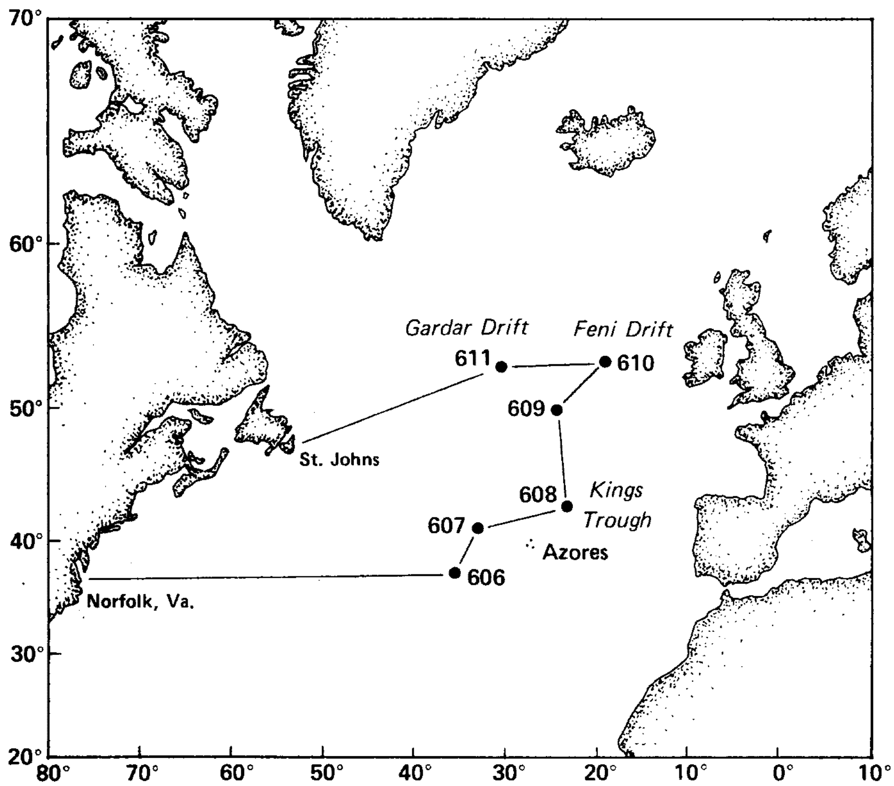
INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 94

NORTH ATLANTIC OCEAN



Prepared for the
NATIONAL SCIENCE FOUNDATION
National Ocean Sediment Coring Program
Under Contract C-482
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UNIVERSITY OF CALIFORNIA
Scripps Institution of Oceanography
Prime Contractor for the Project

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SCRIPPS INSTITUTION OF OCEANOGRAPHY
Deep Sea Drilling Project, A-031

LA JOLLA, CALIFORNIA 92093

August 31, 1984

Dear Colleague:

This document has been produced 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. It is an interim and informal document consisting of site data and sedimentologic and paleontologic data and interpretations as known six (6) months post-cruise. These data, while adequate for most sample selection needs, are subject to slight revision by the time of issue of the corresponding volume of the *Initial Reports* of the Deep Sea Drilling Project.

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

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

Sincerely,

Yves Lancelot
Chief Scientist
Deep Sea Drilling Project

YL:eb

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DEEP SEA DRILLING PROJECT

LEG 94

NORTH ATLANTIC OCEAN

JUNE 17–AUGUST 17, 1983

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

MEMBER ORGANIZATIONS

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Lamont-Doherty Geological Observatory, Columbia University
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Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover
Ocean Research Institute, University of Tokyo
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EXPLANATORY NOTES

INTRODUCTION

This *Initial Core Description* is presented here to aid investigators in selecting samples for detailed study. Samples from this leg become available to the public about 8 months after the cruise, with the completion of this *Initial Core Description.*

Potential investigators who desire to obtain samples should refer to the DSDP-NSF Sample Distribution Policy. Sample request forms may be obtained from:

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

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

NUMBERING OF SITES, HOLES, CORES, 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.

There are two types of coring systems used on the *Glomar Challenger*: (1) the standard DSDP rotary-coring system, which cuts ~9.5 meter-long cores and has been used since Leg 1; and (2) the Hydraulic Piston Coring (HPC) system, used since Leg 64.

HPC holes are not assigned a special letter designation. The HPC operates on the principle of a core barrel which is lowered inside the drill string, hydraulically ejected into the sediment and retrieved. The pipe is then lowered to the next interval and the procedure repeated. Disturbance can occur in the top 50–100 cm of HPC cores especially near the top of a hole. The standard DSDP rotary coring system typically disturbs the cores in the upper 100 meters of any hole, and generally half or more of each core is quite disturbed.

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. For example, in the rotary-coring system, each coring interval is generally 9.5 meters long, which is the nominal length of a core barrel; however, the coring interval may be shorter or longer (rare). "Cored intervals" are not necessarily adjacent to each other, but may be separated by "drilled intervals". In soft sediment, the drill string can be "washed ahead" with the core barrel in place, but no 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. In drilling hard rock, a center bit may replace the core barrel if it is necessary to drill without core recovery.

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

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

This technique differs from the labeling systems used on Legs 1 through 45, which had a designation called "zero section". On Legs 1–45 there were seven sections labeled 0, 1, 2, 3, 4, 5, and 6. The new system used from Legs 46 to the present, has seven sections, but they are labeled 1, 2, 3, 4, 5, 6, and 7.

When recovery is less than 100 percent, the sediment's original stratigraphic position in the cored interval is unknown, so we employ the convention assigning the top of the sediment recovered to the top of the cored interval. This is done for convenience in data handling, and consistency. If recovery is less than 100 percent, and core fragments are separated, and if shipboard scientists believe the sediment was not contiguous, then sections are numbered serially and the intervening sections

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

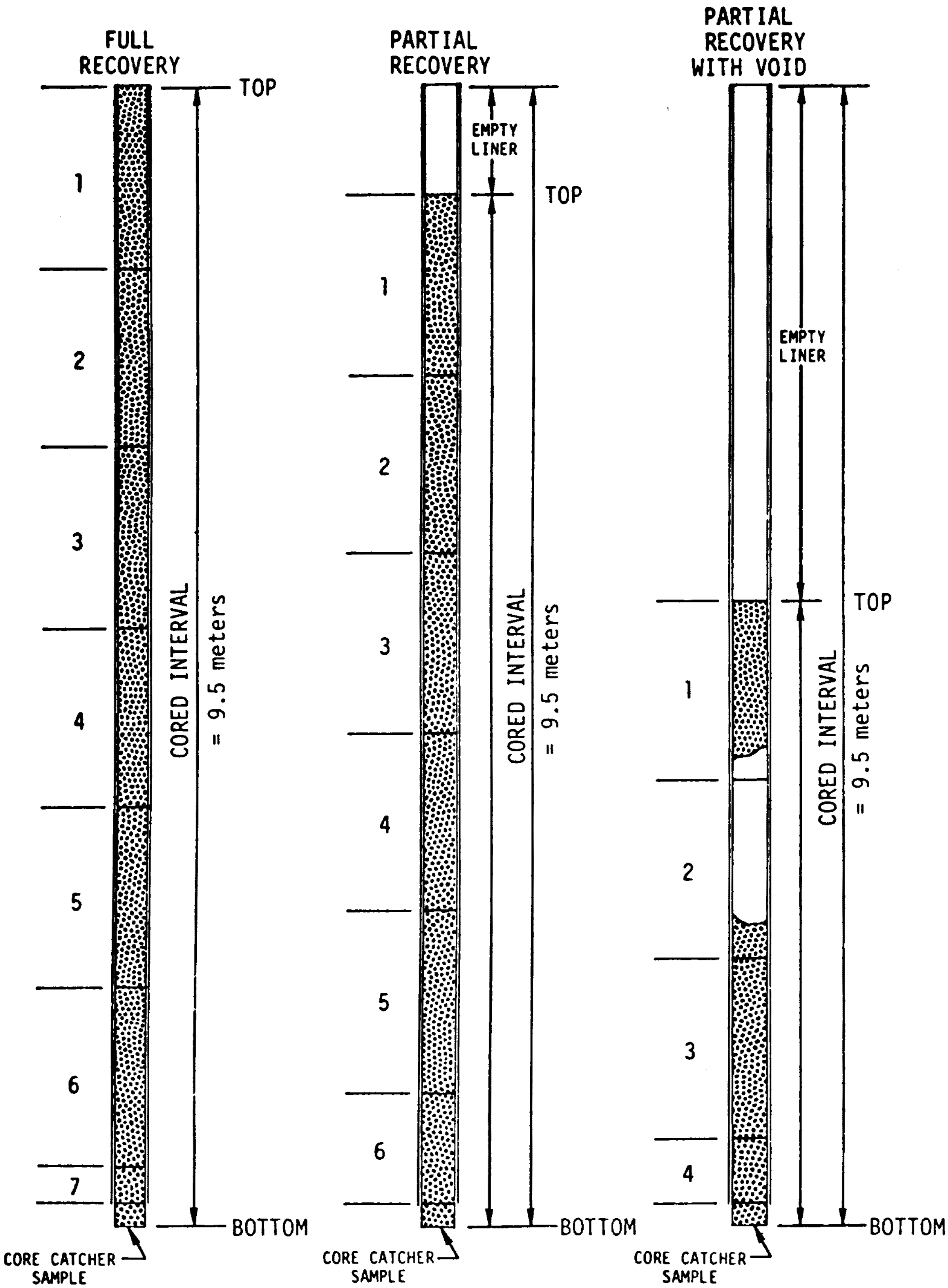

Figure 1. Diagram showing procedure in cutting and labeling of core sections.

are noted as void, whether it is contiguous or not. The Core-Catcher sample is described in the visual core descriptions beneath the lowest section.

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

Leg

Site

Hole

Core Number

Interval in centimeters from the top of section

For example, a sample identification number of "75-531A-6-3, 12–14 cm" is interpreted as follows: 12–14 cm designates a sample taken at 12 to 14 cm from the top of Section 3 of Core 6, from the second hole drilled at Site 531 during Leg 75. A sample from the Core-Catcher of this core is designated as "75-531A-6, CC, 12–14 cm".

The depth below the seafloor for a sample numbered at "75-531A-6-3, 12–14 cm", is the summation of the following: (1) the depth to the top of the cored interval for Core 6, which is 430 meters; (2) plus 3 meters for Sections 1 and 2 (each 1.5 meters long); and plus the 12 cm depth below the top of Section 3. All of these variables add up to 433.21 meters*, which by convention is the sample depth below the sea floor.

HANDLING OF CORES CONTAINING SEDIMENTS

A core containing sediments is normally cut into 1.5 meter sections, sealed, and labeled; and then the sections are brought into the core laboratory for processing. The following determinations are normally made before the sections are split: gas analysis, and continuous wet-bulk density determinations using the Gamma Ray Attenuation Porosity Evaluation (GRAPE) as described in Boyce (1976).

The cores are then split longitudinally into "work" and "archive" halves**. Samples are extracted from the "work" half, including those for determination of grain-size distribution, mineralogy by x-ray diffraction, sonic velocity by the Hamilton Frame method as described in Boyce (1976), wet-bulk density by a static GRAPE technique (Boyce, 1976), water content by gravimetric analysis, carbon-carbonate analysis, percent calcium carbonate (Carbonate Bomb), geochemical analysis, paleontological studies, and others.

Smear slides or thin sections from each major lithology, and most minor lithologies, are prepared and examined microscopically. The archive half is then described and photographed. Physical disturbance by the drill bit, color, texture (for uncemented lithologies), and sedimentary and igneous structures and composition (± 20%) of the various lithologies are noted on standard core description sheets.

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

** In the HPC system the cores are oriented relative to each other, thus, for example, all archive halves are on the same side of the hole. We do not know, however, their orientation relative to the Earth's magnetic north.

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

These core descriptions, smear slide descriptions (plus occasional peels and thin sections) and carbonate bomb (% $CaCO_3$) determinations (all of these data are determined aboard ship) serve as the data for the visual core descriptions presented here. These samples, and their location in the core, are coded with a symbol on the core description sheets. The key to these codes, in order to identify the samples, is in Figures 2–6.

SPECIAL CORES AND SAMPLES

Occasionally, special cores or samples are recovered that require specific identification. These are designated as follows:

X = miscellaneous debris or out-of-sequence core material.

C = center bit samples; i. e., samples obtained upon removal of the center bit (a device to prevent core recovery while drilling or washing ahead for some interval).

S = side-wall core; i.e., a core taken in the side of the hole, usually to obtain a sample of material not recovered during previous coring.

H = a wash core; i. e., a core taken while washing ahead for an interval larger than 9.5 m (say, 50 m), but without the center bit in place. Such a core may sample at several places in the washed interval, but their depths cannot be specified within that interval.

B = bit material; i. e., material removed from core bits upon retrieval of the drill string following completion of a hole, or prior to re-entry with a new core bit.

Cores or samples of these types are designated X1, X2, H1, H2, etc., each type in the sequence they were obtained. Additional types of special samples may be designated by the shipboard party or cruise operations manager. The letter designation for these samples is chosen in consultation with the DSDP curatorial representative and laboratory officer, and is indicated on each core description form.

DESCRIPTION OF SEDIMENTS

The following is the sediment description and classification scheme devised by the JOIDES Sedimentary Petrology and Physical Properties Panel, and approved by the JOIDES Planning Committee in March, 1974. In the past, shipboard parties have, in some instances, found it necessary to modify or amend the classification for their particular situation. Any modifications to the classification for the cores described herein are presented in the section following the JOIDES classification.

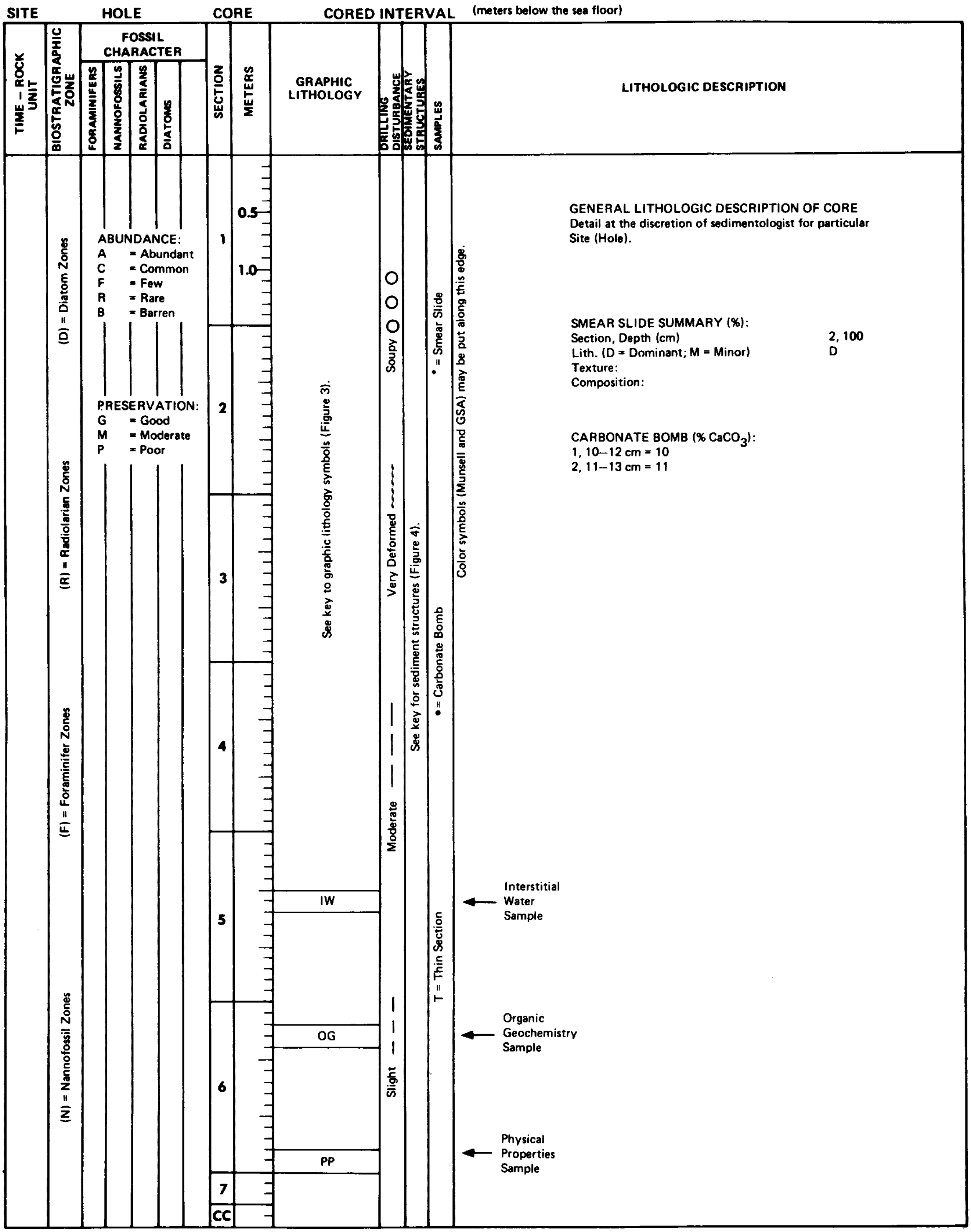


Figure 2. This is a typical sedimentary core description sheet, with the sediment deformation symbols, sample codes, and other general information.

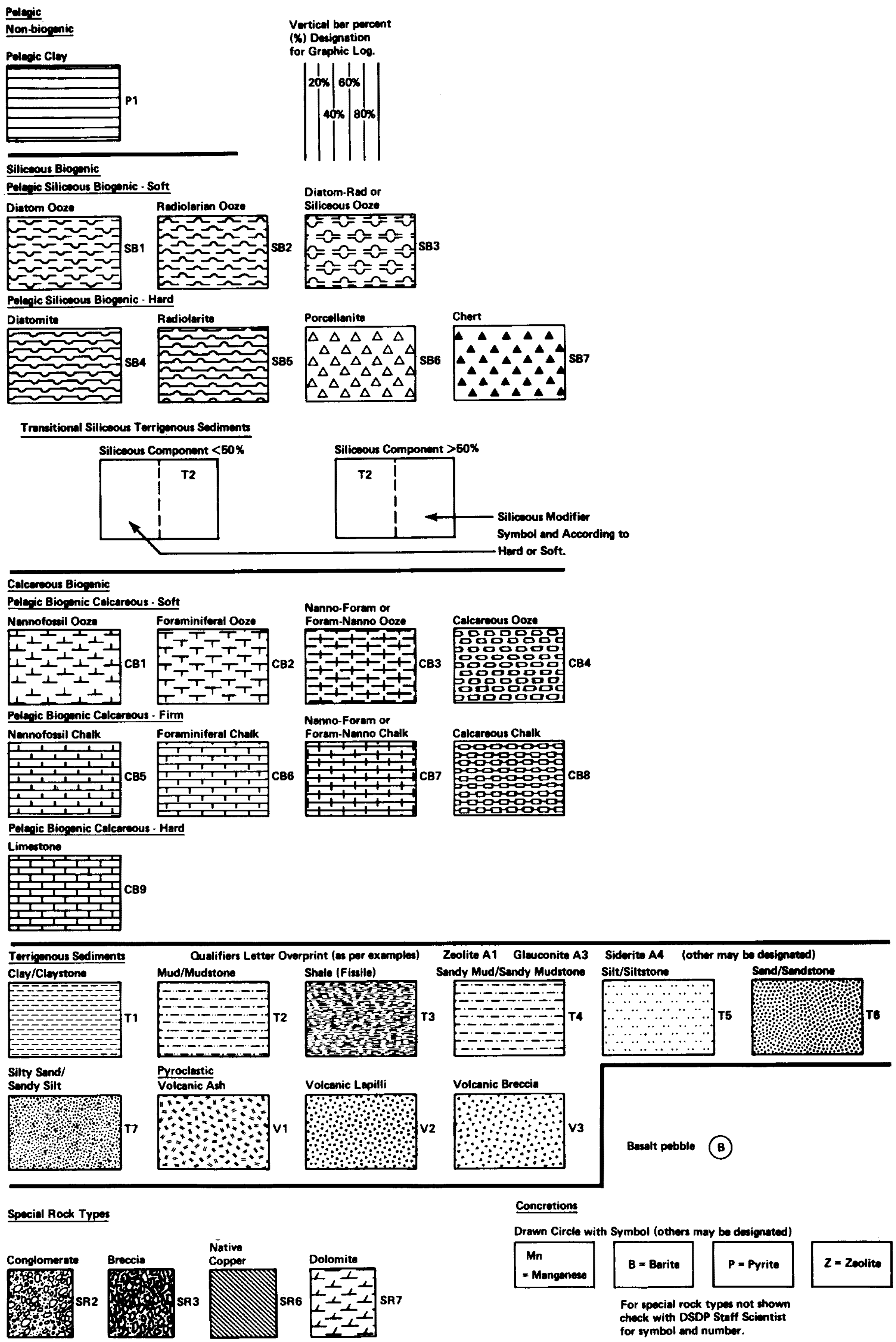


Figure 3. Graphic symbols corresponding to the lithologic visual core descriptions for sediment and sedimentary rocks.

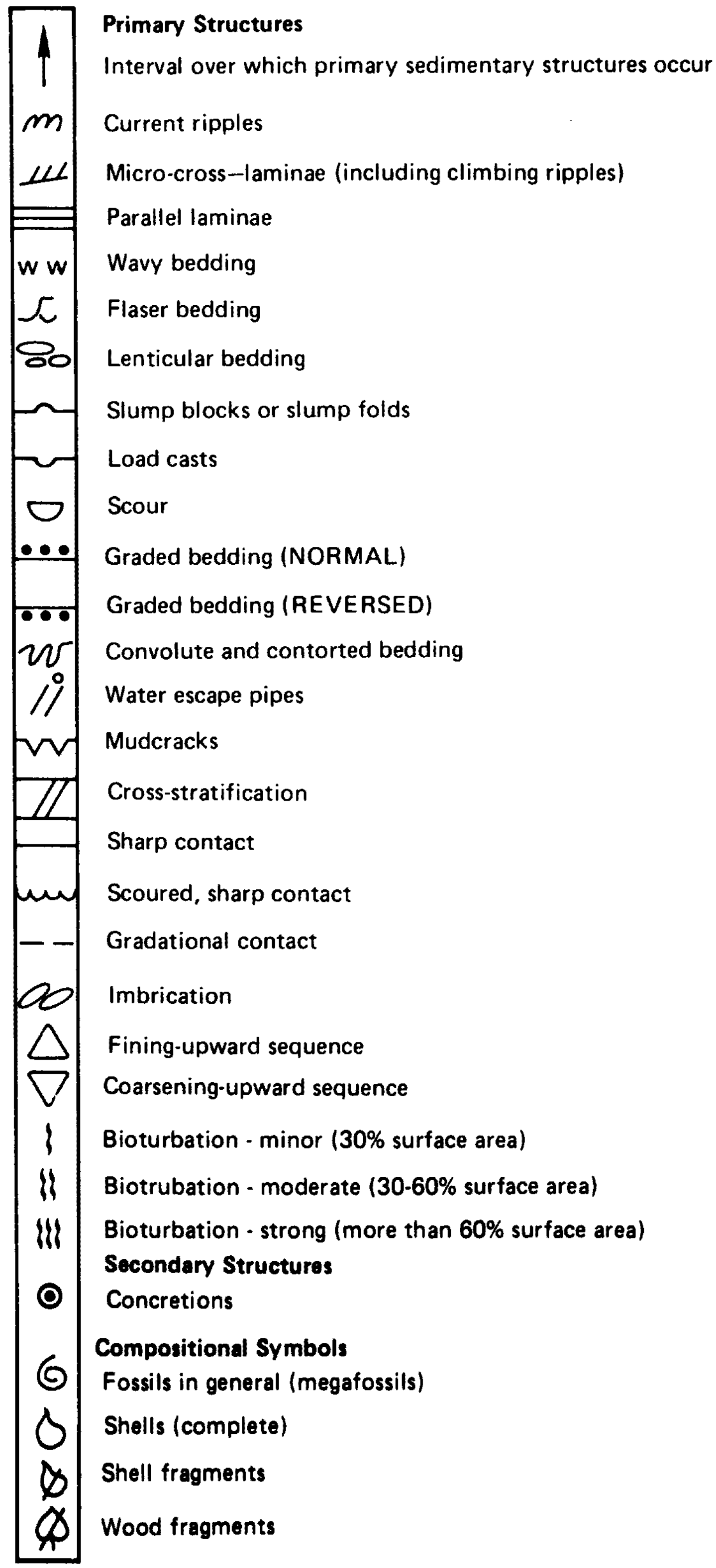


Figure 4. Structure symbol code for sediments.

	Millimeters		Phi (ϕ) units	Wentworth size class
	2.00	2	1.0	Granule
SAND	1.68		0.75	
	1.41		0.5	Very coarse sand
	1.19		0.25	
	1.00	1	0.0	
	0.84		0.25	
	0.71		0.5	Coarse sand
	0.59		0.75	
	0.50	1/2	1.0	
	0.42		1.25	
	0.35		1.5	Medium sand
	0.30		1.75	
	0.25	1/4	2.0	
	0.210		2.25	
	0.177		2.5	Fine sand
	0.149		2.75	
	0.125	1/8	3.0	
	0.105		3.25	
	0.088		3.5	Very fine sand
	0.074		3.75	
	0.0625	1/16	4.0	
SILT	0.053		4.25	
	0.044		4.5	Coarse silt
	0.037		4.75	
	0.031	1/32	5.0	
	0.0155	1/64	6.0	Medium silt
	0.0078	1/128	7.0	Fine silt
	0.0039	1/256	8.0	Very fine silt
MUD	0.0020		9.0	
	0.00098		10.0	Clay
	0.00049		11.0	
	0.00024		12.0	
	0.00012		13.0	
	0.00006		14.0	

Figure 5. Grade scales for terrigenous sediments.

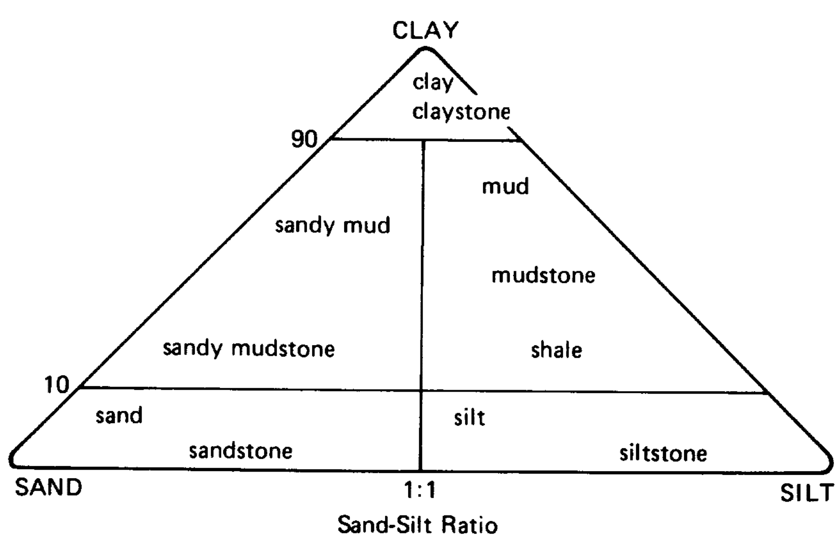


Figure 6. Class boundaries for terrigenous sediments.

CLASSIFICATION OF SEDIMENTS

Several lithologic classifications designed for the construction of the several graphic core and hole summaries have been used during the lifetime of the Deep Sea Drilling Project. The classification system described here has been devised by the JOIDES Panel on Sedimentary Petrology and Physical Properties and adopted for use by the JOIDES Planning Committee in March 1974.

Principles Used in Classification

1 This is a lithologic summary classification designed to generalize core descriptive material of greater detail into a form suitable for standard core and hole logs. Its systematic use will facilitate core to core and leg to leg comparisons.

2 The classification covers most of the lithologic types encountered so far but does not attempt to be comprehensive. A category "Special Rock Types" shows additional definitions and terminology at the discretion of the shipboard staff for rock types not covered.

3 Sediment names are those in common usage and have been defined within the limits of existing definitions.

4 Categories are based on sediment parameters measured on board ship. Refinement by shore laboratory data is possible but not necessary.

5 The classification is descriptive and genetic implications are not intended.

6 The degree of detail of the classification is scaled to the space limitations of printed graphic hole and core summaries.

Shipboard Parameters Measured

Sediment and rock names are defined solely on the basis of compositional and textural parameters. The compositional factors are most important for description of those deposits more characteristic of open marine conditions, with textural factors becoming more important for the classification of hemipelagic and near-shore facies. Sediment names are thus based solely upon these parameters as determined in smear slides aided by compositional and textural properties apparent to the naked eye or under the hand lens. Other descriptive parameters include: induration, sediment disturbance, sedimentary structures, and color. The determination of these parameters is as follows:

1) Composition – biogenic and mineral components are estimated in percent from smear slides. $CaCO_3$ content is estimated by using the carbonate bomb available on the ship. Even with rapid use, a value to ±5% is achievable.

2) Texture – visual estimates from smear slide examination.

3) Induration – The determination of induration is highly subjective, but field geologists have successfully made similar distinctions for many years. The categories suggested here are thought to be practical and significant. The criteria of Moberly and Heath (1971) are used for calcareous deposits; subjective estimate or behavior in core cutting for others. There are three classes for calcareous sediments; two for all others.

a) Calcareous sediments

(i) Soft: Oozes have little strength and are readily deformed under the finger or the broad blade of a spatula.

(ii) Firm: Chalks are partly indurated oozes: they are friable limestones that are readily deformed under the fingernail or the edge of a spatula blade. More indurated chalks are termed limestones (see below).

(ii) Hard: Limestones as a term should be restricted to cemented rocks.

b) The following criteria are recommended for all but calcareous sediments:

(i) If the material is low state of induration as to allow the core to be split with a wire cutter, the sediment name only is used (e. g., silty clay: mud).

(ii) If the core must be cut on the band saw or diamond saw, the suffix 'stone' is used (e. g., silty claystone: mudstone; or shale, if fissile.)

4) Sediment Disturbance – Deformational structures are generally of the type found in piston cores, and are usually simple to visualize and interpret.

a) Soft to firm sediment: The following categories are recommended.

(i) Slightly deformed – bedding contacts are slightly bent.

(ii) Moderately deformed – bedding contacts have undergone extreme bowing.

(iii) Very deformed – bedding is completely disturbed, sometimes showing symmetrical diapir-like structure.

(iv) Soupy – water saturated intervals which have lost all aspects of original bedding.

b) Hard sediments: There is also the need to indicate the degree of fracturing in hard sediments/rock. This is best accomplished with a written description in the Lithologic Description portion of the Core Form (Figure 2).

c) Drilling "Biscuits" – semi-indurated sediments are broken into flat 3–5 cm or so "biscuits" which internally are undeformed, but were rotated against each other resulting in lenses of soft, intensely deformed mud or ooze in-between. Description of this is also best accomplished using the Lithologic Description portion of the Core Form (Figure 2).

5) Sedimentary structures – in many cores it is extremely difficult to differentiate between natural and coring-induced structures. Consequently, the description of sedimentary structures is optional. The following approach is suggested as a guideline, but the specialist is encouraged to use his own preferred system and set of symbols.

a) Median grain size profile: For the sections of terrigenous sediments, with interbeds of varying textural characteristics, the construction of median grain size profile based on hand lens observations provides a rapid method for illustrating graded and non-graded beds, bed thickness, and size distribution.

b) Sedimentary structures: A set of suggested symbols is provided for categories shown on Figure 4.

6) Color – According to standard Munsell and GSA color charts.

Use of the Core Form

1) Mandatory Graphic Lithology Column – This graphic column is based on the above classification scheme. Completion of the column using the appropriate symboles (Figure 3) must be done for each site, and will be inclued in the *Initial Core Description* (*ICD*) and *Initial Report Volume*. The "Special Rock Type" category should be used for sediment types not in the classification.

a) Optional graphic column: If circumstances or the special skills and interests of the shipboard staff indicate an additional modified or different classification, another graphic column may be added to the right of the Mandatory Column using definitions, terminology, and symbols that, in the opinion of the shipboard staff, will increase the information yield. This Optional Column must not substitute for the Mandatory Column.

2) Sediment disturbance column – Completion of the sediment disturance column using symbols and distinctions given below is mandatory.

3) Sedimentary structure columns – Structures may be designated on the core form in the sedimentary structure column parallel to the sediment disturbance column, and/or on the median grain size profile (for the sections of terrigenous sediments, with interbeds of varying textural characteristics). The median grain size profile is located in the lithologic description portion of the core form. A set of suggested symbols for a few more common structures has been prepared by DSDP (Figure 4), but the shipboard geologist is free to use whatever additional symbols he may wish. These optional columns may not substitute for the mandatory sediment disturbance column and must be distinct from it.

4) Lithologic description column – Format, style, and terminology of the descriptive portion of the core sheets are not controlled by the mandatory column scheme, beyond the minimal name assignment which should be derived from this classification. However, colors and additional information on structure and textures should normally be included in the textural section of the core description.

Lithologic Classification Scheme

The following define compositional class boundaries and use of qualifiers in the lithologic classification scheme:

1) Compositional Class Boundaries

a) $CaCO_3$ content (determined by $CaCO_3$ bomb): 30% and 60%. With a 5% precision and given the natural frequency distribution of $CaCO_3$ contents in oceanic sediments, these boundaries can be reasonably ascertained.

b) Biogenic opal abundance (expressed as percent siliceous skeletal remains in smear slides): 10%, 30%, and 50%. Smear-slide estimates of identifiable siliceous skeletal material generally imply a significantly higher total opal abundance. The boundaries have been set to take this into account.

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

d) Abundance of terrigenous detrital material (estimated from smear slides): 30%.

e) Qualifiers: Numerous qualifiers are suggested; the options should be used freely. However, components of less than 5% (in smear slide) should not be used as a qualifier except in special cases. The most important component should be the last qualifier. No more than two qualifiers should be used.

Description of Sediment Types

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

a) Boundary with terrigenous sediments: Where authigenic components (Fe/Mn micronodules, zeolites), fish debris, etc., become common in smear slides. NOTE: Because of large discrepancy in accumulation rates, transitional deposits are exceptional.

b) Boundary with siliceous biogenic sediments: <30% identifiable siliceous remains.

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

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

a) Pelagic biogenic siliceous sediments:

soft: Siliceous ooze (radiolarian ooze, diatom ooze, depending on dominant component).

hard:	radiolarite	porcellanite
	diatomite	chert

(i) Qualifiers:

Radiolarians dominant: radiolarian ooze or radiolarite.

Diatoms dominant: diatom ooze or diatomite.

Where uncertain: siliceous (biogenic) ooze, or chert or porcellanite, when containing >10% $CaCO_3$, qualifiers are as follows:

indeterminate carbonate:	calcareous - -
or	
nannofossils only:	nannofossil - -
foraminifers only:	foraminifer - -
nannofossil-foraminifer - -	depending on dominant component
foraminiferal-nannofossil - -	

b) Transitional biogenic siliceous sediments:

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

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

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

a) Pelagic biogenic calcareous sediments:

soft: calcareous ooze

firm: chalk

hard: indurated chalk

The term *limestone* should preferably be restricted to *cemented rocks*.

(i) Compositional Qualifiers ≤–

Principal components are: nannofossils and foraminifers.

One or two qualifiers may be used, for example:

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

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

b) Transitional biogenic calcareous sediments

(i) $CaCO_3$ = 30–60%: marly calcareous pelagic sediments

soft: marly calcareous (or nannofossil, foraminifer, etc.), ooze (see below)

firm: marly chalk

hard: marly limestone

(ii) $CaCO_3$ >60%: Calcareous pelagic sediments.

soft: calcareous (or nannofossil, foraminifer, etc.), ooze (see below)

firm: chalk

hard: limestone

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

4) Terrigenous sediments

a) Sediments falling in this portion of the classification scheme are subdivided into textural groups on the basis of the relative preportions of three grain size constituents, i. e., clay, silt, and sand. Rocks coarser than sand size are treated as "Special Rock Types." The size limits for these constituents are those defined by Wentworth (1922) (Figure 5).

Five major textural groups are recognized on the accompanying triangular diagram (Figure 6). These groups are defined according to the abundance of clay (> 90%, 90–10%, < 10%) and the ratio of sand to silt (>1 or <1).

The terms *clay, mud, sandy mud, silt,* and *sand* are used for the soft or unconsolidated sediments which are cut with a wire in the shipboard core splitting process. The hard or unconsolidated equivalents for the same textural groups are *claystone, mudstone* (or shale, if fissile), *sandy mudstone, siltstone,* and *sandstone.* Sedimentary rocks falling into the consolidated category include those which must generally be cut with the band saw or diamond saw. Sands medium-, coarse-, or very coarse-grained sands and sandstones according to their median grain size.

(i) Qualifiers — In this group numerous qualifiers are possible, usually based on minor constituents, for example: glaconitic, pyritic, feldspathic. In the sand and sandstone category, conventional divisions such as arkose, graywacke, etc., are, of course, acceptable, providing the scheme is properly identified. Clays, muds, silts, and sands containing 10–30% $CaCO_3$ shall be called calcareous.

b) Volcanogenic sediments

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

Volcanic breccia >32 mm

Volcanic lapilli <32 mm

Volcanic ash (tuff, indurated) <4 mm

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

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

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

In this category fall such rocks as:

Intrusive and extrusive igneous rocks;

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

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

Dolomite;

Gravels, conglomerates, breccias;

Metalliferous brown clays;

Concretions, barite, iron-manganese, phosphorite, pyrite, etc.;

Coal, asphalt, etc.;

and many others.

The mandatory graphic lithology column should be completed by shipboard staff with appropriate symbols for intervals containing special rock types. It is imperative that symbols and rock nomenclature be properly defined and described by shipboard staff.

Basement Description Conventions

Core Forms

Initial core description forms for igneous and metamorphic rocks are not the same as those used for sediments. The sediment barrel sheets are substantially those published in previous *Initial Reports.* Igneous rock representation on barrel sheets is too compressed to provide adequate information for potential sampling. Consequently, Visual Core Description forms, modified from those used on board ship, are used for more complete graphic representation. All shipboard data per 1.5-meter section of core are listed on the modified forms as well as summary hand-specimen and thin-section descriptions. The symbols and a number of format conventions for igneous rocks are presented on Figure 7.

Igneous and metamorphic rocks are split using a rock saw with a diamond blade into archive and working halves. The latter is described and sampled on board ship. On a typical igneous rock description form (Figure 8), the left column is a visual representation of the working half using the symbols of Figure 7. Two closely spaced horizontal lines in this column indicate the location of styrofoam spacers taped between basalt pieces inside the liner. Each piece is numbered sequentially from the top of each section, beginning with the number 1. Pieces are labeled on the rounded, not the sawed surface. Pieces which could be fitted together before splitting are given the same number, but are consecutively lettered, as 1A, 1B, 1C, etc. Spacers are placed between pieces with different number, but not between those with different letters and the same number. In general, addition of spacers represents a drilling gap (no recovery). However, in cores where recovery is high, it is impractical to use spacers. In these cases, drilling gaps are indicated only by a change in numbers. All pieces have orientation arrows pointing to the top of the section, both on archive and working halves, provided the original unsplit piece was cylindrical in the liner and of greater length than the diameter of the liner. Special procedures are used to ensure that orientation is preserved through every step of the sawing and labeling process. All pieces suitable for sampling requiring knowledge of top from bottom are indicated by upward-pointing arrows to the left of the piece numbers on the description forms. Since the pieces are rotated during drilling, it is not possible to sample for declination studies.

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

X = X-ray fluorescence analysis

M = magnetics measurements

S = sonic velocity measurements

T = thin section

D = density measurements

P = porosity measurements

Up to seven such visual representations can be included on a single igneous rock core description sheet (Figure 9), which includes a summary core description, and petrographic and analytical data.

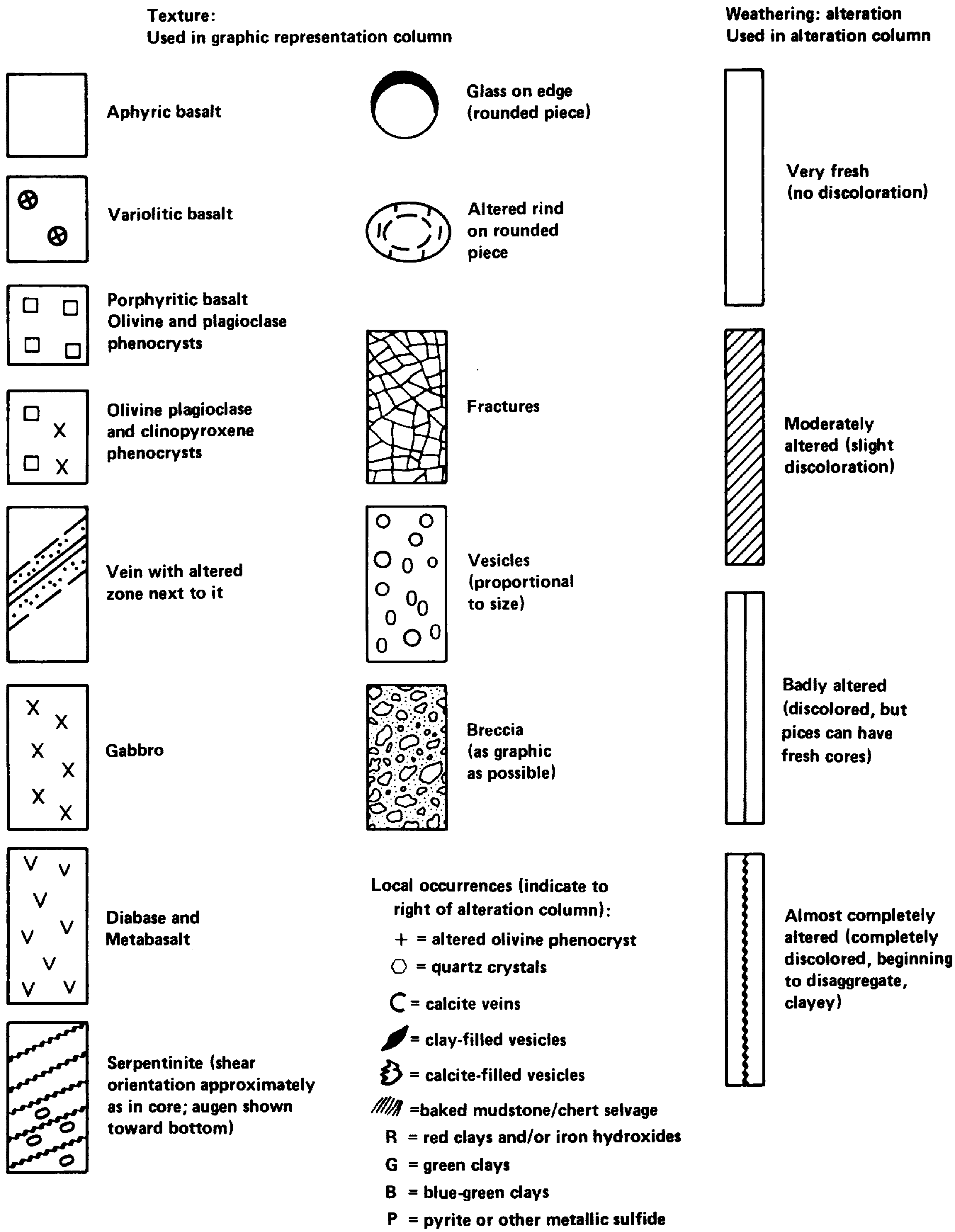


Figure 7. List of symbols for igneous rock description forms.

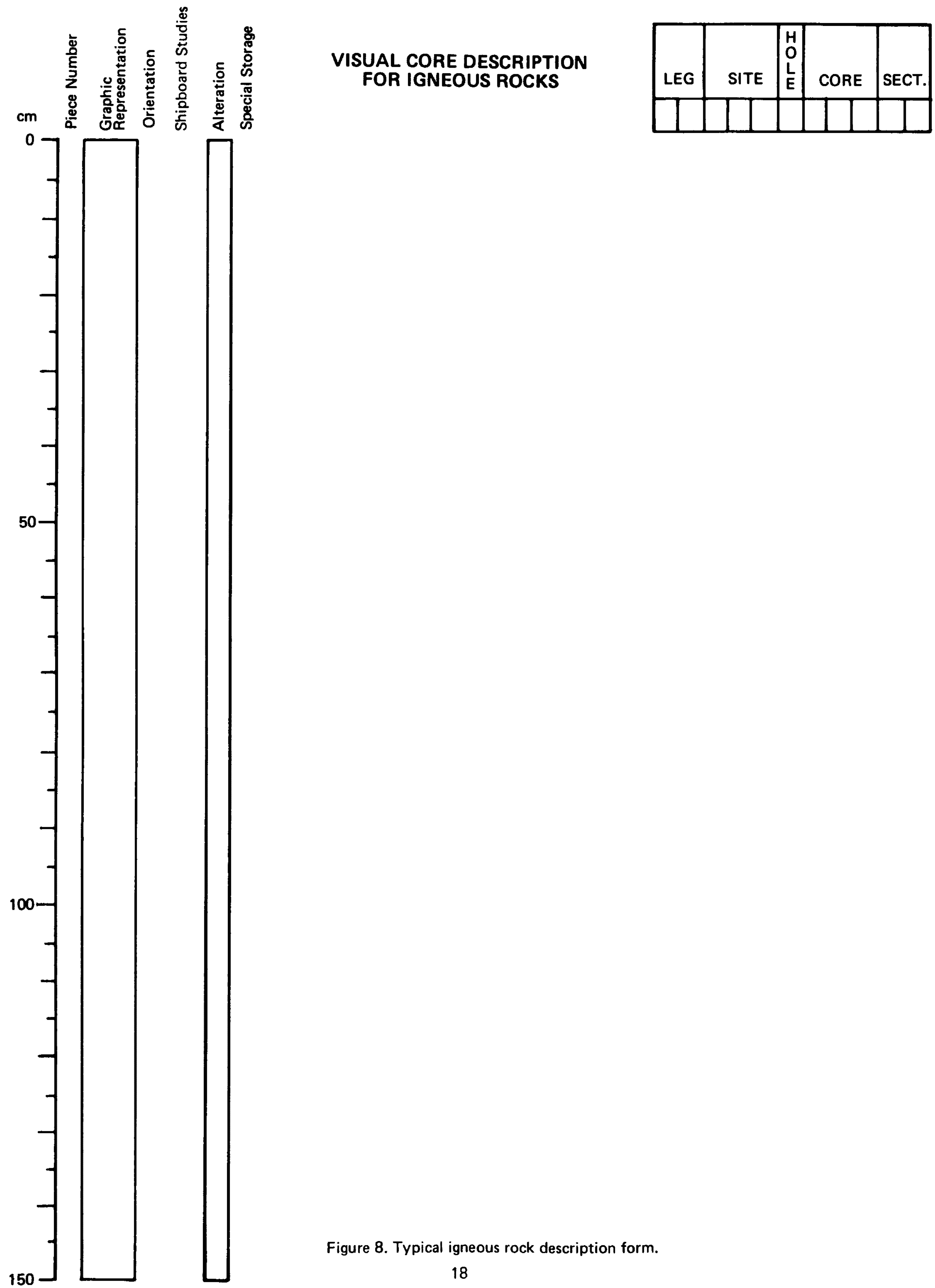
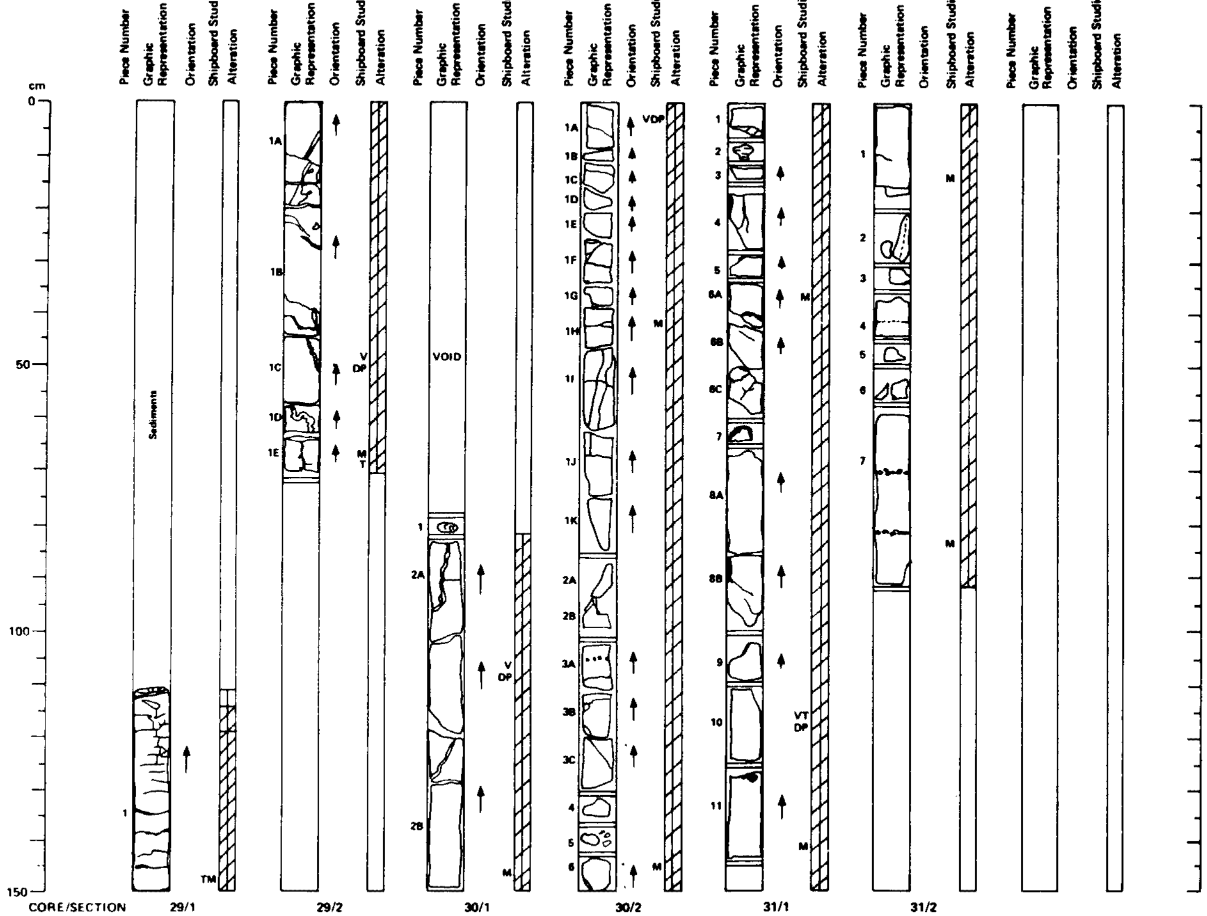


Figure 8. Typical igneous rock description form.



SITE 524, CORE 28, SECTION 3, 279.1–279.6 m

Macroscopic Description

See sediment description form

Thin Section Summaries

Contact Zone below claystone at 61 cm, Sec. 3: Dark brown glass with tiny (~0.01 mm and less) spinifex plagioclase (hollow skeletal, swallow tails) microlites rimmed with spherulitic mantles. Spherulite zone noted away from contact. Section too thick and glass too dark for detailed examination (problem with plucking).

Interior of pillow at 71 cm, Sec. 3: Slight phyric basalt with sparse (1%) relatively large plagioclase phenocrysts (0.7–1.6 mm) set in a hyalopilitic spinifex matrix composed of Na rich (R. I. 1.55), skeletal (hollow cores with smectite filling and crude swallow tails), elongate (0.04–0.5 mm, L/W 1/3–1/35) plagioclase microlites, abundant ilmenite dendrite needles (0.001–0.004 mm thick and 0.04–0.2 mm long) in rectangular boxwork pattern, more sparse magnetite cubes and octahedra in two generations (first 0.02–0.25 mm, second 0.004–0.015 mm), skeletal pyroxene(?) anhedral (~0.006 mm); and hollow skeletal apatite euhedra (0.004–0.008 mm). All these in a mesostasis of pale green smectite or chlorite (devitrified glass ?). Plagioclase phenocrysts about half replaced by inclusion-filled albite and some smectite or chlorite. Approximate mode: plagioclase phenocrysts 1, plagioclase microlites 30–40, ilmenite 10–15, magnetite 3–5, clinopyroxene 3–5, apatite 1–3, devitrified glass 40–50.

Shipboard Studies

Sample	D	P	$V_\perp$	$V_\parallel$	NRM1	NRM2	S. I.
Sec. 3, 71 cm	–	–	–	–	32.014	–38.6	–36
Sec. 3, 110 cm	–	–	–	–	24.443	–49.1	–45

SITE 524, CORE 29, SECTIONS 1–2, 286.1–287.2 m

MAJOR ROCK TYPES – BASALT (or DIABASE), CLAYSTONE, SANDSTONE

Macroscopic Description

Basalt (or Diabase) – Dark gray, aphyric. Sec. 1 has numerous calcite filled veins arranged perpendicular to core axis and spaced every 2–3 cm. Calcite veins in Sec. 2 more irregular, some with green clay rims.
Sandstone and Claystone – see sediment description form.

Thin Section Summaries

Section 1, Piece 1: Fine- to medium coarse-grained aphyric olivine(?) basalt (or diabase) with intergrown intersertal texture, composed of dominant tabular, weakly compositionally zoned plagioclase anhedra (0.06–0.3 mm, $An_{43-?}$, R. I. <1.55) and subordinate intergranular, mostly subhedra grains of clinopyroxene (0.006–0.1 mm), opaque minerals (0.006–0.35 mm) and apatite needles (0.01–0.15 mm, L/W ~1/12), with intersertal patches of greenish brown smectite. There are sparse smectite patches that appear to be pseudomorphs of small (0.06–0.1 mm) euhedral olivine grains. Note: Sparse (<1%) clinopyroxene microphenocrysts (0.15–0.25 mm). Approximate mode: plagioclase 35–45, clinopyroxene 15–20, opaques 15–20, devitrified glass (smectite) 15–20, apatite 1–2, olivine(?) 2–3.

Section 2, Core-Catcher: Coarse-grained to very coarse-grained basalt or diabase, composed of anhedral to subhedral, strongly zoned (An_{45-17}) plagioclase (0.09–0.96 mm) with intergranular clinopyroxene ($2V_z$ ~55–80) (0.01–0.15 mm) and opaques (magnetite 0.01–0.35 mm and ilmenite) and intersertal olive brown smectite (high birefringence). Abundant (for this mineral) apatite (3–6%, 0.02–0.35 mm) of stubby to needle prismatic habit, often with hollow center. Apatite is euhedral and cuts across plagioclase. Ilmenite and magnetite are sometimes hollow skeletal.

Shipboard Studies

Sample	D	P	$V_\perp$	$V_\parallel$	NRM1	NRM2	S. I.
Sec. 1, Piece 1	–	–	–	–	53.485	–44.7	–74
Sec. 2, Piece 1C	2.70	14.0	4.33	4.85	–	–	–
Sec. 2, Piece 1E	–	–	–	–	52.087	–43.4	–71

SITE 524, CORE 30, SECTIONS 1–2, 289.0–292.0 m

MAJOR ROCK TYPE – BASALT (or DIABASE)
MINOR ROCK TYPE – CALCAREOUS CLAYSTONE

Macroscopic Description

Basalt (or Diabase) – Dark gray, aphyric, coarse-grained basalt or diabase. Even grained, massive with widely spaced fractures (2–10 cm). Fractures in Piece 2A–B (Sec. 1) filled with calcite and minor pyrite; some lined with green clay. Fractures in Pieces 1A, 1C, and 1I–K (Sec. 2) parallel lines of irregular vesicles. Pyrite or blue green clay lines vesicles.
Calcareous Claystone – Piece 1 (Sec. 1) is olive gray calcareous claystone with a large horizontal zoophycos burrow.

Shipboard Studies

Sample	D	P	$V_\perp$	$V_\parallel$	NRM1	NRM2	S. I.
Sec. 1, Piece 2A	2.73	11.0	4.57	4.76	–	–	–
Sec. 1, Piece 2B	–	–	–	–	55.769	–57.8	–78
Sec. 2, Piece 1A	2.74	11.2	4.84	5.15	–	–	–
Sec. 2, Piece 1H	–	–	–	–	32.663	–64.4	–79
Sec. 2, Piece 6	–	–	–	–	43.596	–49.4	–73

SITE 524, CORE 31, SECTIONS 1–2, 294.5–296.9 m

MAJOR ROCK TYPE – BASALT (or DIABASE)
MINOR ROCK – CALCAREOUS CLAYSTONE

Macroscopic Description

Basalt (or Diabase) – Dark gray, aphyric, coarse, even-grained basalt (or diabase) with rare fractures filled with green clay. Small pyrite crystals in fractures and in discolored zones. Moderate alteration.
Calcareous Claystone – Piece 2 (Sec. 1) is reddish brown calcareous claystone.

Thin Section Summary

Section 1, Piece 10: Rock is very similar in texture and mineralogy to Core 29, Sec. 2, Core-Catcher, but slightly coarser and plagioclase grains show beautifully developed epitaxial mantles of alkali feldspar or oligoclase, optics (Ax. Pl. + 010, $2V_x$ <80°) indicate 3 possibilities, in order of likelihood: 1) anorthoclase or Na-sanidine, 2) oligoclase, and 3) K-rich sanidine. Choice 1 is favored because of sharply defined mantle boundary, oligoclase should give more gradational transition, and smaller R. I. difference than would be expected with K-rich sanidine.

Shipboard Studies

Sample	D	P	$V_\perp$	$V_\parallel$	NRM1	NRM2	S. I.
Sec. 1, Piece 6A	–	–	–	–	28.924	–56.8	–65
Sec. 1, Piece 10	2.78	11.8	4.46	4.50	–	–	–
Sec. 1, Piece 11	–	–	–	–	26.664	–41.6	–
Sec. 2, Piece 1	–	–	–	–	29.817	–65.9	–66?
Sec. 2, Piece 7	–	–	–	–	30.548	–38.6	–50

Figure 9. Igneous rock description sheet.

Igneous Rock Classification

Igneous rocks are classified mainly on the basis of mineralogy and texture. Thin-section work in general adds little new information to the hand-specimen classification.

Basalts are termed aphyric, sparsely phyric, moderately phyric, or phyric, depending on the proportion of phenocrysts visible with the binocular microscope ($\sim$x 12). The basalts are called aphyric if phenocrysts are absent. For practical purposes, this means that if one piece of basalt is found with a phenocryst or two in a section where all other pieces lack phenocrysts, and no other criteria such as grain size or texture distinguish this basalt from the others, then it is described as aphyric. A note on the rare phenocrysts is included in the general description, however. This approach enables us to restrict the number of lithologic units to those that appear to be clearly distinct.

Sparsely phyric basalts are those with 1–2% phenocrysts present in almost every piece of a given core or section. Clearly contiguous pieces without phenocrysts are included in this category, again with the lack of phenocrysts noted in the general description.

Moderately phyric basalts contain 2–10% phenocrysts. Aphyric basalts within a group of moderately phyric basalts are separately termed aphyric basalts.

Phyric basalts contain more than 10% phenocrysts. No separate designation is made for basalts with more than 20% phenocrysts; the proportion indicated in the core forms should be sufficient to guide the reader.

The basalts are further classified by phenocryst type, preceding the terms phyric, sparsely phyric, etc. For example, a plagioclase-olivine moderately phyric basalt contains 2–10% phenocrysts, most of them plagioclase, but with some olivine.

Other rock types which are less commonly recovered, such as gabbro, serpentinite, andesites, granite, or metamorphic rocks, are classified using standard references such as Williams, et al. (1954) or Moorhouse (1959).

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SAMPLE DISTRIBUTION POLICY

Deep Sea Drilling Project/International Phase of Ocean Drilling

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

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

The Deep Sea Drilling Project's Curator is responsible for distributing the samples and controlling their quality, as well as preserving and conserving core material. He also is responsible for maintaining a record of all samples that have been distributed, shipboard and subsequent, indicating the recipient and the natures of the proposed investigation. This information is made available to all investigators of DSDP materials as well as to 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 Reports* for which it was intended. Notice of submittal to other journals and a copy of the article should be sent to the DSDP Associate Chief Scientist, Science Services.

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, and 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* are 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 those 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 10 ml 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 the 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 Curator is prepared to provide to 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, with specific permission of the Curator or his delegate.

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

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

3. Other Records

Magnetics, seismic reflection, downhole logging, and bathymetric data collected by the *Glomar Challenger* will also be available for distribution at the same time samples become available.

Requests for data may be made to:

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

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

4. Reference Centers

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

Revised 8/1/80

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Deep Sea Drilling Project

The accompanying informal report is a summary of the scientific results of Leg 94 of the Deep Sea Drilling Project, prepared from the shipboard files by the scientists who participated in this cruise. The material contained herein is privileged proprietary information and cannot be used for publication or quotation.

This summary was assembled under time restrictions and is not to be considered a formal publication which incorporates final works or conclusions of the scientists.

The Deep Sea Drilling Project, undertaken on the advice of JOIDES, is managed by Scripps Institution of Oceanography under contract from the National Science Foundation.

Yves Lancelot
Chief Scientist

SUMMARY OF DEEP SEA DRILLING PROJECT, LEG 94

The scientific party aboard D/V Glomar Challenger for Leg 94 of the Deep Sea Drilling Project, International Phase of Ocean Drilling, consisted of:

Robert B. Kidd (Institute of Oceanographic Sciences, Wormley, Godalming, Surrey, United Kingdom)
William F. Ruddiman (Lamont-Doherty Geological Observatory, Palisades, New York)
Jack G. Baldauf (U.S. Geological Survey, Menlo Park, California)
Bradford M. Clement (Lamont-Doherty Geological Observatory, Palisades, New York)
James F. Dolan (University of California at Santa Cruz, Santa Cruz, California)
Margaret R. Eggers (University of South Carolina, Columbia, South Carolina)
Philip R. Hill (Geological Survey of Canada, Dartmouth, Nova Scotia, Canada)
Lloyd D. Keigwin, Jr. (Woods Hole Oceanographic Institution, Woods Hole, Massachusetts)
Margie Mitchell (Scripps Institution of Oceanography, La Jolla, California)
Isabelle Philipps (Universite de Bordeaux I, Talence, France)
Frank Robinson (Lamont-Doherty Geological Observatory, Palisades, New York)
Sasson Salehipour (University of Rhode Island, Kingston, Rhode Island)
Toshiaki Takayama (Kanazawa University, Kanazawa, Japan)
Ellen Thomas (Deep Sea Drilling Project, La Jolla, California)
Gerhard Unsold (Geologisch-Palaontologisches Institut und Museum der Universitat Kiel, Kiel, Federal Republic of Germany)
Philip P. E. Weaver (Institute of Oceanographic Sciences, Wormley, Godalming, Surrey, United Kingdom)

INTRODUCTION

Background and Objectives

The high-latitude North Atlantic Ocean is one of the most critical components of the global climatic system, both as an interactive component and as a long-term climatic sensor. It is flanked on three sides by continents, and is particularly influenced by air masses generated over the Canadian Arctic. The North Atlantic is one of two sites of formation of the deep waters that fill most of the world ocean, and waters sinking to intermediate depths are created here as well. During the winter-time, when cooling of the ocean surface accompanies the formation of deep and intermediate waters, the release of sensible and latent heat to cold air masses from the continents reaches values an order of magnitude larger than the global average. This extracted heat then moderates the climate over adjacent land masses.

The modern linkages of air, land, and sea changed during the ice-age climatic cycles of the Pleistocene and late Pliocene. Periodically, as ice sheets covered North America and Europe, the ocean surface north of 40° latitude chilled by as much as 10°-12°C, and the temperate waters of the North Atlantic Drift were replaced by a cold, iceberg-filled subpolar gyre separated from the warmer subtropical gyre by a sharply defined polar front along 42°-46°N. Formation rates of deep water periodically slowed and may at times have stopped altogether.

These responses to the ice-age cycles left several strong imprints in the deep marine sediments of the high-latitude North Atlantic Ocean: lithologic changes from interglacial carbonate oozes to glacial muds and marls; wholesale replacement of warm planktonic faunas and floras by cold communities; oxygen isotopic evidence of changes in the volume of ice stored on land; and variations in the amount of material dropped by melting icebergs. It is now known that the major late Pleistocene advances and retreats of the polar front north of 45° occurred with a 100,000- and 40,000-yr. periodicity, in phase with ice-volume growth and decay. It is also known that a very different tempo of sea-surface temperature change occurred south of 45°N in the northern subtropical gyre. Here, 23,000-yr. oscillations were dominant, and the ocean responded out of phase with (later than) ice volume.

Studies of conventional piston cores have delimited these changes in detail over the time span of the last several hundred thousand years. However, the high rates of deposition that make North Atlantic sediments ideal recorders of long-term climatic change precluded obtaining long climatic sequences from conventional piston cores. With the development of the hydraulic piston corer for use on the Glomar Challenger, these deeper sections have become accessible.

Beyond the late Pleistocene lies a long span of Neogene time during which the oceanographic response of the North Atlantic was also a critical component of the larger picture of global climatic change. Several intervals within this span stand out as particularly interesting, either in their own right or because of their possible connections to important climatic changes nearby or elsewhere on the globe.

At the time scale of the glacial cycles:

1. When did major southward swings of the polar front begin and with what relation to the first major glaciations?

2. Did development of strong 100,000-yr. cycles in ice volume roughly 800,000 yr. ago coincide with similar changes in rhythm of polar-front movements?

3. What was the rhythm of oceanic response in the northern subtropical gyre south of the polar front as the ice-volume rhythms changed?

Before the major Pliocene-Pleistocene glaciations that began at 2.4 Ma, what were the responses of the North Atlantic to the following events?

1. Closing of the Panamanian Isthmus (4-3 Ma), which must have strengthened Gulf stream flow?

2. Closing and re-opening of connections with the Mediterranean around 6.3 to 5.5 Ma, during the Messinian?

3. Climatic coolings known from scattered glacial evidence on Northern Hemisphere land masses at 3.4 to 3.2 Ma (Iceland, Sierra Nevada Mountains) and 10 Ma (Alaska)?

4. Major increases in Antarctic glaciation around 15 and 6.5 Ma?

In short, what is the Neogene history of paleoceanographic change in the mid-latitude North Atlantic?

Related objectives dependent on a sequence of high-quality pelagic cores from the North Atlantic include the following:

1) high-quality paleomagnetic stratigraphy, including definition of very short events because of unusually high sedimentation rates;

2) long, detailed records of the "global" oxygen isotope signal and of regional variations in the carbon isotopic signal;

3) major refinement and extension of high-latitude biostratigraphic datum levels for all planktonic organisms;

4) investigation of the detailed history of $CaCO_3$ and silica preservation and dissolution;

5) studies of the terrigenous fraction, both that delivered by glacial ice-rafting and the smaller background component of windblown origin;

6) information on Icelandic and Azores volcanism; and

7) the history of deep-water circulation, using both stable isotopes and benthic foraminifers.

Coring during the summer of 1981 on previous DSDP legs obtained two long HPC sequences with which to study North Atlantic paleoclimate: Site 552 on Leg 81 and Site 558 on Leg 82. Both retrieved valuable sedimentary sections, their usefulness limited only by the relatively low sedimentation rates (10-20 m/m.y.) and the lack of double-HPC coring to fill breaks between cores and disturbances within cores. Results from Site 552 on the western flank of Rockall Plateau suggested that the fundamental initiation of glacial carbonate cycles occurred at 2.4 Ma, coincident with the first large positive shift in oxygen-isotope values. Site 558, southwest of the Azores, lies south of the region most heavily impacted by surface-water changes in the North Atlantic. Basically, these two sites are end points that pin the northern and southern limits of the transect of cores obtained on Leg 94 in the summer of 1983.

The Leg 94 objectives called for a transect beginning in the warm waters of the subtropical gyre near the Azores (Site 606) and proceeding to the north and northeast through the northern subtropical gyre (Site 607), and the transitional waters (Sites 608 and 609), to Site 610 located off the coast of Ireland. The final site (611) was chosen to the west of Site 610, but in still colder waters. Thus the numerical sequence of sites is from the warmest to the coldest (Fig. 1).

Because the paleoceanographic objectives require pelagic sediments and good preservation of the calcareous components, most of the sites were situated along the Mid-Atlantic Ridge and all at relatively shallow depths (2417 to 3883 m). In regions of locally variable sediment thickness (Sites 606, 607,and 609), we used seismic profiler records during the approach to pinpoint final site placement within the thickest parts of local sediment ponds. On the sediment drifts at Sites 610 and 611, sedimentation rates were uniformly rather high, so that final adjustments were not needed. Placement of Site 608 was determined largely by the tectonic objectives at King's Trough.

Two other major objectives for Leg 94 were to study the history and nature of North Atlantic Drift sedimentation on Feni and Gardar Drifts, and the tectonic history of the King's Trough region.

Seismic reflection profiles run in many areas of the North Atlantic are replete with examples of anomalously thick sediment piles considered to have been built up by the long-term circulation of bottom waters. Where the major bottom water masses have been most active piles of sediments several hundreds of meters thick, known as sediment drifts, have accumulated. Drilling in such sequences has been sparse, although it has become clear that the drifts hold an important record of the history of bottom water circulation in the ocean. Attempts to relate available drilling results to seismic stratigraphy suggested that the major North Atlantic drifts were initiated in the Paleogene, but the ages of many drifts are poorly constrained.

Sediment drifts have a characteristic ornamentation of large-scale sediment waves, which generally are tens of meters in amplitude and kilometers apart. These wave features have not been sampled to a great extent by piston cores, but they have frequently been characterized as sites of so-called "contourite" deposition.

The proposal to locate some of the sites (in the paleoclimate transect) on two of the major North Atlantic sediment drifts (because of their anticipated high sediment accumulation rates) provided an opportunity to examine the sedimentation of drift sequences in some detail. At Feni Drift on the western side of Rockall Trough and

Gardar Drift on the eastern flank of the Reykjanes Ridge three main aspects were tackled:

1. General characterization of drift lithologies, with documentation of systematic structural features, sedimentation rate changes or hiatuses.

2. The structure and composition of the sediment waves (by drilling a number of closely-spaced offset HPC holes).

3. The overall sedimentation history of the drifts (by drilling some deep holes to date significant seismic reflectors and biostratigraphic horizons within them).

The third site in the original series of sites planned for the paleoclimate transect was chosen to examine the fluctuations of the polar front and Neogene sea surface temperature history at about 44°N. A later proposal, aimed at determining the tectonic history of the intraplate King's Trough complex at a location slightly further to the south and east, was combined with the initial objectives. A continuous stratigraphic record was sought through the Paleogene to basement on the southern flank of King's Trough. The results were to be compared with rock-core and dredge haul data from within the complex.

The origin of King's Trough has been a matter of dispute for over 15 yr., despite the relatively abundant geophysical data available from the area. Hypotheses for its formation included: a compressional origin; a short-lived bend in the Mid-Atlantic Ridge; a transform fault; and a rifted aseismic ridge that had originally been built from a hot spot. The latest hypothesis, based on dredge haul and rock-core data, involves uplift of an aseismic ridge during the early Oligocene, followed by Miocene intraplate rifting. This hypothesis could be tested by drilling a deep hole in a flank of the complex. In addition, a number of biostratigraphic objectives could be met if Paleogene sediments were continuously drilled.

SUMMARY OF MAIN OBSERVATIONS

Leg 94 obtained cores in 21 holes at six sites in the North Atlantic (Fig. 1, Table 1). Ages ranged back to the late middle Eocene at one site (608), but were otherwise all Neogene (mid-Miocene or younger) in age (Fig. 2). At least the upper 3 Ma was doubled-cored at all sites; in some sites, the double coring extended into the Miocene.

Test of New Coring Apparatus

At Site 606 we tested the newly developed Advanced Piston Corer (APC). This tool represents a potential improvement over the VLHPC in two major respects: (1) scoped out, the unit is much shorter than the VLHPC, thus improving ease of handling on deck with no sacrifice in the length of retrieved cores; (2) it was built to withstand roughly double the pull-out pressure limit of the VLHPC (100,000 vs 40,000 lb.), thus potentially extending its coring range beyond that of the VLHPC. The APC functioned successfully to a depth of 178.4 m at Site

606, but was lost at the bottom of Hole 606A after having withstood a 100,000 lb. pull-out on a previous core. This was regarded as a successful test of the new tool.

Core Recovery

Leg 94 cores were taken using the APC and VLHPC to refusal, which invariably occurred within a depth range of 125-175 m sub-bottom. We then used the XCB (Extended Core-Barrel) system to extend continuous coring below. For some of the deeper objectives, we washed down and spot-cored selectively within the sediment column. In general recovery was good, averaging 85% of the total thickness cored. Distortions of the cores were non-existent at Site 606, infrequent at Site 607, but more frequent at the four northern sites. This seemed to be caused by the increasing incidence of moderately large swell in the rougher seas to the north. At no time, however, was the weather on site really bad. The sediments most vulnerable to these disturbances were invariably those in the upper 50 m, where high water contents probably contributed to the poor recovery.

Sediment Lithology

Two kinds of sediment were prevalent: interlayered nannofossil oozes, marls, and muds in the upper 2.4 Ma of Sites 608 through 611, and nannofossil oozes gradually lithifying downwards to nannofossil chalks in early Pliocene and older levels at all sites (Fig. 2). Site 606 consisted of nannofossil oozes even in the Pliocene-Pleistocene, because it lay south of the region of ice-rafting. Similarly, at Site 607 we recovered largely nannofossil ooze, but with some glacial strata of marly oozes.

The variations on this basic pattern were minor: a higher siliceous content in the upper Pliocene of Sites 610 and 611 and the middle Miocene of Site 610; increased volcanic influx in the lower Miocene and upper Oligocene of Site 608 and the upper Pliocene and Pleistocene of Site 610; and slightly higher mud content in the upper Pliocene of Site 609 and various Pliocene-Miocene levels of Sites 610-611.

Stratigraphic Continuity

Because of the striking visual correlations provided by the glacial carbonate layering of the upper Pliocene and Pleistocene, it proved possible to correlate photographs of equivalent layers at offset holes and thus to verify onboard whether or not we had obtained a completely continuous record (that is, with core breaks in one hole at a site spanned by a continuous section of core in the complementary offset hole at that site). Because this correlation was based on photographs, it could not quite be done in real time, but necessarily after a delay of several days. In some cases, gaps in continuity were detected while we were still on station and filled by additional spot coring. More often, we did not know until in transit whether or not we had obtained a complete record.

In general, there were far more complications evident in these cores than might be imagined from an unbroken sequence of homogeneous calcareous oozes or clays. Even in cases where the two holes were placed next to the same beacon with no measurable offset, lithologic and other tie lines were often shifted by 1 to 10 m between holes. This meant that it was not sufficient simply to use pipe-line depths to align core breaks in one hole midway between core breaks in the other; the offset in correlations also had to be considered. We found several instances in which sections were repeated, with the layers retrieved in the top of one core repeating those just obtained in the bottom of the previous core. This implied lateral movement at the bottom of the drill string during raising between cores. In some instances a given core was taken as much as 5 m below the level anticipated from pipe-line lengths, apparently because of downward heaving of the ship at the instant of coring. In such cases, the next core would come up shortened by roughly the amount over-cored on the previous attempt. Other problems included obvious compression and extension of sequences, and various kinds of coring deformation caused by heaving of the ship and armoring of the sediment surface caused by coarse glacial debris. All of these complications will be discussed in detail in Volume 94 of the Initial Reports.

Below the glacial cycles, it was not possible to check for continuity in such detail. Generally, within the resolution available from paleomagnetic and biostratigraphic datum levels, hiatuses were not detected, except for one large 11.6 Ma gap at 462 m in Site 608, with upper Oligocene sediments directly overlying upper Eocene. Even the sites on sediment drifts appeared to be entirely hiatus-free.

Paleomagnetic Stratigraphy

Although results were variable from core to core, in general we obtained very good paleomagnetic stratigraphies. Typically, the detrital minerals in the glacial marls and muds gave the strongest intensities and best signals, with the carbonate-rich oozes below and south of the glacial cycles more weakly magnetized, but still useful. Invariably, it was difficult or impossible to obtain magnetic stratigraphies in the semi-indurated chalks (250-350 m sub-bottom), that were broken up into small "drilling biscuits", but the deeper and more lithified chalks gave useable results, except in tectonically disturbed sections. In most sites, the basic magnetic epochs were clearly defined, and even short events like the Reunion and Cobb Mountain were detected in several holes at one site.

Biostratigraphy and Microfossil Preservation

The North Atlantic is recognized as the least corrosive ocean to calcareous sediments, and in general, preservation of the abundant calcareous microfossils and nannofossils was very good to excellent, except for the Eocene, Oligocene and Miocene at Site 608, and parts of the early Miocene at Site 610, where preservation was moderate to poor. Silica was much rarer, generally constituting only a few percent of the sediment at most. Although silica preservation is generally noted as good to moderate, it is likely that only a very small fraction of the silica originally produced in the surface water survives in the sediments, due to light silification of the tests in silica-deficient surface waters.

Generally, biostratigraphy was secondary to paleomagnetic stratigraphy on Leg 94. This was due in part to the extraordinarily good quality of the paleomagnetic records and in part to the progressive northward loss of the low-latitude species that form the basis of the calcareous microfossil zonation schemes. Usually, the nannofossils (and less frequently the planktonic foraminifers or diatoms) were used to put broad time constraints on intervals of sporadic coring or poor core-recovery, so that the magnetic record could then be used for finer resolution.

Major inconsistencies in age assignments at high latitudes using previously published tropical-subtropical biostratigraphic zonation schemes for both nannofossils and planktonic foraminifers became evident in Site 607 and recurred on every site through Site 611. This forced an even greater reliance on paleomagnetic stratigraphy, but the consistency of results in those sites clearly will result in publication of an improved version of the high-latitude North Atlantic biostratigraphy in Volume 94 of the Initial Reports.

In general, the combination of biostratigraphy and paleomagnetic stratigraphy provided numerous very tightly age-constrained datum levels at all sites.

Sediment Accumulation Rates

Relative to the global average, almost every site cored on Leg 94 had a very high sedimentation rate. Only Site 608, with rates of 10-30 m/m.y., had rates near the global mean.

The reasons for the high sedimentation rates vary. Sites 606, 607, and 609 on the Mid-Atlantic Ridge were specifically chosen in regions of locally thickened sedimentary fill, evident on seismic records. The rates of deposition at these sites range from 45 to 75 m/m.y., unusually high for the deep sea. We envisage that sediment initially deposited on locally higher topography related to basement structure is subsequently removed and transported by some kind of gentle, relatively steady form of near-bottom energy into the closed basins and lower topography that we cored. The lack of significant contamination by older nannofossils at these sites argues against strong erosion by bottom currents; for the most parts, the sediments moving about are contemporaneous with the pelagic "rain". Whatever the exact mechanism of sediment redistribution, it results in accumulation rates two to four times greater than the local mean and far higher than the global average.

The rates of deposition observed at the two drift sites (Sites 610 and 611) were, if anything, somewhat lower than expected, although still above the regional norm, and were also surprisingly steady through time at Feni Drift. Basically, these rates are no more obviously a product of bottom-current deposition than those at the three "pelagic" sites on the Mid-Atlantic Ridge; the drift-sediments did not show major differences from the pelagic sediments (see below).

The only obvious difference between the drift sites and the Mid-Atlantic Ridge sites is one of scale. On the ridge, redeposition is local in scale; sediment-deficient sources are closely juxtaposed with sites of excess deposition. For the drifts, the sediment sources are larger and far more remote, and the transport distances far larger, as are the regions of positive accumulation (the scale of the entire drift). The sources of Feni Drift sediments (Site 610) are probably the European margin and eastern Rockall Plateau. Those for Gardar Drift (Site 611) are the western Rockall Plateau and the Iceland-Faeroes Ridge. During long-range transport, considerable amounts of older nannofossils and other contaminants from a variety of sources are entrained in the flow and deposited on the drift, but in a sedimentary sequence still dominated by contemporaneous pelagic material.

Site 608 has a mean rate of sediment accumulation much nearer to the regional mean. The site is situated in a region of relatively smooth, unvarying topography and sedimentary fill, and this appears to offer less chance for local-scale redistribution and local thickening of sedimentary sequences.

Drift Sedimentology

Our sedimentological studies aimed at characterizing the deposits accumulating on major drifts resulted in additional surprising findings. The lithologies were fundamentally pelagic in type at both the Feni Drift and the Gardar Drift. As at the other Leg 94 sites, the glacial carbonate cycles dominated the upper parts of the holes and gave way downwards to nannofossil oozes, marls and chalks. No primary structures that might be interpreted as due to bottom-current activity were identified at either site. Gardar Drift sediments were generally more terrigenous than those at Feni Drift, but this is clearly due to a greater input of ice-rafted sediment and rock debris from Iceland. Feni Drift sediments contain evidence of local turbidite activity, but sharp-based, coarse-grained beds are entirely absent at Gardar Drift. We await shore-based X-radiography of the cores to confirm the lack of current evidence. Reworking of nannofossil material was recognized throughout the sections drilled, and thus we have no doubt that sediment redistribution occurred. No hiatuses were detected in the records.

Sediment Waves

The sites chosen for drilling were located within sediment wave fields at both drifts, but these fields were situated at different relative levels on the flanks of the drifts. The waves drilled on Feni Ridge were at around 2400 m water depth close to the drift crest (Fig. 3); those drilled on Gardar Drift were at 3200 m on its lower southeastern flank, where the core of Norwegian Sea overflow water turns westward before spilling into the Charlie Gibbs Fracture Zone.

Detailed PDR and 3.5 kHz profiling in the vicinity of both sites showed that the sediment waves are characteristically irregular in shape and amplitude. The wave crests around Site 611 could be traced laterally with ease, whereas only some of those at Site 610 could be traced track-to-track.

Holes were drilled on a selected wave crest on both drifts and in each case were compared with offset holes drilled in adjacent troughs (Fig. 3). Crest-to-trough lithologic variations were slight, although bed-to-bed correlations were easily definable. Some thickening and thinning of individual beds occurred, and we plan detailed shore-based grain size analyses to discern any differences in local sedimentation conditions.

Although there is little evidence of migration of the sediment waves on seismic profiles, systematic differences in accumulation-rate curves for trough versus crest holes at Gardar Drift can at this stage best be explained by Pliocene wave migration.

History of Sediment Drifts

Our prime objective at Feni Drift was to penetrate a regional seismic reflector at 0.75 s sub-bottom (two-way travel time). The reflector had been characterized by some workers as the base of the drift sequence, but others considered it a mid-drift reflector representing the onset of modern circulation in Rockall Trough. We identified the reflector as a siliceous nannofossil chalk, dated as latest early Miocene (NN4). At the level of the reflector, we recognized selective dissolution of diatoms, possibly indicative of a regional oceanographic event. No hiatus was observed; neither was there apparently a change in accumulation rate.

Another reflector at Feni Drift at 0.37 s sub-bottom (two-way travel time) represents a period of decreased sedimentation rate in the late Miocene, which correlates in time with the Messinian isolation of the Mediterranean.

On Gardar Drift a good correlation of seismic stratigraphy with downhole lithologic unit boundaries was obtained, but our plans to penetrate deep reflectors were frustrated by extremely low drilling rates in the upper Miocene sequence.

Overall, the upper parts of the two major drifts are comprised of sediments younger in age than had been estimated previously. We suspect other drift sequences examined in the light of our seismic and stratigraphic results may present a similar picture.

King's Trough

At King's Trough we sampled an almost complete sequence on its southern flank through to basement. In age the sediments range from late Quaternary to late middle Eocene (NP16). They lie on relatively fresh pillow lava basalt, dated at about 42 Ma from sediments at the contact. This matches well with a predicted age from magnetic anomaly identification. A major hiatus occurs at a depth of 462 m sub-bottom, separating green nannofossil chalks with ash layers and volcaniclastic turbidites of late Eocene age (NP17), from upper Oligocene (NP24) chalk conglomerates and pinkish nannofossil chalks: a time span of about 11.6 m.y. The Oligocene chalks display a range of soft-sediment deformation structures that suggest debris-flow processes on unstable slopes. A further interval with soft-sediment deformation structures and with conspicuous microfaulting occurs higher in the sequence within the lower Miocene. The remaining parts of the section are nannofossil oozes and chalks, except for the glacial-interglacial cycles of marl and ooze in the upper 76 m.

The interpretation of tectonic events at King's Trough from the sedimentary evidence of slope instability and volcanic activity, along with the presence of the major hiatus, agrees well with the sequence of events predicted from dredge haul, rock core and geophysical data. Following a period of Oligocene uplift and erosion, an intraplate ridge rifted in the Miocene to form the present-day King's Trough.

Leg 94 was extraordinarily lucky with respect to weather; no storm of any force affected the ship on any station, and no time was lost as a result of bad weather. The only gale-force winds encountered during the entire 55 days came three days from port and pushed the ship into port embarrassingly early.

Table 1. Summary of Leg 94 drilling.

Hole	Dates (1983)	Latitude	Longitude	Water Depth*	Penetration	No. of Cores	Meters Cored	Meters Recovered	Percent of Recovery
606	2-4 July	37°20.32'N	35°29.99'W	3007	165.8	18	165.8	154.1	93
606A	4-5 July	37°20.29'N	35°30.02'W	3007	178.4	19	178.4	156.3	88
607	6-9 July	41°00.07'N	32°57.44'W	3427	284.4	30	284.4	248.2	87
607A	9-11 July	41°00.07'N	32°57.44'W	3427	311.3	26	226.6	205.0	91
608	13-17 July	42°50.21'N	23°05.25'W	3526	530.3	59	530.3	428.0	81
608A	17-18 July	42°50.21'N	23°05.25'W	3526	146.4	16	146.4	144.0	98
609	22-23 July	49°52.67'N	24°14.29'W	3884	399.4	42	399.4	301.2	75
609A	23 July	49°52.67'N	24°14.29'W	3883	43.0	2	19.2	17.9	93
609B	23-26 July	49°52.67'N	24°14.29'W	3883	354.7	38	354.7	308.4	87
610	28-31 July	53°13.30'N	18°53.21'W	2417	723.0	27	259.2	179.3	69
610A	31 July-1 Aug.	53°13.30'N	18°53.21'W	2417	201.0	21	201.0	191.4	95
610B	1-2 August	53°13.30'N	18°53.21'W	2417	146.8	16	146.8	136.3	93
610C	2-3 August	53°13.30'N	18°53.21'W	2417	118.2	6	48.4	43.9	91
610D	3 August	53°13.47'N	18°53.69'W	2445	386.8	7	66.0	54.2	82
610E	3-4 August	53°13.47'N	18°53.69'W	2445	327.2	7	67.2	53.3	79
611	6-7 August	52°50.47'N	30°18.58'W	3203	125.8	14	125.8	112.2	89
611A	7-8 August	52°50.47'N	30°18.58'W	3201	132.0	14	132.0	99.4	75
611B	8 August	52°50.15'N	30°19.10'W	3228	8.9	1	8.9	8.9	100
611C	8-11 August	52°50.15'N	30°19.10'W	3230	511.6	47	434.8	344.1	79
611D	11-12 August	52°50.47'N	30°18.58'W	3195	244.1	14	124.8	122.3	98
611E	12 August	52°50.47'N	30°18.58'W	3195	25.7	2	19.2	19.2	100
							(3939.3)	3327.6	

*at sea level

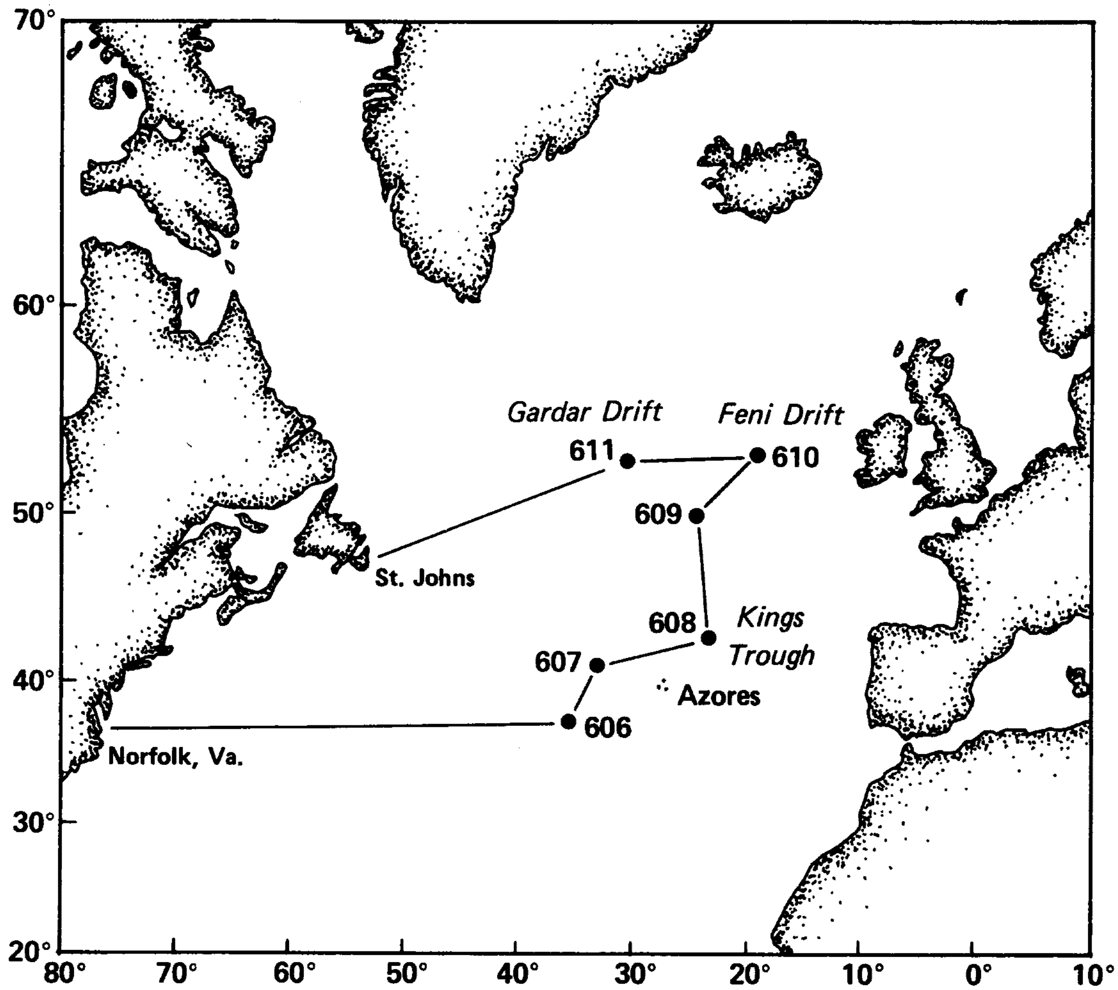


Figure 1. Location of the sites drilled on Leg 94.

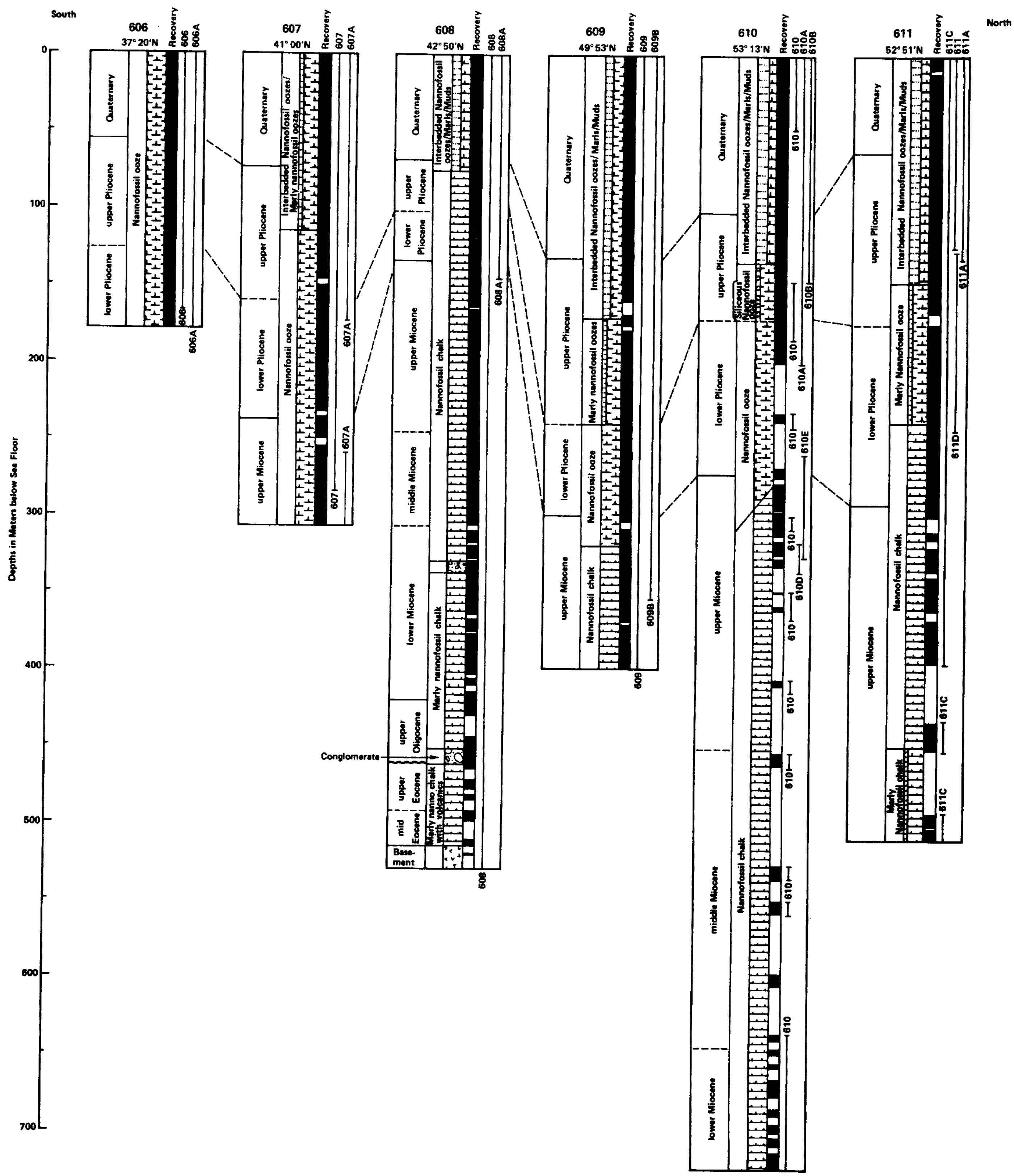


Figure 2. Lithostratigraphic columns of sediments recovered on Leg 94. The stratigraphic boundaries were drawn according to a time scale made up by the shipboard party and defined by calcareous nannofossil, foraminiferal and diatom datum levels and paleomagnetic stratigraphy.

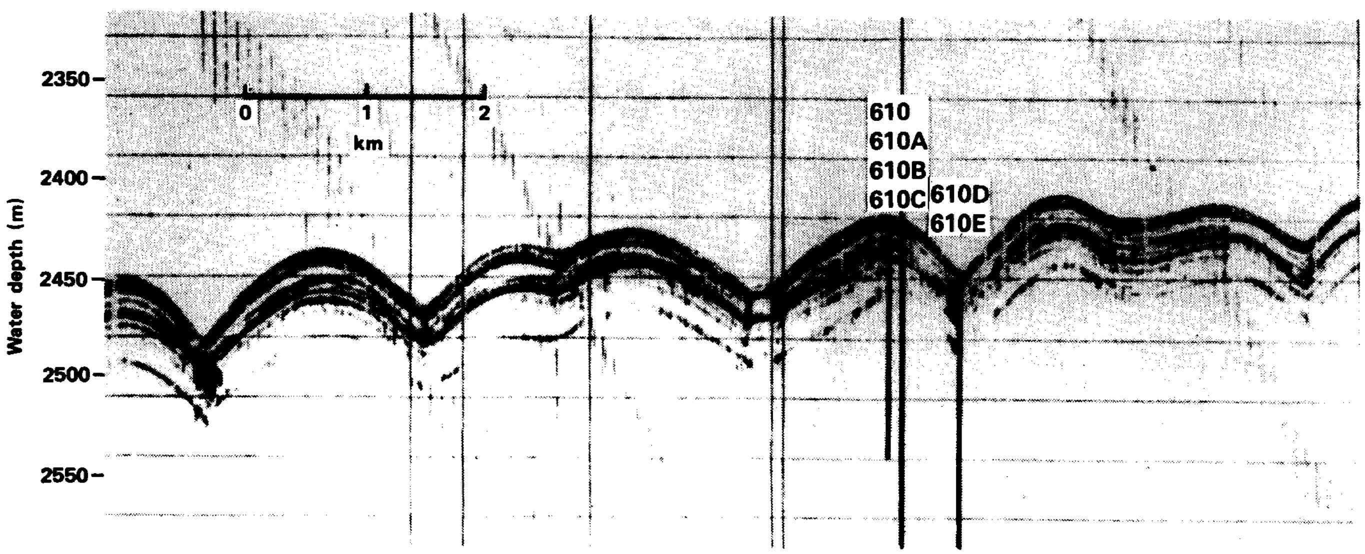


Figure 3. High resolution seismic profile (3.5 kHz) of the sediment waves on Feni Drift, illustrating location of crest and trough drilling at Site 610.

SITE 606

HOLE 606

Date Occupied: 2 July 1983

Date Departed: 4 July 1983

Time on Hole: 1 day, 6 hours

Position (latitude; longitude): 37°20.32'N; 35°29.99'W

Water depth (sea level; corrected m, echo-sounding): 3007

Water depth (rig floor; corrected m, echo-sounding): 3023

Bottom felt (m, drill pipe): 3022.1

Penetration (m): 165.75

Number of cores: 18

Total length of cored section (m): 165.75

Total core recovered (m): 154.1

Core recovery (%): 92.9

Oldest sediment cored: early Pliocene

Depth sub-bottom (m): 165.75

Nature: Nanno ooze

Age: 4 Ma

Measured velocity (km/s):

Basement: Not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 606

HOLE 606A

Date Occupied: 4 July 1983

Date Departed: 5 July 1983

Time on Hole: 26.5 hours

Position (latitude; longitude): 37° 20.29'N; 35° 30.017'W

Water depth (sea level; corrected m, echo-sounding): 3007

Water depth (rig floor; corrected m, echo-sounding): 3023

Bottom felt (m, drill pipe): 3023.8

Penetration (m): 178.4

Number of cores: 19

Total length of cored section (m): 178.4

Total core recovered (m): 156.3

Core recovery (%): 87.6

Oldest sediment cored: early Pliocene

Depth sub-bottom (m): 178.4

Nature: Nanno ooze

Age: 4.4 Ma

Measured velocity (km/s):

Basement: Not reached

Depth sub-bottom (m):

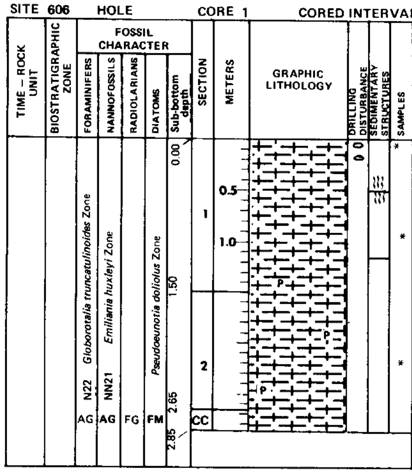
Nature:

Velocity range (km/s):

SITE 606

A. PRINCIPAL RESULTS

Site 606 consists of two holes located on the upper western flank of the Mid-Atlantic Ridge at 37°20.3N, 35°30.0W. Site 606 was cored with the newly developed APC (Advanced Piston Corer) to a sub-bottom depth of 165.75 meters and an age of early Pliocene (4.0 Ma.). Hole 606A was APC cored to a sub-bottom depth of 178.4 meters and an age of early Pliocene (4.4 Ma.). Recovery averaged 92.9% at 606 and 87.6% at 606A. No cores contained contorted layers. Paleomagnetic and lithologic tie-lines between the two holes indicate that the composite section is 100% complete. Both holes were relatively homogeneous nanno oozes throughout their entire lengths. All calcareous microfossil zones were well represented, with no hiatuses evident at the scale of sampling. Three winnowed foraminiferal sands suggest possible short-term hiatuses. The paleomagnetic stratigraphy is excellent in the Pleistocene, then poor until about 3 Ma., then good to the bottom of each hole. Deposition rates average 30 m./m.y. in the Pleistocene and 47 m./m.y. in the Pliocene. These rates are consistent with an environment in which pelagic deposition dominates but is enhanced by continuous transportation and redeposition of dominantly contemporaneous sediments by relatively gently current activity on the sea floor. These currents move sediment from basement outcrops and high-standing topography to the lower basinal topography, but leave intact an excellent "pelagic" record. The large overpull at the bottom of this section suggests that we encountered considerably more indurated sediments and could indicate some kind of depositional hiatus at the bottom of the section.



LITHOLOGIC DESCRIPTION

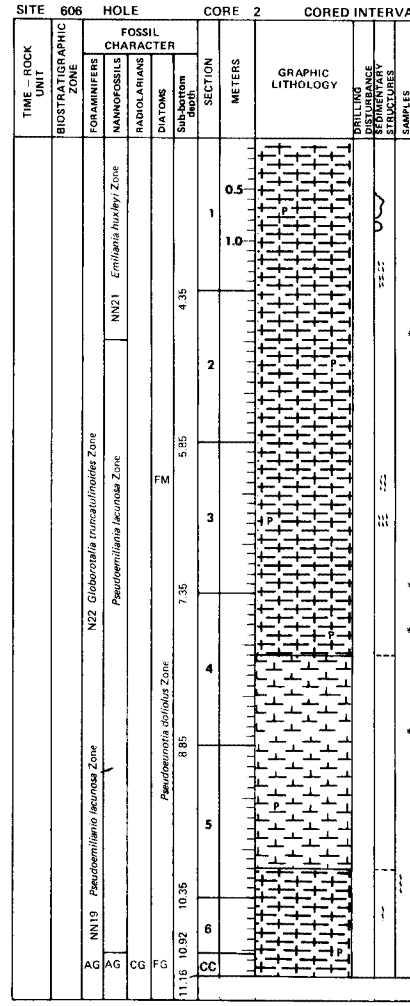
FORAMINIFERAL NANNOFOSSIL OOZE, pale yellowish brown (10YR 6/3) abruptly changing at 50 cm to light gray (5Y 7/1), abruptly changing at 113 cm to white (N9); 4 mm pebble at 137 cm; patches rich in pyrite scattered between Section 1, 130 cm to Section 2, 100 cm.

SMEAR SLIDE SUMMARY (%):

	1, 1	1, 92	2, 70
	D	D	D
Composition:			
Feldspar	–	–	TR
Pyrite	–	–	3
Foraminifers	11	25	10
Calc. nannofossils	89	75	87

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61
Organic carbon	–
Carbonate	90



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, light gray (5Y 7/1) to white (N9), 5–10 mm laminae of pale green (5GY 7/1) and medium gray (N5) scattered through Sections 2–4; patches rich in pyrite scattered throughout core; sedimentary clasts between Section 1, 63 to 76 cm and Section 1, 83 to 88 cm composed of pyrite-rich foraminiferal nannofossil ooze, pale purple (5P 8/2).

MINOR LITHOLOGY: NANNOFOSSIL OOZE, pale gray (5Y 8/1) Section 4, 60 cm to Section 5, 120 cm.

SMEAR SLIDE SUMMARY (%):

	2, 43	3, 143	4, 38	4, 132
	D	D	D	M
Composition:				
Carbonate unspec.	–	–	5	–
Foraminifers	20	20	15	5
Calc. nannofossils	80	80	80	95
Diatoms	–	TR	–	–
Sponge spicules	–	TR	TR	–

ORGANIC CARBON AND CARBONATE (%):

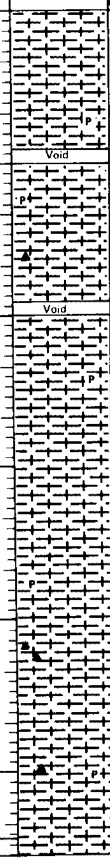
	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	87	83

SITE 606 HOLE CORE 3 CORED INTERVAL 12.45–22.05 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* Zone; AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone; AG
Radiolarians: FM
Diatoms: CG, FM, CG, AG, *Nitzschia reinholdii* Zone, CG, AM

Sub-bottom depth: 12.95, 13.95, 15.45, 16.95, 18.45, 19.95, 20.59, 20.74
Sections: 1 (0.5, 1.0), 2, 3, 4, 5, 6, CC



5Y 8/1, 5P 8/2, 5Y 8/1, 5P 8/2, Void, 5Y 8/1, Void, 5P 8/2, 5Y 8/1, 5P 8/2, 10YR 7/1, 5Y 8/1

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1) and pale yellowish brown (10YR 7/1), abruptly changing to pale purple (5P 8/2) between Section 1, 56 to 59 cm, Section 1, 107 to 111 cm, Section 3, 59 to 61 cm and Section 4, 1 to 3 cm; 5 mm laminae of pale purple (5P 8/2) and pale green (5GY 7/1) scattered through Section 3,CC; patches rich in pyrite scattered through Sections 2, 3, and 6; pumice fragments at Section 2, 91 cm, Section 3, 21, 37, and 146 cm.

SMEAR SLIDE SUMMARY (%):

	1, 10	3, 122	4, 145
	D	D	D
Composition:			
Volcanic glass	TR	–	TR
Foraminifers	10	20	10
Calc. nannofossils	90	80	90
Diatoms	–	TR	TR

ORGANIC CARBON AND CARBONATE (%):

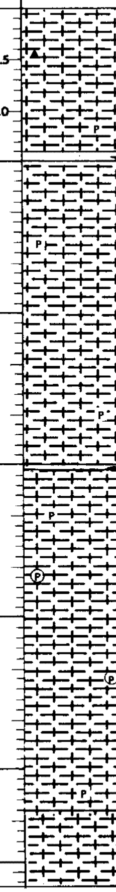
	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	94	81

SITE 606 HOLE CORE 4 CORED INTERVAL 22.05–31.65 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* Zone; AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone; AG
Radiolarians: B
Diatoms: CG, FM, *Nitzschia reinholdii* Zone, B

Sub-bottom depth: 22.05, 23.55, 25.05, 26.55, 28.05, 29.55, 30.45, 30.68
Sections: 1 (0.5, 1.0), 2, 3, 4, 5, 6, CC



5Y 7/1, 5Y 8/1, 5Y 7/1, Void, 5Y 8/1, 5P 8/1, Void, 5Y 8/1, 5P 8/1, 5Y 8/1, 5Y 7/1

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 7/1 to 5Y 8/1) and pale purple (5P 8/1); 5 mm laminae of pale purple (5P 8/1) and pale green (5GY 7/1) scattered throughout core; patches rich in pyrite scattered throughout core; 5 mm lamina rich in ash at Section 3, 3 cm; pyrite nodules at Section 4, 103 cm and Section 5, 58 cm; 5 mm pumice fragment at Section 1, 46 cm.

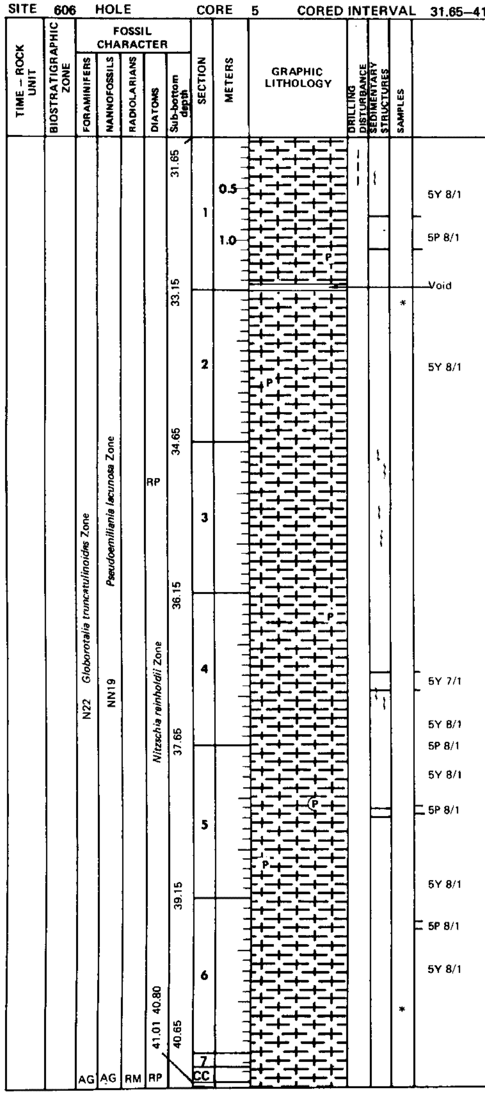
SMEAR SLIDE SUMMARY (%):

	1, 19	2, 132	5, 45
	D	D	D
Composition:			
Volcanic glass	TR	TR	TR
Foraminifers	14	12	10
Calc. nannofossils	86	88	90
Diatoms	–	TR	–
Radiolarians	–	TR	TR
Sponge spicules	TR	–	–
Silicoflagellates	TR	–	–

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	81	92

SITE 606 HOLE CORE 5 CORED INTERVAL 31.65–41.25 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1 to 5Y 7/1) becoming pale purple (5P 8/1) between Section 1, 77 to 104 cm; Section 5, 2 to 5 cm and 56–64 cm; and Section 6, 24–27 cm; 5 mm laminae of pale purple (5P 8/1) and pale green (5GY 7/1) scattered throughout core; patches rich in pyrite scattered throughout core, pyritized worm burrow at Section 5, 56 cm.

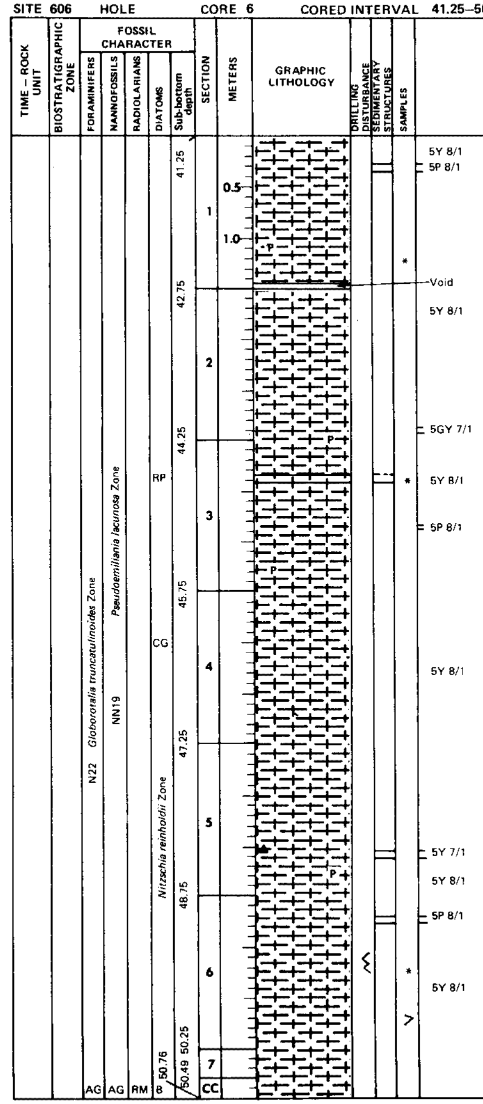
SMEAR SLIDE SUMMARY (%):

	2, 18	6, 110
	D	D
Composition:		
Volcanic glass	TR	TR
Foraminifers	12	11
Calc. nannofossils	88	89
Sponge spicules	TR	–
Silicoflagellates	TR	–

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	45	94

SITE 606 HOLE CORE 6 CORED INTERVAL 41.25–50.85 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1 to 5Y 7/1), pale purple (5P 8/1) between Section 1, 24 to 26 cm, Section 3, 85 to 87 cm, and Section 6, 14 to 18 cm and pale green (5GY 7/1) between Section 2, 137 to 139 cm; 5 mm laminae of pale purple (5P 8/1) and pale green (5GY 7/1) scattered throughout core; patches rich in pyrite scattered throughout core; small pumice piece at Section 5, 102 cm; core highly disturbed due to an "O" ring within the core between Section 6, 114 to 120 cm.

Minor lithology NANNOFOSSIL FORAMINIFERAL OOZE, gray (10YR 6/1) between Section 3, 35 to 41 cm; having sharp basal (erosional) contact.

SMEAR SLIDE SUMMARY (%):

	1, 126	3, 40	6, 74
	D	M	D
Composition:			
Quartz	–	–	TR
Volcanic glass	TR	–	–
Foraminifers	10	75	10
Calc. nannofossils	90	25	90
Radiolarians	TR	–	TR

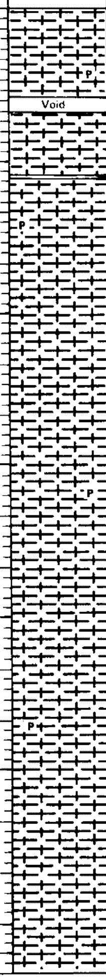
ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	87	96

SITE 606 HOLE CORE 7 CORED INTERVAL 50.85–60.45 m

Time-rock unit	Biostratigraphic zone	Foraminifers	Nannofossils	Radiolarians	Diatoms	Sub-bottom depth	Section	Meters
		PL6 *Globorotalia obliquus extremus* Zone	NN19 *Pseudoemiliania lacunosa* Zone		AG *Nitzschia marina* Zone	52.35	1	0.5, 1.0
					AG	53.85	2	
						55.35	3	
			NN18 *Discoaster brouweri* Zone		CM *Nitzschia reinholdii* Zone	56.85	4	
					AG	58.35	5	
						59.85	6	
					60.32	60.15	7	
		AG	AG	CG	CM		CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

5Y 8/1

Void

5Y 8/1

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1); 5–10 cm laminae of pale purple (5P 8/1) or pale green (5GY 7/1) scattered throughout core; patches rich in pyrite scattered throughout core.

SMEAR SLIDE SUMMARY (%):

	1, 50	4, 52	6, 139
	D	D	D
Composition:			
Quartz	TR	–	–
Foraminifers	20	10	10
Calc. nannofossils	80	90	90
Radiolarians	TR	TR	TR

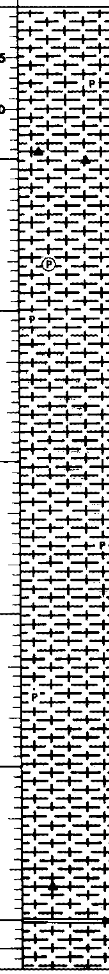
ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	92	100

SITE 606 HOLE CORE 8 CORED INTERVAL 60.45–70.05 m

Time-rock unit	Biostratigraphic zone	Foraminifers	Nannofossils	Radiolarians	Diatoms	Sub-bottom depth	Section	Meters
		PL6 *Globorotalia obliquus extremus* Zone	NN18 *Discoaster brouweri* Zone		CM *Nitzschia marina* Zone	60.95	1	0.5, 1.0
						61.95	2	
						63.45	3	
						64.95	4	
						66.45	5	
						67.95	6	
					69.91	69.45	7	
		AG	AG	FG	FM	69.68	CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

5Y 8/1

5Y 8/1

Void

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1); 5–10 mm laminae of pale purple (5P 8/1) and pale green (5GY 7/1) scattered throughout Sections 1, 4, and 5; patches rich in pyrite scattered throughout core; 10 cm sedimentary clast composed of foraminiferal nannofossil ooze, dark olive gray (5Y 4/2) at Section 3, 94 cm; 5 mm pumice at Section 1, 142 and 144 cm and Section 6, 112 cm; pyritized worm borrow at Section 2, 105 cm.

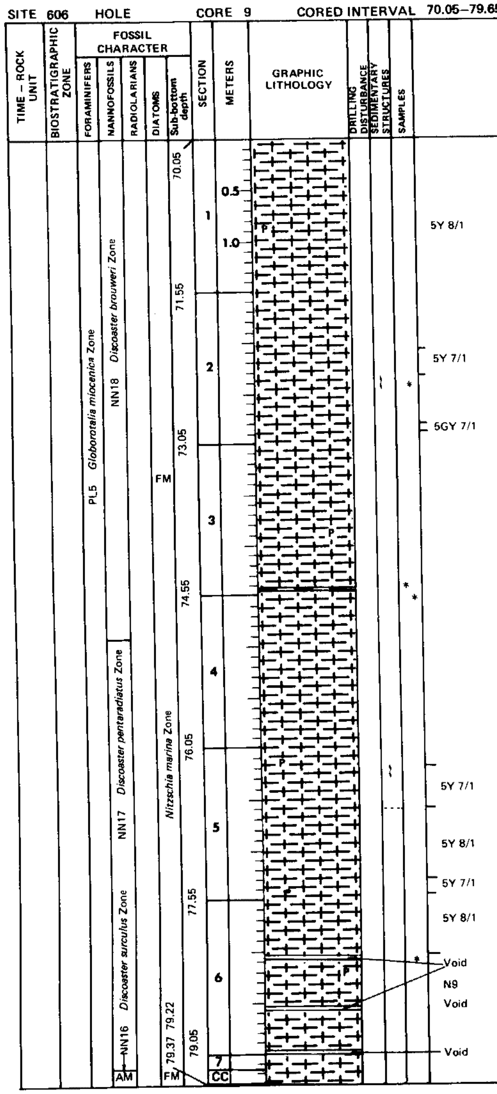
SMEAR SLIDE SUMMARY (%):

	1, 25	5, 88
	D	D
Composition:		
Foraminifers	10	10
Calc. nannofossils	90	90

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	95	96

SITE 606 HOLE CORE 9 CORED INTERVAL 70.05–79.65 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSI OOZE, pale gray (5Y 8/1 to 5Y 7/1) to white (N9); laminae of pale green (5GY 7/1) between Secton 2, 135 to 138 cm and Section 3, 106 to 108 cm; 5–10 mm laminae of pale purple (5P 8/1) and pale green (5GY 7/1) scattered throughout; patches rich in pyrite scattered throughout core; small pebble at Section 5, 141 cm. Layer between Section 3, 140 to 142 cm rich in foraminifers and pyrite, sharp basal (erosional) contact.

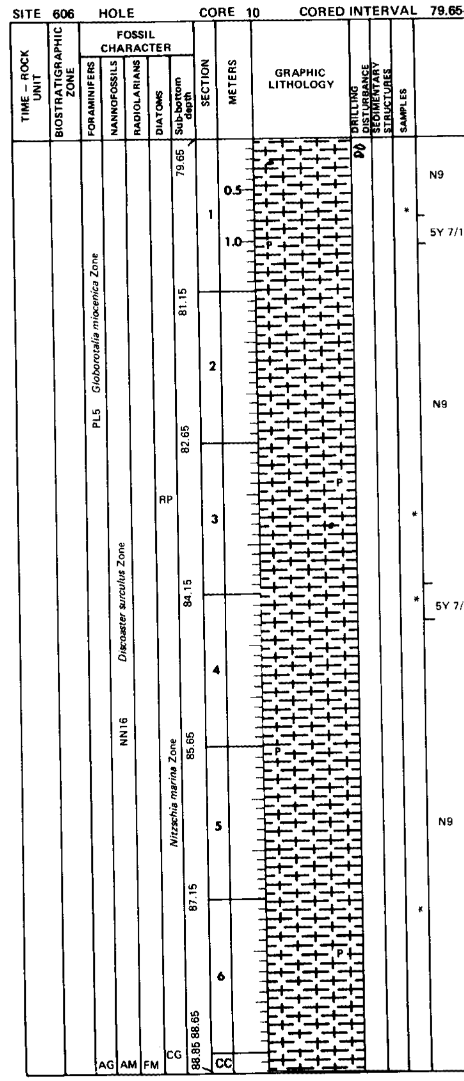
SMEAR SLIDE SUMMARY (%):

	2, 97	4, 1	6, 61	3, 141
	D	D	D	M
Composition:				
Pyrite	–	–	–	15
Foraminifers	20	25	10	25
Calc. nannofossils	80	75	90	60
Radiolarians	TR	–	–	–
Sponge spicules	TR	–	—	–

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	95	85

SITE 606 HOLE CORE 10 CORED INTERVAL 79.65–89.25 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 7/1) to white (N9); 5–10 mm laminae, pale green (5GY 7/1) scattered throughout; patches rich in pyrite scattered throughout 4 mm pebbles at Section 1, 25 cm and Section 3, 71 cm.

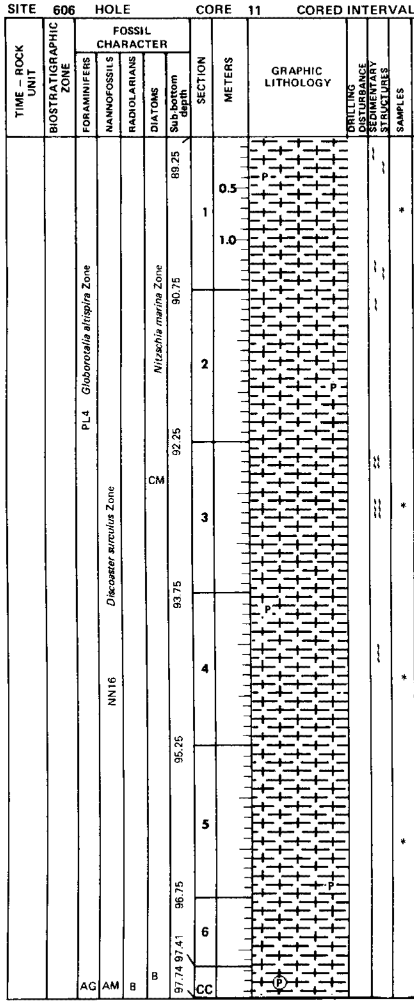
SMEAR SLIDE SUMMARY (%):

	1, 78	3, 77	4, 6	6, 13
	D	D	D	D
Composition:				
Volcanic glass	–	–	–	TR
Foraminifers	20	10	15	20
Calc. nannofossils	79	90	85	80
Radiolarians	–	–	–	TR
Sponge spicules	1	TR	–	–

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	100	99

SITE 606 HOLE CORE 11 CORED INTERVAL 89.25–98.75 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); 10 mm laminae rich in pyrite at Section 2, 160 cm; 5–10 mm lamina, pale green (5GY 7/1) common throughout core; stringers and patches rich in pyrite scattered throughout; 5 mm lamina pale purple (5P 8/1) scattered throughout; 20 mm pyritized worm burrow at 20 cm of Core Catcher.

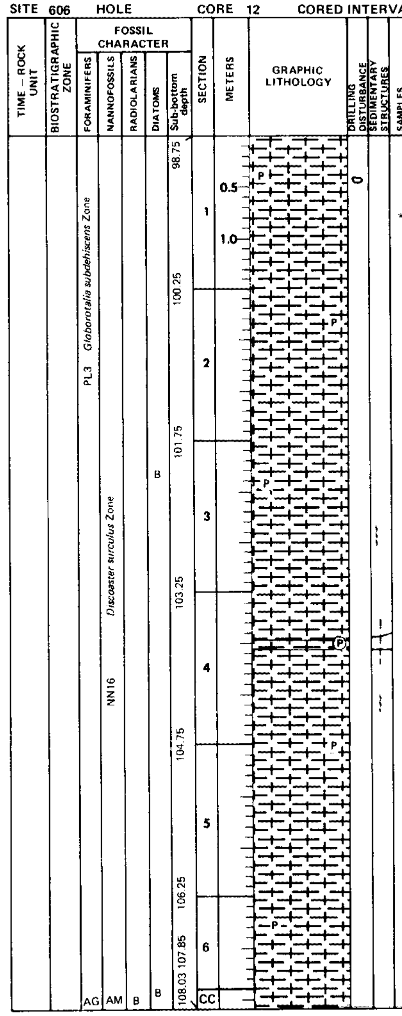
SMEAR SLIDE SUMMARY (%):

	1, 75	3, 64	4, 89	5, 99
	D	D	D	D
Composition:				
Foraminifers	10	10	15	20
Calc. nannofossils	90	90	85	80
Radiolarians	TR	TR	–	–
Sponge spicules	TR	TR	–	–

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	97	91

SITE 606 HOLE CORE 12 CORED INTERVAL 98.75–108.25 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); 2–5 mm laminae, pale green (5GY 7/1) scattered throughout core; patches and stringers rich in pyrite common throughout core.

Minor lithology NANNOFOSSIL FORAMINIFERAL OOZE, white (N9), between Section 4, 47 to 53 cm; contains pyrite nodule; sharp basal (erosional) contact.

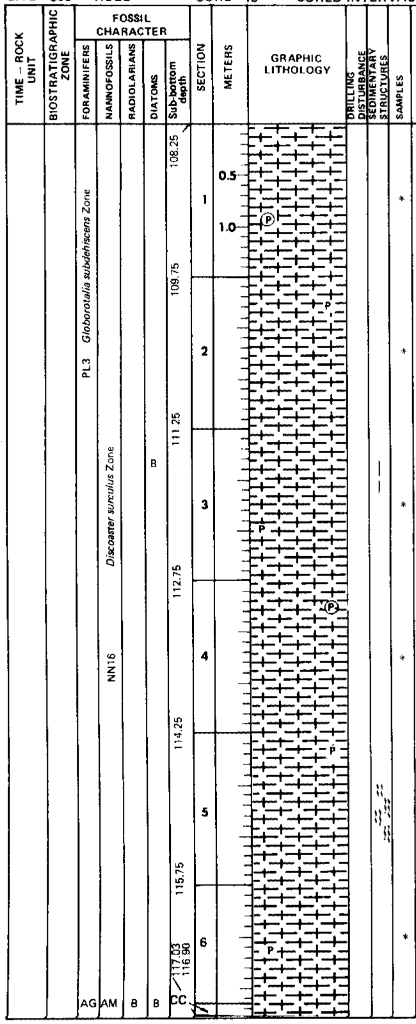
SMEAR SLIDE SUMMARY (%):

	1, 80	4, 53	5, 37
	D	M	D
Composition:			
Foraminifers	10	60	20
Calc. nannofossils	90	40	80
Sponge spicules	TR	–	–

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	90	89

SITE 606 HOLE CORE 13 CORED INTERVAL 108.25–117.75 m



N9

N9

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); patches rich in pyrite scattered throughout. Small pyrite nodules at Section 1, 98 cm and Section 4, 28 cm.

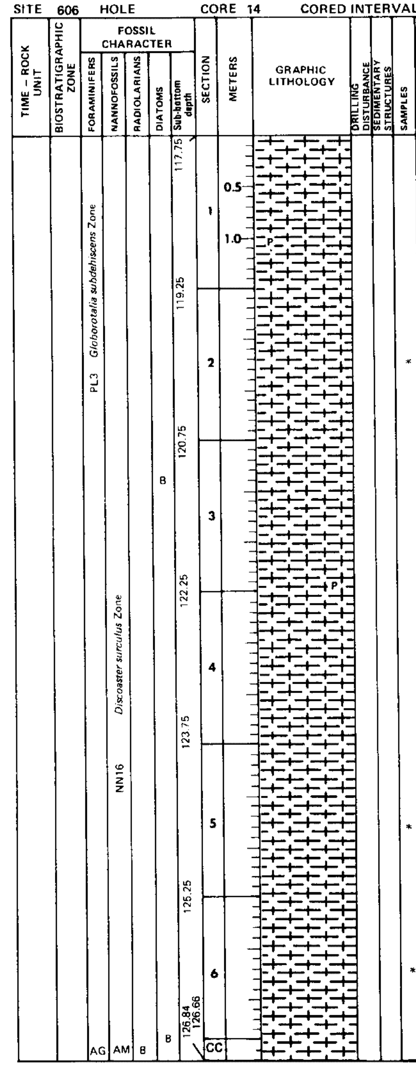
SMEAR SLIDE SUMMARY (%):

	1, 75	2, 75	3, 75	4, 75	6, 50
	D	D	D	D	D
Composition:					
Clay	5	–	–	5	5
Glauconite	TR	–	–	–	–
Carbonate unspec.	15	–	–	–	–
Foraminifers	18	20	25	25	25
Calc. nannofossils	62	80	75	70	70
Plant debris	–	TR	–	–	–

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	94	93

SITE 606 HOLE CORE 14 CORED INTERVAL 117.75–127.25 m



N9

N9

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); occasional patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

	2, 75	5, 80	6, 75
	D	D	D
Composition:			
Clay	5	5	5
Carbonate unspec.	–	–	5
Foraminifers	20	30	20
Calc. nannofossils	75	65	70
Plant debris	TR	TR	–

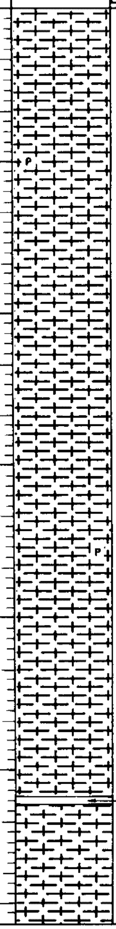
ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	94	96

SITE 606 HOLE CORE 15 CORED INTERVAL 127.35–136.95 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL2 *Globorotalia margaritae* Zone	NN15 *Reticulofenestra pseudoumbilica* Zone		B	127.35	1	0.5, 1.0
						128.85	2	
						130.35	3	
						131.85	4	
						133.35	5	
						134.85	6	
		AG	AM	B	RP	136.10 / 136.30	CC	

GRAPHIC LITHOLOGY



Colors: N9, N8, N7, N9; Void (Section 6). Samples marked at Sections 1, 3, 4 and 6.

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale gray (N8); several pale green (5GY 7/1) laminations between Section 3, 136 to 138 cm; occasional patches rich in pyrite scattered throughout; core highly disturbed between Section 6, 0 to 28 cm due to presence of "O" ring inside liner.

SMEAR SLIDE SUMMARY (%):

	1, 77	3, 56	4, 33	6, 98
	D	D	D	D
Composition:				
Clay	5	–	–	–
Pyrite	–	–	TR	–
Carbonate unspec.	–	20	20	20
Foraminifers	10	10	20	10
Calc. nannofossils	85	70	60	70
Radiolarians	–	TR	–	–

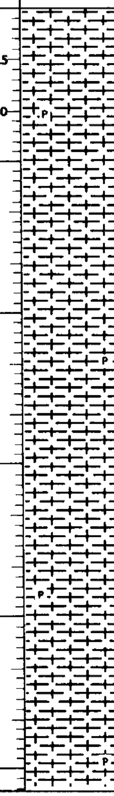
ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	91	96

SITE 606 HOLE CORE 16 CORED INTERVAL 136.95–146.55 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL2 *Globorotalia margaritae* Zone	NN15 *Reticulofenestra pseudoumbilica* Zone		B	136.95	1	0.5, 1.0
						138.45	2	
						139.95	3	
						141.45	4	
						142.95	5	
		AG	AM	B	B	144.45 / 144.67	CC	

GRAPHIC LITHOLOGY



Colors: N9, N8, N9, N8. Samples marked at Sections 3 and 4.

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); single 4 mm pale green (5GY 7/1) lamination at Section 3, 63 cm; patches rich in pyrite scattered throughout.

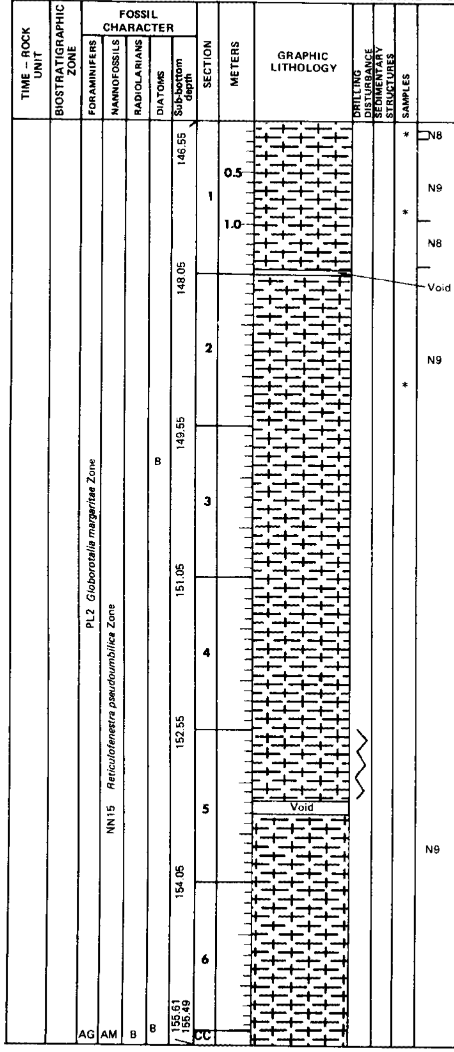
SMEAR SLIDE SUMMARY (%):

	3, 40	4, 15
	D	D
Composition:		
Pyrite	–	1
Carbonate unspec.	20	29
Foraminifers	10	10
Calc. nannofossils	40	60
Silicoflagellates	TR	–

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	96	93

SITE 606 HOLE CORE 17 CORED INTERVAL 146.55–156.15 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale gray (N8); pale green (5GY 7/2) 5 mm laminae at Section 6, 15 and 21 cm; 5 mm medium gray (N8) laminae at Section 6, 36 cm; patches rich in pyrite scattered throughout core; core highly disturbed between Section 5, 0 to 80 cm due to presence of "O" ring inside liner.

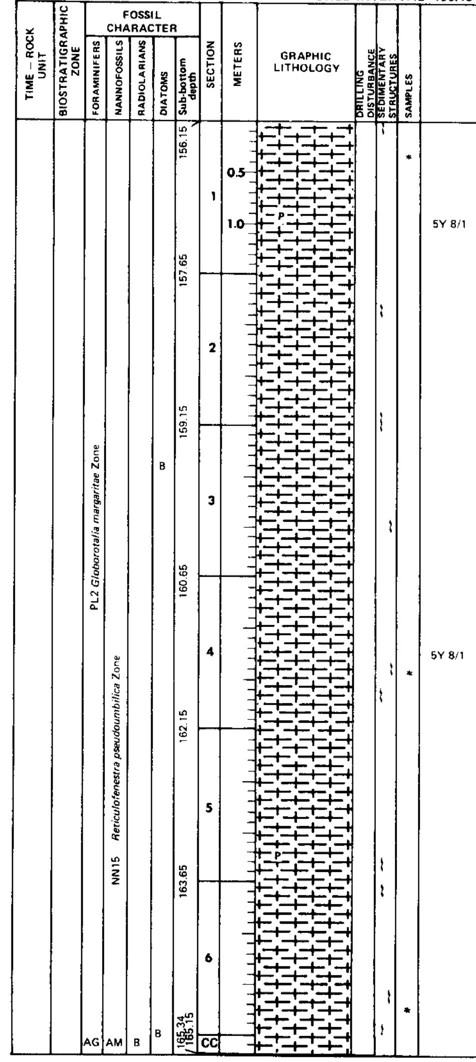
SMEAR SLIDE SUMMARY (%):

	1, 12	1, 90	2, 110
	D	D	D
Composition:			
Feldspar	–	TR	–
Pyrite	–	–	TR
Carbonate unspec.	20	30	20
Foraminifers	20	10	10
Calc. nannofossils	60	60	70
Silicoflagellates	TR	TR	–

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	91	93

SITE 606 HOLE CORE 18 CORED INTERVAL 156.15–165.75 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1); 5 mm pale green (5GY 7/1) laminae abundant between Section 2, 129 to 137 cm, Section 5, 89 to 95 cm, and at Section 4, 11 and 93 cm; patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

	1, 37	4, 94	6, 128
	D	D	D
Composition:			
Volcanic glass	TR	–	–
Foraminifers	10	16	12
Calc. nannofossils	90	84	88

ORGANIC CARBON AND CARBONATE (%):

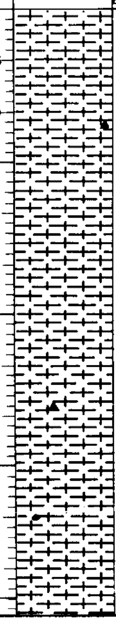
	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	93	93

SITE 606 HOLE A CORE 1 CORED INTERVAL 0.0–5.6 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* Zone (AG)
Nannofossils: NN21 *Emiliania huxleyi* Zone (AG)
Diatoms: *Pseudoeunotia doliolus* Zone (FM)

Sub-bottom depth: 0.00, 1.50, 3.00, 4.50, 5.78, 5.95
Sections: 1, 2, 3, 4, CC
Meters: 0.5, 1.0



10YR 6/3
5Y 7/2
5Y 8/1

FORAMINIFERAL NANNOFOSSIL OOZE, pale yellowish brown (10YR 6/3) abruptly changing to yellowish gray (5Y 7/2) at Section 1, 48 cm, abruptly changing to pale gray (5Y 8/1) at Section 1, 108 cm, 5 mm pale green (5GY 7/1) laminae common between Section 3, 121–133 cm and Section 4, 13–33 cm, 5 mm pebble at Section 4, 50 cm; 5 mm pumice at Section 1, 113 cm and Section 3, 93 cm; occasional patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

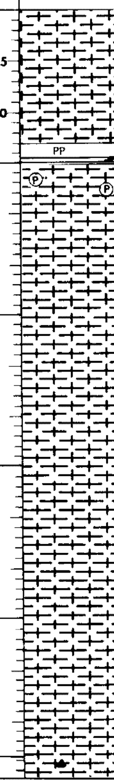
	1, 10	1, 116	3, 36	3, 122
	D	D	D	D
Composition:				
Quartz	–	–	–	TR
Feldspar	–	–	TR	–
Volcanic glass	TR	–	TR	–
Foraminifers	10	10	10	10
Calc. nannofossils	90	90	90	90
Diatoms	–	–	TR	–
Radiolarians	TR	–	TR	TR
Sponge spicules	TR	–	–	–
Fish remains	–	–	–	TR

SITE 606 HOLE A CORE 2 CORED INTERVAL 5.6–15.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* Zone (AG)
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone (AG)
Diatoms: *Nitzschia reinholdii* Zone (FM)

Sub-bottom depth: 5.60, 7.10, 8.60, 10.10, 11.60, 12.95, 13.14
Sections: 1, 2, 3, 4, 5, CC
Meters: 0.5, 1.0



5Y 8/1
5Y 7/1
IW
5Y 8/1
N9
5Y 8/1
5GY 4/1
5Y 8/1
N9
5Y 8/1

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1–5Y 7/1) to white (N9); 5 mm pale purple (5P 8/2) and pale green (5GY 7/1) laminae common throughout Sections 3–5; occasional patches rich in pyrite scattered throughout; pyritized worm burrows at Section 2, 20 and 27 cm; 1 cm pumice at Core Catcher, 1 cm.

SMEAR SLIDE SUMMARY (%):

	3, 21	3, 119	4, 110
	D	D	D
Composition:			
Feldspar	–	–	TR
Foraminifers	10	10	10
Calc. nannofossils	90	90	90
Radiolarians	TR	TR	TR

SITE 606 HOLE A CORE 3 CORED INTERVAL 15.2–24.8 m

Column headings: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

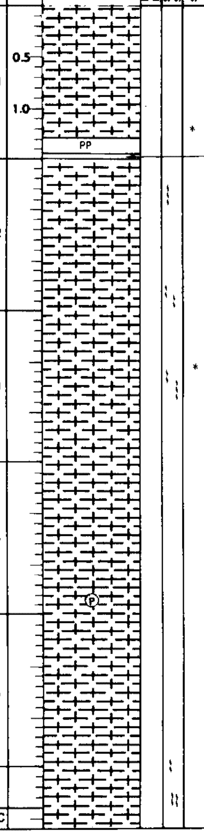
Foraminifers: N22 *Globorotalia truncatulinoides* Zone (AG)

Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone (AG)

Diatoms: *Nitzschia reinholdii* Zone (CG)

Sub-bottom depth: 15.20, 16.70, 19.70, 21.20, 22.70, 23.09, 23.29

Sections: 1, 2, 3, 4, 5, 6, CC



Colors: 5Y 8/1; 5Y 7/1; OG; 5Y 8/1; N9; 5P 8/2; N9; 5Y 8/1; N9; 5Y 8/1

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1–5Y 7/1) to white (N9); 5–10 mm pale purple (5P 8/2) and pale green (5GY 7/1) laminae common throughout; 3 cm pale purple (5P 8/2) laminae at Section 4, 57 cm; 5 mm gray (N4) lamina rich in pyritized foraminifera tests at Section 5, 123 cm; pyritized worm burrow at Section 4, 138 cm; occasional patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

	1, 112	3, 54	5, 54
	D	D	D
Composition:			
Feldspar	–	–	TR
Foraminifers	15	10	10
Calc. nannofossils	85	90	90
Radiolarians	–	TR	TR
Sponge spicules	TR	–	–

SITE 606 HOLE A CORE 4 CORED INTERVAL 24.8–34.4 m

Column headings: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

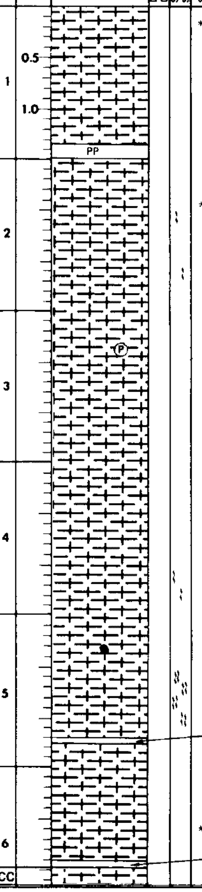
Foraminifers: N22 *Globorotalia truncatulinoides* Zone (AG)

Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone (AG)

Diatoms: *Nitzschia reinholdii* Zone (FM)

Sub-bottom depth: 24.80, 26.30, 27.80, 29.30, 30.80, 32.30, 32.27, 33.44

Sections: 1, 2, 3, 4, 5, 6, CC



Colors: 5Y 8/1; 5Y 8/2; 5Y 8/1; 5P 8/2; 5Y 8/1; N9; Void; 5Y 8/1; Void

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1–5Y 7/1) to white (N9); 5–10 mm pale purple (5P 8/2) and pale green (5GY 7/1) common throughout; 2 cm pale purple (5P 8/2) laminae at Section 2, 132 cm; 5 mm pebble at Section 5, 33 cm; large pyritized worm burrowed Section 3, 35 cm; occasional patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

	1, 16	2, 46	6, 60
	D	D	D
Composition:			
Feldspar	TR	TR	TR
Foraminifers	12	15	14
Calc. nannofossils	88	85	86
Radiolarians	TR	TR	TR
Sponge spicules	TR	TR	TR
Silicoflagellates	–	–	TR

SITE 606 HOLE A CORE 5 CORED INTERVAL 34.4–44.0 m

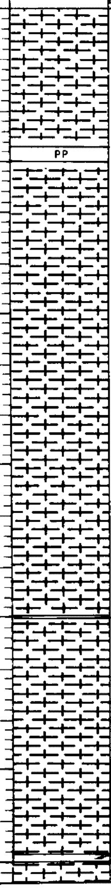
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION

Fossil character: Foraminifers: N22 *Globorotalia truncatulinoides* Zone, AG; Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone, AG; Diatoms: *Nitzschia reinholdii* Zone, CM

Sub-bottom depth: 34.40, 35.90, 37.40, 38.90, 40.40, 41.90, 42.78, 43.00

Sections: 1, 2, 3, 4, 5, 6, CC

Meters: 0.5, 1.0



Colour notes: 5Y 8/1; N9; 5Y 8/1; N9; Void; 5Y 8/1; Void; N9; 5Y 8/1

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1) to white (N9); 5–10 mm pale purple (5P 8/2) and pale green (5GY 7/1) laminae common throughout; occasional patches rich in pyrite common throughout.

SMEAR SLIDE SUMMARY (%):

	1, 30	4, 106	6, 17
	D	D	D
Composition:			
Feldspar	–	TR	TR
Volcanic glass	TR	TR	–
Foraminifers	11	10	11
Calc. nannofossils	89	90	89
Diatoms	–	–	TR
Radiolarians	–	–	TR
Sponge spicules	TR	TR	–

SITE 606 HOLE A CORE 6 CORED INTERVAL 44.0–53.6 m

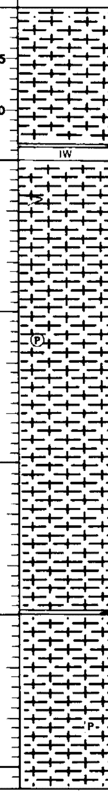
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION

Fossil character: Foraminifers: N22 *Globorotalia truncatulinoides* Zone, AG; Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone, AG; Diatoms: RP

Sub-bottom depth: 44.00, 45.50, 47.00, 48.50, 50.00, 51.50, 51.71

Sections: 1, 2, 3, 4, 5, CC

Meters: 0.5, 1.0



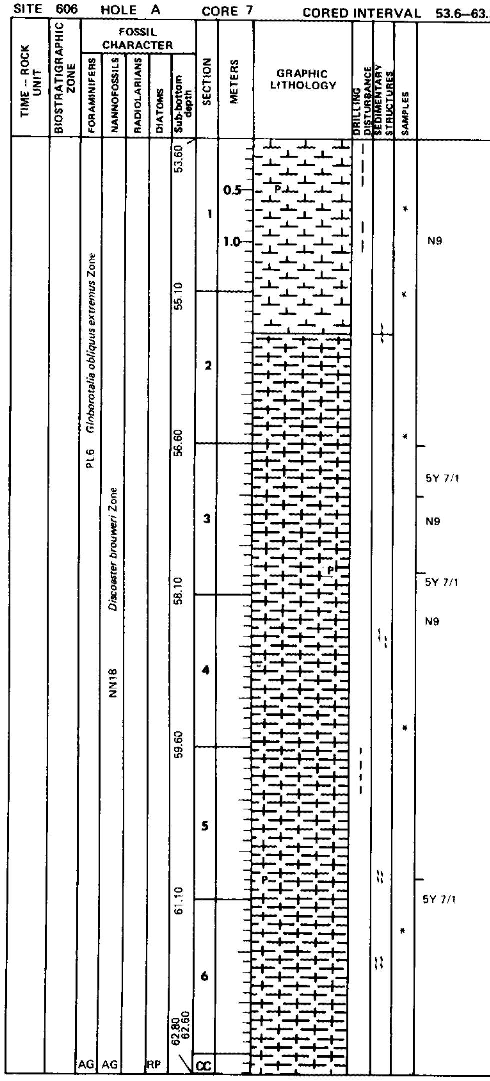
Colour notes: 5Y 8/1; 5Y 7/1; N9; Void; 5Y 7/1; N9; 5Y 8/1; N9; 5Y 8/1; Void; 5Y 7/1; 5Y 8/1

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 8/1–5Y 7/1) to white (N9); 5 mm lamina at Section 1, 41 cm composed of NANNOFOSSIL FORAMINIFERAL OOZE, sharp basal contact; 5–10 mm pale purple (5P 8/2) and pale green (5GY 7/1) laminae common throughout; pyritized worm burrow at Section 3, 23 cm; occasional patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

	1, 42	2, 48	2, 79	5, 127
	M	D	D	D
Composition:				
Feldspar	–	TR	–	TR
Heavy minerals	–	TR	–	–
Volcanic glass	TR	–	–	–
Pyrite	TR	TR	–	–
Foraminifers	50	11	10	12
Calc. nannofossils	50	89	90	88
Sponge spicules	–	–	–	TR

SITE 606 HOLE A CORE 7 CORED INTERVAL 53.6–63.2 m



LITHOLOGIC DESCRIPTION

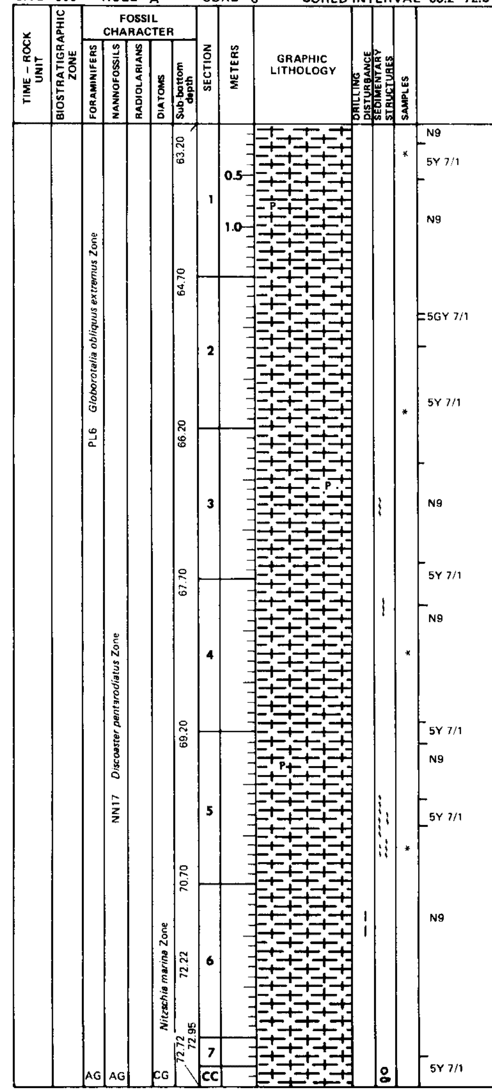
FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 7/1) to white (N9); 5–10 mm pale purple (5P 8/2) and pale green (5GY 7/1) laminae common throughout. Patches rich in pyrite common throughout.

MINOR LITHOLOGY: Section 1, 0 cm to Section 2, 41 cm NANNOFOSSIL OOZE, white (N9); 5 mm pale green (5GY 7/1) laminae common throughout; patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

	1, 70	2, 2	2, 144	4, 124	6, 33
	M	M	D	D	D
Composition:					
Heavy minerals	TR	–	–	–	–
Clay	TR	–	–	–	TR
Carbonate unspec.	–	–	5	–	–
Foraminifers	8	8	10	15	15
Calc. nannofossils	92	92	85	85	85
Radiolarians	TR	–	–	TR	–
Sponge spicules	TR	TR	–	TR	–

SITE 606 HOLE A CORE 8 CORED INTERVAL 63.2–72.8 m



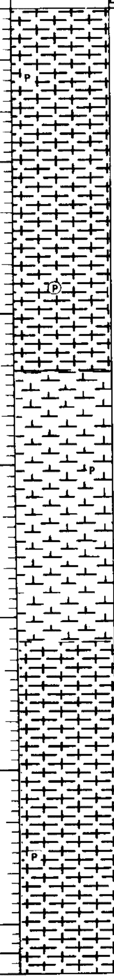
LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 7/1) to white (N9); 5–10 mm pale green (5GY 7/1) and pale purple (5P 8/2) laminae common throughout; 2 cm pale green (5GY 7/1) lamina at Section 2, 34 cm; patches rich in pyrite common throughout.

SMEAR SLIDE SUMMARY (%):

	1, 23	2, 129	4, 65	5, 112
	D	D	D	D
Composition:				
Quartz	TR	–	–	TR
Feldspar	TR	–	–	–
Volcanic glass	–	–	TR	–
Pyrite	TR	–	TR	–
Foraminifers	10	10	12	15
Calc. nannofossils	90	90	88	85
Sponge spicules	–	TR	–	–

SITE 606 HOLE A CORE 9 CORED INTERVAL 72.8–82.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL5 *Globorotalia miocenica* Zone 5Y 7/1	NN16 *Discoaster surculus* Zone		*Nitzschia marina* Zone	72.80, 74.30, 75.80, 77.30, 78.80, 80.30, 8.1.80, 81.99, 82.15	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0				*	5Y 7/1, N9, 5Y 7/1, N9, 5Y 7/1, N9, 5Y 7/1, N9, 5Y 7/1 N9
		AG	AG		RP								

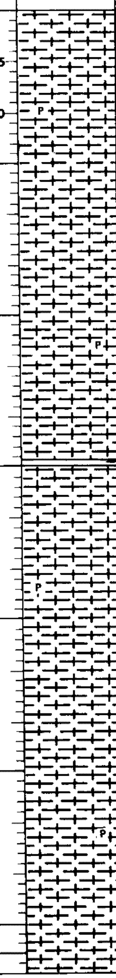
FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (5Y 7/1) to white (N9); pale green (5GY 7/1) and pale purple (5P 8/2), 5–10 mm laminae scattered throughout; 4 mm pyrite nodule at Section 2, 124 cm, patches rich in pyrite common throughout.

MINOR LITHOLOGY: NANNOFOSSIL OOZE, white (N9) between Section 3, 53 cm to Section 5, 20 cm; 5–10 mm pale purple (5P 8/2) and pale green (5GY 7/2) laminae common throughout; patches rich in pyrite common throughout.

SMEAR SLIDE SUMMARY (%):

	1, 87	2, 130	3, 106	5, 146
	D	D	M	D
Composition:				
Quartz	–	TR	–	–
Heavy minerals	TR	–	–	–
Pyrite	TR	–	TR	–
Foraminifers	10	10	5	10
Calc. nannofossils	90	90	95	90
Radiolarians	–	TR	–	–
Sponge spicules	–	TR	–	–
Silicoflagellates	–	–	TR	–

SITE 606 HOLE A CORE 10 CORED INTERVAL 82.4–92.0 m

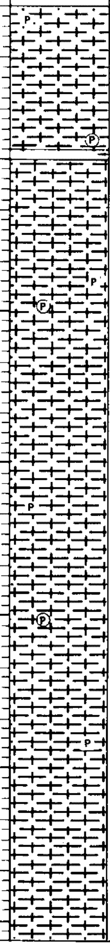
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL5 *Globorotalia miocenica* Zone	NN16 *Discoaster surculus* Zone		*Nitzschia jouseae* Zone	82.40, 83.90, 85.40, 86.90, 88.40, 89.90, 91.40, 91.73, 91.94	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0				*	N9, 5Y 7/1, 5GY 7/1, N9, 5Y 7/1, Void, N9
		AG	AG		FM								

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale gray (5Y 7/1); 5–10 mm pale green (5GY 7/1) and pale purple (5P 8/2) laminae scattered throughout; 3 cm pale green (5GY 7/1) lamina at Section 1, 55 cm; patches rich in pyrite common throughout.

SMEAR SLIDE SUMMARY (%):

	1, 55	3, 40	4, 85
	D	D	D
Composition:			
Quartz	–	–	TR
Heavy minerals	TR	TR	TR
Clay	–	TR	–
Foraminifers	10	10	10
Calc. nannofossils	90	90	90
Silicoflagellates	TR	–	–

SITE 606 HOLE A CORE 11 CORED INTERVAL 92.0–101.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL3 *Globorotalia subdehiscens* Zone	NN16 *Discoaster surculus* Zone			92.00–101.20	1–6, CC	0.5, 1.0				* (Sections 1, 6)	N9; IW; N9
		AG	AG		B								

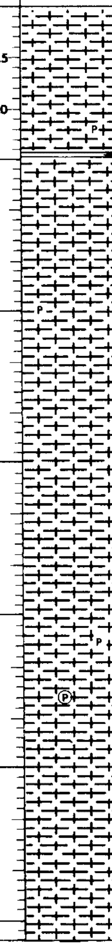
FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); 5–10 mm pale green (5GY 7/1) and pale purple laminae scattered throughout, patches rich in pyrite common throughout. Pyritized burrow at Section 1, 132 cm, Section 2, 147 cm, and Section 5, 2 cm.

SMEAR SLIDE SUMMARY (%):

	1, 28	6, 62
	D	D
Composition:		
Quartz	–	TR
Foraminifers	15	15
Calc. nannofossils	85	85
Sponge spicules	TR	–

Sub-bottom depths: 92.00, 93.50, 95.00, 96.50, 98.00, 99.50, 101.00, 101.20

SITE 606 HOLE A CORE 12 CORED INTERVAL 101.6–111.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL3 *Globorotalia subdehiscens* Zone	NN16 *Discoaster surculus* Zone			101.60–110.80	1–6, CC	0.5, 1.0					N9; OG; N9
		AG	AG		B								

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); 5–10 mm pale green (5GY 7/1) and pale purple (5P 8/2) laminae common in Sections 1 and 2; patches rich in pyrite scattered throughout; pyritized worm burrow at Section 5, 75 cm.

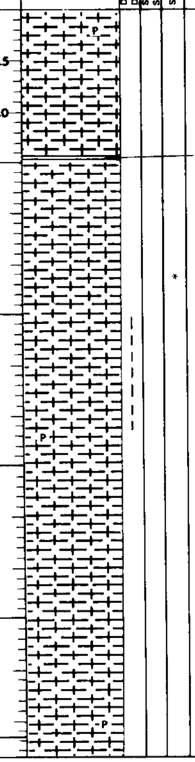
SMEAR SLIDE SUMMARY (%):

	2, 108	4, 20	5, 134
	D	D	D
Composition:			
Heavy minerals	–	TR	–
Clay	TR	–	–
Foraminifers	10	10	8
Calc. nannofossils	90	90	92

Sub-bottom depths: 101.60, 103.10, 104.60, 106.10, 107.60, 109.10, 110.60, 110.80

SITE 606 HOLE A CORE 13 CORED INTERVAL 111.2–120.8 m

Column	Entry
TIME – ROCK UNIT	
BIOSTRATIGRAPHIC ZONE	
FOSSIL CHARACTER – FORAMINIFERS	PL3 *Globorotalia subdehiscens* Zone; AG
FOSSIL CHARACTER – NANNOFOSSILS	NN16 *Discoaster surculus* Zone; AG
FOSSIL CHARACTER – RADIOLARIANS	
FOSSIL CHARACTER – DIATOMS	B
Sub-bottom depth	111.20; 112.70; 114.20; 115.70; 117.20; 118.63; 118.35
SECTION	1; 2; 3; 4; 5; CC
METERS	0.5; 1.0
SAMPLES	*



LITHOLOGIC DESCRIPTION

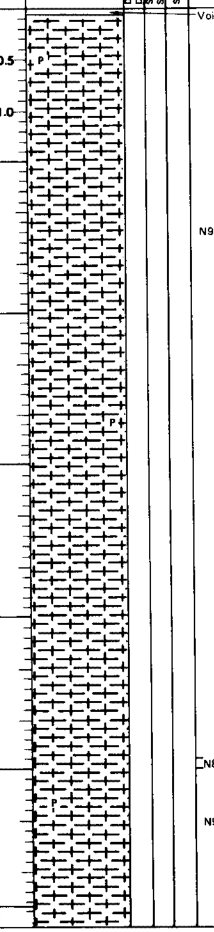
FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); several 5 mm pale green (5GY 7/1) laminations scattered throughout Section 1; patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

	2, 110
	D
Composition:	
Foraminifers	10
Calc. nannofossils	90

SITE 606 HOLE A CORE 14 CORED INTERVAL 120.8–130.4 m

Column	Entry
TIME – ROCK UNIT	
BIOSTRATIGRAPHIC ZONE	
FOSSIL CHARACTER – FORAMINIFERS	PL2 *Globorotalia margaritae* Zone; AG
FOSSIL CHARACTER – NANNOFOSSILS	NN15 *Reticulofenestra pseudoumbilica* Zone; AG
FOSSIL CHARACTER – RADIOLARIANS	
FOSSIL CHARACTER – DIATOMS	B
Sub-bottom depth	120.80; 122.30; 123.80; 125.30; 126.80; 128.30; 129.84; 129.63
SECTION	1; 2; 3; 4; 5; 6; CC
METERS	0.5; 1.0



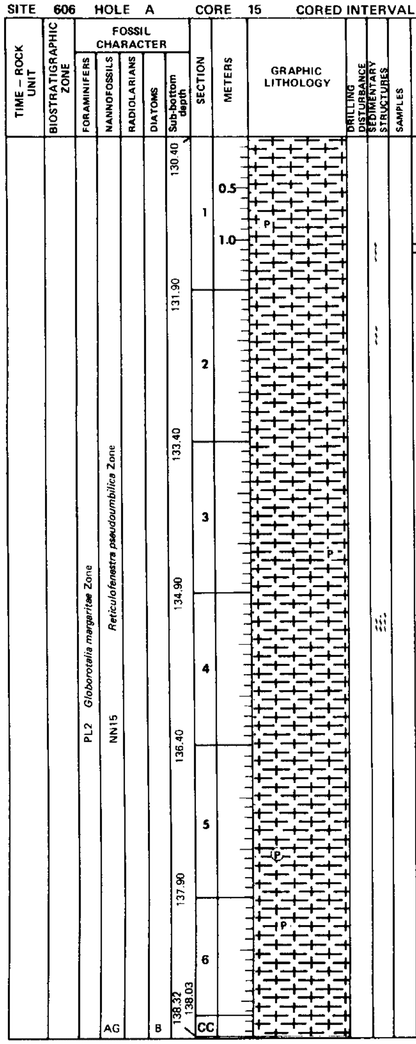
LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale gray (N8); several 3–5 mm pale green (5GY 7/1) laminations scattered throughout Sections 5 and 6; patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

	4, 40
	D
Composition:	
Quartz	TR
Foraminifers	15
Calc. nannofossils	85

SITE 606 HOLE A CORE 15 CORED INTERVAL 130.4–140.0 m



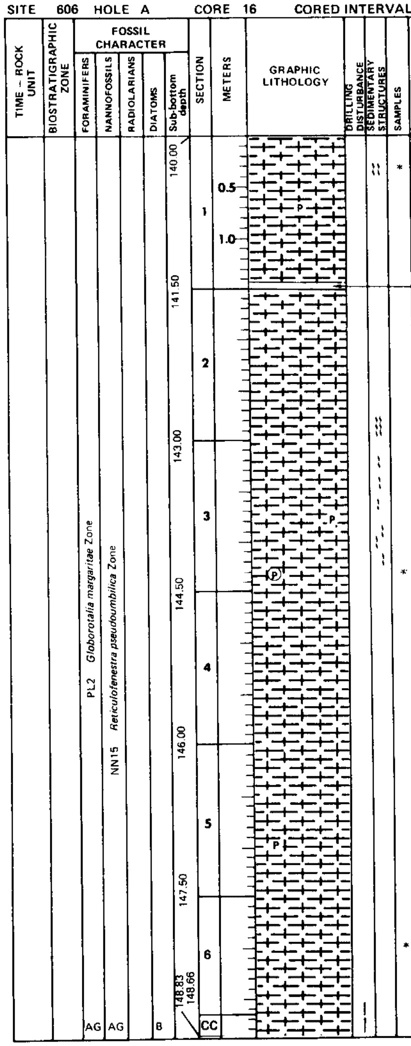
LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale gray (5Y 8/1); 5 mm pale purple (5P 8/2) and pale green (5GY 7/1) laminae sparsely scattered throughout; patches rich in pyrite scattered throughout; pyritized worm burrow at Section 5, 102 cm.

SMEAR SLIDE SUMMARY (%):

	3, 50
	D
Composition:	
Foraminifers	10
Calc. nannofossils	90

SITE 606 HOLE A CORE 16 CORED INTERVAL 140.0–149.6 m



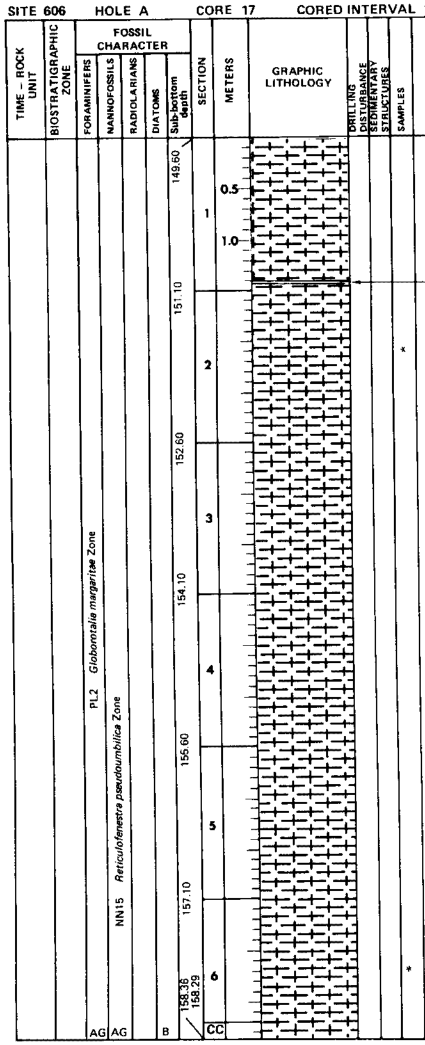
LITHOLOGIC DESCRIPTION

FORAMINIFORAL NANNOFOSSIL OOZE, white (N9) to pale gray (N8); 15 mm laminae rich in pyrite at Section 3, 127 cm; 5 mm pale green (5GY 7/1) laminae common between Section 3, 12–27 cm; pyritized worm burrow at Section 3, 126 cm; patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

	1, 30	3, 127	6, 40
	D	D	D
Composition:			
Quartz	TR	–	–
Pyrite	–	20	–
Foraminifers	10	30	20
Calc. nannofossils	90	50	80

SITE 606 HOLE A CORE 17 CORED INTERVAL 149.6–159.2 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); several 5 mm pale green (5GY 7/1) laminae scattered throughout Sections 5 and 6; stringers and patches rich in pyrite common throughout.

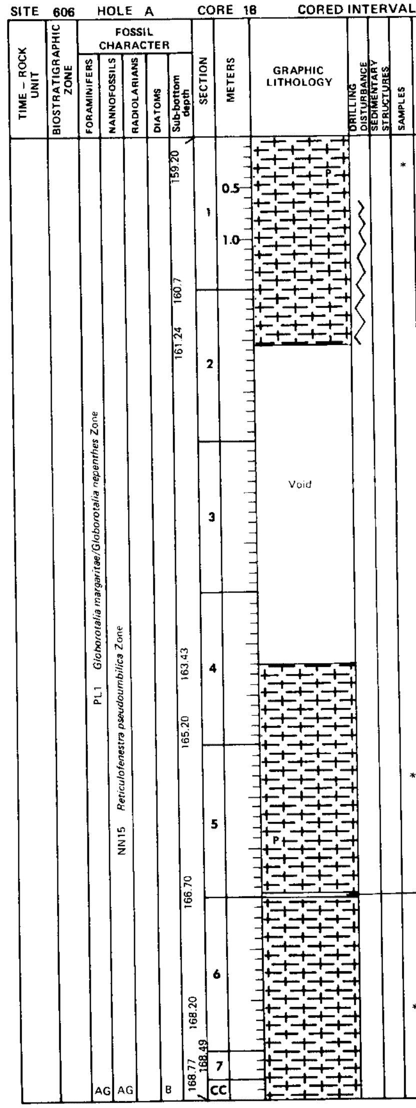
SMEAR SLIDE SUMMARY (%):

	2, 64	6, 66
	D	D
Composition:		
Feldspar	–	TR
Foraminifers	6	10
Calc. nannofossils	94	90

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61	4, 60–61
Organic carbon	–	–
Carbonate	97	94

SITE 606 HOLE A CORE 18 CORED INTERVAL 159.2–168.8 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); 5 mm pale green (5GY 7/1) laminae common between Section 5, 59–134 cm; patches and stringers rich in pyrite common throughout; core severely disturbed between Section 1, 53 cm to Section 2, 54 cm due to fragments of core liner. Portions of Sections 2 and 4 and all of Section 3 lost during extrusion of the core. Core heated during extrusion.

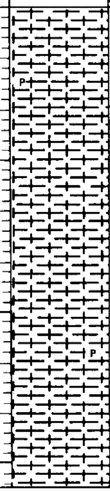
SMEAR SLIDE SUMMARY (%):

	1, 28	5, 31	6, 102
	D	D	D
Composition:			
Feldspar	TR	TR	–
Foraminifers	13	10	10
Calc. nannofossils	87	90	90

ORGANIC CARBON AND CARBONATE (%):

	5, 60–61
Organic carbon	–
Carbonate	93

SITE 606 HOLE A CORE 19 CORED INTERVAL 168.8–178.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL1 *Globorotalia margaritae/Globorotalia nepenthes* Zone; AG	NN15 *Reticulofenestra pseudoumbilica* Zone / NN14 *Discoaster asymmetricus* Zone; AM		B	168.80, 170.30, 171.80, 173.30, 173.53	1, 2, 3, CC	0.5, 1.0				N9	FORAMINIFERAL NANNOFOSSIL OOZE, white (N9); patches rich in pyrite scattered throughout.

SMEAR SLIDE SUMMARY (%):

	1, 46	3, 51
Composition:		
Foraminifers	10	12
Calc. nannofossils	90	88

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61
Organic carbon	–
Carbonate	96

SITE 607

HOLE 607

Date Occupied: July 6,1983 (2030 Hrs.)

Date Departed: July 9,1983 (0300 Hrs.)

Time on Hole: 2 days, 6.5 hours (2.3 days)

Position (latitude; longitude): 41°00.068'N, 32°57.438'W.

Water depth (sea level; corrected m, echo-sounding): 3426.8

Water depth (rig floor; corrected m, echo-sounding): 3436.8

Bottom felt (m, drill pipe): 3426.1

Penetration (m): 284.4

Number of cores: 30

Total length of cored section (m): 284.4

Total core recovered (m): 248.16

Core recovery (%): 87.3

Oldest sediment cored:

Depth sub-bottom (m): 284.4

Nature: Nanno Ooze (friable)

Age: 6.5 Ma (NN11)

Measured velocity (km/s): 1.57

Basement: Not Reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 607

HOLE 607A

Date Occupied: July 9,1983 (0315)

Date Departed: July 11,1983 (0458)

Time on Hole: 2 days, 1.75 hours (2.1 days)

Position (latitude; longitude): 41°00.068'N; 32°57.438'W

Water depth (sea level; corrected m, echo-sounding): 3426.8

Water depth (rig floor; corrected m, echo-sounding): 3436.8

Bottom felt (m, drill pipe): 3424.7

Penetration (m): 311.3

Number of cores: 26

Total length of cored section (m): 226.6

Total core recovered (m): 204.99

Core recovery (%): 90.5

Oldest sediment cored:

Depth sub-bottom (m): 311.3

Nature: Friable Nanno Ooze

Age: 7.1Ma (NN11)

Measured velocity (km/s): 1.57

Basement: Not Reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 607

A. PRINCIPAL RESULTS

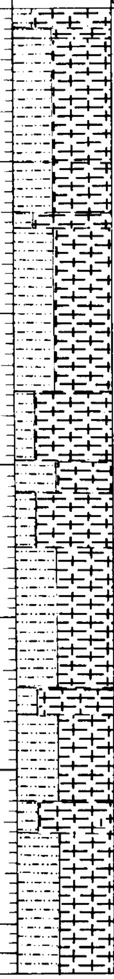
Site 607 consists of two holes located on the upper-middle western flank of the Mid-Atlantic Ridge at 41°00.0'N, 32°57.4'W. Hole 607 was cored with the HPC to a sub-bottom depth of 140.9m (3.2Ma) and then XCB-cored to total depth of 284.4m. (6.4Ma). Hole 607A was HPC-cored to a sub-bottom depth of 159m (3.6Ma), XCB-cored to 173.6m (3.9Ma), washed down to 258.3m (5.8Ma), and XCB-cored to a total depth of 311.3m (7.0Ma). Recovery averaged 87.3% at 607 and 90.5% at 607A. Contorted layering due to coring disturbances was only seen below 255m. Paleomagnetic and lithologic tie lines between holes indicate that the composite section is 100% complete to at least 116m. sub-bottom depth. All calcareous microfossil zones are well represented, with no hiatuses evident at the chosen density of sampling. The paleomagnetic stratigraphy is excellent through 4.75Ma. (early Pliocene) and then marginal to total depth. The upper 116m are interbedded Pleistocene and upper Pliocene foram nanno oozes and marls representing (the North Atlantic glacial marine cycles). Deeper sediments are lower Pliocene and upper Miocene foram nanno oozes and nanno oozes. Deposition rates averaged 44m/m.y. throughout. As at Site 606, these rates are consistent with an environment of dominantly pelagic deposition but subtle enhancement of sedimentation rates by continuous transportation and redeposition of mostly contemporaneous sediment by gentle current activity on the sea floor. Several "pelagic" turbidites, as well as ash-layers and diatom evidence, suggest that periods of more energetic sediment redistribution may have occurred sporadically.

SITE 607 HOLE CORE 1 CORED INTERVAL 0.0–9.6 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* Zone (AG)
Nannofossils: NN21 *Emiliania huxleyi* Zone (AG)
Radiolarians: CG
Diatoms: AG; CG; *Pseudoeunotia doliolus* Zone; AM; RM

Sub-bottom depth: 0.00, 1.50, 3.00, 4.50, 6.00, 7.50, 9.00, 9.18, 9.43
Sections: 1, 2, 3, 4, 5, 6, 7, CC
Meters: 0.5, 1.0



N6
5Y 6/1
N4

LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, top 18 cm of core is yellow/orange/gray (10YR 7/3); remainder of these layers are pale gray (N8) to white (N9) with local olive cast (5Y 6/1); common gray (N6–7) mottles

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly olive gray (5Y 7/1), gray (N7), and very pale olive (10Y 6/2); extensively mottled, local dark gray (N6) and olive (5Y 6/1) laminae, all contacts gradational

SMEAR SLIDE SUMMARY (%):

	1, 3	1, 25	1, 70	3, 49	5, 143
	D	D	D	D	D
Composition:					
Quartz	TR	TR	TR	–	–
Feldspar	–	TR	TR	TR	TR
Heavy minerals	–	TR	–	–	–
Micronodules	TR	TR	–	–	–
Carbonate unspec.	1	3	2	TR	1
Foraminifers	13	14	8	14	13
Calc. nannofossils	86	83	90	66	86
Diatoms	–	–	–	–	TR
Radiolarians	–	–	TR	TR	–
Sponge spicules	TR	TR	TR	TR	–
Silicoflagellates	–	–	TR	–	TR

ORGANIC CARBON AND CARBONATE (%):

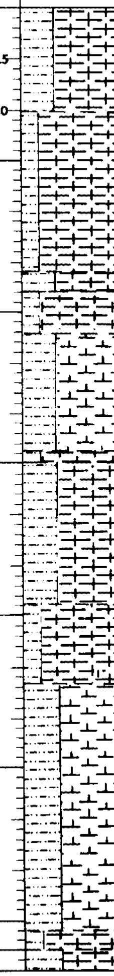
	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	71	82

SITE 607 HOLE CORE 2 CORED INTERVAL 9.6–19.2 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *Globorotalia truncatulinoides* zone (AG)
Nannofossils: NN21 *Emiliania huxleyi* Zone; NN20 *Gephyrocapsa oceanica* Zone; NN19 *Pseudoemiliania lacunosa* Zone (AG)
Radiolarians: CG
Diatoms: RM; *Pseudoeunotia doliolus* Zone; CG

Sub-bottom depth: 9.60, 11.10, 12.60, 13.10, 14.60, 16.10, 17.60, 17.86, 18.12
Sections: 1, 2, 3, 4, 5, 6, 7, CC
Meters: 0.5, 1.0



LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE and MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE

MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly pale olive/gray (5Y 7/1) with common gray (N5–N7) mottles and laminae, olive (5Y 6/1) mottling increasing towards base of each unit, green (5GY 7/1) laminations increase in abundance down unit; gradational tops and bases, typically bioturbated tops

NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8), local minor dark gray (N5–7) mottling and laminations; local minor pale green (5G 7/1) laminae

SMEAR SLIDE SUMMARY (%):

	1, 66	2, 56	3, 80	5, 57	6, 59
	D	D	D	D	D
Composition:					
Quartz	TR	TR	TR	1	TR
Heavy minerals	TR	–	–	–	TR
Glauconite	–	–	TR	–	–
Foraminifers	15	15	5	10	8
Calc. nannofossils	85	85	95	89	92
Diatoms	–	–	TR	–	TR
Radiolarians	TR	–	TR	–	TR
Sponge spicules	TR	–	–	–	–

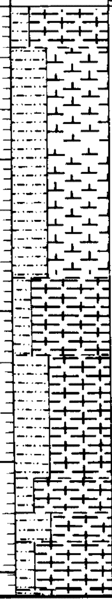
ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	88	77

SITE 607 HOLE CORE 3 CORED INTERVAL 19.2–25.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides* Zone, AG	NN19 *Pseudoemiliania lacunosa* Zone, AG	*Pseudeunotia doliolus* Zone, RM	AG, FM, FM, *Nitzschia reinholdii* Zone, FM	19.20, 20.70, 22.20, 23.70, 24.76, 25.01	1, 2, 3, 4, CC	0.5, 1.0

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

N7

LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale gray (N8) with minor pale green (5GY 8/1) and olive (5Y 7/1) rare dark gray (N4) burrow outlines

MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly olive gray (5Y 6/1 to 8/1), common dark gray (N4–6) laminations and mottles throughout, minor pale green (5GY 7/1) mottles and laminations; typically extensively burrowed with common subhorizontal laminae; all contacts gradational

SMEAR SLIDE SUMMARY (%):

	1, 75	2, 124	3, 124
	D	D	D
Composition:			
Quartz	1	–	–
Heavy minerals	TR	TR	TR
Foraminifers	5	10	15
Calc. nannofossils	95	90	85
Diatoms	TR	–	–
Radiolarians	TR	–	–
Sponge spicules	TR	–	–
Silicoflagellates	TR	–	–

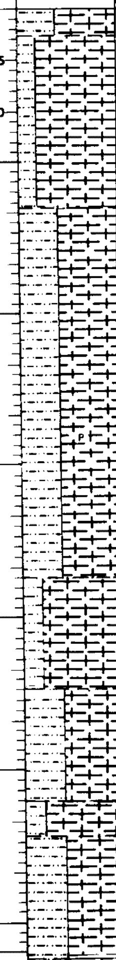
ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	69	NR

SITE 607 HOLE CORE 4 CORED INTERVAL

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides* Zone, AG	NN19 *Pseudoemiliania lacunosa* Zone, AG	FM	CM, *Nitzschia reinholdii* Zone, AG	25.20, 26.70, 28.20, 29.70, 31.20, 32.70, 34.45, 34.68	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale gray (N8), local olive (5Y 7/1) cast; minor dark gray (N4–6) and white (N9) mottling throughout

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly pale olive gray (5Y 6/1–7/1) to pale green (5GY 6/1), common dark gray (N4–6) and green (5GY 8/1) laminae and mottles; units typically well laminated; all contacts gradational

SMEAR SLIDE SUMMARY (%):

	2, 138	3, 27	5, 27	5, 98
	D	D	D	D
Composition:				
Quartz	2	1	1	TR
Heavy minerals	TR	TR	TR	TR
Carbonate unspec.	–	–	TR	–
Foraminifers	15	20	20	20
Calc. nannofossils	83	79	79	80
Diatoms	TR	TR	1	TR
Radiolarians	TR	TR	–	–
Sponge spicules	–	–	TR	–
Silicoflagellates	TR	TR	–	–

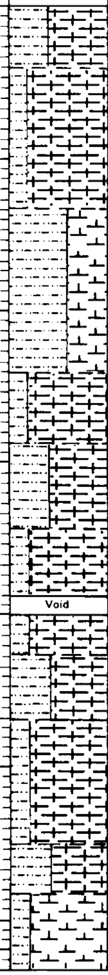
ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	68	62

SITE 607 HOLE CORE 5 CORED INTERVAL 34.8–44.4 m

Field	Entry
Foraminifers	N22 *Globorotalia truncatulinoides* Zone (AG)
Nannofossils	NN19 *Pseudoemiliania lacunosa* Zone (AG)
Radiolarians	FM (FM)
Diatoms	*Nitzschia reinholdii* Zone, AG (RM)
Sub-bottom depth	34.80, 36.30, 37.80, 39.30, 40.80, 42.30, 43.80, 44.30/44.04
Sections	1, 2, 3, 4, 5, 6, 7, CC
Meters	0.5, 1.0

GRAPHIC LITHOLOGY



LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL/NANNOFOSSIL OOZE

NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) with local pale olive (5Y 7/1) cast, minor dark gray (N4–7) mottling scattered throughout, local olive (5Y 7/2) mottles

MARLY FORAMINIFERAL NANNOFOSSIL/NANNOFOSSIL OOZE, varicolored; predominantly pale olive gray (5Y 7/1) and pale green gray (5GY 7/1); common dark–medium gray (N4–7) laminae and mottles, extensively burrowed, local minor green (5GY 7/1) mottling; all contacts gradational

SMEAR SLIDE SUMMARY (%):

	1, 116	2, 146	3, 36
	D	D	D
Composition:			
Quartz	TR	TR	–
Heavy minerals	–	TR	1
Clay	–	13	–
Carbonate unspec.	–	TR	–
Foraminifers	10	5	10
Calc.nannofossils	90	81	89

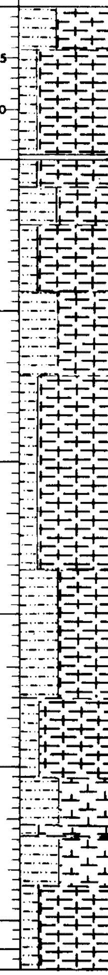
ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	45	NR

SITE 607 HOLE CORE 6 CORED INTERVAL 44.4–54.0 m

Field	Entry
Foraminifers	N22 *Globorotalia truncatulinoides* Zone (AG)
Nannofossils	NN19 *Pseudoemiliania lacunosa* Zone (AG)
Radiolarians	(B)
Diatoms	B, B, *Nitzschia reinholdii* Zone (RP)
Sub-bottom depth	44.40, 45.90, 47.40, 48.90, 50.40, 51.90, 53.40, 53.70
Sections	1, 2, 3, 4, 5, 6, 7, CC
Meters	0.5, 1.0

GRAPHIC LITHOLOGY



Colors noted: 5GY 7/1, Void (Section 1); 5GY 7/1, 5G 6/2, 5GY 7/1 (Section 4)

LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE and MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE

NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to very pale olive gray (5Y 7/1); local minor dark gray (N2–6) mottles and laminations; minor green (5GY 7/1) laminations

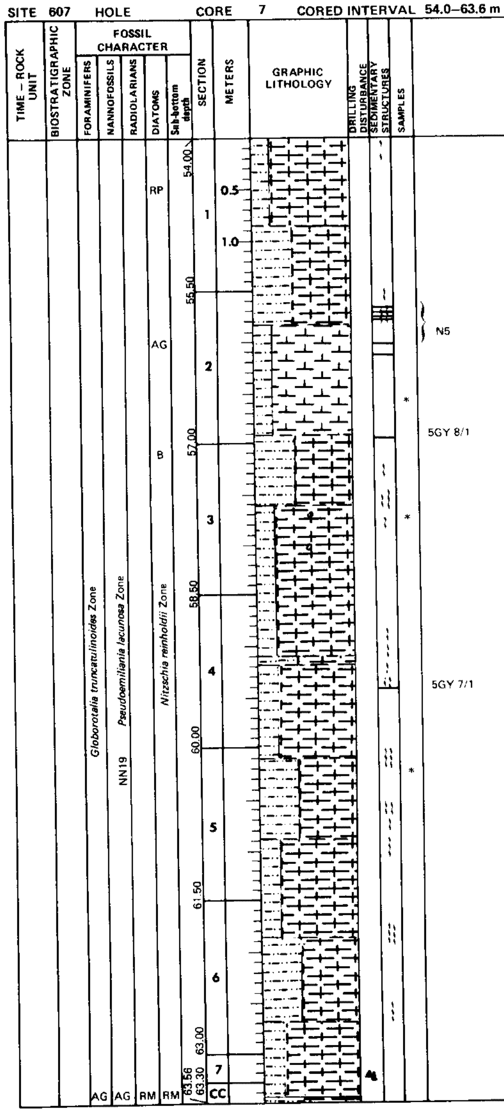
MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominant pale olive gray (5Y 6/1–7/1) with common green gray (5GY 6/1); common green (5GY 7/1–5G 6/2) laminae; local dark gray (N4) mottles and laminations; all contacts gradational

SMEAR SLIDE SUMMARY (%):

	2, 147	5, 64	6, 59
	D	D	D
Composition:			
Quartz	TR	–	TR
Pyrite	–	10	–
Foraminifers	10	10	5
Calc. nannofossils	90	80	95
Diatoms	–	–	TR
Radiolarians	–	–	TR
Silicoflagellates	–	–	TR

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	NR	88



LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale olive gray (5Y 7/1); common dark gray (N4–5) mottles and laminations; local minor green (5GY 7/1) laminations; small (1 cm) volcanic pebbles at Section 3, 69 and 98 cm

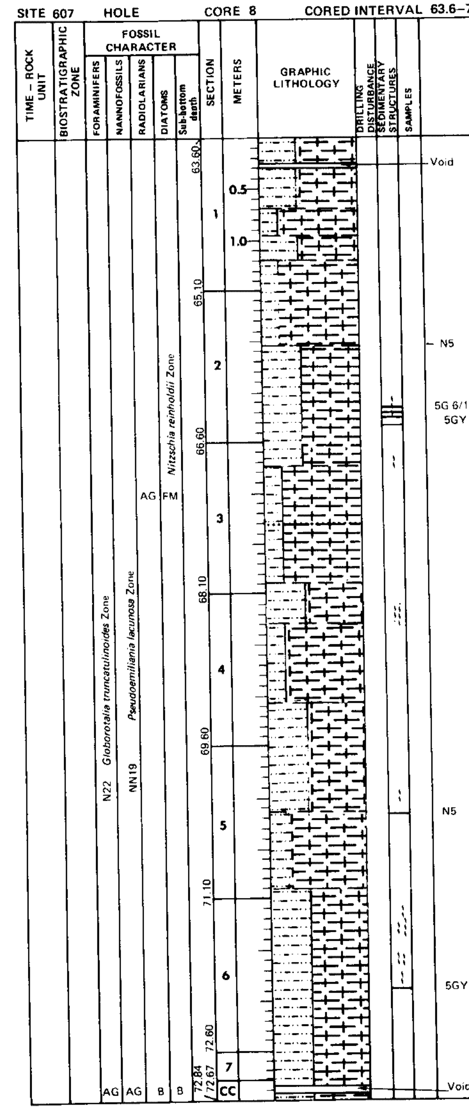
MARLY FORAMINIFER NANNOFOSSIL OOZE, varicolored; predominantly pale olive gray (5Y 6/1–7/1), with common dark gray (N5) laminations and mottles, common green (5G 6/2–5GY 8/1) laminations and mottles; typically well laminated; all contacts gradational

SMEAR SLIDE SUMMARY (%):

	2, 100	3, 72	5, 53
	D	D	D
Composition:			
Quartz	TR	TR	–
Feldspar	–	TR	–
Volcanic glass	TR	TR	TR
Foraminifers	5	15	10
Calc. nannofossils	95	85	90
Sponge spicules	–	TR	–
Silicoflagellates	–	TR	–

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	90	73



LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) with common pale olive gray (5Y 7/1) cast; common dark gray (N5) mottles and laminations

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly olive gray (5Y 6–7/1); common dark gray (N4–6) mottles and laminations, common green (5G 6/2–5GY 8/1) laminations; gradational tops and bases; extensively mottled

MINOR LITHOLOGY: Section 3, 79–80 cm NANNOFOSSIL FORAMINIFERAL SAND, dark gray (N5); lower contact sharp, upper contact gradational; pyrite-rich

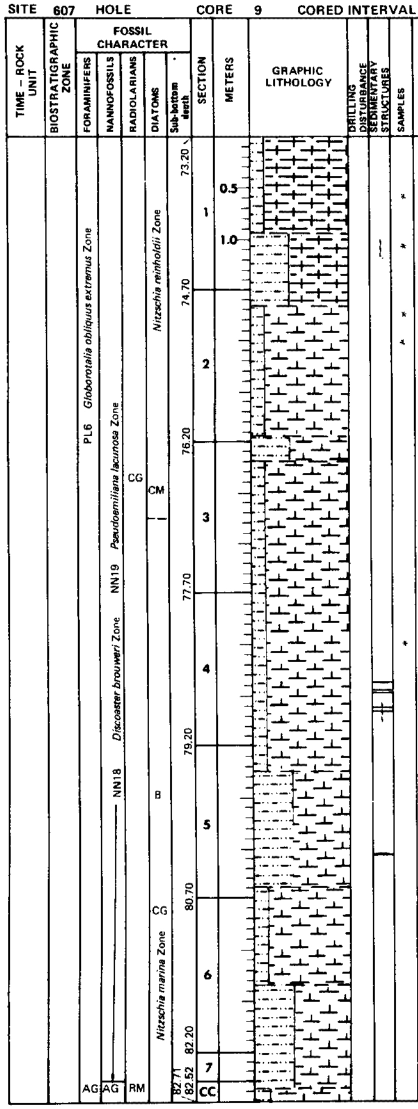
SMEAR SLIDE SUMMARY (%):

	1, 5	1, 142	3, 82	5, 100
	D	D	M	D
Composition:				
Quartz	–	–	–	TR
Feldspar	–	–	TR	–
Volcanic glass	TR	TR	TR	–
Carbonate unspec.	TR	–	–	–
Foraminifers	10	10	60	12
Calc. nannofossils	90	90	40	82
Sponge spicules	–	TR	–	TR

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	NR	87

SITE 607 HOLE CORE 9 CORED INTERVAL 73.2–82.8 m



LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE and MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE

NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8), common dark gray (N4–7) pyrite-rich mottles; local green (5G 7/2) laminations; pyritized burrow at Section 1, 105 cm

MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly olive gray (5Y 6–7/2), local gray (N4) laminations and mottles; extensively mottled; all contacts gradational

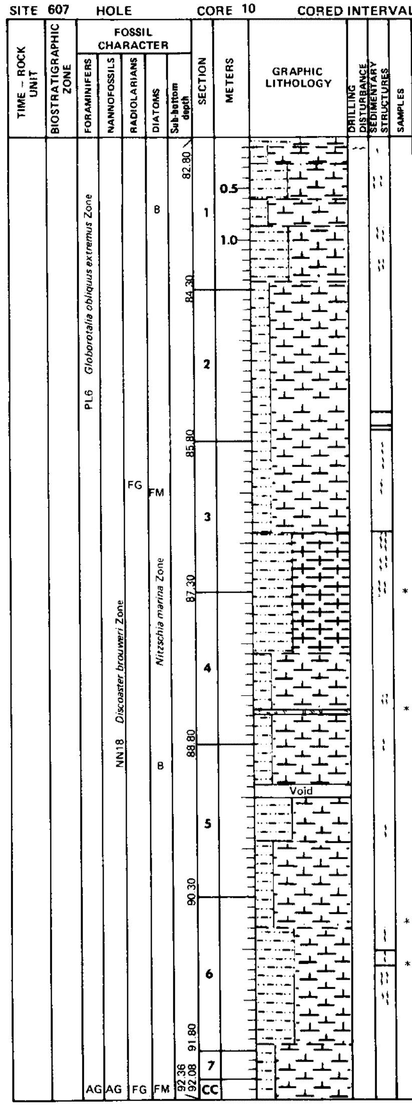
SMEAR SLIDE SUMMARY (%):

	1, 61	1, 106	2, 26	2, 67	4, 50
	D	D	D	D	D
Composition:					
Quartz	–	TR	–	TR	–
Feldspar	TR	TR	–	–	1
Heavy minerals	–	TR	–	–	–
Glauconite	–	TR	–	–	–
Pyrite	–	TR	–	–	–
Carbonate unspec.	–	–	3	2	1
Foraminifers	8	10	8	3	8
Calc. nannofossils	92	90	89	95	90
Diatoms	TR	–	–	–	–

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	81	90

SITE 607 HOLE CORE 10 CORED INTERVAL 82.8–92.4 m



LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8); common olive gray (5Y 6–7/1) and gray (N4–7) mottles; local green (5GY 7/1) and olive (5Y 6/1) laminae, gradational contacts

MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly pale olive gray (5Y 7–6/1) with minor gray (N4–7); extensively mottled, local green (5GY 7/1) laminae

MINOR LITHOLOGY: Section 4, 115–121 cm, dark gray green (5Y 5/1–4/1), bioturbated, gradational contacts

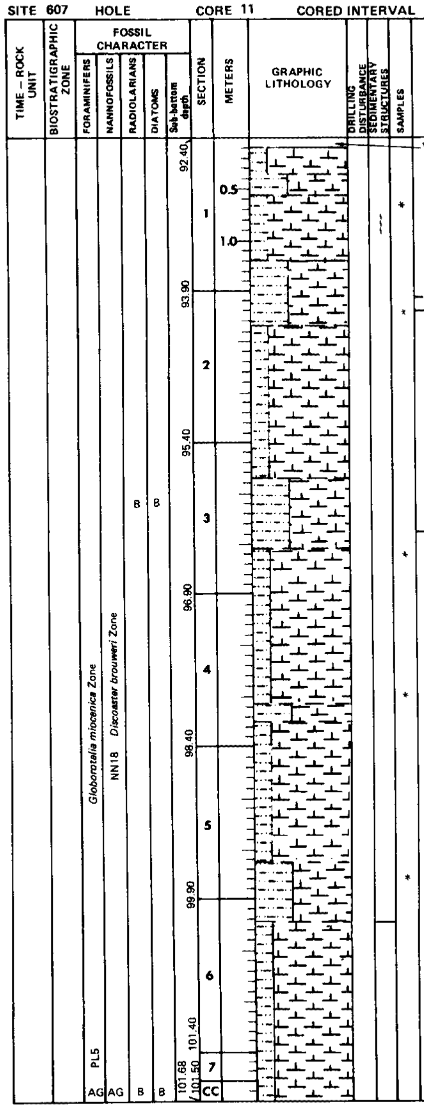
SMEAR SLIDE SUMMARY (%):

	4, 4	6, 26	6, 65	4, 119
	D	D	D	M
Composition:				
Feldspar	TR	TR	TR	8
Heavy minerals	–	TR	–	2
Volcanic glass	–	–	–	55
Foraminifers	10	8	5	3
Calc. nannofossils	90	92	95	32

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	NR	84

SITE 607 HOLE CORE 11 CORED INTERVAL 92.4–102.0 m



LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL OOZE and MARLY NANNOFOSSIL OOZE

NANNOFOSSIL OOZE, white (N9) to pale gray (N8), homogeneous, gradational contacts, local minor dark gray (N5) mottles

MARLY NANNOFOSSIL OOZE, medium gray (N7), extensively mottled with darker gray (N6), local green (5G 6–7/1) laminae, all contacts gradational; pyrite burrow cast at Section 3, 36 cm

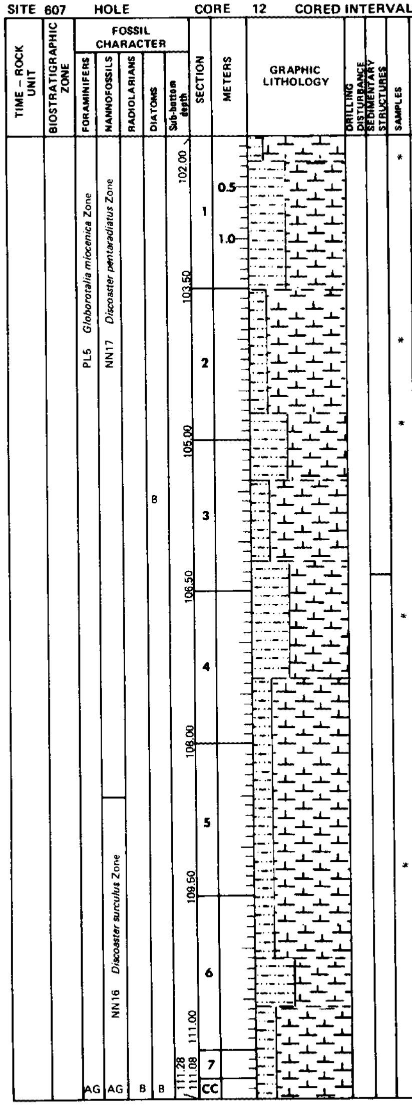
SMEAR SLIDE SUMMARY (%):

	1, 65	2, 19	3, 109	4, 95	5, 124
	D	D	D	D	D
Composition:					
Feldspar	–	TR	TR	–	TR
Pyrite	TR	–	–	–	–
Carbonate unspec.	TR	–	–	–	–
Foraminifers	6	8	8	8	9
Calc. nannofossils	94	92	92	92	91
Radiolarians	TR	TR	–	–	–

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	NR	85

SITE 607 HOLE CORE 12 CORED INTERVAL 102.0–111.6 m



LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL OOZE and MARLY NANNOFOSSIL OOZE

NANNOFOSSIL OOZE, pale gray (N8) with minor local pyrite-rich dark gray (N4) mottles

MARLY NANNOFOSSIL OOZE, medium gray (N7) to pale olive gray (5Y 7/1) and green (5G 7/1), local green (5G 7/1–5GY 7/1) and gray (N6–7) laminae, extensively mottled, gradational contacts

SMEAR SLIDE SUMMARY (%):

	1, 23	2, 43	2, 131	4, 24	5, 118
	D	D	D	D	D
Composition:					
Feldspar	TR	TR	–	TR	TR
Pyrite	–	–	2	TR	–
Carbonate unspec.	–	TR	1	TR	TR
Foraminifers	5	4	7	6	9
Calc. nannofossils	95	96	90	94	91

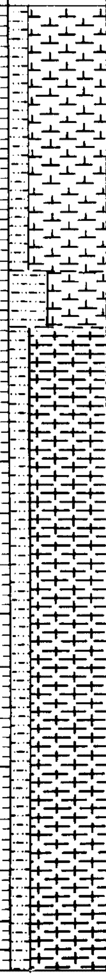
ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	89	75

SITE 607 HOLE CORE 13 CORED INTERVAL 111.6–121.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL5 *Globorotalia miocenica* Zone	NN16 *Discoaster surculus* Zone		B	111.60	1	0.5, 1.0
						113.10	2	
						114.60	3	
						116.10	4	
						117.60	5	
						119.10	6	
						120.60	7	
		AG	AG	B	B	120.83 / 121.07	CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE and MARLY NANNOFOSSIL OOZE, white (N8–5) to pale gray (N8), dark gray (N5–6) mottles scattered throughout unit

SMEAR SLIDE SUMMARY (%):

	1, 30	2, 100	3, 140	4, 114	5, 130
	D	D	D	D	D
Composition:					
Feldspar	TR	TR	TR	TR	TR
Pyrite	TR	TR	–	–	–
Foraminifers	6	9	12	10	11
Calc. nannofossils	94	91	88	90	89

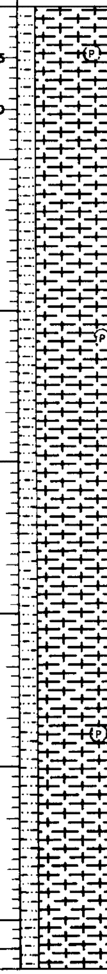
ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	86	88

SITE 607 HOLE CORE 14 CORED INTERVAL 121.2–130.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL4 *Globorotalia altispira* Zone	NN16 *Discoaster surculus* Zone		B	121.20	1	0.5, 1.0
						122.70	2	
						124.20	3	
						125.70	4	
						127.20	5	
						128.70	6	
						130.20	7	
		AG	AG	B	B	130.39 / 130.64	CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

– 5G 7/1

N6

5GY 7/1

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (predominantly N8 with minor N7), local minor pale green (5GY 7/1, 5G 7/1, and dark gray (N6); dark gray patches (rich in pyrite?) scattered throughout core

SMEAR SLIDE SUMMARY (%):

	1, 60	2, 122	3, 140	4, 28	7, 10
	D	D	D	D	D
Composition:					
Feldspar	TR	TR	1	TR	TR
Foraminifers	11	10	13	12	12
Calc. nannofossils	89	90	87	88	88

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	NR	82

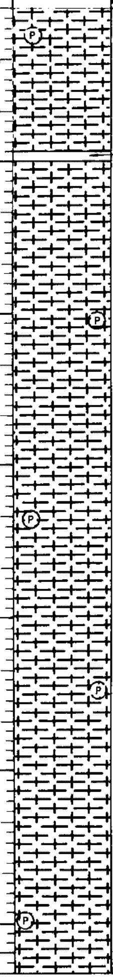
SITE 607 HOLE CORE 15 CORED INTERVAL 130.8–140.4 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL3 *Globorotalia seminulina* Zone; AG
Nannofossils: NN16 *Discoaster surculus* Zone; AG
Radiolarians: B
Diatoms: B; RP

Sub-bottom depth: 130.80, 132.30, 133.80, 135.30, 136.80, 138.30, 139.80, 140.30, 140.14

Sections: 1, 2, 3, 4, 5, 6, 7, CC
Meters: 0.5, 1.0



Color notes: 5G 7/1; Void; 5G 7/1; 5GY 7/1; 5GY 7/1; All 5GY 8/1

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8), faint green (5GY 8/1–5G 7/1) laminations and dark gray (N6–7) pyritic(?) patches scattered through unit.

SMEAR SLIDE SUMMARY (%):

	2, 80	4, 111
	D	D
Composition:		
Feldspar	TR	–
Pyrite	–	TR
Carbonate unspec.	TR	TR
Foraminifers	13	13
Calc. nannofossils	87	87

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	NR	89

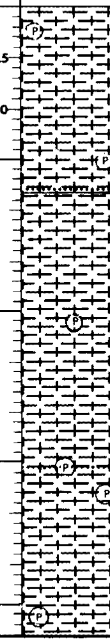
SITE 607 HOLE CORE 16 CORED INTERVAL 140.4–150.0 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL3 *Globorotalia seminulina* Zone; AG
Nannofossils: NN16 *Discoaster surculus* Zone; AG
Radiolarians: B
Diatoms: B

Sub-bottom depth: 140.40, 141.90, 143.40, 149.90, 146.56, 146.29

Sections: 1, 2, 3, 4, CC
Meters: 0.5, 1.0



Color notes: 5G 7/1; 5BG 7/2; 5G 8/1

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8); green laminae (5G 7/1, 5GY 8/1, 5BG 7/2) and dark gray (N6–7) pyritic(?) patches scattered through unit; Section 4, 2 cm thin layer of pyritic sand, pyritic burrow cast Section 3, 13.5 cm.

MINOR LITHOLOGY: NANNOFOSSIL FORAMINIFERAL SAND, pale gray (N7) with dark gray pyrite-rich base.

SMEAR SLIDE SUMMARY (%):

	1, 50	2, 30
	D	M
Composition:		
Feldspar	TR	TR
Foraminifers	10	68
Calc. nannofossils	90	32

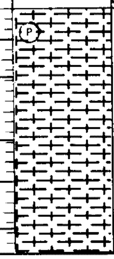
ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	NR	94

SITE 607 HOLE CORE 17 CORED INTERVAL 150.0–159.6 m

Section	Sub-bottom depth	Foraminifers	Nannofossils	Radiolarians	Diatoms
1	150.00	PL3 *Globorotalia seminulina* Zone	NN16 *Discoaster surculus* Zone		B
2	150.28				
3	150.64				
4	151.24				
5	151.68				
CC	152.25 / 152.48	AG	AG	B	B

GRAPHIC LITHOLOGY



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8); entire core probably disturbed due to shattered liner.

SMEAR SLIDE SUMMARY (%):

	3, 21
	D
Composition:	
Feldspar	TR
Foraminifers	11
Calc. nannofossils	89

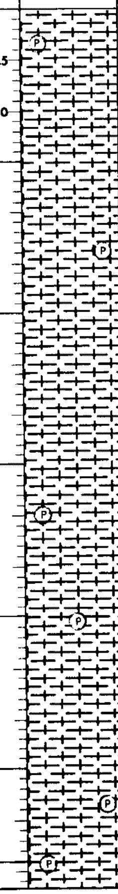
ORGANIC CARBON AND CARBONATE (%):

	3, 53–54
Organic carbon	–
Carbonate	91

SITE 607 HOLE CORE 18 CORED INTERVAL 159.6–169.2 m

Section	Sub-bottom depth	Foraminifers	Nannofossils	Radiolarians	Diatoms
1	159.60	PL2 *Globorotalia margaritae* Zone	NN16 *Discoaster surculus* Zone		B
2	161.40		NN15 *Reticulofenestra pseudoumbilica* Zone		
3	162.90				
4	164.40				
5	165.90				
6	167.40				
CC	168.30 / 168.54	AG	AG	B	B

GRAPHIC LITHOLOGY



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8); minor dark-medium gray (N6–7) patches (pyritic?) scattered throughout unit; pyritized burrow at Section 5, 7 cm.

SMEAR SLIDE SUMMARY (%):

	1, 30	4, 115
	D	D
Composition:		
Feldspar	TR	TR
Pyrite	TR	–
Foraminifers	13	11
Calc. nannofossils	87	89

ORGANIC CARBON AND CARBONATE (%):

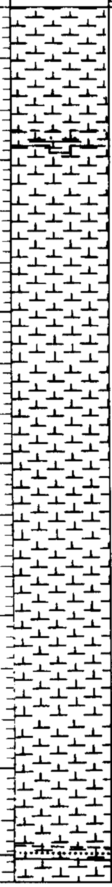
	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	86	89

SITE 607 HOLE CORE 19 CORED INTERVAL 169.2–178.8 m

Fossil character	
Foraminifers	PL2 *Globorotalia margaritae* Zone; AG
Nannofossils	NN15 *Reticulofenestra pseudoumbilica* Zone; AG
Radiolarians	B
Diatoms	B

Section	Sub-bottom depth (m)
1	169.20
2	170.70
3	172.20
4	173.70
5	175.20
6	176.70
CC	177.55–177.79

GRAPHIC LITHOLOGY



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N8.5–9), minor dark gray (N5–6) mottling scattered throughout unit; upper 60 cm of Section 1 soupy.

MINOR LITHOLOGY: Section 1, 120–134 cm and Section 6, 75–85 cm NANNOFOSSIL FORAMINIFERAL SAND, white (N9) to dark gray (N2) at pyritic bases; bases sharp, tops gradational; unit in Section 1 is normally graded (turbidite?) – unit in Section 6 is not graded; base of unit in Section 1 contains a load cast (probably drilling induced).

SMEAR SLIDE SUMMARY (%):

	1, 120	1, 131	2, 93	6, 73	6, 82
	M	M	D	D	M
Composition:					
Carbonate unspec.	–	TR	–	–	–
Foraminifers	60	65	2	2	70
Calc. nannofossils	40	35	98	98	30

ORGANIC CARBON AND CARBONATE (%):

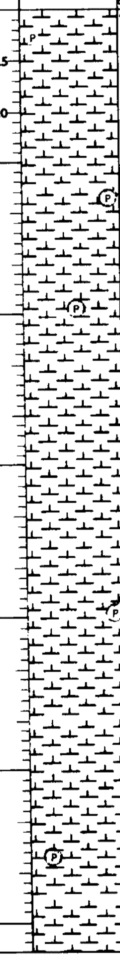
	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	90	91

SITE 607 HOLE CORE 20 CORED INTERVAL 178.8–188.4 m

Fossil character	
Foraminifers	PL2 *Globorotalia margaritae* Zone; AG
Nannofossils	NN15 *Reticulofenestra pseudoumbilica* Zone; AG
Radiolarians	B
Diatoms	B

Section	Sub-bottom depth (m)
1	188.40
2	179.90
3	181.40
4	182.90
5	184.40
6	185.90
CC	187.40–187.64

GRAPHIC LITHOLOGY



5GY 7/1
5GY 7/1
2.5Y 7/2
5GY 7/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N9), minor dark gray (N4–N6) mottling scattered throughout unit; olive mottling (2.5Y 7/2) present in Sections 5 and 6; green (5GY 7/1) laminations in Sections 5–6.

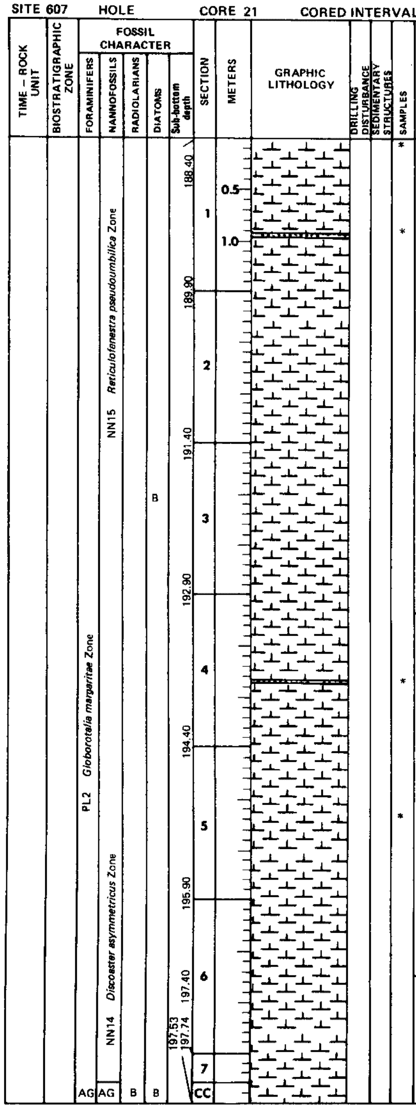
SMEAR SLIDE SUMMARY (%):

	4, 58	5, 75
	D	D
Composition:		
Glauconite	1	–
Foraminifers	5	5
Calc. nannofossils	94	95

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	92	92

SITE 607 HOLE CORE 21 CORED INTERVAL 188.4–198.0 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N9), dark gray (N4–6) mottling and green (5GY 7/2) scattered throughout unit, 3 cm pyritic burrow(?) at Section 5, 74 cm.

MINOR LITHOLOGY: Section 1, 93–94 cm and Section 4, 82 cm NANNOFOSSIL FORAMINIFERAL SAND, white (N9), sharp upper and lower contacts.

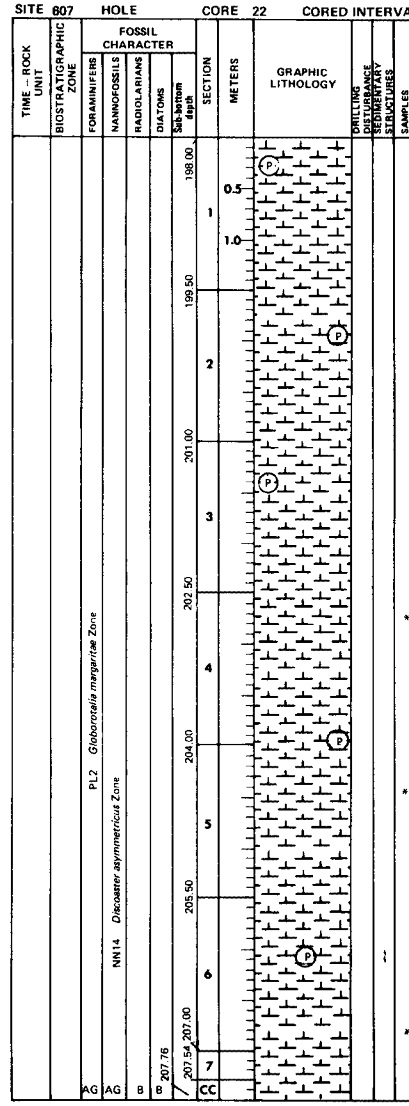
SMEAR SLIDE SUMMARY (%):

	1, 7	1, 93	4, 82	5, 65
	D	M	M	D
Composition:				
Quartz	TR	TR	–	–
Feldspar	–	TR	–	TR
Foraminifers	10	70	60	8
Calc. nannofossils	90	30	40	92

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	94	95

SITE 607 HOLE CORE 22 CORED INTERVAL 198.0–207.6 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N9), dark gray (N5) mottling common throughout unit, olive (2.5Y 7/2) mottling and green (5G 7/1) laminae in Section 4, pyrite burrow cast at Section 6, 55 cm.

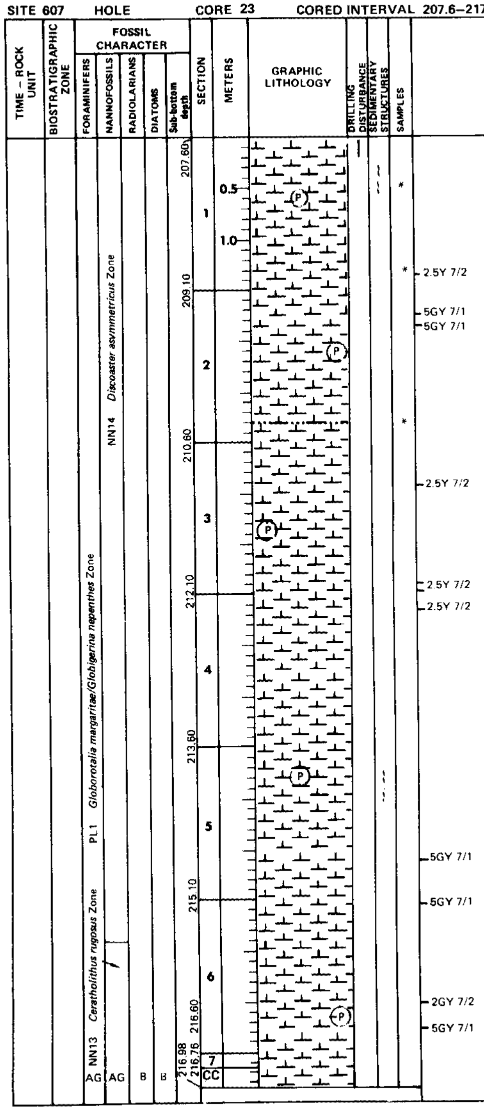
SMEAR SLIDE SUMMARY (%):

	4, 16	5, 38	6, 80
	D	D	D
Composition:			
Quartz	TR	–	–
Volcanic glass	TR?	–	–
Foraminifers	5	8	5
Calc. nannofossils	95	92	95

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	NR	92

SITE 607 HOLE CORE 23 CORED INTERVAL 207.6–217.2 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N9) to very pale gray (N8), dark gray (N4–N6) mottling (pyrite?) of varying intensity scattered throughout unit, olive (2–2.5Y 7/2) mottling present in Sections 1, 3, 4, and 6; green (5GY 7/1) laminations (5–10 mm) scattered through Sections 2 and 6.

MINOR LITHOLOGY: Section 2, 129 cm pyritic NANNOFOSSIL-FORAMINIFERAL SAND, dark gray (N4), 5 mm thick.

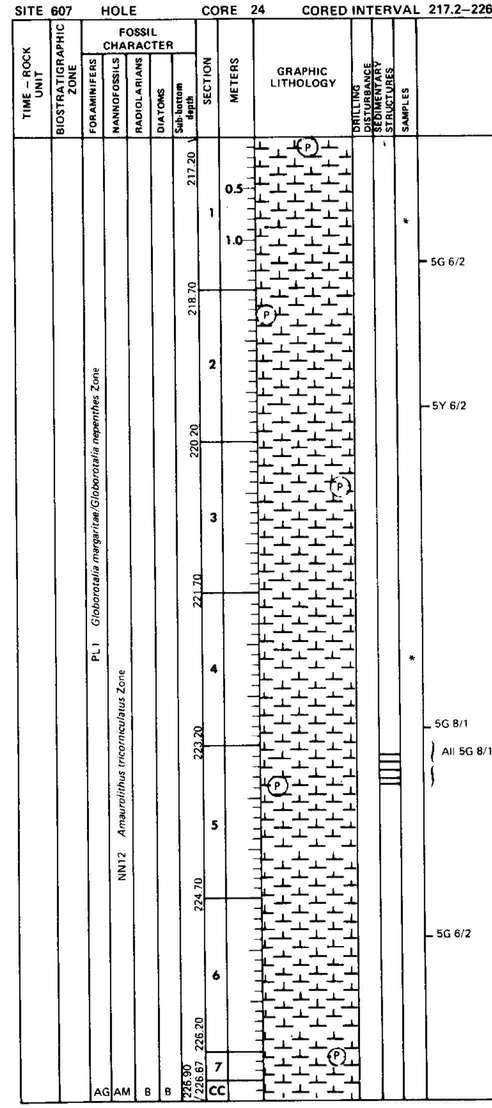
SMEAR SLIDE SUMMARY (%):

	1, 40	1, 120	2, 129
	D	D	M
Composition:			
Feldspar	TR	–	–
Pyrite	–	–	5
Foraminifers	8	2	70
Calc. nannofossils	92	98	25
Radiolarians	–	–	TR

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66	4, 65–66
Organic carbon	–	–
Carbonate	94	NR

SITE 607 HOLE CORE 24 CORED INTERVAL 217.2–226.8 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N9) to very pale gray (N8.5), dark gray mottling (N4–6) of varying intensity scattered throughout core (pyrite?). Olive (5Y 6/2) mottling at Section 2, 112 cm, pale green (5G 6/2–5G 8/1) (5–10 mm) laminations in Sections 1, 4, 5, and 6; indurated 2 cm-thick chalk(?) layers beginning at Section 3, 106 cm and increasing in abundance down section (drill biscuits?).

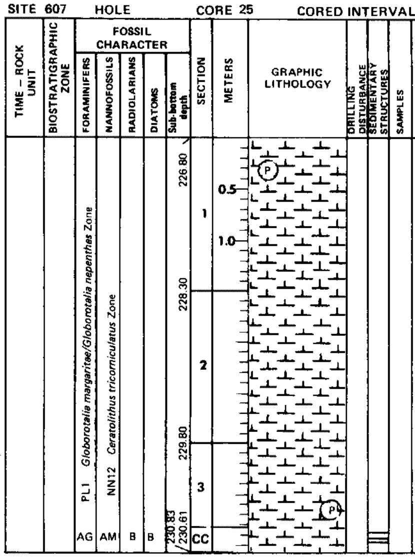
SMEAR SLIDE SUMMARY (%):

	1, 75	4, 65
	D	D
Foraminifers	5	5
Calc. nannofossils	95	95
Silicoflagellates	–	TR

ORGANIC CARBON AND CARBONATE (%):

	4, 65–66
Organic carbon	–
Carbonate	95

SITE 607 HOLE CORE 25 CORED INTERVAL 226.8–236.4 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N9) to very pale gray (N8.5), dark gray (N4–N6) mottling (pyrite?) common throughout core, dark gray (N6) laminae common in Core Catcher. Indurated 1–2 cm chalk layers (drill biscuits?) scattered throughout core; especially common at Section 2, 29–77 cm.

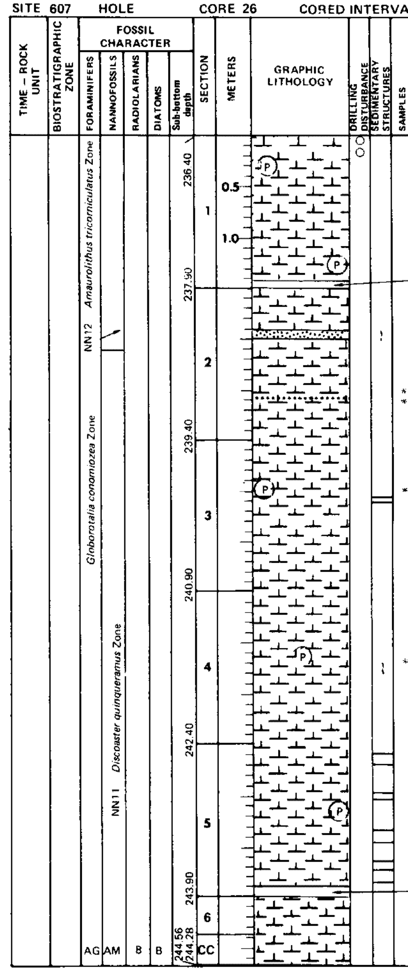
SMEAR SLIDE SUMMARY (%):

	2, 65
	D
Composition:	
Heavy minerals	TR
Foraminifers	3
Calc. nannofossils	97

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66
Organic carbon	—
Carbonate	90

SITE 607 HOLE CORE 26 CORED INTERVAL 236.4–246.0 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N9), minor dark gray (N4–N7) patches (pyrite?) scattered throughout core, pale green (5GY 8/1) laminations common in Sections 3, 4, and 5, pyritized burrow casts; Section 2, 55 cm and Section 4, 67 cm.

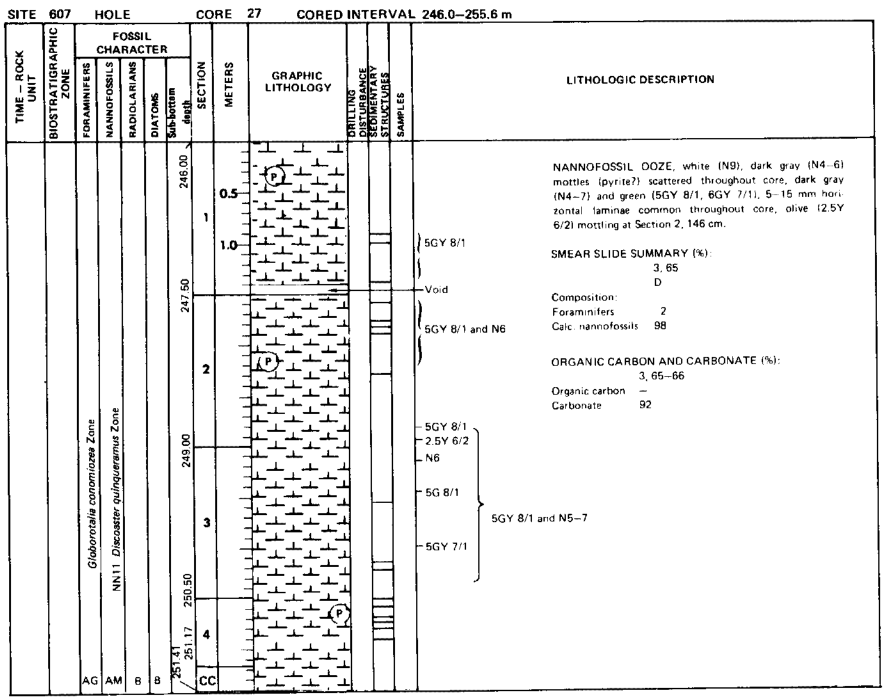
MINOR LITHOLOGY: Section 2, 52–58, 106–107 cm NANNOFOSSIL FORAMINIFERAL SAND, pale gray (N8), sharp contacts.

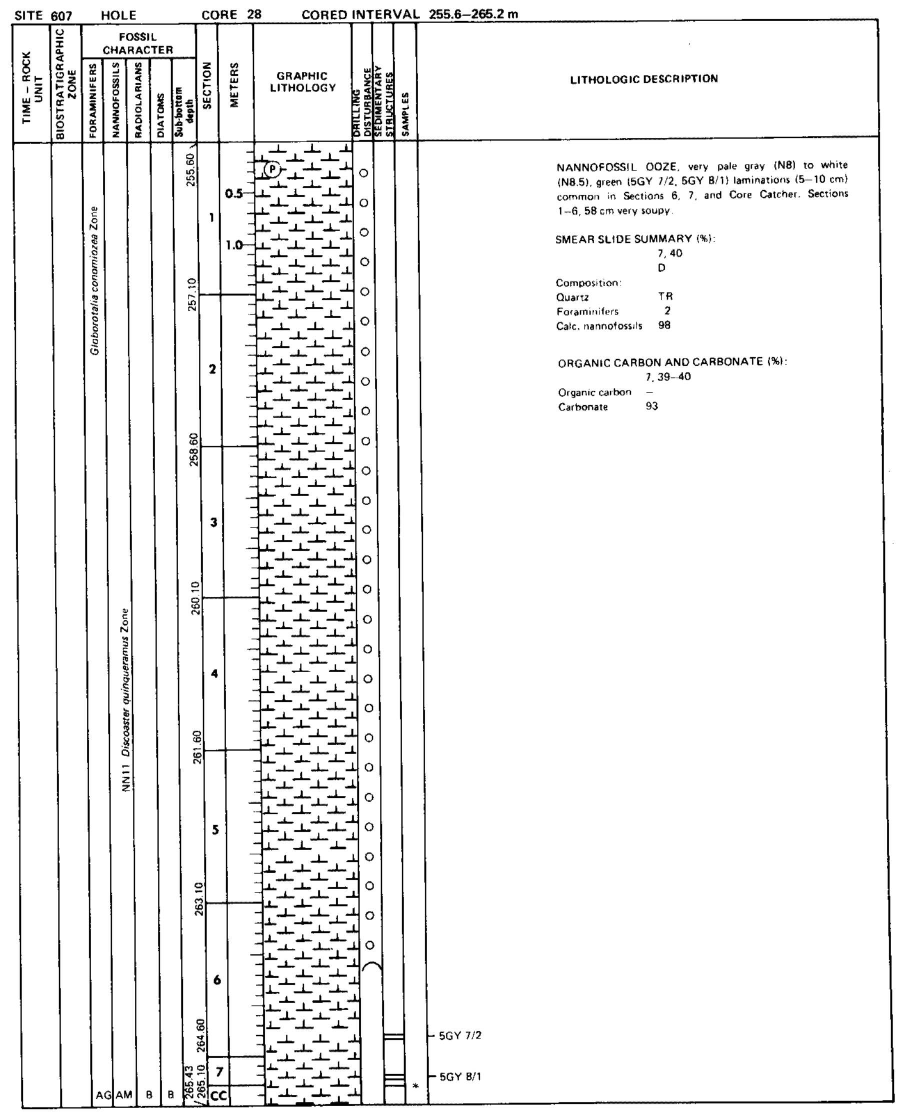
SMEAR SLIDE SUMMARY (%):

	2, 107	2, 109	3, 44	4, 65
	D	D	D	D
Composition:				
Quartz	—	—	TR	—
Feldspar	TR	TR	—	—
Volcanic glass	—	—	TR	TR
Foraminifers	30	10	7	3
Calc. nannofossils	70	90	93	97
Silicoflagellates	—	—	—	TR

ORGANIC CARBON AND CARBONATE (%):

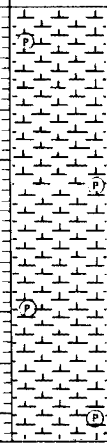
	4, 65–66
Organic carbon	—
Carbonate	89


SITE 607 HOLE CORE 27 CORED INTERVAL 246.0–255.6 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
Globorotalia conomiozea Zone
NN11 Discoaster quinqueramus Zone
AG AM B B
246.00
247.50
249.00
250.50
251.17
251.41
1
2
3
4
CC
0.5
1.0
5GY 8/1
Void
5GY 8/1 and N6
5GY 8/1
2.5Y 6/2
N6
5G 8/1
5GY 7/1
5GY 8/1 and N5–7
NANNOFOSSIL OOZE, white (N9), dark gray (N4–6) mottles (pyrite?) scattered throughout core, dark gray (N4–7) and green (5GY 8/1, 6GY 7/1), 5–15 mm horizontal laminae common throughout core, olive (2.5Y 6/2) mottling at Section 2, 146 cm.
SMEAR SLIDE SUMMARY (%):
3, 65
D
Composition:
Foraminifers 2
Calc. nannofossils 98
ORGANIC CARBON AND CARBONATE (%):
3, 65–66
Organic carbon –
Carbonate 92


SITE 607 HOLE CORE 28 CORED INTERVAL 255.6–265.2 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
Globorotalia conomiozea Zone
NN11 Discoaster quinqueramus Zone
AG AM B B
255.60
257.10
258.60
260.10
261.60
263.10
264.60
265.10
265.43
1
2
3
4
5
6
7
CC
0.5
1.0
5GY 7/2
5GY 8/1
NANNOFOSSIL OOZE, very pale gray (N8) to white (N8.5), green (5GY 7/2, 5GY 8/1) laminations (5–10 cm) common in Sections 6, 7, and Core Catcher. Sections 1–6, 58 cm very soupy.
SMEAR SLIDE SUMMARY (%):
7, 40
D
Composition:
Quartz TR
Foraminifers 2
Calc. nannofossils 98
ORGANIC CARBON AND CARBONATE (%):
7, 39–40
Organic carbon –
Carbonate 93

SITE 607 HOLE CORE 29 CORED INTERVAL 265.2–274.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		Globorotalia conomiozea Zone	NN11 *Discoaster quinqueramus* Zone			265.20, 266.70, 268.20, 269.18, 269.44	1, 2, 3, CC	0.5, 1.0				* , *	5GY 8/1; 5Y 7/3
		AG	AM	B	B								



FORAMINIFERAL NANNOFOSSIL OOZE, very pale gray (N8), faint green (5GY 8/1?), 5–10 mm laminae common in Section 1. Dark gray (N4–N6?) patches (pyrite?) common throughout core. Olive (5Y 7/3) lamination at Section 2, 79 cm.

SMEAR SLIDE SUMMARY (%):

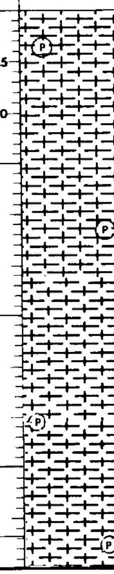
	1, 70	3, 89
	D	D
Composition:		
Feldspar	TR	TR
Foraminifers	91	10
Calc. nannofossils	91	90

ORGANIC CARBON AND CARBONATE (%):

	1, 70–71
Organic carbon	–
Carbonate	93

SITE 607 HOLE CORE 30 CORED INTERVAL 274.8–284.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		Globorotalia conomiozea Zone	NN11 *Discoaster quinqueramus* Zone			274.80, 276.30, 277.80, 279.30, 279.88, 280.15	1, 2, 3, 4, CC	0.5, 1.0				* , *	5GY 7/2
		AG	AM	B	B								



FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8), dark gray (N5) pyrite(?) patches common throughout core. Green laminae (5GY 7/2) (5 mm) at Section 3, 87–92 cm.

SMEAR SLIDE SUMMARY (%):

	1, 58	3, 89
	D	D
Composition:		
Feldspar	TR	TR
Pyrite	–	TR
Foraminifers	11	10
Calc. nannofossils	89	90

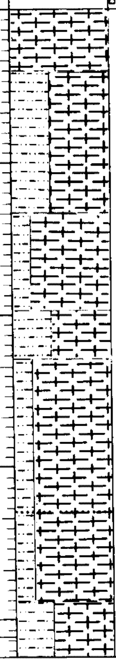
ORGANIC CARBON AND CARBONATE (%):

	3, 73–74
Organic carbon	–
Carbonate	93

SITE 607 HOLE A CORE 1 CORED INTERVAL 0.0–6.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides* Zone	NN21 *Emiliania huxleyi* Zone		*Pseudoeunotia doliolus* Zone	0.00, 1.50, 3.00, 4.50, 6.00, 6.13, 6.34	1, 2, 3, 4, 5, CC	0.5, 1.0
		AG	AG	CG	CG			

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, upper 60 cm yellow-tan gray (10YR 7/3–10YR 8/2), remainder pale gray (N7–8) with common dark gray (N5) mottling throughout. Section 2 contains several open burrows.

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly light olive gray (5Y 6/1) and medium gray (N7) with varying amounts of pale bluish gray (5BG 7/2) laminae; common dark gray (N4–6) mottling throughout.

SMEAR SLIDE SUMMARY (%)

	1, 59	1, 124	3, 90	4, 140
	D	D	D	D
Composition:				
Feldspar	1	1	1	TR
Heavy minerals	–	TR	–	–
Clay	TR	–	–	–
Pyrite	TR	–	TR	TR
Carbonate unspec.	3	2	1	1
Foraminifers	14	15	19	13
Calc. nannofossils	82	82	79	86
Diatoms	–	TR	–	–
Radiolarians	–	–	–	TR
Sponge spicules	TR	TR	TR	TR
Silicoflagellates	–	TR	–	TR

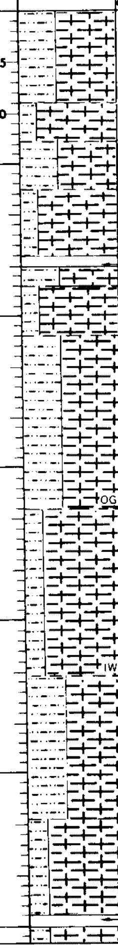
ORGANIC CARBON AND CARBONATE (%):

	1, 14–15
Organic carbon	–
Carbonate	79

SITE 607 HOLE A CORE 2 CORED INTERVAL 6.4–16.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides* Zone	NN20 *Gephyrocapsa oceanica* Zone		*Pseudoeunotia doliolus* Zone	6.40, 7.90, 9.40, 10.90, 12.40, 13.90, 15.40, 15.57	1, 2, 3, 4, 5, 6, CC	0.5, 1.0
		AG	AG	CG	FM			

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Void

5GY 7/1

5G 6/2

5YR 6/1

Void

LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8) with minor medium gray (N7) and pale tan gray (5YR 6/1–8/1), dark gray (N4–6) mottling common.

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly olive (5Y 6/1–8/1), gray (N5–7), common (5YR 6/1–8/1), common dark gray (N4–6) mottling.

SMEAR SLIDE SUMMARY (%)

	1, 54	3, 141	5, 122	6, 106
	D	D	D	D
Composition:				
Feldspar	TR	TR	TR	TR
Pyrite	TR	–	TR	–
Carbonate unspec.	TR	1	TR	1
Foraminifers	12	11	9	7
Calc. nannofossils	88	88	91	92
Diatoms	–	TR	TR	–
Radiolarians	–	TR	–	TR
Sponge spicules	TR	TR	TR	TR
Silicoflagellates	TR	–	–	–

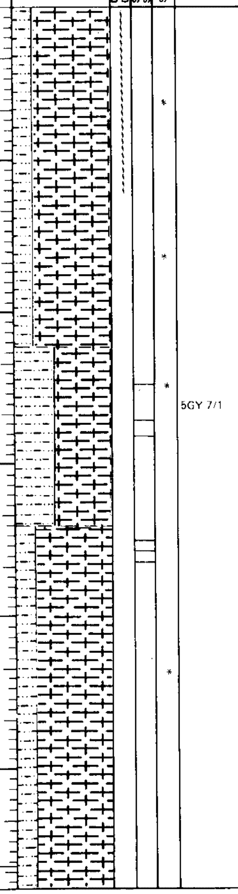
ORGANIC CARBON AND CARBONATE (%):

	1, 100–101
Organic carbon	–
Carbonate	76

SITE 607 HOLE A CORE 3 CORED INTERVAL 16.0–22.5 m (+ 1.9 m wash in = 8.68)

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
	N22 *Globorotalia truncatulinoides* Zone; NN19 *Pseudoemiliania lacunosa* Zone; *Nitzschia reinholdii* Zone	AG	AG	FG	FM	16.00, 17.50, 19.00, 20.50, 22.00, 23.60, 24.45, 24.65	1, 2, 3, 4, 5, 6, CC	0.5, 1.0

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES



LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8) with minor medium gray (N7) and pale green gray (5GY 8/1), common dark gray (N4–7) mottling throughout; minor dark gray (N5) and green (5GY 8/1) laminae.

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly olive gray/green (5GY 7/1) with common green (5GY 7/1) laminae.

SMEAR SLIDE SUMMARY (%)

	1, 90	2, 91	3, 71	5, 52
	D	D	D	D
Composition:				
Quartz	–	1	–	TR
Pyrite	–	–	TR	–
Carbonate unspec.	1	TR	1	–
Foraminifers	13	14	10	11
Calc. nannofossils	84	85	89	89
Diatoms	–	–	TR	–
Radiolarians	–	–	TR	–
Sponge spicules	–	–	TR	–

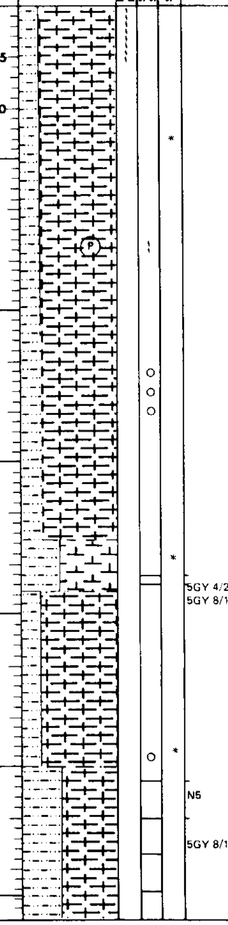
ORGANIC CARBON AND CARBONATE (%):

	3, 100–102
Organic carbon	–
Carbonate	53

SITE 607 HOLE A CORE 4 CORED INTERVAL 22.50–30.50 m (+ 0.69 m wash in = 31.49)

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
	N22 *Globorotalia truncatulinoides* Zone; NN19 *Pseudoemiliania lacunosa* Zone; *Nitzschia reinholdii* Zone	AG	AG	CG	AM	22.50, 24.00, 25.50, 27.00, 28.50, 30.00, 31.29, 31.49	1, 2, 3, 4, 5, 6, CC	0.5, 1.0

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES



LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8) with minor medium gray (N7), common dark gray burrow mottling, pyrite-filled burrow at Section 2, 83 cm; glacial dropstones (≲1 cm) at Section 3, 60–109 cm and Section 5, 142 cm.

MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly olive gray (5Y 6/1) to green gray (5GY 6/1) with dark gray (N5); common green laminae (5G 4/1–5GY 8/1) all contacts except Section 4, 125 cm gradational.

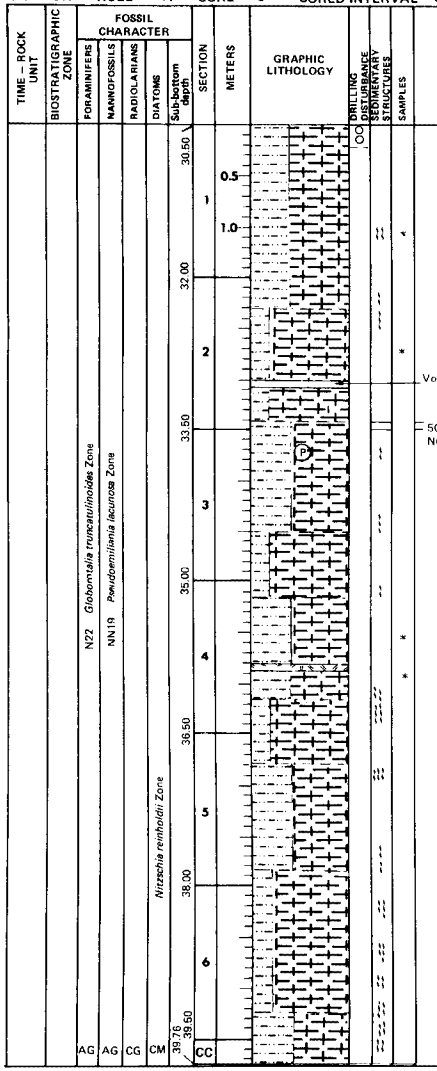
SMEAR SLIDE SUMMARY (%)

	1, 130	4, 89	5, 133
	D	D	D
Composition:			
Feldspar	TR	TR	TR
Pyrite	–	TR	–
Carbonate unspec.	TR	8	2
Foraminifers	10	10	12
Calc. nannofossils	90	82	86
Sponge spicules	–	–	TR

ORGANIC CARBON AND CARBONATE (%):

	2, 70–72	6, 50–51
Organic carbon	–	–
Carbonate	80	50

SITE 607 HOLE A CORE 5 CORED INTERVAL 30.5–40.1 m



LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to light gray (N8–5Y 7/1), common dark gray (N4–6) burrow mottles and laminae, common green (5GY 7/1–5G 6/2) mottling and laminae.

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly gray to greenish gray (5Y 6/1–5GY 6/1) with common dark gray (N4–5) laminae and mottles; extensively bioturbated; all contacts gradational.

MINOR LITHOLOGY: Section 4, 82–84 cm: VOLCANIC ASH, dark gray (N6), sharp upper and lower contacts.

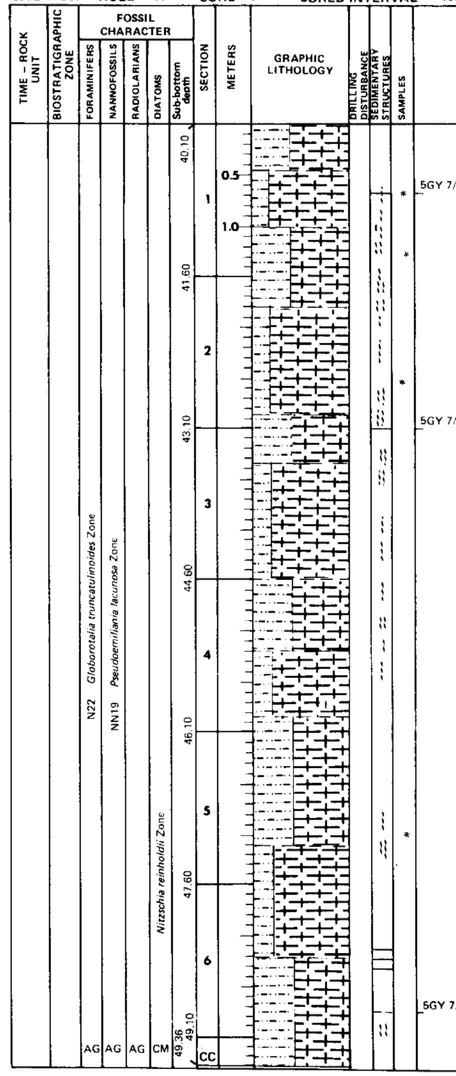
SMEAR SLIDE SUMMARY (%)

	1, 102	2, 80	4, 50	4, 83
	D	D	D	M
Texture:				
Silt	40	30	40	–
Composition:				
Quartz	30	20	30	
Feldspar	9	–	9	5
Heavy minerals	1	–	1	–
Volcanic glass	–	TR	–	90
Foraminifers	15	10	10	–
Calc. nannofossils	45	70	50	5
Silicoflagellates	–	TR	TR	–

ORGANIC CARBON AND CARBONATE (%):

	1, 102–103
Organic carbon	–
Carbonate	60

SITE 607 HOLE A CORE 6 CORED INTERVAL 40.1–49.7 m



LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8), common dark gray (N4–7) mottling, minor pale green laminae (5GY 7/1).

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly olive gray (5Y 6/1) to green gray (5GY 6/1), common dark gray (N4–6) mottling and lamination, common green (5GY 7/1) laminae and mottles, common olive (5Y 7/3) mottles, all contacts gradational.

SMEAR SLIDE SUMMARY (%)

	1, 127	2, 103	5, 96
	D	D	D
Texture:			
Silt	30	15	40
Composition:			
Quartz	30	15	40
Foraminifers	15	10	10
Calc. nannofossils	55	75	50
Silicoflagellates	–	TR	–

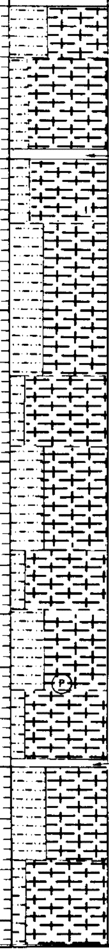
ORGANIC CARBON AND CARBONATE (%):

	1, 100–101	5, 100–101
Organic carbon	–	–
Carbonate	55	69

SITE 607 HOLE A CORE 7 CORED INTERVAL 49.7–59.3 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides* Zone	NN19 *Pseudoemiliania lacunosa* Zone		*Nitzschia reinholdii* Zone	49.70	1	0.5, 1.0
						51.20	2	
						52.70	3	
						54.20	4	
						55.70	5	
						57.20	6	
		AG	AG	CG	FM	58.70, 58.94	CC	

GRAPHIC LITHOLOGY



Color/sample annotations beside column (top to bottom): N5; Void; 5G 7/1; *; N6; N6; N7; N7; Void

LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8) with common dark gray (N4–7) mottling, local pale green (5GY 8/1) cast, common diffuse green (5G 7/1) and medium gray (N6/7).

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, vari-colored; predominantly olive gray (5Y 6/1) with common green (5GY 6/1) and gray (N6–8), common yellow/gray (5Y 8/1) and dark gray mottles; green (5GY 6/1) and gray (N6–7) laminae common; all contacts gradational.

SMEAR SLIDE SUMMARY (%)

	2, 125	6, 120
	D	D
Texture:		
Silt	30	?
Composition:		
Quartz	30	–
Foraminifers	10	12
Calc. nannofossils	60	88
Silicoflagellates	TR	–

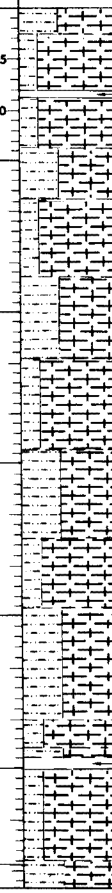
ORGANIC CARBON AND CARBONATE (%):

	2, 126–127
Organic carbon	–
Carbonate	68

SITE 607 HOLE A CORE 8 CORED INTERVAL 59.3–68.9 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides* Zone	NN19 *Pseudoemiliania lacunosa* Zone		*Nitzschia reinholdii* Zone	59.30	1	0.5, 1.0
						60.80	2	
						62.30	3	
						63.80	4	
						65.30	5	
						66.80	6	
		AG	AG	CG	FM	67.75, 67.97	CC	

GRAPHIC LITHOLOGY



Color/sample annotations beside column (top to bottom): Void; N5; N5; 10YR 7/1; Void

LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, white (N8.5) to pale gray (N8) with common dark gray (N6–8) mottling and lamination; 2 small (1/2 cm) glacial dropstones at Section 6, 88 cm.

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, vari-colored; predominantly olive gray (5Y 6–7/1), common gray (N5–8) mottles and laminae, common green (5GY 6–7/1) laminae, common olive (5Y 6/1) mottling towards base of units; extensively burrowed; percentage of laminae increases towards base of units.

SMEAR SLIDE SUMMARY (%)

	1, 23	4, 100
	D	D
Texture:		
Silt	?	15
Composition:		
Quartz	TR	–
Volcanic glass	TR	TR
Foraminifers	12	10
Calc. nannofossils	88	73
Diatoms	TR	–
Radiolarians	–	2

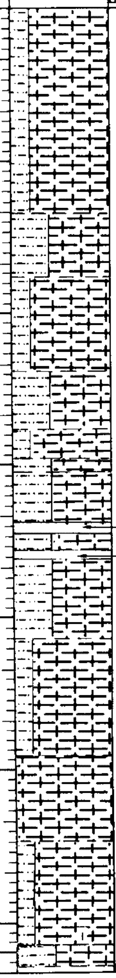
ORGANIC CARBON AND CARBONATE (%):

	4, 100–101
Organic carbon	–
Carbonate	89

SITE 607 HOLE A CORE 9 CORED INTERVAL 66.9–78.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	Sub-bottom depth
		PL6 *Globorotalia obliquus extremus* Zone (AG)	NN19 *Pseudoemiliania lacunosa* Zone (AG)	CG	*Nitzschia reinholdii* Zone (CM)	1–7, CC	68.90, 70.40, 71.90, 73.40, 74.90, 76.40, 77.90, 78.34, 78.50

GRAPHIC LITHOLOGY



LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale green/gray (5Y 7–8/1), minor light gray (N7) laminae, minor dark gray (N5–7) pyrite-rich burrow mottling.

MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly pale gray (5Y 8/1) to pale green gray (5GY 6/1), minor dark gray (N4–6) mottling and pale gray (N8) laminae, minor green (5GY 8/1) laminae scattered through unit; all contacts gradational.

SMEAR SLIDE SUMMARY (%)

	2, 80	3, 84	5, 10
	D	D	D
Texture:			
Silt	3	30	15
Composition:			
Quartz	TR	30	15
Feldspar	TR	–	–
Heavy minerals	–	TR	TR
Volcanic glass	TR	–	–
Glauconite	TR	–	–
Carbonate unspec.	–	–	TR
Foraminifers	10	5	15
Calc. nannofossils	75	95	70

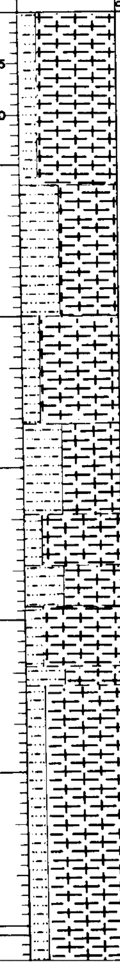
ORGANIC CARBON AND CARBONATE (%):

	2, 79–80	5, 10–11
Organic carbon	–	–
Carbonate	70	79

SITE 607 HOLE A CORE 10 CORED INTERVAL 78.5–88.1 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	Sub-bottom depth
		PL6 *Globorotalia obliquus extremus* Zone (AG)	NN18 *Discoaster brouweri* Zone (AG)	B	B	1–7, CC	78.50, 80.00, 81.50, 83.00, 84.50, 86.00, 87.50, 87.58, 87.84

GRAPHIC LITHOLOGY



LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale gray (N8) with local green (5GY 8/1) and medium gray (N6–7) laminae, minor dark gray (N5–7) pyrite-rich? burrow mottling.

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; pale gray (N8) to pale olive gray (5Y 7/1), common dark gray (N4–7) mottles, local green (5G 6/1–5GY 8/1) laminae; all contacts gradational.

SMEAR SLIDE SUMMARY (%)

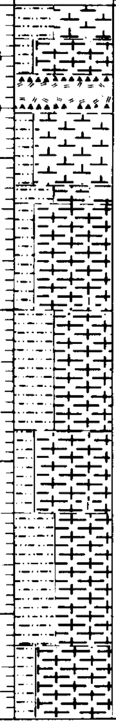
	2, 70
	D
Texture:	
Silt	30
Composition:	
Quartz	30
Heavy minerals	TR
Foraminifers	10
Calc. nannofossils	60
Sponge spicules	TR

ORGANIC CARBON AND CARBONATE (%):

	2, 70–71
Organic carbon	–
Carbonate	77

SITE 607 HOLE A CORE 11 CORED INTERVAL 88.1–97.7 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION
		PL6 *Globorotalia obliquus extremus* Zone	NN18 *Discoaster brouweri* Zone			1, 2, 3, 4, 5, CC
		AG	AG	RP	RP	



5GY 8/1

LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE and MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE

NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale gray (N8), generally homogeneous but contains minor dark gray (N6) mottles and laminations.

MARLY NANNOFOSSIL/FORAMINIFERAL NANNOFOSSIL OOZE, varicolored; predominantly pale olive gray (5Y 7/1) with common medium to pale gray (N6–8), common green (5GY 8/1) laminae and dark gray (N6) laminae and mottles.

MINOR LITHOLOGY: Section 1, 71–105 cm: VOLCANIC ASH-BEARING NANNOFOSSIL OOZE, dark to pale gray (N3–8), extensively mottled; pumice fragments at 76–79 and 94–97 cm; gradational contacts.

SMEAR SLIDE SUMMARY (%)

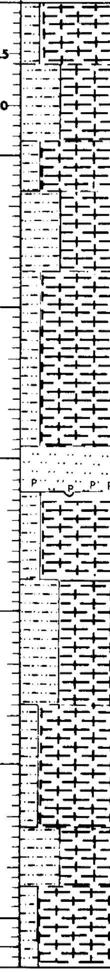
	1, 79 M	1, 80 M	5, 10 D
Texture:			
Silt	50	81	30
Composition:			
Quartz	–	20	30
Feldspar	5	1	–
Heavy minerals	TR	TR	TR
Volcanic glass	–	60	–
Foraminifers	5	–	10
Calc. nannofossils	40	19	60

ORGANIC CARBON AND CARBONATE (%):

	5, 10–11
Organic carbon	–
Carbonate	86

SITE 607 HOLE A CORE 12 CORED INTERVAL 97.7–107.3 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION
		PL5 *Globorotalia miocenica* Zone	NN17 *Discoaster pentaradiatus* Zone			97.70, 99.20, 100.70, 102.20, 103.70, 105.20, 106.70, 106.87, 107.13	1, 2, 3, 4, 5, 6, 7, CC
		AG	AG	FM	B		



5GY 7/1

5GY 6/1

LITHOLOGIC DESCRIPTION

Interlayered FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE

FORAMINIFERAL NANNOFOSSIL OOZE, white (N8) to pale gray (N8–5Y 8/1); common dark gray (N5–6) mottles and laminae local green (5GY 7/1) laminae.

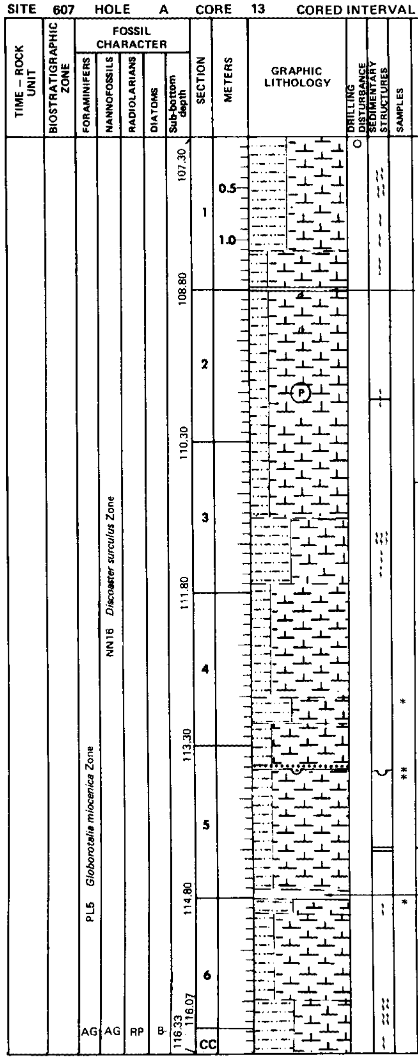
MARLY FORAMINIFERAL NANNOFOSSIL OOZE, predominantly pale olive gray (5Y 6/1) with common dark gray (N5–6) mottles and laminations, minor green (5G 6/2) mottling in Section 4, common diffuse green (5GY 7–8/1) laminae.

MINOR LITHOLOGY: Section 3, 136 cm to Section 4, 35 cm: NANNOFOSSIL FORAMINIFERAL SAND, pale olive gray (5Y 7/1); sharp, dark gray (N6), pyrite-rich base, gradational top; graded; watery.

SMEAR SLIDE SUMMARY (%)

	3, 130 M	3, 142 M	4, 32 M	6, 63 D
Texture:				
Silt	–	–	–	30
Composition:				
Quartz	–	–	–	10
Heavy minerals	–	–	–	20
Foraminifers	70	70	70	20
Calc. nannofossils	25	30	30	50
Sponge spicules	5	–	–	–

SITE 607 HOLE A CORE 13 CORED INTERVAL 107.3–116.9 m



LITHOLOGIC DESCRIPTION

Interlayered NANNOFOSSIL OOZE and MARLY NANNOFOSSIL OOZE

NANNOFOSSIL OOZE, white (N9) to pale gray (N8), slight dark gray (N6) mottling scattered throughout unit; local minor green (5GY 7/1) laminae.

MARLY NANNOFOSSIL OOZE, predominantly pale olive gray (5Y 7/1) and pale green gray (5GY 7/1), local minor green (5G 5/2) mottling, common dark gray (N2–8) mottling and laminations.

MINOR LITHOLOGY: Section 5, 23 cm: NANNOFOSSIL FORAMINIFERAL SAND, white (N9), very sharp basal contact, gradational upper contact.

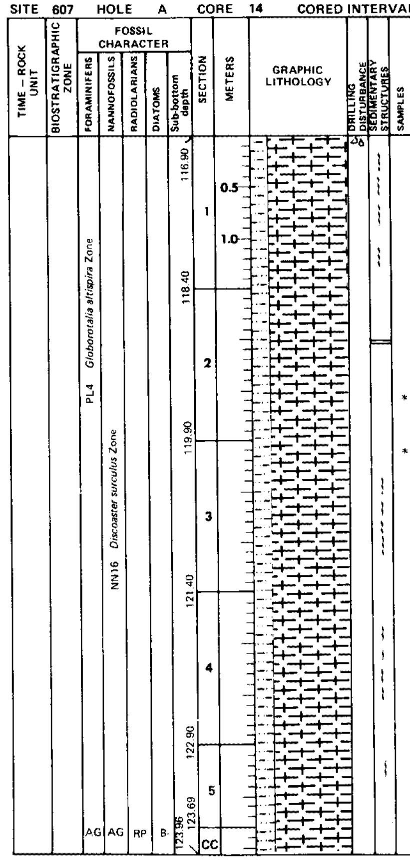
SMEAR SLIDE SUMMARY (%)

	1, 5	1, 50	4, 109	5, 24	5, 25
	D	D	D	M	D
Composition:					
Clay	20	30	38	40	40
Volcanic glass	TR				
Foraminifers	10	5	2	45	45
Calc. nannofossils	65	65	60	15	15
Radiolarians	5				

ORGANIC CARBON AND CARBONATE (%):

	1, 50–51
Organic carbon	–
Carbonate	64

SITE 607 HOLE A CORE 14 CORED INTERVAL 116.9–126.5 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to pale gray (N8), local minor dark gray (N6) mottles and laminae scattered throughout core, green (5G 8/1) laminations in Sections 2, 3, and 4.

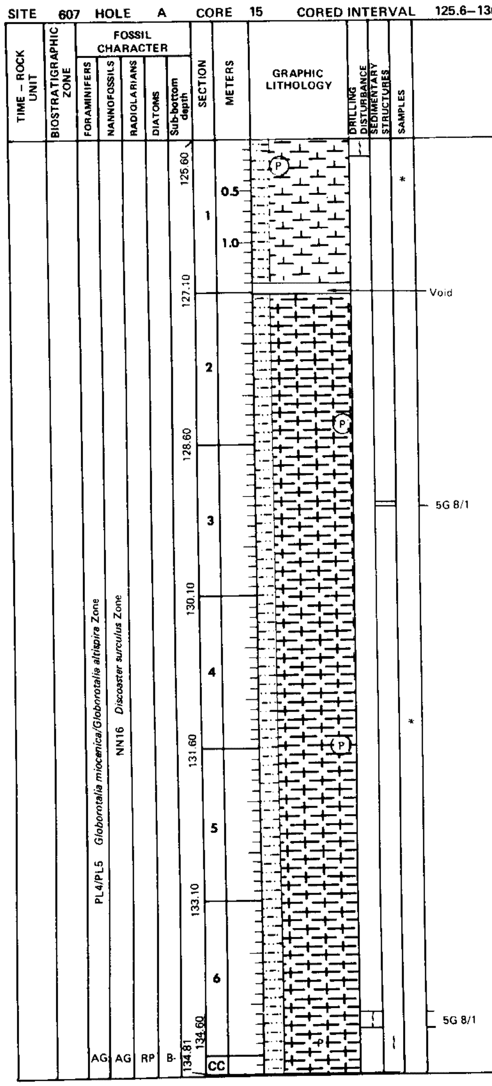
SMEAR SLIDE SUMMARY (%)

	2, 102	3, 9
	D	D
Composition:		
Clay	10	20
Foraminifers	10	10
Calc. nannofossils	80	70

ORGANIC CARBON AND CARBONATE (%):

	2, 101–102
Organic carbon	–
Carbonate	87

SITE 607 HOLE A CORE 15 CORED INTERVAL 125.6–136.1 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE and FORAMINIFERAL NANNOFOSSIL OOZE, very pale gray (N8), dark gray (N5–7) pyritic(?) patches scattered throughout core, green (5G 8/1) laminations (5–10 mm) in Sections 3 and 6; 0–19 cm in Section 1 highly disturbed.

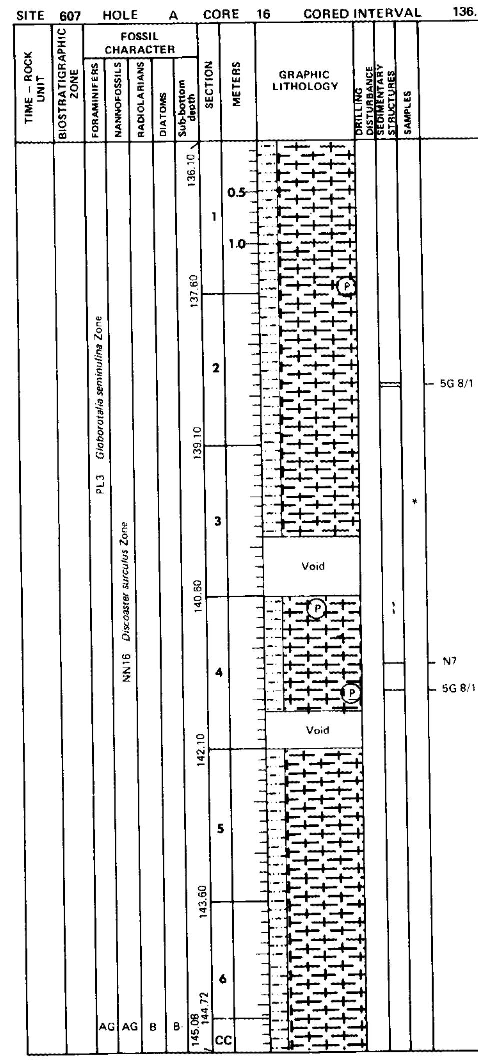
SMEAR SLIDE SUMMARY (%)

	1, 38	4, 122
	D	D
Composition:		
Feldspar	TR	–
Clay	18	18
Pyrite	–	TR
Carbonate unspec.	TR	–
Foraminifers	7	12
Calc. nannofossils	75	70

ORGANIC CARBON AND CARBONATE (%):

	4, 122–123
Organic carbon	–
Carbonate	88

SITE 607 HOLE A CORE 16 CORED INTERVAL 136.1–145.7 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, very pale to pale gray (N8); minor dark gray (N4–6) pyritic(?) patches scattered throughout core; green (5G 8/1) laminations (5–10 mm) present in Sections 2 and 4.

SMEAR SLIDE SUMMARY (%)

	1, 80	3, 50	4, 55
	D	D	D
Composition:			
Feldspar	TR	–	TR
Clay	15	12	16
Carbonate unspec.	–	TR	TR
Foraminifers	8	16	14
Calc. nannofossils	77	72	70

ORGANIC CARBON AND CARBONATE (%):

	3, 50–51
Organic carbon	–
Carbonate	87

SITE 607 HOLE A CORE 17 CORED INTERVAL 145.7–149.4 m

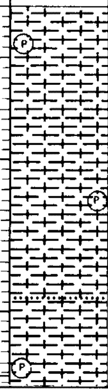
Time-rock unit: —
Biostratigraphic zone: —

Fossil character: Foraminifers: PL3 *Globorotalia seminulina* Zone, AG; Nannofossils: NN16 *Discoaster surculus* Zone, AG; Radiolarians: B; Diatoms: B-

Sub-bottom depth: 145.70, 147.20, 148.70, 149.32, 149.41

Sections: 1, 2, 3, CC

Meters: 0.5, 1.0



Sedimentary structures: 5G 7/1

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8), dark gray (N4–6) pyrite-rich(?) patches scattered throughout section; green (5G 7/1) lamination at Section 2, 22 cm.

MINOR LITHOLOGY: Section 2, 145 cm: NANNO FOSSIL FORAMINIFERAL SAND, medium gray (N7).

SMEAR SLIDE SUMMARY (%)

	1, 50	2, 136
	D	M
Composition:		
Feldspar	TR	–
Clay	20	–
Foraminifers	18	60
Calc. nannofossils	62	40

ORGANIC CARBON AND CARBONATE (%):

	1, 50–51
Organic carbon	–
Carbonate	89

SITE 607 HOLE A CORE 18 CORED INTERVAL 149.4–159.0 m

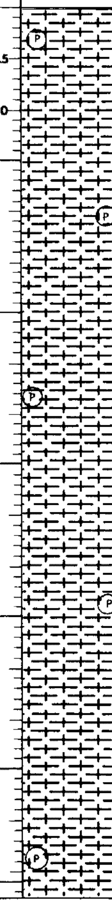
Time-rock unit: —
Biostratigraphic zone: —

Fossil character: Foraminifers: PL3 *Globorotalia seminulina* Zone, AG; Nannofossils: NN16 *Discoaster surculus* Zone, AG; Radiolarians: B; Diatoms: B-

Sub-bottom depth: 149.40, 150.90, 152.40, 153.90, 155.40, 156.90, 158.00, 158.17

Sections: 1, 2, 3, 4, 5, 6, CC

Meters: 0.5, 1.0



Sedimentary structures: 5G 7/1

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8), minor dark gray (N5–6) pyrite-rich(?) patches scattered throughout core, 1 cm thick green (5G 7/1) lamination at Section 2, 22 cm.

SMEAR SLIDE SUMMARY (%)

	1, 42	4, 80
	D	D
Composition:		
Quartz	5	1
Feldspar	5	–
Clay	–	12
Foraminifers	10	14
Calc. nannofossils	80	74

ORGANIC CARBON AND CARBONATE (%):

	4, 80–81
Organic carbon	–
Carbonate	92

SITE 607 HOLE A CORE 19 CORED INTERVAL 159.0–164.0 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL2 *Globorotalia margaritae* Zone; AG
Nannofossils: NN15 *Reticulofenestra pseudoumbilica* Zone; AG
Radiolarians: B
Diatoms: B

Sub-bottom depth: 159.00, 160.50, 162.00, 163.50, 163.79
Sections: 1, 2, 3, CC
Meters: 0.5, 1.0

5G 7/1

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8), dark gray (N5–7) pyrite patches scattered throughout unit, 5 mm green (5G 7/1) lamination at Section 1, 24 cm.

SMEAR SLIDE SUMMARY (%)

	1, 50	3, 100
	D	D
Composition:		
Quartz	TR	5
Feldspar	TR	TR
Foraminifers	10	10
Calc. nannofossils	90	85

ORGANIC CARBON AND CARBONATE (%):

	2, 50–51
Organic carbon	–
Carbonate	87

SITE 607 HOLE A CORE 20 CORED INTERVAL 164.0–173.6 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL2 *Globorotalia margaritae* Zone; AG
Nannofossils: NN15 *Reticulofenestra pseudoumbilica* Zone; AG
Radiolarians: B
Diatoms: B

Sub-bottom depth: 164.00, 165.50, 167.00, 168.50, 170.00, 171.50, 172.11, 172.37
Sections: 1, 2, 3, 4, 5, 6, CC
Meters: 0.5, 1.0

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N8), very scattered dark gray (N5–7) patches (pyritic?) present throughout core, rare thin (1–2 cm) indurated chalky intervals in Sections 1, 2, and 3.

MINOR LITHOLOGY: Section 5, 63–72 cm and Section 6, 26 cm: NANNOFOSSIL FORAMINIFERAL SAND, dark gray (N4) to medium gray (N7), sequence in Section 5 is graded with very sharp basal contact and less sharp upper contact, base of unit is dark gray (N4) and pyrite rich.

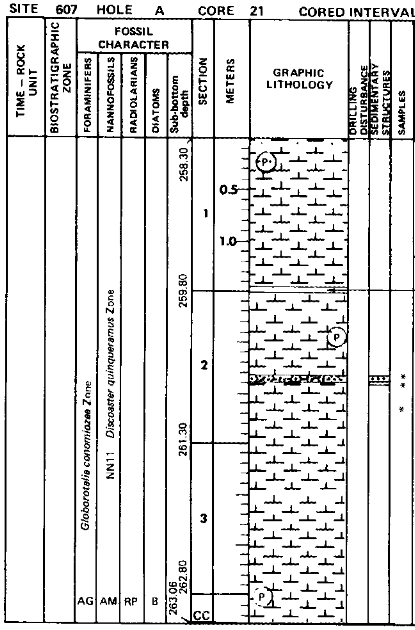
SMEAR SLIDE SUMMARY (%)

	2, 129
	D
Composition:	
Feldspar	TR
Clay	19
Foraminifers	18
Calc. nannofossils	63

ORGANIC CARBON AND CARBONATE (%):

	2, 50–51
Organic carbon	–
Carbonate	81

SITE 607 HOLE A CORE 21 CORED INTERVAL 258.3–263.3 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, pale gray (N8) to white (N8.5), minor dark gray (N6) pyritic patches scattered throughout core, local pale green cast in Sections 1 and Core Catcher; local minor indurated chalky layers (1–2 cm) (drill biscuits?).

MINOR LITHOLOGY: Section 2, 84–88 cm: NANNOFOSSIL FORAMINIFERAL SAND, medium gray (N7) to dark gray (N5), graded; sharp upper and lower contacts; pyrite burrow cast at 86 cm.

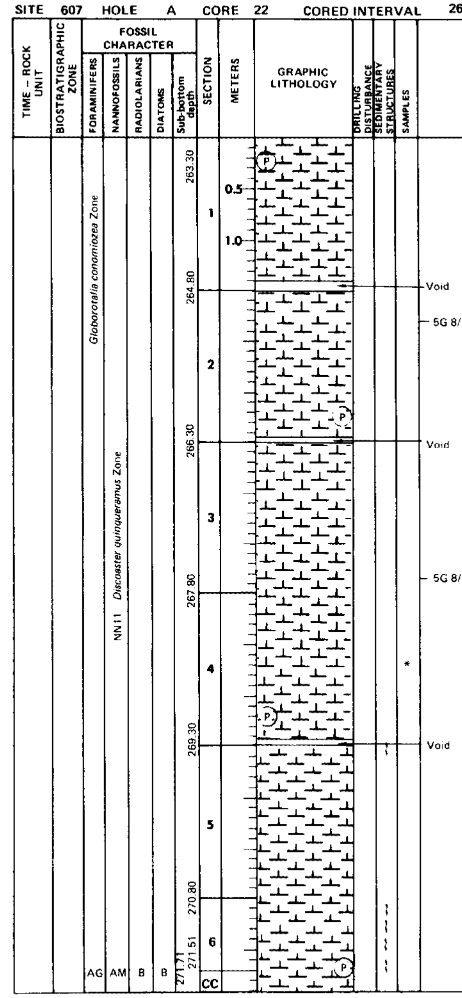
SMEAR SLIDE SUMMARY (%)

	2, 87	2, 110
	M	D
Composition:		
Quartz	5	5
Feldspar	5	–
Volcanic glass	TR	–
Foraminifers	70	2
Calc. nannofossils	20	93

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66
Organic carbon	–
Carbonate	89

SITE 607 HOLE A CORE 22 CORED INTERVAL 263.3–272.9 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N8.5), dark–medium gray (N6–7) pyritic(?) patches scattered throughout core; green (5G 5/2, 5G 8/1) laminations present in Sections 2 and 3; chalky intervals scattered throughout unit, Section 3, 0–25 cm is predominantly chalky (drill biscuits?).

SMEAR SLIDE SUMMARY (%)

	4, 65
	D
Composition:	
Clay	10
Volcanic glass	TR
Foraminifers	8
Calc. nannofossils	82

ORGANIC CARBON AND CARBONATE (%):

	3, 65–66
Organic carbon	–
Carbonate	91

SITE 607 HOLE A CORE 23 CORED INTERVAL 272.9–282.5 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *Globorotalia conomiozea* Zone — AG
Nannofossils: NN11 *Discoaster quinqueramus* Zone — AM
Radiolarians: RM
Diatoms: B

Sub-bottom depth: 272.90, 274.40, 275.90, 277.40, 277.66, 277.93
Sections: 1, 2, 3, 4, CC
Meters: 0.5, 1.0

5GY 7/1
5GY 7/1

NANNOFOSSIL OOZE, white (N9), dark gray (N6) mottling scattered throughout core – common in Sections 1, 2, and 3; green (5GY 7/1) laminations (5 mm) in Sections 3 and Core Catcher; 1–2 cm chalky intervals (drill biscuits?) scattered throughout core.

MINOR LITHOLOGY: Section 1, 149–150 cm: NANNOFOSSIL FORAMINIFERAL SAND, white (N8.5), 1 cm thick, nongraded.

SMEAR SLIDE SUMMARY (%)

	1, 149	2, 65
	M	D
Composition:		
Clay	15	10
Foraminifers	60	5
Calc. nannofossils	25	85

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66
Organic carbon	–
Carbonate	92

SITE 607 HOLE A CORE 24 CORED INTERVAL 282.5–292.1 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *Globorotalia conomiozea* Zone — AG
Nannofossils: NN11 *Discoaster quinqueramus* Zone — AM
Radiolarians: CM
Diatoms: *Thalassiosira convexa* Zone — CM

Sub-bottom depth: 282.50, 284.00, 285.00, 287.00, 288.50, 290.00, 291.06, 291.29
Sections: 1, 2, 3, 4, 5, 6, CC
Meters: 0.5, 1.0

5G 8/1
Void
Void

NANNOFOSSIL OOZE, white (N8.5), faint pale green cast in Section 5, dark gray (N6) pyrite(?) patches present throughout unit, upper 12 cm of Section 1 has common green (5G 8/1) 5 mm laminations, 1–9 cm chalk layers (drill biscuits?) common throughout core; pyrite burrow cast Section 2, 78 cm.

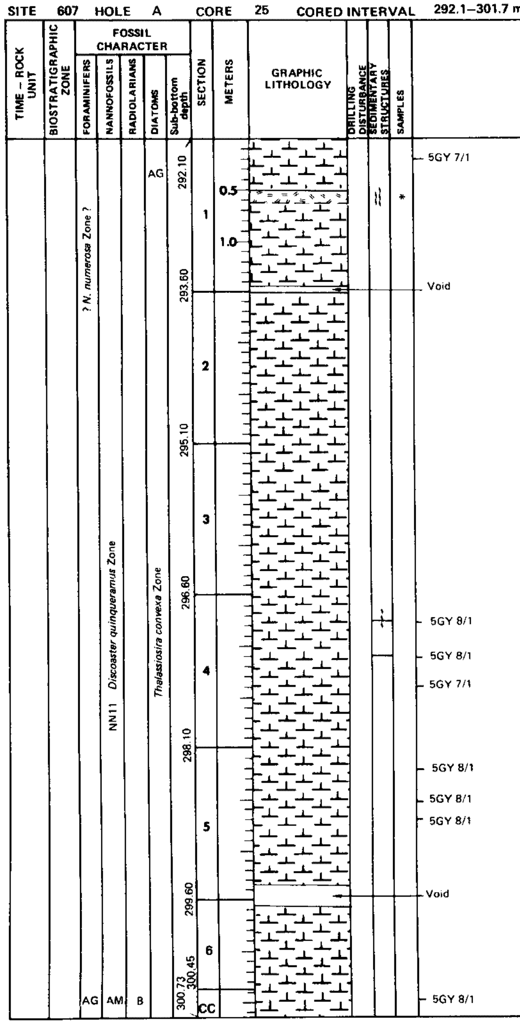
SMEAR SLIDE SUMMARY (%)

	2, 65
	D
Composition:	
Clay	5
Foraminifers	5
Calc. nannofossils	90

ORGANIC CARBON AND CARBONATE (%):

	2, 65–66
Organic carbon	–
Carbonate	90

SITE 607 HOLE A CORE 25 CORED INTERVAL 292.1–301.7 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N9), dark gray (N6) mottling common throughout core, pale green (5GY 7/1, 5GY 8/1) laminations present in Sections 4, 5, and Core Catcher; chalky interlayers (drill biscuits?) common throughout core (to a maximum of 40% Section 3).

MINOR LITHOLOGY: Section 1, 50–62 cm: VOLCANIC ASH, predominantly N7 with slight olive cast, gradational contacts, glass is typically fibrous; very few bubble wall shards.

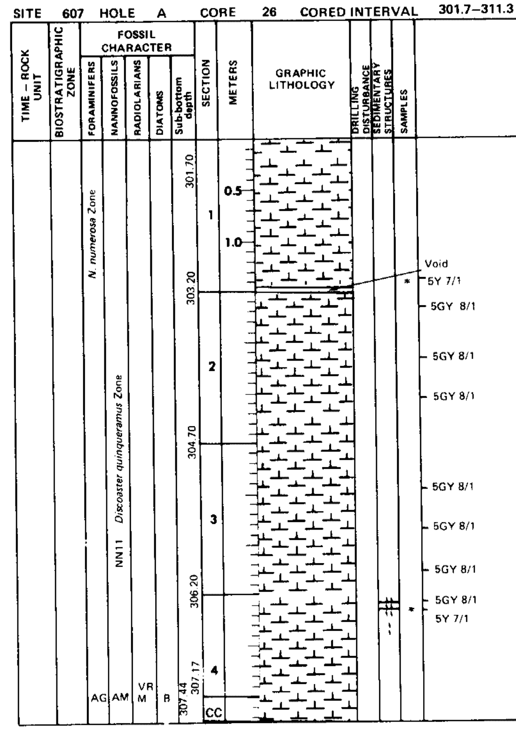
SMEAR SLIDE SUMMARY (%)

	1, 60
	M
Texture:	
Sand	60
Silt	15
Clay	5
Composition:	
Feldspar	TR
Clay	5
Volcanic glass	75
Calc. nannofossils	20

ORGANIC CARBON AND CARBONATE (%):

	1, 60–61
Organic carbon	–
Carbonate	70

SITE 607 HOLE A CORE 26 CORED INTERVAL 301.7–311.3 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N9), dark gray (N6) pyrite-rich(?) mottling scattered throughout unit, pale green (5GY 8/1) laminations common in units 2, 3, and 4; olive (5Y 7/1) laminations in Sections 1 and 4; chalky intervals (drill biscuits?) common throughout core.

SMEAR SLIDE SUMMARY (%)

	1, 135	4, 10
	D	D
Composition:		
Quartz	–	TR
Mica	–	TR
Heavy minerals	–	TR
Clay	20	10
Foraminifers	5	5
Calc. nannofossils	75	85

ORGANIC CARBON AND CARBONATE (%):

	4, 10–11
Organic carbon	–
Carbonate	86

SITE 608

Hole 608

Date Occupied: 13 July 1983 (0730 Hrs.)

Date Departed: 17 July 1983 (1230 Hrs.)

Time on Hole: 3 Days, 5 Hrs. (3.2 Days)

Position (latitude; longitude): 42° 50.205'N; 23°05.252'W.

Water depth (sea level; corrected m, echo-sounding):3526

Water depth (rig floor; corrected m, echo-sounding):3541.8

Bottom felt (m, drill pipe): 3533.6

Penetration (m): 530.3

Number of cores: 59

Total length of cored section (m): 530.3

Total core recovered (m): 428.03

Core recovery (%): 80.7

Oldest sediment cored:

Depth sub-bottom (m): 515.4

Nature: Dolomite Bearing Calcareous Mudstone

Age: upper middle Eocene. NP16 ±42Ma

Measured velocity (km/s): 2.26

Basement:

Depth sub-bottom (m):530.3

Nature:Basalt

Velocity range (km/s):4.27

SITE 608

HOLE 608A

Date Occupied: 17 July, 1983 (1419 Hrs.)

Date Departed: 18 July, 1983 (1600 Hrs.)

Time on Hole: 1 Day 1 Hr. (1.1 Days)

Position (latitude; longitude): 42°50.205'N;23°05.252'W

Water depth (sea level; corrected m, echo-sounding): 3526

Water depth (rig floor; corrected m, echo-sounding): 3541.8

Bottom felt (m, drill pipe): 3533.6

Penetration (m): 146.4

Number of cores: 16

Total length of cored section (m): 146.4

Total core recovered (m): 144.04

Core recovery (%): 98

Oldest sediment cored:

Depth sub-bottom (m): 146.0

Nature: Foram Nanno Ooze

Measured velocity (km/s): 1.536

Basement:

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 608

A. PRINCIPAL RESULTS

Site 608 is located on the southern flank of the King's Trough tectonic complex. Hole 608 was continuously HPC and XCB cored to basement at 530.3 meters sub-bottom. Hole 608A was continuously HPC cored, providing overlap to refusal at 146.4m sub-bottom. Core recovery was generally over 90% but very low recoveries in isolated cores within 100 meters of basement place average recovery for Hole 608 at 81%, versus 98% for Hole 608A.

A stratigraphically continuous sequence of Quaternary (NN21) through mid-upper Oligocene sediments was recovered to 462 meters subbottom (NP24). At this level a major hiatus occurs, representing a time gap of about 11.6 m.y. No other major hiatuses have been detected. Below 462 meters subbottom, a mid-upper Eocene (NP17) to upper middle Eocene (NP16) sediment sequence lies upon basalt at 515.4 meters subbottom. Two cores were taken in this basaltic basement to a terminal depth of 530.9 meters. Paleomagnetic and lithologic tie lines in the overlapping HPC part of the section indicate that a complete composite section appears to have been recovered through the Quaternary and lower Pliocene to at least 120 meters subbottom (NN12).

Dolomite-bearing calcareous mudstone above basement and dolomitic marlstone through the middle Eocene give way to volcanic glass-bearing marly nanno chalk containing volcaniclastic turbidites and volcanic ash falls in the upper Eocene. Immediately above the Eocene/Oligocene hiatus is an interval of marly nannofossil chalk displaying soft sediment deformation structures indicative of debris flows. The hiatus is interpreted as tectonic in origin.

The remaining upper Oligocene, all of the Miocene and most of the Pliocene is a pelagic sequence of chalks to oozes that are marly up to the middle Miocene and then almost pure calcium carbonate above, as the sediments become less lithified. Within this thick pelagic sequence, a further tectonic event is recognized. The marly chalks of the early Miocene (NN3/NN2) at around 320 to 406 meters sub-bottom display soft-sediment deformation structures and microfaulting with slickensides. Maximum sediment instability is recognized at 369 to 375 meters, where a chalky conglomerate lithology is again indicative of debris flow processes. Sedimentation rates during the late Oligocene and early Miocene appear to have been erratic averaging 13.6m/m.y. They are more linear through the middle Miocene and early Pliocene at 19.8m/m.y.

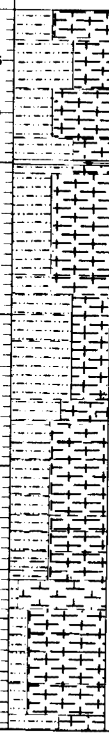
Glacial-interglacial carbonate cycles begin at around 76 meters subbottom in the lower Pliocene and continue to the top of the hole. Ice rafting, characterized by dispersed glacial erratic dropstones is also detected first at around this depth. These observations suggest that the date for initiation of glaciation at this location must be around 2.4m.y. (top of the Gauss). Average sedimentation rates through the glacial/interglacial cycles increased to around 29m/m.y.

SITE 608 HOLE CORE 1 CORED INTERVAL 0.0–7.0 m

Columns: TIME – ROCK UNIT; BIOSTRATIGRAPHIC ZONE; FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS); Sub-bottom depth; SECTION; METERS; GRAPHIC LITHOLOGY; DRILLING DISTURBANCE; SEDIMENTARY STRUCTURES; SAMPLES; LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides*
Nannofossils: NN21 *Emiliania huxleyi* Zone; NN20 *Gephyrocapsa oceanica* Zone
Radiolarians: FG
Diatoms: RG *Pseudoeunotia doliolus* Zone
Fossil character (core catcher): AG AG FM RM

Sub-bottom depth: 0.00, 1.50, 3.00, 4.50, 6.00, 6.80, 7.04
Sections: 1, 2, 3, 4, 5, CC
Meters: 0.5, 1.0



Colors: 10YR 7/4; 10YR 5/4; 10YR 7/4; 10YR 5/4; Void; 10YR 8/3; 10YR 5/4, 10YR 7/3, 10YR 6/4, 10YR 5/4 to 10YR 7/4; 10YR 7/3; 10YR 8/2 to 10YR 7/3, 10YR 8/2, 10YR 7/3; 10YR 8/3; 10YR 7/3; 10YR 8/3; 10YR 7/3, 10YR 6/4, 10YR 7/3, 10YR 8/3; N9; 10YR 8/3, 10YR 8/1; 10YR 8/3; 10YR 8/1, 2.5Y 6/2

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, mostly alternating layers (with gradational contacts) of very light brown (10YR 8/3), light brown (10YR 7/4), and brown (10YR 5/4 and 10YR 6/4). 5.59 to 5.89 m white (N9) NANNOFOSSIL OOZE. Bioturbation evident throughout.

Erratic piece of schist, 0.49 m. At 4.57 m piece of quartzite.

SMEAR SLIDE SUMMARY (%)

	1, 50	2, 50	3, 83	4, 129	CC,23
	D	D	D	D	D
Texture:					
Sand	15	–	TR	TR	5
Silt	70	20	25	30	40
Clay	15	80	75	70	55
Composition:					
Quartz	40	25	35	12	35
Feldspar	5	5	5	3	10
Mica	TR	TR	–	–	–
Heavy minerals	TR	–	–	–	TR
Clay	15	10	TR	TR	10
Foraminifers	25	20	12	3	15
Calc. nannofossils	15	40	48	82	30
Diatoms	–	–	TR	–	–

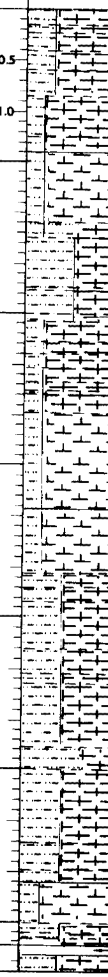
ORGANIC CARBON AND CARBONATE (%)

	1, 50
Organic carbon	–
Carbonate	51

SITE 608 HOLE CORE 2 CORED INTERVAL 7.0–16.6 m

Foraminifers: N22 *Globorotalia truncatulinoides*
Nannofossils: NN20 *Gephyrocapsa oceanica* Zone; NN19 *Pseudoemiliania lacunosa* Zone
Radiolarians: B
Diatoms: *Pseudoeunotia doliolus* Zone; *Nitzschia reinholdii* Zone
Fossil character (core catcher): AG AG FM FM

Sub-bottom depth: 7.00, 8.50, 10.0, 11.50, 13.00, 14.50, 16.00, 16.24, 16.52
Sections: 1, 2, 3, 4, 5, 6, 7, CC
Meters: 0.5, 1.0



Colors: 10YR 8/1, 10YR 7/1, 2.5Y 6/2, 10YR 7/2; 10YR 7/1; 10YR 8/1; N8; N9; 10YR 8/1; 2.5Y 6/2; N5, 2.5Y 7/2, 10YR 5/2, 10YR 7/1, 10YR 8/1, 10YR 7/1, 10YR 8/1, 10YR 7/1; N9 to N8; N9 to 10YR 8/1; N5, 10YR 7/1, 10YR 8/1; 10YR 7/1; 10YR 8/1, N7, 10YR 7/1; 10YR 8/1; 2.5Y 5/2; 5Y 7/2; 10YR 7/1, 5Y 7/2; N9, 10YR 7/1, 5Y 7/2; Void 10YR 7/1; 10YR 8/1

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, mostly alternating layers (with gradational contacts) of very light brown (10YR 8/1) and light brown (10YR 7/1).

NANNOFOSSIL OOZE, 8.24 to 9.19, 10.96 to 12.56, and 15.61 to 16.02 m, white (N9) and very light gray (N8). Frequently bounded by sharp contacts.

Bioturbation mostly at color contrasts. Greenish gray (5Y 6/1) layer at 10.67 m. Erratic pieces of basalt(?) 9.10 to 10.00 m and 14.29 to 14.50 m.

SMEAR SLIDE SUMMARY (%)

	1, 38	2, 111	2, 127
	M	D	D
Texture:			
Sand	–	–	30
Silt	–	100	70
Clay	–	–	–
Composition:			
Quartz	30	30	10
Feldspar	–	10	–
Clay	–	10	5
Foraminifers	20	15	18
Calc. nannofossils	50	35	77

ORGANIC CARBON AND CARBONATE (%)

Section-Interval (cm)	2-111
Carbonate	45

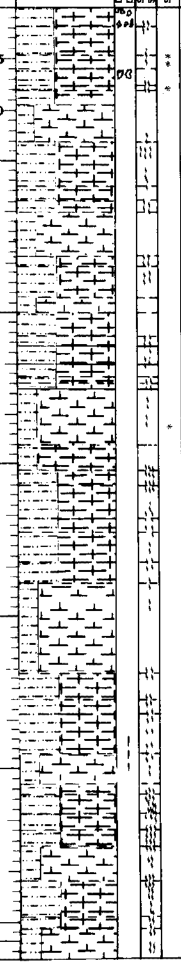
SITE 608 HOLE CORE 3 CORED INTERVAL 16.6–26.2 m

Fossil character: Foraminifers AG; Nannofossils AG; Radiolarians CG (B); Diatoms RM (B)

Biostratigraphic zones: N22 *Globorotalia truncatulinoides*; NN19 *Pseudoemiliania lacunosa* Zone; *Nitzschia reinholdii* Zone

Sub-bottom depths (m): 16.60, 18.10, 19.60, 21.10, 22.60, 24.10, 25.60, 25.71, 25.93

Sections: 1, 2, 3, 4, 5, 6, 7, CC



Colors (top to bottom): 2.5Y 6/2, 10YR 8/1, 2.5Y 6/2, 2.5Y 7/2, N8 to N6, 10YR 8/1, N9, 10YR 8/1, 2.5Y 7/2, 10YR 8/1, N9, 5Y 8/1, 2.5Y 7/2, N9, 10YR 8/1, 5Y 8/1, 10YR 8/1, 2.5Y 7/2, 10YR 8/1, 5Y 8/1, N9, 10YR 8/1, 2.5Y 6/2, 10YR 8/1, 5Y 6/1, 2.5Y 7/2, 5Y 8/1, N9, N9 to N8, 10YR 7/2, 10YR 8/1, 10YR 7/2, N9 to N8, 5Y 8/1, 5Y 7/2, 10YR 7/1, 5Y 8/1, N9, 10YR 7/1, 5Y 8/1, N9

LITHOLOGIC DESCRIPTION

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, mostly layers (with gradational contacts) of very light brown (10YR 8/1) and light brown (2.5Y 7/2, 10YR 7/2, 10YR 7/1, 5Y 8/1).

NANNOFOSSIL OOZE, white (N9) and very light gray (N8): 17.53 to 17.90, 18.70 to 19.13, 19.44 to 19.60, 20.35 to 20.90, 22.26 to 23.13, 23.98 to 24.25, 24.84 to 25.20, 25.67 to 25.93 m.

SMEAR SLIDE SUMMARY (%)

	1, 51	1, 48	1, 80	3, 110
	D	M	D	D
Texture:				
Sand	7	–	–	–
Silt	40	–	–	–
Clay	53	–	–	–
Composition:				
Quartz	30	15	60	20
Feldspar	5	–	–	–
Mica	TR	–	–	–
Clay	15	5	–	–
Foraminifers	20	60	10	5
Calc. nannofossils	30	20	30	75

ORGANIC CARBON AND CARBONATE (%)

	1, 50
Organic carbon	–
Carbonate	57

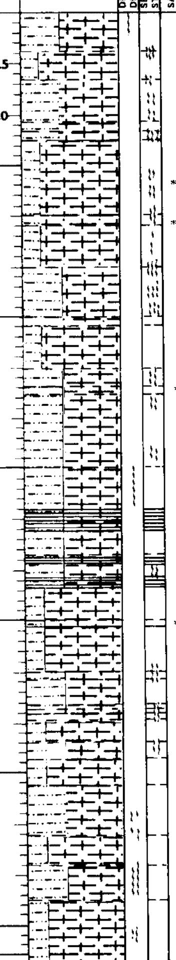
SITE 608 HOLE CORE 4 CORED INTERVAL 26.2–35.8 m

Fossil character: Foraminifers AG; Nannofossils AG; Radiolarians B (FG); Diatoms RP (FM)

Biostratigraphic zones: N22 *Globorotalia truncatulinoides*; NN19 *Pseudoemiliania lacunosa* Zone; *Nitzschia reinholdii* Zone

Sub-bottom depths (m): 26.25, 27.70, 29.20, 30.70, 32.20, 33.70, 35.20, 35.58, 35.87

Sections: 1, 2, 3, 4, 5, 6, 7, CC



Colors (top to bottom): 5Y 7/2 to N9, N9, 5Y 7/2, N8, N7 to N8 to N9 to N8, N7, N9 to 5Y 7/2, 5Y 7/2, N8, N9 to N8, 10YR 7/1, 5G 6/1, 5Y 7/1 to N8, 10YR 7/1 bands, N8, 10YR 7/1 laminae, N9, N7 to N8, N8, 2.5Y 7/2, N8, 10YR 8/1, N8 / 10YR 8/1, N8 to N9, 10YR 8/2, N9, N7 to N8, N9, N7 to N8, N9 with N8 and N7 mottles

LITHOLOGIC DESCRIPTION

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, mostly alternating shades of gray (5Y 7/2, 10YR 7/1, N7 to N8). Contacts gradational. Distinct bands of light gray (10YR 7/1) from 31.10 to 31.84 m.

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) alternating with above darker, marly layers. Contacts gradational.

Note: recovery ~100%.

SMEAR SLIDE SUMMARY (%)

	2, 14	3, 71	4, 149	2, 65
	D	D	D	D
Composition:				
Quartz	20	17	20	–
Feldspar	–	TR	1	–
Heavy minerals	–	TR	–	–
Clay	10	–	–	–
Foraminifers	20	15	12	–
Calc. nannofossils	50	73	67	–
Diatoms	TR	–	–	–

ORGANIC CARBON AND CARBONATE (%)

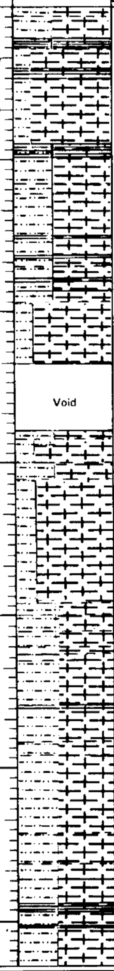
	2, 14
Organic carbon	–
Carbonate	78

SITE 608 HOLE CORE 5 CORED INTERVAL 35.8–45.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	Sub-bottom depth
		PL6 *Globorotalia obliquus extremus*	NN19 *Pseudoemiliania lacunosa* Zone	B	*Nitzschia reinholdii* Zone	1	35.80
		NN18 *Discoaster brouweri* Zone	NN18			2	37.30
		AG	AM	CG	FG	3	38.80
						4	40.30
						5	41.80
						6	43.30
						7	44.80
						CC	45.26, 45.00

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY



Colors (top to bottom): N8 to N7; 7.5YR 8/0 to 7.5YR 7/0; N9; N9; N8 to N7; 5Y 7/2; N8 to 7.5YR 8/0 with N9 laminae; 5Y 7/2; N8; 5Y 7/2; N9; 7.5YR 8/0; N9; 5Y 7/2; N8 to N7; 5Y 7/2; N8; 5Y 7/2; 7.5YR 8/0 to N8; N8; 5YR 8/1; 5Y 7/1 to N8 to 5Y 7/1; N7 to N5 to N7; N6 + N7; N7 to N8; N8

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, mostly alternating layers of white (N9), very light gray (N8), light grayish brown (5Y 7/2), and light gray (7.5YR 8/0). All contacts gradational except where laminae present. Darker gray (7.5YR 7/0) laminae evident 36.10 to 37.30 m. Light greenish gray (5G 7/1) laminae evident 38.48 to 38.58 and 42.66 to 42.68 m. Faint white (N9) laminae at 38.04 to 38.05 and 38.23 to 38.26 m. Thin layers of pale green (5G 7/2), bluish gray (7.5YR 7/0), and pale blue (5PB 7/2) 44.66 to 44.85 m. Generally less color contrast than overlying cores.

SMEAR SLIDE SUMMARY (%):

	1, 30	2, 27	4, 143	5, 12	6, 73
	D	D	D	D	M
Texture:					
Sand	–	–	–	–	1
Silt	5	7	4	2	7
Clay	95	93	96	98	92
Composition:					
Quartz	11	25	43	18	38
Feldspar	TR	TR	1	TR	TR
Volcanic glass	1	–	TR	–	2
Pyrite	–	TR	–	–	–
Carbonate unspec.	TR	–	–	TR	TR
Foraminifers	11	12	17	15	13
Calc. nannofossils	77	65	70	67	46
Diatoms	TR	–	–	–	TR
Sponge spicules	–	–	TR	–	–

ORGANIC CARBON AND CARBONATE (%):

	6, 73
Organic carbon	–
Carbonate	64

SITE 608 HOLE CORE 6 CORED INTERVAL 45.4–55.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	Sub-bottom depth
		PL6 *Globorotalia obliquus extremus*	NN18 *Discoaster brouweri* Zone	RM	*Nitzschia reinholdii* Zone	1	45.40
		FG	FG			2	45.90
		AG	AG	FM	FM	3	47.40
						4	48.90
						5	50.40
						6	51.90
						7	53.40
						CC	53.71, 53.55

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

Colors (top to bottom): N7; N8; 5B 9/1; 5Y 8/1; N8; 7.5YR 7/0; N8; 5Y 8/1; N8; N7; 5Y 8/1; N8; N7; N8 to 7.5YR 8/0; N7; N8; N7, 10YR 7/1; N8; 10YR 7/1; N8; 10YR 7/1; N8; 10YR 7/1; N8; 5GY 8/1, 10YR 7/1; N8; N7; N8; 5B 8/1; N8; 5G 8/1; 5G 8/1; N7; N8; N7–5Y 8/1; 5Y 8/1; N8; N7–N6; N8; N7; N8; N7

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, dominantly very light gray (N8). Occasional layers of light gray (N7), yellowish gray (5Y 8/1), and light grayish brown (10YR 7/1). Couplets of light gray (N7) and light grayish brown (10YR 7/1) occur 47.54 to 48.31 m. Layers of bluish gray (7.5YR 7/0), light blue gray (7.5YR 8/0), and light greenish gray (5GY 8/1 and 5G 8/1) occur 46.44, 47.87, 49.97, 50.44, 51.55, and 52.13 m.

NANNOFOSSIL OOZE, bluish white (5B 9/1), 46.10 m.

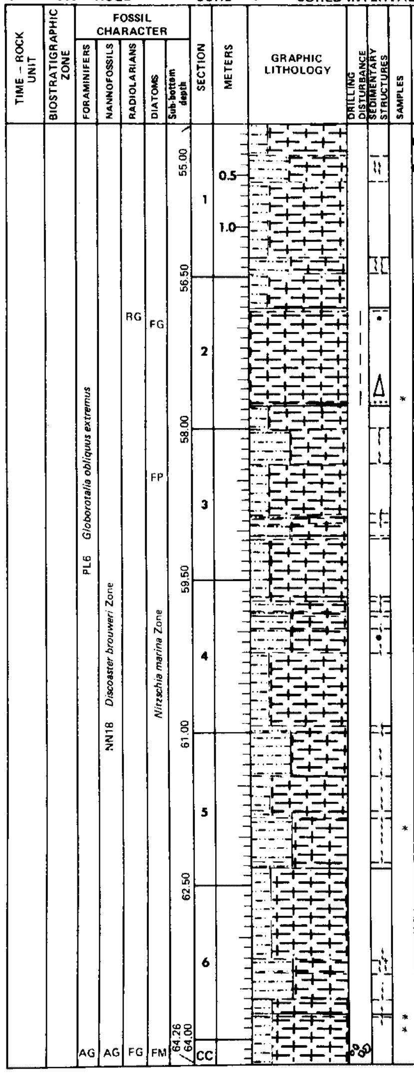
SMEAR SLIDE SUMMARY (%):

	1, 120	2, 20	2, 27	3, 83	6, 53
	D	M	D	M	D
Texture:					
Sand	–	–	–	–	–
Silt	1	2	1	3	3
Clay	99	98	99	97	97
Composition:					
Quartz	15	25	30	28	15
Feldspar	TR	TR	TR	TR	TR
Volcanic glass	–	–	TR	TR	–
Pyrite	–	–	–	1	–
Carbonate unspec.	–	–	TR	TR	TR
Foraminifers	12	6	15	16	11
Calc. nannofossils	73	69	55	55	74
Sponge spicules	–	TR	–	–	–

ORGANIC CARBON AND CARBONATE (%):

	3, 83
Organic carbon	–
Carbonate	81

SITE 608 HOLE CORE 7 CORED INTERVAL 55.0–64.6 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, mostly alternating layers of very light gray (N8), light gray (N7), and light tannish gray (10YR 7/1 and 5Y 7/1).

FORAMINIFERAL SAND, gray (N6) to grayish black (N2) 56.81 to 57.64 m. This interval watery and details of structure probably blurred by coring and splitting process. Some evidence of fining upwards.

Dropstones at 57.04 and 60.09 m.

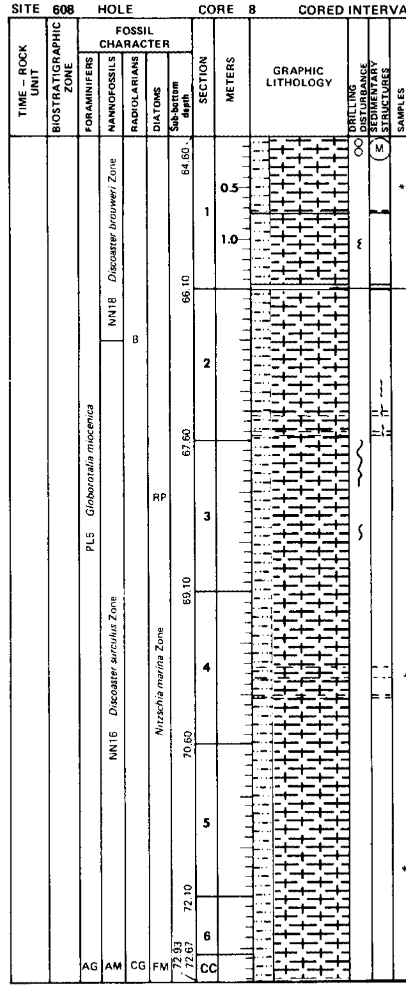
SMEAR SLIDE SUMMARY (%):

	2, 116	5, 86	6, 127	6, 137
	M	M	M	D
Texture:				
Silt	5	10	–	1
Clay	95	90	100	99
Composition:				
Quartz	6	25	6	20
Feldspar	TR	TR	TR	1
Volcanic glass	1	–	TR	–
Pyrite	–	1	–	TR
Carbonate unspec.	3	1	–	1
Foraminifers	22	12	16	12
Calc. nannofossils	68	61	78	67
Sponge spicules	–	–	TR	–
Silicoflagellates	–	–	TR	–

ORGANIC CARBON AND CARBONATE (%):

	2, 41
Organic carbon	–
Carbonate	94

SITE 608 HOLE CORE 8 CORED INTERVAL 64.6–74.2 m



LITHOLOGIC DESCRIPTION

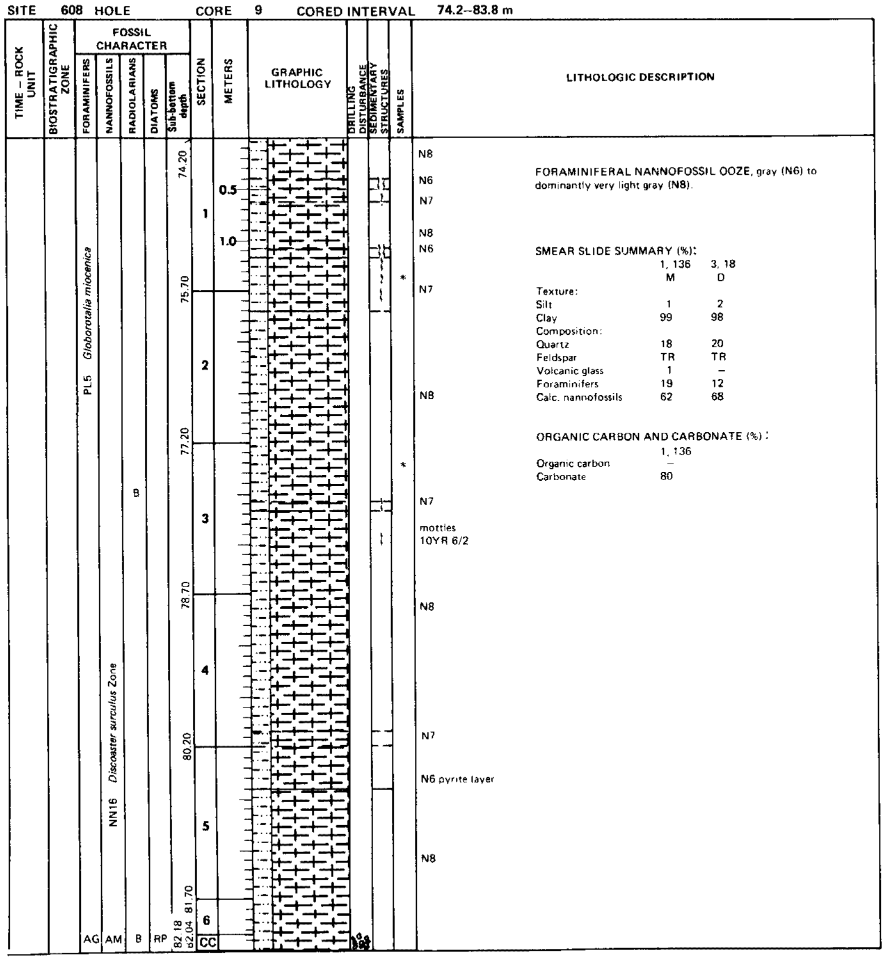
FORAMINIFERAL NANNOFOSSIL OOZE, very light gray (N8). Occasional layers of light brownish gray (10YR 7/2), light tannish gray (10YR 7/1), pale blue (5PB 7/2) and grayish blue (5PB 5/2). Bivalve shell (diameter ~ 0.5 cm) at 64.69 m. Gray (N6) streaks at 45° between 70.60 and 71.40 m.

SMEAR SLIDE SUMMARY (%):

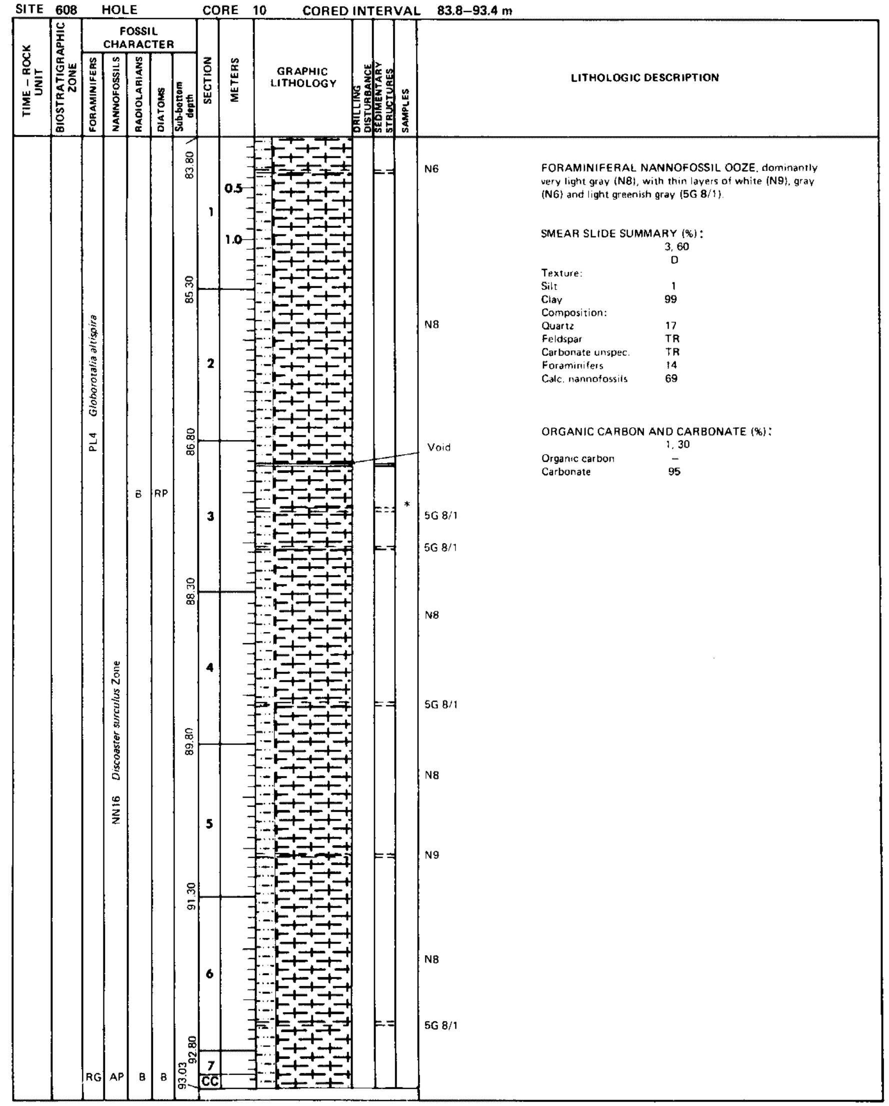
	1, 50	4, 82	5, 120
	D	M	D
Texture:			
Silt	1	5	–
Clay	99	95	100
Composition:			
Quartz	18	22	5
Feldspar	TR	1	1
Pyrite	–	TR	–
Carbonate unspec.	1	–	TR
Foraminifers	10	42	15
Calc. nannofossils	31	36	79

ORGANIC CARBON AND CARBONATE (%):

	4, 81
Organic carbon	–
Carbonate	96



SITE 608 HOLE CORE 9 CORED INTERVAL 74.2–83.8 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
PL5 Globorotalia miocenica
NN16 Discoaster surculus Zone
AG AM B RP
B
74.20
75.70
77.20
78.70
80.20
81.70
82.04
82.18
0.5
1.0
1
2
3
4
5
6
CC
N8
N6
N7
N8
N6
N7
N8
N7
mottles 10YR 6/2
N8
N7
N6 pyrite layer
N8
FORAMINIFERAL NANNOFOSSIL OOZE, gray (N6) to dominantly very light gray (N8).
SMEAR SLIDE SUMMARY (%):
1, 136 3, 18
M D
Texture:
Silt 1 2
Clay 99 98
Composition:
Quartz 18 20
Feldspar TR TR
Volcanic glass 1 –
Foraminifers 19 12
Calc. nannofossils 62 68
ORGANIC CARBON AND CARBONATE (%):
1, 136
Organic carbon –
Carbonate 80



SITE 608 HOLE CORE 10 CORED INTERVAL 83.8–93.4 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
PL4 Globorotalia altispira
NN16 Discoaster surculus Zone
B RP
RG AP B B
83.80
85.30
86.80
88.30
89.80
91.30
92.80
93.03
0.5
1.0
1
2
3
4
5
6
7
CC
N6
N8
Void
5G 8/1
5G 8/1
N8
5G 8/1
N8
N9
N8
5G 8/1
FORAMINIFERAL NANNOFOSSIL OOZE, dominantly very light gray (N8), with thin layers of white (N9), gray (N6) and light greenish gray (5G 8/1).
SMEAR SLIDE SUMMARY (%):
3, 60
D
Texture:
Silt 1
Clay 99
Composition:
Quartz 17
Feldspar TR
Carbonate unspec. TR
Foraminifers 14
Calc. nannofossils 69
ORGANIC CARBON AND CARBONATE (%):
1, 30
Organic carbon –
Carbonate 95

SITE 608 HOLE CORE 11 CORED INTERVAL 93.4–103.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL4 *Globorotalia altispira*	NN16 *Discoaster surculus* Zone			93.40, 94.90, 96.40, 97.90, 99.40, 100.90, 102.26, 102.47	1, 2, 3, 4, 5, 6, CC	0.5, 1.0				*	
		AG	AP	RG	RP								

Color notes: 5G 7/1, 5G 6/2; N7, 5GY 8/1; N7; N7; N7 and 5G 8/1; N6

FORAMINIFERAL NANNOFOSSIL OOZE, very light gray (N8). Faint laminae of gray and green (5G 7/1, 5G 6/2, 5GY 8/1). Multiple laminae of light gray (N7).

SMEAR SLIDE SUMMARY (%):

	1, 69	5, 90
	M	D
Texture:		
Silt	2	2
Clay	98	98
Composition:		
Quartz	12	20
Feldspar	1	TR
Volcanic glass	TR	–
Carbonate unspec.	2	TR
Foraminifers	27	18
Calc. nannofossils	68	56

ORGANIC CARBON AND CARBONATE (%):

	2, 111
Organic carbon	–
Carbonate	93

SITE 608 HOLE CORE 12 CORED INTERVAL 103.0–112.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL3 *Globorotalia seminulina*	NN16 *Discoaster surculus* Zone; NN15 *Reticulofenestra pseudoumbilica* Zone			103.00, 104.50, 106.00, 107.50, 109.00, 110.50, 111.87, 112.03	1, 2, 3, 4, 5, 6, CC	0.5, 1.0				*	
		AG	AM	B	B								

Color notes: N9, 5GY 8/1, 5GY 8/1

FORAMINIFERAL NANNOFOSSIL OOZE, very light gray (N8)

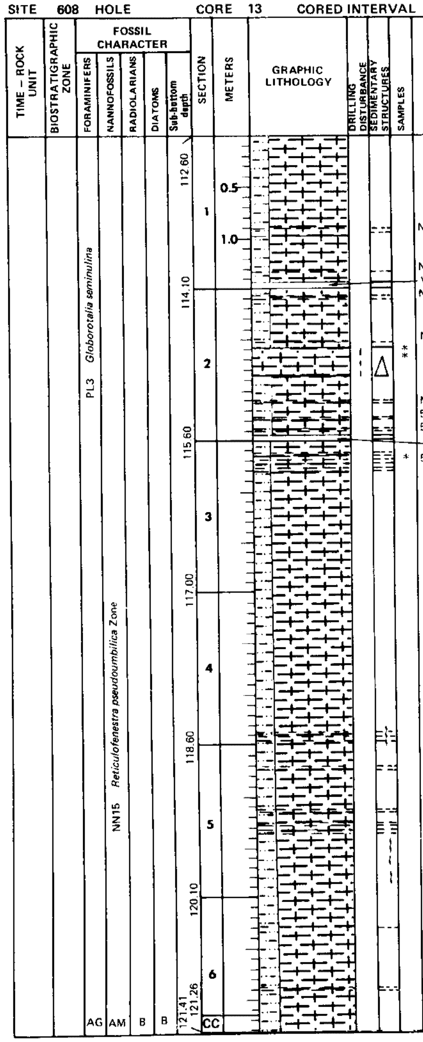
SMEAR SLIDE SUMMARY (%):

	3, 90
	D
Texture:	
Silt	2
Clay	98
Composition:	
Quartz	9
Feldspar	1
Foraminifers	11
Calc. nannofossils	79

ORGANIC CARBON AND CARBONATE (%):

	2, 110
Organic carbon	–
Carbonate	95

SITE 608 HOLE CORE 13 CORED INTERVAL 112.6–122.2 m



LITHOLOGIC DESCRIPTION

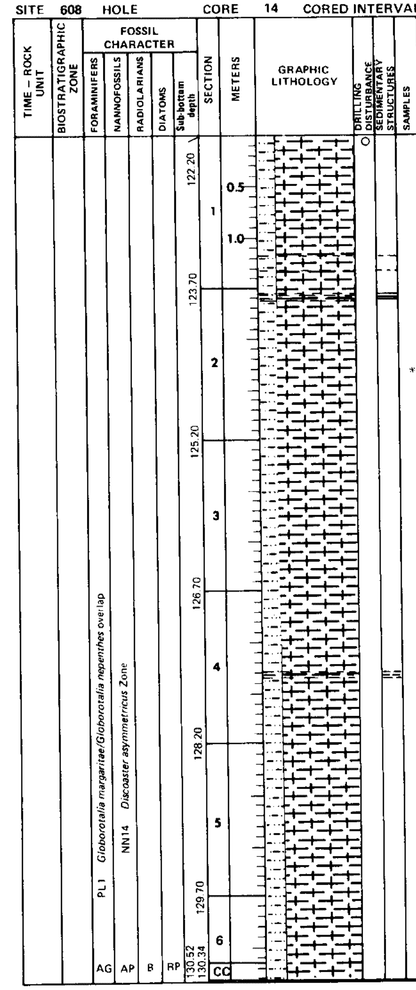
FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) and very light gray (N8). Occasional layers and multiple laminations of light gray (N7), and mottles of gray (N5–6). Multiple green (5G 8/1) laminations 115.75 to 115.91 m.

Watery NANNOFOSSIL FORAMINIFERAL SAND 114.69–114.95 m. Sequence fines upward.

SMEAR SLIDE SUMMARY (%):

	2, 57	2, 61	3, 15
	M	M	M
Composition:			
Quartz	15	5	15
Feldspar	–	–	TR
Heavy minerals	–	TR	10
Clay	–	–	5
Pyrite	10	–	–
Foraminifers	10	50	10
Calc. nannofossils	65	45	60

SITE 608 HOLE CORE 14 CORED INTERVAL 122.2–131.8 m



LITHOLOGIC DESCRIPTION

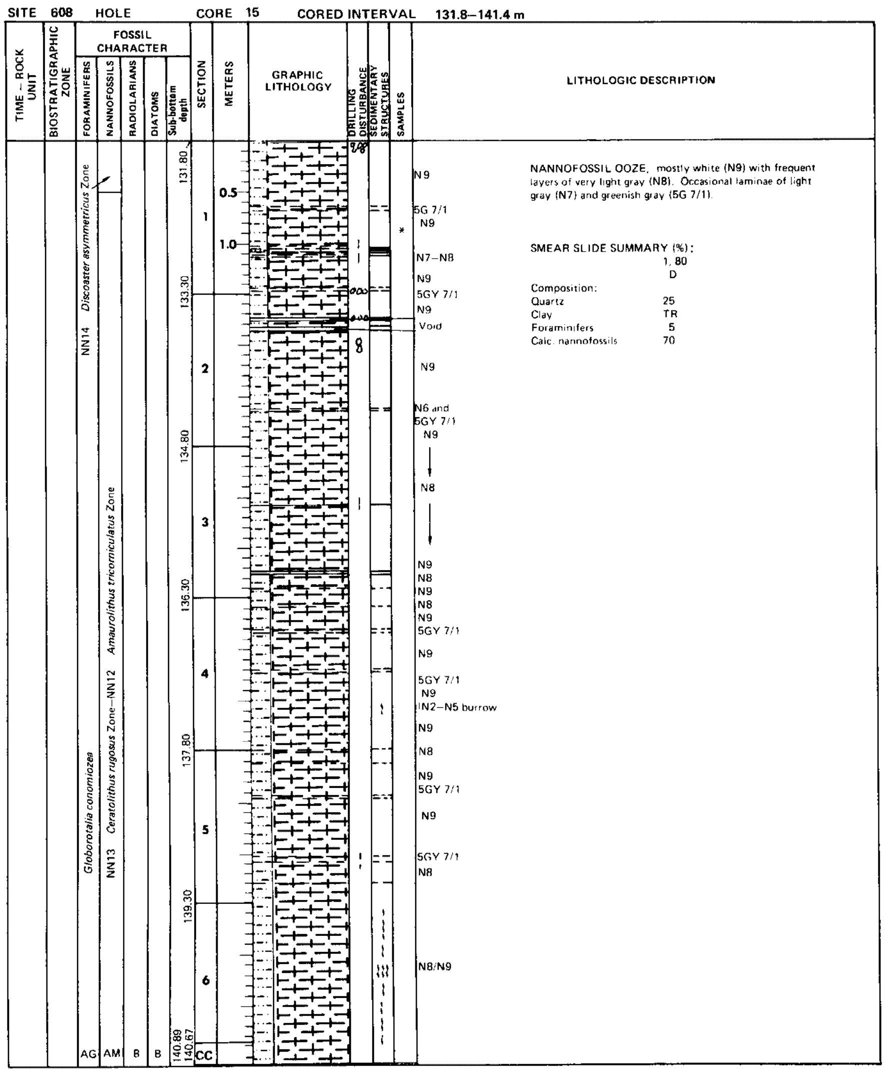
NANNOFOSSIL OOZE, white (N9), rare gray (N5–7) layers and laminae.

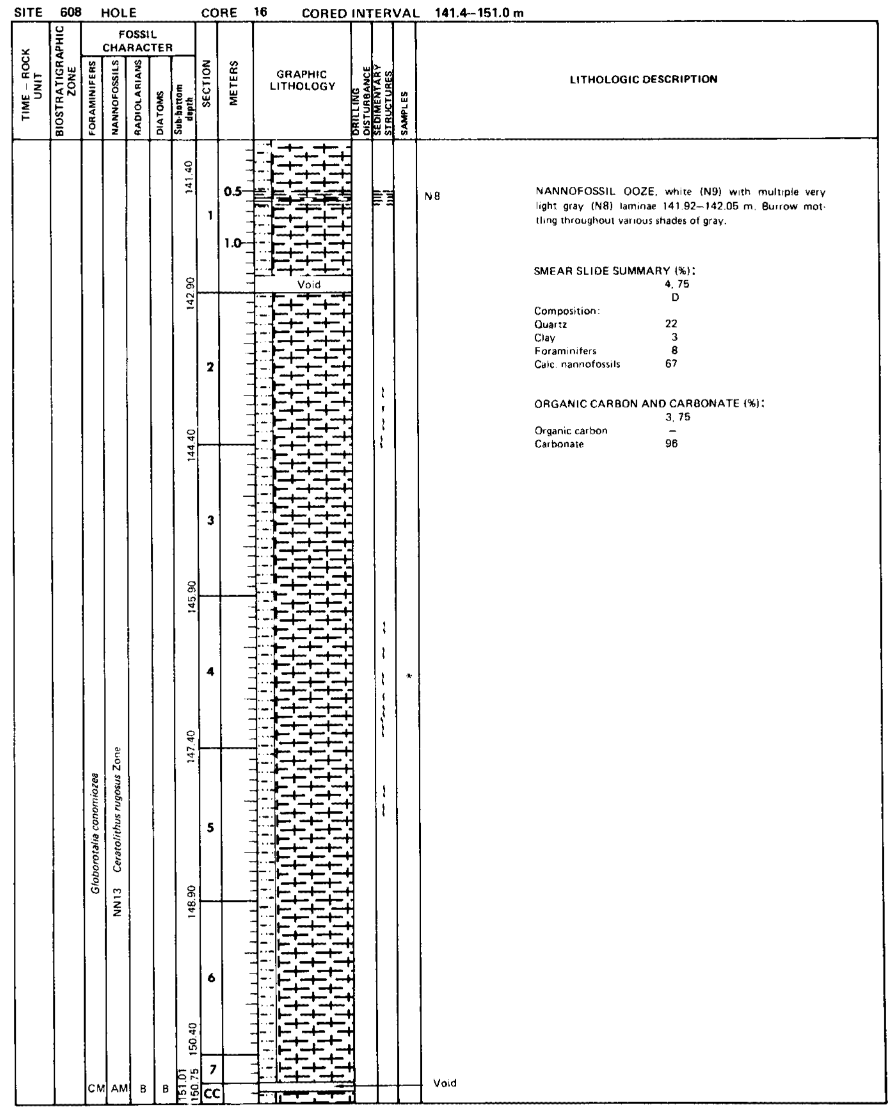
SMEAR SLIDE SUMMARY (%):

	2, 80
	D
Composition:	
Quartz	23
Clay	2
Foraminifers	7
Calc. nannofossils	68

ORGANIC CARBON AND CARBONATE (%):

	2, 80
Organic carbon	–
Carbonate	96


SITE 608 HOLE CORE 15 CORED INTERVAL 131.8–141.4 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
Globorotalia conomiozea
NN14 Discoaster asymmetricus Zone
NN13 Ceratolithus rugosus Zone–NN12 Amaurolithus tricorniculatus Zone
AG AM B B
131.80
133.30
134.80
136.30
137.80
139.30
140.89
140.67
1
2
3
4
5
6
CC
0.5
1.0
Void
N9
5G 7/1
N9
N7–N8
N9
5GY 7/1
N9
Void
N9
N6 and 5GY 7/1
N9
N8
N9
N8
N9
N8
N9
5GY 7/1
N9
5GY 7/1
N9
N2–N5 burrow
N9
N8
N9
5GY 7/1
N9
5GY 7/1
N8
N8/N9
NANNOFOSSIL OOZE, mostly white (N9) with frequent layers of very light gray (N8). Occasional laminae of light gray (N7) and greenish gray (5G 7/1).
SMEAR SLIDE SUMMARY (%):
1, 80
D
Composition:
Quartz 25
Clay TR
Foraminifers 5
Calc. nannofossils 70


SITE 608 HOLE CORE 16 CORED INTERVAL 141.4–151.0 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
Globorotalia conomiozea
NN13 Ceratolithus rugosus Zone
CM AM B B
141.40
142.90
144.40
145.90
147.40
148.90
150.40
151.01
150.75
1
2
3
4
5
6
7
CC
0.5
1.0
Void
N8
Void
NANNOFOSSIL OOZE, white (N9) with multiple very light gray (N8) laminae 141.92–142.05 m. Burrow mottling throughout various shades of gray.
SMEAR SLIDE SUMMARY (%):
4, 75
D
Composition:
Quartz 22
Clay 3
Foraminifers 8
Calc. nannofossils 67
ORGANIC CARBON AND CARBONATE (%):
3, 75
Organic carbon –
Carbonate 96

SITE 608 HOLE CORE 17 CORED INTERVAL 151.0–156.5 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: CM — Reworked lower Miocene

Nannofossils: AM — NN13 *Ceratolithus rugosus* Zone–NN12 *Amaurolithus tricorniculatus* Zone / NN11 *Discoaster quinqueramus* Zone

Radiolarians: B

Diatoms: B

Sub-bottom depth: 151.00, 152.50, 154.00, 155.50, 156.33, 156.60

Sections: 1, 2, 3, 4, CC

Meters: 0.5, 1.0

NANNOFOSSIL OOZE, white (N9) with burrow mottling of various shades of gray.

SITE 608 HOLE CORE 18 CORED INTERVAL 156.5–166.1 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: CM — Reworked lower Miocene

Nannofossils: AM — NN11 *Discoaster quinqueramus* Zone

Radiolarians: B

Diatoms: RP

Sub-bottom depth: 156.50, 158.00, 159.50, 161.00, 162.50, 164.00, 164.68, 164.93

Sections: 1, 2, 3, 4, 5, 6, CC

Meters: 0.5, 1.0

Graphic lithology: PP

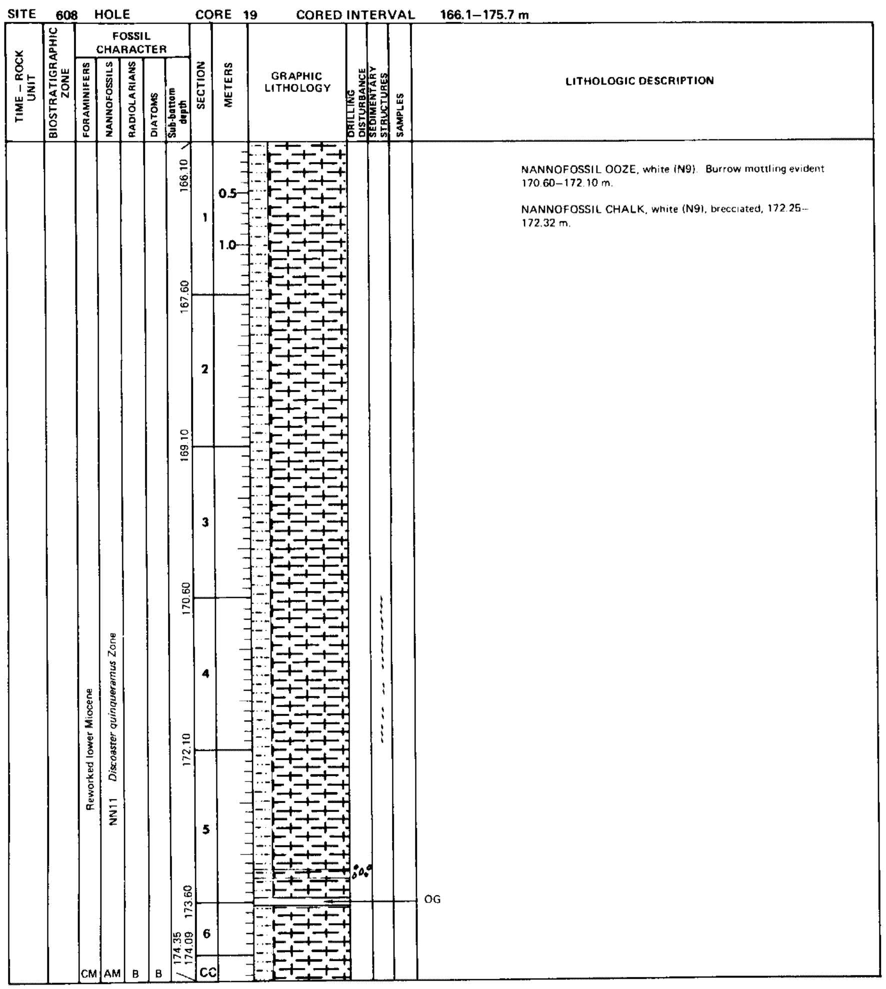
NANNOFOSSIL OOZE, white (N9) with occasional gray (N4–7) mottles.

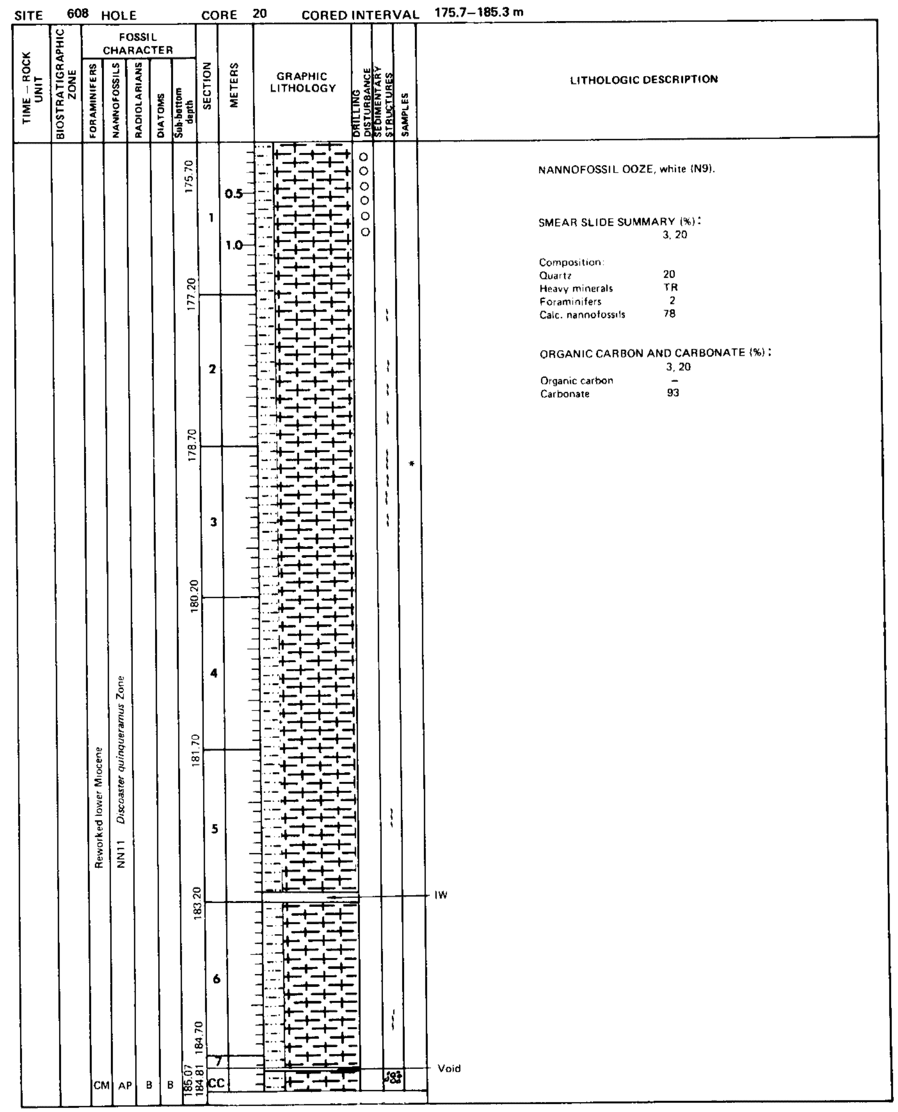
SMEAR SLIDE SUMMARY (%):

	4, 90
Composition:	
Quartz	15
Heavy minerals	TR
Pyrite	TR
Foraminifers	2
Calc. nannofossils	83

ORGANIC CARBON AND CARBONATE (%):

	4, 90
Organic carbon	–
Carbonate	95

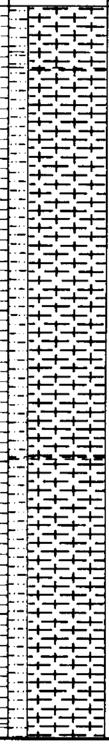

SITE 608 HOLE CORE 19 CORED INTERVAL 166.1–175.7 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
Reworked lower Miocene
NN11 Discoaster quinqueramus Zone
CM AM B B
166.10
167.60
169.10
170.60
172.10
173.60
174.09
174.35
1 2 3 4 5 6 CC
0.5
1.0
OG
NANNOFOSSIL OOZE, white (N9). Burrow mottling evident 170.60–172.10 m.
NANNOFOSSIL CHALK, white (N9), brecciated, 172.25–172.32 m.


SITE 608 HOLE CORE 20 CORED INTERVAL 175.7–185.3 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
Reworked lower Miocene
NN11 Discoaster quinqueramus Zone
CM AP B B
175.70
177.20
178.70
180.20
181.70
183.20
184.70
184.81
185.07
1 2 3 4 5 6 7 CC
0.5
1.0
IW
Void
NANNOFOSSIL OOZE, white (N9).
SMEAR SLIDE SUMMARY (%):
3, 20
Composition:
Quartz 20
Heavy minerals TR
Foraminifers 2
Calc. nannofossils 78
ORGANIC CARBON AND CARBONATE (%):
3, 20
Organic carbon –
Carbonate 93

SITE 608 HOLE CORE 21 CORED INTERVAL 185.3–194.9 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		AM Reworked lower Miocene	AP NN11 *Discoaster quinqueramus* Zone	B	B	185.30	1	0.5, 1.0
						186.80	2	
						188.30	3	
						189.80	4	
						191.30	5	
						192.39, 192.52	CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

N6

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white (N9)

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9), 85.77–85.92 m.

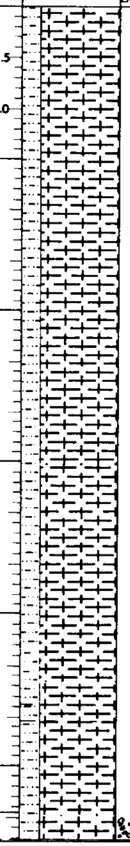
SMEAR SLIDE SUMMARY (%):

	1, 57
	D
Composition:	
Quartz	15
Heavy minerals	TR
Foraminifers	15
Calc. nannofossils	70

SITE 608 HOLE CORE 22 CORED INTERVAL 194.9–204.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		AM Reworked lower Miocene	AP NN11 *Discoaster quinqueramus* Zone	B	B	194.9	1	0.5, 1.0
						196.4	2	
						197.9	3	
						199.4	4	
						200.9	5	
						202.4	6	
						202.85, 203.12	CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

N9 to N8

N8

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) to very light gray (N8). Sediment firm, becoming chalky.

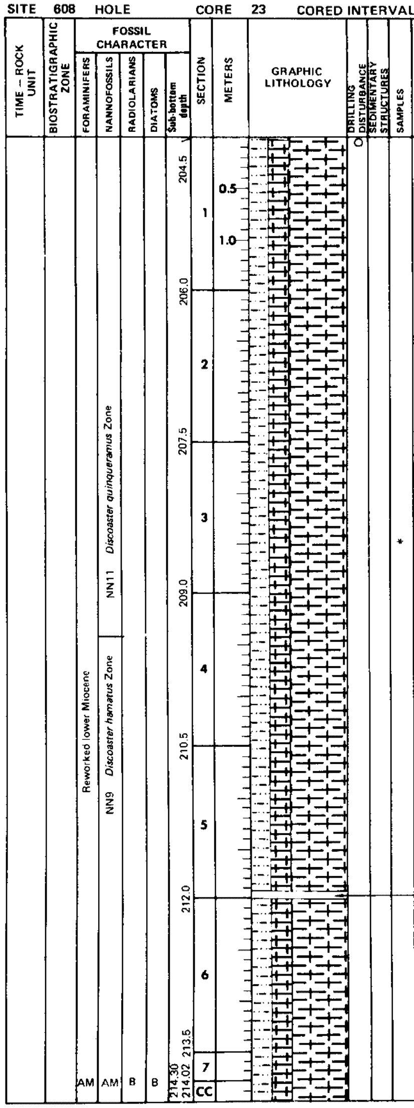
SMEAR SLIDE SUMMARY (%):

	6, 36
	D
Composition:	
Quartz	30
Feldspar	TR
Foraminifers	10
Calc. nannofossils	60

ORGANIC CARBON AND CARBONATE (%):

	6, 36
Organic carbon	–
Carbonate	92

SITE 608 HOLE CORE 23 CORED INTERVAL 204.5–214.1 m



LITHOLOGIC DESCRIPTION

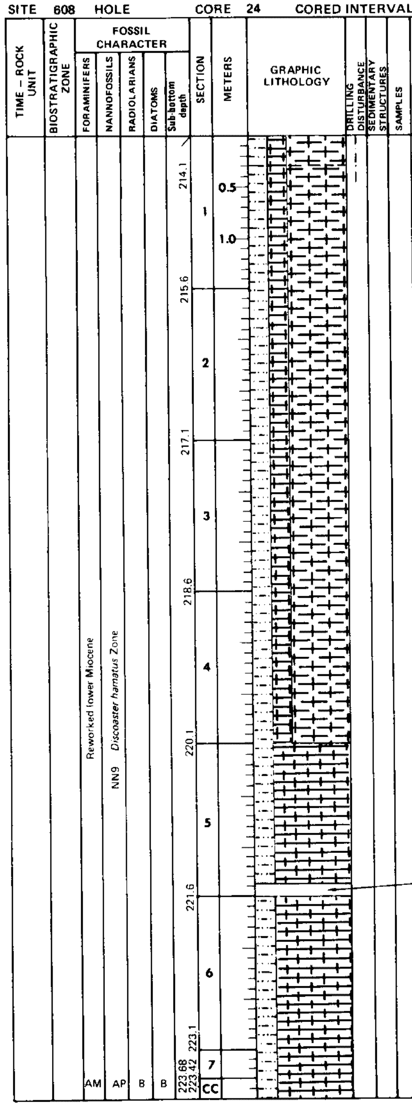
NANNOFOSSIL OOZE, white (N9) with occasional chalky intervals. Sediment stiffness increases noticeably below 212 m.

note: this core recovered >100%

SMEAR SLIDE SUMMARY (%):

	3, 96
	D
Composition:	
Quartz	30
Feldspar	1
Clay	5
Carbonate unspec.	1
Foraminifers	5
Calc. nannofossils	58

SITE 608 HOLE CORE 24 CORED INTERVAL 214.1–223.7 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE/CHALK, white (N9). This core changes from ~20% chalk at the top to mostly chalk by 220.1 m.

SMEAR SLIDE SUMMARY (%):

	1, 15
	D
Composition:	
Quartz	23
Feldspar	1
Clay	7
Carbonate unspec.	3
Foraminifers	4
Calc. nannofossils	62

ORGANIC CARBON AND CARBONATE (%):

	1, 15
Organic carbon	–
Carbonate	93

SITE 608 HOLE CORE 25 CORED INTERVAL 223.7–233.3 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		Reworked lower Miocene	NN7 *Discoaster kugleri* Zone			223.7	1	0.5, 1.0					NANNOFOSSIL CHALK, white (N9).
						226.2	2						Note: this core recovered 100%.
						226.7	3						
						228.2	4						N6 lens of pyrite
						229.7	5						1W
						231.2	6						
						232.7	7						
		AM	AP	B	B	233.12, 233.49, 233.40	CC						

SMEAR SLIDE SUMMARY (%):

	1, 75
Composition:	
Quartz	22
Feldspar	1
Clay	6
Carbonate unspec.	3
Foraminifers	8
Calc. nannofossils	60

SITE 608 HOLE CORE 26 CORED INTERVAL 233.3–242.9 m

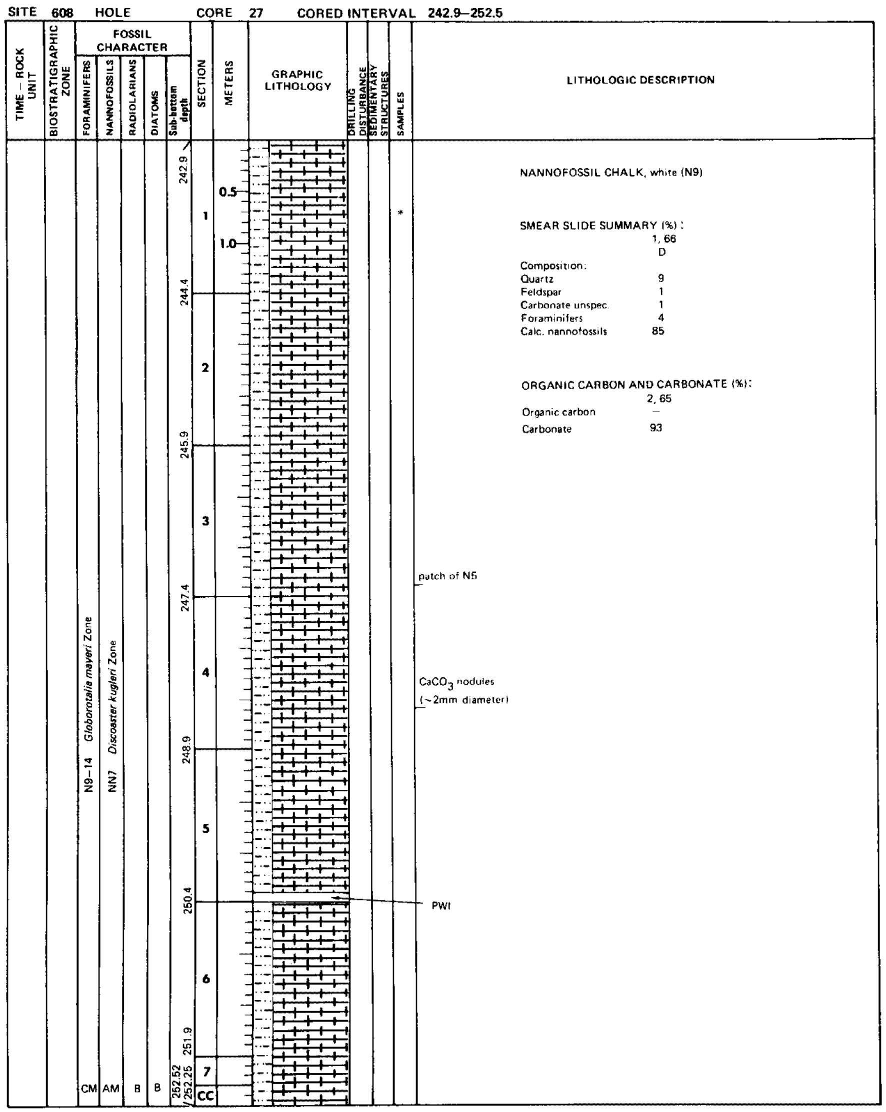
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		Reworked lower Miocene	NN7 *Discoaster kugleri* Zone			233.3	1	0.5, 1.0					NANNOFOSSIL CHALK, white (N9).
						234.8	2						Note: beginning at 237.8 m cores split with saw. Sediment frequently fractured but fractures appear natural because fracture faces darkened with pyrite.
						236.3	3						
						237.8	4					*	N8 to N6 to N8
						239.3	5						N7
													N8
						240.8	6						OG
		CM	AM	B	B	241.1, 241.35	CC						

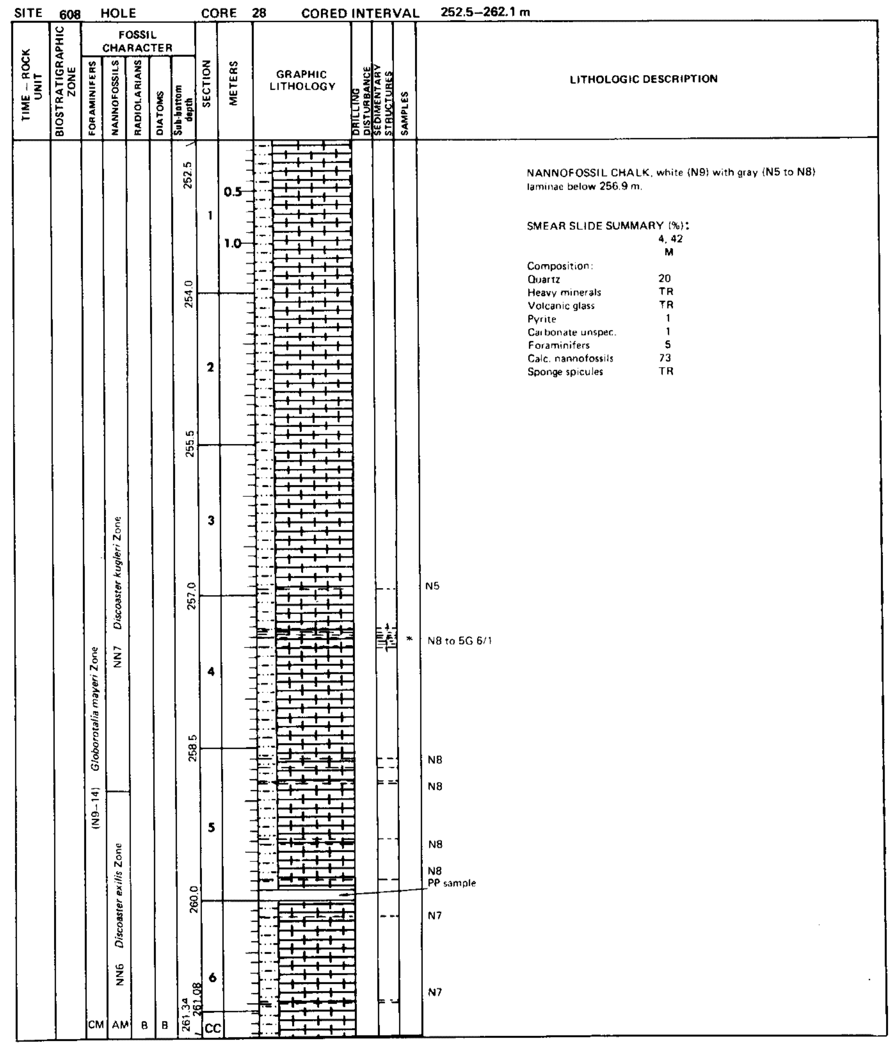
SMEAR SLIDE SUMMARY (%):

	3, 143
	M
Composition:	
Quartz	35
Feldspar	TR
Clay	8
Carbonate unspec.	2
Foraminifers	3
Calc. nannofossils	52

ORGANIC CARBON AND CARBONATE (%):

	3, 143
Organic carbon	–
Carbonate	80


SITE 608 HOLE CORE 27 CORED INTERVAL 242.9–252.5
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
N9–14 Globorotalia mayeri Zone
NN7 Discoaster kugleri Zone
CM AM B B
242.9
244.4
245.9
247.4
248.9
250.4
251.9
252.25
252.52
1
2
3
4
5
6
7
CC
0.5
1.0
*
patch of N5
$CaCO_3$ nodules (~2mm diameter)
PWI
NANNOFOSSIL CHALK, white (N9)
SMEAR SLIDE SUMMARY (%):
1, 66
D
Composition:
Quartz 9
Feldspar 1
Carbonate unspec. 1
Foraminifers 4
Calc. nannofossils 85
ORGANIC CARBON AND CARBONATE (%):
2, 65
Organic carbon –
Carbonate 93


SITE 608 HOLE CORE 28 CORED INTERVAL 252.5–262.1 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
(N9–14) Globorotalia mayeri Zone
NN7 Discoaster kugleri Zone
NN6 Discoaster exilis Zone
CM AM B B
252.5
254.0
255.5
257.0
258.5
260.0
261.08
261.34
1
2
3
4
5
6
CC
0.5
1.0
N5
N8 to 5G 6/1
*
N8
N8
N8
N8
PP sample
N7
N7
NANNOFOSSIL CHALK, white (N9) with gray (N5 to N8) laminae below 256.9 m.
SMEAR SLIDE SUMMARY (%):
4, 42
M
Composition:
Quartz 20
Heavy minerals TR
Volcanic glass TR
Pyrite 1
Carbonate unspec. 1
Foraminifers 5
Calc. nannofossils 73
Sponge spicules TR

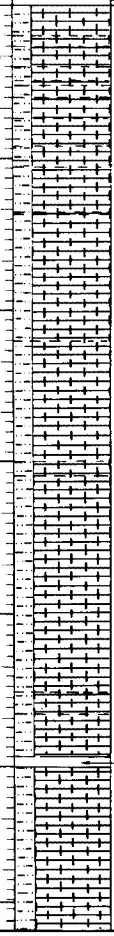
SITE 608 HOLE CORE 29 CORED INTERVAL 262.1–271.7 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: (N9–14) *Globorotalia mayeri* Zone; CM
Nannofossils: NN6 *Discoaster exilis* Zone; AM
Radiolarians: RP, FM, FG; RP
Diatoms: *Coscinodiscus gigas* var *diorama* Zone; AM

Sub-bottom depth: 262.1, 263.6, 265.1, 266.6, 268.1, 269.6, 270.94, 271.20

Sections: 1, 2, 3, 4, 5, 6, CC
Meters: 0.5, 1.0



Colors: N8; N7 to 5G 6/1; N8; 5G 6/1 alternating with N8; N8; 5G 7/2; 5G 7/2; N5; N8; N8; IW; N7 patches

NANNOFOSSIL CHALK, white (N9) with several layers of gray (N5–8). Interval 262.7 to 263.5 m marked by alternating laminae of very light gray (N8), light gray (N7), and greenish gray (5G 6/1). Pale green (5G 7/2) laminae at 263.6 to 264.3 m.

SMEAR SLIDE SUMMARY (%):

	1, 65
	D
Composition:	
Quartz	30
Feldspar	TR
Carbonate unspec.	1
Foraminifers	4
Calc. nannofossils	65

ORGANIC CARBON AND CARBONATE (%):

	1, 115
Organic carbon	–
Carbonate	95

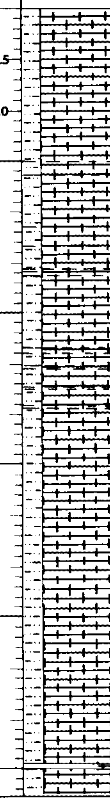
SITE 608 HOLE CORE 30 CORED INTERVAL 271.7–281.3 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: (N9–14) *Globorotalia mayeri* Zone; FM
Nannofossils: NN6 *Discoaster exilis* Zone; AM
Radiolarians: FM; RM
Diatoms: *Coscinodiscus gigas* var *diorama* Zone; AG; CM

Sub-bottom depth: 271.7, 273.2, 274.1, 276.2, 277.7, 279.2, 279.45

Sections: 1, 2, 3, 4, 5, CC
Meters: 0.5, 1.0



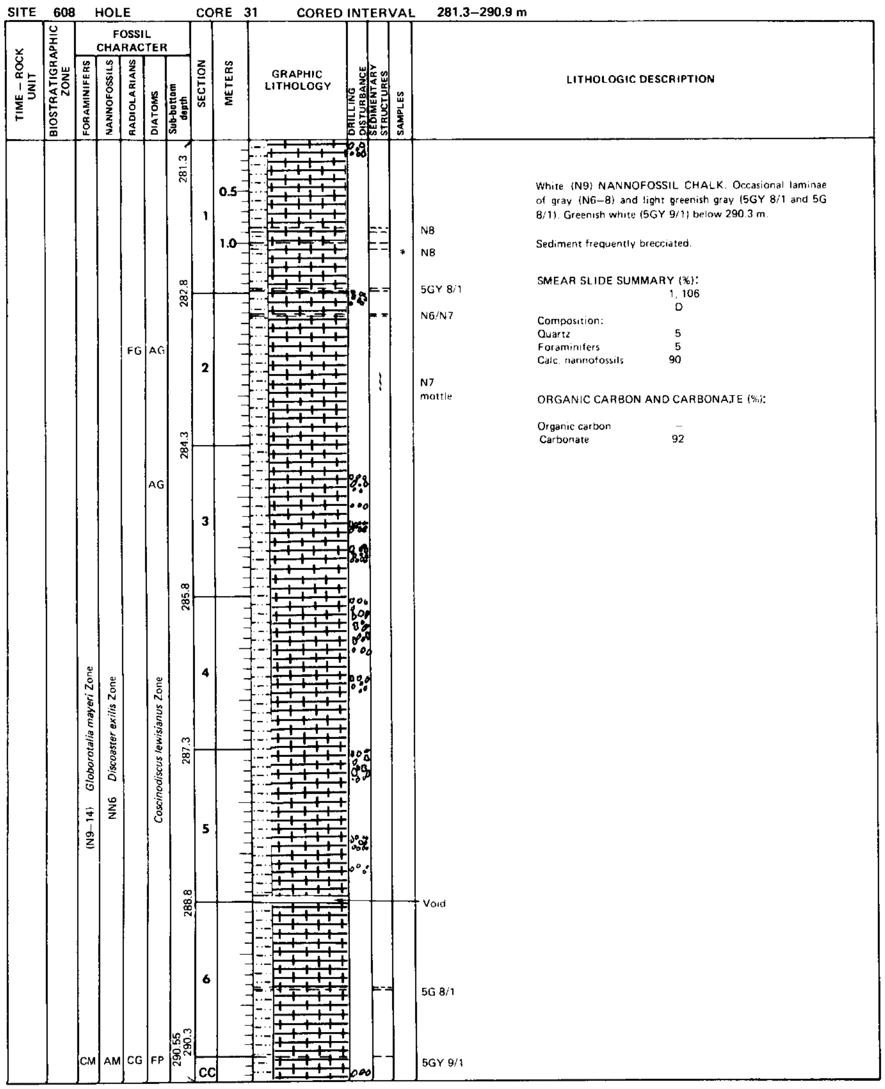
Colors: N9; N8; N9; 5G 8/1; 5GY 9/1; * N6; N7/N8; N7/N8; N7/N8; N7/N8; OG

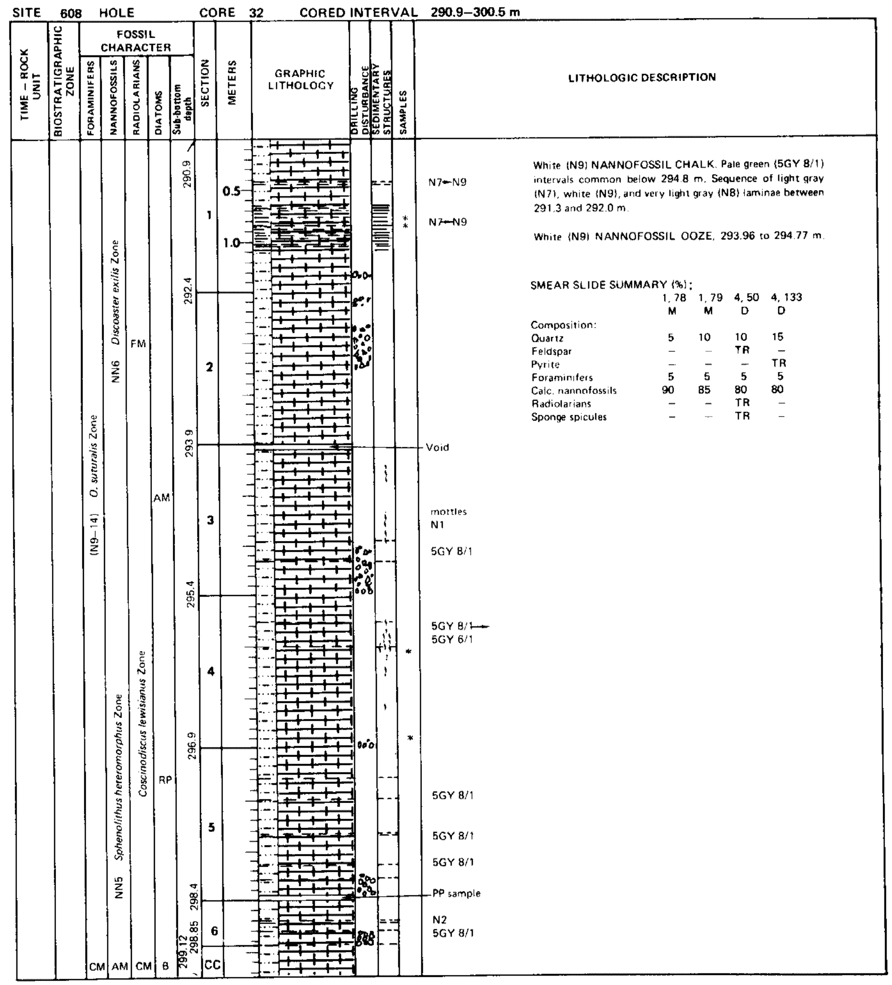
NANNOFOSSIL CHALK, 271.7 to 273.2 m, white (N9). Dominantly greenish white (5GY 9/1) at 274.2 to 279.45 m.

Laminae of gray (N6–8) and light green gray (5GY 8/1) at 273.2 to 275.7 m.

SMEAR SLIDE SUMMARY (%):

	1, 106
Composition:	
Quartz	23
Feldspar	TR
Foraminifers	9
Calc. nannofossils	68


SITE 608 HOLE CORE 31 CORED INTERVAL 281.3–290.9 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
(N9–14) Globorotalia mayeri Zone
NN6 Discoaster exilis Zone
Coscinodiscus lewisianus Zone
FG AG
AG
CM AM CG FP
281.3
282.8
284.3
285.8
287.3
288.8
290.3
290.55
1
2
3
4
5
6
CC
0.5
1.0
N8
N8
5GY 8/1
N6/N7
N7 mottle
Void
5G 8/1
5GY 9/1
White (N9) NANNOFOSSIL CHALK. Occasional laminae of gray (N6–8) and light greenish gray (5GY 8/1 and 5G 8/1). Greenish white (5GY 9/1) below 290.3 m.
Sediment frequently brecciated.
SMEAR SLIDE SUMMARY (%):
1, 106
D
Composition:
Quartz 5
Foraminifers 5
Calc. nannofossils 90
ORGANIC CARBON AND CARBONATE (%):
Organic carbon –
Carbonate 92


SITE 608 HOLE CORE 32 CORED INTERVAL 290.9–300.5 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
(N9–14) O. suturalis Zone
NN6 Discoaster exilis Zone
NN5 Sphenolithus heteromorphus Zone
Coscinodiscus lewisianus Zone
FM
AM
RP
CM AM CM B
290.9
292.4
293.9
295.4
296.9
298.4
298.85
299.12
1
2
3
4
5
6
CC
0.5
1.0
N7←N9
N7←N9
Void
mottles
N1
5GY 8/1
5GY 8/1
5GY 6/1
5GY 8/1
5GY 8/1
5GY 8/1
PP sample
N2
5GY 8/1
White (N9) NANNOFOSSIL CHALK. Pale green (5GY 8/1) intervals common below 294.8 m. Sequence of light gray (N7), white (N9), and very light gray (N8) laminae between 291.3 and 292.0 m.
White (N9) NANNOFOSSIL OOZE, 293.96 to 294.77 m.
SMEAR SLIDE SUMMARY (%):
1, 78 1, 79 4, 50 4, 133
M M D D
Composition:
Quartz 5 10 10 15
Feldspar – – TR –
Pyrite – – – TR
Foraminifers 5 5 5 5
Calc. nannofossils 90 85 80 80
Radiolarians – – TR –
Sponge spicules – – TR –

SITE 608 HOLE CORE 33 CORED INTERVAL 300.5–310.1 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		(N9–14) *O. suturalis* Zone	NN5 *Sphenolithus heteromorphus* Zone			300.5	1	0.5, 1.0
						302.00	2	
						303.50	3	
		FM	AM	B	RP	304.17	CC	

Colors (top to bottom): 5GY 8/1; N8; 5GY 8/1; Void; 5GY 8/1; 5GY 8/1

LITHOLOGIC DESCRIPTION

White (N9) NANNOFOSSIL CHALK. Several layers of very light green (5GY 8/1).

SMEAR SLIDE SUMMARY (%):

	1, 143
	D
Composition:	
Quartz	20
Clay	TR
Volcanic glass	5
Carbonate unspec.	40
Foraminifers	2
Calc. nannofossils	33

SITE 608 HOLE CORE 34 CORED INTERVAL 310.1–319.7 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		(N8) *P. glomerosa curva* Zone	NN5 *Sphenolithus heteromorphus* Zone			310.1	1	0.5, 1.0
						311.6	2	
						313.1	3	
						314.6	4	
						316.1	5	
						317.6	6	
		CM	AM	B	RP	318.95	CC	

Colors (top to bottom): 5GY 7/1; N9; 5GY 7/1; N9; 5GY 8/1, 5GY 7/1; 5GY 8/1; N9; 5GY 8/1; N9; 5GY 8/1; N9; 5GY 8/1; N4 mottling; N9; 5GY 8/1; 5GY 7/1; N9; 5GY 8/1; N9; 5GY 8/1; N9; 5GY 8/1; N9; 5GY8/1; 5GY 7/1; 5GY 8/1; 5GY 7/1; OG sample; N9 to 5GY 8/1; N7; 5GY 8/1

Samples: *

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, dominantly white (N9) at 310.1 to 315.3 m, with occasional light greenish gray (5GY 8/1) intervals. Dominantly light greenish gray (5GY 8/1) with occasional white (N9) below 315.3 m.

Zoophycos burrows frequent throughout core.

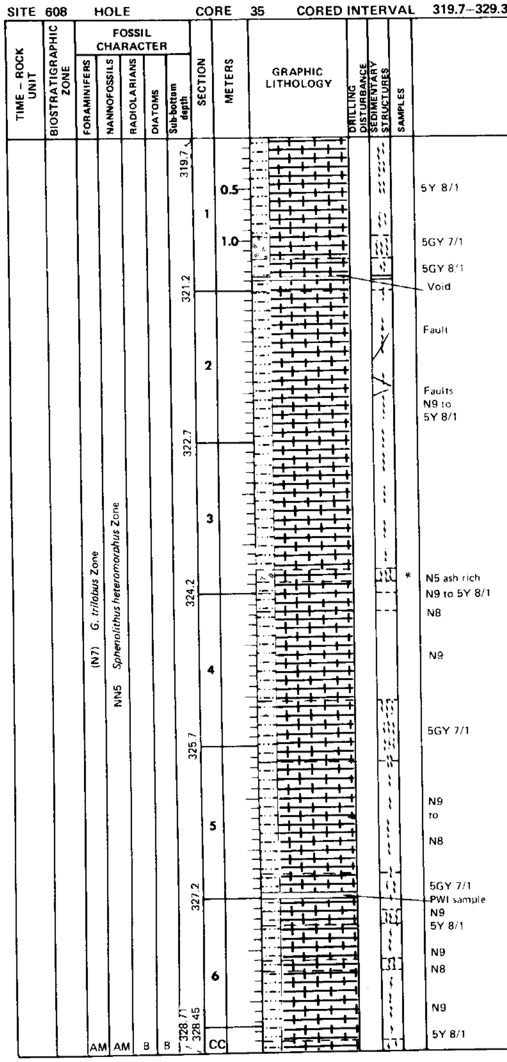
SMEAR SLIDE SUMMARY (%):

	1, 54
	D
Composition:	
Quartz	19
Volcanic glass	2
Carbonate unspec.	TR
Foraminifers	1
Calc. nannofossils	78

ORGANIC CARBON AND CARBONATE (%):

	1, 53
Organic carbon	–
Carbonate	86

SITE 608 HOLE CORE 35 CORED INTERVAL 319.7–329.3 m



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL CHALK, mostly white (N9) to yellowish gray (5Y 8/1), light greenish gray (5GY 8/1), and light gray (N8, 5Y 7/1). Occasional *Zoophycos* burrows, especially in Section 1.

Volcanic ash and glass common ~320.7 and ~324.0 m.

Microfaults and slickensides evident, 321.6 to 322.2 m.

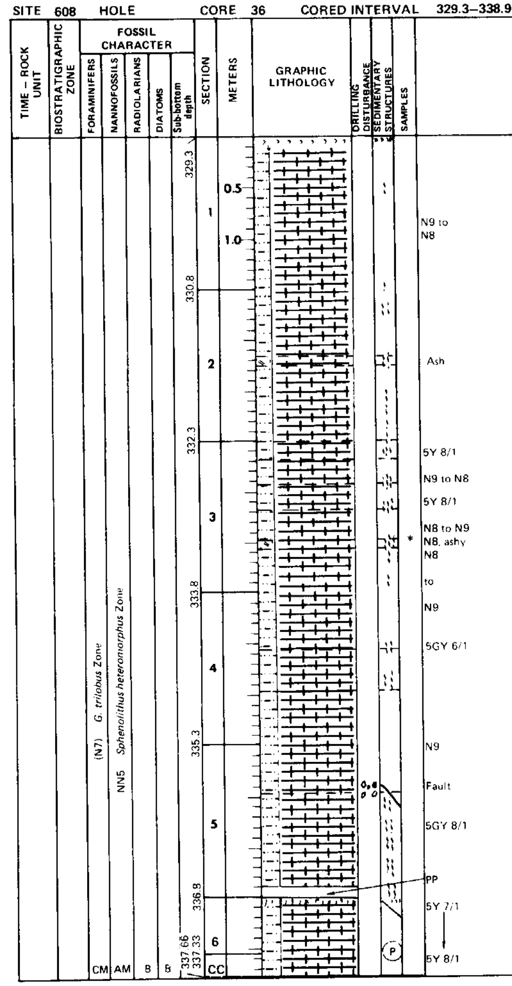
SMEAR SLIDE SUMMARY (%):

	3, 140
	M
Composition:	
Quartz	15
Clay	TR
Volcanic glass	15
Foraminifers	1
Calc. nannofossils	69

ORGANIC CARBON AND CARBONATE (%):

	3, 130
Organic carbon	–
Carbonate	69

SITE 608 HOLE CORE 36 CORED INTERVAL 329.3–338.9 m



LITHOLOGIC DESCRIPTION

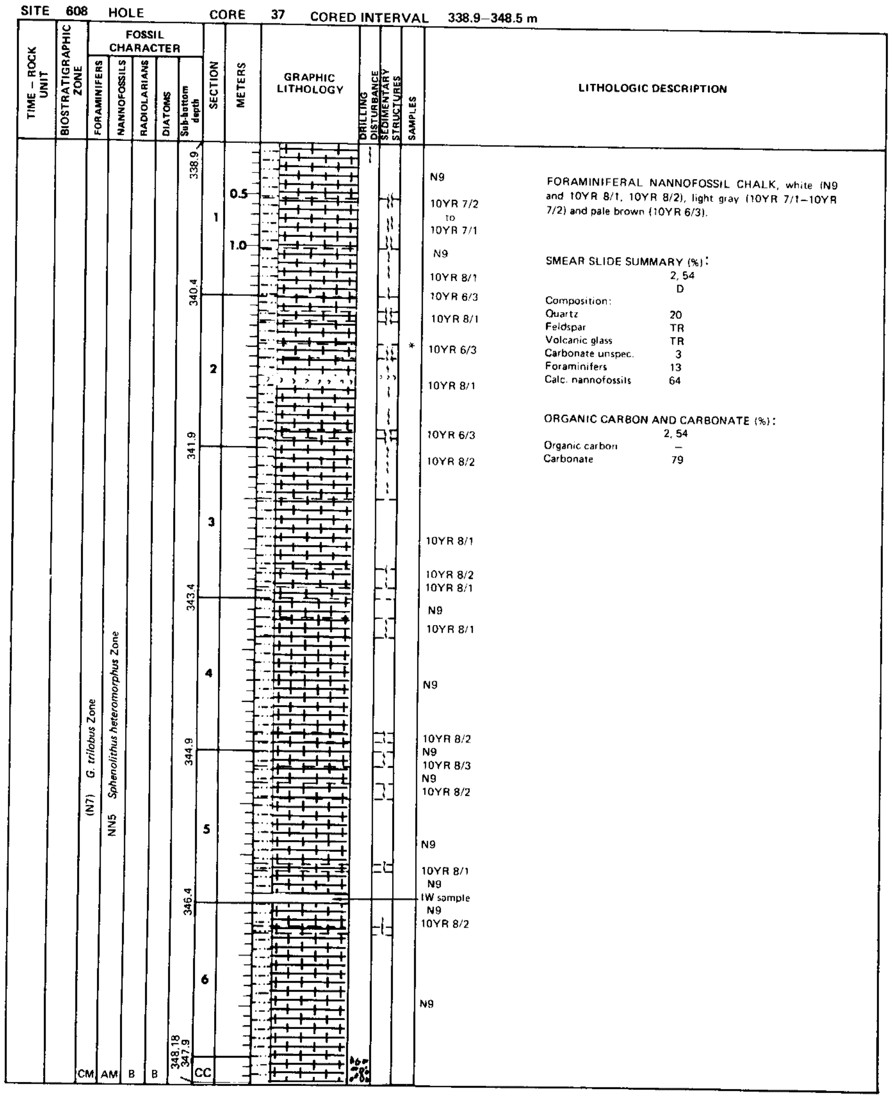
FORAMINIFERAL NANNOFOSSIL CHALK, white (N9) to various shades of gray (N8, 5Y 8/1, 5GY 8/1).

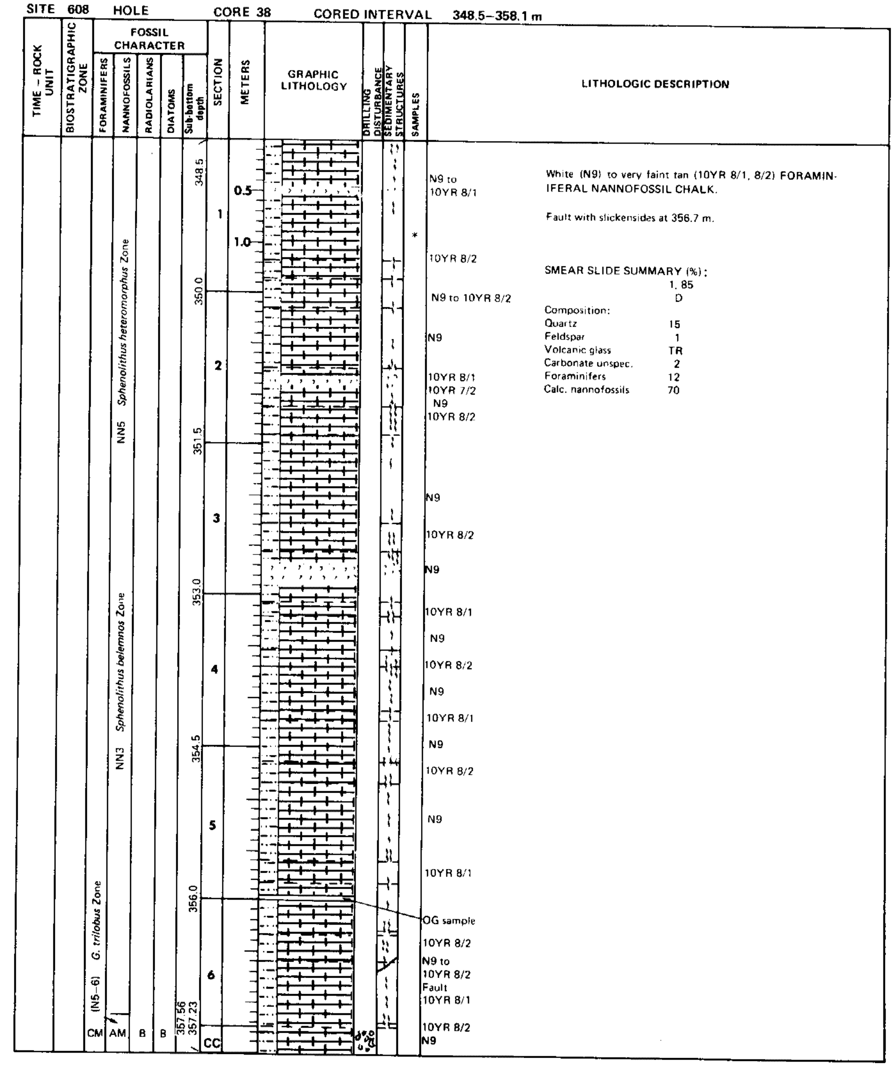
Microfault at ~335.8 and 336.9 m. Two intervals where burrows show subhorizontal streaming (~332.8 and ~337.0 m). At upper interval *Zoophycos* burrows crosscut subhorizonational burrows.

Volcanic ash present ~331.5 and ~333.3 m.

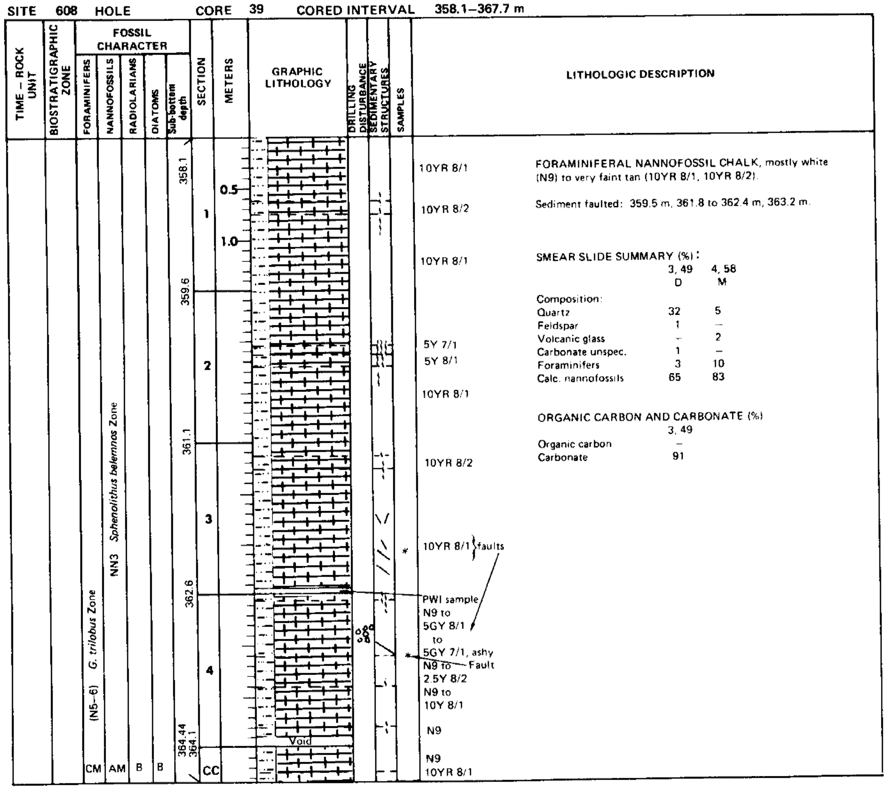
SMEAR SLIDE SUMMARY (%):

	3, 95	2, 70
	D	M
Composition:		
Quartz	10	18
Feldspar	TR	–
Clay	–	TR
Volcanic glass	TR	12
Carbonate unspec.	6	5
Foraminifers	17	5
Calc. nannofossils	67	60


SITE 608 HOLE CORE 37 CORED INTERVAL 338.9–348.5 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
(N7) G. trilobus Zone
NN5 Sphenolithus heteromorphus Zone
CM AM B B
338.9
340.4
341.9
343.4
344.9
346.4
347.9
348.18
0.5
1.0
1
2
3
4
5
6
CC
N9
10YR 7/2 to 10YR 7/1
N9
10YR 8/1
10YR 6/3
10YR 8/1
10YR 6/3
10YR 8/1
10YR 6/3
10YR 8/2
10YR 8/1
10YR 8/2
10YR 8/1
N9
10YR 8/1
N9
10YR 8/2
N9
10YR 8/3
N9
10YR 8/2
N9
10YR 8/1
N9
IW sample
N9
10YR 8/2
N9
FORAMINIFERAL NANNOFOSSIL CHALK, white (N9 and 10YR 8/1, 10YR 8/2), light gray (10YR 7/1–10YR 7/2) and pale brown (10YR 6/3).
SMEAR SLIDE SUMMARY (%):
2, 54
D
Composition:
Quartz 20
Feldspar TR
Volcanic glass TR
Carbonate unspec. 3
Foraminifers 13
Calc. nannofossils 64
ORGANIC CARBON AND CARBONATE (%):
2, 54
Organic carbon –
Carbonate 79


SITE 608 HOLE CORE 38 CORED INTERVAL 348.5–358.1 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
(N5–6) G. trilobus Zone
NN5 Sphenolithus heteromorphus Zone
NN3 Sphenolithus belemnos Zone
CM AM B B
348.5
350.0
351.5
353.0
354.5
356.0
357.56
357.23
0.5
1.0
1
2
3
4
5
6
CC
N9 to 10YR 8/1
10YR 8/2
N9 to 10YR 8/2
N9
10YR 8/1
10YR 7/2
N9
10YR 8/2
N9
10YR 8/2
N9
10YR 8/1
N9
10YR 8/2
N9
10YR 8/1
N9
10YR 8/2
N9
10YR 8/1
OG sample
10YR 8/2
N9 to 10YR 8/2
Fault
10YR 8/1
10YR 8/2
N9
White (N9) to very faint tan (10YR 8/1, 8/2) FORAMINIFERAL NANNOFOSSIL CHALK.
Fault with slickensides at 356.7 m.
SMEAR SLIDE SUMMARY (%):
1, 85
D
Composition:
Quartz 15
Feldspar 1
Volcanic glass TR
Carbonate unspec. 2
Foraminifers 12
Calc. nannofossils 70

SITE 608 HOLE CORE 39 CORED INTERVAL 358.1–367.7 m



FORAMINIFERAL NANNOFOSSIL CHALK, mostly white (N9) to very faint tan (10YR 8/1, 10YR 8/2).

Sediment faulted: 359.5 m, 361.8 to 362.4 m, 363.2 m.

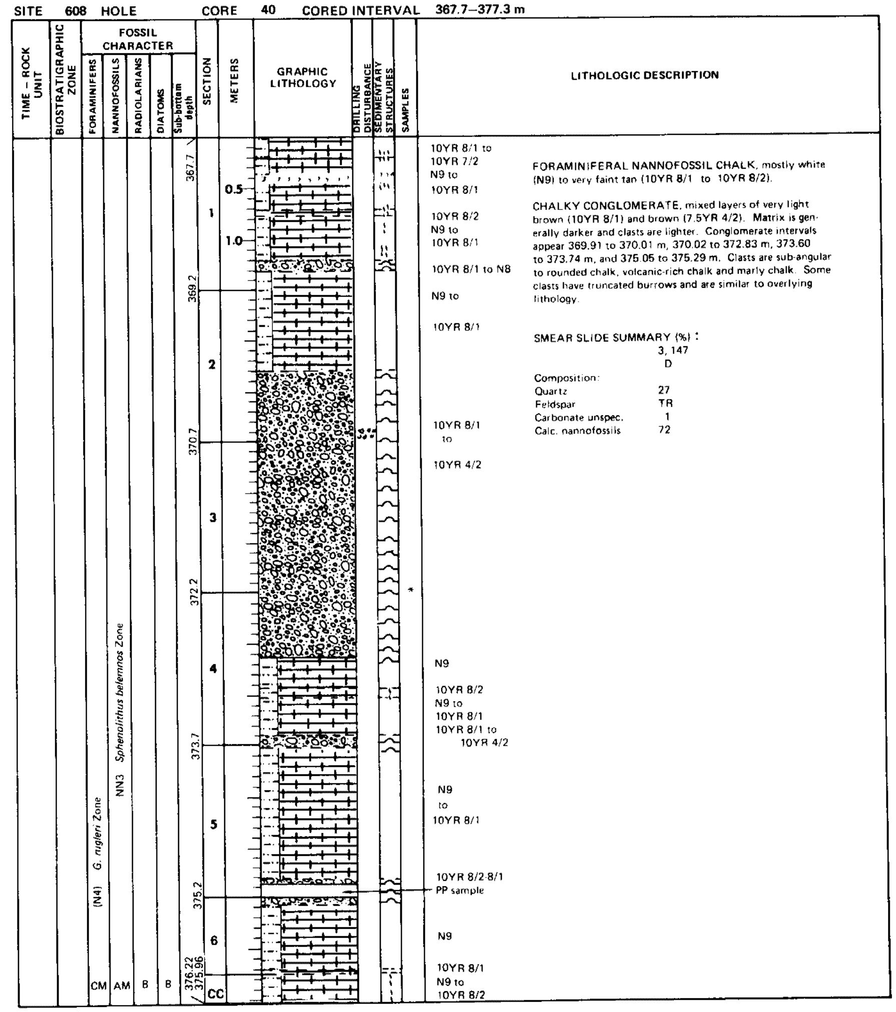
SMEAR SLIDE SUMMARY (%):

	3, 49	4, 58
	D	M
Composition:		
Quartz	32	5
Feldspar	1	–
Volcanic glass	–	2
Carbonate unspec.	1	–
Foraminifers	3	10
Calc. nannofossils	65	83

ORGANIC CARBON AND CARBONATE (%)

	3, 49
Organic carbon	–
Carbonate	91

SITE 608 HOLE CORE 40 CORED INTERVAL 367.7–377.3 m



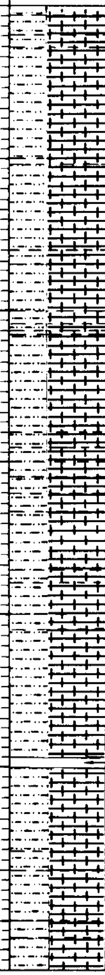
FORAMINIFERAL NANNOFOSSIL CHALK, mostly white (N9) to very faint tan (10YR 8/1 to 10YR 8/2).

CHALKY CONGLOMERATE, mixed layers of very light brown (10YR 8/1) and brown (7.5YR 4/2). Matrix is generally darker and clasts are lighter. Conglomerate intervals appear 369.91 to 370.01 m, 370.02 to 372.83 m, 373.60 to 373.74 m, and 375.05 to 375.29 m. Clasts are sub-angular to rounded chalk, volcanic-rich chalk and marly chalk. Some clasts have truncated burrows and are similar to overlying lithology.

SMEAR SLIDE SUMMARY (%):

	3, 147
	D
Composition:	
Quartz	27
Feldspar	TR
Carbonate unspec.	1
Calc. nannofossils	72

SITE 608 HOLE CORE 41 CORED INTERVAL 377.3–386.9 m

Time-rock unit	Biostratigraphic zone	Foraminifers	Nannofossils	Radiolarians	Diatoms	Sub-bottom depth	Section	Meters	Graphic lithology	Drilling disturbance	Sedimentary structures	Samples	Color
		(N4) *G. kugleri* Zone	NN3 *Sphenolithus belemnos* Zone			377.3	1	0.5, 1.0					N8/N7, N8/N9, 5Y 8/1, N9
						378.8	2						5Y 8/1, N9, 10YR 8/1, N9
						380.3	3					*	10YR 8/1, 10YR 7/1, 10YR 8/1, N9, 10YR 8/1, N9, 10YR 8/1, N9, 10YR 8/1
						381.8	4						N9, 10YR 8/1, N9, 10YR 8/1
						383.3	5					*	N9, IW
						384.8	6						10YR 8/1 to N9, 10YR 7/2, N9
						386.3	7						10YR 8/1, N9
		CM	AM	B	B	386.91, 387.25	CC						N8/N9

LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL CHALK, mostly alternating white (N9) and very faint tan (10YR 8/1).

Sharp, angular contact at 383.4 m.

Note: this core 100% recovery.

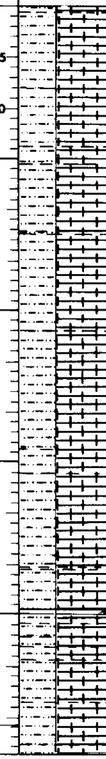
SMEAR SLIDE SUMMARY (%):

	3, 18	5, 106
	D	D
Composition:		
Quartz	45	53
Feldspar	TR	TR
Volcanic glass	TR	–
Carbonate unspec.	1	TR
Foraminifers	–	2
Calc. nannofossils	54	47

ORGANIC CARBON AND CARBONATE (%):

	3, 16
Organic carbon	–
Carbonate	81

SITE 608 HOLE CORE 42 CORED INTERVAL 386.9–396.5 m

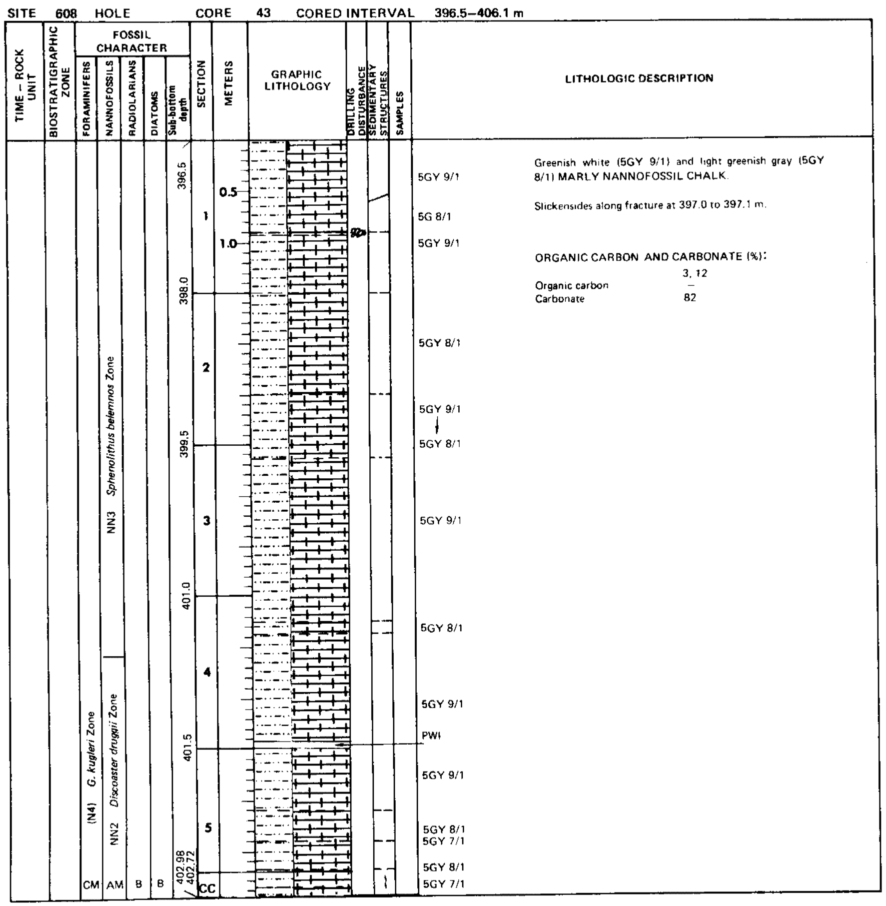
Time-rock unit	Biostratigraphic zone	Foraminifers	Nannofossils	Radiolarians	Diatoms	Sub-bottom depth	Section	Meters	Graphic lithology	Drilling disturbance	Sedimentary structures	Samples	Color
		(N4) *G. kugleri* Zone	NN3 *Sphenolithus belemnos* Zone			386.9	1	0.5, 1.0				*	10Y 8/1, N8, N9, 5Y 8/1
						388.4	2						N9, 5GY 7/1, 5GY 8/1
						389.9	3						N9
						391.4	4					*	5GY 8/1, 5GY 9/1, N9, OG
						392.9	5						5GY 8/1, 5GY 9/1, 5GY 8/1, 5GY 9/1, 5GY 8/1
		FM	AM	B	B	394.24	CC						5GY 8/1, 5GY 9/1

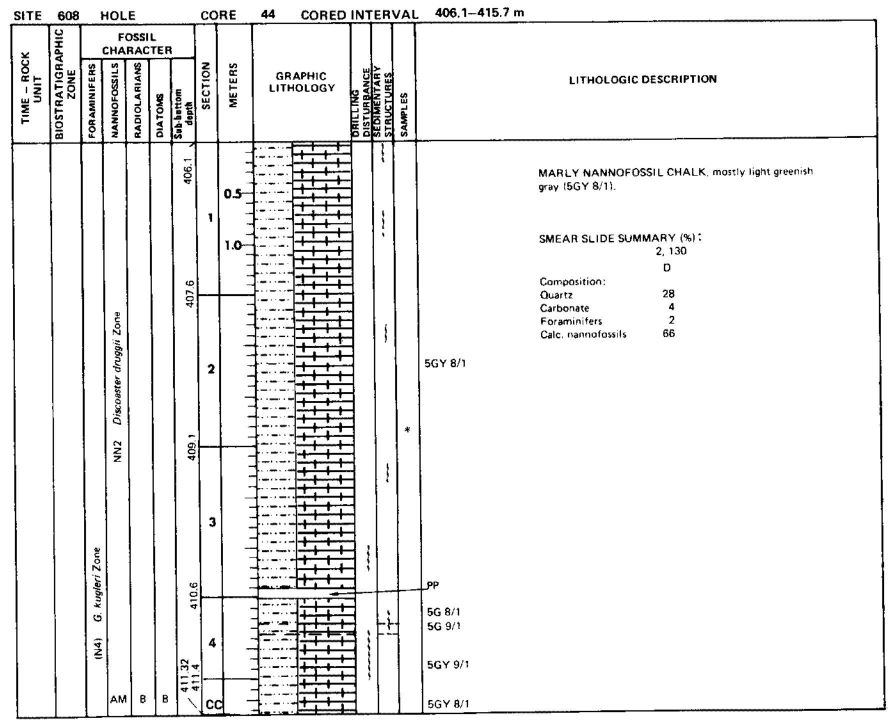
LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL CHALK, mostly white (N9), light greenish gray (5GY 8/1, 5GY 9/1).

SMEAR SLIDE SUMMARY (%):

	1, 140	4, 40
	D	D
Composition:		
Quartz	46	42
Volcanic glass	TR	TR
Carbonate unspec.	3	TR
Foraminifers	1	–
Calc. nannofossils	49	58


SITE 608 HOLE CORE 43 CORED INTERVAL 396.5–406.1 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
(N4) G. kugleri Zone
NN3 Sphenolithus belemnos Zone
NN2 Discoaster druggii Zone
CM AM B B
396.5
398.0
399.5
401.0
401.5
402.72
402.98
1
2
3
4
5
CC
0.5
1.0
5GY 9/1
5G 8/1
5GY 9/1
5GY 8/1
5GY 9/1
5GY 8/1
5GY 9/1
5GY 8/1
5GY 9/1
PWI
5GY 9/1
5GY 8/1
5GY 7/1
5GY 8/1
5GY 7/1
Greenish white (5GY 9/1) and light greenish gray (5GY 8/1) MARLY NANNOFOSSIL CHALK.
Slickensides along fracture at 397.0 to 397.1 m.
ORGANIC CARBON AND CARBONATE (%):
3, 12
Organic carbon –
Carbonate 82


SITE 608 HOLE CORE 44 CORED INTERVAL 406.1–415.7 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
(N4) G. kugleri Zone
NN2 Discoaster druggii Zone
AM B B
406.1
407.6
409.1
410.6
411.32
411.4
1
2
3
4
CC
0.5
1.0
5GY 8/1
PP
5G 8/1
5G 9/1
5GY 9/1
5GY 8/1
MARLY NANNOFOSSIL CHALK, mostly light greenish gray (5GY 8/1).
SMEAR SLIDE SUMMARY (%):
2, 130
D
Composition:
Quartz 28
Carbonate 4
Foraminifers 2
Calc. nannofossils 66

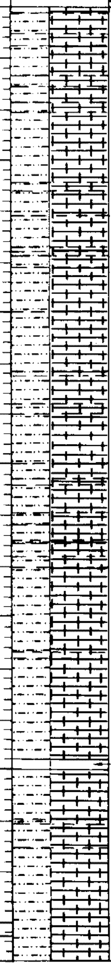
SITE 608 HOLE CORE 45 CORED INTERVAL 415.7–425.3 m

Biostratigraphic zone: N4 *G. kugleri* Zone; NN2 *Discoaster druggii* Zone; NP25 *Sphenolithus ciperoensis* Zone

Fossil character: Foraminifers AG; Nannofossils B; Radiolarians B

Sub-bottom depth: 415.7, 417.2, 418.7, 420.2, 421.7, 423.2, 424.7, 424.85, 425.13

Sections: 1, 2, 3, 4, 5, 6, 7, CC



Colors: 5Y 7/1, 5GY 8/1, 5Y 7/1, 5GY 8/1, 5Y 7/1, 5GY 8/1, 5Y 7/1, 5GY 8/1, 5GY 7/1, 5GY 8/1, 5GY 7/1, 5B 8/1, 5GY 7/1, 5GY 8/1, 5Y 7/2, 5B 8/2, 5Y 7/2, 5Y 8/1, 5Y 7/2, 5Y 8/1, 5Y 7/2, 5Y 8/1, 5Y 7/2, 5Y 8/1, 5B 8/2, 5Y 8/1, 5Y 7/2, 5Y 8/1, 5Y 7/2, 5Y 8/1, IW, 5YR 8/1, 10YR 7/2, 5YR 8/1, 10YR 7/2

LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL CHALK, dominantly light grayish green (5GY 8/1), pinkish gray (5YR 8/1), light tannish gray (10YR 7/2), light gray (5Y 7/2) and yellowish gray (5Y 8/1).

SMEAR SLIDE SUMMARY (%):

	4, 54	4, 77
	D	M
Composition:		
Quartz	45	30
Feldspar	1	1
Carbonate unspec.	6	7
Foraminifers	TR	TR
Calc. nannofossils	48	62

ORGANIC CARBON AND CARBONATE (%):

	4, 54
Organic carbon	–
Carbonate	78

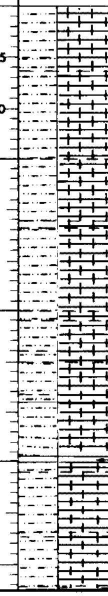
SITE 608 HOLE CORE 46 CORED INTERVAL 425.3–434.9 m

Biostratigraphic zone: (N3) *G. angulisuturalis* Zone; NP25 *Sphenolithus ciperoensis* Zone

Fossil character: Foraminifers AM; Nannofossils B; Radiolarians B

Sub-bottom depth: 425.3, 426.8, 428.3, 429.8, 430.8, 431.06

Sections: 1, 2, 3, 4, CC



Colors: 10YR 8/1, 10YR 7/3, 10YR 8/1, 10YR 8/2, 5G/ 8/1, 10YR 8/2, 10YR 7/3, 10YR 8/2, 10YR 7/3, 10YR 8/2, N9, 10YR 8/2, OG, 10YR 8/3, 10YR 8/2, 10YR 7/2, 10YR 8/2, 10YR 7/2

LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL CHALK, tannish white (10YR 8/1, 10YR 8/2) and light gray (10YR 7/2) to very pale brown (10YR 7/3)

SMEAR SLIDE SUMMARY (%):

	2, 64
	M
Composition:	
Quartz	35
Feldspar	TR
Carbonate unspec.	5
Foraminifers	1
Calc. nannofossils	59

ORGANIC CARBON AND CARBONATE (%):

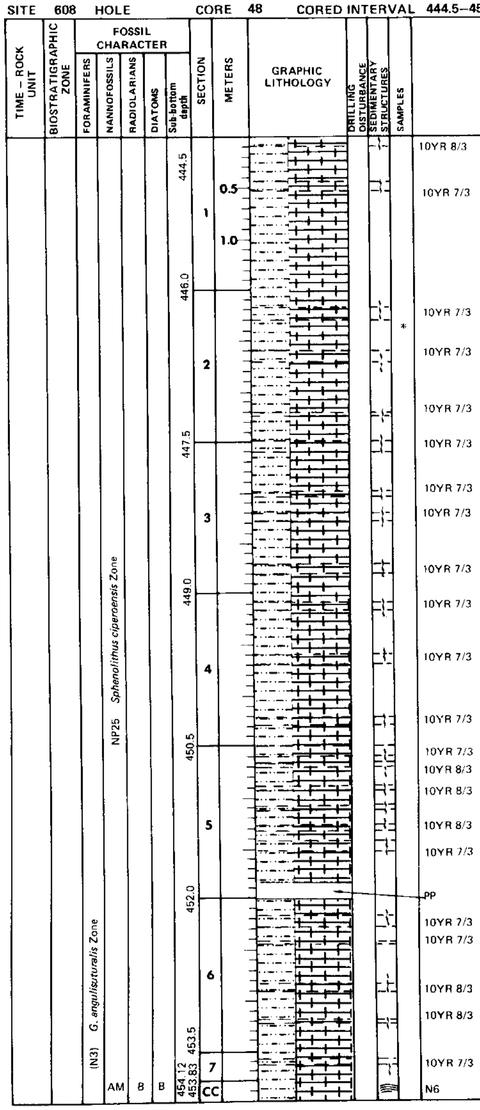
	1, 65
Organic carbon	–
Carbonate	84

SITE 608 HOLE CORE 47 CORED INTERVAL 434.9–444.5 m

LITHOLOGIC DESCRIPTION

Total recovery: 1 cm MARLY NANNOFOSSIL CHALK

SITE 608 HOLE CORE 48 CORED INTERVAL 444.5–454.1 m



LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL CHALK, mostly tannish white (10YR 8/2) alternating with layers of very pale brown (10YR 7/3). Below 450.6 m alternating layers are lighter (10YR 8/3).

Burrow mottles become progressively flattened in this core. By 453.6 m they show first signs of "smearing". Filamentous, wavy bedding structure at ~453.9 m.

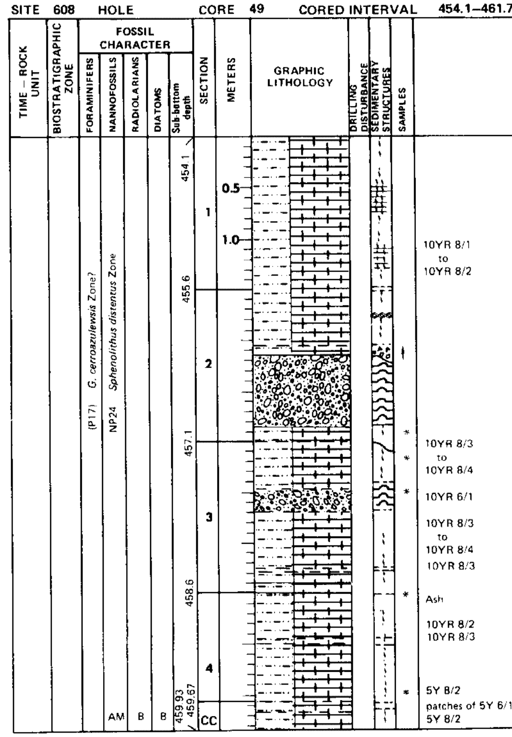
SMEAR SLIDE SUMMARY (%):

	2, 30
	D
Composition:	
Quartz	28
Feldspar	TR
Carbonate unspec.	2
Foraminifers	1
Calc. nannofossils	69

ORGANIC CARBON AND CARBONATE (%):

	1, 65
Organic carbon	–
Carbonate	83

SITE 608 HOLE CORE 49 CORED INTERVAL 454.1–461.7 m



LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL CHALK, white (10YR 8/1–10YR 8/2) and very pale brown (10YR 8/3–10YR 8/4). From 455.6 to 456.15 m chalk has numerous sand to fine gravel sized clasts of dispersed volcanic ash.

VOLCANIC ASH-BEARING MARLY CHALK CONGLOMERATE, 456.15 to 456.94 m and 457.58 to 457.78 m. Interval 456.15 to 456.25 m sequence fines upward. Upper conglomerate bounded by sharp contacts. Clasts are chalk, up to 3 cm across, subangular to (predominantly) rounded.

SMEAR SLIDE SUMMARY (%):

	2, 136	3, 20	3, 50	4, 3	4, 95
	D	D	M	M	D
Composition:					
Quartz	10	22	15	27	13
Feldspar	5	TR	–	2	2
Clay	20	–	–	–	18
Volcanic glass	–	–	10	7	2
Carbonate unspec.	5	2	20	3	15
Foraminifers	–	2	5	2	–
Calc. nannofossils	60	74	50	59	50

ORGANIC CARBON AND CARBONATE (%):

	2, 65
Organic carbon	–
Carbonate	90

SITE 608 HOLE CORE 50 CORED INTERVAL 461.7–467.3 m

Biostratigraphic zones: Foraminifers: NP24 *Sphenolithus distentus* Zone / (P15–17) *G. linaperta* Zone; Nannofossils: NP19 *Isthmolithus recurvus* Zone (AG); Radiolarians: B; Benthic foraminifers: *LAD *Nuttalides truempyi* (B)

Sub-bottom depth: 461.7, 463.2, 464.7, 466.2, 466.52

Sections 1–4. Colors: 5Y 8/2 to 5Y 8/1, N2, N2, N2, 5Y 5/1, 5Y 5/1, 5Y 5/1, 5Y 5/1, N2, 5Y 5/1, 5Y 8/1, 5GY 4/1

LITHOLOGIC DESCRIPTION

Yellowish white (5Y 8/1) MARLY NANNOFOSSIL CHALK with beds of very dark gray (N2) and dark green (5Y 5/1) VOLCANICLASTIC NANNOFOSSIL CHALK and GLASSY TUFF.

SMEAR SLIDE SUMMARY (%):

	1, 72	1, 10	2, 10	2, 87	2, 89
	D	D	M	M	M
Composition:					
Quartz	10	13	30	15	10
Feldspar	5	2	5	–	5
Heavy minerals	TR	–	–	–	–
Clay	5	18	25	35	35
Volcanic glass	25	2	20	35	35
Carbonate unspec.	–	15	5	10	10
Foraminifers	5	–	–	–	–
Calc. nannofossils	50	50	15	5	5
Shell fragments	–	–	–	TR	TR

SITE 608 HOLE CORE 51 CORED INTERVAL 467.3–473.3 m

Biostratigraphic zones: Foraminifers: P15–17 *G. linaperta* Zone; Nannofossils: NP19 *Isthmolithus recurvus* Zone (AM); Radiolarians: B; Diatoms: B

Sub-bottom depth: 467.53. Section CC.

LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL CHALK, pale green/gray (5GY 8/1). Fragments of chalk bedded in ooze.

SITE 608 HOLE CORE 52 CORED INTERVAL 473.3–482.9 m

Biostratigraphic zones: Foraminifers: (P15–17) *G. linaperta* Zone; Nannofossils: NP19 *Isthmolithus recurvus* Zone (AM); Radiolarians: B; Diatoms: B

Sub-bottom depth: 473.3, 474.8, 476.3, 477.8, 479.3, 479.76

Sections 1–4, CC (Void in sections 2 and 3). Colors: 5GY 8/1, 5GY 8/1, 5GY 8/1, 5GY 8/1, 5Y 5/1, N8, 5GY 8/1, 5G 5/1, 5GY 8/1, 5GY 8/1, 5G 5/1, 5GY 8/1, 5G 5/1, 5Y 6/1, N1, 5GY 7/1, N2, 5GY 8/1, 5GY 8/1, 5BG 4/1 to N1

LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL CHALK, dominantly light greenish gray (5GY 8/1). Soft sediment of mixed lithology extensively flowed-in around blocks of chalk. Blocks commonly broken by faulting; well developed slickensides occur at 475.8 and 478.1 to 478.2 m.

Dark gray (5Y 5/1) and dark green (5G 5/1) layers are frequent. At least two appear graded (475.4 and 478.7 m). Uppermost is volcanic glass bearing.

SMEAR SLIDE SUMMARY (%):

	2, 63	2, 64
	M	M
Composition:		
Quartz	15	20
Feldspar	15	20
Heavy minerals	–	TR
Clay	20	20
Volcanic glass	5	5
Carbonate unspec.	15	15
Calc. nannofossils	30	20

ORGANIC CARBON AND CARBONATE (%):

	4, 70
Organic carbon	–
Carbonate	81

SITE 608 HOLE CORE 53 CORED INTERVAL 482.9–492.5 m

Biostratigraphic zones: Foraminifers: (P15–17) *G. linaperta* Zone; Nannofossils: NP18 *Chiasmolithus oamaruensis* Zone / NP19 *Isthmolithus recurvus* Zone (AM); Radiolarians: B; Diatoms: B

Sub-bottom depth: 482.9, 484.4, 485.19, 485.42

Sections 1, 2, CC. Colors: 10YR 6/1, Void, 5GY 8/1, N5, 5GY 7/1, 5GY 8/1, N7, N7, 5GY 8/1, 5GY 8/1, 5GY 8/1

LITHOLOGIC DESCRIPTION

VOLCANIC GLASS BEARING MARLY NANNOFOSSIL CHALK, mostly light greenish gray (5GY 8/1) with occasional layers of darker gray (N5, N7, 10YR 6/1, 5GY 7/1). Section fragmented by drilling.

SMEAR SLIDE SUMMARY (%):

	1, 8	1, 52
	D	
Composition:		
Quartz	20	5
Heavy minerals	–	TR
Clay	15	5
Volcanic glass	10	20
Carbonate unspec.	20	5
Foraminifers	–	TR
Calc. nannofossils	35	65

ORGANIC CARBON AND CARBONATE (%):

	1, 53
Organic carbon	–
Carbonate	54

SITE 608 HOLE CORE 54 CORED INTERVAL 492.5–502.1 m

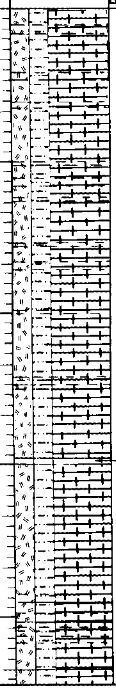
TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Biostratigraphic zone: P14 *T. rohri* Zone; NP17 *Discoaster saipanensis* Zone

Fossil character: AP (nannofossils), B (radiolarians), B (diatoms)

Sub-bottom depth: 492.5, 494.0, 495.5, 497.0, 498.5, 499.05

Sections: 1, 2, 3, 4, 5



Colors: 2.5Y 7/2; N7–N4; 5YR 4/1; 5GY 6/1; 10YR 5/1; 5Y 7/1; 5Y 7/1; 5Y 7/1; 5Y 7/1; 5Y 4/1; 5Y 4/1; OG; 5YR 4/1; 5YR 4/1; 5Y 6/1; 5Y 6/1; 5YR 4/1

VOLCANIC GLASS-BEARING MARLY NANNOFOSSIL CHALK, very light greenish gray (5GY 8/1) to ~496 m. Yellowish white (10YR 8/2) to ~ 498.5 m, followed by very light greenish gray (5GY 8/1) to very light gray (N8) to 499.05 m. Throughout are layers of gray to dark brown (5YR 4/1). Layers at 498.3 and 498.5 m are graded, fining upward.

SMEAR SLIDE SUMMARY (%):

	1, 120	3, 100
	D	D
Composition:		
Quartz	10	5
Feldspar	20	25
Heavy minerals	TR	TR
Volcanic glass	20	20
Zeolite	TR	–
Foraminifers	5	5
Calc. nannofossils	45	45

SITE 608 HOLE CORE 55 CORED INTERVAL 502.1–507.7 m

Biostratigraphic zone: *T. rohri* Zone P14; NP17 *Discoaster saipanensis* Zone

Fossil character: AM (nannofossils), B (radiolarians), B (diatoms)

Section: CC

7 cm of very pale brown (10YR 8/2) MARLY NANNOFOSSIL CHALK

SITE 608 HOLE CORE 56 CORED INTERVAL 507.7–511.7 m

Biostratigraphic zone: *T. rohri* Zone P14; NP17 *Discoaster saipanensis* Zone

Fossil character: AM (nannofossils), B (radiolarians), B (diatoms)

Section: CC

Total recovery: 15–20 cm^3 of light gray (10YR 7/1) VOLCANIC GLASS-BEARING MARLY NANNOFOSSIL CHALK in Core Catcher.

SMEAR SLIDE SUMMARY (%):

	CC
Composition:	
Quartz	4
Feldspar	1
Clay	18
Volcanic glass	1
Carbonate unspec.	11
Calc. nannofossils	65

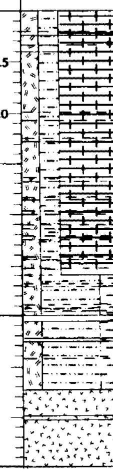
SITE 608 HOLE CORE 57 CORED INTERVAL 511.7–514.7 m

Biostratigraphic zone: NP16 *Discoaster tani nodifer* Zone; *T. rohri* Zone (P14); NP17 *Discoaster saipanensis* Zone

Fossil character: AM (nannofossils), B (radiolarians), B (diatoms)

Sub-bottom depth: 511.7, 513.2, 514.7, 515.7

Sections: 1, 2, 3



Colors: 10YR 6/2; 10YR 8/2; 10YR 8/2; 10YR 6/2; 10YR 8/2; 10YR 8/2; 10YR 6/2; 10YR 8/2; 10YR 6/2; 10YR 8/2; 10YR 8/2; 10YR 8/2; 10YR 8/2; 10YR 8/2; 10YR 6/3, N3; 10YR 7/3–10YR 8/4 and 10YR 8/6; 10YR 5/2 and 10YR 6/2; Void; 10YR 7/3–10YR 8/4 and 10YR 8/6; 10YR 5/2 and 10YR 6/2; 10YR 6/3; Basalt; Carbonate vein; Basalt

VOLCANIC GLASS-BEARING MARLY NANNOFOSSIL CHALK, dominantly light brownish gray (10YR 6/2) to light yellowish brown (10YR 6/4) to 514.3 m.

At 514.3 to 515.44 m DOLOMITIC MARLSTONE, dark grayish brown (10YR 4/2) to pale brown (10YR 6/3). At 514.3 to 514.7 m faint layers of very pale brown (10YR 7/3–10YR 8/4) and yellow (10YR 8/6). At 514.9 to 515.0 m two layers of dark reddish brown (5YR 3/4) sandwiched by layers of light gray (10YR 7/2)

Note: recovery here 150% (see operations section).

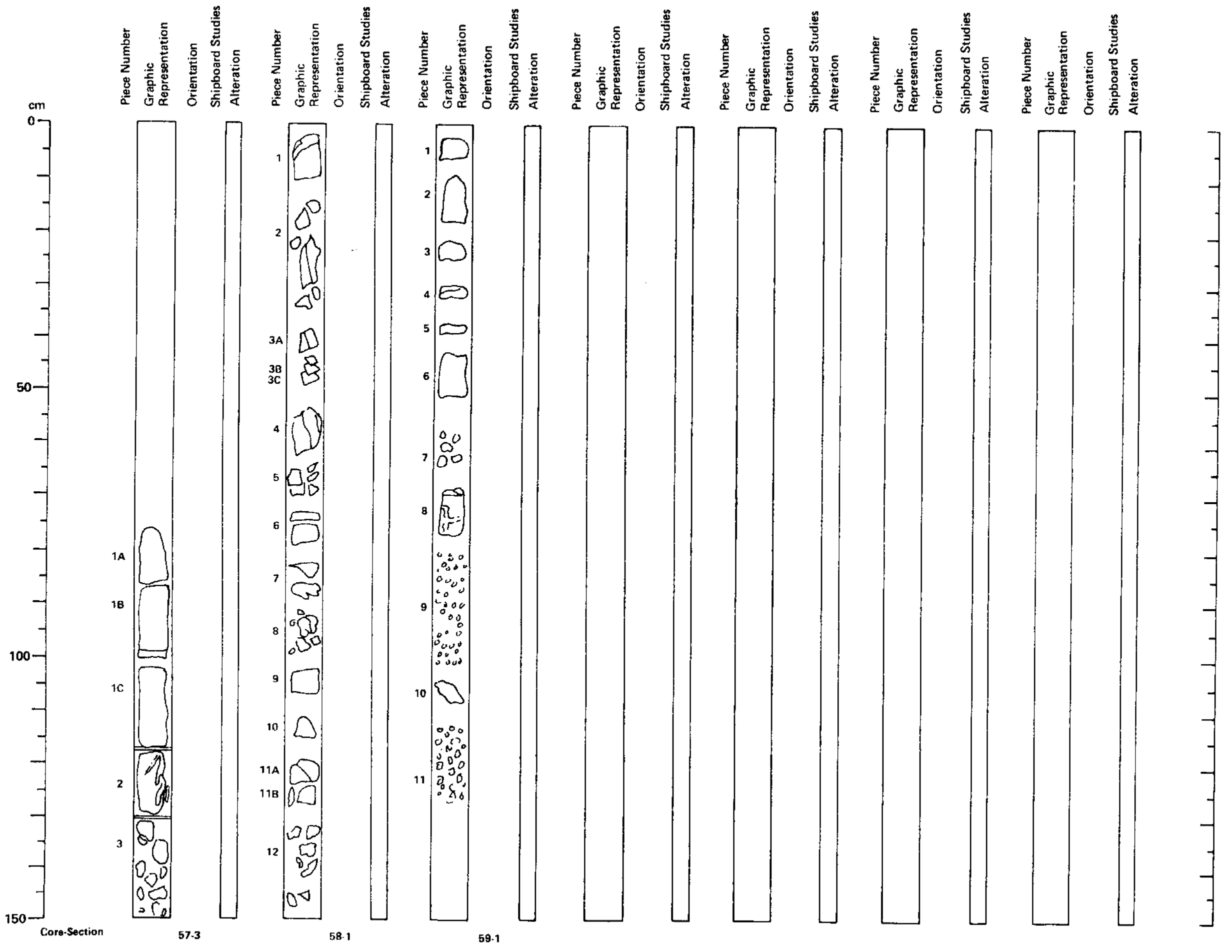
SMEAR SLIDE SUMMARY (%):

	1, 23	2, 10	2, 112
	M	D	D
Composition:			
Quartz	5	3	–
Feldspar	–	–	2
Heavy minerals	–	–	TR
Clay	10	12	70
Volcanic glass	–	–	3
Carbonate unspec.	67	69	20*
Calc. nannofossils	18	16	1
Opaque oxides	–	–	4

* = 20% dolomite

ORGANIC CARBON AND CARBONATE (%):

	2, 111
Organic carbon	–
Carbonate	4



94-608-57-3 Depth: 515.4–516.2 m

Pieces 1–3: DOMINANT LITHOLOGY: BASALT.
Macroscopic description: All fragments are fine-grained and relatively fresh with fresh clinopyroxene phenocrysts (up to 3 mm) and 1 mm vesicles. The uppermost portion of Piece 1A has a 1–2 mm glass rind. Calcite veins are common with a large vein in Piece 1B containing nannofossils.

TS 85 cm (Piece 1A): Fine- to medium-grained basalt, doleritic in texture, made up of plagioclase and clinopyroxene laths. Phenocrysts are fresh, Ti-rich, augitic clinopyroxenes, and calcite-pseudomorphs after plagioclase. Vesicles and some fractures are filled with green, microcrystalline silica, calcite, and chlorite. Approximate composition: 37% plagioclase laths, 37% clinopyroxene laths, 10% calcite, 7% alteration minerals (hematite), 5% opaque oxides (magnetite) and 5% microcrystalline silica.

94-608-58-1 Depth 514.7–521.3 m

Pieces 1–12: DOMINANT LITHOLOGY: BASALT. Macroscopic description: The majority of the fragments are fine-grained, relatively fresh basalt with small weathered olivine phenocrysts (up to 3 mm) and 1 mm vesicles. Larger basalt fragments (1–4, 11) have thick calcite veins (up to 4 cm). Some fragments are calcite (2, 3C, 5, 8, 11) most likely from fractured veins. 1–2 mm alteration rind (green) is present on Piece 7A. Fragments in Piece 12 are volcanic tuff with non-fossiliferous calcite. Pieces in this section are suspected downhole contaminants.

TS 104 cm (Piece 9): Fine-grained basalt, doleritic in texture made up of clinopyroxene and plagioclase. Phenocrysts are augitic clinopyroxenes, calcite pseudomorphs after plagiclase. Common vesicles lined with a green, microcrystalline silica and occassionally filled with secondary calcite. Large (1 cm) phenocryst composed of several calcite crystals surrounded by many small vesicles and alteration minerals. Approximate composition: 35% plagioclase, 25% pyroxene, 15% calcite, 10% reddish-brown alteration minerals, 8% interstitial opaque oxides, 5% olivine and 2% microcrystalline silica.

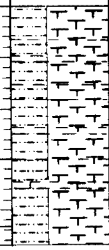
TS 45–47 cm: Clinopyroxene, plagioclase, chlorite, with phenocrysts of olivine.

94-608-59-1 Depth: 521.3–530.9 m

Pieces 1–11: DOMINANT LITHOLOGY: BASALT.
Macroscopic description: Most fragments are fine-grained, relatively fresh vesicular basalt. Some vesicles (up to 2 mm) are lined with a blue/green microcrystalline (silica?) coating. Calcite veins in Pieces 2, 4, and 8 show a reddish-brown alteration zone along the edges and often contain fragments of basalt. Pieces in Sections 9–11 appear highly altered and are probably mixed with wash material.

TS 13 cm (Piece 2): Fine-grained basalt. Fair thin section. Doleritic in texture, made up of plagioclase, with interstitial pyroxene and opaque oxides. Phenocrysts are fresh clinopyroxene, calcite-pseudomorphs after plagioclase. Approximate composition: 43% plagioclase laths, 35% interstitial pyroxenes, 10% opaque oxides, 5% calcite, 5% reddish-brown alteration minerals, and 2% microcrystalline silica.

SITE 608 HOLE A CORE 1 CORED INTERVAL 0.0–2.4 m

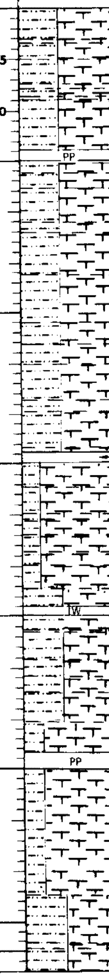
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	SAMPLES	COLORS	LITHOLOGIC DESCRIPTION
		N22 *Globorotalia truncatulinoides*; AG	NN21 *Emiliania huxleyi* Zone; AG		*Pseudoeunotia doliolus* Zone; CG		1, 2, CC	0.5, 1.0		* * * *	10YR 7/3, 10YR 5/4, 10YR 7/3, 10YR 5/4, 10YR 7/3, 10YR 6/4, 10YR 8/2, 10YR 6/4, 10YR 7/3, N9, 10YR 8/3, 10YR 8/2	MARLY NANNOFOSSIL OOZE, alternating layers of brown (10YR 6/4, 10YR 5/4) and light to very light brown (10YR 6/4 to 10YR 8/2). White (N9) FORAMINIFERAL NANNOFOSSIL OOZE, 1.73 to 1.79 m.

SMEAR SLIDE SUMMARY (%)

	1, 42	1, 124	2, 28	2, 58
	D	D	D	D
Composition:				
Quartz	30	25	15	25
Feldspar	–	5	–	–
Heavy minerals	TR	–	–	TR
Clay	5	5	TR	5
Volcanic glass	10	5	1	5
Foraminifers	7	15	20	8
Calc. nannofossils	48	45	65	56
Diatoms	TR	–	–	TR
Radiolarians	TR	–	TR	TR

1%

SITE 608 HOLE A CORE 2 CORED INTERVAL 2.4–12.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	SAMPLES	COLORS	LITHOLOGIC DESCRIPTION
		N22 *Globorotalia truncatulinoides*; AG	NN19 *Pseudoemiliania lacunosa* Zone; AG	RP	B	2.40, 3.90, 5.40, 6.90, 8.40, 9.90, 11.40, 11.85, 12.06	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0		* * PP * * *	10YR 7/3, 10YR 8/2, 10YR 7/3, 10YR 8/2, 10YR 7/3, 10YR 8/2, N8 mottles, 10YR 6/3, 10YR 7/2, 10YR 6/3, 10YR 8/1, 10YR 8/3, 10YR 8/1 with 10YR 8/2, 10YR 6/4, 10YR 8/2, 10YR 6/4, 10YR 7/2, 10YR 8/1, 10YR 7/2, 10YR 5/4, 10YR 8/1, N9, 10YR 7/1, N9, 10YR 7/1, N9, 10YR 7/1, N9, 2.5Y 6/2, 5Y 7/1, N7, 5Y 7/1, 5Y 6/1 to 2.5Y 6/2, 2.5Y 7/2, 10YR 8/1, N9, N9, 5Y 6/1 → 5Y 7/1	Dominantly shades of white (N9) and tan (10YR 8/1–10YR 8/2) FORAMINIFERAL NANNOFOSSIL OOZE, alternating with pale brown (10YR 7/1), dark green/olive (5Y 6/1), and brown (10YR 6/3–10YR 6/4) layers. MARLY FORAMINIFERAL NANNOFOSSIL OOZE at 3.90 to 6.90 m. ASH-BEARING FORAMINIFERAL NANNOFOSSIL OOZE, dark green olive (2.5Y 6/2) at 8.14 to 8.38 m. Note: >100% recovery.

SMEAR SLIDE SUMMARY (%)

	1, 44	1, 110	4, 110	4, 138	5, 20
	D	D	D	D	M
Composition:					
Quartz	25	20	5	10	30
Feldspar	TR	2	1	5	5
Mica	–	–	–	–	TR
Heavy minerals	TR	1	–	1	–
Clay	5	5	4	5	5
Volcanic glass	5	5	–	5	–
Foraminifers	20	12	10	20	20
Calc. nannofossils	45	65	80	54	40
Radiolarians	–	TR	–	–	–

SITE 608 HOLE A CORE 3 CORED INTERVAL 12.0–21.6 m

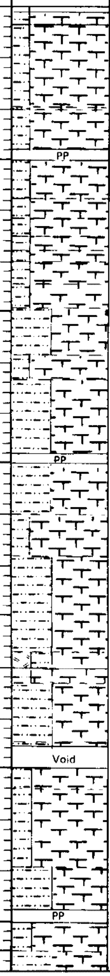
Biostratigraphic zone / Fossil character:
- Foraminifers: N22 *Globorotalia truncatulinoides* — AG
- Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone — AG
- Diatoms: *Nitzschia reinholdii* Zone — AG

Sub-bottom depth (m): 12.0, 13.5, 15.0, 16.5, 18.0, 19.5, 21.0, 21.56, 21.79

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Meters: 0.5, 1.0

Graphic lithology:



Colors: 10YR 6/2; N9 to 10YR 6/1; N8 dropstone; N9 to 10YR 6/1; N7; N7; N5 → N8; N8; 10YR 6 to 10YR 7/1 Pumice; 10YR 7/1; N9 to N8; 10YR 8/1 to 10YR 6/2; N9 to N8; 10YR 6/2 to 10YR 8/1; N8; N8; N8 to 10YR 7/2; dropstone 2.5Y 6/2; N8 to 2.5Y 6/2; 2.5Y 7/2 to 8/2

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE and NANNOFOSSIL OOZE, mostly white (N9) to gray (10YR 6/1) alternating with MARLY FORAMINIFERAL NANNOFOSSIL OOZE, gray (10YR 6/1, N5–N8) to light brownish gray (10YR 6/2, 2.5Y 6/2).

Note: >100% recovery.

SMEAR SLIDE SUMMARY (%):

	1, 70	2, 149	3, 84	5, 47	6, 50
	M	D	D	D	D
Composition:					
Quartz	5	10	15	5	5
Feldspar	1	TR	5	1	TR
Heavy minerals	TR	–	5	TR	–
Clay	–	5	5	TR	–
Volcanic glass	–	5	2	2	2
Foraminifers	5	20	20	25	30
Calc. nannofossils	89	60	48	67	63
Diatoms	–	–	–	TR	–

SITE 608 HOLE A CORE 4 CORED INTERVAL 21.6–31.2 m

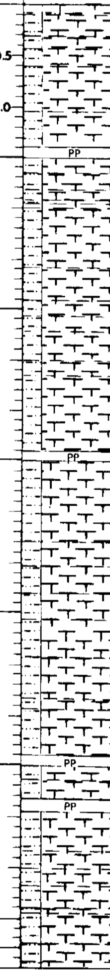
Biostratigraphic zone / Fossil character:
- Foraminifers: N22 *Globorotalia truncatulinoides/Globorotalia tosaensis* overlap — AG
- Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone — AG
- Diatoms: *Nitzschia reinholdii* Zone — AG

Sub-bottom depth (m): 21.6, 23.1, 24.6, 26.1, 27.6, 29.1, 30.6, 31.16, 31.43

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Meters: 0.5, 1.0

Graphic lithology:



Colors: 2.5Y 6/2; 10YR 7/1; 10YR 8/1; N9 to N8; 10YR 7/1 to 10YR 8/1; N9 → 10YR 8/1; 10YR 8/1; 10YR 7/1; N8; N9; 10YR 7/1; 10YR 8/1; 10YR 6/1; 10YT 6/2; 10YR 8/1; N9; dropstone; 10YR 8/1 → 10YR 7/1; N9; 10YR 8/1; 10YR 7/1; 10YR 8/1; N9 → 10YR 8/1; 5Y 7/2; 10YR 8/1; N9 → 10YR 8/1; 10YR 8/1 with N7 laminae; 10YR 7/1; 10YR 8/1; N9; 5Y 8/1; N9; 5YR 8/1; 10YR 8/1

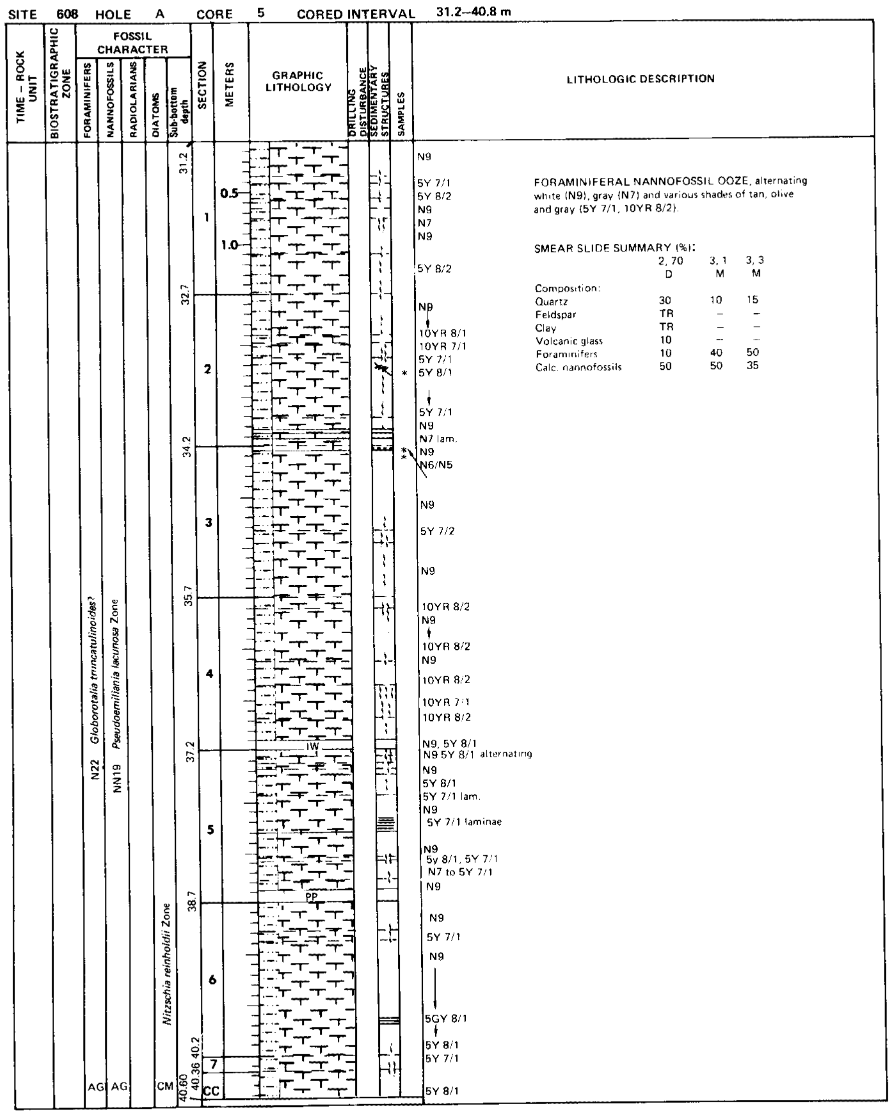
LITHOLOGIC DESCRIPTION

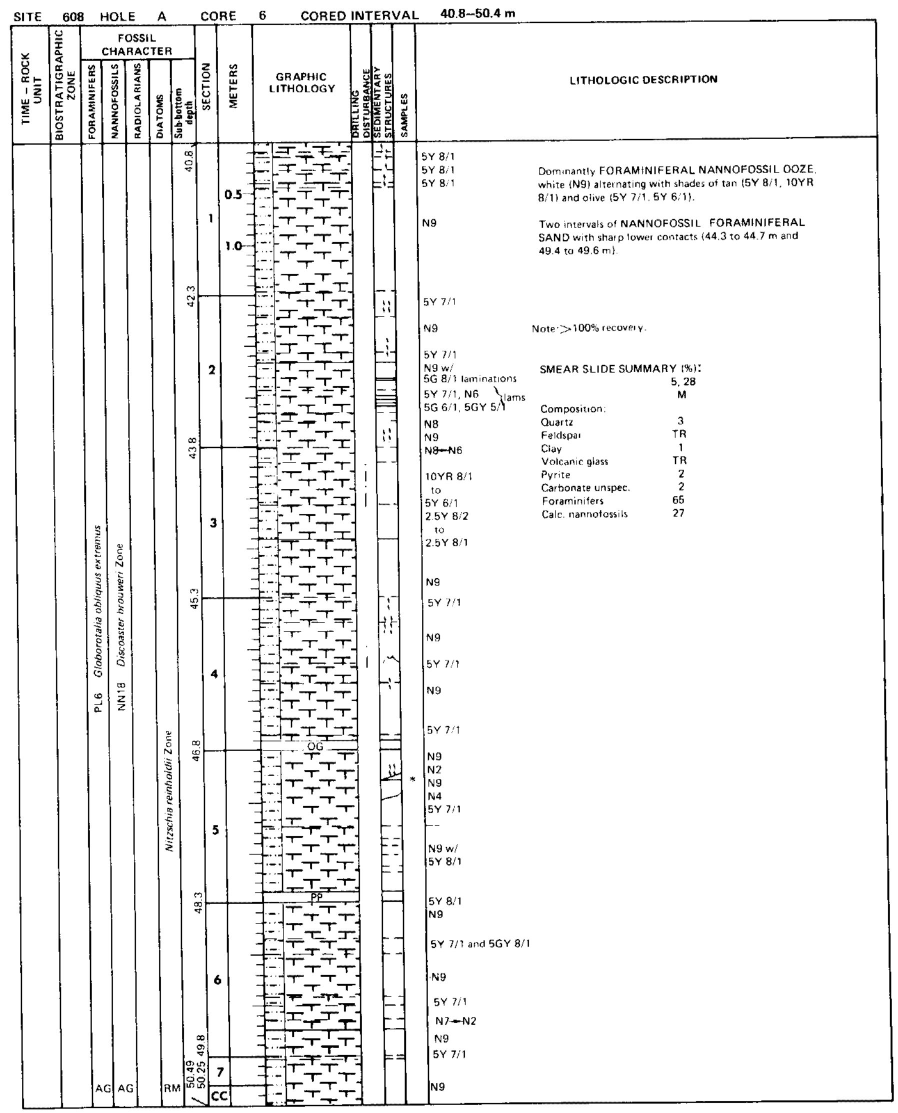
Top 9 cm brown (2.5Y 6/2) MARLY FORAMINIFERAL NANNOFOSSIL OOZE. Remainder FORAMINIFERAL NANNOFOSSIL OOZE, alternating various shades of tan and gray with white.

Note: >100% recovery.

SMEAR SLIDE SUMMARY (%):

	2, 46	2, 65	2, 75
Composition:			
Quartz	15	25	15
Feldspar	–	–	TR
Clay	–	TR	TR
Volcanic glass	–	TR	–
Carbonate unspec.	–	TR	–
Foraminifers	12	10	12
Calc. nannofossils	73	65	73
Diatoms	TR	TR	–
Radiolarians	TR	–	–


SITE 608 HOLE A CORE 5 CORED INTERVAL 31.2–40.8 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
N22 Globorotalia truncatulinoides?
NN19 Pseudoemiliania lacunosa Zone
Nitzschia reinholdii Zone
AG AG CM
31.2 32.7 34.2 35.7 37.2 38.7 40.2 40.36 40.60
1 2 3 4 5 6 7 CC
0.5 1.0
IW PP
N9
5Y 7/1
5Y 8/2
N9
N7
N9
5Y 8/2
N9
10YR 8/1
10YR 7/1
5Y 7/1
5Y 8/1
5Y 7/1
N9
N7 lam.
N9
N6/N5
N9
5Y 7/2
N9
10YR 8/2
N9
10YR 8/2
N9
10YR 8/2
10YR 7/1
10YR 8/2
N9, 5Y 8/1
N9 5Y 8/1 alternating
N9
5Y 8/1
5Y 7/1 lam.
N9
5Y 7/1 laminae
N9
5y 8/1, 5Y 7/1
N7 to 5Y 7/1
N9
N9
5Y 7/1
N9
5GY 8/1
5Y 8/1
5Y 7/1
5Y 8/1
FORAMINIFERAL NANNOFOSSIL OOZE, alternating white (N9), gray (N7) and various shades of tan, olive and gray (5Y 7/1, 10YR 8/2).
SMEAR SLIDE SUMMARY (%):
2, 70 D | 3, 1 M | 3, 3 M
Composition:
Quartz 30 10 15
Feldspar TR – –
Clay TR – –
Volcanic glass 10 – –
Foraminifers 10 40 50
Calc. nannofossils 50 50 35


SITE 608 HOLE A CORE 6 CORED INTERVAL 40.8–50.4 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
PL6 Globorotalia obliquus extremus
NN18 Discoaster brouweri Zone
Nitzschia reinholdii Zone
AG AG RM
40.8 42.3 43.8 45.3 46.8 48.3 49.8 50.25 50.49
1 2 3 4 5 6 7 CC
0.5 1.0
OG PP
5Y 8/1
5Y 8/1
5Y 8/1
N9
5Y 7/1
N9
5Y 7/1
N9 w/
5G 8/1 laminations
5Y 7/1, N6
5G 6/1, 5GY 5/1
lams
N8
N9
N8→N6
10YR 8/1
to
5Y 6/1
2.5Y 8/2
to
2.5Y 8/1
N9
5Y 7/1
N9
5Y 7/1
N9
5Y 7/1
N9
N2
N9
N4
5Y 7/1
N9 w/
5Y 8/1
5Y 8/1
N9
5Y 7/1 and 5GY 8/1
N9
5Y 7/1
N7→N2
N9
5Y 7/1
N9
Dominantly FORAMINIFERAL NANNOFOSSIL OOZE, white (N9) alternating with shades of tan (5Y 8/1, 10YR 8/1) and olive (5Y 7/1, 5Y 6/1).
Two intervals of NANNOFOSSIL FORAMINIFERAL SAND with sharp lower contacts (44.3 to 44.7 m and 49.4 to 49.6 m).
Note: >100% recovery.
SMEAR SLIDE SUMMARY (%):
5, 28 M
Composition:
Quartz 3
Feldspar TR
Clay 1
Volcanic glass TR
Pyrite 2
Carbonate unspec. 2
Foraminifers 65
Calc. nannofossils 27

SITE 608 HOLE A CORE 7 CORED INTERVAL 50.4–60.0 m

Fossil character	
Foraminifers	PL6 *Globorotalia obliquus extremus*; AG
Nannofossils	NN16 *Discoaster surculus* Zone; AG
Diatoms	B

Section	Sub-bottom depth (m)	Colors / notes
1	50.4–51.9	5Y 8/1, N7, N8, 5Y 6/1, N8, Claystone pebble, 5Y 7/1, N9, Void
2	51.9–53.4	N9, N7, N8
3	53.4–54.9	N9, 5Y 7/1, N9, 5P 7/2, N7, N8, N7, N8
4	54.9–56.4	N9 with 5Y 7/2; N9 with 5P 7/2 laminae
5	56.4–57.9	N9; N9 with 5P 7/2 laminations; N9; 5P 7/2 and 5GY 7/1 laminae
6	57.9–59.4	N9 with 5P 7/2 laminae throughout (PP)
CC	59.4–59.68	N9

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, dominantly light gray (N7) to white (N9). Light olive brown (5Y 7/2) and pale purple (5P 7/2) laminae abundant below 54.9 m.

SMEAR SLIDE SUMMARY (%):

	1, 10	3, 89	5, 87
	D	M	D
Composition:			
Quartz	3	31	8
Feldspar	TR	–	TR
Volcanic glass	TR	–	–
Pyrite	–	3	–
Carbonate unspec.	TR	–	TR
Foraminifers	11	16	12
Calc. nannofossils	86	50	80
Sponge spicules	–	TR	–
Sil.-coflagellates	–	TR	–

SITE 608 HOLE A CORE 8 CORED INTERVAL 60.0–69.6 m

Fossil character	
Foraminifers	PL5 *Globorotalia miocenica*; AG
Nannofossils	NN16 *Discoaster surculus* Zone; AG
Diatoms	RP

Section	Sub-bottom depth (m)	Colors / notes
1	60.0–61.5	5Y 7/1, N8, 5Y 7/1, N8
2	61.5–63.0	5Y 7/1, N8, 5Y 7/1, N8, 5Y 7/1, N7
3	63.0–64.5	N8, 5Y 7/1, N8, 5Y 7/1, N8
4	64.5–66.0	5GY 7/1, N8 (scattered laminae 5GY 7/1 & 5P 7/2), 5GY 7/1
5	66.0–67.5	N8, 5Y 8/1, N8, 5Y 8/1, N8
6	67.5–69.0	N8 (PP), Pyrite nodule, N8
7	69.0–69.12	N8
CC	69.12–69.39	

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, dominantly very light gray (N8) with occasional bands of pale olive brown (5Y 7/1). Scattered laminae of light green gray (5GY 7/1) and pale purple (5P 7/2) between 64.5 and 65.4 m.

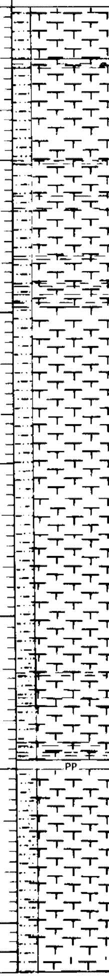
SMEAR SLIDE SUMMARY (%):

	2, 145	3, 82	6, 106
	D	D	D
Composition:			
Quartz	36	12	13
Feldspar	1	1	TR
Volcanic glass	TR	TR	–
Carbonate unspec.	TR	TR	TR
Foraminifers	16	16	10
Calc. nannofossils	47	71	77

SITE 608 HOLE A CORE 9 CORED INTERVAL 69.6–79.2 m

Biostratigraphic zone – Foraminifers	PL5 *Globorotalia miacenica* (AG)
Biostratigraphic zone – Nannofossils	NN16 *Discoaster surculus* Zone (AG)
Diatoms	RP
Sub-bottom depth (m)	69.6, 71.1, 72.6, 74.1, 75.6, 77.1, 78.6, 78.84, 79.08
Sections	1, 2, 3, 4, 5, 6, 7, CC

GRAPHIC LITHOLOGY



LITHOLOGIC DESCRIPTION

Very light gray (N8) FORAMINIFERAL NANNOFOSSIL OOZE with light gray (N6–7) and yellowish gray (5Y 7/1) laminae throughout.

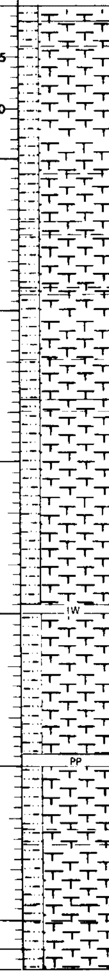
SMEAR SLIDE SUMMARY (%):

	1, 50	6, 77
	M	D
Composition:		
Quartz	34	21
Feldspar	TR	TR
Carbonate unspec.	TR	TR
Foraminifers	18	12
Calc. nannofossils	48	67

SITE 608 HOLE A CORE 10 CORED INTERVAL 79.2–88.8 m

Biostratigraphic zone – Foraminifers	PL4 *Globorotalia altispira* (AG)
Biostratigraphic zone – Nannofossils	NN16 *Discoaster surculus* Zone
Diatoms	RM
Sub-bottom depth (m)	79.2, 80.7, 82.2, 83.7, 85.2, 86.7, 88.2, 88.69, 89.00
Sections	1, 2, 3, 4, 5, 6, 7, CC

GRAPHIC LITHOLOGY



LITHOLOGIC DESCRIPTION

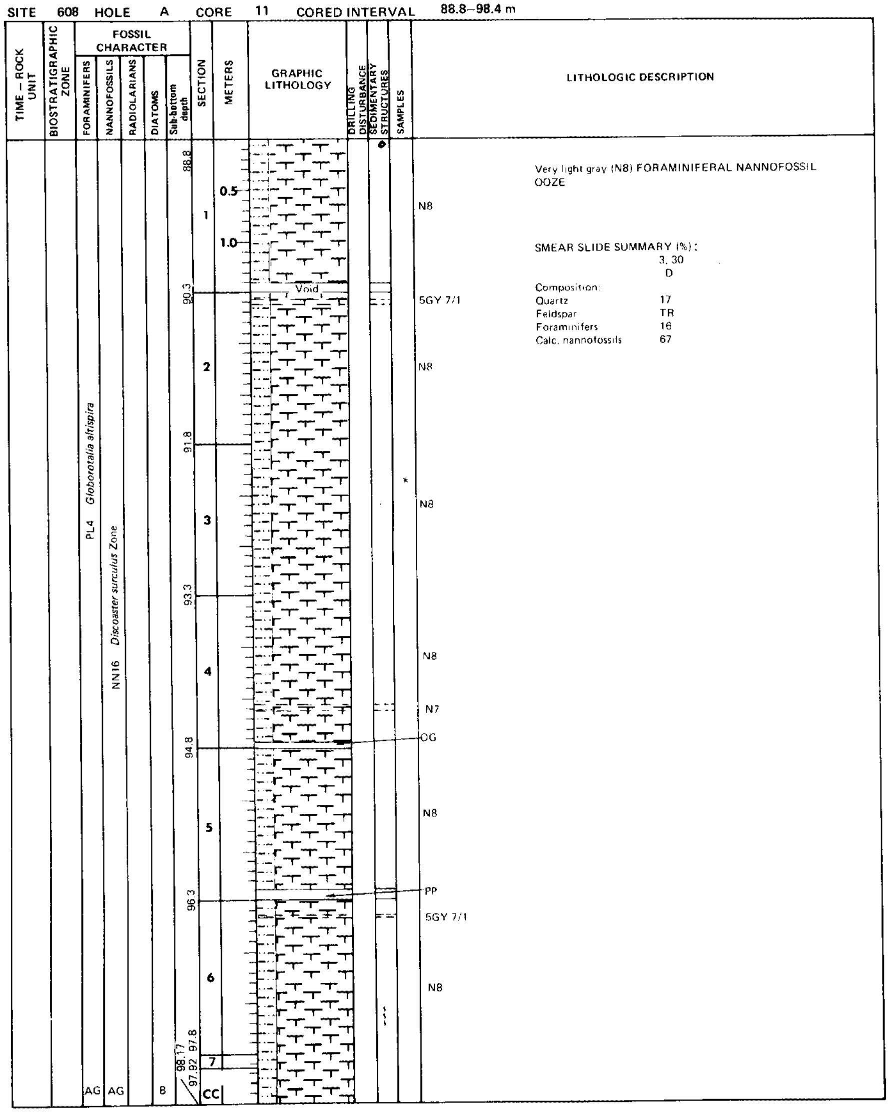
Very light gray (N8) to white (N9) FORAMINIFERAL NANNOFOSSIL OOZE. Occasional gradual changes to yellowish white (5Y 8/1) and light yellowish gray (5Y 7/1).

Note: recovery >100%.

SMEAR SLIDE SUMMARY (%):

	2, 42	5, 84
Composition:		
Quartz	5	8
Feldspar	TR	TR
Volcanic glass	TR	–
Carbonate unspec.	TR	TR
Foraminifers	10	12
Calc. nannofossils	85	80

SITE 608 HOLE A CORE 11 CORED INTERVAL 88.8–98.4 m



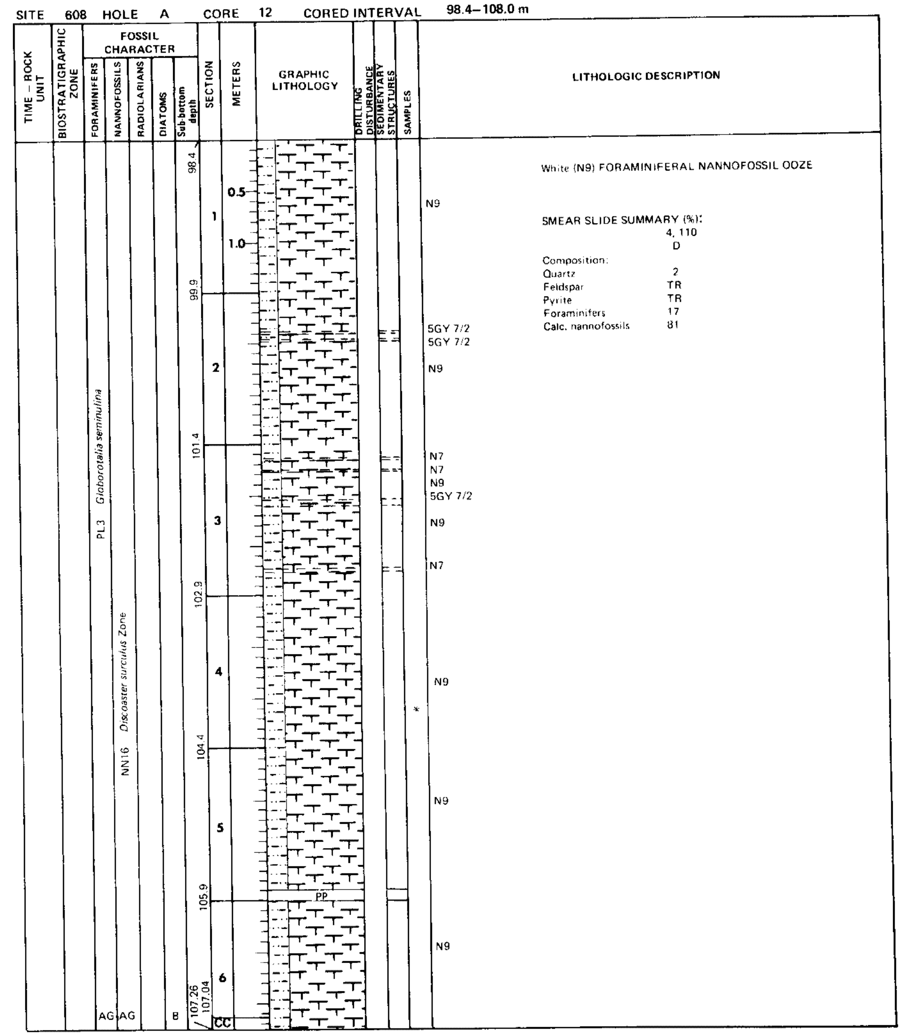
LITHOLOGIC DESCRIPTION

Very light gray (N8) FORAMINIFERAL NANNOFOSSIL OOZE

SMEAR SLIDE SUMMARY (%):

	3, 30
	D
Composition:	
Quartz	17
Feldspar	TR
Foraminifers	16
Calc. nannofossils	67

SITE 608 HOLE A CORE 12 CORED INTERVAL 98.4–108.0 m

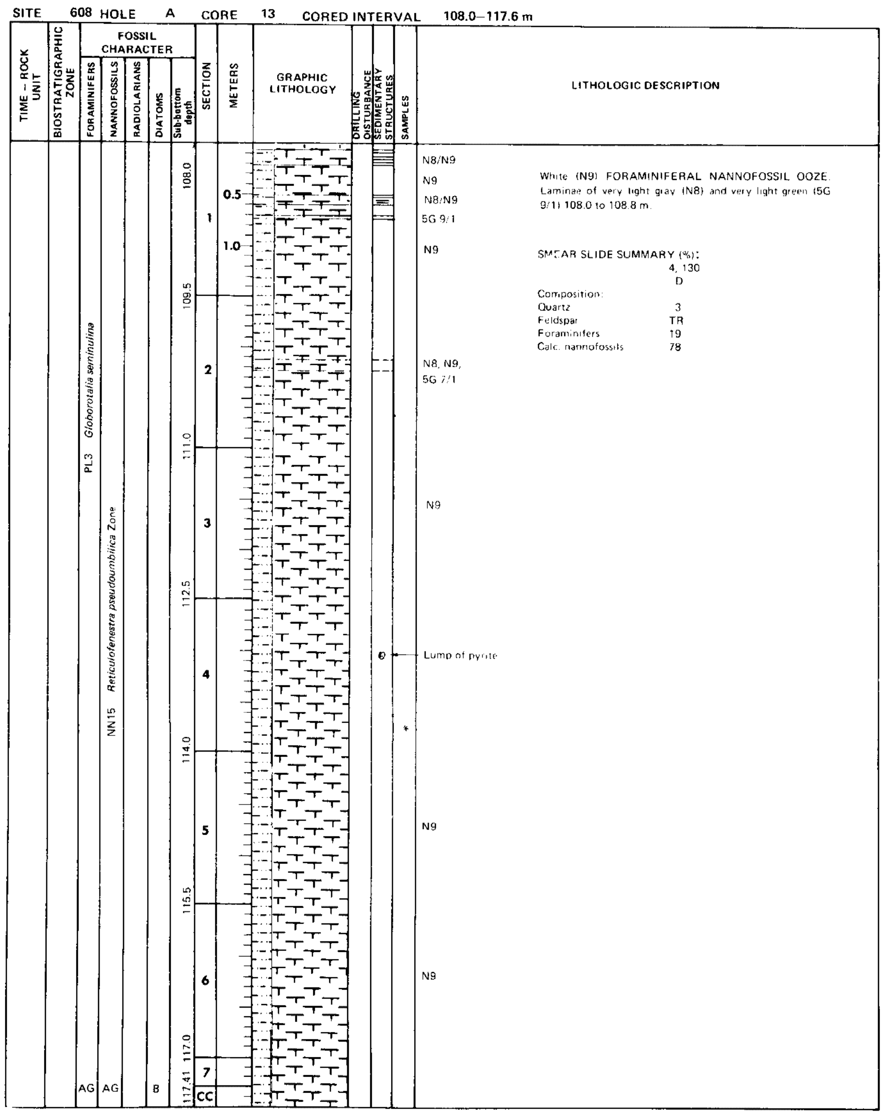


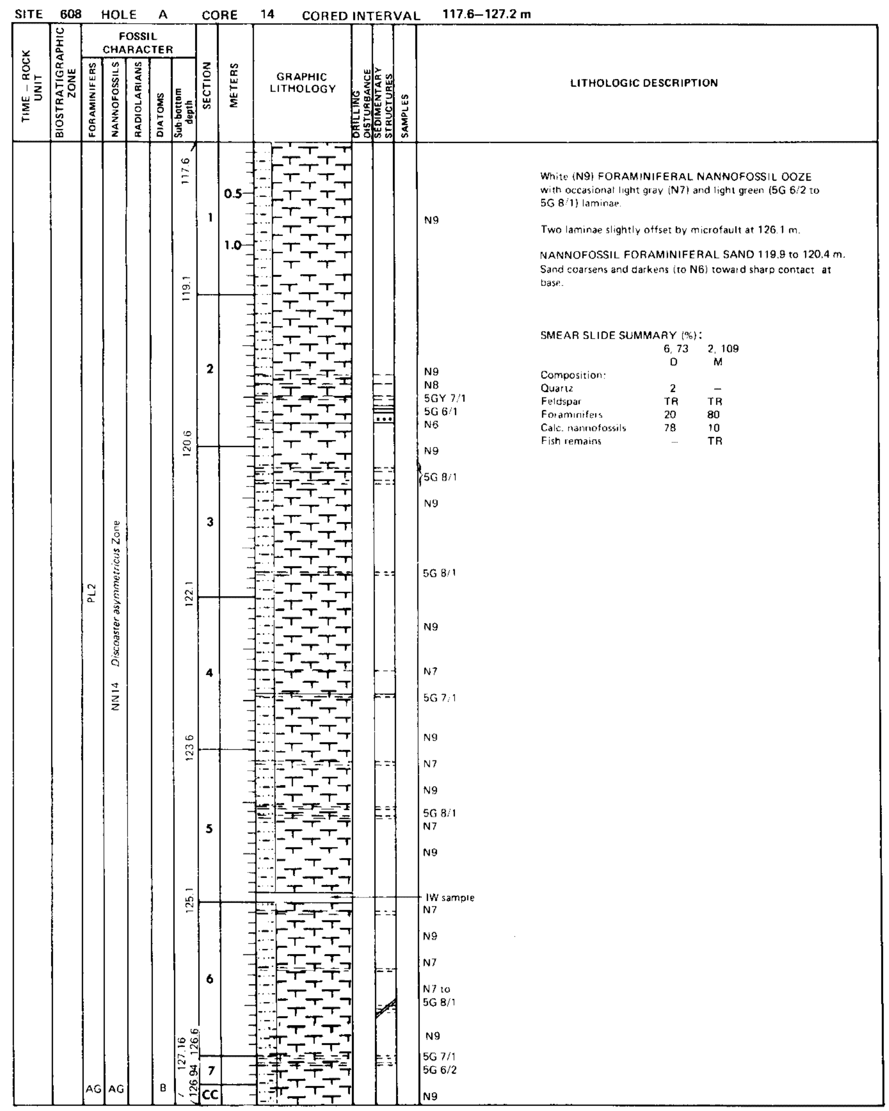
LITHOLOGIC DESCRIPTION

White (N9) FORAMINIFERAL NANNOFOSSIL OOZE

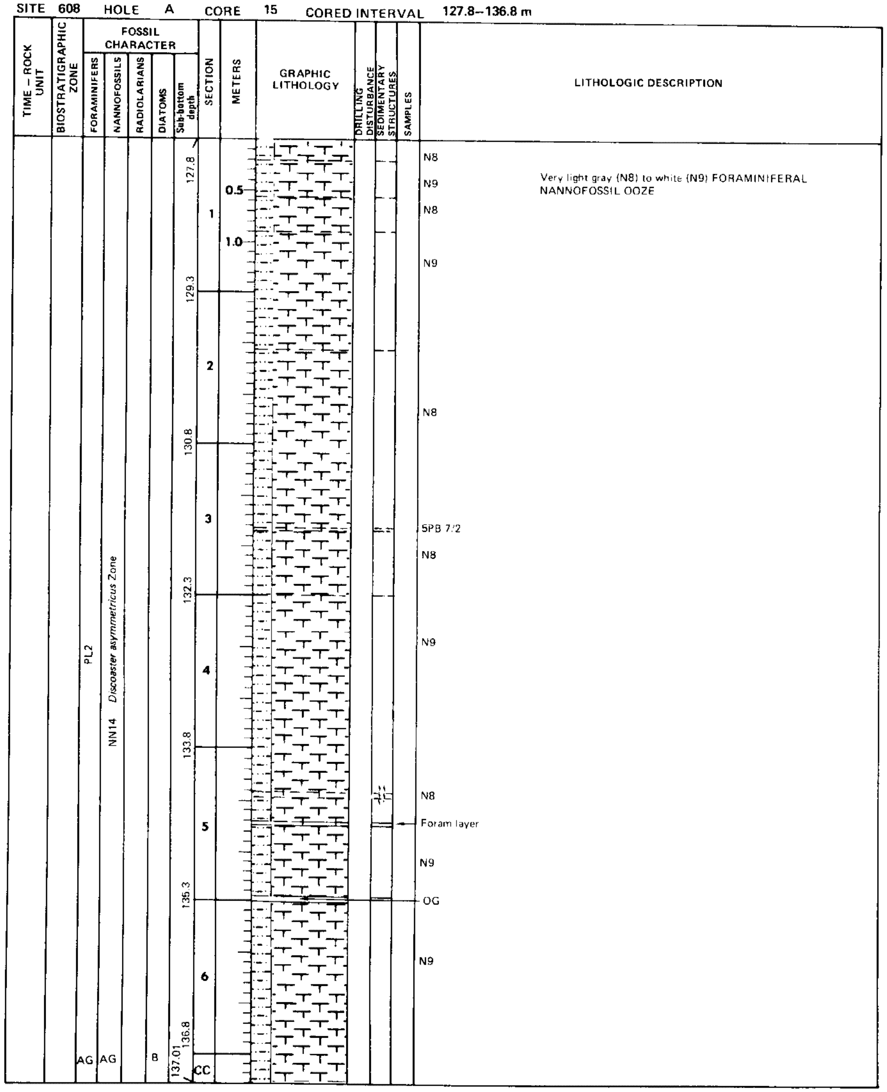
SMEAR SLIDE SUMMARY (%):

	4, 110
	D
Composition:	
Quartz	2
Feldspar	TR
Pyrite	TR
Foraminifers	17
Calc. nannofossils	81

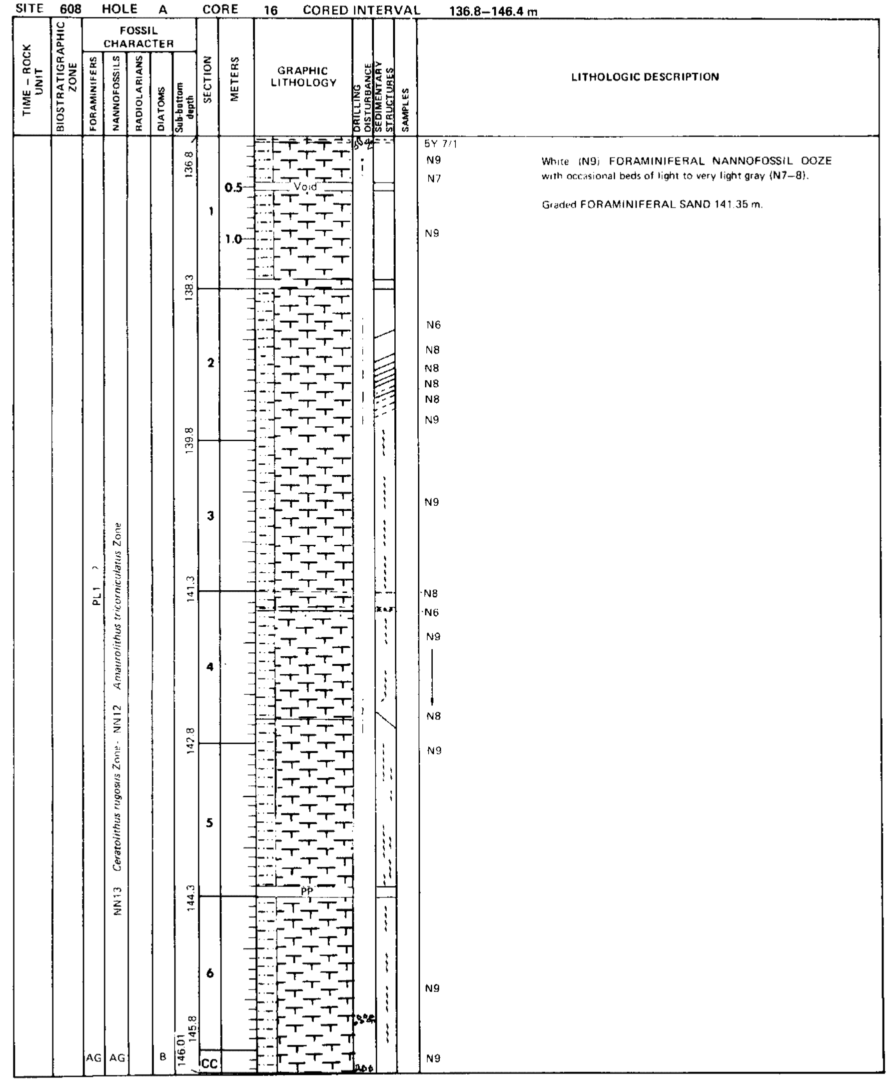

SITE 608 HOLE A CORE 13 CORED INTERVAL 108.0–117.6 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
PL3 Globorotalia seminulina
NN15 Reticulofenestra pseudoumbilica Zone
AG AG B
108.0 109.5 111.0 112.5 114.0 115.5 117.0 117.41
0.5 1.0
1 2 3 4 5 6 7 CC
N8/N9
N9
N8/N9
5G 9/1
N9
N8, N9,
5G 7/1
N9
Lump of pyrite
N9
N9
White (N9) FORAMINIFERAL NANNOFOSSIL OOZE. Laminae of very light gray (N8) and very light green (5G 9/1) 108.0 to 108.8 m.
SMEAR SLIDE SUMMARY (%):
4, 130
D
Composition:
Quartz 3
Feldspar TR
Foraminifers 19
Calc. nannofossils 78


SITE 608 HOLE A CORE 14 CORED INTERVAL 117.6–127.2 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
PL2
NN14 Discoaster asymmetricus Zone
AG AG B
117.6 119.1 120.6 122.1 123.6 125.1 126.6 127.16 126.94
0.5 1.0
1 2 3 4 5 6 7 CC
N9
N9
N8
5GY 7/1
5G 6/1
N6
N9
5G 8/1
N9
5G 8/1
N9
N7
5G 7/1
N9
N7
N9
5G 8/1
N7
N9
IW sample
N7
N9
N7
N7 to
5G 8/1
N9
5G 7/1
5G 6/2
N9
White (N9) FORAMINIFERAL NANNOFOSSIL OOZE with occasional light gray (N7) and light green (5G 6/2 to 5G 8/1) laminae.
Two laminae slightly offset by microfault at 126.1 m.
NANNOFOSSIL FORAMINIFERAL SAND 119.9 to 120.4 m. Sand coarsens and darkens (to N6) toward sharp contact at base.
SMEAR SLIDE SUMMARY (%):
6, 73 2, 109
D M
Composition:
Quartz 2 –
Feldspar TR TR
Foraminifers 20 80
Calc. nannofossils 78 10
Fish remains – TR

SITE 608 HOLE A CORE 15 CORED INTERVAL 127.8–136.8 m



SITE 608 HOLE A CORE 16 CORED INTERVAL 136.8–146.4 m



SITE 609

Hole 609

Date Occupied: 0215 July 22

Date Departed: 1430 July 23

Time on Hole: 2.5 days

Position (latitude; longitude): 49°52.667N; 24°14.287W

Water depth (sea level; corrected m, echo-sounding):3884

Water depth (rig floor; corrected m, echo-sounding):3899.8

Bottom felt (m, drill pipe):3883.6

Penetration (m): 399.4

Number of cores: 42

Total length of cored section (m): 399.4

Total core recovered (m): 301.24

Core recovery (%): 75

Oldest sediment cored:

Depth sub-bottom (m): 399.4

Nature: Nanno chalk

Age: late Miocene (7.0 Ma)

Measured velocity (km/s): 1.8

Basement: Not Reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 609

HOLE 609A

Date Occupied: 2105 July 23

Date Departed: 2240 July 23

Time on Hole: 0.1 days

Position (latitude; longitude): 49°52.667'N; 24°14.287'W

Water depth (sea level; corrected m, echo-sounding): 3883

Water depth (rig floor; corrected m, echo-sounding): 3901.8

Bottom felt (m, drill pipe):No valid mudline core obtained

Penetration (m): 43.0

Number of cores: 2

Total length of cored section (m): 19.2

Total core recovered (m): 17.89

Core recovery (%): 93

Oldest sediment cored:

Depth sub-bottom (m): 43.0

Nature: Nanno oozes/Marls/Muds

Age: late Quaternary (~ 0.7Ma)

Measured velocity (km/s):~1.52

Basement: Not Reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 609

HOLE 609B

Date Occupied: 2345 July 23

Date Departed: 0430 July 26

Time on Hole: 2.2 days

Position (latitude; longitude): 49°52.667'N; 24°14.287'W

Water depth (sea level; corrected m, echo-sounding): 3883

Water depth (rig floor; corrected m, echo-sounding): 3901.8

Bottom felt (m, drill pipe): 3906.8

Penetration (m): 354.7

Number of cores: 38

Total length of cored section (m): 354.70

Total core recovered (m): 308.40

Core recovery (%): 87

Oldest sediment cored:

Depth sub-bottom (m): 354.7

Nature: Nanno chalk

Age: late Miocene (~6.0Ma)

Measured velocity (km/s): ~1.6

Basement: Not Reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 609

HOLE 609C

Date Occupied: 0730 July 26

Date Departed: 0245 July 27

Time on Hole: 0.8 days

Position (latitude; longitude): 49°52.667'N; 24°14.287'W

Water depth (sea level; corrected m, echo-sounding): 3883

Water depth (rig floor; corrected m, echo-sounding): 3901.8

Bottom felt (m, drill pipe): 3906.8

Penetration (m): 190.4

Number of cores: 7

Total length of cored section (m): 67.20

Total core recovered (m): 34.95

Core recovery (%): 52

Oldest sediment cored:

Depth sub-bottom (m): 190.4

Nature: Stiff Nanno ooze/Marl

Age: late Pliocene (~2.75 Ma)

Measured velocity (km/s): 1.8

Basement: Not Reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 609

A. PRINCIPAL RESULTS

Site 609 is located on the upper-middle eastern flank of the Mid-Atlantic Ridge at 49°52.7'N, 24°14.3W at a depth of 3884m. It consists of four holes, three of which drilled significant sections and one which represents cores taken during the process of feeling for bottom. Hole 606 was HPC cored to a sub-bottom depth of 130.6m (1.9 Ma) and then XCB cored to 399.4m (7.0 Ma). Hole 609B was HPC cored to 128.4m (1.8 Ma) and then XCB cored to 354.7m (5.9 Ma). Hole 609C was XCB cored from 123.2m (1.75 Ma) to 190.4 m (2.8 Ma). Recovery averages 75% at 609, 87% at 609B, and 52% at 609C. Contorted layering occurs to a depth of 0.1 to 1.0 m in the tops of most cores, and some are entirely contorted. These disturbances appear to be related to pitching of the ship induced by remotely generated swell. Local weather at the site during operations was generally relatively calm and never bad.

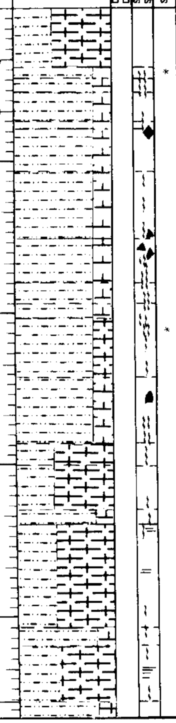
Paleomagnetic and lithologic tie lines between holes indicate that we may have a 100% complete composite section to about 130/160 m sub-bottom (2 Ma). Between core-verification of a 100% complete section is made very difficult by the low recovery, the contorted layering, and by complicated coring-related thickening and thinning of the layering from hole to hole. All calcareous microfossil zones are well represented, with no hiatuses evident at the chosen density of sampling. Preservation of calcareous material is generally very good. The paleomagnetic stratigraphy is exceptional throughout, with very high intensities. The upper 164 m are interbedded oozes, marls and muds of the Pleistocene and late Pliocene extending to the top of the Gauss (2.47 Ma) and deposited at 70m/m.y. These are the glacial cycles of the North Atlantic. From 164m (2.47 Ma) to 240 (3.4 Ma) are upper Pliocene muddy nanno oozes deposited at 60m/m.y. The muddy component is tentatively attributed to an influx of redeposited fine basaltic/volcanic debris from Maury Channel the main axis of which lies some 35 km to the east and some 225 m deeper than Site 609. This suggests a possible initiation of downslope deposition in Maury Channel at about 3.4 Ma and could be related to the first local glaciation of Iceland. The remainder of the section (240m to 399.4m) is lower Pliocene and upper Miocene nanno ooze grading to nanno chalk, with some deformation in the upper Miocene chalks. Deposition rates in this unit average 40m/m.y. In general, deposition is pelagic, with significant enhancement by local redeposition of contemporaneous sediments by gentle current activity.

SITE 609 HOLE CORE 1 CORED INTERVAL 0.0–7.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		G. truncatulinoides	NN21 *Emiliania huxleyi* Zone	RM	*Pseudoeunotia doliolus* Zone								
		AG	AG	AG	AG								

Sub-bottom depth: 0.0, 1.50, 3.0, 4.5, 6.0, 6.81, 6.98

Sections: 1, 2, 3, 4, 5, CC; Meters: 0.5, 1.0



Colors: 10YR 7/4; 10YR 6/4, 10YR 7/4, 10YR 5/3; 10YR 7/4, 10YR 5/3; 5Y 5/2; 5Y 6/1; 5Y 5/1; 5Y 6/1; 5Y 6/2; 5Y 6/1; 5Y 5/2; 5Y 6/1; 5Y 7/1; 5Y 8/1; 5Y 6/1; 5Y 7/1; 5Y 5/2; 5Y 7/1; 5Y 6/1

Very pale brown (10YR 7/4), white (5Y 8/1) and light gray (5Y 7/1) MARLY FORAMINIFERAL NANNOFOSSIL OOZE alternating with gray (5Y 6/1, 5Y 5/1) and olive gray (5Y 5/2) NANNOFOSSIL MUD and FORAMINIFERAL NANNOFOSSIL MUD

Dropstones (mostly polished fragments of granite and gneiss) and pumice prominent at 1.1–1.2,~2.5, and~3.8 m.

Pale green (5G 7/1) and purple (5P 7/1) laminae occur below 5.0 m.

SMEAR SLIDE SUMMARY (%):

	1, 67	3, 15
Texture:		
Sand	15	–
Silt	35	–
Clay	50	–
Composition:		
Quartz	49	45
Feldspar	1	1
Heavy minerals	8	2
Clay	15	25
Volcanic glass	5	1
Carbonate unspec.	3	1
Foraminifers	7	7
Calc. nannofossils	10	18
Diatoms	2	TR

ORGANIC CARBON AND CARBONATE (%)

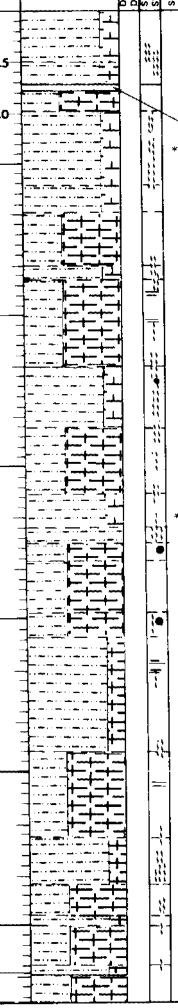
	2, 33	3, 67
Organic carbon	–	–
Carbonate	10	6

SITE 609 HOLE CORE 2 CORED INTERVAL 7.0–16.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		G. truncatulinoides	NN20 *Gephyrocapsa oceanica* Zone	FM	*Pseudoeunotia doliolus* Zone								
		AG	AG	AG	AG								

Sub-bottom depth: 7.00, 8.50, 10.00, 11.50, 13.0, 14.50, 16.00, 16.46, 16.73

Sections: 1, 2, 3, 4, 5, 6, 7, CC; Meters: 0.5, 1.0



Colors: 2.5Y 4/2; 5Y 7/2, 5Y 4/2, 5Y 7/1; Void; 5Y 4/2; 5Y 5/2; 5Y 7/1; 5Y 6/1; N7; N6; 5Y 4/1; 5Y 5/2; N7; N6; 5Y 5/3; 5Y 4/1; N6; 5Y 5/2; 5BG 6/1; N6; 5Y 4/2; 2.5Y 4/2; 5Y 7/2; N7; 5Y 6/1; 5Y 7/1; N7; 5Y 5/1; N7; 5Y 5/2; N7

Gray (5Y 7/2, 5Y 4/2, 5Y 6/1, 5Y 4/1, 5Y 5/2, 5Y 5/3, and N6) and dark grayish brown (2.5Y 4/2) CALCAREOUS MUD and light gray (mostly N7) MARLY FORAMINIFERAL NANNOFOSSIL OOZE.
Calcareous component in mud dominated (in decreasing abundance) by nannofossil, foraminifera, and unspecified carbonate.

Occasional laminae (<5 cm) of greenish gray to pale blue (5B 6/1, 5B 6/2, 5BG 7/2, 5GY 4/1).

Dropstones ~ 10.7, 12.3, and 13.1 m.

SMEAR SLIDE SUMMARY (%):

	1, 139 D	4, 42 D
Texture:		
Sand	5	10
Silt	15	25
Clay	80	65
Composition:		
Quartz	20	20
Feldspar	1	1
Heavy minerals	2	4
Clay	53	50
Volcanic glass	2	–
Micronodules	–	1
Carbonate unspec.	3	2
Foraminifers	5	7
Calc. nannofossils	14	5
Diatoms	TR	TR
Radiolarians	–	TR
Silicoflagellates	–	TR

ORGANIC CARBON AND CARBONATE (%)

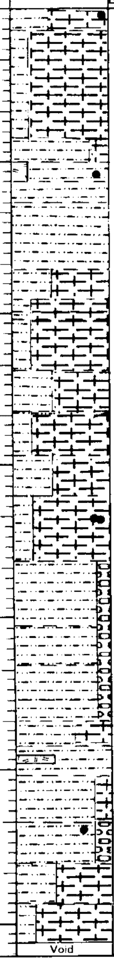
	2, 65–66	4, 65–66	6, 51–52
Organic carbon	–	–	–
Carbonate	55	3	31

SITE 609 HOLE CORE 3 CORED INTERVAL 16.6–26.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *G. truncatulinoides* — AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone — AG
Radiolarians: RM — RG
Diatoms: *Pseudoeunotia doliolus* Zone — RM

Sub-bottom depth: 16.6, 18.1, 19.6, 21.1, 22.6, 24.1, 25.6, 25.81
Sections: 1, 2, 3, 4, 5, 6, CC
Meters: 0.5, 1.0



N7
N8
N6
5Y 4/2
5Y 5/2
5Y 4/2
2.5Y 6/2
N7
N6
5Y 7/1
5Y 5/2
N7
N8
to
N9
N7
N8
5Y 4/1
to
2.5Y 6/2
5Y 5/2
5Y 4/2
5Y 5/1
5Y 7/2
5Y 4/2
5Y 5/1
5Y 4/1
5Y 7/1
5Y 6/1
5Y 8/1

FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE in light colors from white (N9) to light gray (5Y 7/2) alternating with MUD and CALCAREOUS MUD. Gradational changing in dark colors from olive gray (5Y 4/2) to light brownish gray (2.5Y 6/2).

Ash-bearing dark muds at Section 2, 10 cm and Section 5, 141–142 cm.

Erratic dropstones at:
Section 1, 5 cm granitic (probably downhole cont.)
Section 2, 14–15 cm siltstone, angular
Section 4, 51 and 54 cm, and Section 6, 60 cm.

SMEAR SLIDE SUMMARY (%):

	1, 60	2, 93	3, 80
Texture:			
Sand	–	20	10
Silt	–	30	20
Clay	–	50	70
Composition:			
Quartz	2	35	17
Feldspar	–	2	1
Heavy minerals	TR	5	4
Clay	5	46	23
Volcanic glass	TR	3	–
Carbonate unspec.	1	6	6
Foraminifers	15	3	8
Calc. nannofossils	77	–	40
Diatoms	TR	–	1
Radiolarians	TR	–	–
Sponge spicules	–	–	TR
Silicoglagellates	–	–	TR

ORGANIC CARBON AND CARBONATE (%)

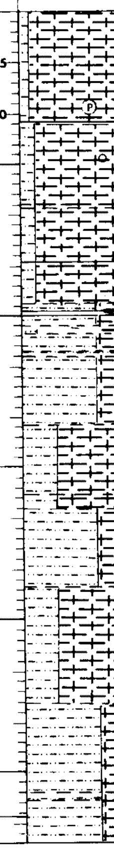
	1, 10–11	4, 102–103
Organic carbon	–	–
Carbonate	64	9

SITE 609 HOLE CORE 4 CORED INTERVAL 26.2–35.8 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *G. truncatulinoides* — AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone — CG
Radiolarians: FM — B
Diatoms: B

Sub-bottom depth: 26.2, 27.7, 29.2, 30.7, 32.2, 33.7, 34.11, 34.38
Sections: 1, 2, 3, 4, 5, 6, CC
Meters: 0.5, 1.0



N8
N7
N8
to
N7
N8
to
N7
5Y 5/1
Void
N7
5Y 6/1
5GY 4/1
N7
to
2.5Y 5/2
5GY 8/1
5Y 5/1
5Y 7/1
to
5Y 5/2
N7
5Y 5/2
5Y 5/1
5Y 3/1
5Y 5/1

Mostly gray (5Y 7/1, 5Y 5/1), grayish brown (2.5Y 5/2) and olive gray (5Y 5/2) FORAMINIFERAL NANNOFOSSIL MUD alternating with lighter gray (N8–7, 5GY 8/1) MARLY FORAMINIFERAL NANNOFOSSIL OOZE.

Occasional green to dark gray (5G 7/1 to N4) laminae throughout.

Metamorphic dropstones~27.7 m.

SMEAR SLIDE SUMMARY (%):

	1, 123 D	3, 36 M	3, 95 D	5, 110 D
Texture:				
Sand	–	10	–	21
Silt	–	30	–	30
Clay	–	60	–	49
Composition:				
Quartz	5	35	3	22
Feldspar	TR	2	1	2
Heavy minerals	–	4	2	2
Clay	–	55	15	–
Carbonate unspec.	1	1	2	25
Foraminifers	16	–	10	9
Calc. nannofossils	78	–	66	1
Diatoms	TR	–	1	–
Radiolarians	TR	–	–	–
Sponge spicules	TR	–	TR	–
Silicoflagellates	TR	–	–	–
Opaque oxides	–	3	–	–

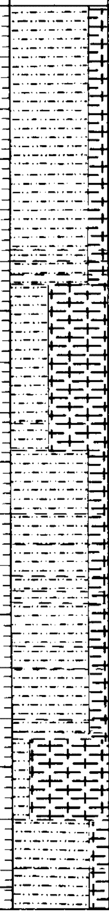
ORGANIC CARBON AND CARBONATE (%)

	3, 36–37	6, 24–25
Organic carbon	–	–
Carbonate	2	2

SITE 609 HOLE CORE 5 CORED INTERVAL 35.8–45.4 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		G. truncatulinoides	NN19 Pseudoemiliania lacunosa Zone	CG	B, B, Pseudoeunotia doliolus Zone	35.8, 37.3, 38.8, 40.3, 41.8, 43.3, 44.48, 44.69	1, 2, 3, 4, 5, 6, CC	0.5, 1.0
		AG	AG	FP	FM			

GRAPHIC LITHOLOGY



Colors: N7 → 5Y 5/2; 5Y 6/1; 5Y 6/2; 5Y 4/2; N8 to N7; 5Y 7/1; 5Y 4/1; 5Y 5/1; 5Y 6/1; 5Y 6/1; 5Y 5/1; 5Y 3/1; 5Y 5/1; 5Y 7/1; 5Y 5/1; 2.5Y 7/0; N6; 2.5Y 7/0; 5Y 4/1; 5Y 5/1; 5Y 5/2

LITHOLOGIC DESCRIPTION

Light gray to very light gray (2.5Y 7/0 to N8) MARLY FORAMINIFERAL NANNOFOSSIL OOZE and FORAMINIFERAL NANNOFOSSIL OOZE alternating with dominantly gray to olive gray (5Y 7/1–5Y 4/2) FORAMINIFERAL NANNOFOSSIL MUD.

Scattered laminae of various shades of gray and green (eg. 5G 6/1, 5Y 3/2).

Erratic piece of sandstone, ~40.4 m.

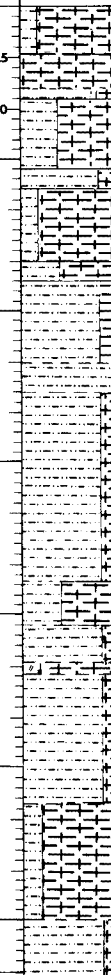
ORGANIC CARBON AND CARBONATE (%)

	1, 22–23	4, 29–30	6, 56–57
Organic carbon	–	–	–
Carbonate	29	2	12

SITE 609 HOLE CORE 6 CORED INTERVAL 45.4–55.0 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		G. truncatulinoides	NN19 Pseudoemiliania lacunosa Zone	CG	Nitzschia reinholdii Zone	45.40, 46.90, 48.40, 49.90, 51.4, 52.90, 54.40, 54.93, 55.11	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0
		AG	CG	CM	CG			

GRAPHIC LITHOLOGY



Colors: N7; 10YR 6; 2.5Y 4/1; 5Y 6/1 to 5Y 6/2; 5Y 4/2; 5Y 7/1; 5Y 5/1 → 5Y 4/2 to 5Y 5/2; 5Y 6/1; 5G 4/1 → 5Y 7/1; 5Y 5/1

LITHOLOGIC DESCRIPTION

Light gray (N7, 5Y 7/1) FORAMINIFERAL NANNOFOSSIL OOZE, gray (5Y 6/1) MARLY FORAMINIFERAL NANNOFOSSIL OOZE, and olive gray (5Y 4/2) and gray (5Y 5/1) FORAMINIFERAL NANNOFOSSIL MUD.

Common gray and green laminae (eg. 5G 6/1, 5GY 4/1).
Common ice-rafted pebbles throughout (~47 m, green tuff; 48.3 m, gray slate; ~49 m, striated siltstone; 53.6 m, granite).

Volcanic ash-bearing layer, dark greenish gray (5G 4/1) at 51.9 m.

Recovery > cored interval!

SMEAR SLIDE SUMMARY (%):

	1, 16 D	2, 60 D	3, 60 D	5, 53 M
Texture:				
Sand	10	15	20	10
Silt	40	45	30	45
Clay	50	45	50	45
Composition:				
Quartz	15	10	40	40
Feldspar	–	–	3	20
Heavy minerals	–	TR	5	10
Clay	3	5	26	25
Volcanic glass	2	1	1	3
Glauconite	–	–	TR	–
Carbonate unspec.	–	10	–	–
Foraminifers	10	15	5	–
Calc. nannofossils	68	57	20	2
Diatoms	1	1	TR	–
Radiolarians	1	1	–	–
Sponge spicules	–	TR	–	–

ORGANIC CARBON AND CARBONATE (%)

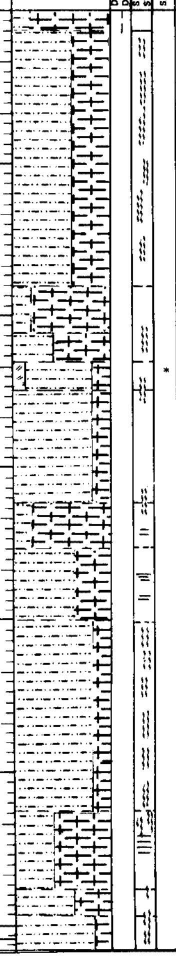
	3, 60–61
Organic carbon	–
Carbonate	6

SITE 609 HOLE CORE 7 CORED INTERVAL 55.0–64.6 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *G. truncatulinoides* — AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone — CM
Radiolarians: FG — CG
Diatoms: *Nitzschia reinholdii* Zone — CG

Sub-bottom depth: 55.0, 56.5, 58.0, 59.5, 61.0, 62.5, 64.13, 64.25
Sections: 1, 2, 3, 4, 5, 6, 7, CC
Meters: 0.5, 1.0



Colors: 5Y 7/1; 5Y 4/1 to 5Y 6/1 to 5Y 3/1 to 5Y 6/1; 5Y 7/1 → 5Y 5/1; 5GY 4/1; 5Y 5/1; 5Y 6/1; 5Y 7/1; 5Y 5/1 to 5Y 6/1; 5Y 4/1 to 5Y 5/1; 5Y 7/1; 5Y 6/1; 5Y 5/1

Light gray (5Y 7/1) FORAMINIFERAL NANNOFOSSIL OOZE, gray (5Y 5/1) MARLY FORAMINIFERAL NANNOFOSSIL OOZE, and dark gray to gray (5Y 4/1–5Y 7/1) CALCAREOUS MUD.

Gray and green laminae frequent below 60 m.

Dark green (5GY 4/1) FORAMINIFERAL SAND and VOLCANIC ASH at ~58.4–58.7 m.

SMEAR SLIDE SUMMARY (%):

	3, 53
	M
Composition:	
Quartz	35
Feldspar	2
Heavy minerals	5
Clay	12
Volcanic glass	5
Carbonate unspec.	20
Foraminifers	10
Calc. nannofossils	10
Diatoms	TR
Opaques	1

ORGANIC CARBON AND CARBONATE (%)

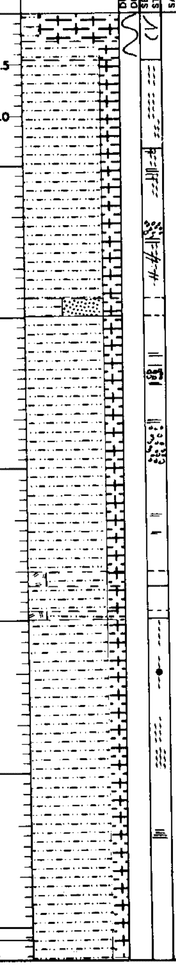
	2, 65–66	4, 66–67
Organic carbon	–	–
Carbonate	47	66

SITE 609 HOLE CORE 8 CORED INTERVAL 64.6–74.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *G. truncatulinoides* — AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone — CG
Radiolarians: CG
Diatoms: *Nitzschia reinholdii* Zone — CM

Sub-bottom depth: 64.6, 66.1, 67.6, 69.1, 70.6, 72.1, 73.72, 73.94
Sections: 1, 2, 3, 4, 5, 6, 7, CC
Meters: 0.5, 1.0



Colors: N7 + 5Y 5/1; 5Y 5/1; 5Y 6/1 to 5Y 4/1; 5Y 4/2 to 5Y 5/2; 5Y 5/1; 5Y 2/2; 5Y 2/2; 5Y 4/1 to 5Y 6/1; 5Y 5/1 to 5Y 6/1; 5Y 5/1

Dominantly gray (5Y 4/1–5Y 6/1) CALCAREOUS MUD.

Sandy interval ~ 67.5 m and volcanic ash-rich intervals at 70.1 to 70.6 m.

Distinct *Chondrites* burrowing at ~66.7 and 68 to 69 m. Green and gray laminae throughout.

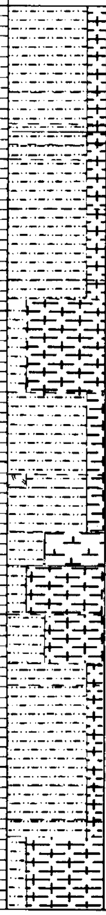
SMEAR SLIDE SUMMARY (%):

	4, 112	6, 52
	M	D
Texture:		
Silt	–	10
Clay	–	90
Composition:		
Quartz	20	25
Feldspar	10	3
Heavy minerals	TR	–
Clay	30	38
Volcanic glass	30	3
Foraminifers	TR	1
Calc. nannofossils	5	30
Opaque	5	–

ORGANIC CARBON AND CARBONATE (%)

	5, 94–95
Organic carbon	–
Carbonate	6

SITE 609 HOLE CORE 9 CORED INTERVAL 74.2–83.8 m



LITHOLOGIC DESCRIPTION

Mostly CALCAREOUS MUD, various shades of gray (N7, 5Y 4/1–5Y 7/1) alternating with MARLY FORAMINIFERAL NANNOFOSSIL OOZE and FORAMINIFERAL NANNOFOSSIL OOZE of lighter gray (N7–8).

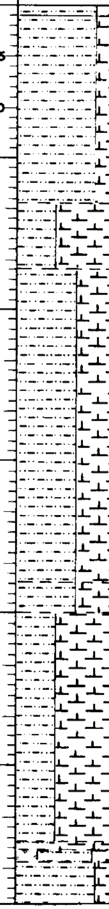
SMEAR SLIDE SUMMARY (%):

	3, 39	4, 18	4, 121
	D	M	D
Composition:			
Quartz	–	–	15
Feldspar	–	25	5
Heavy minerals	TR	2	TR
Clay	10	25	TR
Volcanic glass	TR	15	–
Carbonate unspec.	15	10	–
Foraminifers	20	–	17
Calc. nannofossils	55	14	63
Diatoms	–	4	–
Radiolarians	–	TR	–
Sponge spicules	TR	5	–

ORGANIC CARBON AND CARBONATE (%)

	4, 122–123
Organic carbon	–
Carbonate	79

SITE 609 HOLE CORE 10 CORED INTERVAL 83.8–93.4 m



LITHOLOGIC DESCRIPTION

Interlayered CALCAREOUS MUD, MARLY NANNOFOSSIL OOZE and NANNOFOSSIL OOZE

CALCAREOUS MUD predominantly olive gray (5Y 5/1–5Y 7/1), common dark gray (N4) and olive mottles.

MARLY NANNOFOSSIL OOZE, gray to light gray (N5–8).

Green and gray (5GY 7/2, 5GY 8/1, N6) laminae common throughout.

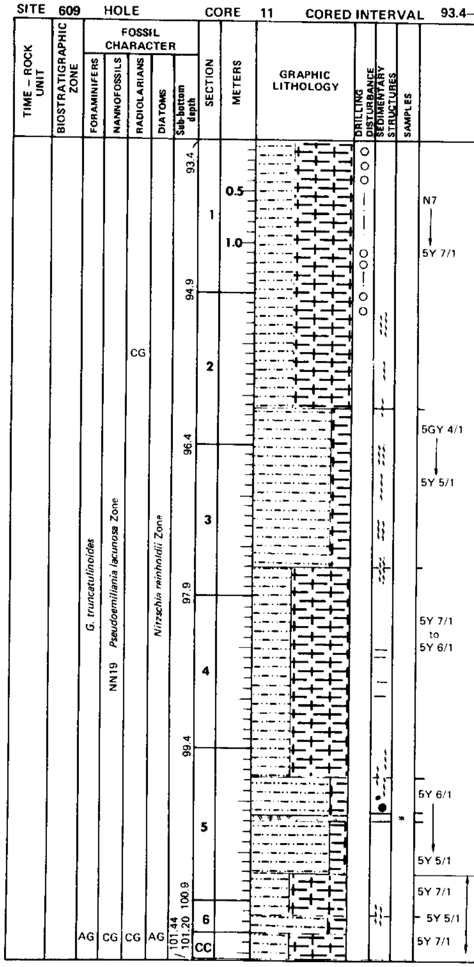
SMEAR SLIDE SUMMARY (%):

	6, 84
	M
Composition:	
Quartz	15
Feldspar	10
Heavy minerals	10
Clay	15
Volcanic glass	15
Carbonate unspec.	15
Foraminifers	TR
Calc. nannofossils	20
Sponge spicules	TR

ORGANIC CARBON AND CARBONATE (%)

	2, 80–81	6, 81–82
Organic carbon	–	–
Carbonate	82	11

SITE 609 HOLE CORE 11 CORED INTERVAL 93.4–103.0 m



LITHOLOGIC DESCRIPTION

Interlayered MARLY FORAM-NANNO OOZE and CALCAREOUS MUD

MARLY FORAM-NANNO OOZE, gray (N7) to pale gray (5Y 7/1) predominant, with dark gray (N5) mottles and green (5GY 7/1) laminations.

CALCAREOUS MUD, varicolored, predominantly olive gray (5Y 5/1–5Y 6/1); common green (5G 5/1) mottles and dark gray (N4–6) laminations.

Dark gray (N2) ash-bearing layer at Section 5, 67 cm. Pyritized burrow at Section 2, 129 cm. Glacial erratics at Section 5, 42 cm. Sandstone (0.5 cm) at Section 5, 60 cm. Gneiss (2.5 cm in diameter).

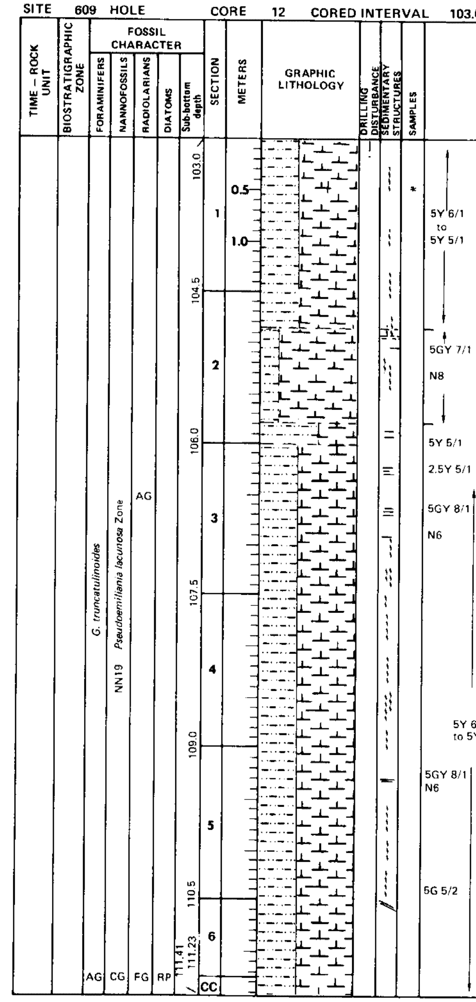
SMEAR SLIDE SUMMARY (%):

	5, 69
Texture:	
Sand	10
Silt	40
Clay	50
Composition:	
Quartz	30
Feldspar	TR
Heavy minerals	5
Clay	25
Volcanic glass	30
Calc. nannofossils	10

ORGANIC CARBON AND CARBONATE (%)

	5, 65–66
Organic carbon	–
Carbonate	2

SITE 609 HOLE CORE 12 CORED INTERVAL 103.0–112.6 m



LITHOLOGIC DESCRIPTION

Marly NANNOFOSSIL OOZE, varicolored, primarily olive gray (5Y 6/1–5Y 5/1); subhorizontal green (5GY 7/1) and gray laminations. Interlayered nannofossil ooze, white (N8) with pyritized burrow (P) and green (5GY 7/1) laminations and dark gray (N5) mottles.

SMEAR SLIDE SUMMARY (%):

	1, 50
Composition:	
Quartz	20
Heavy minerals	1
Clay	15
Volcanic glass	3
Carbonate unspec.	10
Foraminifers	10
Calc. nannofossils	40
Diatoms	TR
Sponge spicules	1

ORGANIC CARBON AND CARBONATE (%)

	1, 50–51
Organic carbon	–
Carbonate	54

SITE 609 HOLE CORE 13 CORED INTERVAL 112.6–122.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

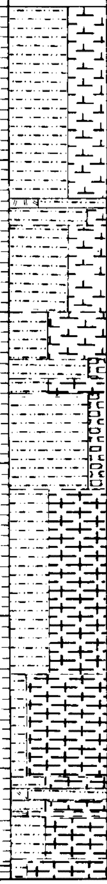
Foraminifers: G. truncatulinoides; Nannofossils: NN19 Pseudoemiliania lacunosa Zone; Radiolarians: B

Core catcher: AG CG FG RM

Sub-bottom depth: 112.6, 114.1, 115.6, 117.1, 118.6, 120.1, 121.15, 121.02

Sections: 1, 2, 3, 4, 5, 6, CC

Meters: 0.5, 1.0



Colors: 5Y 4/1, 5Y 5/1, 2.5Y 3/2, 5Y 6/1, 5Y 6/1, 5Y 4/1, 5Y 5/1, 5Y 4/1 to 5Y 5/1, 5Y 6/1, 5Y 4/1, 5GY 7/1, 5GY 7/1, 5Y 6/1, 2.5Y 3/2, N3, 5Y 4/1

MARLY FORAMINIFERAL-NANNOFOSSIL OOZE interlayered with CALCAREOUS MUD and FORAMINIFERAL-NANNOFOSSIL OOZE

Very thin ash-bearing mud layers, very dark grayish brown (2.5Y 3/2) and very dark (N3) at: ~141.5, ~120.3, and ~120.5 m.

SMEAR SLIDE SUMMARY (%):

	2, 40	5, 70
	M	D
Texture:		
Silt	–	10
Clay	–	90
Composition:		
Quartz	30	10
Feldspar	5	–
Mica	TR	TR
Heavy minerals	TR	–
Clay	30	15
Volcanic glass	25	–
Glauconite	TR	–
Carbonate unspec.	5	–
Foraminifers	TR	15
Calc. nannofossils	5	60

ORGANIC CARBON AND CARBONATE (%)

	5, 70–71
Organic carbon	–
Carbonate	64

SITE 609 HOLE CORE 14 CORED INTERVAL 122.2–130.6 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

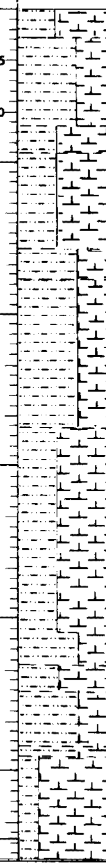
Nannofossils: NN19 Pseudoemiliania lacunosa Zone; Radiolarians: FG; Diatoms: CM, Nitzschia reinholdii Zone

Core catcher: AG AG CG CM

Sub-bottom depth: 122.2, 123.7, 125.2, 126.7, 128.2, 129.7, 130.35, 130.53

Sections: 1, 2, 3, 4, 5, 6, CC

Meters: 0.5, 1.0



Colors: 5Y 7/1, 5Y 5/1, 5Y 6/1, 5Y 7/1, 5GY 6/1, 5Y 6/1, 5Y 4/1, 5Y 5/1, 5Y 6/1, 5GY 5/1, 5Y 5/1, 5Y 6/1, 5Y 7/1, 5Y 6/1, 5Y 5/1, 5Y 6/1, 5Y 7/1, 5Y 5/1, 5Y 4/1, 5Y 8/1, 5Y 7/1

NANNOFOSSIL OOZE, MARLY NANNOFOSSIL OOZE and combinations thereof.

Green (5GY 6/1, 5GY 5/1) laminae common throughout.

Dropstones in upper 0.5 m.

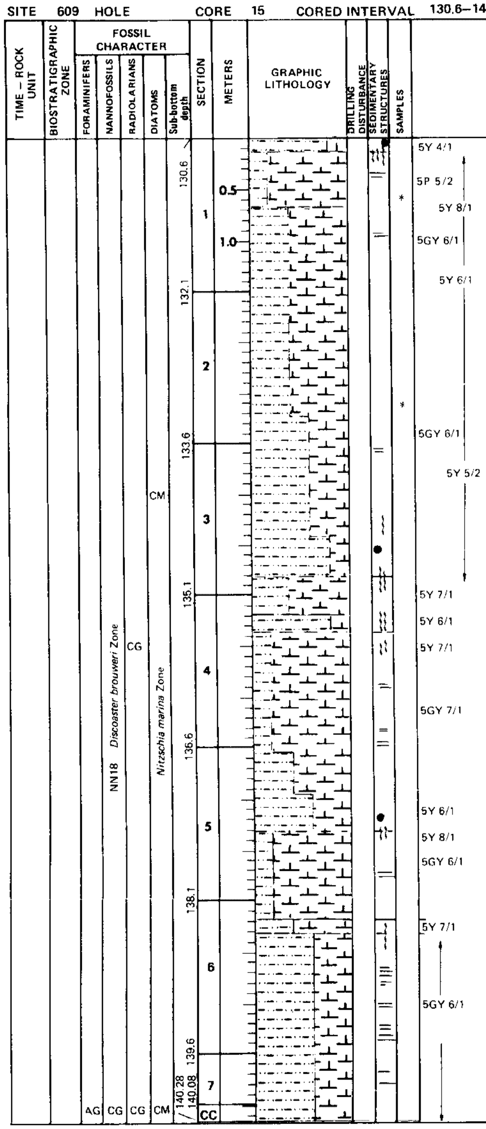
SMEAR SLIDE SUMMARY (%):

	1, 50	6, 20
		D
Texture:		
Sand	–	–
Silt	5	–
Clay	95	–
Composition:		
Quartz	25	15
Mica	TR	–
Clay	10	–
Volcanic glass	15	–
Foraminifers	4	20
Calc. nannofossils	46	65
Radiolarians	TR	–

ORGANIC CARBON AND CARBONATE (%)

	1, 50–51	6, 20–21
Organic carbon	–	–
Carbonate	39	82

SITE 609 HOLE CORE 15 CORED INTERVAL 130.6–140.2 m



LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL OOZE, light gray to gray (5Y 6/1) in gradational transitions to NANNOFOSSIL OOZE, white (5Y 8/1) and CALCAREOUS MUD, olive gray (5Y 5/1).

Bioturbation throughout; lighter layers with dark gray (N3) pyrite rich mottles. Some greenish gray (5GY 6/1) laminae.

Dropstones at: Section 1, 6–9 cm; Section 3, 111 cm (biotite schist), and Section 5, 76 cm (granitic).

Recovery > cored interval!

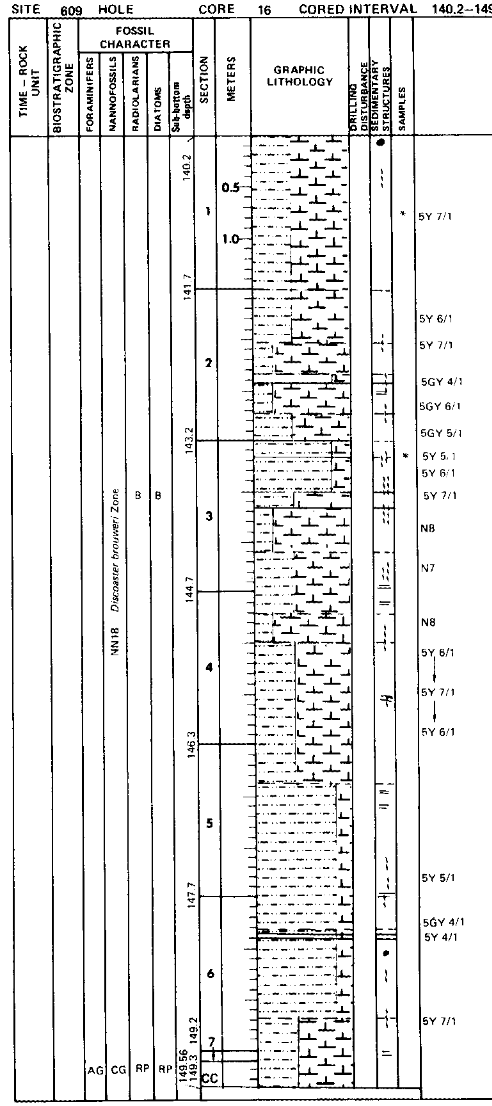
SMEAR SLIDE SUMMARY (%):

	1, 62	2, 112
	D	
Composition:		
Quartz	22	22
Feldspar	TR	2
Heavy minerals	–	5
Clay	–	40
Volcanic glass	1	3
Carbonate unspec.	TR	1
Foraminifers	8	3
Calc. nannofossils	68	23
Diatoms	1	–
Radiolarians	TR	–
Sponge spicules	TR	–
Silicoflagellates	TR	–

ORGANIC CARBON AND CARBONATE (%)

	3, 50–51	5, 50–51
Organic carbon	–	–
Carbonate	40	48

SITE 609 HOLE CORE 16 CORED INTERVAL 140.2–149.8 m



LITHOLOGIC DESCRIPTION

Alternating gray (N7, 5Y 6/1) and light gray (N8, 5Y 7/1) MARLY NANNOFOSSIL OOZE and NANNOFOSSIL OOZE. Less frequent CALCAREOUS MUD which is always darker gray (5Y 5/1 and 5GY 4/1).

Greenish gray (5GY 4/1–5GY 6/1) laminae common below 142.7 m.

Dropstones at 140.2 and 148.2 m.

SMEAR SLIDE SUMMARY (%):

	1, 77	3, 11
Texture:		
Sand	8	5
Silt	12	20
Clay	80	75
Composition:		
Quartz	15	30
Feldspar	1	1
Heavy minerals	3	5
Clay	30	57
Volcanic glass	1	2
Carbonate unspec.	TR	1
Foraminifers	8	3
Calc. nannofossils	42	1
Sponge spicules	TR	–

ORGANIC CARBON AND CARBONATE (%)

	2, 89–90	6, 58–59
Organic carbon	–	–
Carbonate	25	4

SITE 609 HOLE CORE 17 CORED INTERVAL 149.8–159.4 m

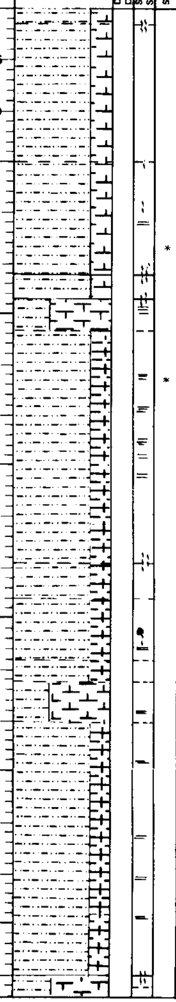
Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Biostratigraphic zones: *N. acostaensis*; NN18 *Discoaster brouweri* Zone

Fossil character: RP (radiolarians, Section 3); AG CG RM CP (core catcher)

Sub-bottom depths: 149.8, 151.3, 152.8, 154.3, 155.8, 157.3, 158.8, 159.31, 159.60

Sections: 1, 2, 3, 4, 5, 6, 7, CC; Meters: 0.5, 1.0



Colors: 5Y 7/1, 5Y 8/1, 5Y 6/1, 5Y 7/1, 5Y 8/1, 5Y 6/1, 5Y 7/1, dropstone, 5Y 6/1, 5Y 7/1, 5Y 8/1, 5Y 6/1, 5Y 8/1

LITHOLOGIC DESCRIPTION

Dominantly gray (5Y 6/1–5Y 8/1) CALCAREOUS MUD with intervals of light gray (5Y 8/1) MARLY FORAMINIFERAL AND MARLY NANNOFOSSIL OOZE (152.7 to 153.0 and 156.2–156.8 m).

Gray (5GY 6/1) laminae common throughout; black (5Y 2/2) and dark purple (5P 2/2) laminae less common.

Note: recovery >100%.

SMEAR SLIDE SUMMARY (%):

	2, 80 D	3, 67
Composition:		
Quartz	26	20
Feldspar	1	1
Heavy minerals	3	3
Clay	38	49
Volcanic glass	1	1
Carbonate unspec.	2	1
Foraminifers	9	7
Calc. nannofossils	20	17
Diatoms	–	1
Radiolarians	–	TR
Sponge spicules	–	TR
Silicoflagellates	–	TR

ORGANIC CARBON AND CARBONATE (%):

	2, 80–81	4, 13–14
Organic carbon	–	–
Carbonate	36	55

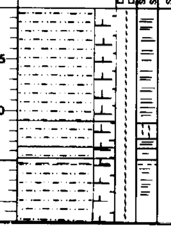
SITE 609 HOLE CORE 18 CORED INTERVAL 159.4–169.0 m

Biostratigraphic zones: *N. acostaensis*; NN18 *Discoaster brouweri* Zone

Fossil character: AG AG RP

Sub-bottom depths: 159.4, 160.9, 161.4, 161.59

Sections: 1, 2, CC; Meters: 0.5, 1.0



Colors: 5Y 6/1, 5Y 7/1, 5Y 6/1, 5Y 7/1, 5Y 6/1

LITHOLOGIC DESCRIPTION

Gray (5Y 6/1–5Y 7/1) CALCAREOUS MUD. Abundant green/gray (5GY 6/1) laminae throughout.

Note: this core taken without a liner in barrel, so it was forcefully extruded.

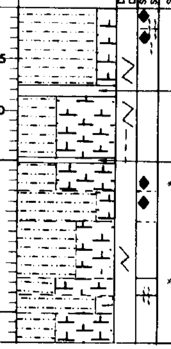
SITE 609 HOLE CORE 19 CORED INTERVAL 169.0–178.6 m

Biostratigraphic zones: *N. acostaensis*; NN18 *Discoaster brouweri* Zone; *Nitzschia marina* Zone

Fossil character: AG AG AM

Sub-bottom depths: 162.0, 170.5, 172.0, 172.32

Sections: 1, 2, CC; Meters: 0.5, 1.0



Colors: 5Y 5/1, Void, 5Y 6/1, Void, 5Y 4/1, 5Y 5/1, 5Y 7/1, 5Y 5/1, 5Y 6/1

LITHOLOGIC DESCRIPTION

CALCAREOUS MUD, gray to dark gray (5Y 6/1–5Y 5/1), with common greenish gray (5GY 6/1) patches and some laminae. Sediment distinctly hardened and fractured during drilling (liner broken).

Ice-rafted dropstones at: Section 1, 4–5 and 24–28 cm, and Section 2, 27 and 41 cm.

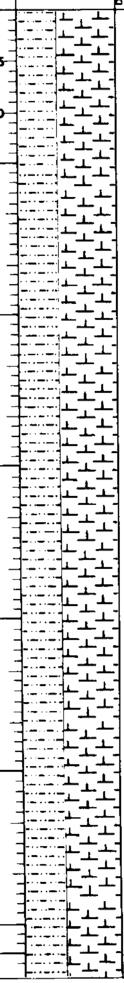
SMEAR SLIDE SUMMARY (%):

	2, 20 D	2, 117 D
Texture:		
Sand	8	–
Silt	15	–
Clay	77	–
Composition:		
Quartz	18	6
Feldspar	1	–
Heavy minerals	2	3
Clay	48	38
Volcanic glass	1	–
Micronodules	TR	–
Carbonate unspec.	1	1
Foraminifers	6	10
Calc. nannofossils	23	39
Diatoms	–	3
Radiolarians	TR	TR
Sponge spicules	–	TR
Silicoflagellates	–	TR

ORGANIC CARBON AND CARBONATE (%):

	2, 20–21
Organic carbon	–
Carbonate	42

SITE 609 HOLE CORE 20 CORED INTERVAL 178.6–188.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		N. acostaensis	NN16 *Discoaster surculus* Zone	RP		178.6, 180.1, 181.6, 183.1, 184.6, 186.1, 187.6, 187.92, 188.18	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0				*	
		AG	AG		CM								

Colors: 5G 6/2; N4; 5G 6/2; N7; 5G 6/1; N5; 5Y 5/1; 5G 6/1; N7; 5G 6/1; N4; 5Y 5/1; 5Y 6/1; 5GY 7/1; N6; 5GY 7/1; N7; 5G 6/1; N5

MARLY NANNOFOSSIL OOZE, dominantly light gray (N7) with some gray parts (N5, 5Y 5/1). Grayish green (5G 6/1) streaks and bands are common.

(P) pyritized burrow cast at Section 4, 111–115 cm.

Large dropstone at top (basalt) has probably fallen downhole. No other dropstones detected!

Some spots of very stiff material.

SMEAR SLIDE SUMMARY (%):

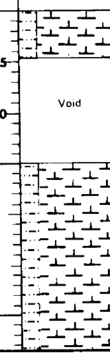
	2, 98	5, 90	1, 74
Composition:			
Quartz	10	12	14
Feldspar	1	TR	1
Heavy minerals	3	–	2
Clay	59	59	50
Carbonate unspec.	–	1	–
Foraminifers	4	8	8
Calc. nannofossils	20	20	22
Diatoms	3	–	3

ORGANIC CARBON AND CARBONATE (%)

	2, 97–98
Organic carbon	–
Carbonate	44

Note: Core 21, 188.2–197.8 m, no recovery.

SITE 609 HOLE CORE 22 CORED INTERVAL 197.8–207.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		N. acostaensis	NN16 *Discoaster surculus* Zone			197.8, 199.3, 200.8, 201.11	1, 2, CC	0.5, 1.0					
		AG	AG		AG								

Colors: N7–5GY 7/1; 5G 5/1; N7–5GY 7/1; 5G 5/1

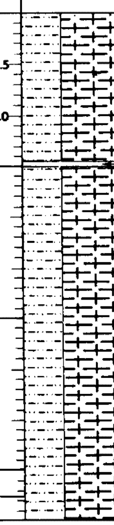
NANNOFOSSIL OOZE, pale gray green (N7–5GY 7/1). Some green (5G 5/1) laminations. Core strongly disturbed.

ORGANIC CARBON AND CARBONATE (%)

	2, 65–66
Organic carbon	–
Carbonate	75

Note: Core 23, 207.4–217.0 m, no recovery.

SITE 609 HOLE CORE 24 CORED INTERVAL 217.0–226.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		N. acostaensis	NN16 *Discoaster surculus* Zone	RP		217.0, 218.5, 221.5, 221.75, 221.97	1, 2, 3, 4, CC	0.5, 1.0				*	
		AG	AG	FM	FM								

Colors: N7; Void; 5GY 7/1; 5GY 7/1; 5GY 7/1; N7; 5GY 7/1

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, predominantly light gray (N7) with common mottles of gray (N5) and light gray (5Y 7/1). Laminae green (5GY 7/1) of about 1 cm thickness in Section 3. All contacts unsharp.

Sediment rather stiff. Drilling biscuits frequent.

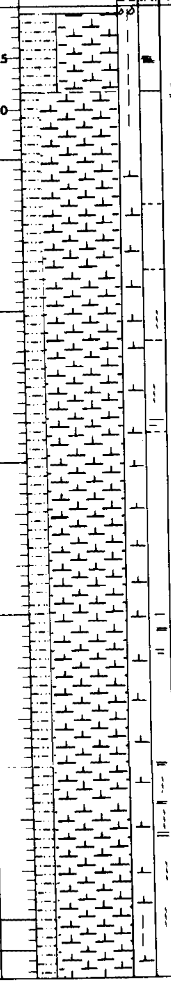
SMEAR SLIDE SUMMARY (%):

	2, 53
	D
Composition:	
Quartz	10
Feldspar	TR
Mica	TR
Heavy minerals	TR
Clay	20
Volcanic glass	5
Carbonate unspec.	10
Foraminifers	15
Calc. nannofossils	40
Diatoms	TR
Radiolarians	TR
Sponge spicules	TR

SITE 609 HOLE CORE 25 CORED INTERVAL 226.6–236.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			AG NN16 *Discoaster surculus* Zone		RM *Nitzschia jouseae* Zone	1	0.5 1.0					No recovery (only fragments in Core Catcher).

SITE 609 HOLE CORE 26 CORED INTERVAL 236.2–245.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		N. acostaensis AG	NN16 *Discoaster surculus* Zone AG		B	236.2, 237.7, 239.2, 240.7, 242.2, 243.7, 245.2, 245.46, 245.77	1, 2, 3, 4, 5, 6, 7, CC	0.5 1.0					5Y 6/1, N9, N8, N9, N8, N9, N8, N9–N8, N8

NANNOFOSSIL OOZE, white (N8–9), very homogeneous with rare greenish (5GY 8/1) faint laminations and some darker gray (N4–5) pyritiferous patches.

Sharp contact to gray (5Y 6/1), marly nannofossil ooze in Section 1 is probably due to drilling disturbances. Top of core (0–3 cm) with washed down gravel. Sediment stiff with drilling biscuits throughout.

SMEAR SLIDE SUMMARY (%):

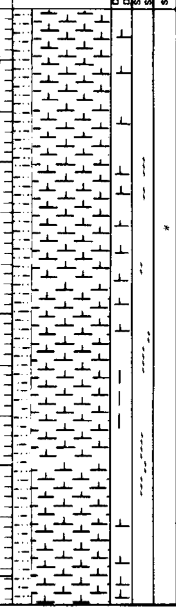
Composition:	1, 79	1, 82	2, 65
Quartz	35	10	5
Feldspar	–	TR	–
Mica	TR	TR	–
Volcanic glass	–	–	TR
Foraminifers	4	6	5
Calc. nannofossils	59	84	90
Diatoms	1	–	TR
Radiolarians	1	–	TR
Sponge spicules	TR	–	TR

ORGANIC CARBON AND CARBONATE (%)

	2, 65–66
Organic carbon	–
Carbonate	91

SITE 609 HOLE CORE 27 CORED INTERVAL 245.8–255.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N. acostaensis	NN15 *Reticulofenestra pseudombilica* Zone	B		245.8	1	0.5, 1.0
						247.3	2	
						248.8	3	
						250.3	4	
		AM	AG		B	251.38, 251.62	CC	



Colors: N8; 5GY 8/1; N8; 5GY 8/1; N8

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, pale gray (N8) with some very gradational changes to pale gray green (5GY 8/1); dark gray mottles (N5–6) scattered throughout.

Sediment stiff and very homogeneous; drilling biscuits throughout.

Section 4 is cut in two parts.

SMEAR SLIDE SUMMARY (%):

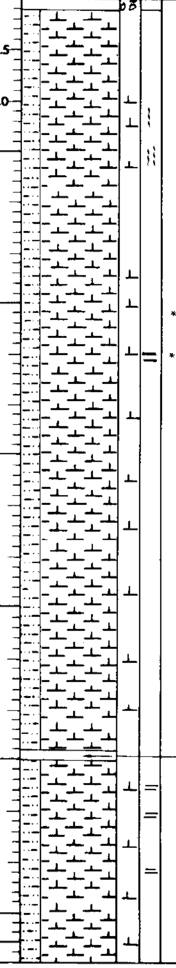
	2, 65
	D
Composition:	
Quartz	5
Carbonate unspec.	1
Foraminifers	2
Calc. nannofossils	92

ORGANIC CARBON AND CARBONATE (%)

	2, 65–66
Organic carbon	–
Carbonate	92

SITE 609 HOLE CORE 28 CORED INTERVAL 255.4–265.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N. acostaensis	NN14 *Discoaster asymmetricus* Zone – NN17 *Amaurolithus tricorniculatus* Zone	B		255.4	1	0.5, 1.0
						258.4	2	
							3	
						261.4	4	
							5	
						264.4	6	
						264.68	7	
		AG	AM		FP	264.99	CC	



Colors: N9; N8; N2; N9; N8; N9; IW; 5GY 8/1; 5GY 8/1; 5GY 8/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, very uniform white (N9) with two smaller sections darkening to N8. Dark gray (N4) mottles and faint greenish (5GY 8/1) laminations are rare.

Drilling biscuits common over the whole core.

Top of the core (0–10 cm) mixing of white ooze and washed-down gravel. (Large piece of basalt 5 cm in diameter.)

SMEAR SLIDE SUMMARY (%):

	3, 14	3, 49
	D	M
Composition:		
Quartz	5	15
Mica	TR	–
Clay	TR	–
Volcanic glass	1	–
Pyrite	–	15
Carbonate unspec.	1	TR
Foraminifers	3	1
Calc. nannofossils	90	69

ORGANIC CARBON AND CARBONATE (%)

	3, 14–15
Organic carbon	–
Carbonate	92

SITE 609 HOLE CORE 29 CORED INTERVAL 265.0–274.6 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *G. margaritae*; AG
Nannofossils: NN14 *Discoaster asymmetricus* Zone – NN12 *Amaurolithus tricorniculatus* Zone; AM
Radiolarians: B
Diatoms: B

Sections: 1, 2, 3, 4, 5, 6, CC
Meters: 0.5, 1.0

Color: N9, 5G 7/1, 5G 7/1, N8, OG, N9

NANNOFOSSIL OOZE, white (N9 gradational to N8) with horizontal and subhorizontal greenish (5GY 7/1) diffuse laminations.

SMEAR SLIDE SUMMARY (%):

	4, 78
	D
Composition:	
Quartz	10
Foraminifers	8
Calc. nannofossils	82

ORGANIC CARBON AND CARBONATE (%)

	4, 78–79
Organic carbon	–
Carbonate	91

SITE 609 HOLE CORE 30 CORED INTERVAL 274.6–284.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *G. margaritae*; CM
Nannofossils: NN14 *Discoaster asymmetricus* Zone – NN12 *Amaurolithus tricorniculatus* Zone; AM
Radiolarians: B
Diatoms: B

Sub-bottom depth: 274.6, 276.1, 277.6, 279.1, 280.6, 282.1, 283.47, 283.81

Sections: 1, 2, 3, 4, 5, 6, CC
Meters: 0.5, 1.0

Color: N9, 5G 5/2, N6, N9, 5G 8/1, N8, N9, 5G 8/1, N5, N8, N9

NANNOFOSSIL OOZE, very uniform white (N9 to N8). Some gray mottles throughout. Some diffuse or sharp contacted, faint laminations green (5G 8/1) or gray (N6–5). Indurated, pyritized green (5G 5/2) layer of about 6 mm thickness at Section 2, 135 cm.

Sediment stiff and drilling biscuits common.

SMEAR SLIDE SUMMARY (%):

	2, 135
	M
Composition:	
Quartz	20
Clay	5
Pyrite	20
Foraminifers	2
Calc. nannofossils	53

ORGANIC CARBON AND CARBONATE (%)

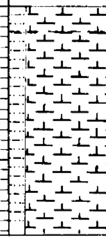
	3, 50–51
Organic carbon	–
Carbonate	95

SITE 609 HOLE CORE 31 CORED INTERVAL 284.2–293.8 m

Biostratigraphic zone — Foraminifers: *G. margaritae* (CM); Nannofossils: NN14 *Discoaster asymmetricus* Zone – NN12 *Amaurolithus tricorniculatus* Zone (AM); Diatoms: B

Sub-bottom depth: 284.2, 285.7, 286.18, 286.41

Section: 1, 2, CC — Meters: 0.5, 1.0



N9, 5GY 7/1, 5GY 7/1, 5GY 7/1, N8, N9

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, dominantly white (N9) with some diffuse pale green (5GY 7/1) layers of very dense mottling.

Sediment stiff with drilling biscuits. Top (0–24 cm) soupy.

Sediment stiff with drilling biscuits. Top (0-26 cm) soupy.

SMEAR SLIDE SUMMARY (%):

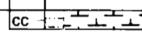
	1, 123
	D
Texture:	
Clay	1
Composition:	
Pyrite	TR
Carbonate unspec.	TR
Foraminifers	2
Calc. nannofossils	97

SITE 609 HOLE CORE 32 CORED INTERVAL 293.8–303.4 m

Biostratigraphic zone — Foraminifers: *G. margaritae* (AG); Nannofossils: NN14 *Discoaster asymmetricus* Zone – NN12 *Amaurolithus tricorniculatus* Zone (AM); Diatoms: B

Sub-bottom depth: 293.95

Section: CC



N9 to N8

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, very light gray (N8) and white (N9).

Recovery only 15 cm in Core Catcher. Broken pieces.

SMEAR SLIDE SUMMARY (%):

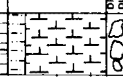
	CC,13
Texture:	
Clay	3
Composition:	
Pyrite	TR
Foraminifers	3
Calc. nannofossils	94

SITE 609 HOLE CORE 33 CORED INTERVAL 303.4–313.0 m

Biostratigraphic zone — Foraminifers: *G. nepenthes* (CM); Nannofossils: NN14 *Discoaster asymmetricus* Zone – NN12 *Amaurolithus tricorniculatus* Zone (AM)

Sub-bottom depth: 303.74, 304.0

Section: CC — Meters: 0.5



N8–N9

LITHOLOGIC DESCRIPTION

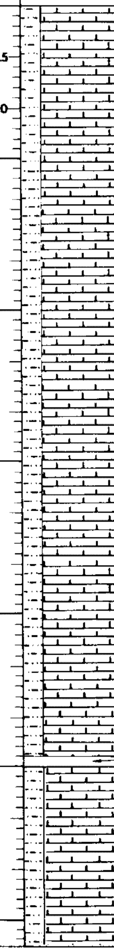
NANNOFOSSIL OOZE, white (N9 + N8) changing to light gray (2.5Y 7/0). Dark gray (N4) mottles common.

SITE 609 HOLE CORE 34 CORED INTERVAL 313.0–322.6 m

Biostratigraphic zone — Foraminifers: *G. nepenthes* (AG); Nannofossils: NN11 *Discoaster quinqueramus* Zone (AG); Diatoms: B

Sub-bottom depth: 313.0, 316.0, 319.0, 322.0, 322.24

Section: 1, 2, 3, 4, 5, 6, CC — Meters: 0.5, 1.0



N9, IW, N8, N9

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, predominantly white (N9) with occasionally pyrite-rich dark (N4) mottles. Small part of section getting darker (N8) and showing well preserved burrows (*Zoophycos*). Sediment firm. Splitting of core by using saw.

(P) = pyritized burrow cast.

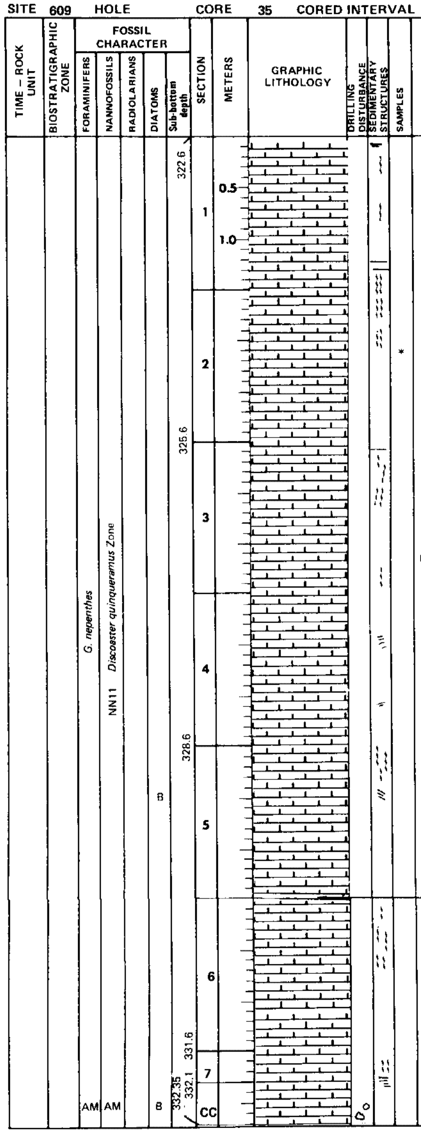
SMEAR SLIDE SUMMARY (%):

	2, 87
Texture:	
Clay	2
Composition:	
Pyrite	TR
Foraminifers	2
Calc. nannofossils	96

ORGANIC CARBON AND CARBONATE (%)

	2, 87–88	4, 37–38	6, 51–52
Organic carbon	–	–	–
Carbonate	92	91	90

SITE 609 HOLE CORE 35 CORED INTERVAL 322.6–332.2 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK

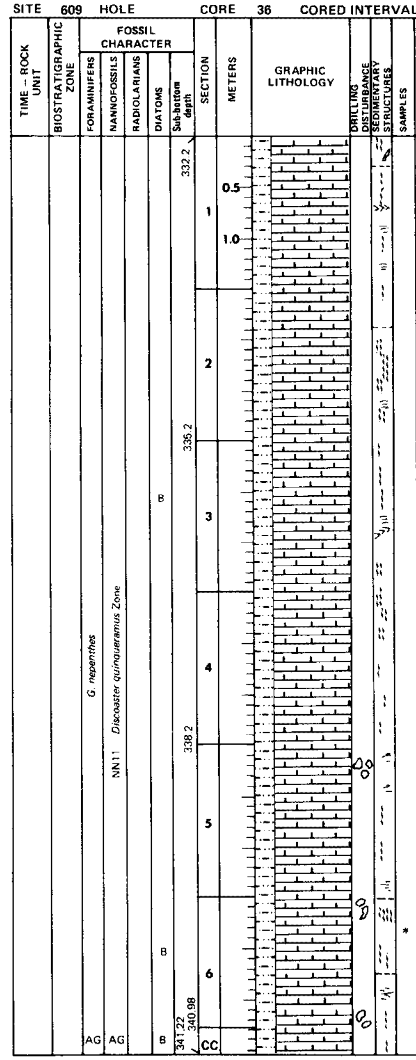
SMEAR SLIDE SUMMARY (%)
2, 70

Composition:	
Quartz	3
Clay	2
Carbonate unspec.	1
Foraminifers	4
Calc. nannofossils	92

ORGANIC CARBON AND CARBONATE (%)
3, 74–75

Organic carbon	–
Carbonate	90

SITE 609 HOLE CORE 36 CORED INTERVAL 332.2–341.8 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, dominantly white (N8) with very gradational changes to white (N9) and very light greenish gray (5GY 8/1).

Very dusky purple (5P 2/2) and light greenish gray (5GY 8/1) in haloes around burrows and in very thin discontinuous laminations.

SMEAR SLIDE SUMMARY (%):
6, 37

Composition:	
Clay	6
Pyrite	1
Carbonate unspec.	2
Foraminifers	2
Calc. nannofossils	89

ORGANIC CARBON AND CARBONATE (%)
6, 38–40

Organic carbon	–
Carbonate	73

SITE 609 HOLE CORE 37 CORED INTERVAL 341.8–351.4 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION
		G. nepenthes	NN11 Discoaster quinqueramus Zone			341.8	1
						344.8	2
							3
						347.8	4
							5
							6
						351.25	7
		AG	AM		B	351.57	CC

Colors: N8, N9

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK

SMEAR SLIDE SUMMARY (%):

	3, 70
Composition:	
Clay	4
Carbonate unspec.	2
Foraminifers	4
Calc. nannofossils	90

ORGANIC CARBON AND CARBONATE (%)

	3, 70–71
Organic carbon	–
Carbonate	92

SITE 609 HOLE CORE 38 CORED INTERVAL 351.4–361.0 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION
		G. nepenthes	NN11 Discoaster quinqueramus Zone			351.4	1
							2
						354.4	3
							4
						357.4	5
						359.49	6
		FM	AG		B	359.73	CC

Colors: 5GY 6/1, N9, 5GY 6/1, 5GY 6/1, N8, 5P 8/2, 5GY 8/1, N7, N8, N9, 5P 6/2

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, dominantly white (N8) with gradual changes to N9 and very light gray (N7).

Thin laminae of greenish gray (5GY 6/1) and pale purple are forming small bands around tectonic fractures, filled with pyrite.

SMEAR SLIDE SUMMARY (%):

	4, 53
Composition:	
Clay	6
Pyrite	1
Carbonate unspec.	2
Foraminifers	TR
Calc. nannofossils	91

ORGANIC CARBON AND CARBONATE (%)

	4, 53–54
Organic carbon	–
Carbonate	68

SITE 609 HOLE CORE 39 CORED INTERVAL 361.0–370.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	SUB-BOTTOM DEPTH	SAMPLES
		G. nepenthes	NN11 *Discoaster quinqueramus* Zone			1	361.0	N9, N8
						2		N9
						3	364.0	N8
						4		5Y 7/1
						5	367.0	* 5Y 6/1
						6	368.97	IW, 5Y 7/1
		FM	AM		B	CC	369.31	

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, predominantly white (N9–8). Gradationally changing to marly nannofossil chalk with pale olive gray (5Y 7/1–5Y 6/1) in the lower part. Abundant greenish gray (5GY 6/1) and pale purple (5P 8/2) laminae forming bands and haloes around burrows.

Dropstones (conglomerate and biotite gneiss) at top are washed down.

SMEAR SLIDE SUMMARY (%):

	5, 65
Composition:	
Quartz	5
Clay	12
Pyrite	1
Micronodules	TR
Carbonate unspec.	2
Foraminifers	2
Calc. nannofossils	78

ORGANIC CARBON AND CARBONATE (%)

	5, 65–66
Organic carbon	–
Carbonate	54

SITE 609 HOLE CORE 40 CORED INTERVAL 370.6–380.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	SUB-BOTTOM DEPTH	SAMPLES
		G. nepenthes	NN11 *Discoaster quinqueramus* Zone			1	370.6	5GY 7/1
						2	372.1	
						3	373.6	N8, *
						4	375.1	
						5	376.6	
						6	378.1	OG, 5GY 8/1, N8
						7	379.52	5GY 8/1
		FM	AM		B	CC	379.86	

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, white (N8) interlayered with marly nannofossil chalk light greenish gray (5GY 8/1).

Typical are fine greenish gray (5GY 6/1) laminations mostly in form of parallel bands as well as olive (5Y 7/1) and gray (N4–6) burrow mottles.

Top of core (0–30 cm) brecciated down-washed material in oozy matrix.

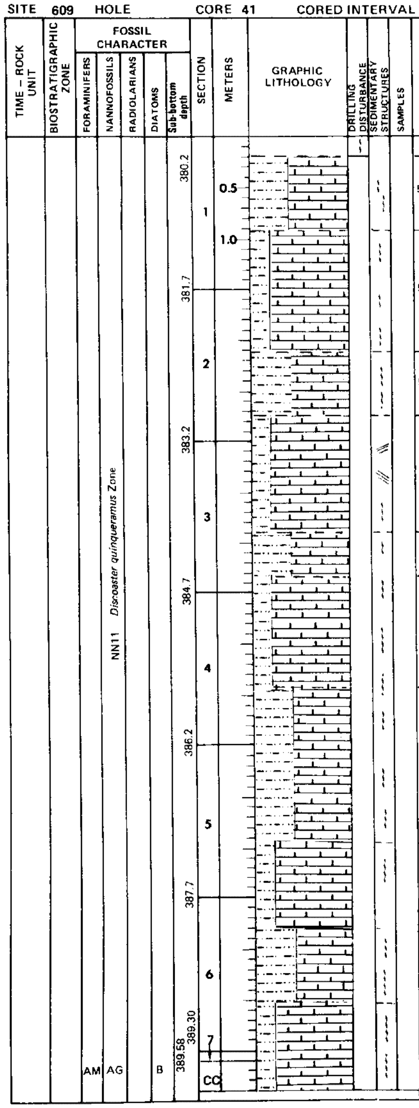
SMEAR SLIDE SUMMARY (%):

	3, 80
Composition:	
Quartz	15
Carbonate unspec.	3
Calc. nannofossils	82

ORGANIC CARBON AND CARBONATE (%)

	3, 77–78
Organic carbon	–
Carbonate	89

SITE 609 HOLE CORE 41 CORED INTERVAL 380.2–389.8 m



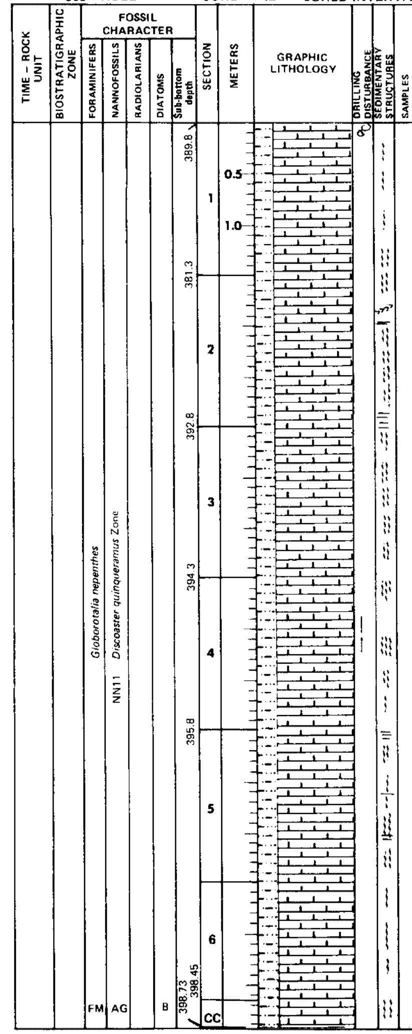
LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, very light greenish (5GY 8/1) interbedded with greenish gray (5GY 6/1) marly nannofossil chalk. Strongly bioturbated, all contacts gradational.

ORGANIC CARBON AND CARBONATE (%)

	6, 65–66
Organic carbon	–
Carbonate	56

SITE 609 HOLE CORE 42 CORED INTERVAL 389.8–399.4 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, predominantly very light gray (N8) to very light greenish gray (5GY 8/1). Large olive gray (5Y 7/1) burrows and lenticular patches with dark halos are as well characteristic as bands of green (5G 6/1) laminations.

ORGANIC CARBON AND CARBONATE (%)

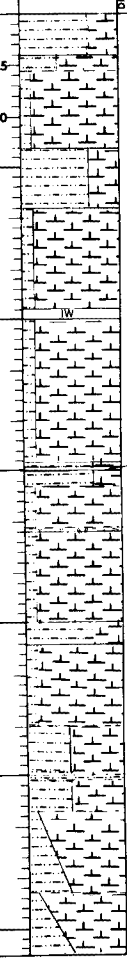
	2, 65–66
Organic carbon	–
Carbonate	83

SITE 609 HOLE A CORE 1 CORED INTERVAL 23.8–33.4 m *

Biostratigraphic zone / Fossil character: Foraminifers: *Globorotalia truncatulinoides* (AG); Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone (AG); Diatoms: *Pseudoeunotia doliolus* Zone (CG)

Sections: 1, 2, 3, 4, 5, 6, CC (Meters: 0.5, 1.0)

GRAPHIC LITHOLOGY



Colors: 5Y 4/1; 5Y 6/1; 5Y 6/1; 5Y 4/1; N9 to N8; N8; N8; Void; 5Y 5/1; N8; 5Y 6/1; N3; 5Y 7/1 to 5Y 6/1; 5Y 7/1 to 5Y 6/1; 2.5Y 5/2; N8; 5Y 6/1 to 5Y 4/1; 5Y 4/1; 5Y 6/1; 5Y 7/1 becoming 5Y 5/2; 5Y 7/1 becoming 5Y 6/1

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and NANNOFOSSIL OOZE to MARLY NANNOFOSSIL OOZE. Layer (3 cm) rich in volcanic ash at 4.53 cm; burrows occasionally surrounded by purple halos; dark mottles throughout.

*Core shot one stand too low.

SMEAR SLIDE SUMMARY (%)

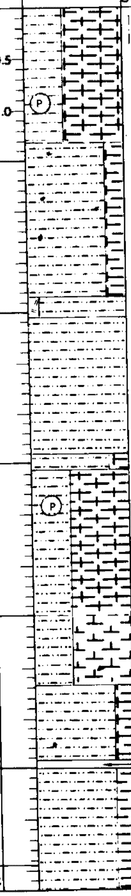
	2, 2	3, 80	4, 57	6, 90
	M	D	M	M
Texture:				
Sand	15	–	30	–
Silt	40	–	40	–
Clay	45	–	30	–
Composition:				
Quartz	30	10	10	32
Feldspar	5	–	25	3
Mica	5	–	–	–
Heavy minerals	5	–	–	TR
Clay	70	TR	20	–
Volcanic glass	TR	–	5	–
Glauconite	TR	–	–	–
Pyrite	TR	–	–	–
Carbonate unspec.	–	1	10	TR
Foraminifers	5	3	–	5
Calc. nannofossils	10	85	TR	60
Diatoms	–	TR	–	–
Radiolarians	–	1	–	TR
Sponge spicules	–	TR	–	–
Basalt/tuff clasts	–	–	30	–

SITE 609 HOLE A CORE 2 CORED INTERVAL 33.4–43.0 m*

Biostratigraphic zone / Fossil character: Foraminifers: *Globorotalia truncatulinoides* (AG); Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone (AG); Diatoms: *Pseudoeunotia doliolus* Zone (AG)

Sections: 1, 2, 3, 4, 5, 6, CC (Meters: 0.5, 1.0)

GRAPHIC LITHOLOGY



Colors: 5Y 7/1; 5Y 6/1; 5Y 7/1; 5Y 6/1; 5GY 5/2; 5Y 5/2; 5Y 3/1; 5Y 5/2; 5Y 7/1; 5Y 5/2; 5Y 7/1; 10Y 4/2; 5Y 7/1; 10Y 4/2; 5Y 7/1; 5Y 7/1; 5Y 7/2; 5Y 5/2; OG; 5GY 5/1; 5Y 6/1

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD to MUD and MARLY FORAMINIFERAL NANNOFOSSIL OOZE; occasional dropstones of varying lithologies throughout. Several 1–5 mm laminae of purple (5P 2/2) and green (5GY 6/1) in Sections 4 and 6. Pyritized worm burrows at Section 1, 93 cm and Section 4, 42 cm; 10 cm layer rich in volcanic ash at Section 2, 43 cm.

*Core shot one stand too low.

SMEAR SLIDE SUMMARY (%)

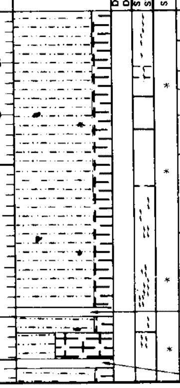
	1, 86	2, 137	5, 135
	D	M	D
Texture:			
Sand	–	15	15
Silt	–	25	35
Clay	–	60	50
Composition:			
Quartz	30	7	68
Feldspar	1	1	1
Heavy minerals	2	–	3
Clay	15	20	15
Volcanic glass	2	–	2
Carbonate unspec.	1	2	8
Foraminifers	20	–	2
Calc. nannofossils	29	TR	1
Diatoms	TR	–	–
Sponge spicules	TR	–	–

SITE 609 HOLE B CORE 1 CORED INTERVAL 0.0–3.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION
		G. truncatulinoides	NN21 *Emiliania huxleyi* Zone		*Pseudoeunotia doliolus* Zone	1, 2, 3, CC
		AG	AG		RP	

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES



LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and MARLY FORAMINIFERAL NANNOFOSSIL OOZE; occasional dropstones of varying lithologies; up to 6 cm.

SMEAR SLIDE SUMMARY (%)

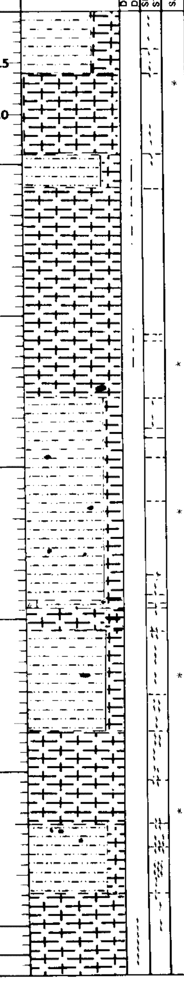
	1, 71 D	2, 4 D	2, 108 D	3, 35 M
Texture:				
Sand	15	10	5	–
Silt	35	30	25	–
Clay	50	60	70	–
Composition:				
Quartz	50	59	49	2
Feldspar	1	1	TR	1
Heavy minerals	2	3	2	TR
Clay	20	25	30	40
Volcanic glass	1	2	–	–
Carbonate unspec.	14	10	6	–
Foraminifers	6	–	5	15
Calc. nannofossils	6	TR	8	40
Diatoms	–	–	–	2
Sponge spicules	–	–	–	TR
Silicoflagellates	–	–	–	TR

SITE 609 HOLE B CORE 2 CORED INTERVAL 3.6–13.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION
		G. truncatulinoides	NN21 *Emiliania huxleyi* Zone		*Pseudoeunotia doliolus* Zone	1, 2, 3, 4, 5, 6, 7, CC
		AG	AG		FG	

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES



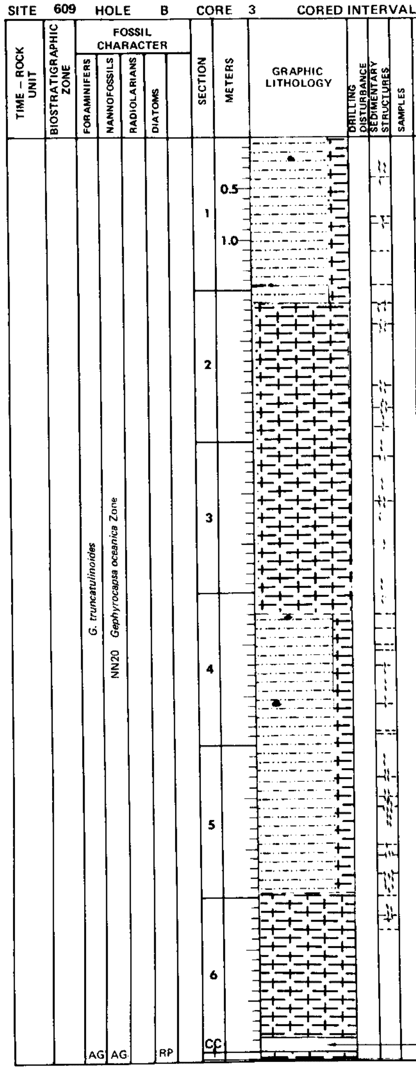
LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive gray to brown and light gray; dropstones of varying lithologies throughout. Occasional 1–2 cm layers of green (5BG 7/2) or purple (5P 4/2) in Sections 1–3.

SMEAR SLIDE SUMMARY (%)

	1, 70 D	3, 43 D	4, 43 D	5, 47 D	6, 37 D
Texture:					
Sand	–	–	15	15	–
Silt	–	–	25	40	–
Clay	–	–	60	45	–
Composition:					
Quartz	1	–	46	50	–
Feldspar	1	TR	2	1	TR
Heavy minerals	TR	TR	2	6	TR
Clay	5	–	20	13	25
Volcanic glass	–	–	1	–	–
Carbonate unspec.	1	–	10	7	TR
Foraminifers	6	16	16	10	19
Calc. nannofossils	83	81	3	8	53
Diatoms	3	3	–	–	3
Radiolarians	TR	TR	–	–	TR
Sponge spicules	–	TR	–	–	TR
Silicoflagellates	TR	TR	–	–	TR

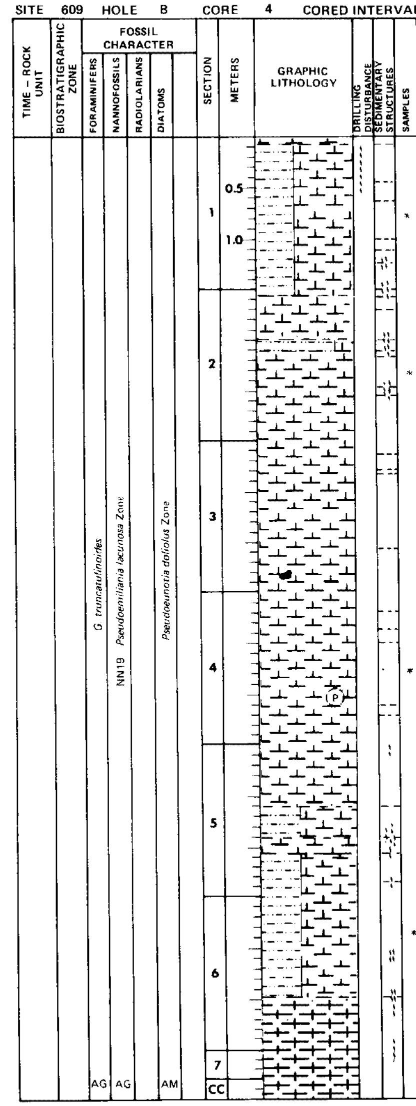
SITE 609 HOLE B CORE 3 CORED INTERVAL 13.2–22.8 m



LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive brown to brown and pale gray. One cm layers of dark greenish gray throughout. Occasional dropstones. Several hard mud clasts at Section 1, 45 cm.

SITE 609 HOLE B CORE 4 CORED INTERVAL 22.8–32.4 m



LITHOLOGIC DESCRIPTION

Interbedded NANNOFOSSIL OOZE, MARLY NANNOFOSSIL OOZE and FORAMINIFERAL NANNOFOSSIL OOZE, olive brown to pale gray. Occasional 1–10 mm laminae of dark gray (N5); 4 cm dropstone at Section 3, 135 cm. One cm pyritized burrow at Section 4, 106 cm.

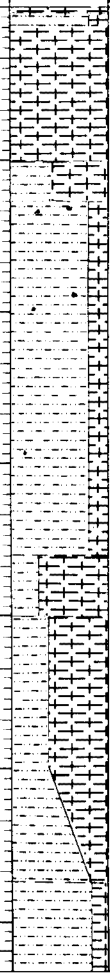
SMEAR SLIDE SUMMARY (%)

	1, 74	2, 74	4, 76	6, 32
	M	D	M	M
Composition:				
Quartz	2	–	–	–
Feldspar	TR	–	TR	TR
Heavy minerals	2	–	–	TR
Clay	38	3	4	35
Volcanic glass	TR	TR	–	–
Carbonate unspec.	2	–	–	2
Foraminifers	5	18	10	20
Calc. nannofossils	51	79	85	45
Diatoms	–	TR	1	TR
Radiolarians	TR	TR	TR	TR
Sponge spicules	–	TR	–	TR
Silicoflagellates	–	–	TR	–

SITE 609 HOLE B CORE 5 CORED INTERVAL 32.4–42.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		G. truncatulinoides / AG	NN19 *Pseudoemiliania lacunosa* Zone / AG		*Nitzschia reinholdii* Zone / CM	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0

GRAPHIC LITHOLOGY



Colors (top to bottom): N7, 5Y 5/2, N7, N7, 5Y 5/2, 5G 6/1, 5Y 5/1, N4, 5Y 4/1, 5Y 5/2, N4, 5Y 4/1, 5Y 5/2, 5Y 4/1, 5Y 5/2, 5Y 5/2, 5Y 6/1, 5Y 5/2, 5Y 6/1 to 5Y 4/2, 5Y 6/2, 5Y 4/2, 5Y 6/2, 5Y 4/2, N8, N7, N7–5GY 5/2, 5GY 5/2, N7, 5GY 5/2, N7, 5Y 4/1 to 5Y 5/1, N6, 5RP 4/2, N6, N7

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE. Dropstones of varying lithologies in Sections 2–3; 1–10 mm pale green (5GY 5/2) laminations in Sections 4, 5, and Core Catcher. 1–10 mm grayish purple (5P 4/2) laminae at Section 4, 49 cm and Section 6, 134–137 cm.

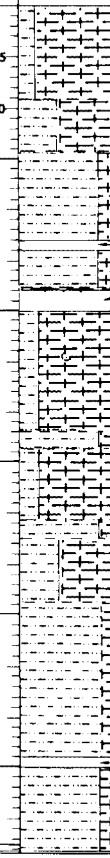
SMEAR SLIDE SUMMARY (%)

	2, 115	4, 107	6, 56
	D	D	D
Texture:			
Sand	20	–	20
Silt	40	–	35
Clay	40	–	45
Composition:			
Quartz	47	–	58
Feldspar	1	1	1
Heavy minerals	2	–	3
Clay	20	30	25
Volcanic glass	–	–	2
Carbonate unspec.	3	–	10
Foraminifers	11	25	2
Calc. nannofossils	16	42	–
Diatoms	–	2	–
Radiolarians	–	TR	–
Sponge spicules	–	TR	–
Silicoflagellates	–	TR	–

SITE 609 HOLE B CORE 6 CORED INTERVAL 42.0–51.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		G. truncatulinoides / AG	NN19 *Pseudoemiliania lacunosa* Zone / AG		*Nitzschia reinholdii* Zone / CG	1, 2, 3, 4, 5, 6, CC	0.5, 1.0

GRAPHIC LITHOLOGY



Colors (top to bottom): 5Y 4/1, 5Y 5/2, 5Y 7/1, 5Y 6/1, 5Y 7/1 to N9, 5Y 7/1 to 5Y 6/1, 5Y 5/2, 5Y 4/2, 5Y 5/2, Void, 5Y 5/2, Void, N7, N7, 10YR 6/1, N7, 5Y 6/2, 5Y 5/3, N7, 5Y 7/2, 5G 6/2, N7, 5Y 5/3, N7, N6 to N4, N5, 5Y 4/2, 5Y 5/3, IW, 5Y 4/3, N4, 5Y 5/2, 5Y 5/1

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFRAL NANNOFOSSIL OOZE. Olive brown to brown and light to dark gray. 5–10 mm laminae of green to greenish gray (5G 6/2–5BG 7/1) common in Sections 3–4.

SMEAR SLIDE SUMMARY (%)

	1, 119	4, 95	5, 112
	D	M	D
Texture:			
Sand	–	–	15
Silt	–	–	30
Clay	–	–	55
Composition:			
Quartz	4	–	35
Feldspar	1	TR	TR
Heavy minerals	2	–	3
Clay	15	35	41
Volcanic glass	TR	–	2
Carbonate unspec.	–	1	8
Foraminifers	16	17	7
Calc. nannofossils	62	43	4
Diatoms	–	4	–
Radiolarians	–	TR	–
Sponge spicules	–	TR	–
Silicoflagellates	–	TR	–

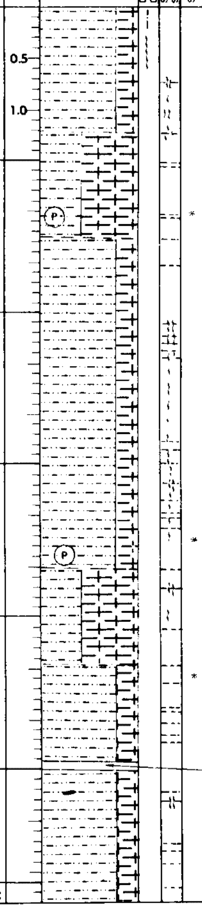
SITE 609 HOLE B CORE 7 CORED INTERVAL 51.6–61.2 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Biostratigraphic zones: Foraminifers: *G. truncatulinoides*; Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone; Diatoms: *Nitzschia reinholdii* Zone

Fossil character (CC): Foraminifers AG; Nannofossils AG; Diatoms AM

Sections: 1, 2, 3, 4, 5, 6, CC; Meters: 0.5, 1.0



Colors: 5Y 6/1 to 5Y 5/1; 5Y 6/1; N7; 5P 7/2; N7; 5P 7/2; N7; 5Y 6/1 to 5Y 5/1; 5Y 5/1 to 5Y 3/2; 5Y 6/1; 5Y 5/1; 5Y 6/1; 5Y 5/1; 5Y 6/1 to 5Y 7/2; 5Y 6/1; 5Y 7/1; 5Y 6/1; 5Y 4/1; 5Y 6/1; 5GY 6/1; 2.5Y 5/2; 5G 6/2; 5Y 6/1; 5Y 7/1; 5G 7/1; 5Y 4/1; 5G 7/1; 5Y 5/2; 5Y 5/3; 5Y 4/2; 5Y 6/1; OG; 5Y 6/1; 5Y 5/3; N7; 5GY 6/1; 5GY 6/1; 5GY 7/1; 5GY 6/1

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and MARLY FORAMINIFERAL NANNOFOSSIL OOZE. Olive gray to gray and light gray to gray. Occasional 1 cm pale purple (5P 7/2) and green (5G 6/2) laminae throughout. Pyritized burrows at Section 2, 61 cm and Section 4, 98 cm. Mudstone pebble at Section 6, 22 cm.

SMEAR SLIDE SUMMARY (%)

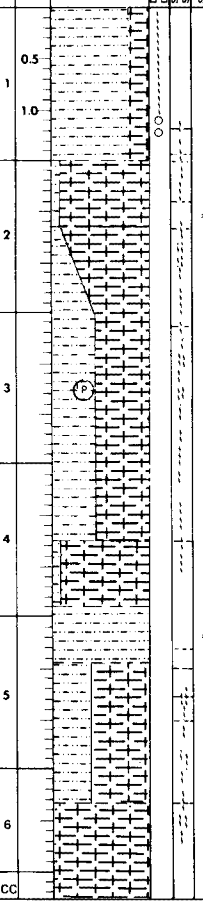
	2, 43	4, 74	3, 62
	M	D	D
Texture:			
Sand	-	10	15
Silt	–	20	25
Clay	–	70	60
Composition:			
Quartz	3	42	51
Feldspar	TR	TR	1
Heavy minerals	–	TR	4
Clay	35	12	20
Carbonate unspec.	-	TR	3
Foraminifers	15	17	15
Calc. nannofossils	44	25	8
Diatoms	3	4	
Radiolarians	–	TR	–
Sponge spicules	TR	–	–

SITE 609 HOLE B CORE 8 CORED INTERVAL 61.2–70.8 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Fossil character (CC): Foraminifers B; Nannofossils B; Diatoms B

Sections: 1, 2, 3, 4, 5, 6, CC; Meters: 0.5, 1.0



Colors: 5Y 4/1; 5Y 5/2; 5Y 7/2; 5Y 7/1 to 5Y 8/1; N9 to N8; 5Y 7/1 to 5Y 5/1; 5Y 6/1; 5Y 7/1; 5Y 4/1; 10YR 5/2; 10YR 6/2; 5Y 6/1; 5Y 7/1 to 5Y 6/1; 5Y 7/1

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE to MARLY FORAMINIFERAL NANNOFOSSIL OOZE. 5–10 mm diffuse green (5G 6/1) laminae throughout. Dark gray mottling common in Section 6. Pyritized 3 cm worm burrow at Section 3, 77 cm.

Pebbles in the top of this core are washed down from overlying units during drilling.

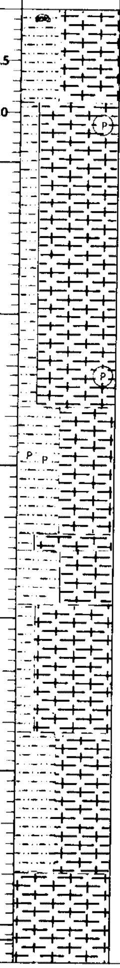
SMEAR SLIDE SUMMARY (%)

	2, 52	5, 20
	D	M
Texture:		
Sand	–	20
Silt	–	50
Clay	–	30
Composition:		
Quartz	10	71
Feldspar	–	10
Heavy minerals	–	TR
Clay	–	20
Volcanic glass	–	15
Carbonate unspec.	–	1
Foraminifers	10	–
Calc. nannofossils	80	3
Radiolarians	TR	–

SITE 609 HOLE B CORE 9 CORED INTERVAL 70.8–80.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		G. truncatulinoides (AG)	NN19 Pseudoemiliania lacunosa Zone (AG)		Nitzschia reinholdii Zone (CM)	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0

GRAPHIC LITHOLOGY



Colors (top to bottom): 5Y 5/1; 5GY 6/1 to 5Y 6/1; 5GY 5/1 to 5Y 5/1; 5Y 6/1; 5Y 5/1; 5Y 6/1; N8; 5Y 5/1 to 5Y 4/1; 5GY 5/1, 5Y 4/1; 5Y 6/1; 5Y 7/1 to N8

LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL NANNOFOSSIL OOZE. Gray (N4–N7) and green (5G 5/2) mottling and occasional 5–20 mm laminae. Pyritized worm burrows at Section 1, 118 cm and Section 3, 63 cm. Abundant 3–5 mm pyrite fragments between Section 2, 137–141 cm. Pebble of vesicular basalt at top of core most likely a downhole contaminant.

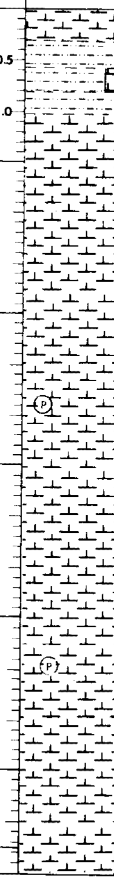
SMEAR SLIDE SUMMARY (%)

	2, 70	6, 20
	D	M
Texture:		
Sand	–	50
Silt	–	20
Clay	–	30
Composition:		
Quartz	20	40
Mica	TR	–
Heavy minerals	5	TR
Clay	–	15
Volcanic glass	–	20
Pyrite	–	5
Foraminifers	10	5
Calc. nannofossils	61	15
Diatoms	2	–
Radiolarians	TR	–
Sponge spicules	TR	–

SITE 609 HOLE B CORE 10 CORED INTERVAL 80.4–90.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		G. truncatulinoides (AG)	NN19 Pseudoemiliania lacunosa Zone (AG)		B	1, 2, 3, 4, 5, 6, CC	0.5, 1.0

GRAPHIC LITHOLOGY



Colors (top to bottom): 5Y 6/1; 5Y 4/1; 5Y 5/2; 5Y 4/1; 5Y 7/1 to 5Y 5/1; 5Y 7/1 to 5Y 6/1; 5Y 5/1; 5Y 6/1; 5Y 7/1; N8 to 5Y 7/1; 5Y 7/1 to 5Y 6/1; 5Y 6/1 to 5Y 5/1; 5Y 6/1 to 5Y 5/1; 5Y 6/1 to to 5Y 5/1; 5Y 7/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, pale brownish gray (5Y 5/1–5Y 7/1). Diffuse 5–10 mm green (5G 5/1–5GY 7/1) laminae common throughout. Gray mottling throughout. Pyritized worm burrows at Section 3, 89 amd and Section 5, 54 cm.

Interbedded MUD and CALCAREOUS MUD, dark olive gray (5Y 4/1–5Y 5/1). Small patches of volcaniclastic sand between Section 1, 55–101 cm.

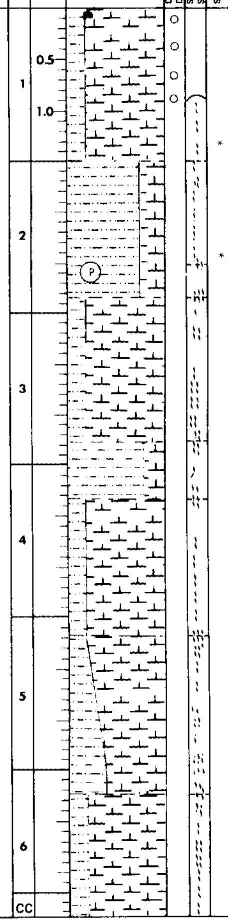
SMEAR SLIDE SUMMARY (%)

	3, 10
	D
Composition:	
Quartz	10
Clay	5
Pyrite	2
Carbonate unspec.	1
Foraminifers	10
Calc. nannofossils	59
Diatoms	12
Radiolarians	TR
Sponge spicules	1
Silicoflagellates	TR

SITE 609 HOLE B CORE 11 CORED INTERVAL 90.0–99.6 m

Biostratigraphic zone / Fossil character: Foraminifers: *G. truncatulinoides* (AG); Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone (AG); Diatoms: *Nitzschia reinholdii* Zone (CM)

Sections: 1–6, CC



Colors (top to bottom): 5GY 6/1; 5GY 6/1; 5GY 5/1; 5Y 6/1 to 5Y 5/1; N8 to 5GY 8/1; 5GY 5/1 to 5Y 4/1; N8 to 5GY 7/1; 5Y 6/1 to 5GY 4/1; 5GY 8/1

LITHOLOGIC DESCRIPTION

Interbedded NANNOFOSSIL OOZE and CALCAREOUS MUD, pale greenish gray (5GY 6/1) to pale gray (N8) and olive gray (5GY 5/1–5Y 4/1). Diffuse 5–10 mm green to gray (5GY 6/1–N5) laminae throughout Sections 2 and 3. Common dark mottling. Pyritized worm burrow at Section 2, 105 cm. Basalt pebble at top of core is most likely downhole contamination.

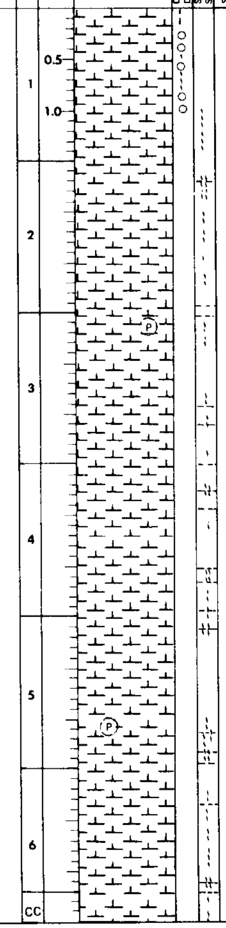
SMEAR SLIDE SUMMARY (%)

	1, 130	2, 92
	D	M
Texture:		
Sand	–	10
Silt	–	30
Clay	–	60
Composition:		
Quartz	20	51
Feldspar	–	2
Heavy minerals	TR	4
Clay	1	20
Volcanic glass	TR	8
Carbonate unspec	5	10
Foraminifers	5	TR
Calc. nannofossils	61	5
Diatoms	8	TR
Radiolarians	TR	–
Sponge spicules	TR	TR
Silicoflagellates	TR	–

SITE 609 HOLE B CORE 12 CORED INTERVAL 99.6–109.2 m

Biostratigraphic zone / Fossil character: Foraminifers: *G. truncatulinoides* (AG); Nannofossils: NN19 *Pseudoemiliania lacunosa* (AG); Diatoms: RP

Sections: 1–6, CC



Colors (top to bottom): 5Y 6/1; N8 to 5Y 7/1; 5Y 6/1; 5Y 5/1; 5Y 6/1; 5Y 7/1 to 5Y 6/1; 5Y 5/1; 5Y 7/1; N8 to 5Y 7/1; 5Y 5/1; 5Y 7/1; 5Y 6/1; 5Y 7/1 to 5Y 6/1; 5Y 5/2; 5Y 7/1; 5Y 6/1; 5Y 7/1 to 5Y 6/1; 5Y 7/1; 5Y 6/1

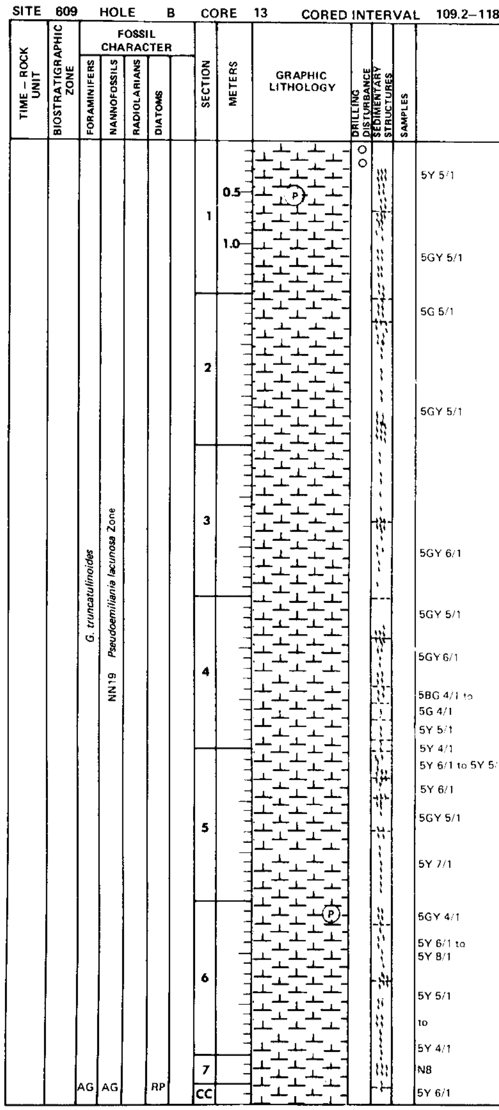
LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, pale gray to brown (N8–5Y 5/1). 5–10 mm gray to green (N7–5GY 7/1) laminae throughout. Rare *Zoophycos*, dark gray mottling throughout. Pyritized burrows at Section 3, 10 cm and Section 5, 104 cm.

SMEAR SLIDE SUMMARY (%)

	3, 40	5, 120
	D	D
Composition:		
Quartz	25	20
Mica	TR	–
Clay	–	5
Volcanic glass	–	TR
Foraminifers	7	4
Calc. nannofossils	68	71
Diatoms	TR	–
Radiolarians	TR	–
Sponge spicules	TR	–

SITE 609 HOLE B CORE 13 CORED INTERVAL 109.2–118.8 m

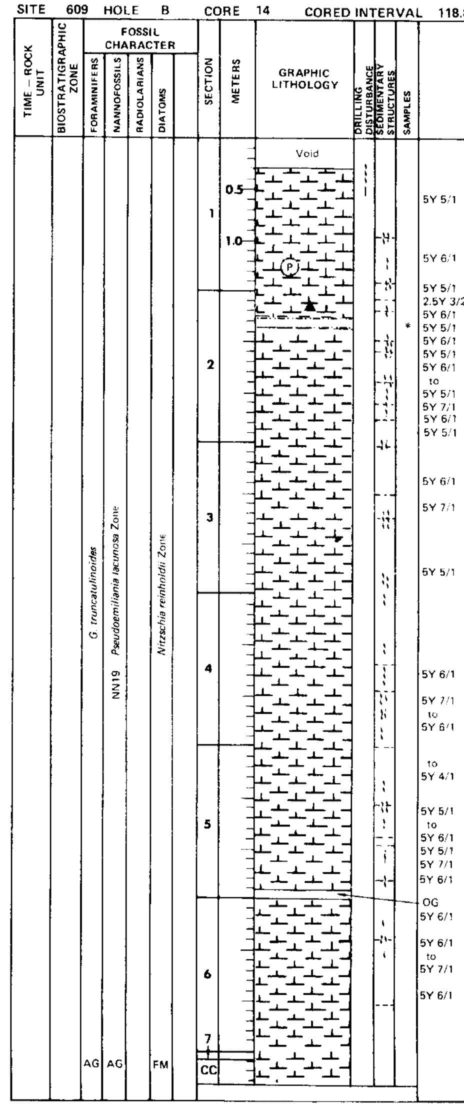


LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, olive gray (5Y 5/1–5GY 6/1). Common diffuse 5–10 mm green (5G 5/1–5GY 6/1) laminae throughout. Dark gray mottles throughout. Pyrite burrows at Section 1, 55 cm and Section 6, 5 cm.

Note: Section 5 is only 140 cm long – not 150 cm (section cut too short).

SITE 609 HOLE B CORE 14 CORED INTERVAL 118.8–128.4 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, grayish brown (5Y 4/1–5Y 7/1). 5–10 mm green to gray (5G 5/1–N7) laminations throughout. Rare *Zoophycos*. Dark gray mottles throughout. Pebbles at Section 2, 13 cm (volcanic) and Section 3, 94 cm (ash-rich mudstone). Pyritized burrow at Section 1, 123 cm.

SMEAR SLIDE SUMMARY (%)

	2, 31
	M
Texture:	
Sand	25
Silt	40
Clay	35
Composition:	
Quartz	52
Feldspar	15
Mica	1
Heavy minerals	TR
Clay	15
Glauconite	TR
Carbonate unspec.	2
Foraminifers	TR
Calc. nannofossils	5

SITE 609 HOLE B CORE 15 CORED INTERVAL 128.4–133.9 m

Field	Entry
Time – rock unit	
Biostratigraphic zone	
Foraminifers	AG
Nannofossils	NN19 *Pseudoemiliania lacunosa* Zone; AG
Radiolarians	
Diatoms	B
Sections	1, 2, 3, CC
Colors	5GY 6/1 (Section 1); N7 to 5GY 6/1 (Section 2); 5GY 6/1 (Section 3)

LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL OOZE to NANNOFOSSIL OOZE, gray to grayish green (N7–5GY 6/1). Occasional greenish gray mottles. Pyritized burrows at Section 2, 100 cm and Section 3, 86 cm.

SITE 609 HOLE B CORE 16 CORED INTERVAL 133.9–143.5 m

Field	Entry
Time – rock unit	
Biostratigraphic zone	
Foraminifers	*N. acostaensis*; AG
Nannofossils	NN18 *Discoaster brouweri* Zone; AG
Radiolarians	
Diatoms	*Nitzschia marina* Zone; CM
Sections	CC

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, pale gray (N8).

Note: This core consists of a Core Catcher only. Pebbles in catcher are probably downhole contaminants.

SITE 609 HOLE B CORE 17 CORED INTERVAL 143.5–153.1 m

Field	Entry
Time – rock unit	
Biostratigraphic zone	
Foraminifers	*N. acostaensis*; AG
Nannofossils	NN18 *Discoaster brouweri* Zone; AG
Radiolarians	
Diatoms	*Nitzschia marina* Zone; CM
Sections	1, 2, 3, 4, 5, 6, CC
Colors	5Y 5/1; 5Y 8/1; 5Y 4/1; 5Y 6/1; N8; 5GY 6/1 to 5Y 6/1; 5GY 7/1; 5GY 8/1 to 5GY 6/1; 5G 2/1
Samples	* (Section 2)

LITHOLOGIC DESCRIPTION

Interbedded NANNOFOSSIL OOZE and MARLY NANNOFOSSIL OOZE. Occasional 5–10 mm green to gray (5G 5/1–N6) laminae throughout. Dark gray to olive mottling throughout. Volcanic-rich mud layer Section 2, 88–91 cm. Mud layer Section 5, 111–119 cm; sharp base. Pyritized burrow at Section 1, 109 cm.

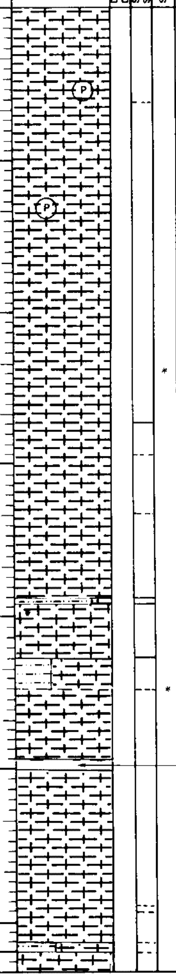
SMEAR SLIDE SUMMARY (%)

	2, 90
	M
Texture:	
Sand	10
Silt	50
Clay	40
Composition:	
Quartz	25
Feldspar	15
Heavy minerals	5
Clay	30
Volcanic glass	15
Carbonate unspec.	5
Calc. nannofossils	5

Note: Core 18, 153.1–162.7 m, no recovery.

SITE 609 HOLE B CORE 19 CORED INTERVAL 162.7–172.3 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		N. acostaensis	NN16 *Discoaster surculus* Zone		*Nitzschia marina* Zone	1–7, CC	0.5, 1.0
		AG	AG		CG		



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, light gray to gray (N6–5GY 6/1). Occasionally becoming MARLY FORAMINIFERAL NANNOFOSSIL OOZE (N7–5Y 5/1). 5–10 mm green (10G 6/2–5G 6/2) laminae common throughout. Dark mottling throughout. Pebble (mudstone) at Section 4, 142 cm. Pyritized burrows at Section 1, 85 cm and Section 2, 46 cm.

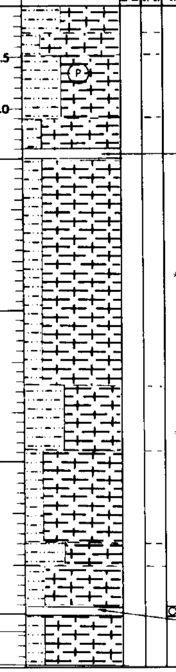
Layer of CALCAREOUS MUD between Section 4, 125–130 cm.

SMEAR SLIDE SUMMARY (%)

	3, 57	5, 64
	D	M
Composition:		
Quartz	2	10
Feldspar	TR	1
Clay	23	30
Volcanic glass	–	TR
Carbonate unspec.	-	2
Foraminifers	12	10
Calc. nannofossils	58	47
Diatoms	4	TR
Radiolarians	TR	TR
Sponge spicules	TR	TR
Silicoflagellates	TR	–
Opaque oxides	1	–

SITE 609 HOLE B CORE 20 CORED INTERVAL 172.3–181.9 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		N. acostaensis	NN16 *Discoaster surculus* Zone		*Nitzschia marina* Zone	1–5, CC	0.5, 1.0
		AG	AG		CM		



LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and MARLY FORAMINIFERAL OOZE, pale gray to pale brown (N7 to 5Y 5/1). 5–10 mm green (5GY 5/2) laminae throughout. Dark mottles throughout. Pyritized burrow at Section 1, 61 cm.

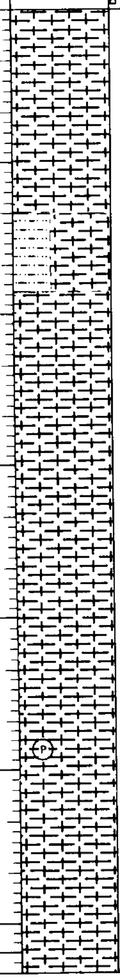
SMEAR SLIDE SUMMARY (%)

	2, 113	3, 118
	D	M
Composition:		
Quartz	–	4
Feldspar	TR	TR
Clay	18	35
Micronodules	TR	TR
Carbonate unspec.	–	1
Foraminifers	10	10
Calc. nannofossils	65	45
Diatoms	6	4
Radiolarians	–	TR
Sponge spicules	TR	TR
Silicoflagellates	–	TR
Opaque oxides	1	1

SITE 609 HOLE B CORE 21 CORED INTERVAL 181.9–191.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		N. acostaensis (AG)	NN16 *Discoaster surculus* Zone (AG)		*Nitzschia jouseae* Zone (CM)	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0

GRAPHIC LITHOLOGY



Colors (top to bottom): N7; 5Y 7/1 to 5Y 6/1; 5Y 6/1; 5Y 7/1; 5Y 7/1; 5Y 6/1; 5Y 7/1; N7

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, pale gray (N7–5Y 6/1) becoming MARLY FORAMINIFERAL NANNOFOSSIL OOZE (5Y 7/1–5Y 6/1) between Section 2, 50–127 cm.

5–10 mm laminae of green (5GY 8/2) common throughout. Dark gray to olive gray mottles throughout. Pyritized burrow at Section 5, 130 cm.

SMEAR SLIDE SUMMARY (%)

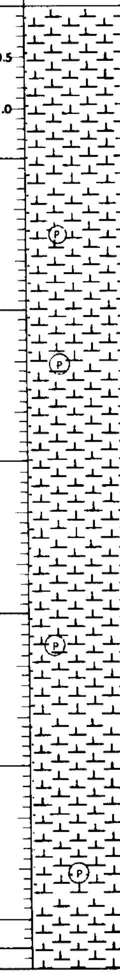
	1, 73	2, 70
	D	M
Composition:		
Quartz	1	4
Feldspar	TR	TR
Heavy minerals	TR	–
Clay	25	35
Carbonate unspec.	–	TR
Foraminifers	10	10
Calc. nannofossils	61	48
Diatoms	2	2
Radiolarians	TR	TR
Sponge spicules	TR	TR
Silicoflagellates	TR	–
Opaque oxides	1	1

Note: Section 7 is 55 cm long

SITE 609 HOLE B CORE 22 CORED INTERVAL 191.5–201.1 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		N. acostaensis (AG)	NN16 *Discoaster surculus* Zone (AG)		*Nitzschia jouseae* Zone (FM)	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0

GRAPHIC LITHOLOGY



Colors (top to bottom): N7; N8; 5GY 6/1; N8; N7; 5GY 6/1; N7

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE, gray, 5–10 mm laminae of green (5GY 6/1) common throughout. Dark gray (N3) mottles throughout. Pyritized burrows at Section 2, 73 cm, Section 3, 52 cm, Section 5, 30 cm and Section 6, 100 cm.

SMEAR SLIDE SUMMARY (%)

	2, 127	4, 47
	D	D
Composition:		
Quartz	5	2
Feldspar	TR	TR
Heavy minerals	TR	–
Clay	12	8
Carbonate unspec.	–	TR
Foraminifers	13	15
Calc. nannofossils	70	75
Diatoms	TR	TR
Silicoflagellates	TR	–

SITE 609 HOLE B CORE 23 CORED INTERVAL 201.1–210.7 m

Fossil character	Zone
Foraminifers	*N. acostaensis* (AG)
Nannofossils	NN16 *Discoaster surculus* Zone (AG)
Diatoms	*Nitzschia jouseae* Zone (FP)

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Colors: 5Y 7/1, 5Y 8/1, 5Y 7/1, 5Y 6/1, 5Y 7/1, 5Y 6/1, 5Y 7/1, 5Y 6/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, pale gray (5Y 8/1–5Y 6/1). 5–15 mm green (10GY 3/2) laminae common throughout. Dark gray (N3) mottles throughout. Pyritized burrow at Section 1, 129 cm.

SMEAR SLIDE SUMMARY (%)

Composition:	1, 68	2, 73
Quartz	TR	TR
Feldspar	TR	TR
Heavy minerals	–	TR
Clay	4	6
Micronodules	–	TR
Carbonate unspec.	TR	TR
Foraminifers	8	6
Calc. nannofossils	88	86
Diatoms	TR	2
Radiolarians	–	TR
Sponge spicules	TR	TR
Silicoflagellates	–	TR

SITE 609 HOLE B CORE 24 CORED INTERVAL 210.7–220.3 m

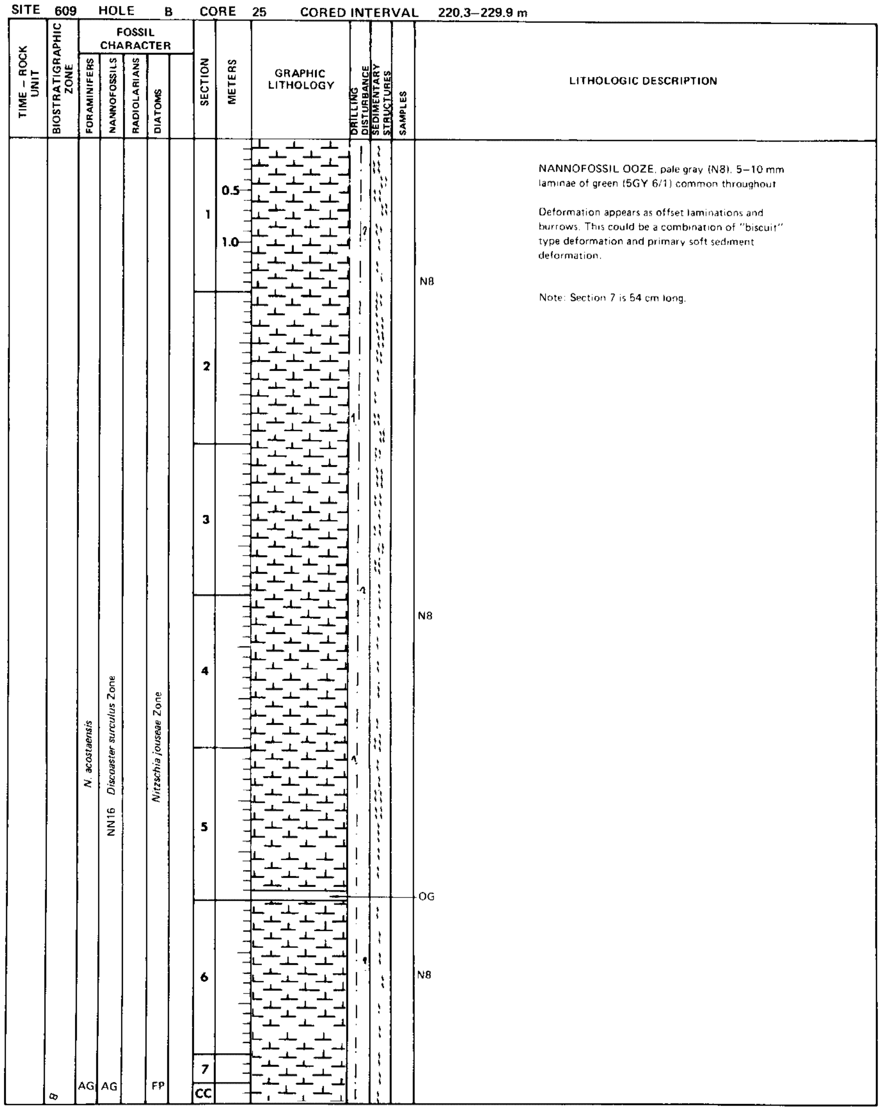
Fossil character	Zone
Foraminifers	*N. acostaensis* (AG)
Nannofossils	NN16 *Discoaster surculus* Zone (AG)
Diatoms	*Nitzschia jouseae* Zone (CP)

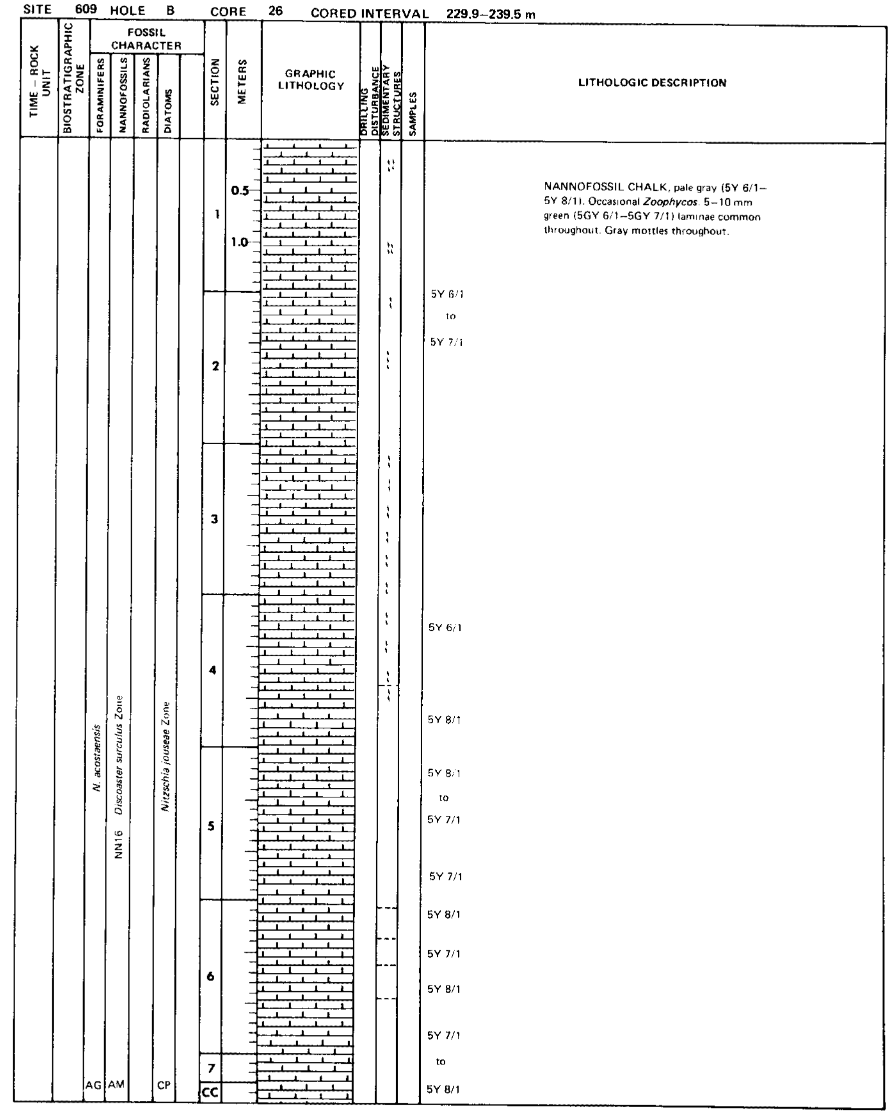
Sections: 1, 2, 3, 4, 5, 6, 7, CC

Colors: 5Y 7/1, 5Y 6/1, 5Y 7/2, N9, 5Y 7/1, 5Y 8/1, 5Y 7/1, 5Y 7/1, IW, 5Y 6/1, 5Y 7/1

LITHOLOGIC DESCRIPTION

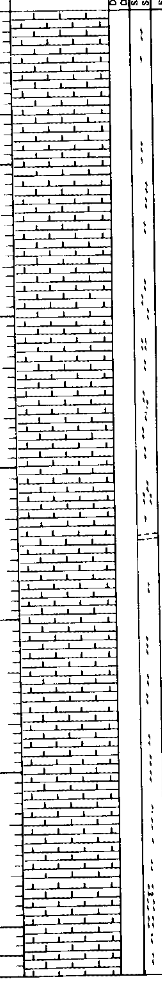
NANNOFOSSIL OOZE, pale gray (5Y 6/1–5Y 8/1). 5–10 mm green (5Y 5/2) laminae common throughout. Dark gray mottles throughout. Pyritized worm burrow at Section 3, 61 cm. Pebbles abundant in top of core are probably downhole contamination.


SITE 609 HOLE B CORE 25 CORED INTERVAL 220.3–229.9 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
N. acostaensis
NN16 Discoaster surculus Zone
Nitzschia jouseae Zone
B
AG
AG
FP
1
2
3
4
5
6
7
CC
0.5
1.0
N8
N8
OG
N8
NANNOFOSSIL OOZE, pale gray (N8). 5–10 mm laminae of green (5GY 6/1) common throughout.
Deformation appears as offset laminations and burrows. This could be a combination of "biscuit" type deformation and primary soft sediment deformation.
Note: Section 7 is 54 cm long.


SITE 609 HOLE B CORE 26 CORED INTERVAL 229.9–239.5 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
N. acostaensis
NN16 Discoaster surculus Zone
Nitzschia jouseae Zone
AG
AM
CP
1
2
3
4
5
6
7
CC
0.5
1.0
5Y 6/1
to
5Y 7/1
5Y 6/1
5Y 8/1
5Y 8/1
to
5Y 7/1
5Y 7/1
5Y 8/1
5Y 7/1
5Y 8/1
5Y 7/1
to
5Y 8/1
NANNOFOSSIL CHALK, pale gray (5Y 6/1–5Y 8/1). Occasional Zoophycos. 5–10 mm green (5GY 6/1–5GY 7/1) laminae common throughout. Gray mottles throughout.

SITE 609 HOLE B CORE 27 CORED INTERVAL 239.5–249.1 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		N. acostaensis AG	NN16 *Discoaster surculus* Zone AM		RP	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0					N8 / 5GY 8/1 / N8

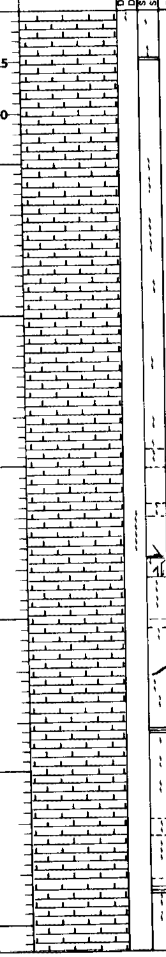


NANNOFOSSIL CHALK, pale gray (N8), faint green (5GY 8/1) 5–10 mm laminae common throughout *Zoophycos*. Dark gray mottling throughout.

Note: Section 7 is 56 cm long.

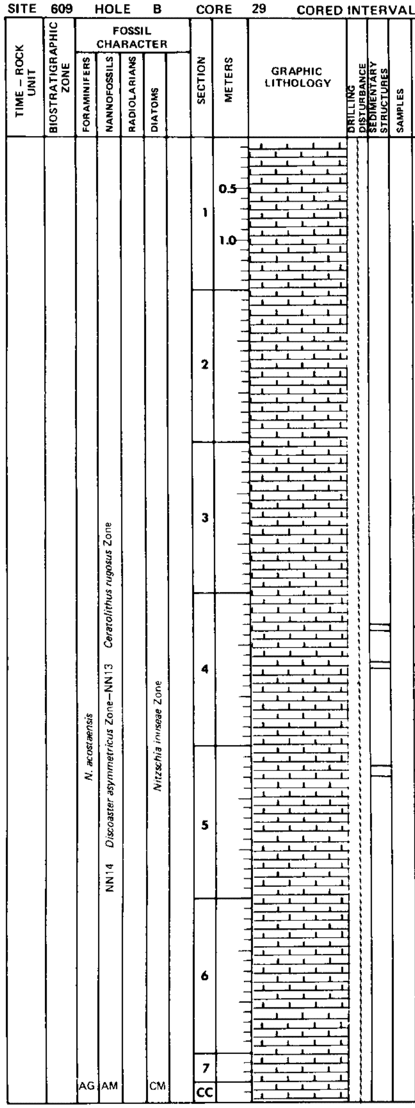
SITE 609 HOLE B CORE 28 CORED INTERVAL 249.1–258.7 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		N. acostaensis AG	NN15 *Reticulofenestra pseudoumbilica* Zone AM		RP	1, 2, 3, 4, 5, 6, 7	0.5, 1.0					N9 / N8 to N9 / 5GY 8/1 / N8 / 5G 8/1 / N8 / 5G 8/1 / N9 to N8 / N9 / 5G 8/1 / N8 / N9



NANNOFOSSIL CHALK, pale gray (N8–N9). Rare *Zoophycos*, *Chondrites*. 5–10 mm green (5G 6/1–5G 8/1) laminations throughout. Several series (1 cm) of very thin (<1 mm) green (5G 6/1) laminations throughout. Occasional small faults with slickensides present Section 4, 72–86 cm. Dark gray mottling throughout.

SITE 609 HOLE B CORE 29 CORED INTERVAL 258.7–268.3 m

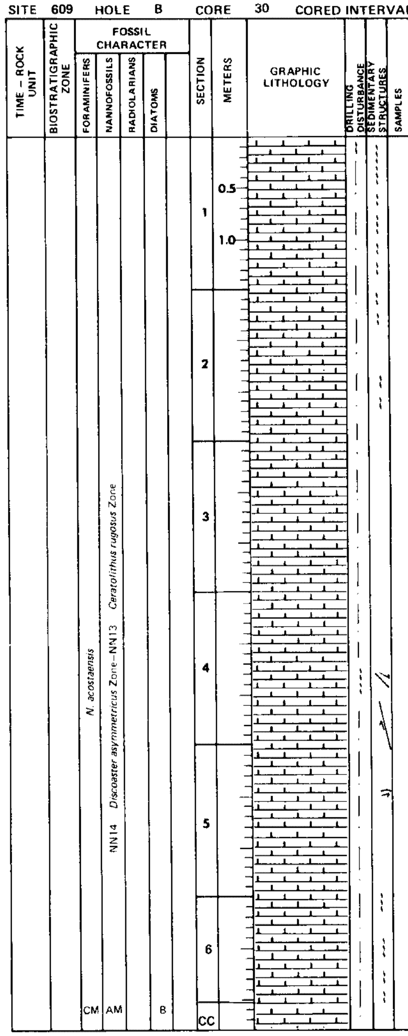


LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, pale gray to white (N8–N9). Occasional 5–10 mm green (5GY 7/1) *Zoophycos* in Section 7 and Core Catcher.

Sediments are disturbed into drill biscuits throughout. Slickensides between 126 to 137 cm.

SITE 609 HOLE B CORE 30 CORED INTERVAL 268.3–277.9 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, pale gray to white (N8–N9). Occasional 1–10 mm green (5GY 7/1) laminae throughout. Gray mottling throughout. Faults in Section 4 have slickensides.

Disturbance is in the form of drill "biscuits" surrounded by flowage.

SITE 609 HOLE B CORE 31 CORED INTERVAL 277.9–287.5 m

Fossil character	
Foraminifers	*Globorotalia margaritae*; CM
Nannofossils	NN14 *Discoaster asymmetricus* Zone – NN13 *Ceratolithus rugosus* Zone; AM
Diatoms	B

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Samples/colors: N9; N9; N9, 5GY 7/1; N9, 5GY 7/1; 5GY 7/1; N9; 5GY 7/1; N9

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, white (N9), 5–10 mm green (5GY 7/1) laminations throughout. Rare *Zoophycos*. Gray mottles throughout. Microfractures with oxidized surfaces occasionally throughout. Pyritized burrow at Section 6, 114 cm. Disturbance is in the form of generally large, firm fragments (biscuits?) surrounded by breccia and flowage.

SITE 609 HOLE B CORE 32 CORED INTERVAL 287.5–297.1 m

Fossil character	
Foraminifers	*G. margaritae*; FM
Nannofossils	NN14 *Discoaster asymmetricus* Zone – NN13 *Ceratolithus rugosus* Zone; AM
Diatoms	B

Sections: 1, 2, 3, 4, 5, 6, 7, CC

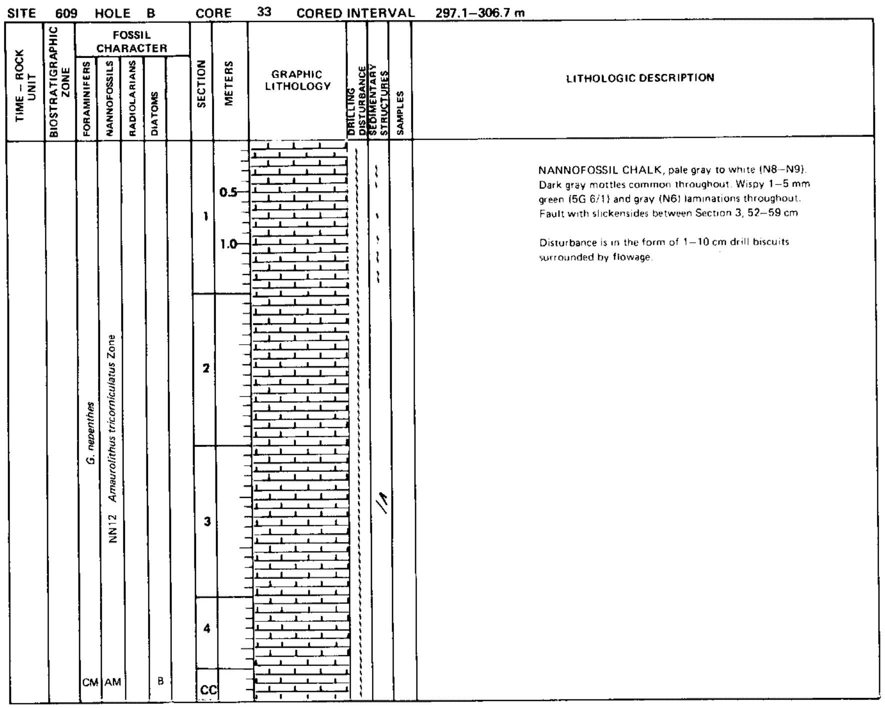
Samples/colors: N9 to N8

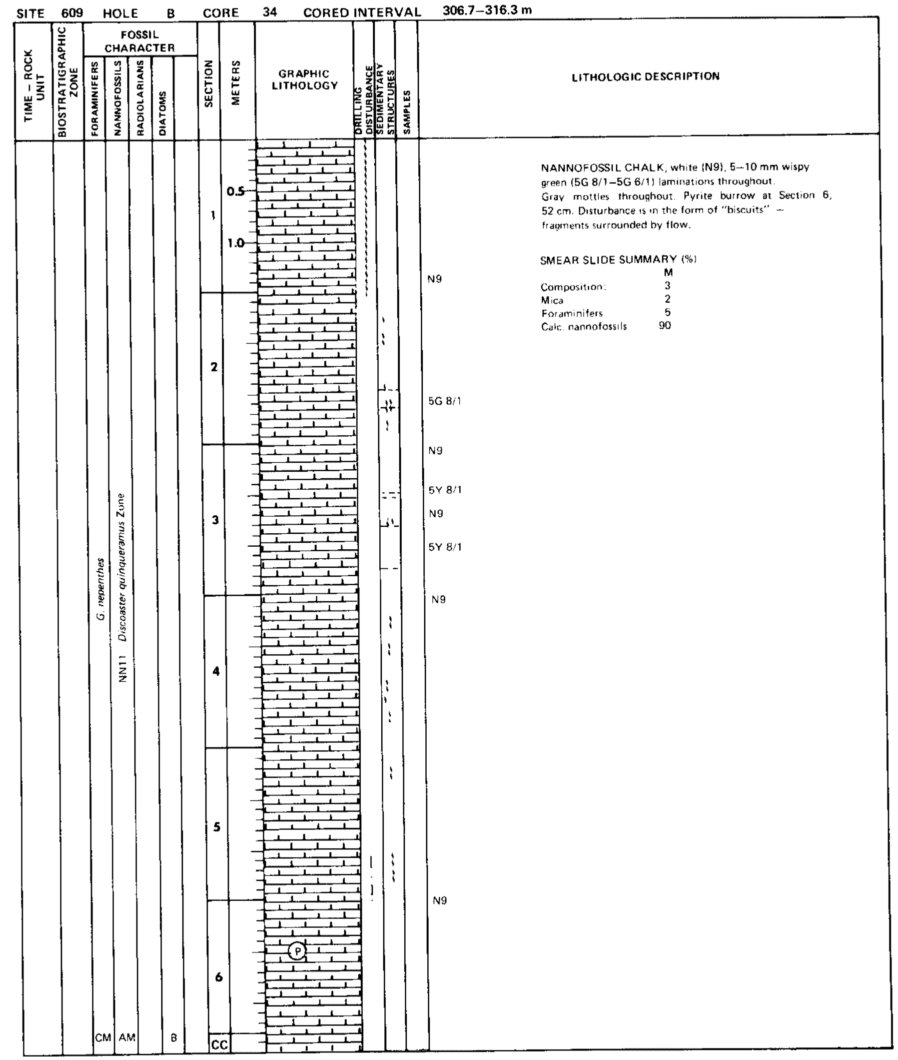
LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, white to light gray (N8–N9), 5–20 mm green (5GY 7/1) laminae throughout. Dark mottles common throughout.

Pyritized worm burrow at Section 5, 135 cm.

Disturbance is in the form of large, hard fragments (biscuits) surrounded by flowage.

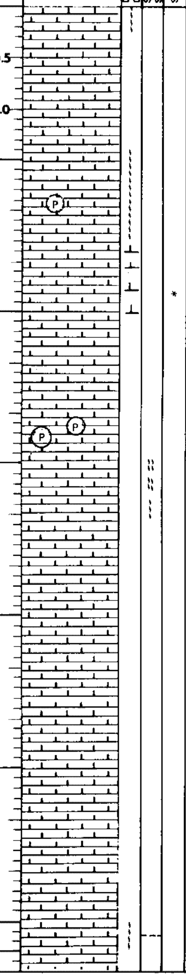

SITE 609 HOLE B CORE 33 CORED INTERVAL 297.1–306.7 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
G. nepenthes
NN12 Amaurolithus tricorniculatus Zone
CM AM B
0.5
1.0
1
2
3
4
CC
NANNOFOSSIL CHALK, pale gray to white (N8–N9). Dark gray mottles common throughout. Wispy 1–5 mm green (5G 6/1) and gray (N6) laminations throughout. Fault with slickensides between Section 3, 52–59 cm.
Disturbance is in the form of 1–10 cm drill biscuits surrounded by flowage.


SITE 609 HOLE B CORE 34 CORED INTERVAL 306.7–316.3 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
G. nepenthes
NN11 Discoaster quinqueramus Zone
CM AM B
0.5
1.0
1
2
3
4
5
6
CC
P
N9
5G 8/1
N9
5Y 8/1
N9
5Y 8/1
N9
N9
NANNOFOSSIL CHALK, white (N9), 5–10 mm wispy green (5G 8/1–5G 6/1) laminations throughout. Gray mottles throughout. Pyrite burrow at Section 6, 52 cm. Disturbance is in the form of "biscuits" – fragments surrounded by flow.
SMEAR SLIDE SUMMARY (%)
M
Composition:
Mica 3
Foraminifers 2
Calc. nannofossils 5
90

SITE 609 HOLE B CORE 35 CORED INTERVAL 316.3–325.9 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		G. nepenthes	NN11 *Discoaster quinqueramus* Zone			1–7, CC	0.5, 1.0
		CG	AM		B	CC	

GRAPHIC LITHOLOGY



Color: N9 (Section 2), to (Section 3), N8 (Section 4), N8 (Section 5), 5Y 7/1 (Section 7)

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, white (N9), 5–15 mm laminae of green (5GY 7/2) throughout. Occasional dark mottling. Disturbance in the form of "biscuits" in Section 2, 80–150 cm. Pyritized burrows at Section 2, 34 cm and Section 3, 117 and 122 cm.

SMEAR SLIDE SUMMARY (%)

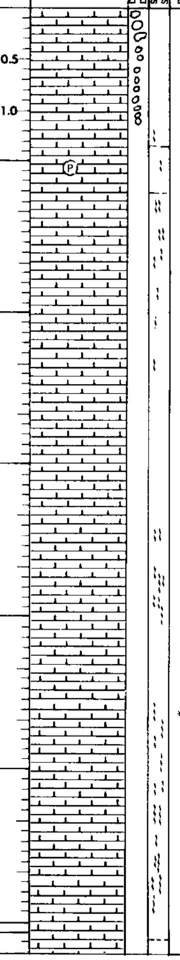
	2, 130
	D
Composition:	
Quartz	1
Feldspar	TR
Clay	4
Foraminifers	5
Calc. nannofossils	90

Note: Section 7 is 77 cm long.

SITE 609 HOLE B CORE 36 CORED INTERVAL 325.9–335.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		G. nepenthes	NN11 *Discoaster quinqueramus* Zone			1–7, CC	0.5, 1.0
		RM	AM		B	CC	

GRAPHIC LITHOLOGY



Color: N9 (Section 1), 5Y 7/1, N8 (Section 2), 5Y 7/1 (CC)

LITHOLOGIC DESCRIPTION

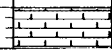
NANNOFOSSIL CHALK, pale gray (N9–N8), 1–2 cm series of ≤1 mm green (5GY 7/1) wispy laminations throughout core. Dark gray mottles throughout. Pyritized worm burrow at Section 2, 9 cm.

Abundant pebbles in top of first section are most likely downhole contamination.

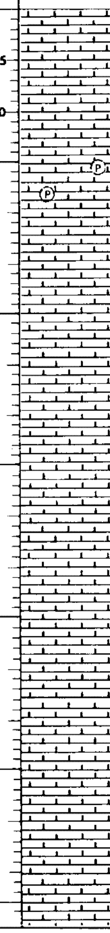
SMEAR SLIDE SUMMARY (%)

	5, 91
Composition:	
Feldspar	TR
Clay	6
Carbonate unspec.	TR
Foraminifers	3
Calc. nannofossils	91

SITE 609 HOLE B CORE 37 CORED INTERVAL 335.5–345.1 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			NN11 *Discoaster quinqueramus* Zone; AM		B	CC					N8	Nannofossil chalk pale white (N8). Abundant pebbles are most likely downhole contamination.

SITE 609 HOLE B CORE 38 CORED INTERVAL 345.1–354.7 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
			NN11 *Discoaster quinqueramus* Zone; AM		B	1, 2, 3, 4, 5, 6, CC	0.5, 1.0		OO		N9, N8, N9	NANNOFOSSIL CHALK, pale gray to white (N8–N9), 5–10 mm green (5G 7/1) and purple (5RP 4/2) laminations throughout. Dark gray mottling throughout. Occasional pyritized fractures throughout. *Zoophycos* Pyritized burrows at Section 2, 5 and 30 cm.

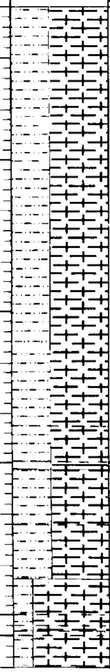
SMEAR SLIDE SUMMARY (%)

	4, 114
	D
Composition:	
Feldspar	TR
Clay	4
Carbonate unspec.	TR
Foraminifers	6
Calc. nannofossils	90

SITE 609 HOLE C CORE 1 CORED INTERVAL 123.2–132.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		G. truncatulinoides	NN19 *Pseudoemiliania lacunosa* Zone		*Nitzschia reinholdii* Zone	123.2	1	0.5, 1.0
						124.7	2	
						126.2	3	
						127.7	4	
						129.2	5	
		AG	AG		FM	129.4	CC	
						129.7		

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Colors: 5GY 5/1; 5Y 4/2; 5GY 5/1; 5Y 6/1 → 5GY 5/1; 5Y 8/1; 5Y 7/1; 5Y 8/1; 5Y 6/1 → 5Y 5/1; 5Y 7/1

LITHOLOGIC DESCRIPTION

Greenish gray (5GY 5/1) MARLY FORAMINIFERAL NANNOFOSSIL OOZE with small mottles of dark gray (N3) throughout.

Light gray to very light gray (5Y 5/1 to 5Y 8/1) FORAMINIFERAL NANNOFOSSIL OOZE.

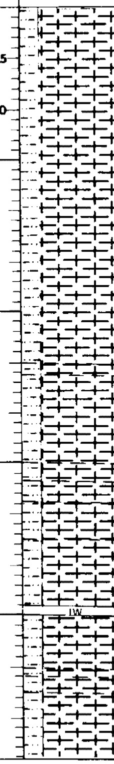
SMEAR SLIDE SUMMARY (%)

	1, 12	2, 135	4, 140
	M	D	M
Composition:			
Quartz	40	6	TR
Feldspar	–	TR	–
Heavy minerals	5	TR	–
Clay	45	35	6
Volcanic glass	5	–	–
Pyrite	TR	–	–
Micronodules	TR	–	–
Carbonate unspec.	3	TR	TR
Foraminifers	TR	12	11
Calc. nannofossils	1	46	83
Diatoms	–	1	–
Radiolarians	–	TR	–
Opaque oxides	1	–	–

SITE 609 HOLE C CORE 2 CORED INTERVAL 132.8–142.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
			NN18 *Discoaster brouweri* Zone			132.8	1	0.5, 1.0
						134.3	2	
						135.8	3	
						137.3	4	
						138.8	5	
		AG	AG		B	140.2		

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Colors: 5Y 6/1; 5Y 5/1; 5Y 6/1 with 5Y 5/1 mottles; 5Y 6/1; 5Y 7/1; 5Y 8/1; 5Y 7/1; 5Y 7/1 → 5Y 6/1; 5G 5/1, N5; 5Y 5/1; 5Y 7/1

LITHOLOGIC DESCRIPTION

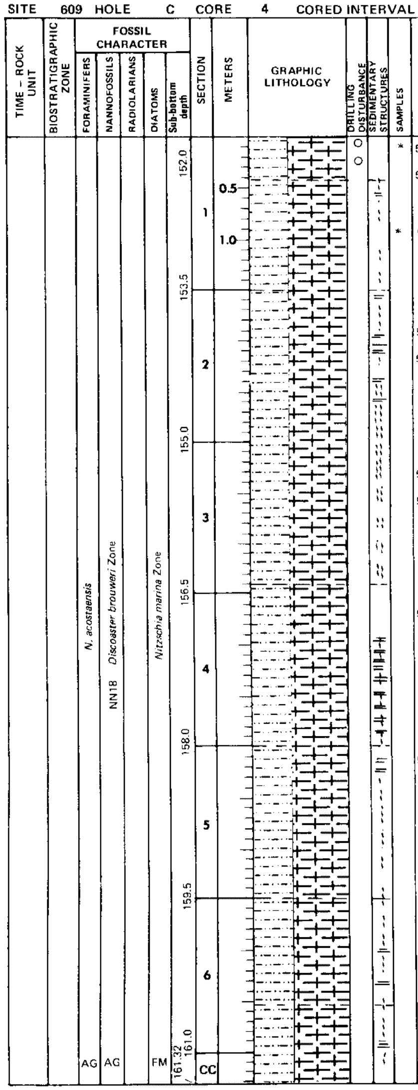
Gray (5Y 5/1–5Y 7/1) FORAMINIFERAL NANNOFOSSIL OOZE. Occasional bluish gray (5B 5/1), and pale green (5G 6/2, 5G 6/1) laminae below 138.5 m.

SMEAR SLIDE SUMMARY (%)

	2, 100	3, 125
	D	D
Composition:		
Quartz	TR	10
Feldspar	TR	TR
Clay	14	30
Carbonate unspec.	1	1
Foraminifers	13	12
Calc. nannofossils	72	47

Note: Core 2, 132.8–142.4 m, no recovery.

SITE 609 HOLE C CORE 4 CORED INTERVAL 152.0–161.6 m



LITHOLOGIC DESCRIPTION

Gray to light gray (5Y 5/1 to 5Y 7/1) MARLY NANNOFOSSIL OOZE with light green (5G 5/2) and grayish green (5GY 6/1 to 5GY 8/1) laminae common, especially 157.0 to 158.0 m.

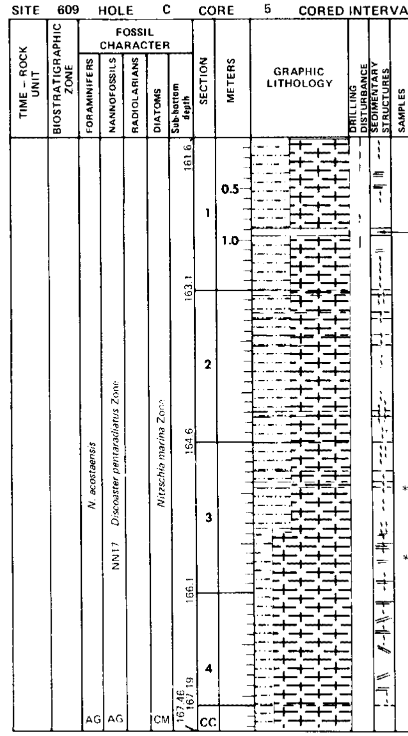
SMEAR SLIDE SUMMARY (%)

	1, 20	1, 90
	D	D
Composition:		
Quartz	40	40
Heavy minerals	1	TR
Clay	15	5
Volcanic glass	5	1
Carbonate unspec.	–	TR
Foraminifers	2	5
Calc. nannofossils	37	34
Diatoms	–	5
Radiolarians	–	5
Sponge spicules	TR	3
Silicoflagellates	–	2
Opaques	TR	–

ORGANIC CARBON AND CARBONATE (%)

	1, 93
Organic carbon	–
Carbonate	74

SITE 609 HOLE C CORE 5 CORED INTERVAL 161.6–171.2 m



LITHOLOGIC DESCRIPTION

Gray (5Y 4/1 to 5Y 6/1) MARLY NANNOFOSSIL OOZE, with intervals of brown (10YR 5/2 to 10YR 6/1).

Light gray (5Y 6/1 to 5Y 7/1) NANNOFOSSIL OOZE.

Green (5G 5/1, 5G 6/1) laminae common.

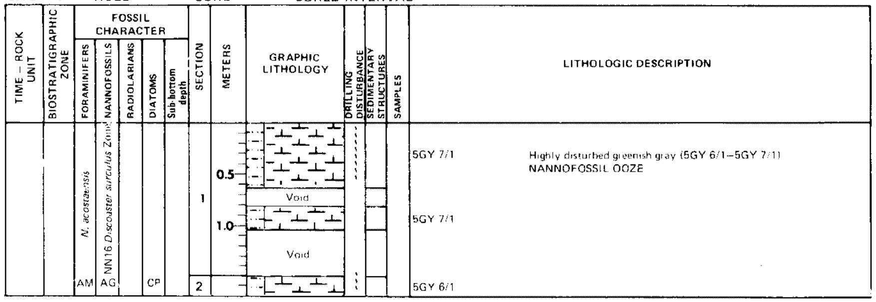
SMEAR SLIDE SUMMARY (%)

	3, 42	3, 116
	M	D
Composition:		
Quartz	55	10
Mica	2	–
Clay	30	–
Volcanic glass	7	–
Glauconite	1	–
Foraminifers	TR	1
Calc. nannofossils	5	81
Diatoms	–	3
Radiolarians	–	TR
Sponge spicules	TR	5
Silicoflagellates	–	TR

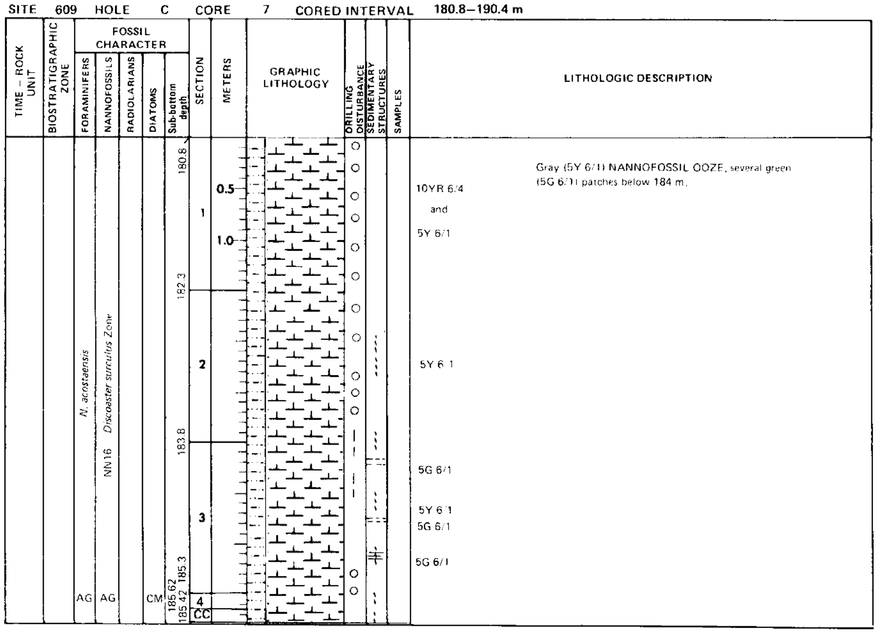
ORGANIC CARBON AND CARBONATE (%)

	3, 115
Organic carbon	–
Carbonate	76

SITE 609 HOLE C CORE 6 CORED INTERVAL 171.2–180.8 m



SITE 609 HOLE C CORE 7 CORED INTERVAL 180.8–190.4 m



SITE 610

Hole 610

Date Occupied: July 28, 1983

Date Departed: July 31, 1983

Time on Hole: 3.1 days

Position (latitude; longitude): 53°13.297'N; 18°53.213'W

Water depth (sea level; corrected m, echo-sounding): 2417

Water depth (rig floor; corrected m, echo-sounding): 2432.8

Bottom felt (m, drill pipe): 2426.7

Penetration (m): 723

Number of cores: 27

Total length of cored section (m): 259.2

Total core recovered (m): 179.32

Core recovery (%): 69

Oldest sediment cored:

Depth sub-bottom (m): 723

Nature: Nanno Chalk

Age: late early Miocene (NN3)

Measured velocity (km/s): 2.304

Basement: Not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 610

HOLE 610A

Date Occupied: July 31, 1983

Date Departed: August 1, 1983

Time on Hole: 0.9 days

Position (latitude; longitude): 53°13.297'N; 18°53.213'W

Water depth (sea level; corrected m, echo-sounding): 2417

Water depth (rig floor; corrected m, echo-sounding): 2432.8

Bottom felt (m, drill pipe): 2426.3

Penetration (m): 201

Number of cores: 21

Total length of cored section (m): 201

Total core recovered (m): 191.4

Core recovery (%): 95

Oldest sediment cored:

Depth sub-bottom (m): 201

Nature: Nannofossil ooze

Age: early Pliocene (NN15)

Measured velocity (km/s): 1.558

Basement: Not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 610

HOLE 610B

Date Occupied: August 1, 1983

Date Departed: August 2, 1983

Time on Hole: 0.75 days

Position (latitude; longitude): 53°13.297'N; 18°53.213'W

Water depth (sea level; corrected m, echo-sounding): 2417

Water depth (rig floor; corrected m, echo-sounding): 2432.8

Bottom felt (m, drill pipe): 2427.5

Penetration (m): 146.8

Number of cores: 16

Total length of cored section (m): 146.8

Total core recovered (m):136.33

Core recovery (%): 93

Oldest sediment cored:

Depth sub-bottom (m): 146.8

Nature: Nannofossil ooze

Age: early Pliocene (NN16)

Measured velocity (km/s):

Basement: Not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 610

HOLE 610C

Date Occupied: August 2, 1983

Date Departed: August 3, 1983

Time on Hole: 0.3 days

Position (latitude; longitude): 53°13.297'N; 18°53.213'W

Water depth (sea level; corrected m, echo-sounding): 2417

Water depth (rig floor; corrected m, echo-sounding): 2432.8

Bottom felt (m, drill pipe): 2427.5

Penetration (m): 118.2

Number of cores: 6

Total length of cored section (m): 48.4

Total core recovered (m): 43.91

Core recovery (%): 91

Oldest sediment cored:

Depth sub-bottom (m): 118.2

Nature: Marly nanno ooze

Age: late Pliocene (NN18)

Measured velocity (km/s):

Basement: Not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 610

HOLE 610D

Date Occupied: August 3, 1983

Date Departed: August 3, 1983

Time on Hole: 0.5 days

Position (latitude; longitude): 53°13.467'N; 18°53.690'W

Water depth (sea level; corrected m, echo-sounding): 2445

Water depth (rig floor; corrected m, echo-sounding): 2460.8

Bottom felt (m, drill pipe): 2458.7

Penetration (m): 386.8

Number of cores: 7

Total length of cored section (m): 66.0

Total core recovered (m): 54.16

Core recovery (%): 82

Oldest sediment cored:

Depth sub-bottom (m): 336.8

Nature: Nanno Chalk

Age: late Miocene (NN10)

Measured velocity (km/s):

Basement: Not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 610

HOLE 610E

Date Occupied: August 3, 1983

Date Departed: August 4, 1983

Time on Hole: 0.7 days

Position (latitude; longitude): 53°13.467'N; 18°53.690'W

Water depth (sea level; corrected m, echo-sounding): 2445

Water depth (rig floor; corrected m, echo-sounding): 2460.8

Bottom felt (m, drill pipe): 2458.7

Penetration (m): 327.2

Number of cores: 7

Total length of cored section (m): 67.2

Total core recovered (m): 53.31

Core recovery (%): 79

Oldest sediment cored:

Depth sub-bottom (m): 327.2

Nature: white Nanno Chalk

Age: late Miocene (NN10)

Measured velocity (km/s): 1.66

Basement: Not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 610

A. PRINCIPAL RESULTS

Six holes were drilled near the axis of the Feni sediment drift in Rockall Trough. Four holes (610 and 610A to C) were located on the crest of a sediment wave and two offset holes (610D and E) were drilled in an adjacent trough, 0.7km to the northwest and 28 meters deeper in water depth.

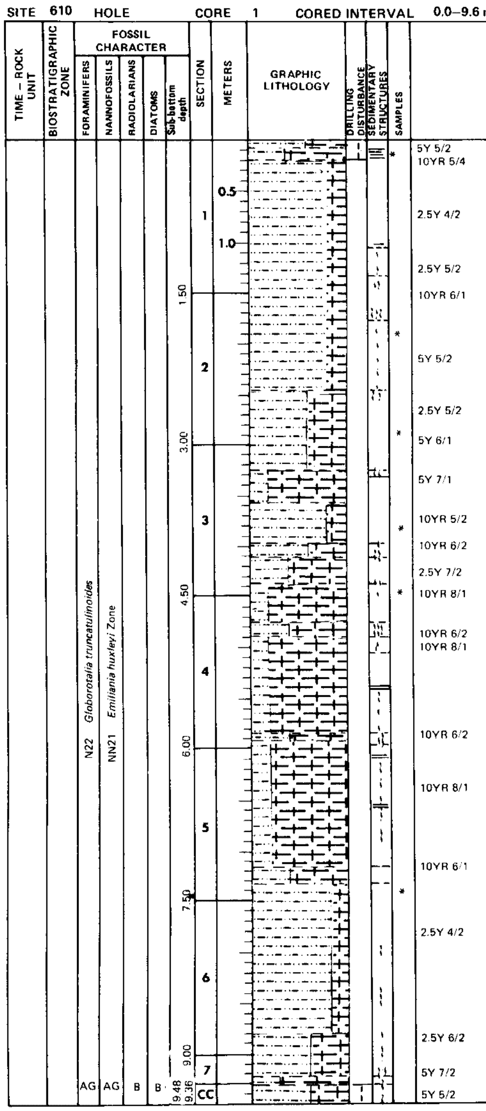
Two regional seismic reflectors were identified and dated. In Hole 610, which was spot cored beyond the Pliocene-Quaternary to 636.6 meters sub-bottom, the regional 0.75 second reflector (two-way travel time) was identified within a lower Miocene sequence that was continuously cored between 636 and 735m sub-bottom. The reflector represents a hardness change within a chalk sequence, caused by an increased biogenic silica content. Dissolution of the silica may be related to a widespread lower Miocene oceanographic change. A faint reflector at 0.37 secs sub-bottom (two-way travel time) was continuously cored in Hole 610E. It represents a marked lowering in sedimentation rates during the Messinian (late Miocene).

Sediment waves in the vicinity of Site 610 appear generally symmetrical and show no clear wave migration on 3.5kHz or airgun profiles. The complexity of their trends and shape is recognizable only from detailed survey lines. Holes 610 and 610A to D were located to allow investigation of vertical and lateral facies variations that might be related to the sediment waves.

The lithologies recovered at Site 610 are pelagic in type with glacial mud to interglacial nannofossil ooze cycles extending to 135 meters sub-bottom and nannofossil oozes and chalks to 723 meters sub-bottom. No primary sedimentary structures indicative of bottom-current deposition were observed, but a general reworking of the nannofossil component was apparent. Sediment wave crest-to-trough lithologic differences are apparently slight. Sedimentation rates were remarkably linear at about 51m/m.y. in the Pliocene-Quaternary and around 45m/m.y. in the middle and early Miocene. No hiatuses were evident.

Heave-related core disturbance, as detected by hole-to-hole correlations results in contorted sections and under-recovery that are severe in the upper 50 meters at all holes and only moderate below. Despite this, it was possible to demonstrate that an apparently 100 percent complete composite section can be pieced together to 2.5Ma using overlapping cores from five of the six holes.

SITE 610 HOLE CORE 1 CORED INTERVAL 0.0–9.6 m



LITHOLOGIC DESCRIPTION

(MARLY) FORAMINIFERAL NANNOFOSSIL OOZE interbedded with CALCAREOUS MUD

Light gray ooze layers generally homogeneous with mottled transitions to olive gray calcareous mud. Occasional gray green (5G 5/2–5G 6/2) layers and pyrite halos. Calcareous mud layers mottled to homogeneous, sometimes slightly sandy intervals. Dropstones of Cretaceous mudstone and pumice. Open burrows common and *Zoophycos.*

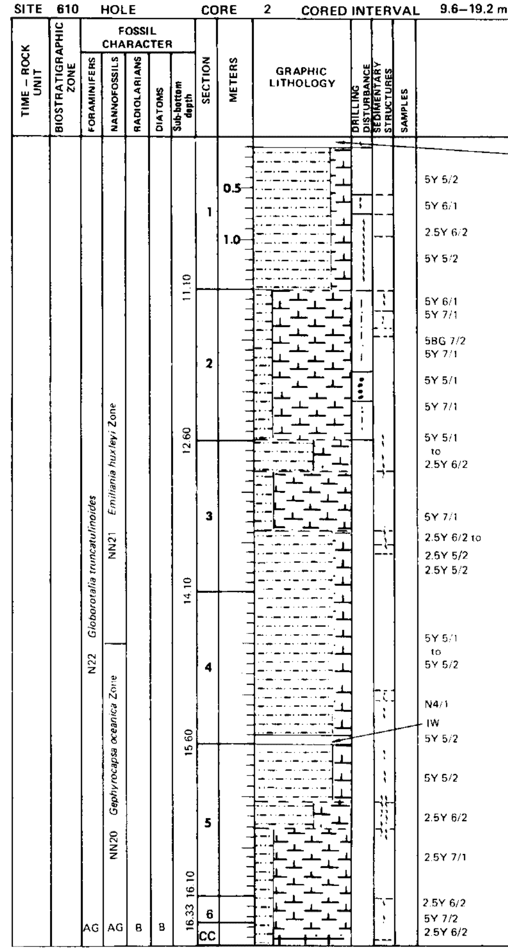
SMEAR SLIDE SUMMARY (%)

	1, 14	2, 51	2, 141	3, 81	3, 144	5, 145
	M	D	D	D	D	D
Composition:						
Quartz	2	6	1	15	1	16
Feldspar	–	TR	TR	TR	–	1
Heavy minerals	–	TR	TR	TR	TR	1
Clay	35	57	35	62	10	54
Volcanic glass	–	4	2	6	TR	8
Micronodules	1	–	–	–	–	–
Carbonate unspec.	3	8	7	11	TR	15
Foraminifers	3	7	3	2	9	2
Calc. nannofossils	57	18	52	4	80	3
Diatoms	–	–	–	–	TR	–
Sponge spicules	TR	–	TR	–	TR	–

ORGANIC CARBON AND CARBONATE (%)

	2, 19–20	5, 76–77
Organic carbon	–	–
Carbonate	11	79

SITE 610 HOLE CORE 2 CORED INTERVAL 9.6–19.2 m



LITHOLOGIC DESCRIPTION

0–10 cm badly disturbed to soupy

NANNOFOSSIL OOZE interbedded with CALCAREOUS MUD

Light gray ooze layers homogeneous with pyrite halos and occasional gray green laminae. Dropstone (pumice). Olive gray and brown calcareous mud mottled to homogeneous. Occasional dropstones. *Zoophycos, Chondrites,* and *Planolites.*

SMEARS SLIDE SUMMARY (%)

	2, 65	3, 126	4, 56
	D	D	D
Composition:			
Quartz	1	10	3
Feldspar	TR	1	TR
Heavy minerals	TR	2	TR
Clay	3	60	71
Volcanic glass	2	8	4
Carbonate unspec	1	13	13
Foraminifers	4	3	5
Calc. nannofossils	89	3	4

ORGANIC CARBON AND CARBONATE (%)

	4, 56–57
Organic carbon	–
Carbonate	30

SITE 610 HOLE CORE 3 CORED INTERVAL 19.2–28.8 m

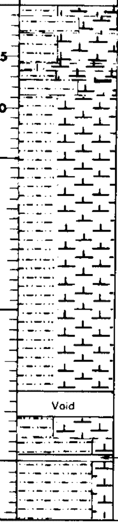
TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Biostratigraphic zones: N22 *Globorotalia truncatulinoides*; NN20 *Gephyrocapsa oceanica* Zone

Fossil character: Foraminifers AG; Nannofossils AG; Radiolarians B; Diatoms B

Sub-bottom depth: 20.70, 22.20, 23.70, 24.27

Sections: 1, 2, 3, 4; Meters: 0.5, 1.0



Colors: 5Y 7/1; 2.5Y 5/2; 5Y 7/1; 5Y 4/1; 2.5Y 5/2; 5Y 7/1; 5Y 8/1; 5Y 7/1; 5Y 8/1; 5Y 4/2; OG sample; 5Y 4/2 to 2.5Y 6/2

Very deformed interbedded NANNOFOSSIL OOZE and CALCAREOUS MUD, gray to olive gray, vertical streaks throughout. ?Dropstones of sandy mud, mudstone and volcanic rock. Mud at 237.7 m contain volcanic glass (12%).

SMEAR SLIDE SUMMARY (%)

	4, 7 M	3, 1 D
Composition:		
Quartz	45	50
Feldspar	5	5
Mica	1	TR
Heavy minerals	–	TR
Clay	20	TR
Volcanic glass	12	–
Pyrite	–	5
Carbonate unspec.	10	15
Foraminifers	–	5
Calc. nannofossils	7	20

SITE 610 HOLE CORE 4 CORED INTERVAL 28.8–38.4 m

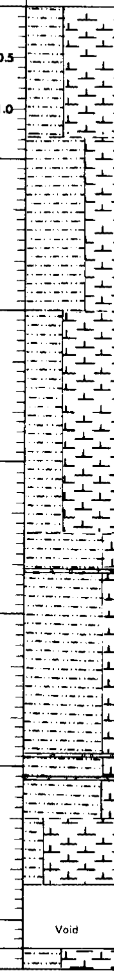
TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Biostratigraphic zones: N22 *Globorotalia truncatulinoides*; NN19 *Pseudoemiliania lacunosa* Zone

Fossil character: Foraminifers AG; Nannofossils AG; Radiolarians B; Diatoms B

Sub-bottom depth: 30.30, 31.80, 33.30, 34.80, 36.30, 37.47

Sections: 1, 2, 3, 4, 5, 6, 7, CC; Meters: 0.5, 1.0



Colors: 5Y 7/1; 5GY 7/2; 5Y 7/1 to 2.5Y 5/2; 5Y 6/1; 5Y 7/1; 2.5Y 5/2; 5Y 4/1; 2.5Y 4/2; 5Y 6/2 to 2.5Y 5/2; 5Y 7/1; 5Y 5/2; 5Y 8/1; 5Y 7/2

Very deformed to 33.30 m. Moderately deformed 33.30 to 34.00 m.

Interbedded MARLY NANNOFOSSIL OOZE and CALCAREOUS MUD.

Light gray ooze is homogeneous with pyrite patches and green gray laminae. Mud is olive gray to brown mottled to homogeneous with dropstones, mudclasts, *Chondrites* at transitions. Volcanic ash beds at 5.53 to 5.56 m, 7.37 to 7.40 m, and 7.60 to 7.63 m. Sharpbased.

SMEAR SLIDE SUMMARY (%)

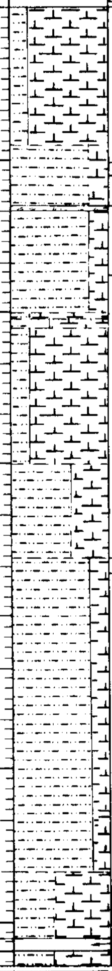
	5, 41 D	6, 70 M
Composition:		
Quartz	30	5
Feldspar	3	–
Mica	TR	TR
Heavy minerals	TR	–
Volcanic glass	5	–
Glauconite	–	TR
Carbonate unspec.	10	–
Foraminifers	7	35
Calc. nannofossils	45	60

ORGANIC CARBON AND CARBONATE (%)

Organic carbon	–
Carbonate	28

SITE 610 HOLE CORE 5 CORED INTERVAL 38.4–48.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone	B		39.90	1	0.5, 1.0					5Y 8/1 to 5Y 5/1
				B		41.40	2						5Y 5/2; 5G 4/1; 5Y 5/2; 2.5Y 7/1; 10YR 6/2
						42.90	3						10YR 8/1
				B		44.40	4					*	10YR 5/2 to 10YR 7/1; 5Y 7/2; 10YR 5/2
						45.90	5						2.5Y 4/2; 10YR 5/3; 10YR 4/2
				B		47.40	6						2.5Y 5/2; 5GY 6/1
						47.58	7						Void
		AG	AG	B	RP		CC						5Y 6/1



Disturbed to varying degrees in Section 1 to 4.

NANNOFOSSIL OOZE and CALCAREOUS MUD interbeds, light gray to olive gray. Homogeneous to mottled with occasional gray green laminae and pyrite patches. Volcanic ash bed at 1.92 to 1.96 m. Sharpbased.

SMEAR SLIDE SUMMARY (%)

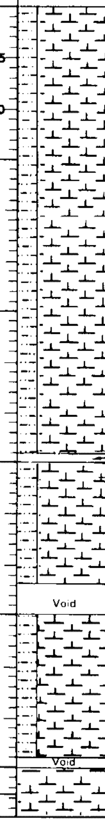
	4, 64
	D
Composition:	
Quartz	45
Feldspar	5
Mica	TR
Heavy minerals	TR
Volcanic glass	5
Glauconite	TR
Carbonate unspec.	10
Foraminifers	5
Calc. nannofossils	30

ORGANIC CARBON AND CARBONATE (%)

	5, 65–66
Organic carbon	–
Carbonate	24

SITE 610 HOLE CORE 6 CORED INTERVAL 147.0–156.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL3–5 undifferentiated		RM		148.50	1	0.5, 1.0				*	5Y 8/1
						150.00	2						
			NN16 *Discoaster surculus* Zone			151.50	3						5Y 7/1; Void
						153.00	4		Void				
				RM	*Nitzschia jouseae* Zone	154.90	5		Void				
					CM		6						
		AG	AM		FM		CC						



SILICEOUS NANNOFOSSIL OOZE, very light gray, lightly mottled with gray (N8/1) pyritiferous patches and halos. Occasional diffuse gray green (5GY 7/1) laminae. *Zoophycos* common.

SMEAR SLIDE SUMMARY (%)

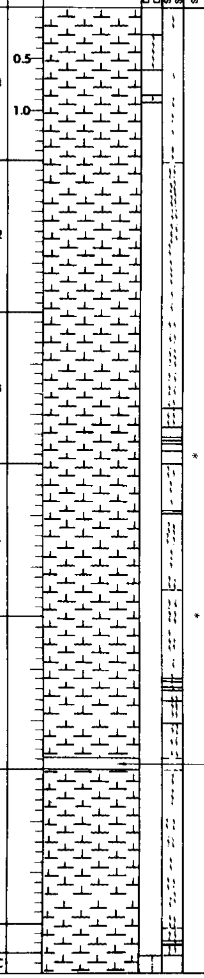
	1, 90
	D
Composition:	
Quartz, Feldspar, Mica, Heavy minerals, Clay	10
Volcanic glass	1
Foraminifers	4
Calc. nannofossils	75
Diatoms	8
Sponge spicules	2

ORGANIC CARBON AND CARBONATE (%)

	1, 90–91
Organic carbon	–
Carbonate	79

SITE 610 HOLE CORE 7 CORED INTERVAL 156.6–166.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone	FM		158.1	1	0.5, 1.0
						159.6	2	
						161.1	3	
				FM		162.6	4	
						164.1	5	
						165.6	6	
						166.19	7	
		AG	AM		B		CC	



5Y 8/1

5Y 7/1

N8.5/1

IW sample

N8/1

5Y 8/1

N8.5/1

LITHOLOGIC DESCRIPTION

SILICEOUS NANNOFOSSIL OOZE, white to light gray with gray (N5–6/1) mottling and gray green diffuse laminae. Pyrite halos.

SMEAR SLIDE SUMMARY (%)

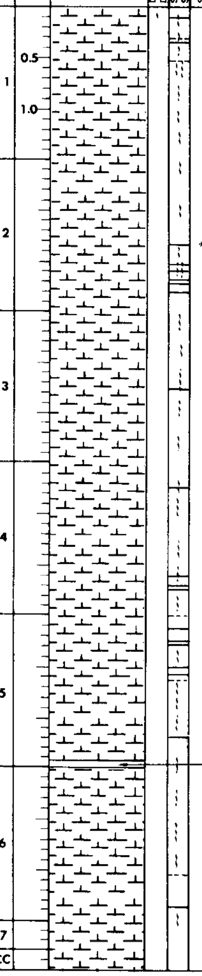
	3, 140	4, 140
	D	D
Composition:		
Quartz, Feldspar, Mica, Heavy minerals, Clay	10	5
Volcanic glass	1	1
Carbonate unspec.	2	1
Foraminifers	8	5
Calc. nannofossils	69	86
Diatoms, Radiolarians, Sponge spicules	10	2
Silicoflagellates	TR	–

ORGANIC CARBON AND CARBONATE (%)

	4, 140–141
Organic carbon	–
Carbonate	92

SITE 610 HOLE CORE 8 CORED INTERVAL 166.2–175.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone		AG *Nitzschia jouseae* Zone	167.7	1	0.5, 1.0
				FP		169.2	2	
						170.7	3	
						172.2	4	
				FM		173.7	5	
					FG		6	
							7	
		AG	AM		FM		CC	



N8/1

N9/1

N9/1

N9/1

N9/1

5Y 8/1

N9/1

OG sample

N9/1

N8/1

N8/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white with gray (N4/1–N5/1) and gray green (5GY 8/1–5GY 7/1) mottling. Some gray green diffuse laminae. Pyrite halos. *Zoophycos.*

SMEAR SLIDE SUMMARY (%)

	2, 80
Composition:	
Quartz	10
Feldspar	TR
Volcanic glass	TR
Glauconite	TR
Carbonate unspec.	TR
Foraminifers	3
Calc. nannofossils	86

ORGANIC CARBON AND CARBONATE (%)

	2, 80–81
Organic carbon	–
Carbonate	89

SITE 610 HOLE CORE 9 CORED INTERVAL 175.8–185.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone			177.3	1	0.5, 1.0					5Y 8/1; N8.5/1; Void
						178.8	2						N8.5/1
						180.3	3						N8.5/1
						181.8	4						Lenticular foram sand N8.5/1; 5GY 8/1
						183.3	5						N8/1
						184.8	6						N8.5/1
						185.26	7						
		AG	AG		RP		CC						

NANNOFOSSIL OOZE, white to pale gray, mottled with gray (N4/1–N6/1) and gray green (5GY 8/1–5Y 6/2). Pyritized burrow, diffuse green laminae. Foram sand in lenticular bed at 180.65 m.

ORGANIC CARBON AND CARBONATE (%)

	3, 65–66
Organic carbon	–
Carbonate	88

SITE 610 HOLE CORE 10 CORED INTERVAL 233.4–243.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL2 *Globorotalia margaritae*	NN12 *Amaurolithus tricorniculatus* Zone?			234.9	1	0.5, 1.0					N9/1
				RM		236.4	2					*	N9/1
						237.9	3					*	5Y 7/1; N9/1; 5Y 7/1
				RM		238.93	4						
		AG	AG		RP		CC						N9/1

NANNOFOSSIL OOZE, white with gray (N6/1) mottling.

SMEAR SLIDE SUMMARY (%)

	2, 70	3, 2
	D	M
Composition:		
Quartz	5	5
Clay	2	–
Volcanic glass	TR	–
Carbonate unspec.	1	1
Foraminifers	2	2
Calc. nannofossils	90	91
Diatoms	–	TR
Sponge spicules	–	TR

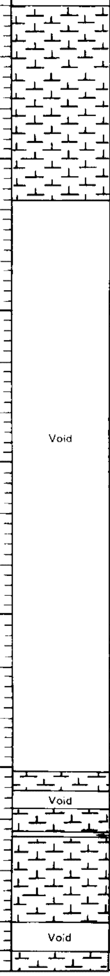
ORGANIC CARBON AND CARBONATE (%)

	2, 70–71
Organic carbon	–
Carbonate	96

SITE 610 HOLE CORE 11 CORED INTERVAL 300.6–310.2 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		Globorotalia margaritae AG	NN11 *Discoaster quinqueramus* Zone AM	RM, RM	RP	300.6, 302.1, 302.58, 308.1, 309.6, 310.1	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0

GRAPHIC LITHOLOGY:



Drilling disturbance, sedimentary structures, samples: * (Section 1)

Colors: N8.5/1; N8.5/1; N8.5/1; Void; N8.5/1

LITHOLOGIC DESCRIPTION

34–44 Soupy

NANNOFOSSIL OOZE, white with minor gray (N6/1) mottling.

SMEAR SLIDE SUMMARY (%)

	1, 110
Composition:	
Quartz, Feldspar, Mica, Heavy minerals, Clay	5
Carbonate unspec.	3
Foraminifers	5
Calc. nannofossils	87

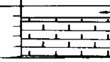
ORGANIC CARBON AND CARBONATE (%)

	1, 110–111
Organic carbon	–
Carbonate	92

SITE 610 HOLE CORE 12 CORED INTERVAL 348.6–358.2 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		Globorotalia conomiozea AG	NN10 *Discoaster calcaris* Zone – NN7 *Discoaster kugleri* Zone AM		RP	348.6, 349.1	CC	

GRAPHIC LITHOLOGY:



Samples: * (CC)

Colors: Void; N8

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, generally homogeneous, wispy gray laminations.

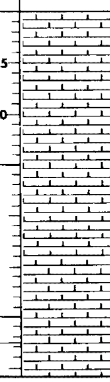
SMEAR SLIDE SUMMARY (%)

	CC, 41
	D
Composition:	
Quartz	10
Feldspar	TR
Carbonate unspec.	TR
Foraminifers	5
Calc. nannofossils	85
Sponge spicules	TR

SITE 610 HOLE CORE 13 CORED INTERVAL 358.2–367.8 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N. humerosa AG	NN10 *Discoaster calcaris* Zone – NN7 *Discoaster kugleri* Zone AP	RM	RP		1, 2, 3, CC	0.5, 1.0

GRAPHIC LITHOLOGY:



Samples: * (Section 1)

Colors: 5B 9/1; 5B 9/1 to 5G 9/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, bluish white to greenish white (5B 9/1–5G 9/1); *Zoophycos*; thin blue to gray laminations, pyrite staining; slickensides present at Section 1, 133 cm. Core disturbed by fracturing during drilling.

SMEAR SLIDE SUMMARY (%)

	1, 40
	D
Composition:	
Quartz	5
Carbonate unspec.	TR
Foraminifers	5
Calc. nannofossils	90

SITE 610 HOLE CORE 14 CORED INTERVAL 406.2–415.8 m

Field	Entry
Time-rock unit	
Biostratigraphic zone	
Foraminifers	*N. numerosa*; AG
Nannofossils	NN10 *Discoaster calcaris* Zone – NN7 *Discoaster kugleri* Zone; AM
Radiolarians	CM; RP
Diatoms	
Sub-bottom depth	406.2, 407.3, 409.2, 410.7, 410.83, 411.03
Sections	1, 2, 3, 4, CC
Meters	0.5, 1.0
Graphic lithology	Nannofossil chalk
Samples	5G 9/1, OG, IW

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, pale green (5G 9/1); few faint wispy laminations; *Zoophycos*; pyrite halos and staining. Core brecciated and fractured by drilling.

SMEAR SLIDE SUMMARY (%)

	1, 41
	D
Composition:	
Quartz	12
Feldspar	TR
Heavy minerals	TR
Carbonate unspec.	TR
Foraminifers	3
Calc. nannofossils	85
Sponge spicules	TR

ORGANIC CARBON AND CARBONATE (%)

	1, 35–36
Organic carbon	–
Carbonate	85

SITE 610 HOLE CORE 15 CORED INTERVAL 454.2–463.8 m

Field	Entry
Time-rock unit	
Biostratigraphic zone	
Foraminifers	*N. numerosa*; AG
Nannofossils	NN8 *Catinaster coalitus* Zone – NN7 *Discoaster kugleri* Zone; AM
Radiolarians	FG; CM
Diatoms	*Coscinodiscus gigas* var. *diorama* Zone
Sub-bottom depth	454.2, 455.7, 457.2, 458.7, 460.2, 461.7, 462.8, 463.1
Sections	1, 2, 3, 4, 5, 6, CC
Meters	0.5, 1.0
Graphic lithology	Nannofossil chalk
Samples / colors	5G 8/1, 5GY 7/1, 5G 8/1, 5GY 7/1, 5GY 8/1, 5GY 7/1, 5G 8/1, 5GY 7/1, 5G 8/1, *, 5GY 7/1, OG, 5G 8/1, *, 5GY 7/1, 5G 8/1, IW, 5G 8/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, greenish gray (5GY 7/1–5G 8/1); occasional *Zoophycos*; occasional wispy bedding; pyrite halos and staining. Coring deformation in the form of breccia and "biscuits".

SMEAR SLIDE SUMMARY (%)

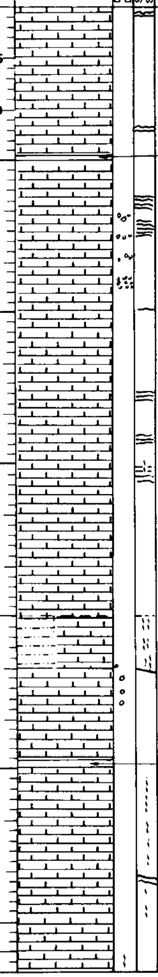
	4, 57	5, 80
	D	M
Composition:		
Quartz	3	40
Volcanic glass	–	TR
Pyrite	TR	–
Carbonate unspec.	TR	TR
Foraminifers	1	TR
Calc. nannofossils	96	60
Diatoms	TR	TR
Radiolarians	TR	–
Sponge spicules	TR	TR
Silicoflagellates	–	TR

ORGANIC CARBON AND CARBONATE (%)

	5, 70–71
Organic carbon	–
Carbonate	75

SITE 610 HOLE CORE 16 CORED INTERVAL 502.2–511.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		Globigerina druryi	NN6 *Discoaster exilis* Zone	FG (2), FG (6)	*Coscinodiscus lewisianus* Zone; CM (4)	503.7, 505.2, 506.7, 508.2, 509.7, 511.2	1, 2, 3, 4, 5, 6, 7	0.5, 1.0				*	N8/1; Void; N8/1; N8/1; 5Y 6/3, N8/1, 5Y 7/1; N8/1; 5G 8/1; N8/1; OG sample; N8/1; N8/1
		AG	AM	FG	RP	511.72	CC						N8/1



NANNOFOSSIL CHALK with thin unit of MARLY CHALK, white to light gray, homogeneous to mottled. Occasional pyrite mottles and halos. *Zoophycos* very common throughout core. Very thin wavy bedding common to 4.70 m. Microfault at 4.70 m which shows a sharp lithological break.

Coring disturbance limited to drill biscuit rotation and rare flow-in.

SMEAR SLIDE SUMMARY (%)

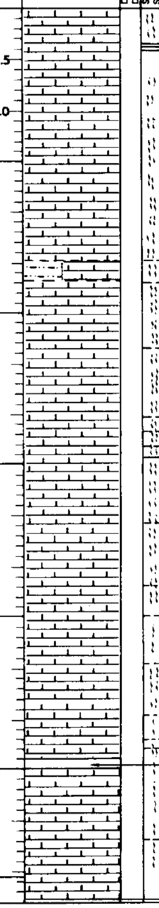
	4, 40
Composition:	
Clay	TR
Carbonate unspec.	TR
Foraminifers	2
Calc. nannofossils	98
Radiolarians	TR
Sponge spicules	TR

ORGANIC CARBON AND CARBONATE (%)

	4, 62–66
Organic carbon	–
Carbonate	94

SITE 610 HOLE CORE 17 CORED INTERVAL 550.2–559.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		G. druryi	FM (3); NN5 *Sphenolithus heteromorphus* Zone		FM (1); CM (2); *Coscinodiscus peplum?* Zone; FP (6)	551.7, 553.2, 554.7, 556.2, 557.7	1, 2, 3, 4, 5, 6	0.5, 1.0				*, *	5GY 7/1; 5GY 8/1; 5Y 6/1; 5GY 8/1; 5GY 7/1; 5GY 8/1, 5GY 7/1; 5GY 6/1 to 5GY 7/1; 5GY 8/1; 5GY 7/1; N8/1; 5GY 7/1; 5GY 8/1, 5GY 7/1, 5GY 6/1; IW; 5GY 8/1
		AG	AM		FP	558.75	CC						5GY 7/1



NANNOFOSSIL CHALK with interval of MARLY CHALK, light greenish gray to very mottled with abundant *Chondrites* and *Zoophycos*, pyrite mottles and wispy gray green laminae.

SMEAR SLIDE SUMMARY (%)

	2, 105	1, 85
	M	D
Composition:		
Quartz	5	–
Feldspar	TR	–
Mica	TR	–
Clay	25	10
Carbonate unspec.	35	38
Foraminifers	2	2
Calc. nannofossils	28	50
Diatoms } Radiolarians } Sponge spicules } Silicoflagellates }	5	–

ORGANIC CARBON AND CARBONATE (%)

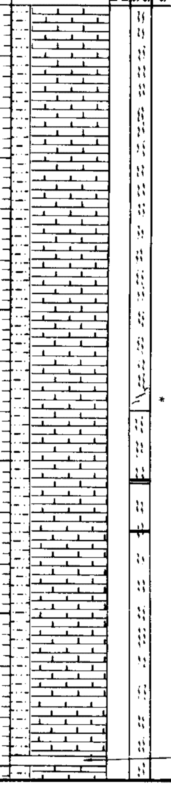
	2, 105–106
Organic carbon	–
Carbonate	67

SITE 610 HOLE CORE 18 CORED INTERVAL 598.2–607.8 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES

Foraminifers: *G. druryi*; AG
Nannofossils: NN5 *Sphenolithus heteromorphus* Zone; AM
Radiolarians: RP; RP

Section	Sub-bottom depth
1	598.2
2	599.7
3	601.2
4	602.7
5	604.2
CC	605.7 – 605.82



5GY 7/1 — 5GY 7/1 — 5GY 7/1 — 5GY 8/1 to 5GY 7/1 — 5GY 8/1 to 5GY 7/1 — IW

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, light greenish gray, highly mottled throughout, with pale green (5GY 6/1), white (N9/1) and gray (N2–4/1). *Zoophycos, Chondrites*. Occasional very thin horizontal lamination unaffected by bioturbation.

Drilling disturbance limited to break-up into 3–14 cm coherent blocks.

SMEAR SLIDE SUMMARY (%)

	3, 88
	D
Texture:	
Clay	10
Composition:	
Volcanic glass	TR
Carbonate unspec.	1
Foraminifers	TR
Calc. nannofossils	87
Radiolarians	TR
Sponge spicules	2

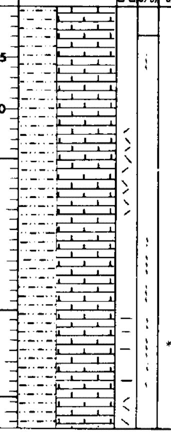
ORGANIC CARBON AND CARBONATE (%)

	3, 88–89
Organic carbon	–
Carbonate	67

SITE 610 HOLE CORE 19 CORED INTERVAL 636.6–646.2 m

Foraminifers: *G. druryi*; AM
Nannofossils: NN5 *Sphenolithus heteromorphus* Zone; AM
Radiolarians: RP; B
Diatoms: RP

Section	Sub-bottom depth
1	636.6
2	638.1
3	637.6
CC	640.49 – 640.81



5GY 7/1 — 5GY 6/1

LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL CHALK

Top 30 cm is chalk breccia to conglomerate, mostly angular clasts; inclined burrows and/or laminations at Section 1, 96 to 114 cm, sandy clast (3 cm) containing foraminifera (recrystalized) at Section 1, 105 cm. Occasional *Zoophycos* throughout.

SMEAR SLIDE SUMMARY (%)

	3, 34
	D
Composition:	
Quartz	TR
Feldspar	TR
Clay	45
Volcanic glass	TR
Glauconite	TR
Carbonate unspec.	24
Foraminifers	TR
Calc. nannofossils	30
Sponge spicules	1

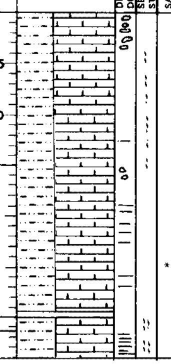
ORGANIC CARBON AND CARBONATE (%)

	3, 33–34
Organic carbon	–
Carbonate	63

SITE 610 HOLE CORE 20 CORED INTERVAL 646.2–655.8 m

Foraminifers: *G. druryi*; AP
Nannofossils: NN4 *Helicosphaera ampliaperta* Zone; AM
Diatoms: RP; RP

Section	Sub-bottom depth
1	646.2
2	647.7
3	
CC	



5GY 6/1 to 5GY 7/1

LITHOLOGIC DESCRIPTION

MARLY NANNOFOSSIL CHALK

Occasional *Zoophycos*, some small offsets and vertical faults especially Section 3.

Disturbance is in the form of breccia and flowage around coherent pieces.

SMEAR SLIDE SUMMARY (%)

	2, 97
	D
Composition:	
Quartz	TR
Feldspar	TR
Heavy minerals	TR
Clay	75
Volcanic glass	TR
Carbonate unspec.	21
Calc. nannofossils	33
Sponge spicules	1

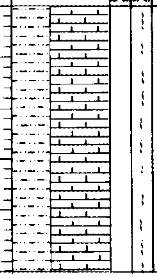
ORGANIC CARBON AND CARBONATE (%)

	1, 35–36
Organic carbon	–
Carbonate	64

SITE 610 HOLE CORE 21 CORED INTERVAL 655.8–665.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		G. druryi	NN4 *Helicosphaera ampliaperta* Zone	FP		655.8	1	0.5, 1.0
		AM	AM	RM	RP	657.3	2	

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES



LITHOLOGIC DESCRIPTION

5GY 6/1

MARLY NANNOFOSSIL CHALK

Occasional *Zoophycos* in Section 1. This core has no Core Catcher.

SMEAR SLIDE SUMMARY (%)

	2, 97
	D
Composition:	
Quartz	TR
Feldspar	TR
Heavy minerals	TR
Clay	40
Volcanic glass	TR
Carbonate unspec.	26
Calc. nannofossils	33
Sponge spicules	1

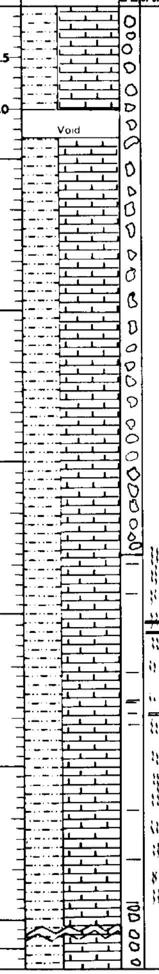
ORGANIC CARBON AND CARBONATE (%)

	1, 97–98
Organic carbon	–
Carbonate	74

SITE 610 HOLE CORE 22 CORED INTERVAL 665.4–675.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		C. dissimilis	NN4 *Helicosphaera ampliaperta* Zone	RP	B	665.4	1	0.5, 1.0
						666.9	2	
						668.4	3	
						669.9	4	
						671.4	5	
						672.9	6	
						674.4	7	
		CP	AP	RP	B	675.03, 675.29	CC	

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES



LITHOLOGIC DESCRIPTION

5GY 7/1 to 5GY 6/1

MARLY NANNOFOSSIL CHALK

Zoophycos, irregular green fine laminae in Section 5. Occasional pyrite halos and burrow fillings (pyrite?). Section 7 badly fractured but pieces in correct relative position. Disturbance in Sections 1–4 occurs as drill breccia surrounded by flow of groundup material.

SMEAR SLIDE SUMMARY (%)

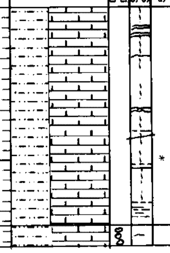
	5, 81
	D
Composition:	
Quartz	5
Feldspar	TR
Heavy minerals	TR
Clay	35
Volcanic glass	TR
Carbonate unspec.	22
Calc. nannofossils	38
Sponge spicules	TR

ORGANIC CARBON AND CARBONATE (%)

	5, 81–82
Organic carbon	–
Carbonate	82

SITE 610 HOLE CORE 23 CORED INTERVAL 675.0–684.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES		LITHOLOGIC DESCRIPTION
	NN3 *Sphenolithus belemnos* Zone	*C. dissimilis* / CP	NN4 *Helicosphaera ampliaperta* Zone / AP	RP / FM	RP / *Denticulopsis nicobarica* Zone? / RP	676.5 / 677.14	1, 2, CC	0.5, 1.0				*	5GY 7/1, 5GY 8/1, 5GY 6/1, 5GY 7/1, 5GY 6/1, 5GY 7/1	NANNOFOSSIL CHALK, light greenish gray, mottled. Faint wispy laminations. Microfault at 121 m.



SMEAR SLIDE SUMMARY (%)

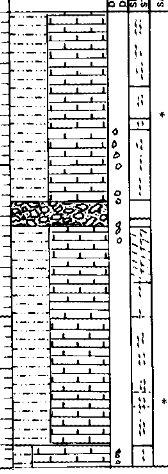
	1, 149
	D
Composition:	
Heavy minerals	TR
Clay	15
Volcanic glass	TR
Glauconite	TR
Carbonate unspec.	20
Foraminifers	5
Calc. nannofossils	60

ORGANIC CARBON AND CARBONATE (%)

	1, 149–150
Organic carbon	–
Carbonate	61

SITE 610 HOLE CORE 24 CORED INTERVAL 684.6–694.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	
		C. dissimilis / CP	NN3 *Sphenolithus belemnos* Zone / AP	RP / RP	FM / *Triceratium pileus* Zone / CG / FP	686.1 / 687.6	1, 2, 3, CC	0.5, 1.0				*, *	5GY 7/1, 5Y 8/1, 5GY 7/1, 5Y 8/1, 5GY 5/1 to 6/1, 5Y 6/1, 5GY 8/1, 5Y 7/1, 5Y 5/2, 5Y 7/1, 5Y 6/1



LITHOLOGIC DESCRIPTION

0.00–1.86 m: NANNOFOSSIL CHALK, pale gray green, mottled. Interbedded lighter and darker layers with sharp boundaries. Lighter layers show extensive, very fine veining.

1.86–2.11 m: BRECCIA, elongated chalk clasts in chalky matrix. Maximum clast size ~1 cm. Flow structures.

2.11–4.25 m: SILICEOUS NANNOFOSSIL OOZE, bedding inclined at 10°, 2.11 to 2.61 m, pale green, mottled. Darker, ?organic-rich layer at 3.75–3.89 m. Flattened and elongated burrows common.

Whole core is broken up by microfaults with slickenside planes.

SMEAR SLIDE SUMMARY (%)

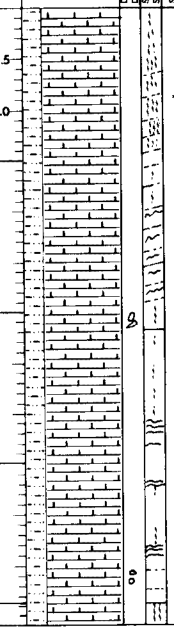
	1, 90	3, 85
	D	M
Composition:		
Quartz	10	–
Feldspar	TR	–
Clay	10	10
Carbonate unspec.	10	15
Foraminifers	–	TR
Calc. nannofossils	68	40
Diatoms		15
Radiolarians		
Sponge spicules	2	
Silicoflagellates		
Organic material	15	

ORGANIC CARBON AND CARBONATE (%)

	3, 85–86
Organic carbon	–
Carbonate	52

SITE 610 HOLE CORE 25 CORED INTERVAL 694.2–703.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	
		C. dissimilis / CM	NN3 *Sphenolithus belemnos* Zone / AM	*Craspedodiscus elegans* Zone / FG / FM	AG / FM / RP		1, 2, 3, 4, CC	0.5, 1.0				*	5GY 7/1, N9/1, 5GY 7/1, N9/1, 5GY 7/1, 5GY 7/1



LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, slightly siliceous.
(a) Pale gray green, mottled, inclined bedding (Section 5, 80 cm), 0.60 to 2.90 m.
(b) White with wispy laminae, some characteristically stylolitic.
Both sharp and gradational boundaries present.

SMEAR SLIDE SUMMARY (%)

	1, 90
	D
Composition:	
Quartz	5
Clay	5
Carbonate unspec.	15
Foraminifers	1
Calc. nannofossils	68
Diatoms	1
Sponge spicules	5

ORGANIC CARBON AND CARBONATE (%)

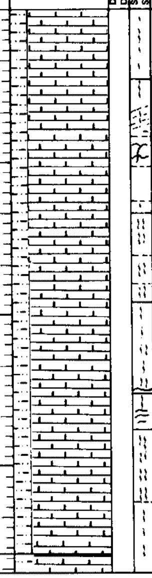
	1, 65–66
Organic carbon	–
Carbonate	79

SITE 610 HOLE CORE 26 CORED INTERVAL 703.8–713.4 m

Columns: TIME – ROCK UNIT; BIOSTRATIGRAPHIC ZONE; FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, Sub-bottom depth); SECTION; METERS; GRAPHIC LITHOLOGY; DRILLING DISTURBANCE; SEDIMENTARY STRUCTURES; SAMPLES; LITHOLOGIC DESCRIPTION

Foraminifers: *C. dissimilis*; CM (CC)
Nannofossils: NN3 *Sphenolithus belemnos* Zone; AP (CC)
Radiolarians: RM (Section 3); RP (CC)
Diatoms: FP (CC)

Sections: 1, 2, 3, 4, CC. Meters: 0.5, 1.0



Colors: N9/1; 5Y 8/1; N9/1, 5GY 6/1 to 5/1; 5GY 7/1; 5GY 6/1; 5GY 7/1; 5GY 6/1; 5GY 7/1; 5GY 6/1; 5GY 7/1; 5GY 6/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, slightly siliceous, pale green to white, mottled. Inclined bedding 0.90 to 1.25 m, 20° decreasing downwards to horizontal. Common, thin, veins in lighter layers *Zoophycos, Chondrites* common. Wispy laminations (possible solution features common).

SMEAR SLIDE SUMMARY (%)

	1, 15	2, 48
	D	
Composition:		
Quartz	5	10
Carbonate unspec.*	10	5
Calc. nannofossils	83	75
Diatoms	TR	–
Radiolarians	TR	TR
Sponge spicules	2	10

*Detrital

ORGANIC CARBON AND CARBONATE (%)

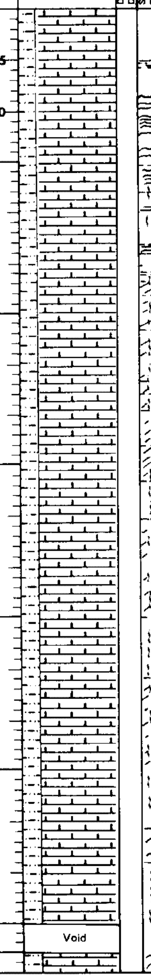
	2, 15–16
Organic carbon	–
Carbonate	91

SITE 610 HOLE CORE 27 CORED INTERVAL 713.4–723.0 m

Columns: TIME – ROCK UNIT; BIOSTRATIGRAPHIC ZONE; FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, Sub-bottom depth); SECTION; METERS; GRAPHIC LITHOLOGY; DRILLING DISTURBANCE; SEDIMENTARY STRUCTURES; SAMPLES; LITHOLOGIC DESCRIPTION

Foraminifers: *C. dissimilis*; CM (CC)
Nannofossils: NN3 *Sphenolithus belemnos* Zone; AP (CC)
Radiolarians: FG (Section 2); FG (CC)
Diatoms: FG (Section 2); CM (Section 3); RP (Section 6); FM (CC)

Sections: 1, 2, 3, 4, 5, 6, 7, CC. Meters: 0.5, 1.0



Colors: N9/1; 5GY 6/1; N9/1 to 5GY 8/1; 5GY 7/1; N9/1; 5GY 7/1; 5GY 6/1; 5GY 7/1; 5GY 8/1; 5GY 7/1; 5GY 8/1; 5GY 7/1; 5GY 8/1; 5GY 7/1; 5GY 8/1; 5GY 7/1; 5GY 8/1; 5GY 7/1; 5GY 8/1; 5GY 7/1; 5GY 7/1 to 5GY 8/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK, variously colored from green to white. Highly mottled with abundant wispy lamination and stylolites. Below 2.30 m, predominantly inclined bedding. Pyrite patches and laminae common. Slightly siliceous.

SMEAR SLIDE SUMMARY (%)

	1, 56	1, 23	1, 24
Composition:			
Quartz	–	5	15
Clay	5	5	5
Pyrite	–	–	TR
Carbonate unspec.	10	10	10
Foraminifers	1	TR	–
Calc. nannofossils	63	80	60
Diatoms	TR	–	–
Radiolarians	1	–	TR
Sponge spicules	10	TR	10

ORGANIC CARBON AND CARBONATE (%)

	1, 55–56
Organic carbon	–
Carbonate	65

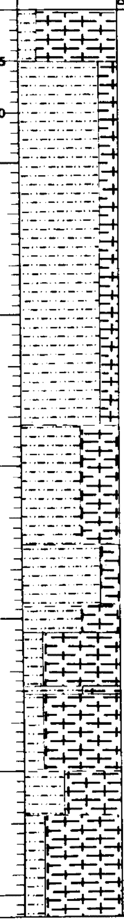
Note: Core Catcher is 34 cm long.

SITE 610 HOLE A CORE 1 CORED INTERVAL 0.0–9.0 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* (AG)
Nannofossils: NN21 *Emiliania huxleyi* Zone (AG)
Radiolarians: B
Diatoms: *Pseudoeunotia doliolus* Zone (CM)

Sections: 1, 2, 3, 4, 5, 6, CC (0.5, 1.0 m)



Colors: 2.5Y 7/4, 2.5Y 6/2, 2.5Y 7/3, 2.5Y 6/2, 2.5Y 8/2, 2.5Y 6/2; 2.5Y 7/2 to 5Y 5/2; 5Y 5/2; 5GY 6/1, 10G 6/2, 5GY 6/1; N6/1 to 5GY 6/1; N5/1, 5Y 5/3; N5/1, 5Y 5/3, 5Y 6/3, 5Y 7/2; N7/1; 5Y 7/2; N6/1 to N7/1; N7/1 to 2.5Y 7/2; N7/1; N7/1

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, light gray to olive gray and brown. Gradational boundaries. Burrow mottling. Occasional gray green layers (5G 5/2–5G 7/2). *Zoophycos* and open burrows common. Pyrite halos in ooze layers. Sandsized ice-rafted debris common in calcareous mud layers.

SMEAR SLIDE SUMMARY (%)

	1, 19	1, 140	5, 35
	M	D	D
Composition:			
Quartz	2	67	2
Feldspar	–	–	1
Heavy minerals	3	5	TR
Clay	3	15	3
Volcanic glass	1	1	2
Micronodules	4	–	–
Carbonate unspec.	3	9	2
Foraminifers	18	1	10
Calc. nannofossils	66	2	80
Diatoms	–	–	TR
Sponge spicules	TR	–	TR

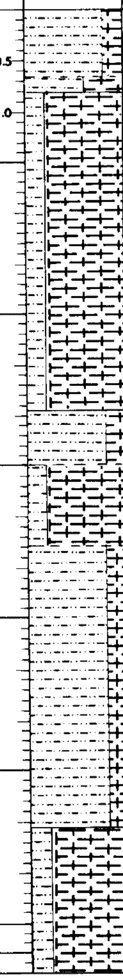
ORGANIC CARBON AND CARBONATE (%)

	2, 110–111	5, 110–111
Organic carbon	–	–
Carbonate	20	67

SITE 610 HOLE A CORE 2 CORED INTERVAL 9.0–18.6 m

Foraminifers: N22 *Globorotalia truncatulinoides* (AG)
Nannofossils: NN21 *Emiliania huxleyi* Zone; NN20 *Gephyrocapsa oceanica* Zone (AG)
Radiolarians: B
Diatoms: B

Sections: 1, 2, 3, 4, 5, 6, 7, CC (0.5, 1.0 m)



Colors: 5Y 5/2; 5GY 6/1, 2.5Y 6/2 to 6/4, 5Y 7/2; 5Y 7/2 to N7/1; N7/1 to N6/1; N7/1; 5Y 5/2; N7/1; 2.5Y 6/2; 2.5Y 5/2; N5 to 2.5Y 5/2; N2/1; 2.5Y 5/2; 5Y 5/3; 2.5Y 6/2; N7/1; N7/1 to 5Y 6/1; N7/1, 5Y 7/1 to 6/1

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive gray and brown to very light gray. Gradational boundaries and mottling. Pumice pebbles at 6.90 m. Gneiss gravel dropstone at 7.43 m. Occasional bioturbated laminae of light gray green and gray.

Very deformed to moderately deformed above 6.00 m.

SMEAR SLIDE SUMMARY (%)

	5, 66	6, 98
	D	D
Composition:		
Quartz	63	3
Feldspar	1	1
Heavy minerals	3	TR
Clay	10	7
Volcanic glass	4	2
Carbonate unspec.	12	2
Foraminifers	3	12
Calc. nannofossils	4	72

ORGANIC CARBON AND CARBONATE (%)

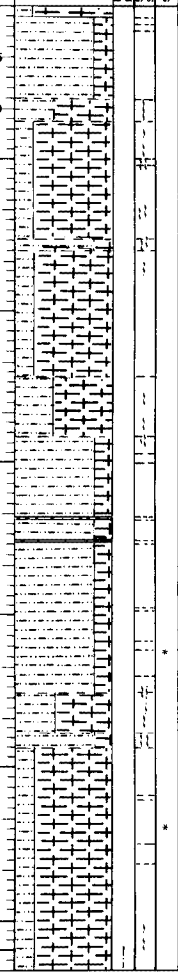
	5, 70–71	6, 83–84
Organic carbon	–	–
Carbonate	26	67

SITE 610 HOLE A CORE 3 CORED INTERVAL 18.6–28.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* — AG
Nannofossils: NN20 *Gephyrocapsa oceanica* Zone; NN19 *Pseudoemiliania lacunosa* Zone — AG
Radiolarians: B — B
Diatoms: *Nitzschia reinholdii* Zone — AM

Sections: 1, 2, 3, 4, 5, 6, 7, CC
Meters: 0.5, 1.0



Colors: 5Y 7/1, 5Y 5/1, 5Y 5/2; 5Y 5/2; 2.5Y 6/2; 2.5Y 7/2; 2.5Y 6/2; N7/1; 2.5Y 6/2; N7/1 to N8/1; 5Y 7/2; 2.5Y 6/2; 2.5Y 5/2; 5Y 5/2; 5Y 4/2, 5Y 5/2, N4/1; 5Y 5/2; N4/1, 5Y 5/2 to 2.5Y 6/2, 5Y 5/2; 2.5Y 6/2; 2.5Y 5/2; 2.5Y 4/2; N7/1 to N8/1; 5Y 5/2; N8/1 to N9/1; 10YR 8/1; N8/1; 5Y 8/2; N8/1

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE (becoming NANNOFOSSIL OOZE below 7.30 m). Gradational boundaries with much mottling. Olive gray and brown to white and light gray. Gravel dropstones of basalt and tuff. Dark gray layer rich in volcanic ash at 6.27 to 6.35 m. Sharpbased volcanic ash beds at 5.04 to 5.06 and 5.28 to 5.30 m. *Zoophycos* and open burrows common.

SMEAR SLIDE SUMMARY (%)

	5, 30	6, 55
	M	
Composition:		
Quartz	60	TR
Feldspar	–	TR
Heavy minerals	3	–
Clay	15	2
Volcanic glass	9	TR
Micronodules	1	–
Carbonate unspec.	5	1
Foraminifers	3	8
Calc. nannofossils	4	89

ORGANIC CARBON AND CARBONATE (%)

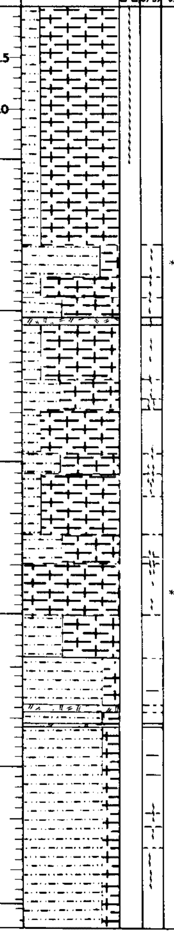
	3, 80–81
Organic carbon	–
Carbonate	72

SITE 610 HOLE A CORE 4 CORED INTERVAL 28.2–37.8 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* — AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone — AG
Radiolarians: B — B
Diatoms: B

Sections: 1, 2, 3, 4, 5, 6, CC
Meters: 0.5, 1.0



Colors: N7/1 to N8/1; N6/1 to N7/1; N8/1; N6/1, N4/1; N6/1 to N7/1; 10YR 7/2; 2.5Y 6/2; N8/1 to 2.5Y 7/2; 5Y 6/1; 5Y 7/2; 5GY 7/1 to 2.5Y 6/2; N7/1; 5GY 7/1; 2.5Y 7/2; 2.5Y 6/2; 2.5Y 5/2; 5BG 4/1; N4/1; 2.5Y 5/2; N5/1; 2.5Y 5/2 to 5Y 6/1; 5Y 5/2; 5GY 5/1; 5Y 5/2; 2.5Y 6/2; 5Y 5/1 to 5Y 4/1

Interbedded CALCAREOUS MUD and NANNOFOSSIL OOZE with interval of NANNOFOSSIL FORAMINIFERAL OOZE at 5.48 to 6.00 m, olive gray and brown to very light gray. Burrow mottled with gray green and gray bioturbated laminae. Ashy intervals with sharp bases at 3.07 to 3.12, 6.88 to 6.94, and 7.04 to 7.06 m. Rare *Zoophycos*.

SMEAR SLIDE SUMMARY (%)

	2, 100	4, 125
	D	–
Composition:		
Quartz	55	–
Feldspar	1	TR
Mica	–	TR
Heavy minerals	3	TR
Clay	15	2
Volcanic glass	4	TR
Carbonate unspec.	5	3
Foraminifers	3	40
Calc. nannofossils	14	55
Sponge spicules	TR	TR

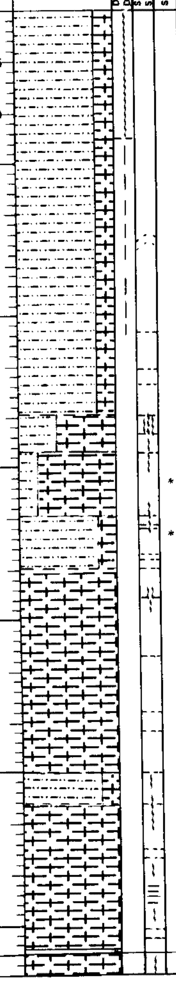
ORGANIC CARBON AND CARBONATE (%)

	2, 100–101
Organic carbon	–
Carbonate	14

SITE 610 HOLE A CORE 5 CORED INTERVAL 37.8–47.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone			1–7, CC	0.5, 1.0
		AG	AG	B	B		

GRAPHIC LITHOLOGY



Colors (top to bottom): N8/1 to 5Y 4/2 and N3/1; 2.5Y 6/2 to N6/1; 5G 6/2; N6/1; 5Y 6/1; 5Y 5/1; 5Y 6/1; 2.5Y 7/2; 5Y 7/1; N8/1; 5Y 5/2; 5GY 5/1; 10YR 6/2; 5BG 5/1; 2.5Y 6/2; 2.5Y 7/2; 10YR 8/1 to N8/1; 5G 7/2; 10YR 8/1; 10YR 7/2; 10YR 8/1 to 10YR 7/1; 10YR 7/1 to 10YR 6/2; N8/1; 10YR 6/2; N8/1 to N6/1; 10YR 7/1; 5Y 5/2; Void; 5Y 5/2

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive gray and brown to very light gray. Mottled with burrows. Gray green laminae common.

Highly to slightly disturbed 0.00 to 3.00 m.

SMEAR SLIDE SUMMARY (%)

	4, 14	4, 65
	D	D
Composition:		
Quartz	TR	59
Feldspar	TR	2
Heavy minerals	–	5
Clay	1	15
Volcanic glass	1	4
Carbonate unspec.	1	11
Foraminifers	28	2
Calc. nannofossils	69	2

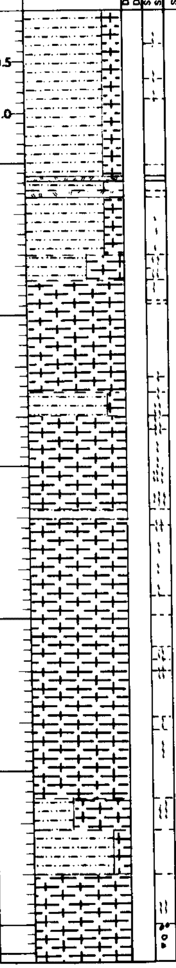
ORGANIC CARBON AND CARBONATE (%)

	4, 14–15
Organic carbon	–
Carbonate	81

SITE 610 HOLE A CORE 6 CORED INTERVAL 47.4–57.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone	RM	*Nitzschia reinholdii* Zone	1–7, CC	0.5, 1.0
		AG	AG	FG	CM		

GRAPHIC LITHOLOGY



Colors (top to bottom): 10YR 5/2; 5GY 7/1; 10YR 6/2; 5Y 6/1; 5Y 5/1; N4/1; 5Y 5/1; 5BG 4/1; 10YR 6/2; 10YR 7/1; 5Y 7/1; N8/1; 5B 7/1; N8/1; 5Y 7/2; 5Y 5/1; 5Y 6/1; 5Y 7/1; 5G 5/1; 5Y 7/1; 5G 5/1; 5Y 6/1; 5Y 7/1; 5Y 5/1; 5Y 7/1; 5Y 5/1; 5GY 7/1; 5Y 7/1 to 10YR 7/1; 5Y 6/1; 10YR 6/2; N7/1–8/1

LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light brown gray. Mottled and burrowed. Some sandy mud intervals and dropstones. Rare *Zoophycos*. Volcanic ash intervals with sharp bases at 1.63 to 1.65 and 1.77 to 1.85 m.

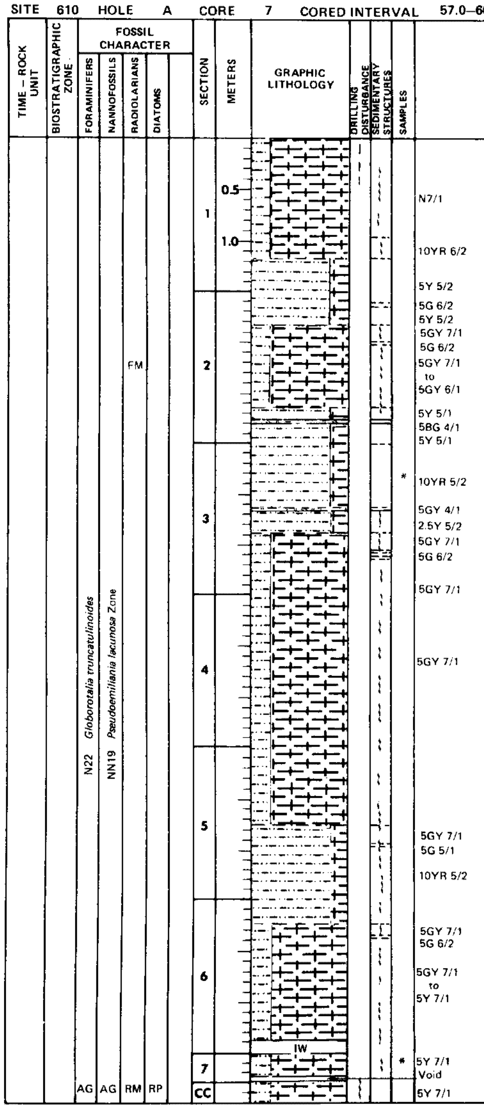
SMEAR SLIDE SUMMARY (%)

	2, 65	3, 30	4, 52
	D	D	M
Texture:			
Sand	–	–	15
Silt	–	–	50
Clay	–	–	35
Composition:			
Quartz	59	–	54
Feldspar	1	TR	1
Mica	TR	–	TR
Heavy minerals	–	TR	5
Clay	15	5	30
Volcanic glass	4	1	5
Micronodules	TR	–	–
Carbonate unspec.	14	TR	3
Foraminifers	3	10	1
Calc. nannofossils	4	84	1
Sponge spicules	TR	TR	–

ORGANIC CARBON AND CARBONATE (%)

	4, 51–52
Organic carbon	–
Carbonate	1

SITE 610 HOLE A CORE 7 CORED INTERVAL 57.0–66.6 m



LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD. Very light gray to light brown gray. Some sandy mud intervals. Ash rich layers at 2.78 to 2.80 m and 3.62 to 3.65 m. Mottled. Occasional light gray green laminae. *Zoophycos* common.

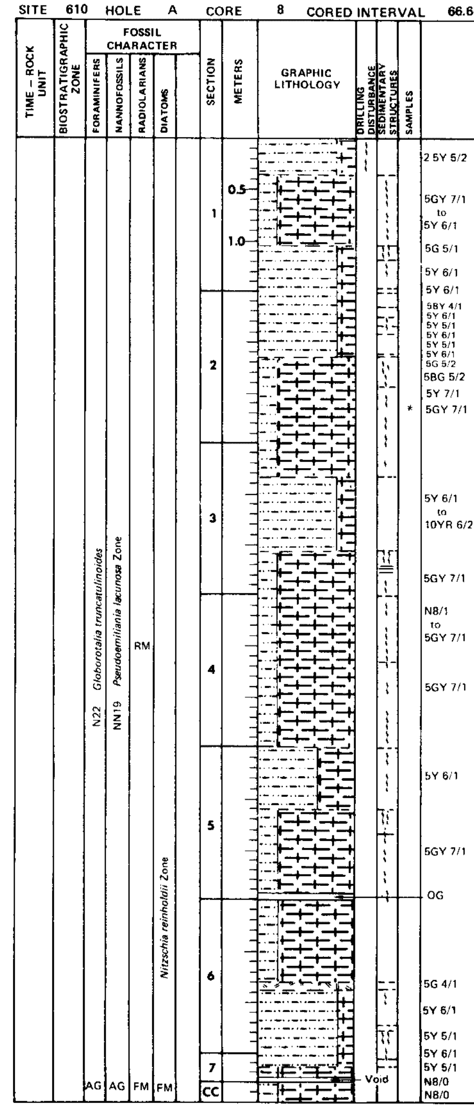
SMEAR SLIDE SUMMARY (%)

	3, 30	7, 5
	D	D
Texture:		
Sand	12	–
Silt	20	–
Clay	68	–
Composition:		
Quartz	50	–
Feldspar	1	TR
Heavy minerals	4	TR
Clay	20	15
Volcanic glass	2	1
Carbonate unspec.	6	–
Foraminifers	9	11
Calc. nannofossils	8	73
Sponge spicules	TR	TR

ORGANIC CARBON AND CARBONATE (%)

	3, 120–121
Organic carbon	–
Carbonate	69

SITE 610 HOLE A CORE 8 CORED INTERVAL 66.6–76.2 m



LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD. Very light gray to light gray brown. Mottled. Pyrite halos common in ooze layers. Ashy interval at 8.30 to 8.37 m. Sharpbased.

SMEAR SLIDE SUMMARY (%)

	2, 120
	D
Composition:	
Feldspar	1
Heavy minerals	TR
Clay	5
Foraminifers	12
Calc. nannofossils	80
Diatoms	1
Radiolarians	TR
Sponge spicules	1

ORGANIC CARBON AND CARBONATE (%)

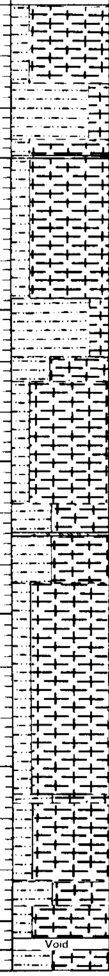
	2, 38–39
Organic carbon	-
Carbonate	3

SITE 610 HOLE A CORE 9 CORED INTERVAL 76.2–85.8 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides*; AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone; AG
Radiolarians: B, B, B

Sections: 1, 2, 3, 4, 5, 6, 7, CC (Meters: 0.5, 1.0)



Colors: N8/0, 2.5Y 5/2, 2.5Y 7/2, Void, 5G 7/2, 5G 7/2, N8/0, N8/0, 5G 7/2, N7/0, 5Y 5/1, 2.5Y 6/2, 5G 7/2, 2.5Y 6/2, 5Y 7/1, 5GY 7/1, 5G 7/2, 5GY 7/1, 5G 7/2, 5GY 7/1, 5Y 7/1, 5BG 4/1, 10YR 7/2, 2.5Y 7/2, N8/0, 5BG/1, N8/0, 5BG/1, 5GY 7/1 to 5Y 7/1, 5G 7/2, 5Y 6/1, 5Y 7/1, 5B 6/1, 5Y 7/1, 5B 5/1, 5Y 6/1, 5GY 7/1, 5Y 6/1, 5Y 7/1, 5Y 6/1

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE, MARLY NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light gray brown, mottled to homogeneous. Pyrite burrow casts. Volcanic ash-rich layer with sharp base at 5.19 to 5.22 m.

SMEAR SLIDE SUMMARY (%)

	3, 60	6, 58
	D	D
Composition:		
Quartz	30	16
Feldspar	1	–
Heavy minerals	TR	TR
Clay	10	–
Volcanic glass	TR	–
Carbonate unspec.	–	1
Foraminifers	16	11
Calc. nannofossils	43	72
Diatoms	–	TR
Sponge spicules	–	TR

ORGANIC CARBON AND CARBONATE (%)

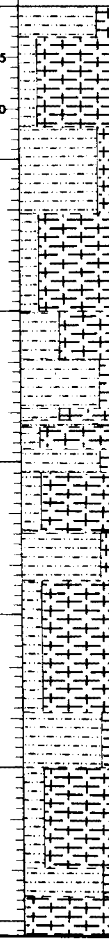
	5, 65–66
Organic carbon	–
Carbonate	75

SITE 610 HOLE A CORE 10 CORED INTERVAL 85.8–95.4 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Neogloboquadrina acostaensis*; AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone; AM
Radiolarians: B; FG
Diatoms: *Nitzschia reinholdii* Zone; CM

Sections: 1, 2, 3, 4, 5, 6, 7 (Meters: 0.5, 1.0)



Colors: 5GY 7/1, 5G 7/2, 5Y 7/1, 5G 6/1, 5Y 7/1, 5GY 7/1, 5GY 7/1, 5G 7/2, 5G 7/2, 5GY 7/1, 5B 6/1, 5GY 7/1, 5Y 7/1, 5BG 4/1, 2.5Y 6/2, 5Y 6/1, 5Y 7/1, 5Y 6/1, N8/0, 5G 6/1, 5Y 6/1, 5Y 7/1, 5G 5/1, 5Y 6/1, 5Y 5/1, 5GY 7/1, 5G 7/2, 5Y 7/1, 5G 5/1, 5BG 4/1, 5Y 6/1, 5BG 4/1, 5Y 6/1, 5Y 7/1 to 5GY 7/1, 5Y 6/1, 5GY 7/1, 5G 6/2, 5GY 7/1

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light gray brown, mottled to homogeneous. Pyrite patches in oozes. Gray green layers common. Volcanic ash-rich layers with gradational bases at 3.50 to 3.67 m, 5.15 to 5.18 m, and 7.10 to 7.20 m.

SMEAR SLIDE SUMMARY (%)

	4, 140
	D
Composition:	
Clay	25
Carbonate unspec.	2
Foraminifers	10
Calc. nannofossils	60
Diatoms	2
Radiolarians	TR
Sponge spicules	1
Silicoflagellates	TR

ORGANIC CARBON AND CARBONATE (%)

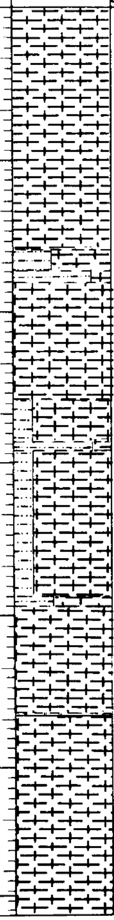
	4, 110–111
Organic carbon	–
Carbonate	3

SITE 610 HOLE A CORE 11 CORED INTERVAL 95.4–105.0 m

Columns: TIME – ROCK UNIT; BIOSTRATIGRAPHIC ZONE; FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS); SECTION; METERS; GRAPHIC LITHOLOGY; DRILLING DISTURBANCE; SEDIMENTARY STRUCTURES; SAMPLES; LITHOLOGIC DESCRIPTION

Foraminifers: *N. acostaensis*; PL6 *Globorotalia obliquus extremus*; AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone; NN18 *Discoaster brouweri* Zone; AM
Radiolarians: RM; RP
Diatoms: AG; *Nitzschia marina* Zone; B

Sections: 1, 2, 3, 4, 5, 6, CC. Meters: 0.5, 1.0



Colors (top to bottom): 5GY 6/1; N8/0; 5GY 6/1; 5G 6/2; 5YGY 6/1; 5G 6/2; 5Y 6/1; 5Y 5/1; N8/0; 5Y 7/1 to 5Y 6/1; 5Y 5/1; 5Y 7/1; 5GY 7/1; 5Y 5/1; 5Y 6/1; 5Y 7/1; N8/0; 5B 6/1; N8/0; 5Y 7/1 to 5GY 7/1; N7/0

LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light gray. Homogeneous with a few mottled intervals at gradational boundaries. Gray green laminae common. Volcanic ash-rich bed with sharp base at 6.95 to 6.97 m.

SMEAR SLIDE SUMMARY (%)

	3, 120	4, 65
	M	D
Composition:		
Feldspar	–	1
Heavy minerals	TR	TR
Clay	40	15
Volcanic glass	TR	–
Foraminifers	12	12
Calc. nannofossils	47	69
Diatoms	TR	2
Radiolarians	–	TR
Sponge spicules	1	1
Silicoflagellates	–	TR

ORGANIC CARBON AND CARBONATE (%)

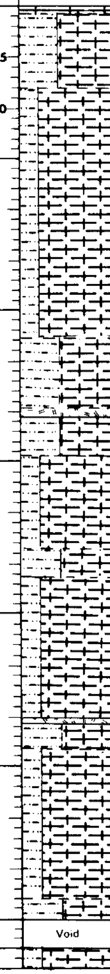
	3, 129–130
Organic carbon	–
Carbonate	22

SITE 610 HOLE A CORE 12 CORED INTERVAL 105.0–114.6 m

Columns: TIME – ROCK UNIT; BIOSTRATIGRAPHIC ZONE; FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS); SECTION; METERS; GRAPHIC LITHOLOGY; DRILLING DISTURBANCE; SEDIMENTARY STRUCTURES; SAMPLES; LITHOLOGIC DESCRIPTION

Foraminifers: PL6 *Globorotalia obliquus extremus*; AG
Nannofossils: NN18 *Discoaster brouweri* Zone; AG
Radiolarians: RP; RP
Diatoms: RP

Sections: 1, 2, 3, 4, 5, 6, 7, CC. Meters: 0.5, 1.0



Colors (top to bottom): 5Y 5/1; N8/0; 10YR 6/1; 5Y 6/1; 5Y 7/1; N8/0; 5Y 7/1; N8/0; 5Y 7/1 to 5Y 5/1; 5Y 7/1; N8/0; 5Y 7/1; 5Y 6/1; 5Y 5/1; 10YR 5/2; 5Y 4/1; 5Y 7/1; 5Y 6/1; 10YR 6/2; 10YR 5/2; N8/0; 5Y 6/1; N8/0; 5Y 7/1; 5Y 8/1; 5Y 7/1; 5GY 4/1; 5Y 6/1; 5Y 5/1; 5Y 7/1; 5Y 8/1; 5Y 7/1; 5Y 6/1; 5Y 8/1

LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL OOZE with marly intervals and volcanic ash layers with sharp bases at 4.03 to 4.05 m and 7.02 to 7.06 m. Slightly mottled to homogeneous, with extensive pyrite mottles.

SMEAR SLIDE SUMMARY (%)

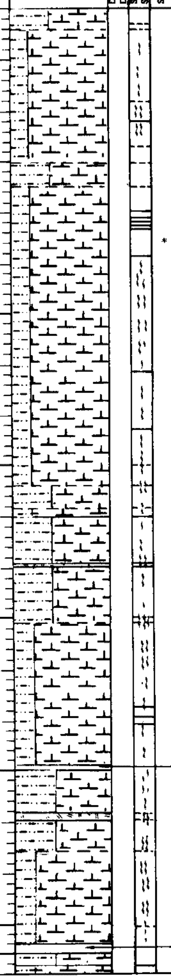
	1, 40	1, 115	3, 104
	D	D	M
Texture:			
Sand	–	–	5
Silt	–	–	55
Clay	–	–	40
Composition:			
Quartz	30	25	35
Feldspar	–	–	5
Mica	TR	–	10
Heavy minerals	TR	TR	2
Clay	5	–	25
Volcanic glass	3	–	20
Glauconite	–	–	TR
Carbonate unspec.	10	10	–
Foraminifers	2	3	TR
Calc. nannofossils	50	62	6

ORGANIC CARBON AND CARBONATE (%)

	1, 37–38
Organic carbon	–
Carbonate	44

SITE 610 HOLE A CORE 13 CORED INTERVAL 114.6–124.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL3–5 undifferentiated	NN18 *Discoaster brouweri* Zone	CG	*Nitzschia marina* Zone; AG	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0				*	5Y 6/1, 5Y 5/1, N8/0, 5Y 8/1, 5Y 7/1, 5Y 6/1, N8/0 to 5Y 8/1, 5Y 7/1, 5Y 6/1, N8/0, 5Y 6/1, 5Y 5/1, N8/0, OG, 5Y 6/2, 5Y 2/1, 5Y 5/2, N8/0, 5Y 8/1, Void, 5Y 6/1, 5Y 7/1
		AG	AG	RP	RP							



SILICEOUS NANNOFOSSIL OOZE with marly intervals, very light gray to light gray. Mottled with olive gray and gray mottles. Volcanic ash lamina at 5.47 m; ash bed at 7.91 to 7.98 m.

SMEAR SLIDE SUMMARY (%)

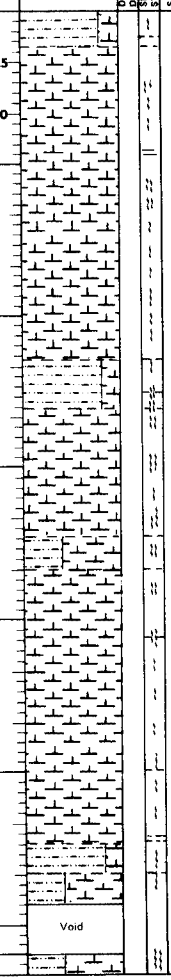
	2, 80 D	4, 88
Composition:		
Quartz	–	20
Feldspar	–	2
Mica	–	TR
Heavy minerals	–	4
Clay	10	–
Volcanic glass	–	5
Glauconite	–	TR
Carbonate unspec.	10	15
Foraminifers	5	2
Calc. nannofossils	64	50
Diatoms	} 1	} 2
Radiolarians		
Sponge spicules	10	

ORGANIC CARBON AND CARBONATE (%)

	2, 80–82
Organic carbon	–
Carbonate	82

SITE 610 HOLE A CORE 14 CORED INTERVAL 124.2–133.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL3–5 undifferentiated	NN18 *Discoaster brouweri* Zone; NN17 *Discoaster pentaradiatus* Zone	AG	*Nitzschia marina* Zone	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0	Void			*, *, *	5Y 5/1, 5Y 6/1, N9/0, N9/0, 5Y 5/1, 5Y 6/1, 5Y 8/1, 5Y 8/1, 5Y 7/1, 5Y 8/1, N8/0 to N9/0, 5Y 7/1, 5GY 4/1, 5Y 6/1, 5Y 7/1, 5Y 7/1
		AG	AG	RM	CM							



Interbedded NANNOFOSSIL OOZE and CALCAREOUS MUD with marly and siliceous intervals. Mottled with gray (pyrite) and gray-green. *Zoophycos* common.

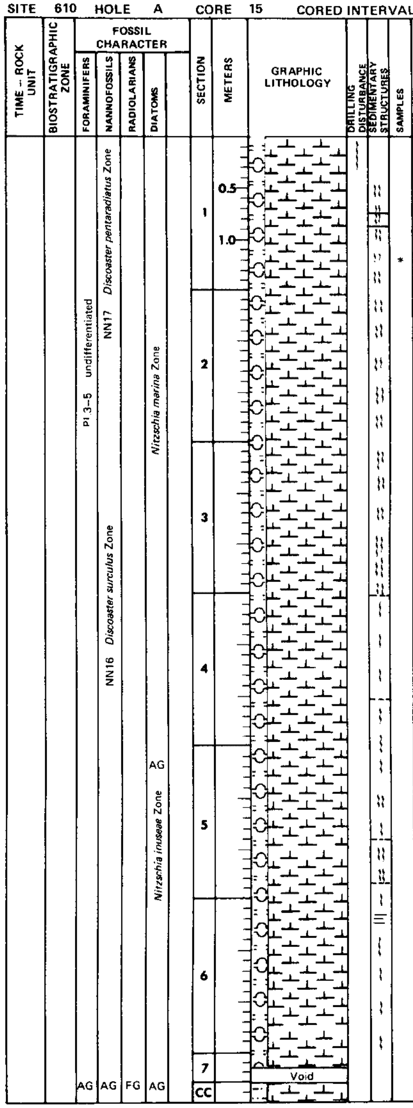
SMEAR SLIDE SUMMARY (%)

	3, 70 M	4, 70 D	6, 66 M
Texture:			
Sand	3	–	–
Silt	32	–	–
Clay	65	–	–
Composition:			
Quartz	25	10	15
Feldspar	–	–	2
Mica	2	TR	–
Heavy minerals	–	–	2
Clay	10	–	–
Volcanic glass	3	–	1
Glauconite	TR	–	TR
Carbonate unspec.	10	7	25
Foraminifers	2	3	TR
Calc. nannofossils	40	70	57
Diatoms	TR	1	–
Radiolarians	1	2	–
Sponge spicules	7	7	–
Silicoflagellates	–	TR	–
?Dolomite	–	TR	–
Acicular crystals	–	–	2

ORGANIC CARBON AND CARBONATE (%)

	4, 70–71
Organic carbon	–
Carbonate	66

SITE 610 HOLE A CORE 15 CORED INTERVAL 133.8–143.4 m



LITHOLOGIC DESCRIPTION

SILICEOUS NANNOFOSSIL OOZE, very light gray with darker gray and green gray mottles. Pale green gray laminae and pyrite patches.

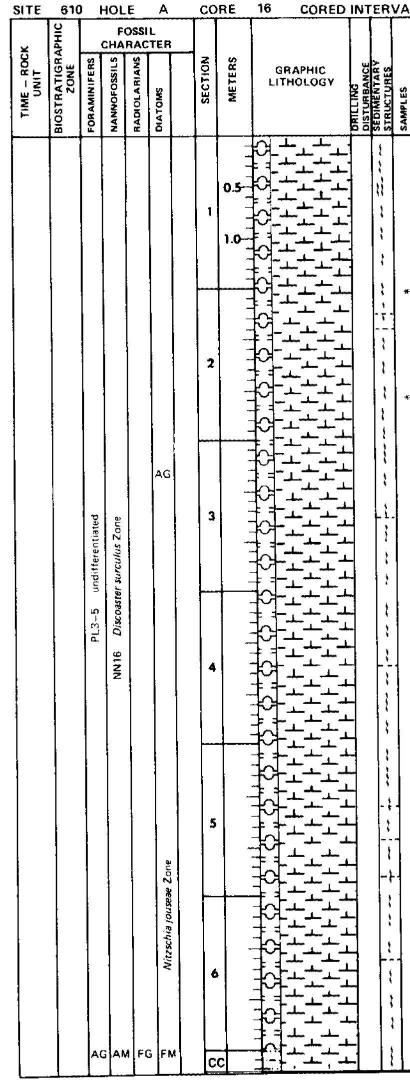
SMEAR SLIDE SUMMARY (%)

	1, 120	4, 21
	D	–
Composition:		
Quartz	5	5
Volcanic glass	–	TR
Carbonate unspec.	2	2
Foraminifers	10	2
Calc. nannofossils	67	77
Diatoms	1	1
Radiolarians	–	TR
Sponge spicules	15	12
Silicoflagellates	TR	1

ORGANIC CARBON AND CARBONATE (%)

	1, 120–121
Organic carbon	–
Carbonate	86

SITE 610 HOLE A CORE 16 CORED INTERVAL 143.4–153.0 m



LITHOLOGIC DESCRIPTION

SILICEOUS NANNOFOSSIL OOZE, very light gray with darker gray and green gray mottles and/or diffuse laminae. Pyrite patches.

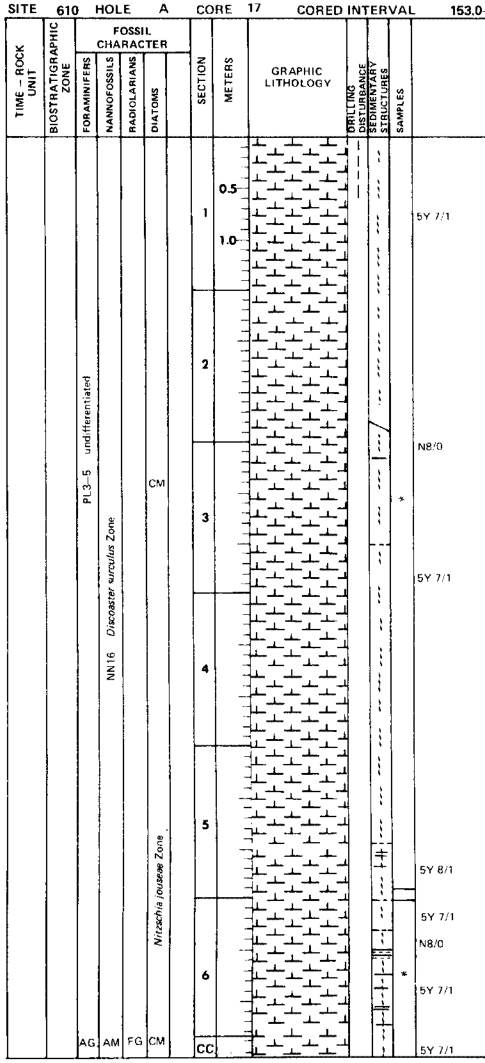
SMEAR SLIDE SUMMARY (%)

	2, 3	2, 106
	D	D
Composition:		
Quartz	10	–
Pyrite	2	–
Carbonate unspec.	3	TR
Foraminifers	7	8
Calc. nannofossils	68	82
Diatoms	2	2
Radiolarians	2	2
Sponge spicules	6	6

ORGANIC CARBON AND CARBONATE (%)

	2, 5–6
Organic carbon	–
Carbonate	66

SITE 610 HOLE A CORE 17 CORED INTERVAL 153.0–162.6 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, very light gray with darker gray and green gray mottles and/or diffuse laminae. Pyrite patches.

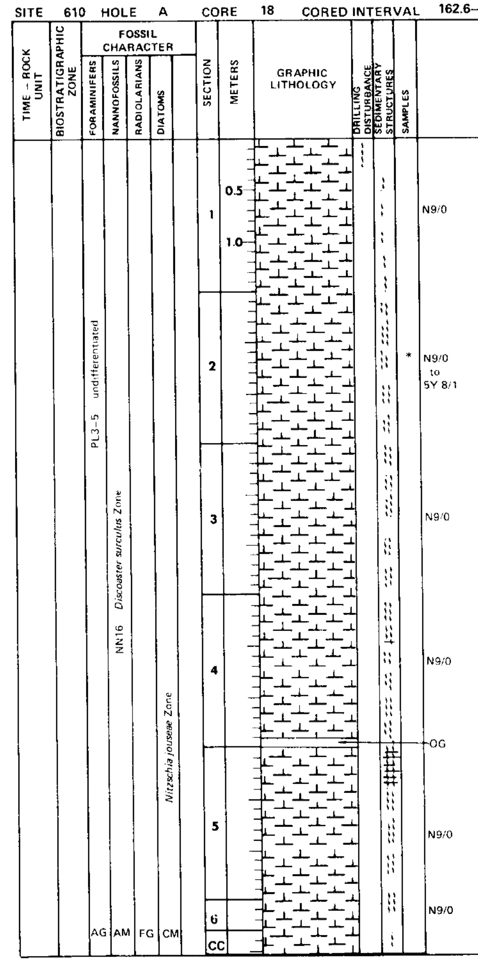
SMEAR SLIDE SUMMARY (%)

	3, 50	6, 70
	D	D
Composition:		
Quartz	10	5
Volcanic glass	–	TR
Carbonate unspec.	5	–
Foraminifers	8	3
Calc. nannofossils	71	80
Diatoms	1	TR
Radiolarians	2	TR
Sponge spicules	3	2

ORGANIC CARBON AND CARBONATE (%)

Section–Interval (cm)	3, 50–51
Organic carbon	–
Carbonate	87

SITE 610 HOLE A CORE 18 CORED INTERVAL 162.6–172.2 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white to very light gray. Mottled with gray and pale gray green. Gray green diffuse laminae common.

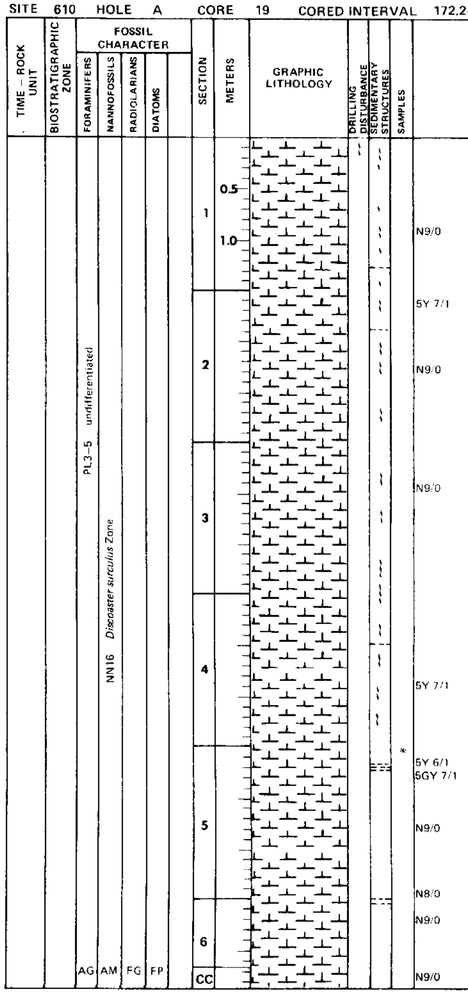
SMEAR SLIDE SUMMARY (%)

	2, 65
	D
Composition:	
Quartz	2
Carbonate unspec.	5
Foraminifers	5
Calc. nannofossils	87
Diatoms	1
Radiolarians	TR
Sponge spicules	TR

ORGANIC CARBON AND CARBONATE (%)

Section–Interval (cm)	2, 65–66
Organic carbon	–
Carbonate	93

SITE 610 HOLE A CORE 19 CORED INTERVAL 172.2–181.8 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white to very light gray. Mottled with gray pyrite and light green gray. Occasional green gray laminae.

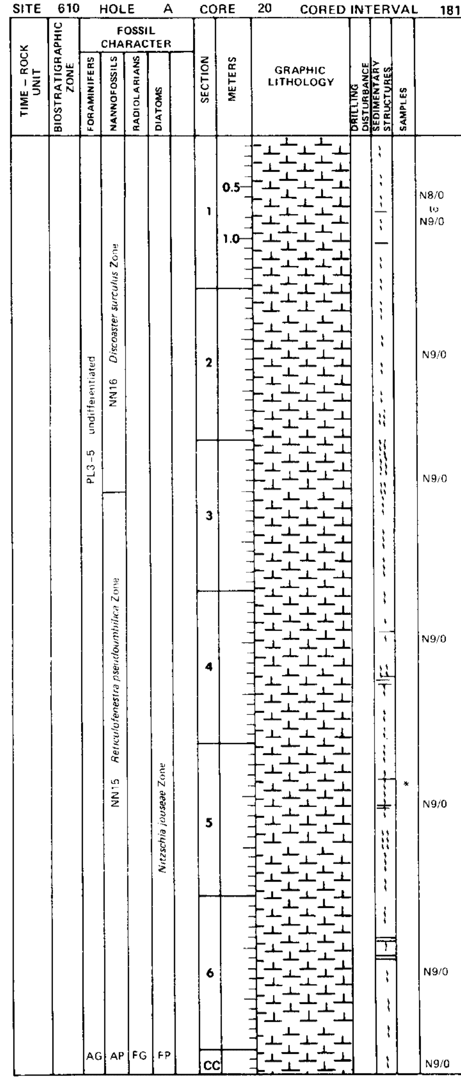
SMEAR SLIDE SUMMARY (%)

	5, 8
	D
Composition:	
Quartz	10
Carbonate unspec.	3
Foraminifers	2
Calc. nannofossils	83
Diatoms	1
Radiolarians	TR
Sponge spicules	1
Silicoflagellates	TR

ORGANIC CARBON AND CARBONATE (%)

Section-Interval (cm)	5, 7–8
Organic carbon	–
Carbonate	85

SITE 610 HOLE A CORE 20 CORED INTERVAL 181.8–191.4 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, mottled with pyrite, white to gray. Common diffuse green laminations.

SMEAR SLIDE SUMMARY (%)

	5, 40
	D
Composition:	
Quartz	10
Carbonate unspec.	5
Foraminifers	5
Calc. nannofossils	79
Diatoms	1
Radiolarians	1
Sponge spicules	1

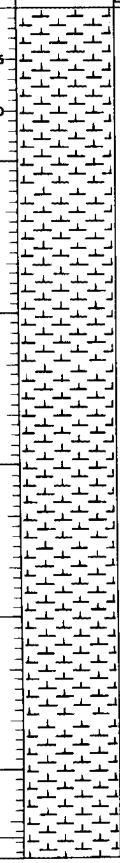
ORGANIC CARBON AND CARBONATE (%)

Section-Interval (cm)	5, 40–41
Organic carbon	–
Carbonate	93

SITE 610 HOLE A CORE 21 CORED INTERVAL 191.4–201.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	SAMPLES	
		PL2 *Globorotalia margaritae*	NN15 *Reticulofenestra pseudoumbilica* Zone		CM / *Nitzschia jouseae* Zone	1	0.5, 1.0		N9/0
						2			N9/0
						3		*	N9/0
						4			5Y 7/1, N9/0
						5			N9/0
						6			N9/0 to 5GY 8/1
		AG	AP	FG	FP	CC			N8/0 to N9/0

GRAPHIC LITHOLOGY



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white to gray, with pyrite mottles and pale green gray diffuse laminae.

SMEAR SLIDE SUMMARY (%)

	3, 70
	D
Composition:	
Quartz	10
Carbonate unspec.	3
Foraminifers	5
Calc. nannofossils	80
Sponge spicules	2

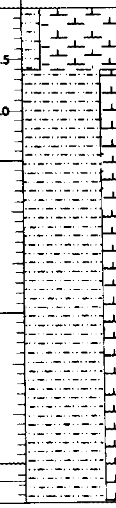
ORGANIC CARBON AND CARBONATE (%)

	3, 70–71
Organic carbon	–
Carbonate	92

SITE 610 HOLE B CORE 1 CORED INTERVAL 0.0–4.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	SAMPLES	
		N22 *Globorotalia truncatulinoides*	NN21 *Emiliania huxleyi* Zone			1	0.5, 1.0	*, *	10YR 6/4, 5Y 5/2
						2		*	5Y 5/2
						3			5Y 5/3
						4			
		AG	AG		FP	CC			

GRAPHIC LITHOLOGY



LITHOLOGIC DESCRIPTION

CALCAREOUS MUD with thin interval of NANNOFOSSIL OOZE (0.00 to 0.60 m). Olive gray and yellow brown. Mottled. Common open burrows and diffuse gray green laminae. Occasional dropstones. Volcanic ash-rich interval at 1.57 to 1.85 m.

SMEAR SLIDE SUMMARY (%)

	1, 40	1, 105	2, 25
	D	D	M
Composition:			
Quartz	5	20	5
Feldspar	5	5	5
Heavy minerals	2	–	TR
Clay	–	–	30
Volcanic glass	5	3	25
Carbonate unspec.	20	15	25
Foraminifers	2	5	–
Calc. nannofossils	60	48	10
Sponge spicules	TR	–	–
Organic matter	1	2	–

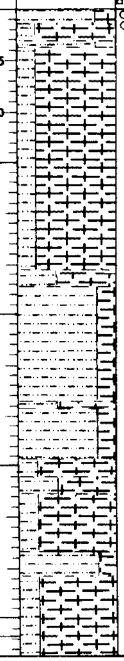
SITE 610 HOLE B CORE 2 CORED INTERVAL 4.8–14.4 m

Biostratigraphic zone: Foraminifers: N22 *Globorotalia truncatulinoides*; Nannofossils: NN21 *Emiliania huxleyi* Zone

Fossil character (CC): Foraminifers AG; Nannofossils AG; Diatoms B

Sections: 1, 2, 3, 4, 5, CC (Meters: 0.5, 1.0)

Graphic lithology:



Colors (top to bottom): 2.5Y 5/2; N8/0; 10YR 5/2; N8/0; 5Y 7/1 to 2.5Y 7/1; 5Y 7/1; 2.5Y 7/1; 2.5Y 5/2; 2.5Y 6/2; 5Y 6/1; 10YR 7/1; 10YR 6/2; 5Y 7/1; 5Y 5/1; 5Y 6/1 to 5Y 7/1; 5Y 7/1

LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to olive gray and brown. Homogeneous to mottled with burrows and pyrite halos. Occasional green gray diffuse lamine. Abundant dropstones.

SMEAR SLIDE SUMMARY (%)

	2, 100	3, 35
	D	D
Composition:		
Quartz	–	54
Feldspar	TR	1
Heavy minerals	TR	5
Clay	3	20
Volcanic glass	TR	2
Carbonate unspec.	1	12
Foraminifers	13	3
Calc. nannofossils	83	3
Diatoms	TR	–
Radiolarians	TR	–
Sponge spicules	TR	–
Silicoflagellates	TR	–

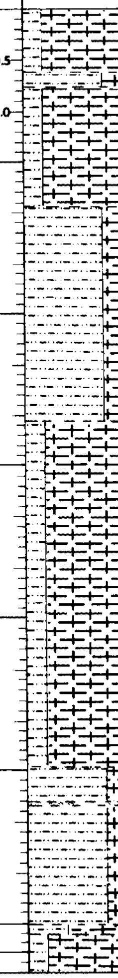
SITE 610 HOLE B CORE 3 CORED INTERVAL 14.4–24.0 m

Biostratigraphic zone: Foraminifers: N22 *Globorotalia truncatulinoides*; Nannofossils: NN20 *Gephyrocapsa oceanica* Zone

Fossil character (CC): Foraminifers AG; Nannofossils AG; Diatoms FP

Sections: 1, 2, 3, 4, 5, 6, 7, CC (Meters: 0.5, 1.0)

Graphic lithology:



Colors (top to bottom): 5Y 7/1; 2.5Y 5/2; 5Y 7/1; 5Y 5/1; 10YR 6/2; 5Y 7/1; 5GY 7/1; 5Y 6/1 to 5Y 7/1; 5Y 7/1; 5GY 7/1; 5Y 6/1; 5GY 7/1; 5Y 6/1; 5Y 7/1; 5Y 5/1; N4/0; 5Y 5/2; 10YR 6/2; 5Y 7/1

LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to olive gray and brown. Mottled. Pyrite halos. *Zoophycos* rare. Volcanic ash-rich layer at 7.80 m.

Very deformed bedding 0.00 to 3.80 m, inclined bedding at 5.00 to 7.50 m.

SMEAR SLIDE SUMMARY (%)

	3, 95	5, 85
	D	D
Composition:		
Quartz	58	–
Feldspar	1	–
Clay	25	4
Carbonate unspec.	10	1
Foraminifers	5	12
Calc. nannofossils	1	83
Radiolarians	–	TR
Sponge spicules	–	TR

SITE 610 HOLE B CORE 4 CORED INTERVAL 24.0–33.6 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

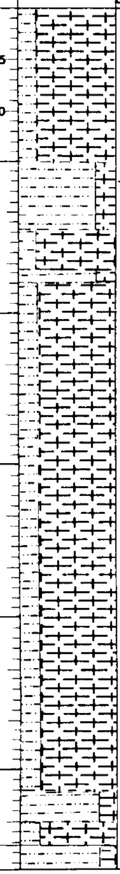
Foraminifers: N22 *Globorotalia truncatulinoides*; AG

Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone; AG

Diatoms: RP

Sections: 1, 2, 3, 4, 5, 6, CC

Meters: 0.5, 1.0



Colors: N7/0; 5Y 6/1; 5Y 5/1; 5Y 6/1; N8/0 to 5Y 7/1; 5Y 7/1; N8/0 to 10YR 7/1; N8/0; N8/0 to 5GY 7/1; 5Y 7/1; N8/0 to 5Y 7/1; 5Y 7/1; 5Y 6/1; 5GY 7/1; 5Y 6/1

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light olive gray and light brown. Mottled. Occasional gray green laminae.

SMEAR SLIDE SUMMARY (%)

	2, 112	2, 140
	D	D
Composition:		
Quartz	63	–
Feldspar	1	TR
Heavy minerals	3	TR
Clay	15	TR
Volcanic glass	4	TR
Carbonate unspec.	3	1
Foraminifers	3	10
Calc. nannofossils	8	89
Sponge spicules	TR	–

SITE 610 HOLE B CORE 5 CORED INTERVAL 33.6–43.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

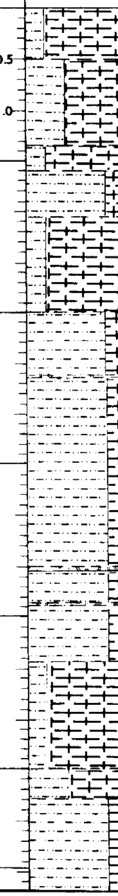
Foraminifers: N22 *Globorotalia truncatulinoides*; AG

Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone; AG

Diatoms: B

Sections: 1, 2, 3, 4, 5, 6, CC

Meters: 0.5, 1.0



Colors: N8/0; 5Y 7/1 to 5GY 7/1; 5Y 7/1; 10YR 6/2; 5GY 7/1; 5Y 6/1; 5BG 4/1, 5Y 6/1, 5G 6/1; 5Y 5/1; 5G 5/1; 5Y 6/1 to 5Y 5/1; 5G 4/1; 5Y 5/1; 5Y 4/1; N8/0 to 5GY 7/1; 5Y 7/1 to 5Y 6/1; 5Y 5/1; 5Y 5/1

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light olive gray and light brown. Mottled. Volcanic ash-rich layers at 3.60 to 3.62 m, 5.49 to 5.53 m, and 5.85 to 5.87 m.

Highly disturbed by coring 0.0 to 3.0 m.

Inclined bedding at 6.80 to 7.10 m.

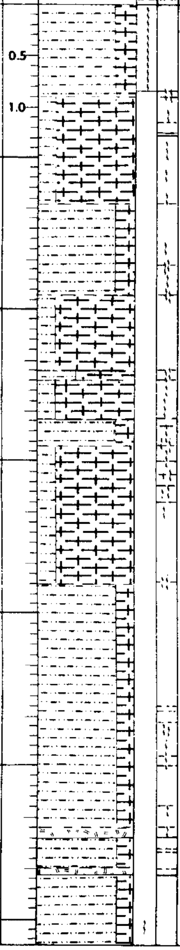
SMEAR SLIDE SUMMARY (%)

	3, 105	5, 85
	D	D
Texture:		
Sand	10	–
Silt	25	–
Clay	65	–
Composition:		
Quartz	42	–
Feldspar	1	TR
Heavy minerals	4	TR
Clay	20	1
Volcanic glass	4	TR
Carbonate unspec.	8	–
Foraminifers	9	10
Calc. nannofossils	12	89
Sponge spicules	–	TR

SITE 610 HOLE B CORE 6 CORED INTERVAL 43.2–52.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone			1–6
		AG	CG		B	CC

GRAPHIC LITHOLOGY



Colors (top to bottom): 5Y 7/1 to 5Y 4/1; 5Y 6/1; 5Y 7/1; N8/0 to 5Y 7/1; 5Y 5/1 to 5Y 6/1; 5Y 5/1; N8/0; 5Y 6/1; 5Y 7/1 to N8/0; 2.5Y 5/2; N8/0; 5Y 7/1; N8/0; 5Y 7/1; N8/0 to 5Y 7/1; 2.5Y 5/2 to 5Y 5/3; 5G 5/1; 2.5Y 5/2; 5GY 6/1; 2.5Y 6/2; 2.5Y 5/2; 5GY 6/1; 5Y 5/1; 5G 4/1; 2.5Y 4/2; 5G 4/1; 2.5Y 4/2; 2.5Y 5/2

LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light olive gray and light brown. Mottled. Occasional dropstones and gray green laminae. Rare *Zoophycos*. Volcanic ash layers with sharpbases at 8.13 to 8.20 m and 8.50 to 8.57 m. Coring disturbance 0.00 to 0.85 m.

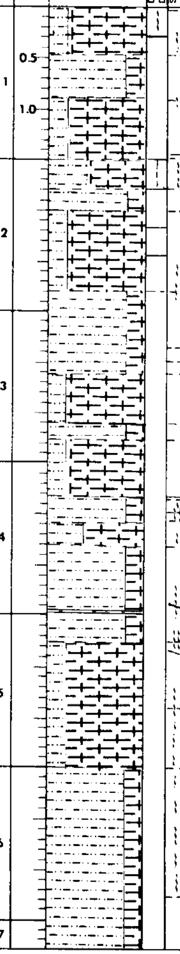
SMEAR SLIDE SUMMARY (%)

	1, 125	5, 30
	D	D
Composition:		
Quartz	–	58
Feldspar	TR	–
Heavy minerals	–	3
Clay	TR	18
Volcanic glass	TR	2
Carbonate unspec.	1	8
Foraminifers	11	4
Calc. nannofossils	88	7
Diatoms	TR	–
Sponge spicules	TR	–

SITE 610 HOLE B CORE 7 CORED INTERVAL 52.8–62.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone			1–6
		AG	CG		B	7

GRAPHIC LITHOLOGY



Colors (top to bottom): 2.5Y 5/2; N8/0 to N7/0; 5Y 6/1 to 5Y 5/1; 5GY 7/1 to 5Y 7/1; 5Y 7/1 to 5Y 6/1; 5G 5/1; 5Y 7/1 to 5GY 6/1; 5GY 5/1 to 5Y 5/1; 5Y 6/1; 5Y 5/1; 5Y 7/1; 5Y 5/1; 5GY 7/1; 5Y 6/1; 5GY 6/1; 5GY 5/1; 5GY 6/1; 2.5Y 6/2; 5GY 7/1 to N8/0; 5GY 7/1; 5Y 5/1

LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light olive gray and light brown. Mottled. Rare *Zoophycos*. Volcanic ash-rich bed at 5.90 m. Inclined laminae at 5.90 and 6.35 m.

SMEAR SLIDE SUMMARY (%)

	5, 5	5, 60
	D	D
Texture:		
Sand	15	–
Silt	25	–
Clay	60	–
Composition:		
Quartz	48	–
Feldspar	1	TR
Heavy minerals	3	–
Clay	25	TR
Volcanic glass	3	TR
Carbonate unspec.	6	–
Foraminifers	10	15
Calc. nannofossils	4	84
Diatoms	–	1
Radiolarians	–	TR
Sponge spicules	TR	TR
Silicoflagellates	–	TR

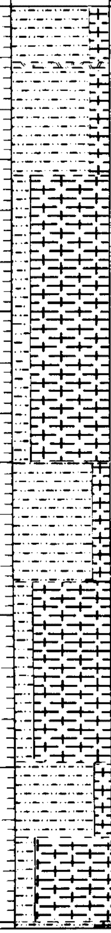
Note: Section 7 is 37 cm long.

SITE 610 HOLE B CORE 8 CORED INTERVAL 62.4–72.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS
		N22 *Globorotalia truncatulinoides* AG	NN19 *Pseudoemiliania lacunosa* Zone AG		FP

Sections: 1, 2, 3, 4, 5, 6, 7 (meters: 0.5, 1.0)

GRAPHIC LITHOLOGY



Colors (top to bottom): 5GY 5/1; 5G 4/1; 5Y 5/1 to 2.5Y 5/2; 5GY 7/1; 5GY 7/1; 2.5Y 5/2; 5GY 6/1; 2.5Y 5/2; 2.5Y 6/2; 5GY 7/1; 5Y 7/1; 2.5Y 5/2; 2.5Y 6/2; 5GY 7/1; 5G 7/2; 5GY 7/1; 5Y 6/1

LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light olive gray and light brown. Mottled. Rare *Zoophycos*. Volcanic ash-rich layer at 0.53 to 0.58 m. Foraminiferal sand at 1.74 to 1.76 m.

SMEAR SLIDE SUMMARY (%)

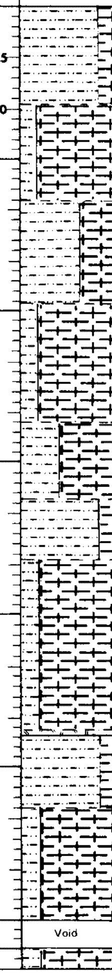
	2, 25	5, 70
	M	D
Composition:		
Quartz	4	–
Heavy minerals	2	1
Clay	5	4
Volcanic glass	3	TR
Pyrite	10	2
Carbonate unspec.	3	–
Foraminifers	56	11
Calc. nannofossils	15	79
Diatoms	–	2
Radiolarians	TR	TR
Sponge spicules	2	1

SITE 610 HOLE B CORE 9 CORED INTERVAL 72.0–81.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS
		N22 *Globorotalia truncatulinoides* AG	NN19 *Pseudoemiliania lacunosa* Zone AG		*Nitzschia reinholdii* Zone AG

Sections: 1, 2, 3, 4, 5, 6, 7, CC (meters: 0.5, 1.0)

GRAPHIC LITHOLOGY



Colors (top to bottom): 5Y 5/1 to 5Y 7/1; 5Y 7/1; 5GY 7/1; N8/0 to 5GY 7/1; 5GY 6/1; 5Y 5/1; 5Y 6/1; 5GY 7/1; 2.5Y 5/2; 2.5Y 6/2; N8/0 to 5GY 7/1; N8/0

LITHOLOGIC DESCRIPTION

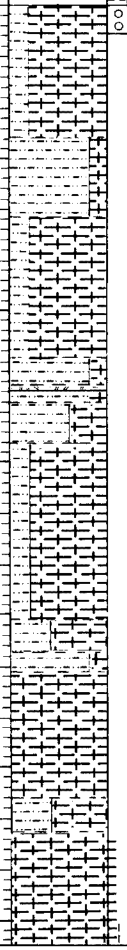
Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light olive gray and light brown. Mottled. Rare *Zoophycos*. Rare dropstones. Volcanic ash-rich bed at 7.13 to 7.19 m.

SMEAR SLIDE SUMMARY (%)

	1, 65	6, 90
	D	D
Composition:		
Quartz	67	–
Feldspar	1	TR
Heavy minerals	3	–
Clay	15	8
Volcanic glass	3	–
Micronodules	TR	–
Carbonate unspec.	7	TR
Foraminifers	2	12
Calc. nannofossils	2	80
Diatoms	–	1
Radiolarians	–	TR
Sponge spicules	TR	TR
Silicoflagellates	TR	–

SITE 610 HOLE B CORE 10 CORED INTERVAL 81.6–91.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone		*Nitzschia reinholdii* Zone	1, 2, 3, 4, 5, 6, CC	0.5, 1.0		O O		*	
		AG	AG		FM							



N7/0 to 5GY 6/1
5Y 5/1
5Y 6/1 to 5Y 7/1
5GY 7/1 to 5Y 7/1
10YR 6/2
5G 4/1
10YR 6/2
5Y 7/1
N8/0
5GY 7/1
5Y 7/1
5Y 6/1
N8/0
5GY 7/1
N8/0
N7/0

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE, NANNOFOSSIL OOZE, and CALCAREOUS MUD, very light gray to light olive gray and light brown. Mottled or homogeneous. Dropstones. Volcanic ash-rich layer at 3.71 to 3.76 m.

SMEAR SLIDE SUMMARY (%)

	5, 100
	D
Composition:	
Feldspar	TR
Heavy minerals	TR
Clay	3
Volcanic glass	1
Pyrite	TR
Carbonate unspec.	1
Foraminifers	10
Calc. nannofossils	85

SITE 610 HOLE B CORE 11 CORED INTERVAL 91.2–100.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL6 *Globorotalia obliquus extremus*	NN18 *Discoaster brouweri* Zone?		*Nitzschia reinholdii* Zone	1, 2, 3, 4, 5, 6, CC	0.5, 1.0		O O		*	
		AG	AG		CM							

2.5Y 5/2
5GY 7/1
5GY 4/1
2.5Y 5/2
5Y 5/1
5Y 6/1
5GY 5/1
5Y 7/1
5GY 5/1
5Y 6/1
5Y 7/1
5Y 6/1
5GY 5/1
5Y 6/1
2.5Y 6/2
5Y 5/1
5GY 7/1 to 5Y 7/1
2.5Y 6/2
5Y 7/1
5GY 4/1
5Y 6/1
5Y 7/1
2.5Y 5/2
5GY 7/1
5GY 7/1

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to light olive gray. Mottled or homogeneous. Volcanic ash at 5.83 to 5.90 m.

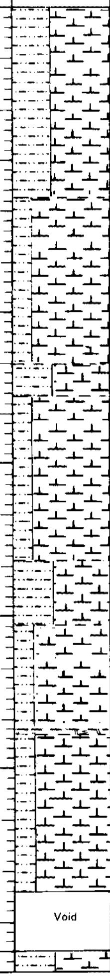
SMEAR SLIDE SUMMARY (%)

	4, 56
	M
Composition:	
Quartz	TR
Feldspar	TR
Clay	1
Volcanic glass	TR
Carbonate unspec.	1
Foraminifers	13
Calc. nannofossils	84
Diatoms	1
Sponge spicules	TR
Silicoflagellates	TR

SITE 610 HOLE B CORE 12 CORED INTERVAL 100.8–110.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		PL6 *Globorotalia obliquus extremus*	NN18 *Discoaster brouweri* Zone		*Nitzschia reinholdii* Zone	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0
		AG	AG		FM		

GRAPHIC LITHOLOGY



Colors (top to bottom): 5GY 7/1 to 5Y 5/1; N8/0 to 5Y 7/1; 2.5Y 4/2; 5Y 7/1; N8/0 to 5Y 8/1; 5Y 7/1 to 5Y 6/1; 2.5Y 6/2; N8/0; N8/0; 5Y 7/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE with marly intervals, very light gray to pale olive gray. Mottled with pale green gray laminae. Pyrite mottles common. Volcanic ash-rich interval at 7.10 to 7.14 m.

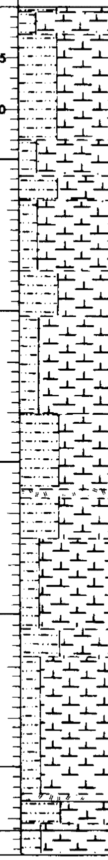
SMEAR SLIDE SUMMARY (%)

	3, 70	3, 142	5, 113
	D	D	M
Composition:			
Quartz	15	–	–
Feldspar	–	TR	–
Volcanic glass	1	1	35
Glauconite	–	–	TR
Pyrite	–	–	35
Carbonate unspec.	15	10	15
Foraminifers	8	3	–
Calc. nannofossils	60	75	5
Diatoms	} 1	2	–
Radiolarians		1	–
Sponge spicules		3	–

SITE 610 HOLE B CORE 13 CORED INTERVAL 110.4–118.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		PL6 *Globorotalia obliquus extremus*	NN18 *Discoaster brouweri* Zone		*Nitzschia marina* Zone	1, 2, 3, 4, 5, 6, CC	0.5, 1.0
		AG	AG		FP		

GRAPHIC LITHOLOGY



Colors (top to bottom): 5Y 5/1, 5Y 7/1, 5Y 6/1, 5Y 5/1, 5Y 4/1, 5Y 5/1, 5Y 4/1; 5Y 5/1; 5Y 6/1; 5Y 7/1; 5Y 6/1; 5Y 7/1; 5Y 6/1; 5Y 5/1; 5Y 6/1; 5Y 7/1; 5Y 6/1; 5Y 5/1, 5Y 6/1; 5Y 2/1, 5Y 5/1, 10YR 6/1; 5Y 5/1; 5Y 8/1; N7/0; 5Y 8/1; 5Y 6/1; 5Y 8/1; 5Y 7/1; 5Y 6/1; 5Y 7/1; N8/0

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE with marly intervals and volcanic ash-rich beds. Ooze, very light gray to light gray in marly intervals.

Mottling pervasive, pyrite common. Occasional pale green gray laminae. Dark gray ash bed at 4.75 to 4.82 m and 7.77 to 7.82 m, and patches at 0.77 to 0.89 m and 4.33 to 4.44 m.

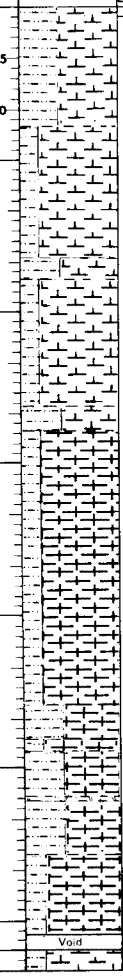
SMEAR SLIDE SUMMARY (%)

	3, 111	4, 30	6, 31
	D	M	M
Composition:			
Quartz	25	60	75
Feldspar	–	10	–
Mica	–	TR	–
Heavy minerals	–	5	5
Clay	5	–	–
Volcanic glass	–	20	15
Glauconite	–	TR	TR
Carbonate unspec.	3	–	–
Foraminifers	8	–	–
Calc. nannofossils	68	5	5
Sponge spicules	1	–	–

SITE 610 HOLE B CORE 14 CORED INTERVAL 118.0–127.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		PL3–5 *Undifferentiated*	NN18 *Discoaster brouweri* Zone		*Nitzschia marina* Zone	1	0.5, 1.0
						2	
						3	
						4	
						5	
						6	
						7	
		AG	AG		AM	CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Colors (top to bottom): 5Y 6/1; 5Y 7/1; N8/0 to 5Y 8/1; 5Y 5/1; N8/0; 5Y 5/1; 5Y 8/1; 5Y 8/1; 5Y 6/1; 5Y 8/1; 5Y 5/3; 5Y 2/1; 5Y 5/1; 5Y 8/1; 5Y 8/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE with SILICEOUS FORAMINIFERAL OOZE (4.15 to 8.33 m), and marly intervals. Mottled with pyrite. Diffuse pale green gray laminae. Volcanic ash-rich bed at 7.76 to 7.80 m.

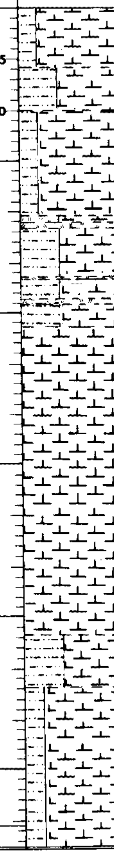
SMEAR SLIDE SUMMARY (%)

	1, 140	3, 141	6, 80
	D	D	D
Composition:			
Quartz			20
Feldspar			–
Mica	15	10	–
Heavy minerals	–	–	2
Clay			–
Volcanic glass	TR	TR	5
Carbonate unspec.	10	5	20
Foraminifers	8	20	3
Calc. nannofossils	61	53	50
Diatoms	1	–	TR
Radiolarians	–	TR	TR
Sponge spicules	5	12	TR

SITE 610 HOLE B CORE 15 CORED INTERVAL 127.6–137.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone		*Nitzschia marina* Zone	1	0.5, 1.0
						2	
						3	
						4	
						5	
						6	
		AG	AG		CM	CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Colors (top to bottom): 5Y 7/1; 5Y 5/1; 5Y 8/1; 5Y 4/1, N2/1, 10YR 5/1, N3/1, 5Y 5/1, N2/1, 5Y 4/1, 5Y 5/1, N2/1, 10YR 6/1; N9/0; N8/0 to 5Y 7/1; 5Y 7/1; 5Y 5/1; 5Y 6/1; 5Y 8/1; 5Y 7/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE with marly intervals and VOLCANIC ASH bearing beds, very light gray to gray to dark gray. Mottled with occasional pale green gray and dark gray laminae.

SMEAR SLIDE SUMMARY (%)

	2, 140	3, 110	4, 85
	M	D	
Texture:			
Sand	20	–	–
Silt	55	–	–
Clay	25	–	–
Composition:			
Quartz	25	5	–
Feldspar	15	–	–
Mica	3	–	–
Heavy minerals	5	–	–
Clay	15	–	5
Volcanic glass	40	–	TR
Glauconite	TR	–	–
Carbonate unspec.	–	2	10
Foraminifers	TR	8	40
Calc. nannofossils	2	87	40
Diatoms	–	TR	TR
Radiolarians	–	TR	TR
Sponge spicules	–	2	5
Silicoflagellates	–	TR	–

SITE 610 HOLE B CORE 16 CORED INTERVAL 137.2–146.8 m

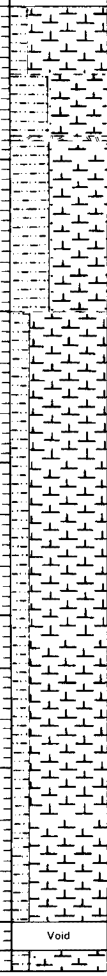
Time-rock unit: (none)

Biostratigraphic zone: (none)

Fossil character:
- Foraminifers: PL3–5 undifferentiated; CC: AG
- Nannofossils: NN16 *Discoaster surculus* Zone; CC: AG
- Radiolarians: (none)
- Diatoms: *Nitzschia jouseae* Zone; CC: CG

Sections: 1, 2, 3, 4, 5, 6, 7, CC (Meters: 0.5, 1.0)

Graphic lithology:



Drilling disturbance: OOO

Colors (downcore): 5Y 8/1; 5Y 7/1 to 5Y 6/1; 5Y 7/1 to 5Y 6/1; 5Y 8/1; N8/0; 5Y 7/1; N8/0; 5Y 8/1 to 5Y 7/1; N8/0; N8/0

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE with marly intervals and volcanic ash-rich interval (1.24 to 1.28 m), very light gray to light gray. Mottled. Occasional pale green/gray laminae.

SITE 610 HOLE C CORE (HPC) 1 CORED INTERVAL 8.0–12.0 m

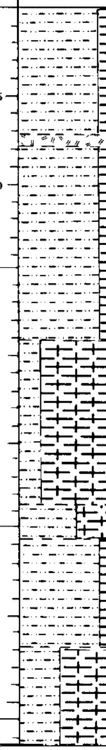
Time-rock unit: (none)

Biostratigraphic zone: (none)

Fossil character:
- Foraminifers: N22 *Globorotalia truncatulinoides*; CC: AG
- Nannofossils: NN21 *Emiliania huxleyi* Zone; CC: AG
- Radiolarians: (none)
- Diatoms: CC: B

Sections: 1, 2, 3, CC (Meters: 0.5, 1.0)

Graphic lithology:



Drilling disturbance: OO

Samples: *

Colors (downcore): 2.5Y 5/2; 10YR 4/1; 2.5Y 5/2; 10YR 6/1; 10YR 6/1; 5Y 6/1; 5Y 5/1; 2.5Y 5/2; 5Y 5/1; 5Y 7/1; 5Y 6/1; 5Y 7/1; 5Y 6/1; 5Y 5/1; 5Y 6/1; 5Y 7/1; 5Y 7/1

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive gray to very light gray. Mottled by burrowing. *Zoophycos* present. Volcanic ash layer at 0.72 to 0.79 m. Pale green/gray laminae.

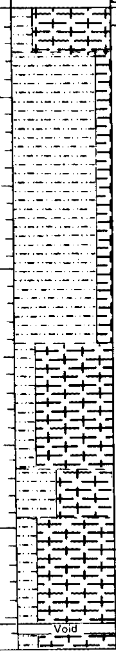
SMEAR SLIDE SUMMARY (%)

	1, 30
	D
Composition:	
Quartz	33
Feldspar	15
Volcanic glass	10
Carbonate unspec.	12
Foraminifers	5
Calc. nannofossils	25

SITE 610 HOLE C CORE (HPC) 2 CORED INTERVAL 13.0–18.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN21 *Emiliania huxleyi* Zone			1, 2, 3, CC	0.5, 1.0
		AG	AG		B		

GRAPHIC LITHOLOGY



Colors: N8/0; 5Y 6/1 to 5Y 5/1; 5Y 7/1; 5Y 6/1; 5Y 8/1; 5Y 7/1

LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive gray to very light gray. Mottled. *Zoophycos*. Pale green/gray laminae.

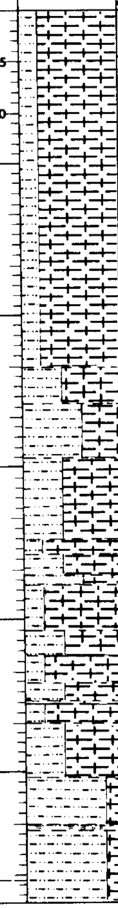
SMEAR SLIDE SUMMARY (%)

	1, 142	2, 81
	D	
Texture:		
Sand	2	–
Silt	25	–
Clay	73	–
Composition:		
Quartz	47	10
Feldspar	5	–
Clay	10	–
Volcanic glass	5	2
Carbonate unspec.	25	15
Foraminifers	1	8
Calc. nannofossils	5	65
Organic matter	2	–

SITE 610 HOLE C CORE 3 CORED INTERVAL 26.0–35.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone			1, 2, 3, 4, 5, 6, CC	0.5, 1.0
		AG	AG		B		

GRAPHIC LITHOLOGY



Colors: N9/0 to 5Y 8/1; 5Y 7/1; 5Y 8/1; N9/0; 5Y 8/1; 5Y 7/1; 5Y 6/1; 5Y 5/1; 5Y 4/1; 5Y 6/1; 5Y 8/1; 5Y 5/1; 5Y 7/1; 5Y 6/1; 5Y 7/1; 5Y 6/1; 5Y 5/1; 5Y 7/1; 5Y 6/1; 5GY 6/1; 5GY 5/1; 10YR 4/1; 5Y 2/1; 10YR 4/1; 10YR 4/1; 5Y 4/1; 5Y 4/1; 10YR 4/1

LITHOLOGIC DESCRIPTION

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to olive gray and brown. Dark gray patches of volcanic ash-rich mud at 4.11 to 4.40 m. Volcanic ash-rich bed at 8.02 to 8.07 m with associated bioturbated zone of ash-rich mud. Mottled. Gray/green laminae.

SMEAR SLIDE SUMMARY (%)

	3, 130
	D
Texture:	
Sand	10
Silt	50
Clay	40
Composition:	
Quartz	40
Feldspar	5
Clay	15
Volcanic glass	3
Foraminifers	5
Calc. nannofossils	35

SITE 610 HOLE C CORE 4 CORED INTERVAL 35.6–45.2 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* — AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone — AG
Diatoms: B

Sections: 1, 2, 3, 4, 5, 6, CC

Colors: 5Y 6/1, 5Y 2/1, 5Y 6/1, 5Y 2/1, 5Y 6/1, 5Y 5/1, N9/0, 5G 7/2, 5Y 7/1, 5Y 5/1, 5Y 6/1, 5Y 5/1, 5Y 2/1, 5Y 5/1, 5Y 6/1, 5Y 7/1, N9/0, 5Y 7/1, 5Y 5/1, 5Y 2/1, 5Y 5/1, 5Y 2/1, 5Y 5/1, 5Y 8/1, 5Y 7/1 to 5Y 5/1, 5Y 7/1 to 5Y 8/1, 5Y 7/1

Interbedded FORAMINIFERAL NANNOFOSSIL OOZE and CALCAREOUS MUD, very light gray to olive gray. Dark gray volcanic ash-rich intervals at 0.35 to 0.39 m, 0.67 to 0.72 m, 3.99 to 4.05 m, 5.68 to 5.71 m, 5.95 to 6.00 m. Foraminiferal-rich interval at 8.02 to 8.05 m. Occasional pale green/gray laminae.

SMEAR SLIDE SUMMARY (%)

	3, 56	6, 54
	D	M
Composition:		
Quartz	27	5
Volcanic glass	3	–
Carbonate unspec.	5	5
Foraminifers	5	20
Calc. nannofossils	58	70
Sponge spicules	TR	–
Organic matter	2	–

SITE 610 HOLE C CORE 5 CORED INTERVAL 99.0–108.6 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL6 *Globorotalia obliquus extremus* — AG
Nannofossils: NN18 *Discoaster brouweri* Zone — AG
Diatoms: RP

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Colors: 5Y 6/1, 5Y 7/1, N5/0, 5Y 7/1, 5Y 4/1, 5Y 6/1, 5Y 5/1, 5Y 6/1, 5Y 8/1, 5Y 6/1 to 5Y 5/1, 5Y 7/1, 5Y 8/1, 5Y 7/1, 5Y 5/1, N2/0, 10YR 5/2, 10YR 4/1, N2/0, 10YR 4/1, 10YR 5/2, 10YR 5/1, 5Y 8/1, 5Y 7/1, Void, 5Y 7/1

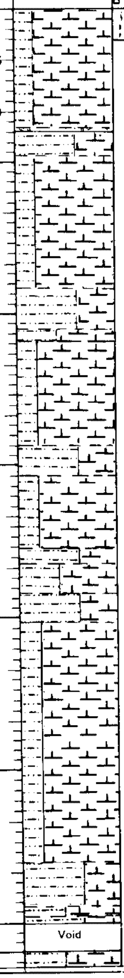
Interbedded NANNOFOSSIL OOZE and (MARLY) NANNOFOSSIL OOZE, very light gray to light olive gray and light brown. Dark gray volcanic ash layers at 1.35 to 1.40 m, 3.70 to 3.79 m, 7.69 to 7.70 m, and 7.83 to 7.86 m. Mottled. Pale green/gray laminae.

SMEAR SLIDE SUMMARY (%)

	1, 138	1, 140	4, 16
Composition:			
Quartz	4	5	25
Mica	TR	–	TR
Heavy minerals	TR	TR	–
Volcanic glass	75	79	TR
Pyrite	10	10	–
Carbonate unspec.	–	–	3
Foraminifers	1	1	6
Calc. nannofossils	10	5	65
Radiolarians	–	–	TR
Sponge spicules	–	–	1

SITE 610 HOLE C CORE 6 CORED INTERVAL 108.6–118.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		PL6 *Globorotalia obliquus extremus*	NN18 *Discoaster brouweri* Zone			1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0					
		AG	AG		B							



Colors: 5Y 6/1; N8/0 to 5GY 7/1; 5Y 6/1; 5Y 7/1; N8/0; 5Y 6/1; N8/0; 5Y 6/1; 5Y 7/1; 5Y 6/1; N8/0 to 5GY 7/1; 5Y 6/1; 5Y 7/1; 5Y 8/1; 5Y 4/2

Void

Interbedded NANNOFOSSIL OOZE and MARLY NANNOFOSSIL OOZE, very light gray to light olive gray and light brown. Volcanic ash interval 1.15 to 1.19 m. Mottled, with green/gray laminae.

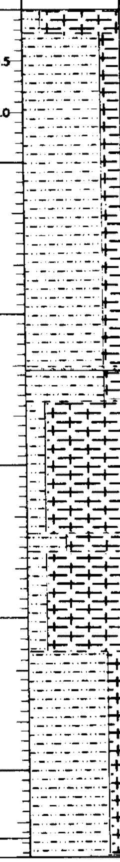
SMEAR SLIDE SUMMARY (%)

	5, 130
	D
Composition:	
Quartz	37
Heavy minerals	2
Clay	20
Volcanic glass	1
Calc. nannofossils	40
Diatoms	TR
Sponge spicules	TR

* Reassessed. Questionable position (still).

SITE 610 HOLE D CORE 1 CORED INTERVAL 0.0–8.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		Globorotalia truncatulinoides	NN21 *Emiliania huxleyi* Zone			1, 2, 3, 4, 5, 6, CC	0.5, 1.0				*	
		AG	AG		B							

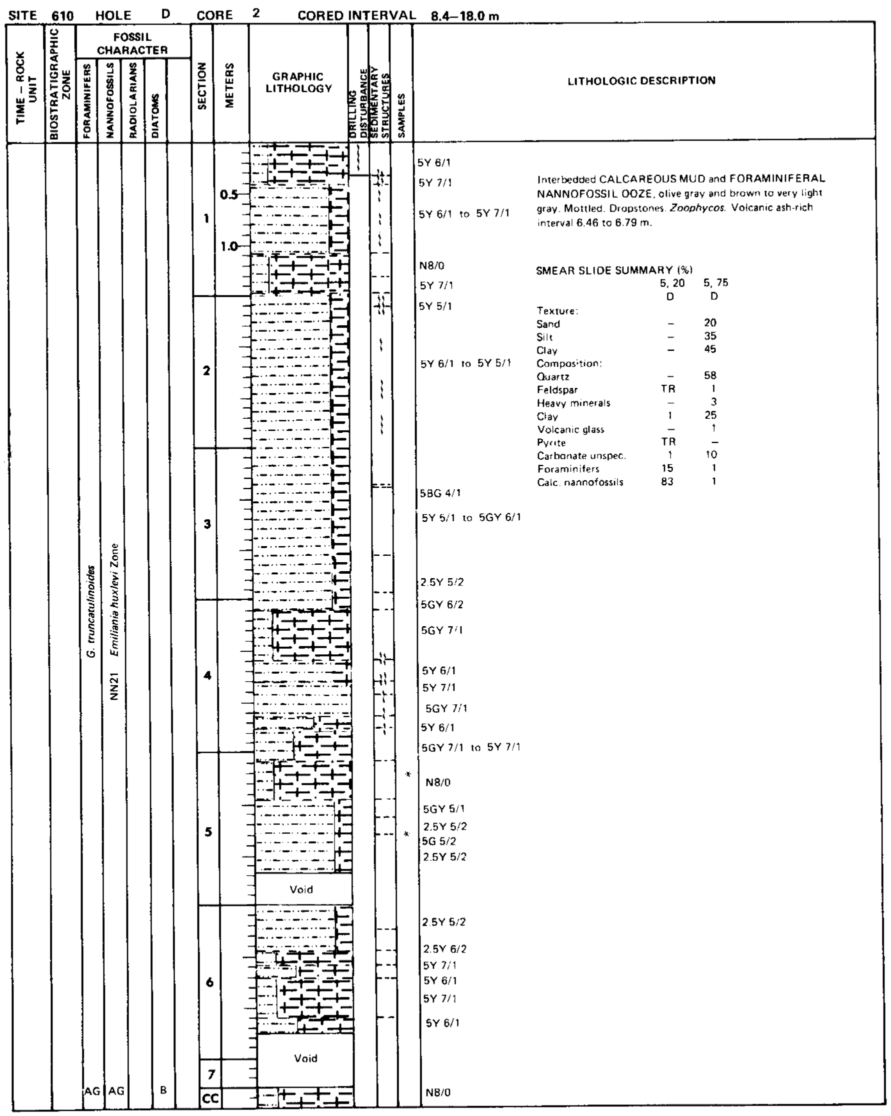


Colors: 2.5Y 6/3; 2.5Y 5/2; 2.5Y 5/2 to 5Y 5/2; 5Y 5/2; 5GY 6/1; 5Y 6/1; 2.5Y 6/2; N8/0; 2.5Y 7/2; N8/0; 2.5Y 7/2; N8/0; 5Y 7/1; 2.5Y 5/2; 2.5Y 7/2; 2.5Y 6/7; 5Y 5/2

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive gray and brown to very light gray. Dark gray volcanic ash-rich bed at 3.51 to 3.53 m and patch at 6.55 m. Mottled, *Zoophycos*. Occasional pale green/gray patches in ooze layers. Dropstones.

SMEAR SLIDE SUMMARY (%)

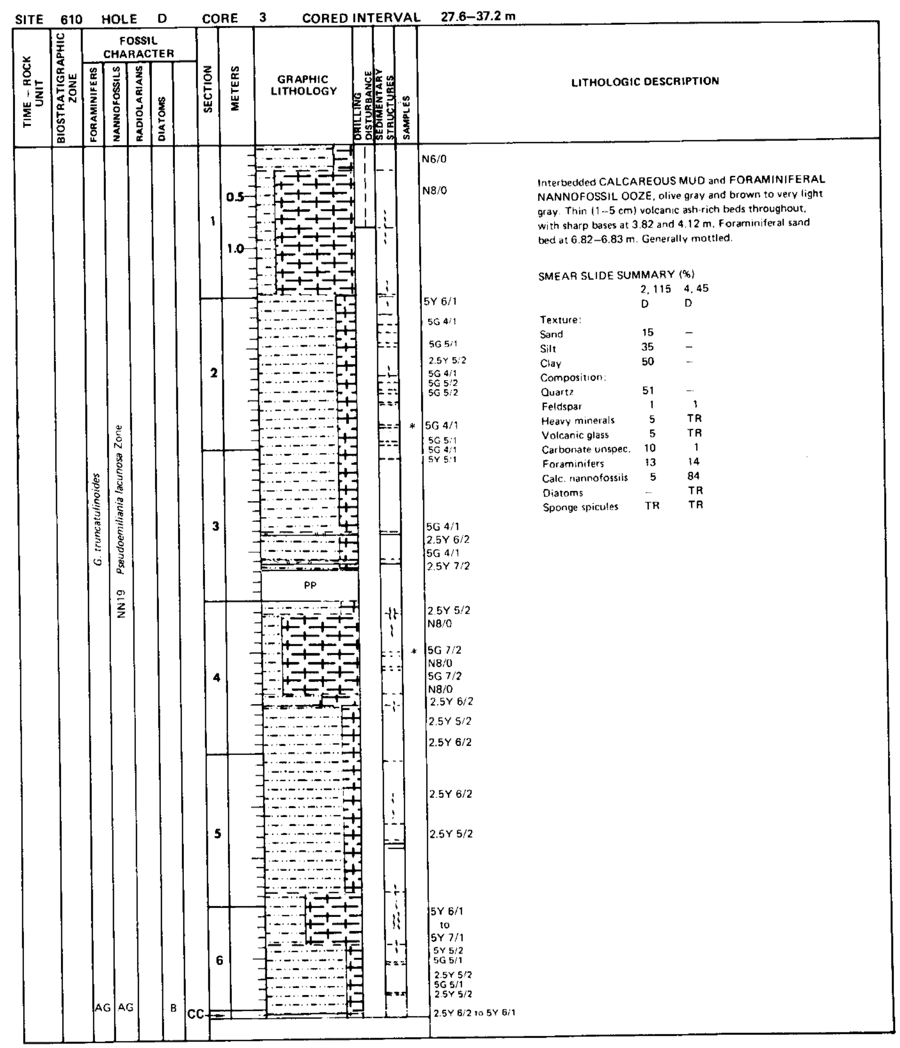
	1, 8	1, 96	4, 55
Texture:			
Sand	–	15	–
Silt	–	30	–
Clay	–	50	–
Composition:			
Quartz	TR	67	TR
Feldspar	TR	1	TR
Heavy minerals	1	2	TR
Clay	TR	15	–
Micronodules	TR	–	–
Carbonate unspec.	1	10	1
Foraminifers	15	2	12
Calc. nannofossils	83	1	87
Diatoms	TR	–	–
Radiolarians	–	–	TR
Sponge spicules	TR	–	TR



Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive gray and brown to very light gray. Mottled. Dropstones. *Zoophycos*. Volcanic ash-rich interval 6.46 to 6.79 m.

SMEAR SLIDE SUMMARY (%)

	5, 20	5, 75
	D	D
Texture:		
Sand	–	20
Silt	–	35
Clay	–	45
Composition:		
Quartz	–	58
Feldspar	TR	1
Heavy minerals	–	3
Clay	1	25
Volcanic glass	–	1
Pyrite	TR	–
Carbonate unspec.	1	10
Foraminifers	15	1
Calc. nannofossils	83	1

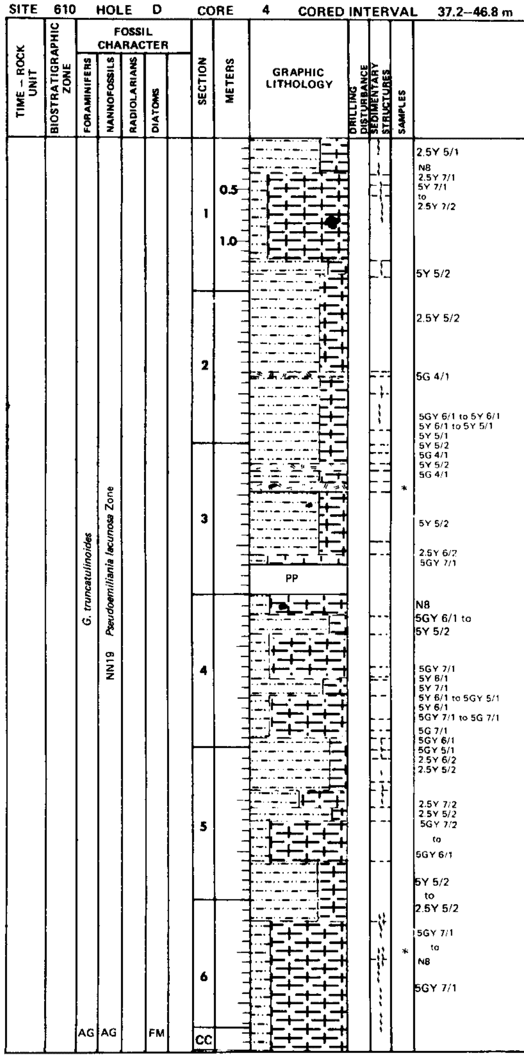


Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive gray and brown to very light gray. Thin (1–5 cm) volcanic ash-rich beds throughout, with sharp bases at 3.82 and 4.12 m. Foraminiferal sand bed at 6.82–6.83 m. Generally mottled.

SMEAR SLIDE SUMMARY (%)

	2, 115	4, 45
	D	D
Texture:		
Sand	15	–
Silt	35	–
Clay	50	–
Composition:		
Quartz	51	–
Feldspar	1	1
Heavy minerals	5	TR
Volcanic glass	5	TR
Carbonate unspec.	10	1
Foraminifers	13	14
Calc. nannofossils	5	84
Diatoms	–	TR
Sponge spicules	TR	TR

SITE 610 HOLE D CORE 4 CORED INTERVAL 37.2–46.8 m



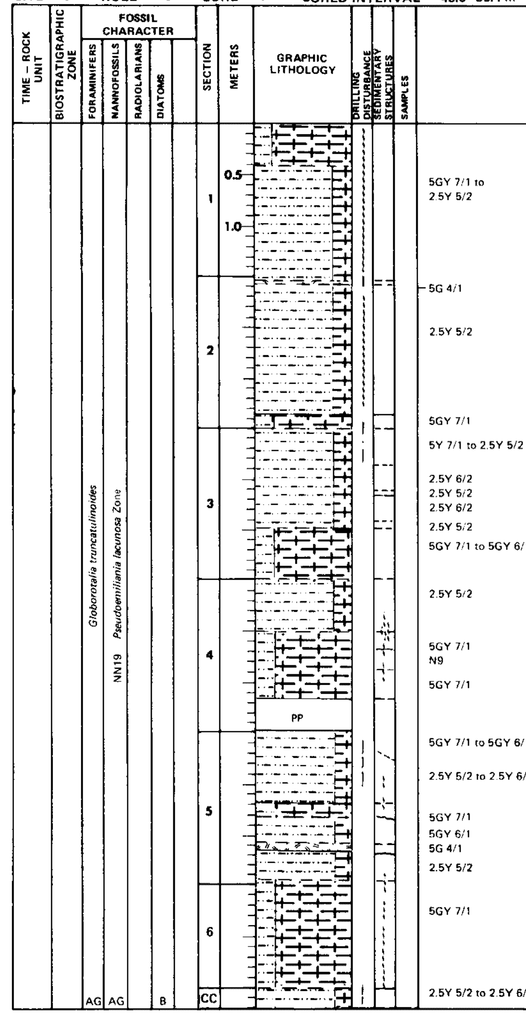
LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive brown and brown to pale green and gray. Thin (1–6 cm) volcanic-rich beds throughout; occasional pebbles (dropstones); *Zoophycos*; sedimentary clast at Section 4, 10 cm (4 cm) composed predominantly of pyrite micronodules and volcanic ash.

SMEAR SLIDE SUMMARY (%)

	3, 40 M	6, 45 D
Texture:		
Sand	30	–
Silt	35	–
Clay	35	–
Composition:		
Quartz	71	–
Feldspar	1	TR
Heavy minerals	3	–
Clay	10	TR
Volcanic glass	14	–
Carbonate unspec.	1	–
Foraminifers	–	11
Calc. nannofossils	TR	89
Diatoms	–	TR
Sponge spicules	–	TR

SITE 610 HOLE D CORE 5 CORED INTERVAL 46.8–56.4 m



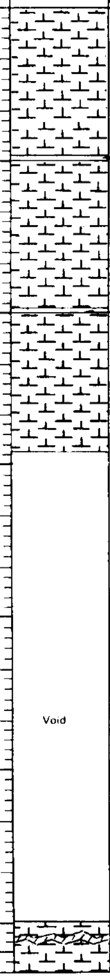
LITHOLOGIC DESCRIPTION

Interbedded CALCAREOUS MUD and FORAMINIFERAL NANNOFOSSIL OOZE, olive brown and brown to white and pale green. Thin (1–7 cm) volcanic-rich beds throughout; *Zoophycos*; occasionally mottled.

SITE 610 HOLE D CORE 6 CORED INTERVAL 317.6–327.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION
	NN10 *Discoaster calcaris* Zone	AG	AP	RP		317.6	1
						319.1	2
						320.6	3
						322.1	4
						323.6	5
						325.1	6
							7
							CC

METERS: 0.5, 1.0



Colors: N9; 5GY 8/1; Void; N9 to 5GY 8/1; Void; N9 to 5GY 8/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, occasional dark gray mottles and chalky intervals.

SMEAR SLIDE SUMMARY (%)

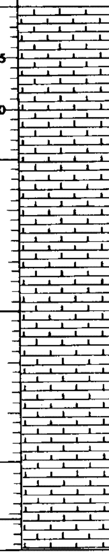
	1, 26	2, 100
	D	D
Composition:		
Quartz	–	9
Carbonate unspec.	5	2
Foraminifers	5	1
Calc. nannofossils	90	88
Diatoms	–	TR
Sponge spicules	TR	TR

Note: Section 7 is 54 cm long.

SITE 610 HOLE D CORE 7 CORED INTERVAL 327.2–336.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION
			NN10 *Discoaster calcaris* Zone			1
						2
						3
						4
		AG	AG		B	CC

METERS: 0.5, 1.0



Colors: N9 to 5GY 8/1; 5GY 8/1; N9; 5GY 8/1; N9; 5GY 8/1; N9; 5GY 8/1; N9; 5GY 8/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE to CHALK pale green to white; common *Zoophycos;* some dark mottling.

Disturbance is in the form of drill biscuits with occasional flowage or fragmentation.

SITE 610 HOLE E CORE 1 CORED INTERVAL 260.0–269.6 m

Column headings: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, Sub-bottom depth) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *Globorotalia margaritae* — AG

Nannofossils: NN12 *Amaurolithus tricorniculatus* Zone — AM

Diatoms: FP

Sections: 1, 2, 3, 4, CC

Meters: 0.5, 1.0

NANNOFOSSIL OOZE, white. *Zoophycos* at Section 3, 56 cm. Pyritized worm burrow at Section 2, 135 cm; dark mottling throughout.

SMEAR SLIDE SUMMARY (%)

	2, 100
Composition:	
Quartz	9
Carbonate unspec.	2
Foraminifers	1
Calc. nannofossils	88
Diatoms	TR
Sponge spicules	TR

SITE 610 HOLE E CORE 2 CORED INTERVAL 269.6–279.2 m

Column headings: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, Sub-bottom depth) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: *Globigerina nepenthes* — AG

Nannofossils: NN12 *Amaurolithus tricorniculatus* Zone; NN11 *Discoaster quinqueramus* Zone — AM

Diatoms: B

Sections: 1, 2, 3, 4, 5, CC

Meters: 0.5, 1.0

N9 to N8

NANNOFOSSIL OOZE, white, dark gray mottling throughout; 2 cm pyrite-rich layer at Section 3, 106 cm.

SMEAR SLIDE SUMMARY (%)

	3, 106
	M
Composition:	
Pyrite	10
Carbonate unspec.	5
Foraminifers	2
Calc. nannofossils	81
Diatoms	1
Radiolarians	TR
Sponge spicules	1

SITE 610 HOLE E CORE 3 CORED INTERVAL 279.2–288.8 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

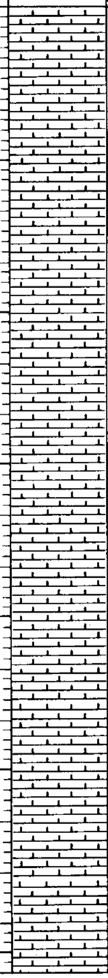
Foraminifers: *Globigerina nepenthes* (AG)

Nannofossils: NN11 *Discoaster quinqueramus* Zone (AM)

Diatoms: RP

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Meters: 0.5, 1.0



Colors: N9, 5GY 7/1, N9, 5G 7/1, N9, 5G 7/1, N9, 5GY 8/1, 5G 7/1, N9

NANNOFOSSIL CHALK, white to very pale green; occasional green (5G 7/1) laminae (1 cm) with a concentration of fine green (5G 7/1) laminae at 8.46 to 8.58 m. Dark mottling throughout.

Slight drilling disturbance in the form of drill biscuits.

SITE 610 HOLE E CORE 4 CORED INTERVAL 288.8–298.4 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS, Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

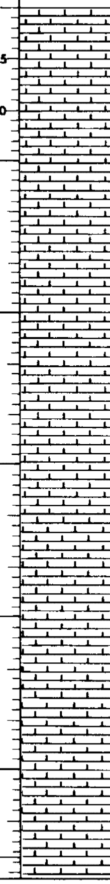
Foraminifers: *Globigerina nepenthes* (AG)

Nannofossils: NN11 *Discoaster quinqueramus* Zone (AG)

Diatoms: B, B

Sections: 1, 2, 3, 4, 5, 6, CC

Meters: 0.5, 1.0



Colors: N9/0, N9/0, N9/0, N9/0, 5G 9/1, 5G 9/1

NANNOFOSSIL CHALK, white with faint green hue. Very homogeneous. Occasional *Zoophycos*. Faint green laminae at 5.10 m.

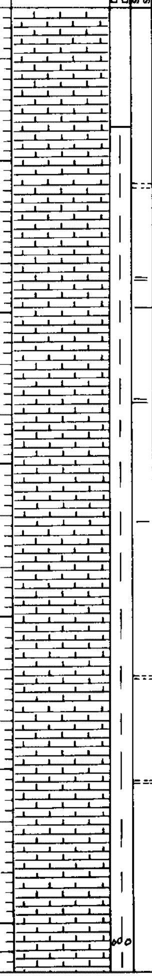
Slight drilling disturbance in the form of drill biscuits.

SMEAR SLIDE SUMMARY (%)

	2, 130
	D
Composition:	
Carbonate unspec.	1
Foraminifers	3
Calc. nannofossils	96

SITE 610 HOLE E CORE 5 CORED INTERVAL 298.4–308.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		Globigerina nepenthes	NN11 *Discoaster quinqueramus* Zone		B		1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0				*	N9/0, 5Y 7/1, N9/0, 5G 7/1, 5P 7/1, 5GY 7/1, N9/0, 5GY 7/1, 5P 7/1, N9/0, 5Y 7/1, 5GY 7/1, N9/0, 5GY 7/1, N9/0 to 5G 9/1, 5G 9/1, 5G 9/1
		AG	AG		B								



NANNOFOSSIL CHALK, white, becoming very pale green towards base. Occasional pale green/gray laminae. Common *Zoophycos*. Otherwise homogeneous.

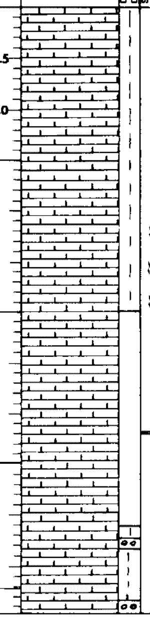
Drilling disturbance in the form of drill biscuits.

SMEAR SLIDE SUMMARY (%)

	1, 63
	D
Composition:	
Carbonate unspec.	1
Foraminifers	9
Calc. nannofossils	90
Sponge spicules	TR

SITE 610 HOLE E CORE 6 CORED INTERVAL 308.0–317.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		Globigerina nepenthes	NN11 *Discoaster quinqueramus* Zone		RP		1, 2, 3, 4, CC	0.5, 1.0				*	5G 9/1, 5G 9/1, 5G 9/1, N4/0, 5G 9/1, 5G 9/1
		AG	AM		B								



NANNOFOSSIL CHALK, very pale green, lightly mottled in places. Occasional *Zoophycos*. Sharp, pyritized laminae, 4.18 m. Pyrite halos.

Some drill-biscuit coring deformation.

SMEAR SLIDE SUMMARY (%)

	3, 80
	D
Composition:	
Feldspar	TR
Foraminifers	9
Calc. nannofossils	90

SITE 610 HOLE E CORE 7 CORED INTERVAL 317.6–327.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		Globigerina nepenthes	NN11 *Discoaster quinqueramus* Zone; NN10 *Discoaster calcaris* Zone				1, 2, 3, 4, 5, 6, CC	0.5, 1.0					
		AG	AG		B								

N9/0
N8/0
N9/0
N9/0 to 5G 8/1
5P 8/1
5GY 7/1
5GY 7/1
5GY 7/1
N9/0 to 5G 9/1
5GY 7/1
5G 9/1
5B 6/1
5G 9/1 to 5G 8/1
5G 9/1
5G 9/1

NANNOFOSSIL CHALK, white to very pale green. Occasional mottles. Common *Zoophycos*. Occasional green/gray laminae.

Drill biscuits throughout.

SMEAR SLIDE SUMMARY (%)

	4, 111
	D
Composition:	
Carbonate unspec.	2
Foraminifers	7
Calc. nannofossils	91

SITE 611

Hole 611

Date Occupied: 6th August, 1983

Date Departed: 7th August, 1983

Time on Hole: 23.6 hrs.

Position (latitude; longitude): 52°50.47N';30°18.58'W

Water depth (sea level; corrected m, echo-sounding): 3203

Water depth (rig floor; corrected m, echo-sounding): 3212.8

Bottom felt (m, drill pipe): 3203.6

Penetration (m): 125.8

Number of cores: 14

Total length of cored section (m): 125.8

Total core recovered (m): 112.21

Core recovery (%):89%

Oldest sediment cored:

Depth sub-bottom (m): 125.8

Nature: calcareous mud

Age: late Pliocene (NN16)

Measured velocity (km/s):1.517

Basement: not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 611

HOLE 611A

Date Occupied: 7th August, 1983

Date Departed: 8th August, 1983

Time on Hole: 17.6 Hrs.

Position (latitude; longitude): 52°50.47'N; 30°18.58'W

Water depth (sea level; corrected m, echo-sounding): 3201

Water depth (rig floor; corrected m, echo-sounding): 3212.8

Bottom felt (m, drill pipe): 3203.6

Penetration (m): 132

Number of cores:14

Total length of cored section (m): 132

Total core recovered (m): 99.4

Core recovery (%): 75

Oldest sediment cored:

Depth sub-bottom (m): 122.4

Nature: Calcareous Mud

Age: late Pliocene (NN16)

Measured velocity (km/s):

Basement: not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 611

HOLE 611B

Date Occupied: August 8th, 1983

Date Departed: August 8th, 1983

Time on Hole: 2.5 Hrs.

Position (latitude; longitude): 52°50.15'N; 30°19.10'W

Water depth (sea level; corrected m, echo-sounding): 3228

Water depth (rig floor; corrected m, echo-sounding): 3245.8

Bottom felt (m, drill pipe): 3227.6

Penetration (m): 8.9

Number of cores: 1

Total length of cored section (m): 8.9

Total core recovered (m): 8.9

Core recovery (%): 100

Oldest sediment cored:

Depth sub-bottom (m): 8.9

Nature:Calcareous Mud and Foram Nanno Ooze

Age: Quaternary (NN21)

Measured velocity (km/s): 1.501

Basement: not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 611

HOLE 611C

Date Occupied: August 8th, 1983

Date Departed: August 11th, 1983

Time on Hole:66.25 Hrs. (2 3/4 days)

Position (latitude; longitude): 52°50.15'N; 30°19.10'W

Water depth (sea level; corrected m, echo-sounding): 3230

Water depth (rig floor; corrected m, echo-sounding): 3245.8

Bottom felt (m, drill pipe): 3227.6

Penetration (m):511.6

Number of cores: 47

Total length of cored section (m): 434.8

Total core recovered (m):344.1

Core recovery (%): 79

Oldest sediment cored:

Depth sub-bottom (m): 511.6

Nature: Marly Nanno Chalk

Age: middle Miocene (NN9)

Measured velocity (km/s): 1.970

Basement: not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 611

HOLE 611E

Date Occupied: August 12th, 1983

Date Departed: August 12th, 1983

Time on Hole: 6.75 Hrs.

Position (latitude; longitude): 52°50.47'N; 30°18.58'W

Water depth (sea level; corrected m, echo-sounding): 3195

Water depth (rig floor; corrected m, echo-sounding): 3212.8

Bottom felt (m, drill pipe): 3199.5

Penetration (m): 25.7

Number of cores:2

Total length of cored section (m): 19.2

Total core recovered (m): 19.2

Core recovery (%): 100

Oldest sediment cored:

Depth sub-bottom (m): 25.7

Nature: Calcareous Mud and Foram Nanno Ooze

Age: Quaternary (NN19)

Measured velocity (km/s):

Basement: not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 611

HOLE 611D

Date Occupied: August 11th, 1983

Date Departed: August 12th, 1983

Time on Hole: 19.5 Hrs.

Position (latitude; longitude): 52°50.47'N; 30°18.58'W

Water depth (sea level; corrected m, echo-sounding): 3195

Water depth (rig floor; corrected m, echo-sounding): 3212.8

Bottom felt (m, drill pipe): 3109.5

Penetration (m): 244.1

Number of cores: 14

Total length of cored section (m): 124.8

Total core recovered (m): 122.3

Core recovery (%): 98

Oldest sediment cored:

Depth sub-bottom (m): 244.1

Nature: Nanno Chalk

Age: early Pliocene (NN15)

Measured velocity (km/s):

Basement: not reached

Depth sub-bottom (m):

Nature:

Velocity range (km/s):

SITE 611

A. PRINCIPAL RESULTS

Six holes were drilled on the lower southeastern flank of Gardar Drift. Four holes were drilled on the broad crest of a sediment wave at 3201 meters water depth (corrected). Two holes were located in an adjacent trough half a nautical mile to the southeast and in water 29 meters deeper. No clear sediment wave migration was visible on crossing 3.5kHz profiles and most waves in the vicinity appear symmetrical. Airgun records show faint indications of inclined reflectors below 0.2 seconds (two-way travel time).

A continuous Quaternary through Miocene section was recovered with the VLHPC and XCB in the trough, Hole 611C, and a complimentary Quaternary through Pliocene, continuous VLHPC and XCB section was recovered on the wave crest in the combined holes 611A and 611D.

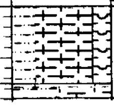
Coring in the overlapping crest holes 611 and 611A provided an almost complete section for paleoclimatic studies spanning the last 2.47Ma (to the Gauss). A total of three spot cores were taken in Holes 611D and 611E in attempts to fill perceived gaps in this record. Still the sequence appears to have one, to at most three, interruptions.

Glacial/interglacial mud to ooze cycles extend to 91 meters sub-bottom in the wave crest sequence and to 114 meters in the trough. Below these levels, the sequence is made up of nannofossil oozes and chalks, which in the Pliocene become siliceous and/or marly.

No primary sedimentary structures that might be interpreted as due to current sedimentation were observed. Some wave crest-to-trough differences in bed thickness were found. No hiatuses were detected and sedimentation rates are high (around 58m/m.y.) and generally linear. Some indications are present in the accumulation rate curves for the Pliocene and Quaternary of wave crest-to-trough differences that seem best explained by large-scale wave migration in the Pliocene.

Good correlations of seismic reflectors with mid-drift lithologic changes can be made but low Miocene penetration rates meant that the base of the drift at 1.0 secs sub-bottom (two-way travel time) was beyond the reach of the drilling in the time available at this site.

SITE 611 HOLE CORE 1 CORED INTERVAL 0.0–1.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		AG; N22 *Globorotalia truncatulinoides*	AG; NN21 *Emiliania huxleyi* Zone	RG	FM; *Pseudoeunotia doliolus* Zone	0.72	1, CC	0.5		O O		* *	10YR 5/3, 10YR 4/2, 10YR 5/2, 2.5Y 5/2, 5Y 4/2

SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE, brown to dark grayish brown (10YR 5/3 to 10YR 4/2).

Lower part of Core Catcher: MARLY FORAMINIFERAL NANNOFOSSIL OOZE, olive gray (5Y 4/2), containing volcanic glass in coarse fraction.

0.53 to 0.60 m: dark grayish brown (10YR 4/2) layer, very bioturbated by frequent small *chondrite*-type burrows, and one *zoophycos* at 0.60 m.

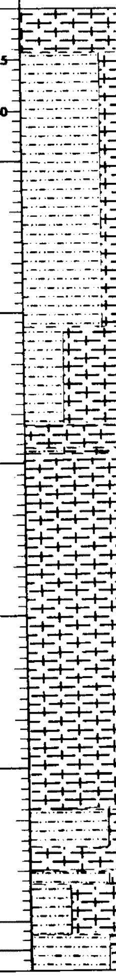
SMEAR SLIDE SUMMARY (%)

	1, 20	CC, 10
	D	M
Composition:		
Quartz	10	26
Feldspar	–	2
Mica	1	2
Heavy minerals	4	5
Clay	5	10
Volcanic glass	TR	–
Foraminifers	15	15
Calc. nannofossils	51	30
Diatoms	2	2
Radiolarians	1	TR
Sponge spicules	10	8
Silicoflagellates	1	TR

ORGANIC CARBON AND CARBONATE (%)

	1, 20–21
Organic carbon	–
Carbonate	65

SITE 611 HOLE CORE 2 CORED INTERVAL 1.0–10.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		AG; N22 *Globorotalia truncatulinoides*	AG; NN21 *Emiliania huxleyi* Zone; NN20 *Gephyrocapsa oceanica* Zone; NN19 *Pseudoemiliania lacunosa* Zone	VRP	RP; AM; AG; *Pseudoeunotia doliolus* Zone	1.0, 2.5, 4.0, 5.5, 7.0, 8.5, 10.0, 10.29	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0				* *	10YR 5/3, N7, 5Y 5/2, 5Y 6/1, 5Y 5/1, 5Y 6/1, 5Y 5/3, 5Y 6/1, 10YR 6/4, 10YR 8/2, 10YR 6/4, 10YR 8/1, 5GY 6/1, 5G 5/1, 5G 5/1, 5GY 6/1, 5GY 6/1 and 5GY 7/1, N7, 5Y 4/1, N7, 5Y 4/1, N6, 5Y 6/1, 5Y 7/1, 5Y 5/2, N6

Alternating:
FORAMINIFERAL NANNOFOSSIL OOZE, light gray (N7), very light gray (10YR 8/1 or 8/2) or greenish gray (5GY 7/1 or 6/1);
MARLY FORAMINIFERAL NANNOFOSSIL OOZE, gray (N6), light yellowish brown (10YR 6/4) or light gray to olive gray (5Y 7/1 to 5/2); and
CALCAREOUS MUD, gray to olive gray (5Y 6/1 to 5/2) or dark gray (5Y 4/1).

Three DROPSTONES: 2 pumices and 1 tuff.

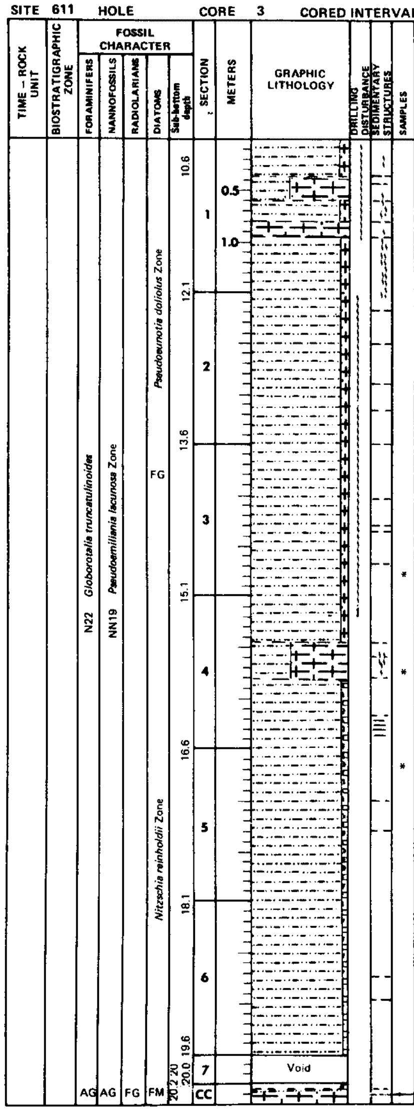
SMEAR SLIDE SUMMARY (%)

	1, 106	3, 82	4, 115
	D		
Compositon:			
Quartz	52	5	–
Feldspar	1	1	–
Heavy minerals	3	2	1
Clay	20	35	8
Volcanic glass	4	1	–
Carbonate unspec.	15	2	1
Foraminifers	3	16	10
Calc. nannofossils	2	38	78
Diatoms	TR	–	2
Sponge spicules	TR	–	TR

ORGANIC CARBON AND CARBONATE (%)

	6, 39–40
Organic carbon	–
Carbonate	41

SITE 611 HOLE CORE 3 CORED INTERVAL 10.6–20.2 m



LITHOLOGIC DESCRIPTION

CALCAREOUS MUD to MUD, light to dark gray (5Y 7/2 to 4/1) or pale brown to yellowish brown (10YR 6/3 to 5/6) or greenish gray (5GY 5/1 to 5G 6/1), with silty laminations between 16.25 to 16.50 m.

MARLY FORAMINIFERAL NANNOFOSSIL OOZE intervals:
10.95 to 11.20 m: pale brown (10YR 6/3) and light gray (5Y 7/1); and
15.55 to 15.90 m: light gray to gray (5G 7/1 to 6/1).

FORAMINIFERAL NANNOFOSSIL OOZE intervals:
11.3 to 11.45 m: light gray (5Y 7/1); and
20.0 to 20.2 m (CC): light gray (N7) to greenish gray (5GY 6/1).

Greenish LAMINATIONS between 16.3 to 16.5 m.

Dropstones.

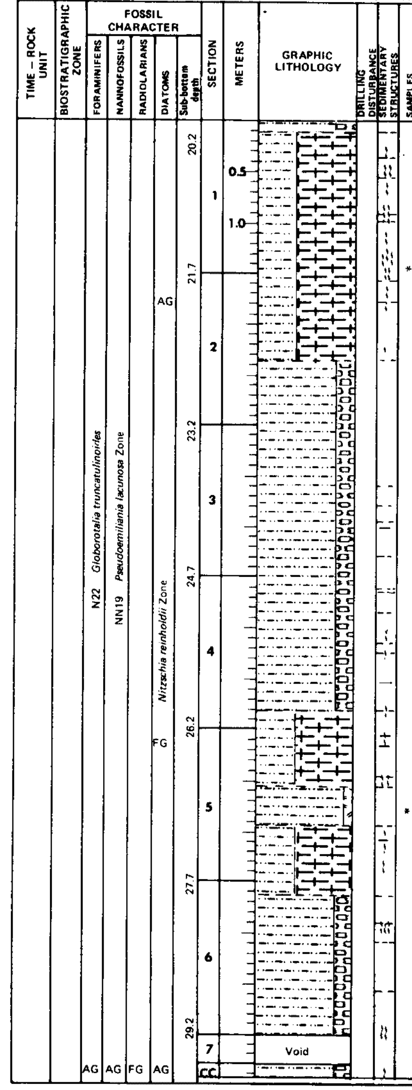
SMEAR SLIDE SUMMARY (%)

	3, 133	4, 75	5, 19
	D	M	D
Texture:			
Sand	10	–	12
Silt	35	–	38
Clay	55	–	50
Composition:			
Quartz	57	10	47
Feldspar	TR	TR	1
Heavy minerals	1	TR	2
Clay	25	25	35
Volcanic glass	3	–	5
Carbonate unspec.	8	–	9
Foraminifers	4	10	–
Calc. nannofossils	2	54	1
Diatoms	–	1	–
Sponge spicules	–	TR	–

ORGANIC CARBON AND CARBONATE (%)

	5, 19–20
Organic carbon	–
Carbonate	3

SITE 611 HOLE CORE 4 CORED INTERVAL 20.2–29.8 m



LITHOLOGIC DESCRIPTION

Alternating:
MARLY FORAMINIFERAL NANNOFOSSIL OOZE, gray (N7 to N6), grayish brown (2.5Y 5/2) or bluish gray (5B 6/1); and
CALCAREOUS MUD, greenish gray (5G 5/1 or 5BG 5/1), or light brownish gray (2.5Y 6/2), this last color appears to be more silty.

26.75 to 27.2 m: layer of dark greenish gray (5GY 4/1) ASH-BEARING MUD (10% volcanic glass).

Rare greenish gray (5G 5/1 or 6/1) or gray (N4) LAMINATIONS.

Rare PYRITIC HALOS.

Dropstones.

SMEAR SLIDE SUMMARY (%)

	1, 145	5, 76
	D	M
Texture:		
Sand	–	15
Silt	–	40
Clay	–	45
Composition:		
Quartz	–	55
Feldspar	1	–
Heavy minerals	TR	2
Clay	35	30
Volcanic glass	1	10
Micronodules	–	TR
Carbonate unspec.	1	3
Foraminifers	10	–
Calc. nannofossils	50	TR
Diatoms	2	–
Radiolarians	TR	–
Sponge spicules	TR	–

ORGANIC CARBON AND CARBONATE (%)

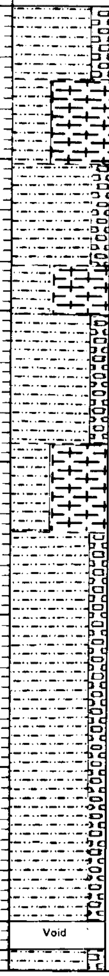
	5, 76–77
Organic carbon	–
Carbonate	2

SITE 611 HOLE CORE 5 CORED INTERVAL 29.8–39.4 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* (AG)
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone (AG)
Radiolarians: B
Diatoms: *Nitzschia reinholdii* Zone (FM, CG, RP)

Section	Sub-bottom depth (m)
1	29.8
2	31.3
3	32.8
4	34.3
5	35.8
6	37.3
7	38.8
CC	



Colors: N5; 5G 5/1; N7; 5G 6/1; 5G 5/1; 5GY 6/1; 2.5Y 6/2; 5GY 6/1; N4; 2.5Y 6/2; 5G 5/1; 5GY 5/1; 2.5Y 6/2; N6; 5B 6/1; 5G 5/2; N7; N6; 2.5Y 6/2; 5G 4/1; 5GY 5/1; 2.5Y 6/2; 5Y 5/1; 2.5Y 6/2; 5G 5/2; 5G 5/1; 5G 6/2; 5GY 5/1; 5GY 4/1; 5GY 4/1

LITHOLOGIC DESCRIPTION

Alternating:
MARLY FORAMINIFERAL NANNOFOSSIL OOZE, gray (N7 or N6) or greenish gray (5G 5/1); ~ 40% detrital; and
CALCAREOUS MUD, gray (N5), greenish gray (5GY 6/1 or 5/1), or light brownish gray (2.5Y 6/2); this last color appears to be more silty; ~ 80% detrital.

Some greenish gray (5G 5/1 or 5/2) LAMINATIONS, especially between 34.40 to 34.60 m and 37.35 to 37.55 m.

FORAMINIFERAL SAND patch at 31.50 m.

Common DROPSTONES.

SMEAR SLIDE SUMMARY (%):

	2, 145	6, 120
Texture:		
Sand	–	15
Silt	–	35
Clay	–	50
Composition:		
Quartz	15	62
Feldspar	1	1
Heavy minerals	3	–
Clay	20	20
Volcanic glass	–	3
Carbonate unspec.	1	3
Foraminifers	14	7
Calc. nannofossils	40	4
Diatoms	5	–
Radiolarians	TR	–
Sponge spicules	1	TR
Silicoflagellates	TR	–

ORGANIC CARBON AND CARBONATE (%)

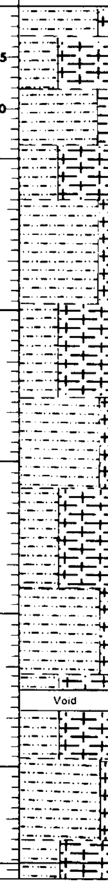
	3, 104–105
Organic carbon	–
Carbonate	6

SITE 611 HOLE CORE 6 CORED INTERVAL 39.4–49.0 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* (AG)
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone (AG)
Radiolarians: VRM
Diatoms: *Nitzschia reinholdii* Zone (FM, RP)

Section	Sub-bottom depth (m)
1	39.4
2	40.9
3	42.4
4	43.9
5	45.4
6	46.9
CC	47.85



Colors: 2.5Y 6/2; N6; 5Y 5/1; 2.5Y 6/2; 5GY 6/1; 2.5Y 5/2; 5GY 6/1 and 5G 6/1; 5G 5/1; 2.5Y 5/2; 5G 5/2; 5GY 6/1; 5GY 5/1; 5G 6/1; 5B 6/1; 5G 5/2; 5G 6/1; 5GY 5/1; N6; N6

LITHOLOGIC DESCRIPTION

39.4 to 39.7 m: downhole contamination (pebbles).

Alternating:
MARLY FORAMINIFERAL NANNOFOSSIL OOZE, gray (N6) or greenish gray (5G 6/1 or 5GY 6/1); and
CALCAREOUS MUD (80% detrital), gray (5Y 5/1) to greenish gray (5GY 5/1), or light brownish gray to grayish brown (2.5Y 6/2 to 5/2); these two colors appearing more silty.

Rare greenish (5G 5/2) or bluish (5B 6/1) LAMINATIONS between 43.4 to 43.5 m and 46.5 to 46.6 m.

One DROPSTONE: ash and pyrite clast at 41.15 m.

SMEAR SLIDE SUMMARY (%)

	2, 67	5, 120
	D	D
Texture:		
Sand	15	–
Silt	25	–
Clay	60	–
Composition:		
Quartz	50	–
Feldspar	1	–
Heavy minerals	3	–
Clay	30	40
Volcanic glass	2	1
Carbonate unspec.	3	–
Foraminifers	5	25
Calc. nannofossils	6	31
Diatoms	–	2
Sponge spicules	–	1
Silicoflagellates	–	TR

ORGANIC CARBON AND CARBONATE (%)

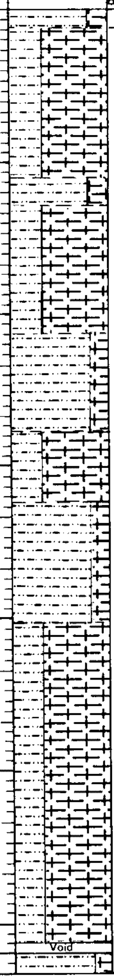
	2, 65–66
Organic carbon	–
Carbonate	15

SITE 611 HOLE CORE 7 CORED INTERVAL 49.0–58.6 m

Fossil character: Foraminifers N22 *Globorotalia truncatulinoides*; Nannofossils NN19 *Pseudoemiliania lacunosa* Zone; Diatoms *Nitzschia reinholdii* Zone, *Nitzschia marina* Zone (B, AG, FM, RP); CC: CG AG B RP

Sub-bottom depth: 49.0, 50.5, 52.0, 53.5, 55.0, 56.5, 58.0

Sections: 1, 2, 3, 4, 5, 6, 7, CC



Colors: 5Y 6/1, N7, 5B 6/1, 5GY 6/1, 5GY 5/1, 5Y 5/1, 5GY 5/1, 5Y 6/1, 5G 6/1, 5G 5/2, 5G 6/1, 5GY 4/1, 5Y 4/1, 5GY 6/1, 5Y 5/1, 5G 6/2, 5B 5/1, 5GY 6/1, 5G 6/2, 5GY 6/1, 5G 4/2, 5GY 5/1, 5GY 6/1, 5GY 4/1, 5GY 5/1

LITHOLOGIC DESCRIPTION

Alternating:
MARLY FORAMINIFERAL NANNOFOSSIL OOZE, greenish gray (5GY 5/1 or 6/1); and CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1), or dark greenish gray (5GY 4/1); some intervals seem to be more silty: 51.10 to 51.30 m and 53.88 to 54.40 m. Marly foraminiferal nannofossil ooze intervals are thicker than calcareous mud intervals.

Rare greenish (5G 6/2 to 4/2) or bluish (5B 5/1 or 6/1) gray LAMINATIONS.

DROPSTONES.

SMEAR SLIDE SUMMARY (%)

	1, 30	4, 75
	D	D
Texture:		
Sand	–	5
Silt	–	30
Clay	–	65
Composition:		
Quartz	–	53
Feldspar	–	TR
Heavy minerals	TR	1
Clay	30	30
Volcanic glass	–	3
Carbonate unspec.	–	1
Foraminifers	12	4
Calc. nannofossils	53	8
Diatoms	4	–
Radiolarians	TR	–
Sponge spicules	1	–
Silicoflagellates	TR	–

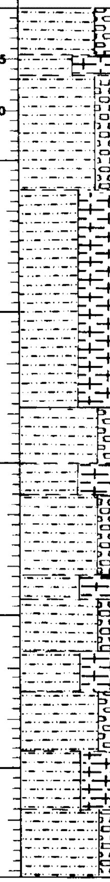
ORGANIC CARBON AND CARBONATE (%)

	5, 40–41
Organic carbon	–
Carbonate	63

SITE 611 HOLE CORE 8 CORED INTERVAL 58.6–68.2 m

Fossil character: Foraminifers N22 *Globorotalia truncatulinoides*; Nannofossils NN19 *Pseudoemiliania lacunosa* Zone; Diatoms *Nitzschia marina* Zone (B); base: CG AG VRM FM

Sections: 1, 2, 3, 4, 5, 6



Colors: 5GY 5/1, 5GY 6/1, 5GY 5/1, 5G 5/2, 5GY 6/1, 5GY 5/1, 5GY 6/1, 5Y 5/2, 5GY 5/1, 5G 4/2, N4, 5GY 6/1, 5GY 5/1, 5GY 6/1, 5G 5/2, 5GY 5/1, 5GY 6/1, 5GY 5/1

LITHOLOGIC DESCRIPTION

CALCAREOUS MUD
Alternating layers of:
Very fine grained mud (75% clay); ~40% $CaCO_3$ (foraminifers and nannofossils); light greenish gray (5GY 6/1); and relatively coarse grained mud (40% silt, 45% clay); poorer in $CaCO_3$ (20%); greenish gray (5GY 5/1). Some intervals seem "rougher" (more silty): 59.9 to 60.35 m; 62.05 to 62.50 m; and 65.6 to 65.9 m.

Rare greenish (5G 5/2 to 4/2) LAMINATIONS.

Small patches of FORAMINIFERAL SAND between 62.76 and 62.82 m.

DROPSTONES.

SMEAR SLIDE SUMMARY (%)

	1, 120	2, 120
Texture:		
Sand	15	5
Silt	40	20
Clay	45	75
Composition:		
Quartz	52	29
Feldspar	1	–
Heavy minerals	3	2
Clay	20	30
Volcanic glass	2	–
Micronodules	–	TR
Carbonate unspec.	8	–
Foraminifers	12	14
Calc. nannofossils	2	25

ORGANIC CARBON AND CARBONATE (%)

	1, 117–118
Organic carbon	–
Carbonate	11

SITE 611 HOLE CORE 9 CORED INTERVAL 68.2–77.8 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL6 *Globorotalia obliquus extremus*

Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone; NN18 *Discoaster brouweri* Zone

Diatoms: AC; CM; *Nitzschia marina* Zone

Sub-bottom depth: 68.2, 69.7, 71.2, 72.7, 74.2, 75.7, 76.03

Sections: 1, 2, 3, 4, 5, 6, CC (0.5, 1.0 m)

Core catcher: AG AG B B

Colors: N7; 5GY 5/1; 5GY 6/1; 5GY 4/1; 5Y 6/1; 5G 5/2; 5GY 5/1; 5G 5/2; 5G 5/2; 5G 5/2; 5G 5/2; 5GY 6/1; 5GY 4/1; 5Y 5/1; 5Y 4/1; 5G 5/2; 5G 5/2; N6; 5G 6/1; 5G 5/2; 5G 5/2; 5G 5/2; 5G 5/2; 5G 6/1; 5GY 5/1; 5GY 6/1; 5Y 5/1; 5Y 6/1; 5Y 5/1; 5GY 5/1; 5Y 5/1; 5Y 6/1; 5Y 5/1; N7 to N4; N7 to N4

CALCAREOUS MUD, greenish gray (5GY 6/1 to 4/1), or gray to dark gray (5Y 6/1 to 4/1); some "rougher" (more silty) intervals: 69.4 to 69.7 m; 69.86 to 69.91 m; 70.28 to 70.58 m; 71.8 to 72.08 m; and 72.70 to 73.0 m.

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, light gray to dark gray (N7 to N4) or greenish gray (5G 6/1).

Some grayish green (5G 5/2) LAMINATIONS.

Small FORAMINIFERAL SAND patches between 73.88 to 74.10 m.

DROPSTONES.

SMEAR SLIDE SUMMARY (%)

	3, 130
	D
Texture:	
Sand	5
Silt	15
Clay	80
Composition:	
Quartz	32
Feldspar	TR
Clay	35
Volcanic glass	1
Micronodules	4
Foraminifers	5
Calc. nannofossils	20
Diatoms	1
Radiolarians	TR
Sponge spicules	TR
Opaque oxides	2

ORGANIC CARBON AND CARBONATE (%)

	2, 80–82
Organic carbon	–
Carbonate	28

SITE 611 HOLE CORE 10 CORED INTERVAL 77.8–87.4 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL6 *Globorotalia obliquus extremus*

Nannofossils: NN18 *Discoaster brouweri* Zone

Diatoms: CM; CG; *Nitzschia marina* Zone; FG

Sub-bottom depth: 77.8, 79.3, 80.8, 82.3, 83.8, 85.3, 86.7

Sections: 1, 2, 3, 4, 5, 6, CC (0.5, 1.0 m)

Core catcher: CG CG B RP

Colors: 5Y 4/1; 5Y 5/1; 5GY 4/1; 5Y 4/1; 5G 4/2; 5Y 5/1; 5G 4/2; 5Y 6/1; 5G 5/2; 5Y 6/1; 5Y 5/1; 5GY 5/1; 5Y 5/1; N4; 5Y 4/2; 5G 4/2; 5Y 5/1; 5Y 4/1; 5Y 5/1; 5Y 4/1; 5Y 5/1; 5G 4/2 5Y 6/1; 5Y 4/1; 5Y 5/1 to 5Y 6/1; 5Y 4/1; 5GY 4/1; 5Y 4/1; 5GY 4/1; 5G 4/1 to 5GY 4/1

0–19 cm: washed-down gravel.

Alternating:
CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1);
and
FORAMINIFERAL NANNOFOSSIL OOZE, light gray to gray (5Y 6/1 to 5/1). Both generally slightly mottled.

78.85 to 79.10 m: layer of ASH-BEARING MUD; dark gray (5GY 4/1).

81.75 to 81.78 m: layer of VOLCANIC SANDY MUD (50% volcanic glass; grain size: 50% sand, 35% silt).

Grayish green (5G 5/2 to 4/2) LAMINATIONS, sometimes slightly indurated.

79.1 to 79.3 m: *CHONDRITE*-TYPE BURROWS.

SMEAR SLIDE SUMMARY (%)

	1, 120	2, 128	3, 87
	M	D	M
Texture:			
Sand	20	–	50
Silt	50	–	35
Clay	30	–	15
Composition:			
Quartz	45	15	35
Feldspar	7	–	8
Mica	TR	5	2
Heavy minerals	TR	–	–
Clay	15	5	–
Volcanic glass	15	–	50
Glauconite	–	–	1
Carbonate unspec.	10	5	3
Foraminifers	–	10	–
Calc. nannofossils	8	49	1
Diatoms	–	4	–
Radiolarians	–	2	–
Sponge spicules	–	5	–

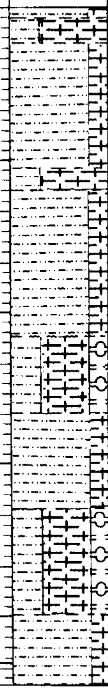
ORGANIC CARBON AND CARBONATE (%)

	2, 128–129
Organic carbon	–
Carbonate	67

SITE 611 HOLE CORE 11 CORED INTERVAL 87.4–97.0 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN18 *Discoaster brouweri* Zone		AM; *Nitzschia marina* Zone	87.4	1	0.5, 1.0
						88.9	2	
						90.4	3	
						91.9	4	
						93.4	5	
		AG	AG	B	CM	93.86	CC	

GRAPHIC LITHOLOGY



Colors (top to bottom): 5Y 4/1; 5GY 5/1; 5Y 4/1; 5GY 5/1; 5G 4/1; 5G 5/2; 5Y 4/1; N4; 5Y5/1; 5G 5/2; N4; 5G 5/2; 5GY 7/1; 5Y 4/1; 5Y 5/1; 5Y 4/1; 5GY 5/1; 5GY 6/1; 5Y 4/1; 5Y 4/1

LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1); and
MARLY FORAMINIFERAL NANNOFOSSIL OOZE, greenish gray (5GY 5/1), becoming MARLY SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE at 90.6 m; light greenish gray to greenish gray (5GY 7/1 to 5/1)

Rare gray (N4) or green (5G 5/2) LAMINATIONS in CALCAREOUS MUD.

Common green (5G 5/2) diffuse LAMINATIONS in siliceous ooze.

Common MOTTLING between 89.2 m and the base; gray or olive.

SMEAR SLIDE SUMMARY (%)

	2, 25	3, 80	4, 130
	M	D	D
Composition:			
Quartz	5	15	15
Feldspar	–	–	2
Mica	TR	–	5
Heavy minerals	–	5	3
Clay	20	5	2
Volcanic glass	–	–	TR
Foraminifers	15	10	10
Calc. nannofossils	55	42	40
Diatoms	2	4	3
Radiolarians	–	2	2
Sponge spicules	3	15	15
Silicoflagellates	–	2	TR

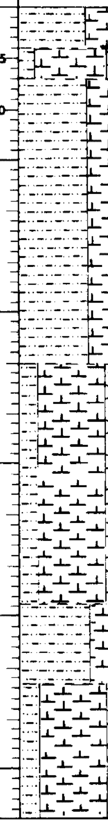
ORGANIC CARBON AND CARBONATE (%)

	3, 80–81
Organic carbon	–
Carbonate	66

SITE 611 HOLE CORE 12 CORED INTERVAL 97.0–106.6 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN18 *Discoaster brouweri* Zone			97.0	1	0.5, 1.0
						98.5	2	
						100.0	3	
						101.5	4	
						103.0	5	
		AG	AG	VRM	RP	104.5, 104.97	6	

GRAPHIC LITHOLOGY



Colors (top to bottom): 5Y 4/1; 5Y 5/1; 5Y 4/1; 5GY 4/1 with 5Y 4/1 and 5Y 5/1; 5Y 4/1; 5G 4/2; 5Y 3/2; 5Y 4/1; 5Y 5/1 to 5Y 6/1; 5Y 5/1; 5Y 5/1 to 5Y 6/1; 5Y 4/1; 5Y 3/2; 5Y 3/1; 5Y 3/2; 5Y 6/1; 5Y 5/1 to 5GY 5/1; 5GY 4/1

LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, dark gray (5Y 4/1) to dark olive gray (5Y 3/2); and
SILICEOUS NANNOFOSSIL OOZE, gray (5Y 5/1 or 6/1).

Generally common MOTTLING.

Rare green LAMINATIONS.

ZOOPHYCOS burrow at 100.8 m.

104.91 to 104.97 m: indurated green interval.

SMEAR SLIDE SUMMARY (%)

	2, 91	3, 98
	D	D
Texture:		
Sand	20	–
Silt	50	–
Clay	30	–
Composition:		
Quartz	30	18
Mica	5	2
Heavy minerals	1	–
Clay	34	–
Carbonate unspec.	–	5
Foraminifers	3	TR
Calc. nannofossils	22	58
Diatoms	2	2
Radiolarians	2	3
Sponge spicules	1	7

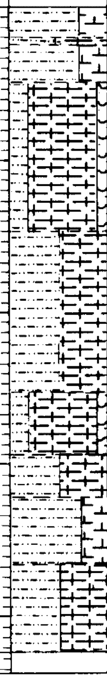
ORGANIC CARBON AND CARBONATE (%)

	2, 93–94
Organic carbon	–
Carbonate	14

SITE 611 HOLE CORE 13 CORED INTERVAL 106.6–116.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN17 *Discoaster pentaradiatus* Zone; NN16 *Discoaster surculus* Zone		B; AG; *Nitzschia marina* Zone	106.6, 108.1, 109.6, 111.1, 112.6, 112.95	1, 2, 3, 4, 5, CC	0.5, 1.0
		AG	AG	FG	AG			

GRAPHIC LITHOLOGY



Colors: 5Y 4/1, 5GY 5/1, 5Y 4/1, 5GY 6/1, 5GY 5/1, 5GY 5/1, 5GY 6/1, 5GY 5/1, 5Y 4/1, 5GY 5/1, 5GY 5/1

LITHOLOGIC DESCRIPTION

MARLY FORAMINIFERAL NANNOFOSSIL OOZE (greenish gray 5GY 5/1) and SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE (light greenish gray 5GY 6/1). Very gradational contacts between one sediment type and the other.

Common dark green (5G 4/2) and olive gray (5Y 6/1) laminations or mottling.

CALCAREOUS MUD intervals: 106.6 to 107.35 m and 111.4 to 112.2 m, with greenish gray (5GY 3/1 and 5Y 5/1) diffuse layers.

ZOOPHYCOS BURROWS at 112.4 and 112.42 m.

SMEAR SLIDE SUMMARY (%)

	1, 130	2, 130
	D	D
Composition:		
Quartz	10	20
Mica	5	TR
Heavy minerals	2	5
Clay	3	25
Foraminifers	10	10
Calc. nannofossils	57	33
Diatoms	3	2
Radiolarians	1	TR
Sponge spicules	10	5
Silicoflagellates	TR	TR

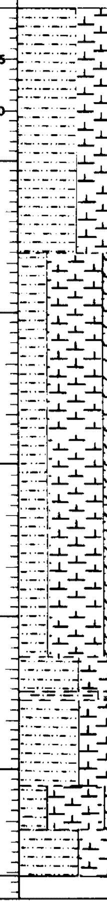
ORGANIC CARBON AND CARBONATE (%)

	2, 130–131
Organic carbon	–
Carbonate	44

SITE 611 HOLE CORE 14 CORED INTERVAL 116.2–125.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone	AG	*Nitzschia marina* Zone	116.2, 117.7, 119.2, 120.7, 122.2, 123.7, 124.74	1, 2, 3, 4, 5, 6, CC	0.5, 1.0
		RG	FG	RG	FM			

GRAPHIC LITHOLOGY



Colors: 5Y 4/1, 5Y 5/1, 5Y 5/1 to 5Y 6/1, 5Y 4/1 to 5Y 3/1, 5Y 3/1, 5Y 4/1, 5Y 5/1, 5Y 4/1, 5Y 4/1

LITHOLOGIC DESCRIPTION

CALCAREOUS MUD (dark gray 5Y 4/1 to 3/1) and MARLY SILICEOUS NANNOFOSSIL OOZE (gray 5Y 5/1 to 6/1) with very gradational contacts between one type and the other.

122.9 to 123 m: SANDY VOLCANIC LAYER, rich in tuff fragments.

Green (5G 4/2) and brown MOTTLING.

ZOOPHYCOS BURROWS: 122.7 to 123.1 m and 124.3 to 124.4 m.

PLANOLITES (?) BURROWS: 124.03 to 124.10 m.

SMEAR SLIDE SUMMARY (%)

	1, 110	5, 80
	D	M
Texture:		
Sand	2	40
Silt	68	35
Clay	30	25
Composition:		
Quartz	52	45
Feldspar	–	15
Mica	3	5 (Tuff fragments)
Clay	–	20
Volcanic glass	–	15
Glauconite	TR	–
Pyrite	TR	–
Carbonate detrital	5	–
Foraminifers	2	–
Calc. nannofossils	30	–
Diatoms	2	–
Radiolarians	2	TR
Sponge spicules	4	–
Plant debris (pollen)	–	TR

ORGANIC CARBON AND CARBONATE (%)

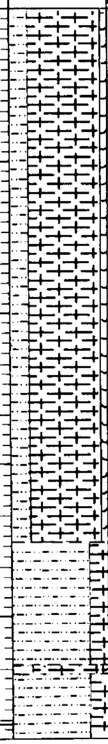
	5, 128–130
Organic carbon	–
Carbonate	17

SITE 611 HOLE A CORE 1 CORED INTERVAL 0.0–7.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* — AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone — AG
Diatoms: *Pseudoeunotia doliolus* Zone — FM

Sub-bottom depth: 0, 1.5, 3, 4.5, 6, 7.08, 7.2
Sections: 1, 2, 3, 4, 5, CC
Meters: 0.5, 1.0



Colors: 10YR 6/4; 10YR 5/3; 2.5Y 5/3; 2.5Y 7/2; 2.5Y 4/3; 10YR 6/4; 10YR 7/2; 2.5Y 7/2, 10YR 5/3, 1.5Y 7/2, 2.5Y 6/2; * 2.5Y 7/2; 2.5Y 6/3; 2.5Y 7/2; N5, N5, 5GY 7/1; 10YR 8/1; 5Y 4/1; 10YR 7/1; * 5Y 4/1; 5Y 5/1

SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE (0.00 to 5.30 m), light gray to gray (10YR 7/1 to 6/1) or grayish brown (2.5Y 7/2 to 4/3).

CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1).

Common MOTTLING.

Rare gray (N5) and greenish gray (5GY 7/1) LAMINATIONS.

SMEAR SLIDE SUMMARY (%)

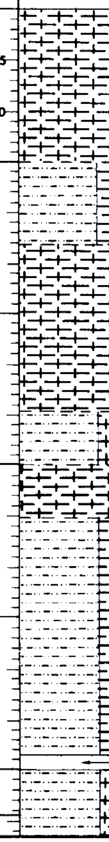
	3, 80	5, 78
	D	D
Composition:		
Quartz	18	42
Feldspar	–	5
Heavy minerals	2	5
Clay	–	30
Volcanic glass	–	3
Foraminifers	10	10
Calc. nannofossils	60	5
Diatoms	2	–
Sponge spicules	8	–

SITE 611 HOLE A CORE 2 CORED INTERVAL 7.2–16.8 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* — AG
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone — CG
Diatoms: B

Sub-bottom depth: 7.2, 8.7, 10.2, 11.7, 13.2, 14.7, 15.2
Sections: 1, 2, 3, 4, 5, 6, CC
Meters: 0.5, 1.0



Colors: 5Y 5/1; N7; 5Y 4/1, N7, 5Y 5/1 to 5Y 6/1; 10YR 5/2; N3; N6; 5Y 4/1 to 5Y 5/1; 5G 4/2; 2.5Y 5/2; 5Y 5/1; 2.5Y 4/2; IW; 2.5Y 3/2; 5Y 4/1; 2.5Y 5/1; 2.5Y 5/2

First section very disturbed: mixed calcareous mud and foraminiferal nannofossil ooze.

Alternating:
CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1), grayish brown (10YR 5/2) to dark grayish brown (2.5Y 3/2); and
FORAMINIFERAL NANNOFOSSIL OOZE, light gray to gray (N7 or N6).

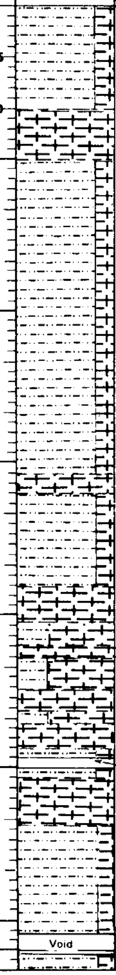
Slight MOTTLING. Rare green (5G 4/2) PATCHES and green (5G 4/2) LAMINATIONS. Rare PYRITIC (N3) LAMINATIONS.

PLANOLITES BURROWS between 11.91 and 11.94 m.

SITE 611 HOLE A CORE 3 CORED INTERVAL 16.8–26.4 m

Time – Rock Unit	Biostratigraphic Zone	Foraminifers	Nannofossils	Radiolarians	Diatoms	Sub-bottom depth	Section	Meters
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone			16.8	1	0.5, 1.0
						18.3	2	
						19.8	3	
						21.3	4	
						22.8	5	
						24.3	6	
						25.8	7	
		RG	FM		B	25.9	CC	

GRAPHIC LITHOLOGY



Samples: * * * * *

Colors: 5Y 5/1; 2.5Y 7/1; 5G 5/2; 5Y 5/1; 5Y 4/1; 5GY 4/1; 5GY 5/1; 5Y 4/3; 5Y 7/1; 5Y 5/1; 5Y 4/1; 5Y 7/1; 5Y 5/1; 5GY 8/1; 5Y 8/1; 5Y 6/1; 2.5Y 4/3; 5GY 7/1; N5; 5Y 8/1; 5Y 6/1; 5Y 7/1; 5Y 5/1; 5Y 5/1; Void; 5Y 8/1; 5Y 4/1; 5Y 5/1; 5Y 4/1

LITHOLOGIC DESCRIPTION

16.8 to 22.5 m: alternating:
CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1);
and
thiner layers of FORAMINIFERAL NANNOFOSSIL OOZE, light gray (5Y 8/1 to 7/1 or 2.5Y 7/1).
22.5 to 24.1 m: alternating thin layers of:
FORAMINIFERAL NANNOFOSSIL OOZE; and
MARLY FORAMINIFERAL NANNOFOSSIL OOZE, gray (5Y 6/1).

Slight to common MOTTLING.

Common small *CHONDRITE*-TYPE BURROWS between 21.74 and 22.51 m.

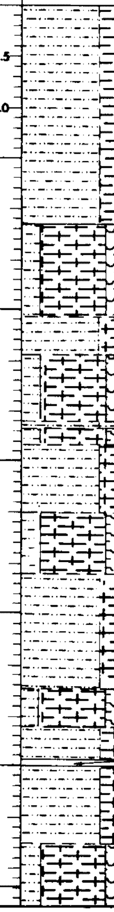
SMEAR SLIDE SUMMARY (%)

	4, 39	4, 111
	D	D
Composition:		
Quartz	40	30
Feldspar	10	20
Mica	5	10
Heavy minerals	5	10
Clay	30	40
Foraminifers	10	20
Calc. nannofossils	5	30

SITE 611 HOLE A CORE 4 CORED INTERVAL 26.4–36.0 m

Time – Rock Unit	Biostratigraphic Zone	Foraminifers	Nannofossils	Radiolarians	Diatoms	Sub-bottom depth	Section	Meters
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone		*Nitzschia reinholdii* Zone	26.4	1	0.5, 1.0
						27.9	2	
						29.4	3	
						30.9	4	
						32.4	5	
						33.9	6	
		AG	AG		CM	35.1	CC	

GRAPHIC LITHOLOGY



Samples: *

Colors: 5Y 5/1 to 5Y 4/1; 5G 4/1; 5Y 4/1; 5Y 5/2; 5Y 5/1; 5Y 6/1; 5Y 4/1; 5Y 5/1; 5Y 5/2; 5Y 6/1; 5Y 4/1; 5GY 4/1; 2.5Y 4/2; 5Y 5/1; 5GY 5/1; 5Y 6/1; 5GY 4/1; 5Y 5/1; 5G 4/2; 2.5Y 4/2; 5Y 5/1; 2.5Y 4/2; 5GY 5/1; 5Y 4/1; 5G 6/2; IW; 5Y 4/1; 5GY 4/1; 2.5Y 4/2; 5Y 5/1 to 5Y 6/1; N7

LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1) or dark grayish brown (2.5Y 4/2); often silty, mainly homogeneous; bases of layers often mottled; and
MARLY SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE, gray (5Y 6/1) or greenish gray (5GY 5/1); probably marly foraminiferal nannofossil ooze in the upper part of the core, gradually becoming siliceous; mottled.

Rare green or gray LAMINATIONS.

Gray (N7) PYRITIC HALO at 33.30 m.

SMEAR SLIDE SUMMARY (%)

	5, 100
	D
Composition:	
Quartz	25
Mica	TR
Heavy minerals	TR
Foraminifers	7
Calc. nannofossils	58
Diatoms	1
Radiolarians	2
Sponge spicules	7

SITE 611 HOLE A CORE 5 CORED INTERVAL 36.0–45.6 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

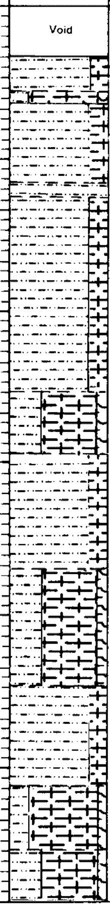
Biostratigraphic zones: N22 *Globorotalia truncatulinoides*; NN19 *Pseudoemiliania lacunosa* Zone

Fossil character: Foraminifers FG; Nannofossils FP; Diatoms B

Sub-bottom depth: 36.0, 37.5, 39.0, 40.50, 42.0, 43.5, 44.80

Sections: 1, 2, 3, 4, 5, 6

Meters: 0.5, 1.0



Colors: 5Y 4/1, 5Y 8/1, 5Y 4/1, 5GY 2/1, 5GY 4/1, 5Y 5/1, 5Y 4/1, 5G 5/2, N3, 5G 5/2, 5Y 5/1, 5G 5/2, 5G 5/2, 5Y 4/1, 5Y 4/2, 5G 6/2, 5G 4/2, 5GY 5/1, N6, 5Y 5/2, N5, 5Y 6/1, 5G 5/2, 5G 5/2, 5Y 5/1, 5Y 4/1

LITHOLOGIC DESCRIPTION

Alternating layers of:
CALCAREOUS MUD, olive gray to dark gray (5Y 5/2 to 4/1) or dark greenish gray (5GY 4/1); and
MARLY SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE to SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE, very light gray to gray (5Y 8/1 to 5/1) or greenish gray (5GY 5/1).

Faint MOTTLING, especially on foraminiferal nannofossil ooze.

Greenish (5G 6/2 to 4/2) or gray (N3 to N5) LAMINATIONS.

40.50 to 41.54 m: common mottling and diffuse laminations.

Dropstones.

SMEAR SLIDE SUMMARY (%)

	2, 38 M	6, 42 D
Texture:		
Sand	15	–
Silt	60	–
Clay	25	–
Composition:		
Quartz	40	15
Feldspar	10	2
Mica	–	2
Heavy minerals	10	2
Clay	20	–
Foraminifers	–	10
Calc. nannofossils	–	59
Diatoms	–	2
Sponge spicules	–	8
Tuff clasts	20	–

SITE 611 HOLE A CORE 6 CORED INTERVAL 45.6–55.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

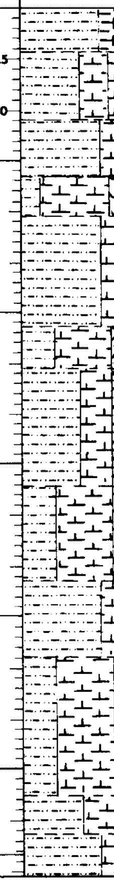
Biostratigraphic zones: N22 *Globorotalia truncatulinoides*; NN19 *Pseudoemiliania lacunosa* Zone

Fossil character: Foraminifers AG; Nannofossils AG; Diatoms FM

Sub-bottom depth: 45.6, 47.1, 48.6, 50.1, 51.6, 53.1, 53.92

Sections: 1, 2, 3, 4, 5, 6, CC

Meters: 0.5, 1.0



Colors: 5Y 4/2, 5GY 5/1, 5Y 4/1, N7, 5Y 4/1, 5Y 5/1, 5Y 4/1, 5GY 4/1, 5Y 6/1, 5Y 5/1, 5GY 4/1, 5Y 5/1 to 5Y 4/1, 5Y 6/1 to 5GY 6/1, 5Y 4/1, 5Y 4/1, 5Y 3/1, 5GY 4/1, 5Y 5/1, 5Y 6/1, 5GY 4/1, 5Y 5/1 to 5Y 4/1, 5Y 4/1

LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, dark gray (5Y 4/1 to 4/2) or SILICEOUS CALCAREOUS MUD, gray (5Y 5/1 to 4/1) or greenish gray (5GY 4/1); and
MARLY SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE, gray (N7) or light greenish gray (5Y 6/1 to 5GY 6/1).
Some calcareous mud intervals seem more silty: 45.6 to 46.05 m; 46.46 to 47.2 m; 47.65 to 48.75 m; and 53.35 to 53.92 m.

MOTTLING: 45.6 to 47.1 m; 48.75 to 50.10 m; and 52.0 to 53.35 m.
VOLCANIC ASH-RICH(?) LAYERS, dark, at 48.57 to 49.60 m and 51.49 to 51.50 m.

Greenish or gray LAMINATIONS, particularly indurated 52.5 to 52.8 m.

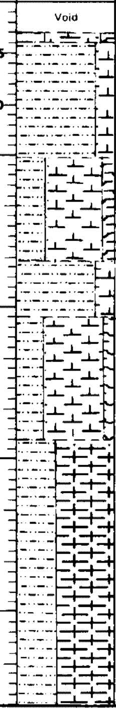
Dropstones.

SMEAR SLIDE SUMMARY (%)

	60 D
Texture:	
Sand	5
Silt	45
Clay	50
Composition:	
Quartz	58
Mica	1
Heavy minerals	1
Foraminifers	2
Calc. nannofossils	28
Diatoms	1
Radiolarians	3
Sponge spicules	8
Silicoflagellates	TR

SITE 611 HOLE A CORE 7 CORED INTERVAL 55.2–64.8 m

Time-rock unit	Biostratigraphic zone	Foraminifers	Nannofossils	Radiolarians	Diatoms	Sub-bottom depth	Section
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone			55.2	1
						56.7	2
						58.2	3
						59.7	4
						61.2	5
		AG	CM		B	62.10	



LITHOLOGIC DESCRIPTION

MARLY SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE (gray 5Y 6/1) to MARLY FORAMINIFERAL NANNOFOSSIL OOZE (gray 5Y 5/1 to 6/1); amount of siliceous organisms decreasing probably progressively, becoming <10% around 59.6 m.

Interval between 58.34 to 59.56 is varicolored, predominantly gray (5Y 5/1 or 6/1), with common green, olive, and gray LAMINATIONS, and common MOTTLING; 59.01 to 59.07 m: common *CHONDRITE*-TYPE BURROWS.

Two layers of CALCAREOUS MUD; dark gray (5Y 4/1): 55.6 to 56.72 m and 57.75 to 58.24 m.

Generally common mottling.

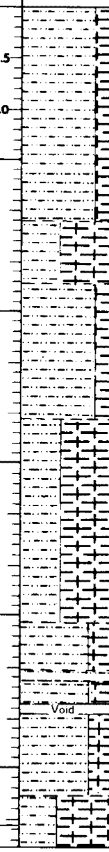
61.73 to 61.90 m: common sandsize grained clasts with sharp contacts, grayish green (5G 4/2).

SMEAR SLIDE SUMMARY (%)

	4, 70
Composition:	
Quartz	25
Feldspar	5
Mica	TR
Heavy minerals	5
Clay	5
Foraminifers	10
Calc. nannofossils	43
Diatoms	2
Radiolarians	TR
Sponge spicules	5
Silicoflagellates	TR

SITE 611 HOLE A CORE 8 CORED INTERVAL 64.8–74.4 m

Time-rock unit	Biostratigraphic zone	Foraminifers	Nannofossils	Radiolarians	Diatoms	Sub-bottom depth	Section
		PL6 *Globorotalia obliquus extremus*	NN18 *Discoaster brouweri* Zone?		*Nitzschia reinholdii* Zone	64.8	1
						66.3	2
						69.8	3
						71.3	4
						72.8	5
							6
		AG	AG		FM		CC



LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1);
and
MARLY FORAMINIFERAL NANNOFOSSIL OOZE, gray (N6 or 5Y 6/1).

73.3 to 73.45 m: layer of olive (5Y 5/3) MUD.

Green (5G 5/2) LAMINATIONS, sometimes relatively thick (2 to 5 cm).

Green (5G 5/2) PATCHES between 72.31 and 72.46 m.

DROPSTONES

SMEAR SLIDE SUMMARY (%)

	1, 140 D	3, 144
Texture:		
Sand	15	–
Silt	25	–
Clay	60	–
Composition:		
Quartz	41	30
Heavy minerals	4	TR
Clay	20	5
Volcanic glass	6	–
Micronodules	TR	–
Carbonate unspec.	1	TR
Foraminifers	8	6
Calc. nannofossils	20	57
Sponge spicules	TR	TR

SITE 611 HOLE A CORE 9 CORED INTERVAL 74.4–84.0 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N. acostaensis PL6 *Globorotalia obliquus extremus*; RG

Nannofossils: NN18 *Discoaster brouweri* Zone?; AG

Diatoms: B

Sub-bottom depth: 74.4, 74.6, 75.9, 76.25, 76.8, 77.4, 78.3, 78.9, 80.4, 81.9, 82.75, 83.4

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Graphic lithology: Void (section 1); Void (section 2); Void (section 2); Void (sections 3–6); Void (section 7)

Colors: 5GY 5/1; 5Y 5/1 washed in sand + gravel; 5Y 6/1; 5Y 5/1; 5Y 4/1; 5G 5/2; 5GY 6/1; 5Y 5/1; 5GY 5/1; 2.5Y 5/2

Core stuck in liner; only a few fragments could be saved.

CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1).

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, greenish gray (5GY 5/1 to 5GY 6/1).

SITE 611 HOLE A CORE 10 CORED INTERVAL 84.0–93.6 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: AG

Nannofossils: NN18 *Discoaster brouweri* Zone?; AG

Diatoms: *Nitzschia marina* Zone; FM

Sub-bottom depth: 84.0, 85.5, 87.0, 88.5, 90.0, 91.5

Sections: 1, 2, 3, 4, 5, 6, CC

Graphic lithology: Void (section 6); OD

Colors: 5B 5/1; 5Y 5/1; 5Y 5/1 + 6/1; 5Y 5/1 (flowed); 5G 5/2; 5G 6/1 and 5G 5/2; (flowed); 5Y 6/1; 5GY 5/1; 5B 6/1; 5G 5/2; 5G 5/2; 5BG 4/1; 5Y 5/1; 5G 6/1; 5GY 6/1; IW; OG; 5Y 5/1; 5G 5/2; 5GY 6/1; 5G 5/2; 5Y 4/1; 5Y 4/1; 5Y 4/1

CALCAREOUS MUD, gray (5Y 6/1 or 5/1), or greenish gray (5GY 6/1 or 5/1); greener intervals contain ~3% volcanic glass.

Bluish (5B 5/1 or 6/1) or greenish (5G 6/1 to 5/2) LAMINATIONS, sometimes relatively thick (3 to 5 cm).

90.6 to 91.1 m: interval with common green LAMINATIONS and *ZOOPHYCOS* BURROWS.

Dropstones.

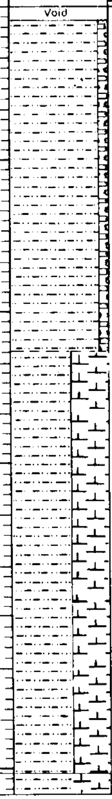
SMEAR SLIDE SUMMARY (%)

	1, 75	4, 91
	D	D
Texture:		
Sand	15	5
Silt	30	20
Clay	55	75
Composition:		
Quartz	65	53
Feldspar	1	–
Clay	20	30
Volcanic glass	3	–
Micronodules	TR	–
Carbonate unspec.	3	1
Foraminifers	4	3
Calc. nannofossils	5	10
Diatoms	–	3
Sponge spicules	–	TR

SITE 611 HOLE A CORE 11 CORED INTERVAL 93.6–103.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN18 *Discoaster brouweri* Zone		*Nitzschia marina* Zone	93.6	1	0.5, 1.0
						95.1	2	
						96.6	3	
						98.1	4	
						99.6	5	
						101.1	6	
		AG	AG		CM	101.17	CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Colors: 5Y 5/1 (*); 5G 5/2; 5Y 6/1; 5G 5/2; 5G 5/2; 5Y 5/1; 5GY 6/1 (*); 5G 5/2; 5G 5/2; 5GY 5/1; 5G 5/2; 5GY 5/1; 5G 5/2; 5GY 6/1; 5G 5/2; 5G 5/2; 5GY 5/1; 5GY 6/1; 5G 5/2; 5GY 5/1; 5GY 6/1

LITHOLOGIC DESCRIPTION

93.7 to 97.0 m: CALCAREOUS MUD, gray (5Y 6/1 to 5/1), containing ~10% $CaCO_3$ (smear slide estimation).

97.0 to 101.2 m: CALCAREOUS MUD to MARLY NANNOFOSSIL OOZE, greenish gray (5GY 6/1 to 5/1), containing more than 30% $CaCO_3$ and ~8% siliceous organisms(smear slide estimation).

Green LAMINATIONS (5G 5/2), sometimes relatively thick (3.4 cm).

Rare *ZOOPHYCOS* BURROWS.

Dropstones.

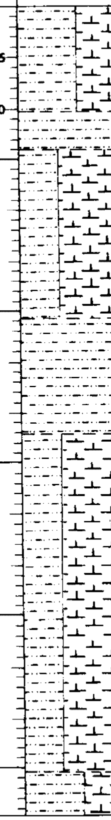
SMEAR SLIDE SUMMARY (%)

	1, 75	3, 47
	D	D
Texture:		
Sand	10	10
Silt	25	20
Clay	65	70
Composition:		
Quartz	65	37
Feldspar	1	3
Heavy minerals	3	–
Clay	20	30
Carbonate unspec.	3	1
Foraminifers	3	8
Calc. nannofossils	6	20
Diatoms	TR	8
Radiolarians	–	TR
Sponge spicules	TR	TR
Silicoflagellates	–	TR

SITE 611 HOLE A CORE 12 CORED INTERVAL 103.2–112.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN17 *Discoaster pentaradiatus* Zone		*Nitzschia marina* Zone		1	0.5, 1.0
							2	
							3	
							4	
							5	
		AG	AG		FM		6	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Colors: 5GY 5/1; 5G 4/1; 2.5Y 4/2; 5GY 6/1; 5Y 4/1; 2.5Y 4/2 and 5G 4/2 (*); 2.5Y 5/2 and 5G 5/2; 5GY 6/1 (*); 5Y 5/1; 5GY 6/1; 5GY 5/1

LITHOLOGIC DESCRIPTION

Mostly MARLY NANNOFOSSIL OOZE, gray to greenish gray (5Y 5/1 to 5GY 6/1).

Top and bottom of core: CALCAREOUS MUD, greenish gray (5GY 5/1).

Two layers of MUD, dark grayish brown (2.5Y 4/2) to grayish green (5G 4/2), containing ~ 7% volcanic glass: 104.25 to 104.62 m and 106.30 to 107.4 m.

Distorted green (5G 5/2) or gray (5Y 5/1) LAMINATIONS common between 104.7 and 104.84 m.

Common green (5G 5/2) LAMINATIONS and PATCHES on marly nannofossil ooze intervals.

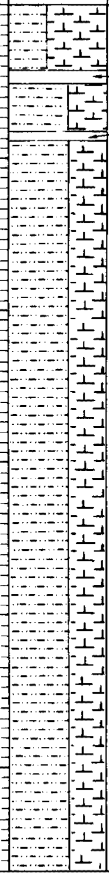
SMEAR SLIDE SUMMARY (%)

	3, 40	4, 60
	D	D
Texture:		
Sand	20	–
Silt	35	–
Clay	45	–
Composition:		
Quartz	65	25
Feldspar	1	TR
Heavy minerals	4	3
Clay	25	15
Volcanic glass	7	–
Micronodules	TR	–
Carbonate unspec.	1	TR
Foraminifers	–	4
Calc. nannofossils	TR	45
Diatoms	–	7
Radiolarians	–	TR
Sponge spicules	–	1
Silicoflagellates	–	TR

SITE 611 HOLE A CORE 13 CORED INTERVAL 112.8–122.4 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone		*Nitzschia marina* Zone	112.8	1	0.5, 1.0
						114.3	2	
						115.8	3	
						117.3	4	
						118.8	5	
		AG	AG		AG	120.3 / 121.3	6	

GRAPHIC LITHOLOGY



Colors: 5GY 6/1; Void; Void; 5G 5/2; 5GY 5/1; 5GY 4/1; 5G 5/2; 5G 5/2; 5GY 5/1; 5Y 7/1 (*Zoophycos*); 5GY 5/1

LITHOLOGIC DESCRIPTION

Layer of MARLY NANNOFOSSIL OOZE, greenish gray (5GY 6/1), but mostly CALCAREOUS MUD, greenish gray to dark greenish gray (5GY 5/1 to 4/1).

Green (5G 5/2) faint irregular PATCHES and LAMINATIONS.

ZOOPHYCOS BURROWS between 118.20 and 118.30 m.

Dropstone.

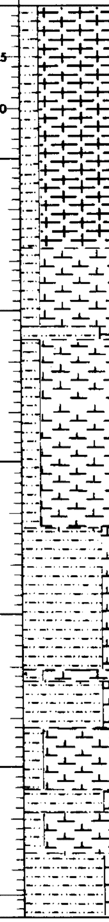
SMEAR SLIDE SUMMARY (%)

	4, 77
Texture:	
Sand	5
Silt	15
Clay	80
Composition:	
Quartz	38
Heavy minerals	1
Clay	30
Pyrite	3
Micronodules	TR
Carbonate unspec.	1
Foraminifers	2
Calc. nannofossils	19
Diatoms	5
Radiolarians	TR
Sponge spicules	1
Silicoflagellates	TR

SITE 611 HOLE B CORE 1 CORED INTERVAL 0.0–8.9 m

TIME–ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN21 *Emiliania huxleyi* Zone		*Pseudoeunotia doliolus* Zone	0.0	1	0.5, 1.0
						1.5	2	
						3.0	3	
						4.5	4	
						6.0	5	
						7.5	6	
		AG	AG		FP		CC	

GRAPHIC LITHOLOGY



Colors: 10YR 6/4; 2.5Y 4/3; 2.5Y 5/3; 2.5Y 4/3; 2.5Y 6/2; 5Y 7/1; 2.5Y 6/2; 5Y 7/1; 5Y 5/2; 5Y 7/1; 5Y 6/2; 5Y 7/1; 5Y 6/3; 5Y 7/1; 2.5Y 7/3; 2.5Y 4/3; 2.5Y 7/3; 5Y 7/1; 5Y 5/1; 5Y 7/1; 5Y 5/1; 10YR 5/3; 5Y 7/3; 2.5Y 4/3; 5Y 7/1; 5Y 5/1; 5Y 6/1

LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1);
and
FORAMINIFERAL NANNOFOSSIL OOZE, light yellowish brown (10YR 6/4) or grayish brown (2.5Y 5/3 to 4/3), becoming NANNOFOSSIL OOZE, yellow (2.5Y 7/3) to brownish gray (2.5Y 6/2), or gray (5Y 7/1 to 6/3).

Generally common MOTTLING.

0.16 to 0.84 m; 5.17 to 6.30 m; and 6.62 to 7.10 m: common coarse sandsized SANDSTONE and MUDSTONE CLASTS.

3.35 to 3.37 m: SAND-FILLED BURROWS.

Dropstones.

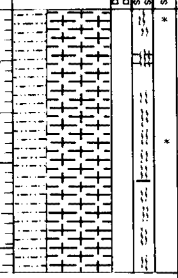
SMEAR SLIDE SUMMARY (%)

	2, 144
	D
Composition:	
Quartz	15
Heavy minerals	TR
Carbonate unspec.	5
Foraminifers	7
Calc. nannofossils	67
Diatoms	1
Radiolarians	1
Sponge spicules	4

SITE 611 HOLE C CORE 1 CORED INTERVAL 0.0–2.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN21 *Emiliania huxleyi* Zone		*Pseudoeunotia doliolus* Zone	0.0	1	0.5, 1.0
						1.5	2	
		AG	AG		FM		CC	

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES:



Colors: 10YR 5/4 to 10YR 6/4; 10YR 4/4; 10YR 5/4 to 10YR 6/4; 10YR 5/4; N8; 10YR 5/4

LITHOLOGIC DESCRIPTION

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, light to dark yellowish brown (10YR 6/4 to 4/4).

Numerous SANDY CLASTS.

Highly MOTTLED *CHONDRITES* BURROWS.

Dropstones.

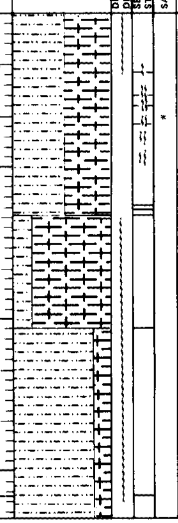
SMEAR SLIDE SUMMARY (%)

Composition:	1, 10 D	1, 80 D
Quartz	26	21
Feldspar	2	2
Mica	TR	TR
Heavy minerals	2	2
Clay	20	5
Foraminifers	10	10
Calc. nannofossils	46	50
Diatoms	2	5
Radiolarians	TR	TR
Sponge spicules	2	5
Silicoflagellates	TR	TR

SITE 611 HOLE C CORE 2 CORED INTERVAL 2.4–7.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN21 *Emiliania huxleyi* Zone		*Pseudoeunotia doliolus* Zone	2.4	1	0.5, 1.0
						3.9	2	
						5.4	3	
						6.9	4	
		AG	FG		FM	7.15	CC	

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES:



Colors: 5Y 7/1; 10YR 6/2; 2.5Y 5/2; 5Y 7/1; 2.5Y 6/2; 2.5Y 7/1; 2.5Y 4/2; 2.5Y 8/3; 5Y 7/1; 5Y 5/1; 5Y 5/1

LITHOLOGIC DESCRIPTION

Whole core appears to have extensive flowage.

MARLY FORAMINIFERAL NANNOFOSSIL OOZE, light gray (2.5Y 7/1) to grayish brown (2.5Y 5/2); and FORAMINIFERAL NANNOFOSSIL OOZE, light gray (5Y 7/1).

Very sharp laminations: dark grayish brown (2.5Y 4/2) and pale yellow (2.5Y 8/3), both 0.5 to 1 cm thick.

CALCAREOUS MUD, gray (5Y 5/1).

5.73 to 5.89 m and 6.26 to 6.87 m: common coarse sand-sized MUDSTONE(?) clasts.

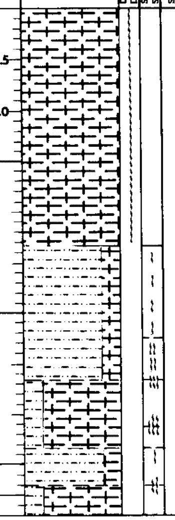
SMEAR SLIDE SUMMARY (%)

Composition:	1, 100 D
Quartz	30
Feldspar	2
Mica	TR
Heavy minerals	2
Clay	20
Foraminifers	10
Calc. nannofossils	30
Diatoms	3
Radiolarians	TR
Sponge spicules	3
Silicoflagellates	TR

SITE 611 HOLE C CORE 3 CORED INTERVAL 7.4–12.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN20 *Gephyrocapsa oceanica* Zone		*Pseudoeunotia doliolus* Zone	7.4	1	0.5, 1.0
						8.9	2	
						10.4	3	
						11.9	4	
		AG	AG		CM	12.23	CC	

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES:



Colors: 5Y 4/1; 5BG 4/1; 2.5Y 4/2; 5Y 7/1; 5Y 6/1; 5Y 4/2; 5Y 4/1; 5Y 6/1; 5Y 6/1

LITHOLOGIC DESCRIPTION

7.40 to 9.75 m: very deformed by coring; mixing of gray silty mud and brown or light gray ooze.

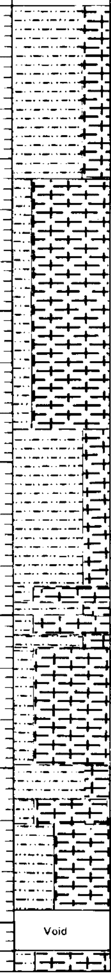
Alternating:
CALCAREOUS MUD, dark olive gray (5Y 4/1 to 4/2) or dark grayish brown (2.5Y 4/2), appearing silty; mottled; brown patches between 9.75 and 10.40 m; and FORAMINIFERAL NANNOFOSSIL OOZE, light gray to gray (5Y 7/1 to 6/1) mottled; some pyritic patches and streaks.

SITE 611 HOLE C CORE 4 CORED INTERVAL 12.4–22.0 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* (AG)
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone (AG)
Diatoms: *Pseudoeunotia doliolus* Zone (AG)

Sub-bottom depth: 12.4, 13.9, 15.4, 16.9, 18.4, 19.9, 21.3
Sections: 1, 2, 3, 4, 5, 6, 7, CC



Colors: 5Y 5/1; 5Y 4/1; 5Y 5/1; 5Y 7/1; 5Y 7/1 and 5Y 5/2; N5; 5Y 7/1; 5G 6/2; 5Y 7/1; 5Y 7/1; 5Y 5/1; 5Y 6/1; 5Y 7/1; 5Y 7/1 5Y 5/1; 5Y 8/1; 5Y 5/2; 5Y 6/1; 5Y 7/1; 5G 5/2; 5Y 5/1; 5Y 6/1; 5Y 5/1; 5Y 6/1; 5GY 7/1 (laminated); 5Y 6/1

Flowage from 14.15 to 15.4 m.

Alternating:
CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1); and FORAMINIFERAL NANNOFOSSIL OOZE, light gray to gray (5Y 7/1 to 6/1).

Common sand-sized clasts: 13.0 to 14.1 m and 17.40 to 17.46 m (mudstone).

General mottling, more common on ooze.

Common diffuse green (5G 5/2) gray (5Y 6/1) and olive laminations between 19.10 to 20.2 m.

SMEAR SLIDE SUMMARY (%)

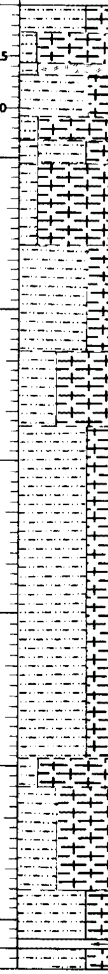
	4, 90
	D
Texture:	
Sand	15
Silt	45
Clay	40
Composition:	
Quartz	35
Feldspar	5
Heavy minerals	TR
Clay	30
Foraminifers	15
Calc. nannofossils	15

SITE 611 HOLE C CORE 5 CORED INTERVAL 22.0–31.6 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: N22 *Globorotalia truncatulinoides* (AG)
Nannofossils: NN19 *Pseudoemiliania lacunosa* Zone (CG)
Diatoms: (B)

Sub-bottom depth: 22.0, 23.5, 25.0, 26.5, 28.0, 29.5, 31.0, 31.2
Sections: 1, 2, 3, 4, 5, 6, 7, CC



Colors: 5Y 4/1; 5G 5/2; 5Y 7/1; 5GY 4/1; 5Y 5/1; 5Y 7/1; 5Y 5/1; 5Y 4/2; 5Y 7/1; N3; 5Y 4/2; 5Y 5/1; 2.5Y 5/2; 5Y 6/2; 5Y 5/1; 2.5Y 3/2; 5GY 4/1; 5Y 4/1; 5Y 7/1; 5Y 6/1; 5Y 5/1; 5G 5/2; 5Y 4/1; Void; 5Y 4/1

Alternating:
CALCAREOUS MUD, gray to olive gray (5Y 5/1 to 4/2), or grayish brown to very dark grayish brown (2.5Y 5/2 to 3/2); some intervals appear more silty: 31.6 to 31.9 m, 36.2 to 37.2 m, and 37.6 to 39.2 m; and FORAMINIFERAL NANNOFOSSIL OOZE, light gray (5Y 7/1) to MARLY FORAMINIFERAL NANNOFOSSIL OOZE, gray to olive gray (5Y 6/1 to 6/2).

32.2 to 32.31 m: layer of VOLCANIC MUD (rich in TUFF); underlaying mud seems ash-rich.

Rare green or gray LAMINATIONS 37.36 to 37.60 m: yellowish brown (10YR 5/4) patch.

MOTTLED INTERVALS: 31.6 to 32.2 m, 32.7 to 32.95 m, and 34.6 to 35.05 m.

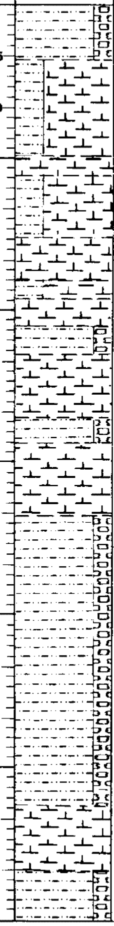
SMEAR SLIDE SUMMARY (%)

	1, 60	2, 42
	M	D
Texture:		
Sand	30	–
Silt	60	–
Clay	10	–
Composition:		
Quartz	19	15
Mica	TR	–
Volcanic glass	65	–
Glauconite	1	–
Carbonate unspec.	–	3
Foraminifers	TR	10
Calc. nannofossils	15	68
Diatoms	–	TR
Radiolarians	–	TR
Sponge spicules	–	4

SITE 611 HOLE C CORE 6 CORED INTERVAL 31.6–41.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone		*Nitzschia reinholdii* Zone	31.6	1	0.5, 1.0
						33.1	2	
						34.6	3	
						36.1	4	
						37.6	5	
						39.1	6	
		AG	AG		CM	40.6		

GRAPHIC LITHOLOGY



Colors (top to bottom): 5Y 4/2; 2.5Y 5/2; 2.5Y 6/2; 5Y 6/1; N7; 5Y 6/1; N7; 5Y 6/1; N7; 5Y 6/1; 2.5Y 5/3; 5Y 7/1 and 5B 6/1; N7; 5Y 5/1 + 2.5Y 6/2; N7; 5GY 6/1; 5Y 4/2; 5Y 5/2; 5G 5/2; 5GY 5/1; 5G 4/1; 5GY 5/1; 5Y 5/3; 5Y 5/1; 5GY 5/1; N6; N7; 5GY5 /1; 5GY 4/1

LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, gray to olive gray (5Y 5/1 to 4/2) or dark grayish brown (2.5Y 5/2 to 5/3); and NANNOFOSSIL OOZE, light gray (N7 to N6) to MARLY NANNOFOSSIL OOZE, gray to brownish gray (5Y 6/1, 2.5Y 6/1 to 6/2).

Rare green (5G 5/2) laminations.

38.56 to 38.63 m: scattered ash.

SMEAR SLIDE SUMMARY (%)

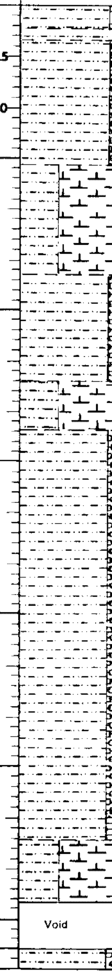
	2, 102	4, 94
	D	D
Texture:		
Sand	–	15
Silt	–	25
Clay	–	60
Composition:		
Quartz	–	60
Feldspar	TR	–
Heavy minerals	–	3
Clay	5	20
Volcanic glass	–	3
Carbonate unspec.	1	8
Foraminifers	9	4
Calc. nannofossils	84	2
Diatoms	1	–
Radiolarians	TR	–
Sponge spicules	TR	TR
Silicoflagellates	TR	–

Note: Core 7, 41.2–50.8 m: no recovery.

SITE 611 HOLE C CORE 8 CORED INTERVAL 50.8–60.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone		*Nitzschia reinholdii* Zone	50.8	1	0.5, 1.0
						52.3	2	
						53.8	3	
						55.3	4	
						56.8	5	
						58.3	6	
						59.67	7	
		AG	AG		FM		CC	

GRAPHIC LITHOLOGY



Void

Colors (top to bottom): 5GY 5/1; 5GY 4/1; 5GY 5/1; 2.5Y 5/2; 5G 5/2; 5G 5/2; 5GY 6/1; 5Y 5/2; 5BG 6/1; 5GY 6/1; 5G 5/2; 5GY 5/1; 5Y 5/1; 5Y 5/2; 5G 5/2; 5G 5/2; 5Y 5/1; 5Y 5/3; 5GY 5/1; 5Y 5/3; 5GY 5/1; 5G 5/2; 5B 5/1; 5G 5/2; 5Y 5/2; 5GY 5/1; 5GY 6/1; 5GY 5/1; 5GY 5/1

LITHOLOGIC DESCRIPTION

Mostly CALCAREOUS MUD (slightly >10% carbonate), gray (5Y 5/1 to 5/3), greenish gray (5GY 5/1) or grayish brown (2.5Y 5/2). Some intervals seem more silty: 51.06 to 51.30 m, 51.8 to 52.35 m, 53.45 to 54.5 m, 55.86 to 56.0 m, 58.4 to 58.54 m, and 58.85 to 59.10 m.

Rare intervals of MARLY NANNOFOSSIL OOZE, greenish or bluish gray (5GY 6/1 or 5BG 6/1).

MUD LAYER, probably volcanic, dark greenish gray (5GY 4/1) between 51.06 to 51.15 m.

57.25 to 57.30 m: igneous dropstone and clasts of quartz, ash and tuff.

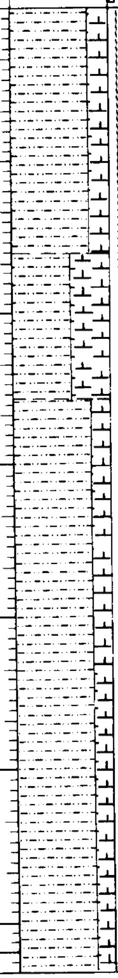
SMEAR SLIDE SUMMARY (%)

	3, 40	3, 95
	D	M
Texture:		
Sand	20	–
Silt	40	–
Clay	40	–
Composition:		
Quartz	54	–
Feldspar	1	1
Heavy minerals	6	TR
Clay	20	35
Volcanic glass	7	–
Carbonate unspec.	8	1
Foraminifers	2	10
Calc. nannofossils	2	53
Diatoms	TR	–
Sponge spicules	TR	–

SITE 611 HOLE C CORE 9 CORED INTERVAL 60.4–70.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone		*Nitzschia reinholdii* Zone	60.4	1	0.5, 1.0
						61.9	2	
						63.4	3	
						64.9	4	
						66.4	5	
						67.9	6	
						69.4	7	
		AG	AG		AG	69.7	CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Colors: 5GY 5/1; 5GY 5/1 and 5GY 6/1; 5GY 5/1; N7; 5GY 6/1; 5GY 5/1; 5GY 6/1; 5G 5/2; 5GY 5/1; 5GY 6/1; 5G 5/2

LITHOLOGIC DESCRIPTION

Most part of the core flowed.

CALCAREOUS MUD, greenish gray (5GY 6/1 or 5/1).

Lighter interval from 62.8 to 64.20 m probably more calcareous: MARLY NANNOFOSSIL OOZE, light gray (N7) to greenish gray (5GY 6/1).

Some green (5G 5/2) LAMINATIONS in undisturbed part of the core.

Dropstones.

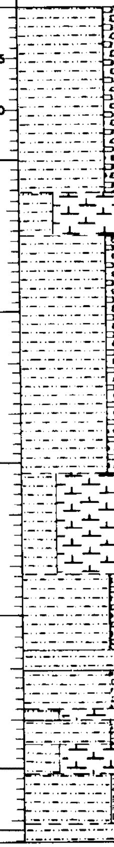
SMEAR SLIDE SUMMARY (%)

	6, 60
	D
Texture:	
Sand	5
Silt	20
Clay	75
Composition:	
Quartz	47
Feldspar	TR
Heavy minerals	1
Clay	30
Volcanic glass	3
Carbonate unspec.	1
Calc. nannofossils	18

SITE 611 HOLE C CORE 10 CORED INTERVAL 70.0–79.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides*				70.0	1	0.5, 1.0
						71.5	2	
						73.0	3	
						74.5	4	
						76.0	5	
						77.5	6	
		RG	B		B		CC	

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Colors: 5GY 5/1; 5GY 6/1; 5GY 5/1; 5Y 5/2; 5G 5/2; 5G 5/2; 5GY 5/1; 5GY 6/1; 5GY 5/1; 5GY 4/1; 5G 4/1; 5Y 4/2; 5GY 5/1; 5GY 6/1; 5G 5/2; 5GY 5/1; 5GY 6/1; 5GY 5/1; 5B 5/1; 5Y 5/1; 5Y 5/1

LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, olive gray (5Y 5/2) or dark greenish gray (5GY 5/1 to 4/1); and
MARLY NANNOFOSSIL OOZE, greenish gray (5GY 6/1). Layers become more and more thin towards core base.

Two layers of MUD (ash-bearing): 76.3 to 76.5 m: olive gray (5Y 4/2) with sharp contacts; and 78.10 to base: gray (5Y 5/1).

Rare green (5G 5/2) LAMINATIONS in calcareous mud.

Common *zoophycos* between 72.3 and 73.0 m.

SMEAR SLIDE SUMMARY (%)

	2, 49	5, 86	6, 62
	D	D	M
Texture:			
Sand	–	15	–
Silt	–	30	–
Clay	–	55	–
Composition:			
Quartz	–	57	68
Feldspar	TR	TR	2
Heavy minerals	–	4	3
Clay	30	25	20
Volcanic glass	–	3	5
Carbonate unspec.	TR	8	1
Foraminifers	7	1	1
Calc. nannofossils	57	2	
Diatoms	6	–	–
Radiolarians	TR	–	–
Sponge spicules	TR	–	–
Silicoflagellates	TR	–	–

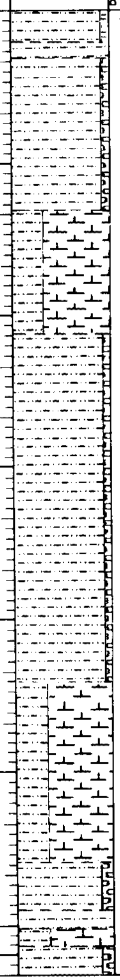
SITE 611 HOLE C CORE 11 CORED INTERVAL 79.6–89.2 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL6 *Globorotalia obliquus extremus* (AG)
Nannofossils: NN18 *Discoaster brouweri* Zone (AG)
Diatoms: *Nitzschia marina* Zone (AG)

Sub-bottom depth: 79.6, 81.1, 82.6, 84.1, 85.6, 87.1, 88.6

Sections: 1, 2, 3, 4, 5, 6, 7, CC (Meters: 0.5, 1.0)



Colors: 5GY 5/1, 5Y 5/2, 5GY 5/1, 5GY 6/1, 5GY 5/1, 5GY 6/1, 5GY 5/1, 5G 5/2, 5GY 5/1, 5GY 6/1, 5GY 5/1, 5GY 6/1, 5GY 5/1, 5Y 5/2, 5GY 6/1, 5G 6/1, 5GY 5/1

Alternating:
CALCAREOUS MUD, greenish gray (5GY 5/1 to 5/2); and MARLY NANNOFOSSIL OOZE, light greenish gray (5GY 6/1) with very gradational contacts between one type and the other, especially around 82.3 and 87.1 m.

Some silty intervals in calcareous mud: 81.33 to 81.57 m, 82.88 to 83.6 m, and 84.1 to 85.95 m.

MUD layers, olive gray (5Y 5/2) at 79.8 to 79.95 m and 88.45 to 88.6 m.

Very rare green (5G 5/2) LAMINATIONS.

88.02 m: SANDY ASH clast.

SMEAR SLIDE SUMMARY (%):

	2, 73	5, 44
	D	D
Texture:		
Sand	–	10
Silt	–	25
Clay	–	65
Composition:		
Quartz	–	64
Feldspar	TR	–
Heavy minerals	1	1
Clay	25	20
Volcanic glass	–	5
Carbonate unspec.	TR	7
Foraminifers	8	TR
Calc. nannofossils	66	3
Diatoms	TR	–
Sponge spicules	TR	TR

SITE 611 HOLE C CORE 12 CORED INTERVAL 89.2–98.8 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL6 *Globorotalia obliquus extremus* (CG)
Nannofossils: NN18 *Discoaster brouweri* Zone (AM)
Diatoms: RP

Sub-bottom depth: 89.2, 90.7, 92.2, 93.7, 95.2, 96.7, 98.2

Sections: 1, 2, 3, 4, 5, 6, 7, CC (Meters: 0.5, 1.0)

Colors: 5GY 5/1, 5Y 5/2, 5G 5/2, 5GY 5/1, 5G 5/2, 5GY 6/1, 5G 5/2, 5G 5/2, 5G 5/2, 5GY 5/1, 5G 5/2, 5GY 6/1, 5GY 5/1, 5Y 6/1, 2.5Y 5/2, 5Y 5/1, 5G 5/1, 5Y 5/1, 5Y 6/1, 5Y 5/1, 5Y 6/1, 5Y 5/1, N8, N7, 5G 5/2, N5, N6, 5Y 5/1, 5G 5/1, 5GY 6/1, 5GY 5/1, 5G 5/2, 5GY 5/1, 2.5Y 3/2, 5Y 5/1, 5Y 4/2, 5Y 4/2 Mud.

CALCAREOUS MUD, greenish gray (5GY 5/1), gray to olive gray (5Y 5/1 to 5/2), grayish brown (2.5Y 5/2) or gray (N6 to N5) alternating with thinner intervals of MARLY FORAMINIFERAL NANNOFOSSIL OOZE, light gray (N8 to N7), or light greenish gray (5GY 6/1) with very gradational contacts between both types.

Rare green (5G 5/2) or grayish brown (2.5Y 5/2) LAMINATIONS, common between 96.8 and 97.3 m (with light brownish gray (10YR 6/2) traces of burrows).

Small SANDY PATCHES: 94.98 to 95.1 m.

In Core Catcher: dark green (5G 4/1) layer (3 cm) of ASH-BEARING MUD.

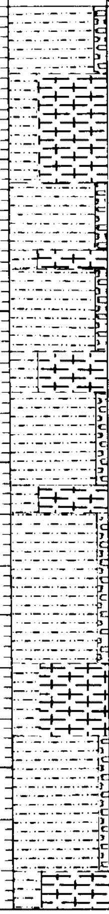
SMEAR SLIDE SUMMARY (%)

	1, 101	3, 133
	D	D
Texture:		
Sand	15	–
Silt	30	–
Clay	55	–
Composition:		
Quartz	60	–
Feldspar	TR	TR
Heavy minerals	3	TR
Clay	20	35
Volcanic glass	5	–
Carbonate unspec.	7	TR
Foraminifers	1	13
Calc. nannofossils	4	52
Diatoms	–	TR

SITE 611 HOLE C CORE 13 CORED INTERVAL 98.8–108.4 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN18 *Discoaster brouweri* Zone		*Nitzschia marina* Zone	98.8, 100.3, 101.8, 103.3, 104.8, 106.3, 107.6	1, 2, 3, 4, 5, 6	0.5, 1.0
		AG	AG		CM			

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

LITHOLOGIC DESCRIPTION

5Y 5/1 + 5G 4/1 (mixed)
5Y 4/2
5GY 6/1
5G 5/2
5GY 5/1
5G 5/2
5GY 6/1
5B 6/1
5B 6/1
5GY 5/1
5G 4/1
5GY 6/1
5G 5/2
5GY 4/1
5G 4/1
5G 4/1
5GY 6/1
5GY 5/1
5Y 4/1
5Y 6/1
5GY 6/1
5GY 5/1
5GY 4/1
5G 5/2 5GY 5/1
5GY 6/1 5GY 4/1
5GY 6/1
5GY 7/1

CALCAREOUS MUD, dark gray or greenish gray (5Y 4/1 or 5GY 5/1 to 4/1) alternating with thinner intervals of FORAMINIFERAL NANNOFOSSIL OOZE to MARLY FORAMINIFERAL NANNOFOSSIL OOZE, light greenish gray to greenish gray (5GY 7/1 to 6/1).

107.25 m: thin (1 cm) layer of marly foraminiferal nannofossil ooze in calcareous mud interval.

Green (5G 5/2) and bluish gray (5B 6/1) LAMINATIONS. Bluish ones may be halos around burrows.

Rare *ZOOPHYCOS* BURROWS.

Dropstone.

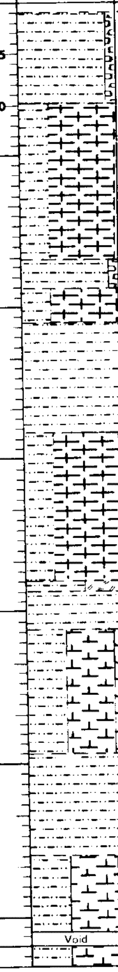
SMEAR SLIDE SUMMARY (%)

	1, 32	4, 35
	D	D
Texture:		
Sand	20	–
Silt	30	–
Clay	50	–
Composition:		
Quartz	62	–
Feldspar	TR	–
Heavy minerals	4	TR
Clay	15	20
Volcanic glass	6	–
Carbonate unspec.	7	–
Foraminifers	2	11
Calc. nannofossils	4	63
Diatoms	–	6
Sponge spicules	TR	TR

SITE 611 HOLE C CORE 14 CORED INTERVAL 108.4–118.0 m

TIME-ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone		*Nitzschia marina* Zone	108.4, 109.9, 111.4, 112.9, 114.4, 115.9, 117.4	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0
		AG	AG		AM			

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

LITHOLOGIC DESCRIPTION

Downhole contamination
5Y 5/1
5G 4/2
5GY 5/1
5B 5/1
5G 5/1
5Y 4/1
5GY 5/1
5G 5/2
5GY 5/1
5GY 4/1
5B 3/1
5GY 4/1
5G 5/2
5GY 5/1
5G 4/1
5Y 4/1
5GY 6/1
5G 5/2
5GY 4/1 + 5Y 4/1
5G 4/2
5BG 4/1
5Y 5/1 + 5GY 6/1 mixed
5GY 6/1
5B 5/1
5GY 6/1

Alternating:
CALCAREOUS MUD, gray to dark gray (5Y 5/1 to 4/1), becoming (around 111.55 m): MUD, dark gray to greenish gray (5Y 4/1 to 5GY 4/1); and MARLY FORAMINIFERAL NANNOFOSSIL OOZE, greenish gray (5GY 5/1), becoming (around 114.60 m): MARLY DIATOMACEOUS NANNOFOSSIL OOZE, lighter greenish gray (5GY 6/1).

ASH-BEARING MUD layer between 114.14 and 114.18 m.

Green (5G 5/2) or bluish (5B 5/1 or 3/1) LAMINATIONS.

Green mud patches: 112.31 m, 112.47 to 112.49 m, and 112.95 m.

Foraminifer-rich interval: 113.55 to 113.65 m.

SMEAR SLIDE SUMMARY (%)

	2, 85	5, 138
	D	D
Composition:		
Quartz	1	–
Feldspar	TR	–
Heavy minerals	TR	1
Clay	30	35
Volcanic glass	TR	–
Carbonate unspec.	TR	–
Foraminifers	12	6
Calc. nannofossils	57	47
Diatoms	7	10
Radiolarians	TR	TR
Sponge spicules	TR	1
Silicoflagellates	–	TR

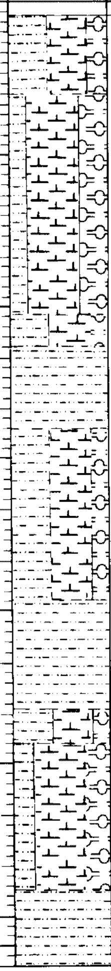
SITE 611 HOLE C CORE 15 CORED INTERVAL 118.0–127.6 m

Time–rock unit: (blank)
Biostratigraphic zone: (blank)

Fossil character: Foraminifers: PL3–5 undifferentiated (AG); Nannofossils: NN16 *Discoaster surculus* Zone (AG); Radiolarians: (VRM); Diatoms: *Nitzschia marina* Zone (CG)

Sub-bottom depth: 118.0 / 119.5 / 121.0 / 122.5 / 124.0 / 125.5 / 127.0

Sections: 1, 2, 3, 4, 5, 6, 7, CC (meters 0.5, 1.0)



Colors: Pebbly wash-down; 5Y 5/1; 5Y 6/1; 5GY 7/1; 5Y 5/1; 5Y 4/1; 5Y 5/1 (dominant) + 5G 5/2 and 5Y 6/1; 5Y 4/1; 5Y 5/1; 5GY 6/1 (dominant) + 5G 5/2 and 5Y 6/1; 5Y 4/1

LITHOLOGIC DESCRIPTION

SILICEOUS NANNOFOSSIL OOZE, light gray or greenish gray (5Y 6/1 or 5GY 7/1), to MARLY SILICEOUS NANNOFOSSIL OOZE, gray (5Y 5/1), alternating with thinner layers of MUD, dark gray (5Y 4/1).

Green (5G 5/2) or gray (5Y 6/1) LAMINATIONS in whole core, especially common in siliceous nannofossil ooze.

General MOTTLING.

Common *ZOOPHYCOS* BURROWS between: 124.95 and 125.20 m; 125.8 and 127.10 m.

SMEAR SLIDE SUMMARY (%)

	2, 71	3, 90
	D	D
Texture:		
Sand	–	5
Silt	–	40
Clay	–	55
Composition:		
Quartz	20	} 98
Feldspar	–	
Mica	TR	
Heavy minerals	5	
Clay	–	
Carbonate unspec.	–	2
Foraminifers	5	–
Calc. nannofossils	40	–
Diatoms	12	–
Radiolarians	TR	–
Sponge spicules	18	–
Silicoflagellates	TR	–

ORGANIC CARBON AND CARBONATE (%)

	2, 71–72
Organic carbon	–
Carbonate	56

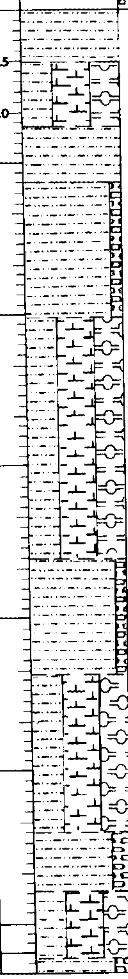
SITE 611 HOLE C CORE 16 CORED INTERVAL 127.6–137.2 m

Time–rock unit: (blank)
Biostratigraphic zone: (blank)

Fossil character: Foraminifers: PL3–5 undifferentiated (AG); Nannofossils: NN16 *Discoaster surculus* Zone (AG); Radiolarians: (RM); Diatoms: *Nitzschia jouseae* Zone (CM)

Sub-bottom depth: 127.6 / 129.1 / 130.6 / 132.1 / 133.6 / 135.1 / 136.6

Sections: 1, 2, 3, 4, 5, 6, 7, CC (meters 0.5, 1.0)



Colors: 5Y 2/2; 5Y 4/1; 5Y 5/1 to 6/1; 5Y 3/2; 5Y 4/1; 5Y 6/1; 5Y 5/1; 5Y 4/1; 5Y 4/1; 5Y 6/1; 5G 5/2; 5Y 4/1; 5Y 6/1; 5G 5/2; 10Y 4/2; 5G 4/2; 5Y 4/1

LITHOLOGIC DESCRIPTION

Alternating:
MUD, dark olive gray (5Y 3/2) to CALCAREOUS MUD, dark gray (5Y 4/1). Amount of carbonate probably increasing towards core base; and MARLY SILICEOUS NANNOFOSSIL OOZE, gray (5Y 4/1 to 5/1), to SILICEOUS NANNOFOSSIL OOZE, light gray (5Y 5/1 to 6/1).

General MOTTLING; especially on siliceous nannofossil ooze: green (5G 5/2) mottles and laminations.

Two brown (10Y 4/2) laminations at 136.75 and 136.76 m.

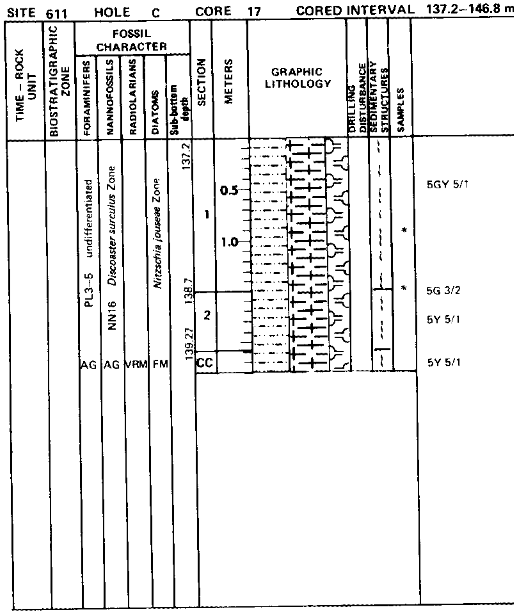
SMEAR SLIDE SUMMARY (%)

	1, 70
	D
Composition:	
Quartz	30
Carbonate unspec.	3
Foraminifers	4
Calc. nannofossils	33
Diatoms	3
Radiolarians	2
Sponge spicules	20

ORGANIC CARBON AND CARBONATE (%)

	1, 7–8
Organic carbon	–
Carbonate	3

SITE 611 HOLE C CORE 17 CORED INTERVAL 137.2–146.8 m



LITHOLOGIC DESCRIPTION

MARLY SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE, gray (5Y 5/1) to greenish gray (5GY 5/1).

Common greenish gray (5GY 6/1) and olive MOTTLES and diffuse horizontal LAMINATIONS.

138.69 to 138.70 m: dark grayish green (5G 3/2) thin layer of GLAUCONITE.

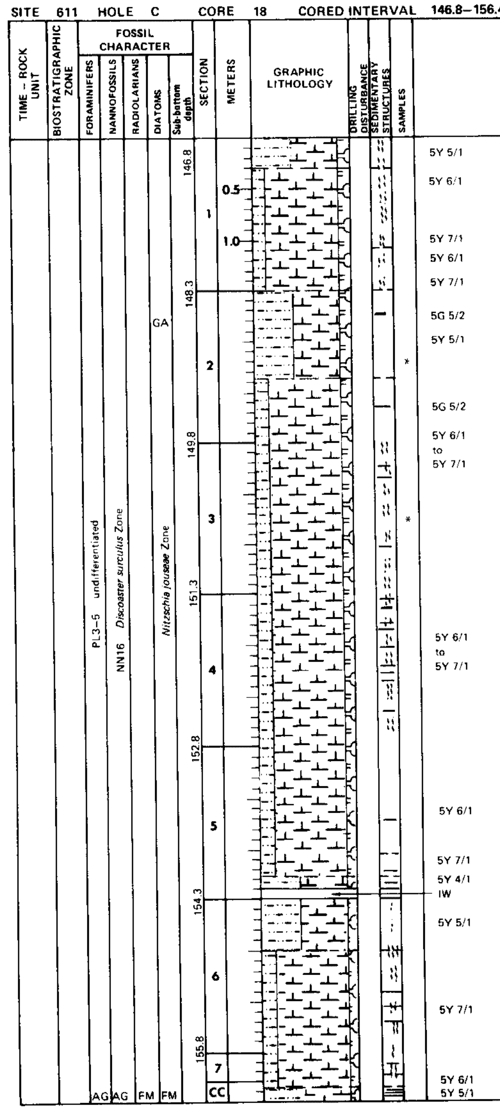
SMEAR SLIDE SUMMARY (%)

	1, 90	1, 149
	D	M
Composition:		
Quartz	38	–
Mica	–	1
Heavy minerals	–	TR
Glauconite	–	94
Pyrite	–	1
Carbonate unspec.	2	–
Foraminifers	12	–
Calc. nannofossils	31	4
Diatoms	3	–
Radiolarians	2	–
Sponge spicules	10	–
Silicoflagellates	TR	–

ORGANIC CARBON AND CARBONATE (%)

	1, 93–94
Organic carbon	–
Carbonate	43

SITE 611 HOLE C CORE 18 CORED INTERVAL 146.8–156.4 m



LITHOLOGIC DESCRIPTION

SILICEOUS NANNOFOSSIL OOZE, light gray (5Y 7/1 to 6/1), with some MARLY intervals, gray (5Y 5/1 to 4/1).

General MOTTLING, green or brown, occasionally pyritic.

Common green (5G 5/2) LAMINATIONS.

SMEAR SLIDE SUMMARY (%)

	2, 70	3, 80
	D	D
Composition:		
Quartz	20	10
Heavy minerals	5	2
Clay	20	3
Foraminifers	5	5
Calc. nannofossils	40	70
Diatoms	2	2
Sponge spicules	8	8

ORGANIC CARBON AND CARBONATE (%)

	3, 81–82
Organic carbon	–
Carbonate	64

SITE 611 HOLE C CORE 19 CORED INTERVAL 156.4–166.0 m

Field	Value
Time-rock unit	
Biostratigraphic zone	
Foraminifers	PL3–5 undifferentiated
Nannofossils	NN16 *Discoaster surculus* Zone
Radiolarians	
Diatoms	*Nitzschia jouseae* Zone
Sub-bottom depth	156.4, 157.9, 159.4, 160.9, 161.3
Sections	1, 2, 3, 4

5Y 5/1; 5Y 6/1; 5Y 6/1; 5Y 5/1; Void; 5Y 5/1

LITHOLOGIC DESCRIPTION

SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE, greenish gray (5Y 6/1) to MARLY SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE, darker greenish gray (5Y 5/1).

Common green (5G 5/2) and light gray (5Y 7/1) LAMINATIONS AND MOTTLES.

Dark green (5G 3/2) GLAUCONITE PATCHES at: 159.15 m, 160.32 m, and 161.14 m (burrow fills).

SMEAR SLIDE SUMMARY (%)

	2, 70	4, 24
	D	M
Composition:		
Quartz	15	10
Heavy minerals	2	–
Clay	3	–
Volcanic glass	TR	–
Glauconite	–	83
Carbonate unspec.	–	2
Foraminifers	15	–
Calc. nannofossils	55	5
Diatoms	5	–
Radiolarians	TR	–
Sponge spicules	5	–
Silicoflagellates	TR	–

ORGANIC CARBON AND CARBONATE (%)

	2, 79–80
Organic carbon	–
Carbonate	65

SITE 611 HOLE C CORE 20 CORED INTERVAL 166.0–175.6 m

Field	Value
Time-rock unit	
Biostratigraphic zone	
Foraminifers	PL3–5 undifferentiated (AG)
Nannofossils	NN16 *Discoaster surculus* Zone (AG)
Radiolarians	FM
Diatoms	*Nitzschia jouseae* Zone (CM)
Sub-bottom depth	166.0, 167.5, 168.65
Sections	1, 2, CC

5Y 5/1; 5Y 8/1; 5Y 8/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE to MARLY NANNOFOSSIL OOZE, very light gray (5Y 8/1) or gray (5Y 5/1), mottling, green laminations.

SMEAR SLIDE SUMMARY (%)

	1, 70
	D
Composition:	
Quartz	45
Foraminifers	8
Calc. nannofossils	40
Diatoms	1
Sponge spicules	6

ORGANIC CARBON AND CARBONATE (%)

	1, 70–71
Organic carbon	–
Carbonate	52

SITE 611 HOLE C CORE 21 CORED INTERVAL 175.6–185.2 m

Field	Value
Time-rock unit	
Biostratigraphic zone	
Foraminifers	PL3–5 undifferentiated (AG)
Nannofossils	NN16 *Discoaster surculus* Zone (AG)
Radiolarians	VRM
Diatoms	B
Sub-bottom depth	175.6, 176.8
Sections	1, CC

5GY 8/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, light greenish gray (5GY 8/1 to 7/1).

Common green (5G 5/2 to 5GY 6/1) gray (5Y 6/1 or N3 to N5) MOTTLES.

Common diffuse green LAMINATIONS.

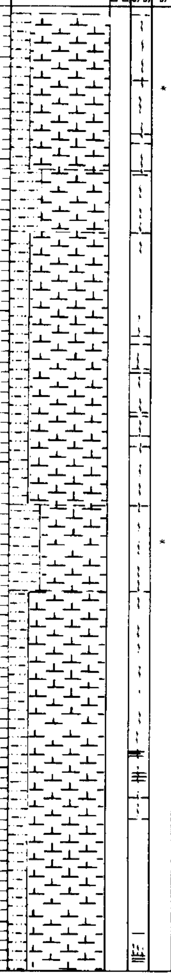
Dark green (5G 4/2) BURROW FILLS of glauconite, at 176.05 m and in Core Catcher.

SITE 611 HOLE C CORE 22 CORED INTERVAL 185.2–194.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	Sub-bottom depth
		PL3–5 undifferentiated	NN15 *Reticulofenestra pseudoumbilica* Zone		*Nitzschia jouseae* Zone	1	185.2
						2	186.7
						3	188.2
						4	189.7
						5	191.2
						6	192.7
						7	194.2
		AG	AG	VRM	FM	CC	194.5

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY



Samples (*): Section 1, Section 4.

Colors: 5Y 6/1, 5Y 8/1, N3, 5G 7/2, 5Y 8/1, 5G 6/2, 5Y 6/1, 5Y 8/1, 5Y 7/1, 5G 7/1, 5Y 7/1, 5G 6/2, 5Y 7/1, 5G 7/2, 5Y 7/1, 5G 7/2, 5Y 7/1, 5Y 5/1, 5Y 7/1, 5G 4/2, 5Y 6/1, 5G 4/2, 5Y 7/1, 5Y 8/1, 5Y 8/1, 5Y 7/1, 5Y 7/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, very light to light gray (5Y 8/1 to 7/1). Some MARLY intervals, gray (5Y 6/1 to 5/1).

Common green mottling, occasionally pyritic.

Very common green (5G 4/2) laminations, or thin layers (5G 7/1 to 5G 6/2).

SMEAR SLIDE SUMMARY (%)

	1, 80	4, 80
	D	D
Composition:		
Quartz	20	30
Mica	–	2
Carbonate unspec.	–	3
Foraminifers	4	6
Calc. nannofossils	76	52
Radiolarians	–	2
Sponge spicules	–	3

ORGANIC CARBON AND CARBONATE (%)

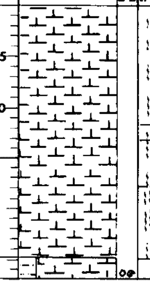
	1, 80–81	4, 80–81
Organic carbon	–	–
Carbonate	83	53

SITE 611 HOLE C CORE 23 CORED INTERVAL 194.8–204.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	Sub-bottom depth
		PL3–5 undifferentiated	NN15 *Reticulofenestra pseudoumbilica* Zone			1	194.8
						2	196.3
		AG	AG	VRM	FM	CC	197.27

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY



Samples (*): Section 1.

Colors: N9 to 5GY 8/1, 5G 6/2, 5Y 8/1, 5Y 7/1, 5Y 8/1, 5Y 6/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, white with local pale greenish (N9 to 5GY 8/1) cast, or very light gray (5Y 8/1 to 5Y 7/1).

Green and gray MOTTLING.

Rare green (5G 6/2) LAMINATIONS.

SMEAR SLIDE SUMMARY (%)

	1, 70
	D
Composition:	
Quartz	10
Carbonate unspec.	2
Foraminifers	4
Calc. nannofossils	84

ORGANIC CARBON AND CARBONATE (%)

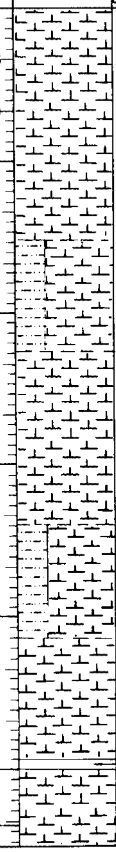
	1, 70–71
Organic carbon	–
Carbonate	83

SITE 611 HOLE C CORE 24 CORED INTERVAL 204.4–214.0 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL2 *Globorotalia margaritae* — AG
Nannofossils: NN15 *Reticulofenestra pseudoumbilica* Zone — AG
Radiolarians: VRM
Diatoms: *Nitzschia jouseae* Zone — AG; FP

Sub-bottom depth: 204.4, 205.9, 207.4, 208.9, 210.4, 211.9, 212.4
Sections: 1, 2, 3, 4, 5, 6, CC
Meters: 0.5, 1.0



5GY 8/1
5Y 8/1 to 5GY 8/1
5G 5/2
5Y 6/1
5G 5/2
5G 5/2
5Y 8/1
5G 5/2
5Y 8/1
5G 5/2
5Y 6/1
5G 5/2
5Y 8/1
OG
5Y 8/1 to 5GY 8/1
5Y 7/1
5Y 8/1

NANNOFOSSIL OOZE, very light gray to very light greenish gray (5Y 8/1 to 5GY 8/1), and MARLY intervals, gray (5Y 6/1).

PYRITIC MOTTLING.

Common green LAMINATIONS or thin intervals (2–4 cm); rare gray or brown laminations.

204.80 m: large (4.5 cm) pebble.

ORGANIC CARBON AND CARBONATE (%)

	5, 70–71
Organic carbon	–
Carbonate	79

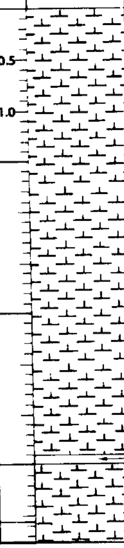
Note: Core 25, 214.0–223.6 m: no recovery.

SITE 611 HOLE C CORE 26 CORED INTERVAL 223.6–233.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL2 *Globorotalia margaritae* — AG
Nannofossils: NN15 *Reticulofenestra pseudoumbilica* Zone — AG
Radiolarians: VRM
Diatoms: FP

Sub-bottom depth: 223.6, 225.1, 226.6, 228.1, 228.7
Sections: 1, 2, 3, 4, CC
Meters: 0.5, 1.0



N8.7 and 5GY 7/1
N8 with 5GY 7/1 and 5Y 7/1
IW
5Y 7/1
5G 6/2
N8
N8
5Y 7/1

NANNOFOSSIL OOZE, very light gray (N8), with gray (5Y 7/1 and 5GY 7/1) patches.

Common green (5G 6/2) patches, becoming laminations around 226.5 m.

Pyritic mottling and patches.

SMEAR SLIDE SUMMARY (%)

	1, 111	
	D	
Composition:		
Heavy minerals	TR	1
Clay	5	25
Carbonate unspec.	–	TR
Foraminifers	5	6
Calc. nannofossils	90	64
Diatoms	TR	3
Sponge spicules	TR	1

ORGANIC CARBON AND CARBONATE (%)

	4, 13–14
Organic carbon	–
Carbonate	70

SITE 611 HOLE C CORE 27 CORED INTERVAL 233.2–242.8 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL2 *Globorotalia margaritae*

Nannofossils: NN14 *Discoaster asymmetricus* Zone–NN12 *Amaurolithus tricorniculatus* Zone

Diatoms: *Nitzschia jouseae* Zone; AG

Fossil character (base): AG AG FG CM

Sub-bottom depths: 233.2, 234.7, 236.2, 237.7, 239.2, 240.7, 242.2

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Meters: 0.5, 1.0

Colors: N8 dominant; 5Y 7/1; N5; 5Y 7/1 dominant; 5G 7/2; N8 dominant; 5G 5/2; 5Y 7/1; OG; 5Y 6/1; 5Y 7/1; 5G 7/2; 5Y 7/1; N8; 5G 7/2; 5G 7/1; N8

NANNOFOSSIL OOZE, becoming more and more chalky light gray (N8 or 5Y 7/1), with common gray and greenish (5Y 7/1; 5G 7/2 to 6/2) patches.

From 240.7 m down: NANNOFOSSIL CHALK (cut by saw), light gray (N8 or 5Y 7/1) with evident burrowing (gray 5Y 7/1).

SMEAR SLIDE SUMMARY (%)

	3, 133
	D
Composition:	
Quartz	TR
Heavy minerals	TR
Clay	8
Carbonate unspec.	1
Foraminifers	4
Calc. nannofossils	85
Diatoms	2
Radiolarians	TR
Sponge spicules	TR
Silicoflagellates	TR

ORGANIC CARBON AND CARBONATE (%)

	3, 31–32
Organic carbon	–
Carbonate	82

SITE 611 HOLE C CORE 28 CORED INTERVAL 242.8–252.4 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL2 *Globorotalia margaritae*

Nannofossils: NN14 *Discoaster asymmetricus* Zone–NN12 *Amaurolithus tricorniculatus* Zone

Fossil character (base): AG AG RG RP

Sub-bottom depths: 242.8, 244.5, 245.8, 247.3, 248.8, 250.3, 251.8

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Meters: 0.5, 1.0

Colors: 5Y 6/1; 5Y7/1; 5G 6/2; 5G 7/2; 5GY 7/1; 2.5Y 6/2; 2.5Y 6/2; 5GY 7/1 to 5Y 7/1; 2.5Y 7/2; 5Y 6/1; 5G 6/2; 5G 6/2; 5G 6/2; 5Y 7/1; 5G 7/2; 2.5Y 7/2; 5G 7/2; 5Y 8/1; 2.5Y 7/2; 5G 6/2; 2.5Y 7/2; 5Y 6/1; 2.5Y 6/2

Very fragmented by drilling; flow-in (soft ooze) between hard chalk blocks.

NANNOFOSSIL CHALK, light gray to light greenish gray (5Y 7/1 to 5GY 7/1); darker (5Y 6/1) MARLY intervals.

Frequent green (5G 6/2 or 5/2) or light brownish gray (2.5Y 7/2 to 6/2) patches.

Rare laminations in almost all of the core, but frequent (and wispy) below 252.0 m (in Core Catcher).

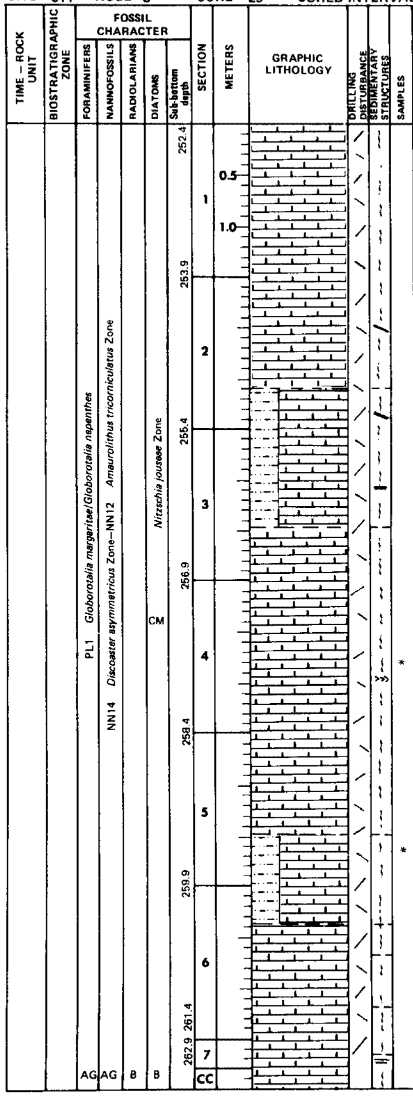
SMEAR SLIDE SUMMARY (%)

	4, 115	5, 115
	D	D
Composition:		
Heavy minerals	TR	–
Clay	35	8
Micronodules	–	TR
Carbonate unspec.	TR	–
Foraminifers	3	4
Calc. nannofossils	60	86
Diatoms	2	2
Sponge spicules	TR	TR
Silicoflagellates	TR	–

ORGANIC CARBON AND CARBONATE (%)

	4, 30–31
Organic carbon	–
Carbonate	86

SITE 611 HOLE C CORE 29 CORED INTERVAL 252.4–262.0 m



LITHOLOGIC DESCRIPTION

Very fragmented by drilling; flow-in between blocks.

NANNOFOSSIL CHALK, very light gray or greenish gray (N8 to 5Y 7/1 to 5GY 7/1); darker MARLY intervals (5Y 6/1 or 5GY 6/1); transitions between both types very gradational.

Frequent gray (5Y 7/1) or green (5G 7/2 to 5G 5/2) patches.

Rare green (5G 6/1 to 5/2) laminations.

Deformed *Zoophycos* burrow at 257.85 m.

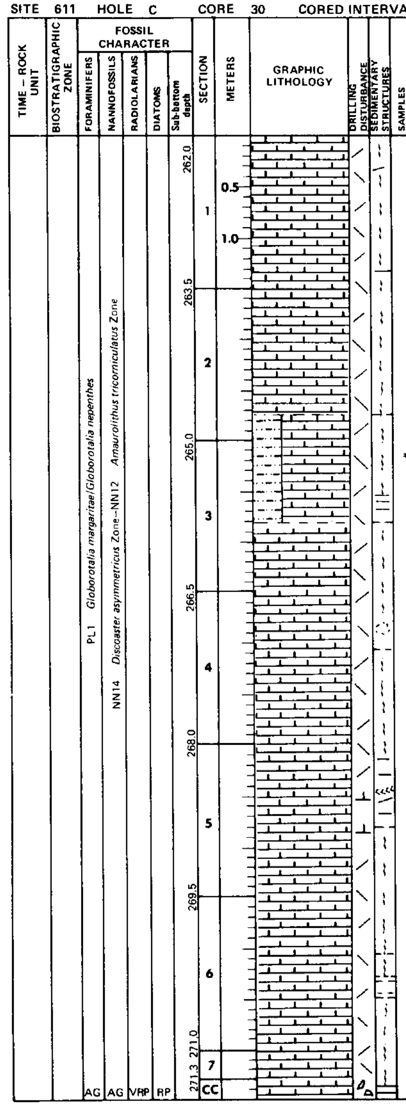
SMEAR SLIDE SUMMARY (%)

	4, 83	5, 119
	D	M
Composition:		
Heavy minerals	–	TR
Clay	6	25
Micronodules	TR	–
Carbonate unspec.	TR	1
Foraminifers	3	7
Calc. nannofossils	91	61
Diatoms	TR	–
Sponge spicules	TR	TR
Silicoflagellates	–	TR

ORGANIC CARBON AND CARBONATE (%)

	4, 85–86
Organic carbon	–
Carbonate	84

SITE 611 HOLE C CORE 30 CORED INTERVAL 262.0–271.6 m



LITHOLOGIC DESCRIPTION

Very fragmented by drilling; flow-in between blocks. Hard blocks get larger towards base.

NANNOFOSSIL CHALK, very light gray (N8) to greenish gray (5GY 7/1); darker (5Y 6/1) MARLY intervals.

Frequent light brownish gray (2.5Y 7/2 to 6/2) burrow patches, and green (5G 7/2 to 6/2) disrupted laminations.

Rare green (5G 7/2 to 5/2) laminations.

SMEAR SLIDE SUMMARY (%)

	3, 18	4, 12
	D	D
Composition:		
Feldspar	TR	–
Heavy minerals	–	TR
Clay	20	5
Micronodules	TR	–
Carbonate unspec.	1	TR
Foraminifers	3	4
Calc. nannofossils	73	91
Diatoms	3	–
Radiolarians	TR	–
Sponge spicules	TR	–
Silicoflagellates	TR	–

ORGANIC CARBON AND CARBONATE (%)

	3, 17–18
Organic carbon	–
Carbonate	64

SITE 611 HOLE C CORE 31 CORED INTERVAL 271.6–281.2 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL1 *Globorotalia nepenthes*/*Globorotalia margaritae*

Nannofossils: NN14 *Discoaster asymmetricus* Zone–NN12 *Amaurolithus tricorniculatus* Zone; NN11 *Discoaster quinqueramus* Zone

Fossil character (CC): AG AG B B

Sub-bottom depths: 271.6, 273.1, 274.6, 276.1, 277.6, 279.1, 280.6, 280.9

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Meters: 0.5, 1.0

Colors: 5GY 7/1, N8, 5GY 7/1, N8, 5GY 7/1, 5G 5/2, 5GY 7/1, 2.5Y 6/2, 5G 7/2, 5G 7/2, 5GY 7/1, 5G 7/2, 5GY 7/1, IW, 5GY 7/1, 5G 6/2, 5G 6/2, 5GY 7/1

Very fragmented by drilling; flow-in between blocks.

NANNOFOSSIL CHALK, very light gray to greenish gray (N8 to 5GY 7/1).

Common light brownish gray (2.5Y 7/2) burrow mottling.

279.3 to 280.3 m: common green (5G 6/2) diffuse or broken-up laminations.

SMEAR SLIDE SUMMARY (%)

	2, 80
	D
Composition:	
Quartz	TR
Heavy minerals	TR
Clay	25
Carbonate unspec.	TR
Foraminifers	2
Calc. nannofossils	70
Diatoms	3
Radiolarians	TR
Sponge spicules	TR
Silicoflagellates	TR

ORGANIC CARBON AND CARBONATE (%)

	2, 80–81
Organic carbon	–
Carbonate	60

SITE 611 HOLE C CORE 32 CORED INTERVAL 281.2–290.8 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL1 *Globorotalia nepenthes*/*Globorotalia margaritae*

Nannofossils: NN11 *Discoaster quinqueramus* Zone

Diatoms: B

Fossil character (CC): CG AG VRP FM

Sub-bottom depths: 281.2, 282.7, 284.2, 285.7, 287.2, 288.7, 290.2, 290.5

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Meters: 0.5, 1.0

Colors: N8 and 2.5 Y/2, 5GY 7/1, N5, 5GY 7/1 dominant with 5G 7/2, 5G 7/2, 5G 7/2, 2.5Y 7/2, 5G 7/2, 5GY 7/1, 5Y 5/1, 5G 5/2, 5GY 7/1 dominant, OG, 5GY 7/1, 5GY 6/1, 5GY 5/1, 5G 4/2

Very fragmented by drilling; hard blocks become larger under 284.0 m; flow-in between blocks.

NANNOFOSSIL CHALK, very light gray to greenish gray (N8 or 5GY 7/1), or SLIGHTLY MARLY and darker (5Y 5/1), mottled by frequent brownish gray (2.5Y 7/2) patches and more or less disrupted greenish (5GY 7/2) laminations.

On marly intervals: green (5G 5/2 to 4/2) wispy laminations.

Zoophycos burrows.

SMEAR SLIDE SUMMARY (%)

	1, 72	4, 70
	D	D
Composition:		
Feldspar	–	TR
Heavy minerals	–	TR
Clay	8	25
Micronodules	–	TR
Carbonate unspec.	TR	–
Foraminifers	5	2
Calc. nannofossils	87	72
Diatoms	TR	1
Sponge spicules	TR	TR

ORGANIC CARBON AND CARBONATE (%)

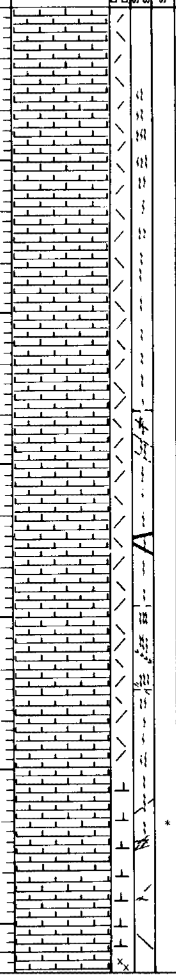
	1, 70–71
Organic carbon	–
Carbonate	83

SITE 611 HOLE C CORE 36 CORED INTERVAL 319.6–329.2 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL1 *Globorotalia nepenthes*/*Globorotalia margaritae*
Nannofossils: NN11 *Discoaster quinqueramus* Zone
Fossil character (CC): AG AG VRM FP

Sub-bottom depth: 319.6, 321.2, 322.6, 324.2, 325.6, 327.2, 328.6, 328.9
Sections: 1, 2, 3, 4, 5, 6, 7, CC
Meters: 0.5, 1.0



Colors: 5GY 8/1; 5GY 8/1; 5Y 7/1; Faults N8; 5GY 6/1; 5GY 8/1; 5Y 7/1 N8; 5G 5/2; 5G 7/1 5G 5/2 N8; 5Y 7/1; N8

LITHOLOGIC DESCRIPTION

Very fragmented by drilling, with flow-in between blocks.

NANNOFOSSIL CHALK, light gray (N8 to 5Y 7/1), or light greenish gray (5GY 8/1 to 6/1) with frequent gray (5Y 7/1) burrow mottles and green (5G 5/2) irregular wispy laminations.

323.5 to 324.2 m: most mottles appear flattened and tilted (~15°).

323.7 m: first fault with SLICKENSIDES.

From 325.6 m: mottles and green laminations are tilted (45–55°) and cross-cut by *zoophycos* burrows. Green laminae frequent 326.7 to 327.2 m (with thin dark microfinures), rare under 327.2 m.

SMEAR SLIDE SUMMARY (%)

	6, 47
Composition:	
Quartz	12
Heavy minerals	3
Foraminifers	5
Calc. nannofossils	80

ORGANIC CARBON AND CARBONATE (%)

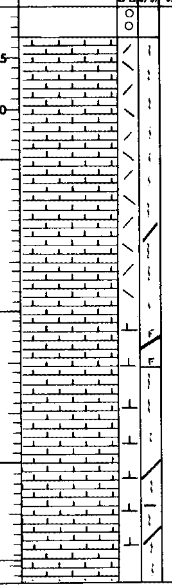
	6, 46–47
Organic carbon	–
Carbonate	75

SITE 611 HOLE C CORE 37 CORED INTERVAL 329.2–338.8 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL1 *Globorotalia nepenthes*/*Globorotalia margaritae*
Nannofossils: NN11 *Discoaster quinqueramus* Zone
Fossil character (CC): AM AG B RP

Sub-bottom depth: 329.2, 330.7, 332.2, 333.7, 338.5
Sections: 1, 2, 3, 4, CC
Meters: 0.5, 1.0



Colors: 5GY 8/1; 5GY 8/1; 5G 7/1 to 5G 6/1; 5GY 8/1; 5Y 7/1

LITHOLOGIC DESCRIPTION

Fragmented by drilling; flow-in between blocks.

NANNOFOSSIL CHALK, very light greenish gray (5G 7/1 or 5GY 8/1).

Common green and brown mottles and irregularly-shaped burrows.

Rare inclined (70 to 80°) laminations.

332.71 m: fault with slickensides; different sediment colors either side; general bedding inclined (~80°) either side.

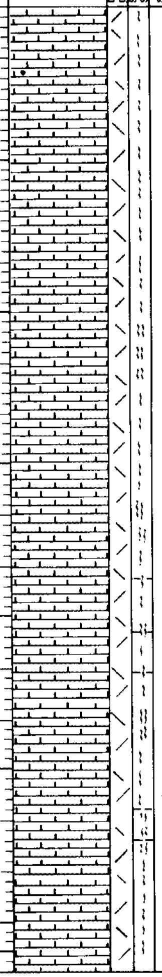
334.12 m: horizontal lamination.

ORGANIC CARBON AND CARBONATE (%)

	4, 26–27
Organic carbon	–
Carbonate	80

SITE 611 HOLE C CORE 33 CORED INTERVAL 290.8–300.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES		LITHOLOGIC DESCRIPTION
		PL1 *Globorotalia nepenthes/Globorotalia margaritae*	NN11 *Discoaster quinqueramus* Zone			290.8	1	0.5 1.0					5GY 8/1	Very fragmented by drilling; flow in between blocks.
						292.3	2						N9	NANNOFOSSIL CHALK, very light gray to gray (N8 or 5Y 8/1 to 6/1), or greenish gray (5GY 8/1).
						293.8	3						5GY 8/1	Frequent gray (5Y 7/1) burrow mottles and green (5G 5/2) wispy laminations.
						295.3	4						5GY 8/1 to N8; 5GY 6/1	
						296.8	5						5GY 8/1; N8 to N9; 5Y 8/1	
						298.3	6					*	5Y 6/1; 5Y 7/1; N8	
						299.8	7							
		AG	AG	B	B	300.1	CC							



SMEAR SLIDE SUMMARY (%)

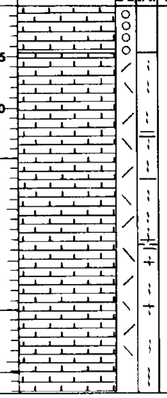
	6, 35
	M
Composition:	
Quartz	1
Mica	TR
Heavy minerals	4
Foraminifers	5
Calc. nannofossils	85
Diatoms	1
Radiolarians	TR
Sponge spicules	2
Silicoflagellates	2

ORGANIC CARBON AND CARBONATE (%)

	6, 35–36
Organic carbon	–
Carbonate	75

SITE 611 HOLE C CORE 35 CORED INTERVAL 310.0–319.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES		LITHOLOGIC DESCRIPTION
		PL1 *Globorotalia nepenthes/Globorotalia margaritae*	NN11 *Discoaster quinqueramus* Zone			310.0	1	0.5 1.0				*	5GY 8/1	NANNOFOSSIL CHALK, very light greenish gray to greenish gray (5GY 8/1 to 6/1). Very fragmented by drilling; flow-in. Green and brown patches and mottles throughout. Green laminations.
						311.5	2						5GY 6/1	
						313.0	3							
		AG	AG	CP			CC						5Y 6/1	



SMEAR SLIDE SUMMARY (%)

	1, 90
	D
Composition:	
Quartz	10
Carbonate unspec.	4
Foraminifers	1
Calc. nannofossils	85
Sponge spicules	TR

ORGANIC CARBON AND CARBONATE (%)

	1, 90–91
Organic carbon	–
Carbonate	67

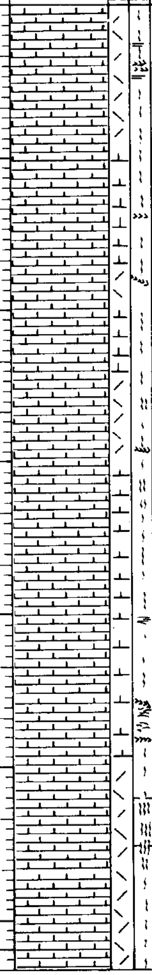
SITE 611 HOLE C CORE 38 CORED INTERVAL 338.8–348.4 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers zone: *Globorotalia conomiozea*
Nannofossils zone: NN11 *Discoaster quinqueramus* Zone
Fossil character (CC): Foraminifers AG, Nannofossils AG, Radiolarians B, Diatoms B

Section	Sub-bottom depth (m)
1	338.8
2	340.3
3	341.8
4	343.3
5	344.8
6	346.3
7	347.8
CC	348.1

Meters: 0.5, 1.0



Colors: 5G 5/2, 5G 5/2, 5GY 8/1, 5GY 8/1, 5GY 8/1, 5G 5/2, N8, 5G 5/2, 5G 5/2, 5GY 8/1, 5Y 6/1, 5GY 8/1

LITHOLOGIC DESCRIPTION

Very fragmented by drilling; flow-in between blocks.

NANNOFOSSIL CHALK, very light greenish gray to greenish gray (5GY 8/1 to 6/1).

Gray (5Y 7/1) burrow mottles; common between 346.7 and 347.4 m.

Green (5G 5/2) wispy laminations; common between 346.4 and 346.9 m. 347.8 to 348.1 m: common diffuse green (5G 5/2 or 5GY 7/2) broke-up laminations.

Zoophycos burrows.

SMEAR SLIDE SUMMARY (%)

	2, 97
	D
Composition:	
Quartz	5
Foraminifers	5
Calc. nannofossils	90
Sponge spicules	TR

ORGANIC CARBON AND CARBONATE (%)

	2, 97–98
Organic carbon	–
Carbonate	67

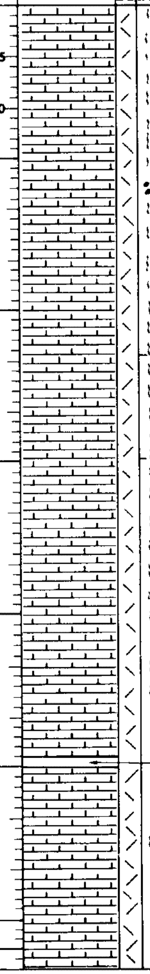
SITE 611 HOLE C CORE 39 CORED INTERVAL 348.4–358.0 m

Columns: TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers zone: *Globorotalia conomiozea*
Nannofossils zone: NN11 *Discoaster quinqueramus* Zone
Fossil character (CC): Foraminifers AG, Diatoms FP

Section	Sub-bottom depth (m)
1	348.4
2	349.9
3	351.4
4	352.9
5	354.4
6	355.9
7	357.4
CC	357.7

Meters: 0.5, 1.0



Colors: 5GY 8/1, 5GY 6/1, 5Y 7/1 to 5GY 8/1, 5GY 7/1, 5GY 7/1 to 5GY 8/1, OG, 5GY 6/1, 5GY 7/1

LITHOLOGIC DESCRIPTION

Very fragmented by drilling; only ~ 40% recovery from 348.4 to 349.72 m; flowage.

NANNOFOSSIL CHALK, very light greenish gray to greenish gray (5GY 8/1 to 6/1).

Common gray (5Y 7/1) and green (5G 5/2) mottles.

350.10 to 350.20 m: dark green (5G 4/2) halos to light green burrows.

Zoophycos.

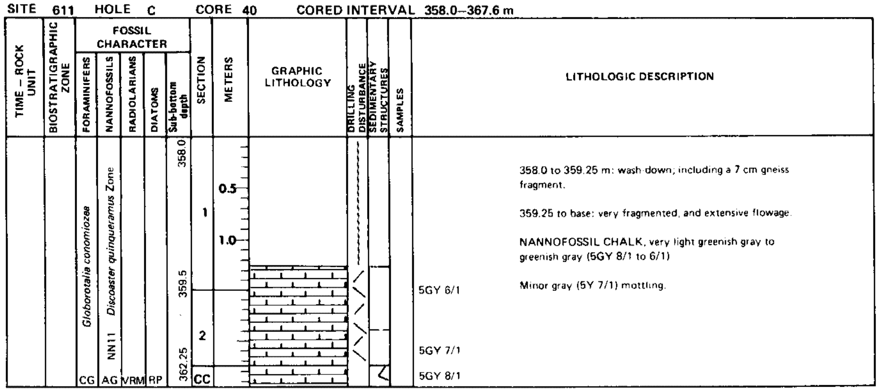
SMEAR SLIDE SUMMARY (%)

	2, 40
	D
Composition:	
Quartz	10
Mica	TR
Heavy minerals	5
Foraminifers	5
Calc. nannofossils	80
Diatoms	TR
Radiolarians	TR

ORGANIC CARBON AND CARBONATE (%)

	2, 40–41
Organic carbon	–
Carbonate	32

SITE 611 HOLE C CORE 40 CORED INTERVAL 358.0–367.6 m



LITHOLOGIC DESCRIPTION

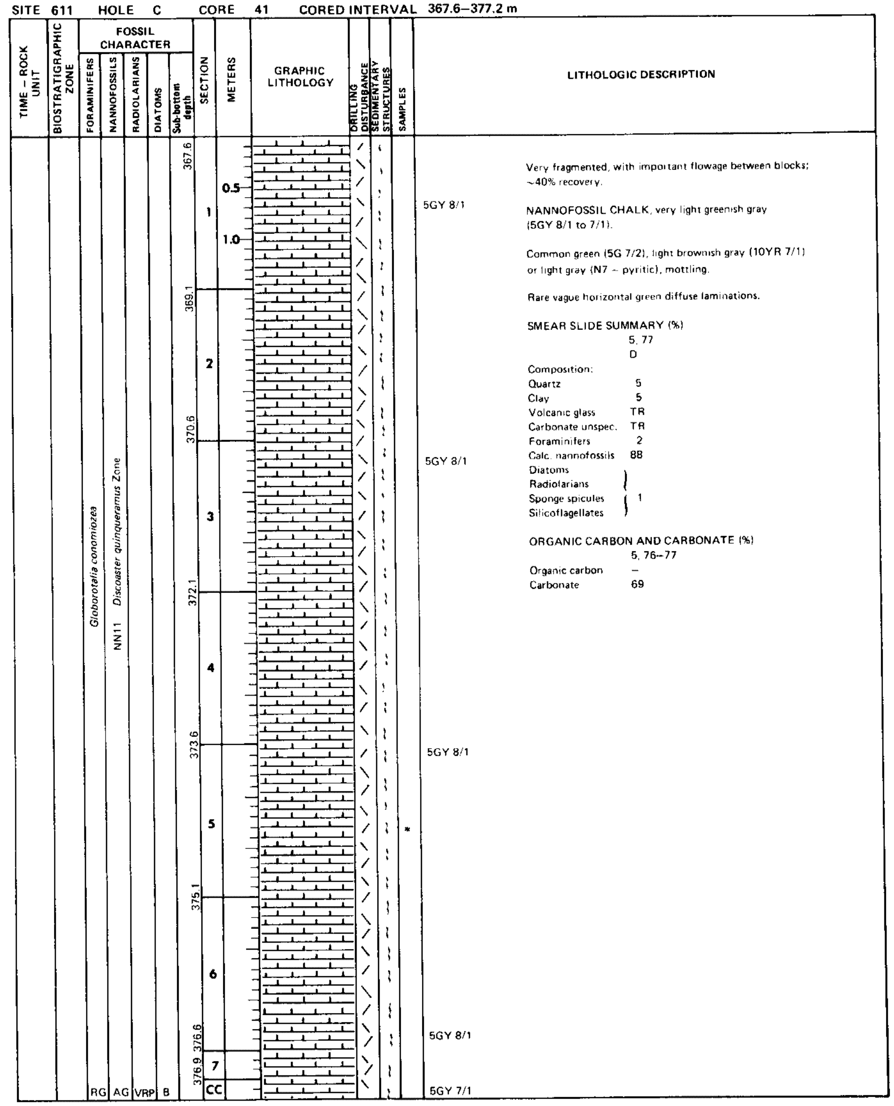
358.0 to 359.25 m: wash down, including a 7 cm gneiss fragment.

359.25 to base: very fragmented, and extensive flowage.

NANNOFOSSIL CHALK, very light greenish gray to greenish gray (5GY 8/1 to 6/1)

Minor gray (5Y 7/1) mottling.

SITE 611 HOLE C CORE 41 CORED INTERVAL 367.6–377.2 m



LITHOLOGIC DESCRIPTION

Very fragmented, with important flowage between blocks; ~40% recovery.

NANNOFOSSIL CHALK, very light greenish gray (5GY 8/1 to 7/1).

Common green (5G 7/2), light brownish gray (10YR 7/1) or light gray (N7 – pyritic), mottling.

Rare vague horizontal green diffuse laminations.

SMEAR SLIDE SUMMARY (%)

	5, 77
	D
Composition:	
Quartz	5
Clay	5
Volcanic glass	TR
Carbonate unspec.	TR
Foraminifers	2
Calc. nannofossils	88
Diatoms	}
Radiolarians	}
Sponge spicules	{ 1
Silicoflagellates	}

ORGANIC CARBON AND CARBONATE (%)

	5, 76–77
Organic carbon	–
Carbonate	69

SITE 611 HOLE C CORE 42 CORED INTERVAL 377.2–386.18 m

Time-rock unit: —; Biostratigraphic zone: —

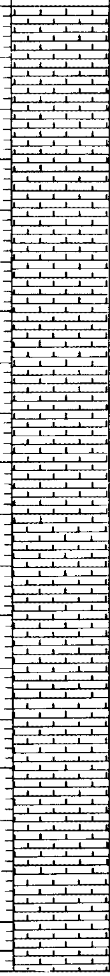
Fossil character: Foraminifers FG, Nannofossils AG, Radiolarians B, Diatoms B

Foraminifer zone: *Globorotalia conomiozea*; Nannofossil zone: NN11 *Discoaster quinqueramus* Zone

Sub-bottom depth (m): 377.2 (Section 1), 378.7 (Section 2), 380.2 (Section 3), 381.7 (Section 4), 383.2 (Section 5), 384.7 (Section 6), 386.2 (Section 7), 386.5 (CC)

Meters: 0.5, 1.0

Sections: 1, 2, 3, 4, 5, 6, 7, CC



Colors: 5GY 8/1, 5GY 8/1, 5GY 8/1, 5GY 8/1, 5G 5/2, N8 with 5GY 8/1, 5G 5/2

Samples: * (Section 3)

LITHOLOGIC DESCRIPTION

Very fragmented by drilling; flowage between blocks.

NANNOFOSSIL CHALK, very light gray (N8) or very light greenish gray (5GY 8/1).

Common subhorizontal light brownish gray (10YR 7/1) burrow mottles; some *zoophycos*.

Rare wispy green (5G 5/2) laminations.

390.50 m: fault with slickensides; upper sediment lightly darker than lower sediment.

395.91 m: horizontal burrow crosscutting vertical burrow.

SMEAR SLIDE SUMMARY (%)

	3, 80
	D
Composition:	
Quartz	5
Mica	TR
Heavy minerals	5
Foraminifers	5
Calc. nannofossils	85
Diatoms	TR
Sponge spicules	TR

ORGANIC CARBON AND CARBONATE (%)

	3, 80–81
Organic carbon	–
Carbonate	74

SITE 611 HOLE C CORE 43 CORED INTERVAL 386.8–396.4 m

Time-rock unit: —; Biostratigraphic zone: —

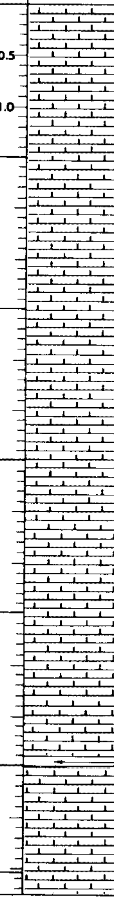
Fossil character: Foraminifers AG, Nannofossils AG, Radiolarians B, Diatoms B

Foraminifer zone: *Globorotalia conomiozea*; Nannofossil zone: NN11 *Discoaster quinqueramus* Zone

Sub-bottom depth (m): 386.8 (Section 1), 388.3 (Section 2), 389.8 (Section 3), 391.3 (Section 4), 392.8 (Section 5), 394.3 (Section 6), 395.36 (CC)

Meters: 0.5, 1.0

Sections: 1, 2, 3, 4, 5, 6, CC



Colors: N7, N8, 5GY 7/1, 5GY 6/1, 5G 6/1, 5G 6/1, 5GY 7/1, 5GY 6/1, 5GY 6/1, 5GY 7/1, 5GY 6/1, IW – OG, 5GY 7/1, 5GY 6/1

Samples: * (Section 6)

LITHOLOGIC DESCRIPTION

Fragmented by drilling; flowage between hard fragments.

NANNOFOSSIL CHALK, very light gray or greenish gray (N8 to N7; 5GY 7/1 to 6/1).

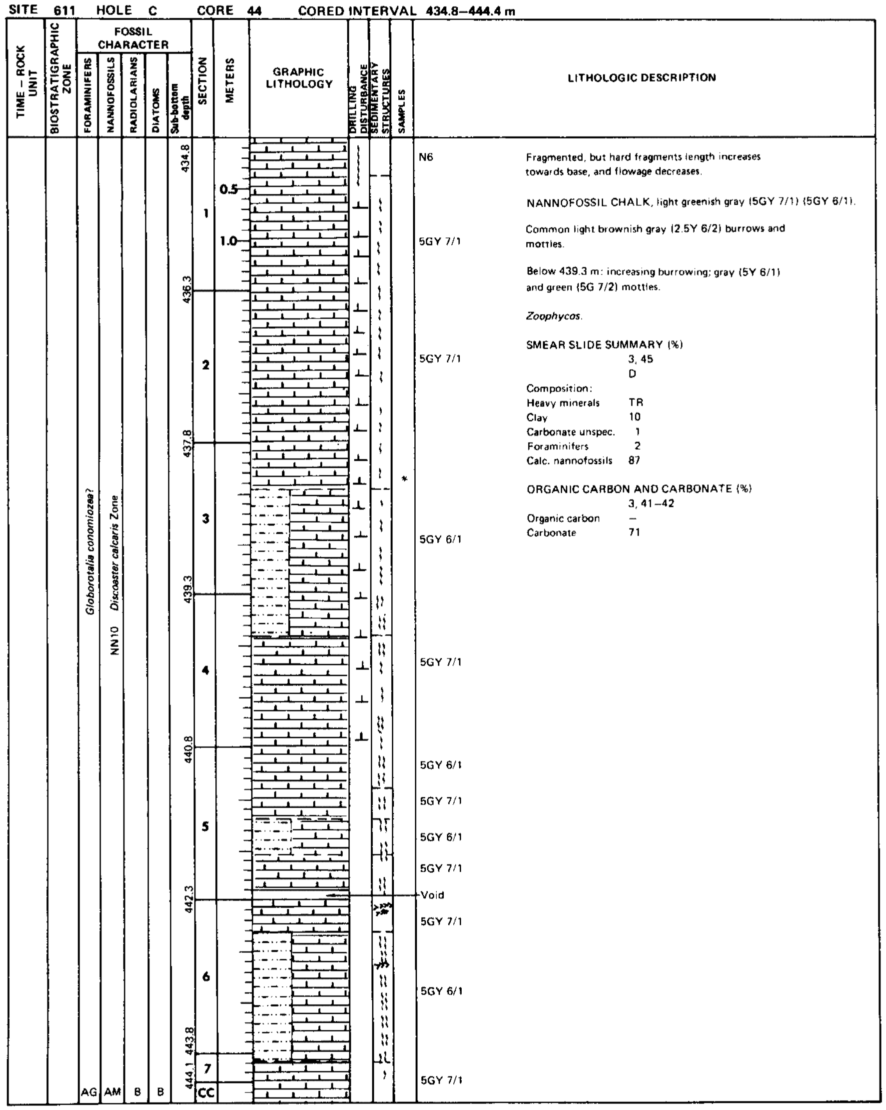
Common gray (10YR 7/1) burrow mottles and green (5G 7/2) mottles.

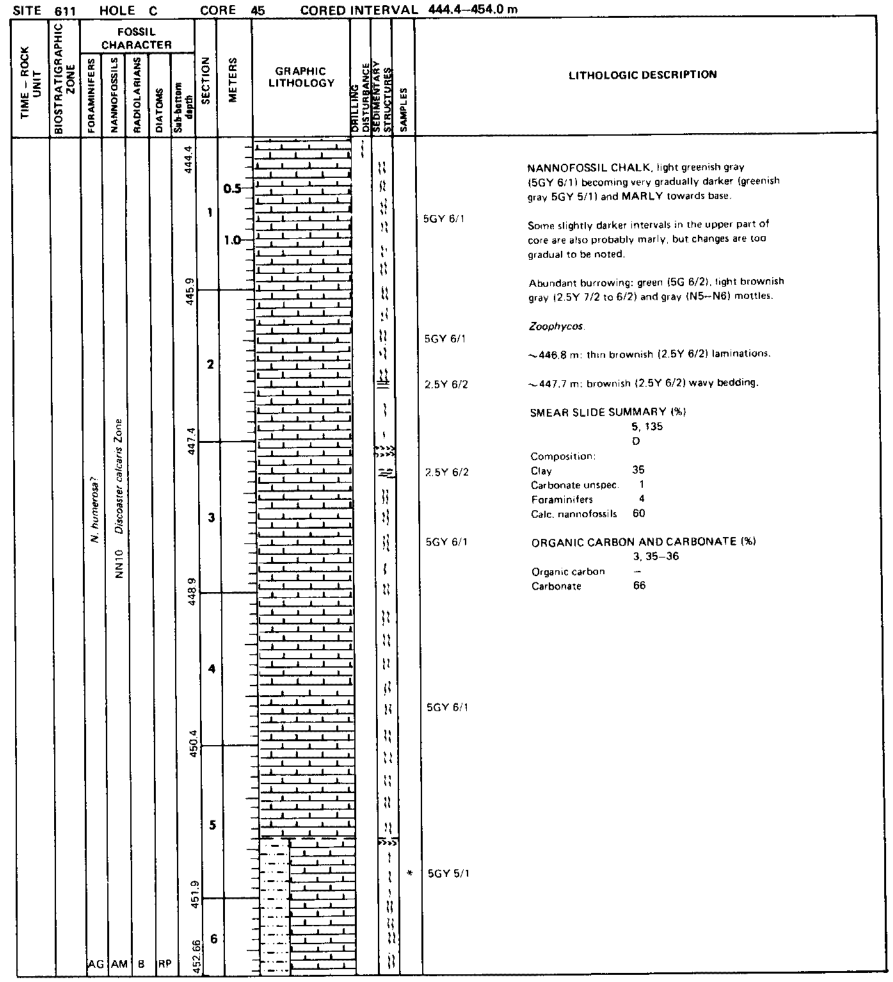
SMEAR SLIDE SUMMARY (%)

	6, 47
	D
Composition:	
Heavy minerals	TR
Clay	6
Carbonate unspec.	1
Calc. nannofossils	93

ORGANIC CARBON AND CARBONATE (%)

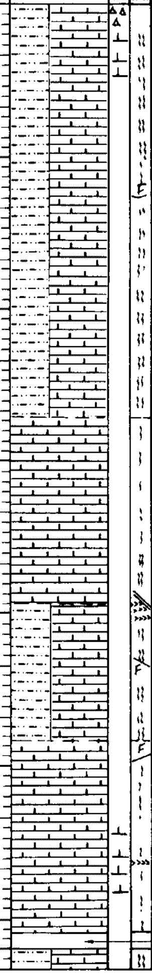
	6, 46–47
Organic carbon	–
Carbonate	69


SITE 611 HOLE C CORE 44 CORED INTERVAL 434.8–444.4 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
Globorotalia conomiozea?
NN10 Discoaster calcaris Zone
AG AM B B
434.8
436.3
437.8
439.3
440.8
442.3
443.8
444.1
0.5
1.0
1
2
3
4
5
6
7
CC
N6
5GY 7/1
5GY 7/1
5GY 6/1
5GY 7/1
5GY 6/1
5GY 7/1
5GY 6/1
5GY 7/1
Void
5GY 7/1
5GY 6/1
5GY 7/1
Fragmented, but hard fragments length increases towards base, and flowage decreases.
NANNOFOSSIL CHALK, light greenish gray (5GY 7/1) (5GY 6/1).
Common light brownish gray (2.5Y 6/2) burrows and mottles.
Below 439.3 m: increasing burrowing; gray (5Y 6/1) and green (5G 7/2) mottles.
Zoophycos.
SMEAR SLIDE SUMMARY (%)
3, 45
D
Composition:
Heavy minerals TR
Clay 10
Carbonate unspec. 1
Foraminifers 2
Calc. nannofossils 87
ORGANIC CARBON AND CARBONATE (%)
3, 41–42
Organic carbon –
Carbonate 71


SITE 611 HOLE C CORE 45 CORED INTERVAL 444.4–454.0 m
TIME – ROCK UNIT
BIOSTRATIGRAPHIC ZONE
FOSSIL CHARACTER
FORAMINIFERS
NANNOFOSSILS
RADIOLARIANS
DIATOMS
Sub-bottom depth
SECTION
METERS
GRAPHIC LITHOLOGY
DRILLING DISTURBANCE
SEDIMENTARY STRUCTURES
SAMPLES
LITHOLOGIC DESCRIPTION
N. humerosa?
NN10 Discoaster calcaris Zone
AG AM B RP
444.4
445.9
447.4
448.9
450.4
451.9
452.66
0.5
1.0
1
2
3
4
5
6
5GY 6/1
5GY 6/1
2.5Y 6/2
2.5Y 6/2
5GY 6/1
5GY 6/1
5GY 5/1
NANNOFOSSIL CHALK, light greenish gray (5GY 6/1) becoming very gradually darker (greenish gray 5GY 5/1) and MARLY towards base.
Some slightly darker intervals in the upper part of core are also probably marly, but changes are too gradual to be noted.
Abundant burrowing; green (5G 6/2), light brownish gray (2.5Y 7/2 to 6/2) and gray (N5–N6) mottles.
Zoophycos.
~446.8 m: thin brownish (2.5Y 6/2) laminations.
~447.7 m: brownish (2.5Y 6/2) wavy bedding.
SMEAR SLIDE SUMMARY (%)
5, 135
D
Composition:
Clay 35
Carbonate unspec. 1
Foraminifers 4
Calc. nannofossils 60
ORGANIC CARBON AND CARBONATE (%)
3, 35–36
Organic carbon –
Carbonate 66

SITE 611 HOLE C CORE 46 CORED INTERVAL 492.4–502.0 m

Time-rock unit	Biostratigraphic zone	Foraminifers	Nannofossils	Radiolarians	Diatoms	Sub-bottom depth	Section	Meters
		N. humerosa	NN9 Discoaster hamatus Zone			492.4	1	0.5, 1.0
						493.9	2	
						495.4	3	
						496.9	4	
						408.4	5	
						499.9	6	
						501.4	7	
		CM	AM	B	B	501.7	CC	



Colors (top to bottom): 5GY 6/1; 5GY 6/1; 5GY 7/1; 5GY 6/1; 5GY 7/1; 5GY 6/1; Void; 5GY 6/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK to MARLY NANNOFOSSIL CHALK, light greenish gray (5GY 7/1) to greenish gray (5GY 6/1).

Abundant burrowing: green (5G 6/2), light brownish gray (2.5Y 7/2 to 6/2) and gray (N6) mottles.

Zoophycos.

Some faults with slickensides.

SMEAR SLIDE SUMMARY (%)

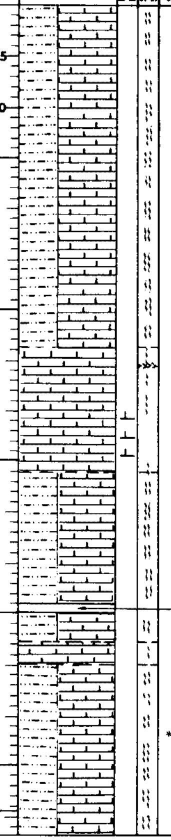
	5, 70
Composition:	
Quartz	TR
Feldspar	TR
Heavy minerals	1
Clay	45
Carbonate unspec.	1
Calc. nannofossils	53

ORGANIC CARBON AND CARBONATE (%)

	5, 70–71
Organic carbon	–
Carbonate	63

SITE 611 HOLE C CORE 47 CORED INTERVAL 502.0–511.6 m

Time-rock unit	Biostratigraphic zone	Foraminifers	Nannofossils	Radiolarians	Diatoms	Sub-bottom depth	Section	Meters
		N. humerosa	NN9 Discoaster hamatus Zone			502.0	1	0.5, 1.0
						503.5	2	
						505.0	3	
						506.5	4	
						508.0	5	
						509.5	6	
		CM	AM	B	B		CC	



Colors (top to bottom): 5GY 6/1; 5GY 6/1; 5GY 7/1; 5GY 6/1; Void; 5GY 7/1; 5GY 6/1; 5GY 6/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CHALK to MARLY NANNOFOSSIL CHALK, light greenish gray (5GY 7/1) to greenish gray (5GY 6/1).

Abundant burrowing: gray (N5) and mostly light brownish gray (10YR 6/2) mottles.

Rare *zoophycos.*

SMEAR SLIDE SUMMARY (%)

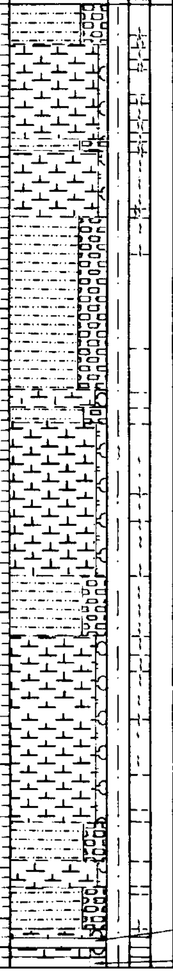
	5, 130
Composition:	
Heavy minerals	TR
Clay	45
Micronodules	TR
Carbonate unspec.	TR
Calc. nannofossils	55

ORGANIC CARBON AND CARBONATE (%)

	3, 80–81
Organic carbon	–
Carbonate	62

SITE 611 HOLE D CORE 1 CORED INTERVAL 5.5–15.1 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides* (AG)	NN19 *Pseudoemiliania lacunosa* Zone (AG)		*Pseudoeunotia doliolus* Zone (FM)	5.5, 7.0, 8.5, 10.0, 11.5, 13.0, 14.5, 14.8	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0



Colors (top to bottom): 5Y 4/2, 5Y 5/2, 5Y 7/1, 5Y 6/1, 5Y 7/1, 5Y 6/1, 5Y 7/1, 5Y 6/1, 5Y 7/1, 5Y 5/1, 5Y 7/1, 5Y 6/1, 5Y 4/2, 5Y 5/1, 5Y 4/2, 5Y 7/1, 5Y 5/2, 5Y 7/1 + 5Y 5/2, 5Y 6/1, 5Y 7/1, 5Y 6/1, 5Y 5/1, 5Y 6/1, 5Y 7/1, 5Y 6/1, 5Y 7/1, 5Y 6/1, 5Y 7/1, 5Y 6/1, 5Y 4/1, 5Y 6/1, 5Y 4/1, 5Y 5/1, Void, 5Y 6/1, 5Y 6/1, Void

LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, olive gray (5Y 5/2 to 4/2); and SILICEOUS NANNOFOSSIL OOZE, light gray (5Y 7/1); darker gray (5Y 6/1), probably marly intervals.

Abundant granule-sized dropstones in calcareous mud intervals. 14.20 to 14.28 m: tuff clasts.

Siliceous nannofossil ooze generally mottled.

Pyritized burrow: 12.62 to 12.64 m.

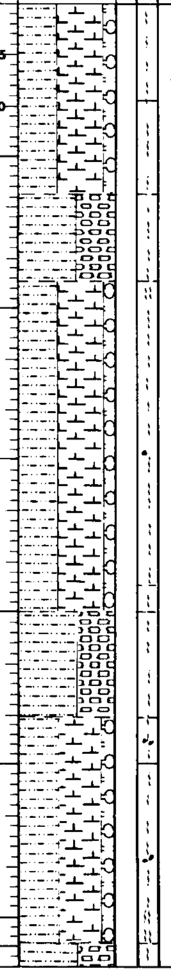
7.55 m: limestone dropstone.

SMEAR SLIDE SUMMARY (%)

	2, 18	3, 18
	D	D
Composition:		
Quartz	5	30
Heavy minerals	–	5
Clay	–	30
Volcanic glass	–	5
Carbonate unspec.	10	20
Foraminifers	2	TR
Calc. nannofossils	83	10
Diatoms	2	–
Sponge spicules	8	–

SITE 611 HOLE D CORE 2 CORED INTERVAL 128.9–138.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated (AG)	NN16 *Discoaster surculus* Zone (AG)		*Nitzschia marina* Zone (CM)	128.9, 130.4, 131.9, 133.5, 134.9, 136.5, 137.9	1, 2, 3, 4, 5, 6, 7, CC	0.5, 1.0



Colors (top to bottom): 5Y 6/1, 5G 5/2, 5Y 4/1, 5Y 6/1, 5G 3/2, 5Y 5/1, 5Y 4/1, 5G 3/2, 5Y 6/1, 5G 3/2, 5Y 4/1

LITHOLOGIC DESCRIPTION

MARLY SILICEOUS NANNOFOSSIL OOZE, light gray to gray (5Y 6/1 to 5Y 5/1), alternating with thinner intervals of CALCAREOUS MUD, dark gray (5Y 4/1).

Common green (5G 5/2) and olive gray (5Y 6/2) mottles and laminations; less common on calcareous mud.

Rare green (5G 3/2) small patches of glauconite.

SMEAR SLIDE SUMMARY (%)

	1, 75
	D
Composition:	
Quartz	30
Feldspar	5
Mica	TR
Heavy minerals	5
Foraminifers	5
Calc. nannofossils	42
Diatoms	5
Radiolarians	TR
Sponge spicules	8
Silicoflagellates	TR

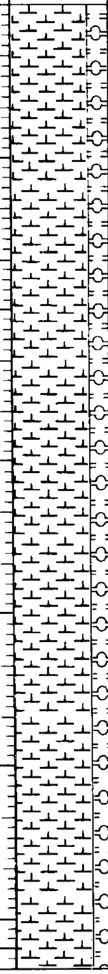
SITE 611 HOLE D CORE 3 CORED INTERVAL 138.5–148.1 m

Fossil character: Foraminifers: PL3–5 undifferentiated (AG); Nannofossils: NN16 *Discoaster surculus* Zone (AG); Diatoms: *Nitzschia jouseae* Zone (AM)

Sub-bottom depth: 138.5, 140.0, 141.5, 143.0, 144.5, 146.0, 147.5

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Meters: 0.5, 1.0



Colors: 5Y 5/1, 5Y 4/1, 5Y 6/1, 5Y 5/1, 5G 5/2, 5Y 6/1, 5Y 5/1, 5Y 7/1, 5Y 6/1, 5Y 6/1

LITHOLOGIC DESCRIPTION

SILICEOUS NANNOFOSSIL OOZE, light gray to gray (5Y 7/1 to 5/1). Darker (5Y 4/1) interval probably marly, but changes of color very gradational.

Common green mottling.

146.56 m: very dark green haloed burrow.

147.77 m: small (0.5 cm) pyritic patch.

SMEAR SLIDE SUMMARY (%)

	1, 50
	D
Composition:	
Clay	5
Carbonate unspec.	2
Foraminifers	3
Calc. nannofossils	68
Diatoms	10
Radiolarians	2
Sponge spicules	10

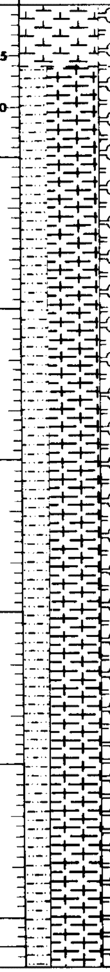
SITE 611 HOLE D CORE 4 CORED INTERVAL 148.1–157.7 m

Fossil character: Foraminifers: PL3–5 undifferentiated (AG); Nannofossils: NN16 *Discoaster surculus* Zone (AG); Diatoms: *Nitzschia jouseae* Zone (CM)

Sub-bottom depth: 148.1, 149.6, 151.1, 152.6, 154.1, 155.6, 157.1

Sections: 1, 2, 3, 4, 5, 6, 7, CC

Meters: 0.5, 1.0



Colors: 5Y 6/1, 5Y 5/1, 5Y 5/1, 5Y 5/1, 5Y 6/1, 5Y 5/1, 5Y 5/1, 5Y 6/1, 5Y 7/1, 5Y 5/1, 5G 5/2

LITHOLOGIC DESCRIPTION

MARLY SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE, light gray to gray (5Y 7/1 to 5/1).

Very gradational changes of color, probably in relation with slight variations of detrital amount.

General green mottling and diffuse green patches, but no real laminations.

SMEAR SLIDE SUMMARY (%)

	2, 50
	D
Composition:	
Quartz	20
Mica	TR
Heavy minerals	10
Clay	5
Foraminifers	15
Calc. nannofossils	35
Diatoms	8
Sponge spicules	7

SITE 611 HOLE D CORE 5 CORED INTERVAL 157.7–167.3 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL3–5 undifferentiated (AG)
Nannofossils: NN16 *Discoaster surculus* Zone (AG)
Diatoms: *Nitzschia jouseae* Zone (CM)

Sub-bottom depth: 157.7, 159.2, 160.7, 162.2, 163.7, 165.2, 166.7
Sections: 1, 2, 3, 4, 5, 6, 7, CC
Meters: 0.5, 1.0

Colors: 5Y 6/1, 5Y 6/1, 5Y 6/1, 5Y 5/1, 5Y 6/1, 5G 5/2, 5G 5/2, 5Y 5/1, 5Y 5/1, 5Y 6/1, 5GY 7/1, 5G 5/2

MARLY SILICEOUS FORAMINIFERAL NANNOFOSSIL OOZE, gray (5Y 5/1 to 6/1).

Below 166.3 m: SILICEOUS NANNOFOSSIL OOZE, light greenish gray (5GY 7/1).

Common olive gray (5Y 6/2) and green (5G 5/2) mottling. Rare diffuse green (5G 5/2) laminations. Rare small green (5G 3/2) patches of glauconite.

SITE 611 HOLE D CORE 6 CORED INTERVAL 167.3–172.3 m

TIME – ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | Sub-bottom depth | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION

Foraminifers: PL3–5 undifferentiated (AG)
Nannofossils: NN16 *Discoaster surculus* Zone (AG)
Diatoms: *Nitzschia jouseae* Zone (AM)

Sub-bottom depth: 167.3, 168.8, 170.3, 171.8, 172.2
Sections: 1, 2, 3, 4, CC
Meters: 0.5, 1.0

Samples: *

Colors: 5G 5/2, 5Y 6/1, 5Y 6/1, 5Y 6/1, 5G 5/2

SILICEOUS NANNOFOSSIL OOZE, gray (5Y 6/1).

Mottling: frequent diffuse green patches, tending towards laminae. Rare laminations, green (5G 5/2).

SMEAR SLIDE SUMMARY (%)

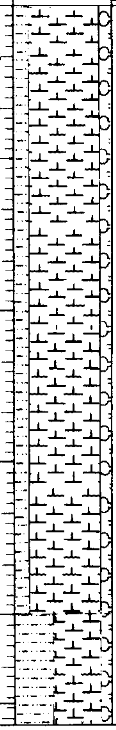
Composition:	1, 100 D
Quartz	10
Clay	5
Volcanic glass (brown)	TR
Carbonate unspec.	5
Foraminifers	1
Calc. nannofossils	61
Diatoms	5
Radiolarians	TR
Sponge spicules	8

SITE 611 HOLE D CORE 7 CORED INTERVAL 172.3–176.9 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone			172.3	1
						173.5	2
						175.3	3
						176.5	4
						178.3	5
		CG	AG		FP		CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Colors (top to bottom): 5GY 6/1, 5G 5/2, 5G 5/2, 5Y 5/1, 5GY 7/1, 5GY 7/1, 5G 5/2, 5Y 6/1, 5G 5/2, 5G 5/2, 5Y 5/1, 5Y 4/1

LITHOLOGIC DESCRIPTION

SILICEOUS NANNOFOSSIL OOZE, light greenish gray to gray (5GY 7/1 to 5Y 6/1).

Below 178.3 m: MARLY SILICEOUS NANNOFOSSIL OOZE, gray to dark gray (5Y 5/1 to 4/1).

Frequent diffuse green patches (almost laminations). Rare real green (5G 5/2) laminations.

Common olive gray mottles.

SMEAR SLIDE SUMMARY (%)

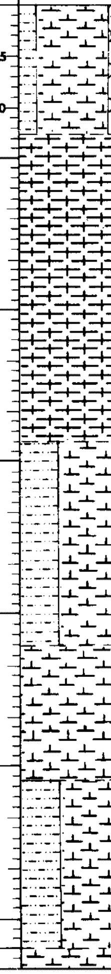
	5, 37
	D
Texture:	
Sand	–
Silt	15
Clay	85
Composition:	
Quartz	40
Mica	1
Foraminifers	TR
Calc. nannofossils	46
Diatoms	4
Radiolarians	2
Sponge spicules	7

SITE 611 HOLE D CORE 8 CORED INTERVAL 176.9–186.5 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone		*Nitzschia jouseae* Zone	176.9	1
						178.4	2
						179.9	3
						181.4	4
						182.9	5
						184.4	6
						185.9	7
		AG	AG		CM		CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

Colors (top to bottom): 5Y 6/1, 5G 6/2, 5G 6/2, 5Y 7/1, N8, 5GY 7/1, 5Y 6/1, 5G 5/2, 5G 5/2, 5Y 6/1, 5G 6/2, 5GY 7/1, 5G 6/2, 5Y 6/1, 5G 6/2, 5GY 7/1

LITHOLOGIC DESCRIPTION

176.9 to 178.15 m: SILICEOUS NANNOFOSSIL OOZE, gray (5Y 6/1).

178.15 to 181.2 m: FORAMINIFERAL NANNOFOSSIL OOZE, light gray to light greenish gray (5Y 7/1 to 5GY 7/1).

Below 181.2 m: alternating:
MARLY NANNOFOSSIL OOZE, gray (5Y 6/1); and NANNOFOSSIL OOZE, light greenish gray (5GY 7/1), mottled with faint burrows, light olive gray (2.5Y 7/2).

On the whole core: frequent green (5G 5/2 or 6/2) laminations or patches.

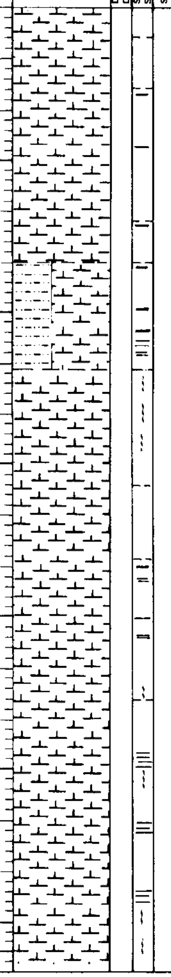
SMEAR SLIDE SUMMARY (%)

	2, 30	4, 30
	D	D
Composition:		
Quartz	TR	–
Heavy minerals	TR	1
Clay	5	35
Micronodules	–	TR
Foraminifers	13	4
Calc. nannofossils	75	66
Diatoms	2	4
Radiolarians	TR	–
Sponge spicules	TR	–
Silicoflagellates	TR	TR

SITE 611 HOLE D CORE 9 CORED INTERVAL 186.5–196.1 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone			186.5	1	0.5, 1.0
						188.0	2	
						189.5	3	
						191.0	4	
						192.5	5	
						194.0	6	
						195.5	7	
		AG	AG		FP	197.0	CC	

GRAPHIC LITHOLOGY



Colors (top to bottom): 5Y 7/1, N8, 5Y 7/1, 5GY 7/1, 5Y 6/1, 5G 6/2, 5GY 7/1, N8, 5GY 7/1, 5GY 6/1, 5GY 7/1, N8, 5GY 7/1, 5GY 7/1

LITHOLOGIC DESCRIPTION

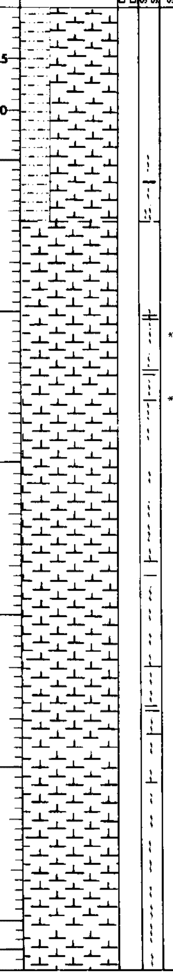
NANNOFOSSIL OOZE, very light gray to light greenish gray (N8 or 5Y 7/1 to 5GY 7/1); rare darker gray (5Y 6/1 or 5GY 6/1) MARLY intervals.

Common green (5G 6/2) LAMINATIONS or patches; rare olive gray (2.5Y 7/2) burrow mottles.

SITE 611 HOLE D CORE 10 CORED INTERVAL 196.1–205.7 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		PL3–5 undifferentiated	NN16 *Discoaster surculus* Zone			196.1	1	0.5, 1.0
						197.6	2	
						199.1	3	
						200.6	4	
						202.1	5	
						203.6	6	
						205.1	7	
		AG	AG		FP	205.4	CC	

GRAPHIC LITHOLOGY



Colors (top to bottom): 5GY 5/1, 5GY 6/1, 5GY 7/1, 5G 6/2, 5GY 7/1, 5G 6/2, 5GY 7/1, 5GY 7/1

LITHOLOGIC DESCRIPTION

196.1 to 198.2 m: MARLY NANNOFOSSIL OOZE, greenish gray (5GY 5/1 to 6/1).

Below 198.2 m: NANNOFOSSIL OOZE, very light greenish gray (5GY 7/1).

Rare distinct green (5G 6/2) laminations; but frequent green (5G 6/2) patches and common olive gray (2.5Y 7/2) burrow mottles.

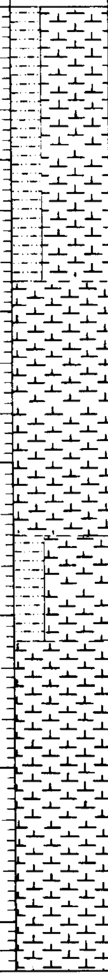
Rare chalky intervals.

SMEAR SLIDE SUMMARY (%)

	3, 22	3, 80
	D	D
Composition:		
Quartz	TR	–
Clay	4	10
Micronodules	TR	TR
Carbonate unspec.	TR	–
Foraminifers	6	6
Calc. nannofossils	87	84
Diatoms	3	TR
Sponge spicules	TR	TR
Silicoflagellates	TR	–

SITE 611 HOLE D CORE 11 CORED INTERVAL 205.7–215.3 m

Field	Content
TIME – ROCK UNIT	
BIOSTRATIGRAPHIC ZONE	
FOSSIL CHARACTER – FORAMINIFERS	PL3–5 undifferentiated; AG
FOSSIL CHARACTER – NANNOFOSSILS	NN16 *Discoaster surculus* Zone; AG
FOSSIL CHARACTER – RADIOLARIANS	
FOSSIL CHARACTER – DIATOMS	RP
Sub-bottom depth	205.7, 207.2, 208.7, 210.2, 211.7, 213.2, 214.7, 215.0
SECTION	1, 2, 3, 4, 5, 6, 7, CC
METERS	0.5, 1.0



Colors (downcore): 5GY 6/1; 5GY 6/1; 5G 6/2; N8 to 5G 7/1; 5GY 7/1; 5GY 6/1; 5G 6/2; 5G 7/1; 5Y 7/1; * N8; 5GY 7/1; 5GY 7/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, very light gray or greenish gray (N8 or 5G 7/1 to 5GY 7/1) to MARLY NANNOFOSSIL OOZE, greenish gray (5GY 6/1).

Green (5G 6/2) laminations and patches.

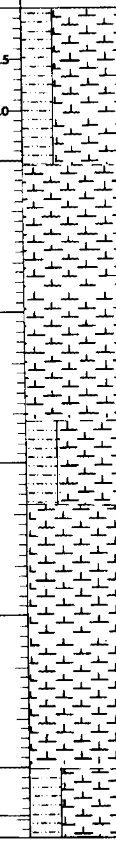
Chalky intervals getting more common.

SMEAR SLIDE SUMMARY (%)

Composition:	5, 130 D
Quartz	TR
Feldspar	TR
Clay	4
Carbonate unspec.	TR
Foraminifers	7
Calc. nannofossils	89
Diatoms	TR

SITE 611 HOLE D CORE 12 CORED INTERVAL 215.3–224.9 m

Field	Content
TIME – ROCK UNIT	
BIOSTRATIGRAPHIC ZONE	
FOSSIL CHARACTER – FORAMINIFERS	PL3–5 undifferentiated; AG
FOSSIL CHARACTER – NANNOFOSSILS	NN15 *Reticulofenestra pseudoumbilica* Zone; AG
FOSSIL CHARACTER – RADIOLARIANS	
FOSSIL CHARACTER – DIATOMS	B
Sub-bottom depth	215.3, 216.8, 218.3, 219.8, 221.3, 222.8, 223.25
SECTION	1, 2, 3, 4, 5, 6, CC
METERS	0.5, 1.0



Colors (downcore): 5Y 5/1; 5Y 6/1; 5GY 7/1; 5G 6/2; 5GY 7/1; 5G 6/2 N3; 5GY 6/1; 5G 7/1; N8; 5GY 7/1; 5G 6/2; 5GY 6/1; 5Y 6/1

LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE, light gray to greenish gray (N8 or 5GY 7/1) to MARLY NANNOFOSSIL OOZE, gray to greenish gray (5Y 6/1 to 5/1; 5GY 6/1).

Rare green (5G 6/2) laminations, frequent between 222.8 and 223.25 m. Diffuse green (5G 6/2) patches. Rare pyritic (N3) patches.

Scattered chalky intervals

SITE 611 HOLE D CORE 13 CORED INTERVAL 224.9–234.5 m

Column headings: TIME – ROCK UNIT; BIOSTRATIGRAPHIC ZONE; FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS); Sub-bottom depth; SECTION; METERS; GRAPHIC LITHOLOGY; DRILLING DISTURBANCE; SEDIMENTARY STRUCTURES; SAMPLES; LITHOLOGIC DESCRIPTION

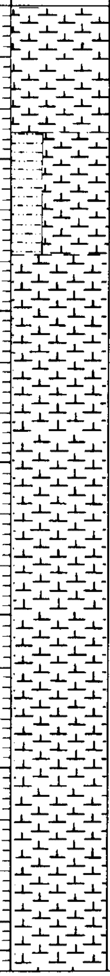
Foraminifers: PL3–5 undifferentiated (AG)

Nannofossils: NN15 *Reticulofenestra pseudoumbilica* Zone (AG)

Diatoms: *Nitzschia jouseae* Zone (CM)

Section	Sub-bottom depth
1	224.9
2	226.4
3	227.9
4	229.4
5	230.9
6	231.4
7	233.9
CC	234.2

Meters: 0.5, 1.0



Colors (top to bottom): N8; 5GY 7/1; 5GY 6/1; 5G 4/2; 5Y 6/1; N8; N8; N8 and 5G 7/1; 5G 6/2; 2.5Y 6/2; N8 and 5GY 7/1; 2.5Y 6/2; 5G 6/2; 5G 6/2; 5GY 7/1

NANNOFOSSIL OOZE, almost CHALK under 231.5 m, very light gray or greenish gray.

One dark (5Y 6/1 to 5GY 6/1) MARLY interval.

Rare green (5G 6/2) or olive gray (2.5Y 6/2) laminations.

SMEAR SLIDE SUMMARY (%)

Composition:	3, 70
	D
Clay	5
Carbonate unspec.	TR
Foraminifers	3
Calc. nannofossils	92
Diatoms	TR
Sponge spicules	TR

SITE 611 HOLE D CORE 14 CORED INTERVAL 234.5–244.1 m

Column headings: TIME – ROCK UNIT; BIOSTRATIGRAPHIC ZONE; FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS); Sub-bottom depth; SECTION; METERS; GRAPHIC LITHOLOGY; DRILLING DISTURBANCE; SEDIMENTARY STRUCTURES; SAMPLES; LITHOLOGIC DESCRIPTION

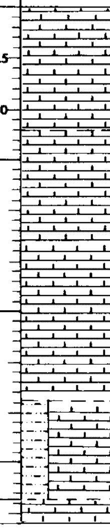
Foraminifers: PL2 *Globorotalia margaritae* (AG)

Nannofossils: NN15 *Reticulofenestra pseudoumbilica* Zone (AG)

Diatoms: *Nitzschia jouseae* Zone (AM)

Section	Sub-bottom depth
1	234.5
2	236.0
3	237.5
4	239.0
CC	239.35

Meters: 0.5, 1.0



Colors (top to bottom): N8; 5GY 7/1; N8; 5GY 7/1; 5GY 6/1; 5GY 7/1

NANNOFOSSIL CHALK, very light gray or greenish gray (N8 or 5GY 7/1) to MARLY NANNOFOSSIL CHALK, greenish gray (5GY 6/1).

234.5 to 235.7 m: soupy ooze, breccia and downhole gravel.

Frequent green (5G 6/2) laminations under 237.8 m.

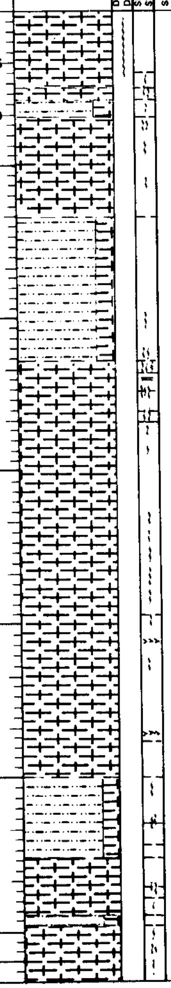
SMEAR SLIDE SUMMARY (%)

Composition:	2, 65
	D
Clay	7
Foraminifers	4
Calc. nannofossils	89
Diatoms	TR
Sponge spicules	TR

SITE 611 HOLE E CORE 1 CORED INTERVAL 6.5–16.1 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone		*Pseudoeunotia doliolus* Zone	6.5	1	0.5, 1.0
						8.0	2	
						9.5	3	
						11.0	4	
						12.5	5	
						14.0	6	
						15.5	7	
		AG	AG		CM	15.8	CC	

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES



5Y 7/1, 5Y 5/3, 5Y 5/1, 5Y 7/1, 5Y 4/2, 5Y 4/2, 5Y 5/2, 5Y 7/1, 2.5Y 6/2, N8, 2.5Y 6/2, N7, 5GY 6/1, 5GY 6/1, 5GY 7/1, 5GY 6/1, 5GY 6/1, 5GY 7/1, 5GY 6/1, 5GY 5/1, 5GY 6/1, 5GY 5/1, 5GY 6/1, 5Y 7/1, 5Y 6/1, 5Y 5/2, 5GY 6/1

LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, gray to olive gray (5Y 5/1 to 4/2) or greenish gray (5GY 5/1); and
FORAMINIFERAL NANNOFOSSIL OOZE light gray (N7 or 5Y 7/1) or light greenish gray (5GY 7/1).
Darker (5Y 6/1 or 5GY 6/1) intervals are probably MARLY.

Rare green (5G 6/2) or gray (N8 or N7), bluish (5B 5/1) laminations.

Open burrows; *Zoophycos*.

Dropstones.

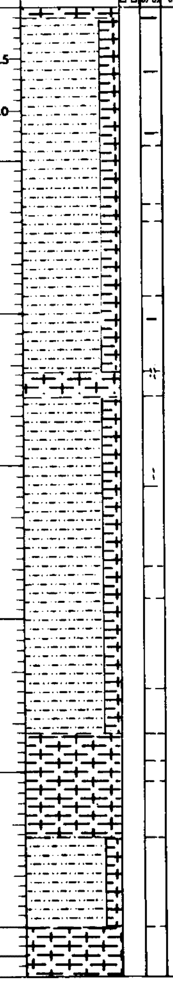
SMEAR SLIDE SUMMARY (%)

	3, 85 M	6, 30 D
Texture:		
Sand	–	10
Silt	–	20
Clay	–	70
Composition:		
Quartz	–	38
Heavy minerals	–	2
Clay	TR	30
Volcanic glass	–	3
Carbonate unspec.	–	3
Foraminifers	12	6
Calc. nannofossils	85	18
Diatoms	3	–
Sponge spicules	TR	–

SITE 611 HOLE E CORE 2 CORED INTERVAL 16.1–25.7 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	Sub-bottom depth	SECTION	METERS
		N22 *Globorotalia truncatulinoides*	NN19 *Pseudoemiliania lacunosa* Zone			16.1	1	0.5, 1.0
						17.6	2	
						19.1	3	
						20.6	4	
						22.1	5	
						23.6	6	
						25.1	7	
		AG	AG		B	25.6	CC	

GRAPHIC LITHOLOGY / DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES



5Y 6/1, 5Y 5/1, 5GY 5/1, 5Y 4/2, 5G 4/1, 5Y 4/3, 5G 5/1, 2.5Y 5/2, 5G 5/1, 2.5Y 5/2, 5B 7/1, 5GY 6/1, 5GY 5/1, 5Y 4/2, 5GY 5/1, 5Y 4/2, 2.5Y 5/2, 5Y 6/2, 5GY 6/1, 5G 7/1, 5Y 4/2, 5Y 5/2, 5GY 6/1, 5Y 6/1

LITHOLOGIC DESCRIPTION

Alternating:
CALCAREOUS MUD, gray, olive gray to dark olive gray (5Y 5/1 to 5Y 4/3) or greenish gray (5GY 5/1); and
FORAMINIFERAL NANNOFOSSIL OOZE, light gray or greenish gray (5B 7/1, 5G 7/1); darker intervals (5Y 6/1 or 5GY 6/1) probably MARLY.

Very rare (5G 5/1 or 4/1) laminations.

Rare open burrows.

Dropstones.

SMEAR SLIDE SUMMARY (%)

	2, 55 D	3, 80 M
Texture:		
Sand	15	–
Silt	30	–
Clay	55	–
Composition:		
Quartz	36	–
Feldspar	1	–
Heavy minerals	4	1
Clay	30	5
Volcanic glass	3	–
Carbonate unspec.	8	2
Foraminifers	5	10
Calc. nannofossils	3	80
Diatoms	–	2
Radiolarians	–	TR