

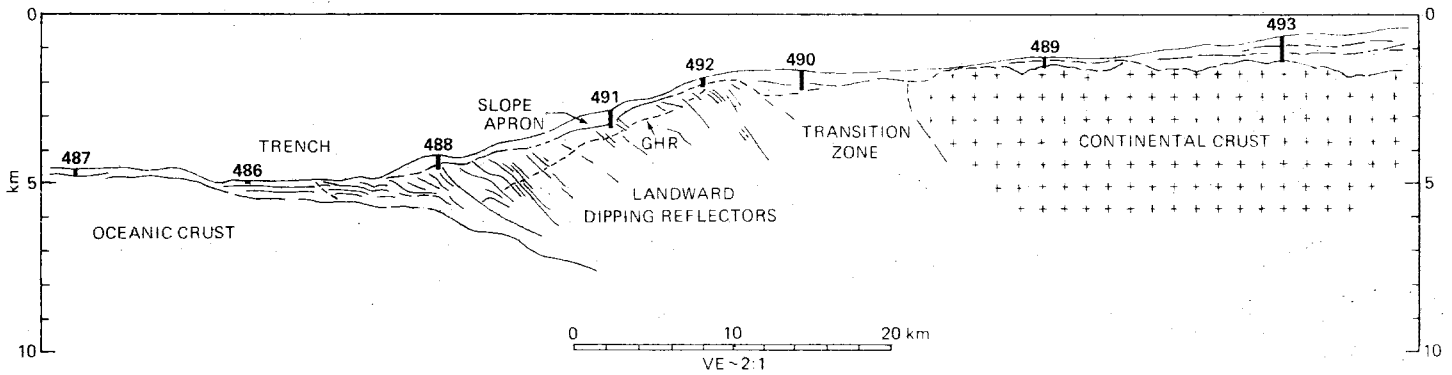
INITIAL CORE DESCRIPTIONS

69

DEEP SEA DRILLING PROJECT

LEG 66

MIDDLE AMERICA TRENCH TRANSECT: SOUTHERN MEXICO



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

Schematic cross section through Leg 66 area from composite depth section of seismic lines OM-7N and MX-16.

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LA JOLLA, CALIFORNIA 92093

Deep Sea Drilling Project

February 22, 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.

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

Sincerely,

A handwritten signature in cursive script that reads "Matthew H. Salisbury".

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

MHS:eb

INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 66

18 MARCH — 2 MAY 1979

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

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INITIAL CORE DESCRIPTIONS
 LEG 66
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INITIAL CORE DESCRIPTIONS
LEG 66
Southern Mexico Middle America Trench Transect

INTRODUCTION

Leg 66 departed Mazatlan, Mexico on 18 March 1979 and arrived in Manzanillo, Mexico on 2 May 1979. Eight sites were drilled along a transect in water depths that ranged from 645–5142 meters (Table 1, Moore, Watkins et al., 1979a, b).

The IPOD active margin transect off southern Mexico constitutes one of two across the Middle America Trench, the other being off Guatemala (Leg 67). The transect off southern Mexico is characterized by a narrow shelf, steep trench slope, and no fore-arc basin (Shipley et al., 1980). As such, the drilling off Mexico has focused on the nature of the ocean-continent transition across a subduction zone abbreviated in space and possibly time.

Convergence between the Mexican portion of the North America Plate and the Cocos and other Pacific Ocean plates has been occurring at least intermittently for 100 m.y. (e.g., Coney, 1972). In view of this long history of convergence, an extensive accretionary zone and fore-arc basin should have developed; instead Mesozoic to Precambrian crystalline basement rocks, intruded by a Mesozoic magmatic arc, crop out at the coast within 65 km of the trench axis (Mejorada, 1976). The proximity to the trench of both the basement complex and a Mesozoic magmatic arc suggest truncation of the margin with the removal of a pre-existing accretionary zone and fore-arc basin (e.g., Karig et al., 1978) but the timing and mechanism of truncation are not well-defined (de Czerna, 1971; Malfait and Dinkelman, 1972; Karig et al., 1978). The present phase of accretion probably commenced in the Neogene coupled with the inception of magmatism in the trans-Mexican volcanic belt to the northwest. The probable youthful stage of this convergent margin provides a unique opportunity to examine the contact of the continental crust and the accretionary prism in the absence of overlying fore-arc deposits.

Specific problems addressed by Leg 66 include:

1) The dynamics of accretion at trenches: The lower slope sites of Leg 66 test whether offscraped deep-sea sediments, including trench deposits, or deformed slope deposits constitute the accretionary zone, and whether the offscraped deposits increase in age landward with stratigraphic inversion as predicted by a simple accretionary model. The popular trench-slope models (e.g., Seely, Vail, and Walton, 1974) are supported primarily by marine seismic data but have yet to be definitively tested by drilling.

2) Consumption of oceanic sediments and tectonic erosion of continental crust at subduction zones: Part of the trench and oceanic crust sediments entering the subduction zone in the Leg 66 area may be consumed in the sense of being deeply under-thrust, never to return to the surface in recognizable form. Sedimentologic and paleobathymetric data from drilling coupled with high quality multichannel seismic data in the Leg 66 area yield quantitative estimates of volume and age of sediment in the accretionary prism. This coupled with estimates of input of sediment into the subduction zone provide a measure of sediments being consumed by the subduction process. Tectonic erosion of a pre-existing accretionary wedge and fore-arc basin may account for the truncation of continental basement off southern Mexico. Leg 66 data constrain this hypothesis but do not altogether resolve it.

3) Onset and early evolution of subduction: Little is known in general about the beginning or early history of subduction largely due to masking by subsequent sedimentation and deformation at mature convergent margins. The probable youth of subduction off southern Mexico allows us to study artifacts of late pre-subduction and early subduction phases, and so reconstruct geologic history through this fundamental tectonic transition.

4) Gas hydrate: The expected occurrence of gas hydrate in the Leg 66 area (Shipley et al., 1979) posed a problem unrelated to major tectonic objectives but pertinent to the geology and energy resources of continental margins.

SITE SUMMARIES

We drilled 8 sites (Table 1) including continental, oceanic and trench reference sites, three sites in the accretionary wedge, and one in the transition zone between continental crust and the accretionary wedge (Figure 1 and cover).

SITE 486

Site 486 is in a small sediment pond representative of the discontinuous sediment fill of the Middle America Trench off southern Mexico (Figure 1 and cover). The seismic reflection profile through the site indicates a sediment thickness of about

Table 1. Leg 66 Coring Summary

Hole	Dates (1979)	Latitude	Longitude	Water * Depth (m)	Penetration (m)	Number of Cores	Meters Cored	Meters Recovered	Percent of Recovery
486	22-23 March	15°55.37'N	99°08.10'W	5142	38.0	5	38.0	12.5	33
486A	23-24 March	15°54.83'N	99°08.28'W	5138	22.0	3	22.0	3.5	16
487	24-27 March	15°51.21'N	99°10.52'W	4764	181.7	21	181.7	119.9	66
488	27 March-2 April	15°57.10'N	99°01.66'W	4254	428.5	46	428.5	160.4	37
489	3-5 April	16°16.19'N	99°01.13'W	1240	34.5	4	34.5	22.6	66
489A	5-7 April	16°16.19'N	99°01.13'W	1240	298.5	34	298.5	164.5	55
490	8-13 April	16°09.56'N	99°03.39'W	1761	588.5	64	588.5	344.8	59
491	13-20 April	16°01.74'N	98°58.33'W	2883	542.0	59	542.0	388.0	72
492	20-23 April	16°04.73'N	98°56.72'W	1935	279.0	31	279.0	189.6	68
492A	23-24 April	16°04.73'N	98°56.72'W	1935	71.8	11	51.8	30.3	59
492B	29-30 April	16°04.73'N	98°56.72'W	1942	290.0	1	9.5	6.4	68
493	24-28 April	16°22.86'N	98°55.53'W	645	670.5	60	556.5	333.4	60
493A	28-28 April	16°22.86'N	98°55.53'W	645	12.0	2	12	7.6	63
493B	28-29 April	16°22.86'N	98°55.53'W	645	126.0	12	114	59.8	52

* Corrected meters from echo sounding

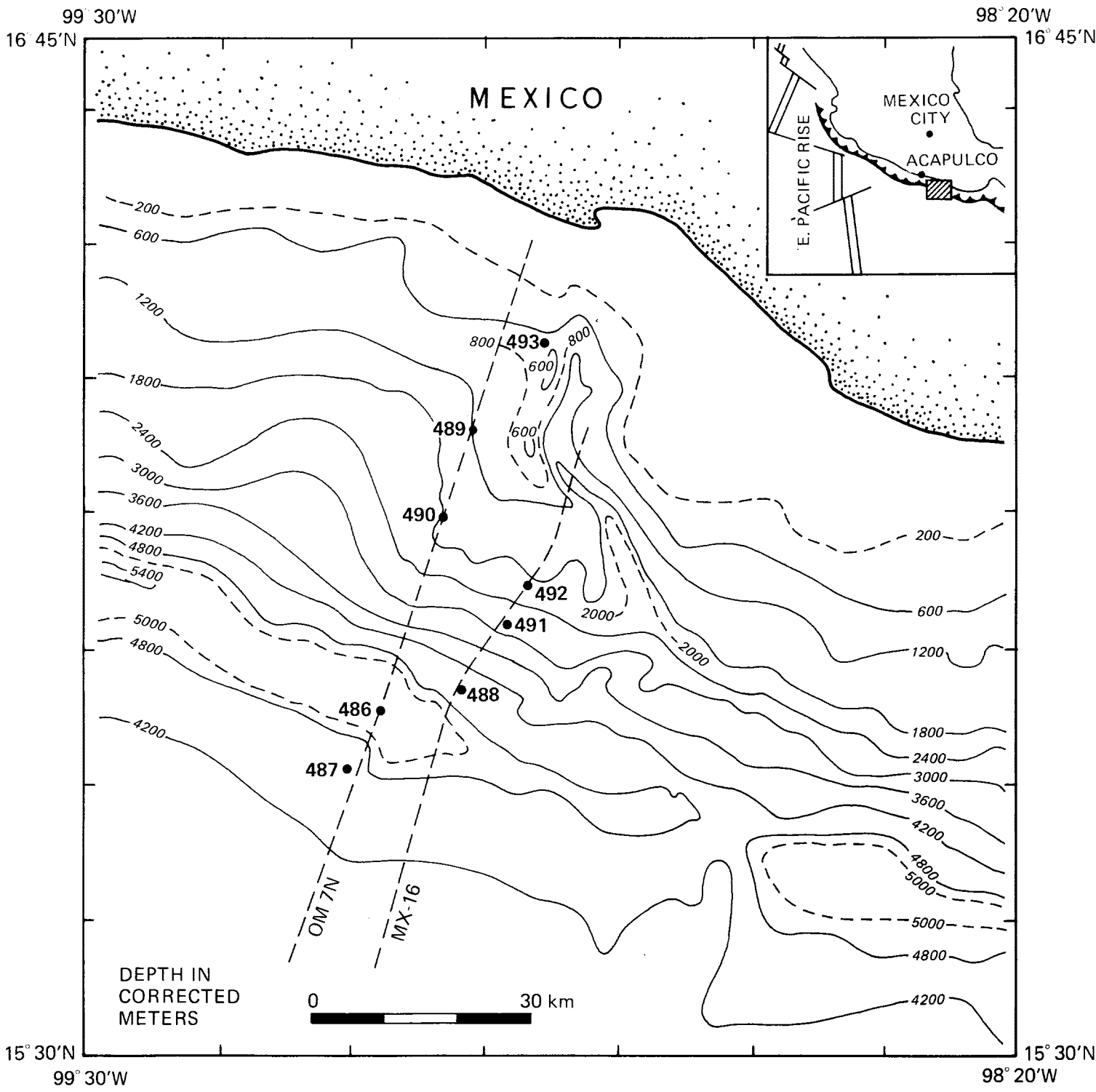


Figure 1. Location of Leg 66 sites.

425 meters composed of approximately equal amounts of density current deposits and subjacent hemipelagic to pelagic deposits. The stratigraphic section cored in Hole 486 consists of 38 meters of predominantly fine to medium muddy sand and in Hole 486A of 22 meters of fine to medium muddy sand and very coarse sand (Figure 2). All cores recovered are of Quaternary age and contain redeposited benthic foraminifers of nearshore or shelf environments. Flow of sand into both holes caused abandonment of drilling. The sands at Site 486 constitute the coarsest material ever recovered by drilling on a trench floor.

SITE 487

Site 487 is located on the oceanic plate about 11 km landward of the Middle America Trench (Figure 1 and cover). Here we penetrated 182 meters of sediment and rock that comprises two lithologic units (Figure 2). Unit 1 consists of 115 meters of Pleistocene and latest Pliocene hemipelagic mud with a high content of quartzo-feldspic silt and displaced benthic foraminifers that indicate derivation from the Mexican continental margin. Fifty-five meters of late Miocene to Pliocene brown pelagic clay comprise Unit 2 which overlies basalt. The entire brown clay unit probably accumulated below the carbonate compensation depth.

The late Miocene age of the oldest sediment recovered at Site 487 agrees reasonably with the middle Miocene age of the oceanic crust estimated from magnetic anomalies (Lynn and Lewis, 1976). The hemipelagic sediments at Site 487 are similar to trench slope deposits elsewhere in the Leg 66 area but the pelagic mud unit is distinct from any modern sediment accumulating locally.

SITE 488

At Site 488 on the lower slope of the Middle America Trench we penetrated 428 meters of sediment comprising two lithologic units (Figure 2). Unit 1 consists of 313 meters of lower-middle to upper Quaternary mud-mudstone with local thin silt and muddy sandy beds in its lower portion. Lower-middle Quaternary mud-mudstone, sand, and pebbly sand of Unit 2 extends from 313 to 428 meters.

The coarse sand of Unit 2 must have accumulated in a major turbidite channel, trench or slope basin and can be correlated with a series of landward dipping reflectors shown on the multichannel seismic reflection profile through Site 488.

SITE 489

Two holes, 489 and 489A, were drilled to determine the nature of a strong acoustic basement reflector and to document the depositional and subsidence history of this segment of the margin. Landward correlation of the acoustic basement reflector with seismic reflection and dredge haul data suggested that the reflector represented continental metamorphic basement rocks. This was of considerable interest because a landward-dipping reflector thought to belong to the accretionary wedge could be traced to within 10 km of a point immediately seaward of Site 489 where the inferred basement reflector broke up. Thus Site 489 was closest to the seaward limit of continental crust and the site most likely to yield data on pre-subduction and early subduction movements of the continental basement adjacent to the subduction zone.

After aborting Hole 489 due to mechanical problems, we drilled Hole 489A to a schistose basement of a pre-Tertiary age at 300 meters sub-bottom.

Sediments overlying the basement consisted of 10 meters of basal sand and 283 meters of mud and mudstone of lower Miocene age, which in turn were overlain by 7 meters of Quaternary mud.

SITE 490

We drilled Site 490, in 1761 meters of water to determine the nature of sediments immediately seaward of inferred continental crust at Site 489. At this site, we sought information on the early evolution of the accretionary wedge, as well as evidence relating to tectonic erosion of nearby continental crust.

Hole 490 bottomed at 588 meters after penetrating three lithological units ranging in age from late Miocene to Quaternary. Unit 1, from 0–123 meters, was Quaternary mud. Unit 2 was lower Quaternary to Pliocene muds from 123–399 meters sub-bottom. Unit 3 was Pliocene to late Miocene mudstone from 399–588 meters.

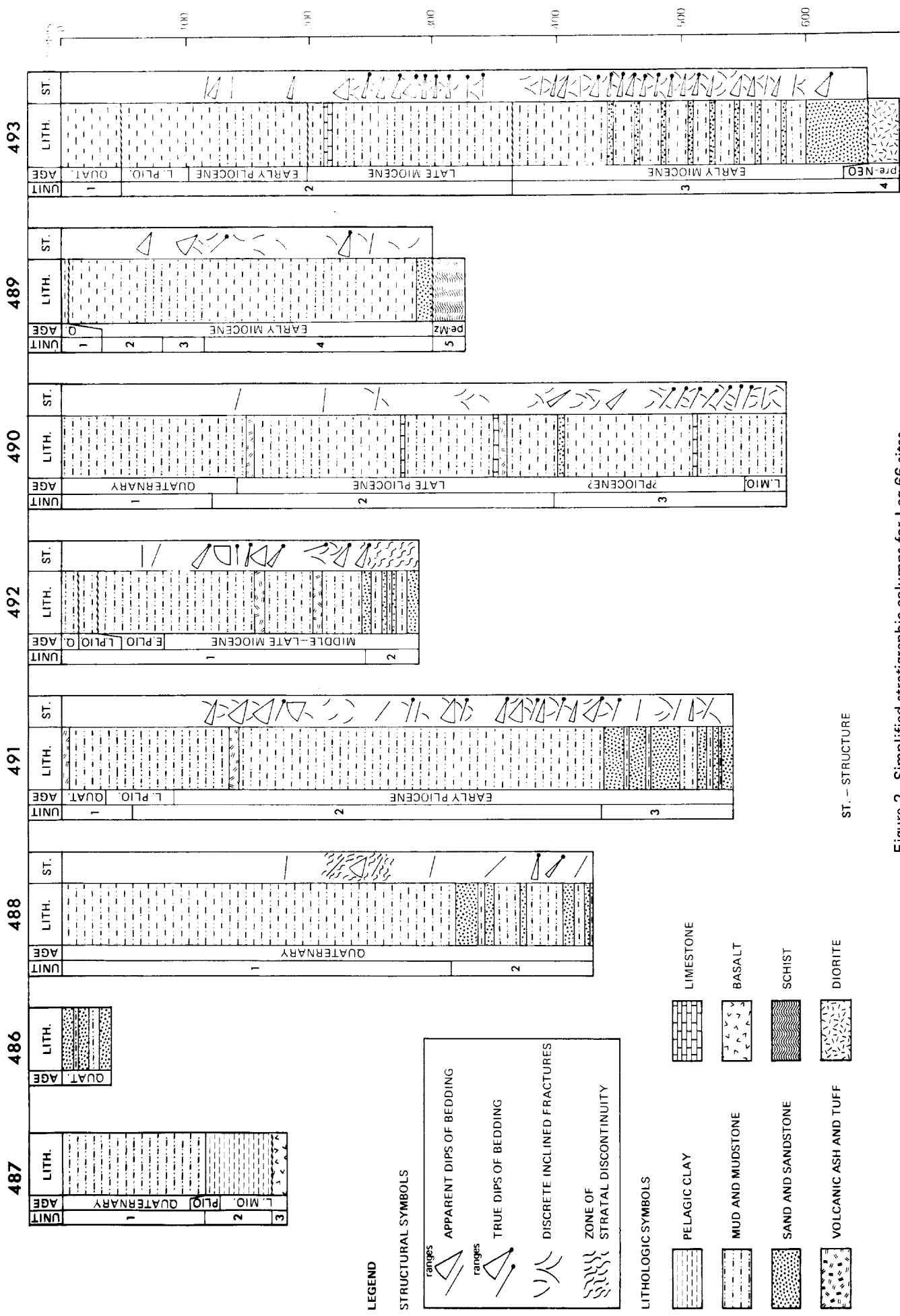


Figure 2. Simplified stratigraphic columns for Leg 66 sites.

SITE 491

Site 491 is located in the middle to lower slope regions about 14 km landward of the Middle America Trench. Here we penetrated 542 meters of sediment comprising three lithologic units (Figure 2). Unit 1 extends 0–57.5 meters and consists of upper Pliocene to upper Quaternary mud. Lower to upper Pliocene mud with minor fine sand layers constitute Unit 2 cored between 57.5 and 437.5 meters. Unit 3 which extends from 437.5 to 542 meters is composed of mud and mudstone with interbedded fine to coarse pebbly sand layers up to 40 cm thick.

The multichannel seismic reflection profile through Site 491 shows a series of discontinuous and indistinct reflectors above about 0.4 seconds that overlie more coherent landward dipping reflectors. The base of the discontinuous and indistinct reflection occurs at 440 meters near the top of Unit 3 which is defined by the first occurrence of sand.

Failure of the pressure core barrel prevented an attempt to sample *in-situ* gas hydrates at Site 491 but Cores 10 and 19 contained gassy frozen sediment. Released gas in excess of 7 times the volume of one sample may indicate the presence of hydrate.

SITE 492

Site 492 constitutes the landwardmost site of a lower to mid-slope transect northeast of the Middle America Trench. Here we penetrated 279 meters of sediment comprising two lithologic units. Unit 1 extends from 0–247 meters and consists predominantly of Quaternary to upper Miocene mud-mudstone. Upper Miocene mudstone with interbedded sand and granular gravel constitutes Unit 2 cored between 247 and 290 meters.

The multichannel seismic reflection profile through Site 492 shows a series of poorly defined slope-subparallel reflectors from 0.0–0.2 seconds sub-bottom covering numerous high amplitude landward dipping reflectors.

The dipping reflectors correlate with the first occurrence of significant sand beds as is the case at Sites 488 and 491.

Penetration at Site 492 occurred above a weak reflector subparallel to the seafloor which may represent the hydrate-gas phase boundary. Gassy frozen ash layers encountered at 141 and 170 meters released significantly greater amounts of gas than the maximum *in-situ* solubility of methane in seawater. This may indicate the presence of gas hydrate.

SITE 493

Site 493 includes three holes drilled in 645 meters of water about 25 km from the Mexican mainland (Figure 1). Hole 493 covered the interval 120–675.5 meters sub-seafloor, Hole 493A the interval 0–12 meters sub-seafloor, and Hole 493B the interval 12–120 meters sub-seafloor. Hole 493A was an inadvertent re-entry into Hole 493 at 12 meters.

Sediments above basement document four hiatuses. The entire middle Miocene is missing during the longest hiatus. Later hiatuses occur in the late Miocene, late Pliocene-late Quaternary and in the latest Quaternary.

Basement diorites closely resemble outcrops of Cretaceous intrusives on shore roughly 30 km from the site.

EXPLANATORY NOTES

GENERAL INFORMATION

Leg 66 *Initial Core Description* is presented here to aid investigators in selecting samples for detailed study. Samples from Leg 66 become available to the scientific community two months after the publication of this *ICD*.

Potential investigators who desire to obtain samples should refer to the DSDP-NSF Sample Distribution Policy (see Table of Contents). 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 samples required. The purpose of this publication is to aid interested investigators in understanding the (1) terminology, labeling, and numbering conventions used by the Deep Sea Drilling Project; (2) sediment classification and biostratigraphic framework used on Leg 66; and to (3) present the preliminary lithologic and paleontologic data on core forms, to guide sampling. However, 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 that the coring operation began to the depth that 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 sometimes slightly longer. "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, however, 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. In special cases, some cores may also have a letter designation: for example: H = "washed interval but recovered material in the core barrel."

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 core is then cut into 1.5 meter-long sections and numbered serially from the top of the core (Figure 3). When we obtain full recovery the sections are numbered from 1 through 7 with the last section 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.

For partial recovery, the original stratigraphic position of the material in the cored interval is unknown. If the recovered material is contiguous we assign the top of this material to the top of the cored interval and number sections serially from the top beginning with Section 1 (Figure 3). There are as many sections as needed to accommodate the length of the recovered material. For example, four meters of material are divided into three sections, two upper sections each 1.5 meters long and a final lower section only 1.0 meter in length. If the material recovered is not contiguous, as determined by the shipboard scientists, then sections are divided and numbered serially as with contiguous material and gaps labeled as voids

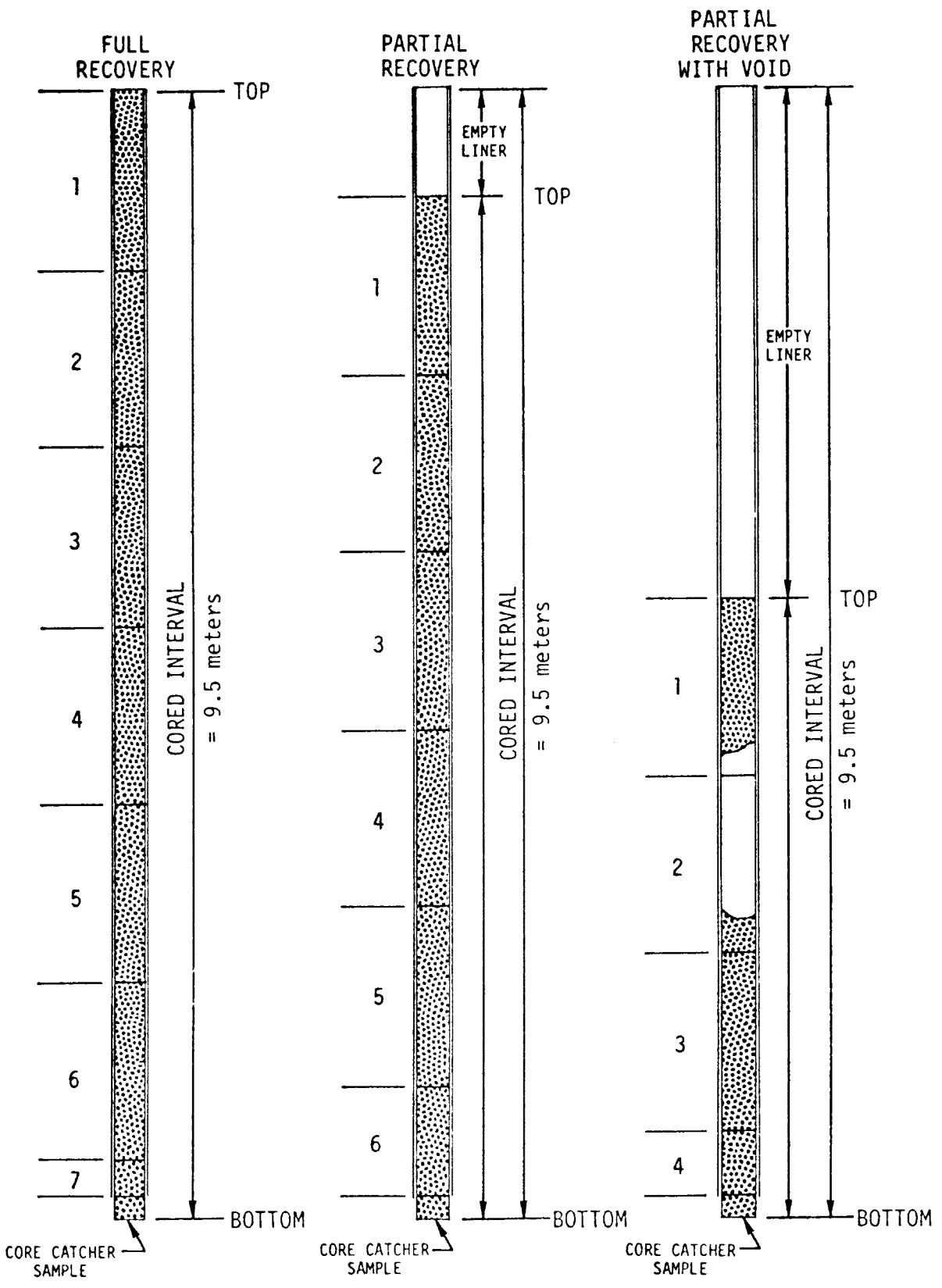


Figure 3. Diagram showing procedure in cutting and labeling of core sections.

for sediments (Figure 3) or marked by spacers for igneous rocks (see Igneous Rocks 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 66-489A-9-3, 12–14 cm is interpreted as follows: 12–14 cm designates a sample taken at 12–14 cm from the top of Section 3 of Core 9, from the second hole drilled at Site 489 during Leg 66. A sample from the Core-Catcher of this core is designated as 66-489A-9, CC.

HANDLING OF CORES

A core was normally cut into 1.5 meter sections, sealed, and labeled, then brought into the core laboratory for processing. Gas analyses and continuous wet-bulk density determinations using the Gamma Ray Attenuation Porosity Evaluation (GRAPE) were made on selected sections before splitting the plastic liner.

The cores were then split longitudinally into "working" and "archive" halves. Samples were taken from the "working" half, including those for determination 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, calcium carbonate percentage (Karbonate Bomb), geochemical analysis, paleontological studies, and others.

Smear slides (thin sections for lithified sedimentary and igneous rocks) from each major lithology, and most minor lithologies, were prepared and examined microscopically. The archive half was then described and photographed. Physical disturbance by the drill bit, color, texture, structures, and composition of the various lithologies were noted on standard Core Description Forms. All prime data is routinely microfilmed and some is digitized for computer retrieval.

After the cores were sampled and described, they are maintained in cold storage aboard *Glomar Challenger* until they can be transferred to the DSDP repository. Core sections of sediments removed for organic geochemistry study were frozen immediately onboard ship and kept frozen. All Leg 66 cores are presently stored at the DSDP West Coast Repository (Scripps Institution of Oceanography).

HPC CORES

On Leg 64 the Serocki-Storms-Cameron hydraulic piston corer (HPC) was first used successfully to recover undisturbed sediments at Site 480 and again at Site 481. HPC holes are not assigned a special letter designation. The HPC operates on the principle of a 4.45-meter core barrel which is lowered inside the drill string, hydraulically ejected into the sediment and retrieved. The pipe is then lowered those 4.45 meters to the next interval and the procedure repeated. The HPC was used on Leg 66 at Hole 492A. High shear strengths in the Miocene sediments prevented good recovery with the HPC.

PCB CORES

Hole 491 was drilled using a special bit which cuts a core slightly smaller than the plastic core liner (6.6 cm I.D.). The bit was used to allow operation of a special pressure core barrel (PCB) to recover sediments at *in situ* pressure. On two attempts the PCB did not work correctly. Total recovery at Hole 491 was high, about 72%. However, the core was more highly disturbed by drilling than at similar holes using the normal diameter drill bit.

SEDIMENTS AND SEDIMENTARY ROCKS

Core Description Forms

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:

- (a) Slightly deformed: Bedding contacts are slightly bent.
- (b) Moderately deformed: Bedding contacts have undergone extreme bowing. Firm sediment is fractured.
- (c) Very deformed: Bedding is completely disturbed or homogenized by drilling, sometimes showing symmetrical diapir-like structure. Firm zones may have relic "drill biscuits" in a breccia or homogeneous matrix.
- (d) Soupy: Water saturated intervals which have lost all aspects of original bedding
- (e) Breccia: Indurated sediments broken into angular fragments by the drilling process, perhaps along pre-existing fractures.

These categories are coded on the core description form in the column headed "Drilling Disturbance" (Figure 4).

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. Thus, the description of sedimentary structures was optional. Locations and types of these structures appear as graphic symbols in the column headed "Sedimentary Structures" on the Core Description Form (Figure 4). Figures 5 and 6 give the keys to these symbols.

Bioturbation is difficult to recognize in the monotonous hemipelagic muds, but are noted, where distinguishable, on the graphic column.

Color

Colors of the core samples are determined with a Geological Society of America Rock-Color Chart. Colors were determined immediately after the cores were split and while wet.

Lithology

The graphic column presented on the Core Description Form is based on the lithologies and represented by a single pattern or by a grouping of two or more symbols. The symbols in a grouping correspond to end members of sediment constituents, such as clay or nannofossil ooze. The symbol for the terrigenous constituent appears on the right-hand side of the column, the symbol for the biogenic constituent(s) is on the left-hand side of the column. The abundance of any component approximately equals the percentage of the width of the graphic column its symbol occupies. For example the left 20% of the column may have a diatom ooze symbol while the right 80% of the column may have a silty-clay symbol, indicating sediment composed of 80% mud and 20% diatoms.

Because of the difference in the length-to-width ratio between the actual sediment core and the graphic lithologic column, it is not possible to reproduce structures as they appeared in the core; they become highly flattened and distorted. The same is true for rock fragments or pebbles in the cores. As a result, the locations of pebbles are shown by a solid square and the depth of small "patches" of ash or other lithologic changes are given by triangular inset of the appropriate lithologic symbol on the right side of the lithologic column (Figures 4 and 6). This convention applies also to beds thinner than 10 cm. Voids less than 10 cm not shown.

Smear slide (or thin section) compositions, carbonate content (% CaCO₃), and organic carbon content determined aboard ship are listed below the core description on these forms, where two numbers separated by a hyphen refer to the section and centimeter interval, respectively, of the sample. The locations of these samples in the core and a key to the codes used to identify these samples are given in the column headed "Samples" (Figure 4). Locations and intervals of organic geochemistry (OG), interstitial water (IW) and physical property (PP) samples, are given in the lithology column.

Lithologic Classification of Sediments

The basic classification system used here 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. Leg 66 shipboard scientists have modified this classification because of the dominant hemipelagic nature of the sediments recovered and difficulty in accurately determining silt/clay ratios in smear slides.

This classification is descriptive rather than generic and divisions between different types of sediment are somewhat arbitrary. We treat lithologic types not covered in this classification as a separate category termed "Special Rock Types." A brief outline of the conventions and descriptive data used to construct this classification follows. See Figures 7 and 8.

SITE		HOLE				CORE		CORED INTERVAL		Meters below the sea floor	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS						
	(N) = Nannofossil Zones	(F) = Foraminifer Zones	(R) = Radiolarian Zones	(D) = Diatom Zones		0.5 1.0					<p>Lithologic Description</p> <p>Organic Carbon and Carbonate Content Section-Depth (cm), % Organic Carbon, % CaCO₃</p> <p>Smear Slide Summary Section-Depth (cm) (M) = Minor Lithology (D) = Dominant Lithology (T) = Thin Section CF = Coarse Fraction Texture: % Sand, Silt, Clay Components: %</p> <p>↑ Interstitial Water Sample</p> <p>↑ Organic Geochemistry Sample</p> <p>↑ Physical Property Samples</p> <p>▽ Layers or blebs less than 10 cm</p>
						2	IW				
						3	See key to graphic lithology symbols (Figure 7).				
						4	OG				
						5	PP				
						6					
						7					
						CC					

Figure 4. Sample core form (sediment).

Description




















	Parallel bedding
	Load casts
	Plant or wood fragments
	Scour
	Normal graded bedding
	Reversed graded bedding
	Convolute and contorted bedding
	Shell fragments
	Gradational contact
	Sharp contact
	Zoophycos
	Teichichnus
	Siliceous spong spicules
	Chondrites
	Interval over which a specific structure occurs in core
	Bioturbation – minor (0–30% surface area)
	Bioturbation – moderate (30–60% surface area)
	Bioturbation – strong (more than 60% of surface area)
	Burrows

Figure 5. Symbols of sedimentary structures used on core description forms (sediment).

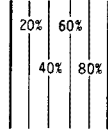
Pelagic

Non-biogenic

Pelagic Clay



Vertical bar percent (%) Designation for Graphic Log.



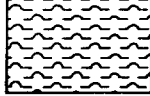
Siliceous Biogenic

Pelagic Siliceous Biogenic - Soft

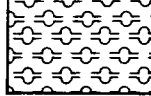
Diatom Ooze



Radiolarian Ooze



Diatom-Rad or Siliceous Ooze

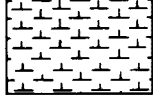


Layers or blebs < 10 cm thick of given lithology at the interval depth shown by the triangle. The size is independent of the size of the patch or bleb.

Calcareous Biogenic

Pelagic Biogenic Calcareous - Soft

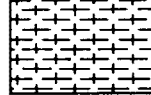
Nannofossil Ooze



Foraminifer Ooze



Nanno-Foram or Foram-Nanno Ooze



Calcareous Ooze

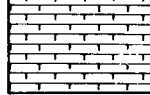


Pelagic Biogenic Calcareous - Firm

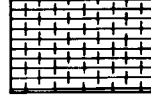
Nannofossil Chalk



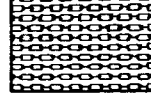
Foraminifer Chalk



Nanno-Foram or Foram Nanno Chalk

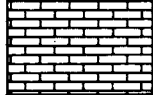


Calcareous Chalk

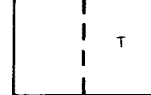


Pelagic Biogenic Calcareous - Hard

Limestone

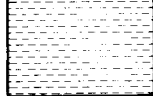


Transitional Terrigenous - Biogenic Sediments (Hemipelagics)
Biogenic modifier with area approximate according to abundance.



Terrigenous Sediments

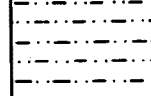
Clay/Claystone



Mud/Mudstone



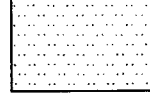
Muddy Silt/Stone



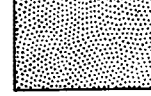
Sandy mud/Sandy mudstone



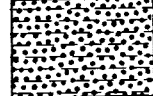
Silt/Siltstone



Sand/Sandstone

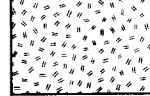


Muddy Sand/Stone



Pyroclastic

Volcanic Ash



Special Rock Types

Gravel



Conglomerate



Breccia



Basic Igneous



Acid Igneous



Figure 6. Symbols used in graphic lithology column of core description forms (sediment).

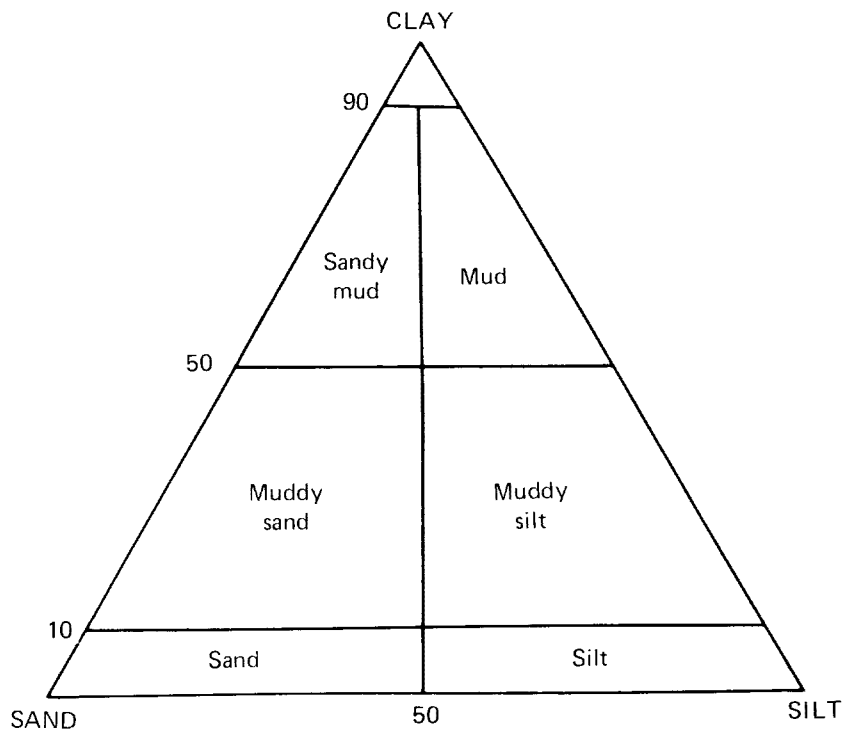


Figure 7. Terrigenous sediment classification on Leg 66. Used when siliceous components <10%, authigenic components <10%, and total terrigenous components >30%.

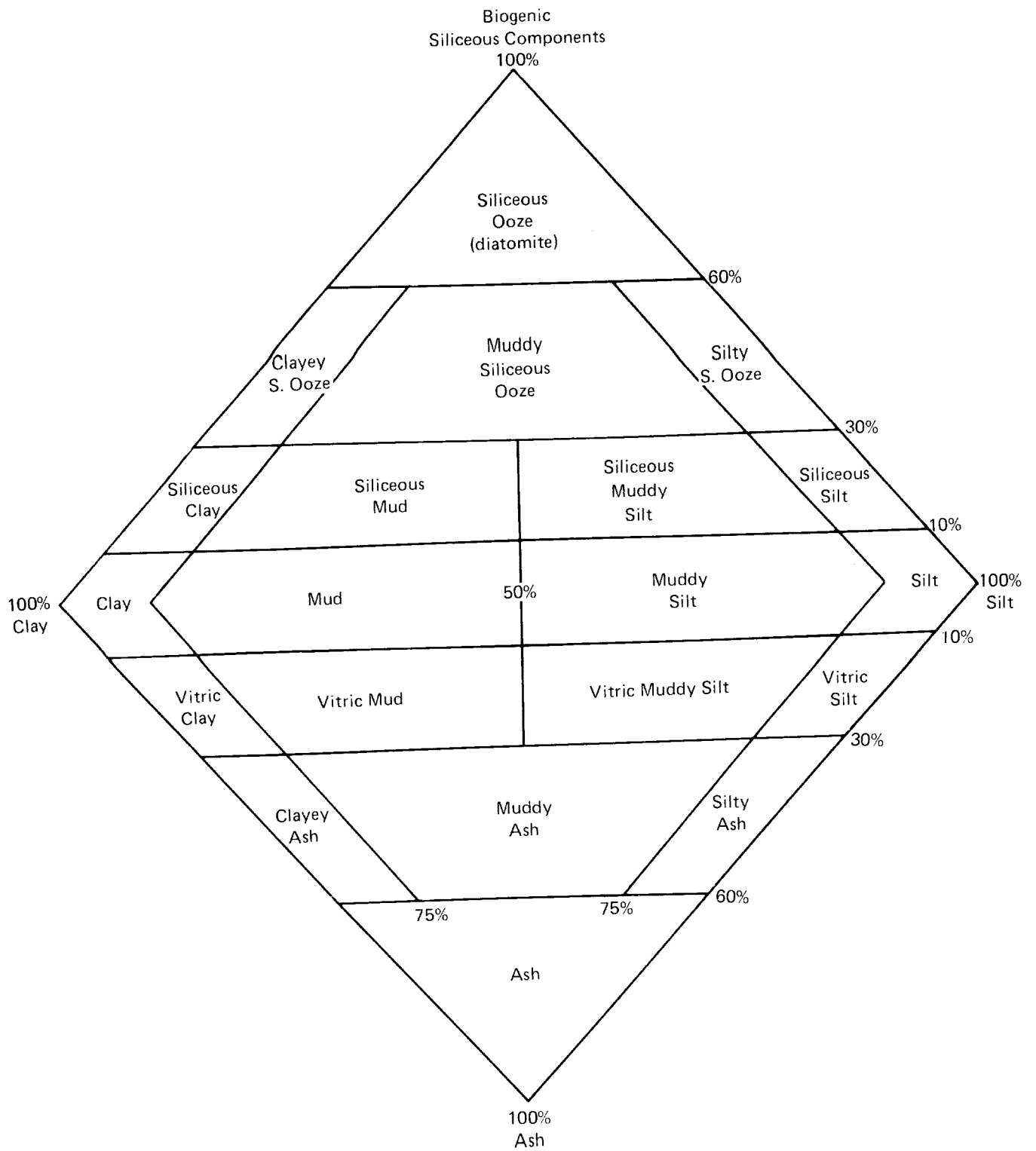


Figure 8. Hemipelagic sediment classification for use on Leg 66. Used when biogenic silica >10%, terrigenous component >30% and total non-biogenic component >40%.

Conventions and Descriptive Data

Composition and Texture

In this classification composition and texture are the only criteria used to define the type of sediment or sedimentary rock. Composition is most important for describing sediments deposited in the open ocean, while texture becomes significant for hemipelagic and nearshore sediments. These data come principally from visual estimates of smear slides using a petrographic microscope. They are estimates of areal abundance and size components on the slide and may differ somewhat from more accurate analyses of grain size, carbonate content, and mineralogy (see "Special Studies" section). From past experience, quantitative estimates of distinctive minor components are accurate to within 1–2%, but for major constituents accuracy is poorer, $\pm 10\%$. All smear slide estimates were done onboard. In Site 487 (Cores 13–19), disparity between smear slides estimation of grain size and laboratory analysis, appears to be much more than 10%. After re-examination of the relevant smear slides on land, we prefer to use the visual estimation values. The large difference between methods may be due to flocculation of clays during laboratory processing. Carbonate content is difficult to estimate from smear slides. Therefore, for many cores we determined the percentage of carbonate using the "Karbonate Bomb" technique of Muller and Gastner (1971). This method involves treating a powdered sample with HCl in a closed cylinder. The resulting pressure of CO_2 is proportional to the carbonate (CaCO_3) content of the sample and this value is converted to per cent CaCO_3 using the calibration factor of the manometer. The accuracy of this method is $\pm 5\%$. Carbonate content determined in this manner is listed on the core description forms below the lithologic description.

Where applicable we used one or several modifiers in naming the type of sediment encountered. In all cases the dominant component appears last in the name, minor components precede with the least common constituent listed first. If minor constituents occur in amounts less than 10% they are not included in the name. This convention also holds for zeolites, Fe- and Mn-micronodules and other indicators of very slow rates of sedimentation or nondeposition such as fish bones. Often these minerals are conspicuous even though greatly diluted. If deemed important and environmentally significant, as glauconite and dolomite were on Leg 64, they are sometimes included in the name of the sediment or mentioned in the lithologic description.

Induration of Sediments

We recognize three classes of induration or lithification for all sediments, differing slightly from previous legs.

1. Calcareous sediments and sedimentary rocks ; categories after Gealy, et al. (1971).
 - a. Soft = ooze; has little strength and readily deformed under pressure of finger or broad blade of spatula
 - b. Firm = chalk; partially lithified and readily scratched with fingernail or edge of spatula
 - c. Hard = limestone; dolostone; well lithified and cemented; resistant or impossible to scratch with fingernail or edge of spatula
2. The three classes of induration for transitional carbonates, siliceous, pelagic and terrigenous sediments are as follows:
 - a. Soft = sediment core may be split with wire cutter
 - b. Firm = partially lithified but finger-tip pressure leaves an indentation
 - c. Hard = cannot be compressed with finger-tip pressure

Types of Sediments and Compositional Boundaries

Pelagic Clay

Pelagic clay is 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 used.

1. 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.
2. Boundary of pelagic clay with siliceous-biogenic-sediments is where there is less than 30% siliceous remains.
3. Boundary of pelagic clay with calcareous-biogenic-sediment is uncommon. Generally this facies passes 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 other metallic trace elements. For proper identification they require more elaborate geochemical work than is available onboard ship. These sediments would be placed in the Special Rock Category.

Pelagic-Siliceous-Biogenic-Sediment

Pelagic-siliceous-biogenic-sediment is distinguished from pelagic clay because the siliceous-biogenic-sediment has more than 30% siliceous microfossils. Siliceous-biogenic-sediments are distinguished from a calcareous category by a calcium carbonate content of less than 30%. These sediment types were rarely encountered on Leg 66.

For a pelagic-biogenic-siliceous-sediment with ~ 30--100% siliceous fossils, the following terminology is used:

1. Soft: Siliceous ooze (radiolarian ooze, diatomaceous ooze, etc. depending on the dominant fossil component).
2. Hard: Radiolarite, diatomite, chert, or porcellanite.
3. Compositional Qualifiers. Diatoms and radiolaria may be the principle components, thus one or two qualifiers may be used. The order of the two modifiers in the terms is dependent on the dominant fossil type. The most dominant component is listed last and the minor component is listed first.

Pelagic-Biogenic-Calcareous-Sediment

Pelagic-calcareous-sediment is distinguished by a biogenic CaCO_3 content in excess of 30%. There are two classes: 1) Pelagic-Biogenic-Calcareous-Sediments which contain 60--100% biogenic CaCO_3 and 2) Transitional-Biogenic-Calcareous-Sediments which contain 30--60% CaCO_3 . These sediment type were rarely encountered on Leg 66.

1. For the Pelagic-Biogenic-Calcareous-Sediment with 60--100% CaCO_3 the following terminology is used:
 - a. Soft: Calcareous ooze
 - b. Firm: Chalk
 - c. Hard and cemented: Limestone
 - d. Compositional Qualifiers: If nannofossils and foraminifers are the principal components, then one or two qualifiers may be used.
2. The Transitional-Biogenic-Calcareous-Sediments with 30--60% CaCO_3 are termed marl or marlstone depending if they are soft or hard.

Terrigenous Sediments

Terrigenous sediments are distinguished by a terrigenous component in excess of 30%, and siliceous and authigenic components, each less than 10%. These are the most common sediment type encountered on Leg 66.

Sediments in this category are subdivided into textural groups (by smear slide estimation or grain size analysis on the basis of the relative proportions of sand, silt, and clay. The size limits are those defined by Wentworth (1922). Textural classification follows the triangular diagram (Figure 7).

The transition between pelagic and terrigenous sediments are termed hemipelagic. This is the dominant type of sediment encountered during continental margin drilling. As such it is treated separately.

Hemipelagic Sediments

Hemipelagic sediments are distinguished by a terrigenous component in excess of 30%, a total non-biogenic component in excess of 40%, and a biogenic silica content in excess of 10%. Besides the terrigenous component, hemipelagic sediments are usually rich in biogenic silica (usually diatoms because of coastal upwelling) and volcanic ash (predominantly along active margins). The classification of these sediments in terms of the dominant components can be represented by a pyramid in which the peak and each corner represents 100% of a specific component: 100% sand at the peak; 100% silt and 100% clay at diagonal corners of the base; and 100% biogenic silica and 100% ash at the other diagonal corners of the base.

The plane of the base of the pyramid (Figure 8) shows the classification of sediments with less than a 10% sand component. Such sediments are the dominant type found on most continental margins and thus the classification in Figure 8 is broadly applicable. The percentage silt and clay used in the diagram (Figure 8) refers to only terrigenous components. Authigenic minerals, ash, and biogenic particles are not included.

For biogenic opal contents greater than 10%, the dominant siliceous biogenic component should be used in the name. We have used the term "siliceous" in the diagram (Figure 8). However, where other identifiable biogenic siliceous components dominate the terms radiolarians, radiolarite, spicular, etc., may be used.

Components such as sand, diatoms, radiolarians, spicules, ash, etc., may be used as qualifiers to the original sediment description if their abundance is 10–30% of the sediment. Within the textural group and the component group the modifiers are listed in order of increasing sedimentary abundance.

Volcanogenic Sediments

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

The textural groups are:

- > 32 mm - Volcanic breccia
- 32 mm–4 mm - Volcanic lapilli
- < 4 mm - Volcanic ash (tuff when indurated)

The composition of these pyroclastic rocks are described as vitric (glass), crystalline, or lithic.

Sediments rich in ash are described in the following manner:

% Ash	Soft-Sediment	Indurated
0–10	Mud	Mudstone
10–30	Vitric mud	Vitric mudstone
30–60	Muddy ash	Tuffite
> 60	Ash	Tuff

Qualifiers

In general, sediments containing various constituents in the 10–30% range may be identified in the name of sediment such as 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.

IGNEOUS ROCKS

Visual Core Description Forms

All igneous rocks were split using a rock saw into working and archive halves described and sampled onboard. Figure 9 shows a composite Visual Core Description Form used for the description of igneous rocks recovered on Leg 66. On this form, each section of a core is described under a set of five column headings: (1) piece number, (2) graphic representation, (3) orientation, (4) shipboard studies, and (5) alteration.

In the graphic representation column each piece is accurately drawn and different features, such as texture, glassy margins, or vesicles, coded according to the symbols given in Figure 10. Two closely spaced horizontal lines in this column indicate the location of styrofoam spacers taped between pieces inside the liner. Each piece is numbered sequentially from the top of the section beginning with the number 1 (piece number column). Pieces are labeled on the rounded surface rather than the flat slabbed face. Pieces which fit together before splitting were given the same number, but are consecutively lettered as 1A, 1B, 1C, etc. Spacers were placed only between pieces which did not fit together; those pieces were given different numbers. In general, spacers may or may not indicate missing material (not recovered) between pieces. All cylindrical pieces longer than the diameter of the liner have arrows in the "orientation" column indicating that top and bottom have not been reversed as a result of drilling and recovery. Arrows also appear on the labels of these pieces on both archive and working halves.

The column marked "Shipboard Studies" designates the location and the type of measurements made on a sample onboard. The column headed "Alteration" gives the degree of alteration using the code given in Figure 10. Below each set of five descriptive columns is the designation for core and section for which these data apply.

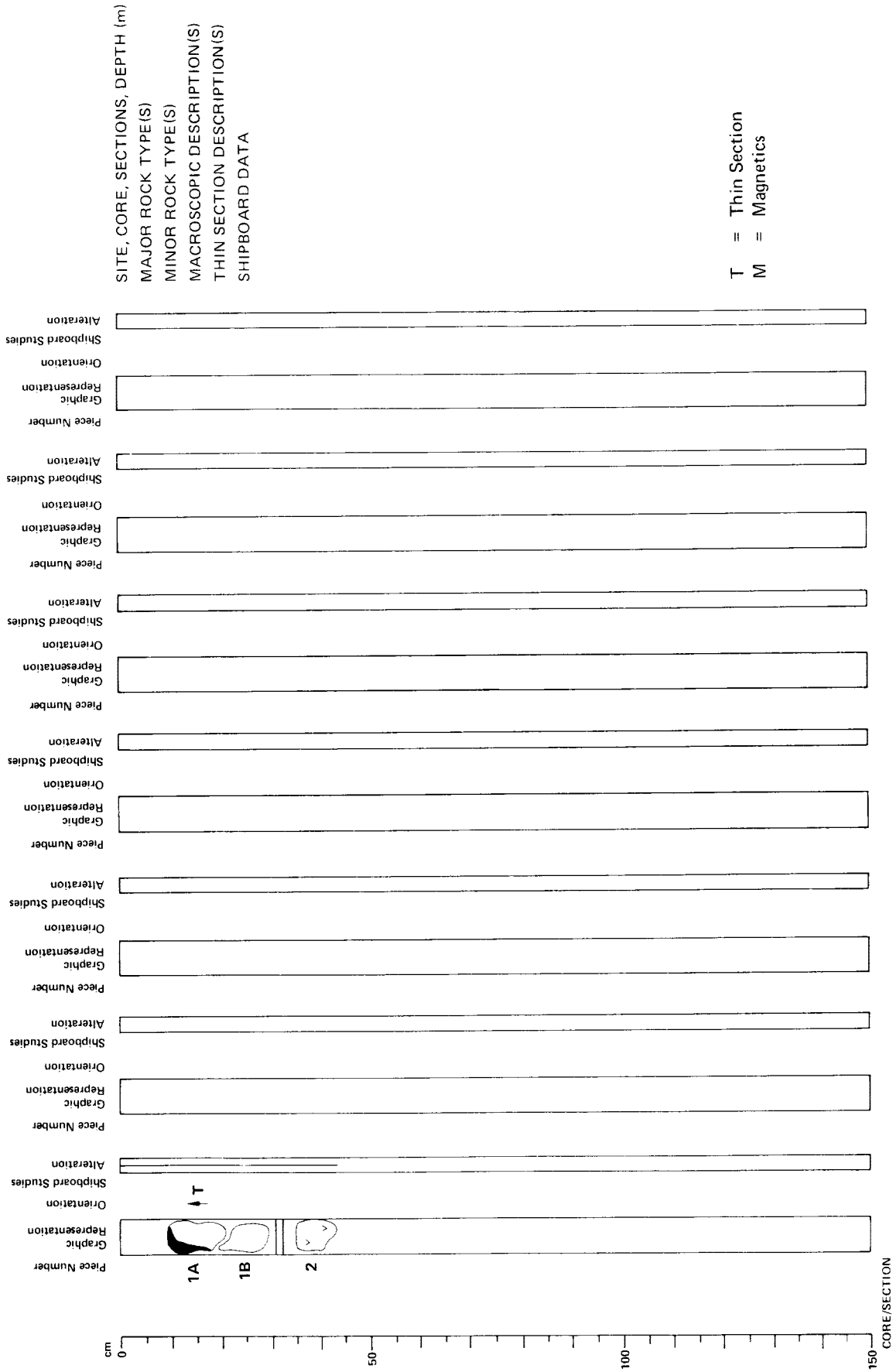


Figure 9. Visual core description form (igneous).

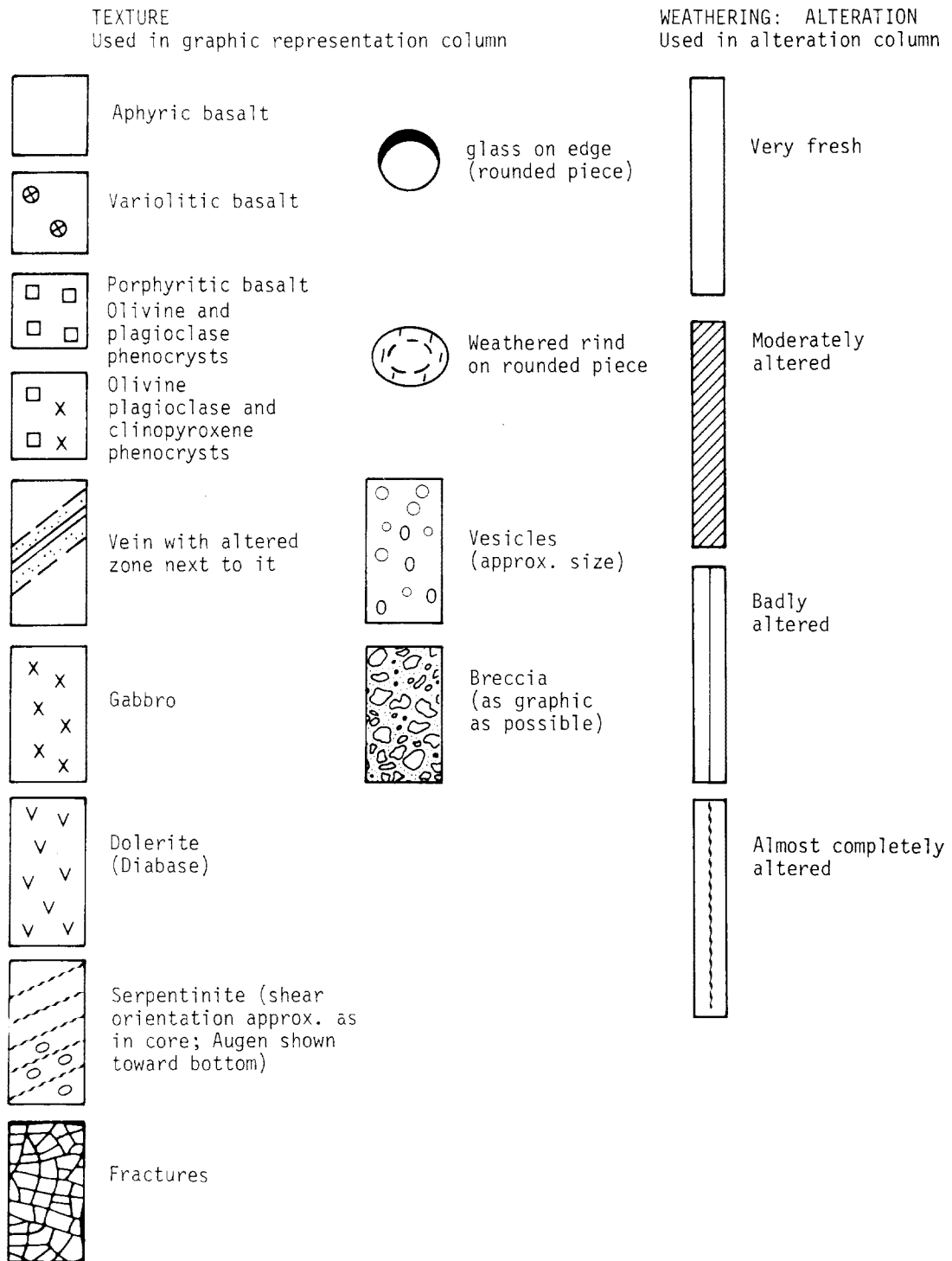


Figure 10. List of symbols for igneous rocks.

Figure 8 gives the outline for core descriptions of igneous rocks in the right-hand margin of the Visual Core Description Form. If more than one core appear on the core form these data are listed below the description of the first core using the same format. As many cores as space allows are included on one Visual Core Description Form. When space for descriptions is inadequate on this form, these data appear on the following or facing page. However, in no case does information from one core appear on successive core forms.

For each core, the core number, sections, and depth interval recovered are listed followed by the major and minor rock types and a short description. Thin section data are tallied below this, then shipboard data.

Classification of Igneous Rocks

We informally classified igneous rocks recovered on Leg 66 according to mineralogy and texture determined from visual inspection of hand specimens and thin sections.

PHOTOGRAPHY

Sets of color and black and white negatives of whole cores are available for consultation. In addition, negatives in black and white for close-up documentation of special structures are archived at DSDP. Appendix 1 lists those from Leg 66. Photographs are available on a charge and time available basis.

SAMPLE DISTRIBUTION POLICY

Deep Sea Drilling Project/International Phase of Ocean Drilling

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

D. Investigators receiving samples are responsible for:

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

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

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

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

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

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

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

3. Other Records

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

Requests for data may be made to:

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

A charge will be made to recover the expenses in excess of \$50.00 in filing 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

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SITE SUMMARY SHEET

SITE 486

Date occupied: 22 March 1979

Date departed: 23 March 1979

Time on hole: 26.2 hours

Position: latitude: 15°55.37'N

longitude: 99°08.10'W

Water depth (sea level): 5142 corrected meters, echo sounding

Water depth (rig floor): 5152 corrected meters, echo sounding

Bottom felt at: 5157 meters, drill pipe

Penetration: 38 meters

Number of cores: 5

Total length of cored section: 38 meters

Total core recovery: 12.5 meters

Percentage core recovery: 33%

Oldest Sediment Cored

Depth sub-bottom: 38 meters

Nature: Sand

Age: Quaternary

Basement

Depth sub-bottom: Not penetrated

Principal Results

See Hole 486A.

SITE 486 HOLE	CORE 3	CORED INTERVAL	9.5-19.0 m		LITHOLOGIC DESCRIPTION
			SECTION	METERS	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	QUATERNARY			MUDDY SAND, olive black (BY 271), fine- to medium-grained, locally coarse-grained, structureless, soupy.
FOSSIL CHARACTER	ELIOPHAG.	DIATOMS	NANNOFOSILS	FORAMINIFERS	SMEAR SLIDES
DISTURBANCE STRUCTURES			GZ		
ORILLING					
SECTION			1	0.5	
SECTION			2	1.0	
SECTION			3		
SECTION			4		
SECTION			5		
SECTION			6		
SECTION			CC		

SITE 486 HOLE	CORE 1	CORED INTERVAL	0.0-9.5 m		LITHOLOGIC DESCRIPTION
			SECTION	METERS	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	QUATERNARY			Recovery limited to smears on core liner: MUDDY SAND, dark gray (N3), coarse-grained.
FOSSIL CHARACTER	ELIOPHAG.	DIATOMS	NANNOFOSILS	FORAMINIFERS	SMEAR SLIDES
DISTURBANCE STRUCTURES					
ORILLING					
SECTION			1	0.5	
SECTION			2	1.0	

10

SITE 486 HOLE	CORE 2	CORED INTERVAL	0.0-9.5 m		LITHOLOGIC DESCRIPTION
			SECTION	METERS	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	QUATERNARY			Recovery limited to smears on core liner: MUDDY SAND, fine-grained, olive black (BY 271).
FOSSIL CHARACTER	ELIOPHAG.	DIATOMS	NANNOFOSILS	FORAMINIFERS	SMEAR SLIDES
DISTURBANCE STRUCTURES					
ORILLING					
SECTION			1	0.5	
SECTION			2	1.0	

10

SITE 486 HOLE	CORE 6X	CORED INTERVAL	38.0 m (Washed)	LITHOLOGIC DESCRIPTION								
					TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEMI-UNITARY SAMPLES
				MEDIUM SAND, olivegray (BY 3/2).	QUATERNARY	NN 21/NN 20	FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, SILICOFLAGELLATES	SECTION 1, 2, 3, 4	0.5, 1.0, 2, 3, 4			

SITE 486 HOLE	CORE 4	CORED INTERVAL	19.0-28.5 m	LITHOLOGIC DESCRIPTION								
					TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEMI-UNITARY SAMPLES
				Total recovery 10 cm in Core-Catcher only. Lump of MUDDY SAND (massive) AND MUD, brownish-black (SYR 2/1).	QUATERNARY	NN 21/NN 20	FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, SILICOFLAGELLATES	SECTION 1, 2, 3	0.5, 1.0			
				SMEAR SLIDES								
				TEXTURE:								
				Sand	CC-1 (D)	CC-4 (M)	CC-7 (D)					
				Silt	TR	TR	TR					
				Clay	40	60	15					
				COMPOSITION:								
				Quartz	30	35	75					
				Feldspar	5	2	7					
				Mica	-	1	-					
				Heavy minerals	5	2	-					
				Clay	50	60	15					
				Foraminifers	TR	TR	TR					
				Nannofossils	TR	TR	TR					
				Radiolarians	TR	TR	TR					
				Diatoms	TR	TR	TR					
				Sponge spicules	TR	TR	TR					
				Shell fragments	-	5	-					

SITE 486 HOLE	CORE 5	CORED INTERVAL	28.5-38.0 m	LITHOLOGIC DESCRIPTION								
					TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEMI-UNITARY SAMPLES
				Fine to medium MICACEOUS SAND, olive gray (BY 3/2) grading to MEDIUM TO COARSE SAND, medium dark gray (N4), through Sections 1 and 2. Minor SANDY MUD, grayish black (N2) in Section 3.	QUATERNARY	NN 21/NN 20	FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, SILICOFLAGELLATES	SECTION 1, 2, 3	0.5, 1.0			
				SMEAR SLIDES								
				TEXTURE:								
				Sand	1-41 (D)	2-132 (D)	3-2 (D)					
				Silt	98	97	20					
				Clay	2	2	40					
				COMPOSITION:								
				Quartz	80	73	35					
				Feldspar	10	10	3					
				Mica	5	5	1					
				Heavy minerals	5	2	1					
				Clay	TR	TR	40					
				Foraminifers	TR	TR	TR					
				Nannofossils	TR	TR	TR					
				Diatoms	TR	TR	TR					
				Sponge spicules	TR	TR	TR					
				Plant fragments	-	-	20					
				GRAIN SIZE	1-40	2-132						
				Sand	98.7	98.8						
				Silt	1.2	0.2						
				Clay	2.1	1.2						

SITE SUMMARY SHEET

HOLE 486A

Date occupied: 23 March 1979

Date departed: 24 March 1979

Time on hole: 19.3 hours

Position: latitude: 15°54.83'N

longitude: 99°08.28'W

Water depth (sea level): 5138 corrected meters, echo sounding

Water depth (rig floor): 5148 corrected meters, echo sounding

Bottom felt at: 5152 meters, drill pipe

Penetration: 22 meters

Number of cores: 3

Total length of cored section: 22 meters

Total core recovery: 3.5 meters

Percentage core recovery: 16%

Oldest Sediment Cored

Depth sub-bottom: 22 meters

Nature: Sand

Age: Quaternary

Basement

Depth sub-bottom: Not penetrated

Principal Results

Site 486 is located in the Middle America Trench 120 km southeast of Acapulco, Mexico. The stratigraphic section cored in Hole 486 consists of 38 meters of predominantly fine to medium clayey sand and in Hole 486A of 22 meters of fine to medium clayey sand and very coarse sand. All cores are of Quaternary age and contain redeposited faunal elements of nearshore or shelf environments. The abundant sand which caused abandonment of the Site is the coarsest material yet recovered by drilling on a trench floor.

SITE 486 HOLE A CORE 1 CORED INTERVAL 0.0-5.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		DIATOMS	RADIOLARIANS	MANNOFOSSILS	FORAMINIFERS				
UPPER - MIDDLE PLEISTOCENE	NN 21/ NN 20							<p>MUD, olive gray (SY 3/2); FINE SAND, dusky yellow brown (10YR 2/2); CLAY, olive gray (SY 3/2); massive, micaceous SILT, grayish olive (10Y 4/2); grading into fine to medium micaceous MUDDY SAND.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Sand 10 20 60 CC (D) Mud Silt 40 75 30 Muddy sand Clay 50 5 10</p> <p>COMPOSITION: Quartz 44 75 66 Feldspar 2 10 20 Mica 1 2 3 Heavy minerals 30 3 1 Clay 48 5 10 Foraminifers TR TR TR Radiolarians TR TR TR Diatoms TR TR Sponge spicules TR TR TR Plant fragments TR 5 TR TR</p> <p>GRAIN SIZE 2-82 Sand 70.8 Silt 28.7 Clay 8.5</p>	
TIME - ROCK UNIT									
BIOSTRATIGRAPHIC ZONE									
FORAMINIFERS									
MANNOFOSSILS									
RADIOLARIANS									
DIATOMS									
SECTION									
METERS									
GRAPHIC LITHOLOGY									
DRILLING DISTURBANCE									
SEDIMENTARY STRUCTURES									
SAMPLES									

SITE 486 HOLE A CORE 2 CORED INTERVAL 5.0-14.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		DIATOMS	RADIOLARIANS	MANNOFOSSILS	FORAMINIFERS				
								<p>Core-Catcher only: very coarse-grained SAND, medium dark gray (M4), Megafossil fragments.</p>	
TIME - ROCK UNIT									
BIOSTRATIGRAPHIC ZONE									
FORAMINIFERS									
MANNOFOSSILS									
RADIOLARIANS									
DIATOMS									
SECTION									
METERS									
GRAPHIC LITHOLOGY									
DRILLING DISTURBANCE									
SEDIMENTARY STRUCTURES									
SAMPLES									

SITE 486 HOLE A CORE 3 CORED INTERVAL 14.5-22.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		DIATOMS	RADIOLARIANS	MANNOFOSSILS	FORAMINIFERS				
								<p>Fine to medium MUDDY SAND, olive gray (SY 3/2), micaceous. Core-Catcher: MUDDY SAND with lump of olive gray (SY 3/2) sticky CLAY.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Sand 30 CC (D) Silt 25 Clay 45</p> <p>COMPOSITION: Quartz 42 Feldspar 1 Mica 2 Heavy minerals 3 Clay 45 Sponge spicules TR Plant fragments 2 Calc. unspc. 5</p>	
TIME - ROCK UNIT									
BIOSTRATIGRAPHIC ZONE									
FORAMINIFERS									
MANNOFOSSILS									
RADIOLARIANS									
DIATOMS									
SECTION									
METERS									
GRAPHIC LITHOLOGY									
DRILLING DISTURBANCE									
SEDIMENTARY STRUCTURES									
SAMPLES									

SITE SUMMARY SHEET

SITE 487

Date occupied: 24 March 1979

Date departed: 27 March 1979

Time on hole: 63.2 hours

Position: latitude: 15°51.21'N

longitude: 99°10.52'W

Water depth (sea level): 4764 corrected meters, echo sounding

Water depth (rig floor): 4774 corrected meters, echo sounding

Bottom felt at: 4777 meters, drill pipe

Penetration: 181.7 meters

Number of cores: 21

Total length of cored section: 181.7 meters

Total core recovery: 119.9 meters

Percentage core recovery: 66.0%

Oldest Sediment Cored

Depth sub-bottom: 170 meters

Nature: Brown clay

Age: Late Miocene

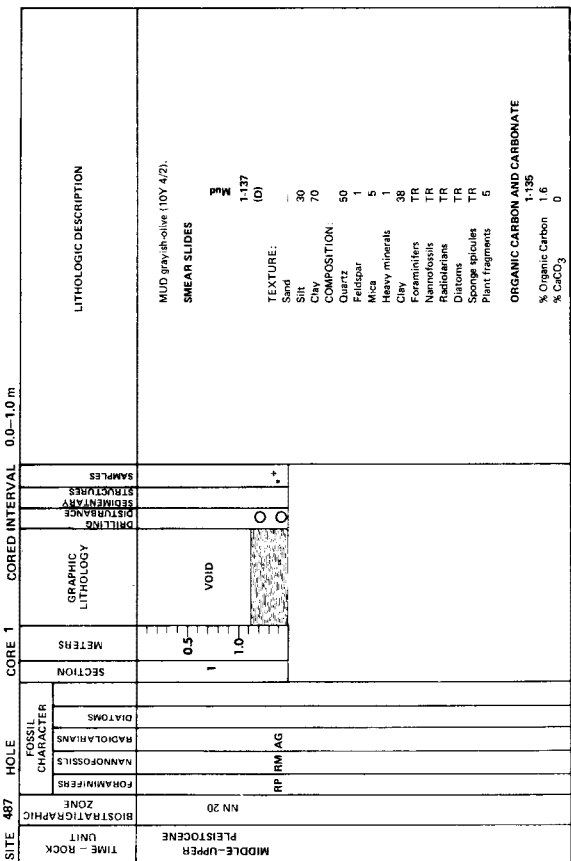
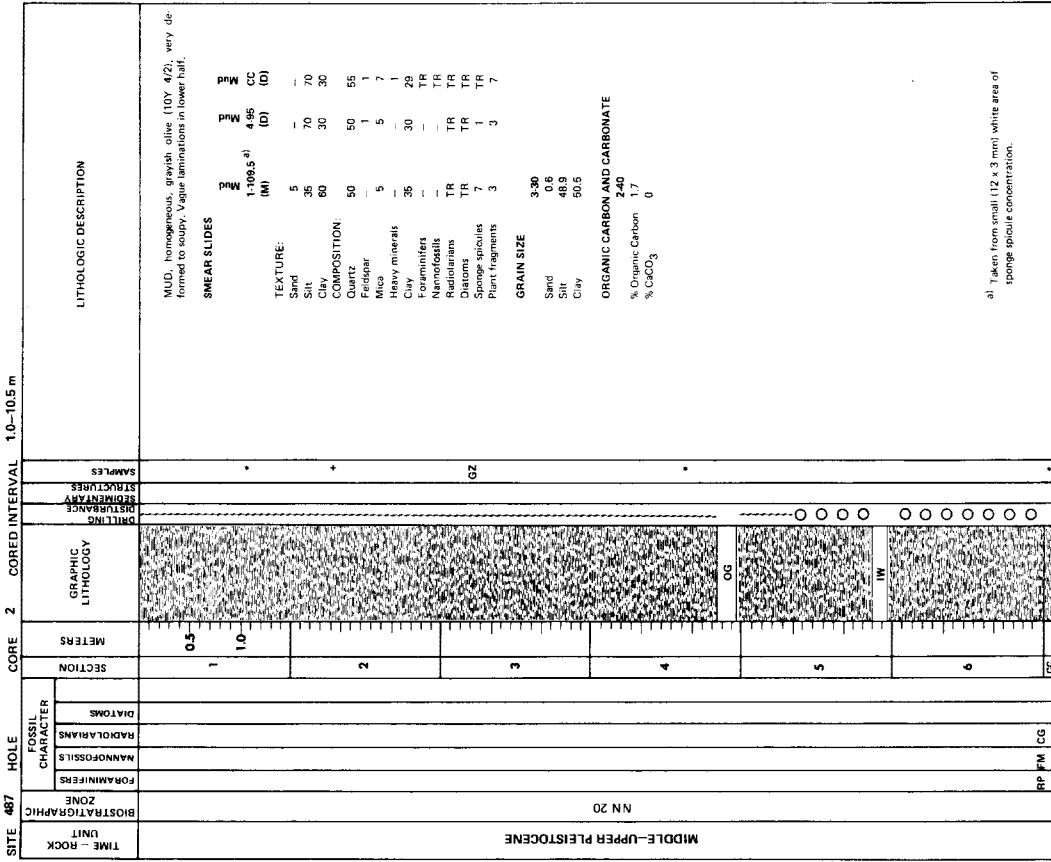
Basement

Depth sub-bottom: 171 meters

Nature: Basalt

Principal Results

Site located on oceanic crust to sample sediments which are being subducted to the northeast. Recovered 105 meters Quaternary hemipelagic mud overlying a lower upper Miocene-Pliocene pelagic brown clay interval and basalt.



SITE 487 HOLE CORE 3 CORED INTERVAL 10.5-20.0 m

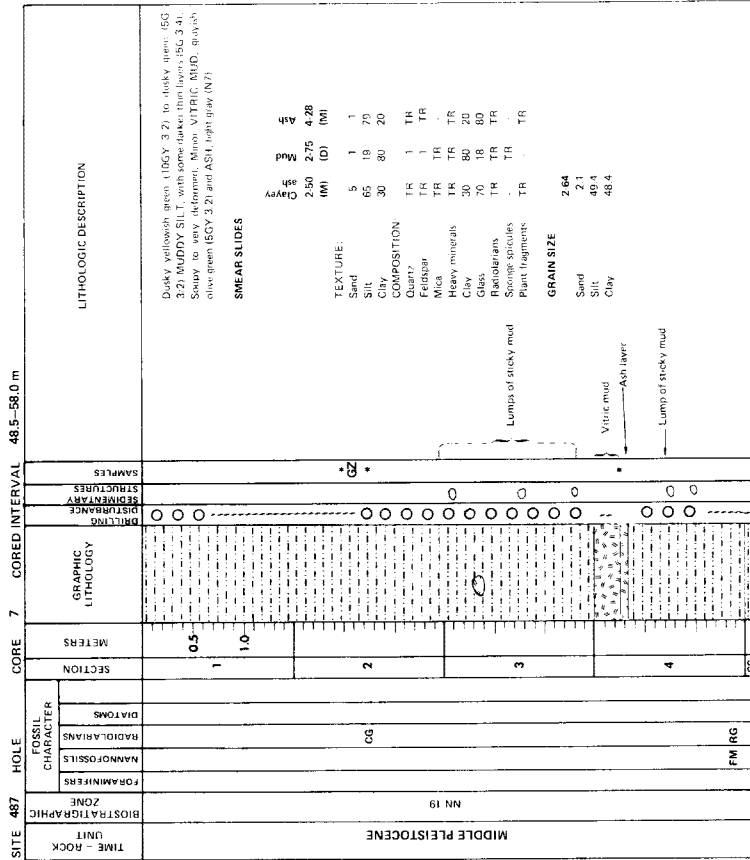
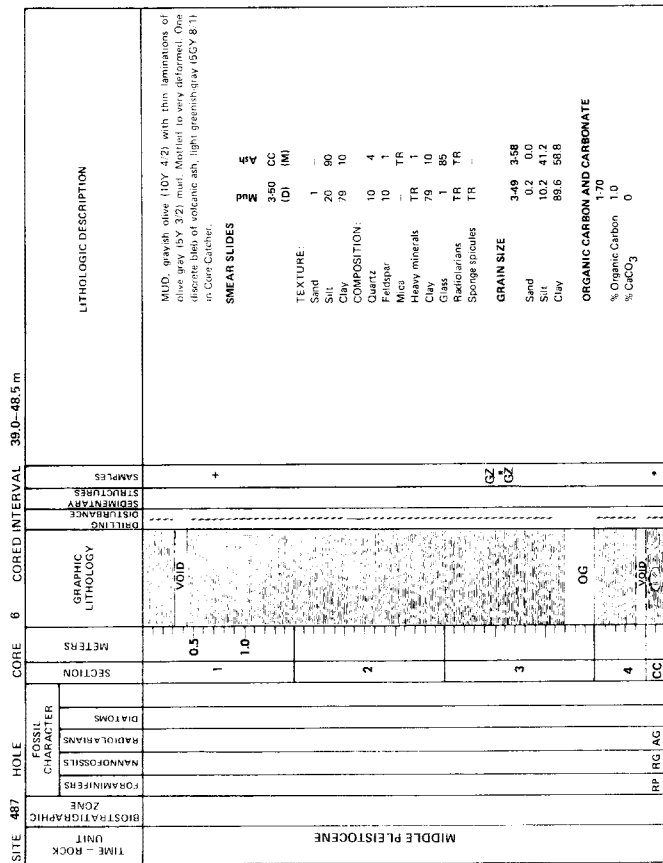
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADICULARIANS	DIATOMS						
MIDDLE-UPPER PLEISTOCENE	NN 20 (N)					0.5				Muddy silt, homogeneous, grayish olive (10Y 4/2) including diffuse irregular pale yellowish gray (5Y 3/2), ash balls. Probably original layers deformed, by drilling.	
					1	1.0				4x1 cm diffuse "ash ball", vertical long axis, pale yellowish gray (5Y 5/2)	
					2					SMEAR SLIDES Mud 1-80 1-130 2-80 2-120 2-130 Silt (D) (M) (D) (M) (M) Silt 40 60 40 10 10 Clay 60 20 60 10 10 COMPOSITION: Feldspar 1 - - - - Mica 5 2 2 3 3 Clay 4 2 0 0 0 Foraminifers TR TR TR TR TR Radiolarians TR TR TR TR TR Diatoms TR TR TR TR TR Sponge spicules TR TR TR TR TR Plant fragments TR TR TR TR TR	
					3					Discrete (8 cm) unit of ash	
					4					Discrete (11 cm) unit of ash	
					5					SMEAR SLIDES Mud 3-40 3-40 Silt 5-30 5-30 Silt 52.7 50.7 Clay 37.9 46.3 COMPOSITION: Feldspar 1 - 1 1 Mica 1 - 1 1 Heavy minerals 10 30 33 Clay 50 TR - TR Nannofossils TR - TR TR Radiolarians TR - TR TR Diatoms TR TR TR TR Sponge spicules TR TR TR Plant fragments TR 1 -	
					6					ORGANIC CARBON AND CARBONATE % Organic Carbon 1.6 % CaCO ₃ 0	
					CC					GRAIN SIZE Sand 3-60 Silt 5-30 Clay 37.9 46.3	

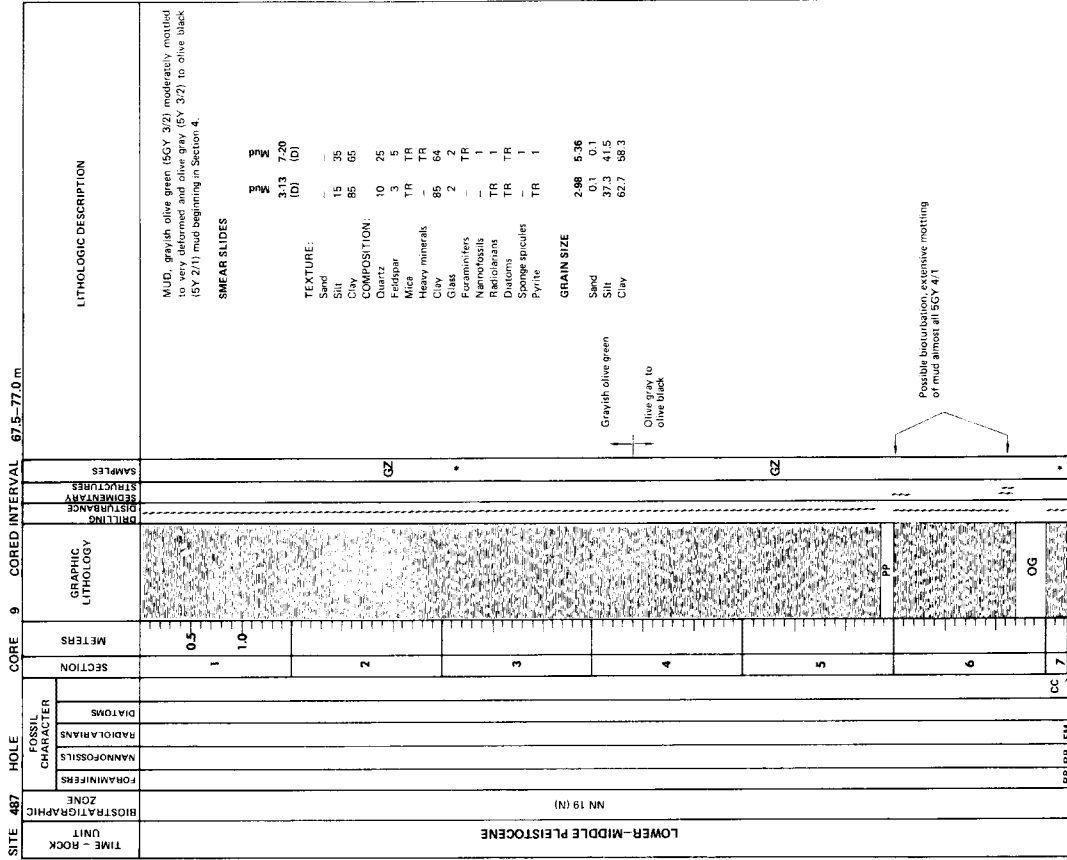
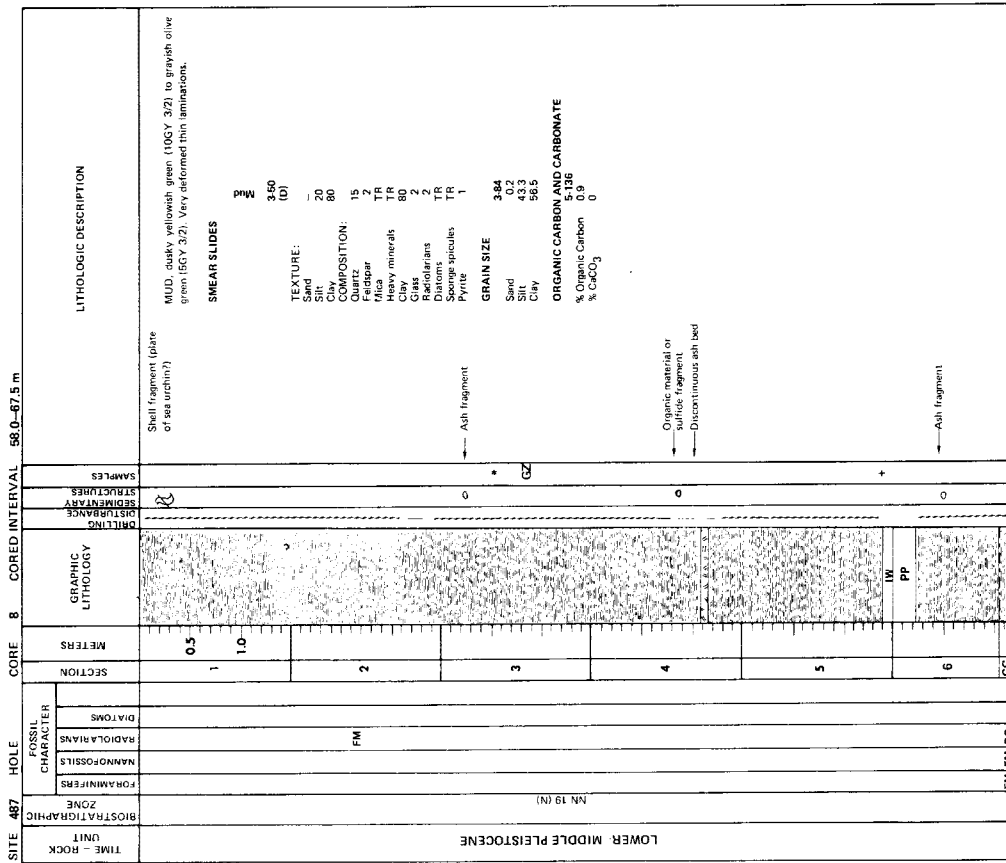
SITE 487 HOLE CORE 4 CORED INTERVAL 20.0-29.5 m

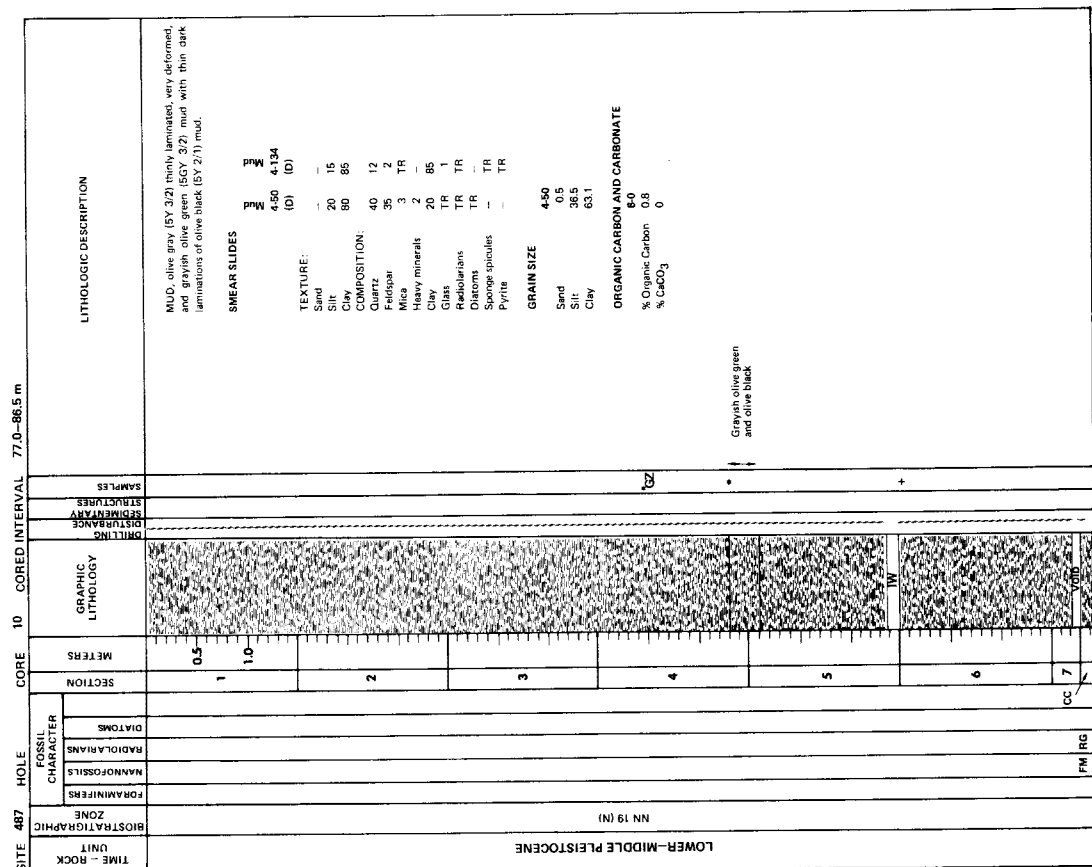
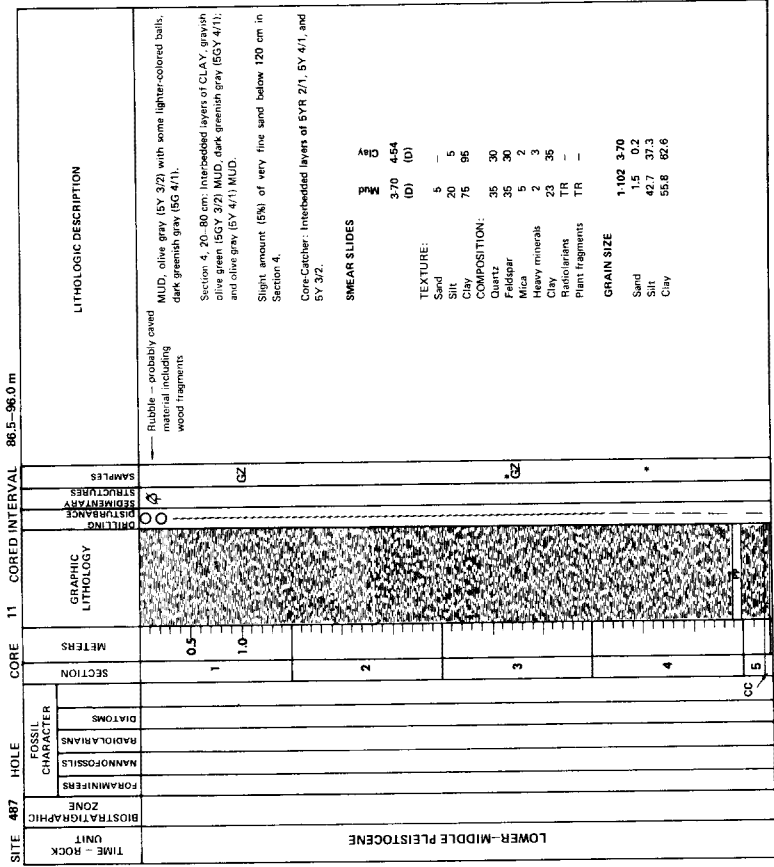
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADICULARIANS	DIATOMS						
MIDDLE-UPPER PLEISTOCENE	NN 20 (N)					0.5				Trace only, MUD, grayish olive (10Y 4/2).	
					1	1.0					

SITE 487 HOLE CORE 5 CORED INTERVAL 29.5-39.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADICULARIANS	DIATOMS						
MIDDLE-UPPER PLEISTOCENE	NN 20 (N)			AG		0.5				MUD, olive gray (5Y 3/2), mottled to very deformed in Section 2. Thin unit of olive gray (5Y 3/2) in grayish olive (10Y 4/2) mud in Section 3.	
					1	1.0				SMEAR SLIDES Mud 1-60 1-60 2-132 3-133 3-134 Silt (D) (M) (D) (D) Silt 30 85 10 50 Clay 70 10 90 50 COMPOSITION: Feldspar 40 1 2 40 Mica 25 - TR 3 Heavy minerals 25 TR 6 2 Clay 10 10 90 50 Nannofossils TR - TR Radiolarians TR - TR Diatoms TR - TR Sponge spicules TR - TR Plant fragments TR - TR	
					CC					GRAIN SIZE Sand 2-62 Silt 47.1 Clay 51.8	







SITE 487	HOLE	CORE	12	CORED INTERVAL	96.0-105.5 m	LITHOLOGIC DESCRIPTION	DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	METERS	SECTION	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	
																				FOSSIL CHARACTER
						Section 1: VITRIFIC MUD (10% ash), olive gray (SY 3/2), olive gray (SY 3/2) MUD with small ash balls of pale olive (10Y 6/2) and black (N2) mud streaks. Sand-sized lumps of aggregated mud are present throughout this section.								1	0.5					Light olive gray (SY 5/2) clay gradation change to yellowish gray (SY 7/2) 1x1 cm mudstone nodules; same color as unhydrated sediment
						Section 2: Olive gray MUD with burrows filled with grayish olive green (5GY 3/2) and grayish black (N2) MUD.								2	1.0					
						Section 3: Grayish olive green (5GY 3/2) MUD with grayish black (N2) mottling.								3						
						Section 4: Olive gray (SY 3/2) MUD.								4						
														5						
														CC						

SITE 487	HOLE	CORE	13	CORED INTERVAL	105.5-115.0 m	LITHOLOGIC DESCRIPTION	DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	METERS	SECTION	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	
																				FOSSIL CHARACTER
						Section 1: VITRIFIC MUD (10% ash), olive gray (SY 3/2), olive gray (SY 3/2) MUD with small ash balls of pale olive (10Y 6/2) and black (N2) mud streaks. Sand-sized lumps of aggregated mud are present throughout this section.								1	0.5					Light olive gray (SY 5/2) clay gradation change to yellowish gray (SY 7/2) 1x1 cm mudstone nodules; same color as unhydrated sediment
						Section 2: Olive gray MUD with burrows filled with grayish olive green (5GY 3/2) and grayish black (N2) MUD.								2	1.0					
						Section 3: Grayish olive green (5GY 3/2) MUD with grayish black (N2) mottling.								3						
						Section 4: Olive gray (SY 3/2) MUD.								4						
														5						
														CC						

SITE 487	HOLE	CORE 15	CORED INTERVAL	124.5-134.0 m		LITHOLOGIC DESCRIPTION	
				SECTION	METERS		
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	NANNOFOSSILS	RADIOLARIANS	Section 1. PELAGIC CLAY, very dusky red (10R 2/2) to dark reddish brown (10R 4/6); local diffuse irregular grayish orange (10YR 7/4) patches of clay in part semi-lithified (1-5%); moderately deformed	
						Section 2. Dusky brown (5YR 2/2) to moderate brown (5YR 3/4) clay; local diffuse irregular grayish orange (10YR 7/4) to moderate orange pink (5YR 3/4) patches of clay in part semi-lithified (1-3%).	
						Section 3. Predominantly 5YR 3/4 local diffuse irregular 10YR 7/4 to 5YR 3/4 patches of clay in part semi-lithified (1-1%).	
						Section 4. Clay, 5YR 3/4, irregular diffuse areas in top 30 cm of 10YR 7/4 to 5YR 3/4 clay.	
						Section 5. 5YR 3/4. Small areas of 10YR 7/4 to 5YR 3/4.	
						Section 6. 5YR 3/4. Small diffuse areas of 10YR 7/4 to 5YR 3/4.	
						Section 7 and Core-Catcher: 5YR 3/4 clay.	
UPPER MIOCENE	OMARTUS PENTINUS (R)	RG				SMEAR SLIDES	
							TEXTURE:
							Sand - 1 3
							Silt - 98 99 97
							Clay - 98 99 97
							COMPOSITION: TR - -
							Heavy Minerals - -
							Clay - 2 1 1
							Glass - 2 1 1
							Zeolite - - -
							GRAIN SIZE
							Sand 2.19
							Silt 0.6
							Clay 50.4
							48.0

SITE 487	HOLE	CORE 14	CORED INTERVAL	115.0-124.5 m		LITHOLOGIC DESCRIPTION						
				SECTION	METERS							
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	NANNOFOSSILS	RADIOLARIANS	Sections 1 and 2. Variegated CLAY predominantly moderate yellowish brown (10YR 5/4); locally dusky yellowish brown (10YR 2/2) with also minor pale yellowish orange patches (10YR 8/6). The clay is moderately deformed.						
						Section 3. CLAY predominantly grayish brown (5YR 3/2) with local pale to dark yellowish orange streaks (10YR 8/6 and 8/8) resulting from presence of diffuse concretions of silty clay and zeolite nodules.						
						Section 4. 0-50 cm: Moderate brown (5YR 4/4) clay locally darker moderate brown (5YR 3/4).						
						Section 5. 60-80 cm and Core-Catcher: Very deformed mixture of pale reddish brown (10R 5/4) and very pale orange (10YR 8/2) ASH (1-50%) and moderate brown (5YR 3/4) to dusky brown (5YR 2/2) CLAY (1-50%).						
												SMEAR SLIDES
												TEXTURE:
												Sand - 2 3 90 40
						Silt - 98 97 5 20						
						Clay - 98 97 5 20						
						COMPOSITION: TR - -						
						Heavy Minerals - -						
						Clay - 98 97 5 20						
						Glass - TR - - 78						
						Zeolite - 2 - 3 95						
						GRAIN SIZE						
						Sand 3.19						
						Silt 0.0						
						Clay 42.1						
						57.8						
						ORGANIC CARBON AND CARBONATE						
						% Organic Carbon 0.2						
						% CaCO ₃ 0						

SITE 487 HOLE CORE 17 CORED INTERVAL 143.5-153.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	DRIILLING DISTANCE	SEMINARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION																																																																																															
									DIATOMS	RADOLARIANS	NANNOFOSSILS	FORAMINIFERS																																																																																											
UPPER MIOCENE	<i>Omnartus antepenultimus</i> (f)		1					<p>PELAGIC CLAY, moderate brown (SYR 3.4) and grayish orange (10YR 7.4) (locally limited to mudstone), homogeneous.</p> <p>SMEAR SLIDES</p> <table border="1"> <tr> <td>Clay</td> <td>262</td> <td>264</td> <td>(M)</td> <td>(D)</td> </tr> <tr> <td>Sand</td> <td>-</td> <td>-</td> <td>-</td> <td>5</td> </tr> <tr> <td>Silt</td> <td>95</td> <td>95</td> <td>95</td> <td>95</td> </tr> <tr> <td>Clay</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>COMPOSITION:</td> <td colspan="4"></td> </tr> <tr> <td>Quartz</td> <td>2</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Fe/Spar</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Mica</td> <td>1</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Heavy minerals</td> <td>1</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Clay</td> <td>95</td> <td>95</td> <td>95</td> <td>95</td> </tr> <tr> <td>Radiolarians</td> <td>0.5</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Sponge spicules</td> <td>0.5</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>GRAIN SIZE</td> <td colspan="4"></td> </tr> <tr> <td>Sand</td> <td>1.03</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Silt</td> <td>49.3</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Clay</td> <td>50.0</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td colspan="5">ORGANIC CARBON AND CARBONATE</td> </tr> <tr> <td colspan="5">% Organic Carbon 1.50</td> </tr> <tr> <td colspan="5">% CaCO₃ 0.2</td> </tr> </table>	Clay	262	264	(M)	(D)	Sand	-	-	-	5	Silt	95	95	95	95	Clay	-	-	-	-	COMPOSITION:					Quartz	2	-	-	-	Fe/Spar	-	-	-	-	Mica	1	-	-	-	Heavy minerals	1	-	-	-	Clay	95	95	95	95	Radiolarians	0.5	-	-	-	Sponge spicules	0.5	-	-	-	GRAIN SIZE					Sand	1.03	-	-	-	Silt	49.3	-	-	-	Clay	50.0	-	-	-	ORGANIC CARBON AND CARBONATE					% Organic Carbon 1.50					% CaCO ₃ 0.2				
Clay	262	264	(M)		(D)																																																																																																		
Sand	-	-	-		5																																																																																																		
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OS

SITE 487 HOLE CORE 16 CORED INTERVAL 134.0-143.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	DRIILLING DISTANCE	SEMINARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION																																																																																																																														
									DIATOMS	RADOLARIANS	NANNOFOSSILS	FORAMINIFERS																																																																																																																										
UPPER MIOCENE	<i>Omnartus antepenultimus</i> (f)		1					<p>32 x 20 mm SYR 8:1</p> <p>PELAGIC CLAY, pale olive (10Y 6/2) in Section 1 above 70 cm. Moderate brown (BYR 3/4), PELAGIC CLAY with minor pale olive streaks to Section 2, 120 cm.</p> <p>Section 2, 120 cm to Section 3, 25 cm: Grayish orange (10YR 7/4) PELAGIC CLAY with moderate brown discolored areas (~10% of core).</p> <p>Section 3, 100 cm to Clay Contact: Moderate brown PELAGIC CLAY with minor admixture of ASH (~5%) and grayish orange (10YR 7/4) streaks.</p> <p>SMEAR SLIDES</p> <table border="1"> <tr> <td>Clay</td> <td>143</td> <td>135.5</td> <td>95.45</td> <td>3.80</td> <td>A</td> </tr> <tr> <td>(D)</td> <td>(D)</td> <td>(D)</td> <td>(D)</td> <td>(M)</td> <td></td> </tr> <tr> <td>Sand</td> <td>5</td> <td>5</td> <td>7</td> <td>60</td> <td>-</td> </tr> <tr> <td>Silt</td> <td>95</td> <td>95</td> <td>93</td> <td>40</td> <td>-</td> </tr> <tr> <td>Clay</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>COMPOSITION:</td> <td colspan="5"></td> </tr> <tr> <td>Quartz</td> <td>1</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Fe/Spar</td> <td>95</td> <td>95</td> <td>93</td> <td>40</td> <td>-</td> </tr> <tr> <td>Clay</td> <td>4</td> <td>3</td> <td>2</td> <td>TR</td> <td>-</td> </tr> <tr> <td>Mica</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Sponge spicules</td> <td>-</td> <td>-</td> <td>-</td> <td>TR</td> <td>TR</td> </tr> <tr> <td>GRAIN SIZE</td> <td colspan="5"></td> </tr> <tr> <td>Sand</td> <td>1.06</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Silt</td> <td>0.1</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Clay</td> <td>44.2</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Clay</td> <td>55.6</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td colspan="6">Ash, yellowish gray (5Y 8/1)</td> </tr> <tr> <td colspan="5">ORGANIC CARBON AND CARBONATE</td> <td></td> </tr> <tr> <td colspan="5">% Organic Carbon 2.110</td> <td>2.140</td> </tr> <tr> <td colspan="5">% Organic Carbon 0.2</td> <td>0.2</td> </tr> <tr> <td colspan="5">% CaCO₃ 0</td> <td>0</td> </tr> </table>	Clay	143	135.5	95.45	3.80	A	(D)	(D)	(D)	(D)	(M)		Sand	5	5	7	60	-	Silt	95	95	93	40	-	Clay	-	-	-	-	-	COMPOSITION:						Quartz	1	-	-	-	-	Fe/Spar	95	95	93	40	-	Clay	4	3	2	TR	-	Mica	-	-	-	-	-	Sponge spicules	-	-	-	TR	TR	GRAIN SIZE						Sand	1.06	-	-	-	-	Silt	0.1	-	-	-	-	Clay	44.2	-	-	-	-	Clay	55.6	-	-	-	-	Ash, yellowish gray (5Y 8/1)						ORGANIC CARBON AND CARBONATE						% Organic Carbon 2.110					2.140	% Organic Carbon 0.2					0.2	% CaCO ₃ 0					0
Clay	143	135.5	95.45		3.80	A																																																																																																																																
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SITE 487	HOLE	CORE 19	CORED INTERVAL 162.5-172.0 m		SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION								
			FOSSIL CHARACTER	DIAGRAMS														
UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	MANNIFERS	RADOLARIANS	DIATOMS	1	0.5	VOID	DISTURBANCE	GZ	Section 1: PELAGIC CLAY, dusky moderate brown more indurated (5YR 3/4) in Section 1, dusky brown (5YR 2/2) below. 5YR 7/2 clay 2.8 x 1.8 x 1.3 cm nodule, grayish orange (5YR 5/4) clay, indurated, identified as phillipsite (peeler)								
											FORMINIFERS	RG CP RG	RG CP RG	Dusky brown (5YR 2/2)				
															SMEAR SLIDES	TEXTURE: Sand 1, Silt 5, Clay 96 COMPOSITION: Quartz 2, Clay 94, Glass 2, Radiolarians TR, Heavy minerals 1 GRAIN SIZE: 1-66 5-53, Sand 0.9 18.3, Silt 46.1 36.4, Clay 53.0 45.2		
																	ORGANIC CARBON AND CARBONATE	% Organic Carbon 0.1, % CaCO ₃ 0
3	VOID																	
		4	VOID															
				5	VOID													

SITE 487	HOLE	CORE 18	CORED INTERVAL 153.0-162.5 m		SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION									
			FOSSIL CHARACTER	DIAGRAMS															
UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	MANNIFERS	RADOLARIANS	DIATOMS	1	0.5	VOID	DISTURBANCE	GZ	PELAGIC CLAY, grayish brown (5YR 3/2) with streaks and blotches of moderate reddish orange to moderate orange pink (10R 6/6 to 10R 7/4) clay (generally better indurated than the brown clay). Concentration of moderate reddish orange (10R 6/6) to moderate orange pink (10R 7/4) clay including mm-scale indurated areas									
											FORMINIFERS	RG CP RG	RG CP RG	SMEAR SLIDES	TEXTURE: Sand 1, Silt 5, Clay 96 COMPOSITION: Quartz TR, Clay 96, Glass 98, Radiolarians TR, Heavy minerals 1, Sponges/spicules 2				
																ORGANIC CARBON AND CARBONATE	% Organic Carbon 0.1, % CaCO ₃ 0		
																		2	VOID
4	VOID																		
		5	VOID																
				6	VOID														

SITE 487, CORE 20, SECTION 1, 172.0—173.5 m

Macroscopic Description

Fine-grained plagioclase-olivine phyric to aphyric basalt. Small variolites present in Pieces 7, 11, 12, 13, 15, and 16; glass present only in one piece of Section 2. Pieces 4, 5, and 6 are aphyric. Plagioclase phenocrysts form up to 5% of the basalt, and are up to 4 mm across. Olivine phenocrysts are rare (0–1%), up to 2 mm across, and are often altered to light orange secondary minerals. The basalt is slightly to moderately altered throughout, with brown alteration zones rimming fractures. No interbedded sediments were recovered; granular material at 122–150 cm is probably drilling rubble composed of sediment and small basalt fragments which are stratigraphically out of place and intermixed by drilling.

This Section Description

16–20 cm (Piece 3), 43–49 cm (Piece 8), 63–66 cm (Piece 10), and 81–86 cm (Piece 12). Sparsely phyric plagioclase-olivine basalt to aphyric basalt.

Texture: Sparsely porphyritic, with interstitial groundmass. (Piece 8 is aphyric and interstitial).

Phenocrysts: Plagioclase TR ~5% (1–4 mm); olivine 0–15% (up to 1.5 mm); glomerophyric clusters of plagioclase and olivine, often somewhat resorbed and rounded; plagioclase phenocrysts often contain inclusions of glass and rarely euhedral chrome spinel. Groundmass: Olivine 3–10% (0.02–0.1 mm), euhedral to subhedral, occasionally at centers of clusters of radiating plagioclase laths; plagioclase 25–40% (0.05–0.3 mm), euhedral to subhedral laths; acicular needles, rarely skeletal; clinopyroxene 20–35% (up to 0.3 mm), generally very fine-grained, often as dendritic intergrowths with titanomagnetite dust and minute plagioclase needles, occasionally skeletal; titanomagnetite 2% (up to 0.05 mm), dust and small skeletal crystals; glass 14–36%, partially altered to palagonite and clays.

Vesicles: 1–1% (up to 0.2 mm), generally partially filled by clays. Alteration: Palagonite (up to 5%) and clays (< 1%) replacing glass, and iddingsite (< 1%) and minor clays partially replacing olivine.

SITE 487, CORE 20, SECTION 2, 173.5—181.5 m

Macroscopic Description

General description given in Section 1. Small variolites present in Pieces 1C, 2, 3, 4, 5, and 6 (25–75 cm); Piece 9 (88–91 cm) is the only glass recovered in Core 20.

This Section Description

68–70 cm (Piece 6) and 81–84 cm (Piece 8): Sparsely phyric plagioclase-olivine basalt.

Texture: Porphyritic with an interstitial groundmass.

Phenocrysts: Plagioclase 2–3% (1–4 mm); olivine < 1% (up to 1 mm); glomerophyric clusters of plagioclase-olivine, clusters somewhat rounded; plagioclase phenocrysts contain abundant glass inclusions and rare euhedral chrome spinel inclusions.

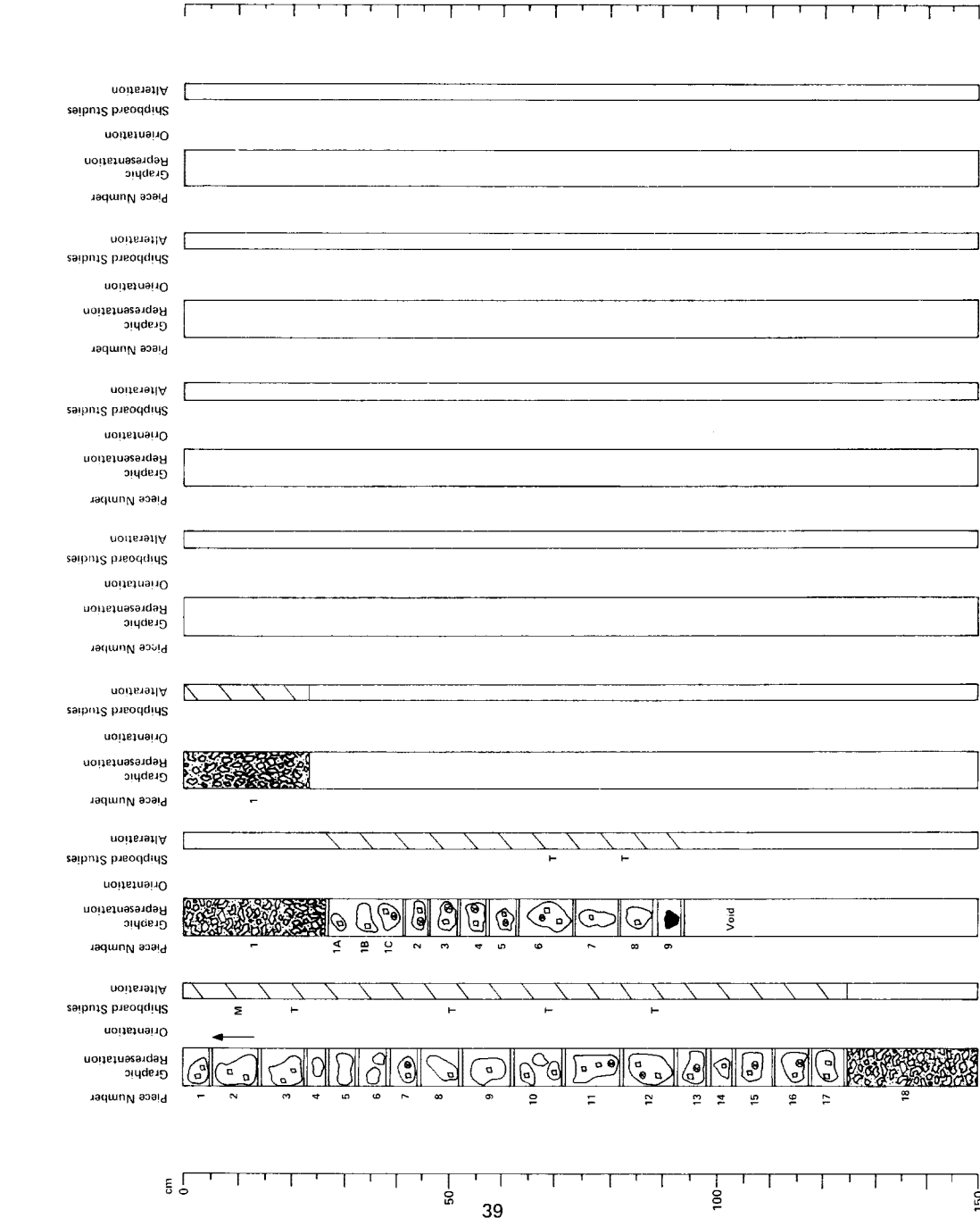
Groundmass: Olivine 8% (up to 0.1 mm), euhedral; plagioclase 30–35% (up to 0.3 mm), euhedral to subhedral laths, acicular needles, rarely skeletal; clinopyroxene 30–35% (up to 0.2 mm), generally very fine-grained, often dendritic intergrowths with titanomagnetite dust and minute plagioclase needles, occasionally skeletal; titanomagnetite 5–7% (up to 0.05 mm), fine-grained dust; glass 15–17%, partially palagonitized.

Vesicles: 2%, void to partially filled by clays. Alteration: Trace of palagonite replacing glass.

SITE 487, CORE 21, SECTION 1, 181.5—191.0 m

Macroscopic Description

Drilling rubble, mostly basalt fragments, and clasts (rare) of zoelite (phillipsite).



21/1
20/2
20/1
CORE/SECTION

SITE SUMMARY SHEET

SITE 488

Date occupied: 27 March 1979

Date departed: 2 April 1979

Time on hole: 155.9 hours

Position: latitude: 15°57.10'N

longitude: 99°01.66'W

Water depth (sea level): 4254 corrected meters, echo sounding

Water depth (rig floor): 4264 corrected meters, echo sounding

Bottom felt at: 4265 meters, drill pipe

Penetration: 429 meters

Number of cores: 46

Total length of cored section: 428.5 meters

Total core recovery: 160.4 meters

Percentage core recovery: 37%

Oldest Sediment Cored

Depth sub-bottom: 428.5 meters

Nature: Sand

Age: Early-middle Quaternary

Basement

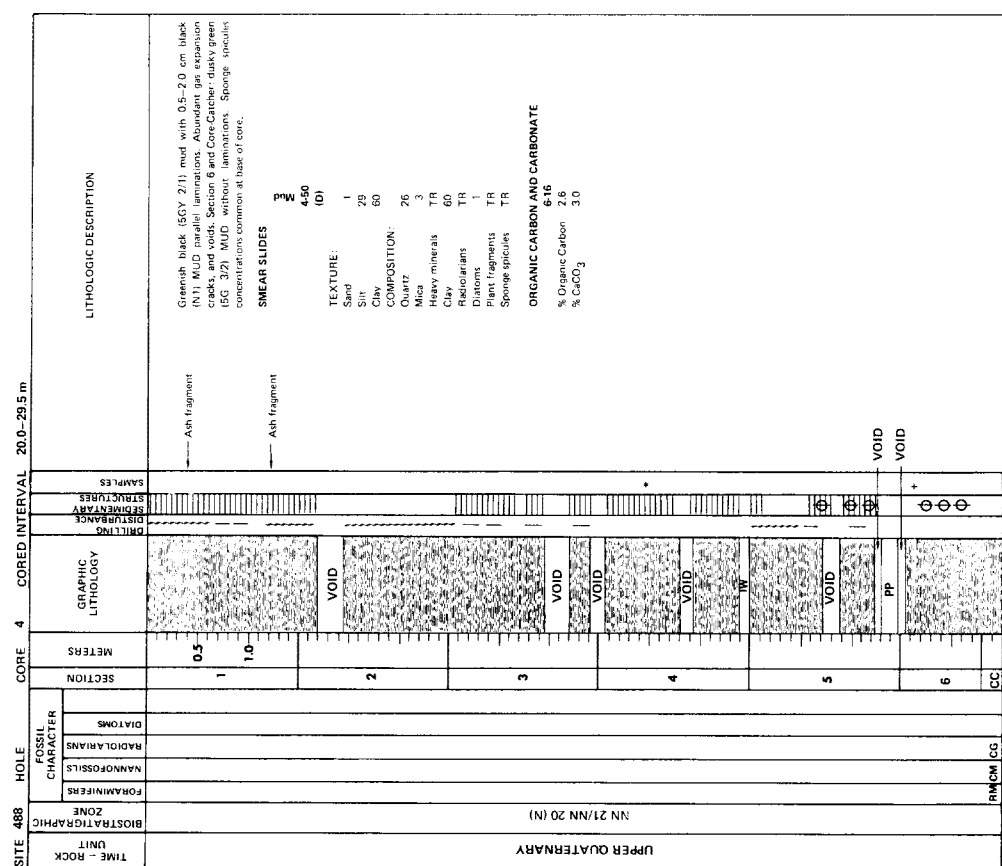
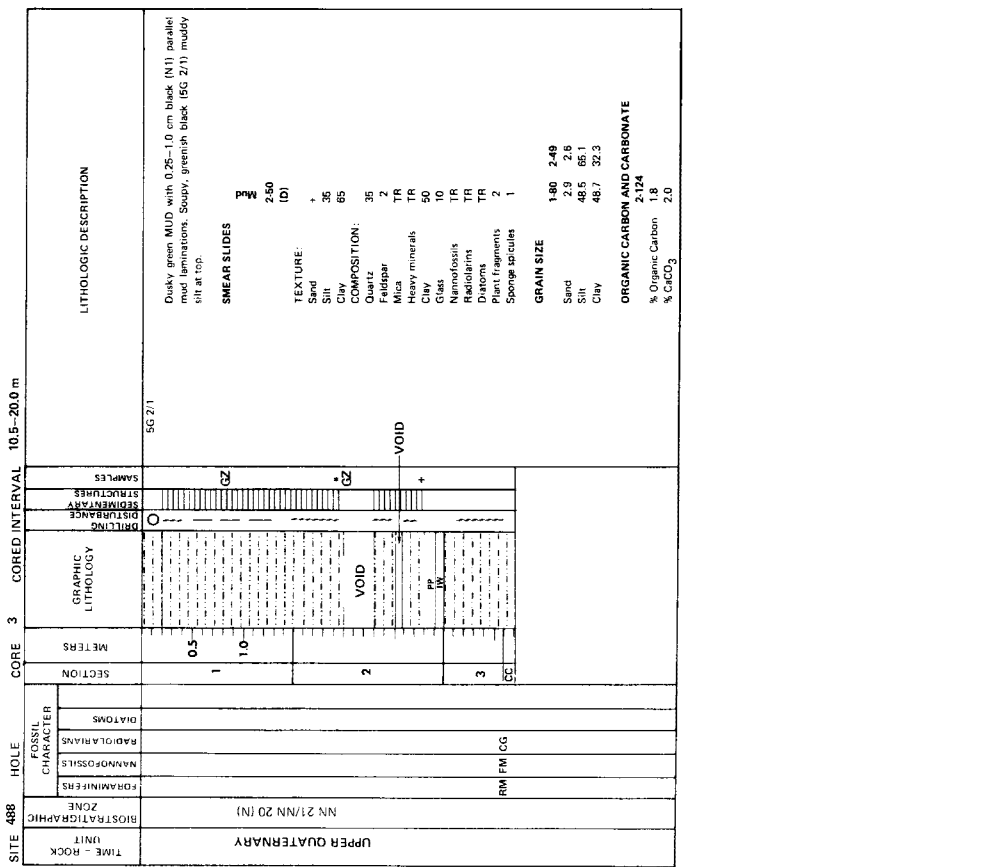
Depth sub-bottom: Not Penetrated

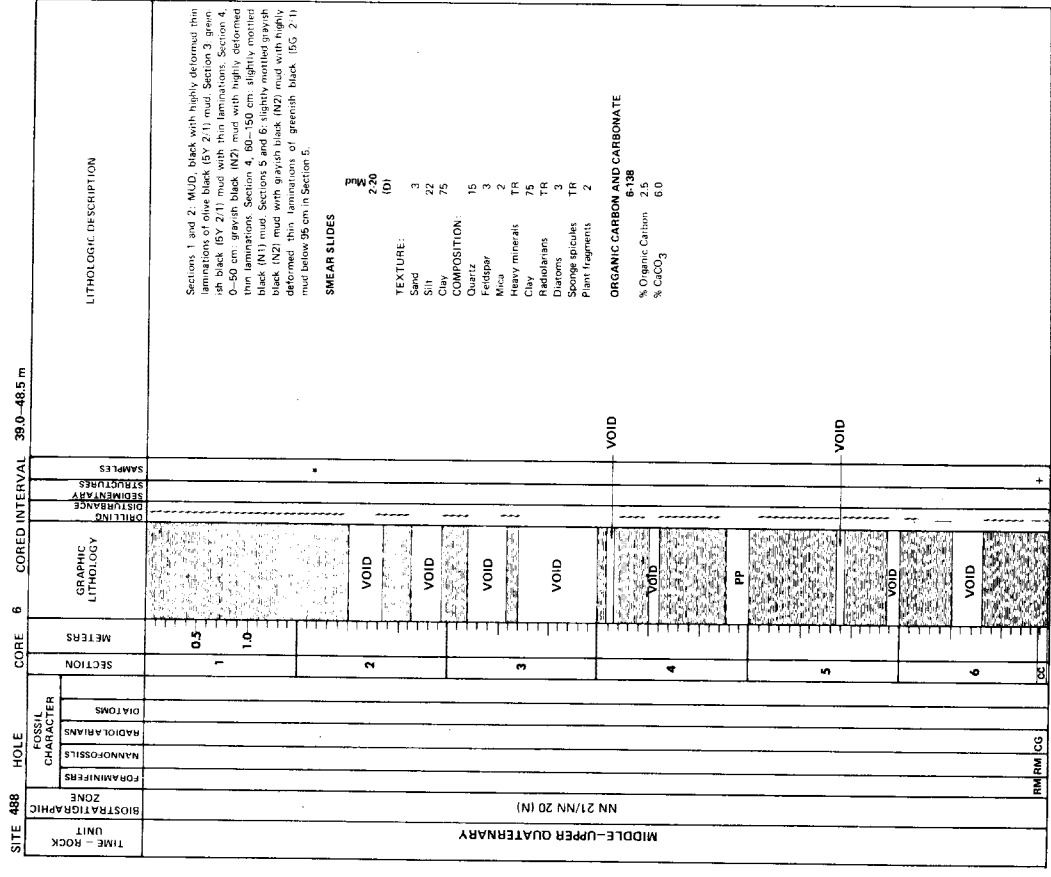
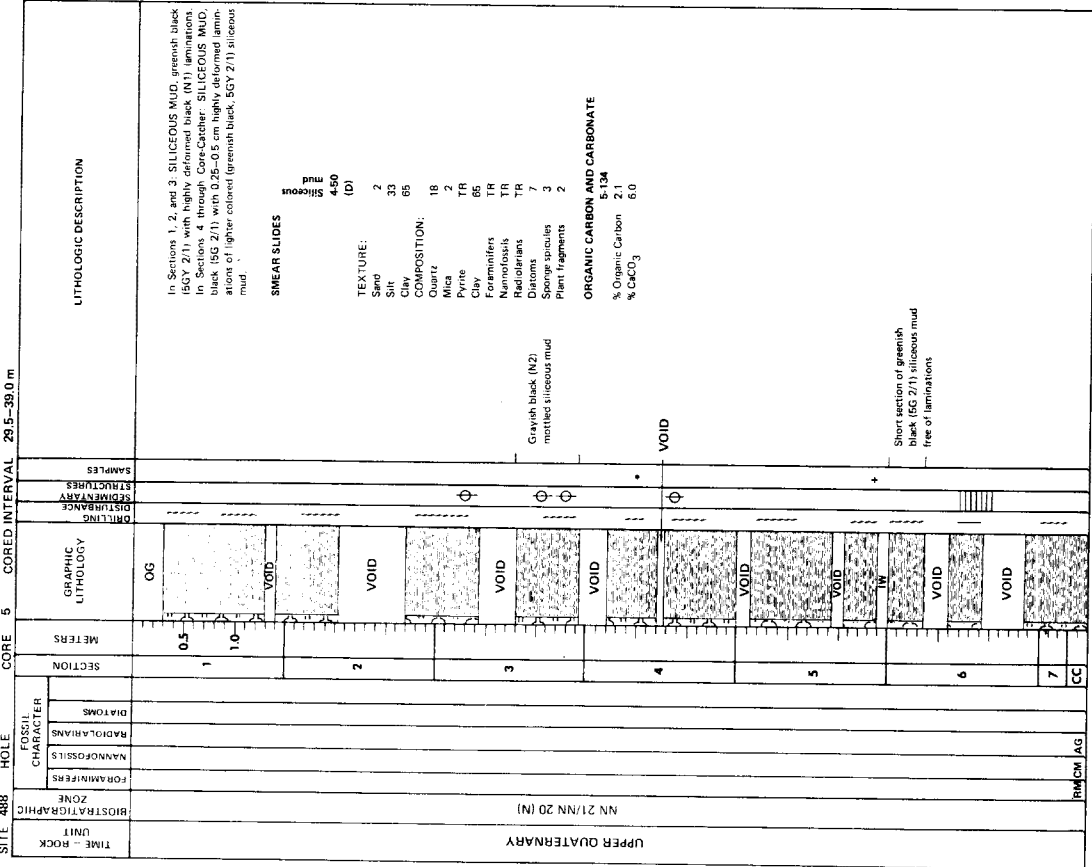
Principal Results

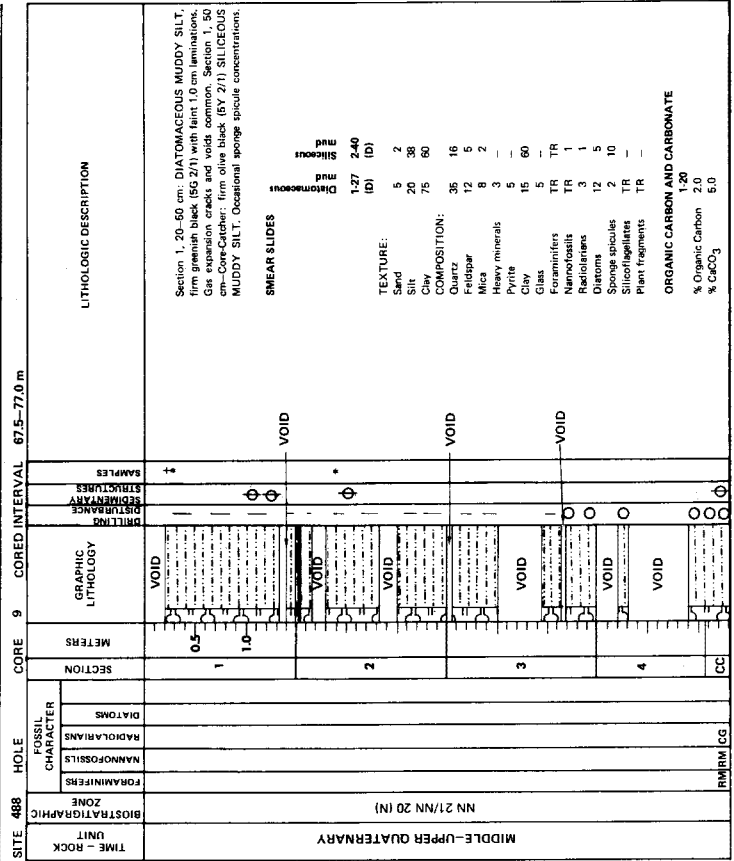
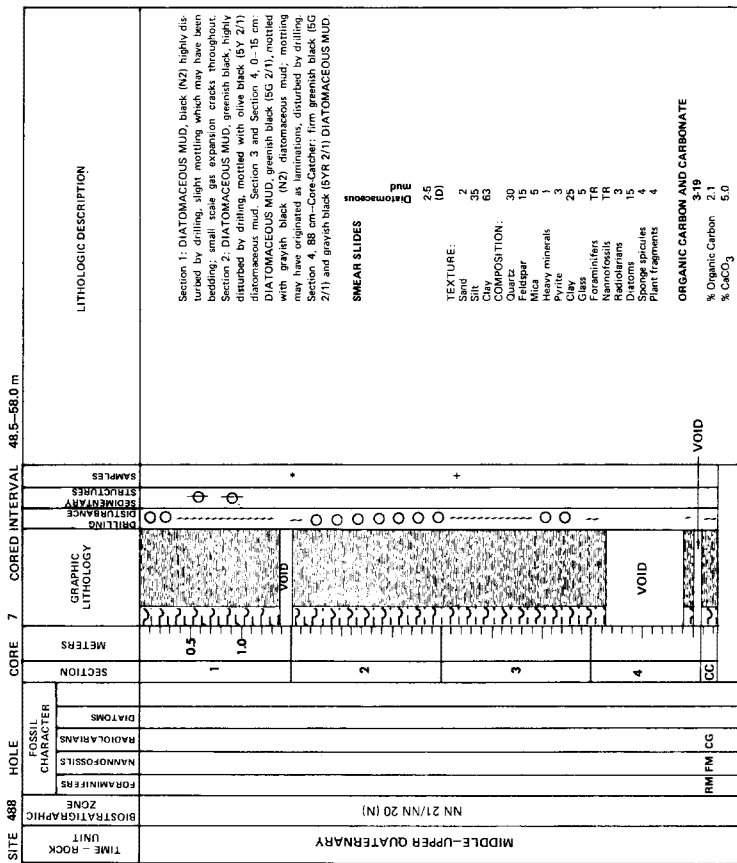
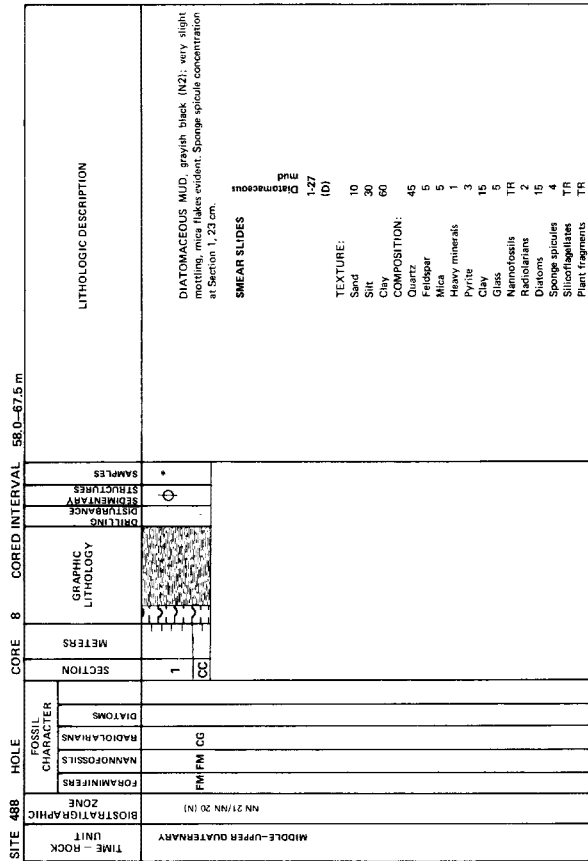
Site 488 is located on a ridge just landward of the trench axis. 313 meters of lower-middle to upper Quaternary muddy silt-siltstone and mud-mudstone with local thin silt and muddy sand beds in lower portion overly lower-middle Quaternary mud-mudstone, sand, and pebbly sand from 313–428.5 meters. In spite of poor recovery variations in drilling rate suggest several thick (8–9 m) sand beds near the top of the lower unit. The lower unit is interpreted as uplifted trench deposits mantled by an overlying slope sequence.

SITE 488	HOLE	CORE 1	CORED INTERVAL	0.0-1.0 m	LITHOLOGIC DESCRIPTION	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRANIC LITHOLOGY	SEMENIFER	DRILLING DISTURBANCE	SAMPLES	
								DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS							
					<p>MUDDY SILT and MUDDY ASH, olive silt (SY 211).</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Silt 2 Silt 1-30 180 Clay 1-30 180 Clay 1 2</p> <p>COMPOSITION: Quartz 10 18 Feldspar 5 5 Mica 2 2 Pyrite 46 46 Sulfide 46 46 Magnetite 50 50 Radiolarians TR 1 Diatoms TR 1 Sponge spicules TR 1 Plant fragments 2 -</p> <p>GRAIN SIZE Silt 140 Silt 11 Silt 64.3 Clay 32.6</p>	UPPER QUATERNARY	NN 21/NN 20 (N)	RP	RP	CG		1	0.5					

SITE 488	HOLE	CORE 2	CORED INTERVAL	1.0-10.5 m	LITHOLOGIC DESCRIPTION	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRANIC LITHOLOGY	SEMENIFER	DRILLING DISTURBANCE	SAMPLES		
								DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS								
					<p>MUDDY SILT - greenish black (SG 271) with thin (0.5-1.0 cm) parallel laminations of olive black or black (N1) mud throughout core. Black mud is rich in carbonized plant debris. Interbedding is shown diagrammatically, roughly two-thirds of the core is muddy silt, in laminations of 1.0-2.0 cm, one-third is mud in thinner laminations (0.9-1.0 cm).</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Silt 1 Silt 20 59 Clay 80 40</p> <p>COMPOSITION: Quartz 10 80 Feldspar 1 5 Mica TR TR Heavy minerals TR TR Clay TR TR Radiolarians TR TR Diatoms TR TR Sponge spicules TR 1 Plant fragments TR 2</p> <p>ORGANIC CARBON AND CARBONATE 4.30 % Organic Carbon 1.7 % CaCO₃ 3.0</p>	UPPER QUATERNARY	NN 21/NN 20 (N)	RP	PM	CG		1	0.5						







SITE 488	HOLE	CORED INTERVAL	77.0-86.5 m	CORE 10	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			
													DIATOMS	RADOLARIANS	NANNOFOSSILS	FORAMINIFERS
					1	0.5			2	Muddy silt, firm olive black (SY 2/1). Gas expansion cracks are common. Common bluish white (BB 9/1) sponge spicule concentrations, generally 1-2 cm in maximum dimension.	MIDDLE-UPPER QUATERNARY	NN 21/NN 20 (N)				
					2					Muddy silt, firm olive black (SY 2/1). Gas expansion cracks are common. Common bluish white (BB 9/1) sponge spicule concentrations, generally 1-2 cm in maximum dimension.						
					3					Muddy silt, firm olive black (SY 2/1). Gas expansion cracks are common. Common bluish white (BB 9/1) sponge spicule concentrations, generally 1-2 cm in maximum dimension.						
					4					Muddy silt, firm olive black (SY 2/1). Gas expansion cracks are common. Common bluish white (BB 9/1) sponge spicule concentrations, generally 1-2 cm in maximum dimension.						
					5					Muddy silt, firm olive black (SY 2/1). Gas expansion cracks are common. Common bluish white (BB 9/1) sponge spicule concentrations, generally 1-2 cm in maximum dimension.						
					CC					Muddy silt, firm olive black (SY 2/1). Gas expansion cracks are common. Common bluish white (BB 9/1) sponge spicule concentrations, generally 1-2 cm in maximum dimension.						

SITE 488	HOLE	CORED INTERVAL	86.5-96.0 m	CORE 11	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			
													DIATOMS	RADOLARIANS	NANNOFOSSILS	FORAMINIFERS
					1	0.5			2	Muddy silt, soft to firm, olive black (SY 2/1), with vague diffuse, black mm-scale vertical and subvertical streaks. Horizontal and sub-horizontal gas expansion cracks common. Common bluish white (BB 9/1) sponge spicule concentrations.	MIDDLE-UPPER QUATERNARY	NN 20				
					2					Muddy silt, soft to firm, olive black (SY 2/1), with vague diffuse, black mm-scale vertical and subvertical streaks. Horizontal and sub-horizontal gas expansion cracks common. Common bluish white (BB 9/1) sponge spicule concentrations.						
					3					Muddy silt, soft to firm, olive black (SY 2/1), with vague diffuse, black mm-scale vertical and subvertical streaks. Horizontal and sub-horizontal gas expansion cracks common. Common bluish white (BB 9/1) sponge spicule concentrations.						
					4					Muddy silt, soft to firm, olive black (SY 2/1), with vague diffuse, black mm-scale vertical and subvertical streaks. Horizontal and sub-horizontal gas expansion cracks common. Common bluish white (BB 9/1) sponge spicule concentrations.						
					5					Muddy silt, soft to firm, olive black (SY 2/1), with vague diffuse, black mm-scale vertical and subvertical streaks. Horizontal and sub-horizontal gas expansion cracks common. Common bluish white (BB 9/1) sponge spicule concentrations.						
					6					Muddy silt, soft to firm, olive black (SY 2/1), with vague diffuse, black mm-scale vertical and subvertical streaks. Horizontal and sub-horizontal gas expansion cracks common. Common bluish white (BB 9/1) sponge spicule concentrations.						
					CC					Muddy silt, soft to firm, olive black (SY 2/1), with vague diffuse, black mm-scale vertical and subvertical streaks. Horizontal and sub-horizontal gas expansion cracks common. Common bluish white (BB 9/1) sponge spicule concentrations.						

SITE 488 HOLE	CORE 15	CORED INTERVAL	124.5-134.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
				MIDDLE-UPPER QUATERNARY	NN 20		1	0.5	VOID			MUDDY SILT, dark interbed gray (SGY 4.1). Common sponge spicule concentrations (bluish white, 5B 9.1)
							2	1.0	VOID			SMEAR SLIDES TEXTURE: 7 Sand 63 Silt 30 Clay COMPOSITION: 84 Feldspar 15 Mica 1 Heavy minerals 10 Clay 1 Diatoms 1 Radiolarians TR Foraminifera TR Nannofossils TR Dinoflagellates TR Silicoflagellates TR Plant fragments 3 GRAIN SIZE 1.120 Sand 8.9 Silt 62.9 Clay 28.3 ORGANIC CARBON AND CARBONATE 1.140 % Organic Carbon 1.7 % CaCO ₃ 3.0

SITE 488 HOLE	CORE 13	CORED INTERVAL	105.5-115.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
				MIDDLE-UPPER QUATERNARY	NN 20		1	0.5	VOID			Site 488, Core 12, 105.5-115.0 m, NO RECOVERY MUDDY SILT, greenish black (SG 2.1) to dark greenish gray (SG 4.1). Gas expansion cracks common. Common sponge spicule concentrations (bluish white, 5B 9.1). Discontinuous sand lamination
							2	1.0	VOID			SMEAR SLIDES TEXTURE: 80 1 Sand 1-36 1-60 3-103 Silt 5 58 (M) (D) (M) Clay 5 40 Zeolite COMPOSITION: 77 89 Feldspar 10 15 Mica 3 3 Heavy minerals 5 10 Clay 1 1 Diatoms 1 1 Radiolarians TR Foraminifera TR Nannofossils TR Dinoflagellates TR Silicoflagellates TR Plant fragments 2 1 Zeolites 100 GRAIN SIZE 4.14 Sand 4.6 Silt 63.4 Clay 28.0 ORGANIC CARBON AND CARBONATE 3-130 % Organic Carbon 1.9 % CaCO ₃ 5.0

SITE 488 HOLE	CORE 14	CORED INTERVAL	115.0-124.5 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
				MIDDLE-UPPER QUATERNARY	NN 20		1	0.5	VOID			MUDDY SILT, dark greenish gray (SGY 4.1). ORGANIC CARBON 1.34 % Organic Carbon 1.8 % CaCO ₃ 2.0
							2	1.0	VOID			

SITE 488 HOLE CORE 17 CORED INTERVAL 143.5-153.0 m

TIME - ROCK UNIT	MIDDLE-UPPER QUATERNARY	BIOSTRATIGRAPHIC ZONE	NN 20	FOSSIL CHARACTER	DIATOMS RADIOLARIANS NANNOFOSILS FORAMINIFERS	SECTION	1	METERS	0.5	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE SEDIMENTARY STRUCTURES SAMPLES	LITHOLOGIC DESCRIPTION	MUDDY SILT, dark brown (SYR 2). SMEAR SLIDES TEXTURE: Sand 2 Silt 26 Clay 63 COMPOSITION: Quartz 40 Feldspar 10 Mica 1 Heavy minerals 1 Pyrite 1 Clay 12 Glauc 5 Nannofossils TR Radiolarians 1 Diatoms 10 Sponge spicules 5 Silicoflagellates TR Plant fragments TR
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SITE 488 HOLE CORE 16 CORED INTERVAL 134.0-143.5 m

TIME - ROCK UNIT	MIDDLE-UPPER QUATERNARY	BIOSTRATIGRAPHIC ZONE	NN 20	FOSSIL CHARACTER	DIATOMS RADIOLARIANS NANNOFOSILS FORAMINIFERS	SECTION	1 2 3 4 5	METERS	0.5 1.0 2 3 5	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE SEDIMENTARY STRUCTURES SAMPLES	LITHOLOGIC DESCRIPTION	MUDDY SILT, dark greenish gray (SGY 471) with minor silty mud. Sparse greenish sandstone inclusions (bluish white, 58.9-1). Common. Clay expansion cracks common. SMEAR SLIDES TEXTURE: Sand 1 Silt 39 Clay 62 COMPOSITION: Quartz 69 Feldspar 13 Mica 15 Heavy minerals 1 Clay 10 Glass TR Foraminifers TR Nannofossils TR Radiolarians TR Diatoms 1 Sponge spicules 1 Plant fragments 1 ORGANIC CARBON AND CARBONATE 4-134 % Organic Carbon 2.1 % CaCO ₃ 5.0 Faciably extruded from core 10YR 6/6 250/16 grains
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SITE 488	HOLE	CORE 20	CORED INTERVAL 172.0-181.5 m	LITHOLOGIC DESCRIPTION	DRILLING DISTURBANCE	SAMPLES	SECTION	METERS	GRAPHIC LITHOLOGY	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	FOSSIL CHARACTER			FM	RP	FG
												DIAZONES	RADIOLARIANS	NANNOFOSILS			
				MUDDY SILT, stiff, homogeneous olive gray (5Y 4/2) with sparse thin fine-grained SAND laminae, interbedding shown diagrammatically; sand beds are 1-3 mm thick. Scattered sponge remains.			1	0.5									
							2	1.0									
							3										
							CC										

LITHOLOGIC DESCRIPTION

MUDDY SILT, stiff, homogeneous olive gray (5Y 4/2) with sparse thin fine-grained SAND laminae, interbedding shown diagrammatically; sand beds are 1-3 mm thick. Scattered sponge remains.

SMEAR SLIDES

2-103 (ID)

TEXTURE:

Sand 7
Silt 26
Clay 65

COMPOSITION:

Quartz 50
Feldspar 15
Mica 13
Heavy minerals 1
Pyrite TR
Clay 10
Gast 3
Amorphous 1
Diatoms 1
Sponge spicules 5
Plant fragments TR

SITE 488	HOLE	CORE 21	CORED INTERVAL 181.5-191.0 m	LITHOLOGIC DESCRIPTION	DRILLING DISTURBANCE	SAMPLES	SECTION	METERS	GRAPHIC LITHOLOGY	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	FOSSIL CHARACTER			FM	RP	FG
												DIAZONES	RADIOLARIANS	NANNOFOSILS			
				MUDDY SILT, alternating laminae 10.5-4.0 cm of olive black (5Y 2/1) and greenish black (5G 2/1). Occasional silt beds. Mottling in upper half of Section 2. Scattered sponge remains. Possible silt apparent slip at base of Section 2.			1	0.5									
							2										
							3										
							4										
							5										
							6										
							CC										

LITHOLOGIC DESCRIPTION

MUDDY SILT, alternating laminae 10.5-4.0 cm of olive black (5Y 2/1) and greenish black (5G 2/1). Occasional silt beds. Mottling in upper half of Section 2. Scattered sponge remains. Possible silt apparent slip at base of Section 2.

SMEAR SLIDES

115 (ID)

2-105 (ID)

TEXTURE:

Sand 3
Silt 60
Clay 37

COMPOSITION:

Quartz 45
Feldspar 5
Mica 2
Clay 37
Amorphous TR
Radiolarians TR
Diatoms 1
Sponge spicules 5
Plant fragments 2

ORGANIC CARBON AND CARBONATE

4.6b
% Organic Carbon 1.6
% CaCO₃ 1.0

SITE 488	HOLE	CORE 22	CORED INTERVAL	191.0-200.5 m	LITHOLOGIC DESCRIPTION	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	STRUCTURES	SAMPLES	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	QUATERNARY			
						DIATOMS	RADIODIATOMS												
			1	0.5	<p>Section 1, 0-35 cm: MUDDY SILT, moderately mottled greenish black (GGY 271). Section 1, 98-120 cm: MUDDY SILT, finely laminated (0.5-1.5 cm); equal parts greenish black (GGY 271) and olive gray (GGY 272). Section 1, 120-135 cm: olive black (GGY 271) and olive gray (GGY 272). Occasional thin (0.5-1.0 cm) silt beds. Gradational color change at Section 3, 120 cm to olive gray (GGY 272) muddy silt.</p> <p>SMEAR SLIDES</p> <p>129 cm Smear Slide 1:126 2.3 mm dark gray (N3) mud Drilling laminations Diffuse sandy silt Muddy silt Discontinuous sandy silt beds at unit -135 cm</p> <p>TEXTURE</p> <p>Sand 8 Silt 62 Mud 30</p> <p>COMPOSITION:</p> <p>Quartz 55 Felspar 5 Mica 5 Clay 30 Nannofossils TR Radiolarians TR Diatoms 1 Sponge spicules 2 Plant fragments 2</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 1.7 % CaCO₃ 0.0</p>														
			2	VOID															
			3	VOID															
				CC															

SITE 488	HOLE	CORE 23	CORED INTERVAL	200.5-210.0 m	LITHOLOGIC DESCRIPTION	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	STRUCTURES	SAMPLES	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	QUATERNARY	
						DIATOMS	RADIODIATOMS										
			1	0.5	<p>MUDDY SILT, grayish olive green (GGY 32).</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 1.3 % CaCO₃ 0.0</p>												
			2	VOID													
				CC													

SITE 488	HOLE	CORE 24	CORED INTERVAL	210.0-219.5 m	LITHOLOGIC DESCRIPTION	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	STRUCTURES	SAMPLES	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	QUATERNARY		
						DIATOMS	RADIODIATOMS											
			1	0.5	<p>MUDDY SILT, grayish olive green (GGY 32). Several gk exposed cracks. Occasional silt intervals. There is one N3 at 100-105 cm. Silt and sandy silt, deformed in Core-Catcher. Silt beds are truncated and apparent coloration is caused by horizontal risk drilling laminations, horizons along which rotation occurred during drilling.</p> <p>SMEAR SLIDES</p> <p>129 cm Smear Slide 1:126 2.3 mm dark gray (N3) mud Drilling laminations Diffuse sandy silt Muddy silt Discontinuous sandy silt beds at unit -135 cm</p> <p>TEXTURE</p> <p>Sand 5 Silt 85 Mud 10</p> <p>COMPOSITION:</p> <p>Quartz 90 Felspar 1 Mica 3 Clay 2</p> <p>Heavy minerals 1 Glass 5 Sponge spicules TR Plant fragments TR Carb. unsp. 3</p> <p>GRAIN SIZE</p> <p>Sand 1.97 Silt 45.2 Clay 40.0 14.9</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 1.30 % CaCO₃ 4.0</p>													
			2	VOID														
			3	VOID														
				CC														

SITE 488 HOLE CORE 25 CORED INTERVAL 219.5-229.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
QUATERNARY	NN 20 (N)	RP	RM	RG	CC	0.5	VOID				<p>MUDDY SILT, dark greenish gray (SGY 4/1). Three 1 cm SANDY SILT beds at 70 cm with an apparent dip of 45°. Diffuse traces of deformed sandy silt beds below 100 cm ... fairly well developed early stages of deformation resulting in wavy beds of sandy silt. Matrix sediment of Core-Catcher is mud.</p> <p>SMEAR SLIDES</p> <p>Muddy 113 66 Silt 103 44 Mud 103 44</p> <p>TEXTURE: Sand 10 2 Silt 60 18 Clay 30 30</p> <p>COMPOSITION: Quartz 66 44 Feldspar 66 44 Mica 2 3 Heavy minerals 1 1 Clay 20 40 Radiolarians - TR Diatoms - TR Sponge spicules 1 2 Plant fragments 1 2</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 1.4 1.2 % CaCO₃ 4.0 -</p>	

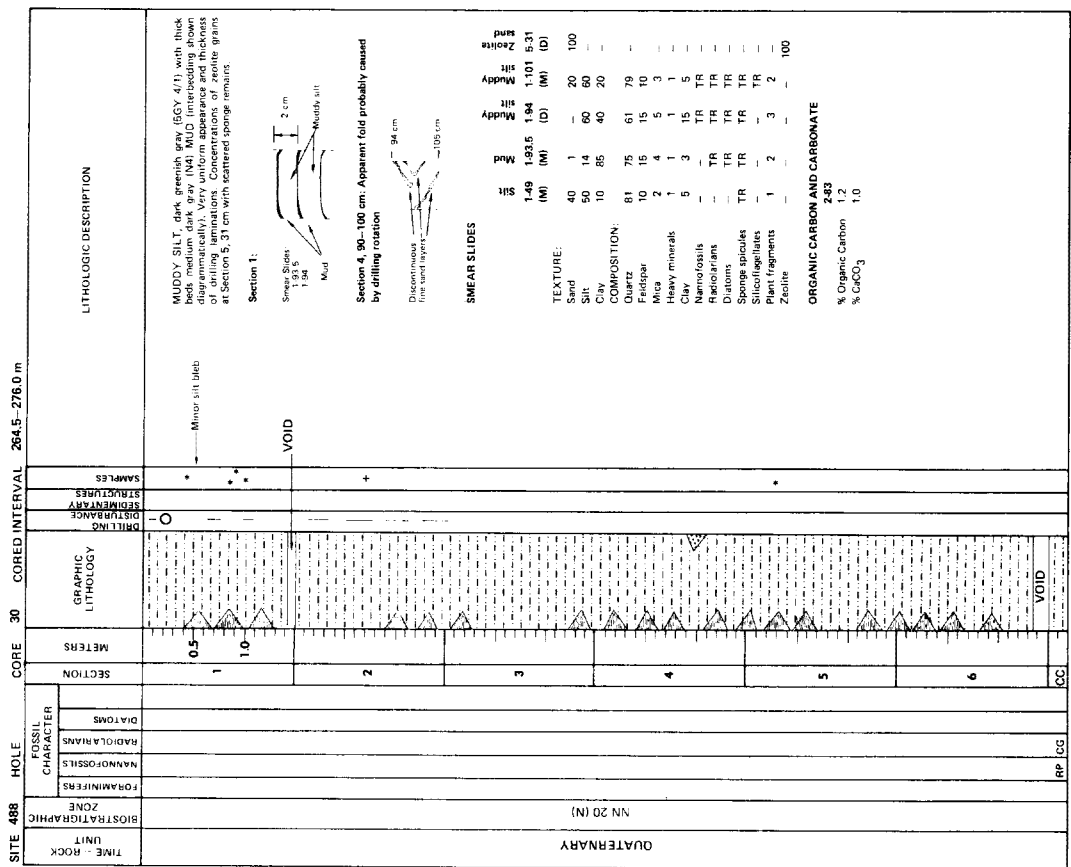
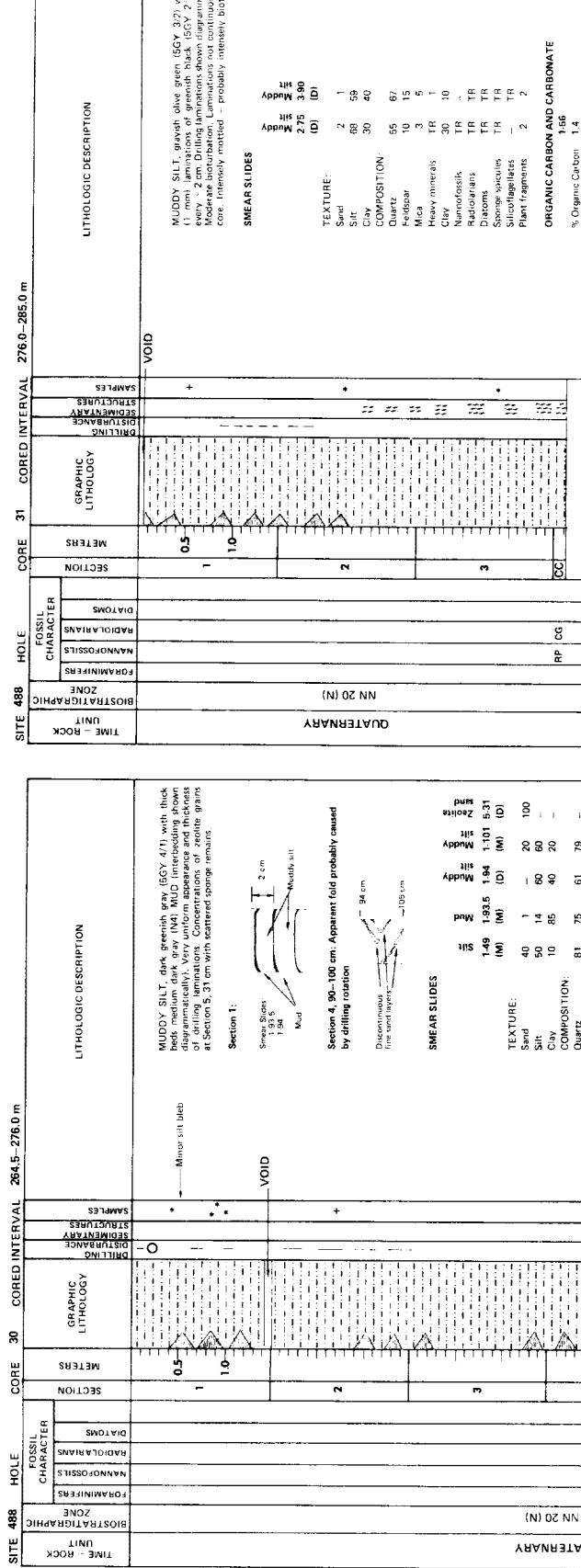
SITE 488 HOLE CORE 26 CORED INTERVAL 229.0-238.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
QUATERNARY	NN 20 (N)	RP	RM	RG	CC	0.5	VOID				<p>Sections 1-4: MUDDY SILT olive black (SGY 2/1) to greenish black (SGY 2/1) with silt interbeds. Some wavy deformation, other areas apparently through-going beds. Section 5 - Core-Catcher: MUDDY SILT, dusky green (SGY 3/2), healed fractures that indicate bedding in the original deposit. In situ, probably deformation of poorly consolidated sediments.</p> <p>SMEAR SLIDES</p> <p>Muddy 4105 646 Silt 4105 646 Mud 4105 646</p> <p>TEXTURE: Sand 5 1 Silt 75 20 Clay 20 79</p> <p>COMPOSITION: Quartz 66 55 Feldspar 3 20 Mica 5 8 Heavy minerals 20 15 Clay minerals 3 3 Diatoms 1 TR Sponge spicules 1 TR Plant fragments 3 4</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 1.0 3.28 % CaCO₃ 5.0</p>	
						1.0	VOID				<p>Apparent dip 45°</p> <p>Apparent dip 45°</p> <p>SGY 2/1</p> <p>Silt interbeds, to 4 cm thick, apparent dip of 28°</p> <p>47° apparent dip</p> <p>40° apparent dip</p> <p>3 cm silt bed, possibly normal grading</p> <p>26° apparent dip</p> <p>Fracture, core may have tilted 45°</p> <p>1 cm silt bed, 61° apparent dip, sharper contact toward top of bed</p> <p>2.0-3.0 cm silt-normal grading</p> <p>13° apparent dip</p> <p>21° apparent dip</p> <p>28° apparent dip</p>	

SITE 488	HOLE	CORE 27	CORED INTERVAL	238.5-248.0 m	LITHOLOGIC DESCRIPTION	SAMPLER	SEMENARY	DISTANCE	DRILLING	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER	BIOSTRATIGRAPHIC ZONE				TIME - ROCK UNIT	
														FORAMINIFERS	MANNOFOSSILS	RADIOLARIANS	DIATOMS		
					MUDDY SILT, greenish black (EGY 271) with common silt interbeds - up to 1.5 cm thick, thin silt beds generally truncated and wavy. Two thin parallel (horizontal) dark fine-grained laminae (1.5-2.0 mm thick, 2 cm apart) surrounding a muddy silt. # Section 1, 144-147 cm. Laminae probably produced by drilling rotation.						0.5 1.0	1 CC						QUATERNARY	NN 20
					SMEAR SLIDES 1.80 (D) Muddy Silt														
					TEXTURE: Sand 1 Silt 58 Clay 40														
					COMPOSITION: Quartz 60 Feldspar 20 Mica 10 Heavy minerals 2 Clay 3 Diatoms TR Sponge spicules TR Plant fragments 5														
					ORGANIC CARBON AND CARBONATE 1.84 % Organic Carbon 1.1 % CaCO ₃ 1.0														

SITE 488	HOLE	CORE 28	CORED INTERVAL	257.5-264.5 m	LITHOLOGIC DESCRIPTION	SAMPLER	SEMENARY	DISTANCE	DRILLING	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER	BIOSTRATIGRAPHIC ZONE				TIME - ROCK UNIT		
														FORAMINIFERS	MANNOFOSSILS	RADIOLARIANS	DIATOMS			
					13-14 couples of greenish black muddy silt (1-2.5 cm) and grayish black (N2) MUD (2-4 mm)						0.5 1.0	1 2 3 4 5 CC						QUATERNARY	NN 20 (N)	
					Diffuse olive gray (BY 4/1) slightly SANDY SILT laminae: 37' apparent dip															
					SMEAR SLIDES 1.90 (M) 2.12 (D) Muddy Silt															
					TEXTURE: Sand 30 Silt 40 Clay 60															
					COMPOSITION: Quartz 48 Feldspar 15 Mica 4 Heavy minerals 1 Clay 30 Radiolarians R Sponge spicules TR Plant fragments 2															
					ORGANIC CARBON AND CARBONATE 2.142 % Organic Carbon 1.3 % CaCO ₃ 1.0															
					Very firm, muddy, silt, apparently stratified															
					20% darker beds															

SITE 488	HOLE	CORE 28	CORED INTERVAL	248.0-257.5 m	LITHOLOGIC DESCRIPTION	SAMPLER	SEMENARY	DISTANCE	DRILLING	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER	BIOSTRATIGRAPHIC ZONE				TIME - ROCK UNIT		
														FORAMINIFERS	MANNOFOSSILS	RADIOLARIANS	DIATOMS			
					Very poor recovery - only a few cm of sediment in Core Catcher.														QUATERNARY	NN 20 (N)



SITE 488 HOLE CORE 32 CORED INTERVAL 285.0-294.0 m

TIME - ROCK UNIT	QUATERNARY	BIOSTRATIGRAPHIC ZONE	NN 20 (N)	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
								1	0.5					Coarse, olive green (SGY 3/1) MUDDY SILT with mottling of green black (SGY 2/1) MUD. Moderate mottling probably bioturbated, no drilling biscuits and laminations in Section 1. In rest of core drilling laminations common. Drilling laminations shown diagrammatically. Scattered sponge remains.
								2	1.0					Section 2: slight disruption in coarse (silt) beds
								3					Core-Catcher: Mud Muddier silt Burrow	
								4					SMEAR SLIDES	
								CC						<p>TEXTURE:</p> <p>Sand 0 5</p> <p>Silt 25 70</p> <p>Clay 75 25</p> <p>COMPOSITION:</p> <p>Quartz 20 60</p> <p>Feldspar 3 8</p> <p>Mica 1 1</p> <p>Heavy minerals 1 TR</p> <p>Clay minerals 75 25</p> <p>Radiolarians - TR</p> <p>Diatoms TR TR</p> <p>Sponge spicules TR 1</p> <p>Plant fragments 1 2</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 4.8</p> <p>% CaCO₃ 0.0</p>

SITE 488 HOLE CORE 33 CORED INTERVAL 294.0-303.0 m

TIME - ROCK UNIT	QUATERNARY	BIOSTRATIGRAPHIC ZONE	NN 20 (N)	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
								1	0.5					Dark greenish gray (SGY 4/1) firm muddy silt. Homogeneous, but vaguely mottled with a diffuse darker colored muddier silt - probably bioturbated. Scattered sponge remains.
								2	1.0					Section 2: slight disruption in coarse (silt) beds
								3					Core-Catcher: Mud Muddier silt Burrow	
								4					SMEAR SLIDES	
								CC						<p>TEXTURE:</p> <p>Sand 0 5</p> <p>Silt 25 70</p> <p>Clay 75 25</p> <p>COMPOSITION:</p> <p>Quartz 20 60</p> <p>Feldspar 3 8</p> <p>Mica 1 1</p> <p>Heavy minerals 1 TR</p> <p>Clay minerals 75 25</p> <p>Radiolarians - TR</p> <p>Diatoms TR TR</p> <p>Sponge spicules TR 1</p> <p>Plant fragments 1 2</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 4.8</p> <p>% CaCO₃ 0.0</p>

SITE 488 HOLE 35 CORED INTERVAL 312.0-321.0 m

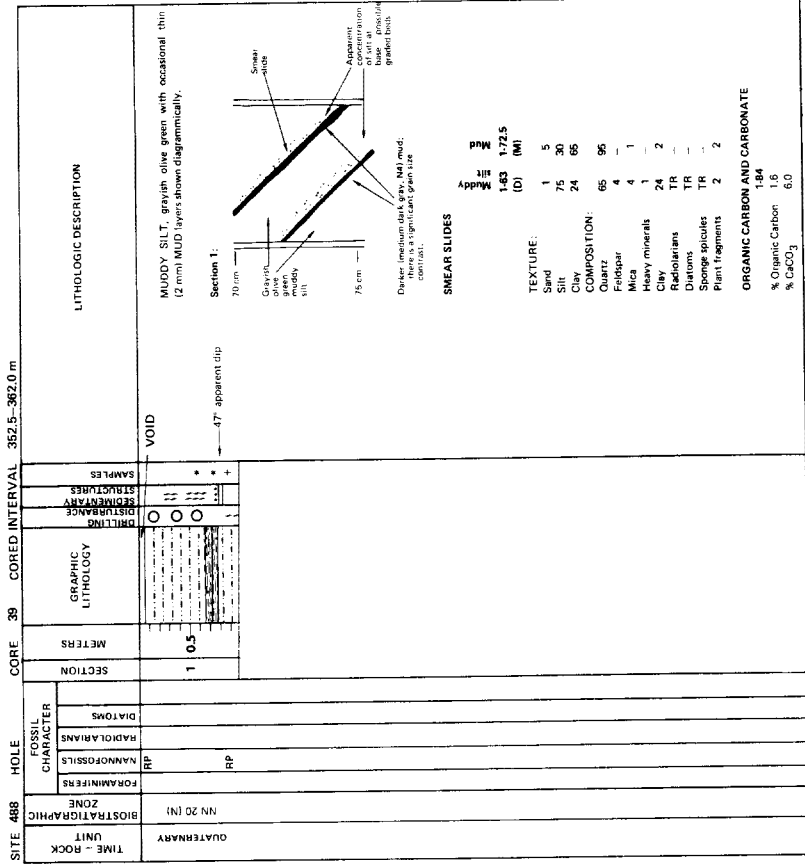
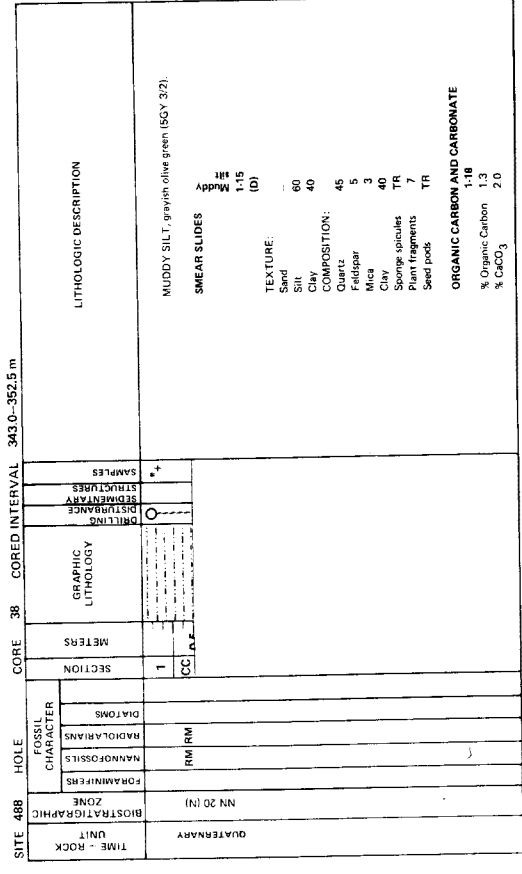
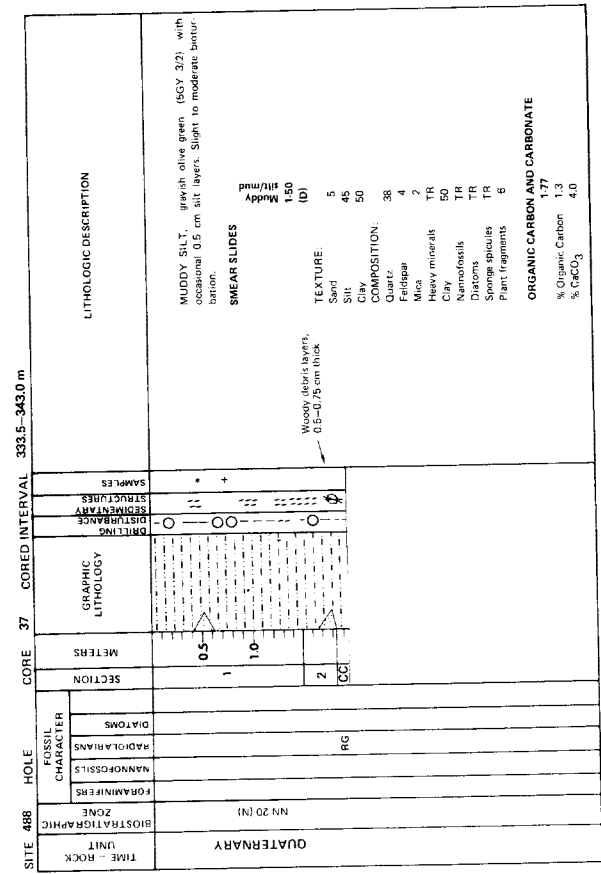
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SAMPLES			
QUATERNARY	NN 20 (N)					1	0.5	<p>MUDDY SILT, grayish olive green (SGY 3Z), possibly bioturbated. Medium to coarse SAND, medium dark gray (M4), normally graded, probably due to settling in core barrel. Core-Catcher, olive black (SY 2T1) mud. Drillers detected sand at 1 meter depth into this core.</p> <p>SMEAR SLIDES</p> <p>Texture: Sand 2 95, Silt 70 5, Clay 26 -</p> <p>Composition: Quartz 90 95, Feldspar 3 5, Mica 3 5, Heavy minerals 1R TR, Clay 28 -</p> <p>Nannofossils TR -</p> <p>Diatoms TR -</p> <p>Sponge spicules TR -</p> <p>Plant fragments 2 TR</p> <p>GRAIN SIZE</p> <p>Sand 1.124, Silt 95.5, Clay 2.3</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 1.40, % CaCO₃ 1.3</p>	
						1	1.0		

SITE 488 HOLE 36 CORED INTERVAL 321.0-333.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SAMPLES			
QUATERNARY	NN 20 (N)					CC		MUDDY SILT, grayish olive green (SGY 3Z).	

SITE 488 HOLE 34 CORED INTERVAL 303.0-312.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SAMPLES			
QUATERNARY	NN 20 (N)					1	0.5	<p>MUDDY SILT, grayish olive green (SGY 3Z) with minor thin (1 mm) mud laminations. Moderately bioturbated.</p> <p>SMEAR SLIDES</p> <p>Texture: Sand - 05, Silt 35, Clay 60, Organic 350, Muddy (D)</p> <p>Composition: Quartz 57, Feldspar 3, Mica 3, Clay 35, Nannofossils TR, Radiolarians TR, Diatoms TR, Sponge spicules 2, Plant fragments 3</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 1.7, % CaCO₃ 3.0</p>	
						2	1.0		
						3			
						4			
						5			
						6			
						CC			



SITE 488 HOLE CORE 41 CORED INTERVAL 371.5-381.0 m

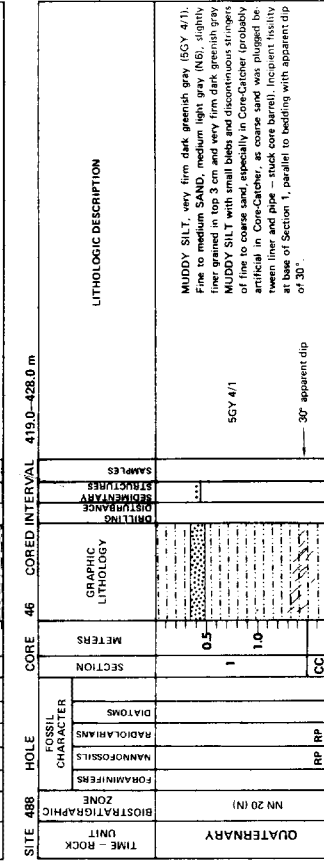
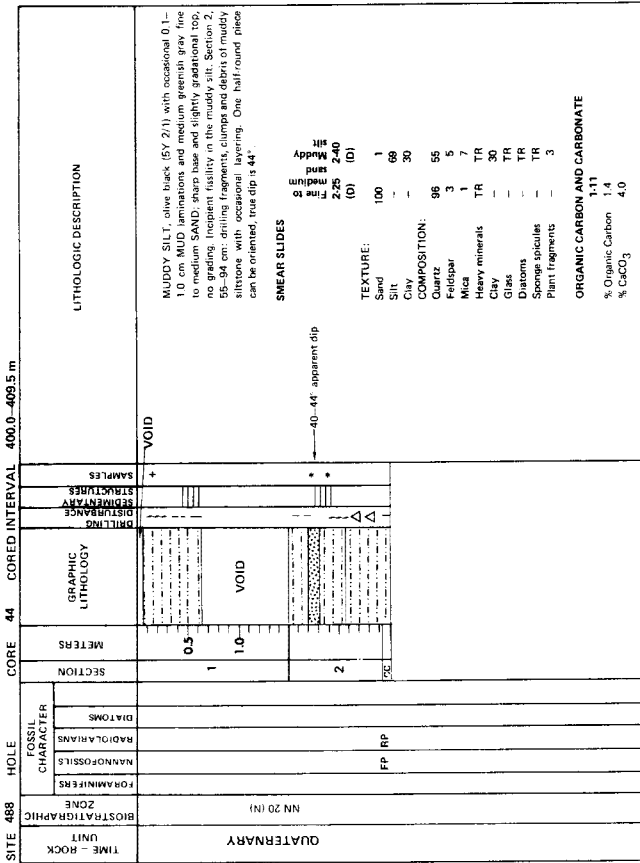
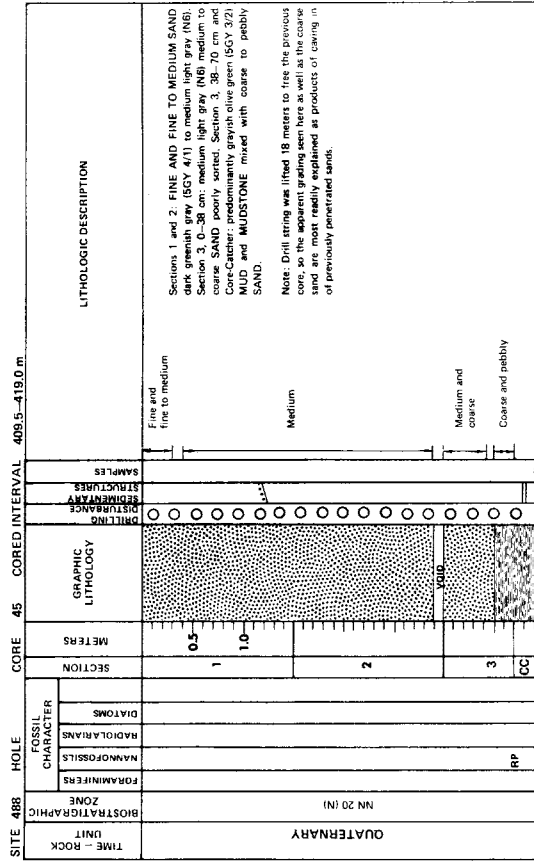
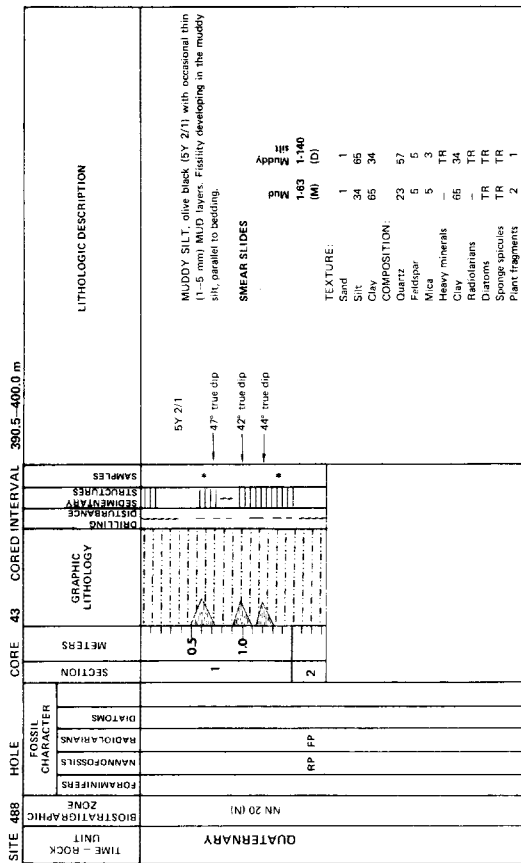
TIME - ROCK UNIT	QUATERNARY	BIOSTRATIGRAPHIC ZONE	NN 20 (N)	FOSSIL CHARACTER	FORAMINIFERS NANNOFOSILS RADIOLARIANS DIATOMS	SECTION	1 CC	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION
												MUDDY SILT, grayish olive green (SGY 3:2).

SITE 488 HOLE CORE 42 CORED INTERVAL 381.0-390.5 m

TIME - ROCK UNIT	QUATERNARY	BIOSTRATIGRAPHIC ZONE	NN 20 (N)	FOSSIL CHARACTER	FORAMINIFERS NANNOFOSILS RADIOLARIANS DIATOMS	SECTION	1 1.0 2 3	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION
												<p>Section 1, 0-15 cm: FINE TO MEDIUM GRAINED SAND and FISSILE SHALE, grayish olive green (SGY 3:2).</p> <p>Section 1, grayish olive green (SGY 3:2) MUDDY SILT, incipiently fissile in places. Section 2, 15-20 cm: true dip, interbedded laminations of greenish gray (SGY 6:1) and medium dark gray (N4) FINE SAND and SILT, the latter rich in carbonised organic detritus. Interbedding above diagrammatically. Minor normal faults at Section 2, 40 and 50 cm. Section 2, 10-15 cm: Silt, grayish olive green (SGY 3:2).</p> <p>Section 3, 15-20 cm: Silt, grayish olive green (SGY 3:2), above sand below 5 cm thick sealed bed of fine to very fine sand. Occasional sponge remains.</p> <p>SMEAR SLIDES</p> <p>SGY 3:2 6:1 N4</p> <p>TEXTURE Sand 1 15 Silt 19 65 Clay 80 20</p> <p>COMPOSITION Quartz 65 70 Feldspar 10 10 Mica 3 4 Heavy minerals 1 1 Clay 70 5 Radiolarians TR TR Diatoms TR TR Sponge spicules TR TR Plant fragments 1 10</p> <p>GRAIN SIZE Sand 15.9 Silt 62.3 Clay 22.5</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 2.106 % CaCO₃ 3.0</p>

SITE 488 HOLE CORE 40 CORED INTERVAL 382.0-371.5 m

TIME - ROCK UNIT	QUATERNARY	BIOSTRATIGRAPHIC ZONE	NN 20 (N)	FOSSIL CHARACTER	FORAMINIFERS NANNOFOSILS RADIOLARIANS DIATOMS	SECTION	1 2 CC	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION
												<p>MUDDY SILT, firm (locally soft) grayish olive green (SGY 3:2).</p> <p>Section 2, Dead of upper portion. Vaguely outlined siltier, slightly lighter colored beds.</p> <p>5 cm 10 cm 15 cm</p> <p>* Smear slides Apparent dip 12-15° Mica fractures</p> <p>SMEAR SLIDES</p> <p>2.3.5 2.8.5 2.12 Mud Muddy Silt (M) (D) (D)</p> <p>2 3 38 62 80 Clay 60 35 20</p> <p>COMPOSITION: Quartz 61 81 79 Feldspar 10 10 10 Mica 5 2 3 Heavy minerals 1 1 1 Clay 20 5 5 Radiolarians TR TR TR Diatoms TR TR TR Sponge spicules TR TR TR Plant fragments 3 1 1</p> <p>ORGANIC CARBON AND CARBONATE 1.40 % Organic Carbon 1.2 % CaCO₃ 2.0</p>



SITE SUMMARY SHEET

SITE 489

Date occupied: 3 April 1979

Date departed: 5 April 1979

Time on hole: 39.2 hours

Position: latitude: 16°16.19'N

longitude: 99°01.13'W

Water depth (sea level): 1240 corrected meters, echo sounding

Water depth (rig floor): 1250 corrected meters, echo sounding

Bottom felt at: 1268.5 meters, drill pipe

Penetration: 34.5 meters

Number of cores: 4

Total length of cored section: 34.5 meters

Total core recovery: 22.6 meters

Percentage core recovery: 66%

Oldest Sediment Cored

Depth sub-bottom: 34.5 meters

Nature: Green mud

Age: Early Miocene

Basement

Depth sub-bottom: Not penetrated

Principal Results

Hole terminated because of leaking bumper-sub assembly. See Hole 489A.

SITE 489	HOLE	CORED INTERVAL	CORE 2				LITHOLOGICAL DESCRIPTION		
			SECTION	METERS	GRAPHIC LITHOLOGY	DEPTH			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	RADOLIARIANS	NANNOFOSSILS	FORAMINIFERS	DRILLING DISTURBANCE	SEISMIC STRUCTURES	SAMPLES
LOWER MIOCENE	NN 4	6.0-15.5 m	1	0.5	[Graphic Lithology]	VOID	Silty Muddy silt, grayish green (5G 5.2) and vitric muddy silt, mottled. SMEAR SLIDES Silty Muddy 1-100 (D) TEXTURE: Sand 2 Silt 63 Clay 30 COMPOSITION: Quartz 40 Feldspar 4 Mica 3 Heavy minerals TR Pyrite 5 Clay 30 Radiolarians 5 Diatoms 5 Sponge spicules 2 Plant fragments 1 ORGANIC CARBON AND CARBONATE 5-130 % Organic Carbon 0.2 % CaCO ₃ 1		
			2						
			3						
			4						
			5						
			6						
CC									

SITE 489	HOLE	CORED INTERVAL	CORE 1				LITHOLOGICAL DESCRIPTION		
			SECTION	METERS	GRAPHIC LITHOLOGY	DEPTH			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	RADOLIARIANS	NANNOFOSSILS	FORAMINIFERS	DRILLING DISTURBANCE	SEISMIC STRUCTURES	SAMPLES
LOWER MIOCENE	NN 4 <i>Calocybe costata</i>	0.0-6.0 m	1	0.5	[Graphic Lithology]	MUDDY SILT, grayish olive green (5GY 3/2) to dusky yellowish green (10GY 3/2) and siliceous vitric silt, grayish olive green (5GY 3/2). Woody shins and reworked 1-2 mm mud balls. SMEAR SLIDES Muddy silt Muddy silt 1-10 (D) 2-70 (D) CC (D) TEXTURE: Sand 3 Silt 75 Clay 85 COMPOSITION: Quartz 60 Feldspar 8 Mica 1 Pyrite 3 Clay 25 Glass 7 Glauconite - Foraminifers TR Nannofossils TR Radiolarians TR Sponge spicules TR Plant fragments 1 ORGANIC CARBON AND CARBONATE 3-106 % Organic Carbon 1.4 % CaCO ₃ 6			
			2						
			3						
			4						
CC									

SITE 489	HOLE	CORED INTERVAL	25.0-34.5 m	CORE 4	SECTION	FOSSIL CHARACTER					TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	LITHOLOGIC DESCRIPTION			
						DIATOMS	RADOLIARIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE						
					1						RM	RP	FG	LOWER MIOCENE	NN 4	<p>MUDDY SILT, mottled, dark greenish gray (SG 4.1). Thin siliceous muddy silt layers, indurated limestone clasts, pyritized and fractured, diameter 3 mm-5 cm.</p> <p>SMEAR SLIDES</p> <p>Siliceous Muddy silt 142 (M) 280 (D)</p> <p>TEXTURE: Sand 1 2 Silt 70 63 Clay 29 35</p> <p>COMPOSITION: Quartz 42 45 Feldspar 7 14 Mica 7 14 Pyrite 5 3 Clay 24 35 Glass 5 - Radiolarians 7 TR Diatoms 2 TR Sponge spicules 5 TR Plant fragments TR 1</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 0.2 % CaCO₃ 3</p>
					2											VOID
					3											VOID

SITE 489	HOLE	CORED INTERVAL	25.0-34.5 m	CORE 5X	SECTION	FOSSIL CHARACTER					TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	LITHOLOGIC DESCRIPTION			
						DIATOMS	RADOLIARIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE						
					1						RM	RP	FG	LOWER MIOCENE	NN 4	<p>Washed into core barrel as bit was rotated near base of Core 4 for several hours. Structureless mud, grayish green (SG 5/2), mixed with radiolarian mud.</p> <p>SMEAR SLIDES</p> <p>Mud 142 (M) 280 (D)</p> <p>TEXTURE: Sand - Silt 20 20 Clay 80 80</p> <p>COMPOSITION: Quartz 7 5 Feldspar 3 2 Mica 1 2 Heavy minerals 2 2 Pyrite 2 2 Clay 74 73 Glass 1 1 Foraminifers TR TR Nanno-fossils 1 1 Radiolarians 6 10 Diatoms TR TR Sponge spicules TR TR Plant fragments TR TR</p>
					2											VOID

SITE 489	HOLE	CORED INTERVAL	15.5-25.0 m	CORE 3	SECTION	FOSSIL CHARACTER					TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	LITHOLOGIC DESCRIPTION			
						DIATOMS	RADOLIARIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE						
					1						RM	CC	LOWER MIOCENE	NN 4	<p>MUDDY SILT, grayish green (SG 5/2), mottled</p> <p>SMEAR SLIDES</p> <p>Muddy silt 3-135 (D)</p> <p>TEXTURE: Sand 1 Silt 59 Clay 40</p> <p>COMPOSITION: Quartz 43 Feldspar 5 Mica 2 Heavy minerals TR Pyrite 3 Clay 40 Radiolarians 5 Diatoms TR Sponge spicules 2</p> <p>ORGANIC CARBON AND CARBONATE 4-130 % Organic Carbon 0.4 % CaCO₃ 2</p>	
					2											VOID
					3											VOID
					4											VOID
					5											VOID
					6											VOID

Thin ash layers

SITE SUMMARY SHEET

HOLE 489A

Date occupied: 5 April 1979

Date departed: 7 April 1979

Time on hole: 52.4 hours

Position: latitude: 16°16.19'N

longitude: 99°01.13'W

Water depth (sea level): 1240 corrected meters, echo sounding

Water depth (rig floor): 1250 corrected meters, echo sounding

Bottom felt at: 1266.5 meters, drill pipe

Penetration: 327 meters

Number of cores: 34

Total length of cored section: 298.5 meters

Total core recovery: 164.5 meters

Percentage core recovery: 55%

Oldest Sediment Cored

Depth sub-bottom: 302 meters

Nature: Green silt and siltstone

Age: Early Miocene

Basement

Depth sub-bottom: 303 meters

Nature: Schist

Principal Results

Verified existence of continental basement within 10 km of inferred accretionary wedge sediments. Inferred lower Miocene paleobathymetry and sedimentation rates from supra basement sedimentary section.

SITE 489 HOLE A CORE 1 CORED INTERVAL 0.0-8.0 m		CORE H-1 CORED INTERVAL 0.0-38.5 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE
		FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS MOLLUSCS			SAMPLES
LOWER MIOCENE	NN 4 <i>Calocybetta costata</i>		1 0.5		
QUATERNARY	NN 20/NN 21		2 1.0		
			3		
			4		
			5		
			CC		

SITE 489 HOLE A CORE 2 CORED INTERVAL 36.5-46.0 m		CORE H-1 CORED INTERVAL 0.0-38.5 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE
		FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS MOLLUSCS			SAMPLES
LOWER MIOCENE	NN 4 <i>Calocybetta virgins</i>		1 0.5		
			2 1.0		
			3		
			4		
			5		
			CC		

Wash sample: MUDDY SILT - dusky yellowish brown (10YR 2/2). Core-Catcher: grayish green (6.5 Z) MUDDY SILT, well-sorted angular limestone fragment.

GLAUCONITIC FORAMINIFERAL MUDDY SILT, dusky yellowish green (10GY 3/2). Firm clay fragments. Minor vitric siliceous muddy silt, grayish green (6.5 Z).

SMEAR SLIDES

TEXTURE: 15 2
Silt 50 70
Clay 35 28

COMPOSITION: 28 30
Quartz TR 2
Mica 5 5
Pyrite 35 28
Clay 5 15
Calcite 5 1
Glaucopite 1 2

FORAMINIFERS 15
Nannofossils 1
Radiolarians 2
Diatoms TR 3
Sponge spicules 2
Plant fragments 1 TR?

FORAMINIFERAL 1-15 CC
VITRIC SILICEOUS muddy silt
VITRIC SILICEOUS muddy silt

SITE 489 HOLE A CORE 2 CORED INTERVAL 36.5-46.0 m		CORE H-1 CORED INTERVAL 0.0-38.5 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE
		FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS MOLLUSCS			SAMPLES
LOWER MIOCENE	NN 4 <i>Calocybetta virgins</i>		1 0.5		
			2 1.0		
			3		
			4		
			5		
			CC		

MUDDY SILT, dark greenish gray (5G 4 1), sandy to fine.

SMEAR SLIDES

TEXTURE (ID): 15
28
77
20

COMPOSITION: 57
Quartz
Feldspar 5
Mica 5
Pyrite 3
Calcite 1
Clay 1
Nannofossils TR
Radiolarians 1
Diatoms 2
Sponge spicules 2

ORGANIC CARBON AND CARBONATE
2.100
% Organic carbon 0.3
% CaCO₃ 2

→ 5 cm limestone clast
Branched, filled with whitish siliceous muds
(SGY 3/2)

SITE 489 HOLE A CORE 3 CORED INTERVAL 46.0-55.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADOLARANS	DIATOMS	MOLLUSCS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER MIOCENE	N14 <i>Chlorocystis zimmeri</i>	RG					1	0.5	VOID			MUDDY SILT, dark greenish gray (BG 4/1), waxy to firm. Rounded clasts 12-4 cm diameter of firm muddy silt. At 20-38 cm, slightly mottled with grayish olive green (BG 3/2) muddy silt. Very firm in Core Catcher.
							2	1.0	VOID			
							CC					

SMEAR SLIDES

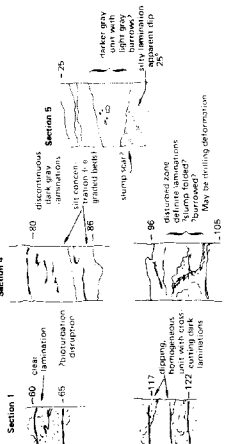
TEXTURE: Muddy 1,73 CC Silt 2
Sand 69 88 Clay 40 30

COMPOSITION:
Quartz 60 58
Feldspar 2 3
Pyrite 3 2
Clay 40 30
Glass - TR
Carb. unsp. 1 1
Foraminifers - TR
Nannofossils - TR
Diatoms TR
Sponge spicules TR
Plant fragments TR

SITE 489 HOLE A CORE 4 CORED INTERVAL 55.5-65.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADOLARANS	DIATOMS	MOLLUSCS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER MIOCENE							1	0.5				MUDDY SILTSTONE, dark greenish gray (BG 4/1). Moderately to intensely mottled (bioturbated). Streaks of medium bluish gray (BG 5/1) and minor olive gray (BG 4/1) mudstone. Cores 1-2 mm bluish gray (BG 5/1), silty olive gray (BG 4/1). At 20-38 cm, slightly mottled with grayish olive green (BG 3/2) muddy silt. Very firm in Core Catcher.
							2	1.0				
							3					
							4					
							5					
							6					

Representative gray lamination texture:



SMEAR SLIDES

TEXTURE: Muddy 1,58 (M) 30 (M) Silt 7 65 86 Sand 26 15 15

COMPOSITION:
Quartz 50 75 79 83
Feldspar 5 7 7 1
Heavy minerals 1 1 TR
Pyrite 3 1 5 10
Glass - 3 5 -
Chert - 3 37
Carbonate unsp. TR
Nannofossils TR
Sponge spicules TR
Plant fragments TR

ORGANIC CARBON AND CARBONATE
% Organic Carbon 2.89
% CaCO₃ 2

VOID

SITE 489 HOLE A CORE 5 CORED INTERVAL 65.0-74.5 m		CORE 6 CORED INTERVAL 74.5-84.0 m									
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			METERS	SECTION	GRAPHIC LITHOLOGY	DRILLING	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADICULARIANS							
LOWER MIOCENE		RP			0.5	1					MUDDY SILTSTONE, dark greenish gray (SG 4/1) locally soft to firm silt), moderately to intensely mottled (locally turbated). Streaks of medium bluish gray (SB 5/1) and minor olive gray (GY 4/1) areas. Common 1-2 mm bluish concentric to subconcentric, irregular, but often diffuse - possibly smeared out by bioturbation. Deviation: 1.6 degrees.
					1.0	2					<p>Section 4</p> <p>Section 4</p> <p>Deviation: 1.6 degrees.</p> <p>Section 4</p> <p>Ovoid to sub-oval burrows in the section appearing to be planar</p> <p>Last recognizable horizontal bed</p> <p>Bedding (discontinuous color and silt concentration) apparent 35° dip</p>
					2	3					<p>Inclined dark gray laminae (discontinuous) have 54° apparent dip</p> <p>Large circular burrows, 12 mm maximum dimension</p> <p>Gray laminations no longer present</p> <p>Increased bedding (45°) by layers of different color or silt concentration</p> <p>Fault, 65° apparent dip, sense not clear</p> <p>37° west dip beds, Micrite concretions, 1.5 m above fracture zone</p> <p>At 140 cm, 25° apparent dip</p> <p>Fracture zone, 2 crudely conjugate sets, 55-60°</p> <p>30° apparent dip</p> <p>17° apparent dip</p> <p>Sub-horizontal true bedding</p>
					3	4					<p>Muddy siltstone and minor mudstone, probably with minor dark greenish gray (SG 4/1) streaks, but no turbated. Bedding traces occasionally evident (as shown)</p> <p>SMEAR SLIDES</p> <p>2-01 2-137</p> <p>Muddy siltstone</p> <p>Mudstone</p> <p>TEXTURE:</p> <p>Sand 1 2</p> <p>Silt 51 38</p> <p>Clay 48 60</p> <p>COMPOSITION:</p> <p>Quartz 25 30</p> <p>Feldspar 1 5</p> <p>Mica 1 2</p> <p>Heavy minerals TR 1 2</p> <p>Pyrite 48 65</p> <p>Clay 1 2</p> <p>Glauconite 1 2</p> <p>Plant fragments 1 1</p> <p>Apatite? 20 3</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 0.2</p> <p>% CaCO₃ 3</p>
					4	5					<p>5-10° apparent dip</p> <p>1 mm laminations of medium bluish gray</p> <p>SB 5/1 muddy siltstone</p>
					CC						

SITE 489 HOLE A CORE 5 CORED INTERVAL 65.0-74.5 m		CORE 6 CORED INTERVAL 74.5-84.0 m									
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			METERS	SECTION	GRAPHIC LITHOLOGY	DRILLING	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADICULARIANS							
LOWER MIOCENE		RP			0.5	1					MUDDY SILTSTONE and MINOR MUDSTONE, probably with minor dark greenish gray (SG 4/1) streaks, but no turbated. Bedding traces occasionally evident (as shown) <p>SMEAR SLIDES</p> <p>2-01 2-137</p> <p>Muddy siltstone</p> <p>Mudstone</p> <p>TEXTURE:</p> <p>Sand 1 2</p> <p>Silt 51 38</p> <p>Clay 48 60</p> <p>COMPOSITION:</p> <p>Quartz 25 30</p> <p>Feldspar 1 5</p> <p>Mica 1 2</p> <p>Heavy minerals TR 1 2</p> <p>Pyrite 48 65</p> <p>Clay 1 2</p> <p>Glauconite 1 2</p> <p>Plant fragments 1 1</p> <p>Apatite? 20 3</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 0.2</p> <p>% CaCO₃ 3</p>
					1.0	2					<p>Inclined dark gray laminae (discontinuous) have 54° apparent dip</p> <p>Large circular burrows, 12 mm maximum dimension</p> <p>Gray laminations no longer present</p> <p>Increased bedding (45°) by layers of different color or silt concentration</p> <p>Fault, 65° apparent dip, sense not clear</p> <p>37° west dip beds, Micrite concretions, 1.5 m above fracture zone</p> <p>At 140 cm, 25° apparent dip</p> <p>Fracture zone, 2 crudely conjugate sets, 55-60°</p> <p>30° apparent dip</p> <p>17° apparent dip</p> <p>Sub-horizontal true bedding</p>
					3	4					<p>Muddy siltstone and minor mudstone, probably with minor dark greenish gray (SG 4/1) streaks, but no turbated. Bedding traces occasionally evident (as shown)</p> <p>SMEAR SLIDES</p> <p>2-01 2-137</p> <p>Muddy siltstone</p> <p>Mudstone</p> <p>TEXTURE:</p> <p>Sand 1 2</p> <p>Silt 51 38</p> <p>Clay 48 60</p> <p>COMPOSITION:</p> <p>Quartz 25 30</p> <p>Feldspar 1 5</p> <p>Mica 1 2</p> <p>Heavy minerals TR 1 2</p> <p>Pyrite 48 65</p> <p>Clay 1 2</p> <p>Glauconite 1 2</p> <p>Plant fragments 1 1</p> <p>Apatite? 20 3</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 0.2</p> <p>% CaCO₃ 3</p>
					4	5					<p>5-10° apparent dip</p> <p>1 mm laminations of medium bluish gray</p> <p>SB 5/1 muddy siltstone</p>
					CC						

SITE 489 HOLE A CORE 7 CORED INTERVAL 84.0-93.5 m

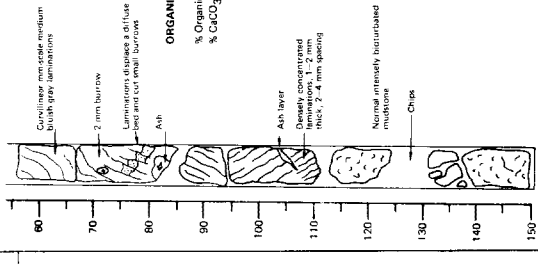
TIME UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	
		FORAMINIFERS	NANNOFOSILS	RADICLARIANS	DIATOMS							MOLLUSCS
LOWER MIOCENE	<i>Calocyclia virgins</i>					1	0.5				MUDDY SILTSTONE underlain by MUDSTONE, greenish gray (SG 8/1) to dark greenish gray (SG 4/1). Intensely homotaxial. Vague horizontal bedding.	
						2	1.0				1 mm medium bluish gray (SG 5/1) mudstone lamination. Ash fragments.	
						3					<p>SMEAR SLIDES</p> <p>Ash</p> <p>Muddy sand (M) 107 47 88</p> <p>Mudstone (D) 100 30 70</p> <p>Sand 50 1</p> <p>Silt 20 20</p> <p>Clay 76</p> <p>TEXTURE:</p> <p>Sand 100</p> <p>Silt 30</p> <p>Clay 48.6</p> <p>COMPOSITION:</p> <p>Quartz 44</p> <p>Mica 2</p> <p>Heavy minerals TR 1</p> <p>Pyrite 45</p> <p>Clay 1</p> <p>Glaucophane? 0</p> <p>Apatite? 3</p> <p>GRAIN SIZE</p> <p>Sand 1.80</p> <p>Silt 3.0</p> <p>Silt 48.6</p> <p>Clay 47.4</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 0.4</p> <p>% CaCO₃ 3</p>	
						4						Vague horizontal laminations
						5						

SITE 489 HOLE A CORE 8 CORED INTERVAL 93.5-103.0 m

TIME UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	
		FORAMINIFERS	NANNOFOSILS	RADICLARIANS	DIATOMS							MOLLUSCS
LOWER MIOCENE	<i>Calocyclia virgins</i>					1	0.5				MUDSTONE, greenish gray and dark greenish gray (SG 6/1 to SG 4/1 and SG 4/1). Intensely bioturbated. Primary bedding destroyed except as indicated.	
						2	1.0				<p>Bedding truncated by 1 mm mudstone laminae, medium bluish gray (SG 5/1) mudstone lamination, diffuse and thicker (0.8 mm).</p> <p>SMEAR SLIDES</p> <p>Mudstone 3-133</p> <p>(D)</p> <p>TEXTURE:</p> <p>Sand 10</p> <p>Silt 10</p> <p>Clay 90</p> <p>COMPOSITION:</p> <p>Quartz 8</p> <p>Mica 2</p> <p>Heavy minerals 1</p> <p>Pyrite TR</p> <p>Clay 87</p> <p>Radiolarians 1</p> <p>Sponge spicules TR</p> <p>Plant fragments TR</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 0.4</p> <p>% CaCO₃ 1</p>	
						3						
						4						

SITE 489	HOLE A	CORE 10	CORED INTERVAL		1125-122.0 m	LITHOLOGIC DESCRIPTION
			SECTIONS	METERS		
LOWER MIOCENE						<p>MUDDY SILTSTONE, dark grayish gray (EG 4.11), bluish to black, medium to coarse grained, massive to bedded. Bedding planes are indistinct, these is intense burrowing. No clear bedding details. Core broken into large blocks.</p> <p>SMEAR SLIDES</p> <p>2.63 Muddy siltstone (D)</p> <p>TEXTURE:</p> <p>Sand 2 Silt 65 Clay 33</p> <p>COMPOSITION:</p> <p>Quartz 46 Feldspar 18 Mica 3 Heavy minerals 1 Pyrite 1 Clay 30</p> <p>FORAMINIFERS TR RADIOLARIANS 1 Sponge spicules 1 Plant fragments TR</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 0.6 % CaCO₃ 3</p>
			1	0.5		
			2	1.0		

SITE 489	HOLE A	CORE 9	CORED INTERVAL		103.0-112.5 m	LITHOLOGIC DESCRIPTION
			SECTIONS	METERS		
LOWER MIOCENE						<p>MUDDY SILTSTONE, dark gray (EG 4.11), intensely bluish to black, medium to coarse grained, massive to bedded. Bedding planes are indistinct, these is intense burrowing. No clear bedding details. Core broken into large blocks.</p> <p>SMEAR SLIDES</p> <p>2.84 Mudstone (M) (D) 2.116 Ash (D)</p> <p>TEXTURE:</p> <p>Sand 1 Silt 100 Clay 29</p> <p>COMPOSITION:</p> <p>Quartz 15 Feldspar 5 Mica TR Heavy minerals TR Pyrite 1 Clay 72</p> <p>FORAMINIFERS TR RADIOLARIANS 1 Sponge spicules 1 Plant fragments TR</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 1.145 % CaCO₃ 0.4</p>
			1	0.5		
			2	1.0		
			3			
			CC			
			3			
			4			



SITE 489	HOLE A	CORE INTERVAL 1220--1315 m											
		TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SAMPLERS	LITHOLOGIC DESCRIPTION
				NANNOFOSSILS	RADIOLARIANS	DIATOMS	MOLLUSCS	SECTION					
		LOWER MIOCENE	<i>Calocyrtella virgins</i>						0.5				<p>MUDDY SILTSTONE, dark, greenish gray (SG 4.11) with olive green (5G 3.2), bioturbation. At 1, 25-100 cm, probable bedding 60 degree apparent dip, planar fractures with 40-70 degree apparent dip, slickensides up to 47 degrees. Fractures subparallel to bedding. Below 2, 14 cm, soft to very firm MUDDY SILT, moderate bioturbation. At 2.30 cm, set of horizontal and rounded throughpart sections. At 2.30 cm, set of horizontal and rounded throughpart sections. Full round of LIMESTONE, cave upward laminations. Full round of LIMESTONE, bioturbated, dark greenish gray (5G 4.11) in Section 2, 140-150 cm. Core Catcher same as above MUDDY SILT, 4x8 cm rounded fragment of LIMESTONE, as above.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 2 Sand, 68 Silt, 30 Clay COMPOSITION: 50 Quartz, 39 Feldspar, 6 Mica, 3 Pyrite, 2 Glass, TR Nannofossils, TR Radiolarians, 1 Diatoms, 3 Sponge spicules, 1? Plant fragments, TR?</p> <p>GRAIN SIZE</p> <p>1-10 Sand, 5.4 Silt, 66.6 Clay, 27.9</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>4.194 % Organic Carbon, 0.6 % CaCO₃, 2</p>
								1.0					
								2					
								3					
								4					
								5					
								CC					

SITE 489	HOLE A	CORE INTERVAL 1315--1410 m											
		TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SAMPLERS	LITHOLOGIC DESCRIPTION
				NANNOFOSSILS	RADIOLARIANS	DIATOMS	MOLLUSCS	SECTION					
		LOWER MIOCENE	<i>Calocyrtella virgins</i>						0.5				<p>Soft, MUDDY SILT to MUDDY SILTSTONE, greenish olive green (5G 3.2), bioturbation. At 1, 25-100 cm, probable bedding 60 degree apparent dip, planar fractures with 40-70 degree apparent dip, slickensides up to 47 degrees. Fractures subparallel to bedding. Below 2, 14 cm, soft to very firm MUDDY SILT, moderate bioturbation. At 2.30 cm, set of horizontal and rounded throughpart sections. At 2.30 cm, set of horizontal and rounded throughpart sections. Full round of LIMESTONE, cave upward laminations. Full round of LIMESTONE, bioturbated, dark greenish gray (5G 4.11) in Section 2, 140-150 cm. Core Catcher same as above MUDDY SILT, 4x8 cm rounded fragment of LIMESTONE, as above.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 2 Sand, 68 Silt, 30 Clay COMPOSITION: 50 Quartz, 39 Feldspar, 6 Mica, 3 Pyrite, 2 Glass, TR Nannofossils, TR Radiolarians, 1 Diatoms, 3 Sponge spicules, 1? Plant fragments, TR?</p> <p>GRAIN SIZE</p> <p>1-10 Sand, 5.4 Silt, 66.6 Clay, 27.9</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>4.194 % Organic Carbon, 0.6 % CaCO₃, 2</p>
								1.0					
								2					
								CC					
								VOID					

SITE 489 HOLE A CORE 13 CORED INTERVAL 141.0-150.5 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	LOWER MIOCENE		
BIOSTRATIGRAPHIC ZONE	NN 1 <i>Calocybetta virgins</i>		
FOSSIL CHARACTER			
FORAMINIFERS			
NANNOFOSSILS			
RADIOLARIANS			
DIATOMS			
MOLLUSCS			
SECTION			
METERS			
GRAPHIC LITHOLOGY			
DRAWINGS			
SEDIMENTARY STRUCTURES			
SAMPLES			
<p>Section 1, 99 cm, dark greenish gray (ISGY 4/1) muddy siltstone, moderately bioturbated. Fractures dip 50-77 degrees true, slickensides 51-77 degrees true plunge.</p> <p>Section 2, infrequent fractures, 22 degrees to near 90 degrees apparent dip.</p> <p>Section 3, more abundant fractures, 28-90 degrees apparent dip, slickensides plunge up to 90 degrees. Much burrowing. Wood fragments.</p> <p>SMEAR SLIDES</p> <p>TEXTURE:</p> <p>Sand 1</p> <p>Silt 55</p> <p>Clay 34</p> <p>COMPOSITION:</p> <p>Quartz 47</p> <p>Feldspar 3</p> <p>TR 1</p> <p>Heavy minerals 2</p> <p>Pyrite 1</p> <p>Clay 45</p> <p>Carbonate unsp. TR 2</p> <p>Nannofossils TR</p> <p>Radiolarians TR</p> <p>Diatoms TR</p> <p>Sponge spicules 2</p> <p>Plant fragments TR</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 0.7</p> <p>% CaCO₃ 2</p>			

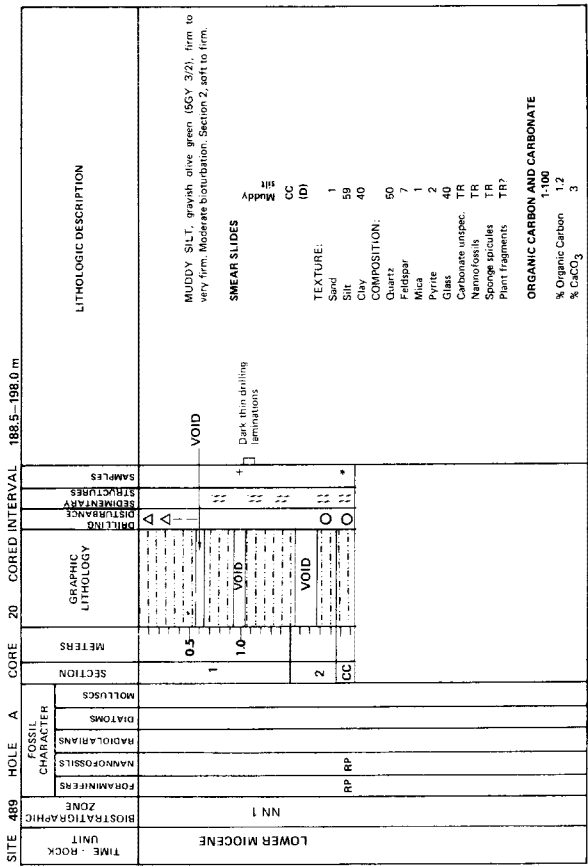
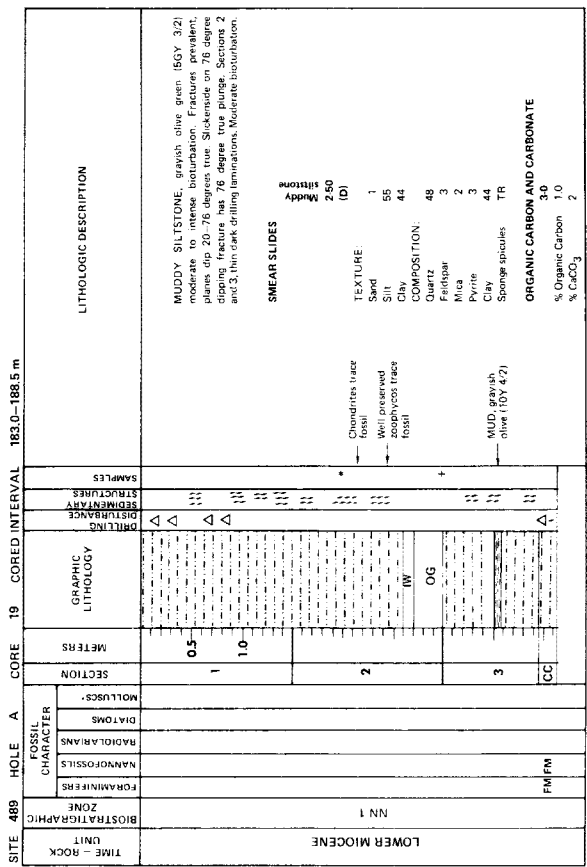
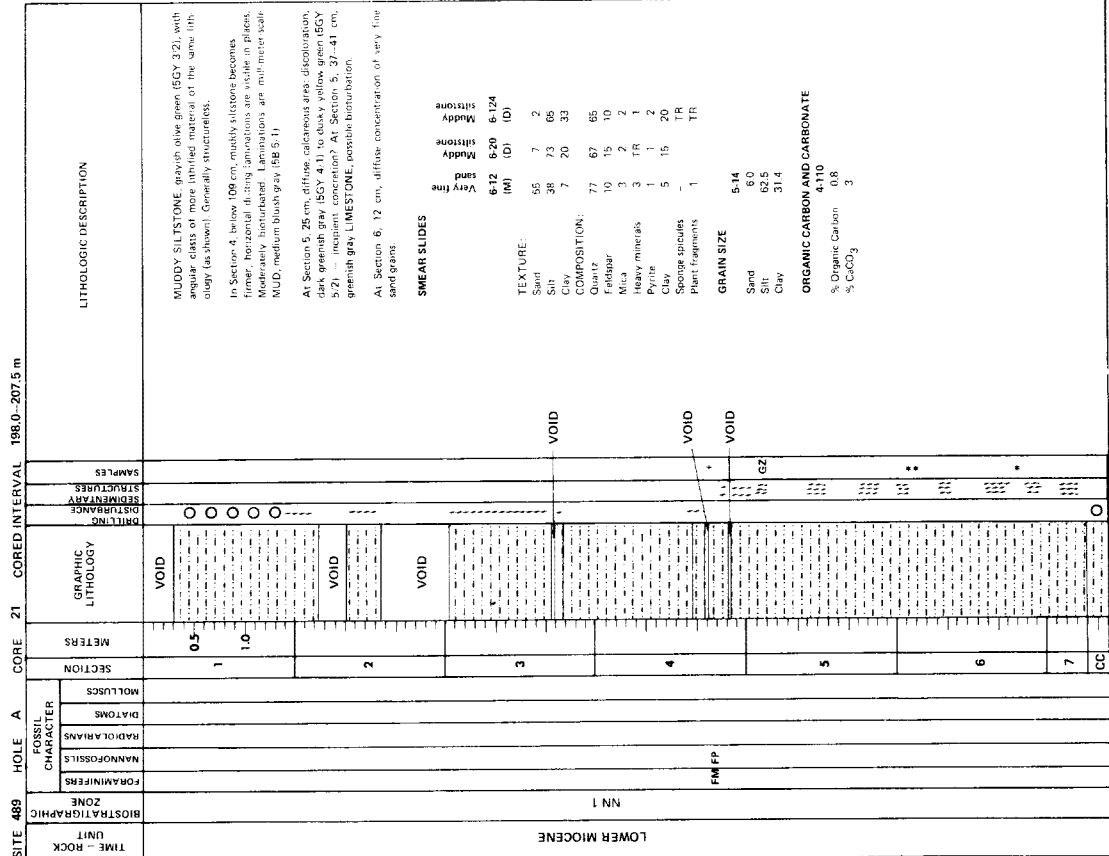
SITE 489 HOLE A CORE 14 CORED INTERVAL 150.5-160.0 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	LOWER MIOCENE		
BIOSTRATIGRAPHIC ZONE	NN 1 <i>Calocybetta virgins</i>		
FOSSIL CHARACTER			
FORAMINIFERS			
NANNOFOSSILS			
RADIOLARIANS			
DIATOMS			
MOLLUSCS			
SECTION			
METERS			
GRAPHIC LITHOLOGY			
DRAWINGS			
SEDIMENTARY STRUCTURES			
SAMPLES			
<p>Muddy silt, silt, grayish olive green (ISGY 3/2), shaly textures.</p> <p>SMEAR SLIDES</p> <p>TEXTURE:</p> <p>Sand 2</p> <p>Silt 60</p> <p>Clay 38</p> <p>COMPOSITION:</p> <p>Quartz 49</p> <p>Feldspar 2</p> <p>TR 1</p> <p>Heavy minerals 3</p> <p>Pyrite 3</p> <p>Clay 38</p> <p>Carbonate unsp. TR</p> <p>Nannofossils TR</p> <p>Radiolarians TR</p> <p>Sponge spicules 5</p>			

SITE 489 HOLE A CORE 15 CORED INTERVAL 160.0-164.5 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	LOWER MIOCENE		
BIOSTRATIGRAPHIC ZONE	NN 1 <i>Calocybetta virgins</i>		
FOSSIL CHARACTER			
FORAMINIFERS			
NANNOFOSSILS			
RADIOLARIANS			
DIATOMS			
MOLLUSCS			
SECTION			
METERS			
GRAPHIC LITHOLOGY			
DRAWINGS			
SEDIMENTARY STRUCTURES			
SAMPLES			
<p>Muddy siltstone (below Section 1, 1-12 cm), color grayish olive green (ISGY 3/2), abundant fractures (fine and medium scale), shaly textures, moderately bioturbated. Fractures dip 50-60 degrees true, slickensides plunge up to 90 degrees. Muddy siltstone, same color, bioturbated in Section 1, 0-12 cm, 101-107 cm and Core-Catcher.</p> <p>SMEAR SLIDES</p> <p>TEXTURE:</p> <p>Sand 2</p> <p>Silt 68</p> <p>Clay 30</p> <p>COMPOSITION:</p> <p>Quartz 60</p> <p>Feldspar 5</p> <p>Mica 5</p> <p>Heavy minerals TR</p> <p>Pyrite TR</p> <p>Clay 30</p> <p>Carbonate unsp. TR</p> <p>Nannofossils TR</p> <p>Radiolarians TR</p> <p>Diatoms TR</p> <p>Sponge spicules 5</p> <p>Plant fragments TR?</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 2.16</p> <p>% CaCO₃ 2</p>			

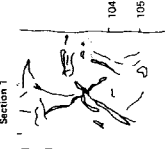
SITE 489 HOLE A CORE 16 CORED INTERVAL 164.5-169.5 m		CORE 17 CORED INTERVAL 169.5-179.0 m	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION
		FORAMINIFERS MAMMOFOSILS RADIOLARIANS DIATOMS MOLLUSCS	METERS
			GRAPHIC LITHOLOGY
			SAMPLES
			DRILLING DISTURBANCE
			SEMI-METERS
			LITHOLOGIC DESCRIPTION
LOWER MIOCENE	<i>Calocycletta virgins</i> - NN 1		0.5 1.0 2
			VOID
			1.80 1.120 Mud Silt Muddy
			TEXTURE: Sand 40 53 Silt 60 45 Clay 30 42
			COMPOSITION: Feldspar 2 5 Quartz 36 5 Mica 36 5 Heavy minerals TR Pyrite 3 2 Clay 60 40 Carbonate unsp. TR Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules TR Plant fragments TR
			ORGANIC CARBON AND CARBONATE % Organic Carbon 1.0 % CaCO ₃ 3
			SMEAR SLIDES 1.80 1.120 Mud Silt Muddy
			MUDDY SILT, grayish olive green (SGY 3/2), with sub-rounded clasts of MUDDY SILTSTONE, dark greenish gray (SG 4/1). High concentration of clasts at top of core may be remnants of earlier lithology that caved into hole while retrieving Core 16. Slightly mottled. Muddy silt is firmer in Section 2. Below Section 3, 23 cm, MUDDY SILTSTONE, same color.
			VOID
			1 mm subhorizontal grayish black (N2) mud every 3-4 cm. Not clear if original bedding.
			Very firm
			VOID
			Horizontal to vertical fractures
			Burrows
			Fractures, true dip approximately 30 degrees
			Burrows

SITE 489 HOLE A CORE 17 CORED INTERVAL 169.5-179.0 m		CORE 18 CORED INTERVAL 179.0-183.0 m	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION
		FORAMINIFERS MAMMOFOSILS RADIOLARIANS DIATOMS MOLLUSCS	METERS
			GRAPHIC LITHOLOGY
			SAMPLES
			DRILLING DISTURBANCE
			SEMI-METERS
			LITHOLOGIC DESCRIPTION
LOWER MIOCENE	<i>Calocycletta virgins</i>		0.5 1.0 2
			VOID
			IRP FP CG
			TEXTURE: Sand 1 Silt 69 Clay 30
			COMPOSITION: Quartz 59 Feldspar 4 Mica 4 Heavy minerals TR Pyrite 3 Clay 30 Carbonate unsp. TR Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules TR Plant fragments TR
			ORGANIC CARBON AND CARBONATE % Organic Carbon 0.5 % CaCO ₃ 2
			SMEAR SLIDES Thin black horn. zonal laminations
			MUDDY SILT, very soft to firm, grayish olive green (SGY 3/2), with subrounded clasts, up to diameter of core barrel, of bioturbated MUDDY SILTSTONE, same color. Muddy silt becomes firmer and more indurated with depth. Below Section 2, 4 cm, some subhorizontal sandy strata, same color. Moderate to intense bioturbation.
			VOID
			Constant fractures, 16-19 degrees true dip
			Irregular fractures up to 10 cm, slickensides plunging 20-50 degrees.
			Thin dark mud laminations
			Thin dark mud laminations
			Thin dark mud laminations

SITE 489 HOLE A CORE 16 CORED INTERVAL 164.5-169.5 m		CORE 17 CORED INTERVAL 169.5-179.0 m	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION
		FORAMINIFERS MAMMOFOSILS RADIOLARIANS DIATOMS MOLLUSCS	METERS
			GRAPHIC LITHOLOGY
			SAMPLES
			DRILLING DISTURBANCE
			SEMI-METERS
			LITHOLOGIC DESCRIPTION
LOWER MIOCENE	<i>Calocycletta virgins</i> - NN 1		0.5 1.0 2
			VOID
			CG
			TEXTURE: Sand 2 Silt 58 Clay 38
			COMPOSITION: Quartz 47 Feldspar 3 Mica 3 Pyrite 2 Clay 40 Carbonate unsp. TR Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules TR
			ORGANIC CARBON AND CARBONATE % Organic Carbon 1.0 % CaCO ₃ 2
			SMEAR SLIDES Muddy siltstone 780 Muddy siltstone 2
			MUDDY SILTSTONE, grayish olive green (SGY 3/2), bioturbated, Core-Catcher siltier at base.
			VOID
			Constant fractures, 16-19 degrees true dip
			Irregular fractures up to 10 cm, slickensides plunging 20-50 degrees.
			Thin dark mud laminations
			Thin dark mud laminations
			Thin dark mud laminations



SITE 489 HOLE A CORE 22 CORED INTERVAL 207.5-217.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION	METERS	GRAPHIC LITHOLOGY	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION																																																								
		FORAMINIFERS	NANNOFOSSILS	RADICULARIANS	DIATOMS	MOLLUSCS																																																														
LOWER MIOCENE							1	0.5				<p>MUDDY SILTSTONE, grayish olive (10Y 4/2), soft, no internal structure, friable, almost shaly. Shale, bluish gray (5B 7/1). Section 3, 127-132 cm MUD, light blue-gray (5B 7/1). Sections 3 and 4, concentrations of dark, fine to coarse sand-sized material (glauconite) bioturbation.</p> <p>SMEAR SLIDES</p>  <p>Section 1 Fracture, apparent dip 30 degrees</p> <p>SMEAR SLIDES</p> <table border="1"> <tr><td>Siltstone</td><td>4-22</td><td>Muddy</td><td>5-60</td></tr> <tr><td>Muddy</td><td>(M)</td><td>(D)</td><td>(D)</td></tr> </table> <p>TEXTURE:</p> <table border="1"> <tr><td>Sand</td><td>40</td><td>3</td><td>2</td></tr> <tr><td>Silt</td><td>50</td><td>62</td><td>73</td></tr> <tr><td>Clay</td><td>10</td><td>25</td><td>25</td></tr> </table> <p>COMPOSITION:</p> <table border="1"> <tr><td>Quartz</td><td>61</td><td>83</td><td>62</td></tr> <tr><td>Feldspar</td><td>15</td><td>12</td><td>10</td></tr> <tr><td>Mica</td><td>5</td><td>2</td><td>4</td></tr> <tr><td>Heavy minerals</td><td>2</td><td>1</td><td>1</td></tr> <tr><td>Pyrite</td><td>2</td><td>1</td><td>1</td></tr> <tr><td>Clay</td><td>5</td><td>-</td><td>20</td></tr> <tr><td>Nannofossils</td><td>-</td><td>-</td><td>1</td></tr> <tr><td>Plant fragments</td><td>10</td><td>1</td><td>1</td></tr> </table> <p>ORGANIC CARBON AND CARBONATE</p> <table border="1"> <tr><td>% Organic Carbon</td><td>0.8</td></tr> <tr><td>% CaCO₃</td><td>2</td></tr> </table>	Siltstone	4-22	Muddy	5-60	Muddy	(M)	(D)	(D)	Sand	40	3	2	Silt	50	62	73	Clay	10	25	25	Quartz	61	83	62	Feldspar	15	12	10	Mica	5	2	4	Heavy minerals	2	1	1	Pyrite	2	1	1	Clay	5	-	20	Nannofossils	-	-	1	Plant fragments	10	1	1	% Organic Carbon	0.8	% CaCO ₃	2
		Siltstone	4-22	Muddy	5-60																																																															
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Pyrite	2	1	1																																																																	
Clay	5	-	20																																																																	
Nannofossils	-	-	1																																																																	
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SITE 489 HOLE A CORE 23 CORED INTERVAL 217.0-226.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION	METERS	GRAPHIC LITHOLOGY	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION																																																																				
		FORAMINIFERS	NANNOFOSSILS	RADICULARIANS	DIATOMS	MOLLUSCS																																																																										
LOWER MIOCENE	NN 1						1	0.5				<p>MUDDY SILT, grayish olive (10Y 4/2), soft, no internal structure, friable, almost shaly. Shale, bluish gray (5B 7/1). Section 3, 127-132 cm MUD, light blue-gray (5B 7/1). Sections 3 and 4, concentrations of dark, fine to coarse sand-sized material (glauconite) bioturbation.</p> <p>SMEAR SLIDES</p> <table border="1"> <tr><td>Muddy</td><td>3-80</td><td>Muddy</td><td>3-130</td><td>Muddy</td><td>4-60</td></tr> <tr><td>Muddy</td><td>(M)</td><td>(M)</td><td>(M)</td><td>(M)</td><td>(M)</td></tr> </table> <p>TEXTURE:</p> <table border="1"> <tr><td>Sand</td><td>30</td><td>-</td><td>2</td></tr> <tr><td>Silt</td><td>50</td><td>40</td><td>63</td></tr> <tr><td>Clay</td><td>20</td><td>60</td><td>35</td></tr> </table> <p>COMPOSITION:</p> <table border="1"> <tr><td>Quartz</td><td>55</td><td>41</td><td>58</td></tr> <tr><td>Feldspar</td><td>15</td><td>10</td><td>10</td></tr> <tr><td>Mica</td><td>4</td><td>2</td><td>3</td></tr> <tr><td>Heavy minerals</td><td>2</td><td>1</td><td>2</td></tr> <tr><td>Pyrite</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>Clay</td><td>15</td><td>45</td><td>25</td></tr> <tr><td>Glass</td><td>3</td><td>-</td><td>-</td></tr> <tr><td>Glauconite</td><td>3</td><td>-</td><td>-</td></tr> <tr><td>Nannofossils</td><td>1</td><td>TR</td><td>TR</td></tr> <tr><td>Plant fragments</td><td>1</td><td>TR</td><td>1</td></tr> </table> <p>ORGANIC CARBON AND CARBONATE</p> <table border="1"> <tr><td>% Organic Carbon</td><td>1.95</td></tr> <tr><td>% CaCO₃</td><td>4</td></tr> </table>	Muddy	3-80	Muddy	3-130	Muddy	4-60	Muddy	(M)	(M)	(M)	(M)	(M)	Sand	30	-	2	Silt	50	40	63	Clay	20	60	35	Quartz	55	41	58	Feldspar	15	10	10	Mica	4	2	3	Heavy minerals	2	1	2	Pyrite	1	1	1	Clay	15	45	25	Glass	3	-	-	Glauconite	3	-	-	Nannofossils	1	TR	TR	Plant fragments	1	TR	1	% Organic Carbon	1.95	% CaCO ₃	4
		Muddy	3-80	Muddy	3-130	Muddy	4-60																																																																									
		Muddy	(M)	(M)	(M)	(M)	(M)																																																																									
		Sand	30	-	2																																																																											
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Mica	4	2	3																																																																													
Heavy minerals	2	1	2																																																																													
Pyrite	1	1	1																																																																													
Clay	15	45	25																																																																													
Glass	3	-	-																																																																													
Glauconite	3	-	-																																																																													
Nannofossils	1	TR	TR																																																																													
Plant fragments	1	TR	1																																																																													
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SITE 489	HOLE A	CORE 25	CORED INTERVAL 236.0-345.5 m	LITHOLOGIC DESCRIPTION											
				TIME - ROCK	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION	METERS	GRAPHIC LITHOLOGY	DRAWING	SEDIMENTARY STRUCTURES
				LOWER MIOCENE	NN 1	FORAMINIFERS	DIATOMS	MOLLUSCS	1	0.5					
									2	1.0					
									3						
									4						
									5						
									6						
									CC						

LITHOLOGIC DESCRIPTION

MUDDY SILT, grayish olive (10Y 4/2), wett to firm struc-
tureless. Slight to moderate bioturbation.

SMEAR SLIDES

Thin, horizontal dark
drilling laminations
every 2-3 cm

TEXTURE:
Sand 2
Silt 73
Clay 25

COMPOSITION:
Quartz 60
Feldspar 8
Mica
Heavy minerals TR
Porph 3
Clay 25
Nannofossils TR
Sponge spicules TR
Plant fragments 1

GRAIN SIZE
Sand 2.70
Silt 6.2
Clay 70.5
23.3

ORGANIC CARBON AND CARBONATE
% Organic Carbon 0.9
% CaCO₃ 4

Minor irregular rips and
spurt of fine sand

Gradual color change
to dark greenish
gray (6GY 4/1)

Sediment becomes very firm.
Small wood fragments

SITE 489	HOLE A	CORE 24	CORED INTERVAL 226.5-236.0 m	LITHOLOGIC DESCRIPTION											
				TIME - ROCK	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION	METERS	GRAPHIC LITHOLOGY	DRAWING	SEDIMENTARY STRUCTURES
				LOWER MIOCENE	NN 1	FORAMINIFERS	DIATOMS	MOLLUSCS	1	0.5					
									2	1.0					
									3						
									4						
									5						
									6						
									RP CP						

LITHOLOGIC DESCRIPTION

MUDDY SILT, grayish olive green (6GY 3/2), and MUDDY
SILTSTONE, buff 8.5 cm, incipient fissile, prominent
dipole dipping 20 degrees true. Structureless otherwise.
Color becomes grayish olive (10Y 4/2) in Section 2.

SMEAR SLIDES

3-70
Muddy
Siltstone

TEXTURE:
Sand 1
Silt 79
Clay 20

COMPOSITION:
Quartz 60
Feldspar 10
Mica 3
Heavy minerals 1
Clay 15
Nannofossils TR
Plant fragments 1

ORGANIC CARBON AND CARBONATE
2-140
% Organic Carbon 0.9
% CaCO₃ 5

Fissile zone is
subhorizontal

Fissile zone dips
30 degrees true

Microfossil disjuncts mm-scale
partially oriented dip
of fault 70 degrees true.

SITE 489 HOLE A CORE 26 CORED INTERVAL 245.5-255.0 m		CORED INTERVAL		SECTION		FOSSIL CHARACTER		TIME - ROCK UNIT		LITHOLOGIC DESCRIPTION
BIOSTRATIGRAPHIC ZONE	FORMANIFERUS	NANNOFOSSILS	RADOLARIANS	DIATOMS	MOLLUSCS	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	
LOWER MIOCENE	NN 1					0.5		+		<p>MUDDY SILT, olive gray (SY 3/2), soft to firm. No internal features present except moderate bioturbation. At Section 2, 47-56 cm, MUDDY SILTSTONE. Section 3, firm to very firm. Section 4, smooth, pleural fractures common, subhorizontal to 58 degree true dips. At 4, 50-120 cm, increase then decrease in degree of lithification. Corresponding color changes to light olive gray (SY 6/2) and return to SY 3/2.</p>
						1.0				
						2				
						3				
						4				
5	CC									

SITE 489 HOLE A CORE 27 CORED INTERVAL 255.0-264.0 m		CORED INTERVAL		SECTION		FOSSIL CHARACTER		TIME - ROCK UNIT		LITHOLOGIC DESCRIPTION
BIOSTRATIGRAPHIC ZONE	FORMANIFERUS	NANNOFOSSILS	RADOLARIANS	DIATOMS	MOLLUSCS	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	
LOWER MIOCENE	NN 1					0.5				<p>MUDDY SILT, dark greenish gray (SCY 4/1), soft to very firm, moderate bioturbation. At Section 1, 110-150 cm, faint thin (1-2 mm) black (N2) stringing laminations, horizontal or sub-horizontal.</p>
						1.0				
						2				
						3				
						CC				

SITE 489 HOLE A CORE 28 CORED INTERVAL 264.0-273.0 m		CORED INTERVAL		SECTION		FOSSIL CHARACTER		TIME - ROCK UNIT		LITHOLOGIC DESCRIPTION
BIOSTRATIGRAPHIC ZONE	FORMANIFERUS	NANNOFOSSILS	RADOLARIANS	DIATOMS	MOLLUSCS	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	
LOWER MIOCENE	NN 1					0.5				<p>MUDDY SILT, grayish olive green (SCY 3/2), soft to firm. Slight to moderate bioturbation. Irregularly oriented straight fractures dipping 35-80 degrees true.</p>
						1.0				
						2				
						3				
						4				

SITE 489 HOLE A CORE 28 CORED INTERVAL 264.0-273.0 m		CORED INTERVAL		SECTION		FOSSIL CHARACTER		TIME - ROCK UNIT		LITHOLOGIC DESCRIPTION
BIOSTRATIGRAPHIC ZONE	FORMANIFERUS	NANNOFOSSILS	RADOLARIANS	DIATOMS	MOLLUSCS	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	
LOWER MIOCENE	NN 1					0.5				<p>Muddy siltstone, light olive gray (SY 5/2), winned. Burrowed limestone, olive green (SY 3/2). Burrows.</p>
						1.0				
						2				
						3				
						4				

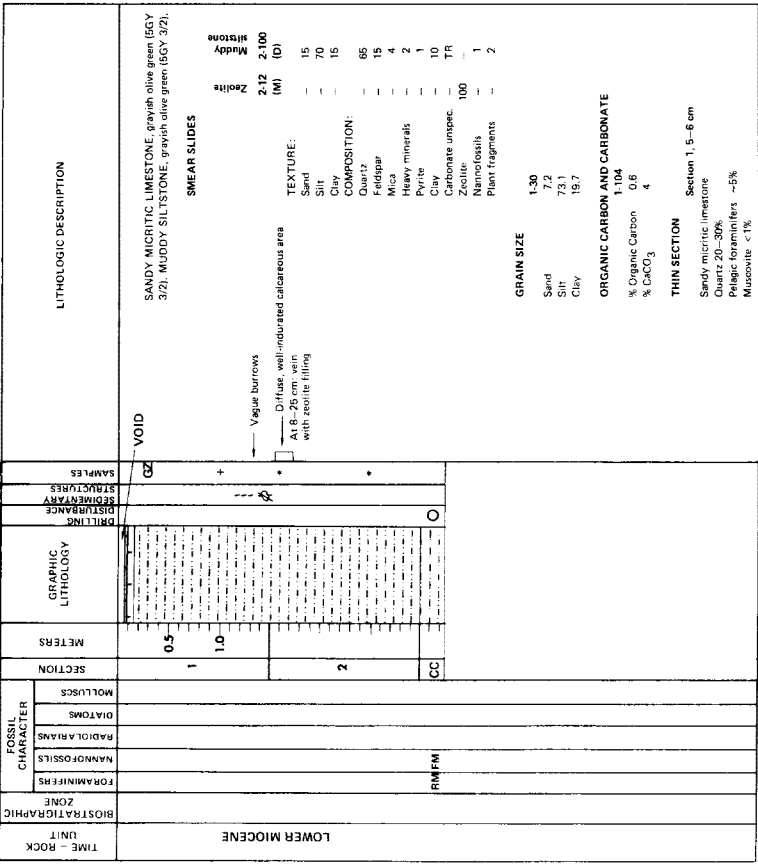
SITE 489 HOLE A CORE 30 CORED INTERVAL 282.0-291.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					METERS	SECTION	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	MOLLUSCS							
LOWER MIOCENE							0.5	1	VOID			<p>MUDDY SILT, dark greenish gray (SGY 411), soft, slightly sandy and fine, to medium-grained SANDSTONE, olive gray (SY 321), carbonate cement, with irregular dark, finer grained zones. Occasional shell fragments.</p> <p>In Section 5, zeolite filled and unfilled fractures, apparent dip 40-80 degrees.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Sand 20 7 Silt 50 73 Clay 30 20</p> <p>COMPOSITION: Quartz 55 64 Feldspar 3 5 Mica 2 2 Pyrite TR 2 Carbonate unsp. 2 2 Chondrites trace fossils Coral? fragment Borrows</p> <p>GRAIN SIZE: Sand 264 6-138 Silt 183 38-1 Clay 23.0 20.9</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 4.70 % CaCO₃ 6</p>	
							1.0	2	VOID				
								2	3	VOID			
								3	4	VOID			
								4	5	VOID			

SITE 489 HOLE A CORE 29 CORED INTERVAL 273.0-282.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					METERS	SECTION	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	MOLLUSCS							
LOWER MIOCENE	NN 1						0.5	1				<p>MUDDY SILT, dark greenish gray (SGY 411), soft at top of section, becoming firm with depth, very firm by middle of Section 2, slight to intense induration.</p> <p>In Section 2, smooth planar fractures, true dip 28-73 degrees. Sand fraction increases downward.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Sand 15 30 Silt 70 55 Clay 15 15</p> <p>COMPOSITION: Quartz 64 66 Feldspar 10 5 Mica 3 5 Heavy minerals 2 2 Pyrite 15 15 Clay 15 15 Carbonate unsp. 2 2 Chondrites trace fossils Coral? fragment Borrows</p> <p>GRAIN SIZE: Sand 264 6-138 Silt 183 38-1 Clay 23.0 20.9</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 0.9 % CaCO₃ 5</p>	
							1.0	2					
								2	3				
								3	4				
								4	5				
								5	6	VOID			

SITE 489 HOLE A CORE 31 CORED INTERVAL 291.0-300.0 m



SITE 489A, CORE 32, SECTION 1 and CORE CATCHER, 300.0-309.0 m

Macroscopic Description
 Drilling breccia - fragments of BIOTITE-MUSCOVITE-QUARTZ SCHIST up to 2x3 cm. In upper 50 cm, rubble enclosed in medium light gray (N3) MUD. Schist is greenish black (BG 2.1) to medium bluish gray (BG 5.1). Subrounded schist pebbles in Core-Catcher.

Thin Section Descriptions
 Core-Catcher: Biotite-Muscovite-Quartz Schist
 Biotite = common
 Muscovite = common

SITE 489A, CORE 33, SECTION 1, 309.0-318.0 m

Macroscopic Description
 BIOTITE-HORNBLende-QUARTZ SCHIST, with angular blocks of MUSCOVITE-CHLORITE BEARING QUARTZITE, Crenulation foliation, dark gray (N3).

Thin Section Descriptions
 Section 1, 26-28 cm: Biotite-Hornblende-Quartz Schist
 Biotite = common
 Hornblende = abundant
 Section 1, 40-42 cm: Muscovite-Chlorite-bearing Quartzite
 Chlorite = common
 Muscovite = few



SITE 489A, CORE 34, SECTION 1, 318.0-327.0 m

Macroscopic Description
 GARNET-MUSCOVITE-QUARTZ SCHIST, dark gray (N3). Crinoidal foliation, pyrite-bearing. Smaller siliceous fragments, probably same as Core 33 (muscovite-chlorite-bearing quartzite).

Thin Section Descriptions
 Section 1, 36-37 cm: Garnet-Muscovite-Quartz Schist
 Garnet = common
 Muscovite = abundant



Alteration	Shipboard Studies	Orientation	Graphic Representation	Piece Number	Alteration	Shipboard Studies	Orientation	Graphic Representation	Piece Number	Alteration	Shipboard Studies	Orientation	Graphic Representation	Piece Number	Alteration	Shipboard Studies	Orientation	Graphic Representation	Piece Number	Alteration	Shipboard Studies	Orientation	Graphic Representation	Piece Number

cm 0 50 100 150 CORE/SECTION

32/1 32, CC 33/1 34/1

SITE SUMMARY SHEET

SITE 490

Date occupied: 8 April 1979

Date departed: 13 April 1979

Time on hole: 115 hours

Position: latitude: 16°09.56'N

longitude: 99°03.39'W

Water depth (sea level): 1761 corrected meters, echo sounding

Water depth (rig floor): 1771 corrected meters, echo sounding

Bottom felt at: 1777 meters, drill pipe

Penetration: 588.5 meters

Number of cores: 64

Total length of cored section: 586.5 meters

Total core recovery: 341.4 meters

Percentage core recovery: 58%

Oldest Sediment Cored

Depth sub-bottom: 588.5 meters

Nature: Muddy siltstone

Age: Late Miocene

Basement

Depth sub-bottom: Not penetrated

Principal Results

Oldest sediments were probably deposited on the lower slope in a relatively narrow zone between the accretionary wedge and the lip of gneissic basement cored in Hole 489A. Subsequent uplift raised the section to its present position, with the section passing through the CCD about 5 m.y. Normal faulting, evidenced by fractures and slickensides, elevated the block to the east in middle Pliocene. This initiated upslope erosion and deposition of reworked microfossils formed in the middle Pliocene and younger parts of the 490 section.

Gas-releasing ice inclusions and frozen sediments could represent gas hydrates which caused freezing due to cooling of expanding gas during recovery of the core.

SITE 490	HOLE	CORE 2	CORED INTERVAL	9.0-18.5 m	LITHOLOGIC DESCRIPTION	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER	DIATOMS	RADIOLARIANS	NANNOFOSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT
					VOID 8 x 2 cm limestone concentration, bored, same color as mud. 50-62 cm - diffuse area of moderate olive brown (SY 4/4) slightly calcareous mud		0.5	1							
					MUDDY SILT, grayish olive green (SGY 3/2) moderately firm, apparently structureless. Occasional white sponge spicule concentrations.		1.0	2							
					SMEAR SLIDES 15 mm x 4 mm wood fragment										
					TEXTURE: Sand 1-130 Silt 2 3 Clay 10 42 88 55										
					COMPOSITION: Quartz 5 40 Feldspar 2 8 Mica 2 2 Heavy minerals 1 1 Pyrite 1 1 Glauconite 88 45 Carb. unsp. 2 1 Foraminif. TR TR Nannofossils TR TR Diatoms TR TR Sponge spicules TR 1 Silicoflagellates TR TR										
					ORGANIC CARBON AND CARBONATE % Organic Carbon 4.106 % CaCO ₃ 2.0 0										

SITE 490	HOLE	CORE 1	CORED INTERVAL	0.0-7.0 m	LITHOLOGIC DESCRIPTION	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER	DIATOMS	RADIOLARIANS	NANNOFOSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT
					MUDDY SILT, grayish olive (10Y 4/2) to grayish olive green (6.5Y 3/2), soft to firm, structureless with sand-sized clasts. Dark gray to black, dark greenish gray (6GY 4/1) to greenish black (6GY 2/1).		0.5	1							
					Prominent glauconite concentrations between 80 and 85 cm		1.0	2							
					SMEAR SLIDES Mud (glauconitic) 1-30 Muddy silt (glauconitic) 2-55 Claystones (sandy) 3-100 Mud (glauconitic) 4-30										
					TEXTURE: Sand 12 44 Silt 40 53 57 44 Clay 55 35 100 36 55										
					COMPOSITION: Quartz 33 46 TR 45 42 Feldspar 15 10 - 10 7 Mica 3 2 - 2 3 Heavy minerals 1 2 1 1 Clay 45 30 97 30 45 Glauconite 2 8 - 3 TR Carb. unsp. - - - 5 1 Foraminif. TR TR - TR TR Nannofossils TR - - - TR TR Diatoms TR TR - TR TR Silicoflagellates TR TR - TR TR Plant fragments present in lower half of section										
					GRAIN SIZE Sand 3-83 Silt 2-9 Clay 57.6 39.5										
					2 x 1.5 cm indurated moderate olive brown calcareous claystone concretion Diffuse concentration of glauconite 2 x 1.5 indurated moderate olive brown calcareous claystone concretion More diffuse, soft to indurated, but crumbly, indurated, moderate olive brown calcareous claystone concretion. Slightly calcareous areas present in lower half of section										
					8 x 2 cm limestone fragment, same color as mud. Note: fragment oriented towards right side (Tropi).										
					VOID										

SITE 490	HOLE	CORE 4	CORED INTERVAL	28.0--37.5 m		LITHOLOGIC DESCRIPTION
				TIME - ROCK UNIT	QUATERNARY	
FOSSIL CHARACTER		DIATOMS				
RADIOLARIANS						
NANNOFOSILS						
FORAMINIFERS						
SECTION						
METERS						
GRAPHIC LITHOLOGY						
SECTIONS						
DISTURBANCES						
SAMPLES						
LITHOLOGIC DESCRIPTION		MUDDY SILT, olive gray (SY 3/2) to grayish olive (10Y 4/2) soft to moderately firm, apparently structureless. Occasional white sponge spicule concentrations in Sections 4 and 5. SMEAR SLIDES Muddy Silt 5-80 TEXTURE: (0) Sand 1 Silt 54 Clay 45 COMPOSITION: 41 Quartz 15 Feldspar 3 Heavy minerals 1 Pyrite 1 Clay 35 Carb. unsp. 1 Diatoms 1 Sponge spicules 1 Siliocollelatae TR Plant fragments 1 ORGANIC CARBON AND CARBONATE 4-130 % Organic Carbon 2.2 % CaCO ₃ 4 Moderately firm Gas expansion cracks 10Y 4/2 Vague 2 mm thick lamination (SY 3/2) 3-4 mm olive gray (SY 3/2) lamination				

SITE 490	HOLE	CORE 3	CORED INTERVAL	18.5--28.0 m		LITHOLOGIC DESCRIPTION
				TIME - ROCK UNIT	QUATERNARY	
FOSSIL CHARACTER		DIATOMS				
RADIOLARIANS						
NANNOFOSILS						
FORAMINIFERS						
SECTION						
METERS						
GRAPHIC LITHOLOGY						
SECTIONS						
SAMPLES						
LITHOLOGIC DESCRIPTION		MUDDY SILT, olive gray (SY 3/2) to grayish olive (10Y 4/2), moderately firm, structureless. Occasional minute white sponge spicule concentrations in Sections 2, 3, 6 and 7. SMEAR SLIDES Mud 2-60 6-117 Sand (M) Glaucinite Silt 38 30 Clay 60 10 COMPOSITION: 64 Quartz 8 Feldspar 4 Heavy minerals 3 Pyrite 1 Clay 7 Carbonate 12 Carb. unsp. 1 Foraminifera TR Nannofossils TR Radiolarian TR Diatoms 3 TR Sponge spicules TR Siliocollelatae TR Plant fragments 1 Slightly darker unit... probably than grayish olive Glaucinitic sand unit, top and base diffuse, greenish black, (SG 2/1) Glaucinite concentration, local VOID				

SITE 490 HOLE CORE 5 CORED INTERVAL 37.5-47.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
QUATERNARY	NN 21/NN 20					1	0.5				<p>MUDDY SILT, olive gray (5Y 3/2) to grayish olive (10Y 4/2), soft to moderately firm, structureless with minor glauconite SAND, greenish black (5G 2/1). Gas expansion cracks common.</p> <p>SMEAR SLIDES</p> <p>Muddy silt Mud</p> <p>TEXTURE: Sand 2-60 5-50 Silt 1 1 Clay 54 44 COMPOSITION: Quartz 45 55 Feldspar 43 34 Mica 5 2 Heavy minerals 2 2 Phosphate 2 TR Clay 45 55 Glauconite - TR Carb. unspc. TR 2 Foraminifera TR TR Nannofossils TR TR Radiolarians TR TR Diatoms 1 1 Sponge spicules 2 2 Plant fragments TR - 2</p> <p>GRAIN SIZE Sand 1.70 Silt 1.8 Clay 43.2</p>	
						2						
						3						
						4						
						5						
						6						
						7						
				CC								

VOID
Graded bed of medium-to fine-grained glauconitic sand,
irregular (loaded?) soursed base.

SITE 490 HOLE CORE 6 CORED INTERVAL 47.0-56.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
QUATERNARY	NN 19					1	0.5				<p>MUDDY SILT, olive gray (5Y 3/2) homogeneous. Gas expansion cracks common. Scattered sponge remains. Core-Catcher artificially compacted (extruded from Core-Catcher originally).</p> <p>SMEAR SLIDES</p> <p>Mud</p> <p>TEXTURE: Sand 3-100 Silt 1 Clay 44 COMPOSITION: Quartz 33 Feldspar 2 Mica 2 Heavy minerals TR Phosphate TR Clay 55 Glauconite TR Carb. unspc. 1 Foraminifera TR TR Nannofossils TR TR Radiolarians TR Diatoms 3 Sponge spicules 2 Plant fragments 2</p>	
						2						
						3						
						4						
						5						
				CC								

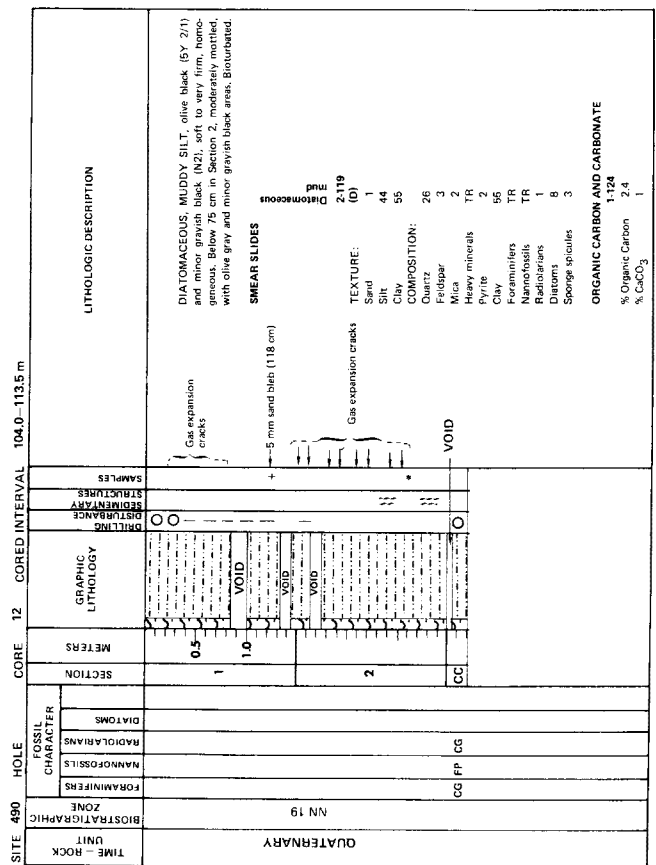
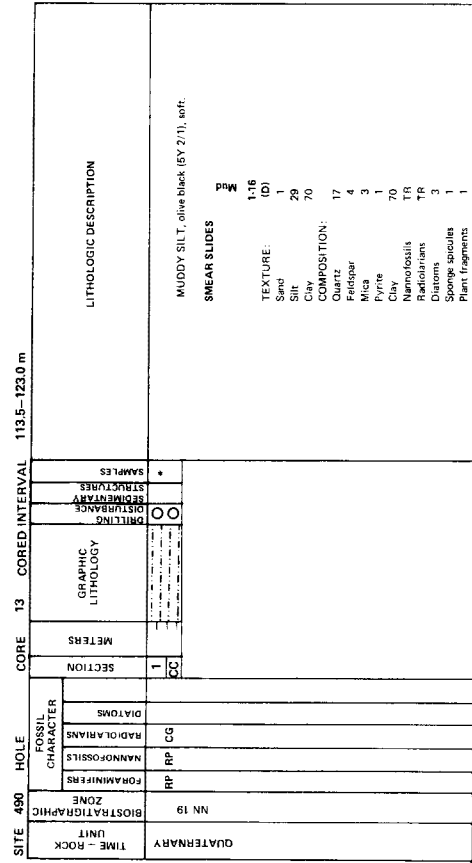
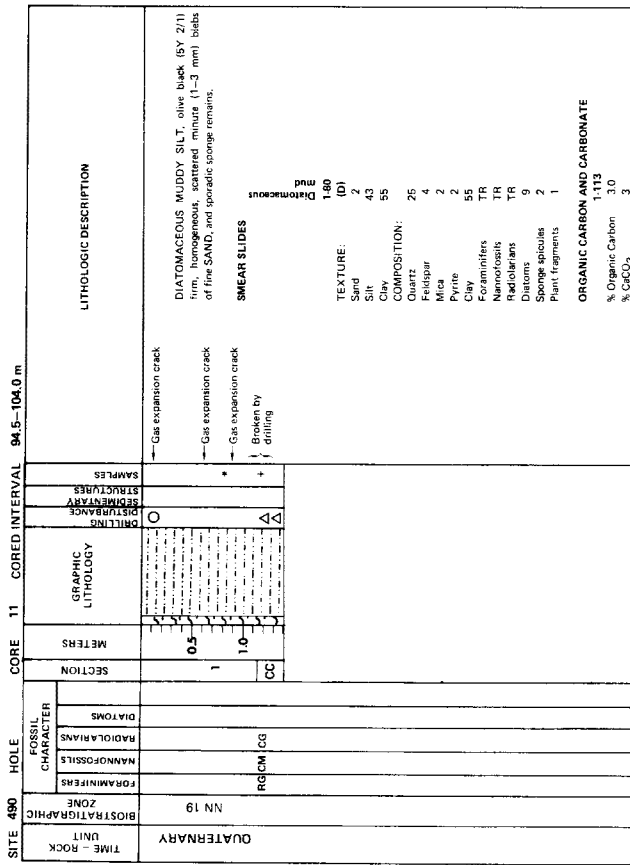
VOID
80-90 cm - concentration of sponge remains
110-150 cm - scattered sponge remains

SITE 490 TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	CORE 7					CORED INTERVAL 56.5-66.0 m	LITHOLOGIC DESCRIPTION
		FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY		
		DIATOMS	RADIOLARIANS					
QUATERNARY	NN 19			1	0.5		<p>MUDDY SILT, olive gray (SY 3/2) soft to moderate firm, homogeneous, scattered sponges, spicules, plant fragments, small (2-5 mm) diffuse sand shales. Gas expansion cracks common.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 2110 3/71 Sand Very fine sand Silt 100 Clay 30</p> <p>COMPOSITION: 17 80 Quartz 2 20 Feldspar 3 Mica 1 Pyrite 1 Clay 10 Sponges TR Foraminifers TR Nannofossils TR Diatoms 3 Sponge spicules 2 Plant fragments 2</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 2.5 % CaCO₃ 0</p>	
				2				
				3				
				4				
				CC				

SITE 490 TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	CORE 8					CORED INTERVAL 66.0-75.5 m	LITHOLOGIC DESCRIPTION
		FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY		
		DIATOMS	RADIOLARIANS					
QUATERNARY	NN 19			1	0.5		<p>MUDDY SILT, olive gray (SY 3/2) soft to firm, homogeneous, infrequent sponge remains. Firmer towards base of core.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 3550 Sand 1 Silt 29 Clay 70</p> <p>COMPOSITION: 21 Quartz 1 Feldspar 1 Mica 1 Pyrite 1 Clay 70 Sponges TR Foraminifers TR Nannofossils TR Diatoms 2 Sponge spicules 2 Plant fragments 2</p> <p>2 cm lamination of lighter grayish olive, 10Y 4/2 mud</p>	
				2				
				3				
				4				
				CC				

SITE 480	HOLE	CORE 10	CORED INTERVAL	85.0-94.5 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
							FORAMINIFERS	NANNOFOSSILS	RADICULARIANS				
					QUATERNARY	NN 19						DIATOMACEOUS MUDDY SILT, olive gray (SY 3/2) to olive black (SY 2/1), firm, homogeneous, scattered minute (1-2 mm) blebs of fine-grained sand.	
										1	0.5	SMEAR SLIDES Diatomaceous mud 3-60 (0)	
										2	1.0	TEXTURE: Sand 2 Silt 43 Clay 55 COMPOSITION: Quartz 26 Feldspar 2 Pyrite 2 Clay 55 Nannofossils TR Radiolarians TR Diatoms 9 Sponge spicules 3 Plant fragments 1	
										3			
										4			
										5			
										CC			

SITE 480	HOLE	CORE 9	CORED INTERVAL	75.5-85.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
							FORAMINIFERS	NANNOFOSSILS	RADICULARIANS				
					QUATERNARY	NN 19						MUDDY SILT, olive gray (SY 3/2), soft, homogeneous, very small (2-3 mm) blebs of fine sand and sponge spicules. Firmer towards base.	
										1	0.5	SMEAR SLIDES 2-60 (0) Sand 2 Silt 40 Clay 60 COMPOSITION: Quartz 26 Feldspar 2 Mica TR Pyrite TR Clay 60 Diatoms 6 Sponge spicules 2 Plant fragments 1	
										2	1.0	TEXTURE: Sand 2 Silt 40 Clay 60 COMPOSITION: Quartz 26 Feldspar 2 Mica TR Pyrite TR Clay 60 Diatoms 6 Sponge spicules 2 Plant fragments 1	
										CC			



SITE 490 HOLE CORE 15 CORED INTERVAL 132.5-142.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			1	0.5	VOID			<p>Site 490, Core 14, 123.0-132.5 m. NO RECOVERY.</p> <p>MUDDY SILT, olive gray (SY 3/2) soft, structureless to MUDDY SILTSTONE, olive gray (SY 3/2) structureless (below 85 cm in Section 1).</p> <p>Section 4: Slightly darker mottling effect in this section due to induration. Several low areas, up to several cm in length, are present. These areas are composed of 4/2) calcareous - 2/3) precipitant concretions (40, 70, 84, and 100 cm). Millimeter-scale fine sand blebs between 100 and 115 cm. Very occasional minute white sponge specks.</p> <p>Section 5: 118 cm: Pale calcareous area, as in Section 4. 120 cm: 5 x 3 x 1 cm wood fragment. 122-125 cm: 3 cm irregular ICE fragment (canned).</p>
			2		VOID			<p>SMEAR SLIDES</p> <p>1.25 Muddy silt (sandy)</p> <p>1.45 Muddy silt</p> <p>7 20</p> <p>53 60</p> <p>40 20</p> <p>COMPOSITION:</p> <p>Quartz 57 73</p> <p>Feldspar 7 7</p> <p>Mica 2 2</p> <p>Heavy minerals 1 TR</p> <p>Pyrite 1 1</p> <p>Clay 30 15</p> <p>Glaucite TR</p> <p>Calc. unsp. TR</p> <p>Hydrocarbons TR</p> <p>Diatoms TR</p> <p>Sponge spicules TR</p> <p>Silicoflagellates 1 TR</p> <p>Plant fragments 1 TR</p>
			3		VOID			<p>TEXTURE:</p> <p>Sand 1.25 1.45</p> <p>Silt 7 20</p> <p>Clay 53 60</p> <p>COMPOSITION:</p> <p>Quartz 40 20</p> <p>Feldspar 57 73</p> <p>Mica 7 7</p> <p>Heavy minerals 2 2</p> <p>Pyrite 1 TR</p> <p>Clay 1 1</p> <p>Glaucite TR</p> <p>Calc. unsp. TR</p> <p>Hydrocarbons TR</p> <p>Diatoms TR</p> <p>Sponge spicules TR</p> <p>Silicoflagellates TR</p> <p>Plant fragments TR</p>
			4		VOID			<p>2 cm indurated calcareous concretion, without sharp margins</p>
			5		VOID			<p>Gas expansion cracks</p> <p>mm lamination of very fine sand</p> <p>Gas expansion cracks</p> <p>Gas expansion cracks</p>
			6		VOID			VOID
			CC					

SITE 490 HOLE CORE 16 CORED INTERVAL 142.0-151.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
								<p>0-28 cm soft, muddy silt</p> <p>MUDDY SILTSTONE, grayish olive (1B/ 4/2) to olive gray (BY 3/2), fine sand blebs and VITRIFIC SILT.</p> <p>Inset (Section 3)</p> <p>mm fine sand bed, 10-30' accurate dip (5 cm) in accurate dip apparent, caused by drilling!</p> <p>Minute fine sand bleb (15 cm)</p> <p>Diffuse calcareous discoloration, approaching light in color (30-35 cm)</p> <p>Apparent dip -10' (40-75 cm)</p> <p>SMEAR SLIDES</p> <p>Diffuse calcareous discoloration approaching light brown (BY 5/6) in color (125-127 cm)</p> <p>Minute fine sand bleb (15 cm)</p> <p>Gas expansion cracks</p>
			1	0.5				<p>TEXTURE</p> <p>Sand 3.22 3.58 3.73</p> <p>Silt 69 88 82</p> <p>Clay 30 15 10</p> <p>COMPOSITION:</p> <p>Quartz 61 68 64</p> <p>Feldspar 7 7 5</p> <p>Mica 3 7 3</p> <p>Heavy minerals 1 1 1</p> <p>Pyrite 1 1 1</p> <p>Clay 20 10 5</p> <p>Glaucite 5 10 15</p> <p>Calc. unsp. TR</p> <p>Hydrocarbons 0.5 TR</p> <p>Diatoms 0.5 TR</p> <p>Sponge spicules TR</p> <p>Plant fragments 1 TR</p>
			CC					<p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 2.0</p> <p>% CaCO₃ 2</p>

SITE 490 HOLE CORE 17 CORED INTERVAL 151.5--161.0 m

TIME UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION METERS	GRAPHIC LITHOLOGY	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORMANIFERS	NANNOFOSSILS	RADOLAMANS	DIATOMS	OTHER					
UPPER PLIOCENE	NN 18						VOID			VOID	MUD, grayish olive green (SG 3/2) to greenish black (SG 2/1) and MUDDY SILTSTONE, greenish black (SG 2/1), soft, structureless. SMEAR SLIDES Muddy siltstone (siltaceous) 1-79 3-133 5-20 (ID) (D) (ID) Muddy (siltaceous) 20 52 56 Siltaceous mud 60 46 40 TEXTURE: Sand 30 34 43 Silt 5 7 7 Clay 2 3 2 COMPOSITION: Quartz 30 34 43 Feldspar 5 7 7 Mica 2 3 2 Heavy minerals 1 TR TR Pyrite 1 2 2 Clay 56 45 40 Gypsum 1 TR Calcite 1 TR Caus. unsp. - TR Silic. unsp. 1 TR Radiolarians TR TR Diatoms 2 5 3 Sponge spicules 3 1 3 Siliocolligates - TR

SITE 490 HOLE CORE 18 CORED INTERVAL 161.0--170.5 m

TIME UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION METERS	GRAPHIC LITHOLOGY	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORMANIFERS	NANNOFOSSILS	RADOLAMANS	DIATOMS	OTHER					
UPPER PLIOCENE	NN 18						VOID				MUDDY SILTSTONE, grayish olive green (SG 2/2). Occasional minute white spongy specks. Splitting of this indurated specimen with wire cutter (instead of saw, to avoid losing possible calcareous material) is characterized by small conchoidal, basalt laminae and shaly. Occasional small nodules, basalt laminae and shaly are evident in places. Fine SAND laminations and ASH are rare. In Section 4, 100--136 cm parallel laminated ash unit, predominantly greenish gray (SG 4/1) with laminations of medium gray (NB), medium light gray (NB) and light gray (N7) to very light gray (NB). When first opened, frozen. Fine sand/silt in total 4 cm, very fine sand/silt over remainder. SMEAR SLIDES Muddy siltstone (siltaceous) 4-43 4-93 4-108 4-134 (ID) (M) (M) (M) Muddy (siltaceous) 10 3 35 85 Silt 70 67 65 10 Clay 20 30 5 5 COMPOSITION Quartz 70 48 10 10 Feldspar 7 7 7 7 Mica 3 4 TR TR Heavy minerals 1 1 TR TR Pyrite 1 2 1 2 Clay 15 25 2 5 Glass 85 80 Underterm. silic. - TR Foraminifers - TR Nannofossils - 2 Radiolarians TR TR Sponge spicules 1 4 TR 1 Siliocolligates - TR Plant fragments TR ORGANIC CARBON AND CARBONATE 3-10 % Organic Carbon 2-1 % CaCO ₃ 3 mms. fine sand and lamination VOID Siltaceous mud (SG 2/1) Thermistor probe readings: Minus 1.8°C - 120 cm Minus 1.0°C - 110 cm Minus 0.8°C - 127 cm mmscale efflux (fine sand bleed) (25-30 cm) Fine sand bleed (mmscale), apparent dip 12 (75 cm) Fine sand blebs VOID Ash areas in Core-Catcher rubble

SITE 490 HOLE CORE 19 CORED INTERVAL 170.5-180.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS						
UPPER Pliocene	NN 18				1	0.5	VOID			MUDDY SILT TO MUDDY SILTSTONE, greenish black (5G 2/1), structureless.
					2	1.0	VOID			SMEAR SLIDES 1-134 Muddy siltstone (siltstone)
					CC					TEXTURE: (DI) (DI) Sand 4 Silt 58 Clay 40 COMPOSITION: Quartz 44 Feldspar 10 Mica 3 Heavy minerals 1 Pyrite 2 Clay 35 Nannofossils TR Radiolarians 7 Sponge spicules 2


SITE 490 HOLE CORE 20 CORED INTERVAL 180.0-188.5 m


TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS						
UPPER Pliocene	NN 18				1	0.5	VOID			Muddy siltstone, grayish olive green contact with apparent dip 2°
					2	1.0	VOID			In Section 4, at 19 and 20 cm, two thin, dark clay laminae occur - the lower one displaces a bioturbated zone. The dark laminae are soft and pass into a marginal silty layer of similar dark clay - evidence that these laminae are produced in the drilling process.
					3					SMEAR SLIDES 2-114 4.7 4.10 4.36 4.89 Muddy silt (siltstone) (siltstone) (siltstone) (siltstone)
					4					TEXTURE: (DI) (MI) (MI) (DI) Sand 2 30 - - 1 Silt 63 55 - - 74 Clay 36 15 - - 25 COMPOSITION: Quartz 49 47 - - 53 Feldspar 0 1 - - 3 Mica 2 1 - - 3 Heavy minerals TR 15 - - TR Pyrite 2 6 - - 100 1 Clay 30 - - 20 - - 25 Glauconite - - 100 - - Zeolite - - - - Carb unsp. - - - - Nannofossils TR - - - - Radiolarians TR - - - - Diatoms 5 TR - - 6 Sponge spicules 2 TR - - 2 Silicoflagellates - - - - TR
					5					ORGANIC CARBON AND CARBONATE 5-120 % Organic Carbon 2.0 % CaCO ₃ 1
					6					Grayish silt (10Y 4/2) more silty than normal with indistinct contacts
					7					Dark greenish gray color band. One bed of glauconite sand with pyrite (15 cm)
					CC					

SITE 490 HOLE CORE 20 CORED INTERVAL 180.0-188.5 m

SITE 480	HOLE	CORE 24	CORED INTERVAL	218.0-227.5 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE STRUCTURES	LITHOLOGIC DESCRIPTION
							DIATOMS	RADICULARIANS	NANNOFOSSILS	FORAMINIFERS					
					UPPER PLEOCENE	NN 18					1	0.5		<p>6 cm foraminiferal muddy silt (13-22 cm)</p> <p>Several plant fragments up to 3 cm</p> <p>Thin (1-3 mm) silt intervals</p> <p>SMEAR SLIDES</p> <p>1-18 386 Muddy silt Foraminiferal stretions stretions stretions</p> <p>TEXTURE: Sand 25 Silt 36 Clay 40</p> <p>COMPOSITION: Quartz 50 Feldspar 8 Mica 15 Heavy minerals 5 Pyrite 2 Clay 13 Calc. unsp. 2 Foraminif. 2 Nannofossils 1 Radiolarians 1 Diatoms 1 Sponge spicules 1 Silicoflagellates 1 Plant fragments 1</p> <p>ORGANIC CARBON AND CARBONATE 3-112 % Organic Carbon 1.6 % CaCO₃ 0</p>	
										2	1.0			VOID	
										3				VOID	
										4				VOID	
										5				VOID	
										CC				VOID	

SITE 480	HOLE	CORE 23	CORED INTERVAL	208.5-218.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE STRUCTURES	LITHOLOGIC DESCRIPTION
							DIATOMS	RADICULARIANS	NANNOFOSSILS	FORAMINIFERS					
					UPPER PLEOCENE	NN 18					1	0.5			<p>SILICEOUS MUDDY SILTSTONE, olive gray (SY 3/2); slight bioturbation, infrequent drilling blebs, and infrequent pyrite nodules (1-2 mm). Drilling blebs abundant in Section 6.</p> <p>SMEAR SLIDES</p> <p>2-73 3-44 Muddy silt Stretions stretions stretions</p> <p>TEXTURE: Sand 40 Silt 35 Clay 25</p> <p>COMPOSITION: Quartz 35 Feldspar 10 Mica 15 Heavy minerals 2 Pyrite 1 Clay 2 Calc. unsp. 2 Foraminif. 2 Nannofossils 1 Radiolarians 1 Diatoms 6 Sponge spicules 1 Silicoflagellates 1 Plant fragments 1</p>
										2	1.0			<p>Gas expansion cracks</p> <p>Fine-medium sand beds, 1-2 mm, @ apparent dip (138-143 cm)</p> <p>Gas expansion cracks</p> <p>3.5 cm foraminifer muddy sand</p> <p>VOID</p>	
										3				<p>Gas expansion crack</p> <p>Gas expansion cracks</p> <p>VOID</p>	
										4				<p>Small black flecks - organic matter?</p> <p>Gas expansion crack</p> <p>VOID</p>	
										5				<p>Gas expansion crack</p> <p>VOID</p>	
										6				<p>Several gas expansion cracks</p> <p>2 cm VOID</p> <p>Gas expansion crack</p> <p>VOID</p>	
										7				<p>Numerous horizontal breaks in the siltstone, due to extrusion from core barrel. No drilling deformation within individual pieces.</p> <p>1.5 x 1.5 x 0.5 cm white ash fragment</p>	

SITE 480 HOLE CORE 26 CORED INTERVAL 237.0-246.5 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION																																																			
										DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS																																															
		UPPER PLEISTOCENE		1	0.5	VOID			<p>MUD, olive gray (SY 3/2) soft and MUDDY SILTSTONE. Slightly bitubular, with occasional thin 1-2 mm bit invertebrate. Rare to common drilling biscuit.</p> <p>Section 1, 95-150 cm: interval less indurated, firm muddy silt, otherwise as above.</p> <p>Irregular organization</p> <p>Gas expansion cracks</p>  <p>Vague internal structure with irregularly distributed discrete desiccational events</p> <p>SMEAR SLIDES</p> <table border="1"> <tr><td>1-14</td><td>3-25</td><td>4-1</td></tr> <tr><td>Muddy siltstone</td><td>Muddy siltstone</td><td>Muddy sand</td></tr> </table> <p>TEXTURE: (M) (DI) (MI)</p> <table border="1"> <tr><td>Sand</td><td>30</td><td>TR</td><td>35</td><td>4-1</td></tr> <tr><td>Silt</td><td>45</td><td>55</td><td>25</td><td></td></tr> <tr><td>Clay</td><td>25</td><td>45</td><td>40</td><td></td></tr> </table> <p>COMPOSITION:</p> <table border="1"> <tr><td>Quartz</td><td>50</td><td>60</td><td>58</td></tr> <tr><td>Feldspar</td><td>10</td><td>5</td><td>10</td></tr> <tr><td>Mica</td><td>5</td><td>4</td><td>5</td></tr> <tr><td>Pyrite</td><td>3</td><td>1</td><td>3</td></tr> <tr><td>Clay</td><td>1</td><td>20</td><td>10</td></tr> </table> <p>GRAIN SIZE</p> <table border="1"> <tr><td>Sand</td><td>2-100</td></tr> <tr><td>Silt</td><td>12.4</td></tr> <tr><td>Clay</td><td>51.5</td></tr> </table> <p>ORGANIC CARBON AND CARBONATE</p> <table border="1"> <tr><td>% Organic Carbon</td><td>1.4</td></tr> <tr><td>% CaCO₃</td><td>1</td></tr> </table>	1-14	3-25	4-1	Muddy siltstone	Muddy siltstone	Muddy sand	Sand	30	TR	35	4-1	Silt	45	55	25		Clay	25	45	40		Quartz	50	60	58	Feldspar	10	5	10	Mica	5	4	5	Pyrite	3	1	3	Clay	1	20	10	Sand	2-100	Silt	12.4	Clay	51.5	% Organic Carbon	1.4	% CaCO ₃	1
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SITE 480 HOLE CORE 25 CORED INTERVAL 227.5-237.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION																																																			
										DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS																																															
		UPPER PLEISTOCENE		1	0.5	VOID			<p>MUDDY SILTSTONE, olive gray (SY 3/2), locally silty. Slightly bitubular, with occasional thin 1-2 mm bit invertebrate. Rare to common drilling biscuit.</p> <p>Section 1, 95-150 cm: interval less indurated, firm muddy silt, otherwise as above.</p> <p>Irregular organization</p> <p>Gas expansion cracks</p>  <p>Vague internal structure with irregularly distributed discrete desiccational events</p> <p>SMEAR SLIDES</p> <table border="1"> <tr><td>1-14</td><td>3-25</td><td>4-1</td></tr> <tr><td>Muddy siltstone</td><td>Muddy siltstone</td><td>Muddy sand</td></tr> </table> <p>TEXTURE: (M) (DI) (MI)</p> <table border="1"> <tr><td>Sand</td><td>30</td><td>TR</td><td>35</td><td>4-1</td></tr> <tr><td>Silt</td><td>45</td><td>55</td><td>25</td><td></td></tr> <tr><td>Clay</td><td>25</td><td>45</td><td>40</td><td></td></tr> </table> <p>COMPOSITION:</p> <table border="1"> <tr><td>Quartz</td><td>50</td><td>60</td><td>58</td></tr> <tr><td>Feldspar</td><td>10</td><td>5</td><td>10</td></tr> <tr><td>Mica</td><td>5</td><td>4</td><td>5</td></tr> <tr><td>Pyrite</td><td>3</td><td>1</td><td>3</td></tr> <tr><td>Clay</td><td>1</td><td>20</td><td>10</td></tr> </table> <p>GRAIN SIZE</p> <table border="1"> <tr><td>Sand</td><td>2-100</td></tr> <tr><td>Silt</td><td>12.4</td></tr> <tr><td>Clay</td><td>51.5</td></tr> </table> <p>ORGANIC CARBON AND CARBONATE</p> <table border="1"> <tr><td>% Organic Carbon</td><td>1.4</td></tr> <tr><td>% CaCO₃</td><td>1</td></tr> </table>	1-14	3-25	4-1	Muddy siltstone	Muddy siltstone	Muddy sand	Sand	30	TR	35	4-1	Silt	45	55	25		Clay	25	45	40		Quartz	50	60	58	Feldspar	10	5	10	Mica	5	4	5	Pyrite	3	1	3	Clay	1	20	10	Sand	2-100	Silt	12.4	Clay	51.5	% Organic Carbon	1.4	% CaCO ₃	1
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SITE 480 HOLE	CORE 27	CORED INTERVAL	246.5-256.0 m	LITHOLOGIC DESCRIPTION	SAMPLES	DRILLING DISTANCE	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER	DIATOMS	MANNIFERALS	RADIOLARIANS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	PLIOCENE	NN 17	BP	BP	FG	
																		CC	CG	FG	
				MUDDY SILTSTONE, olive gray (SY 3/2) drilling biscuit near base, small amount of pyrite. Section 2 slightly mottled.				0.5	1												
				SMEAR SLIDES 2-66 Muddy Siltstone				1.0	2												
				TEXTURE: Sand Silt Clay																	
				COMPOSITION: Feldspar Mica Heavy minerals Pyrite Clay Glauconite Radiolarians Diatoms Sponge spicules Plant fragments																	
				7 Reducing spot - 7 cm maximum dimension, angular, well indurated																	
				Pyrite common 60-85 cm																	
				1 mm fine sand																	
				Gas expansion cracks																	

SITE 480 HOLE	CORE 28	CORED INTERVAL	256.0-265.5 m	LITHOLOGIC DESCRIPTION	SAMPLES	DRILLING DISTANCE	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER	DIATOMS	MANNIFERALS	RADIOLARIANS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	PLIOCENE	NN 17	BP	BP	FG	
																		CC	CG	FG	
				MUDDY SILTSTONE, olive gray (SY 3/2) thin top to 5 mm silt layers, mostly graded, with apparent dips 0-9°. Drilling biscuit present.				0.5	1												
				SMEAR SLIDES				1.0	2												
				TEXTURE: Sand Silt Clay																	
				COMPOSITION: Feldspar Mica Heavy minerals Pyrite Clay Glauconite Radiolarians Diatoms Sponge spicules Plant fragments																	
				2 cm graded calcareous muddy silt (65 cm)																	
				Diffuse area of calcareous muddy silt																	
				5 x 3 cm (75 cm)																	
				Plan fragments bed (112-116 cm)																	
				2-3 cm silt beds																	
				4 cm silt bed																	
				4 silt beds, lower three graded																	
				Very fine sand lamination, 11° apparent dip																	
				3 mm silt, 11° apparent dip																	
				12° apparent dip																	
				Carbonaceous matter																	
				VOID																	
				Calcareous pods (fine silt size calcite)																	
				Irregularly concentrated glauconite, local calcareous pods (one at 70 cm is 2 x 1 cm)																	

SITE 480	HOLE	CORE 29		CORED INTERVAL	265.5-275.0 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	1	0.5	<p>Muddy silt - grayish olive (10Y 4/2) with minor dusky yellow green (5GY 5/2) Limestone. Fractures common in Section 1 and drilling biscuits occur in all sections. Bio-turbation confined to discrete areas. Glauconite grains abundant in Sections 1 and 2.</p> <p>Section 2, 60 cm: Vague mottling - probably bioturbation, 80 cm: Concentration of diffuse pale olive areas.</p> <p>Section 4: Fragments limestone, with internal brecciated texture and common, vertically-oriented pale microvoids.</p> <p>SMEAR SLIDES</p> <p>Glauconite 2-32 3-17 4-30 Muddy siltstone 10 10 10 Muddy sand 40 1 60 TEXTURE: Sand (M) (D) (M) Silt 40 1 60 Clay 50 79 30 COMPOSITION: Quartz 96 67 70 Feldspar 10 10 10 Mica 2 1 3 Heavy minerals 3 2 2 Perlite 3 2 2 Clay 10 20 10 Glauconite 15 - 1 Radiolarians - TR TR Diatoms - TR TR Sponge spicules 1 1 2</p>
			NANNOFOSSILS	2	1.0	
			RADIOLARIANS	3		
			DIATOMS	4		
			CC			

SITE 480	HOLE	CORE 30		CORED INTERVAL	275.0-284.5 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	1	0.5	<p>Muddy silt and muddy siltstone (grayish olive 10Y 4/2) structureless with Limestone, greenish gray (5GY 6/1 wet) with irregular paler carbonate veins, light bluish gray (5B 7/1). Drilling biscuits visible in Section 3.</p> <p>SMEAR SLIDES</p> <p>Muddy siltstone 3-16 Muddy silt (D) 20 Sand 60 Silt 20 Clay 20 COMPOSITION: Quartz 65 Feldspar 10 Mica 2 Heavy minerals 2 Perlite 2 Clay 15 Glauconite TR Radiolarians TR Diatoms 2 Sponge spicules 2 Siliicollagelates TR</p> <p>GRAIN SIZE Sand 1-50 150 Silt 46.2 40.9 Sh 28.7 40.3 Clay 15.1 18.8</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 2.80 % CaCO₃ 1.7 0</p>
			NANNOFOSSILS	2		
			RADIOLARIANS	3		
			DIATOMS	CC		

SITE 480	HOLE	CORE 31		CORED INTERVAL	284.5-294.0 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	1	0.5	<p>Muddy siltstone (silt where intensely deformed by drilling), grayish olive (10Y 4/2) structureless.</p>
			NANNOFOSSILS	2		
			RADIOLARIANS	CC		
			DIATOMS			

SITE 480	HOLE	CORE 30		CORED INTERVAL	275.0-284.5 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	1	0.5	<p>Muddy siltstone (silt where intensely deformed by drilling), grayish olive (10Y 4/2) structureless.</p>
			NANNOFOSSILS	2		
			RADIOLARIANS	CC		
			DIATOMS			

SITE 480 HOLE	CORE 32	CORED INTERVAL	294.0-299.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DISTRIBUTION	SAMPLES	LITHOLOGIC DESCRIPTION
						DIATOMS	RADICLARIANS	NANNOFOSSILS						
									1	0.5	VOID			MUDDY SILT, grayish olive (10Y 4/2), moderately hard, structureless. SMEAR SLIDES Muddy siltstone (sandy) 1-25 5-55 6-55 Muddy siltstone (sandy) 15 10 30 30 Muddy siltstone (sandy) 20 20 50 TEXTURE: (D) (M) Sand 15 10 30 30 Silt 65 70 30 30 Clay 20 20 50 COMPOSITION: Quartz 60 67 40 Feldspar 10 8 8 Mica 2 1 2 Heavy minerals 2 1 2 Pyrite - TR - 2 Glauconite - TR - 2 Carb. unsp. TR TR 1 Foraminifers TR TR 1 Radiolarians TR TR 1 Diatoms TR TR 1 Spongiae spicules 2 2 2 Silicoflagellates - TR -
									2	1.0	VOID			
									3		VOID			
									4		VOID			
									5		VOID			
									6		VOID			
									7		VOID			
									CC					

SITE 480 HOLE	CORE 33	CORED INTERVAL	299.0-303.5 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DISTRIBUTION	SAMPLES	LITHOLOGIC DESCRIPTION
						DIATOMS	RADICLARIANS	NANNOFOSSILS						
									1	0.5	VOID			MUDDY SILT (to 55 cm) and MUDDY SILTSTONE, grayish olive (10Y 4/2) to olive gray (5Y 3/2), structureless. SMEAR SLIDES Muddy siltstone (sandy) 1-81 Muddy siltstone (ID) 25 Sand 25 Silt 60 Clay 15 COMPOSITION: Quartz 65 Feldspar 10 Mica 3 Heavy minerals 2 Pyrite 2 Clay 15 Carb. unsp. 2 Foraminifers TR Radiolarians TR Diatoms TR Spongiae spicules 1 ORGANIC CARBON AND CARBONATE % Organic Carbon 1.0 % CaCO ₃ 0
									CC					

SITE 480 HOLE	CORE 34	CORED INTERVAL	303.5-313.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DISTRIBUTION	SAMPLES	LITHOLOGIC DESCRIPTION
						DIATOMS	RADICLARIANS	NANNOFOSSILS						
									1	0.5	VOID			MUDDY SILTSTONE, olive gray (5Y 3/2), with drilling lamination and minor fine- to medium-SAND, medium dark gray (M4), soupy and SANDY MUD (drilling breccia?), olive black (5Y 7/1). Section 2, more mottled (olive gray and darker olive gray). SMEAR SLIDES Trans-medium sand 1-2 Muddy siltstone (ID) 75 4 60 35 Silt 20 66 30 45 Clay 5 30 10 20 COMPOSITION: Quartz 80 54 68 70 Feldspar 8 8 8 7 Mica 2 2 3 2 Heavy minerals 2 1 2 1 Pyrite 2 1 2 1 Clay 5 25 10 15 Glauconite - TR - Carb. unsp. 1 2 1 2 Foraminifers - TR - Radiolarians TR TR TR Diatoms TR 2 1 1 Spongiae spicules 1 3 4 1
									2		VOID			
									3		VOID			
									4		VOID			
									CC					

SITE 490 HOLE CORE 36 CORED INTERVAL 322.5-332.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			FORAMINIFERS	NANNOFOSILS	RADIOLARIANS	DIATOMS						
						0.5						<p>PLIOCENE?</p> <p>MUDDY SILTSTONE, greenish black (EG 2/1). Open fractures variously oriented in Sections 1 and 2. Fractures generally observed in Section 3. Drilling biscuits become common.</p> <p>SMEAR SLIDES</p> <p>Muddy 4.65 (D)</p> <p>TEXTURE: Sed 15 Silt 65 Clay 20</p> <p>COMPOSITION: Quartz 71 Feldspar 8 Mica 3 Some burrow fillings more sily than matrix</p> <p>Heavy minerals 1 Clay 15 Foraminifers TR Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p> <p>--- Olive black (5Y 2/1) clay lump</p>
						1						
						2						
						3						
						4						
						5						
						6						
						CC						

SITE 490 HOLE CORE 35 CORED INTERVAL 313.0-322.5 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			FORAMINIFERS	NANNOFOSILS	RADIOLARIANS	DIATOMS						
						0.5						<p>SILTSTONE, olive gray (5Y 3/2); moderate boturbation. Section 1: fractured throughout, with soupy material between the blocks. Rare drilling biscuits in Sections 3, 4, and 5.</p> <p>SMEAR SLIDES</p> <p>Muddy 3.82 Siltstone (D) 5-51 70 62 10 35</p> <p>TEXTURE: Sed 70 Silt 62 Clay 35</p> <p>COMPOSITION: Quartz 74 Feldspar 8 Mica 7 Heavy minerals 3 Clay 2 Foraminifers 1 Carb. unsp. TR Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 2</p> <p>ORGANIC CARBON AND CARBONATE 2.17 % Organic Carbon 1.4 % CaCO₃ 0</p> <p>4 cm fine sand beds at 0-4 and 18-20 cm</p> <p>Two sand-silt-silty mud graded units, 38-30 and 63-50 cm</p>
						1						
						2						
						3						
						4						
						5						
						CC						

SITE 490	HOLE	CORE 37	CORED INTERVAL	332.0-341.5 m	LITHOLOGIC DESCRIPTION	SAMPLES	DRILLING DISTANCE	REINFORCING STRUCTURES	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER				TIME - ROCK	PLIOCENE?	
												BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANOFOSSILS	RADIOLARIANS			DIATOMS
					MUDDY SILTSTONE, grayish olive green (SGY 3/2); slightly mottled, highly bioturbated, drilling biscuits common with minor limestone, light olive gray (SY 5/2) to grayish olive (DY 4/2); structureless.					0.5	1							
										1.0	2							
											3							
											4							
											5							
											6							
											7							
											CC							

LITHOLOGIC DESCRIPTION

MUDDY SILTSTONE, grayish olive green (SGY 3/2); slightly mottled, highly bioturbated, drilling biscuits common with minor limestone, light olive gray (SY 5/2) to grayish olive (DY 4/2); structureless.

SMEAR SLIDES

(D) 15
 (D) 20
 Muddy Siltstone

TEXTURE:
 Sand 15
 Silt 65
 Clay 20

COMPOSITION:
 Quartz 68
 Feldspar 3
 Heavy minerals 2
 Pyrite 2
 Clay 15

Glauconite TR
 Nanofossils TR
 Radiolarians TR
 Diatoms TR
 Sponge spicules TR
 Sclerogoniatids TR

ORGANIC CARBON AND CARBONATE
 % Organic Carbon 1.40
 % CaCO₃ 1.1
 0

SITE 490	HOLE	CORE 38	CORED INTERVAL	341.5-351.0 m	LITHOLOGIC DESCRIPTION	SAMPLES	DRILLING DISTANCE	REINFORCING STRUCTURES	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER				TIME - ROCK	PLIOCENE?	
												BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANOFOSSILS	RADIOLARIANS			DIATOMS
					MUDDY SILTSTONE, olive gray (SY 3/2). Drilling laminations common to abundant. Moderately bioturbated.					0.5	1							
					Section 4: minor fractures, with 21-72° apparent dip. Apparent conjugate set.					1.0	2							
					Section 5: minor fractures, with 17-69° apparent dip. Apparent conjugate set.						3							
					Section 6: minor fractures, 15-75° apparent dip.						4							
											5							
											6							
											CC							

LITHOLOGIC DESCRIPTION

MUDDY SILTSTONE, olive gray (SY 3/2). Drilling laminations common to abundant. Moderately bioturbated.

Section 4: minor fractures, with 21-72° apparent dip. Apparent conjugate set.

Section 5: minor fractures, with 17-69° apparent dip. Apparent conjugate set.

Section 6: minor fractures, 15-75° apparent dip.

SMEAR SLIDES

(D) 10
 (D) 30
 (D) 60
 (D) 65
 (D) 70
 (D) 72
 (D) 75
 Muddy Siltstone

TEXTURE:
 Sand 10
 Silt 60
 Clay 30

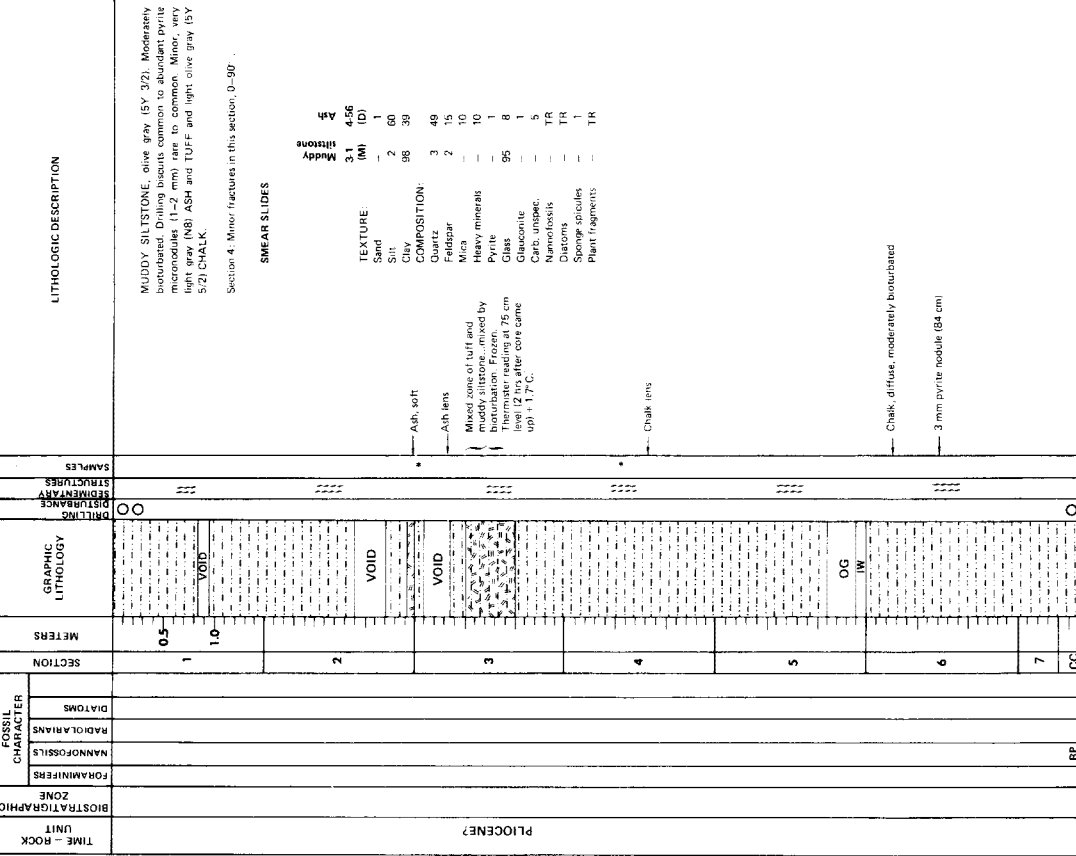
COMPOSITION:
 Quartz 65
 Feldspar 10
 Heavy minerals 12
 Pyrite 2
 Clay 10

Glauconite TR
 Glims TR
 Foraminifers TR
 Carb. unsp. TR
 Nanofossils TR
 Radiolarians TR
 Spongespicules TR
 Plant fragments TR

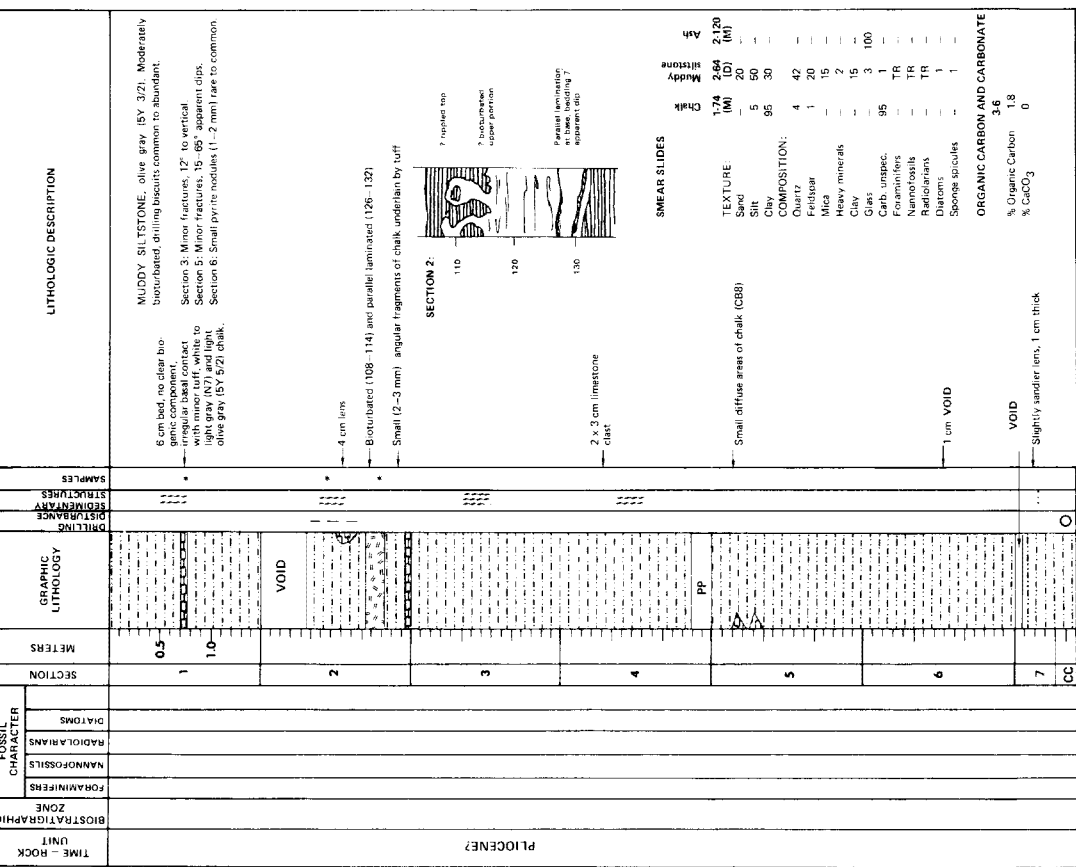
Small area of light olive gray (SY 5/2) calcareous clay
 Rare to common pyrite micronodules in this section.

Healed fracture, smooth, apparently mud-filled, apparent dip 69°

SITE 490 HOLE CORE 39 CORED INTERVAL 351.0-360.5 m



SITE 490 HOLE CORE 40 CORED INTERVAL 360.5-370.0 m



SITE 480 HOLE		CORE 41		CORED INTERVAL 370.0-379.5 m		LITHOLOGIC DESCRIPTION		
TIME - ROCK UNIT	Pliocene?							
BIOSTRATIGRAPHIC ZONE								
FORAMINIFERS								
NANNOFOSSILS								
RADOLARIANS								
DIATOMS								
FOSSIL CHARACTER								
SECTION	1						0.5	
METERS								
GRAPHIC LITHOLOGY	VOID							
OBTURANCE								
SEDIMENTARY STRUCTURES								
SAMPLES								
LITHOLOGIC DESCRIPTION								
<p>MUDDY SILTSTONE, olive gray (SY 3/2). Moderately bedded, drilling biscuits throughout, in places separated.</p> <p>SMEAR SLIDES 188 Muddy Siltstone</p> <p>TEXTURE: Silt 8 Silt 50 Clay 42</p> <p>COMPOSITION: Quartz 49 Feldspar 15 Mica 10 Heavy minerals 2 Pyrite 2 Clay 10 Glauc. 7</p> <p>Glauc. 1 Carb. unsp. 1 Nannofossils TR Radiolarians TR Diatoms 1 Sponge spicules 2</p>								

SITE 480 HOLE		CORE 42		CORED INTERVAL 379.5-389.0 m		LITHOLOGIC DESCRIPTION		
TIME - ROCK UNIT	Pliocene?							
BIOSTRATIGRAPHIC ZONE								
FORAMINIFERS								
NANNOFOSSILS								
RADOLARIANS								
DIATOMS								
FOSSIL CHARACTER								
SECTION	1						0.5	
METERS								
GRAPHIC LITHOLOGY	VOID							
OBTURANCE								
SEDIMENTARY STRUCTURES								
SAMPLES								
LITHOLOGIC DESCRIPTION								
<p>MUDDY SILTSTONE, olive gray (SY 3/2), slightly bedded, drilling biscuits throughout, in places separated.</p> <p>SMEAR SLIDES 282 Muddy Siltstone</p> <p>TEXTURE: Silt 10 Silt 60 Clay 30</p> <p>COMPOSITION: Quartz 55 Feldspar 15 Mica 15 Heavy minerals 1 Pyrite 2 Clay 5 Glauc. 5</p> <p>Glauc. 1 Carb. unsp. 1 Nannofossils TR Radiolarians TR Diatoms 1 Sponge spicules 1</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 4.3 % CaCO₃ 0</p>								

SITE 480 HOLE CORE 43 CORED INTERVAL 389.0 - 398.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		DIATOMS	RADIOLARIANS	NANNOFOSSILS						
Pliocene?					1	0.5				<p>Muddy siltstone, olive gray (BY 3/2), highly bioturbated. Drilling biscuits common to abundant in some fractures in Section 2 with 2 main sets apparent dip ~ 10° and 80°.</p> <p>Soft (muddy silt)</p>
					2	1.0				
					3					<p>SMEAR SLIDES</p> <p>2-103 Muddy siltstone</p> <p>TEXTURE: Sand 7 Silt 73 Clay 20</p> <p>COMPOSITION: Quartz 66 Feldspar 8 Mica 2 Heavy minerals 1 Pyrite 2 Clay 20 Carb. unspic. TR Radiolarians TR Diatoms TR Sponge spicules 1</p> <p>ORGANIC CARBON AND CARBONATE CC-16 3-86 % Organic Carbon 1.8 % CaCO₃ 0</p>
					CC					

SITE 480 HOLE CORE 44 CORED INTERVAL 396.5 - 408.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		DIATOMS	RADIOLARIANS	NANNOFOSSILS						
Pliocene					1	0.5				<p>Muddy siltstone, olive gray (BY 3/2), intensely bioturbated. Very highly fractured. Most planes sub-horizontal in Section 1. Section 1, ~30-60 cm. Brecciated unit, possibly primary breccia, but not cemented. In Section 2 the fractures are steeply dipping faults as well as sub-horizontal planes. Occasional thin beds defined by concentrations of clay in the matrix. ESR brecciated unit. Some siltstone on faults; in two cases showing dip-slip (normal) motion.</p>
					2	1.0				
					3					<p>SMEAR SLIDES</p> <p>2-38 Muddy siltstone</p> <p>TEXTURE: Sand 8 Silt 62 Clay 30</p> <p>COMPOSITION: Quartz 61 Feldspar 10 Mica 2 Heavy minerals 1 Pyrite 2 Clay 20 Zeolitic TR Carb. unspic. TR Radiolarians TR Diatoms TR Sponge spicules 3</p> <p>ORGANIC CARBON AND CARBONATE CC-16 CC-16 % Organic Carbon 1.3 % CaCO₃ 0</p>
					CC					

SITE 480 HOLE CORE 47 CORED INTERVAL 422.5-427.0 m

TIME - ROCK UNIT	Pliocene	
BIOSTRATIGRAPHIC ZONE		
FOSSIL CHARACTER		
DIATOMS		
RADOLIARIANS		
NANNOFOSSILS	CM RG	
FORAMINIFERS		
SECTION	CC	
METERS	0.5	
GRAPHIC LITHOLOGY		
SAMPLES	DRILLING DISTANCE: 0.5, 1.0, 2.0 STAINING: * SECTION: 1, 2	
LITHOLOGIC DESCRIPTION	<p>MUDDY SILTSTONE, olive gray (5Y 3/2), very well indurated, slightly cherty, contains very calcareous, light gray, siliceous nodules, very calcareous, (5-7) true dip, siderosidets predominantly indicate dip slip motion.</p> <p>SMEAR SLIDES</p> <p>Muddy siltstone (sandy) 1:60 Silt (D) 30 Sand 20 Clay 60 Quartz 70 Feldspar 7 Mica 2 Heavy minerals 3 Pyrite 1 Clay 15 Foraminifera TR Nannofossils TR Radiolarians TR Diatoms TR Spongiae spicules 2</p> <p>Fractures dip 5-50' (true) here</p>	

SITE 490 HOLE CORE 48 CORED INTERVAL 427.0-436.5 m

TIME - ROCK UNIT	Pliocene	
BIOSTRATIGRAPHIC ZONE	Spongaster pentas	
FOSSIL CHARACTER		
DIATOMS		
RADOLIARIANS		
NANNOFOSSILS	FP FM	
FORAMINIFERS		
SECTION	CC	
METERS	0.5	
GRAPHIC LITHOLOGY		
SAMPLES	DRILLING DISTANCE: 0.5, 1.0, 2.0 STAINING: * SECTION: 1, 2	
LITHOLOGIC DESCRIPTION	<p>MUDDY SILTSTONE, olive gray (5Y 3/2) moderately bioturbated, very fractured. Below 30 cm the rock is broken into discrete blocks, ~10 cm long possibly along pre-existing fracture surfaces.</p> <p>SMEAR SLIDES</p> <p>Muddy siltstone 1:83 Muddy siltstone (sandy) 1:96 Sand 10 Silt (D) 60 Clay 75 Quartz 30 Feldspar 15 Mica 10 Heavy minerals 9 Pyrite 2 Clay 2 Carb. unsp. 3 Nannofossils 2 Radiolarians TR Diatoms TR Spongiae spicules TR</p> <p>Fractures dip 5-50' (true) here</p> <p>Drilling breccia matrix not visible</p> <p>File sand</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>1:148 % Organic Carbon 1.5 % CaCO₃ 0</p>	

SITE 480 HOLE CORE 45 CORED INTERVAL 408.0-417.5 m

TIME - ROCK UNIT	Pliocene	
BIOSTRATIGRAPHIC ZONE		
FOSSIL CHARACTER		
DIATOMS		
RADOLIARIANS		
NANNOFOSSILS	RF FM	
FORAMINIFERS		
SECTION	CC	
METERS	0.5	
GRAPHIC LITHOLOGY		
SAMPLES	DRILLING DISTANCE: 0.5, 1.0, 2.0 STAINING: * SECTION: 1, 2	
LITHOLOGIC DESCRIPTION	<p>Loose sediment cuttings of pebblesized muddy siltstone at the base, medium SAND above. Pebbles of muddy siltstone up to 3 cm in Core-Catcher.</p> <p>SMEAR SLIDES</p> <p>Muddy siltstone (sandy) 1:60 Silt (D) 30 Sand 30 Clay 50 Quartz 80 Feldspar 67 Mica 10 Heavy minerals 10 Pyrite 3 Clay 1 Foraminifera 1 Nannofossils 2 Radiolarians 5 Diatoms TR Spongiae spicules TR</p>	

SITE 490 HOLE CORE 46 CORED INTERVAL 417.5-422.5 m

TIME - ROCK UNIT	Pliocene	
BIOSTRATIGRAPHIC ZONE		
FOSSIL CHARACTER		
DIATOMS		
RADOLIARIANS		
NANNOFOSSILS	RF	
FORAMINIFERS		
SECTION	CC	
METERS	0.5	
GRAPHIC LITHOLOGY		
SAMPLES	DRILLING DISTANCE: 0.5, 1.0, 2.0 STAINING: * SECTION: 1, 2	
LITHOLOGIC DESCRIPTION	<p>MUDDY SILTSTONE, olive gray (5Y 3/2), up to 5 cm across in a soft matrix of similar material - possibly paralyzed by churning.</p> <p>SMEAR SLIDES</p> <p>Muddy siltstone (sandy) 1:100 Silt (D) 35 Sand 40 Clay 25 Quartz 60 Feldspar 8 Mica 4 Heavy minerals 2 Pyrite 2 Clay 2 Foraminifera 1 Nannofossils 1 Radiolarians TR Diatoms TR Spongiae spicules 2</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>1:20 % Organic Carbon 1.1 % CaCO₃ 0</p>	

SITE 480 HOLE	CORE 48	CORED INTERVAL	436.5-446.0 m	FOSSIL CHARACTER	SECTION			METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SAMPLING STRUCTURES	LITHOLOGIC DESCRIPTION
					DIATOMS	RADIOLARIANS	NANNOFOSSILS					
					SECTION 1		0.5					<p>MUDDY SILTSTONE, olive gray (SY 3/2), moderate blockiness, some free sand burrow fillings. Occasional, irregularly shaped, rounded, to 0.1 mm, brachiopod shells. Fractures, variously oriented, some with slickensides.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
					SECTION 2		1.0					<p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							1.0					<p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							0.5					<p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							0.5					<p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							1.0					<p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							0.5					<p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							1.0					<p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>

SITE 490 HOLE	CORE 50	CORED INTERVAL	446.0-455.5 m	FOSSIL CHARACTER	SECTION			METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SAMPLING STRUCTURES	LITHOLOGIC DESCRIPTION
					DIATOMS	RADIOLARIANS	NANNOFOSSILS					
					SECTION 1		0.5					<p>MUDDY SILTSTONE, olive gray (SY 3/2), moderately bioturbated. No obvious bedding or slickensides. Mostly drilling breccia, some detached blocks.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
					SECTION 2		1.0					<p>MUDDY SILTSTONE, olive gray (SY 3/2), moderately bioturbated. No obvious bedding or slickensides. Mostly drilling breccia, some detached blocks.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							1.0					<p>MUDDY SILTSTONE, olive gray (SY 3/2), moderately bioturbated. No obvious bedding or slickensides. Mostly drilling breccia, some detached blocks.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							0.5					<p>MUDDY SILTSTONE, olive gray (SY 3/2), moderately bioturbated. No obvious bedding or slickensides. Mostly drilling breccia, some detached blocks.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							1.0					<p>MUDDY SILTSTONE, olive gray (SY 3/2), moderately bioturbated. No obvious bedding or slickensides. Mostly drilling breccia, some detached blocks.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							0.5					<p>MUDDY SILTSTONE, olive gray (SY 3/2), moderately bioturbated. No obvious bedding or slickensides. Mostly drilling breccia, some detached blocks.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
							1.0					<p>MUDDY SILTSTONE, olive gray (SY 3/2), moderately bioturbated. No obvious bedding or slickensides. Mostly drilling breccia, some detached blocks.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 170 Muddy Sand 206 Silt 30 Clay 45 Feldspar 15 Quartz 20 Heavy minerals 68 Mica 8 Pyrite 2 Zircon 2 Glass 15 Zeolite 15 Calcite 1 Foraminifera 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>

SITE 490 HOLE CORE 55 CORED INTERVAL 493.5-503.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLER	LITHOLOGIC DESCRIPTION
				1	0.5	VOID			MUDDY SILTSTONE, olive gray (SY 3/2) intensely bioturbated. Fractured into discrete 10-25 cm blocks. Section 1 fractures dip 9-31° (true dip). Section 2 fractures dip 5-55° (true). Section 3 fractures 5-59° (true). Section 4 fractures 12-30° (true). Core-Catcher fractures 10-18° (true). SMEAR SLIDES Muddy ID 368 Sand 10 Silt 5 Clay 25 COMPOSITION: Quartz 67 Feldspar 8 Mica 6 Heavy minerals 2 Pyrite 2 Clay 10 Glauconite 1 Glauconite TR Carb. unsp. 1 Nannofossils TR Diatoms TR Sponge spicules 3
				2	1.0	VOID			
				3		VOID			
				4		VOID			
				CC		VOID			80-120 cm intensely fractured, with healed fracture zones. Primary tectonic breccia

SITE 490 HOLE CORE 53 CORED INTERVAL 474.5-484.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLER	LITHOLOGIC DESCRIPTION
				1	0.5	VOID			MUDDY SILTSTONE, olive gray (SY 3/2) moderately bioturbated. Discrete indurated blocks are separated by soft matrix of the same material. Drilling biscuits. SMEAR SLIDES Muddy ID 180 Sand 2 Silt 73 Clay 25 COMPOSITION: Quartz 50 Feldspar 15 Mica 2 Pyrite 3 Clay 25 Carb. unsp. 2 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 3
				2	1.0	VOID			
				3		VOID			
				4		VOID			

SITE 490 HOLE CORE 54 CORED INTERVAL 484.0-493.5 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLER	LITHOLOGIC DESCRIPTION
				1	0.5	VOID			MUDDY SILTSTONE, olive gray (SY 3/2) highly bioturbated. Fractured into discrete 10-25 cm blocks. Bedding with true dip to 38°. Moderate bioturbation. SMEAR SLIDES Muddy ID 152 Sand 20 Silt 46 Clay 35 COMPOSITION: Quartz 50 Feldspar 15 Mica 12 Heavy minerals 2 Pyrite 2 Clay 10 Glauconite 2 Carb. unsp. TR Nannofossils TR Radiolarians TR Diatoms 1 Sponge spicules 2 Plant fragments 1
				2	1.0	VOID			
				3		VOID			
				4		VOID			
				CC		VOID			ORGANIC CARBON AND CARBONATE 159 % Organic Carbon: 1.5 % CaCO ₃ : 0

SITE 490 HOLE CORE 57 CORED INTERVAL 512.5-522.0 m	TIME - ROCK UNIT	MIOCENE?	BIOSTRATIGRAPHIC ZONE		FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
			CORRECTION										
								1	0.5				Muddy siltstone, olive gray (SY 3/2), well indurated, sporadic drilling biscuit developments, intensely botulobated. Minor light olive gray (SY 3/2) chalk.
								2	1.0				<p>Six laminations in 150 cm</p> <p>Eight non-drilling fractures in 150 cm (3 with slickensides) Bedding, 28° true dip</p> <p>One fracture in 150 cm (with dip-slip slickensides)</p> <p>Chalk, intensely indurated</p> <p>Six fractures in 150 cm (no slickensides)</p> <p>Bedding, apparent dip 40°</p>
								CC					

SITE 490 HOLE CORE 56 CORED INTERVAL 503.0-512.5 m	TIME - ROCK UNIT	MIOCENE?	BIOSTRATIGRAPHIC ZONE		FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
			CORRECTION										
								1	0.5				<p>Botulobated chalk</p> <p>Muddy siltstone, olive gray (SY 3/2), intensely botulobated with one light olive gray (SY 5/2) chalk layer. Well indurated.</p> <p>Section 1: 9 fractures in this section (8-32° true dip), some with slickensides, mostly indicating bedding, dip-slip motion. Flattened and concentrated burrows, 25° true dip</p>
								2	1.0				<p>Nine fractures in 150 cm, 18-51° true dip some with slickensides, some not</p> <p>Drilling biscuits common below</p> <p>Two fractures in 150 cm</p> <p>Five fractures in 150 cm, 18-51° true dip some with slickensides</p> <p>No fractures in Section 5 and 6</p>
								CC					

SITE	480 HOLE	CORE	58	CORED INTERVAL	531.5-541.0 m	LITHOLOGIC DESCRIPTION	SAMPLES	DISTURBANCE	DRILLING	GRAINIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER				TIME - ROCK	MIOCENE?
													BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADICLARIANS		
						38 cm: bedding, 37° dip 170 cm: bedding, 36° dip					0.5 1.0	1						
						MUDDY SILTSTONE, olive gray (5Y 3/2), moderate bioturbation, drilling bisulca common. Fossils fractures, all assembly along bedding defined by narrow carbonate neck.						2						
						SMEAR SLIDES Muddy 1.30 3.37 Middly Ash 100						3						
						TEXTURE: Sand Clay Clay COMPOSITION: Quartz Calcite Mica Heavy minerals Clay Glauc Carb. unspac. Sponge spicules						4						
						52 cm: fault, 62° dip, 10° azimuth, slickensides pitch 34-40°, east, footwall facing 270°, pitch 34° to 27°.						5						
						64 cm: fault, 63° dip, 348° azimuth, slickensides pitch 34-30° (from notches in footwall facing 270°, pitch 48° to E, suggesting normal movement with right lateral components)						CC						
						35 cm: fault, 56° dip, 68-71° azimuth, slickensides pitch 89° NE												

SITE	480 HOLE	CORE	58	CORED INTERVAL	522.0-531.5 m	LITHOLOGIC DESCRIPTION	SAMPLES	DISTURBANCE	DRILLING	GRAINIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER				TIME - ROCK	MIOCENE?
													BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADICLARIANS		
						10 cm: bedding, 42° azimuth 270° 12 cm: fault 53° azimuth 234° 24 cm: (in working half) 3 cm x 3 mm ² woody fragment					0.5 1.0	1						
						MUDDY SILTSTONE, olive gray (5Y 3/2), moderate bioturbation, drilling bisulca common.						2						
						ORGANIC CARBON AND CARBONATE % Organic Carbon 1.5 % CaCO ₃ 3.57 0						3						
						Seven fractures (2 along bedding, 5 along fault) with slickensides 44 cm: fault, 38° dip, azimuth 215° 48 cm: fault, 38° dip, azimuth 215°						4						
						Four or five fractures with slickensides 51 cm: fault, 27° dip, 173 azimuth 214° 55 cm: fault, 46° dip, 180 azimuth 208°						5						
						2 cm: fault, 85° dip, 240 azimuth, slickensides pitch 15-30° azimuth 25 cm: bedding, 40° dip fault, 45° dip, 203 azimuth, with slickensides at 190° azimuth (large) and 178° azimuth (small) About 10 fractures (section cut at low angle to slickensides)						6						
												CC						

SITE 490 HOLE CORE 61 CORED INTERVAL 550.5-560.0 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
	UPPER MIOCENE			1	0.5		<p>MUDDY SILTSTONE, olive gray (5Y 3/2), fractured slickensided, moderate bioturbation. Common drilling biscuits.</p> <p>SMEAR SLIDES</p> <p>Muddy Siltstone</p> <p>TEXTURE: 2-73 (D)</p> <p>Sand 5 Silt 55 Clay 40</p> <p>COMPOSITION:</p> <p>Quartz 69 Feldspar 5 Mica 5 Heavy minerals 3 Pyrite 1 Clay 15 Glass 2 Carb. unspic. TR Sponge spicules TR</p> <p>Only minor fracturing in Sections 2 and 3</p> <p>20' Use dip picked out by flattened burrows - aligned mud chips</p>
				2	1.0		
				3			
				4			
				CC			

SITE 490 HOLE CORE 60 CORED INTERVAL 541.0-550.5 m	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
	MIOCENE?			1	0.5		<p>50 cm: fault: 45-50° dip slickensided, pitch 50° to NE</p> <p>85 cm: bedding 18° dip</p> <p>Eight fractures in section, bedding and/or faults</p> <p>MUDDY SILTSTONE, olive gray (5Y 3/2), moderate bioturbation. Fracturing now appears subparallel to fault surfaces, drilling biscuits common.</p> <p>SMEAR SLIDES</p> <p>Muddy Siltstone</p> <p>TEXTURE: 2-26 (D)</p> <p>Sand 5 Silt 75 Clay 20</p> <p>COMPOSITION:</p> <p>Quartz 47 Feldspar 5 Mica 5 Heavy minerals TR Pyrite 3 Clay 20 Carb. unspic. TR Nannofossils TR Sponge spicules TR</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>1.29 % Organic Carbon 1.2 % CaCO₃ 0</p>
				2	1.0		
				3			
				CC			

SITE 490 HOLE	CORE 62	CORED INTERVAL	560.0-569.5 m	LITHOLOGIC DESCRIPTION	DIAGRAMS	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	FOSSIL CHARACTER																																								
														DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT																																			
UPPER MIOCENE	CG	CC	110-120 cm; bedding 10' apparent dip	<p>MUDDY SILTSTONE, olive gray (SY 3Z1), moderate bioturbation. Common drilling biscuits. Fractured.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 2/2 Muddy (D) 50 Muddy siltstone</p> <p>COMPOSITION: 45 Quartz 69 Feldspar 17 Mica 3 Heavy minerals 2 Pyrite Clay 10 Glass 10 Radiolarians TR Diatoms 1 Sponge spicules 1 Silicoflagellates TR</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 4.28 % CaCO₃ 0</p>		<p>VOID</p>	1	0.5		<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>Stichocorys peregrina</p>	UPPER MIOCENE	CG																																							
																						2	2	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>																
																																							3	3	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>

SITE 490 HOLE	CORE 63	CORED INTERVAL	569.5-579.0 m	LITHOLOGIC DESCRIPTION	DIAGRAMS	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	FOSSIL CHARACTER																																						
														DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT																																	
UPPER MIOCENE	CG	CC		<p>MUDDY SILTSTONE, olive gray (SY 3Z1), intensely bioturbated. Common drilling biscuits.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 1-40 Muddy (D) 50 Muddy siltstone</p> <p>COMPOSITION: 72 Quartz 5 Feldspar 5 Mica 5 Heavy minerals 1 Pyrite Clay 10 Glass 10 Radiolarians TR Diatoms 2 Sponge spicules 1 Silicoflagellates TR</p>		<p>VOID</p>	1	0.5		<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>Stichocorys peregrina</p>	UPPER MIOCENE	CG																																					
																					2	2	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>															
																																						3	3	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>

SITE 490 HOLE	CORE 64	CORED INTERVAL	579.0-586.5 m	LITHOLOGIC DESCRIPTION	DIAGRAMS	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	FOSSIL CHARACTER																																						
														DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT																																	
UPPER MIOCENE	CG	CC		<p>MUDDY SILTSTONE, olive gray (SY 3Z1), intensely bioturbated. Broken up with fractures with slickensides and by drilling deformation. Fine-grained soft muddy silt between biscuits and fragments.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: 180 Muddy (D) 50 Muddy siltstone</p> <p>COMPOSITION: 64 Quartz 6 Feldspar 4 Mica 2 Heavy minerals 2 Pyrite Clay 15 Glass 1 Radiolarians TR Diatoms 1 Sponge spicules 2 Silicoflagellates TR</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 1.33 % CaCO₃ 0</p>		<p>VOID</p>	1	0.5		<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>Stichocorys peregrina</p>	UPPER MIOCENE	CG																																					
																					2	2	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>															
																																						3	3	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>	<p>VOID</p>

SITE SUMMARY SHEET

SITE 491

Date occupied: 13 April 1979

Date departed: 20 April 1979

Time on hole: 182.1 hours

Position: latitude: 16°01.74'N

longitude: 98°58.33'W

Water depth (sea level): 2883 corrected meters, echo sounding

Water depth (rig floor): 2893 corrected meters, echo sounding

Bottom felt at: 2870 meters, drill pipe

Penetration: 542 meters

Number of cores: 59

Total length of cored section: 542 meters

Total core recovery: 388 meters

Percentage core recovery: 72%

Oldest Sediment Cored

Depth sub-bottom: 542 meters

Nature: Muddy siltstone and sand

Age: Early Pliocene

Basement

Depth sub-bottom: Not penetrated

Principal Results

At Site 491 we penetrated 542 meters and recovered 59 cores that comprise three lithologic units. Unit 1 extends from 0–57.5 meters and consists of upper Pliocene to upper Quaternary mud. Lower to upper Pliocene muddy silt with minor fine sand layers constitutes Unit 2 cored between 57.5–437.5 meters. Unit 3 extends from 437.5–542 meters and is composed of muddy silt and siltstone with interbedded fine to coarse pebbly sand.

Tilted beds and fracturing first occur at about 120 meters and continue the total depth through the lower two lithologic units. In Unit 2 dips are variable and range to nearly vertical; fracturing is present throughout though slickensides are rare. Dip angles in Unit 3 range up to 30° being more uniform than in Unit 2. Fracturing and slickensides are more abundant in Unit 3 than in Unit 2 and a strong fissility develops locally. Paleomagnetic restorations of bedding in both Units 2 and 3 indicate modal dip directions to the north though with considerable scatter.

Unit 3 and much of Unit 2 probably accumulated in a trench and/or lower slope environment. Deformation of these sediments occurred shortly after deposition and prior to being uplifted to the present mid-slope position.

A special drilling bit for the pressure core barrel was used at this site. The smaller inside diameter resulted in higher recovery rates but the core is more disturbed than normal. The pressure core barrel failed.

SITE 491	HOLE	CORE 2	CORED INTERVAL	9E-19.0 m														
				TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DIAGRAMS	DIATOMS	NANNOFOSSILS	RADICULARIANS	FORAMINIFERS	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
				QUATERNARY	NN 21/NN 20	AG	1	0.5										
							2	1.0										
							3											
							4											
							5											
							CC											

MUDDY SILT, soft, grayish olive green (SGY 3/2) moderate deformation, sponge spicules sporadic. Silty zones are probably concentrations in burrows. Black specks of Pyrite common.

SMEAR SLIDES

Muddy silt 272 289
Mud

TEXTURE:
Sand 2 10
Silt 46 70
Clay 58 20

COMPOSITION:
Quartz 33 68
Feldspar 8 8
Mica 4 2
Heavy minerals 1 1
Pyrite 1 1
Clay 50 20

GRAIN SIZE
Sand 3-52
Silt 1-5
Clay 80-5
400

SITE 491	HOLE	CORE 1	CORED INTERVAL	0.0-10.0 m														
				TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DIAGRAMS	DIATOMS	NANNOFOSSILS	RADICULARIANS	FORAMINIFERS	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
				QUATERNARY	NN 21/NN 20	AG	1	0.5										
							2	1.0										
							3											
							4											
							5											
							6											
							7											
							CC											

MUDDY SILT, soft, grayish olive green (SGY 3/2) with sporadic white sponge specks.

SMEAR SLIDES

Muddy silt 1-5 1-30 7-40
Mud

TEXTURE:
Sand 1 1
Silt 80 60
Clay 10 30 60

COMPOSITION:
Quartz 5 60 37
Feldspar 2 8 5
Mica 1 3 3
Heavy minerals 1 1 1
Pyrite 1 1 1
Clay 10 25 50

GRAIN SIZE
Sand 3-52
Silt 1-5
Clay 80-5
34.9

ORGANIC CARBON AND CARBONATE
% Organic Carbon 1.9
% CaCO₃ 0.0

One cm diffuse dusky yellow green (SGY 5/2) ash spot

One cm wood fragment

Color change 5Y 5/2 with MUD 5Y 4/4 rings

SITE 491 HOLE CORE 3 CORED INTERVAL 19.0-28.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS					
QUATERNARY/UPPER PLEISTOCENE					0.5			<p>MUD, grayish olive green (5GY 3/2) moderately deformed. White sponge concentrations are less common, dark concentrations of pyrite are common, grayish olive (10Y 4/2) carbonate-rich zones occur in 2 or 3 places in each section. Section 4, gas expansion cracks common between 80 and 150 cm. Section 5, gas expansion cracks common from 3-80 cm, slight mottling, 120-130 cm. Section 6, slight mottling, some silty concentrations in burrows(?)</p> <p>SMEAR SLIDES</p> <p>2-70 Md 2 Sand 4 Silt 45 Clay 53 Organic COMPOSITION: 36 Quartz 10 Feldspar 4 Mica 1 Heavy minerals 2 Pyrite 45 Clay TR Radiolarians 1 Diatoms 1 Sponges 1 Plant fragments TR</p> <p>ORGANIC CARBON AND CARBONATE 7.38 % Organic Carbon 2.0 % CaCO₃ 0.0</p>	
					1				
					2				
				CG	3				
					4				
					5				
					6				
			7						
			CC						

SITE 491 HOLE CORE 4 CORED INTERVAL 28.5-38.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS					
UPPER PLEISTOCENE	NN 8				0.5			<p>MUD, grayish olive green (5GY 3/2) Diffuse ASH concentrations in Section 1, small calcareous nodules are common. Section 2, small calcareous nodules are common. Section 4, gas expansion cracks 36-80 cm and 120-140 cm.</p> <p>SMEAR SLIDES</p> <p>472 Md 472 513 Ash 472 513 Mch 472 513 Mch</p> <p>TEXTURE: Sand 80 Silt 20 Clay 80 COMPOSITION: 39 Quartz 8 Feldspar 1 Mica 1 Heavy minerals 2 Pyrite 45 Clay TR Glass 100 Radiolarians TR Diatoms 1 Sponges 1 Sponges spicules</p>	
					1				
					2				
				CG	3				
					4				
					5				
			6						
			CC						

SITE 481	HOLE	CORE 6		CORED INTERVAL		47.5-57.5 m		LITHOLOGIC DESCRIPTION
		FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SAMPLES	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS			
UPPER Pliocene	NN 17 <i>Pterocarium prismatum</i>							
CC								

MOUDY SILT, grayish olive green (SGY 3/2). Small areas of ASH, light olive gray (SY 6/1) diffuse areas of carbonate COZE/CHALK, moderate olive brown (SY 5/1). Occasional siltstone (mm) concentrations of sponge spicules bluish white (SS 9/1).

SMEAR SLIDES

TEXTURE: Silt 10, Silty Silt 48, Clay 85

COMPOSITION: Quartz 62, Feldspar 8, Heavy minerals 2, Pyrite 20, Calcite 83

GRAIN SIZE: Sand 2.84, Silt 68.0, Clay 37.9

SITE 481	HOLE	CORE 5		CORED INTERVAL		38.0-47.5 m		LITHOLOGIC DESCRIPTION
		FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SAMPLES	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS			
UPPER Pliocene	NN 17							
CC								

MUD, grayish olive green (SGY 3/2); homogeneous, soft to firm; small calcareous zones (CHALK) which were originally burrows. Section 4: firm, no gas expansion cracks.

SMEAR SLIDES

TEXTURE: Silt 2, Silty Silt 48, Clay 50

COMPOSITION: Quartz 56, Feldspar 7, Heavy minerals 3, Pyrite 1, Clay 40, Calcite 1, Nannofossils 1, Radiolarians 1, Diatoms 1, Sponge spicules 1, Plant fragments 1

ORGANIC CARBON AND CARBONATE

% Organic Carbon 1.2, % CaCO₃ 0.0

Gas expansion cracks

Gas expansion cracks less common

Calcareous (worm tuber nodules)

SITE 481	HOLE	CORE 7	CORED INTERVAL	57.5-67.0 m	LITHOLOGIC DESCRIPTION	SAMPLES	DRILLING DISTURBANCE STRUCTURES	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER				TIME - ROCK UNIT	B	FM	AG				
											DIATOMS	RADICULARIANS	NANNOFOSILS	FORAMINIFERS								
NN 17	UPPER Pliocene	NN 17	Pterotium prismatum	0.5	Chalk				1													
				1.0	Chalk				2													
				VOID																		
				VOID																		
				VOID																		
				VOID																		
				VOID																		
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				VOID																		
				VOID																		

SITE 481	HOLE	CORE 8	CORED INTERVAL	67.0-76.5 m	LITHOLOGIC DESCRIPTION	SAMPLES	DRILLING DISTURBANCE STRUCTURES	GRAPHIC LITHOLOGY	METERS	SECTION	FOSSIL CHARACTER				TIME - ROCK UNIT	B	FM	CG				
											DIATOMS	RADICULARIANS	NANNOFOSILS	FORAMINIFERS								
NN 15	LOWER Pliocene	NN 15	LOWER Pliocene	0.5	Muddy silt, grayish, olive green (SGY 372), firm homogeneous. Small (1-3 mm) /ASH flakes, occasional minute (< 2 mm) sponge remains. Siltstone area of CHALK.				1													
				1.0	Muddy silt, grayish, olive green (SGY 372), firm homogeneous. Small (1-3 mm) /ASH flakes, occasional minute (< 2 mm) sponge remains. Siltstone area of CHALK.				2													
				2	Muddy silt, grayish, olive green (SGY 372), firm homogeneous. Small (1-3 mm) /ASH flakes, occasional minute (< 2 mm) sponge remains. Siltstone area of CHALK.				3													
				3	Muddy silt, grayish, olive green (SGY 372), firm homogeneous. Small (1-3 mm) /ASH flakes, occasional minute (< 2 mm) sponge remains. Siltstone area of CHALK.				4													
				4	Muddy silt, grayish, olive green (SGY 372), firm homogeneous. Small (1-3 mm) /ASH flakes, occasional minute (< 2 mm) sponge remains. Siltstone area of CHALK.				5													
				5	Muddy silt, grayish, olive green (SGY 372), firm homogeneous. Small (1-3 mm) /ASH flakes, occasional minute (< 2 mm) sponge remains. Siltstone area of CHALK.				6													
				6	Muddy silt, grayish, olive green (SGY 372), firm homogeneous. Small (1-3 mm) /ASH flakes, occasional minute (< 2 mm) sponge remains. Siltstone area of CHALK.				7													
				7	Muddy silt, grayish, olive green (SGY 372), firm homogeneous. Small (1-3 mm) /ASH flakes, occasional minute (< 2 mm) sponge remains. Siltstone area of CHALK.																	

SITE 491	HOLE	CORE 10		CORED INTERVAL	86.0-96.5 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS			
TIME - ROCK UNIT LOWER PLOECENE NN 15 Spongaster pentas	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	1	0.5	<p>MUDDY SILT, soft to firm, olive gray (SY 32) (Sections 1-3) to grayish olive green (BGY 32) (Sections 4-7) to grayish olive green (BGY 32) (Sections 8-10). Occasional spots of fine to very fine sand occur occasionally in all the sections. Sections 1-3 SY 32 mottled with BGY 32.</p> <p>SMEAR SLIDES</p> <p>Texture: Sand 3, Silt 69, Clay 37 Composition: Quartz 66, Feldspar 10, Mica 5, Heavy minerals 1, Pyrite 10, Glass 2, Carb. unspic. 2, Aluminosils. 2, Radiolarians 2, Diatoms 2, Sponges spicules 2</p> <p>Grain Size: Sand 2-50, Silt 17-8, Clay 98.6-22.6</p>
			NANNOFOSSILS	2	1.0	
			RAOULIANS	3		
			DIATOMS	4		
			VOID	5		
			VOID	6		
			VOID	7		
CC						

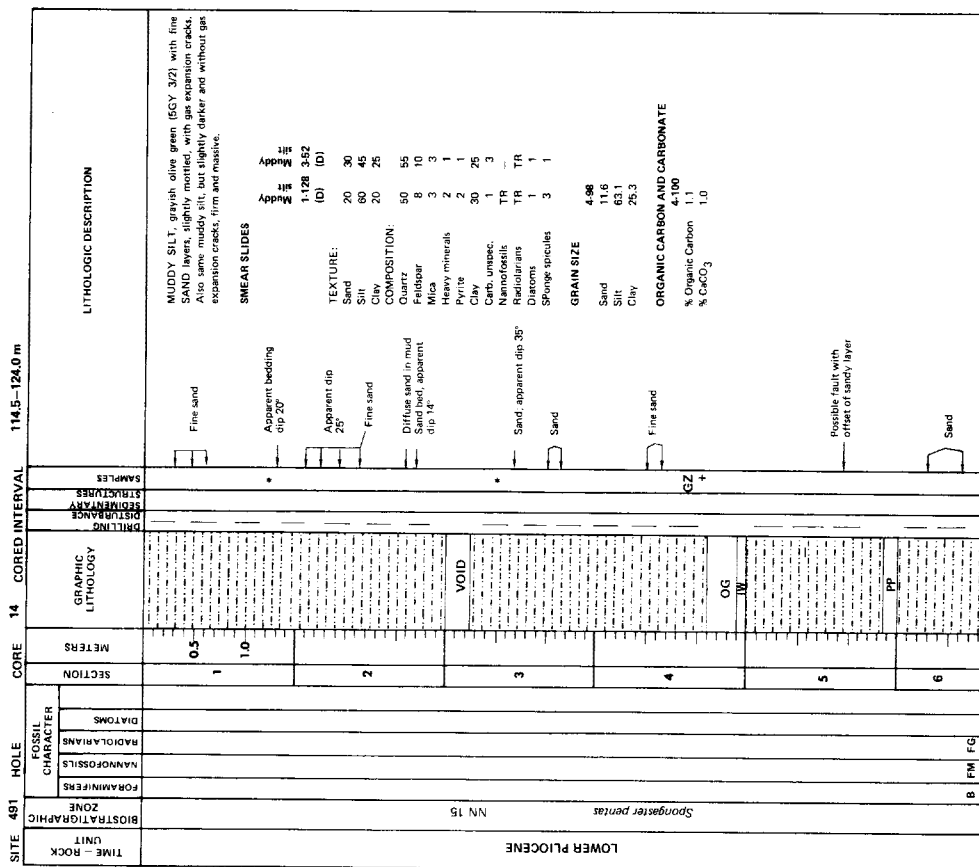
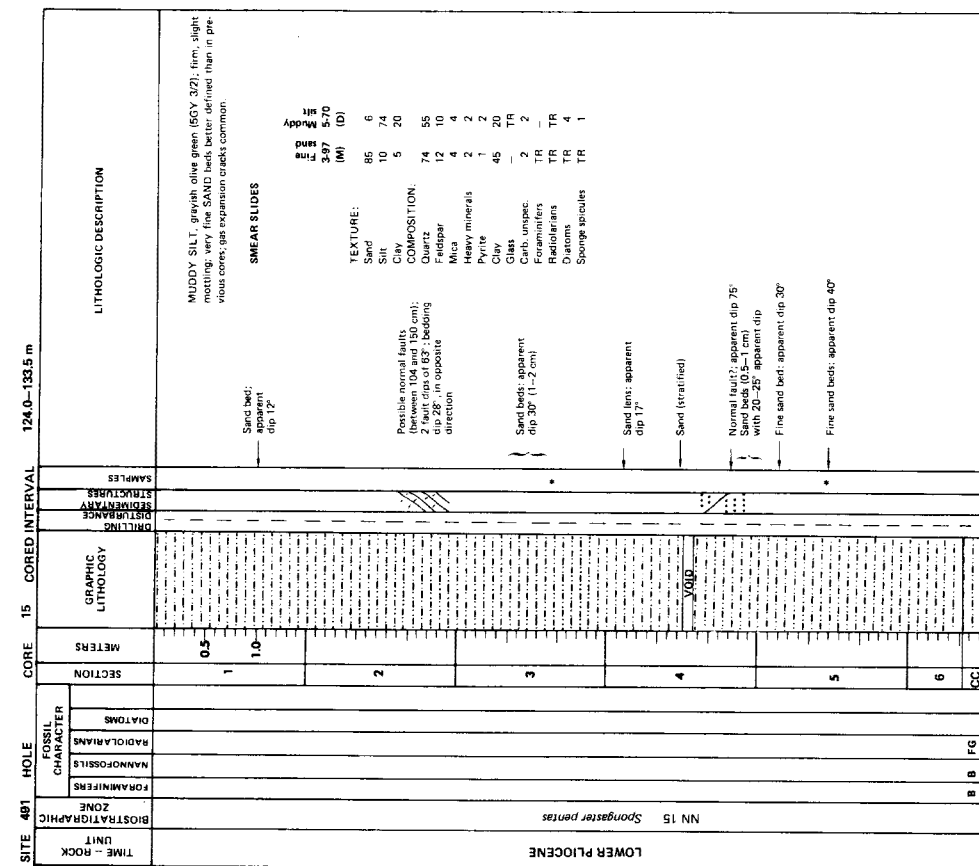
SITE 491	HOLE	CORE 9		CORED INTERVAL	76.5-86.0 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS			
TIME - ROCK UNIT LOWER PLOECENE NN 15 Spongaster pentas	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	1	0.5	<p>MUDDY SILT, olive gray (SY 32) (Sections 1 and 2) to grayish olive green (BGY 32) (Section 3 and below), firm to very firm with fine sand layers.</p> <p>SMEAR SLIDES</p> <p>Texture: Sand 3, Silt 55, Clay 42 Composition: Quartz 61, Feldspar 15, Mica 10, Heavy minerals 3, Pyrite 15, Glass 1, Carb. unspic. 1, Aluminosils. 1, Radiolarians 1, Diatoms 2, Sponges spicules 2, Plant fragments 2</p> <p>Grain Size: Sand 3-81, Silt 3-1, Clay 98.8-55.1</p> <p>ORGANIC CARBON AND CARBONATE: % Organic Carbon 1.5, % CaCO₃ 0.0</p>
			NANNOFOSSILS	2	1.0	
			RAOULIANS	3		
			DIATOMS	4		
			VOID	5		
			VOID	6		
			VOID	7		
CC						

SITE 491	HOLE	CORE 12	CORED INTERVAL	100.5-105.0 m		LITHOLOGIC DESCRIPTION
				GRAPHIC LITHOLOGY	SMEARS	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	DISTURBANCE	Smears on core liner. Deviation of the hole: 1.0'.
LOWER Pliocene	NN 15	FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS			SAMPLES	

SITE 491	HOLE	CORE 13	CORED INTERVAL	105.0-114.5 m		LITHOLOGIC DESCRIPTION
				GRAPHIC LITHOLOGY	SMEARS	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	DISTURBANCE	MUDDY SILT, grayish olive green (SGY 3/2), slight mottling, minor concentrations of pyrite and fine SAND layer. Gas expansion cracks and voids common. Intense drilling deformation. SMEAR SLIDES TEXTURE: Sand 7 Silt 53 Clay 40 COMPOSITION: Quartz 52 Feldspar 12 Mica 2 Heavy minerals 1 Pyrite 2 Clay 30 Foraminifers TR Nannofossils TR Radiolarians TR Diatoms 1 Sponge spicules 1
LOWER Pliocene	NN 15 <i>Spongaster pentas</i>	FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS	1 2 CC	0.5 1.0	SAMPLES	

SITE 491	HOLE	CORE 11	CORED INTERVAL	95.5-100.0 m		LITHOLOGIC DESCRIPTION
				GRAPHIC LITHOLOGY	SMEARS	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	DISTURBANCE	MUDDY SILT, grayish olive green (SGY 3/2) mottled with minor olive gray (SGY 3/2) soupy to soft. Thin (3 mm) layers of fine sand at 94 and 138 cm inclined at 50-55°, artifact of drilling(?) SMEAR SLIDES TEXTURE: Sand 1 88 Silt 52 3-18 Clay 47 2 Muddy Very Fine to Fine sand COMPOSITION: Quartz 49 95 Feldspar 15 5 Mica 2 Heavy minerals 3 Pyrite 1 Clay 20 Glass also unspc. Foraminifers TR Nannofossils TR Diatoms 6 Sponge spicules 1 ORGANIC CARBON AND CARBONATE % Organic Carbon 3-90 % CaCO ₃ 1.1 0.0
LOWER Pliocene	NN 15 <i>Spongaster pentas</i>	FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS	1 2 3 4 CC	0.5 1.0	SAMPLES	

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	DISTURBANCE	VOID
LOWER Pliocene	NN 15 <i>Spongaster pentas</i>	FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS			SAMPLES	



SITE 481 HOLE CORE 16 CORED INTERVAL 133.5-143.0 m

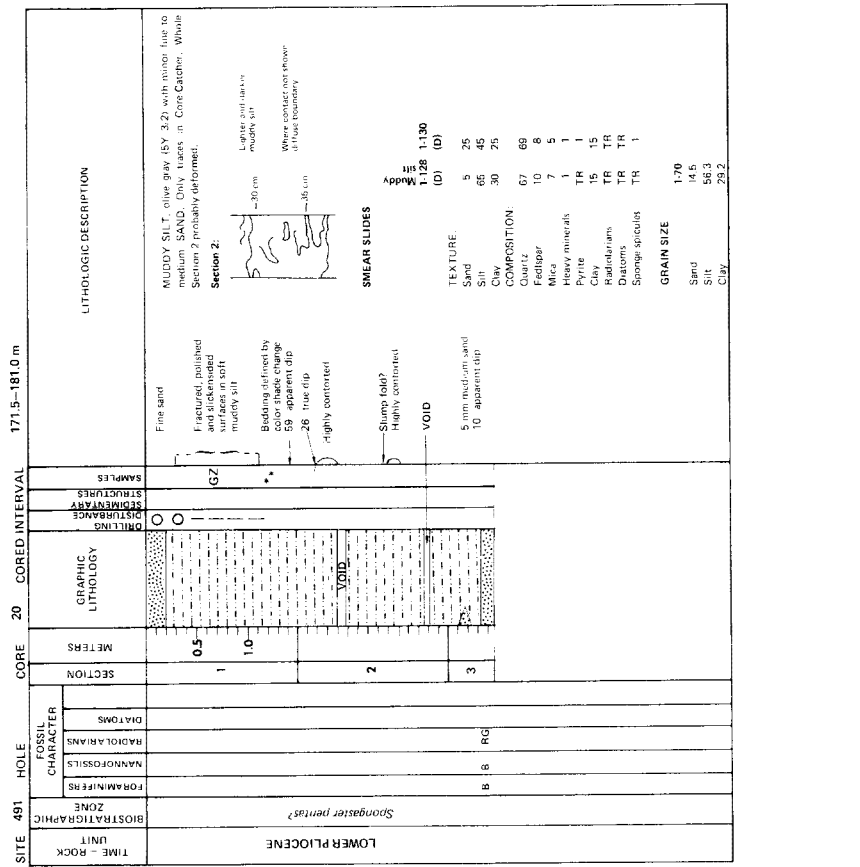
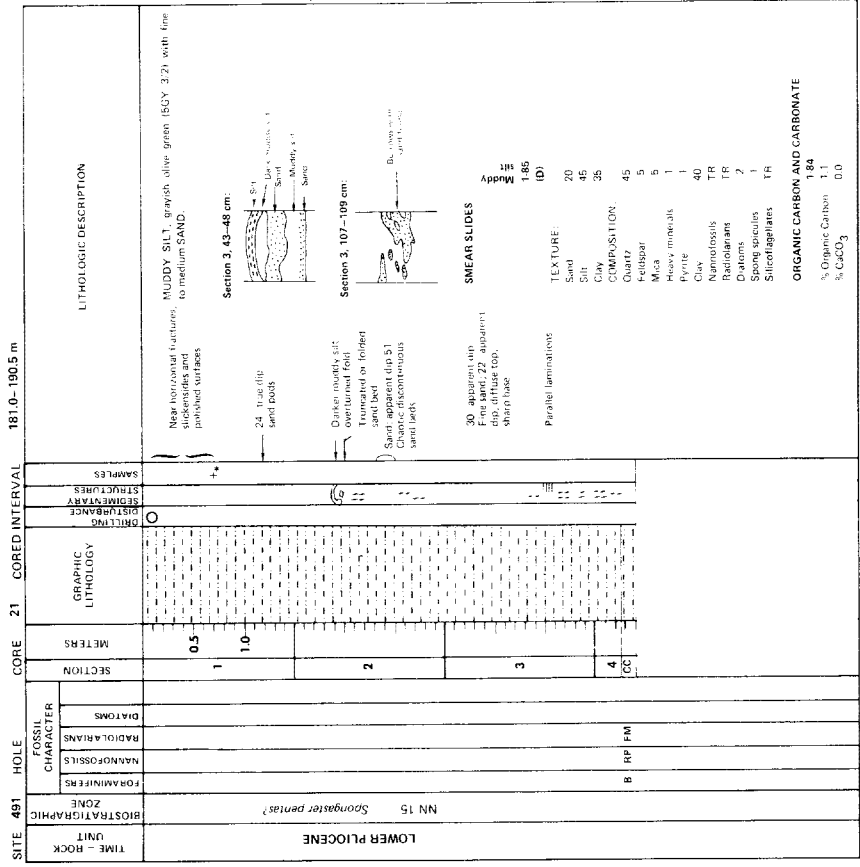
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTANCE DRILLING	STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER PLEISTOCENE	NN 15		1	0.5					<p>Muddy silt, grayish olive green (SGY 3/2), firm, slightly mottled, some fine sand laminae (1 or 2 per section). One ASH bed (SGY 100), grayish olive green (SGY 3/2) and (SGY 3/2), very firm, mottled, some drilling biscuits in Section 6.</p> <p>SMEAR SLIDES</p> <p>1-15 (ID) (M) (M)</p> <p>Muddy 40 Mud 55 Silt 10 Sand 60</p> <p>TEXTURE: Silt Silt Clay</p> <p>COMPOSITION: Quartz 45 Feldspar 7 Mica 2 Heavy minerals 1 Pyrite 1 Zircon 1 Zeolite 3 Sponge spicules 1</p> <p>GRAIN SIZE Sandy concentration Silt Clay</p>
			2	1.0					<p>Fault plane</p> <p>Fault plane</p> <p>Fault plane</p> <p>Zeolites (yellow patch)</p> <p>Fault plane</p> <p>Sandy lens</p> <p>Zeolite Possible fault</p> <p>GZ</p> <p>Drilling bleeds?</p> <p>Zeolite</p> <p>ASH BED: apparent dip: 40°</p>
			3						<p>Sandy bed: apparent dip 22°</p> <p>Sandy bed apparent dip 14°</p> <p>Stickered surface apparent dip 16°</p> <p>Fracture: apparent dip 43°</p> <p>Sandy beds: 56° apparent dip</p> <p>Sandy laminae: 35° apparent dip</p> <p>Texture: Silt, Clay</p> <p>Composition: Quartz, Feldspar, Mica, Heavy minerals, Pyrite, Zircon, Radiolarians, Diatoms, Sponge spicules</p> <p>Grain size: 3-97, 8-7, 7-0, 18-4</p> <p>Organic Carbon and Carbonate: 4.98% Organic Carbon, 1.4% CaCO₃, 0.0%</p>
			4						
			5						
			6						
			CC						

SITE 491 HOLE CORE 17 CORED INTERVAL 143.0-152.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTANCE DRILLING	STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER PLEISTOCENE	NN 15		1	0.5					<p>Muddy silt, grayish olive green (SGY 3/2), firm, slightly mottled, numerous gas expansion cracks; minor very fine sand laminae; slickensides on some fractures. Some drilling biscuits are in the bottom half of Section 4.</p> <p>SMEAR SLIDES</p> <p>1-15 (ID) (M) (M)</p> <p>Muddy 3-98 Mud 55 Silt 10 Sand 60</p> <p>TEXTURE: Silt Silt Clay</p> <p>COMPOSITION: Quartz 55 Feldspar 8 Mica 2 Heavy minerals 1 Pyrite 30 Zircon 2 Radiolarians TR Diatoms 1 Sponge spicules TR</p> <p>GRAIN SIZE Sandy lamination: apparent dip 30° Sandy lamination: apparent dip 17° Sandy lamination: apparent dip 20°</p> <p>Fracture: apparent dip 31°</p> <p>Fracture: apparent dip 15°</p> <p>Sandy lamination: apparent dip 17° Fracture: possibly weakly developed slickensides, apparent dip 0°</p>
			2						
			3						
			4						
			5						
			6						
			7						
			CC						

SITE 491	HOLE	CORE 19		CORING INTERVAL	162.0-171.5 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS			
TIME - ROCK UNIT LOWER PLOECENE Spongaster pentas	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS	1	0.5	Very fine sand, 10CY 5/2 Very fine sand	<p>Muddy silt, grayish olive green with very fine to fine SAND, more abundant and in thicker layers than previous cores, sequences observed. Only traces in Core Catcher.</p> <p>Muddy silt (5CY 3/4) lower sand with sharp for sometimes gradational contact, base of sand gradational or sharp contact.</p> <p>Sequences =</p> <p>Section 4: Possible slump field Dark muddy silt, slightly laminated Slightly diffuse</p> <p>Section 4: Possible slump field Dark muddy silt, slightly laminated Slightly diffuse</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Silt 20 10 Silt 60 50 Clay 30 40</p> <p>COMPOSITION: Quartz 54 49 Feldspar 8 5 Mica 6 3 Heavy minerals TR TR Pyrite 2 40 Clay 30 TR Nannofossils TR TR Radiolarians TR TR Diatoms 1 1 Sponge spicules 1 TR</p> <p>GRAIN SIZE Silt 316 Silt 605 Clay 30.8</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 4.0 % CaCO₃ 0.0</p>
			2	1.0	Fine sand, 11C gas bubbling off Sequences Fine to medium sand 1.5°C, gas bubbling off Fine sand Fine sand, apparent dip 12° Sequences Apparent dip 11° Disturbed sand beds Fine sand, 19° apparent dip Sequence Disturbed sand beds Sequences Sequence, 12° apparent dip Fine sand Sequence, 12° apparent dip Disturbed bedding	
			3			
			4			
			5			
			6			
			7			
			8			

SITE 491	HOLE	CORE 18		CORING INTERVAL	152.5-162.0 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS			
TIME - ROCK UNIT LOWER PLOECENE Spongaster pentas	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS	1	0.5	Development of polished surfaces, slickensides in soft mud, fractures, 0-80"	<p>Muddy silt, grayish olive green (5CY 3/2) to olive gray (5Y 3/2), becomes sandier from top to base (10-25%). Some very fine to fine SAND.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Silt 10 25 77 Silt 60 45 15 Clay 30 30 8</p> <p>COMPOSITION: Quartz 58 51 85 Feldspar 5 3 10 Mica 8 5 3 Heavy minerals TR TR 1 Pyrite 1 TR 1 Clay 25 30 8 Foraminifera TR - TR Nannofossils TR TR - TR Radiolarians TR TR - TR Diatoms 1 1 TR Sponge spicules 1 TR TR</p> <p>VOID</p> <p>5 mm sand beds (apparent dip: 12°) Diffuse sand Diffuse sand (apparent dip 46°) Slicks and polished surfaces as in Section 1 Apparent dip 26° Apparent dip 27° Diffuse sand Graded sand, overlain by darker mud, possible T_{ad} sequence. Fine to very fine sand, apparent dip 40° (possibly due to drilling)</p>
			2	1.0	Fine sand layer (discovered by drilling) Pyrite	
			3			
			4			
			5			
			6			
CC						



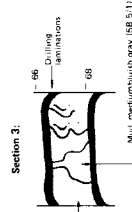
SITE	HOLE	CORED INTERVAL	CORE 22		LITHOLOGIC DESCRIPTION	CORE 24		LITHOLOGIC DESCRIPTION	
			200.0-204.0 m	204.0-209.5 m					
491	HOLE	199.5-200.0 m			Muddy silt, grayish olive green (SGY 3.2) with fine sand beds characterized (SGY 5.2). Minutely silty with polished surfaces. Very diffuse, poorly indurated sand. Abundant dispersed sand. Muddy silt, grayish olive green (SGY 3.2) - Disruption of hole 0.7.			Muddy silt, grayish olive green (SGY 3.2) - Disruption of hole 0.7.	

SITE	HOLE	CORED INTERVAL	CORE 23		LITHOLOGIC DESCRIPTION	CORE 24		LITHOLOGIC DESCRIPTION	
			200.0-204.0 m	204.0-209.5 m					
491	HOLE	200.0-204.0 m			Muddy silt, grayish olive green (SGY 3.2) with fine sand beds characterized (SGY 5.2). Minutely silty with polished surfaces. Very diffuse, poorly indurated sand. Abundant dispersed sand. Muddy silt, grayish olive green (SGY 3.2) - Disruption of hole 0.7.			Muddy silt, grayish olive green (SGY 3.2) - Disruption of hole 0.7.	

SITE 491	HOLE	CORE 26		CORED INTERVAL	219.0-228.5 m		LITHOLOGIC DESCRIPTION
		SECTION	METERS		GRAPHIC LITHOLOGY	STAMPES	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	0.5			<p>Two inclined drilling laminations</p> <p>MUDDY SILT. Firm to hard, grayish olive green (65Y 3/2), internally structureless. Section 2, siltstone toward base, drilling laminations throughout. Section 3, drilling laminations throughout, unusual thickness here, some up to 2 cm thick; diposits have 3-4 cm thickness. Section 4, same comments, except laminations here 15 mm maximum, two instances worthy of note.</p>
			NANNOFOSSILS	1	1.0		
			RADICLARIANS	2			
			DIATOMS	3			
			FOSSIL CHARACTER	4			
			SECTION	5			
			METERS	6			
GRAPHIC LITHOLOGY	7						
STAMPES	CC						
LOWER PIOCENE							

SITE 491	HOLE	CORE 25		CORED INTERVAL	209.5-219.0 m		LITHOLOGIC DESCRIPTION
		SECTION	METERS		GRAPHIC LITHOLOGY	STAMPES	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	DIATOMS	0.5			<p>Scattered grains of dark yellowish orange (10YR 6/6) (?) siltstone</p> <p>MUDDY SILTSTONE, grayish olive green (65Y 3/2) sporadic fractures, irregular with polished faces and slickensides. Apart from fine spots and beds (as shown) no other structures are visible. Section 3, occasional drilling laminations (less well-integrated than muddy siltstone and slightly darker in color). Sections 5 and 6, drilling laminations common.</p>
			NANNOFOSSILS	1	1.0		
			RADICLARIANS	2			
			DIATOMS	3			
			FOSSIL CHARACTER	4			
			SECTION	5			
			METERS	6			
GRAPHIC LITHOLOGY	7						
STAMPES	CC						
LOWER PIOCENE							

SITE 491 HOLE CORE 27 CORED INTERVAL 228.5-238.0 m

TIME - ROCK UNIT	BOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	SAMPLING DISTURBANCE	SAMPLING	LITHOLOGIC DESCRIPTION
		DIATOMS	RADICLARIANS	NANNOFOSSILS						
LOWER PLEIOENE	Spongaster pentas?				1	0.5	VOID			<p>MUDDY SILT, grayish olive green (SGY 312), firm to hard drilling laminations abundant. Section 3: abrupt, somewhat swirling, color variations, truncated by common drilling laminations, as shown in example. Section 4: 40-50 cm; conjugate set of normal faults offsetting drilling laminations.</p>  <p>Section 3: Muddy silt, grayish olive green (SGY 312) Mud, medium bluish gray (SB 5.11)</p>
					2	1.0				<p>TEXTURE: Sand 6 Silt 49 Clay 45</p> <p>COMPOSITION: Quartz 48 Feldspar 8 Mica 4 Heavy minerals 1 Pyrite 1 Clay 35</p> <p>GRAIN SIZE 3-30 Sand 6.7 Silt 54.2 Clay 39.0</p> <p>ORGANIC CARBON AND CARBONATE 3.40 % Organic Carbon 0.9 % CaCO₃ 0.0</p>
					3					<p>TEXTURE: Sand 6 Silt 49 Clay 45</p> <p>COMPOSITION: Quartz 48 Feldspar 8 Mica 4 Heavy minerals 1 Pyrite 1 Clay 35</p> <p>GRAIN SIZE 3-30 Sand 6.7 Silt 54.2 Clay 39.0</p> <p>ORGANIC CARBON AND CARBONATE 3.40 % Organic Carbon 0.9 % CaCO₃ 0.0</p>
					4					<p>TEXTURE: Sand 6 Silt 49 Clay 45</p> <p>COMPOSITION: Quartz 48 Feldspar 8 Mica 4 Heavy minerals 1 Pyrite 1 Clay 35</p> <p>GRAIN SIZE 3-30 Sand 6.7 Silt 54.2 Clay 39.0</p> <p>ORGANIC CARBON AND CARBONATE 3.40 % Organic Carbon 0.9 % CaCO₃ 0.0</p>
					5					<p>TEXTURE: Sand 6 Silt 49 Clay 45</p> <p>COMPOSITION: Quartz 48 Feldspar 8 Mica 4 Heavy minerals 1 Pyrite 1 Clay 35</p> <p>GRAIN SIZE 3-30 Sand 6.7 Silt 54.2 Clay 39.0</p> <p>ORGANIC CARBON AND CARBONATE 3.40 % Organic Carbon 0.9 % CaCO₃ 0.0</p>
					6					<p>TEXTURE: Sand 6 Silt 49 Clay 45</p> <p>COMPOSITION: Quartz 48 Feldspar 8 Mica 4 Heavy minerals 1 Pyrite 1 Clay 35</p> <p>GRAIN SIZE 3-30 Sand 6.7 Silt 54.2 Clay 39.0</p> <p>ORGANIC CARBON AND CARBONATE 3.40 % Organic Carbon 0.9 % CaCO₃ 0.0</p>
					7					<p>TEXTURE: Sand 6 Silt 49 Clay 45</p> <p>COMPOSITION: Quartz 48 Feldspar 8 Mica 4 Heavy minerals 1 Pyrite 1 Clay 35</p> <p>GRAIN SIZE 3-30 Sand 6.7 Silt 54.2 Clay 39.0</p> <p>ORGANIC CARBON AND CARBONATE 3.40 % Organic Carbon 0.9 % CaCO₃ 0.0</p>

SITE 491 HOLE CORE 28 CORED INTERVAL 238.0-247.5 m

TIME - ROCK UNIT	BOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	SAMPLING DISTURBANCE	SAMPLING	LITHOLOGIC DESCRIPTION
		DIATOMS	RADICLARIANS	NANNOFOSSILS						
LOWER PLEIOENE	Spongaster pentas?				1	0.5				<p>Dark yellowish orange (10YR 6/6) concentration of carbonate grains</p> <p>MUDDY SILT, grayish olive green (SGY 312), with thin (1-2 mm) drilling laminations of dark gray (N3) MUD every 2-4 cm, soft to firm. Occasional sponge remains; slight lusterations.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Sand 1 Silt 60 Clay 39</p> <p>COMPOSITION: Quartz 2 Feldspar 15 Mica 3 Heavy minerals 1 Pyrite 1 Clay 20</p> <p>GRAIN SIZE 3-38 Sand 4.5 Silt 65.3 Clay 32.2</p>
					2					<p>TEXTURE: Sand 1 Silt 60 Clay 39</p> <p>COMPOSITION: Quartz 2 Feldspar 15 Mica 3 Heavy minerals 1 Pyrite 1 Clay 20</p> <p>GRAIN SIZE 3-38 Sand 4.5 Silt 65.3 Clay 32.2</p>
					3					<p>TEXTURE: Sand 1 Silt 60 Clay 39</p> <p>COMPOSITION: Quartz 2 Feldspar 15 Mica 3 Heavy minerals 1 Pyrite 1 Clay 20</p> <p>GRAIN SIZE 3-38 Sand 4.5 Silt 65.3 Clay 32.2</p>
					4					<p>TEXTURE: Sand 1 Silt 60 Clay 39</p> <p>COMPOSITION: Quartz 2 Feldspar 15 Mica 3 Heavy minerals 1 Pyrite 1 Clay 20</p> <p>GRAIN SIZE 3-38 Sand 4.5 Silt 65.3 Clay 32.2</p>
					5					<p>TEXTURE: Sand 1 Silt 60 Clay 39</p> <p>COMPOSITION: Quartz 2 Feldspar 15 Mica 3 Heavy minerals 1 Pyrite 1 Clay 20</p> <p>GRAIN SIZE 3-38 Sand 4.5 Silt 65.3 Clay 32.2</p>

SITE 491	HOLE	CORE 30				CORED INTERVAL	257.0-266.5 m	LITHOLOGIC DESCRIPTION		
		FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY				DRILLING STRUCTURES	SAMPLES
LOWER PLOCENE	BIOSTRATIGRAPHIC UNIT	NN 15 <i>Spongaster pentas</i>					<p>MUDDY SILT, grayish olive green (BGY 3/2), soupy to soft. Section 1: minor recipient facility defined by parting planes with polished surfaces, but generally lacking well-developed slickensides. Section 2: soft to firm; drilling laminations abundant below 54 cm; drilling laminations and beds of equal firmness. High angle (85-90°) apparent parting planes forming bedding laminations. Section 3-6: drilling laminations throughout; lamination and biscuits of equal firmness.</p> <p>SMEAR SLIDES</p> <p>Yellowish gray (SY 7/2) area of laboratory core</p> <p>TEXTURE: Sand 1 Silt 70 Clay 29</p> <p>COMPOSITION: Quartz 57 Feldspar 20 Mica 5 Heavy minerals 2 Pyrite 1 Calc. unsp. 15 Carb. unsp. TR Radiolarians TR Diatoms TR Spongy spicules TR</p> <p>GRAIN SIZE 3-105 Sand 85 Silt 67.1 Clay 26.1</p> <p>8 mm thick parallel 37° apparent dip</p>			

SITE 491	HOLE	CORE 29				CORED INTERVAL	247.5-257.0 m	LITHOLOGIC DESCRIPTION		
		FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY				DRILLING STRUCTURES	SAMPLES
LOWER PLOCENE	BIOSTRATIGRAPHIC UNIT	<i>Spongaster pentas?</i>					<p>MUDDY SILT, grayish olive green (BGY 3/2), soft to firm. Laminations abundant; parting planes and biscuits of equal firmness. Minor normal faults offsetting drilling laminations.</p> <p>SMEAR SLIDES</p> <p>3-74 Muddy silt</p> <p>TEXTURE: Sand 2 Silt 60 Clay 38</p> <p>COMPOSITION: Quartz 57 Feldspar 15 Mica 5 Heavy minerals 3 Pyrite 1 Calc. unsp. 15 Carb. unsp. 1 Radiolarians TR Diatoms TR Spongy spicules 1</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 1.75 % CaCO₃ 0.0</p> <p>Yellowish gray (SY 7/2) calcareous ooze</p> <p>Very soft broken up</p>			

SITE 491 HOLE CORE 31 CORED INTERVAL 266.5-276.0 m	TIME - ROCK UNIT LOWER PLEOCENE Spongaster pentas?	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
			DIATOMS	RADOLARIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE			
			CC	B	B	RM	VOID			
1						0.5		MUDDY SILT, grayish olive green (SGY 372), soft to firm. Sections 1 and 2: broken up by drilling, infrequent small (up to 2 mm) pyrite nodules. Section 3: firm, drilling laminations throughout. Section 5: slightly botulbarred, still very broken up. SMEAR SLIDES Thin discontinuous calcareous layer TEXTURE: Sand 5 Silt 52 Clay 43 COMPOSITION: Quartz 52 Feldspar 15 Mica 7 Heavy minerals 2 Pyrite 1 Clay 20 Chalk unspac. TR Radiolarians TR Diatoms TR Sponge spicules TR ORGANIC CARBON AND CARBONATE 3.77 % Organic Carbon 1.1 % CaCO ₃ 0.0		
2					2					
3						3		Drilling lamination These thin (1 mm) layers of fine sand 24" apparent dip		
4					4					
5						5		Drilling lamination		
6					6					
CC										

SITE 491 HOLE CORE 32 CORED INTERVAL 276.0-285.5 m	TIME - ROCK UNIT LOWER PLEOCENE Spongaster pentas	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
			DIATOMS	RADOLARIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE			
			CC	B	B	RM	VOID			
1						0.5		Muddy silt, firm to very firm, grayish olive green (BGY 321); appears as discrete blocks in soupy muddy silt. Section 3: more firm material and less soupy matrix. Section 4: soft to firm, slightly botulbarred, still very broken up. SMEAR SLIDES Eleven fractures over 80 (drilling? tectonic?) TEXTURE: Sand 3 Silt 59 Clay 38 COMPOSITION: Quartz 47 Feldspar 15 Mica 8 Heavy minerals 2 Pyrite 2 Clay 20 Chalk 1 Calc. unspac. TR Radiolarians TR Diatoms TR Sponge spicules TR GRAIN SIZE Sand 3.95 Silt 8.2 Clay 23.1		
2					2					
3						3		Section major fractures are 110 cm of strike material Drilling lamination Three-mm fine sand layer 15" true dip		
4					4					
5						5		Drilling laminations common		
6					6					
CC										

SITE 491	HOLE	CORE 34	CORED INTERVAL	295.0-304.0 m		LITHOLOGIC DESCRIPTION
				SECTION	METERS	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
LOWER PLEISTOCENE	NN 15		1	0.5		MUDDY SILT and MUDDY SILTSTONE, grayish olive green (SGY 312). Chips of indurated material in soupy drilling breccia.
			2	1.0		SMEAR SLIDES HE Applg 273 (D) TEXTURE: Sand 4 Silt 56 Clay 40 COMPOSITION: Quartz 54 Feldspar 7 Mica 3 Heavy minerals 1 Pyrite TR Clay 30 Carb. unspec. 2 Foraminifers TR Radiolarians TR Diatoms 2 Sponge spicules 1
			3			
			4			
			5			Intact but apparently structureless
			6			Same as above but for occasional vague healed fractures (oblique)

SITE 491	HOLE	CORE 33	CORED INTERVAL	285.5-295.0 m		LITHOLOGIC DESCRIPTION
				SECTION	METERS	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
LOWER PLEISTOCENE	Spongster pentast		1	0.5		MUDDY SILTSTONE, grayish olive green (SGY 312), firm to well-indurated internally structureless. Section 2: irregular and straight discontinuous fractures. Section 4: well indurated, with minor spongy material between fragments. Section 5: straight fractures with polished burr facets.
			2	1.0		ORGANIC CARBON AND CARBONATE 7.40 % Organic Carbon 1.5 % CaCO ₃ 0.0 Value bed apparent dip 12°
			3		VOID	
			4			Horizontal bedding clearly disturbed by a discontinuous straight fracture (normal fault?)
			5			
			6			
			7			Horizontal slickensides

SITE 491 TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	CORE 36		METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			HOLE	INTERVAL					
LOWER PLOCENE	NN 15 <i>Spongaster pentas?</i>		314.0	323.5 m					<p>MUDDY SILTSTONE, grayish olive green (BGY 3/2). Section 1: indurated blocks in chiling breccia. Section 3: mostly soft, water saturated. Section 4: irregular, shot, discontinuous fractures throughout core.</p> <p>SMEAR SLIDES</p> <p>5.141 Muddy 5.26 Muddy (D) (M)</p> <p>Texture: 8 2 Silt 72 38 Clay 20 60</p> <p>COMPOSITION: Quartz 85 98 Feldspar 3 2 Mica 3 2 Heavy minerals TR 1 Pyrite TR 1 Clay 20 50 Carb. unsp. 2 2 Radiolarians TR TR Diatoms 1 TR Sponge spicules TR TR</p> <p>Fissility: 30' apparent dip Silty, fissility horizontal</p> <p>Drilling breccia</p> <p>Vague fissility B' apparent dip</p> <p>Horizontal fissility</p> <p>Vague fissility Vague fissility, 10' apparent dip</p> <p>Bedded fault: 68' apparent dip 1.5 cm fine sand bed, diffuse top with small ripples; 17' true dip</p>

SITE 491 TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	CORE 35		METERS	GRAPHIC LITHOLOGY	DRILLING STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			HOLE	INTERVAL					
LOWER PLOCENE	NN 15 <i>Spongaster pentas?</i>		304.5	314.0 m					<p>MUDDY SILT, grayish olive green (BGY 3/2). Sections 1 and 2: soupy, structureless. Section 3: soft to firm, but veiling on shaly in places. Section 4: firm to hard.</p> <p>SMEAR SLIDES</p> <p>4.190 Muddy (D) (M)</p> <p>Texture: 20 Sand 50 Silt 30 Clay 58</p> <p>COMPOSITION: Quartz 7 Feldspar 3 Mica 3 Heavy minerals 1 Pyrite 1 Clay 25 Carb. unsp. 2 Radiolarians TR Diatoms 1 Sponge spicules 2</p> <p>GRAIN SIZE Sand 320 Silt 12.5 Clay 65.0 22.5</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 2.8 % CaCO₃ 0.0</p> <p>Fracture 28' dip Slight fissility, bedding, apparent dip 38'</p> <p>Very vague fissility? bedding, apparent dip 30'</p> <p>Vague fissility, apparent dip 35'</p> <p>Vague bedding apparent dip 27'</p>

SITE 491	HOLE	CORE 37	CORED INTERVAL	323.5-333.0 m	LITHOLOGIC DESCRIPTION	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES
						DIATOMS	RADIOLARIANS					
TIME - ROCK	UNIT	BOSTRATIGRAPHIC ZONE	FORAMINIFERS					1	0.5			
LOWER Pliocene		NN 15 Spongsiter pentas?						2	1.0			GZ +
								3				
								4				
								5				

Muddy silt, grayish olive green (5GY 3/2). Section 1: some drilling laminations, deformed moderate mottling (not sure if bioturbation). Sections 2 and 3: same as Section 1, left to moderate firm. Section 5: all beds wavy, discontinuous, 0-80 cm, firm muddy silt, 100-150 cm: muddy siltstone.
SMEAR SLIDES
 4-120 Muddy
 3 Muddy
 5 Muddy
 40 Muddy
TEXTURE:
 Sand 3
 Silt 5
 Clay 40
COMPOSITION:
 Quartz 55
 Feldspar 8
 Mica 5
 Heavy minerals TR
 Pyrite 1
 Clay 30
 Radiolarians TR
 Sponges spicules TR
 Occasional drilling lamination
GRAIN SIZE
 Sand 2-50
 Silt 63.7
 Clay 27.5
ORGANIC CARBON AND CARBONATE
 % Organic Carbon 1.1
 % CaCO₃ 1.0
VOID
 Voids in sand bed, normal faults (drilling artifact?)
VOID
 Well developed drilling laminations
 Fault (no slickensides), discontinuous fine sand layers

SITE 491	HOLE	CORE 38	CORED INTERVAL	333.0-342.5 m	LITHOLOGIC DESCRIPTION	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES
						DIATOMS	RADIOLARIANS					
TIME - ROCK	UNIT	BOSTRATIGRAPHIC ZONE	FORAMINIFERS					1	0.5			
LOWER Pliocene		NN 15 Spongsiter pentas?						2	1.0			GZ

Muddy silt, grayish olive green (5GY 3/2) with fine sand beds. Section 1: wavy and soft, structureless. Section 2: sands very disturbed, only fragments of beds left, no apparent bedding, all chaotic.
SMEAR SLIDES
 280 Muddy
 5 Muddy
 40 Muddy
TEXTURE:
 Sand 5
 Silt 55
 Clay 40
COMPOSITION:
 Quartz 52
 Feldspar 4
 Mica 5
 Heavy minerals TR
 Pyrite 1
 Clay 35
 Carb. unsp. TR
 Nanofossils TR
 Diatoms 2
 Sponges spicules 1
GRAIN SIZE
 Sand 2-90
 Silt 11.4
 Clay 60.9
 27.7

SITE 491	HOLE	CORE 39	CORED INTERVAL	342.5-352.0 m	LITHOLOGIC DESCRIPTION	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES
						DIATOMS	RADIOLARIANS					
TIME - ROCK	UNIT	BOSTRATIGRAPHIC ZONE	FORAMINIFERS					1	0.5			
LOWER Pliocene		Spongsiter pentas?						2	1.0			GZ
								3				

Muddy siltstone, olive gray (5Y 3/2) to grayish olive (10Y 4/2) with fine sand. Section 1: light and dark shade changes define bedding at several cm scale; also possible minor drilling laminations at base. Sections 2 and 3: apparent chaotic bedding.
SMEAR SLIDES
 285 Muddy
 15 Muddy
 55 Muddy
 30 Muddy
TEXTURE:
 Sand 15
 Silt 55
 Clay 30
COMPOSITION:
 Quartz 60
 Feldspar 10
 Mica 4
 Pyrite 1
 Clay 25
 Glauconite TR
 Diatoms TR
 Sponges spicules TR
GRAIN SIZE
 Sand 1-80
 Silt 12.3
 Clay 61.7
 20.0

SITE 491	HOLE	CORE 39	CORED INTERVAL	342.5-352.0 m	LITHOLOGIC DESCRIPTION	FOSSIL CHARACTER		SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES
						DIATOMS	RADIOLARIANS					
TIME - ROCK	UNIT	BOSTRATIGRAPHIC ZONE	FORAMINIFERS					1	0.5			
LOWER Pliocene		Spongsiter pentas?						2	1.0			GZ
								3				

Fossil clay dipping at 55-80° true
 Wavy fine sand layers
 Fine sand

SITE 491	HOLE	CORE 41	CORED INTERVAL	381.5-371.0 m	LITHOLOGIC DESCRIPTION	SAMPLES	DISTANCE	DRILLING	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT		
															DIATOMS	RADICULARIANS
					<p>Drilling breccia</p> <p>Drilling breccia</p> <p>Dark (gray) silt Fine sand, 2° true dip</p> <p>Fossil</p> <p>Silt, 11° true dip Silt, apparent horizontal Silt, 29° true dip Fine sand, 0° apparent dip</p> <p>Very fine sand, 38° true dip</p> <p>Silt layer</p> <p>150-80 cm highly contorted beddings, minor drilling laminations</p> <p>27° apparent dip, some drilling laminations</p> <p>Pyritic very fine sand, 11° apparent dip</p> <p>Fine sand beds Fine sand, 2° true dip Pyritic silt, apparent dip 15° Fine sand, apparent dip 0° Sand</p>											
					<p>Drilling breccia</p> <p>Drilling breccia</p> <p>Dark (gray) silt Fine sand, 2° true dip</p> <p>Fossil</p> <p>Silt, 11° true dip Silt, apparent horizontal Silt, 29° true dip Fine sand, 0° apparent dip</p> <p>Very fine sand, 38° true dip</p> <p>Silt layer</p> <p>150-80 cm highly contorted beddings, minor drilling laminations</p> <p>27° apparent dip, some drilling laminations</p> <p>Pyritic very fine sand, 11° apparent dip</p> <p>Fine sand beds Fine sand, 2° true dip Pyritic silt, apparent dip 15° Fine sand, apparent dip 0° Sand</p>											

SITE 491	HOLE	CORE 40	CORED INTERVAL	352.0-381.5 m	LITHOLOGIC DESCRIPTION	SAMPLES	DISTANCE	DRILLING	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT
					<p>Fossil</p> <p>Drilling lamination</p> <p>29° apparent dip</p> <p>Fossil</p> <p>28° apparent dip</p> <p>31° apparent dip</p> <p>Definite bioturbation</p> <p>Silt</p> <p>Fine to medium sand graded, 10° true dip</p> <p>Waxy, discontinued beds</p> <p>Fragments only 2 cm Core Catcher</p>									
					<p>Fossil</p> <p>Drilling lamination</p> <p>29° apparent dip</p> <p>Fossil</p> <p>28° apparent dip</p> <p>31° apparent dip</p> <p>Definite bioturbation</p> <p>Silt</p> <p>Fine to medium sand graded, 10° true dip</p> <p>Waxy, discontinued beds</p> <p>Fragments only 2 cm Core Catcher</p>									

SITE 481 HOLE CORE 42 CORED INTERVAL 371.0-380.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS					
LOWER Pliocene	NN 15 <i>Spongaster pentas?</i>				0.5			<p>MUDDY SILT, soft to hard, grayish olive green (SGY 3/2) to olive gray (SY 3/2). Section 2: drilling laminations throughout (olive gray, SY 3/2). Section 3: drilling laminations throughout (olive gray, SY 3/2). Section 4: soft to firm, irregular fracturing/irregular fissility (polished surfaces on fracture fragments). Section 5: firm muddy silt, in places muddy siltstone.</p> <p>130-150 cm: extremely fine, olive green, folded, overturned etc., picked out by grayish olive green (major) and olive gray (minor) color variations.</p> <p>35-50 cm: very soft zone</p> <p>5Y 3/2 drilling lamination</p> <p>2 cm thick, drilling lamination</p> <p>Healed fractures</p> <p>VOID</p> <p>Vague fissility</p> <p>Vague healed fracture</p>	
					1.0			<p>65-80 cm fissile</p>	
					2			<p>SMEAR SLIDES</p> <p>Texture: 25 Sand, 45 Silt, 30 Clay</p> <p>Composition: 72 Quartz, 5 Feldspar, 2 Mica, 2 Heavy minerals, 1 Pyrite, 1 Clay, 1 Organic</p> <p>Grain size: 5-15 Sand, 8-1 Silt, 5 Clay, 28.3 Organic Carbon and Carbonate</p> <p>% Organic Carbon 1.3, % CaCO₃ 2.0</p>	
					3			<p>SMEAR SLIDES</p> <p>Texture: 4 Sand, 70 Silt, 26 Clay</p> <p>Composition: 57 Quartz, 7 Feldspar, 9 Mica, 1 Pyrite, 1 Clay, 30 Organic</p>	
					4			<p>SMEAR SLIDES</p> <p>Texture: 4 Sand, 70 Silt, 26 Clay</p> <p>Composition: 57 Quartz, 7 Feldspar, 9 Mica, 1 Pyrite, 1 Clay, 30 Organic</p>	
					5			<p>SMEAR SLIDES</p> <p>Texture: 4 Sand, 70 Silt, 26 Clay</p> <p>Composition: 57 Quartz, 7 Feldspar, 9 Mica, 1 Pyrite, 1 Clay, 30 Organic</p>	
					6			<p>SMEAR SLIDES</p> <p>Texture: 4 Sand, 70 Silt, 26 Clay</p> <p>Composition: 57 Quartz, 7 Feldspar, 9 Mica, 1 Pyrite, 1 Clay, 30 Organic</p>	

SITE 481 HOLE CORE 43 CORED INTERVAL 380.5-380.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS					
LOWER Pliocene	NN 15 <i>Spongaster pentas?</i>				0.5			<p>Special high freshed cement, possibly originally presence of thin sand, shales</p> <p>MUDDY SILTSTONE: grayish olive green (SGY 3/2) in places soft to firm silt with fine SAND beds.</p> <p>Intense irregular fracturing</p> <p>Fine sand, 15' apparent dip</p> <p>Bedding 8' apparent dip</p> <p>Bedding picked out by sandier silt in muddy siltstone, 15' apparent dip</p> <p>Fine sand, 18' apparent dip</p> <p>Fractured with some horizontal</p> <p>Bedding 10-20' apparent dip</p> <p>Sponge</p> <p>Fine sand, 20' apparent dip</p> <p>Zone of complex color (SY 3/2) bands up to 1 cm thick concentrated "tools" and vertical stress common</p> <p>Minor short fractures with polished surfaces</p> <p>Bedding in muddy siltstone</p> <p>Fracture 50' apparent dip</p> <p>Silt bed</p> <p>22' true dip</p> <p>12' apparent dip</p> <p>20' apparent dip</p> <p>Bedding 20' true dip</p> <p>Graded sand bed medium fine</p>	
					1.0			<p>Intense irregular fracturing</p> <p>Fine sand, 15' apparent dip</p> <p>Bedding 8' apparent dip</p> <p>Bedding picked out by sandier silt in muddy siltstone, 15' apparent dip</p> <p>Fine sand, 18' apparent dip</p> <p>Fractured with some horizontal</p> <p>Bedding 10-20' apparent dip</p> <p>Sponge</p> <p>Fine sand, 20' apparent dip</p> <p>Zone of complex color (SY 3/2) bands up to 1 cm thick concentrated "tools" and vertical stress common</p> <p>Minor short fractures with polished surfaces</p> <p>Bedding in muddy siltstone</p> <p>Fracture 50' apparent dip</p> <p>Silt bed</p> <p>22' true dip</p> <p>12' apparent dip</p> <p>20' apparent dip</p> <p>Bedding 20' true dip</p> <p>Graded sand bed medium fine</p>	
					2			<p>SMEAR SLIDES</p> <p>Texture: 4 Sand, 70 Silt, 26 Clay</p> <p>Composition: 57 Quartz, 7 Feldspar, 9 Mica, 1 Pyrite, 1 Clay, 30 Organic</p>	
					3			<p>SMEAR SLIDES</p> <p>Texture: 4 Sand, 70 Silt, 26 Clay</p> <p>Composition: 57 Quartz, 7 Feldspar, 9 Mica, 1 Pyrite, 1 Clay, 30 Organic</p>	
					4			<p>SMEAR SLIDES</p> <p>Texture: 4 Sand, 70 Silt, 26 Clay</p> <p>Composition: 57 Quartz, 7 Feldspar, 9 Mica, 1 Pyrite, 1 Clay, 30 Organic</p>	
					5			<p>SMEAR SLIDES</p> <p>Texture: 4 Sand, 70 Silt, 26 Clay</p> <p>Composition: 57 Quartz, 7 Feldspar, 9 Mica, 1 Pyrite, 1 Clay, 30 Organic</p>	
					6			<p>SMEAR SLIDES</p> <p>Texture: 4 Sand, 70 Silt, 26 Clay</p> <p>Composition: 57 Quartz, 7 Feldspar, 9 Mica, 1 Pyrite, 1 Clay, 30 Organic</p>	

SITE 491 HOLE CORE 44 CORED INTERVAL 390.0-399.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER PLEISTOCENE	NN 15 <i>Spongaster pentast?</i>	FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS	1 1.0		0 ○			MUDDY SILT (SILTSTONE), grayish olive green (SGY 3/2) with fine SAND and SANDY MUD. Section 1, cont. from above. Section 2, silty. Section 3, firm to hard, locally classifiable as MUDDY SILTSTONE "swirly", color bands in muddy siltstone; 7 compacted ball and pillow structure?
			2		○			<p>Section 3:</p> <p>SMEAR SLIDES</p> <p>3/15 3/14 (M) (D)</p> <p>Sand Silt Clay Quartz Feldspar Mica Heavy minerals Pyrite Clay Carb. unsp. spec. Nannofossils Radiolarians Diatoms Sponge spicules</p> <p>TEXTURE: Sand 2 35 Silt 68 10 Clay 30 55</p> <p>COMPOSITION: Quartz 60 40 Feldspar 9 5 Mica 9 5 Heavy minerals TR 1 Pyrite 1 TR Clay 25 55 Carb. unsp. spec. 1 TR Nannofossils TR - Radiolarians TR - Diatoms 1 TR Sponge spicules 1 TR</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 1.3 % CaCO₃ 2.0</p>
			3		○			<p>Fine to medium sandy mud with a gradational, highly irregular, base as shown</p> <p>Bedding in muddy silt and healed fractures</p> <p>Diffuse fine sand concentration</p> <p>1 cm graded fine sand bed</p> <p>Darker area, curving bands as illustrated</p>
			4		○			
			CC 4					

SITE 481 HOLE CORE 45 CORED INTERVAL 399.5-409.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER PLEISTOCENE	NN 15 <i>Spongaster pentast?</i>	FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS	1 1.0		○			MUDDY SILTSTONE with MUDSTONE, both grayish olive green (SGY 3/2) and fine to medium SAND. Section 1: fractured blocks in drilling breccia, soupy matrix.
			2		○			<p>SMEAR SLIDES</p> <p>4/42 4/96 (M) (D)</p> <p>Muddy Siltstone</p> <p>TEXTURE: Sand 7 15 Silt 53 30 Clay 40 55</p> <p>COMPOSITION: Quartz 59 43 Feldspar 6 6 Mica 1 1 Heavy minerals TR 1 Pyrite TR 1 Clay 30 50 Carb. unsp. spec. TR TR Nannofossils TR TR Diatoms TR - Sponge spicules 1 -</p>
			3		○			<p>Sand beds and muddy siltstone cut by a preconsolidated fracture system</p> <p>Vuggy parallel lamination</p> <p>Fine sand, 18° true dip</p> <p>Prominent sand concentration</p> <p>Vague diffuse concentration of fine sand</p>
			4		○			<p>Bedding within muddy siltstone, apparent dip 10°</p> <p>Bedding apparent dip 12°</p> <p>Bedded fracture 50° apparent dip</p>
			CC					

SITE 481 HOLE CORE 46 CORED INTERVAL 409.0-418.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	DRILLING DISTANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER PLEISTOCENE	<i>Spongaster pentast?</i>	FORAMINIFERS NANNOFOSSILS RADIOLARIANS DIATOMS	1 1.0		○			MUDDY SILT, grayish olive green (SGY 3/2).
			2		○			<p>SMEAR SLIDES</p> <p>1-141 Muddy Silt</p> <p>TEXTURE: Sand 10 Silt 30 Clay 30</p> <p>COMPOSITION: Quartz 64 Feldspar 7 Mica 2 Heavy minerals TR Pyrite TR Clay 25 Carb. unsp. spec. 1 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1</p>
			CC					

SITE 481	HOLE	CORE 48	CORED INTERVAL	428.0-437.5 m	LITHOLOGIC DESCRIPTION	DIAMETER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	FOSSIL CHARACTER				BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT
													DIATOMS	RADOLIARIANS	NANNOFOSSILS	FORAMINIFERS		
					Drilling breccia and soup		1	0.5	VOID									
					Soft, sandy soup with angular fragments of lithified muddy siltstone		2	1.0										
							3											
							4											
							5											
							6											
							7											
							CC											

SITE 491	HOLE	CORE 47	CORED INTERVAL	418.5-428.0 m	LITHOLOGIC DESCRIPTION	DIAMETER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	FOSSIL CHARACTER				BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT
													DIATOMS	RADOLIARIANS	NANNOFOSSILS	FORAMINIFERS		
					Muddy silt, grayish olive green (SGY 3/2). Section 1: soupy to firm. Section 2: soft to firm, drilling laminations abundant.		1	0.5	VOID									
							2	1.0										
							3											
							CC											

LITHOLOGIC DESCRIPTION

Muddy silt, grayish olive green (SGY 3/2). Section 1: soupy to firm. Section 2: soft to firm, drilling laminations abundant.

SMEAR SLIDES

Texture: Sand 10, Silt 95, Clay 5, Quartz 50, Feldspar 25, Mica 2, Heavy minerals 2, Pyrite 3, Clay 15, Glass 1, Carb. waste: 1, Forams: TR, Nannofossils TR, Radiolarians TR, Diatoms 1, Sponge spicules TR

GRAIN SIZE

Sand 2-80, Silt 62-5, Clay 22-0

ORGANIC CARBON AND CARBONATE

% Organic Carbon 1.2, % CaCO₃ 2.0

FOSSIL CHARACTER

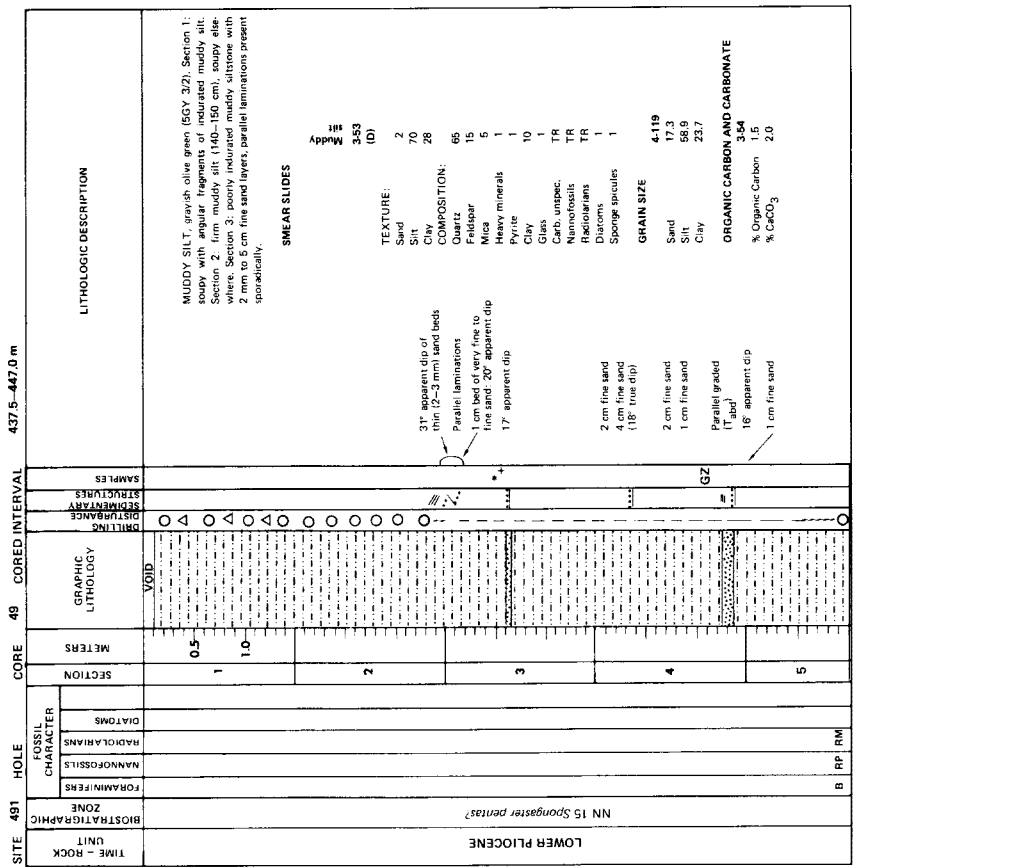
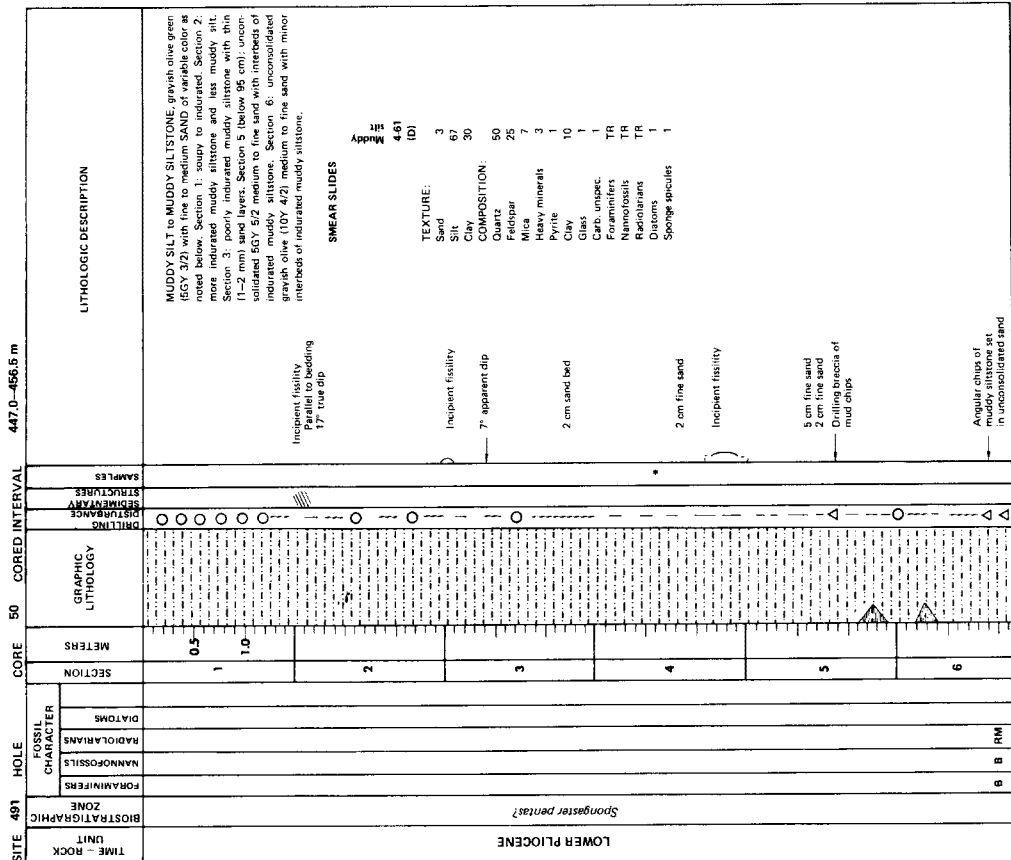
DIATOMS
RADOLIARIANS
NANNOFOSSILS
FORAMINIFERS

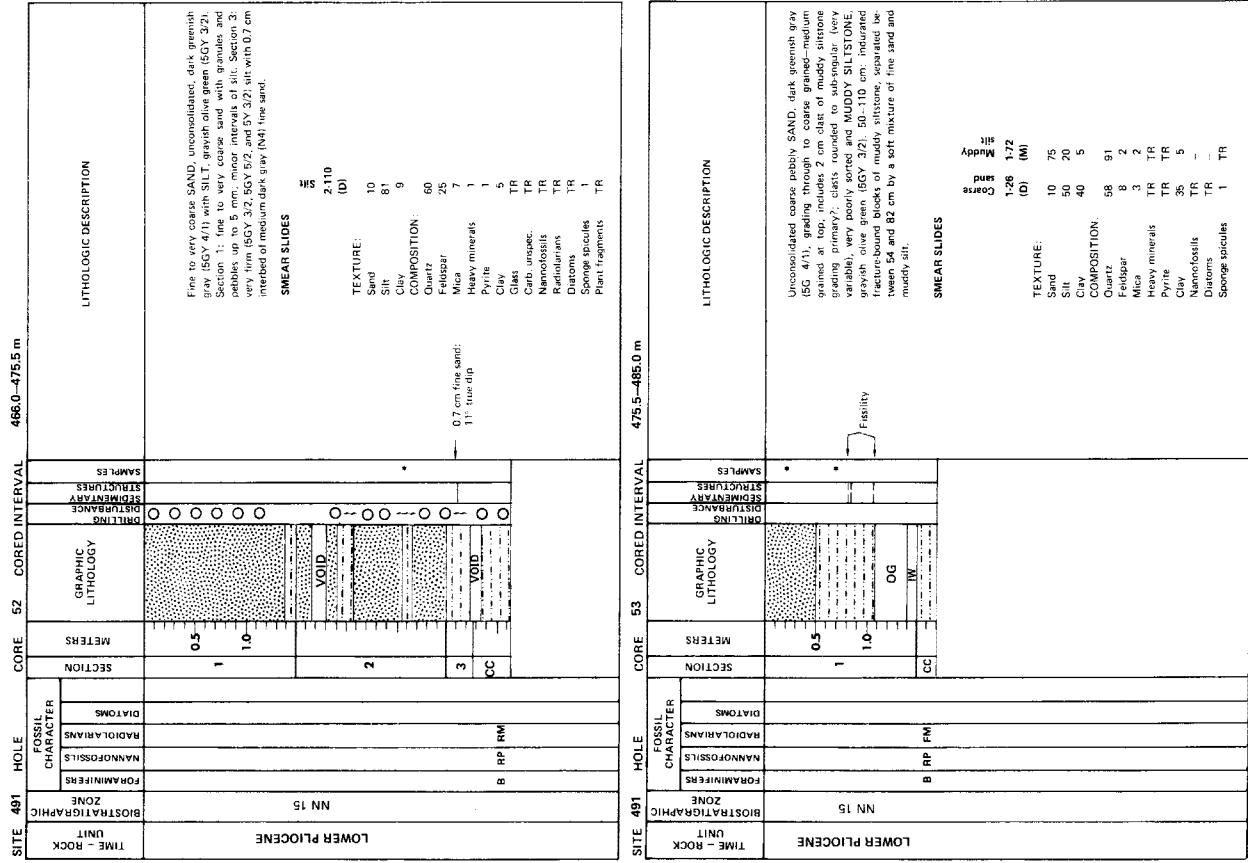
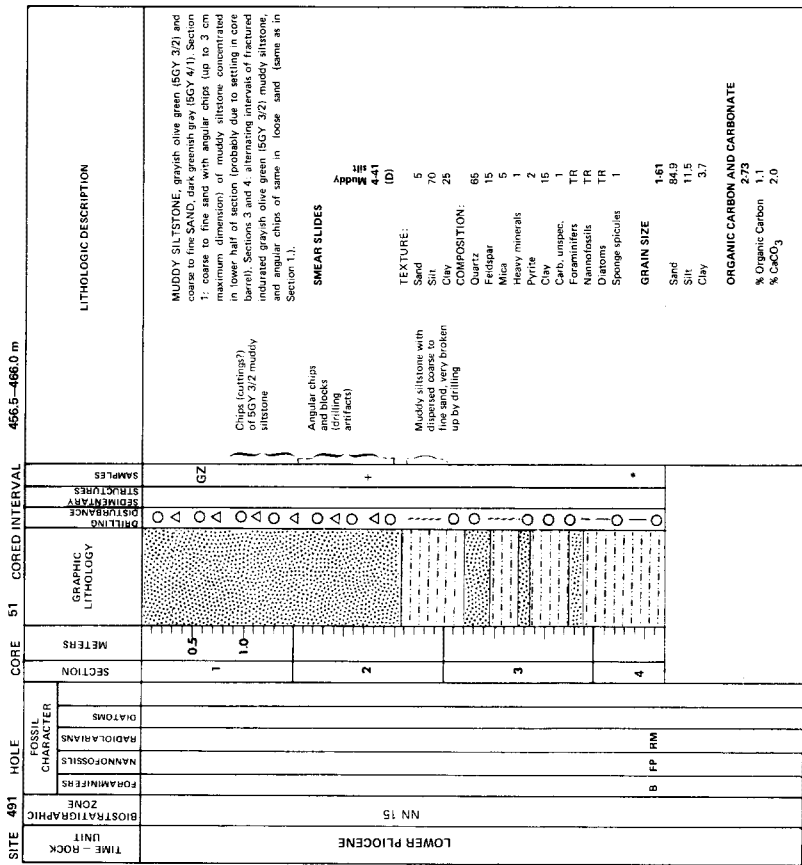
BIOSTRATIGRAPHIC ZONE

LOWER PLEISTOCENE

TIME - ROCK UNIT

NN 15 *Spongiaster pentast*





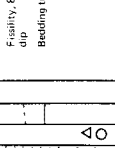
SITE 491	HOLE	CORE 55		CORED INTERVAL		494.5-504.0 m		
		FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING	SEDIMENTARY STRUCTURES	SAMPLES
TIME - ROCK UNIT	LOWER PLIOCENE							
BIOSTRATIGRAPHIC ZONE	NN 15							
FOSSIL CHARACTER								
SECTION		1						
METERS		0.5						
GRAPHIC LITHOLOGY								
DRILLING								
SEDIMENTARY STRUCTURES								
SAMPLES								
LITHOLOGIC DESCRIPTION		<p>Section 1: intense fracturing; 0-80 cm, close (generally < 1 cm), slightly irregular - dip 90-90°; 80-100 cm, 1-2 cm spaced, predominantly horizontal fractures; 100-150 cm, close fractures, sandy matrix; 150-180 cm, 2 sets of fractures (one set illustrated) (1) 0-12° and (2) 45-80°, one example with slicken-sides.</p> <p>Section 2 and 3: fractured throughout, variable intensity. Straight fractures are horizontal or steeply inclined (60-80°) in both directions. Soft, muddy silt matrix permeates between fracture-bound blocks in several places.</p> <p>SNEAR SLIDES</p> <p>Texture: Sand, Silt, Clay, Feldspar, Quartz, Mica, Heavy minerals, Pyrite, Calcite, Chert nodules, Foraminifers, Nannofossils, Radiolarians, Diatoms, Sponge spicules.</p> <p>Composition: Mica, Heavy minerals, Pyrite, Calcite, Chert nodules, Foraminifers, Nannofossils, Radiolarians, Diatoms, Sponge spicules.</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 1.1 % CaCO₃ 1.0</p>						

SITE 491	HOLE	CORE 54		CORED INTERVAL		485.0-494.5 m		
		FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING	SEDIMENTARY STRUCTURES	SAMPLES
TIME - ROCK UNIT	LOWER PLIOCENE							
BIOSTRATIGRAPHIC ZONE								
FOSSIL CHARACTER								
SECTION		1						
METERS		0.5						
GRAPHIC LITHOLOGY								
DRILLING								
SEDIMENTARY STRUCTURES								
SAMPLES								
LITHOLOGIC DESCRIPTION		<p>Muddy siltstone, grayish-olive green (EGY 3/2), increased to FINE SAND in COARSE SAND in Section 2. Fewer muddy silt blocks, none in original position.</p> <p>Section 1, 70 cm:</p> <p>Trace fossil on base of bed (x 3/4)</p> <p>Vague annular markings</p> <p>Plan View - 3 cm</p> <p>Section View -</p> <p>1.5' apparent dip, weakly bedded in sandy unit, peculiar slightly wavy drilling lamination</p>						

SITE 491 HOLE CORE 56 CORED INTERVAL 504.0-519.5 m

TIME ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION METERS	ORGANIC LITHOLOGY	DRILLING DISTURBANCE SAMPLES	LITHOLOGIC DESCRIPTION	
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION METERS					
LOWER PLEISTOCENE	NN 15						0.5			<p>MUDDY SILTSTONE, grayish clay state (EGY 3/2), sandy and blocky, overlain by more soupy matrix, horizontal and subhorizontal fracturing often closely-spaced and flaggy predominates; probably bedding. Section 2, becoming more matrix-rich, so that blocks are all displaced. Section 4, is soft to firm, core largely intact, little internal structures visible.</p>	
							1			<p>1 cm thick sand bed (fine sand)</p>	
							1.0				<p>Bedding? trace</p>
											<p>Localized flexibility 20' apparent dip</p>
		B	FM	FM							

SITE 491 HOLE CORE 57 CORED INTERVAL 513.5-523.0 m

TIME ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION METERS	ORGANIC LITHOLOGY	DRILLING DISTURBANCE SAMPLES	LITHOLOGIC DESCRIPTION	
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION METERS					
LOWER PLEISTOCENE	NN 15						0.5			<p>MUDDY SILTSTONE, grayish clay state (EGY 3/2), with fine to medium SAND. In Section 2 chips float in soft soupy matrix, in places rich in fine sand.</p>	
							1.0			<p>Facility, 8' apparent dip Bedding trace?</p>	
											
											<p>SMEAR SLIDES</p> <p>Fine sand, soupy matrix fragments of muddy siltstone Facility probably bedding Prominent fractures</p>
											<p>TEXTURE: Sand 8 60 Silt 62 20 Clay 30 20</p> <p>COMPOSITION: Quartz 61 70 Feldspar 7 6 Mica 3 3 Heavy minerals 1 1 Clay 25 20 Glims TR - Carb. unspacc. TR - Foraminifers TR - Nannofossils TR - Radiolarians TR - Diatoms TR - Sponge spicules TR - Plant fragments TR -</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 5-94 % CaCO₃ 0.9 0.0</p>
										<p>Very fine muddy sand</p>	
										<p>Faint bioturbation Very fine muddy sand layer</p>	
										<p>Incomplete sandy beds</p>	
		B	RP	RM							

SITE 491 HOLE CORE 58 CORED INTERVAL 523.0-532.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS						
LOWER PLEISTOCENE	NN 15	B	RP	RM	1	0.5	Silt lamination 28" apparent dip		*	MUDDY SILTSTONE, grayish olive green (GGY 3:2) with very fine to coarse SAND.	
					2	1.0	Drilling breccia			SMEAR SLIDES TEXTURE: 1.50 (D) Muddy Sand 15 Silt 25 Clay 30 COMPOSITION: 60 Quartz Feldspar 9 Mica 4 Heavy mineral TR Pyrite 1 Clay 25 Biogenic: Radiolarians TR Diatoms 1 Sponge spicules TR	
					3		Drilling breccia			TEXTURE: 1.50 (D) Muddy Sand 15 Silt 25 Clay 30 COMPOSITION: 60 Quartz Feldspar 9 Mica 4 Heavy mineral TR Pyrite 1 Clay 25 Biogenic: Radiolarians TR Diatoms 1 Sponge spicules TR	
					4		Fine sand			TEXTURE: 1.50 (D) Muddy Sand 15 Silt 25 Clay 30 COMPOSITION: 60 Quartz Feldspar 9 Mica 4 Heavy mineral TR Pyrite 1 Clay 25 Biogenic: Radiolarians TR Diatoms 1 Sponge spicules TR	
					CC		Grabbed sand, coarse to fine			Fine sand Very fine sand Very fine sand	

SITE 491 HOLE CORE 59 CORED INTERVAL 532.5-542.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS						
LOWER PLEISTOCENE	NN 15	B	RP	RM	1	0.5	Medium sand			MUDDY SILTSTONE and coarse to medium SAND.	
					CC	1.0	Coarse to medium sand, probably graded			SMEAR SLIDES TEXTURE: 1.55 (D) Muddy Sand 10 Silt 60 Clay 30 COMPOSITION: 99 Quartz Feldspar 8 Mica 5 Heavy minerals TR Pyrite 2 Clay 24 Diatoms Sponge spicules TR	

SITE SUMMARY SHEET

SITE 492

Date occupied: 20 April 1979

Date departed: 23 April 1979

Time on hole: 72.5 hours

Position: latitude: 16°04.73'N

longitude: 98°56.72'W

Water depth (sea level): 1935 corrected meters, echo sounding

Water depth (rig floor): 1945 corrected meters, echo sounding

Bottom felt at: 1972.5 meters, drill pipe

Penetration: 279 meters

Number of cores: 31

Total length of cored section: 279 meters

Total core recovery: 189.6 meters

Percentage core recovery: 68%

Oldest Sediment Cored

Depth sub-bottom: 279 meters

Nature: Siltstone and sand

Age: Late Miocene

Basement

Depth sub-bottom: Not penetrated

Principal Results -- Holes 492, 492A, and 492B

At Site 492, we penetrated 279 meters and recovered 31 cores comprising two lithologic units. Unit 1 extends from 0–247 meters and consists predominantly of upper Miocene to Quaternary silt-siltstone. Gassy ice occurred at 141 and 170 meters and may indicate gas hydrate. Upper Miocene muddy siltstone with interbedded sand and granular gravel constitutes Unit 2 between 247 and 279 meters. Bedding in Unit 1 ranges from horizontal to overturned and locally defines folds. Muddy siltstone intervals below 250 meters resemble "scaly argillite" where they are cut by slickensided and astomosing fractures. The interbedded sands and mudstones of Unit 2 probably represent uplifted trench for lower slope deposits and correlate with the landward dipping reflectors evident on the seismic profile through the site.

SITE 482	HOLE	CORED INTERVAL		CORED INTERVAL	3.5--13.0 m	LITHOLOGIC DESCRIPTION
		CORE 2	HOLE			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
UPPER QUATERNARY	NN 20	DIATOMS	2	2		Muddy silt 1-10 (D) 1-130 (M) 4-60 (D) 4-60 (M)
AG AG AG		DIATOMS	3	3		
		DIATOMS	4	4		
		DIATOMS	5	5		
		DIATOMS	6	6		

SITE 482	HOLE	CORED INTERVAL		CORED INTERVAL	0.0--3.5 m	LITHOLOGIC DESCRIPTION
		CORE 1	HOLE			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
UPPER QUATERNARY	NN 20/NN 27	DIATOMS	2	2		Muddy silt 1-145 (D) Carbonaceous
		DIATOMS	3	3		
		DIATOMS	CC	CC		

SITE	492 HOLE	CORE	CORED INTERVAL	22.5-32.0 m	SAMPLER	DEPTH	DIAGRAM	METERS	SECTION	FOSSIL CHARACTER				BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	LITHOLOGIC DESCRIPTION	
										DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS				
								0.5							Muddy silt grayish olive green (5GY 3/2), firm to soft. Minor irregular lighter colored (light olive, 10Y 5/4) areas of slightly calcareous muddy silt. Lens of greenish black (5G 2/1) GLAUCONITIC MUDDY SILT at Section 1, 80 cm. At Section 5, 52 cm 2 mm light olive brown (5Y 9/6) nodular zirconifer? Section 6 is MUDDY SILT, grayish olive green (5GY 3/2). SMEAR SLIDES Muddy silt 1-80 374 6-127 Glauconitic mucky silt (M) (D) (I) (D) 15 1 3 56 38 57 30 60 49 COMPOSITION: 53 38 51 Feldspar 4 6 5 Mica 1 3 3 Heavy minerals TR TR TR Pyrite 12 2 2 Clay 20 50 35 Glass - - TR - Glauconite - TR - Foraminifera - TR - Nannofossils TR TR TR Radiolarians TR - TR Diatoms TR TR 2 Sponges spicules TR 1 2 Silicoflagellates TR - TR GRAIN SIZE Sand 6.55 Silt 5.5 64.0 Clay 36.5		
								1.0						VOID			
								2									
								3			FM						
								4									
								5									
								6									
								7									
								CC									

SITE	492 HOLE	CORE	CORED INTERVAL	13.0-22.5 m	SAMPLER	DEPTH	DIAGRAM	METERS	SECTION	FOSSIL CHARACTER				BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	LITHOLOGIC DESCRIPTION
										DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS			
								0.5							MUDDY SILT grayish olive green (5GY 3/2), soft to firm, vague blocky parallel laminations of lighter (dusky yellow green, 5GY 5/2) muddy silt at Section 1, 15-20 cm. Minor VITRIC MUDDY SILT at Section 2, 81 cm. Mottled Section 1, 80 cm to Section 2, 40 cm with irregular round red lumps of firm muddy silt set in soft muddy silt - possibly due to coring. Minor amounts of interbedded olive gray (5Y 5/2) GLAUCONITIC MUDDY SAND below Section 3, 140 cm. Occasional sponge remains. SMEAR SLIDES Muddy silt 2-90 41 4-90 Muddy silt Glauconitic (M) (D) (I) (M) (M) 2 2 2 10 10 5 53 60 25 45 40 40 COMPOSITION: 58 48 49 Quartz 10 10 5 Mica 2 2 2 Heavy minerals 3 1 1 Pyrite 20 25 20 Glass 1 10 TR Glauconite TR - 12 Carb. unspic. 3 1 4 Foraminifera - TR 1 Nannofossils TR TR 3 Diatoms TR 1 TR Sponges spicules TR - TR Plant fragments TR - - GRAIN SIZE Sand 2.90 Silt 10.3 52.0 Clay 37.7 ORGANIC CARBON AND CARBONATE % Organic Carbon 3.58 % CaCO ₃ 1.8 5.0	
								1.0								
								2								
								3								
								4								
								5								
								CC								

SITE 492	HOLE	CORE 6			CORED INTERVAL			41.5-51.0 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS	GRAPHIC LITHOLOGY	DIATOMS	RADIOLARIANS	NANOFOSSILS		
		1	0.5						<p>MUDDY SILT grayish olive green (BGY 3/2), soft to very firm. Minor ASH spot at Section 1, 40 cm and Section 4, 50 cm, dispersed in Section 6. Glauconite concentrations interbedded at Section 2, 30 cm, 55 cm, and 95 cm. MUD interbedded at Section 2, 70-150 cm. Scattered wood frag. in Section 1, 35 cm and 50-95 cm.</p> <p>A Scale of 1 cm. 4.5 x 3 CM LUMESTONE marked with grayish green (106Y 5/2) with internal mottling - probably bioturbated.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Sand 40 2 1 Silt 20 53 40 Clay 40 45 59</p> <p>COMPOSITION: Quartz 49 48 36 Feldspar 5 5 5 Heavy minerals TR TR TR Pyrite 4 2 1 Clay 35 40 50 Glauconite 5 TR TR Foraminifera TR - - Radiolarians TR TR - Diatoms TR 1 2 Sponge spicules TR 2 2 Succinea spicules TR - - Succinopollens TR - -</p> <p>GRAIN SIZE Sand 1-80 Silt 17.9 Clay 60.9 21.2</p>
		2	1.0						
		3							
		4							
		5							
		6							
		CC							
		LOWER PLOCENE			Spongaster pentas				
		GZ							

SITE 492	HOLE	CORE 5			CORED INTERVAL			32.0-41.5 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS	GRAPHIC LITHOLOGY	DIATOMS	RADIOLARIANS	NANOFOSSILS		
		1	0.5						<p>MUDDY SILT grayish olive green (BGY 3/2), soft to firm. Small 12 cm spots of grayish yellow green (BGY 7/2) slightly calcareous material at Section 1, 35 cm and 50 cm. Mud interbedded with grayish blue green (5BG 5/2) below Section 4, 70 cm.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Sand 3 1 Silt 52 69 Clay 45 30</p> <p>COMPOSITION: Quartz 52 61 Feldspar 3 5 Heavy minerals TR TR Pyrite 1 1 Clay 35 30 Glauconite - TR Radiolarians TR TR Diatoms 3 1 Sponge spicules 1 TR Succinea spicules TR -</p> <p>GRAIN SIZE Sand 5.7 Silt 6.6 Clay 62.1 31.3</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 1.8 % CaCO₃ 4.0</p>
		2	1.0						
		3							
		4							
		5							
		CC							
		LOWER PLOCENE			Spongaster pentas				
		GZ							

SITE 492	HOLE	CORE 8	CORED INTERVAL	60.5-70.0 m	LITHOLOGIC DESCRIPTION	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SEMENTARY STRUCTURES	SAMPLES
								DIATOMS	RADICLARIANS	NANNOFOSILS	FORAMINIFERS						
					MUDDY SILTSTONE, grayish olive green (5GY 3/2) with very firm grayish olive green (5GY 3/2), soft and with minor pale olive areas (10Y 6/2).	LOWER PLEIOCENE	<i>Spongaster pentas/Stichocorys peregrina</i>					1					
											2						
											3						
											4						
											CC						

SITE 492	HOLE	CORE 7	CORED INTERVAL	51.0-60.5 m	LITHOLOGIC DESCRIPTION	TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SEMENTARY STRUCTURES	SAMPLES
								DIATOMS	RADICLARIANS	NANNOFOSILS	FORAMINIFERS						
					MUDDY SILT, grayish olive green (5GY 3/2), soft and very firm grayish olive green (5GY 3/2) MUDDY SILT with minor pale olive areas (10Y 6/2).	LOWER PLEIOCENE	<i>Spongaster pentas/Stichocorys peregrina</i>					1					
											2						
											3						
											CC						

SITE 492 HOLE CORE 10 CORED INTERVAL 79.5-89.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SECTIONS	SAMPLES	LITHOLOGIC DESCRIPTION					
		FORAMINIFERS	NANNOFOSILS	RADICULARIANS								DIATOMS				
UPPER MIOCENE-LOWER PIOCENE	<i>Stichocorys peregrina</i>	B	B	CG	CC	4	VOID				MUDDY SILTSTONE grayish olive green (SGY 3/2). Drilling lamination throughout Section 2, occasionally in Section 3. Bubination moderate at Section 2, 100-150 cm and light and wavy in lower Section 2 and lower Section 4. Ducky yellow (SY 6/4) calcareous area, possibly disrupted sub horizontal layer at Section 4, 30 cm. SMEAR SLIDES TEXTURE: Sand 1 1 Silt 74 69 Clay 25 30 COMPOSITION: Quartz 65 59 Feldspar 5 6 Mica 7 3 Heavy minerals 2 2 Clay 25 30 Diatoms TR TR Radiolarians TR TR Sponges spicules TR TR GRAIN SIZE Sand 3.70 Silt 2.9 Clay 61.8 35.3					
						3	VOID									
						2	VOID									
						1	VOID									
						0.5										

SITE 492 HOLE CORE 9 CORED INTERVAL 70.0-79.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SECTIONS	SAMPLES	LITHOLOGIC DESCRIPTION				
		FORAMINIFERS	NANNOFOSILS	RADICULARIANS								DIATOMS			
UPPER MIOCENE-LOWER PIOCENE	<i>Stichocorys peregrina</i>	B	RP	CG	CC	3	VOID				MUDDY SILTSTONE grayish olive green (SGY 3/2) with soft MUDDY SILT in Section 1, 0-20 cm and 46-56 cm. White ASH spots at Section 1, 86 cm and Section 2, 66 cm. Horizontal bedding evident at Section 1, 81 cm and Section 3, 42 cm. SMEAR SLIDES TEXTURE: Sand 226 100 Silt 45 45 Clay 55 55 COMPOSITION: Quartz 40 40 Feldspar 6 6 Mica 3 3 Heavy minerals 1 1 Clay 45 45 Diatoms TR TR Radiolarians TR TR Sponges spicules 2 2 GRAIN SIZE Sand 1.90 Silt 55.0 Clay 43.8 ORGANIC CARBON AND CARBONATE % Organic Carbon 1.60 % CaCO ₃ 1.6 2.0				
						2	VOID								
						1	VOID								
						0.5	VOID								
						0.5									

SITE 492 HOLE CORE 11 CORED INTERVAL 98.0-98.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADICULARIANS			
UPPER MIOCENE	<i>Stichocorys peregrina</i>				0.5 1 1.0		<p>MUDDY SILTSTONE grayish olive green (SGY 3Z2). Moderate to intense bioturbation. Bedding very discontinuous. Burrows include nodules, up to 2 mm across, scattered throughout below 5.2 cm and 115 cm. MICRITIC CHALK layer (6 cm) at Section 3, 88-94 cm. Well indurated, dark yellowish brown (10YR 3/2). No obvious biogenic origin, probably diagenetic. Drilling laminations throughout.</p> <p>SMEAR SLIDES</p> <p>1.30 1.46 (D) (M)</p> <p>Muddy silt</p> <p>TEXTURE: Sand 2 Silt 3 Clay 73 Quartz 25 COMPOSITION: Feldspar 64 TR Mica 7 TR Clay 2 TR Glass 25 - 100 Foraminifers TR Radiolarians TR Diatoms TR Sponge spicules TR</p> <p>GRAIN SIZE 1.30 Silt 3.3 Silt 48.7 Clay 48.0</p> <p>ORGANIC CARBON AND CARBONATE 3-0 % Organic Carbon: 1.2 % CaCO₃ 4.0</p>
					CC		

SITE 492 HOLE CORE 12 CORED INTERVAL 98.5-108.0 m

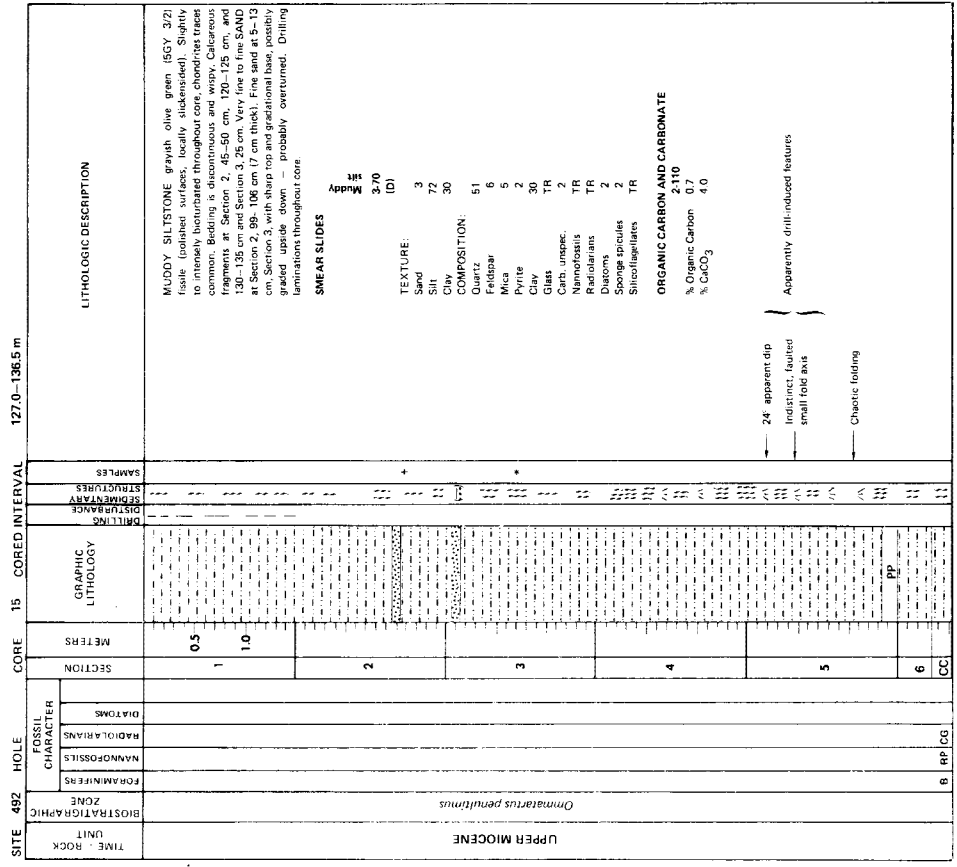
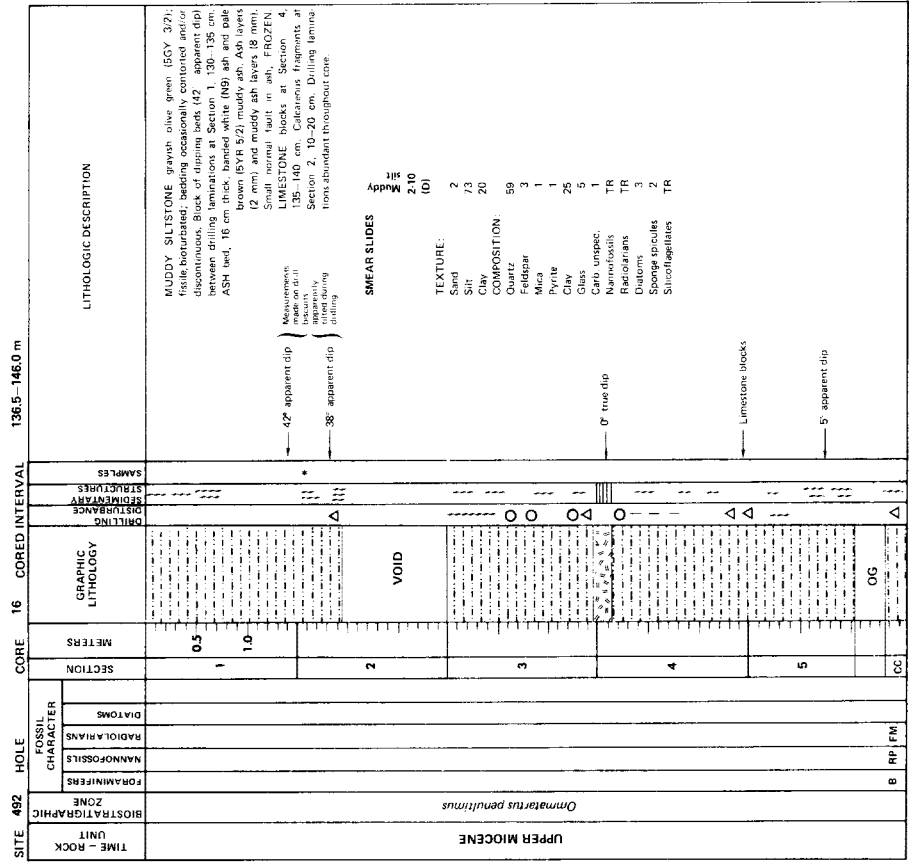
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADICULARIANS			
UPPER MIOCENE	<i>Ommatrus penultimus</i>				0.5 1 1.0 2 3 4 5 6		<p>MUDDY SILTSTONE grayish olive green (SGY 3Z2). Moderate to intense bioturbation. Bedding very discontinuous. Burrows include nodules, up to 2 mm across, scattered throughout below 5.2 cm and 115 cm. MICRITIC CHALK layer (6 cm) at Section 3, 88-94 cm. Well indurated, dark yellowish brown (10YR 3/2). No obvious biogenic origin, probably diagenetic. Drilling laminations throughout.</p> <p>SMEAR SLIDES</p> <p>2.70 3.90 (D) (M)</p> <p>Muddy silt</p> <p>TEXTURE: Sand 2 Silt 58 Clay 40 COMPOSITION: Quartz 48 Feldspar 6 Mica 3 Pyrite 1 Clay 40 Glass 2 Cath. unspic TR Diatoms TR Foraminifers TR Sponge spicules TR Silicoflagellates TR Plant fragments TR</p> <p>GRAIN SIZE 2.68 Silt 1.8 Silt 58.0 Clay 28.0</p>
					CC		

SITE 492 HOLE CORE 13 CORED INTERVAL 108.0--117.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER MIOCENE	<i>Omnatrus penitrus</i>		1	0.5				MUDDY SILTSTONE grayish olive green (SGY 3/2). Moderately bioturbated throughout. Incipient fissility developed locally below Section 1, 50 cm (breaks along polished surfaces). Some discontinuous, wavy bedding, some of which may be related to the bioturbation. Well indurated CHALK layers at Section 1 (75-88 cm) and Section 3 (32-39 cm). Chalk and muddy siltstone are interbedded by bioturbation. VITRIC MUDDY SILTSTONE bed at Section 4, 55 cm. Very fine SAND bed at Section 4, 51 cm. Drilling laminations throughout.
			2					SMEAR SLIDES 20° apparent dip 30° apparent dip 29° true dip 27° apparent dip
			3					TEXTURE: Sand 2 Silt 63 Clay 35 COMPOSITION: Quartz 60 Feldspar 5 Mica 2 Heavy minerals TR Pyrite 1 Clay 35 Glauconite 1 Carb. unsp. TR Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1 Siliolagellates TR
			4					GRAIN SIZE Sand 3-18 Silt 12 Clay 60-4 38.5
			CC					ORGANIC CARBON AND CARBONATE 3-14 % Organic Carbon 1.3 % CaCO ₃ 3.0

SITE 492 HOLE CORE 14 CORED INTERVAL 117.5--127.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER MIOCENE	<i>Omnatrus penitrus</i>		1	0.5				MUDDY SILTSTONE grayish olive green (SGY 3/2). Fissile, bioturbated, discontinuous and wavy deformation. Calcareous fragments at Section 6, 145 cm and Section 7, 25 cm. Drilling laminations abundant locally throughout core.
			2					SMALL POOL OF VITRIC MUD 90° dip on bed separated by healed fractures Teichichnus, upright
			3					Possible overturned fold in upper Section 3. Reverse graded, or ungraded, siltstone on muddy silt Chondrites Unclear, probably possibly flattened, nose of fold Burrow Horizontal apparent dip
			4					SMEAR SLIDES 2° apparent dip
			5					TEXTURE: Sand 3 Silt 40 Clay 72 COMPOSITION: Quartz 20 Feldspar 2 Mica 2 Heavy minerals TR Pyrite TR Clay 60 Glauconite 25 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 2
			6					VOID
			7					VOID
			CC					VOID



SITE 482	HOLE	CORE 18		CORED INTERVAL	155.5—165.0 m	LITHOLOGIC DESCRIPTION																				
		SECTION	METERS																							
UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	FORMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	FOSSIL CHARACTER	TIME - ROCK UNIT	UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	FORMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	CUTTINGS	STRAINS	SAMPLES	1	0.5	VOID	28	apparent dip	<p>MUDDY SILTSTONE, grayish olive green (6GY 3/2) and olive gray (5Y 3/2), bioturbated, fissile (blockiness common), bedding discontinuous and wavy. Section 2 exhibits extreme fracturing, with well developed slicken-sides, along anastomosing jointing surfaces, pervasive on bedding. Calcareous lenses at Sections 4, 7 and 89 cm by drilling. Calcareous lenses at Section 1, 10-15 cm. Ash bed at Section 4, 21-59 cm (38 cm thick), interbedded ash and muddy ash, decreasing in ash content and thickness of ash layers (average cm to 2 mm) towards top. Drilling laminations abundant.</p> <p>SMEAR SLIDES</p> <p>3-72 Muddy Ash (M)</p> <p>4-24 (M)</p> <p>TEXTURE:</p> <p>Sand 1</p> <p>Silt 54</p> <p>Clay 95</p> <p>COMPOSITION:</p> <p>Quartz 42</p> <p>Mica 5</p> <p>Pyrite 3</p> <p>Heavy minerals TR</p> <p>Pyrite 1</p> <p>Clay 45</p> <p>Glass 5</p> <p>Carb. unsp. TR</p> <p>Nannofossils TR</p> <p>Radiolarians TR</p> <p>Diatoms TR</p> <p>Sponges 2</p> <p>Silicoflagellates TR</p>
																					2	VOID	4	apparent dip		
																					3	VOID	11	apparent dip		
																					4	VOID	14	true dip		
																					5	VOID	19	true dip		
																					6	VOID	2-42	apparent dip		
																					7	VOID	VOID	VOID		
																					CC	VOID	VOID	VOID		

SITE 482	HOLE	CORE 17		CORED INTERVAL	146.0—155.5 m	LITHOLOGIC DESCRIPTION																				
		SECTION	METERS																							
UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	FORMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	FOSSIL CHARACTER	TIME - ROCK UNIT	UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	FORMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	CUTTINGS	STRAINS	SAMPLES	1	0.5	VOID	50	apparent dip	<p>MUDDY SILTSTONE, olive gray (5Y 3/2), fissile, bestur-banded, bedding often discontinuous, "wavy". Chondrites traces abundant, represented diagenetically. Drilling laminations common.</p> <p>SMEAR SLIDES</p> <p>2 Muddy Silt (M)</p> <p>2-10 (M)</p> <p>TEXTURE:</p> <p>Sand 2</p> <p>Silt 63</p> <p>Clay 35</p> <p>COMPOSITION:</p> <p>Quartz 52</p> <p>Feldspar 4</p> <p>Mica 2</p> <p>Pyrite 1</p> <p>Clay 35</p> <p>Glass TR</p> <p>Carb. unsp. TR</p> <p>Nannofossils TR</p> <p>Radiolarians TR</p> <p>Diatoms TR</p> <p>Sponges 2</p> <p>Silicoflagellates TR</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>3-40</p> <p>% Organic Carbon 1.5</p> <p>% CaCO₃ 2.0</p>
																					2	VOID	30	apparent dip		
																					3	VOID	VOID	VOID		
																					4	VOID	8	apparent dip		
																					5	VOID	6	apparent dip		
CC	VOID	21	apparent dip																							

SITE 492 HOLE CORE 19 CORED INTERVAL 165.0-174.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER MIOCENE	<i>Omnartus penlinus</i>	B B CC	1	0.5	VOID		GZ	MUDDY SILTSTONE grayish olive green (BGY 3/2); slightly bioturbated, fissile. Some discontinuous, "wispy" bedding; anastomosing fractures on small scale, with slickensides on all fractured pieces. Seven cm-thick laminated ASH and muddy ash bed, frozen, 0.8°C measured, at Core-Catcher. Drilling laminations common.
			2	1.0	VOID			
			3	1.0	VOID			
			CC		VOID			

SMEAR SLIDES

Texture: Sand 70, Silt 25.2, Clay 30

Composition: Quartz 55, Feldspar 5, Heavy minerals TR, Pyrite 1, Clay 30, Radiolarians TR, Diatoms 2, Spongy spicules 3

Grain Size: Sand 1:110, Silt 6:8, Clay 42.5

ORGANIC CARBON AND CARBONATE

% Organic Carbon 1.1, % CaCO₃ 2.0

VOID: 30 apparent dip, 32 apparent dip, 27 apparent dip, 47 apparent dip, 34 true dip, 22 apparent dip, Vague fold, 8 apparent dip, 30 true dip

SITE 492 HOLE CORE 20 CORED INTERVAL 174.5-184.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER MIOCENE	<i>Omnartus penlinus</i>	B B CC	1	0.5	VOID		GZ	MUDDY SILTSTONE moderately grayish olive green (BGY 3/2); bioturbated. Small scale anastomosing hackly fractures to incipient fissility present locally, more abundant lower in core. Intense in Sections 5, 6, and 7. Slickensides common on polished surfaces. Drilling laminations common locally.
			2	1.0	VOID			
			3	1.0	VOID			
			4	1.0	VOID			
			5	1.0	VOID			
			6	1.0	VOID			
			7	1.0	VOID			
			CC		VOID			

SMEAR SLIDES

Texture: Sand 1, Silt 68, Clay 30

Composition: Quartz 64, Feldspar 2, Heavy minerals TR, Pyrite 1, Clay 25, Calc. unspic. TR, Radiolarians TR, Diatoms 1, Spongy spicules 2

Grain Size: Sand 1:105, Silt 7.0, Clay 91.6

VOID: 44° true dip, 29 apparent dip, 39 true dip

Detail of fractures and mottling in Section 4: Horizontal reedynosis trace, Streaks of olive to brownish gray (5Y to YR 4/1)

SITE 492 HOLE CORE 22 CORED INTERVAL 193.5-203.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION		
		DIATOMS	RADICOLARIANS	NANNOFOSSILS	FORAMINIFERS								
UPPER MIOCENE	<i>Omnatarrus antepenultimus</i>					1	0.5	VOID		GZ	<p>MUDDY SILTSTONE, grayish olive green (SGY 3.2); streaky, mottled laminated and mottled appearance throughout, streaks and mottles generally olive gray (SY 4.1). Bioherms and nodules developed in the upper part of the section, locally intensely developed with polished surfaces, locally intensely developed with polished surfaces, locally intensely developed with polished surfaces, locally intensely developed with polished surfaces. Less indurated mudstone, locally intensely developed with polished surfaces. Less indurated mudstone, locally intensely developed with polished surfaces. Less indurated mudstone, locally intensely developed with polished surfaces.</p> <p>Small scale (1-2 mm) nodules, due to <i>Calcareous</i> type (mottled) may be observed bedding, larger scale bioherms and nodules developed in the upper part of the section, locally intensely developed with polished surfaces. Less indurated mudstone, locally intensely developed with polished surfaces. Less indurated mudstone, locally intensely developed with polished surfaces.</p> <p>muddy silt alternates with muddy siltstone in upper 3 sections.</p> <p>SMEAR SLIDES</p> <p>TEXTURE:</p> <p>Sand 1 Silt 74 Clay 25</p> <p>COMPOSITION:</p> <p>Quartz 64 Feldspar 5 Mica 3 Heavy minerals 1 Pyrite 1 Clay 25 Glass TR? Carbonaceous TR Radiolarians TR Diatoms TR Sponge spicules 1</p> <p>GRAIN SIZE</p> <p>Sand 1.70 4.40 Silt 10.0 4.1 Clay 62.3 61.5 27.7 34.4</p>		
						2		VOID					
						3		VOID					
						4		VOID				GZ	
						5		VOID					
						6		VOID					
						7		VOID					
				CC									

SITE 492 HOLE CORE 21 CORED INTERVAL 184.0-193.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION		
		DIATOMS	RADICOLARIANS	NANNOFOSSILS	FORAMINIFERS								
UPPER MIOCENE	<i>Omnatarrus antepenultimus</i>					1	0.5	VOID		*	<p>MUDDY SILTSTONE grayish olive green (SGY 3.2); with minor streak of dark greenish gray (SGY 4.1). Bioherms and nodules developed in the upper part of the section, locally intensely developed with polished surfaces, locally intensely developed with polished surfaces, locally intensely developed with polished surfaces. Less indurated mudstone, locally intensely developed with polished surfaces. Less indurated mudstone, locally intensely developed with polished surfaces. Less indurated mudstone, locally intensely developed with polished surfaces.</p> <p>a muddy silt. Mottled ash nodules (5 cm across) at Section 2, 4.4-4.9 cm. Calcareous nodules at Section 6, 2.4 cm. Fracture dips. Section 6, one at 32° true dip. Drilling laminations common to abundant throughout.</p> <p>SMEAR SLIDES</p> <p>TEXTURE:</p> <p>Sand 1 97 Silt 64 3 Clay 35</p> <p>COMPOSITION:</p> <p>Quartz 59 Feldspar 6 Mica 2 Heavy minerals TR Pyrite 1 Clay 30 Glass TR 89 Radiolarians TR Diatoms TR Sponge spicules 2</p> <p>GRAIN SIZE</p> <p>Sand 2.29 Silt 1.3 Clay 56.4 42.4</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>% Organic Carbon 0.8 % CaCO₃ 1.0</p>		
						2		VOID		GZ			
						3		VOID					
						4		VOID					
						5		VOID					
						6		VOID					
						CC							

SITE 482 HOLE CORE 24 CORED INTERVAL 212.5-222.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS							
UPPER MIOCENE	<i>Ommatartus antepenultimus</i>	B	B	CG	0.5	VOID			5V 3/2	<p>MUDDY SILTSTONE (see, well-indurated), olive gray (5Y 3/2), frequently commonly well-developed with slickensided planar surfaces. Locally less indurated (soft muddy silt); streaky, mottled appearance in Section 3.</p> <p>SMEAR SLIDES</p> <p>Fracture set at 15° true dip</p> <p>Also measured at 65° true dip</p> <p>TEXTURE:</p> <p>Sand 5 Silt 75 Muddy 20</p> <p>COMPOSITION:</p> <p>Quartz 73 Feldspar 5 Mica 4 Heavy minerals 1 Pyrite 1 Clay 15 Radiolarians TR Diatoms TR Sponge spicules 1</p>	
					1	VOID					
					2	VOID					
					3	VOID					
					CC	VOID					

SITE 482 HOLE CORE 23 CORED INTERVAL 203.0-212.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION METERS	GRAPHIC LITHOLOGY	DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION	
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS							
UPPER MIOCENE	<i>Ommatartus antepenultimus</i>	B	B	CG	0.5	VOID				<p>MUDDY SILTSTONE (see 3/2), streaky, mottled, bedded and mottled appearance, small scale (several mm) nodules clearly due to bioturbation, larger scale (cm-scale) may be larger burrow traces or disrupted bedding (wedge folds). Less indurated MUDDY SILT in Sections 1, 4, and 8. Gas expansion voids common. Fracturing locally intense. In Sections 1, 3, 4, 6, 7, and 8, with some mobilized surfaces and an incipient fissility and shaly zones. In Section 3, and 74-86 cm and Section 7, 201-38 cm. Small ASH pool at greenish gray (5Y 4/2) silty clay shale at 70-71.5 m. Drill stem sections occasionally present. Section 8 forcibly extruded from core barrel. Described on sheet 1.</p> <p>SMEAR SLIDES</p> <p>Very fine sand 2-15 3-7 3-15 7-28 Muddy (ID) (M) (M) (ID) (ID)</p> <p>Silt 70 10 Muddy 3 70 10 Muddy 3 15 7 28</p> <p>Texture: Sand 62 20 60 80 Clay 35 10 30 20</p> <p>COMPOSITION:</p> <p>Quartz 56 80 55 85 Feldspar 6 4 6 6 Mica 2 1 3 2 Heavy minerals 1 4 1 TR Pyrite 2 1 3 TR Clay 30 10 30 20 Radiolarians TR - TR - Carb. unsp. TR - TR - Radiolarians TR TR TR TR Diatoms TR TR TR TR Sponge spicules 3 TR 4 2 Silicoflagellates TR - TR</p> <p>ORGANIC CARBON AND CARBONATE</p> <p>1.90 % Organic Carbon 1.10 % C_{org} 2.0 % CaCO₃</p>	
					1	VOID					
					2	VOID					
					3	VOID					
					4	VOID					
					5	VOID					
					6	VOID					
					7	VOID					
					8	VOID					
					CC	VOID					

SITE 492 HOLE CORE 28 CORED INTERVAL 250.5-260.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTANCE	STRACTIONS	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER MIOCENE	<i>Omnimartus antepeditinus</i>	B B B B	CC						<p>MUDDY SILT olive gray (SY 3/2). Bioturbated; some discontinuous, wavy bedding. Locally, fine to medium SAND beds in Sections 4 and 5, up to 17 and 38 cm thick respectively. Very subtle grading in latter. Thin sand beds interbedded below 38 cm sand of Section 5, comprising approximately 10-20% of section. Drilling laminations present in Sections 5 and 6.</p> <p>SMEAR SLIDES</p> <p>Texture: Sand 3, Silt 72, Clay 25 Composition: Quartz 61, Feldspar 3, Heavy minerals TR, Pyrite 2, Clay 25, Radiolarians TR, Diatoms 1, Sponge spicules 3</p>

SITE 492 HOLE CORE 29 CORED INTERVAL 260.0-265.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTANCE	STRACTIONS	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER MIOCENE	<i>Omnimartus antepeditinus</i>	B B B B	CC						<p>MUDDY SILTSTONE grayish olive green (SGY 3/2) interbeds to 20 cm thick of fine to coarse SAND. Bioturbated; discontinuous, wavy bedding. Fractile, especially lower Section 2. Sections 4 and 5 - breaks into very small stickensides and/or polished chips - a "scaly argillite".</p> <p>SMEAR SLIDES</p> <p>Texture: Sand 15, Silt 65, Clay 20 Composition: Quartz 65, Feldspar 10, Mica 2, Heavy minerals TR, Pyrite 20, Clay 20, Calcareous spots TR, Nannofossils TR, Diatoms TR, Sponge spicules TR</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 0.5 % CaCO₃ 2.0</p>

SITE 492 HOLE CORE 27 CORED INTERVAL 241.0-250.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	DISTANCE	STRACTIONS	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER MIOCENE	<i>Omnimartus antepeditinus</i>	B B B B	CC						<p>MUDDY SILTSTONE, olive gray (SY 3/2). Bioturbated; some discontinuous, wavy bedding. Locally, fine to medium SAND beds in Sections 4 and 5, up to 17 and 38 cm thick respectively. Very subtle grading in latter. Thin sand beds interbedded below 38 cm sand of Section 5, comprising approximately 10-20% of section. Drilling laminations present in Sections 5 and 6.</p> <p>SMEAR SLIDES</p> <p>Texture: Sand 4, Silt 75, Clay 20 Composition: Quartz 56, Feldspar 10, Mica 4, Heavy minerals TR, Pyrite 2, Clay 30, Radiolarians TR, Diatoms 2, Silicoflagellates TR</p> <p>ORGANIC CARBON AND CARBONATE % Organic Carbon 2.10 % CaCO₃ 2.0</p>

SITE 492 HOLE 31	CORED INTERVAL	269.5-279.0 m	LITHOLOGIC DESCRIPTION	DIAMETER	METERS	FOSSIL CHARACTER				TIME - ROCK UNIT
						FORAMINIFERS	NANNOFOSSILS	RADOLARIANS	DIATOMS	
UPPER MIOCENE	Omnartus anepentlms		<p>MUDDY SILTSTONE, grayish olive green (SGY 3/2) slightly bioturbated with medium and fine to medium SAND beds at Section 2, 89-95 cm and Section 3, 13-23 cm. Muddy siltstone is friable throughout, generally with stickensided anastomosing fractures, a "fakly argillite". Locally broken by drilling into mm-size chips.</p> <p>SMEAR SLIDES</p> <p>Texture: Sand 2, Silt 50, Clay 40 Composition: Quartz 48, Micas 2, Heavy minerals 2, Pyrite TR, Carb. unsec. 40, Nanno fossils TR, Diatoms 2, Sponge spicules 3</p> <p>2-50 Muddy (OI)</p>		+	B	B	AG	CC	

SITE 492 HOLE 30	CORED INTERVAL	265.0-289.5 m	LITHOLOGIC DESCRIPTION	DIAMETER	METERS	FOSSIL CHARACTER				TIME - ROCK UNIT
						FORAMINIFERS	NANNOFOSSILS	RADOLARIANS	DIATOMS	
UPPER MIOCENE	Omnartus anepentlms		<p>MUDDY SILTSTONE, grayish olive green (SGY 3/2) slightly bioturbated with medium and fine to medium SAND beds at Section 2, 89-95 cm and Section 3, 13-23 cm. Muddy siltstone is friable throughout, generally with stickensided anastomosing fractures, a "fakly argillite". Locally broken by drilling into mm-size chips.</p> <p>SMEAR SLIDES</p> <p>Texture: Sand 2, Silt 50, Clay 40 Composition: Quartz 48, Micas 2, Heavy minerals 2, Pyrite TR, Carb. unsec. 40, Nanno fossils TR, Diatoms 2, Sponge spicules 3</p> <p>2-50 Muddy (OI)</p>			B	PP	CG	CC	

SITE SUMMARY SHEET

HOLE 492A

Date occupied: 23 April 1979

Date departed: 24 April 1979

Time on hole: 25.2 hours

Position: latitude: 16°04.73'N

longitude: 98°56.72'W

Water depth (sea level): 1935 corrected meters, echo sounding

Water depth (rig floor): 1945 corrected meters, echo sounding

Bottom felt at: 1971.5 meters, drill pipe

Penetration: 70.8 meters

Number of cores: 11

Total length of cored section: 51.8 meters

Total core recovery: 30.3 meters

Percentage core recovery: 58%

Oldest Sediment Cored

Depth sub-bottom: 70.8 meters

Nature: Muddy siltstone

Age: Late Miocene

Basement

Depth sub-bottom: Not penetrated

Principal Results

See Hole 492. The hydraulic piston core was used to recover the upper section undisturbed.

SITE 492 HOLE A CORE 1 CORED INTERVAL 0.00-4.25 m		CORED INTERVAL 9.00-13.75 m			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION		
		DIATOMS	METERS		
		RADIOLARIANS	GRAPHIC LITHOLOGY		
		NANNOFOSSILS	DISTANCE FROM STRATIGRAPHIC ZONE		
		FORAMINIFERS	DRILLING		
			STRUCTURES		
			SAMPLES		
QUATERNARY	NN 20	AG CG AG	0.5	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft, locally calcareous. Slight indurification.</p> <p>SMEAR SLIDES</p> <p>250 Muddy silt</p> <p>TEXTURE:</p> <p>Sand 5</p> <p>Silt 60</p> <p>Clay 35</p> <p>COMPOSITION:</p> <p>Quartz 50</p> <p>Calciferous 2</p> <p>Micas 2</p> <p>Heavy minerals TR</p> <p>Pyrite 3</p> <p>Clay 35</p> <p>Glaucinite 3</p> <p>Carb. unsp. 2</p> <p>Foraminifers 1</p> <p>Nannofossils TR</p> <p>Diatoms 2</p> <p>Amphicels 2</p> <p>Fish remains TR</p>	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Bio-turbated, occasional sponge spicule concentrations.</p>
			1.0		
			2		
			CC		

SITE 492 HOLE A CORE 2 CORED INTERVAL 4.25-9.00 m		CORED INTERVAL 13.75-18.50 m			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION		
		DIATOMS	METERS		
		RADIOLARIANS	GRAPHIC LITHOLOGY		
		NANNOFOSSILS	DISTANCE FROM STRATIGRAPHIC ZONE		
		FORAMINIFERS	DRILLING		
			STRUCTURES		
			SAMPLES		
QUATERNARY	NN 20	AG CG AG	0.5	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft, locally calcareous. Thin ASH bed at Section 1.73 cm. Carbonized woody material at Section 3.20 and 54 cm. Occasional sponge spicule concentrations. Boturbated, slight to moderate.</p>	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Thin layer of GLAUCONITIC MUDDY SAND at Section 7.80-88 cm. Silt, clay, and 100-100 cm. MUD at Section 11.90-12.00 cm. Occasional sponge spicules. Shell (brachiopod?) at Section 1.120 cm.</p>
			1.0		
			2		
			CC		

SITE 492 HOLE A CORE 3 CORED INTERVAL 9.00-13.75 m		CORED INTERVAL 13.75-18.50 m			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION		
		DIATOMS	METERS		
		RADIOLARIANS	GRAPHIC LITHOLOGY		
		NANNOFOSSILS	DISTANCE FROM STRATIGRAPHIC ZONE		
		FORAMINIFERS	DRILLING		
			STRUCTURES		
			SAMPLES		
UPPER PLIOCENE - LOWER QUATERNARY	NN 17/NN 19	PP CM	0.5	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Thin layer of GLAUCONITIC MUDDY SAND at Section 7.80-88 cm. Silt, clay, and 100-100 cm. MUD at Section 11.90-12.00 cm. Occasional sponge spicules. Shell (brachiopod?) at Section 1.120 cm.</p>	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Thin layer of GLAUCONITIC MUDDY SAND at Section 7.80-88 cm. Silt, clay, and 100-100 cm. MUD at Section 11.90-12.00 cm. Occasional sponge spicules. Shell (brachiopod?) at Section 1.120 cm.</p>
			1.0		
			2		
			CC		

SITE 492 HOLE A CORE 4 CORED INTERVAL 13.75-18.50 m		CORED INTERVAL 18.50-23.25 m			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION		
		DIATOMS	METERS		
		RADIOLARIANS	GRAPHIC LITHOLOGY		
		NANNOFOSSILS	DISTANCE FROM STRATIGRAPHIC ZONE		
		FORAMINIFERS	DRILLING		
			STRUCTURES		
			SAMPLES		
UPPER PLIOCENE - LOWER QUATERNARY	NN 17/NN 19	PP CM	0.5	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Thin layer of GLAUCONITIC MUDDY SAND at Section 7.80-88 cm. Silt, clay, and 100-100 cm. MUD at Section 11.90-12.00 cm. Occasional sponge spicules. Shell (brachiopod?) at Section 1.120 cm.</p>	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Thin layer of GLAUCONITIC MUDDY SAND at Section 7.80-88 cm. Silt, clay, and 100-100 cm. MUD at Section 11.90-12.00 cm. Occasional sponge spicules. Shell (brachiopod?) at Section 1.120 cm.</p>
			1.0		
			2		
			CC		

SITE 492 HOLE A CORE 1 CORED INTERVAL 0.00-4.25 m		CORED INTERVAL 9.00-13.75 m				
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION			
		DIATOMS	METERS			
		RADIOLARIANS	GRAPHIC LITHOLOGY			
		NANNOFOSSILS	DISTANCE FROM STRATIGRAPHIC ZONE			
		FORAMINIFERS	DRILLING			
			STRUCTURES			
			SAMPLES			
QUATERNARY	NN 20	AG CG AG	0.5	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft, locally calcareous. Thin ASH bed at Section 1.73 cm. Carbonized woody material at Section 3.20 and 54 cm. Occasional sponge spicule concentrations. Boturbated, slight to moderate.</p>	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft, locally calcareous. Slight indurification.</p> <p>SMEAR SLIDES</p> <p>250 Muddy silt</p> <p>TEXTURE:</p> <p>Sand 5</p> <p>Silt 60</p> <p>Clay 35</p> <p>COMPOSITION:</p> <p>Quartz 50</p> <p>Calciferous 2</p> <p>Micas 2</p> <p>Heavy minerals TR</p> <p>Pyrite 3</p> <p>Clay 35</p> <p>Glaucinite 3</p> <p>Carb. unsp. 2</p> <p>Foraminifers 1</p> <p>Nannofossils TR</p> <p>Diatoms 2</p> <p>Amphicels 2</p> <p>Fish remains TR</p>	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft, locally calcareous. Slight indurification.</p>
			1.0			
			2			
			CC			

SITE 492 HOLE A CORE 2 CORED INTERVAL 4.25-9.00 m		CORED INTERVAL 13.75-18.50 m			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION		
		DIATOMS	METERS		
		RADIOLARIANS	GRAPHIC LITHOLOGY		
		NANNOFOSSILS	DISTANCE FROM STRATIGRAPHIC ZONE		
		FORAMINIFERS	DRILLING		
			STRUCTURES		
			SAMPLES		
QUATERNARY	NN 20	AG CG AG	0.5	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft, locally calcareous. Thin ASH bed at Section 1.73 cm. Carbonized woody material at Section 3.20 and 54 cm. Occasional sponge spicule concentrations. Boturbated, slight to moderate.</p>	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Thin layer of GLAUCONITIC MUDDY SAND at Section 7.80-88 cm. Silt, clay, and 100-100 cm. MUD at Section 11.90-12.00 cm. Occasional sponge spicules. Shell (brachiopod?) at Section 1.120 cm.</p>
			1.0		
			2		
			CC		

SITE 492 HOLE A CORE 3 CORED INTERVAL 9.00-13.75 m		CORED INTERVAL 13.75-18.50 m			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION		
		DIATOMS	METERS		
		RADIOLARIANS	GRAPHIC LITHOLOGY		
		NANNOFOSSILS	DISTANCE FROM STRATIGRAPHIC ZONE		
		FORAMINIFERS	DRILLING		
			STRUCTURES		
			SAMPLES		
UPPER PLIOCENE - LOWER QUATERNARY	NN 17/NN 19	PP CM	0.5	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Thin layer of GLAUCONITIC MUDDY SAND at Section 7.80-88 cm. Silt, clay, and 100-100 cm. MUD at Section 11.90-12.00 cm. Occasional sponge spicules. Shell (brachiopod?) at Section 1.120 cm.</p>	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Thin layer of GLAUCONITIC MUDDY SAND at Section 7.80-88 cm. Silt, clay, and 100-100 cm. MUD at Section 11.90-12.00 cm. Occasional sponge spicules. Shell (brachiopod?) at Section 1.120 cm.</p>
			1.0		
			2		
			CC		

SITE 492 HOLE A CORE 4 CORED INTERVAL 13.75-18.50 m		CORED INTERVAL 18.50-23.25 m			
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION		
		DIATOMS	METERS		
		RADIOLARIANS	GRAPHIC LITHOLOGY		
		NANNOFOSSILS	DISTANCE FROM STRATIGRAPHIC ZONE		
		FORAMINIFERS	DRILLING		
			STRUCTURES		
			SAMPLES		
UPPER PLIOCENE - LOWER QUATERNARY	NN 17/NN 19	PP CM	0.5	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Thin layer of GLAUCONITIC MUDDY SAND at Section 7.80-88 cm. Silt, clay, and 100-100 cm. MUD at Section 11.90-12.00 cm. Occasional sponge spicules. Shell (brachiopod?) at Section 1.120 cm.</p>	<p>MUDDY SILT, grayish olive green (BGY 3/2), soft. Thin layer of GLAUCONITIC MUDDY SAND at Section 7.80-88 cm. Silt, clay, and 100-100 cm. MUD at Section 11.90-12.00 cm. Occasional sponge spicules. Shell (brachiopod?) at Section 1.120 cm.</p>
			1.0		
			2		
			CC		

SITE 492	HOLE A	CORE 7	CORED INTERVAL		METERS	SECTION	FOSSIL CHARACTER	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	LITHOLOGIC DESCRIPTION
			28.00-32.75 m							
										Muddy silt, grayish olive green (6GY 3/2), hard. Small calcareous areas at Section 1, 1.0 cm, and Section 2, 26-29 cm. FINE CLAUCCONITIC SANDS at Section 2, 35-50 cm. SMEAR SLIDES Fine to medium muddy sand 2-40 3-50 (M) (D) Muddy silt 75 2 Sand 5 58 Silt 20 40 Clay 70 57 COMPOSITION: Quartz 4 5 Feldspar 2 7 Mica 1 2 Heavy minerals 3 3 Pyrite 20 30 Clay 20 30 GBS - TR - Glauconite TR - Foraminifera TR - Nannofossils TR - Radiolarians TR - Diatoms - 2 Sponge spicules - 1 Silicoflagellates TR -

SITE 492	HOLE A	CORE 8	CORED INTERVAL		METERS	SECTION	FOSSIL CHARACTER	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	LITHOLOGIC DESCRIPTION
			32.75-37.50 m							
										Muddy silt, grayish olive green (6GY 3/2), soft to firm to hard. SMEAR SLIDES Muddy silt 75 2 Sand 5 58 Silt 20 40 Clay 70 57 COMPOSITION: Quartz 4 5 Feldspar 2 7 Mica 1 2 Heavy minerals 3 3 Pyrite 20 30 Clay 20 30 GBS - TR - Glauconite TR - Foraminifera TR - Nannofossils TR - Radiolarians TR - Diatoms - 2 Sponge spicules - 1 Silicoflagellates TR -

SITE 492	HOLE A	CORE 5	CORED INTERVAL		METERS	SECTION	FOSSIL CHARACTER	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	LITHOLOGIC DESCRIPTION
			18.50-23.25 m							
										Muddy silt, grayish olive green (6GY 3/2), firm. Olive grey (6Y 3/2) MUDDY SILT imbedded. 6GY 3/2

SITE 492	HOLE A	CORE 6	CORED INTERVAL		METERS	SECTION	FOSSIL CHARACTER	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	LITHOLOGIC DESCRIPTION
			23.25-28.00 m							
										Muddy silt, grayish olive green (6GY 3/2), firm. ASH spots at Section 2, 120 cm. SILT layer, discontinuous, at Section 2, 5 cm. Slight bioherbation. SMEAR SLIDES Muddy silt 75 2 Sand 5 58 Silt 20 40 Clay 70 57 COMPOSITION: Quartz 4 5 Feldspar 2 7 Mica 1 2 Heavy minerals 3 3 Pyrite 20 30 Clay 20 30 GBS - TR - Glauconite TR - Foraminifera TR - Nannofossils TR - Radiolarians TR - Diatoms - 2 Sponge spicules - 1 Silicoflagellates TR -

SITE 492	HOLE A	CORE 9	CORED INTERVAL	37.50-42.25 m	LITHOLOGIC DESCRIPTION	DIAMETER	SECTION	FOSSIL CHARACTER					TIME - ROCK UNIT		
								FORMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	METERS		GRAPHIC LITHOLOGY	B
					MUDDY SILT, grayish olive green (SGY 3Z1), hard.	1	0.5	CG							

SITE 492	HOLE A	CORE 11	CORED INTERVAL	66.00-70.75 m	LITHOLOGIC DESCRIPTION	DIAMETER	SECTION	FOSSIL CHARACTER					TIME - ROCK UNIT		
								FORMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	METERS		GRAPHIC LITHOLOGY	B
					MUDDY SILTSTONE TO MUDDY SILT, grayish olive green (SGY 3Z1), indurated at Core-Catcher, 46-50 cm. Shaly throughout, broken into slightly polished angular fragments less than 1 cm across.	1	CC	B	B	CG					

SITE 492	HOLE A	CORE 10	CORED INTERVAL	42.25-47.00 m	LITHOLOGIC DESCRIPTION	DIAMETER	SECTION	FOSSIL CHARACTER					TIME - ROCK UNIT		
								FORMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	METERS		GRAPHIC LITHOLOGY	B
					MUDDY SILT, grayish olive green (SGY 3Z1), hard. ASH concentration at Section 1, 46-51 cm. FINE SAND layers at Section 1, 19 and 20 cm, and spots at Section 1, 30-100 cm.	1	0.5	B	RP	AG					

SMEAR SLIDES

	Fine Sand (M)	1-28 (M)	1-47 (M)	1-77 (D)	1-77 (D)	Muddy Ill
TEXTURE:						
Sand	80	1	2			
Silt	15	94	68			
Clay	5	5	30			
COMPOSITION:						
Quartz	79	8	64			
Feldspar	8	5	5			
Mica	1	1	3			
Heavy minerals	2	TR	TR			
Pyrite	2	1	1			
Clay	5	5	25			
Clas	80	TR	TR			
Forams	3					
Foraminifera	TR					
Nannofossils						
Radiolarians						
Diatoms						
Sponge spicules						

SITE SUMMARY SHEET

HOLE 492B

Date occupied: 29 April 1979

Date departed: 30 April 1979

Time on hole: 41.2 hours

Position: latitude: 16°04.73'N

longitude: 98°56.72'W

Water depth (sea level): 1942 corrected meters, echo sounding

Water depth (rig floor): 1952 corrected meters, echo sounding

Bottom felt at: 1971.5 meters, drill pipe

Penetration: 290 meters

Number of cores: 1

Total length of cored section: 9.5 meters

Total core recovery: 6.4 meters

Percentage core recovery: 68%

Oldest Sediment Cored

Depth sub-bottom: 290 meters

Nature: Sand and muddy siltstone

Age: Mid-late Miocene

Basement

Depth sub-bottom: Not penetrated

Principal Results

In Hole 429B we washed 280.5 meters and drilled one core from 280.5--290.0 meters. The core was lowest upper Miocene sand with minor muddy siltstone and confirmed the presence of a sand-rich unit at the base of Hole 492. Logs were run through the pipe since the bit did not release. See Hole 492.

SITE 492 HOLE B CORE 1 CORED INTERVAL 280.0-290.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	Fossil Character	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION												
									DIATOMS	RADIOLARIANS	FORAMINIFERS	FORAMINIFERS								
UPPER MIOCENE	Unzoned		1	0.5 - 1.0	[Dotted pattern]		*	<p>MEDIUM TO COARSE VERY CLEAN SAND, medium light gray (M6), one graded bed through the first four sections, with small (to 3 cm) clasts of fractured shaly MUDSTONE with shiny polished fractures. Sand is massive, grading is the only visible internal structure. This core has been broken up and is probably composed of primary - dipositional or relict structures.</p> <p>Below Section 4, 140 cm, interlayered medium to coarse sand and shaly argillite, a well laminated mudstone with a pervasive fabric of anastomosing polished and lined fracture surfaces. Section 5, 84 - 108 cm, waxy argillite with waxy stringers of medium to coarse sand (strata).</p> <p>SMEAR SLIDES</p> <p>Medium sand (fine to coarse)</p> <table border="1"> <tr> <td>1-50</td> <td>52b</td> <td>Mud</td> </tr> <tr> <td>90</td> <td>5</td> <td></td> </tr> <tr> <td>10</td> <td>45</td> <td></td> </tr> <tr> <td>50</td> <td></td> <td></td> </tr> </table> <p>TEXTURE:</p> <p>Sand 5</p> <p>Silt 10</p> <p>Clay 45</p> <p>COMPOSITION:</p> <p>Quartz 93</p> <p>Feldspar 1</p> <p>Heavy minerals 5</p> <p>Pyrite 1</p> <p>Glauconite TR</p> <p>Diatoms TR</p> <p>Sponge spicules TR</p>	1-50	52b	Mud	90	5		10	45		50		
		1-50	52b	Mud																
		90	5																	
		10	45																	
		50																		
2		[Dotted pattern]																		
3		[Dotted pattern]																		
4		[Dotted pattern]																		
5		[Dotted pattern]																		
			CC																	

SITE SUMMARY SHEET

SITE 493

Date occupied: 24 April 1979

Date departed: 28 April 1979

Time on hole: 95.2 hours

Position: latitude: 16 22.86'N

longitude 98 55.53'W

Water depth (sea level): 645 corrected meters, echo sounding

Water depth (rig floor): 655 corrected meters, echo sounding

Bottom felt at: 675 meters, drill pipe

Penetration: 670.5 meters

Number of cores: 60

Total length of cored section: 556.5 meters

Total core recovery: 337.3 meters

Percentage core recovery: 61%

Oldest Sediment Cored

Depth sub-bottom: 652 meters

Nature: Sand

Age: Early Miocene

Basement

Depth sub-bottom: 652 meters

Nature: Diorite

Principal Results

Obtained subsidence and paleoenvironment baseline data for Mexican continental margin. This Site sand below sea level in early Miocene. It rapidly sank to 2–3 km subsea by 17 m.y. ago and then began slowly and steadily to its present elevation.

SITE 483	HOLE	CORE 2			CORED INTERVAL	120.0-129.5 m	LITHOLOGIC DESCRIPTION			
		FOSSIL CHARACTER	SECTION	METERS						
TIME - ROCK	BIOSTRATIGRAPHIC ZONE	NANNOFOSSILS	DIATOMS	1	0.5		MUDDY SILT, olive gray (SY 3/2), firm, with thin beds to 2 cm of mud, medium light gray (NG). SMEAR SLIDES 1.47 2.100 (M) (D) Mud TEXTURE: Sand 1 Silt 1 Clay 34 70 65 COMPOSITION: Quartz 22 25 Feldspar 2 5 Mica 3 2 Heavy minerals TR 1 Pyrite 70 65 Clay - TR Nannofossils - TR Radiolarians - TR Diatoms - TR Sponges spicules 1 1 Plant fragments - 1 GRAIN SIZE Sand 2.100 Silt 0.4 Silt 57.9 Clay 41.8 Calcareous concentration Zeolite clump			
								2		Unzoned Pliocene ?
								4		Calcareous concentration Indurated calcareous block, probably concretions
TIME - ROCK	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	DRILLING DISTANCE	SEMI-CONTINUOUS SAMPLES	LITHOLOGIC DESCRIPTION			

SITE 483	HOLE	CORE 3			CORED INTERVAL	129.5-139.0 m	LITHOLOGIC DESCRIPTION			
		FOSSIL CHARACTER	SECTION	METERS						
TIME - ROCK	BIOSTRATIGRAPHIC ZONE	NANNOFOSSILS	DIATOMS	1	0.5		MUD, olive gray (SY 3/2), firm with interbeds of medium light gray (NG) mud. In Core Catcher, vertical bed due to drilling disturbance. SMEAR SLIDES 2.50 (D) Mud TEXTURE: Sand 1 Silt 34 Clay 65 COMPOSITION: Quartz 28 Feldspar 2 Mica 2 Pyrite 3 Clay 65 Carb. unsp. TR Sponges spicules TR GRAIN SIZE Sand 2.60 Silt 49.3 Clay 50.0 Calcareous concentration Indurated calcareous block, probably concretions			
								2		Unzoned Pliocene ?
								4		Calcareous concentration Indurated calcareous block, probably concretions
TIME - ROCK	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	DRILLING DISTANCE	SEMI-CONTINUOUS SAMPLES	LITHOLOGIC DESCRIPTION			

SITE 483	HOLE	CORE 1			CORED INTERVAL	0.0-6.0 m	LITHOLOGIC DESCRIPTION			
		FOSSIL CHARACTER	SECTION	METERS						
TIME - ROCK	BIOSTRATIGRAPHIC ZONE	NANNOFOSSILS	DIATOMS	1	0.5		MUDDY SILT, grayish olive green (SY 3/2), soft, with interbeds of medium light gray (NG) silt, 5-10 mm. Wood debris common. SMEAR SLIDES 2.50 2.96 (D) (M) Muddy Muddy TEXTURE: Sand 1 Silt 69 Clay 40 COMPOSITION: Quartz 60 52 Feldspar 2 3 Heavy minerals TR TR Pyrite 3 1 Clay 30 40 Carb. unsp. TR TR Foraminifers - TR Radiolarians - TR Diatoms 1 1 Sponges spicules 2 1 GRAIN SIZE Sand 2.70 Silt 7.4 Silt 65.6 Clay 27.0			
								2		Unzoned NN 21/NN 20 Upper Quaternary
								4		Unzoned Pliocene ?
TIME - ROCK	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	DRILLING DISTANCE	SEMI-CONTINUOUS SAMPLES	LITHOLOGIC DESCRIPTION			

SITE 483	HOLE	CORE 1			CORED INTERVAL	0.0-6.0 m	LITHOLOGIC DESCRIPTION			
		FOSSIL CHARACTER	SECTION	METERS						
TIME - ROCK	BIOSTRATIGRAPHIC ZONE	NANNOFOSSILS	DIATOMS	1	0.5		MUDDY SILT, grayish olive green (SY 3/2), soft, with interbeds of medium light gray (NG) silt, 5-10 mm. Wood debris common. SMEAR SLIDES 2.50 2.96 (D) (M) Muddy Muddy TEXTURE: Sand 1 Silt 69 Clay 40 COMPOSITION: Quartz 60 52 Feldspar 2 3 Heavy minerals TR TR Pyrite 3 1 Clay 30 40 Carb. unsp. TR TR Foraminifers - TR Radiolarians - TR Diatoms 1 1 Sponges spicules 2 1 GRAIN SIZE Sand 2.70 Silt 7.4 Silt 65.6 Clay 27.0			
								2		Unzoned NN 21/NN 20 Upper Quaternary
								4		Unzoned Pliocene ?
TIME - ROCK	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	DRILLING DISTANCE	SEMI-CONTINUOUS SAMPLES	LITHOLOGIC DESCRIPTION			

SITE 483	HOLE	CORE 6	CORED INTERVAL	165.0-167.5 m	LITHOLOGIC DESCRIPTION	FOSSIL CHARACTER		DIATOMS	MADPOLEMIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT		
						SECTION	METERS								
					<p>MUDDY SILT, moderate olive brown (SY 4.4). Calcareous spots at Section 1, 31 cm, 40 cm, and 100 cm and Section 2, 6 cm, 60 cm, 100 cm, 130 cm, and 140 cm.</p> <p>SMEAR SLIDES</p> <p>Muddy 270 (D)</p> <p>TEXTURE</p> <p>Sand 1</p> <p>Silt 50</p> <p>Clay 40</p> <p>COMPOSITION:</p> <p>Quartz 43</p> <p>Feldspars 5</p> <p>Mica TR</p> <p>Heavy minerals TR</p> <p>Pyrite 10</p> <p>Clay 40</p> <p>Glass 1</p> <p>Plant remains TR</p> <p>Foraminifers TR</p> <p>Nannofossils TR</p> <p>Diatoms TR</p> <p>Sponge spicules TR</p> <p>GRAIN SIZE</p> <p>Sand 1-136</p> <p>Silt 0.1</p> <p>Clay 48.8</p>										

SITE 483	HOLE	CORE 4	CORED INTERVAL	139.0-148.5 m	LITHOLOGIC DESCRIPTION	FOSSIL CHARACTER		DIATOMS	MADPOLEMIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	
						SECTION	METERS							
					<p>MUDDY SILT, firm, olive gray (SY 3/2), 41-88 cm in Section 1, indicated crest of calcareous mud, non-calcareous veins (opp?). Silt spots at base of core.</p> <p>SMEAR SLIDES</p> <p>220 (D)</p> <p>Muddy 270 (D)</p> <p>TEXTURE:</p> <p>Sand 2</p> <p>Silt 23</p> <p>Clay 75</p> <p>COMPOSITION:</p> <p>Quartz 17</p> <p>Feldspar 2</p> <p>Mica 2</p> <p>Pyrite 3</p> <p>Clay 75</p> <p>Glass unspc.</p> <p>Sponge spicules TR</p> <p>Plant fragments TR</p> <p>Fish remains TR</p> <p>GRAIN SIZE</p> <p>Sand 220</p> <p>Silt 15.2</p> <p>Clay 49.8</p> <p>38.8</p>									

SITE 483	HOLE	CORE 5	CORED INTERVAL	148.5-158.0 m	LITHOLOGIC DESCRIPTION	FOSSIL CHARACTER		DIATOMS	MADPOLEMIANS	NANNOFOSSILS	FORAMINIFERS	BIOSTRATIGRAPHIC ZONE	TIME - ROCK UNIT	
						SECTION	METERS							
					<p>MUD, olive gray (SY 3/2), firm. At Section 1, 136-145 cm and Section 2, 15 cm, 20-25 cm, and 71-78 cm, greenish gray (SG 6/1), non-calcareous irregular discolorations. At Section 3, 45-75 cm and Section 4, 2-70 cm, moderate olive brown (SY 4/4), slightly calcareous discolorations. In Section 4, local NANNOFOSSIL MUD. Deviation 2.5.</p> <p>SMEAR SLIDES</p> <p>Mud 170 (D)</p> <p>Muddy 468 (D)</p> <p>Mud 1-130</p> <p>Mud 48.7</p> <p>Mud 50.1</p> <p>TEXTURE:</p> <p>Sand -</p> <p>Silt 2</p> <p>Clay 30</p> <p>70</p> <p>COMPOSITION:</p> <p>Quartz 31</p> <p>Feldspar 5</p> <p>Mica 1</p> <p>Heavy minerals TR</p> <p>Pyrite 2</p> <p>Clay 60</p> <p>Glass -</p> <p>Carb. unspc. TR</p> <p>Foraminifers TR</p> <p>Nannofossils TR</p> <p>Sponge spicules TR</p> <p>Plant fragments TR</p> <p>GRAIN SIZE</p> <p>Sand 1-130</p> <p>Silt 0.2</p> <p>Clay 48.7</p> <p>50.1</p>									

SITE 483	HOLE	CORE 8				CORED INTERVAL	177.0-186.5 m	LITHOLOGIC DESCRIPTION						
		SECTION	METERS	GRAPHIC LITHOLOGY	DISTANCE									
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Fossil Character	VOID							
							1	0.5	GZ	SAMPLES	SEDIMENTARY STRUCTURES	DISTANCE	LITHOLOGIC DESCRIPTION	
							2	1.0						
							3							
							4							
5														
		CC												
LOWER Pliocene														
Spongaster pentas														
CM AG CS														

MUD, olive gray (SY 3/2), firm, structureless. Dark greenish gray (5G 4.1) non-calcareous discolored areas at Section 1, 100 cm, Section 2, 8-10 cm and 78-80 cm, Section 3, 44-46 cm, and Section 4, 20 cm. Moderate olive brown (SY 4.4) calcareous discolored areas at Section 1, 126 cm, Section 3, 40-42 cm, Section 4, 68-70 cm, and Section 5, 9 cm. Micritic LIMESTONE nodule at Section 2, 29 cm, 49 cm, and 52-56 cm. Ash pod at Section 4, 3 cm.

SMEAR SLIDES

1-12 1-97
Muddy silt
Muddy silt

TEXTURE:
Sand 80
Silt 12
Clay 6

COMPOSITION:
Quartz 72
Feldspar 4
Mica 2
Heavy minerals TR
Pyrite TR
Clay 20
Clay 20
Foraminifers TR
Nannofossils TR
Radiolarians TR
Diatoms TR
Sponge spicules TR

GRAIN SIZE
Sand 2126
Silt 603
Clay 469
52.8

SITE 483	HOLE	CORE 7				CORED INTERVAL	167.5-177.0 m	LITHOLOGIC DESCRIPTION						
		SECTION	METERS	GRAPHIC LITHOLOGY	DISTANCE									
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Fossil Character	VOID							
							1	0.5	GZ	SAMPLES	SEDIMENTARY STRUCTURES	DISTANCE	LITHOLOGIC DESCRIPTION	
							2	1.0						
							3							
							4							
5														
		CC												
LOWER Pliocene														
Spongaster pentas														
FP AG FG														

MUD, olive gray (SY 3/2), firm, structureless. Greenish gray (5G 6/1) discolored areas at Section 1, 9-14 cm and Section 3, 30-32 cm. Ash spots, light gray (SY 4.4) calcareous discolored areas at Section 1, 126 cm, and Section 2, 79 cm. Organic nodules, color of matrix at Section 2, 79 cm. Organic fragment as shown.

SMEAR SLIDES

1-12 1-97
Muddy silt
Muddy silt

TEXTURE:
Sand 80
Silt 12
Clay 6

COMPOSITION:
Quartz 72
Feldspar 4
Mica 2
Heavy minerals TR
Pyrite TR
Clay 20
Clay 20
Foraminifers TR
Nannofossils TR
Radiolarians TR
Diatoms TR
Sponge spicules TR

GRAIN SIZE
Sand 2126
Silt 603
Clay 469
52.8

SITE 483	HOLE	CORE 10	CORED INTERVAL 196.0-205.5 m			LITHOLOGIC DESCRIPTION				
			SECTION	METERS	GRAPHIC LITHOLOGY					
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	UPPER MIOCENE - LOWER PLOCENE				<p>MUDDY SILT, olive gray (5Y 3/2), structureless with dark greenish gray (5G 4/1) in part. Silty. MUD, dark greenish gray (5G 4/1), possibly siliceous, diffuse areas (dark greenish gray (5G 4/1), possibly siliceous at Section 3, 66 cm, 84 cm, 105 cm, and 118 cm and Section 4, 25 and 111 cm and Section 5, 30 and 66 cm.</p> <p>SMEAR SLIDES</p> <p>Silicaceous mud 1:100 1:10</p> <p>(M) (D)</p> <p>TEXTURE: Sand 2 Silt 30 Clay 60 68 COMPOSITION: Quartz 30 19 Feldspar 4 4 Mica 1 TR Heavy minerals 1 4 Clay 50 60 Glass TR TR Carb. unspic. 1 3 Fossils: Foraminifers TR 1 Nannofossils TR 3 Radiolarians TR TR Diatoms 1 TR Sponges spicules 1 TR Microfossils 1 TR Unidentified siliceous 2 5</p> <p>GRAIN SIZE Sand 150 Silt 1.4 Clay 52.3 46.3</p>				
		FOSSIL CHARACTER		DIATOMS			NANNOFOSSILS		FORAMINIFERS	
TIME - ROCK UNIT		BIOSTRATIGRAPHIC ZONE		UPPER MIOCENE - LOWER PLOCENE		STROBILITE		SAMPLES		CZ
TIME - ROCK UNIT		BIOSTRATIGRAPHIC ZONE		UPPER MIOCENE - LOWER PLOCENE		STROBILITE		SAMPLES		
TIME - ROCK UNIT		BIOSTRATIGRAPHIC ZONE		UPPER MIOCENE - LOWER PLOCENE		STROBILITE		SAMPLES		CZ

SITE 483	HOLE	CORE 9	CORED INTERVAL 186.5-196.0 m			LITHOLOGIC DESCRIPTION				
			SECTION	METERS	GRAPHIC LITHOLOGY					
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	LOWER PLOCENE				<p>MUDDY SILT, olive gray (5Y 3/2), firm, structureless with dark greenish gray (5G 4/1) in part. Silty. MUD, dark greenish gray (5G 4/1), possibly siliceous, diffuse areas (dark greenish gray (5G 4/1), possibly siliceous at Section 3, 66 cm, 84 cm, 105 cm, and 118 cm and Section 4, 25 and 111 cm and Section 5, 30 and 66 cm.</p> <p>SMEAR SLIDES</p> <p>Silicaceous mud 1:100 1:10</p> <p>(M) (D)</p> <p>TEXTURE: Sand 1 Silt 59 40 Clay 40 COMPOSITION: Quartz TR 51 Feldspar TR 4 Mica TR 2 Heavy minerals TR 2 Clay 100 TR Glass TR TR Carb. unspic. TR TR Fossils: Foraminifers TR 3 Nannofossils TR TR Radiolarians TR TR Diatoms TR 1 Siliocollites TR</p> <p>GRAIN SIZE Sand 150 Silt 0.5 Clay 51.5 48.0</p>				
		FOSSIL CHARACTER		DIATOMS			NANNOFOSSILS		FORAMINIFERS	
TIME - ROCK UNIT		BIOSTRATIGRAPHIC ZONE		LOWER PLOCENE		STROBILITE		SAMPLES		CZ
TIME - ROCK UNIT		BIOSTRATIGRAPHIC ZONE		LOWER PLOCENE		STROBILITE		SAMPLES		
TIME - ROCK UNIT		BIOSTRATIGRAPHIC ZONE		LOWER PLOCENE		STROBILITE		SAMPLES		CZ

SITE 493		HOLE		CORE 11		CORED INTERVAL		205.5-215.0 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	<i>Omnartus dentifimus</i>	SECTION	1	METERS	0.5	GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	MUD (fin, olive gray (SY 3/2) with a dark greenish gray (SG 2/1) color band (3-5 cm) and fine sand (SG 2/1) color bands at Section 2, 2 cm and Section 3, 0 cm and 52-53 cm.
DIATOMS		RADIOLARIANS		SECTION	2	METERS	1.0	GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	MUD (fin, olive gray (SY 3/2) with a dark greenish gray (SG 2/1) color band (3-5 cm) and fine sand (SG 2/1) color bands at Section 2, 2 cm and Section 3, 0 cm and 52-53 cm.
FORAMINIFERS		NANNOFOSSILS		SECTION	3	METERS		GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	MUD (fin, olive gray (SY 3/2) with a dark greenish gray (SG 2/1) color band (3-5 cm) and fine sand (SG 2/1) color bands at Section 2, 2 cm and Section 3, 0 cm and 52-53 cm.
FOSSIL CHARACTER				SECTION	CC	METERS		GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	MUD (fin, olive gray (SY 3/2) with a dark greenish gray (SG 2/1) color band (3-5 cm) and fine sand (SG 2/1) color bands at Section 2, 2 cm and Section 3, 0 cm and 52-53 cm.
SMEAR SLIDES											
TEXTURE:											
Sand		2									
Silt		40									
Clay		58									
COMPOSITION:											
Quartz		35									
Feldspar		5									
Mica		1									
Heavy minerals		TR									
Pyrite		4									
Clay		45									
Carb. unspcc.		3									
Foraminif.		1									
Nannofossils		4									
Radiolarians		TR									
Diatoms		TR									
Sponge spicules		TR									
GRAIN SIZE		1.00									
Sand		0.2									
Silt		47.7									
Clay		52.0									

SITE 493		HOLE		CORE 13		CORED INTERVAL		224.5-234.0 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	<i>Omnartus penitimus</i>	SECTION	1	METERS	0.5	GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	SILICEOUS MUD, olive gray (SY 3/2) firm. LIMESTONE blocks, very fine-grained, greenish black (BG 2/1) at Section 1, 15-24 cm and 141 cm. Fine silt layers, dark greenish gray (BG 4/1) at Section 1, 83 cm, 111 cm and 122 cm. Ash horns at Section 1, 135-140 cm.
DIATOMS		RADIOLARIANS		SECTION	CC	METERS		GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	SILICEOUS MUD, olive gray (SY 3/2) firm. LIMESTONE blocks, very fine-grained, greenish black (BG 2/1) at Section 1, 15-24 cm and 141 cm. Fine silt layers, dark greenish gray (BG 4/1) at Section 1, 83 cm, 111 cm and 122 cm. Ash horns at Section 1, 135-140 cm.
FORAMINIFERS		NANNOFOSSILS		SECTION		METERS		GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	SILICEOUS MUD, olive gray (SY 3/2) firm. LIMESTONE blocks, very fine-grained, greenish black (BG 2/1) at Section 1, 15-24 cm and 141 cm. Fine silt layers, dark greenish gray (BG 4/1) at Section 1, 83 cm, 111 cm and 122 cm. Ash horns at Section 1, 135-140 cm.
FOSSIL CHARACTER				SECTION		METERS		GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	SILICEOUS MUD, olive gray (SY 3/2) firm. LIMESTONE blocks, very fine-grained, greenish black (BG 2/1) at Section 1, 15-24 cm and 141 cm. Fine silt layers, dark greenish gray (BG 4/1) at Section 1, 83 cm, 111 cm and 122 cm. Ash horns at Section 1, 135-140 cm.
SMEAR SLIDES											
TEXTURE:											
Sand		2									
Silt		78									
Clay		20									
COMPOSITION:											
Quartz		54									
Feldspar		5									
Mica		TR									
Heavy minerals		TR									
Pyrite		4									
Clay		20									
Carb. unspcc.		3									
Foraminif.		TR									
Nannofossils		3									
Radiolarians		TR									
Diatoms		TR									
Sponge spicules		TR									
GRAIN SIZE		1.80									
Sand		0.2									
Silt		44.8									
Clay		55.0									

SITE 493		HOLE		CORE 12		CORED INTERVAL		216.0-224.5 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	<i>Omnartus penitimus</i>	SECTION	1	METERS		GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	LIMESTONE blocks, greenish black (BG 2/1), very fine-grained, structureless. Non-calcareous dark areas, hard, may be opal. Blocks appear to break on veins of non-calcareous material.
DIATOMS		RADIOLARIANS		SECTION		METERS		GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	LIMESTONE blocks, greenish black (BG 2/1), very fine-grained, structureless. Non-calcareous dark areas, hard, may be opal. Blocks appear to break on veins of non-calcareous material.
FORAMINIFERS		NANNOFOSSILS		SECTION		METERS		GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	LIMESTONE blocks, greenish black (BG 2/1), very fine-grained, structureless. Non-calcareous dark areas, hard, may be opal. Blocks appear to break on veins of non-calcareous material.
FOSSIL CHARACTER				SECTION		METERS		GRAPHIC LITHOLOGY		LITHOLOGIC DESCRIPTION	LIMESTONE blocks, greenish black (BG 2/1), very fine-grained, structureless. Non-calcareous dark areas, hard, may be opal. Blocks appear to break on veins of non-calcareous material.

SITE 493	HOLE	CORE 15		CORED INTERVAL	243.5-253.0 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS			
TIME - ROCK UNIT UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE <i>Omnartus penitimus</i>	FOSSIL CHARACTER DIATOMS NANNOFOSILS FORAMINIFERS	SECTION 1	0.5	16 true dip	MUDSTONE, olive gray (SY 37); fissile throughout, occasional discrete inclined fractures (some with slicken sides), drilling bitcups common. Carbonate-rich laminae, light olive gray (SY 37), 1.7 m, Section 2, 30 cm, 119 cm, and 114 cm, Section 4, 20 cm, 42 cm, 67 cm, and 104 cm, Section 5, 15 cm and 56 cm, and Section 6, 26 cm. Thin MUD beds, light bluish gray (SY 7 H), with sharp bases and slightly gradational tops at Section 1, 96 cm, Section 2, 79 cm, 96 cm, and 130 cm, Section 3, 52 cm, Section 4, 18 cm, 47 cm, and 71 cm, and Section 5, 140 cm. At Section 5, 80-86 cm, these beds are waxy, clayey and inclined fractures, some with slickensides. Deviate from 2.6.
			SECTION 2		Maximum apparent dip 16	
			SECTION 3		Maximum apparent dip 11	
			SECTION 4		Maximum apparent dip 11	
			SECTION 5		Maximum apparent dip 19	
			SECTION 6		Maximum apparent dip 19	
<p>SMEAR SLIDES</p> <p>TEXTURE: Sand 63 40 Silt 35 60 Clay</p> <p>COMPOSITION: Quartz 53 32 Feldspar 2 2 Mica 1 1 Heavy minerals TR 3 Clay 35 60 Carb. unsp. 1 Foraminif. TR - Nannofossils 1 TR Radiolarians TR - Diatoms 2 TR Sponge spicules 1 1 Silicoflagellates - TR</p> <p>GRAIN SIZE 150 Sand 0.6 Silt 47.2 Clay 52.2</p>						

SITE 493	HOLE	CORE 14		CORED INTERVAL	234.0-243.5 m	LITHOLOGIC DESCRIPTION
		SECTION	METERS			
TIME - ROCK UNIT UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE <i>Omnartus penitimus</i>	FOSSIL CHARACTER DIATOMS NANNOFOSILS FORAMINIFERS	SECTION 1	0.5		MUD, olive gray (SY 37); hard Angular LIMESTONE clasts, same color as mud. Section 3, first to be cut with saw, shows many more features (some above may be marked by crease cuttings). Very fine parallel laminae, horizontal or subhorizontal. Drilling bitcups common. Fractures from Section 3, 180-130 cm and Section 4, 10-95 cm. Incipient fissility beginning in Section 4. ASH at Section 4, 50 cm. Gravelly muddy silt at Section 5, 48 cm and minor plant fragments.
			SECTION 2			
			SECTION 3			
			SECTION 4			
			SECTION 5			
			SECTION 6			
<p>SMEAR SLIDES</p> <p>TEXTURE: Sand 1 80 Silt 59 80 Clay 40 20</p> <p>COMPOSITION: Quartz 41 64 Feldspar 6 12 Mica 1 2 Heavy minerals TR 2 Clay 40 20 Carb. unsp. 5 - Foraminif. TR - Nannofossils 4 - Diatoms TR TR Sponge spicules TR TR Silicoflagellates TR TR Fish remains TR TR</p> <p>GRAIN SIZE 150 Sand 0.4 Silt 48.0 Clay 51.6</p>						

SITE 483		HOLE		CORE 16		CORED INTERVAL 253.0-262.5 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			METERS	SECTION	GRAPHIC LITHOLOGY	DRAINING DISTURBANCE	SAMPLES
		FORAMINIFERS	NANNOCOSILS	RADIOLARIANS					
UPPER MIOCENE	<i>Omnartus penitimus</i>				0.5	1	MUD, soft, grayish olive (10Y 4/2). Possibly pulverized during drilling. Base of Core-Catcher has 4 cm well-indurated MUDDY SILTSTONE - perhaps whole core was this material.		
					1.0	2	VOID		
					2	3	VOID		
					CC				

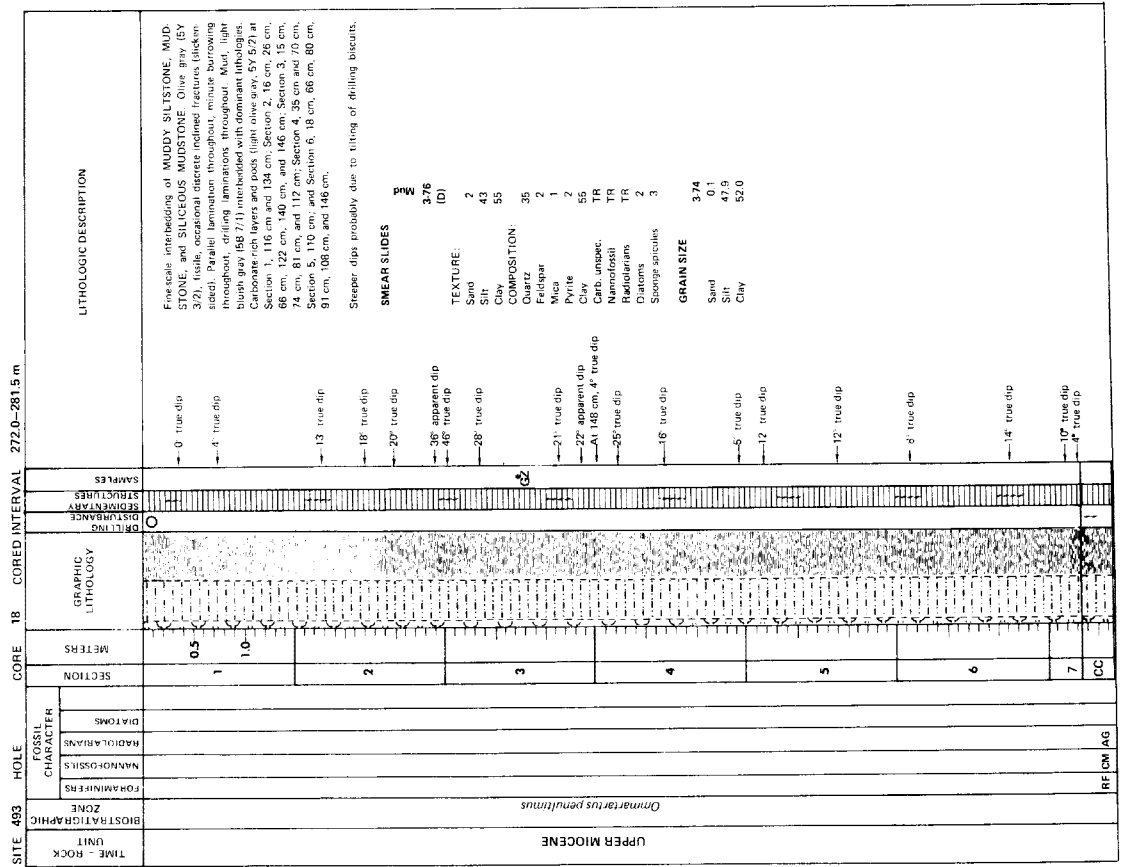
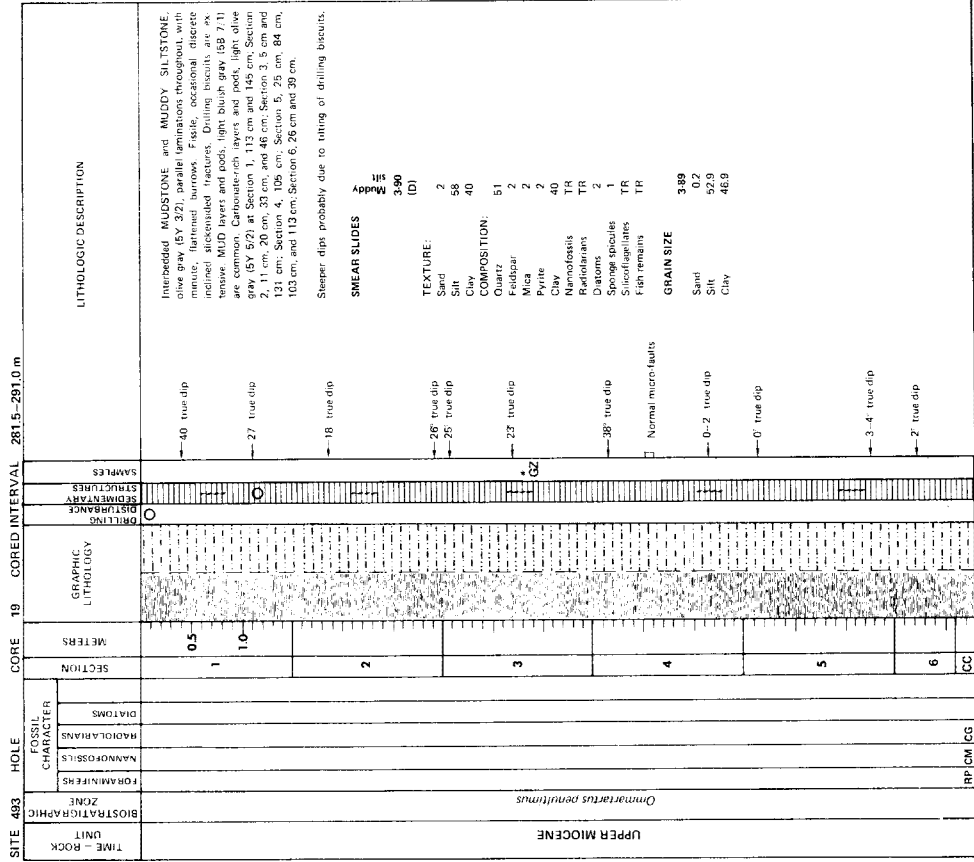
SITE 483		HOLE		CORE 17		CORED INTERVAL 262.5-272.0 m		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			METERS	SECTION	GRAPHIC LITHOLOGY	DRAINING DISTURBANCE	SAMPLES
		FORAMINIFERS	NANNOCOSILS	RADIOLARIANS					
UPPER MIOCENE	<i>Omnartus penitimus</i>				0.5	1	VOID		
					1.0	2	VOID		
					2	3	OG		
					3	4	PP		
					B	CC			
			B	AG					

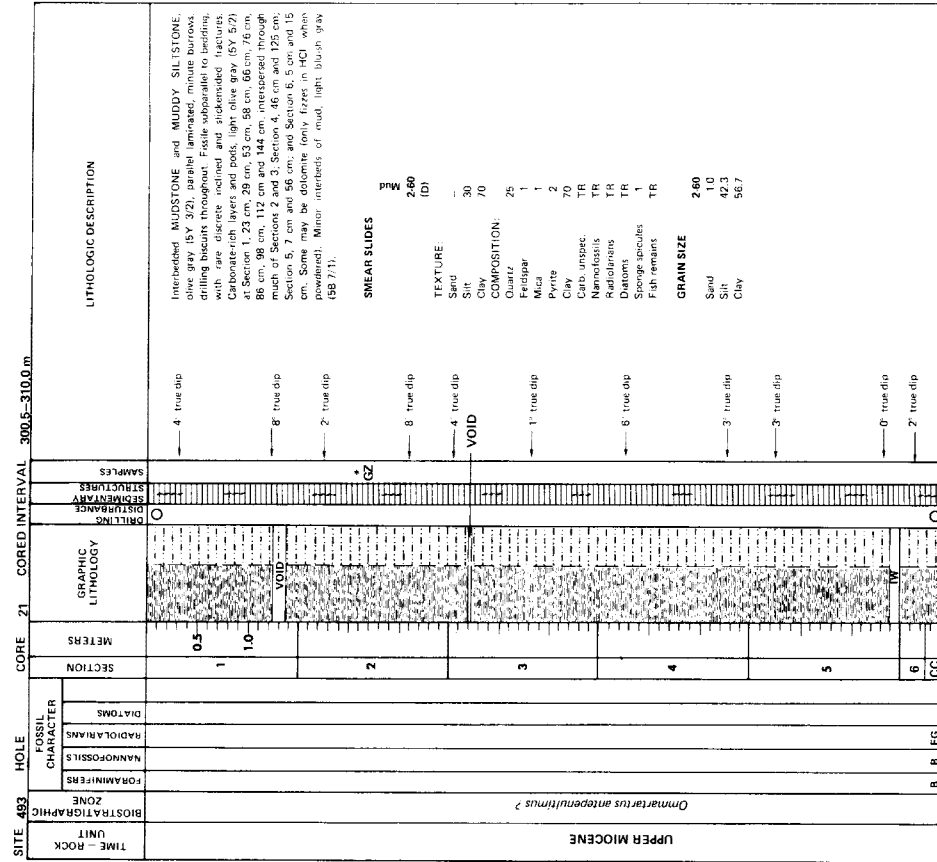
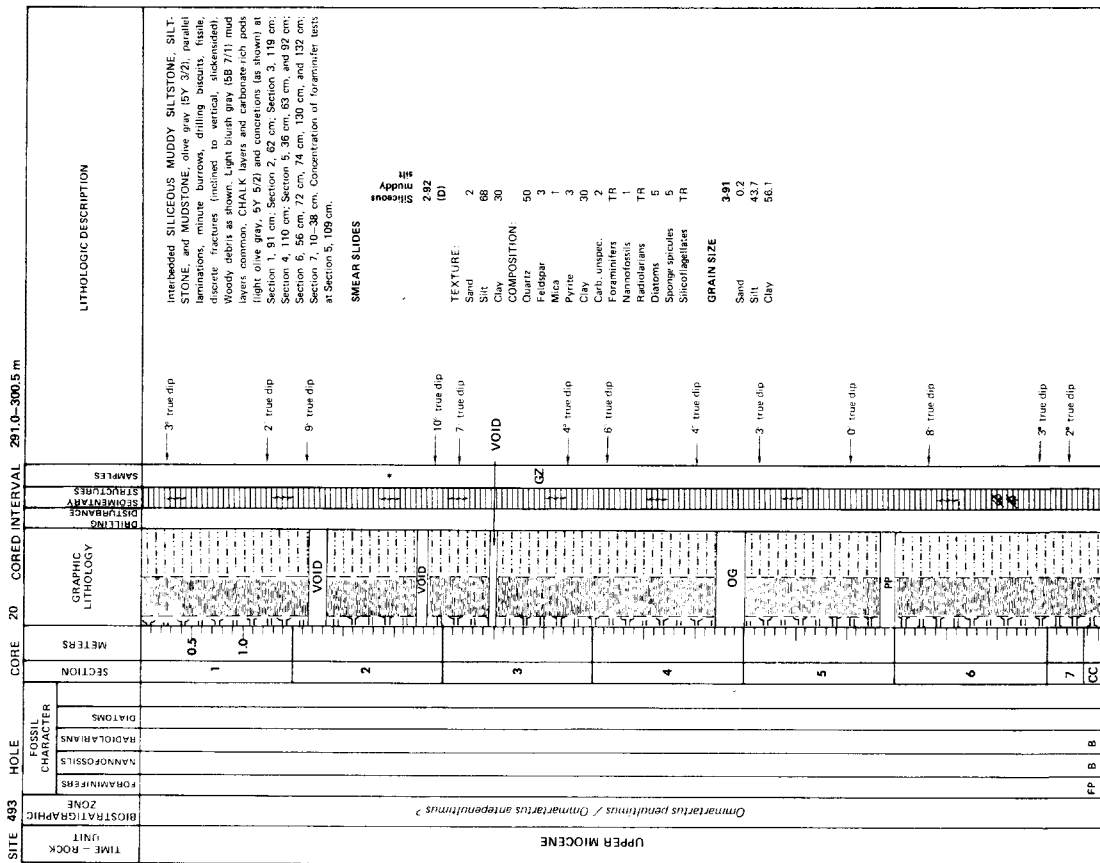
MUDSTONE, olive gray (5Y 3/2), fissile, parallel laminated, minute (< 1 mm) burrowing, common inclined fractures (some slickensided), drilling biscuits throughout core. Carbonate-rich layers or pods, light olive gray (5Y 5/2) at Section 1, 24 cm, 48 cm, and 118 cm. Section 2, 38 cm, 56 cm, and 84 cm. Section 3, 48 cm. Section 4, 38 cm, 56 cm, 72 cm, and 118 cm. Section 5, 16 cm, 32 cm, 48 cm, 64 cm, 80 cm, and Core-Catcher. Very thin, discontinuous, faint layers of mud, light bluish gray (6.5 7.1) at Section 1, 86 cm. Section 2, 9 cm, 34 cm, and 130 cm. Section 3, 4 cm, 44 cm, 74 cm, 86 cm, and 100 cm. Section 4, 20 cm, and 75 cm. Section 5, 26 cm and 31 cm, and Core-Catcher. Section 5, subtle graded beds.

SMEAR SLIDES
 Muddy
 180
 10
 Muddy
 1
 Sand
 64
 Silt
 35
 Clay
 52
 Quartz
 3
 Feldspar
 2
 Mica
 Heavy minerals
 TR
 35
 Clay
 TR
 Forams, unapp.
 TR
 Forams
 TR
 Nannofossil
 TR
 Radiolaria
 TR
 Diatoms
 3
 Sponge spicules
 2
 Silicoflagellates
 R
 Fish remains
 TR

GRAIN SIZE
 1-77
 Sand
 0.2
 Silt
 47.4
 Clay
 52.4

Apparent dip
 0-16
 Maximum apparent dip 22
 Maximum apparent dip 14
 Maximum apparent dip 3





SITE 483 HOLE CORE 22 CORED INTERVAL 310.0-319.5 m

TIME - ROCK UNIT	UPPER MIOCENE
BIOSTRATIGRAPHIC ZONE	<i>Ommartus antepenultimus</i> ?
FOSSIL CHARACTER	DIATOMS RADIOLARIANS NANNOFOSSILS FORAMINIFERS
SECTION	1 2 3 4 5 CC
METERS	0.5 1.0
GRAPHIC LITHOLOGY	
DRETTING DISTURBANCE	
SAMPLES	GZ
LITHOLOGIC DESCRIPTION	<p>MUDSTONE, interbeds of MUDDY SILTSTONE, olive gray (SY 3/2), parallel laminated, small scale burrows, fissile subparallel to bedding, occasional to common indented, siccened fractures, drilling bisect, throughout. Carbonate iron layers, 14 cm, 15 cm, 15 cm, 48 cm, 80 cm, 104 cm, 135 cm and 145 cm. Section 3, 4 cm and 90 cm. Section 4, 62 cm, 66 cm, 100 cm, 130 cm, and 135 cm. Section 5, 4 cm, 14 cm, 48 cm, and 95 cm, and Core-Catcher. Carbonate concretions, well-indurated, at Section 1, 85 cm and Section 4, 126 cm. Occasional mud laminae, light bluish gray (SB 7/1).</p> <p>SMEAR SLIDES</p> <p>2-25 Mud</p> <p>TEXTURE:</p> <p>Sand 2 Silt 33 Clay 65</p> <p>COMPOSITION:</p> <p>Quartz 25 Feldspar 1 Mica 2 Pyrite 65 Carb. unsp. 1 Foraminif. 2 Nannofossils 1 Radiolarians TR Diatoms TR Sponge spicules 1</p> <p>GRAIN SIZE</p> <p>2-25 Sand 0.3 Silt 42.8 Clay 56.9</p>

SITE 483 HOLE CORE 24 CORED INTERVAL 329.0-338.5 m

TIME - ROCK UNIT	UPPER MIOCENE
BIOSTRATIGRAPHIC ZONE	<i>Ommartus antepenultimus</i>
FOSSIL CHARACTER	DIATOMS RADIOLARIANS NANNOFOSSILS FORAMINIFERS
SECTION	1 2 3 4 5 6 CC
METERS	0.5 1.0
GRAPHIC LITHOLOGY	
DRETTING DISTURBANCE	
SAMPLES	GZ
LITHOLOGIC DESCRIPTION	<p>MUDSTONE, with interbeds of MUDDY SILTSTONE, olive gray (SY 3/2), subtle parallel laminations, small burrows, fissile subparallel to bedding, occasional to common indented, siccened fractures, drilling bisect, throughout. Carbonate iron layers, 14 cm, 15 cm, 15 cm, 48 cm, 80 cm, 104 cm, 135 cm and 145 cm. Section 3, 4 cm and 90 cm. Section 4, 62 cm, 66 cm, 100 cm, 130 cm, and 135 cm. Section 5, 4 cm, 14 cm, 48 cm, and 95 cm, and Core-Catcher. Carbonate concretions, well-indurated, at Section 1, 85 cm and Section 4, 126 cm. Occasional mud laminae, light bluish gray (SB 7/1).</p> <p>SMEAR SLIDES</p> <p>2-100 Mud</p> <p>TEXTURE:</p> <p>Sand 3 Silt 37 Clay 60</p> <p>COMPOSITION:</p> <p>Quartz 36 Feldspar 5 Mica TR Pyrite TR Heavy minerals 2 Clay 50 Glauconite TR Carb. unsp. 2 Foraminif. 1 Nannofossils TR Radiolarians TR Diatoms 1 Sponge spicules 2 Plant fragments TR</p> <p>GRAIN SIZE</p> <p>150 Sand 0.0 Silt 32.3 Clay 67.6</p>

SITE 483 HOLE CORE 23 CORED INTERVAL 319.5-329.0 m

TIME - ROCK UNIT	UPPER MIOCENE
BIOSTRATIGRAPHIC ZONE	NM 11 <i>Ommartus penultimus</i>
FOSSIL CHARACTER	DIATOMS RADIOLARIANS NANNOFOSSILS FORAMINIFERS
SECTION	1 CC
METERS	1
GRAPHIC LITHOLOGY	
DRETTING DISTURBANCE	
SAMPLES	GZ
LITHOLOGIC DESCRIPTION	<p>MUDDY SILTSTONE and MUDSTONE, olive gray (SY 3/2), fissile, very small burrows, parallel laminations, drilling bisect. At Section 1, 10-15 cm, calcareous concretion.</p>

SITE 493	HOLE	CORE 26	CORED INTERVAL 348.0-357.5 m	LITHOLOGIC DESCRIPTION																															
				SECTION	GRAPHIC LITHOLOGY																														
UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	DIATOMS	METERS	SAMPLES	<p>MUDSTONE, olive gray (SY 37); Below Section 2, 7.6 cm, vague horizontal laminations, sub-parallel horizontal fracture locally. Deviation 3.0</p> <p>SMEAR SLIDES</p> <table border="1"> <tr><td>Mud</td><td>24</td><td>282</td></tr> <tr><td>(ID)</td><td>(ID)</td><td>(ID)</td></tr> </table> <p>TEXTURE:</p> <table border="1"> <tr><td>Sand</td><td>2</td></tr> <tr><td>Silt</td><td>30</td><td>20</td></tr> <tr><td>Clay</td><td>68</td><td>80</td></tr> </table> <p>COMPOSITION:</p> <table border="1"> <tr><td>Quartz</td><td>24</td><td>13</td></tr> <tr><td>Feldspar</td><td>4</td><td>5</td></tr> <tr><td>Mica</td><td>1</td><td>1</td></tr> <tr><td>Pyrite</td><td>1</td><td>2</td></tr> <tr><td>Clay</td><td>65</td><td>80</td></tr> </table> <p>Carb. unspic. Foraminifera Nannofossils Radiolarians Diatoms Sponges spicules Succiniferous</p>	Mud	24	282	(ID)	(ID)	(ID)	Sand	2	Silt	30	20	Clay	68	80	Quartz	24	13	Feldspar	4	5	Mica	1	1	Pyrite	1	2	Clay	65	80
							Mud	24	282																										
(ID)	(ID)	(ID)																																	
Sand	2																																		
Silt	30	20																																	
Clay	68	80																																	
Quartz	24	13																																	
Feldspar	4	5																																	
Mica	1	1																																	
Pyrite	1	2																																	
Clay	65	80																																	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	DIATOMS	METERS	SAMPLES																														

SITE 493	HOLE	CORE 25	CORED INTERVAL 338.5-348.0 m	LITHOLOGIC DESCRIPTION																										
				SECTION	GRAPHIC LITHOLOGY																									
UPPER MIOCENE	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	DIATOMS	METERS	SAMPLES	<p>MUDSTONE, olive gray (SY 37); subtle parallel laminations defined by alternating thin, sub-parallel to bedding, horizontal to slightly sub-parallel to bedding, bedded fractures. Drilling bitoucks. Carbonate-rich layers and pods, light olive gray (SY 5/2) at Section 1, 81 cm and 108 cm; Section 2, 42 cm and 94 cm; Section 3, 118 cm; Section 4, 31 cm; and Section 5, 94 cm. Carbonized wood fragments as shown.</p> <p>SMEAR SLIDES</p> <table border="1"> <tr><td>Mud</td><td>270</td><td>2</td></tr> <tr><td>(ID)</td><td>(ID)</td><td>(ID)</td></tr> </table> <p>TEXTURE:</p> <table border="1"> <tr><td>Sand</td><td>2</td></tr> <tr><td>Silt</td><td>33</td><td>65</td></tr> <tr><td>Clay</td><td>65</td><td>65</td></tr> </table> <p>COMPOSITION:</p> <table border="1"> <tr><td>Quartz</td><td>25</td></tr> <tr><td>Feldspar</td><td>1</td></tr> <tr><td>Mica</td><td>1</td></tr> <tr><td>Pyrite</td><td>1</td></tr> <tr><td>Clay</td><td>65</td></tr> </table> <p>Carb. unspic. Foraminifera Nannofossils Radiolarians Diatoms Sponges spicules</p>	Mud	270	2	(ID)	(ID)	(ID)	Sand	2	Silt	33	65	Clay	65	65	Quartz	25	Feldspar	1	Mica	1	Pyrite	1	Clay	65
							Mud	270	2																					
(ID)	(ID)	(ID)																												
Sand	2																													
Silt	33	65																												
Clay	65	65																												
Quartz	25																													
Feldspar	1																													
Mica	1																													
Pyrite	1																													
Clay	65																													
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	DIATOMS	METERS	SAMPLES																									

SITE 493 HOLE CORE 27 CORED INTERVAL 357.5-367.0 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION	
							Mud	Siltaceous mud
UPPER MIOCENE	Ommatartus antepenultimus		1	VOID			MUDSTONE, olive gray (BY 3/2), locally siliceous, parallel laminations in places to Section 3, 102 cm. Organic (woody) fragments as shown. Drilling bits and common MUDDY SILTSTONE, grayish olive (10Y 4/2), slightly bedded, occasional sponges and fragments from Section 3, 102 cm to Section 5, 132 cm. MUDSTONE, grayish olive (10Y 4/2), structures in Core Catalogue.	
			2	VOID				
			3	VOID				
LOWER MIOCENE	NN 5 Calocyclus costata		4				MUDSTONE, olive gray (BY 3/2), locally siliceous, parallel laminations in places to Section 3, 102 cm. Organic (woody) fragments as shown. Drilling bits and common MUDDY SILTSTONE, grayish olive (10Y 4/2), slightly bedded, occasional sponges and fragments from Section 3, 102 cm to Section 5, 132 cm. MUDSTONE, grayish olive (10Y 4/2), structures in Core Catalogue.	
			5					
			6					

SITE 493 HOLE CORE 28 CORED INTERVAL 367.0-376.5 m

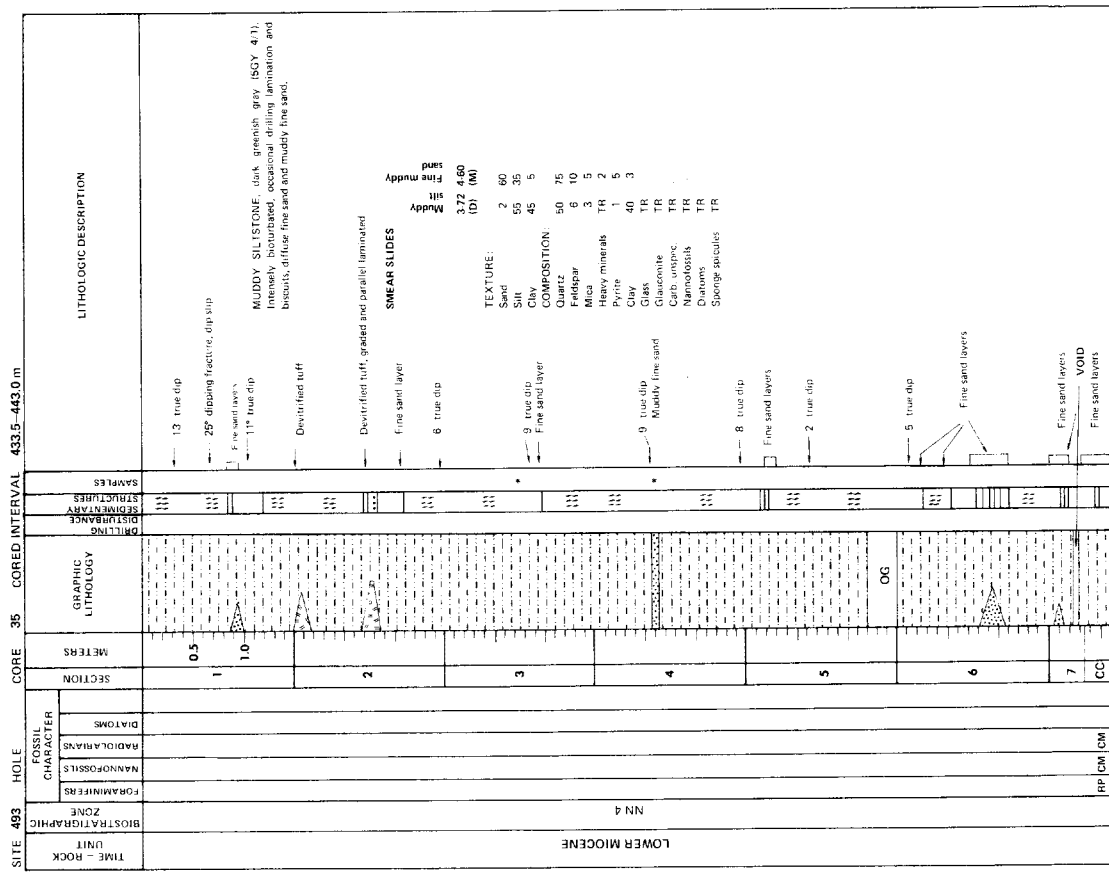
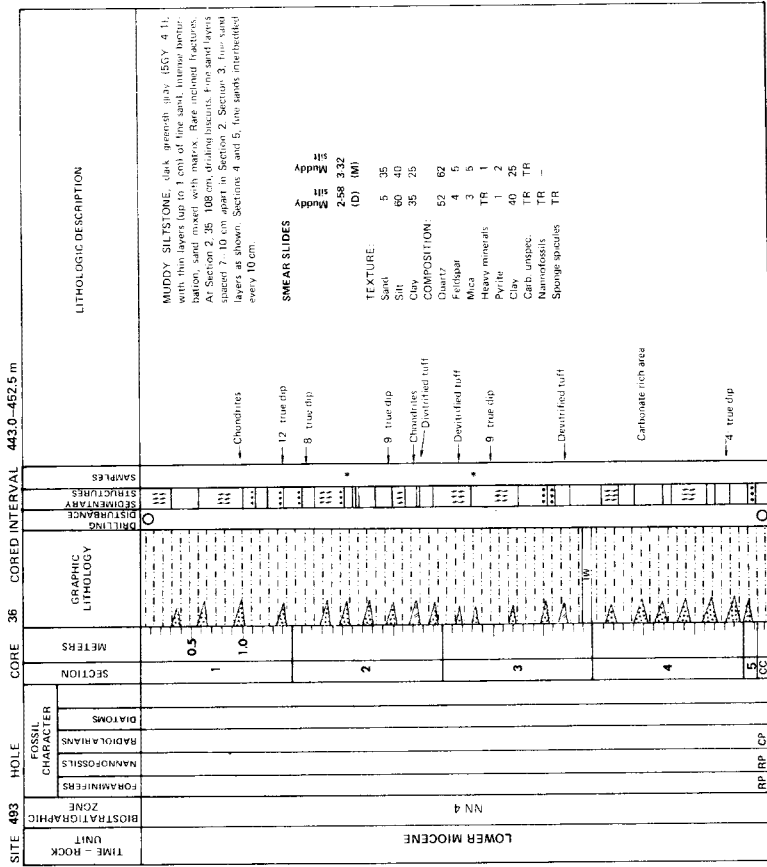
TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION	
							Mud	Siltaceous mud
LOWER-MIDDLE MIOCENE	NN 5 Calocyclus costata		1				MUDSTONE, olive gray (BY 3/2), locally siliceous, parallel laminations in places to Section 3, 102 cm. Organic (woody) fragments as shown. Drilling bits and common MUDDY SILTSTONE, grayish olive (10Y 4/2), slightly bedded, occasional sponges and fragments from Section 3, 102 cm to Section 5, 132 cm. MUDSTONE, grayish olive (10Y 4/2), structures in Core Catalogue.	
			2					
			3					
			4					
			5					
			6					

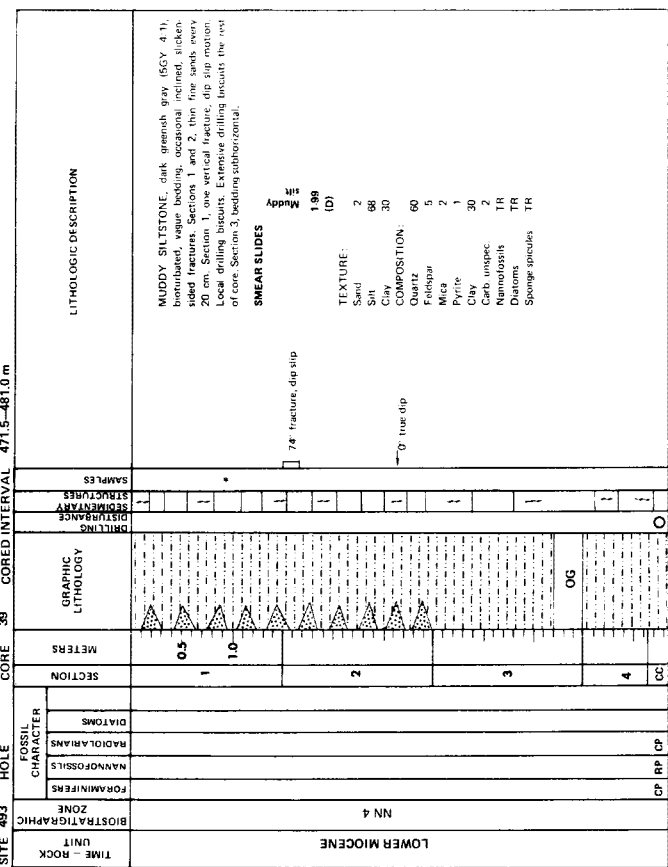
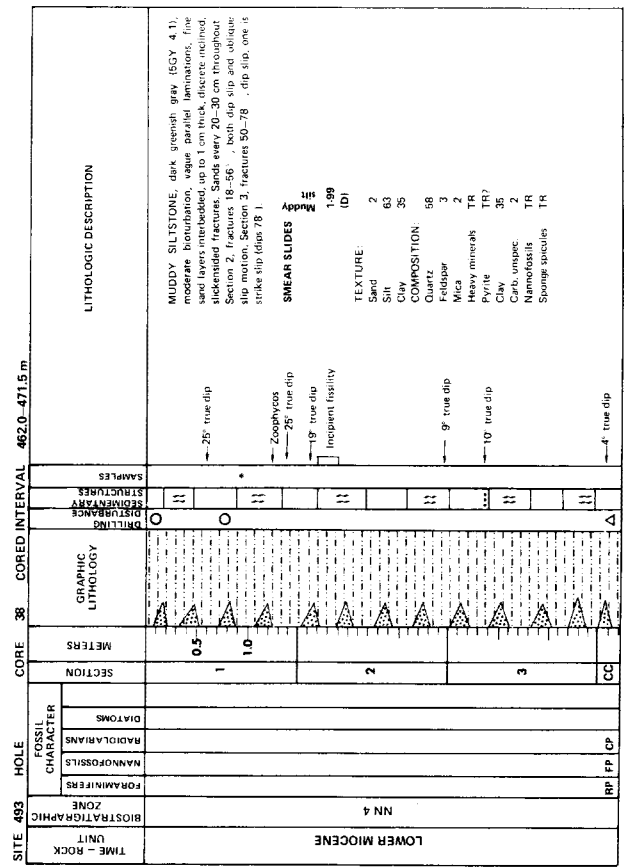
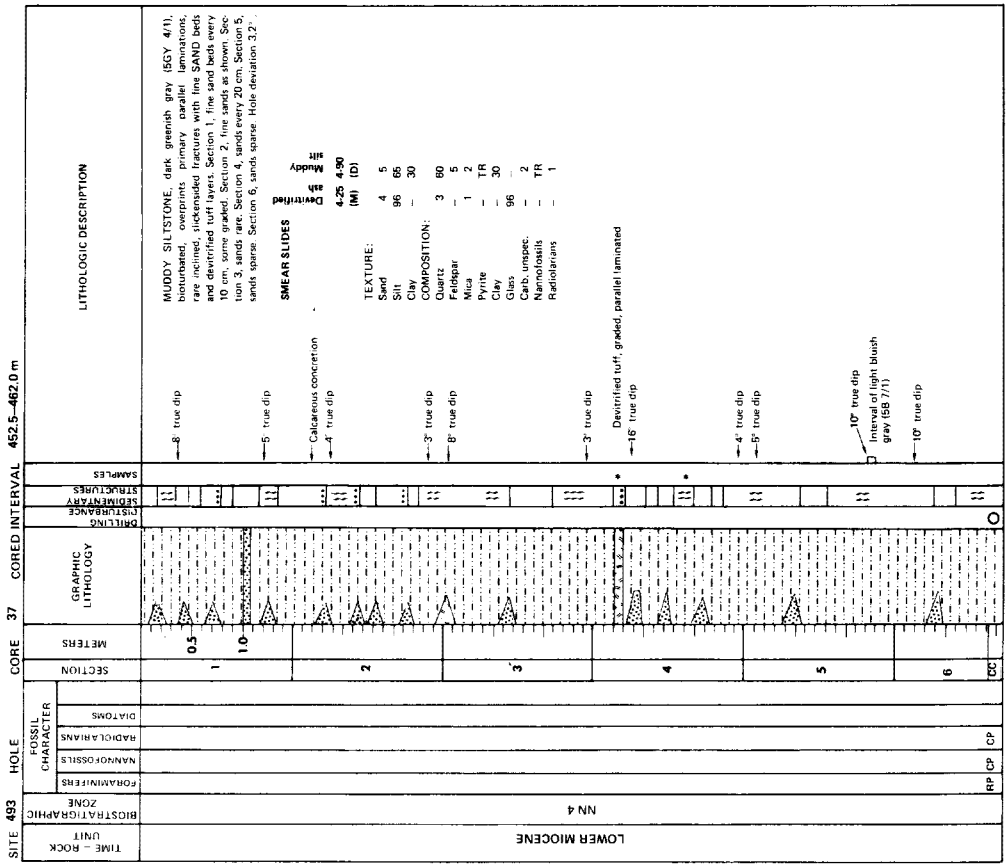
SITE 483 HOLE CORE 32 CORED INTERVAL 405.0-414.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION METERS	GRANULAR LITHOLOGY	BRILLIANCE	DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION																																																
		DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS																																																						
LOWER MIOCENE	NN 4 <i>Calocyctea costata</i>					0.5					<p>MUDDY SILTSTONE, calcareous at the top, becoming reddish-brown with depth. Grayish olive (10Y 4/2), brownish, open fractures throughout, with some stickensided, 0-56 fracture planes, average throw on one fracture. Laminated tuff, light gray (N7) in Section 2. Local drilling laminations, biccuits and fissile zones throughout. In Core Catcher, coarse sand concentration.</p> <p>SECTION 2:</p> <p>SMEAR SLIDES</p> <table border="1"> <tr><td>Calcareous</td><td>1-24</td><td>4-29</td></tr> <tr><td>Muddy silt</td><td>3</td><td>2</td></tr> <tr><td>Sand</td><td>57</td><td>68</td></tr> <tr><td>Silt</td><td>40</td><td>30</td></tr> <tr><td>COMPOSITION:</td><td>39</td><td>41</td></tr> <tr><td>Quartz</td><td>5</td><td>4</td></tr> <tr><td>Feldspar</td><td>5</td><td>4</td></tr> <tr><td>Heavy minerals</td><td>TR</td><td>TR</td></tr> <tr><td>Pyrite</td><td>TR</td><td>1</td></tr> <tr><td>Clay</td><td>40</td><td>30</td></tr> <tr><td>Clay minerals</td><td>TR</td><td>TR</td></tr> <tr><td>Foraminifers</td><td>TR</td><td>TR</td></tr> <tr><td>Nannofossils</td><td>1</td><td>1</td></tr> <tr><td>Radiolarians</td><td>1</td><td>1</td></tr> <tr><td>Sponge spicules</td><td>1</td><td>2</td></tr> <tr><td>Silicoflagellates</td><td>1</td><td>1</td></tr> </table>	Calcareous	1-24	4-29	Muddy silt	3	2	Sand	57	68	Silt	40	30	COMPOSITION:	39	41	Quartz	5	4	Feldspar	5	4	Heavy minerals	TR	TR	Pyrite	TR	1	Clay	40	30	Clay minerals	TR	TR	Foraminifers	TR	TR	Nannofossils	1	1	Radiolarians	1	1	Sponge spicules	1	2	Silicoflagellates	1	1
		Calcareous	1-24	4-29																																																							
		Muddy silt	3	2																																																							
		Sand	57	68																																																							
Silt	40	30																																																									
COMPOSITION:	39	41																																																									
Quartz	5	4																																																									
Feldspar	5	4																																																									
Heavy minerals	TR	TR																																																									
Pyrite	TR	1																																																									
Clay	40	30																																																									
Clay minerals	TR	TR																																																									
Foraminifers	TR	TR																																																									
Nannofossils	1	1																																																									
Radiolarians	1	1																																																									
Sponge spicules	1	2																																																									
Silicoflagellates	1	1																																																									
					1.0																																																						
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SITE 483 HOLE CORE 31 CORED INTERVAL 395.5-405.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION METERS	GRANULAR LITHOLOGY	BRILLIANCE	DISTURBANCE	SAMPLES	LITHOLOGIC DESCRIPTION																																																																
		DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS																																																																						
LOWER MIOCENE	NN 4 <i>Calocyctea costata</i>					0.5					<p>MUDDY SILTSTONE, grayish olive (10Y 4/2), brownish, calcareous with minor TUFF beds with light gray (N6). Small fragments as shown. Below Section 3, 100 cm fractures, 85° apparent dip, subhorizontal stickensides on these planes (Section 3 only). Section 5, vertical and horizontal fractures, minor stickensides on horizontal ones.</p> <p>SMEAR SLIDES</p> <table border="1"> <tr><td>Muddy silt</td><td>1-30</td><td>4-99</td><td>7-22</td></tr> <tr><td>Sand</td><td>2</td><td>85</td><td>1</td></tr> <tr><td>Silt</td><td>58</td><td>10</td><td>59</td></tr> <tr><td>Clay</td><td>40</td><td>5</td><td>40</td></tr> <tr><td>COMPOSITION:</td><td>38</td><td>76</td><td>42</td></tr> <tr><td>Quartz</td><td>5</td><td>10</td><td>4</td></tr> <tr><td>Feldspar</td><td>2</td><td>10</td><td>1</td></tr> <tr><td>Heavy minerals</td><td>TR</td><td>TR</td><td>TR</td></tr> <tr><td>Pyrite</td><td>1</td><td>10</td><td>TR</td></tr> <tr><td>Clay</td><td>40</td><td>5</td><td>40</td></tr> <tr><td>Glass</td><td>TR</td><td>TR</td><td>10</td></tr> <tr><td>Glauconite</td><td>4</td><td>1</td><td>2</td></tr> <tr><td>Carb. unspic.</td><td>2</td><td>1</td><td>1</td></tr> <tr><td>Nannofossils</td><td>5</td><td>1</td><td>1</td></tr> <tr><td>Radiolarians</td><td>TR</td><td>TR</td><td>TR</td></tr> <tr><td>Sponge spicules</td><td>3</td><td>1</td><td>1</td></tr> </table>	Muddy silt	1-30	4-99	7-22	Sand	2	85	1	Silt	58	10	59	Clay	40	5	40	COMPOSITION:	38	76	42	Quartz	5	10	4	Feldspar	2	10	1	Heavy minerals	TR	TR	TR	Pyrite	1	10	TR	Clay	40	5	40	Glass	TR	TR	10	Glauconite	4	1	2	Carb. unspic.	2	1	1	Nannofossils	5	1	1	Radiolarians	TR	TR	TR	Sponge spicules	3	1	1
		Muddy silt	1-30	4-99	7-22																																																																						
		Sand	2	85	1																																																																						
		Silt	58	10	59																																																																						
		Clay	40	5	40																																																																						
		COMPOSITION:	38	76	42																																																																						
		Quartz	5	10	4																																																																						
Feldspar	2	10	1																																																																								
Heavy minerals	TR	TR	TR																																																																								
Pyrite	1	10	TR																																																																								
Clay	40	5	40																																																																								
Glass	TR	TR	10																																																																								
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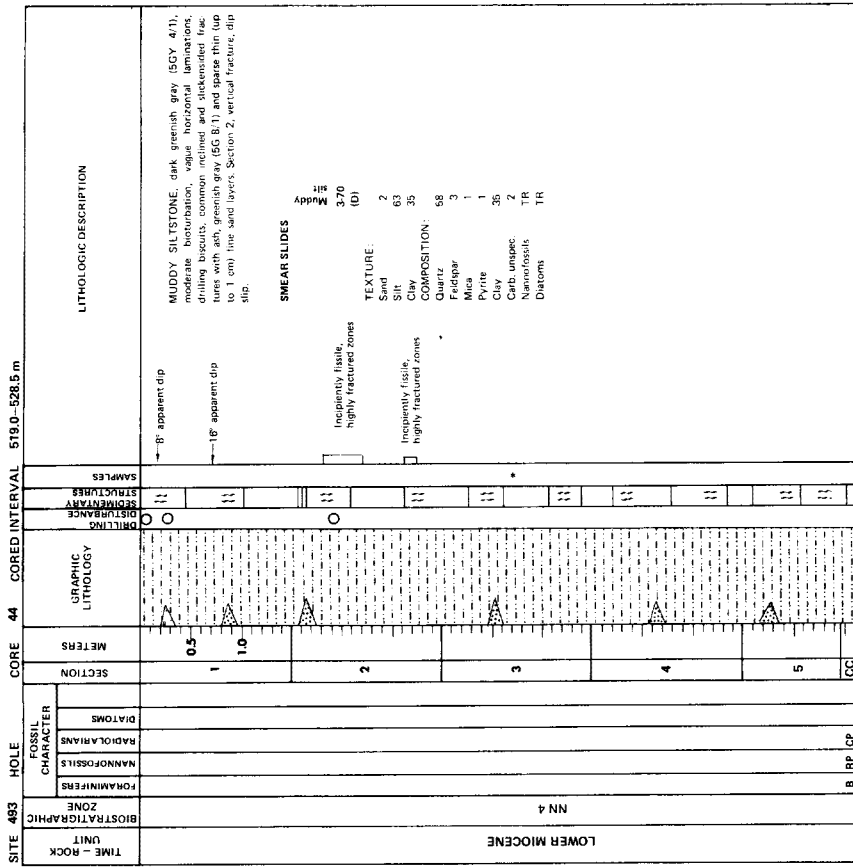
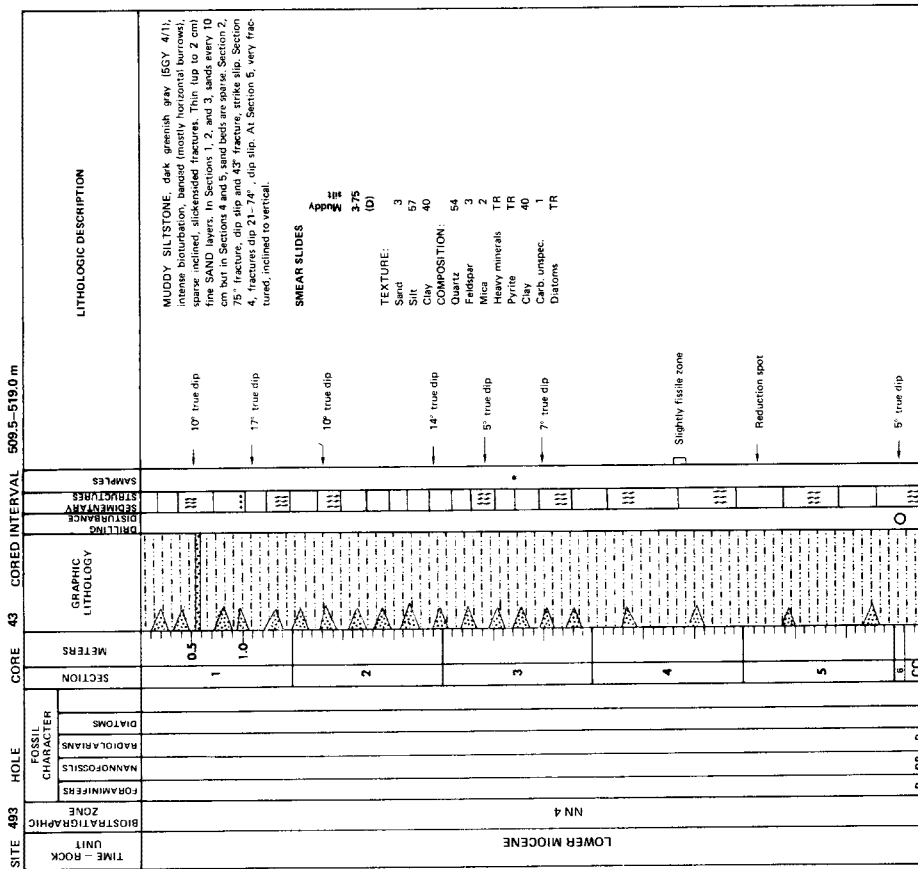




SITE 483	HOLE	CORE 42	CORED INTERVAL		500.0-509.5 m	LITHOLOGIC DESCRIPTION
			SECTION	METERS		
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
LOWER MIOCENE	NN 4		1	0.5		<p>MUDDY SILTSTONE, olive gray (5Y 3/2), slight to moderate bioturbation, vague bedding with bands of muddy siltstone, light bluish gray (5B 7/1), locally up to half of core area. Bands are 2-4 cm. One fine sand layer. Rare to common inclined, stickensided fractures.</p> <p>SMEAR SLIDES</p> <p>Muddy silt 3-66 (ID) 2 2 58 40 COMPOSITION: Quartz 62 Feldspar 3 Mica 2 Pyrite 1 Clay 40 Carb. unsp. 1 Nannofossils TR Diatoms 1</p>
			2	1.0		
			CC			

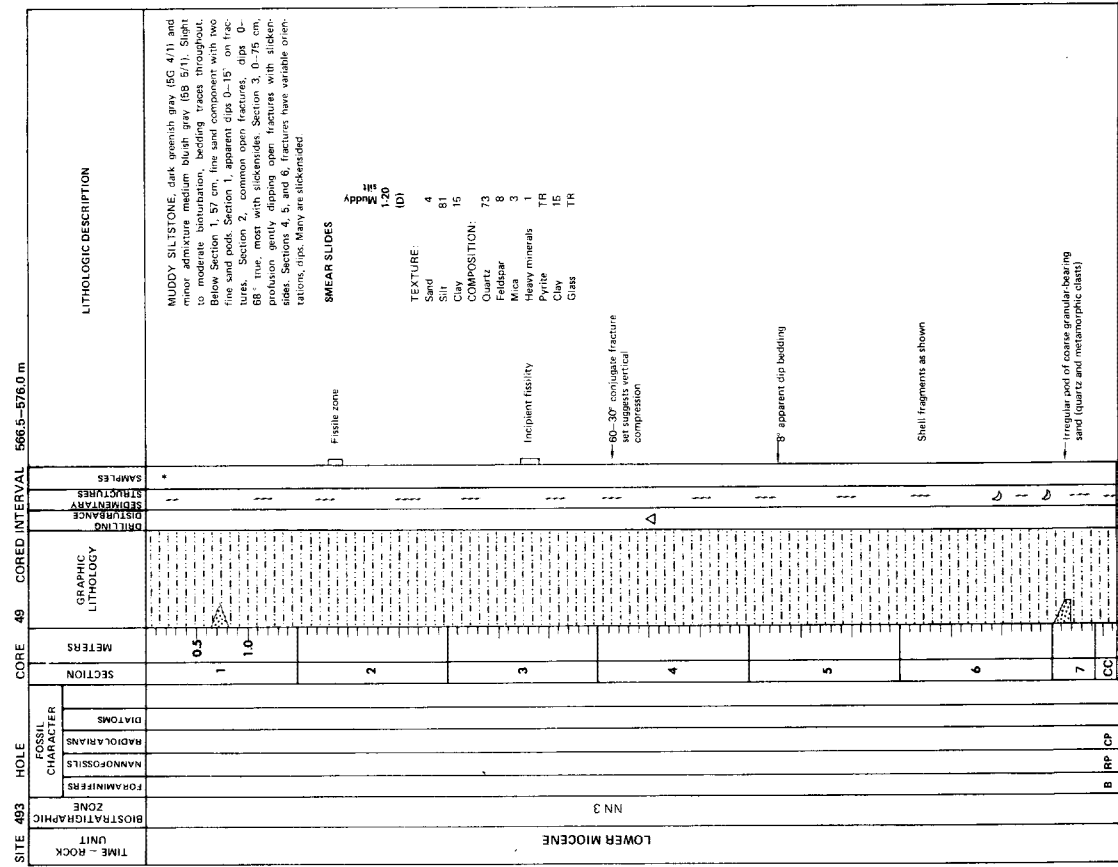
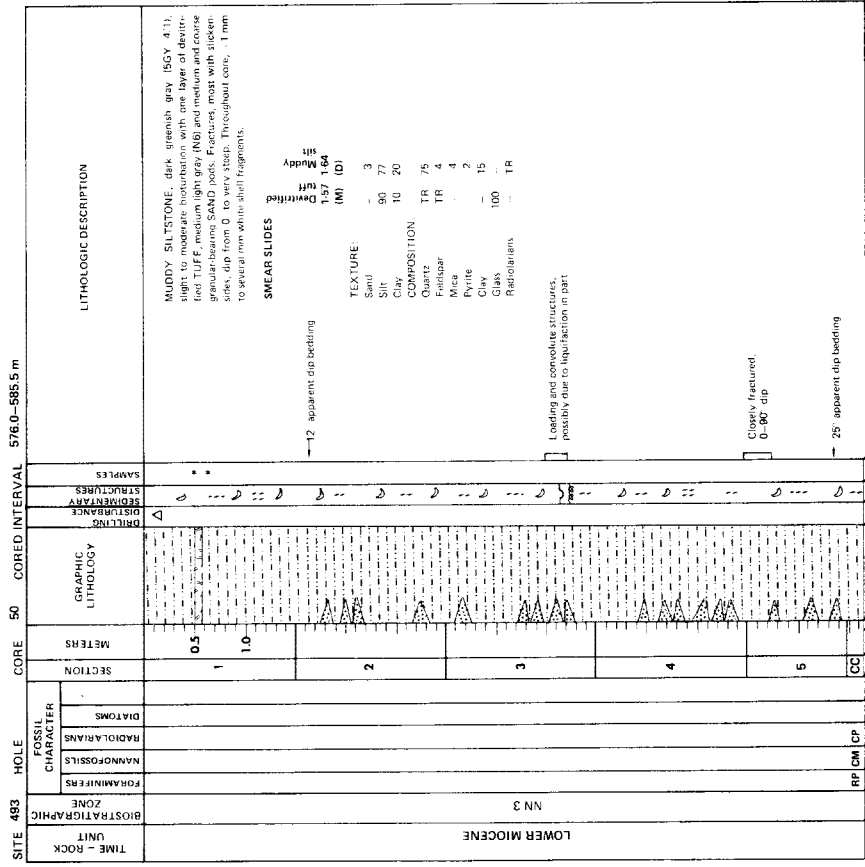
SITE 483	HOLE	CORE 40	CORED INTERVAL		481.0-490.5 m	LITHOLOGIC DESCRIPTION
			SECTION	METERS		
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
LOWER MIOCENE	NN 4		1	0.5		<p>MUDDY SILTSTONE, dark greenish gray (5GY 4/1), slight to moderate bioturbation, vague bedding, common to abundant (to 2 cm) fine sand layers, some graded. Sands every 20 cm.</p> <p>SMEAR SLIDES</p> <p>Muddy silt 1-70 (ID) 3 3 67 30 COMPOSITION: Quartz 62 Feldspar 4 Mica 3 Heavy minerals TR Pyrite 1 Clay unsp. 3 Carb. unsp. TR Nannofossils TR</p>
			2	1.0		
			CC			

SITE 483	HOLE	CORE 41	CORED INTERVAL		490.5-500.0 m	LITHOLOGIC DESCRIPTION
			SECTION	METERS		
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION	METERS	GRAPHIC LITHOLOGY	LITHOLOGIC DESCRIPTION
LOWER MIOCENE	NN 4		1	0.5		<p>MUDDY SILTSTONE, dark greenish gray (5GY 4/1), slight to moderate bioturbation, vague bedding, common to abundant (to 2 cm) fine sand layers, some graded. Sands every 20 cm.</p> <p>SMEAR SLIDES</p> <p>Muddy silt 1-70 (ID) 3 3 67 30 COMPOSITION: Quartz 62 Feldspar 4 Mica 3 Heavy minerals TR Pyrite 1 Clay unsp. 3 Carb. unsp. TR Nannofossils TR</p>
			2	1.0		
			3			
			CC			



SITE 483	HOLE	CORE 45		CORE 46		CORED INTERVAL		LITHOLOGIC DESCRIPTION
		528.5-538.0 m	538.0-547.5 m	SECTION	METERS	SECTION	METERS	
LOWER MIOCENE	TIME - ROCK UNIT	NN 4		NN 4				<p>MUDDY SILTSTONE, dark greenish gray (SGY 471), slight bioturbation, vague subhorizontal bedding laminations, incipient fissility, drilling biscuits with desiccated ASH layer and fine SAND pod. Section 1, fracture 54 true dip, vertical slickensides. Sections 2 and 3, hairline fractures, common discrete fractures. One inclined, straight, slickensided - 50° true dip, normal slip. Sections 4 and 5, hairline fractures, some straight, fractures 10 04 - 010.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Sand 4 Silt 130 5-10 Clay 18 Feldspar 78 90 Quartz 18 10 Mica 10</p> <p>COMPOSITION: 71 TR 6 TR 4 TR TR - 18 100 1 -</p> <p>Carb. unspic. 1 -</p>
	BIOSTRATIGRAPHIC ZONE							
	FOSSIL CHARACTER							<p>Shell fragments as shown</p>
	DIATOMS							
	RADIOLARIANS							
	NANNOFOSSILS							
	FORAMINIFERS							
	DRILLING DISTURBANCE							
	SEDIMENTARY STRUCTURES							
	SAMPLES							

SITE 483	HOLE	CORE 45		CORED INTERVAL		LITHOLOGIC DESCRIPTION
		528.5-538.0 m	538.0-547.5 m	SECTION	METERS	
LOWER MIOCENE	TIME - ROCK UNIT	NN 4		NN 4		<p>MUDDY SILTSTONE, grayish olive (LOY 472), slight bioturbation locally, abundant hairline fractures, some 0-60° dip, slickensided, normal slip on one. Section 3, 105-150 cm and Section 4, 0-21 cm, straight and irregular fractures, 0-27° apparent dip, some slickensides.</p> <p>SMEAR SLIDES</p> <p>TEXTURE: Sand 12 Silt 63 Clay 15 Feldspar 73 Quartz 6 Mica 4 Heavy minerals 1 Pyrite 1 Clay 15 Glauc 15 Carb. unspic. TR Nannofossils TR Radiolarians TR</p>
	BIOSTRATIGRAPHIC ZONE					
	FOSSIL CHARACTER					<p>OG</p>
	DIATOMS					
	RADIOLARIANS					
	NANNOFOSSILS					
	FORAMINIFERS					
	DRILLING DISTURBANCE					
	SEDIMENTARY STRUCTURES					
	SAMPLES					



SITE 493	HOLE	CORE 52	CORED INTERVAL	595.0 - 604.5 m		LITHOLOGIC DESCRIPTION
				TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	
LOWER MIOCENE	NN 2	RP CP FM				Complex mixture of MUDDY SILTSTONE and SAND. Color gray to olive gray. Grains regular to moderately well rounded. Mixture may be due to loading and/or slumping. Sandstone cemented by calcite. Common straight fractures, 0-90° dip, slickensided, variable orientation.
						<p>SMEAR SLIDES</p> <p>Example of mixing in Section 2:</p> <p>TEXTURE: (M) (D)</p> <p>Sand 200 222</p> <p>Silt 60 5</p> <p>Clay 30 70</p> <p>COMPOSITION:</p> <p>Quartz 66 85</p> <p>Feldspar 7 6</p> <p>Mica minerals 1 4</p> <p>Pyrite 1 1</p> <p>Clay 15 20</p> <p>Carb. unsp. 5 2</p> <p>Foraminifera 1 TR</p> <p>Nannofossils TR 1</p> <p>This Section Description: 1-120 to 122 cm</p> <p>Composition: 80% Sand, 20% Silt</p> <p>COMPOSITION:</p> <p>40% Quartz</p> <p>40% Feldspar (mostly microcline)</p> <p>10% Carbonate</p> <p>10% Foraminifera</p> <p>Calcite cement</p>

SITE 493	HOLE	CORE 51	CORED INTERVAL	585.5 - 595.0 m		LITHOLOGIC DESCRIPTION
				TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	
LOWER MIOCENE	NN 3/NN 2	RP CM B				MUDDY SILTSTONE, olive gray (SY 3/2), prominent and common diffuse concentrations and pods of fine to coarse granular-bearing sands. Slight bioturbation. Shell fragments and wood fragments as shown. Hole deviation 2.6°.
						<p>SMEAR SLIDES</p> <p>10° apparent dip bedding</p> <p>TEXTURE: (M) (D)</p> <p>Sand 10</p> <p>Silt 75</p> <p>Clay 15</p> <p>COMPOSITION:</p> <p>Quartz 58</p> <p>Feldspar 15</p> <p>Mica minerals 4</p> <p>Pyrite 2</p> <p>Clay 15</p> <p>Glass TR</p> <p>Carb. unsp. TR</p> <p>and shell frag. 5</p> <p>Foraminifera TR</p> <p>Nannofossils TR</p>

SITE 493	HOLE	CORE 54		CORED INTERVAL		614.0-623.5 m		LITHOLOGIC DESCRIPTION
		SECTION	METERS	GRAPHIC LITHOLOGY	SECTIONS	SAMPLES		
TIME - ROCK	UNIT	LOWER MIOCENE		NN 1				<p> MUDDY SILTSTONE, olive gray (SY 3/2), fissile, sub parallel to bedding, bedding faint, bioturbation faint with fine SAND layers. MUDDY SANDSTONE, olive gray (SY 3/2), calcareous, medium to coarse in Section 5. Section 1, fissile and bedding dip 15-20° N. Fractures dip 67-85° dip slip at Section 2, 115 cm and 130 cm, calcareous coarse SANDSTONE, shell fragments, granitic lithic fragments. Section 3, fissility slightly steeper than bedding. Fractures dip 16° and 72-76°, dip slip 35° apparent dip bedding. Section 4, fractures dip 9° and 40-74°, dip slip. Section 5, 12° true dip, 19° apparent dip bedding. </p> <p> SMEAR SLIDES Sand 35 Silt 50 Clay 15 Quartz 74 Feldspar 5 Heavy minerals 1 Pyrite 1 Clay 15 Carb. unsp. 1 </p>
		DIATOMS	FORAMINIFERS	NANNOFOSSILS	MAMMOLITHS	DIATOMS	SECTIONS	
BIOSTRATIGRAPHIC ZONE		NN 1						
FOSSIL CHARACTER		RP CM B						
SECTION		CC						
METERS		0.5						
GRAPHIC LITHOLOGY								
SECTION		1						
METERS		1.0						
GRAPHIC LITHOLOGY								
SECTION		2						
METERS		2.0						
GRAPHIC LITHOLOGY								
SECTION		3						
METERS		3.0						
GRAPHIC LITHOLOGY								
SECTION		4						
METERS		4.0						
GRAPHIC LITHOLOGY								
SECTION		5						
METERS		5.0						
GRAPHIC LITHOLOGY								
SECTION		CC						

46° true dip bedding

SITE 493	HOLE	CORE 53		CORED INTERVAL		604.5-614.0 m		LITHOLOGIC DESCRIPTION
		SECTION	METERS	GRAPHIC LITHOLOGY	SECTIONS	SAMPLES		
TIME - ROCK	UNIT	LOWER MIOCENE		NN 1				<p> Interbedded SANDSTONE, calcareous, coarse to very coarse, with shell fragments, and MUDDY SILTSTONE with coarse sand grains. Olive gray (SY 3/2). Muddy siltstone fissile locally. Sandstone is often muddy. </p> <p> SMEAR SLIDES Sand 30 Silt 55 Clay 15 Quartz 73 Feldspar 6 Mica 1 Heavy minerals TR Pyrite 1 Clay 15 Carb. unsp. 3 Nannofossil 1 </p>
		DIATOMS	FORAMINIFERS	NANNOFOSSILS	MAMMOLITHS	DIATOMS	SECTIONS	
BIOSTRATIGRAPHIC ZONE		NN 1						
FOSSIL CHARACTER		RP CM B						
SECTION		CC						
METERS		0.5						
GRAPHIC LITHOLOGY								
SECTION		1						
METERS		1.0						
GRAPHIC LITHOLOGY								
SECTION		2						
METERS		2.0						
GRAPHIC LITHOLOGY								
SECTION		CC						

SITE 483 HOLE CORE 55 CORED INTERVAL 623.5-633.0 m

TIME - ROCK UNIT LOWER MIOCENE	BIOSTRATIGRAPHIC ZONE Unzoned	FOSSIL CHARACTER	SECTION				LITHOLOGIC DESCRIPTION SAND on side of Core-Catcher - only recovery.
			DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS	
			METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	
			CC				

SITE 483 HOLE CORE 56 CORED INTERVAL 633.0-642.5 m

TIME - ROCK UNIT LOWER MIOCENE	BIOSTRATIGRAPHIC ZONE Unzoned	FOSSIL CHARACTER	SECTION				LITHOLOGIC DESCRIPTION Small fragment of medium to coarse SANDSTONE, medium light gray (NG) in Core-Catcher, calcite-cemented.
			DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS	
			METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	
			CC				

SITE 483 HOLE CORE 57 CORED INTERVAL 642.5-652.0 m

TIME - ROCK UNIT LOWER MIOCENE	BIOSTRATIGRAPHIC ZONE Unzoned	FOSSIL CHARACTER	SECTION				LITHOLOGIC DESCRIPTION Small fragment SANDSTONE in Core-Catcher, coarse, calcite-cement.
			DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS	
			METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	
			CC				

SITE 483 HOLE CORE 58 CORED INTERVAL 652.0-652.2 m

TIME - ROCK UNIT LOWER MIOCENE	BIOSTRATIGRAPHIC ZONE Unzoned	FOSSIL CHARACTER	SECTION				LITHOLOGIC DESCRIPTION FINE SAND, loose, quartzose, possibly washed down the hole from upper section. SMEAR SLIDES TEXTURE: Sand 95 Silt 5 Clay - COMPOSITION: Quartz? 91 Feldspar 6 Mica 1 Other minerals 1 Pyrite 1
			DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS	
			METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	
			1				

Core 59. See page 182

SITE 483 HOLE CORE 60 CORED INTERVAL 661.5-662.1 m

TIME - ROCK UNIT PRENEOGENE	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION				LITHOLOGIC DESCRIPTION Fine to medium sand, greenish gray (5GY 6.1), caved from hole above (originally surrounding pieces of alutonic rock when core opened).
			DIATOMS	RADIOLARIANS	NANNOFOSSILS	FORAMINIFERS	
			METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SAMPLES	
			1				

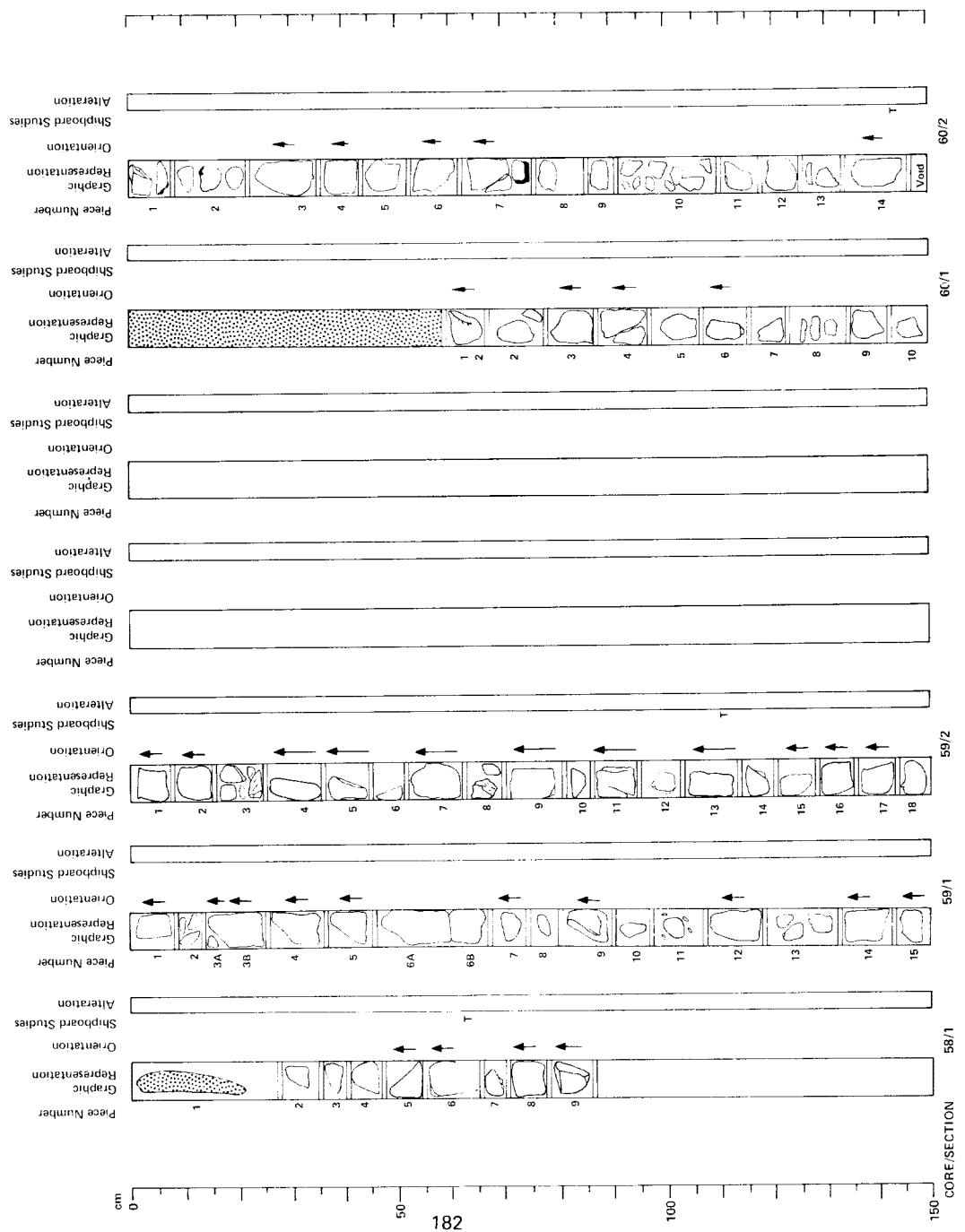
SITE 493, CORE 59, SECTION 1, 652.2-652.8 m
Macroscopic Description
 Diorite, medium light gray (NG), 1-3 mm equant crystals of plagioclase, quartz, hornblende, biotite, and sulfides (pyrite and chalcopyrite).

SITE 493, CORE 59, SECTION 1, 656.5-658.0 m
Macroscopic Description
 Diorite, medium light gray (NB) (average color), up to 3 mm equant crystals of plagioclase, quartz, hornblende, biotite, and sulfides (pyrite and chalcopyrite). Occasional fracturing and veining.

SITE 493, CORE 59, SECTION 2, 658.0-659.5 m
Macroscopic Description
 Same as Core 59, Section 1.

SITE 493, CORE 60, SECTION 1, 662.1-663.0 m
Macroscopic Description
 Diorite, medium light gray (NG).

SITE 493, CORE 60, SECTION 2, 663.0-664.5 m
Macroscopic Description
 Same as Core 60, Section 1.
Thin Section Description
 Section 2, 139-141 cm: equant crystals up to 2 cm of: 4% quartz, 68% plagioclase, 1% microcline, 7% biotite, and 20% green amphibole-hornblende.



SITE SUMMARY SHEET

HOLE 493A

Date occupied: 28 April 1979

Date departed: 28 April 1979

Time on hole: 2.0 hours

Position: latitude: 16°22.86'N

longitude: 98°55.53'W

Water depth (sea level): 645 corrected meters, echo sounding

Water depth (rig floor): 655 corrected meters, echo sounding

Bottom felt at: 670 meters, drill pipe

Penetration: 12 meters

Number of cores: 2

Total length of cored section: 12 meters

Total core recovery: 7.6 meters

Percentage core recovery: 63%

Oldest Sediment Cored

Depth sub-bottom: 12 meters

Nature: Quaternary

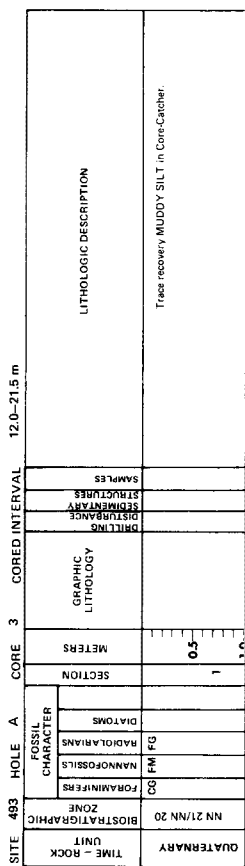
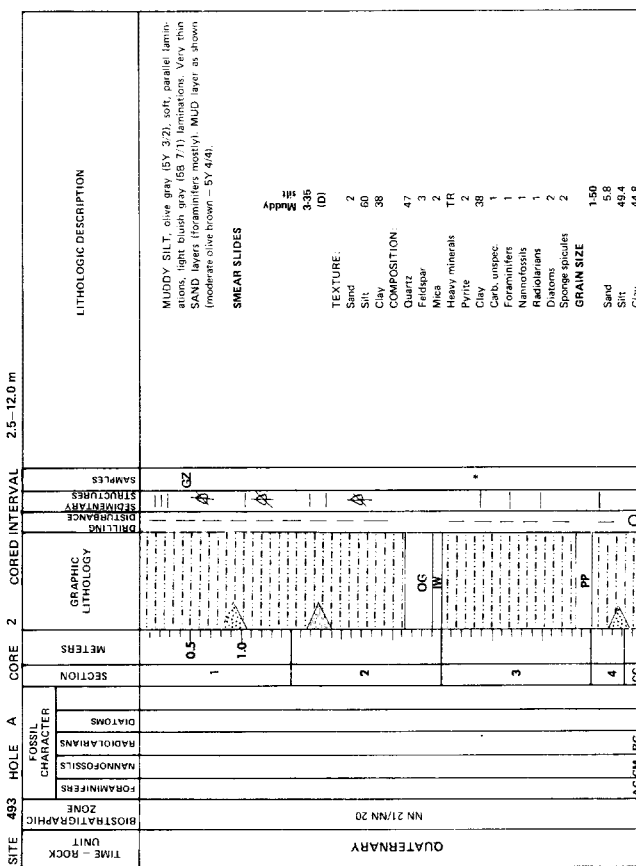
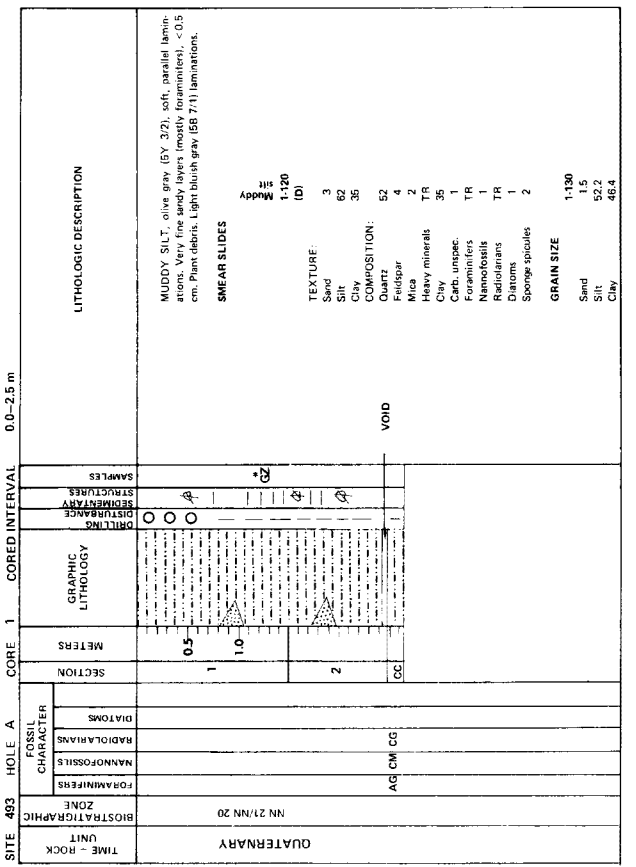
Age: Green mud

Basement

Depth sub-bottom: Not penetrated

Principal Results

Inadvertent re-entry of Hole 493.



SITE SUMMARY SHEET

HOLE 493B

Date occupied: 28 April 1979

Date departed: 29 April 1979

Time on hole: 12.8 hours

Position: latitude: 16 22.86'N

longitude: 98 55.53'W

Water depth (sea level): 645 corrected meters, echo sounding

Water depth (rig floor): 655 corrected meters, echo sounding

Bottom felt at: 670 meters, drill pipe

Penetration: 126 meters

Number of cores: 12

Total length of cored section: 114 meters

Total core recovery: 60.1 meters

Percentage core recovery: 52%

Oldest Sediment Cored

Depth sub-bottom: 126 meters

Nature: Muddy silt

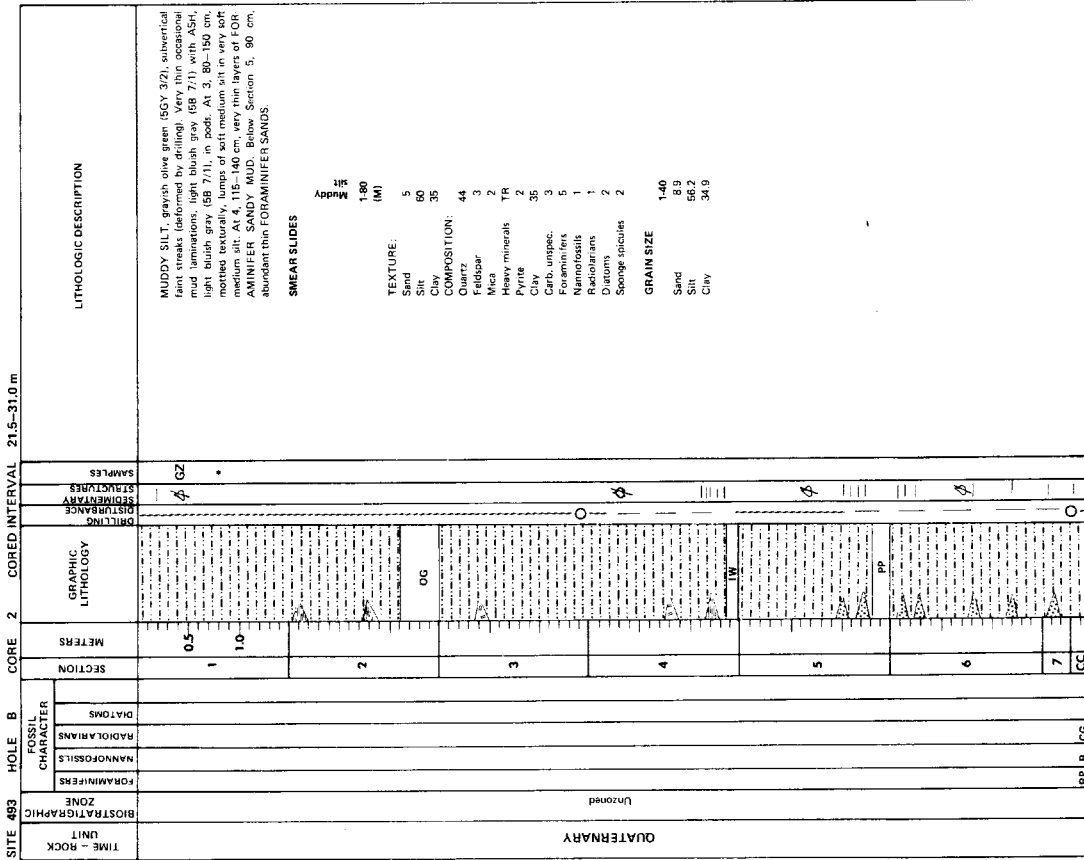
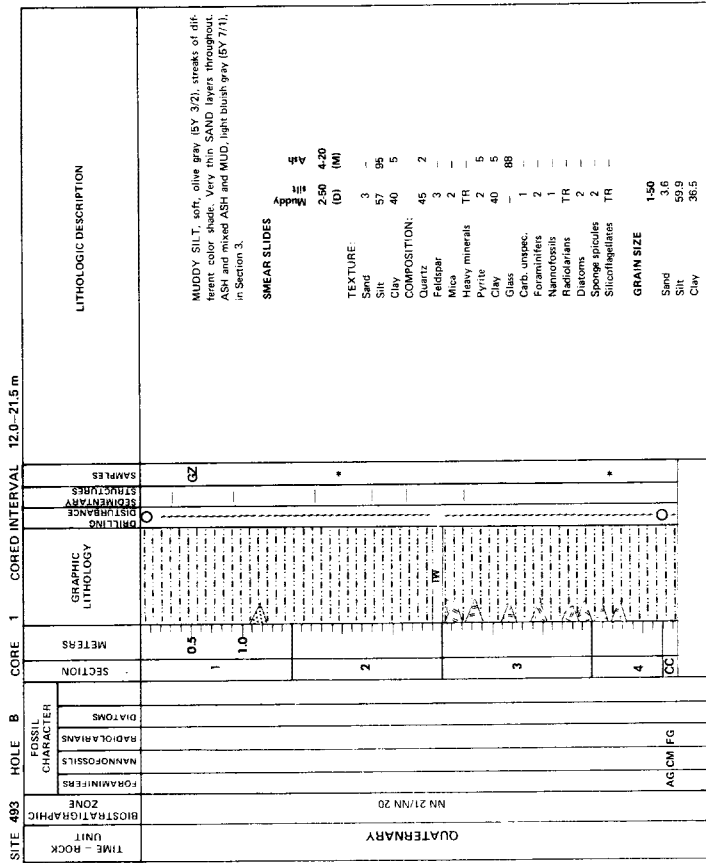
Age: Early Pliocene

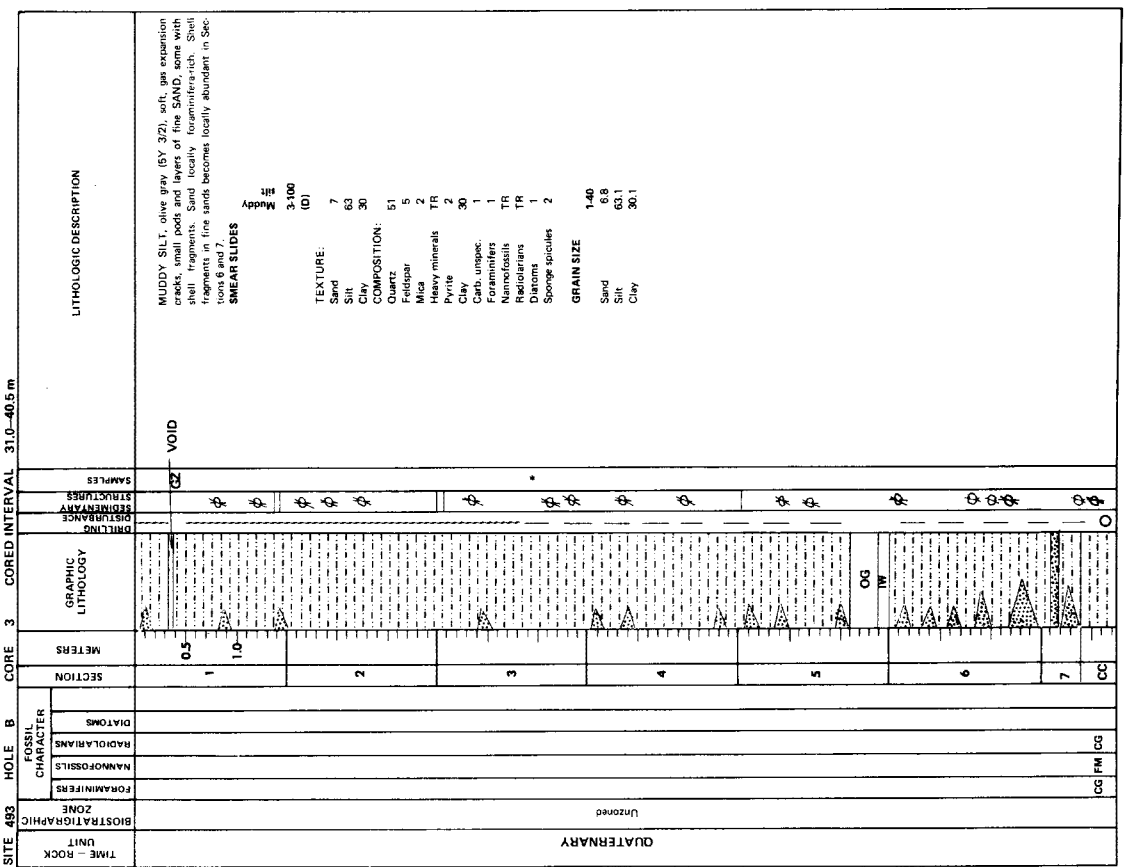
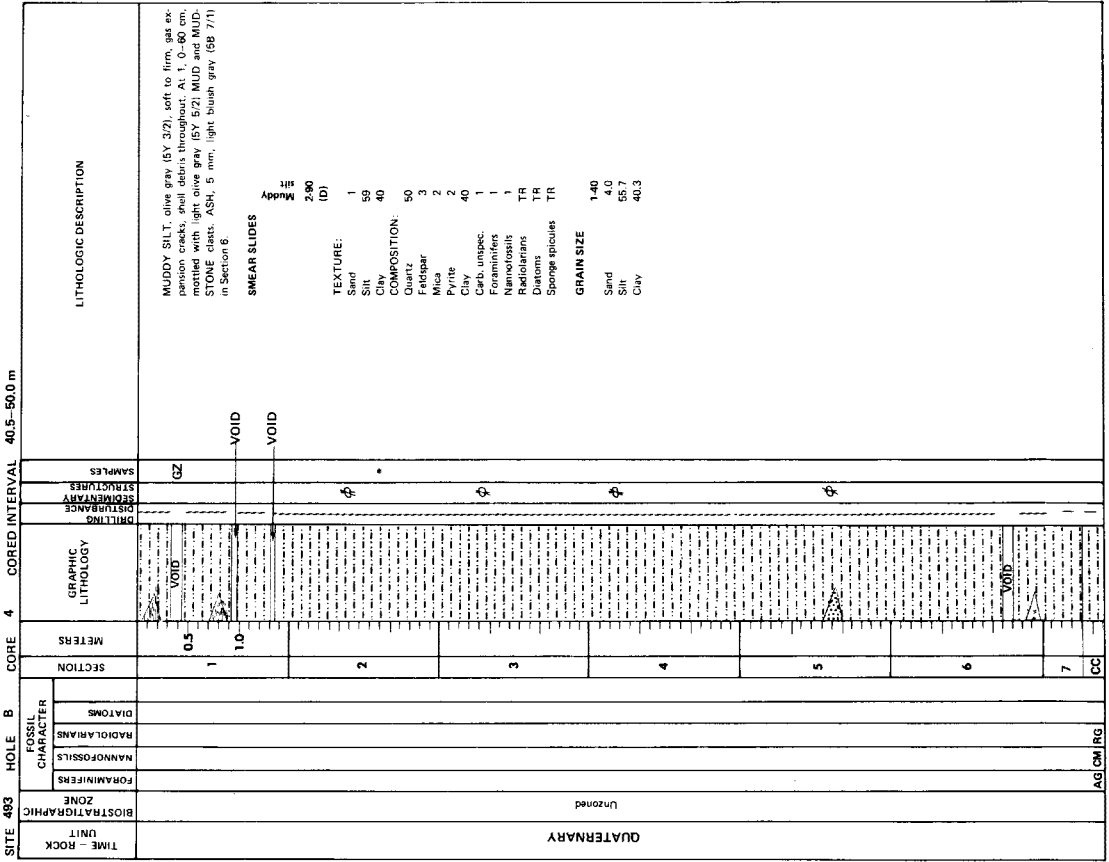
Basement

Depth sub-bottom: Not penetrated

Principal Results

Cored upper section bypassed in Hole 493. See Hole 493.





SITE 493 HOLE B CORE 5 CORED INTERVAL 50.0-59.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS							
QUATERNARY/PLOECENE?	Unzoned				1	0.5				CZ	MUDDY SILT, olive gray (5Y 3/2), firm, faint parallel laminations. Minor areas of light bluish gray (5B 7/1). SMEAR SLIDES Muddy silt 1-10 (D) TEXTURE: Sand 7 Silt 63 Clay 30 COMPOSITION: Quartz 60 Feldspar 4 Mica 2 Heavy minerals TR Pyrite 2 Clay unsp. 30 Carbonaceous material TR Forams TR Nannofossils TR Radiolarians TR Diatoms 1 Sponge spicules TR GRAIN SIZE Sand 140 Silt 151 Clay 39.8
					2		VOID				
					3		IV				
					3C		VOID				

SITE 493 HOLE B CORE 7 CORED INTERVAL 69.0-78.5 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS							
PLOECENE?	Unzoned				1	0.5					MUDDY SILT, olive gray (5Y 3/2), firm, parallel laminations, occasional layers light bluish gray (5B 7/1). SMEAR SLIDES Muddy silt 2-70 (D) TEXTURE: Sand 3 Silt 47 Clay 50 COMPOSITION: Quartz 50 Feldspar 5 Mica 2 Heavy minerals TR Pyrite 2 Clay unsp. 40 Carbonaceous material TR Forams TR Radiolarians TR Diatoms TR Sponge spicules 1 GRAIN SIZE Sand 270 Silt 260 Clay 48.5
					2		VOID				
					3		VOID				

SITE 493 HOLE B CORE 6 CORED INTERVAL 59.5-69.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS							
PLOECENE?	Unzoned				1	0.5					MUDDY SILT, olive gray (5Y 3/2), soft, gas expansion cracks, structureless. Below Section 2: parallel laminated, near horizontal bedding, sparse thin SAND beds. Foraminifer concentration in Section 3. SMEAR SLIDES Muddy silt 3-60 (D) TEXTURE: Sand 10 Silt 50 Clay 40 COMPOSITION: Quartz 43 Feldspar 2 Mica 4 Heavy minerals TR Pyrite 2 Clay unsp. 40 Carbonaceous material 1 Forams 7 Nannofossils TR Radiolarians TR Diatoms TR Sponge spicules 1 GRAIN SIZE Sand 290 Silt 26 Clay 59.6 37.7
					2		OG			CZ	
					3		PP				
					4						

SITE 493 HOLE B CORE 8 CORED INTERVAL 78.5-88.0 m

TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER			SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS							
UPPER PLOECENE?	Unzoned				1	0.5					MUDDY SILT, olive gray (5Y 3/2), soupy to firm, mottled with grayish olive (10Y 4/2). Foraminifer-rich SAND at 1.23-38 cm. SMEAR SLIDES Muddy silt 1-100 (D) TEXTURE: Sand 2 Silt 53 Clay 45 COMPOSITION: Quartz 46 Feldspar 5 Mica 1 Pyrite 2 Clay unsp. 45 Carbonaceous material TR Nannofossils TR Sponge spicules TR Plant fragments TR GRAIN SIZE Sand 188 Silt 37 Clay 56.0 41.3
					2		VOID				

SITE 493 HOLE B CORE 9 CORED INTERVAL 88.0-97.5 m		CORE 9		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	SAMPLES
RM/CM	Zone	DIATOMS RADIOLARIANS NANNOFOSSILS FORAMINIFERS			
PLIOCENE?	Unzoned		0.5 1.0		
		RM/CM RM	CC		
<p>MUD, olive gray (BY 3/2), sandy to firm with some streaks light buff gray (BB 7/1) mud. One bed of ASH, light buff gray (BB 7/1).</p> <p>SMEAR SLIDES 1-100 1-130 (M) (D) Sand 5 3 Silt 90 42 Clay 5 55</p> <p>COMPOSITION: Quartz 6 35 Feldspar 1 2 Mica 1 1 Pyrite 2 2 Clay 5 55 Glass 87 2 Carb. unsp. 2 Foraminifera 1 Nannofossils 1 Radiolarians 1 Spongy spicules 1</p>					

SITE 493 HOLE B CORE 11 CORED INTERVAL 107.0-116.5 m		CORE 11		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	SAMPLES
RM/CM	Zone	DIATOMS RADIOLARIANS NANNOFOSSILS FORAMINIFERS			
PLIOCENE?	Unzoned		0.5 1.0		
		RM/CM CP CG	CC		
<p>MUDDY SILT, olive gray (BY 3/2), soft but firmer below Section 1.</p> <p>SMEAR SLIDES 3-80 (D) Sand 1 Silt 60 Clay 39</p> <p>COMPOSITION: Quartz 52 Feldspar 4 Mica 2 Heavy minerals TR Pyrite 2 Clay 35 Carb. unsp. 2 Foraminifera 1 Nannofossils 2 Spongy spicules TR</p> <p>GRAIN SIZE 2-30 Sand 0.2 Silt 62.4 Clay 37.4</p>					

SITE 493 HOLE B CORE 10 CORED INTERVAL 97.5-107.0 m		CORE 10		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	SAMPLES
RM/CM B	Zone	DIATOMS RADIOLARIANS NANNOFOSSILS FORAMINIFERS			
PLIOCENE?	Unzoned		0.5 1.0		
		RM/CM B	CC		
<p>MUDDY SILT, olive gray (BY 3/2), very firm with MUD. STONE colors and CHALK, light olive gray (BY 3/2).</p> <p>SMEAR SLIDES 1-80 (D) Sand 2 Silt 38 Clay 60</p> <p>COMPOSITION: Quartz 34 Feldspar 2 Mica 1 Pyrite 2 Clay 60 Carb. unsp. 2 Foraminifera TR Nannofossils TR Radiolarians TR Spongy spicules TR</p> <p>GRAIN SIZE 1-74 Sand 0.4 Silt 63.5 Clay 36.1</p>					

SITE 493 HOLE B CORE 12 CORED INTERVAL 116.5-126.0 m		CORE 12		LITHOLOGIC DESCRIPTION	
TIME - ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER	SECTION METERS	GRAPHIC LITHOLOGY	SAMPLES
RM/CM FM	Zone	DIATOMS RADIOLARIANS NANNOFOSSILS FORAMINIFERS			
PLIOCENE?	Unzoned		0.5 1.0		
		RM/CM FM	CC		
<p>MUDDY SILT, olive gray (BY 3/2), soft, sandy in places.</p> <p>SMEAR SLIDES 2-80 (D) Sand 1 Silt 54 Clay 45</p> <p>COMPOSITION: Quartz 48 Feldspar 4 Mica 3 Heavy minerals TR Pyrite 1 Clay 40 Carb. unsp. 2 Foraminifera 1 Spongy spicules 1</p> <p>GRAIN SIZE 2-85 Sand 21.1 Silt 47.6 Clay 31.4</p>					

Appendix 1. Leg 66 Detail Core Negatives (black and white)

486A:	29-3, 15–30 cm	20-2, 25–40 cm
2, CC, 0–25 cm	29-5, 35–45 cm	22-4, 125–140 cm
488:	34-1, 0–10 cm	22-5, 40–55 cm
21-3, 25–40 cm	34-1, 0–20 cm	26-5, 15–35 cm
21-4, 0–40 cm	34-1, 10–20 cm	26-5, 125–135 cm
21-5, 85–120 cm	490:	27-4, 35–50 cm
21-5, 115–150 cm	1-2, 70–90 cm	42-1, 130–150 cm
24, CC, 0–10 cm	1-4, 80–90 cm	42-2, 60–75 cm
24-1, 80–110 cm	5-7, 0–20 cm	42-4, 30–45 cm
24-1, 100–130 cm	8-1, 10–30 cm	53-1, 25–45 cm
25-1, 100–120 cm	15-5, 105–110 cm	54-1, 60–62 cm
26, CC	16-3, 65–75 cm	57-3, 25–40 cm
26-6, 0–30 cm	18-4, 105–130 cm	492:
26-6, 30–60 cm	20-5, 80–90 cm	10-2, 120–130 cm
26-6, 60–90 cm	21-3, 25–40 cm	12-2, 40–60 cm
26-6, 90–120 cm	24-3, 0–30 cm	12-2, 65–85 cm
26-6, 120–150 cm	25-4, 0–20 cm	14-1, 80–90 cm
27-1, 130–150 cm	25-4, 20–40 cm	14-3, 30–55 cm
30-1, 110–135 cm	25-4, 40–60 cm	16-3, FROZEN PIECE
30-3, 35–50 cm	29, CC, 0–5 cm	16-4, FROZEN PIECE SPLIT
30-3, 105–115 cm	29, CC, 5–10 cm	30, CC
30-4, 85–105 cm	29, CC, 10–20 cm	30-2, 9–21 cm
32-1, 90–120 cm	36-6, 15–30 cm	30-2, 25–45 cm
32-2, 5–35 cm	36-6, 100–120 cm	492A:
32-2, 35–70 cm	37-2, 55–65 cm	5-2, 40–60 cm
42-2, 20–45 cm	44-2, 110–140 cm	5-2, 40–60 cm
42-2, 30–40 cm	47-1, 55–75 cm	5-2, 70–100 cm
42-2, 45–70 cm	52-1, 92–96 cm	492B:
45-3, 35–55 cm	54-1, 50–60 cm	1-3, 80–100 cm
489A:	55-1, 130–140 cm	493:
4-3, 70–110 cm	55-4, 45–55 cm	18-2, 130–150 cm
4-4, 70–110 cm	60-1, 30–40 cm	18-3, 15–45 cm
4-4, 90–110 cm	60-1, 34-48 cm	18-4, 10–40 cm
4-5, 25–40 cm	491:	18-4, 145–150 cm
5-4, 10–25 cm	10-2, ICE CHUNK	18-4, 145–150 cm
5-4, 40–85 cm	15-2, 100–125 cm	19-4, 45–70 cm
5-4, 85–95 cm	15-2, 125–150 cm	19-6, 20–30 cm
8-2, 60–85 cm	19-4, 35–60 cm	32-2, 55–70 cm
13-2, 1–10 cm	19-4, 40–55 cm	35-1, 25–40 cm
19-2, 90–100 cm	19-4, 60–80 cm	49-1 and 2, 60–80 cm