITE	HOLE	CORE	SECT.
52	418	A	48	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

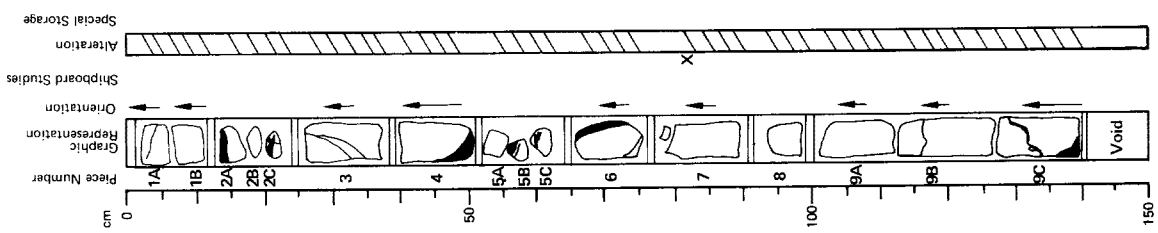
Visual Description

Moderately phyrlic pillow basalt. Basalt is medium to dark gray; weakly to moderately altered. Plagioclase phenocrysts 3-12%, < 7 mm, fresh; olivine phenocrysts 1%, < 2 mm, altered to smectite and carbonate; clinopyroxene phenocrysts < 1%, present only in the lower 50 cm of the section. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles are rare. Veinlets are scattered throughout, filled with smectite and carbonate. Pyrite is locally present.

Shipboard Data

Bulk Analysis: 82.84 cm

SiO ₂	49.6
Al ₂ O ₃	16.4
Fe ₂ O ₃	8.80
MgO	7.45
CaO	12.7
Na ₂ O	N.D.
K ₂ O	0.01
TiO ₂	1.04
P ₂ O ₅	N.D.
MnO	N.D.
LOI	1.6
H ₂ O ⁺	0.67
H ₂ O	N.D.
CO ₂	0.05
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.



LEG	SITE	HOLE	CORE	SECT.
52	418	A	48	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

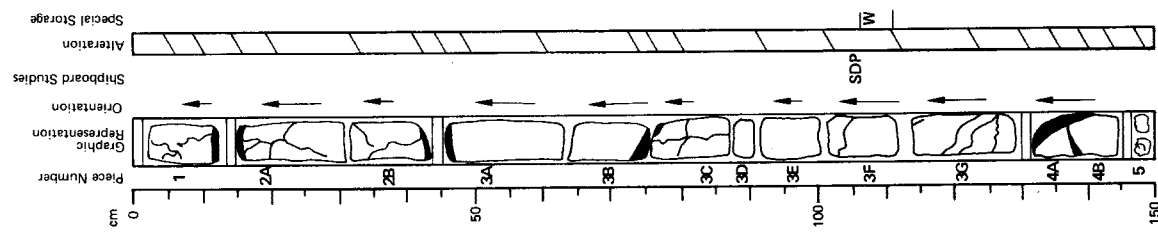
Visual Description

Moderately phyrlic pillow basalt. Basalt is medium to dark gray; weakly to moderately altered. Plagioclase phenocrysts 10%, < 8 mm, some glomerocrysts up to 15 mm, fresh; olivine phenocrysts 1%, < 2 mm, altered to smectite and carbonate; clinopyroxene phenocrysts < 1%, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite but fresh glass occurs throughout the section. Vesicles are rare. Veinlets are scattered throughout, filled with smectite, carbonate and minor pyrite.

Shipboard Data

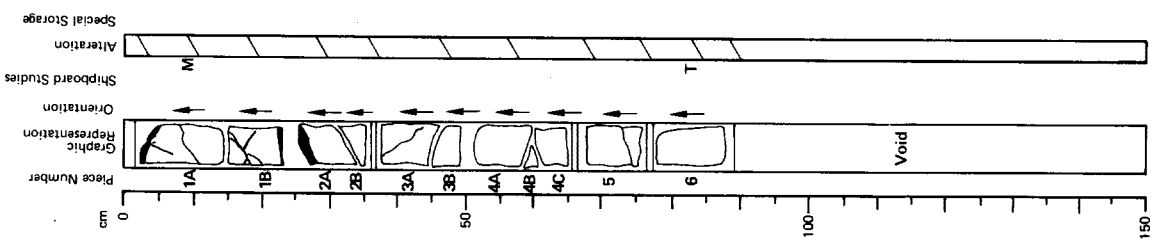
Physical Property Data: 106-108 cm

Vp (km/sec)	5.92
Wet Bulk Density (g/cc)	2.85



LEG	SITE	H	O	CORE	SECT.
52	418A	4	8	4	8
52	418A	4	8	4	5

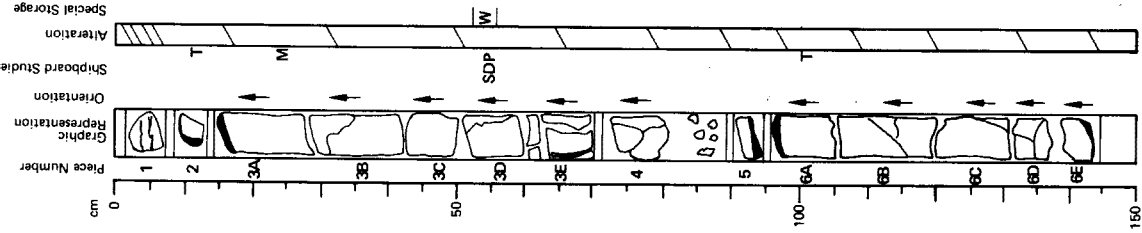
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phryic pillow basalt. Basalt is dark gray to medium gray; weakly altered. Plagioclase phenocrysts 10-12%, < 8 mm, often in glomerocrysts with olivine. Fresh olivine phenocrysts 1-2%, < 1 mm, mostly altered to smectite; clinopyroxene phenocrysts < 1 mm, mostly altered to glassy; glass selvages are fresh. Vesicles < 1%, < 1.5 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are fresh. Vesicles < 1%, < 0.5 mm, filled with smectite and carbonate. Narrow veinlets are filled with smectite and carbonate. Minor pyrite is present in the groundmass.

Thin Section Description
Location: 83 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, < 2 mm, euhedral; plagioclase 18%, < 4 mm, euhedral
Groundmass: olivine 3%, < 0.2 mm, subhedral; plagioclase 25%, 0.6 mm, acicular; clinopyroxene 45%, radiating sheaves; opaques 5%, 0.01 mm, granular; spinel < 1%, 0.15 mm, euhedral
Vesicles: 1%, < 0.4 mm, round
Alteration: olivine partly to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data
Magnetic Data:
8-10 cm
NRM Intensity (emu/cc) 30.13 x 10⁻³
Stable Inclination -25.1°



Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, < 10 mm, fresh olivine phenocrysts 2-3%, < 1 mm, mostly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are relatively fresh with only minor alteration to smectite. Occasional veinlets are filled with carbonate and smectite with minor silica(?) and pyrite.

Thin Section Description
Location: 10 cm
Texture: porphyritic - quench
Phenocrysts: olivine 1%, < 1.5 mm, euhedral; plagioclase 15%, < 3.5 mm, euhedral
Groundmass: olivine 2%, < 0.3 mm, subhedral; plagioclase 35%, < 0.3 mm, acicular; glass 46%, some poorly crystallized; opaques 2%, 0.01 mm, granular; spinel tr. 0.05 mm, euhedral
Vesicles: 1%, 0.2 mm, round
Alteration: olivine and glass, partly to smectite and minor carbonate; smectite and carbonate fill vesicles

Shipboard Data
Magnetic Data:
20-22 cm
NRM Intensity (emu/cc) 017.38 x 10⁻³
NRM Inclination -28.7°

Physical Property Data:
Vp (km/sec) 6.04
Porosity (%) 3.41
Wet Bulk Density (g/cc) 2.86
Grain Density (g/cc) 2.93

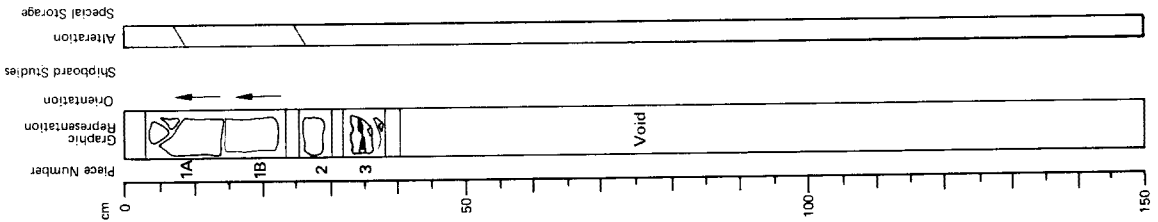
LEG	SITE	H	O	CORE	SECT.
53	418A	4	8	4	9
53	418A	4	8	4	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

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LEG	SITE	H	O	L	E	CORE	SECT.
5	3418A					49	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

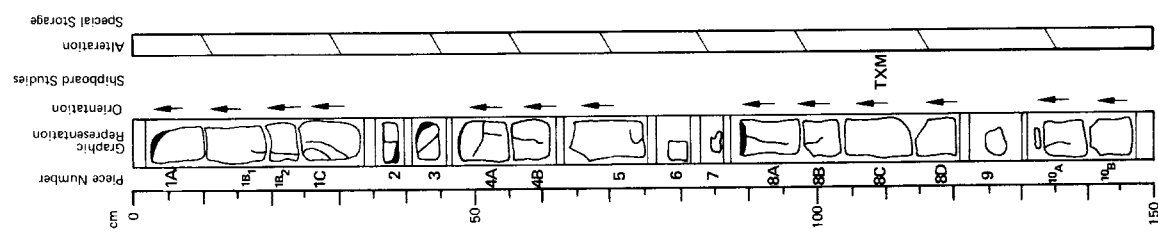


Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 10%, <8 mm, fresh, olivine phenocrysts 2%, completely altered to smectite. Groundmass is fine-grained to glassy, glass selvages are fresh. Veinlets are common, filled with smectite and carbonate. Pyrite occurs locally in the groundmass.

Shipboard Data
Bulk Analysis: 32.35 cm
SiO₂ 50.59
Al₂O₃ 10.48
Fe₂O₃ 13.68
MgO 16.34
CaO 3.98
Na₂O N.D.
K₂O 0.88
TiO₂ 1.03
P₂O₅ 0.04
MnO N.D.
LOI 10.20
H₂O⁺ 5.87
H₂O N.D.
CO₂ 0.99
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.

LEG	SITE	H	O	L	E	CORE	SECT.
5	3418A					49	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 10%, <10 mm, fresh, olivine phenocrysts 2%, <2 mm, mostly altered to smectite but with some fresh olivine preserved. Groundmass is fine-grained to glassy, glass selvages are fresh. Scattered veinlets are filled with smectite, carbonate and minor pyrite.

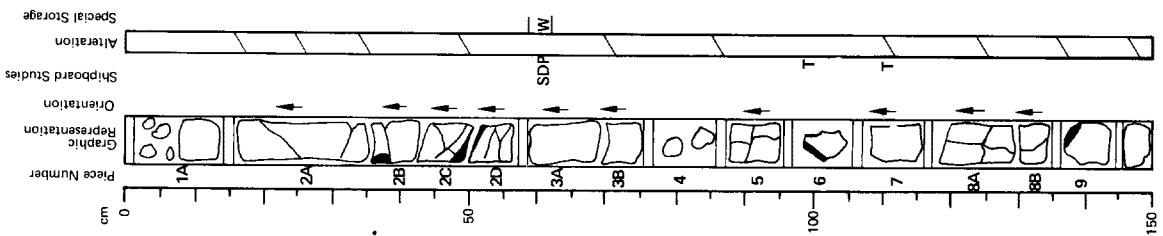
Thin Section Description
Location: 110 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, <2.5 mm, euhedral; plagioclase 15%, <7 mm, euhedral
Groundmass: olivine 2%, <0.7 mm, subhedral; plagioclase 3%, <0.7 mm, acicular; clinopyroxene 4%, poorly crystallized, radiating sheaves, opaques 6%, 0.02 mm, granular; spinels tr, <0.15 mm, euhedral
Vesicles: <1%, 0.15, round
Alteration: olivine and some groundmass to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data
Bulk Analysis: 108-110 cm
SiO₂ 50.51
Al₂O₃ 18.04
Fe₂O₃ 10.66
MgO 5.32
CaO 14.03
Na₂O N.D.
K₂O < 0.03
TiO₂ 1.10
P₂O₅ N.D.
MnO N.D.
LOI 2.94
H₂O⁺ 1.18
H₂O N.D.
CO₂ 0.45
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.

Magnetic Data:
NRM Intensity (emu/cc) 108-110 cm 022.51 x 10⁻³
NRM Inclination -25.9°
Stable Inclination -27.2°

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
53	418A	50	1	



Visual Description

Moderately phyrnic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 12%, <6 mm, fresh; olivine phenocrysts 4%, <2 mm, partly altered to smectite. Groundmass is mostly fine-grained to glassy, some zones are medium grained and subophitic; glass selvages are fresh. Veinlets are scattered throughout, filled with smectite, carbonate and pyrite. Pyrite is also disseminated in the groundmass.

Thin Section Description

Location: 100 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 2%, <1 mm, subhedral; plagioclase 18%, <3.5 mm, euhedral
 Groundmass: olivine 2%, <0.3 mm, subhedral; plagioclase 35%, <0.4 mm, acicular, opaques 5%, 0.02 mm, granular; spinels tr, 0.04 mm, euhedral; glass 36%, some poorly devitrified
 Vesicles: <1%, <0.2 mm, round
 Alteration: olivine partly to smectite and carbonate; smectite and carbonate fill vesicles

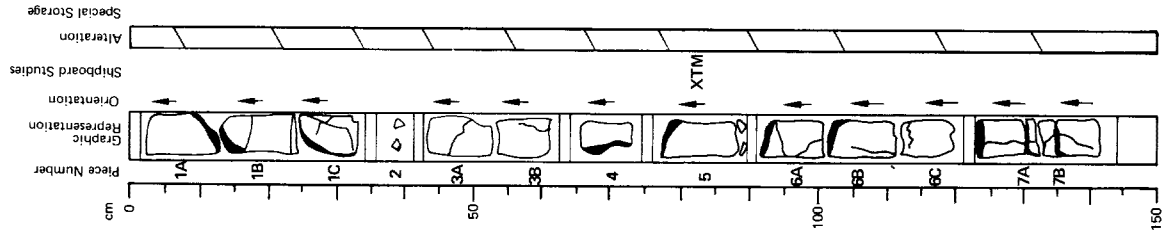
Shipboard Data

Location: 110 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 2%, <0.3 mm, subhedral; plagioclase 12%, <4 mm, euhedral
 Groundmass: olivine 2%, <0.3 mm, subhedral; plagioclase 25%, <0.5 mm, acicular, clinopyroxene 53%, radiating sheaves; opaques 5%, 0.01 mm, granular; spinel tr, 0.5 mm
 Vesicles: 1%, <0.2 mm, round
 Alteration: olivine and some groundmass to smectite; smectite and minor carbonate fill vesicles

Physical Property Data:
 Vp (km/sec) 5.55
 Porosity (%) 6.67
 Wet Bulk Density (g/cc) 2.79
 Grain Density (g/cc) 2.91

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
53	418A	50	2	



Visual Description

Moderately phyrnic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 7-12%, <6 mm, fresh; olivine phenocrysts 1-2%, <2 mm, partly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are fresh. Veinlets are common, filled with smectite and carbonate.

Thin Section Description

Location: 83 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 3%, <2 mm, euhedral; plagioclase 12%, <2.5 mm, euhedral; clinopyroxene <1%, <2 mm, rounded
 Groundmass: olivine 3%, 0.2 mm, subhedral; plagioclase 30%, 0.3 mm, acicular; clinopyroxene 47%, poorly crystallized, radiating sheaves; opaques 5%, 0.01 mm, granular
 Vesicles: <1%, 0.2 mm, round
 Alteration: olivine and minor groundmass to smectite; smectite and carbonate fill vesicles

Shipboard Data

Bulk Analysis: 82.84 cm
 SiO₂ 48.67
 Al₂O₃ 16.88
 Fe₂O₃ 11.18
 MgO 5.28
 CaO 14.25
 K₂O < 0.03
 Na₂O N.D.
 TiO₂ 1.10
 P₂O₅ 0.11
 MnO N.D.
 LOI 1.75
 H₂O⁺ 1.40
 H₂O⁻ N.D.
 CO₂ 0.70
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Z N.D.

Magnetic Data:
 Bulk Analysis: 82.84 cm
 NRM Intensity (emu/cc) 028.36 x 10⁻³
 NRM Inclination -22.4°
 Stable Inclination 23.0°

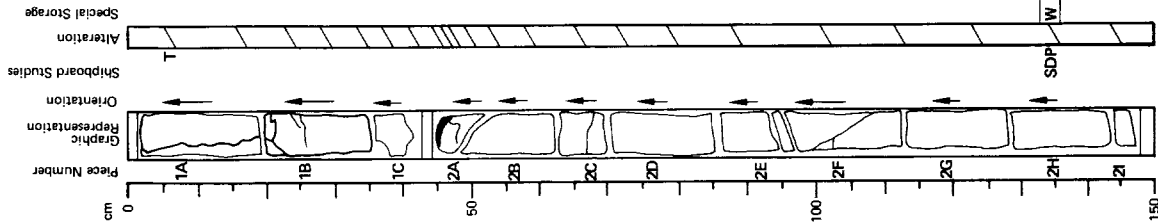
LEG	SITE	HOLE	CORE	SECT.
53	418	A	50	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly to moderately altered. Plagioclase phenocrysts 15%, <10 mm, fresh; olivine phenocrysts 1-5%, <1 mm, most abundant in piece 1, partly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are altered to smectite, carbonate and rare pyrite. Pyrite is also disseminated in the groundmass.

Thin Section Description
Location: 5 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, <1 mm, euhedral; plagioclase 20%, <2.5 mm euhedral; clinopyroxene <1%, <0.6 mm, rounded
Groundmass: olivine 2%, <0.2 mm, subhedral; plagioclase 30%, <0.5 mm, acicular; clinopyroxene 39%, radiating sheaves; opaques 6%, 0.02 mm, granular; spinel tr, 0.08 mm, euhedral
Vesicles: <1%, <0.2 mm, round
Alteration: olivine and some groundmass to smectite; smectite and carbonate fill vesicles and veinlets

Shipboard Data
Physical Property Data:
Vp (km/sec) 136-138 cm
Porosity (%) 5.97
Wet Bulk Density (g/cc) 3.60
Grain Density (g/cc) 2.87
2.93



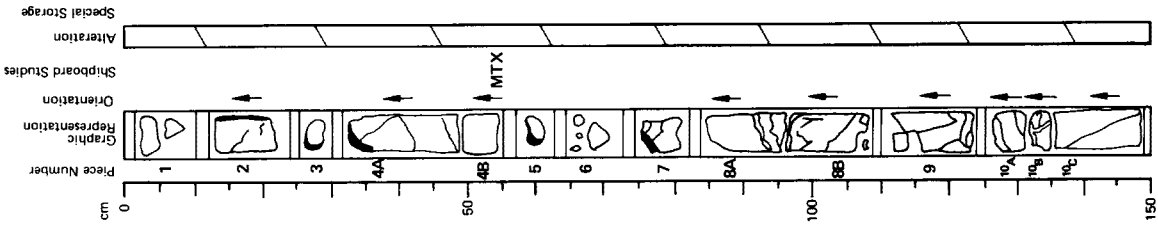
LEG	SITE	HOLE	CORE	SECT.
53	418	A	50	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 10-15%, <6 mm, fresh; olivine phenocrysts 2-3%, <3 mm, some fresh but most altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly fresh, some partly altered to smectite and carbonate. Veins are filled with carbonate and smectite. Pyrite nodule 8 mm across occurs in piece 10A.

Thin Section Description
Location: 52 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, <1 mm, euhedral; plagioclase 15%, <3.5 mm, euhedral; spinel tr, <0.6 mm, euhedral
Groundmass: olivine 2%, <0.1 mm, subhedral; plagioclase 25%, <0.3 mm, acicular; clinopyroxene 50%, radiating sheaves, poorly crystallized; opaques 5%, 0.01 mm, granular
Vesicles: <1%, <0.2 mm, round
Alteration: olivine and minor groundmass to smectite; smectite and carbonate fill vesicles

Shipboard Data
Bulk Analysis: 51-53 cm
Magnetic Data:
SiO₂ 47.83 NRM Intensity (emu/cc) 51-53 cm
Al₂O₃ 18.08 NRM Inclination 015.43 x 10⁻³
Fe₂O₃ 10.88 Stable Inclination -25.2°
MgO 5.67 -25.4°
CaO 14.34
Na₂O N.D.
K₂O 0.06
TiO₂ 1.13
P₂O₅ 0.12
MnO N.D.
LOI 2.45
H₂O⁺ 1.04
H₂O⁻ N.D.
CO₂ 0.69
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.

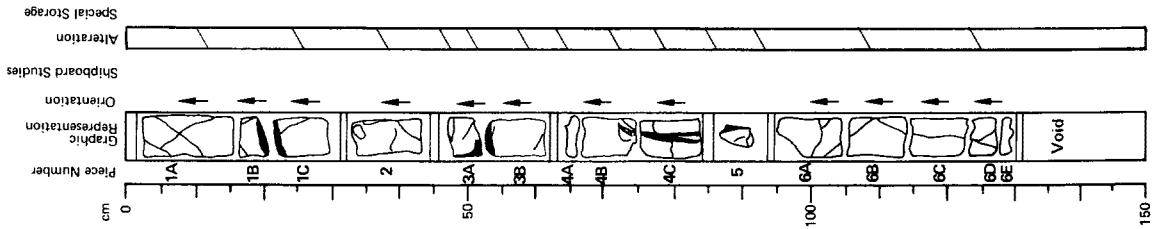


LEG	SITE	HOLE	CORE	SECT.
53	418	A	50	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phryic pillow basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 10-12%, <10 mm, mostly 4-5 mm long, fresh, olivine phenocrysts 2%, <2 mm, partly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly fresh. Vesicles 1%, filled with carbonate. Veins are filled with smectite, carbonate and minor pyrite.



LEG	SITE	HOLE	CORE	SECT.
53	418	A	51	1

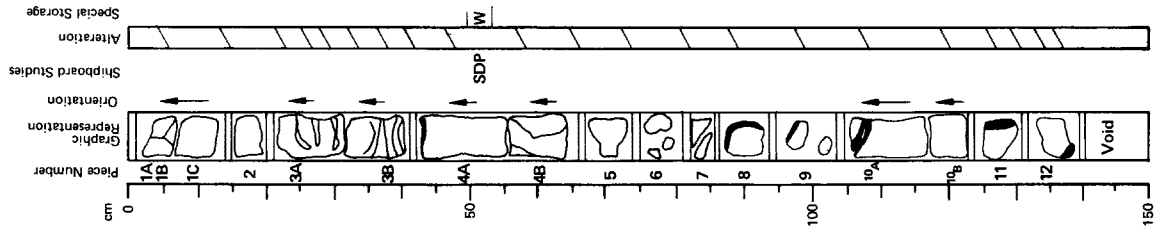
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phryic pillow basalt. Basalt is gray to greenish-gray, weakly to moderately altered. Plagioclase phenocrysts 10-15%, <4 mm, fresh, olivine phenocrysts 2.5%, <2 mm, slightly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are fresh except in pieces 3A, 3B and 12, where they are altered to smectite, palagonite and minor carbonate. Veins are filled with smectite.

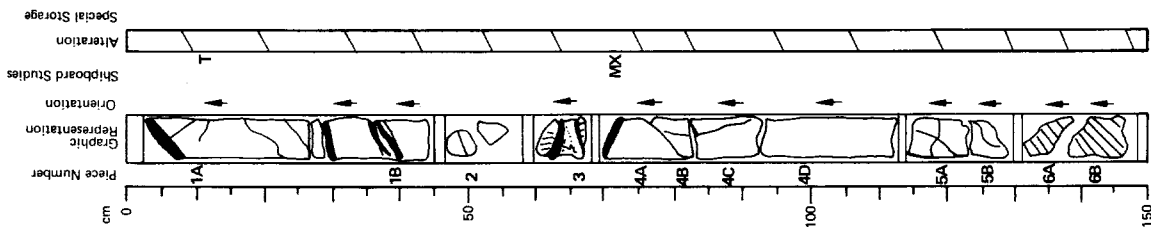
Shipboard Data

Physical Property Data: 49-51 cm
 Vp (km/sec) 5.17
 Porosity (%) 7.96
 Wet Bulk Density (g/cc) 2.78
 Grain Density (g/cc) 2.94



LEG	SITE	HOLE	CORE	SECT.
5	3418A		51	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



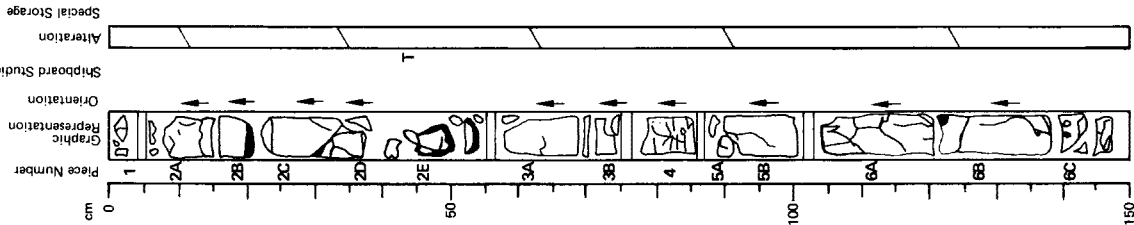
Visual Description
Moderately phryic pillow basalt. Basalt is gray to greenish gray; weakly to moderately altered. Plagioclase phenocrysts 15%, <8 mm, fresh; olivine phenocrysts 3%, <1 mm, partly altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, rounded, fresh. Groundmass is fine-grained to glassy; glass selvages are usually fresh, but are altered to smectite and minor carbonate in pieces 3, 6A and 6B. Veinlets are common throughout, filled with carbonate, smectite and minor pyrite. Minor pyrite also is disseminated in the groundmass.

Thin Section Description
Location: 11 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, <2 mm, euhedral; plagioclase 15%, <3 mm, euhedral; clinopyroxene 3%, <3 mm, rounded
Groundmass: olivine 2%, <0.2 mm, subhedral; plagioclase 15%, <0.3 mm, acicular; clinopyroxene 57%, radiating sheaves; opaques 5%, 0.01 mm, granular
Vesicles: <1%, <0.5 mm, round
Alteration: olivine and some groundmass to smectite

Thin Section Description
Location: 74 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, <0.9 mm, euhedral; plagioclase 15%, <3.5 mm, euhedral; clinopyroxene tr, 1 mm, rounded
Groundmass: olivine 1%, <0.2 mm, subhedral; plagioclase 12%, <0.3 mm, acicular; clinopyroxene 68% poorly crystallized, radiating sheaves; opaques 1%, 0.01 mm, euhedral
Vesicles: <1%, 0.2 mm, round
Alteration: olivine to smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 73-75 cm	Magnetic Data:	
SiO ₂ 49.07	NRM Intensity (emu/cc)	73-75 cm
Al ₂ O ₃ 17.47	NRM Inclination	013.68 x 10 ³
Fe ₂ O ₃ 9.88	Stable Inclination	-23.6°
MgO 6.77		-24.2°
CaO 13.76		
Nb ₂ O ₅ N.D.		
K ₂ O < 0.03		
TiO ₂ 1.16		
P ₂ O ₅ 0.11		
MnO N.D.		
LOI 1.47		
H ₂ O ⁺ 1.13		
H ₂ O ⁻ N.D.		
CO ₂ 0.39		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray, relatively fresh. Plagioclase phenocrysts 15%, <8 mm, fresh; olivine phenocrysts 2%, <1.5 mm, altered to smectite; clinopyroxene phenocrysts <1%, <1.5 mm, rounded, fresh. Groundmass is fine-grained to glassy; glass selvages are generally fresh with minor alteration to smectite in piece 2A. Veinlets are filled with carbonate and smectite.

Thin Section Description
Location: 44 cm
Texture: porphyritic - glassy
Phenocrysts: olivine 2%, <1.5 mm, euhedral; plagioclase 15%, <2 mm, euhedral; clinopyroxene tr, 1.5 mm, rounded
Groundmass: olivine 1%, <0.1 mm, subhedral; plagioclase 12%, 0.3 mm, acicular; opaques <1%, 0.01 mm, granular; spinel tr, 0.05 mm, euhedral; glass 70%, devitrified
Vesicles: none
Alteration: olivine and minor glass to smectite

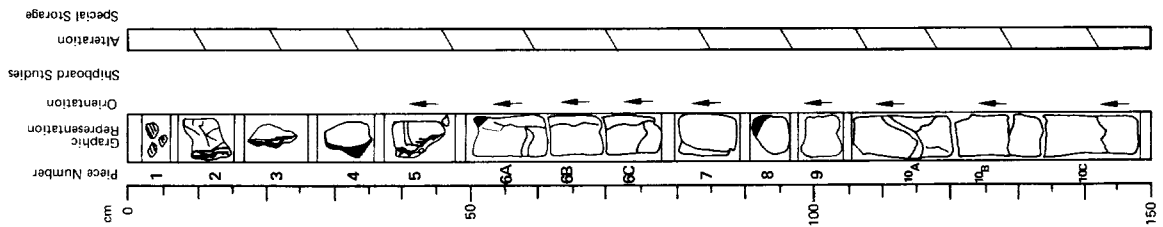
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	3418A		51	3

LEG	SITE	HOLE	CORE	SECT.
534	18A		52	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 10-15%, <10 mm, fresh; olivine phenocrysts 5%, <4 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are altered to smectite, carbonate and minor zeolite(?); fresh glass is present in piece 8. Vesicles 1%, filled with smectite and carbonate. Veins are filled with smectite, carbonate and minor pyrite. Piece 1 consists of chert fragments, probably slumped into the hole during bit change.

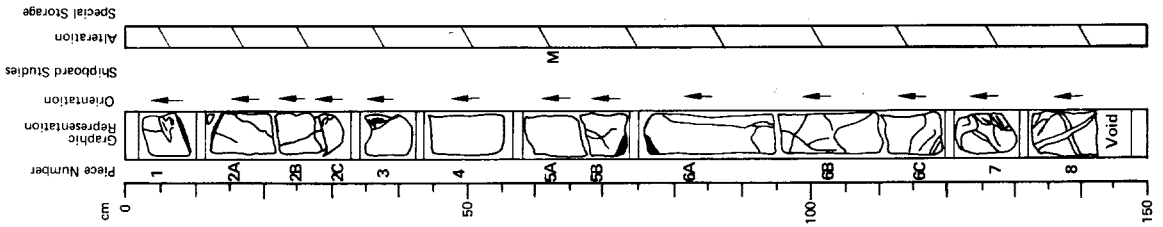


LEG	SITE	HOLE	CORE	SECT.
534	18A		52	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 10%, 7 mm, fresh; olivine phenocrysts 4%, 4 mm, completely altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Veins are filled with smectite and carbonate. Minor pyrite occurs locally.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 62.64 cm
 NRM Intensity (emu/cc) 026.66 x 10⁻³
 NRM Inclination -17.3°
 Stable Inclination -19.2°

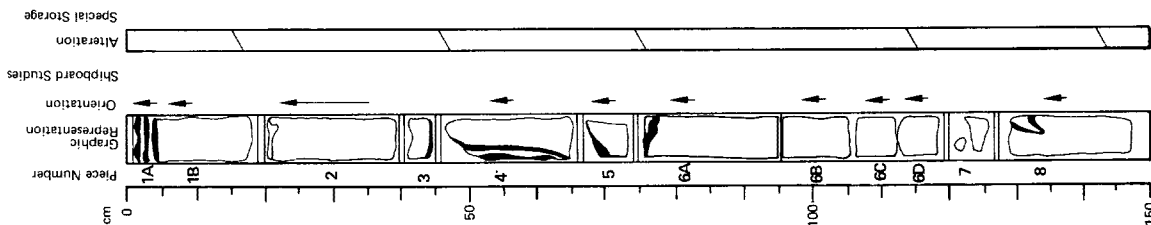


LEG	SITE	H O L	CORE	SECT.
5341	8A		52	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately aphyric pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 8-15%, <1 mm, fresh; olivine phenocrysts 4%, <4 mm, partly altered to smectite; clinopyroxene phenocrysts 1%, <1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Veins are common throughout, filled with smectite, carbonate and minor pyrite.



LEG	SITE	H O L	CORE	SECT.
5341	8A		52	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

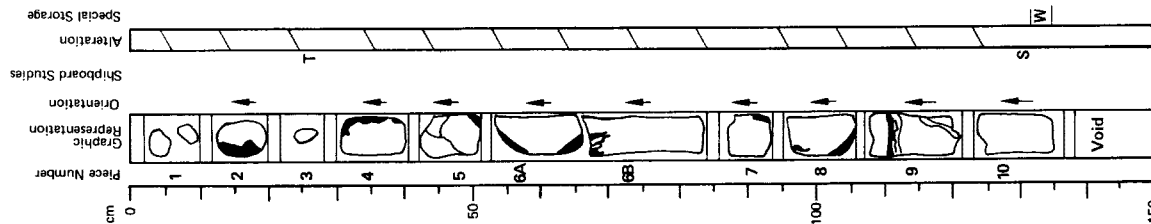
Moderately aphyric pillow basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 10-12%, <8 mm, fresh; olivine phenocrysts 4%, <3 mm, completely altered to smectite; clinopyroxene phenocrysts 1%, <1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly altered to smectite and minor zeolite(?). Vesicles 1%, filled with smectite and carbonate. Sparse veins are filled with smectite, carbonate and minor pyrite. Some smectite and pyrite are disseminated in the groundmass.

Thin Section Description

Location: 24 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 4%, <1.5 mm, euhedral; plagioclase 12%, <2 mm, euhedral; clinopyroxene 1%, <1 mm, anhedral
 Groundmass: olivine 1%, <0.2 mm, subhedral; plagioclase 25%, <0.5 mm, acicular; clinopyroxene 54%, radiating sheaves, poorly crystallized; opaques 3%, 0.01 mm, granular
 Vesicles: <1%, <0.5 mm, round
 Alteration: olivine and minor groundmass to smectite and carbonate; smectite fills vesicles

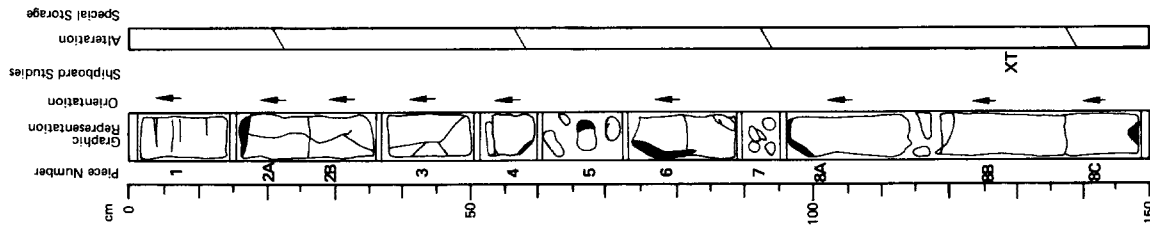
Shipboard Data

Physical Property Data: 129-131 cm
 Vp (km/sec) 5.61



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
53	418A	52	5	5

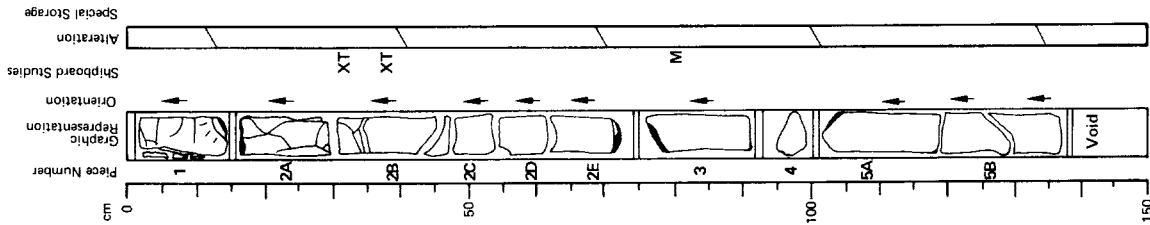


Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 10-15%, <4 mm, fresh; olivine phenocrysts 2%, <2 mm, partly altered to smectite; clinopyroxene phenocrysts 1%, <1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly fresh, some are partly altered to smectite. Veins are filled with smectite, carbonate, zeolite(?) and minor pyrite.

Thin Section Description
Location: 128 cm
Texture: porphyritic - quench
Phenocrysts: olivine 4%, <2 mm, euhedral; plagioclase 12%, <2.5 mm, euhedral; clinopyroxene 1%, anhedral
Groundmass: olivine 1%, 0.2 mm, subhedral; plagioclase 25%, <0.4 mm, acicular; clinopyroxene 54%, poorly crystallized, radiating sheaves; opaques 3%, 0.01 mm, granular; spinel tr, 0.3 mm euhedral
Vesicles: <1%, 0.6 mm, irregular
Alteration: olivine and some groundmass to smectite and carbonate; carbonate fills vesicles

Shipboard Data
Bulk Analysis: 127-129 cm

SiO ₂	50.89
Al ₂ O ₃	17.04
Fe ₂ O ₃	96.33
MgO	6.28
CaO	12.72
Na ₂ O	N.D.
K ₂ O	0.10
TiO ₂	1.10
P ₂ O ₅	0.14
MnO	N.D.
LOI	1.15
H ₂ O ⁺	0.74
H ₂ O ⁻	N.D.
CO ₂	0.27
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.



Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8-15%, <6 mm, fresh; olivine phenocrysts 1.5%, <1 mm, partly altered to smectite; clinopyroxene phenocrysts 1%, <1.5 mm, rounded, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite, fresh glass occurs in pieces 2A, 2E, and 3. Veins are filled with carbonate, smectite, zeolite(?) and minor pyrite.

Thin Section Description
Location: 30 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, <1.5 mm, euhedral; plagioclase 15%, <3.5 mm, euhedral; clinopyroxene 1%, <1.5 mm, rounded
Groundmass: olivine 1%, 0.2 mm, subhedral; plagioclase 35%, 0.3 mm, acicular; clinopyroxene 36%, radiating sheaves, opaques 6%, 0.03 mm, euhedral to granular
Vesicles: 1%, <0.2 mm, round
Alteration: olivine and minor groundmass to smectite; smectite and carbonate fill vesicles

Thin Section Description
Location: 39 cm
Texture: porphyritic - quench
Phenocrysts: olivine 4%, <2 mm, euhedral; plagioclase 12%, <3 mm, euhedral; clinopyroxene 1%, <1 mm, rounded
Groundmass: olivine 2%, 0.2 mm, subhedral; plagioclase 35%, 0.4 mm, acicular; clinopyroxene 37%, radiating sheaves, opaques 8%, 0.05 mm, granular to lath-shaped
Vesicles: 1%, 0.5 mm, round
Alteration: olivine and minor groundmass to smectite and carbonate; carbonate and smectite fill vesicles

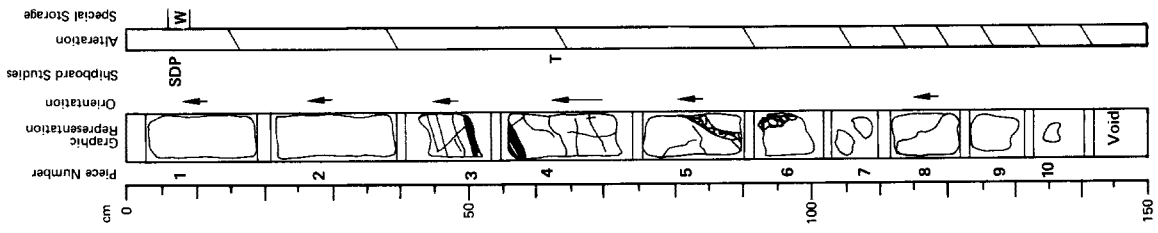
Shipboard Data
Bulk Analysis: 30-32 cm 37-39 cm

SiO ₂	49.72	49.73
Al ₂ O ₃	16.37	17.52
Fe ₂ O ₃	10.30	10.47
MgO	8.18	5.64
CaO	12.05	13.35
Na ₂ O	N.D.	N.D.
K ₂ O	0.05	< 0.03
TiO ₂	1.15	1.15
P ₂ O ₅	0.12	0.13
MnO	N.D.	N.D.
LOI	1.28	1.43
H ₂ O ⁺	0.66	0.79
H ₂ O ⁻	N.D.	N.D.
CO ₂	0.77	0.28
Cr	N.D.	N.D.
Ni	N.D.	N.D.
Sr	N.D.	N.D.
Zr	N.D.	N.D.

Magnetic Data:
NRM Intensity (emu/cc) 80-82 cm
NRM Inclination 018.23 x 10⁻³
Stable Inclination -21.9°
-21.8°

LEG	SITE	H O L E	CORE	SECT.
534	18A	52	7	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

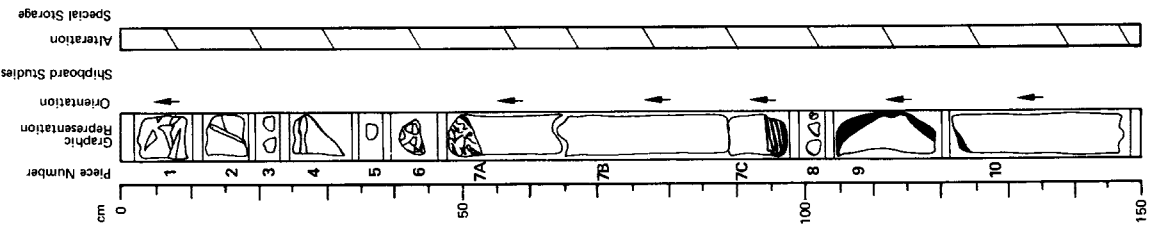
Moderately phryic pillow basalt. Basalt is gray to greenish-gray; weakly to moderately altered. Plagioclase phenocrysts 10%, <8 mm, fresh; olivine phenocrysts 4%, <3 mm, mostly altered to smectite; clinopyroxene phenocrysts 1-2%, <1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly altered to smectite. Veins are filled with carbonate, smectite and minor pyrite. Groundmass is partly altered to smectite, particularly in pieces 7 through 10.

Thin Section Description

Location: 64 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 4%, <1 mm, euhedral; plagioclase 15%, <2 mm, subhedral to rounded; clinopyroxene 2%, <1 mm, subhedral
 Groundmass: olivine 2%, 0.2 mm, subhedral; plagioclase 30%, 0.4 mm, acicular; clinopyroxene 42%, radiating sheaves; opaques 5%, 0.02 mm, granular
 Vesicles: <1%, 0.4 mm, round to irregular
 Alteration: olivine and minor groundmass to smectite and carbonate; carbonate fills vesicles

Shipboard Data

Physical Property Data:
 Vp (km/sec) 10-12 cm
 Porosity (%) 5.60
 Wet Bulk Density (g/cc) 5.69
 Grain Density (g/cc) 2.86
 2.97



Visual Description

Moderately phryic pillow basalt. Basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 8-10%, <8 mm, fresh; olivine phenocrysts 3%, <5 mm, altered to smectite, except in some glassy margins; clinopyroxene phenocrysts 1%, <1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages in pieces 8 and 7A are altered to smectite. Veins are filled with carbonate and minor pyrite. Smectite and pyrite are also locally present in the groundmass. Pieces 1 through 4 are partly brecciated.

LEG	SITE	H O L E	CORE	SECT.
534	18A	53	1	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

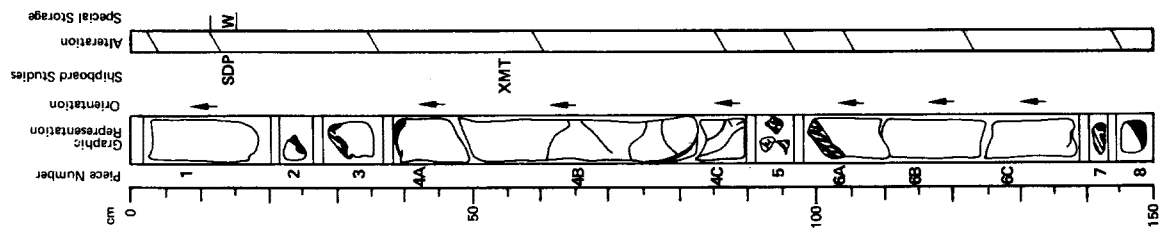
333

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5 3 4	1 B A	5 3	2	

Visual Description
Moderately to highly phyrlic pillow basalt. Basalt is medium gray to greenish gray; weakly to moderately altered. Plagioclase phenocrysts 10-15%, < 10 mm, fresh; olivine phenocrysts 3-5%, < 3 mm, partly altered to smectite; clinopyroxene phenocrysts 1-2%, < 2.5 mm, subophitic to rounded, fresh. Groundmass is fine-grained to glassy; glass selvages are slightly altered to smectite, selvages in pieces 5 and 6 are highly altered. Veins are filled with carbonate, smectite and minor pyrite. Some smectite and pyrite also occur in the groundmass.

Thin Section Description
Location: 52 cm
Texture: 1%, 0.5 mm, round
Phenocrysts: olivine 5%, < 1.5 mm, euhedral; plagioclase 15%, < 3 mm, euhedral; clinopyroxene 2%, < 2.5 mm, subophitic to rounded; spinel tr, 0.3 mm, euhedral
Groundmass: olivine 1%, 0.2 mm, subhedral; plagioclase 10%, 0.3 mm, acicular; clinopyroxene 60% radiating sheaves; opaques 6%, 0.01 mm, granular
Vesicles: 1%, 0.5 mm, round
Alteration: olivine and minor groundmass to smectite; carbonate fills vesicles



Shipboard Data

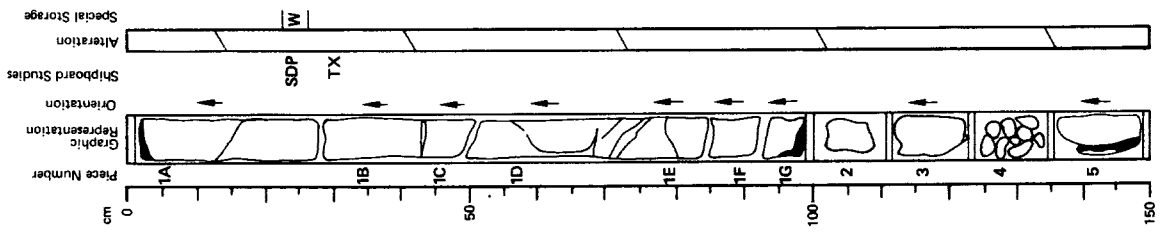
Bulk Analysis: 51-53 cm	Magnetic Data:	51-53 cm
SiO ₂ 49.39	NRM Intensity (emu/cc)	017.30 x 10 ⁻³
Al ₂ O ₃ 17.43	NRM Inclination	-23.9°
Fe ₂ O ₃ 8.81	Stable Inclination	-26.3°
MgO 6.50	Physical Property Data:	
CaO 15.15	Vp (km/sec)	5.40
Na ₂ O N.D.	Porosity (%)	6.41
K ₂ O 0.11	Wet Bulk Density (g/cc)	2.82
TiO ₂ 0.98	Grain Density (g/cc)	2.84
P ₂ O ₅ 0.22		
MnO N.D.		
LOI 3.19		
H ₂ O ⁺ 0.55		
H ₂ O ⁻ N.D.		
CO ₂ 2.03		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
5 3 4	1 B A	5 3	3	

Visual Description
Moderately phyrlic pillow basalt. Basalt is medium gray; weakly altered. Plagioclase phenocrysts 12-15%, < 6 mm, fresh; olivine phenocrysts 3-5%, < 2 mm, partly replaced by smectite and carbonate; clinopyroxene phenocrysts 1-2%, < 2 mm, subophitic to rounded, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly altered to smectite. Veins are filled with smectite, carbonate, zoisite(?) and minor pyrite.

Thin Section Description
Location: 29 cm
Texture: porphyritic - quench
Phenocrysts: 5%, < 1.5 mm, euhedral; plagioclase 15%, < 2 mm, euhedral; clinopyroxene 2%, < 0.5 mm subhedral
Groundmass: olivine 2%, 0.2 mm subhedral; plagioclase 30%, 0.4 mm, acicular; clinopyroxene 41%, radiating sheaves; opaques 5%, 0.01 mm, granular; spinel tr, 0.2 mm, euhedral
Vesicles: < 1%, 0.2 mm, round
Alteration: olivine and minor groundmass to smectite and carbonate

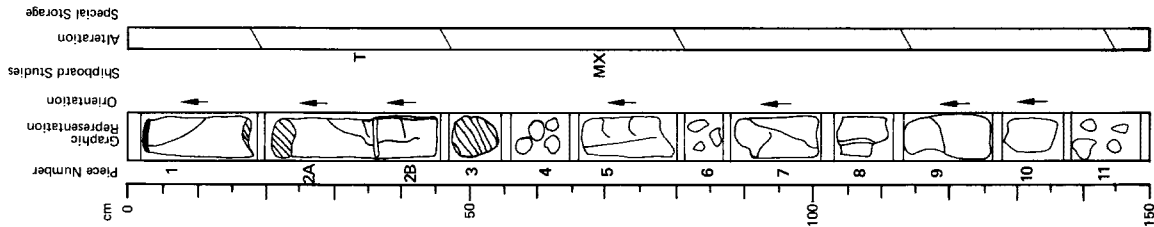


Shipboard Data

Bulk Analysis: 28-30 cm	Physical Property Data:	23.25 cm
SiO ₂ 49.02	Vp (km/sec)	5.72
Al ₂ O ₃ 17.33	Porosity (%)	4.86
Fe ₂ O ₃ 10.65	Wet Bulk Density (g/cc)	2.87
MgO 6.85	Grain Density (g/cc)	2.97
CaO 13.26		
Na ₂ O N.D.		
K ₂ O < 0.03		
TiO ₂ 1.12		
P ₂ O ₅ 0.12		
MnO N.D.		
LOI 1.06		
H ₂ O ⁺ 0.65		
H ₂ O ⁻ N.D.		
CO ₂ 0.16		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

LEG	SITE	HOLE	CORE	SECT.
53	418	A	54	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

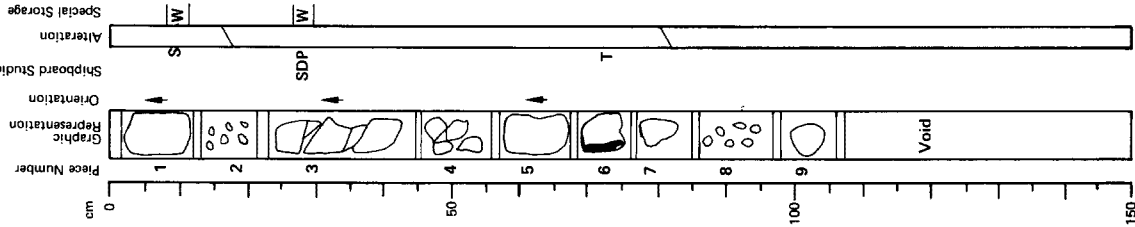
Moderately phryic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10-15%, <5 mm, fresh; olivine phenocrysts 3%, <1 mm, partly altered to smectite; clinopyroxene phenocrysts 5%, <1.5 mm, subophitic fresh. Groundmass is fine-grained to glassy; glass selvages partly altered to smectite. Vesicles 1%, filled with carbonate and smectite. Veins are filled with smectite, carbonate and pyrite. Piece 3 consists of smectite and silica and may be altered sediment.

Thin Section Description

Location: 34 cm
 Texture: glomeroporphyritic - quench
 Phenocrysts: plagioclase 15%, <4 mm, glomerophytic clusters; clinopyroxene 10%, <1.5 mm, subophitic clusters
 Groundmass: olivine 5%, <0.4 mm, euhedral; plagioclase 15%, <0.3 mm, acicular; clinopyroxene 49%, radiating sheaves; opaques 5%, 0.03 mm, euhedral to granular
 Vesicles: 1%, <0.5 mm, round
 Alteration: olivine and minor groundmass to smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis:	68-70 cm	121-123 cm	Magnetic Date:	68-70 cm
SiO ₂	48.96	48.46	NRM Intensity (emu/cc)	023.97 x 10 ⁻³
Al ₂ O ₃	15.71	15.36	NRM Inclination	-32.7°
Fe ₂ O ₃	11.29	11.31	Stable Inclination	-33.0°
MgO	7.79	6.55		
CaO	13.02	13.10		
Na ₂ O	N.D.	N.D.		
K ₂ O	< 0.03	< 0.03		
TiO ₂	1.31	1.32		
P ₂ O ₅	0.12	0.11		
MnO	N.D.	N.D.		
LOI	0.99	0.72		
H ₂ O ⁺	0.57	0.55		
H ₂ O ⁻	N.D.	N.D.		
CO ₂	0.33	0.39		
Cr	N.D.	N.D.		
Ni	N.D.	N.D.		
Sr	N.D.	N.D.		
Zr	N.D.	N.D.		



Visual Description

Moderately phryic basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 10%, <3 mm, fresh; olivine phenocrysts 5%, <1 mm, partly altered to smectite; clinopyroxene phenocrysts 5%, <0.5 mm, in subophitic clots with plagioclase; fresh. Groundmass is fine-grained to glassy; glass selvage in piece 6 is fresh. Vesicles 1-2%, <1.5 mm, filled with carbonate and smectite. Veinlets are filled with smectite and pyrite.

Thin Section Description

Location: 73 cm
 Texture: glomeroporphyritic - quench
 Phenocrysts: olivine 5%, <1 mm, euhedral; plagioclase 10%, <2 mm, in clusters or individual crystals; clinopyroxene 7%, <1 mm, subophitic intergrowths; opaques <1%, 0.4 mm, skeletal
 Groundmass: olivine 1%, 0.15 mm, euhedral; plagioclase 8%, 0.4 mm, acicular; opaques 5%, 0.01 mm, granular; glass 62%, devitrified
 Vesicles: 2%, <0.4 mm, round
 Alteration: olivine and minor groundmass to smectite; carbonate fills vesicles

Shipboard Data

Physical Property Data:	1-9 cm	25-27 cm
Vp (km/sec)	5.96	5.92
Porosity (%)		2.84
Wet Bulk Density (g/cc)		2.94
Grain Density (g/cc)		3.00

LEG	SITE	HOLE	CORE	SECT.
53	418	A	54	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	55	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

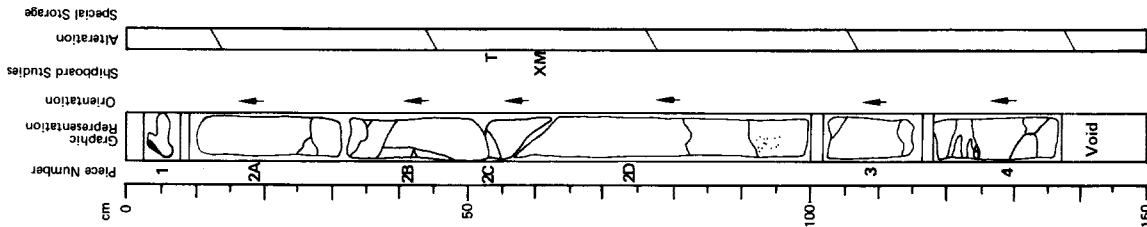
Visual Description
 Sparsely to moderately phryic basalt. Basalt is medium gray; weakly altered. Plagioclase phenocrysts 5-10%, <3 mm, fresh; olivine phenocrysts 2-4%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <1 mm, fresh. Groundmass is fine-grained; one glass selvage is present on piece 1; glass is fresh. Vesicles <1%, filled with smectite and carbonate. Veinlets are filled with smectite, carbonate and pyrite.

Thin Section Description

Location: 51 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 4%, <1 mm, euhedral; plagioclase 12%, <2.5 mm, subhedral; clinopyroxene 1%, <0.4 mm, subophitic
 Groundmass: olivine 2%, 0.2 mm, subhedral; plagioclase 10%, <0.3 mm, acicular; opaques 7%, 0.02 mm, granular; glass 63%, devitrified
 Vesicles: 1%, <0.5 mm, round
 Alteration: olivine and minor groundmass to smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 62.64 cm	Magnetic Data:	62.64 cm
SiO ₂ 49.66	NRM Intensity (emu/cc)	006.62 x 10 ⁻³
Al ₂ O ₃ 15.41	NRM Inclination	- 8.5°
Fe ₂ O ₃ 11.24	Stable Inclination	-31.0°
MgO 6.86		
CaO 12.81		
Na ₂ O N.D.		
K ₂ O 0.06		
TiO ₂ 1.36		
P ₂ O ₅ 0.13		
MnO N.D.		
LOI 1.46		
H ₂ O ⁺ 0.75		
H ₂ O ⁻ N.D.		
CO ₂ 0.70		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



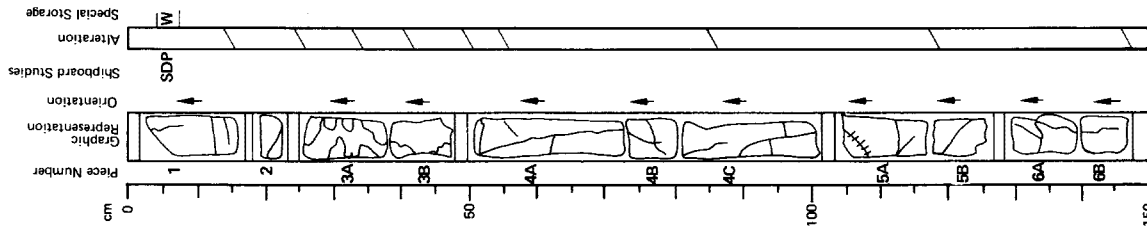
LEG	SITE	HOLE	CORE	SECT.
53	418	A	55	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phryic basalt. Basalt is gray to greenish-gray; weakly altered. Plagioclase phenocrysts 2-5%, <3 mm, fresh; olivine phenocrysts 3%, <2 mm, mostly altered to smectite. Groundmass is fine-grained with one glass selvage on piece 4A; glass is altered to smectite. Vesicles <1%, filled with carbonate. Veins are filled with carbonate, smectite and minor pyrite. Pieces 2 and 3 are breccia composed of basalt fragments in a smectite matrix.

Shipboard Data

Physical Property Data:	4.6 cm
Vp (km/sec)	5.56
Porosity (%)	4.29
Wet Bulk Density (g/cc)	2.93
Grain Density (g/cc)	3.02



LEG	SITE	HOLE	CORE	SECT.
53	418	A	55	3

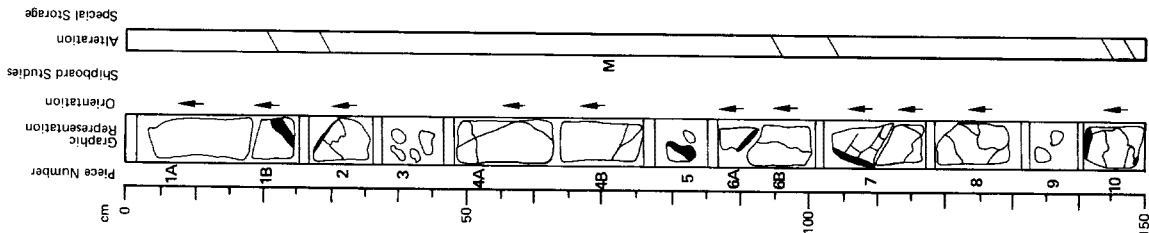
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Sparsely phyrlic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 1%, <2 mm, fresh; olivine phenocrysts 1%, <2 mm, mostly altered to smectite; clinopyroxene <1%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite. Vesicles <1%, filled with carbonate. Veins are filled with smectite, carbonate and minor pyrite. Some pyrite is also disseminated in groundmass. Slickensides are present on pieces 2, 4A, and 4B.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 68-71 cm 014.42 x 10⁻³
 NRM Inclination -26.6°
 Stable Inclination -29.6°



LEG	SITE	HOLE	CORE	SECT.
53	418	A	55	3

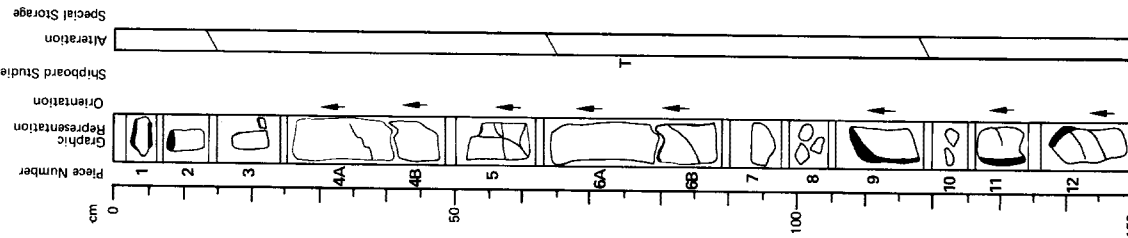
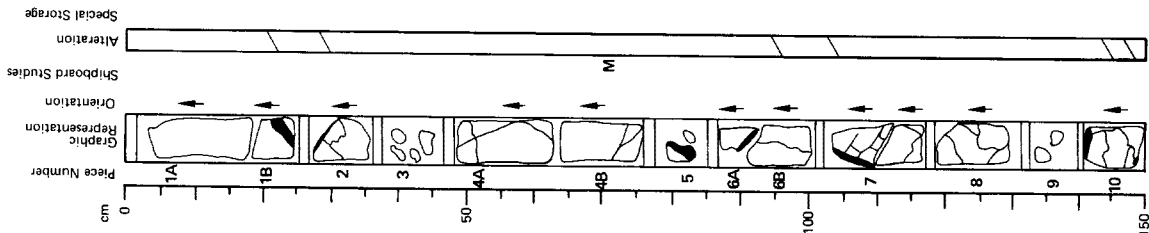
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Sparsely phyrlic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 1%, <2 mm, fresh; olivine phenocrysts 1%, <2 mm, mostly altered to smectite; clinopyroxene <1%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are completely altered to smectite. Vesicles <1%, filled with carbonate. Veins are filled with smectite, carbonate and minor pyrite. Some pyrite is also disseminated in groundmass. Slickensides are present on pieces 2, 4A, and 4B.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 68-71 cm 014.42 x 10⁻³
 NRM Inclination -26.6°
 Stable Inclination -29.6°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	55	4

Visual Description

Sparsely phyrlic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 1%, <6 mm, fresh; olivine phenocrysts 2%, <2 mm, generally altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite and zeolite(?). Vesicles 1%, filled with carbonate and smectite. Veins are filled with carbonate, smectite and minor pyrite. Piece 1 is altered sediment between two glass selvages; sediment is altered, now composed of silica and zeolite(?).

Thin Section Description

Location: 72 cm
 Texture: porphyritic - quench
 Phenocrysts: plagioclase 10%, <2 mm, olivine 3%, <0.5 mm
 Groundmass: plagioclase 10%, 0.3 mm, skeletal, opaques 10%, 0.01 mm; clinopyroxene 65%, radiating sheaves
 Vesicles: 2%, <0.3 mm round
 Alteration: olivine to smectite and carbonate; carbonate fills vesicles

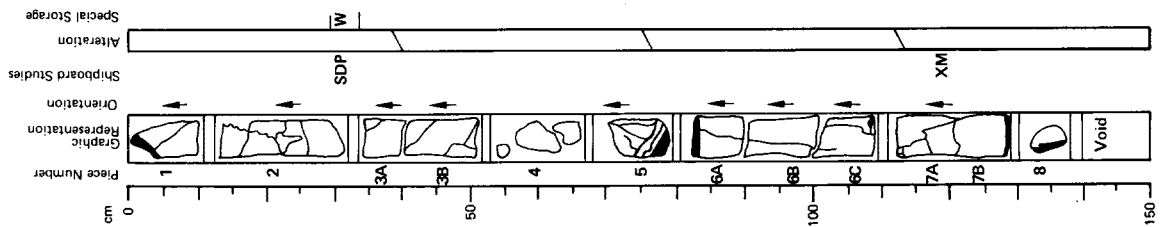
LEG	SITE	CORE	SECT.
5 3 4 1	8 A	5 5	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phryic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 1% < 8 mm, fresh; olivine phenocrysts 2% < 1 mm, partly altered to smectite; clinopyroxene phenocrysts < 1%, < 1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite and zeolite(?). Vesicles < 1%; filled with carbonate. Veins are filled with smectite, carbonate, zeolite(?) and minor pyrite. Minor pyrite is also disseminated in the groundmass.

Shipboard Data

Bulk Analysis:	118-120 cm	Magnetic Data:	118-120 cm
SiO ₂	49.83	NRM Intensity (emu/cc)	011.64 x 10 ⁻³
Al ₂ O ₃	15.72	NRM Inclination	+43.2°
Fe ₂ O ₃	10.63	Stable Inclination	+45.1°
MgO	7.07		
CaO	13.84	Physical Property Data:	28-30 cm
Ni ₂ O	N.D.	Vp (km/sec)	5.48
K ₂ O	0.04	Porosity (%)	5.09
TiO ₂	1.32	Wet Bulk Density (g/cc)	2.90
P ₂ O ₅	0.13	Grain Density (g/cc)	3.00
MnO	N.D.		
LOI	1.44		
H ₂ O ⁺	0.80		
H ₂ O ⁻	N.D.		
CO ₂	0.55		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



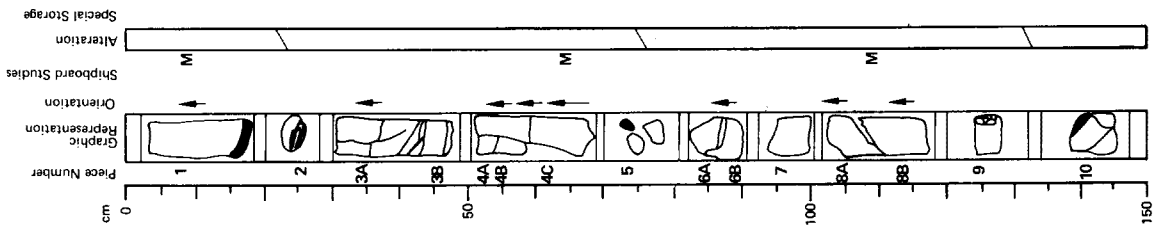
LEG	SITE	CORE	SECT.
5 5 4 1	8 A	5 5	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phryic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 1% < 3 mm, fresh; olivine phenocrysts 2% < 2 mm, generally altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Veins are filled with smectite and carbonate.

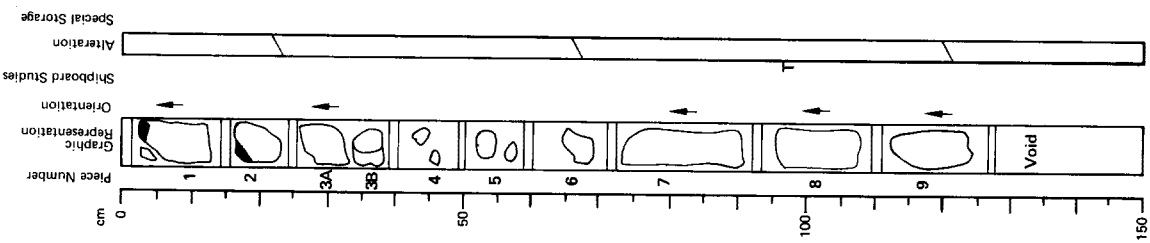
Shipboard Data

Magnetic Data:	6-8 cm	66-67 cm	110-112 cm
NRM Intensity (emu/cc)	021.68 x 10 ⁻³	009.50 x 10 ⁻³	010.49 x 10 ⁻³
NRM Inclination	+43.1°	+37.9°	-42.6°
Stable Inclination	+45.1°		-44.4°



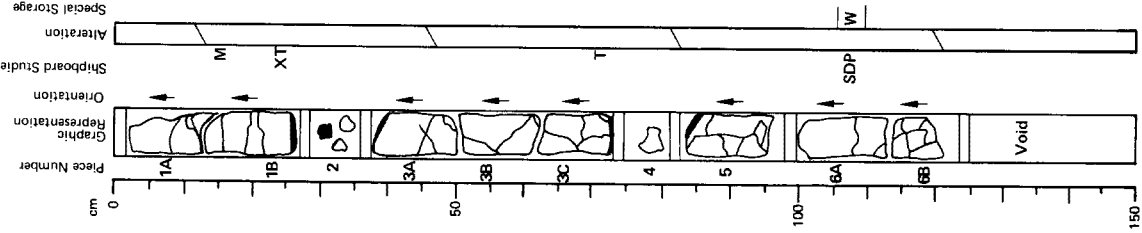
LEG	SITE	H O L E	CORE	SECT.
53	418A	5	5	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Sparsely phyrlic pillow basalt and highly phyrlic basalt. Sparsely phyrlic basalt comprises the upper half of the section to 72 cm. The highly phyrlic basalt comprises the lower part of the section. The sparsely phyrlic basalt is medium to dark gray, relatively fresh. Plagioclase phenocrysts 1% to 4 mm, fresh; olivine phenocrysts 2% to 2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Veins are filled with smectite and carbonate. Piece 5 is rich in smectite and may be altered glass and highly phyrlic basalt is medium to dark gray, relatively fresh. Plagioclase phenocrysts 12%, < 3 mm, fresh; olivine phenocrysts 8%, < 2 mm, altered to smectite; clinopyroxene phenocrysts 3%, < 1 mm, fresh. Groundmass is holocrystalline, fine-grained.

Thin Section Description
Location: 85 cm
Texture: porphyritic, interstitial to intergranular
Phenocrysts: olivine 8%, < 0.5 mm, subhedral; plagioclase 12%, < 3 mm; clinopyroxene 3%, < 0.5 mm, anhedral
Groundmass: olivine 5%, 0.05, anhedral; plagioclase 30%, 0.3 mm; clinopyroxene 35%, 0.15 mm, granular; opaques 5%, 0.01 mm, subhedral
Vesicles: 2%, < 0.6 mm, filled with carbonate, round
Alteration: olivine to smectite, carbonate fills vesicles



Visual Description
Moderately phyrlic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10-12%, < 6 mm, sometimes with inclusions of spinel, fresh; olivine phenocrysts 2%, < 2 mm, partly altered to smectite; clinopyroxene phenocrysts 3%, < 1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are altered to smectite. Vesicles 1.2%, < 0.5 mm, filled with carbonate. Veins are filled with smectite and carbonate.

Thin Section Description
Location: 24 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, < 0.5 mm, subhedral; plagioclase 25%, < 4 mm; clinopyroxene 3%, < 0.5 mm, subhedral; spinel tr, 0.15 mm, anhedral
Groundmass: plagioclase 5%, 0.2 mm, skeletal; opaques 1%, 0.01 mm, anhedral; clinopyroxene 60%, radiating sheaves
Vesicles: 2%, 0.5 mm, round
Alteration: olivine to carbonate and smectite; carbonate and manganese(?) fill vesicles

Thin Section Description
Location: 70 cm
Texture: porphyritic
Phenocrysts: olivine 5%, < 3 mm, subhedral; plagioclase 20%, < 5 mm, subhedral; seriate; clinopyroxene 2%, < 0.5 mm, anhedral
Groundmass: olivine 4%, 0.05 mm; plagioclase 30%, 0.3 mm, skeletal; clinopyroxene 30%, 0.1 mm, granular to sheaf-like; opaques 7%, 0.01 mm, < 0.3 mm, round
Alteration: olivine to smectite and minor carbonate, carbonate and manganese fill vesicles

LEG	SITE	H O L E	CORE	SECT.
53	418A	5	6	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Shipboard Data

Bulk Analysis: 22 24 cm	Magnetic Data:	16-18 cm
SiO ₂ 47.96	NRM Intensity (emu/cc)	008.03 x 10 ⁻³
Al ₂ O ₃ 16.50	NRM Inclination	-49.0°
Fe ₂ O ₃ 9.95	Stable Inclination	-49.4°
MgO 7.25	Physical Property Data:	104-106 cm
CaO 13.47	Vp (km/sec)	6.07
Na ₂ O N.D.	Porosity (%)	3.78
K ₂ O < 0.03	Wet Bulk Density (g/cc)	2.90
TiO ₂ 1.24	Grain Density (g/cc)	2.97
P ₂ O ₅ 0.11		
MnO N.D.		
LOI 0.67		
H ₂ O ⁺ 0.58		
H ₂ O ⁻ N.D.		
CO ₂ 0.81		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

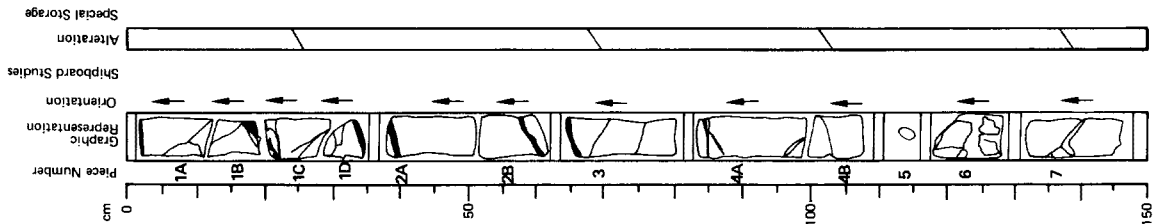
210

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5 3	4 1 8 A		5 6	2

Visual Description

Moderately phryic pillow basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 12%, <5 mm, fresh; olivine phenocrysts 2%, <2 mm, partly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are altered to smectite. Veins are filled with carbonate and smectite. Carbonate vug occurs in piece 7. Slickensides are present on pieces 2B and 4B. Pieces 4B, 5 and 6 are slightly brecciated.

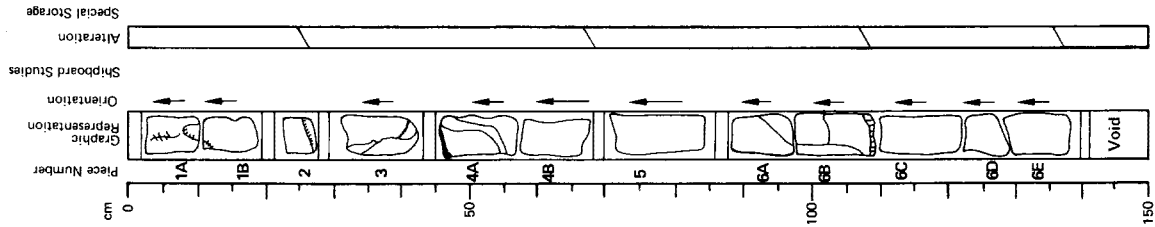


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
5 3	4 1 8 A		5 6	3

Visual Description

Moderately phryic basalt. Pieces 1 through 3 are a continuation of the pillow sequence of Section 2; piece 4A is the top of a massive cooling unit extending to Section 5. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8%, <6 mm, fresh; olivine phenocrysts 4.6%, <5 mm, mostly altered to smectite. Groundmass is fine-grained to glassy; glass selvage in piece 4A is altered to smectite. Vesicles <1%, filled with smectite and carbonate. Veins are filled with smectite, carbonate and minor pyrite.

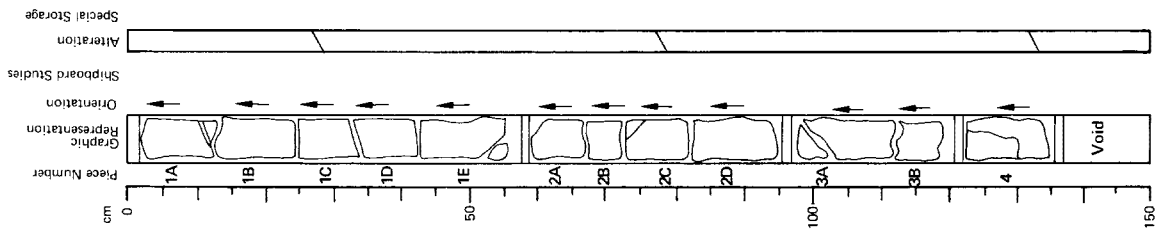


LEG	SITE	HOLE	CORE	SECT.
5	3418	A	56	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phyrlic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 8-10%, <4 mm, fresh; olivine phenocrysts 3%, <2 mm, mostly fresh with only minor alteration to smectite. Groundmass is fine-grained, holocrystalline. Sparse vesicles are filled with carbonate and smectite. Minor pyrite is disseminated in the groundmass.



LEG	SITE	HOLE	CORE	SECT.
5	3418	A	56	5

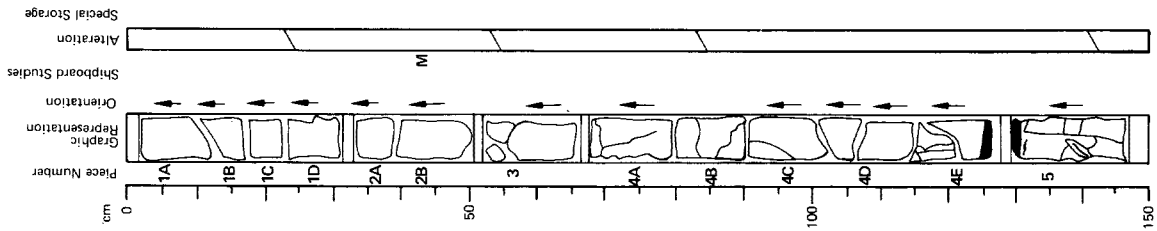
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phyrlic basalt. Pieces 1 through 4C are a continuation of the massive cooling unit in Section 4; piece 5 is the top of a pillow basalt sequence. Basalt is medium gray; weakly altered. Plagioclase phenocrysts 10%, <5 mm, fresh; olivine phenocrysts 5%, <3 mm, altered to smectite. Groundmass is fine-grained to glassy with glass selvages only on pieces 4A and 5; glass selvages are slightly altered to smectite. Veins are filled with smectite, carbonate and minor pyrite. Minor pyrite is also disseminated in the groundmass.

Shipboard Data

Magnetic Data:
 Length: 42.44 cm
 NRM Intensity (emu/cc): 006.07 x 10⁻³
 NRM Inclination: -59.9°
 Stable Inclination: -50.0°

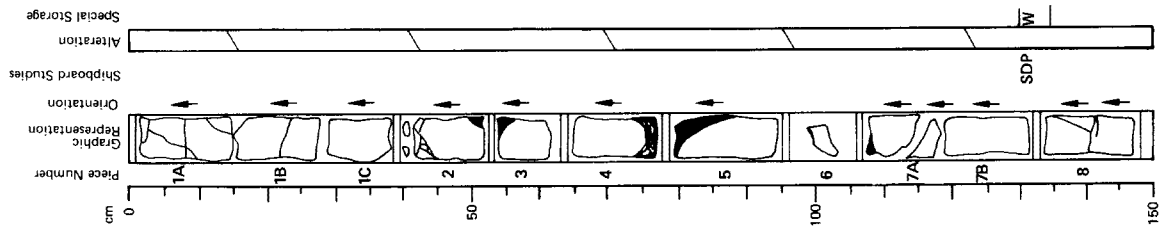


LEG	SITE	HOLE	CORE	SECT.
53418A	56	7		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phyrlic pillow basalt. Basalt is gray to greenish-gray; weakly altered. Plagioclase phenocrysts 8-12%, < 6 mm, fresh; olivine phenocrysts 2%, < 1 mm, partly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to palagonite and smectite. Vesicles 1%, filled with smectite, carbonate, zeolite and minor pyrite.

Shipboard Data
Physical Property Data:
Vp (km/sec) 128-131 cm
Porosity (%) 5.75
Wet Bulk Density (g/cc) 4.25
Grain Density (g/cc) 2.89



LEG	SITE	HOLE	CORE	SECT.
53418A	56	7		

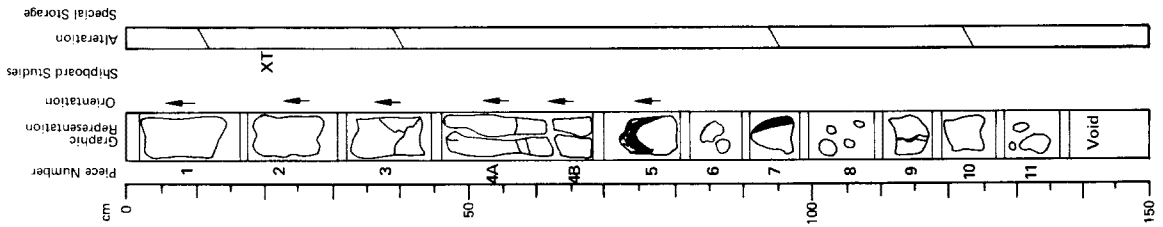
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phyrlic pillow basalt. Basalt is medium gray to greenish-gray; weakly altered. Plagioclase phenocrysts 10%, < 5 mm, fresh; olivine phenocrysts 5%, < 3 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite and palagonite. Vesicles 1%, < 1 mm, filled with smectite and carbonate. Veins are filled with smectite and minor pyrite. Some pyrite is also disseminated in groundmass.

Thin Section Description
Location: 21 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, < 0.8 mm, euhedral; plagioclase 15%, < 3 mm, subhedral; clinopyroxene 2%, < 0.8 mm, subhedral
Groundmass: olivine 4%, < 0.3 mm, subhedral; plagioclase 25%, < 0.5 mm, acicular; clinopyroxene 39%, radiating sheaves; opaques 6%, 0.01, granular; glass 5%
Vesicles: 1%, 0.5 mm, round
Alteration: olivine to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data

Bulk Analysis: 20-22 cm
SiO₂ 49.86
Al₂O₃ 16.89
Fe₂O₃ 11.22
MgO 6.09
CaO 11.91
Na₂O N.D.
K₂O < 0.03
TiO₂ 1.38
P₂O₅ 0.15
MnO N.D.
LOI 0.83
H₂O⁺ 0.71
H₂O⁻ N.D.
CO₂ 0.25
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.



LEG	SITE	HOLE	CORE	SECT.
5	3418	A	57	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

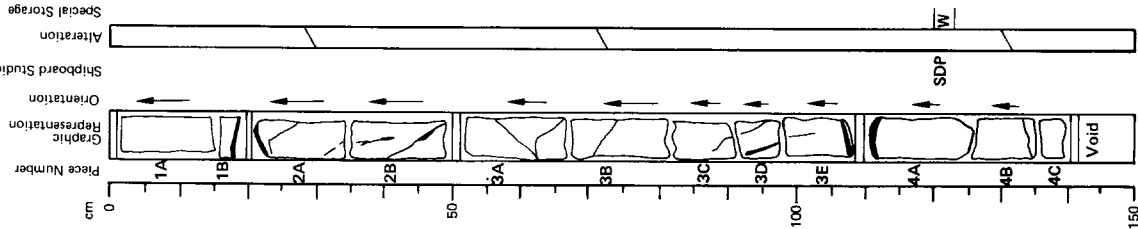
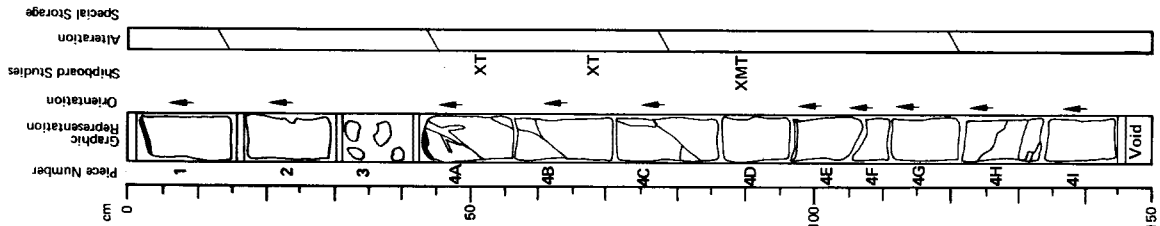
Visual Description
Moderately phryic pillow basalt. Basalt is medium gray to greenish gray; weakly altered. Plagioclase phenocrysts 8-12%, <4 mm, fresh; olivine phenocrysts 2-4%, <1 mm, partly altered to smectite; clinopyroxene phenocrysts 3-5%, <1 mm, fresh. Groundmass is fine-grained to glassy. Glass selvages are mostly altered to smectite. Vesicles 1%, filled with smectite and carbonate. Veins are filled with smectite, carbonate and minor pyrite. Piece 3 consists of silicified sediment.

Thin Section Descriptions

Location: 65 cm
Texture: porphyritic - quench
Phenocrysts: olivine 4%, <1 mm, euhedral; plagioclase 15%, <1.5 mm, subhedral; clinopyroxene 5%, subophitic
Groundmass: olivine 1%, <0.3 mm, subhedral; plagioclase 20%, <0.5 mm, acicular; clinopyroxene 52%, radiating sheaves; opaques 2%, 0.01, granular
Vesicles: 1%, <2 mm, round
Alteration: olivine and minor groundmass to smectite and carbonate; carbonate fills vesicles
Location: 68 cm
Texture: porphyritic - quench
Phenocrysts: olivine 5%, <0.8 mm, euhedral; plagioclase 12%, <3 mm, euhedral; clinopyroxene 5%, <1 mm, subophitic
Groundmass: plagioclase 30%, <0.5 mm, acicular; clinopyroxene 30%, radiating sheaves; opaques 8%, 0.01 mm, granular; glass 5%
Vesicles: 5%, <2 mm, round
Alteration: olivine and some groundmass to smectite; carbonate and smectite fill vesicles
Location: 90 cm
Texture: porphyritic - quench
Phenocrysts: olivine 2%, 0.4 mm, euhedral; plagioclase 12%, <3.5 mm, euhedral glomerocrysts; clinopyroxene 1%, 0.3 mm, subophitic
Groundmass: plagioclase 35%, 0.7 mm, acicular; clinopyroxene 35%, radiating sheaves; opaques 8%, 0.05 mm, granular to lath-shaped; glass 5%, altered
Vesicles: 2%, <0.8 mm, round
Alteration: olivine and glass to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data

50-54 cm	67-68 cm	90-92 cm	Magnetic Data:
Bulk Analysis:	49.86	48.69	NRM Intensity (emu/cc)
SiO ₂	16.42	15.37	011.32 x 10 ⁻³
Al ₂ O ₃	10.90	11.34	NRM Inclination
Fe ₂ O ₃	5.48	5.89	-17.8°
MgO	12.48	13.16	Stable Inclination
CaO	N.D.	N.D.	-29.5°
Na ₂ O	0.15	0.04	
K ₂ O	1.49	1.41	
TiO ₂	0.22	0.17	
P ₂ O ₅	N.D.	N.D.	
MnO	1.44	0.77	
LOI	0.88	0.79	
H ₂ O ⁺	N.D.	N.D.	
H ₂ O ⁻	0.60	0.15	
CO ₂	N.D.	N.D.	
Cr	N.D.	N.D.	
Ni	N.D.	N.D.	
Sr	N.D.	N.D.	
Zr	N.D.	N.D.	



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 8-12%, <6 mm, fresh; olivine phenocrysts 1-2%, <1 mm, mostly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly fresh with only minor alteration to palagonite. Vesicles 0.5%, filled with smectite and carbonate. Veins are filled with smectite, carbonate, zeolite(?) and minor pyrite.

Shipboard Data

Physical Property Data:	119-121 cm	122-124 cm
Vp (km/sec)	5.69	5.77
Porosity (%)	3.69	
Wet Bulk Density (g/cc)	2.85	
Grain Density (g/cc)	2.92	

LEG	SITE	HOLE	CORE	SECT.
5	3418	A	57	2

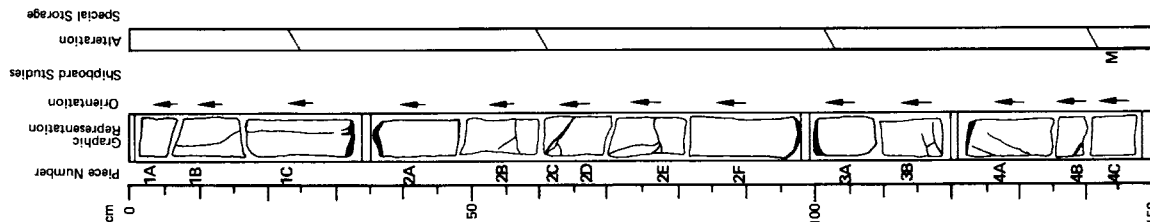
364

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
53418A			573	

Visual Description
Moderately phryic pillow basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 8-15%, <6 mm, fresh; olivine phenocrysts 2%, <1 mm, most altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly fresh with minor palagonite alteration. Vesicles 0-5%, filled with smectite. Veins are filled with carbonate, smectite, zeolite(?) and minor pyrite.

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 143-145 cm
NRM Inclination 025.45 x 10⁻³
Stable Inclination -39.3°
-39.5°



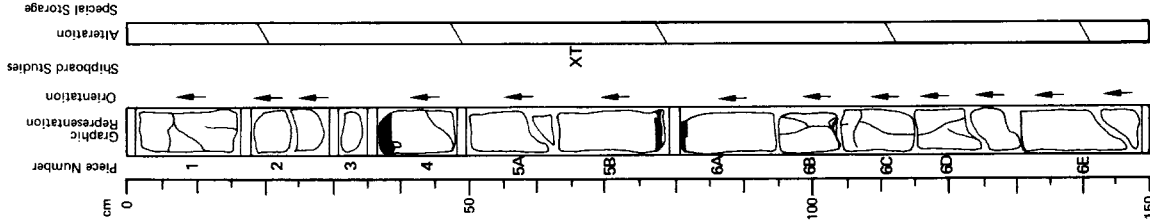
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
53418A			574	

Visual Description
Moderately phryic pillow basalt. Basalt is gray to greenish-gray; weakly altered. Plagioclase phenocrysts 10-15%, <7 mm, fresh; olivine phenocrysts 2%, <1.5 mm, altered to smectite; clinopyroxene phenocrysts 2%, <1 mm, in subophitic clots with plagioclase, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to palagonite and smectite. Vesicles 1%, <2 mm, filled with smectite and carbonate. Veins are filled with smectite, carbonate, zeolite(?) and pyrite.

Thin Section Description
Location: 65 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, <1 mm, euhedral; plagioclase 15%, <3 mm, subhedral, clinopyroxene 2%, <1 mm, subophitic
Groundmass: olivine 2%, <0.4 mm, euhedral; plagioclase 25%, <0.5 mm, acicular; clinopyroxene 41%, radiating sheaves; opaques 6%, 0.02 mm, granular; glass 5%
Vesicles: 1%, <2 mm, round
Alteration: olivine and minor groundmass to smectite and carbonate; carbonate fills vesicles

Shipboard Data
Bulk Analysis: 66-68 cm
SiO₂ 47.85
Al₂O₃ 15.99
Fe₂O₃ 11.36
MgO 5.90
CaO 12.70
Na₂O N.D.
K₂O 0.08
TiO₂ 1.47
P₂O₅ 0.15
MnO N.D.
LOI 1.06
H₂O⁺ 0.68
H₂O⁻ N.D.
CO₂ 0.40
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.

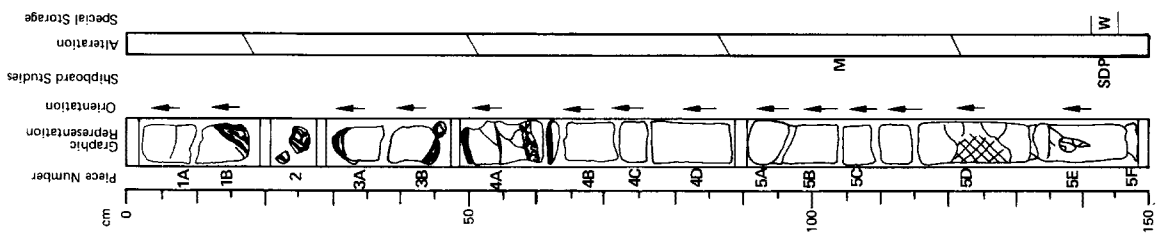


LEG	SITE	HOLE	CORE	SECT.
53	418	A	57	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Upper part of section to 62 cm is pillowed; lower part is massive cooling unit which continues into Section 6. Basalt is medium gray to greenish-gray; weakly altered. Plagioclase phenocrysts 12-15%, <5 mm, fresh; olivine phenocrysts 3%, <2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite, carbonate and pink zeolite(?). Vesicles 1.2%, filled with smectite, carbonate and pyrite. Piece 5D contains an inclusion composed of quartz, carbonate and smectite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 105-107 cm
 006.22 x 10⁻³
 NRM Inclination -25.6°
 Stable Inclination -32.2°
 Physical Property Data:
 Vp (km/sec) 141-143 cm
 Porosity (%) 5.66
 4.40
 Wet Bulk Density (g/cc) 2.86
 Grain Density (g/cc) 2.95

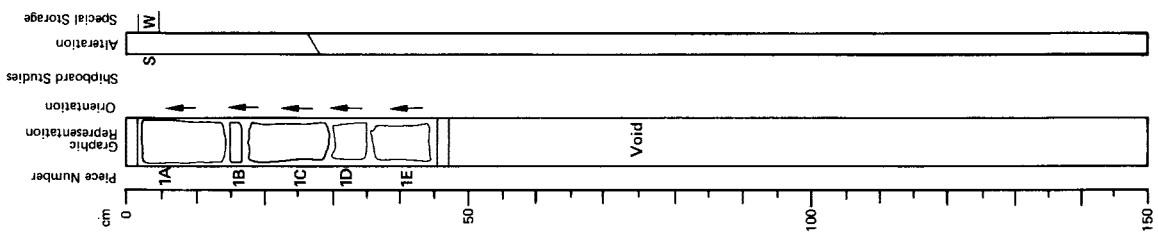


LEG	SITE	HOLE	CORE	SECT.
53	418	A	57	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 12-15%, <5 mm, fresh; olivine phenocrysts 2%, <3 mm, altered to smectite. Groundmass is holocrystalline, fine-grained.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 4.6 cm
 5.50

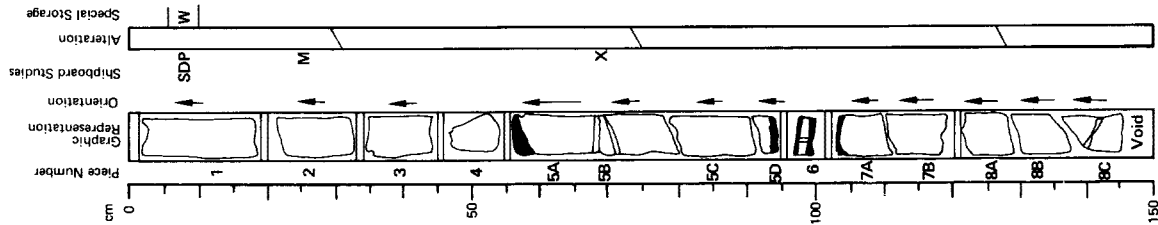


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
53	418	A	58	1

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 8-12%, <5 mm, fresh; olivine phenocrysts 5%, <2 mm, partly replaced by smectite. Olivine groundmass is fine-grained to glassy; glass selvages are mostly fresh with some alteration. Vesicles 0.5%, filled with carbonate and zeolite(?). Veins are filled with carbonate, smectite and pyrite.

Shipboard Data	Magnetic Data:
Bulk Analysis: 68-70 cm	NRM Intensity (emu/cc) 015.47 x 10 ⁻³
SiO ₂ 45.23	NRM Inclination -22.2°
Al ₂ O ₃ 15.27	Stable Inclination -23.0°
Fe ₂ O ₃ 13.26	
MgO 5.86	
CaO 13.80	
Na ₂ O N.D.	Physical Property Data:
K ₂ O 0.24	Vp (km/sec) 5.60
TiO ₂ 1.56	Porosity (%) 3.80
P ₂ O ₅ 0.16	Wet Bulk Density (g/cc) 2.90
MnO N.D.	Grain Density (g/cc) 2.98
LOI 1.84	
H ₂ O ⁺ 1.16	
H ₂ O ⁻ N.D.	
CO ₂ 1.09	
Cr N.D.	
Ni N.D.	
Sr N.D.	
Zr N.D.	

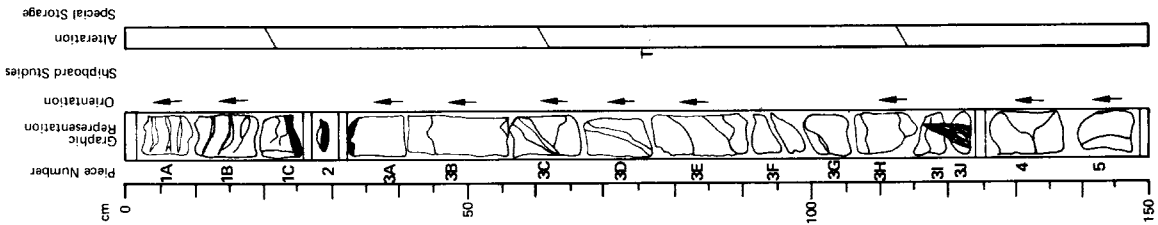


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O E	CORE	SECT.
53	418	A	58	2

Visual Description
 Moderately to highly phyrlic pillow basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 15-20%, <2 mm, fresh; olivine phenocrysts 2%, <2 mm, altered to smectite. Clinopyroxene phenocrysts 1.2%, <3 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite and zeolite(?). Vesicles 1-2%, smectite and silica. Veins are filled with smectite, carbonate and pyrite. Stickensides are present on many fractures.

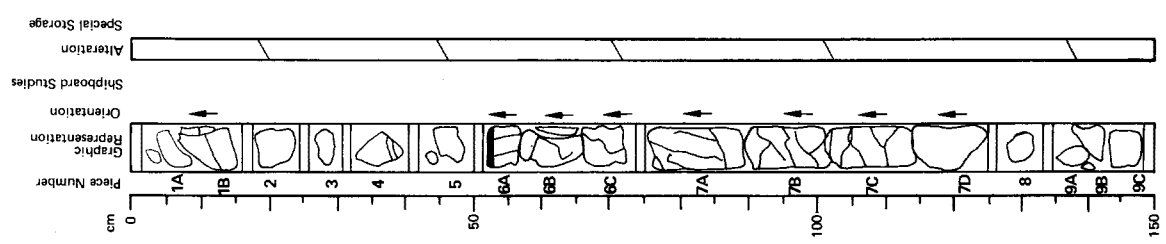
Thin Section Description
 Location: 75 cm
 Texture: porphyritic; quench
 Phenocrysts: olivine 2%, <1 mm, subhedral; plagioclase 20%, <3 mm, subhedral; clinopyroxene 2%, <0.3 mm, anhedral
 Groundmass: olivine 1%, 0.25 mm; plagioclase 15%, <0.5 mm; clinopyroxene 50%, radiating sheaves; opaques 8%, 0.01 mm, euhedral
 Vesicles: 2%, <0.5 mm, round
 Alteration: olivine to smectite; smectite fills vesicles



LEG	SITE	HOLE	CORE	SECT.
53	418	A	58	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is gray to greenish-gray; weakly altered. Plagioclase phenocrysts 10-15%, <7 mm, fresh, some with inclusions of spinel; olivine phenocrysts 2%, <3 mm, altered to smectite; clinopyroxene phenocrysts 1%, <1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1-2%, <2 mm, filled with carbonate and smectite. Veins are filled with smectite, carbonate and minor pyrite. Groundmass is slightly altered to smectite. Stickensides occur on many fractures.



LEG	SITE	HOLE	CORE	SECT.
53	418	A	58	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic basalt. Basalt is gray to greenish-gray; weakly to moderately altered. Plagioclase phenocrysts 10%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <1 mm, fresh. Groundmass is fine-grained to glassy; no glass selvages were recovered but groundmass has glassy intersertal texture. Vesicles 1-2%, filled with smectite, zeolite(?) and pyrite. Veins are filled with smectite, carbonate, zeolite(?) and minor pyrite.

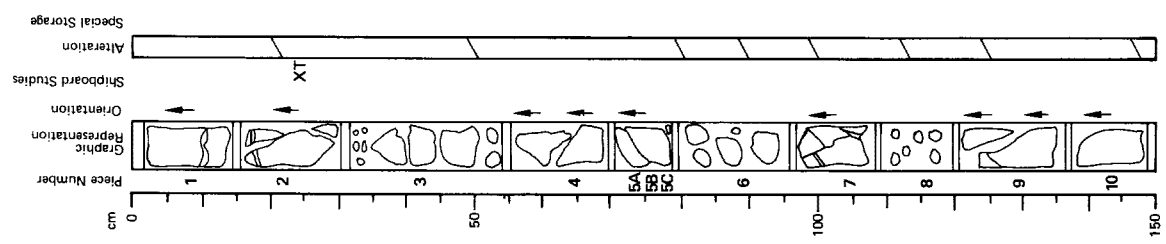
Thin Section Description

Location: 25 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine <1%, 0.3 mm, euhedral; plagioclase 10%, <2 mm; clinopyroxene 1%, 0.3 mm, anhedral
 Groundmass: plagioclase 25%, <0.6 mm, skeletal, seriate; clinopyroxene 55%, radiating sheaves; opaques 8%, 0.01 mm, euhedral, some laths <0.3 mm
 Vesicles: 1%, 0.2 mm, round
 Alteration: olivine to smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 25.27 cm

SiO ₂	49.14
Al ₂ O ₃	15.62
Fe ₂ O ₃	13.31
MgO	6.79
CaO	12.73
Na ₂ O	N.D.
K ₂ O	0.14
TiO ₂	1.57
P ₂ O ₅	0.18
MnO	N.D.
LOI	1.34
H ₂ O ⁺	0.98
H ₂ O	N.D.
CO ₂	0.35
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.



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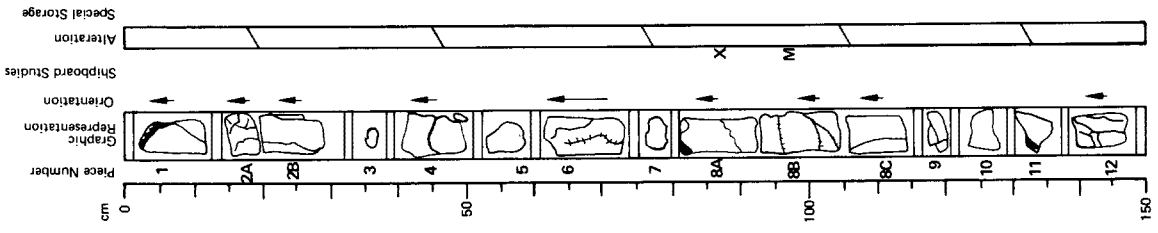
LEG	SITE	HOLE	CORE	SECT.
53418A	59	1		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, <5 mm, fresh; olivine phenocrysts 1%, <2 mm, partly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly altered to smectite. Vesicles 1%, filled with carbonate and smectite. Scattered veins are also filled with carbonate and smectite. Piece 2A is brecciated with a matrix of carbonate and smectite. Zeolite (?) occurs in piece 1.

Shipboard Data

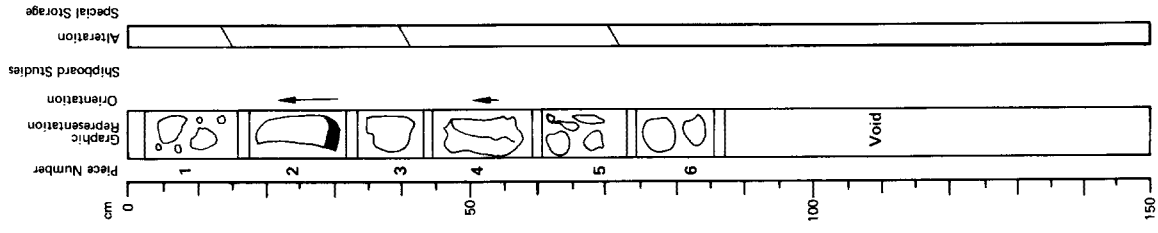
Bulk Analysis:	84.86 cm	Magnetic Data:	97.99 cm
SiO ₂	48.67	NRM Intensity (emu/cc)	034.93 x 10 ⁻³
Al ₂ O ₃	15.88	NRM Inclination	27.2
Fe ₂ O ₃	11.60	Stable Inclination	27.9
MgO	6.12		
CaO	13.36		
Na ₂ O	N.D.		
K ₂ O	0.08		
TiO ₂	1.62		
P ₂ O ₅	0.14		
MnO	N.D.		
LOI	1.63		
H ₂ O*	1.15		
H ₂ O	N.D.		
CO ₂	0.77		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



LEG	SITE	HOLE	CORE	SECT.
53418A	58	5		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is gray to greenish-gray; weakly altered. Plagioclase phenocrysts 10%, <5 mm, fresh; olivine phenocrysts 1%, <2 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvage in piece 2 is partly altered to smectite. Veins are common, filled with smectite and often stickensided.

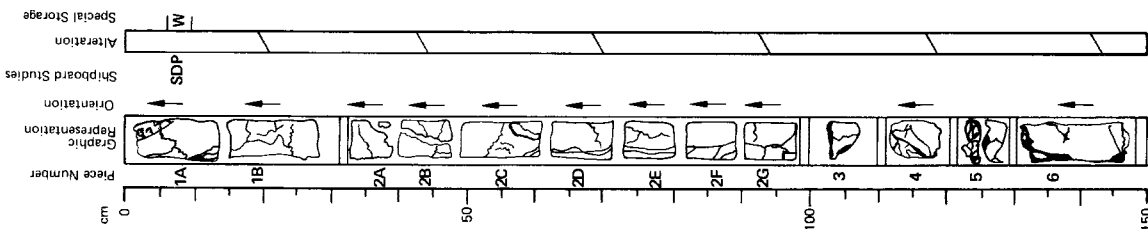


LEG	SITE	HOLE	CORE	SECT.
534	18A	59	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8-12%, <2 mm, fresh; olivine phenocrysts 3%, <1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to dark green smectite. Veins are scattered throughout, filled with coarsely crystalline carbonate and smectite. Pyrite is present in piece 2D. Minor breccia occurs in piece 4.

Shipboard Data
Physical Property Data:
Vp (km/sec) 7.9 cm
Porosity (%) 5.70
Wet Bulk Density (g/cc) 6.43
Grain Density (g/cc) 2.81
2.93

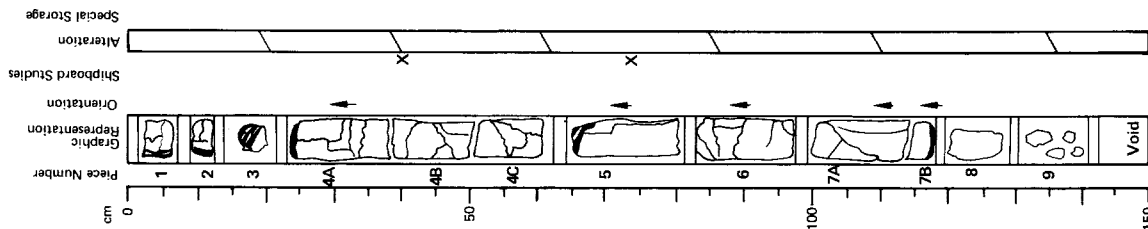


LEG	SITE	HOLE	CORE	SECT.
534	18A	59	3	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 7-10%, <5 mm, fresh; olivine phenocrysts 1-2%, generally altered to smectite. Groundmass is fine-grained to glassy; glass selvages are mostly fresh, some are partly altered to dark green smectite. Vesicles 1%, filled with smectite and carbonate. Veins are scattered throughout, filled with smectite and carbonate. Minor disseminated pyrite is present in the groundmass.

Shipboard Data
Bulk Analysis: 40-42 cm 74-76 cm
SiO₂ 48.36 50.12
Al₂O₃ 15.09 15.02
Fe₂O₃ 12.23 12.83
MgO 10.74 10.74
Na₂O N.D. N.D.
K₂O 0.11 0.50
TiO₂ 1.57 1.50
P₂O₅ 0.17 0.11
MnO N.D. N.D.
LOI 1.48 2.34
H₂O⁺ 1.22 1.96
H₂O⁻ N.D. N.D.
CO₂ 0.47 0.42
Cr N.D. N.D.
Ni N.D. N.D.
Sr N.D. N.D.
Zr N.D. N.D.



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VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

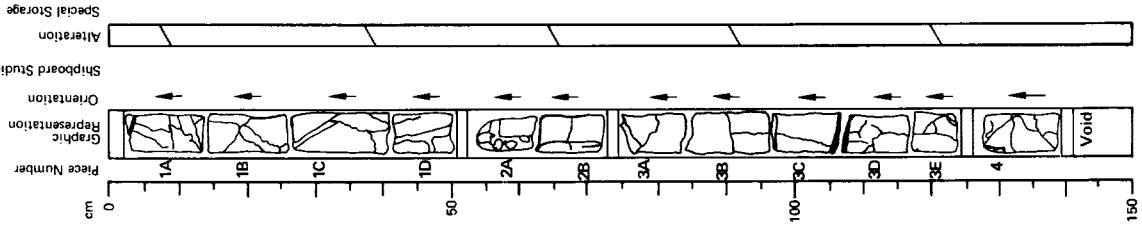
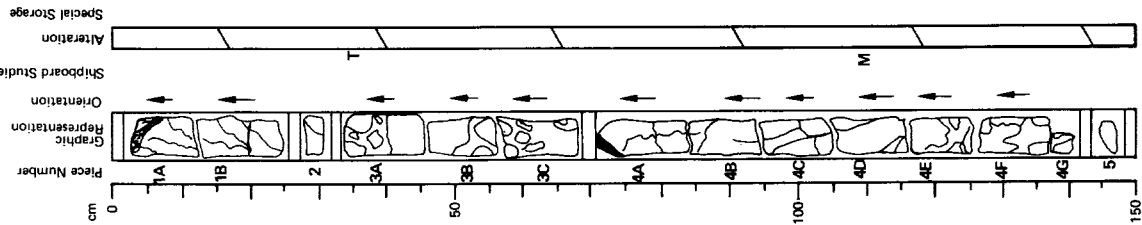
LEG	SITE	HOLE	CORE	SECT.
53	418	A	59	4

LEG	SITE	HOLE	CORE	SECT.
53	418	A	59	4

Visual Description
 Moderately phryic pillow basalt and minor basalt breccia. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 1-2%, <2 mm, generally altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Minor breccia occurs in pieces 2, 3 and 4; breccia consists of angular fragments of crystalline basalt in a matrix of dark green smectite, carbonate and zeolite(?).

Thin Section Description
 Location: 35 cm
 Texture: porphyritic - glassy
 Phenocrysts: olivine 3%, <2.5 mm, euhedral; plagioclase 5%, <3 mm, euhedral
 Groundmass: plagioclase 2%, <0.3 mm, skeletal; glass 88%, partly devitrified
 Vesicles: <1%, 0.1 mm, round, in glass
 Alteration: olivine to carbonate and smectite, smectite fills vesicles; glass to carbonate and silica

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 110-112 cm 015.06 x 10⁻³
 NRM Inclination -15.1°
 Stable Inclination -17.7°



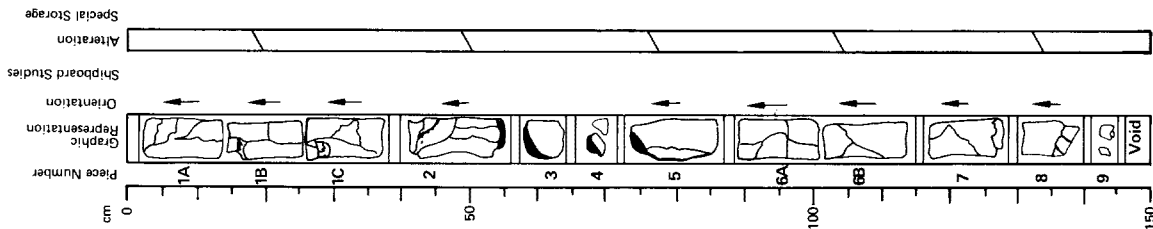
Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 6%, <4 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <5 mm, fresh, euhedral, occur only below 107 cm. Groundmass is fine-grained to glassy; glass selvages are mostly fresh with only minor alteration to smectite. Vesicles 1%, filled with carbonate. Veins are scattered throughout, filled with carbonate and smectite.

LEG	SITE	HOLE	CORE	SECT.
53	418	A	59	5

LEG	SITE	HOLE	CORE	SECT.
53	418A		59	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phyrlic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8-10%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts, 1 grain, 4 mm, in piece 3. Groundmass is fine-grained to glassy; glass selvages are partly altered to dark green smectite. Vesicles <1%, filled with carbonate. Scattered veins are filled with carbonate and smectite. Zeolite occurs in altered selvage in piece 3.



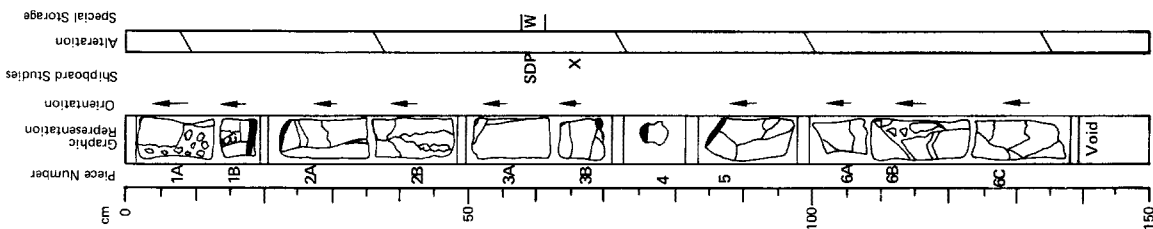
LEG	SITE	HOLE	CORE	SECT.
53	418A		59	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phyrlic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 7%, <6 mm, fresh; olivine phenocrysts 1.2%, <1 mm, partly altered to smectite; clinopyroxene phenocrysts <1%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite but fresh glass is present throughout. Vesicles <1%, filled with carbonate. Veins are present throughout, filled with smectite, carbonate, minor pyrite and minor zeolite(?).

Shipboard Data

Bulk Analysis:	65.67 cm	Magnetic Data:	59.61 cm
SiO ₂	48.91	Vp (km/sec)	5.45
Al ₂ O ₃	15.64	Porosity (%)	6.20
Fe ₂ O ₃	11.80	Wet Bulk Density (g/cc)	2.83
MgO	5.95	Grain Density (g/cc)	2.95
CaO	12.63		
Na ₂ O	N.D.		
K ₂ O	0.12		
TiO ₂	1.60		
P ₂ O ₅	0.17		
MnO	N.D.		
LOI	1.09		
H ₂ O ⁺	0.90		
H ₂ O ⁻	N.D.		
CO ₂	0.31		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

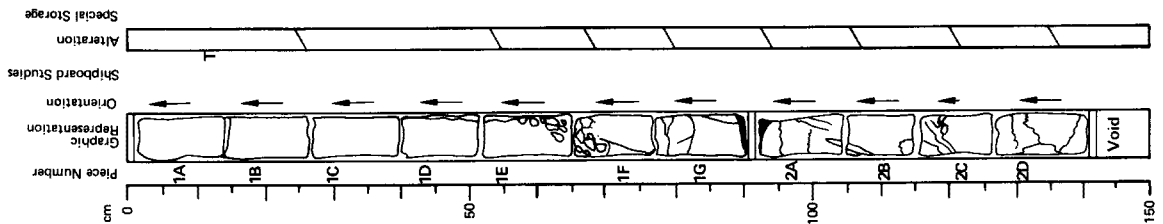
LEG	SITE	H	O	CORE	SECT.
53	418A	6	0	1	1

Visual Description

Moderately phryic pillow basalt. Basalt is medium to dark gray, some brown staining in lower part of section; weakly altered. Plagioclase phenocrysts 5-10%, <5 mm, fresh, most abundant in upper half of section; olivine phenocrysts 2%, <1 mm, mostly altered to smectite; clinopyroxene phenocrysts 1%, <1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly fresh with minor alteration to smectite. Vesicles 1-2%, filled with smectite, carbonate and zeolite(?). Scattered veins are filled with smectite, carbonate, iron oxides and minor pyrite. The basalt is incipiently brecciated below 60 cm.

Thin Section Description

Location: 12 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 1%, <1.3 mm, euhedral; plagioclase 10%, <3.5 mm, euhedral; clinopyroxene <1%, <0.8 mm, subophitic
 Groundmass: plagioclase 35%, <0.5 mm, acicular; clinopyroxene 45%, 0.15 mm, granular; opaque 7%, 0.01 mm, granular
 Vesicles: 2%; 0.8 mm, round
 Alteration: olivine to smectite; smectite and carbonate fill vesicles



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H	O	CORE	SECT.
53	418A	6	0	2	2

Visual Description

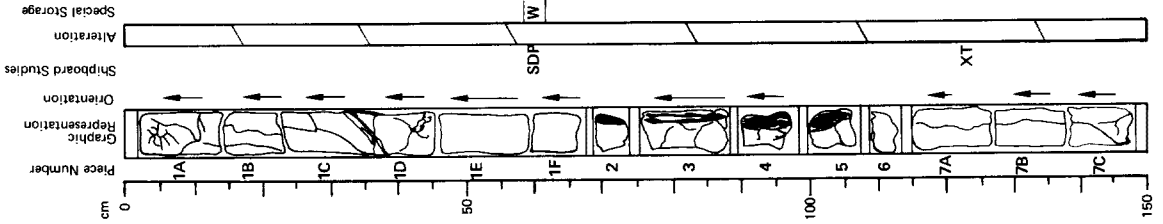
Sparingly to moderately phryic pillow basalt. Basalt is mostly medium to dark gray, stained brown in upper part; weakly altered. Plagioclase phenocrysts 4-12%, <7 mm, fresh, most abundant in the lower part of section; olivine phenocrysts 2%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <3 mm, subhedral oriented toward top of section. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 2%, <3 mm, filled with smectite and carbonate. Scattered veins are filled with amictite and carbonate.

Thin Section Description

Location: 124 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 2%, <1.5 mm, euhedral; plagioclase 10%, <2.5 mm, subhedral
 Groundmass: plagioclase 5%, <0.3 mm, skeletal; clinopyroxene 72%, radiating sheaves; opaques <1%, 0.3 mm; pyrite(?)
 Vesicles: 1%; 0.7 mm, round
 Alteration: olivine to carbonate and smectite. Smectite and carbonate fill vesicles and replace groundmass

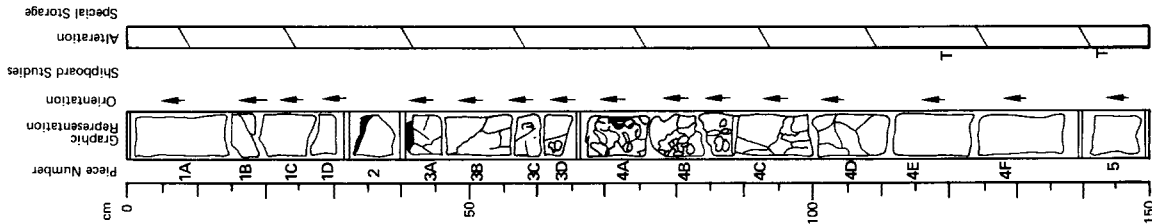
Shipboard Data

Bulk Analysis: 123-126 cm	Physical Property Data:	60.62 cm
SiO ₂ 48.07	Vp (tkm/sec)	5.69
Al ₂ O ₃ 16.67	Porosity (%)	5.14
Fe ₂ O ₃ 12.69	Wet Bulk Density (g/cc)	2.85
MgO 6.56	Grain Density (g/cc)	2.95
CaO 12.82		
N ₂ O N.D.		
K ₂ O < 0.03		
TiO ₂ 1.59		
P ₂ O ₅ 0.13		
MnO N.D.		
LOI 0.85		
H ₂ O ⁺ 0.82		
H ₂ O ⁻ N.D.		
CO ₂ 0.19		
Cr N.D.		
Ni N.D.		
Zr N.D.		



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53418A	610	3		



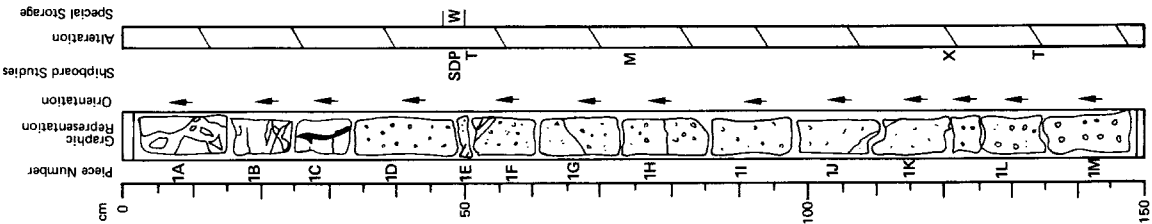
Visual Description
 Sparingly to moderately phryic pillow basalt. Basalt is medium to dark gray, moderately altered. Plagioclase phenocrysts 2-6%, < 8 mm, fresh, olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 2 mm, often intergrown with plagioclase, fresh. Groundmass is fine-grained to glassy, glass selvages are partly altered to smectite, fresh glass occurs in piece 2. Vesicles 1%, filled with smectite, carbonate and zeolite(?). Scattered veins are filled with carbonate, smectite, silica and minor zeolite(?). In pieces 2, 4D and 5 the basalt is incipiently brecciated.

Thin Section Description
 Location: 122 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 2%, < 2 mm, euhedral; plagioclase 20%, < 4 mm, subhedral
 Groundmass: plagioclase 20%, < 0.4 mm, skeletal; clinopyroxene 48%, radiating sheaves; opaques 8%, 0.05 mm, laths
 Vesicles: 2%, 0.3 mm, round
 Alteration: olivine to carbonate and smectite. Smectite, carbonate and silica(?) fill veinlets and vesicles

Thin Section Description
 Location: 142 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 4%, 0.6 mm, euhedral; plagioclase 12%, < 4 mm, euhedral; clinopyroxene < 1%, 0.2 mm, rounded
 Groundmass: plagioclase 30%, < 0.5 mm, acicular; clinopyroxene 46%, radiating sheaves; opaques 8%, 0.01 mm, granular
 Vesicles: < 1%, < 0.5 mm round
 Alteration: olivine to smectite; smectite and carbonate fill vesicles

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53418A	610	4		



Visual Description
 Sparingly phryic pillow basalt 0 to 25 cm, sparsely phryic massive basalt 25 to 150 cm. Pillow basalt is medium to dark gray, moderately altered. Plagioclase phenocrysts 2%, < 4 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 1 mm, intergrown with plagioclase, fresh. Groundmass is fine-grained. Vesicles 1-2%, < 2 mm, filled with smectite and carbonate. Numerous veinlets are filled with carbonate, smectite and silica. Massive basalt is medium to dark gray with brownish discoloration along fractures and veins; moderately altered. Plagioclase phenocrysts 4.5%, < 7 mm, fresh. Groundmass is fine- to medium-grained with grain size increasing downward. Vesicles 7-10%, < 2 mm, filled with carbonate and smectite. Veins are sparse, filled with smectite, carbonate and minor pyrite.

Thin Section Description
 Location: 50 cm
 Texture: porphyritic - quench
 Phenocrysts: plagioclase 8%, < 1.5 mm, subhedral
 Groundmass: plagioclase 25%, 0.5 mm, skeletal; clinopyroxene 30%, radiating sheaves; opaques 8%, 0.03 mm glass 14%
 Vesicles: 15%, 1 mm, round
 Alteration: smectite and carbonate fill vesicles and veins; some glass to smectite

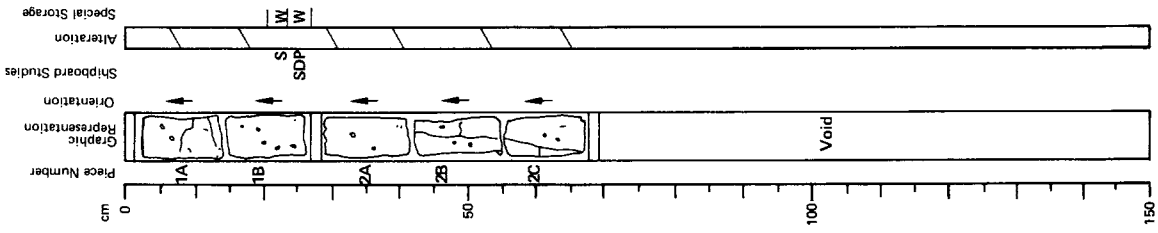
Thin Section Description
 Location: 132 cm
 Texture: porphyritic - subophitic
 Phenocrysts: plagioclase 5%, < 4 mm, subhedral
 Groundmass: olivine 5%, 0.4 mm, euhedral; plagioclase 30%, 0.5 mm; clinopyroxene 15%, anhedral; opaques 5%, 0.1 mm, subhedral; smectite 20%
 Vesicles: 20%, 1 mm, round
 Alteration: olivine to smectite; abundant interstitial smectite

Shipboard Data
 Bulk Analysis: 121-124 cm
 Magnetic Data: 74-76 cm
 SiO₂ 47.43 NRM Intensity (emu/cc) 008.17 x 10⁻³
 Al₂O₃ 15.28 NRM Inclination 6.8
 Fe₂O₃ 12.76 Stable Inclination 15.1
 MgO 5.76
 CaO 12.89 Physical Property Data: 47-49 cm
 Na₂O N.D. Vp (km/sec) 5.17
 K₂O 0.24 Porosity (%) 5.82
 TiO₂ 1.56 Wet Bulk Density (g/cc) 2.76
 P₂O₅ 0.15 Grain Density (g/cc) 2.87
 MnO N.D.
 LOI 1.90
 H₂O⁺ 1.18
 H₂O⁻ N.D.
 CO₂ 0.83
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

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LEG	SITE	HOLE	CORE	SECT.
53418A	60	6	0	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

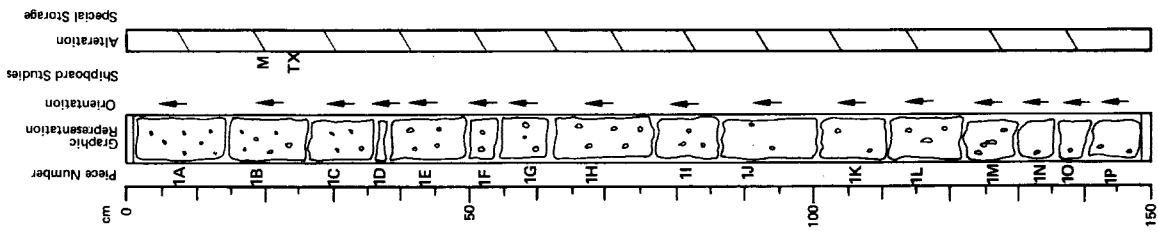


Visual Description
Moderately phryic massive basalt. Basalt is medium to dark gray; moderately altered. Plagioclase phenocrysts 7.9%, <4 mm, fresh. Groundmass is fine-grained with no glass selvages. Vesicles 2%, <1 mm, filled mostly with smectite. Minor veins are filled with smectite.

Shipboard Data
Physical Property Data: 21.23 cm
Vp (km/sec) 5.87
Porosity (%) 2.89
Wet Bulk Density (g/cc) 2.91
Grain Density (g/cc) 2.96

LEG	SITE	HOLE	CORE	SECT.
53418A	60	6	0	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



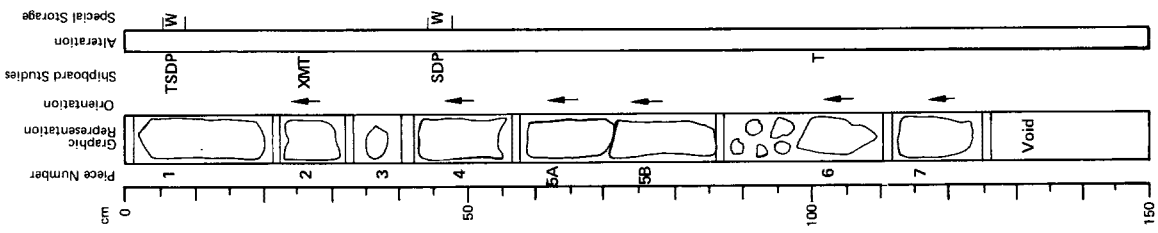
Visual Description
Sparsely phryic massive basalt. Basalt is medium to dark gray; moderately altered. Plagioclase phenocrysts 0.4%, <5 mm, fresh, most abundant in lower part of section. Groundmass is fine-grained to glassy but with no glassy selvages. Vesicles 5%, filled with smectite, carbonate and minor pyrite. Veins are scattered throughout, filled with carbonate, smectite, zeolite(?) and minor pyrite.

Thin Section Description
Location: 25 cm
Texture: porphyritic - intersertal
Phenocrysts: plagioclase 4%, <4 mm, euhedral
Groundmass: plagioclase 30%, <1 mm, euhedral; clinopyroxene 30%, <0.8 mm, subophitic; opaques 8%, 0.1 mm, granular to lath-shaped; glass 18%
Vesicles: 10%, <7 mm, round
Alteration: glass to smectite; smectite and carbonate fill vesicles

Shipboard Data
Bulk Analysis: 25-27 cm
Magnetic Data: 18.20 cm
SiO₂ 49.79 NRM Intensity (emu/cc) 003.02 x 10⁻³
Al₂O₃ 15.46 NRM Inclination 1.5°
Fe₂O₃ 13.65 Stable Inclination -19.5°
MgO 6.91
CaO 11.73
Na₂O N.D.
K₂O 0.08
TiO₂ 1.50
P₂O₅ 0.28
MnO N.D.
LOI 2.06
H₂O⁺ 1.39
H₂O⁻ N.D.
CO₂ 0.86
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.

LEG	SITE	HOLE	CORE	SECT.
53	418	A	61	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Moderately phryic massive basalt. Basalt is medium gray; fresh. Plagioclase phenocrysts 8-10%, <4 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite. Groundmass consists of subophitic clots in glassy matrix - 'ophimottled' texture. Vesicles <1%, <1 mm, filled with smectite. Veins are rare, filled with smectite. Veins are rare, filled with carbonate and smectite.

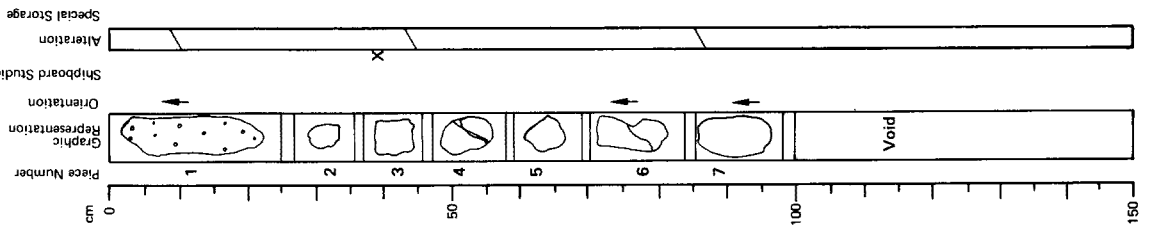
Thin Section Description
 Location: 5 cm
 Texture: porphyritic - intersertal
 Phenocrysts: plagioclase 15%, <4 mm, subhedral
 Groundmass: olivine 5%, 0.5 mm, euhedral; plagioclase 35%, 0.5 mm; clinopyroxene 30%, <0.5 mm, granular; opaques 5%, <0.2 mm, laths and octahedra; glass 9%, interstitial, devitrified
 Vesicles: 1%, 0.6 mm, round
 Alteration: olivine to smectite; vesicles filled with smectite and carbonate

Location: 30 cm
 Texture: porphyritic - intersertal
 Phenocrysts: plagioclase 15%, <2 mm, subhedral
 Groundmass: olivine 10%, 0.5 mm; subhedral; plagioclase 25%, 0.3 mm; clinopyroxene 35%, 0.3 mm, granular; opaques 5%, 0.1 mm, granular to lath-shaped; glass 17%, interstitial
 Vesicles: 1%, 0.5 mm, round
 Alteration: olivine to smectite; smectite after glass; carbonate fills vesicles

Location: 105 cm
 Texture: porphyritic - intersertal
 Phenocrysts: plagioclase 5%, <3 mm, euhedral
 Groundmass: olivine 3%, 0.4 mm, euhedral; plagioclase 30%, 0.5 mm; clinopyroxene 40%, 0.2 mm; granular; opaques 5%, 0.1 mm, granular to lath-shaped; glass 17%, interstitial
 Vesicles: <1%, 0.3 mm, round
 Alteration: olivine and some glass to smectite; smectite fills vesicles

Shipboard Data

Bulk Analysis:	28-30 cm	Magnetic Data:	28-30 cm
SiO ₂	49.81	NRM Intensity (emu/cc)	0.10 0.7 x 10 ⁻³
Al ₂ O ₃	14.93	NRM Inclination	-15.4°
Fe ₂ O ₃	13.69	Stable Inclination	-18.5°
MgO	5.85		
CaO	10.80	Physical Property Data:	45-47 cm
Na ₂ O	N.D.	Vp (km/sec)	5.69
K ₂ O	0.11	Porosity (%)	2.84
TiO ₂	1.52	Wet Bulk Density (g/cc)	2.94
P ₂ O ₅	0.27	Grain Density (g/cc)	2.97
MnO	N.D.		
LOI	0.86		
H ₂ O ⁺	0.82		
H ₂ O ⁻	N.D.		
CO ₂	0.39		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	61	Brt

Visual Description
 Moderately phryic massive basalt. Basalt is medium gray, weakly altered. Plagioclase phenocrysts 8-10%, <4 mm, fresh. Groundmass consists of subophitic clots in glassy matrix - 'ophimottled' texture. Vesicles are common in piece 1, filled with green smectite. Veins are rare, filled with smectite and carbonate.

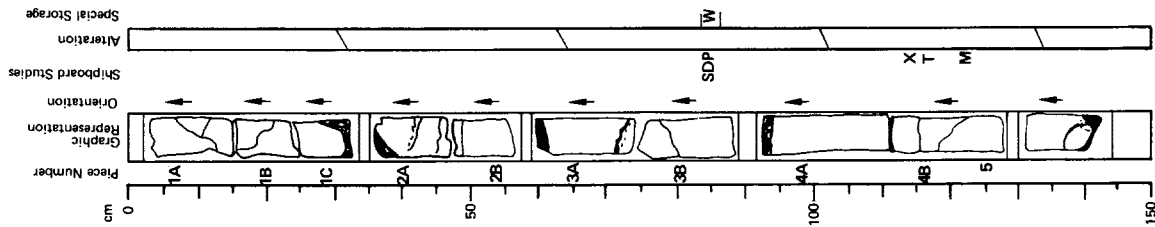
Shipboard Data

Bulk Analysis: 40-42 cm

SiO ₂	49.48
Al ₂ O ₃	14.86
Fe ₂ O ₃	11.86
MgO	6.99
CaO	12.30
Na ₂ O	N.D.
K ₂ O	0.11
TiO ₂	1.52
P ₂ O ₅	0.13
MnO	N.D.
LOI	1.19
H ₂ O ⁺	0.68
H ₂ O ⁻	N.D.
CO ₂	0.51
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

LEG		SITE		HOLE		CORE		SECT.	
5	3	4	1	8	A	6	2	1	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



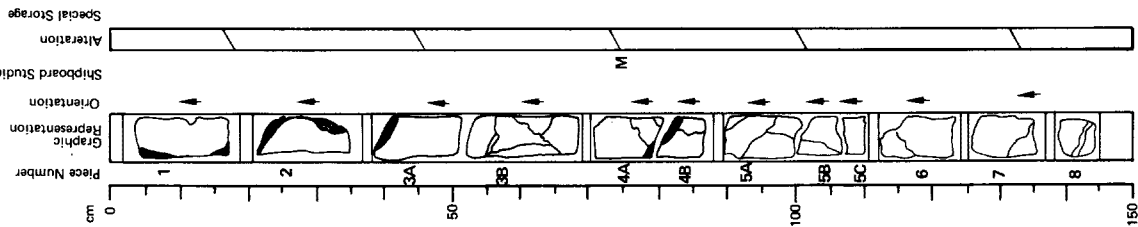
Visual Description
 Sparsely to moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 3-8%, <3 mm, fresh, locally concentrated; olivine phenocrysts <1%, <1 mm, partly altered to smectite; clinopyroxene phenocrysts 1%, fresh. Groundmass is fine-grained to glassy; glass selvages are somewhat brecciated and partly altered to smectite and zeolite(?). Vesicles 1%, increasing in abundance toward bottom of section, filled with smectite and carbonate. Scattered veins are filled with smectite and carbonate. Small pyrite vug occurs in piece 4A.

Thin Section Description

Location: 115 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 3%, <0.7 mm, subhedral; plagioclase 5%, <3 mm, subhedral
 Groundmass: olivine 3%, 0.2 mm, subhedral; plagioclase 30%, 0.3 mm; clinopyroxene 35%, 0.1 mm, granular or in sheaves; opaques 5%, 0.05 mm, laths; glass 18%, interstitial
 Vesicles: <1%, 0.5 mm, round
 Alteration: olivine to smectite and carbonate

Shipboard Data

Bulk Analysis:	113-115 cm	Magnetic Data:	122-124 cm
SiO ₂	49.31	NRM Intensity (emu/cc)	006.73 x 10 ⁻³
Al ₂ O ₃	16.12	NRM Inclination	-11.9°
Fe ₂ O ₃	11.36	Stable Inclination	-14.4°
MgO	7.70	Physical Property Data:	
CaO	12.36	Vp (km/sec)	82.84 cm
Na ₂ O	N.D.	Porosity (%)	5.45
K ₂ O	0.09	Wet Bulk Density (g/cc)	4.57
TiO ₂	1.57	Grain Density (g/cc)	2.89
P ₂ O ₅	0.17		2.98
MnO	N.D.		
LOI	1.58		
H ₂ O ⁺	1.25		
H ₂ O ⁻	N.D.		
CO ₂	0.32		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



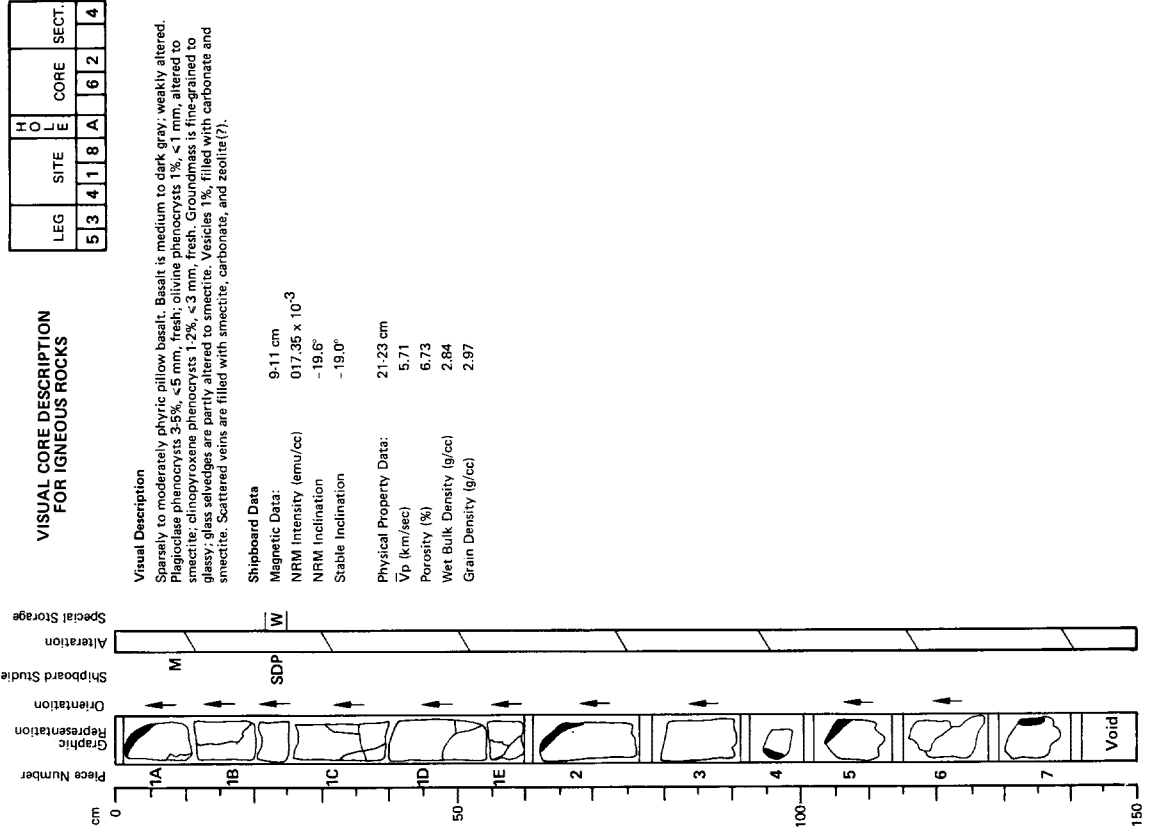
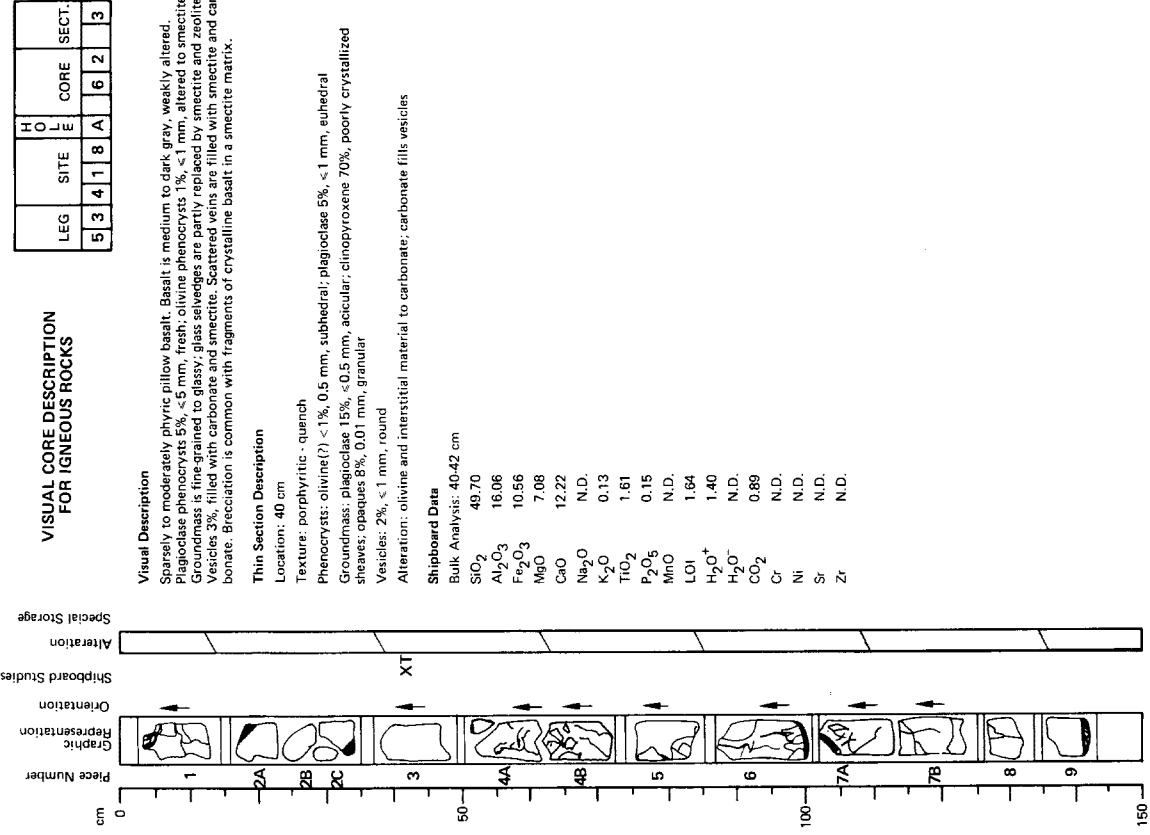
Visual Description
 Sparsely to moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 5%, <3 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 2.3%, <3 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to green smectite. Vesicles 1%, filled with carbonate. Scattered veins are filled with smectite, carbonate and zeolite(?).

Shipboard Data

Magnetic Data:	73-75 cm
NRM Intensity (emu/cc)	016.08 x 10 ⁻³
NRM Inclination	-23.0°
Stable Inclination	-24.0°

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG		SITE		HOLE		CORE		SECT.	
5	3	4	1	8	A	6	2	1	1



LEG	SITE	HOLE	CORE	SECT.
53	418	A	6	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

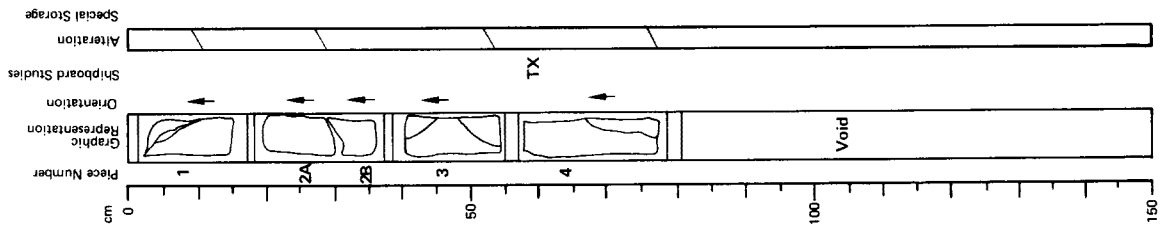
Visual Description
Sparsely to moderately phyrlic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 2.5%, decreasing in abundance downward, <3 mm, fresh, olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <2 mm, fresh. Groundmass is fine-grained. Scattered veins are filled with carbonate and smectite. Irregular patch of carbonate occurs in piece 3.

Thin Section Description

Location: 60 cm
Texture: porphyritic - quench
Phenocrysts: olivine 5%, 0.6 mm, euhedral; plagioclase 5%, <2 mm, subhedral
Groundmass: plagioclase 35%, 0.5 mm, acicular; clinopyroxene 50%, <0.1 mm, radiating sheaves; opaques 5%, 0.02 mm granular
Vesicles: <1%, 0.5 mm, round
Alteration: olivine and groundmass to carbonate; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 59-63 cm
SiO₂ 48.19
Al₂O₃ 16.52
Fe₂O₃ 11.99
MgO 5.79
CaO 14.29
Na₂O N.D.
K₂O 0.04
TiO₂ 1.56
P₂O₅ 0.15
MnO N.D.
LOI 1.54
H₂O⁺ 0.80
H₂O⁻ N.D.
CO₂ 1.47
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.



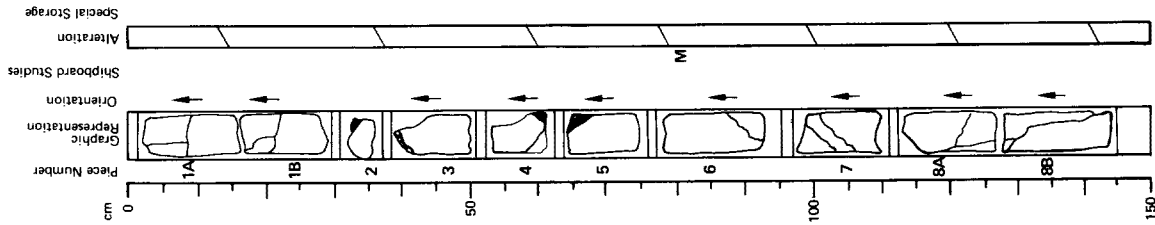
LEG	SITE	HOLE	CORE	SECT.
53	418	A	6	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

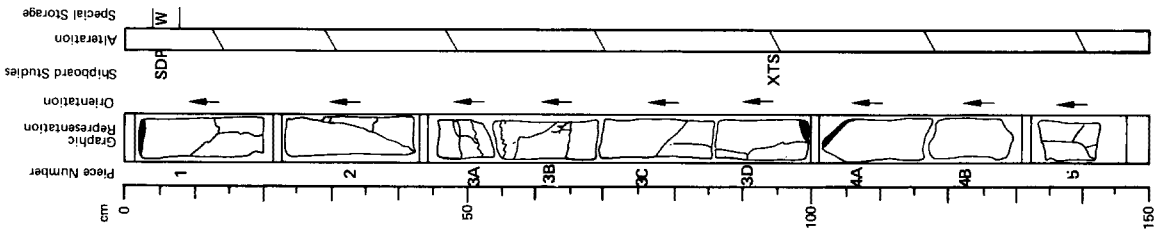
Visual Description
Sparsely phyrlic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 3%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite, carbonate and zeolite(?). Vesicles 5%, <1 mm, filled with carbonate and smectite. Scattered veins are filled with smectite, carbonate and zeolite(?).

Shipboard Data

Magnetic Data:
82.84 cm
NRM Intensity (emu/cc) 018.33 x 10⁻³
NRM Inclination -23.9°
Stable Inclination -24.0°



LEG	SITE	H	O	L	CORE	SECT.
5342	8A	6	3	2		

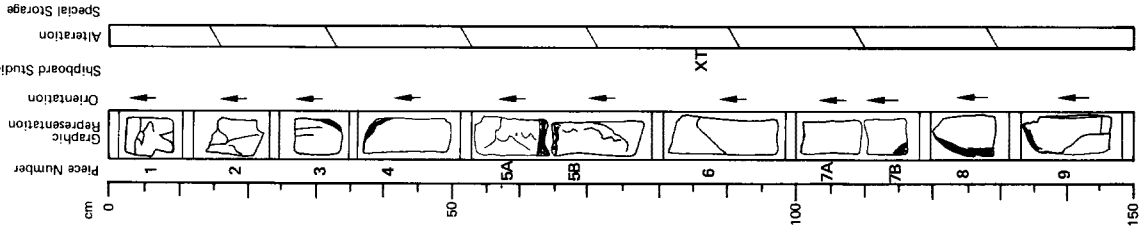


Visual Description
Sparsely to coarsely phryic pillow basalt. Basalt is medium to dark grey; weakly altered. Phenocrysts are unevenly distributed, sparsely phryic in pieces 1 to 3 and highly phryic in pieces 4 and 5. Plagioclase phenocrysts 3-20%, < 5 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 1%, < 1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are altered to smectite and zeolite(?). Veins are scattered throughout, filled with smectite and carbonate. A vug in pieces 3A and 3B is filled with quartz, smectite and dolomite(?).

Thin Section Description
Location: 90 cm
Texture: porphyritic - quench
Phenocrysts: olivine 2%, 0.5 mm, euhedral; plagioclase 10%, < 4 mm, euhedral; clinopyroxene 1%, < 0.5 mm anhedral
Groundmass: plagioclase 35%, < 0.5 mm; clinopyroxene 40%, radiating sheaves; opaques 11%, 0.05 mm, granular
Vesicles: 1%, < 0.3 mm, round
Alteration: olivine to smectite

Shipboard Data

Bulk Analysis:	90.92 cm	Physical Property Data:	8-10 cm
SiO ₂	47.12	V _p (km/sec)	5.28
Al ₂ O ₃	16.67	Porosity (%)	8.22
Fe ₂ O ₃	10.97	Wet Bulk Density (g/cc)	2.79
MgO	6.81	Grain Density (g/cc)	2.94
CaO	14.47		
Na ₂ O	N.D.		
K ₂ O	< 0.03		
TiO ₂	1.28		
P ₂ O ₅	0.13		
MnO	N.D.		
LOI	1.36		
H ₂ O ⁺	0.87		
H ₂ O ⁻	N.D.		
CO ₂	0.57		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8-10%, < 3 mm, fresh; olivine phenocrysts < 1%, < 1 mm, partly altered to smectite; clinopyroxene phenocrysts 1%, < 2 mm, fresh; clinopyroxene megacryst occurs in piece 6. Groundmass is fine-grained to glassy; glass selvages are mostly altered to smectite and zeolite(?). Vesicles < 1%, filled with carbonate and smectite. Scattered veins are also filled with carbonate and smectite.

Thin Section Description
Location: 85 cm
Texture: porphyritic - quench
Phenocrysts: olivine 2%, < 1 mm, subhedral; plagioclase 5%, < 2 mm, subhedral
Groundmass: plagioclase 30%, 0.3 mm, subhedral; clinopyroxene 35%, radiating sheaves; opaques 10%, 0.1 mm, laths; glass 17%, interstitial
Vesicles: 1%, 0.5 mm, round
Alteration: olivine to smectite

Shipboard Data

Bulk Analysis:	85-87 cm
SiO ₂	47.98
Al ₂ O ₃	15.24
Fe ₂ O ₃	12.21
MgO	6.76
CaO	12.38
Na ₂ O	N.D.
K ₂ O	< 0.03
TiO ₂	1.60
P ₂ O ₅	0.14
MnO	N.D.
LOI	0.68
H ₂ O ⁺	0.73
H ₂ O	N.D.
CO ₂	0.15
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

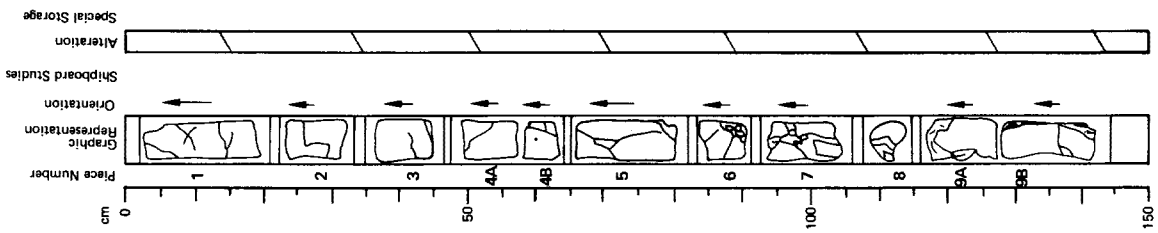
LEG	SITE	H	O	L	CORE	SECT.
5341	8A	6	3	3		

200

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
534	18A	E	63	4

Visual Description
 Sparsely to moderately phytic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 5-10%, increasing downward, <3 mm, fresh; olivine phenocrysts <1%, <3 mm, fresh; clinopyroxene phenocrysts 1%, <2 mm, fresh; groundmass is fine grained; possible groundmass glass alteration to smectite. Vesicles 1%, filled with smectite and carbonate. Scattered veins are filled with smectite and carbonate. Basalt in lower part of the section is brecciated with fragments of crystalline basalt in a matrix of smectite and minor zeolite(?).



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
534	18A	E	63	5

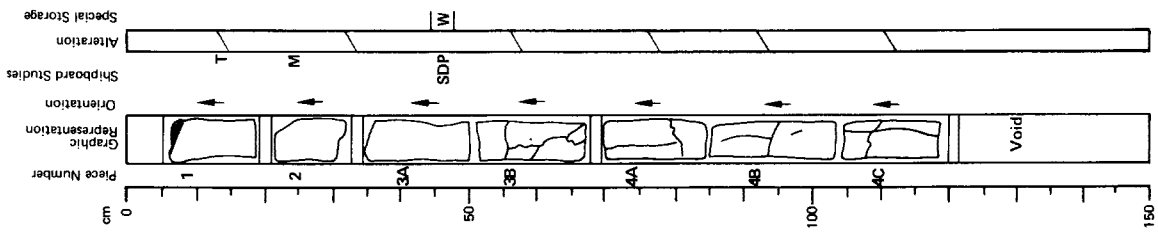
Visual Description
 Moderately phytic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, <3 mm, fresh, one with spiral inclusion; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 3%, <2 mm, fresh. Groundmass is fine-grained to glassy; one glass sand in piece 1, it completely altered to smectite. Scattered veinlets are filled with smectite and carbonate with minor zeolite(?) and pyrite.

Thin Section Description

Location: 14 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 1%, <0.8 mm, euhedral; plagioclase 10%, <2.5 mm, euhedral; clinopyroxene <1%, <0.5 mm, subophitic
 Groundmass: plagioclase 30%, 0.3 mm, acicular; clinopyroxene 45%, radiating sheaves; opaques 8%, 0.01 mm, granular; glass 4%
 Vesicles: 2%, 0.25 mm, round
 Alteration: olivine and minor glass to smectite; carbonate fills vesicles

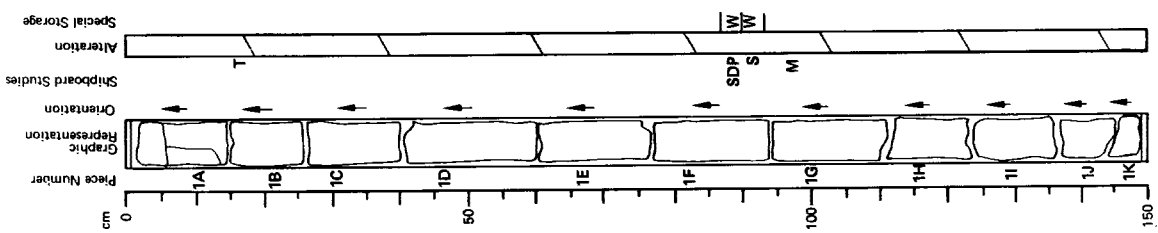
Shipboard Data

Magnetic Data:
 24.26 cm
 NRM Intensity (emu/cc) 011.94 x 10⁻³
 NRM Inclination -33.2°
 Stable Inclination -33.1°
 Physical Property Data:
 Vp (km/sec) 46.48 cm
 Porosity (%) 5.31
 Wet Bulk Density (g/cc) 6.06
 Grain Density (g/cc) 2.84
 2.95



LEG	SITE	HOLE	CORE	SECT.
53	418A	64	64	1

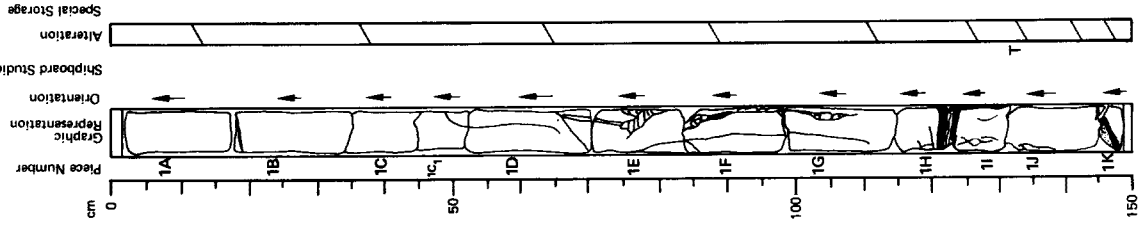
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Moderately phryic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8-10%, 6 mm, fresh; olivine phenocrysts 1%, <2 mm, fresh. Groundmass is fine-grained to subophitic, holocrystalline. Vesicles <1%, filled with carbonate. Scattered veins are filled with smectite, carbonate and minor pyrite.

Thin Section Description
 Location: 14 cm
 Texture: porphyritic - interstitial
 Phenocrysts: olivine 3%, <1 mm, euhedral; plagioclase 15%, <4 mm, euhedral
 Groundmass: plagioclase 30%, 0.5 mm, subhedral; clinopyroxene 30%, 0.2 mm, subophitic; opaques 6%, 0.06 mm, euhedral; glass 14%, interstitial
 Vesicles: 2%, 0.4 mm, round
 Alteration: olivine to smectite; smectite and carbonate fill vesicles

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 86.88 cm 89.91 cm
 Porosity (%) 5.57 5.53
 Wet Bulk Density (g/cc) 5.94
 Grain Density (g/cc) 2.82 2.93



Visual Description
 Moderately phryic basalt. Basalt is medium to dark gray; weakly altered; moderately altered in lower 25 cm. Plagioclase phenocrysts 8-10%, <6 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite except in glass selvages. Groundmass is fine-grained to glassy; glass selvages occur in lower 30 cm of the section and are mostly fresh. Vesicles 1%, <1 mm, filled with smectite and carbonate. Relatively thick veins occur in pieces 1E, 1F and 1G; these are filled with smectite, carbonate, silica and minor pyrite.

Thin Section Description
 Location: 130 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine <1%, 0.6 mm, euhedral; plagioclase 10%, <1.5 mm, euhedral; clinopyroxene <1%, <1 mm, subophitic
 Groundmass: plagioclase 20%, <0.5 mm, acicular; clinopyroxene 65%, radiating sheaves; opaques 5%, 0.01 mm, granular
 Vesicles: none
 Alteration: minor groundmass to smectite

LEG	SITE	HOLE	CORE	SECT.
53	418A	64	64	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H	O	SECT.
53	418A	6	4	3

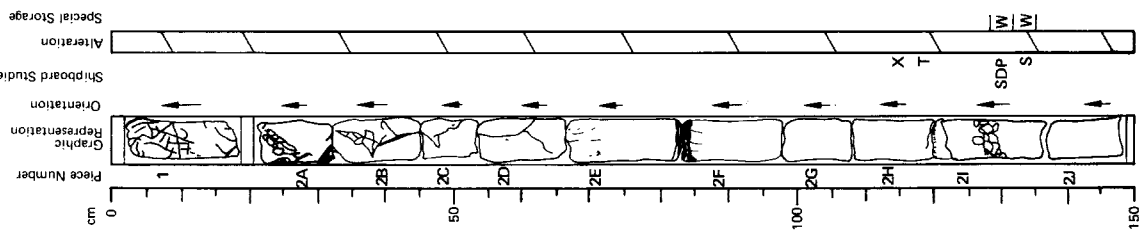
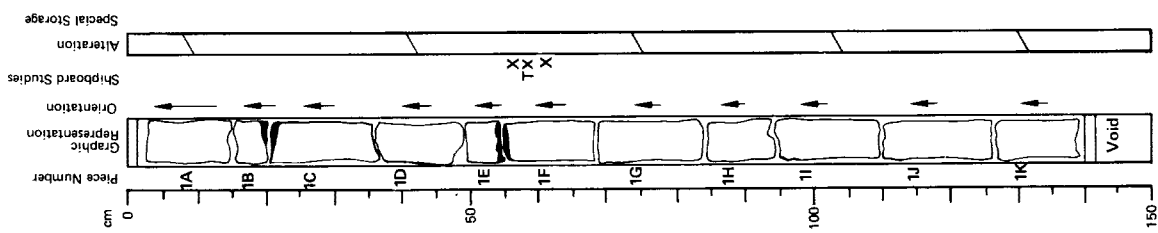
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8%, < 3 mm, fresh, some rims in glomerophytic clusters; olivine phenocrysts 1%, up to 3% in pieces. F through F7, < 2 mm, partly altered to smectite; clinopyroxene phenocrysts < 1%. Groundmass is fine-grained to glassy; glass selvages at vesicles 2% filled with smectite, carbonate and minor zeolite. Minor breccia occurs in pieces 1K; basalt fragments are in a smectite carbonate matrix.

Thin Section Description
 Location: 57 cm
 Texture: porphyritic - glassy
 Phenocrysts: olivine 1%, < 1 mm, euhedral; plagioclase 15%, < 2 mm, euhedral; clinopyroxene < 1%, 0.5 mm, rounded
 Groundmass: glass 84%, partly devitrified
 Vesicles: none
 Alteration: olivine to smectite and carbonate

Shipboard Data

Location	55-56 cm	56-58 cm	58-62 cm
Bulk Analysis:	47.92	48.02	48.25
SiO ₂	16.11	14.79	15.73
Al ₂ O ₃	10.78	12.68	10.89
Fe ₂ O ₃	6.27	8.85	6.57
MgO	13.48	12.29	13.72
CaO	N.D.	N.D.	N.D.
Na ₂ O	0.30	0.27	0.07
K ₂ O	1.29	1.24	1.26
TiO ₂	0.11	0.09	0.15
P ₂ O ₅	N.D.	N.D.	N.D.
MnO	1.52	1.46	1.28
LOI	2.21	1.20	0.86
H ₂ O ⁺	N.D.	N.D.	N.D.
H ₂ O ⁻	0.14	0.45	0.82
CO ₂	N.D.	N.D.	N.D.
Cr	N.D.	N.D.	N.D.
Ni	N.D.	N.D.	N.D.
Sr	N.D.	N.D.	N.D.
Zr	N.D.	N.D.	N.D.



LEG	SITE	H	O	SECT.
53	418A	6	4	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic basalt. Basalt is medium to dark gray; moderately altered. Plagioclase phenocrysts 8%, < 6 mm, fresh, olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, fresh. Groundmass is very fine-grained to glassy, slightly coarser-grained in lower part of the section; glass selvages are partly altered to smectite, carbonate and zeolite(?). Minor breccia occurs in pieces 1, 2A, 2B, and 2I.

Thin Section Description
 Location: 118 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 1%, < 1 mm, euhedral; plagioclase 15%, < 3 mm, euhedral; clinopyroxene < 1%, 0.5 mm, anhedral
 Groundmass: plagioclase 20%, < 0.7 mm, acicular; clinopyroxene 60%, radiating sheaves; opaques 4%, 0.01 mm, granular
 Vesicles: 1%, 0.5 mm, round
 Alteration: olivine to carbonate; carbonate fills vesicles

Shipboard Data

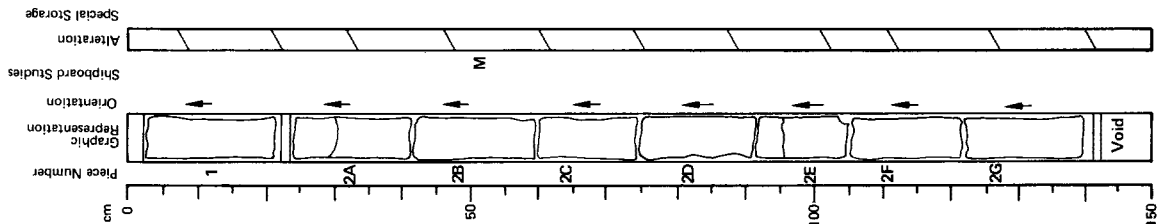
Bulk Analysis:	117-119 cm	129-131 cm	131-133 cm
SiO ₂	47.98	5.19	5.14
Al ₂ O ₃	16.26	8.05	
Fe ₂ O ₃	9.89	2.76	
MgO	6.28	2.91	
CaO	14.03		
Na ₂ O	N.D.		
K ₂ O	0.11		
TiO ₂	1.30		
P ₂ O ₅	0.14		
MnO	N.D.		
LOI	2.90		
H ₂ O ⁺	1.19		
H ₂ O ⁻	N.D.		
CO ₂	1.29		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

LEG	SITE	H O E A	CORE	SECT.
534	18A		64	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Sparsely to moderately phryic basalt. Basalt is medium to dark gray except for minor brown staining along oxidized veins; moderately altered. Plagioclase phenocrysts 4-8%, <4 mm, fresh; clinopyroxene phenocrysts <1%, <1 mm, fresh. Groundmass is medium-grained, subophitic, holocrystalline. Vesicles 1%, filled with smectite and carbonate. Lower half of section exhibits minor brecciation.

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 005.81 x 10⁻³
NRM Inclination -29.4°
Stable Inclination -33.5°

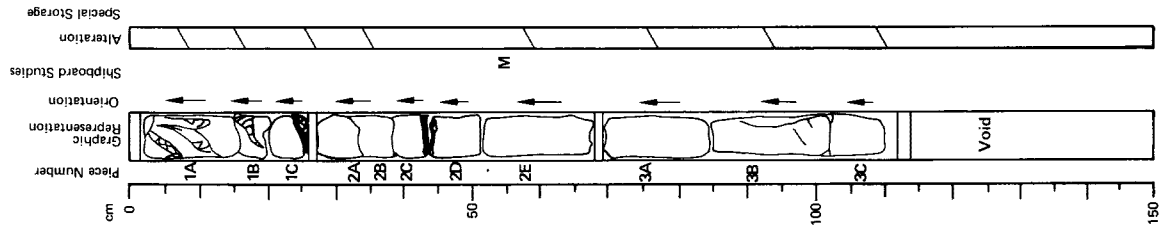


LEG	SITE	H O E A	CORE	SECT.
534	18A		64	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic basalt. Basalt is medium to dark gray; weakly to moderately altered. Plagioclase phenocrysts 7-10%, <5 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles <1%, <1 mm, filled with smectite. Minor breccia occurs in pieces 1A and 1B; basalt fragments are set in a matrix of smectite and carbonate.

Shipboard Data
Magnetic Data:
NRM Intensity (emu/cc) 009.63 x 10⁻³
NRM Inclination -38.7°
Stable Inclination -39.9°

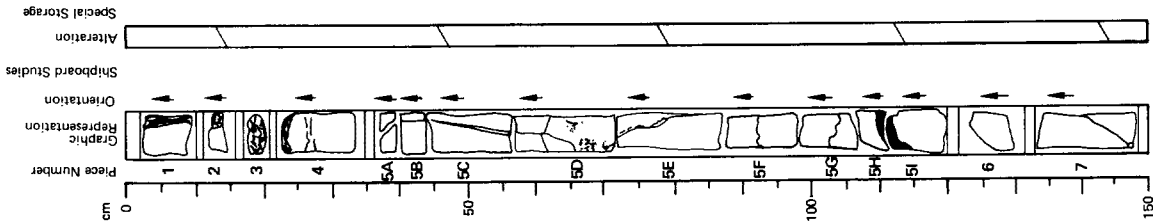


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LEG	SITE	HOLE	CORE	SECT.
534	18A	65	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 5-8%, <4 mm, fresh, most abundant in pillow rims; olivine phenocrysts <1%, fresh, altered to smectite except in glassy selvages; clinopyroxene phenocrysts 1%, <1 mm, fresh. Groundmass is fine-grained to glassy; 3-5% vesicles. Partly altered to smectite and partly altered to smectite and zeolite(?). Vesicles <1%, filled with carbonate. Large veins occur in pieces 5E, 5I and 7, filled with carbonate and smectite. Irregular patches of smectite and carbonate occur in piece 5D.

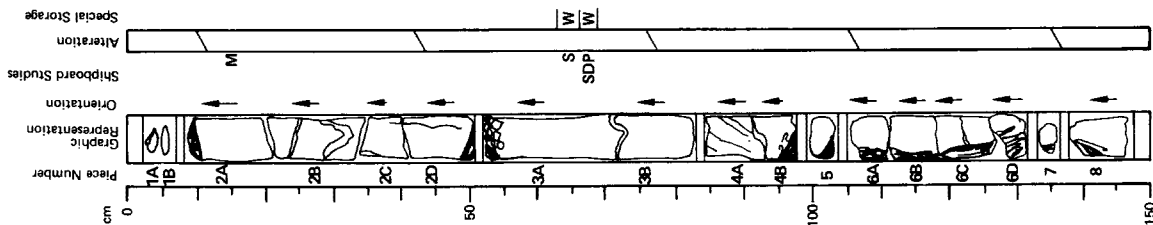


LEG	SITE	HOLE	CORE	SECT.
534	18A	65	1	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 4-8%, <4 mm, fresh, crystals are most abundant near the rims of pillows; olivine phenocrysts 1%, <1 mm, partly altered to smectite, fresh in glass selvages; clinopyroxene phenocrysts <1%, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite and zeolite(?). Vesicles <1%, filled with carbonate and smectite. Large veins are filled with carbonate and smectite in pieces 1B, 4A and 4B.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 13-15 cm 014.70 x 10⁻³
 NRM Inclination -43.8°
 Stable Inclination -43.4°
 Physical Property Data:
 Vp (km/sec) 66-68 cm 5.47
 Porosity (%) 5.30
 Wet Bulk Density (g/cc) 2.82
 Grain Density (g/cc) 2.93



LEG	SITE	HOLE	CORE	SECT.
53418A	65	3		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

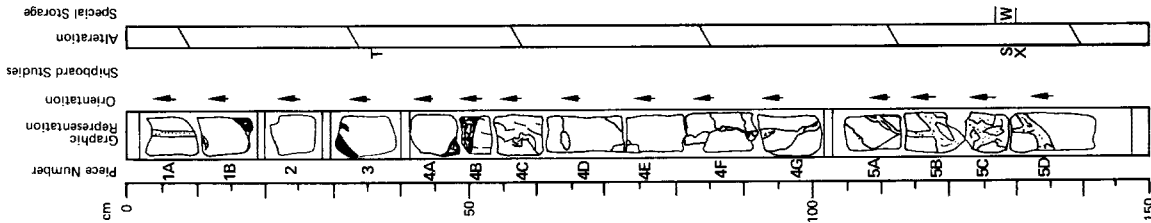
Visual Description
Moderately to sparsely phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 3-7%, <3 mm, fresh, plagioclase abundance decreases from piece 3 to piece 4G; olivine phenocrysts 1%, <1 mm, partly altered to smectite and minor zeolite(?). Thick veins occur in pieces 1A, 4C, 4D, 4F and 4G; filled with smectite and carbonate. Lower 50 cm of section is brecciated with basalt clasts in a matrix of smectite and minor zeolite(?).

Thin Section Description

Location: 35 cm
Texture: porphyritic - quench
Phenocrysts: olivine 2%, <1 mm, euhedral; plagioclase 12%, <1.5 mm, subhedral; clinopyroxene <1%, <0.4 mm, anhedral
Groundmass: plagioclase 15%, <0.5 mm, skeletal; clinopyroxene 70%, radiating sheaves; opaques 3%, 0.01 mm, granular
Vesicles: 1%, 0.2 mm, irregular
Alteration: olivine and interstitial material to carbonate and minor smectite

Shipboard Data

Bulk Analysis:	35.37 cm	128-130 cm	Physical Property Data:	128-130 cm
SiO ₂	49.05	52.44	V _p (km/sec)	2.81
Al ₂ O ₃	16.21	13.84		
Fe ₂ O ₃	10.19	13.44		
MgO	5.77	10.66		
CaO	14.35	5.23		
Na ₂ O	N.D.	N.D.		
K ₂ O	0.20	1.34		
TiO ₂	1.28	1.21		
P ₂ O ₅	0.21	0.02		
MnO	N.D.	N.D.		
LOI	1.63	7.80		
H ₂ O ⁺	0.98	3.66		
H ₂ O ⁻	N.D.	N.D.		
CO ₂	0.75	0.73		
Cr	N.D.	N.D.		
Ni	N.D.	N.D.		
Sr	N.D.	N.D.		
Zr	N.D.	N.D.		



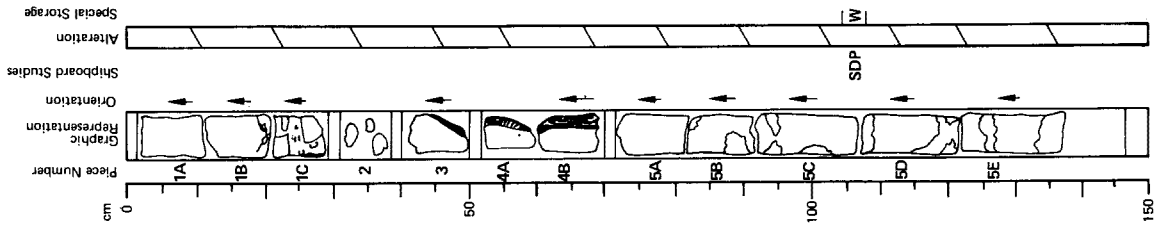
LEG	SITE	HOLE	CORE	SECT.
53418A	65	4		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Sparsely to moderately phryic basalt and basalt breccia. Basalt is gray to greenish-gray; moderately altered. Upper half of section is fine-grained, sparsely to moderately phryic basalt. Plagioclase phenocrysts 3-8%, <5 mm, partly altered to smectite; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <3 mm, fresh. Groundmass is aphanitic to glassy; glass selvages in pieces 3 and 4 are completely altered to smectite. Lower half of section is breccia composed of crystalline basalt fragments in a matrix of smectite, carbonate and minor zeolite(?).

Shipboard Data

Physical Property Data:	105-107 cm
V _p (km/sec)	4.50
Porosity (%)	12.29
Wet Bulk Density (g/cc)	2.68
Grain Density (g/cc)	2.91



01/10

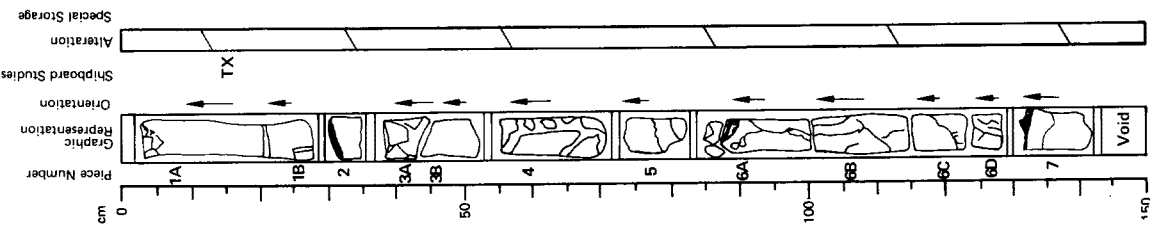
LEG	SITE	HOLE	CORE	SECT.
53418A	65	5		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely to moderately phryic basalt and basalt breccia. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts range from 2% at the top of the section to 7% near the base. They are < 3 mm, fresh. Olivine phenocrysts < 1%, < 1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly altered to smectite and minor zeolite(?). Vesicles 1%, filled with smectite. Veinlets are common, particularly in piece 8D, filled with smectite. One large vein in piece 6A is filled with smectite and carbonate. Minor breccia occurs in pieces 1A, 4, 5 and 6; breccia consists of angular fragments of crystalline basalt, 1 mm to 10 mm, in a matrix of smectite and carbonate. Small angular fragments of anecite in the breccia are probably altered glass.

Thin Section Description
 Location: 15 cm
 Texture: porphyritic - quench
 Phenocrysts: plagioclase 7%, < 2.5 mm, subhedral; clinopyroxene < 1%, 0.5 mm
 Groundmass: olivine(?) 1%, 0.2 mm; plagioclase 20%, < 0.5 mm, opaques 6%, 0.02 mm, granular
 Vesicles: < 1%, 0.2 mm, round
 Alteration: olivine(?) to smectite

Shipboard Data
 Bulk Analysis: 15.17 cm
 SiO₂ 49.40
 Al₂O₃ 16.43
 Fe₂O₃ 9.74
 MgO 6.99
 CaO 13.42
 Na₂O N.D.
 K₂O 0.05
 TiO₂ 1.31
 P₂O₅ 0.22
 MnO N.D.
 LOI 1.71
 H₂O⁺ 1.32
 H₂O⁻ N.D.
 CO₂ 0.86
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



LEG	SITE	HOLE	CORE	SECT.
53418A	65	5		

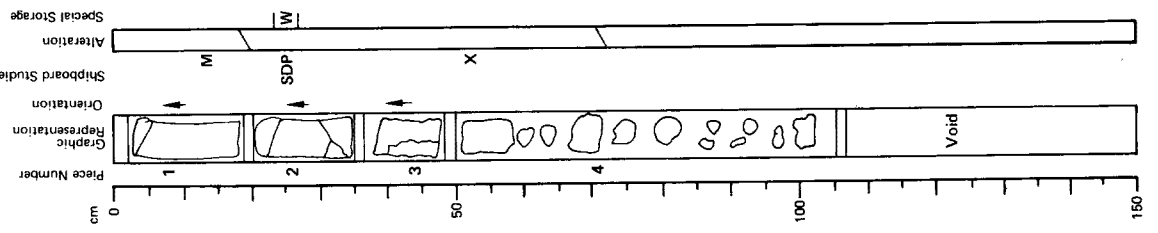
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phryic basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 3%, < 4 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 1%, < 4 mm, fresh. Groundmass is aphanitic. Scattered veins are filled with smectite and carbonate.

Shipboard Data
 Bulk Analysis: 52.54 cm
 SiO₂ 49.10
 Al₂O₃ 15.26
 Fe₂O₃ 11.31
 MgO 7.33
 CaO 12.85
 Na₂O N.D.
 K₂O 0.08
 TiO₂ 1.50
 P₂O₅ 0.23
 MnO N.D.
 LOI 1.80
 H₂O⁺ 1.20
 H₂O⁻ N.D.
 CO₂ 0.63
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

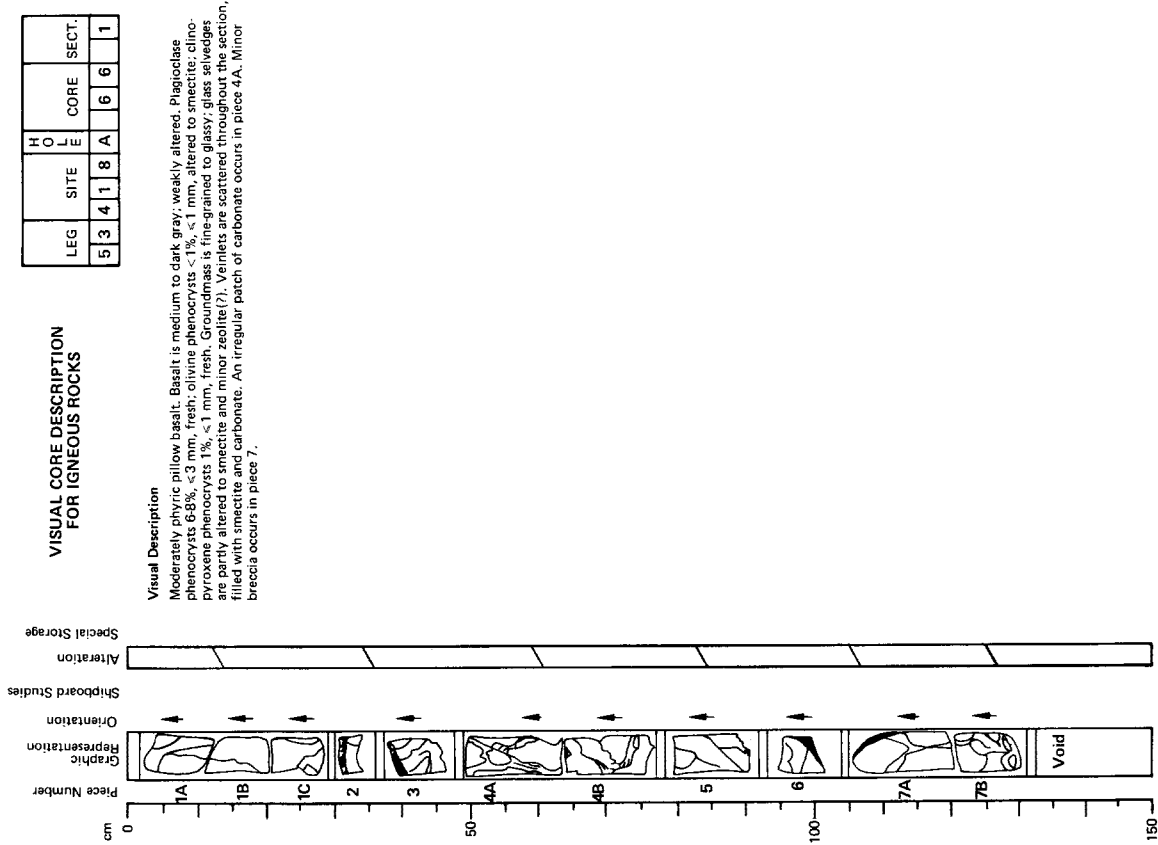
Magnetic Data:
 NRM Intensity (emu/cc) 007.80 x 10⁻³
 NRM Inclination -64.5°
 Stable Inclination -63.2°

Physical Property Data:
 V_p (km/sec) 5.71
 Porosity (%) 3.02
 Wet Bulk Density (g/cc) 2.91
 Grain Density (g/cc) 2.96



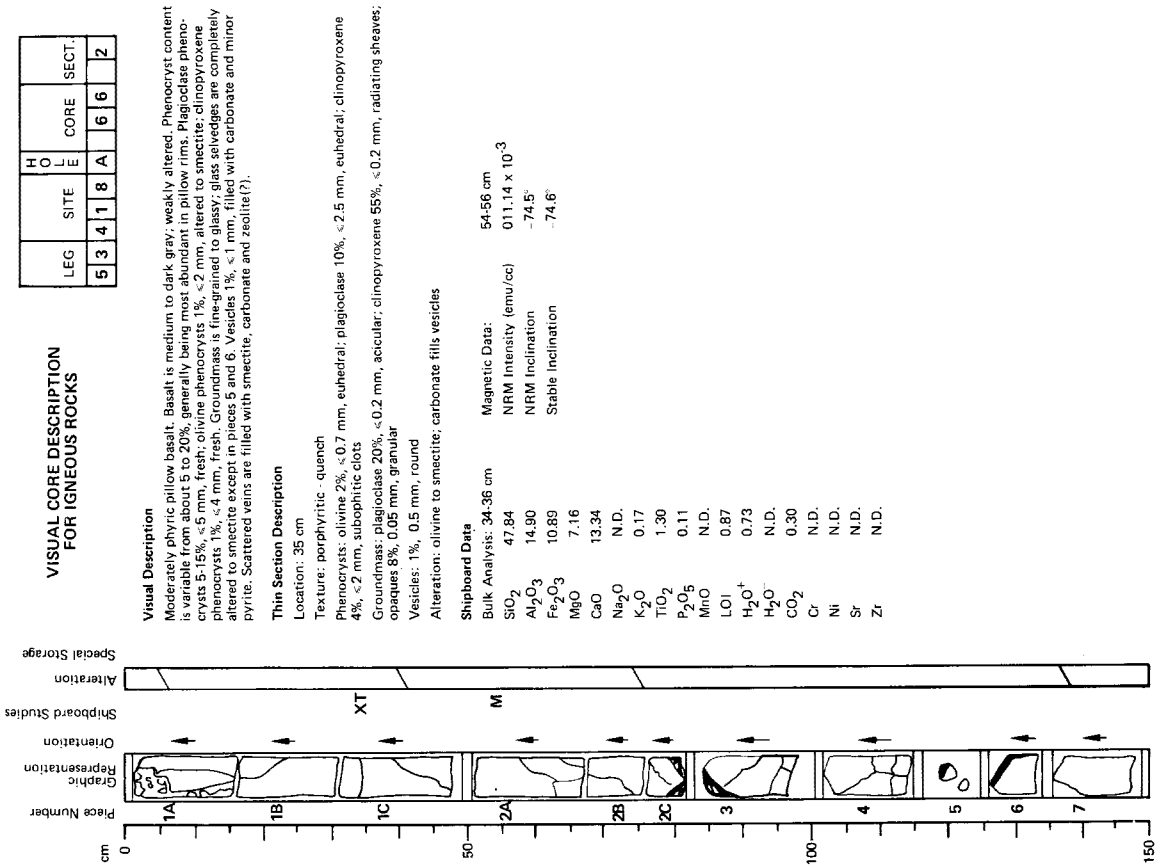
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
534	18A	66	1	



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
534	18A	66	2	

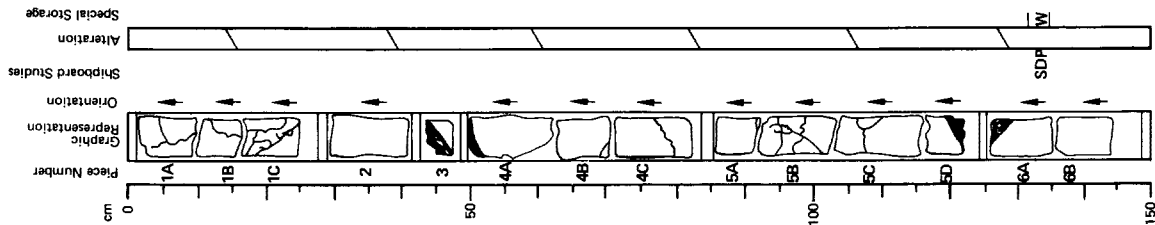


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	66	3

Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Phenocryst content varies from about 5 to 15%, generally being most abundant in pillow rims. Plagioclase phenocrysts 5-10%, < 5 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 1-2%, < 5 mm, rare megacrysts to 10 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are altered to smectite except in pieces 5D and 6A. Vesicles are rare. Scattered veins and veinlets are filled with smectite and carbonate. Minor disseminated pyrite occurs in the groundmass.

Shipboard Data
Physical Property Data:
Vp (ft/m/sec) 129-131 cm
Porosity (%) 5.28
Wet Bulk Density (g/cc) 6.36
Grain Density (g/cc) 2.80
2.92



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

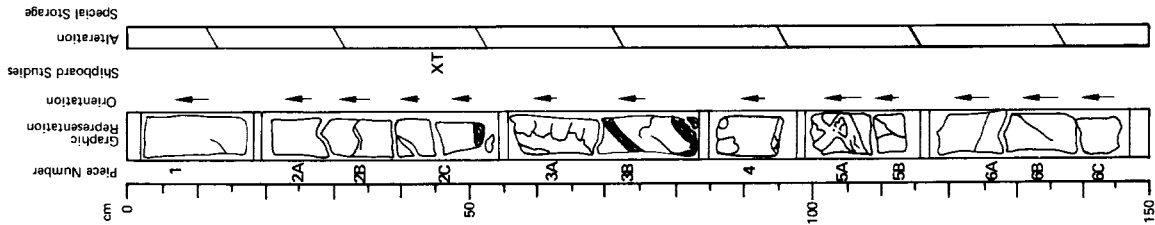
LEG	SITE	HOLE	CORE	SECT.
53	418	A	66	4

Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 7-10%, < 1 mm fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 2 mm, fresh, often in subophitic clots with plagioclase. Groundmass is fine-grained to glassy; glass selvages are altered to smectite and minor zeolite(?). Vesicles < 1% filled with carbonate. Rare veins are filled with carbonate and smectite. Minor pyrite is disseminated in the groundmass. Minor breccia occurs in pieces 3, 4, 5A and 6C; breccia consists of basalt fragments in a matrix of smectite.

Thin Section Description
Location: 47 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, < 1.5 mm, euhedral; plagioclase 20%, < 4 mm, euhedral; clinopyroxene 4%, < 1.5 mm, rounded
Groundmass: plagioclase 20%, 0.3 mm, acicular; clinopyroxene 56%, radiating sheaves; opaques 6%, 0.02 mm, granular
Vesicles: 1%, 0.3 mm, round
Alteration: olivine and minor interstitial material to smectite

Shipboard Data

Bulk Analysis: 46-48 cm
SiO₂ 48.33
Al₂O₃ 16.20
Fe₂O₃ 11.58
MgO 6.18
CaO 13.22
Na₂O N.D.
K₂O < 0.03
TiO₂ 1.33
P₂O₅ 0.13
MnO N.D.
LOI 0.95
H₂O⁺ 0.60
H₂O⁻ N.D.
CO₂ 0.51
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.



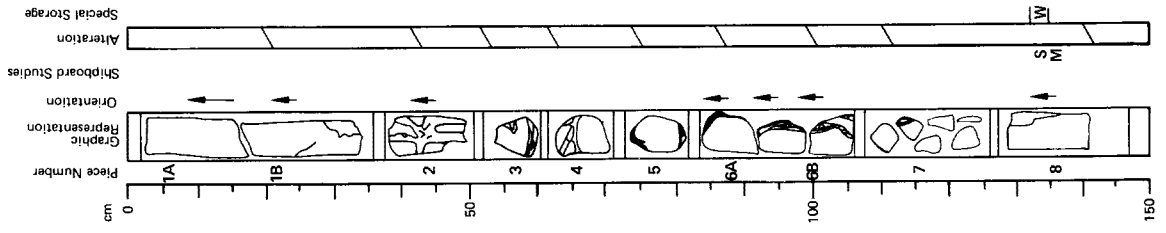
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
53418A	66	5	6	5

Visual Description
 Moderately phryic pillow basalt and minor basalt breccia. Basalt is mostly medium to dark gray, greenish-gray in breccia zones; weakly to moderately altered. Plagioclase phenocrysts 10-15%, < 5 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 3 mm, fresh. Groundmass is very fine-grained to glassy; glass selvages are altered to smectite. Vesicles < 1%, filled with carbonate. Scattered veins are filled with smectite and carbonate. Upper 50 cm of section are becciated; breccia consists of basalt fragments in a smectite matrix. Minor pyrite is disseminated in breccia matrix.

Thin Section Description
 Location: 144 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 3%, < 0.8 mm, euhedral; plagioclase 10%, < 3.5 mm, euhedral
 Groundmass: plagioclase 30%, 0.2 mm, acicular; clinopyroxene 46%, radiating sheaves; opaques 10%, 0.03 mm, granular
 Vesicles: 1%, 0.8 mm, round
 Alteration: olivine and minor groundmass to smectite; carbonate and smectite fill vesicles

Shipboard Data
 Bulk Analysis: 143.145 cm
 SiO₂ 47.93
 Al₂O₃ 17.43
 Fe₂O₃ 10.70
 MgO 6.12
 CaO 13.38
 Na₂O N.D.
 K₂O < 0.03
 TiO₂ 1.40
 P₂O₅ 0.13
 MnO N.D.
 LOI 1.07
 H₂O⁺ 0.68
 H₂O N.D.
 CO₂ 0.76
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

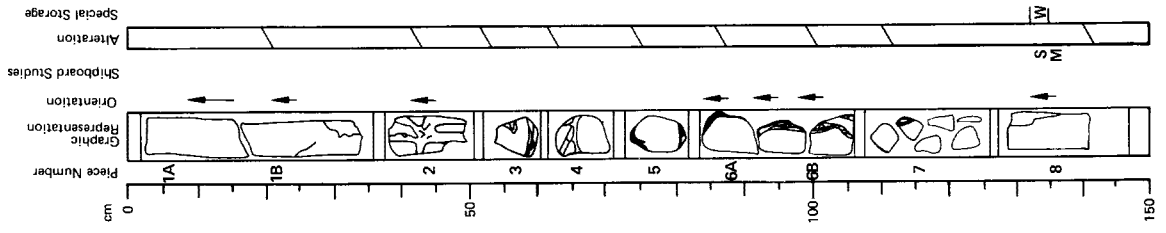


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
53418A	66	5	6	6

Visual Description
 Moderately phryic pillow basalt and minor basalt breccia. Basalt is medium to dark gray, greenish-gray in breccia zones; weakly to moderately altered. Plagioclase phenocrysts 10%, < 5 mm, fresh; clinopyroxene phenocrysts < 1%, < 1 mm, altered to smectite; olivine phenocrysts < 1%, < 3 mm, fresh. Groundmass is very fine-grained to glassy; glass selvages are altered to smectite. Vesicles < 1%, filled with carbonate. Scattered veins are filled with smectite and carbonate. Upper 50 cm of section are becciated; breccia consists of basalt fragments in a smectite matrix. Minor pyrite is disseminated in breccia matrix.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 135-137 cm
 009.76 x 10⁻³
 NRM Inclination -37.2°
 Stable Inclination -50.5°
 Physical Property Data:
 Vp (km/sec) 132-134 cm
 5.58

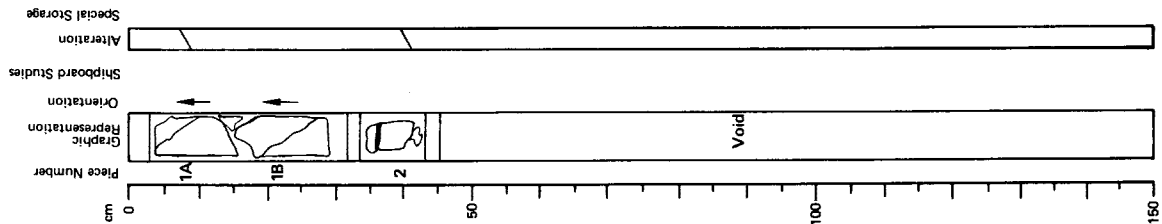


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VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	66	7

Visual Description
 Moderately phyrlic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 15%, <5 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <3 mm, fresh. Groundmass is fine-grained without glass selvages. Prominent veins in pieces 1 and 2 are filled with smectite and carbonate.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	67	1

Visual Description
 Moderately phyrlic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 15%, <8 mm, fresh, some have spine inclusions; olivine phenocrysts 1%, <2 mm, altered to smectite; clinopyroxene phenocrysts 1%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are fresh. Scattered veins are filled with smectite, carbonate and minor pyrite. Minor pyrite is also disseminated in the groundmass.

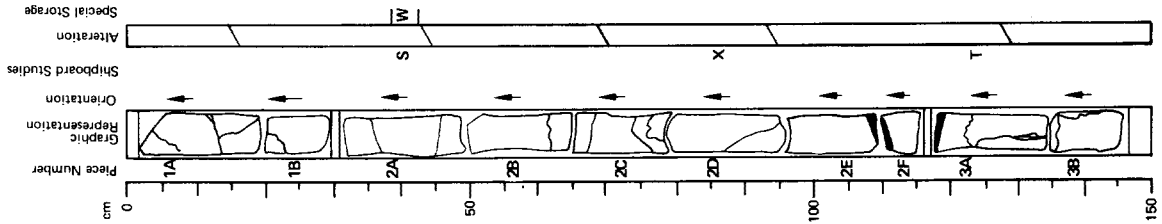
Thin Section Description

Location: 123 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 1%, <0.5 mm, euhedral; plagioclase 15%, <2.5 mm, euhedral; clinopyroxene 3%, <2 mm, subhedral crystals or subophitic clots
 Groundmass: olivine 3%, 0.2 mm, subhedral; plagioclase 20%, <0.5 mm, acicular; clinopyroxene 47%, radiating sheaves; opaques 10%, <0.05 mm, granular
 Vesicles: 1%, 0.2 mm, round
 Alteration: olivine and minor groundmass to smectite; carbonate and smectite fill vesicles

Shipboard Data

Bulk Analysis: 86-88 cm Physical Property Data: 38.40 cm
 Vp (km/sec) 6.10

SiO ₂	51.58
Al ₂ O ₃	17.23
Fe ₂ O ₃	10.70
MgO	5.84
CaO	10.89
Na ₂ O	N.D.
K ₂ O	< 0.03
TiO ₂	1.20
P ₂ O ₅	0.12
MnO	N.D.
LOI	0.85
H ₂ O ⁺	0.70
H ₂ O ⁻	N.D.
CO ₂	0.30
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.



LEG	SITE	HOLE	CORE	SECT.
53	418	A	67	2

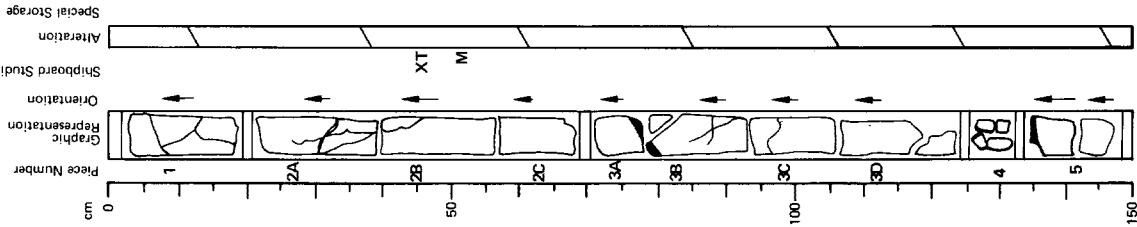
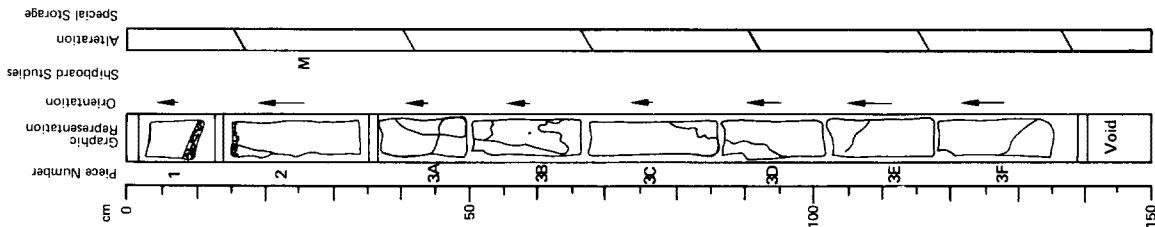
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phryic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, < 5 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 2 mm, fresh, often in subophitic clots with plagioclase. Groundmass is fine-grained to glassy; glass selvages on pieces 1 and 2 are partly altered to smectite. Section below 15 cm is probably a massive flow. Vesicles < 1%, filled with smectite and carbonate. Scattered veins are also filled with smectite and carbonate. Minor pyrite is disseminated in the groundmass. Irregular patches of smectite and carbonate occur in pieces 3E and 3F.

Shipboard Data

Location: 47 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 28-30 cm 012.64 x 10⁻³
 NRM Inclination -46.1°
 Stable Inclination -44.3°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	67	3

Visual Description

Moderately phryic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 12%, < 5 mm, fresh; olivine phenocrysts 1%, < 2 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 3 mm, fresh, often in subophitic clots with plagioclase. Groundmass is fine-grained to glassy; glass selvages at 80 and 135 cm is probably continuation of flow in Section 2; the lower part of the section is pillow basalt. Rare veins are filled with smectite and carbonate. Minor pyrite is disseminated in groundmass.

Thin Section Description

Location: 47 cm
 Texture: porphyritic - intersertal
 Phenocrysts: olivine 5%, < 1 mm, euhedral; plagioclase 12%, < 4 mm, euhedral; clinopyroxene 5%, < 2 mm, subhedral to rounded
 Groundmass: olivine 5%, 0.15 mm, euhedral; plagioclase 30%, 0.5 mm, subhedral; clinopyroxene 35%, 0.5 mm, granular; opaques 4%, 0.05 mm, euhedral; glass 5%, devitrified
 Vesicles: < 1%; 0.5 mm, round
 Alteration: olivine and interstitial material to smectite; smectite and carbonate in vesicles

Shipboard Data

Bulk Analysis: 46-48 cm Magnetic Data:
 SiO₂ 50.95 NRM Intensity (emu/cc) 53-55 cm 006.19 x 10⁻³
 Al₂O₃ 15.72 NRM Inclination -73.3°
 Fe₂O₃ 10.97 Stable Inclination -52.4°
 MgO 6.92
 CaO 11.63
 Na₂O N.D.
 K₂O 0.04
 TiO₂ 1.27
 P₂O₅ 0.10
 MnO N.D.
 LOI 0.68
 H₂O⁺ 0.65
 H₂O⁻ N.D.
 CO₂ 0.20
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

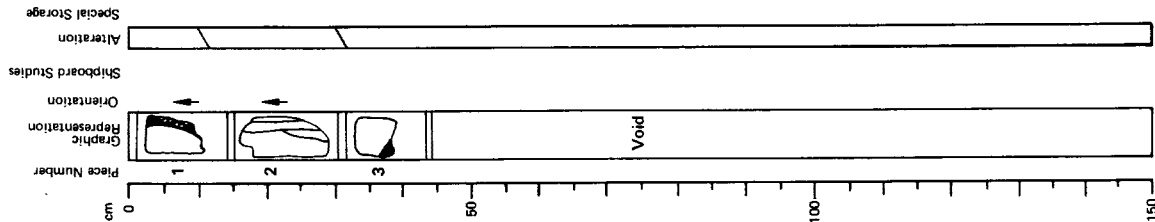
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VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
53	418	A	67	4

Visual Description

Moderately phyrlic pillow basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 15%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite, zeolite(?) and minor pyrite and silica. Voids in piece 2 are filled with smectite and minor pyrite. Minor pyrite is also disseminated in the groundmass.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O L	CORE	SECT.
53	418	A	68	1

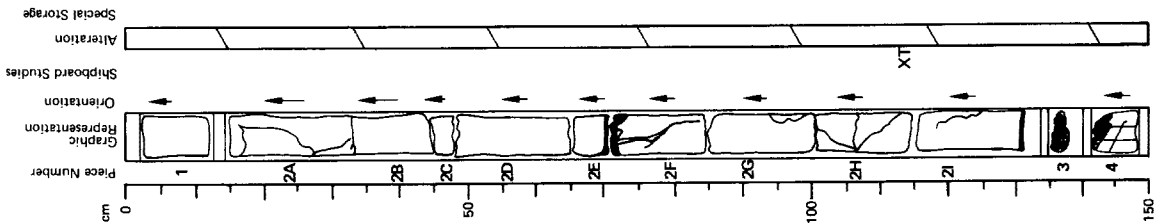
Visual Description
Moderately phyrlic pillow basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 8%, <5 mm, fresh; olivine phenocrysts 2%, <3 mm, altered to smectite; clinopyroxene phenocrysts 3%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are mostly fresh with minor alteration to smectite. Vesicles <1%, <1 mm, filled with smectite, zeolite(?) and carbonate. Scattered veins are filled with carbonate, smectite and minor pyrite. A pyrite-filled vein occurs in glass selvage in piece 2F.

Thin Section Description

Location: 115 cm
Texture: porphyritic - quench
Phenocrysts: olivine 5%, <1.5 mm, euhedral; plagioclase 15%, <3 mm, euhedral; clinopyroxene 5%, <1.5 mm, anhedral to rounded
Groundmass: plagioclase 10%, <0.6 mm, acicular; clinopyroxene 57%, radiating sheaves; opaques 7%, 0.05 mm, granular to euhedral
Vesicles: 1%, <0.4 mm, round
Alteration: olivine and minor interstitial material to smectite; carbonate fills vesicles

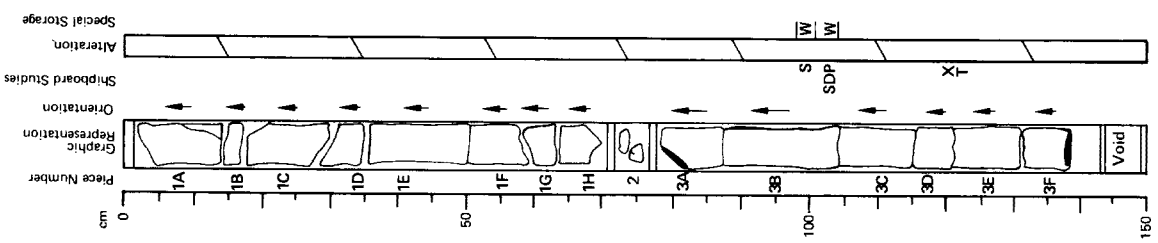
Shipboard Data

Bulk Analysis: 113-116 cm
SiO₂ 47.91
Al₂O₃ 14.85
Fe₂O₃ 11.01
MgO 8.19
CaO 13.92
Na₂O N.D.
K₂O 0.06
TiO₂ 1.25
P₂O₅ 0.14
MnO N.D.
LOI 1.27
H₂O⁺ 0.41
H₂O⁻ N.D.
CO₂ 1.14
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.



LEG	SITE	H O L E	CORE	SECT.
53418A	682			

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Upper half of section is more phryic and has less clinopyroxene phenocrysts than lower half. Plagioclase phenocrysts 12-15%, <4 mm, fresh; olivine phenocrysts 4%, <1 mm, completely altered to smectite; clinopyroxene phenocrysts 3%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are fresh. Vesicles <1%, <1 mm, filled with smectite, carbonate and minor pyrite. Scattered veins are also filled with smectite, carbonate and pyrite. Minor carbonate and pyrite also occurs in the groundmass.

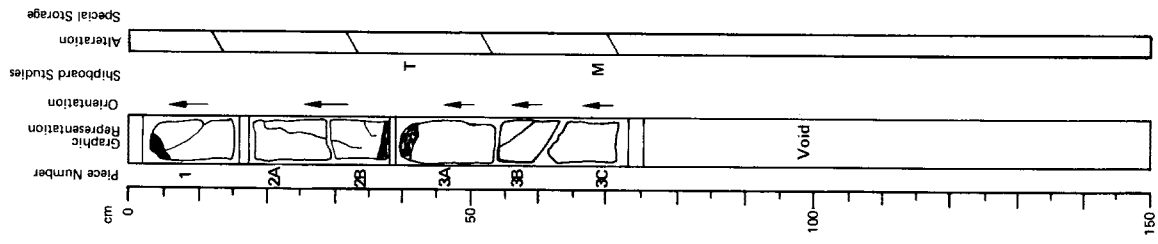
Thin Section Description
Location: 125 cm
Texture: porphyritic - quench
Phenocrysts: olivine 5%, <1.5 mm, euhedral; plagioclase 15%, <5 mm, euhedral; clinopyroxene 5%, <2.5 mm, rounded
Groundmass: plagioclase 10%, 0.3 mm, skeletal; clinopyroxene 57%, radiating sheaves; opaques 6%, 0.05 mm, granular
Vesicles: 2%, 0.5 mm, round
Alteration: olivine to smectite and carbonate; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 121-123 cm	Physical Property Data:	98-100 cm	101-103 cm
SiO ₂ 48.08	Vp (km/sec)	6.11	6.13
Al ₂ O ₃ 14.84	Porosity (%)		2.27
Fe ₂ O ₃ 10.74	Wet Bulk Density (g/cc)		2.93
MgO 6.53	Grain Density (g/cc)		2.97
CaO 14.20			
Na ₂ O N.D.			
K ₂ O < 0.03			
TiO ₂ 1.26			
P ₂ O ₅ 0.13			
MnO N.D.			
LOI 1.44			
H ₂ O ⁺ 0.41			
H ₂ O ⁻ N.D.			
CO ₂ 1.18			
Cr N.D.			
Ni N.D.			
Sr N.D.			
Zr N.D.			

LEG	SITE	H O L E	CORE	SECT.
53418A	683			

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, <6 mm, fresh; olivine phenocrysts 2%, <3 mm, altered to smectite; clinopyroxene phenocrysts 2%, <5 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly brecciated and altered to smectite, carbonate and minor zeolite (?). Vesicles 1%, <1 mm, filled with smectite, carbonate and minor pyrite.

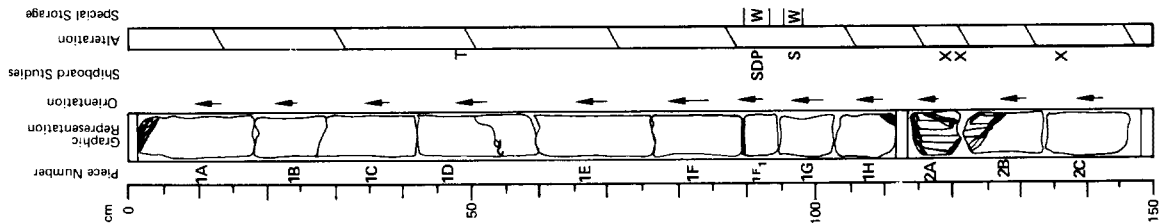
Thin Section Description
Location: 41 cm
Texture: porphyritic - glassy
Phenocrysts: olivine 1%, <1 mm, euhedral; plagioclase 10%, <5 mm, euhedral; clinopyroxene 2%, <1.5 mm, rounded
Groundmass: glass 87%, mostly fresh
Vesicles: none
Alteration: olivine to smectite

Shipboard Data

Location: 41 cm	68-70 cm
Magnetic Data:	014.80 x 10 ⁻³
NRM Intensity (emu/cc)	-67.5°
NRM Inclination	-66.9°
Stable Inclination	

LEG	SITE	CORE	SECT.
53418A	69	1	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately to highly phyrlic basalt. Basalt is medium to dark gray; weakly altered. Phenocrysts abundance is variable being greatest near glassy margins. Plagioclase phenocrysts 10-15%, 7 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 5%, <4 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are somewhat brecciated and partly altered to smectite, carbonate and zeolite(?). Vesicles 1%, filled with carbonate, smectite and minor pyrite. Scattered veinlets are filled with carbonate, smectite and pyrite. Pyrite also occurs as small clusters in the groundmass. Inclusions of altered sediment occur along some glass selvages.

Thin Section Description
Location: 48 cm
Texture: porphyritic - quench
Phenocrysts: olivine 2%, <1 mm, euhedral; plagioclase 15%, <4 mm, euhedral; clinopyroxene 4%, <5 mm, subophitic clots
Groundmass: olivine 1%, 0.2 mm, subhedral; plagioclase 25%, <0.4 mm, acicular; opaques 8%, 0.03 mm, granular; clinopyroxene 44%, radiating sheaves
Vesicles: 1%, <0.5 mm, round
Alteration: olivine to smectite; carbonate and smectite fill vesicles

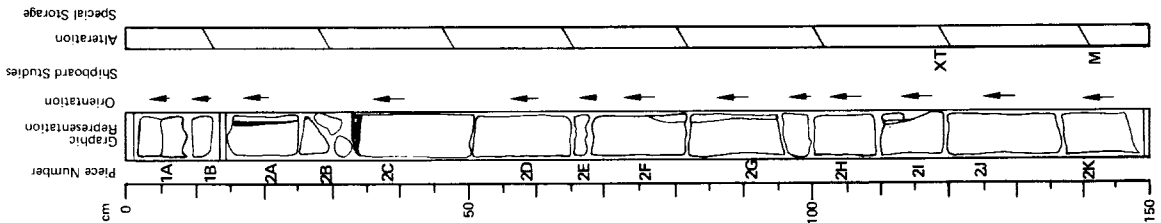
Shipboard Data
Bulk Analysis: 118-122 cm vein
118-122 cm smectite
133-138 cm

SiO ₂	50.13	49.92	47.05
Al ₂ O ₃	14.94	14.32	15.59
Fe ₂ O ₃	11.95	11.85	10.31
MgO	11.09	12.09	7.72
CaO	6.80	5.93	14.28
Na ₂ O	N.D.	N.D.	N.D.
K ₂ O	0.13	0.16	0.07
TiO ₂	1.67	1.64	1.21
P ₂ O ₅	0.04	0.47	0.14
MnO	N.D.	N.D.	N.D.
LOI	9.18	5.00	1.39
H ₂ O ⁺	4.78	5.33	0.37
H ₂ O ⁻	N.D.	N.D.	N.D.
CO ₂	4.38	1.72	1.33
Cr	N.D.	N.D.	N.D.
Ni	N.D.	N.D.	N.D.
Sr	N.D.	N.D.	N.D.
Zr	N.D.	N.D.	N.D.

Physical Property Data:
Vp (km/sec) 92.94 cm 96.97 cm
Porosity (%) 5.85 6.03
Wet Bulk Density (g/cc) 2.54
Grain Density (g/cc) 2.83 2.98

LEG	SITE	CORE	SECT.
53418A	69	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phyrlic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8-10%, <3 mm, fresh; olivine phenocrysts 3%, <2 mm, altered to smectite and carbonate; clinopyroxene phenocrysts 2%, <3 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are only slightly altered to smectite. Vesicles <1%, <1 mm, filled with carbonate.

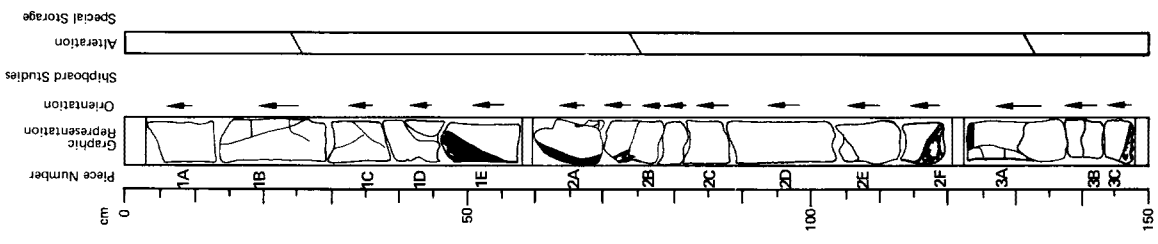
Thin Section Description
Location: 118 cm
Texture: porphyritic - quench
Phenocrysts: olivine 4%, <1.5 mm, euhedral; plagioclase 10%, <3 mm, euhedral; clinopyroxene 3%, <2.5 mm, rounded
Groundmass: plagioclase 10%, 0.5 mm, acicular; clinopyroxene 67%, radiating sheaves; opaques 6%, 0.05 mm, granular
Vesicles: <1%, 0.3 mm, round
Alteration: olivine and minor interstitial material to smectite; carbonate fills vesicles

Shipboard Data
Bulk Analysis: 117-119 cm
Magnetic Data: 142-144 cm
142-144 cm
NRM Intensity (emu/cc) 006.23 x 10⁻³
NRM Inclination -65.5°
Stable Inclination -62.9°

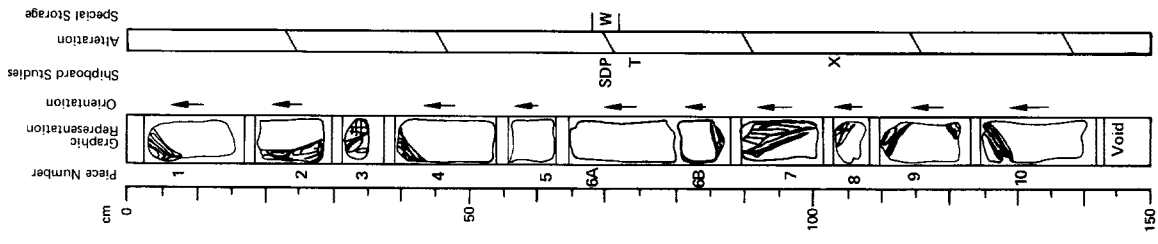
SiO ₂	48.78		
Al ₂ O ₃	15.68		
Fe ₂ O ₃	11.02		
MgO	7.10		
CaO	12.84		
Na ₂ O	N.D.		
K ₂ O	0.05		
TiO ₂	1.48		
P ₂ O ₅	0.12		
MnO	N.D.		
LOI	1.16		
H ₂ O ⁺	0.69		
H ₂ O ⁻	N.D.		
CO ₂	0.36		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

LEG	SITE	H O L E	CORE	SECT.
53	418	A	69	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 10%, <6 mm, fresh; olivine phenocrysts 2%, <3 mm, completely altered to smectite and carbonate; clinopyroxene phenocrysts 2%, <4 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite, carbonate and zeolite(?). Vesicles 1%, <1 mm, filled with carbonate, smectite and pyrite. Veinlets are present throughout, filled with smectite, carbonate and pyrite.



Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, <5 mm, fresh; olivine phenocrysts 2%, <3 mm, altered to smectite; clinopyroxene phenocrysts 1.2%, <4 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite, carbonate and zeolite(?). Vesicles 1%, <1 mm, filled with smectite and carbonate. Scattered veins are filled with smectite, carbonate and minor zeolite(?). Minor glass breccia occurs between selvages; glass fragments are altered to smectite.

Thin Section Description
 Location: 70 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 1%, <1 mm, euhedral; plagioclase 10%, <4 mm, euhedral; clinopyroxene 4%, <0.7 mm; anhedral
 Groundmass: plagioclase 20%, 0.5 mm, acicular; clinopyroxene 56%, radiating sheaves; opaques 8%, 0.02 mm, granular and lath-shaped
 Vesicles: 1%, 0.2 mm, round
 Alteration: olivine and interstitial glass to smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis:	100-105 cm	Physical Property Data:	67.69 cm
SiO ₂	55.13	Vp (km/sec)	5.85
Al ₂ O ₃	2.45	Porosity (%)	4.35
Fe ₂ O ₃	1.77	Wet Bulk Density (g/cc)	2.88
MgO	1.88	Grain Density (g/cc)	2.96
CaO	38.46		
Ni ₂ O	N.D.		
K ₂ O	0.30		
TiO ₂	0.02		
P ₂ O ₅	0.13		
MnO	N.D.		
LOI	24.33		
H ₂ O ⁺	0.60		
H ₂ O ⁻	N.D.		
CO ₂	23.5		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

LEG	SITE	H O L E	CORE	SECT.
53	418	A	69	4

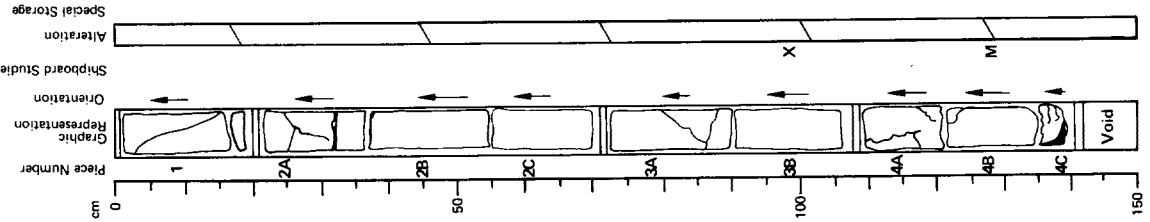
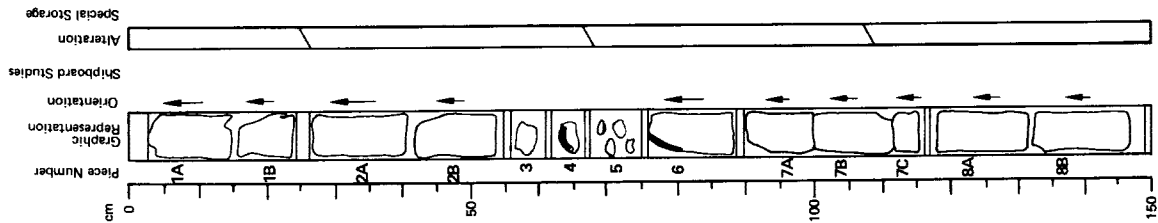
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

3320

LEG	SITE	HOLE	CORE	SECT.
53	418	A	69	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic basalt. Basalt is medium to dark gray, very weakly altered. Plagioclase phenocrysts 5-7%, < 4 mm, fresh; olivine phenocrysts 1-2%, < 1 mm, altered to smectite, carbonate and minor pyrite; clinopyroxene phenocrysts 3%, < 2 mm, fresh. Groundmass is fine-grained to glassy, glass selvages are partially altered to smectite. Vesicles 1%, < 0.5 mm, filled with carbonate. Scattered veinlets are filled with smectite, carbonate and minor pyrite.



LEG	SITE	HOLE	CORE	SECT.
53	418	A	69	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 12%, < 5 mm, fresh; olivine phenocrysts 2%, < 2 mm, altered to smectite; clinopyroxene phenocrysts 1%, < 3 mm, fresh. Groundmass is very fine-grained to glassy, glass selvages are completely altered to smectite. Vesicles are rare. Veins are filled with smectite, carbonate and pyrite.

Shipboard Data

Bulk Analysis: 97.99 cm
 Magnetic Data: 128-130 cm
 NRM Intensity (emu/cc) 009.28 x 10⁻³
 NRM Inclination -50.8°
 Stable Inclination -51.3°

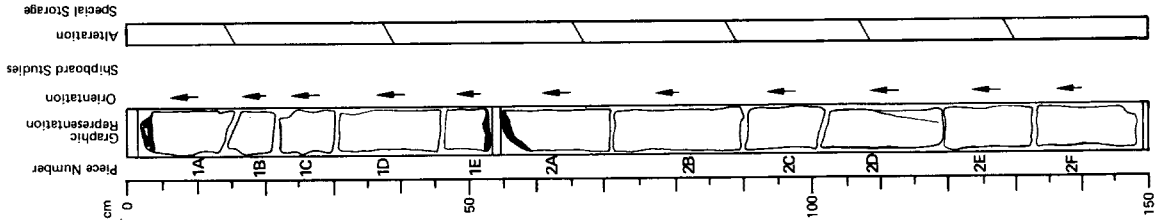
SiO₂ 48.43
 Al₂O₃ 15.20
 Fe₂O₃ 11.09
 MgO 7.72
 CaO 13.75
 Na₂O N.D.
 K₂O 0.06
 TiO₂ 1.27
 P₂O₅ 0.13
 MnO N.D.
 LOI 1.28
 H₂O⁺ 0.52
 H₂O⁻ N.D.
 CO₂ 0.88
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

LEG	SITE	H O L E	CORE	SECT.
53	418A	710	710	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8-10%, < 2 mm, fresh; clinopyroxene 2-4%, < 2 mm, altered to smectite carbonate and minor pyrite; clinopyroxene 2-4%, < 2 mm, fresh. Groundmass is very fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1%, < 0.1 mm, filled with carbonate. Scattered veinlets are filled with smectite, carbonate, pyrite and zeolite(?).

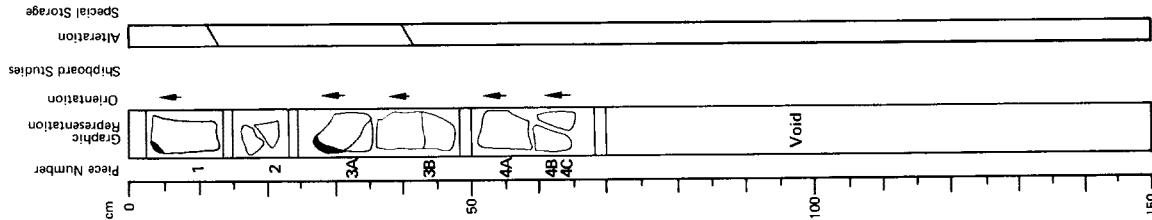


LEG	SITE	H O L E	CORE	SECT.
53	418A	697	697	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, < 3 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 1%, < 2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Sparse veins are filled with smectite.



LEG	SITE	HOLE	CORE	SECT.
53	41B	A	710	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray, locally greenish-gray; upper 8 cm weakly altered, lower 85 cm moderately altered. Plagioclase phenocrysts 7%, < 7 mm, fresh; olivine phenocrysts 3-4%, < 3 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 4 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles < 1%, < 1 mm, filled with carbonate and smectite. Veinlets are common in lower 85 cm, sparse in upper part of section, filled with smectite, carbonate and pyrite. Pyrite is also disseminated in the groundmass.

Thin Section Description

Location: 60 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, < 1 mm, euhedral; plagioclase 15%, < 4 mm, euhedral; clinopyroxene 4%, < 2.5 mm, subophitic clots
Groundmass: olivine 2%, 0.2 mm, subhedral; plagioclase 25%, 0.4 mm, acicular; clinopyroxene 43%, radiating sheaves; opaques 8%, 0.02 mm, granular
Vesicles: none

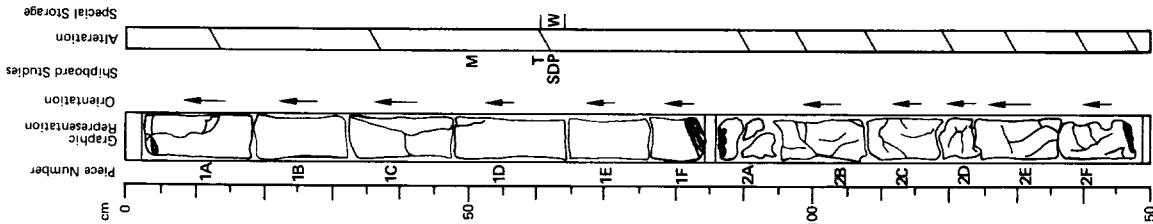
Alteration: olivine to smectite

Shipboard Data

Magnetic Data: 52.54 cm
NRM Intensity (emu/cc) 004.57 x 10⁻³
NRM Inclination -62.3°
Stable Inclination -61.4°

Physical Property Data:

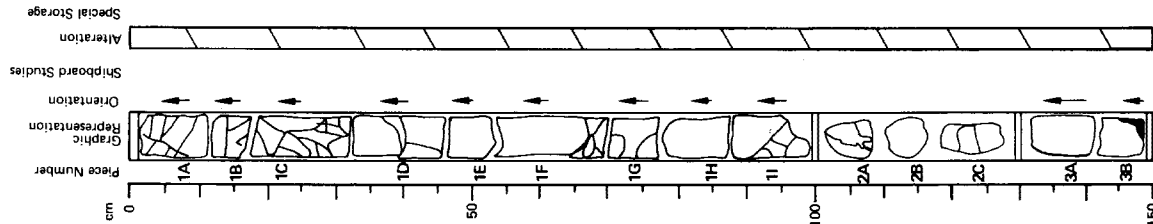
Vp (km/sec) 63.65 cm
Porosity (%) 5.96
Wet Bulk Density (g/cc) 2.78
Grain Density (g/cc) 2.92



LEG	SITE	HOLE	CORE	SECT.
53	41B	A	710	3

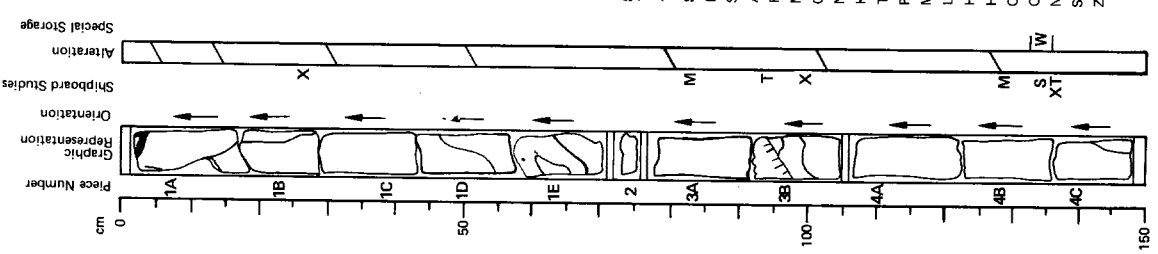
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic basalt. Basalt is medium to dark gray, locally greenish-gray; moderately altered. Plagioclase phenocrysts 8-12%, < 4 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 4 mm, fresh or slightly altered to smectite. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles < 1%, filled with smectite. Veins and fractures are common in upper 30 cm, less common in lower part of section; veins are filled with smectite, carbonate and zeolite(?) with minor iron hydroxides locally present.



LEG	SITE	H O L E	CORE	SECT.
53	418	A	70	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

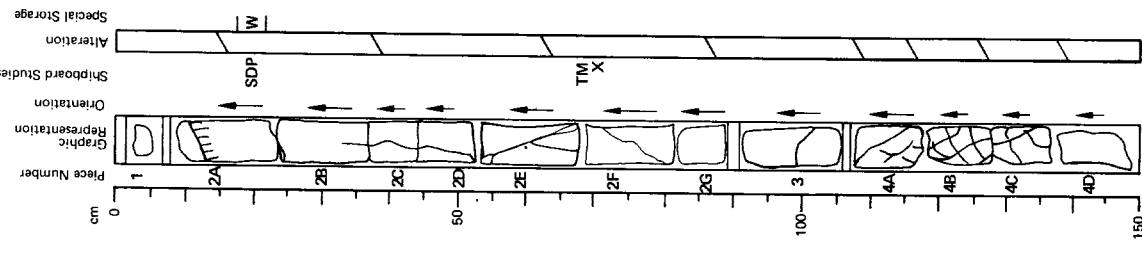


Visual Description
 Sparingly phryic basalt and aphyric basalt dike. Sparingly phryic basalt extends from top of section to 94 cm. Basalt is medium to dark gray, weakly altered. Phenocryst content varies from 15% near upper glass selvage to 2% in pieces 2 and 3A. Plagioclase phenocrysts 1-12%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 2%, <2 mm, fresh. Groundmass is fine-grained to glassy with grain size increasing downward from glass selvage at top of section; glass selvage is altered to smectite. Vesicles vary from 1 to 7%, increasing downward to contact with dike at 94 cm, filled with carbonate, smectite, silica and minor pyrite. Scattered veinlets are filled with smectite, carbonate, silica, and minor pyrite. Dike is medium to dark gray, weakly altered. Basalt dike extends from 94 cm to base of section. Plagioclase phenocrysts 2-3%, olivine phenocrysts 0.8%, <4 mm, fresh; olivine phenocrysts 0.2%, <1 mm, altered to smectite; clinopyroxene phenocrysts 0.3%, <3 mm, fresh. Groundmass is fine-grained to glassy; glass selvage in piece 4A is partly altered to smectite. Vesicles 1-4%, decreasing in abundance downward, filled with smectite and carbonate. Veins are most common in the lower 45 cm of the section, filled with smectite and carbonate. Pyrite.

Thin Section Description
 Location: 93 cm
 Texture: porphyritic - intersertal
 Phenocrysts: olivine(?) 2%, 0.5 mm, subhedral; plagioclase 10%, <4 mm, euhedral; clinopyroxene 2%, <1 mm, subophitic
 Groundmass: plagioclase 40%, 0.7 mm, subhedral; clinopyroxene 17%, 0.4 mm, subophitic; opaques 4%, 0.03 mm, anhedral; glass 15%
 Vesicles: 1-7%, <5 mm, round
 Alteration: nickel(?) to carbonate and smectite; carbonate fills vesicles
 Location: 135 cm
 Texture: porphyritic - intersertal
 Phenocrysts: olivine 1%, 0.7 mm, subhedral; plagioclase 6%, <2.5 mm, euhedral; clinopyroxene 1%, 0.4 mm, anhedral
 Groundmass: plagioclase 30%, 0.25 mm, subhedral; clinopyroxene 40%, 0.1 mm, granular; opaques 8%, 0.05 mm, euhedral; glass 11%
 Vesicles: 3%, <3 mm, round
 Alteration: olivine to smectite and carbonate; carbonate fills vesicles; minor smectite after glass

Shipboard Data

Bulk Analysis:	26-29 cm	96-99 cm	134-138 cm	Magnetic Data:
SiO ₂	48.84	50.51	47.35	NRM Intensity (emu/cc)
Al ₂ O ₃	14.78	15.21	14.87	NRM Inclination
Fe ₂ O ₃	10.39	11.81	10.94	Stable Inclination
MgO	7.51	7.26	7.60	Physical Property Data:
CaO	14.13	11.27	13.66	Vp (km/sec)
Na ₂ O	N.D.	N.D.	N.D.	85.87 cm
K ₂ O	0.11	0.09	0.06	003.5 x 10 ⁻³
TiO ₂	1.42	1.23	1.30	-71.7°
P ₂ O ₅	0.14	0.12	0.12	-70.4°
MnO	N.D.	N.D.	N.D.	
LOI	1.88	1.72	1.53	
H ₂ O ⁺	0.45	1.32	0.59	
H ₂ O ⁻	N.D.	N.D.	N.D.	
CO ₂	1.73	0.48	1.93	
Cr	N.D.	N.D.	N.D.	
Ni	N.D.	N.D.	N.D.	
Sr	N.D.	N.D.	N.D.	
Zr	N.D.	N.D.	N.D.	



Visual Description
 Aphyric basalt dike and sparsely phryic basalt. Dike is a continuation of dike in lower part of section 4 and it extends from the top of the section to 14 cm. It consists of medium gray, relatively fresh, aphyric basalt. Groundmass is fine-grained, generally decreasing in grain size toward the contact. Vesicles 2-3%, filled with smectite, carbonate, silica and minor pyrite. Sparse veinlets are filled with smectite and pyrite. Sparingly phryic basalt extends from 14 cm to base of the section. It is medium to dark gray, weakly altered, except in interval from 107 to 135 cm where it is moderately altered. Phenocryst content decreases downward from about 10% at contact with dike to 0% at base of the section. Plagioclase phenocrysts 0.8%, <4 mm, fresh; olivine phenocrysts 0.2%, <1 mm, altered to smectite; clinopyroxene phenocrysts 0.3%, <3 mm, fresh. Groundmass is fine-grained to glassy; glass selvage in piece 4A is partly altered to smectite. Vesicles 1-4%, decreasing in abundance downward, filled with smectite and carbonate. Veins are most common in the lower 45 cm of the section, filled with smectite and carbonate.

Thin Section Description
 Location: 88 cm
 Texture: porphyritic - intersertal
 Phenocrysts: olivine 3%, <1 mm, euhedral; plagioclase 8%, <4 mm, euhedral; clinopyroxene 3%, <0.8 mm, anhedral to rounded
 Groundmass: plagioclase 40%, <0.3 mm, acicular; clinopyroxene 33%, 0.05 mm, granular; opaques 7%, 0.03 mm, euhedral; glass 5%
 Vesicles: 1%, 0.1 mm, round
 Alteration: olivine and glass to smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis:	68-71 cm	69-71 cm	Magnetic Data:
SiO ₂	47.57	47.57	NRM Intensity (emu/cc)
Al ₂ O ₃	15.07	15.07	NRM Inclination
Fe ₂ O ₃	10.50	10.50	Stable Inclination
MgO	6.69	6.69	-73.0°
CaO	15.06	15.06	Physical Property Data:
Na ₂ O	N.D.	N.D.	Vp (km/sec)
K ₂ O	0.08	0.08	5.89
TiO ₂	1.24	1.24	2.64
P ₂ O ₅	0.13	0.13	2.93
MnO	N.D.	N.D.	Grain Density (g/cc)
LOI	2.81	2.81	2.64
H ₂ O ⁺	0.35	0.35	
H ₂ O ⁻	N.D.	N.D.	
CO ₂	2.14	2.14	
Cr	N.D.	N.D.	
Ni	N.D.	N.D.	
Sr	N.D.	N.D.	
Zr	N.D.	N.D.	

LEG	SITE	H O L E	CORE	SECT.
53	418	A	70	5

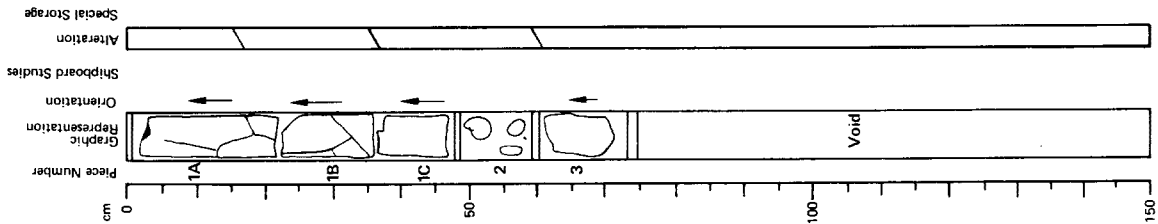
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

330

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53418A	706			

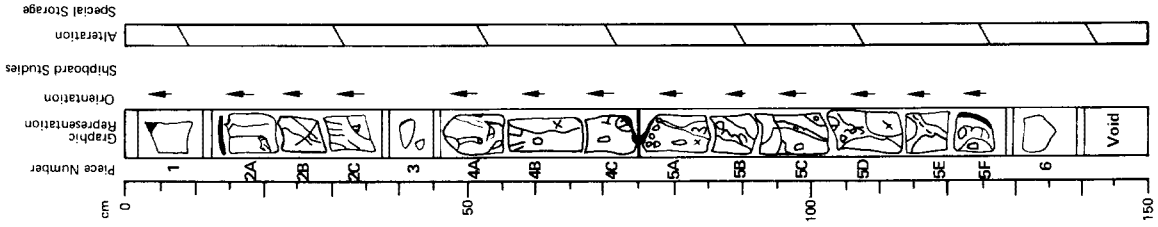
Visual Description
 Moderately phyrlic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 15% - 40%, mostly fresh with iron alteration; olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 3.5%, fresh. Groundmass is fine grained. Vesicles 1%, filled with carbonate and smectite. Scattered veins are filled with carbonate, smectite, zeolite(?) and minor iron hydroxides.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53418A	711			

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, < 3 mm, fresh; olivine phenocrysts 2%, < 1 mm, usually altered to smectite but some are fresh; clinopyroxene phenocrysts 2%, < 2 mm, fresh. Groundmass is fine grained to glassy. Glass selvages are partly altered to smectite. Vesicles < 1%, < 1 mm filled with carbonate and smectite. Basalt is moderately brecciated throughout; fractures and veins are filled with carbonate and smectite. Pyrite is disseminated in the groundmass. A small piece of altered sediment is present in piece 1.



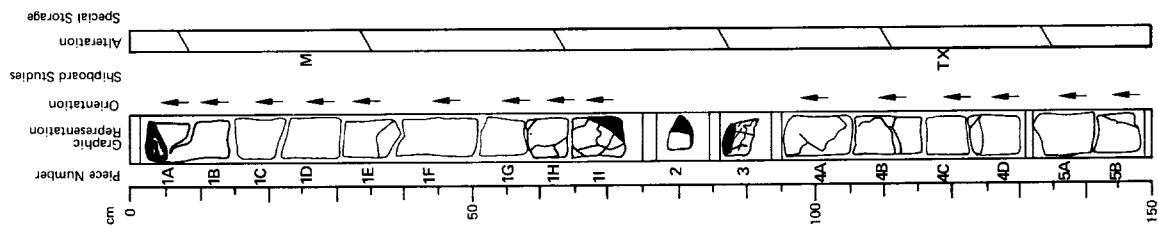
LEG	SITE	HOLE	CORE	SECT.
53418A		71	1	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 10-15%, mostly < 4 mm but with a few megacrysts to 8 mm, fresh, olivine phenocrysts 1%, < 2 mm, altered to smectite; clinopyroxene phenocrysts 1-2%, < 2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are fresh or partly altered to smectite. Vesicles 1%, < 0.5 mm, filled with carbonate and smectite. Rare veinlets are filled with smectite, carbonate and minor pyrite.

Thin Section Description
 Location: 117 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 3%, < 1.5 mm, euhedral; plagioclase 10%, < 2 mm, euhedral; clinopyroxene 3%, < 1.5 mm, subhedral
 Groundmass: olivine 2%, 0.2 mm, subhedral; plagioclase 30%, < 0.5 mm, acicular; clinopyroxene 46%, radiating sheaves; opaques 5%, 0.01 mm, granular
 Vesicles: 1%, < 0.2 mm, round
 Alteration: olivine to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data
 Bulk Analysis: 116.118 cm Magnetic Date: 26.28 cm
 SiO₂ 47.83 NRM intensity (emu/cc) 008.36 x 10⁻³
 Al₂O₃ 15.46 NRM Inclination -58.7°
 Fe₂O₃ 10.60 Stable Inclination -60.4°
 MgO 7.08
 CaO 13.70
 Na₂O N.D.
 K₂O 0.06
 TiO₂ 1.17
 P₂O₅ 0.11
 MnO N.D.
 LOI 1.45
 H₂O⁺ 0.51
 H₂O⁻ 0.94
 CO₂ N.D.
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

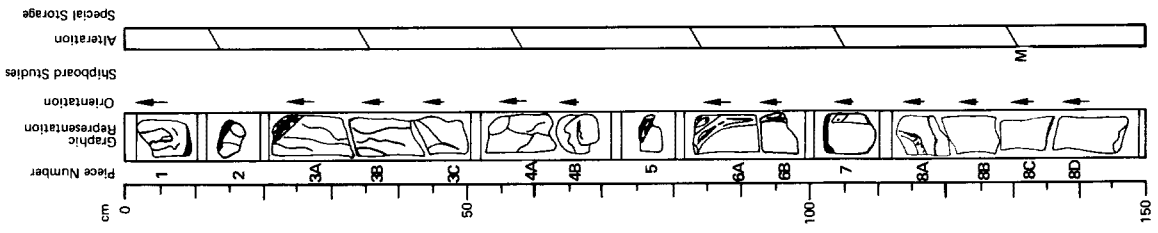


LEG	SITE	HOLE	CORE	SECT.
53418A		71	1	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, < 4 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Many scattered veinlets are filled with smectite, carbonate and minor pyrite. A small piece of chert is attached to the base of piece 8D.

Shipboard Data
 Magnetic Date: 132.134 cm
 NRM intensity (emu/cc) 004.88 x 10⁻³
 NRM Inclination -80.5°
 Stable Inclination -69.7°



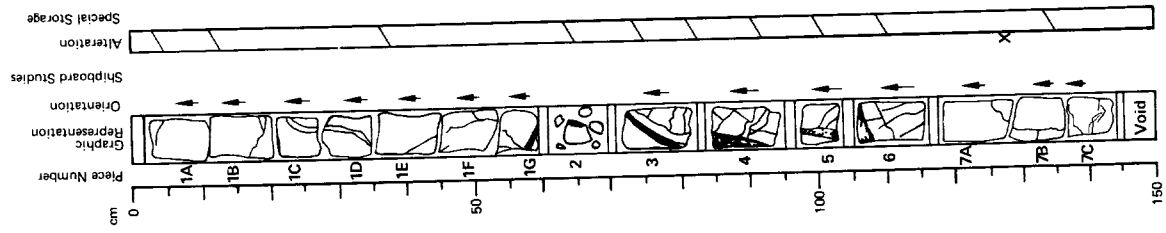
LEG	SITE	HOLE	CORE	SECT.
53	418	A	71	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium to dark gray; weakly to moderately altered. Plagioclase phenocrysts 8-12%, <5 mm, fresh; olivine phenocrysts <1%, <2 mm, altered to smectite; clinopyroxene phenocrysts 2-3%, <3 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1%, filled with carbonate and smectite. Veinlets are scattered throughout, filled with carbonate, smectite and zeolite(?). Disseminated pyrite occurs in the groundmass. Small pieces of altered sediment occur in pieces 1A and 2.

Shipboard Data

Bulk Analysis: 126-129 cm
 SiO₂ 48.93
 Al₂O₃ 15.01
 Fe₂O₃ 11.02
 MgO 8.24
 CaO 13.97
 Na₂O N.D.
 K₂O 0.06
 TiO₂ 1.29
 P₂O₅ 0.12
 MnO N.D.
 LOI 1.10
 H₂O⁺ 0.47
 H₂O⁻ N.D.
 CO₂ 1.62
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



LEG	SITE	HOLE	CORE	SECT.
53	418	A	72	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 12-15%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 3%, <3 mm, fresh, sometimes associated with plagioclase. Groundmass is fine-grained to glassy; glass selvages are altered to smectite. Veinlets are common in piece 2, filled with smectite. Minor pyrite is disseminated in the groundmass. Irregular patches of smectite and carbonate occur in piece 2A. Piece 3 contains a fragment of altered sediment.

Thin Section Description

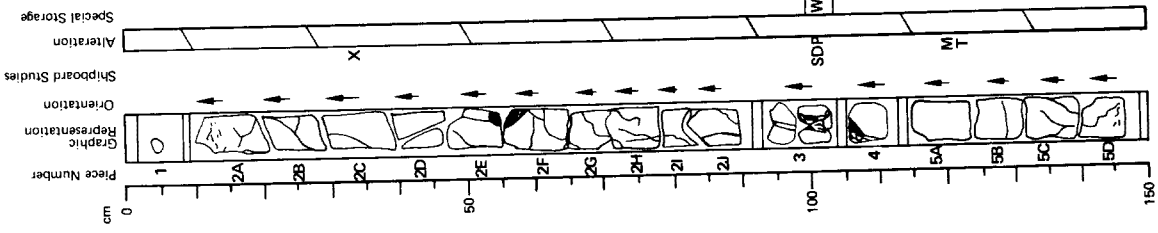
Location: 121 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 4%, <2 mm, euhedral; plagioclase 8%, <2.5 mm, euhedral; clinopyroxene 3%, <1.5 mm, anhedral
 Groundmass: olivine 3%, 0.07 mm, anhedral; plagioclase 25%, <0.5 mm, acicular; clinopyroxene 43%, radiating sheaves; opaques 5%, 0.01 mm, granular; glass 8%
 Vesicles: 1%, 0.25 mm, round
 Alteration: olivine to smectite, carbonate and silica; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 31-34 cm
 SiO₂ 48.23
 Al₂O₃ 14.87
 Fe₂O₃ 10.84
 MgO 7.78
 CaO 14.67
 Na₂O N.D.
 K₂O 0.07
 TiO₂ 1.30
 P₂O₅ 0.12
 MnO N.D.
 LOI 1.75
 H₂O⁺ 0.42
 H₂O⁻ N.D.
 CO₂ 1.49
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 Bulk Intensity (emu/cc) 120-122 cm
 NRM Intensity -63.7°
 Stable Inclination -63.8°

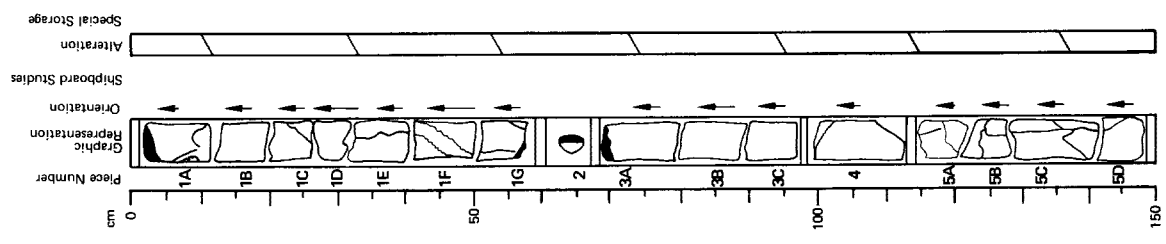
Physical Property Data:
 Vp (km/sec) 5.64
 Porosity (%) 4.45
 Wet Bulk Density (g/cc) 2.88
 Grain Density (g/cc) 2.97



LEG	SITE	HOLE	CORE	SECT.
53	418	A	72	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic pillow basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 5.7%, <4 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1.2%, <4 mm, fresh. Groundmass is fine-grained to glassy; some glass selvages are fresh, some partly altered to smectite. Vesicles 1%, filled with carbonate and smectite. Numerous veins are present particularly in pieces 1 and 5, filled with smectite, carbonate and minor pyrite. Some pyrite is disseminated in the groundmass. A chert fragment occurs in piece 1D.

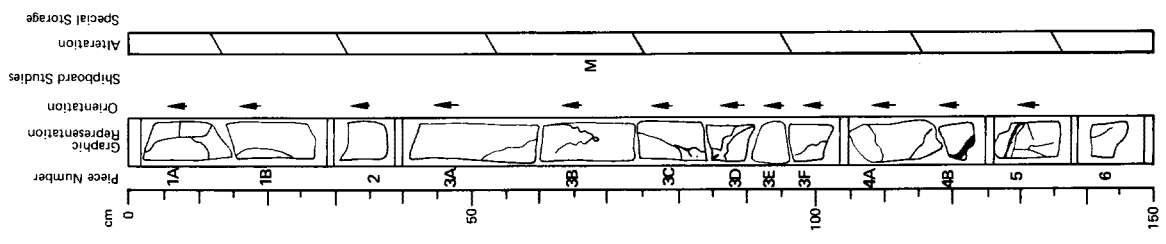


LEG	SITE	HOLE	CORE	SECT.
53	418	A	72	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

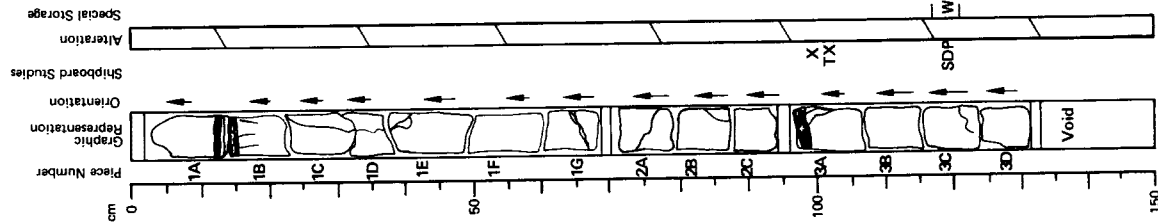
Visual Description
 Moderately phryic basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 5.7%, <10 mm, fresh; olivine phenocrysts 1.2%, <3 mm, altered to smectite; clinopyroxene phenocrysts 2.3%, <4 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite and zeolite(?). Vesicles 1.2%, <2 mm, filled with carbonate and smectite. Scattered veins are filled with carbonate and smectite. Minor pyrite is disseminated in the groundmass. A small fragment of altered sediment occurs in piece 5.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 68.70 cm
 NRM Inclination 006.20 x 10⁻³
 Stable Inclination -58.5°
 -57.1°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
5	34118A	7	2	4



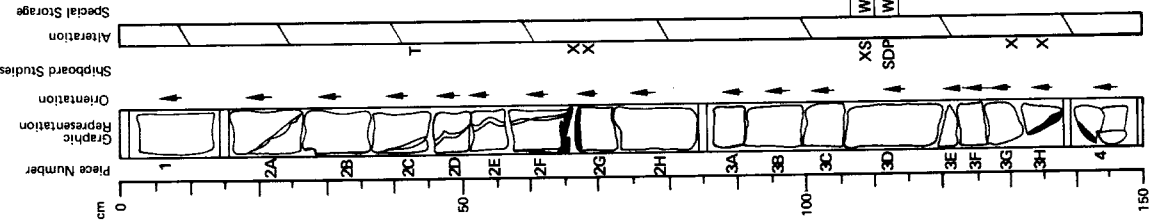
Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, <3 mm, fresh; olivine phenocrysts 1-2%, <3 mm, altered to smectite and carbonate; clinopyroxene phenocrysts 1%, <4 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are generally fresh with only minor alteration to smectite. Vesicles 1%, <2 mm, filled with carbonate and smectite. Scattered veins are filled with quartz, carbonate, smectite and minor pyrite. Pyrite is also disseminated in the groundmass.

Thin Section Description
Location: 100 cm
Texture: porphyritic - glassy
Phenocrysts: olivine 1%, <1.5 mm, euhedral; plagioclase 10%, <4 mm, euhedral; clinopyroxene 4%, <2 mm, subhedral
Groundmass: glass 83%, partly devitrified
Vesicles: 2%, 0.2 mm, round
Alteration: olivine to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data

Bulk Analysis:	98-99 cm	98-102 cm	Physical Property Data:	117-119 cm
SiO ₂	49.41	48.92	\bar{V}_p (km/sec)	5.98
Al ₂ O ₃	15.49	15.17	Porosity (%)	2.36
Fe ₂ O ₃	9.85	10.90	Wet Bulk Density (g/cc)	2.93
MgO	7.20	7.93	Grain Density (g/cc)	2.97
CaO	13.22	13.63		
Na ₂ O	N.D.	N.D.		
K ₂ O	0.36	0.08		
TiO ₂	1.21	1.26		
P ₂ O ₅	0.13	0.12		
MnO	N.D.	N.D.		
LOI	2.36	0.89		
H ₂ O ⁺	0.80	0.43		
H ₂ O ⁻	N.D.	N.D.		
CO ₂	1.09	0.94		
Cr	N.D.	N.D.		
Ni	N.D.	N.D.		
Sr	N.D.	N.D.		
Zr	N.D.	N.D.		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8-12% (5-8% in piece 1), <7 mm, slightly altered to smectite, often in glomerocrysts; olivine phenocrysts 1%, <1 mm, mostly altered to smectite, carbonate and zoisite(?); clinopyroxene phenocrysts 3%, <6 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles <1%, <1 mm, filled with carbonate. Scattered veins are filled with smectite, carbonate and pyrite.

Thin Section Description
Location: 43 cm
Texture: porphyritic - intersertal
Phenocrysts: olivine 4%, <3.5 mm, euhedral; plagioclase 10%, <4 mm, euhedral; clinopyroxene 3%, <1.5 mm, subhedral
Groundmass: olivine 3%, 0.2 mm, subhedral; plagioclase 30%, <0.3 mm, acicular; clinopyroxene 44%, <0.2 mm, anhedral; opaques 5%, 0.005 mm, granular
Vesicles: 1%, <0.3 mm, round
Alteration: olivine to smectite and carbonate; smectite and carbonate fill vesicles

Shipboard Data

Bulk Analysis:	65-66 cm	66-68 cm	105-107 cm	130-137 cm
SiO ₂	52.13	48.21	48.69	50.1
Al ₂ O ₃	15.85	15.28	15.42	15.1
Fe ₂ O ₃	11.19	10.66	10.74	11.6
MgO	6.65	7.88	7.05	6.94
CaO	9.88	11.59	12.60	9.73
Na ₂ O	N.D.	N.D.	N.D.	N.D.
K ₂ O	1.27	0.15	0.11	0.89
TiO ₂	1.25	1.26	1.28	1.28
P ₂ O ₅	0.10	0.12	0.10	0.08
MnO	N.D.	N.D.	N.D.	N.D.
LOI	1.99	0.52	0.92	2.57
H ₂ O ⁺	1.90	0.69	0.60	0.50
H ₂ O ⁻	N.D.	N.D.	N.D.	N.D.
CO ₂	0.25	0.39	0.35	1.33
Cr	N.D.	N.D.	N.D.	N.D.
Ni	N.D.	N.D.	N.D.	N.D.
Sr	N.D.	N.D.	N.D.	N.D.
Zr	N.D.	N.D.	N.D.	N.D.

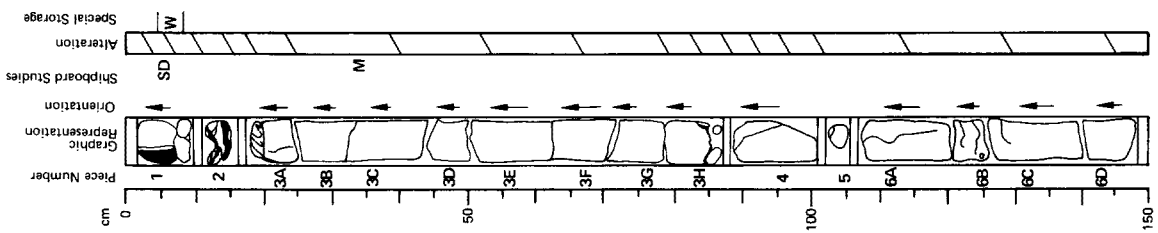
Physical Property Data:
 \bar{V}_p (km/sec) 106-108 cm 6.03 109-111 cm 6.06
 Porosity (%) 2.24
 Wet Bulk Density (g/cc) 2.94
 Grain Density (g/cc) 2.99

LEG	SITE	HOLE	CORE	SECT.
53	418	A	73	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phryic pillow basalt. Basalt is medium gray to greenish gray; moderately to highly altered. Plagioclase phenocrysts 10-15%, <9 mm, fresh; olivine phenocrysts 1.2%, <3 mm, altered to carbonate and smectite; clinopyroxene phenocrysts 2%, <4 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Scattered veins are filled with smectite, carbonate and pyrite. Minor altered sediment is associated with glass selvages.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 35-37 cm 009.01 x 10⁻³
 NRM Inclination -74.5°
 Stable Inclination -73.1°
 Physical Property Data:
 Vp (km/sec) 5-7 cm 3.13
 Wet Bulk Density (g/cc) 2.30

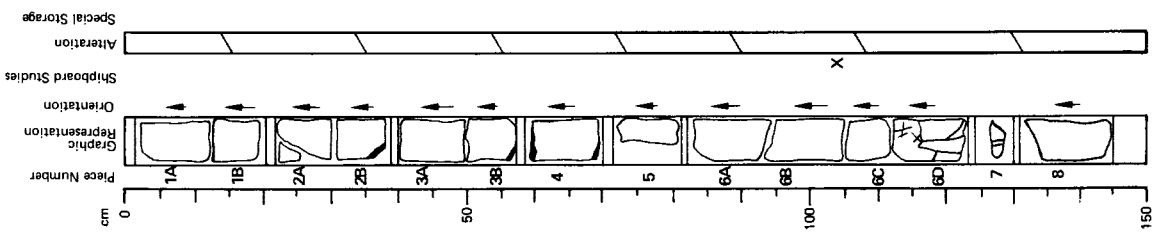


LEG	SITE	HOLE	CORE	SECT.
53	418	A	73	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

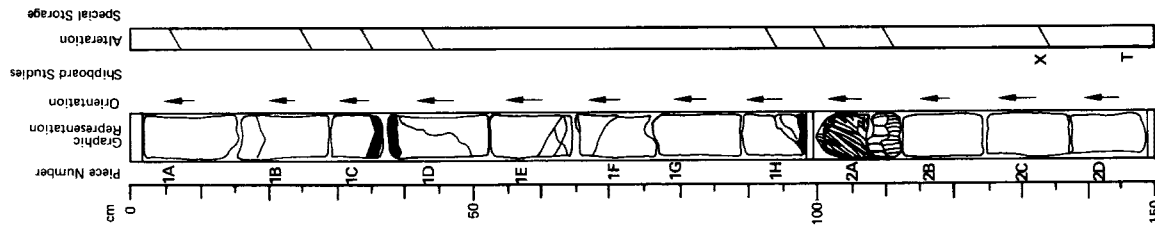
Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 12-14%, <8 mm, fresh, commonly in glomerocrysts to 20 mm; olivine phenocrysts 1%, <1 mm, mostly altered to smectite and carbonate; clinopyroxene phenocrysts 2-3%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles <1%, <0.2 mm, some empty, some filled with carbonate, smectite and pyrite. Some pyrite is also disseminated in the groundmass.

Shipboard Data
 Bulk Analysis: 106-106 cm
 SiO₂ 47.81
 Al₂O₃ 16.00
 Fe₂O₃ 11.46
 MgO 6.38
 CaO 14.37
 Na₂O N.D.
 K₂O < 0.03
 TiO₂ 1.25
 P₂O₅ 0.14
 MnO N.D.
 LOI 1.17
 H₂O⁺ 0.38
 H₂O⁻ N.D.
 CO₂ 1.21
 Cl N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



LEG	SITE	HOLE	CORE	SECT.
53	418	A	73	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

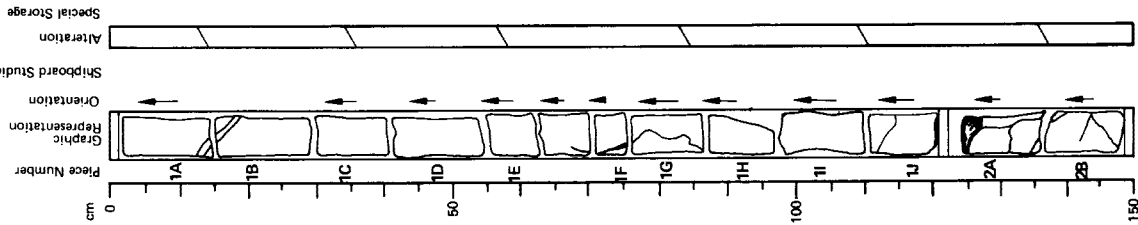


Visual Description
Moderately phyrlic pillow basalt. Basalt is medium gray; moderately to weakly altered. Plagioclase phenocrysts 10-15%, <10 mm, fresh; olivine phenocrysts 1-2%, <3 mm, altered to smectite; clinopyroxene phenocrysts 2-3%, <2 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Scattered veins are filled with carbonate, smectite, silica and pyrite. Pyrite is also disseminated in the groundmass. A vein in piece 1H contains pink zirconite(?).

Thin Section Description
Location: 147 cm
Texture: porphyritic - quench
Phenocrysts: olivine 5%, <1.5 mm, euhedral; plagioclase 10%, <3 mm, euhedral; clinopyroxene 4%, <2 mm, anhedral
Groundmass: olivine 3%, 0.2 mm, subhedral; plagioclase 35%, 0.3 mm, acicular; clinopyroxene 35%, 0.2 mm, radiating sheaves; opaques 2%, 0.01, euhedral; glass 5%
Vesicles: 1%, 0.5 mm, round
Alteration: olivine and minor glass to smectite; carbonate fills vesicles

Shipboard Data
Bulk Analysis: 132-134 cm

SiO ₂	48.11
Al ₂ O ₃	14.94
Fe ₂ O ₃	10.70
MgO	7.30
CaO	12.96
Na ₂ O	N.D.
K ₂ O	0.13
TiO ₂	1.23
P ₂ O ₅	0.15
MnO	N.D.
LOI	1.08
H ₂ O ⁺	0.62
H ₂ O ⁻	N.D.
CO ₂	0.43
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phyrlic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10-15%, <10 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite and carbonate; clinopyroxene phenocrysts 2%, <2 mm, fresh, usually in subophitic clusters with plagioclase. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1%, <1 mm, filled with smectite and carbonate. Scattered veins are filled with carbonate, smectite and pyrite.

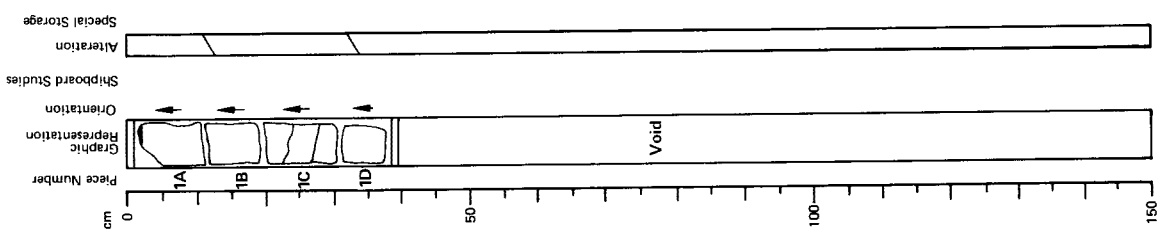
LEG	SITE	HOLE	CORE	SECT.
53	418	A	73	5

LEG	SITE	CORE	SECT.
53418A	73	7	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phryic pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10-15%, < 9 mm; fresh; olivine phenocrysts 1% < 0.5 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles < 1%, < 0.5 mm, filled with smectite and carbonate. Scattered veins are filled with carbonate and smectite.



LEG	SITE	CORE	SECT.
53418A	73	6	

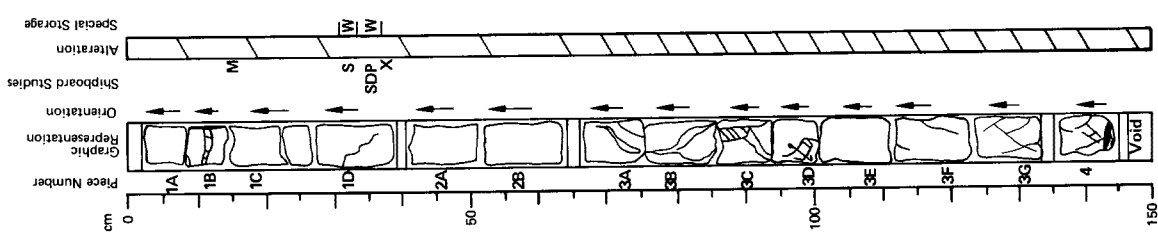
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phryic pillow basalt. Basalt is medium gray; weakly to moderately altered in upper 65 cm, highly altered in the lower 85 cm. Plagioclase phenocrysts 10-15%, < 8 mm, fresh; olivine phenocrysts 2%, < 3 mm, altered to smectite; clinopyroxene phenocrysts 3%, < 5 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1%, < 2 mm, filled with smectite. Piece 3 is partly brecciated; fractures and veins are filled with silica, carbonate, smectite and minor pyrite.

Shipboard Data

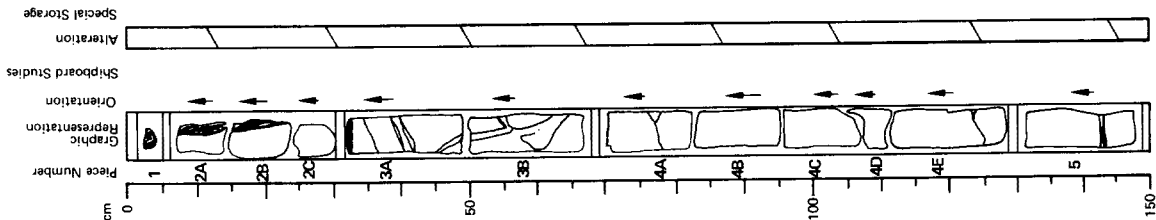
Bulk Analysis:	33.36 cm	Magnetic Data:	16.18 cm
SiO ₂	48.81	NRM Intensity (emu/cc)	005.69 x 10 ⁻³
Al ₂ O ₃	14.87	NRM Inclination	-51.2°
Fe ₂ O ₃	10.66	Stable Inclination	-49.4°
MgO	7.55	Physical Property Data:	
CaO	13.03	Vp (km/sec)	35-37 cm
Na ₂ O	N.D.	Porosity (%)	5.64
K ₂ O	0.13	Wet Bulk Density (g/cc)	4.30
TiO ₂	1.22	Grain Density (g/cc)	2.88
P ₂ O ₅	0.14		2.97
MnO	N.D.		
H ₂ O ⁺	0.68		
H ₂ O ⁻	N.D.		
CO ₂	0.44		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	74	1

Visual Description
 Moderately phyrlic basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 12%, <5 mm, some megacrysts to 10 mm, partly altered to smectite; olivine phenocrysts 0-1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1-2%, <2 mm, fresh, often occur in glomerocrysts with plagioclase. Groundmass varies from fine-grained or glassy in the upper 30 cm to medium-grained in the lower 120 cm. No glass selvages occur below 30 cm and the grain size increases gradually from this point to the base of the section; glass selvages are relatively fresh with only minor alteration to smectite. Vesicles 1%, <1.5 mm, filled with carbonate. Veins and veinlets are filled with carbonate, smectite and minor pyrite. Pyrite is also disseminated in the groundmass.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	74	2

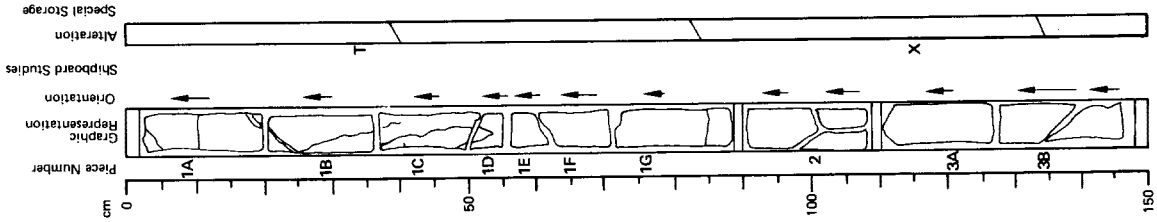
Visual Description
 Moderately phyrlic massive basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 8-10%, <7 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 3%, <2 mm, fresh, often in glomerophytic clusters with plagioclase. Groundmass is medium-grained, subophitic, with grain size increasing gradually with depth. Vesicles 1%, <0.5 mm, filled with carbonate and minor smectite.

Thin Section Description

Location: 36 cm
 Texture: porphyritic - subophitic
 Phenocrysts: plagioclase 10%, <4 mm, euhedral
 Groundmass: olivine 5%, <0.3 mm, euhedral; plagioclase 40%, <0.5 mm, euhedral; clinopyroxene 37%, <0.3 mm, subophitic; opaques 5%, 0.1 mm, subhedral
 Vesicles: 3%, <2 mm, round
 Alteration: olivine to smectite; smectite and carbonate fill vesicles

Shipboard Data

Bulk Analysis: 115-117 cm
 SiO₂ 49.39
 Al₂O₃ 16.47
 Fe₂O₃ 10.59
 MgO 6.15
 CaO 13.03
 Na₂O N.D.
 K₂O < 0.03
 TiO₂ 1.24
 P₂O₅ 0.13
 MnO N.D.
 LOI 1.06
 H₂O⁺ 0.59
 H₂O⁻ N.D.
 CO₂ 0.41
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

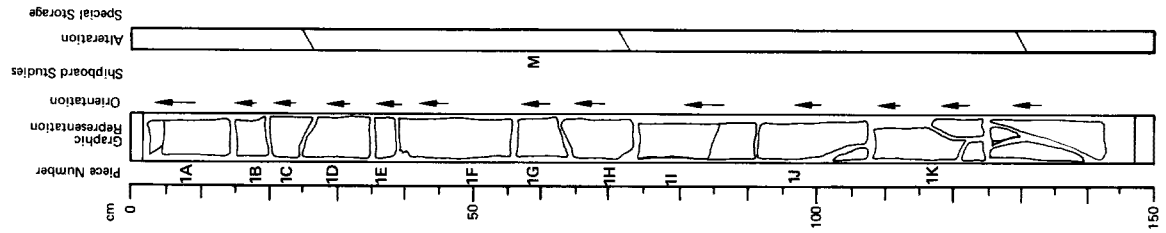


LEG	SITE	H O L	CORE	SECT.
53418A	74	3		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyric massive basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 10%, <5 mm, one megacryst in piece 1C is 25 mm. Fresh, olivine phenocrysts <1%, <1mm, altered to smectite; clinopyroxene phenocrysts 3%, 3 mm. Groundmass is massive, medium-grained, subophitic. Vesicles 1%, <0.2 mm, filled with carbonate. Sparse veins are filled with smectite and carbonate. Slickensides are present on pieces 1C and 1D.

Shipboard Data
 Magnetic Data: 59.61 cm
 NRM Intensity (emu/cc) 002.19 x 10⁻³
 NRM Inclination -20.6°
 Stable Inclination -53.9°

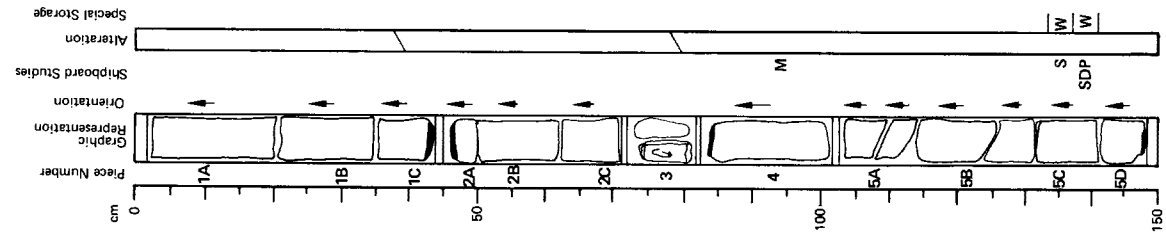


LEG	SITE	H O L	CORE	SECT.
53418A	74	4		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyric massive basalt and pillow basalt. Basalt is medium to dark gray; very slightly altered. Piece 1 is a continuation of the massive unit in sections 2 and 3; remainder of the section consists of pillow basalt. Plagioclase phenocrysts 10%, 6 mm, fresh; olivine phenocrysts 1%, 2 mm, altered to smectite and carbonate; clinopyroxene phenocrysts 2.4%, 6 mm, fresh, often forms glomerocrysts with plagioclase. Groundmass is fine grained to glassy; grain size in piece 1 decreases downward to glassy margin in piece 1C; glass selvages are fresh. Scattered veinlets are filled with smectite and carbonate.

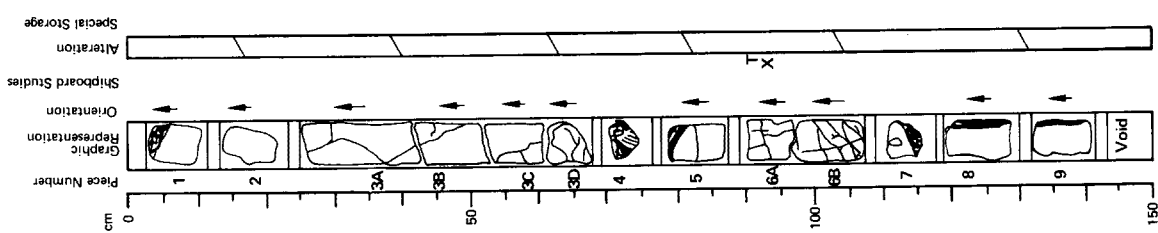
Shipboard Data
 Magnetic Data: 93.95 cm
 NRM Intensity (emu/cc) 008.19 x 10⁻³
 NRM Inclination -67.5°
 Stable Inclination -65.6°
 Physical Property Data:
 Vp (km/sec) 136.136 cm
 Porosity (%) 6.06
 Wet Bulk Density (g/cc) 1.95
 Grain Density (g/cc) 2.95



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LEG	SITE	HOLE	CORE	SECT.
5	3418A	7	4	5

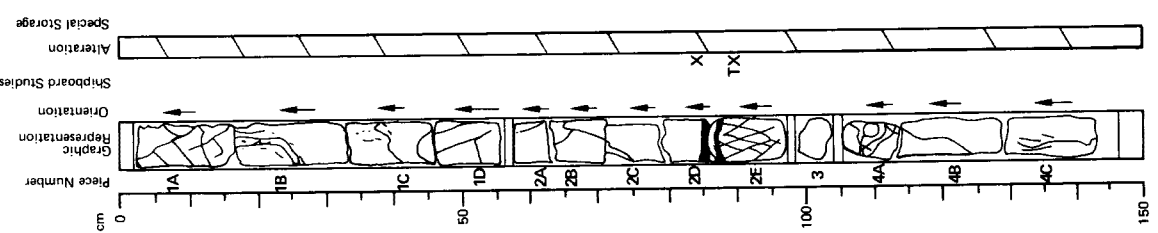
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phyric pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, <8 mm, fresh; olivine phenocrysts 1%, <2 mm, altered to smectite; clinopyroxene phenocrysts 2-3%, <3 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1%, <2 mm, filled with carbonate and pyrite. Voids are present throughout the section, filled with smectite and minor pyrite. Pyrite is also disseminated in the groundmass. A piece of altered sediment occurs between glass selvages in piece 4.

Thin Section Description
Location: 91 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, <0.7 mm, euhedral; plagioclase 12%, <5 mm, euhedral; clinopyroxene 2%, <3 mm, euhedral
Groundmass: plagioclase 4%, <0.5 mm, laths; clinopyroxene 73%, poorly crystallized radiating sheaves; opaques 2%, 0.005, granular
Vesicles: 2%, <0.6 mm, round to irregular
Alteration: olivine to smectite, carbonate, and quartz(?); carbonate fills vesicles

Shipboard Data
Bulk Analysis: 90.94 cm
SiO₂ 48.25
Al₂O₃ 16.87
Fe₂O₃ 10.54
MgO 7.11
CaO 13.80
Na₂O N.D.
K₂O 0.04
TiO₂ 1.25
P₂O₅ 0.11
MnO N.D.
LOI N.D.
H₂O⁺ 0.34
H₂O⁻ N.D.
CO₂ 0.79
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.



Visual Description
Moderately phyric pillow basalt. Basalt is medium gray to greenish-gray; moderately altered. Plagioclase phenocrysts 10%, <8 mm, fresh; olivine phenocrysts 1%, <3 mm, altered to smectite; clinopyroxene phenocrysts 2%, <3 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1.2%, <2 mm, filled with carbonate and smectite. Fractures are present throughout the section, filled with smectite, carbonate and pyrite.

Thin Section Description
Location: 87 cm
Texture: porphyritic - glassy
Phenocrysts: olivine 3%, <0.8 mm, euhedral; plagioclase 15%, <3.5 mm, euhedral; clinopyroxene 5%, <3.5 mm, euhedral
Groundmass: glass 75%, partly devitrified
Vesicles: 2%, 0.2 mm, round
Alteration: smectite after some olivine

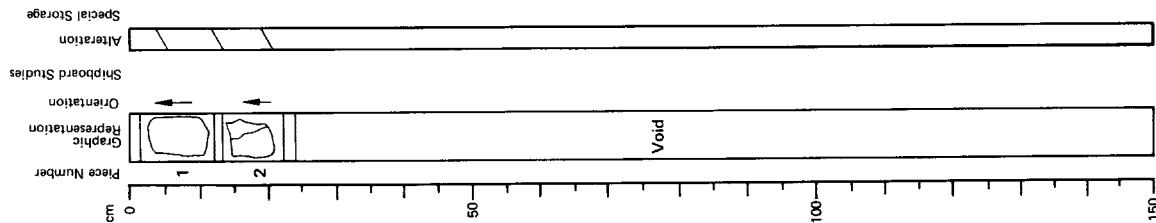
Shipboard Data
Bulk Analysis: 85-86 cm
SiO₂ 86-88 cm
Al₂O₃ 50.0
Fe₂O₃ 16.8
MgO 13.1
CaO 6.62
Na₂O 8.73
K₂O N.D.
TiO₂ 1.17
P₂O₅ 1.33
MnO 0.12
LOI N.D.
H₂O⁺ 1.94
H₂O⁻ 1.89
CO₂ N.D.
Cr 0.18
Ni N.D.
Sr N.D.
Zr N.D.

LEG	SITE	HOLE	CORE	SECT.
5	3418A	7	4	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

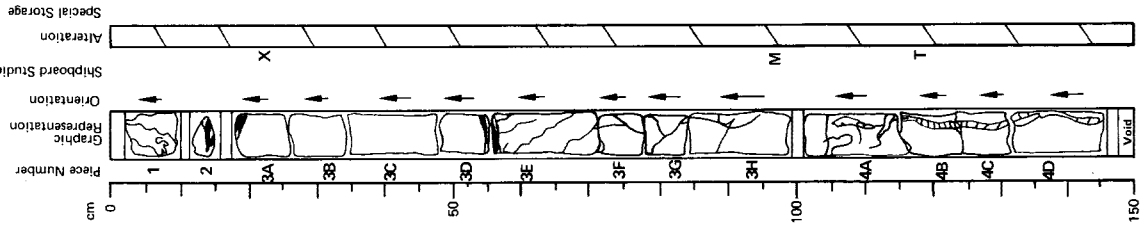
LEG	SITE	HOLE	CORE	SECT.
53	418A	74	7	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Moderately phryic pillow basalt. Basalt is medium gray to greenish-gray; moderately altered. Plagioclase phenocrysts 7.9%, <6 mm, fresh; olivine phenocrysts 1%, <2 mm, altered to smectite; clinopyroxene phenocrysts 2%, <3 mm, fresh. Groundmass is fine-grained. Vesicles <0.5%, <1 mm, filled with carbonate. Carbonate also fills scattered veins.



Visual Description

Moderately phryic pillow basalt. Basalt is medium gray to greenish-gray; moderately altered. Plagioclase phenocrysts 7.8%, <6 mm, fresh; olivine phenocrysts 1%, <2 mm, altered to smectite; clinopyroxene phenocrysts 1%, <3 mm, fresh, mostly in glomerocrysts with plagioclase. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Veins are scattered throughout, filled with smectite; one large vein in piece 4 is filled with carbonate, smectite, silica and pyrite. Pyrite is also disseminated in the groundmass. Piece 1 is brecciated with basalt fragments in a smectite matrix.

Thin Section Description

Location: 120 cm

Texture: porphyritic - quench

Phenocrysts: olivine 3%, <1 mm, euhedral; plagioclase 12%, <3 mm, euhedral; clinopyroxene 6%, <4 mm, subhedral

Groundmass: plagioclase 15%, <0.5 mm, acicular; clinopyroxene 68%, radiating sheaves; opaques 5%, 0.01 mm, granular

Vesicles: 1%, 0.7 mm, round

Alteration: olivine to carbonate and smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 22.24 cm
 SiO₂ 48.61
 Al₂O₃ 16.72
 Fe₂O₃ 10.60
 MgO 6.87
 CaO 13.71
 Na₂O N.D.
 K₂O 0.04
 TiO₂ 1.31
 P₂O₅ 0.16
 MnO N.D.
 LOI 1.58
 H₂O⁺ 0.86
 H₂O⁻ N.D.
 CO₂ 1.04
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 NRM Intensity (emu/cc) 93.95 cm
 NRM Inclination 008.43 x 10⁻³
 Stable Inclination -47.6°
 -46.9°

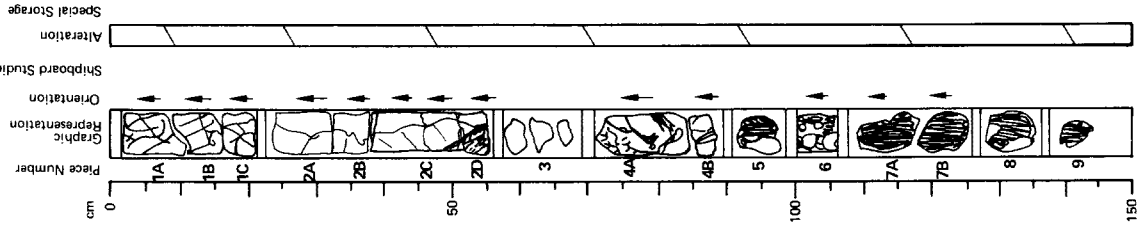
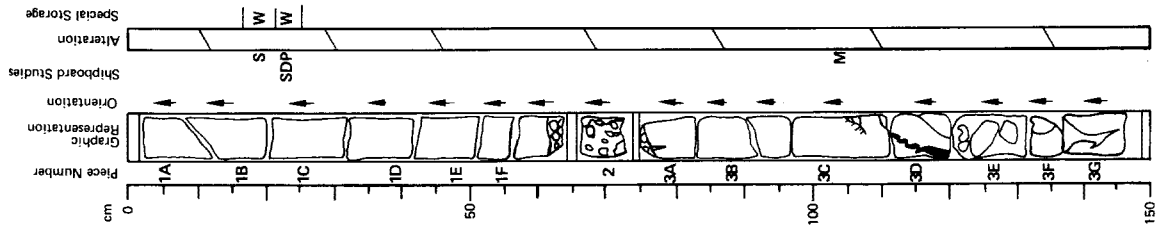
LEG	SITE	HOLE	CORE	SECT.
53	418	A	75	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyric pillow basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 8-10%, <8 mm, fresh; olivine phenocrysts <1%, <0.5 mm, mostly altered to smectite and carbonate; clinopyroxene phenocrysts 4%, <6 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles <0.5%, <0.5 mm, filled with smectite and carbonate. Veins are present throughout, filled with smectite and carbonate. Minor brecciation is present particularly in pieces 1F, 2 and 3A; breccia consists of angular basalt fragments in a smectite matrix.

Shipboard Data
 104-106 cm
 NRM Intensity (emu/cc) 008.72 x 10³
 NRM Inclination -55.2°
 Stable Inclination -56.9°

Physical Property Data:
 Vp (km/sec) 21-23 cm
 Porosity (%) 6.00
 Wet Bulk Density (g/cc) 2.42
 Grain Density (g/cc) 2.92
 2.97



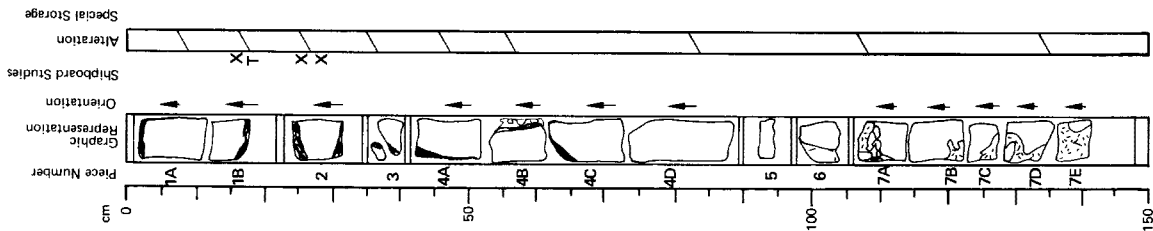
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	75	3

Visual Description
 Moderately phyric pillow basalt and sparsely phyric basalt glass. Pieces 1 through 4 (0-90 cm) consist of mostly crystalline basalt; pieces 5-9 (90-150 cm) consist of basalt glass. Lithic basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 10%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <3 mm, fresh. Lithic basalt is partly brecciated with angular fragments in smectite matrix. Basalt glass has 1-2% phenocrysts, plagioclase 1-2%, <5 mm, fresh; olivine <1%, <1 mm, altered to smectite. Glass in piece 6 is brecciated. Fragments of altered sediment occur in piece 8.

LEG	SITE	HOLE	CORE	SECT.
53	418	A	7	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phyric pillow basalt breccia. Breccia consists of crystalline basalt fragments with many glass selvages. Breccia is gray to greenish-gray; weakly to moderately altered. Plagioclase phenocrysts 8-10%, <6 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite and carbonate; clinopyroxene phenocrysts 2%, <2 mm, fresh. Groundmass of breccia fragments is fine-grained to glassy; glass selvages are partly altered to smectite. Vesicles 1-3%, <2 mm, filled with smectite and carbonate. Breccia matrix is green smectite.

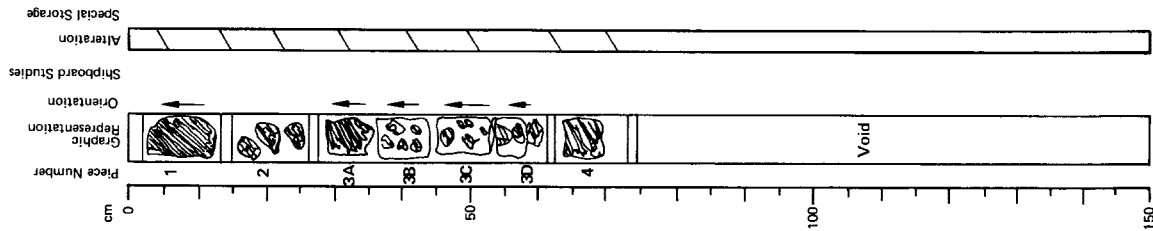
Thin Section Description
Location: 18 cm
Texture: porphyritic - quench
Phenocrysts: olivine 2%, <1 mm, euhedral; plagioclase 10%, <5 mm, euhedral; clinopyroxene 4%, <1.5 mm, anhedral to rounded
Groundmass: olivine 2%, 0.15 mm, subhedral; plagioclase 25%, 0.3 mm, acicular; clinopyroxene 54%, radiating sheaves; opaques 2%, 0.005 mm, granular
Vesicles: 1%, 0.5 mm, round
Alteration: olivine to carbonate and smectite; carbonate fills vesicles

Shipboard Data

	14-15 cm	24-25 cm	23-24 cm
Bulk Analysis:	48.61	48.46	49.42
SiO ₂	16.14	15.78	15.29
Al ₂ O ₃	10.43	10.66	12.67
Fe ₂ O ₃	7.31	7.76	8.29
MgO	13.22	12.51	9.43
CaO	N.D.	N.D.	N.D.
N ₂ O	< 0.03	0.09	0.85
K ₂ O	1.32	1.33	1.32
TiO ₂	0.13	0.12	0.14
P ₂ O ₅	N.D.	N.D.	N.D.
MnO	1.30	1.46	7.74
LOI	0.85	0.92	3.45
H ₂ O ⁺	N.D.	N.D.	N.D.
H ₂ O ⁻	0.66	0.22	0.27
CO ₂	N.D.	N.D.	N.D.
Cr	N.D.	N.D.	N.D.
Ni	N.D.	N.D.	N.D.
Sr	N.D.	N.D.	N.D.
Zr	N.D.	N.D.	N.D.

LEG	SITE	HOLE	CORE	SECT.
53	418	A	7	5

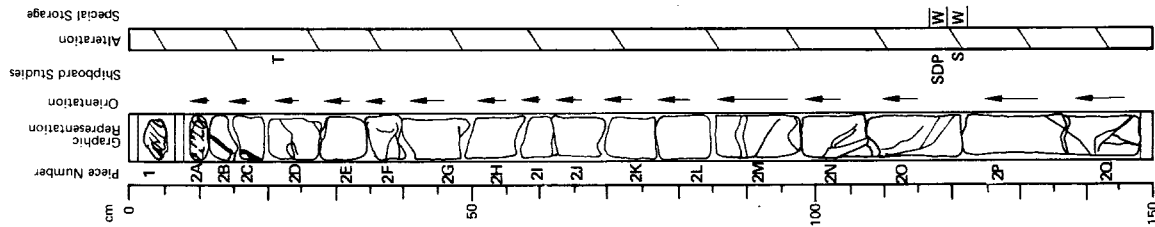
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phyric basalt glass. Glass is partly massive, partly brecciated. Plagioclase phenocrysts 5-7%, fresh; olivine phenocrysts 1%, altered to smectite; plagioclase microclives 3%, fresh. Breccia matrix consists of smectite, carbonate and zeolite(?).

LEG	SITE	HOLE	CORE	SECT.
53418A			76	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Sparsely phyrlic basalt and basalt glass. Pieces 1 through 2C are basalt glass, a continuation of the material in Core 75; pieces 2D through 2G are crystalline basalt. Crystalline basalt is gray to greenish-gray; moderately altered. Plagioclase phenocrysts 2.5%, < 4 mm, fresh, olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 1%, < 2 mm, fresh. Groundmass of crystalline basalt is medium to fine grained, often mottled. Vesicles 1-2%, usually < 2 mm, a few up to 5 mm, filled with carbonate and smectite. Vains are filled with carbonate, smectite, silica and pyrite. Pyrite is also disseminated in the groundmass. Basalt glass has same phenocrysts content as crystalline basalt; glass is partly altered to smectite.

Thin Section Description

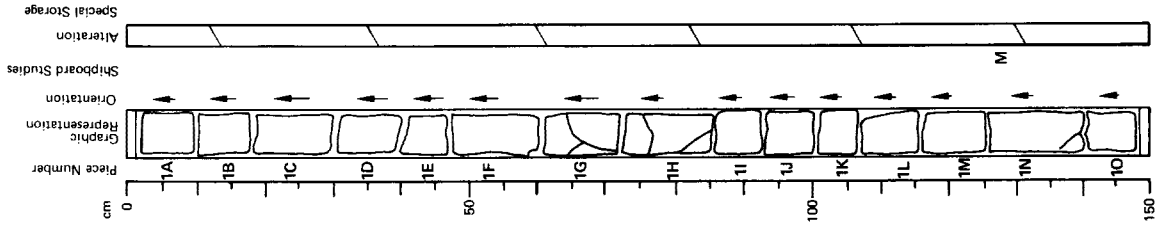
Location: 21 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 2%, < 1 mm, euhedral; plagioclase 8%, < 3 mm, euhedral; clinopyroxene 5%, < 3 mm, anhedral to rounded
 Groundmass: olivine (?) 2%, 0.05 mm, subhedral; plagioclase 15%, 0.3 mm, subhedral; clinopyroxene 35%, radiating sheaves; opaques 6%, 0.005, granular; glass 26%
 Vesicles: 1%, 0.2 mm, round
 Alteration: olivine to smectite and carbonate, smectite fills vesicles

Shipboard Data

Bulk Analysis: 115-118 cm	Physical Property Data:	117-119 cm	119-121 cm
SiO ₂ 49.54	V _p (km/sec)	5.72	5.61
Al ₂ O ₃ 16.41	Porosity (%)	3.92	
Fe ₂ O ₃ 10.82	Wet Bulk Density (g/cc)	2.89	
MgO 7.03	Grain Density (g/cc)	2.97	
CaO 13.13			
Ni ₂ O N.D.			
K ₂ O 0.05			
TiO ₂ 1.36			
P ₂ O ₅ 0.10			
MnO N.D.			
LOI 2.09			
H ₂ O ⁺ 0.92			
H ₂ O ⁻ N.D.			
CO ₂ 0.84			
Cr N.D.			
Ni N.D.			
Sr N.D.			
Zr N.D.			

LEG	SITE	HOLE	CORE	SECT.
53418A			76	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Sparsely phyrlic massive basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 2-3%, < 3 mm, fresh, olivine phenocrysts < 1%, < 1 mm, altered to smectite, clinopyroxene phenocrysts 1-2%, < 4 mm, fresh. Groundmass is fine-grained to medium-grained, subophitic. Vesicles 0.5%, < 0.5 mm, filled with carbonate, smectite and pyrite. Vains are also filled with smectite, carbonate and pyrite.

Shipboard Data

Magnetic Data:	129-131 cm
NRM Intensity (emu/cc)	002.82 x 10 ⁻³
NRM Inclination	-25.0°
Stable Inclination	-33.8°

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

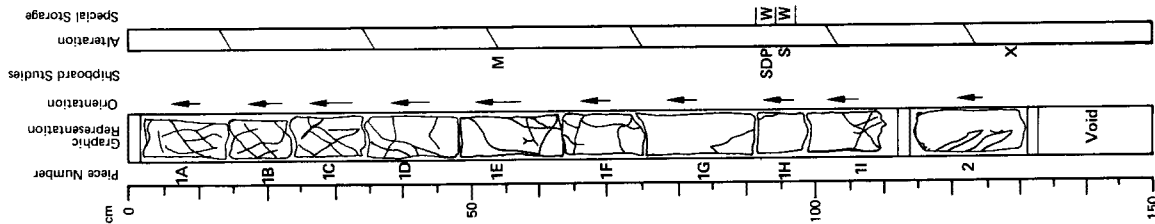
LEG	SITE	HOLE	CORE	SECT.
53	418	A	76	3

Visual Description

Sparsely phryic massive basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 3-4%, <3 mm, fresh; olivine phenocrysts 1-2%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <2 mm, fresh. Groundmass is fine grained, holocrystalline. Basalt is highly fractured, filled with carbonate and smectite.

Shipboard Data

Bulk Analysis:	125-130 cm	Magnetic Date:	54.56 cm
SiO ₂	47.87	NRM Intensity (emu/cc)	001.41 x 10 ⁻³
Al ₂ O ₃	16.02	NRM Inclination	47.7°
Fe ₂ O ₃	10.47	Physical Property Data:	
MgO	6.70	Vp (km/sec)	92.94 cm
CaO	13.25	Porosity (%)	5.57
Na ₂ O	N.D.	Wet Bulk Density (g/cc)	3.62
K ₂ O	0.08	Grain Density (g/cc)	2.91
TiO ₂	1.46		2.98
P ₂ O ₅	0.14		
MnO	N.D.		
LOI	2.92		
H ₂ O ⁺	1.16		
H ₂ O ⁻	N.D.		
CO ₂	1.68		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

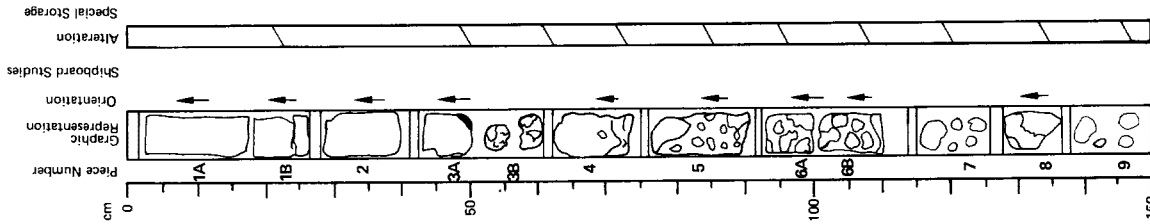


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	77	1

Visual Description

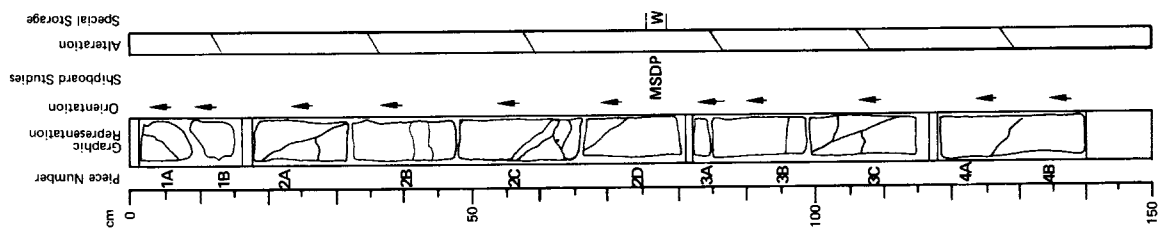
Aphyric to sparsely phryic basalt and basalt breccia. The upper 50 cm of the section consists of aphyric to sparsely phryic basalt. Basalt is medium gray, weakly altered. Plagioclase phenocrysts 1-2%, <2 mm, fresh; olivine phenocrysts 1%, <2 mm, fresh, often intergrown with plagioclase. Groundmass is fine grained, holocrystalline. Basalt is highly fractured, filled with carbonate and smectite. The lower 100 cm consist of moderately altered basalt breccia. Angular fragments, 1 mm to 10 cm, consist chiefly of crystalline basalt, many with glass rinds; many small fragments are completely glass. Breccia matrix is green smectite.



2-216

LEG	SITE	HOLE	CORE	SECT.
53418A	77	2		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



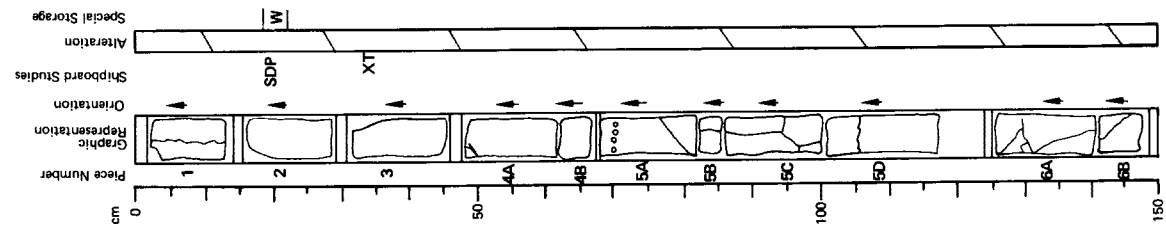
Visual Description
 Aphyric to sparsely phryic massive basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 2-4%, <4 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, aphanitic in piece 1, fine-grained in pieces 2 and 3, and medium-grained, subophitic in lower 100 cm of the section. Vesicles are abundant only in pieces 4A through 4B where they are 5%, <2 mm, filled with carbonate and smectite. Scattered veinlets are filled with carbonate, smectite, and pyrite. Pyrite is also disseminated in the groundmass.

Thin Section Description
 Location: 35 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 3%, 0.5 mm, euhedral; plagioclase 10%, <1 mm, euhedral; clinopyroxene 7%, 0.5 mm, subhedral
 Groundmass: olivine 10%, 0.1 mm, subhedral; plagioclase 25%, 0.4 mm, acicular; clinopyroxene 36%, radiating sheaves; opaques 8%, 0.05 mm, granular
 Vesicles: 1%, 0.5, round
 Alteration: olivine to smectite and carbonate; carbonate fills vesicles

Shipboard Data
 Bulk Analysis: 34-36 cm
 SiO₂ 48.10 Physical Property Data: 20-22 cm
 Al₂O₃ 14.97 Vp (km/sec) 5.71
 Fe₂O₃ 10.06 Porosity (%) 2.57
 MgO 6.96 Wet Bulk Density (g/cc) 2.93
 CaO 14.75 Grain Density (g/cc) 2.98
 Na₂O N.D.
 K₂O < 0.03
 TiO₂ 1.21
 P₂O₅ 0.13
 MnO N.D.
 LOI 3.31
 H₂O⁺ 0.80
 H₂O⁻ N.D.
 CO₂ 2.26
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

LEG	SITE	HOLE	CORE	SECT.
53418A	77	2		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Sparsely phryic massive basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts <1%, <1 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, aphanitic in piece 1, fine-grained in pieces 2 and 3, and medium-grained, subophitic in lower 100 cm of the section. Vesicles are abundant only in pieces 4A through 4B where they are 5%, <2 mm, filled with carbonate and smectite. Scattered veinlets are filled with carbonate, smectite, and pyrite. Pyrite is also disseminated in the groundmass.

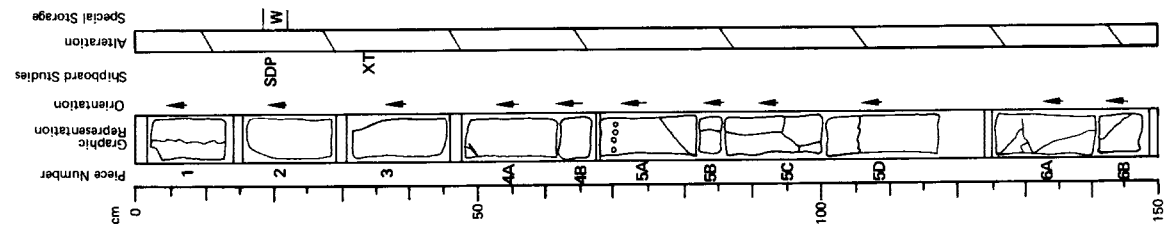
Shipboard Data
 Bulk Analysis: 34-36 cm
 SiO₂ 48.10 Physical Property Data: 20-22 cm
 Al₂O₃ 14.97 Vp (km/sec) 5.71
 Fe₂O₃ 10.06 Porosity (%) 2.57
 MgO 6.96 Wet Bulk Density (g/cc) 2.93
 CaO 14.75 Grain Density (g/cc) 2.98
 Na₂O N.D.
 K₂O < 0.03
 TiO₂ 1.21
 P₂O₅ 0.13
 MnO N.D.
 LOI 3.31
 H₂O⁺ 0.80
 H₂O⁻ N.D.
 CO₂ 2.26
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Visual Description
 Sparsely phryic massive basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 3-5%, <6 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, medium-grained, subophitic, piece 1, fine-grained in pieces 2 and 3, and medium-grained, subophitic in lower 100 cm of the section. Vesicles are abundant only in pieces 4A through 4B where they are 5%, <2 mm, filled with carbonate and smectite. Scattered veinlets are filled with carbonate and smectite; prominent vein in piece 2A is filled with carbonate.

Shipboard Data
 Magnetic Data: 75-77 cm
 NRM Intensity (emu/cc) 002.08 x 10⁻³
 NRM Inclination -51.4°
 Stable Inclination -52.2°
 Physical Property Data:
 Vp (km/sec) 5.93
 Porosity (%) 1.36
 Wet Bulk Density (g/cc) 2.93
 Grain Density (g/cc) 2.95

LEG	SITE	HOLE	CORE	SECT.
53418A	77	2		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

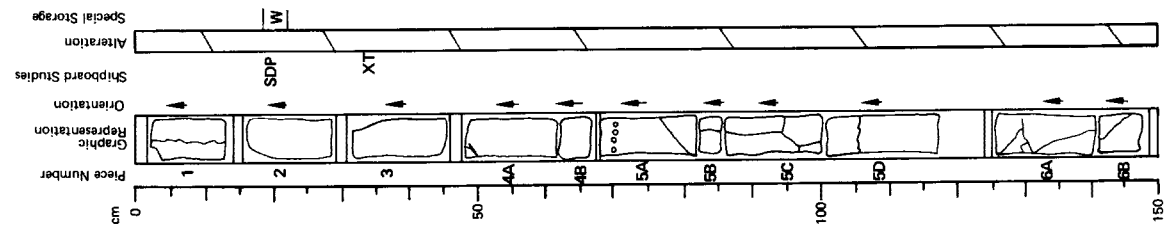


Visual Description
 Sparsely phryic massive basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts <1%, <1 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, aphanitic in piece 1, fine-grained in pieces 2 and 3, and medium-grained, subophitic in lower 100 cm of the section. Vesicles are abundant only in pieces 4A through 4B where they are 5%, <2 mm, filled with carbonate and smectite. Scattered veinlets are filled with carbonate, smectite, and pyrite. Pyrite is also disseminated in the groundmass.

Shipboard Data
 Magnetic Data: 75-77 cm
 NRM Intensity (emu/cc) 002.08 x 10⁻³
 NRM Inclination -51.4°
 Stable Inclination -52.2°
 Physical Property Data:
 Vp (km/sec) 5.93
 Porosity (%) 1.36
 Wet Bulk Density (g/cc) 2.93
 Grain Density (g/cc) 2.95

LEG	SITE	HOLE	CORE	SECT.
53418A	77	2		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Sparsely phryic massive basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts <1%, <1 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, aphanitic in piece 1, fine-grained in pieces 2 and 3, and medium-grained, subophitic in lower 100 cm of the section. Vesicles are abundant only in pieces 4A through 4B where they are 5%, <2 mm, filled with carbonate and smectite. Scattered veinlets are filled with carbonate, smectite, and pyrite. Pyrite is also disseminated in the groundmass.

Shipboard Data
 Magnetic Data: 75-77 cm
 NRM Intensity (emu/cc) 002.08 x 10⁻³
 NRM Inclination -51.4°
 Stable Inclination -52.2°
 Physical Property Data:
 Vp (km/sec) 5.93
 Porosity (%) 1.36
 Wet Bulk Density (g/cc) 2.93
 Grain Density (g/cc) 2.95

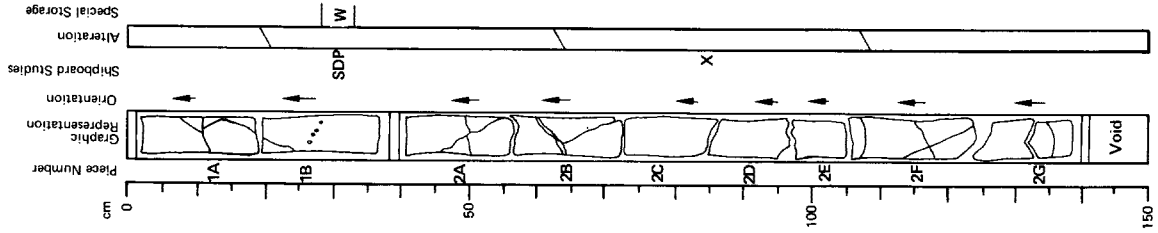
LEG	SITE	HOLE	CORE	SECT.
53418A			77	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phryic massive basalt. Basalt is medium to dark grey, very weakly altered. Plagioclase phenocrysts 3-5%, <7 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 2%, <2 mm, fresh. Groundmass is holocrystalline, medium-grained, coarse-grained, subophitic. Vesicles 1-2%, <3 mm, filled with smectite and carbonate. Prominent veins in pieces 2B and 2C are filled with smectite, carbonate and pyrite.

Shipboard Data
 Bulk Analysis: 84-86 cm
 SiO₂ 48.73
 Al₂O₃ 16.23
 Fe₂O₃ 10.58
 MgO 5.99
 CaO 13.59
 Na₂O N.D.
 K₂O < 0.03
 TiO₂ 1.21
 P₂O₅ 0.13
 MnO N.D.
 LOI 1.15
 H₂O⁺ 0.50
 H₂O⁻ N.D.
 CO₂ 0.78
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Physical Property Data:
 Vp (km/sec) 28-30 cm
 Porosity (%) 5.98
 Wet Bulk Density (g/cc) 2.01
 Grain Density (g/cc) 2.92

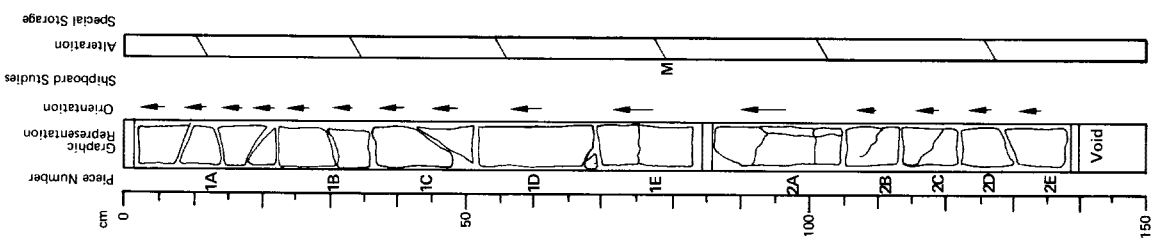


LEG	SITE	HOLE	CORE	SECT.
53418A			77	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phryic massive basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 3-5%, <8 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, fresh. Groundmass is holocrystalline, medium-grained, subophitic. Vesicles 1-3%, increasing in abundance toward top, <3 mm, filled with smectite and carbonate. Sparse veinlets are filled with smectite and minor pyrite.

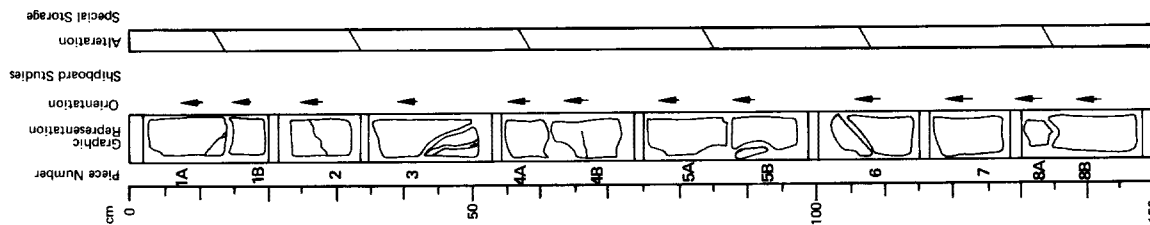
Shipboard Data
 Magnetic Data: 77-79 cm
 NRM Intensity (emu/cc) 001.81 x 10⁻³
 NRM Inclination -72.3°
 Stable Inclination -53.3°



LEG	SITE	HO L E	CORE	SECT.
53	418	A	77	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phyrlic massive basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 3-5%, < 5 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 3%, < 2 mm, fresh; often in glomerophytic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Vesicles 1%, filled with carbonate and smectite. Prominent vein in piece 3 is filled with smectite; vein in piece 8B is filled with carbonate. Stickensides are present on pieces 4B and 6.



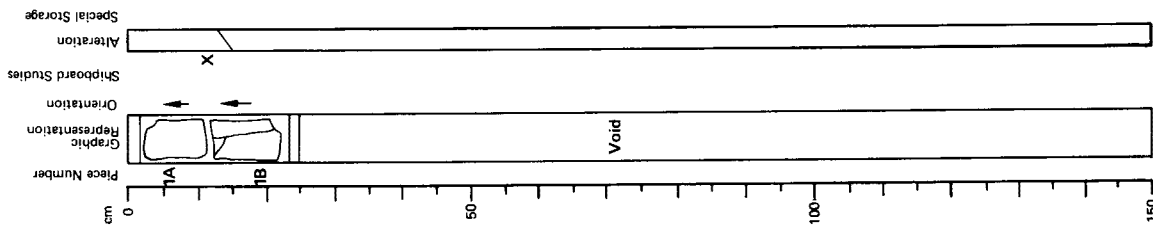
LEG	SITE	HO L E	CORE	SECT.
53	418	A	77	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phyrlic massive basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 3-5%, < 5 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 1%, < 3 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Vesicles < 1%, < 1 mm, filled with smectite and carbonate.

Shipboard Data
 Bulk Analysis: 11-13 cm

SiO ₂	49.26
Al ₂ O ₃	15.55
Fe ₂ O ₃	10.11
MgO	6.53
CaO	14.56
Na ₂ O	N.D.
K ₂ O	0.06
TiO ₂	1.30
P ₂ O ₅	0.14
MnO	N.D.
LOI	1.86
H ₂ O ⁺	0.73
H ₂ O ⁻	N.D.
CO ₂	1.24
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

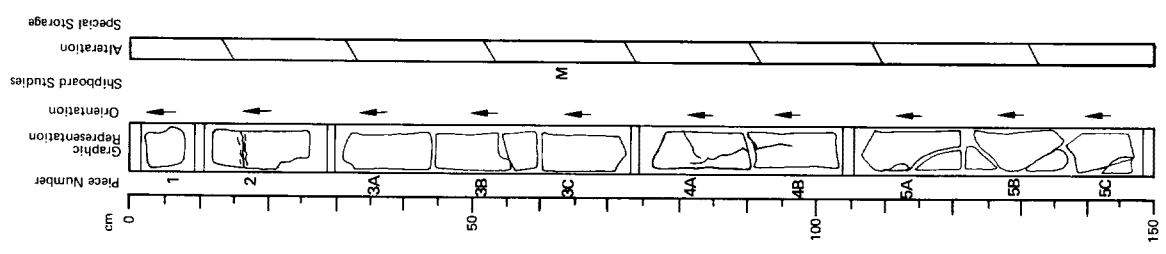


LEG	SITE	HOLE	CORE	SECT.
53418A	718	1		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phyrlic massive basalt. Basalt is medium to dark gray, weakly altered. Plagioclase phenocrysts 3-5%, < 0.8 mm, fresh, olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 2 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Notable veins in pieces 2, 3B, and 4B are filled with carbonate, smectite and minor pyrite.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 64.66 cm
 NRM Inclination 002.35 x 10⁻³
 Stable Inclination -22.5°
 -53.4°

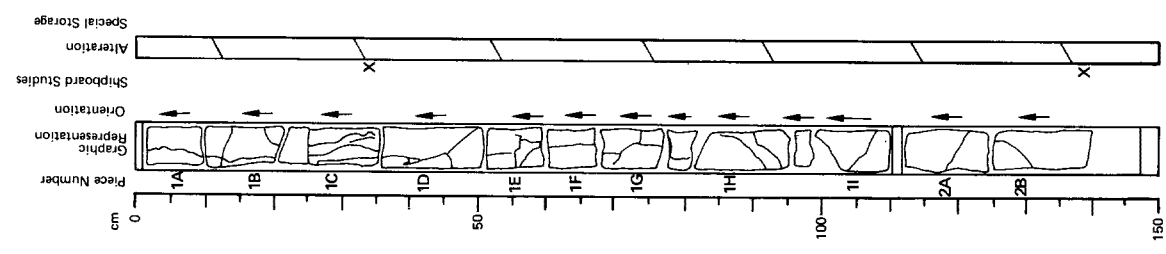


LEG	SITE	HOLE	CORE	SECT.
53418A	718	2		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic massive basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 3-5%, < 0.8 mm, fresh, olivine phenocryst 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 2 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Vesicles < 1%, < 2 mm, filled with carbonate and smectite with minor pyrite. Scattered veinlets are filled with carbonate and smectite.

Shipboard Data
 Bulk Analysis:
 SiO₂ 35.37 cm
 Al₂O₃ 48.94
 Fe₂O₃ 15.00
 MgO 10.37
 CaO 6.48
 Na₂O 13.92
 K₂O N.D.
 TiO₂ 0.06
 P₂O₅ 1.25
 MnO 0.14
 LOI N.D.
 H₂O⁺ 1.35
 H₂O⁻ 0.49
 CO₂ N.D.
 Cr 1.00
 Ni N.D.
 Sr N.D.
 Zr N.D.

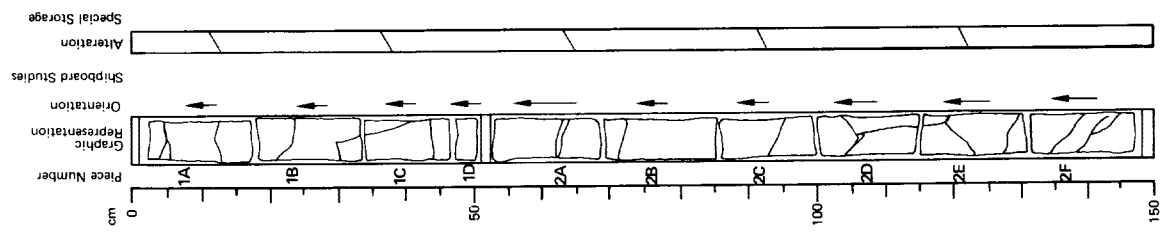


4100

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418A	78	3	

Visual Description
 Sparsely phyrlic massive basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 5%, < 7 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 2 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Vesicles < 1%, < 1 mm, filled with carbonate. Prominent veins in pieces 1 and 2 are filled with smectite, carbonate and minor pyrite.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418A	78	4	

Visual Description
 Sparsely phyrlic massive basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 3.5%, < 6 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 2 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Vesicles 1%, < 0.2 mm, filled with carbonate. Notable veins in pieces 1B, 2B, and 3D are filled with smectite and minor pyrite. Slickensides are present on pieces 3A and 3D.

Shipboard Data

Bulk Analysis: 0.3 cm

SiO ₂	49.64
Al ₂ O ₃	15.22
Fe ₂ O ₃	10.75
MgO	6.44
CaO	13.34
Na ₂ O	N.D.
K ₂ O	< 0.03
TiO ₂	1.28
P ₂ O ₅	0.15
MnO	N.D.
LOI	1.23
H ₂ O ⁺	0.52
H ₂ O ⁻	N.D.
CO ₂	0.68
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

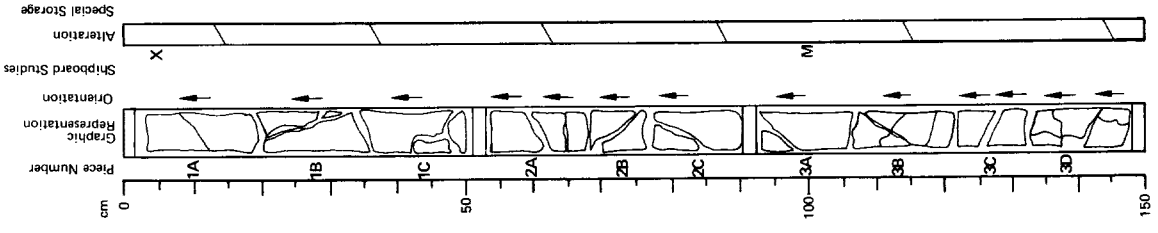
Magnetic Data:

101-103 cm

NRM Intensity (emu/cc) 006.28 x 10⁻³

NRM Inclination -57.9°

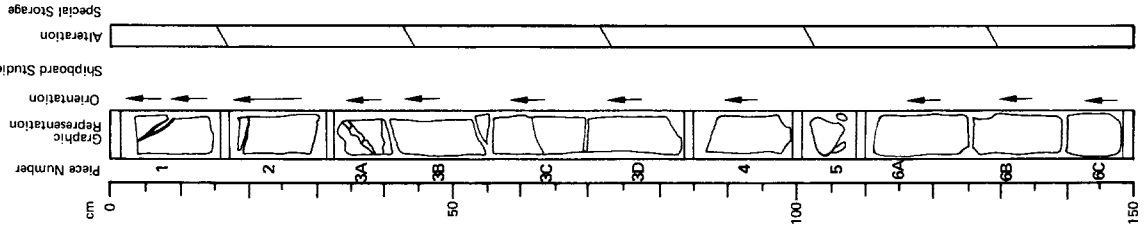
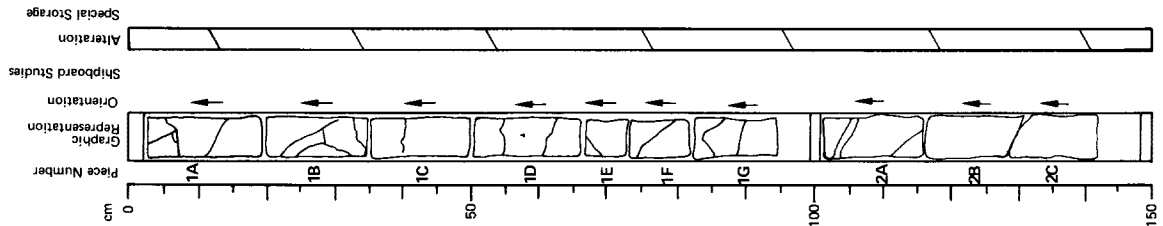
Stable Inclination -58.9°



LEG	SITE	H O E	CORE	SECT.
5341	8A	7	8	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic massive basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 3%, <6 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <2 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Vesicles <1%, filled with carbonate. Prominent veins in pieces 1G and 2A are filled with smectite and carbonate.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic massive basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 1.2%, <4 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 2%, <1 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Prominent veins in pieces 2, 3A, and 3C are filled with carbonate and smectite. Slickensides are present on piece 1.

LEG	SITE	H O E	CORE	SECT.
5341	8A	7	8	6

402

LEG	SITE	H O L	CORE	SECT.
53	418A	7	8	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

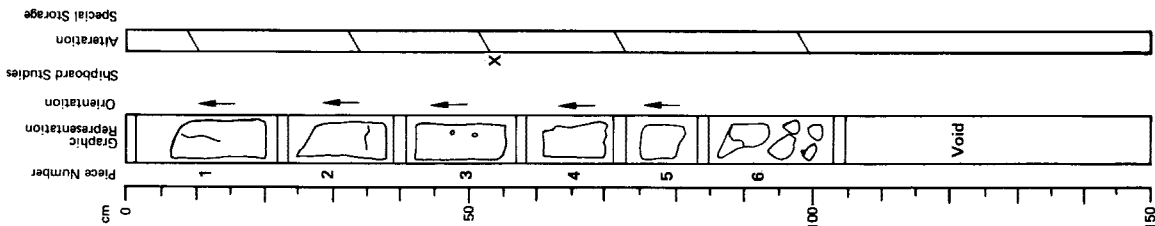
Visual Description

Very sparsely phyrlic massive basalt. Basalt is medium to dark gray; weakly altered. Plagioclase phenocrysts 1%, <2 mm, fresh, olivine phenocrysts <1%, <1 mm, altered to smectite. Groundmass is holocrystalline, coarse-grained and subophitic. Vesicles are present in piece 1, 3 and 6, filled with carbonate, smectite and minor pyrite.

Shipboard Data

Bulk Analysis: 57-59 cm

SiO ₂	50.25
Al ₂ O ₃	15.15
Fe ₂ O ₃	10.64
MgO	6.74
CaO	13.29
Na ₂ O	N.D.
K ₂ O	< 0.03
TiO ₂	1.32
P ₂ O ₅	0.12
MnO	N.D.
LOI	1.24
H ₂ O ⁺	0.56
H ₂ O ⁻	N.D.
CO ₂	0.78
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.

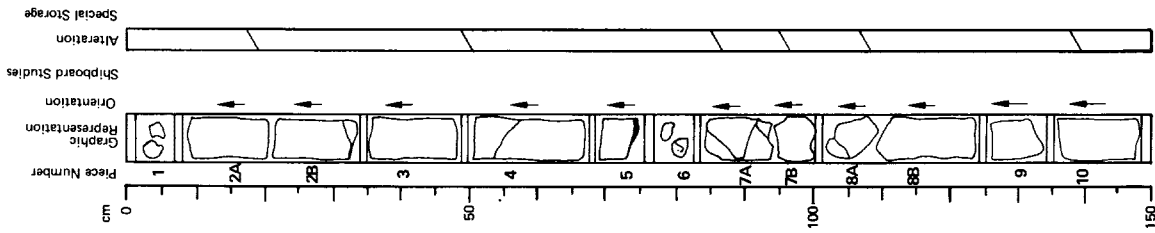


LEG	SITE	H O L	CORE	SECT.
53	418A	7	9	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

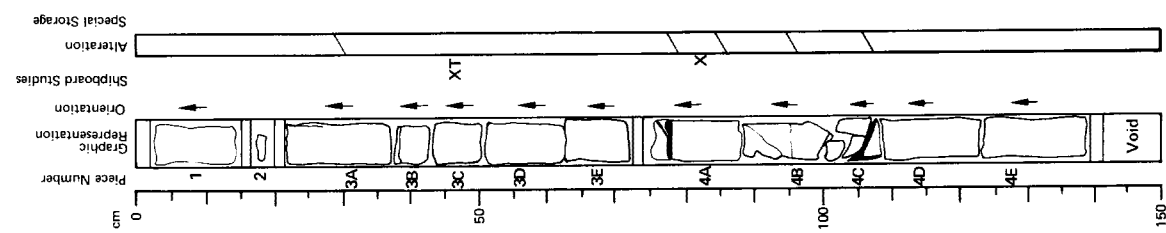
Visual Description

Aphyric basalt flow and sparsely phyrlic basalt dike. Section consists chiefly of aphyric basalt flow cut by a dike between 75 and 110 cm. Basalt flow is medium to dark gray, weakly altered. Plagioclase phenocrysts <1%, <3 mm, clinopyroxene phenocrysts <1%, fresh. Groundmass is holocrystalline, medium-grained, subophitic. Large vesicle in piece 10 is filled with carbonate and smectite. Piece 1 consists of small fragment of altered sediment, probably slumped into the hole. Dike consists of greenish-gray, moderately altered basalt. Plagioclase phenocrysts <1%, <1 mm, fresh, olivine phenocrysts 2%, <1 mm. Groundmass is fine-grained to glassy, chilled margins are present on both upper and lower contacts, glass is altered to smectite.



LEG	SITE	HOLE	CORE	SECT.
53	418A	79	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

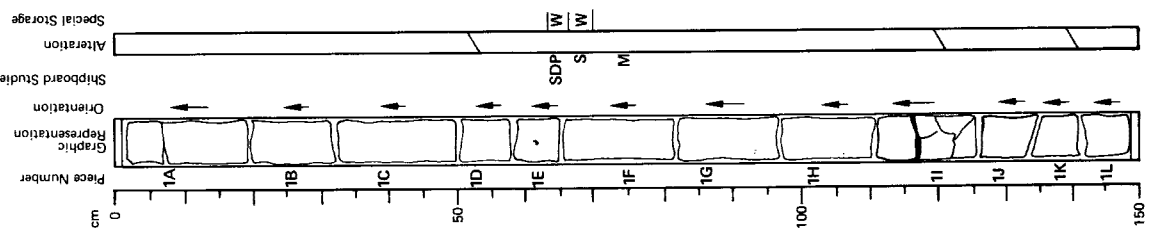


Visual Description
 Aphric basalt flow and sparsely phryic basalt dike. Section consists chiefly of aphric basalt cut by a dike between 88 and 107 cm. Basalt flow is medium gray; relatively fresh. Basalt is aphric, holocrystalline, medium- to coarse-grained, subophitic. Vesicles < 1%, filled with carbonate and smectite, not uniformly distributed. Minor carbonate and pyrite are disseminated in the groundmass. Dike consists of greenish-gray, moderately altered, sparsely phryic basalt. Plagioclase phenocrysts 5%, < 2 mm, fresh; olivine phenocrysts 3%, < 0.5 mm, altered to smectite; clinopyroxene phenocrysts 1%, < 1 mm, fresh. Groundmass is fine-grained to glassy, glassy margins are present on top and bottom of the dike; glass is mostly altered to smectite. Scattered veinlets are filled with smectite and pyrite.

Thin Section Description
 Location: 48 cm
 Texture: coarse-grained, subophitic
 Phenocrysts: none
 Groundmass: plagioclase 50%, < 5 mm; euhedral; clinopyroxene 35%; opaques 5%, < 0.5 mm, subhedral; interstitial material 10%, altered to smectite
 Vesicles: < 1%, 1 mm, round
 Alteration: interstitial material to smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis:	46.48 cm	81.83 cm
SiO ₂	49.33	47.74
Al ₂ O ₃	15.38	13.90
Fe ₂ O ₃	10.41	11.72
MgO	6.36	7.66
CaO	13.80	13.37
Na ₂ O	N.D.	N.D.
K ₂ O	0.03	< 0.03
TiO ₂	1.28	1.39
P ₂ O ₅	0.14	0.12
MnO	N.D.	N.D.
LOI	1.42	1.44
H ₂ O ⁺	0.37	1.37
H ₂ O ⁻	N.D.	N.D.
CO ₂	1.06	1.83
Cr	N.D.	N.D.
Ni	N.D.	N.D.
Sr	N.D.	N.D.
Zr	N.D.	N.D.



Visual Description
 Aphric basalt flow and sparsely phryic basalt dike. Upper 115 cm of the section consist of aphric basalt flow and lower 35 cm of basalt dike. Flow consists of medium gray, relatively fresh, aphric basalt. Rock is holocrystalline, medium- to coarse-grained, subophitic. Vesicles 1%, filled with carbonate and smectite. Dike consists of medium gray, slightly altered, sparsely phryic basalt. Plagioclase phenocrysts 1-2%, < 1 mm, fresh; olivine phenocrysts 2-3%, < 1 mm, altered to smectite. Groundmass is fine-grained to glassy; glass margin occurs at 115 cm.

Shipboard Data

Magnetic Data:	74-76 cm
NRM Intensity (emu/cc)	001.36 x 10 ⁻³
NRM Inclination	13.1°
Stable Inclination	-44.0°
Physical Property Data:	67-69 cm
Vp (km/sec)	6.08
Porosity (%)	1.74
Wet Bulk Density (g/cc)	2.94
Grain Density (g/cc)	2.98

LEG	SITE	HOLE	CORE	SECT.
53	418A	79	3	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

4104

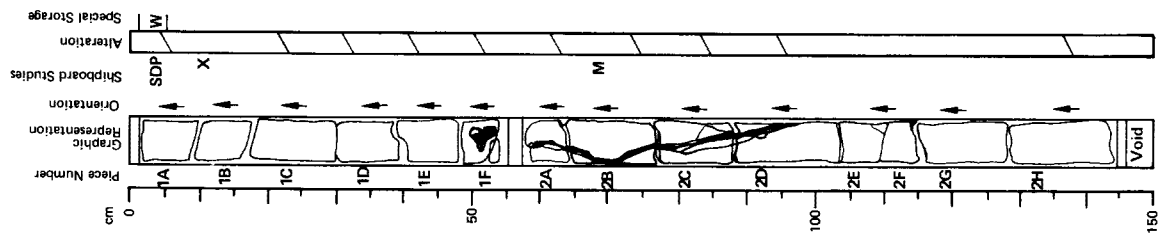
LEG	SITE	HOLE	CORE	SECT.
53	418	A	79	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phryic basalt dike and sparsely phryic basalt flow. Dike continues from Section 3 and extends from top of Section 4 to 95 cm. The lower part of the section is a massive basalt flow. The contact between the flow and dike is very steep, extending from 65 to 96 cm. Dike consists of greenish-gray, moderately altered, sparsely phryic basalt. Plagioclase phenocrysts 1% to 15% < 2 mm, fresh, olivine phenocrysts 4%, < 2 mm, altered to smectite; clinopyroxene phenocrysts 1% to 3 mm, fresh. Groundmass is fine-grained to glassy, glassy zone marks contact of dike and flow, glass is altered to relatively fresh, irregular pyrite. Sparse veins are filled with smectite and pyrite. Flow consists of gray, relatively fresh, irregular pyrite. Plagioclase phenocrysts 3% to 8 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Vesicles < 1%, < 3 mm, filled with carbonate. Sparse veins are filled with smectite and pyrite.

Shipboard Data

Bulk Analysis: 9-12 cm	Magnetic Data:	69-71 cm
SiO ₂ 48.94	NRM Intensity (emu/cc)	017.70 x 10 ⁻³
Al ₂ O ₃ 14.99	NRM Inclination	+57.5°
Fe ₂ O ₃ 11.26	Stable Inclination	+58.5°
MgO 7.89		
CaO 13.57	Physical Property Data:	2.4 cm
Na ₂ O N.D.	Vp (km/sec)	6.01
K ₂ O < 0.03	Porosity (%)	1.98
TiO ₂ 1.35	Wet Bulk Density (g/cc)	2.95
P ₂ O ₅ 0.12	Grain Density (g/cc)	2.99
MnO N.D.		
LOI 1.32		
H ₂ O ⁺ 0.65		
H ₂ O ⁻ N.D.		
CO ₂ 0.77		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



LEG	SITE	HOLE	CORE	SECT.
53	418	A	79	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

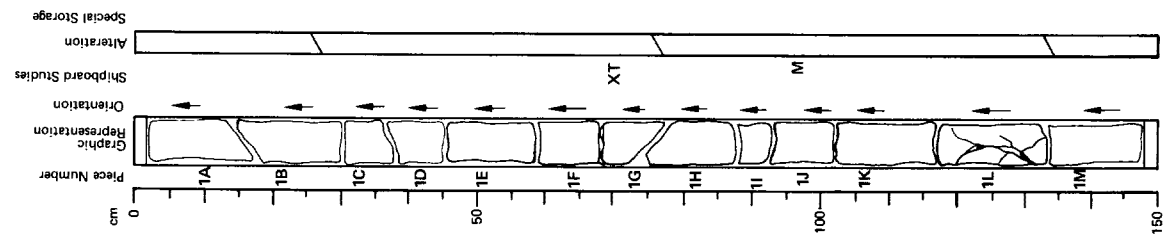
Visual Description
 Sparsely phryic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 5-8%, < 5 mm, fresh; olivine phenocrysts 3%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 4%, < 2 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Prominent vein in piece 1E is filled with smectite and carbonate.

Thin Section Description

Location: 68 cm
 Texture: porphyritic - subophitic to intersertal
 Phenocrysts: olivine 3%, < 1 mm, euhedral; plagioclase 8%, < 3 mm, subhedral; clinopyroxene 1%, < 1.5 mm, rounded
 Groundmass: olivine 8%, 0.2 mm, subhedral; plagioclase 50%, < 1 mm, subhedral; clinopyroxene 24%, < 0.5 mm, subophitic; glass 5%, interstitial
 Vesicles: 1%, 1 mm, round to irregular
 Alteration: olivine to smectite; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 67-69 cm	Magnetic Data:	96-98 cm
SiO ₂ 50.25	NRM Intensity (emu/cc)	011.11 x 10 ⁻³
Al ₂ O ₃ 16.36	NRM Inclination	+50.2°
Fe ₂ O ₃ 10.84	Stable Inclination	+49.7°
MgO 5.86		
CaO 13.36		
Na ₂ O N.D.		
K ₂ O < 0.03		
TiO ₂ 1.31		
P ₂ O ₅ 0.15		
MnO N.D.		
LOI 0.84		
H ₂ O ⁺ 0.46		
H ₂ O ⁻ N.D.		
CO ₂ 0.55		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

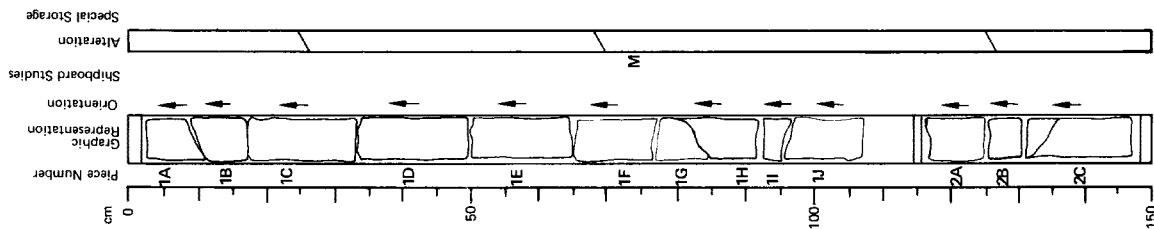


LEG	SITE	HOLE	CORE	SECT.
53	418A	79	8	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phytic massive basalt. Basalt is medium gray, relatively fresh. Plagioclase phenocrysts 2.8%, <8 mm, fresh, increasing in abundance downward; olivine phenocrysts 1%, <1 mm, partly replaced by smectite. Groundmass is fine, to medium-grained with some interstitial glass altered to smectite. Vesicles 1%, filled with smectite and carbonate. Scattered veins are also filled with smectite and carbonate.

Shipboard Data
 Location: 75-77 cm
 Magnetic Data:
 NRM Intensity (emu/cc) 009.45 x 10⁻³
 NRM Inclination -56.9°
 Stable Inclination -55.3°



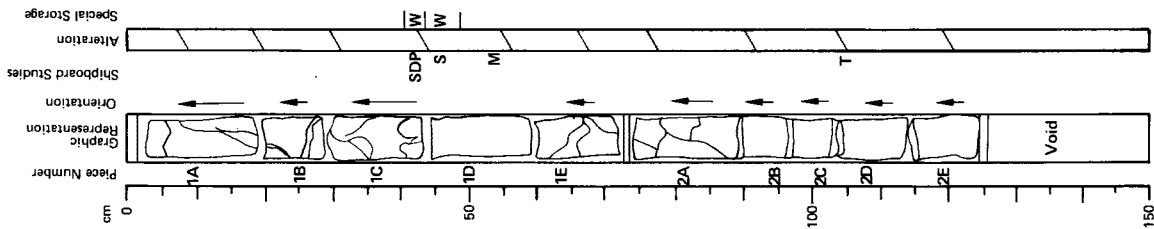
LEG	SITE	HOLE	CORE	SECT.
53	418A	79	7	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phytic massive basalt. Basalt is gray to greenish-gray; weakly to moderately altered. Plagioclase phenocrysts 10%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <2 mm, fresh. Groundmass is fine-grained; grain size decreases gradually with depth. Numerous fractures and veinlets are filled with smectite.

Thin Section Description
 Location: 102 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 1%, 0.6 mm, euhedral; plagioclase 12%, <3.5 mm, euhedral; clinopyroxene 1%, 1 mm, anhedral
 Groundmass: plagioclase 10%, <1 mm, acicular; clinopyroxene 70%, radiating sheaves, opaques 6%, 0.02 mm, euhedral
 Vesicles: none
 Alteration: olivine to carbonate and smectite

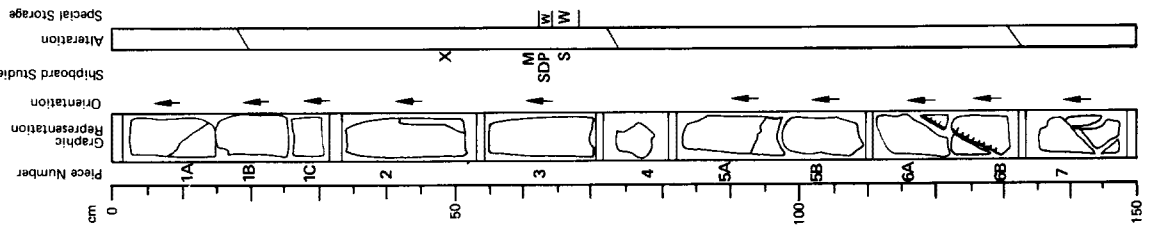
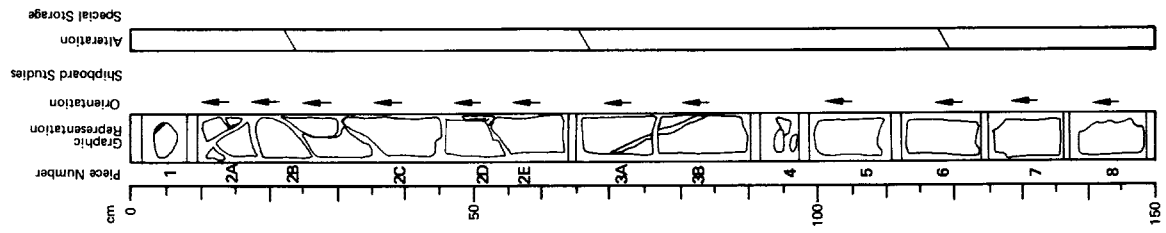
Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 52.54 cm 006.13 x 10⁻³
 NRM Inclination -60.6°
 Stable Inclination -56.1°
 Physical Property Data:
 Vp (km/sec) 43.45 cm 46-48 cm
 Porosity (%) 6.10 6.15
 Wet Bulk Density (g/cc) 1.68
 Grain Density (g/cc) 2.90 2.94



LEG	SITE	HOLE	CORE	SECT.
53418A			80	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately to sparsely phryic massive basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 5-8%, < 5 mm, fresh, phenocrysts abundance decreases slightly with depth; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 1 mm, fresh. Groundmass is fine- to very fine-grained with grain size increasing downward. Scattered veins are filled with smectite, carbonate and pyrite.



LEG	SITE	HOLE	CORE	SECT.
53418A			80	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phryic massive basalt and moderately phryic basalt dike. Upper 117 cm of the section consist of massive basalt, flow and lower 33 cm are composed of a moderately phryic basalt dike. Contact between the two is steep, extending from 117 to 129 cm. The basalt flow is medium gray; relatively fresh. Plagioclase phenocrysts 3-5%, < 4 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 1 mm, fresh. Groundmass is medium- to coarse-grained, subophitic. Dike consists of medium gray, relatively fresh basalt. Plagioclase phenocrysts 10-12%, < 7 mm, fresh; olivine phenocrysts 2%, < 1 mm, altered to smectite. Groundmass is fine-grained to glassy; glassy chilled zone marks upper contact of dike. Scattered veins are filled with smectite and minor pyrite.

Shipboard Data

Bulk Analysis:	49.51 cm	Magnetic Data:	60-62 cm
SiO ₂	49.86	NRM Intensity (emu/cc)	011.34 x 10 ⁻³
Al ₂ O ₃	16.27	NRM Inclination	+58.6°
Fe ₂ O ₃	11.02	Stable Inclination	+47.2°
MgO	6.70		
CaO	13.03	Physical Property Data:	65-67 cm
Na ₂ O	N.D.	Vp (km/sec)	6.04
K ₂ O	< 0.03	Porosity (%)	1.52
TiO ₂	1.33	Wet Bulk Density (g/cc)	2.93
P ₂ O ₅	0.16	Grain Density (g/cc)	2.96
MnO	N.D.		
LOI	0.58		
H ₂ O ⁺	0.48		
H ₂ O ⁻	N.D.		
CO ₂	0.36		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		

LEG	SITE	HOLE	CORE	SECT.
53	418	A	80	3

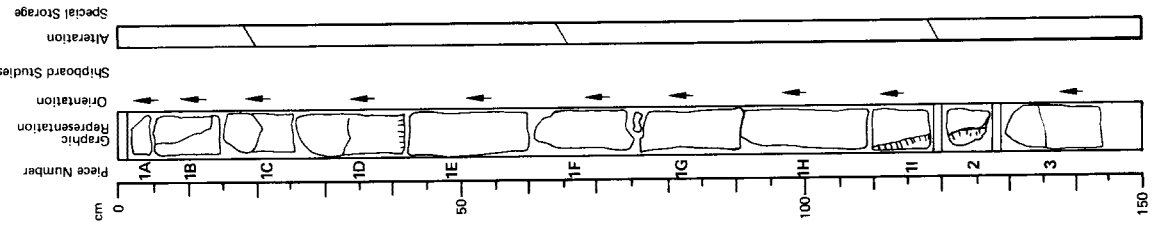
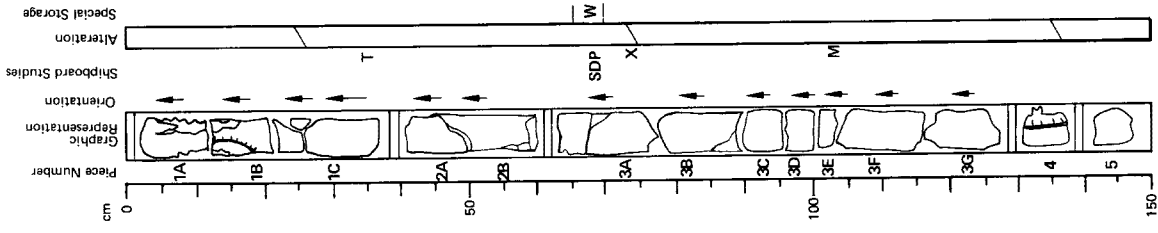
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyrlic basalt dike and sparsely phyrlic massive basalt. Basalt dike is a continuation of the dike in Section 2, extending from the top of the section to 140 cm. The host rock, a massive flow, is present only in pieces 1B, 4 and 5. The boundary between the dike and flow, preserved in pieces 1B and 4, is apparently very steep. Dike is medium gray, moderately phyrlic, relatively fresh basalt. Plagioclase phenocrysts 8-10%, <6 mm, fresh, olivine phenocrysts 1-2%, <1 mm, altered to smectite. Groundmass is fine-grained to glassy, grain size increases slightly from margin to center of dike; glass selvages are preserved in chill zones in pieces 1A and 4. Minor pyrite is disseminated in groundmass of dike. Minor breccia occurs in pieces 1A and 4. Flow consists of angular basalt fragments in a matrix of smectite, carbonate, pyrite and quartz (?). Flow consists of medium gray, sparsely phyrlic, relatively fresh basalt. Plagioclase phenocrysts 3-5%, <4 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, sub-ophitic.

Thin Section Description

Location: 36 cm
 Texture: porphyritic - intergranular to intersertal
 Phenocrysts: olivine 2%, <1.5 mm, euhedral; plagioclase 8%, <2 mm, subhedral
 Groundmass: olivine 3%, 0.05 mm, subhedral; plagioclase 42%, 0.25 mm, laths; clinopyroxene 40%, 0.1 mm, granular to acicular; opaques 5%, <0.1 mm, laths and granules
 Vesicles: <1%, 0.2 mm, irregular
 Alteration: olivine to smectite and carbonate

Shipboard Data		Magnetic Data:	104-106 cm
Bulk Analysis:	73-75 cm	NRM Intensity (emu/cc)	033.45 x 10 ⁻³
SiO ₂	49.31	NRM Inclination	+50.1°
Al ₂ O ₃	16.49	Stable Inclination	+49.4°
Fe ₂ O ₃	10.16	Physical Property Data:	
MgO	7.54	Vp (km/sec)	5.85
CaO	12.97	Porosity (%)	1.51
Na ₂ O	N.D.	Wet Bulk Density (g/cc)	2.94
K ₂ O	< 0.03	Grain Density (g/cc)	2.97
TiO ₂	1.18		
P ₂ O ₅	0.09		
MnO	N.D.		
LOI	0.58		
H ₂ O ⁺	0.51		
H ₂ O ⁻	N.D.		
CO ₂	0.13		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



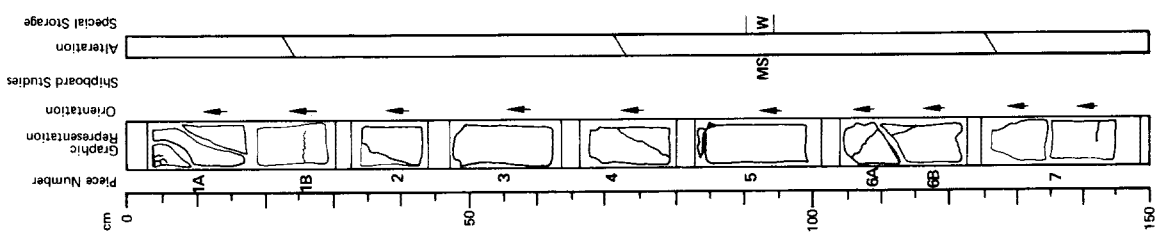
LEG	SITE	HOLE	CORE	SECT.
53	418	A	80	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyrlic massive basalt and moderately phyrlic basalt dikes. Central part of section from 20 to 127 cm is massive flow. The upper and lower parts consist of dikes intruding the flow. The contact between the dike and flow is steep as seen in pieces 1H, 1I, and 2, or flat as in piece 1D. The upper contact of the dike at the top of the section is preserved on back of piece 1A. The massive basalt is medium gray, relatively fresh. Plagioclase phenocrysts 8%, <4 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <2 mm, fresh, often intergrown with plagioclase in subophitic dots. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Dikes are medium to dark gray, fine-grained, relatively fresh. Plagioclase phenocrysts 10%, <5 mm, fresh; olivine phenocrysts <1%, <2 mm, altered to smectite; clinopyroxene phenocrysts <1%, not definitely identified. Groundmass is very fine-grained to glassy. Glass chill zone is preserved along contacts.

LEG	SITE	HOLE	CORE	SECT.
53418A	18A	80	6	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

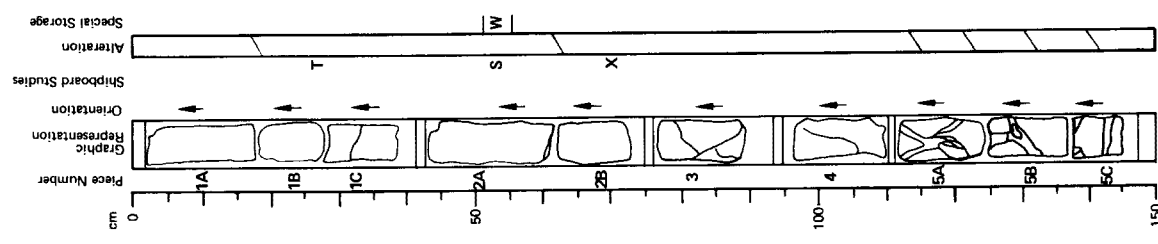


Visual Description
 Sparately phyrlic massive basalt. Basalt is massive, medium-gray; relatively fresh. Plagioclase phenocrysts 5-7%, <8 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, fresh, intergrown with plagioclase. Groundmass is medium- to coarse-grained, subophitic. Sparse veinlets are filled with smectite and carbonate. Minor smectite alteration occurs in piece 1A.

Shipboard Data
 Magnetic Data:
 NRM Intensity (emu/cc) 91.93 cm
 NRM Inclination 005.94 x 10⁻³
 Stable Inclination +48.5°
 Physical Property Data:
 Vp (km/sec) +18.4
 Vp (km/sec) 91.93 cm
 Vp (km/sec) 6.01

LEG	SITE	HOLE	CORE	SECT.
53418A	18A	80	5	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Moderately phyrlic basalt dike and sparsely phyrlic massive basalt. Dike extends from the top of the section to 110 cm. Flow extends from 110 cm to base of section. The contact between dike and flow is preserved on back of piece 5A. Dike is medium gray; relatively fresh. Phenocryst content varies from 10-20%; plagioclase phenocrysts 10-18%, <5 mm, fresh; olivine phenocrysts 1%, <2 mm, altered to smectite. Groundmass is very fine-grained to glassy; glass chilled zone occurs at contact in piece 5A. A xenolith of the host rock is enclosed in the dike in pieces 2B and 3. The massive flow is gray to greenish-gray, locally red-brown; moderately altered. Plagioclase phenocrysts 5-7%, <5 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <2 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Prominent veins are filled with smectite, carbonate, minor pyrite and iron hydroxide.

Thin Section Description
 Location: 27 cm
 Texture: porphyritic - intergranular
 Phenocrysts: olivine 1%, 0.7 mm, euhedral; plagioclase 12%, <3 mm, euhedral
 Groundmass: olivine 3%, 0.05 mm, subhedral; plagioclase 40%, 0.3 mm, lath; clinopyroxene 38%, 0.1 mm, granular; opaques 4%, 0.01 mm, granular; glass 2%
 Vesicles: <1%, 0.2 mm, round
 Alteration: olivine to smectite; carbonate fills vesicles

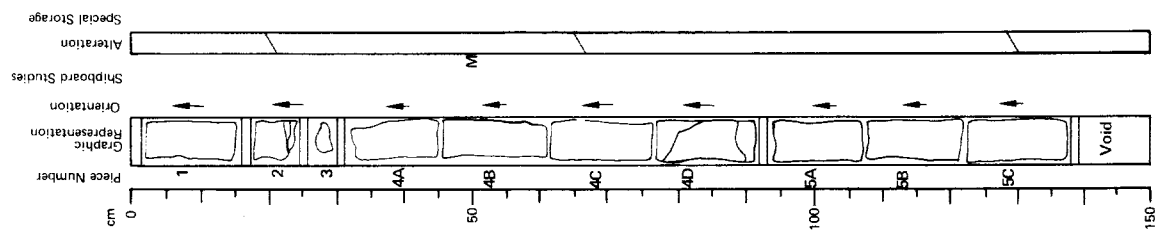
Shipboard Data
 Bulk Analysis: 69.71 cm Physical Property Data: 52.54 cm
 SiO₂ 48.93 Vp (km/sec) 5.78
 Al₂O₃ 17.41
 Fe₂O₃ 9.86
 MgO 6.89
 CaO 13.11
 Na₂O N.D.
 K₂O 0.04
 TiO₂ 1.18
 P₂O₅ 0.10
 MnO N.D.
 LOI 0.66
 H₂O⁺ 0.66
 H₂O⁻ N.D.
 CO₂ 0.25
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

LEG	SITE	HOLE	CORE	SECT.
53	418	A	81	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic massive basalt. Basalt is medium gray, relatively fresh. Plagioclase phenocrysts 4-7%, < 6 mm, fresh, clinopyroxene phenocrysts < 1%, < 1 mm, altered to smectite, clinopyroxene < 1%, < 2 mm, fresh, intergrown with plagioclase. Groundmass is holocrystalline, medium to coarse grained, subophitic. Prominent vein in piece 2 is filled with carbonate, smectite and zeolite(?).

Shipboard Data
 Magnetic Data: 49.51 cm
 NRM Intensity (emu/cc): 0.14.08 x 10⁻³
 NRM Inclination: -88.4°
 Stable Inclination: 64.6°

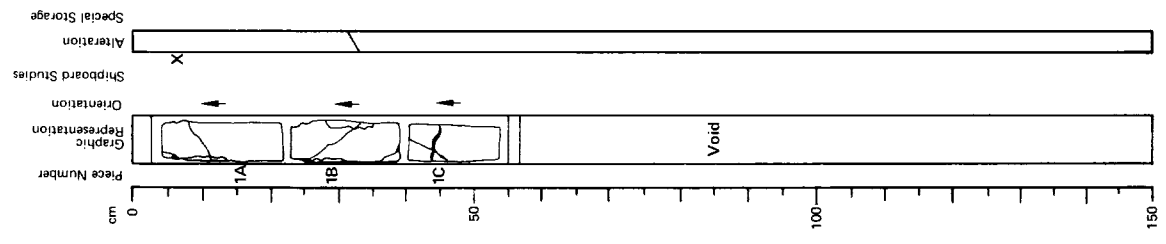


LEG	SITE	HOLE	CORE	SECT.
53	418	A	80	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic massive basalt. Basalt is medium gray, relatively fresh. Plagioclase phenocrysts 4-7%, < 6 mm, fresh, clinopyroxene phenocrysts < 1%, < 1 mm, fresh, intergrown with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic.

Shipboard Data
 Bulk Analysis: 0.2 cm
 SiO₂: 48.77
 Al₂O₃: 16.09
 Fe₂O₃: 10.95
 MgO: 6.01
 CaO: 13.13
 Na₂O: N.D.
 K₂O: < 0.03
 TiO₂: 1.33
 P₂O₅: 0.14
 MnO: N.D.
 LOI: 0.84
 H₂O⁺: 0.39
 H₂O: N.D.
 CO₂: 0.49
 Cr: N.D.
 Ni: N.D.
 Sr: N.D.
 Zr: N.D.



LEG	SITE	HOLE	CORE	SECT.
53	418	A	81	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

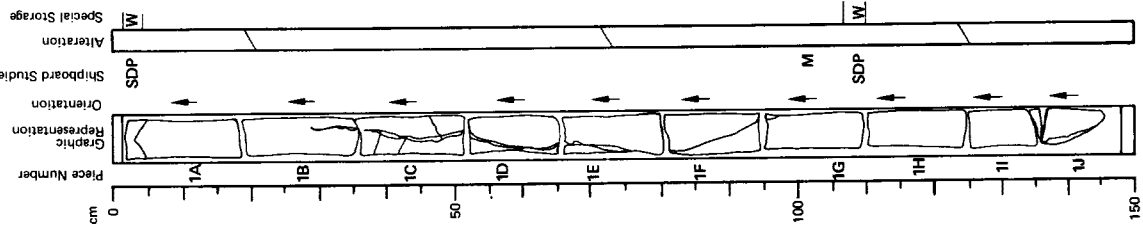
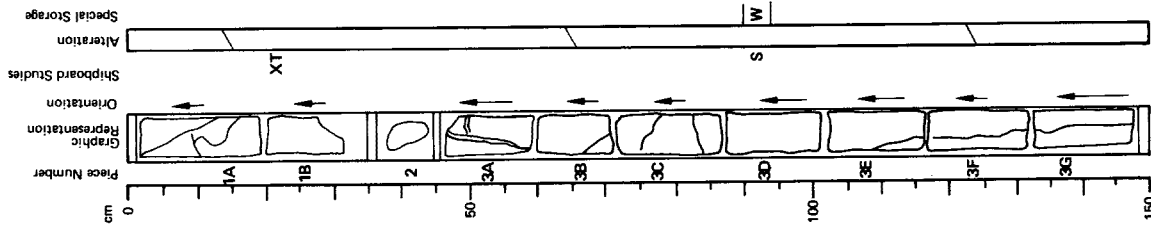
Visual Description
 Sparsely phytic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 4-7%, <6 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <1 mm, fresh, intergrown with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Prominent veins in pieces 3A and 3B is filled with carbonate and smectite.

Thin Section Description

Location: 20 cm
 Texture: porphyritic - subophitic to intersertal
 Phenocrysts: olivine 2%, <1 mm, euhedral; plagioclase 10%, <4 mm, euhedral; clinopyroxene 5%, <1.5 mm, subophitic
 Groundmass: olivine 3%, 0.3 mm, subhedral; plagioclase 40%, <0.6 mm, laths; clinopyroxene 30%, 0.2 mm, granular to subophitic; opaques 5%, 0.05 mm, euhedral; glass 5%, interstitial, devitrified
 Vesicles: none
 Alteration: olivine to smectite

Shipboard Data
 Bulk Analysis: 19.21 cm Physical Property Data: 92.94 cm
 Vp (km/sec) 5.78

SiO ₂	49.52
Al ₂ O ₃	15.54
Fe ₂ O ₃	10.86
MgO	6.58
CaO	13.15
Na ₂ O	N.D.
K ₂ O	< 0.03
TiO ₂	1.33
P ₂ O ₅	0.13
MnO	N.D.
LOI	0.73
H ₂ O ⁺	0.43
H ₂ O ⁻	N.D.
CO ₂	0.54
Cr	N.D.
Ni	N.D.
Sr	N.D.
Zr	N.D.



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	81	3

Visual Description
 Sparsely phytic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 3-5%, <5 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <2 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic; pieces 1A, 1D, 1H and 1I have irregular patches of fine-grained material. Scattered veins are filled with smectite and carbonate; a thick carbonate vein occurs in piece 1J. Minor pyrite is disseminated in the groundmass.

Shipboard Data
 Location: 103-105 cm
 NRM Intensity (emu/cc) 005.08 x 10⁻³
 NRM Inclination -83.2°
 Stable Inclination -66.1°

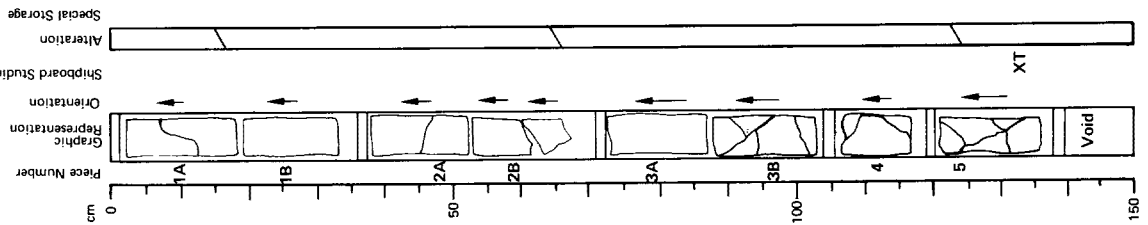
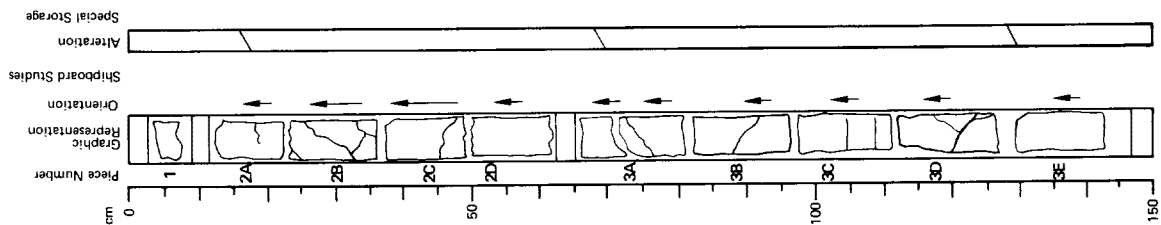
Physical Property Data:
 Vp (km/sec) 2.4 cm
 Porosity (%) 5.78
 Wet Bulk Density (g/cc) 1.51
 Grain Density (g/cc) 2.93
 108-110 cm
 6.04
 2.78
 2.93
 2.99

LEG	SITE	HOLE	CORE	SECT.
53	418	A	81	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Sparsely phyrlic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 3-6%, <6 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts <1%, <2 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic; scattered finer-grained patches are locally present. Sparse fractures are filled with smectite, carbonate and zeolite(?).



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	81	5

Visual Description

Sparsely to moderately phyrlic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 5-10%, <3 mm, fresh; olivine phenocrysts 1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <2 mm, fresh, in subophitic clots with plagioclase. Groundmass is holocrystalline, fine- to coarse-grained, subophitic; in pieces 2B and 5 texture is mottled with fine-grained and coarse-grained patches. Sparse veins are filled with carbonate, smectite and pyrite. Minor pyrite is also disseminated in the groundmass.

Thin Section Description

Location: 134 cm

Texture: porphyritic - quench

Phenocrysts: olivine 1%, <1 mm, euhedral; plagioclase 12%, <4 mm, euhedral; clinopyroxene 2%, <0.5 mm, anhedral

Groundmass: olivine 2%, 0.3 mm, euhedral; plagioclase 10%, <0.6 mm, skeletal; clinopyroxene 68%, radiating sheaves; opaques 5%, 0.02 mm, granular

Vesicles: none

Alteration: olivine to smectite and carbonate

Shipboard Data

Bulk Analysis: 133.135 cm

SiO₂ 49.51

Al₂O₃ 14.87

Fe₂O₃ 11.43

MgO 7.35

CaO 12.50

Na₂O N.D.

K₂O < 0.03

TiO₂ 1.39

P₂O₅ 0.13

MnO N.D.

LOI 0.83

H₂O⁺ 0.44

H₂O⁻ N.D.

CO₂ 0.28

Cr N.D.

Ni N.D.

Sr N.D.

Zr N.D.

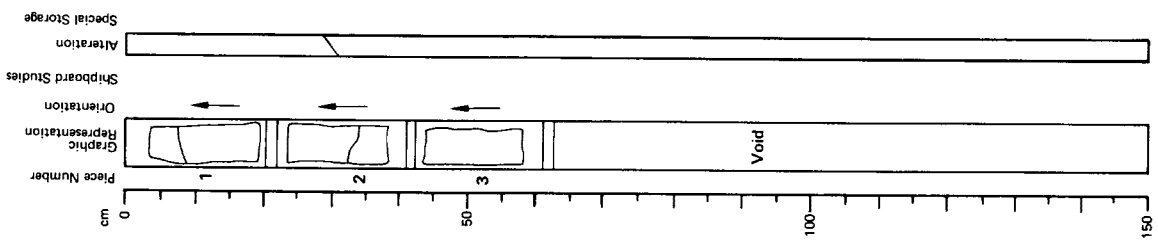
412

LEG	SITE	HOLE	CORE	SECT.
53	418	A	81	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Sparsely phryic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 3-5%, < 7 mm, fresh; olivine phenocrysts < 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 2 mm, fresh; intergrown with plagioclase. Groundmass is holocrystalline with irregular patches of fine-grained and coarse-grained basalt giving a mottled texture.



LEG	SITE	HOLE	CORE	SECT.
53	418	A	82	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

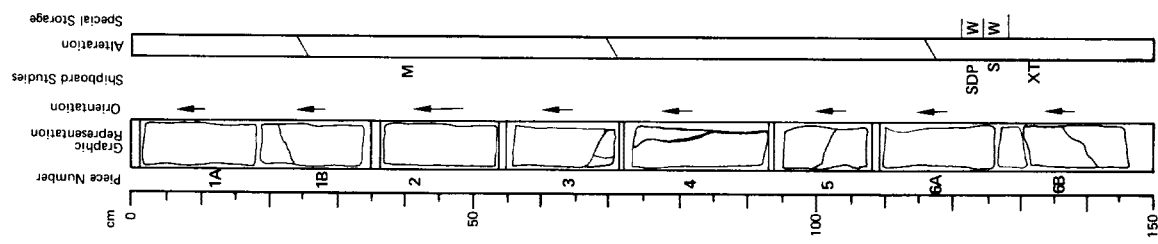
Sparsely to moderately phryic massive basalt. Basalt is medium gray; relatively fresh. Phenocryst content increases gradually with depth. Plagioclase phenocrysts 3-8%, < 8 mm, fresh; olivine phenocrysts 3%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 3%, < 2 mm, fresh. Groundmass is holocrystalline, medium- to fine-grained, subophitic; grain size decreases gradually with depth. Fine-grained patches and schlieren occur throughout the section and are prominent in piece 8B.

Thin Section Description

Location: 135 cm
 Texture: ophimottled to intersertal
 Phenocrysts: plagioclase 1%, < 2.5 mm, subhedral
 Groundmass: olivine 3%, < 0.5 mm, euhedral; plagioclase 50%, 1 mm, subhedral; clinopyroxene 31%, 0.2 mm, granular to subophitic; opaques 5%, 0.05 mm, euhedral; glass 10%; interstitial
 Vesicles: none
 Alteration: olivine to smectite

Shipboard Data

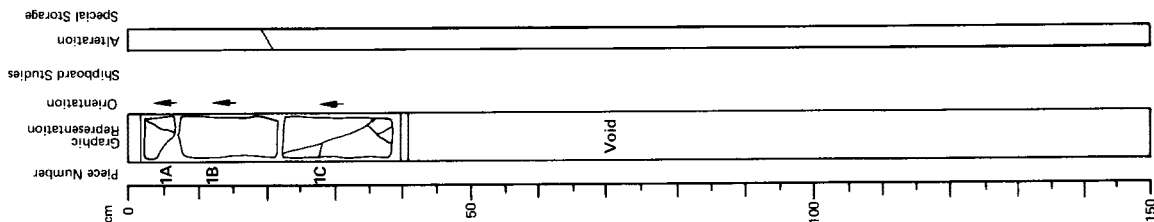
Bulk Analysis:	133-137 cm	Magnetic Data:	41.43 cm
SiO ₂	50.05	NRM Intensity (emu/cc)	001.91 x 10 ⁻³
Al ₂ O ₃	13.41	NRM Inclination	66.9°
Fe ₂ O ₃	12.42	Stable Inclination	57.0°
MgO	7.70		
CaO	11.95	Physical Property Data:	122-124 cm
Na ₂ O	N.D.	Vp (km/sec)	5.78
K ₂ O	< 0.03	Porosity (%)	1.66
TiO ₂	1.57	Wet Bulk Density (g/cc)	2.96
P ₂ O ₅	0.13	Grain Density (g/cc)	2.99
MnO	N.D.		
LOI	0.34		
H ₂ O ⁺	0.49		
H ₂ O ⁻	N.D.		
CO ₂	0.23		
Cr	N.D.		
Ni	N.D.		
Sr	N.D.		
Zr	N.D.		



LEG	SITE			CORE			SECT.
53	4	1	8	A	B	2	C

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phyric massive basalt. Basalt is medium gray, relatively fresh. Plagioclase phenocrysts 8%, <10 mm, fresh; olivine phenocrysts 2%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1%, <2 mm, fresh. Groundmass is holocrystalline, very fine-grained. Vesicles <1%, filled with carbonate. Sparse veins are also filled with carbonate.



LEG	SITE			CORE			SECT.
53	4	1	8	A	8	2	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

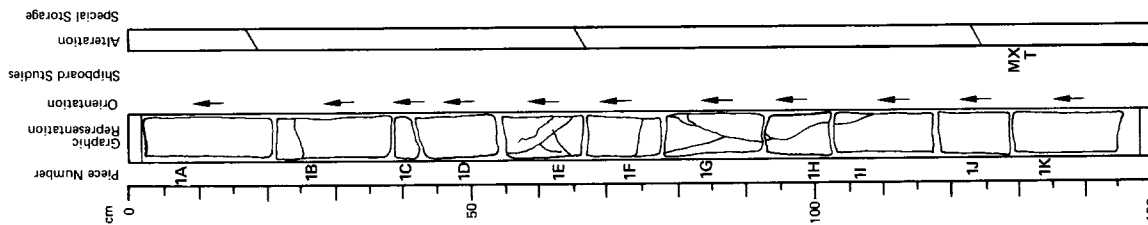
Visual Description
 Sparsely to moderately phyric massive basalt. Basalt is medium gray, relatively fresh. Plagioclase phenocrysts 5%, <10 mm, fresh; olivine phenocrysts 1.2%, <1 mm, altered to smectite; clinopyroxene phenocrysts 2%, <1 mm, fresh. Groundmass is holocrystalline, medium-grained, subophitic. Fine-grained schlieren occur in piece 1D. Veins are common, filled with smectite, carbonate and silica. Minor pyrite is disseminated in the groundmass.

Thin Section Description

Location: 131 cm
 Texture: porphyritic - quench
 Phenocrysts: olivine 3%, <1 mm, anhedral; plagioclase 8%, <1.5 mm, anhedral; clinopyroxene 4%, subophitic clots
 Groundmass: olivine 2%, <0.2 mm, subhedral; plagioclase 30%, 0.3 mm, acicular; clinopyroxene 48%, radiating sheaves, opaques 5%, 0.05 mm, granular
 Vesicles: <1%, 0.2 mm, round
 Alteration: olivine to smectite; smectite fills vesicles

Shipboard Data

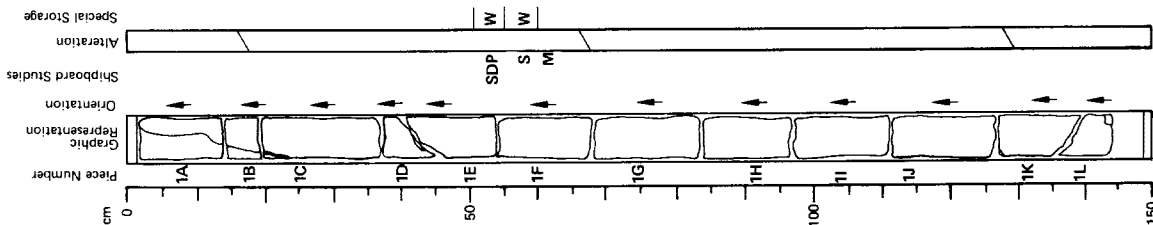
Bulk Analysis: 130-133 cm	Magnetic Data:	129-131 cm
SiO ₂ 49.05	NRM Intensity (emu/cc)	011.74 x 10 ⁻³
Al ₂ O ₃ 15.60	NRM Inclination	-53.2°
Fe ₂ O ₃ 10.85	Stable Inclination	57.5°
MgO 7.21		
CaO 12.58		
Na ₂ O N.D.		
K ₂ O < 0.03		
TiO ₂ 1.27		
P ₂ O ₅ 0.10		
MnO N.D.		
LOI 0.68		
H ₂ O ⁺ 0.49		
H ₂ O ⁻ N.D.		
CO ₂ 0.23		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		



11/14

LEG	SITE	HOLE	CORE	SECT.
53	418A	83	2	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

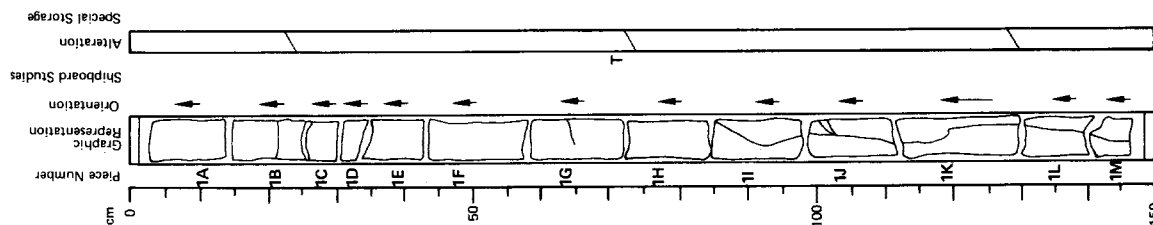
Sparsely to moderately phryic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 3-7%, < 8 mm, fresh, olivine phenocrysts 2%, < 2 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Vena are filled with carbonate and green smectite. Slickensides are present on fracture separating pieces 1D and 1E.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 004.74 x 10³
 NRM Inclination -52.2°
 Stable Inclination -57.3°
 Physical Property Data:
 Vp (km/sec) 5.89
 Porosity (%) 1.25
 Wet Bulk Density (g/cc) 2.94
 Grain Density (g/cc) 2.96

LEG	SITE	HOLE	CORE	SECT.
53	418A	83	1	

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description

Sparsely to moderately phryic massive basalt. Basalt is medium-gray; relatively fresh. Plagioclase phenocrysts 8%, < 8 mm, fresh; olivine phenocrysts 3%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 2%, < 2 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, fine-grained; aphyric zones in pieces 1B and 1D probably don't represent cooling breaks. Vesicles 1%, < 1 mm, filled with smectite. Scattered veinlets are filled with smectite and minor carbonate. Groundmass is locally altered to smectite, carbonate and minor pyrite.

Thin Section Description

Location: 70 cm
 Texture: porphyritic - intersertal to intergranular
 Phenocrysts: olivine 2%, < 1 mm, euhedral; plagioclase 8%, < 3 mm, euhedral; clinopyroxene 3%, < 1.5 mm, subophitic
 Groundmass: olivine 3%, 0.3 mm, subhedral; plagioclase 40%, 0.6 mm, subhedral; clinopyroxene 34%, 0.25 mm, granular; opaques 5%, 0.1 mm, euhedral; glass 5%, interstitial, devitrified
 Vesicles: None
 Alteration: olivine to smectite and carbonate

Shipboard Data

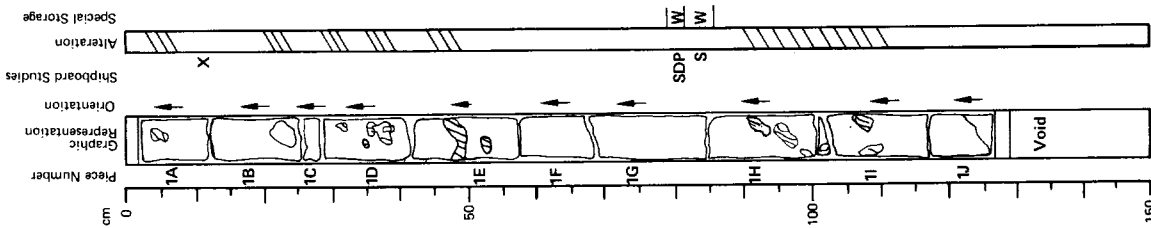
Bulk Analysis: 71:75 cm
 SiO₂ 48.65
 Al₂O₃ 15.92
 Fe₂O₃ 9.92
 MgO 6.92
 CaO 13.22
 Na₂O N.D.
 K₂O < 0.03
 TiO₂ 1.18
 P₂O₅ 0.12
 MnO N.D.
 LOI 0.97
 H₂O⁺ 0.66
 H₂O⁻ N.D.
 CO₂ 0.50
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

LEG	SITE	HOLE	CORE	SECT.
53	418	A	83	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparingly phyrlic massive basalt. Basalt is gray to greenish-gray; relatively fresh except for irregular patches of intense alteration. Plagioclase phenocrysts 5%, <8 mm, fresh or partly altered to smectite. Groundmass is holocrystalline, medium-grained; in altered zones groundmass is replaced by smectite, carbonate and minor pyrite.

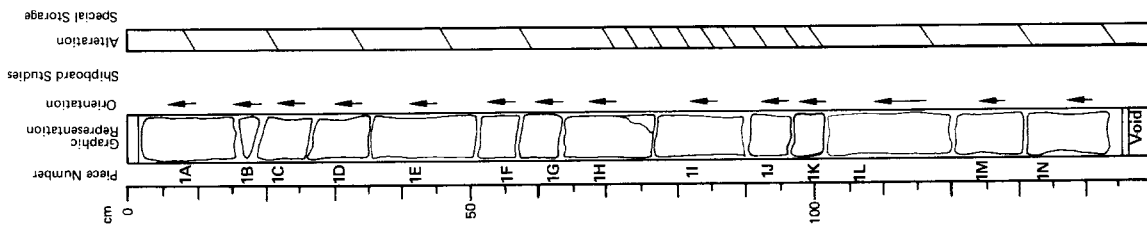
Shipboard Data	Bulk Analysis: 8-12 cm	Physical Property Data:	79-81 cm	82-84 cm
SiO ₂	49.42	Vp (km/sec)	5.08	5.35
Al ₂ O ₃	15.44	Porosity (%)	6.74	
Fe ₂ O ₃	9.11	Wet Bulk Density (g/cc)	2.79	
MgO	9.30	Grain Density (g/cc)	2.92	
CaO	8.34			
Na ₂ O	N.D.			
K ₂ O	1.41			
TiO ₂	0.99			
P ₂ O ₅	0.12			
MnO	N.D.			
LOI	5.67			
H ₂ O ⁺	4.56			
H ₂ O ⁻	N.D.			
CO ₂	0.92			
Cr	N.D.			
Ni	N.D.			
Sr	N.D.			
Zr	N.D.			



LEG	SITE	HOLE	CORE	SECT.
53	418	A	83	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Aphyric to sparsely phyrlic massive basalt. Basalt is medium gray to greenish-gray; moderately altered, except for interval from 70 to 100 cm which is highly altered. Plagioclase phenocryst 1%, <6 mm, fresh. Groundmass is holocrystalline, fine-grained. Vesicles 0.5%, <1 mm, filled with smectite and carbonate. Groundmass is altered to smectite, zeolite(?) and minor carbonate between 70 and 100 cm. Piece 1E has slickensided surfaces.



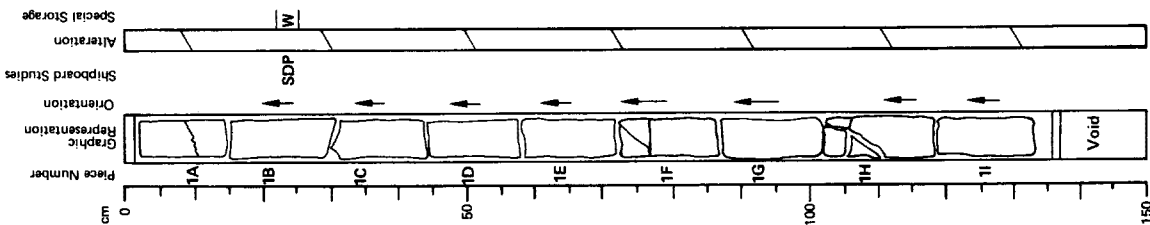
416

LEG	SITE	HOLE	CORE	SECT.
53	418	A	84	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely to moderately phyrlic massive basalt. Basalt is medium-gray, slightly altered. Phenocryst content increases slightly with depth. Plagioclase phenocrysts 3-8%, <6 mm, fresh; olivine phenocrysts 2-3%, <1 mm, altered to smectite; clinopyroxene phenocrysts 2%, <2 mm, in sub-optic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, sub-optic. Groundmass has small patches of smectite and minor pyrite.

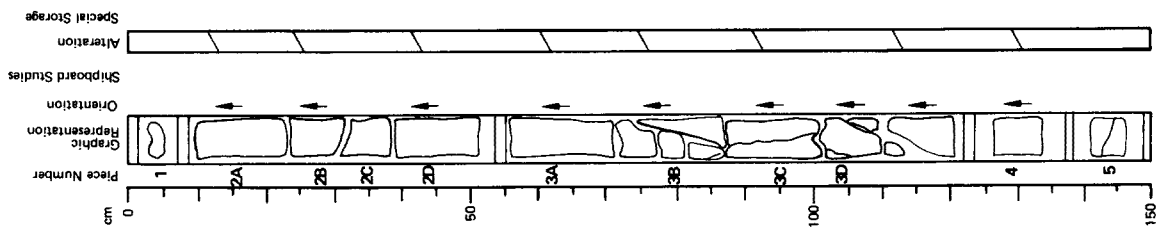
Shipboard Data
 Physical Property Data:
 Vp (km/sec) 24-26 cm
 Porosity (%) 5.62
 Wet Bulk Density (g/cc) 3.23
 Grain Density (g/cc) 2.94
 3.00



LEG	SITE	HOLE	CORE	SECT.
53	418	A	84	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phyrlic massive basalt. Basalt is medium gray to greenish-gray; slightly to moderately altered. Plagioclase phenocrysts 2-3%, <5 mm, fresh; olivine phenocrysts 1-2%, <1 mm, fresh; clinopyroxene phenocrysts 1%, <1 mm, fresh, often in suboptical clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, suboptical. Veins are filled with smectite and carbonate with minor pyrite. Irregular patches of smectite occur in groundmass. Piece 3B is slickensided. Piece 1 is moderately phyrlic basalt with very fine-grained groundmass. It probably slumped from higher in the hole.



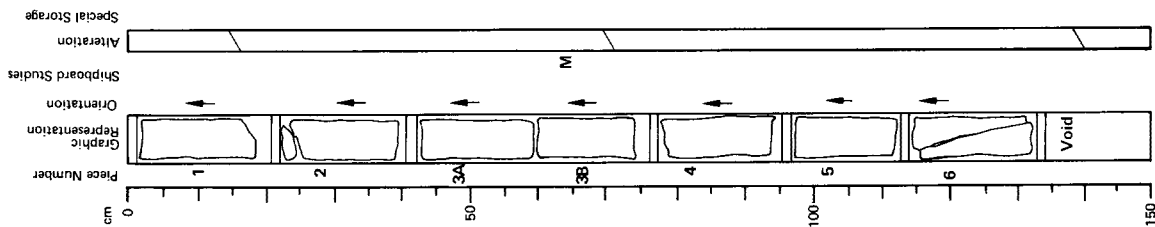
LEG	SITE	HOLE	CORE	SECT.
53	418	A	84	4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phytic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 5-8%, <2 mm, fresh; olivine phenocrysts 1%, <2 mm, altered to smectite; clinopyroxene phenocrysts 1-3%, <2 mm, usually in subophitic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Prominent veins in pieces 2 and 6 are filled with smectite, minor carbonate and minor pyrite.

Shipboard Data

Bulk Analysis: 48.57 cm
Magnetic Data: 62.64 cm
SiO₂ 48.89 NRM Intensity (emu/cc) 004.05 x 10⁻³
Al₂O₃ 16.06 NRM Inclination -64.1°
Fe₂O₃ 11.06 Stable Inclination -59.7°
MgO 8.95
CaO 12.69
Na₂O N.D.
K₂O < 0.03
TiO₂ 1.16
P₂O₅ 0.09
MnO N.D.
LOI 1.15
H₂O⁺ 0.64
H₂O⁻ N.D.
CO₂ 0.28
Cr N.D.
Ni N.D.
Sr N.D.
Zr N.D.



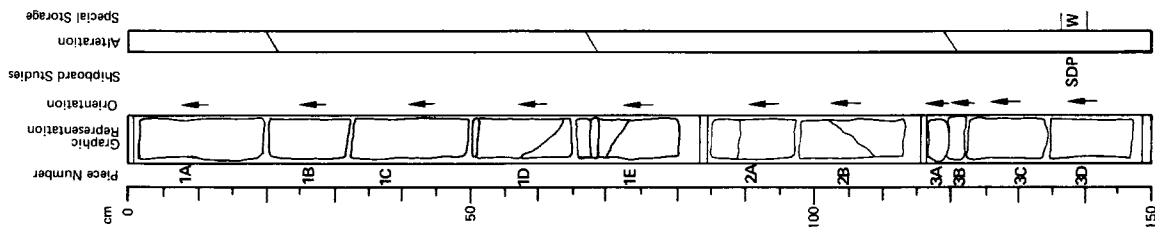
LEG	SITE	HOLE	CORE	SECT.
53	418	A	84	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
Moderately phytic massive basalt. Basalt is medium-gray; relatively fresh. Plagioclase phenocrysts 5-8%, <8 mm, fresh; olivine phenocrysts <1%, <1 mm, altered to smectite; clinopyroxene phenocrysts 1-3%, <2 mm, often in subophitic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Occasional veinlet is filled with carbonate, smectite and minor pyrite.

Shipboard Data

Physical Property Data: 135-137 cm
Vp (km/sec) 5.47
Porosity (%) 1.56
Wet Bulk Density (g/cc) 2.97
Grain Density (g/cc) 3.01



LEG	SITE	HOLE	CORE	SECT.
53	418	A	85	1

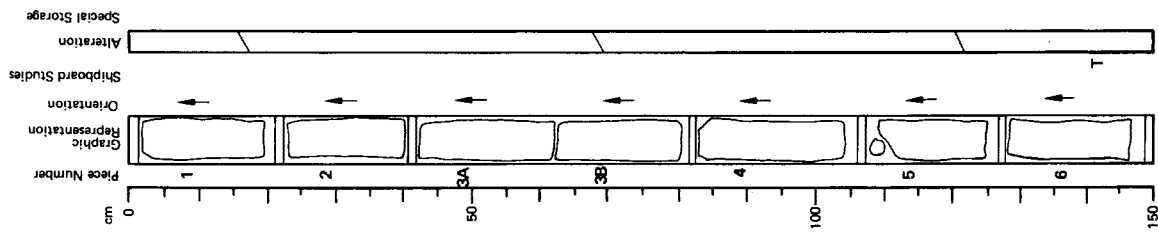
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phytic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 6-9%, <8 mm, fresh; olivine phenocrysts 5%, <3 mm, mostly fresh, some altered to smectite and carbonate; clinopyroxene phenocrysts 4-8%, <3 mm, fresh, often in subophitic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Rare veinlets are filled with smectite.

Thin Section Description

Location: 143 cm
 Texture: porphyritic - subophitic
 Phenocrysts: olivine 4%, <2.5 mm, subhedral; plagioclase 2.5%, <4 mm, subhedral; clinopyroxene 20%, <4 mm, anhedral to subophitic
 Groundmass: olivine 2%, <0.4 mm, subhedral; plagioclase 20%, <0.7 mm, subhedral; clinopyroxene 22%, 0.2 mm, granular; opaques 7%, <0.25 mm, subhedral
 Vesicles: none
 Alteration: olivine partially altered to smectite



LEG	SITE	HOLE	CORE	SECT.
53	418	A	85	2

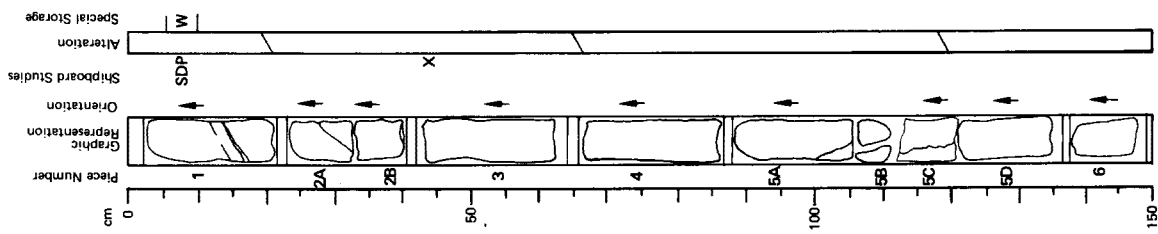
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately phytic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 4-5%, <5 mm, fresh; olivine phenocrysts 4-5%, <4 mm, partly altered to smectite; clinopyroxene phenocrysts 2%, <2 mm, often in subophitic clots with plagioclase. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Pieces 2A, 5A, 5B, and 5C are slickensided.

Shipboard Data

Bulk Analysis: 42.44 cm
 Physical Property Data:
 Vp (km/sec) 9.11 cm
 Porosity (%) 6.13
 Wet Bulk Density (g/cc) 0.95
 Grain Density (g/cc) 2.98
 3.00

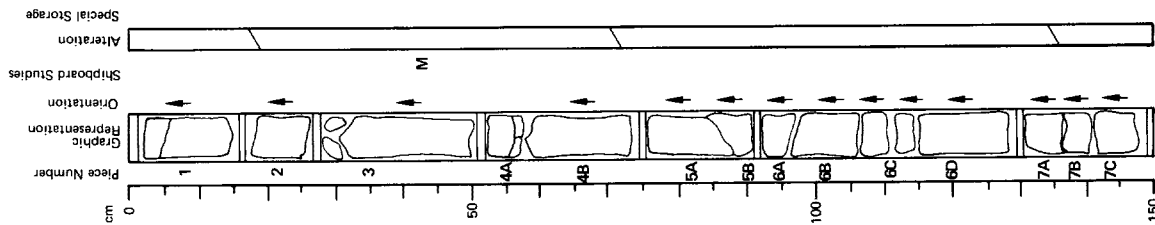


VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOULE	CORE	SECT.
53	418	A	85	3

Visual Description
 Sparsely phyrlic massive basalt. Basalt is medium grey; relatively fresh. Plagioclase phenocrysts 2% < 3 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Sparse veins are filled with smectite and carbonate.

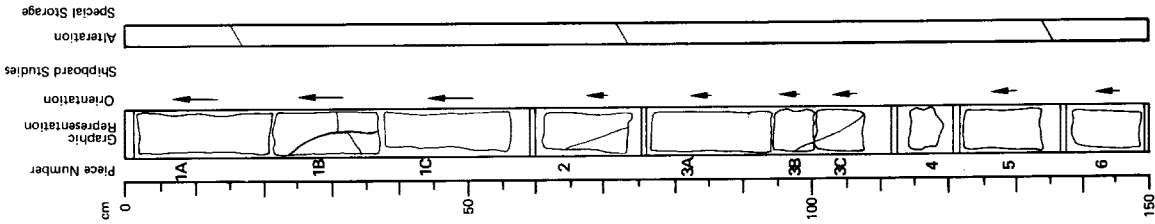
Shipboard Data
 Magnetic Data:
 44-46 cm
 NRM Intensity (emu/cc) 004.49 x 10⁻³
 NRM Inclination -61.2°
 Stable Inclination -59.9°



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOULE	CORE	SECT.
53	418	A	85	4

Visual Description
 Sparsely phyrlic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 2-3%, < 4 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Sparse veins are filled with amecite.



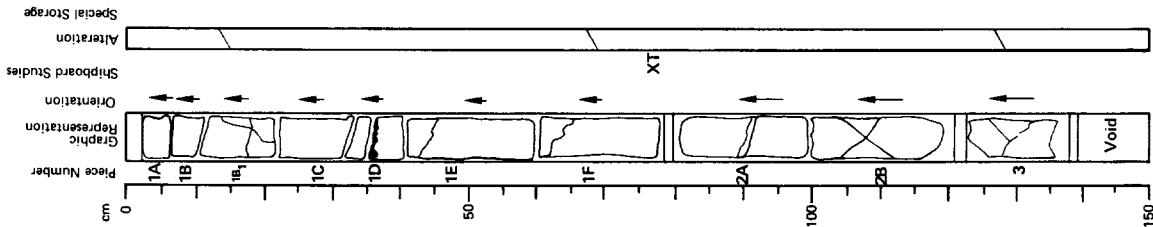
LEG	SITE			CORE			SECT.
5	3	4	1	8	A	8	5
5	3	4	1	8	A	8	5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely to moderately phytic massive basalt. Basalt is medium-gray; relatively fresh. Plagioclase phenocrysts 5%, < 8 mm, fresh; olivine phenocrysts 3-5%, < 3 mm, partly altered to smectite. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Scattered veins are filled with smectite and carbonate. Fractures are often slickensided.

Thin Section Description
 Location: 78 cm
 Texture: ophitic
 Phenocrysts: plagioclase 5%, < 8 mm; olivine 3-5%, < 3 mm
 Groundmass: olivine 5%, < 1.5 mm, euhedral; plagioclase 40%, < 2 mm, euhedral; clinopyroxene 40%, < 2 mm, ophitic; opaques 5%, 0.15 mm, euhedral; interstitial material 10%, altered to smectite
 Vesicles: none
 Alteration: olivine to smectite, smectite fills vesicles and interstitial areas.

Shipboard Data
 Bulk Analysis: 77.79 cm
 SiO₂ 49.14
 Al₂O₃ 15.61
 Fe₂O₃ 10.54
 MgO 8.08
 CaO 12.84
 Na₂O N.D.
 K₂O < 0.03
 TiO₂ 1.25
 P₂O₅ 0.14
 MnO N.D.
 LOI 1.74
 H₂O⁺ 0.54
 H₂O⁻ N.D.
 CO₂ 0.88
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.



LEG	SITE			CORE			SECT.
5	3	4	1	8	A	8	5
5	3	4	1	8	A	8	5

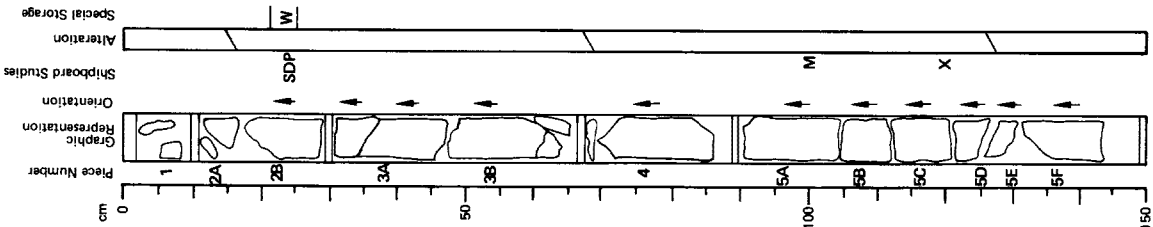
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely phytic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 4%, < 3 mm, fresh. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Scattered veins are filled with smectite. Piece 5E is slickensided.

Shipboard Data
 Bulk Analysis: 122-124 cm
 SiO₂ 46.52
 Al₂O₃ 7.50
 Fe₂O₃ 12.07
 MgO 20.73
 CaO 11.39
 Na₂O N.D.
 K₂O < 0.03
 TiO₂ 0.12
 P₂O₅ 0.04
 MnO N.D.
 LOI 12.25
 H₂O⁺ 14.1
 H₂O⁻ N.D.
 CO₂ 5.12
 Cr N.D.
 Ni N.D.
 Sr N.D.
 Zr N.D.

Magnetic Data:
 NRM Intensity (emu/cc) 98-101 cm
 NRM Inclination 007.33 x 10⁻³
 Stable Inclination -56.1°
 -61.5°

Physical Property Data:
 Vp (km/sec) 21-23 cm
 Porosity (%) 6.13
 Wet Bulk Density (g/cc) 1.90
 Grain Density (g/cc) 2.99

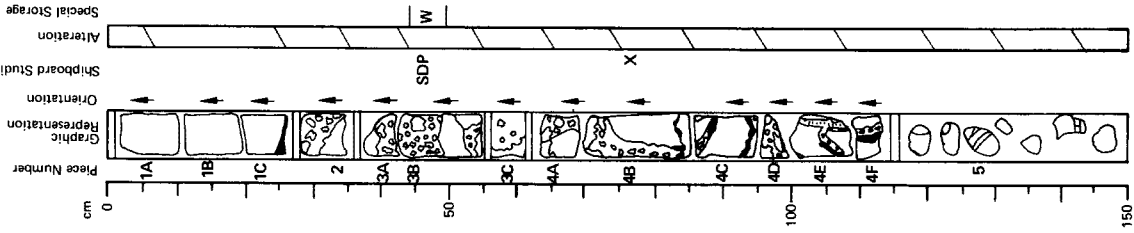
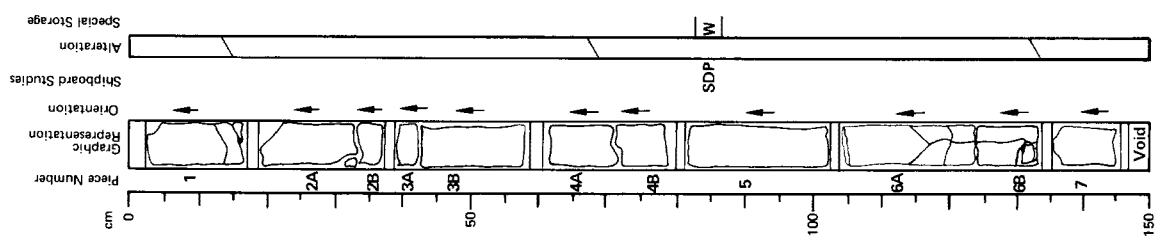


LEG	SITE	H O L E	CORE	SECT.
53	418A		85	7

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Sparsely to moderately phytic massive basalt. Basalt is medium gray; relatively fresh. Plagioclase phenocrysts 5%, < 8 mm, fresh; olivine phenocrysts 5%, < 4 mm, partly altered to smectite. Groundmass is holocrystalline, medium- to coarse-grained, subophitic. Scattered veins are filled with smectite. Some fractures are slickensided.

Shipboard Data
 Physical Property Data:
 Vp (km/sec) 86-88 cm
 Porosity (%) 5.96
 Wet Bulk Density (g/cc) 2.24
 Grain Density (g/cc) 2.95
 2.99



LEG	SITE	H O L E	CORE	SECT.
53	418A		86	1

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description
 Moderately phytic massive basalt and basalt breccia. Massive basalt extends from top of section to 25 cm; breccia from 25 cm to base of section. Massive basalt is medium gray; relatively fresh. Plagioclase phenocrysts 10%, < 4 mm, fresh; olivine phenocrysts 3%, < 1 mm, partly altered to smectite; clinopyroxene phenocrysts 5%, < 2 mm, fresh. Groundmass is holocrystalline, medium-grained to fine-grained, subophitic; grain size decreases gradually toward base of unit at 25 cm. Breccia is greenish-gray; moderately altered. Poorly sorted angular clasts up to 20 cm across are in a matrix of greenish to bluish smectite. Clasts are moderately phytic basalt with glass rinds. Plagioclase phenocrysts 10%, < 4 mm, fresh; olivine phenocrysts 1%, < 1 mm, altered to smectite; clinopyroxene phenocrysts 3%, < 3 mm, fresh. Groundmass is fine-grained to glassy; glassy rinds are altered to palagonite and smectite.

Thin Section Description
 Location: 15 cm
 Texture: porphyritic - intersertal
 Phenocrysts: olivine 3%, < 0.8 mm, euhedral; plagioclase 10%, < 3.5 mm, euhedral; clinopyroxene 5%, < 1.5 mm, subophitic
 Groundmass: olivine 2%, 0.2 mm, subhedral; plagioclase 35%, 0.3 mm, subhedral; clinopyroxene 34%, 0.1 mm, granular; opaque 3%, 0.1 mm, euhedral; glass 8% interstitial; devitrified
 Vesicles: none
 Alteration: olivine to smectite

Shipboard Data
 Bulk Analysis: 14-19 cm 74-78 cm
 SiO₂ 48.66 48.82
 Al₂O₃ 15.27 15.68
 Fe₂O₃ 10.70 9.93
 MgO 8.81 8.32
 CaO 12.71 12.67
 Na₂O N.D. N.D.
 K₂O 0.11 0.18
 TiO₂ 1.28 1.30
 P₂O₅ 0.11 0.12
 MnO N.D. N.D.
 LOI 1.08 1.31
 H₂O⁺ 0.57 0.82
 H₂O⁻ N.D. N.D.
 CO₂ 0.44 0.74
 Cl N.D. N.D.
 Ni N.D. N.D.
 Sr N.D. N.D.
 Zr N.D. N.D.

Magnetic Data:
 NRM Intensity (emu/cc) 001.21 x 10³
 NRM Inclination -73.3°
 Stable Inclination -67.5°

Physical Property Data:
 Vp (km/sec) 46-46 cm
 Porosity (%) 4.86
 Wet Bulk Density (g/cc) 14.30
 Grain Density (g/cc) 2.63
 2.91

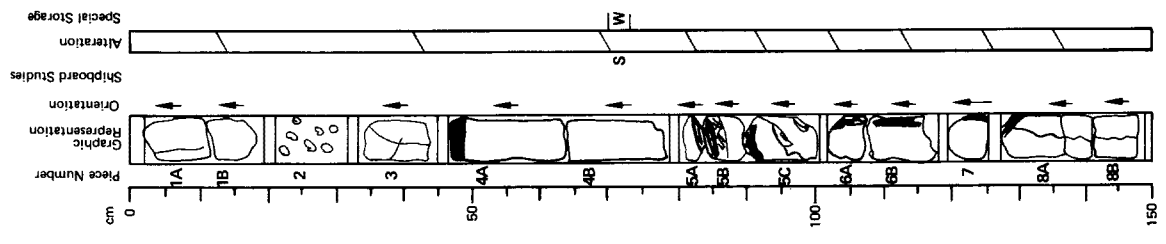
227

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	HOLE	CORE	SECT.
53	418	A	86	2

Visual Description
 Moderately phyrlic pillow basalt. Basalt is dark gray to greenish gray; weakly to moderately altered. Plagioclase phenocrysts 12-14%, < 6 mm, fresh; olivine phenocrysts 3%, < 4 mm, altered to smectite; clinopyroxene phenocrysts < 1%, < 5 mm, fresh, rimmed with plagioclase, probably xenocrystic. Groundmass is fine-grained to glassy; glass selvages are partly palagonitized and partly altered to smectite. Minor breccia occurs at pillow margins. Veins and cracks are filled with smectite and minor pyrite.

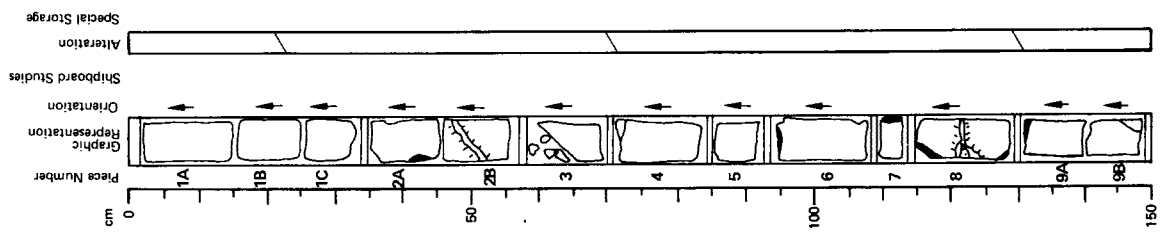
Shipboard Data
 Physical Property Data:
 Vp (km/sec) 71-73 cm
 5.87



VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

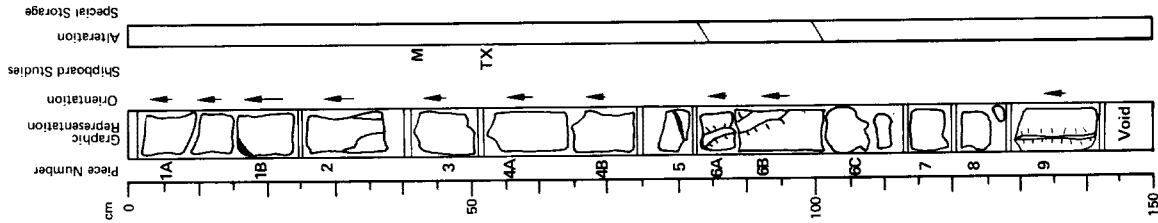
LEG	SITE	HOLE	CORE	SECT.
53	418	A	86	3

Visual Description
 Moderately phyrlic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 10%, < 4 mm, fresh; olivine phenocrysts 4%, < 3 mm, altered to smectite and carbonate; clinopyroxene phenocrysts 4%, < 6 mm, fresh, often in subophitic dows with plagioclase; groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Veins < 1% filled with smectite and carbonate. Prominent veins in pieces 2B, 6 and 9B are filled with smectite and carbonate.



LEG	SITE	HOLE	CORE	SECT.
53418A	816	5		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phryic pillow basalt and aphyric basalt. Moderately phryic basalt is present in the upper and lower parts of the section; aphyric basalt is between 25 and 80 cm (pieces 2 through 5) and is either a pillow or a small intrusion. The moderately phryic basalt is medium to dark gray, slightly altered in pieces 6A and 6B. Plagioclase phenocrysts 8%, < 4 mm, fresh, olivine phenocrysts 1%, < 1.5 mm, altered to smectite; clinopyroxene phenocrysts 1-2%, < 1 mm, fresh usually in subophitic clots with plagioclase. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Prominent veins in pieces 6A, 6B and 9 are filled with smectite, carbonate and minor pyrite. Aphyric basalt is medium gray; relatively fresh. Plagioclase phenocrysts < 1%, < 1 mm, fresh. Groundmass is very fine-grained to glassy; glass selvages are present at the top and bottom; glass is mostly fresh.

Thin Section Description

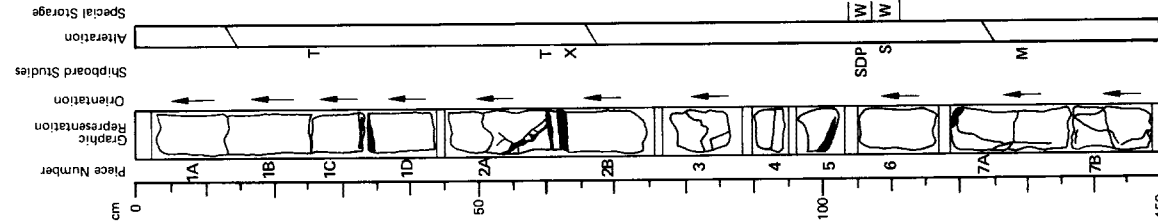
Location: 55 cm
Texture: porphyritic - quench
Phenocrysts: olivine 1%, < 0.8 mm, euhedral; plagioclase 5%, < 1.5 mm, euhedral; clinopyroxene < 1%, < 0.8 mm, rounded
Groundmass: plagioclase 40%, 0.2 mm, acicular; clinopyroxene 46%, radiating sheaves; opaques 8%, 0.01 mm, granular; spinel tr, 0.25 mm, euhedral
Vesicles: < 1%, 0.1 mm, round
Alteration: olivine to smectite; smectite and carbonate fill vesicles

Shipboard Data

Bulk Analysis: 54-57 cm	Magnetic Data:	45-47 cm
SiO ₂ 47.29	NRM Intensity (emu/cc)	021.53 x 10 ⁻³
Al ₂ O ₃ 15.68	NRM Inclination	-42.1°
Fe ₂ O ₃ 10.02	Stable Inclination	-38.2°
MgO 8.47		
CaO 12.61		
N ₂ O N.D.		
K ₂ O 0.13		
TiO ₂ 1.31		
P ₂ O ₅ 0.14		
MnO N.D.		
LOI 1.67		
H ₂ O ⁺ 1.12		
H ₂ O ⁻ N.D.		
CO ₂ 0.60		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

LEG	SITE	HOLE	CORE	SECT.
53418A	816	5		

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
Moderately phryic pillow basalt. Basalt is medium to dark gray; relatively fresh. Plagioclase phenocrysts 12-15%, < 8 mm, fresh; olivine phenocrysts 3-4%, < 3 mm, altered to smectite; clinopyroxene phenocrysts 1-2%, < 3 mm, fresh, often in subophitic clots with plagioclase. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite, carbonate and zeolite(?). Some glassy selvages are partly brecciated. Scattered veins are filled with smectite and carbonate; veins in piece 2A is slickensided. One pillow (piece 2B through 5) has smaller phenocrysts and finer-grained groundmass than the remainder of the section.

Thin Section Description

Location: 25 cm
Texture: porphyritic - quench
Phenocrysts: olivine 3%, < 1.5 mm, euhedral; plagioclase 12%, < 4 mm, euhedral; clinopyroxene 1%, < 3 mm, rounded
Groundmass: plagioclase 15%, 0.3 mm, skeletal; clinopyroxene 65%, radiating sheaves; opaques 2%, 0.005, granular
Vesicles: 2%, 0.2 mm, round
Alteration: olivine to smectite; carbonate fills vesicles

Thin Section Description

Location: 61 cm
Texture: porphyritic - quench
Phenocrysts: olivine 1%, < 2 mm, euhedral; plagioclase 10%, < 3 mm, euhedral; clinopyroxene 2%, < 2 mm, rounded
Groundmass: olivine 1%, 0.2 mm, subhedral; plagioclase 15%, 0.3 mm, acicular; clinopyroxene 56%, radiating sheaves; opaques 5%, 0.01 mm, granular
Vesicles: < 1%, 0.1 mm, round
Alteration: olivine to smectite and carbonate; carbonate fills vesicles

Shipboard Data

Bulk Analysis: 62-65 cm	Magnetic Data:	129-131 cm
SiO ₂ 48.75	NRM Intensity (emu/cc)	013.31 x 10 ⁻³
Al ₂ O ₃ 15.67	NRM Inclination	-32.8°
Fe ₂ O ₃ 10.89	Stable Inclination	-33.3°
MgO 8.46		
CaO 12.85		
Na ₂ O N.D.		
K ₂ O 0.06		
TiO ₂ 1.27		
P ₂ O ₅ 0.11		
MnO N.D.		
LOI 0.81		
H ₂ O ⁺ 0.56		
H ₂ O ⁻ N.D.		
CO ₂ 0.34		
Cr N.D.		
Ni N.D.		
Sr N.D.		
Zr N.D.		

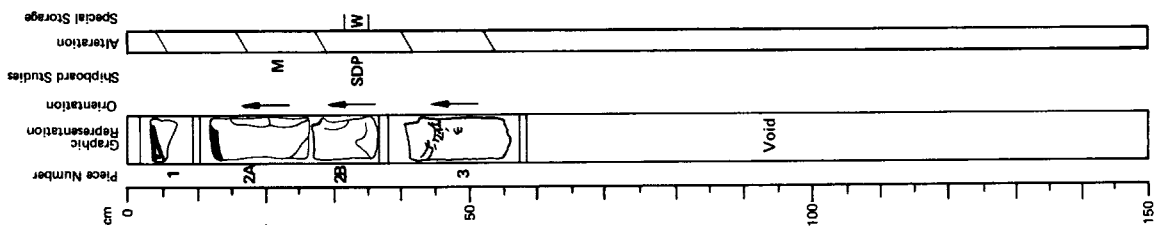
Physical Property Data:

V _p (km/sec)	6.14	108-110 cm
Porosity (%)	3.56	5.68
Wet Bulk Density (g/cc)	2.89	
Grain Density (g/cc)	2.96	

424

LEG	SITE	HOLE	CORE	SECT.
53	418A	816	816	6

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS



Visual Description
 Moderately phryic pillow basalt. Basalt is greenish-gray; moderately altered. Plagioclase phenocrysts 7%, <3 mm, fresh; olivine 1%, <3 mm, altered to smectite and carbonate; clinopyroxene phenocrysts <1%, <1 mm, fresh. Groundmass is fine-grained to glassy; glass selvages are partly altered to smectite. Veins are filled with smectite and minor pyrite. Piece 3 has minor breccia.

Shipboard Data
 26-27 cm

Magnetic Data:
 NRM Intensity (emu/cc) 006.55 x 10⁻³
 NRM Inclination -26.0°
 Stable Inclination -25.8°

Physical Property Data:
 Vp (km/sec) 34-36 cm
 Porosity (%) 5.62
 Wet Bulk Density (g/cc) 4.72
 Grain Density (g/cc) 2.89
 2.98

SITE SUMMARY SHEET

SITE 418, HOLE B

LEGS 52, 53

Date occupied	14 April 1977
Date departed	18 April 1977
Time on hole	3 days, 17 hours
Position: latitude	25° 02.08'N
longitude	68° 03.45'W
Water depth (sea level)	5514 corrected meters, echo sounding
Water depth (rig floor)	5524 corrected meters, echo sounding
Bottom felt at depth	5523 meters, drill pipe
Penetration	329.6 meters
Number of holes	1
Number of cores	35
Total length cored section	329.6 meters
Total core recovered	172.7 meters
Percentage core recovery	52.4 per cent

Oldest Sediment Cored

Depth sub-bottom	319.5 meters
Nature	nanno clay/ooze
Age	Late Aptian
Measured velocity	1.62 km/sec

Basement

Depth sub-bottom	319.5 meters
Nature	Basalt
Velocity range	4.1-5.8 km/sec

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SITE 418 HOLE B CORE 3 CORED INTERVAL: 16.3-25.9 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORMS	NANNOS	RADS				
					1	0.5		<p>Pelagic Clay</p> <p>Extremely disturbed by drilling, almost homogenized. Dominant lithology is a dark yellow brown (10YR 4/2) pelagic clay containing abundant micromodules and fine-grained resinous heavy minerals. Rare nodules of yellow brown color (10YR 5/2) is dominant. Scattered patches of Fe-Mn micromodules. Zones of coarser material occur.</p> <p>Smear: 1-99 (dark yellowish-brown)</p> <p>5% quartz 80% clay 12% micromodules 1% rutile 2% fish remains TR% pollen</p>
					2	1.0		<p>5% quartz 73% clay TR% hornblende 20% micromodules 4% rutile TR% fish remains</p> <p>Smear: 1-74 (dark yellowish brown)</p>
					3			<p>5% quartz 87% clay 5% opaques 3% rutile TR% fish remains</p> <p>Smear: 3-73 (yellowish brown)</p>
					4			<p>Grain Size</p> <p>2-80 6-200 sand 4-9% silt 6-2% clay 95-1% clay 93.6% clay Carbon, Carbon-Carbonate</p>
					5			
					6		VOID	
				CC				

SITE 418 HOLE B CORE 1 CORED INTERVAL: 0.0-6.8 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORMS	NANNOS	RADS				
EARLY QUATERNARY		Ag			1	0.5		<p>Nannofossil ooze and Nannofossil-rich clay: yellow brown, contains Foraminifera. Highly disturbed, homogenized.</p> <p>Smear: 1-133</p> <p>5% quartz 50% clay 10% opaques 10% forams 5-10% nannofossils 20% nannofossils TR% silt/clayflag 1- 2% fish debris</p> <p>Smear: 1-140</p> <p>5% quartz 40% clay 10% opaques TR% forams 40% nannofossils 8% siltic. debris</p>
						1.0		

SITE 418 HOLE B CORE 2 CORED INTERVAL: 6.8-16.3 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORMS	NANNOS	RADS				
EARLY QUATERNARY		Rp			1	0.5		<p>Foraminifera-Rich Nannofossil ooze and pelagic clay (orange yellowish brown (10YR 7/2) foraminifera-rich nannofossil ooze - yellowish brown (10YR 5/2) pelagic clay. In some parts patches speckled with Fe-Mn micromodules. Highly disturbed by drilling.</p> <p>Major lithology (yellowish brown)</p> <p>Smear: 1-71</p> <p>5% quartz 85% clay 10% opaques TR% manganite(?) TR% fish debris</p>
					2	1.0		<p>Minor lithology (yellow orange)</p> <p>Smear: 1-42</p> <p>20% clay 5% opaques TR% rutile 15% forams 60% nannofossils TR% fish debris</p> <p>Minor lithology (dusky yellow brown)</p> <p>Smear: 2-90</p> <p>5% quartz 30% nannofossils 62% clay 3% rutile TR% fish debris</p> <p>Grain Size</p> <p>1-40 1-200 sand 5-8% silt 93-2% clay Carbon, Carbon-Carbonate</p>
				CC				

SITE 418	HOLE B	CORE 5	CORED INTERVAL: 35.4-44.9 m		TIME-ROCK UNIT	BIOSTRAZ ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	LITHOLOGIC STRUCTURES	SAMPLE	LITHOLOGIC DESCRIPTION	
			DRILLING	DIAPHRAGM														
												0.5					10YR 5/4 to 5Y 7/4	60
											1						10YR 5/4 to 5Y 7/4	
											2						10YR 5/4 to 5Y 7/4	89
											3						10YR 5/4 to 5Y 7/4	
											4						10YR 5/4 to 5Y 7/4	71
											5						10YR 5/4 to 5Y 7/4	
											6						10YR 5/4 to 5Y 7/4	
											7						10YR 5/4 to 5Y 7/4	
											CC						10YR 5/4 to 5Y 7/4	CC

SITE 418	HOLE B	CORE 4	CORED INTERVAL: 25.9-35.4 m		TIME-ROCK UNIT	BIOSTRAZ ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	LITHOLOGIC STRUCTURES	SAMPLE	LITHOLOGIC DESCRIPTION	
			DRILLING	DIAPHRAGM														
												0.5					10YR 5/2-4/2	88
											1						10YR 5/2-4/2	
											2						10YR 5/4 (mottles)	106
											3						10YR 4/2 (10YR 5/4)	
											4						10YR 5/2 (10YR 5/4 mottles)	76
											5						10YR 5/2-5/4	
											6						10YR 5/2	
											CC						10YR 5/2	CC

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CORE 7 CORED INTERVAL: 54.4-63.9 m

SITE 418	HOLE B	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION	LITHOLOGIC SAMPLE	LITHOLOGIC STRUC- TURES	LITHOLOGIC DISTURBANCE	DRILLING	TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	
																FOSSIL CHARACTER
			1	0.5		Pelagic Clay Highly disturbed, firm, pelagic clay, 95% is shades of yellow gray (SY 7/2-6/2) with a brown cast. Some lighter mottles and faint evidence of bioturbation noted. Scattered micronodule streaks and patches. In Section 5, a streak of pale green (10Y 8/2) is contained within a light yellow gray zone.	5Y 7/2 5Y 6/2									
			2		VOID											
			3		VOID											
			4		VOID											
			5													
			6													
			7		VOID											
			CC													

CORE 6 CORED INTERVAL: 44.9-54.4 m

SITE 418	HOLE B	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION	LITHOLOGIC SAMPLE	LITHOLOGIC STRUC- TURES	LITHOLOGIC DISTURBANCE	DRILLING	TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	
																FOSSIL CHARACTER
			1	0.5		Pelagic Clay Highly disturbed to homogenized pelagic clay. 90% is dusky yellow gray (SY 6/2-6/3) with a brownish cast and swirls of either gray (M2) containing micronodule concen- trations or pale yellow gray (SY 7/2) clay. Core is homogeneous with remains of a former cyclic brown layering. In section 6 there is an halo of pale gray with zeolites and volcanic minerals suggest an ash.	5Y 6/2-6/3									
			2			Major lithology Smear: 3-78 (dusky yellow gray) 5% quartz 6% clay 3% opaques 3% rutile 2% fish remains	5Y 6/2									
			3			Smear: 5-41 (dusky yellow) 5% quartz 85% clay 5% opaques 2% rutile 3% fish remains	5G 6/2									
			4			Smear: 6-42 (pale yellow green) TR% quartz 70% clay 5% rhodochrosite 20% phillipsite 3% rutile 2% fish remains Other lithology Smear: 6-37 (light olive gray) TR% quartz 94% clay 3% opaques 3% rutile TR% fish remains	5Y 6/2- 5Y 7/2									
			5			Grain Size 2-40 0.75% sand 5.8% silt 94.2% clay Carbon, Carbon-Carbonate 2-60 (0.1, 0.1, 0) 4-60 (0.1, 0.1, 0)	5Y 7/2 5Y 6/2									
			6				37 42									
			7		VOID											
			CC													

SITE 418 HOLE B CORE 9 CORED INTERVAL: 73.3-82.7 m

TIME - ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			1	0.5				73	5Y 7/2-5/2 10YR 7/4
			2						5Y 7/2
			3						5Y 7/2
			4					96	10Y 8/2-7/2 10YR 6/2
			5						5Y 7/2
			6					53	10YR 6/2-7/2
			CC						5Y 7/2

SITE 418 HOLE B CORE 8 CORED INTERVAL: 63.9-73.3 m

TIME - ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			1	0.5				64	5Y 6/1-5/2
			2					84	5Y 7/2-5/2
			3					109	NZ
			4					53	5Y 6/1-7/2
			5					14	5Y 7/2
			6						
			7						
			CC						

SITE 418 HOLE B CORE 13 CORED INTERVAL: 110.9-120.3 m

TIME - ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			0.5				56 8/1	<u>Zeolite-bearing Clay</u> Highly disturbed, pelagic clay to zeolite bearing clay. Firm, partly homogenized by drilling. Pale grayish orange (10YR 7/4) with scattered pale mottles and wispy beds of grayish to reddish pale orange. Numerous pale green zeolitic clay (ash) layers and blebs occur. Commonly layers show a halo. Major lithology Smear: 1-73 (pale gray orange) 3% quartz 8% clay 1% zeolites 5% rutile 5% siliceous blebs Other lithology Smear: 1-28 (black speck in light greenish gray) TR% quartz TR% feldspar 7% clay 5% opaques 5% zeolites 2% rutile 10% siliceous blebs TR% fish remains Smear: 1-91 (light yellowish gray) 2% quartz 8% clay 5% opaques 5% rutile TR% fish remains Smear: 1-113 (light yellowish gray) 8% clay 2% opaques 5% zeolites 5% rutile 5% fish remains Grain Size 1-40 0.0% sand 3.4% silt 96.6% clay Carbon, Carbon-Carbonate 1-60 (0.2, 0.2, 0)
			1				73	
			1.0				10YR 7/4	
			2				10YR 7/4	
			3					
			4		VOID			
			5				10YR 7/4	
			6				100.8/1 clay	
			7					
			CC					

SITE 418 HOLE B CORE 12 CORED INTERVAL: 101.5-110.9 m

TIME - ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			0.5				44	<u>Zeolitic Clay</u> Moderately disturbed homogeneous, very pale orange zeolite clay, also yellowish gray (5Y 7/2-8/1) although there is an over trend upwards in this core from pale orange to gray tones. Very faint red-orange, greenish and brown mottles throughout, possibly as bioturbation. Pale green to gray (M) "ash" layers; zeolites in some, others only clay. Smears: 1-44 (pale green ash) 40% clay 60% fish devitrified TR% fish remains Smear: 1-71 (yellowish gray) TR% quartz 7% clay 20% opaques 2% zeolites 3% rutile Smear: 3-33 (pale green ash) TR% quartz 5% opaques 20% zeolites 10% siliceous blebs 5% fish remains Smear: 3-70 (yellowish gray) TR% quartz 7% clay 20% opaques 2% zeolites 2% rutile Grain Size 4-40 3.0% sand 5.6% silt 91.4% clay Carbon, Carbon-Carbonate 4-60 (0.3, 0.2, 1)
			1				56 8/1	
			1.0				71	
			2				10YR 8/4	
			3				10YR 8/4	
			4				10YR 7/4	
			5		VOID		56Y 5/1	
			6					
			7					
			CC					

SITE 418 HOLE B CORE 16 CORED INTERVAL: 139.1-146.6 m.

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			1	0.5				10VR 7/4 10VR 4/2 5Y 4/1	Zeolite and Radiolaria-bearing Clay Highly disturbed interlayers of firm, (30%) grayish-orange (10VR 7/4) zeolite bearing clay and (70%) pale yellow-brown clay (10VR 4/2) and (30%) olive gray brown (5Y 4/1) clay. From 0-30 cm in the best preserved section 15 orange/brown cycles occur. Contacts are diffuse, irregular. At 3-10 cm mineral specks occur on the core surface. Smears: 1-3 (grayish orange) 5% quartz 70% clay 5% opaques 5% zeolites 3% rutile 10% radiolaria molds and casts TRX fish remains Smears: 1-21 (dark yellow brown) TRX quartz TRX feldspar 8% clay 10% opaques 5% rutile TRX dolomite Grain Size 1-40 100% sand 3.5% silt 96.5% clay Carbon, Carbon-Carbonate 1-60 (0.1, 0.1, 0)

SITE 418 HOLE B CORE 15 CORED INTERVAL: 129.6-139.1 m.

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
			1	0.5				10VR 7/4	Pelagic Clay to Zeolite-bearing Clay Highly disturbed, firm clay to zeolite-bearing clay. Mostly (95%) grayish orange (10VR 7/4) with (5%) streaks of pale brown (5YR 6/2) (original banding on cm scale. In some zones, zeolites form coarse surface texture. Smear: 2-80 (pale gray orange) TRX quartz 86% clay 2% opaques 2% zeolites 5% silt 2% fish remains Grain Size 2-40 1.2% sand 4.6% silt 94.3% clay Carbon, Carbon-Carbonate 2-60 (0.2, 0.1, 1)
			2					80	10VR 7/4 dominant
			3						10VR 7/4
			4						10VR 7/4
			5						
			6						
			7						
			CC						

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SITE 418 HOLE B CORE 21 CORED INTERVAL: 186.7-196.3 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	SEDIMENTARY DISTURBANCE	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
					CHARACTER	SECTION						
							1	0.5	Z			Zeolite-rich Clay Highly disturbed to homogenized, firm, dark yellowish brown (10YR 4/2) zeolite clay. Color tones are lighter than Core 20 and swirls and blebs of pale orange (10YR 7/4) occur throughout. Evidence of original cm-scale interlayers.
							2		Z			Major lithology (dark) Smear 6-90 75% clay 5% dolomite 10% zeolites 5% opaques 5% fish remains Minor lithology (light beige) Smear 6-122 5% quartz 65% clay 20% zeolites 10% fish remains Grain Size 1-40 0.0% sand 9.4% silt 90.6% clay Carbon, Carbon-Carbonate 1-60 (0.0, 0.0, 0)
							3		Z			10YR 4/2
							4		Z			
							5		Z			
							6		Z			10YR 4/2
							7		Z			122-10YR 7/4
							CC					

SITE 418 HOLE B CORE 20 CORED INTERVAL: 177.2-186.7 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	SEDIMENTARY DISTURBANCE	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
					CHARACTER	SECTION						
							1	0.5	Z			Zeolite-bearing Clay, Pelagic Clay, Zeolitic Clay Highly disturbed to homogenized mixture of zeolite-bearing clay, pelagic clay and brown (10YR 4/2). Minor amounts of dolomite crystals occur. A few rare patches of pale orange (10YR 8/2) or light brown (5YR 5/6) occur in Section 1.
							2		Z		77	Major lithology (choco. brown) Smear: 2-77 90% clay 5% zeolites 5% fish remains Smear: 3-120 90% clay 5% dolomite 5% zeolites Smear: 5-74 5% quartz 70% opaques 15% zeolites 5% fish remains Grain Size 2-40 0.0% sand 8.4% silt 91.6% clay Carbon, Carbon-Carbonate 2-60 (0.1, 0.1, 0)
							3		Z		120	10YR 4/2
							4		Z			
							5		Z		74	
							6		Z			
							7		Z			
							CC					

SITE 418 HOLE B CORE 23 CORED INTERVAL: 205.8-215.3 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	ORILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
						1	0.5	Z			16	Zeolitic clay Highly disturbed, partly drilling breccia, of firm, zeolitic clay with alternating color bands to swirls of dominantly pale grayish orange (10YR 7/4) and pale yellow brown (10YR 6/2) with streaks and blebs of light brown. Streaks appear sharp to brown. Overall light colors dominant except from 1-0 to 40 where more than 40 clay bands occur.
						2		Z			34	Smear: 1-16 (coarse dark) 50% clay 10% opaques 30% zeolites Smear: 1-34 (dark bleb) 55% clay 15% opaques 25% zeolites 5% quartz Grain Size 1-60 10YR 6/2-4/2 0.2% sand 10YR 2/2 rare 8.5% silt 91.3% clay Carbon, Carbon-Carbonate 1-80 (0.1, 0.1, 0)
						3		VOID				10YR 6/2 and 10YR 7/4 10YR 2/2 minor
						4		VOID				10YR 6/2 10YR 7/4 trace 10YR 4/2
						5		Z				
						6		Z				
						7		Z				
						CC						

SITE 418 HOLE B CORE 22 CORED INTERVAL: 196.

TIME-ROCK UNIT	BIOSTRAT ZONE	FORAMS	NANNOS	RADS	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	ORILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
						1	0.5	Z			10YR 3/2	Zeolite clay Firm zeolitic clay, moderate to highly disturbed with alternating bands of grayish orange with coarse thin laminae of zeolite forming light pale orange (10YR 8/6) streaks. Also, there is a dusky to pale yellow brown (10YR 2/2-6/2-3/2) zeolitic clay with some microodule patches and streaks, especially in lower sections. In section 1 to 3, the light-dark colors are present with cm bands and moderately sharp to wavy contacts. No evidence of grading or turbidite.
						2		Z			90 106 138	Major lithology Smear: 1-90 (yellow brown) 20% clay 80% zeolites Smear 1-138 (dark) 50% clay 30% zeolites 20% opaques Other lithologies Smear: 1-106 (coarse, light beige) 20% clay 80% zeolites Grain Size 2-110 7-11 sand 30.4% silt 69.2% clay
						3		Z				10YR 7/4 + 10YR 6/2
						4		Z				10YR 4/2
						CC						

SITE 418 HOLE B CORE 24 CORED INTERVAL: 215.3-224.9 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
					0.5	7	Zeolitic clay	
				1	1.0	7	Extremely disturbed, light brown, hard zeolitic clay with moderate to light brown (10YR 6/2) to light brown (5YR 5/6) and some patches of moderate dusky yellow brown (10YR 2/2)	
						7	Grain Size 1-40 1.1% sand 16.9% silt 82.0% clay	
				CC			Carbon, Carbon-Carbonate 1-60 (0.0, 0.1, 0)	

SITE 418 HOLE B CORE 26 CORED INTERVAL: 34.4-244.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
	CENOMANIAN				1	VOID 7 7 7	5YR 4/4-5/4 10YR 4/2	
					2	7 7 7	Major lithology: Cyclic beds of firm, brownish zeolitic clay with dominant light bands of moderate brown (5YR 4/4-5/4) and minor dark yellow brown (10YR 4/2) or near the base more frequent dusky yellow brown (10YR 2/2). 32 cycles counted with cm-scale. Base to next lower unit marked by thin chert-a black hand band. 80% of this unit is ash of pale green (10G 5/2) zeolitic clay (non-carbonaceous).	
					3		Major lithology Smear: 1-96 (yellow brown) 50% clay 20% opaques 30% zeolites (cl) Smear: 1-92 (yellow-brown, darker) 50% clay 0% opaques 40% zeolites (cl) 1% fish debris 1% heavyes Smear: 1-129 (pale yellow brown) 45% clay 5% opaques 50% zeolites (cl) 1% fish debris	

SITE 418 HOLE B CORE 25 CORED INTERVAL: 224.9-234.4 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS				
					0.5	VOID 7	Zeolitic clay	
				1	1.0	7	Moderate to highly deformed, hard to firm zeolitic clay smearing as bedded color cycles with diffuse to light brown on a cm scale. Dominant colors are light brown (5YR 6/4-5/4) with lesser amounts of dusky yellow brown (10YR 2/2) (20%) cm bands. Scattered blebs of pale green clay, possibly ash, and one ash bed (1-18 to 20) also occur.	
					2	7	Major lithology (dusky yellowish brown) Smear: 1-96 50% clay 20% opaques 30% zeolites Minor lithology (pale green) Smear: 1-18 90% clay 5% opaques 5% quartz	
				CC			Carbon, Carbon-Carbonate 2-60 (0.1, 0.1, 0)	

SITE 418 HOLE B CORE 32 CORED INTERVAL: 291.4-301.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS			
LATE ALBIAN TO EARLY ALBIAN		Rg B	Rg B	Rg B	0.5		Disturbed mixture of hard, I: NANNOFOSSIL CHALK, RADOLARIA-NANNOFOSSIL CHALK, and NANNOFOSSIL-WALL, AND CHERT. Colors dominantly light greenish gray (56Y 8/1-9/1) to yellow gray (5Y 7/2) and drab (light green). Diffuse, on cm-scale with cyclic trends. 8 cycles. Coarse layers in green, radiolarian-rich, chert at 1-30 to 38 cm, moderate olive green with specks and bands of light greenish gray.
		Rg B	Rg B	Rg B	1.0		1-23 (light green) 5% clay 95% calc. nannofossils 1-67 (light brown) 15% clay 1% micromodules 84% calc. nannofossils 1-119 (light brown, coarse) 20% clay 1% micromodules 80% calc. nannofossils
		Rg B	Rg B	Rg B	3		1-61 (light green) 5% clay 95% calc. nannofossils 1-109 (coarse light green) 1-120 (dark red-brown, hard)
		Rg B	Rg B	Rg B	4		Grain Size 1-64 2.6% sand 31.6% silt 65.8% clay Carbon, Carbon-Carbonate 1-78 (8.6, 0.0, 71)

SITE 418 HOLE B CORE 31 CORED INTERVAL: 281.9-291.4 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER			SECTION METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMS	NANNOS	RADS			
LATE ALBIAN TO EARLY ALBIAN		Rg B	Rg B	Rg B	0.5		56 cyclic alternations of I: dominantly black CLAYSTONE (m-SR 7/1) rich coarse to fine, lvs. cc with indurated zones, nodules and ultrafine laminations. (1-18, 2-5, 2-23, 2-40, 2-90 - pyritic crumbly organic-rich, and phosphatic.) Sharp to transition contacts. Base usually sharper and top transitional to II: light green gray (10GY 5/1) to rusty yellow green (5GY 5/2) CLAY TO RUSTY YELLOW GREEN. Typically streaked with flattened, little drab to transitional contacts. Little drab to transitional deposition although possibly some. Flaser layering. Some beds seem to have coarser layering. Concentration at base. III: hard layers are cemented RADOLARIAN-SAND and IV: CHERT OR SILICEOUS GREEN MUDSTONES at base (3-120), speckled and bioturbated.
		Rg B	Rg B	Rg B	1.0		1-18 (major, very light green) 40% clay 30% micr. nannofossils 1% fish remains 1-104 (minor moderate brown) 85% clay 10% opaques 5% fish remains 2-56 (major, black, soft) 5% feldspar 75% clay 10% opaques 15% organics 2-118 (light green, coarse) 30% clay 70% radiolaria Grain Size 2-40 7% sand 42.6% silt 50.0% clay Carbon, Carbon-Carbonate 2-60 (0.5, 0.4, 0)
		Rg B	Rg B	Rg B	3		1-88 (major, light gray green) 70% clay 30% opal flakes 2-74 (black, hard) 50% clay 15% pyrite & opaques 18% calc. nannofossils 20% radiolaria 2% fish remains 2-117 (major, green, fine) 5% feldspar 84% clay 10% opaques 18% calc. nannofossils 5% radiolaria
		Rg B	Rg B	Rg B	4		Grain Size 2-40 7% sand 42.6% silt 50.0% clay Carbon, Carbon-Carbonate 2-60 (0.5, 0.4, 0)

SITE 418 HOLE B CORE 33 CORED INTERVAL: 301.0-310.5 m

TIME-ROCK UNIT	BIOSTRAZ ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
EARLY ALBIAN		B	1	0.5		<p>1-28 (red-brown clay)</p> <p>1-29 (dark brown, bottom turbidite?)</p> <p>80% clay</p> <p>5% pyrite opaques</p> <p>8% micromodules</p> <p>10% calc. nanofossils</p> <p>30% calc. nanofossils</p> <p>2% fish remains</p> <p>1-30 (dark brown-black)</p> <p>1-32 (brown)</p> <p>5% clay</p> <p>1% heavy mins.</p> <p>32% clay</p> <p>25% calc. debris</p> <p>15% pyrite opaques</p> <p>10% radiolaria</p> <p>2% carb. unsp.</p> <p>40% radiolaria</p> <p>5% plant debris</p> <p>5% fish remains</p> <p>1-51.5 (gray, top turb?)</p> <p>1-57 (gray brown, mid-cycle)</p> <p>25% quartz</p> <p>18% heavy mins.</p> <p>65% clay</p> <p>5% calc. nanofossils</p> <p>5% fish remains</p> <p>1-60 (dark brown, bottom of cycle)</p> <p>1-72 (light green, gray)</p> <p>20% opaques</p> <p>80% calc. nanofossils</p> <p>90% calc. nanofossils</p> <p>1-96 (green gray, coarse)</p> <p>1-118 (light greenish gray)</p> <p>60% calc. nanofossils</p> <p>20% clay</p> <p>TR opaques</p> <p>80% calc. nanofossils</p> <p>Grain Size</p> <p>1-70</p> <p>4-3% sand</p> <p>19.8% silt</p> <p>75.9% clay</p> <p>Carbon, Carbon-Carbonate</p> <p>1-80 (1.0, 0.1, 8)</p>
		B	2	1.0		<p>10YR 4/2, 5Y 5/6, 5B 5/7</p> <p>Interlayered lithologies of I: (0-25, 100-102 cm), multi-colored CHERTS OR SILICIFIED CHALKS AND CLAYSTONES. Dark yellow-brown, olive brown, medium bluish and gray brown, hard mudstones; 1-10 (25-32 cm), one cycle of FOSIL CLAY with coarse radiolaria and red-dish brown (5YR 3/4) clay plus light gray red-mottles. Nanofossil-rich in mid-zone. Other coarse laminae in core are also radiolarian-rich; 111: (50-62 cm), olive green gray (5Y 4/1) NANNO CHALK with microlaminations; 1V: (62-90 cm), 4 cycles burrowed NANNO MARL, each cycle has a thin basal coarse radiolaria lamina; (5Y 8/1) (90-135 cm), light greenish gray (5Y 8/1) clayey nanofossil chalk, hard, some streaks and burrows.</p> <p>Smears:</p> <p>1-28 (red-brown clay)</p> <p>1-29 (dark brown, bottom turbidite?)</p> <p>80% clay</p> <p>5% pyrite opaques</p> <p>8% micromodules</p> <p>10% calc. nanofossils</p> <p>30% calc. nanofossils</p> <p>2% fish remains</p> <p>1-30 (dark brown-black)</p> <p>1-32 (brown)</p> <p>5% clay</p> <p>1% heavy mins.</p> <p>32% clay</p> <p>25% calc. debris</p> <p>15% pyrite opaques</p> <p>10% radiolaria</p> <p>2% carb. unsp.</p> <p>40% radiolaria</p> <p>5% plant debris</p> <p>5% fish remains</p> <p>1-51.5 (gray, top turb?)</p> <p>1-57 (gray brown, mid-cycle)</p> <p>25% quartz</p> <p>18% heavy mins.</p> <p>65% clay</p> <p>5% calc. nanofossils</p> <p>5% fish remains</p> <p>1-60 (dark brown, bottom of cycle)</p> <p>1-72 (light green, gray)</p> <p>20% opaques</p> <p>80% calc. nanofossils</p> <p>90% calc. nanofossils</p> <p>1-96 (green gray, coarse)</p> <p>1-118 (light greenish gray)</p> <p>60% calc. nanofossils</p> <p>20% clay</p> <p>TR opaques</p> <p>80% calc. nanofossils</p> <p>Grain Size</p> <p>1-70</p> <p>4-3% sand</p> <p>19.8% silt</p> <p>75.9% clay</p> <p>Carbon, Carbon-Carbonate</p> <p>1-80 (1.0, 0.1, 8)</p>
		B	3	1.0		<p>1-28 (red-brown clay)</p> <p>1-29 (dark brown, bottom turbidite?)</p> <p>80% clay</p> <p>5% pyrite opaques</p> <p>8% micromodules</p> <p>10% calc. nanofossils</p> <p>30% calc. nanofossils</p> <p>2% fish remains</p> <p>1-30 (dark brown-black)</p> <p>1-32 (brown)</p> <p>5% clay</p> <p>1% heavy mins.</p> <p>32% clay</p> <p>25% calc. debris</p> <p>15% pyrite opaques</p> <p>10% radiolaria</p> <p>2% carb. unsp.</p> <p>40% radiolaria</p> <p>5% plant debris</p> <p>5% fish remains</p> <p>1-51.5 (gray, top turb?)</p> <p>1-57 (gray brown, mid-cycle)</p> <p>25% quartz</p> <p>18% heavy mins.</p> <p>65% clay</p> <p>5% calc. nanofossils</p> <p>5% fish remains</p> <p>1-60 (dark brown, bottom of cycle)</p> <p>1-72 (light green, gray)</p> <p>20% opaques</p> <p>80% calc. nanofossils</p> <p>90% calc. nanofossils</p> <p>1-96 (green gray, coarse)</p> <p>1-118 (light greenish gray)</p> <p>60% calc. nanofossils</p> <p>20% clay</p> <p>TR opaques</p> <p>80% calc. nanofossils</p> <p>Grain Size</p> <p>1-70</p> <p>4-3% sand</p> <p>19.8% silt</p> <p>75.9% clay</p> <p>Carbon, Carbon-Carbonate</p> <p>1-80 (1.0, 0.1, 8)</p>
		B	4	1.0		<p>1-28 (red-brown clay)</p> <p>1-29 (dark brown, bottom turbidite?)</p> <p>80% clay</p> <p>5% pyrite opaques</p> <p>8% micromodules</p> <p>10% calc. nanofossils</p> <p>30% calc. nanofossils</p> <p>2% fish remains</p> <p>1-30 (dark brown-black)</p> <p>1-32 (brown)</p> <p>5% clay</p> <p>1% heavy mins.</p> <p>32% clay</p> <p>25% calc. debris</p> <p>15% pyrite opaques</p> <p>10% radiolaria</p> <p>2% carb. unsp.</p> <p>40% radiolaria</p> <p>5% plant debris</p> <p>5% fish remains</p> <p>1-51.5 (gray, top turb?)</p> <p>1-57 (gray brown, mid-cycle)</p> <p>25% quartz</p> <p>18% heavy mins.</p> <p>65% clay</p> <p>5% calc. nanofossils</p> <p>5% fish remains</p> <p>1-60 (dark brown, bottom of cycle)</p> <p>1-72 (light green, gray)</p> <p>20% opaques</p> <p>80% calc. nanofossils</p> <p>90% calc. nanofossils</p> <p>1-96 (green gray, coarse)</p> <p>1-118 (light greenish gray)</p> <p>60% calc. nanofossils</p> <p>20% clay</p> <p>TR opaques</p> <p>80% calc. nanofossils</p> <p>Grain Size</p> <p>1-70</p> <p>4-3% sand</p> <p>19.8% silt</p> <p>75.9% clay</p> <p>Carbon, Carbon-Carbonate</p> <p>1-80 (1.0, 0.1, 8)</p>
		B	5	1.0		<p>1-28 (red-brown clay)</p> <p>1-29 (dark brown, bottom turbidite?)</p> <p>80% clay</p> <p>5% pyrite opaques</p> <p>8% micromodules</p> <p>10% calc. nanofossils</p> <p>30% calc. nanofossils</p> <p>2% fish remains</p> <p>1-30 (dark brown-black)</p> <p>1-32 (brown)</p> <p>5% clay</p> <p>1% heavy mins.</p> <p>32% clay</p> <p>25% calc. debris</p> <p>15% pyrite opaques</p> <p>10% radiolaria</p> <p>2% carb. unsp.</p> <p>40% radiolaria</p> <p>5% plant debris</p> <p>5% fish remains</p> <p>1-51.5 (gray, top turb?)</p> <p>1-57 (gray brown, mid-cycle)</p> <p>25% quartz</p> <p>18% heavy mins.</p> <p>65% clay</p> <p>5% calc. nanofossils</p> <p>5% fish remains</p> <p>1-60 (dark brown, bottom of cycle)</p> <p>1-72 (light green, gray)</p> <p>20% opaques</p> <p>80% calc. nanofossils</p> <p>90% calc. nanofossils</p> <p>1-96 (green gray, coarse)</p> <p>1-118 (light greenish gray)</p> <p>60% calc. nanofossils</p> <p>20% clay</p> <p>TR opaques</p> <p>80% calc. nanofossils</p> <p>Grain Size</p> <p>1-70</p> <p>4-3% sand</p> <p>19.8% silt</p> <p>75.9% clay</p> <p>Carbon, Carbon-Carbonate</p> <p>1-80 (1.0, 0.1, 8)</p>
		B	6	1.0		<p>1-28 (red-brown clay)</p> <p>1-29 (dark brown, bottom turbidite?)</p> <p>80% clay</p> <p>5% pyrite opaques</p> <p>8% micromodules</p> <p>10% calc. nanofossils</p> <p>30% calc. nanofossils</p> <p>2% fish remains</p> <p>1-30 (dark brown-black)</p> <p>1-32 (brown)</p> <p>5% clay</p> <p>1% heavy mins.</p> <p>32% clay</p> <p>25% calc. debris</p> <p>15% pyrite opaques</p> <p>10% radiolaria</p> <p>2% carb. unsp.</p> <p>40% radiolaria</p> <p>5% plant debris</p> <p>5% fish remains</p> <p>1-51.5 (gray, top turb?)</p> <p>1-57 (gray brown, mid-cycle)</p> <p>25% quartz</p> <p>18% heavy mins.</p> <p>65% clay</p> <p>5% calc. nanofossils</p> <p>5% fish remains</p> <p>1-60 (dark brown, bottom of cycle)</p> <p>1-72 (light green, gray)</p> <p>20% opaques</p> <p>80% calc. nanofossils</p> <p>90% calc. nanofossils</p> <p>1-96 (green gray, coarse)</p> <p>1-118 (light greenish gray)</p> <p>60% calc. nanofossils</p> <p>20% clay</p> <p>TR opaques</p> <p>80% calc. nanofossils</p> <p>Grain Size</p> <p>1-70</p> <p>4-3% sand</p> <p>19.8% silt</p> <p>75.9% clay</p> <p>Carbon, Carbon-Carbonate</p> <p>1-80 (1.0, 0.1, 8)</p>
		B	7	1.0		<p>1-28 (red-brown clay)</p> <p>1-29 (dark brown, bottom turbidite?)</p> <p>80% clay</p> <p>5% pyrite opaques</p> <p>8% micromodules</p> <p>10% calc. nanofossils</p> <p>30% calc. nanofossils</p> <p>2% fish remains</p> <p>1-30 (dark brown-black)</p> <p>1-32 (brown)</p> <p>5% clay</p> <p>1% heavy mins.</p> <p>32% clay</p> <p>25% calc. debris</p> <p>15% pyrite opaques</p> <p>10% radiolaria</p> <p>2% carb. unsp.</p> <p>40% radiolaria</p> <p>5% plant debris</p> <p>5% fish remains</p> <p>1-51.5 (gray, top turb?)</p> <p>1-57 (gray brown, mid-cycle)</p> <p>25% quartz</p> <p>18% heavy mins.</p> <p>65% clay</p> <p>5% calc. nanofossils</p> <p>5% fish remains</p> <p>1-60 (dark brown, bottom of cycle)</p> <p>1-72 (light green, gray)</p> <p>20% opaques</p> <p>80% calc. nanofossils</p> <p>90% calc. nanofossils</p> <p>1-96 (green gray, coarse)</p> <p>1-118 (light greenish gray)</p> <p>60% calc. nanofossils</p> <p>20% clay</p> <p>TR opaques</p> <p>80% calc. nanofossils</p> <p>Grain Size</p> <p>1-70</p> <p>4-3% sand</p> <p>19.8% silt</p> <p>75.9% clay</p> <p>Carbon, Carbon-Carbonate</p> <p>1-80 (1.0, 0.1, 8)</p>

SITE 418 HOLE B CORE 34 CORED INTERVAL: 310.5-320.0 m

TIME-ROCK UNIT	BIOSTRAZ ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
EARLY ALBIAN		B	1	0.5		<p>56Y 8/1</p> <p>Light greenish gray (56Y 8/1) NANNOFOSSIL OOLITE (0-2 cm); II: dominantly black to olive BLACK FRIBBLE CLAY with organic matter rich laminae and rads, discontinuous; soured clay with some coarse (radiolaria) laminae; IV: one module (16-17 cm) of hard cemented RADJOLARIA-SAND; V: bright grayish blue green 9586 6/6) NANNOFOSSIL CLAY; VI: three pieces of CHERT from the base olive green to green, replacement grain with relict structure, burrows, etc; one sprinkled with pyrite. Contacts are mostly sharp especially the base of black layers. No clear cyclicity except transition black to green.</p> <p>Major lithology</p> <p>Smear: 1-2 (light green)</p> <p>15% silic. micromodules</p> <p>60% calc. nanofossils</p> <p>2% detrital</p> <p>2% clay</p> <p>Smear: 1-11 (black clay)</p> <p>1% calc. nanofossils</p> <p>30% detrital</p> <p>30% clay</p> <p>TR detrital</p> <p>10% fish remains</p> <p>29% plant debris</p> <p>Other lithologies</p> <p>Smears:</p> <p>1-13 (gray, brown nodule)</p> <p>1-16 (black laminated)</p> <p>5% other</p> <p>15% opaques</p> <p>13% clay</p> <p>18% carb. unsp.</p> <p>2% calc. nanofossils</p> <p>60% rads</p> <p>1-21 (organic clay)</p> <p>1-26 (light green)</p> <p>10% other</p> <p>10% opaques</p> <p>5% heavy mins.</p> <p>45% clay</p> <p>5% zeolite?</p> <p>20% plant debris</p> <p>30% calc. nanofossils</p> <p>10% fish remains</p> <p>1-44</p> <p>13% other</p> <p>5% opaques</p> <p>40% clay</p> <p>30% chert</p> <p>2% calc. nanofossils</p> <p>10% rads</p>
		B	2	1.0		<p>56Y 8/1</p> <p>Light greenish gray (56Y 8/1) NANNOFOSSIL OOLITE (0-2 cm); II: dominantly black to olive BLACK FRIBBLE CLAY with organic matter rich laminae and rads, discontinuous; soured clay with some coarse (radiolaria) laminae; IV: one module (16-17 cm) of hard cemented RADJOLARIA-SAND; V: bright grayish blue green 9586 6/6) NANNOFOSSIL CLAY; VI: three pieces of CHERT from the base olive green to green, replacement grain with relict structure, burrows, etc; one sprinkled with pyrite. Contacts are mostly sharp especially the base of black layers. No clear cyclicity except transition black to green.</p> <p>Major lithology</p> <p>Smear: 1-2 (light green)</p> <p>15% silic. micromodules</p> <p>60% calc. nanofossils</p> <p>2% detrital</p> <p>2% clay</p> <p>Smear: 1-11 (black clay)</p> <p>1% calc. nanofossils</p> <p>30% detrital</p> <p>30% clay</p> <p>TR detrital</p> <p>10% fish remains</p> <p>29% plant debris</p> <p>Other lithologies</p> <p>Smears:</p> <p>1-13 (gray, brown nodule)</p> <p>1-16 (black laminated)</p> <p>5% other</p> <p>15% opaques</p> <p>13% clay</p> <p>18% carb. unsp.</p> <p>2% calc. nanofossils</p> <p>60% rads</p> <p>1-21 (organic clay)</p> <p>1-26 (light green)</p> <p>10% other</p> <p>10% opaques</p> <p>5% heavy mins.</p> <p>45% clay</p> <p>5% zeolite?</p> <p>20% plant debris</p> <p>30% calc. nanofossils</p> <p>10% fish remains</p> <p>1-44</p> <p>13% other</p> <p>5% opaques</p> <p>40% clay</p> <p>30% chert</p> <p>2% calc. nanofossils</p> <p>10% rads</p>
		B	3	1.0		<p>56Y 8/1</p> <p>Light greenish gray (56Y 8/1) NANNOFOSSIL OOLITE (0-2 cm); II: dominantly black to olive BLACK FRIBBLE CLAY with organic matter rich laminae and rads, discontinuous; soured clay with some coarse (radiolaria) laminae; IV: one module (16-17 cm) of hard cemented RADJOLARIA-SAND; V: bright grayish blue green 9586 6/6) NANNOFOSSIL CLAY; VI: three pieces of CHERT from the base olive green to green, replacement grain with relict structure, burrows, etc; one sprinkled with pyrite. Contacts are mostly sharp especially the base of black layers. No clear cyclicity except transition black to green.</p> <p>Major lithology</p> <p>Smear: 1-2 (light green)</p> <p>15% silic. micromodules</p> <p>60% calc. nanofossils</p> <p>2% detrital</p> <p>2% clay</p> <p>Smear: 1-11 (black clay)</p> <p>1% calc. nanofossils</p> <p>30% detrital</p> <p>30% clay</p> <p>TR detrital</p> <p>10% fish remains</p> <p>29% plant debris</p> <p>Other lithologies</p> <p>Smears:</p> <p>1-13 (gray, brown nodule)</p> <p>1-16 (black laminated)</p> <p>5% other</p> <p>15% opaques</p> <p>13% clay</p> <p>18% carb. unsp.</p> <p>2% calc. nanofossils</p> <p>60% rads</p> <p>1-21 (organic clay)</p> <p>1-26 (light green)</p> <p>10% other</p> <p>10% opaques</p> <p>5% heavy mins.</p> <p>45% clay</p> <p>5% zeolite?</p> <p>20% plant debris</p> <p>30% calc. nanofossils</p> <p>10% fish remains</p> <p>1-44</p> <p>13% other</p> <p>5% opaques</p> <p>40% clay</p> <p>30% chert</p> <p>2% calc. nanofossils</p> <p>10% rads</p>
		B	4	1.0		<p>56Y 8/1</p> <p>Light greenish gray (56Y 8/1) NANNOFOSSIL OOLITE (0-2 cm); II: dominantly black to olive BLACK FRIBBLE CLAY with organic matter rich laminae and rads, discontinuous; soured clay with some coarse (radiolaria) laminae; IV: one module (16-17 cm) of hard cemented RADJOLARIA-SAND; V: bright grayish blue green 9586 6/6) NANNOFOSSIL CLAY; VI: three pieces of CHERT from the base olive green to green, replacement grain with relict structure, burrows, etc; one sprinkled with pyrite. Contacts are mostly sharp especially the base of black layers. No clear cyclicity except transition black to green.</p> <p>Major lithology</p> <p>Smear: 1-2 (light green)</p> <p>15% silic. micromodules</p> <p>60% calc. nanofossils</p> <p>2% detrital</p> <p>2% clay</p> <p>Smear: 1-11 (black clay)</p> <p>1% calc. nanofossils</p> <p>30% detrital</p> <p>30% clay</p> <p>TR detrital</p> <p>10% fish remains</p> <p>29% plant debris</p> <p>Other lithologies</p> <p>Smears:</p> <p>1-13 (gray, brown nodule)</p> <p>1-16 (black laminated)</p> <p>5% other</p> <p>15% opaques</p> <p>13% clay</p> <p>18% carb. unsp.</p> <p>2% calc. nanofossils</p> <p>60% rads</p> <p>1-21 (organic clay)</p> <p>1-26 (light green)</p> <p>10% other</p> <p>10% opaques</p> <p>5% heavy mins.</p> <p>45% clay</p> <p>5% zeolite?</p> <p>20% plant debris</p> <p>30% calc. nanofossils</p> <p>10% fish remains</p> <p>1-44</p> <p>13% other</p> <p>5% opaques</p> <p>40% clay</p> <p>30% chert</p> <p>2% calc. nanofossils</p> <p>10% rads</p>
		B	5	1.0		<p>56Y 8/1</p> <p>Light greenish gray (56Y 8/1) NANNOFOSSIL OOLITE (0-2 cm); II: dominantly black to olive BLACK FRIBBLE CLAY with organic matter rich laminae and rads, discontinuous; soured clay with some coarse (radiolaria) laminae; IV: one module (16-17 cm) of hard cemented RADJOLARIA-SAND; V: bright grayish blue green 9586 6/6) NANNOFOSSIL CLAY; VI: three pieces of CHERT from the base olive green to green, replacement grain with relict structure, burrows, etc; one sprinkled with pyrite. Contacts are mostly sharp especially the base of black layers. No clear cyclicity except transition black to green.</p> <p>Major lithology</p> <p>Smear: 1-2 (light green)</p> <p>15% silic. micromodules</p> <p>60% calc. nanofossils</p> <p>2% detrital</p> <p>2% clay</p> <p>Smear: 1-11 (black clay)</p> <p>1% calc. nanofossils</p> <p>30% detrital</p> <p>30% clay</p> <p>TR detrital</p> <p>10% fish remains</p> <p>29% plant debris</p> <p>Other lithologies</p> <p>Smears:</p> <p>1-13 (gray, brown nodule)</p> <p>1-16 (black laminated)</p> <p>5% other</p> <p>15% opaques</p> <p>13% clay</p> <p>18% carb. unsp.</p> <p>2% calc. nanofossils</p> <p>60% rads</p> <p>1-21 (organic clay)</p> <p>1-26 (light green)</p> <p>10% other</p> <p>10% opaques</p> <p>5% heavy mins.</p> <p>45% clay</p> <p>5% zeolite?</p> <p>20% plant debris</p> <p>30% calc. nanofossils</p> <p>10% fish remains</p> <p>1-44</p> <p>13% other</p> <p>5% opaques</p> <p>40% clay</p> <p>30% chert</p> <p>2% calc. nanofossils</p> <p>10% rads</p>
		B	6	1.0		<p>56Y 8/1</p> <p>Light greenish gray (56Y 8/1) NANNOFOSSIL OOLITE (0-2 cm); II: dominantly black to olive BLACK FRIBBLE CLAY with organic matter rich laminae and rads, discontinuous; soured clay with some coarse (radiolaria) laminae; IV: one module (16-17 cm) of hard cemented RADJOLARIA-SAND; V: bright grayish blue green 9586 6/6) NANNOFOSSIL CLAY; VI: three pieces of CHERT from the base olive green to green, replacement grain with relict structure, burrows, etc; one sprinkled with pyrite. Contacts are mostly sharp especially the base of black layers. No clear cyclicity except transition black to green.</p> <p>Major lithology</p> <p>Smear: 1-2 (light green)</p> <p>15% silic. micromodules</p> <p>60% calc. nanofossils</p> <p>2% detrital</p> <p>2% clay</p> <p>Smear: 1-11 (black clay)</p> <p>1% calc. nanofossils</p> <p>30% detrital</p> <p>30% clay</p> <p>TR detrital</p> <p>10% fish remains</p> <p>29% plant debris</p> <p>Other lithologies</p> <p>Smears:</p> <p>1-13 (gray, brown nodule)</p> <p>1-16 (black laminated)</p> <p>5% other</p> <p>15% opaques</p> <p>13% clay</p> <p>18% carb. unsp.</p> <p>2% calc. nanofossils</p> <p>60% rads</p> <p>1-21 (organic clay)</p> <p>1-26 (light green)</p> <p>10% other</p> <p>10% opaques</p> <p>5% heavy mins.</p> <p>45% clay</p> <p>5% zeolite?</p> <p>20% plant debris</p> <p>30% calc. nanofossils</p> <p>10% fish remains</p> <p>1-44</p> <p>13% other</p> <p>5% opaques</p> <p>40% clay</p> <p>30% chert</p> <p>2% calc. nanofossils</p> <p>10% rads</p>
		B	7	1.0		<p>56Y 8/1</p> <p>Light greenish gray (56Y 8/1) NANNOFOSSIL OOLITE (0-2 cm); II: dominantly black to olive BLACK FRIBBLE CLAY with organic matter rich laminae and rads, discontinuous; soured clay with some coarse (radiolaria) laminae; IV: one module (16-17 cm) of hard cemented RADJOLARIA-SAND; V: bright grayish blue green 9586 6/6) NANNOFOSSIL CLAY; VI: three pieces of CHERT from the base olive green to green, replacement grain with relict structure, burrows, etc; one sprinkled with pyrite. Contacts are mostly sharp especially the base of black layers. No clear cyclicity except transition black to green.</p> <p>Major lithology</p> <p>Smear: 1-2 (light green)</p> <p>15% silic. micromodules</p> <p>60% calc. nanofossils</p> <p>2% detrital</p> <p>2% clay</p> <p>Smear: 1-11 (black clay)</p> <p>1% calc. nanofossils</p> <p>30% detrital</p> <p>30% clay</p> <p>TR detrital</p> <p>10% fish remains</p> <p>29% plant debris</p> <p>Other lithologies</p> <p>Smears:</p> <p>1-13 (gray, brown nodule)</p> <p>1-16 (black laminated)</p> <p>5% other</p> <p>15% opaques</p> <p>13% clay</p> <p>18% carb. unsp.</p> <p>2% calc. nanofossils</p> <p>60% rads</p> <p>1-21 (organic clay)</p> <p>1-26 (light green)</p> <p>10% other</p> <p>10% opaques</p> <p>5% heavy mins.</p> <p>45% clay</p> <p>5% zeolite?</p> <p>20% plant debris</p> <p>30% calc. nanofossils</p> <p>10% fish remains</p> <p>1-44</p> <p>13% other</p> <p>5% opaques</p> <p>40% clay</p> <p>30% chert</p> <p>2% calc. nanofossils</p> <p>10% rads</p>

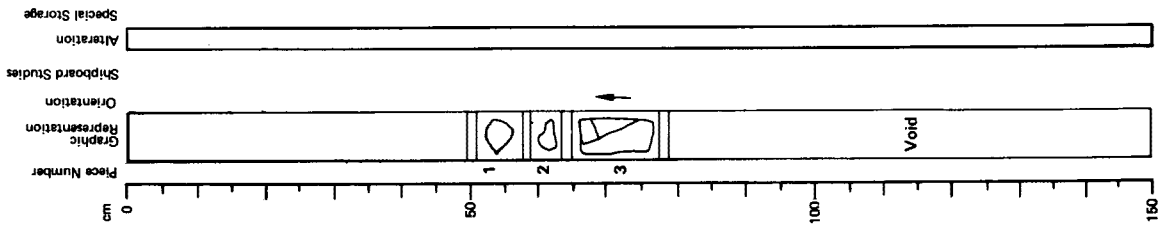
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
53	418B	E	34	1

Visual Description
 0-64 cm: clay, nanno-chalk, sand and chert (described in sediment section). Pieces 3: altered plagioclase-phyric basalt with chilled margin. Groundmass fine-grained, microclitic, locally altered to smectite. Altered plagioclase phenocrysts 5%, < 3 mm. Calcite-filled vesicles < 1%, 1 mm. Veins filled by calcite and smectite.

Shipboard Data
 Magnetic Data: 70-71 cm
 NRM Intensity (emu/cc) 22.22 x 10⁻³
 NRM Inclination +41.6°
 Stable Inclination +41.8°

Physical Property Data:
 Vp (km/sec) 4.13
 Wet Bulk Density (g/cc) 2.61



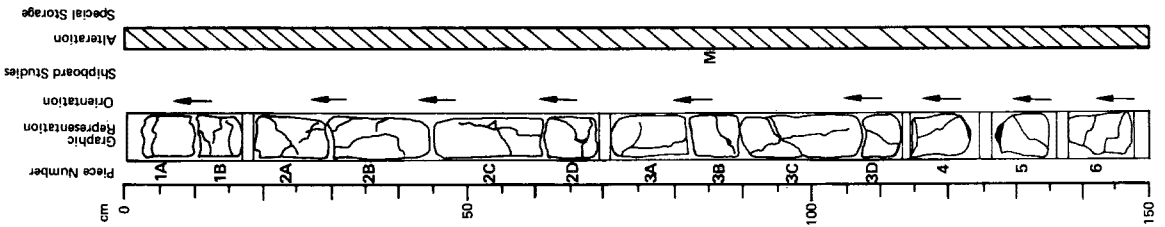
VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

LEG	SITE	H O	CORE	SECT.
53	418B	E	35	1

Visual Description
 Moderately to strongly altered plagioclase-phyric basalt with glassy chilled margins in pieces 4 and 5. Groundmass fine-grained, microclitic. Plagioclase phenocrysts 7%, < 5 mm. Plagioclase matrix 10%. Calcite-filled vesicles 1%, < 1 mm. Veins common, filled by calcite, pyrite and dark green, yellow or brown smectite.

Shipboard Data
 Magnetic Data: 85-86 cm
 NRM Intensity (emu/cc) 14.63 x 10⁻³
 NRM Inclination +29.3°
 Stable Inclination +29.8°

Physical Property Data:
 Vp (km/sec) 5.32
 Wet Bulk Density (g/cc) 2.84



LEG	SITE	HOLE	CORE	SECT.
53	418B	35	3	3

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Moderately altered plagioclase-phyric basalt with glassy chilled margins in pieces 1, 5, 6A, 8, 10 and 11. Basalt dark grey, altered to brown along veins and cracks. Groundmass aphanitic to fine-grained with fresh plagioclase microlites. Glass relatively fresh except along cracks. Plagioclase phenocrysts 8%, <5 mm. Vesicles <1%, <1 mm, filled by calcite and smectite. Veins commonly filled by calcite, dark smectite and minor pyrite. Piece 4A contains irregular leached cavities filled by calcite.

Thin Section Description

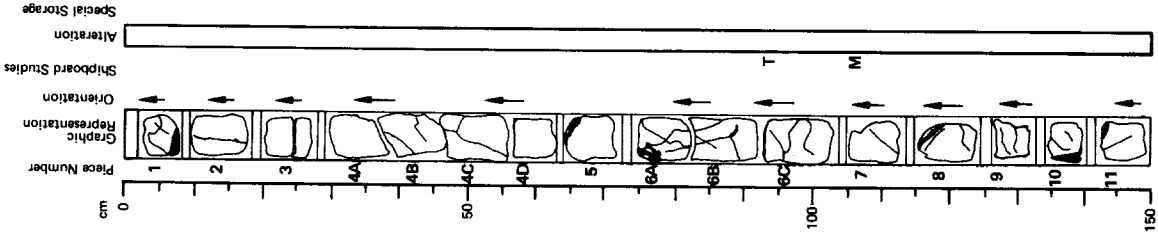
Location: near chilled margin, 103 cm
 Texture: cryptocrystalline, variolitic
 Phenocrysts: altered olivine <1%; plagioclase 10%, 0.3-3 mm, euhedral with devitrified glass inclusions; spinel rare, found as inclusions in plagioclase.
 Groundmass: plagioclase laths and dendritic clinopyroxene 80%; minor granular opaques.
 Vesicles: <1%, filled by smectite, minor calcite.
 Alteration: olivine replaced by calcite and smectite; veins filled by calcite and smectite.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 117-118 cm
 23.86 x 10⁻³
 NRM Inclination +34.9°
 Stable Inclination +35.1°

Physical Property Data:

Vp (km/sec) 118-120 cm
 5.82
 Wet Bulk Density (g/cc) 2.88



LEG	SITE	HOLE	CORE	SECT.
53	418B	35	3	2

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Slightly to moderately altered phyric pillow basalt with numerous glassy margins. Groundmass aphanitic to fine-grained. Plagioclase phenocrysts 8%, <6 mm; olivine phenocrysts <1%, <2 mm, replaced by calcite, smectite. Vesicles <1%, <1 mm. Veins filled by smectite and calcite.

Thin Section Description

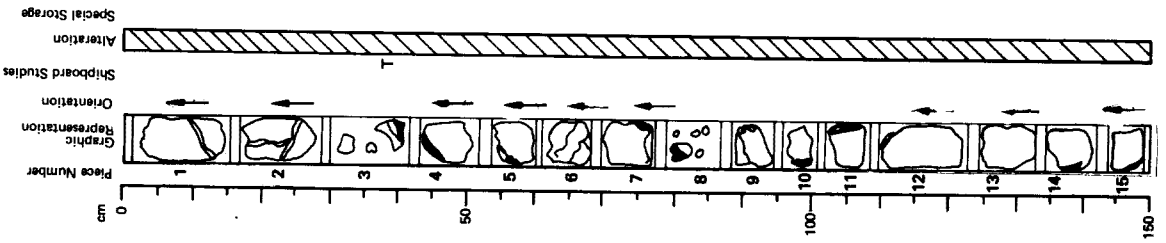
Location: glassy margin, 38 cm
 Texture: porphyritic, glassy to variolitic
 Phenocrysts: fresh to partially altered olivine <1%, 0.1-0.7 mm, euhedral; plagioclase 7%, 0.3-2.2 mm, occasionally with glass inclusions.
 Groundmass: glass 92%.
 Vesicles: 1%, filled by green smectite.
 Alteration: calcite in veins and with smectite after olivine.

Shipboard Data

Magnetic Data:
 NRM Intensity (emu/cc) 143-144 cm
 19.70 x 10⁻³
 NRM Inclination +34.2°
 Stable Inclination +34.4°

Physical Property Data:

Vp (km/sec) 144-146 cm
 5.64
 Wet Bulk Density (g/cc) 2.90

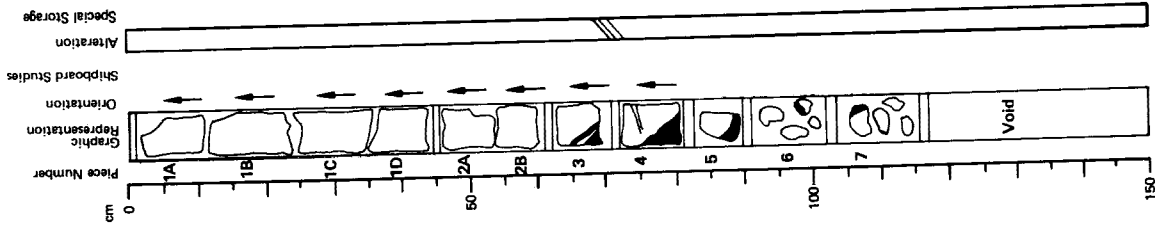


LEG	SITE	HOLE	CORE	SECT.
5	4	18	B	3
				5

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Sparsely to moderately plagioclase phyric basalt with glassy chilled margins in pieces 3-6. Groundmass glassy to interstitial. Plagioclase phenocrysts <5%, <4 mm. Smectite-filled vesicles <1%, <0.1 mm. Veins filled by calcite and smectite.



LEG	SITE	HOLE	CORE	SECT.
5	4	18	B	3
				4

VISUAL CORE DESCRIPTION FOR IGNEOUS ROCKS

Visual Description

Slightly altered, sparsely to moderately phyric basalt. Groundmass interstitial. Plagioclase phenocrysts <5%, <4 mm; olivine phenocrysts <1%, <1 mm, completely altered to smectite. Vesicles <1%, 0.5 mm, filled by smectite + cores of calcite and minor pyrite. Veins filled by smectite, calcite and pyrite. Piece 2 locally strongly altered, contains white and green microcline, calcite, minor pyrite and chalcodony(?). Piece 3 is composed entirely of large calcite crystals in a secondary (sedimentary?) matrix of smectite and chalcodony.

