INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 65

GULF OF CALIFORNIA

0 cm

24 cm

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

Cover Caption

Hole 482C-10-1, 0–24 cm: Hydrothermal vein in massive basalt lined with chalcopyrite, pyrite, calcite and zeolites. A pronounced alteration halo containing smectite and zeolites extends approximately 2 cm into the basalt, while a more diffuse halo characterized by sulfide vesicle fillings extends to the edge of the core.

UNIVERSITY OF CALIFORNIA, SAN DIEGO

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

SCRIPPS INSTITUTION OF OCEANOGRAPHY LA JOLLA, CALIFORNIA 92093

Deep Sea Drilling Project

June 30, 1980

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,

Matthew H. Salisbury
Chief Scientist's Office
Deep Sea Drilling Project

MHS:eb

INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 65

20 JANUARY — 13 MARCH 1979

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
Department of Oceanography, Texas A & M University
University of Washington
Woods Hole Oceanographic Institution
National Environment Research Council, London
Centre National Pour L'Exploitation Des Oceans, Paris
Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover
Ocean Research Institute, University of Tokyo
USSR Academy of Sciences, P. P. Shirshov Institute of Oceanology, Moscow

---

PARTICIPATING SCIENTISTS

Brian T. R. Lewis, Paul Robinson, Richard N. Benson, Grant Blackinton, Pierre Cambon, Ron Day, Frederick K. Duennebier, Martin Flower, Mario Gutierrey-Estrada, John G. Hattner, Albert M. Kudo, M. Ann Morrison, Claude Rangin, Matthew H. Salisbury, Hans Schmincke, Ralph Stephen, and Boris Zolotarev

5

INITIAL CORE DESCRIPTIONS

LEG 65

TABLE OF CONTENTS

INITIAL CORE DESCRIPTIONS
LEG 65
BACKGROUND AND OBJECTIVES

The principal objective of Leg 65 was to drill a deep hole in the oceanic crust near the crest of the fast-spreading East Pacific Rise. Drilling was planned near the mouth of the Gulf of California where high sedimentation rates make it possible to spud into nearly "zero age" crust and where refraction studies had indicated that the crust has relatively high *in situ* compressional wave velocities, similar to those of old oceanic crust in the Atlantic Ocean successfully drilled at Sites 417 and 418. If this objective could not be met, it was then planned to complete the transect across the mouth of the Gulf of California begun on Legs 63 (Site 473) and 64 (Site 474).

Leg 65 departed San Pedro, California, on 20 January 1979 and arrived in Mazatlan, Mexico, on 13 March, 1979. Four sites were occupied (Figure 1) and a total of 15 holes were drilled (Tables 1 and 2), of which 8 reached basement (Figure 2). Re-entry holes were started at Sites 482 and 483, but both were lost because of operational problems.

GEOLOGIC SUMMARIES

SITE 482

Site 482 (GCA-1) lies about 12 km east of the axis of the East Pacific Rise and about 15 km south of the Tamayo Fracture Zone. The age of the crust as determined from magnetic anomalies is about 0.5 m.y., and the sediment thickness from reflection data is about 150 meters. The principal objectives of this site were to drill a deep re-entry hole into young oceanic crust, to log the hole and to install a downhole seismometer into the crust to record natural seismicity for a two-month period.

Seven holes were drilled at Site 482, only four of which reached basement. Hole 482 recovered only a mudline core, 482A was drilled to 44 meters, and 482B to 229.0 meters. Hole 482C was a single bit hole drilled from 44.5 to 186.5 meters for emplacement of the Hawaiian downhole seismometer. The first re-entry hole, 482D, was drilled to a depth of 186.5 meters before the pipe became stuck and had to be blown off. Hole 482E recovered no core, being washed to a depth of 48.5 meters while attempting to set casing for a new re-entry hole. Finding that the casing could not be washed down to full depth in Hole E, it was pulled out and washed down again in Hole F. Hole F was then cored from 49 to 56.5 meters, washed from 56.5 to 113.5 meters, and then continuously cored to 145 meters.

The principal holes, 482B, C, and D are about 100 meters apart and lie along a line roughly at right angles to the ridge axis and to the axis of the sediment pond in which the site is located, Hole D being closest to the pond axis.

Approximately 137 meters of sediment overlie acoustic basement at this site (Figure 2). The sediments are predominantly olive gray, hemipelagic clay to silty clay with an average composition of 60–70% clay, 30–35% silt, and 0–5% sand. Biogenic material includes calcareous nannofossils, foraminifers, radiolarians, and diatoms. Rare layers of silty sand with abundant detrital minerals and reworked foraminifers are interpreted as fine-grained turbidites. These layers contain abundant quartz and feldspar and lesser quantities of amphibole, mica, zircon and tourmaline, all indicative of a continental source. The turbidites were probably derived from sediment previously deposited on the continental shelf and slope of the Mexican mainland. Sands and silty sands are somewhat more abundant in the section cored in Hole D than in the other holes, suggesting that turbidite deposition was greatest along the axis of the sediment pond.

Recovery of the basal sediments above basement was poor but sediments near the contact show some induration and dehydration. The top of the basalt was usually marked by a glassy rim but no clear evidence of baking in the sediments was observed. Pyrite and dolomite rhombs increase downward in the lower 3.5 meters of sediment and in Hole C several layers of dolostone occur just above the basement contact.

All of the cored sediments above basement are probably Quaternary. The absence of the radiolarian species *Druppatractus acquilonius*, which occurs nearby at Site 475 of Leg 64, suggests an age of less than 310,000 years B. P. Nannofossils could fall into either zone NN21 beginning at 250,000 years B. P. or zone NN20, beginning about 400,000 years B. P.

Based on a maximum age of between 250,000 and 400,000 years, the calculated sedimentation rate ranges from a minimum of 343 m/m.y. to a maximum of 548 m/m.y.

Numerous pieces of mudstone and siltstone were recovered within basement and many are indurated or dolomitized. These generally are poorly recovered because they are washed during drilling. Sedimentary layers were inferred only where sediments were actually recovered from a given interval, and the drilling rate was used to determine probable thickness. Layers identified in this way range from 0.5–4.0 meters in thickness, and are distributed throughout the entire drilled section.

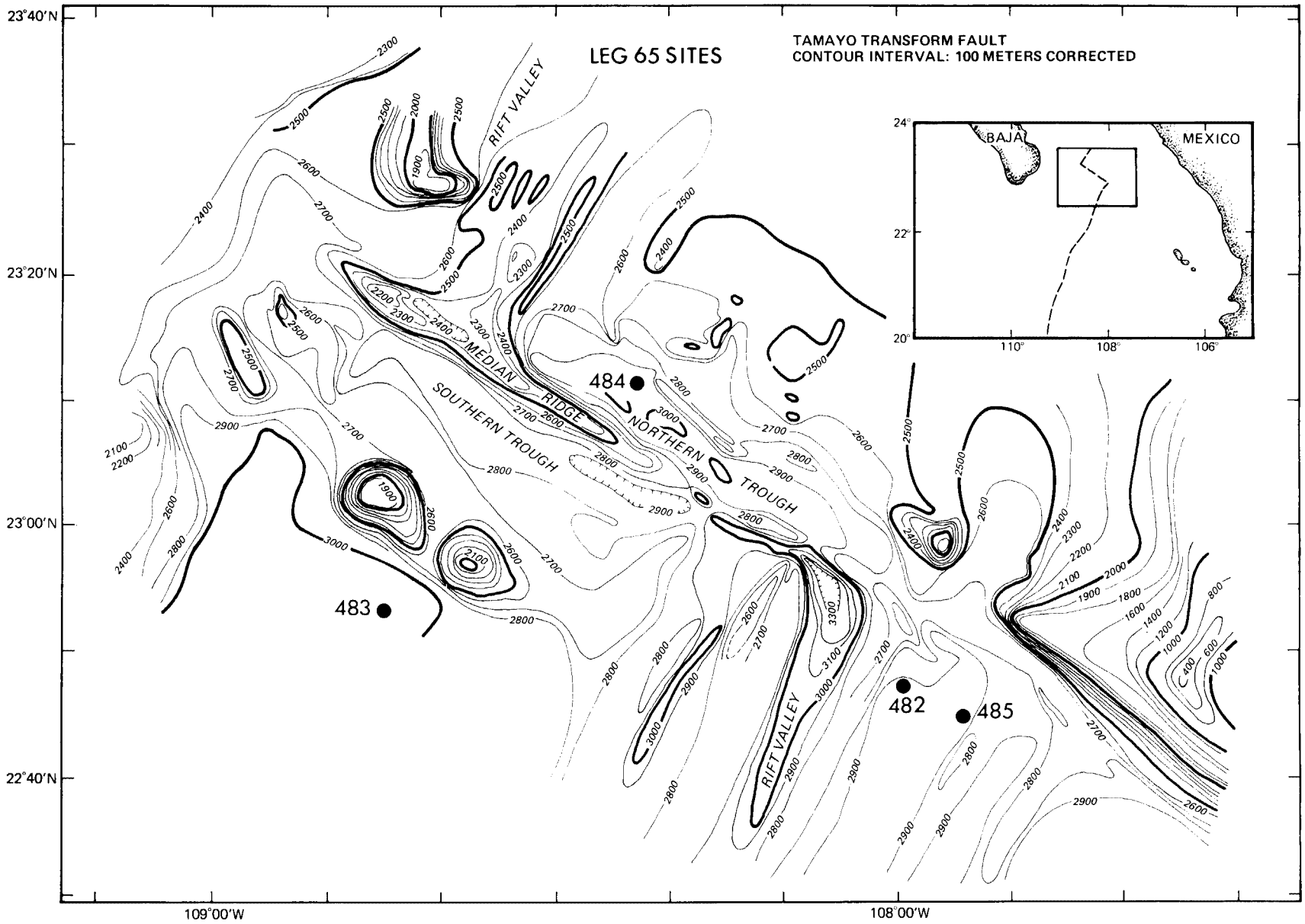


Figure 1. Locations of sites drilled on Leg 65.

LEG 65

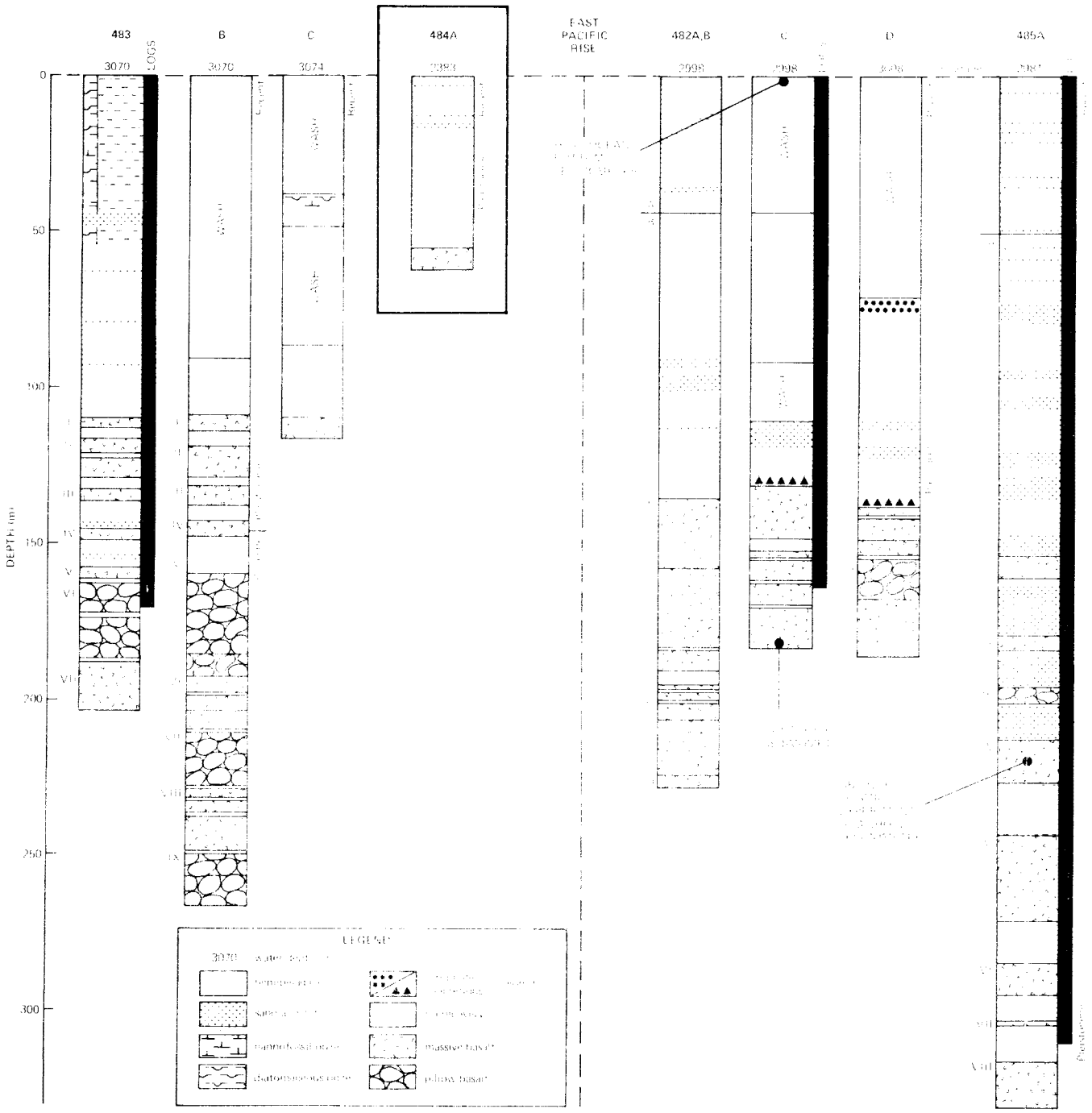


Figure 2. Lithologic columns for holes drilled on Leg 65.

TABLE 1
Leg 65 Coring Summary

Hole	Date (1979)	Latitude	Longitude	Water * Depth (m)	Penetration (m)	No. of Cores	Meters Cored	Meters Recovered	Per Cent of Recovery
482	24–25 January	22°47.38'N	107°59.63'W	2998	4.0	1	4.0	3.94	99
482A	25 January	22°47.38'N	107°59.60'W	2998	44.0	5	44.0	33.25	76
482B	25–29 January	22°47.38'N	107°59.60'W	2998	229.0	24	185.0	99.87	54
482C	29 January–3 February	22°47.34'N	107°59.57'W	2998	184.0	15	120.5	84.56	70
482D	3–8 February	22°47.31'N	107°59.51'W	3008	186.5	13	115.0	64.41	56
482E	8–10 February	22°47.37'N	107°59.56'W	3008	48.5	0	0.0	0.00	0
482F	10–12 February	22°47.36'N	107°59.61'W	3008	145.0	5	39.0	16.07	41
483	12–17 February	22°53.00'N	108°44.90'W	3070	204.5	26	204.5	110.92	54
483A	17 February	22°52.99'N	108°44.84'W	3070	0.0	0	0.0	0.00	0
483B	18 February–3 March	22°52.99'N	108°44.84'W	3070	267.0	32	175.5	91.59	52
483C	21–22 February	22°52.98'N	108°44.58'W	3070	114.0	4	37.5	26.24	70
484	3 March	23°11.32'N	108°23.60'W	2891	5.0	1	5.0	5.0	100
484A	3–4 March	23°11.15'N	108°23.62'W	2883	62.0	8	62.0	41.15	67
485	5–6 March	22°44.95'N	107°54.21'W	2981	50.5	6	50.5	36.93	73
485A	6–12 March	22°44.92'N	107°54.23'W	2981	331.0	39	280.5	136.10	49
					Total	179	1323.0	750.43	57

*Water depth from sea level

TABLE 2
Coring Summary for Sites 482, 483, 484, and 485

Core No.	Date	Local Time	Depth from Drill Floor (m) Top	Depth from Drill Floor (m) Bottom	Depth below Sea Floor (m) Top	Depth below Sea Floor (m) Bottom	Length Cored (m)	Length Recovered (m)	Per Cent Recovery
HOLE 482									
1	1 25 79	0514	3012.0	3021.0	0.0	4.0	4.0	3.94	99
HOLE 482A									
1	1 25 79	1028	3015.0	3021.0	0.0	6.0	6.0	5.99	100
2	1 25 79	1125	3021.0	3030.5	6.0	15.5	9.5	9.50	100
3	1 25 79	1225	3030.5	3040.0	15.5	25.0	9.5	7.45	78
4	1 25 79	1325	3040.0	3049.5	25.0	34.5	9.5	8.53	90
5	1 25 79	1419	3049.5	3059.0	34.5	44.0	9.5	7.78	82
HOLE 482B									
1	1 25 79	1916	3059.0	3068.5	44.0	53.5	9.5	7.26	76
2	1 26 79	2019	3068.5	3078.0	53.5	63.0	9.5	6.43	68
3	1 26 79	2126	3078.0	3087.5	63.0	72.5	9.5	0.10	1
4	1 26 79	2228	3087.5	3097.0	72.5	82.0	9.5	4.26	45
	Heat Flow Measurement								
5	1 26 79	0105	3097.0	3106.5	82.0	91.5	9.5	4.68	41
6	1 26 79	0225	3106.5	3116.0	91.5	101.0	9.5	8.09	85
7	1 26 79	0335	3116.0	3125.5	101.0	110.5	9.5	2.68	28
8	1 26 79	0450	3125.5	3135.0	110.5	120.0	9.5	7.04	74
	Heat Flow Measurement								
9	1 26 79	0725	3135.0	3144.5	120.0	129.5	9.5	9.13	96
10	1 26 79	0931	3144.5	3152.0	129.5	137.0	7.5	9.58	128
11	1 26 79	1236	3152.0	3154.0	137.0	139.0	2.0	2.67	134
12	1 26 79	1705	3154.0	3159.0	139.0	144.0	5.0	2.59	52
13	1 26 79	1941	3159.0	3163.0	144.0	148.0	4.0	2.11	53
14	1 26 79	2326	3163.0	3172.0	148.0	157.0	9.0	3.55	39
15	1 27 79	0410	3172.0	3181.0	157.0	166.0	9.0	5.50	61
16	1 26 79	1024	3181.0	3190.0	166.0	175.0	9.0	5.52	61
17	1 26 79	1409	3190.0	3199.0	175.0	184.0	9.0	2.39	27
18	1 27 79	2009	3199.0	3208.0	184.0	193.0	9.0	1.86	21
19	1 26 79	2245	3208.0	3212.5	193.0	197.5	4.5	1.50	33
20	1 28 79	0250	3212.5	3217.0	197.5	202.0	4.5	3.16	70
21	1 28 79	0920	3217.0	3226.0	202.0	211.0	9.0	3.11	35
22	1 28 79	1416	3226.0	3235.0	211.0	220.0	9.0	4.21	47
23	1 28 79	1534	3235.0	3239.5	220.0	224.5	4.5	0.23	5
24	1 28 79	1806	3239.5	3244.0	224.5	229.0	4.5	3.00	67
HOLE 482C									
1	1 30 79	1351	3059.5	3069.0	44.5	54.0	9.5	3.24	34
2	1 30 79	1608	3069.0	3078.5	54.0	63.5	9.5	4.31	45
3	1 30 79	1712	3078.5	3088.0	63.5	73.0	9.5	9.65	102
4	1 30 79	1820	3088.0	3097.5	73.0	82.5	9.5	9.42	99
5	1 30 79	2035	3097.5	3107.0	82.5	92.0	9.5	9.73	102
	Wash		3107.0	3126.0	92.0	111.0			
6	1 30 79	2315	3126.0	3135.5	111.0	120.5	9.5	7.83	82
7	1 31 79	0200	3135.5	3145.0	120.5	130.0	9.5	9.42	99
8	1 31 79	0350	3145.0	3147.0	130.0	132.0	2.0	1.67	84
9	1 31 79	0610	3147.0	3154.0	132.0	139.0	7.0	1.31	19
10	1 31 79	1237	3154.0	3163.0	139.0	148.0	9.0	3.70	41
11	1 31 79	1849	3163.0	3172.0	148.0	157.0	9.0	5.28	59
12	1 31 79	2241	3172.0	3176.5	157.0	161.5	4.5	2.99	66
13	2 1 79	0338	3176.5	3181.0	161.5	166.0	4.5	3.80	84
14	2 1 79	1025	3181.0	3190.0	166.0	175.0	9.0	6.21	69
15	2 1 79	2023	3190.0	3199.0	175.0	184.0	9.0	6.0	67
HOLE 482D									
1	2 4 79	2329	3083.5	3093.0	71.5	81.0	9.5	9.79	103
2	2 5 79	0058	3093.0	3102.5	81.0	90.5	9.5	6.08	64
3	2 5 79	0227	3102.5	3112.0	90.5	100.0	9.5	9.60	101
4	2 5 79	0340	3112.0	3121.5	100.0	109.5	9.5	4.00	42
5	2 5 79	0445	3121.5	3131.0	109.5	119.0	9.5	3.17	33
6	2 5 79	0603	3131.0	3140.5	119.0	128.5	9.5	7.32	77
7	2 5 79	0740	3140.5	3150.0	128.5	138.0	9.5	4.76	50
8	2 6 79	1238	3150.0	3153.5	138.0	141.5	3.5	1.50	43
9	2 6 79	1716	3153.5	3162.5	141.5	150.5	9.0	3.65	41
10	2 6 79	2226	3162.5	3171.5	150.5	159.5	9.0	3.80	42
11	2 7 79	0500	3171.5	3180.5	159.5	168.5	9.0	3.27	36
12	2 7 79	1230	3180.5	3189.5	168.5	177.5	9.0	4.24	47
13	2 7 79	1625	3189.5	3198.5	177.5	186.5	9.0	3.23	36
HOLE 482E									
	2 9 79	Hole drilled to 48.5 meters, nothing cored, nothing recovered							
HOLE 482F									
1	2 10 79	1128	3064.0	3071.5	49.0	56.5	7.5	0.00	0
	Wash		3071.5	3128.5	56.5	113.5			
2	2 10 79	1450	3128.5	3138.0	113.5	123.0	9.5	4.22	44
3	2 10 79	1600	3138.0	3147.5	123.0	132.5	9.5	7.04	74
4	2 10 79	1823	3147.5	3157.0	132.5	142.0	9.5	3.31	35
5	2 10 79	2223	3157.0	3160.0	142.0	145.0	3.0	1.50	50
HOLE 483									
1	2 13 79	0042	3084.0	3085.0	0.0	1.0	1.0	0.50	50
2	2 13 79	0146	3085.0	3094.5	1.0	10.5	9.5	4.60	48
3	2 13 79	0245	3094.5	3104.0	10.5	20.0	9.5	6.00	63
4	2 13 79	0345	3104.0	3113.5	20.0	29.5	9.5	4.40	46
5	2 13 79	0445	3113.5	3123.0	29.5	39.0	9.5	7.61	80
6	2 13 79	0555	3123.0	3132.5	39.0	48.5	9.5	4.55	48
7	2 13 79	0650	3132.5	3142.0	48.5	58.0	9.5	6.96	73
8	2 13 79	0755	3142.0	3151.5	58.0	67.5	9.5	5.74	60
9	2 13 79	0902	3151.5	3161.0	67.5	77.0	9.5	9.64	101
10	2 13 79	1011	3161.0	3170.5	77.0	86.5	9.5	2.75	29
11	2 13 79	1250	3170.5	3180.0	86.5	96.0	9.5	7.31	77
12	2 13 79	1350	3180.0	3189.5	96.0	105.5	9.5	9.81	103
13	2 13 79	1653	3189.5	3199.0	105.5	115.0	9.5	4.67	49
14	2 13 79	2327	3199.0	3208.0	115.0	124.0	9.0	2.28	25
15	2 14 79	0105	3208.0	3217.0	124.0	133.0	9.0	3.32	37
16	2 14 79	1111	3217.0	3226.0	133.0	142.0	9.0	2.76	31
17	2 14 79	1520	3226.0	3235.0	142.0	151.0	9.0	3.00	33
18	2 14 79	1951	3235.0	3244.0	151.0	160.0	9.0	4.95	55
19	2 15 79	0112	3244.0	3253.0	160.0	169.0	9.0	0.07	1
20	2 15 79	0745	3253.0	3262.0	169.0	178.0	9.0	1.79	20
21	2 15 79	1157	3262.0	3266.5	178.0	182.5	4.5	3.00	67
22	2 15 79	1706	3266.5	3271.0	182.5	187.0	4.5	4.86	108
23	2 15 79	2232	3271.0	3275.5	187.0	191.5	4.5	2.50	56
24	2 16 79	0240	3275.5	3280.0	191.5	196.0	4.5	2.15	48
25	2 16 79	1052	3280.0	3284.0	196.0	200.0	4.0	1.90	48
26	2 16 79	1511	3284.0	3288.5	200.0	204.5	4.5	3.80	84
HOLE 483A									
	2 17 79	Hole drilled to 60.0 meters, nothing cored, nothing recovered							

Core No.	Date	Local Time	Depth from Drill Floor (m) Top	Depth from Drill Floor (m) Bottom	Depth below Sea Floor (m) Top	Depth below Sea Floor (m) Bottom	Length Cored (m)	Length Recovered (m)	Per Cent Recovery
HOLE 483B									
1	2 19 79	0210	3176.5	3185.0	91.5	101.0	9.5	7.51	79
2	2 19 79	0550	3185.0	3194.5	101.0	110.5	9.5	9.78	103
3	2 19 79	1200	3194.5	3203.5	110.5	119.5	9.0	1.23	14
4	2 19 79	1809	3203.5	3211.0	119.5	127.0	7.5	8.07	108
5	2 22 79	2137	3211.0	3214.0	127.0	130.0	3.0	0.00	0
6	2 23 79	0227	3214.0	3217.0	130.0	133.0	3.0	0.00	0
7	2 23 79	0748	3217.0	3221.5	133.0	137.5	4.5	3.24	72
8	2 23 79	1148	3221.5	3230.5	137.5	146.5	9.0	3.17	35
9	2 23 79	1347	3230.5	3235.0	146.5	151.0	4.5	0.30	7
10	2 23 79	1645	3235.0	3244.0	151.0	160.0	9.0	0.00	0
11	2 23 79	2343	3244.0	3253.0	160.0	169.0	9.0	0.00	0
8-1	2 24 79	0715						0.33	
12	2 24 79	2333	3253.0	3258.5	169.0	174.5	5.5	2.87	52
13	2 25 79	0446	3258.5	3264.0	174.5	180.0	5.5	4.09	74
14	2 25 79	0821	3264.0	3268.5	180.0	184.5	4.5	2.13	47
15	2 25 79	1345	3268.5	3273.5	184.5	189.5	5.0	0.07	1
16	2 25 79	1800	3273.5	3278.0	189.5	194.0	4.5	0.00	0
17	2 26 79	1844	3278.0	3283.0	194.0	199.0	5.0	3.00	60
18	2 26 79	2148	3283.0	3288.0	199.0	204.0	5.0	3.00	60
19	2 27 79	0210	3288.0	3292.5	204.0	208.5	4.5	3.60	80
20	2 27 79	0522	3292.5	3297.0	208.5	213.0	4.5	3.17	70
21	2 27 79	0811	3297.0	3301.5	213.0	217.5	4.5	2.62	58
22	2 27 79	1159	3301.5	3306.0	217.5	222.0	4.5	2.83	63
23	2 27 79	1555	3306.0	3310.5	222.0	226.5	4.5	4.45	99
24	2 27 79	1803	3310.5	3315.0	226.5	231.0	4.5	1.80	40
25	2 27 79	2044	3315.0	3319.5	231.0	235.5	4.5	2.72	60
26	2 27 79	2258	3319.5	3324.0	235.5	240.0	4.5	2.44	54
27	2 28 79	0328	3324.0	3328.5	240.0	244.5	4.5	5.06	112
28	2 28 79	0730	3328.5	3333.0	244.5	249.0	4.5	3.31	74
29	2 28 79	1125	3333.0	3337.5	249.0	253.5	4.5	1.14	25
30	2 28 79	1637	3337.5	3342.0	253.5	258.0	4.5	3.00	67
31	2 28 79	1830	3342.0	3346.5	258.0	262.5	4.5	3.45	77
32	2 28 79	2304	3346.5	3351.0	262.5	267.0	4.5	3.40	76
HOLE 483C									
1	2 21 79	2209	3122.5	3132.0	38.5	48.0	9.5	7.47	79
2	2 22 79	0315	3170.0	3179.5	86.0	95.5	9.5	9.40	99
3	2 22 79	0420	3179.5	3189.0	95.5	105.0	9.5	3.05	32
4	2 22 79	0958	3189.0	3198.0	105.0	114.0	9.0	6.32	70
HOLE 484									
1	3 3 79	1845	2899.5	2904.5	0.0	5.0	5.0	5.0	100
HOLE 484A									
1	3 4 79	0243	2906.0	2914.0	0.0	8.0	8.0	7.60	95
2	3 4 79	0343	2914.0	2923.5	8.0	17.5	9.5	7.08	75
3	3 4 79	0445	2923.5	2933.0	17.5	27.0	9.5	8.26	87
4	3 4 79	0554	2933.0	2942.5	27.0	36.5	9.5	5.43	57
5	3 4 79	0655	2942.5	2952.0	36.5	46.0	9.5	6.22	65
6	3 4 79	0810	2952.0	2961.5	46.0	55.5	9.5	6.49	68
7	3 4 79	1134	2961.5	2967.0	55.5	61.0	5.5	0.07	1
8	3 4 79		2967.0	2968.0	61.0	62.0	1.0	0.00	0
HOLE 485									
1	3 5 79	1510	2996.5	2999.5	0.0	3.0	3.0	2.69	90
2	3 5 79	1608	2999.5	3009.0	3.0	12.5	9.5	4.90	52
3	3 5 79	1658	3009.0	3018.5	12.5	22.0	9.5	9.62	101
4	3 5 79	1756	3018.5	3028.0	22.0	31.5	9.5	3.90	41
5	3 5 79	1847	3028.0	3037.5	31.5	41.0	9.5	6.27	66
6	3 5 79	1943	3037.5	3047.0	41.0	50.5	9.5	9.55	101
HOLE 485A									
1	3 6 79	1151	3047.0	3056.5	50.5	60.0	9.5	9.60	101
2	3 6 79	1253	3056.5	3066.0	60.0	69.5	9.5	5.89	62
3	3 6 79	1357	3066.0	3075.5	69.5	79.0	9.5	3.44	36
4	3 6 79	1448	3075.5	3085.0	79.0	88.5	9.5	1.14	12
5	3 6 79	1548	3085.0	3094.5	88.5	98.0	9.5	5.18	55
6	3 6 79	1652	3094.5	3104.0	98.0	107.5	9.5	4.40	46
7	3 6 79	1745	3104.0	3113.5	107.5	117.0	9.5	2.23	23
8	3 6 79	1846	3113.5	3123.0	117.0	126.5	9.5	3.34	35
9	3 6 79	2005	3123.0	3132.5	126.5	136.0	9.5	3.48	37
10	3 6 79	2128	3132.5	3142.0	136.0	145.5	9.5	3.70	39
11	3 7 79	0008	3142.0	3151.5	145.5	155.0	9.5	4.36	46
12	3 7 79	0755	3151.5	3154.5	155.0	158.0	3.0	1.38	46
13	3 7 79	1211	3154.5	3156.0	158.0	159.5	1.5	1.35	90
14	3 7 79	1350	3156.0	3160.5	159.5	164.0	4.5	0.61	14
15	3 7 79	1456	3160.5	3170.0	164.0	173.5	9.5	0.00	0
16	3 7 79	1639	3170.0	3177.0	173.5	180.5	7.0	0.05	1
17	3 7 79	1914	3177.0	3180.0	180.5	183.5	3.0	2.25	75
18	3 7 79	2037	3180.0	3184.5	183.5	188.0	4.5	1.50	33
19	3 7 79	2143	3184.5	3189.0	188.0	192.5	4.5	1.67	37
20	3 7 79	2307	3189.0	3193.5	192.5	197.0	4.5	2.12	47
21	3 8 79	0011	3193.5	3198.0	197.0	201.5	4.5	0.12	3
22	3 8 79	0203	3198.0	3208.0	201.5	211.5	10.0	8.57	86
23	3 8 79	0600	3208.0	3212.5	211.5	216.0	4.5	4.34	96
24	3 8 79	1040	3212.5	3217.5	216.0	221.0	5.0	4.65	93
25	3 8 79	1405	3217.5	3222.5	221.0	226.0	5.0	3.21	64
26	3 8 79	1527	3222.5	3227.0	226.0	230.5	4.5	1.75	39
27	3 8 79	1647	3227.0	3231.5	230.5	235.0	4.5	1.48	33
28	3 8 79	1749	3231.5	3236.0	235.0	239.5	4.5	0.90	20
29	3 8 79	2204	3236.0	3246.0	239.5	249.5	10.0	5.40	54
30	3 9 79	0115	3246.0	3251.0	249.5	254.5	5.0	4.60	92
31	3 9 79	0331	3251.0	3255.5	254.5	259.0	4.5	4.01	89
32	3 9 79	0640	3255.5	3264.5	259.0	268.0	9.0	8.04	89
33	3 9 79	0902	3264.5	3273.5	268.0	277.0	9.0	2.37	26
34	3 9 79	1119	3273.5	3282.5	277.0	286.0	9.0	2.39	27
35	3 9 79	1547	3282.5	3291.5	286.0	295.0	9.0	7.69	85
36	3 9 79	1738	3291.5	3300.5	295.0	304.0	9.0	3.87	43
37	3 9 79	1910	3300.5	3309.5	304.0	313.0	9.0	1.95	22
38	3 9 79	2321	3309.5	3318.5	313.0	322.0	9.0	7.48	83
39	3 10 79	0355	3318.5	3327.5	322.0	331.0	9.0	5.80	64

Basement was cored in Holes 482B, C, D, and F. The deepest penetration was 90 meters in Hole B; Holes C and D each penetrated about 50 meters and Hole F only about 8 meters. Basement recovery averaged about 46% in Hole B, 57% in Hole C, 41% in Hole D and 40% in Hole F.

Eight cooling units (Table 3) are recognized in Hole B, 2 in Hole C, 4 in Hole D and 1 in Hole F. Most cooling units are at least 5 meters thick and some exceed 10 meters. They are tentatively interpreted as submarine lava flows because of their thickness, lack of curved glassy selvedges, relatively coarse grain size, and lack of obvious intrusive relationships. The relatively coarse-grained nature of the basalts and the presence of interstitial groundmass quartz indicate slow cooling of thick units, but are not considered proof of an intrusive origin. Some thinner cooling units between 0.5 and 1.0 meters thick are present, particularly in Hole D; these might represent individual pillows, or more probably, thin flows because their glassy rinds are generally thin and flat, and vesicle zones, characteristic of pillow margins, are absent. Obvious baking of basement sediments was not recognized but many of the sediments interlayered with basalts are indurated and dolomitized.

Most basalts are aphyric to sparsely phyric with up to 5% phenocrysts, chiefly plagioclase with minor amounts of green clinopyroxene and altered olivine. The phyric basalts occur in the lower parts of the basement section and are overlain by aphyric varieties. Groundmass textures are generally medium- to fine-grained, intergranular to subophitic, and coarse grained with a holocrystalline mesostasis in the central part of the thicker cooling units. Plagiolcase and well-crystallized clinopyroxene are the most abundant groundmass minerals, with plagioclase being generally more abundant than clinopyroxene. Olivine and titanomagnetites are present in all specimens and range from about 2–5% each. The mesostasis is glassy (generally replaced by smectite) in fine-grained rocks; in coarse-grained rocks it consists of tridymite(?), quartz, and apatite needles.

The recovered basalts are tholeiites with a composition characteristic of the East Pacific Rise (Table 4). Fresh basalts have MgO contents generally between 6.5% and 8.5%, TiO_2 between 1.2% and 1.9%, Al_2O_3 between 14% and 17%, CaO between 11% and 13%, and K_2O less than 0.1%. Six chemical types have been recognized in the four basement holes. Two chemical types are recognized in the aphyric basalts and these cannot be related to each other by any simple fractionation scheme, making them good candidates for derivatives from separate parental melts. At least some of the phyric rocks may be related by phenocryst accumulation and fractionation, suggesting at least some high level crystal fractionation.

Although a temperature of about 90°C was estimated for the basement-sediment contact from heat flow measurements in Hole C, and an equilibrium temperature of 150 ± 5°C was measured in the bottom of the hole during the Hawaiian downhole seismometer experiment, most of the basalts are not more altered than other oceanic tholeiites. Sparse vesicles (nearly always less than 1 volume per cent and less than 1 mm in diameter) and hairline fractures are filled with brown smectite, sometimes associated with carbonate and sulfide. Groundmass olivine and glassy interstitial material are replaced by smectite and serpentine(?) in thick cooling units and rarely by carbonate. This type of alteration is characteristic of low temperature interaction between basalt and sea water with probable deuteric alteration in thicker flows. The principal chemical changes associated with this type of alteration are losses of CaO and MgO and in some rocks, SiO_2, and increases in H_2O. However, enrichment in K_2O was observed in only one sample.

Higher temperature hydrothermal(?) alteration was found in the upper part of Core 11, Section 2, Hole C. Here olivine and clinopyroxene have been partly to completely altered to chlorite and actinolite, possibly with associated zoisite(?) and sphene(?). These rocks are the first reported specimens of hydrothermally altered basalts from DSDP drill holes in "normal" ocean crust. Chemical trends in these rocks are quite different from those of low temperature alteration, as indicated by increases in MgO and Na_2O and losses of CaO.

Site 482 is located in crust with a probable age of about 0.5 m.y. and a positive surface magnetic anomaly (Bruhnes). The expected inclination of the axial geomagnetic dipole is about +39° and the expected range of magnetic inclinations due to secular variation is about +23° to +54°.

All reliably oriented specimens have positive magnetic polarities and the stable NRM inclinations fall within the range postulated for secular variation (Table 5). The average inclination in Hole 482B is close to that expected from an axial dipole. Magnetic intensities in the basalts range from 2.6×10^{-2}g to 5.5×10^{-9}g. The median destructive field is low, ranging from 51 Oe in Hole C to 110 Oe in Hole D in keeping with the relatively coarse grain size.

Measured compressional wave velocities in the basalts range from 5.5 to 6.0 km/s and average about 5.8 km/s, reflecting the very fresh character of the rocks (Table 6). Comparison with the *in situ* velocities suggests that the upper few hundred meters of basement contain about 7% water-filled cracks or interlayered sediments. Basalt densities range from 2.74 to 3.11 g/cm^3 and show a positive correlation with compressional velocities. Both density and velocity decrease with increasing alteration.

TABLE 3
Basement Lithologic Units

Unit	Top (m) 1*	Top (m) 2**	Base (m) 1*	Base (m) 2**	Thickness (m) 1*	Thickness (m) 2**	Type Cooling Unit	Phenocryst Assemblage	Core-Section, cm
HOLE 482B									
1	136.5	136.5	158.0	158.0	21.5	21.5	Massive basalt	Aphyric	10-7, 8 to 15-1, 115
2	158.0	158.0	174.7	184.0	16.7	26.0	Massive basalt	Pl	15-1, 115 to 17-2, 150
	Sedimentary Intercalation								
3	184.1	185.5	186.2	191.5	2.1	6.0	Massive basalt	Pl	18-1, 90 to 18-2, 107
	Sedimentary Intercalation								
4	193.5	195.0	199.5	199.5	6.0	4.5	Massive basalt	Pl	19-1, 60 to 20-2, 83
5	199.5	199.5	201.5	201.5	2.0	2.0	Massive basalt	Pl-Cpx	20-2, 83 to 20-3, 130
6	201.5	201.5	205.0	207.0	3.5	5.5	Massive basalt	Pl-Cpx-Ol	20-3, 130 to 21-3, 50
7	205.0	207.0	220.3	223.0	15.3	16.0	Massive basalt	Pl-Cpx-Ol	21-3, 50 to 23-1, 30
	Sedimentary Intercalation								
8	224.7	225.0	229.0	229.0	4.3	4.0	Massive basalt	Aphyric	24-1, 25 to 24-3, 130
HOLE 482C									
1	135.5	–	157.0	–	21.5	–	Massive basalt	Aphyric	9-1, 60 to 11-4, 150
2	157.0	–	184.0	–	27.0	–	Massive basalt	Pl-(Cpx)-(Ol)	12-1, 0 to 15-4, 145
HOLE 482D									
1	138.0	138.0	139.6	141.5	1.6	3.5	Massive basalt	Aphyric	8-1, 0 to 8-2, 30
	Sedimentary Intercalation								
2	141.7	142.5	154.0	154.0	12.3	11.5	Massive basalt	Aphyric	9-1, 15 to 10-3, 60
	Sedimentary Intercalation								
3	154.1	154.5	169.6	167.5	15.5	13.0	Pillowed basalt?	Aphyric	10-3, 65 to 12-1, 130
4	169.6	167.5	186.5	186.5	16.9	19.0	Massive basalt	Pl	12-1, 130 to 13-3, 35
HOLE 482F									
1	136.2	–	145.0	–	8.8	–	Massive basalt	Aphyric	4-3, 117 to 5-2, 30
HOLE 483									
1	110.0	110.0	111.0	114.0	1.0	4.0	Massive basalt	Pl-Ol	13-4, 5 to 13-4, 95
	Sedimentary Intercalation?								
2	115.0	117.0	127.0	129.0	12.0	12.0	Massive basalt	Aphyric	14-1, 5 to 15-2, 128
	Sedimentary Intercalation?								
3	127.0	132.0	135.8	137.0	8.8	5.0	Massive basalt	Aphyric	15-2, 128 to 16-3, 12
	Sedimentary Intercalation								
4	142.2	145.5	145.0	149.0	2.8	3.5	Massive basalt	Aphyric	17-1, 18 to 17-3, 24
	Sedimentary Intercalation								
5	156.5	158.0	160.1	161.0	3.6	3.0	Massive basalt	Aphyric	18-4, 130 to 19-1, 10
	Sedimentary Intercalation?								
6a	–	163.0	–	171.0	–	8.0	Pillowed basalt?	Not Recovered	
	Sedimentary Intercalation?								
6b	169.0	174.0	186.5	186.5	17.5	12.5	Pillowed basalt	Pl-Ol-Cpx	20-1, 5 to 22-4, 60
6c	186.5	186.5	188.5	188.5	2.0	2.0	Massive basalt	Pl-Ol	22-4, 60 to 23-2, 20
6d	188.5	188.5	190.0	190.5	1.5	2.0	Pillowed basalt	Pl-Ol(Cpx)	23-2, 20 to 23-2, 150
	Sedimentary Intercalation?								
7a	191.5	191.5	200.3	200.2	8.8	8.7	Massive basalt	Pl-(Ol)	24-1, 5 to 26-1, 40
	Sedimentary Intercalation								
7b	200.4	201.0	204.5	204.5	4.1	3.5	Massive basalt	Pl	26-1, 50 to 26-3, 150
HOLE 483B									
1	110.0	110.0	111.3	112.0	1.3	2.0	Massive basalt	Pl-Ol	2-7, 0 to 3-1, 75
	Sedimentary Intercalation?								
2	111.3	116.0	127.0	130.0	15.7	14.0	Massive basalt	Aphyric	3-1, 75 to 4-7, 20
	Sedimentary Intercalation								
3	133.0	132.0	136.4	137.5	3.4	5.5	Massive basalt	Aphyric	7-1, 7 to 7-3, 75
	Sedimentary Intercalation								
4	137.6	142.5	146.8	148.0	9.2	5.5	Massive basalt	Aphyric	8-1, 10 to 9-1, 44
	Sedimentary Intercalation								
5	169.0	160.5	184.6	189.0	15.6	28.5	Pillowed basalt	Pl-Ol-Cpx	12-1, 0 to 15-1, 6
	Sedimentary Intercalation								
6a	194.0	191.0	197.3	199.0	3.3	8.0	Massive basalt	Aphyric	17-1, 0 to 17-3, 45
	Sedimentary Intercalation?								
6b	199.0	200.0	204.6	204.6	5.6	4.6	Massive basalt	Aphyric	18-1, 0 to 19-1, 65
	Sedimentary Intercalation(?)								
6c	204.6	204.6	206.2	206.2	1.6	1.6	Massive basalt	Aphyric	19-1, 65 to 19-2, 85
6d	206.2	206.5	210.5	210.5	4.3	4.0	Massive basalt	Pl-Ol-(Cpx)	19-2, 85 to 20-2, 65
	Sedimentary Intercalation								
7a	211.1	211.1	213.0	213.0	1.9	1.9	Pillowed basalt	Pl-Ol	20-2, 130 to 20-3, 30
7b	213.0	213.0	227.7	227.7	14.7	14.7	Pillowed basalt	Pl-Cpx-Ol	21-1, 0 to 24-1, 145
	Sedimentary Intercalation?								
8a	227.7	228.8	232.4	232.4	4.7	3.6	Massive basalt	Pl-Cpx-Ol	24-1, 145 to 25-2, 5
	Sedimentary Intercalation								
8b	232.6	233.8	236.9	238.5	4.3	4.7	Massive basalt	Pl-Ol	25-2, 20 to 26-1, 150
	Sedimentary Intercalation								
8c	237.0	238.7	249.5	249.5	12.5	10.8	Massive basalt	Pl-Ol	26-2, 5 to 29-1, 65
	Sedimentary Intercalation?								
9	249.5	251.6	267.0	267.0	17.5	15.4	Pillowed basalt	Pl-Ol-Cpx	29-1, 65 to 32-3, 82
HOLE 483C									
1	109.5	–	114.0	–	4.5	–	Massive basalt	Aphyric	4-2, 47 to 4-5, 120
HOLE 484A									
1	59.5	–	62.0	–	2.5	–	Basalt	Pl-Ol	7-1, 0 to 7-1, 6
HOLE 485A									
1	153.5	153.5	159.4	160.7	5.9	7.2	Massive basalt	Pl-(Ol)-(Cpx)	11-3, 55 to 14-1, 65
	Sedimentary Intercalation?								
2	180.5	179.3	184.0	183.7	3.5	4.4	Massive basalt	Pl	17-1, 0 to 18-1, 58
	Sedimentary Intercalation								
3	201.5	195.8	201.5	201.0	0.03	5.2	Pillowed basalt?	Pl	22-1, 0 to 22-1, 3
	Sedimentary Intercalation								
4	212.0	212.5	226.2	226.4	14.2	13.9	Massive basalt	Pl-Ol	23-1, 50 to 26-1, 20
	Sedimentary Intercalation								
5	239.5	243.6	270.4	270.7	30.9	27.1	Massive basalt	(Pl)	29-1, 0 to 33-2, 95
	Sedimentary Intercalation								
6	277.5	284.5	294.0	294.5	16.5	10.0	Massive basalt	(Pl)-(Ol)	34-1, 56 to 35-6, 55
	Sedimentary Intercalation								
7	298.6	303.2	298.7	304.2	0.1	1.0	Massive basalt	Pl	36-3, 64 to 36, CC, 31
	Sedimentary Intercalation								
8	314.5	315.0	328.5	331.0	14.0	16.0	Massive basalt	Pl	38-2, 2 to 39-5, 60

* Calculated from core log and corrected for spacers
** Calculated from drilling rate log or downhole logs

TABLE 4
Basalt Composition from XRF Analysis

Sample	Major Elements (weight %)														Trace (ppm)		
Core-Section, Interval (cm)	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Total	LOI	$H_2O^{+1)}$	CO_2 1)	Ni	Sr	Zr
HOLE 482B																	
10-7, 14–16	47.11	1.92	15.14	14.15	0.25	7.24	10.38	2.80	0.09	0.18	99.26	7.78	1.34	0.50	65	107	103
11-1, 23–25	49.78	1.79	14.16	11.58	0.20	7.60	12.16	2.40	0.08	0.17	99.92	1.61	0.49	0.86	74	111	119
12-2, 135–137	49.82	1.76	14.20	11.74	0.18	8.00	11.77	2.20	0.08	0.18	99.93	1.11	0.67	0.20	73	107	n.d.
14-2, 121–124	49.59	1.41	14.64	11.24	0.18	7.92	12.19	2.22	0.05	0.13	99.57	1.47	0.95	0.20	98	91	84
15-1, 135–139	49.71	1.32	14.74	11.18	0.18	8.09	12.13	2.04	0.04	0.12	99.55	1.73	0.95	0.32	58	92	80
15-3, 117–119	49.96	1.28	14.48	11.10	0.16	7.91	12.32	2.20	0.05	0.11	99.57	1.33	0.59	0.18	57	94	81
16-1, 36–38	50.00	1.28	14.60	11.06	0.16	7.89	12.24	2.10	0.05	0.11	99.49	1.12	0.58	0.18	63	93	84
17-2, 111–113	49.88	1.31	14.42	11.47	0.19	7.81	12.49	2.00	0.02	0.12	99.71	1.04	0.45	0.23	60	94	79
18-1, 18–20	50.25	1.31	14.22	11.39	0.17	7.97	12.08	2.20	0.06	0.11	99.76	1.12	0.46	0.25	60	93	83
18-2, 99–101	49.45	1.56	14.26	11.94	0.19	7.63	12.18	2.05	0.04	0.13	99.43	1.10	0.67	0.11	64	90	101
19-1, 96–100	49.87	2.29	16.72	12.01	0.12	7.42	7.40	3.16	0.06	0.21	99.26	3.77	1.93	0.48	51	119	151
20-3, 24–26	49.84	1.58	15.74	10.23	0.16	7.50	11.68	2.45	0.04	0.14	99.36	2.58	1.26	0.55	67	97	103
21-1, 62–64	49.11	1.91	14.10	11.92	0.16	7.61	11.41	2.48	0.06	0.16	98.92	1.82	0.86	0.18	67	112	130
21-3, 74–76	49.70	1.63	15.38	10.80	0.17	7.25	12.20	2.40	0.03	0.16	99.72	1.40	0.72	0.10	62	126	116
22-2, 34–36	50.00	1.58	15.80	10.80	0.16	7.04	12.22	2.40	0.03	0.15	100.18	1.47	0.66	0.12	61	125	116
22-4, 34–36	50.00	1.55	15.30	10.67	0.16	6.87	12.22	2.30	0.06	0.14	99.27	2.79	0.85	0.18	71	125	106
24-1, 93–95	49.91	1.69	16.00	10.60	0.16	7.47	10.74	2.55	0.05	0.15	99.32	3.62	0.83	0.30	63	96	108
HOLE 482C																	
9-1, 121–123	49.68	1.81	14.53	11.81	0.20	7.72	11.86	2.10	0.08	0.17	99.96	1.96	0.80	0.88	67	110	125
10-2, 73–75	49.73	1.74	14.54	11.62	0.19	8.09	11.66	2.10	0.06	0.16	99.89	1.81	0.95	0.31	72	106	121
11-1, 115–117	49.22	1.81	14.65	11.54	0.17	7.80	11.85	2.20	0.06	0.17	99.47	1.56	0.92	0.19	81	114	127
11-1, 138–139	49.50	1.76	14.55	11.24	0.17	7.94	12.00	2.30	0.07	0.17	99.70	1.46	0.66	0.16	84	111	122
11-2, 16–18	50.09	1.38	14.11	11.10	0.16	10.04	9.66	2.65	0.07	0.15	99.41	4.66	2.19	0.32	79	92	88
11-2, 21–24	49.37	1.24	14.33	12.01	0.14	10.69	8.67	2.50	0.08	0.13	99.18	4.15	2.86	0.33	80	84	75
11-3, 141–143	49.90	1.82	14.06	11.84	0.18	7.86	11.79	2.25	0.07	0.17	99.94	1.46	0.49	0.23	72	113	120
12-1, 11–13	49.74	1.31	14.50	11.32	0.18	8.11	12.00	1.90	0.05	0.12	99.23	1.04	0.65	0.23	59	93	81
12-2, 95–97	50.09	1.32	14.58	11.47	0.18	7.90	12.30	2.00	0.03	0.11	99.98	1.19	0.55	0.23	58	94	87
13-1, 22–24	49.84	1.33	14.90	10.71	0.15	8.45	11.71	2.10	0.03	0.10	99.32	2.28	0.88	0.22	55	93	80
13-1, 125–127	49.89	1.31	14.40	11.28	0.17	7.90	12.21	2.05	0.04	0.11	99.36	1.33	0.59	0.30	56	93	76
13-3, 108–110	49.83	1.31	14.45	11.39	0.18	7.74	12.23	2.05	0.05	0.12	99.35	1.09	0.65	0.15	57	93	78
14-1, 40–42	50.06	1.30	14.46	11.30	0.17	7.77	12.32	2.00	0.04	0.12	99.54	1.31	0.51	0.14	54	94	81
14-4, 127–129	49.80	1.30	14.35	11.34	0.17	8.01	12.27	1.95	0.05	0.12	99.36	1.10	0.51	0.11	57	92	75
15-1, 44–46	49.96	1.30	14.36	11.32	0.18	7.83	12.23	2.05	0.04	0.11	99.38	1.11	0.58	0.10	58	92	80
15-2, 132–134	49.97	1.29	14.36	11.20	0.17	8.00	12.24	2.00	0.05	0.12	99.40	0.53	0.59	0.12	59	92	75
15-3, 97–99	50.11	1.29	14.52	11.29	0.18	7.90	12.27	2.00	0.02	0.12	99.70	1.18	0.52	0.11	56	94	74
15-4, 119–121	50.20	1.28	14.45	11.23	0.18	7.77	12.30	2.05	0.05	0.11	99.62	1.18	0.56	0.13	60	92	82

TABLE 4 — *Continued*

Sample	Major Elements (weight %)														Trace (ppm)		
Core-Section, Interval (cm)	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Total	LOI	$H_2O^{+1)}$	CO_2 1)	Ni	Sr	Zr
HOLE 482D																	
8-1, 30	48.99	1.90	15.20	11.55	0.26	6.87	11.19	2.20	0.49	0.18	98.83	5.61	0.79	0.41	60	104	111
8-1, 109–111	49.83	1.78	14.30	11.72	0.19	7.71	12.06	2.10	0.04	0.16	99.89	1.81	0.68	0.20	70	111	119
9-1, 48–50	49.94	1.81	14.07	11.76	0.20	7.81	11.97	2.20	0.04	0.17	99.96	1.46	0.72	0.11	73	107	120
9-3, 50–52	49.58	1.82	14.08	12.00	0.20	7.54	11.89	2.39	0.05	0.17	99.72	1.31	0.69	0.11	71	109	124
10 2, 52 55	50.01	1.78	14.04	11.76	0.19	7.75	11.91	2.42	0.05	0.17	100.08	1.39	0.63	0.27	71	108	127
10-2, 109–112	50.04	1.80	14.22	11.62	0.18	7.92	11.76	2.35	0.07	0.16	100.12	1.88	0.63	0.12	73	106	122
10-3, 14–16	50.02	1.93	14.08	12.08	0.19	7.61	11.48	2.64	0.04	0.17	100.24	1.32	0.69	0.14	65	108	133
10-3, 101–103	49.56	1.44	15.13	11.29	0.18	7.45	12.25	2.52	0.05	0.13	100.00	2.16	1.23	0.25	99	91	91
11-1, 135–137	49.51	1.43	14.57	11.30	0.18	8.00	12.12	2.35	0.04	0.12	99.62	1.73	1.07	0.24	86	94	91
12-1, 105–107	49.53	1.41	14.63	11.32	0.18	8.00	12.00	2.24	0.04	0.13	99.48	1.11	0.76	0.21	96	97	84
12-2, 50–52	49.71	1.31	14.33	11.38	0.18	8.19	12.25	2.26	0.03	0.11	99.75	1.25	0.57	0.15	63	93	78
12-2, 82–84	49.86	1.30	14.33	11.30	0.17	8.11	12.13	2.17	0.03	0.11	99.51	1.11	0.58	0.17	63	91	79
12-3, 118–120	49.87	1.28	14.58	11.18	0.17	7.72	12.31	2.24	0.03	0.11	99.49	1.04	0.48	0.15	59	95	83
13-1, 127–129	49.92	1.36	15.00	10.70	0.16	8.43	11.63	2.41	0.03	0.12	99.76	1.80	1.03	0.22	64	99	80
13-3, 4–6	49.87	1.33	14.36	11.34	0.17	8.81	11.76	2.36	0.06	0.11	100.17	1.60	0.74	0.28	61	95	85
HOLE 482F																	
4-3, 131–137	49.60	1.97	13.90	12.42	0.19	7.60	11.44	2.41	0.08	0.19	99.80	1.11	0.47	0.59	64	113	135
HOLE 483																	
13-4, 17–19	49.89	1.28	16.00	10.96	0.16	7.26	12.39	2.22	0.05	0.11	100.32	1.04	0.49	0.15	70	93	74
14-1, 35–37	49.28	1.20	14.79	10.76	0.23	8.40	12.49	2.38	0.07	0.11	99.71	2.08	0.73	0.58	69	110	78
14-2, 12–14	49.82	1.22	14.86	10.58	0.16	8.00	12.44	2.55	0.06	0.11	99.80	1.53	0.73	0.20	73	114	75
15-1, 21–24	49.53	1.20	14.74	10.60	0.17	8.52	12.57	2.44	0.05	0.11	99.93	1.04	0.48	0.09	71	113	77
15-2, 96–98	49.20	1.20	14.75	10.41	0.16	8.83	12.65	2.48	0.05	0.11	99.84	1.18	0.53	0.16	68	114	78
15-3, 7–9	50.34	1.39	14.55	11.00	0.17	7.68	12.23	2.47	0.04	0.10	99.97	1.18	0.64	0.17	57	97	79
16-1, 114–115	50.05	1.32	14.47	10.98	0.18	7.76	12.35	2.66	0.05	0.11	99.93	1.11	0.68	0.34	58	94	75
16-1, 133–134	49.82	1.36	14.46	11.29	0.18	7.73	12.16	2.47	0.05	0.11	99.63	1.18	0.83	0.18	57	94	75
16-2, 58–60	50.11	1.38	14.47	11.30	0.18	7.83	12.15	2.36	0.05	0.11	99.94	0.97	0.63	0.14	57	94	80
16-3, 10–12	50.27	1.27	14.66	10.76	0.16	8.40	11.83	2.57	0.05	0.11	100.08	1.46	1.03	0.21	61	103	72
17-1, 64–66	48.94	0.98	16.35	9.66	0.17	9.61	12.46	2.08	0.02	0.09	100.36	1.39	0.93	0.15	107	97	57
17-3, 16–18	48.86	0.96	16.54	9.60	0.16	9.44	12.81	1.98	0.02	0.08	100.45	1.39	0.78	0.31	106	134	61
18-4, 103–105	49.08	0.97	16.38	9.63	0.16	9.29	12.76	1.98	0.02	0.09	100.36	1.73	1.05	0.34	112	101	60
18-4, 140–142	49.60	1.74	15.06	10.39	0.15	7.05	12.00	2.70	0.13	0.19	99.01	1.11	0.66	0.05	89	166	124
19-1, 6–8	49.57	1.73	15.46	10.55	0.16	7.20	12.36	2.75	0.06	0.17	100.01	1.94	1.15	0.48	88	166	128
20-1, 39–40	49.37	1.90	14.38	12.41	0.20	7.10	11.66	2.53	0.11	0.18	99.84	0.83	0.68	0.17	68	101	132
20-1, 144–146	49.50	1.93	14.98	11.81	0.20	7.13	11.70	2.51	0.06	0.19	100.01	1.25	0.63	0.26	66	106	138
21-1, 86–88	49.38	1.87	14.80	12.23	0.22	7.00	11.72	2.41	0.08	0.17	99.88	0.69	0.49	0.09	67	101	131

TABLE 4 — *Continued*

Sample	Major Elements (weight %)														Trace (ppm)		
Core-Section, Interval (cm)	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Total	LOI	$H_2O^{+1)}$	CO_2 [1)]	Ni	Sr	Zr
21-2, 78–80	49.45	1.88	14.80	12.30	0.20	7.01	11.74	2.47	0.08	0.18	100.11	0.69	0.50	0.10	67	101	134
21-3, 53–55	49.16	1.80	14.76	12.15	0.22	7.32	11.95	2.38	0.06	0.18	99.98	1.18	0.59	0.16	68	100	124
22-1, 40–42	49.15	1.73	14.47	11.85	0.20	7.30	12.00	2.33	0.10	0.16	99.29	0.76	0.58	0.09	78	98	123
22-2, 84–87	49.59	1.67	14.94	11.52	0.19	7.05	12.10	2.38	0.11	0.15	99.70	1.18	0.80	0.16	82	96	116
22-3, 38–40	49.42	1.73	15.47	10.86	0.17	6.78	12.27	2.53	0.05	0.16	99.40	2.22	0.93	0.21	89	102	126
22-4, 30–32	49.26	1.62	14.92	11.48	0.18	7.24	12.05	2.39	0.11	0.16	99.41	1.11	0.69	0.09	91	99	115
23-1, 12–14	49.17	1.73	15.25	11.67	0.19	6.80	12.39	2.29	0.07	0.17	99.73	1.67	0.76	0.19	77	103	120
23-1, 108–110	49.43	1.61	14.78	11.53	0.19	7.70	12.04	2.45	0.04	0.14	99.41	1.18	0.70	0.16	98	99	113
23-2, 32–35	49.36	1.66	15.00	11.64	0.19	7.18	12.02	2.38	0.07	0.17	99.67	1.32	0.72	0.21	77	101	118
24-2, 58–60	48.97	2.19	13.62	13.16	0.19	6.48	11.04	2.55	0.11	0.21	98.52	0.83	0.62	0.15	70	105	155
25-1, 3–5	49.44	1.28	15.85	10.88	0.19	6.94	12.63	2.34	0.06	0.12	99.73	0.97	0.48	0.28	64	89	71
25-1, 67–69	49.40	2.21	14.86	12.04	0.18	7.20	11.22	2.58	0.07	0.22	99.98	1.87	0.97	0.31	77	114	156
26-1, 20–22	49.65	2.16	13.87	12.98	0.18	6.94	10.97	2.50	0.09	0.21	99.59	0.97	0.63	0.13	68	104	158
26-1, 128–130	49.19	2.23	14.67	12.24	0.19	7.15	10.96	2.66	0.11	0.21	99.61	1.88	0.90	0.36	67	109	156
26-3, 3–5	49.55	2.15	14.01	13.13	0.20	6.88	11.19	2.53	0.09	0.22	99.95	1.18	0.79	0.11	63	104	150
HOLE 483B																	
3-1, 49–50	49.50	1.25	15.66	11.05	0.17	7.28	12.43	2.35	0.05	0.10	99.84	0.69	0.55	0.19	65	88	67
3-1, 124–126	49.98	1.25	14.94	10.40	0.14	7.95	12.31	2.60	0.05	0.11	99.73	1.66	1.27	0.12	71	116	75
4-4, 50–53	49.90	1.23	15.05	10.08	0.17	7.80	12.87	2.64	0.06	0.12	99.92	1.32	0.69	0.23	72	114	75
7-2, 48–50	49.82	1.36	14.19	11.63	0.19	8.03	12.00	2.44	0.04	0.11	99.81	1.67	1.06	0.22	60	105	78
8-1, 46–48	49.00	.97	16.30	9.65	0.16	9.55	12.38	2.24	0.03	0.08	100.36	1.88	–	–	115	93	62
9-1, 40–42	48.60	.98	16.17	9.59	0.15	9.55	12.53	2.12	0.03	0.08	99.80	1.25	0.87	0.15	107	98	58
B-1, 1–3	49.25	1.58	15.18	11.50	0.19	7.34	12.18	2.44	0.08	0.15	99.89	1.53	0.79	0.15	74	116	104
12-1, 15–17	49.62	1.57	15.37	11.34	0.19	7.14	12.28	2.41	0.07	0.14	100.13	1.53	0.75	0.19	75	117	106
12-2, 94–96	48.82	1.75	14.41	11.89	0.21	7.50	12.16	2.52	0.04	0.14	99.44	1.66	0.75	0.26	66	115	113
13-1, 3–5	49.35	1.93	14.89	11.88	0.19	7.13	11.84	2.58	0.07	0.19	100.05	1.32	0.73	0.24	71	106	135
13-1, 145–147	48.98	1.85	14.48	12.23	0.19	6.99	11.69	2.38	0.14	0.18	99.11	1.18	0.80	0.15	75	102	135
13-2, 146–148	49.29	1.86	14.63	12.22	0.19	7.11	11.74	2.45	0.10	0.18	99.77	1.04	0.61	0.10	67	102	140
13-3, 135–137	49.56	1.85	14.66	12.32	0.19	7.07	11.78	2.50	0.13	0.17	100.23	1.25	0.87	0.11	69	105	136
14-2, 44–46	49.25	1.98	14.06	12.58	0.20	7.33	11.33	2.65	0.06	0.19	99.63	0.83	0.54	0.16	66	102	140
17-1, 85–87	49.25	2.19	13.77	13.09	0.20	6.60	11.37	2.59	0.05	0.20	99.31	1.53	0.76	0.16	64	107	156
17-3, 7–9	49.53	2.11	13.81	13.07	0.21	7.17	11.38	2.63	0.05	0.20	100.16	1.18	0.57	0.12	65	105	153
18-1, 30–32	49.21	2.17	13.63	12.62	0.22	7.01	11.37	2.67	0.08	0.21	99.19	1.81	0.76	0.63	62	107	157
18-3, 45–48	48.52	2.18	14.38	12.83	0.22	6.92	11.78	2.54	0.05	0.21	99.63	2.36	1.18	0.29	65	108	156
19-1, 123–125	49.66	2.22	13.97	12.55	0.19	6.93	11.24	2.68	0.10	0.21	99.75	1.32	0.58	0.22	59	109	161
19-2, 122–124	49.15	2.16	13.90	13.09	0.19	6.88	11.12	2.67	0.08	0.21	99.45	1.22	0.76	0.18	65	105	155
20-2, 137–139	48.91	2.07	14.18	12.57	0.20	7.33	11.75	2.48	0.07	0.20	99.75	1.73	0.70	0.21	69	100	147
21-2, 100–102	49.68	1.67	14.44	11.85	0.20	7.56	12.12	2.29	0.07	0.16	100.04	0.69	0.46	0.08	63	108	108

TABLE 4 – *Continued*

Sample	Major Elements (weight %)														Trace (ppm)		
Core-Section, Interval (cm)	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Total	LOI	$H_2O^{+1)}$	CO_2 [1)]	Ni	Sr	Zr
22-1, 115–117	48.88	1.69	14.06	11.77	0.19	6.94	12.10	2.43	0.06	0.15	98.27	1.11	0.04	0.17	59	107	107
23-1, 95–97	49.26	1.66	14.91	11.57	0.18	7.30	12.20	2.42	0.05	0.14	99.69	2.08	0.71	0.08	54	108	106
23-2, 29–31	49.36	1.65	14.73	11.67	0.19	7.50	12.14	2.37	0.06	0.14	99.81	1.11	0.75	0.13	69	109	106
23-4, 69–71	49.27	1.80	14.04	12.22	0.20	7.38	11.80	2.56	0.09	0.16	99.52	0.90	0.74	0.14	67	109	118
24-2, 11–14	49.56	1.95	15.12	11.03	0.21	7.16	12.08	2.66	0.10	0.19	100.06	3.34	0.90	0.98	68	119	121
25-3, 10–12	49.33	1.94	14.35	12.48	0.18	6.59	11.78	2.88	0.08	0.17	99.78	1.39	0.67	0.15	54	114	130
26-2, 96–100	49.22	1.93	15.17	11.54	0.18	7.00	11.42	2.88	0.12	0.17	99.63	3.06	1.26	0.39	66	119	121
26-2, 145–147	49.51	1.87	15.16	11.50	0.17	7.58	10.37	2.81	0.11	0.16	99.24	2.84	1.52	0.27	68	115	117
27-3, 85–87	49.85	1.87	14.10	12.56	0.18	7.14	11.60	2.48	0.08	0.16	100.02	1.11	0.76	0.12	61	112	126
28-1, 66–68	49.76	1.73	14.29	11.93	0.18	7.64	11.85	2.43	0.08	0.15	100.04	1.25	0.65	0.16	80	109	117
30-1, 31–34	49.56	1.77	14.62	11.50	0.21	7.53	11.85	2.56	0.07	0.16	99.83	1.10	0.65	0.19	109	112	118
31-2, 86–89	49.03	1.60	14.57	11.66	0.22	7.45	11.99	2.33	0.18	0.15	99.18	1.25	0.74	0.40	128	110	99
32-1, 135–137	49.40	1.62	15.53	10.18	0.17	8.00	12.29	2.30	0.04	0.14	99.67	1.80	0.93	0.46	123	121	110
32-3, 62–64	49.33	1.83	14.15	12.23	0.22	7.12	11.77	2.38	0.17	0.16	99.36	0.76	0.63	0.23	68	106	122
HOLE 483C																	
4-2, 110	50.22	1.33	14.52	11.32	0.17	7.64	12.37	2.53	0.04	0.11	100.25	0.90	0.58	0.09	67	109	89
4-5, 103–105	50.20	1.33	14.44	11.36	0.17	7.45	12.25	2.64	0.05	0.11	100.00	1.04	0.57	0.19	70	108	84
HOLE 484A																	
7-1, 5–7	48.56	2.10	16.00	11.60	0.19	5.60	11.91	2.73	0.33	0.21	99.23	1.93	0.64	0.09	101	161	140
HOLE 485A																	
11-3, 82–83	47.93	1.45	15.70	10.46	0.15	9.80	11.55	2.44	0.02	0.10	99.60	1.80	0.86	0.26	220	135	90
12-1, 62–64	49.15	2.10	13.45	13.35	0.21	7.00	11.51	2.40	0.04	0.21	99.42	0.83	0.33	0.47	69	90	134
13-1, 103–105	49.24	1.98	13.76	13.03	0.20	6.99	11.62	2.31	0.05	0.18	99.36	1.32	0.38	0.62	76	107	132
17-1, 112–114	49.06	2.21	14.65	12.50	0.17	6.93	11.02	2.51	0.06	0.20	99.31	1.73	0.87	0.35	101	105	151
23-1, 118–120	48.92	2.19	14.46	12.81	0.18	6.96	11.10	2.48	0.08	0.20	99.38	1.46	0.87	0.22	84	109	145
24-1, 89-91	49.17	1.99	14.87	11.73	0.18	7.24	11.60	2.49	0.05	0.18	99.50	1.11	0.68	0.21	90	105	136
25-3, 14–16	49.05	2.13	14.20	12.67	0.20	7.44	11.31	2.36	0.07	0.20	99.63	1.46	1.00	0.32	91	155	144
29-2, 122–124	49.40	2.21	13.92	13.00	0.18	7.61	10.87	2.41	0.11	0.20	99.91	1.52	1.02	0.18	91	94	142
29-4, 62–64	49.30	2.21	13.19	13.31	0.21	7.65	11.10	2.30	0.07	0.19	99.53	1.59	0.88	0.16	65	94	143
30-1, 39–41	49.52	2.23	13.21	13.26	0.20	7.42	11.25	2.25	0.06	0.19	99.59	1.32	0.65	0.17	59	97	142
30-3, 103–105	49.20	2.06	14.75	12.50	0.19	6.56	11.05	2.55	0.07	0.20	99.13	1.18	0.62	0.19	75	106	151
31-2, 81–83	49.38	1.82	14.26	11.80	0.19	7.77	12.02	2.33	0.12	0.17	99.86	1.11	0.51	0.14	102	96	119

1) % Composition after baking off H_2O^-

TABLE 5
Leg 65 Shipboard Paleomagnetic Data

Sample Core-Section, Interval (cm)	NRM Intensity ($\times 10^{-3}$ g)	Stable Inclination (°)	Susceptibility ($\times 10^{-3}$ g/Oe)	MDF (Oe)	Q (for H = .45)
HOLE 482B					
11-1, 21	9.37	40	2.87	–	7.3
11-2, 41	7.43	35	2.76	68	6.0
11-3, 15	9.75	40	3.18	35	6.8
12-1, 63	26.4	32	1.96	50	30.0
12-1, 89	24.4		–	–	–
12-2, 44	6.12	–	–	–	–
12-2, 143	18.9	31	2.57	40	16.3
13-1, 126	10.1	33	2.33	62	9.7
14-1, 97	17.2	25	0.55	317	69.6
14-3, 126	13.8	28	1.57	47	19.6
15-1, 16	19.1	24	1.25	68	34.0
15-2, 39	10.2	25	1.89	48	12.0
15-3, 114	8.61	28	2.26	32	8.5
15-4, 125	5.85	26	2.44	–	5.3
16-1, 31	10.3	26	2.28	30	10.0
16-1, 56	10.7		–	–	–
16-1, 84	10.9	20	2.39	37	10.1
16-1, 100	12.3	12	2.00	80	13.6
16-1, 117	11.5	2	1.93	110	13.2
16-2, 54	6.69		–	–	
16-2, 87	5.11	29	2.19	47	5.2
16-3, 78	4.07	50	2.69	35	3.4
16-4, 42	6.33	41	2.56	41	5.5
16-4, 125	7.10	24	2.38	35	6.2
17-1, 70	4.79	30	2.30	50	4.6
17-2, 55	6.29	27	2.53	70	5.5
17-2, 143	13.9		–	–	–
18-1, 16	7.69	36	2.13	38	8.0
18-1, 97	4.15	–	–		–
18-2, 84	15.0	51	2.00	63	16.7
18-2, 96	13.1		–	–	–
19-1, 78	20.2	54	2.32	68	19.4
19-1, 108	11.3	−53	2.95	59	8.5
19-1, 134	11.2	−45	2.97	68	8.4
20-1, 39	8.75	53	2.58	40	7.6
20-1, 143	10.7	53	2.50	35	9.5
20-3, 17	14.1	50	2.28	47	13.8
20-3, 141	19.6	53	2.45	37	17.7
21-1, 95	12.5	44	2.42	44	11.4
21-2, 30	5.55	–	–	–	–
21-2, 33	6.72	58	2.69	40	5.6
21-2, 64	7.35	–	–	–	–
21-2, 78	8.24	53	2.54	35	7.2
21-2, 111	6.79	55	2.67	39	5.6
21-3, 69	15.8	54	2.18	41	16.1
21-3, 98	23.5	–	–	–	–
22-1, 83	19.0	49	2.28	32	18.6
22-2, 32	13.5	53	2.38	40	12.6
22-3, 99	14.9	41	1.89	47	17.6
22-4, 57	6.46	53	2.40	47	6.0
24-1, 43	6.33	43	3.01	57	4.7
24-1, 106	6.57	47	3.45	45	4.2
24-3, 70	6.40	47	3.43	47	4.2
HOLE 482C					
9-1, 113	3.61	30	4.74	55	1.7
9-1, 138	5.89	31	3.28	81	2.4
10-2, 58	4.27	27	3.57	57	2.7
10-2, 61	4.02	28	3.62	53	2.5
10-2, 65	4.00	–	3.77	–	2.4
10-2, 78	4.10	30	3.87	64	2.4
10-3, 9	2.91	–	2.88	–	2.2
10-3, 113	4.07	−30	3.34	70	2.6
11-1, 97	2.08	28	2.16	41	2.1
11-2, 11	5.30	37	2.70	66	4.4
11-2, 44	0.55	36	1.34	55	0.9
11-2, 115	5.92	–	2.83	–	4.64
11-3, 26	4.74	35	3.25	62	3.2
11-3, 63	4.05	36	3.33	54	2.7
11-3, 128	4.53	38	3.09	54	3.3
11-4, 107	5.26	37	2.75	59	4.3
11-4, 122	4.16	–	2.61	–	3.5
12-1, 39	3.58	12	2.70	45	2.9
12-1, 146	3.39	14	2.61	34	2.9
12-2, 92	3.30	11	2.40	45	3.1
13-1, 56	5.96	11	2.33	50	5.7
13-2, 17	3.28	11	2.17	72	3.4
13-2, 96	2.62	9	2.28	81	2.6
13-3, 2	2.10	–	2.51	–	1.9
13-3, 25	3.07	27	2.43	37	2.8
13-3, 80	2.60	26	2.91	30	2.0
13-3, 132	2.80	19	2.85	53	2.2
14-1, 44	4.90	7	2.76	73	3.9
14-2, 22	4.25	13	2.38	46	4.0
14-2, 131	5.02	11	2.52	43	4.4
14-3, 77	3.68	17	2.71	33	3.1
14-3, 122	2.63	27	2.53	35	2.3
14-4, 61	2.49	32	2.58	43	2.1
14-4, 132	2.46	27	2.92	29	1.9
14-5, 46	2.10	36	2.42	50	1.9
15-1, 42	2.76	18	2.37	50	2.6
15-1, 103	3.77	–	2.29	–	3.7
15-1, 132	8.00	–	2.08	–	8.5
15-2, 11	8.35	18	1.98	40	9.4
15-2, 92	5.43	15	2.23	45	5.4
15-3, 63	3.34	–	2.53	–	2.9
15-3, 93	4.36	14	2.60	26	3.7
15-4, 68	3.42	14–18	2.44	50	3.0
15-4, 117	3.68	21	2.52	37	3.3
HOLE 482D					
8-1, 106	4.39	24	1.80	385	5.57
9-1, 51	3.96	25	1.75	490	5.03
9-2, 6	4.49		2.16	–	4.61
9-2, 54	4.77	–	2.95	–	3.59
9-2, 106	6.74	26	3.15	229	4.75
9-3, 23	6.16	25	3.27	108	4.19
9-3, 54	5.88	26	2.95	109	4.42
10-1, 69	17.0	40	3.41	78	11.1
10-2, 11	8.81	31	3.24	85	6.0
10-2, 57	4.76	32	3.35	50	3.16
10-2, 111	3.53	40–42	3.11	61	2.5
10-3, 18	3.48	37	3.23	58	2.39
10-3, 109	15.92	16	1.08	145	32.9
11-1, 13	16.69	–	0.97	–	38.35
11-1, 128	15.88	22	1.17	107	30.2
11-2, 101	8.78	–	1.41	–	13.82
11-3, 80	10.25	24	1.38	68	16.54
12-1, 27	4.50	13	1.95	59	5.1
12-1, 65	5.82	19	1.97	53	6.6
12-1, 119	6.00	30	1.71	50	7.81
12-2, 86	20.4	2	2.18	80	20.8
12-3, 21	10.2	4	1.88	57	12.0
12-3, 61	11.5	5	2.28	55	11.2
12-3, 122	3.25	9	2.65	75	2.7
12-4, 2	4.91	–	2.04	–	5.34
12-4, 45	17.99	6	2.06	62	19.4
13-1, 127	6.99	14	2.08	45	7.5
13-2, 12	9.66	18	1.82	77	11.8
13-3, 33	2.41	25	2.62	52	2.0
HOLE 482F					
4-3, 129	9.30	41	2.85	65	7.3
5-1, 7	9.79	43	3.04	42	7.2
5-1, 141	11.35	34	2.85	47	8.9
HOLE 483					
13-4, 13	6.63	+32	2.40	68	6.1
13-4, 89	5.91	+36	2.76	65	4.8
14-1, 31	5.33	−23	2.31	55	5.1
14-1, 83	4.28	+29	2.12	94	4.5
14-2, 10	5.25	−26	1.91	75	6.1
14-2, 53	2.47	−18	2.13	75	2.6
14-2, 106	3.92	+21	2.43	110	3.6
15-1, 20	3.03	?	2.46	18	2.7
15-1, 102	2.23	−16	2.03	57	2.4
15-2, 99	3.01	−11	2.36	45	2.8
15-3, 4	3.42	−36	2.51	80	3.0
16-1, 54	3.62	−38	2.42	67	3.3
16-1, 112	1.21	−34	2.36	107	0.9
16-1, 138	2.38	−34	2.37	70	2.2
16-2, 14	2.53	−26	2.62	59	2.1
16-2, 62	3.98	−34	2.35	81	3.8
16-2, 140	1.85	−36	2.34	100	1.8
17-1, 60	1.59	−40	1.24	91	2.8
17-1, 101	1.65	–	1.17	–	3.1
17-2, 30	1.46	−40	1.29	90	2.5
17-2, 96	2.71	−40	1.18	96	5.1
17-3, 20	1.85	−44	1.14	130	3.6
18-4, 110	2.03	+49	1.23	75	3.7
18-4, 148	2.72	−22	2.21	85	2.7
20-1, 14	18.9	−48	2.30	102	18.3
20-1, 92	14.1	–	1.56	–	20.1
20-1, 110	19.4	−42	1.22	138	35.4
20-1, 142	18.8	−44	1.73	100	24.0
20-2, 22	12.4	−48	2.12	122	13.0
21-1, 29	21.1	−43	1.61	82	29.1
21-1, 106	7.3	−47	2.31	138	7.0
21-2, 4	17.3	−50	1.99	80	19.3
21-2, 36	32.9	–	0.73	–	100.3
21-2, 39	18.7	−47	1.24	130	33.6
21-2, 124	12.3	−50	1.89	90	14.5
21-3, 56	14.7	–	2.06	–	15.8
22-1, 34	22.8	–	1.38	–	36.8
22-1, 84	24.4	−39	0.92	155	59.2
22-1, 135	28.5	−50	0.65	185	97.8
22-2, 8	35.2	–	0.88	–	88.9
22-2, 77	25.8	−49	0.35	339	163.0
22-3, 34	24.1	–	1.03	–	51.9
22-3, 52	15.3	–	0.76	–	44.7
22-3, 103	22.5	−49	0.43	265	117.0
22-3, 115	26.8	–	0.38	–	155.8
22-4, 35	24.5	−34	1.02	122	53.2
22-4, 79	47.6	–	1.46	–	72.2
22-4, 102	8.43	−35	2.13	93	8.8
23-1, 64	25.5	−36	1.50	78	37.9
23-1, 113	14.1	−42	2.02	90	15.5
23-2, 37	10.3	−43	1.82	110	12.5
23-2, 64	11.5	–	1.76	–	14.6
23-2, 120	19.9	−29	0.70	230	63.5
24-1, 48	7.5	−31	2.28	76	7.3
24-2, 4	13.9	−32	2.87	85	10.7
24-2, 61	7.0	−28	3.52	80	4.4
25-1, 24	31.2	−28	1.97	92	35.3
25-1, 84	14.9	−33	3.09	83	10.7
25-2, 4	6.8	–	3.07	–	4.9
25-2, 74	5.9	−31	3.15	67	4.1
26-1, 11	7.9	−32	2.99	74	5.9
26-1, 82	12.9	–	1.98	–	14.4
26-1, 138	5.2	−30	2.37	81	4.9
26-2, 13	6.6	−34	2.55	122	5.7
26-2, 60	28.5	−35	1.75	82	36.1
26-3, 8	16.2	−33	2.63	128	13.8
26-3, 118	6.3	−34	3.30	106	4.3

TABLE 6
Leg 65 Sediment and Basement Physical Properties

Core Section: Interval (cm) Sample	Wet Bulk Density (g/cm^3)[1]	P-Wave Velocity (km/s)[2]	Acoustic Impedance ($\times 10^5$ g/cm^2 s)	Shear Strength (tons/ft^2)[3]	Porosity (volume %)[4]	Remarks
PART I: SEDIMENTS						
HOLE 482A						
1-4, 80-90	1.57	1.51	2.37	0.05	64	silty clay
2-4, 60-68	1.51	1.49	2.25	0.09	68	silty clay
4-4, 37-49	1.65			0.25	59	silty clay
4-4, 80-82		1.52	2.51			gassy silty clay
5-4, 25-27	1.66				59	gassy silty clay
5-4, 75-78	-			0.23		gassy silty clay
HOLE 482B						
1-4, 115-117				0.18		gassy silty clay
1-4, 139-141	1.55				66	gassy silty clay
2-4, 35-41	1.65			0.18	59	gassy silty clay
4-3, 63-76		1.54	2.51	0.19		gassy silty clay
4-3, 95-97	1.63				61	silty clay
5-3, 5-7				0.26		silty clay
5-3, 36-38	1.62				61	silty clay
6-4, 24-36	1.75	1.58	2.77	0.08	53	disturbed silty clay
7-2, 50-63	1.70	1.49	2.53	0.57	56	silty clay
8-4, 71-74	1.77				52	silty clay
8-4, 95-97				0.80		silty clay
8-4, 116-118	-	1.52	2.69			silty clay
9-3, 17-28	1.75	1.49	2.61	0.63	53	silty clay
10-5, 75-77	-	1.53	2.77	-		silty clay
10-5, 95-105	1.81			0.95	49	silty clay
19-1, 31-33	(1.9)	1.99	3.78		44	sediment layer in basalt
HOLE 482C						
8-1, 72-75	2.58	4.25	10.97		13	basal dolostone
9-1, 8-10		2.76				basal dolostone
HOLE 482D						
1-3, 35-37	-	-		0.35		
1-3, 120-131	1.64	1.47	2.41		60	gassy clay
2-3, 95-100	1.73	1.42	2.46		54	gassy clay
2-3, 143-145				0.35		
3-2, 63-65		1.48	2.53			
3-2, 100-114	1.71			0.55	56	
4-2, 99-117	1.71	1.41	2.41	0.40	56	
5-1, 49-54	-	1.51	2.60	0.63		
5-1, 95-98	1.72	-	-		55	
6-2, 13-16	1.59	-	-		63	disturbed
6-2, 40-43	1.74	1.67	2.91		57	indurated
7-2, 20-29	1.80			0.40	50	disturbed
7-2, 80-82	1.69	1.63	2.75		59.5	indurated
HOLE 482F						
4-3, 37-39	1.75	1.66	2.91		54.5	indurated
HOLE 483						
2-3, 54-77	1.39	1.47	2.04	0.04	76	disturbed
3-2, 65-88	1.44	1.48	2.13	0.05	73	disturbed
4-2, 43-78	1.41	1.49	2.10	0.11	74	stiff
6-2, 75-97	1.42	1.49	2.12	0.13	74	stiff
7-4, 88-103	1.41	1.49	2.10	0.04	74	disturbed
8-4, 44-67	1.42	1.49	2.12	0.11	74	stiff
9-4, 70-89	1.43	1.49	2.13	0.25	73	firm
10-2, 41-56	1.54	1.49	2.29	0.18	66	firm
11-4, 52-67	1.57	1.51	2.37	0.20	64	firm
12-4, 53-80	1.70	1.51	2.57	0.48	56	firm
13-2, 39-72	1.64	1.50	2.46	0.69	60	firm
18-4, 24-57	1.76	1.58	2.78	0.68	53	interlayered in basalt
HOLE 483B						
1-3, 102-111	1.58	1.52	2.40	-	64	firm
1-3, 141-143	-	-	-	0.37	-	firm
1-5, 80-82	1.54	1.52	2.34	-	66	firm
2-3, 98-124	1.65	1.57	2.59	0.46	59	firm
2-6, 95-112	1.67	1.53	2.56		58	very firm
20-2, 120-129	1.93	1.93	3.72		45	very firm
25-2, 5-24	2.19	2.22	4.86	-	29	indurated
HOLE 483C						
2-5, 90-107	1.52	1.48	2.25	-	60	firm
2-7, 15-17	-	1.55	-	-	-	firm
3-2, 105-107	-	1.55	-	-	-	firm
4-1, 34-36		1.67	-	-	-	firm
4-2, 16-32	1.47	1.62	2.38		71	firm
HOLE 484						
1-1, 112-115	-	1.49	-	-	-	soft sediment
1-2, 107-124	1.45	1.51	2.19	0.09	72	soft sediment
1-4, 12-30	-	1.50		0.13	-	stiff sediment
HOLE 484A						
1-3, 93-110	1.42	1.50	2.13	0.09	74	soft sediment
1-4, 61-100	1.50	1.53	2.30	0.08	69	soft sediment
2-4, 99-116	1.56	1.52	2.37	0.14	65	stiff sediment
2-5, 80-94	1.40	1.51	2.11	0.14	75	stiff sediment
3-4, 105-142	1.50	1.68	2.52	0.25	69	firm sediment
3-6, 4-15	1.51	1.47	2.22	0.24	68	firm sediment
4-3, 23-36	1.48	1.48	2.19	0.18	70	firm sediment
4-4, 44-68	1.44	1.48	2.13	0.11	72	stiff sediment
5-4, 65-87	1.44	1.63	2.35	0.16	73	stiff sediment
6-4, 127-142	1.50	1.48	2.22	0.39	69	firm sediment
6-5, 13-32	1.46	1.44	2.10	0.33	72	firm sediment
HOLE 485						
1-1, 109-113	-	-	-	0.03	-	soft sediment
1-2, 64-77	1.34	1.50	2.01	0.05	79	soft sediment
2-1, 73-77	-	-	-	0.07	-	soft sediment
2-2, 102-105	-			0.05	-	soft sediment
2-3, 71-110	1.46	1.50	2.19	0.18	71	stiff sediment
3-2, 119-121	-			0.10	-	soft sediment
3-4, 22-24	-	-	-	0.14	-	stiff sediment
3-6, 95-110	1.49	1.50	2.24	0.14	69	stiff sediment
4-2, 110-112	-			0.22	-	stiff sediment
4-3, 32-47	1.50	1.51	2.27	0.25	69	stiff sediment
5-2, 44-46			-	0.19	-	sandy layer in turbidite
5-2, 86-88		-	-	0.25	-	clay layer in turbidite
5-4, 36-47	1.74	1.57	2.73	0.10	54	sandy layer in turbidite
5-4, 124-137	1.59	1.53	2.43	0.30	63	clay layer in turbidite
6-2, 82-84		-	-	0.20	-	stiff sediment
6-4, 120-122	-	-	-	0.13	-	stiff sediment
6-5, 138-140	-	-	-	0.17	-	stiff sediment
6-7, 3-19	1.54	1.48	2.28	0.33	66	firm sediment
HOLE 485A						
1-2, 70-72	-	-		0.32		gassy clay
1-4, 63-65	-		-	0.29	-	gassy clay
1-6, 130-145	1.61	1.52	2.45	0.46	62	gassy clay
2-3, 107-109	-	-	-	0.35	-	gassy clay
2-4, 48-59	1.65	1.49	2.46	0.48	59	gassy clay
3-2, 110-118	1.57		-	0.45	64	gassy clay
3-3, 41-44	-	1.45	-	-	-	gassy clay
4-1, 42-70	1.65	1.49	2.46	0.54	59	gassy clay
5-3, 110-123	1.82	1.55	2.82	0.53	49	gassy clay
5-4, 32-48	1.84	1.57	2.89	0.38	48	turbidite sand
6-3, 42-77	1.83	1.61	2.95	0.55	48	stiff clay
6-3, 100-107	1.80	1.55	2.79		50	turbidite sand
7-2, 7-10	1.73	1.69	2.92	-	54	sand
7-2, 17-20				0.69	-	stiff clay
8-2, 103-125	1.80	1.60	2.88	1.05	50	stiff clay
9-2, 87-104	1.93	1.73	3.34	0.06	42	sand (disturbed)
10-1, 121-130	1.64		-	0.33	-	silty sand
10-2, 62-78	1.78	1.65	2.94	1.03	51	stiff clay
11-1, 104-140	1.78	1.67	2.97		53	hard clay
18-1, 103-112	1.92			0.24	43	silt (disturbed)
19-2, 16-42	1.85	1.54	2.85	0.40	47	soft sandy silt
19-2, 78-137	1.82	1.66	3.02	1.00	49	firm clay
20-1, 95-121	1.83	1.84	3.37		51	hard clay
20, CC, 21-23	2.57	5.00	12.85	-	8	sandstone
22-1, 77-80	1.80	1.83	3.29	-	54	hard clay
22-3, 138-143	1.84	2.57	4.73		49	silty sandstone
26-1, 51-118	1.79	1.62	2.90	-	51	firm clay
27-1, 121-128	1.81	1.72	3.11		50	firm clay
28-1, 113-134	1.84	1.75	3.22	-	48	firm clay
34-1, 41-43	1.93	1.86	3.59	1.47	42	claystone
36-1, 20-23		2.35	-	-	-	limestone
36-1, 101-140	1.93	1.95	3.76	1.45	46	claystone
37-1, 41-70	1.87	2.03	3.80	1.87	46	claystone
38-1, 18-19		2.17	-	-	-	claystone

[1] GRAPE values in parenthesis

[2] Measured at atmospheric pressure

[3] Torvane measurement

[4] Assuming a grain density of 2.60 g/cm^3

PART II: BASEMENT

HOLE 482B						
11-2, 37-39	2.923	3.01	5.75	16.8	4.5	massive basalt
12-2, 147-149	2.939	3.00	5.97	17.5	3.2	massive basalt
13-1, 83-85	3.021	3.07	5.63	17.0	2.6	massive basalt
14-3, 128-130	2.959	2.99	6.12	18.1	1.6	massive basalt
15-4, 76-78	2.946	3.03	5.92	17.4	4.0	massive basalt
16-3, 47-49	2.972	3.02	5.97	17.7	2.5	massive basalt
17-2, 137-139	2.970	3.02	6.06	18.0	2.6	massive basalt
18-2, 88-90	2.995	3.09	5.70	17.1	4.5	massive basalt
19-1, 118-120	2.742	2.84	5.46	15.0	5.1	massive basalt
20-2, 8-10	3.110	3.24	5.69	17.7	5.8	massive basalt
21-3, 85-91	2.895	2.99	5.60	16.2	5.0	massive basalt
22-2, 143-145	2.846	2.91	5.92	16.8	3.4	massive basalt
24-1, 51-53	2.898	3.02	5.51	16.0	6.1	massive basalt
HOLE 482C						
9-2, 16-19	2.846	2.97	5.44	15.5	6.1	massive basalt
10-2, 44-46	2.922	3.00	5.66	16.5	3.9	massive basalt
11-1, 18-20	2.917	3.00	5.58	16.3	4.1	massive basalt
12-2, 80-82	2.953	3.01	5.95	17.6	2.6	massive basalt
13-2, 30-32	2.957	3.01	5.92	17.5	2.7	massive basalt
14-1, 50-52	2.963	3.01	5.98	17.7	2.1	massive basalt
15-2, 97-99	2.948	3.00	6.01	17.7	2.6	massive basalt
HOLE 482D						
9-2, 81-84	2.961	2.99	5.85	16.7	6.7	massive basalt
10-1, 57-59	2.961	3.02	5.94	17.6	2.8	massive basalt
11-3, 99-101	2.960	3.00	6.14	18.2	2.1	massive basalt
12-2, 128-131	2.930	3.01	5.91	17.3	4.2	massive basalt
13-3, 18-20	2.964	3.02	5.72	17.0	3.0	massive basalt
HOLE 483						
14-1, 105-107	2.858	2.99	5.41	15.5	6.6	basalt
15-2, 104-106	2.892	2.99	5.84	16.9	4.9	basalt
16-2, 33-35	2.940	3.00	6.01	17.7	3.0	basalt
17-2, 112-114	2.920	2.97	6.17	18.0	2.5	basalt
20-1, 55-57	2.962	3.01	5.95	17.6	2.3	basalt
21-2, 112-114	2.958	3.01	6.12	18.1	2.7	basalt
22-3, 72-74	2.881	2.96	6.09	17.5	4.1	basalt
23-1, 30-32	2.861	2.97	5.94	17.0	5.6	basalt
24-1, 134-136	2.857	3.00	5.29	15.1	7.1	basalt
25-1, 40-42	2.950	3.03	5.78	17.1	4.0	basalt
26-2, 118-120	2.905	2.99	5.81	16.9	4.5	basalt
HOLE 483B						
2-7, 39-42	2.946	3.00	5.93	17.5	2.7	basalt
3-1, 66-68	2.950	3.02	5.76	17.0	3.4	cracked sample
4-2, 105-107	2.945	3.01	5.92	17.4	3.1	basalt
4-5, 114-116	2.989	3.01	6.18	18.5	1.1	basalt
7-2, 36-38	2.959	3.01	6.13	18.1	2.6	basalt
8-2, 64-66	2.926	2.96	6.18	18.1	1.9	basalt
9-1, 18-20	2.921	2.96	6.09	17.8	2.2	basalt
12-1, 53-55	2.924	3.00	-	-	3.8	basalt
12-3, 59-61	2.908	3.00	5.82	16.9	4.4	basalt
14-2, 4-6	2.929	3.00	6.17	18.1	3.4	basalt
17-2, 121-123	2.932	3.01	5.97	17.5	3.7	basalt
18-2, 112-114	2.847	3.03	5.42	15.4	9.0	basalt
19-1, 115-117	2.922	3.02	5.65	16.5	5.0	basalt
20-1, 132-134	2.934	3.03	5.83	17.1	4.8	basalt
21-1, 121-123	2.867	2.99	-	-	6.3	basalt
22-1, 120-122	2.935	3.02	6.16	18.1	4.1	basalt
23-2, 33-35	2.924	2.99	5.99	17.5	3.4	basalt
24-1, 25-27	2.939	3.05	6.13	18.0	5.3	basalt
25-2, 49-51	2.838	3.00	5.40	15.3	8.1	basalt
26-2, 17-19	2.826	3.01	5.39	15.2	9.3	basalt
27-2, 124-126	2.950	3.03	6.03	17.8	4.0	basalt
28-2, 86-88	2.929	3.02	6.18	18.1	4.7	basalt
29-1, 6-8	2.924	3.00	5.91	17.3	3.9	basalt
30-2, 81-83	2.968	3.03		-	3.2	basalt
31-2, 46-48	2.899	3.01	5.94	17.2	5.4	basalt
32-3, 5-7	2.909	3.01	5.80	16.9	5.2	basalt
HOLE 485A						
11-3, 90-92	2.92		6.13	17.9	3.5	basalt
12-1, 145-147	3.00	-	6.20	18.6	1.5	basalt
17-1, 48-50	2.80		4.99	14.0	8.8	basalt
18-1, 39-41	2.89	-	-	-	5.1	basalt
23-1, 114-116	2.94	-	5.91	17.4	3.4	basalt
23-3, 41-43	2.95	-	5.87	17.3	2.8	basalt
24-4, 42-44	2.97	-	6.03	17.9	3.4	basalt
25-2, 118-120	2.96	-	5.99	17.7	2.9	basalt
29-2, 20-22	2.95	-	5.80	17.1	3.4	basalt
30-1, 50-52	2.94	-	5.61	16.5	5.0	basalt
31-3, 102-104	2.91	-	5.78	16.8	5.8	basalt
32-3, 40-42	2.90	-	5.81	16.8	5.1	basalt
33-2, 52-54	2.98	-	6.12	18.2	1.7	basalt
34-2, 56-58	3.03	-	5.90	17.9	3.8	basalt
35-4, 41-43	2.95	-	6.01	17.7	2.9	basalt
38-4, 39-41	2.95	-	5.92	17.5	3.2	basalt
39-5, 34-37	3.02	-	6.00	18.1	3.6	basalt

[1] Determined by heating for 24 hours in air at 110°C

[2] Measured at atmospheric pressure

The close spacing of Holes 482B, C, D, and F and the relatively high recovery for East Pacific Rise basement afford an unusually good opportunity to compare lithologic, chemical and magnetic units in a transverse strip of 400,000-year-old oceanic crust about 50 meters thick and 200 meters long.

The correlation of lithologic units is excellent. An upper aphyric unit is 22 meters thick in Hole 482B, 24 meters thick in Hole 482C, and 29 meters thick in Hole 482D. A sequence of sparsely plagioclase-phyric basalts underlies the aphyric basalts in all three holes, being 18, 26, and 39 meters thick in Holes D, C, and B, respectively. In the aphyric basalts, thick cooling units predominate in the upper part and thin cooling units in the lower part in all three holes. Similarly, the phyric lithologic unit is characterized by thick cooling units in all three holes. A fairly close coincidence of chemical and magnetic units with lithologic units is also observed.

The recognition of discrete, sequential, lithologic, chemical and magnetic units that correlate quite well between holes suggests that basement at this site was emplaced as a series of eruptions of different or alternating compositions. The continuity of units over a 200-meter interval and the regular stratigraphic succession argues against emplacement as intrusions.

SITE 483

After failure to drill a deep hole at Site 482 (GCA-1), the shipboard party decided to drill a series of single-bit holes at the mouth of the Gulf in order to test drilling conditions at other localities prior to making another re-entry attempt.

Site 483 (GCA-3) is located about 52 km west of the East Pacific Rise crest and about 25 km east of the base of the continental slope off Baja California, along a transect extending from Site 482 to Site 474, the latter having been previously drilled on Leg 64. The site lies in a NE-trending sediment pond about 8 km wide underlain by a very flat, regular basement reflector. The sediment thickness is estimated to be about 105 meters and the water depth is 3088 meters.

The primary scientific goal at the site was to sample the basement for lithologic, magnetic, and geochemical comparisons with rocks drilled at Sites 482 and 474, in order to characterize young crust formed at a fast-spreading ridge in an area of relatively high sedimentation.

Four holes were drilled at this site, including a multiple re-entry hole. Hole 483 was continuously cored to a sub-bottom depth of 204.5 meters, of which 94.5 meters were in basement. Holes 483A and B were drilled 100 meters east of Hole 483; Hole A was a wash test in the sediments during which no cores were recovered and B was the re-entry hole. Hole 483B was cored continuously from 91.5 to 267.0 meters sub-bottom with 157 meters of basement penetration. Four cores were taken in Hole 483C, drilled 500 meters east of Hole B; three of these were in sediment, and one in basement.

Basement recovery averaged 40% in Hole 483, 48% in Hole B, and 100% in Hole C. Sediment recovery, mostly in Hole 483, averaged about 67%.

Three units were recognized in the 110 meters of sediment above basement. Unit 1 consists of 36.5 meters of muddy nannofossil marl and radiolarian ooze with minor clayey silty sand. Unit 2 extends from 36.5 to 52 meters sub-bottom and consists of clayey silt grading downward into muddy nannofossil marl and radiolarian-diatom mud. The lower 9 meters of this unit consist of fine-grained silty sand, interpreted as a turbidite, which passes downward into silty clay and radiolarian-diatom mud. Except for the silty sand, the sediments of Unit 2 contain abundant glass shards scattered through the core and concentrated in small patches of tuffaceous clay. Several fragments of indurated claystone contain abundant fresh and altered sideromelane shards, probably representing a hyaloclastite deposit. Unit 3 is a 58-meter-thick interval of hemipelagic silty clay and clayey silt with a few siliceous fossils.

The sediments above basement are all estimated to be Quaternary. Cores 483-1 to the upper part of Core 5 (0–33 meters sub-bottom) are assigned to zones NN20–21 and the *Artostrobium miralestense* radiolarian zone. Cores 483-5 (lower part) through 13 are assigned to zone NN19 and the *Axoprunum angelinum* and *Anthocyrtidium angulare* radiolarian zones. The lowermost sediments above basement are estimated to be between 1.51 and 1.65 m.y. old based on the *Cyclococcolithina macintyrei* nannofossil zone of Gartner (1977) which spans this interval of time. The calculated sedimentation rate averages about 62 m/m.y.

Physical properties in the upper 70 meters of sediment are very uniform, with a wet-bulk density between 1.40 and 1.44 g/cm^3, a compressional wave velocity of 1.47 to 1.49 km/s, and a porosity of 73% to 76%. From 70 meters to the top of the basement at 110 meters, the properties change markedly in response to increasing compaction. Wet-bulk densities increase to about 1.7 g/cm^3, compressional wave velocities to about 1.67 km/s and porosities decrease to about 55%. Sediments within the basement have even higher densities and velocities and lower porosities in response to increased compaction and possible diagenesis.

As at Site 482, the upper part of the basement consists of interlayered massive basalts and sediments. Sediment layers up to 9 meters thick comprise nearly 50% of the upper 50 meters, but below this level the sediment decreases markedly and basement consists largely of interlayered pillow and massive basalts.

The interlayered sediments are chiefly hemipelagic, slightly to moderately fossiliferous clays and silty clays similar to the sediments above basement. A thin altered hyaloclastite layer occurs directly above basalt in Section 1, Core 8, Hole 483B. This consists of angular glass shards replaced by smectite and zeolite in a matrix of radiating fibrous zeolite, probably phillipsite. A 20 cm-thick layer of hard, black, well-bedded silty claystone occurs in Section 2, Core 25, Hole 483B. The bedding in this piece seems to be inclined about 25° from the horizontal. There is no clear evidence of baking or extensive diagenesis in most of the interlayered sediments but some are well indurated, black and unfossiliferous. Moderately to poorly preserved nannofossils, radiolarians, and foraminifers occur in some of the interlayered sediments, however, and many of these may be reworked. Based on calcareous nannofossils, the Pliocene/Pleistocene boundary is placed between Cores 13 and 17 in Hole 483 and between Cores 8 and 9 in Hole 483B.

The massive basalts in the lower part of the basement section are interpreted as submarine lava flows based on their textures and contact relationships although basalt-sediment contacts are rarely preserved. At one well-preserved contact in Hole 483, Core 26, Section 1, the overlying sediment shows clear imprints of the vesicular texture of the underlying basalt. This could only form by deposition of the sediment onto the basalt. Pillow basalts first appear at a sub-bottom depth of about 178 meters and are interbedded with massive flows in the lower part of the hole.

Dikelets were found in Cores 15 and 16, Hole 483. These range in width from 1–2 cm to about 20 cm, and are usually subhorizontal. Some have sharp, chilled margins, others have diffuse margins grading into the host rock. The dikelets have magnetic inclinations and chemical compositions identical to those of the host rock and, hence are interpreted as last stage segregation veins or "auto-intrusions."

Both phyric and aphyric basalts occur at this site. The most common phenocryst assemblages in the phyric varieties are plagioclase (with minor olivine), plagioclase + olivine, and plagioclase + olivine + clinopyroxene. Plagioclase and olivine are the most common phases, usually occurring as euhedral to subhedral crystals. Clinopyroxene occurs as anhedral intergrowths with plagioclase in glomeroporphyritic clots or as single rounded crystals, some of which have well-developed sector zoning. The partly resorbed nature of some of the phenocrysts and the presence of small spinel inclusions in some olivine phenocrysts suggest two stages of crystallization; one at pressures above about 5 kb and a later one at shallower levels.

Alteration of the basalts is similar to that occurring at Site 482. An early pervasive alteration results in replacement of olivine and interstitial glass by smectite and minor carbonate. Veins and selvedges are filled or partly altered to smectite, carbonate and zeolite. One patch of higher grade alteration in Section 2, Core 8, Hole 483B, is indicated by the presence of chlorite and actinolite(?) replacing clinopyroxene. The amount of alteration increases slightly downhole but no systematic change was noted in alteration grade.

The upper four massive units in Holes 483 and 483B are chemically distinct from those below, being more magnesian and lower in TiO_2, P_2O_5 and Zr than the lower units. Some of these have primitive compositions with $Mg/(Mg + Fe^{+2})$ ratios up to 0.69 suggestive of unfractionated mantle-derived melts.

The lower basalts are considerably more fractionated, with higher contents of TiO_2, P_2O_5 and Zr. Stratigraphic relations of the chemical types suggest this lower sequence may show a cyclic pattern, with a series of massive lavas (and sediments) succeeded by cogenetic pillow lavas. Most of the basalt variation within these series can probably be explained in terms of shallow level fractionation processes. However, Ti/Zr changes may indicate slight changes in the parent magma compositions for successively erupted magma batches. In contrast to predictions for fast-spreading axes, diverse liquid lines are required to explain the compositions observed.

Basalt densities range from 2.83 to 2.99 g/cm^3 in reasonable agreement with the formation densities obtained by logging and vary inversely with porosity which ranges from 1.1% to 9.3%. Compressional wave velocities average 5.9 km/s, range from 5.29 to 6.18 km/s and decrease irregularly with depth, perhaps due to increased alteration. The physical properties measured at this site are typical of fresh, relatively young basalt and, except for velocities, show no clear downhole trends.

Paleomagnetic measurements were completed only for Hole 483. The uppermost basalt layer, encountered in Core 13, has a positive inclination averaging about +34°. Below this level, measured polarities are mostly negative with inclinations ranging from −11° to −50°. Magnetic intensities range from 1.21 to 47.6 x 10^{-3}g, with the low values being from massive units and the high values from pillow basalts. The median destructive field ranges from 18 to 339 Oe, again with the low values from massive units and the high values from pillows.

SITE 484

Two holes were drilled at Site 484, located on top of a basement high interpreted as a magnetic "diapir." Hole 484 penetrated 5 meters of sediment before encountering basement; Hole 484A was drilled to a sub-bottom depth of 62 meters,

21

59.5 meters in sediment and 2.5 meters in basement. Recovery in the sediment section was 69%, but only one small piece of basalt was recovered from the basement in Hole 484A.

The sediments at Site 484 are largely grayish olive, hemipelagic clay with minor muddy nannofossil and diatomaceous ooze and interlayered beds of clayey silt and sand. The relatively coarse-grained silts and sands are generally a few centimeters thick and are confined to the upper 15 meters of the section. They consist of quartz, feldspar, pyroxene and glauconite with some reworked foraminifers. The clays contain varying proportions of diatoms, radiolarians, and sponge spicules up to a maximum of about 50%. Calcareous nannofossils generally make up 10–20% of the sediment but increase to as much as 40% in the lowest 15 meters.

All of the recovered sediments are Late Quaternary. The boundary between nannofossil zones NN19 and NN20 is at the base of Core 5, about 45 meters sub-bottom. Sediments above this level are assigned to the *Artostrobium miralestense* radiolarian zone and those below to the *Axoprunum angelinum* zone. Sediments just above basement are estimated to be about 0.45 m.y. old, giving a sedimentation rate of about 100 m/m.y.

The physical properties of the sediments are more characteristic of compacted material than of the young sediments drilled in other holes on Leg 65, suggesting possible removal of the upper part of the sediment section by erosion. The wet-bulk density averages 1.47 g/cm^3, the compressional wave velocity 1.52 km/s, and the porosity about 71%. Only the shear strength shows significant downhole variation, ranging from 0.08 tons/ft^2 at the mudline to 0.39 tons/ft^2 at a sub-bottom depth of 51 meters.

The one piece of basement recovered consists of sparsely plagioclase-olivine-spinel(?)-phyric tholeiitic basalt with a quench-textured groundmass. Plagioclase and rare olivine and spinel(?) phenocrysts make up about 2%. Excellent skeletal plagioclase crystals and rare skeletal olivine crystals also occur in the groundmass which consists largely of sheaf-like intergrowths of poorly crystallized clinopyroxene, plagioclase, and magnetite. The basalt has an MgO content of 5.7% and an Mg/(Mg + Fe^{+2}) ratio of 0.514. This is the most chemically evolved basalt drilled on Leg 65 and would appear to be more characteristic of transform fault or off-ridge volcanism than of rift zone volcanism.

The magnetic "diapir" drilled at Site 484 appears to consist of a basalt basement hill with a sediment pond at the top. Some other lithology could exist beneath the basalt but penetration was insufficient to identify the source of the magnetic anomaly. The sediments are mostly hemipelagic muds and clays but include significant proportions of silt and sand of probable turbidite origin.

SITE 485

Two holes were drilled at Site 485, 485 was cored from the mudline to 50.5 meters sub-bottom and 485A was continuously cored from 50.5 to 331.0 meters sub-bottom. Drilling conditions were excellent, and the average recovery, respectively, was about 73% and 50% in Holes 485 and 485A.

One hundred and fifty-three meters of sediment overlie acoustic basement. These are chiefly hemipelagic clays with minor terrigenous material. Two units are recognized on the basis of the frequency and thickness of sandy and silty layers interpreted as distal turbidites. The upper unit, extending from the mudline to 79 meters sub-bottom, is chiefly soft to firm, grayish olive clays with a 5–15% silt fraction. A few layers of silty clay, clayey silt and, rarely sandy silt range up to about 30 cm in thickness.These layers contain detrital quartz, feldspar, and heavy minerals and some plant material.

The lower unit from 70.5 to 153.5 meters sub-bottom is similar to the upper one except that clayey silts and silty sands comprise about 35–40%. Most of the sandy and silty layers are poorly indurated and poorly recovered. Calcareous nannofossils average about 15–20% of the clays but increase to 40% or 50% just above the basement contact.

All of the sediments, both above and within the basement, are assigned to the Quaternary. The upper 36 meters are assigned to nannofossil zone NN20–21 (undifferentiated) and the *Astrostrobium miralestense* radiolarian zone. The *Acoprunum angelinum* radiolarian zone is recognized definitely to a sub-bottom depth of 79 meters and possibly to a depth of 277.5 meters, well within acoustic basement. The lowest sediment recovered at this site (about 314 meters sub-bottom) is assigned to nannofossil zone NN19. These sediments are probably no older than 1.22 m.y. No definite age could be assigned to the lowest sediments above basement.

The physical properties of the sediments at this site are somewhat different from those measured at Sites 482 and 483. Instead of remaining constant in the upper 50–70 meters of the section, they change regularly downward from the mudline to the basement. The wet-bulk density increases from about 1.4 to 1.9 g/cm^3, the compressional wave velocity increases from 1.5 to 1.7 km/s, and the porosity decreases from 75% to 45%. This pattern suggests little drilling disturbance in the upper part of the section; thus the measured values listed above may approximate *in situ* values.

Basement was cored from 153.5 to 331.0 meters sub-bottom with an average recovery of 51%. As at Sites 482 and 483, the upper part of the basement consists of interlayered massive basalts (44%) and sediments (56%). Because of poor recovery in the sediments, both the drilling record and downhole logs were used to define basement stratigraphy. The interlayered sediments are moderately indurated clayey siltstones with minor sandstone and claystone. Muddy nannofossil marls are present in a few cores and several pieces of limestone were recovered in Core 22. Pyrite-filled burrows and concretions are fairly common. The massive basalts are similar to those found at Sites 482 and 483 except that they are often thicker, are sometimes much coarser-grained, and have better evidence of intrusive contacts. We recognize 8 lithologic units in the basement based on the criteria used at Site 483. Possible baked contacts occur at the top of Units 4, 7, and 8, and Units 4 and 8 have coarse-grained "gabbroic" textures similar to those expected from slow cooling in a sill.

The basalts are sparsely to moderately phyric with mainly plagioclase and olivine phenocrysts; minor clinopyroxene and spinel sometimes occur in glomeroporphyritic clots with plagioclase. The coarse-grained basalts have ophitic "gabbroic" textures and are characterized by the presence of both pigeonite and augite, as well as interstitial groundmass quartz.

Compositionally, the basalts are more uniform than at the other sites drilled on Leg 65, generally with a relatively narrow range of MgO (7.0% to 7.9%). One nearly aphyric basalt from cooling Unit 1 has 10% MgO and probably reflects a mafic liquid magma composition. The basalts could all be related to a common parent liquid by crystal fractionation.

Most of the basalts exhibit low temperature alteration characterized by replacement of olivine and interstitial glass by smectites and minor carbonate. Veins and sparse vesicles are usually filled with smectite, carbonate, and pyrite; more rarely, they contain minor epidote. The coarse-grained rocks exhibit extensive evidence of deuteric alteration with actinolite and minor epidote replacing clinopyroxene. In a few basalts, chlorite replaces smectite, suggesting some higher temperature, hydrothermal alteration.

The basalt physical properties are also similar to those at Sites 482 and 483. The wet-bulk density ranges from 2.80 to 3.02 g/cm^3, the compressional wave velocity from 5.0 to 6.2 km/s, and the porosity from 3% to 4%. These variations reflect alteration of the basalts rather than regular downhole trends.

In sum, the basement at this site is similar to that at Sites 482 and 483 but the thickness of the upper section composed of interlayered sediment and basalt is thicker, probably because of a higher sedimentation rate. Many of the basalts here are probably or definitely intrusive, and have developed textures and mineralogies reflecting slow cooling.

CONCLUSIONS

Drilling in the Gulf of California confirms that this is an area of high sedimentation with large contributions from adjacent continental landmasses. The sediments above basement are largely hemipelagic clays with sparse muddy nannofossil and radiolarian oozes and some silty or sandy layers interpreted as distal turbidites. All of the drilled sediments are Quaternary in age and calculated sedimentation rates range from about 50 to 625 m/m.y.

Acoustic basement consists of an upper sequence of interlayered massive basalts and sediments from about 50 to more than 160 meters thick. Below this at Sites 483 and 474 (drilled on Leg 64) is a sequence of interlayered pillow and massive basalt with only a few thin sedimentary intercalations. Some of the upper massive basalts are probably submarine lava flows; some are definitely sills with intrusive contacts and coarse-grained "gabbroic" textures.

Drilling on the East Pacific Rise does not support speculations that basalts erupted along fast-spreading ridges are compositionally more uniform than those erupted along slow-spreading ridges. A number of distinct chemical groups can be recognized in the basement basalts and at least two of these probably represent separate parental magmas. Chemical and mineralogical evidence also indicates shallow level crystal fractionation with a range of compositions similar to some Atlantic Ocean sites. Generally, the upper massive basalts are the most mafic with MgO values up to 9% or 10% whereas the lower pillowed and massive basalts are more chemically evolved.

Temperature measurements in the sediments at Site 482 confirmed that crustal rocks near the ridge crest are relatively hot. Despite a measured basement temperature of 150° C, the rocks are relatively fresh and most observed alteration is the result of low temperature basalt-sea water interaction. The observed temperature gradients strongly suggest that hydrothermal circulation is occurring in the oceanic crust and a few small zones of hydrothermal alteration were found in the basalts. This probably developed around fractures or channelways through which hot water was flowing.

The magnetic polarities of the basement rocks are generally in accord with the observed surface anomalies, but the stabilities are low, probably reflecting the relatively coarse-grained nature of most of the basalts. An upper basalt unit with a positive inclination overlies basalts with negative inclinations at Site 483. Measured stable NRM inclinations mostly fall within the range expected for secular variation, but some tilting or rotation in the basement cannot be ruled out on the basis

23

of magnetic evidence alone. However, the continuity of lithologic, chemical and magnetic units between adjacent holes at several sites argues against significant tectonic disruption of the crust.

The expected correlation between high *in situ* seismic velocities and good drilling seems to be generally confirmed. The massive basalts were fairly easy to drill and recovery was good, but the pipe became stuck in two holes. We believe, however, that this may be due to collapse of the sediments above basement around the pipe rather than to jamming with basalt rubble since the bit was above the basement-sediment contact in both instances. If this interpretation is correct, hole stability could have been achieved by casing the sedimentary section to basement, as was done at Site 483.

EXPLANATORY NOTES

INTRODUCTION

The Leg 65 Initial Core Description is presented here to aid investigators in selecting samples for detailed study. Potential investigators who desire to obtain samples should refer to the DSDP-NSF Sample Distribution Policy. Sample request forms may be obtained from:

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

Requests must be as specific as possible: include site, core, section, interval within a section, and volume of sample required. The purpose of this publication is to aid interested investigators in understanding (1) the terminology, labeling, and numbering conventions used by the Deep Sea Drilling Project (DSDP); (2) the sediment classification and biostratigraphic framework used on Leg 65; and (3) to present the preliminary lithologic and paleontologic data on core forms, so that sampling can be guided. The investigator should be aware that the data is subject to future revision.

NUMBERING OF SITES, HOLES, CORES, AND SAMPLES

DSDP drill sites are numbered consecutively from the first site drilled by *Glomar Challenger* in 1968. Site numbers are slightly different from hole numbers. A site number refers to one or more holes drilled while the ship was positioned over one acoustic beacon. These holes could be located within a radius as great as 900 meters from the beacon. Several holes may be drilled at a single site by pulling the drill pipe above the sea floor (out of one hole) and moving the ship 100 meters or more from the previous hole, and then begin drilling another hole.

The first (or only) hole drilled at a site takes the site number. A letter suffix distinguishes each additional hole at the same site. For example: the first hole takes only the site number; the second takes the site number with suffix A; the third takes 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 from different holes usually do not come from equivalent positions in the stratigraphic column.

The cored interval is measured in meters below the sea floor. The depth interval of an individual core is the depth below sea floor at which the coring operation began, to the depth at which the coring operation ended. Each coring interval is generally 9.5 meters long, which is the nominal length of a core barrel; however, the coring interval may be shorter or longer (rare). "Cored intervals" are not necessarily adjacent to each other, but may be separated by "drilled intervals." In soft sediment, the drill string can be "washed ahead" with the core barrel in place, but not recovering sediment, by pumping water down the pipe at high pressure to wash the sediment out of the way of the bit and up the space between the drill pipe and wall of the hole; however, if thin hard rock layers are present then it is possible to get "spotty" sampling of these resistant layers within the washed interval, and thus have a cored interval greater than 9.5 meters.

Cores taken from a hole are numbered serially from the top of the hole downward. Core numbers and their associated cored interval in meters below the sea floor are normally unique for a hole but problems may arise if an interval is cored twice. When this situation occurs, the core number is assigned a suffix, such as "S"* for supplementary.

Full recovery for a single core is normally 9.28 meters of sediment or rock, which is in a plastic liner (6.6 cm I. D.), plus about a 0.2 meter-long sample (without a plastic liner) in the Core-Catcher. The Core-Catcher is a device at the bottom of the core barrel which prevents the cored sample from sliding out when the barrel is being retrieved from the hole. The sediment core, which is in the plastic liner, is then cut into 1.5 meter-long sections which are numbered serially from the top of the sediment-core (Figure 3). When full recovery is obtained, the sections are numbered from 1 through 7 with the last section being shorter than 1.5 meters. The Core-Catcher sample is placed below the last section when the core is described, and labeled Core-Catcher (CC): it is treated as a separate section.**

---

* Note that this designation has been used on previous legs as a prefix to the core number for sidewall core samples.

** This procedure is followed for sediments only. For basalts, the Core-Catcher sample is incorporated into and given the number of the last section.

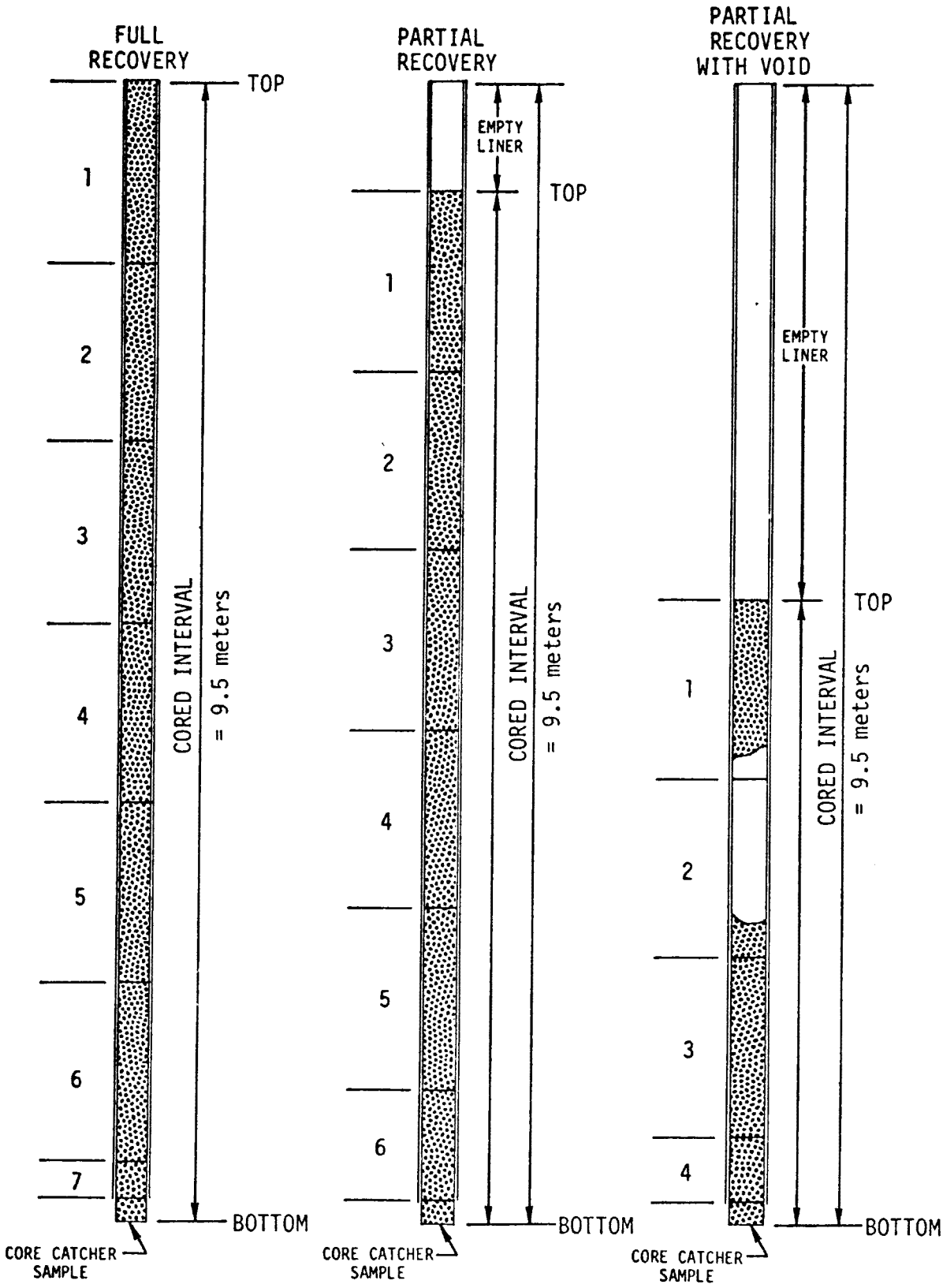


Figure 3. Labeling of sections for various kinds of recovery.

When recovery is less than 100%, and if the sediment or rock is contiguous, the 1.5 meter-long sections are numbered serially, starting with Section 1 at the top of the recovered material.* There will be as many sections as needed to accommodate the length of the core recovered (Figure 3); for example, 3 meters of core sample in plastic liners will be divided into two 1.5 meter-long sections. Since the sections are cut starting at the top of the recovered material, the last section may be shorter than the normal 1.5 meter length.

When recovery is less than 100%, the sediment's original stratigraphic position in the cored interval is unknown, so we employ the convention assigning the top of the sediment recovered to the top of the cored interval. This is done for convenience in data handling, and consistency. If recovery is less than 100%, and core fragments are separated, and if shipboard scientists believe the sediment was not contiguous, then sections are numbered serially and the intervening sections are noted as void, whether it is contiguous or not. The Core-Catcher sample is described in the Core Description Forms beneath the lowest section.

Samples are designated by centimeter distances from the top of each section to the top and bottom of the sample in that section. A full identification number for a sample consists of the following information:

Leg
Site
Hole
Core Number
Interval in centimeters from the top of section

For example, a sample identification number of "65-483-9-3, 12–14 cm" is interpreted as follows: 12 to 14 cm designates a sample taken at 12 to 14 cm from the top of Section 3 of Core 9, from the first hole drilled at Site 483 during Leg 65. A sample from the Core-Catcher of this core is designated as "65-483-9, CC, 12–14 cm."

The depth below the sea floor for a sample numbered "65-483-9-3, 12–14 cm," is the summation of the following: 1) the depth to the top of the cored interval for Core 9, which is 67.5 meters; 2) plus 3 meters for Sections 1 and 2 (each 1.5 meters long) plus the 12 cm depth below the top of Section 3. All of these variables add up to 70.62 meters**, which theoretically is the sample depth below the sea floor.

HANDLING OF CORES

A core is normally cut into 1.5 meter sections, sealed, and labeled; the sections are then brought into the core laboratory for processing. The following determinations normally are made before the sections are split: gas analysis, thermal conductivity analysis (soft sediment only), and continuous wet-bulk density determinations using the Gamma Ray Attentuation Porosity Evaluation (GRAPE) technique.

The cores are then split longitudinally into"working" and "archive" halves. The archive half is described and photographed, but not sampled. Samples are extracted from the "working" half, for determinations of grain-size distribution, mineralogy by x-ray diffraction, sonic velocity by the Hamilton Frame method, wet-bulk density by a static GRAPE technique, water content by gravimetric analysis, carbon/carbonate analysis, per cent calcium carbonate (Karbonate Bomb), geochemical analysis, paleontological studies, magnetic studies, and shorebased studies, depending on the nature of the material. Smear slides or thin sections from each major lithology, and most minor lithologies, are prepared and examined microscopically. Physical disturbance by the drill bit, color, texture (for uncemented lithologies), sedimentary structures and composition (± 20%) of the sediments are recorded on Core Description Forms (Figure 4) while the characteristics of igneous rocks are recorded on Visual Core Description Forms (Figure 5).

After the cores are sampled and described, they are maintained in cold storage aboard *Glomar Challenger* until they can be transferred to a DSDP repository. Core sections removed for organic geochemistry study are frozen immediately on board ship and kept frozen. All Leg 65 cores and frozen cores are presently stored at the DSDP West Coast Repository (Scripps Institution of Oceanography).

Descriptions of cores, smear slides and thin-sections, and determinations of $CaCO_3$ content (Karbonate Bomb), physical properties, chemical composition, and rock magnetism were made for Leg 65 onboard ship. The samples used and their location in the cores, are coded on the core description sheets; the keys to these codes are shown in Figures 4 and 5.

---

* This technique differs from the labeling systems used on Legs 1 through 45, which had a designation called "zero section," but did not have a "number 7 section."

** Sample requests should refer to a specific interval within a core-section, rather than the level below sea floor.

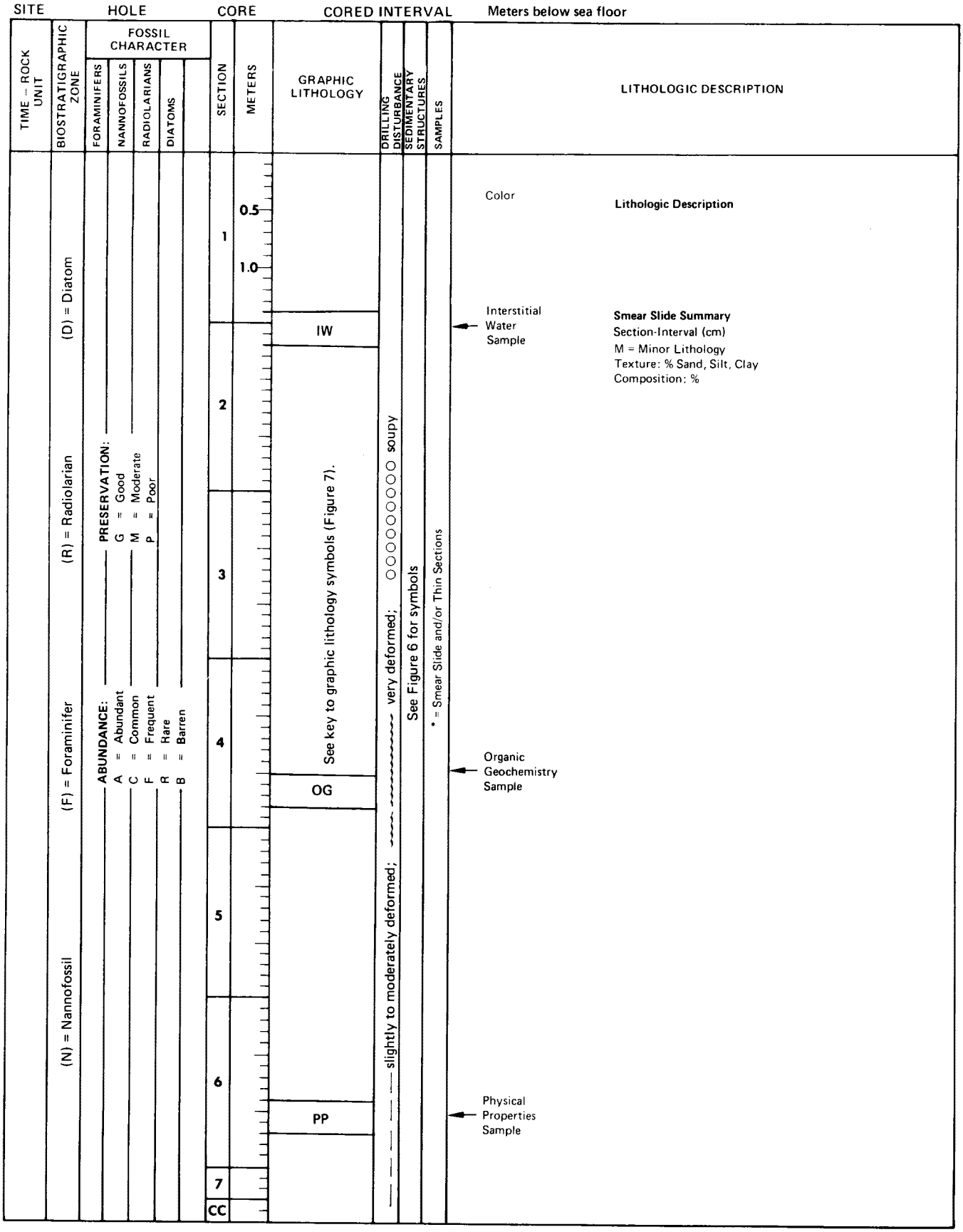


Figure 4. Core Description Form (sediment).

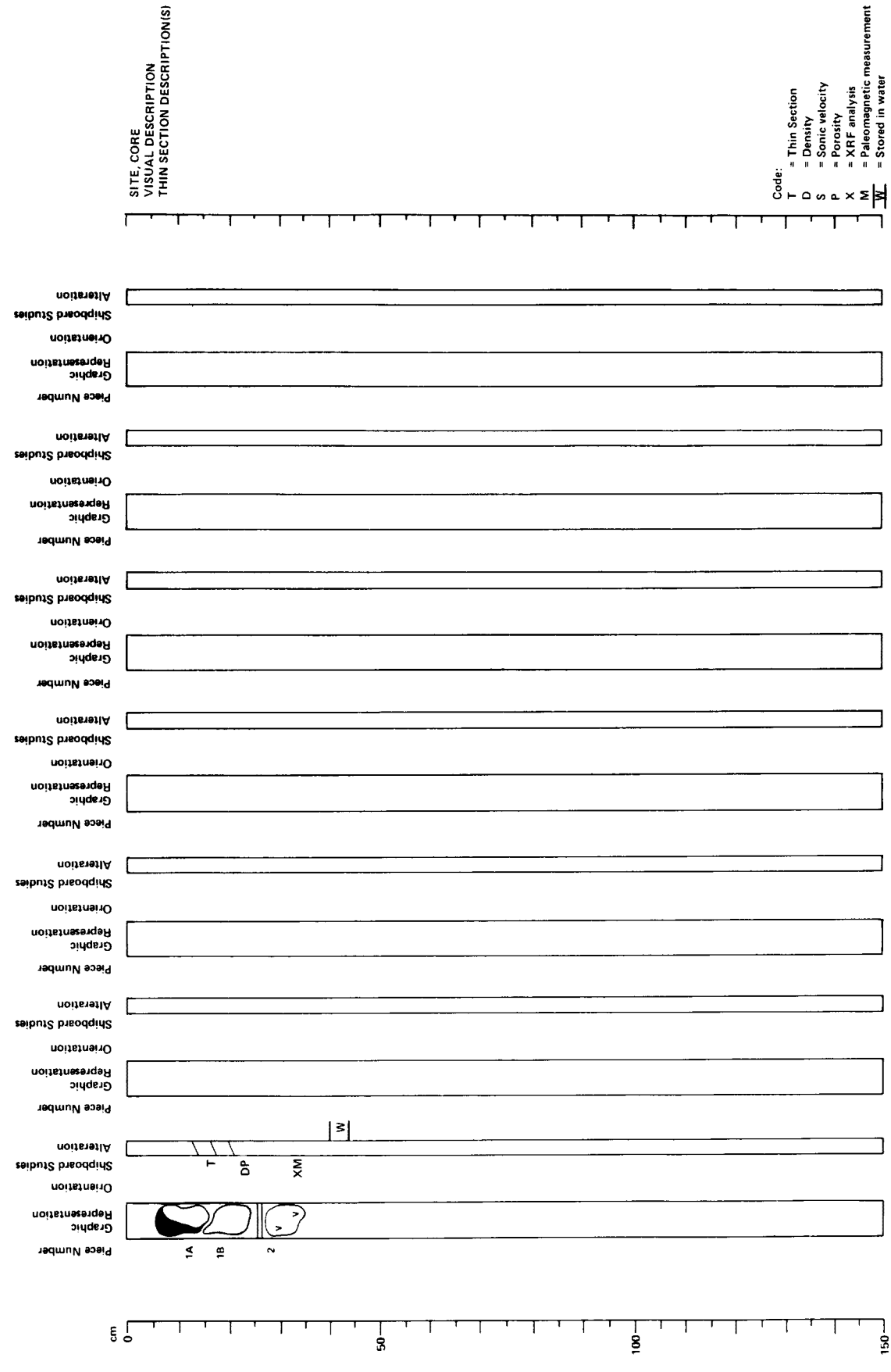


Figure 5. Visual Core Description Form (igneous rocks).

SEDIMENT DESCRIPTION CONVENTIONS

Sediment Disturbance

Recovered rocks, and particularly the soft sediments, may be extremely disturbed. This mechanical disturbance is the result of the coring technique, which uses a large 25 cm diameter bit with a small 6.0 cm diameter opening for the core sample. The following disturbance categories are used for soft and firm sediment. The data is presented in the Drilling Disturbance column on the Core Description Form by coded patterns to which the key is shown in Figure 4. The categories are as follows:

(a) Slightly deformed: bedding contacts are slightly bent.
(b) Moderately deformed: bedding contacts have undergone extreme bowing.
(c) Very deformed: bedding is completely disturbed, sometimes showing symmetrical "diapiric" structures.
(d) Soupy: water saturated intervals which have lost all aspects of original bedding.

Sediment Induration

The determination of induration is highly subjective, but field geologists have successfully made similar distinctions for many years. The criteria of Gealy, E. L., et al. (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).

Sedimentary Structures

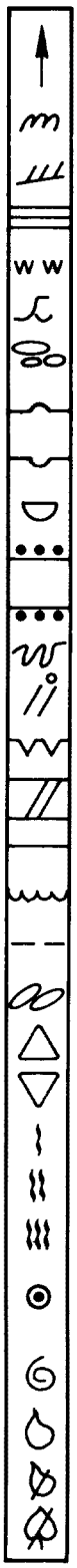
In the soft, and even in some harder sedimentary cores, it may be extremely difficult to distinguish between natural structures and structures created by the coring process. A column on the Core Description Form (Figure 4) may have patterns (coded symbols) to indicate typical structures. A set of structure symbol codes recommended by an *ad hoc* committee of the JOIDES Sedimentary Petrology and Physical Properties Panel is shown in Figure 6.

Color

Colors are determined with a Munsell or Geological Society of America Rock-Color Chart immediately after the cores are split (i.e. while in a wet condition).

Smear Slides

The lithologic classification of sediments is based on visual estimates of texture and composition in smear slides made onboard 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 (~ 1 or 2%), but that an accuracy of ~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 are given on the Core Description Forms.



Primary Structures

Interval over which primary sedimentary structures occur

Current ripples

Micro-cross–laminae (including climbing ripples)

Parallel laminae

Wavy bedding

Flaser bedding

Lenticular bedding

Slump blocks or slump folds

Load casts

Scour

Graded bedding (NORMAL)

Graded bedding (REVERSED)

Convolute and contorted bedding

Water escape pipes

Mudcracks

Cross-stratification

Sharp contact

Scoured, sharp contact

Gradational contact

Imbrication

Fining-upward sequence

Coarsening-upward sequence

Bioturbation - minor (30% surface area)

Biotrubation - moderate (30-60% surface area)

Bioturbation - strong (more than 60% surface area)

Secondary Structures

Concretions

Compositional Symbols

Fossils in general (megafossils)

Shells (complete)

Shell fragments

Wood fragments

Figure 6. Structure symbol code for sediments.

Lithologic Classification

The basic classification system used on Leg 65 was devised by the JOIDES Panel on Sedimentary Petrology and Physical Properties (SPPP) and adopted for use by the JOIDES Planning Committee in March, 1974. The divisions used are necessarily artificial and the classification is only a rough grouping of what we really find in nature. The classification scheme is thus descriptive and genetic implications are not intended. As noted above, the sediment and rock names used are defined solely on the basis of texture and composition determined onboard ship from visual smear slide estimates. As in most such classification schemes, the texture is most important in the description of hemipelagic and nearshore sediments while the composition is important for sediments deposited under open marine conditions. Since the classification system is not comprehensive, a "Special Rock Type" category has been provided for rock types not covered.

The symbols used in the graphic lithology column of the Core Description Form (Figure 4) are shown in Figure 7. A single lithology will be represented by a single pattern. Some lithologies are represented by a grouping of two or more symbols. The symbols in this grouping may correspond to end member sediment constituents, such as clay and nannofossil ooze. The percentage of one component to another may be represented in the graphic column by the symbols being presented in proportion to their percentages. For example 20% of the column may have a clay symbol where 80% of the column may have a nannofossil ooze symbol. This would mean that the sample was approximately 80% nannofossils and 20% clay. The vertical lines which separate the symbols are shown in Figure 7 with their corresponding percentages and positions in the column. The format, style and terminology used in the descriptive portion of the form are not specified beyond the minimal name assignment derived using the classification scheme outlined below.

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%.
   - 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. Composition Class Boundaries
   - A. $CaCO_3$ content (determined by $CaCO_3$ bomb)

     Boundaries of 30 and 60%. With a 5% precision and given the natural frequency distribution of $CaCO_3$ content 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%.
   - E. Qualifiers

     In general, constituents in the 10 to 30% range may be identified in the sediment name e.g., vitric diatomaceous mud or vitric muddy diatomaceous ooze. If more than one such qualifier is used, they are listed in order of increasing abundance in the sediment. Components of less than 5% (in smear slide) should not be used as qualifiers except in special cases.

III. Description of Sediment Types
   - 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

        Boundary of pelagic clay with terrigenous sediments is where authigenic components (Fe/Mn micronodules, zeolites), fish debris, etc., become common (> 10%) in smear slides indicating pelagic clay. The accumulation rates of pelagic clay and terrigenous sediments are very different, therefore transitional deposits are exceptional.

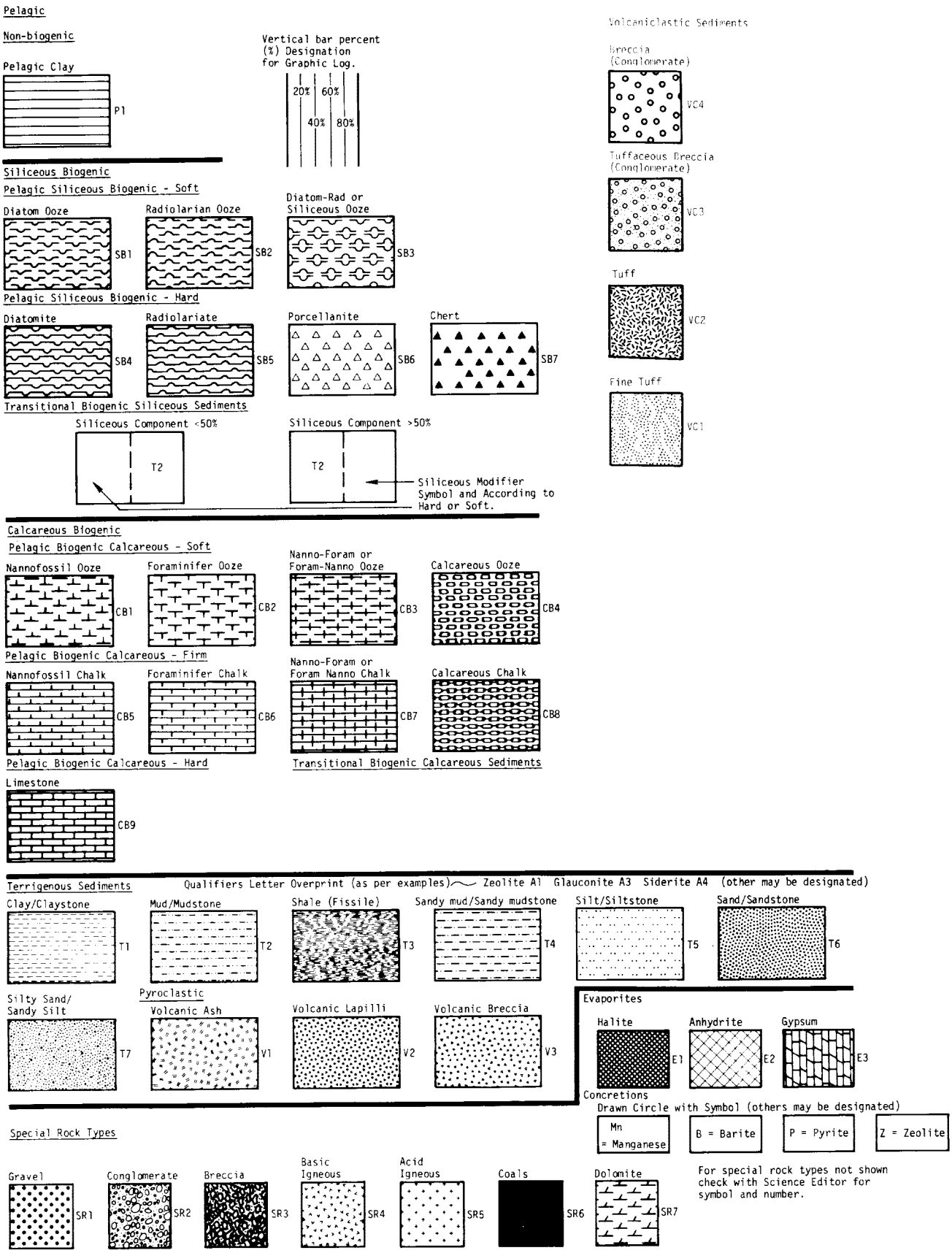


Figure 7. Graphic symbols to accompany the lithologic classification scheme.

2. Boundary With Siliceous Biogenic Sediments
   < 30% identifiable siliceous remains.
3. Boundary With Calcareous Biogenous Sediments
   Generally the sequence is one passing from pelagic clay through siliceous ooze to calcareous ooze, with one important exception: at the base of many oceanic sections, black, brown or red clays occur directly on basalt, overlain by or grading up into calcareous sediments. Most of the basal clayey sediments are rich in iron, manganese and metallic trace elements. For proper identification they require more elaborate geochemical work than is available on shipboard. These sediments are placed in the "Special Rock" category, but care should be taken to distinguish them from ordinary pelagic clays.

B. Pelagic Siliceous Biogenic Sediments

These are distinguished from the previous category because they have more than 30% identifiable siliceous microfossils. They are distinguished from the following category by a $CaCO_3$ content of less than 30%. There are two classes: pelagic biogenic siliceous sediments (containing less than 30% silt and clay), and transitional biogenic siliceous sediments (containing more than 30% silt and clay and more than 10% diatoms).

1. Pelagic Biogenic Siliceous Sediments
   (a) Soft: siliceous ooze (radiolarian ooze, diatomaceous ooze, depending on dominant component).
   (b) Hard: radiolarite, porcellanite, diatomite, and chert.
   (c) Qualifiers:
   Radiolaria dominant – radiolarian ooze or radiolarite.
   Diatoms dominant – diatom ooze or diatomite.
   Where uncertain – siliceous (biogenic) ooze, chert or porcellanite.
   When containing >10% $CaCO_3$, qualifiers are as follows:

Indeterminate carbonate:	calcareous –
Nannofossils only:	nannofossil –
Foraminifers only:	foraminiferal –
Both:	nannofossil-foraminiferal- or foraminiferal-nannofossil-, depending on dominant component

2. Transitional Biogenic Siliceous Sediments

Diatoms	< 50%	diatomaceous mud:	soft
		diatomaceous mudstone:	hard
Diatoms	> 50%	muddy diatom ooze:	soft
		muddy diatomite:	hard

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 foraminifers. 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 as, for example, radiolarian-foraminiferal ooze.

2. Transitional Biogenic Calcareous Sediments

(a) $CaCO_3$ 30–60%: marly calcareous pelagic sediments.
Soft: marly calcareous (or nannofossil, foraminiferal, 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.

D. Terrigenous Sediments

1. Sediments 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 (Shepard, 1954). The size limits for these constituents are those defined by Wentworth (1922). Rocks coarser than sand-size are treated as "Special Rock Types." 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% $CaCO_3$ 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 and >4 mm
Volcanic ash (tuff, if indurated)	= < 4 mm

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

3. Clastic sediments of volcanic provenance are described in the same fashion as 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 such as halite, anhydrite, gypsum (as a rock), etc.
Shallow water limestone (biostromal, biohermal, coquina, oolite, etc.).
Dolomite.
Gravels, conglomerates, breccias.

SPECIAL STUDIES

Carbonate Bomb

Per cent $CaCO_3$ was also determined onboard ship by the Carbonate Bomb technique (Müller and Gastner, 1971). In this simple procedure, a sample is powdered and treated with HCl in a closed cylinder. Any resulting CO_2 pressure is pro-

35

portional to the $CaCO_3$ content of the sample. Application of the calibration factor to the manometer reading (X 100) yields per cent $CaCO_3$. The error can be as low as 1% for sediments high in $CaCO_3$, and in general an accuracy of ~2 to 5% can be obtained. The data is presented as "% $CaCO_3$" on the Core Description Form.

Organic Carbon

Measurements of organic carbon in selected samples were done onboard ship using the Hewlett-Packard CHN analyzer. These data are listed on the Core Description Forms as "% Organic Carbon."

BIOSTRATIGRAPHY

Biostratigraphic studies of Leg 65 material were still in progress when the Leg 65 Initial Core Descriptions were compiled, consequently, biostratigraphic boundaries given herein are tentative. Although no major changes in age assignments are anticipated, some boundaries are likely to be adjusted prior to publication of the *Initial Report* for Leg 65. Zonal schemes used by Leg 65 shipboard paleontologists are, for the foraminifers, Be' (1977); for the nannofossils, Martini (1971); for the radiolarians, Benson (1966), Hays (1970), and Nigrini (1971).

IGNEOUS ROCK DESCRIPTION CONVENTIONS

The Core Description Form for sediments is too compressed to provide adequate information for hard rock sampling. Consequently, the Visual Core Description Form shown in Figure 5 is used for igneous and metamorphic rocks to permit more detailed graphic representation. Each column on these forms covers one 1.5 meter section. Hand specimen and thin-section descriptions as well as sample locations are presented for each section, while the corresponding chemical, magnetic and physical properties data are presented in Tables 4, 5, and 6, respectively.

As in the case of the sediments, the basalt cores are split into an archive and a working half, and the former is described and the latter sampled on shipboard. On the core forms, the left box is a visual representation of the archive half. 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 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, the 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. Because the pieces were rotated during drilling it is not possible to sample for declination studies.

Samples were taken for various shipboard and shorebased measurements. The type of shipboard measurement and approximate location of the sample on which it was made are indicated in the column headed "Shipboard Studies" using the following codes:

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

A number of the physical property (S,D,P) samples recovered on Leg 65 were permanently stored in sea water. These are indicated by "W" to right of alteration column.

Finally, it should be noted that neither the X-ray fluorescence nor the magnetic data were completed on shipboard. In particular, the chemical data shown in Table 4 has been supplemented by shorebased Na_2O analyses supplied by P. Cambon.

REFERENCES

Be', A. W. A., 1977. An ecological, zoogeographic and taxonomic review of Recent planktonic foraminifera. *In* Ramsay, A. T. S. (Ed.), *Oceanic Micropaleontology,* 1 , Academic Press, London-New York-San Francisco, 1–100, 12 pls.

Benson, R. N., 1966. Recent Radiolaria from the Gulf of California. Unpublished PhD thesis, Univ. of Minnesota, Minneapolis, Minn., 577, 35 pls.

Gealy, E. L., Winterer, E. L., and Moberly, R., 1971. Methods, conventions and general observations. In *Init. Repts. DSDP*, 7: Washington (U. S. Govt. Printing Office), 9–26.

Hays, J. D., 1970. Stratigraphic and evolutionary trends of Radiolaria in North Pacific deep sea sediments. *In* Hays, J. D. (Ed.), *Geological Investigations of the North Pacific*, Geol. Soc. Am. Mem. 126, 185–218, 1 pl.

Martini, E., 1971. Standard Tertiary and Quaternary calcareous nannoplankton zonation: Plankt. Conf. Proc. 2nd, Roma 1970, 2, 739–785.

Müller, G. and Gastner, M., 1971. The "Karbonate Bomb," a Simple Device for Determination of the Carbonate Content in Sediments, Soils and Other Materials: *N. Jb. Miner. Mh,* 10, 466–469.

Nigrini, C. A., 1971. Radiolarian zones in the Quaternary of the equatorial Pacific Ocean. *In* Funnell, B. W. and Riedel, W. R. (Ed.), *The Micropaleontology of Oceans*, Cambridge University Press, 443–461, 1 pl.

Shepard, F. P., 1954. Nomenclature based on sand-silt-clay ratios: *J. Sediment. Petrol.*, 24, 151–158.

Wentworth, C. K., 1922. A scale of grade and class terms of clastic sediments. *J. Geol.*, 30, 377.

Wentworth, C. K. and Williams, H., 1932. The Classification and Terminology of the Pyroclastic Rocks: Rept. Comm. Sedimentation, *Bull. Nat. Res. Covnc.*, no. 80, 10–53.

37

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 disiplines 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 eachscruise. 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, downhole 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

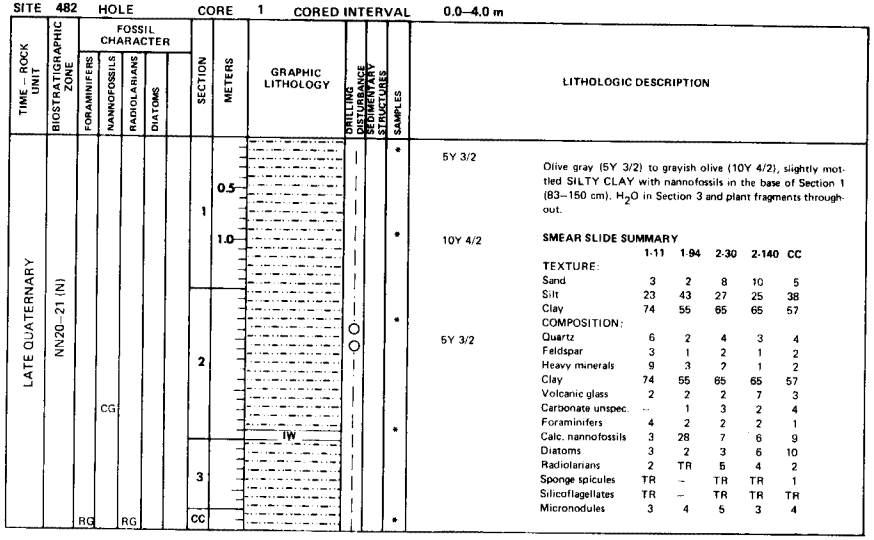
As a separate and special category samples will be distributed for the purpose of establishing up to five reference centers where paleontologic materials will be available for reference and comparison purposes. The first of these reference centers has been approved at Basel, Switzerland.
Revised 9/28/76

SITE SUMMARY

HOLE 482

Date occupied: January 24, 1979
Date departed: January 25, 1979
Time on hole: 20.1 hours
Position: (latitude; longitude): 22°47.38'N; 107°59.63'W
Water depth (sea level; corrected m, echo-sounding): 2998
Water depth (rig floor; corrected m, echo-sounding): 3015
Bottom felt (m, drill pipe): 3015
Penetration (m): 57.0
Number of cores: 1
Total length of cored section (m): 4.0
Total core recovered (m): 3.94
Core recovery (%): 99
Oldest Sediment Cored
Depth sub-bottom (m): 4.0
Nature: Silty clay
Age: Quaternary

SITE 482 HOLE CORE 1 CORED INTERVAL 0.0–4.0 m



Olive gray (5Y 3/2) to grayish olive (10Y 4/2), slightly mottled SILTY CLAY with nannofossils in the base of Section 1 (83–150 cm). H_2O in Section 3 and plant fragments throughout.

SMEAR SLIDE SUMMARY

	1-11	1-94	2-30	2-140	CC
TEXTURE:					
Sand	3	2	8	10	5
Silt	23	43	27	25	38
Clay	74	55	65	65	57
COMPOSITION:					
Quartz	6	2	4	3	4
Feldspar	3	1	2	1	2
Heavy minerals	9	3	7	1	2
Clay	74	55	65	65	57
Volcanic glass	2	2	2	7	3
Carbonate unspec.	--	1	3	2	4
Foraminifers	4	2	2	2	1
Calc. nannofossils	3	28	7	6	9
Diatoms	3	2	3	6	10
Radiolarians	2	TR	5	4	2
Sponge spicules	TR	--	TR	TR	1
Silicoflagellates	TR	--	TR	TR	TR
Micronodules	3	4	5	3	4

SITE SUMMARY

HOLE 482A

Date occupied: January 25, 1979
Date departed: January 25, 1979
Time on hole: 6.3 hours
Position (latitude; longitude): 22°47.38'N; 107°59.60'W
Water depth (sea level; corrected m, echo-sounding): 2998
Water depth (rig floor; corrected m, echo-sounding): 3015
Bottom felt (m, drill pipe): 3015
Penetration (m): 44.0
Number of cores: 5
Total length of cored section (m): 44.0
Total core recovered (m): 33.25
Core recovery (%): 76

Oldest Sediment Cored

Depth sub-bottom (m): 44.0
Nature: Silty Clay
Age: Quaternary
Measured velocity (km/s): 1.5

SITE 482 HOLE A CORE 1 CORED INTERVAL 0.0–6.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY	NN20–21 (N)	A G FM				1	0.5				•	5Y 3/2
							1.0					10Y 4/2
						2					•	
						3					•	
						4					•	
								VOID			•	5Y 3/2
						5						
						6					•	
		CG	CG	AG		CC					•	5Y 3/2

Soft olive gray (5Y 3/2) to grayish olive (10Y 4/2) SILTY MUD with a strong H_2S odor. Sediments in Section 4, 90–100 cm are slightly coarser-grained and display moderate bioturbation. Core-Catcher contains olive gray (5Y 3/2) SANDY SILT composed of mica and quartz with minor radiolarians, foraminifera, and lignite.

SMEAR SLIDE SUMMARY

	1-58	2-110	3-120	4-40	4-100	5-140	6-10 (M)
TEXTURE:							
Sand	5	–	10	5	20	15	30
Silt	40	45	40	45	30	25	20
Clay	55	55	50	50	50	60	50
COMPOSITION:							
Quartz	20	20	20	30	20	20	20
Feldspar	10	10	10	15	15	10	15
Mica	–	1	–	–	–	2	1
Heavy minerals	–	–	–	–	1	–	–
Clay	55	55	50	50	50	60	50
Volcanic glass	5	–	5	TR	–	–	–
Glauconite	TR	–	TR	–	1	–	1
Micronodules	5	5	–	TR	–	–	–
Carbonate unspec.	TR	–	TR	TR	10	–	1
Foraminifers	1	–	–	–	–	1	1
Calc. nannofossils	TR	TR	TR	–	–	TR	10
Diatoms	TR	10	5	5	3	5	TR
Radiolarians	TR	TR	–	TR	–	1	–
Sponge spicules	–	TR	TR	–	–	TR	–
Plant debris	–	–	–	–	–	2	–

SITE 482 HOLE A CORE 2 CORED INTERVAL 6.0–15.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY	NN20–21 (N)					1	0.5				•	5Y 3/2
							1.0					
						2					•	
											•	10Y 4/2
						3					•	5Y 3/2
												10Y 4/2
												5Y 3/2
						4					•	10Y 4/2
								VOID				
						5						5Y 3/2
						6						
						7						
		B	CG	FG		CC						

Soft olive gray (5Y 3/2) to grayish olive (10Y 4/2) DIATOMACEOUS SILTY CLAY with a strong H_2S odor throughout

SMEAR SLIDE SUMMARY

	1-80	2-50	2-100	3-75	4-94
TEXTURE:					
Sand	2	5	–	3	5
Silt	38	35	30	27	40
Clay	60	60	70	70	55
COMPOSITION:					
Quartz	15	16	12	15	20
Feldspar	6	6	5	5	15
Mica	1	–	1	–	2
Clay	60	60	70	70	55
Micronodules	2	2	TR	4	TR
Foraminifers	1	TR	1	TR	–
Calc. nannofossils	1	5	TR	TR	–
Diatoms	10	10	10	5	8
Radiolarians	2	TR	1	2	TR
Sponge spicules	TR	–	–	–	–
Silicoflagellates	TR	TR	TR	TR	TR
Plant debris	–	TR	–	TR	–

SITE 482 HOLE A CORE 3 CORED INTERVAL 15.5–25.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY	NN20–21 (N)	FG	CG	FG		1	0.5, 1.0				*	5Y 3/2

Soft olive gray (5Y 3/2) SANDY MUD.

SMEAR SLIDE SUMMARY

	1-75
TEXTURE:	
Sand	15
Silt	45
Clay	40
COMPOSITION:	
Quartz	30
Feldspar	15
Heavy minerals	1
Clay	40
Volcanic glass	2
Micronodules	3
Carbonate unspec.	2
Foraminifers	1
Calc. nannofossils	4
Diatoms	2
Radiolarians	TR
Sponge spicules	TR
Siliceoflagellates	TR

SITE 482 HOLE A CORE 4 CORED INTERVAL 25.0–34.5 m

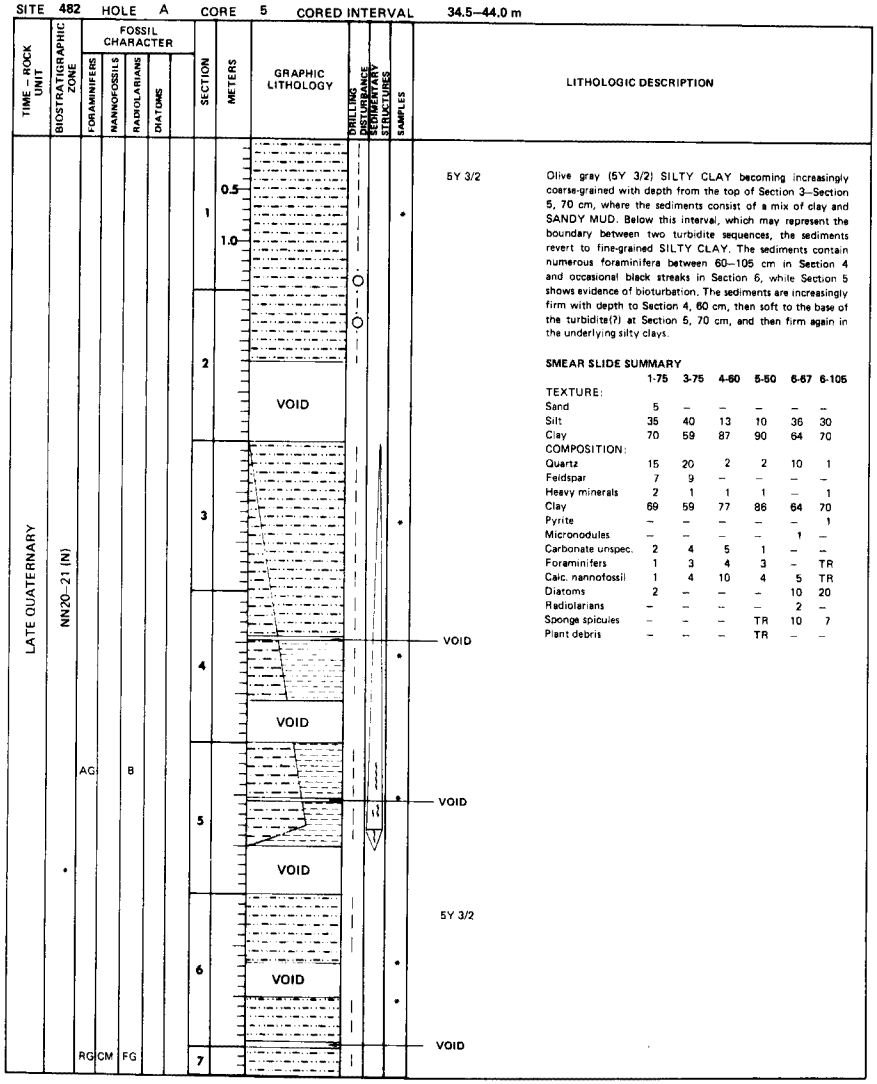
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY	NN20–21 (N)	CG	CG	AG		1	0.5, 1.0				*	5Y 3/2
						2					*	
						3					*	
						4		VOID			*	
												IW
						5		VOID			*	
						6		VOID			*	
								VOID				
						7						5Y 3/2
						CC						

Olive gray (5Y 3/2) SILTY CLAY with large foraminifera in Section 1, 30–50 cm. Core-Catcher consists of olive gray (5Y 3/2) SANDY MUD. Sediments soft in Section 1, moderately firm throughout remainder of core.

SMEAR SLIDE SUMMARY

	1-75	2-75	3-75	4-75	5-60	6-100
TEXTURE:						
Sand	2	7	7	6	1	10
Silt	40	43	48	47	30	40
Clay	58	50	45	47	69	50
COMPOSITION:						
Quartz	12	20	20	20	15	30
Feldspar	5	5	7	10	8	13
Heavy minerals	1	2	–	2	–	–
Clay	58	50	45	47	69	50
Volcanic glass	–	–	3	1	TR	–
Micronodules	4	5	4	4	1	1
Carbonate unspec.	4	2	2	3	–	TR
Foraminifers	2	3	5	2	1	3
Calc. nannofossils	7	7	8	7	4	3
Diatoms	7	4	5	4	TR	TR
Radiolarians	TR	1	TR	–	–	–
Sponge spicules	TR	1	1	TR	5	–
Siliceoflagellates	TR	TR	TR	TR	–	–
Plant debris	–	–	–	–	TR	–

SITE 482 HOLE A CORE 5 CORED INTERVAL 34.5–44.0 m



Olive gray (5Y 3/2) SILTY CLAY becoming increasingly coarse-grained with depth from the top of Section 3–Section 5, 70 cm, where the sediments consist of a mix of clay and SANDY MUD. Below this interval, which may represent the boundary between two turbidite sequences, the sediments revert to fine-grained SILTY CLAY. The sediments contain numerous foraminifera between 60–105 cm in Section 4 and occasional black streaks in Section 6, while Section 5 shows evidence of bioturbation. The sediments are increasingly firm with depth to Section 4, 60 cm, then soft to the base of the turbidite(?) at Section 5, 70 cm, and then firm again in the underlying silty clays.

SMEAR SLIDE SUMMARY

	1-75	3-75	4-60	5-50	6-67	6-105
TEXTURE:						
Sand	5	–	–	–	–	–
Silt	35	40	13	10	36	30
Clay	70	59	87	90	64	70
COMPOSITION:						
Quartz	15	20	2	2	10	1
Feldspar	7	9	–	–	–	–
Heavy minerals	2	1	1	1	–	1
Clay	69	59	77	86	64	70
Pyrite	–	–	–	–	–	1
Micronodules	–	–	–	–	1	–
Carbonate unspec.	2	4	5	1	–	–
Foraminifers	1	3	4	3	–	TR
Calc. nannofossil	1	4	10	4	5	TR
Diatoms	2	–	–	–	10	20
Radiolarians	–	–	–	–	2	–
Sponge spicules	–	–	–	TR	10	7
Plant debris	–	–	–	TR	–	–

4 C 1

SITE SUMMARY

HOLE 482B

Date occupied: January 25, 1979
Date departed: January 29, 1979
Time on hole: 99.6 hours
Position (latitude; longitude): 22°47.38'N; 107°59.60'W
Water depth (sea level; corrected m, echo-sounding): 2998
Water depth (rig floor; corrected m, echo-sounding): 3015
Bottom felt at (m, drill pipe): 3015
Penetration (m): 229.0
Number of cores: 24
Total length of cored section (m): 185
Total core recovered (m): 99.87
Core recovery (%): 54

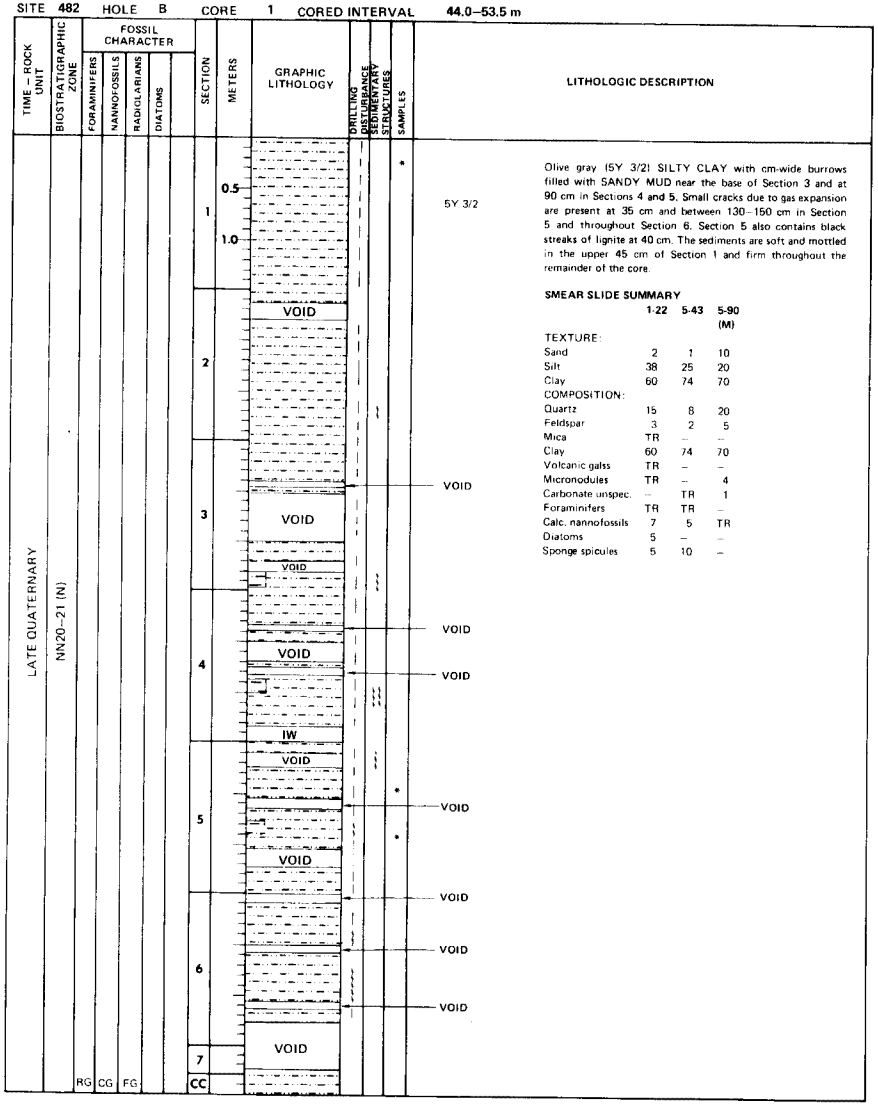
Oldest Sediment Cored

Depth sub-bottom (m): 137
Nature: Shale
Age: Quaternary
Measured velocity (km/s): 1.6

Basement

Depth sub-bottom (m): 229
Nature: Basalt
Velocity range (km/s): 5.6

SITE 482 HOLE B CORE 1 CORED INTERVAL 44.0–53.5 m

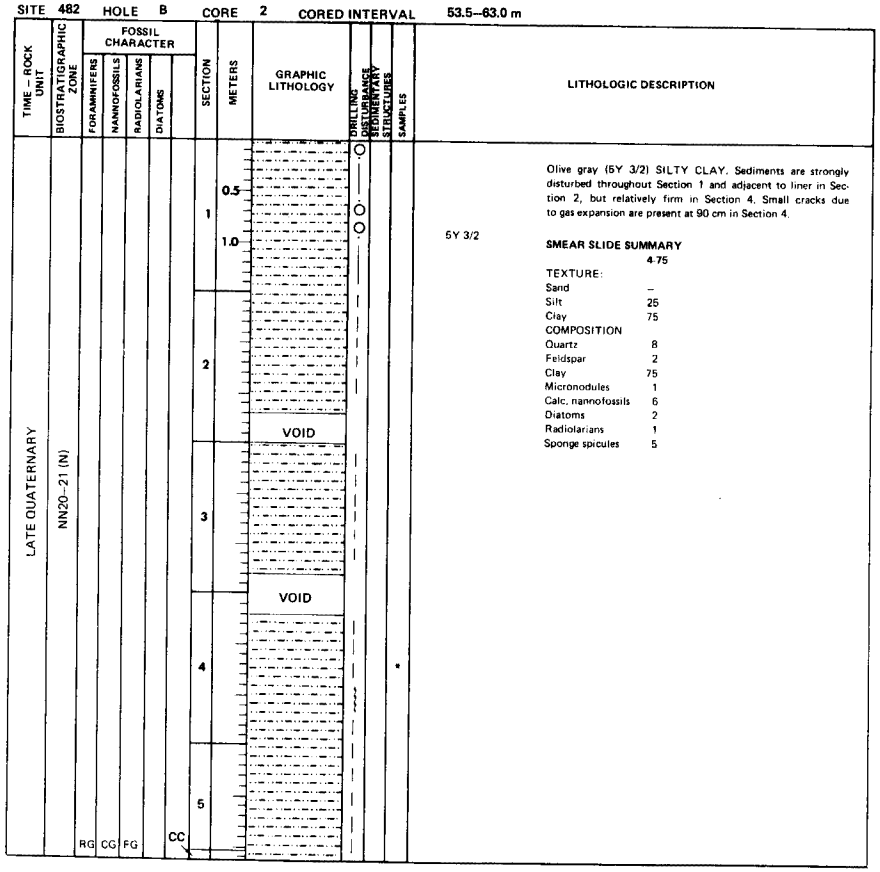


Olive gray (5Y 3/2) SILTY CLAY with cm-wide burrows filled with SANDY MUD near the base of Section 3 and at 90 cm in Sections 4 and 5. Small cracks due to gas expansion are present at 35 cm and between 130–150 cm in Section 5 and throughout Section 6. Section 5 also contains black streaks of lignite at 40 cm. The sediments are soft and mottled in the upper 45 cm of Section 1 and firm throughout the remainder of the core.

SMEAR SLIDE SUMMARY

	1-22	5-43	5-90 (M)
TEXTURE:			
Sand	2	1	10
Silt	38	25	20
Clay	60	74	70
COMPOSITION:			
Quartz	15	8	20
Feldspar	3	2	5
Mica	TR	–	–
Clay	60	74	70
Volcanic galss	TR	–	–
Micronodules	TR	–	4
Carbonate unspec.	–	TR	1
Foraminifers	TR	TR	–
Calc. nannofossils	7	5	TR
Diatoms	5	–	–
Sponge spicules	5	10	–

SITE 482 HOLE B CORE 2 CORED INTERVAL 53.5–63.0 m



Olive gray (5Y 3/2) SILTY CLAY. Sediments are strongly disturbed throughout Section 1 and adjacent to liner in Section 2, but relatively firm in Section 4. Small cracks due to gas expansion are present at 90 cm in Section 4.

SMEAR SLIDE SUMMARY

	4-75
TEXTURE:	
Sand	–
Silt	25
Clay	75
COMPOSITION	
Quartz	8
Feldspar	2
Clay	75
Micronodules	1
Calc. nannofossils	6
Diatoms	2
Radiolarians	1
Sponge spicules	5

SITE 482 HOLE B CORE 3 CORED INTERVAL 63.0–72.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY	NN20–21 (N)	CG	CG	CG		CC			○		*	5Y 3/2

Olive gray (5Y 3/2) SILTY CLAY.

SMEAR SLIDE SUMMARY

	CC-10
TEXTURE:	
Sand	2
Silt	34
Clay	63
COMPOSITION:	
Quartz	10
Feldspar	8
Heavy minerals	1
Clay	60
Volcanic glass	2
Micronodules	2
Carbonate unspec.	3
Foraminifers	1
Calc. nannofossils	3
Diatoms	4
Radiolarians	1
Sponge spicules	2
Silicoflagellates	4

SITE 482 HOLE B CORE 4 CORED INTERVAL 72.5–82.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY	NN20–21 (N)	RM	CG	FG		1	0.5					5Y 3/2
							1.0					
						2					*	
								VOID				
						3					*	
						CC						

Soft olive gray (5Y 3/2) SILTY CLAY. Sediments have a petroliferous odor but show no fluorescence. Upper 110 cm of Section 1 strongly disturbed.

SMEAR SLIDE SUMMARY

	2-75	3-75
TEXTURE:		
Sand	2	5
Silt	21	35
Clay	57	60
COMPOSITION:		
Quartz	15	25
Feldspar	5	5
Mica	–	TR
Heavy minerals	3	–
Clay	57	60
Volcanic glass	–	TR
Glauconite	–	TR
Micronodules	4	4
Zeolite	–	TR
Carbonate unspec.	2	–
Foraminifers	3	TR
Calc. nannofossils	9	5
Diatoms	1	1
Radiolarians	TR	–
Sponge spicules	1	TR

SITE 482 HOLE B CORE 5 CORED INTERVAL 82.0–91.5 m

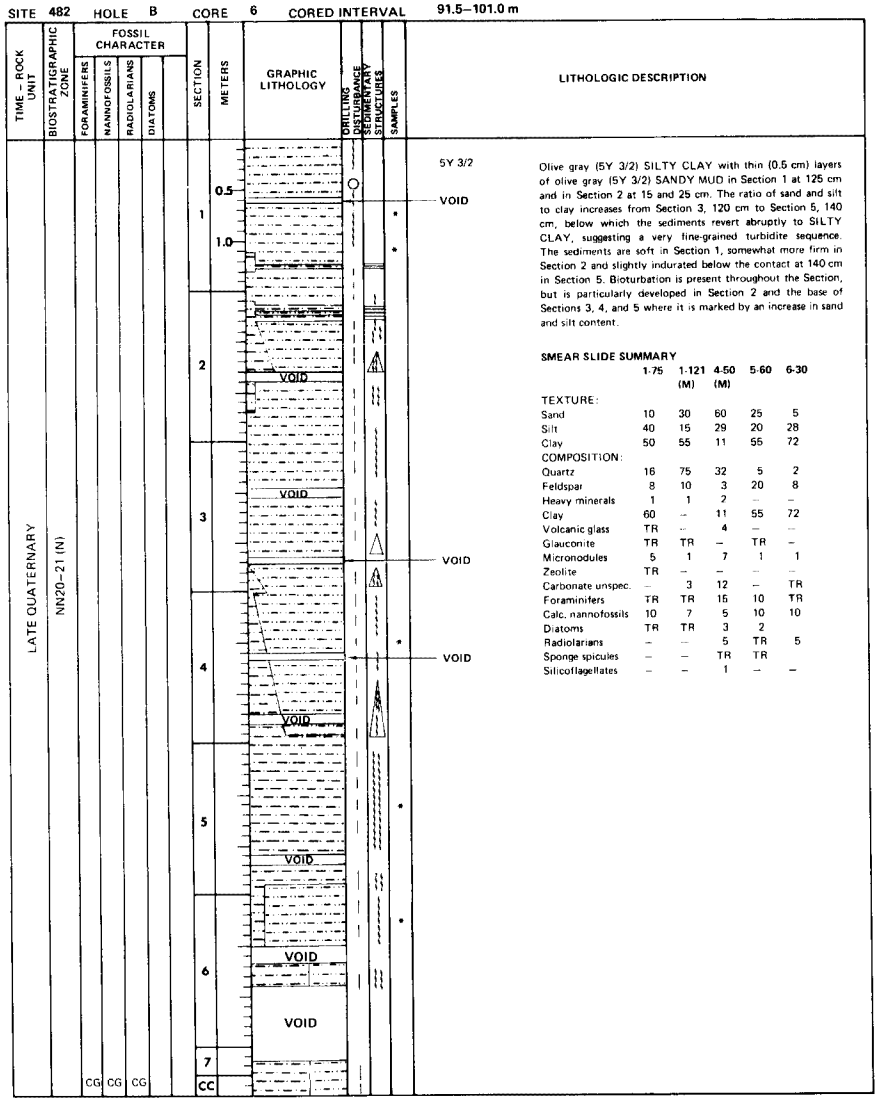
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY	NN20–21 (N)	RG	CG	CG		1	0.5		○		*	5Y 3/2
							1.0	VOID	○			
						2		VOID	○			
						3		VOID				
						CC						

Soft olive gray (5Y 3/2) NANNOFOSSIL-bearing SILTY CLAY with a high gas content. Sediments strongly disturbed in Section 1, but more indurated in Section 2 between 55–120 cm.

SMEAR SLIDE SUMMARY

	1-50
TEXTURE:	
Sand	5
Silt	35
Clay	60
COMPOSITION:	
Quartz	10
Feldspar	9
Mica	TR
Clay	60
Volcanic glass	TR
Micronoculdes	5
Zeolite	TR
Foraminifers	TR
Calc. nannofossils	15
Diatoms	TR
Radiolarians	TR

SITE 482 HOLE B CORE 6 CORED INTERVAL 91.5–101.0 m

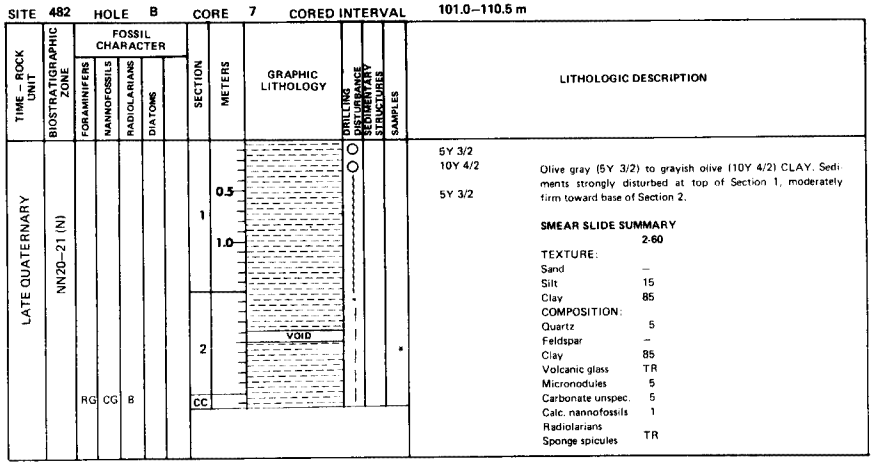


Olive gray (5Y 3/2) SILTY CLAY with thin (0.5 cm) layers of olive gray (5Y 3/2) SANDY MUD in Section 1 at 125 cm and in Section 2 at 15 and 25 cm. The ratio of sand and silt to clay increases from Section 3, 120 cm to Section 5, 140 cm, below which the sediments revert abruptly to SILTY CLAY, suggesting a very fine-grained turbidite sequence. The sediments are soft in Section 1, somewhat more firm in Section 2 and slightly indurated below the contact at 140 cm in Section 5. Bioturbation is present throughout the Section, but is particularly developed in Section 2 and the base of Sections 3, 4, and 5 where it is marked by an increase in sand and silt content.

SMEAR SLIDE SUMMARY

	1-75	1-121 (M)	4-50 (M)	5-60	6-30
TEXTURE:					
Sand	10	30	60	25	5
Silt	40	15	29	20	28
Clay	50	55	11	55	72
COMPOSITION:					
Quartz	16	75	32	5	2
Feldspar	8	10	3	20	8
Heavy minerals	1	1	2	–	–
Clay	60	–	11	55	72
Volcanic glass	TR	–	4	–	–
Glauconite	TR	TR	–	TR	–
Micronodules	5	1	7	1	1
Zeolite	TR	–	–	–	–
Carbonate unspec.	–	3	12	–	TR
Foraminifers	TR	TR	15	10	TR
Calc. nannofossils	10	7	5	10	10
Diatoms	TR	TR	3	2	
Radiolarians	–	–	5	TR	5
Sponge spicules	–	–	TR	TR	
Silicoflagellates	–	–	1	–	–

SITE 482 HOLE B CORE 7 CORED INTERVAL 101.0–110.5 m

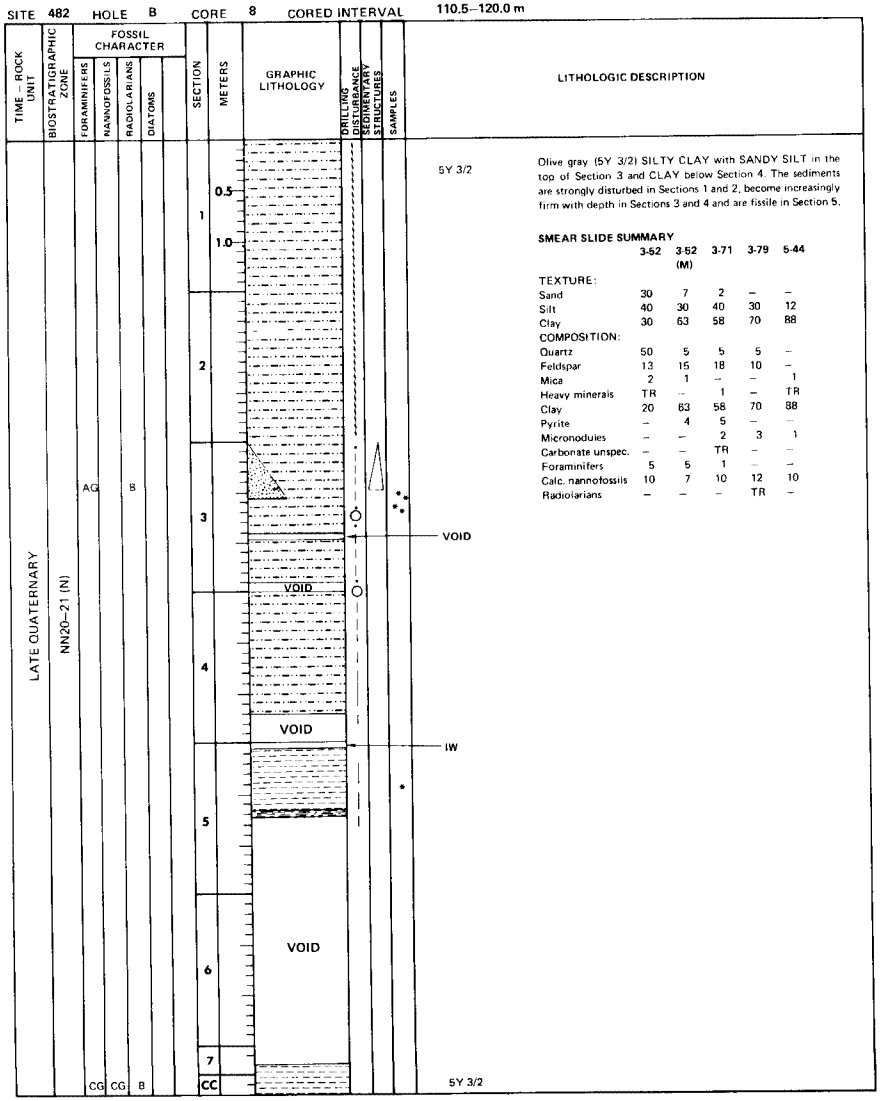


Olive gray (5Y 3/2) to grayish olive (10Y 4/2) CLAY. Sediments strongly disturbed at top of Section 1, moderately firm toward base of Section 2.

SMEAR SLIDE SUMMARY

	2-60
TEXTURE:	
Sand	–
Silt	15
Clay	85
COMPOSITION:	
Quartz	5
Feldspar	–
Clay	85
Volcanic glass	TR
Micronodules	5
Carbonate unspec.	5
Calc. nannofossils	1
Radiolarians	TR
Sponge spicules	

SITE 482 HOLE B CORE 8 CORED INTERVAL 110.5–120.0 m

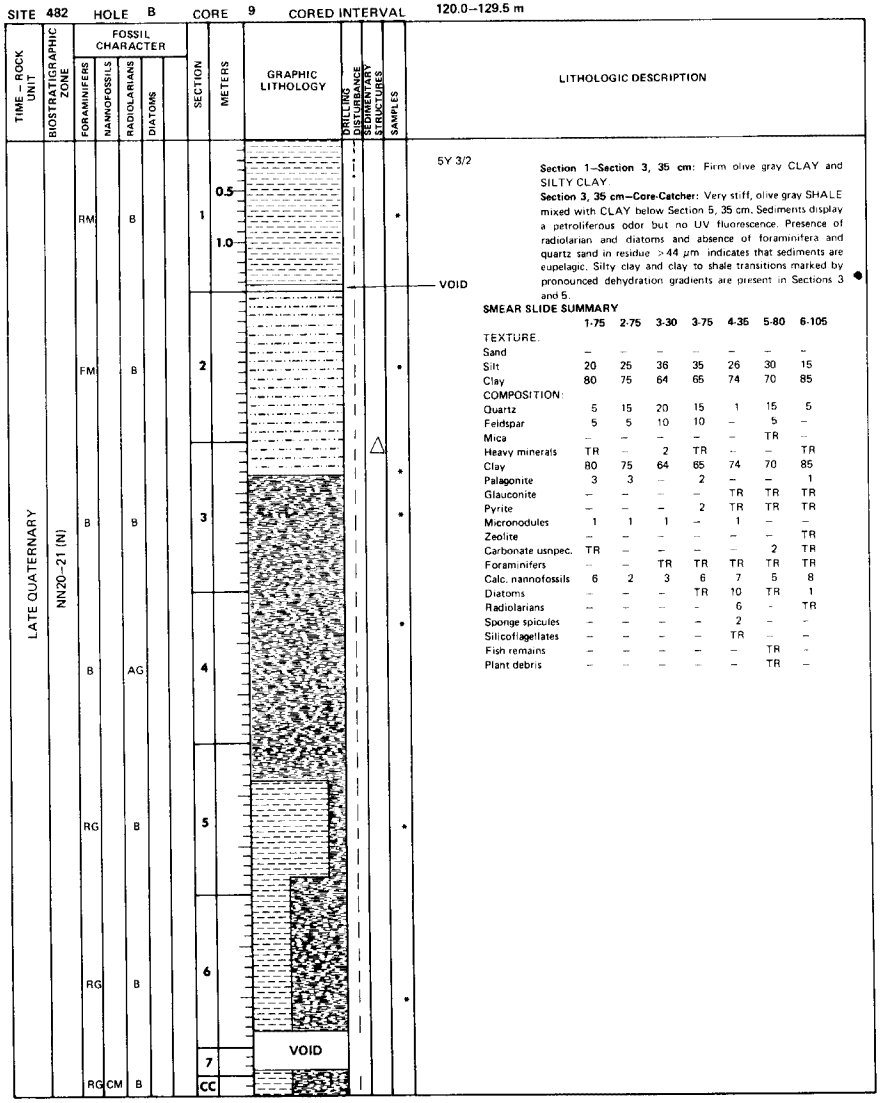


Olive gray (5Y 3/2) SILTY CLAY with SANDY SILT in the top of Section 3 and CLAY below Section 4. The sediments are strongly disturbed in Sections 1 and 2, become increasingly firm with depth in Sections 3 and 4 and are fissile in Section 5.

SMEAR SLIDE SUMMARY

	3-52	3-52 (M)	3-71	3-79	5-44
TEXTURE:					
Sand	30	7	2	–	–
Silt	40	30	40	30	12
Clay	30	63	58	70	88
COMPOSITION:					
Quartz	50	5	5	5	–
Feldspar	13	15	18	10	–
Mica	2	1	–	–	1
Heavy minerals	TR	–	1	–	TR
Clay	20	63	58	70	88
Pyrite	–	4	5	–	–
Micronodules	–	–	2	3	1
Carbonate unspec.	–	–	TR	–	–
Foraminifers	5	5	1	–	–
Calc. nannofossils	10	7	10	12	10
Radiolarians	–	–	–	TR	–

SITE 482 HOLE B CORE 9 CORED INTERVAL 120.0–129.5 m

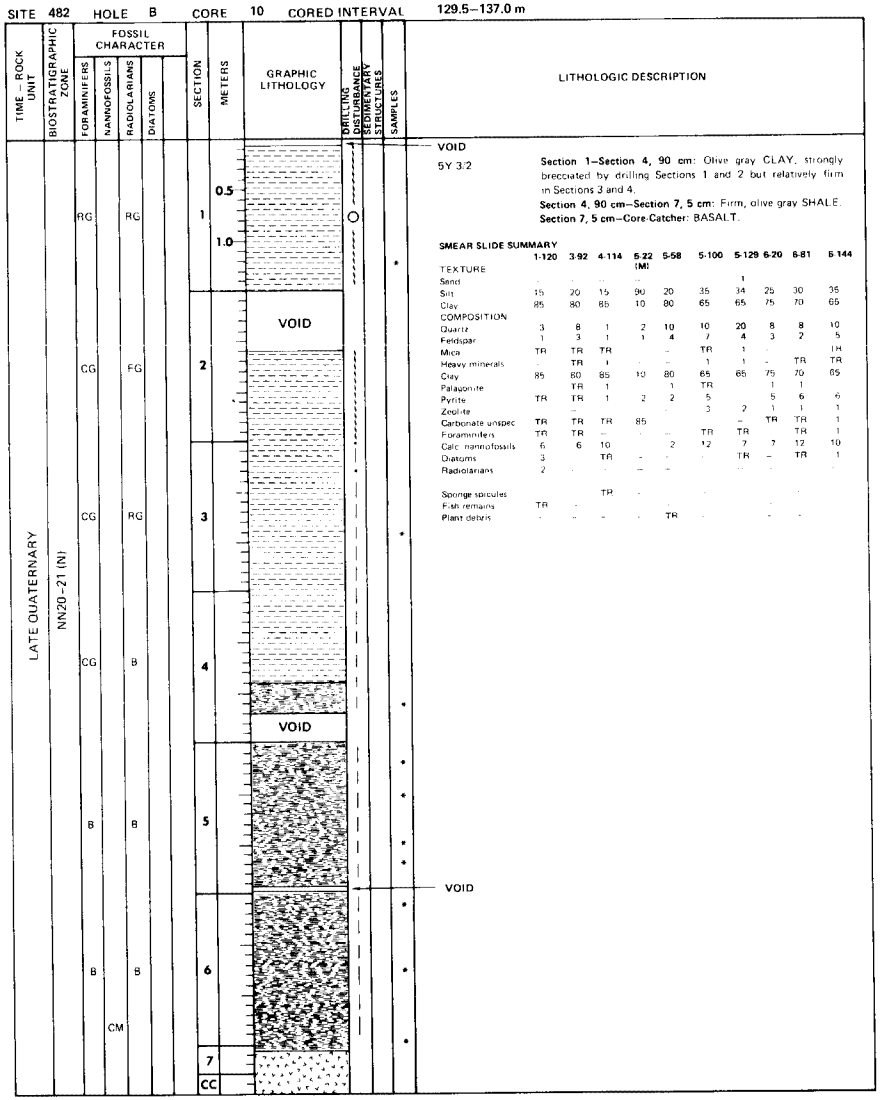


Section 1–Section 3, 35 cm: Firm olive gray CLAY and SILTY CLAY.
Section 3, 35 cm–Core-Catcher: Very stiff, olive gray SHALE mixed with CLAY below Section 5, 35 cm. Sediments display a petroliferous odor but no UV fluorescence. Presence of radiolarian and diatoms and absence of foraminifera and quartz sand in residue >44 μm indicates that sediments are eupelagic. Silty clay and clay to shale transitions marked by pronounced dehydration gradients are present in Sections 3 and 5.

SMEAR SLIDE SUMMARY

	1-75	2-75	3-30	3-75	4-35	5-80	6-105
TEXTURE:							
Sand	–	–	–	–	–	–	–
Silt	20	25	36	35	26	30	15
Clay	80	75	64	65	74	70	85
COMPOSITION:							
Quartz	5	15	20	15	1	15	5
Feldspar	5	5	10	10	–	5	–
Mica	–	–	–	–	–	TR	–
Heavy minerals	TR	–	2	TR	–	–	TR
Clay	80	75	64	65	74	70	85
Palagonite	3	3	–	2	–	–	1
Glauconite	–	–	–	–	TR	TR	TR
Pyrite	–	–	–	2	TR	TR	TR
Micronodules	1	1	1	–	1	–	–
Zeolite	–	–	–	–	–	–	TR
Carbonate unspec.	TR	–	–	–	–	2	TR
Foraminifers	–	–	TR	TR	TR	TR	TR
Calc. nannofossils	6	2	3	6	7	5	8
Diatoms	–	–	–	TR	10	TR	1
Radiolarians	–	–	–	–	6	–	TR
Sponge spicules	–	–	–	–	2	–	–
Silicoflagellates	–	–	–	–	TR	–	–
Fish remains	–	–	–	–	–	TR	–
Plant debris	–	–	–	–	–	TR	–

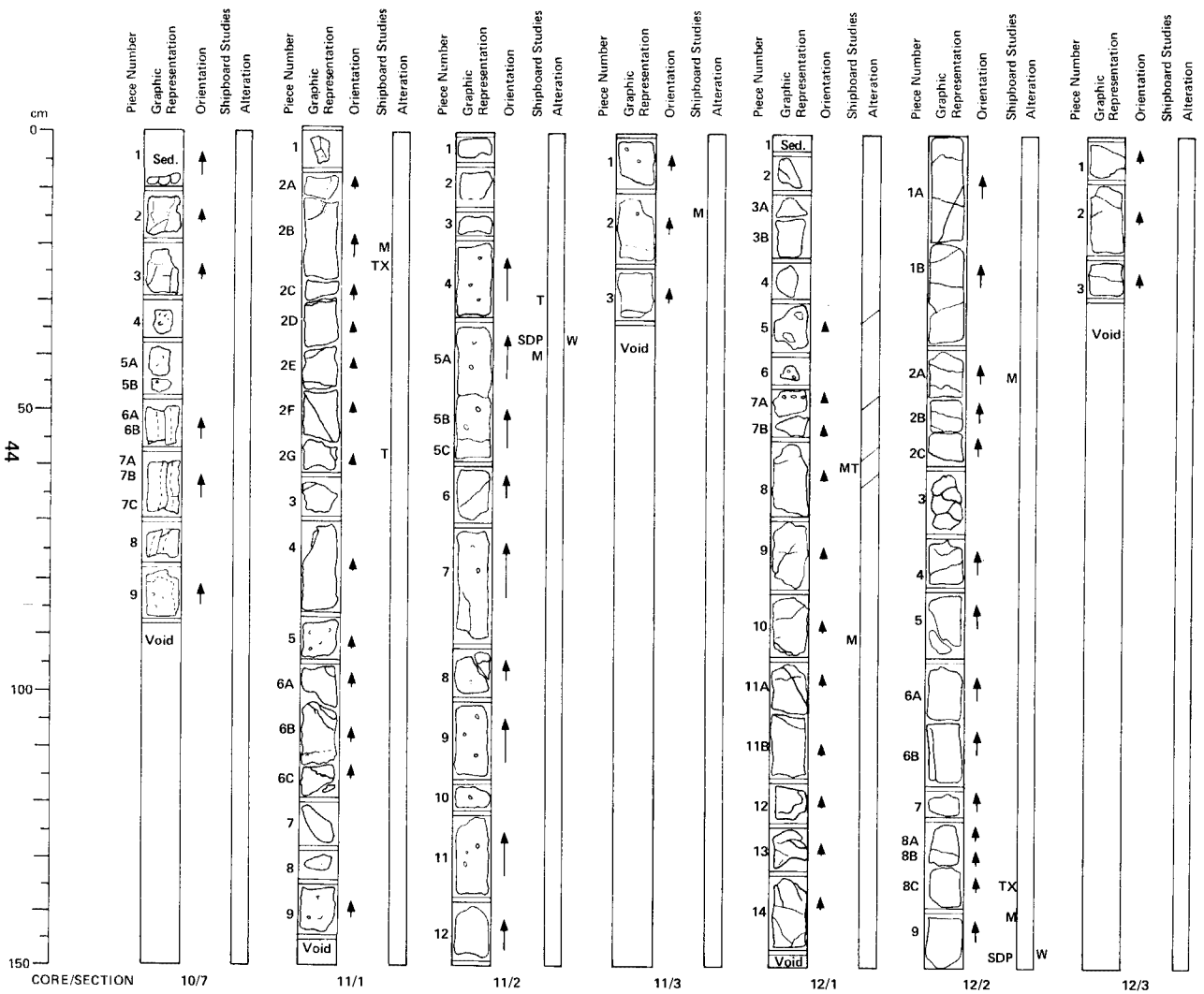
SITE 482 HOLE B CORE 10 CORED INTERVAL 129.5–137.0 m



Section 1–Section 4, 90 cm: Olive gray CLAY, strongly brecciated by drilling. Sections 1 and 2 but relatively firm in Sections 3 and 4.
Section 4, 90 cm–Section 7, 5 cm: Firm, olive gray SHALE.
Section 7, 5 cm–Core Catcher: BASALT.

SMEAR SLIDE SUMMARY

	1-120	3-92	4-114	5-22 (M)	5-58	5-100	5-129	6-20	6-81	6-144
TEXTURE										
Sand	–	–	–	–			1			
Silt	15	20	15	90	20	35	34	25	30	35
Clay	85	80	85	10	80	65	65	75	70	65
COMPOSITION										
Quartz	3	8	1	2	10	10	20	8	8	10
Feldspar	1	3	1	1	4	7	4	3	2	5
Mica	TR	TR	TR		–	TR	1	–		TR
Heavy minerals	–	TR	1	–	–	1	1	–	TR	TR
Clay	85	80	85	10	80	65	65	75	70	65
Palagonite		TR	1	–	1	TR		1	1	
Pyrite	TR	TR	1	2	2	5		5	6	6
Zeolite		–		–	–	3	2	1	1	1
Carbonate unspec	TR	TR	TR	85			–	TR	TR	1
Foraminifers	TR	TR	–	–	–	TR	TR		TR	1
Calc. nannofossils	6	6	10		2	12	7	7	12	10
Diatoms	3		TR	–	–	–	TR	–	TR	1
Radiolarians	2	–		–	–		–	–	–	–
Sponge spicules			TR	–		–			–	
Fish remains	TR	–	–	–	–	–			–	
Plant debris	–	–	–	–	TR	–			–	



HOLE 482B, CORE 10

Visual Description

Dark gray, generally aphyric, massive basalt; color becomes lighter and grain size larger toward base of core. Plagioclase phenocrysts 1–2%, 1–2 mm in upper 20 cm, absent elsewhere. Groundmass aphanitic to fine-grained. Vesicles <1%, 0.5–8 mm, round to irregular, filled with carbonate, zeolite(?) and smectite. Veinlets occur in some pieces, 0.5–1.5 mm wide, filled with carbonate and pyrite, bordered by alteration halos 1.5–10 mm wide. Minor disseminated pyrite in groundmass, particularly in alteration halos.

Thin Section Description

Location: Section 7, 14–16 cm

Texture: Aphyric, fine-grained, intersetal to quench; abrupt change in grain size in slide.

Groundmass: Olivine 1%, 0.05–0.1 mm, subhedral, altered to smectite; plagioclase 5%, 0.2–1 mm, subhedral laths, fresh; augite 1–2%, 0.1–0.4 mm, subhedral to anhedral, sometimes intergrown with plagioclase, fresh; magnetite 3–4%, minute granules; interstitial material 85–90%, cryptocrystalline.

Vesicles: 1%, 0.05–0.25 mm, round, filled with brown smectite.

Veins and Fractures: Veins 1–2 mm wide, filled with smectite, carbonate, and pyrite; surrounded by narrow alteration halos.

Alteration: Olivine completely altered to smectite; augite and plagioclase partly altered; interstitial material mostly fresh.

HOLE 482B, CORE 11

Visual Description

Medium to dark gray, aphyric, massive basalt. Groundmass fine- to medium-grained. Vesicles 1–3%, 0.5–3 mm, round, filled with smectite, carbonate and minor zeolite(?). Veinlets scattered irregularly throughout, 0.5–1 mm wide, filled with carbonate, smectite and minor pyrite. Minor pyrite disseminated in groundmass.

Thin Section Description

Location: Section 1, 23–25 cm

Texture: Aphyric, fine-grained, intergranular

Groundmass: Olivine 1–2%, ≤0.3 mm, subhedral, altered to smectite; plagioclase 55%, 0.2–0.5 mm, euhedral to subhedral laths, fresh; augite 40%, 0.2–0.4 mm, anhedral, fresh; magnetite 3%, 0.01–0.05 mm, subhedral.

Vesicles: 1–2%, 1–2 mm, round, filled with smectite and calcite.

Alteration: Olivine completely altered to smectite or calcite; some small interstitial patches of smectite probably represent altered interstitial material.

Location: Section 1, 56–59 cm

Texture: Aphyric, fine-grained, intersertal to intergranular

Groundmass: Olivine 3–5%, 0.3 mm, subhedral, replaced with smectite; plagioclase 45%, 0.2–0.5 mm, euhedral to subhedral laths, fresh; augite 35%, 0.2–0.4 mm, anhedral, $2V_z$ ~45°, fresh; magnetite 2–3%, 0.05–0.2 mm, euhedral to subhedral; interstitial material 10–12%, irregularly distributed, partly replaced by smectite.

Vesicles: 2%, 1–2 mm, round, filled with brown smectite and minor calcite.

Veins and Fractures: 1–2 mm wide, filled with calcite with minor smectite and pyrite.

Alteration: Olivine and most interstitial material replaced by yellowish-brown smectite.

Location: Section 2, 35–37 cm

Texture: Aphyric, fine-grained, intersertal to intergranular.

Groundmass: Olivine 2–3%, 0.3 mm, subhedral, replaced by smectite; plagioclase 45%, 0.2–0.5 mm, anhedral to subhedral laths; augite 40%, 0.2–0.4 mm, anhedral, $2V_z$ ~45°, fresh; magnetite 2–3%, 0.01–0.05 mm, subhedral; interstitial material 10%, cryptocrystalline.

Vesicles: 1–3%, 1–3 mm, round, filled with brown smectite, minor carbonate and traces of silica(?).

Alteration: Olivine replaced by brown smectite and calcite; interstitial material partly replaced by brown smectite.

HOLE 482B, CORE 12

Visual Description

Section 1, 0–5 cm: Olive gray, indurated, silty clay with uniform grain size, no baking or alteration.

Section 1, 5 cm–base of core: Medium to dark gray, aphyric, massive basalt. Single plagioclase phenocryst, 2.5 mm long, euhedral. Groundmass fine-grained, fresh. Vesicles generally <1%, 0.2–2 mm, round, filled with carbonate, smectite and minor pyrite; large vesicles up to 2 cm occur in Section 1, 40–50 cm. Veins scattered irregularly through core, generally <1 mm, filled with carbonate and minor pyrite. Some irregular patches of smectite and pyrite occur in Section 1.

Thin Section Description

Location: Section 1, 60–62 cm

Texture: Aphyric, fine-grained, intersertal to intergranular

Groundmass: Olivine 3–5%, <0.3 mm, subhedral to euhedral, replaced by smectite; plagioclase 35%, 0.1–0.6 mm, subhedral laths, fresh; augite 45%, 0.2–0.4 mm, anhedral, $2V_z$ ~45°, some subophitic patches, fresh; magnetite 3–4%, 0.05–0.2 mm, granular to acicular, mostly in interstitial patches; interstitial material 10–15%, cryptocrystalline.

Vesicles: <1%, <1 mm, round, filled with brown smectite and minor calcite.

Alteration: Olivine and some interstitial material replaced by brown smectite.

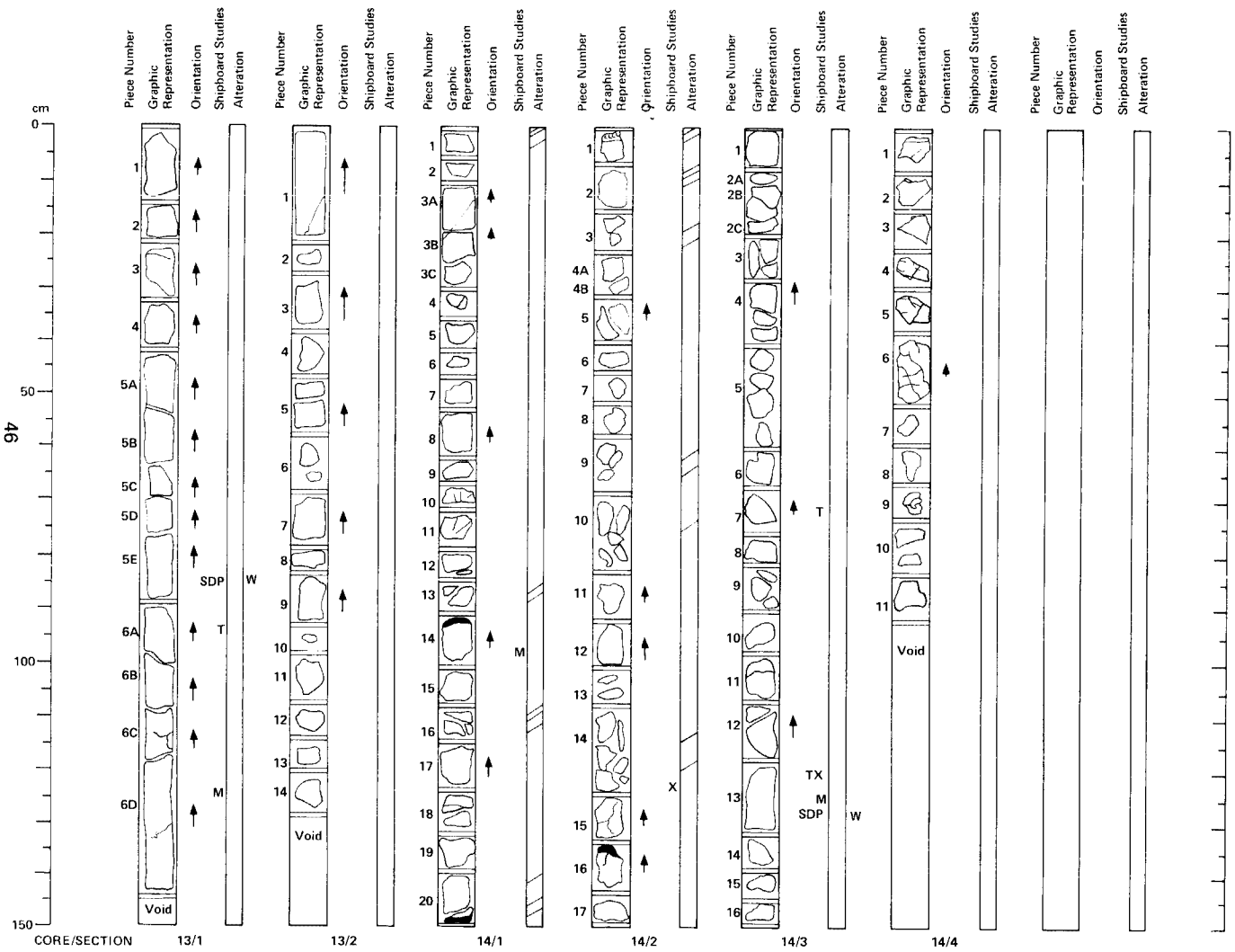
Location: Section 2, 135–137 cm

Texture: Aphyric, fine-grained, intergranular to intersertal.

Groundmass: Olivine 3–4%, 0.2–0.3 mm, subhedral to euhedral, plagioclase 45%, 0.2–1.5 mm, subhedral laths, fresh; augite 35%, 0.1–0.5 mm, $2V_z$ 45°, anhedral, fresh; magnetite 3–4%, 0.05–0.1 mm, square to acicular, mostly in interstitial patches; interstitial material 10–12%, cryptocrystalline, partly replaced by smectite.

Vesicles: 1%, 0.2 mm, round, filled with brown smectite and minor carbonate.

Alteration: Olivine and some interstitial material replaced by dark brown smectite.



HOLE 482B, CORE 13

Visual Description

Medium gray, aphyric, massive basalt. Groundmass fine-grained, equigranular, very fresh. Very fine-grained cooling unit boundary occurs in Section 2, 40 cm. Vesicles <1%, ≤0.5 mm, spherical, filled with carbonate and smectite. Sparse veinlets 1 mm wide, filled with carbonate and minor pyrite. Minor pyrite disseminated in groundmass.

Thin Section Description

Location: Section 1, 93–95 cm

Texture: Aphyric, fine-grained, intergranular to intersertal.

Phenocrysts: Plagioclase trace, 1–2 mm, subhedral, slightly corroded.

Groundmass: Olivine 3–4%, 0.1–0.3 mm, subhedral; plagioclase 45%, 0.2–1.5 mm, subhedral laths, fresh; augite 35%, 0.1–0.5 mm, anhedral, $2V_z \sim 45°$; magnetite 5%, 0.05–0.2 mm, square to lath-shaped cyrstals, mostly in interstitial patches; interstitial material 10–12%, cryptocrystalline, partly altered to smectite.

Vesicles: 1%, 0.5 mm, rimmed with brown smectite and filled with carbonate.

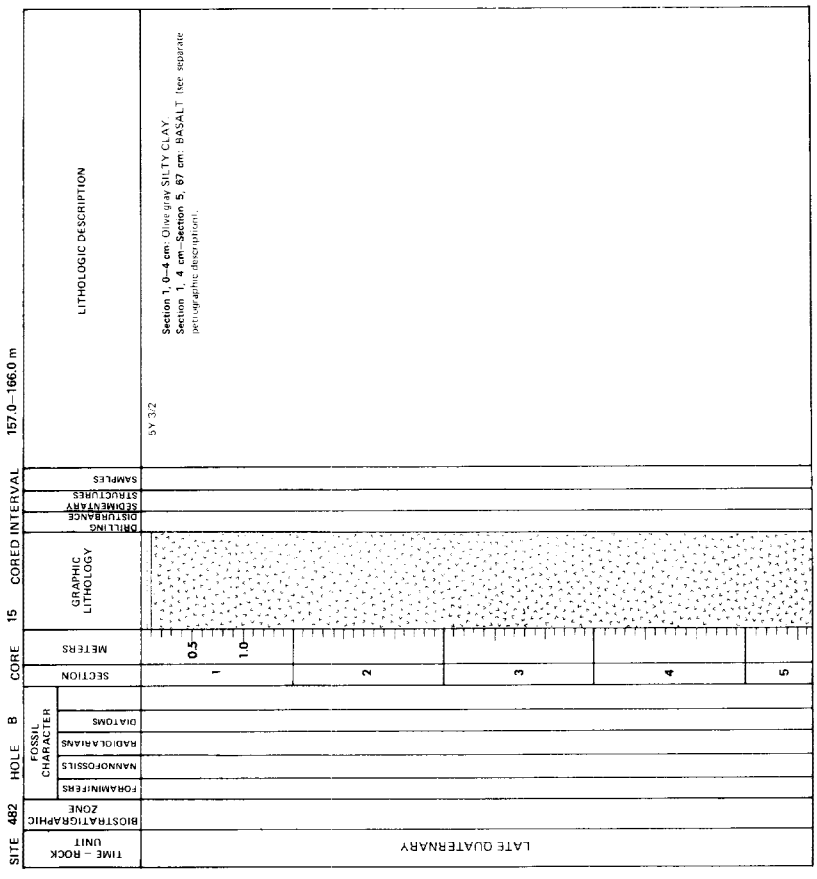
Alteration: Olivine completely altered to brown smectite; interstitial material partly altered.

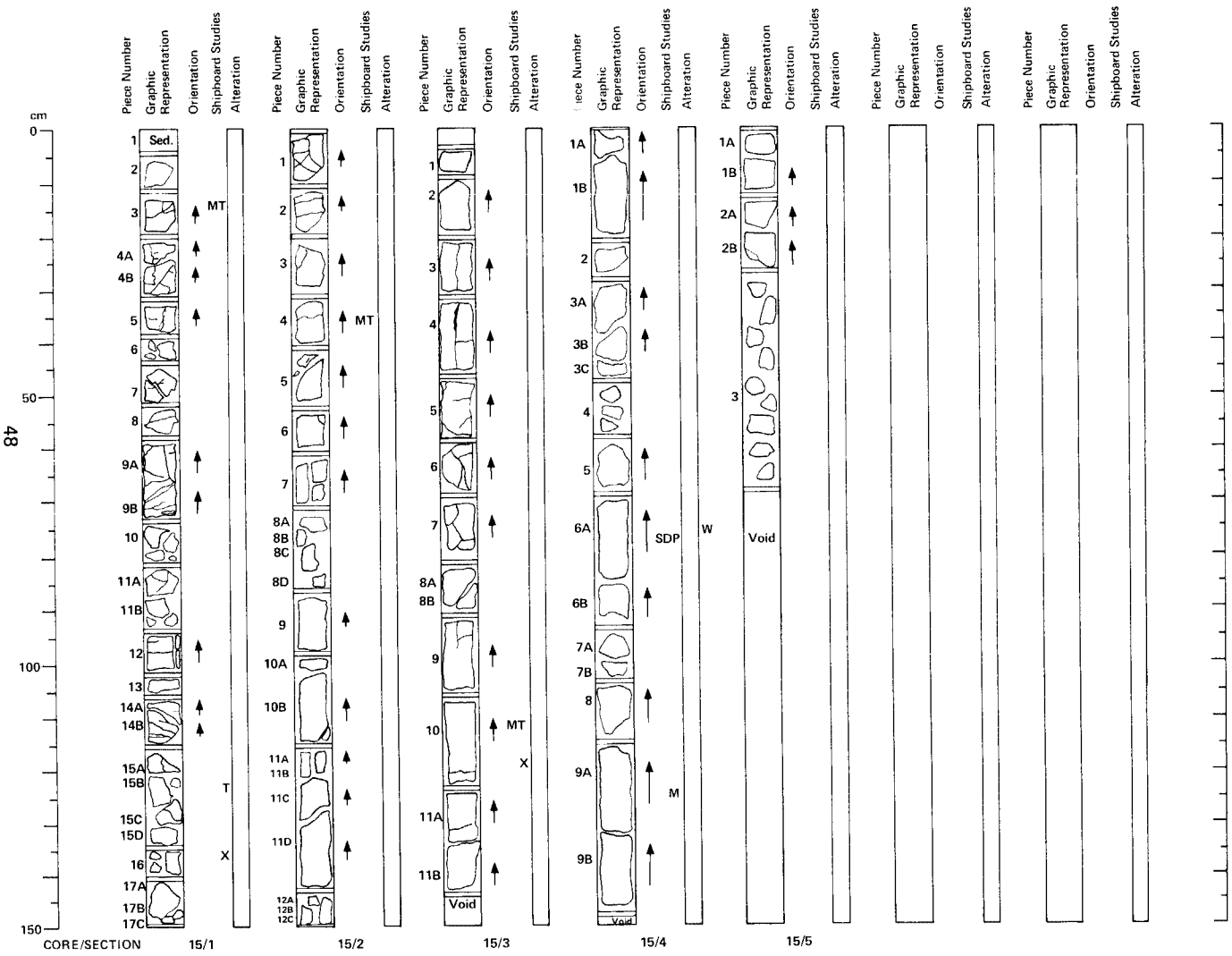
HOLE 482B, CORE 14

Visual Description

Section 1, 0–90 cm: Medium gray, generally aphyric, massive basalt. Sparse glomerophyric clusters of plagioclase and clinopyroxene 2–5 mm across occur between 55 and 90 cm. Groundmass fine to medium-grained; color becomes darker and grain size smaller between 50 and 90 cm. Vesicles absent, small vug at 4 cm, filled with pyrite. Groundmass generally fresh, minor smectite at 89 cm.

Section 1, 90 cm–base of core: Medium to dark gray or greenish-gray, aphyric basalt. Groundmass fine-grained to glassy; glass selvedges occur at 92 cm in Section 1 and at 2 cm and 134 cm in Section 2; acicular plagioclase crystals ≤1 mm often visible in groundmass; some mottling in Section 3. Vesicles absent. Veinlets scattered throughout, 1–2 mm vein in Section 4, 70 cm filled with smectite.


SITE 482
HOLE B
CORE 15
CORED INTERVAL 157.0–166.0 m
TIME – ROCK UNIT
LATE QUATERNARY
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
0.5
1.0
1
2
3
4
5
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
5Y 3/2
Section 1, 0–4 cm: Olive gray SILTY CLAY
Section 1, 4 cm–Section 5, 67 cm: BASALT (see separate petrographic description).



HOLE 482B, CORE 15

Visual Description

Section 1, 0–5 cm: Olive gray mudstone, probably fallen in from sedimentary section.

Section 1, 5–115 cm: Medium gray, aphyric, massive basalt. Groundmass medium- to fine-grained, generally fresh. Vesicles < 1%, ≤ 1 mm, spherical, filled with smectite and carbonate. Fractures and veinlets sparse, ≤ 1 mm wide, irregular, filled with blue-green smectite, carbonate and zeolite(?).

Section 1, 115–base of core: Light to medium gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–3%, 1–5 mm, euhedral fresh. Groundmass medium-grained, somewhat finer-grained near top of unit, fresh. Vesicles < 1%, ≤ 2 mm, spherical, filled with dark green to bluish-green smectite. Fractures and veinlets sparse, 1–2 mm wide, coated or filled with smectite, carbonate, zeolite(?) and minor pyrite.

Thin Section Description

Location: Section 1, 15–17 cm

Texture: Aphyric, fine-grained, intersertal to quench.

Groundmass: Olivine 10–15%, 0.2–0.5 mm, subhedral to euhedral, $2V_z$ ~ 90°, partly altered to smectite; plagioclase, 45%, 0.2–0.8 mm, subhedral laths, fresh; augite 25–30%, 0.2–0.5 mm, poorly crystallized, radiating clusters, $2V_z$ ~ 50°; magnetite 7–8%, 0.05–0.1 mm, subhedral, mostly in interstitial patches; glassy mesostasis 5–7%, dark interstitial material, partly replaced by smectite.

Vesicles: <1%, 0.1–0.3 mm, round, filled with brown smectite.

Alteration: Olivine and interstitial material partly replaced by brown smectite.

Location: Section 1, 123–125 cm

Texture: Sparsely phyric, quench.

Phenocrysts: Plagioclase 5–6%, 0.5–2 mm, subhedral, strongly zoned, usually in glomerophyric clusters with augite; augite 2–3%, 0.2–0.5 mm, anhedral, usually intergrown with plagioclase, $2V_z$ ~ 45°.

Groundmass: Olivine 2–3%, 0.1–0.3 mm, subhedral, altered to smectite; plagioclase 10–15%, 0.2–0.5 mm, acicular; magnetite 3–4%, minute granules; quench matrix 80–85%, incipiently crystallized to clinopyroxene, minor replacement by smectite.

Alteration: Olivine and minor matrix material replaced by yellowish-brown smectite.

Location: Section 2, 34–40 cm

Texture: Sparsely phyric, intersertal to quench

Phenocrysts: Plagioclase 3%, 0.5–2 mm, subhedral, sometimes in small glomerophyric clusters.

Groundmass: Olivine 5%, 0.2–0.5 mm, euhedral to subhedral, altered to smectite; plagioclase 40%, 0.2–0.5 mm, subhedral laths, fresh; augite 45–50%, ≤0.2 mm, usually in poorly crystallized sheaves; magnetite 3–5%, minute granules; glass 5%, mostly devitrified or replaced by smectite, in interstitial patches.

Vesicles: <1%, 0.3–0.5 mm, round, filled with brown smectite.

Alteration: Olivine and minor interstitial material replaced by smectite.

Location: Section 3, 115–117 cm

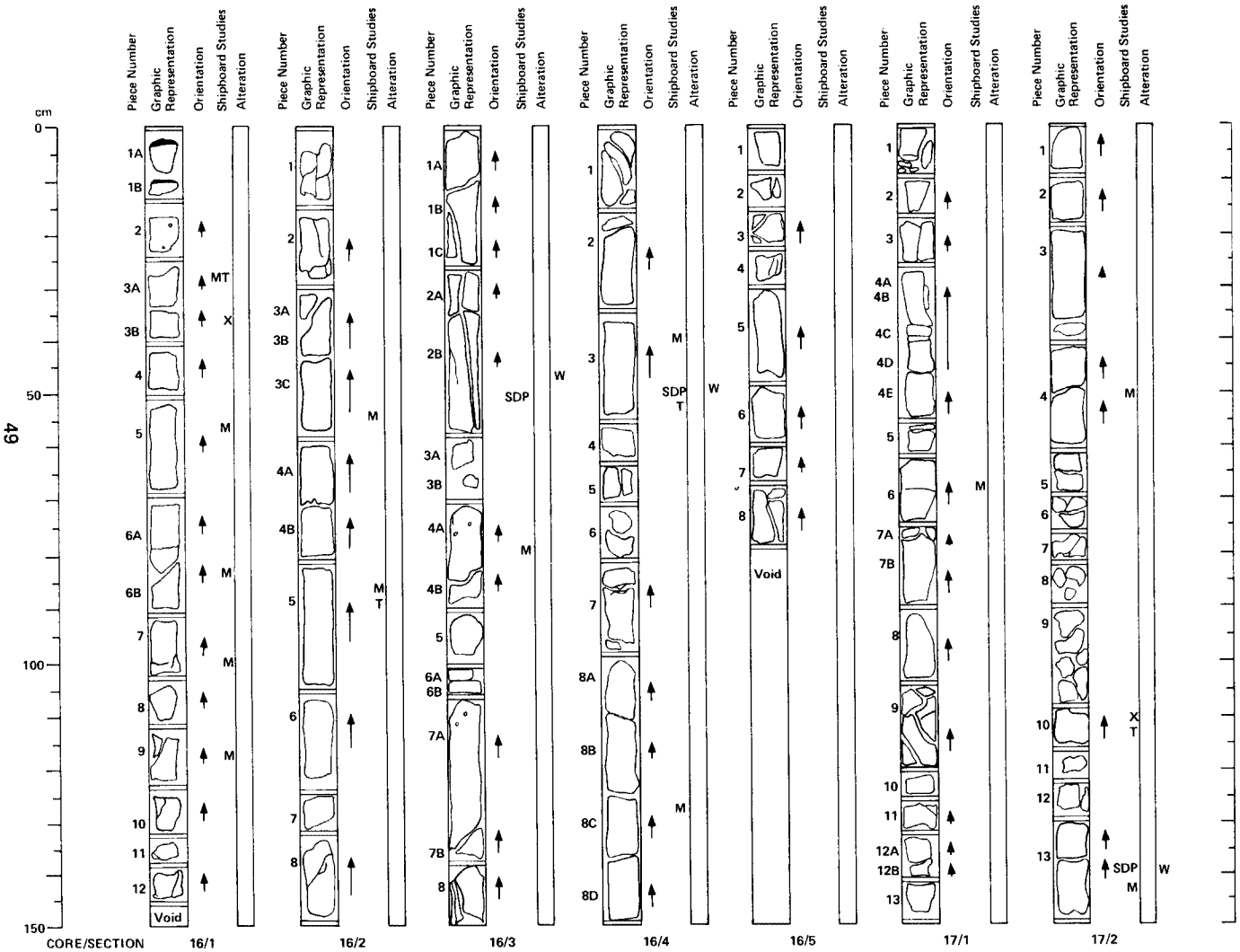
Texture: Sparsely phyric, medium-grained, intersertal to subophitic

Phenocrysts: 1–2%, 1–2 mm, subhedral laths, some clusters to 3 mm, fresh.

Groundmass: Olivine 5%, 0.2–0.6 mm, subhedral to euhedral, altered to smectite; plagioclase 55%, 0.3–1 mm, subhedral laths, fresh; clinopyroxene 30%, 0.3–0.5 mm, anhedral, fresh, $2V_z$ ~ 45°; interstitial material 5%, devitrified glass, partly replaced by smectite.

Vesicles: 1%, 0.2–0.5 mm, round, filled with brown smectite.

Alteration: Olivine and minor glass replaced by brown smectite.



HOLE 482B, CORE 16

Visual Description

Light to medium gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 3–5%, 1–4 mm, euhedral, fresh; rare glomerocrysts of plagioclase and minor clinopyroxene(?), <5 mm. Groundmass medium-grained to glassy; glass selvedges in Section 1, 3 and 11 cm; glass partly altered to smectite, rock otherwise fresh, except for rare patches of smectite alteration. Vesicles 1–3%, < 1 mm, spherical, filled with smectite. Fractures and veinlets sparse, spherical, filled with smectite. Fractures and veinlets sparse, hairline to 1 mm, coated or filled with smectite and minor carbonate.

Thin Section Description

Location: Section 1, 27–30 cm

Texture: Very sparsely phyric, fine-grained, intersertal to intergranular.

Phenocrysts: Plagioclase 1%, 1–2 mm, subhedral, some glomerophyric clots to 3 mm.

Groundmass: Olivine 5%, 0.2–0.5 mm, euhedral to subhedral, altered to smectite; plagioclase 50%, 0.2–1 mm, subhedral laths, fresh; augite 30%, 0.1–0.3 mm, anhedral, fresh, $2V_z$ ~45 ; magnetite 5%, 0.05–0.5 mm, subhedral crystals, some laths, mostly in interstitial areas; interstitial material 10%, cryptocrystalline, partly replaced by smectite.

Vesicles: 1%, 0.2–0.4 mm, round, filled with brown smectite.

Alteration: Olivine and some interstitial material replaced by brown smectite.

Location: Section 2, 88–91 cm

Texture: Very sparsely phyric, medium-grained, intergranular to subophitic.

Phenocrysts: Plagioclase 1%, 1–2 mm, subhedral laths, fresh, some glomerophyric clusters to 3 mm.

Groundmass: Olivine 5%, 0.4–0.8 mm, subhedral to euhedral, altered to smectite; plagioclase 60%, 0.5–1 mm, subhedral, fresh; augite 30%, 0.5–1 mm, fresh, $2V_z$ ~45 ; magnetite 3–5%, 0.1–0.4 mm, subhedral, mostly in interstitial areas; interstitial material 1–2%, cryptocrystalline material with traces of quartz, partly altered to smectite.

Alteration: Olivine and minor interstitial material replaced by greenish-brown smectite.

Location: Section 4, 54–55 cm

Texture: Aphyric, medium-grained, intergranular to subophitic

Groundmass: Olivine 5%, 0.3–0.6 mm, subhedral, replaced by smectite; plagioclase 60%, 0.5–2 mm, subhedral laths, some strongly zoned, fresh; augite 30%, 0.5–1 mm, anhedral, fresh, $2V_z$ ~45°; magnetite 3–5%, 0.1–0.5 mm, subhedral; interstitial material 1–2%, cryptocrystalline with traces of quartz, mostly replaced by smectite.

Vesicles: <1%, 0.4–0.8 mm, round, filled with smectite.

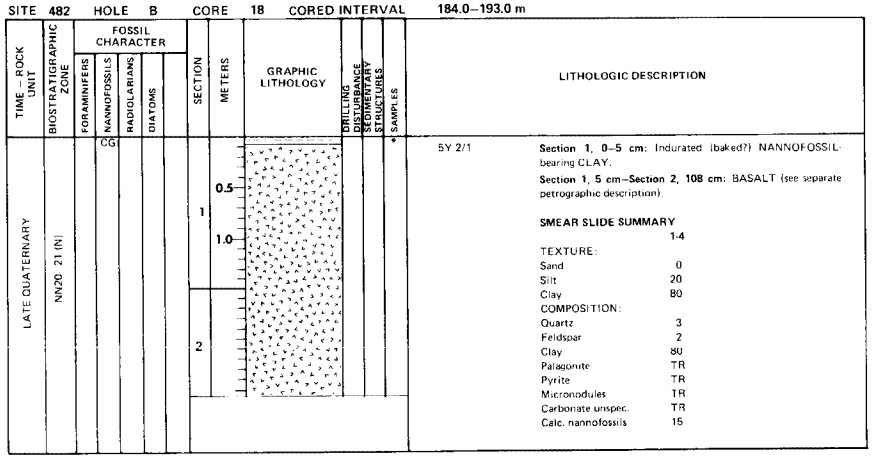
Alteration: Olivine replaced by greenish-brown smectite; interstitial material partly replaced by smectite and minor carbonate.

HOLE 482B, CORE 17

Visual Description

Light to medium gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–3%, 1–4 mm, euhedral, fresh; rare glomerophyric clots of plagioclase and clinopyroxene(?) to 5 mm. Groundmass medium-grained, uniform, generally fresh. Vesicles < 1%, < 1 mm, spherical, filled with smectite. Fractures and veinlets sparse, <1 mm, coated or filled with green smectite and minor carbonate

SITE 482 HOLE B CORE 18 CORED INTERVAL 184.0–193.0 m

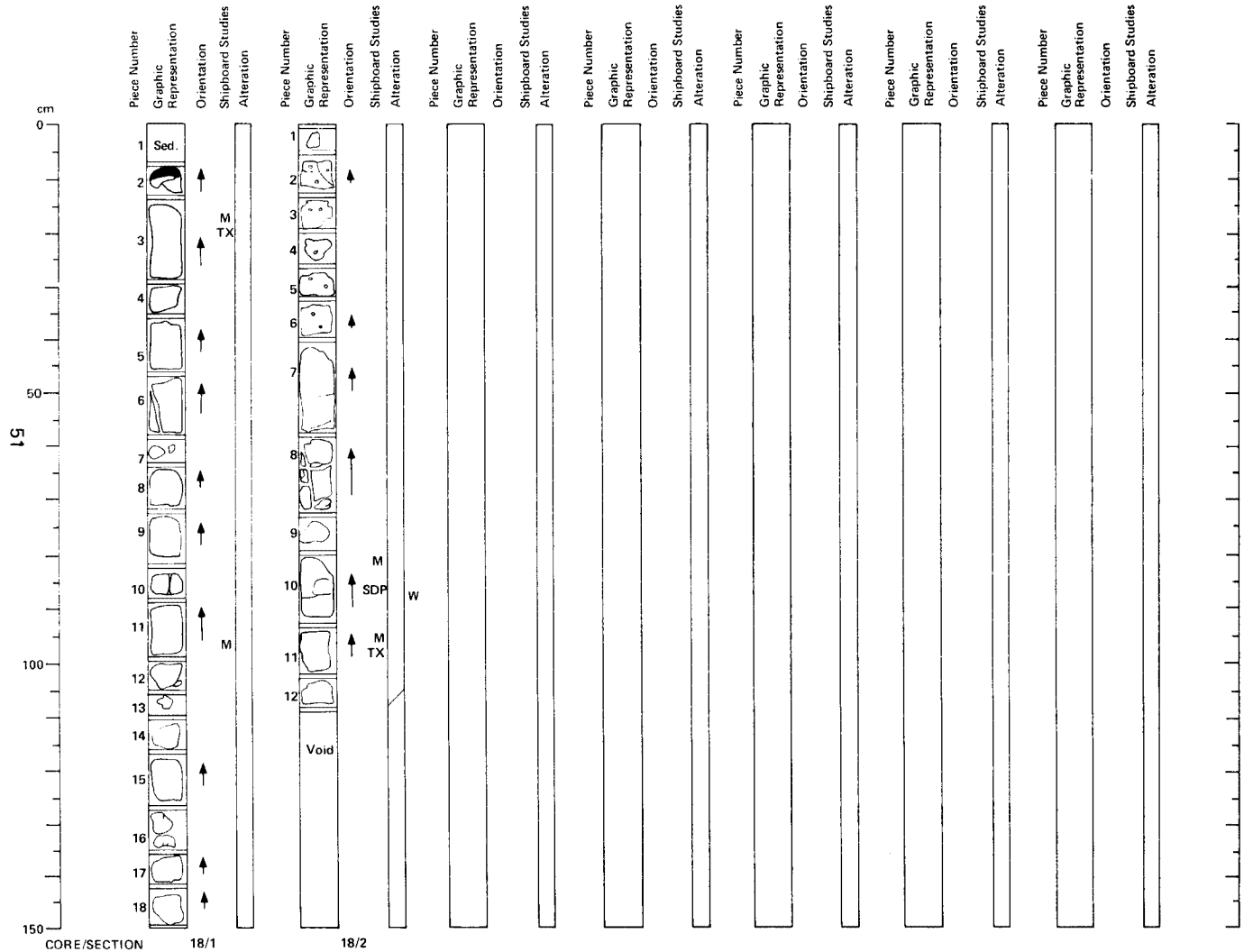


Section 1, 0–5 cm: Indurated (baked?) NANNOFOSSIL-bearing CLAY.

Section 1, 5 cm–Section 2, 108 cm: BASALT (see separate petrographic description).

SMEAR SLIDE SUMMARY

	1-4
TEXTURE:	
Sand	0
Silt	20
Clay	80
COMPOSITION:	
Quartz	3
Feldspar	2
Clay	80
Palagonite	TR
Pyrite	TR
Micronodules	TR
Carbonate unspec.	TR
Calc. nannofossils	15



HOLE 482B, CORE 18

Visual Description

Section 1, 0–8 cm: Yellowish-gray, indurated silty claystone.

Section 1, 8 cm–base of core: Medium to dark gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–3%, 1–2 mm, euhedral, fresh. Groundmass medium-grained to glassy; glass selvedge in Section 1, 9 cm; grain size increases gradually downward from chilled margin; glassy margin partly altered to smectite and coated with pyrite, groundmass otherwise quite fresh. Vesicles 0.5–3%, most abundant in upper part of Section 2, 0.1–1.5 mm, spherical, filled with smectite. Veinlets sparse, <1 mm, filled with smectite and carbonate.

Thin Section Description

Location: Section 2, 99–101 cm

Texture: Very sparsely phyric, fine- to medium-grained, intergranular.

Phenocrysts: Plagioclase <1%, 1–2 mm, subhedral laths, fresh.

Groundmass: Olivine 2–3%, 0.2–0.3 mm, subhedral, replaced by smectite; plagioclase 50%, 0.2–0.6 mm, subhedral, fresh; augite 30%, 0.1–0.3 mm, anhedral, fresh, $2V_z$ ~45 ; magnetite 3%, 0.05–0.1 mm, skeletal crystals; interstitial material 10–12%, replaced by brownish-green smectite.

Vesicles: <1%, 0.3–0.5 mm, round, filled with smectite.

Alteration: Olivine and interstitial material replaced by greenish-brown smectite.

SITE 482 HOLE B CORE 19 CORED INTERVAL 193.0–197.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
LATE QUATERNARY	NN20–21 (N)	CG	CG	RG	B	1	0.5 1.0				** * **

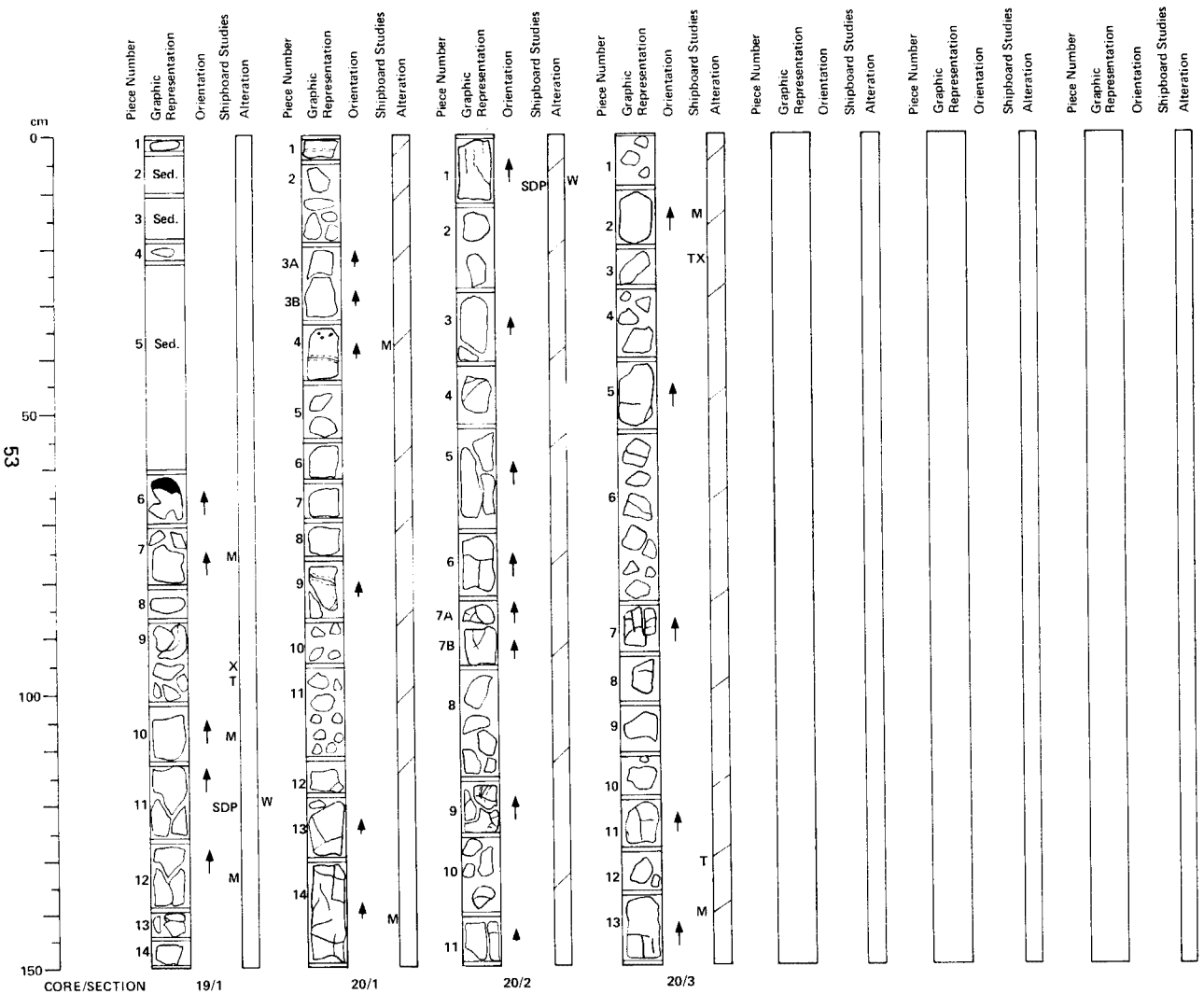
5Y 3/2
N1, N2
5Y 3/2

5YR 2/1

Section 1, 2–3 cm: BASALT.
Section 1, 5–10 cm: Very firm to hard olive gray (5Y 3/2) SILTY CLAY.
Section 1, 10–22 cm: Firm (baked?), grayish black (N2) to black (N1) MUDSTONE displaying conchoidal fractures.
Section 1, 22–25 cm: BASALT.
Section 1, 25–61 cm: Firm olive gray (5Y 3/2) MUDSTONE with a thin (3 cm) brownish black (5YR 2/1) baked(?) layer overlying basalt.
Section 1, 61–150 cm: BASALT (see separate petrographic description).

SMEAR SLIDE SUMMARY

	1-10	1-15	1-34	1-50	1-60
TEXTURE:					
Sand	–	–	–	–	TR
Silt	30	30	35	30	40
Clay	70	70	63	70	60
COMPOSITION:					
Quartz	20	10	20	10	25
Feldspar	10	7	9	–	10
Mica	–	–	–	TR	–
Heavy minerals	TR	TR	TR	TR	–
Clay	70	70	63	70	60
Palagonite	–	–	–	3	–
Pyrite	–	TR	1	1	–
Micronodules	TR	TR	1	1	–
Zeolite	–	10	1	5	15
Carbonate unspec.	TR	TR	–	–	–
Foraminifers	TR	–	–	–	–
Calc. nannofossils	1	–	5	10	–



HOLE 482B, CORE 19

Visual Description

Section 1, 0–5 cm: Dark gray, glassy, aphyric basalt; probably a piece that has fallen into the hole.

Section 1, 5–60 cm: Olive gray to grayish-black, very firm mudstone and silty mudstone, probably baked. Small basalt fragment at 20–23 cm.

Section 1, 60 cm–base of core: Dark gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 3–5%, 1–3 mm, euhedral, fresh. Groundmass fine-grained to glassy; glass selvedge at 60 cm, Section 1, with grain size increasing gradually toward lower parts of core; glass selvedge partly altered to smectite, groundmass otherwise quite fresh. Vesicles absent. Veinlets sparse, < 0.5 mm, most filled with carbonate, those in glass selvedge coated with pyrite.

Thin Section Description

Location: Section 1, 96–100 cm

Texture: Aphyric, fine-grained, intersertal.

Groundmass: Plagioclase 50%, 0.1–2 mm, subhedral laths, partly replaced by smectite; augite 20%, 0.2–0.4 mm, anhedral, $2V_z$ ~45°, partly replaced by smectite; interstitial material 25%, mostly glassy, mostly replaced by smectite, minor interstitial quartz and apatite.

Alteration: Extensive replacement of plagioclase, augite and interstitial material by greenish-brown smectite.

HOLE 482B, CORE 20

Visual Description

Medium to dark gray, fine- to medium-grained, very sparsely phyric, massive basalt. Plagioclase phenocrysts 1–2%, 2–5 mm, euhedral, fresh; some glomerocrysts of plagioclase to 5 mm. Groundmass mostly medium-grained, fine-grained zones probably mark cooling unit boundaries; groundmass often mottled, possibly due to alteration of interstitial glass. Vesicles 1–2%, ~1 mm, filled with dark green smectite. Fractures abundant in some pieces, hairline to 1 mm, lined with smectite, pyrite and rare carbonate, often slickensided.

Thin Section Description

Location: Section 1, 62–64 cm

Texture: Sparsely phyric, very fine-grained, intersertal to quench.

Phenocrysts: Plagioclase 1–2%, 1–3 mm, subhedral, highly zoned, some glomerophyric clots, fresh.

Groundmass: Olivine 2%, 0.3–1 mm, subhedral, replaced by smectite; plagioclase 25%, 0.5–0.8 mm, subhedral laths, fresh; augite 20%, 0.2–0.5 mm, anhedral, fresh, intergrown with plagioclase; magnetite 2%, minute granules in matrix; cryptocrystalline mesostasis 50%, poorly crystallized clinopyroxene, mostly fresh.

Vesicles: < 1%, 0.2–0.3 mm, round, filled with smectite and carbonate.

Veins and Fractures: 1 hairline fracture, filled with smectite and pyrite.

Alteration: Olivine replaced by brown smectite.

Location: Section 3, 25–26 cm

Texture: Very sparsely phyric, fine-grained, intersertal to intergranular.

Phenocrysts: Plagioclase 1%, 1–4 mm, subhedral, highly zoned, fresh.

Groundmass: Olivine 3–5%, 0.2–0.8 mm, subhedral, replaced by smectite; plagioclase 60%, 0.5–1 mm, subhedral laths, slight replacement by smectite; augite 20%, 0.2–0.8 mm, anhedral, $2V_z$ ~45°, slightly altered to smectite; magnetite 5%, 0.05–0.2 mm, subhedral, some laths, mostly in interstitial patches; cryptocrystalline mesostasis 10%, partly replaced by smectite.

Alteration: Olivine and some interstitial material replaced by greenish-brown smectite.

Location: Section 3, 135–136 cm

Texture: Sparsely to moderately phyric, quench.

Phenocrysts: Olivine < 1%, 1.0–1.5 mm, euhedral to subhedral, replaced by smectite; plagioclase 3–5%, 1–5 mm, subhedral, some glomerophyric clots with augite; augite 1%, 0.3–0.5 mm, anhedral, intergrown with plagioclase.

Groundmass: Olivine 3%, 0.1–0.4 mm, euhedral to subhedral, replaced by smectite; plagioclase 10%, 0.1–0.5 mm, euhedral to skeletal, fresh; augite 10%, 0.2–0.5 mm, euhedral, intergrown with plagioclase; magnetite 1–2%, minute granules, in interstitial patches; microcrystalline mesostasis 75%, poorly crystallized clinopyroxene in radiating sheaves.

Vesicles: 1–2%, 0.2–0.8 mm, round to irregular, filled with smectite and minor calcite.

Alteration: Olivine and very minor matrix material replaced by yellowish-brown smectite.

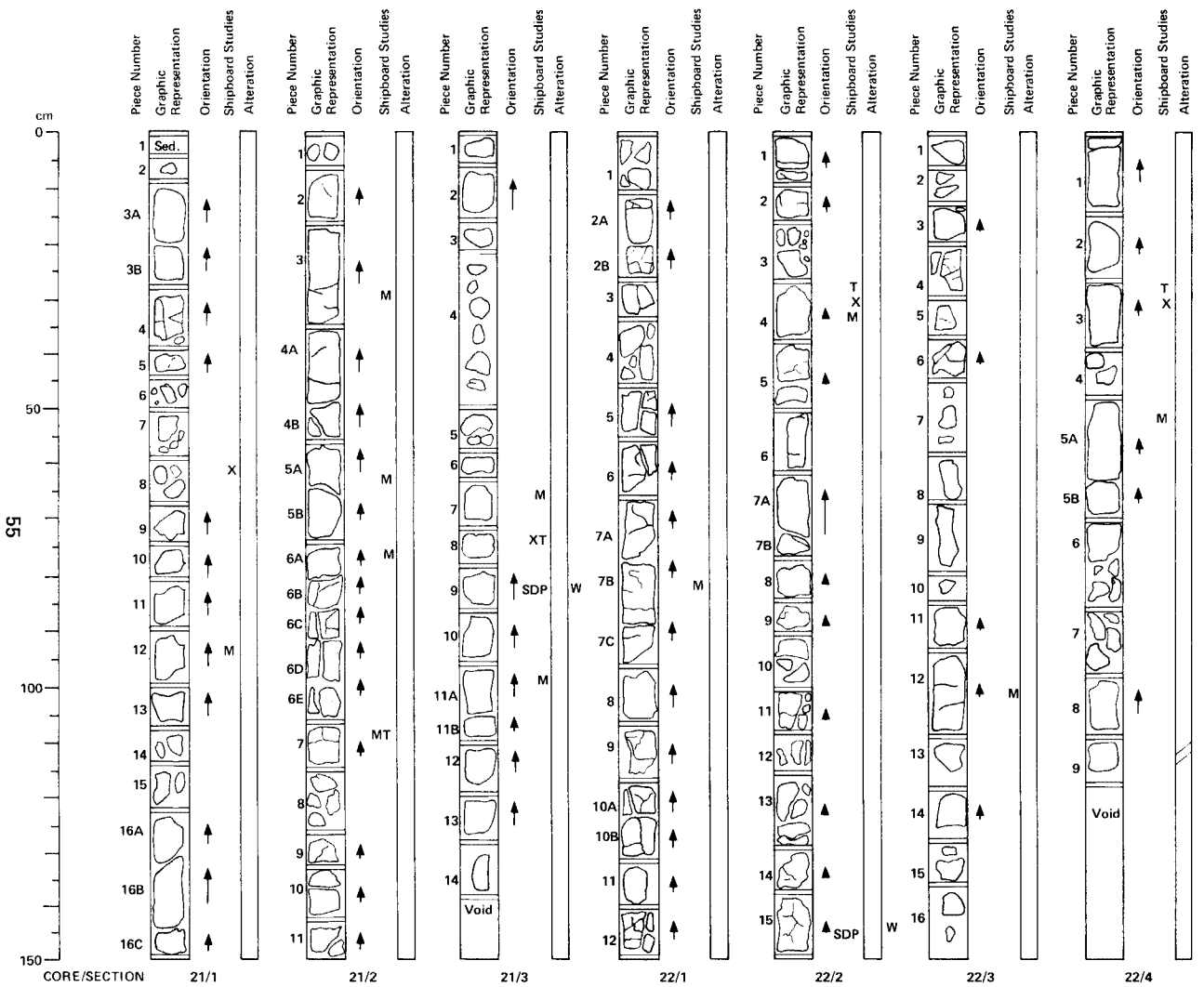
SITE 482 HOLE B CORE 21 CORED INTERVAL 202.0–211.0 m

TIME—ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY			B			1	0.5 1.0				•	5Y 2/1
						2						
						3						

Section 1, 0–5 cm: Firm, olive black SILTY CLAY.
Section 1, 5 cm–Section 3, 137 cm: BASALT.

SMEAR SLIDE SUMMARY

	1-2
TEXTURE:	
Sand	–
Silt	25
Clay	75
COMPOSITION:	
Quartz	20
Feldspar	5
Mica	TR
Clay	75
Carbonate unspec.	TR
Calc. nannofossils	TR



HOLE 482B, CORE 21

Visual Description

Section 1, 0–5 cm: Olive black, silty clay, firm.

Section 1, 0 cm–Section 3, 50 cm: Medium gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–2%, 2–5 mm, euhedral, fresh. Groundmass fine- to medium-grained, finest-grained in Section 1, fresh. Vesicles 1–3%, most abundant in Section 2, < 0.5 mm, round to irregular, filled with green smectite. Fractures and veinlets common, hairline to 2 mm, lined and filled with smectite, carbonate, and pyrite with minor silica(?).

Section 3, 50 cm–base of core: Dark gray, sparsely to moderately phyric, massive basalt. Plagioclase phenocrysts 3–8%, 1–4 mm, euhedral, fresh; clinopyroxene phenocrysts <1%, 1–2 mm, subhedral, fresh. Groundmass fine- to very fine-grained, increasing in grain size downward, fresh. Vesicles <1%, 0.5 mm, spherical, filled with dark green smectite. Fractures sparse, hairline to 1 mm, lined with smectite.

Thin Section Description

Location: Section 2, 113–114 cm

Texture: Sparsely phyric, medium-grained, intergranular to intersertal.

Phenocrysts: Olivine ≤1%, ≤2.5 mm, euhedral, replaced by smectite and carbonate; plagioclase 1–2%, 2–4 mm, subhedral, zoned, fresh; augite <1%, 1–1.5 mm, anhedral, fresh, $2V_z$ ~45°.

Groundmass: Olivine 1–2%, 0.2–0.3 mm, subhedral, replaced by smectite; plagioclase 55%, 0.5–1 mm, subhedral, fresh; augite 35%, 0.5–1 mm, anhedral, fresh; magnetite 5%, 0.1–0.4 mm, subhedral to anhedral; cryptocrystalline mesostasis 5%.

Alteration: Olivine replaced by brown smectite and carbonate; interstitial material mostly fresh, minor replacement by smectite.

Location: Section 3, 76–77 cm

Texture: Moderately phyric, medium-grained, intergranular to intersertal

Phenocrysts: Olivine 1%, 1–1.5 mm, subhedral, replaced by smectite and calcite; plagioclase 5–8%, 1–4 mm, subhedral, often in glomerophyric clusters, fresh; augite <1%, 1–2 mm, anhedral, often in clusters, fresh.

Groundmass: Olivine 3%, 0.2–0.5 mm, euhedral to subhedral, replaced by smectite and carbonate; plagioclase 55%, 0.1–1 mm, subhedral, fresh; augite 20%, 0.2–0.5 mm, anhedral, fresh, $2V_z$ ~45°; magnetite 5%, 0.05–0.1 mm, subhedral; cryptocrystalline mesostasis 5%, slightly altered to smectite.

Vesicles: <1%, 0.4–0.8 mm, round, filled with smectite and minor carbonate.

Alteration: Olivine and minor interstitial material replaced by brown smectite.

HOLE 482B, CORE 22

Visual Description

Medium gray, sparsely to moderately phyric, massive basalt. Plagioclase phenocrysts 5–10%, 1–5 mm, euhedral, fresh; clinopyroxene phenocrysts <1%, 1–2 mm, green, anhedral, fresh, often intergrown with plagioclase in glomerophyric clusters; olivine microphenocrysts 1–2%, ≤1 mm, anhedral, slightly altered to smectite, usually in localized patches. Groundmass fine- to medium-grained, coarsest-grained in middle part of core, fresh. Vesicles 1–2%, 0.2–0.4 mm, spherical, filled with smectite. Fractures sparse, mostly hairline, coated with green smectite, carbonate, minor pyrite and minor silica(?), sometimes slickensided.

Thin Section Description

Location: Section 2, 32–34 cm

Texture: Moderately phyric, fine-grined, intergranular to intersertal.

Phenocrysts: Plagioclase 5–8%, 1–2 mm, subhedral, some glomerophyric clots to 3 mm.

Groundmass: Olivine 3–5%, 0.2–0.4 mm, subhedral, replaced by smectite; plagioclase 50%, 0.2–1 mm, subhedral, fresh; augite 30%, 0.2–0.4 mm, fresh, $2V_z$ ~45°, magnetite 3–5%, 0.05–0.2 mm, subhedral; cryptocrystalline mesostasis 5%, partly replaced by smectite.

Vesicles: <1%, ≤0.5 mm, round, filled with smectite.

Alteration: Olivine and some interstitial material replaced by smectite.

Location: Section 4, 34–36 cm

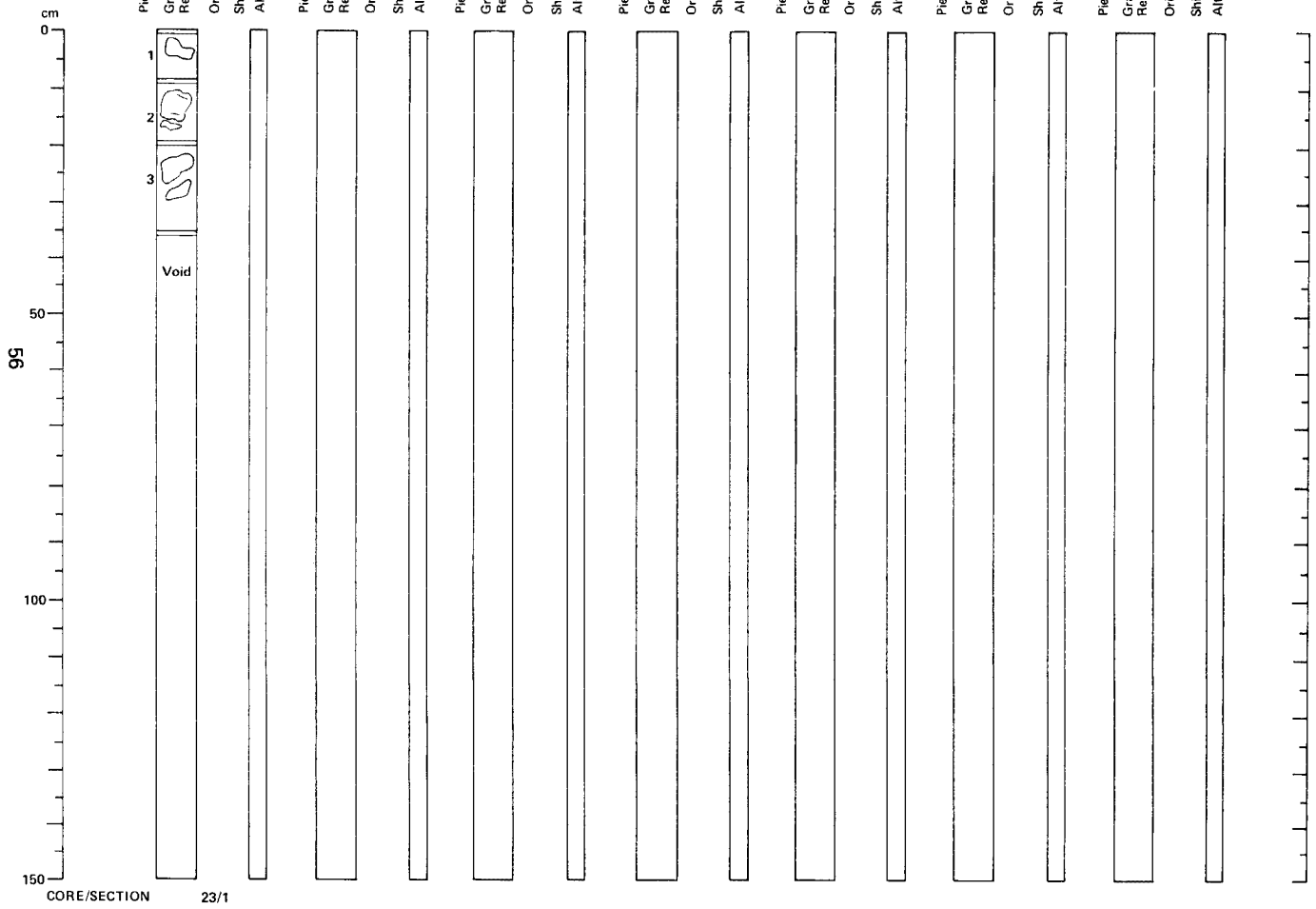
Texture: Moderately phyric, fine-grained, intergranular to intersertal

Phenocrysts: Olivine 1–2%, 1–4.5 mm, euhedral, mostly replaced by smectite; plagioclase 7%, 1–4 mm, subhedral, fresh, often in glomerophyric clusters, augite 1%, 1–3 mm, subhedral, fresh, $2V_z$ ~45°.

Groundmass: Olivine 3–5%, 0.2–0.8 mm, subhedral, replaced by smectite; plagioclase 50%, 0.2–1 mm, subhedral, fresh; augite 25%, 0.2–0.6 mm, anhedral, fresh, $2V_z$ ~45°; magnetite 2–3%, 0.05–0.1 mm, anhedral, some laths; cryptocrystalline mesostasis 5–8%, partly altered to smectite.

Vesicles: 1%, 0.2–0.4 mm, round, filled with smectite.

Alteration: Most olivine and most interstitial material altered to brown smectite.



HOLE 482B, CORE 23

Visual Description

Medium gray, sparsely phyric, massive(?) basalt. Plagioclase phenocrysts 1–2%, 1–2 mm, euhedral, fresh; clinopyroxene phenocrysts < 1%, <1 mm, anhedral, intergrown with plagioclase in glomerophyric clusters. Groundmass fine-grained, uniform, fresh. Fractures sparse, hairline, coated with smectite.

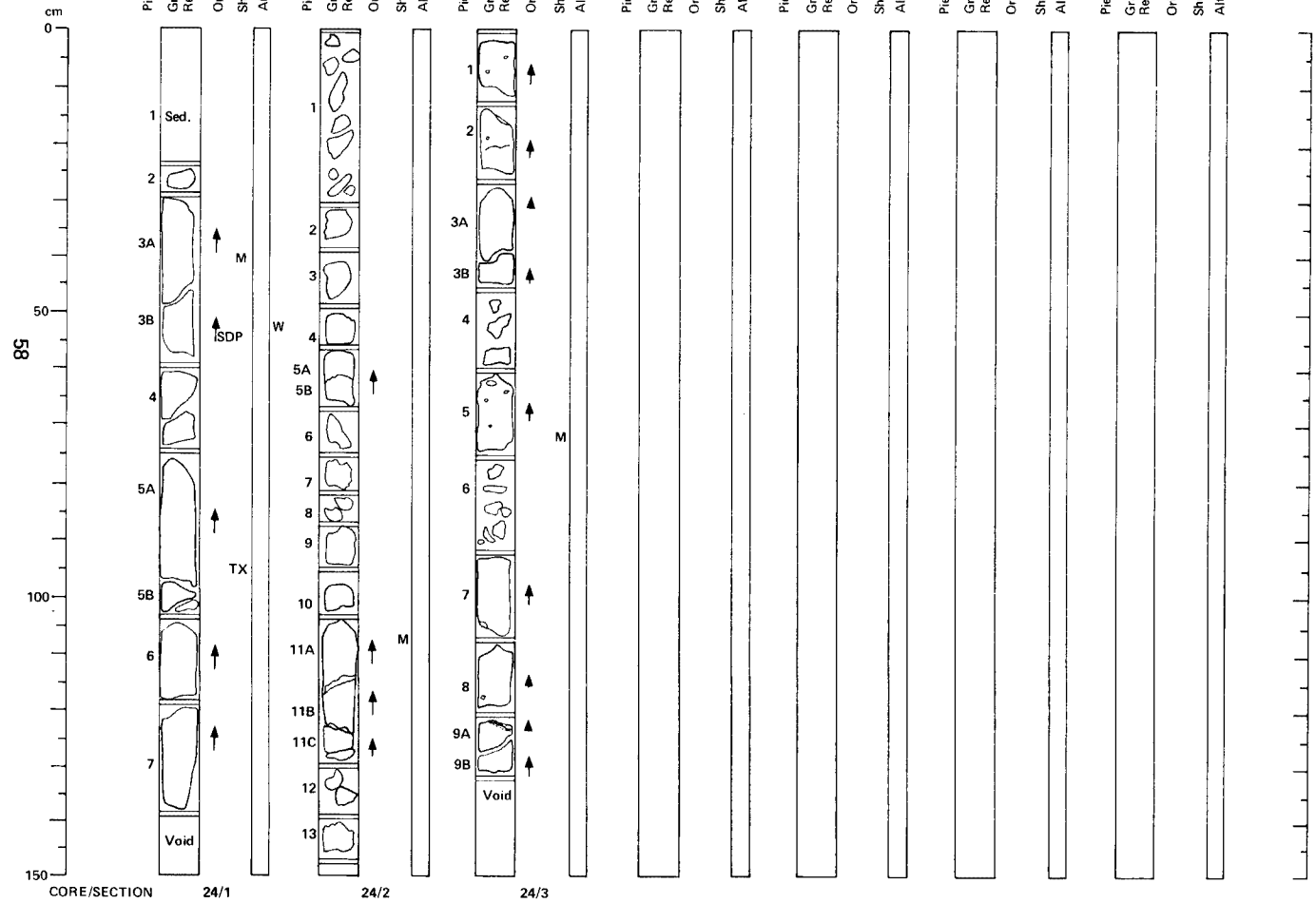
SITE 482 HOLE B CORE 24 CORED INTERVAL 224.5–229.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY	NN20–21 (N)	CG	CM	B		1 2 3	0.5 1.0				•	5Y 2/1

Section 1, 0–14 cm: Firm to hard (baked?) olive black NANNOFOSSIL-bearing SILTY CLAY displaying conchoidal fractures.
Section 1, 14 cm–Section 3, 130 cm: BASALT.

SMEAR SLIDE SUMMARY

	1-1
TEXTURE:	
Sand	–
Silt	35
Clay	65
COMPOSITION:	
Quartz	18
Feldspar	5
Clay	65
Zeolite	TR
Carbonate unspec.	TR
Foraminifers	TR
Calc. nannofossils	12



HOLE 482B, CORE 24

Visual Description

Section 1, 0–25 cm: Olive black, firm, silty clay

Section 1, 25 cm–base of core: Dark gray, aphyric, massive basalt. Rock is fine- to medium-grained with acicular plagioclase crystals visible in groundmass, generally fresh. Vesicles 1–5%, decreasing in abundance near top of core, < 0.5 mm, spherical, filled with green smectite and minor carbonate; a few large vesicles up to 5 mm occur in Section 2, 95–150 cm. Fractures and veins sparse, randomly distributed, hairline to 2 mm, coated or filled with smectite; some veins have narrow alteration halos 1–2 mm wide.

Thin Section Description

Location: Section 1, 93–95 cm

Texture: Aphyric, fine-grained, intergranular to subophitic

Groundmass: Olivine 5%, 0.3–0.9 mm, subhedral, replaced by smectite; plagioclase 50%, 0.5–1.5 mm, subhedral, fresh; augite 35%, 0.2–0.5 mm, anhedral, fresh, $2V_z \sim 45°$; magnetite 2–3%, 0.05–0.1 mm, subhedral; cryptocrystalline mesostasis 5%, partly replaced by brown smectite.

Vesicles: 2%, 1–1.5 mm, round, filled with brown smectite.

Alteration: Olivine and some interstitial material replaced by brown smectite.

SITE SUMMARY

HOLE 482C

Date occupied: January 29, 1979
Date departed: Febraury 3, 1979
Time on hole: 122.2 hours
Position (latitude; longitude): 22°47.34'N; 107°59.57'W
Water depth (sea level; corrected m, echo-sounding): 2998
Water depth (rig floor; corrected m, echo-sounding): 3015
Bottom felt at (m, drill pipe): 3015
Penetration (m): 184
Number of cores: 15
Total length of cored section (m): 120.5
Total core recovered (m): 84.56
Core recovery (%): 70

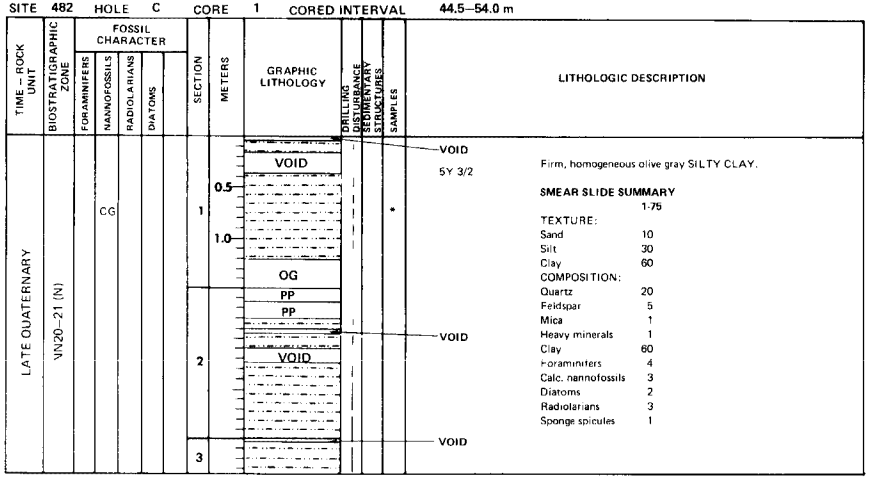
Oldest Sediment Cored

Depth sub-bottom (m): 137
Nature: Silty clay and dolomite
Age: Quaternary
Measured velocity (km/s): 2.0

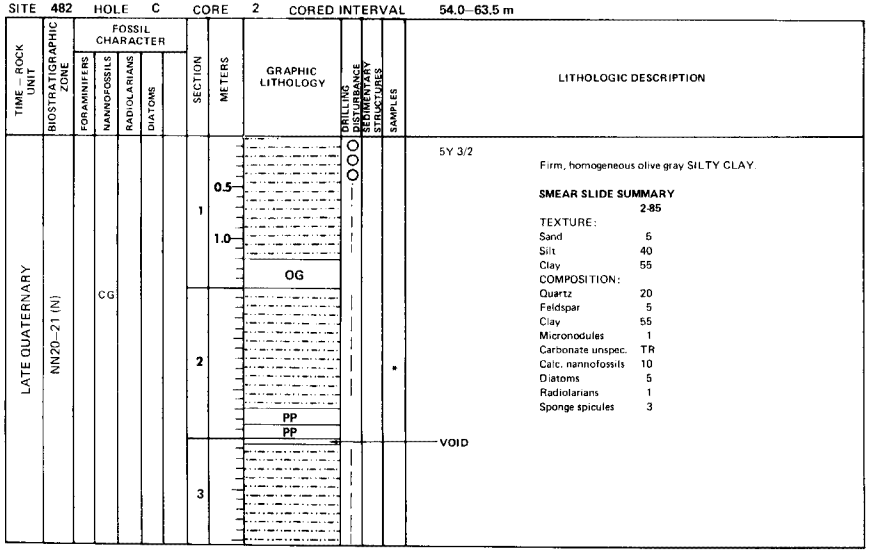
Basement

Depth sub-bottom (m): 47
Nature: Basalt
Velocity range (km/s): 5.6

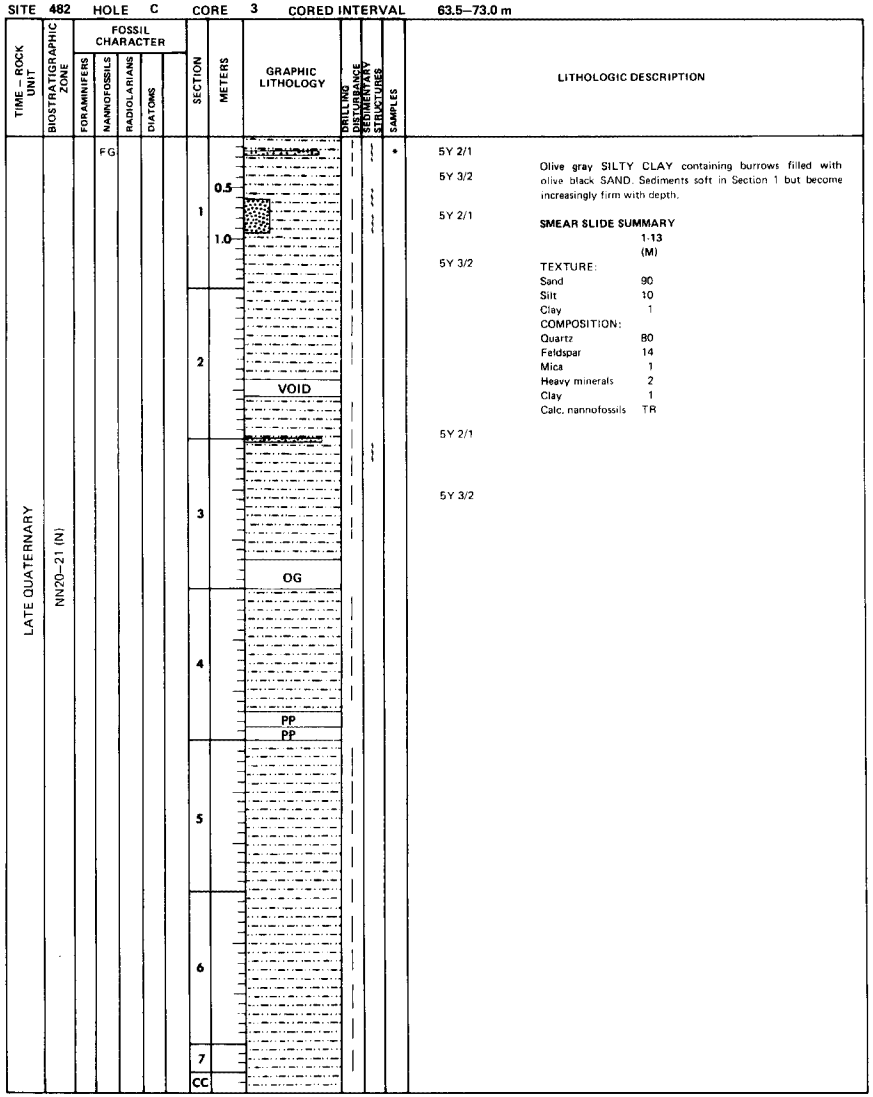
SITE 482 HOLE C CORE 1 CORED INTERVAL 44.5–54.0 m

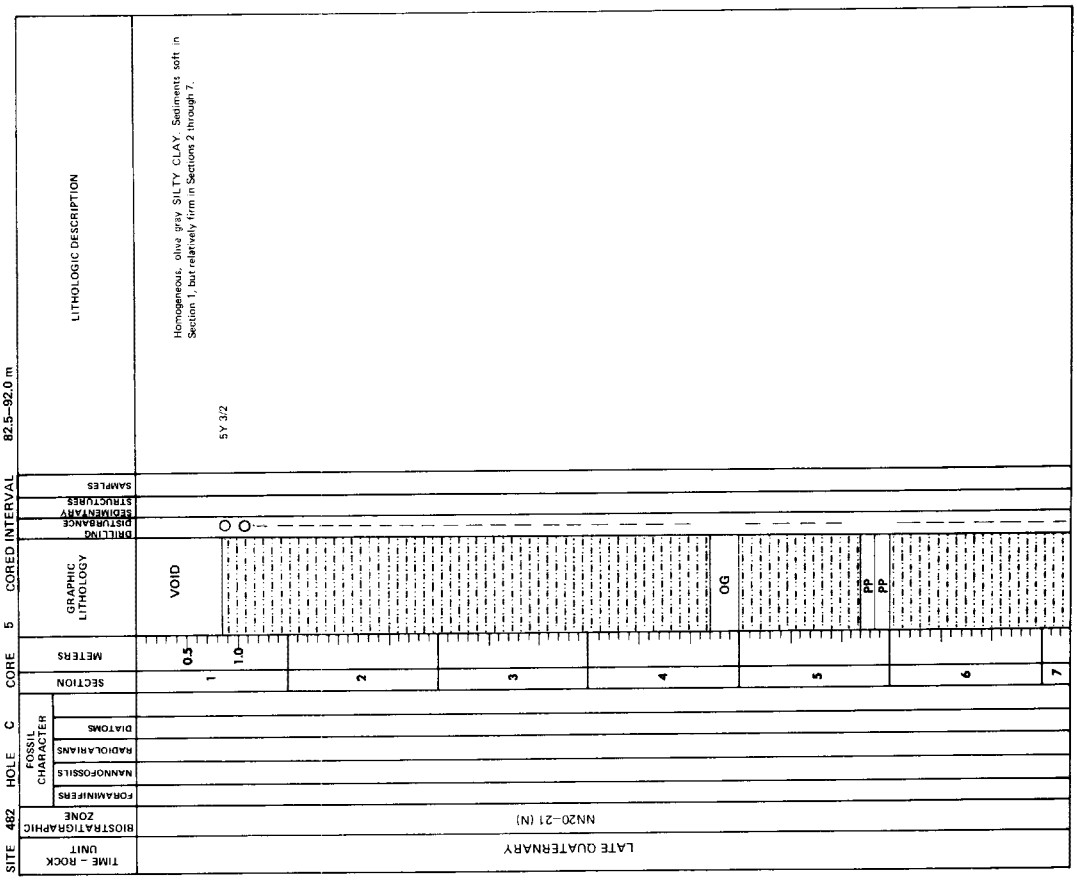


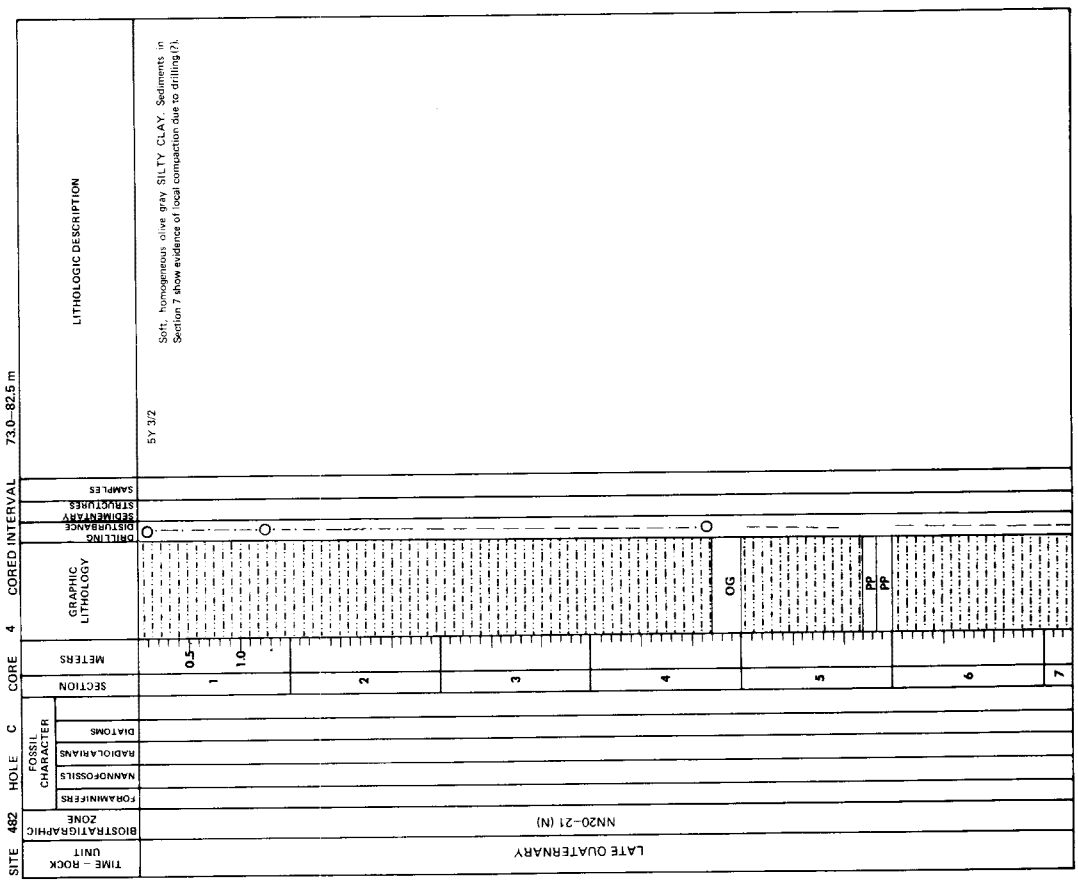
SITE 482 HOLE C CORE 2 CORED INTERVAL 54.0–63.5 m



SITE 482 HOLE C CORE 3 CORED INTERVAL 63.5–73.0 m




SITE 482 HOLE C CORE 5 CORED INTERVAL 82.5–92.0 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
LATE QUATERNARY
NN20–21 (N)
VOID
OG
PP
PP
5Y 3/2
Homogeneous, olive gray SILTY CLAY. Sediments soft in Section 1, but relatively firm in Sections 2 through 7.


SITE 482 HOLE C CORE 4 CORED INTERVAL 73.0–82.5 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
LATE QUATERNARY
NN20–21 (N)
OG
PP
PP
5Y 3/2
Soft, homogeneous olive gray SILTY CLAY. Sediments in Section 7 show evidence of local compaction due to drilling(?).

SITE 482 HOLE C CORE 6 CORED INTERVAL 111.0–120.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY	NN20–21 (N)	CG	FG CG CG	B		1 2 3 4 5 6	0.5 1.0	VOID OG PP PP			**	5Y 3/2 5Y 2/1 5Y 3/2 5Y 2/1 5Y 3/2 5Y 2/1

Olive gray NANNOFOSSIL-bearing SILTY CLAY containing irregular burrows filled with olive black SNADY MUD and SILTY SAND. Sediments soft in Sections 1–4, firm in Sections 5 and 6. Burrows well-preserved in Sections 2–4.

SMEAR SLIDE SUMMARY

	1-90 (M)	1-105	4-43	4-51 (M)
TEXTURE:				
Sand	30	10	10	55
Silt	20	31	32	35
Clay	50	59	58	10
COMPOSITION:				
Quartz	35	15	14	60
Feldspar	12	5	6	20
Mica	TR	TR	TR	–
Heavy minerals	–	–	1	5
Clay	50	59	58	10
Pyrite	1	2	2	–
Carbonate unspec.	–	–	3	–
Foraminifers	1	5	6	5
Calc. nannofossils	1	12	10	–
Diatoms	–	1	–	–
Radiolarians	TR	1	–	–
Sponge spicules	–	TR	–	–

SITE 482 HOLE C CORE 7 CORED INTERVAL 120.5–130.0 m

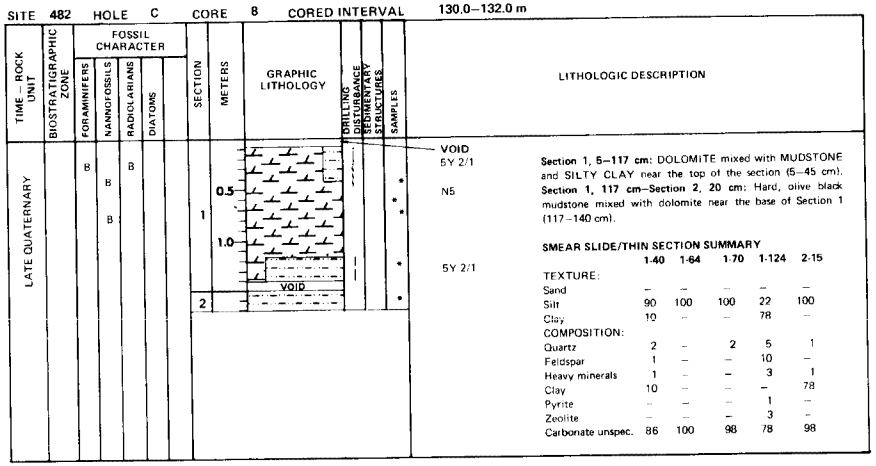
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY	NN20–21 (N)		CG CG			1 2 3 4 5 6 7	0.5 1.0	PP PP OG			*	5Y 2/1

Homogeneous, olive black SILTY CLAY. Sediments range from firm in the upper sections of the core, to sub-fissile in Section 3, 50–80 cm and Sections 5–7.

SMEAR SLIDE SUMMARY

	7-15
TEXTURE:	
Sand	–
Silt	30
Clay	70
COMPOSITION:	
Quartz	20
Feldspar	5
Mica	TR
Clay	70
Foraminifers	TR
Calc. nannofossils	5

SITE 482 HOLE C CORE 8 CORED INTERVAL 130.0–132.0 m

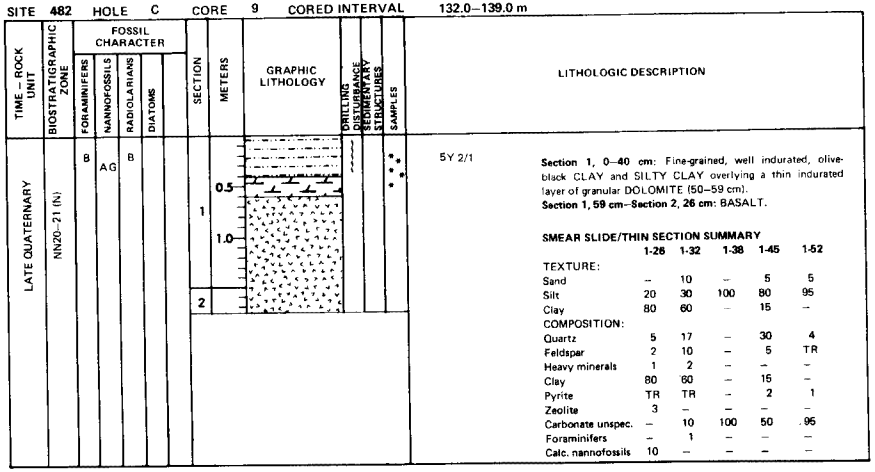


Section 1, 5–117 cm: DOLOMITE mixed with MUDSTONE and SILTY CLAY near the top of the section (5–45 cm). **Section 1, 117 cm–Section 2, 20 cm:** Hard, olive black mudstone mixed with dolomite near the base of Section 1 (117–140 cm).

SMEAR SLIDE/THIN SECTION SUMMARY

	1-40	1-64	1-70	1-124	2-15
TEXTURE:					
Sand	–	–	–	–	–
Silt	90	100	100	22	100
Clay	10	–	–	78	–
COMPOSITION:					
Quartz	2	–	2	5	1
Feldspar	1	–	–	10	–
Heavy minerals	1	–	–	3	1
Clay	10	–	–	–	78
Pyrite	–	–	–	1	–
Zeolite	–	–	–	3	–
Carbonate unspec.	86	100	98	78	98

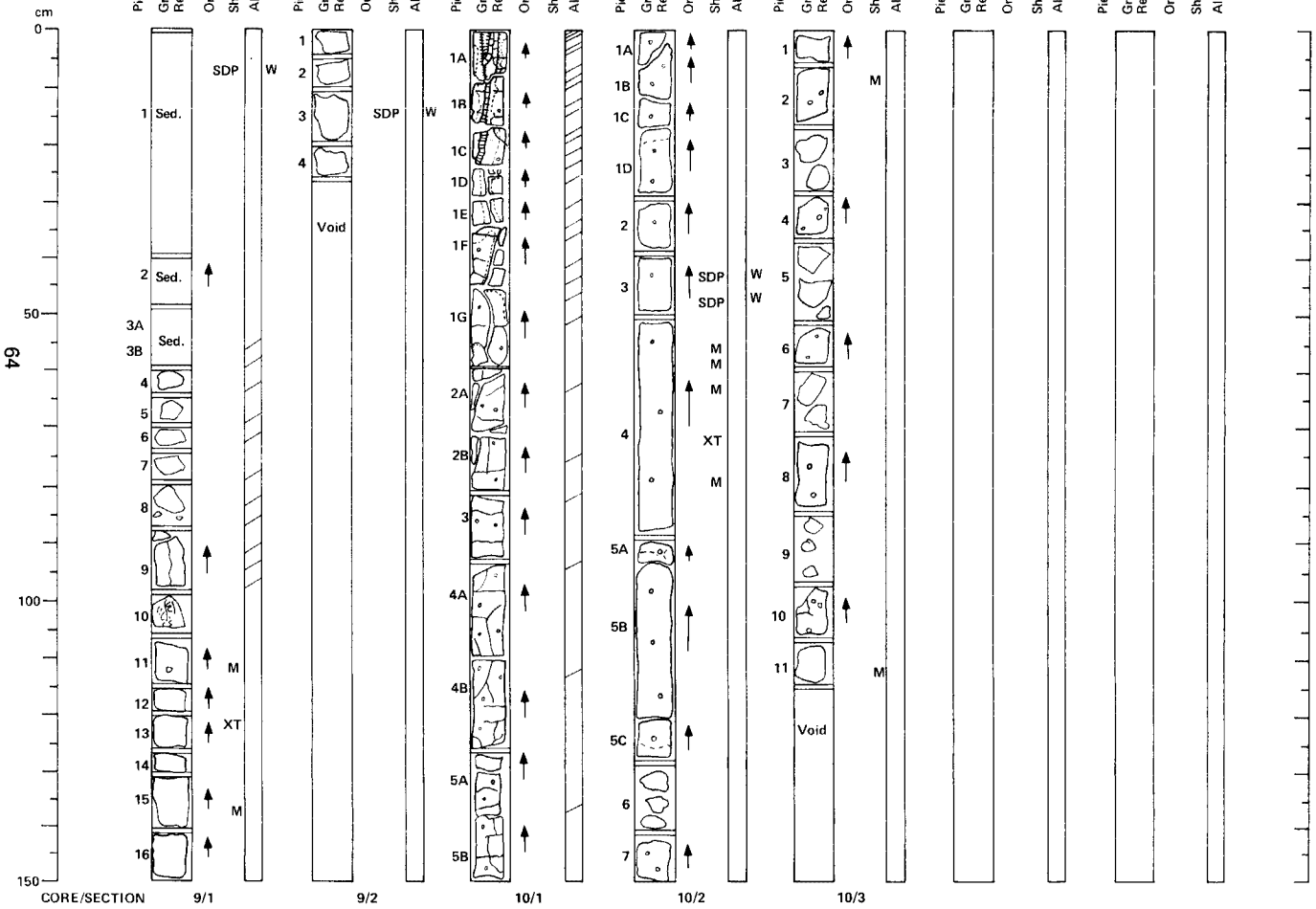
SITE 482 HOLE C CORE 9 CORED INTERVAL 132.0–139.0 m



Section 1, 0–40 cm: Fine-grained, well indurated, olive-black CLAY and SILTY CLAY overlying a thin indurated layer of granular DOLOMITE (50–59 cm).
Section 1, 59 cm–Section 2, 26 cm: BASALT.

SMEAR SLIDE/THIN SECTION SUMMARY

	1-26	1-32	1-38	1-45	1-52
TEXTURE:					
Sand	–	10	–	5	5
Silt	20	30	100	80	95
Clay	80	60	–	15	–
COMPOSITION:					
Quartz	5	17	–	30	4
Feldspar	2	10	–	5	TR
Heavy minerals	1	2	–	–	–
Clay	80	60	–	15	–
Pyrite	TR	TR	–	2	1
Zeolite	3	–	–	–	–
Carbonate unspec.	–	10	100	50	95
Foraminifers	–	1	–	–	–
Calc. nannofossils	10	–	–	–	–



HOLE 482C, CORE 9

Visual Description

Section 1, 0–58 cm: Well indurated, olive-black silty clay from 0–40 cm grading into light gray granular dolomite below.

Section 1, 58 cm–base of core: Medium to dark gray, aphyric, massive basalt. Sparse plagioclase microphenocrysts <1%, ≤1 mm. Groundmass fine-grained, partly altered along veins. Vesicles 1%, ≤ 2 mm, spherical, filled with green smectite. Veins and fractures common, especially at top of basalt, hairline to 5 mm, filled with carbonate, pyrite, and minor smectite; sulfide decreases downward, some veins have narrow alteration halos. Pyrite disseminated in groundmass, particularly near veins.

Thin Section Description

Location: Section 1, 121–123 cm

Texture: Aphyric, fine- to medium-grained, intergranular to subophitic.

Groundmass: Olivine(?) 1%, subhedral clots of smectite, 0.2–0.5 mm; plagioclase 45%, ≤1 mm, subhedral to euhedral, fresh; clinopyroxene 40%, ≤0.5 mm, anhedral, partly intergrown with plagioclase, $2V_z$ ~40°, fresh; magnetite 3–5%, ≤0.2 mm, subhedral to anhedral, mostly in interstitial patches; interstitial material 10%, mostly smectite with lesser feldspar(?) and opal(?) (colorless, isotropic material with high negative relief).

Vesicles: 1%, ≤ 0.5 mm, round, filled with smectite and minor carbonate.

Alteration: Olivine(?) and some interstitial material replaced by greenish-brown smectite.

HOLE 482C, CORE 10

Visual Description

Gray, medium-grained, aphyric, massive basalt; moderately altered in upper part. Vesicles 1–3%, 0.5–3 mm, subspherical, irregularly distributed, filled with green smectite, pyrite, and some calcite. Veins and fractures common, subvertical, 0.3–0.8 mm wide, filled or lined with pyrite, calcite, zeolite(?), and some smectite, opal and barite; large vein in upper 60 cm which splits a pre-existing segregation vein and has a prominent alteration halo with bleached rock on either side; fractures decrease in number downward. Pyrite disseminated in groundmass, particularly near veins.

Thin Section Description

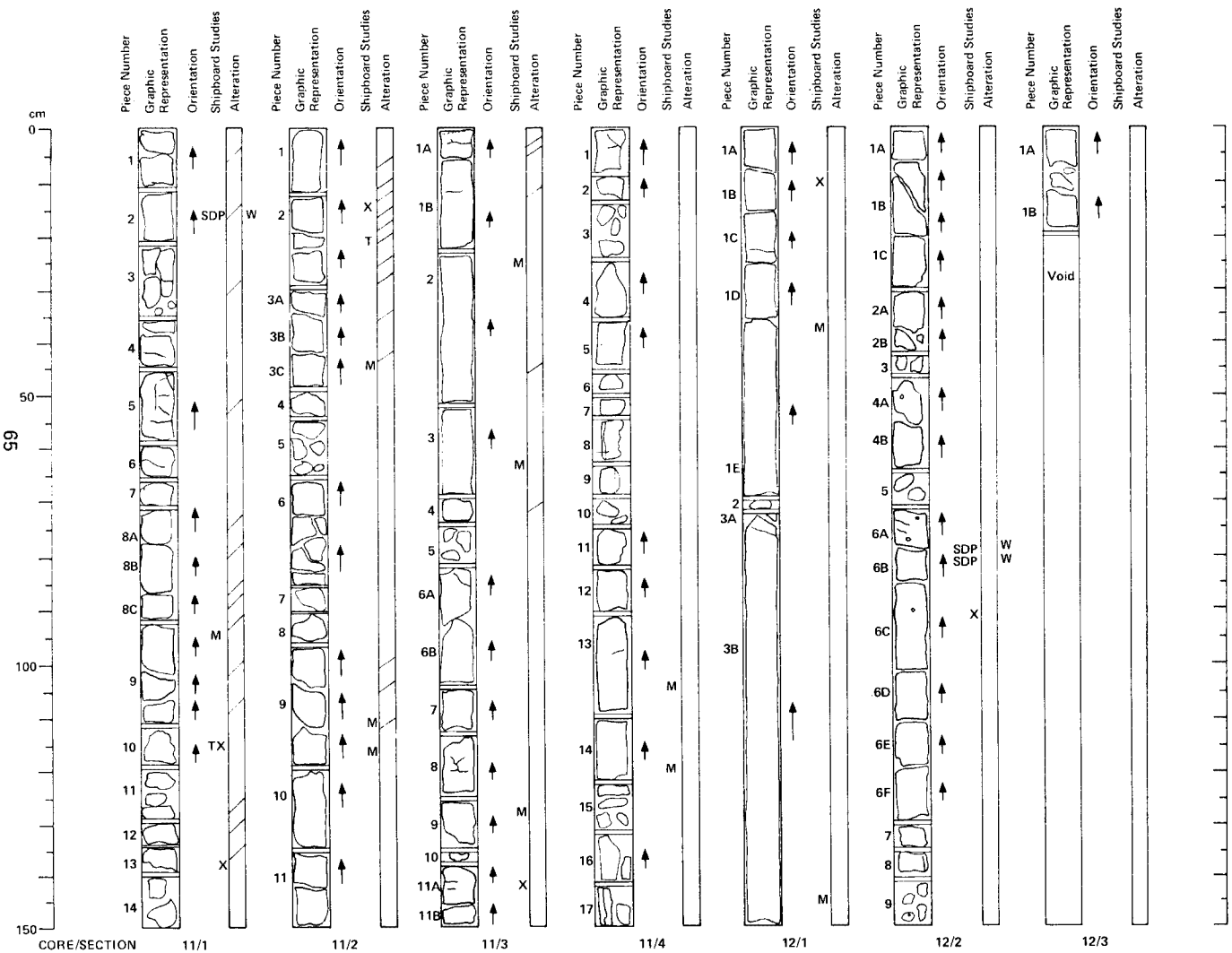
Location: Section 2, 75–76 cm

Texture: Aphyric, medium-grained, intergranular to subophitic.

Groundmass: Olivine 2–3%, ≤ 0.4 mm, subhedral to anhedral, completely replaced by smectite; plagioclase 40–45%, ≤ 1.5 mm, euhedral to subhedral, fresh; clinopyroxene 40%, 0.2–0.7 mm, anhedral, often partly intergrown with plagioclase, $2V_z$ ~ 40°, fresh; magnetite 3–5%, ≤ 0.2 mm subhedral to anhedral, mostly in interstitial patches; interstitial material 10–15%, mostly smectite with minor feldspar(?), apatite and traces of green amphibole(?).

Vesicles: 1–5%, irregularly distributed, 1–2 mm, round, open or partly filled with smectite.

Alteration: Olivine replaced by smectite and minor carbonate; interstitial material replaced by smectite.



HOLE 482C, CORE 11

Visual Description

Gray, medium-grained, aphyric, massive basalt. Vesicles < 2%, < 1 mm, spherical, filled with smectite. Fractures and veinlets sparse, hairline to 0.5 mm, filled or lined with calcite and smectite. Groundmass has patchy replacement by smectite, particularly adjacent to fractures. Section 2, 20–23 cm shows intense replacement by chlorite, carbonate and sulphides.

Thin Section Description

Location: Section 1, 115–117 cm

Texture: Aphyric, medium-grained, intergranular to subophitic.

Groundmass: Olivine(?) 1–2%, < 0.5 mm, subhedral, completely replaced by smectite; plagioclase 55%, < 1 mm, subhedral laths, fresh; clinopyroxene 30–35%, < 0.5 mm, anhedral, partly intergrown with plagioclase, $2V_z \sim 40$; magnetite 2%, 0.05–0.1 mm, subhedral, mostly in interstitial patches; interstitial material 10%, replaced by yellow-brown smectite, minor apatite.

Alteration: Olivine and some interstitial material replaced by smectite.

Location: Section 2, 21–24 cm

Texture: Aphyric, medium-grained, intergranular to subophitic, highly altered.

Groundmass: Olivine(?) 2%, 0.2–0.8 mm, possible pseudomorphs of smectite; plagioclase 50%, 0.3–1.2 mm, subhedral laths, partly replaced by smectite; clinopyroxene 35%, 0.5–1 mm, anhedral, partly replaced by smectite, celadonite(?), actinolite and clinozoisite(?); opaques 2–3%, mostly pyrite; interstitial material 10%, altered to smectite.

Alteration: Olivine(?) to smectite; clinopyroxene to smectite, actinolite, clinozoisite(?) and smectite, some sphene(?) in interstitial areas; unknown secondary mineral, 1 grain, colorless, uniaxial (–), high positive relief, low birefringence.

HOLE 482C, CORE 12

Visual Description

Gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 5%, 1–5 mm, euhedral, fresh. Groundmass fine-grained with grain size increasing slightly downward, generally fresh. Vesicles 1–2%, < 2 mm, spherical, filled with smectite and minor zeolite(?). Veinlets and fractures sparse, < 2 mm wide, filled with smectite and minor pyrite.

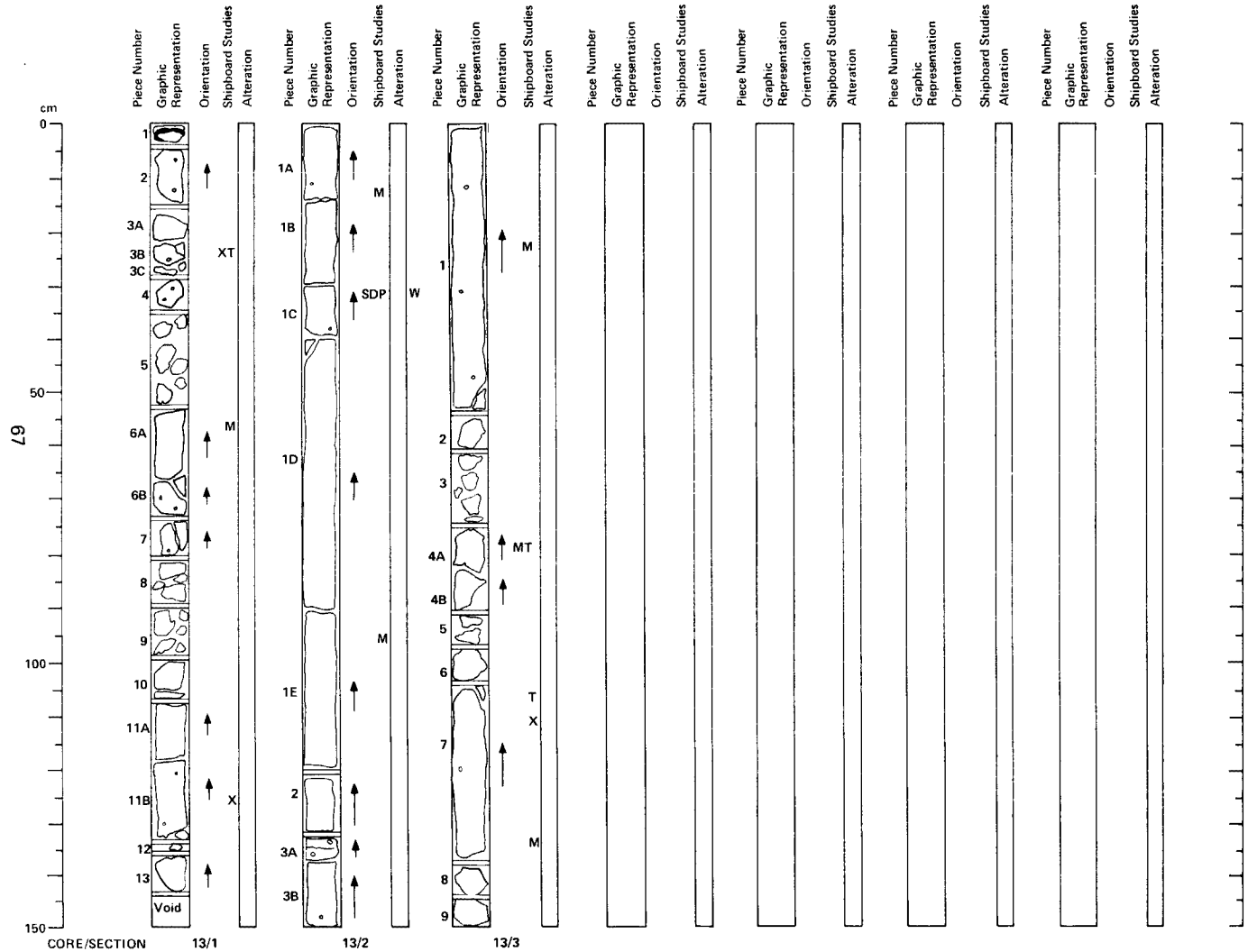
SITE 482 HOLE C CORE 13 CORED INTERVAL 161.5–166.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LATE QUATERNARY						1	0.5 1.0					
						2						
						3						

Section 1, 0–1 cm: Dark brown CLAYSTONE coating devitrified glass along the margin of a basalt pillow.
Section 1, 1 cm–Section 3, 150 cm: BASALT.

SMEAR SLIDE SUMMARY

	1-2
TEXTURE:	
Sand	–
Silt	20
Clay	80
COMPOSITION:	
Clay	80
Pyrite	5
Zeolites	15



HOLE 482C, CORE 13

Visual Description

Section 1, 0–1 cm: Dark brown, indurated, foraminifer-rich mudstone.

Section 1, 1 cm–base of core: Medium gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–3%, 1–4 mm, euhedral, fresh. Groundmass fine- to medium-grained, grain size increases slightly downward; glass selvedge present in Section 1, 2 cm. Groundmass generally fresh with minor disseminated pyrite. Vesicles 1–5%, most abundant near top of core, 0.5–2 mm, spherical, filled with green smectite and rare pyrite. Fractures and veinlets sparse, hairline to 1 mm wide, filled with smectite and minor pyrite.

Thin Section Description

Location: Section 1, 22–24 cm

Texture: Very sparsely phyric, medium-grained, intersertal to subophitic.

Phenocrysts: Plagioclase <1%, 2–4 mm, subhedral laths, fresh.

Groundmass: Olivine 2–3%, 0.1–0.2 mm, subhedral, completely replaced by smectite; plagioclase 50%, 0.2–1 mm, subhedral laths fresh; clinopyroxene 30–35%, 0.1–0.4 mm, anhedral, fresh $2V_z$ ~40°; interstitial material 10–15%, glassy, partly replaced by smectite; magnetite 3–5%, 0.02–0.04 mm, subhedral.

Vesicles: 1–2%, 0.5–2 mm, round, filled with smectite and minor carbonate.

Alteration: Olivine and interstitial altered to smectite.

Location: Section 3, 105–107 cm

Texture: Very sparsely phyric, coarse-grained, intersertal to subophitic.

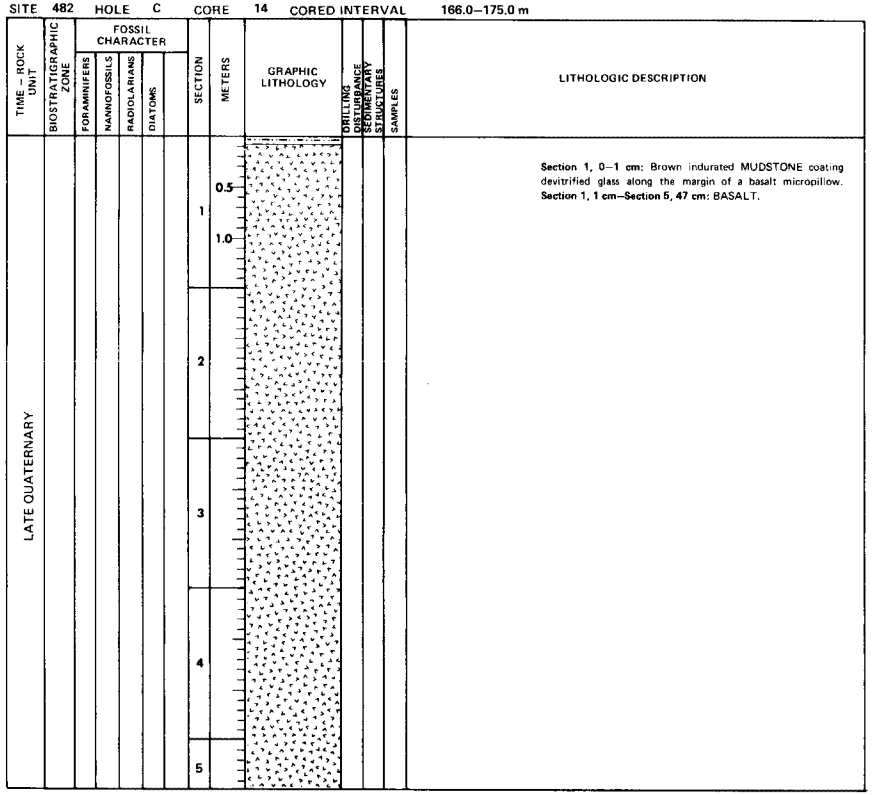
Phenocrysts: Plagioclase <1%, 1–1.5 mm, subhedral, zoned with glassy inclusions, fresh.

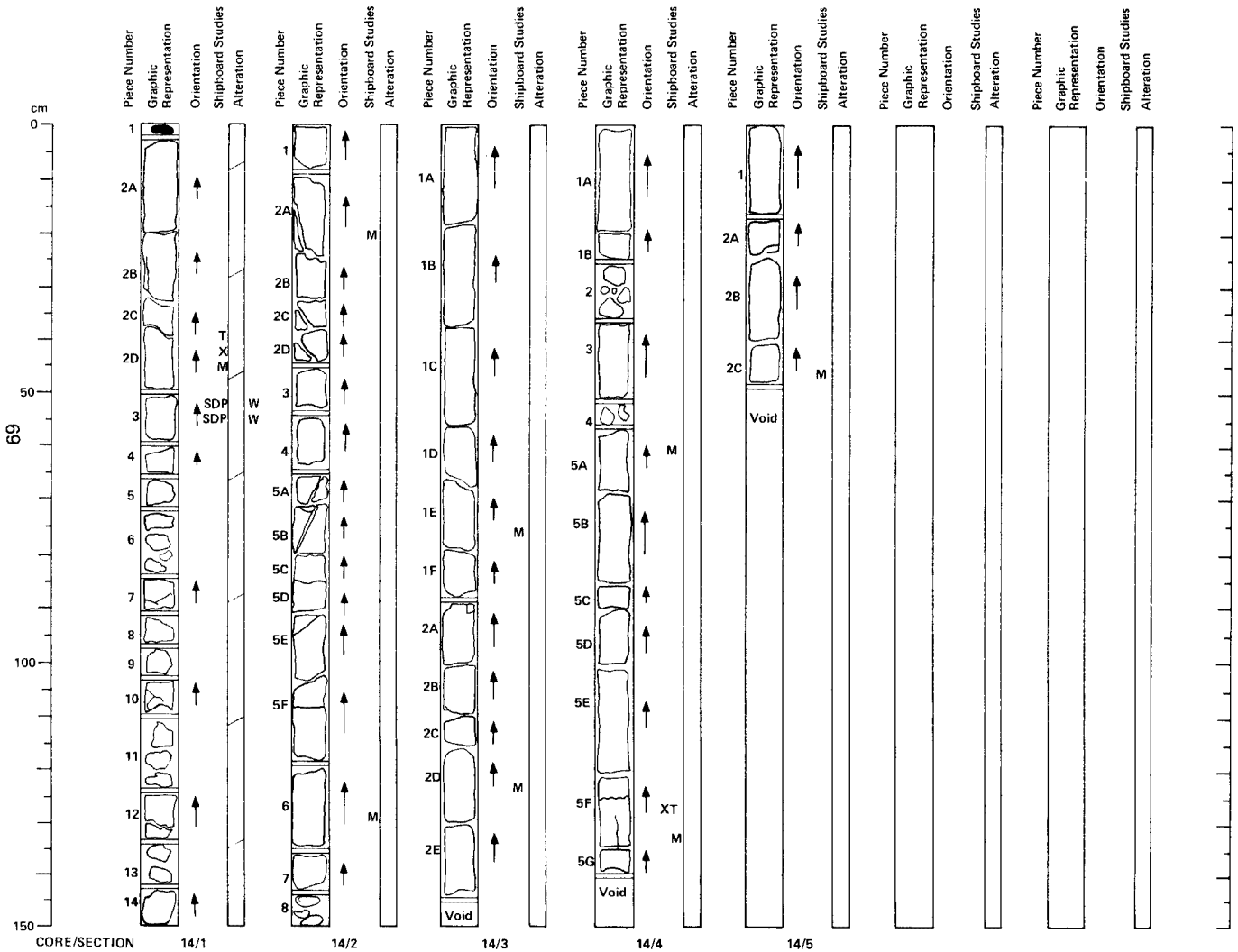
Groundmass: Olivine 2–3%, 0.2–0.4 mm, subhedral, replaced by smectite; plagioclase 50%, 0.2–1.2 mm, subhedral, fresh; clinopyroxene, 35–40%, 0.2–0.8 mm, anhedral, $2V_z$ ~ 40°; magnetite 5%, 0.1–0.4 mm, subhedral; interstitial material 5%, mostly glassy material with minor quartz and apatite, partly replaced by smectite.

Vesicles: <1%, 0.1–0.2 mm, round, filled with smectite.

Alteration: Olivine and some interstitial material replaced by smectite; some clinopyroxene marginally replaced by smectite.

SITE 482 HOLE C CORE 14 CORED INTERVAL 166.0–175.0 m





HOLE 482C, CORE 14

Visual Description

Section 1, 0–1 cm: Brown, indurated mudstone.

Section 1, 1 cm–base of core: Gray, aphyric to sparsely phyric, massive basalt. Plagioclase phenocrysts 0–3%, 1–3 mm, euhedral to subhedral; fresh, occasionally in glomerophyric clots. Groundmass fine- to medium-grained; glass selvedge in Section 1, 2 cm, glass partly palagonitized. Groundmass generally fresh but with some mottling and yellow staining. Vesicles <1%, ≈0.5 mm, spherical filled with smectite. Fractures and veinlets very sparse, hairline to 1 mm wide, coated or filled with smectite and calcite, often slickensided.

Thin Section Description

Location: Section 1, 37–39 cm

Texture: Aphyric, coarse-grained, intersertal to subophitic.

Groundmass: Olivine 2%, 0.2–0.5 mm, subhedral, replaced by smectite; plagioclase 55%, 0.2–1 mm, subhedral, fresh; clinopyroxene 30%, 0.1–0.4 mm, anhedral, fresh; magnetite 4%, 0.1–0.3 mm, subhedral; interstitial material 10%, mostly microcrystalline material with some quartz and apatite, partly replaced by smectite.

Vesicles: <1%, 0.5 mm, round, filled with smectite.

Alteration: Olivine and some interstitial material altered to smectite.

Location: Section 4, 122–127 cm

Texture: Very sparsely phyric, medium-grained, intersertal to subophitic.

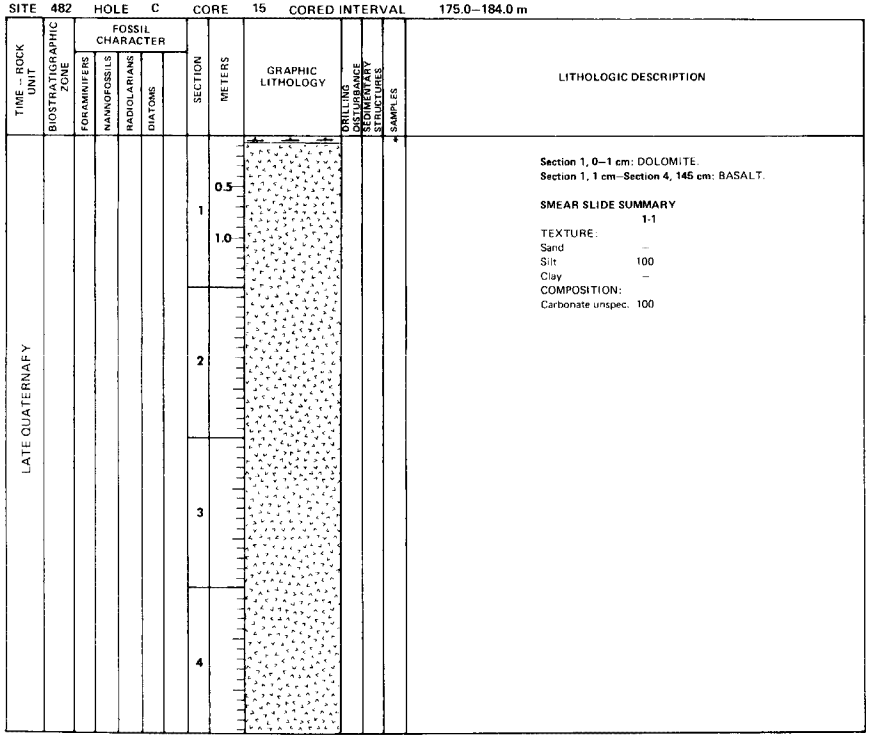
Phenocrysts: Plagioclase <1%, 1–3 mm, subhedral, fresh.

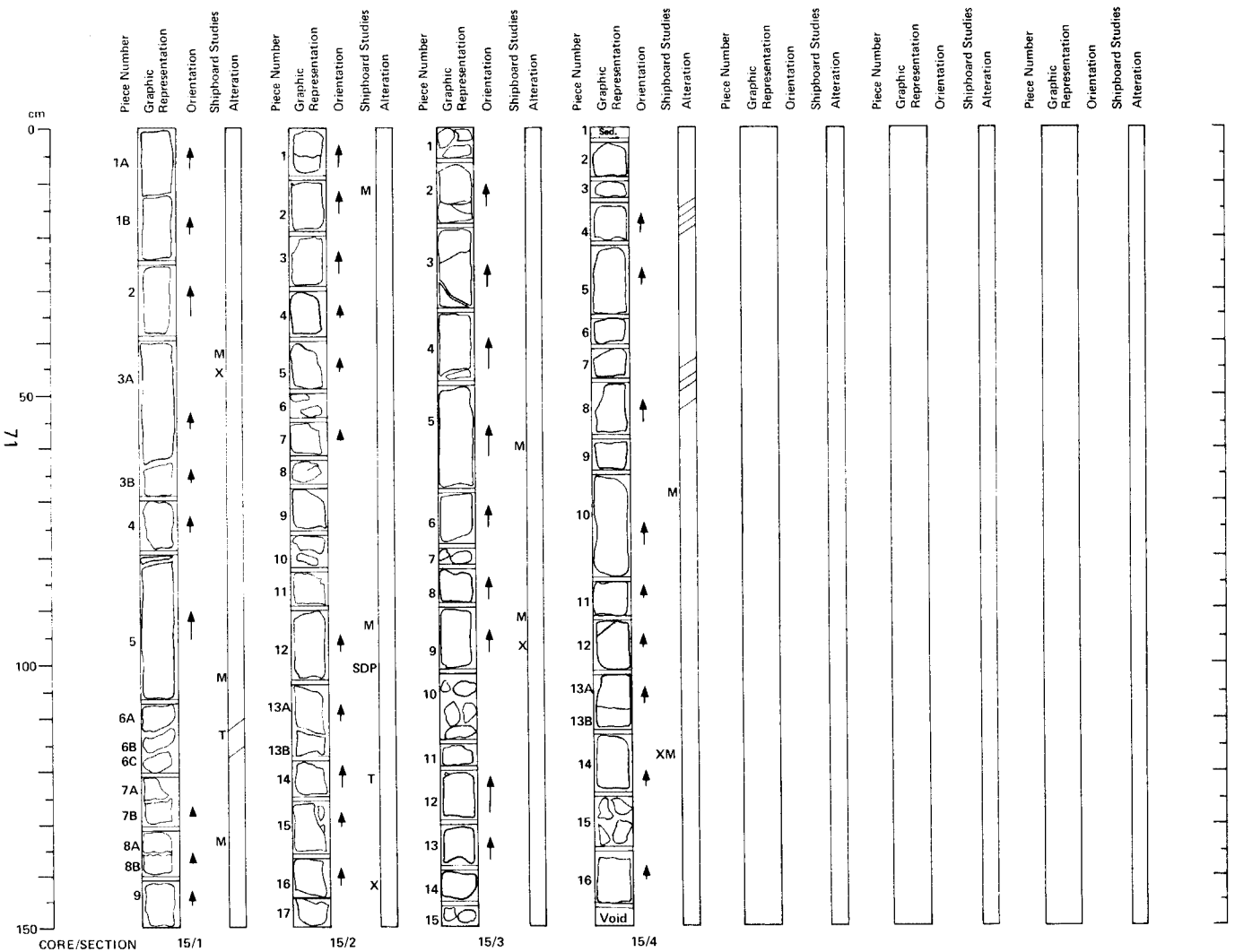
Groundmass: Olivine 2–3%, 0.2–0.5 mm, subhedral, altered to smectite; plagioclase 50–55%, 0.3–1 mm, subhedral, fresh; clinopyroxene 35–40%, 0.2–0.8 mm, anhedral, fresh, $2V_z \sim 40°$; magnetite 2–3%, 0.05–0.02 mm, anhedral; interstitial material 5%, mostly cryptocrystalline material with minor quartz and apatite, partly replaced by smectite.

Vesicles: <1%, 0.2–0.5 mm, round, filled with smectite.

Alteration: Olivine and some interstitial material altered to smectite.

SITE 482 HOLE C CORE 15 CORED INTERVAL 175.0–184.0 m





HOLE 482C, CORE 15

Visual Description

Section 1, 0–1 cm: Light gray dolomite.

Section 1, 1 cm–base of core: Medium gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 3–5%, 1–4 mm, euhedral, fresh, usually in clots with clinopyroxene. Clinopyroxene phenocrysts 1–3%, 0.5–1 mm, anhedral, fresh, intergrown with plagioclase. Olivine microphenocrysts 1%, < 1 mm, altered to smectite. Groundmass fine- to medium-grained, grain size increases slightly downward, generally fresh, but some smectite alteration. Vesicles < 1%, ≤ 0.5 mm spherical, filled with smectite. Fractures and veinlets sparse, hairline to 1 mm, coated and filled with smectite.

Thin Section Description

Location: Section 1, 103–105 cm

Texture: Sparsely phyric, fine-grained, intergranular to quench.

Phenocrysts: Olivine 1%, 0.3–0.5 mm, subhedral, replaced by smectite; plagioclase 3–5%, 0.5–1 mm, subhedral laths, fresh; clinopyroxene 1–2%, 0.2–0.4 mm, subophitic clots, $2V_z \sim 40°$.

Groundmass: Olivine 1–3%, 0.1–0.2 mm, subhedral, replaced by smectite; plagioclase 50%, 0.1–0.3 mm, subhedral, fresh; clinopyroxene 30–40%, 0.05–0.15 mm, anhedral to granular, fresh; magnetite 3–4%, 0.02–0.05 mm, subhedral; interstitial material 5–15%, cryptocrystalline, partly altered to smectite.

Vesicles: < 1%, 0.1–0.3 mm, round, filled with smectite.

Alteration: Olivine and some interstitial material altered to smectite.

Location: Section 2, 119–121 cm

Texture: Sparsely phyric, medium-grained, intergranular to subophitic.

Phenocrysts: Plagioclase 1–2%, 1–2 mm, subhedral, fresh; clinopyroxene < 1%, 0.5–0.8 mm, anhedral, intergrown with plagioclase, $2V_z \sim 40°$.

Groundmass: Olivine 2–3%, 0.4–0.6 mm, subhedral, replaced by smectite; plagioclase 50%, 0.1–0.5 mm, subhedral, fresh; clinopyroxene 30–35%, 0.1–0.4 mm, anhedral, fresh, $2V_z \sim 40°$; magnetite 2–3%, 0.05–0.2 mm, anhedral; interstitial material 10%, partly replaced by smectite.

Vesicles: 1%, 0.1–0.5 mm, round, filled with smectite and minro carbonate.

Alteration: Olivine and some interstitial material replaced by smectite.

SITE SUMMARY

HOLE 482D

Date occupied: 2100 February 3, 1979
Date departed: 1600 February 8, 1979
Time on hole: 5 days
Position (latitude; longitude): 22°47.31'N; 107°59.51'W
Water depth (sea level; corrected m, echo-sounding): 3008
Water depth (rig floor; corrected m, echo-sounding): 3015
Bottom felt at (m, drill pipe): 3015
Penetration (m): 186.5
Number of cores: 13
Total length of cored section (m): 115.0
Total core recovered (m): 64.41
Core recovery (%): 56

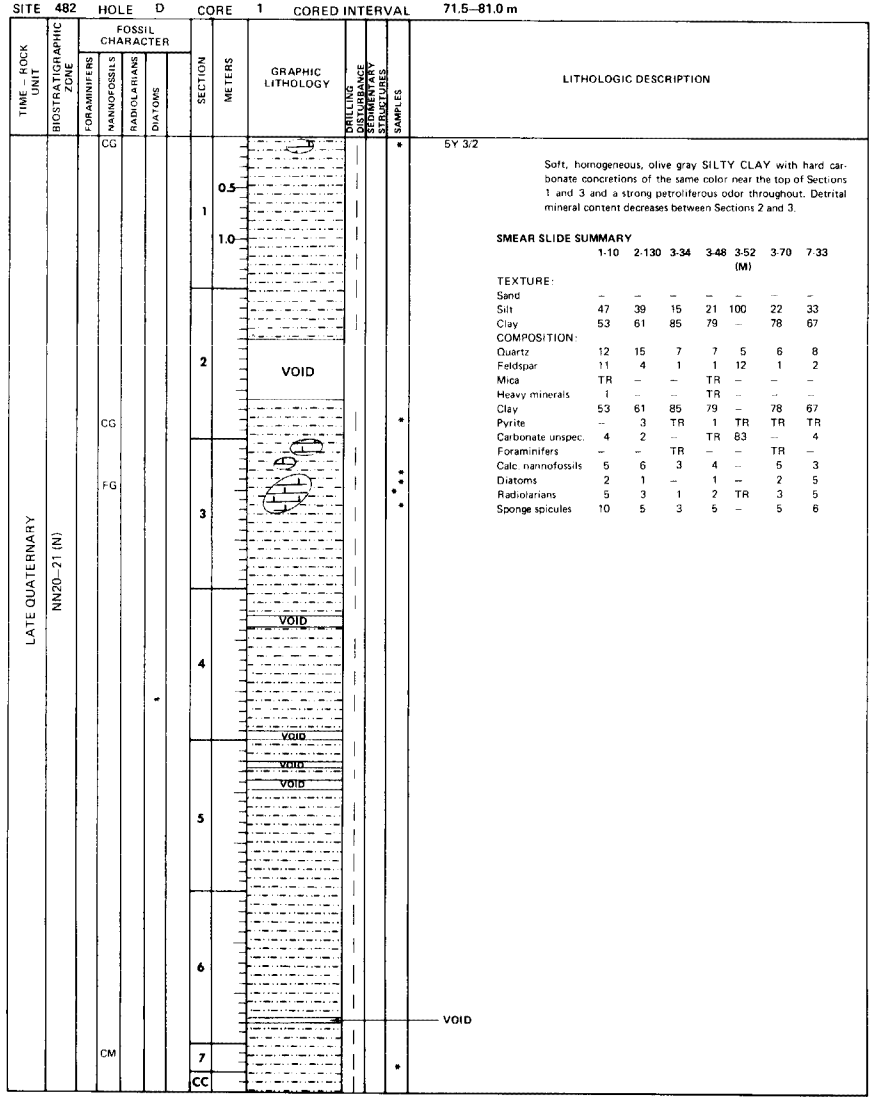
Oldest Sediment Cored

Depth sub-bottom (m): 137
Nature: Silty clay
Age: Quaternary
Measured velocity (km/s): 1.5

Basement

Depth sub-bottom (m): 186.5
Nature: Basalt
Velocity range (km/s): 5.6

SITE 482 HOLE D CORE 1 CORED INTERVAL 71.5–81.0 m

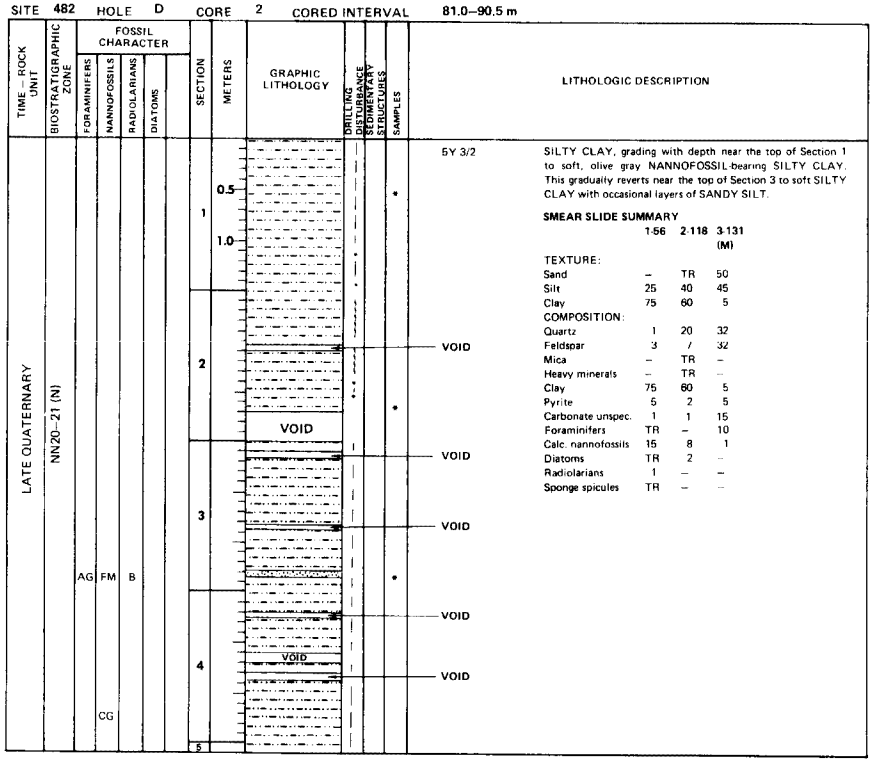


Soft, homogeneous, olive gray SILTY CLAY with hard carbonate concretions of the same color near the top of Sections 1 and 3 and a strong petroliferous odor throughout. Detrital mineral content decreases between Sections 2 and 3.

SMEAR SLIDE SUMMARY

	1-10	2-130	3-34	3-48	3-52 (M)	3-70	7-33
TEXTURE:							
Sand	–	–	–	–	–	–	–
Silt	47	39	15	21	100	22	33
Clay	53	61	85	79	–	78	67
COMPOSITION:							
Quartz	12	15	7	7	5	6	8
Feldspar	11	4	1	1	12	1	2
Mica	TR	–	–	TR	–	–	–
Heavy minerals	1	–	–	TR	–	–	–
Clay	53	61	85	79	–	78	67
Pyrite	–	3	TR	1	TR	TR	TR
Carbonate unspec.	4	2	–	TR	83	–	4
Foraminifers	–	–	TR	–	–	TR	–
Calc. nannofossils	5	6	3	4	–	5	3
Diatoms	2	1	–	1	–	2	5
Radiolarians	5	3	1	2	TR	3	5
Sponge spicules	10	5	3	5	–	5	6

SITE 482 HOLE D CORE 2 CORED INTERVAL 81.0–90.5 m

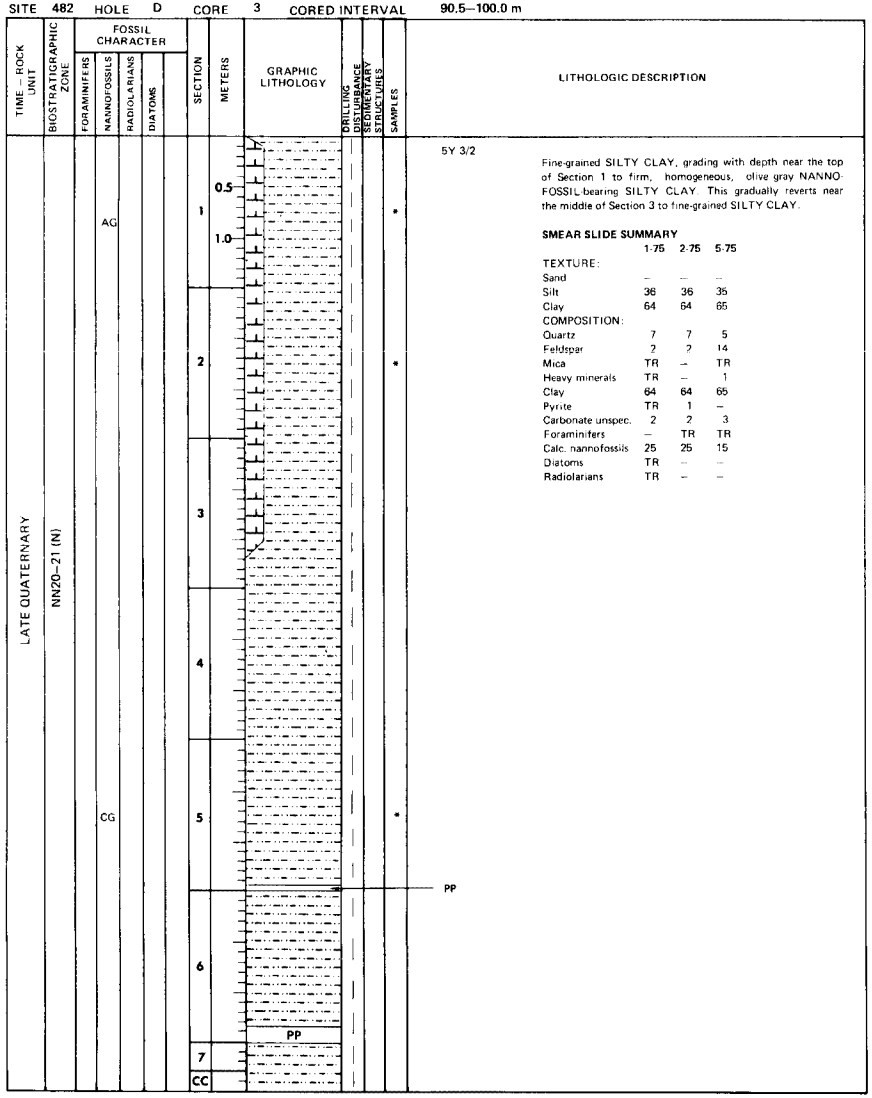


SILTY CLAY, grading with depth near the top of Section 1 to soft, olive gray NANNOFOSSIL-bearing SILTY CLAY. This gradually reverts near the top of Section 3 to soft SILTY CLAY with occasional layers of SANDY SILT.

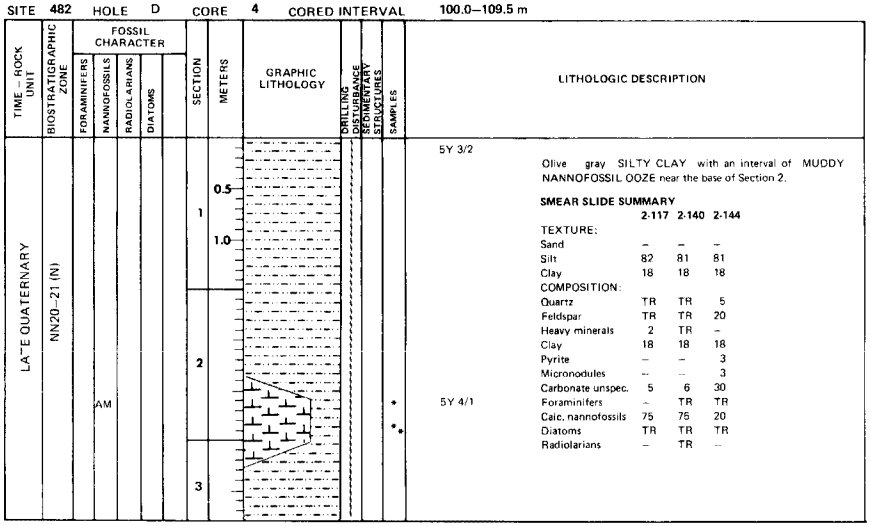
SMEAR SLIDE SUMMARY

	1-56	2-118	3-131 (M)
TEXTURE:			
Sand	–	TR	50
Silt	25	40	45
Clay	75	60	5
COMPOSITION:			
Quartz	1	20	32
Feldspar	3	7	32
Mica	–	TR	–
Heavy minerals	–	TR	–
Clay	75	60	5
Pyrite	5	2	5
Carbonate unspec.	1	1	15
Foraminifers	TR	–	10
Calc. nannofossils	15	8	1
Diatoms	TR	2	–
Radiolarians	1	–	–
Sponge spicules	TR	–	–

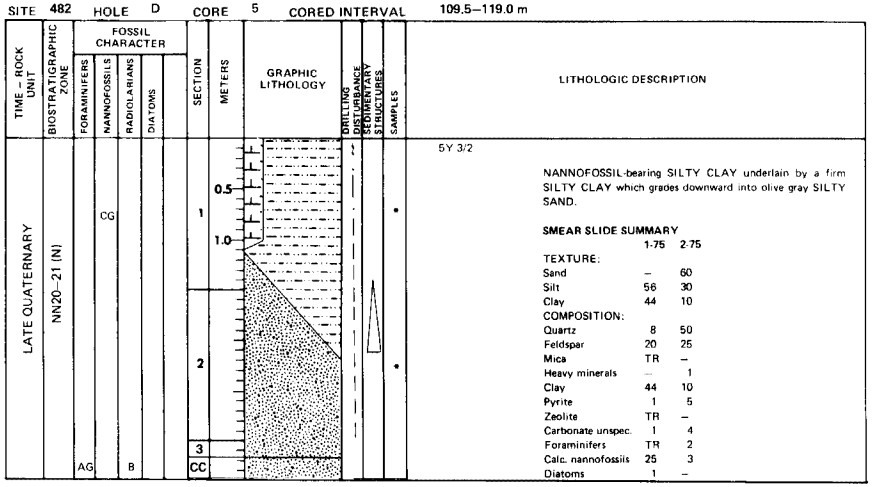
SITE 482 HOLE D CORE 3 CORED INTERVAL 90.5–100.0 m



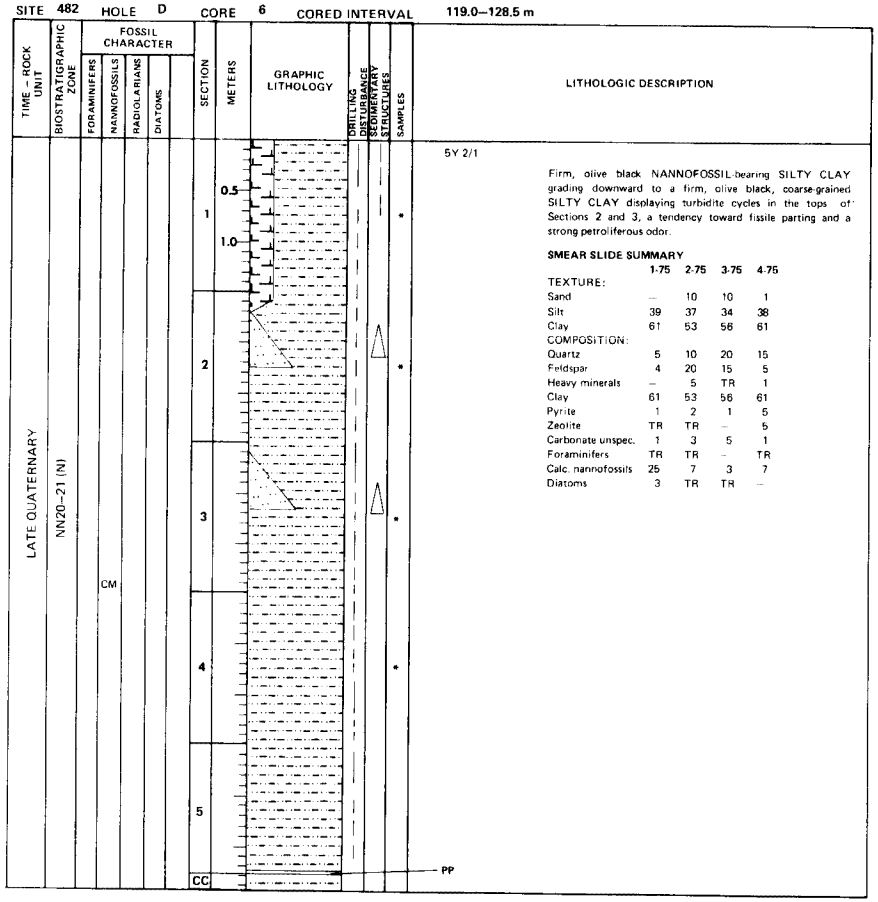
SITE 482 HOLE D CORE 4 CORED INTERVAL 100.0–109.5 m



SITE 482 HOLE D CORE 5 CORED INTERVAL 109.5–119.0 m



SITE 482 HOLE D CORE 6 CORED INTERVAL 119.0–128.5 m

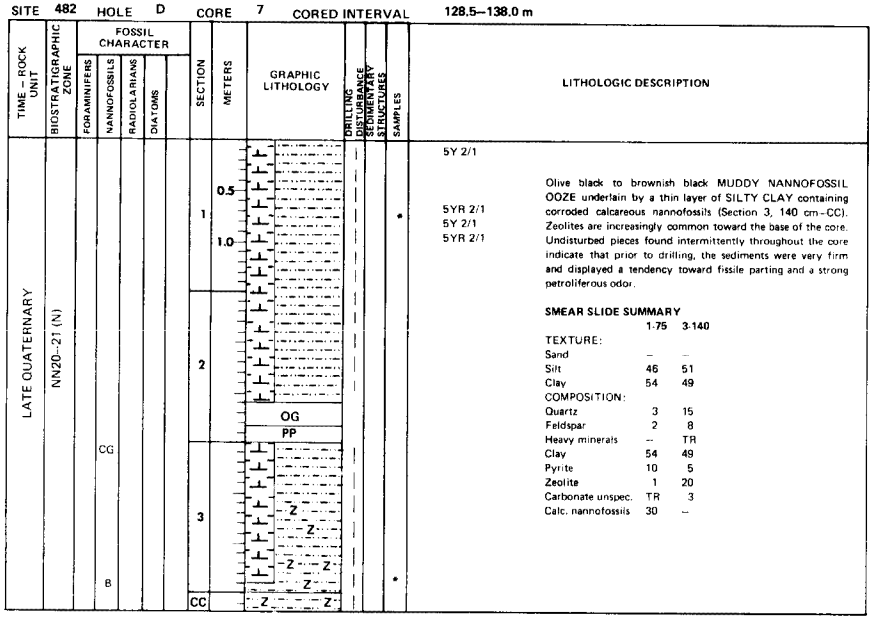


Firm, olive black NANNOFOSSIL-bearing SILTY CLAY grading downward to a firm, olive black, coarse-grained SILTY CLAY displaying turbidite cycles in the tops of Sections 2 and 3, a tendency toward fissile parting and a strong petroliferous odor.

SMEAR SLIDE SUMMARY

	1-75	2-75	3-75	4-75
TEXTURE:				
Sand	–	10	10	1
Silt	39	37	34	38
Clay	61	53	56	61
COMPOSITION:				
Quartz	5	10	20	15
Feldspar	4	20	15	5
Heavy minerals	–	5	TR	1
Clay	61	53	56	61
Pyrite	1	2	1	5
Zeolite	TR	TR	–	5
Carbonate unspec.	1	3	5	1
Foraminifers	TR	TR	–	TR
Calc. nannofossils	25	7	3	7
Diatoms	3	TR	TR	–

SITE 482 HOLE D CORE 7 CORED INTERVAL 128.5–138.0 m

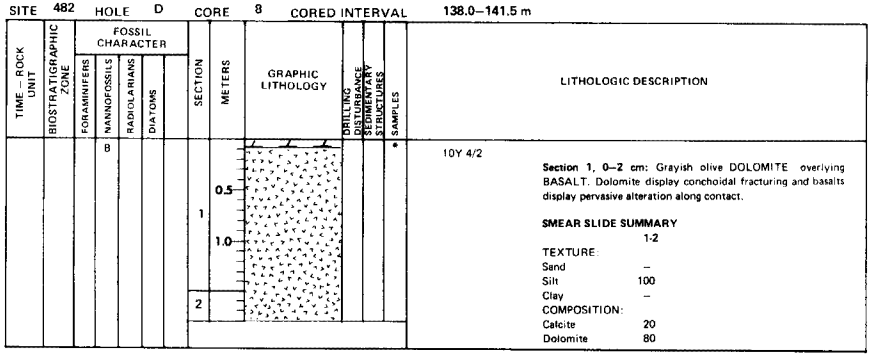


Olive black to brownish black MUDDY NANNOFOSSIL OOZE underlain by a thin layer of SILTY CLAY containing corroded calcareous nannofossils (Section 3, 140 cm–CC). Zeolites are increasingly common toward the base of the core. Undisturbed pieces found intermittently throughout the core indicate that prior to drilling, the sediments were very firm and displayed a tendency toward fissile parting and a strong petroliferous odor.

SMEAR SLIDE SUMMARY

	1-75	3-140
TEXTURE:		
Sand	–	–
Silt	46	51
Clay	54	49
COMPOSITION:		
Quartz	3	15
Feldspar	2	8
Heavy minerals	–	TR
Clay	54	49
Pyrite	10	5
Zeolite	1	20
Carbonate unspec.	TR	3
Calc. nannofossils	30	–

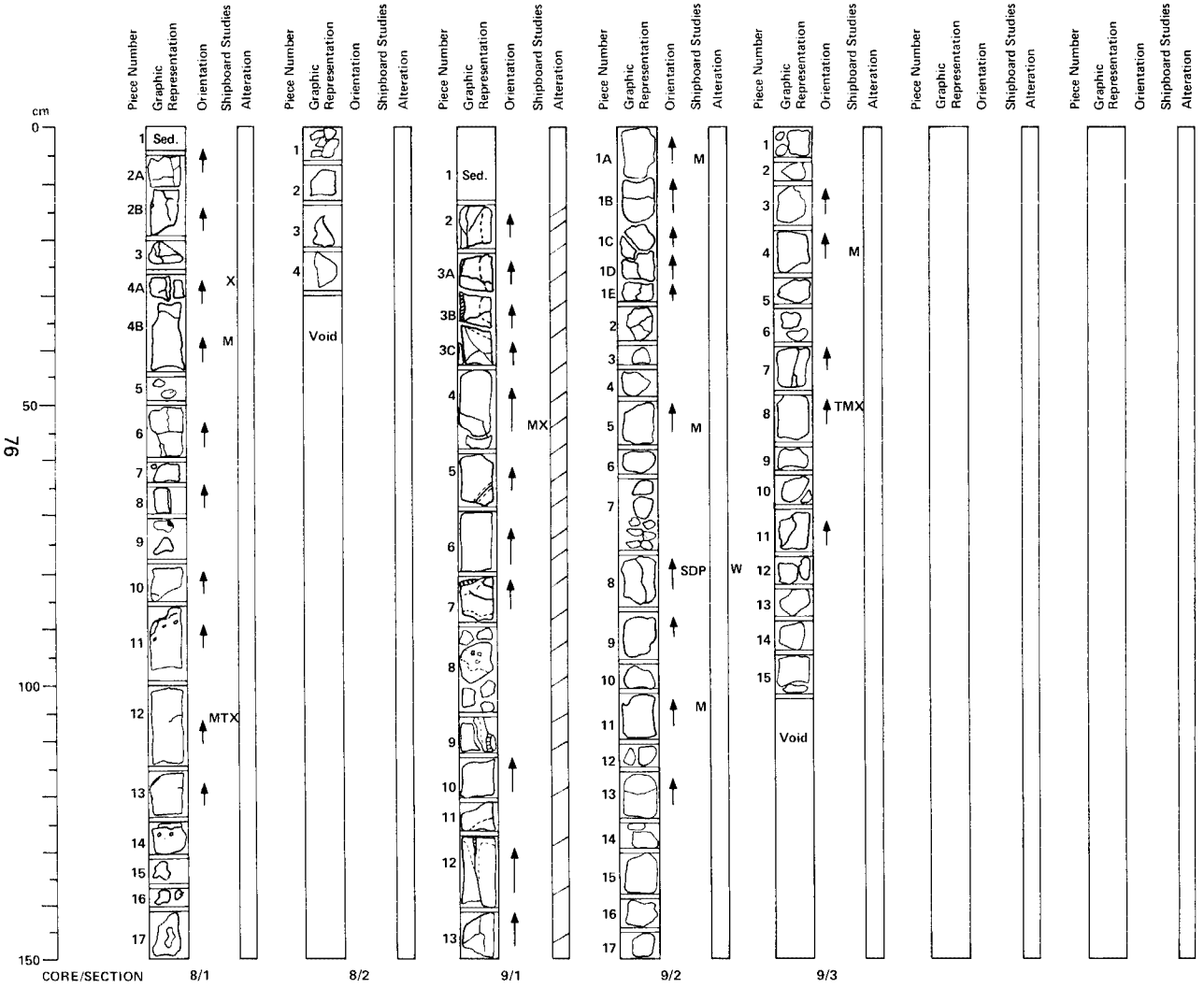
SITE 482 HOLE D CORE 8 CORED INTERVAL 138.0–141.5 m



Section 1, 0–2 cm: Grayish olive DOLOMITE overlying BASALT. Dolomite display conchoidal fracturing and basalts display pervasive alteration along contact.

SMEAR SLIDE SUMMARY

	1-2
TEXTURE:	
Sand	–
Silt	100
Clay	–
COMPOSITION:	
Calcite	20
Dolomite	80



HOLE 482D, CORE 8

Visual Description

Section 1, 0–2 cm: Grayish-olive, indurated mudstone.

Section 1, 2 cm–base of core: Medium gray, very sparsely phyric massive basalt. Plagioclase phenocrysts < 1%, 1–2 mm, euhedral laths, fresh. Groundmass fine- to medium-grained, increasing in grain size downward, generally fresh. Vesicles < 1%, ≈ 1 mm, spherical, filled with calcite and pyrite. Fractures and veinlets common, hairline to 2 mm wide, decreasing in width downward, filled with smectite, calcite and minor pyrite, often with faint alteration halos.

Thin Section Description

Location: Section 1, 30–31 cm

Texture: Very sparsely phyric, fine- to medium-grained, intersertal to intergranular, subvariolitic.

Phenocrysts: Plagioclase 1%, 0.5–1 mm, subhedral laths, fresh.

Groundmass Olivine(?) 1%, 0.1–0.3 mm, possible pseudomorphs of carbonate and pyrite; plagioclase 55%, 0.2–0.5 mm, subhedral laths, fresh; clinopyroxene 30%, 0.05–0.3 mm, anhedral to granular, often poorly crystallized, fresh, $2V_z$ ~30–35 ; opaques 5%, mostly pyrite, 0.05–0.2 mm, anhedral, often associated with carbonate; interstitial material 10%, devitrified glass and poorly crystallized clinopyroxene, partly replaced by carbonate and pyrite.

Vesicles: < 1%, 0.2–0.5 mm, round, filled with carbonate and pyrite; some poorly developed segregation vesicles.

Alteration: Olivine(?) and some groundmass material replaced by carbonate and pyrite.

Location: Section 1, 111–113 cm

Texture: Aphyric, fine- to medium-grained, intersertal to subophitic, slightly ophimottled.

Groundmass: Olivine 3–4%, 0.1–0.2 mm, subhedral, completely replaced by smectite and minor carbonate; plagioclase 50%, 0.3–1 mm, subhedral laths, fresh; clinopyroxene 30%, 0.1–0.3 mm, anhedral, fresh, $2V_z$ ~40 ; magnetite 3%, 0.01–0.08 mm, euhedral to subhedral, mostly in interstitial patches; interstitial material 10–15%, cryptocrystalline, partly replaced by smectite.

Vesicles: 2%, 0.5 mm, round, many with segregation lenses, filled with smectite and carbonate.

Alteration: Olivine and some interstitial material altered to smectite.

HOLE 482D, CORE 9

Visual Description

Section 1, 0–15 cm: Dark yellowish-brown to olive black, indurated mudstone and 1 piece of black chert.

Section 1, 15 cm–base of core: Medium gray, aphyric to very sparsely phyric, massive basalt. Plagioclase phenocrysts < 1%, 1–2 mm, euhedral, fresh, irregularly distributed. Groundmass medium-grained, relatively fresh. Vesicles 1–2%, ≈ 1 mm, decreasing in size and abundant downward, round, filled with greenish-brown smectite, calcite and minor pyrite. Veins and fractures common, hairline to 2 mm wide, filled with blue smectite, calcite, zeolite(?), and minor pyrite, usually surrounded by alteration halos in which pyrite is disseminated in the groundmass.

Thin Section Description

Location: Section 1, 57–58 cm

Texture: Very sparsely phyric, medium-grained, intersertal to subophitic.

Phenocrysts: Plagioclase 1%, 1–1.5 mm, euhedral, fresh.

Groundmass: Olivine 3%, 0.1–0.3 mm, subhedral, completely replaced by smectite; plagioclase 50%, 0.2–0.7 mm, subhedral laths, fresh; clinopyroxene 35–40%, 0.1–0.3 mm, anhedral, fresh, $2V_z$ ~ 40 ; magnetite 3%, 0.05–0.1 mm, subhedral; interstitial material 5–10%, glassy, partly replaced by smectite.

Vesicles: 1%, 0.2–1 mm, round, filled with olive green smectite.

Alteration: Olivine and some interstitial material replaced by smectite.

Location: Section 3, 49–50 cm

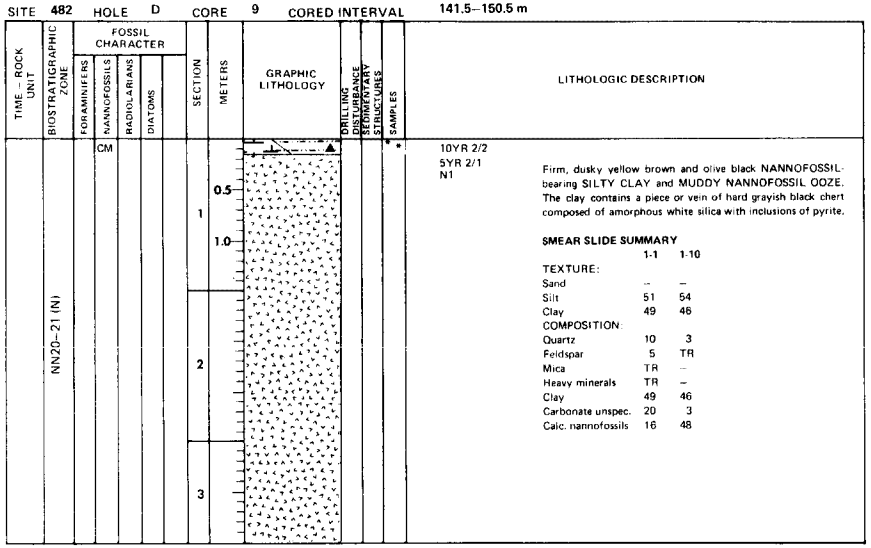
Texture: Aphyric, fine-grained, intersertal to intergranular.

Groundmass: Olivine 2–3%, 0.2–0.5 mm, subhedral, replaced by smectite; plagioclase 45%, 0.2–0.5 mm, subhedral laths, fresh; clinopyroxene 35%, 0.1–0.3 mm, anhedral, fresh, $2V_z$ ~40 ; magnetite 3%, 0.02–0.1 mm, subhedral, mostly in interstitial patches; interstitial material 15%, glassy to cryptocrystalline, mostly replaced by smectite.

Vesicles: ~ 1%, ≈0.5 mm, round, filled with smectite.

Alteration: Olivine and most interstitial material replaced by smectite.

SITE 482 HOLE D CORE 9 CORED INTERVAL 141.5–150.5 m

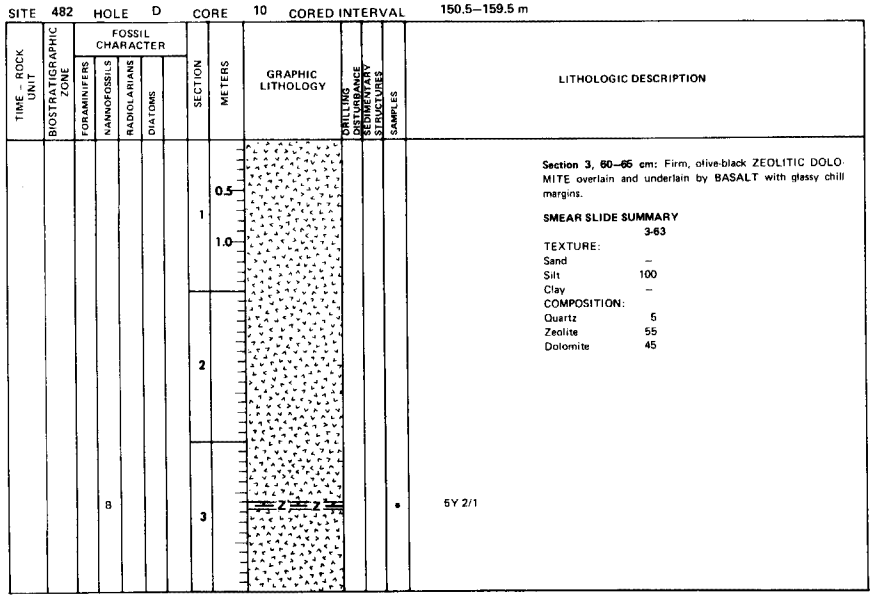


Firm, dusky yellow brown and olive black NANNOFOSSIL-bearing SILTY CLAY and MUDDY NANNOFOSSIL OOZE. The clay contains a piece or vein of hard grayish black chert composed of amorphous white silica with inclusions of pyrite.

SMEAR SLIDE SUMMARY

	1-1	1-10
TEXTURE:		
Sand	–	–
Silt	51	54
Clay	49	46
COMPOSITION:		
Quartz	10	3
Feldspar	5	TR
Mica	TR	–
Heavy minerals	TR	–
Clay	49	46
Carbonate unspec.	20	3
Calc. nannofossils	16	48

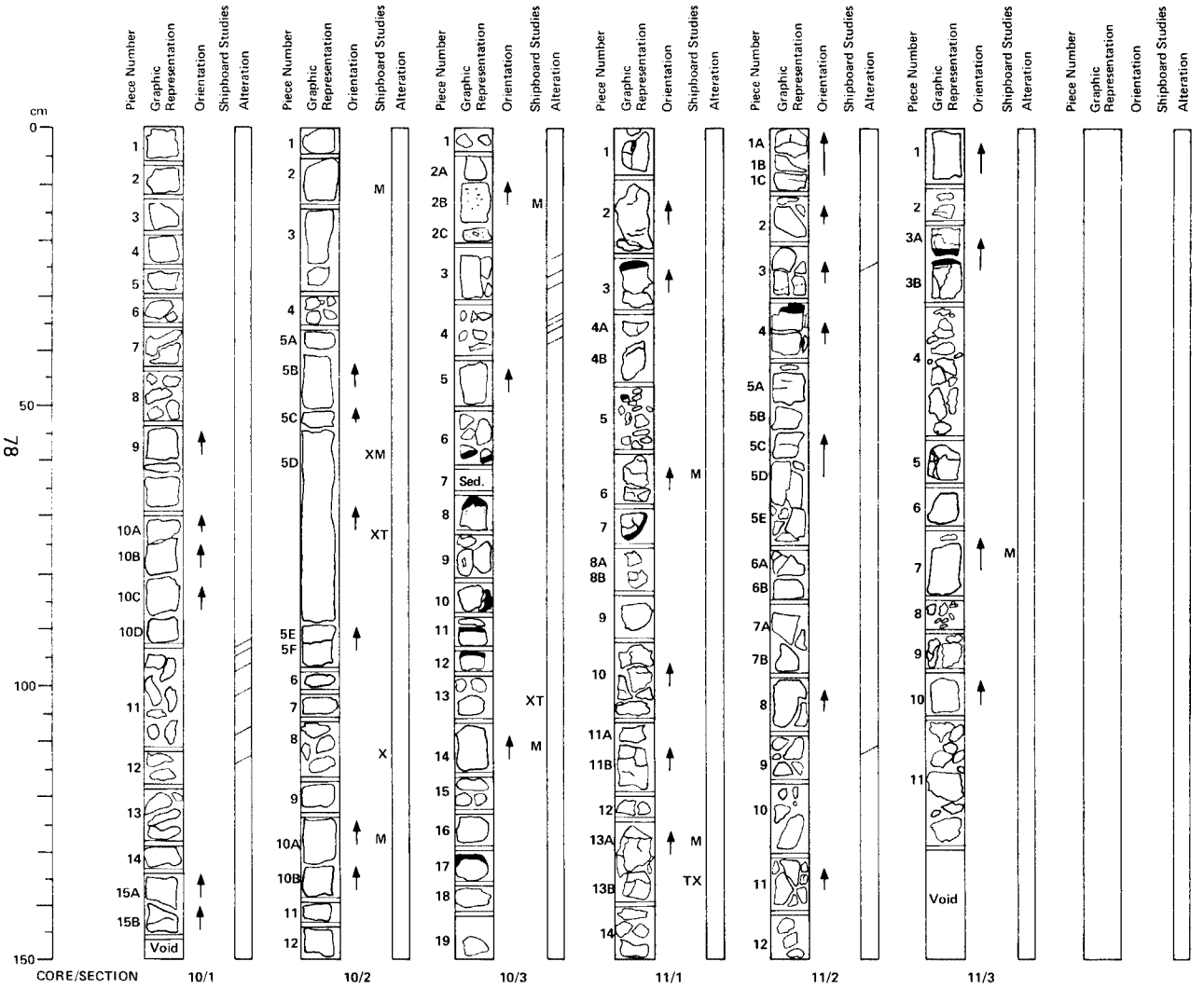
SITE 482 HOLE D CORE 10 CORED INTERVAL 150.5–159.5 m



Section 3, 60–65 cm: Firm, olive-black ZEOLITIC DOLOMITE overlain and underlain by BASALT with glassy chill margins.

SMEAR SLIDE SUMMARY

	3-63
TEXTURE:	
Sand	–
Silt	100
Clay	–
COMPOSITION:	
Quartz	5
Zeolite	55
Dolomite	45



HOLE 482D, CORE 10

Visual Description

Section 1, 0 cm–Section 3, 60 cm: Medium gray, aphyric to very sparsely phyric, massive basalt. Plagioclase microphenocrysts <1%, ≤ 4 mm, euhedral, fresh. Groundmass fine- to medium-grained, slightly mottled; glass selvedge in Section 3, 59 cm; grain size decreases gradually downward in Section 3. Fractures and veinlets sparse, hairline to 1 mm wide, filled with smectite, calcite and minor pyrite.

Section 3, 60–65 cm: Olive black, firm, dolomitic mudstone.

Section 3, 65 cm–base of core: Dark gray, sparsely phyric, pillowed(?) basalt. Plagioclase phenocrysts 1%, 1–2 mm, euhedral, intergrown with clinopyroxene. Groundmass fine-grained to glassy; glass selvedges at 66, 89, 93, and 130 cm; grain size increases gradually away from selvedges. Glass selvedges partly altered to smectite and often coated with pyrite.

Thin Section Description

Location: Section 2, 70–72 cm

Texture: Very sparsely phyric, medium-grained, intersertal to intergranular.

Phenocrysts: Olivine < 1%, 2–4 mm, subhedral, partly replaced by smectite; plagioclase < 1%, 1 mm, subhedral, fresh, in small clots with olivine.

Groundmass: Olivine 2–3%, 0.1–0.5 mm, subhedral, replaced by smectite; plagioclase 50%, 0.2–1 mm, subhedral laths, fresh; clinopyroxene 35%, 0.1–0.3 mm, anhedral, fresh, $2V_z$ ~35–40°; magnetite 3%, 0.03–0.1 mm, subhedral, mostly in interstitial patches; interstitial material 10%, microcrystalline feldspar, clinopyroxene, silica and apatite, partly replaced by smectite.

Vesicles: <1%, 0.2–0.5 mm, round, filled with smectite.

Alteration: Olivine and interstitial material partly replaced by smectite.

Location: Section 3, 17–19 cm

Texture: Very sparsely phyric, fine-grained, intergranular.

Phenocrysts: Olivine < 1%, ≤ 1 mm, subhedral, replaced by smectite; plagioclase <1%, 0.5–1 mm, subhedral, fresh.

Groundmass: Olivine(?) 1%, 0.1–0.2 mm, subhedral pseudomorphs of smectite; plagioclase 50%, 0.2–0.5 mm, subhedral laths, fresh; clinopyroxene 40%, 0.1–0.2 mm, anhedral, fresh, $2V_z$ ~40°; magnetite 2–3%, 0.05–0.1 mm, subhedral to anhedral; interstitial material 5%, cryptocrystalline material with some apatite, replaced by smectite.

Vesicles: 1%, 0.3 mm, round, filled with smectite.

Alteration: Olivine and interstitial material replaced by smectite, minor opal(?) in groundmass.

Location: Section 3, 101–103 cm

Texture: Moderately phyric, quench

Phenocrysts: Olive 5%, 0.3–0.5 mm, subhedral to euhedral, completely replaced by smectite; plagioclase 15%, 0.5–1.5 mm, seriate, subhedral laths and acicular crystals, fresh.

Groundmass: Olivine 1%, 0.05–0.1 mm, subhedral, replaced by smectite; plagioclase 5–10%, 0.2–0.5 mm, acicular, fresh; magnetite 2–3% minute granules in groundmass; interstitial material 70–75%, quench mixture of clinopyroxene, magnetite and plagioclase, mostly fresh.

Vesicles: 1–2%, 0.5–1 mm, round to irregular, open or filled with smectite.

Alteration: Olivine and some groundmass material replaced by smectite.

HOLE 482D, CORE 11

Visual Description

Dark gray, aphyric, pillowed(?) basalt. Basalt is fine-grained to glassy, often mottled; glass selvedges occur in Section 1, 25 and 74 cm, Section 2, 32 cm, and Section 3, 24 cm; grain size fairly uniform but decreases gradually toward glass selvedges. Veinlets and fractures sparse, hairline to 1 mm wide, filled with smectite, calcite, and minor pyrite.

Thin Section Description

Location: Section 1, 133–135 cm

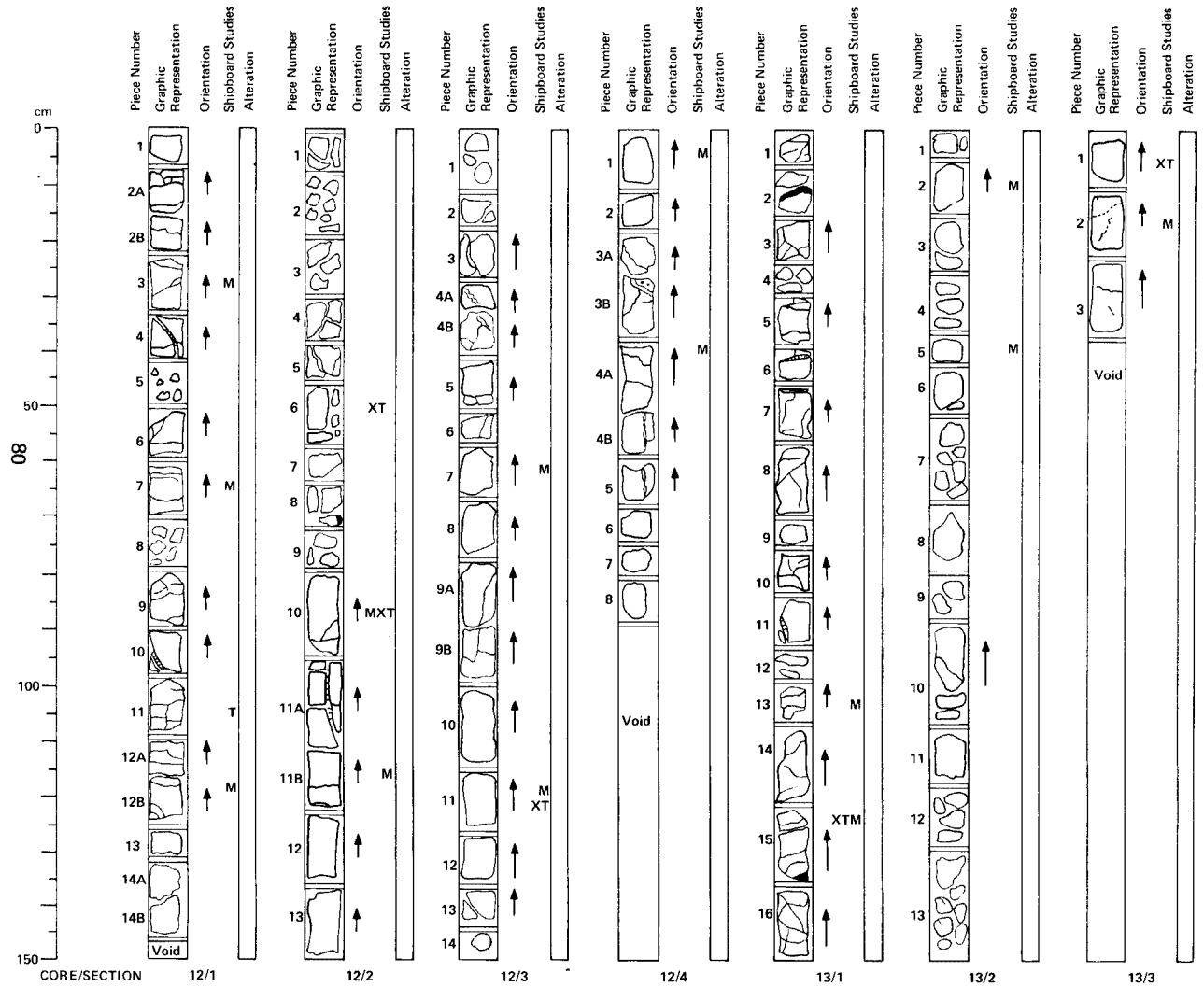
Texture: Sparsely phyric, quench to intersertal

Phenocrysts: Olivine 1%, 0.5 mm, subhedral, partly replaced by smectite, $2V_z$ ~88°; plagioclase 10%, 0.5–2 mm, seriate, subhedral laths, fresh.

Groundmass: Olivine 2%, 0.2–0.4 mm, subhedral, partly replaced by smectite; plagioclase 45%, 0.2–0.5 mm, subhedral, fresh; clinopyroxene 30%, 0.05–0.2 mm, poorly crystallized sheaves and granules, fresh; magnetite 2%, minute granules in interstitial patches; interstitial material 10%, glassy to cryptocrystalline, partly replaced by smectite.

Vesicles: <1%, 0.2–0.3 mm, round, filled with smectite.

Alteration: Some olivine and interstitial material replaced by smectite.



HOLE 482D, CORE 12

Visual Description

Section 1, 0–130 cm: Medium gray, aphyric to very sparsely phyric, massive basalt. Plagioclase microphenocrysts < 1%, 1–1.5 mm, euhedral, fresh. Groundmass fine- to medium-grained, decreasing in grain size downward. Vesicles <1%, ≤1 mm, spherical, filled with green smectite. Veins and fractures sparse, hairline to 1 mm, filled and coated with smectite, calcite, zeolite(?) and minor pyrite.

Section 1, 130 cm—base of core: Medium gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–2%, 1–4 mm, euhedral, fresh. Groundmass fine- to medium-grained with glass selvedge in Section 2, 71 cm; groundmass generally fresh. Vesicles 1%, ≤1.5 mm, spherical to irregular, filled with green smectite and minor calcite. Fractures irregularly distributed, hairline to 4 mm wide, filled with smectite, calcite, zeolite(?) and minor pyrite; alteration halos around some veins have disseminated pyrite.

Thin Section Description

Location: Section 1, 107–109 cm

Texture: Sparsely phyric, medium-grained, intersertal to subophitic.

Phenocrysts: Plagioclase 5%, 0.5–3 mm, subhedral, fresh.

Groundmass: Olivine 5–7%, 0.1–0.5 mm, subhedral, partly replaced by smectite, $2V_z \sim 88°$; plagioclase 45%, 0.2–0.5 mm, subhedral, fresh; clinopyroxene 35%, 0.2–0.3 mm, anhedral, fresh, $2V_z \sim 40°$; magnetite 3%, minute granules, mostly in interstitial patches; interstitial material 5%, cryptocrystalline, partly replaced by smectite.

Vesicles: 1%, 0.2–0.3 mm, round, rimmed with smectite and filled with carbonate.

Alteration: Some olivine and interstitial material replaced by smectite.

Location: Section 2, 49–50 cm

Texture: Moderately phyric, quench

Phenocrysts: Olivine 2–3%, ≤0.5 mm, euhedral to subhedral, altered to smectite; plagioclase 5%, 0.5–1 mm, subhedral laths, fresh; clinopyroxene 2–3%, 0.3–0.6 mm, anhedral, fresh, either as single crystals or in clots intergrown with plagioclase, $2V_z \sim 35°$.

Groundmass: Quenched groundmass 90%, consists of fine magnetite grains in poorly crystallized mixture of clinopyroxene and plagioclase in radiating sheaves; some small glassy patches partly replaced by smectite.

Vesicles: < 1%, ≤0.5 mm, round to irregular, filled with smectite.

Alteration: Olivine and some interstitial material replaced by smectite.

Location: Section 2, 80–84 cm

Texture: Sparsely phyric, fine-grained, intersertal to quench

Phenocrysts: Plagioclase 3%, 0.5–1.5 mm, subhedral to euhedral, zoned, fresh.

Groundmass: Olivine 2%, 0.1–0.3 mm, subhedral, replaced by smectite; plagioclase 45%, 0.1–0.5 mm, anhedral, often in poorly crystallized sheaves, fresh, $2V_z \sim 40°$; magnetite 2%, minute crystals in interstitial patches; interstitial material 10–15%, glassy, partly replaced by smectite.

Vesicles: 1%, 0.1–0.3 mm, round, filled with smectite

Alteration: Olivine and some interstitial material replaced by smectite.

Location: Section 3, 116–117 cm
Texture: Very sparsely phyric, medium-grained, intersertal to subophitic.
Phenocrysts: Plagioclase 1%, 1–1.5 mm, subhedral, fresh.
Groundmass: Olivine 3%, 0.1–0.6 mm, subhedral, replaced by smectite; plagioclase 50%, 0.2–0.6 mm, subhedral laths, fresh; clinopyroxene 40%, 0.1–0.4 mm, anhedral, fresh, $2V_z \sim 40$; magnetite 1–2%, 0.02–0.1 mm, euhedral to subhedral, in interstitial patches; interstitial material 5–8%, cryptocrystalline with minor apatite, partly replaced by smectite.
Vesicles: 1%, < 0.3 mm, round, filled with smectite
Alteration: Olivine and some interstitial material replaced by smectite.

HOLE 482D, CORE 13

Visual Description

Medium- to dark-gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1%, 1–4 mm, euhedral, fresh. Groundmass fine- to medium-grained, variable, weakly to moderately altered; glass selvedge in Section 1, 12 cm. Vesicles ~ 1%, < 1 mm, spherical, filled with green smectite. Fractures and veinlets common, hairline to 1 mm wide, lined or filled with smectite and zeolite(?) with rare calcite and pyrite. Some alteration halos along veins.

Thin Section Description

Location: Section 1, 123–125 cm
Texture: Sparsely phyric, fine-grained, intersertal to subophitic.
Phenocrysts: Plagioclase 2–4%, 0.5–3 mm, subhedral to euhedral, often in clusters, some zoned, fresh.
Groundmass: Olivine 3–5%, 0.1–0.3 mm, subhedral, replaced by smectite and carbonate; plagioclase 45%, 0.2–0.5 mm, subhedral laths, fresh; clinopyroxene 40%, 0.1–0.4 mm, anhedral, fresh, $2V_z \sim 40$; magnetite 2%, minute granules in interstitial patches; interstitial material 5%, cryptocrystalline material, partly replaced by smectite and carbonate.
Alteration: Olivine and some interstitial material replaced by smectite and carbonate.

Location: Section 3, 8–9 cm
Texture: Very sparsely phyric, fine-grained, intersertal to intergranular
Phenocrysts: Plagioclase 1%, 0.5–1 mm, subhedral, fresh, usually in clusters.
Groundmass: Olivine 2–3%, 0.1–0.3 mm, subhedral, replaced by smectite; plagioclase 50%, 0.2–0.5 mm, subhedral laths, fresh; clinopyroxene 40%, 0.1–0.3 mm, anhedral, fresh, $2V_z \sim 40$; magnetite 2%, < 0.05 mm, euhedral to subhedral, usually in interstitial patches; interstitial material 5%, cryptocrytalline material, partly replaced by smectite.
Vesicles: ~ 1%, 0.1 mm, round, filled with smectite
Alteration: Olivine and some interstitial material replaced by smectite.

Location: Section CC
Texture: Sparsely phyric, quench
Phenocrysts: Olivine ~ 1%, 0.4–0.7 mm, euhedral, replaced by smectite; plagioclase 3–4%, 0.5–1.5 mm, subhedral laths, fresh.
Groundmass: Olivine 2%, 0.05–0.1 mm, subhedral, replaced by smectite; plagioclase 5–10%, acicular crystals, < 0.4 mm, fresh; glass 80–85%, brown, incipiently crystallized with sheaf structure, usually fresh.
Vesicles: 1%, 0.2–0.3 mm, round, filled with smectite
Veins and Fractures: Rare, 0.2 mm wide, filled with smectite
Alteration: Olivine and minor glass altered to smectite.

SITE SUMMARY

HOLE 482E

Date occupied: 1600 February 8, 1979
Date departed: 0400 February 10, 1979
Time on hole: 34 hours
Position (latitude; longitude): 22°47.37'N; 107°59.56'W
Water depth (sea level; corrected m, echo-sounding): 3008
Water depth (rig floor; corrected m, echo-sounding): 3015
Bottom felt at (m, drill pipe): 3015
Penetration (m): 48.5
Number of cores: 0
Total length of cored section (m): 0
Total core recovered (m): 0
Core recovery (%): 0

SITE SUMMARY

HOLE 482F

Date occupied: 0530 February 10, 1979
Date departed: 1200 February 12, 1979
Time on hole: 54.5 hours
Position (latitude; longitude): 22°47.36'N; 107°59.61'W
Water depth (sea level; corrected m, echo-sounding): 3008
Water depth (rig floor; corrected m, echo-sounding): 3015
Bottom felt at (m, drill pipe): 3015
Penetration (m): 145.0
Number of cores: 5
Total length of cored section (m): 39.0
Total core recovered (m): 16.07
Core recovery (%): 41

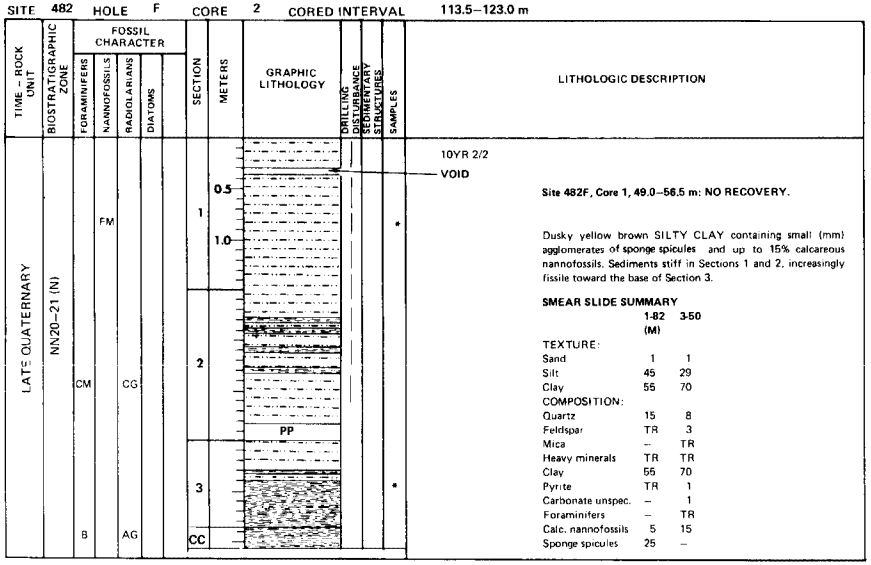
Oldest Sediment Cored

Depth sub-bottom (m): 137
Nature: Nannofossil chalk and silty clay
Age: Quaternary
Measured velocity (km/s): 1.5

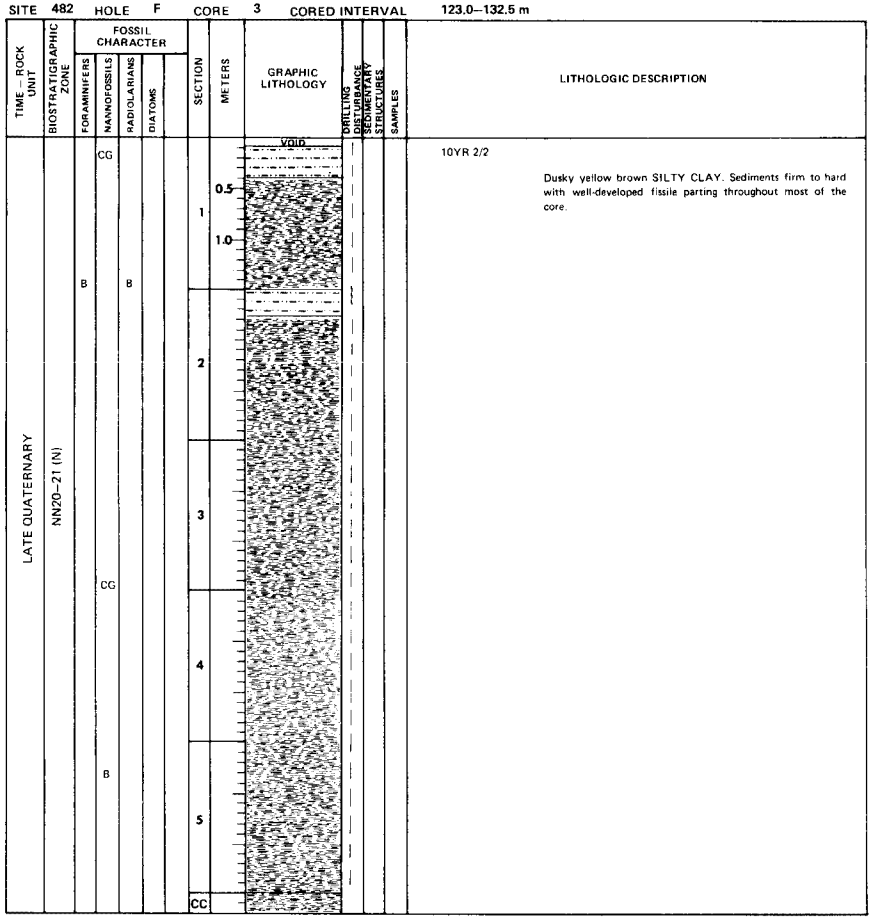
Basement

Depth sub-bottom (m): 136.2
Nature: Basalt
Velocity range (km/s): 5.6

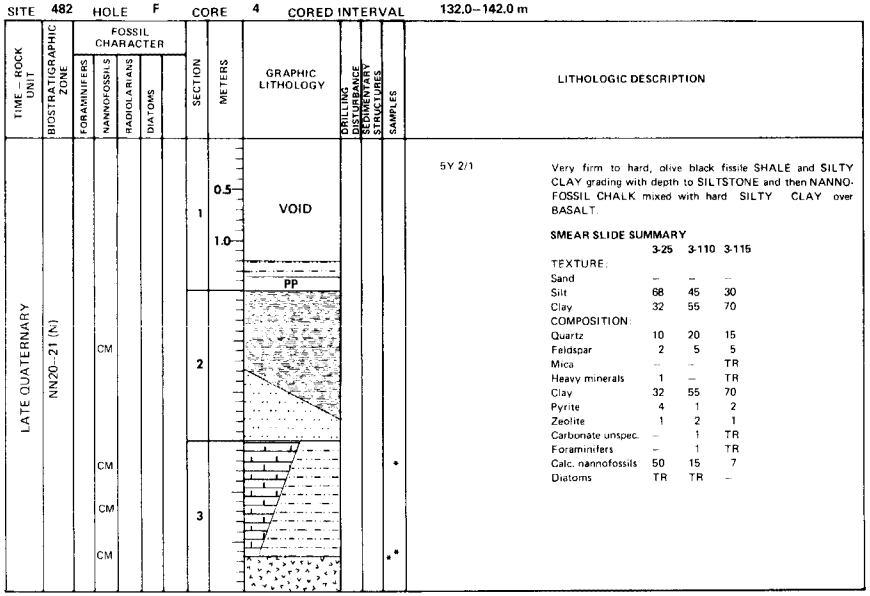
SITE 482 HOLE F CORE 2 CORED INTERVAL 113.5–123.0 m



SITE 482 HOLE F CORE 3 CORED INTERVAL 123.0–132.5 m



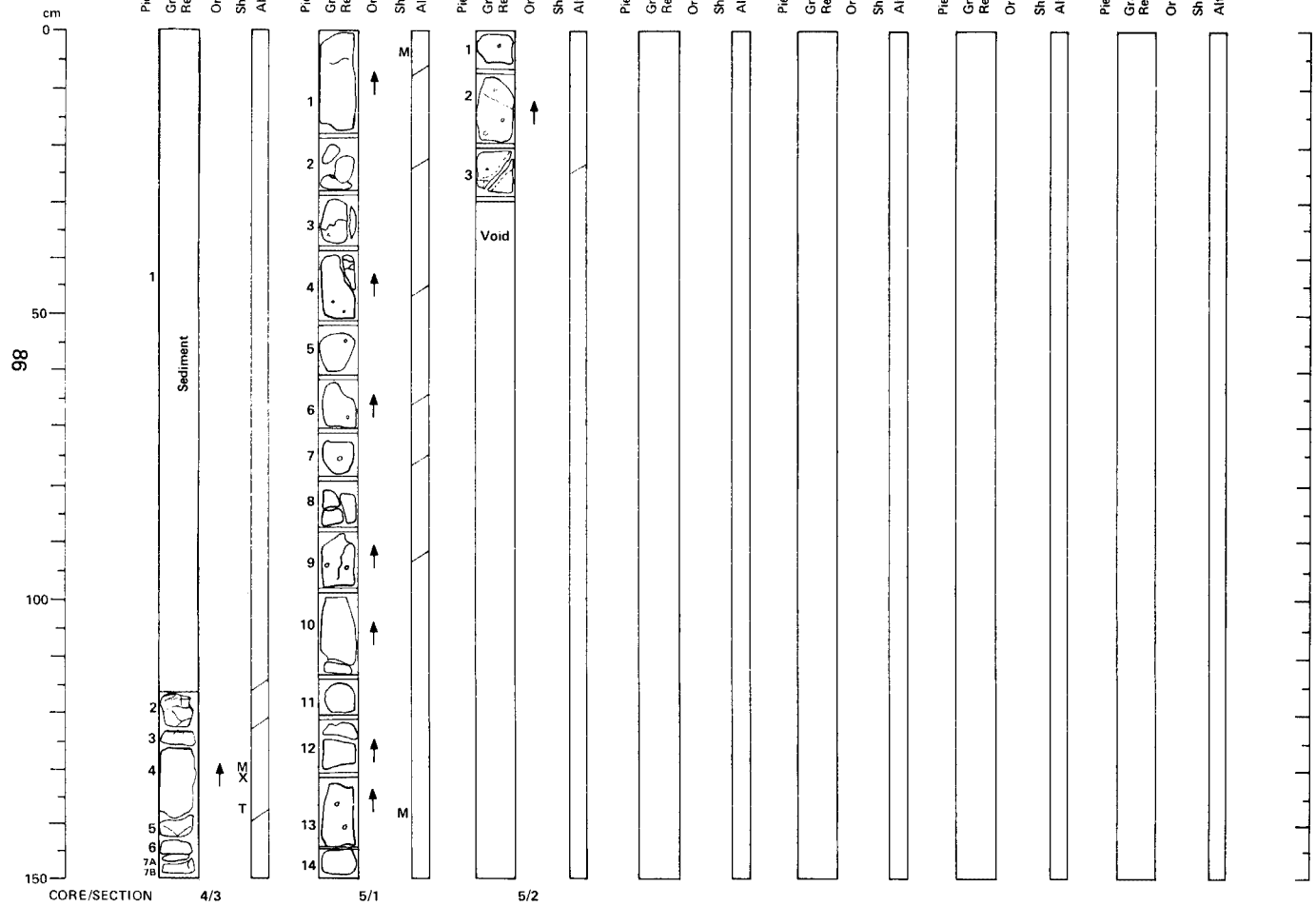
SITE 482 HOLE F CORE 4 CORED INTERVAL 132.0–142.0 m



Very firm to hard, olive black fissile SHALE and SILTY CLAY grading with depth to SILTSTONE and then NANNOFOSSIL CHALK mixed with hard SILTY CLAY over BASALT.

SMEAR SLIDE SUMMARY

	3-25	3-110	3-115
TEXTURE:			
Sand	–	–	–
Silt	68	45	30
Clay	32	55	70
COMPOSITION:			
Quartz	10	20	15
Feldspar	2	5	5
Mica	–	–	TR
Heavy minerals	1	–	TR
Clay	32	55	70
Pyrite	4	1	2
Zeolite	1	2	1
Carbonate unspec.	–	1	TR
Foraminifers	–	1	TR
Calc. nannofossils	50	15	7
Diatoms	TR	TR	–



HOLE 482F, CORE 4

Visual Description

Light gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts 1%, 1–2 mm, euhedral, fresh, intergrown with minor clinopyroxene. Groundmass fine-grained, relatively fresh. Vesicles 1–2%, ≤1 mm, spherical, filled with smectite.

Thin Section Description

Location: Section 3, 134–136 cm

Texture: Aphyric, fine-grained, intergranular

Groundmass: Olivine(?) 1%, 0.05–0.1 mm, subhedral pseudomorphs of smectite; plagioclase 55%, 0.1–0.4 mm, subhedral laths, fresh; clinopyroxene 35%, 0.1–0.3 mm, anhedral, fresh, $2V_z \sim 40°$; magnetite 5%, 0.05–0.1 mm, subhedral; interstitial material 5%, cryptocrystalline with minor apatite, replaced by smectite and carbonate.

Vesicles: 1–2%, ≤ 0.5 mm, round, rimmed with smectite and filled with carbonate

Alteration: Olivine(?) and most interstitial material replaced by smectite and carbonate.

HOLE 482F, CORE 5

Visual Description

Light gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts 1%, 1–2 mm, euhedral, fresh, intergrown with minor clinopyroxene. Groundmass fine- to medium-grained, relatively fresh. Vesicles 1–2%, ≤ 1 mm, spherical, filled with smectite and calcite. Veins and fractures common, hairline to 1 mm wide, filled or lined with smectite and pyrite; some veins have alteration halos with disseminated pyrite.

SITE SUMMARY

HOLE 483

Date occupied: 1800 February 12, 1979
Date departed: 1400 February 17, 1979
Time on hole: 4 days, 20 hours
Position (latitude; longitude): 22°53.00'N; 108°44.90'W
Water depth (sea level; corrected m, echo-sounding): 3070
Water depth (rig floor; corrected m, echo-sounding): 3080
Bottom felt at (m, drill pipe): 3084
Penetration (m): 204.5
Number of cores: 26
Total length of cored section (m): 204.5
Total core recovered (m): 110.92
Core recovery (%): 54

Oldest Sediment Cored

Depth sub-bottom (m): 107
Nature: Clays
Age: About 2 m.y.
Measured velocity (km/s): 1.5

Basement

Depth sub-bottom (m): 204
Nature: Basalt
Velocity range (km/s): 5.5–5.9

SITE 483 HOLE CORE 1 CORED INTERVAL 0.0–1.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER QUATERNARY	NN20–21 (N)	CG	AM	FM		1					*	5GY 3/2
						CC					*	5Y 3/2 5GY 3/2

Soft, olive gray and grayish olive CLAYEY NANNOFOSSIL OOZE and SILTY CLAY.

SMEAR SLIDE SUMMARY

	1-2	1-28
TEXTURE:		
Sand	–	3
Silt	37	57
Clay	63	40
COMPOSITION:		
Quartz	5	10
Mica	–	2
Heavy minerals	TR	TR
Clay	63	50
Pyrite	TR	TR
Carbonate unspec.	TR	5
Foraminifers	TR	–
Calc. nannofossils	35	35
Diatoms	–	3
Radiolarians	TR	2
Sponge spicules	1	3
Silicoflagellates	TR	–

SITE 483 HOLE CORE 2 CORED INTERVAL 1.0–10.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER QUATERNARY	NN20–21 (N)	CG	CM	AG		1	0.5				*	5Y 3/2
							1.0					
						2		VOID			*	
						3					*	10Y 4/2 5Y 3/2 10Y 4/2
						CC						5Y 3/2

Section 1, 0–130 cm: Soft, olive gray SILTY CLAY.
Section 1, 130 cm–Section 2, 110 cm: Soft, olive gray MUDDY RADIOLARIAN-bearing DIATOMACEOS OOZE.
Section 3, 0 cm–Core-Catcher: Relatively firm, olive gray to grayish olive DIATOMACEOUS MUD and MUDDY OOZE.

SMEAR SLIDE SUMMARY

	1-7	1-140	2-50	3-12	3-53	3-62
TEXTURE:						
Sand	5	–	–	–	3	–
Silt	40	60	63	70	70	40
Clay	55	40	37	30	27	60
COMPOSITION:						
Quartz	10	1	5	8	3	3
Feldspar	2	–	–	1	TR	TR
Mica	–	–	TR	–	TR	–
Heavy minerals	–	–	–	TR	–	–
Clay	55	40	37	30	27	60
Pyrite	TR	TR	1	1	TR	2
Carbonate unspec.	1	–	–	TR	TR	–
Foraminifers	TR	–	–	–	–	–
Calc. nannofossils	25	2	1	4	3	25
Diatoms	5	40	30	35	50	5
Radiolarians	2	15	20	15	10	10
Sponge spicules	–	1	5	5	2	–
Silicoflagellates	–	1	1	–	5	–

SITE 483 HOLE CORE 3 CORED INTERVAL 10.5–20.0 m

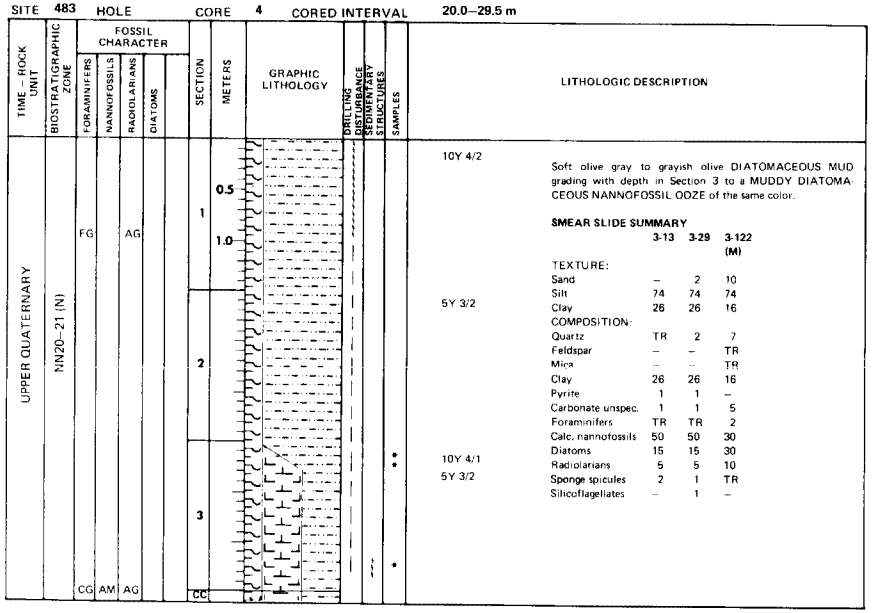
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER QUATERNARY	NN20–21 (N)	RG		CG		1	0.5				*	10Y 4/2
							1.0				*	
						2					*	
											*	5Y 3/2
		FG		CG		3					*	
						4					*	10Y 4/2
		AG		CG							*	

Section 1, 0 cm–Section 3, 130 cm: Very soft, grayish olive DIATOMACEOUS MUD and MUDDY OOZE with burrows in Section 3.
Section 3, 130 cm–Section 4, 100 cm: Olive gray SANDY SILT, grading to grayish olive with depth.
Section 4, 100–150 cm: Soft grayish olive DIATOMACEOUS MUD.

SMEAR SLIDE SUMMARY

	1-140	2-5	2-99	2-113	2-130	3-32	4-6	4-73	4-140
TEXTURE:									
Sand	–	–	–	–	–	–	50	50	–
Silt	58	53	58	50	51	59	26	25	45
Clay	42	47	42	50	49	41	24	25	55
COMPOSITION:									
Quartz	< 1	10	12	10	1	5	70	70	3
Feldspar	–	5	8	5	< 1	1	< 1	3	–
Mica	–	1	2	–	–	1	4	–	–
Heavy minerals	–	5	4	–	–	–	–	–	–
Clay	42	47	42	50	49	41	24	25	55
Volcanic glass	–	–	2	–	–	–	–	–	–
Pyrite	3	–	–	–	–	< 1	< 1	< 1	1
Carbonate unspec.	–	–	–	–	–	1	–	–	1
Foraminifers	–	1	–	2	–	–	1	–	–
Calc. nannofossils	15	–	2	2	8	6	1	2	7
Diatoms	25	16	15	15	30	35	< 1	–	25
Radiolarians	15	5	6	3	10	10	–	–	10
Sponge spicules	–	7	5	7	–	–	–	–	3
Silicoflagellates	–	2	2	2	2	–	–	–	–
Plant Debris	–	1	–	4	–	–	–	–	–

SITE 483 HOLE CORE 4 CORED INTERVAL 20.0–29.5 m



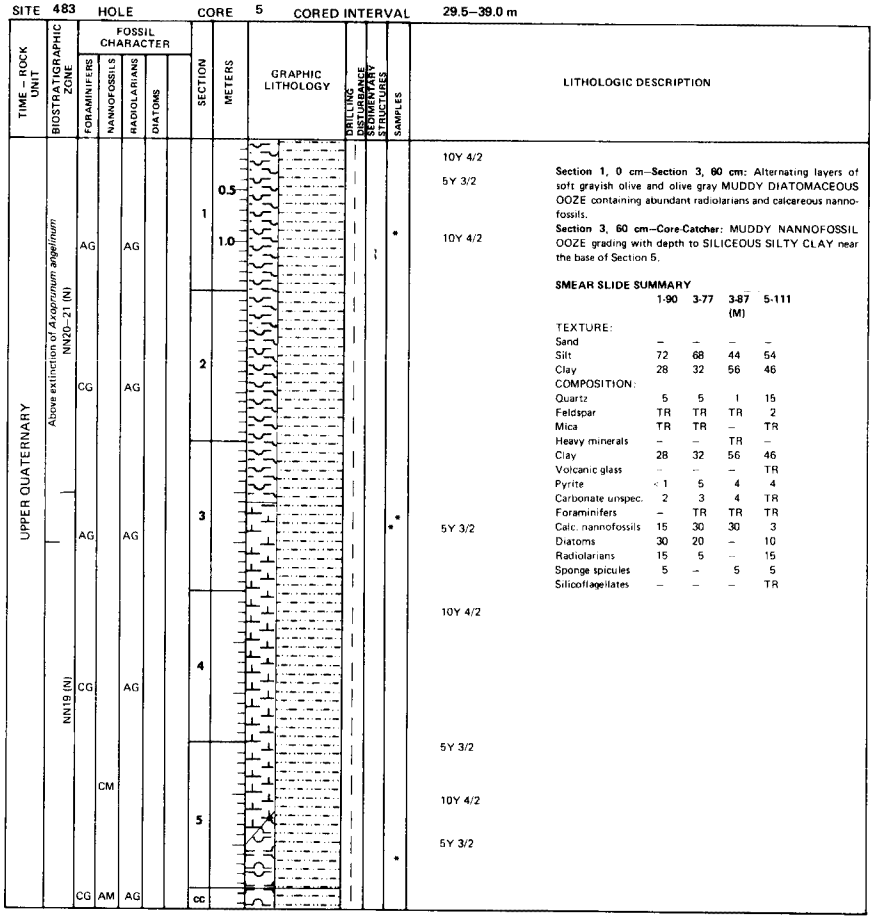
LITHOLOGIC DESCRIPTION

Soft olive gray to grayish olive DIATOMACEOUS MUD grading with depth in Section 3 to a MUDDY DIATOMACEOUS NANNOFOSSIL OOZE of the same color.

SMEAR SLIDE SUMMARY

	3-13	3-29	3-122 (M)
TEXTURE:			
Sand	–	2	10
Silt	74	74	74
Clay	26	26	16
COMPOSITION:			
Quartz	TR	2	7
Feldspar	–	–	TR
Mica	–	–	TR
Clay	26	26	16
Pyrite	1	1	–
Carbonate unspec.	1	1	5
Foraminifers	TR	TR	2
Calc. nannofossils	50	50	30
Diatoms	15	15	30
Radiolarians	5	5	10
Sponge spicules	2	1	TR
Silicoflagellates	–	1	–

SITE 483 HOLE CORE 5 CORED INTERVAL 29.5–39.0 m



LITHOLOGIC DESCRIPTION

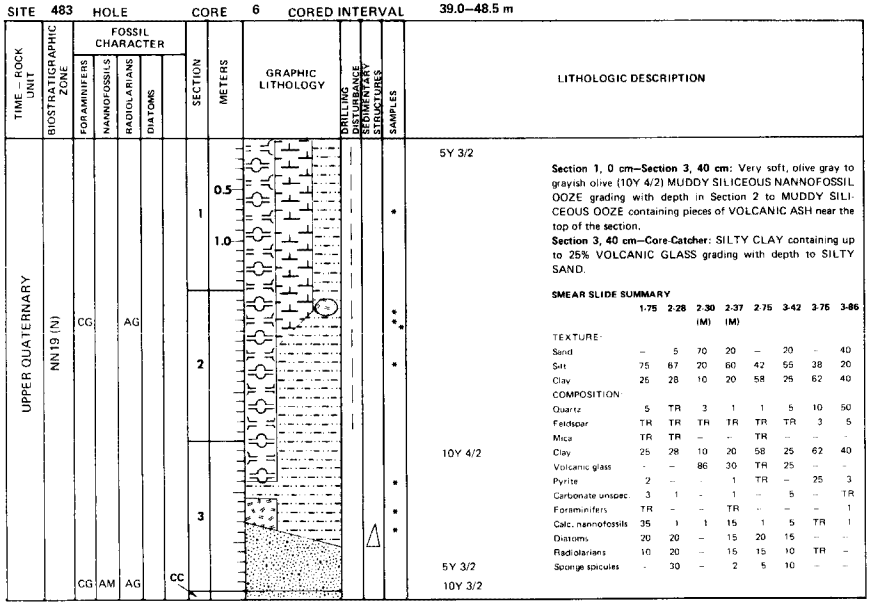
Section 1, 0 cm–Section 3, 60 cm: Alternating layers of soft grayish olive and olive gray MUDDY DIATOMACEOUS OOZE containing abundant radiolarians and calcareous nannofossils.

Section 3, 60 cm–Core-Catcher: MUDDY NANNOFOSSIL OOZE grading with depth to SILICEOUS SILTY CLAY near the base of Section 5.

SMEAR SLIDE SUMMARY

	1-90	3-77	3-87 (M)	5-111
TEXTURE:				
Sand	–	–	–	–
Silt	72	68	44	54
Clay	28	32	56	46
COMPOSITION:				
Quartz	5	5	1	15
Feldspar	TR	TR	TR	2
Mica	TR	TR	–	TR
Heavy minerals	–	–	TR	–
Clay	28	32	56	46
Volcanic glass	–	–	–	TR
Pyrite	< 1	5	4	4
Carbonate unspec.	2	3	4	TR
Foraminifers	–	TR	TR	TR
Calc. nannofossils	15	30	30	3
Diatoms	30	20	–	10
Radiolarians	15	5	–	15
Sponge spicules	5	–	5	5
Silicoflagellates	–	–	–	TR

SITE 483 HOLE CORE 6 CORED INTERVAL 39.0–48.5 m



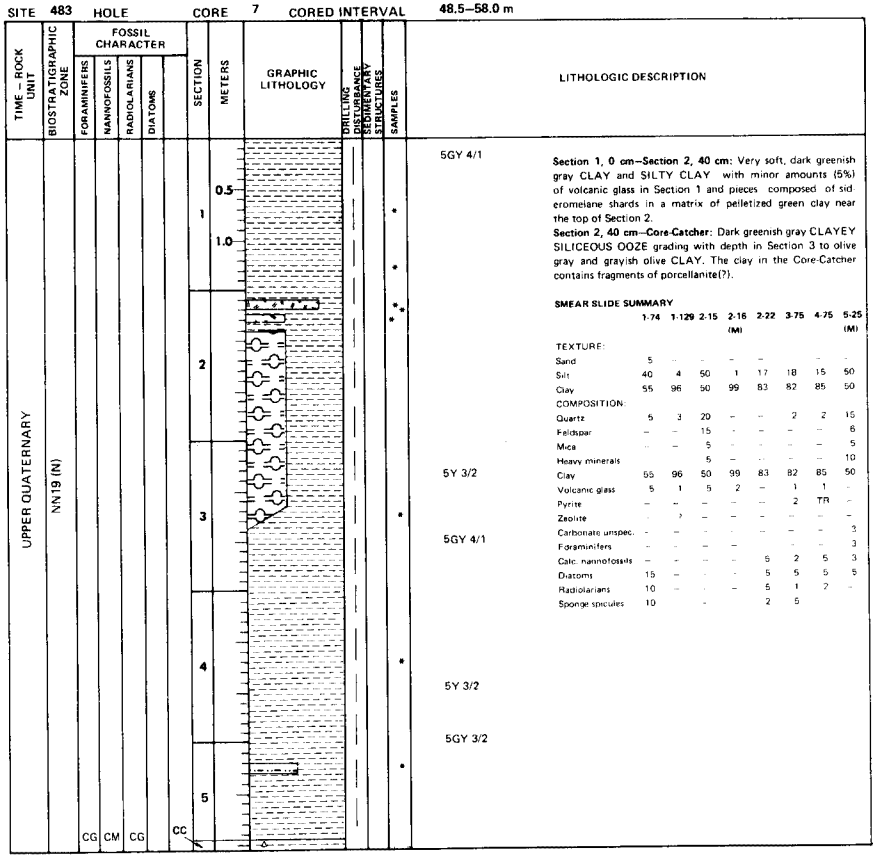
Section 1, 0 cm–Section 3, 40 cm: Very soft, olive gray to grayish olive (10Y 4/2) MUDDY SILICEOUS NANNOFOSSIL OOZE grading with depth in Section 2 to MUDDY SILICEOUS OOZE containing pieces of VOLCANIC ASH near the top of the section.

Section 3, 40 cm–Core-Catcher: SILTY CLAY containing up to 25% VOLCANIC GLASS grading with depth to SILTY SAND.

SMEAR SLIDE SUMMARY

	1-75	2-28	2-30 (M)	2-37 (M)	2-75	3-42	3-76	3-86
TEXTURE:								
Sand	–	5	70	20	–	20	–	40
Silt	75	67	20	60	42	55	38	20
Clay	25	28	10	20	58	25	62	40
COMPOSITION:								
Quartz	5	TR	3	1	1	5	10	50
Feldspar	TR	TR	TR	TR	TR	TR	3	5
Mica	TR	TR	–	–	TR	–	–	–
Clay	25	28	10	20	58	25	62	40
Volcanic glass	–	–	86	30	TR	25	–	–
Pyrite	2	–	–	1	TR	–	25	3
Carbonate unspec.	3	1	–	1	–	5	–	TR
Foraminifers	TR	–	–	TR	–	–	–	1
Calc. nannofossils	35	1	1	15	1	5	TR	1
Diatoms	20	20	–	15	20	15	–	–
Radiolarians	10	20	–	15	15	10	TR	–
Sponge spicules	–	30	–	2	5	10	–	–

SITE 483 HOLE CORE 7 CORED INTERVAL 48.5–58.0 m



Section 1, 0 cm–Section 2, 40 cm: Very soft, dark greenish gray CLAY and SILTY CLAY with minor amounts (5%) of volcanic glass in Section 1 and pieces composed of sid eromelane shards in a matrix of pelletized green clay near the top of Section 2.

Section 2, 40 cm–Core-Catcher: Dark greenish gray CLAYEY SILICEOUS OOZE grading with depth in Section 3 to olive gray and grayish olive CLAY. The clay in the Core-Catcher contains fragments of porcellanite(?).

SMEAR SLIDE SUMMARY

	1-74	1-129	2-15	2-16 (M)	2-22	3-75	4-75	5-25 (M)
TEXTURE:								
Sand	5	..	..	–	–	..	..	..
Silt	40	4	50	1	17	18	15	50
Clay	55	96	50	99	83	82	85	50
COMPOSITION:								
Quartz	5	3	20	–	–	2	2	15
Feldspar	–	–	15	–	–	–	–	6
Mica	..	–	5	–	..	..	–	5
Heavy minerals			5	–	..	..	–	10
Clay	55	96	50	99	83	82	85	50
Volcanic glass	5	1	5	2	–	1	1	..
Pyrite	–	..	–	–	–	2	TR	–
Zeolite	..	?	–	–	–	..	..	–
Carbonate unspec.	–	–	..	..	..	–	–	3
Foraminifers	..	..	–	–		..	..	3
Calc. nannofossils	–	–	..	..	5	2	5	3
Diatoms	15	–	..	..	5	5	5	5
Radiolarians	10	–	..	–	5	1	2	–
Sponge spicules	10		..		2	5		

SITE 483 HOLE CORE 8 CORED INTERVAL 58.0–67.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
QUATERNARY	NN19 (N)	CG	CM	AG		1	0.5				*	10GY 3/2
							1.0				*	
						2					*	
						3					*	5Y 3/2
											*	10GY 3/2
						4						
						CC						

Dusky yellow green SILTY CLAY containing a thin layer of sideromelane shards (< 10%) in a matrix of pelletized green clay near the top of the core (Section 1, 55–68 cm), a thicker layer of SILTY SAND near the middle (Section 3, 80–100 cm) and streaks of slightly coarser olive gray SILTY CLAY throughout. The sediments are soft to a depth of 60 cm in Section 3 and firm below.

SMEAR SLIDE SUMMARY

	1-69	1-112	2-14 (M)	3-61	3-92
TEXTURE:					
Sand	–	–	–	–	50
Silt	58	65	50	50	20
Clay	42	35	50	50	30
COMPOSITION:					
Quartz	20	20	25	20	30
Feldspar	15	10	14	10	20
Mica	3	5	4	15	5
Heavy minerals	5	5	–	1	5
Clay	42	35	50	50	30
Volcanic glass	1	–	–	1	–
Pyrite	–	–	–	–	1
Carbonate unspec.	3	5	–	–	4
Foraminifers	3	3	–	TR	1
Calc. nannofossils	5	15	1	–	–
Diatoms	3	2	1	3	3
Radiolarians	–	–	1	TR	1
Sponge spicules	–	–	4	TR	–
Silicoflagellates	–	–	–	–	TR
Plant debris	–	–	1	–	–

SITE 483 HOLE CORE 9 CORED INTERVAL 67.5–77.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER QUATERNARY	NN19 (N)		CG		AG	1	0.5				*	5GY 3/2
							1.0					
						2						
						3					*	
						4						
						5						
						6						
						7						
		FG	FM	CG		CC						

Soft, homogeneous, grayish olive green SILTY CLAY with small concretions of pyrite or chalcopyrite in Section 1 and diatoms (8–10%) disseminated throughout the core.

SMEAR SLIDE SUMMARY

	1-75	3-75
TEXTURE:		
Sand	5	–
Silt	55	50
Clay	40	50
COMPOSITION:		
Quartz	12	15
Feldspar	10	8
Mica	10	15
Heavy minerals	3	–
Clay	40	50
Pyrite	3	–
Foraminifers	1	1
Calc. nannofossils	4	2
Diatoms	10	8
Radiolarians	6	–
Sponge spicules	1	–

SITE 483 HOLE CORE 10 CORED INTERVAL 77.0–86.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER QUATERNARY	NN19 (N)	RG	FM	RG		1	0.5, 1.0					VOID 5GY 3/2 — Relatively firm, homogeneous, grayish olive green SILTY CLAY grading with depth in Section 2 to SANDY SILT.
						2		VOID				

SITE 483 HOLE CORE 11 CORED INTERVAL 86.5–96.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER QUATERNARY	NN19 (N)	RG	FM	B		1	0.5, 1.0				•	VOID 5Y 3/2 / 5GY 3/2 — Olive gray CLAY and SILTY CLAY with occasional burrows near the top of Section 1 and a small turbidite layer near the base of the core (Section 5, 30–55 cm). The sediments are soft to a depth of 90 cm in Section 2, then firm to the base of Section 3, then soft again to the base of the core.
						2					•	5Y 3/2 / 5GY 3/2
						3						
						4						
						5					•	5Y 3/2 / 5GY 3/2 / 5Y 3/2

SMEAR SLIDE SUMMARY

	1-27 (M)	1-75	5-54
TEXTURE:			
Sand	–	1	–
Silt	43	10	30
Clay	57	89	70
COMPOSITION:			
Quartz	20	5	20
Feldspar	10	2	7
Mica	2	–	–
Heavy minerals	3	2	3
Clay	57	89	70
Volcanic glass	5	2	–
Pyrite	2	–	TR
Diatoms	–	TR	–
Radiolarians	1	–	–

SITE 483 HOLE CORE 12 CORED INTERVAL 96.0–105.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER QUATERNARY	NN19 (N)	FM	FM	B		1	0.5, 1.0					5GY 3/2 — Slightly mottled grayish olive green CLAY with a small clam at a depth of 15 cm in Section 4. The 30 cm of Section 1, then firm to the base of Section 2 and very firm in Sections 3 and 4.
						1		VOID				VOID
						2						
						3						
						4						

SITE 483 HOLE CORE 13 CORED INTERVAL 105.5–115.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
LOWER QUATERNARY	NN19 (N)	RP	B	RG		1	0.5				*
			CM				1.0				
			FM			2					
			RP								
			B			3		VOID			*
			B ?			4					

5GY 3/2

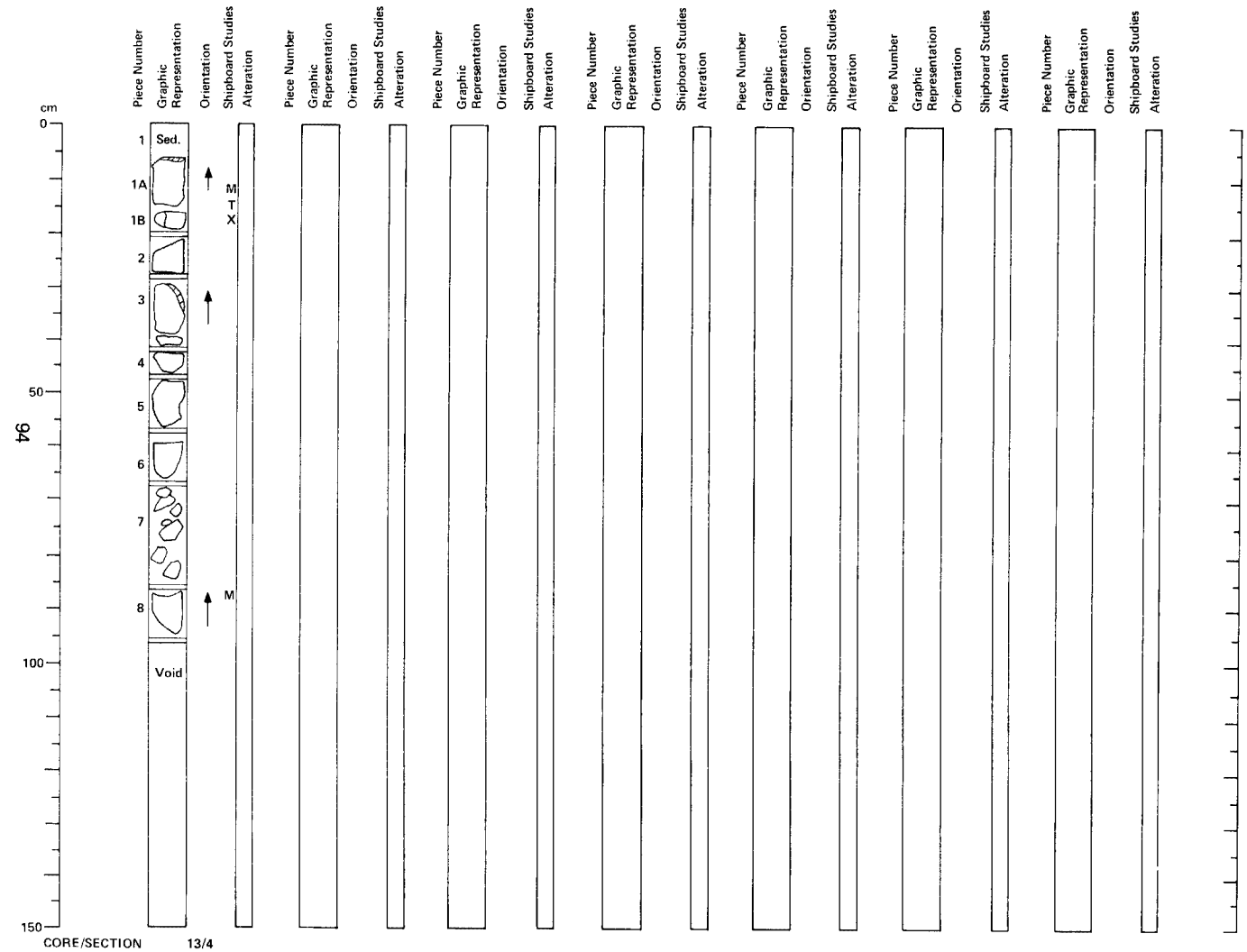
Firm, mottled grayish olive green CLAY and SILTY CLAY grading to olive black near the base of Section 1 and to brownish black from the top of Section 2 to the base of the sediments at a depth of 7 cm in Section 4. The remainder of the core consists of BASALT.

5Y 2/1

5YR 2/1

SMEAR SLIDE SUMMARY

	1-100	3-80
TEXTURE:		
Sand	–	2
Silt	30	14
Clay	70	84
COMPOSITION:		
Quartz	7	5
Feldspar	2	2
Mica	2	3
Heavy minerals	5	6
Clay	70	84
Calc. nannofossils	10	–
Radiolarians	1	...
Plant debris	3	.



HOLE 483, CORE 13

Visual Description

Gray, phyric massive basalt. Plagioclase phenocrysts 5%, locally intergrown with altered olivine. Rock is medium-grained, increases in grain size with depth and is generally fresh. Vesicles < 1%, < 1 mm, filled with blue-green smectite. Pieces 1A and 3 contain veins filled respectively with phillipsite(?) and calcite.

Thin Section Description

Location: Section 4, 15–16 cm

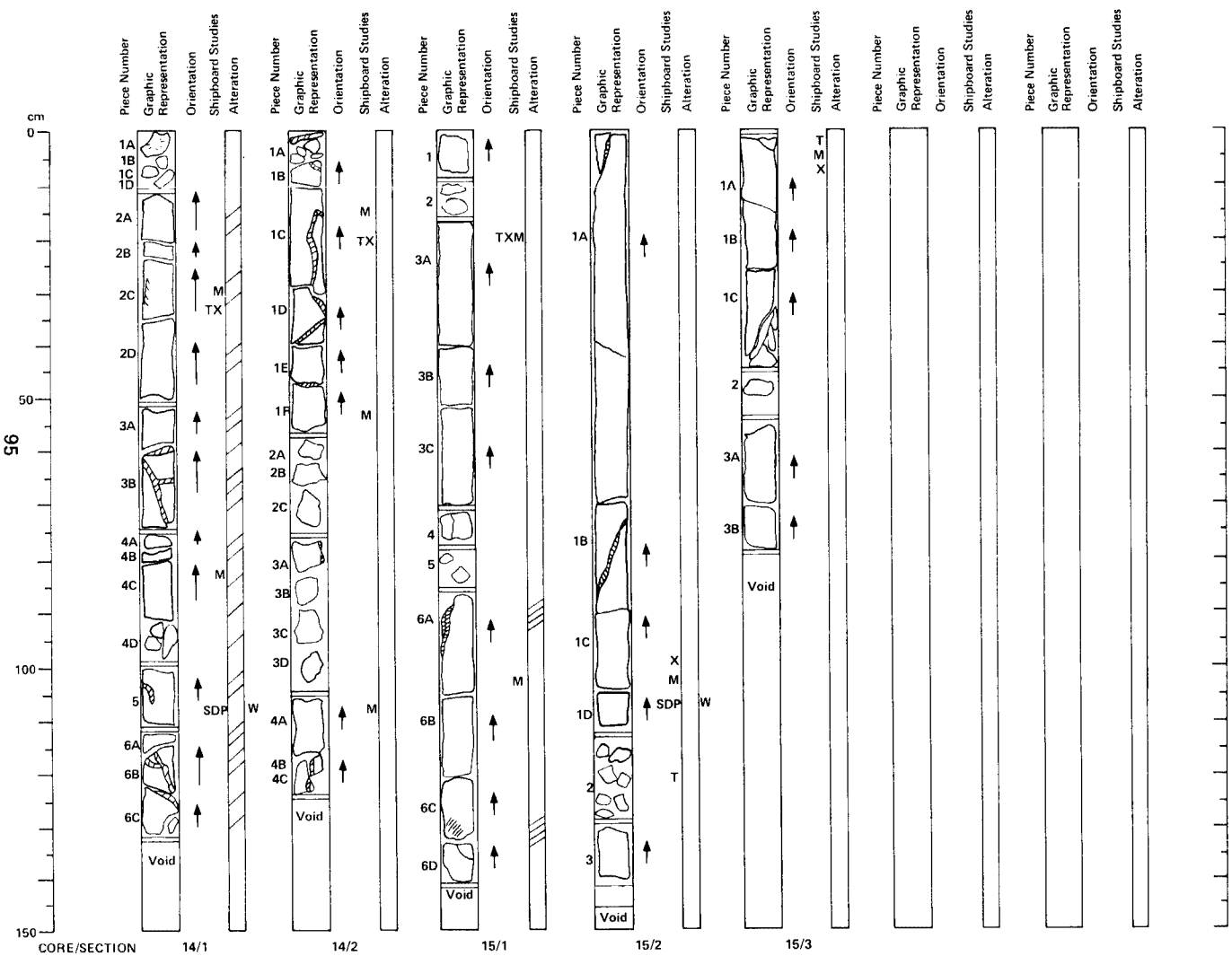
Texture: Sparsely phyric, medium-grained, intergranular

Phenocrysts: Olivine < 1%, 1–2 mm, subhedral, altered to smectite, usually in glomerophyric clots with plagioclase; plagioclase 5–7%, 1–4 mm, subhedral prisms, fresh, usually in glomerophyric clots.

Groundmass: Olivine 2–3%, 0.3–0.5 mm, subhedral, altered to smectite; plagioclase 55%, 0.1–0.6 mm, subhedral laths, fresh; clinopyroxene 30%, 0.2–0.6 mm, anhedral, fresh, $2V_z \sim 35°$; opaques 3%, 0.1–0.3 mm, subhedral, probably magnetite; interstitial material 5–10%, replaced by green smectite.

Vesicles: 1%, 0.2–0.5 mm, round, filled with green smectite and minor carbonate.

Alteration: Olivine and interstitial material replaced by green smectite.



HOLE 483, CORE 14

Visual Description

Medium gray, aphyric, massive basalt. Rock is medium-grained, with grain size increasing somewhat downward from glass selvedge at top of Section 1. Vesicles 5–10%, most abundant in middle part of core, 1–2 mm, round, filled with smectite and carbonate. Veins and fractures abundant, particularly in upper meter of core, 1–5 mm wide, filled with carbonate, smectite, pyrite and zeolite(?).

Thin Section Description

Location: Section 1, 33–35 cm

Texture: Aphyric, coarse-grained, subophitic to intersertal

Groundmass: Olivine 3–5%, 0.2–0.5 mm, subhedral, partly replaced by smectite and carbonate, some fresh, $2V_z \sim 88°$; plagioclase 55–60%, 0.2–1.2 mm, subhedral laths, fresh; clinopyroxene 30–35%, 0.2–0.7 mm, anhedral, tabular crystals, fresh, $2V_z \sim 35–40°$; opaques 2–3%, 0.03–0.15 mm, subhedral, probably magnetite; interstitial material 5%, replaced by smectite.

Vesicles: 3–5%, 0.5–1 mm, round, filled with smectite and carbonate, many with glassy segregations.

Alteration: Interstitial material and some olivine replaced by smectite and carbonate.

Location: Section 2, 9–100 cm

Texture: Aphyric, coarse-grained, subophitic to intersertal

Groundmass: Olivine 3–5%, 0.2–0.5 mm, subhedral, completely replaced by smectite; plagioclase 55–60%, 0.2–1.2 mm, subhedral laths, fresh; clinopyroxene 30–35%, 0.2–0.7 mm, mostly fresh, some rimmed with smectite or amphibole(?), $2V_z \sim 35–40°$; opaques 2–3%, 0.03–0.15 mm, subhedral, probably magnetite; interstitial material 5–10%, altered to smectite and minor carbonate.

Vesicles: 2–3%, 0.5–1 mm, round, rimmed with prismatic crystals and filled with smectite; some with glassy segregations.

Alteration: Olivine and interstitial material replaced by smectite and minor carbonate. Some green prismatic crystals (amphibole?) rim some pyroxene grains.

HOLE 483, CORE 15

Visual Description

Medium gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–3%, < 2 mm, sometimes in clots up to 7 mm across with minor clinopyroxene, fresh. Groundmass fine- to medium-grained, uniform, generally fresh. Vesicles < 1%, mostly in Section 1, 0.1–0.2 mm, round, filled with smectite and minor carbonate. Veins fairly common, most 2–3 mm wide but some up to 30 mm across, filled with carbonate, smectite, pyrite and minor zeolite(?), some surrounded by alteration halos. Some small vugs are associated with the veins.

Thin Section Description

Location: Section 1, 17–21 cm

Texture: Very sparsely phyric, coarse-grained, subophitic to intersertal

Phenocrysts: Plagioclase < 1%, 1–3 mm, subhedral, fresh.

Groundmass: Olivine 3–5%, 0.2–0.5 mm, subhedral, partly replaced smectite, much fresh olivine remains, $2V_z \sim 90°$; plagioclase 50–55%, 0.5–1.2 mm, subhedral laths, fresh; clinopyroxene 35–40%, 0.2–0.6 mm, anhedral to tabular, fresh, $2V_z \sim 35–40°$; opaques 2–3%, 0.05–0.15 mm, subhedral, probably magnetite; interstitial material 5–10%, microcrystalline material mostly replaced with smectite, some quartz and apatite.

Vesicles: < 1%, 0.1–0.2 mm, round, filled with brown smectite and traces of carbonate.

Alteration: Some olivine and interstitial material replaced by smectite.

Location: Section 2, 120–121 cm

Texture: Aphyric, medium-grained, intergranular to intersertal

Groundmass: Olivine 3–5%, 0.3–0.5 mm, subhedral, replaced by smectite and minor carbonate; plagioclase 50%, 0.5–1 mm, subhedral laths, fresh; clinopyroxene 35%, 0.2–0.6 mm, anhedral, fresh, $2V_z \sim 40°$; opaques 3%, 0.06–0.1 mm, often skeletal, probably magnetite; interstitial material 5–10%, replaced by smectite.

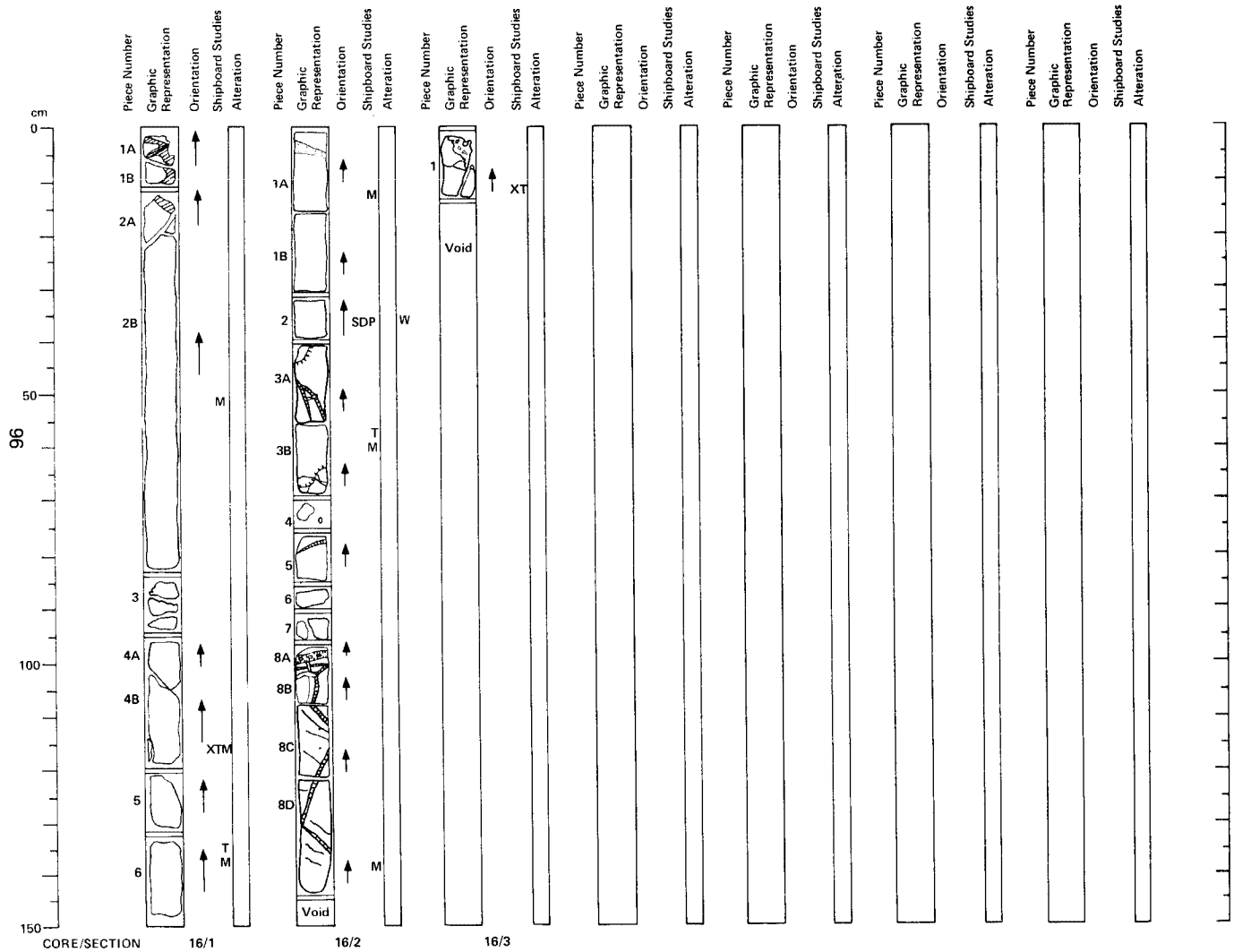
Alteration: Olivine and interstitial material replaced by smectite and minor carbonate.

Location: Section 3, 1–2 cm

Texture: Aphyric, fine- to medium-grained, intergranular to intersertal or slightly subophitic.

Groundmass: Olivine 5–8%, 0.2–0.3 mm, subhedral, replaced by smectite; plagioclase 50%, 0.3–0.5 mm, subhedral laths, fresh; clinopyroxene 35%, 0.1–0.3 mm, anhedral, fresh, $2V_z \sim 40°$; opaques 2–3%, 0.1–0.3 mm, skeletal, probably magnetite; interstitial material 5%, replaced by smectite.

Alteration: Olivine and interstitial material replaced by smectite.



HOLE 483, CORE 16

Visual Description

Medium gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts <1%, 1–5 mm, sometimes in glomerophyric clusters with minor clinopyroxene. Groundmass medium-grained, uniform, relatively fresh; some small 'dikelets' in Section 2. Vesicles <1%, <1 mm, round, filled with smectite. Veinlets and fractures sparse, 1–3 mm wide, filled or lined with smectite, carbonate, pyrite, and minor zeolite(?).

Thin Section Descripton

Location: Section 1, 114–115 cm

Texture: Aphyric, fine- to medium-grained, intergranular to intersertal.

Groundmass: Olivine 2–3%, 0.1–0.5 mm, subhedral, replaced by smectite and traces of carbonate; plagioclase 55%, 0.2–0.6 mm, subhedral laths, fresh; clinopyroxene 35–40%, 0.1–0.2 mm, anhedral, fresh, $2V_z \sim 40°$; opaques 2–3%, 0.05–0.2 mm, subhedral, often skeletal, probably magnetite; interstitial material 5%, replaced by smectite.

Vesicles: <1%, 0.2 mm, round, filled with smectite.

Alteration: Olivine and interstitial material replaced by smectite.

Location: Section 1, 133–134 cm

Texture: Very sparsely phyric, medium-grained, intersertal to intergranular

Phenocrysts: Olivine <1%, 1–3 mm, subhedral, partly replaced by smectite; plagioclase <1%, 1–4 mm, subhedral prisms, fresh.

Groundmass: Olivine 5%, 0.5–1 mm, subhedral, mostly replaced by smectite; plagioclase 55–60%, 0.2–1 mm, subhedral laths, fresh, somewhat zoned; clinopyroxene 30–35%, 0.1–0.4 mm, anhedral, fresh, $2V_z \sim 35°$; opaques 1–2%, 0.02–0.2 mm, microcrystalline, largely replaced by smectite, some quartz and apatite.

Alteration: Olivine and interstitial material mostly replaced by smectite.

Location: Section 2, 58–60 cm

Texture: Aphyric, medium-grained, intergranular to intersertal.

Phenocrysts: Plagioclase <1%, subhedral, fresh.

Groundmass: Olivine 2–3%, 0.1–0.3 mm, subhedral, replaced by smectite; plagioclase 55%, 0.1–0.5 mm, subhedral laths, fresh; clinopyroxene 0.1–0.3 mm, anhedral, fresh, $2V_z \sim 40°$; opaques 2–3%, 0.02–0.2 mm, subhedral, probably magnetite; interstitial material 5%, replaced by smectite.

Alteration: Olivine and interstitial material replaced by smectite.

Location: Section 3, 9–10 cm

Texture: Aphyric, fine-grained, intergranular to intersertal.

Groundmass: Olivine 1–2%, 0.05–0.15 mm, subhedral, replaced by smectite; plagioclase 45–50%, 0.1–0.3 mm, subhedral laths, fresh; clinopyroene 35–45%, 0.05–0.15 mm, anhedral, fresh, some poorly crystallized patches, $2V_z \sim 40°$; opaques 2%, 0.01–0.05 mm, subhedral, probably magnetite; interstitial material 5–15%, glassy or poorly crystallized material in irregular patches, mostly fresh, some replacement by smectite.

Alteration: Olivine and some interstitial material replaced by smectite.

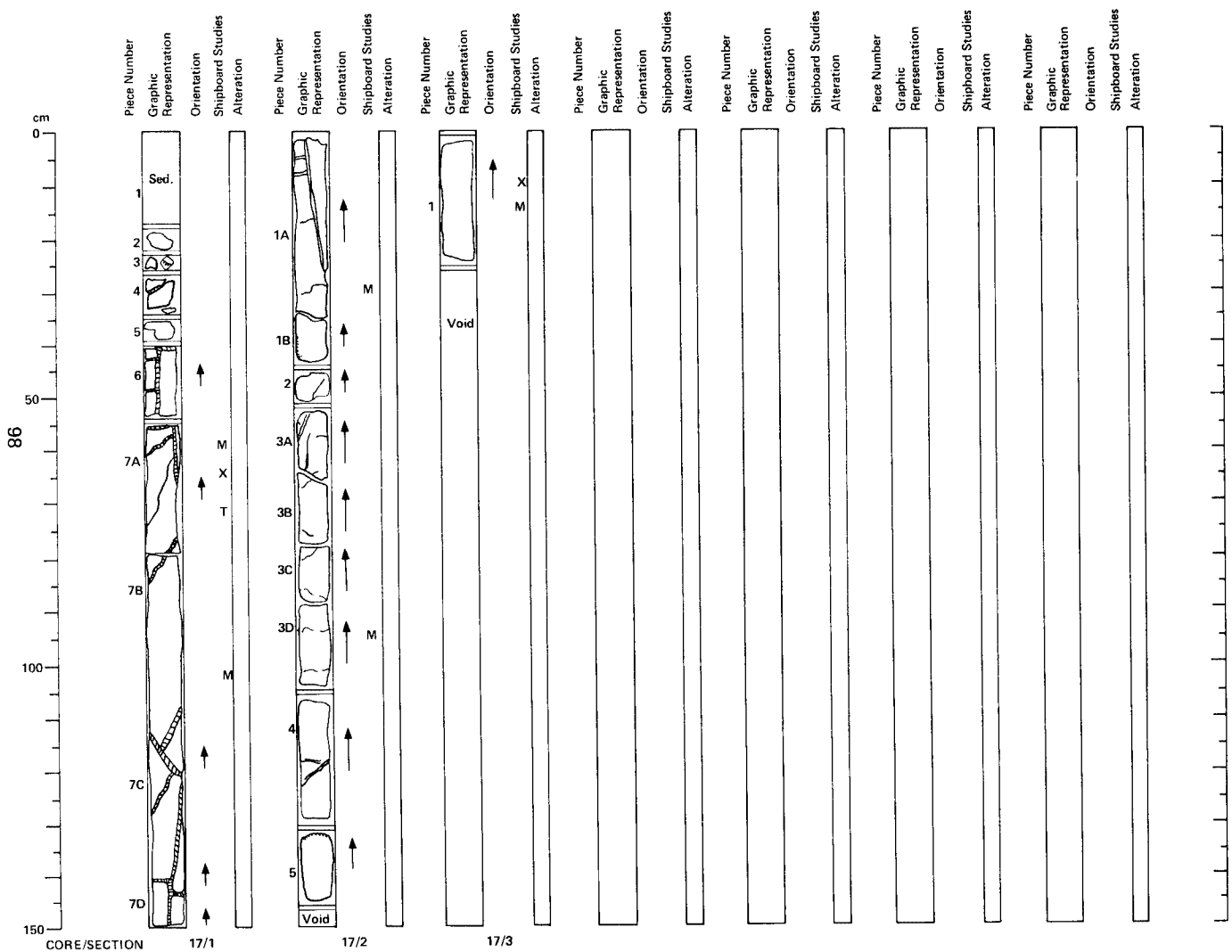
SITE 483 HOLE CORE 17 CORED INTERVAL 142.0–151.0 m

TIME—ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER PLIOCENE	NN18 (N)	RM	RP	B		1 2	0.5 1.0				•	5Y 2/1

Section 1, 0–20 cm: Firm, partially indurated olive black SILTSTONE underlain by coarse-grained BASALT displaying a fine-grained, aphyric contact against the sediments.

SMEAR SLIDE SUMMARY

	1-5
TEXTURE:	
Sand	3
Silt	60
Clay	37
COMPOSITION:	
Quartz	15
Feldspar	10
Mica	5
Heavy minerals	2
Clay	37
Volcanic glass	15
Pyrite	5
Zeolite	10
Carbonate unspec.	1



HOLE 483, CORE 17

Visual Description

Section 1, 0–20 cm: Olive black, firm siltstone.

Section 1, 20 cm–base of core: Medium gray, phyric, massive basalt. Rock is fine- to medium-grained, increasing in grain size downward, generally fresh. Vesicles <1%, <0.5 mm, round, filled with smectite. Small 'dikelet' in Section 1, 25 cm. Veinlets and fractures sparse, hairline to 4 mm, filled with smectite and minor carbonate and zeolite(?).

Thin Section Description

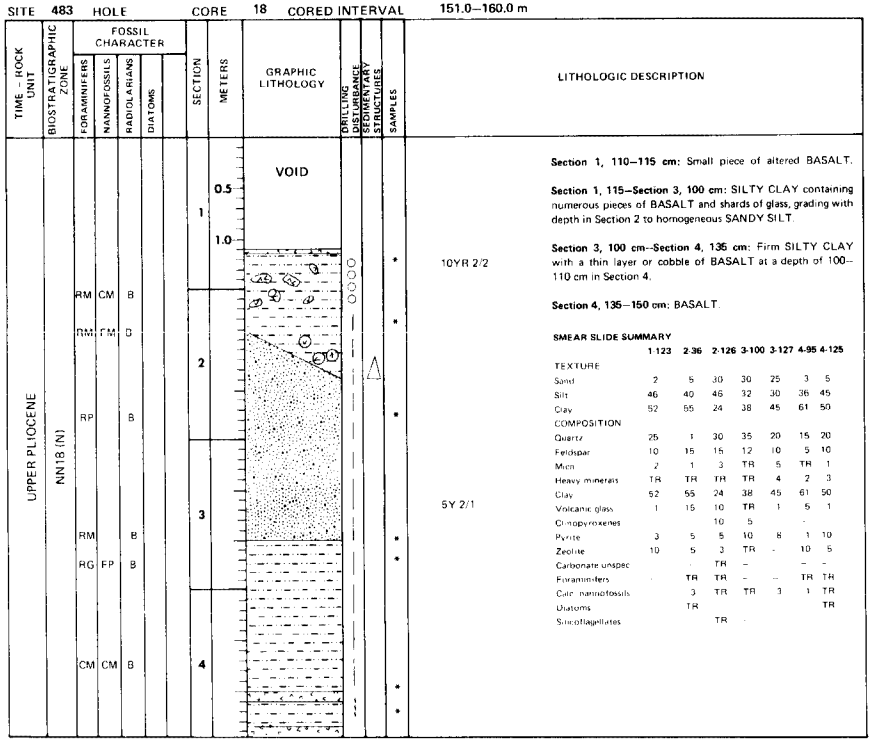
Location: Section 1, 64–66 cm

Texture: Aphyric, medium- to coarse-grained, subophitic.

Groundmass: Olivine 5–7%, 0.05–0.2 mm, partly altered to smectite, $2V_z \sim 90°$; plagioclase 45%, 0.2–1.1 mm, subhedral laths, fresh; clinopyroxene 45%, 0.2–1.5 mm, anhedral, ophitic crystals, fresh, $2V_z \sim 40°$; opaques 2–3%, 0.02–0.1 mm, subhedral, probably magnetite; interstitial material 1–2%, replaced by smectite and minor carbonate.

Alteration: Olivine rimmed by smectite; minor smectite and carbonate replacing interstitial material.

SITE 483 HOLE CORE 18 CORED INTERVAL 151.0–160.0 m



Section 1, 110–115 cm: Small piece of altered BASALT.

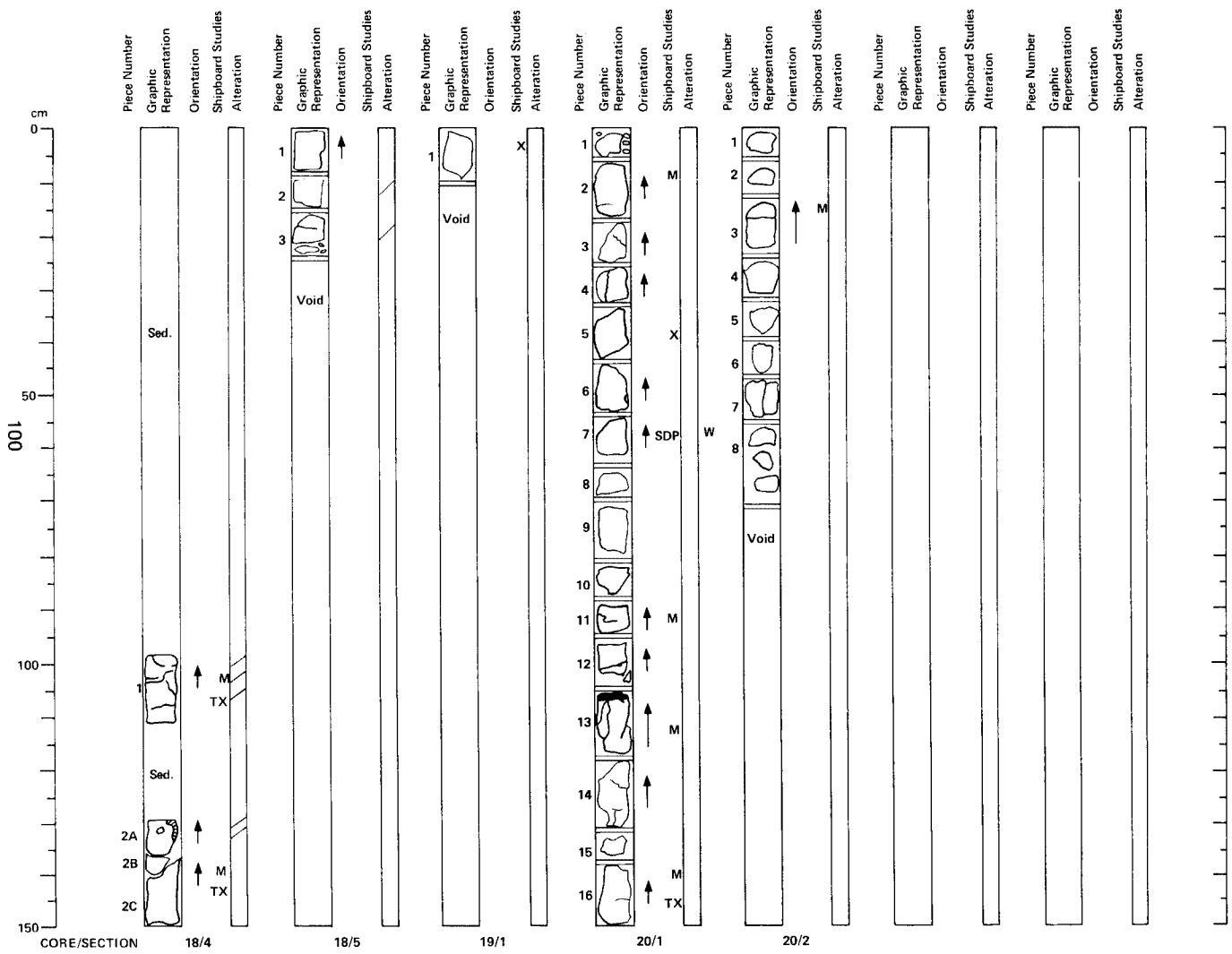
Section 1, 115–Section 3, 100 cm: SILTY CLAY containing numerous pieces of BASALT and shards of glass, grading with depth in Section 2 to homogeneous SANDY SILT.

Section 3, 100 cm–Section 4, 135 cm: Firm SILTY CLAY with a thin layer or cobble of BASALT at a depth of 100–110 cm in Section 4.

Section 4, 135–150 cm: BASALT.

SMEAR SLIDE SUMMARY

	1-123	2-36	2-126	3-100	3-127	4-95	4-125
TEXTURE							
Sand	2	5	30	30	25	3	5
Silt	46	40	46	32	30	36	45
Clay	52	55	24	38	45	61	50
COMPOSITION							
Quartz	25	1	30	35	20	15	20
Feldspar	10	15	15	12	10	5	10
Mica	2	1	3	TR	5	TR	1
Heavy minerals	TR	TR	TR	TR	4	2	3
Clay	52	55	24	38	45	61	50
Volcanic glass	1	15	10	TR	1	5	1
Clinopyroxenes			10	5		-	
Pyrite	3	5	5	10	8	1	10
Zeolite	10	5	3	TR	-	10	5
Carbonate unspec	-	-	TR	–		–	–
Foraminifers	-	TR	TR	–	–	TR	TR
Calc. nannofossils		3	TR	TR	3	1	TR
Diatoms		TR					TR
Silicoflagellates			TR	-			



HOLE 483, CORE 18

Visual Description

Section 1, 0–109 cm: Void.

Section 1, 109 cm–Section 4, 135 cm: Firm, silty clay with numerous pieces of basalt in Section 1.

Section 4, 135 cm–base of core: Medium gray, aphyric, massive basalt. Rock is fine- to medium-grained with grain size increasing slightly downward; generally fresh. Vesicles 1%, ≤ 1 mm, round, filled with smectite; small vug in Section 4, 131 cm is 5 mm across, filled with carbonate, smectite, and minor zeolite(?); some veins have narrow alteration halos.

Thin Section Description

Location: Section 4, 103–105 cm

Texture: Aphyric, medium- to coarse-grained, mostly subophitic

Groundmass: Olivine 5%, 0.1–0.2 mm, subhedral, partly replaced by smectite, $2V_z \sim 90°$; plagioclase 40–45%, 0.2–1 mm, subhedral, fresh; clinopyroxene 40%, 0.1–1.2 mm, anhedral, subophitic, fresh, $2V_z \sim 40°$; opaques 2–3%, 0.05–0.15 mm, subhedral, probably magnetite; interstitial material 2%, replaced by smectite and minor carbonate.

Veins and Fractures: Rare, hairline, filled with smectite.

Alteration: Olivine and interstitial material replaced by smectite and minor carbonate.

Location: Section 4, 140–142 cm

Texture: Very sparsely phyric, medium-grained, intersertal to intergranular

Phenocrysts: Olivine ≪1%, 0.5 mm, subhedral, altered to smectite; plagioclase ≪1%, 2–3 mm, subhedral glomerocrysts, fresh

Groundmass: Olivine 5–7%, 0.1–0.5 mm, subhedral, replaced by brown smectite; plagioclase 50%, 0.2–1 mm, subhedral laths, fresh; clinopyroxene 35%, 0.1–0.3 mm, anhedral, fresh, $2V_z \sim 40°$; opaques 2–3%, 0.05–0.2 mm, subhedral, probably magnetite; interstitial material 5%, mostly replaced by smectite.

Vesicles: ≪1%, 0.5 mm, round, filled with brown smectite.

Alteration: Olivine and interstitial material replaced by smectite.

HOLE 483, CORE 19

Visual Description

Gray, medium-grained, aphyric, massive(?) basalt. Vesicles 3–5%, ≤ 1 mm, spherical, filled with smectite.

HOLE 483, CORE 20

Visual Description

Section 1, 0–6 cm: Medium gray, fine-grained, aphyric, massive(?) basalt. Vesicles 2–3%, ≤ 1 mm, spherical, filled with smectite.

Section 1, 6 cm–base of core: Medium gray, moderately phyric, pillowed(?) basalt. Plagioclase phenocrysts 5–7%, 2–6 mm, euhedral to subhedral, fresh; olivine phenocrysts 3%, 2–4 mm, euhedral, partly replaced by smectite; clinopyroxene phenocrysts ≪1%, 1–2 mm, anhedral, fresh, sometimes in clots with plagioclase; phenocryst size and abundance decreases toward base of core in Section 2. Groundmass is fine-grained to glassy; glass selvedge occurs in Section 1, 105 cm; groundmass fresh to weakly altered. Vesicles 1–2%, most abundant near base of core, ≤ 1 mm, spherical, filled with smectite and carbonate. Fractures and veinlets sparse, hairline to 2 mm, lined or filled with smectite, carbonate and rare pyrite.

Thin Section Description

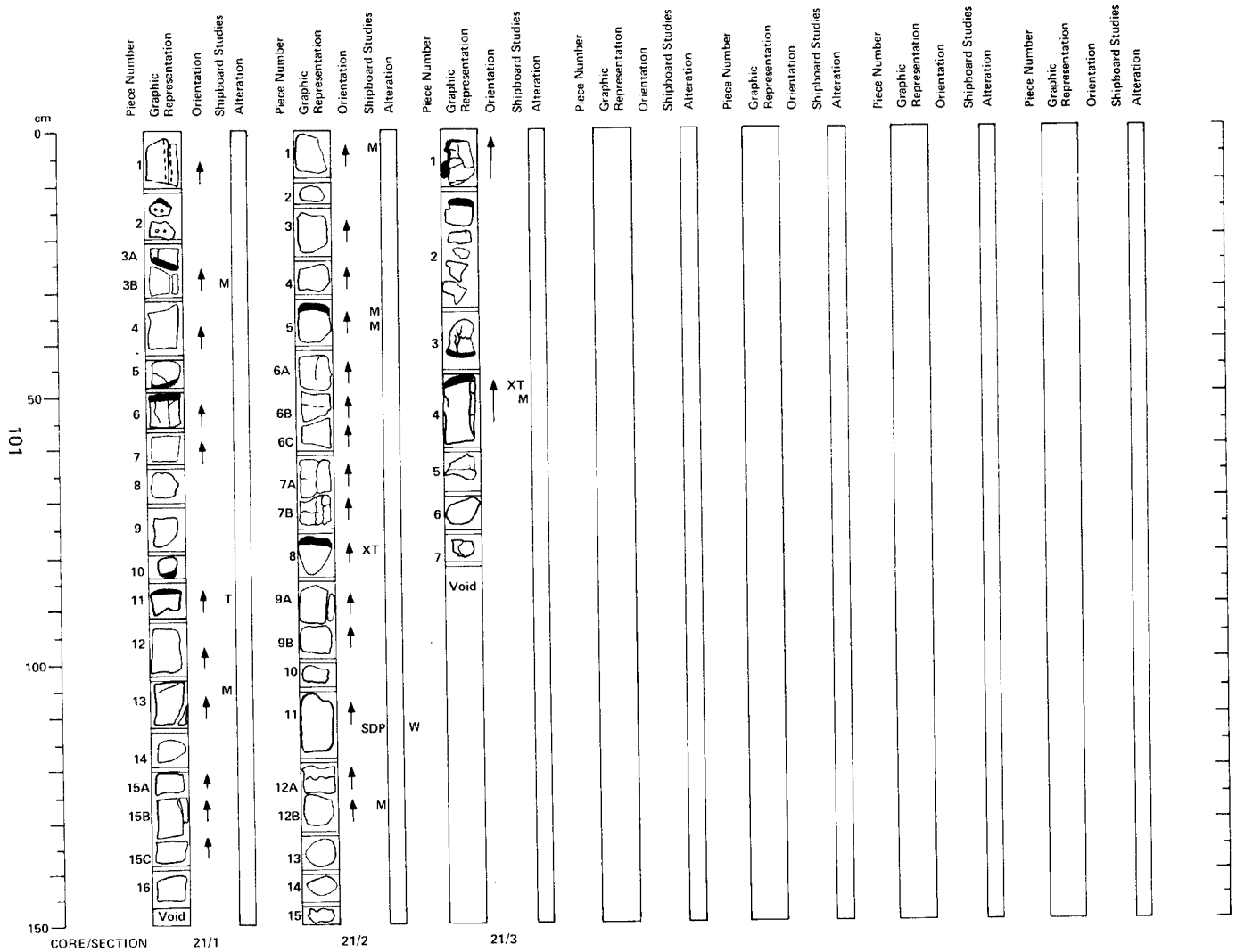
Location: Section 1, 144–146 cm

Texture: Moderately phyric, intergranular, variolitic

Phenocrysts: Olivine 3–4%, 1–2 mm, subhedral, replaced by smectite; plagioclase 55%, 0.3–0.8 mm, subhedral, often skeletal, fresh; clinopyroxene 30%, 0.05–0.2 mm, granular, often poorly crystallized, fresh, $2V_z \sim 40°$; opaques 3–4%, minute grains and laths, probably magnetite.

Vesicles: ≪1%, ≤ 0.8 mm, round, filled with brown smectite, some with segregation patches.

Alteration: Olivine altered to smectite and minor carbonate.



HOLE 483, CORE 21

Visual Description

Dark gray, moderately phyric, pillowed basalt. Plagioclase phenocrysts 5%, generally 2–4 mm, euhedral to subhedral, fresh, a few rounded crystals to 7 mm across and a few glomerocrysts with olivine and clinopyroxene; olivine phenocrysts 1–2%, 1–3 mm, euhedral to subhedral, mostly altered to green smectite and carbonate, some partly fresh; clinopyroxene phenocrysts ≤1%, 1–2 mm, anhedral, both in glomerophyric clots with plagioclase and as rounded single crystals, fresh. Groundmass is fine-grained to glassy; glass selvedges occur in Section 1 at 12, 25, 48, 50, 83, and 85 cm, in Section 2 at 33 and 77 cm and in Section 3 at 2, 13, 42, and 46 cm. Vesicles ≤1%, mostly in variolitic zones next to glassy selvedges, spherical, ≤1 mm, partly filled with smectite. Fractures and veinlets fairly common, hairline to 1 mm, filled with smectite and locally pyrite. Rock generally fresh; glassy selvedges partly altered to smectite and groundmass weakly altered in narrow halos along fractures.

Thin Section Description

Location: Section 1, 86–88 cm

Texture: Sparsely phyric, quench

Phenocrysts: Olivine 1%, 0.2–0.5 mm, subhedral, replaced by smectite and carbonate; plagioclase 3–5%, 0.2–1.5 mm, subhedral laths, fresh, often zoned; clinopyroxene ≤1%, 0.5–1 mm, round, usually intergrown with plagioclase, fresh, $2V_z \sim 40$.

Groundmass: Olivine 1–2%, 0.05–0.1 mm, euhedral, replaced by smectite; plagioclase 15%, 0.05–0.3 mm, acicular, fresh; clinopyroxene, 3%, 0.03–0.05 mm, granular, fresh; opaques 5%, 0.005-0.01 mm, octahedra and granules, probably magnetite; matrix 70–75%, quench mixture with poorly developed sheaf-like patterns.

Vesicles: ≤1%, 0.5–1 mm, round, lined with smectite

Alteration: Olivine altered to smectite and minor carbonate

Location: Section 2, 79–81 cm

Texture: Sparsely phyric, quench

Phenocrysts: Olivine ≤1%, 0.2–2.5 mm, euhedral, replaced by smectite and carbonate; plagioclase 5%, 0.5–2 mm, subhedral, fresh, often in clusters; clinopyroxene ≤1%, 0.05 mm, rounded grains and some microphenocrysts intergrown with plagioclase; spinel ≤1%, slightly rounded, fresh

Groundmass: Glassy material, incipiently crystallized 93–95%, slightly variolitic.

Vesicles: ≤1%, 0.2–1 mm, round, filled with smectite or open

Alteration: Olivine replaced by smectite and minor carbonate

Location: Section 3, 52–54 cm

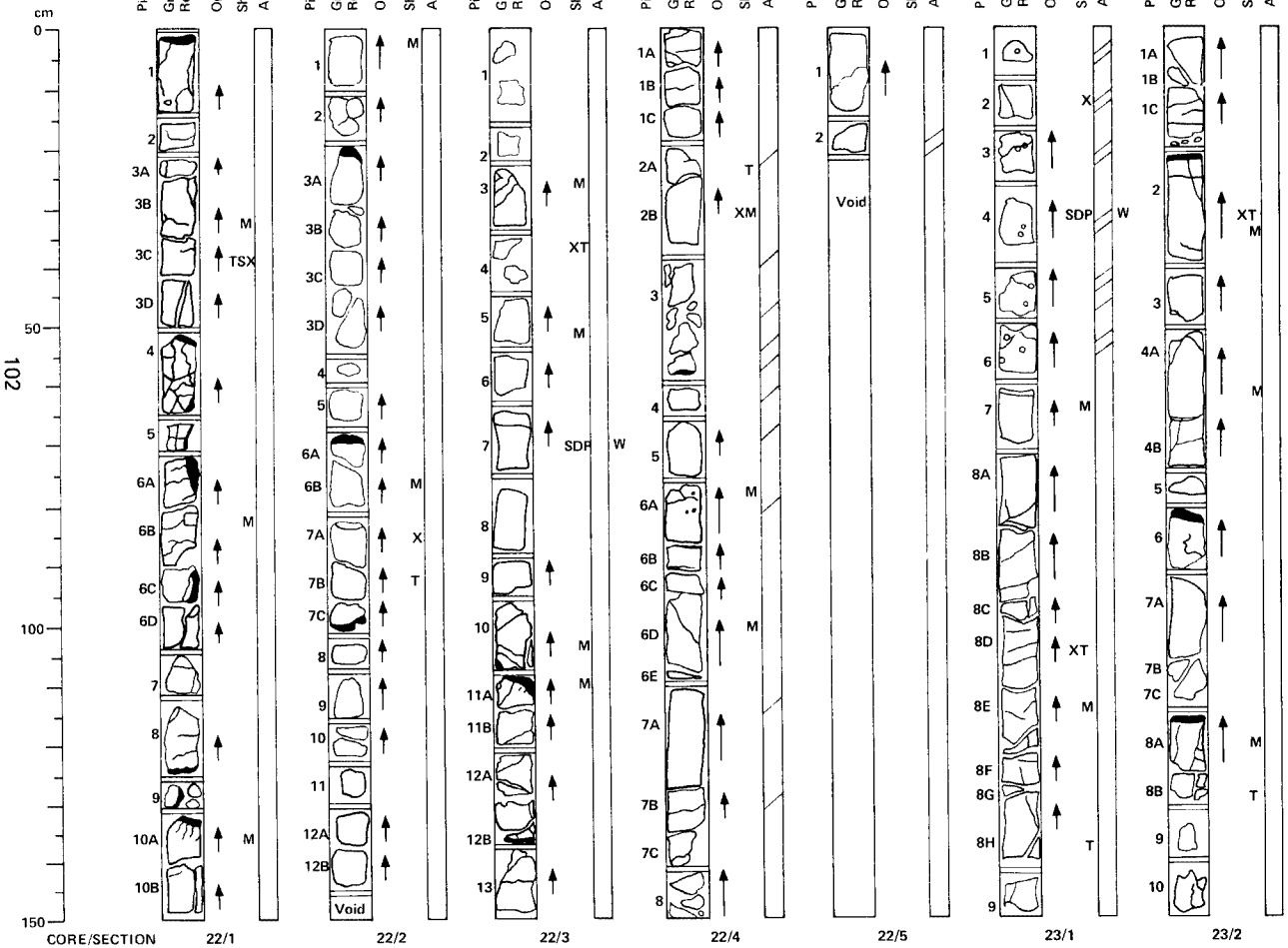
Texture: Sparsely phyric, quench

Phenocrysts: Olivine 1%, 0.5–1 mm, subhedral, replaced by smectite and carbonate; plagioclase 5%, 1–3 mm, subhedral, fresh, often strongly zoned; clinopyroxene 1%, 0.1–0.5 mm, anhedral, intergrown with plagioclase, fresh, $2V_z \sim 40$; some crystals have good sector zoning.

Groundmass: Plagioclase 5%, 0.1–0.2 mm, acicular crystals, fresh; clinopyroxene ≤1%, 0.05–0.1 mm, granular, fresh; opaques 1–2%, minute granules of magnetite; microcrystalline mesostasis 85–90%, fresh

Vesicles: ≤1%, ≤0.5 mm, irregular, filled with smectite

Alteration: Olivine replaced by smectite and carbonate



HOLE 483, CORE 22

Visual Description

Section 1, 0 cm–Section 4, 60 cm: Dark gray, moderately phyric, pillowed basalt. Plagioclase phenocrysts 5%, 2–3 mm, euhedral to subhedral, often in glomerophyric clots with olivine and clinopyroxene; olivine 1%, generally 1–3 mm, rare crystals to 8 mm, euhedral to subhedral, partly altered to smectite and carbonate; clinopyroxene phenocrysts < 1%, 1–3 mm, anhedral, intergrown with plagioclase, fresh. Groundmass fine-grained to glassy, often mottled, generally fresh. Glass selvedges at 1, 52, 63–78, 91–95, 124, and 132 cm in Section 1, at 21, 68, and 100 cm in Section 2, at 108 and 136 cm in Section 3 and 58 cm in Section 4; selvedges are 1–2 cm thick, flat or curved, partly altered to smectite and pyrite along curved, subhorizontal fractures. Vesicles 1%, most common in zones 5–10 cm from glassy selvedges, <1 mm, spherical, filled with blue-green smectite and rare zeolite(?). Fractures and veinlets common, hairline to 2 mm wide, filled with blue-green smectite, carbonate and minor pyrite; larger vein 5 mm–1 cm wide occurs in Section 4, 45–55 cm, filled with smectite. Rock generally slightly altered in narrow halos adjacent to fractures.

Section 4, 60 cm–base of core: Dark gray, moderately phyric, massive basalt. Plagioclase phenocrysts 5–8%, 2–3 mm, euhedral to subhedral, fresh, sometimes in glomerophyric clots with olivine and clinopyroxene; olivine phenocrysts, 2–3%, 2–3 mm, euhedral to subhedral, altered to smectite and minor carbonate; clinopyroxene phenocrysts < 1%, 1–2 mm, usually intergrown with plagioclase, fresh. Groundmass is fine- to medium-grained, generally fresh except near veins. Vesicles 0.5–2%, mostly in Section 4, 75–130 cm, 1–2 mm, spherical, filled with smectite and minor carbonate. Veins and fractures fairly common, hairline to 2 mm, filled with smectite, carbonate and minor pyrite. Groundmass altered to smectite and pyrite in narrow halos around some veins.

Thin Section Description

Location: Section 1, 40–42 cm

Texture: Sparsely phyric, quench

Phenocrysts: 2–3%, 0.5–2 mm, euhedral to subhedral, replaced by smectite and minor carbonate; plagioclase 6–7%, 0.5–2.5 mm, subhedral, fresh, strongly zoned; clinopyroxene < 1%, 0.5–1 mm, rounded, slightly zoned

Groundmass: Olivine 1%, 0.05–0.1 mm, anhedral, replaced by smectite; plagioclase 15–20%, 0.1–0.5 mm, acicular, fresh; clinopyroxene 60–65%, poorly crystallized, radiating sheaves, fresh; opaques 3–4%, 0.005–0.01 mm, granular

Alteration: Olivine altered to smectite and minor carbonate

Location: Section 2, 93–95 cm

Texture: Sparsely phyric, quench

Phenocrysts: Olivine 1%, 0.5 mm, subhedral to euhedral, altered to smectite and minor carbonate; plagioclase 2%, 0.5–1.5 mm, subhedral, fresh; clinopyroxene <1%, 1 mm, rounded, fresh

Groundmass: Olivine 1%, 0.05–0.1 mm, subhedral, altered to smectite; plagioclase 5%, 0.1–1 mm, acicular, seriate in size, fresh; microcrystalline mesostasis, 90%, poorly crystallized mixture of clinopyroxene and plagioclase, fresh

Vesicles: < 1%, 0.2–0.5 mm, round, filled with smectite, some with segregation rims.

Alteration: Olivine replaced by smectite and minor carbonate

Location: Section 3, 38–40 cm
Texture: Sparsely phyric, quench
Phenocrysts: Olivine 2–3%, 0.5–2 mm, subhedral to euhedral, replaced by smectite; plagioclase 5%, 1–2 mm, subhedral laths, fresh, often zoned; clinopyroxene < 1%, 0.2–0.4 mm, anhedral, intergrown with plagioclase, fresh, $2V_z \sim 40°$.
Groundmass: Olivine 1%, 0.05–0.1 mm, subhedral, replaced by smectite; plagioclase 20%, 0.2–0.5 mm, acicular, fresh; clinopyroxene 40%, poorly crystallized sheaves, fresh; opaques 2–3%, minute granules, probably magnetite; microcrystalline mesostasis 30%, fresh
Vesicles: < 1%, 0.5 mm, round, segregation type
Alteration: Olivine replaced by smectite

Location: Section 4, 35–38 cm
Texture: Moderately phyric, quench
Phenocrysts: Olivine 2–3%, 0.3–3 mm, subhedral to euhedral, replaced by smectite, minor carbonate and some pyrite(?); plagioclase 8–10%, 0.5–2.5 mm, subhedral, strongly zoned, fresh; clinopyroxene < 1%, 1–1.5 mm, rounded, fresh
Groundmass: Olivine 1–2%, 0.05–0.1 mm, subhedral, replaced by smectite; plagioclase 20–25%, 0.1–0.5 mm, seriate, often acicular, some in variolitic clusters, fresh; clinopyroxene 60%, poorly crystallized, radiating sheaves, fresh; opaques 2–4%, minute grains, some laths to 0.1 mm
Vesicles: < 1%, 0.5 mm, round, filled with smectite
Alteration: Olivine replaced by smectite and minor carbonate

HOLE 483, CORE 23

Visual Description

Section 1, 0 cm–Section 2, 20 cm: Dark gray, moderately phyric, massive basalt. Plagioclase phenocrysts 5–10%, increasing in abundance downward, 1–5 mm, euhedral to subhedral, fresh; olivine phenocrysts 2–3%, mostly 2–5 mm with some up to 10 cm, euhedral to subhedral, partly altered to smectite but often fresh; clinopyroxene 1%, 1–2 mm, rounded, fresh. Groundmass is medium-grained, uniform, generally fresh. Vesicles 1–2%, chiefly in upper 50 cm of Section 1, < 1 mm, spherical, filled with smectite and carbonate. Fractures and veinlets common, hairline to 1 mm, lined or filled with smectite, carbonate and pyrite.

Section 2, 20 cm–base of core: Dark gray, moderately phyric pillowed(?) basalt. Plagioclase phenocrysts 5–10%, abundance decreases somewhat with depth, 2–5 mm, possibly 2 generations, one euhedral, the other anhedral, fresh; olivine phenocrysts 1–3%, 1 mm, euhedral to subhedral, altered to smectite; clinopyroxene phenocrysts < 1%, 1–1.5 mm, anhedral, usually intergrown with plagioclase, fresh. Groundmass fine-grained to glassy; glass selvedges at 21, 81, and 115 cm in Section 2, partly altered to smectite. Vesicles 0.5–2%, < 1 mm, spherical, filled with smectite and minor carbonate, and pyrite.

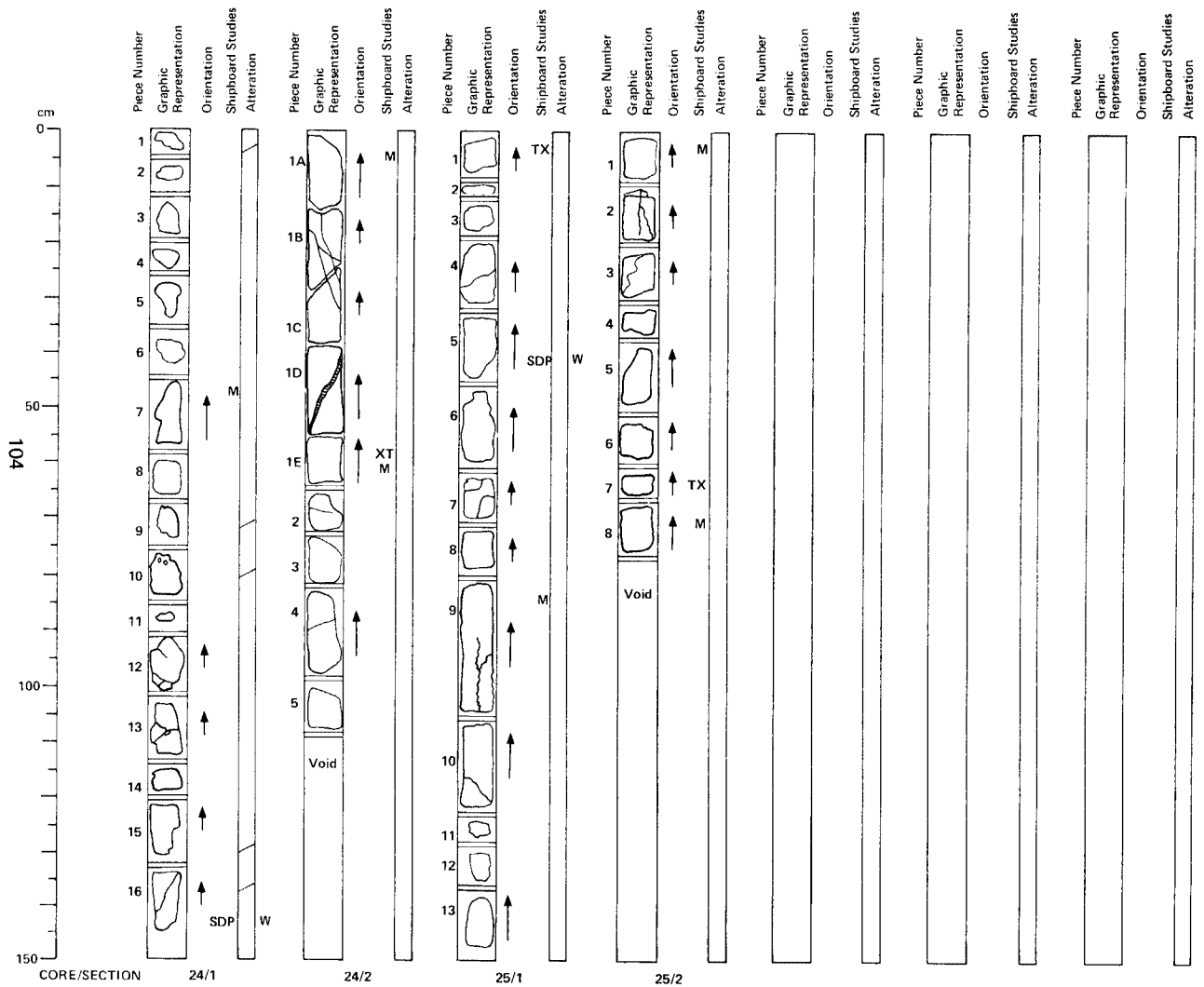
Thin Section Description

Location: Section 1, 108–110 cm
Texture: Sparsely to moderately phyric, intergranular to intersertal
Phenocrysts: Olivine 3%, 1.0–1.6 mm, subhedral, partly replaced by smectite; plagioclase 5%, 0.5–3 mm, subhedral, fresh, strongly zoned; clinopyroxene 1%, 0.5–1.5 mm, round, fresh, zoned, $2V_z \sim 45°$.
Groundmass: Olivine 2–3%, 0.05–0.15 mm, subhedral, mostly replaced by smectite; plagioclase 45%, 0.1–0.5 mm, subhedral, fresh; clinopyroxene 35%, 0.1–0.3 mm, anhedral, fresh, $2V_z \sim 40°$; opaques 2–3%, 0.01–0.05 mm, anhedral, probably magnetite; interstitial material 5–7%, mostly glassy, slightly replaced by smectite.
Vesicles: < 1%, 0.5 mm, round, filled with smectite and carbonate
Alteration: Olivine and minor interstitial material partly replaced by smectite.

Location: Section 1, 136–138 cm
Texture: Sparsely phyric, medium-grained, intergranular to intersertal
Phenocrysts: Olivine 2%, 2–6 mm, subhedral, partly replaced by smectite, mostly fresh, $2V_z \sim 88°$; plagioclase 5–7%, 1–2 mm, subhedral, fresh, often in clusters with olivine
Groundmass: Olivine 3%, 0.1–0.3 mm, subhedral, mostly replaced by smectite; plagioclase 45%, 0.2–0.5 mm, subhedral, fresh; clinopyroxene 35%, 0.1–0.4 mm, anhedral, fresh, $2V_z \sim 45°$; opaques 1–2%, minute granules in interstitial patches; interstitial material 5–10%, mostly glassy, fresh
Vesicles: < 1%, 0.5 mm, round to irregular, filled with smectite and carbonate
Alteration: Olivine partly replaced by smectite.

Location: Section 2, 36–39 cm
Texture: Sparsely to moderately phyric, intersertal
Phenocrysts: Olivine 1–2%, 0.2–0.5 mm, subhedral, resorbed, replaced by smectite; plagioclase 5–7%, 1–2 mm, subhedral, fresh, strongly zoned, usually in glomerocrysts; clinopyroxene < 1%, 1–1.5 mm, subhedral, fresh, in clusters with plagioclase, $2V_z \sim 45°$.
Groundmass: Olivine 1–2%, 0.1–0.2 mm, subhedral, replaced by smectite; plagioclase 40%, 0.2–0.5 mm, subhedral, fresh; clinopyroxene 40%, 0.05–0.2 mm, subhedral to anhedral, fresh, $2V_z \sim 40°$; opaques 2–3%, minute granules in interstitial patches; interstitial material 10%, mostly glassy, fresh
Vesicles: 1–2%, 0.3–1 mm, round to irregular, filled with smectite, some with segregation patches
Alteration: Olivine altered to smectite

Location: Section 2, 126–128 cm
Texture: Sparsely phyric, quench
Phenocrysts: Olivine 1–2%, 0.5–1 mm, subhedral, altered to smectite; plagioclase 5%, 0.5–1.5 mm, subhedral, fresh
Groundmass: Poorly crystallized quench mixture with some sheaf-like structure 90–95%
Vesicles: < 1%, 0.5–1 mm, round, open or filled with smectite, some with segregation patches
Alteration: Olivine altered to smectite



HOLE 483, CORE 24

Visual Description

Section 1, 0–5 cm: Gray, medium-grained, sparsely phyric basalt. Probably ap iece from lithologic Unit 1 that has fallen into the hole.

Section 1, 5 cm–base of core: Medium to dark gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–3%, 1–2 mm, subhedral to euhedral, fresh; sometimes in glomerophyric clots with olivine; olivine phenocrysts < 1%, 1 mm, euhedral to subhedral, completely rpelaced by green smectite. Groundmass fine-grained to medium-grained, grain size decreases rapidly in lower 30 cm of core, generally fresh. Vesicles < 1%, ≤ 1 mm, spherical, irregularly distributed, filled with green smectite; two small vugs 3–7 mm across occur in Section 1, 77 cm, irregular, partly filled with green and brown smectite. Fractures and veinlets sparse, generally hairline to 1 mm, one vein in Section 2 between 40 and 55 cm is 5 mm wide; veins filled with smectite, carbonate and pyrite; carbonate occurs mostly at vein intersections.

Thin Section Description

Location: Section 2, 58–60 cm

Texture: Very sparsely phyric, medium-grained, intergranular to intersertal

Phenocrysts: Plagioclase 1–2%, 1–2 mm, subhedral, fresh, somewhat zoned

Groundmass: Olivine 3–5%, 0.2–0.5 mm, subhedral, replaced by smectite; plagioclase 45–50%, 0.2–0.7 mm, subhedral, fresh; clinopyroxene 25–30%, 0.05–0.15 mm, anhedral, fresh, $2V_z$ ~ 40°; opaques 5%, 0.005–0.1 mm, granular, probably magnetite; interstitial material 7–8%, poorly crystallized material, partly replaced by smectite

Alteration: Olivine and some interstitial material replaced by smectite and traces of carbonate

HOLE 483, CORE 25

Visual Description

Section 1, 0–8 cm: Light gray, medium-grained, moderately phyric basalt. Probably a piece of Unit 1 that has fallen into the hole.

Section 1, 8 cm–base of core: Medium to dark gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–3%, 1–3 mm, euhedral to subhedral, fresh, sometimes in glomerophyric clusters; olivine phenocrysts <1%, 1–1.5 mm, euhedral to subhedral, replaced by smectite. Groundmass is very fine-grained to medium-grained, grain size increases with depth, fresh to weakly altered. Vesicles 1–3%, most abundant in Section 1, 10–20 cm, ≤ 1 mm, spherical, filled with smectite. Fractures and veinlets sparse, hairline to 1 mm wide, lined or filled with smectite, carbonate and rare pyrite.

Thin Section Description

Location: Section 1, 3–5 cm

Texture: Sparsely phyric, fine-grained, intergranular to intersertal

Phenocrysts: Olivine 1%, 0.5–1 mm, subhedral, partly replaced by smectite, some fresh, $2V_z$ ~ 85°; plagioclase 5–7%, 0.5–3 mm, subhedral, strongly zoned, often in glomerocrysts

Groundmass: Olivine 2–3%, 0.05–0.2 mm, subhedral, altered to smectite; plagioclase 45%, 0.1–0.4 mm, subhedral laths, fresh; clinopyroxene 35–40%, 0.1–0.3 mm, anhedral, fresh, $2V_z$ ~ 40°; opaques 3–4%, 0.05–0.2 mm, subhedral, probably magnetite; interstitial material 5–6%, glassy to microcrystalline patches, mostly altered to smectite

Vesicles: 1–2%, 0.2–0.5 mm, round, filled with smectite and minor carbonate

Alteration: Olivine and interstitial material partly altered to smectite

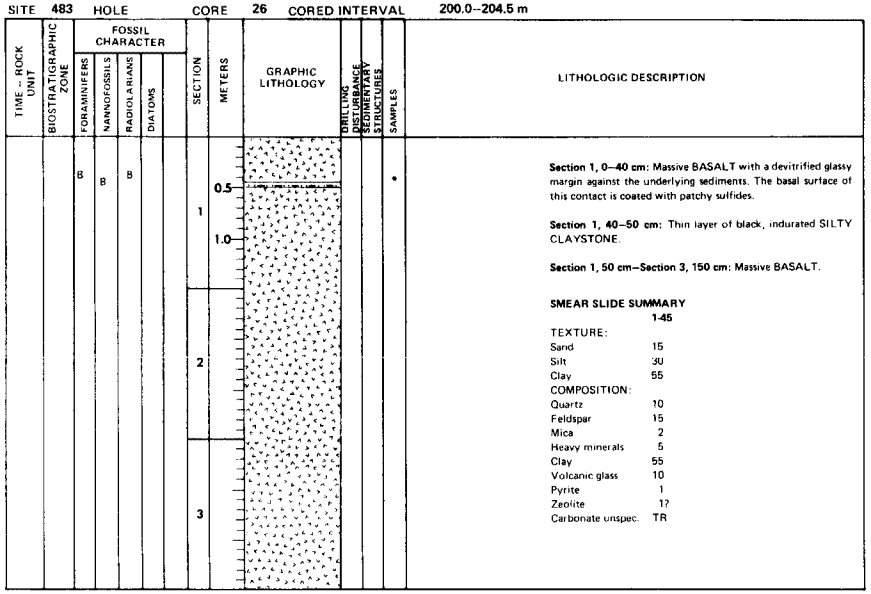
Location: Section 1, 67–69 cm

Texture: Aphyric, coarse-grained, ophimottled

Groundmass: Olivine 5–8%, 0.1–0.5 mm, subhedral, replaced by smectite and minor carbonate; plagioclase 30%, 0.5–2.5 mm, subhedral laths, fresh; clinopyroxene 25%, 0.5–1 mm, anhedral, in ophitic clots with plagioclase, $2V_z$ ~ 35°, fresh; opaques 2–3%, 0.05–0.1 mm, subhedral, probably magnetite; interstitial material 30–35%, microcrystalline mixture of opaques, pyroxene, and apatite, partly replaced by smectite

Alteration: Olivine and interstitial material replaced by smectite and minor carbonate

SITE 483 HOLE CORE 26 CORED INTERVAL 200.0–204.5 m



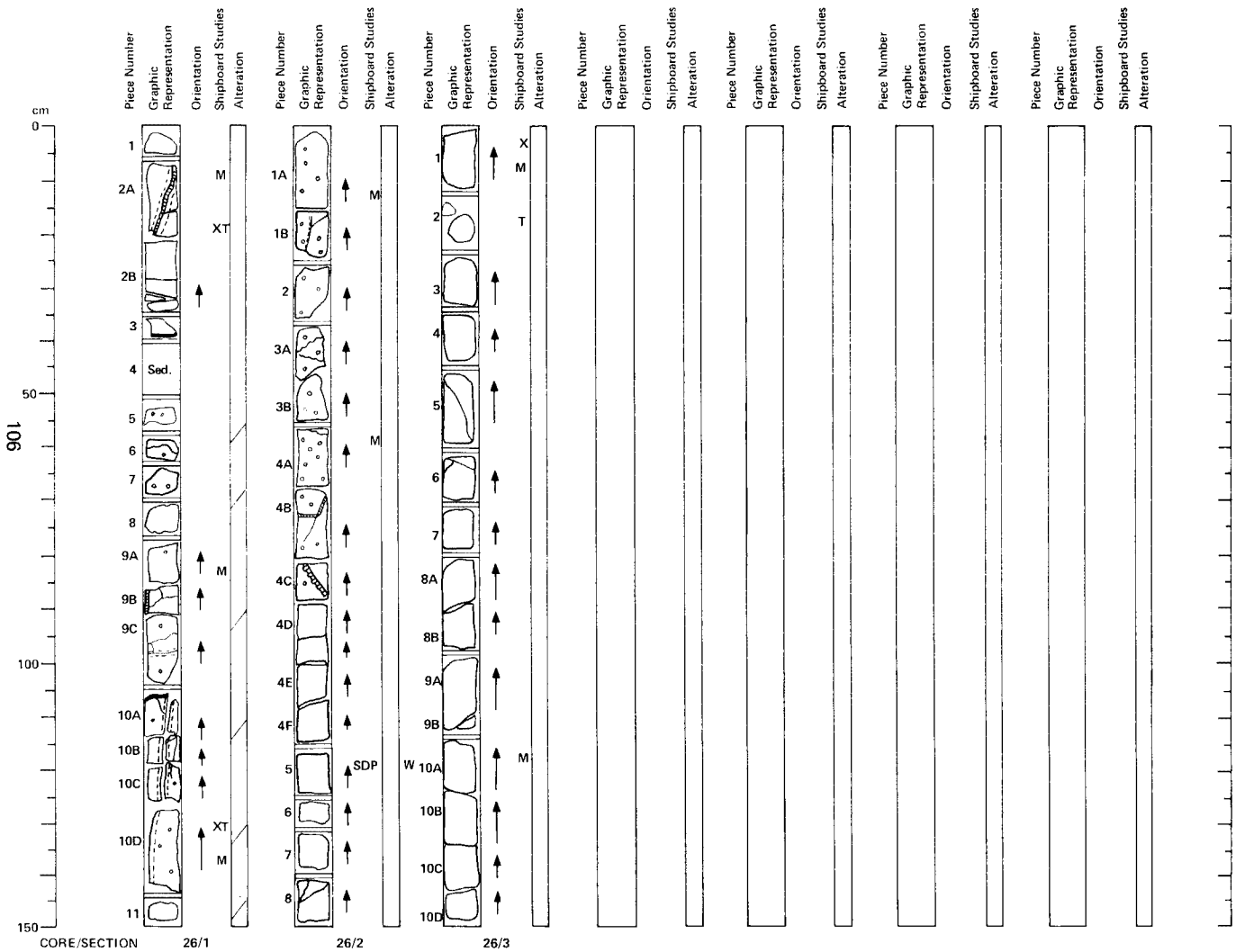
Section 1, 0–40 cm: Massive BASALT with a devitrified glassy margin against the underlying sediments. The basal surface of this contact is coated with patchy sulfides.

Section 1, 40–50 cm: Thin layer of black, indurated SILTY CLAYSTONE.

Section 1, 50 cm–Section 3, 150 cm: Massive BASALT.

SMEAR SLIDE SUMMARY

	1-45
TEXTURE:	
Sand	15
Silt	30
Clay	55
COMPOSITION:	
Quartz	10
Feldspar	15
Mica	2
Heavy minerals	5
Clay	55
Volcanic glass	10
Pyrite	1
Zeolite	1?
Carbonate unspec.	TR



HOLE 483, CORE 26

Visual Description

Section 1, 0–40 cm: Medium to dark gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–2%, 1–2 mm, euhedral to subhedral, fresh; olivine phenocrysts 1%, ≤ 2 mm, subhedral, often resorbed, altered to smectite, with minor carbonate and pyrite. Groundmass is fine- to medium-grained, grain size decreases toward glassy margin at 40 cm; glass devitrified and partly coated with pyrite. Vein extends from 7 to 21 cm, 5–8 mm wide, filled with smectite, carbonate and minor pyrite.

Section 1, 40–50 cm: Black, highly indurated, silty claystone.

Section 1, 50 cm–base of core: Medium gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts 1%, mostly < 2 mm, some crystals and glomerophyric clusters are up to 6 mm, euhedral to subhedral, fresh; olivine < 1%, ≤ 1 mm, euhedral to subhedral, sometimes resorbed, altered to smectite. Groundmass fine- to medium-grained with several cooling breaks, sometimes mottled, fresh to moderately altered in halos along veins. Vesicles 1–5%, abundance decreases in lower 70 cm of core, 1–3 mm, spherical, partly filled with smectite, minor carbonate and zeolite(?). Fractures and veinlets moderately common, hairline to 3 mm, filled with smectite, carbonate and minor pyrite, some slickensided; some fractures appear bleached and some have dark halos 2–3 mm wide containing pyrite.

Thin Section Description

Location: Section 1, 20–21 cm

Texture: Sparsely phyric, fine- to medium-grained, intergranular

Phenocrysts: Olivine 1%, 0.4–0.7 mm, subhedral, replaced by smectite; plagioclase 3–4%, 0.7–1.5 mm, subhedral, fresh

Groundmass: Olivine 1–2%, 0.05–0.2 mm, subhedral, replaced by smectite; plagioclase 45–50%, 0.1–0.6 mm, subhedral, fresh; clinopyroxene 40–45%, 0.05–0.2 mm, granular, fresh, $2V_z \sim 40$; opaques 3%, 0.05–0.1 mm, subhedral, probably magnetite; interstitial material 5%, microcrystalline, partly replaced by smectite

Veins and Fractures: A few hairline cracks filled with smectite

Alteration: Olivine and some interstitial material replaced by smectite.

Location: Section 1, 100–101 cm

Texture: Very sparsely phyric, fine-grained, intergranular to intersertal

Phenocrysts: Plagioclase 1–2%, 1–3 mm, subhedral, some corroded, fresh

Groundmass: Olivine 2–3%, 0.2–0.5 mm, subhedral, replaced by smectite and minor carbonate; plagioclase 55–60%, 0.1–1.5 mm, serrate, acicular, some variolitic clusters; clinopyroxene 25%, 0.005–0.2 mm, granular to prismatic, fresh; $2V_z \sim 45$; opaques 3–5%, minute crystals, probably magnetite; interstitial material 7–8%, microcrystalline, mostly replaced by smectite

Vesicles: 1–2%, 0.3–0.5 mm, round, filled with smectite, carbonate and minor pyrite

Alteration: Olivine and interstitial material replaced by smectite and carbonate

Location: Section 1, 17–19 cm

Texture: Sparsely phyric, fine- to medium-grained, intergranular to intersertal

Phenocrysts: Plagioclase 1%, 1–1.2 mm, subhedral, fresh, often zoned.

Groundmass: Olivine 2–3%, 0.1–0.3 mm, subhedral, replaced by smectite; plagioclase 45%, 0.2–1 mm, subhedral, fresh, somewhat zoned; clinopyroxene 40%, 0.05–0.3 mm, anhedral, fresh, $2V_z \sim 40$; opaques 3–4%, 0.05–0.1 mm, subhedral, probably magnetite; intersertal material 10–15%, microcrystalline, partly replaced by smectite.

Vesicles: ~1%, ~1 mm, round, filled with smectite

Alteration: Olivine and most interstitial material replaced by smectite

SITE SUMMARY

HOLE 483A

Date occupied: February 17, 1979
Date departed: February 17, 1979
Time on hole: About one day
Position (latitude; longitude): 22°52.99'N; 108°44.84'W
Water depth (sea level; corrected m, echo-sounding): 3070
Water depth (rig floor; corrected m, echo-sounding): 3080
Bottom felt at (m, drill pipe): 3084
Penetration (m): 60
Number of cores: 0
Total length of cored section (m): 0
Total core recovered (m): 0
Core recovery (%): 0

SITE SUMMARY

HOLE 483B

Date occupied: February 18, 1979
Date departed: March 3, 1979
Time on hole: 13 days, 8 hours
Position (latitude; longitude): 22°52.99'N; 108°44.84'W
Water depth (sea level; corrected m, echo-sounding): 3070
Water depth (rig floor; corrected m, echo-sounding): 3080
Bottom felt at (m, drill pipe): 3084
Penetration (m): 267.0
Number of cores: 32
Total length of cored section (m): 175.5
Total core recovered (m): 91.59
Core recovery (%): 52

Oldest Sediment Cored

Depth sub-bottom (m): 150
Nature: Claystone
Age: 2.0 m.y.
Measured velocity (km/s): 2.2

Basement

Depth sub-bottom (m): 267
Nature: Basalt
Velocity range (km/s): 5.8–6.1

SITE 483 HOLE B CORE 1 CORED INTERVAL 91.5–101.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
QUATERNARY	NN19 (N)		CM			1	0.5	VOID			*	5Y 3/2
							1.0				*	5GY 3/2
						2					*	
						3					*	
						4					*	5G 2/1
						5		VOID			*	
						6		VOID				

Sections 1–3: Soft olive gray CLAY containing a small, rounded fragment of limestone in Section 3.
Sections 4–6: Firm greenish black CLAY containing small amounts of volcanic glass.

SMEAR SLIDE SUMMARY

	1-41	1-84 (M)	1-111	2-64	2-147	3-65	4-65	5-48	5-64
TEXTURE:									
Sand	3		2	–	–	–	–	–	10
Silt	11	10	10	15	10	14	12	12	6
Clay	86	90	88	85	90	86	88	88	84
COMPOSITION									
Quartz	7	4	6	7	5	5	5	6	8
Feldspar	3	2	3	3	1	3	2	3	2
Mica	2	–	1	1	1	1	1	–	–
Heavy minerals	1	1	1	1	2	–	1	2	3
Clay	86	90	88	85	90	86	88	88	84
Volcanic glass	–	–	–	–	–	3	3	1	2
Pyrite	1	–	1	1	1	–	–		1
Calc. nannofossils	–	3	–			2		–	–
Radiolarians			–	2	–		–	–	–

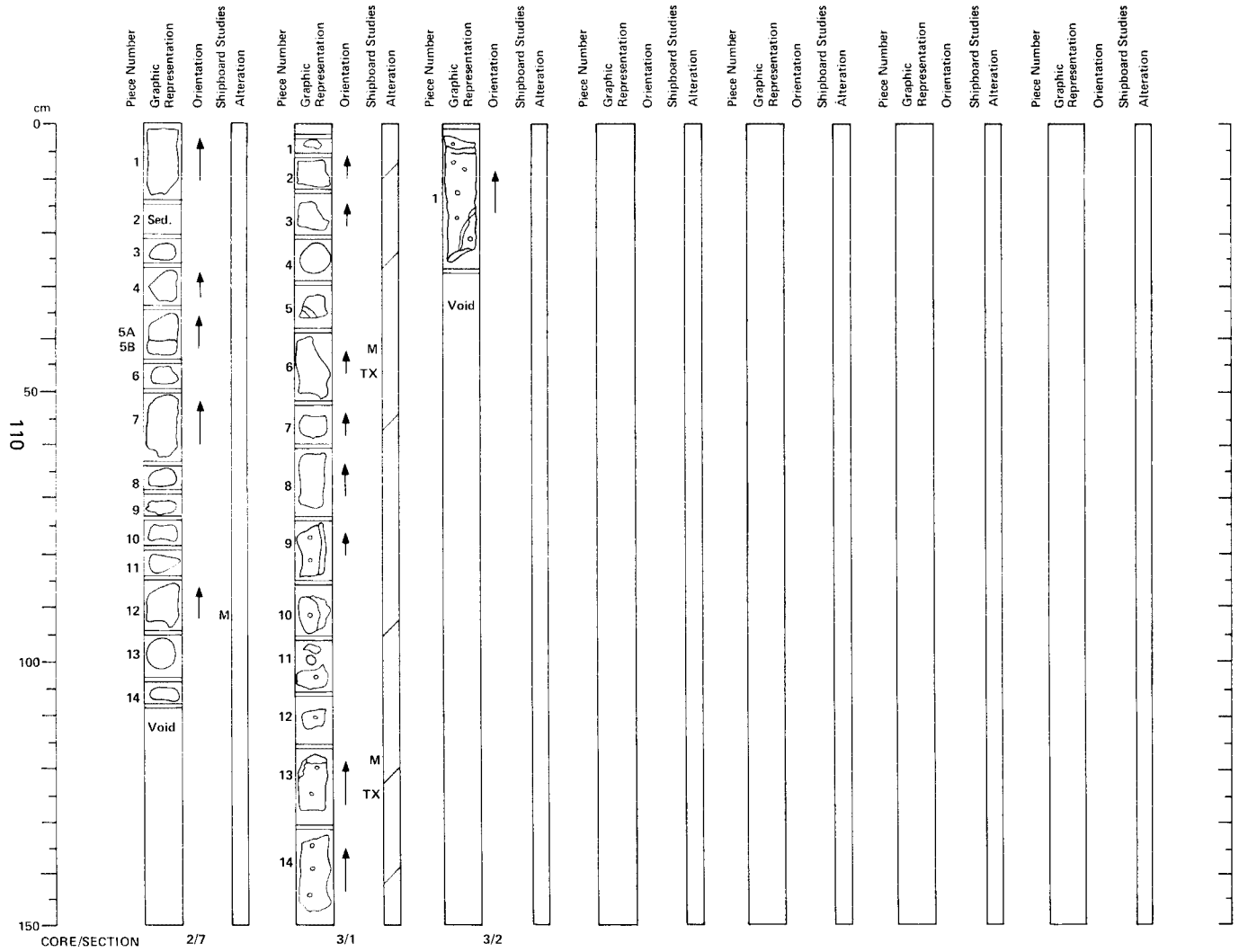
SITE 483 HOLE B CORE 2 CORED INTERVAL 101.0–110.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
QUATERNARY	NN19 (N)	FG		B		1	0.5				*	5Y 3/2
							1.0					5Y 2/1
						2					*	
						3					*	
		FM		B		4		VOID			*	
						5		VOID			*	
		RM		B		6					*	
			FP			7		VOID				

Section 1, 0 cm–Section 6, 130 cm: Olive gray to olive black CLAY with minor amounts of SAND at the base of Section 3 and the top of Section 4. Rare patches of silt-sized carbonate (dolomite?) grains are found in the middle of Section 6. The sediments are firm in Section 1 but firm throughout the rest of the core.
Section 6, 130 cm–Section 7, 30 cm: BASALT with a thin layer of SILTY CLAY at a depth of 15–20 cm in Section 7. Sediment contact with basalt at 130 cm in Section 6 distributed by drilling.

SMEAR SLIDE SUMMARY

	1-75	2-75	3-75	4-3	4-75	5-75	6-73
TEXTURE:							
Sand	–	–	–	3	–	–	1
Silt	15	12	8	5	14	10	90
Clay	85	88	92	92	86	90	9
COMPOSITION:							
Quartz	6	5	3	5	7	4	15
Feldspar	3	2	–	1	3	1	1
Mica	1	–	–	–	–	–	–
Heavy minerals	5	3	4	2	4	3	1
Clay	85	88	92	92	86	90	9
Volcanic glass	–	1	–	–	–	1	–
Pyrite	–	–	–	–	–	1	–
Carbonate unspec.	–	–	–	–	–	TR	74



HOLE 483B, CORE 2

Visual Description

Section 7, 0–15 cm: Gray, sparsely phyric, massive(?) basalt. Plagioclase phenocrysts 2–3%, 2–4 mm, euhedral, fresh. Groundmass medium-grained, fresh.

Section 7, 15–22 cm: Olive-black, silty claystone.

Section 7, 22 cm–base of core: Light gray, sparsely to moderately-phyric, massive basalt. Plagioclase phenocrysts 8–10%, 2–6 mm, euhedral, fresh; olivine phenocrysts 1–2%, 1–2 mm, replaced by smectite. Groundmass medium-grained, uniform, fresh. Vesicles 1%, irregularly distributed, 1–1.5 mm, spherical, filled with smectite.

HOLE 483B, CORE 3

Visual Description

Section 1, 0–74 cm: Gray, moderately phyric, massive basalt. Plagioclase phenocrysts 10%, 1–4 mm, euhedral, fresh; olivine phenocrysts 1–2%, ≤ 1 mm, euhedral, partly replaced by smectite. Groundmass medium-grained, uniform, relatively fresh. Vesicles <1%, ≤ 0.5 mm, spherical, filled with smectite. Fractures and veinlets sparse, one vein at 35 cm is 3 mm wide, most ≤ 1 mm, filled with smectite and carbonate.

Section 1, 74 cm–base of core: Medium gray, aphyric, massive basalt. Groundmass is medium- to coarse-grained, generally weakly to moderately altered. Vesicles 1–7%, 0.5–1.5 mm, spherical, filled with smectite, carbonate and zeolite(?). Fractures and veins sparse, 1–3 mm wide, filled with smectite, carbonate and rare pyrite.

Thin Section Description

Location: Section 1, 49–50 cm

Texture: Moderately phyric, medium-grained, intergranular to intersertal

Phenocrysts: Olivine 2%, 0.3–0.8 mm, euhedral, partly altered to smectite; plagioclase 10%, 0.2–2.5 mm, subhedral, fresh, mostly in glomerophyric clots.

Groundmass: Olivine 1–2%, 0.05–0.2 mm, subhedral, partly altered to smectite, $2V_z \sim 90$; plagioclase 45%, 0.1–0.5 mm, subhedral, fresh; clinopyroxene 35%, 0.1–0.2 mm granular, fresh, $2V_z \sim 40$; opaques 3%, 0.05–0.1 mm, subhedral, probably magnetite; interstitial material 10%, glassy, mostly altered to smectite.

Vesicles: <1%, 0.3 mm, round, filled with smectite.

Alteration: Olivine and interstitial material partly replaced by smectite and traces of carbonate.

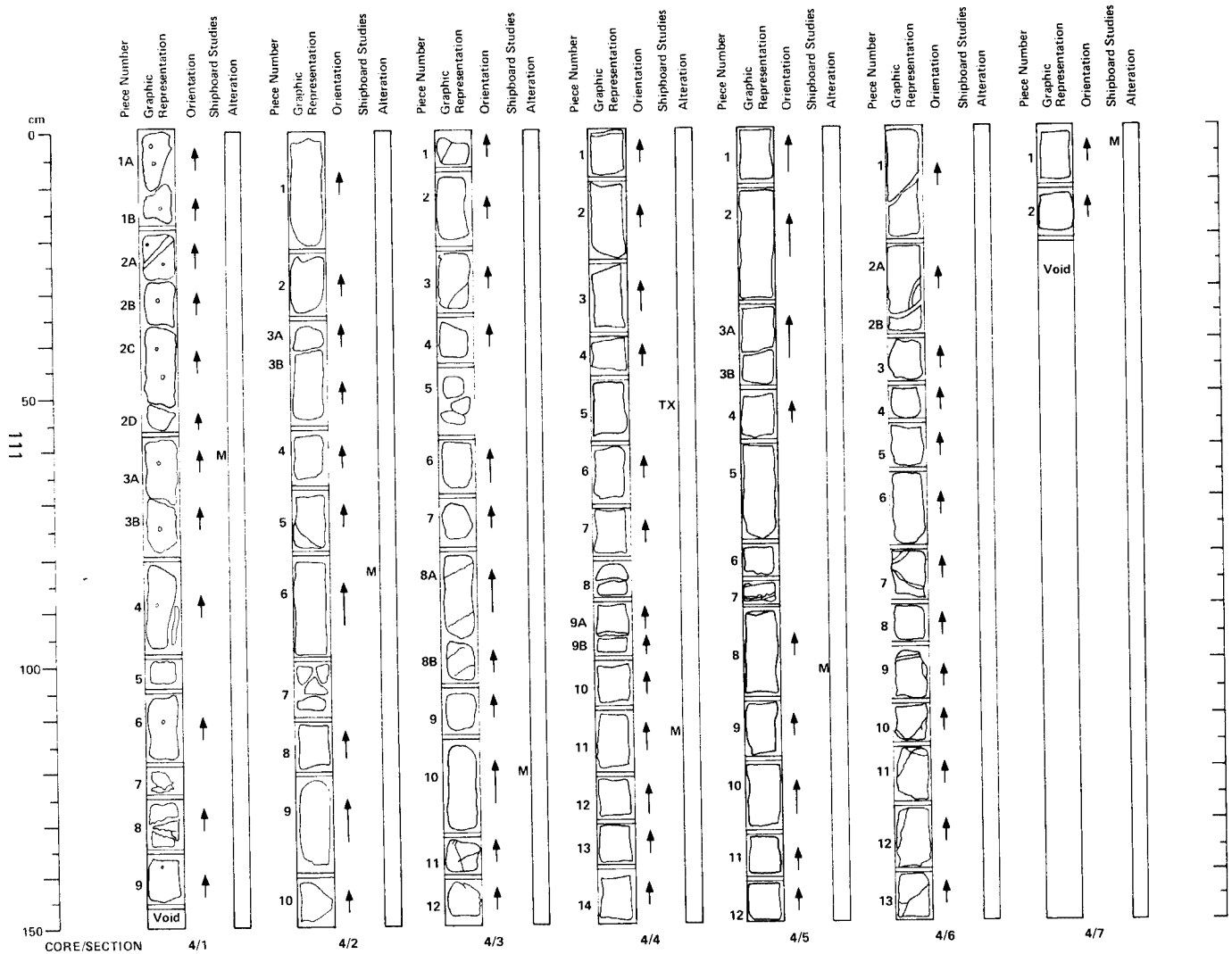
Location: Section 1, 125–126 cm

Texture: Aphyric, medium- to coarse-grained, subophitic

Groundmass: Olivine 2%, 0.1–0.3 mm, subhedral, replaced by smectite; plagioclase 45%, 0.1–1 mm, subhedral, fresh; clinopyroxene 45%, 0.1–0.5 mm, anhedral, fresh, $2V_z \sim 40$; opaques 2%, 0.05–0.2 mm, probably magnetite; interstitial material 7%, glassy, altered to smectite.

Vesicles: 1–2%, 0.5–0.8 mm, round, filled with smectite and carbonate.

Alteration: Olivine and interstitial material replaced by smectite and minor carbonate.



HOLE 483B, CORE 4

Visual Description

Medium to light gray, aphyric, massive basalt. Traces of plagioclase microphenocrysts, < 1 mm, fresh. Groundmass medium- to coarse-grained, generally fresh, some alteration along veins. Vesicles 0–5%, most abundant in upper meter of core, 0.5–1.5 mm, spherical, filled with smectite and carbonate. Veinlets and fractures fairly common, 1–3 mm wide, lined and filled with smectite, carbonate and rare pyrite.

Thin Section Description

Location: Section 4, 50–53 cm

Texture: Aphyric, coarse-grained, subophitic to intersertal

Groundmass: Olivine 2–3%, 0.2–0.5 mm, subhedral, replaced by smectite; plagioclase 45%, 0.3–1.3 mm, subhedral, fresh; clinopyroxene 45%, 0.3–0.7 mm, subhedral to anhedral, fresh, usually in subophitic plates, often zoned, $2V_z \sim 40°$; opaques 3%, 0.05–0.1 mm, subhedral, probably magnetite; interstitial material 2–3%, glassy, replaced by smectite.

Alteration: Olivine and interstitial material replaced by smectite.

SITE 483B, CORE 5, 127.0–130.0 m: NO RECOVERY

SITE 483B, CORE 6, 130.0–133.0 m: NO RECOVERY

SITE 483 HOLE B CORE 7 CORED INTERVAL 133.0–137.5 m

TIME—ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			B			1	0.5 1.0	VOID				5Y 2/1 **Section 1, 0–7 cm:** Firm olive black SILTY CLAY overlying BASALT.
						2						
						3						

HOLE 483B, CORE 7

Visual Description

Section 1, 0–12 cm: Olive black, silty clay with a few pieces of basal.

Section 1, 1 cm–base of core: Light to medium gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts < 1%, 3–5 mm, scattered, fresh, rarely in clusters; olivine phenocrysts, < 1%, 1–2 mm, altered to smectite. Groundmass medium- to coarse-grained, uniform, generally fresh, except for narrow halos along fractures. Fractures and veins fairly common, < 1 mm, filled with smectite, carbonate and minor pyrite.

Thin Section Description

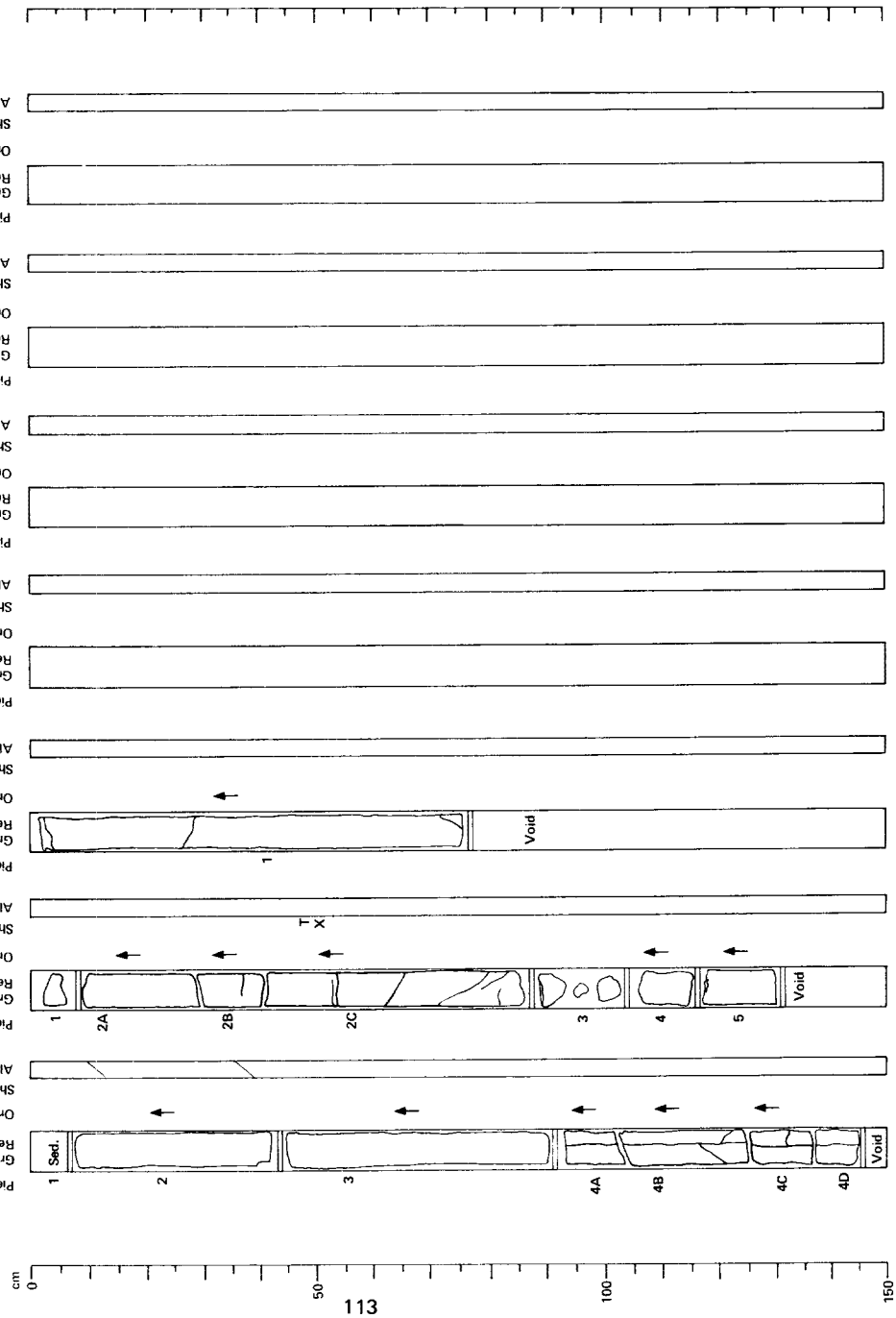
Location: Section 2, 48–50 cm

Texture: Aphyric, coarse-grained, intergranular to subophitic

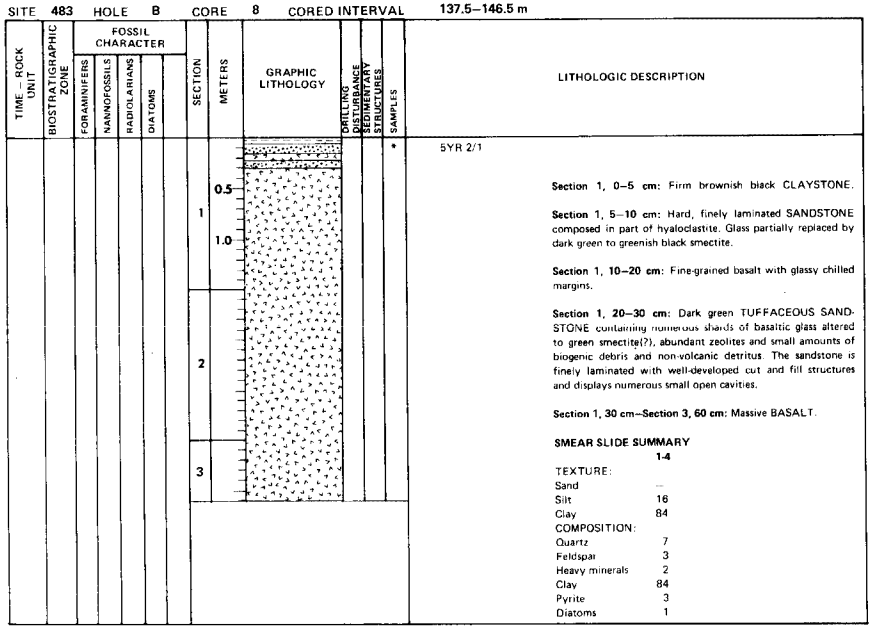
Groundmass: Olivine 3–5%, 0.1–0.3 mm, subhedral, replaced by smectite; plagioclase 45–50%, 0.1–0.6 mm, subhedral, fresh; clinopyroxene 40–45%, 0.02–0.04 mm, anhedral, fresh; $2V_z \sim 40°$; opaques 5%, 0.05–0.15 mm, subhedral, skeletal, probably magnetite; interstitial material 2–3%, replaced by smectite.

Veins and Fractures: 1 veinlet, 0.3 mm wide, lined with brown smectite and filled with carbonate.

Alteration: Olivine and minor interstitial material replaced by greenish-brown smectite.



SITE 483 HOLE B CORE 8 CORED INTERVAL 137.5–146.5 m



Section 1, 0–5 cm: Firm brownish black CLAYSTONE.

Section 1, 5–10 cm: Hard, finely laminated SANDSTONE composed in part of hyaloclastite. Glass partially replaced by dark green to greenish black smectite.

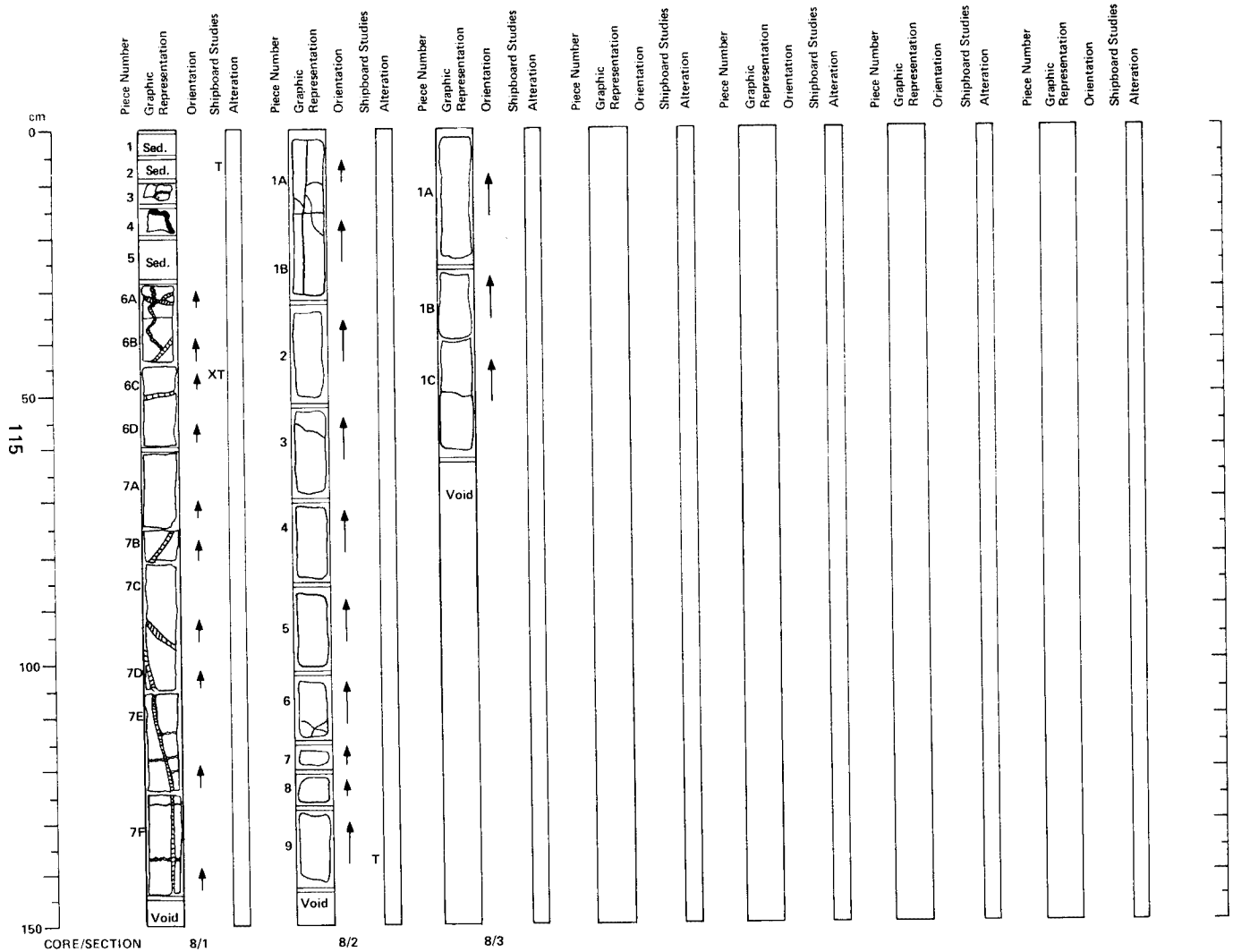
Section 1, 10–20 cm: Fine-grained basalt with glassy chilled margins.

Section 1, 20–30 cm: Dark green TUFFACEOUS SANDSTONE containing numerous shards of basaltic glass altered to green smectite(?), abundant zeolites and small amounts of biogenic debris and non-volcanic detritus. The sandstone is finely laminated with well-developed cut and fill structures and displays numerous small open cavities.

Section 1, 30 cm–Section 3, 60 cm: Massive BASALT.

SMEAR SLIDE SUMMARY

	1-4
TEXTURE:	
Sand	–
Silt	16
Clay	84
COMPOSITION:	
Quartz	7
Feldspar	3
Heavy minerals	2
Clay	84
Pyrite	3
Diatoms	1



115

HOLE 483B, CORE 8

Visual Description

Section 1, 0–10 cm: Light brown, fine- to medium-grained, slightly bedded hyaloclastite.

Section 1, 10–15 cm: Dark gray, aphyric basalt. Veinlets common, filled with carbonate.

Section 1, 15–20 cm: Gray, sparsely phyric basalt with glassy crust. Plagioclase phenocrysts 5–7%, 1–2 mm, often in glomerocrysts to 4 mm, fresh; olivine phenocrysts <1%, ≤ 1 mm, altered to smectite. This piece probably fell into hole from above.

Section 1, 20–28 cm: Dark greenish-gray, hyaloclastite with small cross-laminations; chiefly basaltic glass shards, altered to smectite and zeolite(?).

Section 1, 28 cm–base of core: Medium gray, aphyric, massive basalt. Rock grades downward from fine-grained to medium-grained; rock relatively fresh. Veins and fractures common, mostly steep, ≤1 cm wide, filled with smectite, carbonate and minor zeolite(?).

Thin Section Description

Location: Section 1, 8–9 cm

Texture: Vitroclastic, fine- to medium-grained

Phenocrysts: Plagioclase 2–3%, 0.3–0.8 mm, subhedral to anhedral, some crystal slivers, fresh; clinopyroxene(?) ≤ 1%, granules; quartz and heavy mineral grains 1–2%, sand-size, angular; foraminifers and sponge spicules 1–2%; lithic fragments 1%, mostly microcrystalline basalt

Groundmass: Glass shards 50–75%, 0.2–0.6 mm, angular, mostly replaced by brown and green smectite or zeolite; cement 45%, brown fibrous zeolite (phillipsite?) with minor calcite.

Alteration: Glass to smectite and zeolite.

Location: Section 1, 45–46 cm

Texture: Aphyric, fine- to medium-grained, subophitic to intersertal

Groundmass: Olivine 5–8%, 0.1–0.3 mm, subhedral, partly replaced by smectite; plagioclase 45–50%, 0.2–0.8 mm, subhedral, fresh; clinopyroxene 40–45%, 0.3–0.5 mm, anhedral, fresh, $2V_z \sim 40$; opaques 3%, 0.05–0.1 mm, subhedral, probably magnetite; interstitial material 2–3%, replaced by smectite.

Vesicles: <1%, 0.5 mm, round, filled with smectite and carbonate

Veins and Fractures: 1 veinlet, hairline, filled with brownish-green smectite

Alteration: Interstitial material and some olivine replaced by smectite.

Location: Section 2, 133–137 cm

Texture: Aphyric, fine- to coarse-grained, ophimottled to intersertal

Groundmass: Olivine 10–12%, 0.1–0.8 mm, subhedral, replaced by smectite; plagioclase 40–45%, 0.3–1 mm, subhedral, fresh; clinopyroxene 30–45%, 0.2–3 mm, granular to large, irregular ophitic plates, fresh, $2V_z \sim 45$; opaques 2%, 0.05–0.1 mm, subhedral, probably magnetite

Vesicles: ≤ 1%, 0.5 mm, round, filled with smectite

Alteration: Olivine altered to smectite; some patches show replacement of plagioclase and pyroxene by smectite, chlorite and carbonate.

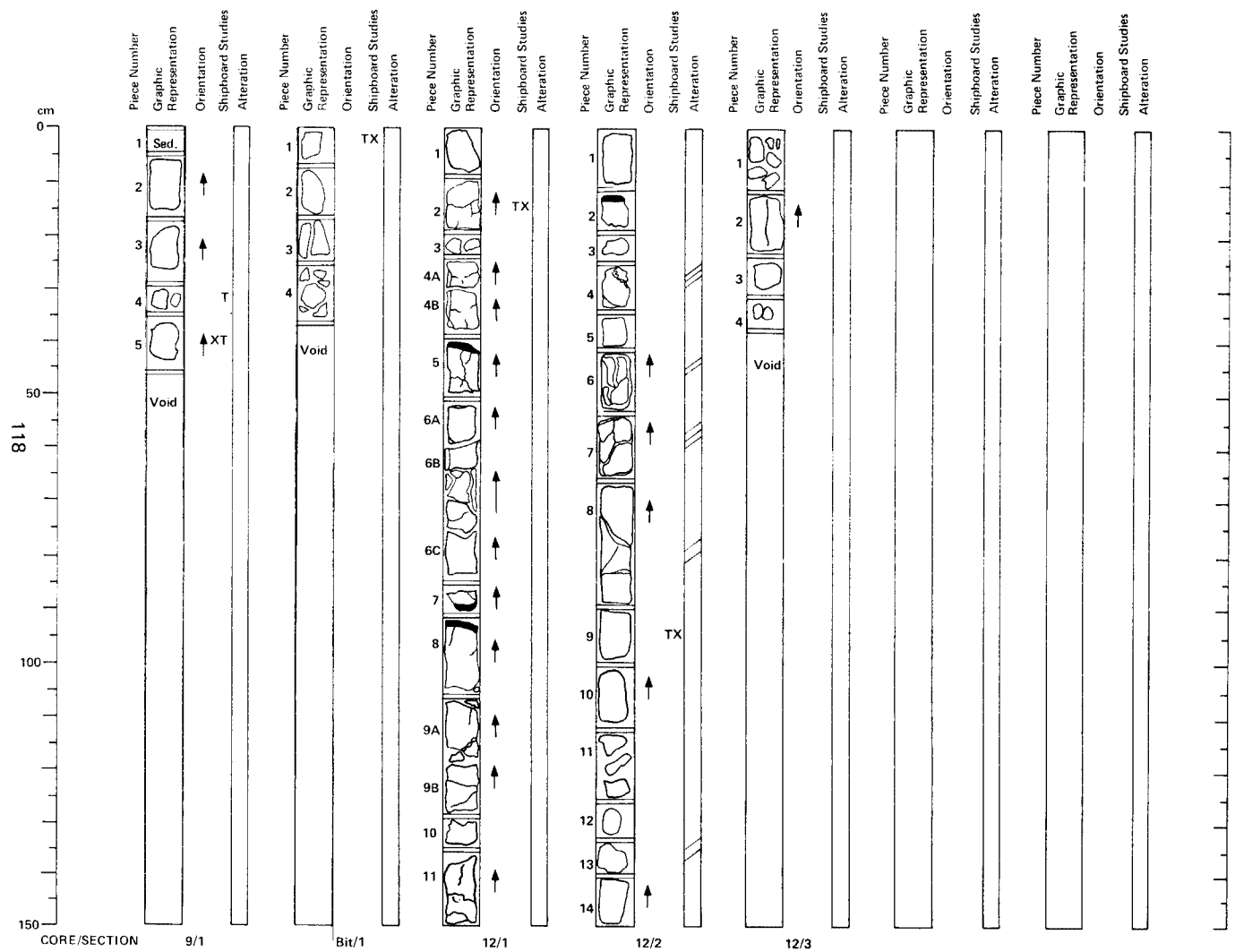
SITE 483 HOLE B CORE 9 CORED INTERVAL 146.5–151.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER PLIOCENE	NN13 (N)		CM			1					*	

Section 1, 0–5 cm: Firm olive black CLAYSTONE overlying massive BASALT.

SMEAR SLIDE SUMMARY

	1-3
TEXTURE:	
Sand	–
Silt	23
Clay	77
COMPOSITION:	
Quartz	7
Feldspar	2
Clay	77
Pyrite	6
Calc. nannofossils	8
Diatoms	TR



HOLE 483B, CORE 9

Visual Description

Section 1, 0–5 cm: Brownish-black, fine-grained, sandy claystone.

Section 1, 5–30 cm: Medium gray, aphyric, medium-grained, massive basalt. Fractures sparse, ≤1 mm, filled with carbonate, and smectite; some alteration of rock adjacent to veins.

Section 1, 30 cm–base of core: Dark gray, aphyric to sparsely phyric basalt. Piece 4 is sparsely phyric, Piece 5 is aphyric. Plagioclase microphenocrysts 3–5%, ≤ 0.5 mm, subhedral, fresh; olivine microphenocrysts 2–3%, ≤ 0.4 mm, subhedral, altered to smectite; clinopyroxene microphenocrysts ≤ 1%, ≤ 0.4 mm, intergrown with plagioclase in small clots. Groundmass quenched but no glassy rinds present; slightly altered. Fractures and veinlets sparse, ≤ 1 mm, filled with smectite and carbonate.

Thin Section Description

Location: Section 1, 33–35 cm

Texture: Sparsely phyric, quench

Phenocrysts: Olivine 2–3%, 0.2–0.4 mm, subhedral, replaced by smectite; plagioclase 3–5%, 0.5 mm, subhedral laths, fresh; clinopyroxene 1%, 0.2–0.4 mm, anhedral, often in small clots with plagioclase, fresh, $2V_z \sim 45°$.

Groundmass: 90%, quench mixture of plagioclase needless, poorly crystallized clinopyroxene with sheaf-like texture, and granular opaques.

Alteration: Olivine replaced by smectite and some carbonate.

Location: Section 1, 40–42 cm

Texture: Aphyric, medium-grained, subophitic to intergranular

Groundmass: Olivine 5%, 0.1–0.3 mm, subhedral to anhedral, mostly fresh, some grains rimmed with smectite, $2V_z \sim 90°$; plagioclase 40–45%, 0.1–1 mm, subhedral, fresh; clinopyroxene 45%, 0.1–1 mm, anhedral, usually subophitic, fresh, $2V_z \sim 45°$; opaques 2–3%, minute grains, probably magnetite; interstitial material 2–3%, glassy, partly replaced by smectite.

Alteration: Some olivine and interstitial material altered to smectite.

HOLE 483B, CORE Bit 1

Visual Description

Medium gray, aphyric to sparsely phyric, massive basalt. Pieces 1, 2, and 4 are phyric with plagioclase phenocrysts 5%, 1–10 mm, subhedral, fresh; olivine phenocrysts 2%, 0.5–1 mm, subhedral, partly replaced by smectite; clinopyroxene phenocrysts <1%, ≤0.5 mm, fresh; Piece 3 is aphyric. Groundmass fine- to medium-grained, generally fresh. Vesicles <1%, ≤0.5 mm, spherical, filled with smectite and carbonate.

Thin Section Description

Location: Section 1, 1–3 cm

Texture: Sparsely phyric, medium-grained, intersertal to subophitic.

Phenocrysts: Olivine 2%, 0.5–1 mm, subhedral, partly replaced by smectite; plagioclase 5%, 1–10 mm, subhedral, often corroded, strongly zoned, fresh; clinopyroxene <1%, 0.2–0.5 mm, fresh.

Groundmass: Olivine 3%, 0.1–0.5 mm, subhedral, mostly replaced by smectite; plagioclase 35–40%, 0.3–1 mm, subhedral, fresh; clinopyroxene 30–35%, 0.2–0.5 mm, anhedral, often subophitic, fresh, $2V_z \sim 45°$; opaques 3%, minute subhedral grains in interstitial patches; interstitial material 15–20%, mostly glassy, partly replaced by smectite.

Vesicles: 1%, 0.2–0.4 mm, round, filled with smectite and carbonate

Alteration: Some olivine and interstitial material replaced by smectite.

HOLE 483B, CORE 12

Visual Description

Medium gray, moderately phyric, pillow basalt. Phenocryst content decreases somewhat with depth; plagioclase phenocrysts 5–10%, 1–3 mm, euhedral, fresh; olivine phenocrysts 3–5%, ≤ 2 mm, subhedral, replaced by smectite; clinopyroxene phenocrysts 3%, ≤ 0.6 mm, anhedral, often in clots with plagioclase. Groundmass fine-grained to glassy, coarsest in centers of pillows; glass selvedges at 41 cm, 89 cm, and 91 cm in Section 1 and at 12 cm in Section 2; generally fresh. Vesicles 1–2%, ≤ 1 mm, spherical, filled with smectite and carbonate. Veins and fractures common, ≤ 2 mm wide, filled with smectite and minor carbonate.

Thin Section Description

Location: Section 1, 15–17 cm

Texture: Moderately phyric, quench

Phenocrysts: Olivine 2–5%, 1–2 mm, subhedral, replaced by smectite; plagioclase 10–12%, 1–3 mm, subhedral laths, often in clusters with clinopyroxene, fresh; clinopyroxene 3%, 0.2–0.6 mm, anhedral, in subophitic clots with plagioclase, fresh, $2V_z \sim 40$.

Groundmass: 80–85%, quench mixture of small plagioclase laths, poorly crystallized clinopyroxene and granular magnetite, mostly fresh.

Vesicles: 1–2%, 0.5–1 mm, round, some with segregation patches, mostly filled with smectite and carbonate.

Alteration: Olivine and some groundmass material replaced by smectite.

Location: Section 2, 94–96 cm

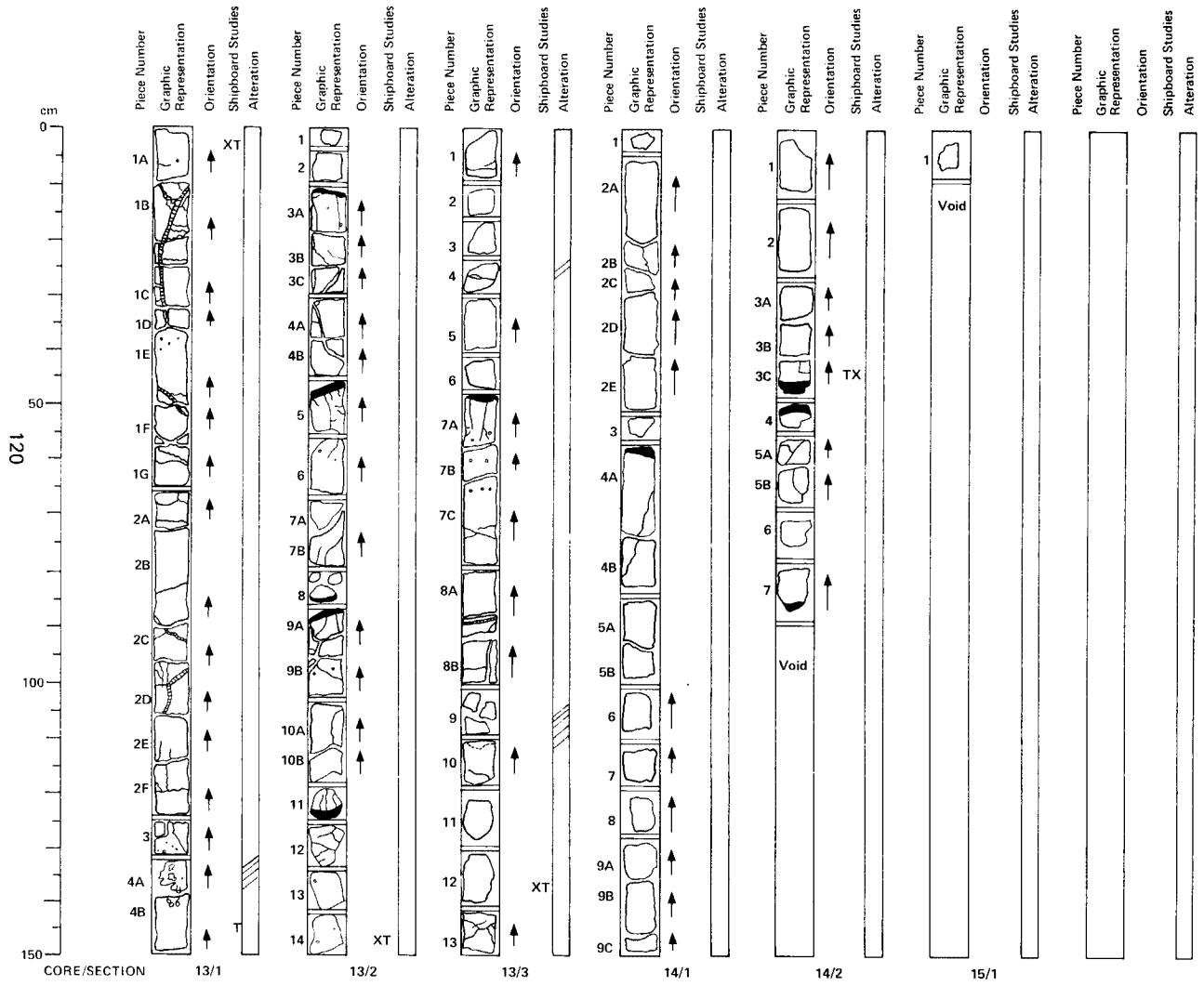
Texture: Very sparsely phyric, fine-grained, intergranular to intersertal

Phenocrysts: Olivine 1%, 0.6 mm, subhedral, replaced by smectite; plagioclase 2%, 0.5–1 mm, subhedral, fresh.

Groundmass: Olivine 1–2%, 0.1–0.2 mm, subhedral, replaced by smectite; plagioclase 50%, 0.2–0.5 mm, subhedral laths, fresh; clinopyroxene 40%, 0.05–0.3 mm, usually granular, fresh, $2V_z \sim 40$; opaques 1–2%, minute crystals of magnetite; interstitial material 2–3%, replaced by smectite.

Vesicles: 2–3%, 1–2 mm, round to irregular, filled with smectite and carbonate.

Alteration: Olivine and interstitial material replaced by smectite.



HOLE 483B, CORE 13

Visual Description

Dark gray, moderately to sparsely phyric, pillow basalt. Plagioclase phenocrysts 5–7%, ≤4 mm, euhedral, fresh; olivine phenocrysts 1–2%, ≤1 mm, subhedral, replaced by smectite; clinopyroxene phenocrysts 1%, <0.5 mm, anhedral, intergrown with plagioclase in small clots. Groundmass fine-grained to glssy, coarsest near pillow centers; glass selvedges at 12 cm, 46–49 cm, 84 cm, 86–88 cm, and 124 cm in Section 2 and at 48 cm in Section 3; non-glassy cooling unit boundaries at 65 and 125 cm in Section 1. Groundmass generally fresh, some glass altered to smectite. Vesicles <1%, most abundant at tops of cooling units, ≤1 mm, spherical, filled with smectite and carbonate. Fractures and veinlets common, ≤2 mm, wide, mostly steep, filled with smectite, carbonate and minor pyrite.

Thin Section Description

Location: Section 1, 3–5 cm
Texture: Moderately phyric, quench
Phenocrysts: Olivine 1–2%, 0.5–1 mm, subhedral, replaced by smectite and minor carbonate; plagioclase 5–7%, 1–4 mm, subhedral, fresh, zoned, some in glomerophyric clusters; clinopyroxene <1%, 0.2–0.4 mm, anhedral, in glomerophyric clusters with plagioclase, fresh, $2V_z \sim 40°$.
Groundmass: 90%, quench mixture of small crystals of olivine, plagioclase and magnetite in a matrix of poorly crystallized clinopyroxene with radiating sheaves; minor glass also present; fresh.
Vesicles: 1%, 0.2–0.6 mm, round, filled with smectite; some with segregation
Alteration: Olivine replaced by smectite and minor carbonate

Location: Section 1, 145–147 cm
Texture: Sparsely phyric, quench
Phenocrysts: Olivine 1–2%, 1–4 mm, subhedral, partly replaced by smectite, some fresh; plagioclase 3–5%, 1–3 mm, subhedral, fresh, mostly in glomerophyric clusters; clinopyroxene <1%, 1–4 mm, anhedral, intergrown with plagioclase and olivine; fresh.
Groundmass: Olivine 2%, 0.1–0.4 mm, subhedral, mostly replaced by smectite; plagioclase 15–20%, 0.3–1 mm, skeletal, fresh; clinopyroxene 20–25%, granular to radiating sheaves; opaques 2–3%, minute granules, probably magnetite; interstitial glass 30–50%, fresh.
Vesicles: <1%, 0.05–0.3 mm, round to irregular, filled with smectite.
Alteration: Olivine replaced by smectite

Location: Section 2, 146–148 cm
Texture: Sparsely to moderately phyric, quench.
Phenocrysts: Olivine 1%, 0.2–0.5 mm, subhedral, replaced by smectite; plagioclase 8–10%, 0.5–3 mm, subhedral laths, fresh, strongly zoned; clinopyroxene <1%, 0.3 mm anhedral, intergrown with plagioclase in glomerophyric clots, fresh, $2V_z \sim 45°$.
Groundmass: 90%, quench mixture composed mostly of poorly crystallized clinopyroxene with acicular plagioclase needles, small olivine crystals, replaced by smectite, and minute opaque granules.
Vesicles: 1%, 1–2 mm, round, filled with brown smectite
Alteration: Olivine replaced by smectite

Location: Section 3, 135–137 cm
Texture: Sparsely phyric, medium-grained, intergranular to intersertal
Phenocrysts: Olivine 1%, 0.5 mm, seriate to groundmass grains, subhedral, mostly replaced by smectite, some fresh; plagioclase 5%, 1–2 mm, subhedral, fresh, zoned; clinopyroxene 1%, 0.5 mm, seriate to groundmass grains, anhedral, intergrown with plagioclase, fresh, $2V_z \sim 45°$.
Groundmass: Olivine 3–4%, 0.2–0.5 mm, subhedral, mostly replaced by smectite; plagioclase 40–45%, 0.2–0.8 mm, subhedral, fresh; clinopyroxene 35%, 0.1–0.3 mm, anhedral, fresh, $2V_z \sim 45°$; opaques 2–3%, minute granules and laths, in interstitial areas; interstitial material 10%, mostly glassy, fresh.
Veins and Fractures: One hairline veinlet filled with carbonate
Alteration: Olivine partly replaced by smectite.

HOLE 483B, CORE 14

Visual Description

Dark gray, sparsely phyric, pillow basalt. Plagioclase phenocrysts 3–5%, ≤ 4 mm, euhedral, fresh; olivine phenocrysts < 1%, ≤ 3 mm, subhedral, replaced by smectite. Groundmass fine-grained to glassy, coarsest in pillow centers, generally fresh; glass selvedges at 59 cm, in Section 1 and at 46 cm, 51 cm, and 86 cm in Section 2; glass fractured and partly altered to smectite, carbonate and zeolite(?). Vesicles ≤ 1%, irregularly distributed, ≤ 0.5 mm, spherical, filled with smectite and carbonate. Fractures and veinlets sparse, filled with smectite, carbonate and minor pyrite.

Thin Section Description

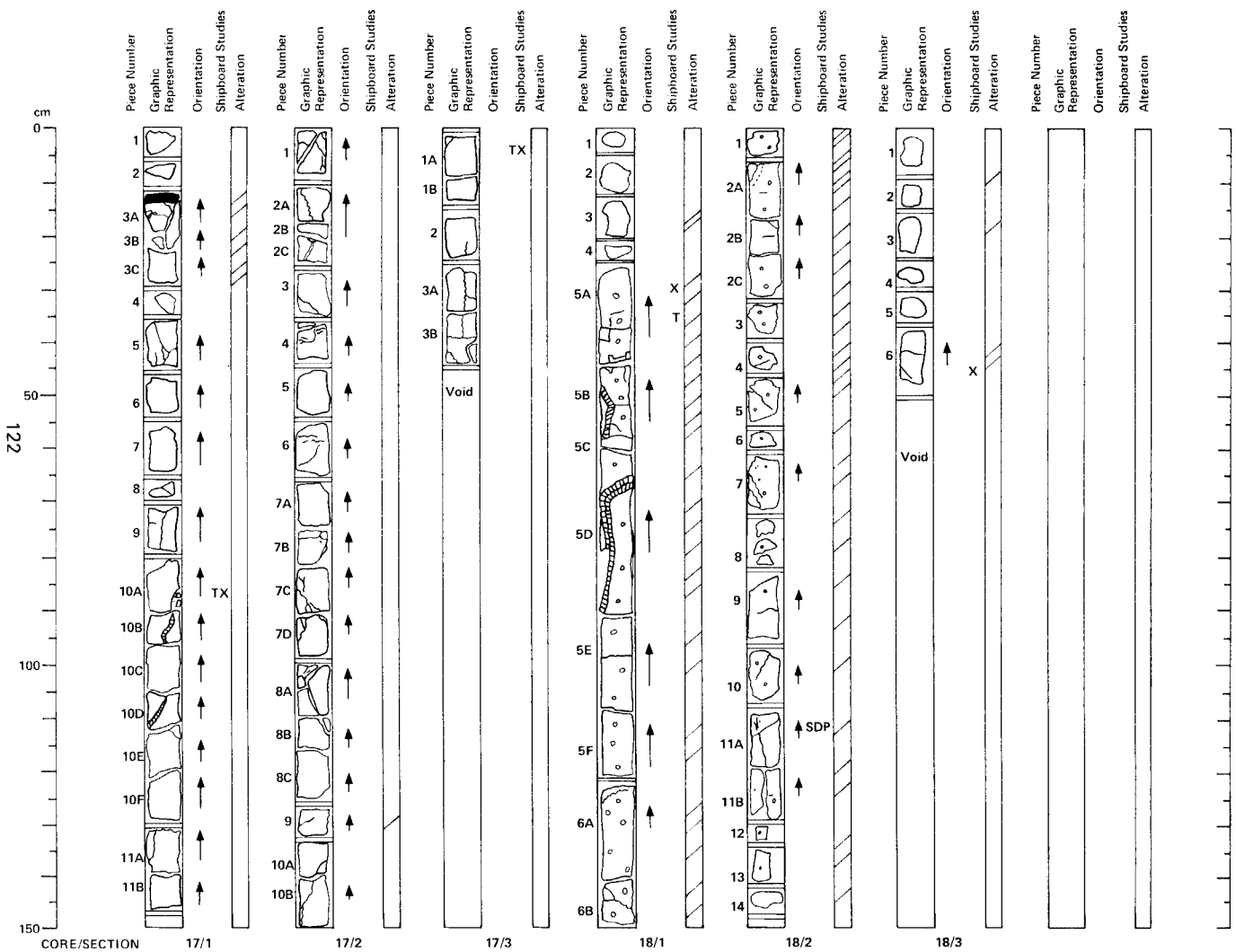
Location: Section 2, 46–48 cm
Texture: Sparsely phyric, quench
Phenocrysts: Olivine < 1%, 0.2–0.3 mm, subhedral, replaced by smectite and minor carbonate; plagioclase 3%, 0.2–3 mm, subhedral laths, largest grains corroded, fresh.
Groundmass: Quench mixture with 10%, acicular plagioclase laths, 1–2%, granular opaques and 85%, very poorly crystallized matrix with sheaf-like texture.
Vesicles: 1%, 0.2–0.3 mm, round, filled with smectite and carbonate.
Alteration: Olivine replaced by smectite.

HOLE 483B, CORE 15

Visual Description

Dark gray, sparsely phyric basalt. Plagioclase phenocrysts 5–7%, ≤ 3 mm, euhedral, fresh; sometimes in glomerophyric clots; olivine phenocrysts < 1%, 1–2 mm, subhedral, altered to smectite. Groundmass fine-grained, relatively fresh. Vesicles < 1%, < 1 mm, spherical, filled with smectite and minor pyrite.

HOLE 483B, CORE 16, 189.5–194.0 m: NO RECOVERY.



HOLE 483B, CORE 17

Visual Description

Gray, sparsely to very sparsely phyric, massive(?) basalt. Phenocrysts decrease in abundance downward; plagioclase phenocrysts 2–5%, ≤ 2 mm, euhedral, fresh; olivine phenocrysts 1–2%, ≤ 1 mm, subhedral, partly replaced by smectite. Groundmass fine- to very fine-grained, grain size increases slightly downward from chilled margin at 13 cm, Section 1; generally fresh. Vesicles < 1%, ≤ 0.5 mm, spherical, filled with smectite and carbonate. Fractures and veinlets sparse, ≤ 1 mm, mostly steep, filled with smectite, carbonate, and minor pyrite.

Thin Section Description

Location: Section 1, 85–87 cm

Texture: Sparsely phyric, quench

Phenocrysts: Olivine 2%, 0.2–1 mm, subhedral, mostly replaced by smectite; plagioclase 4–5%, 0.5–1.5 mm, skeletal laths, strongly zoned, fresh

Groundmass: Plagioclase 35–40%, 0.05–0.5 mm, acicular, often skeletal, some slight replacement by smectite; clinopyroxene 45–50%, 0.05–0.2 mm, poorly crystallized, granular to sheaf-like, fresh; opaques 5%, 0.005–0.05 mm, square to irregular granules, probably magnetite

Vesicles: < 1%, 0.5 mm, round, filled with smectite and carbonate

Alteration: Olivine and groundmass material partly replaced by smectite

Location: Section 3, 7–9 cm

Texture: Very sparsely phyric, medium-grained, intersertal

Phenocrysts: Olivine < 1%, 0.5–1.5 mm, subhedral, replaced by smectite; plagioclase 2%, 1–2 mm, subhedral, often corroded, fresh

Groundmass: Olivine 4%, 0.2–0.5 mm, subhedral, replaced by smectite; plagioclase 45–50%, 0.5–1 mm, subhedral, fresh; clinopyroxene 30%, 0.2–0.6 mm, anhedral, fresh, $2V_z \sim 40$; opaques 5%, 0.05–1 mm, square to lath-shaped crystals, magnetite-ilmenite; interstitial material 10–12%, mostly glassy to microcrystalline material, partly replaced by smectite

Vesicles: < 1%, 0.5–1 mm, subround to irregular, filled with smectite

Alteration: Olivine and some interstitial material replaced by smectite.

HOLE 483B, CORE 18

Visual Description

Medium gray, very sparsely to sparsely phyric, massive basalt. Plagioclase phenocrysts 1–3%, ≤ 2 mm, euhedral, fresh; olivine phenocrysts 1–2%, ≤ 1 mm, a few to 10 mm, subhedral, replaced by smectite. Groundmass fine-grained, generally uniform, weakly to strongly altered, most alteration along veins. Vesicles < 5%, increasing downward in Section 1 and decreasing downward in Sections 2 and 3, ≤ 3 mm, spherical, to irregular, filled with smectite, carbonate and pyrite. Fractures and veins common, particularly in Section 1, hairline to 3 mm wide, mostly steep, filled with smectite, carbonate and pyrite; many with alteration halos up to 15 mm wide. Groundmass alteration pervasive in highly fractured areas, most intense in upper meter of Section 2.

Thin Section Description

Location: Section 1, 35–37 cm

Texture: Very sparsely phyric, fine-grained, intergranular to intersertal

Phenocrysts: Olivine · 1%, 0.5–1 mm subhedral, replaced by smectite; plagioclase 2%, 1–2 mm, subhedral laths, fresh

Groundmass: Olivine 1–2%, 0.2–0.3 mm, subhedral, replaced by smectite; plagioclase 45–50%, 0.2–0.4 mm, acicular, fresh; clinopyroxene 40–45%, 0.1–0.3 mm, granular, fresh, often poorly crystallized; opaques 5%, 0.005–0.1 mm, square to lath-like crystals, magnetite-ilmenite

Vesicles: 3–5%, 1–2 mm, subround, filled with smectite and carbonate

Alteration: Olivine replaced by smectite

Location: Section 3, 45–48 cm

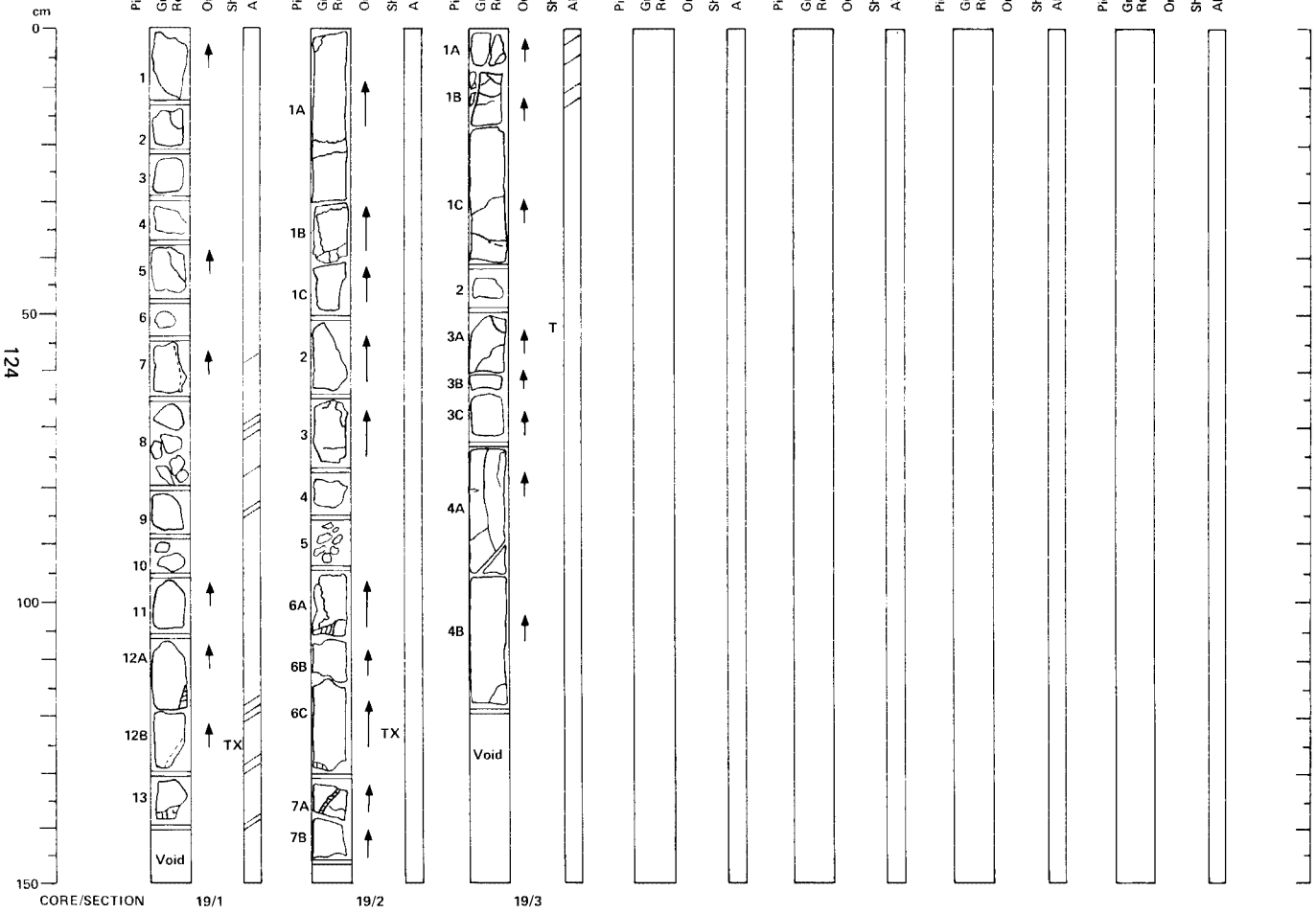
Texture: Sparsely phyric, fine-grained, intersertal to intergranular, somewhat variolitic

Phenocrysts: Olivine 1–2%, 0.5–1 mm, subhedral, replaced by smectite; plagioclase 2–3%, 1–2 mm, prisms and laths, seriate with groundmass, some crystals corroded and most zoned, fresh.

Groundmass: Olivine 1–2%, 0.3–0.5 mm, subhedral, often skeletal, replaced by smectite and minor carbonate; plagioclase 45%, 0.05–0.5 mm, subhedral laths, often in clots intergrown with olivine and clinopyroxene; clinopyroxene 30%, 0.05–0.5 mm, granular to acicular, fresh, $2V_z$ · 45°; opaques 3–4%, 0.005–0.2 mm, granular, probably magnetite; interstitial material 10%, glassy to microcrystalline, partly replaced by smectite

Vesicles: 2–3%, 1 mm, round, filled with smectite, some segregation vesicles

Alteration: Olivine and some interstitial material replaced by smectite



HOLE 483B, CORE 19

Visual Description

Medium to dark gray, aphyric to moderately phyric, massive basalt. Section 1 and upper 85 cm of Section 2 are very sparsely phyric; lower part of Section 2 moderately phyric; Section 3 sparsely phyric to aphyric. Plagioclase phenocrysts 2–12%, < 4 mm, euhedral, fresh; olivine phenocrysts 2–3%, ≤ 1 mm, subhedral, replaced by smectite; clinopyroxene phenocrysts < 1%, ≤ 1 mm, intergrown with plagioclase, fresh. Groundmass very fine- to coarse-grained; cooling breaks at 65 cm in Section 1 and at 75 cm in Section 2; groundmass relatively fresh, some pervasive alteration in Piece 1, Section 3. Vesicles < 1%, ≤ 2 mm, spherical, filled with smectite. Veins and fractures common, mostly steep, hairline to 2 mm, filled with smectite, calcite and minor pyrite.

Thin Section Description

Location: Section 1, 123–125 cm

Texture: Very sparsely phyric, medium-grained, intergranular to intersertal

Phenocrysts: Plagioclase 2–3%, 1–2 mm, subhedral, often zoned, fresh

Groundmass: Olivine 2–3%, 0.1–0.3 mm, subhedral, replaced by smectite and carbonate; plagioclase 45–50%, 0.2–1 mm, subhedral, fresh; clinopyroxene 40–45%, 0.1–0.5 mm, anhedral, fresh, $2V_z \sim 45°$; opaques 3–5%, 0.005–0.1 mm, square crystals, magnetite, interstitial material 5–7%, mostly microcrystalline material, partly replaced by smectite

Vesicles: 1%, 1–2 mm, round to irregular, filled with smectite

Alteration: Olivine and some interstitial material replaced by smectite and minor carbonate

Location: Section 2, 122–124 cm

Texture: Moderately phyric, quench

Phenocrysts: Olivine 2–3%, 0.3–0.6 mm, subhedral, replaced by smectite, often in glomerophyric clusters with plagioclase; plagioclase 10–12%, 0.3–3.5 mm, euhedral to subhedral, fresh; clinopyroxene < 1%, 0.4–0.8 mm, anhedral, intergrown with plagioclase, fresh

Groundmass: 85%, quench mixture of acicular plagioclase, granular magnetite and poorly crystallized clinopyroxene, fresh

Vesicles: < 1%, 1 mm, round, filled with smectite

Alteration: Olivine replaced by smectite

Location: Section 3, 51–53 cm

Texture: Aphyric to medium- to coarse-grained, ophimottled

Groundmass: Olivine 3%, 0.5–1.5 mm, subhedral, replaced by smectite and carbonate; plagioclase 35–40%, 0.5–2 mm, subhedral laths, in glomerophyric clots with clinopyroxene, fresh, often zoned; clinopyroxene 20–25%, 0.2–1 mm, subhedral to anhedral, in subophitic clots with plagioclase, fresh, $2V_z \sim 45°$; opaques 5%, 0.05–0.3 mm, mostly laths, probably ilmenite-magnetite, all in interstitial areas; interstitial material 25–30%, microcrystalline material surrounding clots of plagioclase and clinopyroxene, partly replaced by smectite

Veins and Fractures: 1 veinlet, 1 mm wide, filled with greenish-brown smectite

Alteration: Olivine and some interstitial material replaced by smectite and carbonate

SITE 483 HOLE B CORE 20 CORED INTERVAL 208.5–213.0 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
UPPER PLIOCENE	NN18 (N)	CP / RP	RM / RP	B / RG		1	0.5				N1
							1.0				N2
						2					N1
						3					

LITHOLOGIC DESCRIPTION

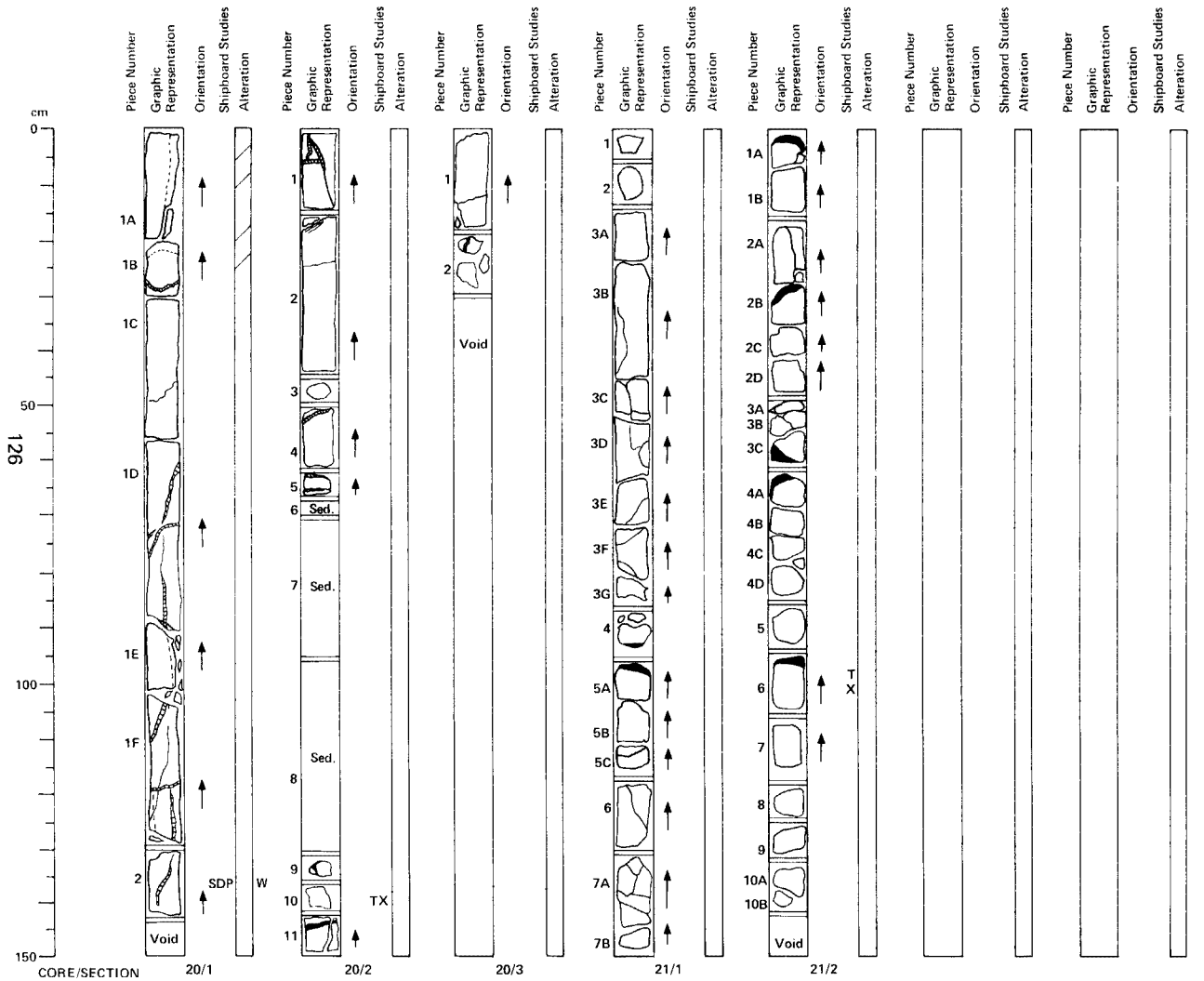
Section 1, 0 cm–Section 2, 65 cm: Massive BASALT with a glassy chilled margin coated with palagonite tuff along the contact with the underlying sediments.

Section 2, 65–130 cm: Black to grayish black CLAY with a thin, relativey coarse-grained laminated turbidite at a depth of 95–97 cm in Section 2. The sediments are indurated near the overlying and underlying basalts and firm throughout the remainder of the section.

Section 2, 130 cm–Section 3, 30 cm: BASALT with a devitrified glassy chilled margin against the overlying sediments.

SMEAR SLIDE SUMMARY

	2-65 (M)	2-67	2-98	2-102	2-112	2-128
TEXTURE:						
Sand	–	–	3	–	–	1
Silt	5	6	10	16	13	12
Clay	95	94	87	84	87	87
COMPOSITION:						
Quartz	5	4	3	3	4	3
Feldspar	–	–	1	1	1	1
Heavy minerals	–	–	3	4	5	5
Clay	95	94	87	84	87	87
Volcanic glass	–	–	5	2	–	–
Pyrite	–	–	1	2	–	1
Zeolite	?	?	?	?	?	?
Calc. nannofossils	–	2	7	4	3	3



HOLE 483B, CORE 20

Visual Description

Section 1, 0 cm–Section 2, 65 cm: Medium to dark gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–5%, ≤0.6 mm, euhedral, fresh; olivine phenocrysts 1%, ≤ 0.5 mm, subhedral, mostly altered to smectite; clinopyroxene ≤ 1%, ≤ 0.3 mm, anhedral, intergrown with plagioclase. Groundmass fine- to medium-grained, grain size decreases rapidly downward in Section 2 to glass selvedge at 72 cm; groundmass relatively fresh. Vesicles ≤ 1%, ≤1 mm, spherical, filled with green smectite. Veins and fractures moderately abundant, mostly subhorizontal, hairline to 2 mm, many filled with carbonate and smectite, some with slickensides, many with narrow alteration halos.

Section 2, 75–130 cm: Brown, moderately bedded, strongly indurated, mudstone and silty mudstone.

Section 2, 130 cm base of core: Dark gray, very sparsely phyric basalt. Plagioclase phenocrysts 2–3%, ≈ 3 mm, euhedral, fresh; olivine phenocrysts 1–2%, ≤ 1 mm, subhedral, replaced by smectite. Groundmass fine-grained to glassy; glass selvedges at 132 and 143 cm in Section 2; groundmass slightly altered in Section 3. Vesicles ≤ 1%, ≤1 mm, spherical, filled with smectite. Veinlets sparse, ≤1 mm, filled with smectite and carbonate.

Thin Section Description

Location: Section 2, 137–139 cm

Texture: Very sparsely phyric, fine-grained, intersertal to intergranular

Phenocrysts: Olivine 1–2%, 0.5–1 mm, euhedral to subhedral, replaced by smectite; plagioclase 2–3%, 1–1.5 mm, subhedral, strongly zoned, fresh

Groundmass: Olivine 1–2%, 0.1–0.3 mm, subhedral, replaced by smectite; plagioclase 45–50%, 0.2–1 mm, subhedral laths, fresh; clinopyroxene 30–35%, 0.1–0.4 mm, granular, fresh, $2V_z$ ~45 ; opaques 3–4%, 0.005–0.1 mm, granular to lath shaped, magnetite-ilmenite; interstitial material 10–12%, dark brown glassy to microcrystalline material, minor replacement by smectite

Vesicles: ≤ 1%, 0.5 mm, round, filled with smectite, some with segregation patches

Alteration: Olivine and minor interstitial material, replaced by smectite

HOLE 483B, CORE 21

Visual Description

Section 1, 0–94 cm: Gray, very sparsely phyric, massive(?) basalt. Plagioclase phenocrysts 1%, ≈ 2 mm, euhedral, fresh; olivine phenocrysts ≤1%, ≤ 1 mm, subhedral, replaced by smectite. Groundmass very fine- to fine-grained, grain size decreases toward glassy selvedge at 94 cm; groundmass moderately altered. Vesicles 1–2%, decreasing in abundance downward, ≈ 1 mm, spherical, filled with smectite, sometimes with a dark rim. Fractures fairly common, mostly steep, ≈ 1 mm wide, filled with smectite, carbonate and minor pyrite.

Section 1, 94 cm–base of core: Dark gray, moderately phyric, pillow basalt. Plagioclase phenocrysts 10%, ≈ 5 mm, euhedral, fresh; olivine phenocrysts 2%, ≈ 1 mm, euhedral, replaced by smectite and carbonate; clinopyroxene phenocrysts 2–3%, ≈ 1 mm, anhedral, often intergrown with plagioclase, fresh. Groundmass fine-grained to glassy; glass selvedges at 95 cm in Section 1 and at 0 cm, 29–32 cm, 59 cm, 62 cm, and 95 cm, in Section 2; glass partly altered to palagonite and replaced by smectite and carbonate. Vesicles ≈ 1%, irregularly distributed, ≈ 0.5 mm, spherical, open or filled with smectite. Fractures fairly common, ≈ 2 mm, filled with smectite, carbonate and minor pyrite.

Thin Section Description

Location: Section 2, 100–102 cm

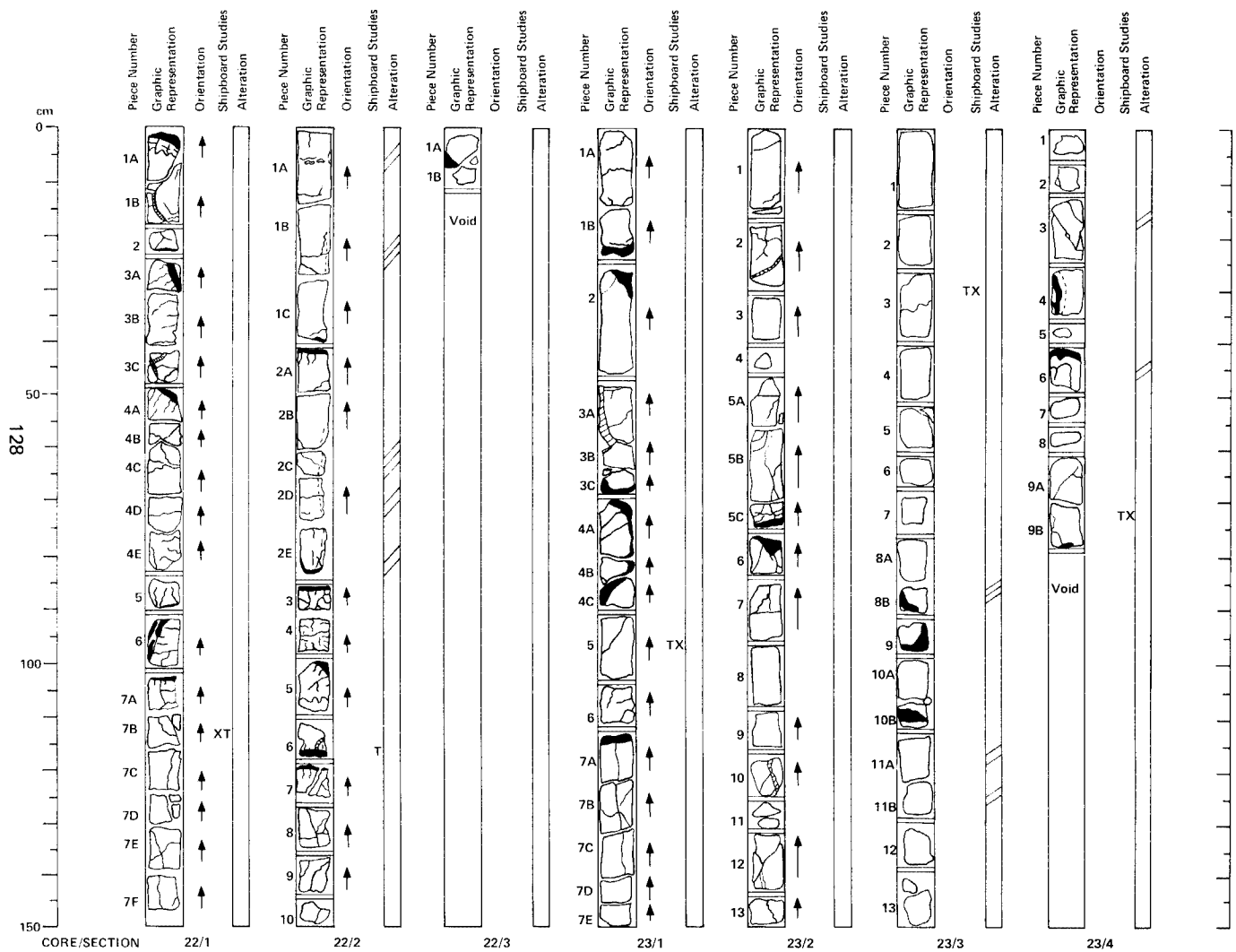
Texture: Moderately phyric, quench

Phenocrysts: Olivine 2%, 0.5–1 mm, euhedral, replaced by smectite and carbonate; plagioclase 10%, 1–5 mm, subhedral prisms, fresh, often in clots with clinopyroxene; clinopyroxene 2–3%, 02–1 mm, anhedral to rounded, fresh, $2V_z$ ~ 45 , sometimes zoned

Groundmass: 85%, quench mixture of poorly crystallized plagioclase, radiating sheaves of clinopyroxene, minute granules of opaques and glassy interstitial material, fresh

Vesicles: ≈ 1%, 0.2-0.5 mm, round, filled with smectite; some segregation vesicles

Alteration: Olivine replaced by smectite



HOLE 483B, CORE 22

Visual Description

Dark gray, moderately phyric, pillow basalt. Phenocryst content varies from 8–15%, generally decreasing with depth in core; plagioclase phenocrysts 5–10%, ~2.5 mm, euhedral, fresh; olivine phenocrysts 1–4%, < 2 mm, euhedral, altered to smectite; clinopyroxene phenocrysts 1–4%, < 3 mm, anhedral, fresh, often intergrown with plagioclase. Groundmass fine-grained to glassy; glass selvedges at 3 cm, 34 cm, 51 cm, 90 cm, 92–100 cm and 103 cm in Section 1, at 39 cm, 42 cm, 83 cm, 86 cm, 101 cm, 118 cm and 120 cm in Section 2 and at 5–7 cm in Section 3; glass usually fractured and partly altered to smectite and zeolite(?), remainder of groundmass relatively fresh. Vesicles 1–2%, <1 mm, spherical to irregular, filled with smectite and carbonate. Veins and fractures common, hairline to 3 mm, filled or lined with smectite, carbonate and minor pyrite.

Thin Section Description

Location: Section 2, 117–119 cm

Texture: Moderately phyric, very fine-grained, intergranular to intersertal

Phenocrysts: Olivine 4%, 0.3–1.5 mm, euhedral to subhedral, replaced in glomerocrysts; clinopyroxene 3–4%, 0.4–2.6 mm, anhedral to rounded, occurs as individual, rounded crystals and in glomerocrysts with plagioclase, fresh, $2V_z$ ~ 45°, often sector zoned

Groundmass: Olivine 2–3%, 0.1–0.2 mm, subhedral, replaced by smectite; plagioclase 35–40%, 0.1–0.4 mm, subhedral laths, fresh; clinopyroxene 30–35%, 0.1–0.3 mm, granular, fresh; opaques 3%, 0.005–0.05 mm, granules probably magnetite; interstitial material 5%, glassy, partly replaced by smectite

Vesicles: ~ 1%, 0.5 mm, round, segregation vesicles

Alteration: Olivine and some interstitial material replaced by smectite

HOLE 493B, CORE 23

Visual Description

Dark gray, moderately phyric, pillow basalt. Phenocrysts vary somewhat in size and abundance; plagioclase phenocrysts 8–12%, 2–10 mm, euhedral, fresh, sometimes in glomerophyric clots; olivine phenocrysts 2–4%, < 1 mm, euhedral, replaced by smectite; clinopyroxene phenocrysts 3–5%, < 1 mm, anhedral, fresh, usually in clots with plagioclase. Groundmass fine-grained to glassy; glass selvedges at 23 cm, 27–30 cm, 67 cm, 70–89 cm and 113 cm in Section 1, at 74 cm and 76–77 cm in Section 2, at 86–89 cm, 91–96 cm and 110 cm in Section 3 and at 42 cm and 77 cm in Section 4; glass often fractured and partly replaced by smectite carbonate and zeolite(?), otherwise groundmass relatively fresh. Vesicles 1–2%, 1 mm, spherical, filled with smectite. Fractures and veinlets common, hairline to 2 mm, filled or lined with carbonate and smectite.

Thin Section Description

Location: Section 1, 95–97 cm

Texture: Moderately phyric, quench

Phenocrysts: Olivine 2–3%, 0.3–0.8 mm, euhedral to subhedral, altered to smectite; plagioclase 10%, 0.5–2 mm, subhedral laths, fresh; clinopyroxene 4%, 0.5–1 mm, anhedral, mostly intergrown with plagioclase in glomerophyric clots, fresh, $2V_z$ ~45°, often sector zoned

Groundmass: 80–85%, quench mixture of plagioclase microlites, radiating sheaves of clinopyroxene and granular opaques. A few grains of fresh olivine

Vesicles: 1–2%, 0.3–0.5 mm, round, filled with smectite, some segregation vesicles

Alteration: Olivine partly replaced by smectite

Location: Section 3, 29–31 cm

Texture: Moderately phyric, quench

Phenocrysts: Olivine 2%, 0.2–0.4 mm, subhedral, replaced by smectite; plagioclase 5%, 0.3–3 mm, subhedral, fresh, usually zoned, clinopyroxene 3%, 0.3–0.8 mm, subhedral, often in glomerophyric clots with plagioclase, fresh, $2V_z$ ~45°, often zoned, some crystals corroded

Groundmass: 90%, quench mixture of plagioclase microlites, small olivine crystals, radiating sheaves of clinopyroxene and granular opaques

Vesicles: 1%, 0.05–0.5 mm, round, filled with smectite

Alteration: Olivine replaced by smectite

Location: Section 4, 69–71 cm

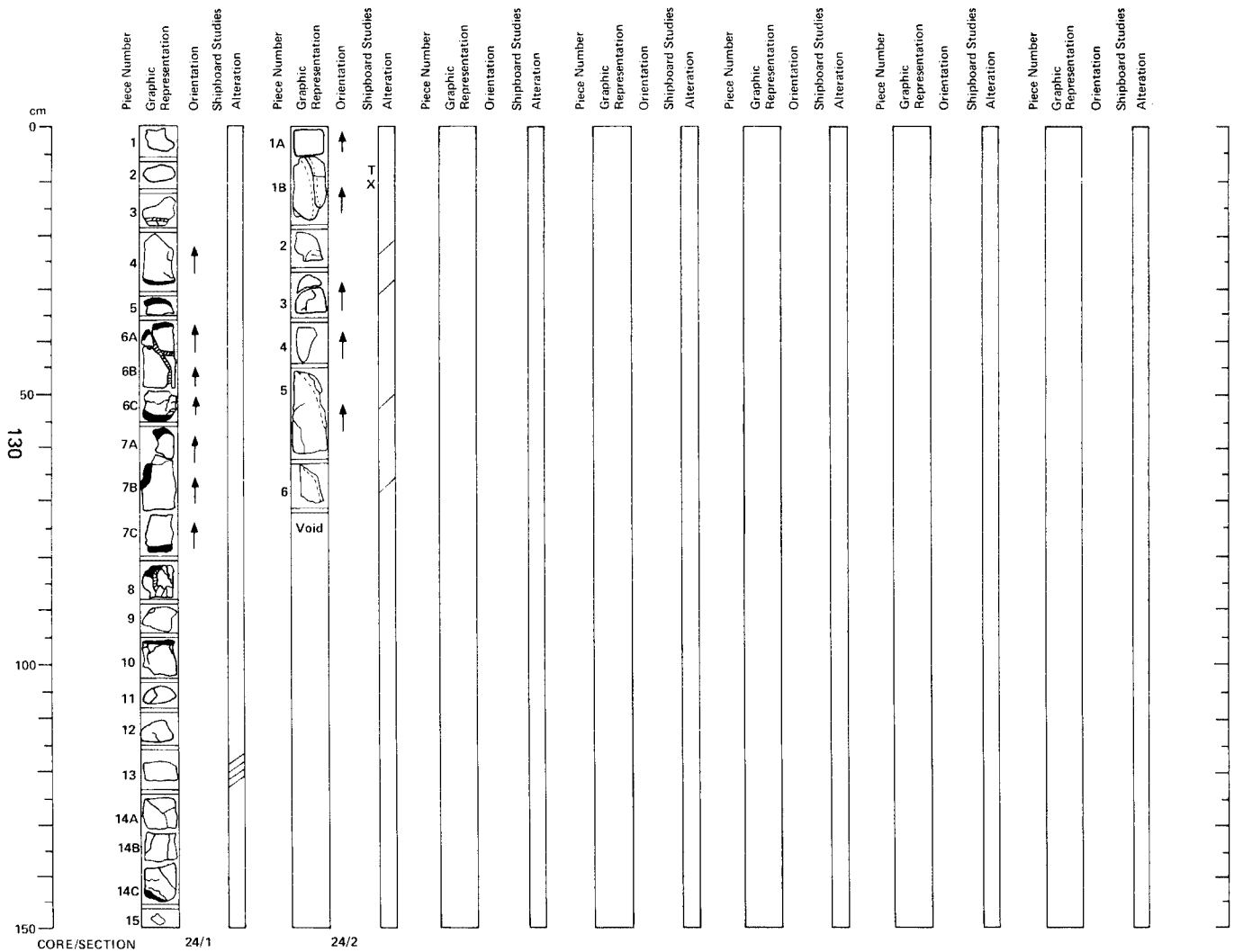
Texture: Moderately phyric, quench

Phenocrysts: Olivine 2%, 0.2–0.4 mm, euhedral; replaced by smectite and carbonate; plagioclase 7–8%, 0.5–2 mm, subhedral prisms, highly zoned, fresh; clinopyroxene 3–4%, 0.5–1 mm, anhedral, usually intergrown with plagioclase in glomerophyric clots, fresh, $2V_z$ 45°, usually zoned

Groundmass: 85%, poorly crystallized mixture of plagioclase microlites, radiating sheaves of clinopyroxene, minute granules of opaques, and some interstitial glass; fresh

Vesicles: 1%, 0.5–0.8 mm, round, filled with smectite

Alteration: Olivine altered to smectite



HOLE 483B, CORE 24

Visual Description

Dark gray, moderately phyric, pillow basalt and massive(?) basalt. Pillow basalt extends to base of Section 1; Section 2 lacks cooling breaks. Plagioclase phenocrysts 6–8%, ≤ 3 mm, euhedral, fresh, often in glomerophyric clots; olivine phenocrysts 2–3%, ≤ 1 mm, euhedral partly to completely replaced by smectite; clinopyroxene phenocrysts 3–4%, ≤ 1 mm, anhedral, usually intergrown with plagioclase. Groundmass fine-grained to glassy; glass selvedges at 79 cm, 32 cm, 37–40 cm, 54 cm, 57–67 cm, 78 cm, 82 cm, 96 cm and 144 cm in Section 1; glass somewhat altered to smectite, otherwise groundmass quite fresh. Vesicles 1–2%, ≤ 1 mm, spherical, filled with smectite and carbonate. Veins and fractures common, hairline to 2 mm, lined or filled with smectite, carbonate and pyrite; some veins have narrow alteration halos.

Thin Section Description

Location: Section 2, 11–14 cm

Texture: Moderately phyric, quench

Phenocrysts: Olivine 2–3%, 0.4–1 mm, subhedral, replaced by smectite and carbonate; plagioclase 7%, 0.3–2.5 mm, subhedral, often in clusters, fresh, strongly zoned; clinopyroxene 3–4%, 0.4–0.6 mm, anhedral to rounded, usually in glomerophyric clots with plagioclase, fresh, $2V_z \sim 45°$.

Groundmass: 85%, quench mixture of skeletal plagioclase microlites, radiating sheaves of clinopyroxene, granular opaques and minor glass; fresh

Vesicles: 1–2%, 0.5–1 mm, round, filled with smectite and carbonate, some with segregation patches

Alteration: Olivine replaced by smectite and carbonate

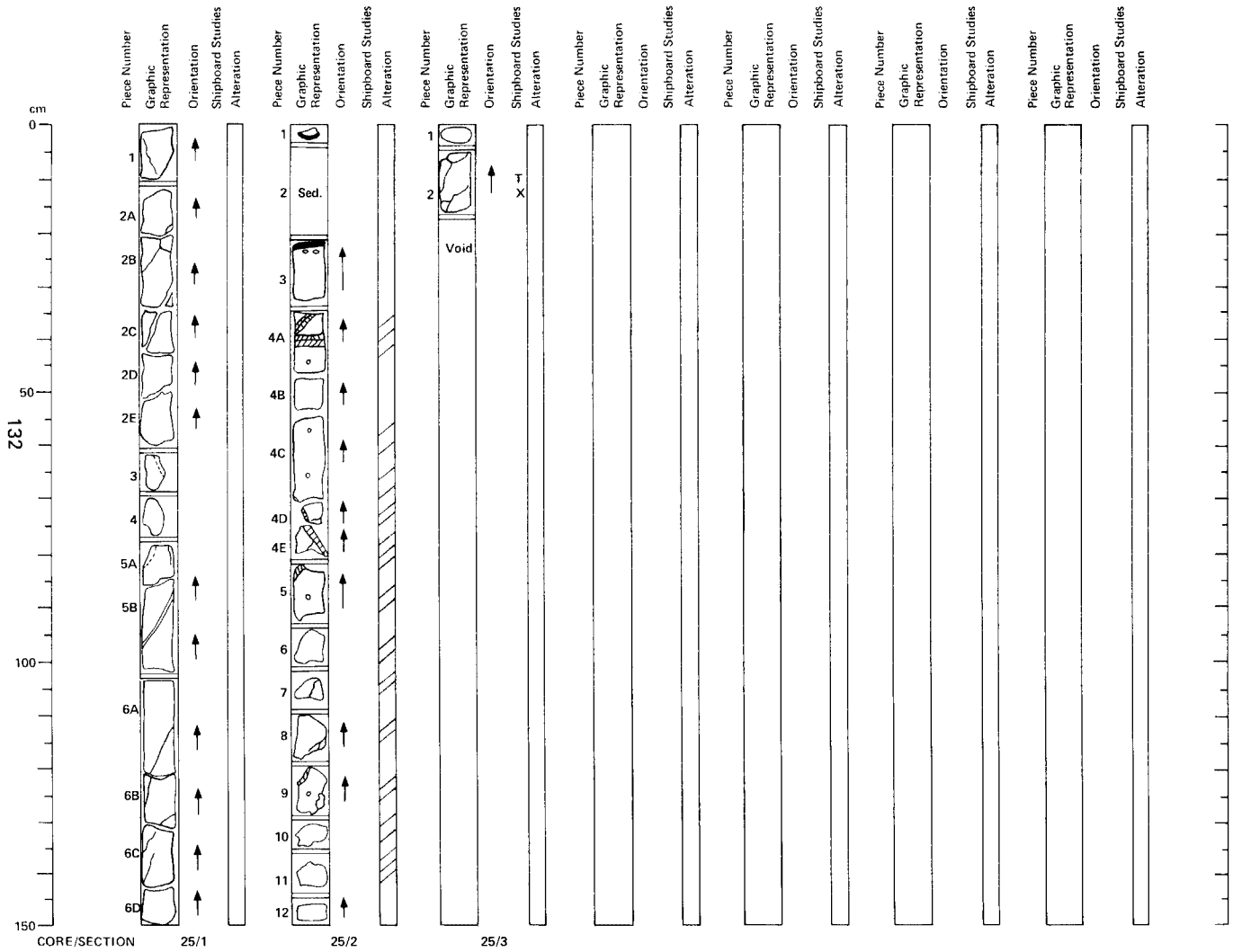
SITE 483 HOLE B CORE 25 CORED INTERVAL 231.0–235.5 m

TIME — ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		B	B	B		1	0.5					
							1.0					
						2					*	N1
						3						

Section 1, 0 cm–Section 2, 5 cm: Massive BASALT with a chilled margin against the underlying sediments.
Section 2, 5–25 cm: Hard black CLAYSTONE with veins of dusky yellow oxidized pyrite. The sediments display flame structures and bedding displaying a 20–30° dip.
Section 2, 25 cm–Section 4, 16 cm: BASALT with a chilled margin against the overlying sediments.

SMEAR SLIDE SUMMARY

	2-14
TEXTURE:	
Sand	–
Silt	23
Clay	77
COMPOSITION:	
Quartz	10
Feldspar	3
Heavy minerals	10
Clay	77
Volcanic glass	TR
Zeolite	?



HOLE 483B, CORE 25

Visual Description

Section 1, 0 cm–Section 2, 4 cm: Medium to dark gray, moderately phyric, massive basalt. Plagioclase phenocrysts 8–10%, ≤1 mm, euhedral fresh; olivine phenocrysts 2%, ≤1 mm, euhedral, replaced by smectite; clinopyroxene phenocrysts 3%, ≤1 mm, anhedral, fresh, often in glomerophyric clots with plagioclase. Groundmass fine- to medium-grained; glass selvedge at 3 cm, Section 2; groundmass relatively fresh. Vesicles ≤1%, ≤0.5 mm, spherical, filled with smectite. Veins and fractures fairly common, mostly steep, filled or lined with smectite, carbonate and minor pyrite; some have alteration halos 3–4 mm wide.

Section 2, 4–22 cm: Black, well indurated, silty claystone.

Section 2, 22 cm–base of core: Medium gray, moderately phyric, massive basalt. Plagioclase phenocrysts 8–10%, ≤1 mm, euhedral, fresh; olivine phenocrysts 2%, ≤1 mm, euhedral, altered to smectite; clinopyroxene phenocrysts 3%, ≤1 mm, anhedral, fresh, often in clots with plagioclase. Groundmass fine- to medium-grained; glass selvedge at 22 cm, Section 2, grain size increases downward from selvedge; groundmass generally fresh. Vesicles 1–3%, largest and most abundant in upper half of Section 2, 0.5–3 mm, spherical, filled with smectite and minor pyrite. Veins and fractures sparse, one large vein between 70 and 80 cm, Section 1; veins hairline to 5 mm, filled with smectite, carbonate and minor pyrite; some veins have narrow alteration halos; some are slickensided.

Thin Section Description

Location: Section 3, 8–10 cm

Texture: Moderately phyric, fine-grained, intergranular to intersertal

Phenocrysts: Olivine 2%, 0.4–0.8 mm, subhedral, replaced by smectite; plagioclase 8–10%, 0.4–1 mm, seriate with groundmass, fresh, some clots with clinopyroxene; clinopyroxene 3%, 0.4–1 mm, anhedral, fresh, often in clots with plagioclase, $2V_z \sim 45°$.

Groundmass: Olivine 1–2%, 0.1–0.3 mm, subhedral, replaced by smectite; plagioclase 40%, 0.2–0.4 mm, subhedral laths, fresh; clinopyroxene 30%, 0.05–0.3 mm, granular to radiating sheaves, fresh, $2V_z \sim 45°$; opaques 2–3%, 0.005–0.1 mm, granular to lath-shaped, magnetite-ilmenite; interstitial material 10%, microcrystalline, partly replaced by smectite

Vesicles: ~1%, 0.5 mm, round, filled with brown smectite

Alteration: Olivine replaced by smectite

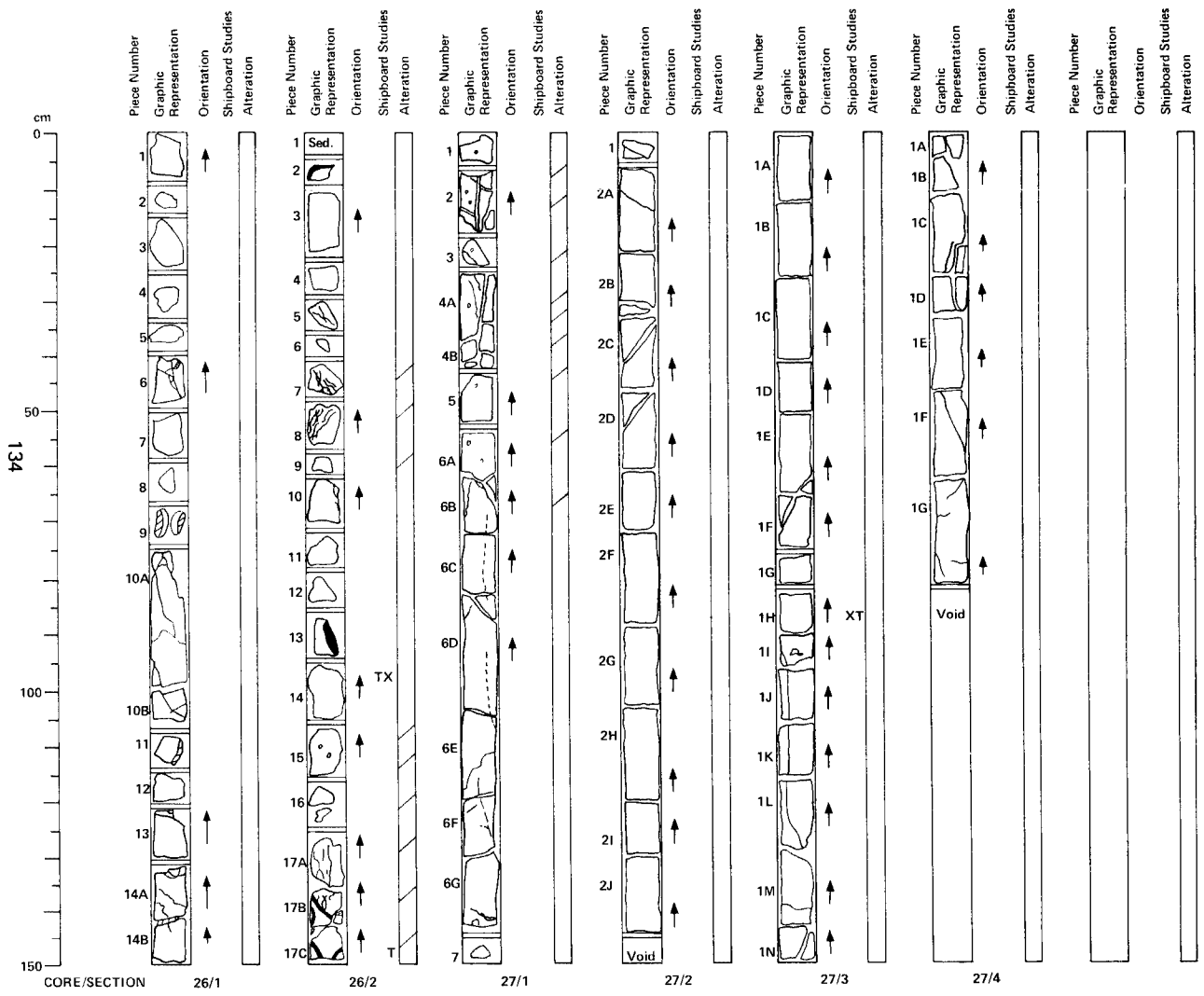
SITE 483 HOLE B CORE 26 CORED INTERVAL 235.5–240.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			B			1	0.5 1.0					
						2					N1	

Section 1: BASALT.
Section 2, 0–5 cm: Firm, black CLAYSTONE.
Section 2, 5–150 cm: BASALT with a chilled margin against the overlying sediments.

SMEAR SLIDE SUMMARY

	2-2
TEXTURE:	
Sand	–
Silt	12
Clay	88
COMPOSITION:	
Quartz	6
Feldspar	1
Clay	88
Volcanic glass	TR
Calc. nannofossils	5



HOLE 483B, CORE 26

Visual Description

Section 1, 0–150 cm: Medium gray, moderately phyric, massive basalt. Plagioclase phenocrysts 6–8%, ≤ 2 mm, euhedral, fresh; olivine phenocrysts 1–2%, ≤ 1 mm, euhedral, altered to smectite; clinopyroxene phenocrysts 3–5%, 1 mm, anhedral, fresh, often intergrown with plagioclase in glomerophyric clots. Groundmass fine-grained, uniform, relatively fresh. Vesicles 1%, ≤ 1 mm, spherical, filled with smectite. Veins and fractures sparse, hairline to 3 mm, filled with smectite and carbonate.

Section 2, 0–5 cm: Black, well indurated, silty claystone.

Section 2, 5 cm–base of core: Medium gray, moderately phyric massive basalt. Plagioclase phenocrysts 8–10%, ≤2 mm, euhedral, fresh; olivine phenocrysts 2%, ≤1 mm, euhedral, replaced by smectite; clinopyroxene phenocrysts 3–4%, ≤ 1 mm, anhedral, often in glomerophyric clots with plagioclase. Groundmass fine-grained to glassy; glass selvedges at 5 cm and possibly at 89–94 cm; Section 2; grain size increases slightly away from selvedges; groundmass relatively fresh but some patches of pervasive alteration occur. Vesicles 1–2%, ≤1 mm, spherical, filled with smectite. Fractures and veinlets common, hairline to 2 mm, filled with smectite.

Thin Section Description

Location: Section 2, 86–100 cm

Texture: Moderately phyric, fine-grained, intersertal

Phenocrysts: Olivine 2%, 0.4–0.6 mm, subhedral, replaced by smectite; plagioclase 8–10%, 0.5–2 mm, seriate with groundmass, often in glomerophyric clots with clinopyroxene, strongly zoned, fresh; clinopyroxene 3–4%, 0.3–0.8 mm, subhedral, occurs mostly in glomerophyric clots with plagioclase but there are some individual, corroded crystals, fresh, $2V_z \sim 45°$.

Groundmass: Olivine 2%, 0.1–0.2 mm, subhedral, replaced by smectite; plagioclase 40%, 0.1–0.5 mm, subhedral laths, fresh; clinopyroxene 20%, 0.1–0.3 mm, granular to radiating sheaves, fresh, $2V_z \sim 45°$; opaques 2–3%, 0.005–0.1 mm, granular to lath-shaped, magnetite-ilmenite; interstitial material 20%, microcrystalline, partly replaced by smectite

Vesicles: 1–2%, 0.3–0.5 mm, round, filled with brown smectite; a few segregation vesicles

Alteration: Olivine and some interstitial material replaced by smectite

Location: Section 2, 145–147 cm

Texture: Moderately phyric, quench

Phenocrysts: Olivine 1–2%, 0.3–0.8 mm, subhedral, replaced by smectite; plagioclase 8–10%, 0.3–1.5 mm, subhedral laths, often intergrown with clinopyroxene, fresh; clinopyroxene 2%, 0.2–0.8 mm, subhedral, intergrown with plagioclase, fresh, $2V_z \sim 45°$.

Groundmass: 85–90%, quench mixture of plagioclase microlites, sheaves of clinopyroxene, granular opaques, and abundant dark brown glass; fresh

Vesicles: ≤ 1%, 0.4 mm, round, filled with smectite

Alteration: Olivine replaced by smectite

HOLE 483B, CORE 27

Visual Description

Medium gray to light gray, aphyric to very sparsely phyric, massive basalt. Plagioclase phenocrysts < 2%, 2–6 mm, euhedral, fresh; olivine phenocrysts ≤ 1%, ≤2 mm, euhedral, replaced by carbonate and smectite. Groundmass holocrystalline, medium- to coarse-grained, generally uniform, slightly altered. Vesicles < 2%, most abundant at top of core, ≤1.5 mm, spherical, filled with smectite. Fractures and veins sparse to common, mostly steep, hairline to 3 mm wide, filled with smectite, carbonate and zeolite(?).

Thin Section Description

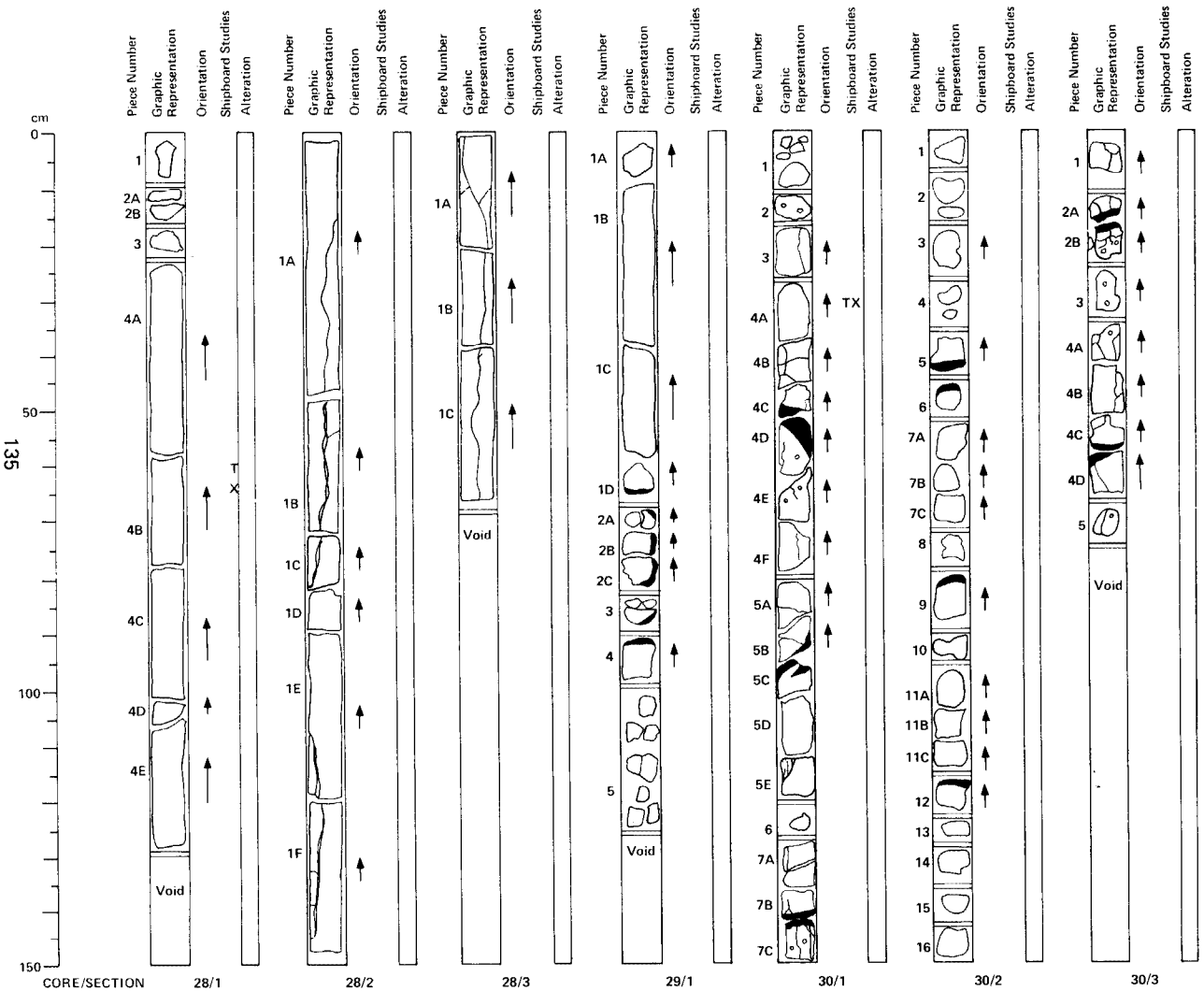
Location: Section 3, 85–87 cm

Texture: Aphyric, medium- to coarse-grained, intergranular to intersertal

Groundmass: Olivine 2–3%, 0.2–0.6 mm, subhedral, replaced by smectite; plagioclase 40–45%, 0.2–1.5 mm, subhedral laths, fresh; clinopyroxene 35–40%, 0.2–2 mm, often in subophitic plates, fresh, $2V_z \sim 45°$; opaques 3–4%, 0.05–0.7 mm, square crystals to laths, magnetite-ilmenite; interstitial material 15%, glassy to devitrified, partly replaced by smectite

Vesicles: < 1%, ≤ 0.5 mm, round, filled with brown smectite

Alteration: Olivine and some interstitial material replaced by smectite



HOLE 483B, CORE 28

Visual Description

Medium to light gray, aphyric to very sparsely phyric, massive basalt. Platioclase phenocrysts <2%, ≤2 mm, euhedral, fresh; olivine phenocrysts ≤ 1%, ≤2 mm, euhedral, replaced by smectite. Groundmass holocrystalline, medium-grained, slightly altered. Vesicles ≤ 1%, ≤ 0.5 mm, spherical, filled with smectite. Veins and fractures sparse to common, mostly steep, hairline to 3 mm wide, filled or lined with smectite, carbonate and zeolite(?).

Thin Section Description

Location: Section 1, 66–68 cm

Texture: Aphyric, medium-grained, intersertal

Groundmass: Olivine 2–3%, 0.5–1 mm, subhedral, partly replaced by smectite, some fresh remnants; plagioclase 35–40%, 0.2–1.5 mm, subhedral laths, fresh; clinopyroxene 30–35%, 0.2–0.8 mm, anhedral intergrown with plagioclase, fresh, $2V_z$ ~ 45°; opaques 3–4%, 0.05–0.5 mm, square crystals to laths, magnetite-ilmenite, occurs in interstitial patches; interstitial material 20%, glassy to microcrystalline, in large irregular patches, partly replaced by smectite, mostly fresh

Vesicles: ≤ 1%, ≤ 0.5 mm, round to irregular, filled with brown smectite

Alteration: Olivine and interstitial material partly replaced by smectite

HOLE 483B, CORE 29

Visual Description

Section 1, 0–65 cm: Medium to light gray, aphyric to very sparsely phyric, massive basalt. Plagioclase phenocrysts ≤ 2%, ≤ 2 mm euhedral, fresh; olivine phenocrysts ≤ 1%, ≤ 2 mm, euhedral, replaced by smectite. Groundmass medium-grained to glassy; glass selvedge at 65 cm; groundmass slightly altered. Vesicles ≤ 1%, 0.5 mm, spherical, filled with smectite. Veins and fractures sparse, mostly steep, hairline to 3 mm wide, filled with smectite, carbonate and zeolite(?).

Section 1, 65 cm–base of core: Dark gray, sparsely to moderately phyric, pillow basalt. Plagioclase phenocrysts 5–8%, ≤ 2 mm, euhedral, fresh; olivine phenocrysts 1–3%, ≤ 4 mm, euhedral, altered to smectite; clinopyroxene phenocrysts 1–2%, ≤ 0.5 mm, fresh, sometimes intergrown with plagioclase. Groundmass fine-grained to glassy; glass selvedges at 66–81 cm, 85–87 cm, and 91 cm, Section 1; glass partly altered to smectite and carbonate, otherwise groundmass is relatively fresh. Vesicles 1–5%, most abundant in lower 25 cm of core, ≤ 1 mm, spherical, filled with smectite. Veins and fractures sparse, filled with smectite.

HOLE 483B, CORE 30

Visual Description

Dark gray, moderately phyric, pillow basalt. Plagioclase phenocrysts 8%, most ≤2 mm, some to 10 mm, euhedral, fresh; olivine phenocrysts 2–3%, ≤4 mm, euhedral, replaced by smectite and carbonate; clinopyroxene phenocrysts 1–2%, ≤ 1 mm, intergrown with plagioclase, fresh. Groundmass fine-grained to glassy; glass selvedges at 50–59 cm, 90–98 cm, and 140–142 cm in Section 1, at 43 cm, 47 cm, 80 cm, and 116 cm in Section 2 and at 15–17 cm and 56–60 cm in Section 3; groundmass slightly altered, glassy selvedges partly replaced by smectite. Vesicles 1–5%, most abundant in upper parts of pillows, ≤ 0.5 mm, spherical, most filled with smectite, carbonate and pyrite, some open. Fractures and veinlets sparse, hairline to 2 mm, mostly steep, filled with smectite and carbonate.

Thin Section Description

Location: Section 1, 31–34 cm

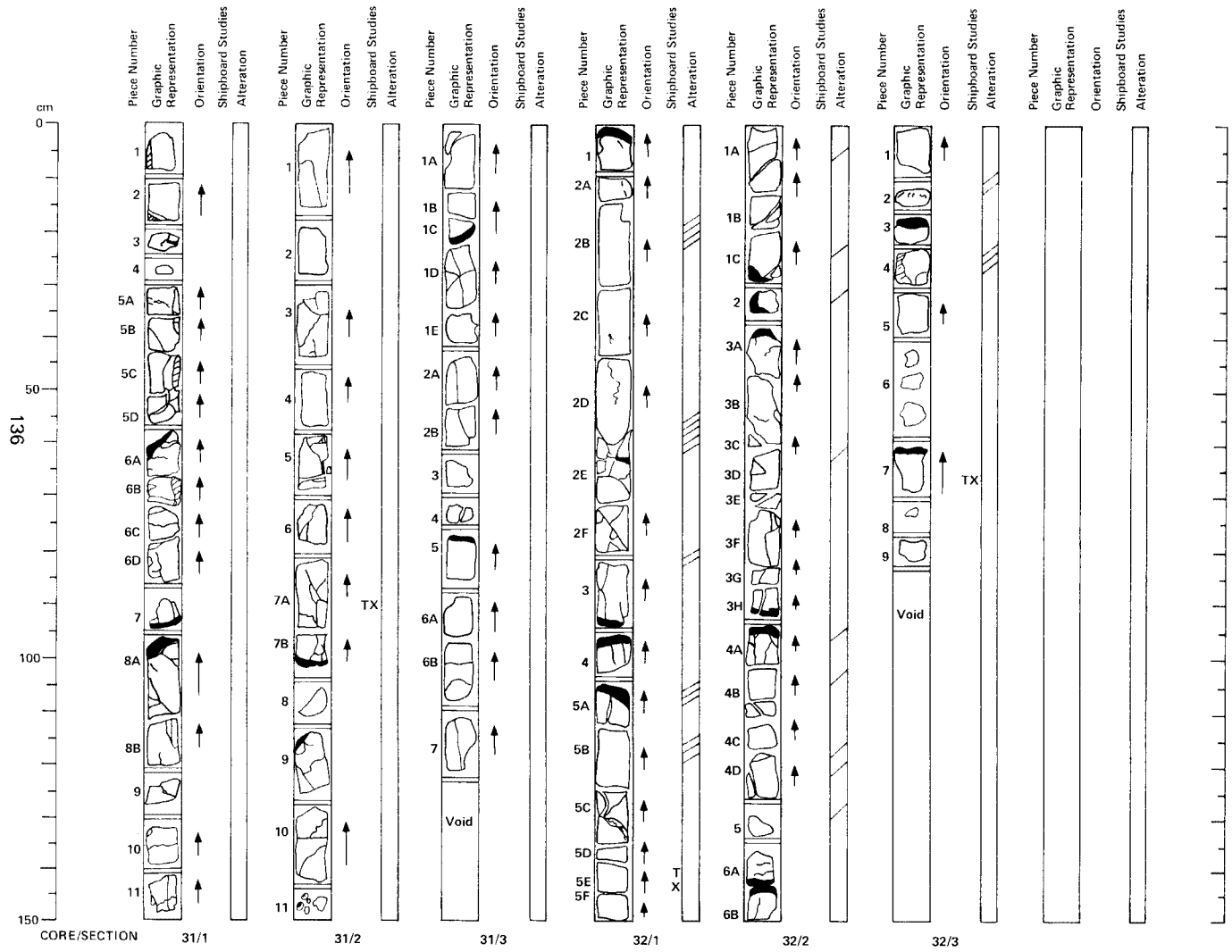
Texture: Moderately phyric, quench

Phenocrysts: Olivine 3%, 0.5–4 mm, subhedral, often corroded, replaced by smectite and minor carbonate; plagioclase 8%, 0.3–2 mm, euhedral to subhedral, fresh, sometimes in glomerophyric clusters; clinopyroxene 1–2%, 0.1–0.5 mm, intergrown with plagioclase, fresh, $2V_z$ ~45°.

Groundmass: 85–90%, quench mixture of plagioclase microlites, sheaves of clinopyroxene, granular opaques and interstitial glass

Vesicles: 1%, ~0.4 mm, round, filled with brown smectite

Alteration: Olivine altered to smectite and minor carbonate



HOLE 483B, CORE 31

Visual Description

Dark gray, moderately phyric, pillow basalt. Plagioclase phenocrysts 5–7%, < 8 mm, euhedral, fresh; olivine phenocrysts 3–5%, < 2 mm, euhedral, altered to smectite. Groundmass fine-grained to glassy; glass selvedges at 57–62 cm, 93 cm, and 96–100 cm in Section 1, at 101 cm and 114–116 cm in Section 2 and at 18–22 cm and 77 cm in Section 3. Groundmass moderately altered, particularly near fractures; glass selvedges partly replaced by smectite. Vesicles 1–3%, < 1 mm, spherical, filled with smectite and minor pyrite. Fractures and veinlets common, hairline to 2 mm, mostly steep, filled with smectite, carbonate and minor pyrite.

Thin Section Description

Location Section 2, 86–89 cm

Texture: Moderately phyric, quench

Phenocrysts: Olivine 3–5%, 0.3–2 mm, euhedral to subhedral, altered to smectite and carbonate; plagioclase 5–7%, 0.3–3 mm, subhedral, fresh

Groundmass: 90%, quench groundmass, mostly brown glass with minor plagioclase microlites, granular opaques, and poorly crystallized clinopyroxene, fresh

Vesicles: < 1%, < 0.6 mm, round, filled with brown smectite

Alteration: Olivine replaced by smectite and carbonate

HOLE 483B, CORE 32

Visual Description

Dark gray, moderately phyric, pillow basalt. Plagioclase phenocrysts 5–8%, < 2 mm, euhedral, fresh; olivine phenocrysts 1–2%, < 1 mm, subhedral, altered to smectite and carbonate; clinopyroxene phenocrysts < 3%, < 0.5 mm, intergrown with plagioclase, fresh. Groundmass fine-grained to glassy; glass selvedges at 0 cm, 93 cm, 96 cm and 94 cm and possibly 143 cm in Section 2 and 61 cm, Section 3; by smectite. Vesicles < 2%, < 1 mm, spherical, filled with smectite. Fractures and veinlets common, hairline to 3 mm wide, filled with smectite, carbonate and minor pyrite; smectite masses at 17 cm and 23–30 cm in Section 3 may be altered glass.

Thin Section Description

Location: Section 1, 135–137 cm

Texture: Moderately phyric, fine grained, intersertal

Phenocrysts: Olivine 2–3%, 0.3–1.1 mm, subhedral, replaced by smectite and carbonate; plagioclase 7–8%, 0.5–2 mm, seriate with groundmass, fresh, skeletal

Groundmass: Olivine 1–2%, 0.05–0.2 mm, subhedral, replaced by smectite; plagioclase 30–35%, 0.1–0.5 mm, subhedral, fresh; clinopyroxene 30–35%, 0.05–0.4 mm, anhedral, fresh, $2V_z \sim 45$; opaques 3–4%, 0.05–0.3 mm, square crystals to laths, magnetite-ilmenite; interstitial material 15–20%, devitrified glass, mostly fresh

Vesicles: < 1%, < 1 mm, round, filled with smectite

Alteration: Olivine replaced by smectite and carbonate

Location: Section 3, 63–65 cm

Texture: Moderately phyric, quench

Phenocrysts: Olivine 2%, 0.2–1 mm, subhedral, replaced by smectite; plagioclase 5–7%, 0.3–1.5 mm, subhedral laths, fresh; clinopyroxene 3%, 0.2–0.4 mm, anhedral, intergrown in clots with plagioclase, fresh, $2V_z \sim 45$

Groundmass: 85–90%, mostly devitrified glass with minor plagioclase microlites and granular opaques

Vesicles: 2%, 0.4–0.8 mm, round, filled with smectite

Alteration: Olivine altered to smectite

SITE SUMMARY

HOLE 483C

Date occupied: 1200 February 21, 1979
Date departed: 1100 February 22, 1979
Time on hole: 23 hours
Position (latitude; longitude) 22°52.98'N; 108°44.58'W
Water depth (sea level; corrected m, echo-sounding): 3070
Water depth (rig floor; corrected m, echo-sounding): 3080
Bottom felt at (m, drill pipe): 3084
Penetration (m): 114
Number of cores: 4
Total length of cored section (m): 37.5
Total core recovered (m): 26.24
Core recovery (%): 70

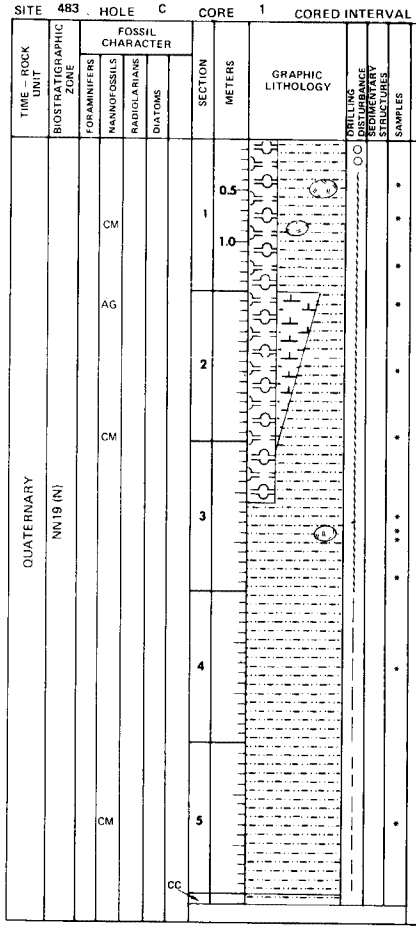
Oldest Sediment Cored

Depth sub-bottom (m): 107
Nature: Silty claystone
Age: About 2 m.y.
Measured velocity (km/s): About 1.5

Basement

Depth sub-bottom (m): 114
Nature: Basalt
Velocity range (km/s): 5.8

SITE 483 HOLE C CORE 1 CORED INTERVAL 38.5–48.0 m



10Y 4/2

5GY 3/2

Section 1: Soft, vitric SILICEOUS SILTY CLAY with small (< 1 cm) inclusions of ASH.
Section 2, 0 cm–Section 3, 60 cm: Soft, SILICEOUS NANNOFOSSIL MARL grading with depth in Section 2 to a NANNOFOSSIL-bearing SILICEOUS SILTY CLAY underlain by SILICEOUS SILTY CLAY.
Section 3, 60–150 cm: Soft, vitric SILTY CLAY with rare inclusions of ASH and numerous streaks of pyrite.
Section 4–Core-Catcher: Firm SILTY CLAY containing small amounts of volcanic glass.

5P 2/2

5GY 3/2

10Y 4/2

5GY 3/2

10Y 4/2

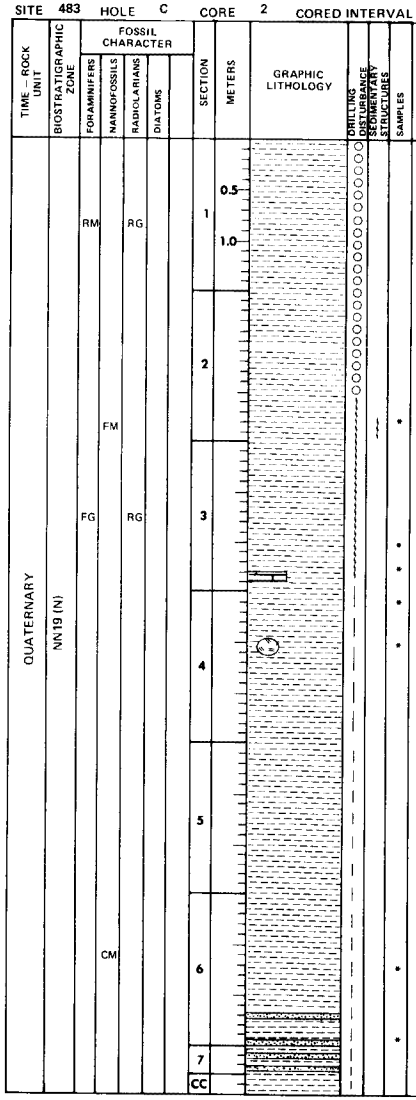
5GY 3/2 and 10Y 4/2

SMEAR SLIDE SUMMARY

	1-46 (M)	1-75	1-127 (M)	2-14	2-75	2-148
TEXTURE:						
Sand	60	TR	TR	TR	TR	TR
Silt	30	63	38	71	52	52
Clay	10	37	62	29	48	48
COMPOSITION:						
Quartz	–	15	4	TR	TR	10
Feldspar	TR	TR	TR	–	TR	2
Mica	–	TR	–	–	–	TR
Heavy minerals	–	TR	TR	–	TR	TR
Clay	10	37	62	29	48	48
Volcanic glass	80	TR	5	–	TR	TR
Pyrite	TR	2	TR	TR	TR	TR
Carbonate unspec.	–	1	–	1	–	TR
Calc. nannofossils	10	5	2	40	20	TR
Diatoms	TR	20	15	15	15	20
Radiolarians	TR	15	10	10	10	10
Sponge spicules	TR	5	2	5	7	10
Silicoflagellates	TR	–	TR	TR	TR	TR

	3-75	3-85 (M)	3-94 (M)	3-138	4-75	5-75
TEXTURE:						
Sand	–	–	40	2	–	–
Silt	25	68	53	20	55	31
Clay	75	32	7	78	45	69
COMPOSITION:						
Quartz	10	5	–	3	10	10
Feldspar	TR	TR	–	TR	TR	1
Mica	1	–	–	TR	–	–
Heavy minerals	–	TR	TR	TR	TR	TR
Clay	75	32	7	78	45	69
Volcanic glass	10	TR	93	10	5	2
Pyrite	TR	60	–	1	2	1
Foraminifers	–	–	TR	–	–	–
Calc. nannofossils	–	–	1	7	8	–
Diatoms	2	1	TR	TR	15	2
Radiolarians	2	1	1	1	10	10
Sponge spicules	TR	1	–	TR	5	5
Silicoflagellates	–	TR	–	–	TR	–

SITE 483 HOLE C CORE 2 CORED INTERVAL 86.0–95.5 m



10Y 4/2

CLAY and SILTY CLAY containing pieces of LIMESTONE in Section 3, a small patch of vitric SILTY CLAY (ash?) at a depth of 46 cm in Section 4 and thin layers of SANDY SILT near the base of the core. The sediments are soft to the base of Section 4, then firm throughout the remainder of the core.

10Y 4/2 and 5Y 3/2

5Y 3/2

5Y 3/2 and 10Y 4/2

5Y 3/2

SMEAR SLIDE SUMMARY

	2-130	3-104	3-138 (M)	4-17	4-56 (M)	6-75	6-148 (M)
TEXTURE:							
Sand	–	TR	–	–	TR	–	10
Silt	11	30	100	6	37	45	60
Clay	89	70	–	94	63	55	30
COMPOSITION							
Quartz	1	15		4	10	20	30
Feldspar	TR	5	–	TR	2	5	15
Mica	–	TR	–	–	–	TR	1
Heavy minerals	2	TR	–	TR	1	TR	1
Clay	89	70	–	94	63	55	30
Volcanic glass	3	TR		1	14	2	TR
Pyrite	5	10	–		5	–	10
Zeolite	–	–	–	–	5	15	10
Carbonate unspec.	TR	TR	100	–	–	TR	–
Calc. nannofossils	TR	TR	–	TR	TR	3	3
Diatoms	TR	–	–	TR	–	TR	
Radiolarians	TR	–	–	TR	–	–	–
Sponge spicules	TR	–	–	1			

SITE 483 HOLE C CORE 3 CORED INTERVAL 95.5–105.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FM	B	B		1	0.5					5Y 3/2
							1.0					
						2					*	
		B		B	CC						*	

Firm, olive gray SILTY CLAY containing small pieces of partially dolomitized LIMESTONE near the top of Section 1, dusky purple streaks of pyrite in the middle of Section 1 and burrows filled with SANDY SILT in the lower half of Section 1.

SMEAR SLIDE SUMMARY

	2-75	2-110 (M)
TEXTURE:		
Sand	1	
Silt	40	20
Clay	59	80
COMPOSITION:		
Quartz	15	10
Feldspar	10	2
Mica	TR	TR
Heavy minerals	TR	TR
Clay	59	80
Volcanic glass	5	3
Pyrite	1	–
Zeolite	10	5

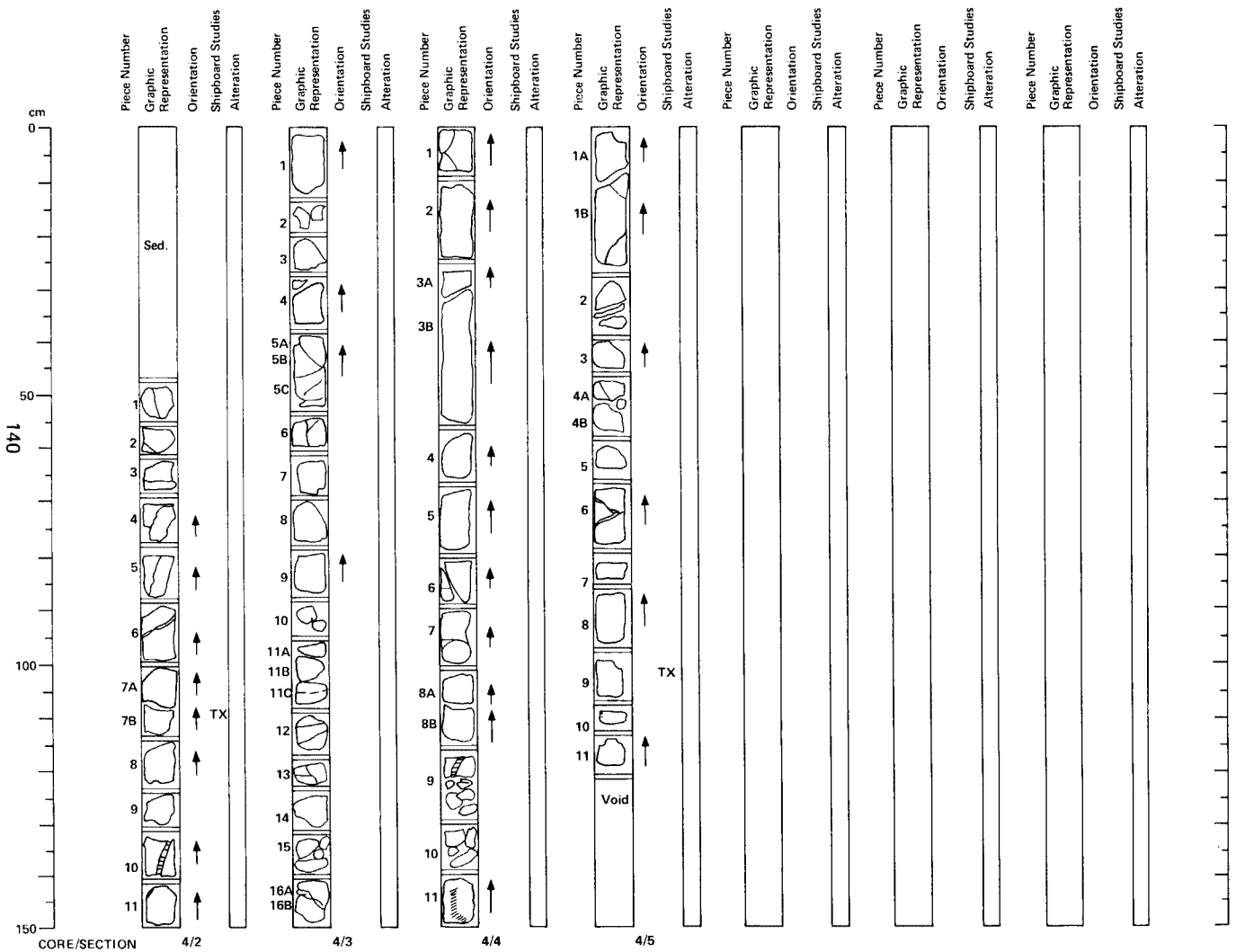
SITE 483 HOLE C CORE 4 CORED INTERVAL 105.0–114.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			B			1	0.5				*	5Y 3/2
							1.0					
						2					*	
						3					*	
						4						
						5						

Section 1, 0 cm–Section 2, 47 cm: Firm olive gray SILTY CLAY underlain by a thin (3 cm) indurated layer of gray SILTY CLAYSTONE and light gray SILTSTONE overlying massive BASALT.

SMEAR SLIDE SUMMARY

	1-107	2-15	2-42
TEXTURE:			
Sand	2	–	1
Silt	38	33	39
Clay	60	67	60
COMPOSITION:			
Quartz	30	15	20
Feldspar	2	2	10
Mica	TR	TR	TR
Heavy minerals	TR	TR	–
Clay	60	67	60
Volcanic glass	–	–	?
Pyrite	1	TR	1
Zeolite	7	10	10



HOLE 483C, CORE 4

Visual Description

Section 1, 0–46 cm: Brown siltstone

Section 1, 46 cm–base of core: Gray, aphyric, massive basalt. Rock fine- to medium-grained, uniform, relatively fresh. Vesicles rare, a few at top of core, ≤1 mm, spherical, filled with carbonate. Veins sparse, ≤2 mm, filled with carbonate.

Thin Section Description

Location: Section 2, 110–112 cm

Texture: Aphyric, medium-grained, intergranular

Groundmass: Olivine 5%, 0.15–0.3 mm, subhedral, altered to smectite, a few grains with fresh remnants; plagioclase 50–55%, 0.2–1 mm, subhedral laths, fresh; clinopyroxene 35–40%, 0.05–0.25 mm, granular, mostly fresh, minor alteration to chlorite(?), $2V_z$ ~40°; opaques 3–4%, 0.05–0.15 mm, subhedral, skeletal crystals, magnetite-ilmenite, interstitial material 1–2%, glassy to microcrystalline patches altered to smectite with minor apatite and chlorite(?).

Vesicles: <1%, 0.2–0.4 mm, spherical, filled with smectite

Alteration: Some olivine and interstitial material replaced by smectite

Location: Section 5, 98–101 cm

Texture: Aphyric, medium-grained, intergranular

Groundmass: Olivine 5%, 0.2–0.5 mm, subhedral, partly altered to smectite; plagioclase 55%, 0.4–1.5 mm, subhedral laths, fresh; clinopyroxene 35%, 0.1–0.3 mm, granular, mostly fresh, some marginally altered to chlorite(?); opaques 2–3%, 0.1–0.3 mm, anhedral, often skeletal, probably magnetite; interstitial material 1%, mostly quartz with minor apatite.

Vesicles: <1%, 0.3–0.5 mm, spherical, filled with smectite

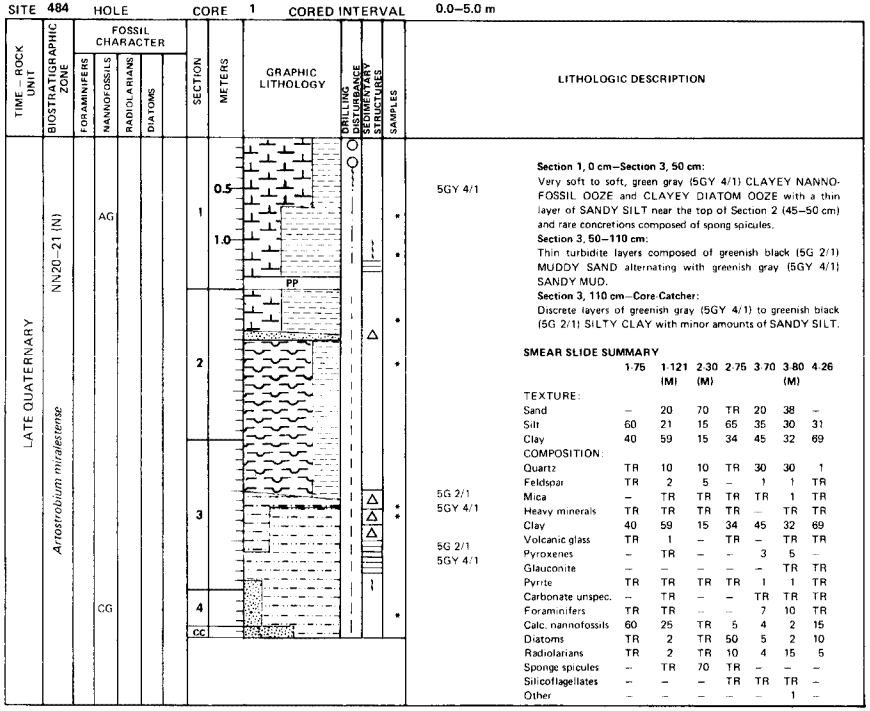
Alteration: Some olivine altered to smectite

SITE SUMMARY

HOLE 484

Date occupied: 1000 March 3, 1979
Date departed: 1800 March 3, 1979
Time on hole: 8 hours
Position (latitude; longitude): 23°11.32'N; 108°23.60'W
Water depth (sea level; corrected m, echo-sounding): 2891
Water depth (rig floor; corrected m, echo-sounding): 2901
Bottom felt at (m, drill pipe): 2906
Penetration (m): 5
Number of cores: 1
Total length of cored section (m): 5.0
Total core recovered (m): 5.0
Core recovery (%): 100
Oldest Sediment Cored
Depth sub-bottom (m): 5.0
Nature: Silty clay
Age: Quaternary
Measured velocity (km/s): About 1.6

SITE 484 HOLE CORE 1 CORED INTERVAL 0.0–5.0 m



LITHOLOGIC DESCRIPTION

5GY 4/1

Section 1, 0 cm–Section 3, 50 cm:
Very soft to soft, green gray (5GY 4/1) CLAYEY NANNOFOSSIL OOZE and CLAYEY DIATOM OOZE with a thin layer of SANDY SILT near the top of Section 2 (45–50 cm) and rare concretions composed of spong spicules.

Section 3, 50–110 cm:
Thin turbidite layers composed of greenish black (5G 2/1) MUDDY SAND alternating with greenish gray (5GY 4/1) SANDY MUD.

Section 3, 110 cm–Core-Catcher:
Discrete layers of greenish gray (5GY 4/1) to greenish black (5G 2/1) SILTY CLAY with minor amounts of SANDY SILT.

SMEAR SLIDE SUMMARY

	1-75	1-121 (M)	2-30 (M)	2-75	3-70	3-80 (M)	4-26
TEXTURE:							
Sand	–	20	70	TR	20	38	–
Silt	60	21	15	65	35	30	31
Clay	40	59	15	34	45	32	69
COMPOSITION:							
Quartz	TR	10	10	TR	30	30	1
Feldspar	TR	2	5	–	1	1	TR
5G 2/1 Mica	–	TR	TR	TR	TR	1	TR
5GY 4/1 Heavy minerals	TR	TR	TR	TR	–	TR	TR
Clay	40	59	15	34	45	32	69
5G 2/1 Volcanic glass	TR	1	–	TR	–	TR	TR
5GY 4/1 Pyroxenes	–	TR	–	–	3	5	–
Glauconite	–	–	–	–	–	TR	TR
Pyrite	TR	TR	TR	TR	1	1	TR
Carbonate unspec.	–	TR	–	–	TR	TR	TR
Foraminifers	TR	TR	–	–	7	10	TR
Calc. nannofossils	60	25	TR	5	4	2	15
Diatoms	TR	2	TR	50	5	2	10
Radiolarians	TR	2	TR	10	4	15	5
Sponge spicules	–	TR	70	TR	–	–	–
Silicoflagellates	–	–	–	TR	TR	TR	–
Other	–	–	–	–	–	1	–

SITE SUMMARY

HOLE 484A

Date occupied: 2355 March 3, 1979
Date departed: 1600 March 4, 1979
Time on hole: 16 hours
Position (latitude; longitude): 23°11.15'N; 108°23.62'W
Water depth (sea level; corrected m, echo-sounding): 2883
Water depth (rig floor; corrected m, echo-sounding): 2893
Bottom felt at (m, drill pipe): 2899.5
Penetration (m): 62
Number of cores: 8
Total length of cored section (m): 62.0
Total core recovered (m): 41.15
Core recovery (%): 67

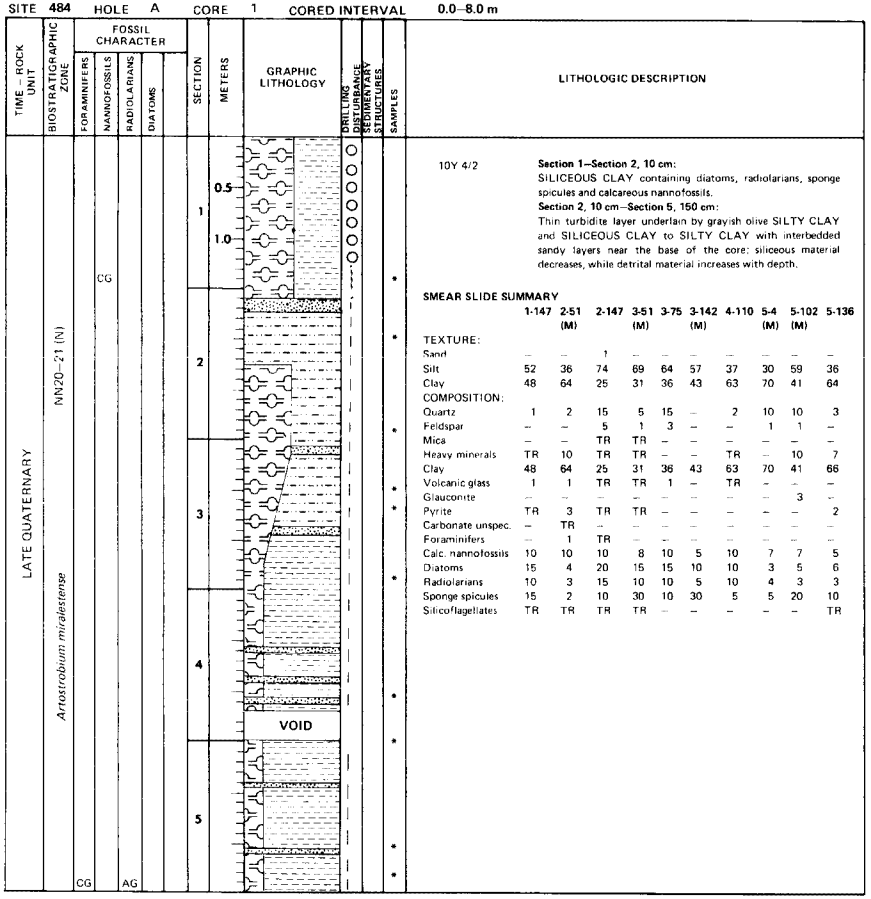
Oldest Sediment Cored

Depth sub-bottom (m): 55.5
Nature: Clayey siliceous nannofossil ooze
Age: Quaternary
Measured velocity (km/s): About 1.6

Basement

Depth sub-bottom (m): 62
Nature: Possibly basalt

SITE 484 HOLE A CORE 1 CORED INTERVAL 0.0–8.0 m



LITHOLOGIC DESCRIPTION

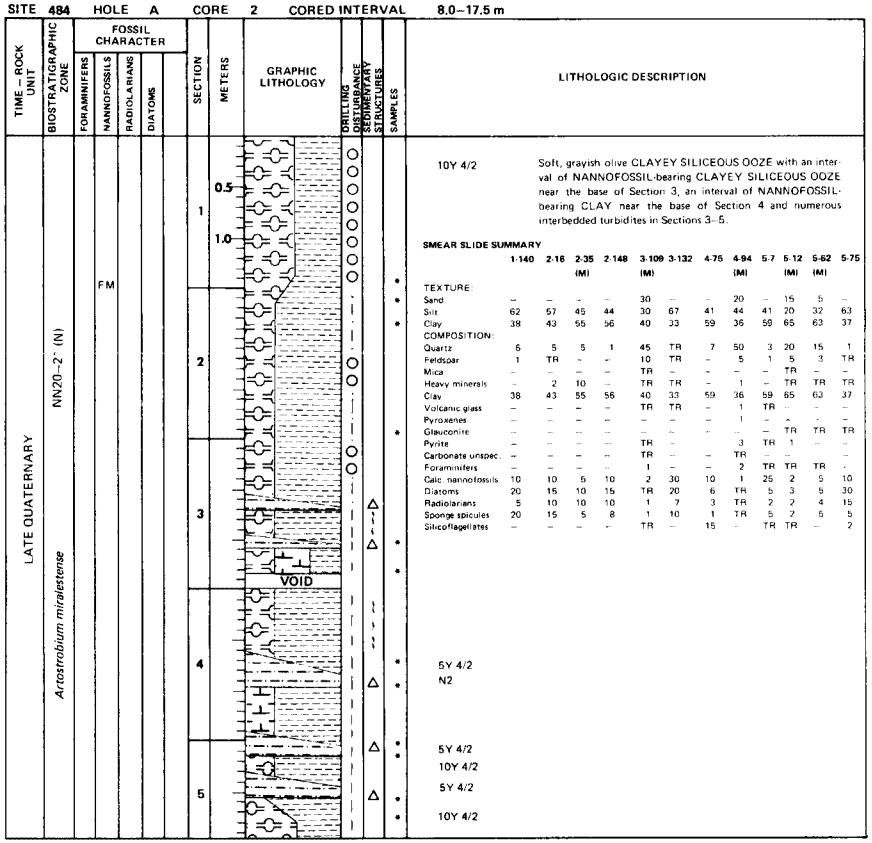
10Y 4/2

Section 1–Section 2, 10 cm:
SILICEOUS CLAY containing diatoms, radiolarians, sponge spicules and calcareous nannofossils.
Section 2, 10 cm–Section 5, 150 cm:
Thin turbidite layer underlain by grayish olive SILTY CLAY and SILICEOUS CLAY to SILTY CLAY with interbedded sandy layers near the base of the core; siliceous material decreases, while detrital material increases with depth.

SMEAR SLIDE SUMMARY

	1-147	2-51 (M)	2-147	3-51 (M)	3-75	3-142 (M)	4-110	5-4 (M)	5-102 (M)	5-136
TEXTURE:										
Sand	–	–	?	–	–	–	–	–	–	–
Silt	52	36	74	69	64	57	37	30	59	36
Clay	48	64	25	31	36	43	63	70	41	64
COMPOSITION:										
Quartz	1	2	15	5	15	–	2	10	10	3
Feldspar	–	–	5	1	3	–	–	1	1	–
Mica	–	–	TR	TR	–	–	–	–	–	–
Heavy minerals	TR	10	TR	TR	–	–	TR	–	10	7
Clay	48	64	25	31	36	43	63	70	41	66
Volcanic glass	1	1	TR	TR	1	–	TR	–	–	–
Glauconite	–	–	–	–	–	–	–	–	3	–
Pyrite	TR	3	TR	TR	–	–	–	–	–	2
Carbonate unspec.	–	TR	–	–	–	–	–	–	–	–
Foraminifers	–	1	TR	–	–	–	–	–	–	–
Calc. nannofossils	10	10	10	8	10	5	10	7	7	5
Diatoms	15	4	20	15	15	10	10	3	5	6
Radiolarians	10	3	15	10	10	5	10	4	3	3
Sponge spicules	15	2	10	30	10	30	5	5	20	10
Silicoflagellates	TR	TR	TR	TR	–	–	–	–	–	TR

SITE 484 HOLE A CORE 2 CORED INTERVAL 8.0–17.5 m



LITHOLOGIC DESCRIPTION

10Y 4/2

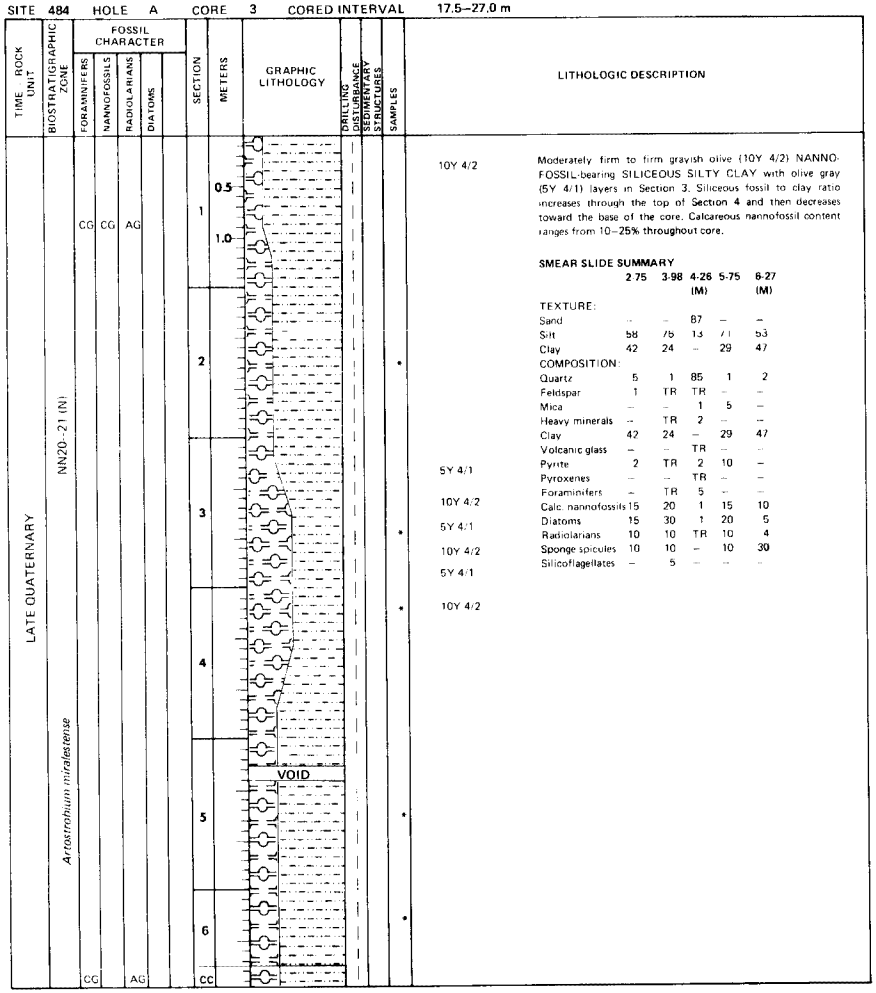
Soft, grayish olive CLAYEY SILICEOUS OOZE with an interval of NANNOFOSSIL-bearing CLAYEY SILICEOUS OOZE near the base of Section 3, an interval of NANNOFOSSIL-bearing CLAY near the base of Section 4 and numerous interbedded turbidites in Sections 3–5.

SMEAR SLIDE SUMMARY

	1-140	2-16	2-35 (M)	2-148	3-109 (M)	3-132	4-75	4-94 (M)	5-7	5-12 (M)	5-62 (M)	5-75
TEXTURE:												
Sand	–	–	–	–	30	–	–	20	–	15	5	–
Silt	62	57	46	44	30	67	41	44	41	20	32	63
Clay	38	43	55	56	40	33	59	36	59	65	63	37
COMPOSITION:												
Quartz	6	5	5	1	45	TR	7	50	3	20	15	1
Feldspar	1	TR	–	–	10	TR	–	5	1	5	3	TR
Mica	–	–	–	–	TR	–	–	–	–	TR	–	–
Heavy minerals	–	2	10	–	TR	TR	–	1	–	TR	TR	TR
Clay	38	43	55	56	40	33	59	36	59	65	63	37
Volcanic glass	–	–	–	–	TR	TR	–	1	TR	–	–	–
Pyroxenes	–	–	–	–	–	–	–	1	–	–	–	–
Glauconite	–	–	–	–	–	–	–	–	–	TR	TR	TR
Pyrite	–	–	–	–	TR	–		3	TR	1	–	–
Carbonate unspec.	–	–	–	–	TR	–	–	TR	–	–	–	–
Foraminifers	–	–	–	–	1	–	–	2	TR	TR	TR	–
Calc. nannofossils	10	10	5	10	2	30	10	1	25	2	5	10
Diatoms	20	15	10	15	TR	20	6	TR	5	3	5	30
Radiolarians	5	10	10	10	1	7	3	TR	2	2	4	15
Sponge spicules	20	15	5	8	1	10	1	TR	5	2	6	5
Silicoflagellates	–	–	–	–	TR	–	15	–	TR	TR	–	2

5Y 4/2
N2
5Y 4/2
10Y 4/2
5Y 4/2
10Y 4/2

SITE 484 HOLE A CORE 3 CORED INTERVAL 17.5–27.0 m

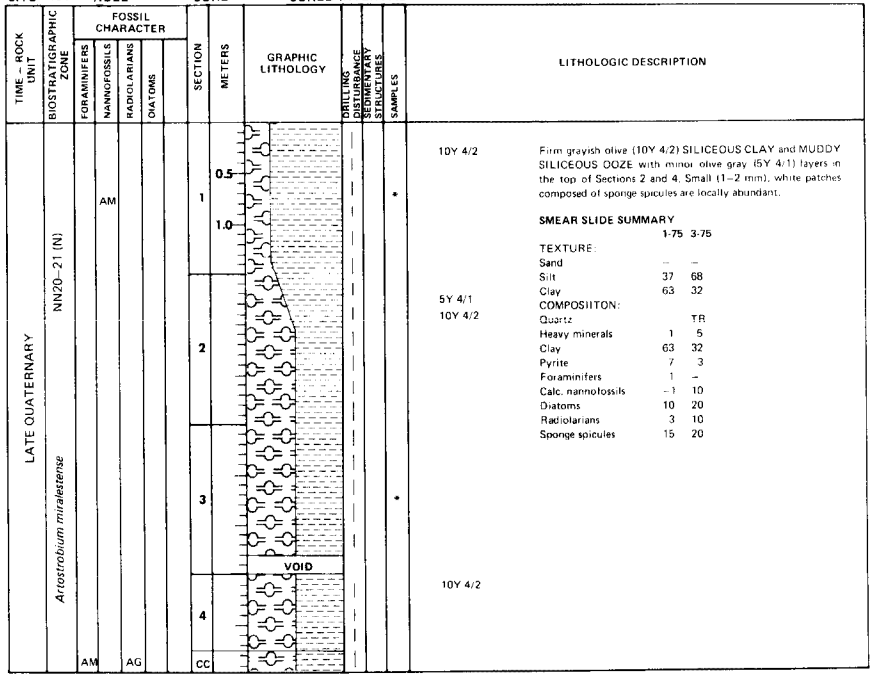


Moderately firm to firm grayish olive (10Y 4/2) NANNOFOSSIL-bearing SILICEOUS SILTY CLAY with olive gray (5Y 4/1) layers in Section 3. Siliceous fossil to clay ratio increases through the top of Section 4 and then decreases toward the base of the core. Calcareous nannofossil content ranges from 10–25% throughout core.

SMEAR SLIDE SUMMARY

	2-75	3-98	4-26 (M)	5-75	6-27 (M)
TEXTURE:					
Sand	–	–	87	–	–
Silt	58	76	13	71	53
Clay	42	24	–	29	47
COMPOSITION:					
Quartz	5	1	85	1	2
Feldspar	1	TR	TR	–	–
Mica	–	–	1	5	–
Heavy minerals	–	TR	2	–	–
Clay	42	24	–	29	47
Volcanic glass	–	–	TR	–	–
Pyrite	2	TR	2	10	–
Pyroxenes	–	–	TR	–	–
Foraminifers	–	TR	5	–	–
Calc. nannofossils	15	20	1	15	10
Diatoms	15	30	1	20	5
Radiolarians	10	10	TR	10	4
Sponge spicules	10	10	–	10	30
Silicoflagellates	–	5	–	–	–

SITE 484 HOLE A CORE 4 CORED INTERVAL 27.0–36.5 m

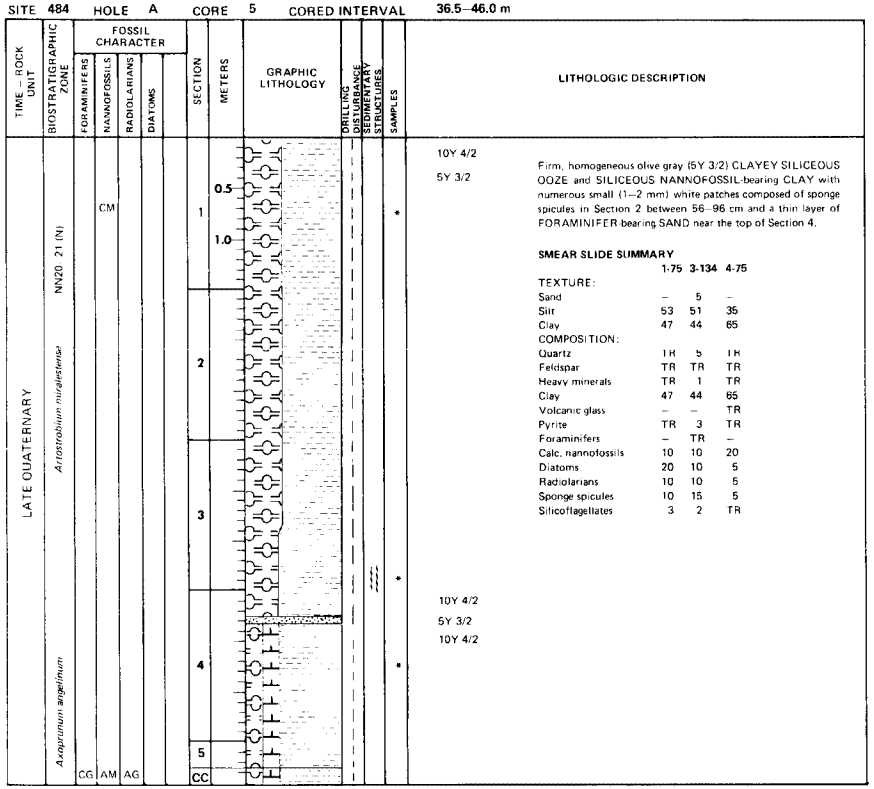


Firm grayish olive (10Y 4/2) SILICEOUS CLAY and MUDDY SILICEOUS OOZE with minor olive gray (5Y 4/1) layers in the top of Sections 2 and 4. Small (1–2 mm), white patches composed of sponge spicules are locally abundant.

SMEAR SLIDE SUMMARY

	1-75	3-75
TEXTURE:		
Sand	–	–
Silt	37	68
Clay	63	32
COMPOSITION:		
Quartz		TR
Heavy minerals	1	5
Clay	63	32
Pyrite	7	3
Foraminifers	1	–
Calc. nannofossils	– 1	10
Diatoms	10	20
Radiolarians	3	10
Sponge spicules	15	20

SITE 484 HOLE A CORE 5 CORED INTERVAL 36.5–46.0 m

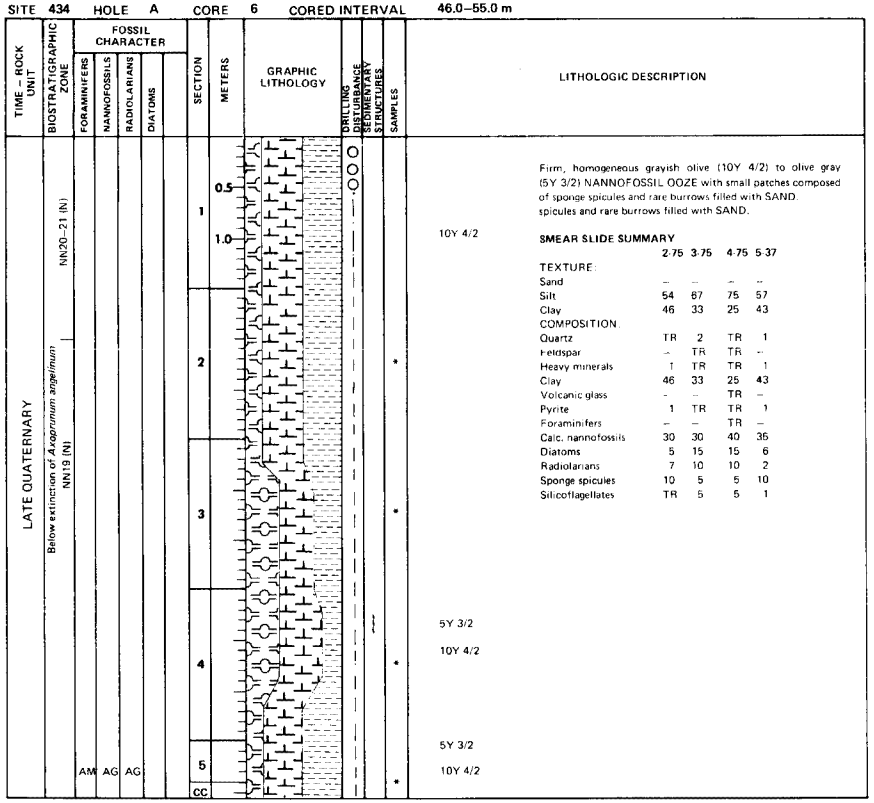


Firm, homogeneous olive gray (5Y 3/2) CLAYEY SILICEOUS OOZE and SILICEOUS NANNOFOSSIL-bearing CLAY with numerous small (1–2 mm) white patches composed of sponge spicules in Section 2 between 56–96 cm and a thin layer of FORAMINIFER-bearing SAND near the top of Section 4.

SMEAR SLIDE SUMMARY

	1-75	3-134	4-75
TEXTURE:			
Sand	–	5	–
Silt	53	51	35
Clay	47	44	65
COMPOSITION:			
Quartz	TR	5	TR
Feldspar	TR	TR	TR
Heavy minerals	TR	1	TR
Clay	47	44	65
Volcanic glass	–	–	TR
Pyrite	TR	3	TR
Foraminifers	–	TR	–
Calc. nannofossils	10	10	20
Diatoms	20	10	5
Radiolarians	10	10	5
Sponge spicules	10	15	5
Silicoflagellates	3	2	TR

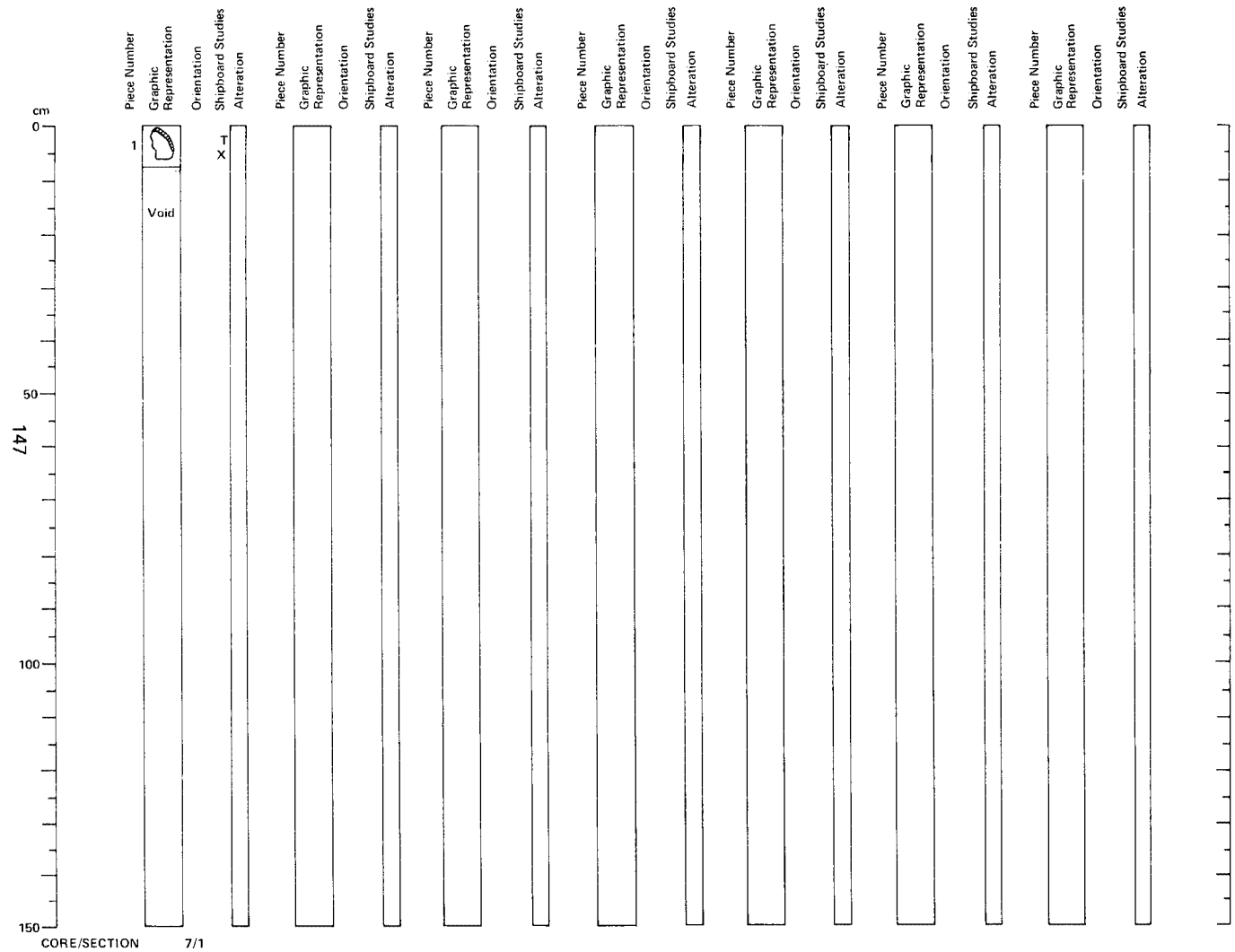
SITE 434 HOLE A CORE 6 CORED INTERVAL 46.0–55.0 m



Firm, homogeneous grayish olive (10Y 4/2) to olive gray (5Y 3/2) NANNOFOSSIL OOZE with small patches composed of sponge spicules and rare burrows filled with SAND.

SMEAR SLIDE SUMMARY

	2-75	3-75	4-75	5-37
TEXTURE:				
Sand	–	–	–	–
Silt	54	67	75	57
Clay	46	33	25	43
COMPOSITION:				
Quartz	TR	2	TR	1
Feldspar	–	TR	TR	–
Heavy minerals	1	TR	TR	1
Clay	46	33	25	43
Volcanic glass	–	–	TR	–
Pyrite	1	TR	TR	1
Foraminifers	–	–	TR	–
Calc. nannofossils	30	30	40	35
Diatoms	5	15	15	6
Radiolarians	7	10	10	2
Sponge spicules	10	5	5	10
Silicoflagellates	TR	5	5	1



HOLE 484A, CORE 7

Visual Description

Section 1, 0–6 cm: Single piece, gray sparsely phyric, basalt. Rock fine-grained wih chilled margin along one side. Plagioclase phenocrysts, 1–2%, subhedral laths, 1–3 mm, fresh, occasionally in glomerophyric clots, trace of olivine replaced by smectite. Rock generally fresh. Vesicles 1–2%, ≤ 2 mm, filled with smectite.

Thin Section Description

Location: Section 1, 5–7 cm

Texture: Sparsely phyric, quench

Phenocrysts: Plagioclase 1–2%, 0.5–2.5 mm, subhedral prisms, fresh, strongly zoned; olivine < 1%, 0.5 mm, subhedral, fresh

Groundmass: 97–98%, quench mixture of plagioclase microlites, granular opaques and poorly crystallized clinopyroxene with a few minute olivine crystals; generally fresh

Vesicles: < 1%, 0.3–0.5 mm, round, open, some segregation vesicles

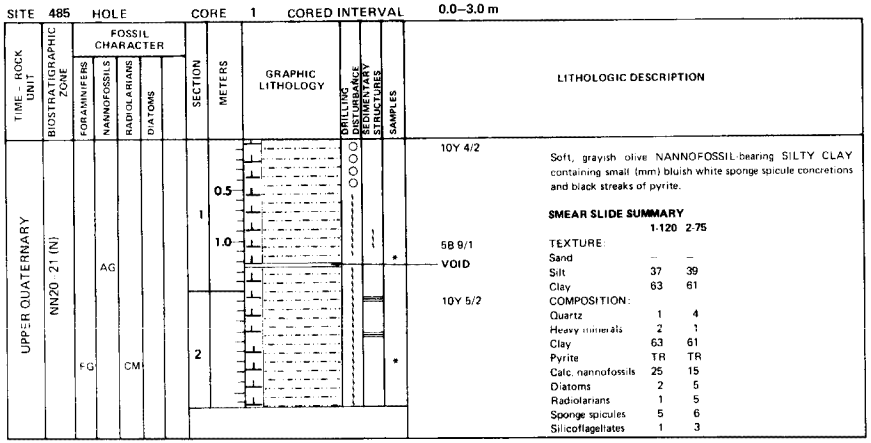
Alteration: Some disseminated pyrite in groundmass

SITE SUMMARY

HOLE 485

Date occupied: March 5, 1979
Date departed: March 6, 1979
Time on hole: 19 hours
Position (latitude; longitude): 22°44.95'N; 107°54.21'W
Water depth (sea level; corrected m, echo-sounding): 2981.0
Water depth (rig floor; corrected m, echo-sounding): 2991.0
Bottom felt at (m, drill pipe): 2996.5
Penetration (m): 50.5
Number of cores: 6
Total length of cored section (m): 50.5
Total core recovered (m): 36.93
Core recovery (%): 73
Oldest Sediment Cored
Depth sub-bottom (m): 50.5
Nature: Silty clay
Age: Quaternary
Measured velocity (km/s): 1.5

SITE 485 HOLE CORE 1 CORED INTERVAL 0.0–3.0 m



10Y 4/2

5B 9/1

VOID

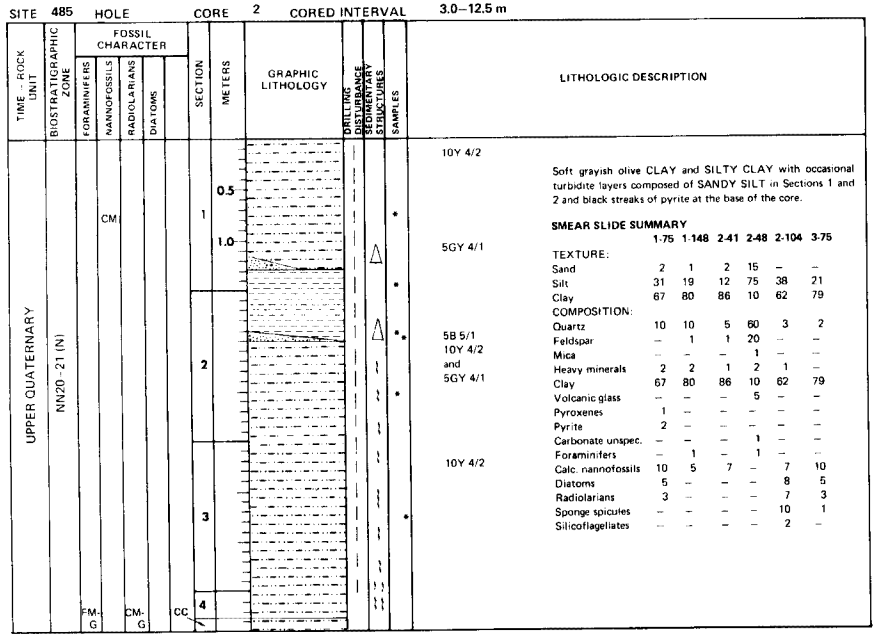
10Y 5/2

Soft, grayish olive NANNOFOSSIL-bearing SILTY CLAY containing small (mm) bluish white sponge spicule concretions and black streaks of pyrite.

SMEAR SLIDE SUMMARY

	1-120	2-75
TEXTURE:		
Sand	–	–
Silt	37	39
Clay	63	61
COMPOSITION:		
Quartz	1	4
Heavy minerals	2	1
Clay	63	61
Pyrite	TR	TR
Calc. nannofossils	25	15
Diatoms	2	5
Radiolarians	1	5
Sponge spicules	5	6
Silicoflagellates	1	3

SITE 485 HOLE CORE 2 CORED INTERVAL 3.0–12.5 m



10Y 4/2

5GY 4/1

5B 5/1
10Y 4/2
and
5GY 4/1

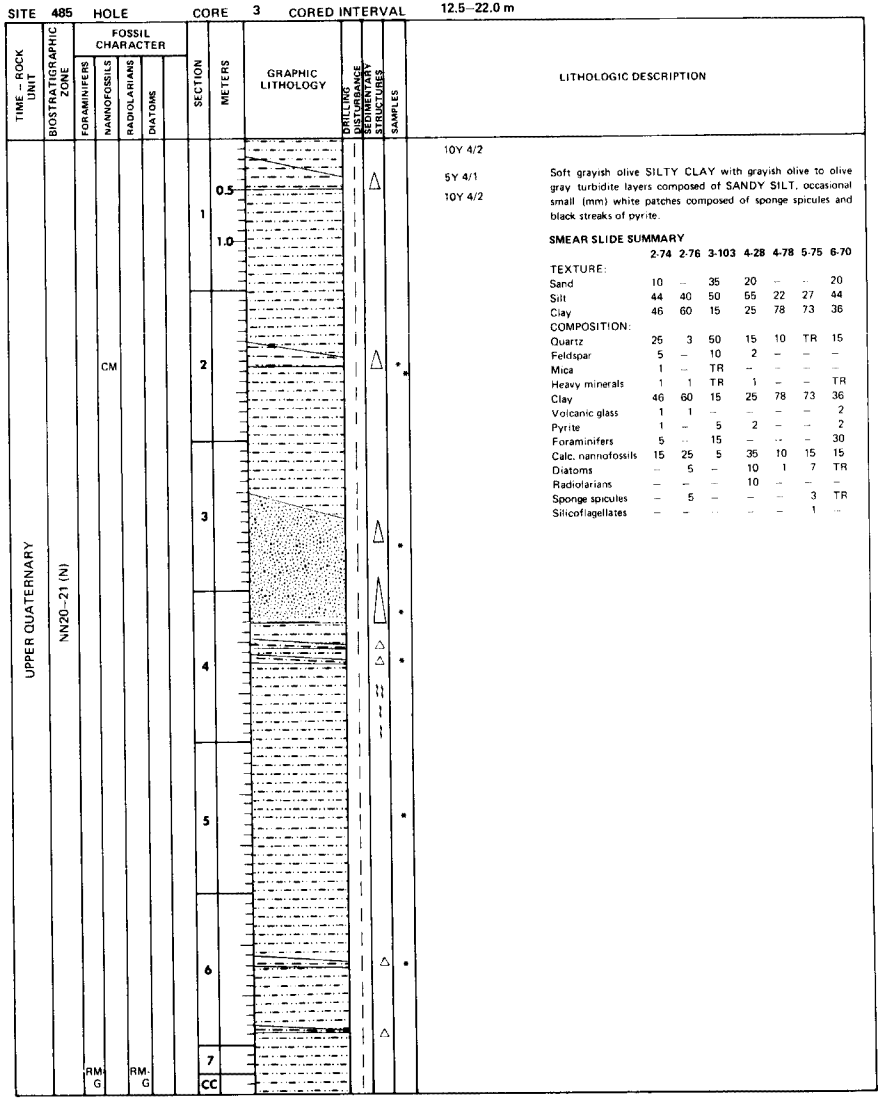
10Y 4/2

Soft grayish olive CLAY and SILTY CLAY with occasional turbidite layers composed of SANDY SILT in Sections 1 and 2 and black streaks of pyrite at the base of the core.

SMEAR SLIDE SUMMARY

	1-75	1-148	2-41	2-48	2-104	3-75
TEXTURE:						
Sand	2	1	2	15	–	–
Silt	31	19	12	75	38	21
Clay	67	80	86	10	62	79
COMPOSITION:						
Quartz	10	10	5	60	3	2
Feldspar	–	1	1	20	–	–
Mica	–	–	–	1	–	–
Heavy minerals	2	2	1	2	1	–
Clay	67	80	86	10	62	79
Volcanic glass	–	–	–	5	–	–
Pyroxenes	1	–	–	–	–	–
Pyrite	2	–	–	–	–	–
Carbonate unspec.	–	–	–	1	–	–
Foraminifers	–	1	–	1	–	–
Calc. nannofossils	10	5	7	–	7	10
Diatoms	5	–	–	–	8	5
Radiolarians	3	–	–	–	7	3
Sponge spicules	–	–	–	–	10	1
Silicoflagellates	–	–	–	–	2	–

SITE 485 HOLE CORE 3 CORED INTERVAL 12.5–22.0 m



10Y 4/2

5Y 4/1

10Y 4/2

Soft grayish olive SILTY CLAY with grayish olive to olive gray turbidite layers composed of SANDY SILT; occasional small (mm) white patches composed of sponge spicules and black streaks of pyrite.

SMEAR SLIDE SUMMARY

	2-74	2-76	3-103	4-28	4-78	5-75	6-70
TEXTURE:							
Sand	10	–	35	20	–	–	20
Silt	44	40	50	65	22	27	44
Clay	46	60	15	25	78	73	36
COMPOSITION:							
Quartz	25	3	50	15	10	TR	15
Feldspar	5	–	10	2	–	–	–
Mica	1	–	TR	–	–	–	–
Heavy minerals	1	1	TR	1	–	–	TR
Clay	46	60	15	25	78	73	36
Volcanic glass	1	1	–	–	–	–	2
Pyrite	1	–	5	2	–	–	2
Foraminifers	5	–	15	–	–	–	30
Calc. nannofossils	15	25	5	35	10	15	15
Diatoms	–	5	–	10	1	7	TR
Radiolarians	–	–	–	10	–	–	–
Sponge spicules	–	5	–	–	–	3	TR
Silicoflagellates	–	–	–	–	–	1	–

SITE 485 HOLE CORE 4 CORED INTERVAL 22.0–31.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER QUATERNARY	NN20–21 (N)	RG	CM	AG		1, 2, 3, CC	0.5, 1.0				*	10Y 4/2; 5Y 4/1; 5Y 3/2

Soft grayish olive to olive gray SILTY CLAY with an olive gray turbidite layer composed of NANNOFOSSIL-bearing SANDY MUD at the top of Section 2.

SMEAR SLIDE SUMMARY

	2-34
TEXTURE:	
Sand	15
Silt	49
Clay	36
COMPOSITION:	
Quartz	10
Feldspar	1
Heavy minerals	1
Clay	36
Volcanic glass	2
Pyrite	2
Carbonate unspec.	2
Foraminifers	15
Calc. nannofossils	25
Diatoms	1
Sponge spicules	< 1
Shell fragments	5

SITE 485 HOLE CORE 5 CORED INTERVAL 31.5–41.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER QUATERNARY	Above extinction of *Axoprunum angelinium* NN20–21 (N); NN19 (N)	RG	AM; AM; CM	CG		1, 2, 3, 4, CC, 5	0.5, 1.0				*	10Y 4/2; 5Y 3/2; 10Y 4/2; 5Y 3/2; 10Y 4/2; 5Y 3/2; 10Y 4/2; 5Y 3/2

Firm, olive gray NANNOFOSSIL-bearing SILTY CLAY with numerous turbidite layers composed of SANDY MUD throughout the core and with layers of grayish olive MUDDY NANNOFOSSIL OOZE near the top of Section 3 and the base of the core. Plant debris and foraminifer are common at the base of many of the turbidites.

SMEAR SLIDE SUMMARY

	1-71	2-10	2-57	2-105	3-15	3-31	3-95	4-49	4-121	4-141
TEXTURE:										
Sand	–	5	–	5	10	–	–	20	–	1
Silt	45	23	–	32	29	71	29	46	38	44
Clay	55	72	–	63	61	29	71	34	62	55
COMPOSITION:										
Quartz	15	10	–	7	12	10	10	15	2	10
Feldspar	–	–	–	–	1	–	–	2	–	–
Mica	–	–	–	–	–	–	–	–	–	1
Heavy minerals	10	2	–	4	3	2	3	1	2	–
Clay	55	72	–	63	61	29	71	34	62	55
Volcanic glass	–	–	–	–	–	–	–	10	–	–
Pyrite	–	1	–	–	–	1	–	1	–	–
Carbonate unspec.	–	–	–	–	–	1	–	5	–	–
Foraminifers	–	–	–	–	–	–	–	15	–	–
Calc. nannofossils	20	10	–	25	20	50	10	15	30	30
Diatoms	–	1	–	1	2	3	5	2	2	3
Radiolarians	–	–	–	–	1	2	–	–	–	–
Sponge spicules	–	2	–	–	–	1	TR	–	TR	1
Silicoflagellates	–	2	–	–	–	1	–	–	TR	–
Plant Debris	–	–	100	–	–	–	–	–	–	–

SITE 485 HOLE CORE 6 CORED INTERVAL 41.0–50.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER QUATERNARY	NN19 (N)	CM–G	CM	CG		1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0				*	10Y 4/2 and 5Y 4/1; 5Y 4/1; 10Y 4/2; 5Y 4/1; 10Y 4/2; 5Y 4/1

Firm, grayish olive SILTY CLAY with pieces of LIMESTONE or DOLOMITE in Sections 1 and 2 and fine-grained turbidites throughout. Foraminifer are common at the base of many of the turbidites.

SMEAR SLIDE SUMMARY

	1-85 (M)	2-80	5-80	6-140
TEXTURE:				
Sand	–	–	–	5
Silt	100	37	37	43
Clay	–	63	63	52
COMPOSITION:				
Quartz	–	12	10	5
Heavy minerals	–	3	3	5
Clay	–	63	63	52
Pyrite	1	1	–	–
Carbonate unspec.	99	–	–	–
Foraminifers	–	–	–	TR
Calc. nannofossils	–	15	20	30
Diatoms	–	2	2	3
Radiolarians	–	1	TR	1
Sponge spicules	–	3	1	1

SITE SUMMARY

HOLE 485A

Date occupied: March 6, 1979
Date departed: March 12, 1979
Time on hole: 7 days
Position (latitude; longitude): 22°44.92'N; 107°54.23'W
Water depth (sea level; corrected m, echo-sounding): 2981.0
Water depth (rig floor; corrected m, echo-sounding): 2991.0
Bottom felt at (m, drill pipe): 2996.5
Penetration (m): 331.0
Number of cores: 39
Total length of cored section (m): 280.5
Total core recovered (m): 136.1
Core recovery (%): 49

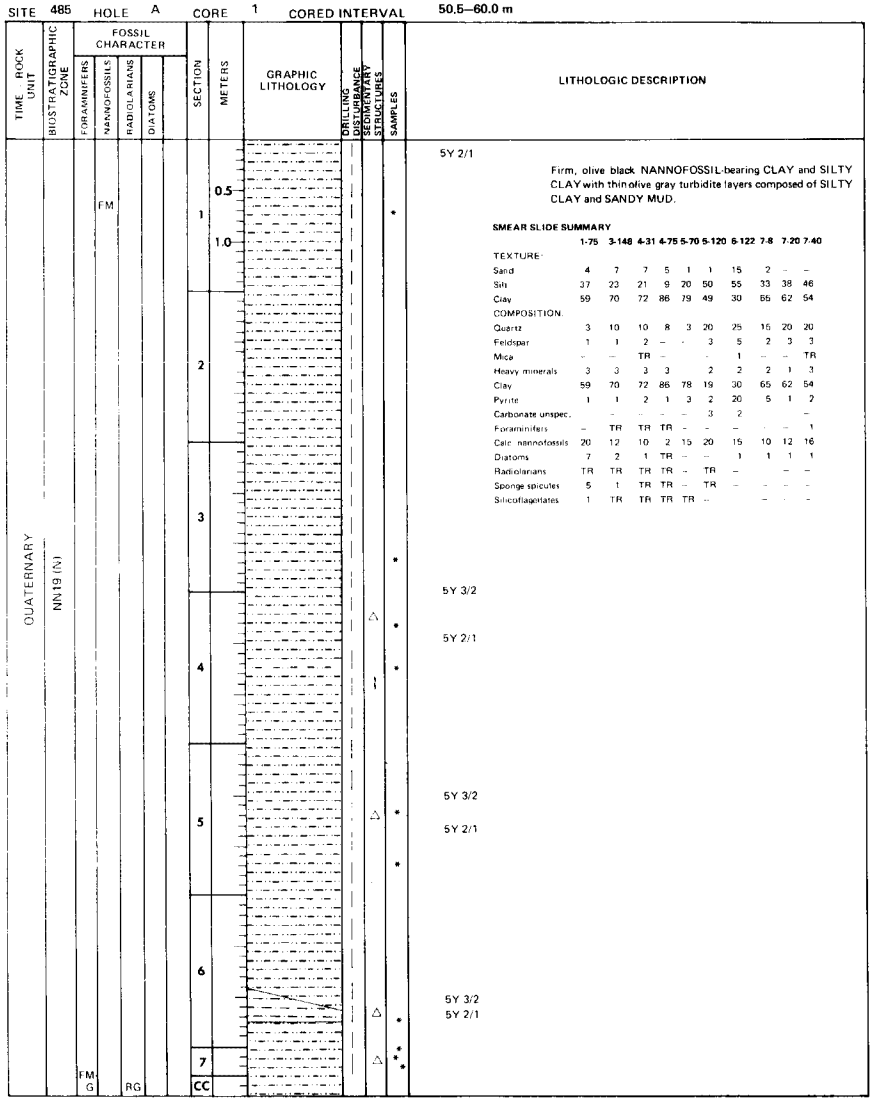
Oldest Sediment Cored

Depth sub-bottom (m): 314.5
Nature: Mudstone
Age: Quaternary
Measured velocity (km/s): 2.17

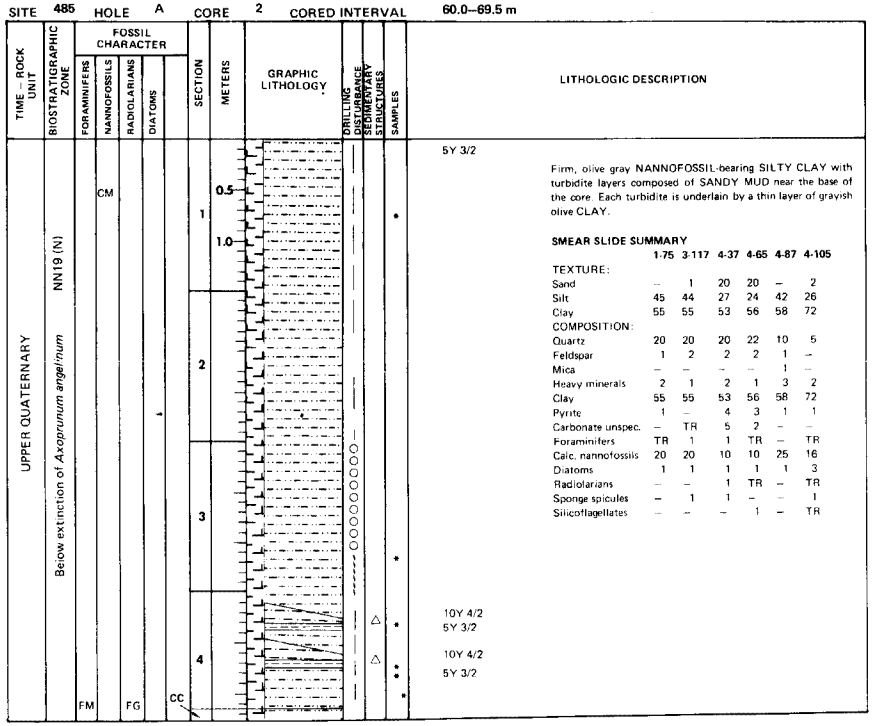
Basement

Depth sub-bottom (m): 153.5
Nature: Basalt
Velocity range (km/s): 4.99–6.20

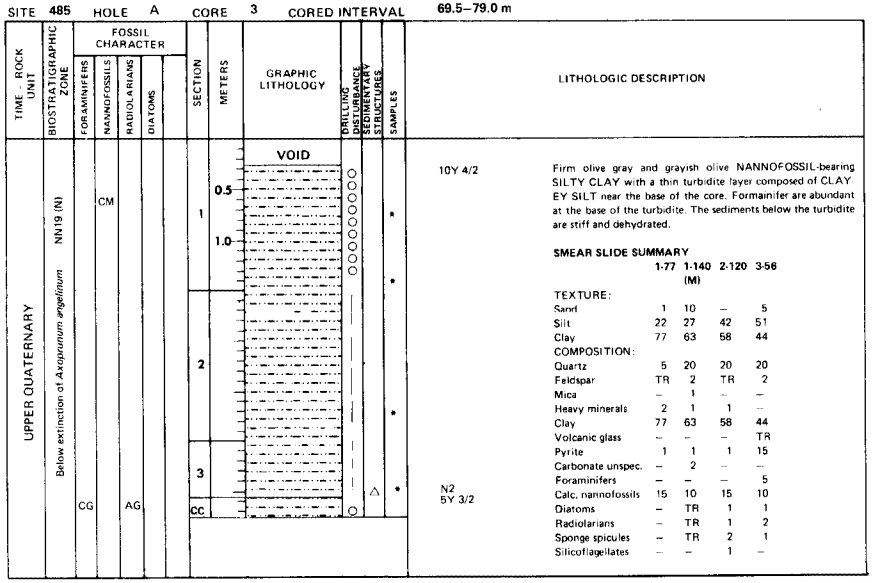
SITE 485 HOLE A CORE 1 CORED INTERVAL 50.5–60.0 m



SITE 485 HOLE A CORE 2 CORED INTERVAL 60.0–69.5 m



SITE 485 HOLE A CORE 3 CORED INTERVAL 69.5–79.0 m

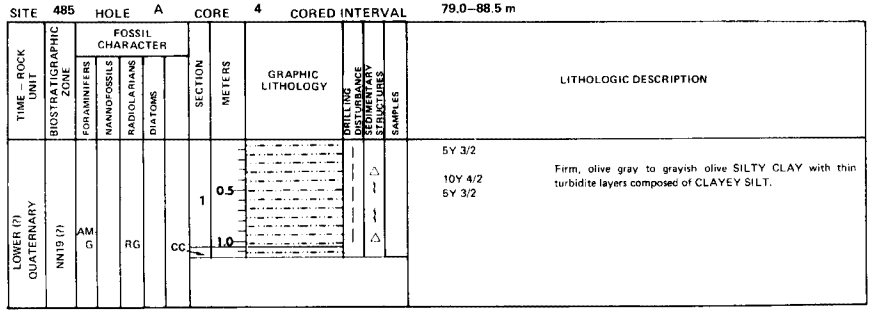


Firm olive gray and grayish olive NANNOFOSSIL-bearing SILTY CLAY with a thin turbidite layer composed of CLAYEY SILT near the base of the core. Formainifer are abundant at the base of the turbidite. The sediments below the turbidite are stiff and dehydrated.

SMEAR SLIDE SUMMARY

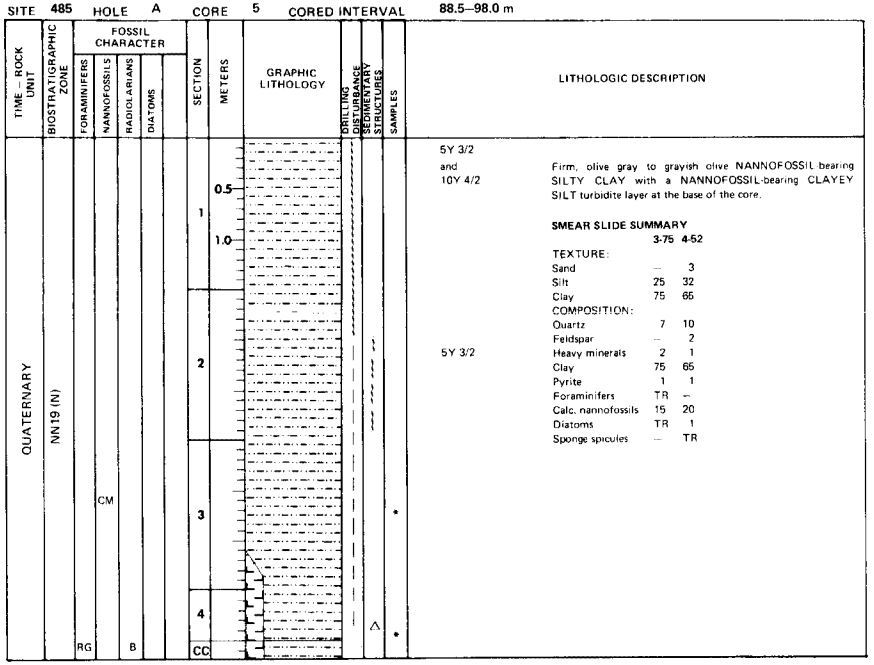
	1-77	1-140 (M)	2-120	3-56
TEXTURE:				
Sand	1	10	–	5
Silt	22	27	42	51
Clay	77	63	58	44
COMPOSITION:				
Quartz	5	20	20	20
Feldspar	TR	2	TR	2
Mica	–	1	–	–
Heavy minerals	2	1	1	–
Clay	77	63	58	44
Volcanic glass	–	–	–	TR
Pyrite	1	1	1	15
Carbonate unspec.	–	2	–	–
Foraminifers	–	–	–	5
Calc. nannofossils	15	10	15	10
Diatoms	–	TR	1	1
Radiolarians	–	TR	1	2
Sponge spicules	–	TR	2	1
Silicoflagellates	–	–	1	–

SITE 485 HOLE A CORE 4 CORED INTERVAL 79.0–88.5 m



Firm, olive gray to grayish olive SILTY CLAY with thin turbidite layers composed of CLAYEY SILT.

SITE 485 HOLE A CORE 5 CORED INTERVAL 88.5–98.0 m

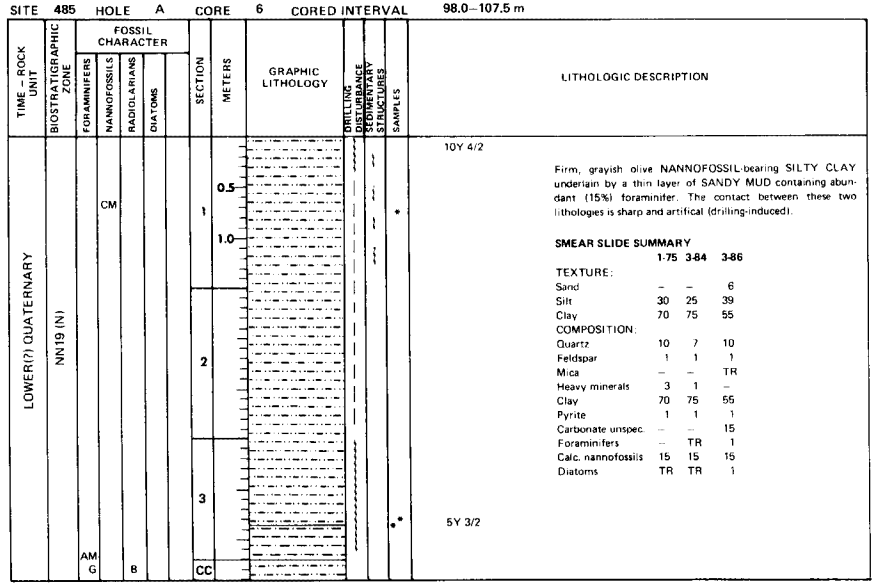


Firm, olive gray to grayish olive NANNOFOSSIL bearing SILTY CLAY with a NANNOFOSSIL-bearing CLAYEY SILT turbidite layer at the base of the core.

SMEAR SLIDE SUMMARY

	3-75	4-52
TEXTURE:		
Sand	–	3
Silt	25	32
Clay	75	66
COMPOSITION:		
Quartz	7	10
Feldspar	–	2
Heavy minerals	2	1
Clay	75	65
Pyrite	1	1
Foraminifers	TR	–
Calc. nannofossils	15	20
Diatoms	TR	1
Sponge spicules	–	TR

SITE 485 HOLE A CORE 6 CORED INTERVAL 98.0–107.5 m

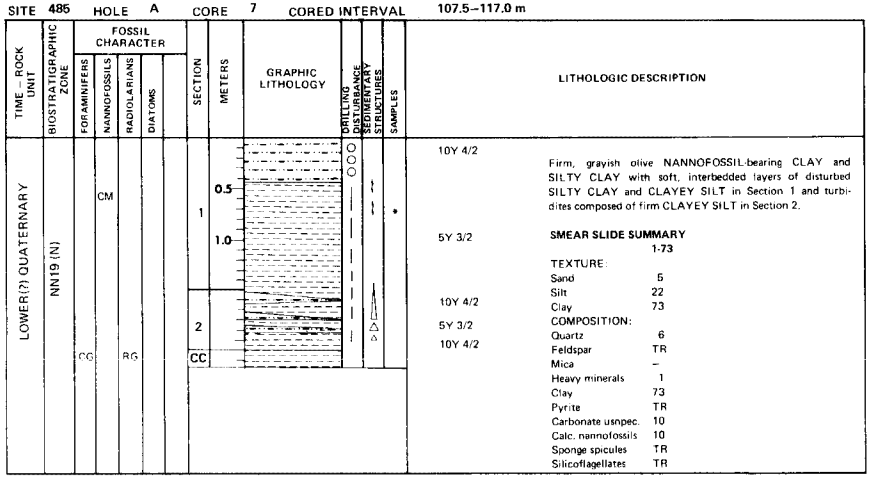


Firm, grayish olive NANNOFOSSIL-bearing SILTY CLAY underlain by a thin layer of SANDY MUD containing abundant (15%) foraminifer. The contact between these two lithologies is sharp and artifical (drilling-induced).

SMEAR SLIDE SUMMARY

	1-75	3-84	3-86
TEXTURE:			
Sand	–	–	6
Silt	30	25	39
Clay	70	75	55
COMPOSITION:			
Quartz	10	7	10
Feldspar	1	1	1
Mica	–	–	TR
Heavy minerals	3	1	–
Clay	70	75	55
Pyrite	1	1	1
Carbonate unspec.	–	–	15
Foraminifers	–	TR	1
Calc. nannofossils	15	15	15
Diatoms	TR	TR	1

SITE 485 HOLE A CORE 7 CORED INTERVAL 107.5–117.0 m



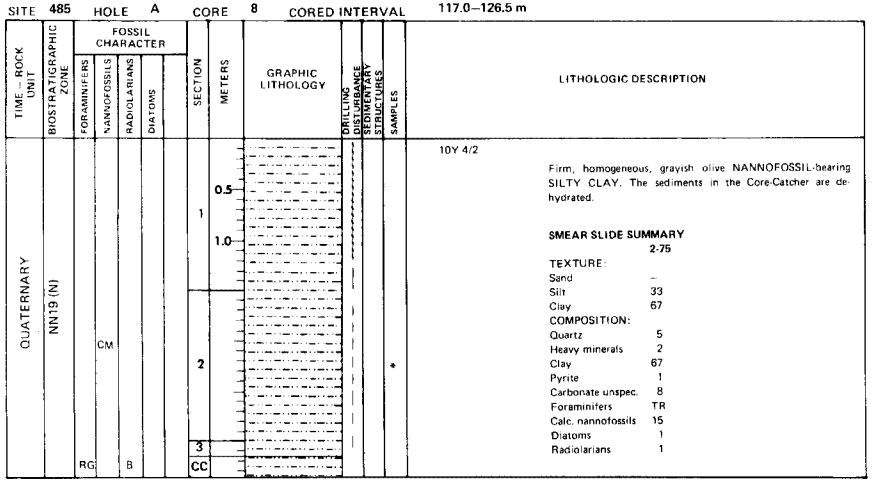
LITHOLOGIC DESCRIPTION

Firm, grayish olive NANNOFOSSIL-bearing CLAY and SILTY CLAY with soft, interbedded layers of disturbed SILTY CLAY and CLAYEY SILT in Section 1 and turbidites composed of firm CLAYEY SILT in Section 2.

SMEAR SLIDE SUMMARY

	1-73
TEXTURE:	
Sand	5
Silt	22
Clay	73
COMPOSITION:	
Quartz	6
Feldspar	TR
Mica	–
Heavy minerals	1
Clay	73
Pyrite	TR
Carbonate unspec.	10
Calc. nannofossils	10
Sponge spicules	TR
Silicoflagellates	TR

SITE 485 HOLE A CORE 8 CORED INTERVAL 117.0–126.5 m



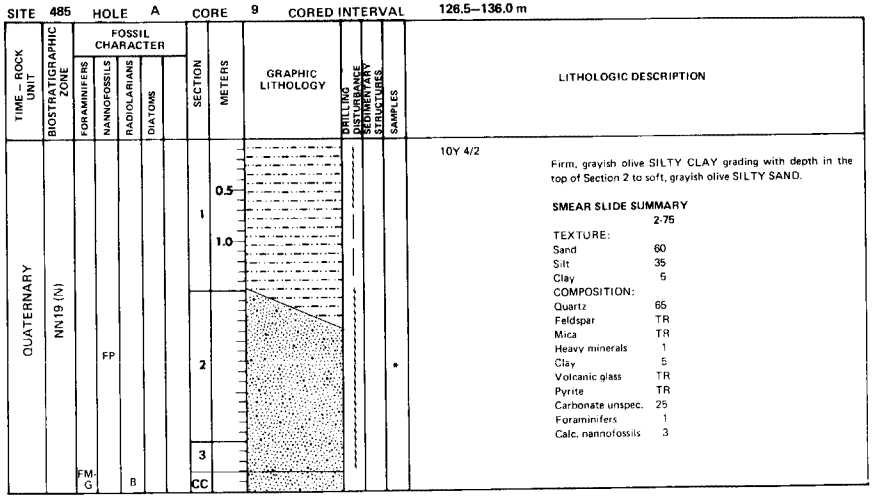
LITHOLOGIC DESCRIPTION

Firm, homogeneous, grayish olive NANNOFOSSIL-bearing SILTY CLAY. The sediments in the Core-Catcher are dehydrated.

SMEAR SLIDE SUMMARY

	2-75
TEXTURE:	
Sand	–
Silt	33
Clay	67
COMPOSITION:	
Quartz	5
Heavy minerals	2
Clay	67
Pyrite	1
Carbonate unspec.	8
Foraminifers	TR
Calc. nannofossils	15
Diatoms	1
Radiolarians	1

SITE 485 HOLE A CORE 9 CORED INTERVAL 126.5–136.0 m



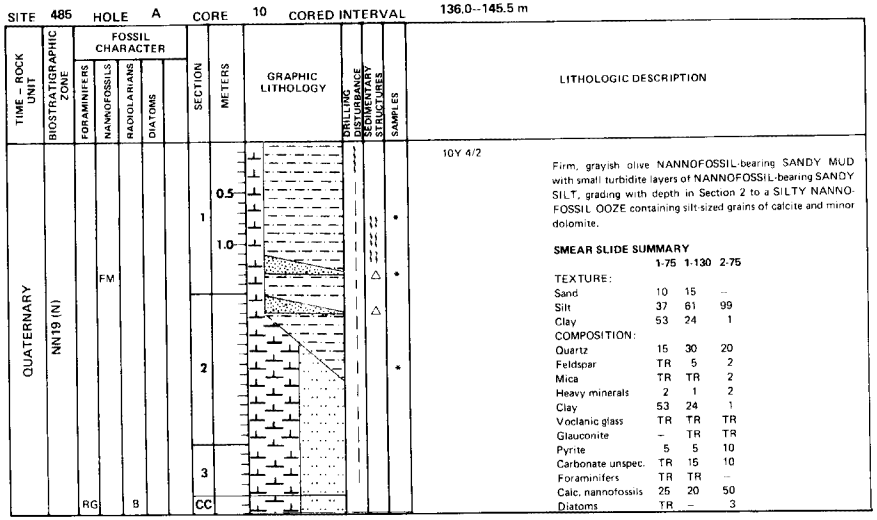
LITHOLOGIC DESCRIPTION

Firm, grayish olive SILTY CLAY grading with depth in the top of Section 2 to soft, grayish olive SILTY SAND.

SMEAR SLIDE SUMMARY

	2-75
TEXTURE:	
Sand	60
Silt	35
Clay	5
COMPOSITION:	
Quartz	65
Feldspar	TR
Mica	TR
Heavy minerals	1
Clay	5
Volcanic glass	TR
Pyrite	TR
Carbonate unspec.	25
Foraminifers	1
Calc. nannofossils	3

SITE 485 HOLE A CORE 10 CORED INTERVAL 136.0–145.5 m



LITHOLOGIC DESCRIPTION

Firm, grayish olive NANNOFOSSIL-bearing SANDY MUD with small turbidite layers of NANNOFOSSIL-bearing SANDY SILT, grading with depth in Section 2 to a SILTY NANNOFOSSIL OOZE containing silt-sized grains of calcite and minor dolomite.

SMEAR SLIDE SUMMARY

	1-75	1-130	2-75
TEXTURE:			
Sand	10	15	–
Silt	37	61	99
Clay	53	24	1
COMPOSITION:			
Quartz	15	30	20
Feldspar	TR	5	2
Mica	TR	TR	2
Heavy minerals	2	1	2
Clay	53	24	1
Volcanic glass	TR	TR	TR
Glauconite	–	TR	TR
Pyrite	5	5	10
Carbonate unspec.	TR	15	10
Foraminifers	TR	TR	–
Calc. nannofossils	25	20	50
Diatoms	TR	–	3

SITE 485 HOLE A CORE 11 CORED INTERVAL 145.5–155.0 m

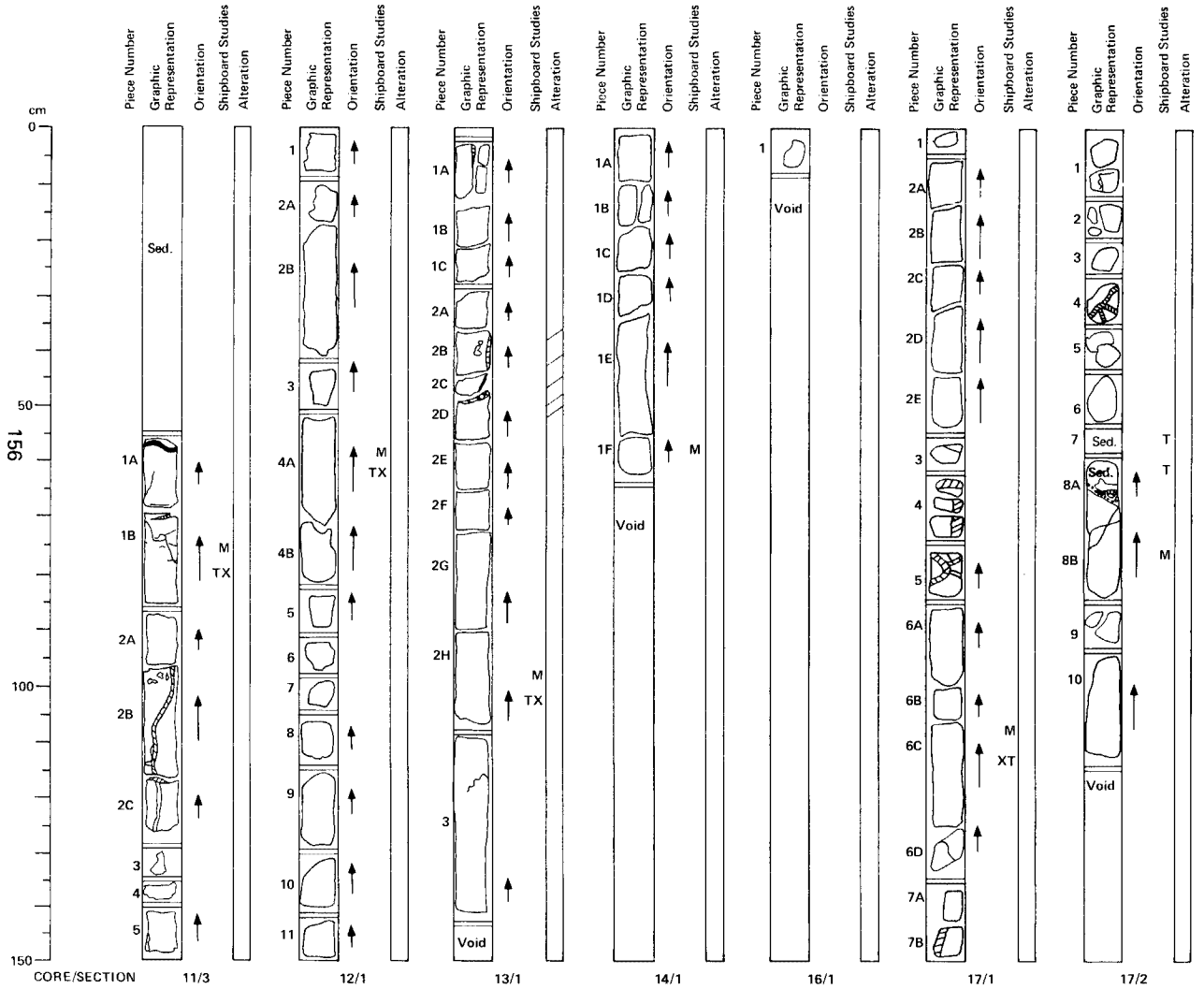
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER(?) QUATERNARY	NN19 (N)	CG	CP	B		1 2 3	0.5 1.0				* * *	5Y 3/2

Section 1, 0 cm–Section 3, 55 cm: Stiff, olive gray CALCAREOUS CLAYEY SILT grading with depth to CALCAREOUS SILTY SAND overlying BASALT. Dehydration is pronounced in the uppermost sediments and increases with depth to the base of the sediment section.

Section 3, 55–150 cm: BASALT with a thin glassy margin and a crust of brecciated, indurated sediments composed of SILTY SAND containing deformed foraminifer, shards of glass and feldspar.

SMEAR SLIDE SUMMARY

	1-75	2-75	3-35
TEXTURE:			
Sand	2	2	80
Silt	60	65	35
Clay	38	33	5
COMPOSITION:			
Quartz	33	20	40
Feldspar	5	3	15
Mica	2	TR	5
Heavy minerals	2	1	5
Clay	38	33	5
Volcanic glass	TR	TR	–
Pyroxenes	–	–	TR
Pyrite	1	2	5
Carbonate unspec.	10	20	10
Foraminifers	2	1	5
Calc. nannofossils	7	20	5
Diatoms	TR	TR	–



HOLE 485A, CORE 11

Visual Description

Section 1, 0 cm–Section 3, 56 cm: Sediment.

Section 3, 56 cm–base of core: Gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts <1%, ≤4 mm, subhedral, fresh. Groundmass very fine- to medium-grained, grain size increases gradually downward from glass selvedge at 56 cm, Section 3. Vesicles common near upper contact with sediment, ≤1 mm, round, filled with carbonate; elsewhere vesicles sparse. Veins and fractures fairly common, steep, filled with carbonate.

Thin Section Description

Location: Section 3, 82–83 cm:

Texture: Very sparsely phyric, fine- to medium-grained, intergranular to intersertal

Phenocrysts: Plagioclase <1%, ≤2 mm, anhedral; fresh, zoned; olivine 2%, ≤1 mm, subhedral, mostly fresh, some alteration to smectite, $2V_z \sim 90°$.

Groundmass: Plagioclase 50%, 0.5–0.8 mm, subhedral, fresh; olivine 5%, 0.1–0.2 mm, anhedral, mostly fresh with some alteration to smectite; clinopyroxene 45%, 0.2–0.5 mm, acicular, fresh, $2V_z \sim 40°$; opaques 2%, 0.05–0.1 mm, subhedral; interstitial material 2–3%, replaced by smectite.

Vesicles: ~1%, 0.5 mm, round to irregular, filled with carbonate.

Alteration: Olivine and interstitial material partly replaced by smectite.

HOLE 485A, CORE 12

Visual Description

Gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts <1%, ≤3 mm, subhedral, fresh; olivine(?) phenocrysts <1%, ≤1 mm, replaced by smectite. Groundmass fine- to medium-grained, fresh. Veinlets and fractures sparse, steep, filled with carbonate, smectite, and minor pyrite.

Thin Section Description

Location: Section 1, 62–64 cm

Texture: Sparsely to moderately phyric, quench

Phenocrysts: Plagioclase 8–10%, 0.6–1 mm, subhedral, fresh; olivine 2–3%, 0.4–0.6 mm, subhedral, mostly altered to smectite; clinopyroxene 2%, 0.3–0.5 mm, anhedral, fresh, $2V_z \sim 40°$; phenocrysts typically intergrown in glomerophyric clusters.

Groundmass: Dark brown, partly devitrified glass with sparse plagioclase and magnetite crystals.

Alteration: Olivine partly replaced by smectite.

HOLE 485A, CORE 13

Visual Description

Gray, sparsely phyric, massive basalt. Plagioclase phenocrysts ~1%, ≤2 mm, subhedral, fresh; olivine phenocrysts 2–3%, ≤1 mm, subhedral, replaced by smectite. Groundmass fine-grained, uniform, fresh. Vesicles <1%, ≤1 mm, round, filled with smectite; one large irregular vesicles at 40 cm, Section 1. Fractures and veinlets sparse, hairline to 1 mm, filled with carbonate and minor pyrite.

Thin Section Description

Location: Section 1, 103–105 cm

Texture: Aphyric, medium-grained, intergranular to intersertal

Groundmass: Plagioclase 50%, 0.5–1 mm, subhedral, fresh; olivine 1–2%, 0.5 mm, subhedral, partly replaced by smectite; clinopyroxene 40%, 0.3–0.5 mm, subhedral, fresh, $2V_z \sim 40°$; opaques 2–3%, 0.1–0.3 mm, subhedral, probably magnetite; interstitial material, 5%, brown microcrystalline material, fresh.

Veins and Fractures: Sparse, 0.2 mm wide, filled with carbonate.

Alteration: Olivine partly replaced by smectite.

HOLE 485A, CORE 14

Visual Description

Gray, sparsely phyric, massive basalt. Plagioclase phenocrysts ~1%, ≤3 mm, subhedral, fresh; olivine phenocrysts 1%, <1 mm, subhedral, replaced by smectite. Groundmass fine-grained, uniform, fresh. Fractures and veinlets sparse, hairline to 1 mm, filled with smectite and carbonate.

HOLE 485A, CORE 15

Visual Description

NO RECOVERY

HOLE 485A, CORE 16

Visual Description

Gray, sparsely phyric, massive basalt. Plagioclase phenocrysts < 1%, < 2 mm, subhedral, fresh. Groundmass fine-grained, uniform, fresh. Vesicles < 1%, < 0.5 mm, round, filled with carbonate.

HOLE 485A, CORE 17

Visual Description

Section 1, 0 cm–Section 2, 53 cm: Gray, aphyric, massive basalt. Plagioclase phenocrysts < 1%, < 2 mm, subhedral, fresh. Rock is fine- to medium-grained, fresh. Vesicles < 1%, ≈ 0.5 mm, round, filled with carbonate. Fractures and veinlets common, hairline to 12 mm wide, filled with carbonate.

Section 2, 53–57 cm: Medium-gray limestone.

Section 2, 57 cm–base of core: Gray, fine-grained, fresh, aphyric, massive basalt.

Thin Section Description

Location: Section 1, 112–114 cm

Texture: Aphyric, medium- to coarse-grained, intergranular to intersertal.

Groundmass: Plagioclase 50%, 0.5–1.5 mm, subhedral, fresh; olivine 5–8%, 0.3–0.5 mm, subhedral, replaced by carbonate and smectite; clinopyroxene 35%, 0.3–0.6 mm, subhedral, fresh, $2V_z \approx 40$; opaques 3%, 0.05–0.2 mm, subhedral, some acicular cyrstals, probably magnetite-ilmenite; interstitial material 5%, microcrystalline plagioclase and clinopyroxene, partly replaced by smectite.

Vesicles: < 1%, 0.5 mm, round, filled with carbonate

Veins and Fractures: Hairline vein filled with brown smectite

Alteration: Olivine and minor interstitial material replaced by smectite and carbonate.

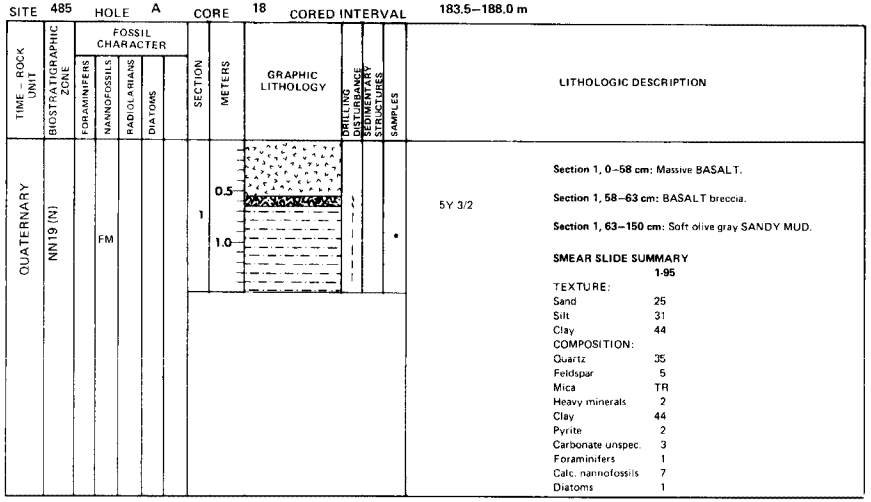
Location: Section 2, 60–65 cm (Depositional contact of sediment on basalt)

Texture: Aphyric, medium-grained, intersertal to subophitic

Groundmass: Plagioclase 35%, 0.5–1 mm, subhedral, fresh; olivine 2%, 0.3 mm, subhedral, altered to smectite and carbonate; clinopyroxene 30%, 0.3–0.5 mm, anhedral, fresh, except at immediate contact where it is partly altered to smectite, $2V_z \approx 40$; opaques 3%, 0.05–0.2 mm, granular to acicular, magnetite-ilmenite; interstitial material 30%, quenched material, partly replaced by smectite particularly near contact

Alteration: Olivine, some pyroxene, and interstitial material replaced by smectite

SITE 485 HOLE A CORE 18 CORED INTERVAL 183.5–188.0 m



Section 1, 0–58 cm: Massive BASALT.

Section 1, 58–63 cm: BASALT breccia.

Section 1, 63–150 cm: Soft olive gray SANDY MUD.

SMEAR SLIDE SUMMARY

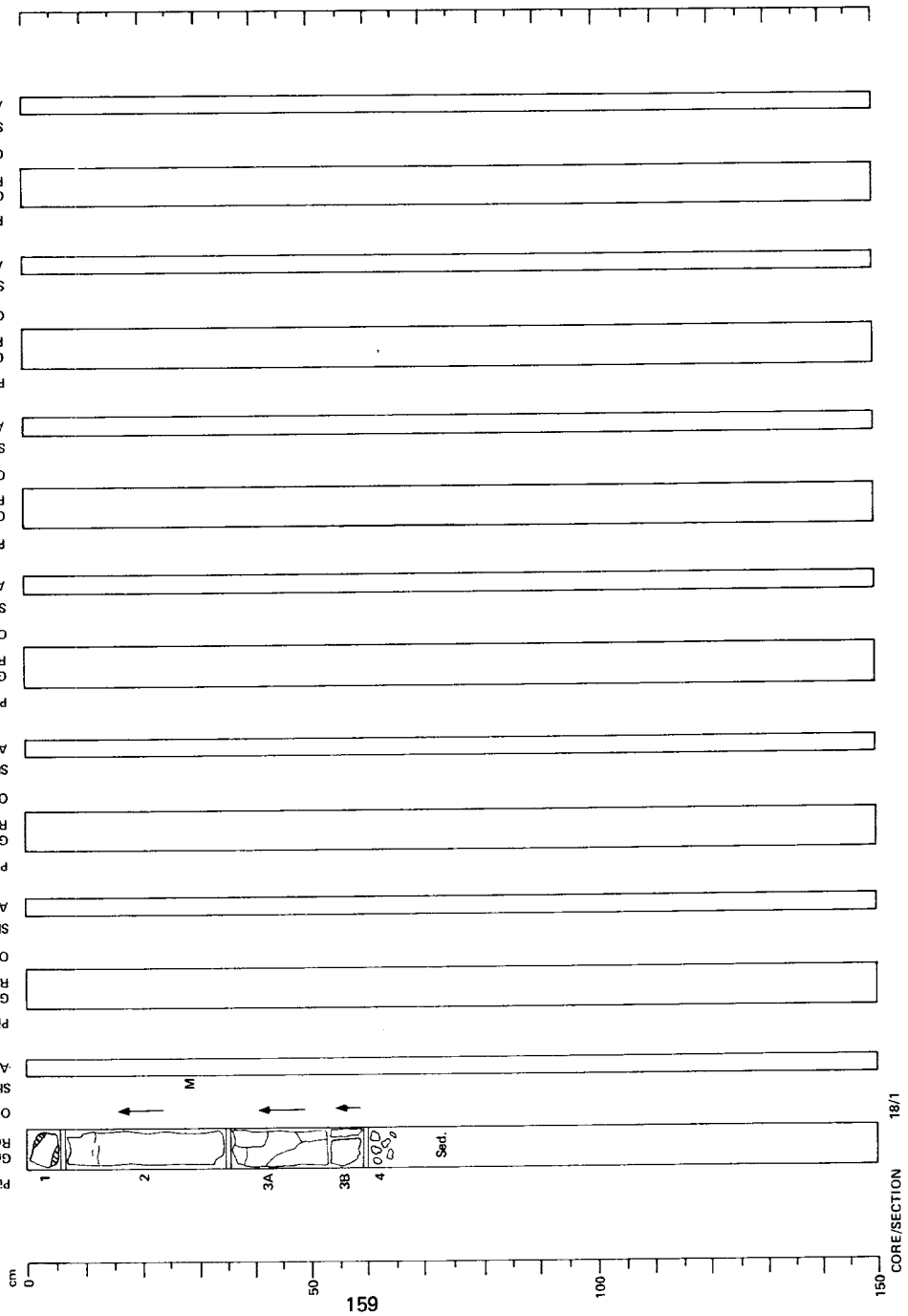
	1-95
TEXTURE:	
Sand	25
Silt	31
Clay	44
COMPOSITION:	
Quartz	35
Feldspar	5
Mica	TR
Heavy minerals	2
Clay	44
Pyrite	2
Carbonate unspec.	3
Foraminifers	1
Calc. nannofossils	7
Diatoms	1

HOLE 485A, CORE 18

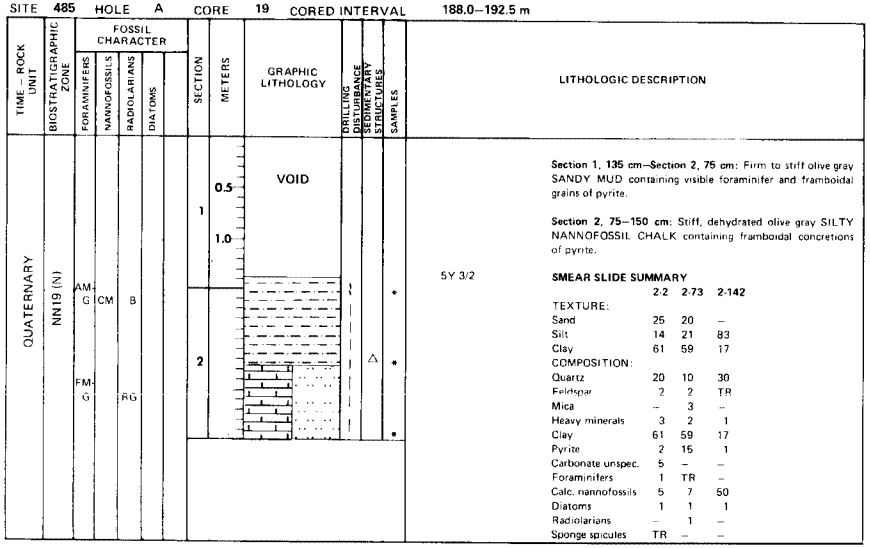
Visual Description

Section 1, 0–58 cm: Gray, fine- to medium-grained, aphyric, massive basalt. Plagioclase and olivine phenocrysts ≤ 1%, < 1 mm; plagioclase fresh, olivine altered to smectite. Veins sparse, filled with smectite and carbonate.

Section 1, 58 cm–base of core: Olive-gray, soft, sandy clay.



SITE 485 HOLE A CORE 19 CORED INTERVAL 188.0–192.5 m



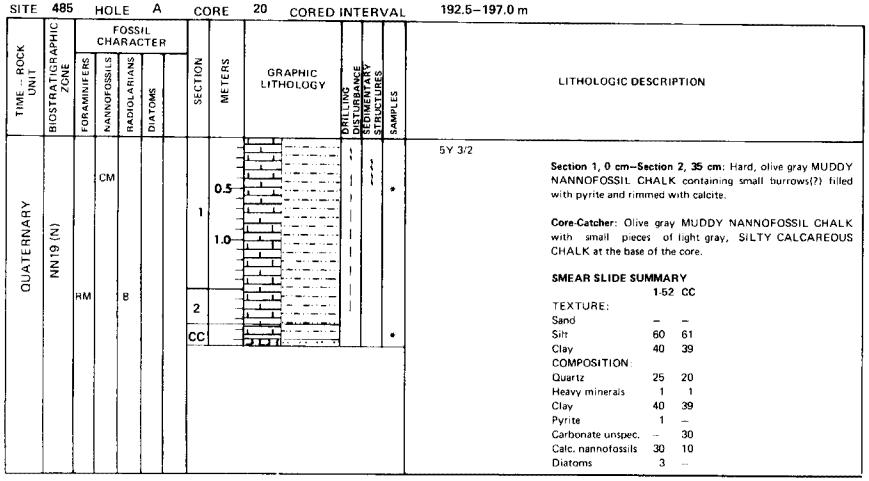
Section 1, 135 cm–Section 2, 75 cm: Firm to stiff olive gray SANDY MUD containing visible foraminifer and framboidal grains of pyrite.

Section 2, 75–150 cm: Stiff, dehydrated olive gray SILTY NANNOFOSSIL CHALK containing framboidal concretions of pyrite.

SMEAR SLIDE SUMMARY

	2-2	2-73	2-142
TEXTURE:			
Sand	25	20	–
Silt	14	21	83
Clay	61	59	17
COMPOSITION:			
Quartz	20	10	30
Feldspar	2	2	TR
Mica	–	3	–
Heavy minerals	3	2	1
Clay	61	59	17
Pyrite	2	15	1
Carbonate unspec.	5	–	–
Foraminifers	1	TR	–
Calc. nannofossils	5	7	50
Diatoms	1	1	1
Radiolarians	–	1	–
Sponge spicules	TR	–	–

SITE 485 HOLE A CORE 20 CORED INTERVAL 192.5–197.0 m



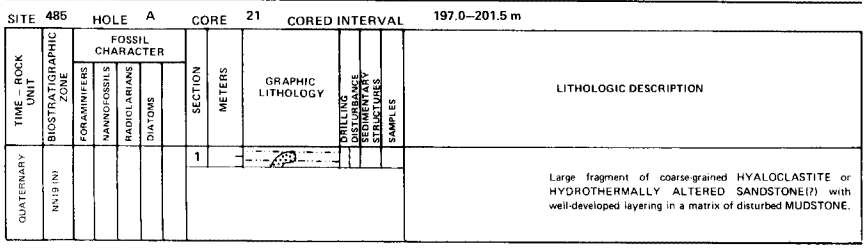
Section 1, 0 cm–Section 2, 35 cm: Hard, olive gray MUDDY NANNOFOSSIL CHALK containing small burrows(?) filled with pyrite and rimmed with calcite.

Core-Catcher: Olive gray MUDDY NANNOFOSSIL CHALK with small pieces of light gray, SILTY CALCAREOUS CHALK at the base of the core.

SMEAR SLIDE SUMMARY

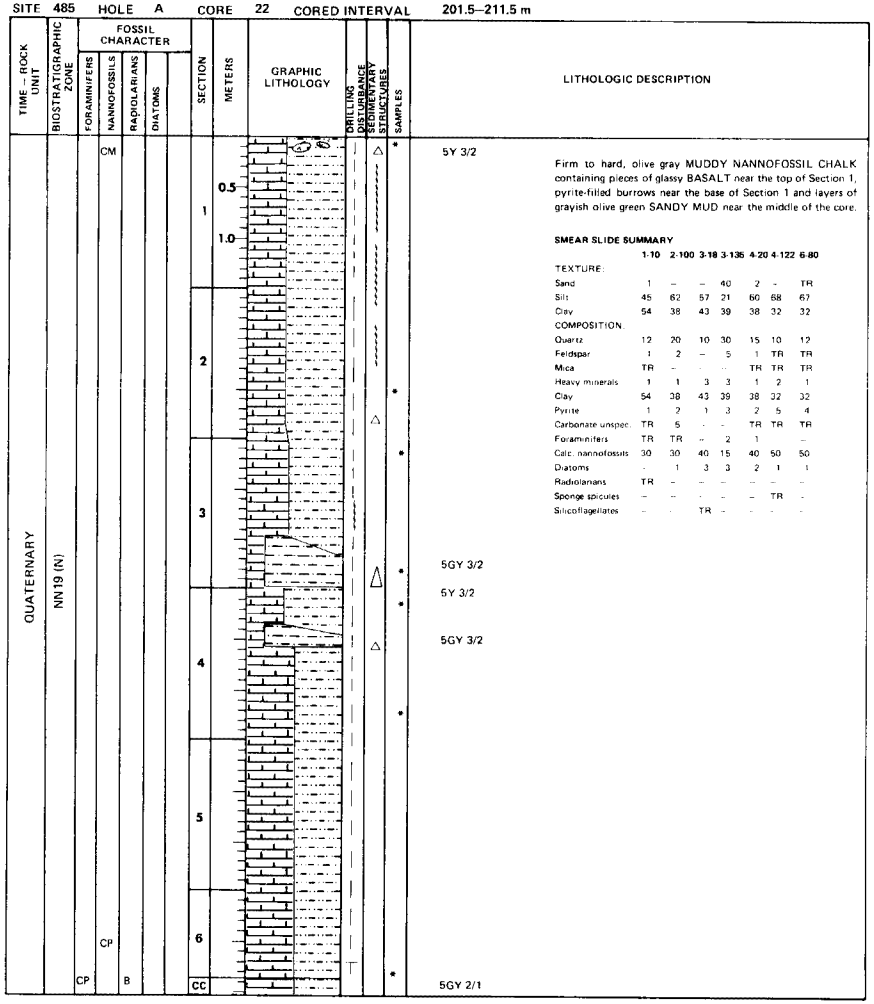
	1-52	CC
TEXTURE:		
Sand	–	–
Silt	60	61
Clay	40	39
COMPOSITION:		
Quartz	25	20
Heavy minerals	1	1
Clay	40	39
Pyrite	1	–
Carbonate unspec.	–	30
Calc. nannofossils	30	10
Diatoms	3	–

SITE 485 HOLE A CORE 21 CORED INTERVAL 197.0–201.5 m



Large fragment of coarse-grained HYALOCLASTITE or HYDROTHERMALLY ALTERED SANDSTONE(?) with well-developed layering in a matrix of disturbed MUDSTONE.

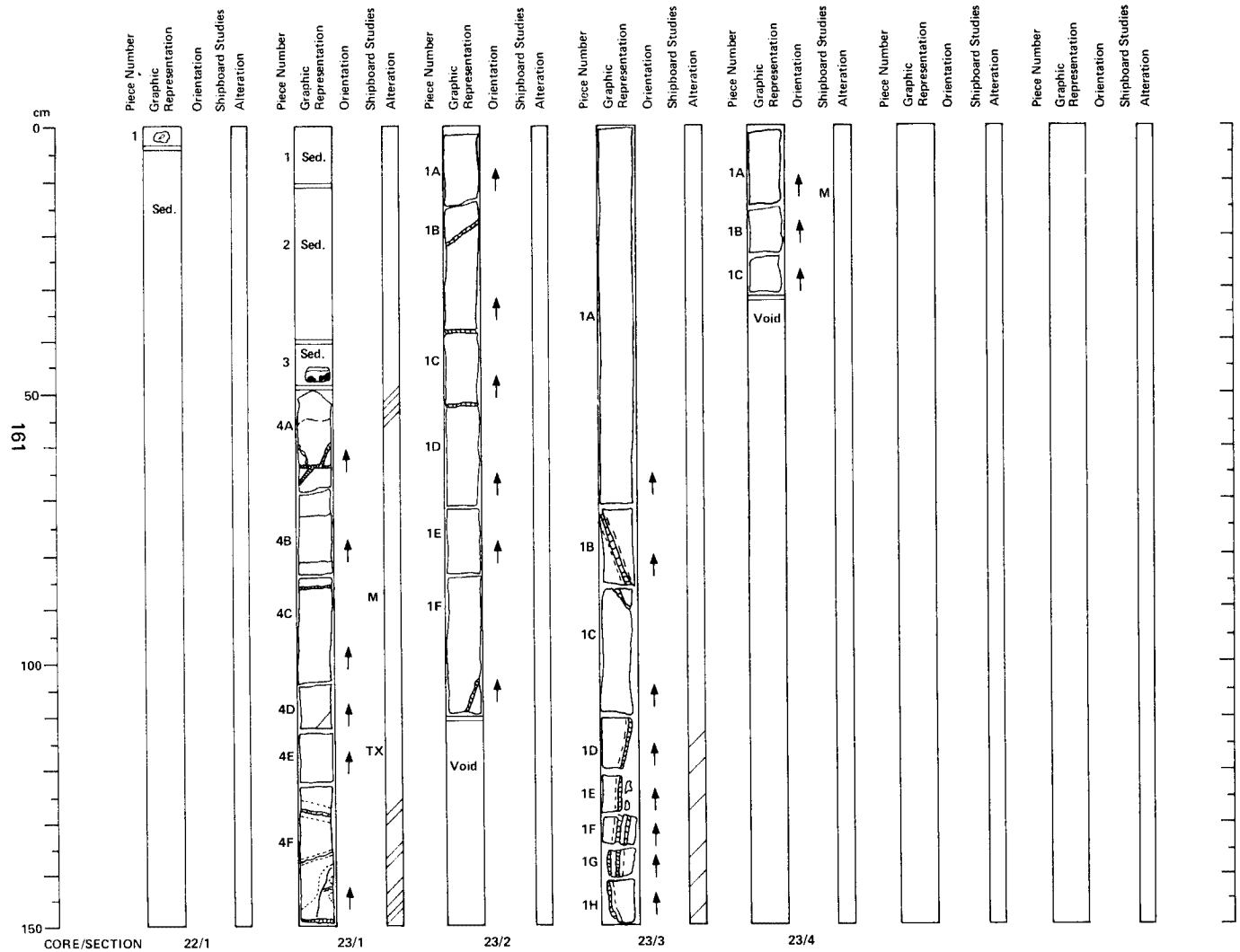
SITE 485 HOLE A CORE 22 CORED INTERVAL 201.5–211.5 m



Firm to hard, olive gray MUDDY NANNOFOSSIL CHALK containing pieces of glassy BASALT near the top of Section 1, pyrite-filled burrows near the base of Section 1 and layers of grayish olive green SANDY MUD near the middle of the core.

SMEAR SLIDE SUMMARY

	1-10	2-100	3-18	3-135	4-20	4-122	6-80
TEXTURE:							
Sand	1	–	–	40	2	–	TR
Silt	45	62	57	21	60	68	67
Clay	54	38	43	39	38	32	32
COMPOSITION:							
Quartz	12	20	10	30	15	10	12
Feldspar	1	2	–	5	1	TR	TR
Mica	TR	–	–	–	TR	TR	TR
Heavy minerals	1	1	3	3	1	2	1
Clay	54	38	43	39	38	32	32
Pyrite	1	2	1	3	2	5	4
Carbonate unspec.	TR	5	–	–	TR	TR	TR
Foraminifers	TR	TR	–	2	1	–	–
Calc. nannofossils	30	30	40	15	40	50	50
Diatoms	–	1	3	3	2	1	1
Radiolarians	TR	–	–	–	–	–	–
Sponge spicules	–	–	–	–	–	TR	–
Silicoflagellates	–	–	TR	–	–	–	–



HOLE 485A, CORE 22

Visual Description

Olive gray, stiff, nannofossil-rich clay, with bioturbations filled with pyrite. Fragments of aphyric basalt at top of core.

HOLE 485A, CORE 23

Visual Description

Section 1, 0–50 cm: Olive gray to dark brown indurated siltstone. Sediment appears baked against basalt at 50 cm.

Section 1, 50 cm–base of core: Gray, sparsely phyric, massive basalt. Plagioclase phenocrysts < 2%, ≤3 mm, subhedral, fresh; olivine microphenocrysts < 1%, ≤ 1 mm, altered to smectite. Groundmass very fine- to medium-grained, grain size increases downward, fresh. Vesicles < 1%, ≤ 1 mm, round, filled with smectite and carbonate. Fractures and veins common, subvertical, 1–10 mm, filled with carbonate, zeolite(?), and minor smectite.

Thin Section Description

Location: Section 1, 118–120 cm

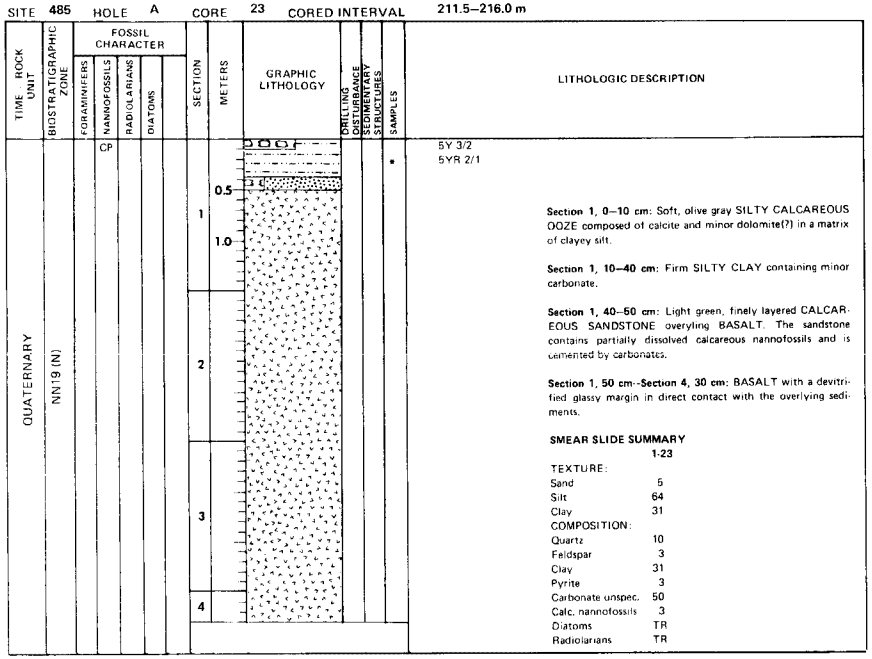
Texture: Very sparsely phyric, medium-grained, intergranular

Phenocrysts: Plagioclase 1%, 1–3 mm, subhedral to anhedral, fresh.

Groundmass: Plagioclase 50%, 0.5–0.8 mm, subhedral, fresh; olivine 5%, 0.3–0.5 mm, subhedral, replaced by smectite; clinopyroxene 35–40%, 0.4–0.7 mm, anhedral, fresh, $2V_z$ = 40°; opaques 3–4%, 0.05–0.1 mm, subhedral, probably magnetite; interstitial material 2–3%, quartz, feldspar and apatite, fresh.

Alteration: Olivine replaced by smectite.

SITE 485 HOLE A CORE 23 CORED INTERVAL 211.5–216.0 m



Section 1, 0–10 cm: Soft, olive gray SILTY CALCAREOUS OOZE composed of calcite and minor dolomite(?) in a matrix of clayey silt.

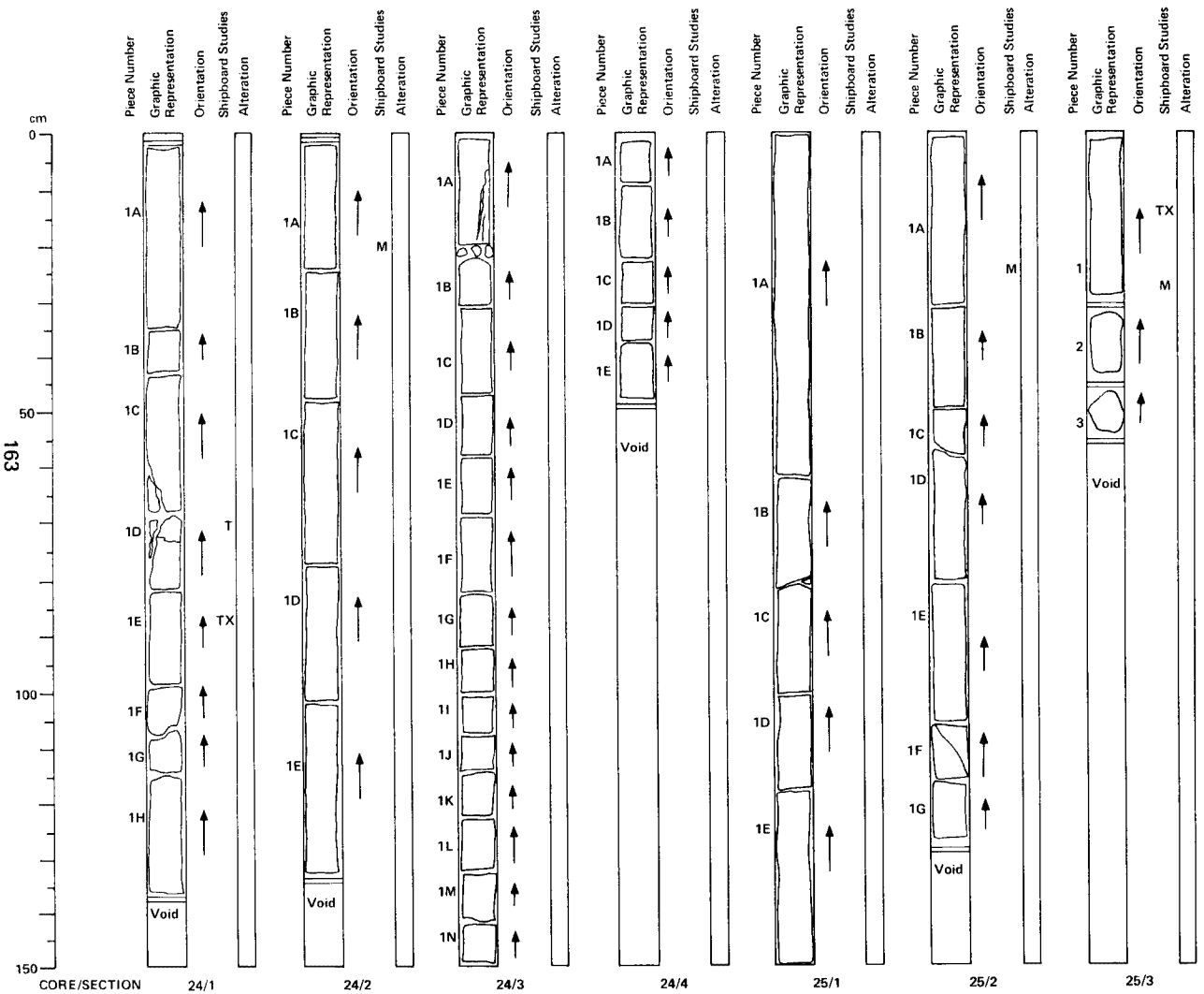
Section 1, 10–40 cm: Firm SILTY CLAY containing minor carbonate.

Section 1, 40–50 cm: Light green, finely layered CALCAREOUS SANDSTONE overlying BASALT. The sandstone contains partially dissolved calcareous nannofossils and is cemented by carbonates.

Section 1, 50 cm–Section 4, 30 cm: BASALT with a devitrified glassy margin in direct contact with the overlying sediments.

SMEAR SLIDE SUMMARY

	1-23
TEXTURE:	
Sand	5
Silt	64
Clay	31
COMPOSITION:	
Quartz	10
Feldspar	3
Clay	31
Pyrite	3
Carbonate unspec.	50
Calc. nannofossils	3
Diatoms	TR
Radiolarians	TR



HOLE 485A, CORE 24

Visual Description

Gray, sparsely phyric, massive basalt. Plagioclase phenocrysts < 2%, 1–3 mm, subhedral, fresh, some glomerophyric blusters; clinopyroxen phenocrysts < 1%, < 1 mm, fresh. Groundmass medium- to coarse-grained, holocrystalline, fresh. Fractures sparse, subvertical, hairline to 1 mm, lined with smectite and minor pyrite.

Thin Section Description

Location: Section 1, 68–70 cm

Texture: Aphyric, very coarse-grained, subophitic

Groundmass: Plagioclase 50%, 1–3 mm, subhedral, partly altered to smectite; clinopyroxene 40%, ≈ 3 mm, anhedral, subophitic crystals, $2V_z \sim 40$; partly replaced by smectite; opaques 2%, 0.1–0.3 mm, often skeletal, probably magnetite; interstitial material 10–15%, replaced by smectite

Alteration: Rock highly altered; plagioclase, clinopyroxene, and interstitial material partly to completely replaced by smectite. Unknown mineral also present, possibly scapolite.

HOLE 485A, CORE 25

Visual Description

Gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 2–3%, 1–3 mm, subhedral, fresh, some glomerophyric clusters with clinopyroxene; clinopyroxene phenocrysts 1%, 1 mm, anhedral, mostly intergrown with plagioclase. Groundmass medium- to coarse-grained, uniform, fresh. Fractures and veinlets sparse, mostly subvertical, hairline to 1 mm, filled with smectite, carbonate and minor pyrite.

Thin Section Description

Location: Section 1, 89–91 cm

Texture: Aphyric, very coarse-grained, ophitic to intersertal

Groundmass: Plagioclase 45%, ≈ 2 mm, subhedral laths, fresh, often zoned; clinopyroxene 40%, ≈ 4 mm, subhedral, ophitic plates, fresh, $2V_z \sim 40$; opaques 3–4%, 0.2–1 mm, skeletal, probably magnetite; interstitial material 10–12%, mostly altered to smectite, may include some altered olivine

Alteration: Interstitial material partly altered to smectite

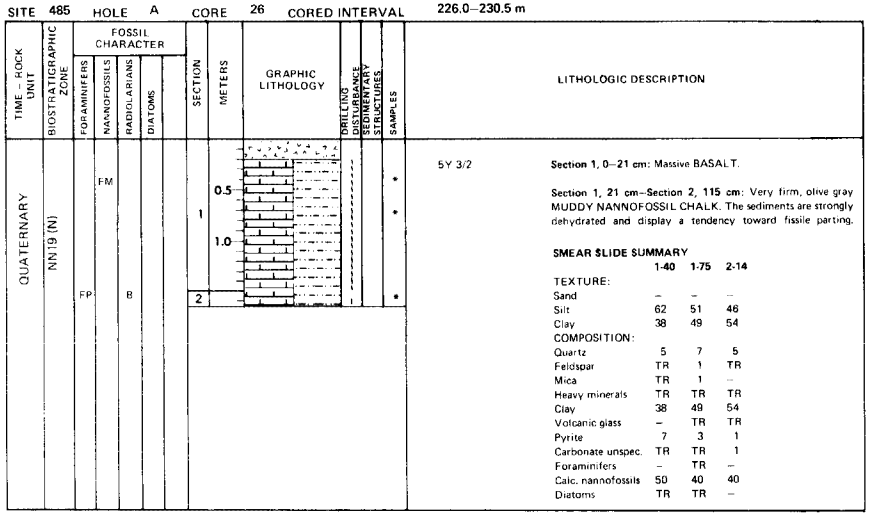
Location: Section 3, 14–16 cm

Texture: Aphyric, medium-grained, subophitic to intersertal

Groundmass: Plagioclase 45%, 0.5–2 mm, subhedral, fresh; olivine 5%, ≈ 0.5 mm, subhedral, replaced by smectite; clinopyroxene 40%, ≈ 1 mm, anhedral, fresh, $2V_z \sim 40$; opaques 2–3%, 0.05–0.2 mm, subhedral, probably magnetite; interstitial material 5–10%, mostly replaced by smectite.

Alteration: Olivine and interstitial material replaced by smectite.

SITE 485 HOLE A CORE 26 CORED INTERVAL 226.0–230.5 m



LITHOLOGIC DESCRIPTION

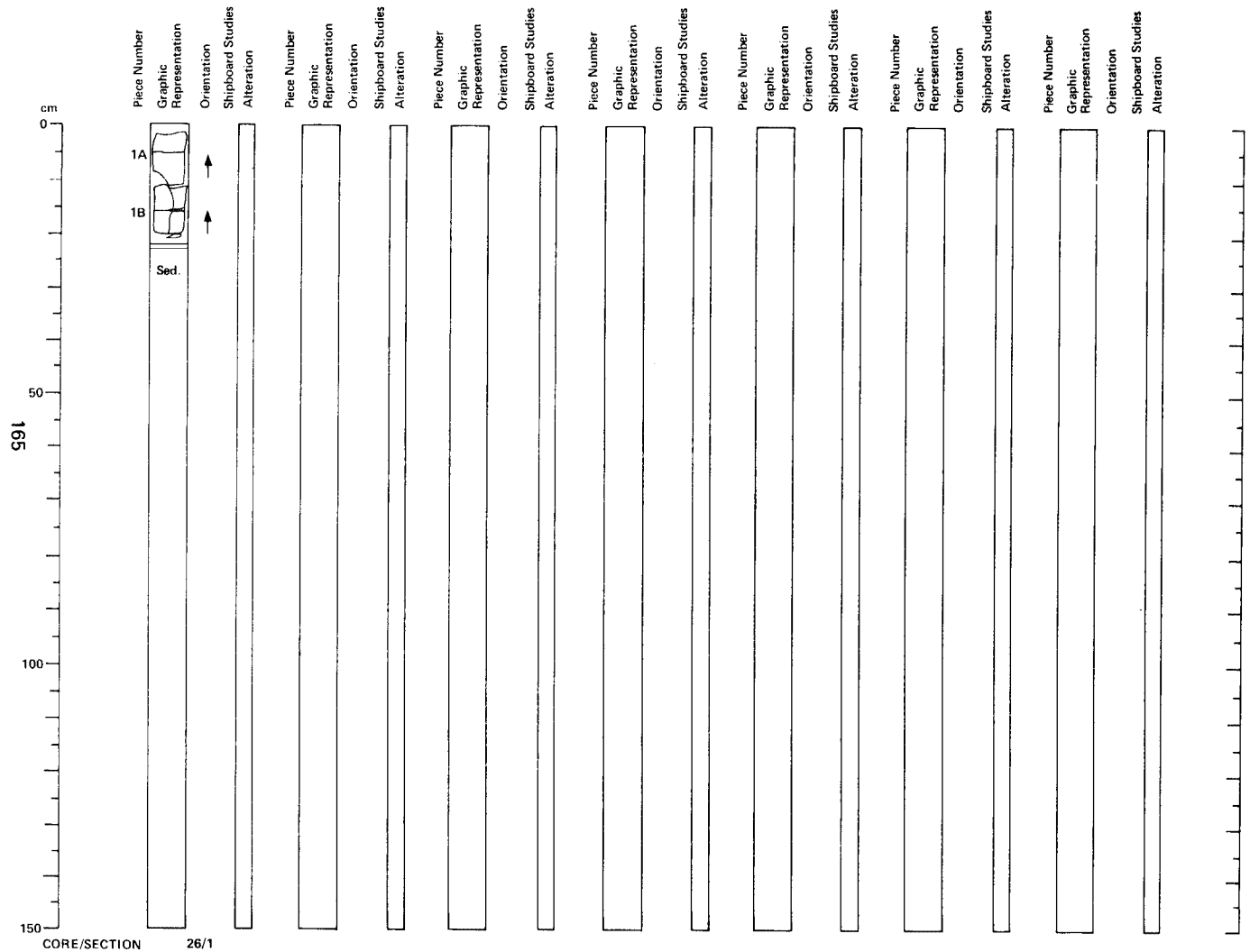
5Y 3/2

Section 1, 0–21 cm: Massive BASALT.

Section 1, 21 cm–Section 2, 115 cm: Very firm, olive gray MUDDY NANNOFOSSIL CHALK. The sediments are strongly dehydrated and display a tendency toward fissile parting.

SMEAR SLIDE SUMMARY

	1-40	1-75	2-14
TEXTURE:			
Sand	–	–	–
Silt	62	51	46
Clay	38	49	54
COMPOSITION:			
Quartz	5	7	5
Feldspar	TR	1	TR
Mica	TR	1	–
Heavy minerals	TR	TR	TR
Clay	38	49	54
Volcanic glass	–	TR	TR
Pyrite	7	3	1
Carbonate unspec.	TR	TR	1
Foraminifers	–	TR	–
Calc. nannofossils	50	40	40
Diatoms	TR	TR	–



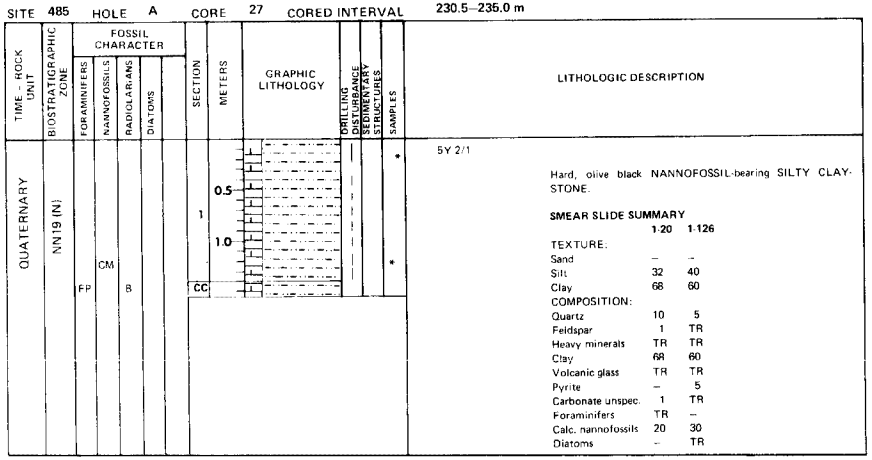
HOLE 485A, CORE 26

Visual Description

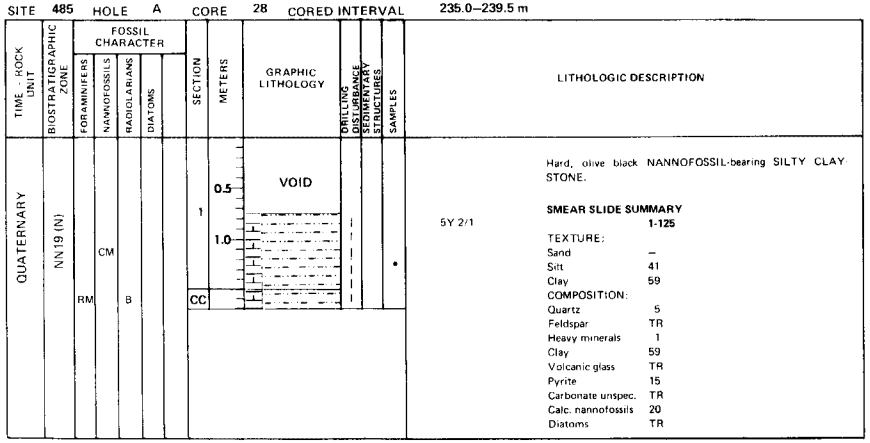
Section 1, 0–21 cm: Gray, sparsely phyric, massive basalt. Plagioclase phenocrysts 1–2%, ≤ 4 mm, subhedral, fresh; olivine phenocrysts 1–2%, ≤ 4 mm, subhedral, altered to smectite. Groundmass fine-grained, uniform, fresh. Fractures sparse, subvertical, hairline, filled with carbonate.

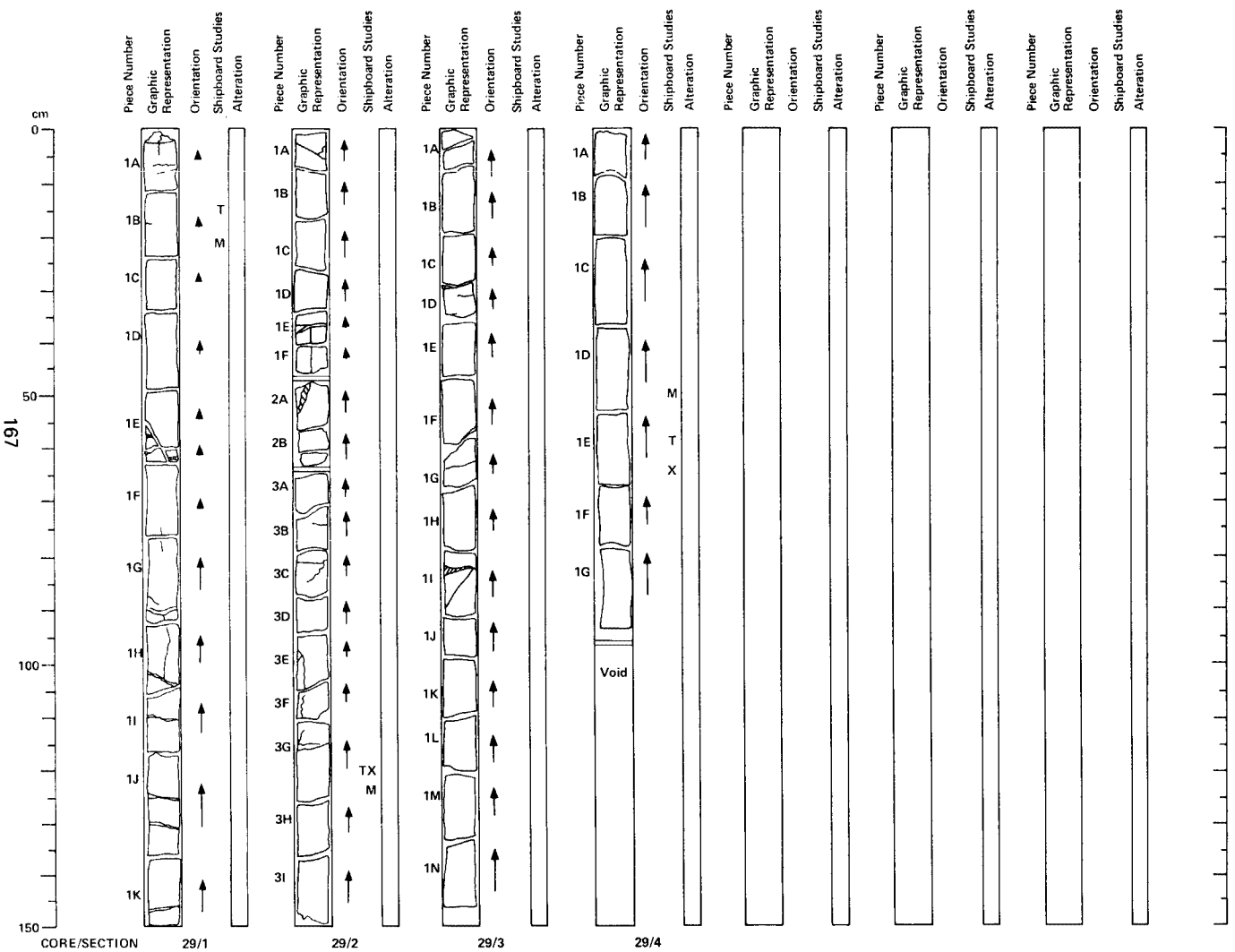
Section 1, 21 cm–base of core: Olive gray, firm, nannofossil marl.

SITE 485 HOLE A CORE 27 CORED INTERVAL 230.5–235.0 m



SITE 485 HOLE A CORE 28 CORED INTERVAL 235.0–239.5 m





HOLE 485A, CORE 29

Visual Description

Gray to greenish-gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts < 1%, 1–3 mm, subhedral, fresh, some glomerophyric clusters with traces of clinopyroxene; rare plagioclase megacrysts to 7 mm. Groundmass fine- to medium-grained, grain size increases gradually with depth; groundmass greenish-gray, locally altered to smectite and chlorite(?) with minor carbonate and pyrite. Vesicles < 1%, ~ 0.5 mm, round, filled with smectite and carbonate. Fractures and veinlets fairly common, subvertical, hairline to 2 mm, filled with smectite and carbonate.

Thin Section Description

Location: Section 1, 15–17 cm

Texture: Aphyric, fine- to medium-grained, intergranular to intersertal

Groundmass: Plagioclase 45%, 0.4–1 mm, subhedral, fresh; olivine 2–3%, 0.2–0.4 mm, subhedral, replaced by smectite and carbonate; clinopyroxene 40–45%, 0.2–0.4 mm, anhedral, fresh, $2V_z \sim 40°$; opaques 2%, 0.05–0.1 mm, granular, probably magnetite; interstitial material 5–10%, replaced by green smectite(?).

Alteration: Olivine and interstitial material replaced by smectite and minor carbonate

Location: Section 2, 122–124 cm

Texture: Aphyric, fine- to medium-grained, intergranular to intersertal

Groundmass: Plagioclase 45%, 0.4–1 mm, subhedral, fresh; olivine 2–4%, 0.2–0.4 mm, subhedral, replaced by smectite and carbonate; clinopyroxene 40–45%, 0.2–0.4 mm, anhedral, fresh, $2V_z \sim 40°$; opaques 2%, 0.05–0.1 mm, granular, probably magnetite; interstitial material 5–10%, replaced by green smectite.

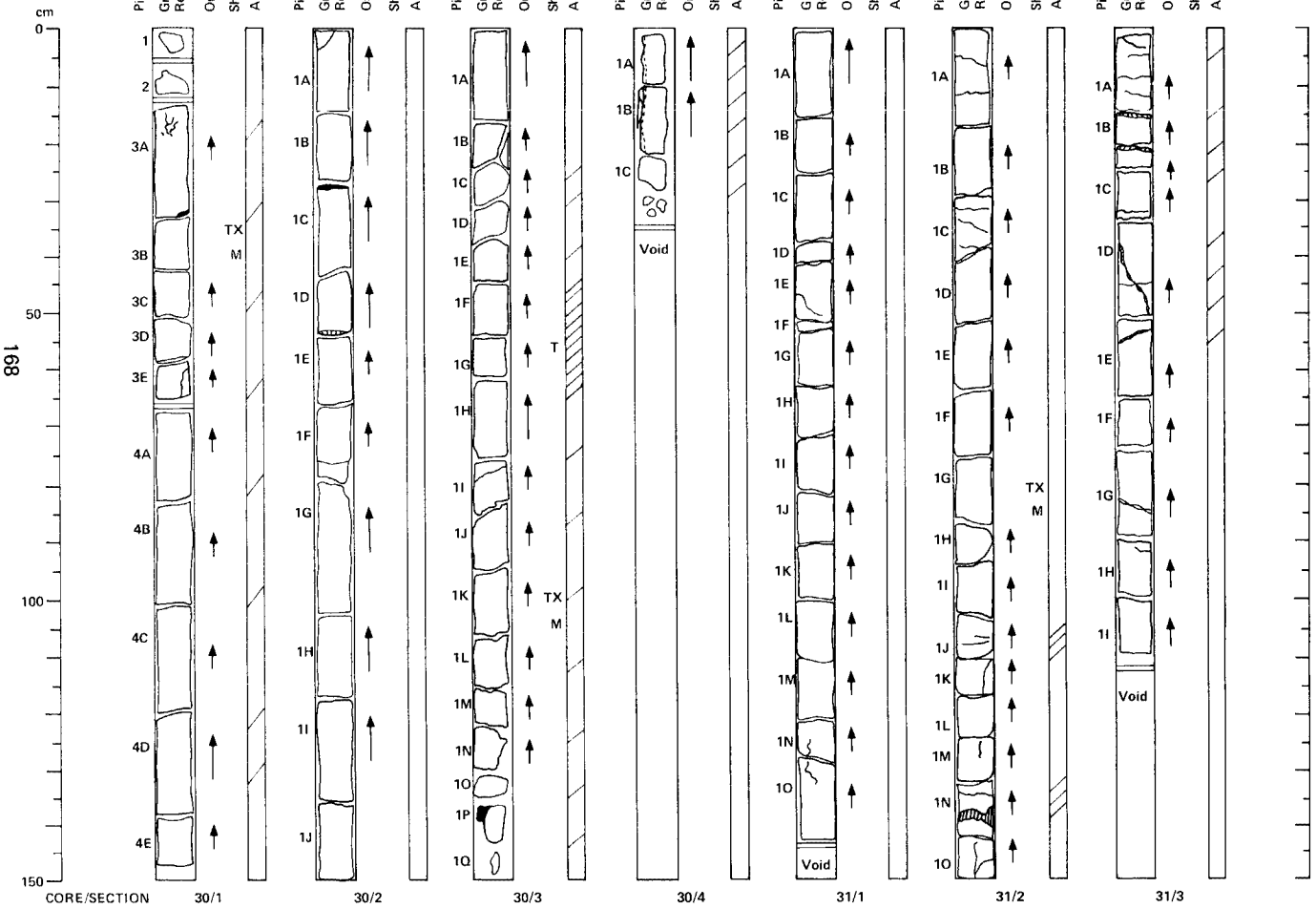
Alteration: Olivine and interstitial material replaced by smectite and minor carbonate.

Location: Section 4, 59–61 cm

Texture: Aphyric, coarse-grained, subophitic to intersertal

Groundmass: Plagioclase 45%, 1–4 mm, subhedral, fresh; clinopyroxene 40–45%, 1–2 mm, subophitic plates, marginally altered to green smectite, $2V_z \sim 40°$; opaques 2%, 0.5–1 mm, skeletal, probably magnetite; interstitial material 10%, mostly quartz, feldspar, and apatite, partly replaced by smectite.

Alteration: Pyroxene and interstitial material partly replaced by smectite.



HOLE 485A, CORE 30

Visual Description

Gray to greenish-gray, aphyric, massive basalt. Rock is fine- to coarse-grained, grain size increases gradually downward, some altered zones with smectite, chlorite(?), carbonate and pyrite. Veins and fractures sparse, filled with smectite and carbonate.

Thin Section Description

Location: Section 1, 39–41 cm

Texture: Aphyric, coarse-grained, intergranular to subophitic

Groundmass: Plagioclase 45–50%, 1–3 mm, subhedral, fresh; clinopyroxene 45%, 0.2–0.5 mm, subhedral, fresh; $2V_z \sim 40°$, some sector zoning, some crystals may have cores of pigeonite; opaques 2–3%, 0.2–0.5 mm, subhedral, probably magnetite; interstitial material 5%, quartz, feldspar, and apatite, partly replaced by smectite.

Alteration: Minor interstitial material replaced by smectite; some altered material may be after olivine.

Location: Section 3, 55–58 cm

Texture: Aphyric, very coarse-grained, ophitic

Groundmass: Plagioclase 30–35%, 4–7 mm, subhedral, often curved crystals, partly replaced by smectite; clinopyroxene 60–65%, 5–10 mm, ophitic plates, partly replaced by smectite, $2V_z \sim 40°$; opaques 1–2%, 0.5 mm, subhedral, probably magnetite.

Alteration: Plagioclase and clinopyroxene partly replaced by smectite

Location: Section 3, 103–105 cm

Texture: Aphyric, very coarse-grained, ophitic to intersertal

Groundmass: Plagioclase 45–50%, 1–3 mm, subhedral, fresh; olivine 3–4%, 1 mm, subhedral, replaced by smectite; clinopyroxene 25–45%, 0.5–5 mm, anhedral, subophitic, twinned, often zoned, $2V_z \sim 40°$, some with probable cores of pigeonite; opaques 1–2%, 0.5–1.5 mm, skeletal, probably magnetite; interstitial material 5–20%, quartz, feldspar, and apatite, partly replaced by smectite

Alteration: Olivine and some interstitial material replaced by smectite

HOLE 485A, CORE 31

Visual Description

Gray, aphyric, massive basalt. Rock very coarse-grained, subophitic, generally uniform, with patchy alteration to smectite. Fractures and veinlets sparse, mostly subhorizontal, hairline to 3 mm, filled with smectite.

Thin Section Description

Location: Section 1, 81–83 cm

Texture: Aphyric, coarse-grained, subophitic to intergranular

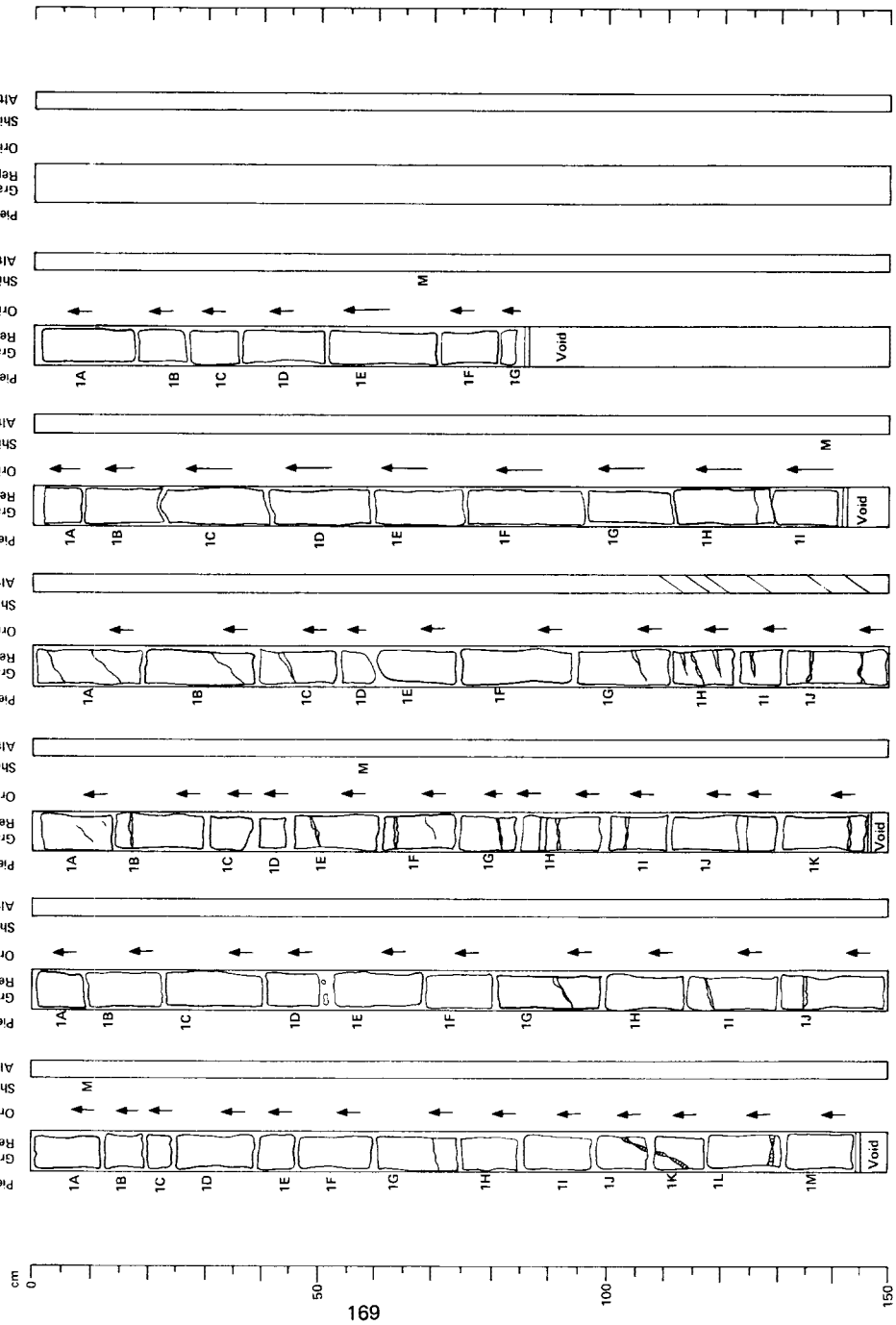
Groundmass: Plagioclase 55%, 0.5–3 mm, subhedral, fresh; olivine 2–3%, ≤ 0.5 mm, replaced by brown smectite; clinopyroxene 30–35%, 0.5–2 mm, subhedral, often zoned, marginally altered to amphibole and smectite, $2V_z \sim 40°$, many crystals with cores of pigeonite, $2V_z \sim 5°$; opaques 3%, ≤ 1.5 mm, skeletal, probably magnetite; interstitial material 5–10%, quartz, feldspar and minor apatite, partly replaced by smectite.

Alteration: Olivine and some interstitial material altered to smectite; clinopyroxene rimmed with amphibole and smectite.

HOLE 485A, CORE 32

Visual Description

Gray, aphyric, massive basalt. Rock coarse-grained, uniform, massive, generally fresh; grain size decreases somewhat downwards. Scattered round plagioclase megacrysts to 15 mm. Fractures fairly common, subhorizontal, hairline to 2 mm, filled with smectite.



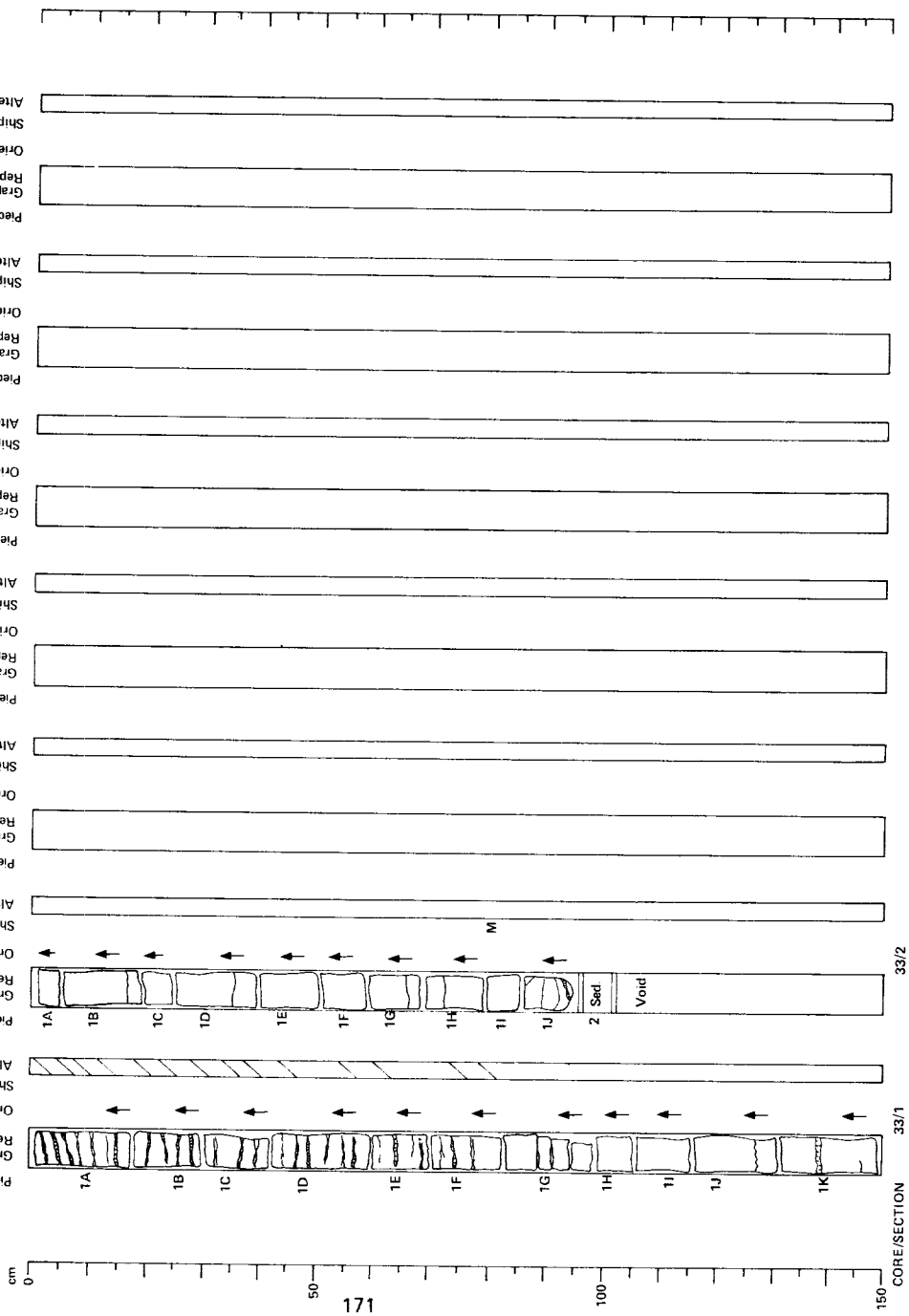
SITE 485 HOLE A CORE 33 CORED INTERVAL 268.0–277.0 m

TIME—ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
QUATERNARY	NN19 (N)		B			1	0.5					**Section 1, 0 cm–Section 2, 95 cm:** Massive BASALT.
							1.0					**Section 2, 95–100 cm:** Hard, black CLAYSTONE.
						2					* N1	**SMEAR SLIDE SUMMARY** 2-99 TEXTURE: Sand 3 Silt 10 Clay 87 COMPOSITION: Quartz 4 Heavy minerals 2 Clay 87 Pyrite 2 Zeolite 5 Calc. nannofossils TR

HOLE 485A, CORE 33

Visual Description

Section 1, 0 cm–Section 2, 93 cm: Gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts 1–2%, 5 mm, subhedral, fresh, some rounded crystals to 10 mm; olivine phenocrysts < 1%, ≤ 3 mm, subhedral, altered to smectite. Groundmass fine- to medium-grained, generally fresh. Fractures common, subhorizontal, hairline to 2 mm, filled with smectite.
Section 2, 93 cm–base of core: Dark brown, soft siltstone



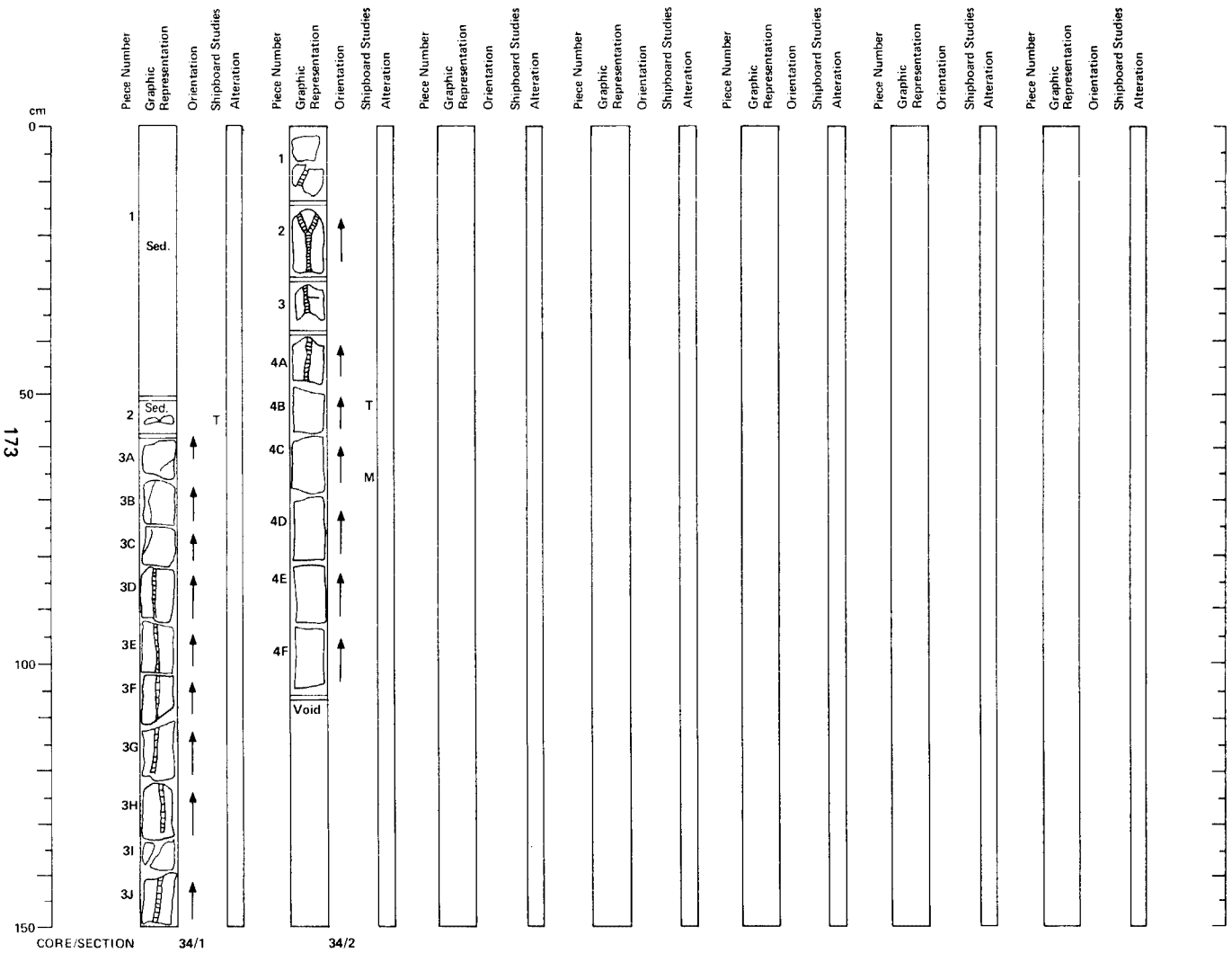
SITE 485 HOLE A CORE 34 CORED INTERVAL 277.0–286.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
QUATERNARY	NN19 (N)	FM B	RP	RM B		1	0.5 1.0				* *	N1

Hard, black CLAYSTONE overlying massive BASALT.

SMEAR SLIDE SUMMARY

	1-14	1-55
TEXTURE:		
Sand	–	4
Silt	11	11
Clay	89	85
COMPOSITION:		
Quartz	5	7
Heavy minerals	1	2
Clay	89	85
Pyrite	2	2
Zeolite		3
Carbonate unspec.	TR	1
Calc. nannofossils	1	TR
Diatoms	TR	–



HOLE 485A, CORE 34

Visual Descripton

Section 1, 0–55 cm: Brownish-black, indurated silty claystone.

Section 1, 55 cm–base of core: Gray, aphyric, massive, basalt. Rock very fine-grained to medium-grained, with grain size increasing downward; some glassy fragments at sediment contact. Rock generally fresh. Vesicles 1–2%, ≤ 1 mm, round, filled with carbonate and smectite. Fractures common, steep, hairline to 5 mm, filled with carbonate, smectite, and minor pyrite.

Thin Section Description

Location: Section 1, 55–57 cm

Texture: Very sparsely phyric, quench

Phenocrysts: Plagioclase 2–3%, ≤ 1 mm, skeletal laths, fresh

Groundmass: Traces of feldspar microlites, minute crystals of altered olivine, and tiny grains of magnetite in a matrix of brown, devitrified glass

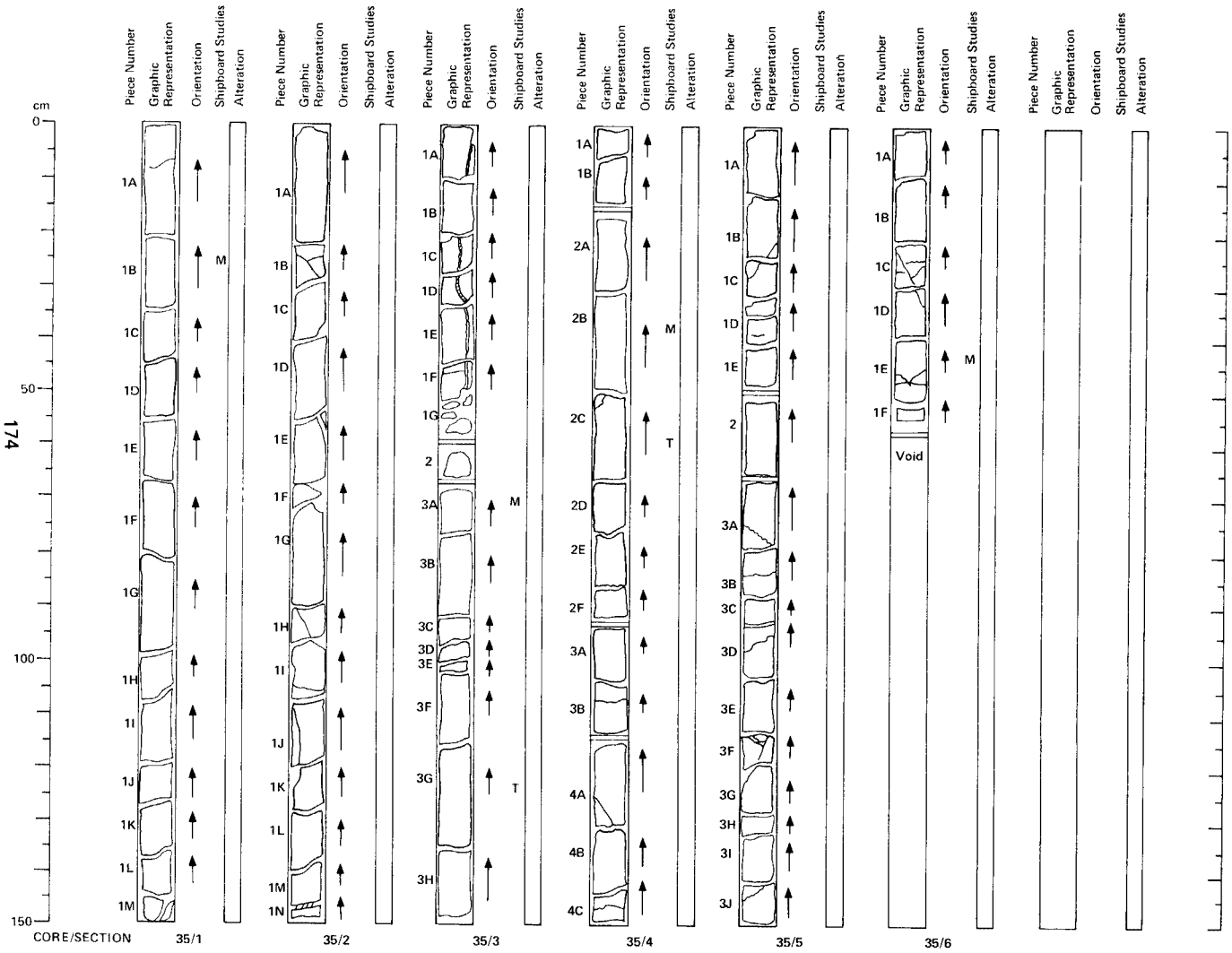
Alteration: Olivinve replaced by smectite

Location: Section 2, 48–50 cm

Texture: Aphyric, fine-grained, intergranular to intersertal

Groundmass: Plagioclase 55%, 0.2–1 mm, subhedral, fresh; olivine 1–2%, 0.2–0.5 mm, subhedral, replaced by smectite; clinopyroxene 30–35%, 0.1–0.4 mm, anhedral, fresh, $2V_z \sim 40°$; opaques 2–3%, 0.05–0.3 mm, skeletal, probably magnetite; interstitial material, 5–10%, quartz, feldspar and apatite, partly replaced by smectite.

Alteration: Olivine and some interstitial material replaced by smectite.



HOLE 485A, CORE 35

Visual Description

Gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts < 1%, < 8 mm, subhedral, fresh; olivine phenocrysts < 1%, < 3 mm, subhedral, altered to smectite. Groundmass fine- to medium-grained, generally uniform, fresh. Vesicles 1%, < 1 mm, filled with smectite. Fractures sparse, to common, steep, hairline to 2 mm, filled with smectite and carbonate.

Thin Section Description

Location: Section 3, 131–135 cm

Texture: Aphyric, fine-grained, intergranular to intersertal

Groundmass: Plagioclase 55%, 0.2–1 mm, subhedral, fresh; olivine 5%, 0.2–0.5 mm, subhedral, replaced by smectite; clinopyroxene 30%, 0.1–0.4 mm, anhedral, fresh, $2V_z$ ~40°; opaques 2–3%, 0.05–0.3 mm, skeletal, probably magnetite; interstitial material 5–10%, quartz, feldspar and apatite, partly replaced by smectite.

Alteration: Olivine and some interstitial material replaced by smectite.

Location: Section 4, 63–66 cm

Texture: Aphyric, fine-grained, intergranular to intersertal

Groundmass: Plagioclase 55%, 0.2–1 mm, subhedral, fresh; olivine 5%, 0.2–0.5 mm, subhedral, replaced by smectite; clinopyroxene 30%, 0.1–0.4 mm, anhedral, fresh, $2V_z$ ~ 40°; opaques 2–3%, 0.05–0.2 mm, skeletal, probably magnetite; interstitial material 5–10%, microcrystalline material, partly altered to smectite.

Alteration: Olivine and some interstitial material replaced by smectite.

SITE 485 HOLE A CORE 36 CORED INTERVAL 295.0–304.0 m

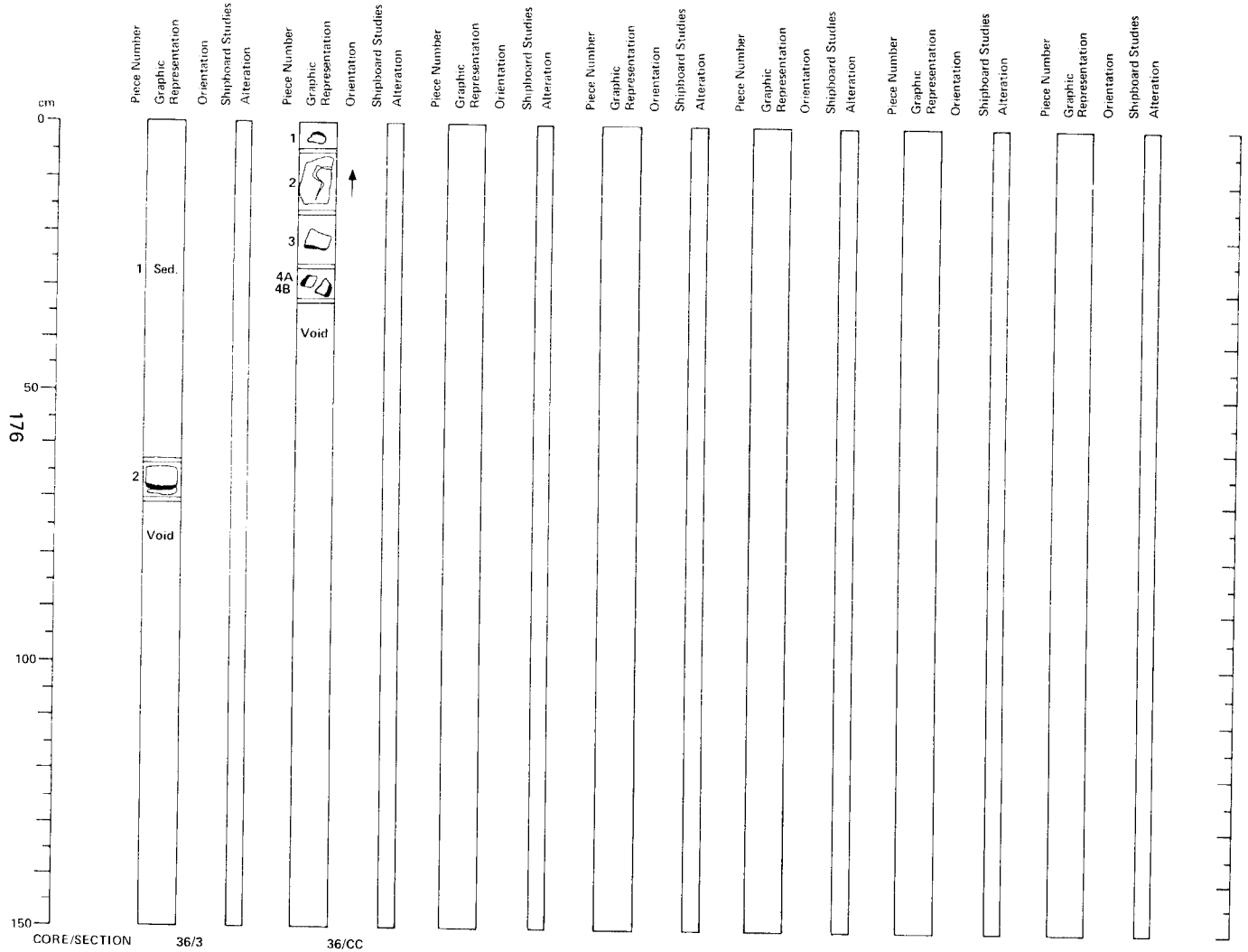
TIME ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	METERS	SECTION	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
QUATERNARY	NN19 (N)	RG	CM	B		0.5 1.0	1 2 3 CC					5Y 2/1

Section 1, 0 cm–Section 3, 85 cm: Hard, olive black NANNOFOSSIL bearing SILTY CLAYSTONE containing a large fragment of limestone at a depth of 17–22 cm in Section 1 and a thin layer of dark, pyrite-rich LIMESTONE in contact with BASALT at the base of the sediments. The sediments between 22–64 cm in Section 1 contain thin intervals of finely laminated SANDY MUDSTONE and occasional burrows filled with pyrite and foraminifer.

Section 3, 85–70 cm: BASALT with a devitrified glassy margin in direct contact with the limestone at the base of the sediments.

SMEAR SLIDE SUMMARY

	1-66	2-82	3-62	3-71
TEXTURE:				
Sand	–	–	–	–
Silt	14	26	56	100
Clay	86	74	44	–
COMPOSITION:				
Quartz	3	1	TR	–
Heavy minerals	1	–	–	–
Clay	86	74	44	–
Pyrite	1	5	15	15
Zeolite	3?	–	–	–
Carbonate unspec.	–	TR	20	85
Calc. nannofossils	10	20	20	–
Diatoms	TR	–	–	–



HOLE 485A, CORE 36

Visual Description

Section 1, 0cm–Section 3, 64 cm: Olive-black mudstone.

Section 3, 64 cm–base of core: Dark gray, sparsely phyric, massive(?) basalt. Plagioclase phenocrysts 3‰, ~3 mm, subhedral, fresh, some rounded crystals to 6 mm. Veins and fractures sparse, filled with smectite and carbonate.

SITE 485 HOLE A CORE 37 CORED INTERVAL 304.0–313.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
QUATERNARY	NN19 (N)	B	CP	B		1 CC	0.5 1.0				*	5Y 2/1 Homogeneous, olive black NANNOFOSSIL bearing SILTY CLAYSTONE.

SMEAR SLIDE SUMMARY

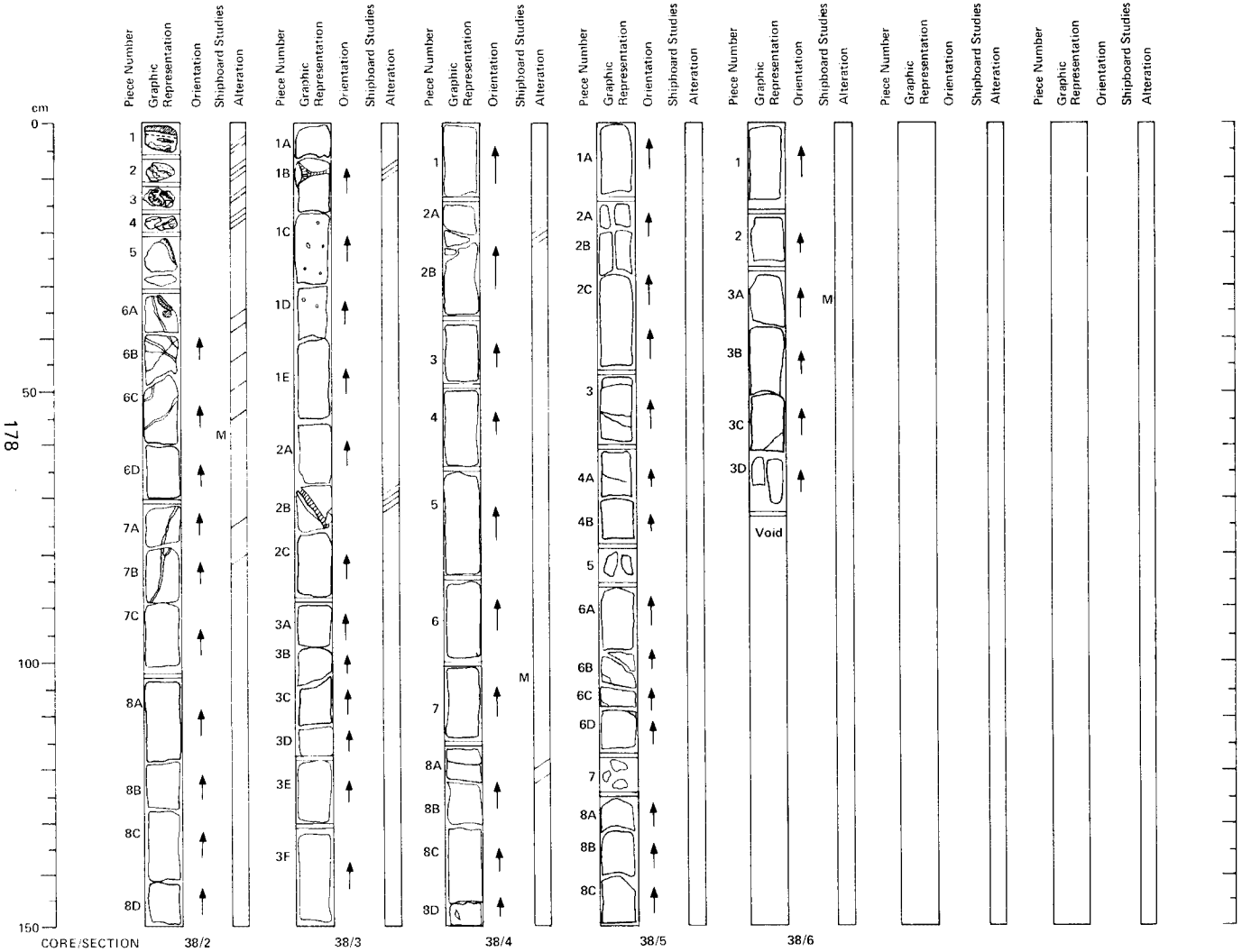
	1-75
TEXTURE:	
Sand	–
Silt	21
Clay	79
COMPOSITION:	
Quartz	3
Feldspar	1
Heavy minerals	TR
Clay	79
Pyrite	2
Zeolite	3?
Calc. nannofossils	15

SITE 485 HOLE A CORE 38 CORED INTERVAL 313.0–322.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
QUATERNARY	NN19 (N)	RM	CP B B	B B		1 2 3 4 5 6	0.5 1.0				* * *	N1 **Section 1, 0 cm–Section 2, 1 cm:** Firm to hard, black CLAYSTONE and SILTY CLAYSTONE with a sulfide-filled vein cutting across the core near the base of the sediments at a dip of about 60°. The basal sediments in contact with the underlying BASALT consist of an indurated mixture of glass and fine-grained basalt fragments, carbonate, sulfide, smectite, chalcedony and silty clay. **Section 2, 1 cm– Section 6, 70 cm:** Massive BASALT.

SMEAR SLIDE SUMMARY

	1-10	1-85	1-146	2-5
TEXTURE:				
Sand	–	–	–	–
Silt	27	20	27	22
Clay	73	80	73	78
COMPOSITION:				
Quartz	10	15	12	10
Feldspar	2	TR	2	1
Heavy minerals	1	–	1	1
Clay	73	80	73	78
Pyrite	3	5	10	10
Carbonate unspec.	TR	–	–	TR
Calc. nannofossils	10	–	2	–



HOLE 485A, CORE 38

Visual Description

Section 1, 0 cm–Section 2, 2 cm: Black, indurated mudstone with minor pyrite.

Section 2, 2 cm–base of core: Gray, sparsely phyric massive basalt. Plagioclase phenocrysts 3–5%, ~10 mm, subhedral, fresh. Groundmass, fine- to medium-grained, increasing slightly in grain size downward, generally fresh. Vesicles ~1%, ~0.5 mm, round, filled with smectite. Veinlets sparse, steep, hairline to 5 mm, filled with smectite.

HOLE 485A, CORE 39

Visual Description

Gray, very sparsely phyric, massive basalt. Plagioclase phenocrysts < 1%, < 5 mm, subhedral, fresh. Groundmass medium-grained to coarse-grained, generally fresh, grain size increases somewhat downward. Vesicles < 1%, irregularly distributed, 1–2 mm, round, filled with smectite. Veins and fractures sparse, steep, hairline to 3 mm, filled with smectite, carbonate and pyrite.