INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 48

NORTH ATLANTIC

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

UNIVERSITY OF CALIFORNIA, SAN DIEGO

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Dear Colleague:

This document has been printed and distributed by the Deep Sea Drilling Project for the purpose of sample selection by interested earth scientists. Sample requests are honored after one year following completion of the cruise on which the samples were collected. It is an interim and informal document consisting of site data and sedimentologic and paleontologic data and interpretations as known six (6) months post-cruise. These data, while adequate for most sample selection needs, are subject to slight revision by the time of issue of the corresponding volume of the Initial Reports of the Deep Sea Drilling Project.

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

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

Sincerely,

David G. Moore
Chief Scientist
Deep Sea Drilling Project

INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 48

22 May – 13 July 1976

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

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Initial Core Descriptions - Leg 48

Objectives and Synopsis

Glomar Challenger sailed May 22 from Brest, France to begin Leg 48 of the IPOD Phase of the Deep Sea Drilling Project. During the Leg, which ended on July 13 at Aberdeen, Scotland, 10 holes were drilled at seven sites in the Bay of Biscay and on the Rockall Plateau (Fig. 1). The primary objective of the leg was to investigate problems concerning the evolution of passive continental margins. Whereas it is generally agreed that most passive margins have formed by rifting and have subsequently subsided through time, a number of questions remain concerning the details of these processes. Principal among these questions is the nature of the pre- and syn-rift environment particularly as regards rifting within former cratons and epicontinental seas. Closely related questions concern the altitude of the continent at the onset of spreading, the validity of the widely used East African Rift analogue, and the contentious role of basement tectonics in determining the rift fabric. Uncertainty exists concerning the timing and history of margin subsidence associated with rifting and spreading. The relation of unconformities beneath the margin to transgression, regression, uplift of the continent, and variations in spreading rate is not understood, yet this is critical to understanding controls on facies relationships, as are associated changes in ocean circulation which are revealed by variations in carbonate-silica production and the carbonate compensation depth. Other poorly understood processes include the diagenesis of marine sediments and organic geochemical processes beneath margins in relation to heat flow.

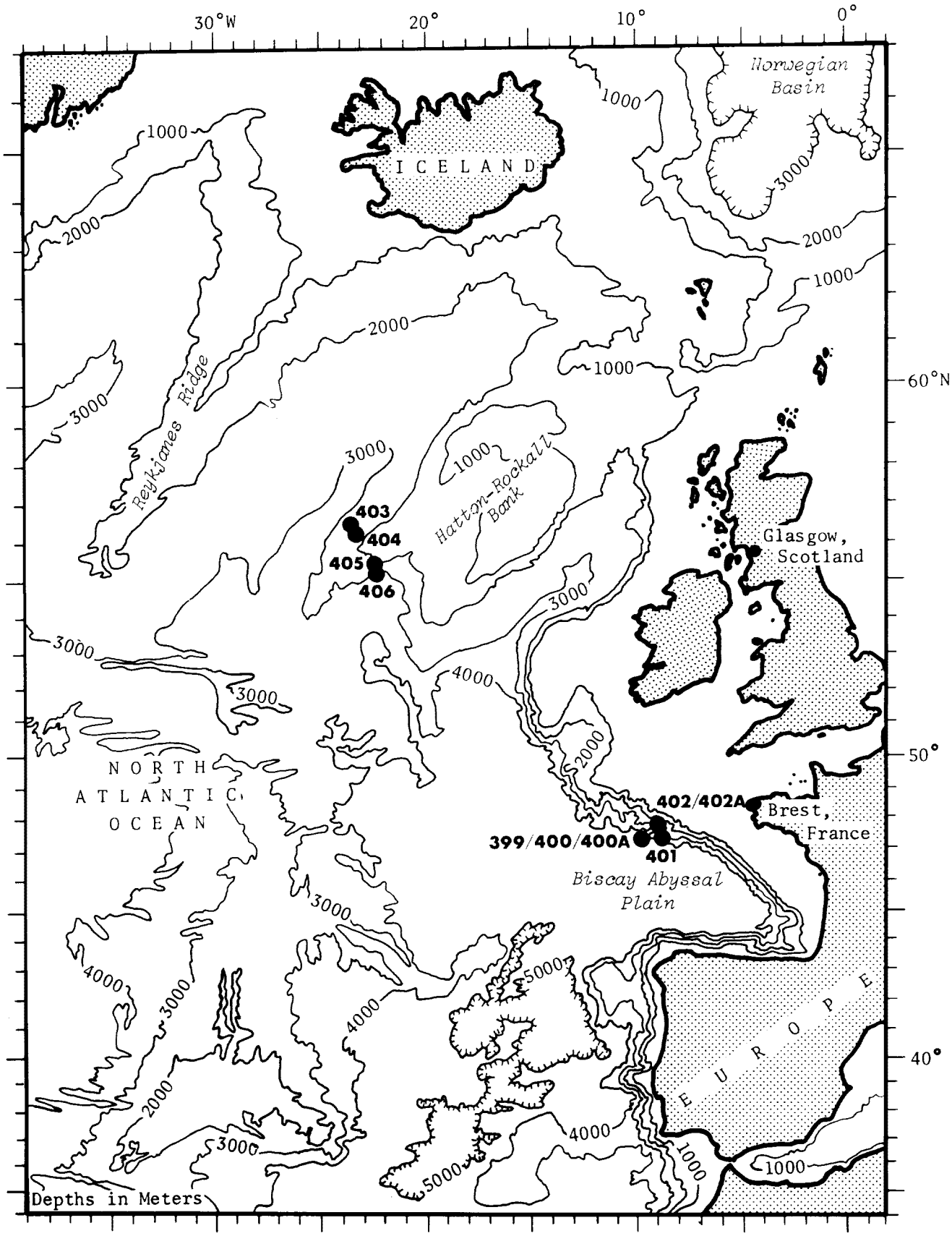


Figure 1. Location of sites drilled during Leg 48.

In the quest for answers to some of these questions, drill sites during Leg 48 were selected on the continental margin of the Bay of Biscay and on the Rockall Plateau. Both of these margins are characterized by reduced Tertiary progradation thus enabling safe penetration of the syn-rift and pre-rift sediments at shallow depths. The two margins also offer a contrast in both age and structure. The margin of the Bay of Biscay apparently formed by rifting at about 130 m.y. B.P., and is structured into horsts and grabens which are overlain by a thin Cretaceous and Tertiary cover. The southwest Rockall Plateau, which was rifted at about 60 m.y. B.P., does not show a prominent horst and graben structure but instead includes a thick deltaic(?) sequence closely similar to that beneath the Outer Vøring Plateau off Norway. Results of the drilling on Leg 48 are summarized in Figure 2 and Table 1 and are discussed below.

Holes 399, 400, 400A

Hole 400A was spudded just south of the Meriadzek Terrace in a half-graben between two tilted fault blocks. The prime objective of penetrating the entire sedimentary sequence and into pre-rift sediments was not met due to the loss of the entire drill string shortly after re-entry. The deepest horizons penetrated are Aptian-Albian carbonaceous mudstones interbedded rhythmically with marly chalks or calcareous mudstones apparently deposited in 2000 meters of water. Pyrolysis of the organic matter showed low maturity and a probable detrital origin from terrestrial plants. A 30 m.y. hiatus between the Aptian-Albian black mudstones and deep water upper Campanian chalk is contemporaneous

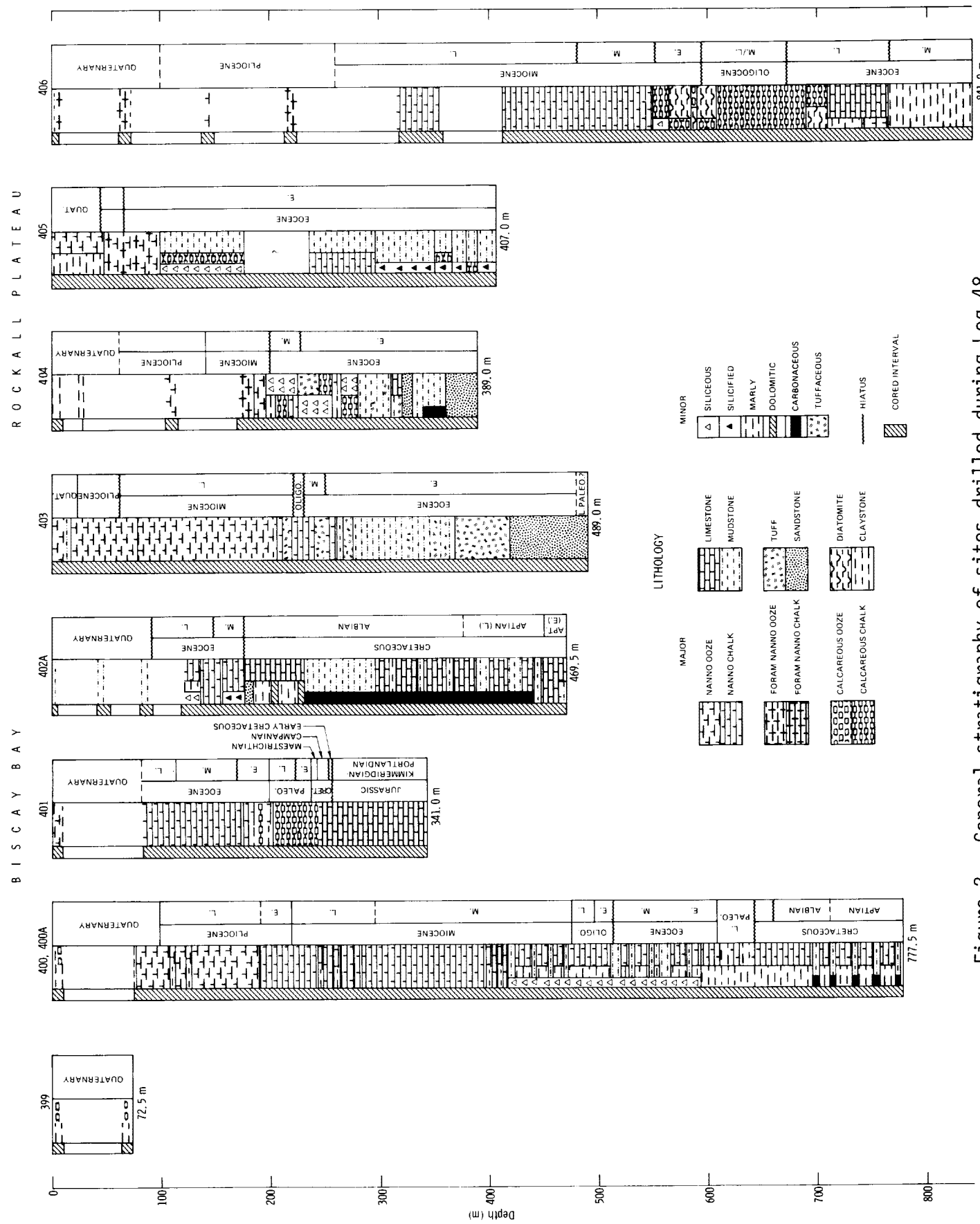


Figure 2. General stratigraphy of sites drilled during Leg 48.

Table 1. Coring Summary - Leg 48

HOLE	DATES	LATITUDE	LONGITUDE	WATER DEPTH	PENETRATION	NO. OF CORES	METERS CORED	METERS RECOVERED	PERCENT RECOVERY
399	May 23-24	47°23.4'N	09°13.3'W	4399	72.5	2	17.5	11.77	---
400	(May 24-	47°22.90'N	09°11.90'W	(4399	---	1	---	---	---
400A	(June 6	47°22.90'N	09°11.90'W	(	777.5	74	729.5	350.86	48
401	June 6-June 10	47°25.65'N	08°48.62'W	2495	341.0	28	265.0	103.22	38.7
402	(June 10	47°52.48'N	08°50.44'W	(2339.5	137.0	5	42.0	12.19	29.0
402A	(June 16			(	469.5	35	332.5	167.5	50.0
403	June 20-June 24	56°08.31'N	23°17.64'W	2301	489.0	52	489.0	160.83	32.9
404	June 25-June 29	56°03.13'N	23°14.95'W	2306	389.0	26	243.5	74.85	30.7
405	June 29-July 4	55°20.18'N	22°03.49'W	2958	407.0	43	407.0	172.05	42.7
406	July 4-9	55°15.50'N	22°05.41'N	2911	841.0	53	489.5	189.42	38.69

with the well-known transgression but of uncertain origin. The Tertiary section consists principally of nannofossil chalk and mudstone with prominent hiatuses in the lower Paleocene, upper Eocene, and lower Oligocene.

Hole 401

Site 401 was selected on the edge of the Meriadzek Terrace where pre-rift sediments could be penetrated at shallow water depths. The hole terminated at 341 meters below the sea floor in shallow water Kimmeridgian limestones. These are overlain by Albian(?) shallow water limestones which are contemporaneous with the deep water carbonaceous mudstones of Site 400A. A prolonged "Cenomanian-Santonian" hiatus again was found separating the Albian limestones from bathyal upper Campanian to Maestrichtian chalks. Yellowish brown to greenish gray nannofossil chalks characterize the Paleogene section with a prominent hiatus separating upper and lower Paleocene.

Hole 402/402A

Holes 402 and 402A were drilled in a canyon on the mid-continental slope of the Bay of Biscay and cored to 469.5 meters subbottom to obtain shallow water equivalents of the deeper facies penetrated at Holes 400A and 401. The hole bottomed in lower Aptian shallow water limestones. The overlying Aptian-Albian carbonaceous limestone and mudstone, which were deposited in less than 200 meters depth, show a rhythmic layering comparable to that observed in the deep carbonaceous facies of Hole 400A. Siliceous claystones and limestones of shallow water aspect occur at the

top of the Albian section. These sediments are highly lithified (sound velocities of up to 4 km/sec.) suggesting the possibility of subaerial exposure. A pronounced hiatus separates the Albian limestones from the overlying middle Eocene nanno chalk, which possibly was deposited in water as deep as 1000-1500 meters.

Holes 403 and 404

Holes 403 and 404 were drilled on the rifted southwest margin of the Rockall Plateau, about 30 km east of the oldest magnetic anomaly (24) recorded in the adjacent ocean crust. Beneath both drill sites a thick, faulted section of deltaic aspect is unconformably overlain by a thin sequence of sediments, pelagic in their upper part and progradational below. The main objective at these sites were to determine the nature of the unconformity and the sediments beneath and to ellucidate their relationship to the rifting and spreading history between Greenland and Rockall. Foram nanno oozes and chalks ranging in age from Recent to upper Miocene are present at both sites. Hiatuses were found between upper Miocene and middle Oligocene chalks and between the middle Oligocene and middle Eocene siliceous nanno chalks in Hole 403. In Hole 404 the upper Miocene rests directly on the middle Eocene. At both sites a small hiatus may separate the middle Eocene chalks from an underlying poorly fossiliferous sequence of lower Eocene volcanogenic siltstones and glauconitic mudstones. The lowermost Eocene-uppermost Paleocene section contains lignite and conglomerates indicative of a littoral environment which probably represents the top of the afore-

mentioned "deltaic" sequence. The lower Eocene section was apparently deposited at inner shelf depths, perhaps as a southward prograding deltaic wedge, but by middle Eocene time the area had subsided to middle bathyal depths. Abundant fresh shards of volcanic glass in the middle Eocene suggest contemporaneous subaerial volcanism, possibly on the Iceland-Faeroe Rise. The prominent upper Miocene-Eocene unconformity may be related to intensified bottom circulation following subsidence of the Iceland-Faeroe Rise.

Holes 405 and 406

Holes 405 and 406 were drilled just five miles apart and south of the transform-fault controlled margin of Rockall Plateau. Together, the two holes provide a composite section detailing the Tertiary evolution of a transform margin. Hiatuses were found in Hole 406 between the upper and middle Miocene, in the lower Miocene, between the middle Oligocene and upper Eocene, and between the upper and middle Eocene. Calcareous mudstones of lower-middle Eocene age found in both holes comprise a thick fan of hemipelagic(?) sediments possible eroded from Rockall Plateau. The overlying upper Eocene, Oligocene and Miocene section is characterized by an alternation of diatomite and chalk with common evidence of slumping in the upper Eocene. This association combined with frequent hiatuses implies marked fluctuations in bottom current activity along with contemporaneous variations in silica and carbonate productivity.

Well Logging

Little downhole logging has been attempted during the history of the Deep Sea Drilling Project. During Leg 48, Holes 401, 402A, 403, 405 and 406 were logged using a gamma-sonic-caliper tool, gamma-density-neutron porosity tool and a gamma-induction-resistivity tool. The logging program was implemented by successful use of a new bit release mechanism that allows logging of single bit holes without re-entry.

Comparison of the logs with lithology and detailed physical properties has revealed many new features. Of relevance to the problem of carbonate compaction and diagenesis is the close correlation between changes in sonic velocity, porosity and density and lithologic changes from ooze to chalk to lithified chalk. Measurements of sonic velocity of the cores showed very close agreement, especially in lithified formations, with *in situ* velocities recorded by the log and demonstrates the value and importance of previous and future systematic measurements of physical properties. Use of the logs and physical properties data has furthered our understanding of the cause of seismic reflections. In zones of poor core recovery, such as the shallow water limestones of Sites 401 and 402A, the logs have aided lithologic correlation and interpretation. In the carbonaceous shales of Holes 402A, the gamma logs strikingly show the rhythmic alternation with marly limestones. Matching of seismic reflectors with lithologic changes by use of the logs has enabled us to correlate accurately between sites and thus directly assess facies changes and their wide implications for continental margin stratigraphy. Processing of the logs on shore is expected to give more complete data on formation parameters and to aid in processing and interpretation of m-ltichannel seismic reflection records. Downhole temperature measurements were also made with the heat flow probe at Holes 402, 403 and 406.

EXPLANATORY NOTES

Introduction

Persons wishing to obtain samples are directed to the DSDP-NSF sample distribution policy (reproduced herein, p.35). Sample requests must be submitted on standard DSDP request forms which may be obtained from:

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

The following material is intended as an aid to understanding:

(1) the terminology, labeling, and numbering conventions used by the Deep Sea Drilling Project;

(2) the sediment classification and biostratigraphic framework used on Leg 48; and

(3) the presentation of the lithologic and paleontologic data on the core forms which make up much of this publication.

Numbering of Sites, Hole, Cores, Samples

Drill site numbers run consecutively from the first site drilled by *Glomar Challenger* in 1968; the site number is thus unique. A site refers to the hole or holes drilled from one acoustic positioning beacon. Several holes may be drilled at a single locality by pulling the drill string above the sea floor ("mud line") and offsetting the ship some distance (usually 100 meters or more) from the previous hole.

The first (or only) hole drilled at a site takes the site number. Additional holes at the same site are further distinguished by a letter suffix. The first hole has only the site number; the second has the site number with suffix A; the third has the site number with suffix B; and so

forth. It is important, for sampling purposes, to distinguish the holes drilled at a site, since recovered sediments or rocks usually do not come from equivalent positions in the stratigraphic column at different holes.

The cored interval is the interval in meters below the sea floor measured from the point at which coring for a particular core was started to the point at which it was terminated. This interval is generally 9.5 meters (nominal length of a core barrel) but may be shorter if conditions dictate. Cores and cored intervals need not be contiguous. In soft sediment, the drill string can be "washed ahead" without recovering core by applying sufficiently high pump pressure to wash sediment out of the way of the bit. In a similar manner, a center bit, which fills the opening in the bit face, can replace the core barrel if drilling ahead in hard sediments without coring is necessary.

The maximum (full) core recovery in a single coring attempt is 9.5 meters of sediment or rock (Figure 3). This consists of 9.3 meters in a plastic liner that is held within the core barrel, and 0.2 meters in the core catcher which is screwed onto the lower end of the barrel. When a core is brought on board, the plastic liner and core are cut in 1.5 meter sections starting from the top of the recovered sediment. A full 9.5 meter core thus consists of six full 1.5 meter sections numbered 1 to 6 from the top down, a short (0.3 meters) Section 7, and the core catcher at the bottom (see discussion below concerning logging of the core catcher). In the case of partial recovery (Figure 3), sections still are measured off and numbered from the top of the recovered sediment, however the number of sections will correspond to the number of 1.5 meter

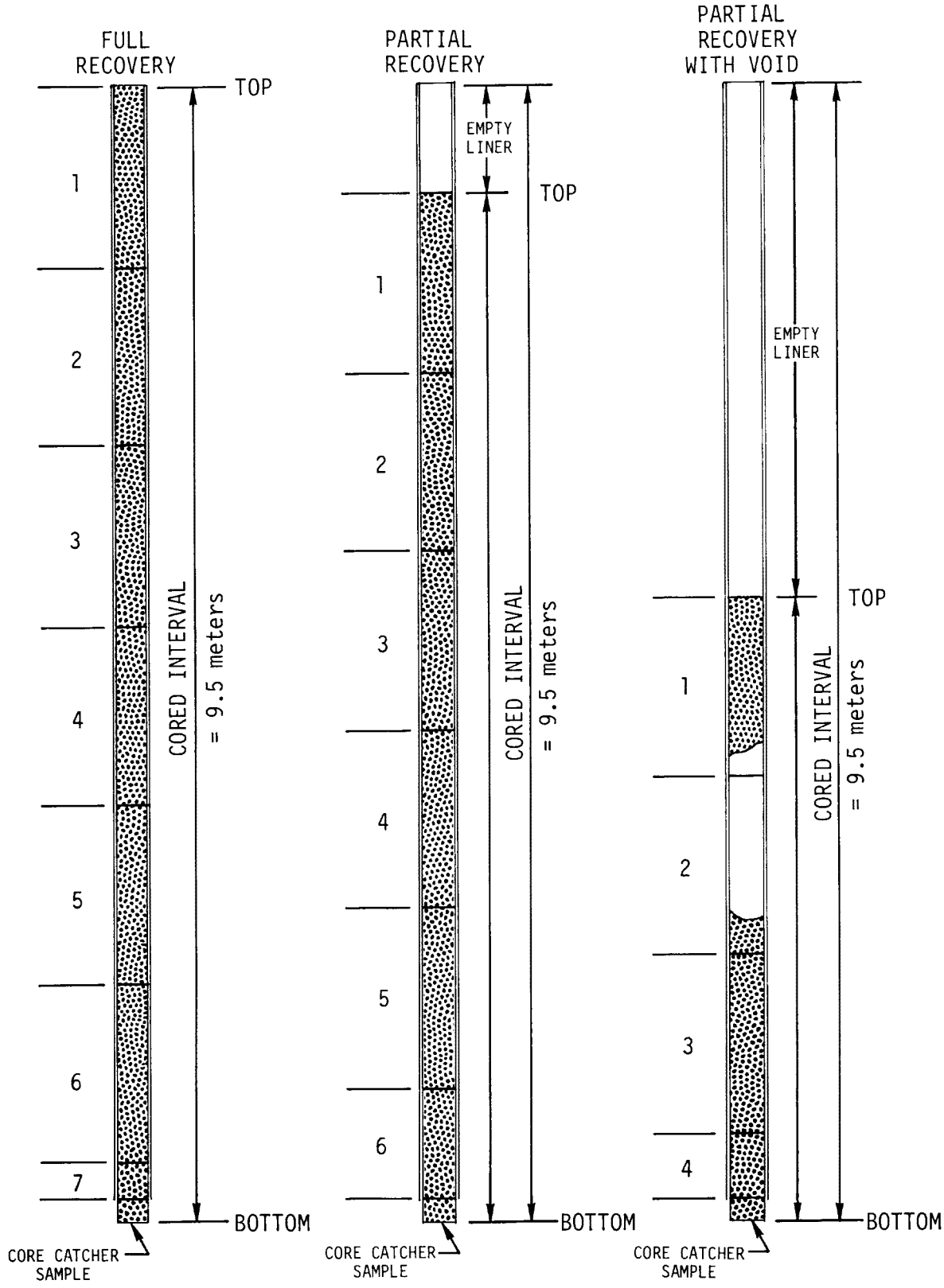


Figure 3. Diagram showing procedure in cutting and labeling of core sections.

intervals necessary to accommodate the length of core recovered. This may range anywhere from 1 to 6 with the lowermost section usually containing less than 1.5 meters and the core catcher.

On Leg 48, the core catcher samples were split, then logged on the barrel sheets and stored as an additional increment (maximum 0.2 meters) of sediment at the bottom of the lowermost section of each core. Despite some contrary opinions, an attempt also was made to maintain the now-conventional designation of CC for the catcher samples. The full designation of catcher samples from this leg thus includes the number of the lowermost section of the core within which the catcher was logged; for example - 400A (site and hole) - 52 (core number) - 5 (section number) - CC.

The cores taken from a hole are numbered sequentially from the top down as the coring proceeds. By DSDP convention, the top of the recovered sediment (top of Section 1) is assigned the depth of the top of the cored interval and any unrecovered sediment is represented as a void at the bottom of the cored interval (Figure 3). The core number and its associated cored inte-val in meters below the sea floor are unique for a hole and are entered into the DSDP computerized data base.

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

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

Leg (Optional)
Site (Hole, if other than first hole)
Core Number
Section Number
Interval in centimeters from top of section

Site 400A-52-3, 122-124 cm (10cc) designates a 10cc sample taken from Section 3 of Core 52 from the second hole (A) drilled at Site 400. The depth below the sea floor for this sample would be the depth to the top of the cored interval (in this case 559 meters) plus 3 meters for Sections 1 and 2, plus 122 cm (depth below top of Section 3), or 563.22 meters. Any sample requests, however, should refer to a specific interval (in centimeters) within a core section rather than depth in meters below the sea floor.

Core Disturbance

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

— — — — Slightly deformed; bedding contacts slightly bent

—— —— —— Moderately deformed; bedding contacts have undergone extreme bowing.

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

Consolidated sediments and rocks seldom show much internal deformation, but are usually broken by drilling into cylindrical pieces of varying length. There is frequently no indication if adjacent pieces in the core liner are actually contiguous or if intervening sediment has been lost during drilling. The symbol (-○-○-○-) was used for cylindrical pieces of core separated by intervals of drilling breccia or injected (remolded) softer sediment. In some cases (notably Site 400) fragments of previously drilled material have sloughed back down the hole and been recored. Such material is indicated by the symbol (○○○) and labeled as cavings.

Sedimentary Structures

Megascopic sedimentary structures are apparent in many of the cored sediments. These include primary features such as lamination, graded bedding and bioturbation as well as secondary features such as microfaulting. Where it is reasonably certain that these features are not the product of coring disturbance, they are logged graphically in a separate column on the core description sheets utilizing the symbols shown in Figure 4. Caution should be used in drawing conclusions based on the sedimentary structures because it is often extremely difficult to differentiate between natural structures and those produced by coring.

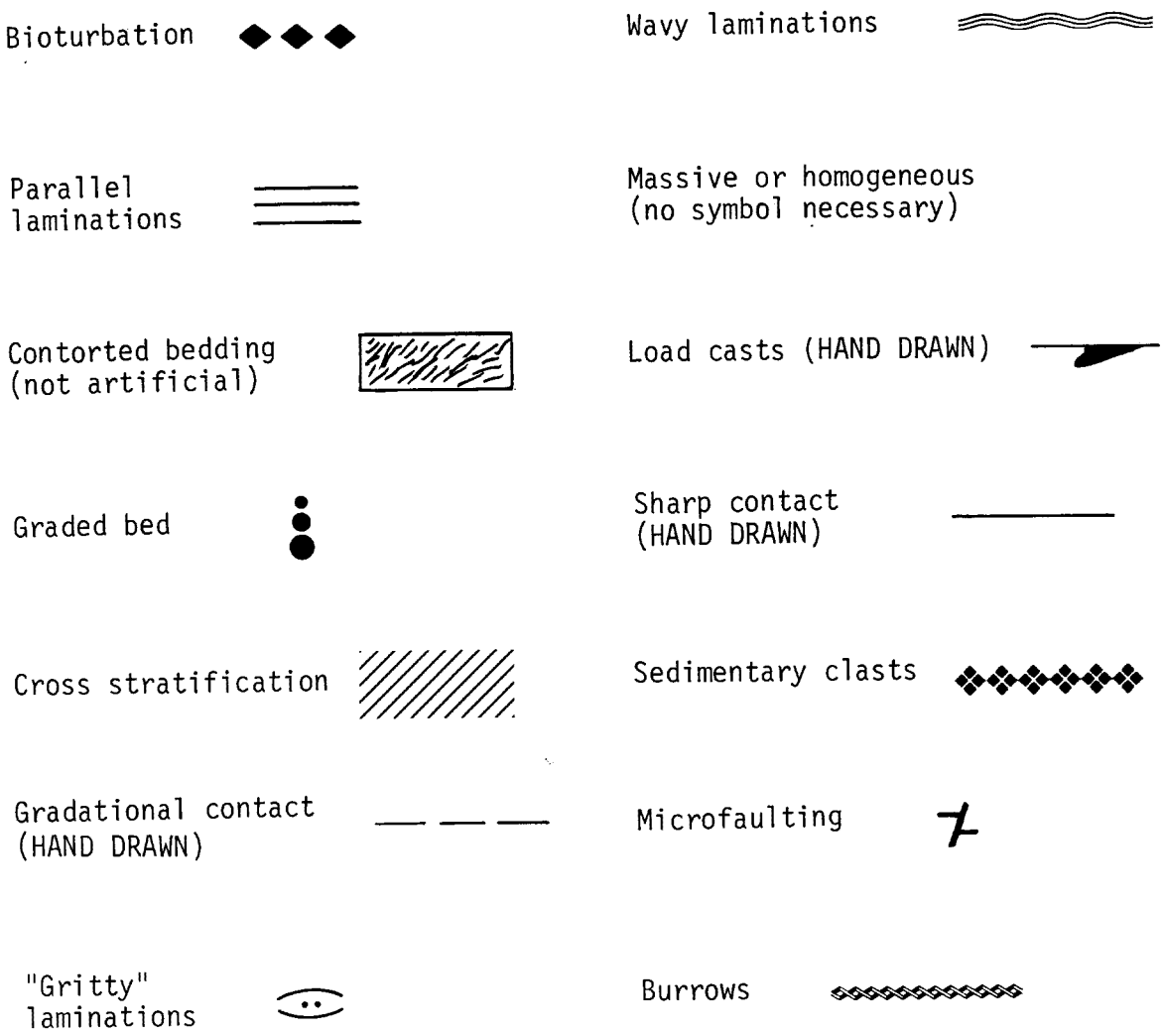


Figure 4. Sedimentary structure symbols.

Smear Slides

The lithologic classification of sediments is based on visual estimates of texture and composition in smear slides made on board ship. These estimates are of areal abundances on the slide and may differ somewhat from the more accurate laboratory analyses of grain size, carbonate content, andmineralogy. Experience has shown that distinctive minor components can be accurately estimated (±1 or 2%), but that an accuracy or ±10% for major constituents is rarely attained. Carbonate content is especially difficult to estimate in smear slides, as is the amount of clay present. Smear slide analyses at selected levels as well as averaged analyses for intervals of uniform lithology are given on the core description sheets. For carbonate content, reference should be made to shipboard carbonate bomb analyses and shorebased analyses (see below).

Carbonate Data

During Leg 48, extensive use was made of the carbonate bomb device as an aid in sediment classification on board ship. This device is basically a cylindrical vessel with pressure gauge in which a sediment sample of known weight is reacted with acid. The pressure of CO_2 generated is measured and converted to percent carbonate. Accuracy to within ±5% total carbonate has been quoted for the device. Shipboard carbonate bomb data are listed separate on the core description sheets.

Samples were taken for DSDP shore-base carbon-carbonate analysis using the Leco 70-second Analyser. The percentages of total carbon, organic carbon and calcium carbonate are listed separately on the core description sheets

where space allows. In addition, the results of the Leco analyses are given in tabular form following core description sheets for each site.

X-ray Mineralogical Analyses

X-ray mineralogical analyses of Leg 48 sediments were provided by the Societe de Nacionale ELF Acquitaine in Pau, France (SNPA) for the Biscaye sites, and by the Centre de Recherches sur l'Environement (Prof. M. Vigneaux, Directeur) of the Universite de Bordeaux for the Rockall sites. Analyses by SNPA were made on powdered bulk samples and comparisons of peak areas yielded percentages of quartz, calcite, dolomite and anhydrite to an estimated accuracy of ±10%. Amounts of feldspar and siderite were estimated qualitatively. Two types of analyses were conducted at Bondeaux:

1) Bulk samples were pulverized and analyzed by powder diagrams. Comparison to synthetic reference samples yielded semiquantitative estimates of quartz, calcite, dolomite and feldspar (alkali and plagioclase); and

2) clay fractions (<2μm) were analyzed by standard techniques and semiquantitative estimates of the various clay minerals (smectite, illite, kaolinite, chlorite) and nonclay minerals (cristobalite-tridymite, zeolite) were made by comparison of peak heights.

The analyses were only partially completed at the time of publishing this report, but results available have been logged on the barrel sheets.

Sediment Induration

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

a) Calcareous sediments

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

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

Hard: Cemented rocks are termed limestones.

b) The following criteria are used for other sediments:

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

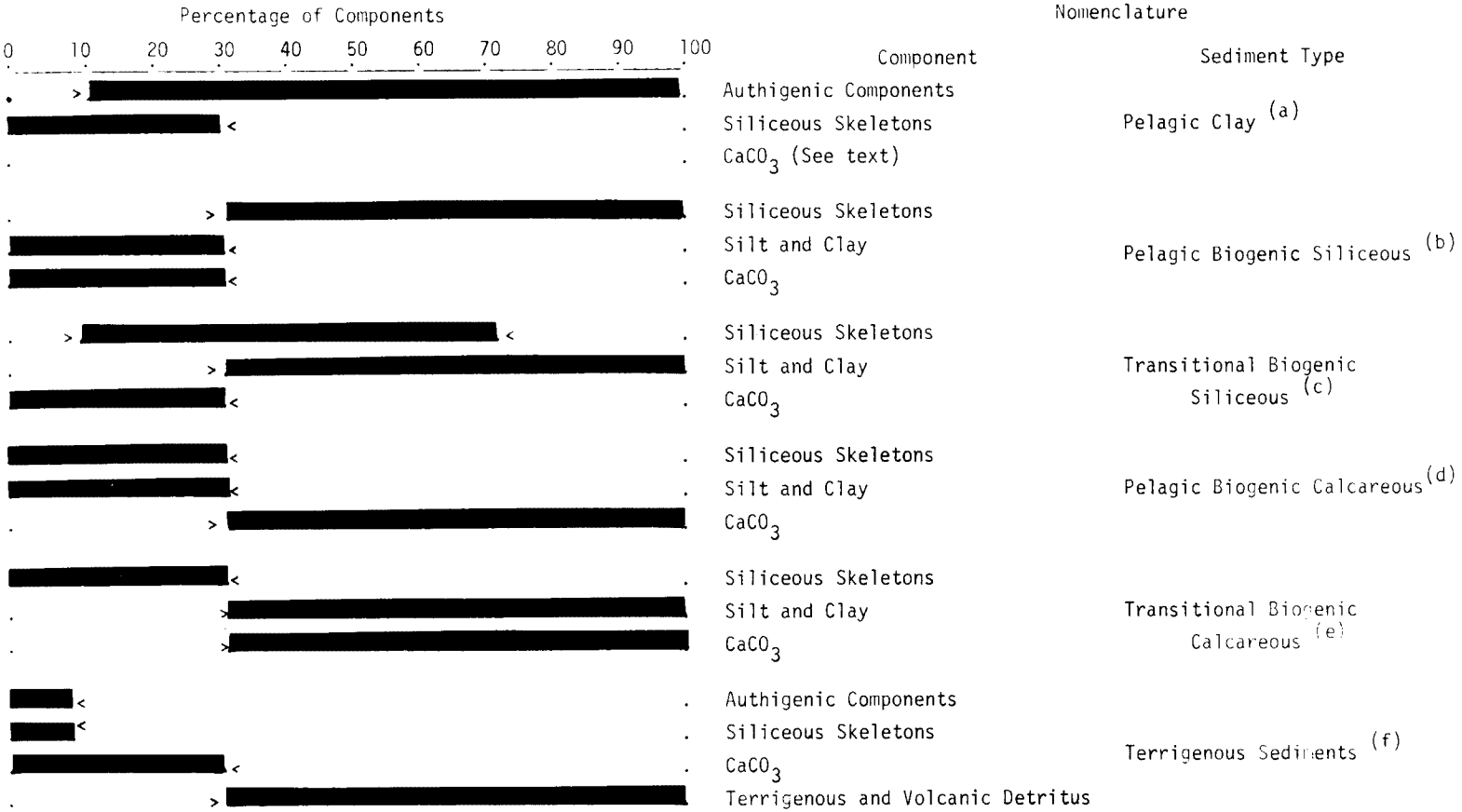
If the core must be cut on the band saw or diamond saw, the suffix 'stone' is used (e.g. silty claystone; sandstone).

Lithologic Classification

The lithologic classification scheme used on Leg 48 is basically that devised by the JOIDES Panel on Sedimentary Petrology and Physical Properties and adopted for use by the JOIDES Planning Committee in March, 1974. The classification is descriptive and sediment/rock names are defined solely on the basis of composition and texture, primarily as determined from smear slides, bomb analyses, or under the hand lens on board ship. The classification is outlined below and summarized in Figure 5. Symbols utilized to represent the various sediment types on core description sheets are shown in Figure 6.

I. Pelagic Clay

>10% authigenic components
<30% siliceous microfossils
<30% $CaCO_3$
<30% terrigenous components



(a) See descriptive notes in text.

(b) Soft - oozes; Hard - radiolarite, diatomite, chert, or porcellanite

(c) Less than 50% siliceous fossils - diatomaceous (radiolarian) mud or mudstone

Greater than 50% siliceous fossils - muddy diatom (radiolarian) ooze or muddy diatomite (radiolarite)

Greater than 10% $CaCO_3$ - calcareous

(d) Soft - ooze; Firm - chalk; Hard - indurated chalk, limestone

(e) Soft - marly calcareous ooze; Firm - marly chalk; Hard - marly limestone

(f) Soft - clay, mud, silt, sand; Hard - claystone, mudstone, shale(if fissile), siltstone, sandstone
For pyroclastic sediments see text.

Figure 5. Summary chart of lithologic classification for oceanic sediments.

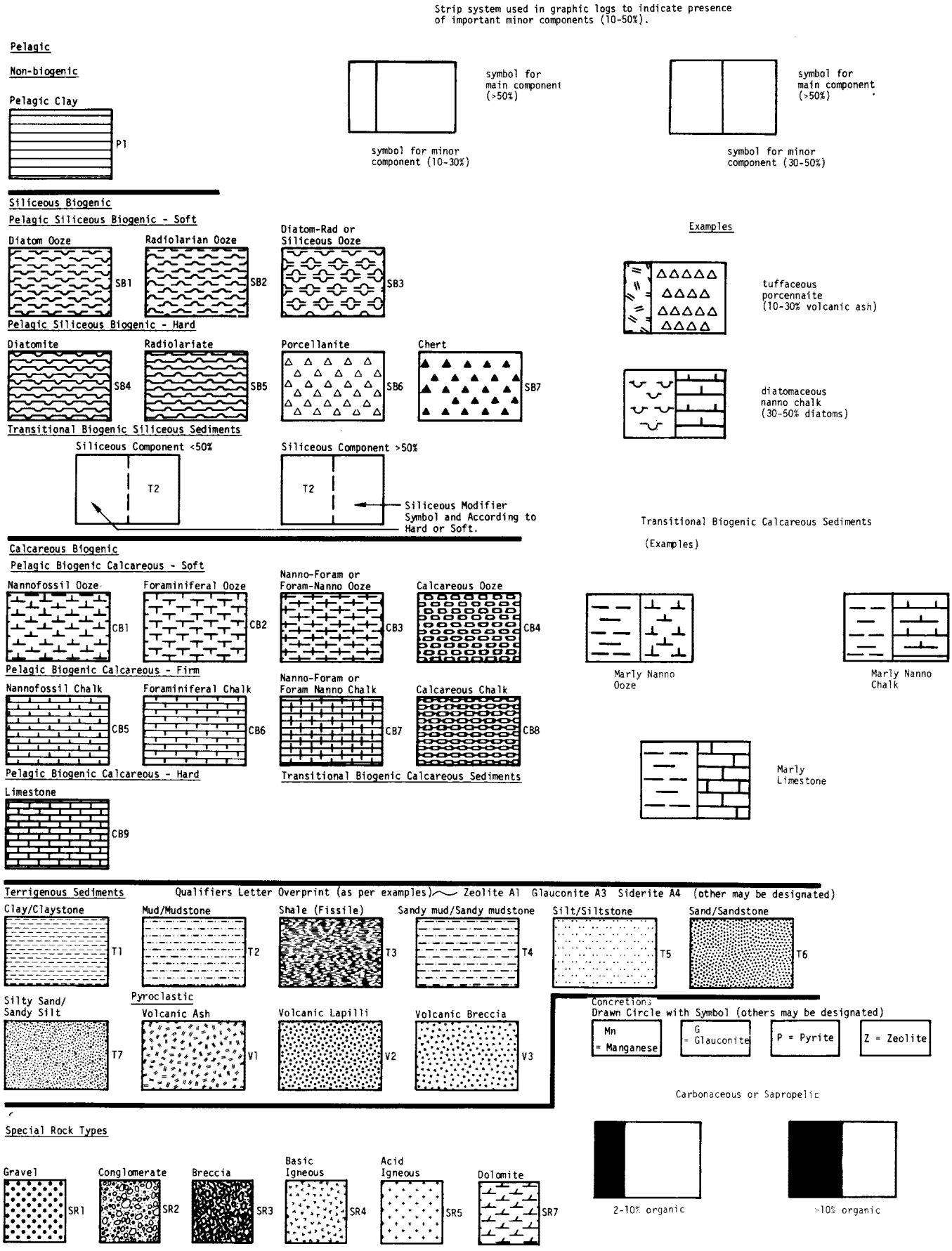


Figure 6. Key to Lithologic and Biostratigraphic Symbols.

II. Pelagic Siliceous Biogenic Sediments

>30% siliceous microfossils
<30% $CaCO_3$
<30% terrigenous components (mud)

Radiolaria dominant: radiolarian ooze (or radiolarite)
Diatoms dominant: diatom ooze (or diatomite)
Sponge spicules dominant: sponge spicule ooze (or spiculite)
Where uncertain: siliceous (biogenic) ooze (or chert, porcellanite)
When containing 10-30% $CaCO_3$: modified by nannofossil-----, foraminiferal-----, calcareous-----, nannofossil-foraminiferal-----, or foraminiferal-nannofossil-----, depending upon kind and quantity of $CaCO_3$ component.

III. Transitional Biogenic Siliceous Sediments

10-70% siliceous microfossils
30-90% terrigenous components (mud)
<30% $CaCO_3$

If diatoms < mud: diatomaceous mud (stone)
If diatoms > mud: muddy diatom ooze (muddy diatomite)
If $CaCO_3$ 10-30%: appropriate qualifier is used (See III).

IV. Pelagic Biogenic Calcareous Sediments

>30% $CaCO_3$
<30% terrigenous components
<30% siliceous microfossils

Principal components are nannofossils and foraminifera; qualifiers are used as follows:

Foram %	Name
<10	nannofossil ooze (chalk, limestone)
10-25	foraminiferal-nannofossil ooze
25-50	nannofossil-foraminiferal ooze
>50	foraminiferal ooze

Calcareous sediment containing 10-30% siliceous fossils carry the qualifier radiolarian, diatomaceous or siliceous depending upon the identification.

V. Transitional Biogenic Calcareous Sediments

>30% $CaCO_3$
>30% terrigenous components
<30% siliceous microfossils

If $CaCO_3$ 30-60%: marly is used as a qualifier:

soft: marly calcareous (or nannofossil, etc.) ooze
firm: marly chalk (or marly nannofossil chalk, etc.)
hard: marly limestone (or marly nannofossil limestone, etc.)

If $CaCO_3$ >60%:

soft: calcareous (or nannofossil, etc.) ooze
firm: chalk (or nannofossil chalk, etc.)
hard: limestone (or nannofossil limestone, etc.)

NOTE: Sediments containing 10-30% $CaCO_3$ fall in other classes where they are denoted with the adjective "calcareous", "nannofossil", etc.

VI. Terrigenous Sediments

>30% terrigenous components
<30% $CaCO_3$
<10% siliceous microfossils
<10% authigenic components

Sediments in this category are subdivided into textural groups on the basis of the relative proportions of three grain-size components, i.e. sand, silt and clay. Sediments coarser than sand-size are treated as "Special Rock Types." The size limits are those defined by Wentworth (1922). The textural classification is according to the triangular diagram shown in Figure 7. The suffix "-stone" is used to indicate hard or consolidated equivalents of the unconsolidated sediments.

If $CaCO_3$ is 10-30%: calcareous, nannofossil, etc. is used as a qualifier.

Other qualifiers (e.g. feldspathic, glauconitic, tuffaceous, etc.) are used for components >10%.

VIII. Volcanogenic Sediments

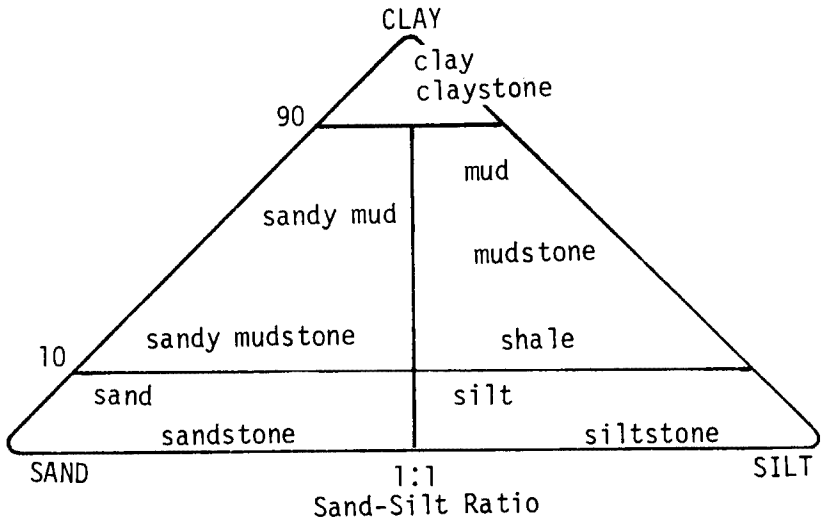
A. Pyroclastic rocks are described according to the textural and compositional scheme of Wentworth and Williams (1932). The textural groups are:

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

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

	Millimeters		Phi (ϕ) units	Wentworth size class
	2.00	2	- 1.0	Granule
	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	
SAND	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	1/6	4.0	
	0.053		4.25	
	0.044		4.5	Coarse silt
	0.037		4.75	
SILT	0.031	1/32	5.0	
	0.0156	1/64	6.0	Medium silt
	0.0078	1/128	7.0	Fine silt
	0.0039	1/256	8.0	Very fine silt
	0.0020		9.0	
	0.00098		10.0	Clay
MUD	0.00049		11.0	
	0.00024		12.0	
	0.00012		13.0	
	0.00006		14.0	

Figure 7. Terminology and class intervals for grade scales.



Textural groups - terrigenous sediments.

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

IX. Special Rock Types

A. The limestones cored at Site 401 (Cores 19-28) are classified according to system of Dunham (1962). In this system, the main rock is assigned according to the following scheme:

Intersticies	Micrite Dominated		Spar & Void Dominated		
Framework	Mud supported		Grain supported		Constructed
Grain %	<10% grains	>10% grains			
Name	Lime Mudstone	Wackestone	Packstone	Grainstone	Boundstone

Each rock name is then modified with appropriate terms in order of increasing significance; for example, a pellet intraclast grainstone contains more intraclasts than pellets and these grains are in mutual contact while the intersticies are either empty or filled with sparry calcite cement. In the Site 401 cores, the intraclasts are mainly algal lumps (algal bound or coated grains); most of the pellets are probably micritized fossils.

B. Carbonaceous Sediments
Sediments (mudstones, chalks, etc.) containing substantial amounts of detrital plant remains were encountered at Sites 400A and 402. These sediments are indicated as carbonaceous if smear slide determinations showed the organic content to be greater than 2% and/or the carbon-carbonate analyses showed greater than 1% by weight of organic carbon.

C. Silicified Sediments
At Site 405, much of the calcareous mudstone obtained in Cores 31-43 contains in excess of 10% opaline silica which is not in the form of recognizable microfossils. Very hard layers in this section are classified as chert whereas the somewhat softer portions are termed silicified mudstone. The latter are indicated graphically by utilizing the chert symbol in only a fraction of the lithology column. These sediments are thus distinguished from those indicated as siliceous wherein greater than 10% of recognizable siliceous microfossils are present, and for which the porcellanite symbol was used.

Biostratigraphy

At the time of this compilation, biostratigraphic studies of Leg 48

material were still in progress so that minor revisions in age assignments from those presented here may ensue; however, however, no major revisions are anticipated from this continuing work.

Planktonic foraminiferal zonation presented herein is based on the number scheme developed by Blow (1969) and Berggren (1972) for the Tertiary and Quaternary sequences. The Mesozoic sequences were zoned according to the scheme of Sigal (in press; see Figure 8). The calcareous nannofossil zonation follows Martini (1971) for the Tertiary and Quaternary and Thierstein (1971, 1973) for the Mesozoic sequences. Absolute age assignments were made in reference to the Neogene scale of Ryan and others (1974) and to the Paleogene section of the scale of Berggren (1972).

Some sediments were too hard to wash for microfossils. In these cases, thin sections were made and stratigraphic ages were assigned either by: 1) recognition of certain marker species; or 2) comparison of the entire microfacies to that in samples from land sections. Ages so determined are indicated by the symbol M (for microfacies) on the barrel sheets and the numbers listed in the microfacies column refer to quantity of thin sections studied.

Downhole Logging

Downhole logging is perhaps best known for its use in petroleum exploration where its success in measuring formation parameters such as porosity, density, etc. is beyond dispute. There has however been little downhole logging during the history of the Deep Sea Drilling Project and none has been attempted in continental margin areas. During Leg 48 the

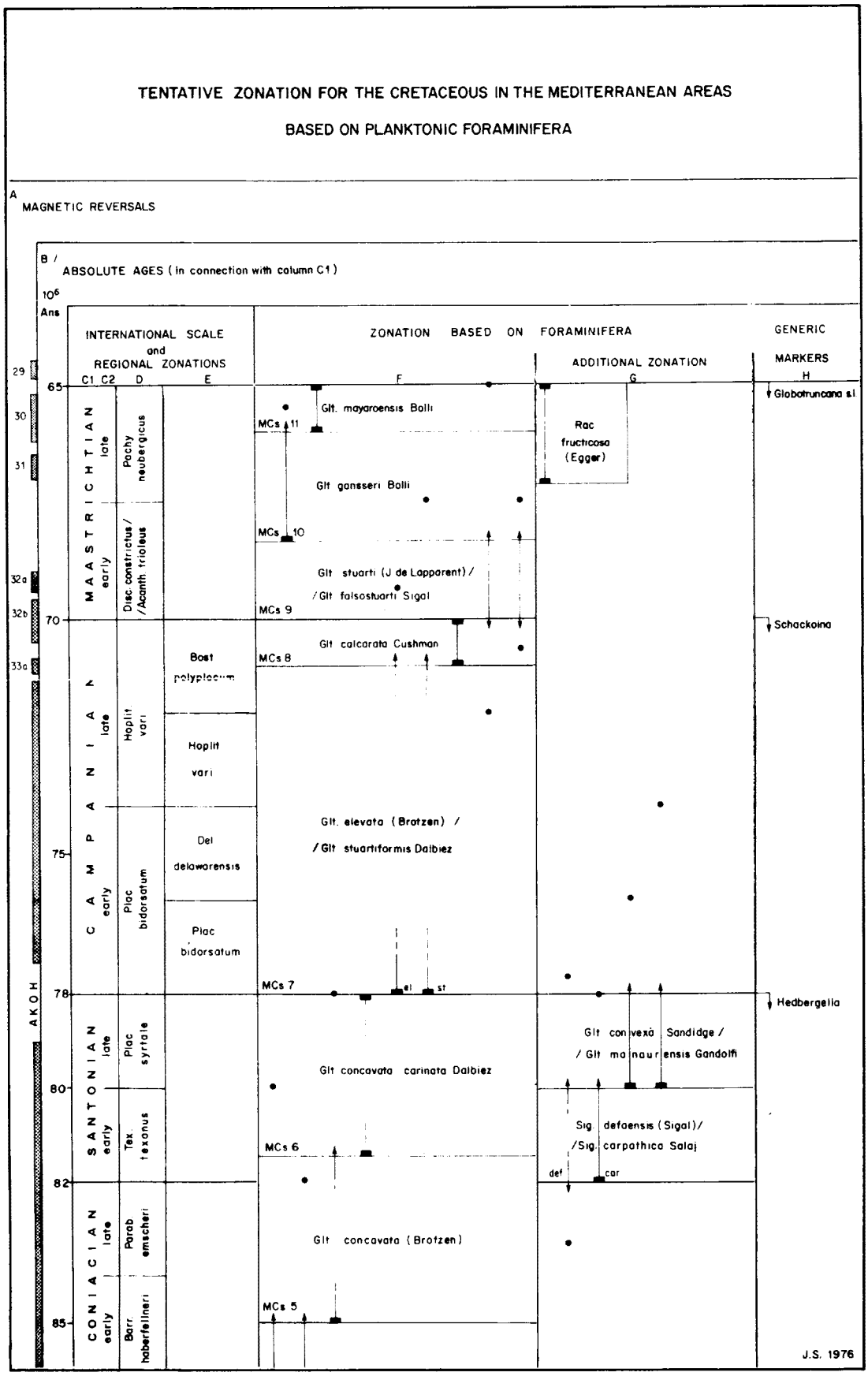


Figure 8. Cretaceous foraminiferal zonation of Sigal, 1976 (in press).

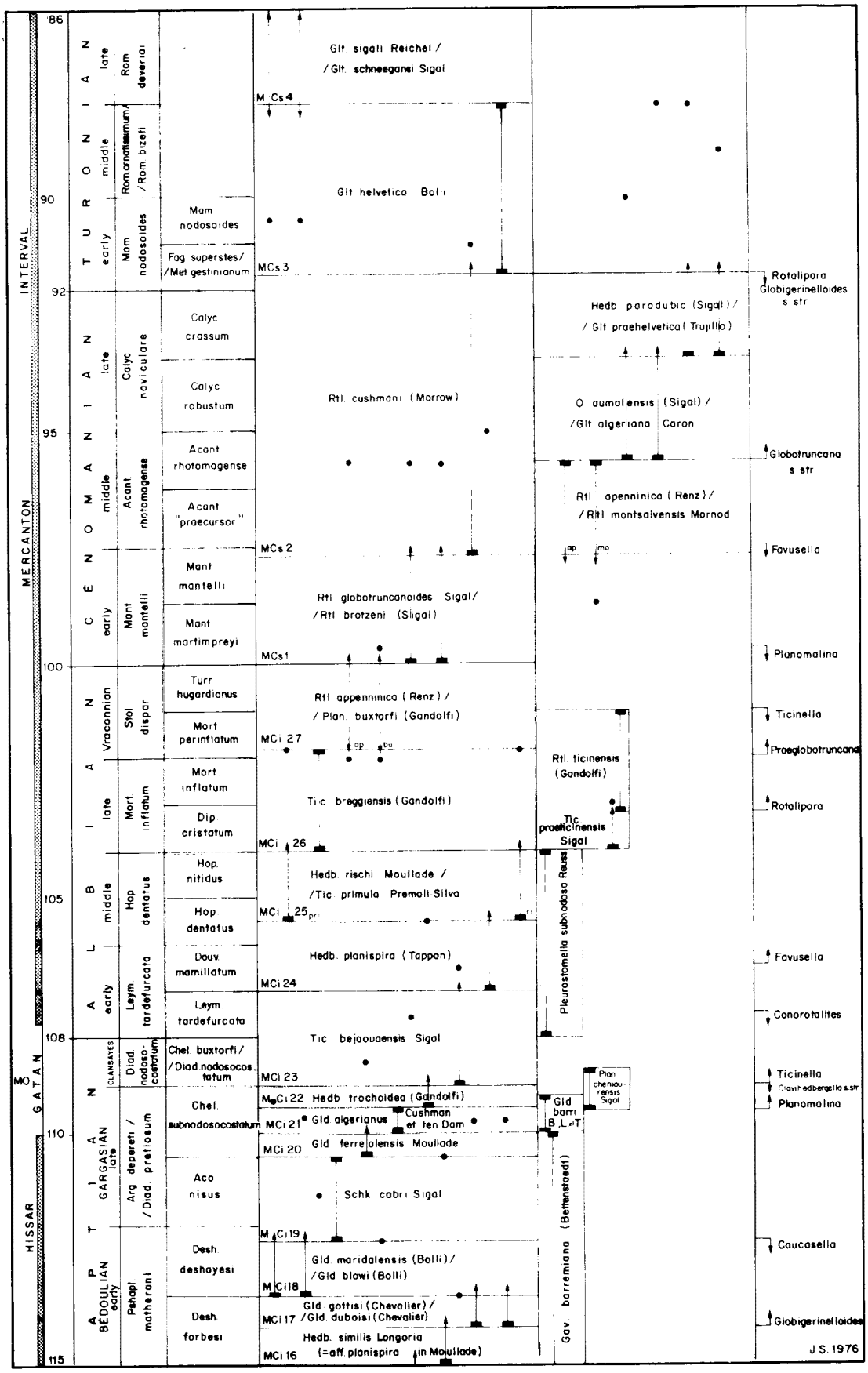
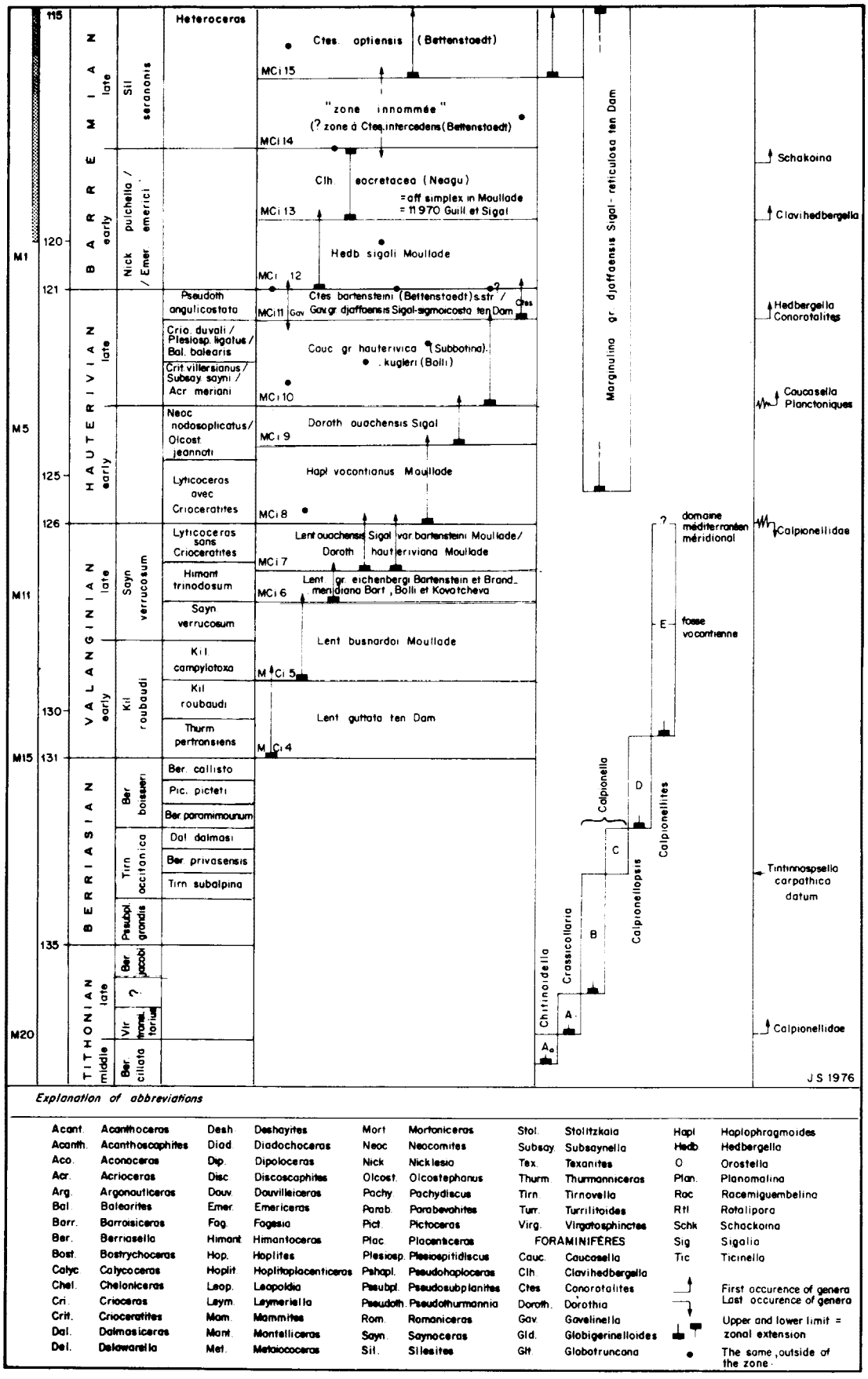


Figure 8. (continued).



Explanation of abbreviations

Acant.	Acanthoceras	Desh.	Deshayites	Mort.	Mortoniceras	Stol.	Stolitzkaia	Hapl.	Haplophragmoides
Acanth.	Acanthoscaphites	Diad.	Diadochoceras	Neoc.	Neocomites	Subsay.	Subsaynella	Hedb.	Hedbergella
Aco.	Aconoceras	Dip.	Dipoloceras	Nick.	Nicklesia	Tex.	Texanites	O	Orostella
Acr.	Acrioceras	Disc.	Discoscaphites	Olcost.	Olcostephanus	Thurm.	Thurmanniceras	Plan.	Planomalina
Arg.	Argonauticeras	Douv.	Douvilleiceras	Pachy.	Pachydiscus	Tirn.	Tirnovella	Rac.	Racemiguembelina
Bal.	Balearites	Emer.	Emericeras	Parab.	Parabevahites	Turr.	Turrilitoides	Rtl.	Rotalipora
Barr.	Barroisiceras	Fag.	Fagesia	Pict.	Pictoceras	Virg.	Virgatosphinctes	Schk.	Schackoina
Ber.	Berriasella	Himant.	Himantoceras	Plac.	Placenticeras	FORAMINIFÈRES		Sig.	Sigalia
Bost.	Bostrychoceras	Hop.	Hoplites	Plesiosp.	Plesiospitidiscus	Couc.	Coucasella	Tic.	Ticinella
Calyc.	Calycoceras	Hoplit.	Hoplitoplacenticeras	Pshapl.	Pseudohaploceras	Clh.	Clavihedbergella		
Chel.	Cheloniceras	Leop.	Leopoldia	Psubpl.	Pseudosubplanites	Ctes.	Conorotalites		First occurence of genera
Cri.	Crioceras	Leym.	Leymeriella	Pseudoth.	Pseudothurmannia	Doroth.	Dorothia		Last occurence of genera
Crit.	Crioceratites	Mam.	Mammites	Rom.	Romaniceras	Gav.	Gavelinella		Upper and lower limit = zonal extension
Dal.	Dalmasiceras	Mant.	Montelliceras	Sayn.	Saynoceras	Gld.	Globigerinelloides		
Del.	Delawarella	Met.	Metaiococeras	Sil.	Silesites	Glt.	Globotruncana		The same, outside of the zone

Figure 8. (continued).

well logging was carried out by Schlumberger Well Services (UK) Ltd. and funded by the Department of Energy through The Institute of Oceanographic Sciences of The Natural Environment Research Council.

The following downhole tools were on board for Leg 48:

1. Compensated Neutron Log (CNL)
2. Borehole Compensated Sonic Log (BHC)
3. Compensated Formation Density (FDC)
4. Induction Resistivity (ISF)
5. Gamma Ray (GR)
6. Temperature Log

The tools were generally run in the following combinations and order:

1. Gamma, Sonic Velocity, Caliper, Variable Density/Sonic Amplitude
2. Gamma, induction Spontaneous Potential
3. Gamma, Density, Neutron

The logging tools were contained so as to reduce the number of runs and to utilize the gamma log as a correlator between runs. All logging parameters were recorded digitally on magnetic tape and graphically by optical camera set to run at scales of 1/200 and 1/1000. Photo reductions of the 1/200 optical camera logs along with generalized lithology and age are displayed herein immediately after the Summary Sheet for each site. Full details of the logging operations and interpretations will be presented in the Initial Reports Volume of Leg 48.

Core Description Forms

The basic lithologic and biostratigraphic data are summarized on core description forms (barrel sheets) which make up the remainder of this volume. Insofar as possible the lithologic data for the main lithology are presented in the following order:

Sediment or rock name
Color name and GSA (or Munsell) number
General Description of the core including disturbance,
sedimentary structures and other special features
Composition from smear slides and/or thin sections
Carbon-carbonate determinations
Grain size determinations
X-ray mineralogy

Many cores contain important minor lithologies as well as the major lithology and descriptive information is included for these wherever possible.

An exemplary core description form showing all symbols and explanatory notes is included herewith (Figure 9) as an aid to understanding and utilizing the core data presented in the remainder of this volume.

SITE HOLE CORE CORED INTERVAL:

TIME–ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	microfacies	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
	(F) Foraminiferal Zone / (N) Nannoplankton Zone / (R) Radiolarian Zone	Abundance: A = Abundant, C = Common, F = Few, R = Rare, B = Barren; Preservation: G = good, M = Moderate, P = Poor; Microfacies: See explantory notes on bio-stratigraphy				1 (0.5–1.0), 2, 3, 4, 5, 6, 7, CC		See key to graphic symbols (Figure 6).	Slight ——— ; Moderate — — — ; Highly deformed ~~~~~~ ; See explanatory notes	* = Smear Slide TS = Thin Section CCB = Calcium Carbonate (BOMB) CCL = Carbon Carbonate (LECO) XM = X-ray Sample GZ - Grain Size Sample	See key to structures symbols (Figure 6).	Color code (GSA and Munsell) plus special remarks

MAJOR LITHOLOGY
Color and general description including comments on sedimentary structures, special features of composition, and interbedded minor lithologies.

Smear Slide (SS) and/or Thin Section (TS)* Descriptions
Section and detph (2-60)
% components

Carbon Carbonate Determinations
Bomb: 2-60 % $CaCO_3$
Leco: 2-60 % total carbon, % organic carbon, % $CaCO_3$

Grain Size (shore based)
2-60 % sand, % silt, % clay

X-ray Analysis (see explanatory notes)

Bulk	2-60	<2μm (partial)	2-60
Qtz.		Smec.	
Cal.		Ill.	
Feld.		Kaol.	
Plag.		Chlor.	
Other		Zeol.	
		Silica	

*TS - in some cases only the rock name is given on the barrel sheet, however detailed thin section descriptions are listed separately after the barrel sheets for each site.

Figure 9. Sample core description.

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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 disiplines leading to a complete and adequate study of the cores and their contents. Funding for the proposed research must be secured separately by the investigator. It cannot be provided through the Deep Sea Drilling Project.

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

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

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

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

The co-chief scientists may elect to have special studies of selected core samples made by other investigators. In this event the names of these investigators and complete listings of all materials loaned or distributed must be forwarded, if possible, prior to the cruise or, as soon as possible following the cruise, to the Chief Scientist through the DSDP Staff Science Representative for that particular cruise. In such cases, all requirements of the Sample Distribution Policy shall also apply.

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

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

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

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

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

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

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

C. Samples will not be provided prior to assurance that funding for sample studies either exists or is not needed. However, neither formal approval of sample requests nor distribution of samples will be made until the appropriate time (Item A). If a sample request is dependent, either wholly or in part, on proposed funding, the organization to whom the funding proposal has been submitted any information on the availability (or potential availability) of samples that it may request.

D. Investigators receiving samples are responsible for:

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

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

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

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

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

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

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

3. Other Records

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

Requests for data may be made to:

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

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

4. Reference Centers

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

Revised 9/28/76

DEEP SEA DRILLING PROJECT
LEG 48 SITE 399
SITE SUMMARY SHEET

Date occupied	May 23, 1976 (0530 LCT)
Date departed	May 24, 1976 (2020 LCT)
Time on site	38 hours 50 minutes
Position: latitude	47°23.4'N
longitude	09°13.3"W
Water depth (sea level)	4399 corrected meters, echo sounding
Water depth (rig floor)	4415 corrected meters, echo sounding
Bottom felt at	4414 meters, drill pipe
Penetration	72.5 meters
Number of holes	1
Number of cores	2
Total length of cored section	17.5 meters
Total core recovered	11.77 meters
Percentage of core recovery	67.3%
Oldest Sediment Cored	
Depth subbottom	72.5 meters
Nature	Marly calcareous ooze
Age	Pleistocene
Measured velocity	1.5 km Sec^{-1}
Basement	Not reached

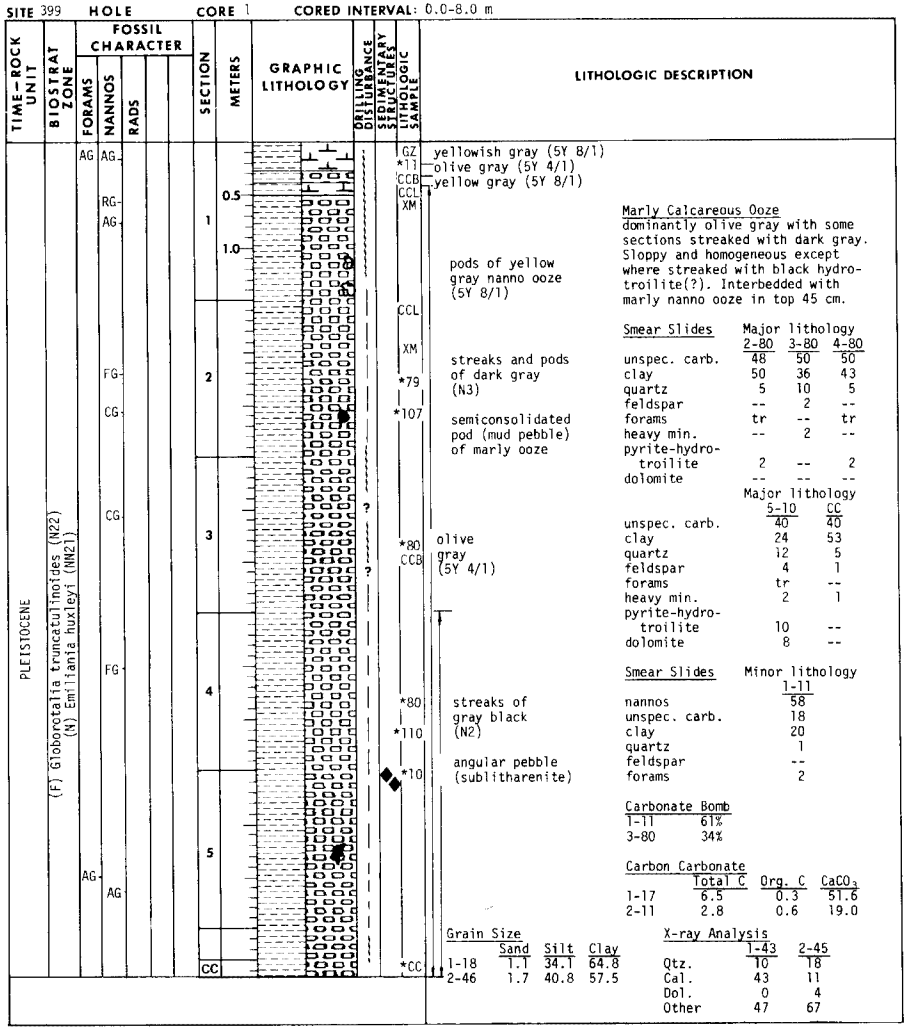
PRINCIPAL RESULTS:

Only a pilot hole was drilled at Site 399 for the purpose of determining the depth to which casing could be washed on the intended subsequent re-entry. Thruster malfunction and beacon

LEG 48 SITE 399
SITE SUMMARY SHEET con't.

signal determination forced a move to Site 400, 0.1 miles ESE before further drilling commenced. The section penetrated at Site 399 was mainly olive gray marly calcareous ooze of Pleistocene age.

SITE 399 HOLE CORE 1 CORED INTERVAL: 0.0-8.0 m



Marly Calcareous Ooze
dominantly olive gray with some sections streaked with dark gray. Sloppy and homogeneous except where streaked with black hydrotroilite(?). Interbedded with marly nanno ooze in top 45 cm.

Smear Slides	Major lithology 2-80	3-80	4-80
unspec. carb.	48	50	50
clay	50	36	43
quartz	5	10	5
feldspar	--	2	--
forams	tr	--	tr
heavy min.	--	2	--
pyrite-hydrotroilite	2	--	2
dolomite	--	--	--

	Major lithology 5-10	CC
unspec. carb.	40	40
clay	24	53
quartz	12	5
feldspar	4	1
forams	tr	--
heavy min.	2	1
pyrite-hydrotroilite	10	--
dolomite	8	--

Smear Slides	Minor lithology 1-11
nannos	58
unspec. carb.	18
clay	20
quartz	1
feldspar	--
forams	2

Carbonate Bomb

1-11	61%
3-80	34%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-17	6.5	0.3	51.6
2-11	2.8	0.6	19.0

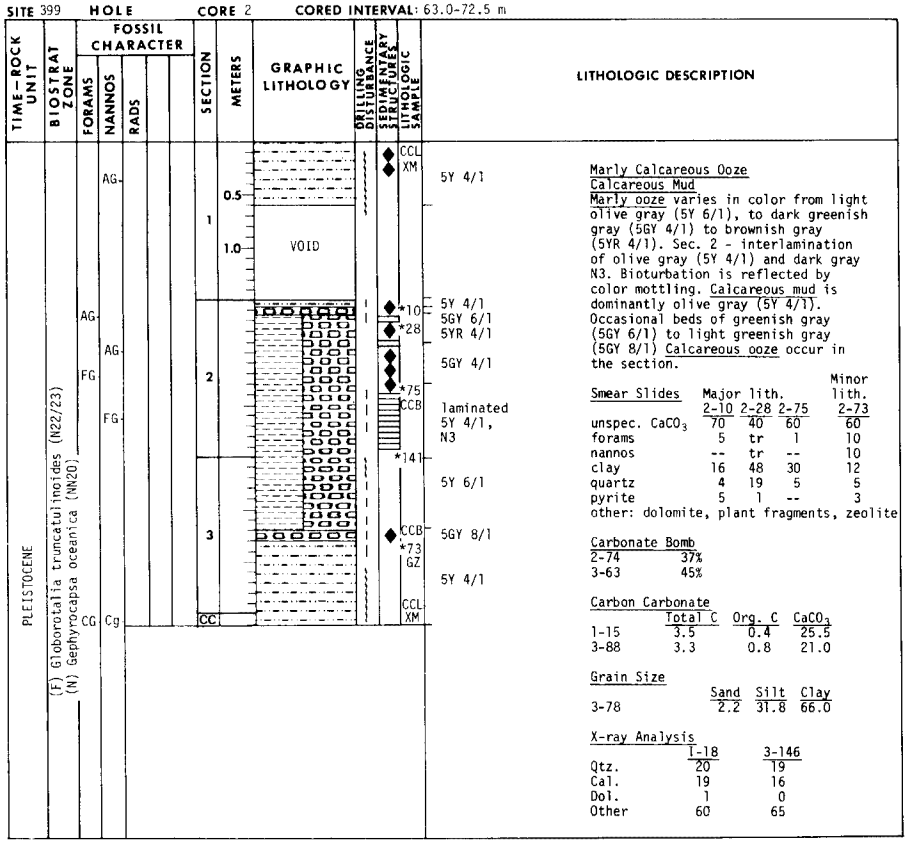
Grain Size

	Sand	Silt	Clay
1-18	1.1	34.1	64.8
2-46	1.7	40.8	57.5

X-ray Analysis

	1-43	2-45
Qtz.	10	18
Cal.	43	11
Dol.	0	4
Other	47	67

SITE 399 HOLE CORE 2 CORED INTERVAL: 63.0-72.5 m



Marly Calcareous Ooze
Calcareous Mud
Marly ooze varies in color from light olive gray (5Y 6/1), to dark greenish gray (5GY 4/1) to brownish gray (5YR 4/1). Sec. 2 - interlamination of olive gray (5Y 4/1) and dark gray N3. Bioturbation is reflected by color mottling. Calcareous mud is dominantly olive gray (5Y 4/1). Occasional beds of greenish gray (5GY 6/1) to light greenish gray (5GY 8/1) Calcareous ooze occur in the section.

Smear Slides	Major lith. 2-10	2-28	2-75	Minor lith. 2-73
unspec. $CaCO_3$	70	40	60	60
forams	5	tr	1	10
nannos	--	tr	--	10
clay	16	48	30	12
quartz	4	19	5	5
pyrite	5	1	--	3

other: dolomite, plant fragments, zeolite

Carbonate Bomb

2-74	37%
3-63	45%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-15	3.5	0.4	25.5
3-88	3.3	0.8	21.0

Grain Size

	Sand	Silt	Clay
3-78	2.2	31.8	66.0

X-ray Analysis

	1-18	3-146
Qtz.	20	19
Cal.	19	16
Dol.	1	0
Other	60	65

Leg 48 Site 399
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
399	1	1	0.00	0.17	6.5	0.3	51.6
399	1	2	0.00	1.61	2.8	0.6	19.0
399	2	1	63.00	63.15	3.5	0.4	25.5
399	2	3	63.00	66.88	3.3	0.8	21.0

#

Leg 48 Site 399
DSDP Shore Laboratory Grain Size Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Sand	Silt	Clay
399	1	1	0.00	0.18	1.1	34.1	64.8
399	1	2	0.00	1.96	1.7	40.8	57.5
399	2	3	63.00	66.78	2.2	31.8	66.0

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DEEP SEA DRILLING PROJECT
LEG 48 SITE 400 and 400A
SITE SUMMARY SHEET

Date occupied	24 May 1976 (2315 LCT)
Date departed	6 June 1976 (2250 LCT)
Time on site	13 days
Position: latitude	47°22.90'N
longitude	09°11.90'W
Water depth (sea level)	4399 corrected meters, echo sounding
Water depth (rig floor)	4399 corrected meters, echo sounding
Bottom felt at	4399 meters, drill pipe
Penetration	777.5 meters
Number of holes	2
Number of cores	400 (1) 400A (74)
Total length of cored section	729.5 meters
Total core recovered	350.86 meters
Percentage of core recovery	48%
Oldest Sediment Cored	
Depth subbottom	768-768.5 meters
Nature	Carbonaceous mudstone and limestone
Age	Lowermost Aptian
Basement	Not reached

PRINCIPAL RESULTS:

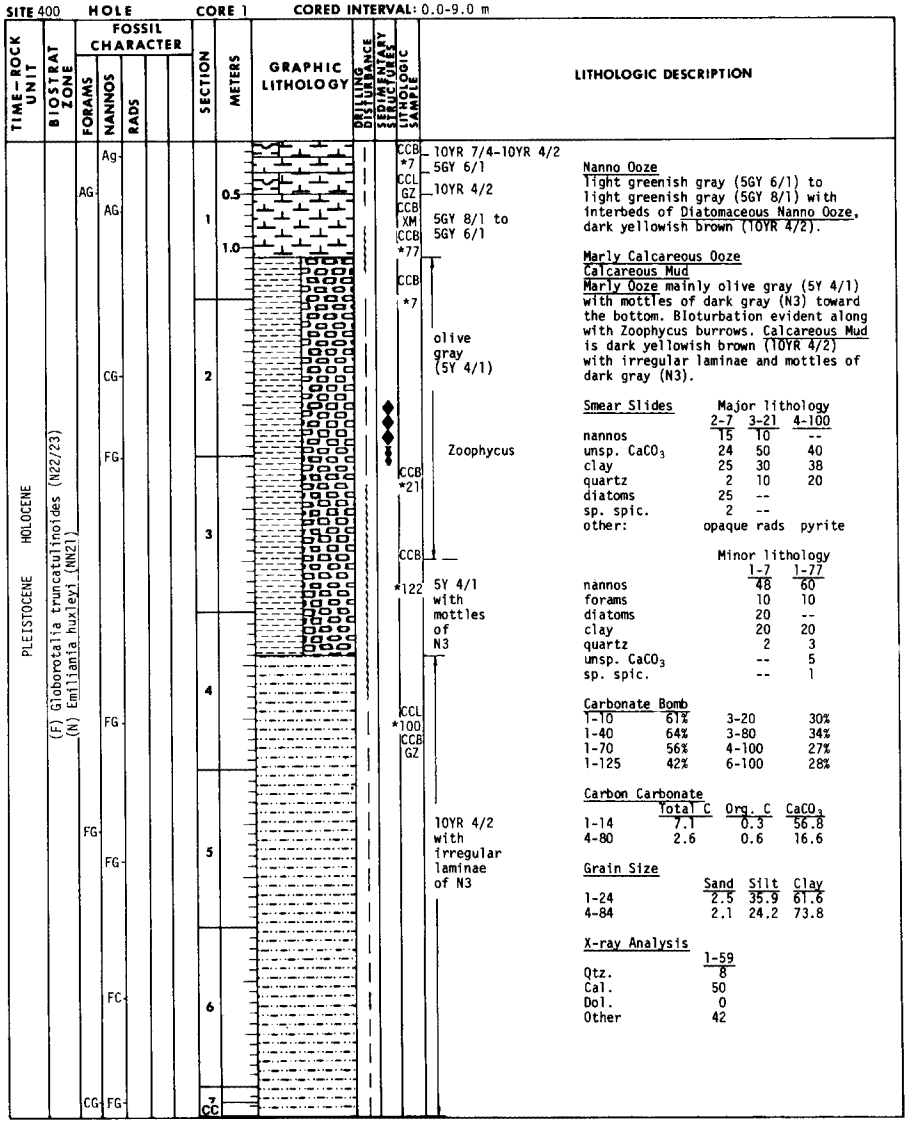
Site 400A was drilled at the foot of the Meriadzek escarpment near the ocean-continent boundary on the northern continental margin of the Bay of Bascay.

The upper 640 meters of the section penetrated in these sites consisted principally of nannofossil ooze, nanno chalk and marly

nanno chalk ranging in age from upper Paleocene to Recent. A late Eocene hiatus was encountered at 516 meters, and upper Paleocene orange pink marly chalk was found resting on Maestrichtian white chalk at a depth of 640 meters. Only 20 meters of Upper Cretaceous sediments occur at Site 400A and these rest on rhythmically interbedded carbonaceous mudstones ere reached at a subbottom depth of 710 meters and drilled to a depth of 777.5 meters before the hole was terminated by the drill string separation after re-entry.

The carbonaceous mudstones were deposited in a deep water environment. Their rhythmic sedimentation is interpreted to reflect periodic influx of land-derived plant fragments which pyrolysis studies indicate are in an immature stage of evolution. Deposition of the "black shales" in the Bay of Biscaye area does not necessitate the development of anoxic conditions during this part of the Lower Cretaceous. Variations in $CaCO_3$ biogenous silica, and clay content in the Tertiary section along with the observed hiatuses apparently reflect an interplay of fluctuations in bottom current activity, CCD level, and surface productivity.

SITE 400 HOLE CORE 1 CORED INTERVAL: 0.0-9.0 m



Nanno Ooze
Light greenish gray (5GY 6/1) to light greenish gray (5GY 8/1) with interbeds of Diatomaceous Nanno Ooze, dark yellowish brown (10YR 4/2).

Marly Calcareous Ooze
Calcareous Mud
Marly Ooze mainly olive gray (5Y 4/1) with mottles of dark gray (N3) toward the bottom. Bioturbation evident along with Zoophycus burrows. Calcareous Mud is dark yellowish brown (10YR 4/2) with irregular laminae and mottles of dark gray (N3).

Smear Slides

	Major lithology 2-7	3-21	4-100
nannos	15	10	--
unsp. $CaCO_3$	24	50	40
clay	25	30	38
quartz	2	10	20
diatoms	25	--	
sp. spic.	2	--	
other:	opaque rads		pyrite

	Minor lithology 1-7	1-77
nannos	48	60
forams	10	10
diatoms	20	--
clay	20	20
quartz	2	3
unsp. $CaCO_3$	--	5
sp. spic.	--	1

Carbonate Bomb

1-10	61%	3-20	30%
1-40	64%	3-80	34%
1-70	56%	4-100	27%
1-125	42%	6-100	28%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-14	7.1	0.3	56.8
4-80	2.6	0.6	16.6

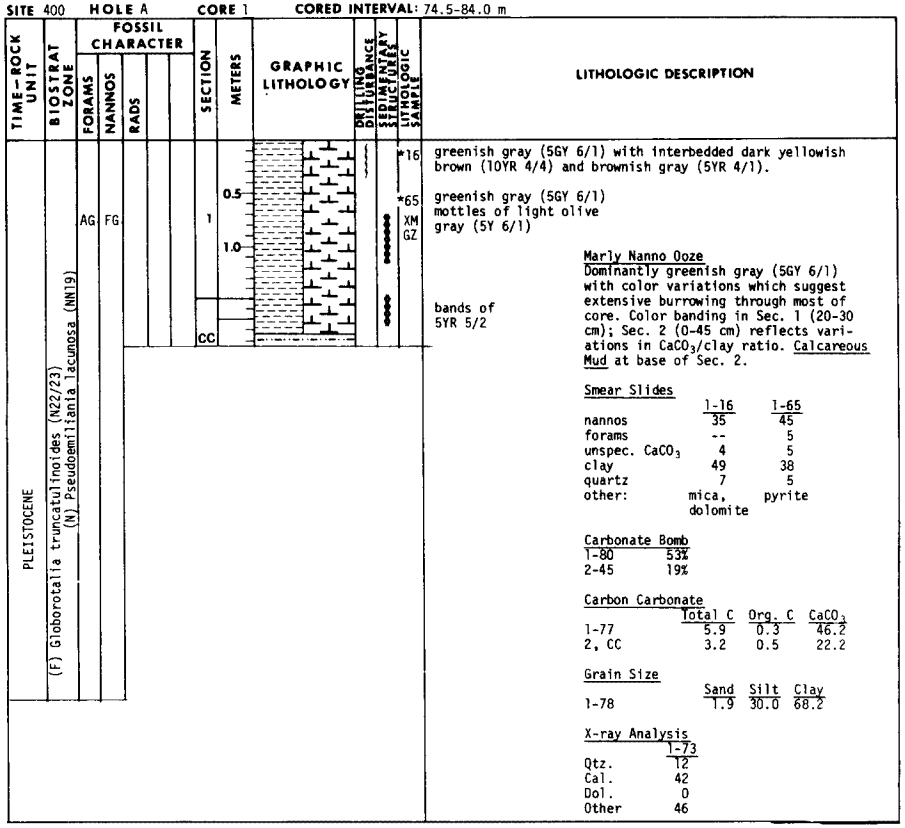
Grain Size

	Sand	Silt	Clay
1-24	2.5	35.9	61.6
4-84	2.1	24.2	73.8

X-ray Analysis

	1-59
Qtz.	8
Cal.	50
Dol.	0
Other	42

SITE 400 HOLE A CORE 1 CORED INTERVAL: 74.5-84.0 m



greenish gray (5GY 6/1) with interbedded dark yellowish brown (10YR 4/4) and brownish gray (5YR 4/1).

greenish gray (5GY 6/1) mottles of light olive gray (5Y 6/1)

Marly Nanno Ooze
Dominantly greenish gray (5GY 6/1) with color variations which suggest extensive burrowing through most of core. Color banding in Sec. 1 (20-30 cm); Sec. 2 (0-45 cm) reflects variations in $CaCO_3$/clay ratio. Calcareous Mud at base of Sec. 2.

Smear Slides

	1-16	1-65
nannos	35	45
forams	--	5
unspec. $CaCO_3$	4	5
clay	49	38
quartz	7	5
other:	mica, dolomite	pyrite

Carbonate Bomb

1-80	53%
2-45	19%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-77	5.9	0.3	46.2
2, CC	3.2	0.5	22.2

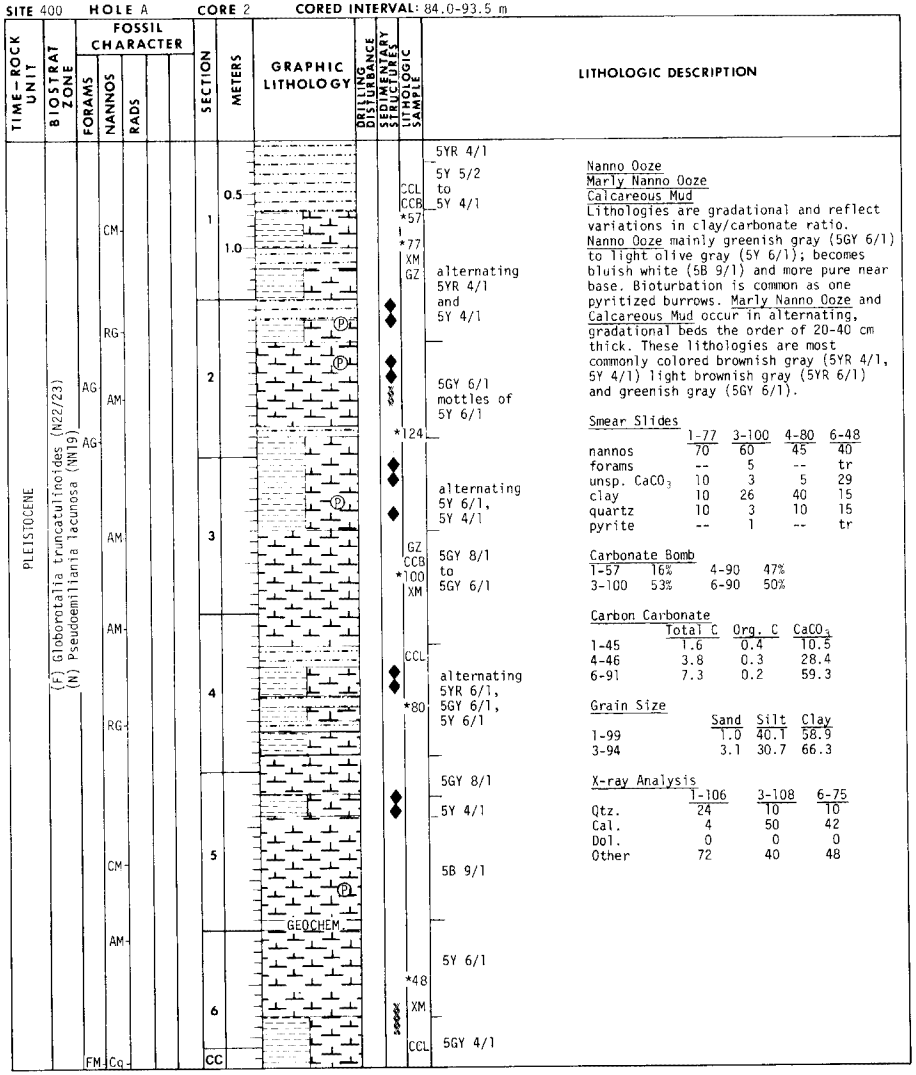
Grain Size

	Sand	Silt	Clay
1-78	1.9	30.0	68.2

X-ray Analysis

	1-73
Qtz.	12
Cal.	42
Dol.	0
Other	46

SITE 400 HOLE A CORE 2 CORED INTERVAL: 84.0-93.5 m



Nanno Ooze
Marly Nanno Ooze
Calcareous Mud

Lithologies are gradational and reflect variations in clay/carbonate ratio. Nanno Ooze mainly greenish gray (5GY 6/1) to light olive gray (5Y 6/1); becomes bluish white (5B 9/1) and more pure near base. Bioturbation is common as one pyritized burrows. Marly Nanno Ooze and Calcareous Mud occur in alternating, gradational beds the order of 20-40 cm thick. These lithologies are most commonly colored brownish gray (5YR 4/1, 5Y 4/1) light brownish gray (5YR 6/1) and greenish gray (5GY 6/1).

Smear Slides

	1-77	3-100	4-80	6-48
nannos	70	60	45	40
forams	--	5	--	tr
unsp. $CaCO_3$	10	3	5	29
clay	10	26	40	15
quartz	10	3	10	15
pyrite	--	1	--	tr

Carbonate Bomb

1-57	16%	4-90	47%
3-100	53%	6-90	50%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-45	1.6	0.4	10.5
4-46	3.8	0.3	28.4
6-91	7.3	0.2	59.3

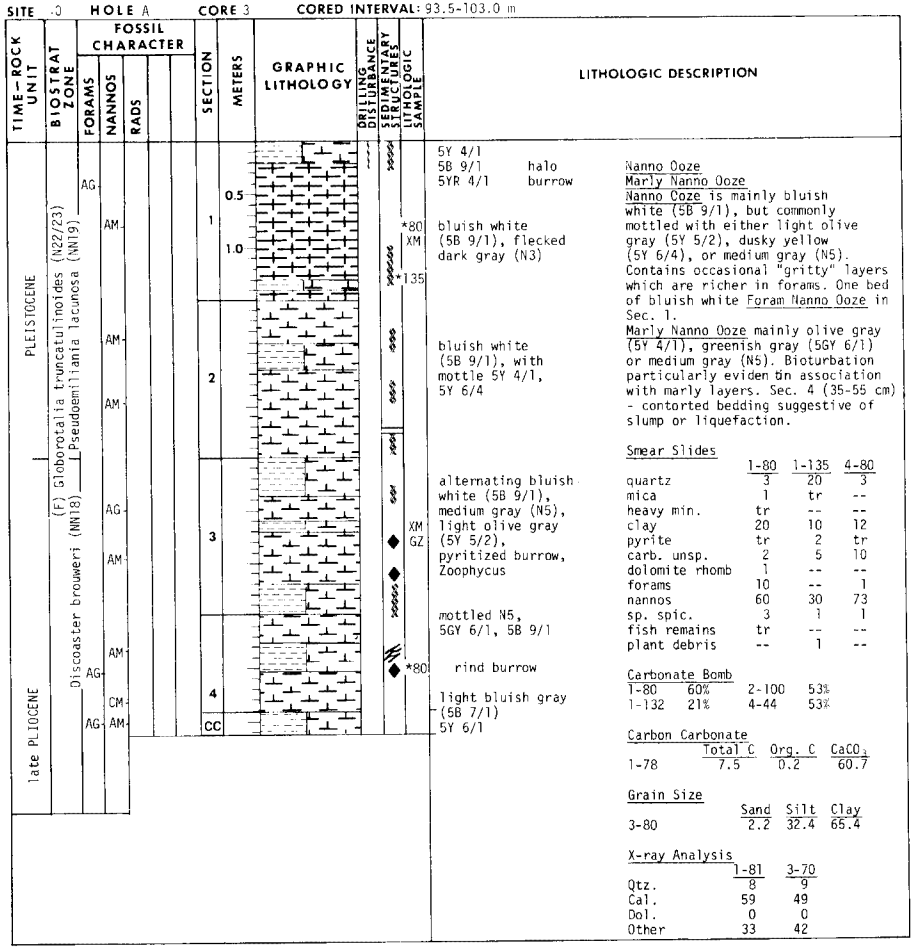
Grain Size

	Sand	Silt	Clay
1-99	1.0	40.1	58.9
3-94	3.1	30.7	66.3

X-ray Analysis

	1-106	3-108	6-75
Qtz.	24	10	10
Cal.	4	50	42
Dol.	0	0	0
Other	72	40	48

SITE 400 HOLE A CORE 3 CORED INTERVAL: 93.5-103.0 m



Nanno Ooze
Marly Nanno Ooze

Nanno Ooze is mainly bluish white (5B 9/1), but commonly mottled with either light olive gray (5Y 5/2), dusky yellow (5Y 6/4), or medium gray (N5). Contains occasional "gritty" layers which are richer in forams. One bed of bluish white Foram Nanno Ooze in Sec. 1.

Marly Nanno Ooze mainly olive gray (5Y 4/1), greenish gray (5GY 6/1) or medium gray (N5). Bioturbation particularly eviden tin association with marly layers. Sec. 4 (35-55 cm) - contorted bedding suggestive of slump or liquefaction.

Smear Slides

	1-80	1-135	4-80
quartz	3	20	3
mica	1	tr	--
heavy min.	tr	--	--
clay	20	10	12
pyrite	tr	2	tr
carb. unsp.	2	5	10
dolomite rhomb	1	--	--
forams	10	--	1
nannos	60	30	73
sp. spic.	3	1	1
fish remains	tr	--	--
plant debris	--	1	--

Carbonate Bomb

1-80	60%	2-100	53%
1-132	21%	4-44	53%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-78	7.5	0.2	60.7

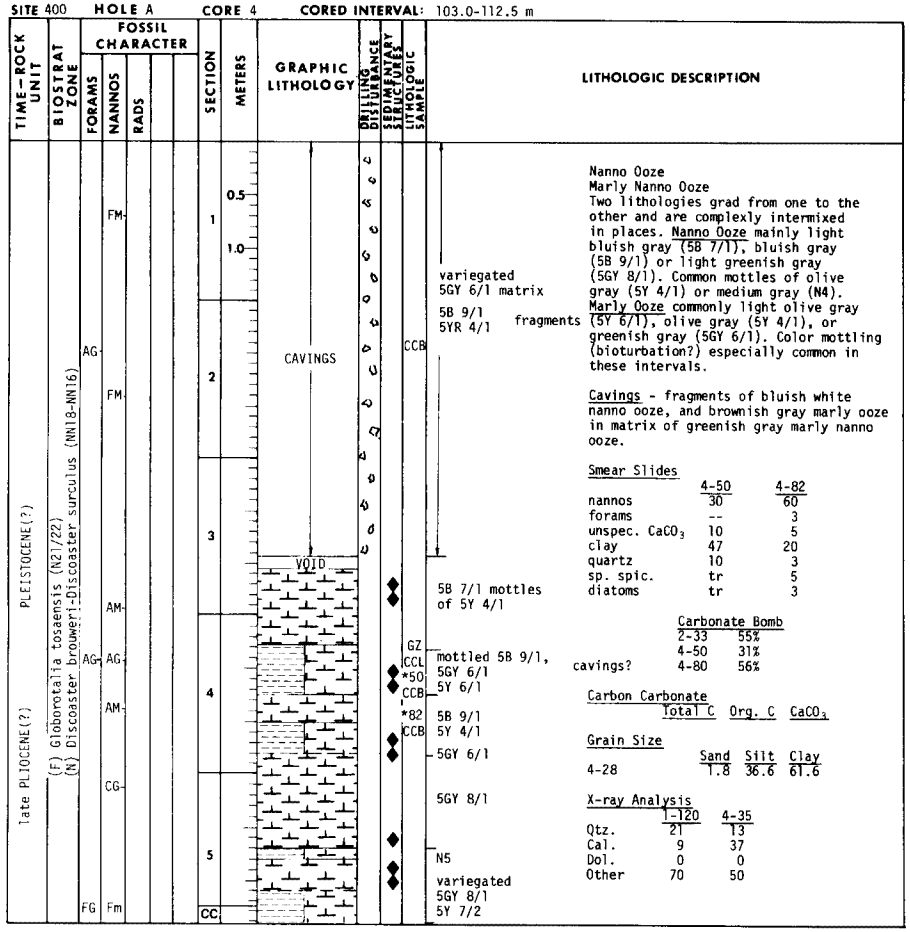
Grain Size

	Sand	Silt	Clay
3-80	2.2	32.4	65.4

X-ray Analysis

	1-81	3-70
Qtz.	8	9
Cal.	59	49
Dol.	0	0
Other	33	42

SITE 400 HOLE A CORE 4 CORED INTERVAL: 103.0-112.5 m



Nanno Ooze
Marly Nanno Ooze
Two lithologies grad from one to the other and are complexly intermixed in places. Nanno Ooze mainly light bluish gray (5B 7/1), bluish gray (5B 9/1) or light greenish gray (5GY 8/1). Common mottles of olive gray (5Y 4/1) or medium gray (N4). Marly Ooze commonly light olive gray (5Y 6/1), olive gray (5Y 4/1), or greenish gray (5GY 6/1). Color mottling (bioturbation?) especially common in these intervals.

Cavings - fragments of bluish white nanno ooze, and brownish gray marly ooze in matrix of greenish gray marly nanno ooze.

Smear Slides

	4-50	4-82
nannos	30	60
forams	--	3
unspec. $CaCO_3$	10	5
clay	47	20
quartz	10	3
sp. spic.	tr	5
diatoms	tr	3

Carbonate Bomb

2-33	55%
4-50	31%
cavings? 4-80	56%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
4-28	1.8	36.6	61.6

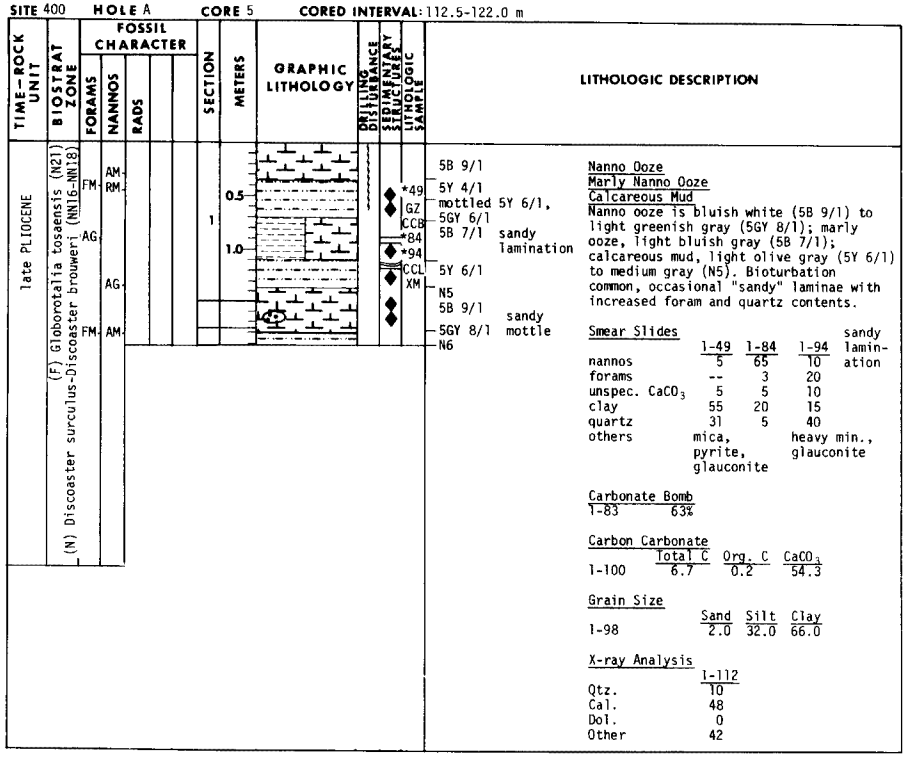
Grain Size

	Sand	Silt	Clay
4-28	1.8	36.6	61.6

X-ray Analysis

	1-120	4-35
Qtz.	21	13
Cal.	9	37
Dol.	0	0
Other	70	50

SITE 400 HOLE A CORE 5 CORED INTERVAL: 112.5-122.0 m



Nanno Ooze
Marly Nanno Ooze
Calcareous Mud
Nanno ooze is bluish white (5B 9/1) to light greenish gray (5GY 8/1); marly ooze, light bluish gray (5B 7/1); calcareous mud, light olive gray (5Y 6/1) to medium gray (N5). Bioturbation common, occasional "sandy" laminae with increased foram and quartz contents.

Smear Slides

	1-49	1-84	1-94	sandy lamination
nannos	5	65	10	
forams	--	3	20	
unspec. $CaCO_3$	5	5	10	
clay	55	20	15	
quartz	31	5	40	
others	mica, pyrite, glauconite		heavy min., glauconite	

Carbonate Bomb

1-83	63%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-100	6.7	0.2	54.3

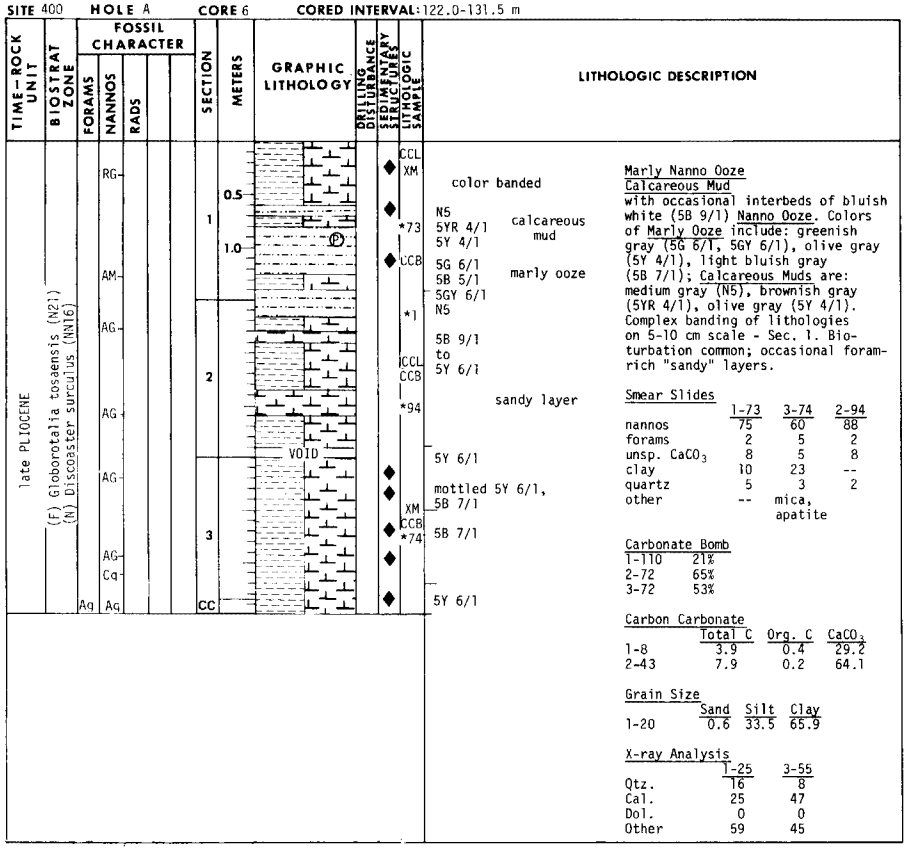
Grain Size

	Sand	Silt	Clay
1-98	2.0	32.0	66.0

X-ray Analysis

	1-112
Qtz.	10
Cal.	48
Dol.	0
Other	42

SITE 400 HOLE A CORE 6 CORED INTERVAL: 122.0-131.5 m



LITHOLOGIC DESCRIPTION

Marly Nanno Ooze
Calcareous Mud
with occasional interbeds of bluish white (5B 9/1) Nanno Ooze. Colors of Marly Ooze include: greenish gray (5G 6/1, 5GY 6/1), olive gray (5Y 4/1), light bluish gray (5B 7/1); Calcareous Muds are: medium gray (N5), brownish gray (5YR 4/1), olive gray (5Y 4/1). Complex banding of lithologies on 5-10 cm scale - Sec. 1. Bioturbation common; occasional foram-rich "sandy" layers.

Smear Slides

	1-73	3-74	2-94
nannos	75	60	88
forams	2	5	2
unsp. $CaCO_3$	8	5	8
clay	10	23	--
quartz	5	3	2
other	--	mica, apatite	

Carbonate Bomb

1-110	21%
2-72	65%
3-72	53%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-8	3.9	0.4	29.2
2-43	7.9	0.2	64.1

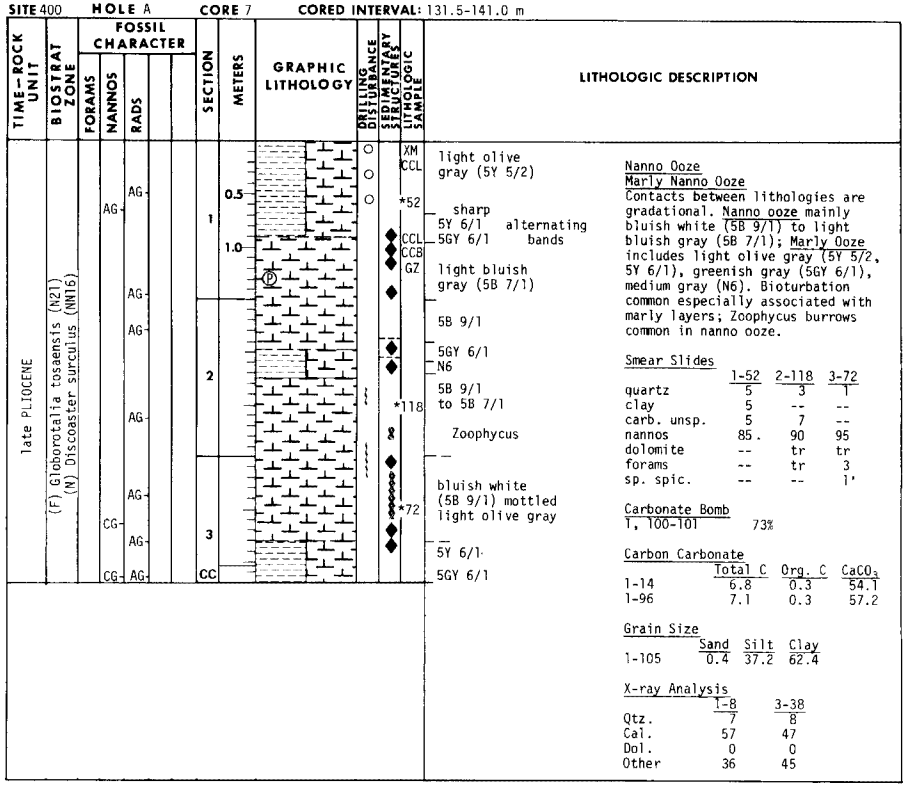
Grain Size

	Sand	Silt	Clay
1-20	0.6	33.5	65.9

X-ray Analysis

	1-25	3-55
Qtz.	16	8
Cal.	25	47
Dol.	0	0
Other	59	45

SITE 400 HOLE A CORE 7 CORED INTERVAL: 131.5-141.0 m



LITHOLOGIC DESCRIPTION

Nanno Ooze
Marly Nanno Ooze
Contacts between lithologies are gradational. Nanno ooze mainly bluish white (5B 9/1) to light bluish gray (5B 7/1); Marly Ooze includes light olive gray (5Y 5/2, 5Y 6/1), greenish gray (5GY 6/1), medium gray (N6). Bioturbation common especially associated with marly layers; Zoophycus burrows common in nanno ooze.

Smear Slides

	1-52	2-118	3-72
quartz	5	3	1
clay	5	--	--
carb. unsp.	5	7	--
nannos	85	90	95
dolomite	--	tr	tr
forams	--	tr	3
sp. spic.	--	--	1

Carbonate Bomb

1, 100-101	73%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-14	6.8	0.3	54.1
1-96	7.1	0.3	57.2

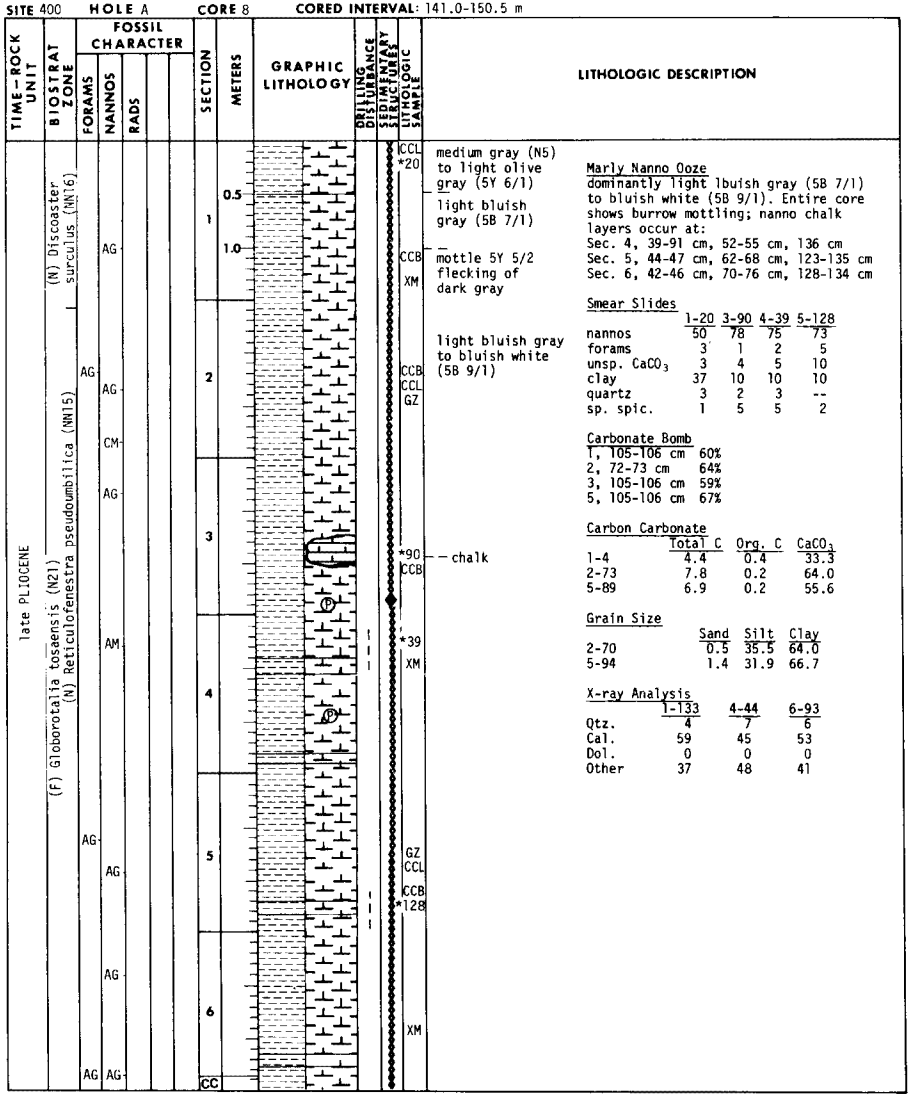
Grain Size

	Sand	Silt	Clay
1-105	0.4	37.2	62.4

X-ray Analysis

	1-8	3-38
Qtz.	7	8
Cal.	57	47
Dol.	0	0
Other	36	45

SITE 400 HOLE A CORE 8 CORED INTERVAL: 141.0-150.5 m



Marly Nanno Ooze

dominantly light lbuish gray (5B 7/1) to bluish white (5B 9/1). Entire core shows burrow mottling; nanno chalk layers occur at:

Sec. 4, 39-91 cm, 52-55 cm, 136 cm
Sec. 5, 44-47 cm, 62-68 cm, 123-135 cm
Sec. 6, 42-46 cm, 70-76 cm, 128-134 cm

Smear Slides

	1-20	3-90	4-39	5-128
nannos	50	78	75	73
forams	3	1	2	5
unsp. $CaCO_3$	3	4	5	10
clay	37	10	10	10
quartz	3	2	3	--
sp. spic.	1	5	5	2

Carbonate Bomb

1, 105-106 cm	60%
2, 72-73 cm	64%
3, 105-106 cm	59%
5, 105-106 cm	67%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-4	4.4	0.4	33.3
2-73	7.8	0.2	64.0
5-89	6.9	0.2	55.6

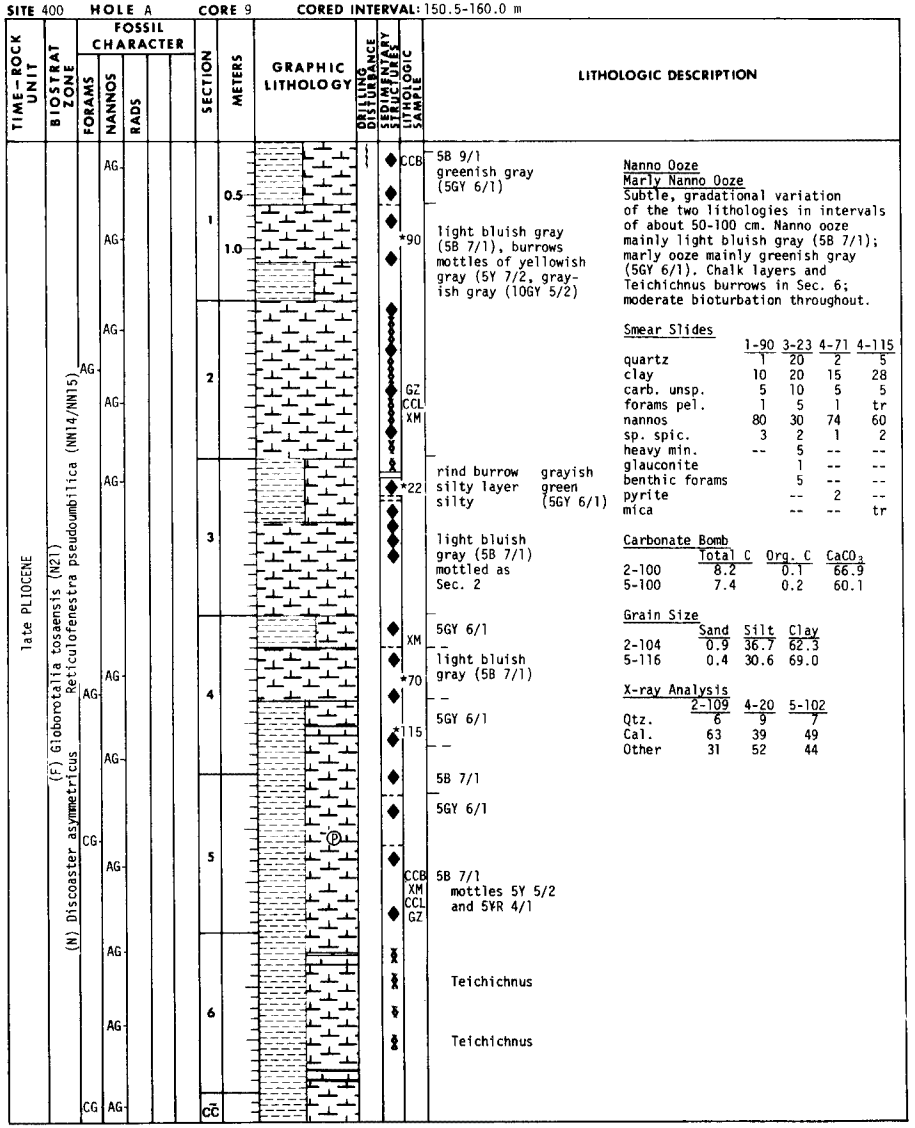
Grain Size

	Sand	Silt	Clay
2-70	0.5	35.5	64.0
5-94	1.4	31.9	66.7

X-ray Analysis

	1-133	4-44	6-93
Qtz.	4	7	6
Cal.	59	45	53
Dol.	0	0	0
Other	37	48	41

SITE 400 HOLE A CORE 9 CORED INTERVAL: 150.5-160.0 m



Nanno Ooze
Marly Nanno Ooze

Subtle, gradational variation of the two lithologies in intervals of about 50-100 cm. Nanno ooze mainly light bluish gray (5B 7/1); marly ooze mainly greenish gray (5GY 6/1). Chalk layers and Teichichnus burrows in Sec. 6; moderate bioturbation throughout.

Smear Slides

	1-90	3-23	4-71	4-115
quartz	1	20	2	5
clay	10	20	15	28
carb. unsp.	5	10	5	5
forams pel.	1	5	1	tr
nannos	80	30	74	60
sp. spic.	3	2	1	2
heavy min.	--	5	--	--
glauconite		1	--	--
benthic forams		5	--	--
pyrite		--	2	--
mica		--	--	tr

Carbonate Bomb

	Total C	Org. C	$CaCO_3$
2-100	8.2	0.1	66.9
5-100	7.4	0.2	60.1

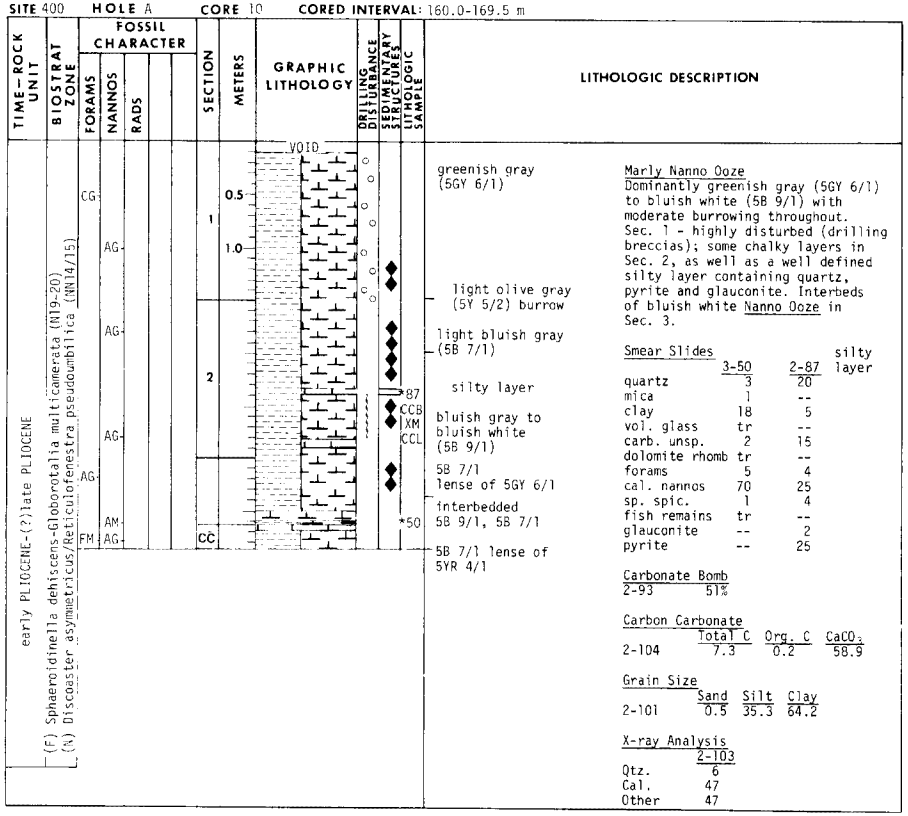
Grain Size

	Sand	Silt	Clay
2-104	0.9	36.7	62.3
5-116	0.4	30.6	69.0

X-ray Analysis

	2-109	4-20	5-102
Qtz.	6	9	7
Cal.	63	39	49
Other	31	52	44

SITE 400 HOLE A CORE 10 CORED INTERVAL: 160.0-169.5 m



greenish gray (5GY 6/1)

light olive gray (5Y 5/2) burrow

light bluish gray (5B 7/1)

silty layer

bluish gray to bluish white (5B 9/1)

5B 7/1 lense of 5GY 6/1

interbedded 5B 9/1, 5B 7/1

5B 7/1 lense of 5YR 4/1

Marly Nanno Ooze

Dominantly greenish gray (5GY 6/1) to bluish white (5B 9/1) with moderate burrowing throughout. Sec. 1 - highly disturbed (drilling breccias); some chalky layers in Sec. 2, as well as a well defined silty layer containing quartz, pyrite and glauconite. Interbeds of bluish white Nanno Ooze in Sec. 3.

Smear Slides

	3-50	2-87	silty layer
quartz	3	20	
mica	1	--	
clay	18	5	
vol. glass	tr	--	
carb. unsp.	2	15	
dolomite rhomb	tr	--	
forams	5	4	
cal. nannos	70	25	
sp. spic.	1	4	
fish remains	tr	--	
glauconite	--	2	
pyrite	--	25	

Carbonate Bomb

2-93	51%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-104	7.3	0.2	58.9

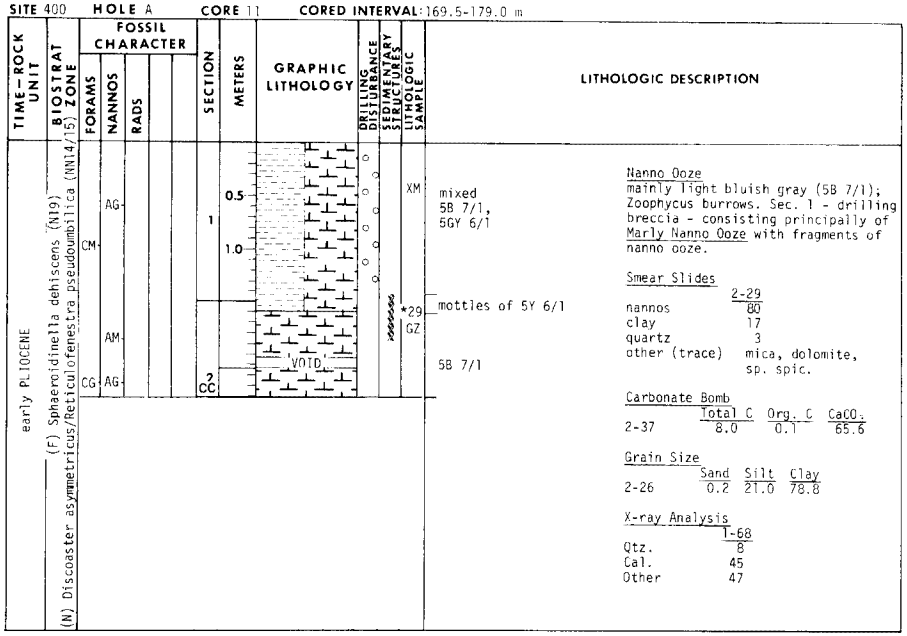
Grain Size

	Sand	Silt	Clay
2-101	0.5	35.3	64.2

X-ray Analysis

	2-103
Qtz.	6
Cal.	47
Other	47

SITE 400 HOLE A CORE 11 CORED INTERVAL: 169.5-179.0 m



mixed 5B 7/1, 5GY 6/1

mottles of 5Y 6/1

5B 7/1

Nanno Ooze

mainly light bluish gray (5B 7/1); Zoophycus burrows. Sec. 1 - drilling breccia - consisting principally of Marly Nanno Ooze with fragments of nanno ooze.

Smear Slides

	2-29
nannos	80
clay	17
quartz	3
other (trace)	mica, dolomite, sp. spic.

Carbonate Bomb

	Total C	Org. C	$CaCO_3$
2-37	8.0	0.1	65.6

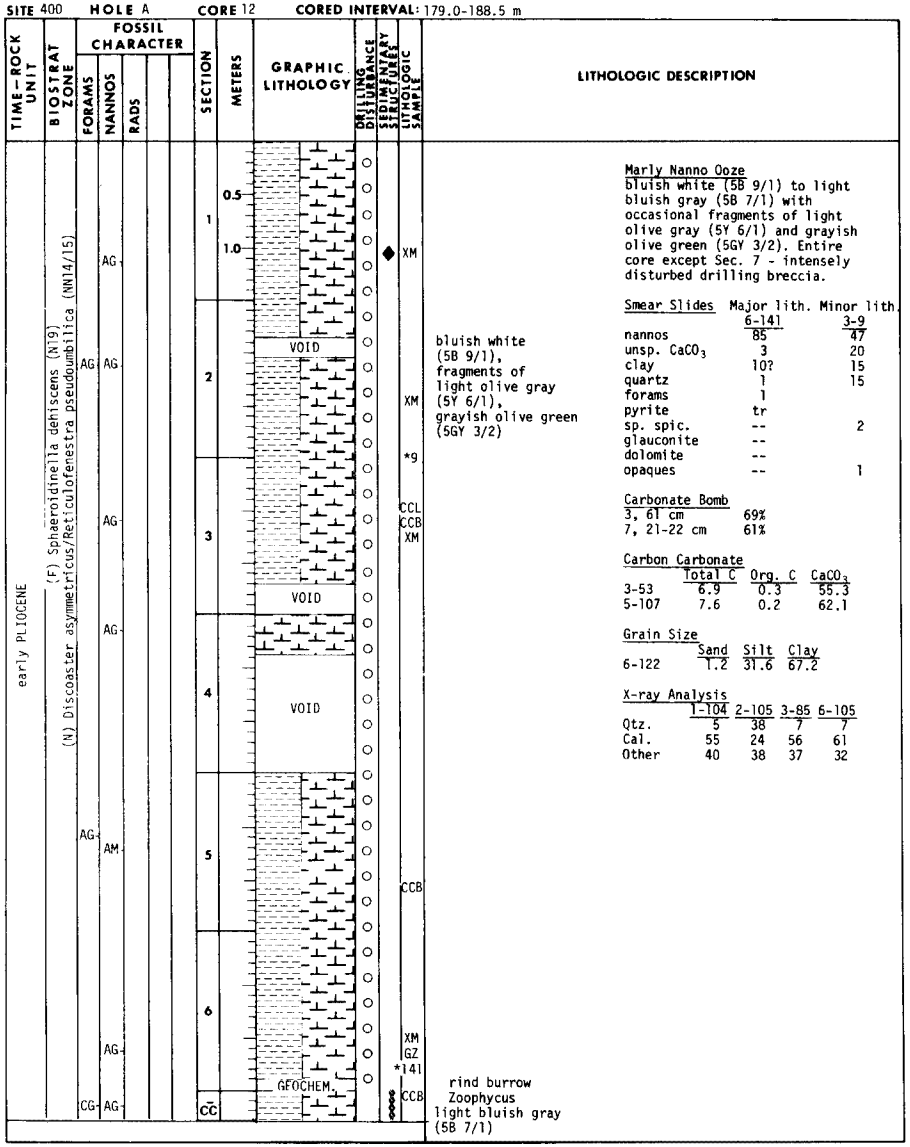
Grain Size

	Sand	Silt	Clay
2-26	0.2	21.0	78.8

X-ray Analysis

	1-68
Qtz.	8
Cal.	45
Other	47

SITE 400 HOLE A CORE 12 CORED INTERVAL: 179.0-188.5 m



bluish white (5B 9/1), fragments of light olive gray (5Y 6/1), grayish olive green (5GY 3/2)

rind burrow
Zoophycus
light bluish gray (5B 7/1)

Marly Nanno Ooze
bluish white (5B 9/1) to light bluish gray (5B 7/1) with occasional fragments of light olive gray (5Y 6/1) and grayish olive green (5GY 3/2). Entire core except Sec. 7 - intensely disturbed drilling breccia.

Smear Slides	Major lith. 6-141	Minor lith. 3-9
nannos	85	47
unsp. $CaCO_3$	3	20
clay	10?	15
quartz	1	15
forams	1	
pyrite	tr	
sp. spic.	--	2
glauconite	--	
dolomite	--	
opaques	--	1

Carbonate Bomb

3, 61 cm	69%
7, 21-22 cm	61%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-53	6.9	0.3	55.3
5-107	7.6	0.2	62.1

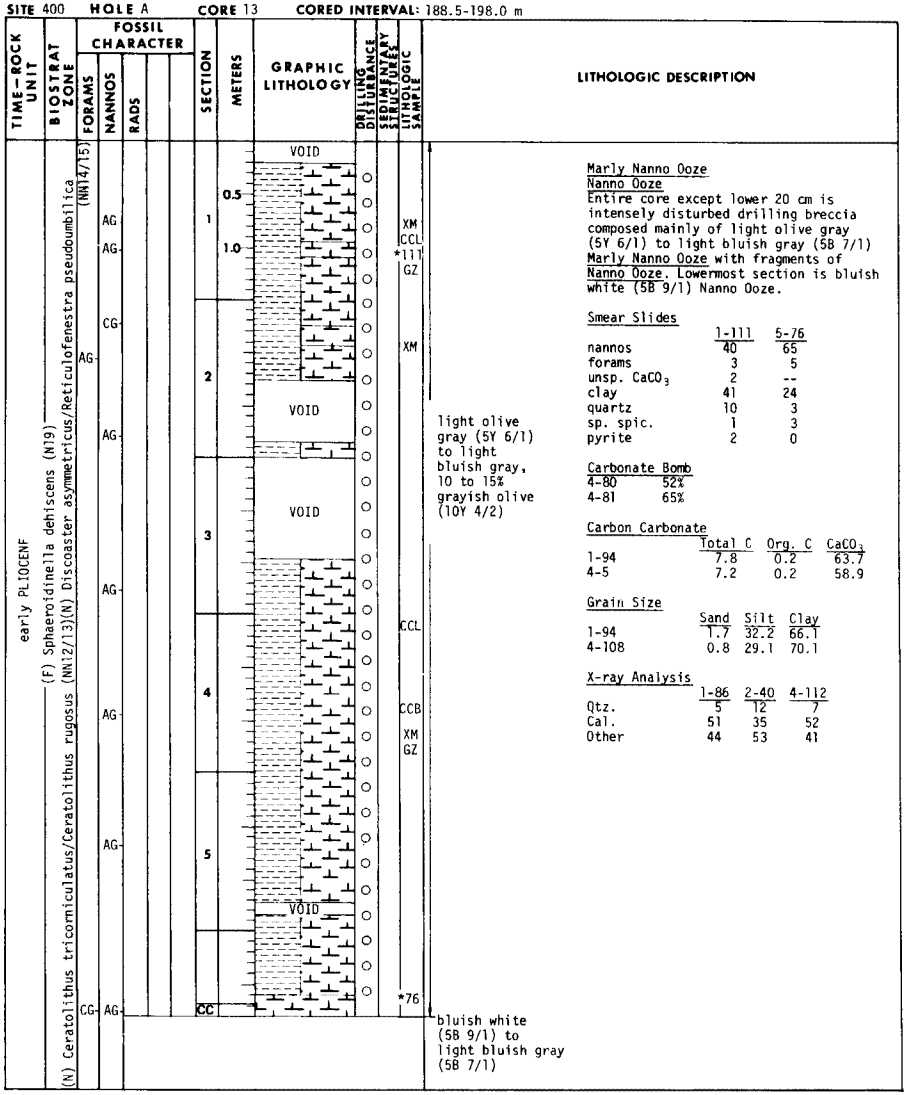
Grain Size

	Sand	Silt	Clay
6-122	1.2	31.6	67.2

X-ray Analysis

	1-104	2-105	3-85	6-105
Qtz.	5	38	7	7
Cal.	55	24	56	61
Other	40	38	37	32

SITE 400 HOLE A CORE 13 CORED INTERVAL: 188.5-198.0 m



light olive gray (5Y 6/1) to light bluish gray, 10 to 15% grayish olive (10Y 4/2)

bluish white (5B 9/1) to light bluish gray (5B 7/1)

Marly Nanno Ooze
Nanno Ooze
Entire core except lower 20 cm is intensely disturbed drilling breccia composed mainly of light olive gray (5Y 6/1) to light bluish gray (5B 7/1)
Marly Nanno Ooze with fragments of Nanno Ooze. Lowermost section is bluish white (5B 9/1) Nanno Ooze.

Smear Slides	1-111	5-76
nannos	40	65
forams	3	5
unsp. $CaCO_3$	2	--
clay	41	24
quartz	10	3
sp. spic.	1	3
pyrite	2	0

Carbonate Bomb

4-80	52%
4-81	65%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-94	7.8	0.2	63.7
4-5	7.2	0.2	58.9

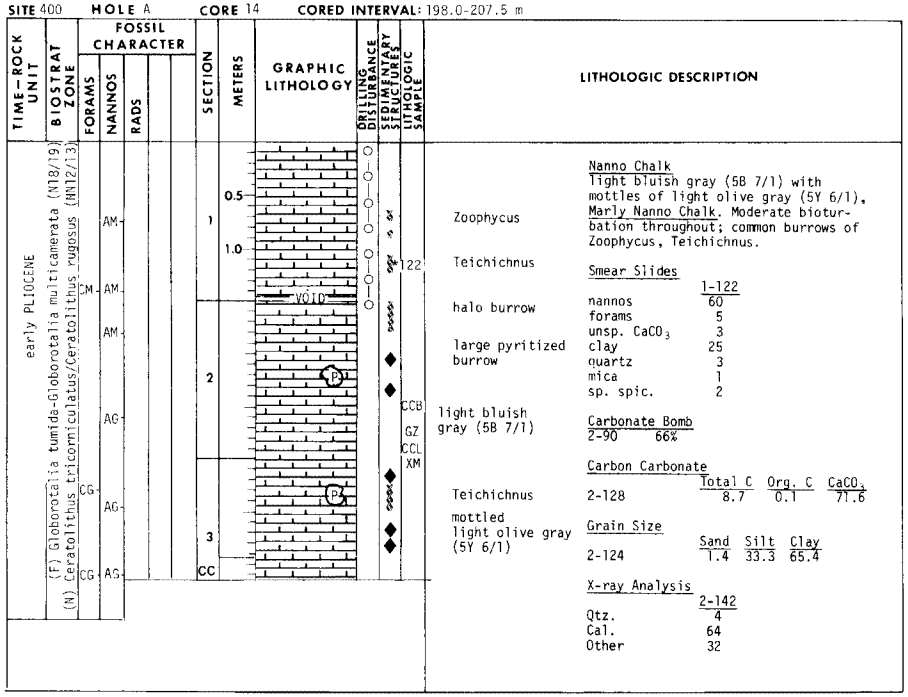
Grain Size

	Sand	Silt	Clay
1-94	1.7	32.2	66.1
4-108	0.8	29.1	70.1

X-ray Analysis

	1-86	2-40	4-112
Qtz.	5	12	7
Cal.	51	35	52
Other	44	53	41

SITE 400 HOLE A CORE 14 CORED INTERVAL: 198.0-207.5 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
light bluish gray (5B 7/1) with mottles of light olive gray (5Y 6/1), Marly Nanno Chalk. Moderate bioturbation throughout; common burrows of Zoophycus, Teichichnus.

Zoophycus
Teichichnus
halo burrow
large pyritized burrow
light bluish gray (5B 7/1)
Teichichnus
mottled light olive gray (5Y 6/1)

Smear Slides

	1-122
nannos	60
forams	5
unsp. $CaCO_3$	3
clay	25
quartz	3
mica	1
sp. spic.	2

Carbonate Bomb

2-90	66%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-128	8.7	0.1	71.6

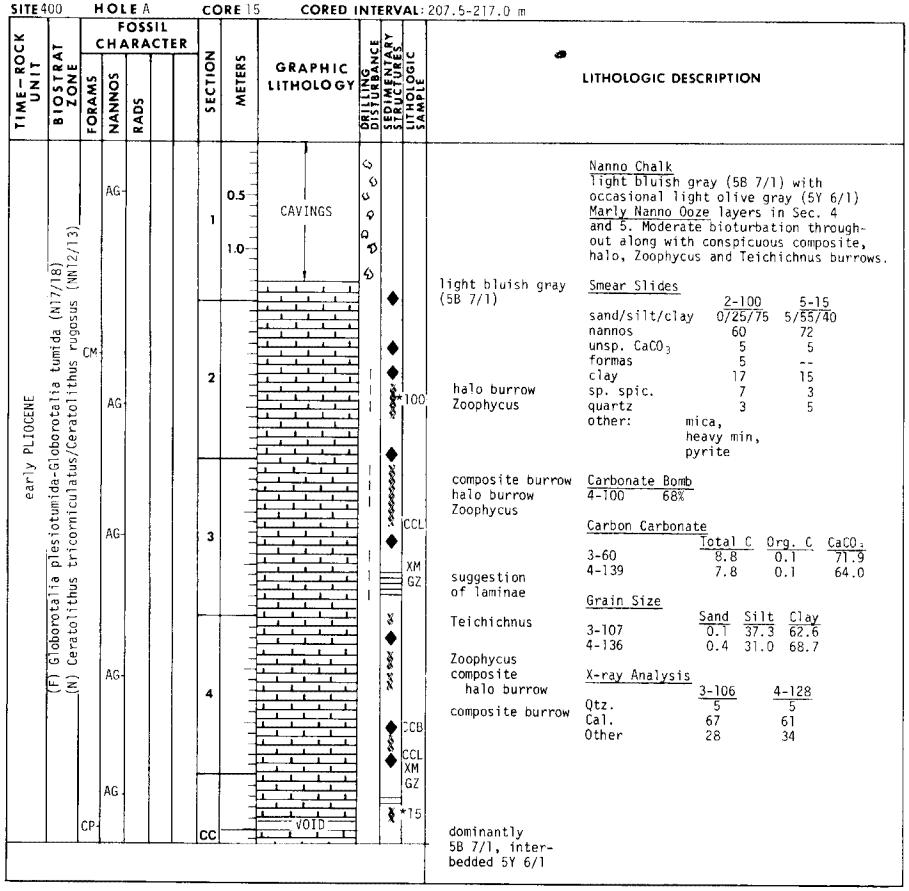
Grain Size

	Sand	Silt	Clay
2-124	1.4	33.3	65.4

X-ray Analysis

	2-142
Qtz.	4
Cal.	64
Other	32

SITE 400 HOLE A CORE 15 CORED INTERVAL: 207.5-217.0 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
light bluish gray (5B 7/1) with occasional light olive gray (5Y 6/1) Marly Nanno Ooze layers in Sec. 4 and 5. Moderate bioturbation throughout along with conspicuous composite, halo, Zoophycus and Teichichnus burrows.

light bluish gray (5B 7/1)
halo burrow
Zoophycus
composite burrow
halo burrow
Zoophycus
suggestion of laminae
Teichichnus
Zoophycus
composite halo burrow
composite burrow
dominantly 5B 7/1, interbedded 5Y 6/1

Smear Slides

	2-100	5-15
sand/silt/clay	0/25/75	5/55/40
nannos	60	72
unsp. $CaCO_3$	5	5
forams	5	--
clay	17	15
sp. spic.	7	3
quartz	3	5
other:	mica, heavy min, pyrite	

Carbonate Bomb

4-100	68%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-60	8.8	0.1	71.9
4-139	7.8	0.1	64.0

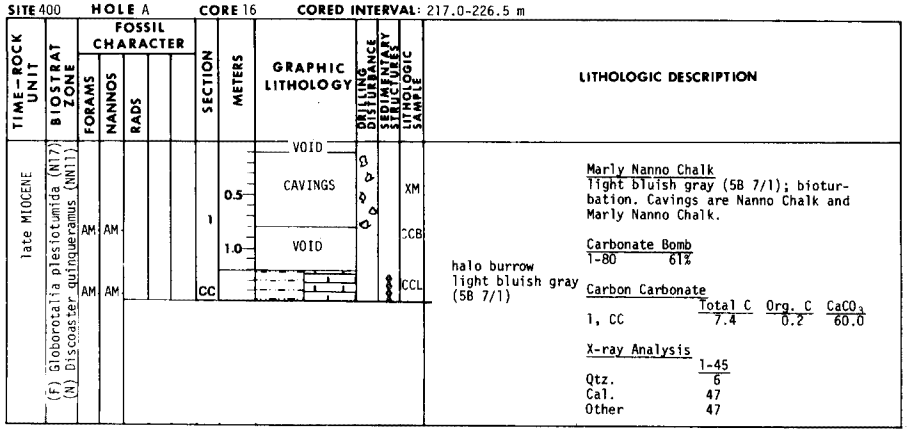
Grain Size

	Sand	Silt	Clay
3-107	0.1	37.3	62.6
4-136	0.4	31.0	68.7

X-ray Analysis

	3-106	4-128
Qtz.	5	5
Cal.	67	61
Other	28	34

SITE 400 HOLE A CORE 16 CORED INTERVAL: 217.0-226.5 m



Marly Nanno Chalk
light bluish gray (5B 7/1); bioturbation. Cavings are Nanno Chalk and Marly Nanno Chalk.

Carbonate Bomb
1-80 61%

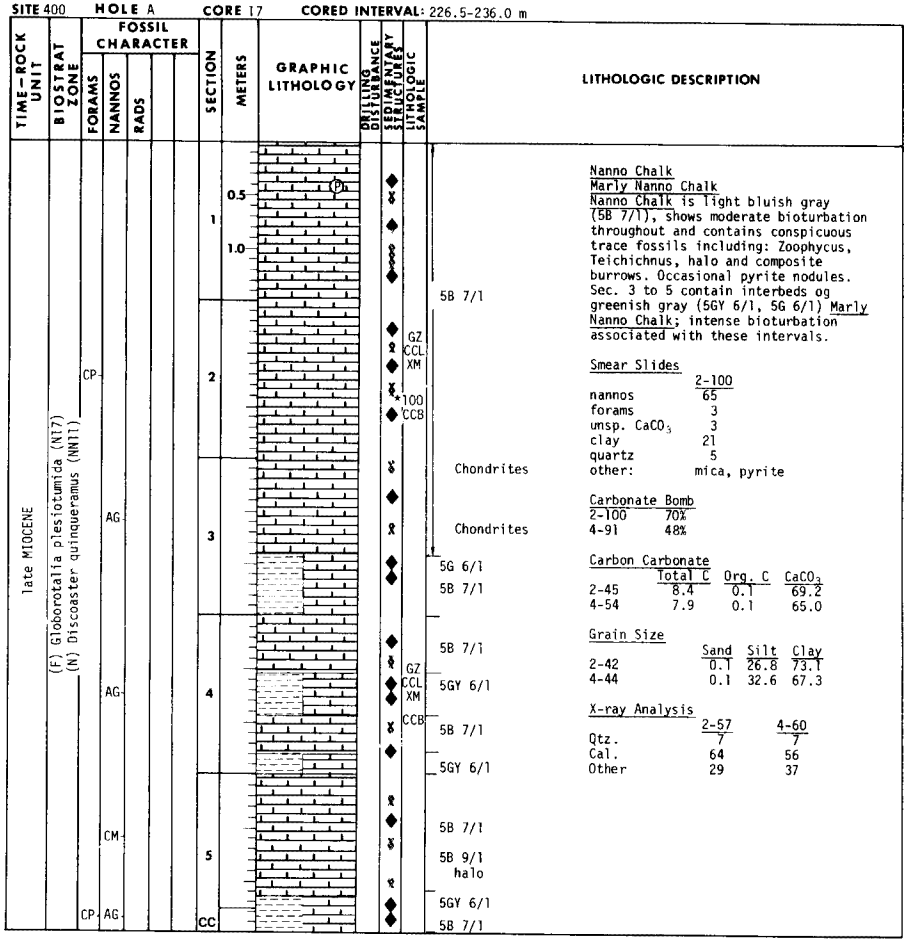
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1, CC	7.4	0.2	60.0

X-ray Analysis

	1-45
Qtz.	6
Cal.	47
Other	47

SITE 400 HOLE A CORE 17 CORED INTERVAL: 226.5-236.0 m



Nanno Chalk
Marly Nanno Chalk
Nanno Chalk is light bluish gray (5B 7/1), shows moderate bioturbation throughout and contains conspicuous trace fossils including: Zoophycus, Teichichnus, halo and composite burrows. Occasional pyrite nodules. Sec. 3 to 5 contain interbeds og greenish gray (5GY 6/1, 5G 6/1) Marly Nanno Chalk; intense bioturbation associated with these intervals.

Smear Slides

	2-100
nannos	65
forams	3
unsp. $CaCO_3$	3
clay	21
quartz	5
other:	mica, pyrite

Carbonate Bomb

2-100	70%
4-91	48%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-45	8.4	0.1	69.2
4-54	7.9	0.1	65.0

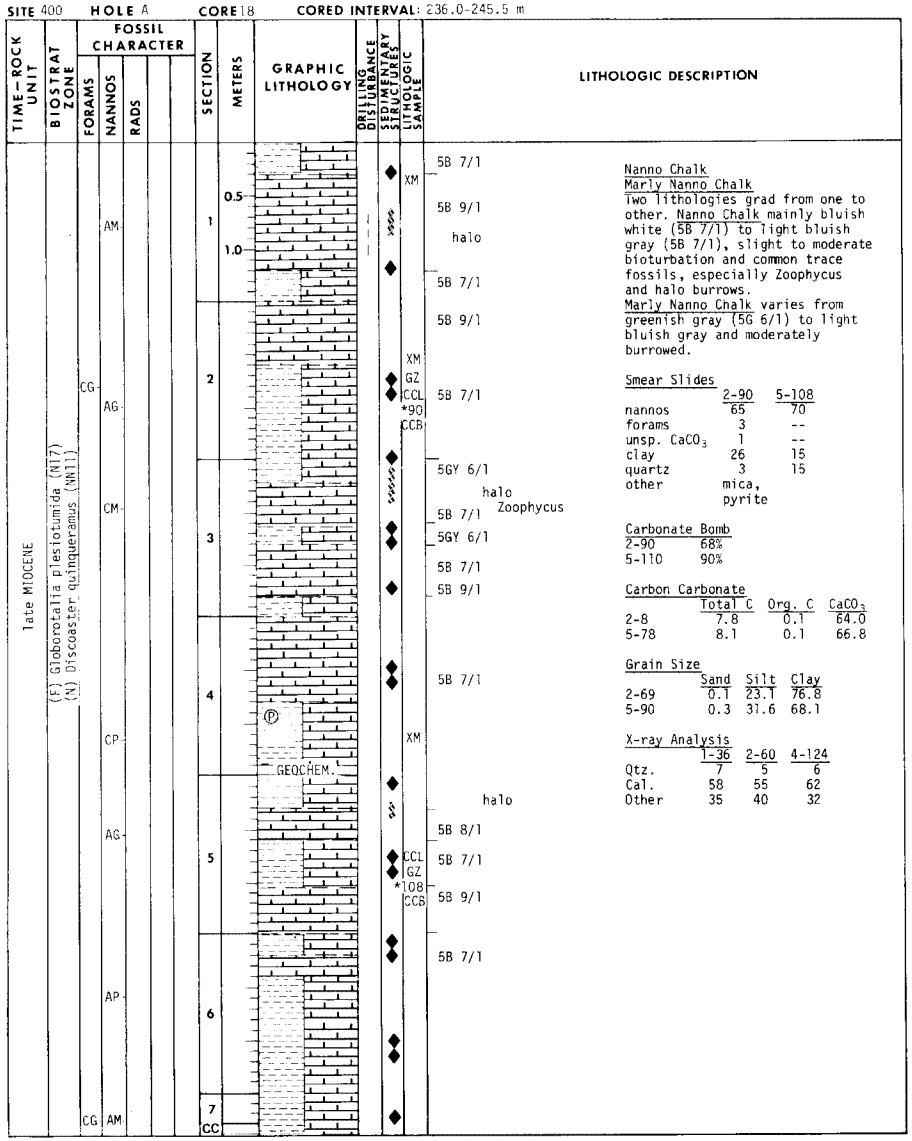
Grain Size

	Sand	Silt	Clay
2-42	0.1	26.8	73.1
4-44	0.1	32.6	67.3

X-ray Analysis

	2-57	4-60
Qtz.	7	7
Cal.	64	56
Other	29	37

SITE 400 HOLE A CORE 18 CORED INTERVAL: 236.0-245.5 m



Nanno Chalk
Marly Nanno Chalk
Two lithologies grad from one to other. Nanno Chalk mainly bluish white (5B 7/1) to light bluish gray (5B 7/1), slight to moderate bioturbation and common trace fossils, especially Zoophycus and halo burrows.
Marly Nanno Chalk varies from greenish gray (5G 6/1) to light bluish gray and moderately burrowed.

Smear Slides

	2-90	5-108
nannos	65	70
forams	3	--
unsp. $CaCO_3$	1	--
clay	26	15
quartz	3	15
other	mica, pyrite	

Carbonate Bomb

2-90	68%
5-110	90%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-8	7.8	0.1	64.0
5-78	8.1	0.1	66.8

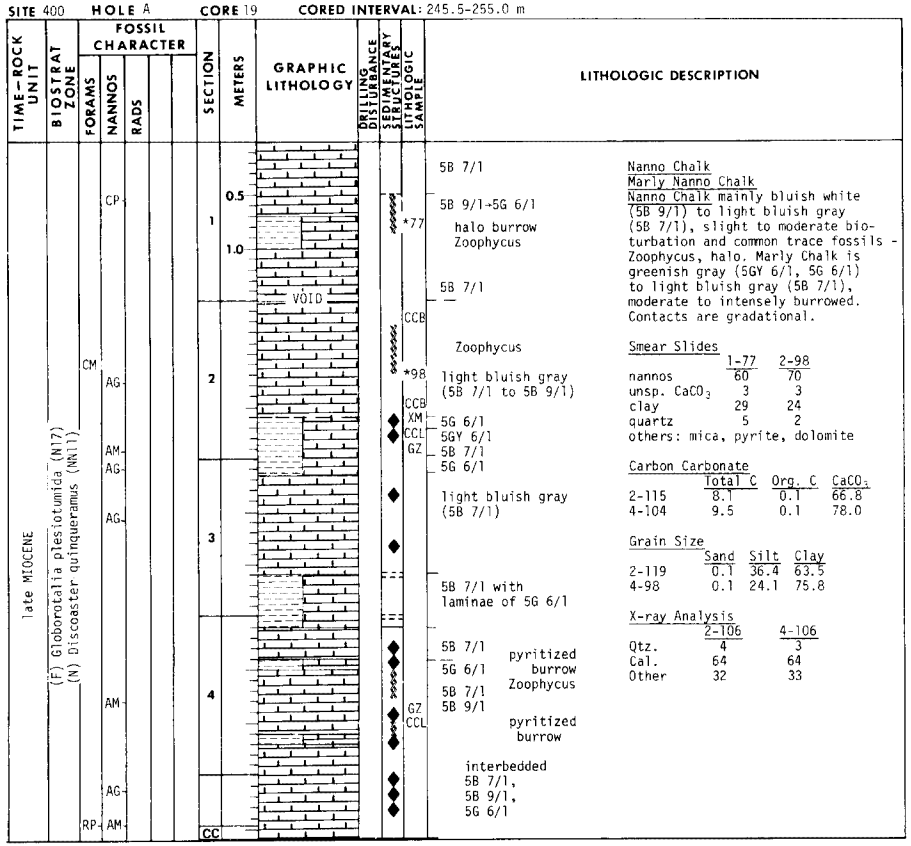
Grain Size

	Sand	Silt	Clay
2-69	0.1	23.1	76.8
5-90	0.3	31.6	68.1

X-ray Analysis

	1-36	2-60	4-124
Qtz.	7	5	6
Cal.	58	55	62
Other	35	40	32

SITE 400 HOLE A CORE 19 CORED INTERVAL: 245.5-255.0 m



Nanno Chalk
Marly Nanno Chalk
Nanno Chalk mainly bluish white (5B 9/1) to light bluish gray (5B 7/1), slight to moderate bioturbation and common trace fossils - Zoophycus, halo. Marly Chalk is greenish gray (5GY 6/1, 5G 6/1) to light bluish gray (5B 7/1), moderate to intensely burrowed. Contacts are gradational.

Smear Slides

	1-77	2-98
nannos	60	70
unsp. $CaCO_3$	3	3
clay	29	24
quartz	5	2
others: mica, pyrite, dolomite		

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-115	8.1	0.1	66.8
4-104	9.5	0.1	78.0

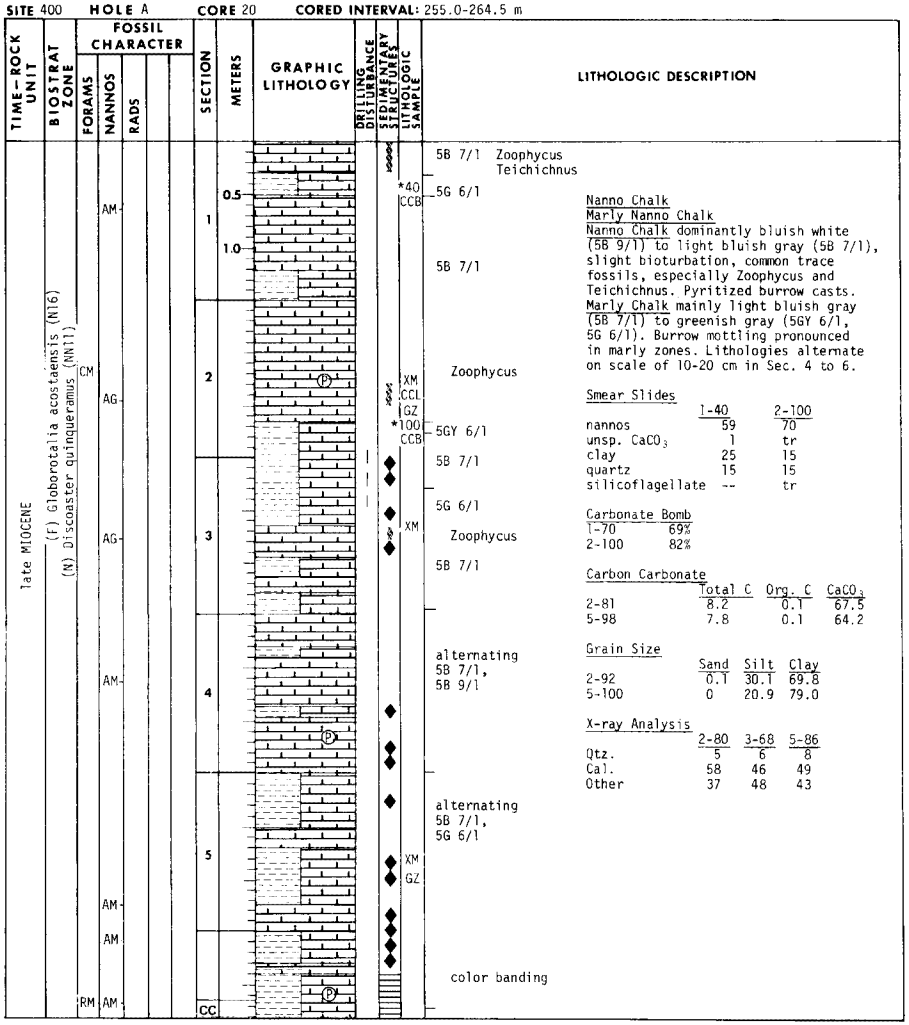
Grain Size

	Sand	Silt	Clay
2-119	0.1	36.4	63.5
4-98	0.1	24.1	75.8

X-ray Analysis

	2-106	4-106
Qtz.	4	3
Cal.	64	64
Other	32	33

SITE 400 HOLE A CORE 20 CORED INTERVAL: 255.0-264.5 m



Nanno Chalk
Marly Nanno Chalk
Nanno Chalk dominantly bluish white (5B 9/1) to light bluish gray (5B 7/1), slight bioturbation, common trace fossils, especially Zoophycus and Teichichnus. Pyritized burrow casts. Marly Chalk mainly light bluish gray (5B 7/1) to greenish gray (5GY 6/1, 5G 6/1). Burrow mottling pronounced in marly zones. Lithologies alternate on scale of 10-20 cm in Sec. 4 to 6.

Smear Slides

	1-40	2-100
nannos	59	70
unsp. $CaCO_3$	1	tr
clay	25	15
quartz	15	15
silicoflagellate	--	tr

Carbonate Bomb

1-70	69%
2-100	82%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-81	8.2	0.1	67.5
5-98	7.8	0.1	64.2

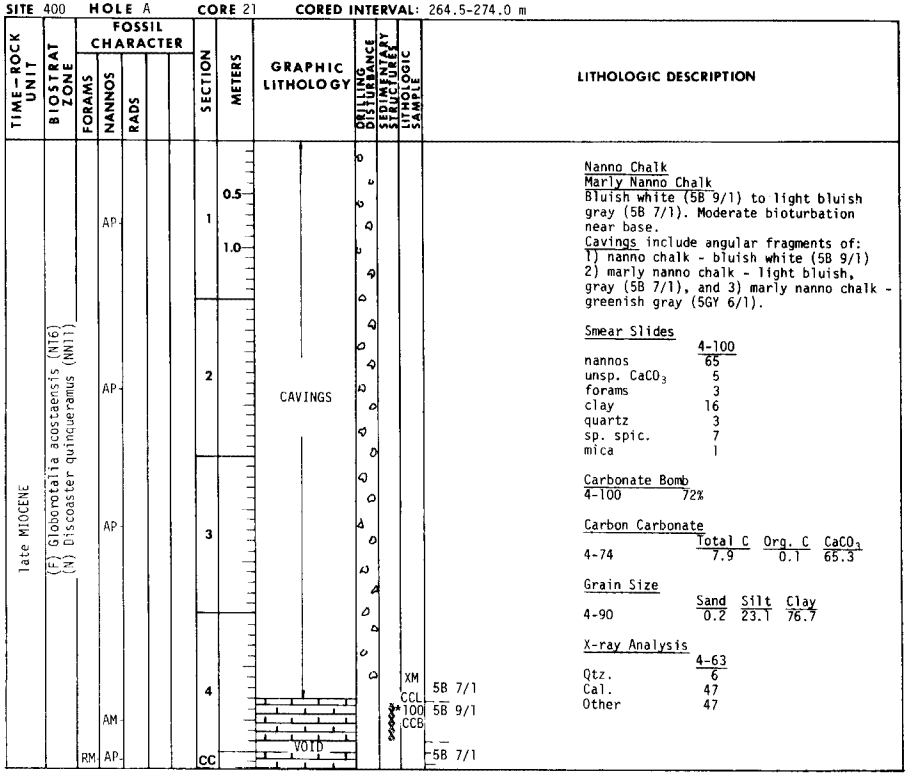
Grain Size

	Sand	Silt	Clay
2-92	0.1	30.1	69.8
5-100	0	20.9	79.0

X-ray Analysis

	2-80	3-68	5-86
Qtz.	5	6	8
Cal.	58	46	49
Other	37	48	43

SITE 400 HOLE A CORE 21 CORED INTERVAL: 264.5-274.0 m



Nanno Chalk
Marly Nanno Chalk
Bluish white (5B 9/1) to light bluish gray (5B 7/1). Moderate bioturbation near base.
Cavings include angular fragments of: 1) nanno chalk - bluish white (5B 9/1) 2) marly nanno chalk - light bluish, gray (5B 7/1), and 3) marly nanno chalk - greenish gray (5GY 6/1).

Smear Slides

	4-100
nannos	65
unsp. $CaCO_3$	5
forams	3
clay	16
quartz	3
sp. spic.	7
mica	1

Carbonate Bomb

4-100	72%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
4-74	7.9	0.1	65.3

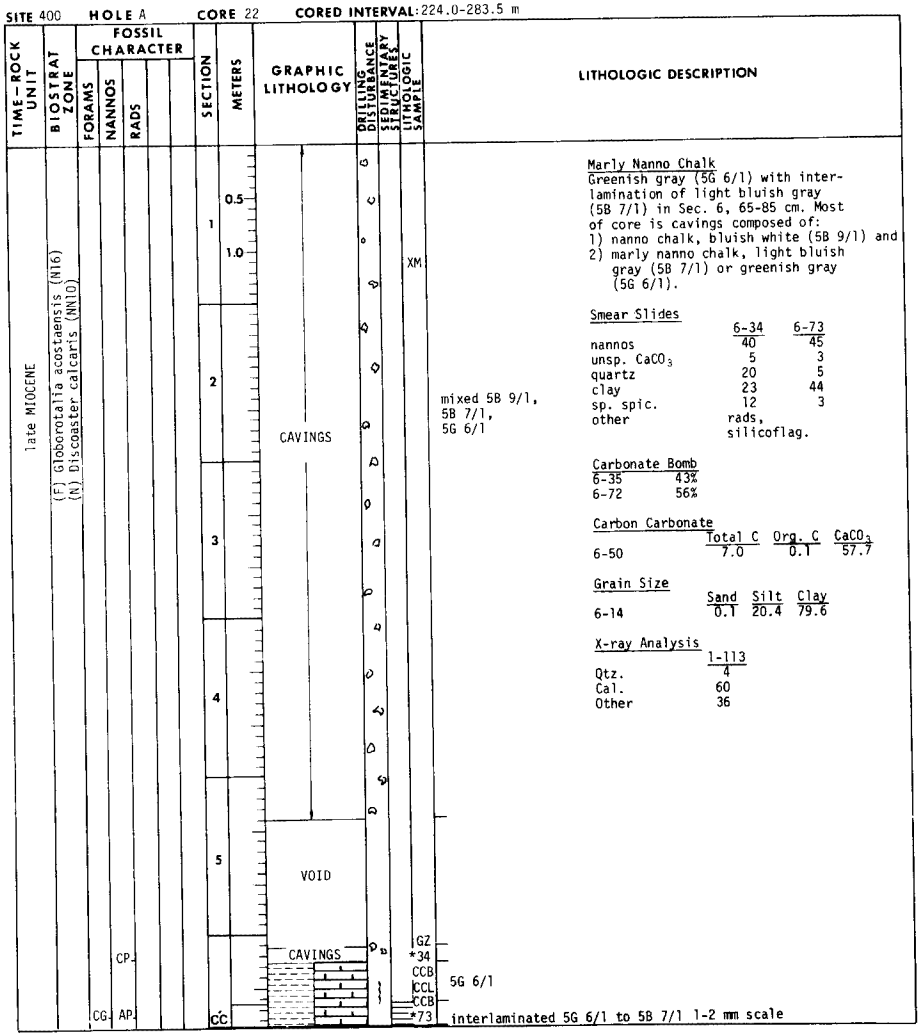
Grain Size

	Sand	Silt	Clay
4-90	0.2	23.1	76.7

X-ray Analysis

	4-63
Qtz.	6
Cal.	47
Other	47

SITE 400 HOLE A CORE 22 CORED INTERVAL: 224.0-283.5 m



Marly Nanno Chalk
Greenish gray (5G 6/1) with interlamination of light bluish gray (5B 7/1) in Sec. 6, 65-85 cm. Most of core is cavings composed of:
1) nanno chalk, bluish white (5B 9/1) and
2) marly nanno chalk, light bluish gray (5B 7/1) or greenish gray (5G 6/1).

Smear Slides

	6-34	6-73
nannos	40	45
unsp. $CaCO_3$	5	3
quartz	20	5
clay	23	44
sp. spic.	12	3
other	rads, silicoflag.	

Carbonate Bomb

6-35	43%
6-72	56%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
6-50	7.0	0.1	57.7

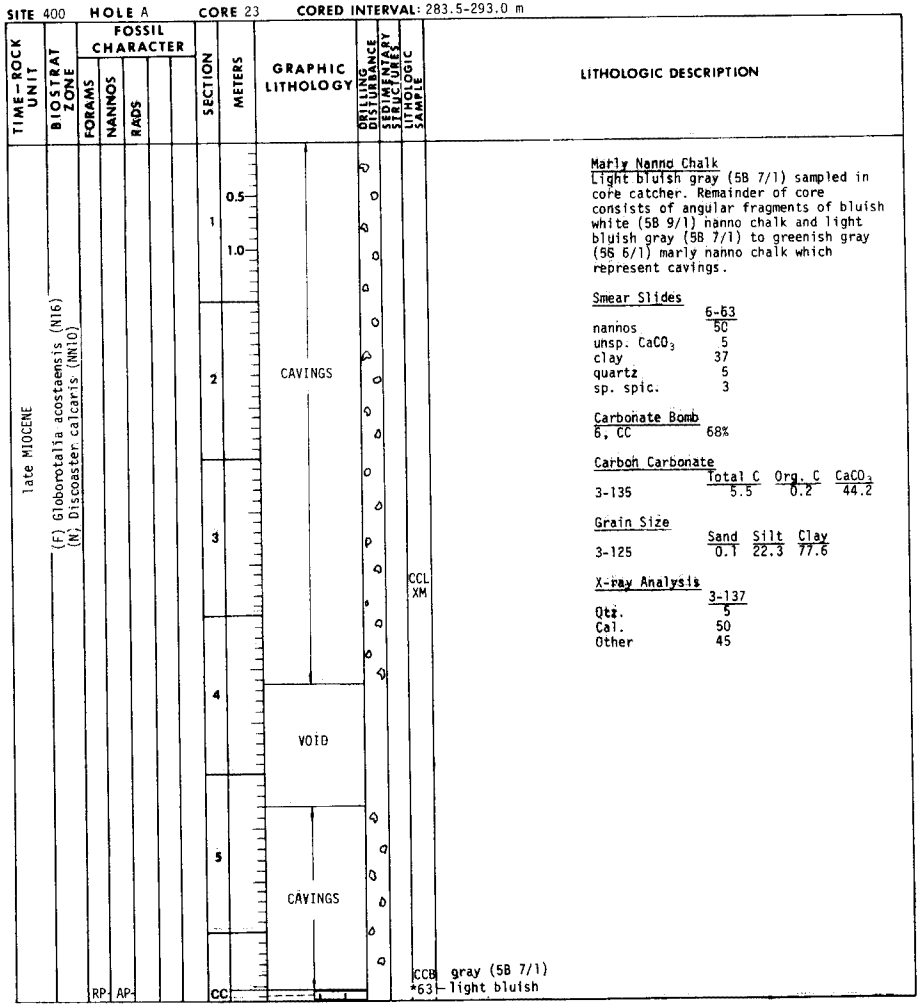
Grain Size

	Sand	Silt	Clay
6-14	0.1	20.4	79.6

X-ray Analysis

	1-113
Qtz.	4
Cal.	60
Other	36

SITE 400 HOLE A CORE 23 CORED INTERVAL: 283.5-293.0 m



Marly Nanno Chalk
Light bluish gray (5B 7/1) sampled in core catcher. Remainder of core consists of angular fragments of bluish white (5B 9/1) nanno chalk and light bluish gray (5B 7/1) to greenish gray (5G 6/1) marly nanno chalk which represent cavings.

Smear Slides

	6-63
nannos	50
unsp. $CaCO_3$	5
clay	37
quartz	5
sp. spic.	3

Carbonate Bomb

6, CC	68%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-135	5.5	0.2	44.2

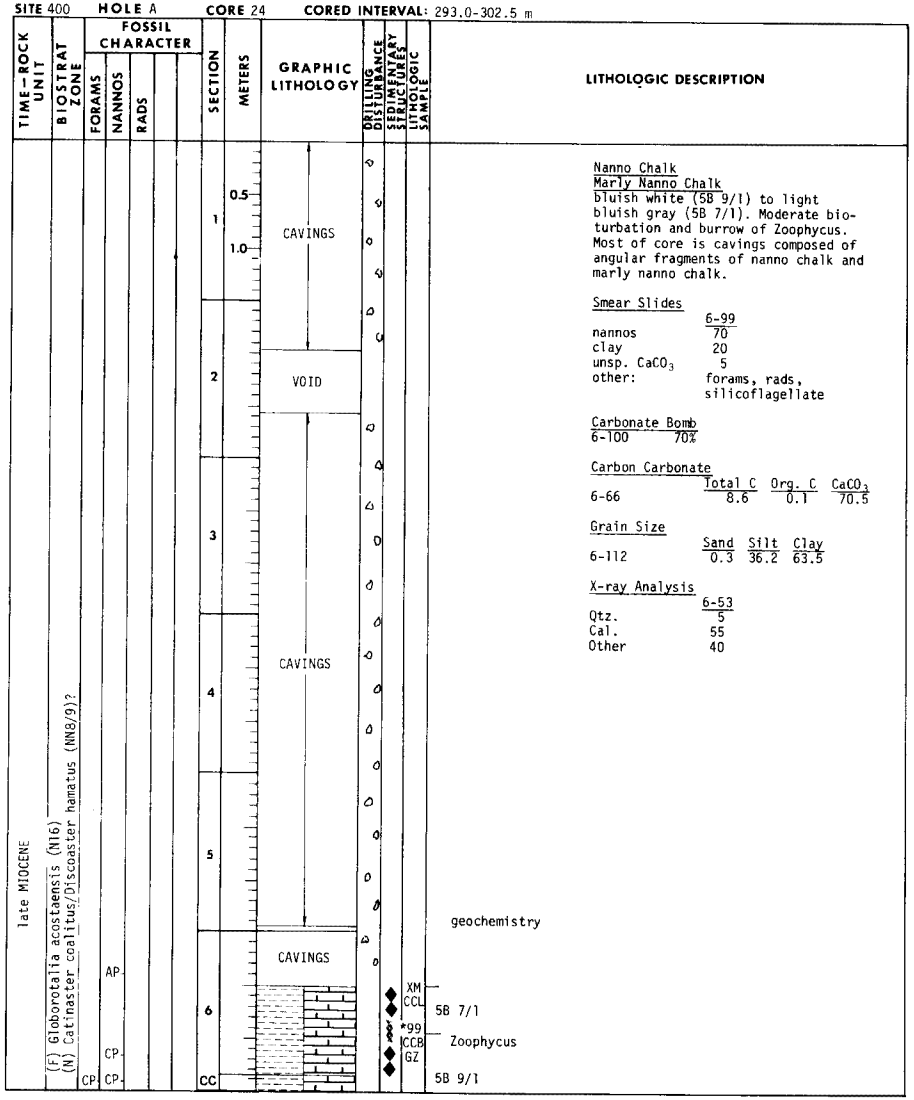
Grain Size

	Sand	Silt	Clay
3-125	0.1	22.3	77.6

X-ray Analysis

	3-137
Qtz.	5
Cal.	50
Other	45

SITE 400 HOLE A CORE 24 CORED INTERVAL: 293.0-302.5 m



Nanno Chalk
Marly Nanno Chalk
bluish white (5B 9/1) to light bluish gray (5B 7/1). Moderate bioturbation and burrow of Zoophycus. Most of core is cavings composed of angular fragments of nanno chalk and marly nanno chalk.

Smear Slides

	6-99
nannos	70
clay	20
unsp. $CaCO_3$	5
other:	forams, rads, silicoflagellate

Carbonate Bomb

6-100	70%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
6-66	8.6	0.1	70.5

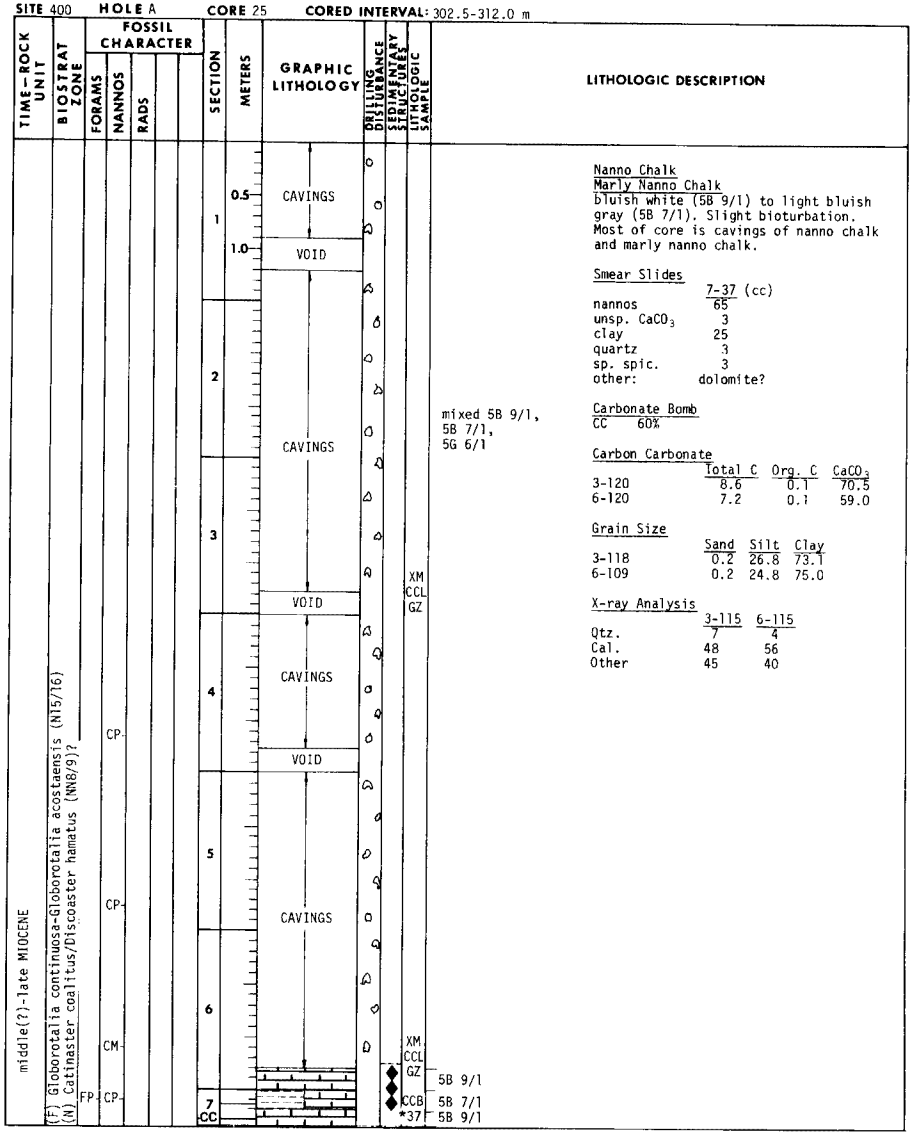
Grain Size

	Sand	Silt	Clay
6-112	0.3	36.2	63.5

X-ray Analysis

	6-53
Qtz.	5
Cal.	55
Other	40

SITE 400 HOLE A CORE 25 CORED INTERVAL: 302.5-312.0 m



Nanno Chalk
Marly Nanno Chalk
bluish white (5B 9/1) to light bluish gray (5B 7/1). Slight bioturbation. Most of core is cavings of nanno chalk and marly nanno chalk.

Smear Slides

	7-37 (cc)
nannos	65
unsp. $CaCO_3$	3
clay	25
quartz	3
sp. spic.	3
other:	dolomite?

Carbonate Bomb

CC	60%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-120	8.6	0.1	70.5
6-120	7.2	0.1	59.0

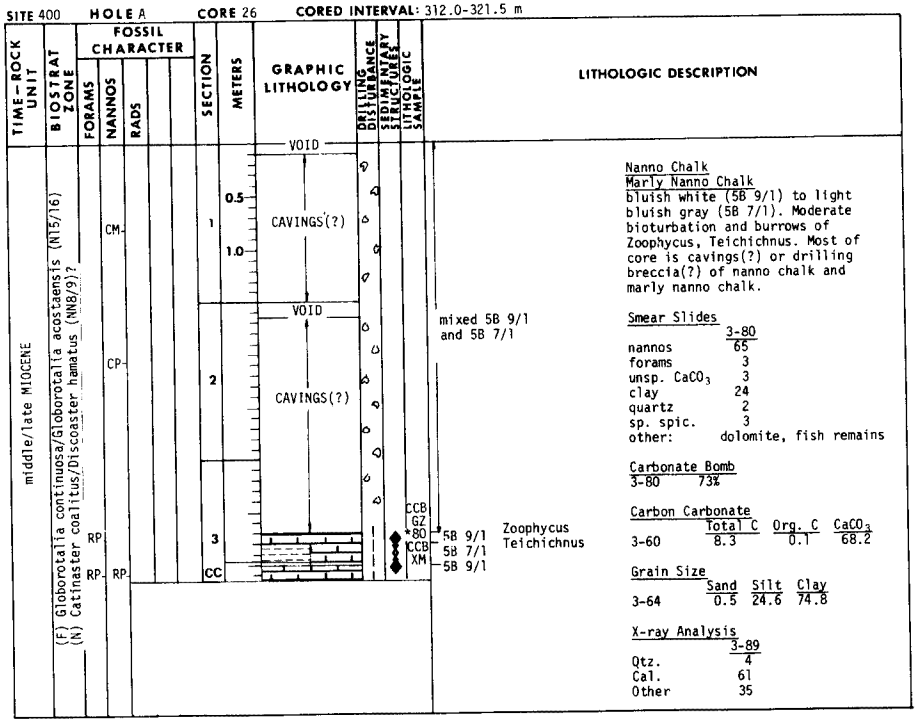
Grain Size

	Sand	Silt	Clay
3-118	0.2	26.8	73.1
6-109	0.2	24.8	75.0

X-ray Analysis

	3-115	6-115
Qtz.	7	4
Cal.	48	56
Other	45	40

SITE 400 HOLE A CORE 26 CORED INTERVAL: 312.0-321.5 m



Nanno Chalk
Marly Nanno Chalk
bluish white (5B 9/1) to light bluish gray (5B 7/1). Moderate bioturbation and burrows of Zoophycus, Teichichnus. Most of core is cavings(?) or drilling breccia(?) of nanno chalk and marly nanno chalk.

Smear Slides

	3-80
nannos	65
forams	3
unsp. $CaCO_3$	3
clay	24
quartz	2
sp. spic.	3
other:	dolomite, fish remains

Carbonate Bomb

3-80	73%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-60	8.3	0.1	68.2

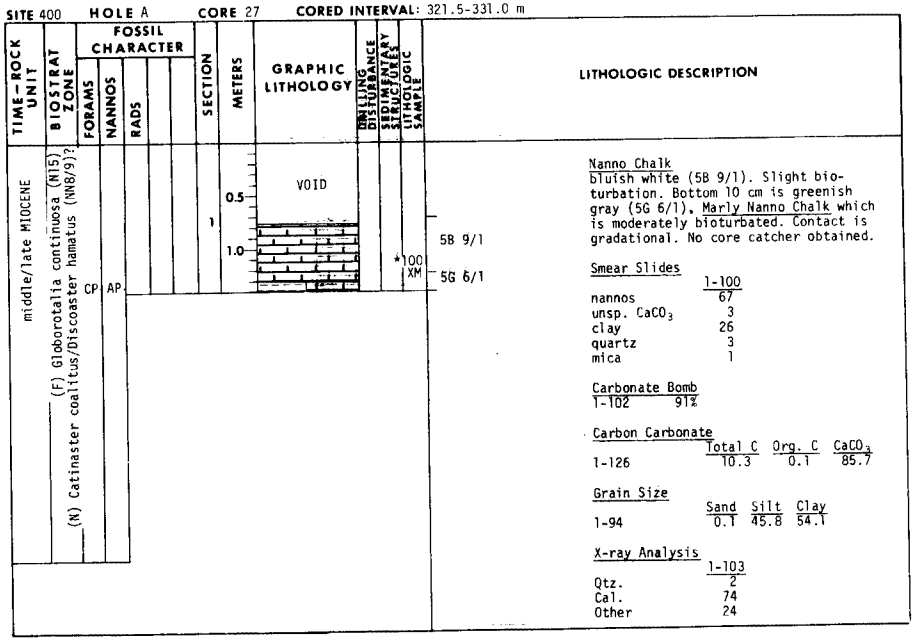
Grain Size

	Sand	Silt	Clay
3-64	0.5	24.6	74.8

X-ray Analysis

	3-89
Qtz.	4
Cal.	61
Other	35

SITE 400 HOLE A CORE 27 CORED INTERVAL: 321.5-331.0 m



Nanno Chalk
bluish white (5B 9/1). Slight bioturbation. Bottom 10 cm is greenish gray (5G 6/1), Marly Nanno Chalk which is moderately bioturbated. Contact is gradational. No core catcher obtained.

Smear Slides

	1-100
nannos	67
unsp. $CaCO_3$	3
clay	26
quartz	3
mica	1

Carbonate Bomb

1-102	91%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-126	10.3	0.1	85.7

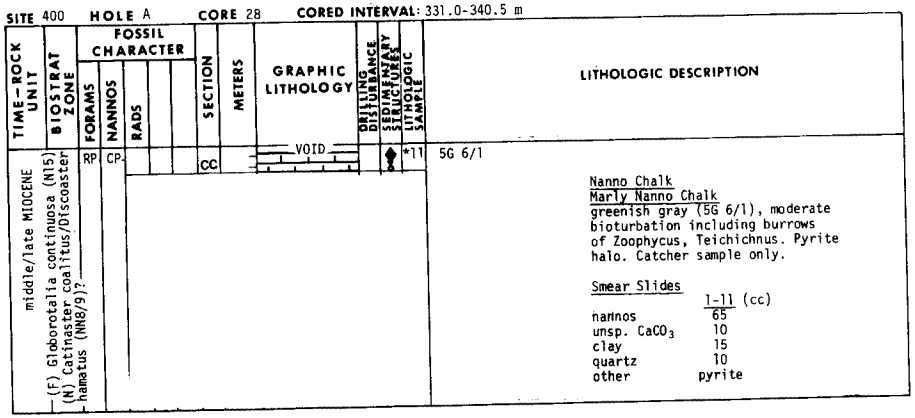
Grain Size

	Sand	Silt	Clay
1-94	0.1	45.8	54.1

X-ray Analysis

	1-103
Qtz.	2
Cal.	74
Other	24

SITE 400 HOLE A CORE 28 CORED INTERVAL: 331.0-340.5 m

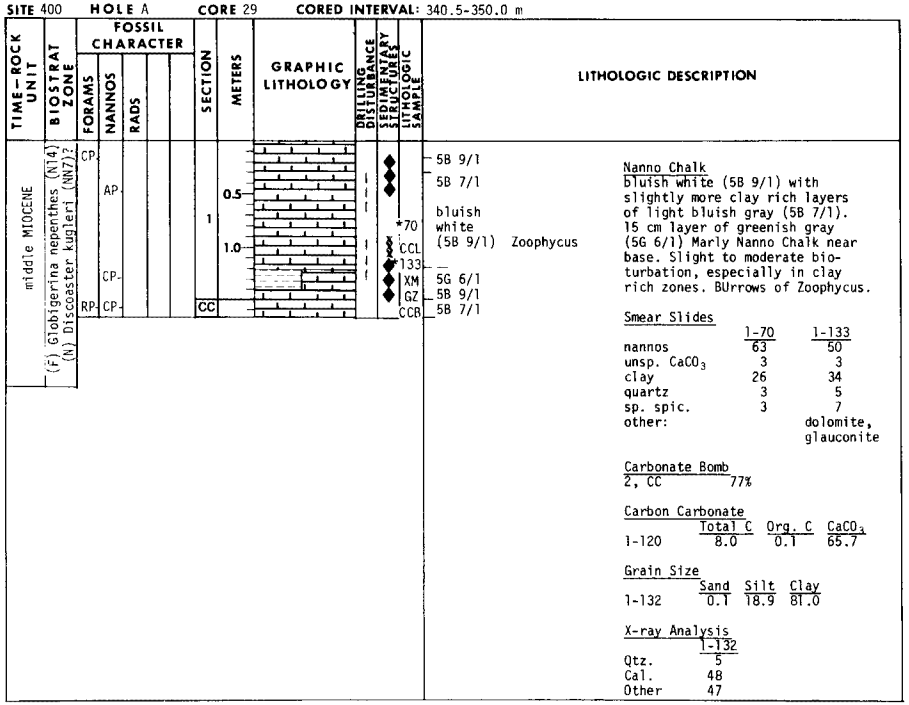


Nanno Chalk
Marly Nanno Chalk
greenish gray (5G 6/1), moderate bioturbation including burrows of Zoophycus, Teichichnus. Pyrite halo. Catcher sample only.

Smear Slides

	1-11 (cc)
nannos	65
unsp. $CaCO_3$	10
clay	15
quartz	10
other	pyrite

SITE 400 HOLE A CORE 29 CORED INTERVAL: 340.5-350.0 m



Nanno Chalk
bluish white (5B 9/1) with slightly more clay rich layers of light bluish gray (5B 7/1). 15 cm layer of greenish gray (5G 6/1) Marly Nanno Chalk near base. Slight to moderate bioturbation, especially in clay rich zones. BUrrows of Zoophycus.

Smear Slides

	1-70	1-133
nannos	63	50
unsp. $CaCO_3$	3	3
clay	26	34
quartz	3	5
sp. spic.	3	7
other:		dolomite, glauconite

Carbonate Bomb

2, CC	77%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-120	8.0	0.1	65.7

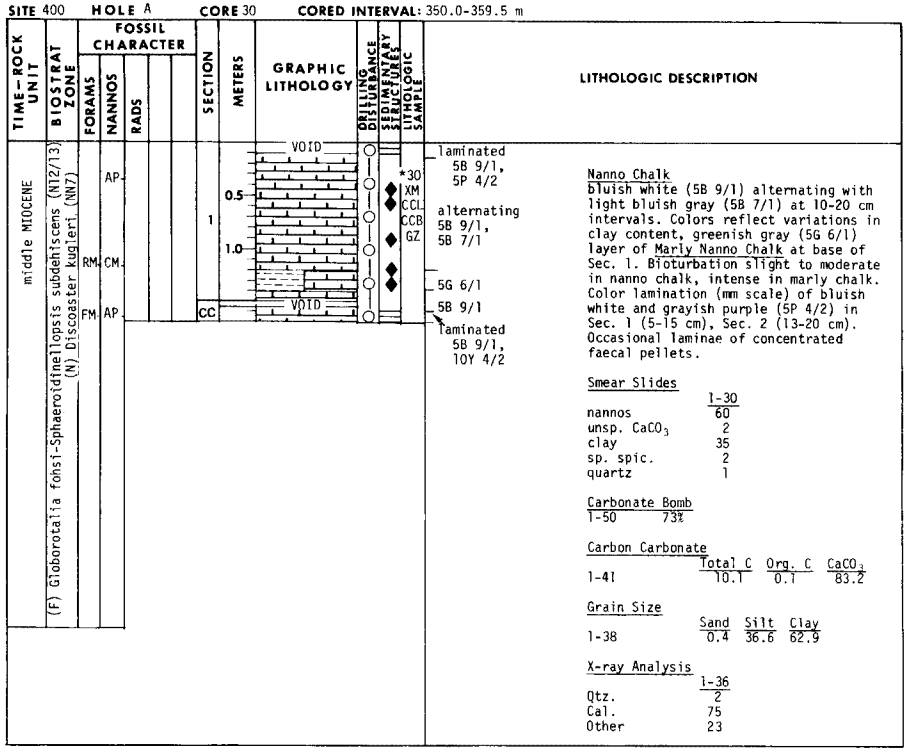
Grain Size

	Sand	Silt	Clay
1-132	0.1	18.9	81.0

X-ray Analysis

	1-132
Qtz.	5
Cal.	48
Other	47

SITE 400 HOLE A CORE 30 CORED INTERVAL: 350.0-359.5 m



Nanno Chalk
bluish white (5B 9/1) alternating with light bluish gray (5B 7/1) at 10-20 cm intervals. Colors reflect variations in clay content, greenish gray (5G 6/1) layer of Marly Nanno Chalk at base of Sec. 1. Bioturbation slight to moderate in nanno chalk, intense in marly chalk. Color lamination (mm scale) of bluish white and grayish purple (5P 4/2) in Sec. 1 (5-15 cm), Sec. 2 (13-20 cm). Occasional laminae of concentrated faecal pellets.

Smear Slides

	1-30
nannos	60
unsp. $CaCO_3$	2
clay	35
sp. spic.	2
quartz	1

Carbonate Bomb

1-50	73%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-41	10.1	0.1	83.2

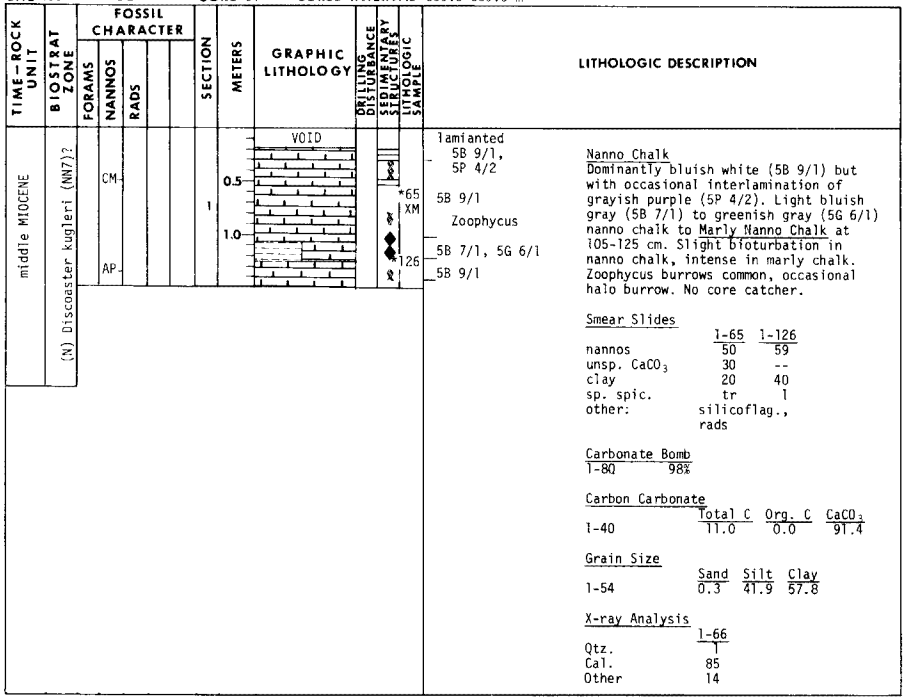
Grain Size

	Sand	Silt	Clay
1-38	0.4	36.6	62.9

X-ray Analysis

	1-36
Qtz.	2
Cal.	75
Other	23

SITE 400 HOLE A CORE 31 CORED INTERVAL: 359.5-369.0 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
Dominantly bluish white (5B 9/1) but with occasional interlamination of grayish purple (5P 4/2). Light bluish gray (5B 7/1) to greenish gray (5G 6/1) nanno chalk to Marly Nanno Chalk at 105-125 cm. Slight bioturbation in nanno chalk, intense in marly chalk. Zoophycus burrows common, occasional halo burrow. No core catcher.

Smear Slides

	1-65	1-126
nannos	50	59
unsp. $CaCO_3$	30	--
clay	20	40
sp. spic.	tr	1
other:	silicoflag., rads	

Carbonate Bomb

1-80	98%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-40	11.0	0.0	91.4

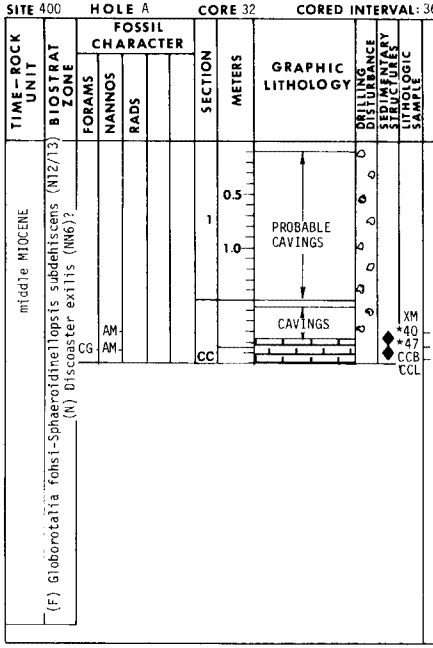
Grain Size

	Sand	Silt	Clay
1-54	0.3	41.9	57.8

X-ray Analysis

	1-66
Qtz.	1
Cal.	85
Other	14

SITE 400 HOLE A CORE 32 CORED INTERVAL: 369.0-378.5 m



Nanno Chalk
bluish white (5B 9/1, 5B 7/1) with greenish gray (5G 6/1) marly clay rich layer in bottom 10 cm. Slight to moderate bioturbation. Cavings includes nanno chalk, marly nanno chalk, clay and abundant rust.

Smear Slides

	2-40	2-47
nannos	60	70
clay	29	23
quartz	3	3
sp. spic.	3	3
unsp. $CaCO_3$	5	1
other	forams	diatoms

Carbonate Bomb

2-45 (cc)	91%
2-55 (cc)	83%

Carbon Carbonate

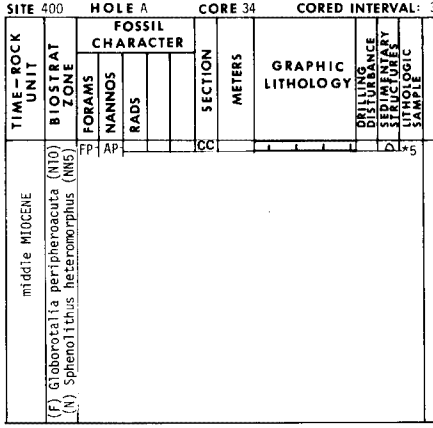
	Total C	Org. C	$CaCO_3$
2-51 (cc)	8.9	0.1	73.7

X-ray Analysis

	2-36
Qtz.	3
Cal.	70
Other	27

Site 400, Hole A, Core 33, 378.5-388.0 m: NO RECOVERY

SITE 400 HOLE A CORE 34 CORED INTERVAL: 388.0-397.5 m

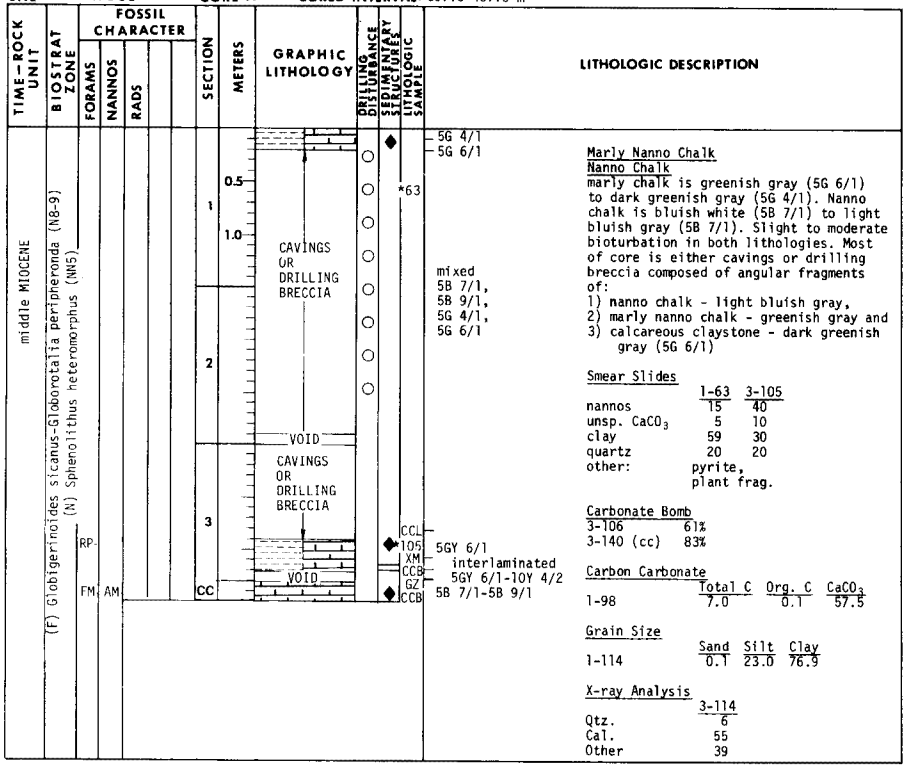


Nanno Chalk
greenish gray (5G 6/1); moderate bioturbation. Catcher sample only.

Smear Slides

	1-5 (cc)
nannos	79
clay	20
unsp. $CaCO_3$	1
quartz	tr
pyrite	tr

SITE 400 HOLE A CORE 35 CORED INTERVAL: 397.5-407.0 m



Marly Nanno Chalk
Nanno Chalk
marly chalk is greenish gray (5G 6/1) to dark greenish gray (5G 4/1). Nanno chalk is bluish white (5B 7/1) to light bluish gray (5B 7/1). Slight to moderate bioturbation in both lithologies. Most of core is either cavings or drilling breccia composed of angular fragments of:
1) nanno chalk - light bluish gray,
2) marly nanno chalk - greenish gray and
3) calcareous claystone - dark greenish gray (5G 6/1)

Smear Slides

	1-63	3-105
nannos	15	40
unsp. $CaCO_3$	5	10
clay	59	30
quartz	20	20
other:	pyrite, plant frag.	

Carbonate Bomb

3-106	61%
3-140 (cc)	83%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-98	7.0	0.1	57.5

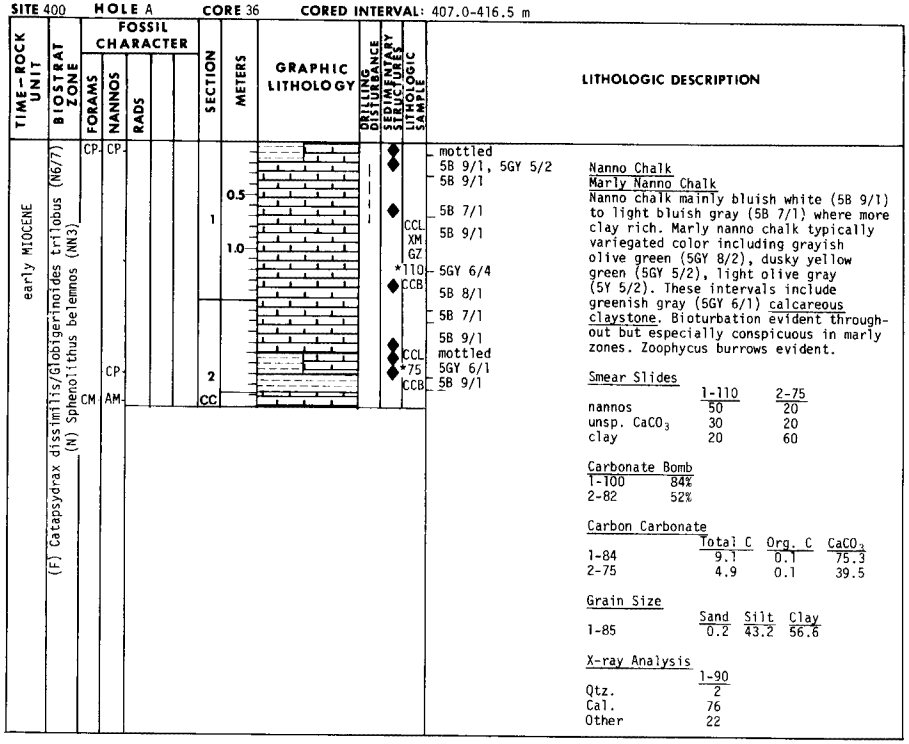
Grain Size

	Sand	Silt	Clay
1-114	0.1	23.0	76.9

X-ray Analysis

	3-114
Qtz.	6
Cal.	55
Other	39

SITE 400 HOLE A CORE 36 CORED INTERVAL: 407.0-416.5 m



Nanno Chalk
Marly Nanno Chalk
Nanno chalk mainly bluish white (5B 9/1) to light bluish gray (5B 7/1) where more clay rich. Marly nanno chalk typically variegated color including grayish olive green (5GY 8/2), dusky yellow green (5GY 5/2), light olive gray (5Y 5/2). These intervals include greenish gray (5GY 6/1) calcareous claystone. Bioturbation evident throughout but especially conspicuous in marly zones. Zoophycus burrows evident.

Smear Slides

	1-110	2-75
nannos	50	20
unsp. $CaCO_3$	30	20
clay	20	60

Carbonate Bomb

1-100	84%
2-82	52%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-84	9.1	0.1	75.3
2-75	4.9	0.1	39.5

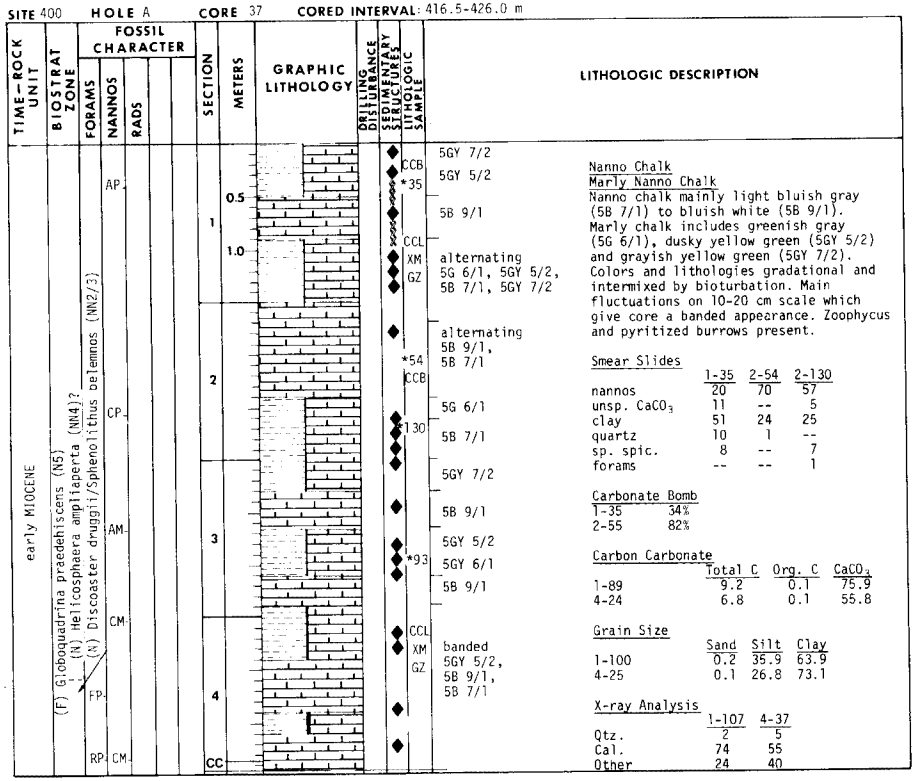
Grain Size

	Sand	Silt	Clay
1-85	0.2	43.2	56.6

X-ray Analysis

	1-90
Qtz.	2
Cal.	76
Other	22

SITE 400 HOLE A CORE 37 CORED INTERVAL: 416.5-426.0 m



Nanno Chalk
Marly Nanno Chalk
Nanno chalk mainly light bluish gray (5B 7/1) to bluish white (5B 9/1). Marly chalk includes greenish gray (5G 6/1), dusky yellow green (5GY 5/2) and grayish yellow green (5GY 7/2). Colors and lithologies gradational and intermixed by bioturbation. Main fluctuations on 10-20 cm scale which give core a banded appearance. Zoophycus and pyritized burrows present.

Smear Slides

	1-35	2-54	2-130
nannos	20	70	57
unsp. $CaCO_3$	11	--	5
clay	51	24	25
quartz	10	1	--
sp. spic.	8	--	7
forams	--	--	1

Carbonate Bomb

1-35	34%
2-55	82%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-89	9.2	0.1	75.9
4-24	6.8	0.1	55.8

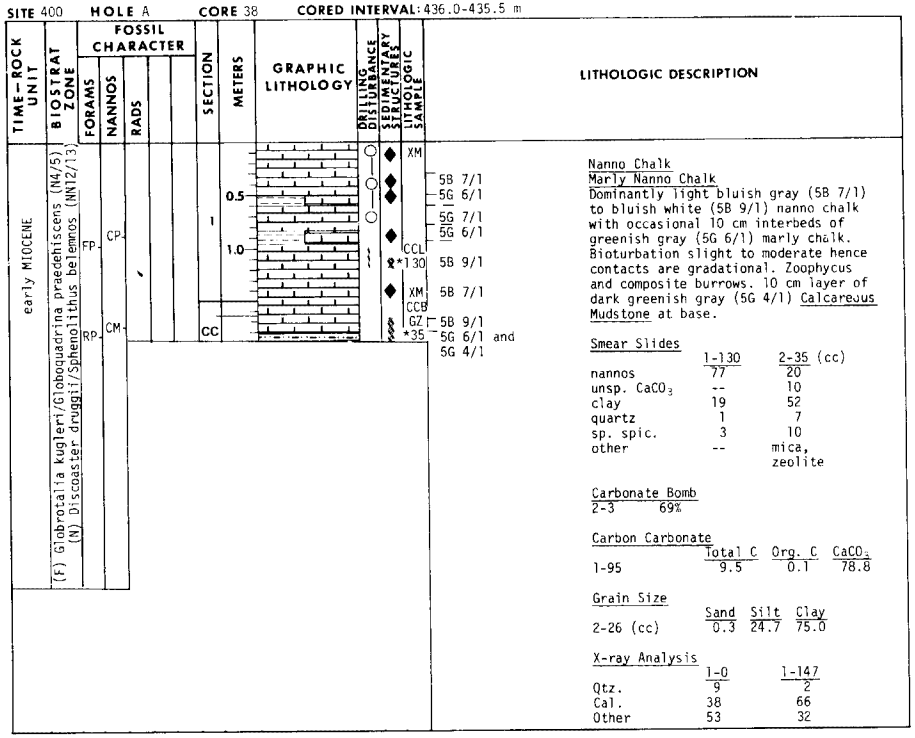
Grain Size

	Sand	Silt	Clay
1-100	0.2	35.9	63.9
4-25	0.1	26.8	73.1

X-ray Analysis

	1-107	4-37
Qtz.	2	5
Cal.	74	55
Other	24	40

SITE 400 HOLE A CORE 38 CORED INTERVAL: 436.0-435.5 m



Nanno Chalk
Marly Nanno Chalk
Dominantly light bluish gray (5B 7/1) to bluish white (5B 9/1) nanno chalk with occasional 10 cm interbeds of greenish gray (5G 6/1) marly chalk. Bioturbation slight to moderate hence contacts are gradational. Zoophycus and composite burrows. 10 cm layer of dark greenish gray (5G 4/1) Calcareous Mudstone at base.

Smear Slides

	1-130	2-35 (cc)
nannos	77	20
unsp. $CaCO_3$	--	10
clay	19	52
quartz	1	7
sp. spic.	3	10
other	--	mica, zeolite

Carbonate Bomb

2-3	69%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-95	9.5	0.1	78.8

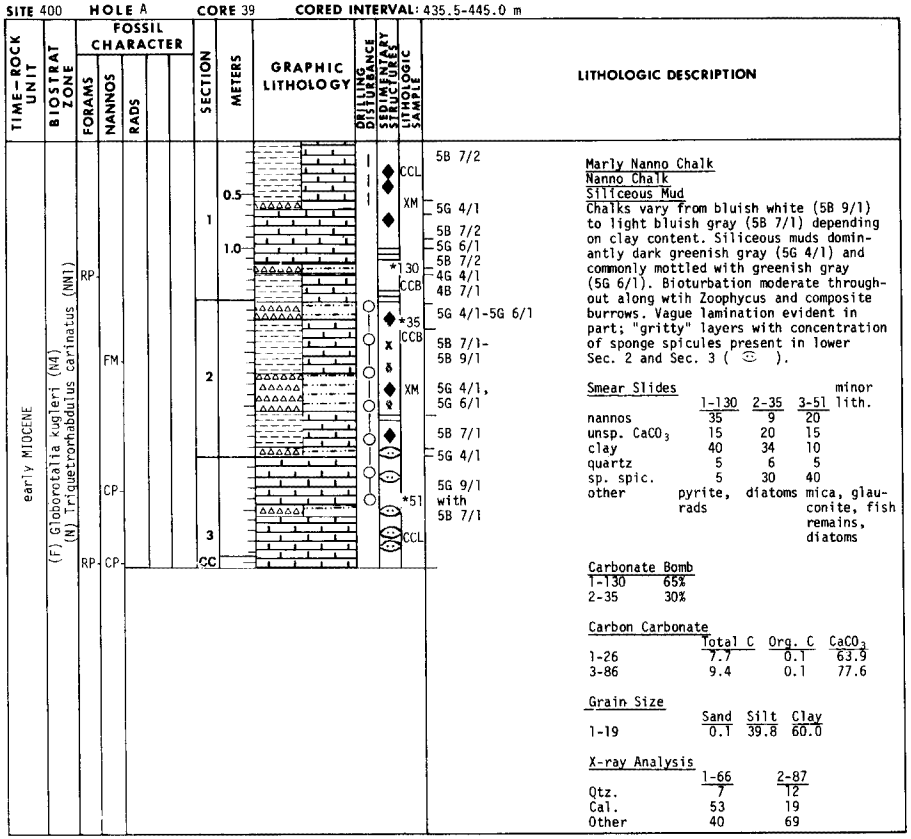
Grain Size

	Sand	Silt	Clay
2-26 (cc)	0.3	24.7	75.0

X-ray Analysis

	1-0	1-147
Qtz.	9	2
Cal.	38	66
Other	53	32

SITE 400 HOLE A CORE 39 CORED INTERVAL: 435.5-445.0 m



Marly Nanno Chalk
Nanno Chalk
Siliceous Mud

Chalks vary from bluish white (5B 9/1) to light bluish gray (5B 7/1) depending on clay content. Siliceous muds dominantly dark greenish gray (5G 4/1) and commonly mottled with greenish gray (5G 6/1). Bioturbation moderate throughout along wtih Zoophycus and composite burrows. Vague lamination evident in part; "gritty" layers with concentration of sponge spicules present in lower Sec. 2 and Sec. 3 (⊙).

Smear Slides

	1-130	2-35	3-51	minor lith.
nannos	35	9	20	
unsp. $CaCO_3$	15	20	15	
clay	40	34	10	
quartz	5	6	5	
sp. spic.	5	30	40	
other	pyrite, rads	diatoms	mica, glauconite, fish remains, diatoms	

Carbonate Bomb

1-130	65%
2-35	30%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-26	7.7	0.1	63.9
3-86	9.4	0.1	77.6

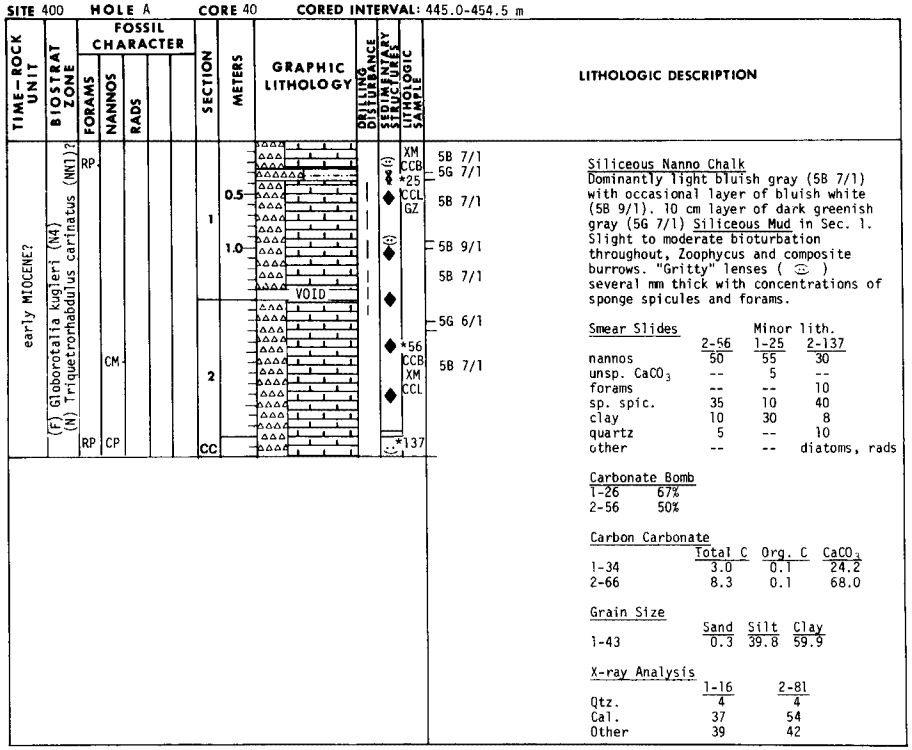
Grain Size

	Sand	Silt	Clay
1-19	0.1	39.8	60.0

X-ray Analysis

	1-66	2-87
Qtz.	7	12
Cal.	53	19
Other	40	69

SITE 400 HOLE A CORE 40 CORED INTERVAL: 445.0-454.5 m



Siliceous Nanno Chalk

Dominantly light bluish gray (5B 7/1) with occasional layer of bluish white (5B 9/1). 10 cm layer of dark greenish gray (5G 7/1) Siliceous Mud in Sec. 1. Slight to moderate bioturbation throughout, Zoophycus and composite burrows. "Gritty" lenses (⊙) several mm thick with concentrations of sponge spicules and forams.

Smear Slides

	2-56	Minor lith. 1-25	2-137
nannos	50	55	30
unsp. $CaCO_3$	--	5	--
forams	--	--	10
sp. spic.	35	10	40
clay	10	30	8
quartz	5	--	10
other	--	--	diatoms, rads

Carbonate Bomb

1-26	67%
2-56	50%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-34	3.0	0.1	24.2
2-66	8.3	0.1	68.0

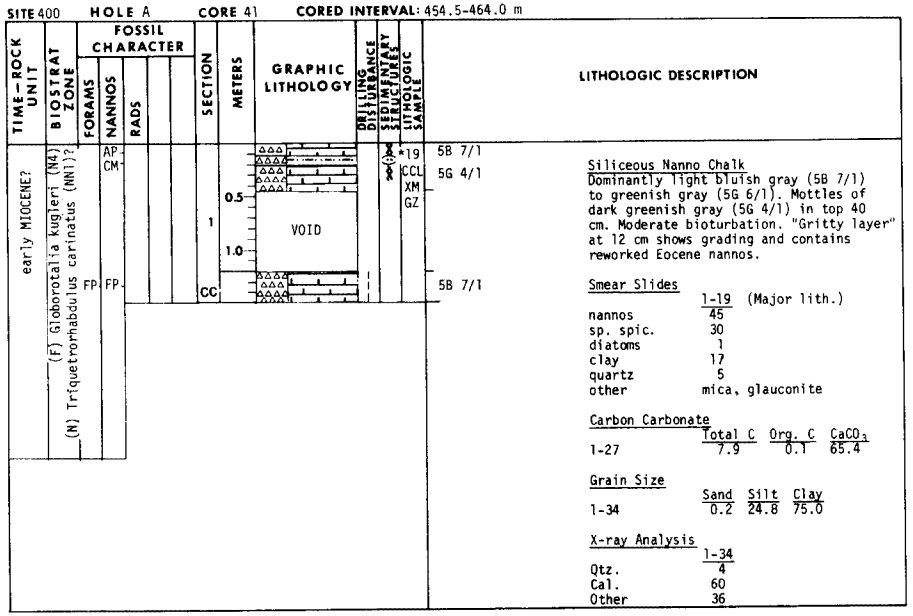
Grain Size

	Sand	Silt	Clay
1-43	0.3	39.8	59.9

X-ray Analysis

	1-16	2-81
Qtz.	4	4
Cal.	37	54
Other	39	42

SITE 400 HOLE A CORE 41 CORED INTERVAL: 454.5-464.0 m



Siliceous Nanno Chalk

Dominantly light bluish gray (5B 7/1) to greenish gray (5G 6/1). Mottles of dark greenish gray (5G 4/1) in top 40 cm. Moderate bioturbation. "Gritty layer" at 12 cm shows grading and contains reworked Eocene nannos.

Smear Slides

	1-19 (Major lith.)
nannos	45
sp. spic.	30
diatoms	1
clay	17
quartz	5
other	mica, glauconite

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-27	7.9	0.1	65.4

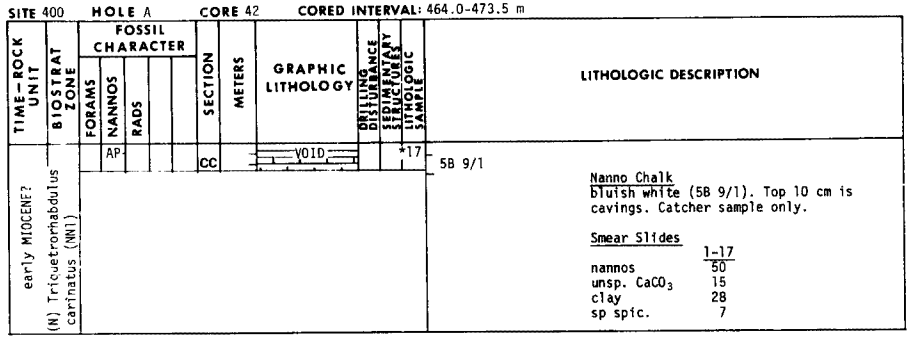
Grain Size

	Sand	Silt	Clay
1-34	0.2	24.8	75.0

X-ray Analysis

	1-34
Qtz.	4
Cal.	60
Other	36

SITE 400 HOLE A CORE 42 CORED INTERVAL: 464.0-473.5 m



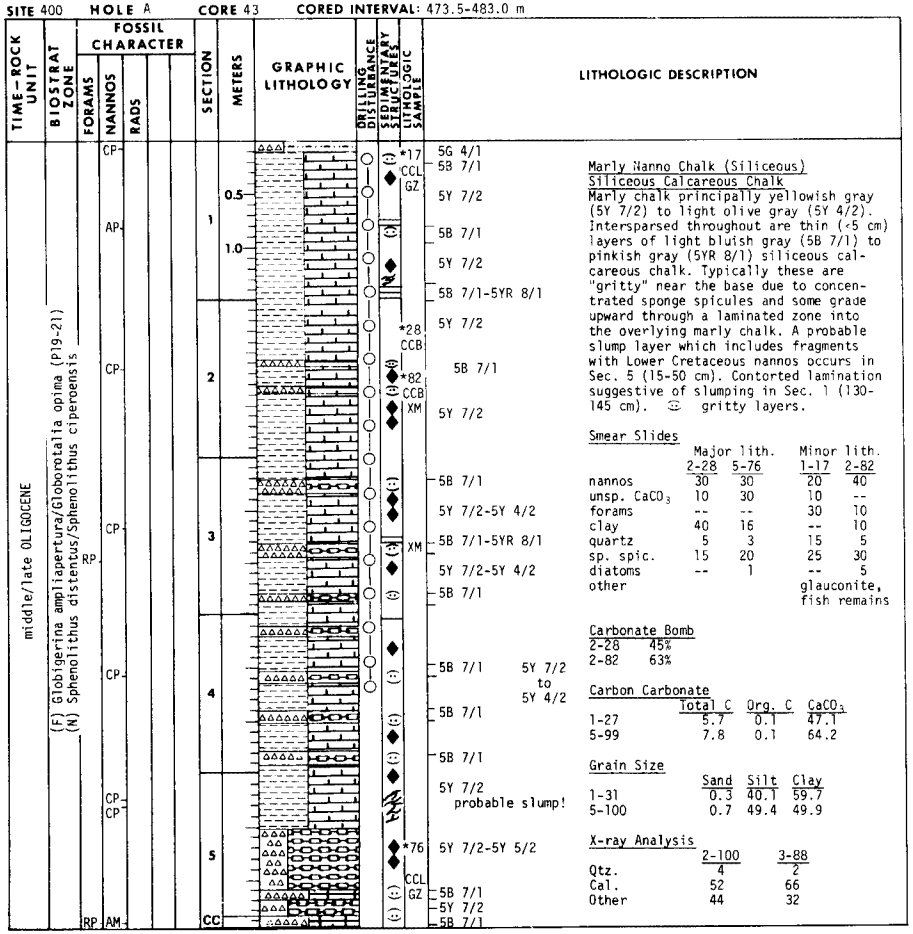
Nanno Chalk

bluish white (5B 9/1). Top 10 cm is cavings. Catcher sample only.

Smear Slides

	1-17
nannos	50
unsp. $CaCO_3$	15
clay	28
sp spic.	7

SITE 400 HOLE A CORE 43 CORED INTERVAL: 473.5-483.0 m



Marly Nanno Chalk (Siliceous)
Siliceous Calcareous Chalk

Marly chalk principally yellowish gray (5Y 7/2) to light olive gray (5Y 4/2). Interspersed throughout are thin (<5 cm) layers of light bluish gray (5B 7/1) to pinkish gray (5YR 8/1) siliceous calcareous chalk. Typically these are "gritty" near the base due to concentrated sponge spicules and some grade upward through a laminated zone into the overlying marly chalk. A probable slump layer which includes fragments with Lower Cretaceous nannos occurs in Sec. 5 (15-50 cm). Contorted lamination suggestive of slumping in Sec. 1 (130-145 cm). ⊜ gritty layers.

Smear Slides

	Major lith. 2-28	Major lith. 5-76	Minor lith. 1-17	Minor lith. 2-82
nannos	30	30	20	40
unsp. $CaCO_3$	10	30	10	--
forams	--	--	30	10
clay	40	16	--	10
quartz	5	3	15	5
sp. spic.	15	20	25	30
diatoms	--	1	--	5
other			glauconite, fish remains	

Carbonate Bomb

2-28	45%
2-82	63%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-27	5.7	0.1	47.1
5-99	7.8	0.1	64.2

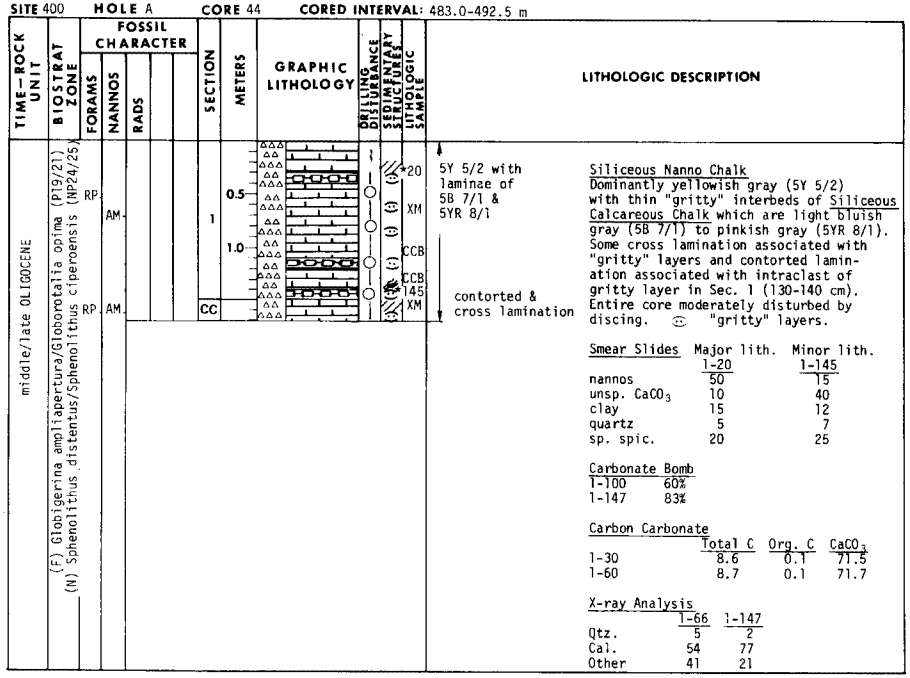
Grain Size

	Sand	Silt	Clay
1-31	0.3	40.1	59.7
5-100	0.7	49.4	49.9

X-ray Analysis

	2-100	3-88
Qtz.	4	2
Cal.	52	66
Other	44	32

SITE 400 HOLE A CORE 44 CORED INTERVAL: 483.0-492.5 m



LITHOLOGIC DESCRIPTION

Siliceous Nanno Chalk
Dominantly yellowish gray (5Y 5/2) with thin "gritty" interbeds of Siliceous Calcareous Chalk which are light bluish gray (5B 7/1) to pinkish gray (5YR 8/1). Some cross lamination associated with "gritty" layers and contorted lamination associated with intraclast of gritty layer in Sec. 1 (130-140 cm). Entire core moderately disturbed by discing. ⊙ "gritty" layers.

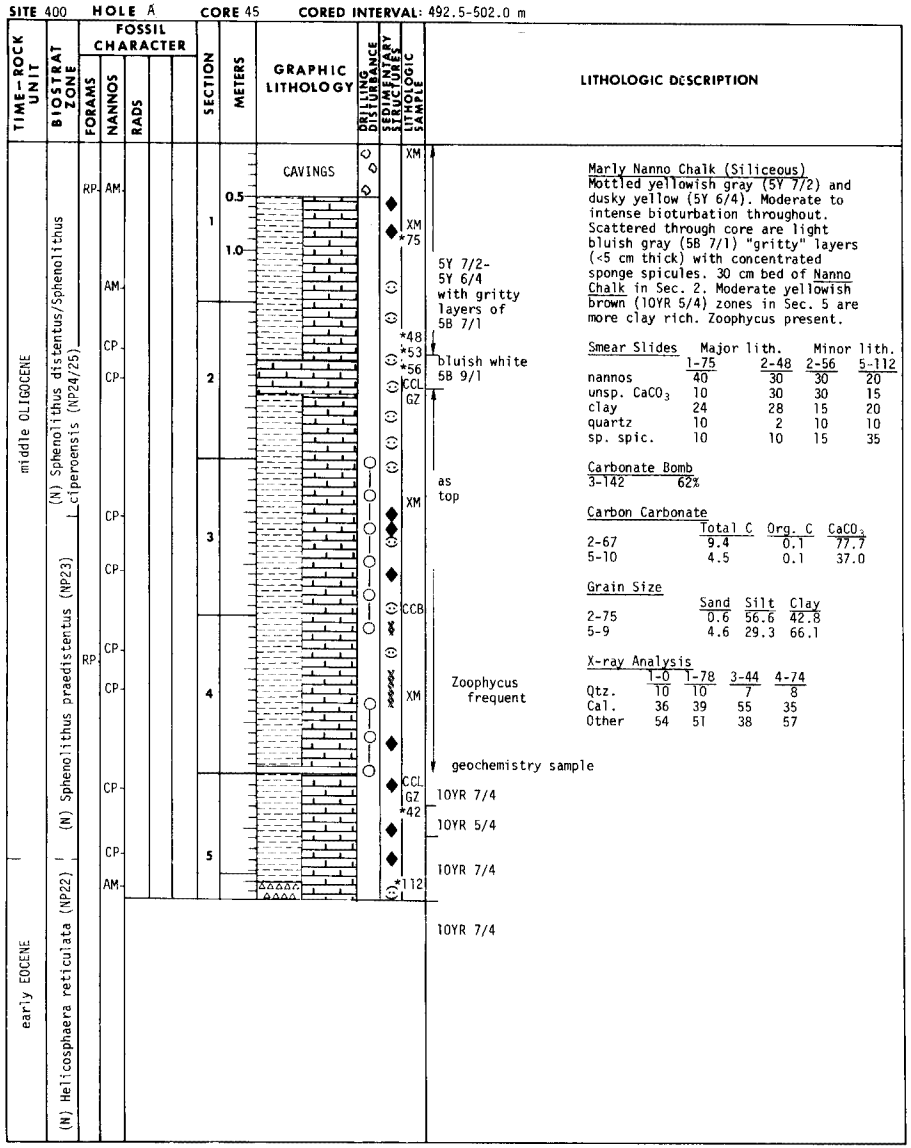
Smear Slides	Major lith. 1-20	Minor lith. 1-145
nannos	50	15
unsp. $CaCO_3$	10	40
clay	15	12
quartz	5	7
sp. spic.	20	25

Carbonate Bomb	
1-100	60%
1-147	83%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-30	8.6	0.1	71.5
1-60	8.7	0.1	71.7

X-ray Analysis	1-66	1-147
Qtz.	5	2
Cal.	54	77
Other	41	21

SITE 400 HOLE A CORE 45 CORED INTERVAL: 492.5-502.0 m



LITHOLOGIC DESCRIPTION

Marly Nanno Chalk (Siliceous)
Mottled yellowish gray (5Y 7/2) and dusky yellow (5Y 6/4). Moderate to intense bioturbation throughout. Scattered through core are light bluish gray (5B 7/1) "gritty" layers (<5 cm thick) with concentrated sponge spicules. 30 cm bed of Nanno Chalk in Sec. 2. Moderate yellowish brown (10YR 5/4) zones in Sec. 5 are more clay rich. Zoophycus present.

Smear Slides	Major lith. 1-75	2-48	Minor lith. 2-56	5-112
nannos	40	30	30	20
unsp. $CaCO_3$	10	30	30	15
clay	24	28	15	20
quartz	10	2	10	10
sp. spic.	10	10	15	35

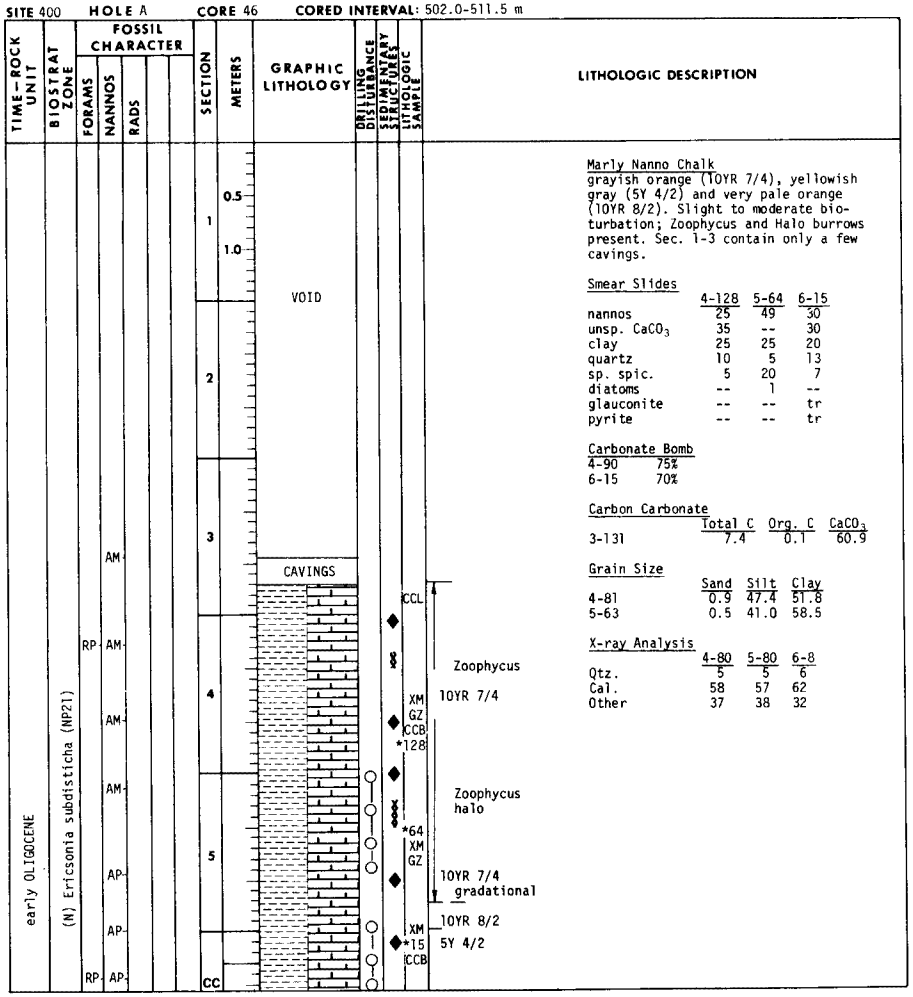
Carbonate Bomb	
3-142	62%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
2-67	9.4	0.1	77.7
5-10	4.5	0.1	37.0

Grain Size	Sand	Silt	Clay
2-75	0.6	56.6	42.8
5-9	4.6	29.3	66.1

X-ray Analysis	1-0	1-78	3-44	4-74
Qtz.	10	10	7	8
Cal.	36	39	55	35
Other	54	51	38	57

SITE 400 HOLE A CORE 46 CORED INTERVAL: 502.0-511.5 m



Marly Nanno Chalk
grayish orange (10YR 7/4), yellowish gray (5Y 4/2) and very pale orange (10YR 8/2). Slight to moderate bioturbation; Zoophycus and Halo burrows present. Sec. 1-3 contain only a few cavings.

Smear Slides

	4-128	5-64	6-15
nannos	25	49	30
unsp. $CaCO_3$	35	--	30
clay	25	25	20
quartz	10	5	13
sp. spic.	5	20	7
diatoms	--	1	--
glauconite	--	--	tr
pyrite	--	--	tr

Carbonate Bomb

4-90	75%
6-15	70%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-131	7.4	0.1	60.9

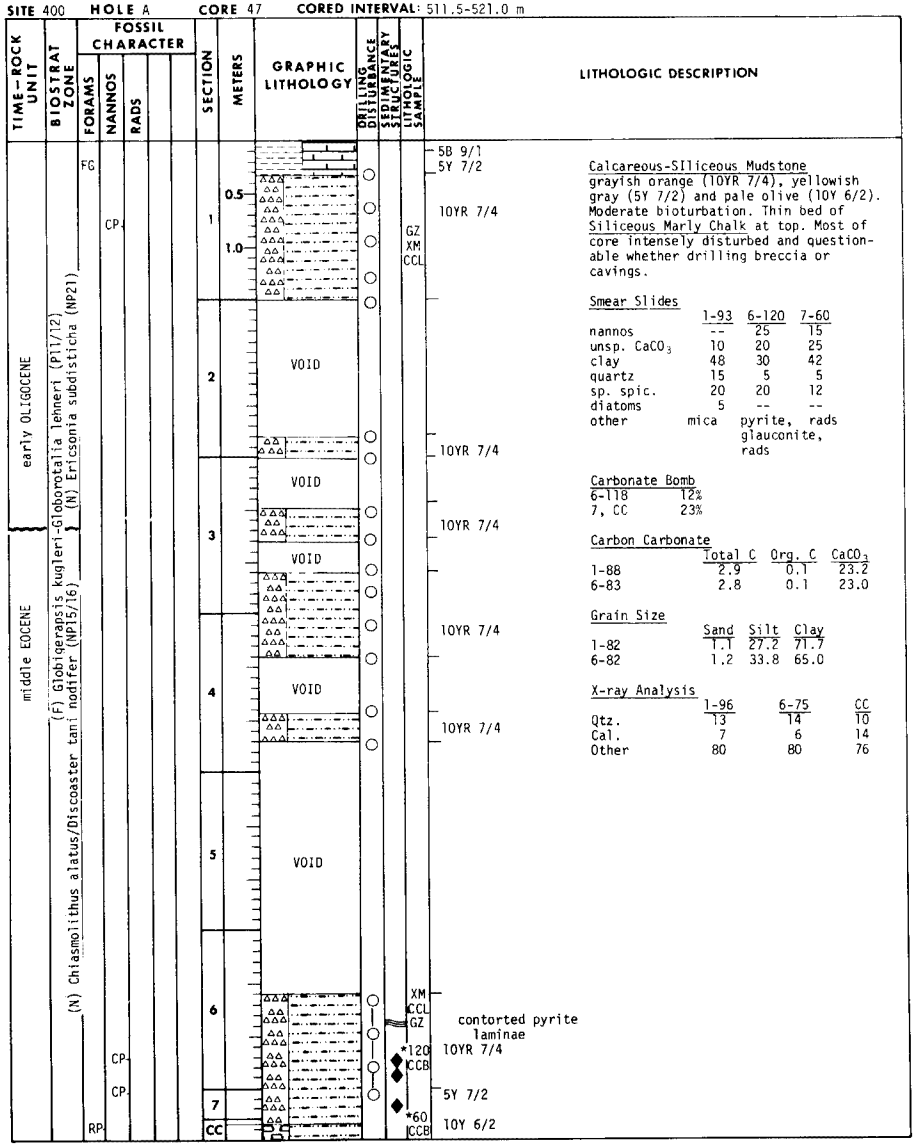
Grain Size

	Sand	Silt	Clay
4-81	0.9	47.4	51.8
5-63	0.5	41.0	58.5

X-ray Analysis

	4-80	5-80	6-8
Qtz.	5	5	6
Cal.	58	57	62
Other	37	38	32

SITE 400 HOLE A CORE 47 CORED INTERVAL: 511.5-521.0 m



Calcareous-Siliceous Mudstone
grayish orange (10YR 7/4), yellowish gray (5Y 7/2) and pale olive (10Y 6/2). Moderate bioturbation. Thin bed of Siliceous Marly Chalk at top. Most of core intensely disturbed and questionable whether drilling breccia or cavings.

Smear Slides

	1-93	6-120	7-60
nannos	--	25	15
unsp. $CaCO_3$	10	20	25
clay	48	30	42
quartz	15	5	5
sp. spic.	20	20	12
diatoms	5	--	--
other	mica	pyrite, glauconite, rads	rads

Carbonate Bomb

6-118	12%
7, CC	23%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-88	2.9	0.1	23.2
6-83	2.8	0.1	23.0

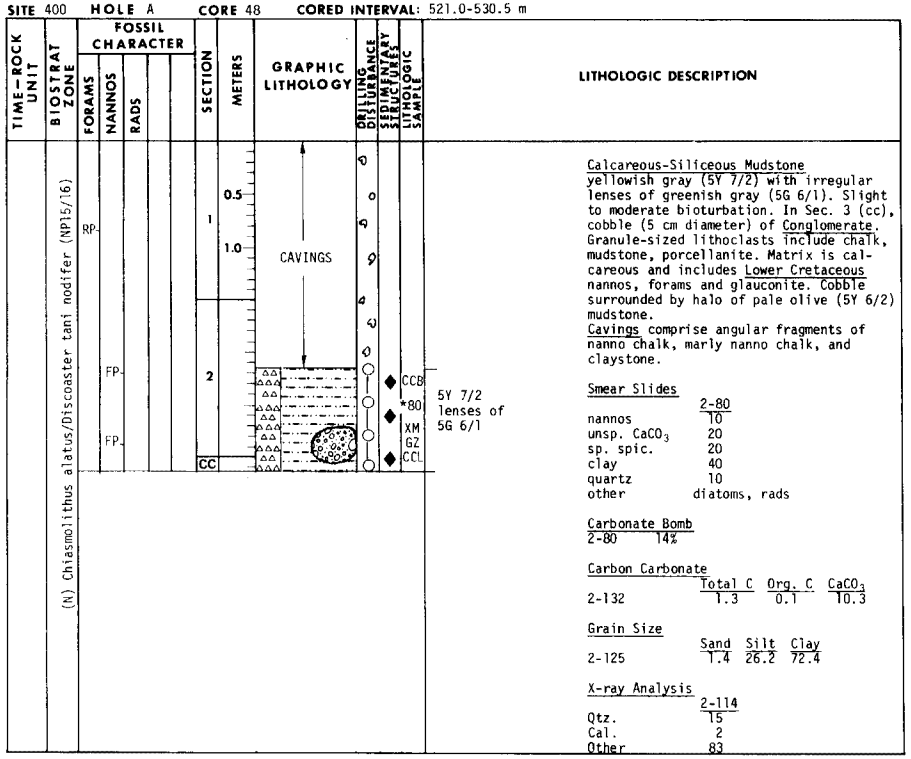
Grain Size

	Sand	Silt	Clay
1-82	1.1	27.2	71.7
6-82	1.2	33.8	65.0

X-ray Analysis

	1-96	6-75	CC
Qtz.	13	14	10
Cal.	7	6	14
Other	80	80	76

SITE 400 HOLE A CORE 48 CORED INTERVAL: 521.0-530.5 m



LITHOLOGIC DESCRIPTION

Calcareous-Siliceous Mudstone
yellowish gray (5Y 7/2) with irregular lenses of greenish gray (5G 6/1). Slight to moderate bioturbation. In Sec. 3 (cc), cobble (5 cm diameter) of Conglomerate. Granule-sized lithoclasts include chalk, mudstone, porcellanite. Matrix is calcareous and includes Lower Cretaceous nannos, forams and glauconite. Cobble surrounded by halo of pale olive (5Y 6/2) mudstone.
Cavings comprise angular fragments of nanno chalk, marly nanno chalk, and claystone.

Smear Slides

	2-80
nannos	10
unsp. $CaCO_3$	20
sp. spic.	20
clay	40
quartz	10
other	diatoms, rads

Carbonate Bomb

2-80	14%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-132	1.3	0.1	10.3

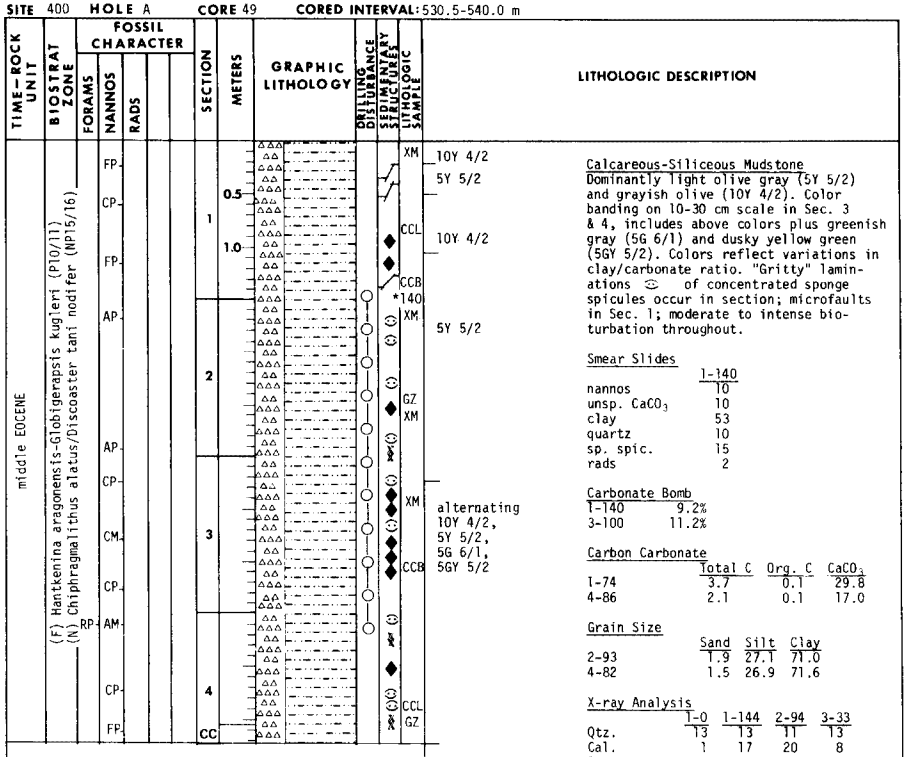
Grain Size

	Sand	Silt	Clay
2-125	1.4	26.2	72.4

X-ray Analysis

	2-114
Qtz.	15
Cal.	2
Other	83

SITE 400 HOLE A CORE 49 CORED INTERVAL: 530.5-540.0 m



LITHOLOGIC DESCRIPTION

Calcareous-Siliceous Mudstone
Dominantly light olive gray (5Y 5/2) and grayish olive (10Y 4/2). Color banding on 10-30 cm scale in Sec. 3 & 4, includes above colors plus greenish gray (5G 6/1) and dusky yellow green (5GY 5/2). Colors reflect variations in clay/carbonate ratio. "Gritty" laminations ⊜ of concentrated sponge spicules occur in section; microfaults in Sec. 1; moderate to intense bioturbation throughout.

Smear Slides

	1-140
nannos	10
unsp. $CaCO_3$	10
clay	53
quartz	10
sp. spic.	15
rads	2

Carbonate Bomb

1-140	9.2%
3-100	11.2%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-74	3.7	0.1	29.8
4-86	2.1	0.1	17.0

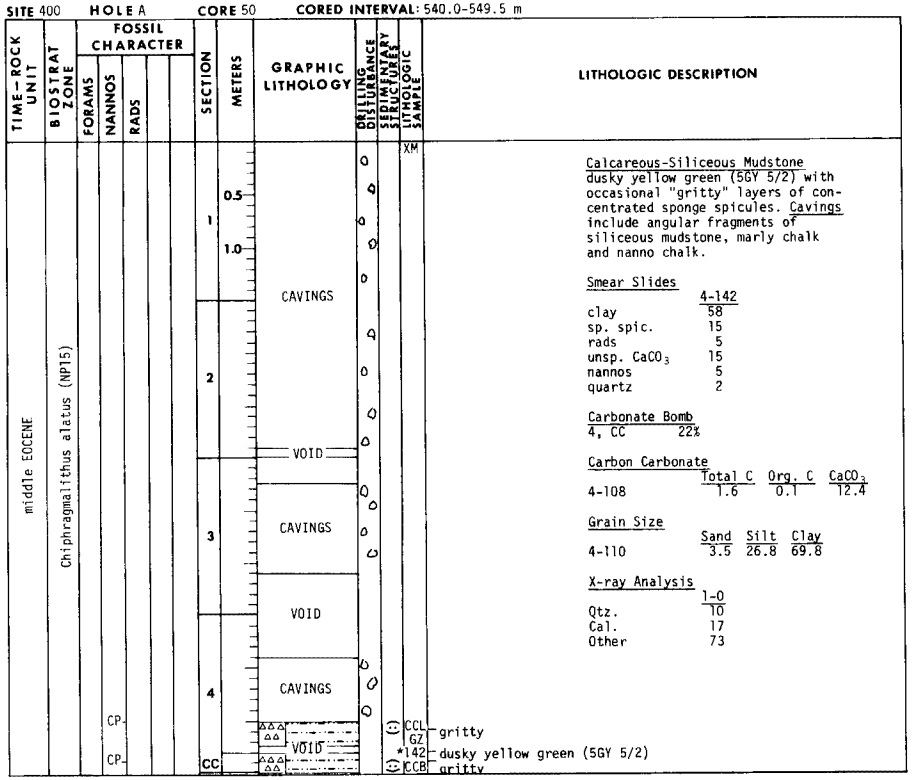
Grain Size

	Sand	Silt	Clay
2-93	1.9	27.1	71.0
4-82	1.5	26.9	71.6

X-ray Analysis

	1-0	1-144	2-94	3-33
Qtz.	13	13	11	13
Cal.	1	17	20	8
Other	86	70	69	79

SITE 400 HOLE A CORE 50 CORED INTERVAL: 540.0-549.5 m



LITHOLOGIC DESCRIPTION

Calcareous-Siliceous Mudstone
dusky yellow green (5GY 5/2) with occasional "gritty" layers of concentrated sponge spicules. Cavings include angular fragments of siliceous mudstone, marly chalk and nanno chalk.

Smear Slides

	4-142
clay	58
sp. spic.	15
rads	5
unsp. $CaCO_3$	15
nannos	5
quartz	2

Carbonate Bomb

4, CC	22%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
4-108	1.6	0.1	12.4

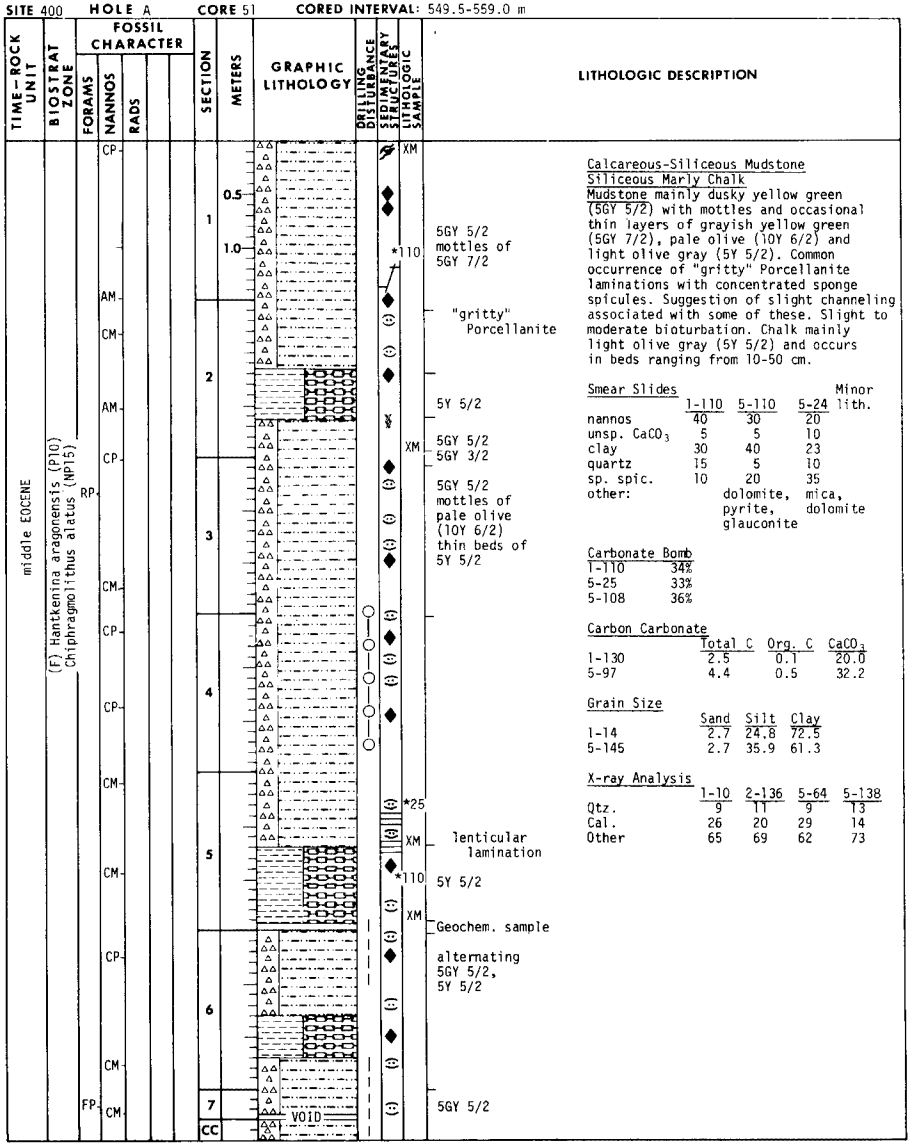
Grain Size

	Sand	Silt	Clay
4-110	3.5	26.8	69.8

X-ray Analysis

	1-0
Qtz.	10
Cal.	17
Other	73

SITE 400 HOLE A CORE 51 CORED INTERVAL: 549.5-559.0 m



Calcareous-Siliceous Mudstone
Siliceous Marly Chalk
Mudstone mainly dusky yellow green (5GY 5/2) with mottles and occasional thin layers of grayish yellow green (5GY 7/2), pale olive (10Y 6/2) and light olive gray (5Y 5/2). Common occurrence of "gritty" Porcellanite laminations with concentrated sponge spicules. Suggestion of slight channeling associated with some of these. Slight to moderate bioturbation. Chalk mainly light olive gray (5Y 5/2) and occurs in beds ranging from 10-50 cm.

Smear Slides

	1-110	5-110	5-24	Minor lith.
nannos	40	30	20	
unsp. $CaCO_3$	5	5	10	
clay	30	40	23	
quartz	15	5	10	
sp. spic.	10	20	35	
other:		dolomite, pyrite, glauconite		mica, dolomite

Carbonate Bomb

1-110	34%
5-25	33%
5-108	36%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-130	2.5	0.1	20.0
5-97	4.4	0.5	32.2

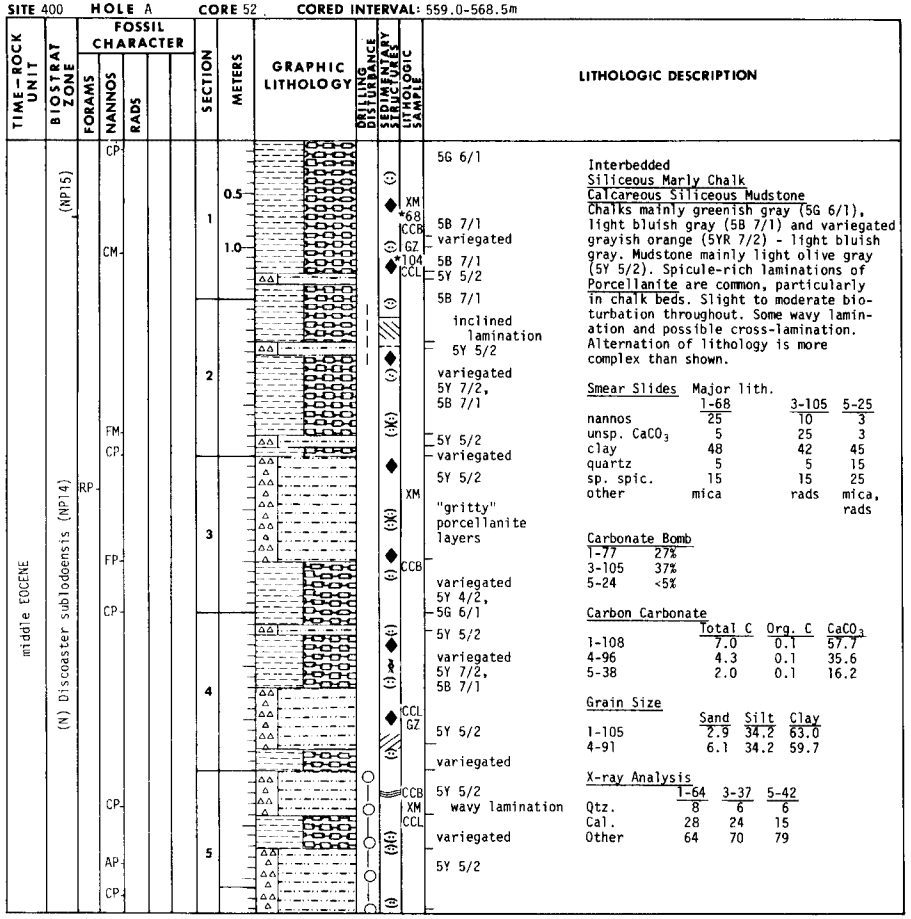
Grain Size

	Sand	Silt	Clay
1-14	2.7	24.8	72.5
5-145	2.7	35.9	61.3

X-ray Analysis

	1-10	2-136	5-64	5-138
Qtz.	9	11	9	13
Cal.	26	20	29	14
Other	65	69	62	73

SITE 400 HOLE A CORE 52 CORED INTERVAL: 559.0-568.5m



Interbedded
Siliceous Marly Chalk
Calcareous Siliceous Mudstone
Chalks mainly greenish gray (5G 6/1), light bluish gray (5B 7/1) and variegated grayish orange (5YR 7/2) - light bluish gray. Mudstone mainly light olive gray (5Y 5/2). Spicule-rich laminations of Porcellanite are common, particularly in chalk beds. Slight to moderate bioturbation throughout. Some wavy lamination and possible cross-lamination. Alternation of lithology is more complex than shown.

Smear Slides

	Major lith. 1-68	3-105	5-25
nannos	25	10	3
unsp. $CaCO_3$	5	25	3
clay	48	42	45
quartz	5	5	15
sp. spic.	15	15	25
other	mica	rads	mica, rads

Carbonate Bomb

1-77	27%
3-105	37%
5-24	<5%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-108	7.0	0.1	57.7
4-96	4.3	0.1	35.6
5-38	2.0	0.1	16.2

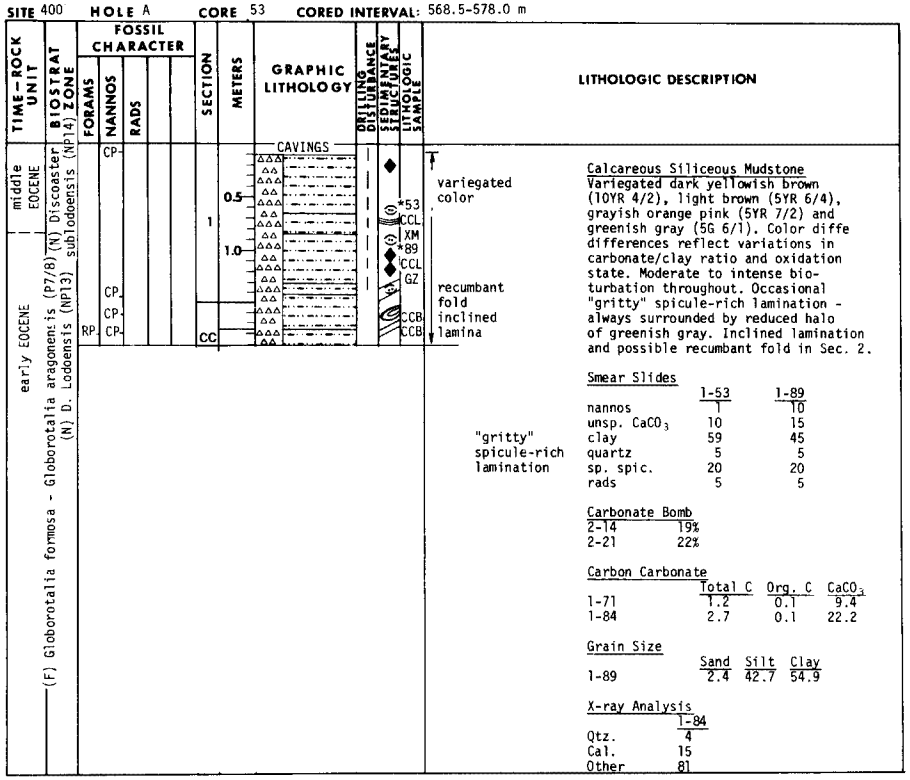
Grain Size

	Sand	Silt	Clay
1-105	2.9	34.2	63.0
4-91	6.1	34.2	59.7

X-ray Analysis

	1-64	3-37	5-42
Qtz.	8	6	6
Cal.	28	24	15
Other	64	70	79

SITE 400 HOLE A CORE 53 CORED INTERVAL: 568.5-578.0 m



Calcareous Siliceous Mudstone
Variegated dark yellowish brown (10YR 4/2), light brown (5YR 6/4), grayish orange pink (5YR 7/2) and greenish gray (5G 6/1). Color differences reflect variations in carbonate/clay ratio and oxidation state. Moderate to intense bioturbation throughout. Occasional "gritty" spicule-rich lamination - always surrounded by reduced halo of greenish gray. Inclined lamination and possible recumbant fold in Sec. 2.

Smear Slides

	1-53	1-89
nannos	1	10
unsp. $CaCO_3$	10	15
clay	59	45
quartz	5	5
sp. spic.	20	20
rads	5	5

Carbonate Bomb

2-14	19%
2-21	22%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-71	1.2	0.1	9.4
1-84	2.7	0.1	22.2

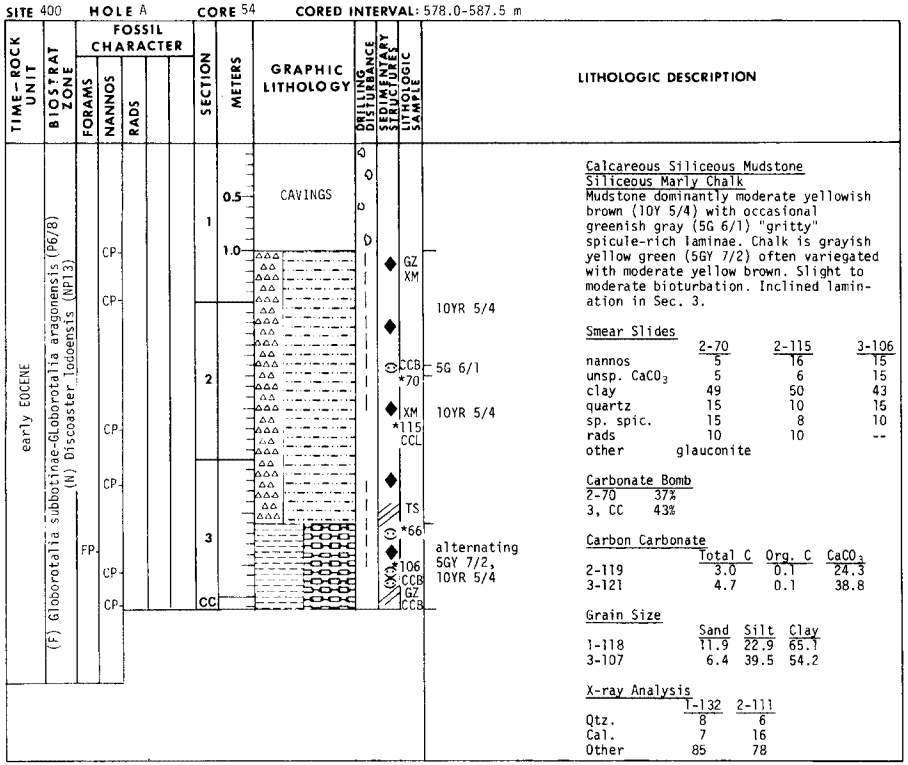
Grain Size

	Sand	Silt	Clay
1-89	2.4	42.7	54.9

X-ray Analysis

	1-84
Qtz.	4
Cal.	15
Other	81

SITE 400 HOLE A CORE 54 CORED INTERVAL: 578.0-587.5 m



Calcareous Siliceous Mudstone
Siliceous Marly Chalk
Mudstone dominantly moderate yellowish brown (10Y 5/4) with occasional greenish gray (5G 6/1) "gritty" spicule-rich laminae. Chalk is grayish yellow green (5GY 7/2) often variegated with moderate yellow brown. Slight to moderate bioturbation. Inclined lamination in Sec. 3.

Smear Slides

	2-70	2-115	3-106
nannos	5	16	15
unsp. $CaCO_3$	5	6	15
clay	49	50	43
quartz	15	10	15
sp. spic.	15	8	10
rads	10	10	--
other	glauconite		

Carbonate Bomb

2-70	37%
3, CC	43%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-119	3.0	0.1	24.3
3-121	4.7	0.1	38.8

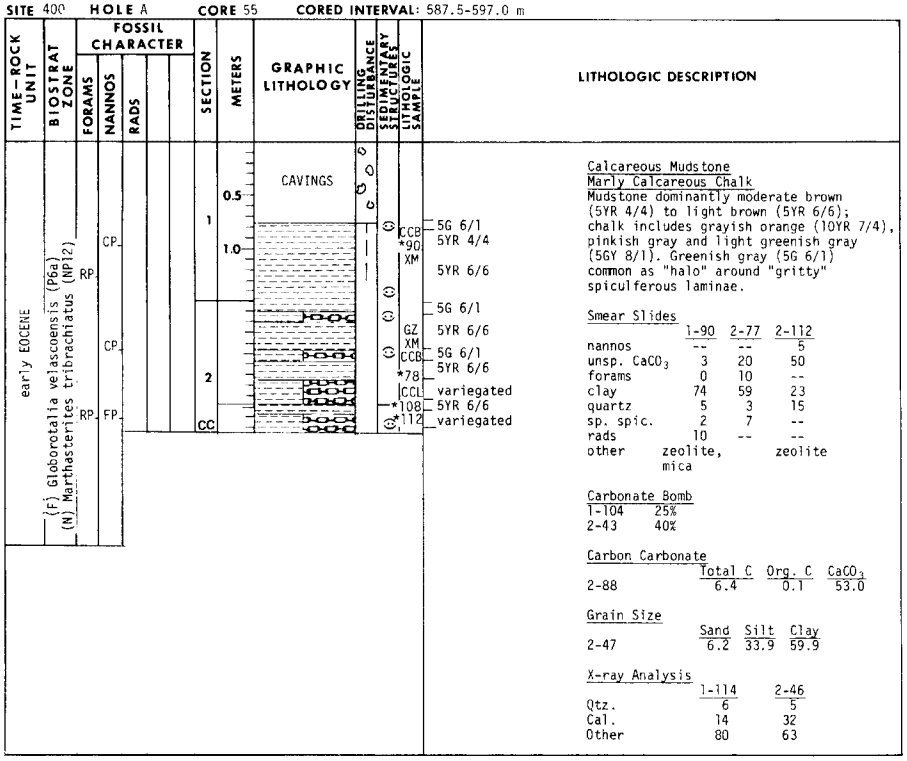
Grain Size

	Sand	Silt	Clay
1-118	11.9	22.9	65.1
3-107	6.4	39.5	54.2

X-ray Analysis

	1-132	2-111
Qtz.	8	6
Cal.	7	16
Other	85	78

SITE 400 HOLE A CORE 55 CORED INTERVAL: 587.5-597.0 m



Calcareous Mudstone
Marly Calcareous Chalk
Mudstone dominantly moderate brown (5YR 4/4) to light brown (5YR 6/6); chalk includes grayish orange (10YR 7/4), pinkish gray and light greenish gray (5GY 8/1). Greenish gray (5G 6/1) common as "halo" around "gritty" spiculiferous laminae.

Smear Slides

	1-90	2-77	2-112
nannos	--	--	5
unsp. $CaCO_3$	3	20	50
forams	0	10	--
clay	74	59	23
quartz	5	3	15
sp. spic.	2	7	--
rads	10	--	--
other	zeolite, mica		zeolite

Carbonate Bomb

1-104	25%
2-43	40%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-88	6.4	0.1	53.0

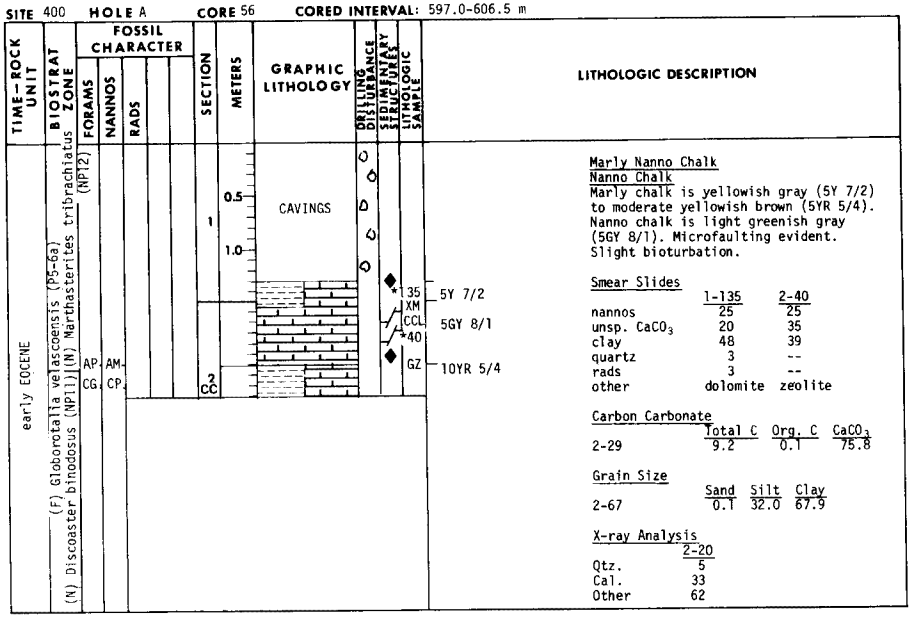
Grain Size

	Sand	Silt	Clay
2-47	6.2	33.9	59.9

X-ray Analysis

	1-114	2-46
Qtz.	6	5
Cal.	14	32
Other	80	63

SITE 400 HOLE A CORE 56 CORED INTERVAL: 597.0-606.5 m



Marly Nanno Chalk
Nanno Chalk
Marly chalk is yellowish gray (5Y 7/2) to moderate yellowish brown (5YR 5/4). Nanno chalk is light greenish gray (5GY 8/1). Microfaulting evident. Slight bioturbation.

Smear Slides

	1-135	2-40
nannos	25	25
unsp. $CaCO_3$	20	35
clay	48	39
quartz	3	--
rads	3	--
other	dolomite	zeolite

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-29	9.2	0.1	75.8

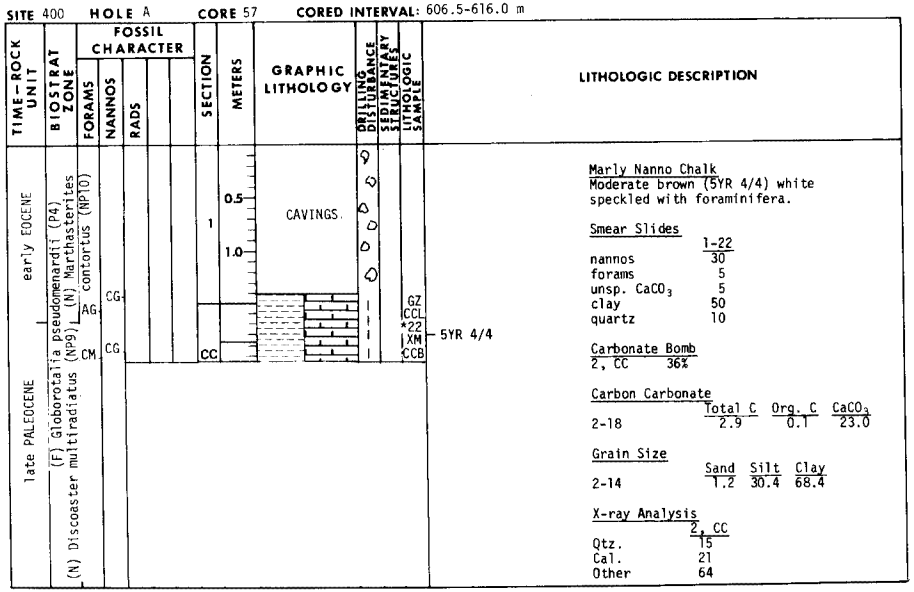
Grain Size

	Sand	Silt	Clay
2-67	0.1	32.0	67.9

X-ray Analysis

	2-20
Qtz.	5
Cal.	33
Other	62

SITE 400 HOLE A CORE 57 CORED INTERVAL: 606.5-616.0 m



Marly Nanno Chalk
Moderate brown (5YR 4/4) white speckled with foraminifera.

Smear Slides

	1-22
nannos	30
forams	5
unsp. $CaCO_3$	5
clay	50
quartz	10

Carbonate Bomb

2, CC	36%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-18	2.9	0.1	23.0

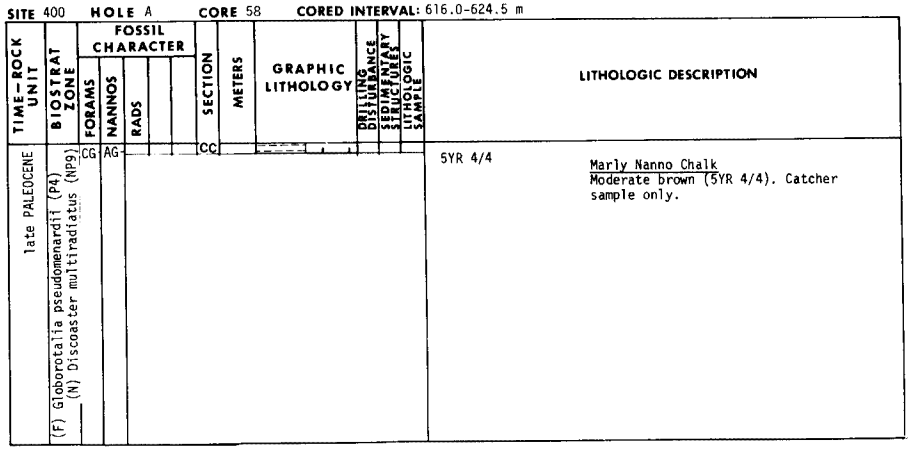
Grain Size

	Sand	Silt	Clay
2-14	1.2	30.4	68.4

X-ray Analysis

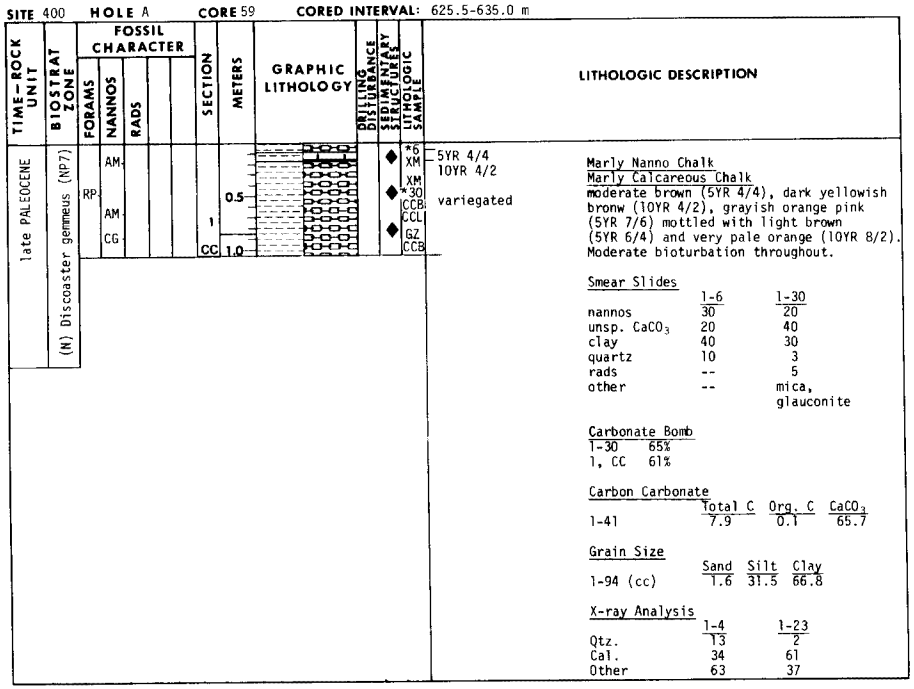
	2, CC
Qtz.	15
Cal.	21
Other	64

SITE 400 HOLE A CORE 58 CORED INTERVAL: 616.0-624.5 m



Marly Nanno Chalk
Moderate brown (5YR 4/4). Catcher sample only.

SITE 400 HOLE A CORE 59 CORED INTERVAL: 625.5-635.0 m



Marly Nanno Chalk
Marly Calcareous Chalk
moderate brown (5YR 4/4), dark yellowish bronw (10YR 4/2), grayish orange pink (5YR 7/6) mottled with light brown (5YR 6/4) and very pale orange (10YR 8/2). Moderate bioturbation throughout.

Smear Slides

	1-6	1-30
nannos	30	20
unsp. $CaCO_3$	20	40
clay	40	30
quartz	10	3
rads	--	5
other	--	mica, glauconite

Carbonate Bomb

1-30	65%
1, CC	61%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-41	7.9	0.1	65.7

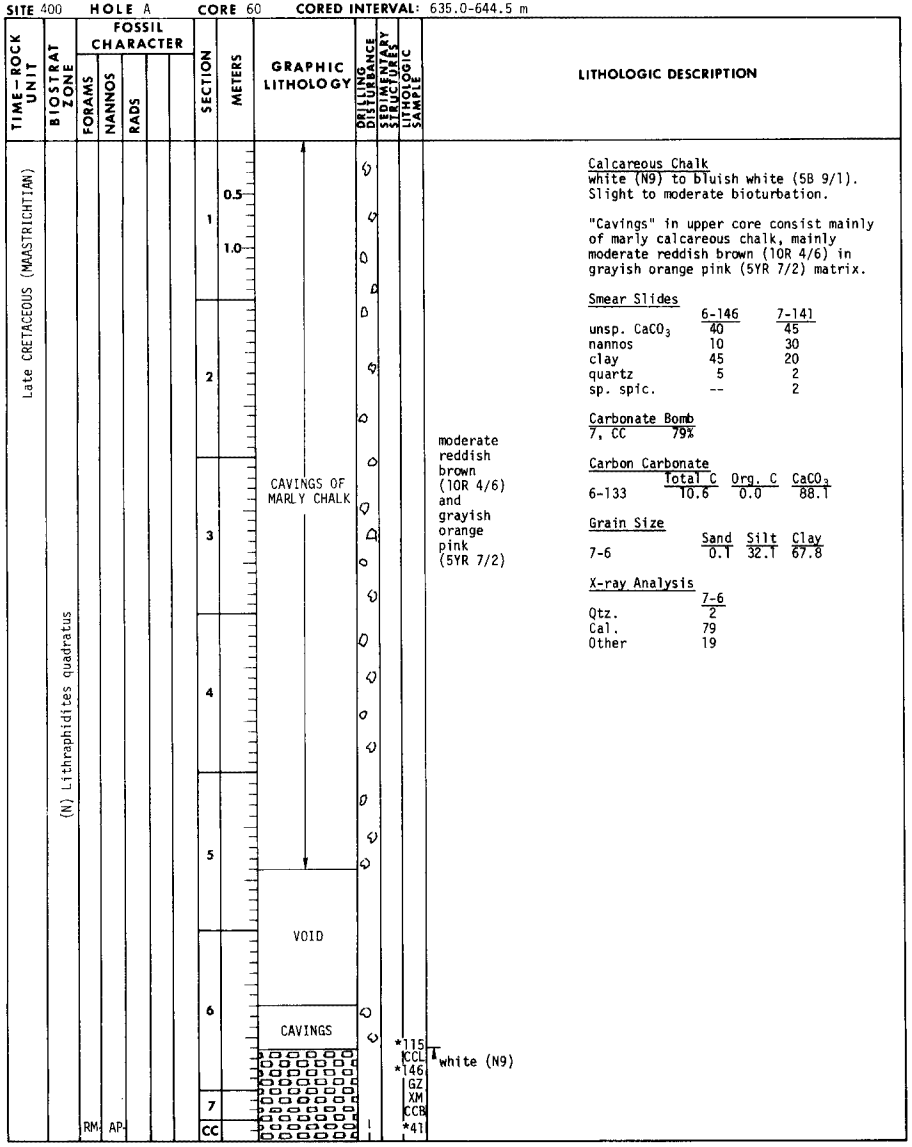
Grain Size

	Sand	Silt	Clay
1-94 (cc)	1.6	31.5	66.8

X-ray Analysis

	1-4	1-23
Qtz.	13	2
Cal.	34	61
Other	63	37

SITE 400 HOLE A CORE 60 CORED INTERVAL: 635.0-644.5 m



Calcareous Chalk
white (N9) to bluish white (5B 9/1).
Slight to moderate bioturbation.

"Cavings" in upper core consist mainly of marly calcareous chalk, mainly moderate reddish brown (10R 4/6) in grayish orange pink (5YR 7/2) matrix.

Smear Slides

	6-146	7-141
unsp. $CaCO_3$	40	45
nannos	10	30
clay	45	20
quartz	5	2
sp. spic.	--	2

Carbonate Bomb
7, CC 79%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
6-133	10.6	0.0	88.1

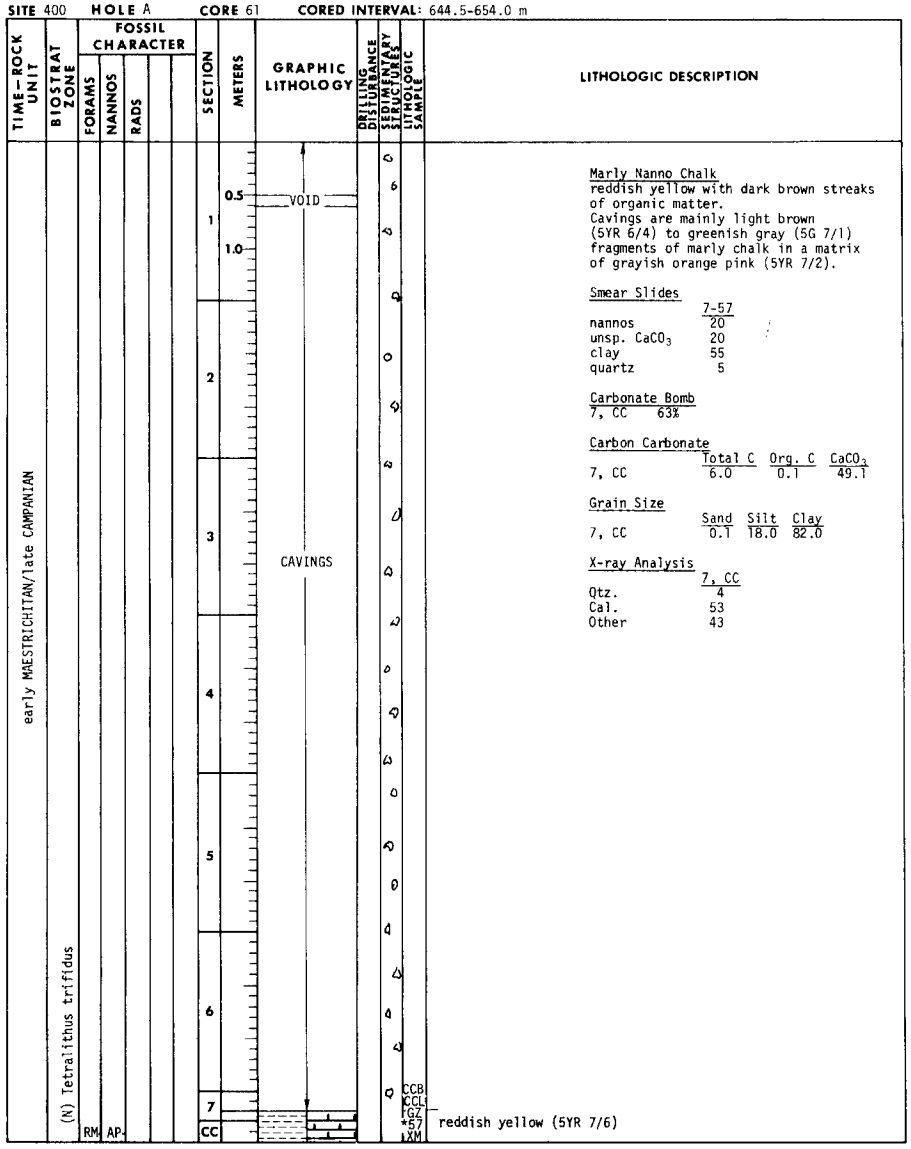
Grain Size

	Sand	Silt	Clay
7-6	0.1	32.1	67.8

X-ray Analysis

	7-6
Qtz.	2
Cal.	79
Other	19

SITE 400 HOLE A CORE 61 CORED INTERVAL: 644.5-654.0 m



Marly Nanno Chalk
reddish yellow with dark brown streaks of organic matter.
Cavings are mainly light brown (5YR 6/4) to greenish gray (5G 7/1) fragments of marly chalk in a matrix of grayish orange pink (5YR 7/2).

Smear Slides

	7-57
nannos	20
unsp. $CaCO_3$	20
clay	55
quartz	5

Carbonate Bomb
7, CC 63%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
7, CC	6.0	0.1	49.1

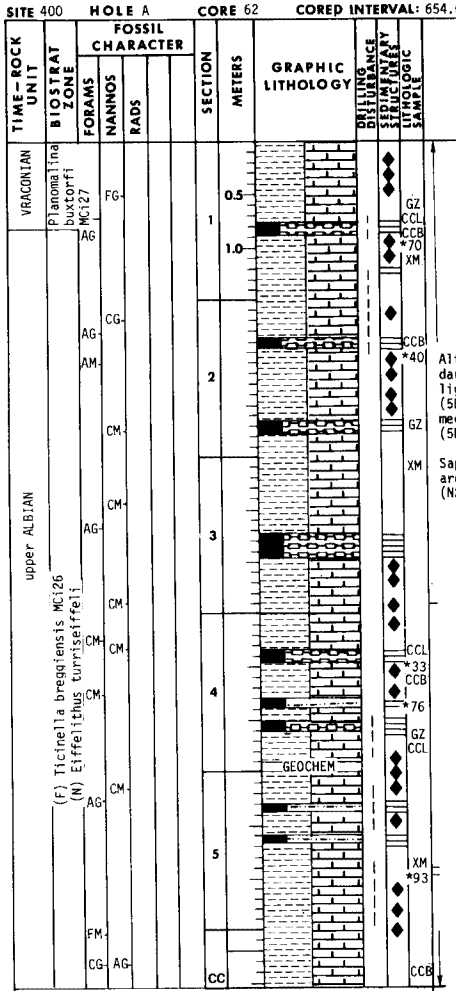
Grain Size

	Sand	Silt	Clay
7, CC	0.1	18.0	82.0

X-ray Analysis

	7, CC
Qtz.	4
Cal.	53
Other	43

SITE 400 HOLE A CORE 62 CORED INTERVAL: 654.0-663.5 m



Alternating medium dark gray (N4), light bluish gray (5B 7/1), and medium bluish gray (5B 5/1)

Sapropelic layers are grayish black (N2)

moderate green (5G 5/6)

medium bluish gray (5B 5/1)

Interbedded Marly Nanno Chalk and Carbonaceous Chalk

Chalks are dominantly light bluish gray to medium bluish gray and are mottled with medium dark gray. Bioturbation varies from slight to intense and is particularly conspicuous adjacent to carbonaceous beds. Zeolite(?) is a common constituent and traces of apatite are present. The carbonaceous layers are grayish black and characterized by very fine lamination (<1 mm). Beds inclined up to 25°.

Smear Slides

	gray chalk 1-70	4-76	5-93
nannos	30	20	10
unsp. $CaCO_3$	10	5	15
forams	--	10	5
clay	35	60	55
quartz	10	5	5
zeolite(?)	15	--	10
carbonaceous	--	--	--
pyrite	--	--	--

	chalk 2-40	4-33
nannos	20	15
unsp. $CaCO_3$	30	15
forams	--	--
clay	45	45
quartz	--	10
zeolite(?)	--	5
carbonaceous	5	5
pyrite	--	5

Carbonate Bomb

1-70	63%	4-35	55%
2-40	48%	6, CC	51%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-69	5.6	0.1	45.8
4-36	6.6	1.2	44.8
4-110	6.7	0.5	51.7

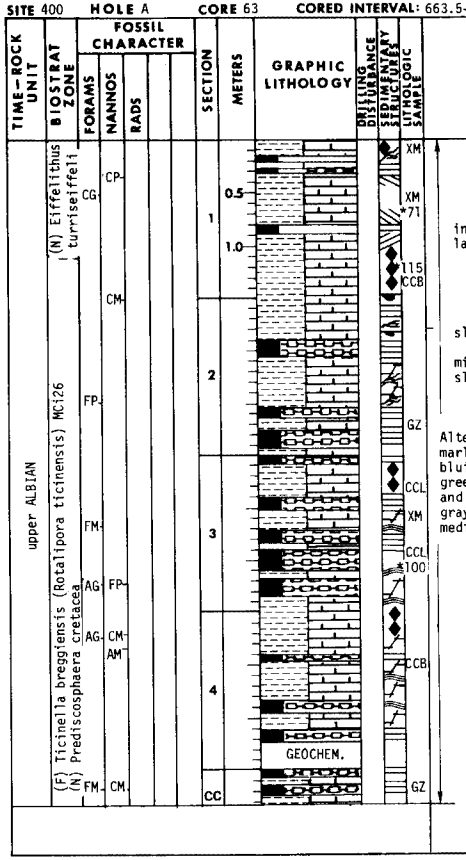
Grain Size

	Sand	Silt	Clay
1-53	3.4	30.7	65.9
2-117	4.0	38.4	57.6
4-108	2.9	40.2	56.9

X-ray Analysis

	1-90	3-10	5-84
Qtz.	3	4	2
Cal.	36	48	51
Other	61	48	47

SITE 400 HOLE A CORE 63 CORED INTERVAL: 663.5-673.0 m



inclined lamination

slump fold

microfaulting slump folding

Alternating colors - marly chalk - medium bluish gray (5G 6/1), greenish gray (5G 6/1); and carbonaceous chalk - grayish black (N2), medium dark gray (N4)

Interbedded Marly Nanno Chalk and Carbonaceous Chalk

Nanno chalks are dominantly medium bluish gray and greenish gray. These are commonly bioturbated and show frequent evidence of soft sediment deformation, including: contorted bedding (slump folding?), load casts, and microfaulting. Carbonaceous chalks are typically medium dark gray to grayish black and characterized by very thin (<1 mm) parallel lamination. Zeolites(?) occur in both lithologies.

Smear Slides

	1-71	1-115	3-100
nannos	5	30	15
unsp. $CaCO_3$	60	5	10
clay	30	45	40
quartz	--	5	10
zeolite	--	12	10
carbonaceous	1	tr	10
dolomite	--	--	5

Carbonate Bomb

1-115	52%
4-44	47%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-27	6.0	0.1	49.1
3-97	9.4	2.8	54.3

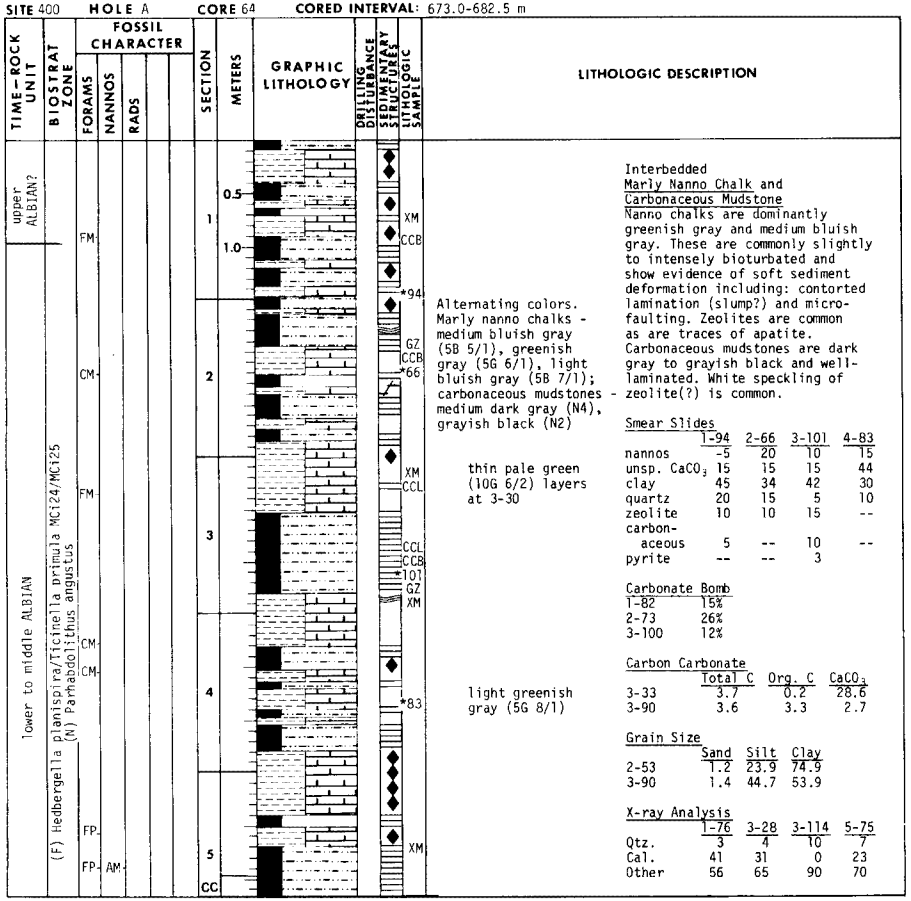
Grain Size

	Sand	Silt	Clay
2-108	1.6	31.5	66.8
5, CC	1.8	32.3	66.0

X-ray Analysis

	1-1	1-68	3-53
Qtz.	3	3	3
Cal.	44	50	44
Other	53	47	53

SITE 400 HOLE A CORE 64 CORED INTERVAL: 673.0-682.5 m



Alternating colors. Marly nanno chalks - medium bluish gray (5B 5/1), greenish gray (5G 6/1), light bluish gray (5B 7/1); carbonaceous mudstones - medium dark gray (N4), grayish black (N2)

thin pale green (10G 6/2) layers at 3-30

light greenish gray (5G 8/1)

Interbedded
Marly Nanno Chalk and
Carbonaceous Mudstone

Nanno chalks are dominantly greenish gray and medium bluish gray. These are commonly slightly to intensely bioturbated and show evidence of soft sediment deformation including: contorted lamination (slump?) and micro-faulting. Zeolites are common as are traces of apatite. Carbonaceous mudstones are dark gray to grayish black and well-laminated. White speckling of zeolite(?) is common.

Smear Slides

	1-94	2-66	3-101	4-83
nannos	-5	20	10	15
unsp. $CaCO_3$	15	15	15	44
clay	45	34	42	30
quartz	20	15	5	10
zeolite	10	10	15	--
carbonaceous	5	--	10	--
pyrite	--	--	3	

Carbonate Bomb

1-82	15%
2-73	26%
3-100	12%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-33	3.7	0.2	28.6
3-90	3.6	3.3	2.7

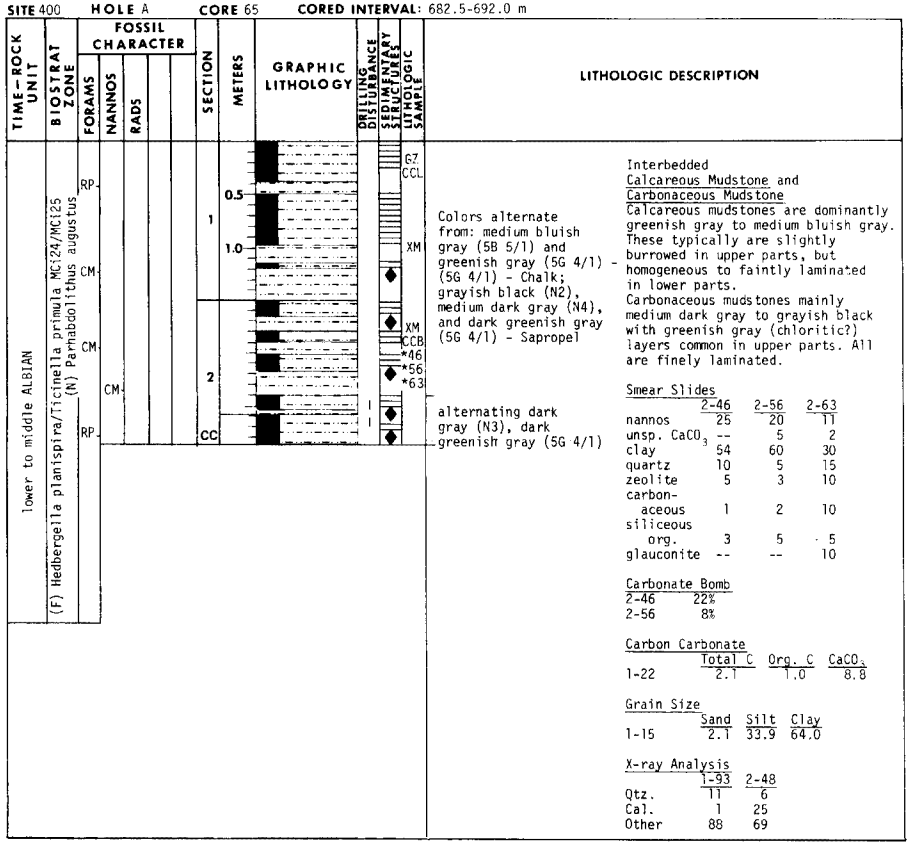
Grain Size

	Sand	Silt	Clay
2-53	1.2	23.9	74.9
3-90	1.4	44.7	53.9

X-ray Analysis

	1-76	3-28	3-114	5-75
Qtz.	3	4	10	7
Cal.	41	31	0	23
Other	56	65	90	70

SITE 400 HOLE A CORE 65 CORED INTERVAL: 682.5-692.0 m



Colors alternate from: medium bluish gray (5B 5/1) and greenish gray (5G 4/1) - Chalk; grayish black (N2), medium dark gray (N4), and dark greenish gray (5G 4/1) - Sapropel

alternating dark gray (N3), dark greenish gray (5G 4/1)

Interbedded
Calcareous Mudstone and
Carbonaceous Mudstone

Calcareous mudstones are dominantly greenish gray to medium bluish gray. These typically are slightly burrowed in upper parts, but homogeneous to faintly laminated in lower parts. Carbonaceous mudstones mainly medium dark gray to grayish black with greenish gray (chloritic?) layers common in upper parts. All are finely laminated.

Smear Slides

	2-46	2-56	2-63
nannos	25	20	11
unsp. $CaCO_3$	--	5	2
clay	54	60	30
quartz	10	5	15
zeolite	5	3	10
carbonaceous	1	2	10
siliceous org.	3	5	5
glauconite	--	--	10

Carbonate Bomb

2-46	22%
2-56	8%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-22	2.1	1.0	8.8

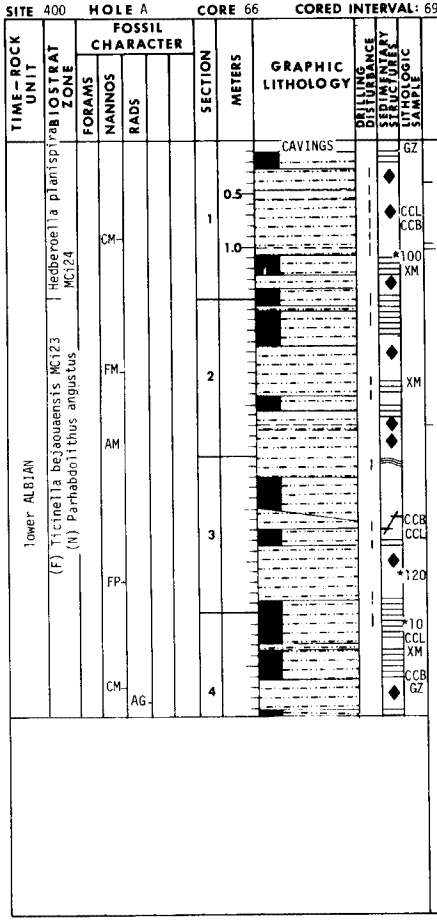
Grain Size

	Sand	Silt	Clay
1-15	2.1	33.9	64.0

X-ray Analysis

	1-93	2-48
Qtz.	11	6
Cal.	1	25
Other	88	69

SITE 400 HOLE A CORE 66 CORED INTERVAL: 692.0-701.5 m



dark grayish green (5GY 4/1)

dark grayish green (5GY 4/1)

dark grayish green (5GY 4/1)

Alternating: medium bluish gray (5B 5/1) and medium dark gray (5G 6/1) - Chalk; medium dark gray (N4) and gray black (N2) - mudstone

Interbedded Calcareous Mudstone and Carbonaceous Mudstone

Calcareous mudstone is mainly greenish gray to medium bluish gray. Typically slightly burrowed in upper parts and homogeneous to vaguely laminated in lower parts. Contorted lamination (flowage?) evident in Sec. 3 - 10 to 20 cm.

Carbonaceous mudstone varies from medium dark gray to gray black and typically is laminated at scale of <1 mm. Thin layers of dark greenish gray calcareous mudstone commonly occur at top of carbonaceous layers.

Smear Slides

	3-120	4-10	1-100
nannos	30	15	20
unsp. $CaCO_3$	5	10	--
clay	52	40	49
quartz	5	10	10
zeolite	5	12	5
carbonaceous	3	12	2
dolomite	--	--	7

Carbonate Bomb

1-80	22%
3-60	17%
4-59	8%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-61	3.2	0.3	23.9
3-62	2.6	0.3	19.0
4-21	2.2	1.6	4.9

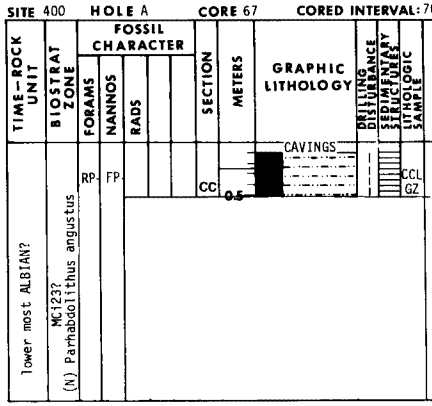
Grain Size

	Sand	Silt	Clay
1-1	0.1	26.9	73.1
4-73	1.6	32.9	65.5

X-ray Analysis

	1-100	2-84	4-12
Qtz.	5	8	12
Cal.	3	17	3
Other	92	75	0

SITE 400 HOLE A CORE 67 CORED INTERVAL: 701.5-711.0 m



grayish black (N2)

Carbonaceous Mudstone
grayish black, well laminated.

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1, CC	2.4	1.8	5.4

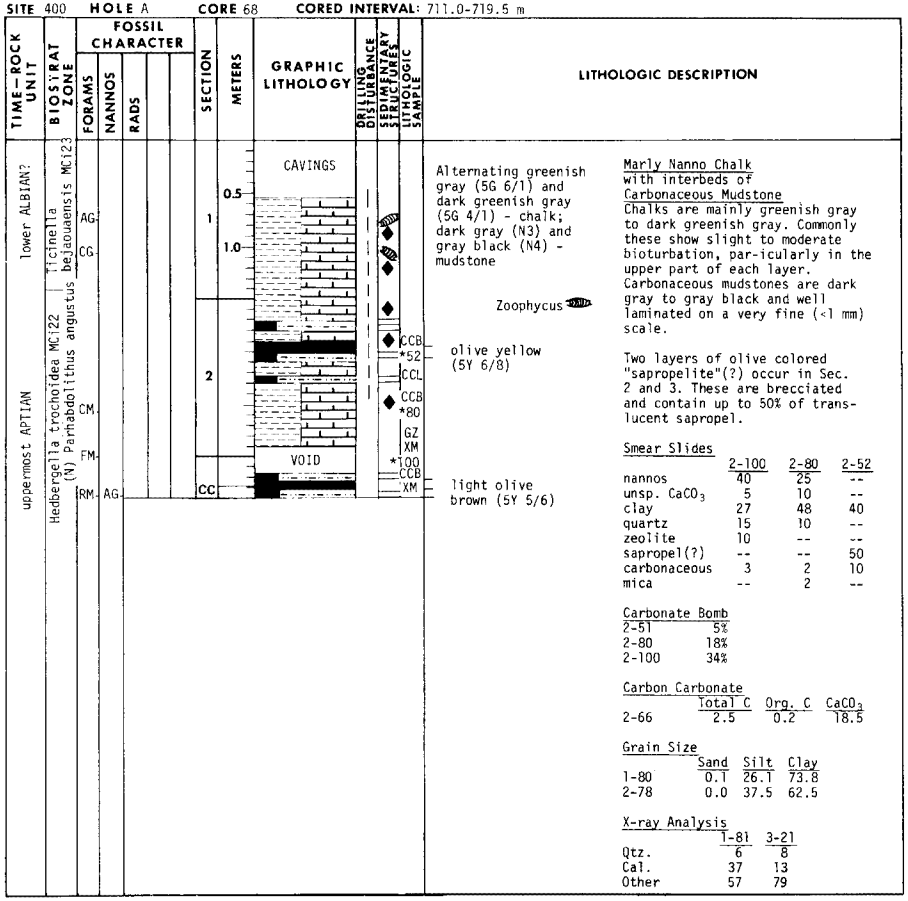
Grain Size

	Sand	Silt	Clay
1, CC	2.0	37.6	60.4

X-ray Analysis

	1, CC
Qtz.	10
Cal.	5
Other	85

SITE 400 HOLE A CORE 68 CORED INTERVAL: 711.0-719.5 m



Alternating greenish gray (5G 6/1) and dark greenish gray (5G 4/1) - chalk; dark gray (N3) and gray black (N4) - mudstone

Marly Nanno Chalk with interbeds of Carbonaceous Mudstone

Chalks are mainly greenish gray to dark greenish gray. Commonly these show slight to moderate bioturbation, par-icularly in the upper part of each layer. Carbonaceous mudstones are dark gray to gray black and well laminated on a very fine (<1 mm) scale.

Two layers of olive colored "sapropelite"(?) occur in Sec. 2 and 3. These are brecciated and contain up to 50% of translucent sapropel.

Smear Slides

	2-100	2-80	2-52
nannos	40	25	--
unsp. $CaCO_3$	5	10	--
clay	27	48	40
quartz	15	10	--
zeolite	10	--	--
sapropel(?)	--	--	50
carbonaceous	3	2	10
mica	--	2	--

Carbonate Bomb

2-51	5%
2-80	18%
2-100	34%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-66	2.5	0.2	18.5

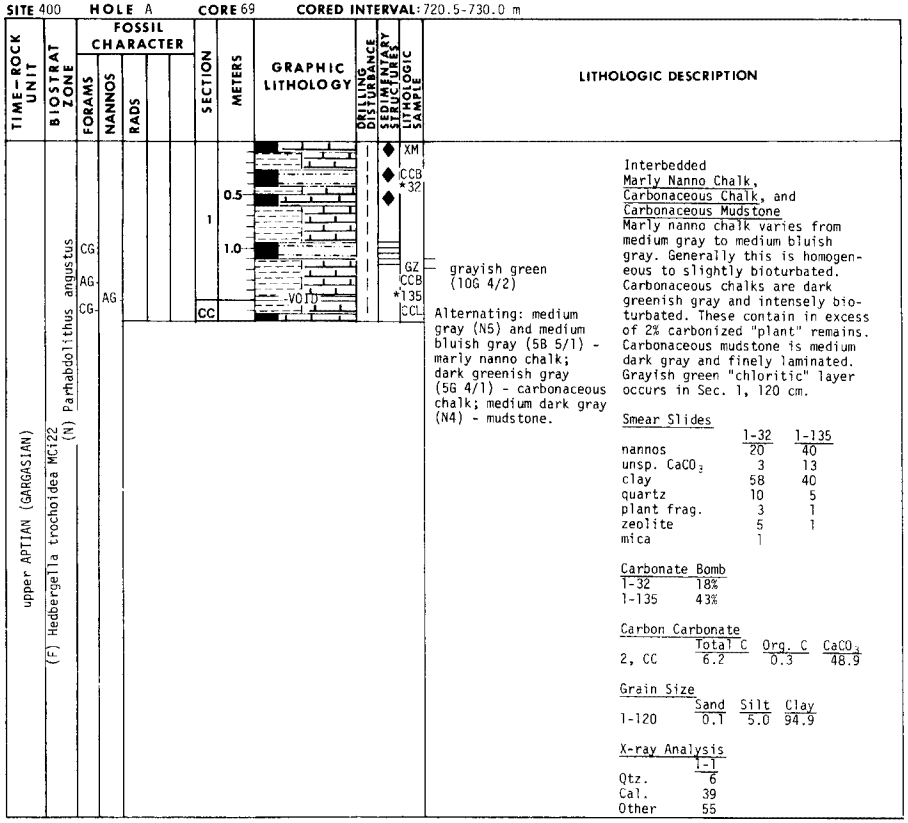
Grain Size

	Sand	Silt	Clay
1-80	0.1	26.1	73.8
2-78	0.0	37.5	62.5

X-ray Analysis

	1-81	3-21
Qtz.	6	8
Cal.	37	13
Other	57	79

SITE 400 HOLE A CORE 69 CORED INTERVAL: 720.5-730.0 m



grayish green (10G 4/2)

Alternating: medium gray (N5) and medium bluish gray (5B 5/1) - marly nanno chalk; dark greenish gray (5G 4/1) - carbonaceous chalk; medium dark gray (N4) - mudstone.

Interbedded Marly Nanno Chalk, Carbonaceous Chalk, and Carbonaceous Mudstone

Marly nanno chalk varies from medium gray to medium bluish gray. Generally this is homogeneous to slightly bioturbated. Carbonaceous chalks are dark greenish gray and intensely bioturbated. These contain in excess of 2% carbonized "plant" remains. Carbonaceous mudstone is medium dark gray and finely laminated. Grayish green "chloritic" layer occurs in Sec. 1, 120 cm.

Smear Slides

	1-32	1-135
nannos	20	40
unsp. $CaCO_3$	3	13
clay	58	40
quartz	10	5
plant frag.	3	1
zeolite	5	1
mica	1	

Carbonate Bomb

1-32	18%
1-135	43%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2, CC	6.2	0.3	48.9

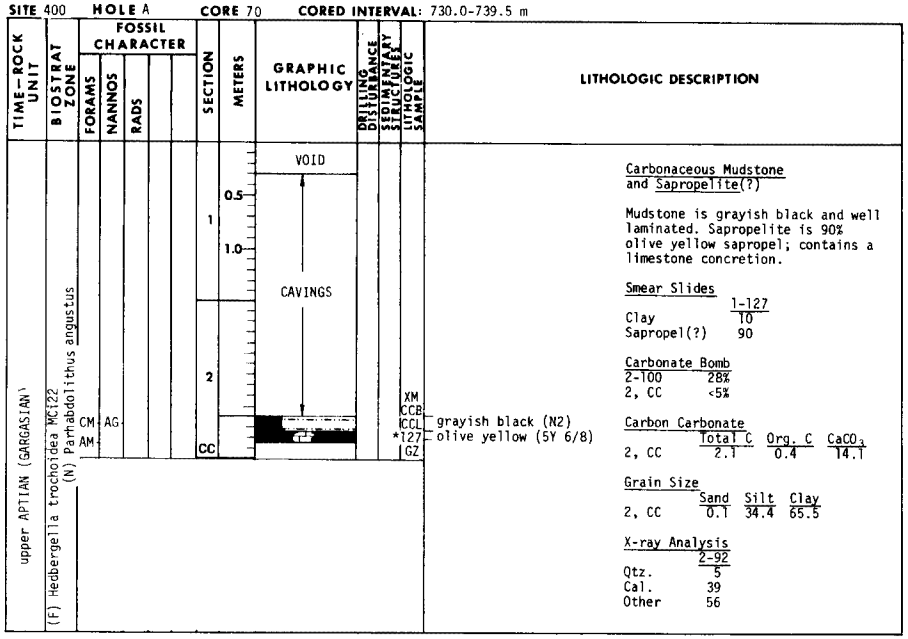
Grain Size

	Sand	Silt	Clay
1-120	0.1	5.0	94.9

X-ray Analysis

	1-1
Qtz.	6
Cal.	39
Other	55

SITE 400 HOLE A CORE 70 CORED INTERVAL: 730.0-739.5 m



Carbonaceous Mudstone and Sapropelite(?)

Mudstone is grayish black and well laminated. Sapropelite is 90% olive yellow sapropel; contains a limestone concretion.

Smear Slides

	1-127
Clay	10
Sapropel(?)	90

Carbonate Bomb

2-100	28%
2, CC	<5%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2, CC	2.1	0.4	14.1

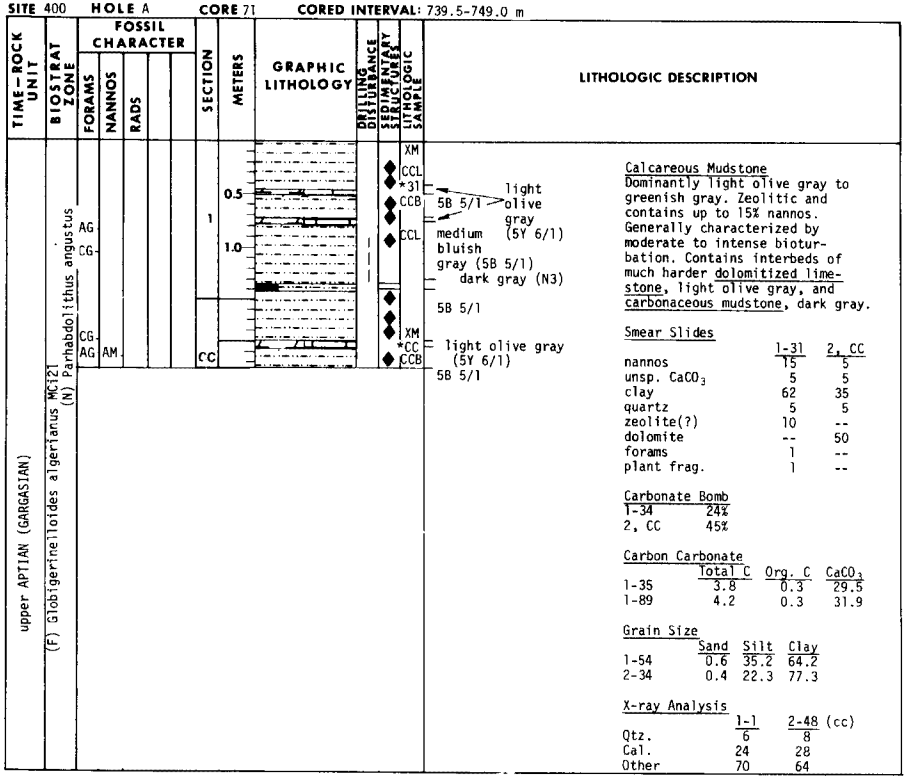
Grain Size

	Sand	Silt	Clay
2, CC	0.1	34.4	65.5

X-ray Analysis

	2-92
Qtz.	5
Cal.	39
Other	56

SITE 400 HOLE A CORE 71 CORED INTERVAL: 739.5-749.0 m



Calcareous Mudstone

Dominantly light olive gray to greenish gray. Zeolitic and contains up to 15% nannos. Generally characterized by moderate to intense bioturbation. Contains interbeds of much harder dolomitized limestone, light olive gray, and carbonaceous mudstone, dark gray.

Smear Slides

	1-31	2, CC
nannos	15	5
unsp. $CaCO_3$	5	5
clay	62	35
quartz	5	5
zeolite(?)	10	--
dolomite	--	50
forams	1	--
plant frag.	1	--

Carbonate Bomb

1-34	24%
2, CC	45%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-35	3.8	0.3	29.5
1-89	4.2	0.3	31.9

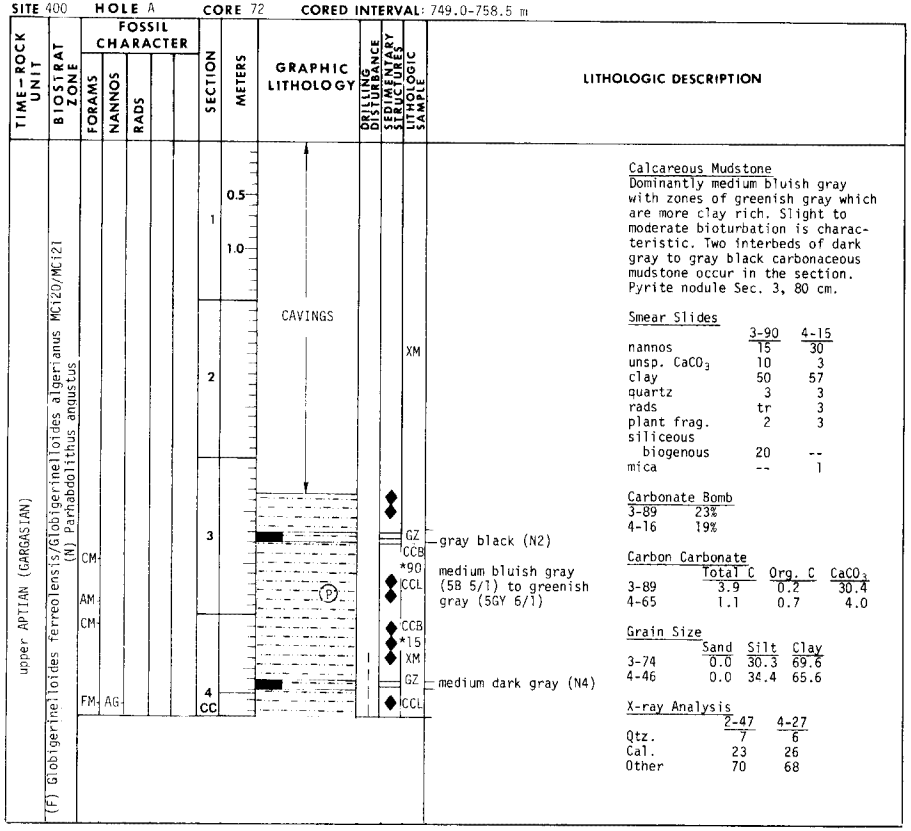
Grain Size

	Sand	Silt	Clay
1-54	0.6	35.2	64.2
2-34	0.4	22.3	77.3

X-ray Analysis

	1-1	2-48 (cc)
Qtz.	6	8
Cal.	24	28
Other	70	64

SITE 400 HOLE A CORE 72 CORED INTERVAL: 749.0-758.5 m



Calcareous Mudstone
Dominantly medium bluish gray with zones of greenish gray which are more clay rich. Slight to moderate bioturbation is characteristic. Two interbeds of dark gray to gray black carbonaceous mudstone occur in the section. Pyrite nodule Sec. 3, 80 cm.

Smear Slides

	3-90	4-15
nannos	15	30
unsp. $CaCO_3$	10	3
clay	50	57
quartz	3	3
rads	tr	3
plant frag.	2	3
siliceous biogenous	20	--
mica	--	1

Carbonate Bomb

3-89	23%
4-16	19%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-89	3.9	0.2	30.4
4-65	1.1	0.7	4.0

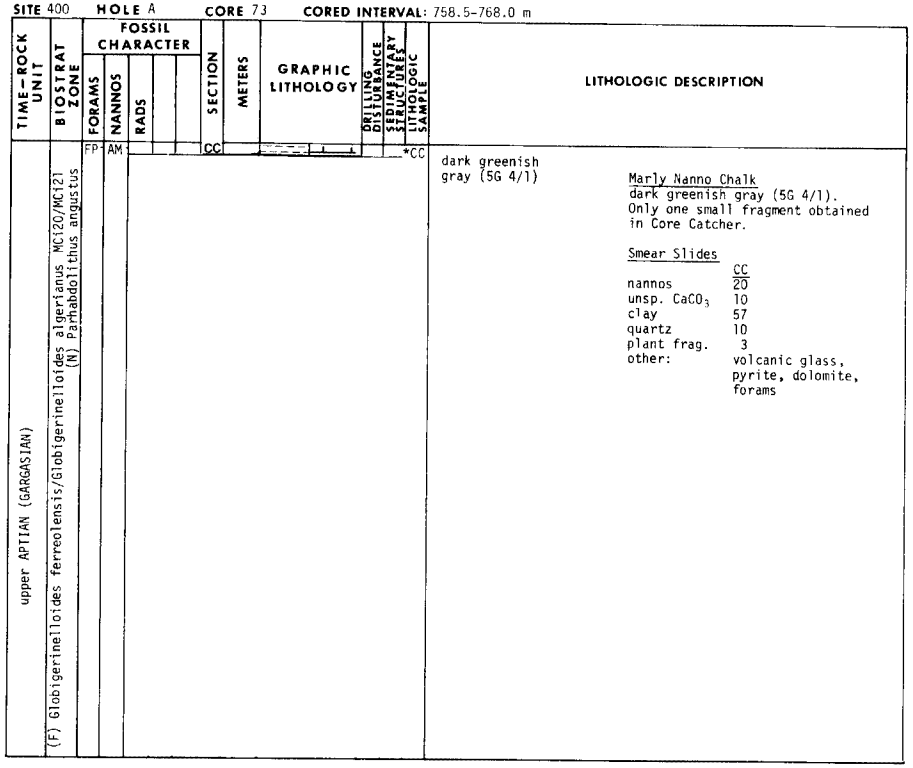
Grain Size

	Sand	Silt	Clay
3-74	0.0	30.3	69.6
4-46	0.0	34.4	65.6

X-ray Analysis

	2-47	4-27
Qtz.	7	6
Cal.	23	26
Other	70	68

SITE 400 HOLE A CORE 73 CORED INTERVAL: 758.5-768.0 m

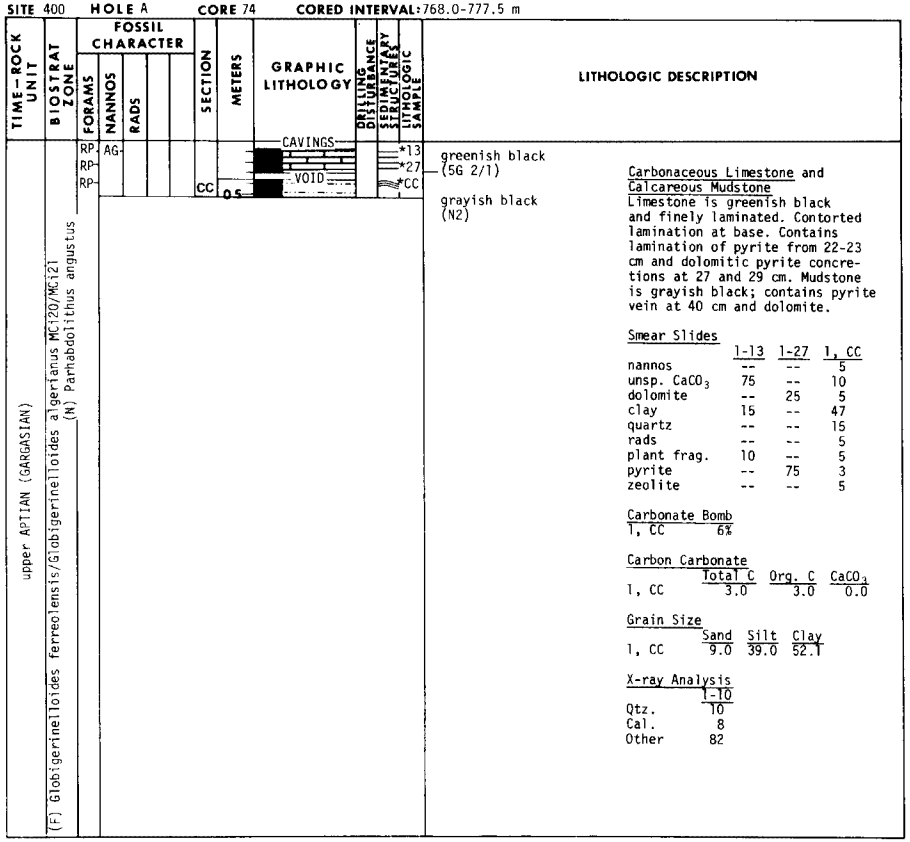


Marly Nanno Chalk
dark greenish gray (5G 4/1). Only one small fragment obtained in Core Catcher.

Smear Slides

	CC
nannos	20
unsp. $CaCO_3$	10
clay	57
quartz	10
plant frag.	3
other:	volcanic glass, pyrite, dolomite, forams

SITE 400 HOLE A CORE 74 CORED INTERVAL: 768.0-777.5 m



Carbonaceous Limestone and Calcareous Mudstone

Limestone is greenish black and finely laminated. Contorted lamination at base. Contains lamination of pyrite from 22-23 cm and dolomitic pyrite concretions at 27 and 29 cm. Mudstone is grayish black; contains pyrite vein at 40 cm and dolomite.

Smear Slides

	1-13	1-27	1, CC
nannos	--	--	5
unsp. $CaCO_3$	75	--	10
dolomite	--	25	5
clay	15	--	47
quartz	--	--	15
rads	--	--	5
plant frag.	10	--	5
pyrite	--	75	3
zeolite	--	--	5

Carbonate Bomb

1, CC	6%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1, CC	3.0	3.0	0.0

Grain Size

	Sand	Silt	Clay
1, CC	9.0	39.0	52.1

X-ray Analysis

	1-10
Qtz.	10
Cal.	8
Other	82

Leg 48 Site 400
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
400	1	1	0.00	0.14	7.1	0.3	56.8
400	1	4	0.00	5.30	2.6	0.6	16.6
400A	1	1	74.50	75.27	5.9	0.3	46.2
400A	1	CC	74.50	76.30	3.2	0.5	22.2
400A	2	1	84.00	84.45	1.6	0.4	10.5
400A	2	4	84.00	88.96	3.8	0.3	28.4
400A	2	6	84.00	92.41	7.3	0.2	59.3
400A	3	1	93.50	94.28	7.5	0.2	60.7
400A	4	4	103.00	107.86	6.2	0.3	49.3
400A	5	1	112.50	113.50	6.7	0.2	54.3
400A	6	1	122.00	122.08	3.9	0.4	29.2
400A	6	2	122.00	123.93	7.9	0.2	64.1
400A	7	1	131.50	131.64	6.8	0.3	54.1
400A	7	1	131.50	132.46	7.1	0.3	57.2
400A	8	1	141.00	141.04	4.4	0.4	33.3
400A	8	2	141.00	143.23	7.8	0.2	64.0
400A	8	5	141.00	147.89	6.9	0.2	55.6
400A	9	2	150.50	153.00	8.2	0.1	66.9
400A	9	5	150.50	157.52	7.4	0.2	60.1
400A	10	2	160.00	162.64	7.3	0.2	58.9
400A	11	2	169.50	171.37	8.0	0.1	65.6
400A	12	3	179.00	182.53	6.9	0.3	55.3
400A	12	5	179.00	186.07	7.6	0.2	62.1
400A	13	1	188.50	189.40	7.8	0.2	63.7
400A	13	4	188.50	194.05	7.2	0.2	58.9
400A	14	2	198.00	200.78	8.7	0.1	71.6
400A	15	3	207.50	211.60	8.8	0.1	71.9
400A	15	4	207.50	213.39	7.8	0.1	64.0
400A	16	CC	217.00	217.80	7.4	0.2	60.0
400A	17	2	226.50	228.45	8.4	0.1	69.2
400A	17	4	226.50	231.54	7.9	0.1	65.0
400A	18	2	236.00	238.37	7.8	0.1	64.0
400A	18	5	236.00	242.78	8.1	0.1	66.8
400A	19	2	245.50	248.15	8.1	0.1	66.8
400A	19	4	245.50	251.04	9.5	0.1	78.0
400A	20	2	255.00	257.31	8.2	0.1	67.5
400A	20	5	255.00	261.98	7.8	0.1	64.2
400A	21	4	264.50	269.74	7.9	0.1	65.3
400A	22	6	274.00	282.00	7.0	0.1	57.7
400A	23	3	283.50	287.85	5.5	0.2	44.2
400A	24	6	293.00	301.06	8.6	0.1	70.5
400A	25	3	302.50	306.71	8.6	0.1	70.5
400A	25	6	302.50	311.21	7.2	0.1	59.0
400A	26	3	312.00	315.60	8.3	0.1	68.2
400A	27	1	321.50	322.76	10.3	0.1	85.7
400A	29	1	340.50	341.75	8.0	0.1	65.7
400A	30	1	350.00	350.41	10.1	0.1	83.2
400A	31	1	359.50	359.90	11.0	0.0	91.4

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Leg 48 Site 400
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
400A	32	CC	369.00	371.05	8.9	0.1	73.7
400A	35	3	397.50	401.48	7.0	0.1	57.5
400A	36	1	407.00	407.84	9.1	0.1	75.3
400A	36	2	407.00	409.25	4.9	0.1	39.5
400A	37	1	416.50	417.39	9.2	0.1	75.9
400A	37	4	416.50	421.24	6.8	0.1	55.8
400A	38	1	426.00	427.45	9.5	0.1	78.8
400A	39	1	435.50	435.76	7.7	0.1	63.9
400A	39	3	435.50	439.36	9.4	0.1	77.6
400A	40	1	445.00	445.34	3.0	0.1	24.2
400A	40	2	445.00	447.16	8.3	0.1	68.0
400A	41	1	454.50	454.77	7.9	0.1	65.4
400A	43	1	473.50	473.77	5.7	0.1	47.1
400A	43	5	473.50	480.49	7.8	0.1	64.2
400A	44	1	483.00	483.30	8.6	0.1	71.5
400A	44	1	483.00	483.62	8.7	0.1	71.7
400A	45	2	492.50	494.67	9.4	0.1	77.7
400A	45	5	492.50	498.61	4.5	0.1	37.0
400A	46	3	502.00	506.31	7.4	0.1	60.9
400A	46	5	502.00	508.62	7.0	6.5	3.7
400A	47	1	511.50	512.38	2.9	0.1	23.2
400A	47	6	511.50	519.83	2.8	0.1	23.0
400A	48	2	521.00	523.82	1.3	0.1	10.3
400A	49	1	530.50	531.24	3.7	0.1	29.8
400A	49	4	530.50	535.86	2.1	0.1	17.0
400A	50	4	540.00	545.58	1.6	0.1	12.4
400A	51	1	549.50	550.80	2.5	0.1	20.0
400A	51	5	549.50	556.47	4.4	0.5	32.2
400A	52	1	559.00	560.08	7.0	0.1	57.7
400A	52	4	559.00	564.46	4.3	0.1	35.6
400A	52	5	559.00	565.38	2.0	0.1	16.2
400A	53	1	568.50	569.21	1.2	0.1	9.4
400A	53	1	568.50	569.34	2.7	0.1	22.2
400A	54	2	578.00	580.69	3.0	0.1	24.3
400A	54	3	578.00	582.21	4.7	0.1	38.8
400A	55	2	587.50	589.88	6.4	0.1	53.0
400A	56	2	597.00	598.79	9.2	0.1	75.8
400A	57	2	606.50	608.18	2.9	0.1	23.0
400A	59	1	625.50	625.91	7.9	0.1	65.7
400A	60	6	635.00	643.83	10.6	0.0	88.1
400A	61	CC	644.50	654.01	6.0	0.1	49.1
400A	62	1	654.00	654.69	5.6	0.1	45.8
400A	62	4	654.00	658.86	6.6	1.2	44.8
400A	62	4	654.00	659.60	6.7	0.5	51.7
400A	63	3	663.50	666.77	6.0	0.1	49.1
400A	63	3	663.50	667.47	9.4	2.8	54.3
400A	64	3	673.00	676.33	3.7	0.2	28.6
400A	64	3	673.00	676.90	3.6	3.3	2.7

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Leg 48 Site 400
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
400A	65	1	682.50	682.72	2.1	1.0	8.8
400A	66	1	692.00	692.61	3.2	0.3	23.9
400A	66	3	692.00	695.62	2.6	0.3	19.0
400A	66	4	692.00	696.71	2.2	1.6	4.9
400A	67	CC	701.50	701.85	2.4	1.8	5.4
400A	68	2	711.00	713.16	2.5	0.2	18.5
400A	69	CC	720.50	722.04	6.2	0.3	48.9
400A	70	CC	730.00	732.69	2.1	0.4	14.1
400A	71	1	739.50	739.85	3.8	0.3	29.5
400A	71	1	739.50	740.39	4.2	0.3	31.9
400A	72	3	749.00	752.89	3.9	0.2	30.4
400A	72	4	749.00	754.15	1.1	0.7	4.0
400A	74	CC	768.00	768.39	3.0	3.0	0.0

#

Leg 48 Site 400
DSDP Shore Laboratory Grain Size Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Sand	Silt	Clay
400	1	1	0.00	0.24	2.5	35.9	61.6
400	1	4	0.00	5.34	2.1	24.2	73.8
400A	1	1	74.50	75.28	1.9	30.0	68.2
400A	2	1	84.00	84.99	1.0	40.1	58.9
400A	2	3	84.00	87.94	3.1	30.7	66.3
400A	3	3	93.50	97.30	2.2	32.4	65.4
400A	4	4	103.00	107.78	1.8	36.6	61.6
400A	5	1	112.50	113.48	2.0	32.0	66.0
400A	6	1	122.00	122.20	0.6	33.5	65.9
400A	7	1	131.50	132.55	0.4	37.2	62.4
400A	8	2	141.00	143.20	0.5	35.5	64.0
400A	8	5	141.00	147.94	1.4	31.9	66.7
400A	9	2	150.50	153.04	0.9	36.7	62.3
400A	9	5	150.50	157.66	0.4	30.6	69.0
400A	10	2	160.00	162.51	0.5	35.3	64.2
400A	11	2	169.50	171.26	0.2	21.0	78.8
400A	12	6	179.00	187.72	1.2	31.6	67.2
400A	13	1	188.50	189.44	1.7	32.2	66.1
400A	13	4	188.50	194.08	0.8	29.1	70.1
400A	14	2	198.00	200.74	1.4	33.3	65.4
400A	15	3	207.50	211.57	0.1	37.3	62.6
400A	15	4	207.50	213.36	0.4	31.0	68.7
400A	17	2	226.50	228.42	0.1	26.8	73.1
400A	17	4	226.50	231.44	0.1	32.6	67.3
400A	18	2	236.00	238.19	0.1	23.1	76.8
400A	18	5	236.00	242.90	0.3	31.6	68.1
400A	19	2	245.50	248.19	0.1	36.4	63.5
400A	19	4	245.50	250.98	0.1	24.1	75.8
400A	20	2	255.00	257.42	0.1	30.1	69.8
400A	20	5	255.00	262.00	0.0	20.9	79.0
400A	21	4	264.50	269.90	0.2	23.1	76.7
400A	22	4	274.00	279.64	0.1	20.4	79.6
400A	23	3	283.50	287.75	0.1	22.3	77.6
400A	24	6	293.00	301.62	0.3	36.2	63.5
400A	25	3	302.50	306.68	0.2	26.8	73.1
400A	25	6	302.50	311.09	0.2	24.8	75.0
400A	26	3	312.00	315.64	0.5	24.6	74.8
400A	27	1	321.50	322.43	0.1	45.8	54.1
400A	29	1	340.50	341.82	0.1	18.9	81.0
400A	30	1	350.00	350.38	0.4	36.6	62.9
400A	31	1	359.50	360.04	0.3	41.9	57.8
400A	35	3	397.50	401.64	0.1	23.0	76.9
400A	36	1	407.00	407.85	0.2	43.2	56.6
400A	37	1	416.50	417.51	0.2	35.9	63.9
400A	37	4	416.50	421.25	0.1	26.8	73.1
400A	38	CC	426.00	427.76	0.3	24.7	75.0
400A	39	1	435.50	435.69	0.1	39.8	60.0
400A	40	1	445.00	445.43	0.3	39.8	59.9

#

Leg 48 Site 400
DSDP Shore Laboratory Grain Size Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Sand	Silt	Clay
400A	41	1	454.50	454.84	0.2	24.8	75.0
400A	43	1	473.50	473.81	0.3	40.1	59.7
400A	43	5	473.50	480.50	0.7	49.4	49.9
400A	45	2	492.50	494.75	0.6	56.6	42.8
400A	45	5	492.50	498.59	4.6	29.3	66.1
400A	46	4	502.00	507.31	0.9	47.4	51.8
400A	46	5	502.00	508.63	0.5	41.0	58.5
400A	47	1	511.50	512.33	1.1	27.2	71.7
400A	47	6	511.50	519.82	1.2	33.8	65.0
400A	48	2	521.00	523.75	1.4	26.2	72.4
400A	49	2	530.50	532.93	1.9	27.1	71.0
400A	49	4	530.50	535.82	1.5	26.9	71.6
400A	50	4	540.00	545.60	3.5	26.8	69.8
400A	51	1	549.50	549.64	2.7	24.8	72.5
400A	51	5	549.50	556.59	2.7	35.9	61.3
400A	52	1	559.00	560.05	2.9	34.2	63.0
400A	52	4	559.00	564.41	6.1	34.2	59.7
400A	53	1	568.50	569.39	2.4	42.7	54.9
400A	54	1	578.00	579.12	11.9	22.9	65.1
400A	54	3	578.00	582.07	6.4	39.5	54.2
400A	55	2	587.50	589.47	6.2	33.9	59.9
400A	56	2	597.00	599.17	0.1	32.0	67.9
400A	57	2	606.50	608.14	1.2	30.4	68.4
400A	59	CC	625.50	626.44	1.6	31.5	66.8
400A	60	7	635.00	644.06	0.1	32.1	67.8
400A	61	CC	644.50	654.01	0.1	18.0	82.0
400A	62	1	654.00	654.53	3.4	30.7	65.9
400A	62	2	654.00	656.67	4.0	38.4	57.6
400A	62	4	654.00	659.58	2.9	40.2	56.9
400A	63	2	663.50	666.08	1.6	31.5	66.8
400A	63	CC	663.50	669.33	1.8	32.2	66.0
400A	64	2	673.00	675.03	1.2	23.9	74.9
400A	64	3	673.00	676.90	1.4	44.7	53.9
400A	65	1	682.50	682.65	2.1	33.9	64.0
400A	66	3	692.00	695.00	0.1	26.9	73.1
400A	66	4	692.00	697.23	1.6	32.9	65.5
400A	67	CC	701.50	701.85	2.0	37.6	60.4
400A	68	1	711.00	711.80	0.1	26.1	73.8
400A	68	2	711.00	713.28	0.0	37.5	62.5
400A	69	1	720.50	721.70	0.1	5.0	94.9
400A	70	CC	730.00	732.69	0.1	34.4	65.5
400A	71	1	739.50	740.04	0.6	35.2	64.2
400A	71	2	739.50	741.34	0.4	22.3	77.3
400A	72	3	749.00	752.74	0.0	30.3	69.6
400A	72	4	749.00	753.96	0.0	34.3	65.6
400A	74	CC	768.00	768.39	9.0	39.0	52.1

DEEP SEA DRILLING PROJECT
LEG 48 SITE 401
SITE SUMMARY SHEET

Date occupied	0315 June 6, 1976
Date departed	0915 June 10, 1976
Time on site	3.75 days
Position: latitude	47°25.65'N
longitude	08°48.62'W
Water depth (sea level)	2495 corrected meters, echo sounding
Water depth (rig floor)	2504 corrected meters, echo sounding
bottom felt at	2555.5 meters, drill pipe
Penetration	341 meters
Number of holes	1
Number of cores	28
Total length of cored section	265 meters
Total core recovered	103.22 meters
Percentage of core recovery	38.7%
Oldest Sediment Cored	
Depth subbottom	341 meters
Nature	Reefal carbonates
Age	Upper Jurassic
Basement	Not reached

PRINCIPAL RESULTS:

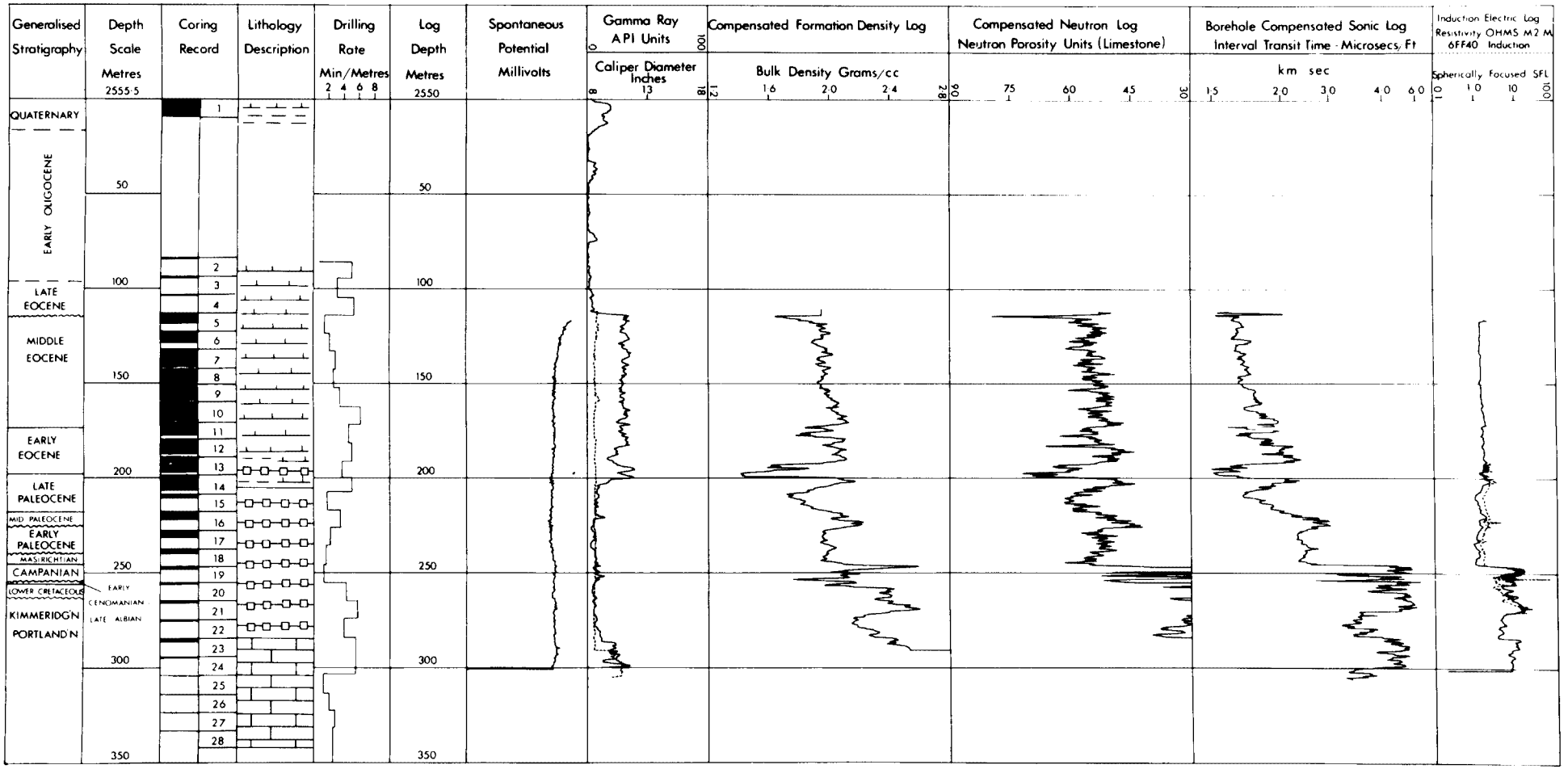
Site 401 was situated on a horst beneath the southern edge of the Meriadzek Terrace on the northern Biscay continental margin. The site was cored continuously below 84.5 meters and terminated in Kimmeridgian-Portlandian shallow water carbonates at 341 meters.

Four lithologic units were distinguished: Unit 1 (0 to 84.5 meters) is composed of Quaternary to late Eocene ooze; Unit 2 (84.5 to 174 meters) ranges in age from late Eocene to middle Eocene and is composed of greenish gray nanno chalk, often siliceous and/or marly; Unit 3 (174 to 247 meters) consists of yellowish brown to brown nanno chalk and marly chalk of early Eocene to Late Cretaceous age; Unit 4 (247 to 341 meters) ranges in age from Early Cretaceous(?) to Upper Jurassic (Kimmeridgian) and is composed of moderately to well cemented limestone with bioclasts of large sponge spicules, algae, corals, echinoderms and bryozoans.

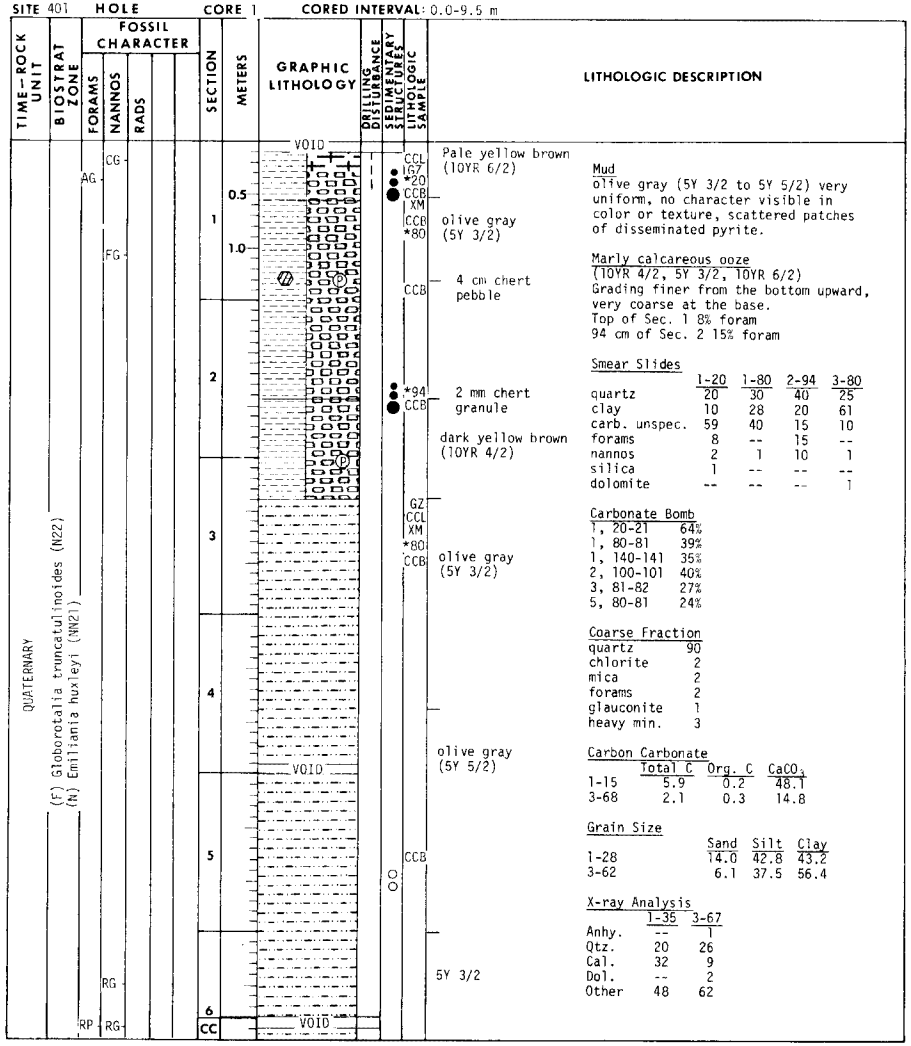
The presence of shallow water Early Cretaceous carbonates demonstrates that high relief existed at the end of the rifting phase of the margin. Subsidence of the margin to bathyal depths started after the Albian because the Campanian-Maestrichtian chalks were deposited at 1500 meters depth and the Eocene sediments at lower bathyal depths. Discovery of a reefal environment in the Kimmeridgian-Portlandian suggests either the existence of a large carbonate platform dissected by rifting or reefal buildups of limited extent on bathymetric highs. Preservation of calcareous microfossils was excellent demonstrating that the CCD was located between Sites 400A and 401 during Cenozoic. Abundance of sponge spicules after the early Eocene at this site as well as Site 400A indicates a time of high silica and carbonate productivity as well as carbonate dissolution.

A complete set of logging was successfully run in this hole.

DOWNHOLE LOGS AND GENERALIZED STRATIGRAPHY
DSDP LEG 48 SITE 401



SITE 401 HOLE CORE 1 CORED INTERVAL: 0.0-9.5 m



Pale yellow brown (10YR 6/2)

olive gray (5Y 3/2)

4 cm chert pebble

2 mm chert granule

dark yellow brown (10YR 4/2)

olive gray (5Y 3/2)

olive gray (5Y 5/2)

Mud
olive gray (5Y 3/2 to 5Y 5/2) very uniform, no character visible in color or texture, scattered patches of disseminated pyrite.

Marly calcareous ooze
(10YR 4/2, 5Y 3/2, 10YR 6/2)
Grading finer from the bottom upward, very coarse at the base.
Top of Sec. 1 8% foram
94 cm of Sec. 2 15% foram

Smear Slides

	1-20	1-80	2-94	3-80
quartz	20	30	40	25
clay	10	28	20	61
carb. unspec.	59	40	15	10
forams	8	--	15	--
nannos	2	1	10	1
silica	1	--	--	--
dolomite	--	--	--	1

Carbonate Bomb

1, 20-21	64%
1, 80-81	39%
1, 140-141	35%
2, 100-101	40%
3, 81-82	27%
5, 80-81	24%

Coarse Fraction

quartz	90
chlorite	2
mica	2
forams	2
glauconite	1
heavy min.	3

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-15	5.9	0.2	48.1
3-68	2.1	0.3	14.8

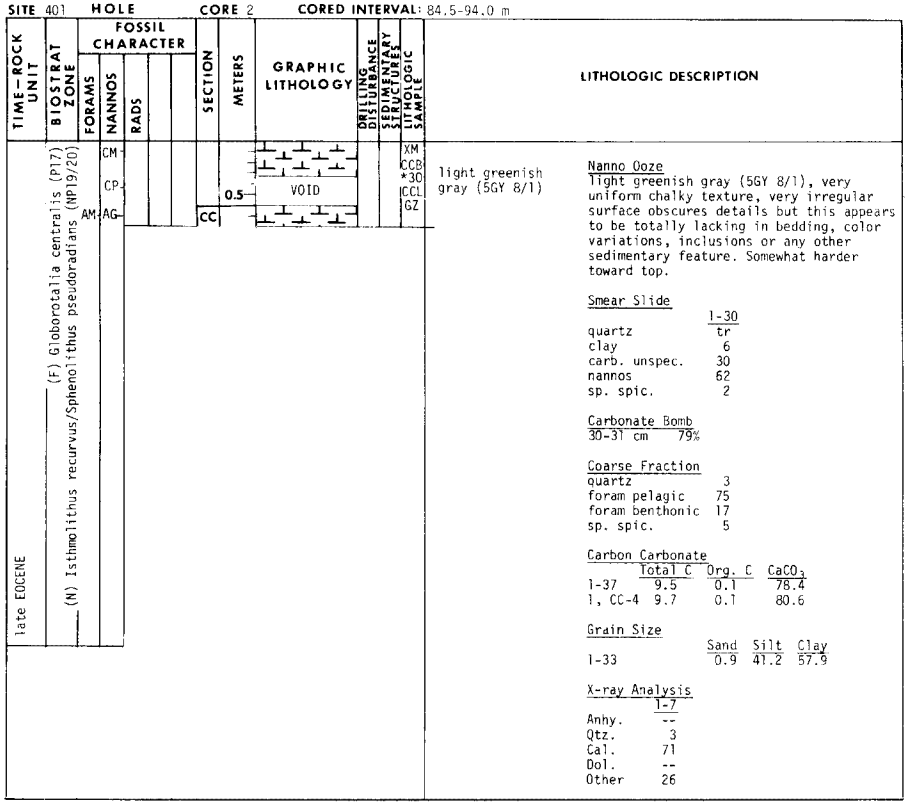
Grain Size

	Sand	Silt	Clay
1-28	14.0	42.8	43.2
3-62	6.1	37.5	56.4

X-ray Analysis

	1-35	3-67
Anhy.	--	1
Qtz.	20	26
Cal.	32	9
Dol.	--	2
Other	48	62

SITE 401 HOLE CORE 2 CORED INTERVAL: 84.5-94.0 m



light greenish gray (5GY 8/1)

Nanno Ooze
light greenish gray (5GY 8/1), very uniform chalky texture, very irregular surface obscures details but this appears to be totally lacking in bedding, color variations, inclusions or any other sedimentary feature. Somewhat harder toward top.

Smear Slide

	1-30
quartz	tr
clay	6
carb. unspec.	30
nannos	62
sp. spic.	2

Carbonate Bomb
30-31 cm 79%

Coarse Fraction

quartz	3
foram pelagic	75
foram benthonic	17
sp. spic.	5

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-37	9.5	0.1	78.4
1, CC-4	9.7	0.1	80.6

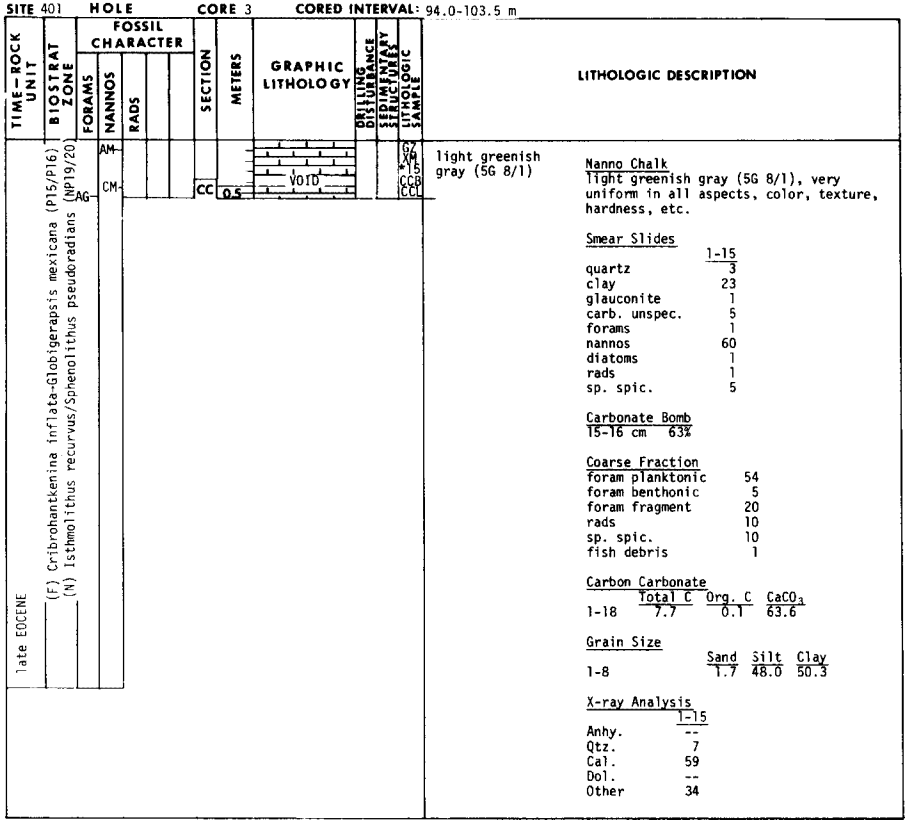
Grain Size

	Sand	Silt	Clay
1-33	0.9	41.2	57.9

X-ray Analysis

	1-7
Anhy.	--
Qtz.	3
Cal.	71
Dol.	--
Other	26

SITE 401 HOLE CORE 3 CORED INTERVAL: 94.0-103.5 m



Nanno Chalk
light greenish gray (5G 8/1), very uniform in all aspects, color, texture, hardness, etc.

Smear Slides

	1-15
quartz	3
clay	23
glauconite	1
carb. unspec.	5
forams	1
nannos	60
diatoms	1
rads	1
sp. spic.	5

Carbonate Bomb
15-16 cm 63%

Coarse Fraction

foram planktonic	54
foram benthonic	5
foram fragment	20
rads	10
sp. spic.	10
fish debris	1

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-18	7.7	0.1	63.6

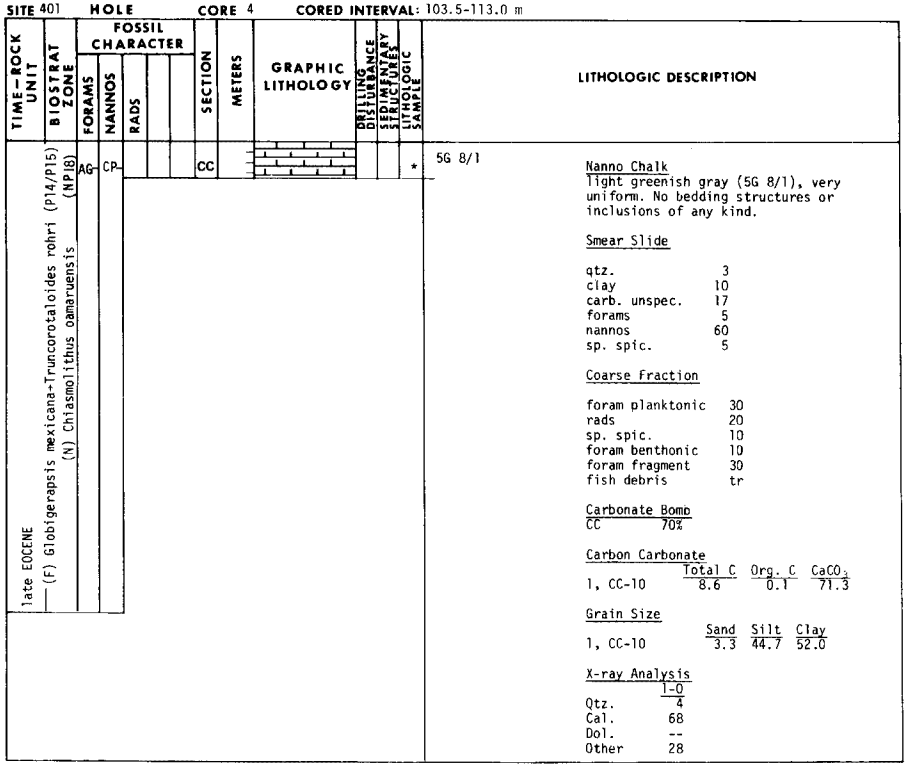
Grain Size

	Sand	Silt	Clay
1-8	1.7	48.0	50.3

X-ray Analysis

	1-15
Anhy.	--
Qtz.	7
Cal.	59
Dol.	--
Other	34

SITE 401 HOLE CORE 4 CORED INTERVAL: 103.5-113.0 m



Nanno Chalk
light greenish gray (5G 8/1), very uniform. No bedding structures or inclusions of any kind.

Smear Slide

qtz.	3
clay	10
carb. unspec.	17
forams	5
nannos	60
sp. spic.	5

Coarse Fraction

foram planktonic	30
rads	20
sp. spic.	10
foram benthonic	10
foram fragment	30
fish debris	tr

Carbonate Bomb
CC 70%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1, CC-10	8.6	0.1	71.3

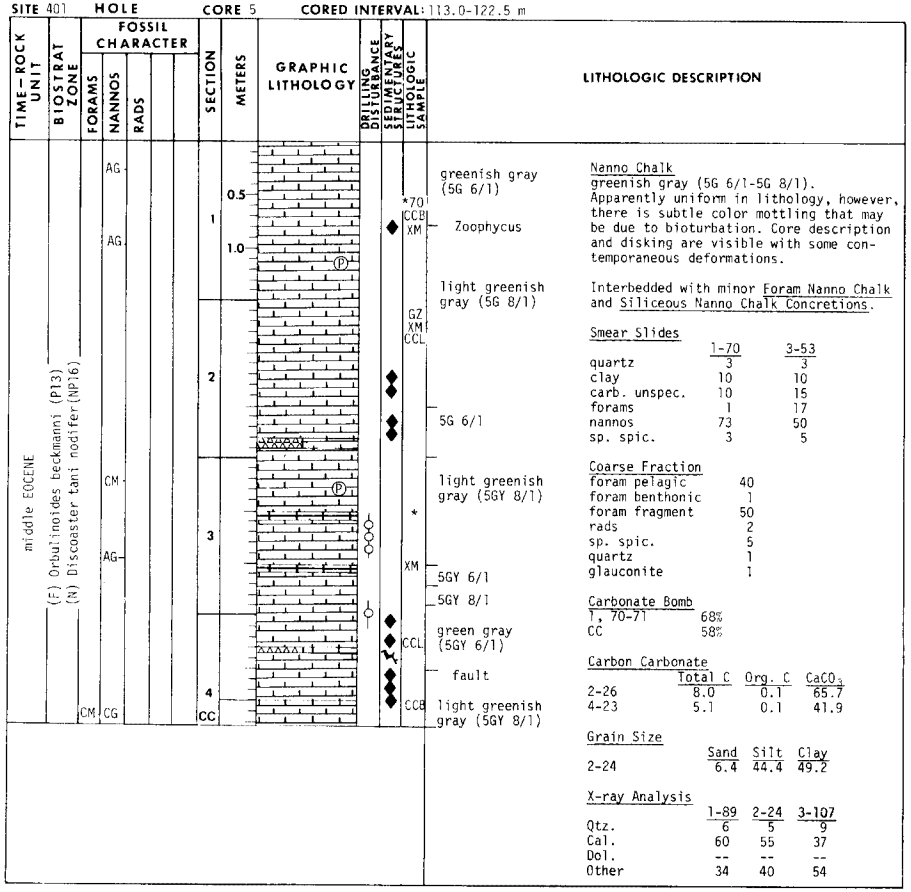
Grain Size

	Sand	Silt	Clay
1, CC-10	3.3	44.7	52.0

X-ray Analysis

	1-0
Qtz.	4
Cal.	68
Dol.	--
Other	28

SITE 401 HOLE CORE 5 CORED INTERVAL: 113.0-122.5 m



greenish gray (5G 6/1)

Zoophycus

light greenish gray (5G 8/1)

light greenish gray (5GY 8/1)

green gray (5GY 6/1)

light greenish gray (5GY 8/1)

Nanno Chalk
greenish gray (5G 6/1-5G 8/1). Apparently uniform in lithology, however, there is subtle color mottling that may be due to bioturbation. Core description and disking are visible with some contemporaneous deformations.

Interbedded with minor Foram Nanno Chalk and Siliceous Nanno Chalk Concretions.

Smear Slides

	1-70	3-53
quartz	3	3
clay	10	10
carb. unspec.	10	15
forams	1	17
nannos	73	50
sp. spic.	3	5

Coarse Fraction

foram pelagic	40
foram benthonic	1
foram fragment	50
rads	2
sp. spic.	5
quartz	1
glauconite	1

Carbonate Bomb

1, 70-71	68%
CC	58%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-26	8.0	0.1	65.7
4-23	5.1	0.1	41.9

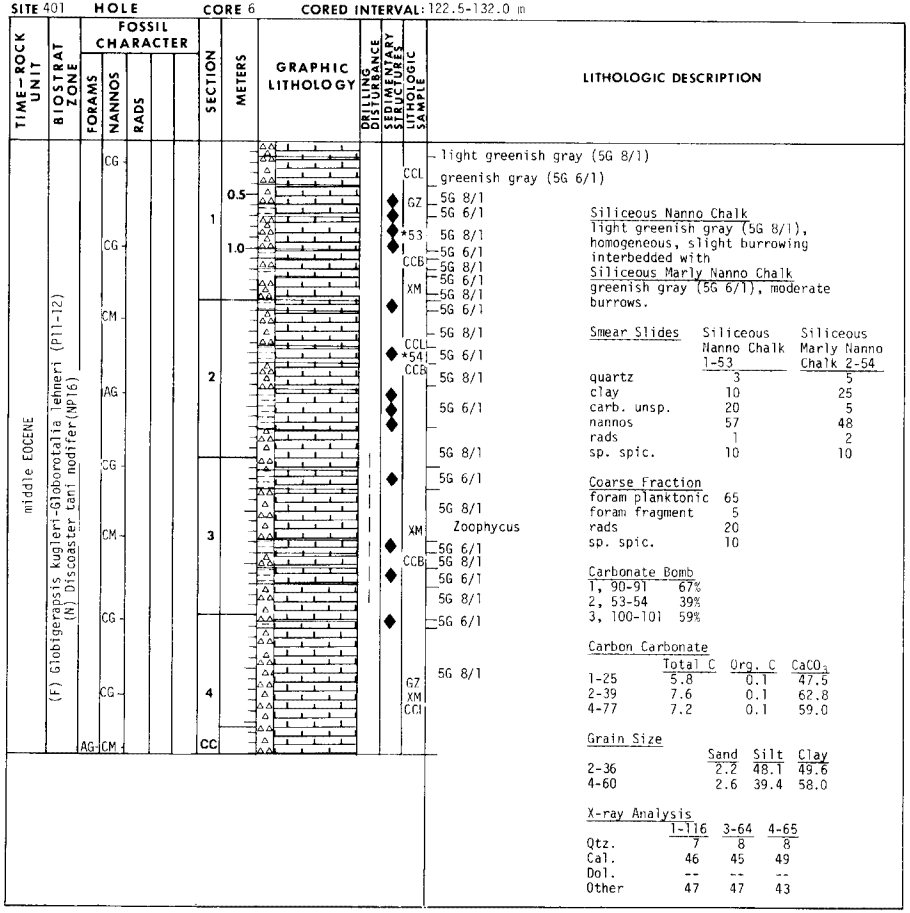
Grain Size

	Sand	Silt	Clay
2-24	6.4	44.4	49.2

X-ray Analysis

	1-89	2-24	3-107
Qtz.	6	5	9
Cal.	60	55	37
Dol.	--	--	--
Other	34	40	54

SITE 401 HOLE CORE 6 CORED INTERVAL: 122.5-132.0 m



light greenish gray (5G 8/1)

greenish gray (5G 6/1)

Zoophycus

Siliceous Nanno Chalk
light greenish gray (5G 8/1), homogeneous, slight burrowing interbedded with
Siliceous Marly Nanno Chalk
greenish gray (5G 6/1), moderate burrows.

Smear Slides

	Siliceous Nanno Chalk 1-53	Siliceous Marly Nanno Chalk 2-54
quartz	3	5
clay	10	25
carb. unsp.	20	5
nannos	57	48
rads	1	2
sp. spic.	10	10

Coarse Fraction

foram planktonic	65
foram fragment	5
rads	20
sp. spic.	10

Carbonate Bomb

1, 90-91	67%
2, 53-54	39%
3, 100-101	59%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-25	5.8	0.1	47.5
2-39	7.6	0.1	62.8
4-77	7.2	0.1	59.0

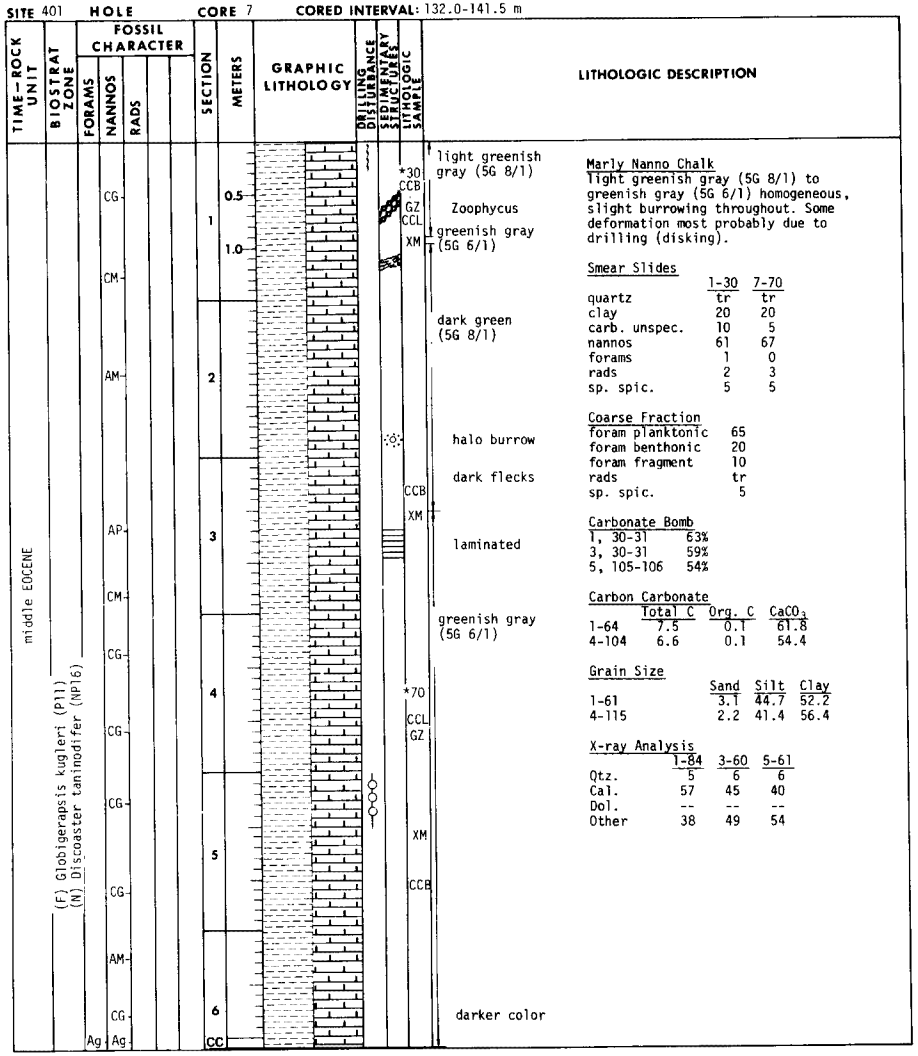
Grain Size

	Sand	Silt	Clay
2-36	2.2	48.1	49.6
4-60	2.6	39.4	58.0

X-ray Analysis

	1-116	3-64	4-65
Qtz.	7	8	8
Cal.	46	45	49
Dol.	--	--	--
Other	47	47	43

SITE 401 HOLE CORE 7 CORED INTERVAL: 132.0-141.5 m



Marly Nanno Chalk
light greenish gray (5G 8/1) to greenish gray (5G 6/1) homogeneous, slight burrowing throughout. Some deformation most probably due to drilling (disking).

Smear Slides

	1-30	7-70
quartz	tr	tr
clay	20	20
carb. unspec.	10	5
nannos	61	67
forams	1	0
rads	2	3
sp. spic.	5	5

Coarse Fraction

foram planktonic	65
foram benthonic	20
foram fragment	10
rads	tr
sp. spic.	5

Carbonate Bomb

1, 30-31	63%
3, 30-31	59%
5, 105-106	54%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-64	7.5	0.1	61.8
4-104	6.6	0.1	54.4

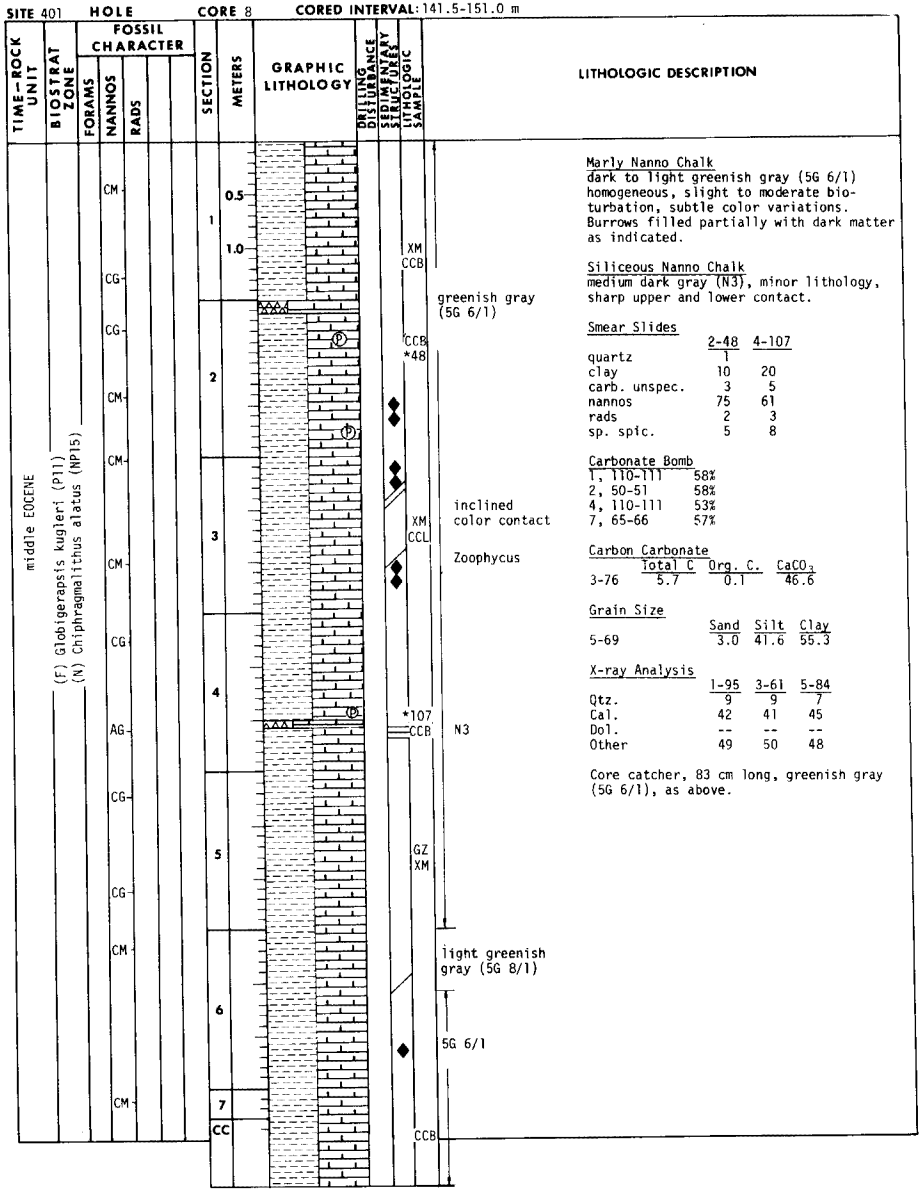
Grain Size

	Sand	Silt	Clay
1-61	3.1	44.7	52.2
4-115	2.2	41.4	56.4

X-ray Analysis

	1-84	3-60	5-61
Qtz.	5	6	6
Cal.	57	45	40
Dol.	--	--	--
Other	38	49	54

SITE 401 HOLE CORE 8 CORED INTERVAL: 141.5-151.0 m



Marly Nanno Chalk
dark to light greenish gray (5G 6/1) homogeneous, slight to moderate bioturbation, subtle color variations. Burrows filled partially with dark matter as indicated.

Siliceous Nanno Chalk
medium dark gray (N3), minor lithology, sharp upper and lower contact.

Smear Slides

	2-48	4-107
quartz	1	
clay	10	20
carb. unspec.	3	5
nannos	75	61
rads	2	3
sp. spic.	5	8

Carbonate Bomb

1, 110-111	58%
2, 50-51	58%
4, 110-111	53%
7, 65-66	57%

Carbon Carbonate

	Total C	Org. C.	$CaCO_3$
3-76	5.7	0.1	46.6

Grain Size

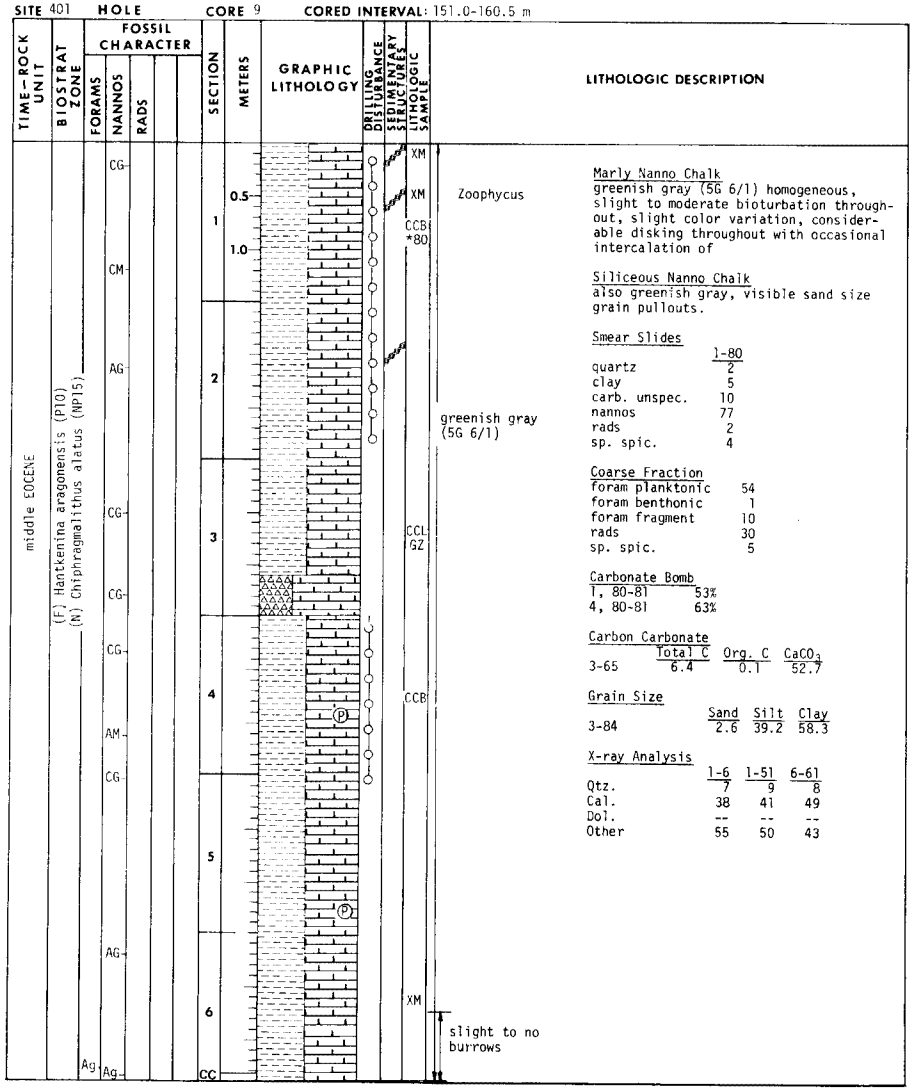
	Sand	Silt	Clay
5-69	3.0	41.6	55.3

X-ray Analysis

	1-95	3-61	5-84
Qtz.	9	9	7
Cal.	42	41	45
Dol.	--	--	--
Other	49	50	48

Core catcher, 83 cm long, greenish gray (5G 6/1), as above.

SITE 401 HOLE CORE 9 CORED INTERVAL: 151.0-160.5 m



LITHOLOGIC DESCRIPTION

Marly Nanno Chalk
greenish gray (5G 6/1) homogeneous, slight to moderate bioturbation throughout, slight color variation, considerable disking throughout with occasional intercalation of

Siliceous Nanno Chalk
also greenish gray, visible sand size grain pullouts.

Smear Slides

	1-80
quartz	2
clay	5
carb. unspec.	10
nannos	77
rads	2
sp. spic.	4

Coarse Fraction

foram planktonic	54
foram benthonic	1
foram fragment	10
rads	30
sp. spic.	5

Carbonate Bomb

1, 80-81	53%
4, 80-81	63%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-65	6.4	0.1	52.7

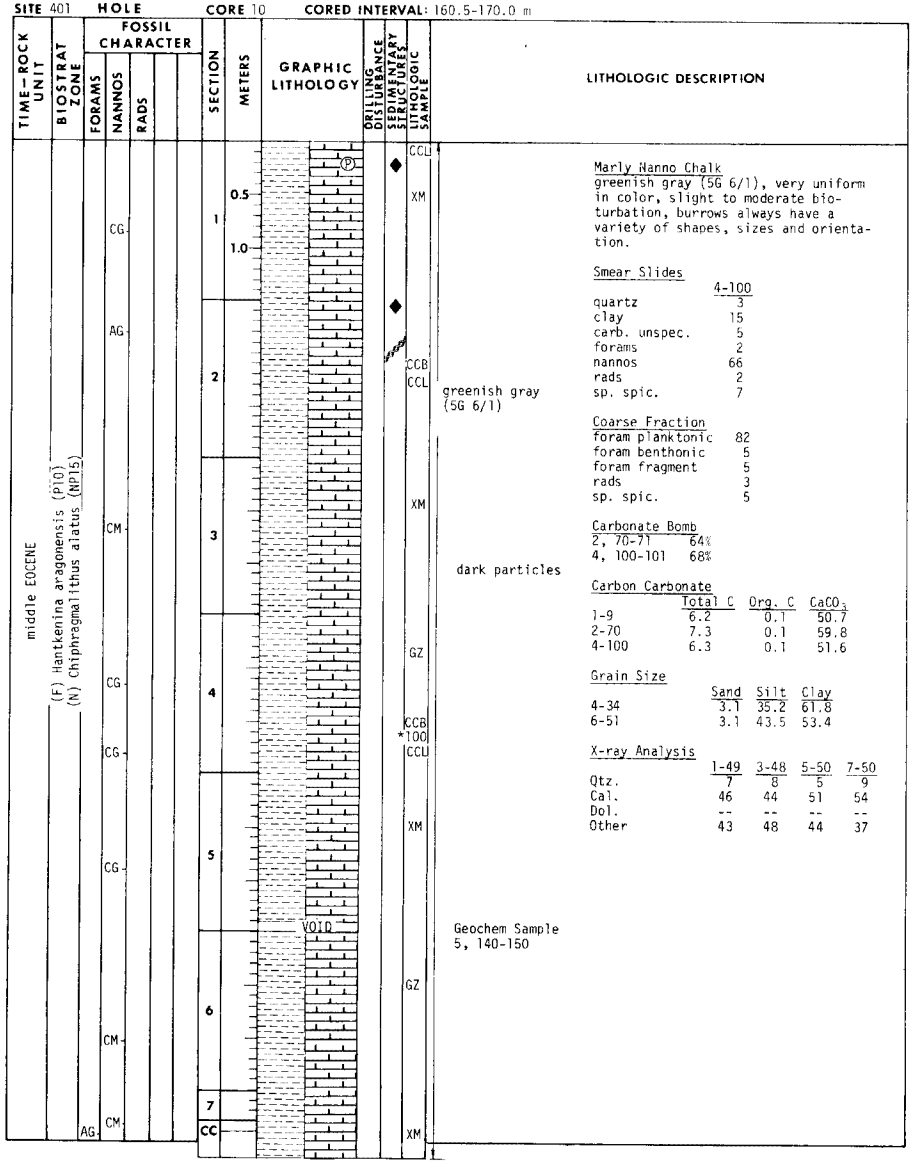
Grain Size

	Sand	Silt	Clay
3-84	2.6	39.2	58.3

X-ray Analysis

	1-6	1-51	6-61
Qtz.	7	9	8
Cal.	38	41	49
Dol.	--	--	--
Other	55	50	43

SITE 401 HOLE CORE 10 CORED INTERVAL: 160.5-170.0 m



LITHOLOGIC DESCRIPTION

Marly Nanno Chalk
greenish gray (5G 6/1), very uniform in color, slight to moderate bioturbation, burrows always have a variety of shapes, sizes and orientation.

Smear Slides

	4-100
quartz	3
clay	15
carb. unspec.	5
forams	2
nannos	66
rads	2
sp. spic.	7

Coarse Fraction

foram planktonic	82
foram benthonic	5
foram fragment	5
rads	3
sp. spic.	5

Carbonate Bomb

2, 70-71	64%
4, 100-101	68%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-9	6.2	0.1	50.7
2-70	7.3	0.1	59.8
4-100	6.3	0.1	51.6

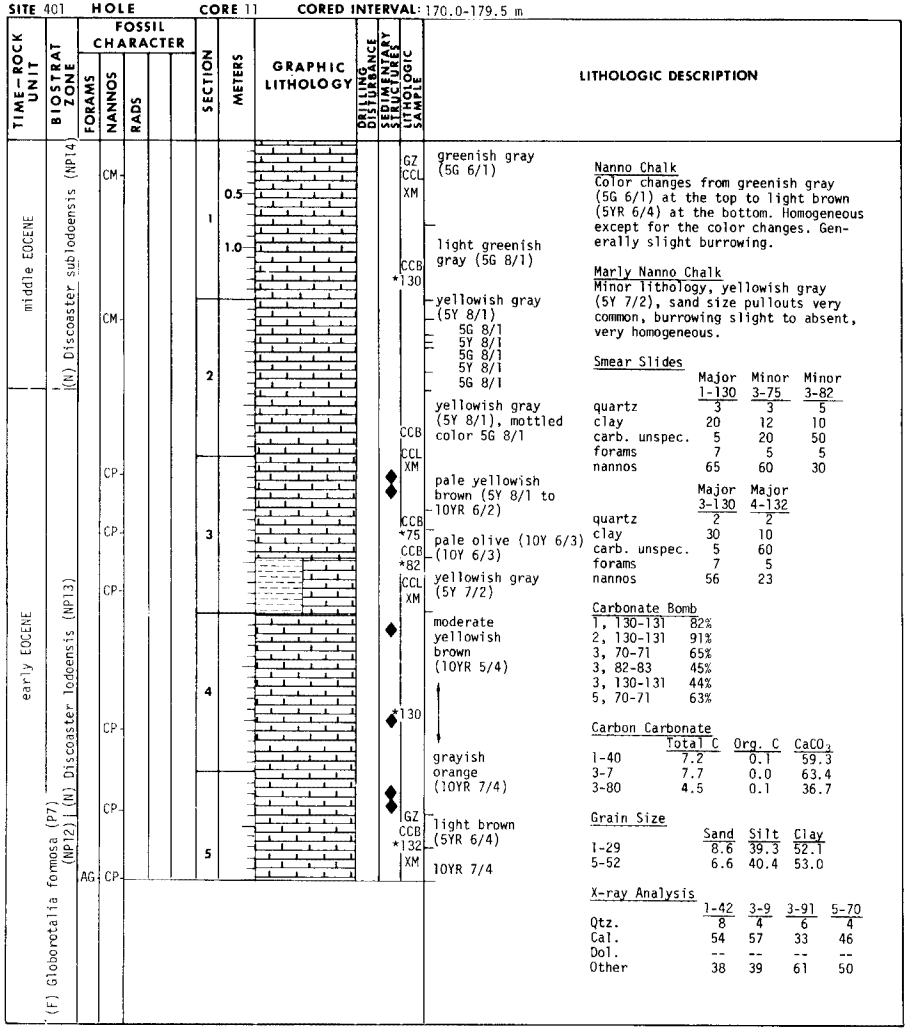
Grain Size

	Sand	Silt	Clay
4-34	3.1	35.2	61.8
6-51	3.1	43.5	53.4

X-ray Analysis

	1-49	3-48	5-50	7-50
Qtz.	7	8	5	9
Cal.	46	44	51	54
Dol.	--	--	--	--
Other	43	48	44	37

SITE 401 HOLE CORE 11 CORED INTERVAL: 170.0-179.5 m



greenish gray (5G 6/1)

light greenish gray (5G 8/1)

yellowish gray (5Y 8/1)
5G 8/1
5Y 8/1
5G 8/1
5Y 8/1
5G 8/1

yellowish gray (5Y 8/1), mottled color 5G 8/1

pale yellowish brown (5Y 8/1 to 10YR 6/2)

pale olive (10Y 6/3)

yellowish gray (5Y 7/2)

moderate yellowish brown (10YR 5/4)

grayish orange (10YR 7/4)

light brown (5YR 6/4)

10YR 7/4

LITHOLOGIC DESCRIPTION

Nanno Chalk
Color changes from greenish gray (5G 6/1) at the top to light brown (5YR 6/4) at the bottom. Homogeneous except for the color changes. Generally slight burrowing.

Marly Nanno Chalk
Minor lithology, yellowish gray (5Y 7/2), sand size pullouts very common, burrowing slight to absent, very homogeneous.

Smear Slides

	Major 1-130	Minor 3-75	Minor 3-82
quartz	3	3	5
clay	20	12	10
carb. unspec.	5	20	50
forams	7	5	5
nannos	65	60	30

	Major 3-130	Major 4-132
quartz	2	2
clay	30	10
carb. unspec.	5	60
forams	7	5
nannos	56	23

Carbonate Bomb

1, 130-131	82%
2, 130-131	91%
3, 70-71	65%
3, 82-83	45%
3, 130-131	44%
5, 70-71	63%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-40	7.2	0.1	59.3
3-7	7.7	0.0	63.4
3-80	4.5	0.1	36.7

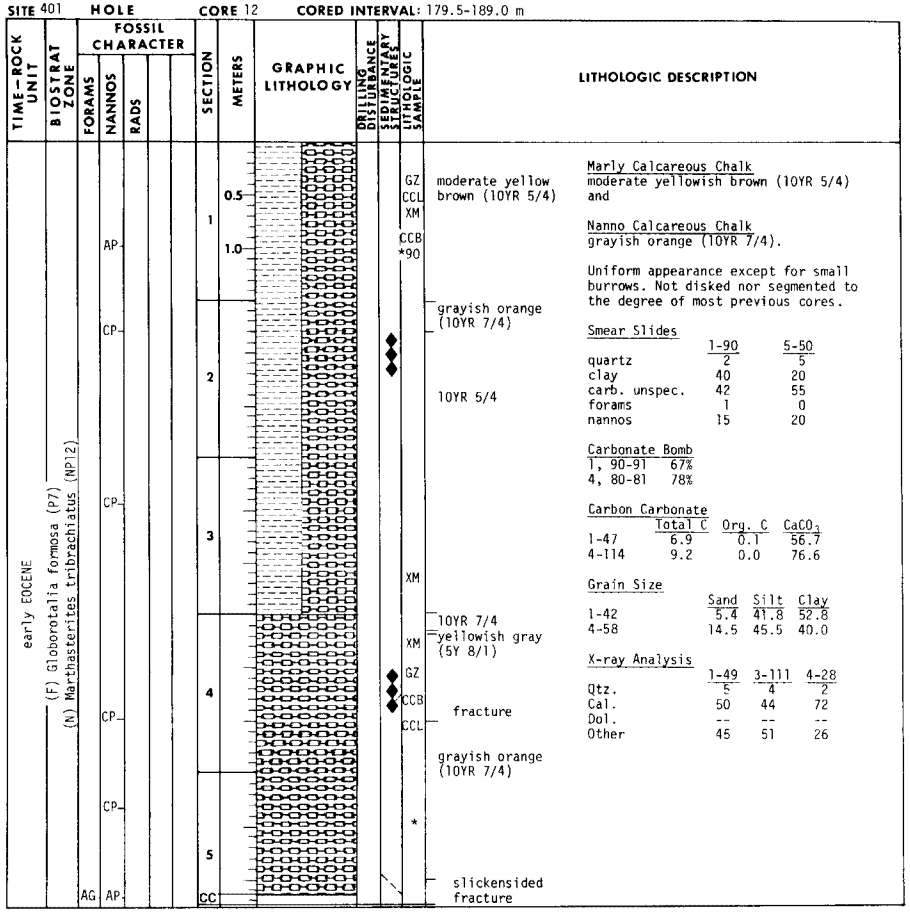
Grain Size

	Sand	Silt	Clay
1-29	8.6	39.3	52.1
5-52	6.6	40.4	53.0

X-ray Analysis

	1-42	3-9	3-91	5-70
Qtz.	8	4	6	4
Cal.	54	57	33	46
Dol.	--	--	--	--
Other	38	39	61	50

SITE 401 HOLE CORE 12 CORED INTERVAL: 179.5-189.0 m



moderate yellow brown (10YR 5/4)

grayish orange (10YR 7/4)

10YR 5/4

10YR 7/4
yellowish gray (5Y 8/1)

fracture

grayish orange (10YR 7/4)

slickensided fracture

LITHOLOGIC DESCRIPTION

Marly Calcareous Chalk
moderate yellowish brown (10YR 5/4) and

Nanno Calcareous Chalk
grayish orange (10YR 7/4).

Uniform appearance except for small burrows. Not disked nor segmented to the degree of most previous cores.

Smear Slides

	1-90	5-50
quartz	2	5
clay	40	20
carb. unspec.	42	55
forams	1	0
nannos	15	20

Carbonate Bomb

1, 90-91	67%
4, 80-81	78%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-47	6.9	0.1	56.7
4-114	9.2	0.0	76.6

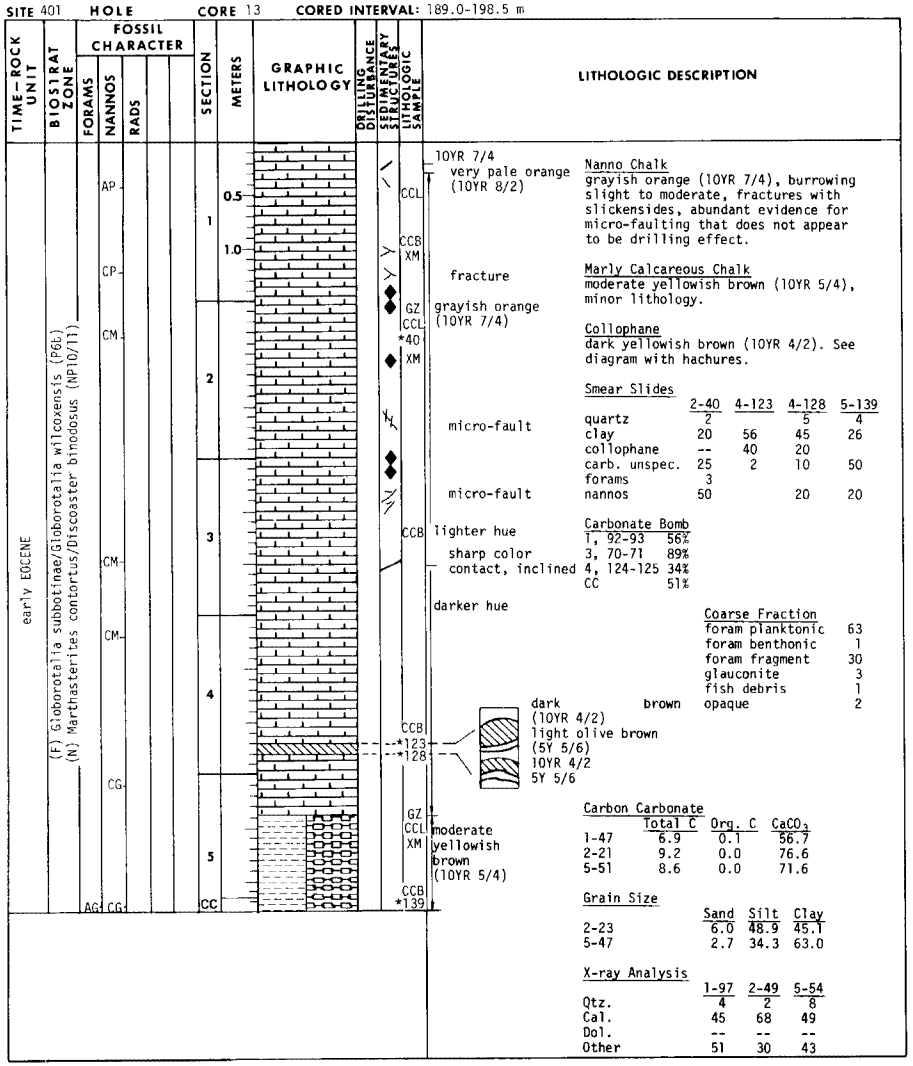
Grain Size

	Sand	Silt	Clay
1-42	5.4	41.8	52.8
4-58	14.5	45.5	40.0

X-ray Analysis

	1-49	3-111	4-28
Qtz.	5	4	2
Cal.	50	44	72
Dol.	--	--	--
Other	45	51	26

SITE 401 HOLE CORE 13 CORED INTERVAL: 189.0-198.5 m



Nanno Chalk
grayish orange (10YR 7/4), burrowing slight to moderate, fractures with slickensides, abundant evidence for micro-faulting that does not appear to be drilling effect.

Marly Calcareous Chalk
moderate yellowish brown (10YR 5/4), minor lithology.

Collophane
dark yellowish brown (10YR 4/2). See diagram with hachures.

Smear Slides

	2-40	4-123	4-128	5-139
quartz	2		5	4
clay	20	56	45	26
collophane	--	40	20	
carb. unspec.	25	2	10	50
forams	3			
nannos	50		20	20

Carbonate Bomb

1, 92-93	56%
3, 70-71	89%
4, 124-125	34%
CC	51%

Coarse Fraction

foram planktonic	63
foram benthonic	1
foram fragment	30
glauconite	3
fish debris	1
opaque	2

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-47	6.9	0.1	56.7
2-21	9.2	0.0	76.6
5-51	8.6	0.0	71.6

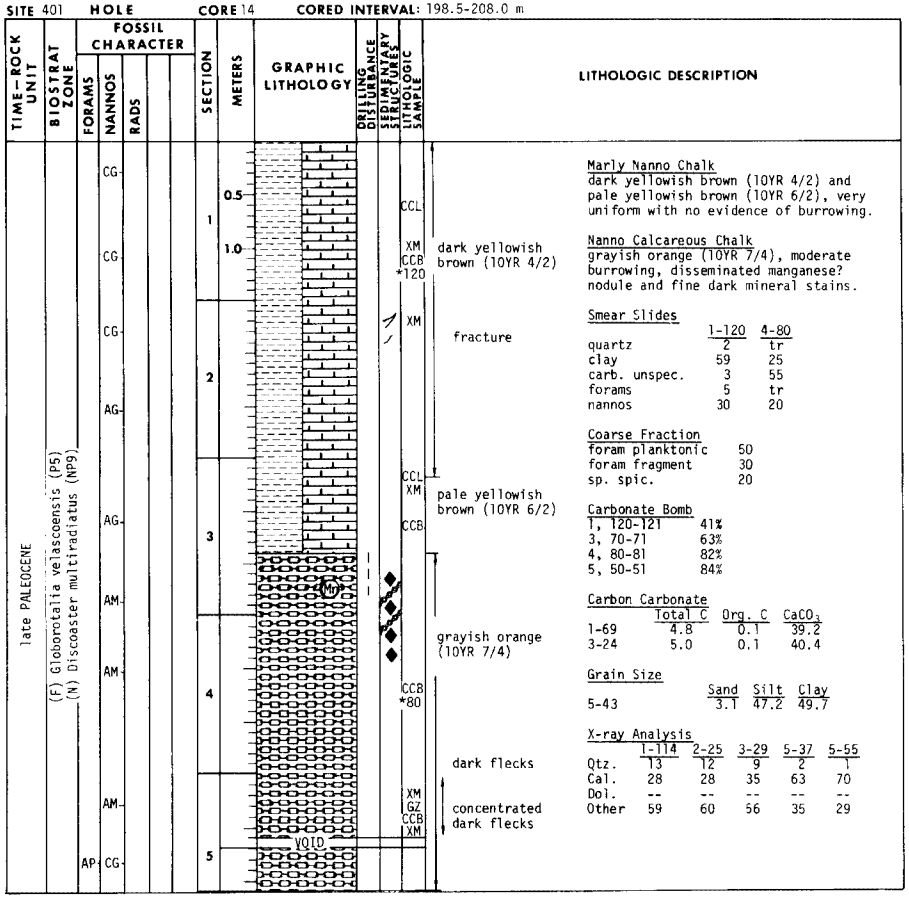
Grain Size

	Sand	Silt	Clay
2-23	6.0	48.9	45.1
5-47	2.7	34.3	63.0

X-ray Analysis

	1-97	2-49	5-54
Qtz.	4	2	8
Cal.	45	68	49
Dol.	--	--	--
Other	51	30	43

SITE 401 HOLE CORE 14 CORED INTERVAL: 198.5-208.0 m



Marly Nanno Chalk
dark yellowish brown (10YR 4/2) and pale yellowish brown (10YR 6/2), very uniform with no evidence of burrowing.

Nanno Calcareous Chalk
grayish orange (10YR 7/4), moderate burrowing, disseminated manganese? nodule and fine dark mineral stains.

Smear Slides

	1-120	4-80
quartz	2	tr
clay	59	25
carb. unspec.	3	55
forams	5	tr
nannos	30	20

Coarse Fraction

foram planktonic	50
foram fragment	30
sp. spic.	20

Carbonate Bomb

1, 120-121	41%
3, 70-71	63%
4, 80-81	82%
5, 50-51	84%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-69	4.8	0.1	39.2
3-24	5.0	0.1	40.4

Grain Size

	Sand	Silt	Clay
5-43	3.1	47.2	49.7

X-ray Analysis

	1-114	2-25	3-29	5-37	5-55
Qtz.	13	12	9	2	1
Cal.	28	28	35	63	70
Dol.	--	--	--	--	--
Other	59	60	56	35	29

SITE 401 HOLE CORE 15 CORED INTERVAL: 208.0-217.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
late PALEOCENE	(N) Discoaster multiradiatus (NP9)		AM		1 2	0.5 1.0	ALL CAVINGS				Caving and Drilling Breccia A mixture of uphole lithology in clasts up to 5 cm in diameter. One large (7 cm long axis) black clast that may be basalt. Coarse Fraction foram benthonic 44 foram planktonic 34 foram fragment 20 sp. spic. 1 glauconite 1

SITE 401 HOLE CORE 16 CORED INTERVAL: 217.5-227.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
late PALEOCENE	(N) Discoaster gemmeus (NP7)		CG CG		1 2	0.5 1.0	VOID VOID			GZ CCL CCB *50 XM XM CCL XM	moderate yellowish brown (10YR 5/4) grayish orange (10YR 7/4)
early PALEOCENE	(F) Globorotalia uncinata/Globorotalia spiralis (P2) (N) Chiasmolithus danicus (NP3)	AG	CG CP		CC						chert clast 4 cm diameter

Nanno Calcareous Chalk
grayish orange (10YR 7/4) and moderate yellowish brown (10YR 5/4). BUrrows are sometimes filled with very pale orange (10YR 8/2). Considerable predrilling faults offset many of the burrows. Darker brown streaks and blebs are common and are uniformly distributed.

Smear Slides

	1-50
quartz	1
clay	10
carb. unspec.	60
forams	2
nannos	19
rads	3
sp. spic.	5

Coarse Fraction

foram benthonic	55
foram planktonic	35
foram fragments	10
glauconite	tr

Carbonate Bomb
1, 50-51 73%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-19	9.2	0.0	76.5
1-147	9.2	0.0	76.2

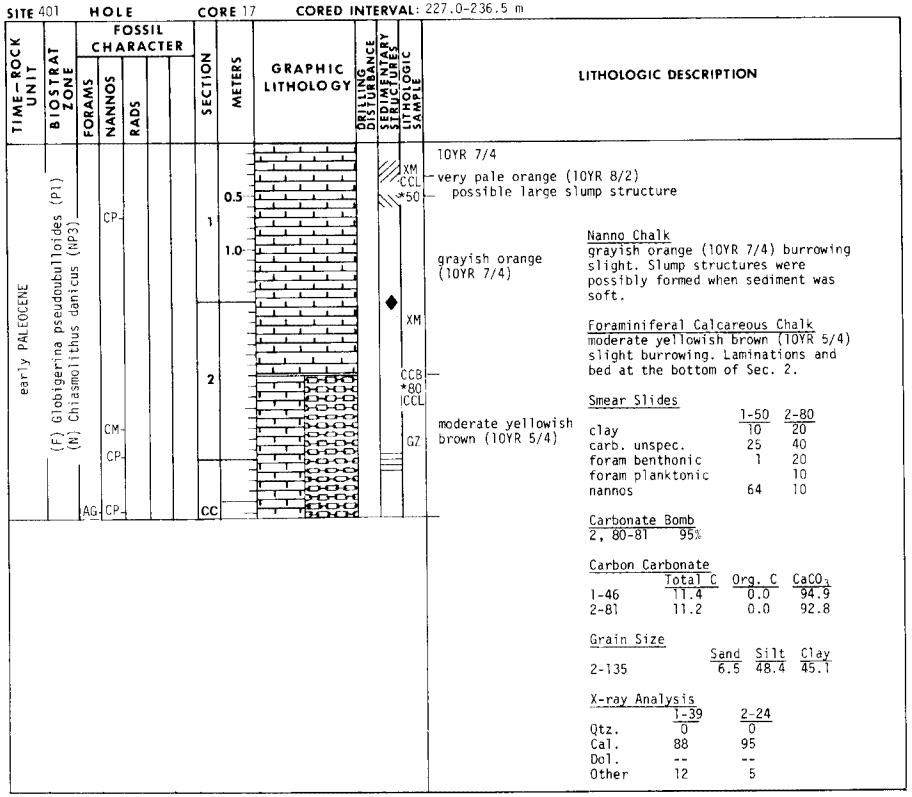
Grain Size

	Sand	Silt	Clay
1-16	5.9	45.1	49.1

X-ray Analysis

	1-77	1-144	3-31
Qtz.	1	1	1
Cal.	65	68	74
Dol.	--	--	--
Other	34	31	25

SITE 401 HOLE CORE 17 CORED INTERVAL: 227.0-236.5 m



Nanno Chalk
grayish orange (10YR 7/4) burrowing slight. Slump structures were possibly formed when sediment was soft.

Foraminiferal Calcareous Chalk
moderate yellowish brown (10YR 5/4) slight burrowing. Laminations and bed at the bottom of Sec. 2.

Smear Slides

	1-50	2-80
clay	10	20
carb. unspec.	25	40
foram benthonic	1	20
foram planktonic		10
nannos	64	10

Carbonate Bomb
2, 80-81 95%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-46	11.4	0.0	94.9
2-81	11.2	0.0	92.8

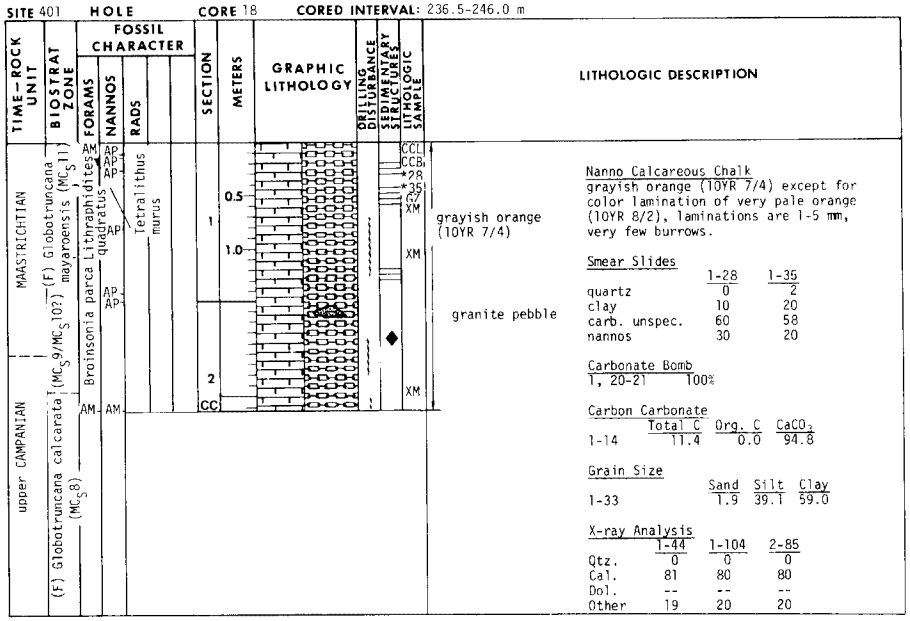
Grain Size

	Sand	Silt	Clay
2-135	6.5	48.4	45.1

X-ray Analysis

	1-39	2-24
Qtz.	0	0
Cal.	88	95
Dol.	--	--
Other	12	5

SITE 401 HOLE CORE 18 CORED INTERVAL: 236.5-246.0 m



Nanno Calcareous Chalk
grayish orange (10YR 7/4) except for color lamination of very pale orange (10YR 8/2), laminations are 1-5 mm, very few burrows.

Smear Slides

	1-28	1-35
quartz	0	2
clay	10	20
carb. unspec.	60	58
nannos	30	20

Carbonate Bomb
1, 20-21 100%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-14	11.4	0.0	94.8

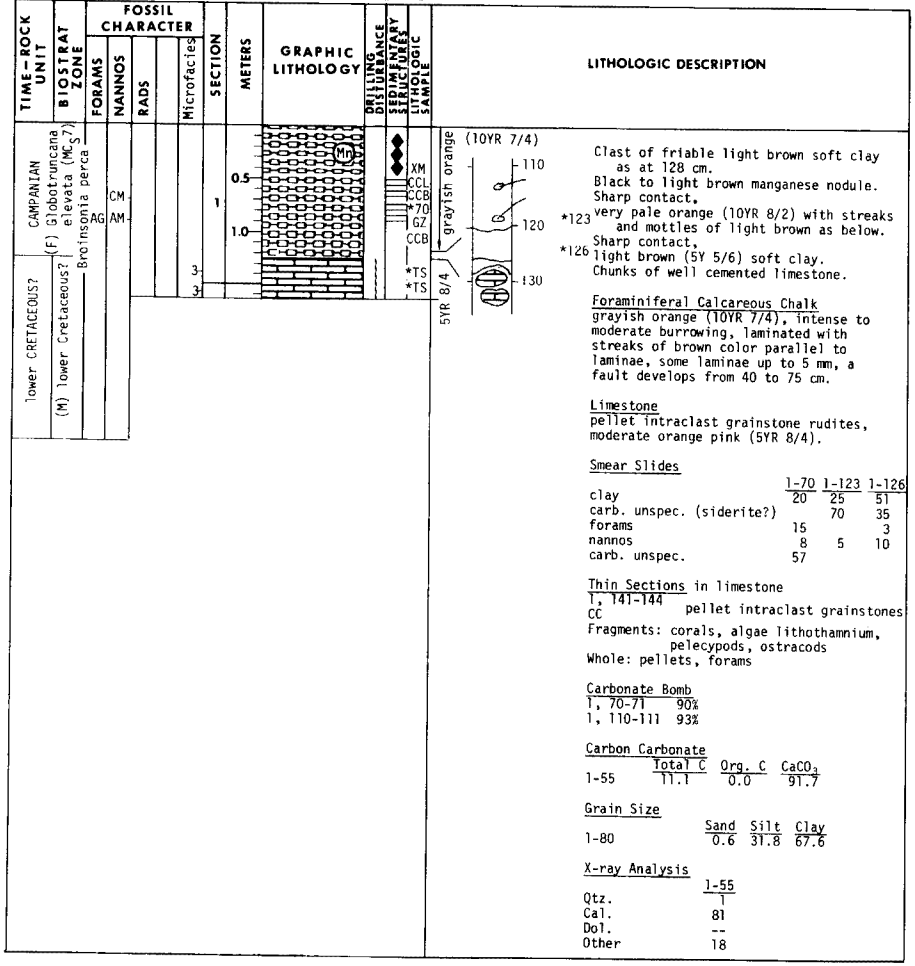
Grain Size

	Sand	Silt	Clay
1-33	1.9	39.1	59.0

X-ray Analysis

	1-44	1-104	2-85
Qtz.	0	0	0
Cal.	81	80	80
Dol.	--	--	--
Other	19	20	20

SITE 401 HOLE CORE 19 CORED INTERVAL: 246.0-255.5 m



Clast of friable light brown soft clay as at 128 cm.
Black to light brown manganese nodule.
Sharp contact,
*123 very pale orange (10YR 8/2) with streaks and mottles of light brown as below.
Sharp contact,
*126 light brown (5Y 5/6) soft clay.
Chunks of well cemented limestone.

Foraminiferal Calcareous Chalk
grayish orange (10YR 7/4), intense to moderate burrowing, laminated with streaks of brown color parallel to laminae, some laminae up to 5 mm, a fault develops from 40 to 75 cm.

Limestone
pellet intraclast grainstone rudites, moderate orange pink (5YR 8/4).

Smear Slides

	1-70	1-123	1-126
clay	20	25	51
carb. unspec. (siderite?)		70	35
forams	15		3
nannos	8	5	10
carb. unspec.	57		

Thin Sections in limestone
1, 141-144
CC pellet intraclast grainstones
Fragments: corals, algae lithothamnium, pelecypods, ostracods
Whole: pellets, forams

Carbonate Bomb
1, 70-71 90%
1, 110-111 93%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-55	11.1	0.0	91.7

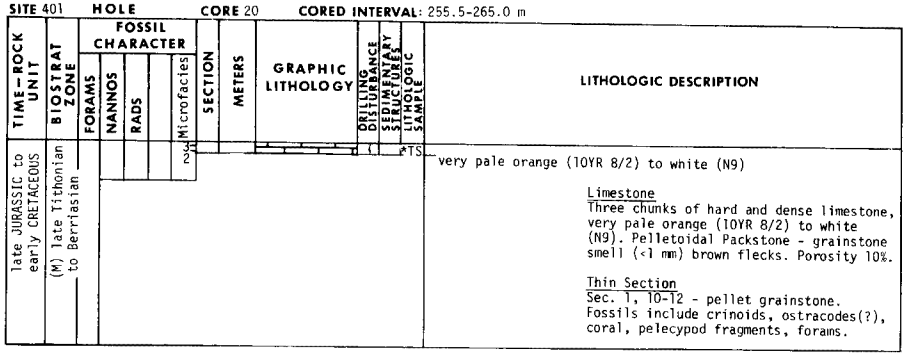
Grain Size

	Sand	Silt	Clay
1-80	0.6	31.8	67.6

X-ray Analysis

	1-55
Qtz.	1
Cal.	81
Dol.	--
Other	18

SITE 401 HOLE CORE 20 CORED INTERVAL: 255.5-265.0 m

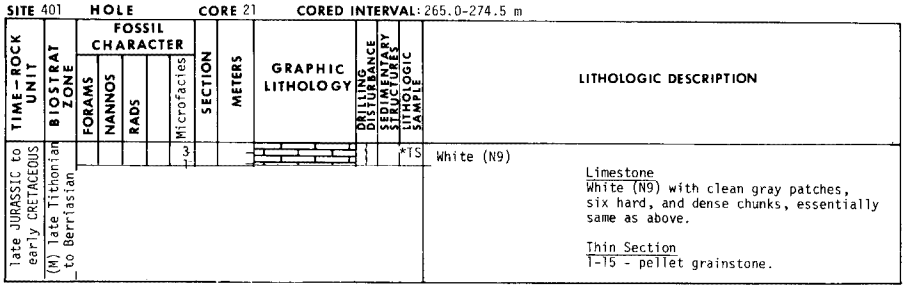


very pale orange (10YR 8/2) to white (N9)

Limestone
Three chunks of hard and dense limestone, very pale orange (10YR 8/2) to white (N9). Pelletoidal Packstone - grainstone smell (<1 mm) brown flecks. Porosity 10%.

Thin Section
Sec. 1, 10-12 - pellet grainstone.
Fossils include crinoids, ostracodes(?), coral, pelecypod fragments, forams.

SITE 401 HOLE CORE 21 CORED INTERVAL: 265.0-274.5 m

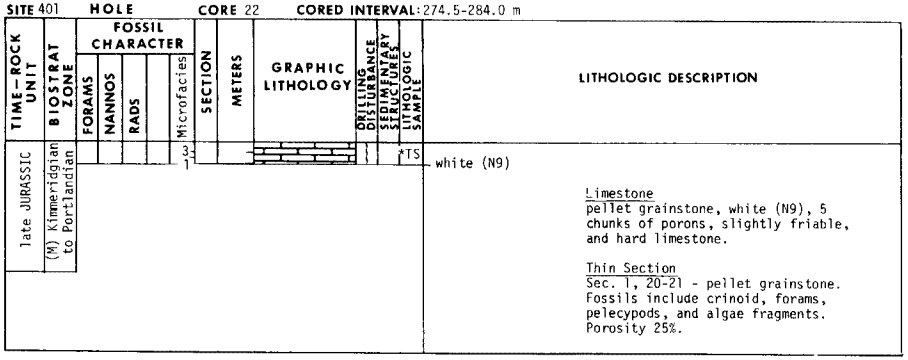


White (N9)

Limestone
White (N9) with clean gray patches, six hard, and dense chunks, essentially same as above.

Thin Section
1-15 - pellet grainstone.

SITE 401 HOLE CORE 22 CORED INTERVAL: 274.5-284.0 m

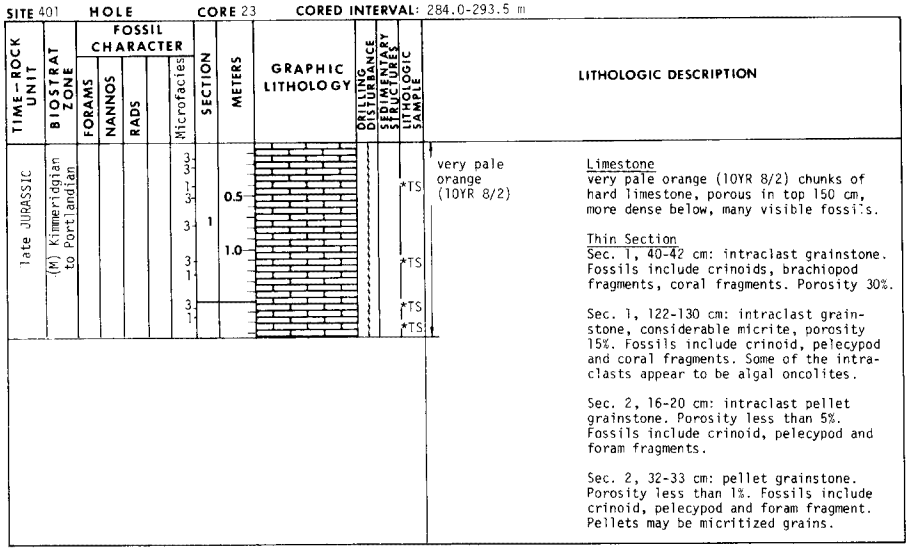


white (N9)

Limestone
pellet grainstone, white (N9), 5 chunks of porons, slightly friable, and hard limestone.

Thin Section
Sec. 1, 20-21 - pellet grainstone.
Fossils include crinoid, forams, pelecypods, and algae fragments.
Porosity 25%.

SITE 401 HOLE CORE 23 CORED INTERVAL: 284.0-293.5 m



Limestone
very pale orange (10YR 8/2) chunks of hard limestone, porous in top 150 cm, more dense below, many visible fossils.

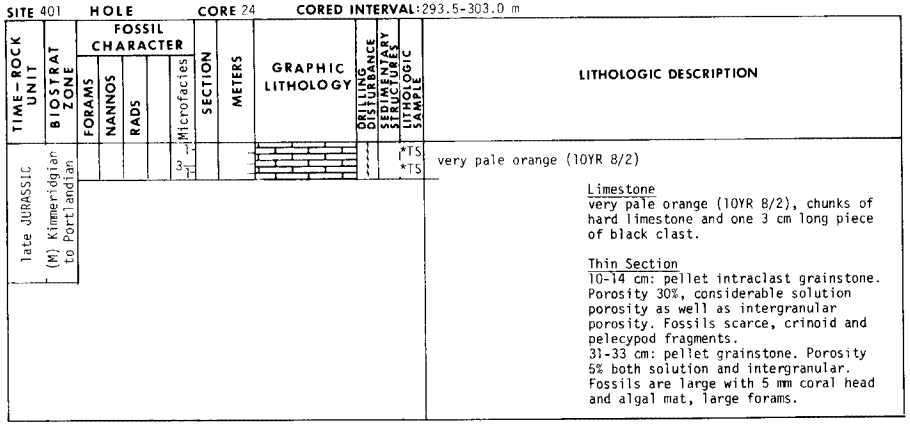
Thin Section
Sec. 1, 40-42 cm: intraclast grainstone. Fossils include crinoids, brachiopod fragments, coral fragments. Porosity 30%.

Sec. 1, 122-130 cm: intraclast grainstone, considerable micrite, porosity 15%. Fossils include crinoid, pelecypod and coral fragments. Some of the intraclasts appear to be algal oncolites.

Sec. 2, 16-20 cm: intraclast pellet grainstone. Porosity less than 5%. Fossils include crinoid, pelecypod and foram fragments.

Sec. 2, 32-33 cm: pellet grainstone. Porosity less than 1%. Fossils include crinoid, pelecypod and foram fragment. Pellets may be micritized grains.

SITE 401 HOLE CORE 24 CORED INTERVAL: 293.5-303.0 m



Limestone
very pale orange (10YR 8/2), chunks of hard limestone and one 3 cm long piece of black clast.

Thin Section
10-14 cm: pellet intraclast grainstone. Porosity 30%, considerable solution porosity as well as intergranular porosity. Fossils scarce, crinoid and pelecypod fragments.
31-33 cm: pellet grainstone. Porosity 5% both solution and intergranular. Fossils are large with 5 mm coral head and algal mat, large forams.

Leg 48 Site 401
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
401	1	1	0.00	0.15	5.9	0.2	48.1
401	1	3	0.00	3.68	2.1	0.3	14.8
401	2	1	84.50	84.87	9.5	0.1	78.4
401	2	CC	84.50	85.14	9.7	0.1	80.6
401	3	1	94.00	94.18	7.7	0.1	63.6
401	4	CC	103.50	103.60	8.6	0.1	71.3
401	5	2	113.00	114.76	8.0	0.1	65.7
401	5	4	113.00	117.73	5.1	0.1	41.9
401	6	1	122.50	122.75	5.8	0.1	47.5
401	6	2	122.50	124.39	7.6	0.1	62.8
401	6	4	122.50	127.77	7.2	0.1	59.0
401	7	1	132.00	132.64	7.5	0.1	61.8
401	7	4	132.00	137.54	6.6	0.1	54.4
401	8	3	141.50	145.26	5.7	0.1	46.6
401	9	3	151.00	154.65	6.4	0.1	52.7
401	10	1	160.50	160.59	6.2	0.1	50.7
401	10	2	160.50	162.70	7.3	0.1	59.8
401	10	4	160.50	166.00	6.3	0.1	51.6
401	11	1	170.00	170.40	7.2	0.1	59.3
401	11	3	170.00	173.07	7.7	0.0	63.4
401	11	3	170.00	173.80	4.5	0.1	36.7
401	12	1	179.50	179.97	6.9	0.1	56.7
401	12	4	179.50	185.14	9.2	0.0	76.6
401	13	1	189.00	189.47	8.6	0.0	71.6
401	13	2	189.00	190.71	9.5	0.0	79.0
401	13	5	189.00	195.51	7.1	0.1	58.6
401	14	1	198.50	199.19	4.8	0.1	39.2
401	14	3	198.50	201.74	5.0	0.1	40.4
401	14	5	198.50	205.93	9.3	0.1	77.2
401	16	1	217.50	217.69	9.2	0.0	76.5
401	16	1	217.50	218.97	9.2	0.0	76.2
401	17	1	227.00	227.46	11.4	0.0	94.9
401	17	2	227.00	229.31	11.2	0.0	92.8
401	18	1	236.50	236.64	11.4	0.0	94.8
401	19	1	246.00	246.55	11.1	0.0	91.7

#

Leg 48 Site 401
DSDP Shore Laboratory Grain Size Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Sand	Silt	Clay
401	1	1	0.00	0.28	14.0	42.8	43.2
401	1	3	0.00	3.62	6.1	37.5	56.4
401	2	1	84.50	84.83	0.9	41.2	57.9
401	3	1	94.00	94.08	1.7	48.0	50.3
401	4	CC	103.50	103.60	3.3	44.7	52.0
401	5	2	113.00	114.74	6.4	44.4	49.2
401	6	2	122.50	124.36	2.2	48.1	49.6
401	6	4	122.50	127.60	2.6	39.4	58.0
401	7	1	132.00	132.61	3.1	44.7	52.2
401	7	4	132.00	137.65	2.2	41.4	56.4
401	8	5	141.50	148.19	3.0	41.6	55.3
401	9	3	151.00	154.84	2.6	39.2	58.3
401	10	4	160.50	165.34	3.1	35.2	61.8
401	10	6	160.50	168.51	3.1	43.5	53.4
401	11	1	170.00	170.29	8.6	39.3	52.1
401	11	5	170.00	176.52	6.6	40.4	53.0
401	12	1	179.50	179.92	5.4	41.8	52.8
401	12	4	179.50	184.58	14.5	45.5	40.0
401	13	2	189.00	190.73	6.0	48.9	45.1
401	13	5	189.00	195.47	2.7	34.3	63.0
401	14	5	198.50	204.93	3.1	47.2	49.7
401	16	1	217.50	217.66	5.9	45.1	49.1
401	17	2	227.00	229.85	6.5	48.4	45.1
401	18	1	236.50	236.88	1.9	39.1	59.0
401	19	1	246.00	246.80	0.6	31.8	67.6

#

DEEP SEA DRILLING PROJECT
LEG 48 SITE 402 and 402A
SITE SUMMARY SHEET

Date occupied	1427 June 10, 1976
Date departed	1320 June 16, 1976
Time on site	6 days
Position: latitude	47°52.48'N
longitude	08°50.44'W
Water depth (sea level)	2339.5 corrected meters, echo sounding
Water depth (righ floor)	2355.5 corrected meters, echo sounding
Bottom felt at	2355.5 meters, drill pipe
Penetration	469.5 meters
Number of holes	2
Number of cores	40 (402 -5; 402A - 35)
Total length of cored section	374 meters (402 - 42.0 m; 402A - 732.0 m)
Total core recovered	179.69 meters (402 - 12.19 m; 402A - 167.5 m)
Percentage of core recovery	48%
Oldest Sediment Cored	
Depth subbottom	469.5 meters
Nature	Calcareous mudstone
Age	Lower Aptian
Measured velocity	2.4 km sec^{-1}
Basement	Not reached

PRINCIPAL RESULTS:

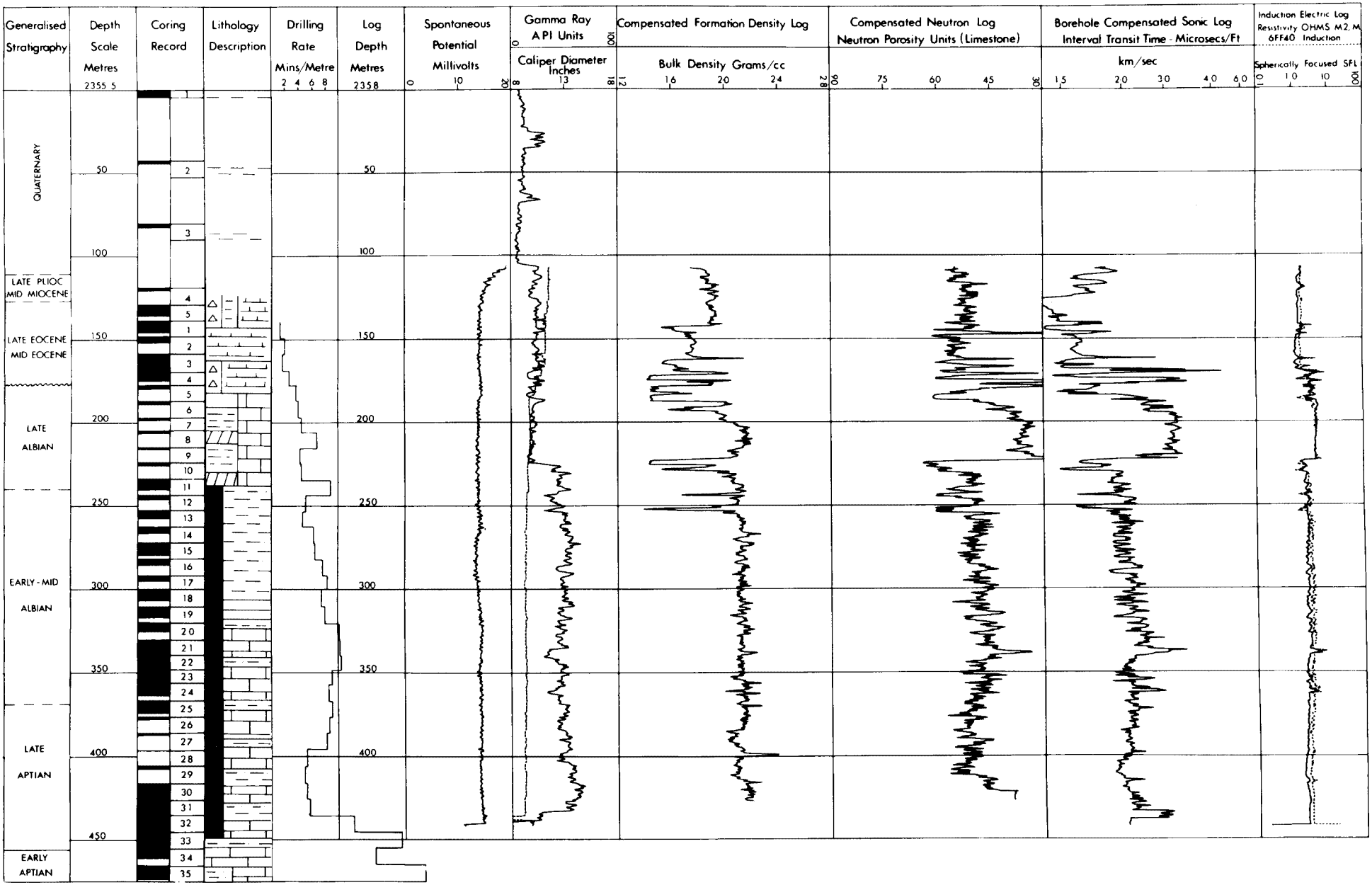
Site 402 was located on the upper slope of the northern continental margin of the Bay of Biscay. The main objectives here were to

establish the presence or absence of hsallow water Upper Cretaceous and to penetrate the upslope equivalent to the deep water Albian-Aptian carbonaceous mudstones and the pre-Aptian sediments which were deposited during rifting. Three lithologic units were distinguished: Unit 1 (0 to 175 meters) is comprised of Quaternary to middle Miocene nanno ooze and greenish gray marly nanno chalk of upper to middle Eocene age deposited in a bathyal or upper slope environment. Unit 2 (175 to 232 meters) is Albian in age and consists of abnormally lithified shallow water limestones. The main facies include vacuolar bioclastic limestone, silicified limestone with large sponge spicules, and fine-grained micritic limestone. Unit 3 (232 to 469.5 meters) is composed principally of olive gray to black carbonaceous marly limestone, carbonaceous mudstone, and carbonaceous marly chalk of Albian and Aptian age. These sediments show rhythmic changes in color and lithology similar to the carbonaceous section of Hole 400A. In the lower Aptian (441 to 469.5 meters) greenish gray shallow water limestones and marly limestones prevail.

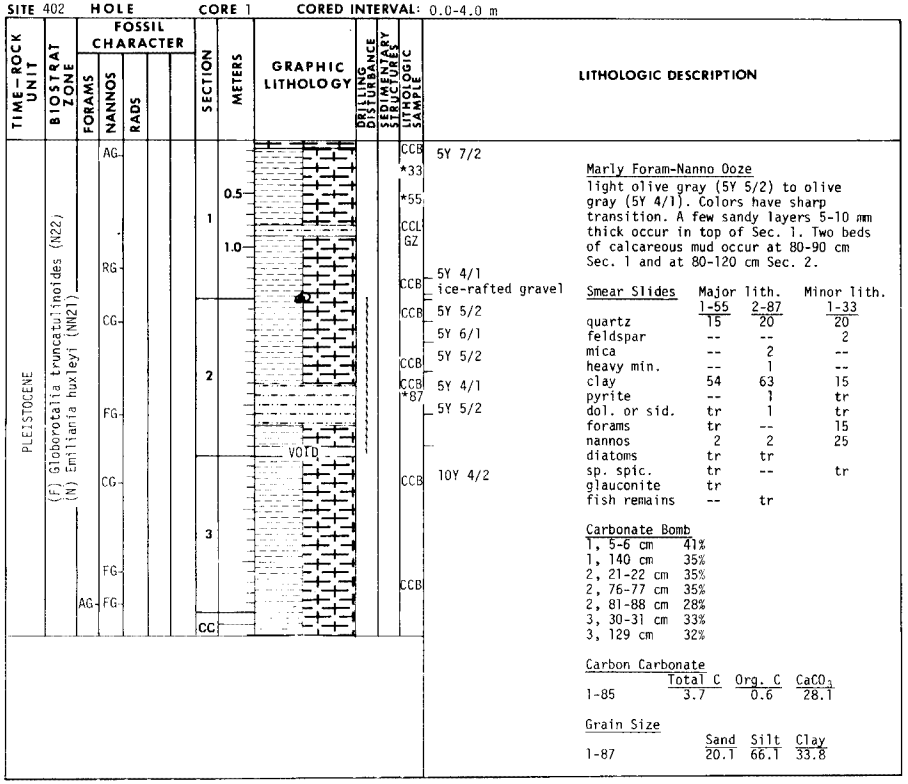
The Aptian-Albian sequence appears to have been deposited in a small depression shoreward of a tilted fault black. Sedimentological features are suggestive of inner shelf, deltaic and tidal flat environments. The organic matter is immature and terrestrial derived. The abnormal lithification in the Albian section is presently unexplained but may reflect either subaerial exposure or some unusual groundwater effect. Presence of mixed fauna in the Tertiary section complicates environmental interpretation, however preliminary evidence favors a bathyal environment (1000-1500 m) with a nearby shelf edge providing shallow water contaminants.

A complete set of logs were run and downhole temperature measurements indicate a low heat flow.

DOWNHOLE LOGS AND GENERALIZED STRATIGRAPHY
DSDP LEG 48 SITE 402A



SITE 402 HOLE CORE 1 CORED INTERVAL: 0.0-4.0 m



LITHOLOGIC DESCRIPTION

Marly Foram-Nanno Ooze
light olive gray (5Y 5/2) to olive gray (5Y 4/1). Colors have sharp transition. A few sandy layers 5-10 mm thick occur in top of Sec. 1. Two beds of calcareous mud occur at 80-90 cm Sec. 1 and at 80-120 cm Sec. 2.

Smear Slides	Major lith. 1-55	Major lith. 2-87	Minor lith. 1-33
quartz	15	20	20
feldspar	--	--	2
mica	--	2	--
heavy min.	--	1	--
clay	54	63	15
pyrite	--	1	tr
dol. or sid.	tr	1	tr
forams	tr	--	15
nannos	2	2	25
diatoms	tr	tr	
sp. spic.	tr	--	tr
glauconite	tr		
fish remains	--	tr	

Carbonate Bomb

1, 5-6 cm	41%
1, 140 cm	35%
2, 21-22 cm	35%
2, 76-77 cm	35%
2, 81-88 cm	28%
3, 30-31 cm	33%
3, 129 cm	32%

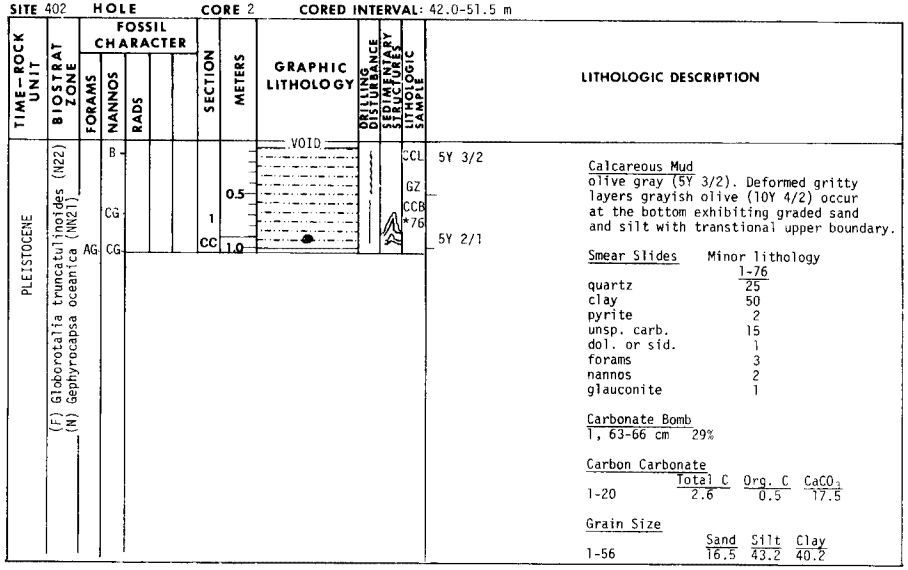
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-85	3.7	0.6	28.1

Grain Size

	Sand	Silt	Clay
1-87	20.1	66.1	33.8

SITE 402 HOLE CORE 2 CORED INTERVAL: 42.0-51.5 m



LITHOLOGIC DESCRIPTION

Calcareous Mud
olive gray (5Y 3/2). Deformed gritty layers grayish olive (10Y 4/2) occur at the bottom exhibiting graded sand and silt with transtional upper boundary.

Smear Slides	Minor lithology 1-76
quartz	25
clay	50
pyrite	2
unsp. carb.	15
dol. or sid.	1
forams	3
nannos	2
glauconite	1

Carbonate Bomb
1, 63-66 cm 29%

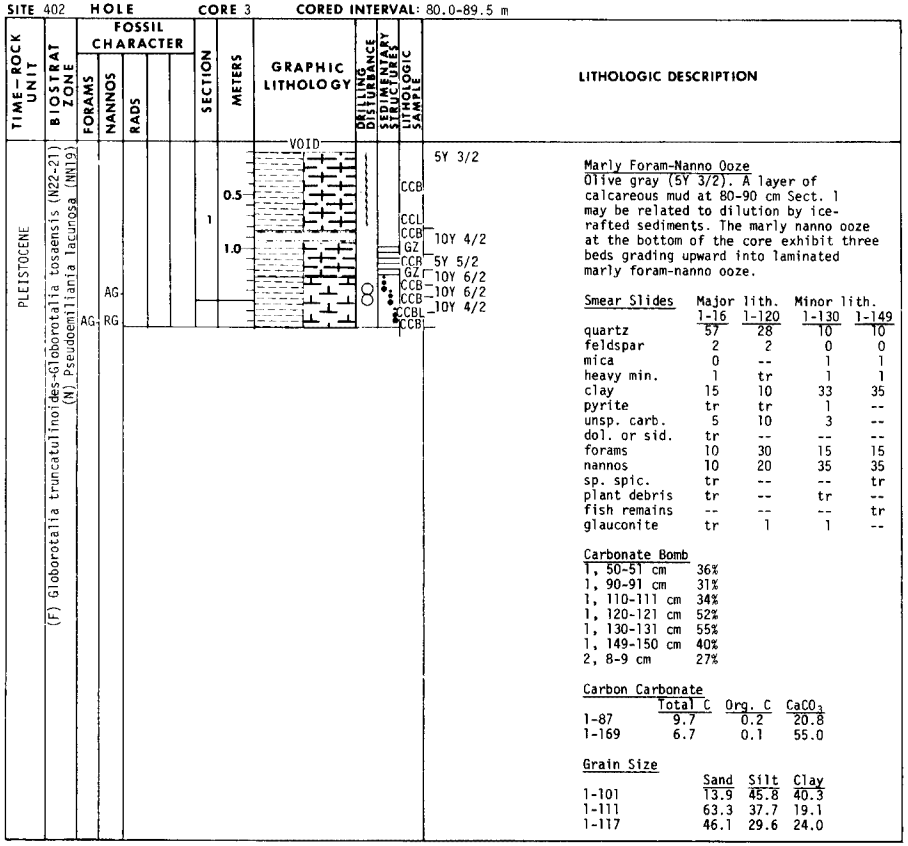
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-20	2.6	0.5	17.5

Grain Size

	Sand	Silt	Clay
1-56	16.5	43.2	40.2

SITE 402 HOLE CORE 3 CORED INTERVAL: 80.0-89.5 m



LITHOLOGIC DESCRIPTION

Marly Foram-Nanno Ooze
Olive gray (5Y 3/2). A layer of calcareous mud at 80-90 cm Sect. 1 may be related to dilution by ice-rafted sediments. The marly nanno ooze at the bottom of the core exhibit three beds grading upward into laminated marly foram-nanno ooze.

Smear Slides	Major lith. 1-16	Major lith. 1-120	Minor lith. 1-130	Minor lith. 1-149
quartz	57	28	10	10
feldspar	2	2	0	0
mica	0	--	1	1
heavy min.	1	tr	1	1
clay	15	10	33	35
pyrite	tr	tr	1	--
unsp. carb.	5	10	3	--
dol. or sid.	tr	--	--	--
forams	10	30	15	15
nannos	10	20	35	35
sp. spic.	tr	--	--	tr
plant debris	tr	--	tr	--
fish remains	--	--	--	tr
glauconite	tr	1	1	--

Carbonate Bomb

1, 50-51 cm	36%
1, 90-91 cm	31%
1, 110-111 cm	34%
1, 120-121 cm	52%
1, 130-131 cm	55%
1, 149-150 cm	40%
2, 8-9 cm	27%

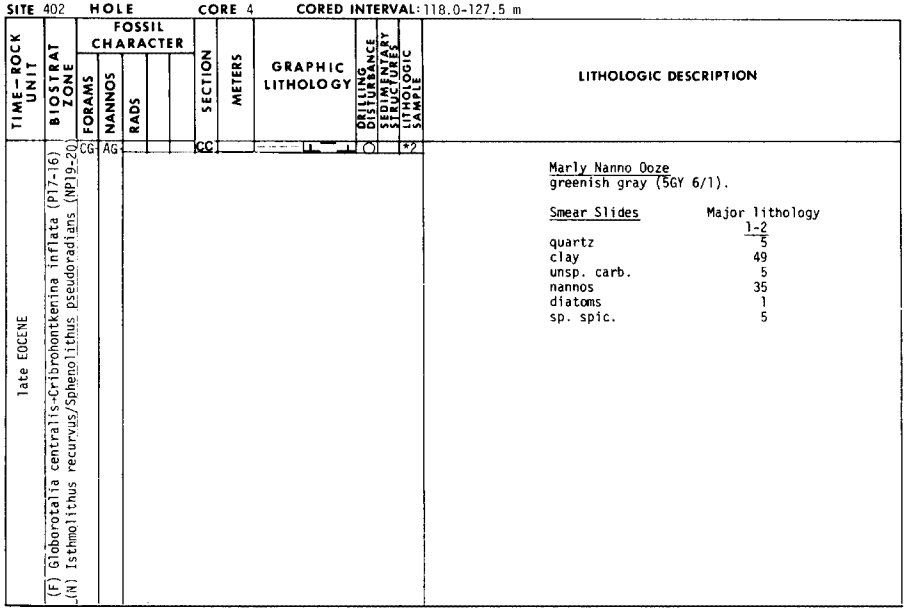
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-87	9.7	0.2	20.8
1-169	6.7	0.1	55.0

Grain Size

	Sand	Silt	Clay
1-101	13.9	45.8	40.3
1-111	63.3	37.7	19.1
1-117	46.1	29.6	24.0

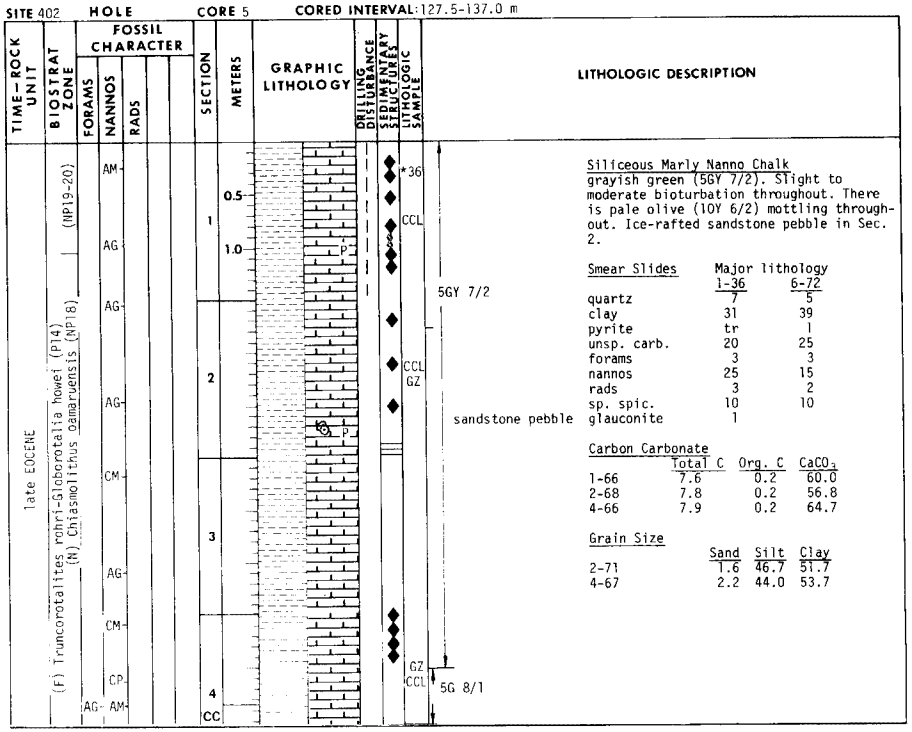
SITE 402 HOLE CORE 4 CORED INTERVAL: 118.0-127.5 m



Marly Nanno Ooze
greenish gray (5GY 6/1).

Smear Slides	Major lithology 1-2
quartz	5
clay	49
unsp. carb.	5
nannos	35
diatoms	1
sp. spic.	5

SITE 402 HOLE CORE 5 CORED INTERVAL: 127.5-137.0 m



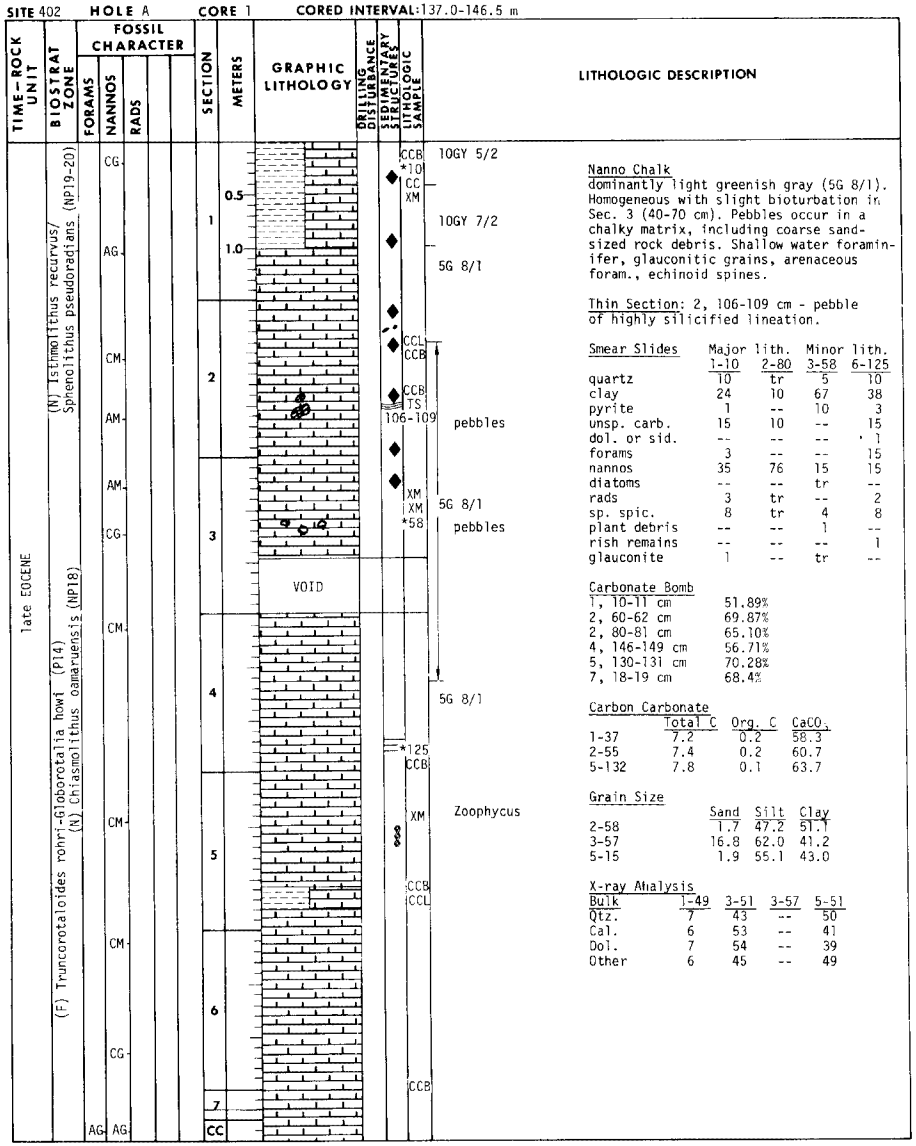
Siliceous Marly Nanno Chalk
grayish green (5GY 7/2). Slight to moderate bioturbation throughout. There is pale olive (10Y 6/2) mottling throughout. Ice-rafted sandstone pebble in Sec. 2.

Smear Slides	Major lithology 1-36	6-72
quartz	7	5
clay	31	39
pyrite	tr	1
unsp. carb.	20	25
forams	3	3
nannos	25	15
rads	3	2
sp. spic.	10	10
glauconite	1	

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-66	7.6	0.2	60.0
2-68	7.8	0.2	56.8
4-66	7.9	0.2	64.7

Grain Size	Sand	Silt	Clay
2-71	1.6	46.7	51.7
4-67	2.2	44.0	53.7

SITE 402 HOLE A CORE 1 CORED INTERVAL: 137.0-146.5 m



Nanno Chalk
dominantly light greenish gray (5G 8/1). Homogeneous with slight bioturbation in Sec. 3 (40-70 cm). Pebbles occur in a chalky matrix, including coarse sand-sized rock debris. Shallow water foraminifer, glauconitic grains, arenaceous foram., echinoid spines.

Thin Section: 2, 106-109 cm - pebble of highly silicified lineation.

Smear Slides	Major lith. 1-10	2-80	Minor lith. 3-58	6-125
quartz	10	tr	5	10
clay	24	10	67	38
pyrite	1	--	10	3
unsp. carb.	15	10	--	15
dol. or sid.	--	--	--	1
forams	3	--	--	15
nannos	35	76	15	15
diatoms	--	--	tr	--
rads	3	tr	--	2
sp. spic.	8	tr	4	8
plant debris	--	--	1	--
rish remains	--	--	--	1
glauconite	1	--	tr	--

Carbonate Bomb

1, 10-11 cm	51.89%
2, 60-62 cm	69.87%
2, 80-81 cm	65.10%
4, 146-149 cm	56.71%
5, 130-131 cm	70.28%
7, 18-19 cm	68.4%

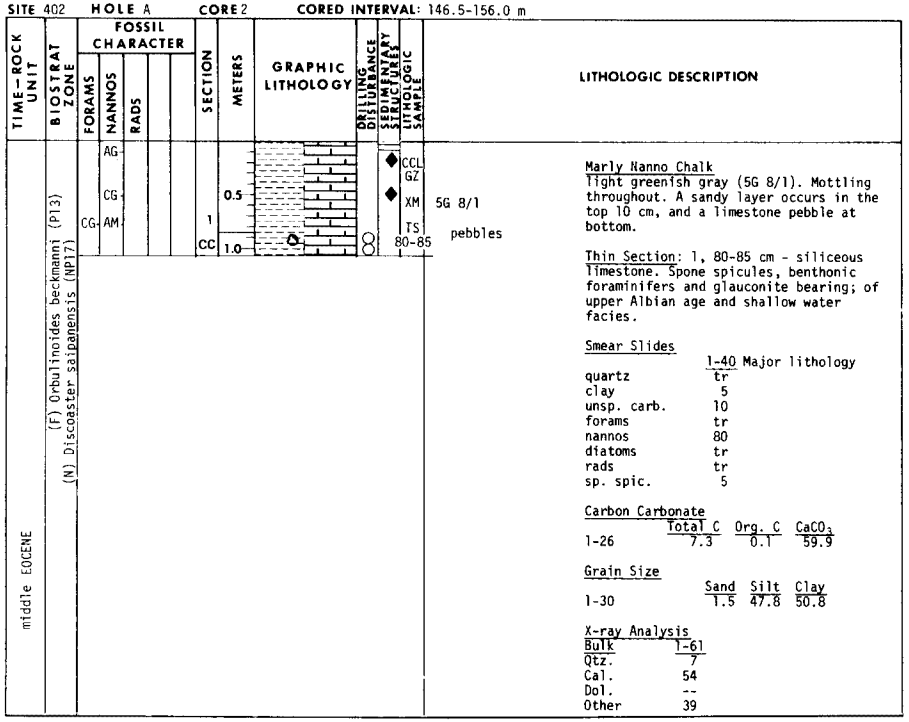
Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-37	7.2	0.2	58.3
2-55	7.4	0.2	60.7
5-132	7.8	0.1	63.7

Grain Size	Sand	Silt	Clay
2-58	1.7	47.2	51.1
3-57	16.8	62.0	41.2
5-15	1.9	55.1	43.0

X-ray Analysis

Bulk	1-49	3-51	3-57	5-51
Qtz.	7	43	--	50
Cal.	6	53	--	41
Dol.	7	54	--	39
Other	6	45	--	49

SITE 402 HOLE A CORE 2 CORED INTERVAL: 146.5-156.0 m



Marly Nanno Chalk
light greenish gray (5G 8/1). Mottling throughout. A sandy layer occurs in the top 10 cm, and a limestone pebble at bottom.

Thin Section: 1, 80-85 cm - siliceous limestone. Spone spicules, benthonic foraminifers and glauconite bearing; of upper Albian age and shallow water facies.

Smear Slides

	1-40 Major lithology
quartz	tr
clay	5
unsp. carb.	10
forams	tr
nannos	80
diatoms	tr
rads	tr
sp. spic.	5

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-26	7.3	0.1	59.9

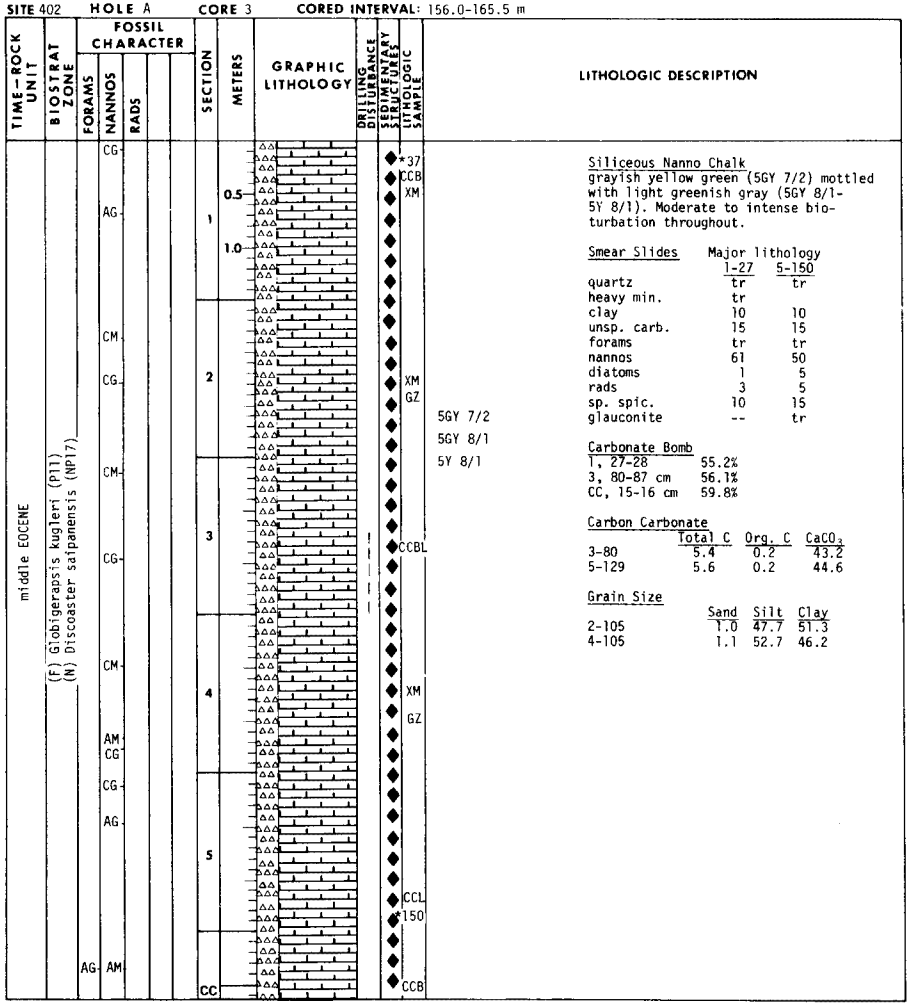
Grain Size

	Sand	Silt	Clay
1-30	1.5	47.8	50.8

X-ray Analysis

Bulk	1-61
Qtz.	7
Cal.	54
Dol.	--
Other	39

SITE 402 HOLE A CORE 3 CORED INTERVAL: 156.0-165.5 m



Siliceous Nanno Chalk
grayish yellow green (5GY 7/2) mottled with light greenish gray (5GY 8/1-5Y 8/1). Moderate to intense bioturbation throughout.

Smear Slides	Major lithology 1-27	5-150
quartz	tr	tr
heavy min.	tr	
clay	10	10
unsp. carb.	15	15
forams	tr	tr
nannos	61	50
diatoms	1	5
rads	3	5
sp. spic.	10	15
glauconite	--	tr

Carbonate Bomb

1, 27-28	55.2%
3, 80-87 cm	56.1%
CC, 15-16 cm	59.8%

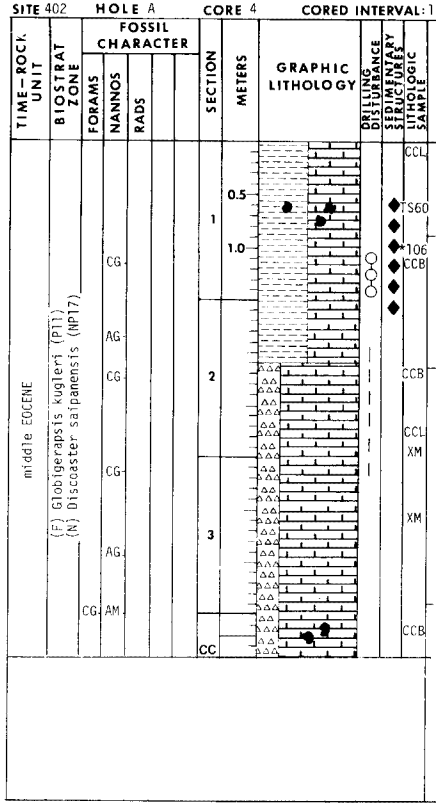
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-80	5.4	0.2	43.2
5-129	5.6	0.2	44.6

Grain Size

	Sand	Silt	Clay
2-105	1.0	47.7	51.3
4-105	1.1	52.7	46.2

SITE 402 HOLE A CORE 4 CORED INTERVAL: 165.5-175.0 m



LITHOLOGIC DESCRIPTION

5GY 7/2

pebbles

10GY 7/2

5GY 6/1

pebbles

10GY 7/2

Siliceous Marly Nanno Chalk
Siliceous Nanno Chalk
pale yellowish green (10GY 7/2) and light greenish gray (5GY 6/1). Slight bioturbation in upper part. Pebbles in Sec. 1 and Sec. 3 include breccia and glauconitic limestone.

Smear Slides	Major lithology 1-106	2-70
quartz	10	tr
clay	36	5
pyrite	1	--
unsp. carb.	20	5
nannos	15	67
diatoms	--	5
rads	3	3
sp. spic.	15	15
plant debris	--	tr
glauconite	--	tr

Carbonate Bomb

1, 106-107 cm	45.28%
2, 70-71 cm	45.28%
6, 10-11 cm	66.27%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-20	6.0	0.2	48.7
2-130	4.0	0.2	31.3

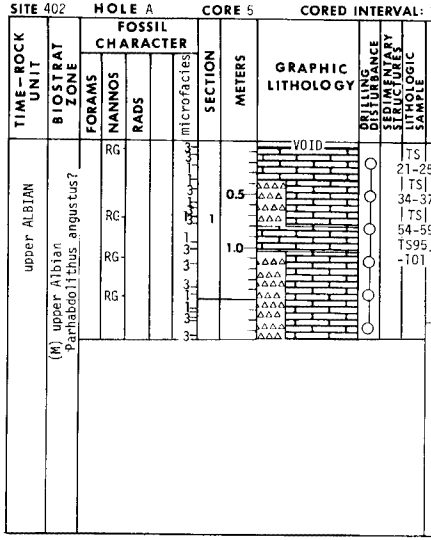
Grain Size

	Sand	Silt	Clay
1-16	0.9	49.2	49.9
2-133	2.3	65.2	52.5

X-ray Analysis

Bulk	2-130	3-57
Qtz.	11	8
Cal.	33	37
Dol.	--	--
Other	56	59

SITE 402 HOLE A CORE 5 CORED INTERVAL: 175.0-184.5 m



LITHOLOGIC DESCRIPTION

Siliceous Limestone
light olive gray (5Y 6/1).

Thin Section:
4, 21-25 cm - varicolor bioclastic limestone with few small grains of quartz and glauconite - micritic to microsparitic cement. Bioclasts include mainly echinoidea fragments.

4, 34-37 cm - as above, bioclast including algae.

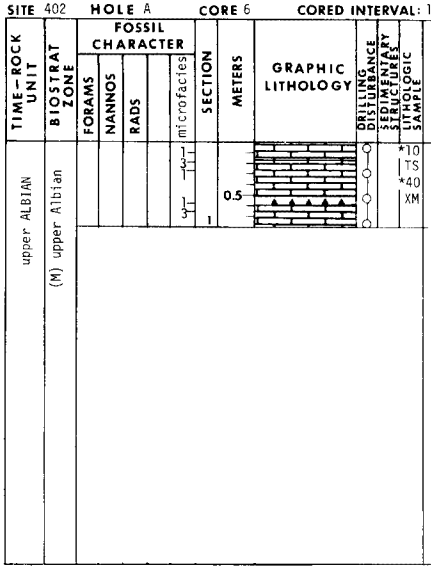
4, 54-59 cm - silicified limestone containing numerous large sponge spicules and few quartz and glauconite grains.

4, 99-101 cm - same facies exhibiting an echinoid spine.

X-ray Analysis

	1-111	2-8
Qtz.	9	6
Cal.	35	35
Others	56	59

SITE 402 HOLE A CORE 6 CORED INTERVAL: 184.5-194.0 m



5Y 6/1

LITHOLOGIC DESCRIPTION

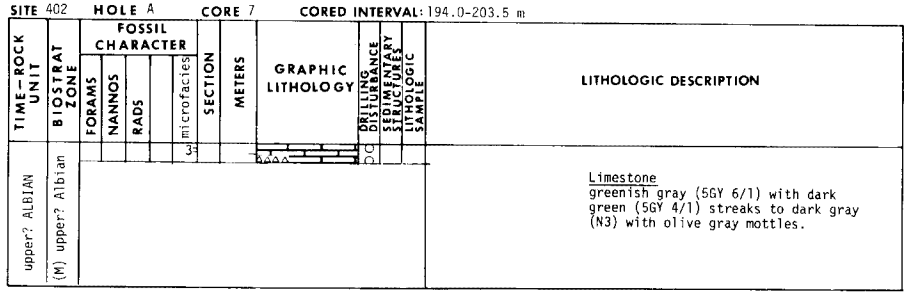
Limestone
olive gray (5Y 6/1) to yellowish gray (5Y 8/1) with dark gray mottling (N3). generally micritic with numerous Pithonella ovalis and calcisphspaerula.

Smear Slides	Major lithology 1-10	1-40
quartz	3	tr
clay	51	20
zeolite	3	5
unsp. carb.	30	30
dol. or sid.	--	24
forams	tr	15
nannos	tr	--
rads	--	3
sp. spic.	--	3
glauconite	1	--
authigenic silica	10	--

X-ray Analysis

Bulk	1-43
Qtz.	1
Cal.	79
Dol.	
Other	20

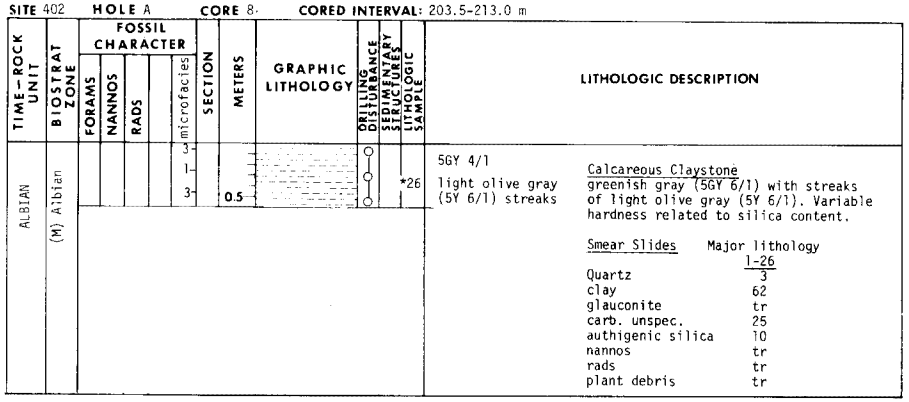
SITE 402 HOLE A CORE 7 CORED INTERVAL: 194.0-203.5 m



LITHOLOGIC DESCRIPTION

Limestone
greenish gray (5GY 6/1) with dark green (5GY 4/1) streaks to dark gray (N3) with olive gray mottles.

SITE 402 HOLE A CORE 8 CORED INTERVAL: 203.5-213.0 m



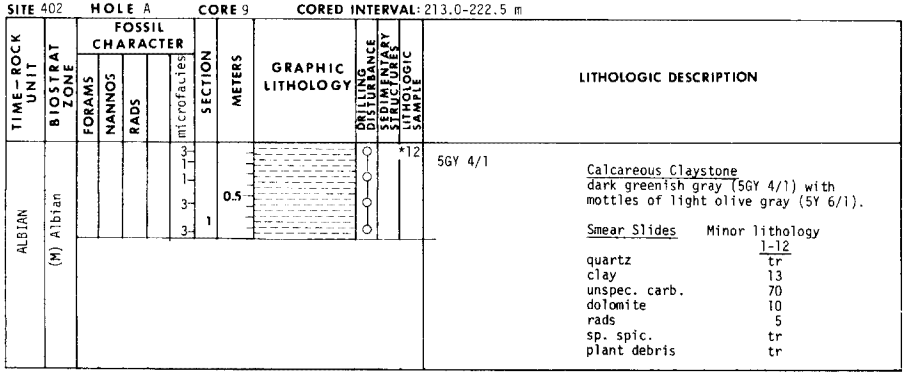
LITHOLOGIC DESCRIPTION

5GY 4/1
light olive gray (5Y 6/1) streaks

Calcareous Claystone
greenish gray (5GY 6/1) with streaks of light olive gray (5Y 6/1). Variable hardness related to silica content.

Smear Slides	Major lithology 1-26
Quartz	3
clay	62
glauconite	tr
carb. unspec.	25
authigenic silica	10
nannos	tr
rads	tr
plant debris	tr

SITE 402 HOLE A CORE 9 CORED INTERVAL: 213.0-222.5 m



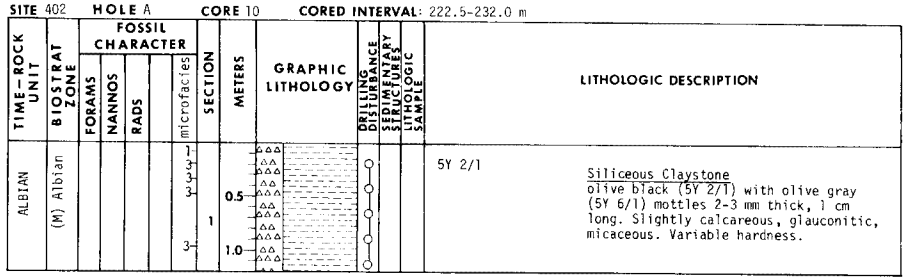
LITHOLOGIC DESCRIPTION

5GY 4/1

Calcareous Claystone
dark greenish gray (5GY 4/1) with mottles of light olive gray (5Y 6/1).

Smear Slides	Minor lithology 1-12
quartz	tr
clay	13
unspec. carb.	70
dolomite	10
rads	5
sp. spic.	tr
plant debris	tr

SITE 402 HOLE A CORE 10 CORED INTERVAL: 222.5-232.0 m

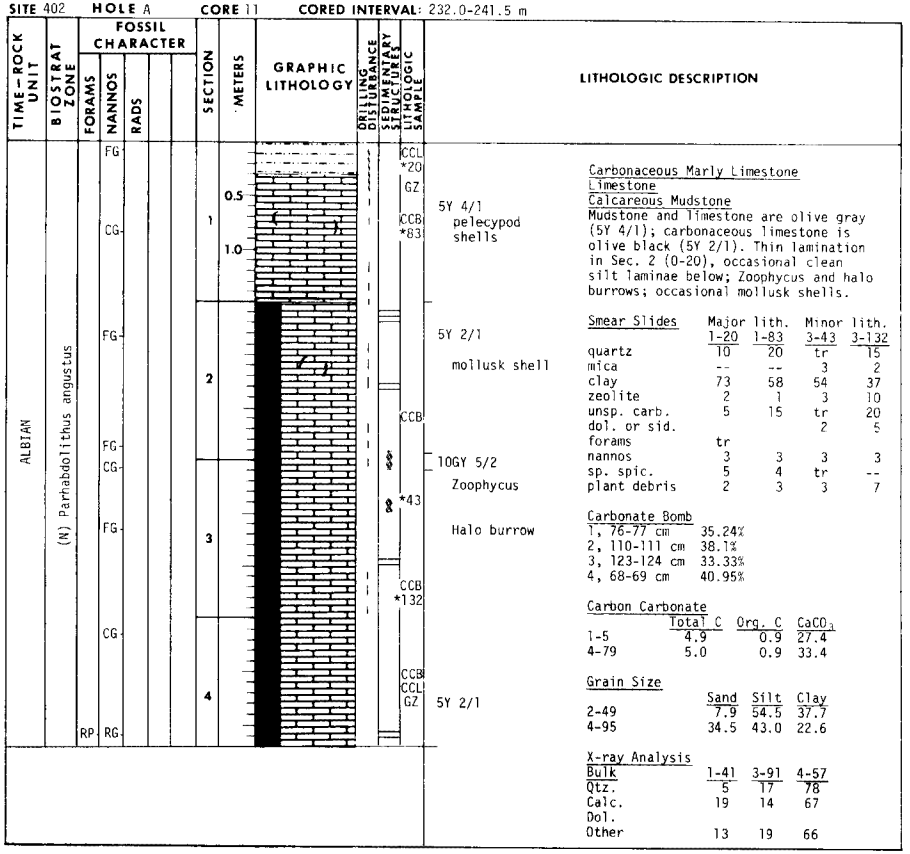


LITHOLOGIC DESCRIPTION

5Y 2/1

Siliceous Claystone
olive black (5Y 2/1) with olive gray (5Y 6/1) mottles 2-3 mm thick, 1 cm long. Slightly calcareous, glauconitic, micaceous. Variable hardness.

SITE 402 HOLE A CORE 11 CORED INTERVAL: 232.0-241.5 m



LITHOLOGIC DESCRIPTION

5Y 4/1
pelecypod shells

5Y 2/1
mollusk shell

10GY 5/2
Zoophycus

Halo burrow

5Y 2/1

Carbonaceous Marly Limestone
Limestone
Calcareous Mudstone
Mudstone and limestone are olive gray (5Y 4/1); carbonaceous limestone is olive black (5Y 2/1). Thin lamination in Sec. 2 (0-20), occasional clean silt laminae below; Zoophycus and halo burrows; occasional mollusk shells.

Smear Slides	Major lith. 1-20	Major lith. 1-83	Minor lith. 3-43	Minor lith. 3-132
quartz	10	20	tr	15
mica	--	--	3	2
clay	73	58	54	37
zeolite	2	1	3	10
unsp. carb.	5	15	tr	20
dol. or sid.			2	5
forams	tr			
nannos	3	3	3	3
sp. spic.	5	4	tr	--
plant debris	2	3	3	7

Carbonate Bomb

1, 76-77 cm	35.24%
2, 110-111 cm	38.1%
3, 123-124 cm	33.33%
4, 68-69 cm	40.95%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-5	4.9	0.9	27.4
4-79	5.0	0.9	33.4

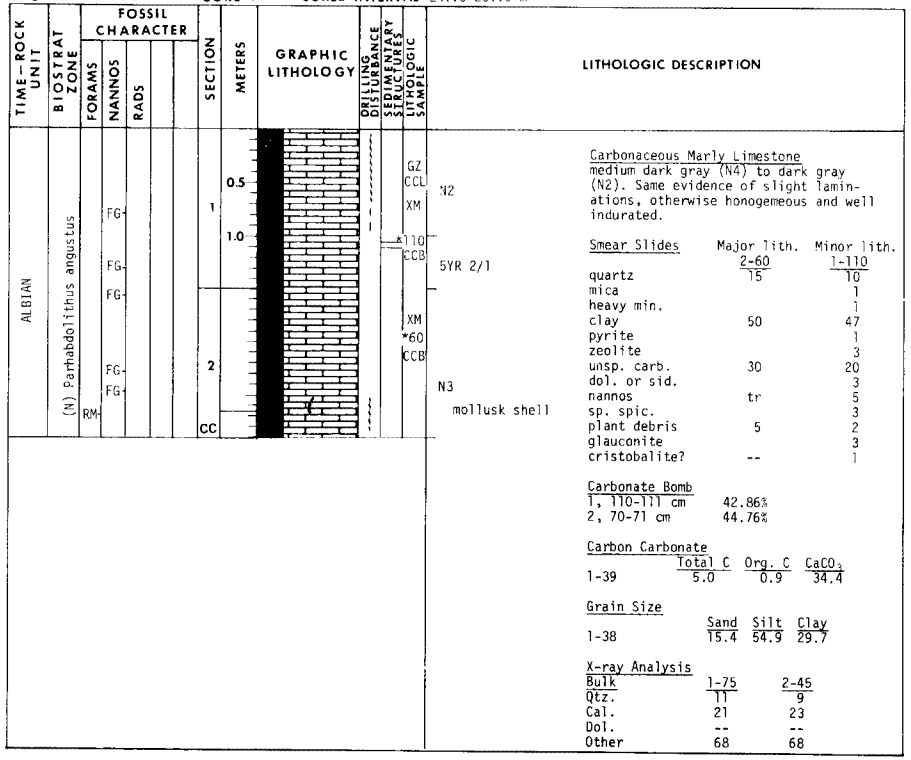
Grain Size

	Sand	Silt	Clay
2-49	7.9	54.5	37.7
4-95	34.5	43.0	22.6

X-ray Analysis

Bulk	1-41	3-91	4-57
Qtz.	5	17	78
Calc.	19	14	67
Dol.			
Other	13	19	66

SITE 402 HOLE A CORE 12 CORED INTERVAL: 241.5-251.0 m



LITHOLOGIC DESCRIPTION

Carbonaceous Marly Limestone
medium dark gray (N4) to dark gray (N2). Same evidence of slight laminations, otherwise honogemeous and well indurated.

Smear Slides	Major lith. 2-60	Minor lith. 1-110
quartz	15	10
mica		1
heavy min.		1
clay	50	47
pyrite		1
zeolite		3
unsp. carb.	30	20
dol. or sid.		3
nannos	tr	5
sp. spic.		3
plant debris	5	2
glauconite		3
cristobalite?	--	1

Carbonate Bomb

1, 110-111 cm	42.86%
2, 70-71 cm	44.76%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-39	5.0	0.9	34.4

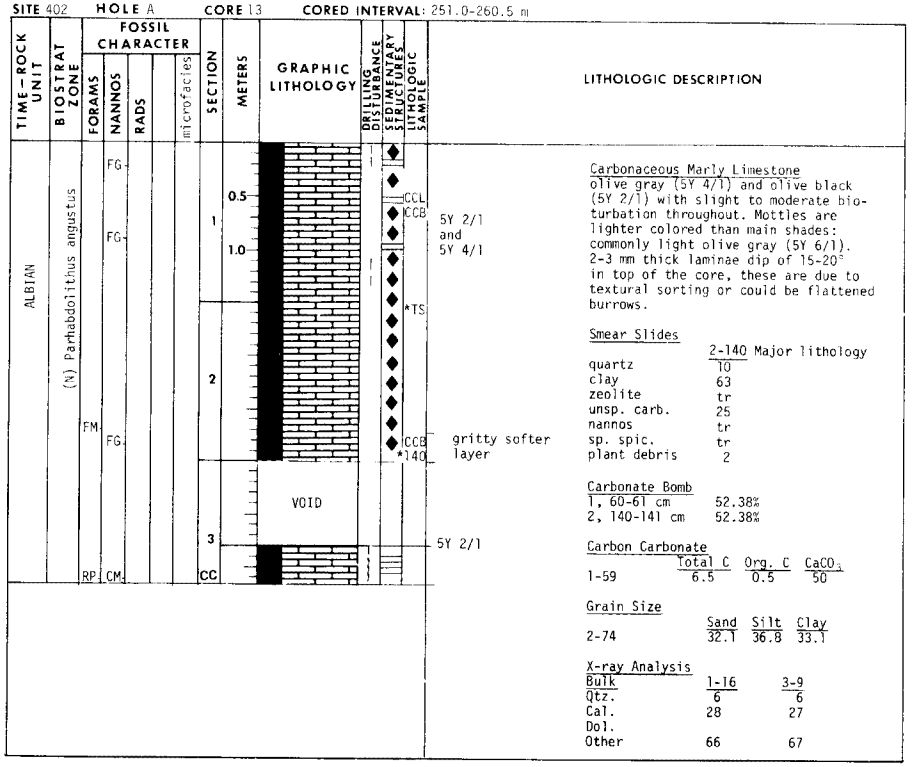
Grain Size

	Sand	Silt	Clay
1-38	15.4	54.9	29.7

X-ray Analysis

Bulk	1-75	2-45
Qtz.	11	9
Cal.	21	23
Dol.	--	--
Other	68	68

SITE 402 HOLE A CORE 13 CORED INTERVAL: 251.0-260.5 m



LITHOLOGIC DESCRIPTION

Carbonaceous Marly Limestone
olive gray (5Y 4/1) and olive black (5Y 2/1) with slight to moderate bioturbation throughout. Mottles are lighter colored than main shades: commonly light olive gray (5Y 6/1). 2-3 mm thick laminae dip of 15-20° in top of the core, these are due to textural sorting or could be flattened burrows.

Smear Slides	2-140 Major lithology
quartz	10
clay	63
zeolite	tr
unsp. carb.	25
nannos	tr
sp. spic.	tr
plant debris	2

Carbonate Bomb

1, 60-61 cm	52.38%
2, 140-141 cm	52.38%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-59	6.5	0.5	50

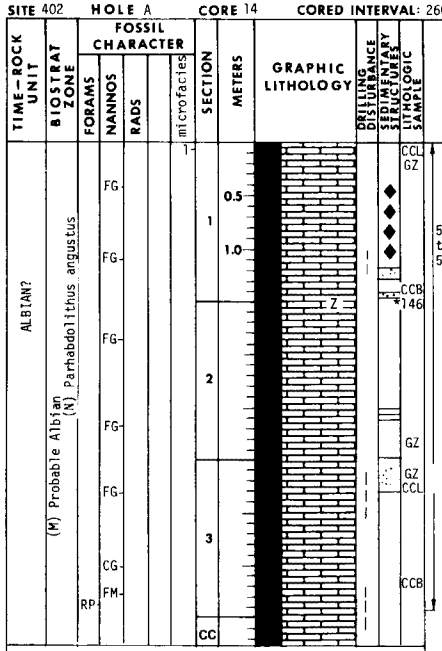
Grain Size

	Sand	Silt	Clay
2-74	32.1	36.8	33.1

X-ray Analysis

Bulk	1-16	3-9
Qtz.	6	6
Cal.	28	27
Dol.		
Other	66	67

SITE 402 HOLE A CORE 14 CORED INTERVAL: 260.5-270.0 m



Carbonaceous Marly Limestone
olive black (5Y 2/1) to olive gray (5Y 4/1). Some mottling in the upper part and few soft "gritty" layers (5 cm thick). Occasional well defined laminae, olive gray (5Y 4/1) Sec. 2, 110 to 120 cm.

Smear Slides

	1-146	Minor lithology
quartz	10	
mica	3	
clay	37	
zeolite	10	
unsp. carb.	15	
dol. or sid.	5	
nannos	5	
sp. spic.	5	
plant debris	5	
glauconite	5	

Carbonate Bomb

1, 166-167 cm	38.57%
3, 120-121 cm	38.57%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-9	4.6	0.9	37.1
3-36	3.5	0.9	31.6

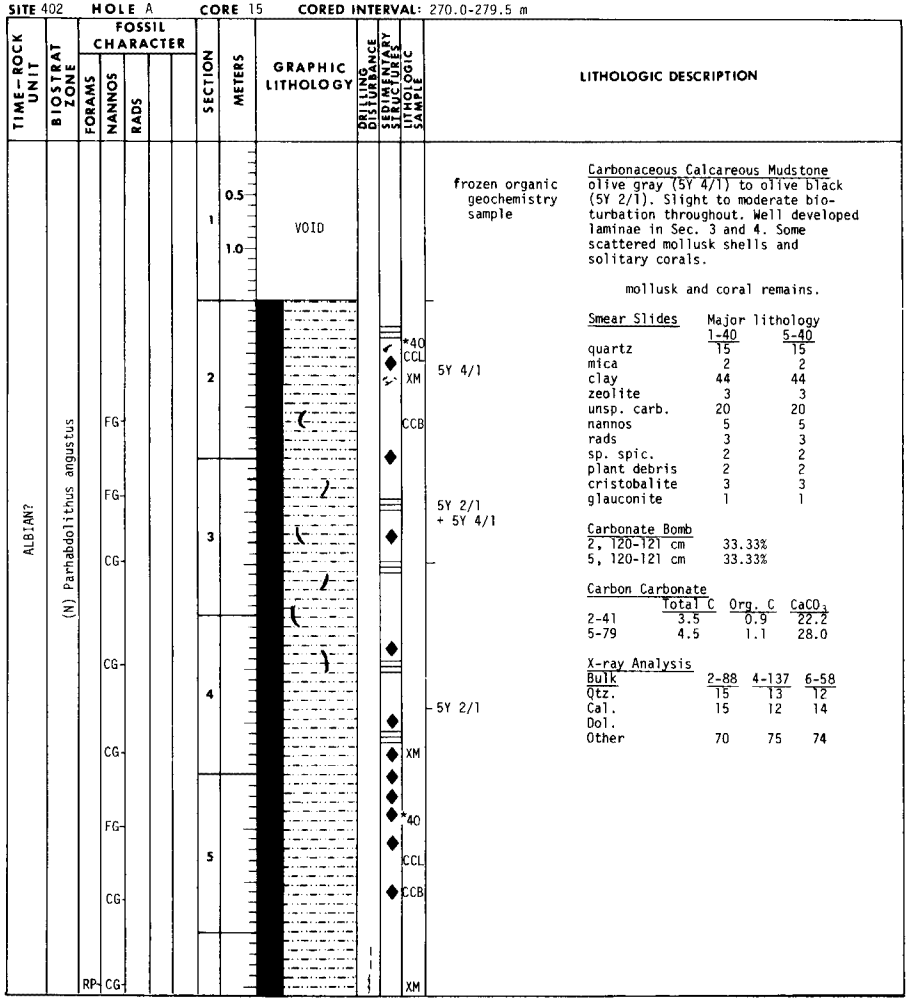
Grain Size

	Sand	Silt	Clay
2-20	17.0	64.9	18.1
2-142	17.9	48.7	33.4
3-20	10.9	47.6	41.5

X-ray Analysis

Bulk	1-62	3-42
Qtz.	8	16
Cal.	21	15
Dol.		
Other	71	69

SITE 402 HOLE A CORE 15 CORED INTERVAL: 270.0-279.5 m



Carbonaceous Calcareous Mudstone
olive gray (5Y 4/1) to olive black (5Y 2/1). Slight to moderate bioturbation throughout. Well developed laminae in Sec. 3 and 4. Some scattered mollusk shells and solitary corals.

mollusk and coral remains.

Smear Slides

	Major lithology 1-40	5-40
quartz	15	15
mica	2	2
clay	44	44
zeolite	3	3
unsp. carb.	20	20
nannos	5	5
rads	3	3
sp. spic.	2	2
plant debris	2	2
cristobalite	3	3
glauconite	1	1

Carbonate Bomb

2, 120-121 cm	33.33%
5, 120-121 cm	33.33%

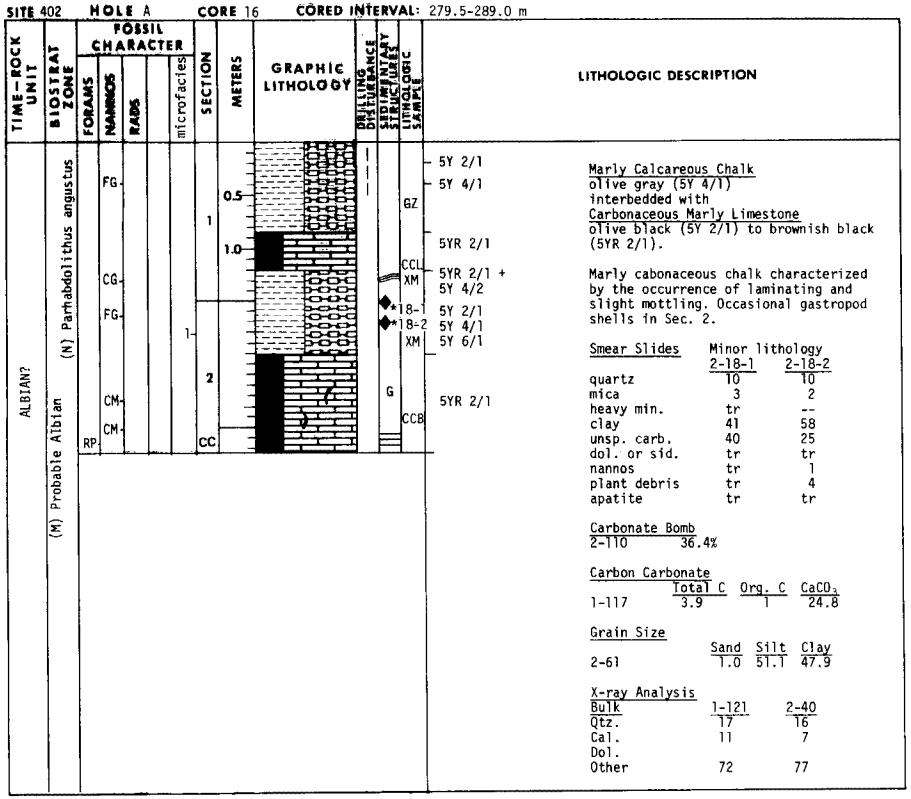
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-41	3.5	0.9	22.2
5-79	4.5	1.1	28.0

X-ray Analysis

Bulk	2-88	4-137	6-58
Qtz.	15	13	12
Cal.	15	12	14
Dol.			
Other	70	75	74

SITE 402 HOLE A CORE 16 CORED INTERVAL: 279.5-289.0 m



LITHOLOGIC DESCRIPTION

Marly Calcareous Chalk
olive gray (5Y 4/1)
interbedded with
Carbonaceous Marly Limestone
olive black (5Y 2/1) to brownish black (5YR 2/1).

Marly cabonaceous chalk characterized by the occurrence of laminating and slight mottling. Occasional gastropod shells in Sec. 2.

Smear Slides	Minor lithology 2-18-1	2-18-2
quartz	10	10
mica	3	2
heavy min.	tr	--
clay	41	58
unsp. carb.	40	25
dol. or sid.	tr	tr
nannos	tr	1
plant debris	tr	4
apatite	tr	tr

Carbonate Bomb
2-110 36.4%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-117	3.9	1	24.8

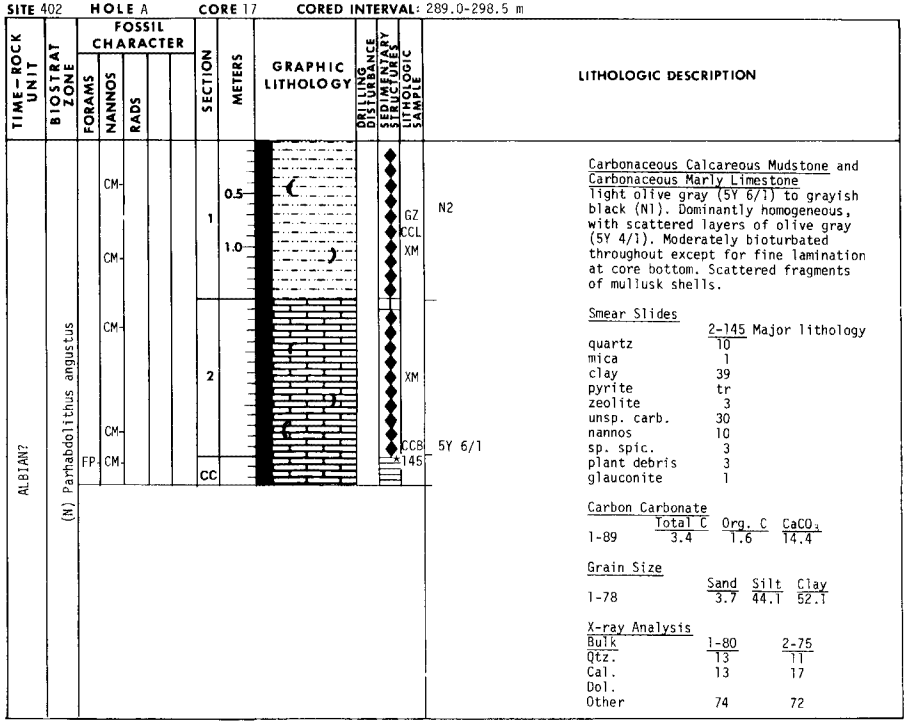
Grain Size

	Sand	Silt	Clay
2-61	1.0	51.1	47.9

X-ray Analysis

Bulk	1-121	2-40
Qtz.	17	16
Cal.	11	7
Dol.		
Other	72	77

SITE 402 HOLE A CORE 17 CORED INTERVAL: 289.0-298.5 m



LITHOLOGIC DESCRIPTION

Carbonaceous Calcareous Mudstone and Carbonaceous Marly Limestone
light olive gray (5Y 6/1) to grayish black (N1). Dominantly homogeneous, with scattered layers of olive gray (5Y 4/1). Moderately bioturbated throughout except for fine lamination at core bottom. Scattered fragments of mullusk shells.

Smear Slides	2-145 Major lithology
quartz	10
mica	1
clay	39
pyrite	tr
zeolite	3
unsp. carb.	30
nannos	10
sp. spic.	3
plant debris	3
glauconite	1

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-89	3.4	1.6	14.4

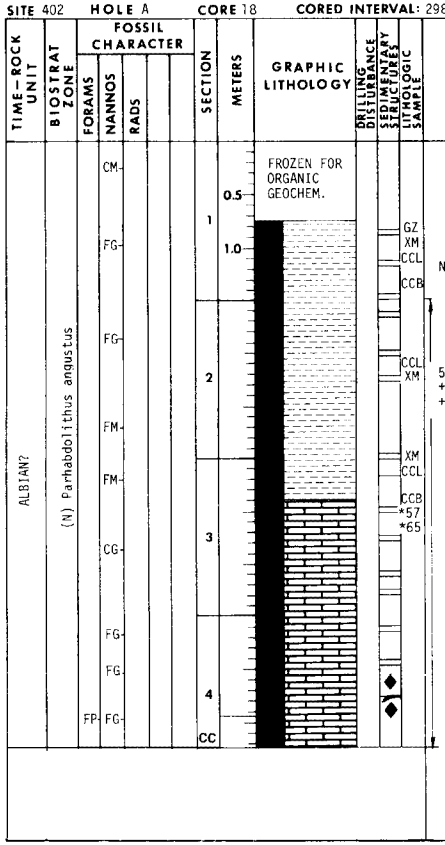
Grain Size

	Sand	Silt	Clay
1-78	3.7	44.1	52.1

X-ray Analysis

Bulk	1-80	2-75
Qtz.	13	11
Cal.	13	17
Dol.		
Other	74	72

SITE 402 HOLE A CORE 18 CORED INTERVAL: 298.5-308.0 m



N3 to N2

5Y 4/1 + 5Y 2/1 + N2

LITHOLOGIC DESCRIPTION

Carbonaceous Marly Limestone and Carbonaceous Calcareous Mudstone olive gray (5Y 4/1) to dark gray (N3). Lamination throughout due to textural variation. Flaser structure in 2-130; some bioturbation near base.

Smear Slides	Major lithology 3-65	3-57
quartz	15	19
mica	2	2
heavy min.	1	0
clay	32	15
pyrite	0	1
zeolite	5	8
unsp. carb.	30	40
dol. or sid.	2	3
nannos	5	2
rads	0	3
sp. spic.	3	5
plant debris	5	3
glauconite	0	1

Carbonate Bomb

1-140	2.70%
3-57	37.3%
3-65	36.7%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-106	4.1	1.5	20.9
2-64	4.7	1.1	30.2
3-6	5.1	1.7	28.4

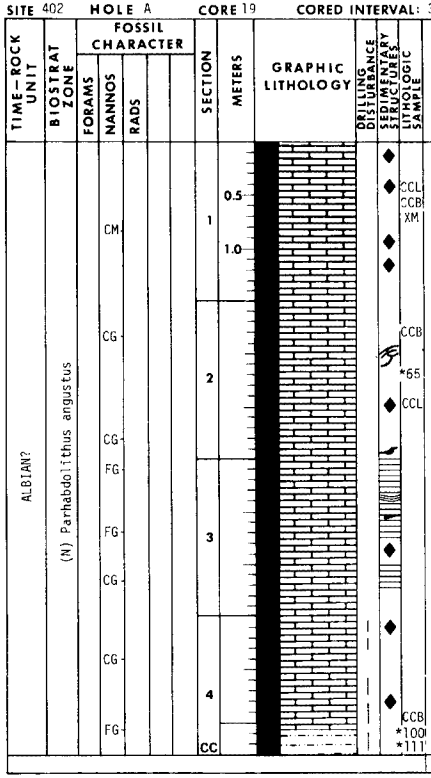
Grain Size

	Sand	Silt	Clay
1-62	2.0	41.2	56.8

X-ray Analysis

Bulk	1-91	2-73	3-36
Qtz.	15	15	16
Cal.	11	11	14
Dol.	--	--	--
Other	74	74	70

SITE 402 HOLE A CORE 19 CORED INTERVAL: 308.0-317.0 m (9.0 m)



LITHOLOGIC DESCRIPTION

Carbonaceous Marly Limestone exhibiting rythmic alternations of olive gray (5Y 4/1) olive black (5Y 2/1) and brownish black (5YR 2/1). Slight bioturbation evident throughout. Fine load casts and ripple(?). Drilled 9.0 meters core then drilled 0.5 meters for inclination test.

Smear Slides	Major lith. 2-65	Minor lith. 4-100	4-111
quartz	8	3	15
feldspar	tr		
mica	2	--	2
heavy min.	tr	--	--
clay	51	15	45
zeolite			5
unsp. carb.	30	82	18
dol. or sid.	1		5
nannos	5		tr
sp. spic.	tr	tr	
plant debris	3	tr	2
glauconite			3

Carbonate Bomb

1-65	30.7%
2-27	42.8%
4-80	38.1%

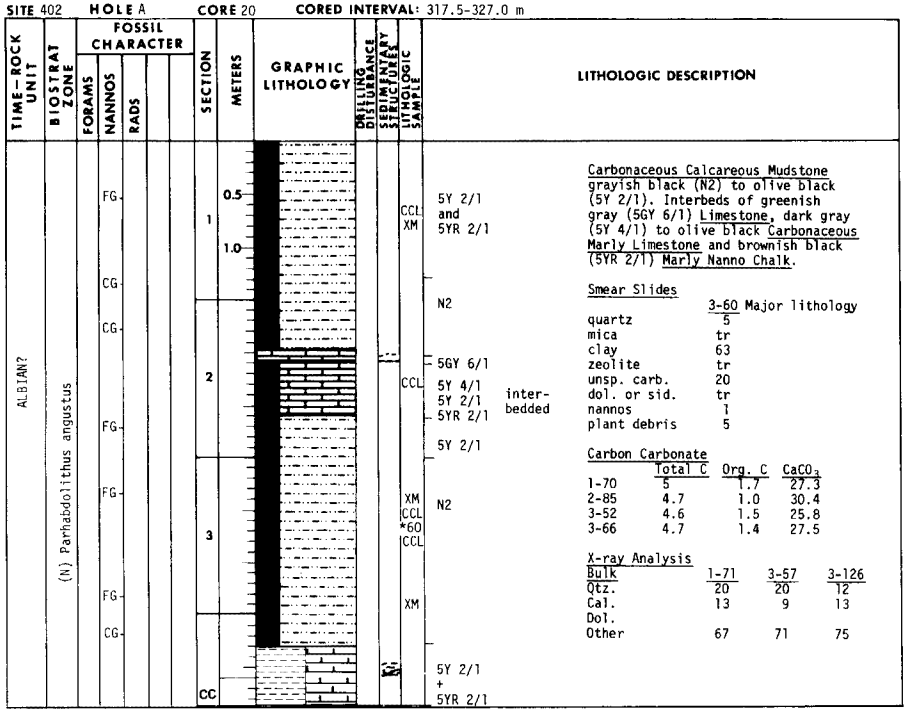
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-63	5.3	1.4	33
2-109	4.7	1.0	30.9

X-ray Analysis

Bulk	1-79	4-106
Qtz.	11	2
Cal.	14	0
Dol.		
Other	75	98

SITE 402 HOLE A CORE 20 CORED INTERVAL: 317.5-327.0 m



Carbonaceous Calcareous Mudstone grayish black (N2) to olive black (5Y 2/1). Interbeds of greenish gray (5GY 6/1) Limestone, dark gray (5Y 4/1) to olive black Carbonaceous Marly Limestone and brownish black (5YR 2/1) Marly Nanno Chalk.

Smear Slides

	3-60 Major lithology
quartz	5
mica	tr
clay	63
zeolite	tr
unsp. carb.	20
dol. or sid.	tr
nannos	1
plant debris	5

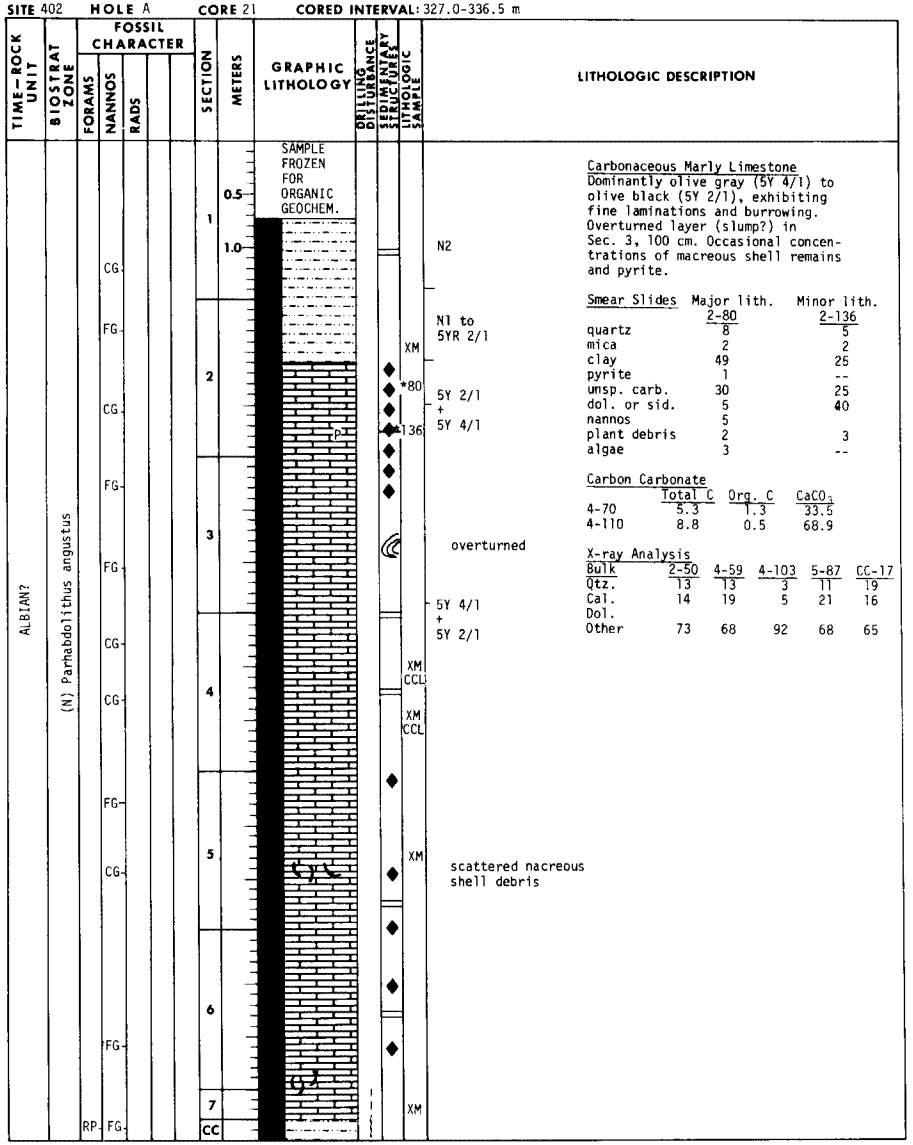
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-70	5	1.7	27.3
2-85	4.7	1.0	30.4
3-52	4.6	1.5	25.8
3-66	4.7	1.4	27.5

X-ray Analysis

Bulk	1-71	3-57	3-126
Qtz.	20	20	12
Cal.	13	9	13
Dol.			
Other	67	71	75

SITE 402 HOLE A CORE 21 CORED INTERVAL: 327.0-336.5 m



Carbonaceous Marly Limestone Dominantly olive gray (5Y 4/1) to olive black (5Y 2/1), exhibiting fine laminations and burrowing. Overturned layer (slump?) in Sec. 3, 100 cm. Occasional concentrations of macreous shell remains and pyrite.

Smear Slides

	Major lith. 2-80	Minor lith. 2-136
quartz	8	5
mica	2	2
clay	49	25
pyrite	1	--
unsp. carb.	30	25
dol. or sid.	5	40
nannos	5	
plant debris	2	3
algae	3	--

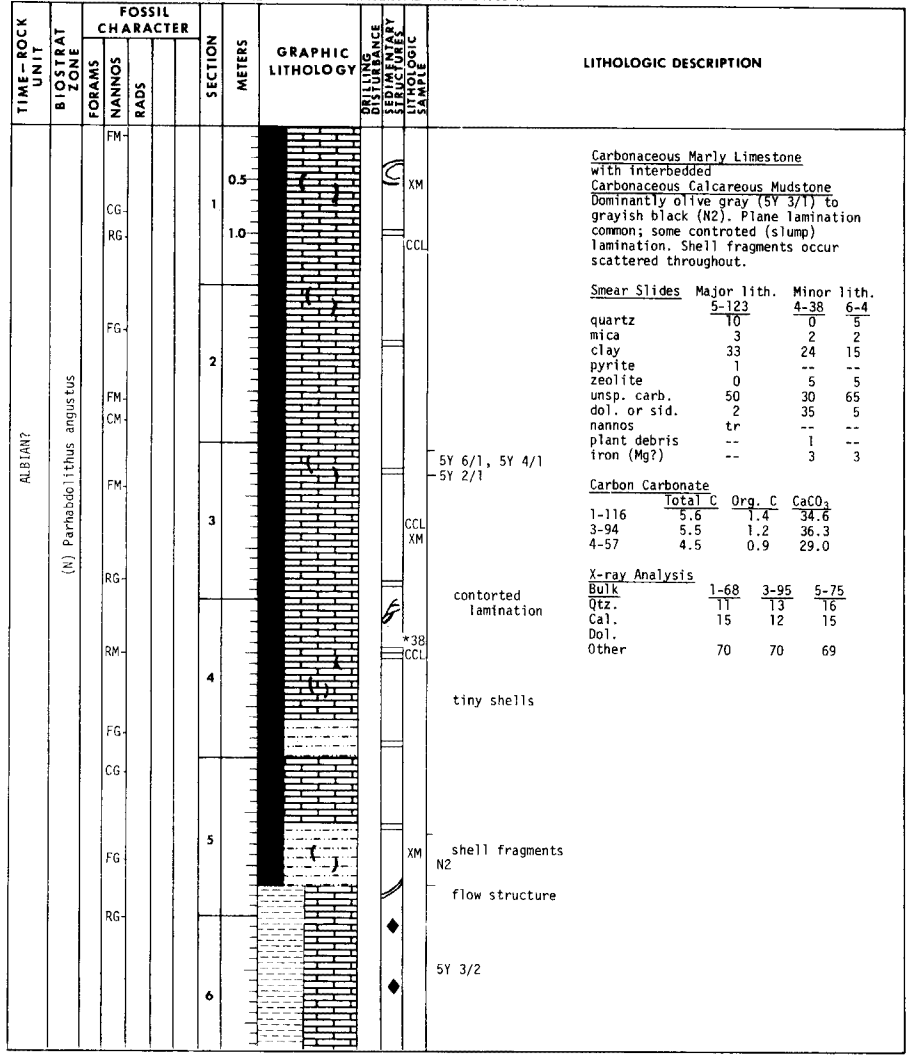
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
4-70	5.3	1.3	33.5
4-110	8.8	0.5	68.9

X-ray Analysis

Bulk	2-50	4-59	4-103	5-87	CC-17
Qtz.	13	13	3	11	19
Cal.	14	19	5	21	16
Dol.					
Other	73	68	92	68	65

SITE 402 HOLE A CORE 22 CORED INTERVAL: 336.5-346.0 m



Carbonaceous Marly Limestone with interbedded Carbonaceous Calcareous Mudstone

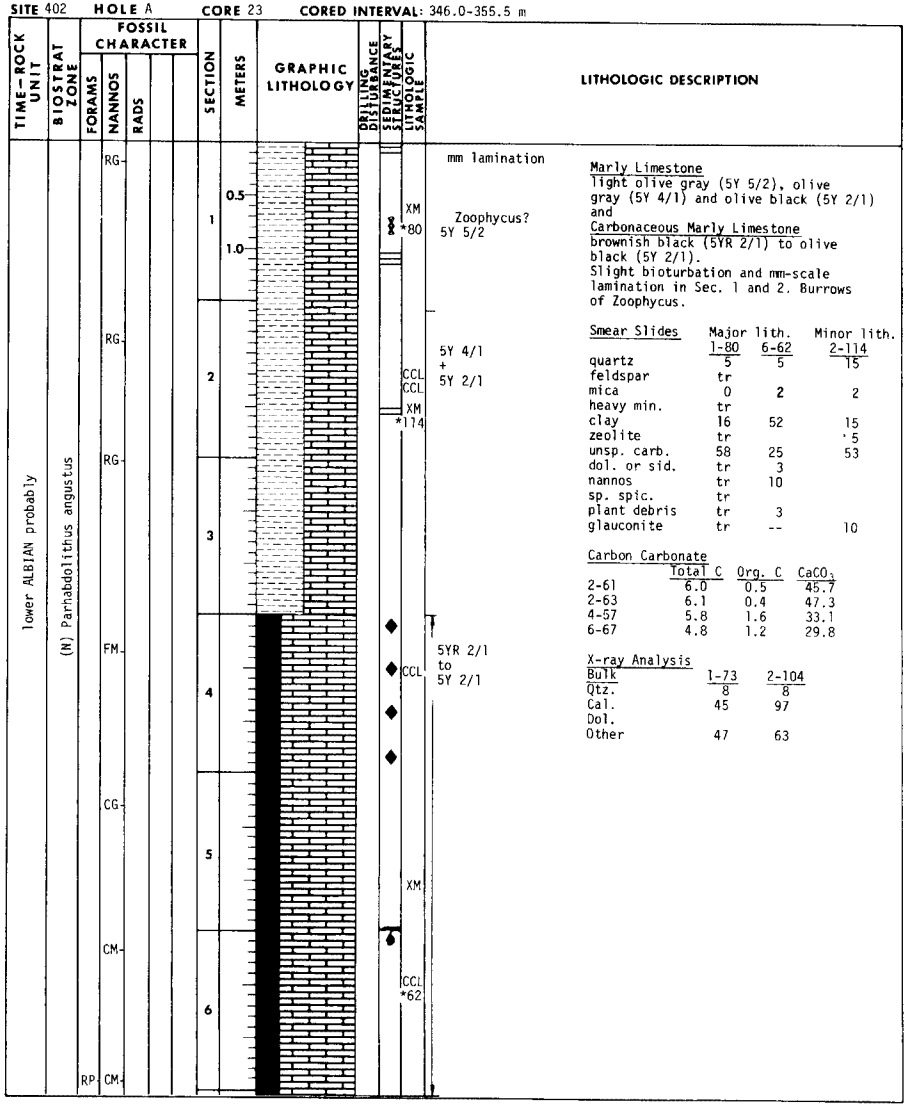
Dominantly olive gray (5Y 3/1) to grayish black (N2). Plane lamination common; some controted (slump) lamination. Shell fragments occur scattered throughout.

Smear Slides	Major lith. 5-123	Minor lith. 4-38	Minor lith. 6-4
quartz	10	0	5
mica	3	2	2
clay	33	24	15
pyrite	1	--	--
zeolite	0	5	5
unsp. carb.	50	30	65
dol. or sid.	2	35	5
nannos	tr	--	--
plant debris	--	1	--
iron (Mg?)	--	3	3

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-116	5.6	1.4	34.6
3-94	5.5	1.2	36.3
4-57	4.5	0.9	29.0

X-ray Analysis Bulk	1-68	3-95	5-75
Qtz.	11	13	16
Cal.	15	12	15
Dol.			
Other	70	70	69

SITE 402 HOLE A CORE 23 CORED INTERVAL: 346.0-355.5 m



Marly Limestone

Light olive gray (5Y 5/2), olive gray (5Y 4/1) and olive black (5Y 2/1) and Carbonaceous Marly Limestone brownish black (5YR 2/1) to olive black (5Y 2/1).

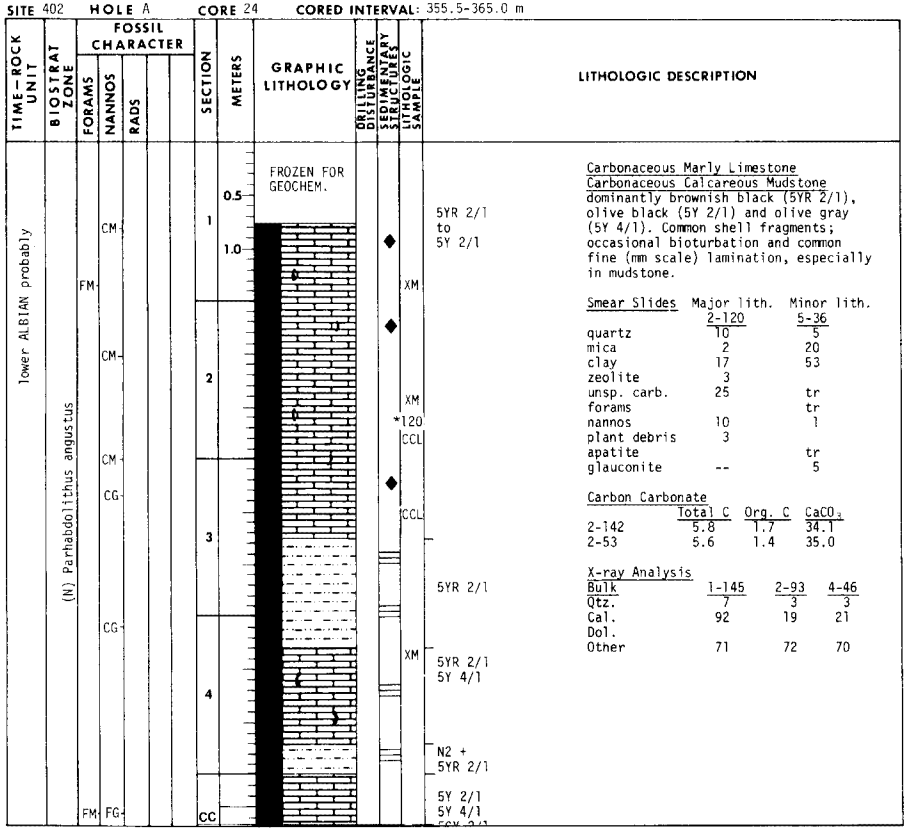
Slight bioturbation and mm-scale lamination in Sec. 1 and 2. Burrows of Zoophycus.

Smear Slides	Major lith. 1-80	Major lith. 6-62	Minor lith. 2-114
quartz	5	5	15
feldspar	tr		
mica	0	2	2
heavy min.	tr		
clay	16	52	15
zeolite	tr		5
unsp. carb.	58	25	53
dol. or sid.	tr	3	
nannos	tr	10	
sp. spic.	tr		
plant debris	tr	3	
glauconite	tr	--	10

Carbon Carbonate	Total C	Org. C	$CaCO_3$
2-61	6.0	0.5	45.7
2-63	6.1	0.4	47.3
4-57	5.8	1.6	33.1
6-67	4.8	1.2	29.8

X-ray Analysis Bulk	1-73	2-104
Qtz.	8	8
Cal.	45	97
Dol.		
Other	47	63

SITE 402 HOLE A CORE 24 CORED INTERVAL: 355.5-365.0 m



LITHOLOGIC DESCRIPTION

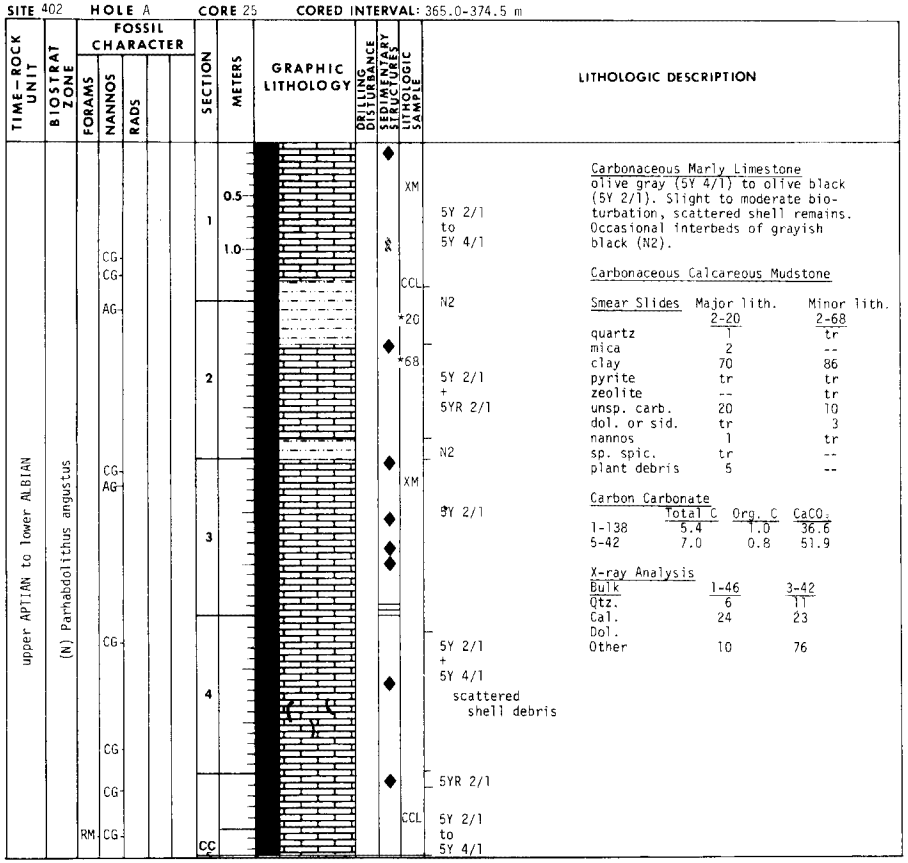
Carbonaceous Marly Limestone
Carbonaceous Calcareous Mudstone
dominantly brownish black (5YR 2/1), olive black (5Y 2/1) and olive gray (5Y 4/1). Common shell fragments; occasional bioturbation and common fine (mm scale) lamination, especially in mudstone.

Smear Slides	Major lith. 2-120	Minor lith. 5-36
quartz	10	5
mica	2	20
clay	17	53
zeolite	3	
unsp. carb.	25	tr
forams		tr
nannos	10	1
plant debris	3	
apatite		tr
glauconite	--	5

Carbon Carbonate	Total C	Org. C	$CaCO_3$
2-142	5.8	1.7	34.1
2-53	5.6	1.4	35.0

X-ray Analysis Bulk	1-145	2-93	4-46
Qtz.	7	3	3
Cal.	92	19	21
Dol.			
Other	71	72	70

SITE 402 HOLE A CORE 25 CORED INTERVAL: 365.0-374.5 m



LITHOLOGIC DESCRIPTION

Carbonaceous Marly Limestone
olive gray (5Y 4/1) to olive black (5Y 2/1). Slight to moderate bioturbation, scattered shell remains. Occasional interbeds of grayish black (N2).

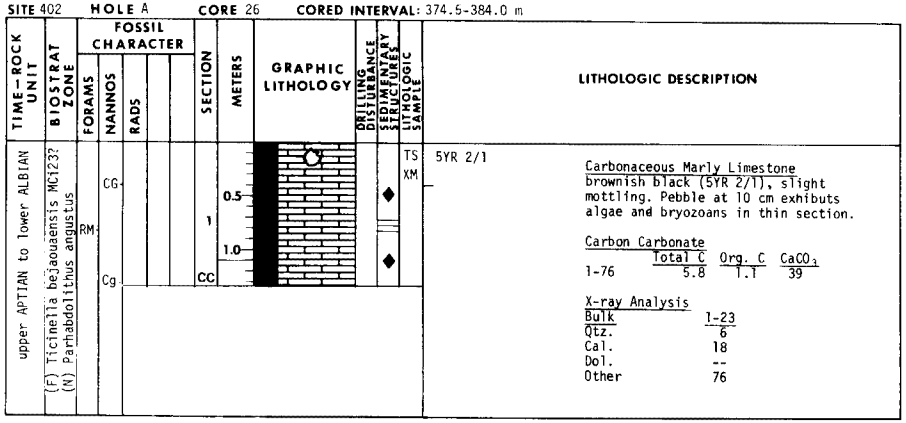
Carbonaceous Calcareous Mudstone

Smear Slides	Major lith. 2-20	Minor lith. 2-68
quartz	1	tr
mica	2	--
clay	70	86
pyrite	tr	tr
zeolite	--	tr
unsp. carb.	20	10
dol. or sid.	tr	3
nannos	1	tr
sp. spic.	tr	--
plant debris	5	--

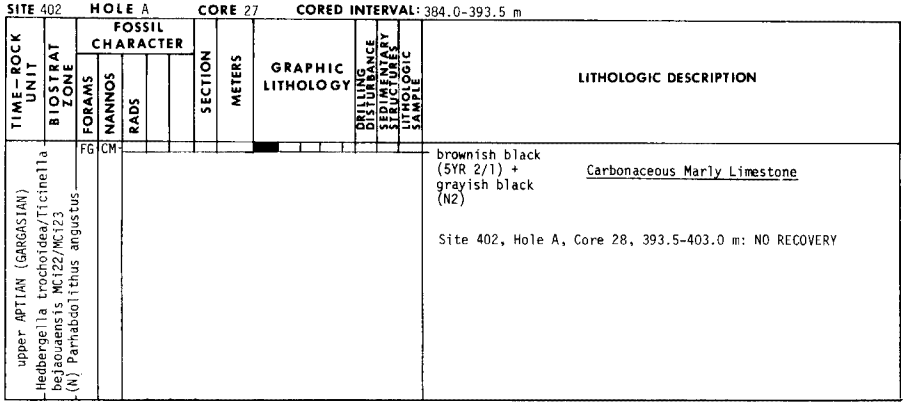
Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-138	5.4	1.0	36.6
5-42	7.0	0.8	51.9

X-ray Analysis Bulk	1-46	3-42
Qtz.	6	11
Cal.	24	23
Dol.		
Other	10	76

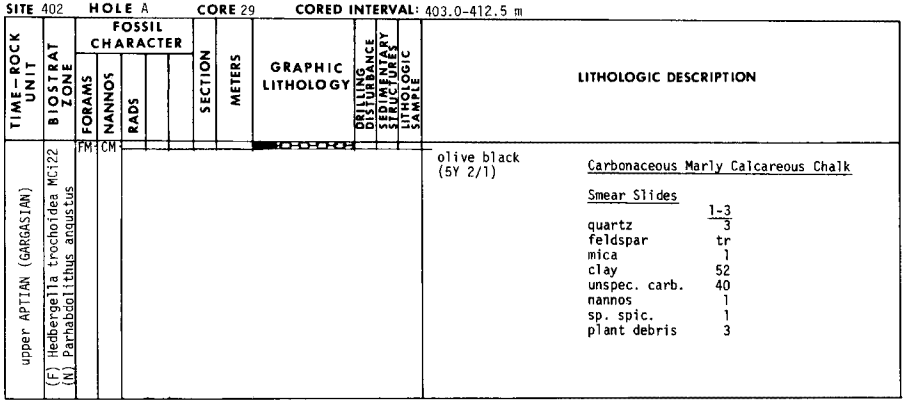
SITE 402 HOLE A CORE 26 CORED INTERVAL: 374.5-384.0 m



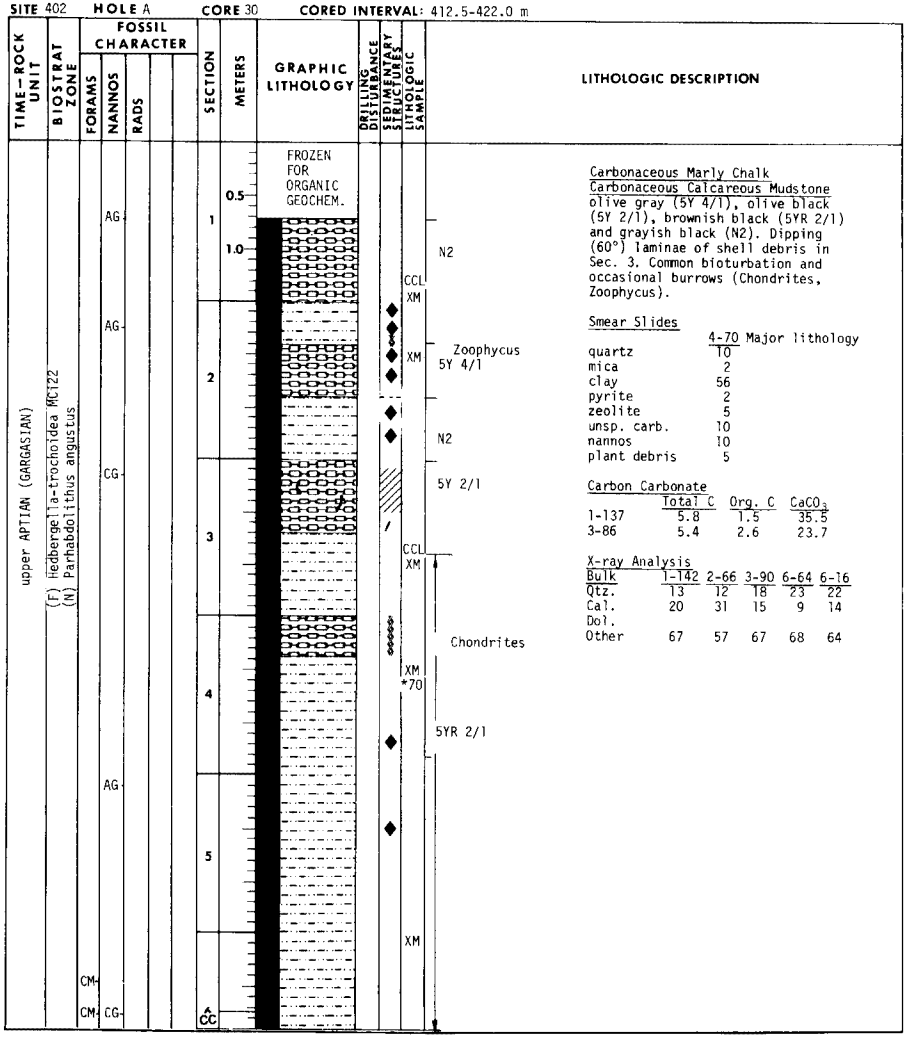
SITE 402 HOLE A CORE 27 CORED INTERVAL: 384.0-393.5 m



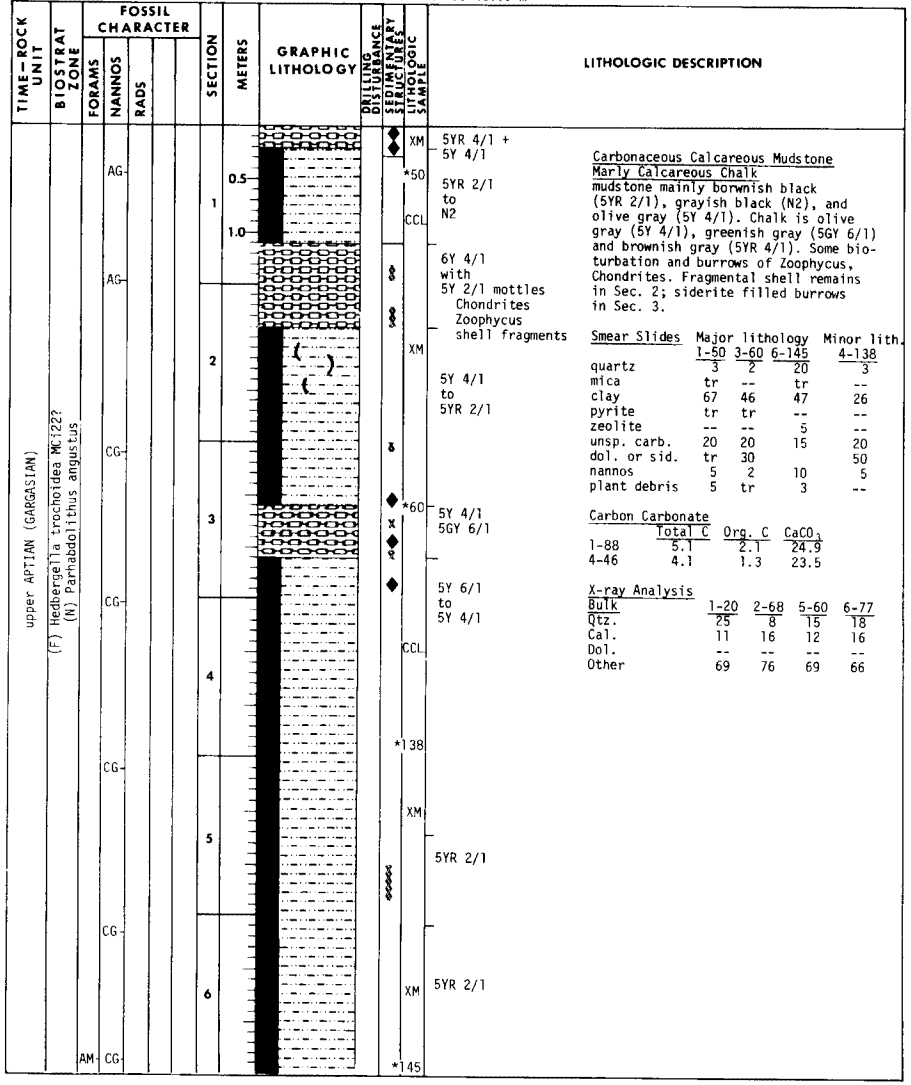
SITE 402 HOLE A CORE 29 CORED INTERVAL: 403.0-412.5 m



SITE 402 HOLE A CORE 30 CORED INTERVAL: 412.5-422.0 m



SITE 402 HOLE A CORE 31 CORED INTERVAL: 422.0-431.5 m



Carbonaceous Calcareous Mudstone
Marly Calcareous Chalk

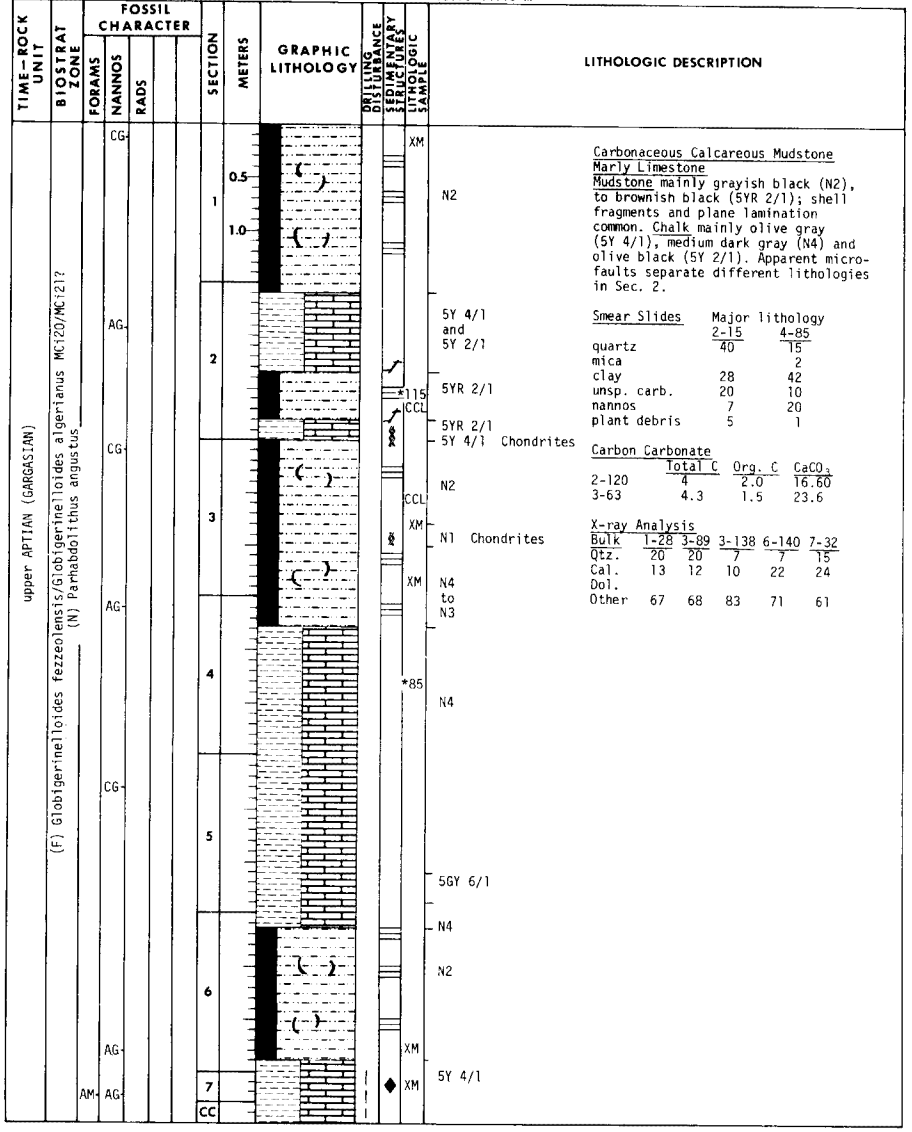
mudstone mainly bornish black (5YR 2/1), grayish black (N2), and olive gray (5Y 4/1). Chalk is olive gray (5Y 4/1), greenish gray (5GY 6/1) and brownish gray (5YR 4/1). Some bioturbation and burrows of Zoophycus, Chondrites. Fragmental shell remains in Sec. 2; siderite filled burrows in Sec. 3.

Smear Slides	Major lithology 1-50	3-60	6-145	Minor lith. 4-138
quartz	3	2	20	3
mica	tr	--	tr	--
clay	67	46	47	26
pyrite	tr	tr	--	--
zeolite	--	--	5	--
unsp. carb.	20	20	15	20
dol. or sid.	tr	30		50
nannos	5	2	10	5
plant debris	5	tr	3	--

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-88	5.1	2.1	24.9
4-46	4.1	1.3	23.5

X-ray Analysis Bulk	1-20	2-68	5-60	6-77
Qtz.	25	8	15	18
Cal.	11	16	12	16
Dol.	--	--	--	--
Other	69	76	69	66

SITE 402 HOLE A CORE 32 CORED INTERVAL: 431.5-441.0 m



Carbonaceous Calcareous Mudstone
Marly Limestone

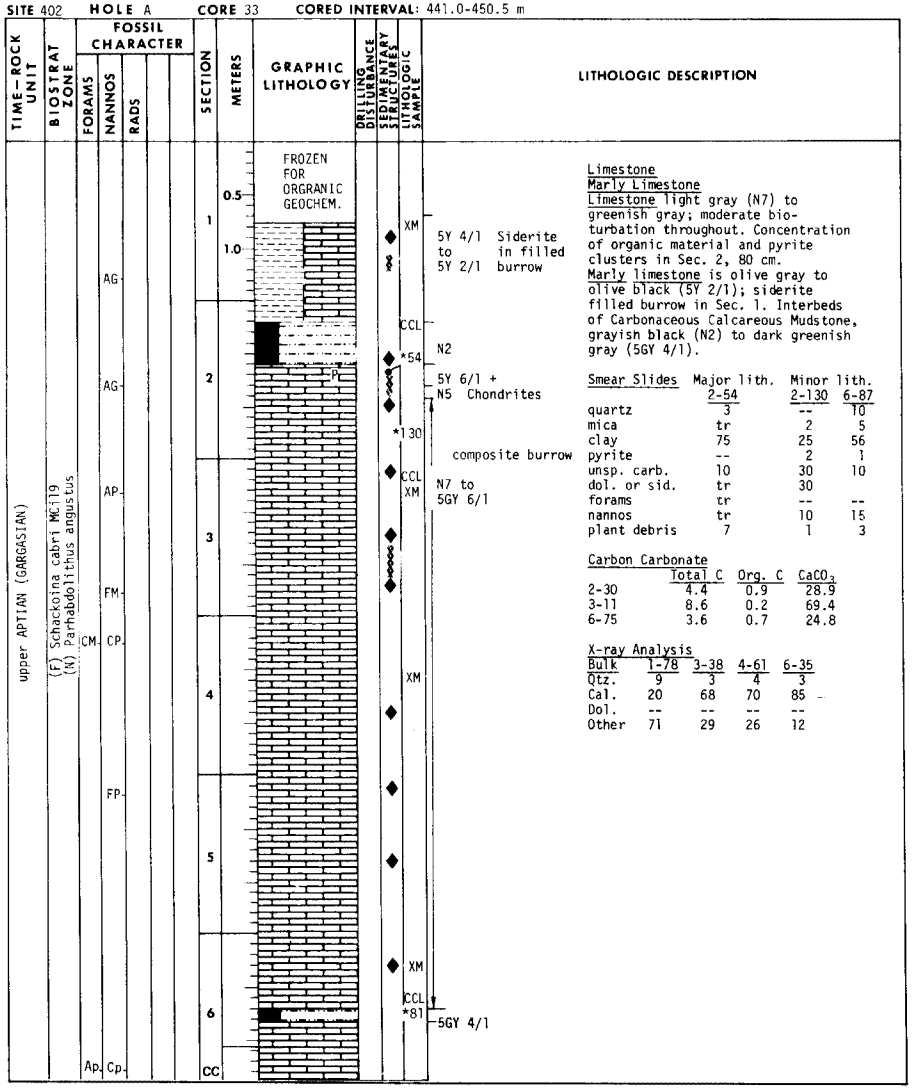
Mudstone mainly grayish black (N2), to brownish black (5YR 2/1); shell fragments and plane lamination common. Chalk mainly olive gray (5Y 4/1), medium dark gray (N4) and olive black (5Y 2/1). Apparent microfaults separate different lithologies in Sec. 2.

Smear Slides	Major lithology 2-15	4-85
quartz	40	15
mica		2
clay	28	42
unsp. carb.	20	10
nannos	7	20
plant debris	5	1

Carbon Carbonate	Total C	Org. C	$CaCO_3$
2-120	4	2.0	16.60
3-63	4.3	1.5	23.6

X-ray Analysis Bulk	1-28	3-89	3-138	6-140	7-32
Qtz.	20	20	7	7	15
Cal.	13	12	10	22	24
Dol.					
Other	67	68	83	71	61

SITE 402 HOLE A CORE 33 CORED INTERVAL: 441.0-450.5 m



Limestone
Marly Limestone
Limestone light gray (N7) to greenish gray; moderate bioturbation throughout. Concentration of organic material and pyrite clusters in Sec. 2, 80 cm.
Marly limestone is olive gray to olive black (5Y 2/1); siderite filled burrow in Sec. 1. Interbeds of Carbonaceous Calcareous Mudstone, grayish black (N2) to dark greenish gray (5GY 4/1).

Smear Slides	Major lith. 2-54	Minor lith. 2-130	Minor lith. 6-87
quartz	3	--	10
mica	tr	2	5
clay	75	25	56
pyrite	--	2	1
unsp. carb.	10	30	10
dol. or sid.	tr	30	
forams	tr	--	--
nannos	tr	10	15
plant debris	7	1	3

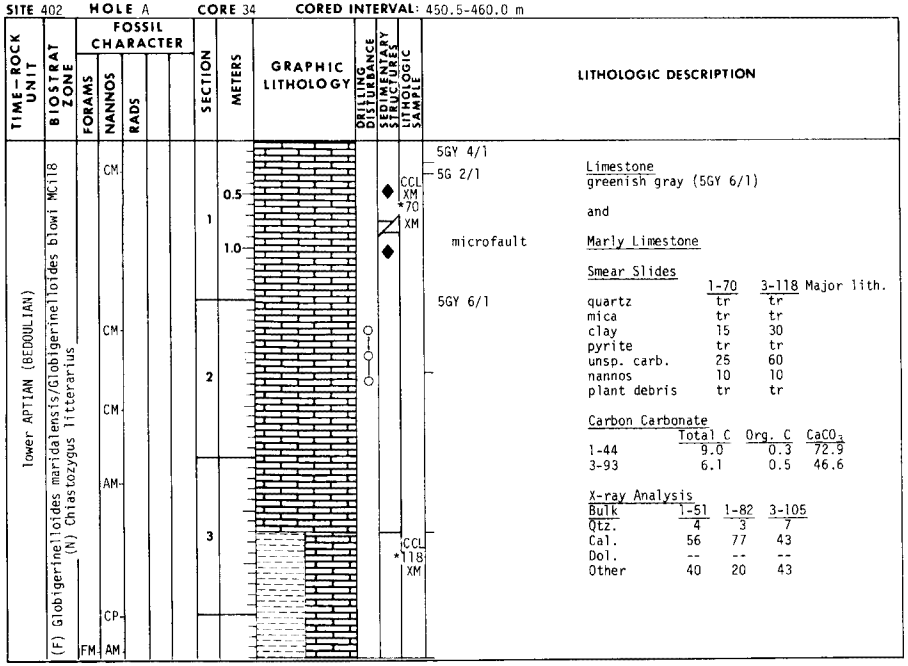
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-30	4.4	0.9	28.9
3-11	8.6	0.2	69.4
6-75	3.6	0.7	24.8

X-ray Analysis

Bulk	1-78	3-38	4-61	6-35
Qtz.	9	3	4	3
Cal.	20	68	70	85
Dol.	--	--	--	--
Other	71	29	26	12

SITE 402 HOLE A CORE 34 CORED INTERVAL: 450.5-460.0 m



Limestone
greenish gray (5GY 6/1)

and

Marly Limestone

Smear Slides	1-70	3-118 Major lith.
quartz	tr	tr
mica	tr	tr
clay	15	30
pyrite	tr	tr
unsp. carb.	25	60
nannos	10	10
plant debris	tr	tr

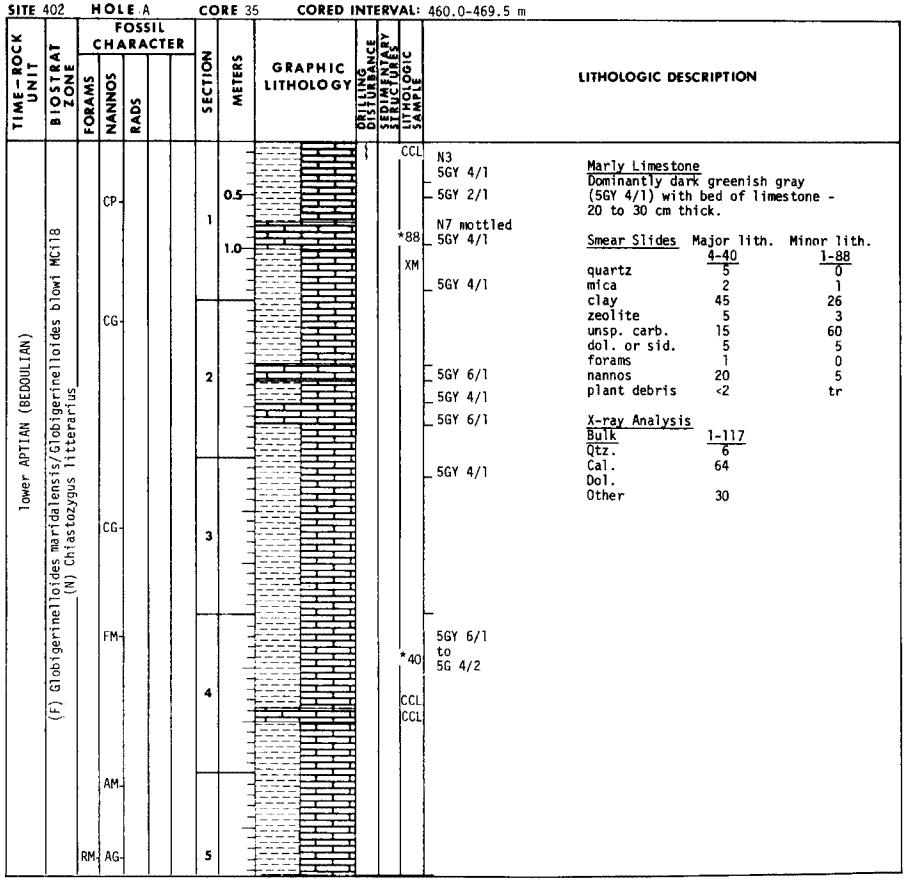
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-44	9.0	0.3	72.9
3-93	6.1	0.5	46.6

X-ray Analysis

Bulk	1-51	1-82	3-105
Qtz.	4	3	7
Cal.	56	77	43
Dol.	--	--	--
Other	40	20	43

SITE 402 HOLE A CORE 35 CORED INTERVAL: 460.0-469.5 m



Leg 48 Site 402
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
402	1	1	0.00	0.85	3.7	0.4	28.1
402	2	1	42.00	42.25	2.6	0.5	17.5
402	3	1	80.00	80.87	2.7	0.2	20.8
402	3	1	80.00	81.49	6.7	0.1	55.0
402	5	1	127.50	128.16	7.4	0.2	60.0
402	5	2	127.50	129.68	7.0	0.2	56.8
402	5	4	127.50	132.66	7.9	0.1	64.7
402A	1	1	137.00	137.37	7.2	0.2	58.3
402A	1	2	137.00	139.05	7.4	0.2	60.7
402A	1	5	137.00	144.32	7.8	0.1	63.7
402A	2	1	146.50	146.76	7.3	0.1	59.9
402A	3	3	156.00	159.80	5.4	0.2	43.2
402A	3	5	156.00	163.29	5.6	0.2	44.6
402A	4	1	165.50	165.70	6.0	0.2	48.7
402A	4	2	165.50	168.30	4.0	0.2	31.3
402A	11	1	232.00	232.05	4.2	0.9	27.4
402A	11	4	232.00	237.29	4.9	0.9	33.4
402A	12	1	241.50	241.89	5.0	0.9	34.4
402A	13	1	251.00	251.59	6.5	0.5	50.0
402A	14	1	260.50	261.59	5.4	0.9	37.1
402A	14	3	260.50	263.86	4.6	0.9	31.4
402A	15	2	270.00	271.91	3.5	0.9	22.2
402A	15	5	270.00	277.29	4.5	1.1	28.0
402A	16	1	279.50	280.67	3.9	1.0	24.8
402A	17	1	289.00	289.81	3.4	1.6	14.4
402A	18	1	298.50	299.56	4.5	1.3	26.0
402A	18	2	298.50	300.64	4.1	1.5	20.9
402A	18	2	298.50	300.64	4.7	1.1	30.2
402A	18	3	298.50	301.56	5.1	1.7	28.4
402A	19	1	308.00	308.63	5.3	1.4	33.0
402A	19	2	308.00	310.59	4.7	1.0	30.9
402A	20	1	317.50	318.20	5.0	1.7	27.3
402A	20	2	317.50	319.85	4.7	1.0	30.4
402A	20	3	317.50	321.02	4.6	1.5	25.8
402A	20	3	317.50	321.14	4.7	1.4	27.5
402A	21	4	327.00	332.20	5.3	1.3	33.5
402A	21	4	327.00	332.60	8.8	0.5	68.9
402A	21	6	327.00	335.13	4.4	0.7	31.2
402A	22	1	336.50	337.66	5.6	1.4	34.6
402A	22	3	336.50	340.44	5.5	1.2	36.3
402A	22	4	336.50	341.57	4.5	0.9	29.6
402A	22	6	336.50	344.64	6.0	0.5	45.8
402A	23	2	346.00	348.11	6.0	0.5	45.7
402A	23	2	346.00	348.13	6.1	0.4	47.3
402A	23	4	346.00	351.07	5.6	1.6	33.1
402A	23	6	346.00	354.07	4.8	1.2	29.8
402A	24	2	355.50	358.42	5.8	1.7	34.1
402A	24	3	355.50	359.03	5.6	1.4	35.0

#

Leg 48 Site 402
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
402A	25	1	365.00	366.38	5.4	1.0	36.6
402A	25	5	365.00	371.42	7.0	0.8	51.9
402A	26	1	374.50	375.26	5.8	1.1	39.0
402A	30	1	412.50	413.87	5.8	1.5	35.5
402A	30	3	412.50	416.36	5.4	2.6	23.7
402A	31	1	422.00	422.88	5.1	2.1	24.9
402A	31	4	422.00	426.96	4.1	1.3	23.5
402A	32	2	431.50	434.20	4.0	2.0	16.6
402A	32	3	431.50	434.63	4.3	1.5	23.6
402A	33	2	441.00	442.80	4.4	0.9	28.9
402A	33	3	441.00	444.11	8.6	0.2	69.4
402A	33	6	441.00	449.25	3.6	0.7	24.8
402A	34	1	450.50	450.94	9.0	0.3	72.9
402A	34	3	450.50	454.43	6.1	0.5	46.6
402A	35	1	460.00	460.62	7.9	0.4	62.1
402A	35	4	460.00	465.35	7.5	0.4	59.1
402A	35	4	460.00	465.44	10.6	0.1	87.8

#

Leg 48 Site 402
DSDP Shore Laboratory Grain Size Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Sand	Silt	Clay
402	1	1	0.00	0.87	20.1	46.1	33.8
402	2	1	42.00	42.56	16.5	43.2	40.2
402	3	1	80.00	81.01	13.9	45.8	40.3
402	3	1	80.00	81.11	43.3	37.7	19.1
402	3	1	80.00	81.17	46.4	29.6	24.0
402	5	2	127.50	129.71	1.6	46.7	51.7
402	5	4	127.50	132.47	2.2	44.0	53.7
402A	1	2	137.00	139.08	1.7	47.2	51.1
402A	1	3	137.00	140.57	16.8	42.0	41.2
402A	1	5	137.00	143.15	1.9	55.1	43.0
402A	2	1	146.50	146.80	1.5	47.8	50.8
402A	3	2	156.00	158.55	1.0	47.7	51.3
402A	3	4	156.00	161.55	1.1	52.7	46.2
402A	4	1	165.50	166.68	0.9	49.2	49.9
402A	4	2	165.50	168.33	2.3	45.2	52.5
402A	11	2	232.00	233.99	7.9	54.5	37.7
402A	11	4	232.00	237.05	34.5	43.0	22.6
402A	12	1	241.50	241.88	15.4	54.9	29.7
402A	13	2	251.00	253.24	32.1	34.8	33.1
402A	14	1	260.50	261.70	17.0	44.9	38.1
402A	14	2	260.50	263.42	17.9	48.7	33.4
402A	14	3	260.50	263.70	10.9	47.6	41.5
402A	16	2	279.50	281.61	1.0	51.1	47.9
402A	17	1	289.00	289.78	3.7	44.1	52.1
402A	18	1	298.50	299.92	2.0	41.2	56.8

#

DEEP SEA DRILLING PROJECT
LEG 48 SITE 403
SITE SUMMARY SHEET

Date occupied	0233 June 20, 1976
Date departed	1100 June 24, 1976
Time on site	5 days
Position: latitude	56°08.31'N
longitude	23°17.64'W
Water depth (sea level)	2301 corrected meters, echo sounding
Water depth (rig floor)	2317 corrected meters, echo sounding
Bottom felt at	2317 meters, drill pipe
Penetration	489.0 meters
Number of holes	1
Number of cores	52
Total length of cored section	489.0 meters
Total core recovered	160.8 meters
Percentage of core recovery	32.9%
Oldest Sediment Cored	
Depth subbottom	489.0 meters
Nature	Tuffaceous sandstone
Age	Lowermost Eocene - uppermost Paleocene?
Measured velocity	2.3 km sec^{-1}
Basement	Not reached

PRINCIPAL RESULTS:

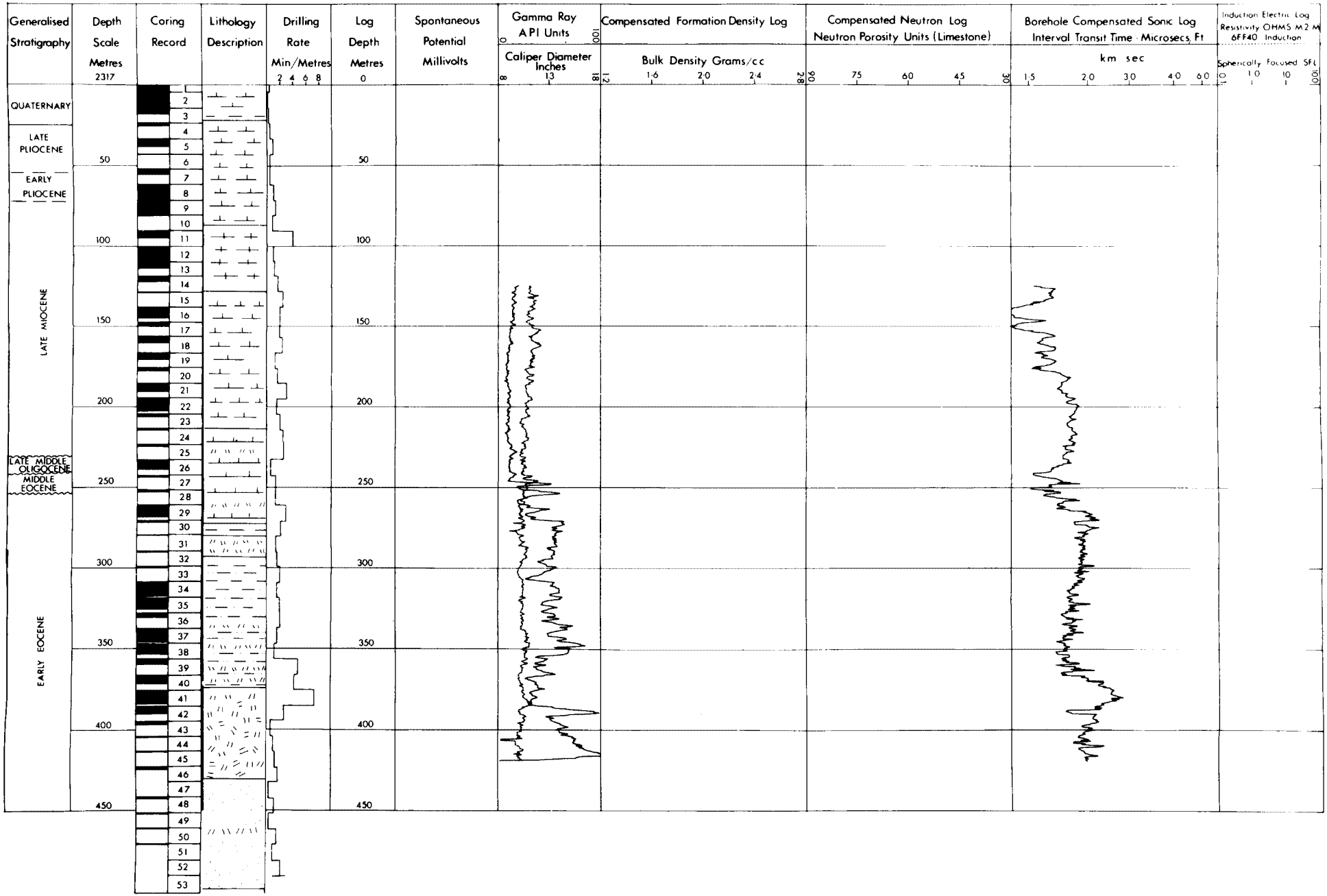
Site 403 was drilled in 2317 meters depth on the southwest margin of the Rockall Plateau about 30 km from the oldest magnetic anomaly (-24) recorded in the adjacent ocean crust.

LEG 48 SITE 403
SITE SUMMARY SHEET con't.

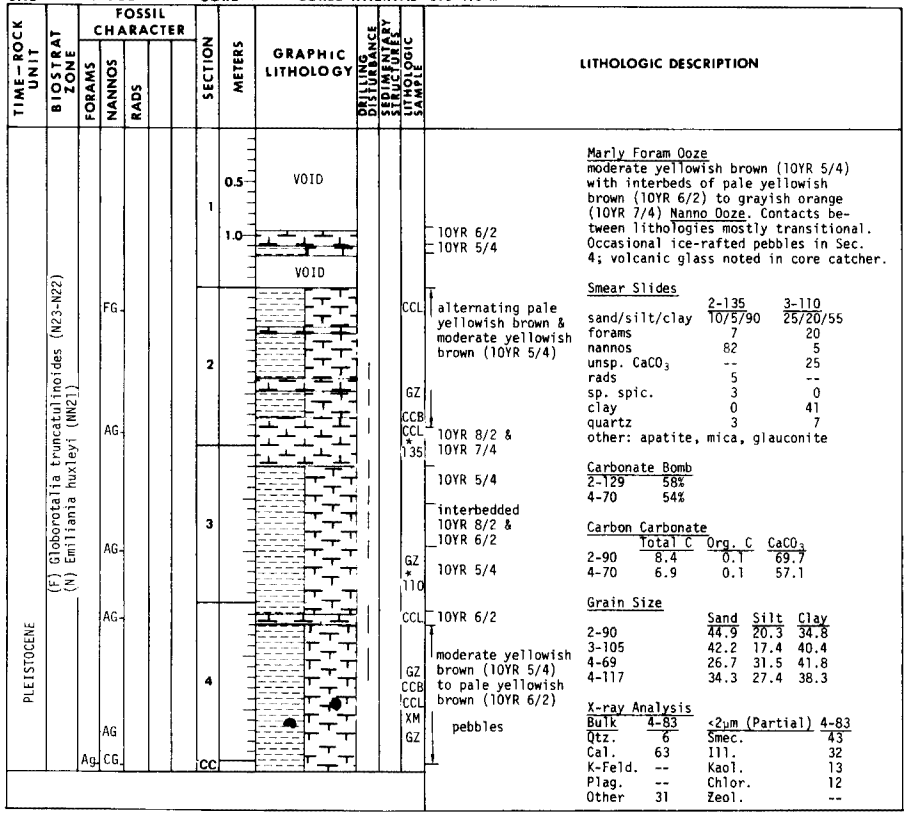
Between the seabed and 223 meters subsea, foram nanno oozes and chalks of upper Miocene to Recent age were present. A prominent 15 m.y. hiatus between the upper Oligocene and the upper Miocene was encountered at 223 meters with a second hiatus between the Oligocene and the middle Eocene at 232 meters. Grayish green nanno chalks comprise the Oligocene section while siliceous glauconitic nanno chalks with tuff layers comprise the middle Eocene. A 3.5 m.y. hiatus may separate the middle and lower Eocene at about 251 meters. Below this depth, interbedded volcanoclastics and mudstones of shallow marine deltaic aspect are present. The oldest, uppermost Paleocene(?) sediments include arkosic sands with a minor lignitic mudstone overlain by a tuffaceous conglomerate. Faunal and lithological evidence indicate progressive subsidence of the site from a littoral depth in uppermost Paleocene-lowermost Eocene time to outer shelf depths by the middle Eocene and to depths in excess of 1000 meters by Oligocene time. The major hiatus between the Oligocene and the upper Miocene may reflect erosion or nondeposition due to more intensive bottom currents following subsidence of the Iceland-Faeroe Rise. Rapid deposition rates of 38 m/m.y. in the upper Miocene may also be related to the influence of bottom currents.

A sonic-gamma log was run in the hole and a suite of downhole temperature measurements were taken.

DOWNHOLE LOGS AND GENERALIZED STRATIGRAPHY
DSDP LEG 48 SITE 403



SITE 403 HOLE CORE 1 CORED INTERVAL: 0.0-4.5 m



Marly Foram Ooze
moderate yellowish brown (10YR 5/4) with interbeds of pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4) Nanno Ooze. Contacts between lithologies mostly transitional. Occasional ice-rafted pebbles in Sec. 4; volcanic glass noted in core catcher.

Smear Slides

	2-135	3-110
sand/silt/clay	10/5/90	25/20/55
forams	7	20
nannos	82	5
unsp. $CaCO_3$	--	25
rads	5	--
sp. spic.	3	0
clay	0	41
quartz	3	7

other: apatite, mica, glauconite

Carbonate Bomb

2-129	58%
4-70	54%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-90	8.4	0.1	69.7
4-70	6.9	0.1	57.1

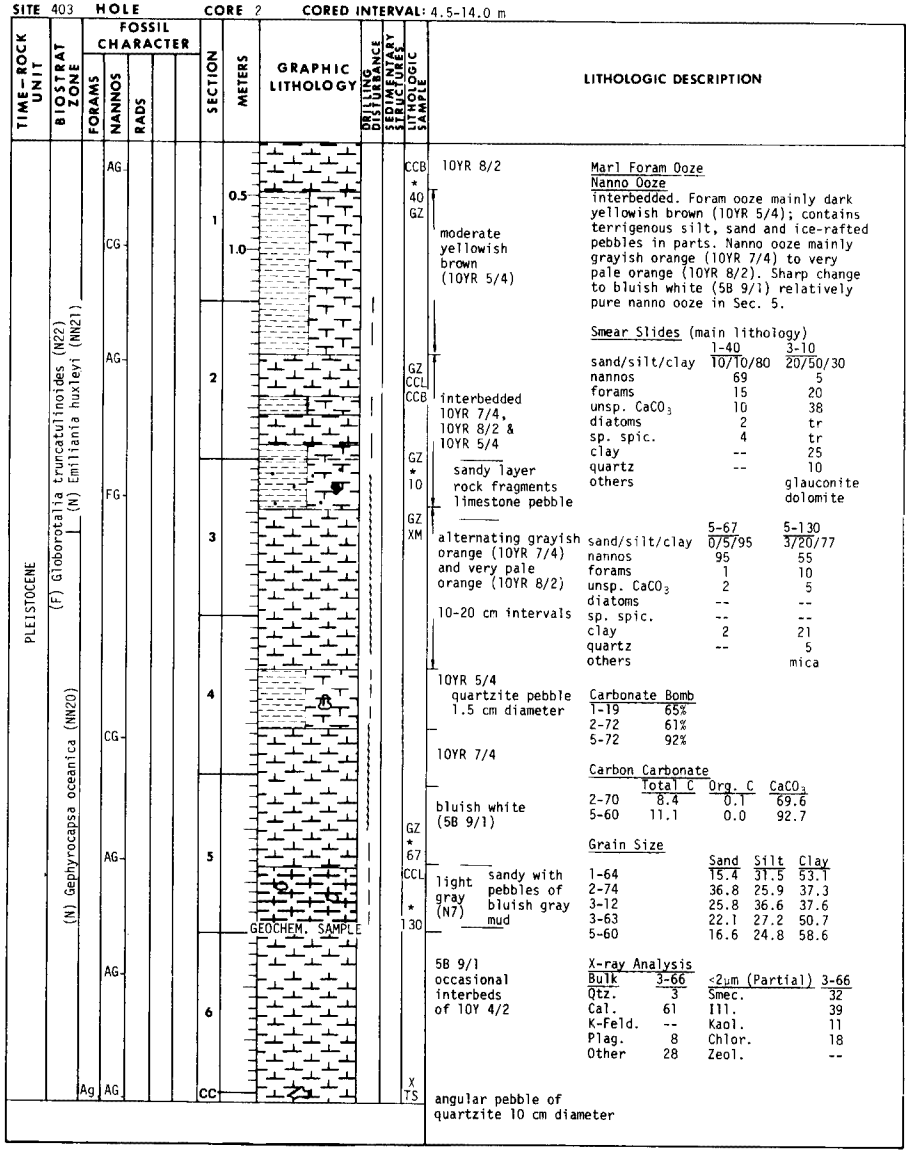
Grain Size

	Sand	Silt	Clay
2-90	44.9	20.3	34.8
3-105	42.2	17.4	40.4
4-69	26.7	31.5	41.8
4-117	34.3	27.4	38.3

X-ray Analysis

Bulk	4-83	<2μm (Partial)	4-83
Qtz.	6	Smec.	43
Cal.	63	Ill.	32
K-Feld.	--	Kaol.	13
Plag.	--	Chlor.	12
Other	31	Zeol.	--

SITE 403 HOLE CORE 2 CORED INTERVAL: 4.5-14.0 m



Marl Foram Ooze
Nanno Ooze
interbedded. Foram ooze mainly dark yellowish brown (10YR 5/4); contains terrigenous silt, sand and ice-rafted pebbles in parts. Nanno ooze mainly grayish orange (10YR 7/4) to very pale orange (10YR 8/2). Sharp change to bluish white (5B 9/1) relatively pure nanno ooze in Sec. 5.

Smear Slides (main lithology)

	1-40	3-10
sand/silt/clay	10/10/80	20/50/30
nannos	69	5
forams	15	20
unsp. $CaCO_3$	10	38
diatoms	2	tr
sp. spic.	4	tr
clay	--	25
quartz	--	10
others		glauconite dolomite

	5-67	5-130
sand/silt/clay	0/5/95	3/20/77
nannos	95	55
forams	1	10
unsp. $CaCO_3$	2	5
diatoms	--	--
sp. spic.	--	--
clay	2	21
quartz	--	5
others		mica

Carbonate Bomb

1-19	65%
2-72	61%
5-72	92%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-70	8.4	0.1	69.6
5-60	11.1	0.0	92.7

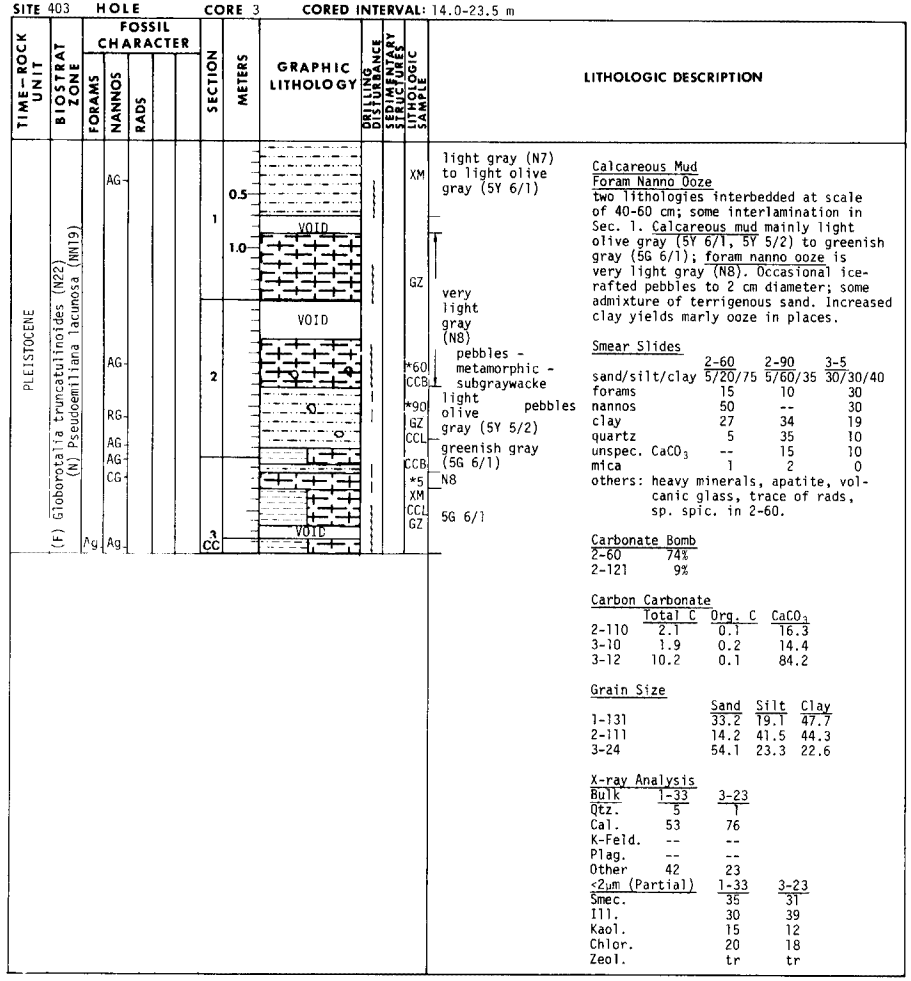
Grain Size

	Sand	Silt	Clay
1-64	15.4	31.5	53.1
2-74	36.8	25.9	37.3
3-12	25.8	36.6	37.6
3-63	22.1	27.2	50.7
5-60	16.6	24.8	58.6

X-ray Analysis

Bulk	3-66	<2μm (Partial)	3-66
Qtz.	3	Smec.	32
Cal.	61	Ill.	39
K-Feld.	--	Kaol.	11
Plag.	8	Chlor.	18
Other	28	Zeol.	--

SITE 403 HOLE CORE 3 CORED INTERVAL: 14.0-23.5 m



light gray (N7) to light olive gray (5Y 6/1)

very light gray (N8) pebbles - metamorphic - subgraywacke

light olive gray (5Y 5/2) pebbles

greenish gray (5G 6/1)

Calcareous Mud

Foram Nanno Ooze

two lithologies interbedded at scale of 40-60 cm; some interlamination in Sec. 1. Calcareous mud mainly light olive gray (5Y 6/1, 5Y 5/2) to greenish gray (5G 6/1); foram nanno ooze is very light gray (N8). Occasional ice-rafted pebbles to 2 cm diameter; some admixture of terrigenous sand. Increased clay yields marly ooze in places.

Smear Slides

	2-60	2-90	3-5
sand/silt/clay	5/20/75	5/60/35	30/30/40
forams	15	10	30
nannos	50	--	30
clay	27	34	19
quartz	5	35	10
unspec. $CaCO_3$	--	15	10
mica	1	2	0

others: heavy minerals, apatite, volcanic glass, trace of rads, sp. spic. in 2-60.

Carbonate Bomb

2-60	74%
2-121	9%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-110	2.1	0.1	16.3
3-10	1.9	0.2	14.4
3-12	10.2	0.1	84.2

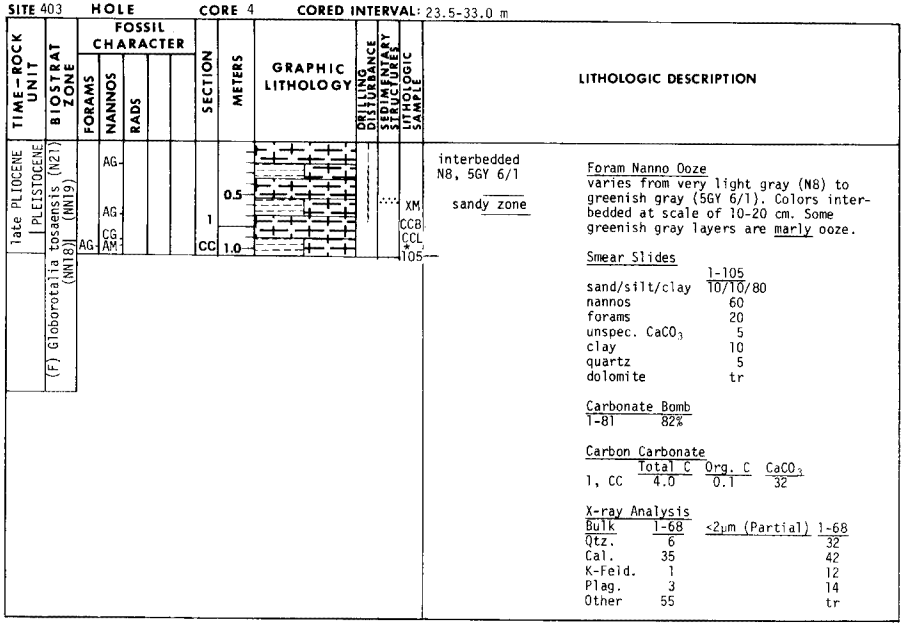
Grain Size

	Sand	Silt	Clay
1-131	33.2	19.1	47.7
2-111	14.2	41.5	44.3
3-24	54.1	23.3	22.6

X-ray Analysis

Bulk	1-33	3-23
Qtz.	5	1
Cal.	53	76
K-Feld.	--	--
Plag.	--	--
Other	42	23
<2μm (Partial)	1-33	3-23
Smec.	35	31
Ill.	30	39
Kaol.	15	12
Chlor.	20	18
Zeol.	tr	tr

SITE 403 HOLE CORE 4 CORED INTERVAL: 23.5-33.0 m



interbedded N8, 5GY 6/1

sandy zone

Foram Nanno Ooze

varies from very light gray (N8) to greenish gray (5GY 6/1). Colors interbedded at scale of 10-20 cm. Some greenish gray layers are marly ooze.

Smear Slides

	1-105
sand/silt/clay	10/10/80
nannos	60
forams	20
unspec. $CaCO_3$	5
clay	10
quartz	5
dolomite	tr

Carbonate Bomb

1-81	82%

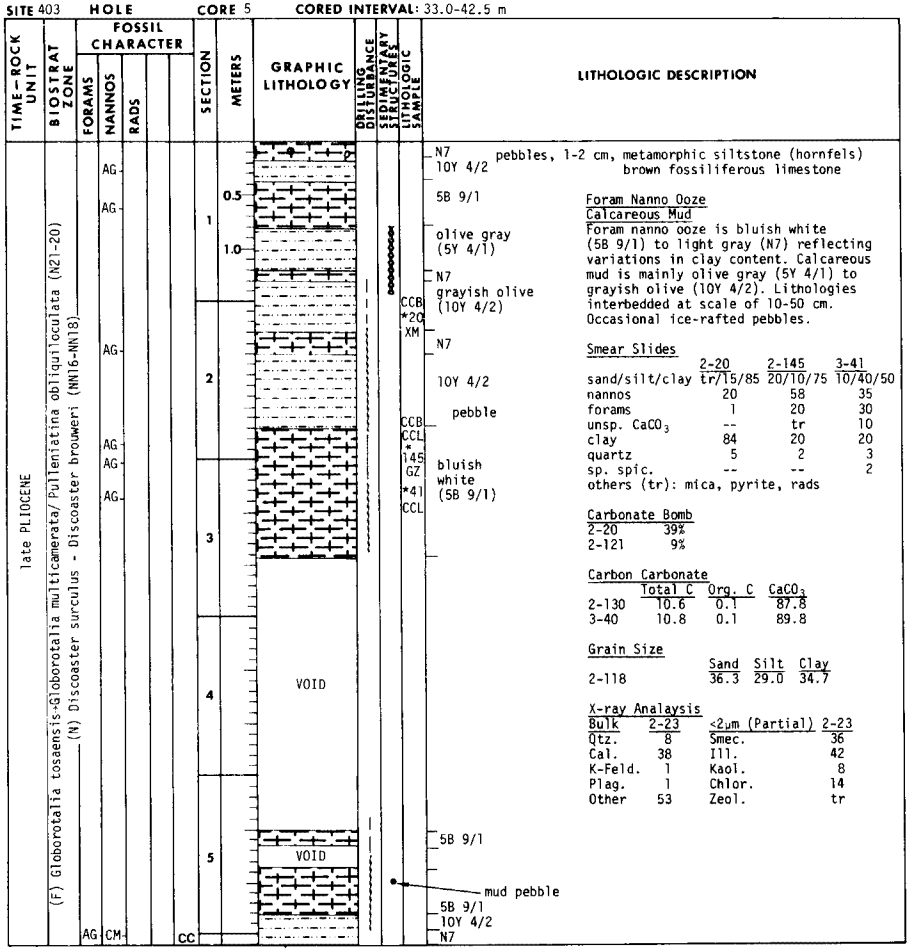
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1, CC	4.0	0.1	32

X-ray Analysis

Bulk	1-68	<2μm (Partial)	1-68
Qtz.	6		32
Cal.	35		42
K-Feld.	1		12
Plag.	3		14
Other	55		tr

SITE 403 HOLE CORE 5 CORED INTERVAL: 33.0-42.5 m



Foram Nanno Ooze
Calcareous Mud
Foram nanno ooze is bluish white (5B 9/1) to light gray (N7) reflecting variations in clay content. Calcareous mud is mainly olive gray (5Y 4/1) to grayish olive (10Y 4/2). Lithologies interbedded at scale of 10-50 cm. Occasional ice-rafted pebbles.

Smear Slides

	2-20	2-145	3-41
sand/silt/clay	tr/15/85	20/10/75	10/40/50
nannos	20	58	35
forams	1	20	30
unsp. $CaCO_3$	--	tr	10
clay	84	20	20
quartz	5	2	3
sp. spic.	--	--	2

others (tr): mica, pyrite, rads

Carbonate Bomb

2-20	39%
2-121	9%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-130	10.6	0.1	87.8
3-40	10.8	0.1	89.8

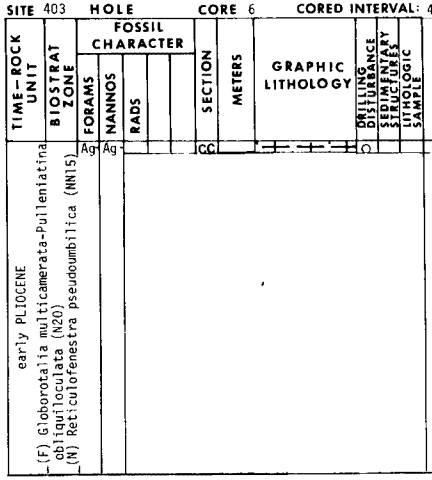
Grain Size

	Sand	Silt	Clay
2-118	36.3	29.0	34.7

X-ray Analysis

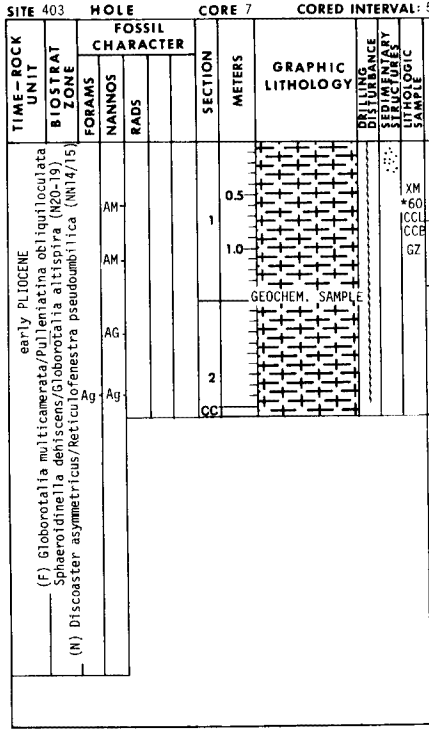
Bulk	2-23	<2μm (Partial)	2-23
Qtz.	8	Smec.	36
Cal.	38	Ill.	42
K-Feld.	1	Kaol.	8
Plag.	1	Chlor.	14
Other	53	Zeol.	tr

SITE 403 HOLE CORE 6 CORED INTERVAL: 42.5-52.0 m



Foram Nanno Ooze
bluish white (5B 9/1), contains abundant terrigenous sand with chert, quartz, and rock fragments of mudstone, basalt(/), subgraywacke and nornfels. Echinoid and benthonic foram fragments.

SITE 403 HOLE CORE 7 CORED INTERVAL: 52.0-61.5 m



Foram Nanno Ooze
dominantly bluish white (5B 9/1); terrigenous sand scattered throughout but concentrated in Sec. 1, 20-40 cm. Spots of manganese stain.

Smear Slide

	1-60
sand/silt/clay	1/10/89
forams	10
nannos	80
unspec. $CaCO_3$	5
clay	5

others (tr): diatom, sp. spic., terrig. sand

Carbonate Bomb

1-65	87%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-60	11.1	0.1	91.5

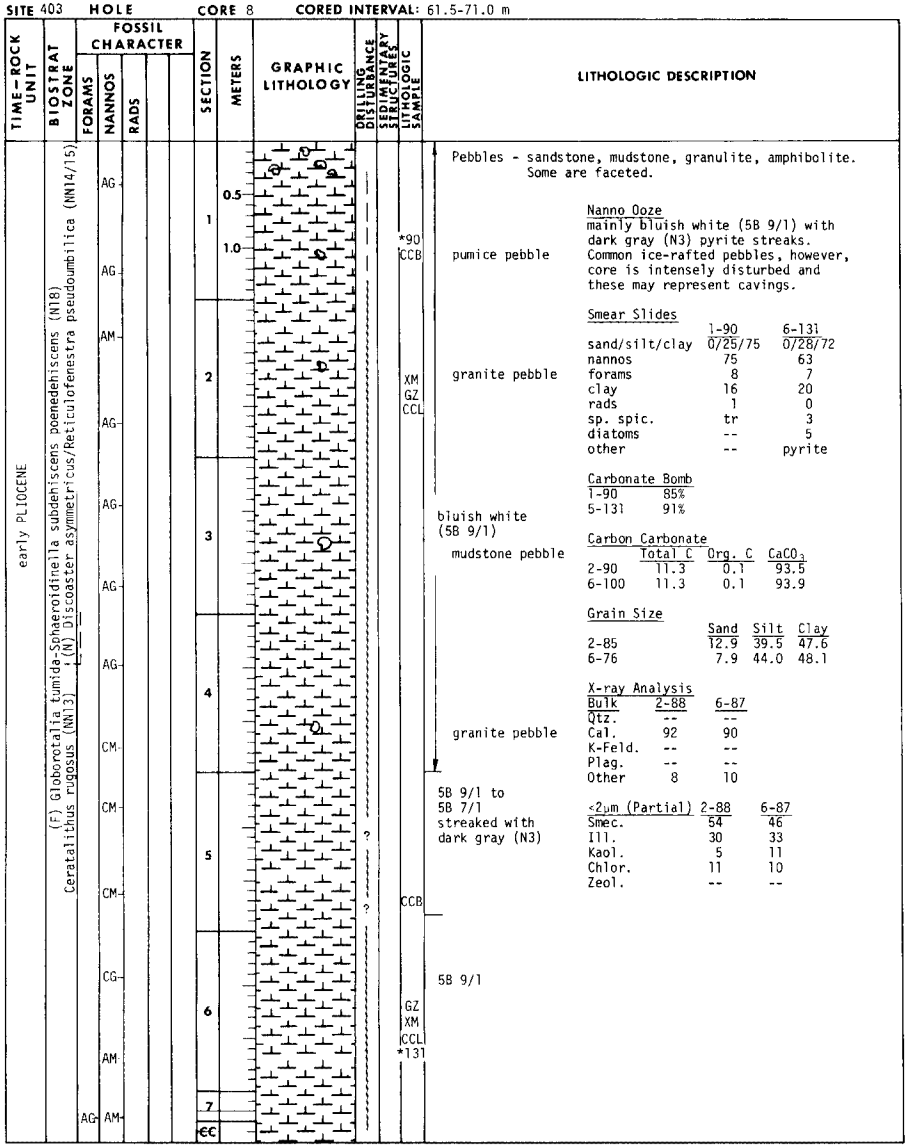
Grain Size

	Sand	Silt	Clay
1-65	27.1	32.6	40.3

X-ray Analysis

Bulk	1-57	<2μm (Partial)	1-57
Qtz.	tr	Smec.	49
Cal.	86	Ill.	27
K-Feld.	--	Kaol.	11
Plag.	--	Chlor.	13
Other	14	Zeol.	--

SITE 403 HOLE CORE 8 CORED INTERVAL: 61.5-71.0 m



Pebbles - sandstone, mudstone, granulite, amphibolite. Some are faceted.

pumice pebble

granite pebble

bluish white (5B 9/1) mudstone pebble

granite pebble

5B 9/1 to 5B 7/1 streaked with dark gray (N3)

5B 9/1

Nanno Ooze
mainly bluish white (5B 9/1) with dark gray (N3) pyrite streaks. Common ice-rafted pebbles, however, core is intensely disturbed and these may represent cavings.

Smear Slides

	1-90	6-131
sand/silt/clay	0/25/75	0/28/72
nannos	75	63
forams	8	7
clay	16	20
rads	1	0
sp. spic.	tr	3
diatoms	--	5
other	--	pyrite

Carbonate Bomb

1-90	85%
5-131	91%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-90	11.3	0.1	93.5
6-100	11.3	0.1	93.9

Grain Size

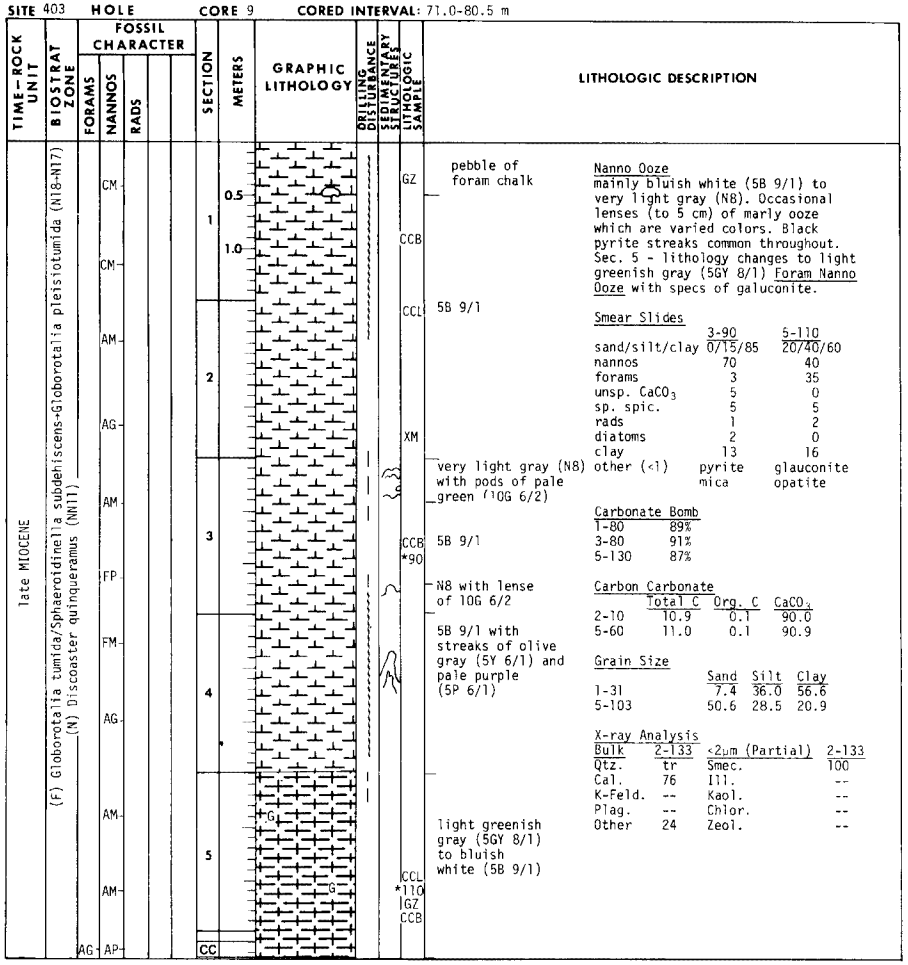
	Sand	Silt	Clay
2-85	12.9	39.5	47.6
6-76	7.9	44.0	48.1

X-ray Analysis

Bulk	2-88	6-87
Qtz.	--	--
Cal.	92	90
K-Feld.	--	--
Plag.	--	--
Other	8	10

<2μm (Partial)	2-88	6-87
Smec.	54	46
Ill.	30	33
Kaol.	5	11
Chlor.	11	10
Zeol.	--	--

SITE 403 HOLE CORE 9 CORED INTERVAL: 71.0-80.5 m



pebble of foram chalk

5B 9/1

very light gray (N8) with pods of pale green (10G 6/2)

5B 9/1

N8 with lense of 10G 6/2

5B 9/1 with streaks of olive gray (5Y 6/1) and pale purple (5P 6/1)

light greenish gray (5GY 8/1) to bluish white (5B 9/1)

Nanno Ooze
mainly bluish white (5B 9/1) to very light gray (N8). Occasional lenses (to 5 cm) of marly ooze which are varied colors. Black pyrite streaks common throughout. Sec. 5 - lithology changes to light greenish gray (5GY 8/1) Foram Nanno Ooze with specs of galuconite.

Smear Slides

	3-90	5-110
sand/silt/clay	0/15/85	20/40/60
nannos	70	40
forams	3	35
unsp. $CaCO_3$	5	0
sp. spic.	5	5
rads	1	2
diatoms	2	0
clay	13	16
other (<1)	pyrite	glauconite
	mica	opatite

Carbonate Bomb

1-80	89%
3-80	91%
5-130	87%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-10	10.9	0.1	90.0
5-60	11.0	0.1	90.9

Grain Size

	Sand	Silt	Clay
1-31	7.4	36.0	56.6
5-103	50.6	28.5	20.9

X-ray Analysis

Bulk	2-133	<2μm (Partial)	2-133
Qtz.	tr	Smec.	100
Cal.	76	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	24	Zeol.	--

SITE 403 HOLE CORE 10 CORED INTERVAL: 80.5-90.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
late MIOCENE	(F) Globorotalia tumida/Sphaeroidinella subdehiscens-Globorotalia pleisiotumida (N18-17) (N) Discoaster quinqueramus (NN11)	AG	AG		CC					CCB	5GY 8/1 to 5B 9/1 Foram Nanno Ooze light greenish gray (5GY 8/1) to bluish white (5B 9/1). Specs of glauconite. Carbonate Bomb CC - 5 cm 88%

SITE 403 HOLE CORE 11 CORED INTERVAL: 90.0-99.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
late MIOCENE	(F) Globorotalia tumida/Sphaeroidinella subdehiscens-Globorotalia pleisiotumida (N18-17) (N) Discoaster quinqueramus (NN11)	AG	CP CM CM CM CM CM	AG	1 2 3 4 CC	0.5 1.0	VOID		GZ *56 CCL *63 XM CCB	CCL	very light gray (N8) bluish white (5B 9/1) with bands of light gray (N7) and very light gray (N8) N8 5B 9/1 N8

Nanno Ooze
Foram Nanno Ooze
nanno ooze bluish white (5B 9/1) and fine-grained; foram nanno ooze light gray (N7) to very light gray (N8) and coarser textured. Two lithologies interbedded at 5-10 cm. Scale in Sec. 2.

Smear Slides

	2-56	2-63
sand/silt/clay	15/15/70	10/15/75
nannos	65	62
forams	25	20
unsp. $CaCO_3$	tr	2
clay	10	15
other	--	rads, sp. spic., glauconite

Carbonate Bomb
2-79 92%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-30	10.6	0.1	87.9
2-70	11.3	0.1	93.3

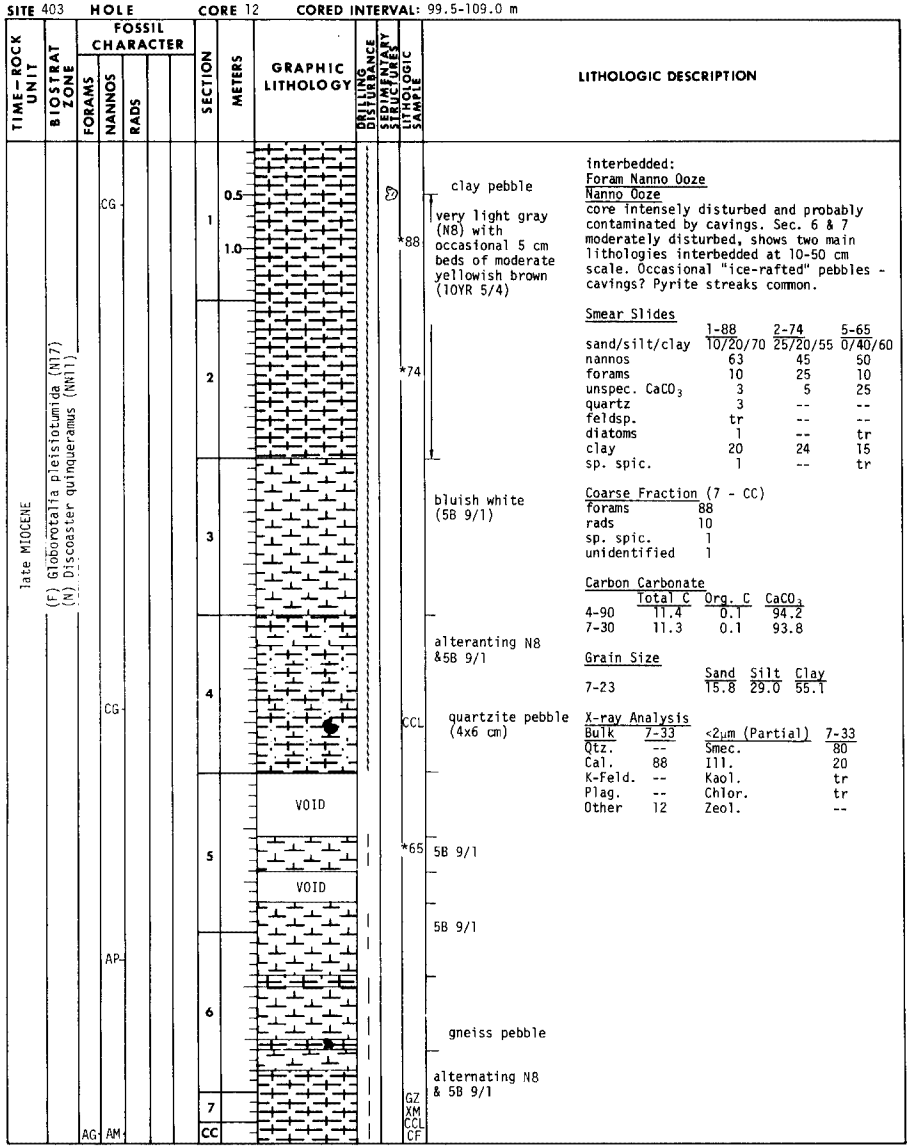
Grain Size

	Sand	Silt	Clay
2-68	13.4	32.2	54.4

X-ray Analysis

Bulk	2-81	<2μm (Partial)	2-81
Qtz.	--	Smec.	60
Cal.	88	Ill.	28
K-Feld.	--	Kaol.	5
Plag.	--	Chlor.	7
Other	12	Zeol.	tr

SITE 403 HOLE CORE 12 CORED INTERVAL: 99.5-109.0 m



clay pebble

very light gray (N8) with occasional 5 cm beds of moderate yellowish brown (10YR 5/4)

bluish white (5B 9/1)

alteranting N8 &5B 9/1

quartzite pebble (4x6 cm)

5B 9/1

5B 9/1

gneiss pebble

alternating N8 & 5B 9/1

interbedded:
Foram Nanno Ooze
Nanno Ooze
core intensely disturbed and probably contaminated by cavings. Sec. 6 & 7 moderately disturbed, shows two main lithologies interbedded at 10-50 cm scale. Occasional "ice-rafted" pebbles - cavings? Pyrite streaks common.

Smear Slides

	1-88	2-74	5-65
sand/silt/clay	10/20/70	25/20/55	0/40/60
nannos	63	45	50
forams	10	25	10
unspec. $CaCO_3$	3	5	25
quartz	3	--	--
feldsp.	tr	--	--
diatoms	1	--	tr
clay	20	24	15
sp. spic.	1	--	tr

Coarse Fraction (7 - CC)

forams	88
rads	10
sp. spic.	1
unidentified	1

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
4-90	11.4	0.1	94.2
7-30	11.3	0.1	93.8

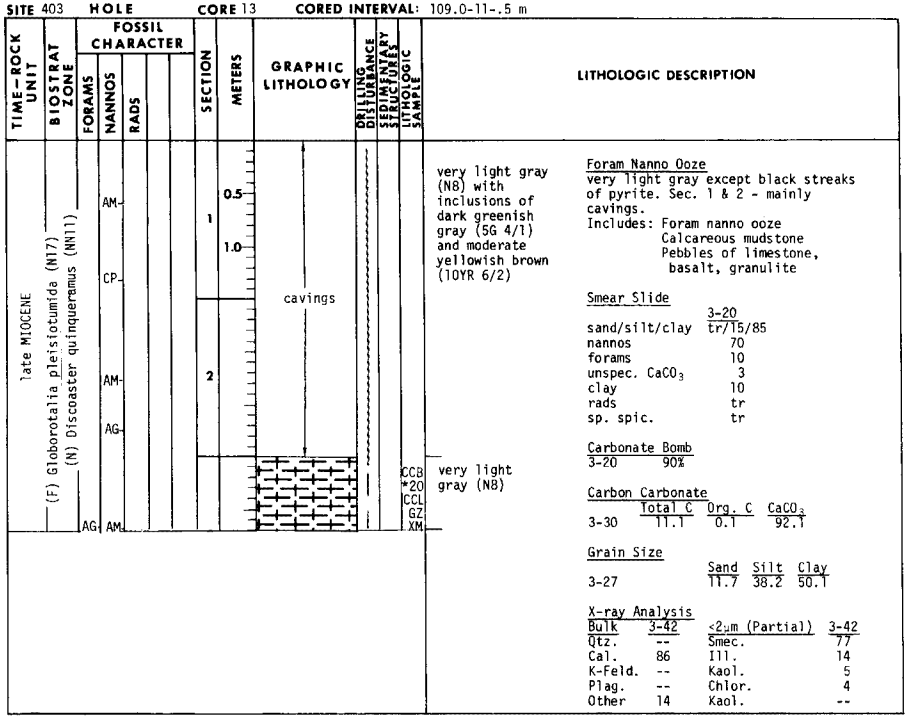
Grain Size

	Sand	Silt	Clay
7-23	15.8	29.0	55.1

X-ray Analysis

Bulk	7-33	<2μm (Partial)	7-33
Qtz.	--	Smec.	80
Cal.	88	Ill.	20
K-Feld.	--	Kaol.	tr
Plag.	--	Chlor.	tr
Other	12	Zeol.	--

SITE 403 HOLE CORE 13 CORED INTERVAL: 109.0-11-.5 m



very light gray (N8) with inclusions of dark greenish gray (5G 4/1) and moderate yellowish brown (10YR 6/2)

very light gray (N8)

Foram Nanno Ooze
very light gray except black streaks of pyrite. Sec. 1 & 2 - mainly cavings.
Includes: Foram nanno ooze
Calcareous mudstone
Pebbles of limestone, basalt, granulite

Smear Slide

	3-20
sand/silt/clay	tr/15/85
nannos	70
forams	10
unspec. $CaCO_3$	3
clay	10
rads	tr
sp. spic.	tr

Carbonate Bomb

3-20	90%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-30	11.1	0.1	92.1

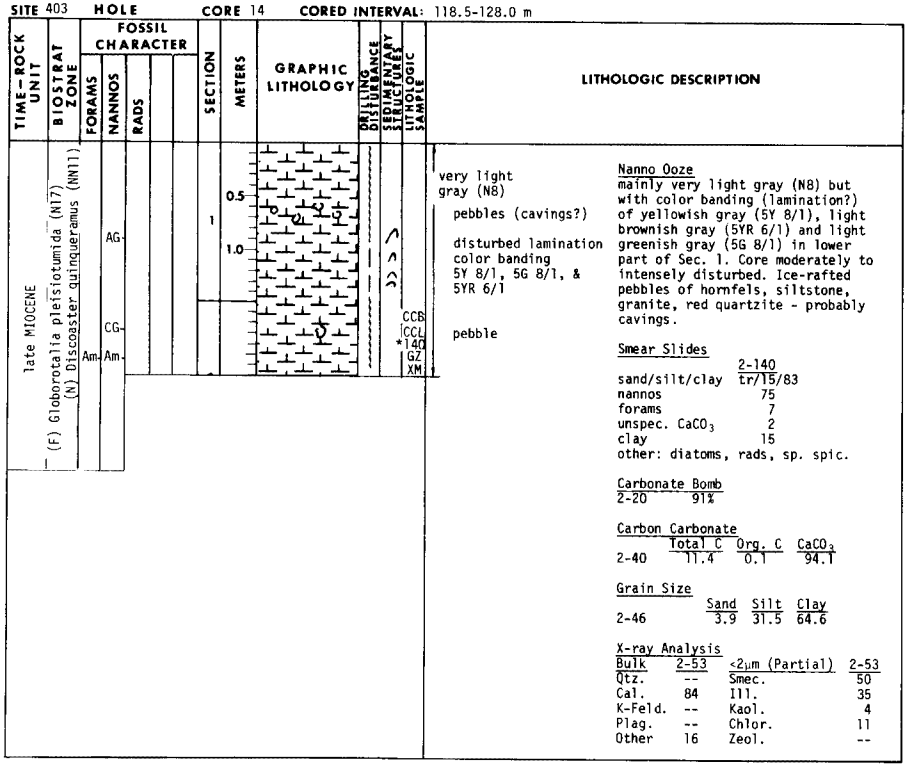
Grain Size

	Sand	Silt	Clay
3-27	11.7	38.2	50.1

X-ray Analysis

Bulk	3-42	<2μm (Partial)	3-42
Qtz.	--	Smec.	77
Cal.	86	Ill.	14
K-Feld.	--	Kaol.	5
Plag.	--	Chlor.	4
Other	14	Kaol.	--

SITE 403 HOLE CORE 14 CORED INTERVAL: 118.5-128.0 m



very light gray (N8)

pebbles (cavings?)

disturbed lamination color banding 5Y 8/1, 5G 8/1, & 5YR 6/1

pebble

Nanno Ooze
mainly very light gray (N8) but with color banding (lamination?) of yellowish gray (5Y 8/1), light brownish gray (5YR 6/1) and light greenish gray (5G 8/1) in lower part of Sec. 1. Core moderately to intensely disturbed. Ice-rafted pebbles of hornfels, siltstone, granite, red quartzite - probably cavings.

Smear Slides

	2-140
sand/silt/clay	tr/15/83
nannos	75
forams	7
unspec. $CaCO_3$	2
clay	15

other: diatoms, rads, sp. spic.

Carbonate Bomb

2-20	91%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-40	11.4	0.1	94.1

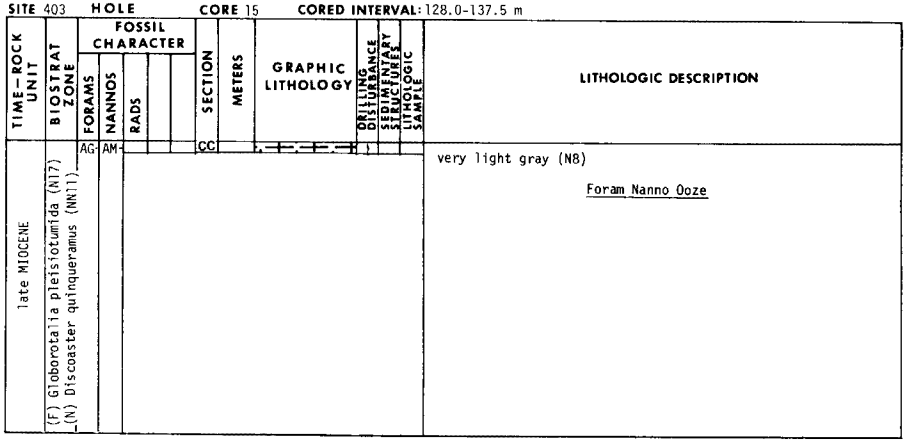
Grain Size

	Sand	Silt	Clay
2-46	3.9	31.5	64.6

X-ray Analysis

Bulk	2-53	<2μm (Partial)	2-53
Qtz.	--	Smec.	50
Cal.	84	Ill.	35
K-Feld.	--	Kaol.	4
Plag.	--	Chlor.	11
Other	16	Zeol.	--

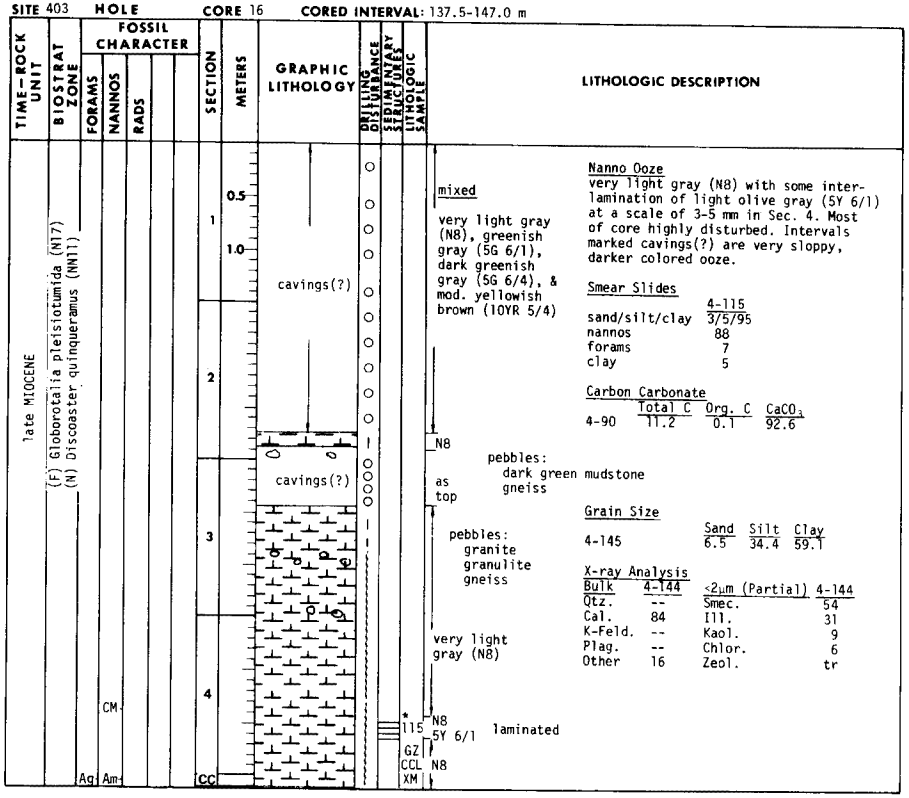
SITE 403 HOLE CORE 15 CORED INTERVAL: 128.0-137.5 m



very light gray (N8)

Foram Nanno Ooze

SITE 403 HOLE CORE 16 CORED INTERVAL: 137.5-147.0 m



mixed

very light gray (N8), greenish gray (5G 6/1), dark greenish gray (5G 6/4), & mod. yellowish brown (10YR 5/4)

as top

pebbles: dark green mudstone gneiss

pebbles: granite granulite gneiss

very light gray (N8)

laminated

Nanno Ooze
very light gray (N8) with some interlamination of light olive gray (5Y 6/1) at a scale of 3-5 mm in Sec. 4. Most of core highly disturbed. Intervals marked cavings(?) are very sloppy, darker colored ooze.

Smear Slides

	4-115
sand/silt/clay	3/5/95
nannos	88
forams	7
clay	5

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
4-90	11.2	0.1	92.6

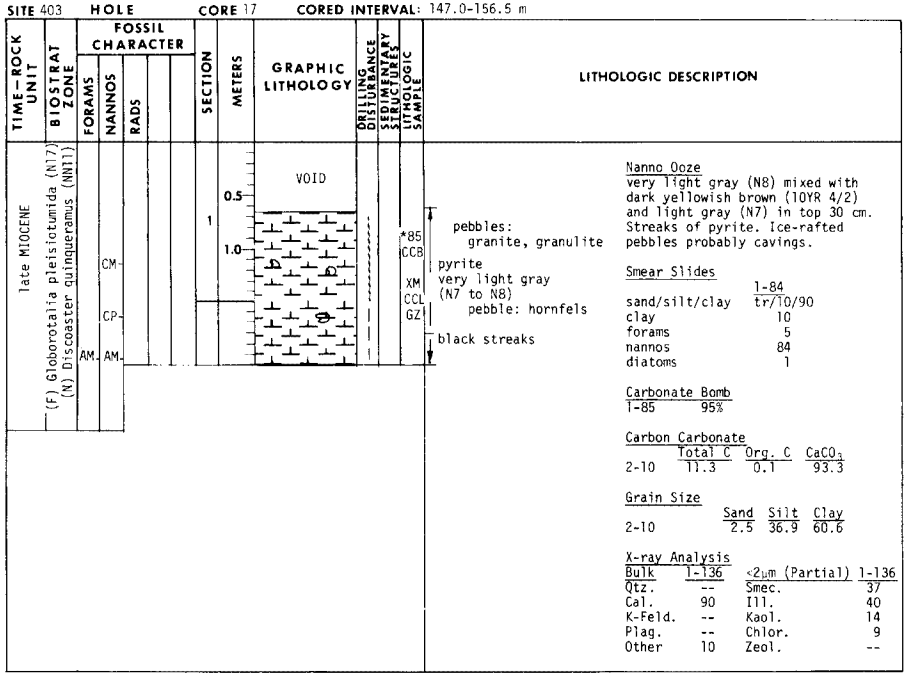
Grain Size

	Sand	Silt	Clay
4-145	6.5	34.4	59.1

X-ray Analysis

Bulk	4-144	<2μm (Partial)	4-144
Qtz.	--	Smec.	54
Cal.	84	Ill.	31
K-Feld.	--	Kaol.	9
Plag.	--	Chlor.	6
Other	16	Zeol.	tr

SITE 403 HOLE CORE 17 CORED INTERVAL: 147.0-156.5 m



Nanno Ooze
very light gray (N8) mixed with dark yellowish brown (10YR 4/2) and light gray (N7) in top 30 cm. Streaks of pyrite. Ice-rafted pebbles probably cavings.

Smear Slides

	1-84
sand/silt/clay	tr/10/90
clay	10
forams	5
nannos	84
diatoms	1

Carbonate Bomb

1-85	95%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-10	11.3	0.1	93.3

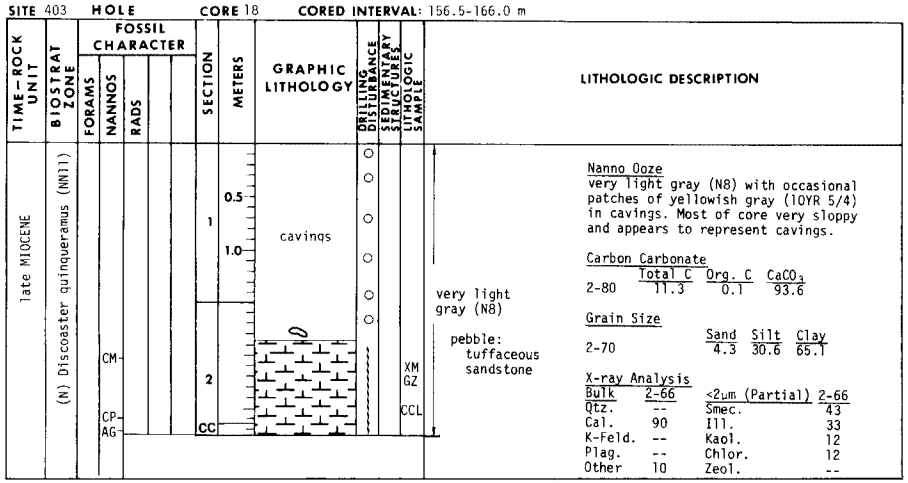
Grain Size

	Sand	Silt	Clay
2-10	2.5	36.9	60.6

X-ray Analysis

Bulk	1-136	<2μm (Partial)	1-136
Qtz.	--	Smec.	37
Cal.	90	Ill.	40
K-Feld.	--	Kaol.	14
Plag.	--	Chlor.	9
Other	10	Zeol.	--

SITE 403 HOLE CORE 18 CORED INTERVAL: 156.5-166.0 m



Nanno Ooze
very light gray (N8) with occasional patches of yellowish gray (10YR 5/4) in cavings. Most of core very sloppy and appears to represent cavings.

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-80	11.3	0.1	93.6

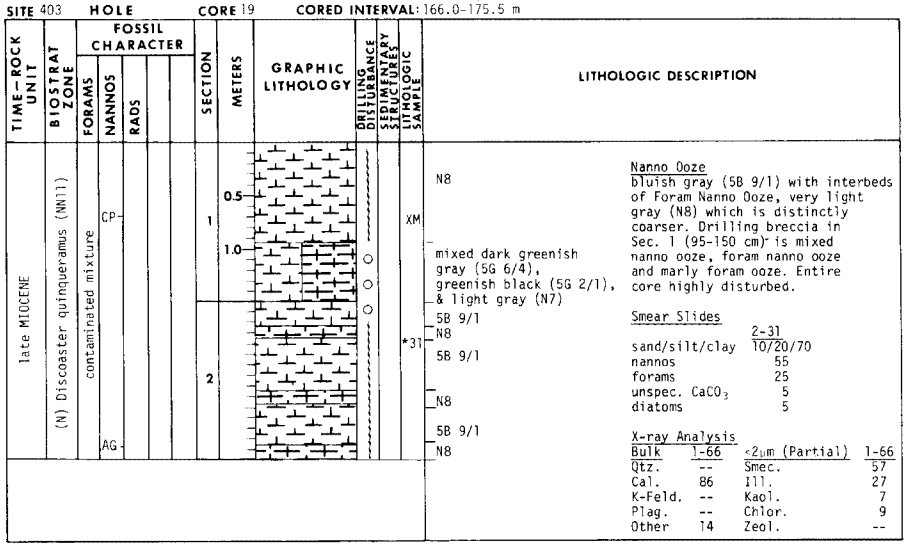
Grain Size

	Sand	Silt	Clay
2-70	4.3	30.6	65.1

X-ray Analysis

Bulk	2-66	<2μm (Partial)	2-66
Qtz.	--	Smec.	43
Cal.	90	Ill.	33
K-Feld.	--	Kaol.	12
Plag.	--	Chlor.	12
Other	10	Zeol.	--

SITE 403 HOLE CORE 19 CORED INTERVAL: 166.0-175.5 m



Nanno Ooze
bluish gray (5B 9/1) with interbeds of Foram Nanno Ooze, very light gray (N8) which is distinctly coarser. Drilling breccia in Sec. 1 (95-150 cm) is mixed nanno ooze, foram nanno ooze and marly foram ooze. Entire core highly disturbed.

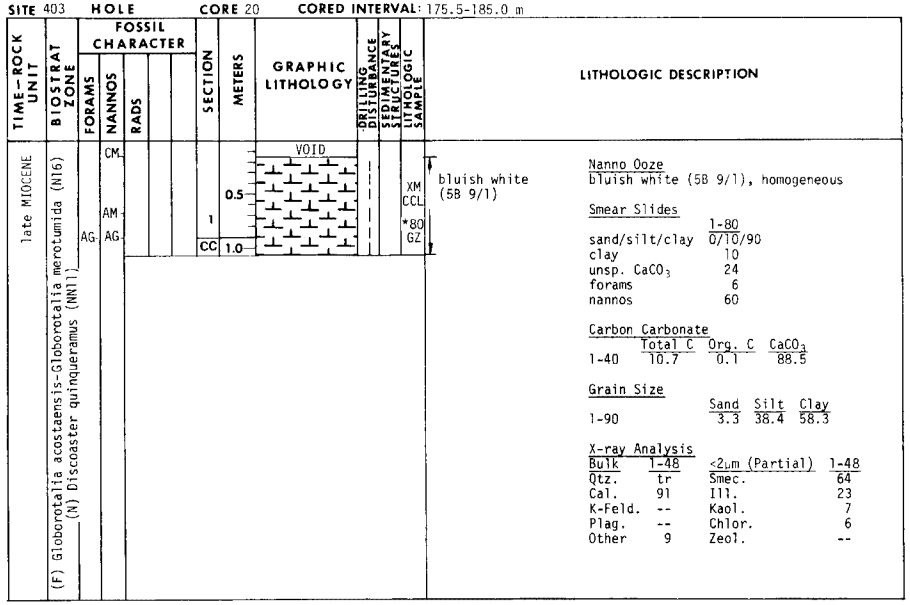
Smear Slides

	2-31
sand/silt/clay	10/20/70
nannos	55
forams	25
unspec. $CaCO_3$	5
diatoms	5

X-ray Analysis

Bulk	1-66	<2μm (Partial)	1-66
Qtz.	--	Smec.	57
Cal.	86	Ill.	27
K-Feld.	--	Kaol.	7
Plag.	--	Chlor.	9
Other	14	Zeol.	--

SITE 403 HOLE CORE 20 CORED INTERVAL: 175.5-185.0 m



Nanno Ooze
bluish white (5B 9/1), homogeneous

Smear Slides

	1-80
sand/silt/clay	0/10/90
clay	10
unsp. $CaCO_3$	24
forams	6
nannos	60

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-40	10.7	0.1	88.5

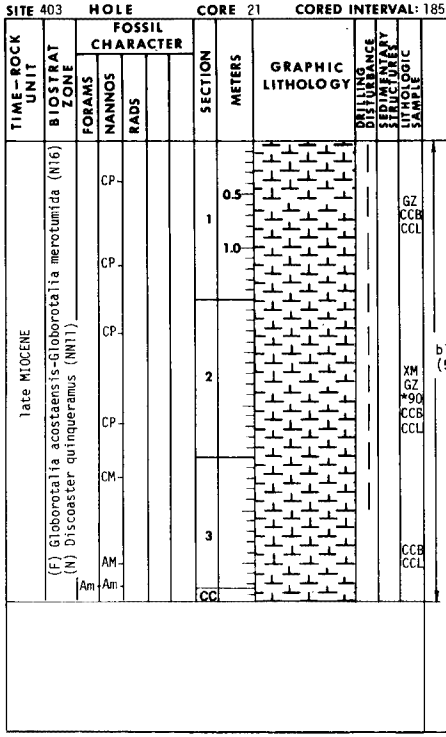
Grain Size

	Sand	Silt	Clay
1-90	3.3	38.4	58.3

X-ray Analysis

Bulk	1-48	<2μm (Partial)	1-48
Qtz.	tr	Smec.	64
Cal.	91	Ill.	23
K-Feld.	--	Kaol.	7
Plag.	--	Chlor.	6
Other	9	Zeol.	--

SITE 403 HOLE CORE 21 CORED INTERVAL: 185.0-194.5 m



LITHOLOGIC DESCRIPTION

Nanno Ooze
bluish white (5B 9/1), homogeneous, moderate disturbance.

Smear Slides

	2-90
sand/silt/clay	5/20/75
clay	20
unsp. $CaCO_3$	3
forams	7
nannos	65
diatoms	1
rads	1
sp. spic.	3

Carbonate Bomb

1-76	92%
2-91	90%
3-88	90%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-70	11.1	0.1	92.3
2-90	11.2	0.0	93.2
3-90	11.3	0.0	93.7

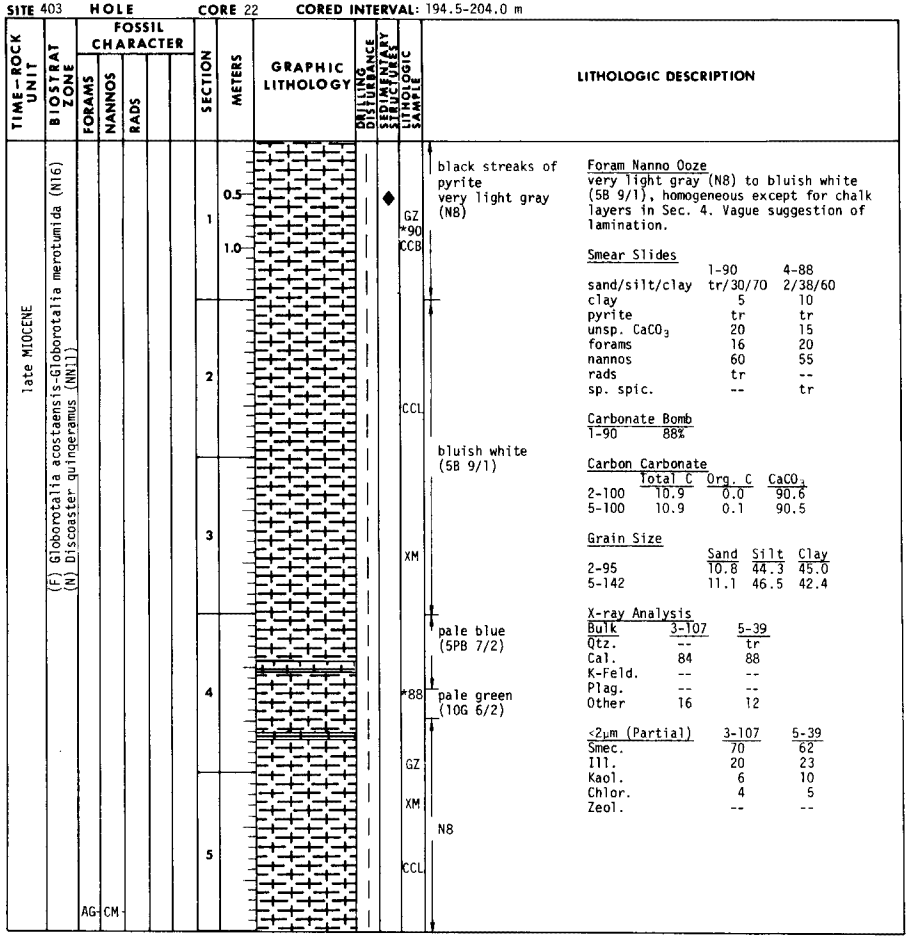
Grain Size

	Sand	Silt	Clay
1-74	2.7	33.7	63.5
2-90	3.2	36.3	60.5

X-ray Analysis

Bulk	2-88	<2μm (Partial)	2-88
Qtz.	--	Smec.	64
Cal.	86	Ill.	22
K-Feld.	--	Kaol.	6
Plag.	--	Chlor.	8
Other	14	Zeol.	--

SITE 403 HOLE CORE 22 CORED INTERVAL: 194.5-204.0 m



black streaks of pyrite
very light gray (N8)

bluish white (5B 9/1)

pale blue (5PB 7/2)

pale green (10G 6/2)

Foram Nanno Ooze
very light gray (N8) to bluish white (5B 9/1), homogeneous except for chalk layers in Sec. 4. Vague suggestion of lamination.

Smear Slides

	1-90	4-88
sand/silt/clay	tr/30/70	2/38/60
clay	5	10
pyrite	tr	tr
unsp. $CaCO_3$	20	15
forams	16	20
nannos	60	55
rads	tr	--
sp. spic.	--	tr

Carbonate Bomb

1-90	88%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-100	10.9	0.0	90.6
5-100	10.9	0.1	90.5

Grain Size

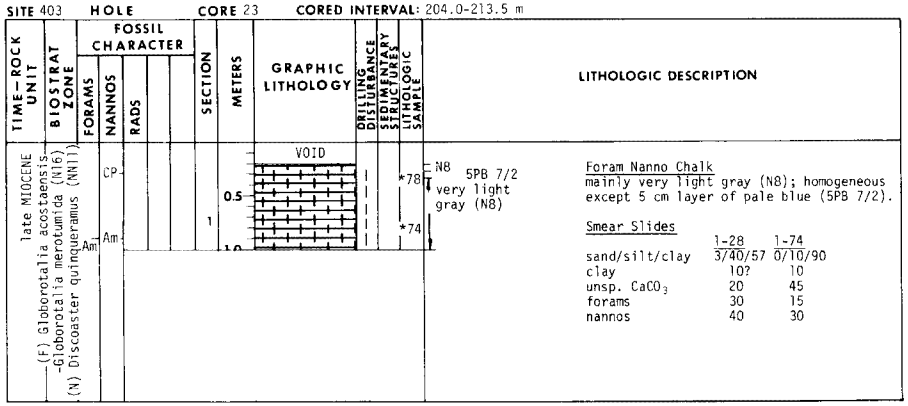
	Sand	Silt	Clay
2-95	10.8	44.3	45.0
5-142	11.1	46.5	42.4

X-ray Analysis

Bulk	3-107	5-39
Qtz.	--	tr
Cal.	84	88
K-Feld.	--	--
Plag.	--	--
Other	16	12

<2μm (Partial)	3-107	5-39
Smec.	70	62
Ill.	20	23
Kaol.	6	10
Chlor.	4	5
Zeol.	--	--

SITE 403 HOLE CORE 23 CORED INTERVAL: 204.0-213.5 m



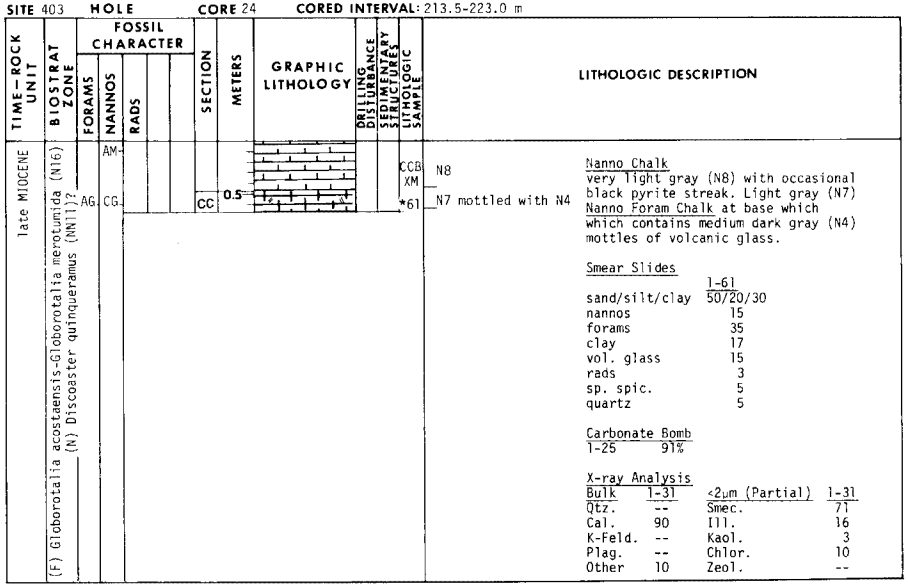
LITHOLOGIC DESCRIPTION

Foram Nanno Chalk
mainly very light gray (N8); homogeneous except 5 cm layer of pale blue (5PB 7/2).

Smear Slides

	1-28	1-74
sand/silt/clay	3/40/57	0/10/90
clay	10?	10
unsp. $CaCO_3$	20	45
forams	30	15
nannos	40	30

SITE 403 HOLE CORE 24 CORED INTERVAL: 213.5-223.0 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
very light gray (N8) with occasional black pyrite streak. Light gray (N7)
Nanno Foram Chalk at base which which contains medium dark gray (N4) mottles of volcanic glass.

Smear Slides

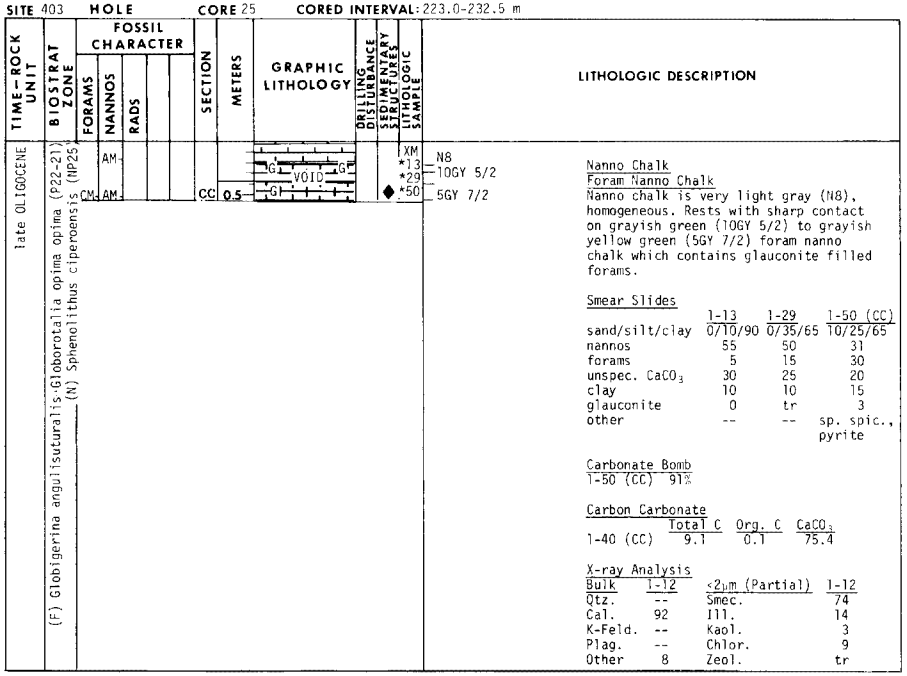
	1-61
sand/silt/clay	50/20/30
nannos	15
forams	35
clay	17
vol. glass	15
rads	3
sp. spic.	5
quartz	5

Carbonate Bomb
1-25 91%

X-ray Analysis

Bulk	1-31	<2μm (Partial)	1-31
Qtz.	--	Smec.	71
Cal.	90	Ill.	16
K-Feld.	--	Kaol.	3
Plag.	--	Chlor.	10
Other	10	Zeol.	--

SITE 403 HOLE CORE 25 CORED INTERVAL: 223.0-232.5 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
Foram Nanno Chalk
Nanno chalk is very light gray (N8), homogeneous. Rests with sharp contact on grayish green (10GY 5/2) to grayish yellow green (5GY 7/2) foram nanno chalk which contains glauconite filled forams.

Smear Slides

	1-13	1-29	1-50 (CC)
sand/silt/clay	0/10/90	0/35/65	10/25/65
nannos	55	50	31
forams	5	15	30
unspec. $CaCO_3$	30	25	20
clay	10	10	15
glauconite	0	tr	3
other	--	--	sp. spic., pyrite

Carbonate Bomb
1-50 (CC) 91%

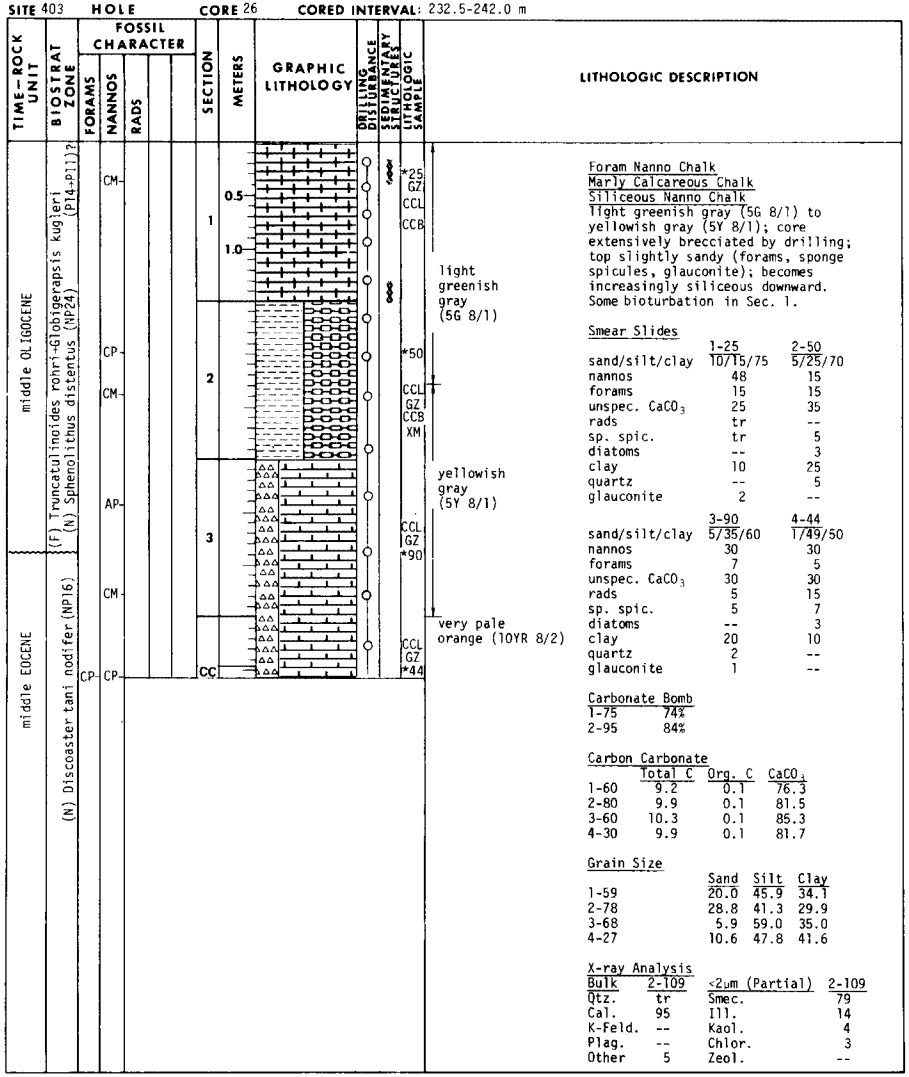
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-40 (CC)	9.1	0.1	75.4

X-ray Analysis

Bulk	1-12	<2μm (Partial)	1-12
Qtz.	--	Smec.	74
Cal.	92	Ill.	14
K-Feld.	--	Kaol.	3
Plag.	--	Chlor.	9
Other	8	Zeol.	tr

SITE 403 HOLE CORE 26 CORED INTERVAL: 232.5-242.0 m



LITHOLOGIC DESCRIPTION

Foram Nanno Chalk
Marly Calcareous Chalk
Siliceous Nanno Chalk
Light greenish gray (5G 8/1) to yellowish gray (5Y 8/1); core extensively brecciated by drilling; top slightly sandy (forams, sponge spicules, glauconite); becomes increasingly siliceous downward. Some bioturbation in Sec. 1.

Smear Slides

	1-25	2-50
sand/silt/clay	10/15/75	5/25/70
nannos	48	15
forams	15	15
unspec. $CaCO_3$	25	35
rads	tr	--
sp. spic.	tr	5
diatoms	--	3
clay	10	25
quartz	--	5
glauconite	2	--

	3-90	4-44
sand/silt/clay	5/35/60	1/49/50
nannos	30	30
forams	7	5
unspec. $CaCO_3$	30	30
rads	5	15
sp. spic.	5	7
diatoms	--	3
clay	20	10
quartz	2	--
glauconite	1	--

Carbonate Bomb

1-75	74%
2-95	84%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-60	9.2	0.1	76.3
2-80	9.9	0.1	81.5
3-60	10.3	0.1	85.3
4-30	9.9	0.1	81.7

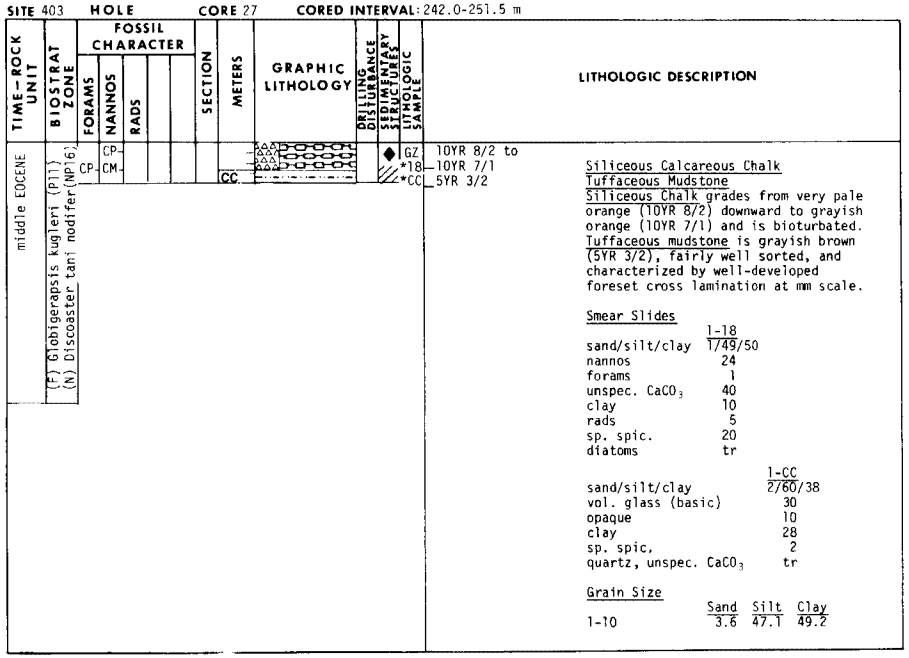
Grain Size

	Sand	Silt	Clay
1-59	20.0	45.9	34.1
2-78	28.8	41.3	29.9
3-68	5.9	59.0	35.0
4-27	10.6	47.8	41.6

X-ray Analysis

Bulk	2-109	<2μm (Partial)	2-109
Qtz.	tr	Smec.	79
Cal.	95	Ill.	14
K-Feld.	--	Kaol.	4
Plag.	--	Chlor.	3
Other	5	Zeol.	--

SITE 403 HOLE CORE 27 CORED INTERVAL: 242.0-251.5 m



LITHOLOGIC DESCRIPTION

Siliceous Calcareous Chalk
Tuffaceous Mudstone
Siliceous Chalk grades from very pale orange (10YR 8/2) downward to grayish orange (10YR 7/1) and is bioturbated. Tuffaceous mudstone is grayish brown (5YR 3/2), fairly well sorted, and characterized by well-developed foreset cross lamination at mm scale.

Smear Slides

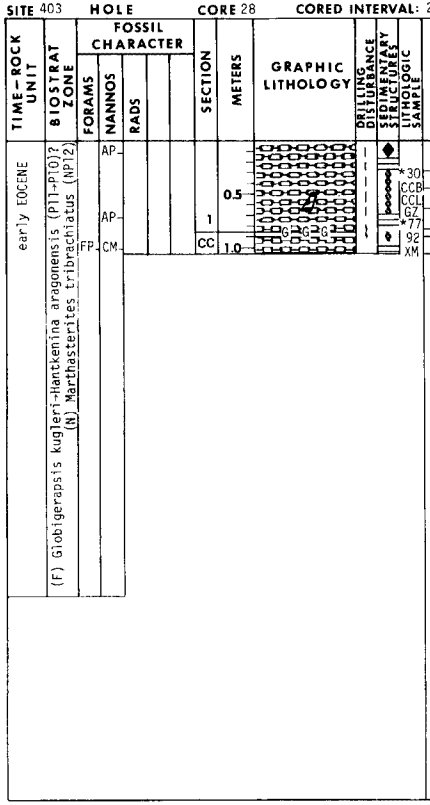
	1-18
sand/silt/clay	1/49/50
nannos	24
forams	1
unspec. $CaCO_3$	40
clay	10
rads	5
sp. spic.	20
diatoms	tr

	1-CC
sand/silt/clay	2/60/38
vol. glass (basic)	30
opaque	10
clay	28
sp. spic.	2
quartz, unspec. $CaCO_3$	tr

Grain Size

	Sand	Silt	Clay
1-10	3.6	47.1	49.2

SITE 403 HOLE CORE 28 CORED INTERVAL: 251.5-261.0 m



LITHOLOGIC DESCRIPTION

Calcareous Chalk
dominantly grayish yellow green (5GY 7/2) to dusky yellow green (5GY 5/2). Parts show moderate to intense bioturbation; parts laminated at scale 1-10 mm with inclinations of 5-15°. Lenses of calcarenite which contain glauconite, echinoid spines, chrinoid fragments. Concentration of glauconite 87-93 cm.

Smear Slides

	1-30	1-77	1-92 (minor)
sand/silt/clay	50/20/30	0/35/65	30/60/10
nannos	0	25	0
forams	3	5	5
unspec. $CaCO_3$	57	47	--
sp. spic.	3	3	5
clay	20	10	10
zeolite	5	2(?)	3
glauconite	5	tr	64
quartz	5	10	10
other	mica	mica, rads	heavy min., dolomite

Carbonate Bomb
1-40 46%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-50	2.9	0.1	23.6

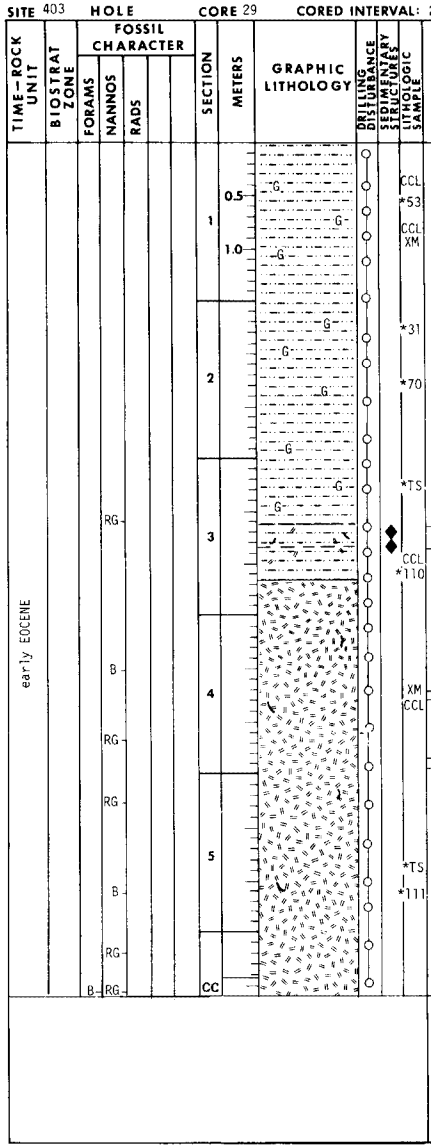
Grain Size

	Sand	Silt	Clay
1-60	6.3	42.3	51.4

X-ray Analysis

Bulk	1-95	<2μm (Partial)	1-95
Qtz.	--	Smec.	94
Cal.	10	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	7	Chlor.	--
Other	83	Zeol.	6

SITE 403 HOLE CORE 29 CORED INTERVAL: 261.0-270.5 m



LITHOLOGIC DESCRIPTION

sandy interval

Glauconitic Mudstone
greenish black (5GY 2/1) with occasional layers of dark greenish gray (5G 4/1). Core broken into cylindrical chunks which internally are undisturbed. Volcanic ash and lapilli are scattered throughout and in lower Sec. 3 grades down from tuffaceous mudstone to vitric tuff.

greenish black (5GY 2/1)

Smear Slides

	1-53	2-70	2-31 (minor)
sand/silt/clay	tr/30/70	15/35/50	20/50/30
clay	68	40	10
quartz	--	5	0
vol. glass	tr	--	60
glauconite	20	39	0
zeolite(?)	2	6	--
sp. spic.	10	5	20
nannos	tr	--	2
mica	1	5	--
forams	--	--	6

dark greenish gray (5G 4/1)

concentration of ash and shell fragments

Volcanic Tuff
mainly greenish black (5GY 2/1) with layers of dark greenish gray (5G 4/1). Core brecciated as above. Tuff varies from vitric to lithic in composition, with lapilli scattered throughout. Matrix of mudstone. Shell fragments (pelecypod, chrinoid) are common.

5GY 2/1
5G 4/1
5GY 2/1
5G 4/1
5GY 2/1

Smear Slides

	3-110	5-111
sand/silt/clay	40/40/20	10/60/30
vol. glass	60	25
vol. RF	20	60
clay	20	7
zeolite	--	2
unspec. $CaCO_3$	tr	5

other: quartz, feldspar, mica, augite, palagonite.

Thin Section (5-83): Heterolithic Tuff.

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-40	0.6	0.1	4.0
1-80	0.3	0.1	1.8
3-100	0.3	0.1	1.3
4-70	0.3	0.1	1.9

Grain Size

	Sand	Silt	Clay
1-45	34.5	28.7	36.8
1-130	34.0	13.6	52.4
4-71	29.9	23.5	46.6

X-ray Analysis

Bulk	1-89	4-72	<2μm (Partial)	1-89	4-72
Qtz.	--	3	Smec.	100	73
Cal.	--	10	Ill.	--	27
K-Feld.	--	3	Kaol.	--	--
Plag.	3	5	Chlor.	--	--
Other	97	79	Zeol.	--	tr

SITE 403 HOLE CORE 30 CORED INTERVAL: 270.5-280.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
early EOCENE		B	RG			0.5				XM *TS

dark greenish gray (5G 4/1)

LITHOLOGIC DESCRIPTION

Lithic Tuff
dark greenish gray (5G 4/1); vague bedding at 3-5 cm scale related to textural variations in ash and lithic fragments; contains shell fragments (mainly chrinoids & pelecypods). Clasts principally of pumiceous lava.

Thin Section (1-34): Pumiceous lava particles predominate and attain 6 mm across, with irregular outlines. Vesicle show variable states of attenuation from perfect spheroids to flattened, and average about 0.1 mm diameter; they are mainly filled with chlorite, devitrified glass, ore, carbonate or perthitic needles. The groundmass is devitrified glass altered mainly to green chlorite or pale brown cryptocrystalline products. Other lava shows a highly fluxioned feldspar-microlitic texture.

Coarse Fraction (>44μm)

vol. rock frag.	10
vol. ash	15
glauconite	20
quartz	25
zeolite(?)	5
mica	10
calcite	20
heavy min.	5

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-40	2.4	0.1	19.4

X-ray Analysis

Bulk	1-34	<2μm (Partial)	1-34
Qtz.	3	Smec.	100
Cal.	--	Ill.	--
K-Feld.	2	Kaol.	--
Plag.	2	Chlor.	--
Other	93	Zeol.	--

SITE 403 HOLE CORE 31 CORED INTERVAL: 280.0-289.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
early EOCENE		B	RG		CC					*TS

grayish black (N2)

LITHOLOGIC DESCRIPTION

Mudstone
grayish black (N2), dominantly coarse silty-very fine sand, moderately well sorted.

Coarse Fraction (>44μm)

quartz	45	Heavy minerals include:
mica	15	hornblende
heavy min.	15	augite
opaque	8	zoisite
glauconite	5	epidote
vol. rock frag.	5	titanite
zeolite	5	
forams	2	

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-10	0.2	0.2	0.2

SITE 403 HOLE CORE 32 CORED INTERVAL: 289.5-299.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE
early EOCENE		B	RG		CC					*15

grayish black (N2)

LITHOLOGIC DESCRIPTION

Mudstone
grayish black (N2); dominantly very fine sand-coarse silt, moderately well sorted.

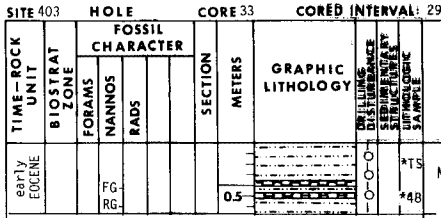
Smear Slides

	CC
sand/silt/clay	60/20/20
quartz	25
feldspar	15
mica	5
altered + opaque	15
heavy min.	tr
glauconite	10
zeolite	10

Coarse Fraction (>44μm)

mica	30	
quartz	30	
glauconite	10	
heavy min.	20	(See Core 31)
opaque plus altered	10	

SITE 403 HOLE CORE 33 CORED INTERVAL: 299.0-308.5 m



LITHOLOGIC DESCRIPTION

Tuffaceous Mudstone-Muddy Tuff
grayish black (N2) with two layers (3-5 cm thick) of tuffaceous calcareous chalk containing abundant shell fragments.

Thin Section (1-13): Closely packed fine sand-grade pyroclastic particles average about 0.15 mm and with conspicuous micas comprise the bulk of this very friable argillaceous and sandy tuff, which contains scattered pellets up to 4 mm across. The last-named are composed of clots of fine quartz and microcline particles in a clay base with rims of similar material and appear to be segregations of partly lithified pyroclastic dust, rather than discrete pyroclasts. Of the resistates, microcline is conspicuous with oligoclase and igenous quarts. Argillized shards are abundant with microlitic intermediate-basic lava, pumica and turbid, subopaque particles too altered to recognize. These also form much of the matrix with green-brown clay material, specks of hypersthene, clinopyroxene and fibrous zeolites. The micas are partly aligned and include conspicuous glauconite, biotite (slightly chloritized) and illite.

Smear Slides

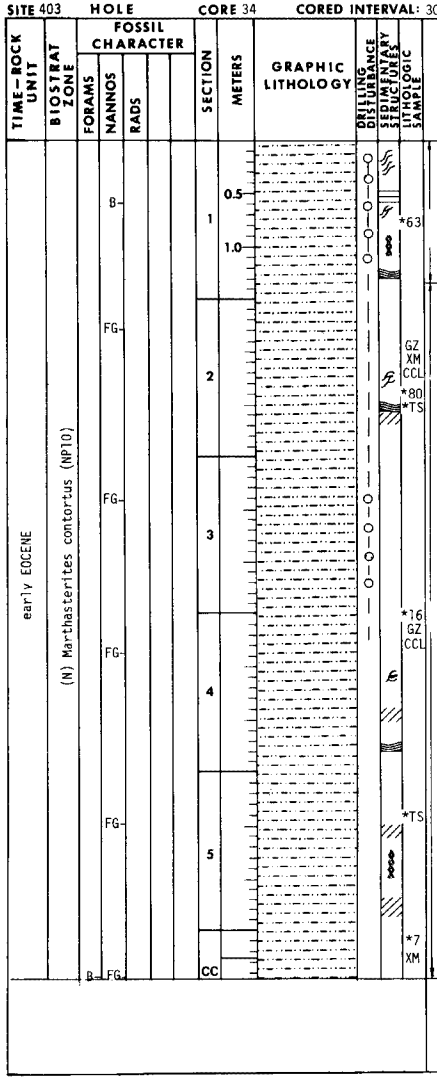
	1-48 (minor)
sand/silt/clay	5/85/10
unspec. $CaCO_3$	72
vol. glass	17
vol. RF	5
clay	5

Coarse Fraction (>44μm)

quartz & feldspar	20
vol. glass	20
mica	20
opaque + altered	30
unspec. $CaCO_3$	5
zeolite	3

Carbonate Bomb
1-59 (CC) <5%

SITE 403 HOLE CORE 34 CORED INTERVAL: 308.5-318.0 m



LITHOLOGIC DESCRIPTION

"slump" structure

N3

Mudstone
dark gray (N3) to dark greenish gray (5GY 4/1). Dominantly coarse silt with some very fine sand. Plane, wavy and lenticular lamination reflects slight textural variations. Evidence of soft sediment deformation-contorted and disrupted laminae. Occasional evidence of bioturbation. Mica and finely divided plant remains are especially conspicuous oriented along laminae.

contorted bedding
wavy lamination
cross lamination

5GY 4/1

Smear Slides

	1-63	2-80
sand/silt/clay	5/40/55	2/58/40
quartz	15	33
mica	15	3
rock frag.(?)	--	36
clay	50	10
glauconite	3	--
heavy min.	2	10
zeolite	10	--
vol. glass	2	5
plant frag.	--	2
unspec. $CaCO_3$	2	1

	4-16	6-7
sand/silt/clay	7/35/58	10/70/20
quartz	25	42
mica	3	--
rock frag.(?)	--	30
clay	49	15
glauconite	5	--
heavy min.	3	7
zeolite	5	--
vol. glass	3	5
plant frag.	--	1
unspec. $CaCO_3$	--	--

Thin Sections (2-93 and 5-36):
Tuffaceous mudstone.

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-60	0.4	0.3	0.9
4-20	0.4	0.3	0.6

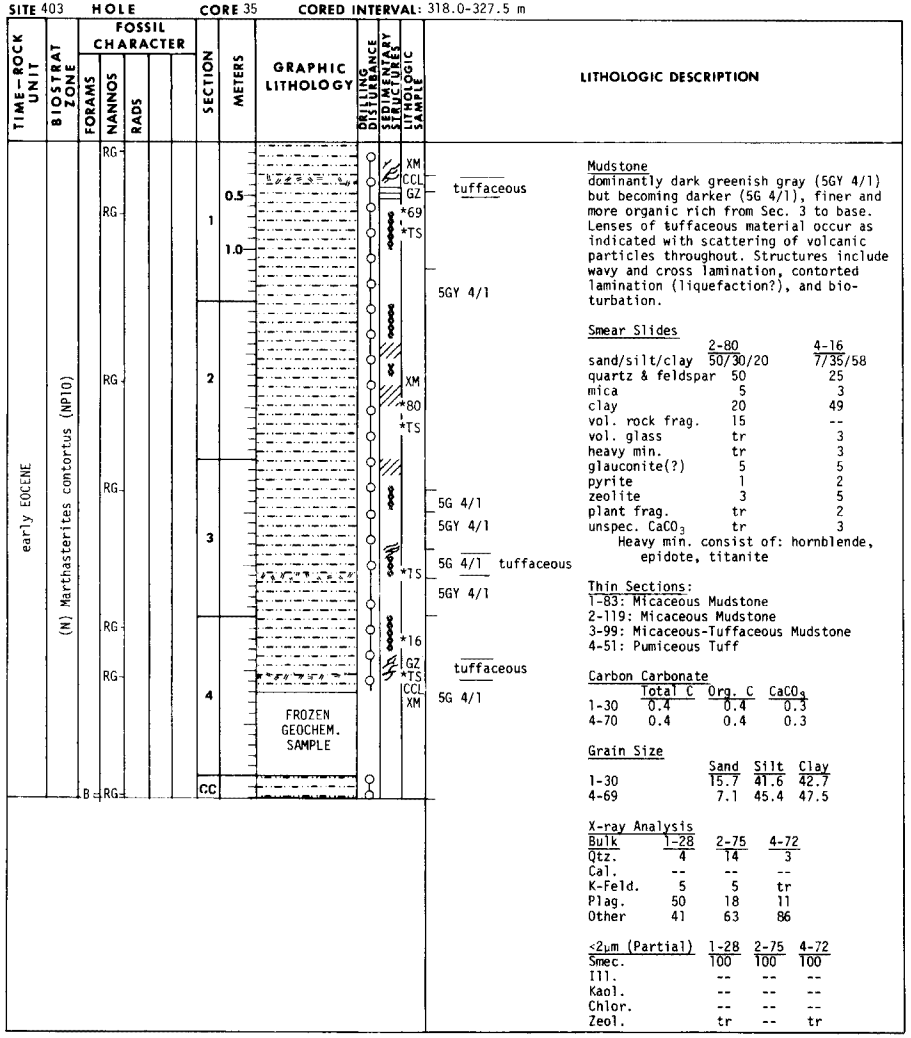
Grain Size

	Sand	Silt	Clay
2-48	33.4	38.6	28.0
4-13	23.3	41.8	34.9

X-ray Analysis

Bulk	2-61	6-30	<2μm (Partial)	2-61	6-30
Qtz.	11	--	Smec.	100	71
Cal.	--	--	Ill.	--	15
K-Feld.	5	--	Kaol.	--	--
Plag.	12	--	Chlor.	--	--
Other	72	100	Zeol.	tr	14

SITE 403 HOLE CORE 35 CORED INTERVAL: 318.0-327.5 m



Mudstone
dominantly dark greenish gray (5GY 4/1) but becoming darker (5G 4/1), finer and more organic rich from Sec. 3 to base. Lenses of tuffaceous material occur as indicated with scattering of volcanic particles throughout. Structures include wavy and cross lamination, contorted lamination (liquefaction?), and bioturbation.

Smear Slides

	2-80	4-16
sand/silt/clay	50/30/20	7/35/58
quartz & feldspar	50	25
mica	5	3
clay	20	49
vol. rock frag.	15	--
vol. glass	tr	3
heavy min.	tr	3
glauconite(?)	5	5
pyrite	1	2
zeolite	3	5
plant frag.	tr	2
unspec. $CaCO_3$	tr	3

Heavy min. consist of: hornblende, epidote, titanite

Thin Sections:
1-83: Micaceous Mudstone
2-119: Micaceous Mudstone
3-99: Micaceous-Tuffaceous Mudstone
4-51: Pumiceous Tuff

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-30	0.4	0.4	0.3
4-70	0.4	0.4	0.3

Grain Size

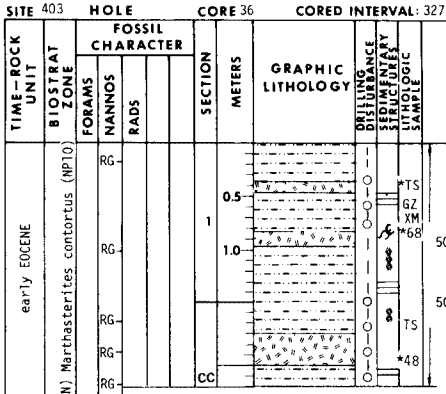
	Sand	Silt	Clay
1-30	15.7	41.6	42.7
4-69	7.1	45.4	47.5

X-ray Analysis

Bulk	1-28	2-75	4-72
Qtz.	4	14	3
Cal.	--	--	--
K-Feld.	5	5	tr
Plag.	50	18	11
Other	41	63	86

<2μm (Partial)	1-28	2-75	4-72
Smec.	100	100	100
Ill.	--	--	--
Kaol.	--	--	--
Chlor.	--	--	--
Zeol.	tr	--	tr

SITE 403 HOLE CORE 36 CORED INTERVAL: 327.5-337.0 m



Mudstone
dark greenish gray (5G 4/1) to greenish black (5GY 2/1) with interbeds of Volcanic Tuff. Plane lamination common with occasional cross lamination and bioturbation. Fine plant fragments common.

Smear Slides

	1-68	2-48 (minor
sand/silt/clay	1/74/25	0/76/30
quartz & feldspar	38	3
mica	2	--
clay	10	10
vol. glass	25	30
vol.(?) RF	14	55
heavy min.	7	--
pyrite	2	
unspec. $CaCO_3$	2	2
plant frag.	tr	tr

Heavy min. consist of: hornblende, tourmaline, zircon, titanite.

Thin Sections:
1-37: Mudstone
2-9: Tuffaceous Mudstone

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-60	0.7	0.7	0.7

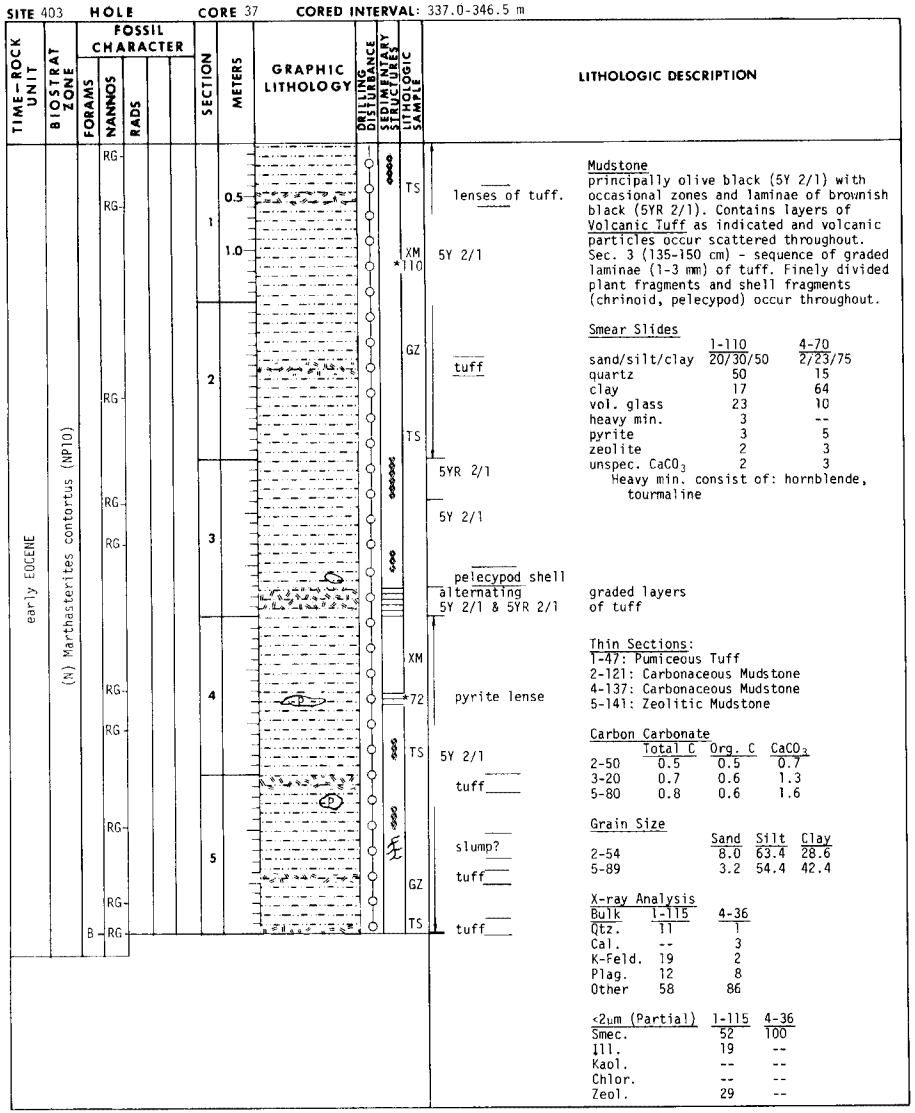
Grain Size

	Sand	Silt	Clay
1-69	3.0	59.8	37.3

X-ray Analysis

Bulk	1-66	<2μm (Partial)	1-66
Qtz.	22	Smec.	81
Cal.	--	Ill.	10
K-Feld.	10	Kaol.	--
Plag.	20	Chlor.	--
Other	48	Kaol.	9

SITE 403 HOLE CORE 37 CORED INTERVAL: 337.0-346.5 m



Mudstone
principally olive black (5Y 2/1) with occasional zones and laminae of brownish black (5YR 2/1). Contains layers of Volcanic Tuff as indicated and volcanic particles occur scattered throughout. Sec. 3 (135-150 cm) - sequence of graded laminae (1-3 mm) of tuff. Finely divided plant fragments and shell fragments (chrinoid, pelecypod) occur throughout.

Smear Slides

	1-110	4-70
sand/silt/clay	20/30/50	2/23/75
quartz	50	15
clay	17	64
vol. glass	23	10
heavy min.	3	--
pyrite	3	5
zeolite	2	3
unspec. $CaCO_3$	2	3

Heavy min. consist of: hornblende, tourmaline

Thin Sections:
1-47: Pumiceous Tuff
2-121: Carbonaceous Mudstone
4-137: Carbonaceous Mudstone
5-141: Zeolitic Mudstone

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-50	0.5	0.5	0.7
3-20	0.7	0.6	1.3
5-80	0.8	0.6	1.6

Grain Size

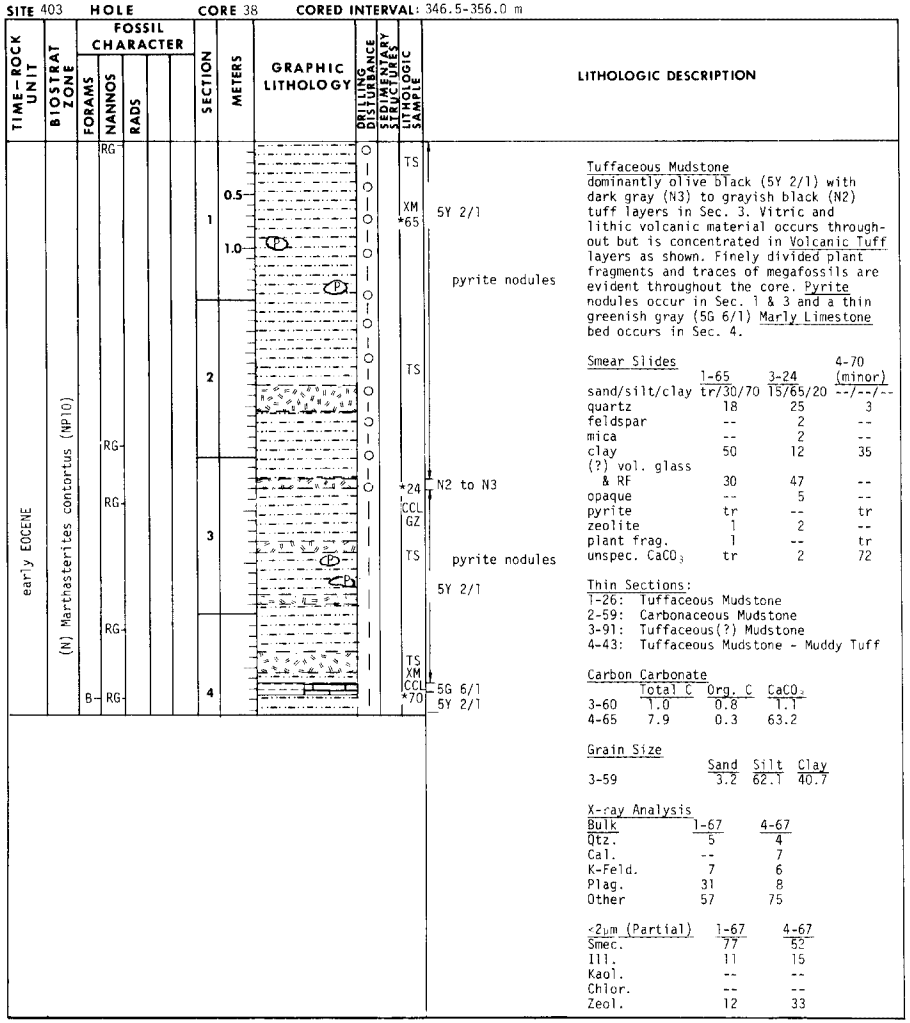
	Sand	Silt	Clay
2-54	8.0	63.4	28.6
5-89	3.2	54.4	42.4

X-ray Analysis

Bulk	1-115	4-36
Qtz.	11	1
Cal.	--	3
K-Feld.	19	2
Plag.	12	8
Other	58	86

<2μm (Partial)	1-115	4-36
Smec.	52	100
Ill.	19	--
Kaol.	--	--
Chlor.	--	--
Zeol.	29	--

SITE 403 HOLE CORE 38 CORED INTERVAL: 346.5-356.0 m



Tuffaceous Mudstone
dominantly olive black (5Y 2/1) with dark gray (N3) to grayish black (N2) tuff layers in Sec. 3. Vitric and lithic volcanic material occurs throughout but is concentrated in Volcanic Tuff layers as shown. Finely divided plant fragments and traces of megafossils are evident throughout the core. Pyrite nodules occur in Sec. 1 & 3 and a thin greenish gray (5G 6/1) Marly Limestone bed occurs in Sec. 4.

Smear Slides

	1-65	3-24	4-70 (minor)
sand/silt/clay	tr/30/70	15/65/20	--/--/--
quartz	18	25	3
feldspar	--	2	--
mica	--	2	--
clay	50	12	35
(?) vol. glass & RF	30	47	--
opaque	--	5	--
pyrite	tr	--	tr
zeolite	1	2	--
plant frag.	1	--	tr
unspec. $CaCO_3$	tr	2	72

Thin Sections:
1-26: Tuffaceous Mudstone
2-59: Carbonaceous Mudstone
3-91: Tuffaceous(?) Mudstone
4-43: Tuffaceous Mudstone - Muddy Tuff

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
3-60	1.0	0.8	1.1
4-65	7.9	0.3	63.2

Grain Size

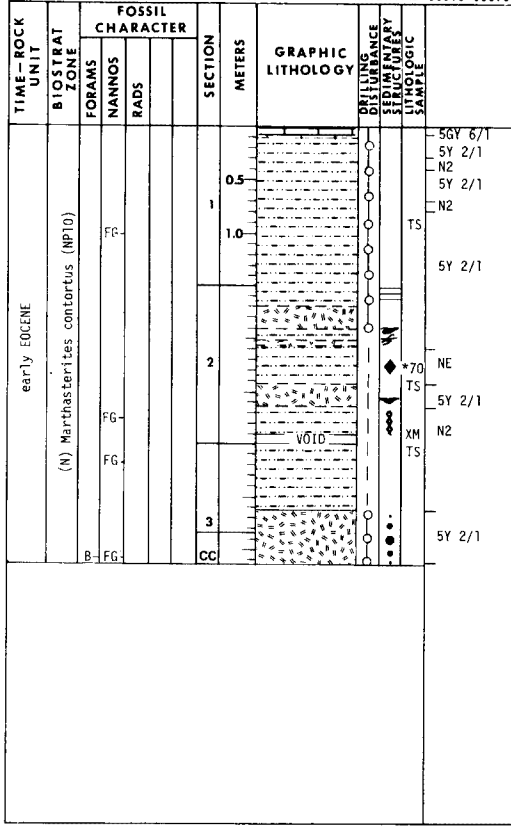
	Sand	Silt	Clay
3-59	3.2	62.1	40.7

X-ray Analysis

Bulk	1-67	4-67
Qtz.	5	4
Cal.	--	7
K-Feld.	7	6
Plag.	31	8
Other	57	75

<2μm (Partial)	1-67	4-67
Smec.	77	52
Ill.	11	15
Kaol.	--	--
Chlor.	--	--
Zeol.	12	33

SITE 403 HOLE CORE 39 CORED INTERVAL: 356.0-365.5 m



LITHOLOGIC DESCRIPTION

Tuffaceous Mudstone
Muddy Tuff

Tuffaceous Mudstone mainly olive black (5Y 2/1) to grayish black (N2); common bioturbation and some lamination; load casts, flame structure, contorted lamination common in association with tuff beds. Pyrite and megafossil fragments scattered throughout.
Muddy Tuff is complexly intertongued with mudstone; mainly medium-coarse sand sized; where occurs in distinct beds, commonly graded, both normal and reverse.

Smear Slides

	2-70
sand/silt/clay	0/30/70
quartz	15
mica	3
clay	57
vol. glass	10
zeolite	5
sp. spic.	3
nannos	3
plant frag.	1
other	3 Pyrite, unspec. $CaCO_3$, heavy min.

Thin Sections (1-90, 2-89, 3-11): Tuffaceous Mudstone

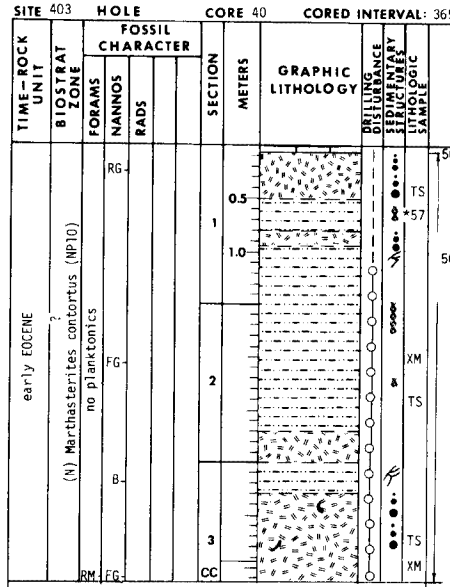
Carbonate Bomb

	Total C	Org. C	$CaCO_3$
2-140	0.8	0.4	2.7
3-50	0.7	0.2	3.7

X-ray Analysis

Bulk	2-138	<2μm (Partial)	2-138
Qtz.	2	Smec.	100
Cal.	--	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	6	Chlor.	--
Other	92	Zeol.	--

SITE 403 HOLE CORE 40 CORED INTERVAL: 365.5-375.0 m



LITHOLOGIC DESCRIPTION

Tuffaceous Mudstone
Muddy Tuff
greenish black (5G 2/1); bioturbation and contorted lamination are common in mudstone; graded bedding common in tuffs. Shell fragments scattered throughout. Thin Limestone bed at top of Sec. 1.

Smear Slides

	1-57
sand/silt/clay	25/15/60
quartz	20
vol. rock frag. and glass (altered)	23
clay	57
others (tr): pyrite, nannos, plant fragments, glauconite	

Thin Sections:
1-46: Muddy (vitric-lithic) Tuff
2-48: Tuffaceous Mudstone
3-78: Muddy Tuff: An argillized, poorly sorted tuff, this is formed of closely packed, unabraded pumice, shards and lesser crystals, with clayey vitroclastic matrix. Considerable lithological variety of parental material is shown by the pyroclasts in this thin section: range of pumice textures with chlorite-filled vesicles in an oxidized base of brown smectitized glass, microlitic lava composed of andesine laths (0.1 x 0.02 mm) indicating basaltic andesite or basalt, brown devitrified glass shards and crystals of K-Feldspar. The clayey matrix contains calcitic nannofossils, glauconite, chlorite, a little quartz silt and zeolites.

Carbon Carbonate

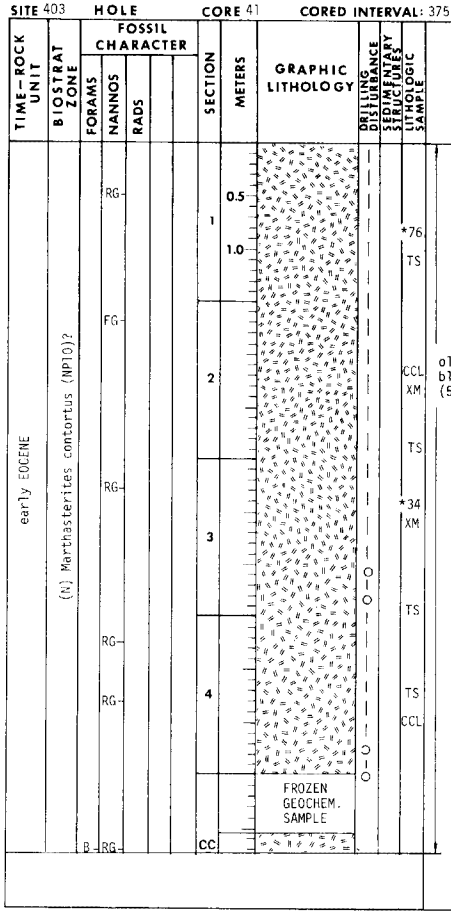
	Total C	Org. C	$CaCO_3$
1-70	0.9	0.4	4.3

X-ray Analysis

Bulk	1-39	2-47	3-101
Qtz.	--	5	--
Cal.	--	--	--
K-Feld.	--	4	tr
Plag.	--	6	7
Other	13	85	93

<2μm (Partial)	1-39	2-47	3-101
Smec.	100	76	100
Ill.	--	--	--
Kaol.	--	--	--
Chlor.	--	--	--
Zeol.	--	24	--

SITE 403 HOLE CORE 41 CORED INTERVAL: 375.0-384.5 m



Muddy Volcanic Tuff
olive black (5Y 2/1); composed mainly of volcanic glass but volcanic rock fragments are common also; most is silt to sand sized with occasional lapilli; matrix of olive black mud (mainly clayey silt); scattering of megafossils (gastropod, pelecypod) throughout core. Parts of Sec. 1 - Tuffaceous Mudstone.

Smear Slides

	1-76 (matrix)	3-34
sand/silt/clay	0/40/60	5/50/45
quartz	10	0
feldspar	0	5
mica	0	5
clay	57	19
vol. glass	20	40
vol. RF		20
chlorite(?)	5	5
unspec. $CaCO_3$	3	5
nannos	3	--
plant frag.	1	--
glauconite	tr	

Thin Sections:
1-111: Tuffaceous Mudstone
2-142: Muddy (vitric-lithic) Tuff
3-147: Muddy (bitric-lithic) Tuff
4-70: Muddy (crystal) Tuff

Carbon Carbonate

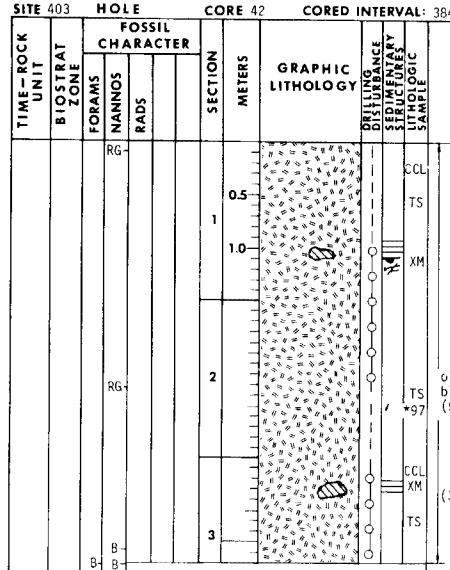
	Total C	Org. C	$CaCO_3$
2-70	0.4	0.1	2.8
4-100	0.4	0.1	2.9

X-Ray Analysis

Bulk	2-77	3-60
Qtz.	4	--
Cal.	3	tr
K-Feld.	--	--
Plag.	--	--
Other	93	100

<2μm (Partial)	2-77	3-60
Smec.	100	100
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--

SITE 403 HOLE CORE 42 CORED INTERVAL: 384.5-394.0 m



Muddy Tuff
olive black (5Y 2/1); dominantly silt to very fine sand sized glass and lithic particles; occasional lapilli and clasts to 3 cm diameter. Megafossils (pelecypods, gastropods) and plant debris are common. Matrix of olive black mud (clayey silt).

Smear Slides

	2-97
sand/silt/clay	10/40/50
clay	45 (largely
vol. glass	30 chlorit?)
vol. RF	20
unsp. $CaCO_3$	5
other	tr (pyrite, plant frag.)

Thin Sections:
1-56: Muddy (lithic-crystal) Tuff. Poorly sorted heterolithic pyroclasts attain 2 mm across and include chloritized pumice, abundant glass shards, some apparently unaltered, oxidized microlitic lava, and crystals of feldspar (microcline) set in a matrix of closely packed chloritized shards, patches of mudstone, with sparse glauconite pellets (0.3 mm), micas and microfauna, chiefly foraminifera.
2-91: Muddy Tuff
3-64: Lithic Lapilli-Tuff. Lapilli of altered pumice occur sparsely up to 1 cm long, with vesicles averaging 0.15 mm diameter. Compared to the previous tuffaceous samples, this is thus very poorly sorted. Pumice is conspicuous among the matrix vesicles ranging in shape and filling which includes chlorite and zeolite. The altered glass base of pumice appears to be mainly chlorite. Glass shards are also conspicuous and are altered to brown clay material. The finer matrix includes much fine sand- and silt-grade angular resistates (averaging 0.1 mm), microcline, soda plagioclase, quartz, with glauconite and biotite flakes.

Carbon Carbonate

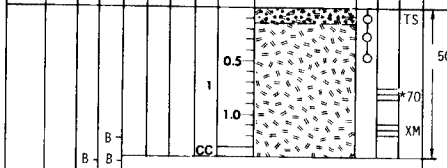
	Total C	Org. C	$CaCO_3$
1-20	0.1	0.1	0.2
3-10	0.3	0.1	1.3

X-ray Analysis

Bulk	1-117	3-15
Qtz.	tr	1
Cal.	5	--
K-Feld.	--	--
Plag.	--	3
Other	95	96

<2μm (Partial)	1-117	3-15
Smec.	100	100
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--

SITE 403 HOLE CORE 43 CORED INTERVAL: 394.0-403.5 m



LITHOLOGIC DESCRIPTION

Volcanic Tuff
greenish black (5G 2/1); composed mainly of sand-silt sized lithic fragments; top 15 cm - mixed ash and lapilli, very porous; scattered megafossils (gastropod, pelecypod). Vague plane lamination.

Smear Slides

quartz	8
feldspar	2
clay	8
vol. RF	70
vol. glass	10
hornblende	1
zeolite	1

Thin Section 1-5: Sand-grade heterolithic pyroclasts and resistates averaging 0.3 mm, and ranging up to fine granules (3 mm) characterize this tuff. All are angular and closely packed. They include green-brown altered pumice with zeolite-infilled vesicles, pale olive green argillized glass, feldspar-microlitic oxidized lava, particles of microcline, andesine, ? anorthoclase, quartz. The matrix includes much clay with comminuted pyroclastic dust, chloritized glass shards, micas, and specks of angular amphibole with X = green, Z = blue green.

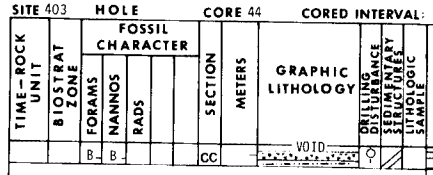
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-100	0.1	0.0	0.1

X-ray Analysis

Bulk	1-104	<2μm (Partial)	1-104
Qtz.	5	Smec.	70
Cal.	--	Ill.	30
K-Feld.	6	Kaol.	--
Plag.	9	Chlor.	--
Other	80	Zeol.	--

SITE 403 HOLE CORE 44 CORED INTERVAL: 403.5-413.0 m

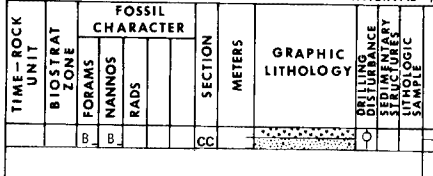


Lapilli Tuff
Tuffaceous Mudstone
Tuff is dark gray (N3), carbonate cemented, with clasts from few mm to 8 mm, poorly sorted. Mudstone is dark greenish gray (5GY 4/2), very soft, micaceous. Contains fragments of coaly material; vague cross lamination.

Smear Slides (Tuff)

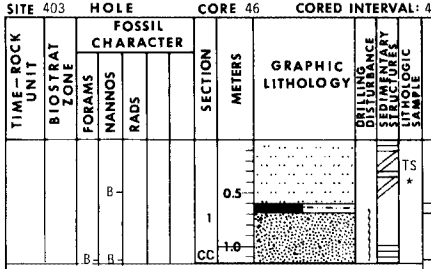
vol. glass	40
vol. RF	20
quartz	10
clay	10
opaque	4
zeolite	2
unspec. $CaCO_3$	14

SITE 403 HOLE CORE 45 CORED INTERVAL: 413.0-422.5 m



Lapilli Conglomerate
Silty Sandstone
Conglomerate is greenish black (5GY 2/1), carbonate cemented and contains granules of quartz and shell fragments as well as volcanic lapilli. Sandstone is dark gray (N3), quartzose, micaceous, moderately sorted, carbonate cemented. Evidence of limonite staining.

SITE 403 HOLE CORE 46 CORED INTERVAL: 422.5-432.0 m



5Y 2/1
10YR 2/2
5Y 2/1

LITHOLOGIC DESCRIPTION

Tuffaceous Siltstone
Lignitic Mudstone
Silty Sand
Siltstone is olive black (5Y 2/1), well-laminated to cross-laminated on scale of 1-3 mm.
Mudstone is dusky yellow brown (10YR 2/2) and contains up to 6% organic carbon.
Silty sand is olive black (5Y 2/1), soft. From 65-100 cm: sand is chiefly poorly sorted medium to coarse quartz with admixture of volcanic ash and lapilli. From 100-115, sand is fine-medium, moderately sorted, but interlaminated with sandy mud.

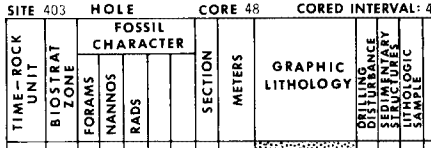
Smear Slides (Siltstone)

quartz	30
vol. glass	25 (pale brown)
mica	20
vol. RF	10
feldspar	5
clay	10
hornblende	tr

Thin Section 1-28: This is composed of closely packed, oriented well-sorted clastic grains and plentiful micas (biotite, chlorite) giving rise to a marked lamination. Resistates average 0.04 mm and comprise very elongated slivers of quartz, oligoclase, andesine, microperthite, microcline, ?anorthe-clase. Pyroclasts include altered pumice (0.3 mm) microlitic lava particles, interstitial brown argillized shards. The clay matrix includes carbonate bioclasts, and specks of angular, fresh green horn-blende, possible riebeckite and a trace of brown tourmaline.

Site 403, Core 47, 432.0-441.5 m: NO RECOVERY

SITE 403 HOLE CORE 48 CORED INTERVAL: 441.5-451.0 m



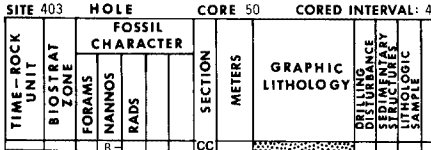
N5

LITHOLOGIC DESCRIPTION

Sandstone
medium gray (N5); chiefly subrounded quartz and feldspar, medium to coarse, moderate sorting. Scattered volcanic ash.

Site 403, Core 49, 451.0-460.5 m: NO RECOVERY

SITE 403 HOLE CORE 50 CORED INTERVAL: 460.5-470.0 m



5GY 4/1

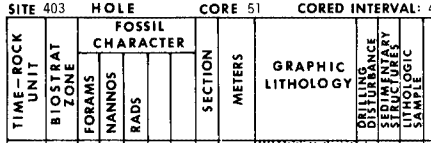
LITHOLOGIC DESCRIPTION

Sandstone
dark greenish gray (5GY 4/1), arkosic, medium to well-sorted, subrounded, calcite cemented.

Thin Section:

quartz	38
feldspar	15
mica	12
vol. RF	5
calcite cemented	30
heavy min.	tr (includes: green hornblende, epidote, zoisite, pyrite

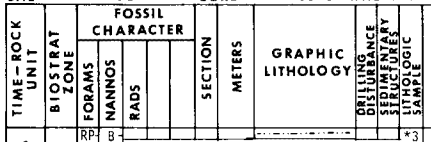
SITE 403 HOLE CORE 51 CORED INTERVAL: 470.0-479.5 m



LITHOLOGIC DESCRIPTION

Sandstone
dark greenish gray (5G 4/1), arkosic, fine-medium, moderate-well sorted, carbonate cemented. Pyrite inclusions. Approximately 5-10% volcanic rock frag-ments.

SITE 403 HOLE CORE 52 CORED INTERVAL: 479.5-489.0 m ?



olive black (5Y 2/1)

LITHOLOGIC DESCRIPTION

Mud
one teaspoonful in core catcher. May be cavings. Olive black (5Y 2/1), soft.

Smear Slides

	CC
sand/silt/clay	40/40/20
quartz	60
feldspar	10
clay	20
mica	5
heavy min.	tr
vol. rock frag.?	5
pyrite	tr
plant debris	1

Leg 48 Site 403
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
403	1	2	0.00	2.88	8.4	0.1	69.7
403	1	4	0.00	5.19	6.9	0.1	57.1
403	2	2	4.50	6.72	8.4	0.1	69.6
403	2	5	4.50	11.11	11.1	0.0	91.7
403	3	2	14.00	16.64	2.1	0.1	16.5
403	3	3	14.00	17.13	1.9	0.2	14.4
403	3	3	14.00	17.27	10.2	0.1	84.2
403	4	1	23.50	24.37	4.0	0.1	32.2
403	5	2	33.00	35.80	10.6	0.1	87.8
403	5	3	33.00	36.38	10.8	0.1	89.8
403	7	1	52.00	52.64	11.1	0.1	91.5
403	8	2	61.50	63.90	11.3	0.1	93.5
403	8	6	61.50	69.87	11.3	0.1	93.9
403	9	2	71.00	72.64	10.9	0.1	90.0
403	9	5	71.00	78.09	11.0	0.1	90.9
403	11	1	90.00	90.27	10.6	0.1	87.9
403	11	2	90.00	92.20	11.3	0.1	93.3
403	12	4	99.50	104.88	11.4	0.1	94.2
403	12	7	99.50	108.84	11.3	0.1	93.8
403	13	3	109.00	112.31	11.1	0.1	92.1
403	14	2	118.50	120.45	11.4	0.1	94.1
403	16	4	137.50	143.40	11.2	0.1	92.6
403	17	2	147.00	148.59	11.3	0.1	93.3
403	18	2	156.50	158.79	11.3	0.1	93.6
403	20	1	175.50	175.93	10.7	0.1	88.5
403	21	1	185.00	185.74	11.1	0.1	92.3
403	21	2	185.00	187.39	11.2	0.0	93.2
403	21	3	185.00	188.88	11.3	0.0	93.7
403	22	2	194.50	197.04	10.9	0.0	90.6
403	22	5	194.50	201.52	10.9	0.1	90.5
403	25	1	223.00	223.41	9.1	0.1	75.4
403	26	1	232.50	233.14	9.2	0.1	76.3
403	26	2	232.50	234.82	9.9	0.1	81.5
403	26	3	232.50	236.15	10.3	0.1	85.3
403	26	4	232.50	237.28	9.9	0.1	81.7
403	28	1	251.50	252.00	2.9	0.1	23.6
403	29	1	261.00	261.38	0.6	0.1	4.0
403	29	1	261.00	261.88	0.3	0.1	1.8
403	29	3	261.00	264.99	0.3	0.1	1.3
403	29	4	261.00	266.21	0.3	0.1	1.9
403	30	1	270.50	270.86	2.4	0.1	19.4
403	31	CC	280.00	280.10	0.2	0.2	0.2
403	34	2	308.50	310.57	0.4	0.3	0.9
403	34	4	308.50	313.22	0.4	0.3	0.6
403	35	1	318.00	318.34	0.4	0.4	0.3
403	35	4	318.00	323.24	0.4	0.4	0.3
403	36	1	327.50	328.12	0.7	0.7	0.2
403	37	2	337.00	339.05	0.5	0.5	0.7

Leg 48 Site 403
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
403	37	3	337.00	340.22	0.7	0.6	1.3
403	37	5	337.00	343.85	0.8	0.6	1.6
403	38	3	346.50	350.11	1.0	0.8	1.1
403	38	4	346.50	351.64	7.9	0.3	63.2
403	39	2	356.00	358.87	0.8	0.4	2.7
403	39	3	356.00	359.55	0.7	0.2	3.7
403	40	1	365.50	366.19	0.9	0.4	4.3
403	41	2	375.00	377.24	0.4	0.1	2.8
403	41	4	375.00	380.46	0.4	0.1	2.9
403	42	1	384.50	384.66	0.1	0.1	0.2
403	42	3	384.50	387.64	0.3	0.1	1.3
403	43	1	394.00	395.05	0.1	0.0	0.1

#

Leg 48 Site 403
DSDP Shore Laboratory Grain Size Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Sand	Silt	Clay
403	1	2	0.00	2.94	44.9	20.3	34.8
403	1	3	0.00	4.05	42.2	17.4	40.4
403	1	4	0.00	5.19	26.7	31.5	41.8
403	1	4	0.00	5.67	34.3	27.4	38.3
403	2	1	4.50	5.14	15.4	31.5	53.1
403	2	2	4.50	6.74	36.8	25.9	37.3
403	2	3	4.50	7.62	25.8	36.6	37.6
403	2	3	4.50	8.13	22.1	27.2	50.7
403	2	5	4.50	11.10	16.6	24.8	58.6
403	3	1	14.00	15.31	33.2	19.1	47.7
403	3	2	14.00	16.61	14.2	41.5	44.3
403	3	3	14.00	17.24	54.1	23.3	22.6
403	5	2	33.00	35.68	36.3	29.0	34.7
403	7	1	52.00	52.65	27.1	32.6	40.3
403	8	2	61.50	63.85	12.9	39.5	47.6
403	8	6	61.50	69.76	7.9	44.0	48.1
403	9	1	71.00	71.31	7.4	36.0	56.6
403	9	5	71.00	78.03	50.6	28.5	20.9
403	11	2	90.00	92.18	13.4	32.2	54.4
403	12	7	99.50	108.73	15.8	29.0	55.1
403	13	3	109.00	112.27	11.7	38.2	50.1
403	14	2	118.50	120.46	3.9	31.5	64.6
403	16	4	137.50	143.45	6.5	34.4	59.1
403	17	2	147.00	148.60	2.5	36.9	60.6
403	18	2	156.50	158.76	4.3	30.6	65.1
403	20	1	175.50	175.94	3.3	38.4	58.3
403	21	1	185.00	185.74	2.7	33.7	63.5
403	21	2	185.00	187.40	3.2	36.3	60.5
403	22	2	194.50	196.95	10.8	44.3	45.0
403	22	5	194.50	201.42	11.1	46.5	42.4
403	22	6	194.50	202.30	12.1	48.9	39.0
403	26	1	232.50	233.09	20.0	45.9	34.1
403	26	2	232.50	234.78	28.8	41.3	29.9
403	26	3	232.50	236.18	5.9	59.0	35.0
403	26	4	232.50	237.27	10.6	47.8	41.6
403	27	1	242.00	242.10	3.6	47.1	49.2
403	28	1	251.50	252.01	6.3	42.3	51.4
403	29	1	261.00	261.45	34.5	28.7	36.8
403	29	1	261.00	262.30	34.0	13.6	52.4
403	29	4	261.00	266.21	29.9	23.5	46.6
403	34	2	308.50	310.48	33.4	38.6	28.0
403	34	4	308.50	313.19	23.3	41.8	34.9
403	35	1	318.00	318.30	15.7	41.6	42.7
403	35	4	318.00	323.19	7.1	45.4	47.5
403	36	1	327.50	328.19	3.0	59.8	37.3
403	37	2	337.00	339.04	8.0	63.4	28.6
403	37	5	337.00	343.89	3.2	54.4	42.4
403	38	3	346.50	350.09	3.2	62.1	34.7

#

DEEP SEA DRILLING PROJECT
LEG 48 SITE 404
SITE SUMMARY SHEET

Date occupied	0957 June 25, 1976
Date departed	0330 June 29, 1976
Time on site	3.75 days
Position: latitude	56°03.13'N
longitude	23°14.95'W
Water depth (sea level)	2306 corrected meters, echo sounding
Water depth (rig floor)	2322 corrected meters, echo sounding
Bottom felt at	2322 meters
Number of holes	1
Number of cores	26
Total length of cored section	243.5 meters
Total core recovered	74.85 meters
Percentage of core recovery	30.7%
Oldest Sediment Cored	
Depth subbottom	389 meters
Nature	Sandstone and conglomerate
Age	Lower Eocene
Basement	Not reached

PRINCIPAL RESULTS:

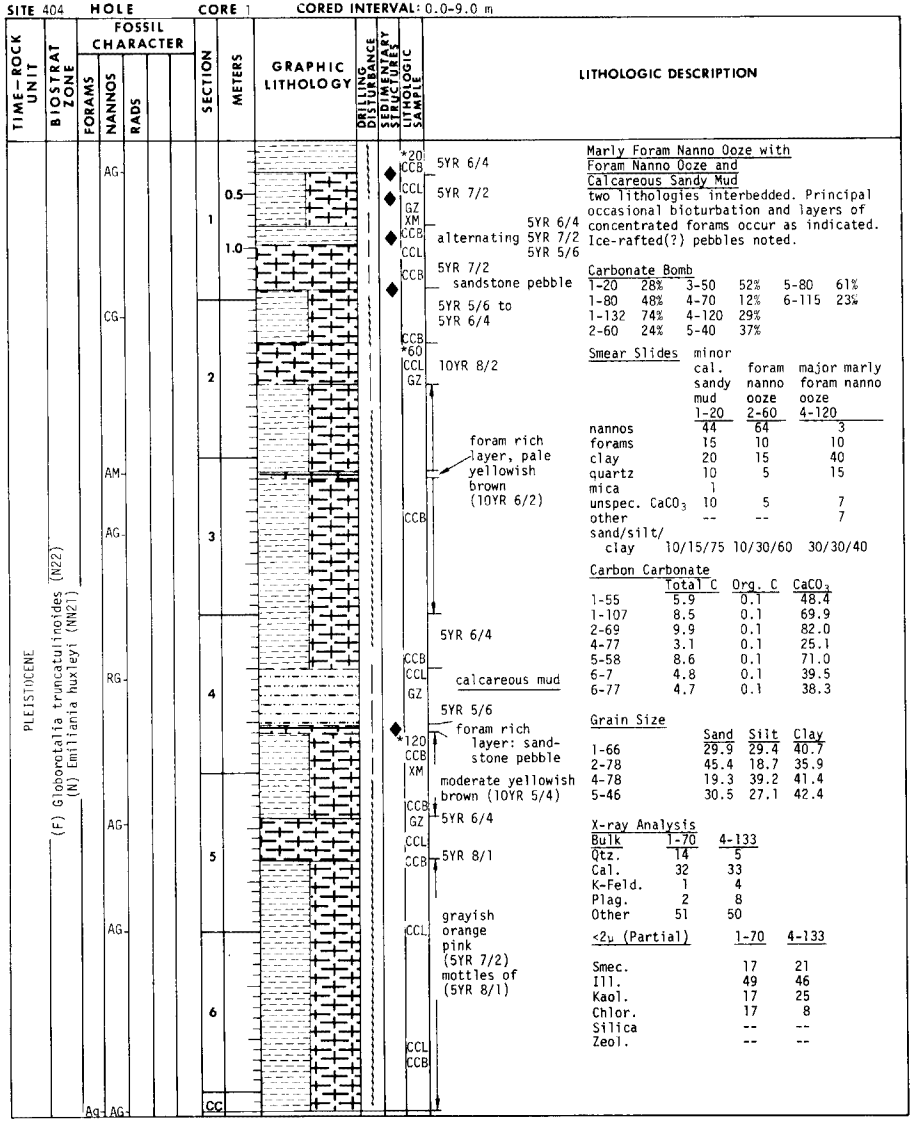
Site 404 was drilled three miles southeast of Site 403 on the southwest margin of the Rockall Plateau on an attempt to avoid the unconsolidated sands that had prematurly terminated drilling at 403. The hole was spot cored to 170 meters.

Three lithological units were recognized and can be considered equivalent to those pentrated at Site 403: Unit 1a (0-28 meters)

consists of an alternation of light brown calcareous mudstone and marly foram ooze. Unit 1b ((104 to 199 meters) of lower Pliocene to upper Miocene age consists of bluish white nanno and foram ooze. Unit 2 (199 to 227.5 meters) is composed of middle Eocene calcareous porcellanites and nanno porcellanites. Unlike Site 403, the Oligocene was absent at this site. SIliceous tuffs, tuffaceous porcellanites and glauconitic siliceous limestones of early Eocene age comprise the upper part of Unit 3 (227.5-290 m). Volcanoclastics become more common in the lower part of the Unit (290-389 meters) where tuffaceous mudstones prevail. Below 360 meters glauconitic, sandstone and conglomerate occur in the section and the hole ended in tuffaceous conglomaerate containing a large fragment of an oyster shell.

Faunal evidence indicates steady progressive subsidence of the site to its present depth beginning from a littoral environment in early Eocene time.

SITE 404 HOLE CORE 1 CORED INTERVAL: 0.0-9.0 m



Marly Foram Nanno Ooze with Foram Nanno Ooze and Calcareous Sandy Mud

two lithologies interbedded. Principal occasional bioturbation and layers of concentrated forams occur as indicated. Ice-rafted(?) pebbles noted.

Carbonate Bomb

1-20	28%	3-50	52%	5-80	61%
1-80	48%	4-70	12%	6-115	23%
1-132	74%	4-120	29%		
2-60	24%	5-40	37%		

Smear Slides

	minor cal. sandy mud 1-20	foram nanno ooze 2-60	major marly foram nanno ooze 4-120
nannos	44	64	3
forams	15	10	10
clay	20	15	40
quartz	10	5	15
mica	1		
unspec. $CaCO_3$	10	5	7
other	--	--	7
sand/silt/clay	10/15/75	10/30/60	30/30/40

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-55	5.9	0.1	48.4
1-107	8.5	0.1	69.9
2-69	9.9	0.1	82.0
4-77	3.1	0.1	25.1
5-58	8.6	0.1	71.0
6-7	4.8	0.1	39.5
6-77	4.7	0.1	38.3

Grain Size

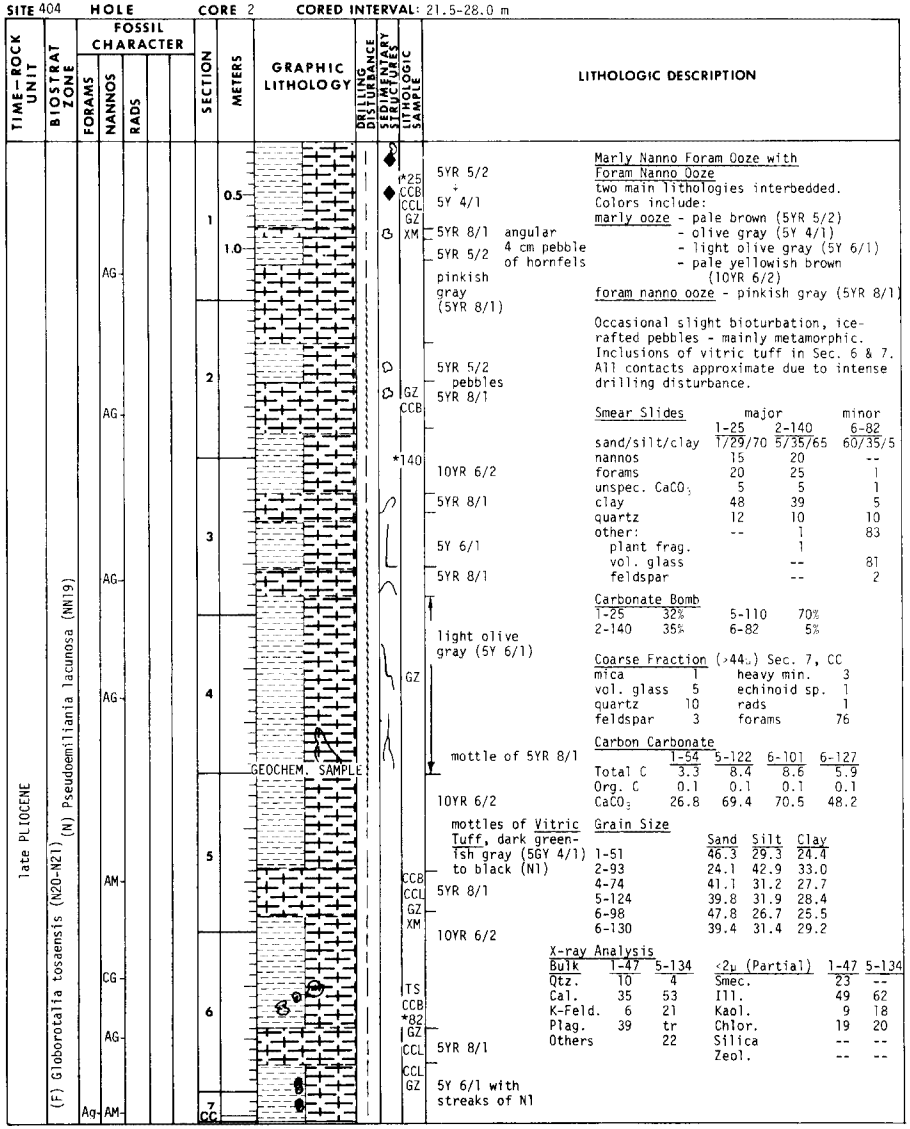
	Sand	Silt	Clay
1-66	29.9	29.4	40.7
2-78	45.4	18.7	35.9
4-78	19.3	39.2	41.4
5-46	30.5	27.1	42.4

X-ray Analysis

Bulk	1-70	4-133
Qtz.	14	5
Cal.	32	33
K-Feld.	1	4
Plag.	2	8
Other	51	50

<2μ (Partial)	1-70	4-133
Smec.	17	21
Ill.	49	46
Kaol.	17	25
Chlor.	17	8
Silica	--	--
Zeol.	--	--

SITE 404 HOLE CORE 2 CORED INTERVAL: 21.5-28.0 m



Marly Nanno Foram Ooze with Foram Nanno Ooze

two main lithologies interbedded. Colors include:

marly ooze - pale brown (5YR 5/2)
- olive gray (5Y 4/1)
- light olive gray (5Y 6/1)
- pale yellowish brown (10YR 6/2)

foram nanno ooze - pinkish gray (5YR 8/1)

Occasional slight bioturbation, ice-rafted pebbles - mainly metamorphic. Inclusions of vitric tuff in Sec. 6 & 7. All contacts approximate due to intense drilling disturbance.

Smear Slides

	major 1-25	major 2-140	minor 6-82
sand/silt/clay	1/29/70	5/35/65	60/35/5
nannos	15	20	--
forams	20	25	1
unspec. $CaCO_3$	5	5	1
clay	48	39	5
quartz	12	10	10
other:	--	1	83
plant frag.		1	
vol. glass		--	81
feldspar		--	2

Carbonate Bomb

1-25	32%	5-110	70%
2-140	35%	6-82	5%

Coarse Fraction (>44μ) Sec. 7, CC

mica	1	heavy min.	3
vol. glass	5	echinoid sp.	1
quartz	10	rads	1
feldspar	3	forams	76

Carbon Carbonate

	1-54	5-122	6-101	6-127
Total C	3.3	8.4	8.6	5.9
Org. C	0.1	0.1	0.1	0.1
$CaCO_3$	26.8	69.4	70.5	48.2

Grain Size

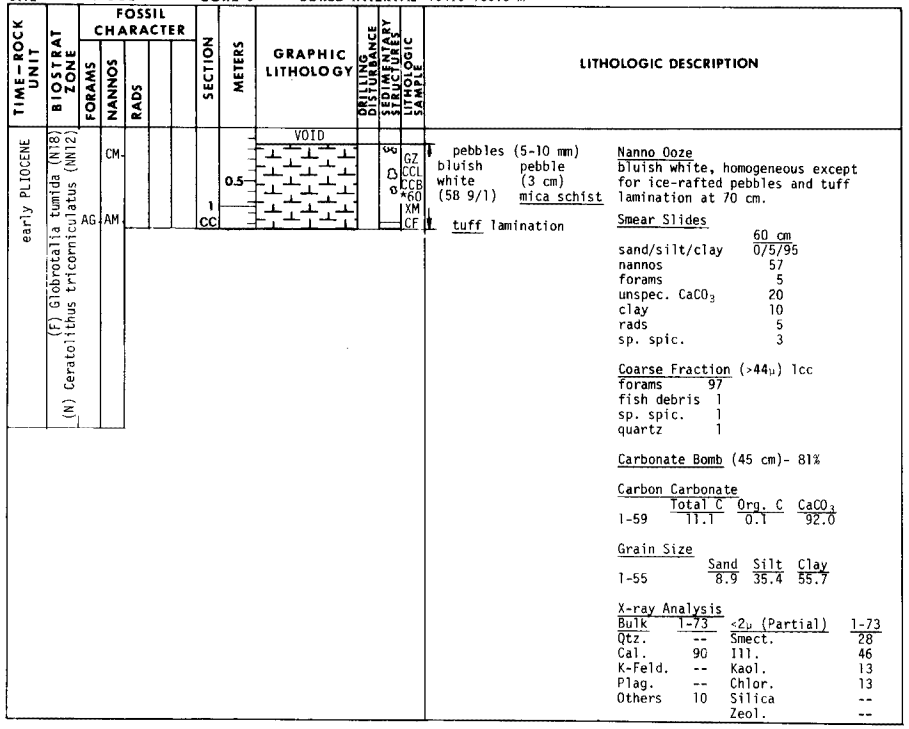
	Sand	Silt	Clay
1-51	46.3	29.3	24.4
2-93	24.1	42.9	33.0
4-74	41.1	31.2	27.7
5-124	39.8	31.9	28.4
6-98	47.8	26.7	25.5
6-130	39.4	31.4	29.2

X-ray Analysis

Bulk	1-47	5-134
Qtz.	10	4
Cal.	35	53
K-Feld.	6	21
Plag.	39	tr
Others		22

<2μ (Partial)	1-47	5-134
Smec.		23
Ill.	49	62
Kaol.	9	18
Chlor.	19	20
Silica	--	--
Zeol.	--	--

SITE 404 HOLE CORE 3 CORED INTERVAL: 104.0-135.0 m



Nanno Ooze
bluish white, homogeneous except for ice-rafted pebbles and tuff lamination at 70 cm.

Smear Slides

	60 cm
sand/silt/clay	0/5/95
nannos	57
forams	5
unspec. $CaCO_3$	20
clay	10
rads	5
sp. spic.	3

Coarse Fraction (>44μ) 1cc

forams	97
fish debris	1
sp. spic.	1
quartz	1

Carbonate Bomb (45 cm)- 81%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-59	11.1	0.1	92.0

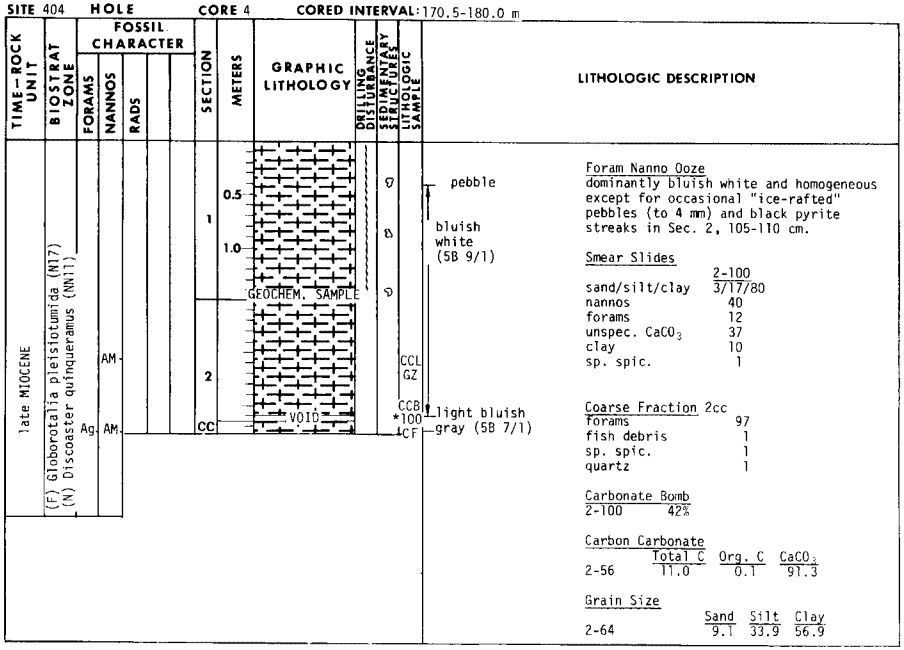
Grain Size

	Sand	Silt	Clay
1-55	8.9	35.4	55.7

X-ray Analysis

Bulk	1-73	<2μ (Partial)	1-73
Qtz.	--	Smect.	28
Cal.	90	Ill.	46
K-Feld.	--	Kaol.	13
Plag.	--	Chlor.	13
Others	10	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 4 CORED INTERVAL: 170.5-180.0 m



Foram Nanno Ooze
dominantly bluish white and homogeneous except for occasional "ice-rafted" pebbles (to 4 mm) and black pyrite streaks in Sec. 2, 105-110 cm.

Smear Slides

	2-100
sand/silt/clay	3/17/80
nannos	40
forams	12
unspec. $CaCO_3$	37
clay	10
sp. spic.	1

Coarse Fraction 2cc

forams	97
fish debris	1
sp. spic.	1
quartz	1

Carbonate Bomb

2-100	42%

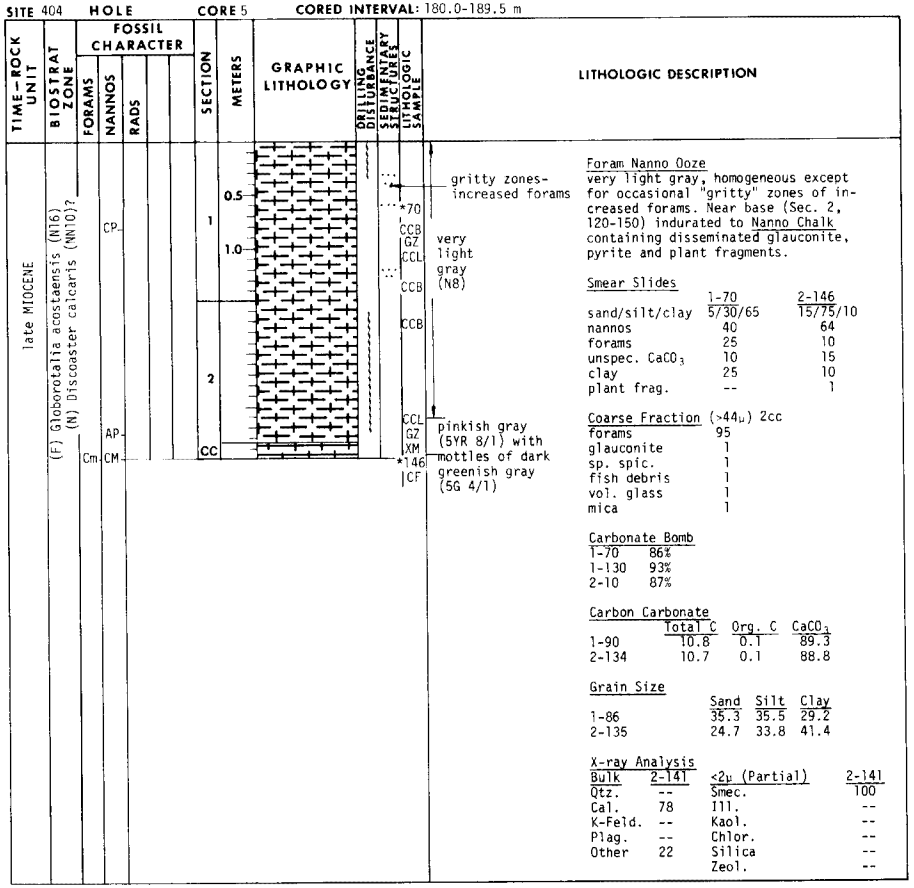
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-56	11.0	0.1	91.3

Grain Size

	Sand	Silt	Clay
2-64	9.1	33.9	56.9

SITE 404 HOLE CORE 5 CORED INTERVAL: 180.0-189.5 m



Foram Nanno Ooze
very light gray, homogeneous except for occasional "gritty" zones of increased forams. Near base (Sec. 2, 120-150) indurated to Nanno Chalk containing disseminated glauconite, pyrite and plant fragments.

Smear Slides

	1-70	2-146
sand/silt/clay	5/30/65	15/75/10
nannos	40	64
forams	25	10
unspec. $CaCO_3$	10	15
clay	25	10
plant frag.	--	1

Coarse Fraction (>44μ) 2cc

forams	95
glauconite	1
sp. spic.	1
fish debris	1
vol. glass	1
mica	1

Carbonate Bomb

1-70	86%
1-130	93%
2-10	87%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-90	10.8	0.1	89.3
2-134	10.7	0.1	88.8

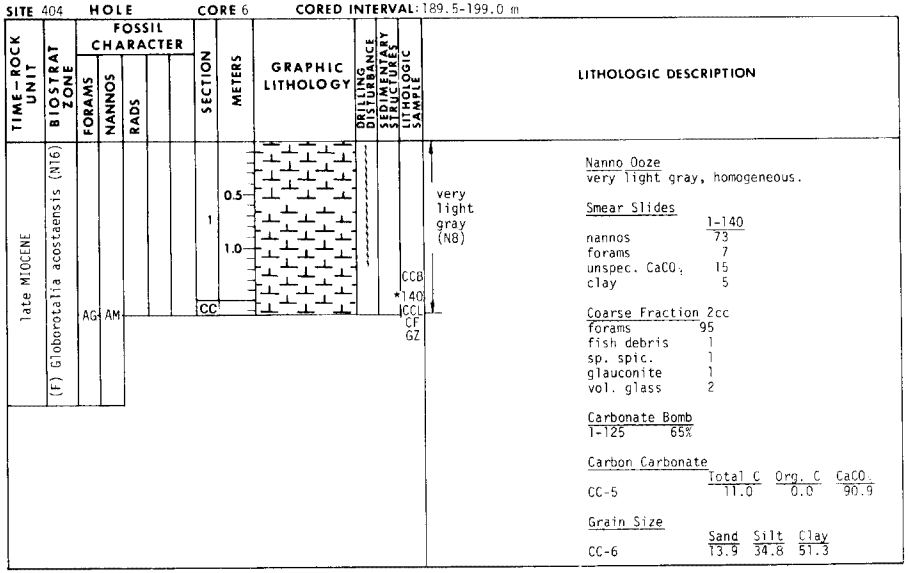
Grain Size

	Sand	Silt	Clay
1-86	35.3	35.5	29.2
2-135	24.7	33.8	41.4

X-ray Analysis

Bulk	2-141	<2μ (Partial)	2-141
Qtz.	--	Smec.	100
Cal.	78	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	22	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 6 CORED INTERVAL: 189.5-199.0 m



Nanno Ooze
very light gray, homogeneous.

Smear Slides

	1-140
nannos	73
forams	7
unspec. $CaCO_3$	15
clay	5

Coarse Fraction 2cc

forams	95
fish debris	1
sp. spic.	1
glauconite	1
vol. glass	2

Carbonate Bomb

1-125	65%

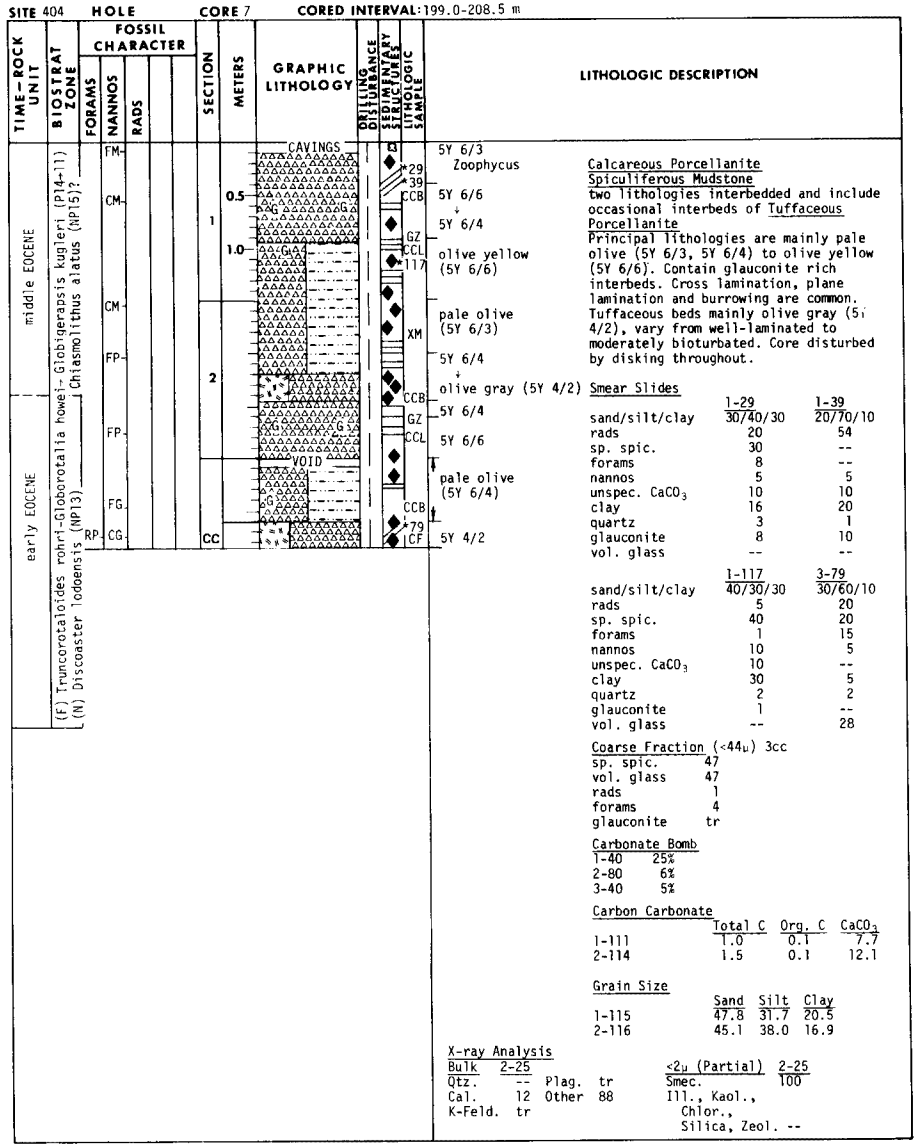
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
CC-5	11.0	0.0	90.9

Grain Size

	Sand	Silt	Clay
CC-6	13.9	34.8	51.3

SITE 404 HOLE CORE 7 CORED INTERVAL: 199.0-208.5 m



LITHOLOGIC DESCRIPTION

5Y 6/3 Zoophycus

Calcareous Porcellanite
Spiculiferous Mudstone
two lithologies interbedded and include occasional interbeds of Tuffaceous Porcellanite
Principal lithologies are mainly pale olive (5Y 6/3, 5Y 6/4) to olive yellow (5Y 6/6). Contain glauconite rich interbeds. Cross lamination, plane lamination and burrowing are common. Tuffaceous beds mainly olive gray (5Y 4/2), vary from well-laminated to moderately bioturbated. Core disturbed by disking throughout.

5Y 6/4 + 5Y 6/4

olive yellow (5Y 6/6)

pale olive (5Y 6/3)

5Y 6/4 + olive gray (5Y 4/2)

5Y 6/4

5Y 6/6

pale olive (5Y 6/4)

5Y 4/2

Smear Slides

	1-29	1-39
sand/silt/clay	30/40/30	20/70/10
rads	20	54
sp. spic.	30	--
forams	8	--
nannos	5	5
unspec. $CaCO_3$	10	10
clay	16	20
quartz	3	1
glauconite	8	10
vol. glass	--	--

	1-117	3-79
sand/silt/clay	40/30/30	30/60/10
rads	5	20
sp. spic.	40	20
forams	1	15
nannos	10	5
unspec. $CaCO_3$	10	--
clay	30	5
quartz	2	2
glauconite	1	--
vol. glass	--	28

Coarse Fraction (<44μ) 3cc

sp. spic.	47
vol. glass	47
rads	1
forams	4
glauconite	tr

Carbonate Bomb

1-40	25%
2-80	6%
3-40	5%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-111	1.0	0.1	7.7
2-114	1.5	0.1	12.1

Grain Size

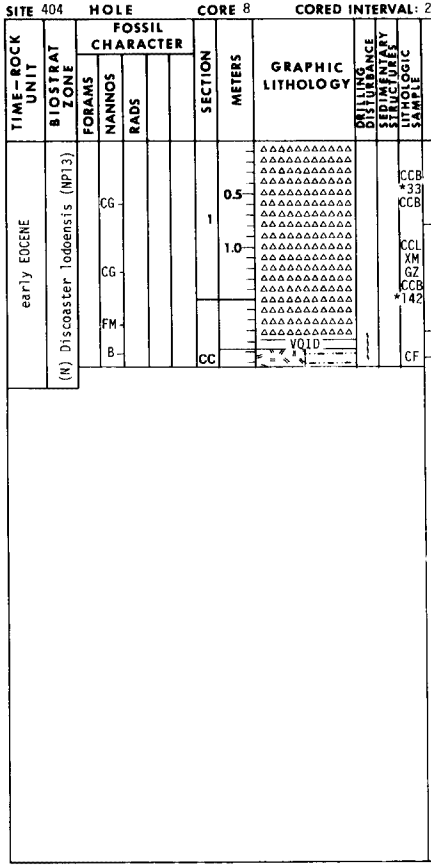
	Sand	Silt	Clay
1-115	47.8	31.7	20.5
2-116	45.1	38.0	16.9

X-ray Analysis

Bulk	2-25		
Qtz.	--	Plag.	tr
Cal.	12	Other	88
K-Feld.	tr		

<2μ (Partial)	2-25
Smec.	100
Ill., Kaol., Chlor., Silica, Zeol.	--

SITE 404 HOLE CORE 8 CORED INTERVAL: 208.5-218.0 m



LITHOLOGIC DESCRIPTION

light olive brown (5Y 5/6)

as above with mottles of dusky green (5G 3/2)

olive gray (5Y 4/2)

Tuffaceous Mudstone

Porcellanite
dominantly light olive gray (5Y 5/6) with dusky green patches of organic matter concentration. Evidence of lamination and burrowing throughout. Wood fragment in mudstone at base.

Smear Slides

	1-33	1-142
sand/silt/clay	30/50/20	35/20/45
rads	29	--
sp. spic.	25	50
diatoms	3	0
forams	10	0
nannos	4	10
unspec. $CaCO_3$		10
clay	25	30
quartz	3	0
plant frag.	0	1
glauconite	1	0

Coarse Fraction (>44μ) 2cc

vol. glass	97
sp. spic.	2
glauconite	1

Carbomate Bomb

1-32	5%
1-141	5%
1-22	5%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-96	1.2	0.1	9.4

Grain Size

	Sand	Silt	Clay
1-100	40.5	45.9	13.6

X-ray Analysis

Bulk	1-98	<2μ (Partial)	1-98
Qtz.	--	Smec.	100
Cal.	7	Ill.	--
K-Feld.	6	Kaol.	--
Plag.	6	Chlor.	--
Other	81	Silica	--
		Zeol.	--

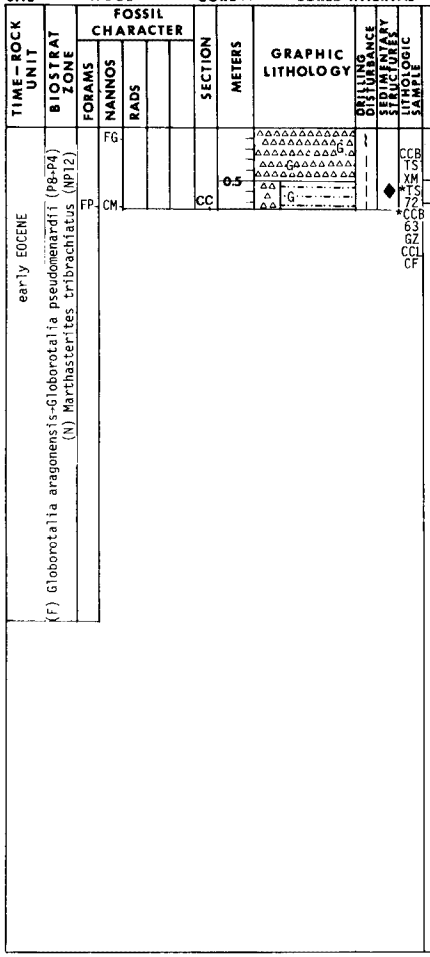
SITE 404 HOLE CORE 9 CORED INTERVAL: 218.0-227.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
early EOCENE	(F) Globigerapsis kugleri-Hantkenina aragonensis (P11-P10) (N) Discoaster lodoensis (NP13)	FP-FG			CC					*5 CCB CF	Procellanite dusky green (5G 3/2). Smear Slides 1-5 sand/silt/clay 60/20/20 rads 2 sp. spic. 61 diatoms 1 nannos 15 unspec. $CaCO_3$ 10 clay 10 plant frag. 1 Coarse Fraction (>44μ) sp. spic. 63 glauconite 10 forams 24 mica 1 feldspar 1 quartz tr Carbonate Bomb - 5%

SITE 404 HOLE CORE 10 CORED INTERVAL: 227.5-237.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
early EOCENE	(F) Globorotalia aragonensis-Globorotalia pseudomenardii (P8-P4) (N) Marthasterites tribrachiatus (NP12)	FG-FM	CP		1 CC	0.5	VOID			CCB *34 CCL GZ *90 CCB CF	dusky green (5G 3/2) dusky yellow green (5GY 5/2) grayish olive green (5GY 3/2) Siliceous Tuff bioturbation throughout including rind burrows. Smear Slides 1-34 90/10/0 1-90 90/10/0 vol. glass 69 57 sp. spic. 13 15 rads 2 5 forams 3 5 nannos 3 3 clay 10 10 quartz 0 5 Coarse Fraction (<44μ) 1cc sp. spic. 35 vol. glass 30 forams 35 rads tr Carbonate Bomb 1-35 6% 1-90 5% Carbon Carbonate Total C Org. C $CaCO_3$ 1-80 2.2 0.1 17.3 Grain Size Sand Silt Clay 1-85 39.4 46.0 14.5

SITE 404 HOLE CORE 11 CORED INTERVAL: 237.0-246.5 m



olive (5Y 5/3) grayish blue green (5BG 5/2) Glauconitic Mudstone

Calcareous Porcellanite
burrowed in part; abundant glauconite both scattered through rock and in concentrated patches of glauconitic mudstone.

Smear Slides

	1-30	1-63
sand/silt/clay		90/10/0
glauconite	5	48
quartz	--	1
heavy min.	--	1
sp. spic.	30	tr
rads	20	
forams	15	
vol. glass	5	
clay	25	

Coarse Fraction (>44μ) 1cc

glauconite	30
sp. spic.	20
rads	10
forams	13
mica	8
zeolite	8
feldspar	5
vol. glass	3
quartz	3

Thin Section

	1-72
glauconite	30
sp. spic.	15
rads	
unspec. $CaCO_3$	25
clay	30

Carbonate Bomb
1-25 5% 1-62 5%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-60	1.0	0.1	7.4

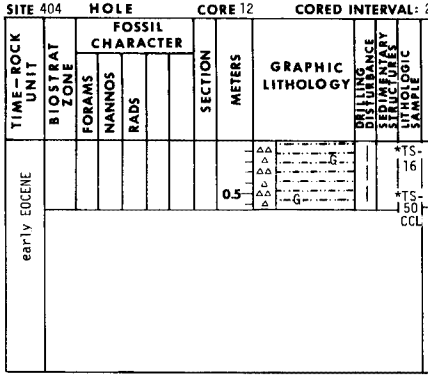
Grain Size

	Sand	Silt	Clay
1-55	28.7	45.0	26.3

X-ray Analysis

Bulk	1-57	<2μ (Partial)	1-57
Qtz.	--	Smec.	32
Cal.	5	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	95	Silica	--
		Zeol.	68

SITE 404 HOLE CORE 12 CORED INTERVAL: 246.5-256.0 m



dark greenish gray (5G 4/1)

Glauconitic Siliceous Mudstone
with marly layers of medium bluish gray (5B 5/1).

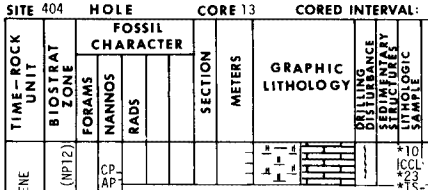
Thin Sections

	1-16	1-50
clay	30	45
glauconite	10	20
forams	25	10
siliceous org.	35	25

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-62	0.4	0.2	2.1

SITE 404 HOLE CORE 13 CORED INTERVAL: 256.0-265.5 m



medium bluish gray (5B 5/1)

Siliceous Marly Limestone
with interbeds(?) of marly nanno chalk, greenish gray (5G 6/1).

Smear Slides

	1-10	1-23	Thin Section 1-33
nannos	15	10	5
unspec. $CaCO_3$	20	40	25
clay	35	25	20
zeolite	10	5	10
plant frag.	1	--	--
sp. spic.	15	15	30
glauconite	4	4	10
quartz	--	1	--

Coarse Fraction - cc

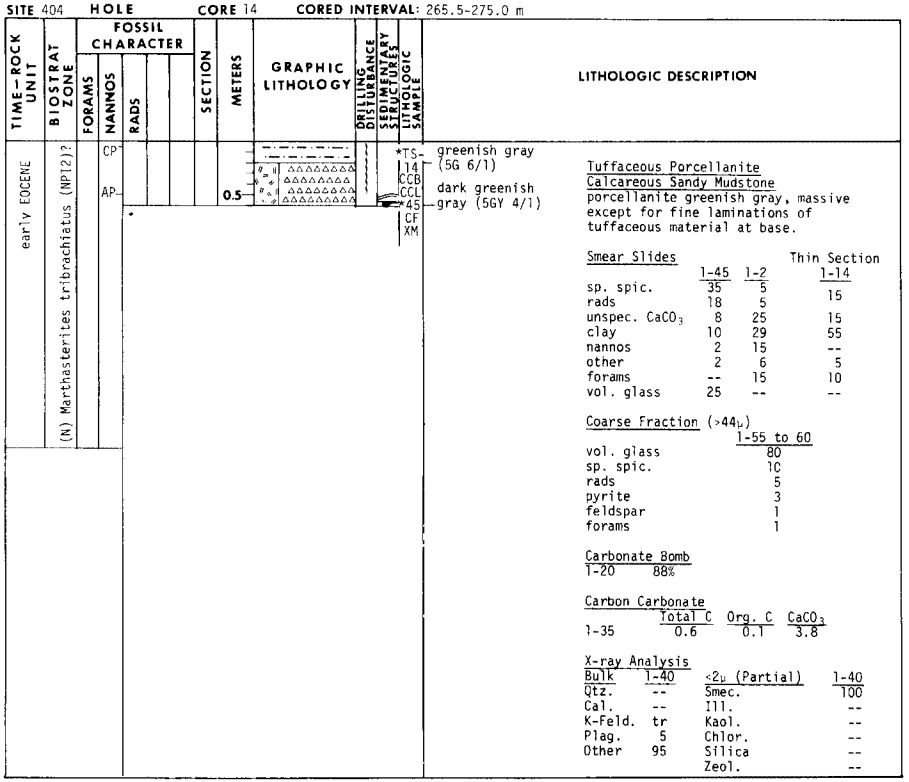
glauconite	38
zeolite	10
sp. spic.	15
rads	10
forams	15
feldspar	5
mica	3

Carbonate Bomb
1-25 47%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-11	3.6	0.1	29.2

SITE 404 HOLE CORE 14 CORED INTERVAL: 265.5-275.0 m



Tuffaceous Porcellanite
Calcareous Sandy Mudstone
porcellanite greenish gray, massive except for fine laminations of tuffaceous material at base.

Smear Slides	1-45	1-2	Thin Section 1-14
sp. spic.	35	5	
rads	18	5	15
unspec. $CaCO_3$	8	25	15
clay	10	29	55
nannos	2	15	--
other	2	6	5
forams	--	15	10
vol. glass	25	--	--

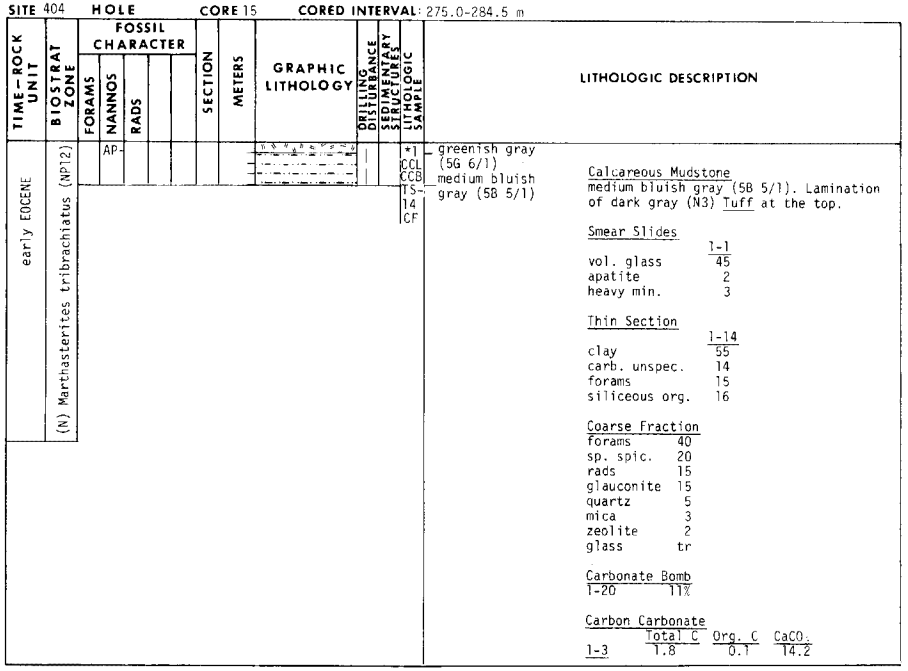
Coarse Fraction (>44μ)	1-55 to 60
vol. glass	80
sp. spic.	10
rads	5
pyrite	3
feldspar	1
forams	1

Carbonate Bomb
1-20 88%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-35	0.6	0.1	3.8

X-ray Analysis Bulk	1-40	<2μ (Partial)	1-40
Qtz.	--	Smec.	100
Cal.	--	Ill.	--
K-Feld.	tr	Kaol.	--
Plag.	5	Chlor.	--
Other	95	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 15 CORED INTERVAL: 275.0-284.5 m



Calcareous Mudstone
medium bluish gray (5B 5/1). Lamination of dark gray (N3) Tuff at the top.

Smear Slides	1-1
vol. glass	45
apatite	2
heavy min.	3

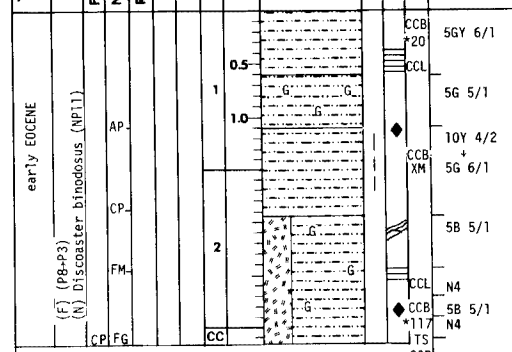
Thin Section	1-14
clay	55
carb. unspec.	14
forams	15
siliceous org.	16

Coarse Fraction	
forams	40
sp. spic.	20
rads	15
glauconite	15
quartz	5
mica	3
zeolite	2
glass	tr

Carbonate Bomb
1-20 11%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-3	1.8	0.1	14.2

SITE 404 HOLE CORE 16 CORED INTERVAL: 284.5-294.0 m



LITHOLOGIC DESCRIPTION

Calcareous Mudstone
Glauconitic Mudstone
interbedded. Calcareous mudstone, greenish gray (5GY 6/1) to gray olive (10Y 4/2), laminated to bioturbated. Glauconitic mudstone, medium bluish gray (5B 5/1) to medium dark gray (N4). Dusky blue green tuffaceous glauconitic mudstone in Sec. 3.

Smear Slides

	1-20	2-117	3-3
sand/silt/clay	0/20/80	35/10/55	20/60/20
sp. spic.	15	5	--
clay	50	55	10
unspec. $CaCO_3$	20	8	16
nannos	10	2	4
glauconite	5	20	50
vol. glass	--	10	20

TS 2-147: Rounded pellets and fragmental (?) glauconite (up to 1 mm across): averaging 0.3 mm diam.) which is microcrystalline with botryoidal structure. Microfossils are predominant with sponge spic. (axial canals filled with glauconite), forams, rads and collophane scraps. Fine sand and silt consist of fresh angular plagioclase grains, and quartz. Pyroclasts are feldspar-microlitic lava particles (0.1 mm). The matrix is microcrystalline calcite with some clay, and interstitial bioclasts, and granular opaque oxides.

Coarse Fraction 3cc

forams	18
glauconite	39
(?) zeolite	20
cristobalite	10
sp. spic.	5
mica	3
quartz	5

Carbonate Bomb

1-20	29%
1-131	13%
2-117	12%
2-149	23%

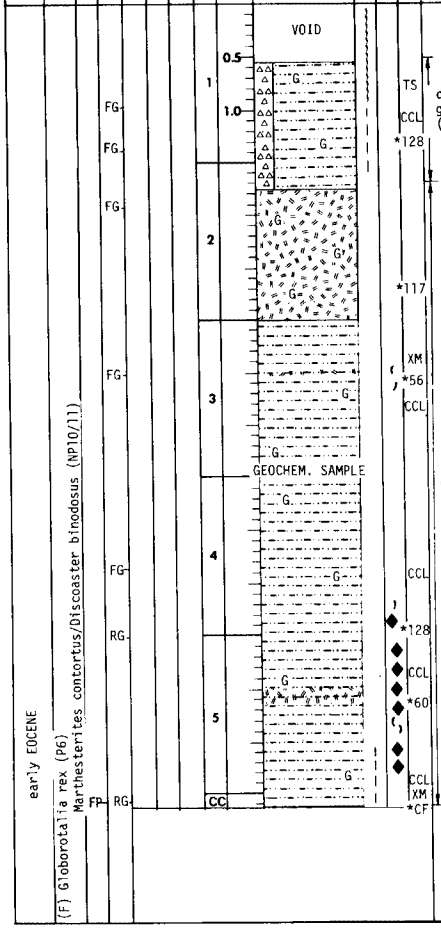
Carbon-Carbonate

	Total C	Org. C	$CaCO_3$
1-37	2.8	0.1	22.4
2-93	1.8	0.1	14.0

X-ray Analysis

Bulk	1-127	<2μ (Partial)	1-127
Qtz.	--	Smec.	8
Cal.	10	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	8	Chlor.	--
Other	82	Silica	--
		Zeol.	92

SITE 404 HOLE CORE 17 CORED INTERVAL: 294.0-303.5 m



dark gray (N3)

matrix of grayish brown (2.5Y 5/2)

shell fragments

greenish black (5GY 2/1)

Glauconitic Mudstone
Siliceous Mudstone
dark gray to greenish black, fragments of megafaunal remains, intense bioturbation in parts. Occasional tuffaceous layers. Interbed of Glauconitic Tuff in Sec. 2.

Smear Slides

	major lithology 1-128	3-56	4-128
sand/silt/clay	50/25/25	40/20/40	
glauconite	15	30	20
clay	44	40	37
quartz	1	5	10
nannos	10	5	3
zeolite	5	5	5
siliceous org.	25	15	25

	minor lithology 2-117	5-60
sand/silt/clay	30/50/20	
vol. glass	30	15
glauconite	25	15
clay	10	32
zeolite	5	5
nannos	5	--
quartz	10	25
siliceous org.	15	5
mica	--	3

TS 1-71: The predominant clay base is charged with fine angular sandy resistates (which are poorly sorted, and average about 0.09 mm) and prominent rounded glauconite pellets up to 1.5 mm across. Quartz and alkali feldspars (oligoclase, microcline, orthoclase) are the main resistates with conspicuous micas (glauconite, and biotite) and sponge spicules. The matrix contains specks of zeolite (0.1 mm across), hornblende and much chloritic material.

Coarse Fraction - 6cc

glauconite	33	heavy min.	5
quartz	25	forams	6
feldspar	5	other	15
mica	11		

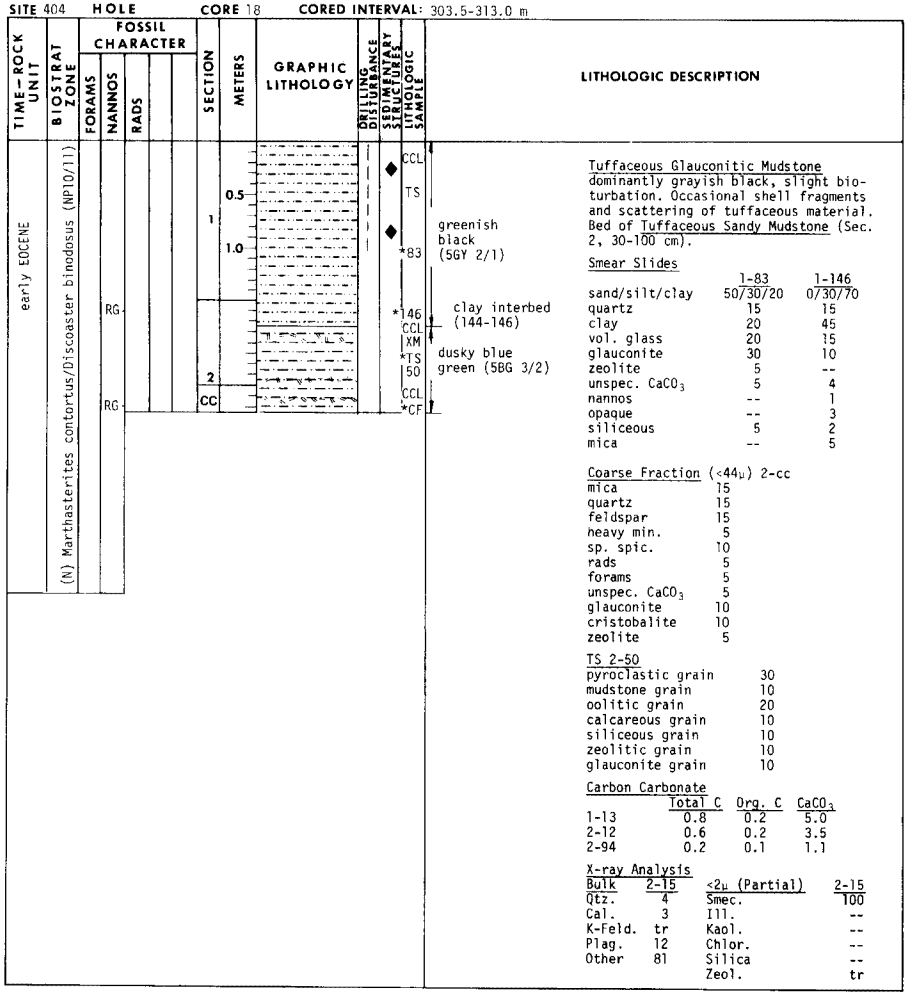
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-111	0.7	0.1	5.0
3-90	0.8	0.1	5.8
4-90	0.3	0.1	1.9
5-23	0.4	0.1	1.9
CC-10	0.6	0.2	4.0

X-ray Analysis

Bulk	3-52	6-12	<2μ (Partial)	3-52	6-12
Qtz.	6	tr	Smec.	40	75
Cal.	--	5	Ill.	--	tr
K-Feld.	--	2	Kaol.	--	--
Plag.	7	17	Chlor.	--	--
Other	87	76	Silica	--	--
			Zeol.	60	25

SITE 404 HOLE CORE 18 CORED INTERVAL: 303.5-313.0 m



Tuffaceous Glauconitic Mudstone
dominantly grayish black, slight bioturbation. Occasional shell fragments and scattering of tuffaceous material. Bed of Tuffaceous Sandy Mudstone (Sec. 2, 30-100 cm).

Smear Slides

	1-83	1-146
sand/silt/clay	50/30/20	0/30/70
quartz	15	15
clay	20	45
vol. glass	20	15
glauconite	30	10
zeolite	5	--
unspec. $CaCO_3$	5	4
nannos	--	1
opaque	--	3
siliceous	5	2
mica	--	5

Coarse Fraction (<44μ) 2-cc

mica	15
quartz	15
feldspar	15
heavy min.	5
sp. spic.	10
rads	5
forams	5
unspec. $CaCO_3$	5
glauconite	10
cristobalite	10
zeolite	5

TS 2-50

pyroclastic grain	30
mudstone grain	10
oolitic grain	20
calcareous grain	10
siliceous grain	10
zeolitic grain	10
glauconite grain	10

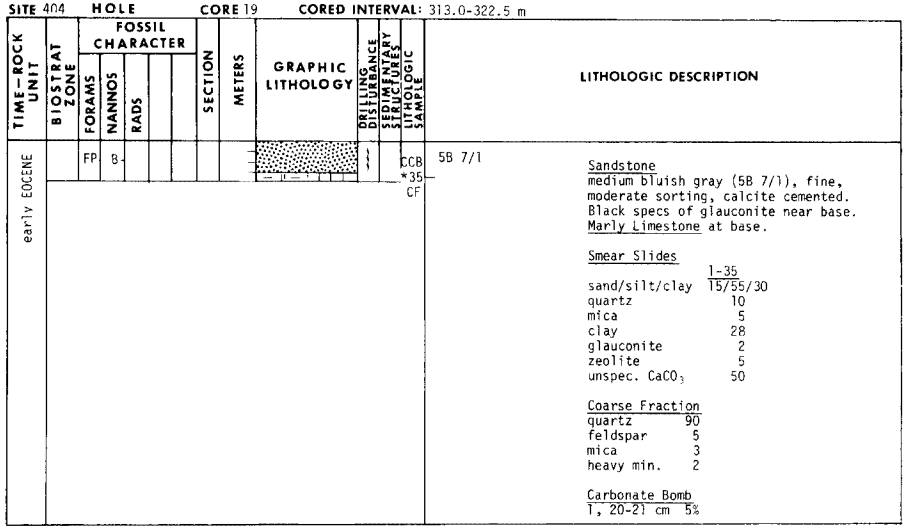
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-13	0.8	0.2	5.0
2-12	0.6	0.2	3.5
2-94	0.2	0.1	1.1

X-ray Analysis

Bulk	2-15	<2μ (Partial)	2-15
Qtz.	4	Smec.	100
Cal.	3	Ill.	--
K-Feld.	tr	Kaol.	--
Plag.	12	Chlor.	--
Other	81	Silica	--
		Zeol.	tr

SITE 404 HOLE CORE 19 CORED INTERVAL: 313.0-322.5 m



Sandstone
medium bluish gray (5B 7/1), fine, moderate sorting, calcite cemented. Black specs of glauconite near base. Marly Limestone at base.

Smear Slides

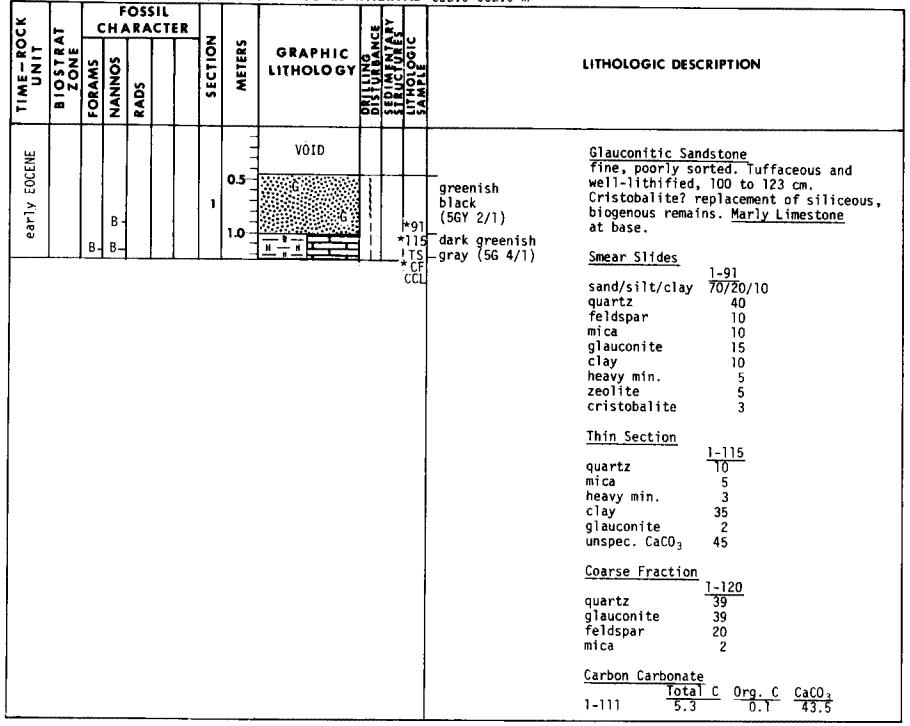
	1-35
sand/silt/clay	15/55/30
quartz	10
mica	5
clay	28
glauconite	2
zeolite	5
unspec. $CaCO_3$	50

Coarse Fraction

quartz	90
feldspar	5
mica	3
heavy min.	2

Carbonate Bomb
1, 20-21 cm 5%

SITE 404 HOLE CORE 20 CORED INTERVAL: 322.5-332.0 m



Glauconitic Sandstone
fine, poorly sorted. Tuffaceous and well-lithified, 100 to 123 cm. Cristobalite? replacement of siliceous, biogenous remains. Marly Limestone at base.

Smear Slides

	1-91
sand/silt/clay	70/20/10
quartz	40
feldspar	10
mica	10
glauconite	15
clay	10
heavy min.	5
zeolite	5
cristobalite	3

Thin Section

	1-115
quartz	10
mica	5
heavy min.	3
clay	35
glauconite	2
unspec. $CaCO_3$	45

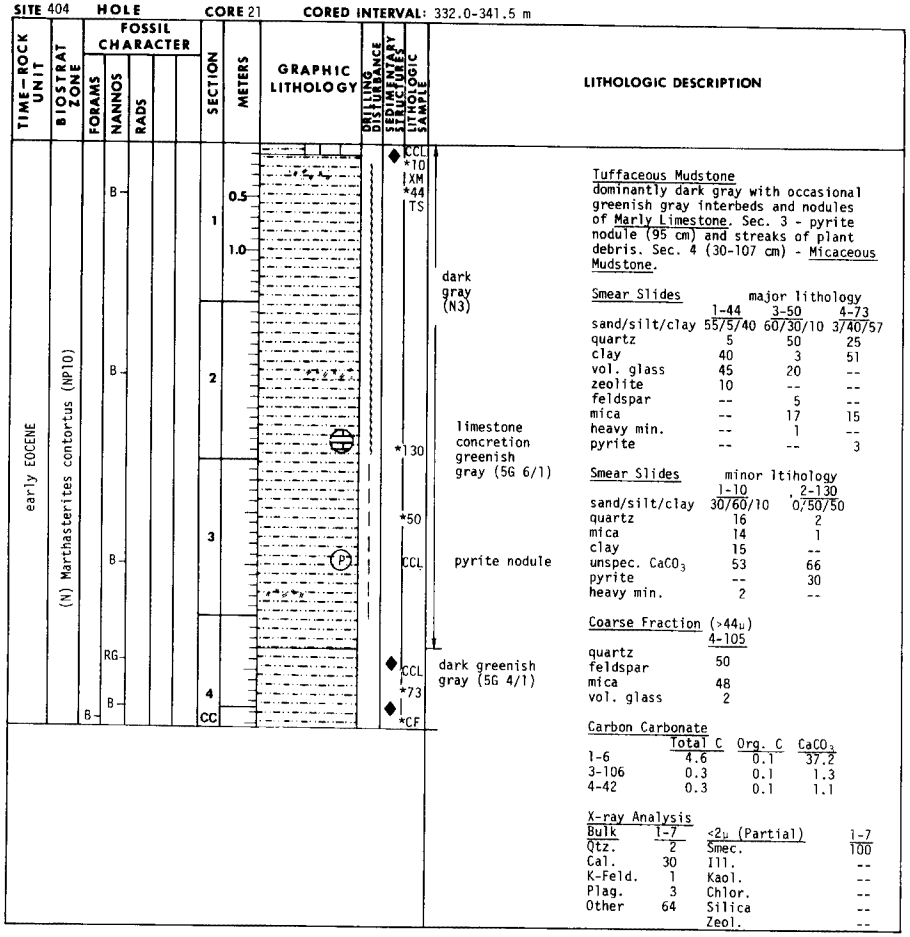
Coarse Fraction

	1-120
quartz	39
glauconite	39
feldspar	20
mica	2

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-111	5.3	0.1	43.5

SITE 404 HOLE CORE 21 CORED INTERVAL: 332.0-341.5 m



Tuffaceous Mudstone
dominantly dark gray with occasional greenish gray interbeds and nodules of Marly Limestone. Sec. 3 - pyrite nodule (95 cm) and streaks of plant debris. Sec. 4 (30-107 cm) - Micaceous Mudstone.

Smear Slides

	major lithology 1-44	3-50	4-73
sand/silt/clay	55/5/40	60/30/10	3/40/57
quartz	5	50	25
clay	40	3	51
vol. glass	45	20	--
zeolite	10	--	--
feldspar	--	5	--
mica	--	17	15
heavy min.	--	1	--
pyrite	--	--	3

	minor lithology 1-10	2-130
sand/silt/clay	30/60/10	0/50/50
quartz	16	2
mica	14	1
clay	15	--
unspec. $CaCO_3$	53	66
pyrite	--	30
heavy min.	2	--

Coarse Fraction (>44μ)

	4-105
quartz	50
feldspar	
mica	48
vol. glass	2

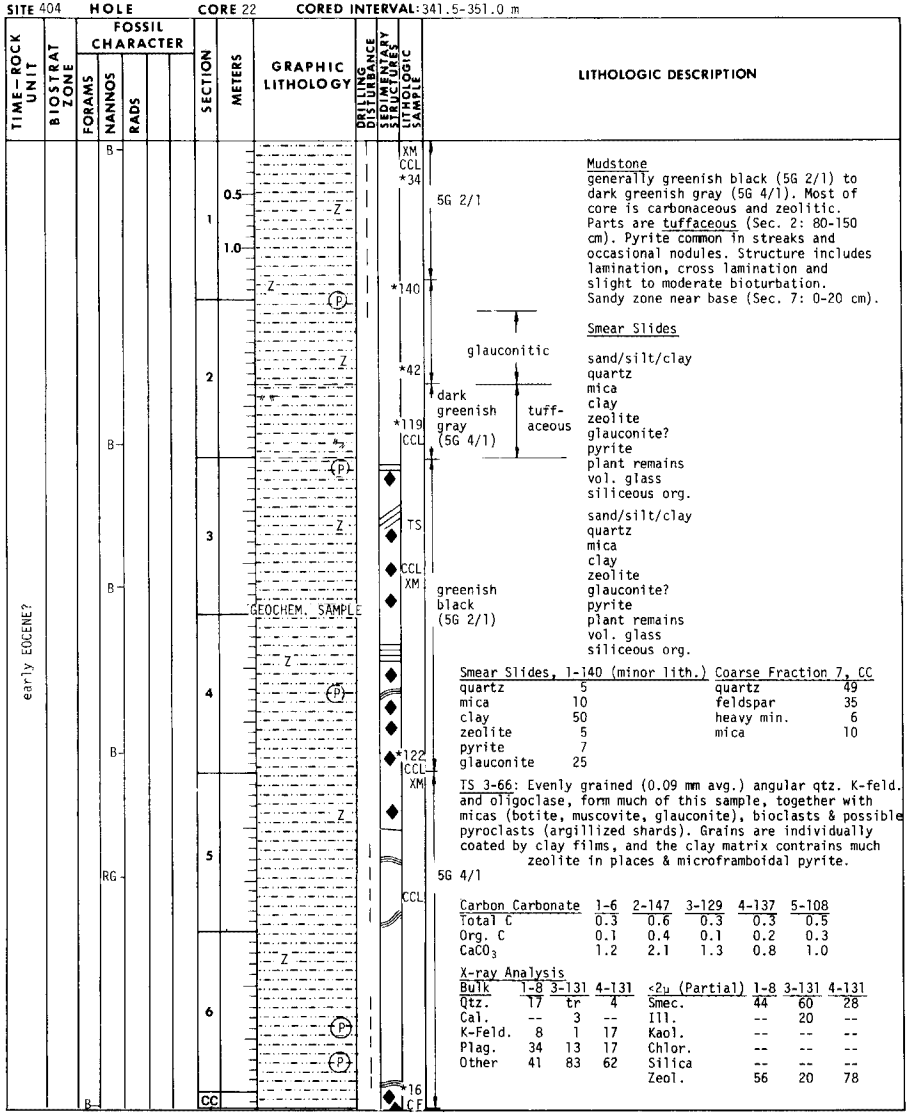
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-6	4.6	0.1	37.2
3-106	0.3	0.1	1.3
4-42	0.3	0.1	1.1

X-ray Analysis

Bulk	1-7	<2μ (Partial)	1-7
Qtz.	2	Smec.	100
Cal.	30	Ill.	--
K-Feld.	1	Kaol.	--
Plag.	3	Chlor.	--
Other	64	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 22 CORED INTERVAL: 341.5-351.0 m



Mudstone
generally greenish black (5G 2/1) to dark greenish gray (5G 4/1). Most of core is carbonaceous and zeolitic. Parts are tuffaceous (Sec. 2: 80-150 cm). Pyrite common in streaks and occasional nodules. Structure includes lamination, cross lamination and slight to moderate bioturbation. Sandy zone near base (Sec. 7: 0-20 cm).

Smear Slides

	dark greenish gray (5G 4/1)	greenish black (5G 2/1)
sand/silt/clay		
quartz		
mica		
clay		
zeolite		
glauconite?		
pyrite		
plant remains		
vol. glass		
siliceous org.		

Smear Slides, 1-140 (minor lith.)

quartz	5
mica	10
clay	50
zeolite	5
pyrite	7
glauconite	25

Coarse Fraction 7, CC

quartz	49
feldspar	35
heavy min.	6
mica	10

TS 3-66: Evenly grained (0.09 mm avg.) angular qtz. K-feld. and oligoclase, form much of this sample, together with micas (botite, muscovite, glauconite), bioclasts & possible pyroclasts (argillized shards). Grains are individually coated by clay films, and the clay matrix contrains much zeolite in places & microframboidal pyrite.

Carbon Carbonate

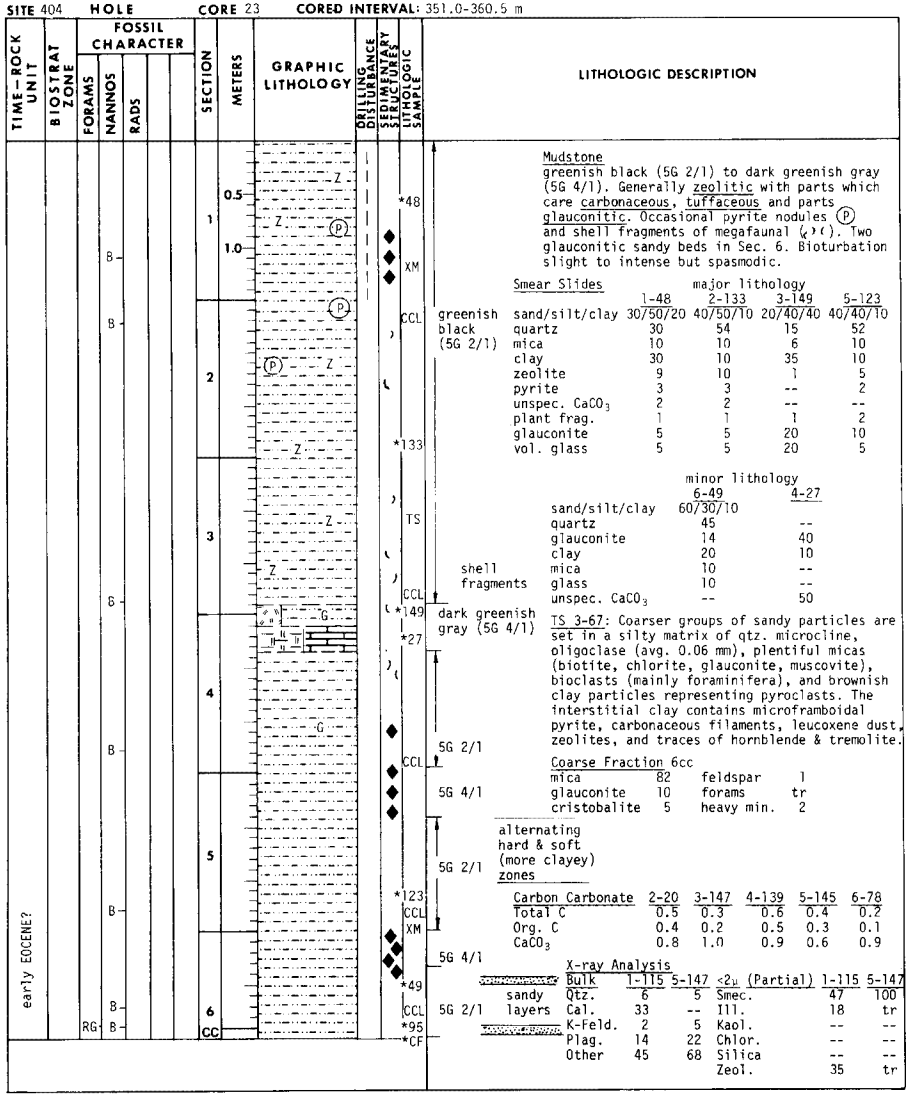
	1-6	2-147	3-129	4-137	5-108
Total C	0.3	0.6	0.3	0.3	0.5
Org. C	0.1	0.4	0.1	0.2	0.3
$CaCO_3$	1.2	2.1	1.3	0.8	1.0

X-ray Analysis

Bulk	1-8	3-131	4-131
Qtz.	17	tr	4
Cal.	--	3	--
K-Feld.	8	1	17
Plag.	34	13	17
Other	41	83	62

<2μ (Partial)	1-8	3-131	4-131
Smec.	44	60	28
Ill.	--	20	--
Kaol.	--	--	--
Chlor.	--	--	--
Silica	--	--	--
Zeol.	56	20	78

SITE 404 HOLE CORE 23 CORED INTERVAL: 351.0-360.5 m



Mudstone
greenish black (5G 2/1) to dark greenish gray (5G 4/1). Generally zeolitic with parts which care carbonaceous, tuffaceous and parts glauconitic. Occasional pyrite nodules (P) and shell fragments of megafaunal (><). Two glauconitic sandy beds in Sec. 6. Bioturbation slight to intense but spasmodic.

Smear Slides — major lithology

	1-48	2-133	3-149	5-123
sand/silt/clay	30/50/20	40/50/10	20/40/40	40/40/10
quartz	30	54	15	52
mica	10	10	6	10
clay	30	10	35	10
zeolite	9	10	1	5
pyrite	3	3	--	2
unspec. $CaCO_3$	2	2	--	--
plant frag.	1	1	1	2
glauconite	5	5	20	10
vol. glass	5	5	20	5

minor lithology

	6-49	4-27
sand/silt/clay	60/30/10	
quartz	45	--
glauconite	14	40
clay	20	10
mica	10	--
glass	10	--
unspec. $CaCO_3$	--	50

TS 3-67: Coarser groups of sandy particles are set in a silty matrix of qtz. microcline, oligoclase (avg. 0.06 mm), plentiful micas (biotite, chlorite, glauconite, muscovite), bioclasts (mainly foraminifera), and brownish clay particles representing pyroclasts. The interstitial clay contains microframboidal pyrite, carbonaceous filaments, leucoxene dust, zeolites, and traces of hornblende & tremolite.

Coarse Fraction 6cc

mica	82	feldspar	1
glauconite	10	forams	tr
cristobalite	5	heavy min.	2

Carbon Carbonate

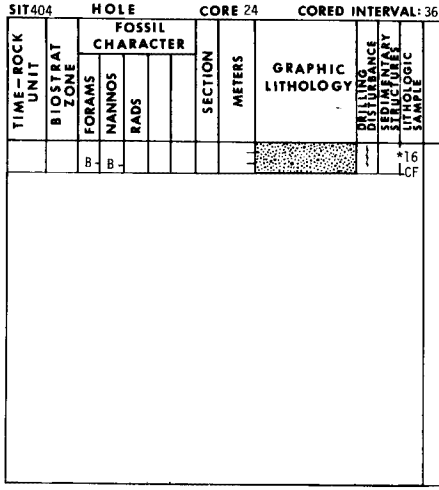
	2-20	3-147	4-139	5-145	6-78
Total C	0.5	0.3	0.6	0.4	0.2
Org. C	0.4	0.2	0.5	0.3	0.1
$CaCO_3$	0.8	1.0	0.9	0.6	0.9

X-ray Analysis

Bulk	1-115	5-147
Qtz.	6	5
Cal.	33	--
K-Feld.	2	5
Plag.	14	22
Other	45	68

<2μ (Partial)	1-115	5-147
Smec.	47	100
Ill.	18	tr
Kaol.	--	--
Chlor.	--	--
Silica	--	--
Zeol.	35	tr

SITE 404 HOLE CORE 24 CORED INTERVAL: 360.5-370.0 m



LITHOLOGIC DESCRIPTION

Sandstone
greenish black (5G 2/1); sand is medium size.

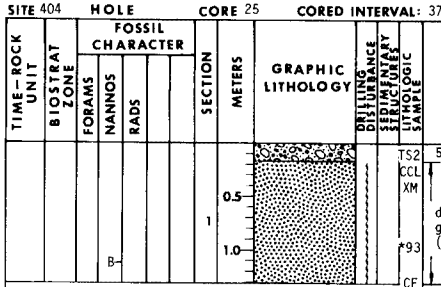
Smear Slides

	1-16
sand/silt/clay	70/25/5
quartz	55
mica	10
clay	5
aggregates	10
opaque	5
heavy min.?	15

Coarse Fraction

quartz	40
feldspar	5
mica	6
zeolite	3
glauconite	15
unidentified	30

SITE 404 HOLE CORE 25 CORED INTERVAL: 370.0-379.5 m



LITHOLOGIC DESCRIPTION

Sandstone
dark gray (N3), fine, quartzose. Top 15 cm granule-sized rock fragments and shell.
Calcareous Conglomerate at top.

Smear Slides

	1-93
quartz	89
heavy min.?	10
mica	1

Thin Section

	1-2
quartzite & sandstone	20
basaltic rocks	40
schist & hornfels	20
calcite	20

Coarse Fraction

mica	35
quartz	30
feldspar	3
zeolite	3
unidentified heavy min. & stained	29

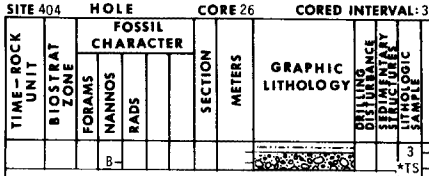
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-7	2.6	0.1	20.6

X-ray Analysis

Bulk	1-5	<2μ (Partial)	1-5
Qtz.	2	Smec.	100
Cal.	17	Ill.	tr
K-Feld.	16	Kaol.	--
Plag.	--	Chlor.	--
Other	65	Silica	--
		Zeol.	--

SITE 404 HOLE CORE 26 CORED INTERVAL: 379.5-389.0



LITHOLOGIC DESCRIPTION

Glauconite Mudstone (top)
Tuffaceous Conglomerate (base)
both contain volcanic lapilli and shell fragments. Large oyster shell fragment at bottom of core.

Smear Slides

	1-3
quartz	15
clay	10
glauconite	74
pyrite	1

Thin Section (18-20 cm)

basaltic rocks	30
sandstone	10
matrix	60

Coarse Fraction

mica	15
quartz	15
vol. glass?	39
feldspar	5
calcite	3
Fe-stained & heavy min.	20

X-ray Analysis

Bulk	1-14	<2μ (Partial)	1-14
Qtz.	tr	Smec.	100
Cal.	--	Ill.	tr
K-Feld.	tr	Kaol.	--
Plag.	tr	Chlor.	--
Other	100	Silica	--
		Zeol.	--

Leg 48 Site 404
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
404	1	1	0.00	0.51	5.9	0.1	48.4
404	1	1	0.00	1.07	8.5	0.1	69.9
404	1	2	0.00	2.19	9.9	0.1	82.0
404	1	4	0.00	5.27	3.1	0.1	25.1
404	1	5	0.00	6.58	8.6	0.1	71.0
404	1	6	0.00	7.57	4.8	0.1	39.5
404	1	6	0.00	8.27	4.7	0.1	38.3
404	2	1	21.50	22.04	3.3	0.1	26.8
404	2	5	21.50	28.72	8.4	0.1	69.4
404	2	6	21.50	30.01	8.6	0.1	70.5
404	2	6	21.50	30.27	5.9	0.1	48.2
404	3	1	104.00	104.59	11.1	0.1	92.0
404	4	2	170.50	172.56	11.0	0.1	91.3
404	5	1	180.00	180.90	10.8	0.1	89.3
404	5	2	180.00	182.84	10.7	0.1	88.8
404	6	2	189.50	191.05	11.0	0.0	90.9
404	7	1	199.00	200.11	1.0	0.1	7.7
404	7	2	199.00	201.64	1.5	0.1	12.1
404	8	1	208.50	209.46	1.2	0.1	9.4
404	10	1	227.50	228.30	2.2	0.1	17.3
404	11	1	237.00	237.60	1.0	0.1	7.4
404	12	1	246.50	247.12	0.4	0.2	2.1
404	13	1	256.00	256.11	3.6	0.1	29.2
404	14	1	265.50	265.85	0.6	0.1	3.8
404	15	1	275.00	275.03	1.8	0.1	14.2
404	16	1	284.50	284.87	2.8	0.1	22.4
404	16	2	284.50	286.93	1.8	0.1	14.0
404	17	1	294.00	295.11	0.7	0.1	5.0
404	17	3	294.00	297.90	0.8	0.1	5.8
404	17	4	294.00	299.40	0.3	0.1	1.9
404	17	5	294.00	300.23	0.4	0.1	1.9
404	17	CC	294.00	301.60	0.6	0.2	4.0
404	18	1	303.50	303.63	0.8	0.2	5.0
404	18	2	303.50	305.12	0.6	0.2	3.5
404	18	2	303.50	305.94	0.2	0.1	1.1
404	20	1	322.50	323.61	5.3	0.1	43.5
404	21	1	332.00	332.06	4.6	0.1	37.2
404	21	3	332.00	336.06	0.3	0.1	1.3
404	21	4	332.00	336.92	0.3	0.1	1.1
404	22	1	341.50	341.56	0.3	0.1	1.2
404	22	2	341.50	344.47	0.6	0.4	2.1
404	22	3	341.50	345.79	0.3	0.1	1.3
404	22	4	341.50	347.37	0.3	0.2	0.8
404	22	5	341.50	348.58	0.5	0.3	1.0
404	23	2	351.00	352.70	0.5	0.4	0.8
404	23	3	351.00	355.47	0.3	0.2	1.0
404	23	4	351.00	356.89	0.6	0.5	0.9
404	23	5	351.00	358.45	0.4	0.3	0.6

#

Leg 48 Site 404
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
404	23	6	351.00	359.28	0.2	0.1	0.9
404	25	1	370.00	370.07	2.6	0.1	20.6

#

Leg 48 Site 404
DSDP Shore Laboratory Grain Size Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Sand	Silt	Clay
404	1	1	0.00	0.66	29.9	29.4	40.7
404	1	2	0.00	2.28	45.4	18.7	35.9
404	1	4	0.00	5.28	19.3	39.2	41.4
404	1	5	0.00	6.46	30.5	27.1	42.4
404	2	1	21.50	22.01	46.3	29.3	24.4
404	2	2	21.50	23.93	24.1	42.9	33.0
404	2	4	21.50	26.74	41.1	31.2	27.7
404	2	5	21.50	28.74	39.8	31.9	28.4
404	2	6	21.50	29.98	47.8	26.7	25.5
404	2	6	21.50	30.30	39.4	31.4	29.2
404	3	1	104.00	104.55	8.9	35.4	55.7
404	4	2	170.50	172.64	9.1	33.9	56.9
404	5	1	180.00	180.86	35.3	35.5	29.2
404	5	2	180.00	182.85	24.7	33.8	41.4
404	6	2	189.50	191.06	13.9	34.8	51.3
404	7	1	199.00	200.15	47.8	31.7	20.5
404	7	2	199.00	201.66	45.1	38.0	16.9
404	8	1	208.50	209.50	40.5	45.9	13.6
404	10	1	227.50	228.35	39.4	46.0	14.5
404	11	1	237.00	237.55	28.7	45.0	26.3

#

DEEP SEA DRILLING PROJECT
LEG 48 SITE 405
SITE SUMMARY SHEET

Date occupied	29 June 1976
Date departed	3 July 1976
Time on site	5 days
Position: latitude	55°20.18'N
longitude	22°03.49'W
Water depth (sea level)	2958 corrected meters, echo sounding
Water depth (rig floor)	2974 corrected meters, echo sounding
Bottom felt at	2974 meters, drill pipe
Penetration	407.0 meters
Number of holes	1
Number of cores	43
Total length of cored section	407.0 meters
Total core recovered	172.05 meters
Percentage of core recovery	42.7%
Oldest Sediment Cored	
Depth subbottom	407.0 meters
Nature	Silicified calcareous mudstone
Age	Lower Eocene
Measured velocity	1.9 km sec^{-1}
Basement	Not reached

PRINCIPAL RESULTS:

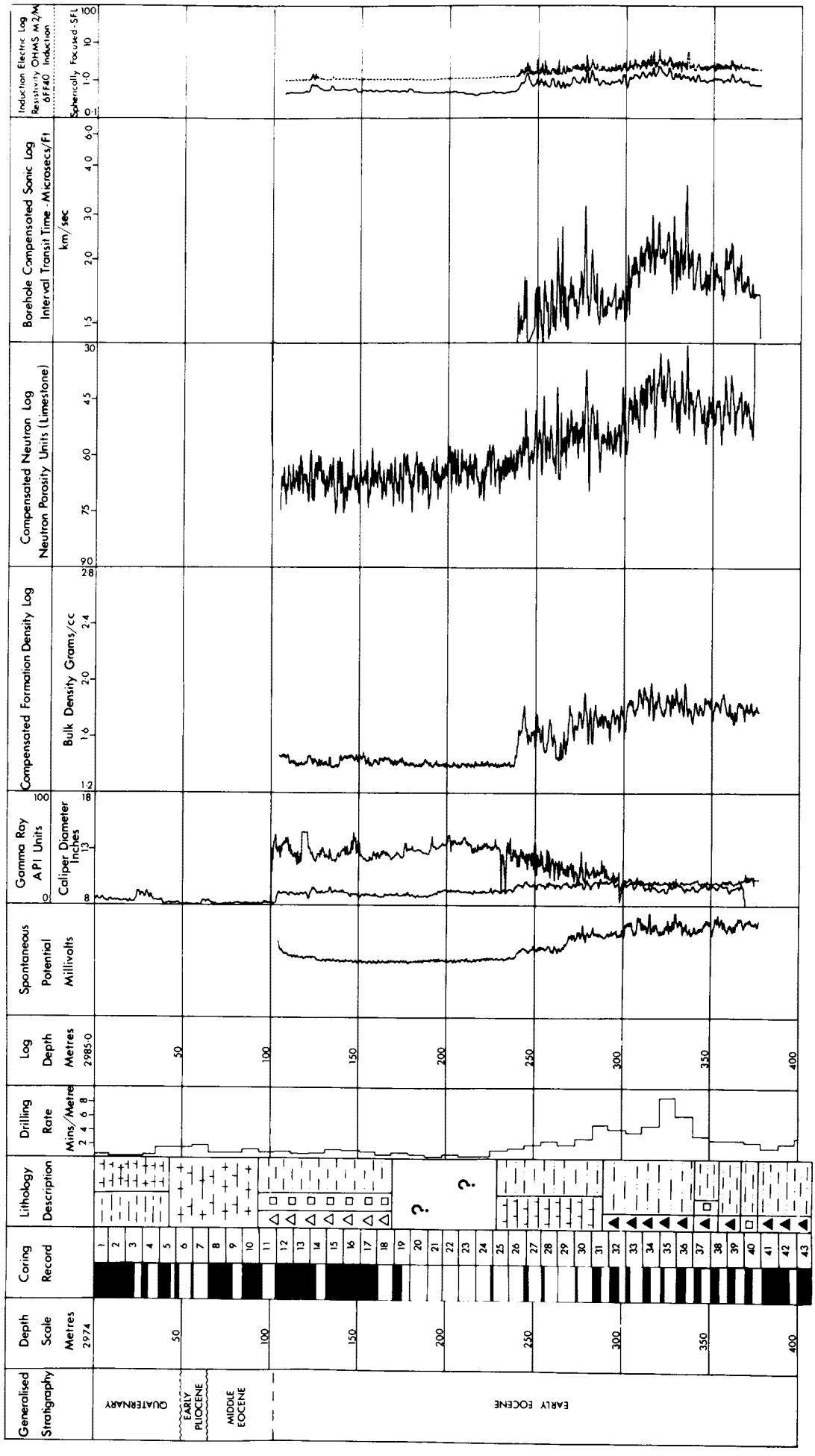
Site 405 was drilled at the foot of the east-west trending transform fault which defines the southwest margin of the Rockall Plateau. The principal objective of the site was to examine the

structural and stratigraphic evolution of a transform margin exposed to the subsequent history of rifting and subsidence as recorded at Sites 403 and 404.

Alternating foram-nanno ooze and marly foram nanno ooze dominate the Pleistocene section which rests on early Pliocene-late Miocene nanno ooze at a subbottom depth of 46 meters. Middle Eocene nanno ooze was encountered at 65 meters indicating a prolonged period (∿35 m.y.) of nondeposition or substantial post-deposition erosion at the site in Middle to Late Tertiary time. Olive-gray to dark greenish gray siliceous mudstone of early and middle Eocene age prevails in the section between 103 and at least 179 meters. In the interval from 179 to 245 meters virtually the only recovery was of occasional pebbles of limestone, basalt, and gneiss which are believed to represent downhole contamination by surficial ice-rafted material. Below 245 meters, the section is dominated by alternating well laminated to bioturbated silicified mudstone with interbedded chert layers. Bedding inclinations of up to 30° were recorded in these lower Eocene sediments.

A complete suite of downhole logs was run at this site however poor hole conditions in the upper section diminished the quality of the logs.

DOWNHOLE LOGS AND GENERALIZED STRATIGRAPHY
DSDP LEG 48 SITE 405



SITE 405 HOLE CORE 1 CORED INTERVAL: 0.0-8.0 m

TIME-ROCK UNIT: PLEISTOCENE
BIOSTRAT ZONE: (F) Globorotalia truncatulinoides (N22) / (N) Emiliania huxleyi (NN21) / (N) Gephyrocapsa oceanica (NN20)
FOSSIL CHARACTER: FORAMS: AG; NANNOS: AG; RADS: CG, FG, FG, AG, CG

SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	
1	0.5			GZ	*CCL	
	1.0			CCB	*80	moderate yellow brown (10YR 5/4)
2						dark yellowish brown (10YR 4/2)
				*CCB	*CCL	
				XR	GZ	moderate yellow brown (10YR 5/4)
3					*CCB	
					*CCL	
4				CCB	*55	moderate brown (5YR 4/4)
						light brown (5YR 6/4)
					GZ	
5				CCB		very pale orange (10YR 8/2)
					*136	moderate yellow brown (10YR 5/4)
6				CCL		very pale orange (10YR 8/2)
				GZ	*90	
CC					*CCB	

Marly Foram Nanno Ooze
moderate yellow brown (10YR 5/4), dark yellowish brown (10YR 4/2), and light brown (5YR 6/4). Consistency of soup throughout. Large forams visible. No structures visible except for vertical streaks of gray (pyrite?). General intervals grading coarser downwards.

Mud
slightly calcareous, moderate brown.

Calcareous mud in moderate brown (10YR 4/4) and **Nanno Ooze** in very pale orange (10YR 8/2). **Foram Nanno Ooze** is very pale orange (10YR 8/2).

Smear Slides

	1-80	4-55	5-136	6-90
quartz	10	25		
clay	20	58	10	
feldspar		tr		
heavy min.		tr		
pyrite	1	--	tr	
carb. unspec.	10	15		
forams	20	2	7	40
nannos	39	tr	83	59
rads	tr	--		tr
sp. spic.	--	--		1
plant frag.	--	tr		

Carbonate Bomb

1-80	68%	4-55	14%
2-80	37%	5-90	15%
3-80	37%	6-95	92%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-17	8.4	0.1	69.1
2-89	5.7	0.1	46.6
3-136	2.3	0.1	18.7
6-62	0.7	0.1	88.9

Grain Size

	Sand	Silt	Clay
1-18	76.9	11.1	12.0
2-98	84.3	8.9	6.8
4-133	21.0	40.0	38.4
6-63	15.4	18.1	66.6

X-ray Analysis

Bulk	2-95	6-68	<2μ (Partial)	2-95	6-68
Qtz.	13	tr	Smec.	tr	44
Cal.	40	82	Ill.	54	29
K-Feld.	tr	--	Kaol.	19	11
Plag.	1	--	Chlor.	27	14
Other	46	18	Zeol.	tr	--

SITE 405 HOLE CORE 2 CORED INTERVAL: 8.0-17.5 m

TIME-ROCK UNIT: PLEISTOCENE
BIOSTRAT ZONE: (F) Globorotalia truncatulinoides (N22) / (N) Pseudoemiliania lacunosa (NN19) / (N) Gephyrocapsa oceanica (NN20)
FOSSIL CHARACTER: FORAMS: AG; NANNOS: AG, FG, FG, AM, AG, AG, FG; RADS: CG

SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	
1	0.5			CCB	*54	very light gray (N8)
	1.0					greenish gray (5GY 6/1)
2				XM		dark yellowish brown (10YR 4/2)
				CCL	*62	
				CCB		light olive gray (5Y 5/2)
				GZ		N8
				GZ		pale brown (5YR 5/2)
				CCL		Pebble of basalt
				XM		N8
3						dark yellowish brown (10YR 4/2)
					*29	
4				CCB		Zoophycus
				GZ		light gray (N7)
				CCL		Zoophycus
				CCB	*122	5GY 4/1
5						light gray (N7)
				XM		dark yellow brown (10YR 4/2)
						10YR 6/2
				CCL		light gray (N7)
6						dark yellowish brown (10YR 4/2)
				GZ		
CC				CCB		

Foram Nanno Ooze
very light gray (N8), greenish gray (5GY 6/1) with light gray (N7) patches due to coring disturbance. Basalt pebble at 3-40.

Marly Foram Nanno Ooze
light gray (N7), and dark yellowish brown (10YR 4/2). Faint indication of graded beds (2) with burrows at top of each.

Calcareous Mudstone
dark yellowish brown (10YR 4/2).

Smear Slides

	1-54	2-62	4-29	4-122
quartz		15	3	56
heavy min.		tr		
clay		25	30	40
glauconite		tr		3
pyrite		tr	tr	
carb. unspec.		5	2	
forams	20	25	10	
nannos	80	30	58	tr
sp. spic.		tr		
plant frag.		tr		2

Carbonate Bomb

1-54	91%	4-120	0%
2-61	7%	6-120	31%
4-30	29%		

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-69	1.9	0.1	14.5
2-139	9.9	0.1	81.6
4-72	9.7	0.1	80.0
6-13	5.5	0.1	44.6

Grain Size

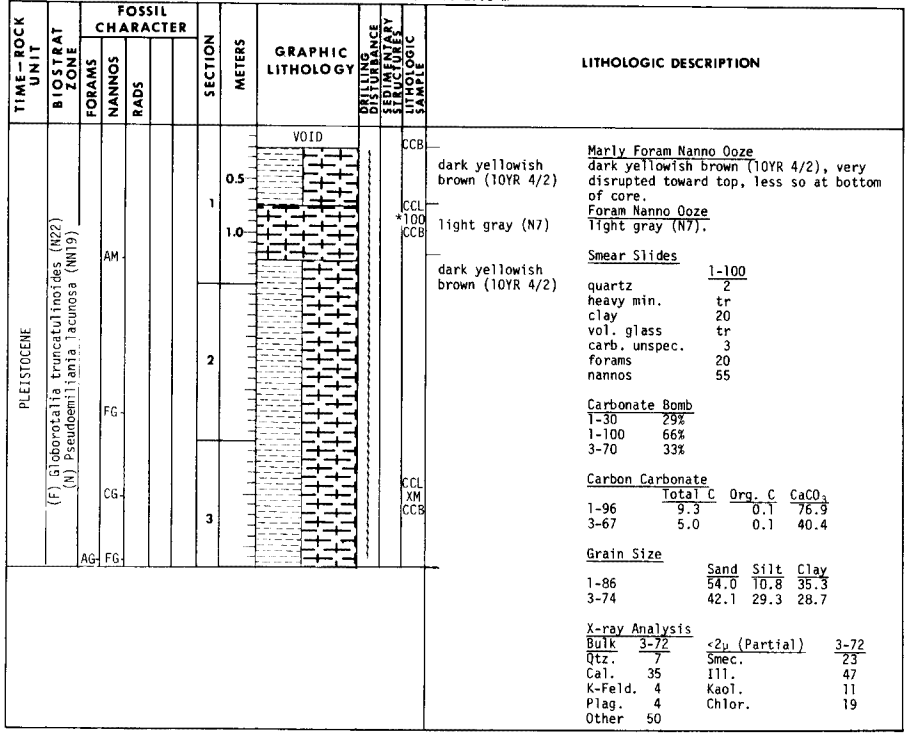
	Sand	Silt	Clay
2-67	12.5	49.7	37.8
2-140	32.1	11.4	56.6
4-74	47.4	23.6	29.0
6-107	48.6	28.2	23.2

X-ray Analysis

Bulk	2-65	2-143	5-77
Qtz.	7	tr	12
Cal.	13	83	20
K-Feld.	11	--	2
Plag.	5	--	11
Other	64	17	55

<2μ (Partial)	2-65	2-143	5-77
Smec.	42	42	29
Ill.	32	34	42
Kaol.	13	14	15
Chlor.	13	10	14

SITE 405 HOLE CORE 3 CORED INTERVAL: 17.5-27.0 m



Marly Foram Nanno Ooze
dark yellowish brown (10YR 4/2), very disrupted toward top, less so at bottom of core.
Foram Nanno Ooze
light gray (N7).

Smear Slides

	1-100
quartz	2
heavy min.	tr
clay	20
vol. glass	tr
carb. unspec.	3
forams	20
nannos	55

Carbonate Bomb

1-30	29%
1-100	66%
3-70	33%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-96	9.3	0.1	76.9
3-67	5.0	0.1	40.4

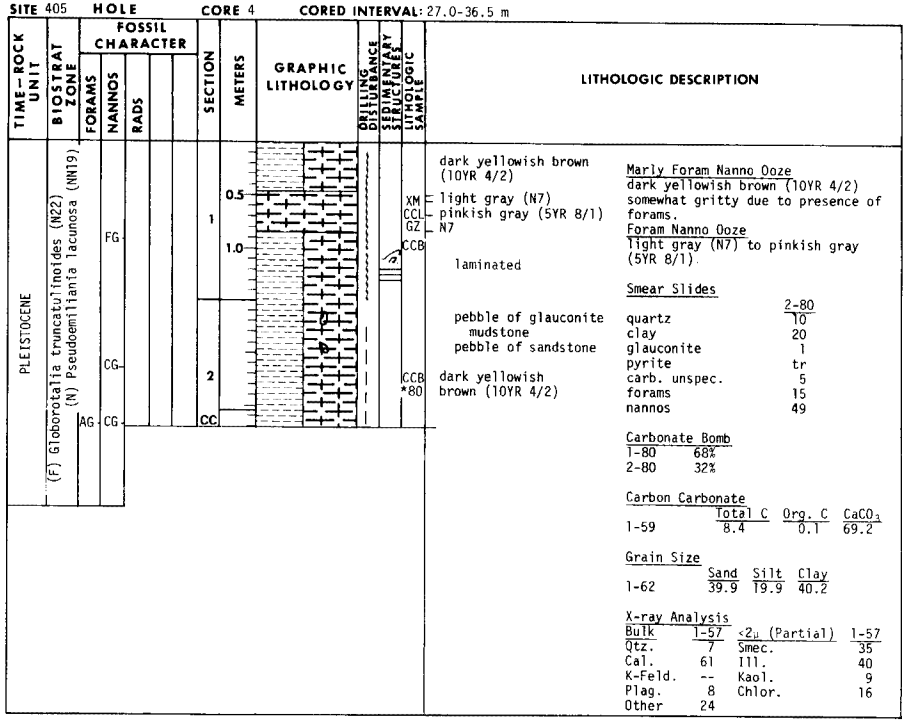
Grain Size

	Sand	Silt	Clay
1-86	54.0	10.8	35.3
3-74	42.1	29.3	28.7

X-ray Analysis

Bulk	3-72	<2μ (Partial)	3-72
Qtz.	7	Smec.	23
Cal.	35	Ill.	47
K-Feld.	4	Kaol.	11
Plag.	4	Chlor.	19
Other	50		

SITE 405 HOLE CORE 4 CORED INTERVAL: 27.0-36.5 m



Marly Foram Nanno Ooze
dark yellowish brown (10YR 4/2) somewhat gritty due to presence of forams.
Foram Nanno Ooze
light gray (N7) to pinkish gray (5YR 8/1).

Smear Slides

	2-80
quartz	10
clay	20
glauconite	1
pyrite	tr
carb. unspec.	5
forams	15
nannos	49

Carbonate Bomb

1-80	68%
2-80	32%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-59	8.4	0.1	69.2

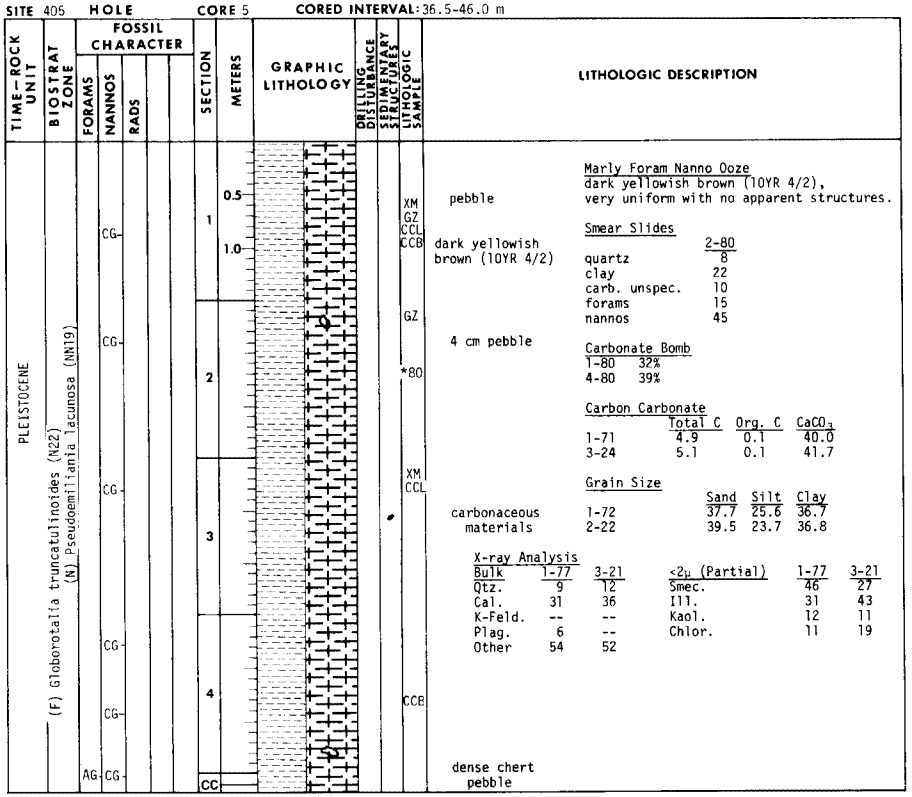
Grain Size

	Sand	Silt	Clay
1-62	39.9	19.9	40.2

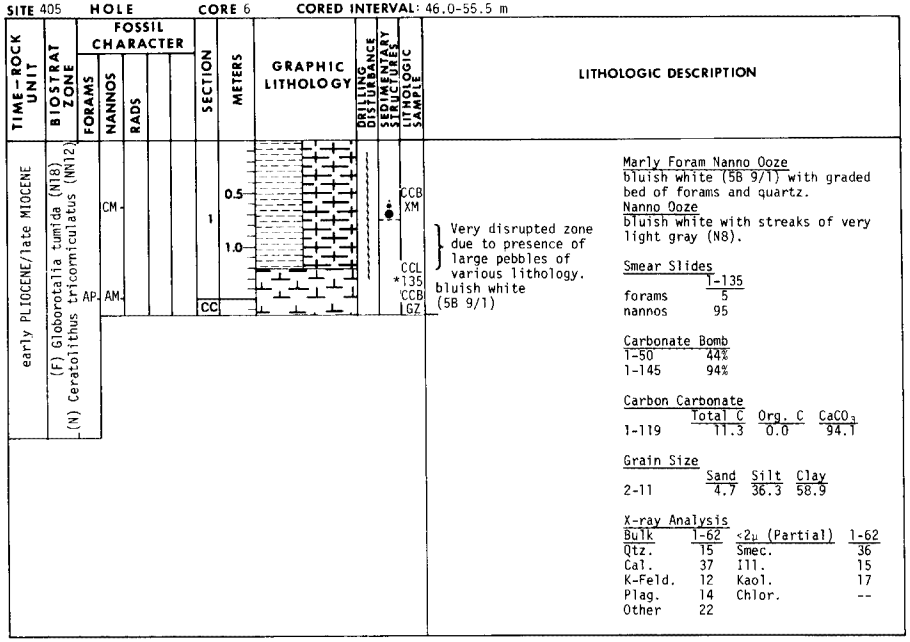
X-ray Analysis

Bulk	1-57	<2μ (Partial)	1-57
Qtz.	7	Smec.	35
Cal.	61	Ill.	40
K-Feld.	--	Kaol.	9
Plag.	8	Chlor.	16
Other	24		

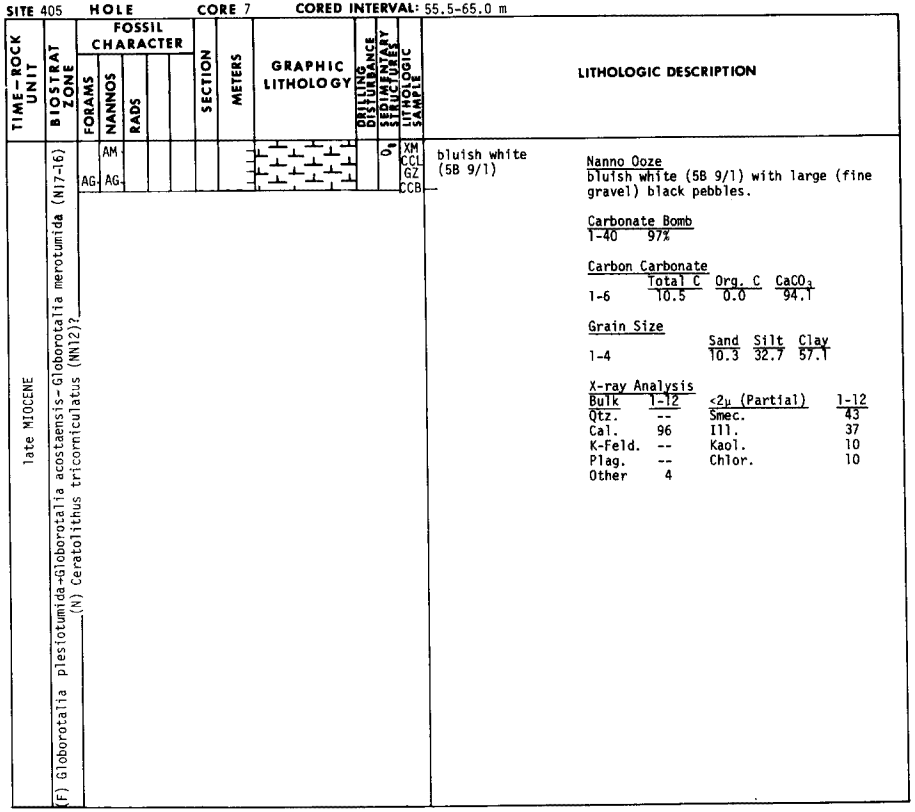
SITE 405 HOLE CORE 5 CORED INTERVAL: 36.5-46.0 m



SITE 405 HOLE CORE 6 CORED INTERVAL: 46.0-55.5 m



SITE 405 HOLE CORE 7 CORED INTERVAL: 55.5-65.0 m



Nanno Ooze
bluish white (5B 9/1) with large (fine gravel) black pebbles.

Carbonate Bomb

1-40	97%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-6	10.5	0.0	94.1

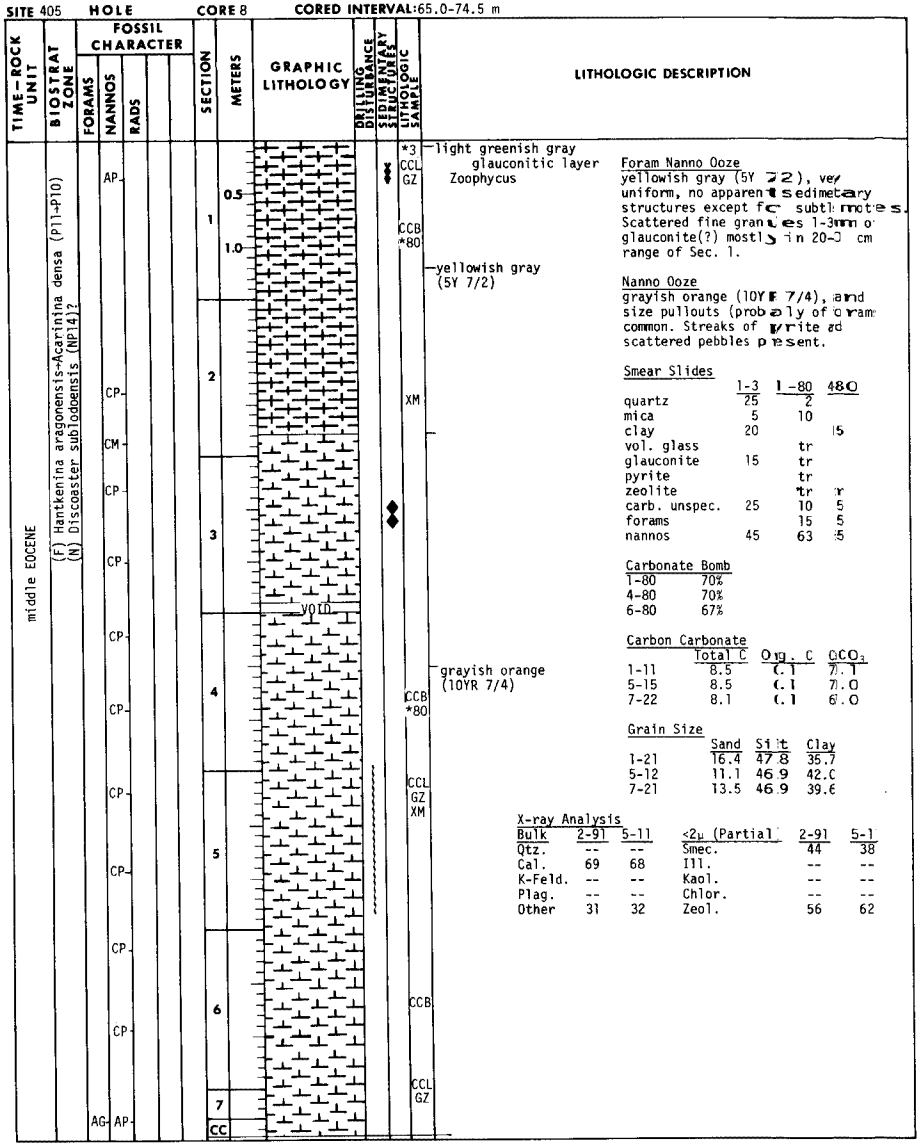
Grain Size

	Sand	Silt	Clay
1-4	10.3	32.7	57.1

X-ray Analysis

Bulk	1-12	<2μ (Partial)	1-12
Qtz.	--	Smec.	43
Cal.	96	Ill.	37
K-Feld.	--	Kaol.	10
Plag.	--	Chlor.	10
Other	4		

SITE 405 HOLE CORE 8 CORED INTERVAL: 65.0-74.5 m



Foram Nanno Ooze
yellowish gray (5Y 7/2), very uniform, no apparent sedimentary structures except for subtle mottles. Scattered fine granules 1-3mm of glauconite(?) mostly in 20-30 cm range of Sec. 1.

Nanno Ooze
grayish orange (10YR 7/4), and size pullouts (probably of foram common. Streaks of pyrite and scattered pebbles present.

Smear Slides

	1-3	1-80	480
quartz	25	2	
mica	5	10	
clay	20		15
vol. glass		tr	
glauconite	15	tr	
pyrite		tr	
zeolite		tr	tr
carb. unspec.	25	10	5
forams		15	5
nannos	45	63	75

Carbonate Bomb

1-80	70%
4-80	70%
6-80	67%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-11	8.5	0.1	71.1
5-15	8.5	0.1	71.0
7-22	8.1	0.1	67.0

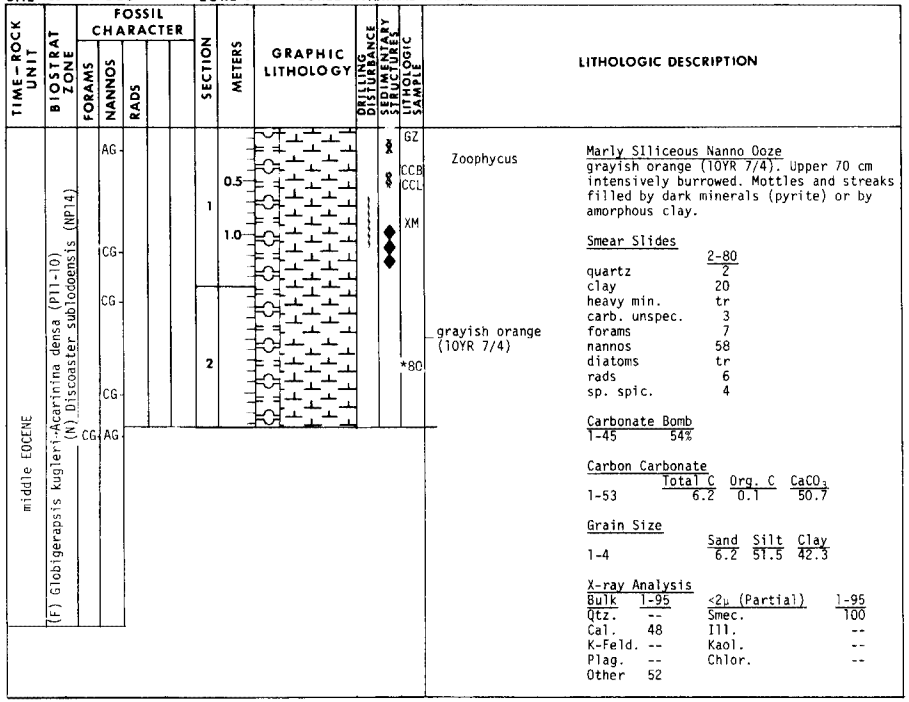
Grain Size

	Sand	Silt	Clay
1-21	16.4	47.8	35.7
5-12	11.1	46.9	42.0
7-21	13.5	46.9	39.6

X-ray Analysis

Bulk	2-91	5-11	<2μ (Partial)	2-91	5-11
Qtz.	--	--	Smec.	44	38
Cal.	69	68	Ill.	--	--
K-Feld.	--	--	Kaol.	--	--
Plag.	--	--	Chlor.	--	--
Other	31	32	Zeol.	56	62

SITE 405 HOLE CORE 9 CORED INTERVAL: 74.5-84.0 m



Marly Siliceous Nanno Ooze
grayish orange (10YR 7/4). Upper 70 cm intensively burrowed. Mottles and streaks filled by dark minerals (pyrite) or by amorphous clay.

Smear Slides

	2-80
quartz	2
clay	20
heavy min.	tr
carb. unspec.	3
forams	7
nannos	58
diatoms	tr
rads	6
sp. spic.	4

Carbonate Bomb

1-45	54%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-53	6.2	0.1	50.7

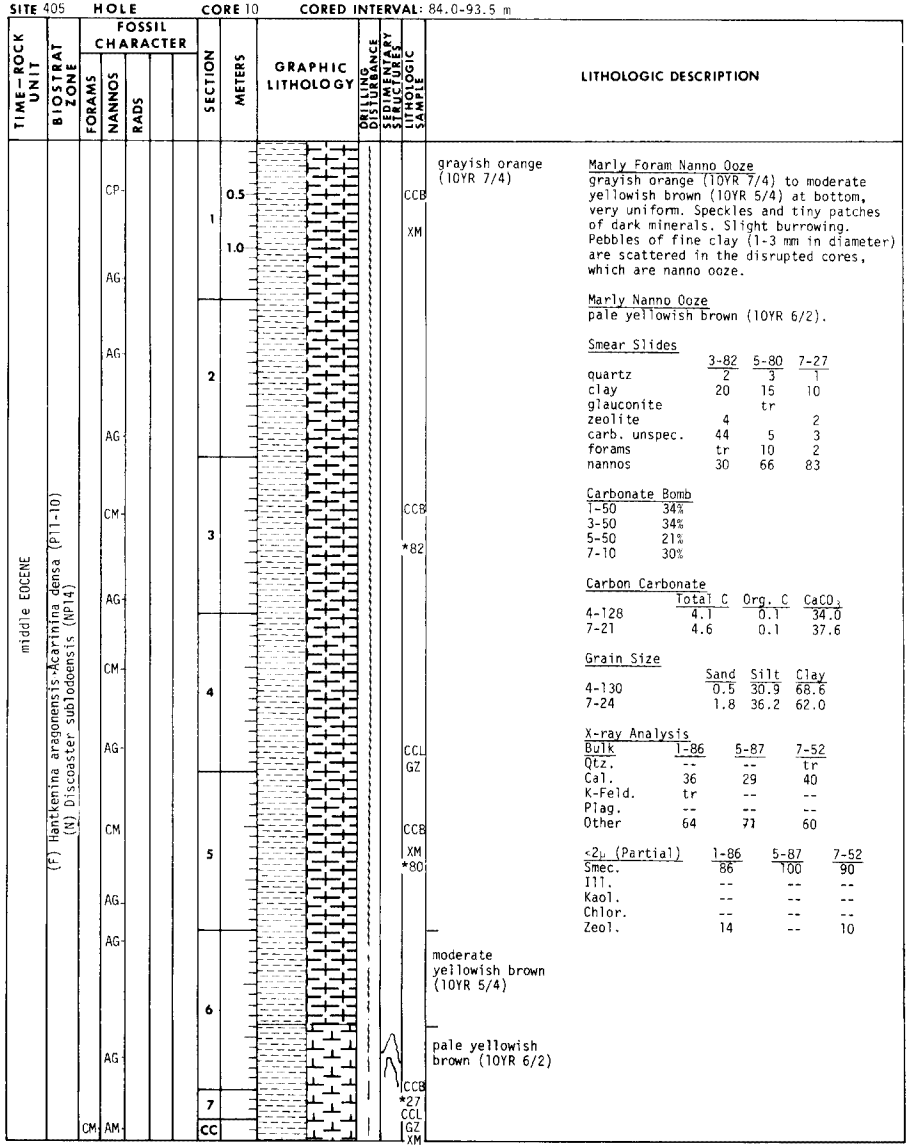
Grain Size

	Sand	Silt	Clay
1-4	6.2	51.5	42.3

X-ray Analysis

Bulk	1-95	<2μ (Partial)	1-95
Qtz.	--	Smec.	100
Cal.	48	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	52		

SITE 405 HOLE CORE 10 CORED INTERVAL: 84.0-93.5 m



Marly Foram Nanno Ooze
grayish orange (10YR 7/4) to moderate yellowish brown (10YR 5/4) at bottom, very uniform. Speckles and tiny patches of dark minerals. Slight burrowing. Pebbles of fine clay (1-3 mm in diameter) are scattered in the disrupted cores, which are nanno ooze.

Marly Nanno Ooze
pale yellowish brown (10YR 6/2).

Smear Slides

	3-82	5-80	7-27
quartz	2	3	1
clay	20	15	10
glauconite		tr	
zeolite	4		2
carb. unspec.	44	5	3
forams	tr	10	2
nannos	30	66	83

Carbonate Bomb

1-50	34%
3-50	34%
5-50	21%
7-10	30%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
4-128	4.1	0.1	34.0
7-21	4.6	0.1	37.6

Grain Size

	Sand	Silt	Clay
4-130	0.5	30.9	68.6
7-24	1.8	36.2	62.0

X-ray Analysis

Bulk	1-86	5-87	7-52
Qtz.	--	--	tr
Cal.	36	29	40
K-Feld.	tr	--	--
Plag.	--	--	--
Other	64	71	60

<2μ (Partial)	1-86	5-87	7-52
Smec.	86	100	90
Ill.	--	--	--
Kaol.	--	--	--
Chlor.	--	--	--
Zeol.	14	--	10

SITE 405 HOLE CORE 11 CORED INTERVAL: 93.5-103.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
middle EOCENE	(F) Hantkenina aragonensis-Acarinina densa (P11-10) (N) Discoaster subiodoensis (NP14)	AG CG AG			CC	0.5				CCB *40	light olive gray (5Y 6/1)

Marly Nanno Ooze
light olive gray (5Y 6/1), uniform, subtle color change possibly due to burrows, but more probably disruption.

Smear Slides

	1-40
clay	20
zeolite	5
forams	1
nannos	74

Carbonate Bomb

1-40	30%

SITE 405 HOLE CORE 12 CORED INTERVAL: 103.0-112.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
middle EOCENE	(F) Hantkenina aragonensis-Acarinina densa (N) Discoaster lodoensis (NP13)	AG CG CG CG CG CM CG CP FP CG CG RP CG			1 2 3 4 5 6 7 CC	0.5 1.0				CCB CCL GZ XM CCL *67 XM GZ CCB CCL	olive gray (5Y 4/1) streaks of glauconite matter

Calcareous Siliceous Mudstone
olive gray (5Y 4/1) with patches and blebs of glauconitic material of dark greenish gray (5GY 4/1). Sec. 2-6 are disrupted.

Smear Slides

	5-67
quartz	7
clay	23
nannos	40
rads	10
sp. spic.	20

Carbonate Bomb

1-70	27%
6-70	27%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-91	3.7	0.1	30.4
3-60	3.2	0.1	25.2
6-92	3.6	0.1	28.5

Grain Size

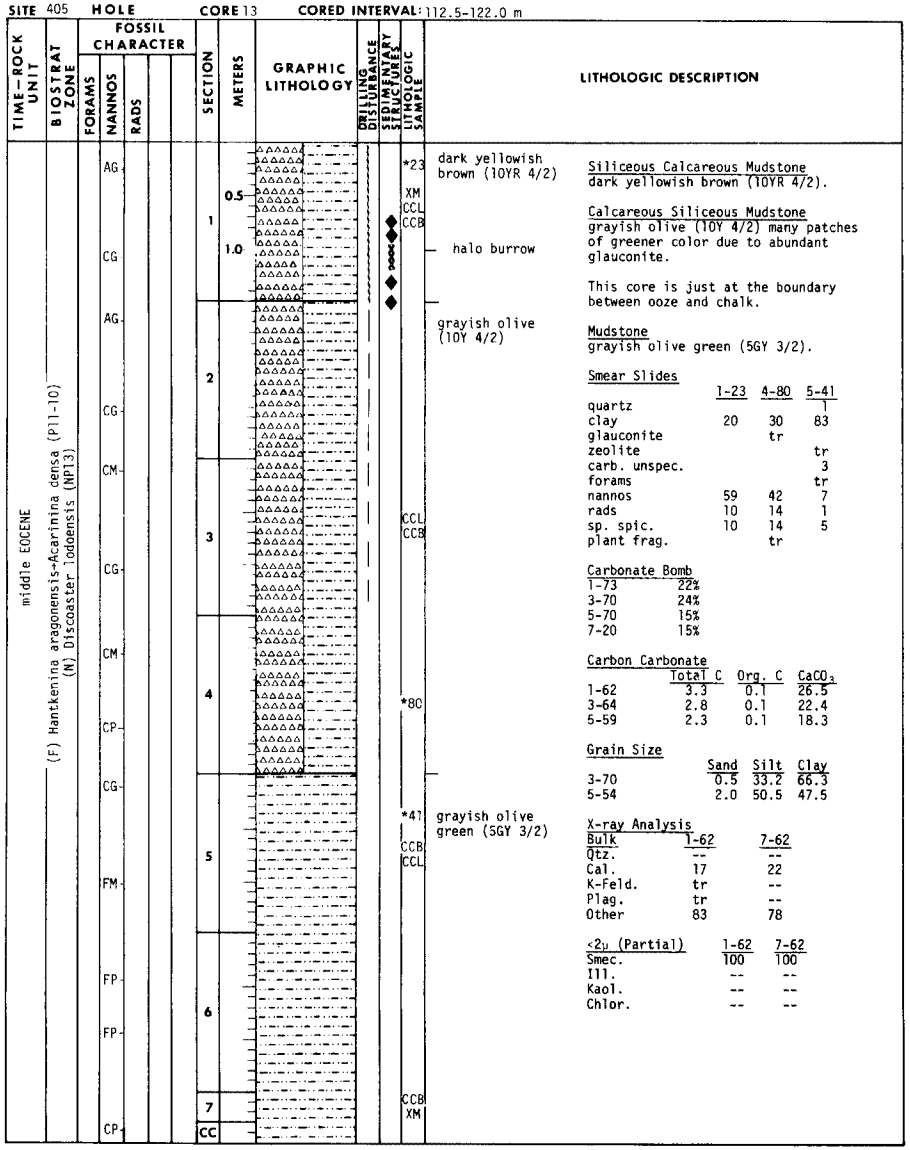
	Sand	Silt	Clay
1-100	0.5	42.8	56.7
5-101	2.3	48.3	49.4

X-ray Analysis

Bulk	1-98	5-98
Qtz.	--	--
Cal.	25	20
K-Feld.	--	--
Plag.	--	--
Other	75	80

<2μ (Partial)	1-98	5-98
Smec.	100	100
Ill.	--	--
Kaol.	--	--
Chlor.	--	--

SITE 405 HOLE CORE 13 CORED INTERVAL: 112.5-122.0 m



LITHOLOGIC DESCRIPTION

dark yellowish brown (10YR 4/2)

Siliceous Calcareous Mudstone
dark yellowish brown (10YR 4/2).

Calcareous Siliceous Mudstone
grayish olive (10Y 4/2) many patches of greener color due to abundant glauconite.

This core is just at the boundary between ooze and chalk.

Mudstone
grayish olive green (5GY 3/2).

Smear Slides

	1-23	4-80	5-41
quartz			tr
clay	20	30	83
glauconite		tr	
zeolite			tr
carb. unspec.			3
forams			tr
nannos	59	42	7
rads	10	14	1
sp. spic.	10	14	5
plant frag.		tr	

Carbonate Bomb

1-73	22%
3-70	24%
5-70	15%
7-20	15%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-62	3.3	0.1	26.5
3-64	2.8	0.1	22.4
5-59	2.3	0.1	18.3

Grain Size

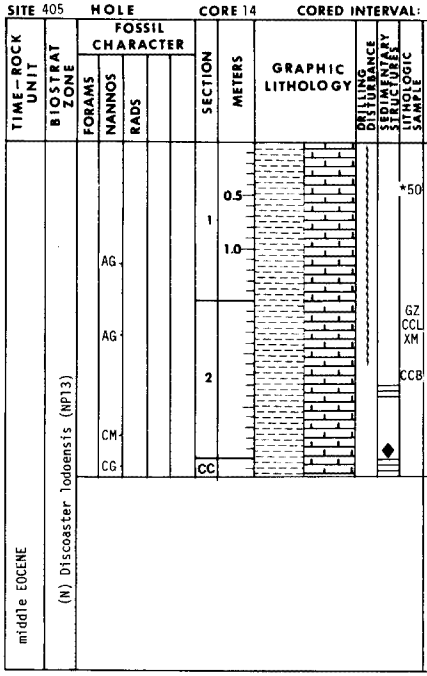
	Sand	Silt	Clay
3-70	0.5	33.2	66.3
5-54	2.0	50.5	47.5

X-ray Analysis

Bulk	1-62	7-62
Qtz.	--	--
Cal.	17	22
K-Feld.	tr	--
Plag.	tr	--
Other	83	78

<2μ (Partial)	1-62	7-62
Smec.	100	100
Ill.	--	--
Kaol.	--	--
Chlor.	--	--

SITE 405 HOLE CORE 14 CORED INTERVAL: 122.0-131.5 m



LITHOLOGIC DESCRIPTION

olive gray (5Y 4/1)

Marly Nanno Chalk
olive gray (5Y 4/1), with mottles, blebs and burrows of dusky green (5G 3/2).

Smear Slides

	1-50
quartz	tr
clay	30
pyrite	tr
forams	tr
nannos	62
diatoms	tr
rads	3
sp. spic.	5

greenish laminae

Carbonate Bomb
2-70 26%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-21	4.8	0.2	39.0

laminae inclined about 5°

Grain Size

	Sand	Silt	Clay
2-18	0.2	38.9	60.9

X-ray Analysis

Bulk	2-27	<2μ (Partial)	2-27
Qtz.	--	Smec.	100
Cal.	36	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	--		

SITE 405 HOLE CORE 15 CORED INTERVAL: 131.5-141.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
early EOCENE	Discoaster lodoensis (NP13)		CM		1	0.5				CCL	grayish olive (10Y 4/2)
						1.0				CCB	
			CM							*61	halo burrow
										GZ	
			CM		2						abundant greenish patches and blebs
			CM								
			CG		3					CCB	
										XM	
										CCL	
			CG							GZ	
			CG		4						less green more brown mottling
			CG								
			FG		5					CCB	less greenish patches
			CM								
			CP		6					CCL	
			CP								intensive mottling of green
					7					CCB	
		RM	CM		CC						

Plus 15 cm long expanded segment

Calcareous Siliceous Mudstone
grayish olive (10Y 4/2) intensively mottled by a combination of burrows and drilling effects.

Smear Slides

	1-61
clay	10
forams	tr
nannos	60
rads	10
sp. spic.	20

Carbonate Bomb

1-62	21%
3-70	19%
5-70	22%
7-20	24%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-50	3.3	0.1	26.4
3-80	2.9	0.1	23.2
6-68	3.0	0.1	24.0

Grain Size

	Sand	Silt	Clay
1-57	4.6	48.9	46.6
3-90	0.4	39.3	60.3

X-ray Analysis

Bulk	3-78	<2μ (Partial)	3-78
Qtz.	--	Smec.	100
Cal.	17	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	83		

SITE 405 HOLE CORE 16 CORED INTERVAL: 141.0-150.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
early EOCENE	(F) Globorotalia aragonensis-Globorotalia pseudoemnardii (P8-P4) Discoaster lodoensis (NP13)				1	0.5				CCL	dark greenish gray (5GY 4/1)
										GZ	
						1.0				XM	Zoophycus
										*97	
										CCB	
			FG		2					CCB	
			CM		3					CCL	
										CCB	
			CG		4						large burrows
			CG		5					CCB	
			CM		6					GZ	
										*120	
										XM	
					7					CCB	
		RM	CM		CC						

Calcareous Siliceous Mudstone
dark greenish gray (5GY 4/1) with abundant mottles and streaks of olive gray (5Y 4/1) and greenish black (5GY 2/1). Slight to moderate burrowing.

Smear Slides

	1-97	6-120
quartz	2	tr
clay	35	35
vol. glass		tr
glauconite	tr	tr
carb. unspec.	10	10
forams	tr	1
nannos	33	29
rads	10	10
sp. spic.	10	15

Carbonate Bomb

1-97	20%
2-52	16%
3-80	15%
5-80	14%
7-20	14%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-50	2.3	0.1	16.4
3-80	2.4	0.1	18.9

Grain Size

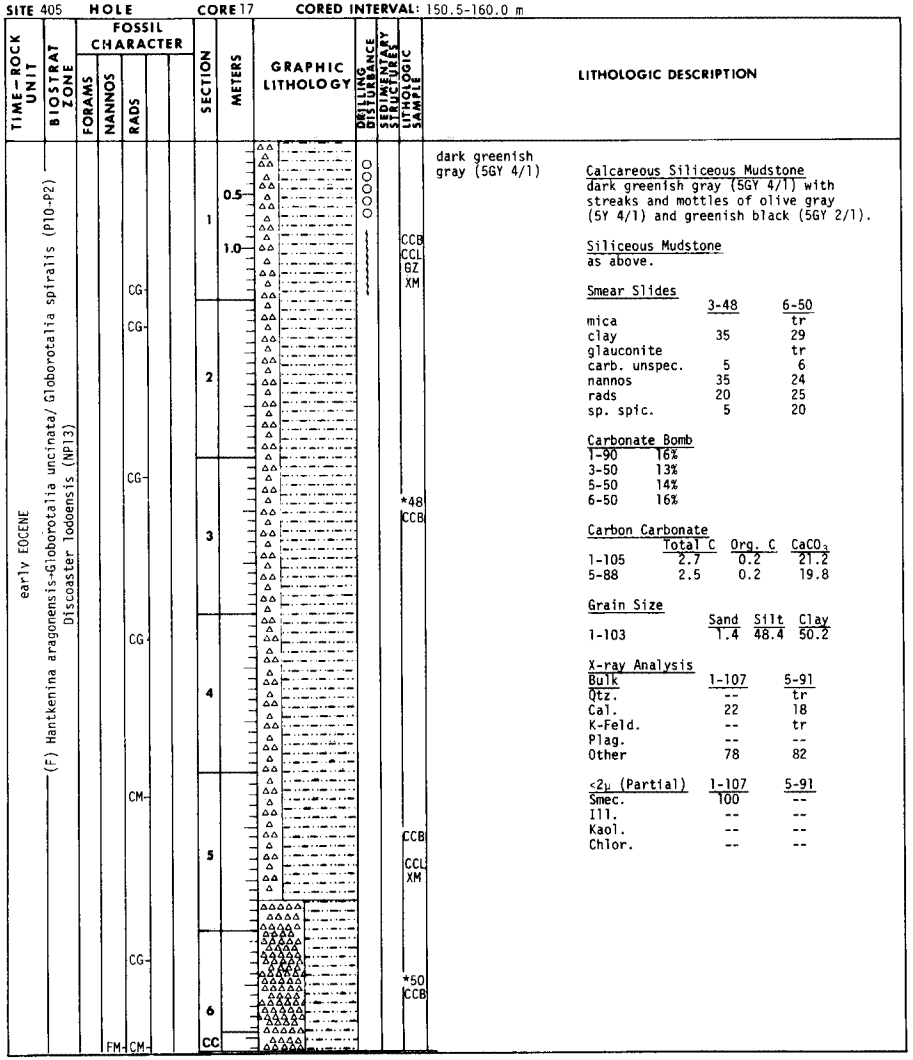
	Sand	Silt	Clay
1-57	1.7	51.7	46.6
6-116	2.2	46.5	51.3

X-ray Analysis

Bulk	1-55	6-120
Qtz.	--	--
Cal.	25	15
K-Feld.	--	tr
Plag.	--	tr
Other	75	85

<2μ (Partial)	1-55	6-120
Smec.	100	100
Ill.	--	--
Kaol.	--	--
Chlor.	--	--

SITE 405 HOLE CORE 17 CORED INTERVAL: 150.5-160.0 m



dark greenish gray (5GY 4/1)

Calcareous Siliceous Mudstone
dark greenish gray (5GY 4/1) with streaks and mottles of olive gray (5Y 4/1) and greenish black (5GY 2/1).

Siliceous Mudstone
as above.

Smear Slides

	3-48	6-50
mica		tr
clay	35	29
glauconite		tr
carb. unspec.	5	6
nannos	35	24
rads	20	25
sp. spic.	5	20

Carbonate Bomb

1-90	16%
3-50	13%
5-50	14%
6-50	16%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-105	2.7	0.2	21.2
5-88	2.5	0.2	19.8

Grain Size

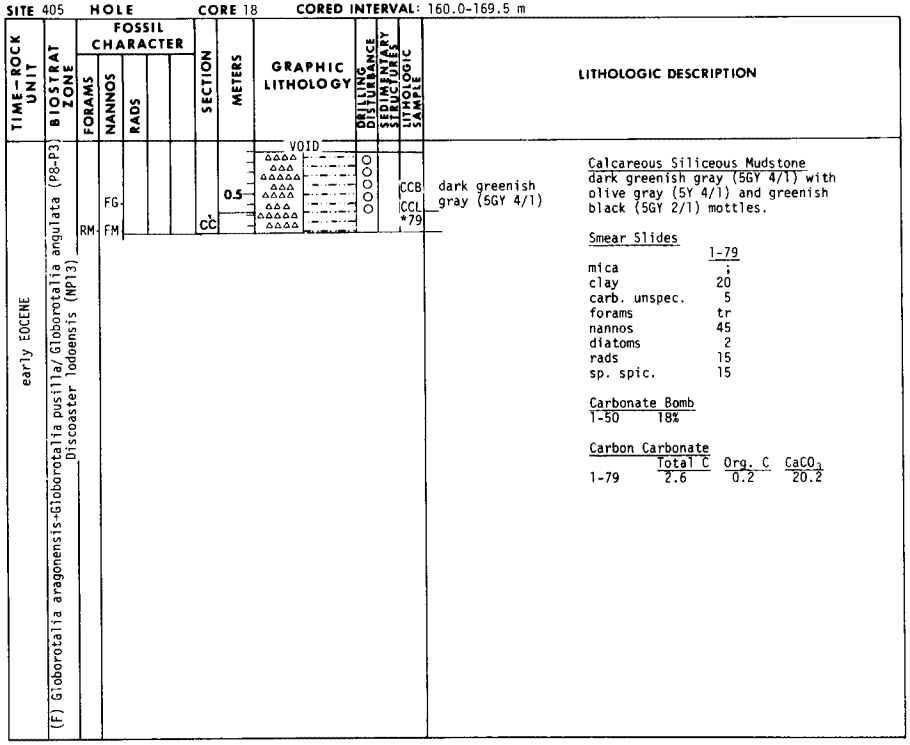
	Sand	Silt	Clay
1-103	1.4	48.4	50.2

X-ray Analysis

Bulk	1-107	5-91
Qtz.	--	tr
Cal.	22	18
K-Feld.	--	tr
Plag.	--	--
Other	78	82

<2μ (Partial)	1-107	5-91
Smec.	100	--
Ill.	--	--
Kaol.	--	--
Chlor.	--	--

SITE 405 HOLE CORE 18 CORED INTERVAL: 160.0-169.5 m



dark greenish gray (5GY 4/1)

Calcareous Siliceous Mudstone
dark greenish gray (5GY 4/1) with olive gray (5Y 4/1) and greenish black (5GY 2/1) mottles.

Smear Slides

	1-79
mica	;
clay	20
carb. unspec.	5
forams	tr
nannos	45
diatoms	2
rads	15
sp. spic.	15

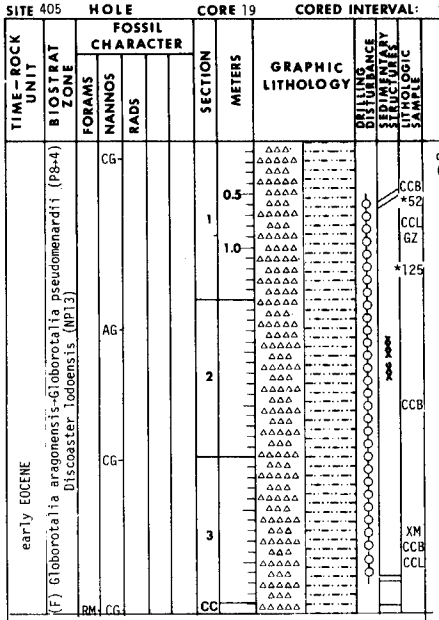
Carbonate Bomb

1-50	18%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-79	2.6	0.2	20.2

SITE 405 HOLE CORE 19 CORED INTERVAL: 169.5-179.0 m



dark greenish gray (5GY 4/1)

Zoophycus

color bedding

Calcareous Siliceous Mudstone

dark greenish gray (5GY 4/1) mottled olive black (5Y 2/1), greenish black (5GY 2/1) and dark greenish gray (5GY 4/1). Disked into segments 5-10 cm thick. Slight to moderate burrowing.

Smear Slides

	1-52	1-125
mica	tr	
clay	25	20
carb. unspec.	10	20
forams	tr	
nannos	25	15
diatoms	tr	
rads	20	35
sp. spic.	20	10
plant frag.	tr	

Carbonate Bomb

1-50	19%
2-100	19%
3-85	19%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-86	3.1	0.2	24.2
3-92	3.4	0.1	27.0

Grain Size

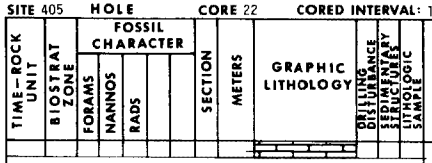
	Sand	Silt	Clay
1-80	1.8	53.6	44.6

X-ray Analysis

Bulk	3-94	<2μ (Partial)	3-94
Qtz.	--	Smec.	--
Cal.	22	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	78		

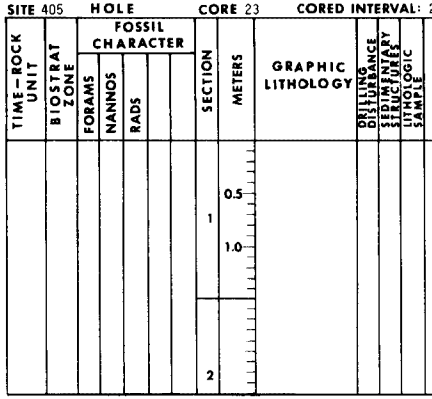
Site 405, Core 20, 179.0-188.5 m: NO RECOVERY
Site 405, Core 21, 188.5-198.0 m: NO RECOVERY

SITE 405 HOLE CORE 22 CORED INTERVAL: 198.0-207.5 m



15 cm piece of dense very hard limestone. Almost certainly this clast came from a shallow water environment.

SITE 405 HOLE CORE 23 CORED INTERVAL: 207.5-217.0 m



15 cm long clast of dark igneous rock (probably caving).

Thin Section: Sec. 1, 6-8 cm: Pyroxene granulite. Hypersthene, augite, biotite, plagioclase and quartz comprise a fresh granulitic gneiss. Biotite flakes are generally interstitial to the pyroxene but in places project across the generally smooth curved edges of the grains. The plagioclase is unaltered and of andesine to oligoclase composition.

Site 405, Core 24, 217.0-226.5 m: NO RECOVERY

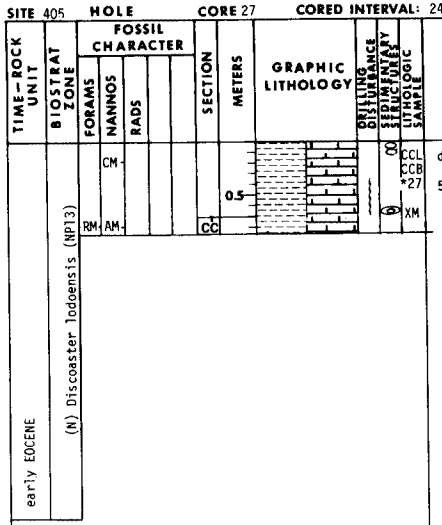
SITE 405 HOLE CORE 25 CORED INTERVAL: 226.5-236.0 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
early EOCENE	(F) Globorotalia aragonensis-Globorotalia pseudomenardii (P8-P4) (N) Discoaster lodoensis (NP13)	FM	CG AG		1 CC	0.5	VOID			CCB XM	diameter 4 cm - dark gneiss 3 cm - dark gneiss 3 cm - basalt 5GY 4/1 Calcareous Siliceous Mudstone dark greenish gray (5GY 4/1). Soupy consistency; contains pebbles of various lithologies which represent probable downhole contaminants. Thin Sections of cobbles: Sec. 1, 6-8 cm: Gray leucocratic gneiss. Anhedral plagioclase and quartz make up 80-90% of the rock with subsidiary biotite, microcline, opaques, apatite, zircon, sphene and epidote. The texture varies between granitoid and granulitized, the latter occurring in elongate zones and probably associated with alteration processes causing development of epidote, sphene and muscovite. Sec. 1, 10-12 cm: Hornblende plagioclase gneiss. Dark green to pale yellow pleochroic hornblende in subhedral crystals forms a granoblastic texture with andesine and oligoclase, and a little quartz. Some quartz occurs as markedly rounded inclusions in the hornbldnde and plagioclase. Accessory minerals are rounded zircons, apatite and opaques, and fractures in the rock are filled with biotite, chlorite. Sec. 1, 17-19 cm: Feldspar porphyritic basalt. Phenocrysts of labradorite and micro-phenocrysts of ?basaltic (pseudomorphous after orthopyroxene) rest in a fine-grained (10-80μm) granular matrix of andesine, augite and opaques. In parts the pyroxene and plagioclase are subophitic. There are a few patches of olive green partly devitrified glass, and analcime may also be present. Carbonate Bomb 1-50 18% X-ray Analysis Bulk 1-65: Qtz. --; Cal. 23; K-Feld. --; Plag. --; Other 77 <2μ (Partial) 1-65: Smec. 100; Ill. --; Kaol. --; Chlor. --

SITE 405 HOLE CORE 26 CORED INTERVAL: 236.0-245.5 m

TIME-ROCK UNIT	BIOSTRAT ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	LITHOLOGIC SAMPLE	LITHOLOGIC DESCRIPTION
early EOCENE	(F) Globorotalia aragonensis-Globorotalia pusilla/ Globorotalia angulata (P8-P3) (N) Discoaster lodoensis (NP13)	RM	CG							CCB *25 XM	8 cm diameter - granite gneiss 5 cm diameter - hornblende granulite Calcareous Siliceous Mudstone dark greenish gray (5GY 4/1) mottled with greenish black (5GY 2/1). Contains pebbles probably from downhole contamination. Smear Slides 1-25 clay 20 carb. unspec. 34 nannos 15 rads 15 sp. spic. 15 plant frag. 1 Thin Sections: Sec. 1, 3-5 cm: Granitic gneiss. Andesine and oligoclase is intergrown with microcline and quartz in a granitoid texture. Many grains are sericitized and some saussuritized. Hornblende, green to pale green pleochroic when fresh, has likewise been extensively altered with development of biotite, clinozoisite quartz, calcite, opaques and sphene to give a sieve texture in parts. Perthite and microcline (typically twinned) mantle the plagioclase and mafic clusters, with quartz filling the interstices. Apatite is a common accessory. Sec. 1, 18-20 cm: Hornblende-biotite-granulite. Large crystals and augen of oligoclase and microcline rest in a matrix of sub to anhedral grains of the same minerals with hornblende (dark green to green pleochroic), dark brown to pale yellow biotite, apatite (both as subrounded grains and tiny prisms), quartz and opaques. Rounded zircons occur in biotite and plagioclase. Carbonate Bomb 1-15 18% X-ray Analysis Bulk 1-19: Qtz. --; Cal. 17; K-Feld. --; Plag. --; Other 83 <2μ (Parital) 1-19: Smec. 100; Ill. --; Kaol. --; Chlor. --

SITE 405 HOLE CORE 27 CORED INTERVAL: 245.5-255.0 m



diameter 6 cm - granite gneiss
7 cm - hornblende gneiss
5GY 4/1

halo burrow

Silicified Marly Nanno Chalk
dark greenish gray (5GY 4/1) with mottle of greenish black (5GY 2/1) and olive gray (5Y 4/1). Pebbles are probably downhole contaminants.

Smear Slides

	1-27
quartz	55
carb. unspec.	10
forams	tr
nannos	35
sp. spic.	tr

Thin Sections of cobbles:
Sec. 1, 4-6 cm: Granitic gneiss. Sericitized plagioclase, microcline and quartz make up 90% of the rock in a granitoid texture, modified in zones to a granulitic one. Sparse clusters of mafic minerals consist of opaques, biotite, chlorite and little clinozoisite. One cluster however contains a sieve-textured green hornblende with quartz, clinozoisite and olive green biotite inclusions. Rounded zircons, prisms of apatite, and calcite are accessory minerals.

Sec. 1, 9-11 cm: Hornblende-plagioclase-gneiss. Green to pale yellow pleochroic hornblende in clusters of coarse interlocking crystals is variably bleached and altered along cleavages to biotite and clinozoisite. Andesine in similar-sized crystals is cloudy and variably altered and replaced by euhedral clinozoisite, calcite and ?chlorite. A little quartz in the rock is also crowded with clinozoisite grains.

Carbonate Bomb
1-30 16%

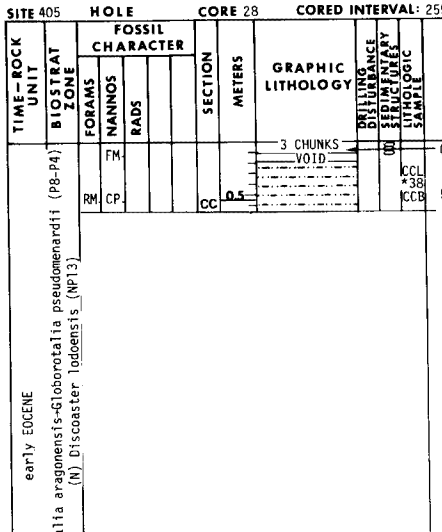
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-20	5.2	0.2	41.7

X-ray Analysis

Bulk	1-51	<2μ (Partial)	1-51
Qtz.	--	Smec.	73
Cal.	28	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	--	Silica	27

SITE 405 HOLE CORE 28 CORED INTERVAL: 255.0-264.5 m



Cobbles diameter: 5 cm - porphyritic basalt
3 cm - plagioclase gneiss
5 cm - dolorite
5GY 2/1

Calcareous Mudstone
dark greenish gray (5GY 2/1) with mottles of greenish black (5GY 2/1) and olive gray (5Y 4/1). Pebbles are probably downhole contaminants.

Smear Slides

	1-38
clay	45
carb. unspec.	22
forams	tr
nannos	30
sp. spic.	tr
fish remain	2
plant frag.	1

Thin Sections of cobbles:
Sec. 1, 4-6 cm: Porphyritic basalt with phenocrysts of zoned clinopyroxene (pale brown core and brown rim) and abundant microphenocrysts of colorless orthopyroxene, brown clinopyroxene and labradorite many with "swallowtail" terminations to the laths. The groundmass is composed of plagioclase laths, pyroxene and opaques in an intergranular texture. Many clinopyroxene grains show shadowy extinction and a few are visibly bent.

Sec. 1, 7-9 cm: Plagioclase-hypersthene-gneiss. Large anhedral andesine crystals in a granitoid texture have been granulitized in zones with development of variable strain shadows and exsolution of ?quartz in plates along cleavage planes. Orthopyroxene is largely fresh but many grains are bent or cracked and some alteration to biotite has occurred. Subhedral opaques are associated with hypersthene, and apatite and zircon are generally found in plagioclase. Quartz is present in granulitic and suture-textured zones.

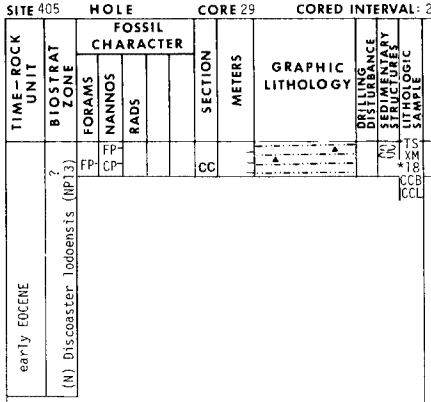
Sec. 1, 13-15 cm: Metamorphosed dolerite. The original intergranular and subophitic texture of a two-pyroxene dolerite is recognizable even though the orthopyroxene has altered to golden brown ?chlorite, the clinopyroxene to green amphibole, and clusters of garnet euhedra have grown at the expense of plagioclase and orthopyroxene. The labradorite and andesine are clouded and a later phase of alteration has caused growth of a pale green amphibole, mobility of the opaques, and development of chlorite and calcite. The rock is probably from a Scourie dyke (Dearnley, pers. comm.).

Carbonate Bomb
1-40 22%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-34	3.6	0.2	28.4

SITE 405 HOLE CORE 29 CORED INTERVAL: 264.5-274.0 m



at 5 cm - very hard layer
15 cm - very hard layer

Calcareous Mudstone
dark greenish gray (5GY 4/1) mottled with greenish black (5GY 2/1) and olive gray (5Y 4/1). Slight to moderate burrowing. Contains two chert layers.

Chert
2 very hard cherty layers.

Smear Slides

	1-18
clay	69
carb. unspec.	15
forams	tr
nannos	15
plant frag.	1

Thin Section:
Sec. 1, 6 cm: fine grained limestone containing abundant coccoliths, foraminifera, siliceous sponges and spicules, and liberally scattered with anhedral opaque grains, glauconite and flakes of chlorite or clay min-ral. Material of low birefringence in the matrix indicates some degree of silicification.

Carbonate Bomb
1-20 22%

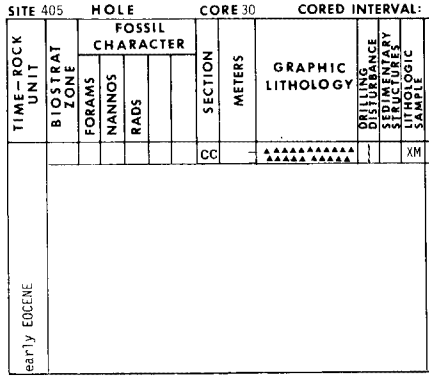
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1, CC-10	3.5	0.2	27.8

X-ray Analysis

Bulk	1, CC-13	<2μ (Partial)	1, CC-13
Qtz.	--	Smec.	76
Cal.	18	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	82	Silica	24

SITE 405 HOLE CORE 30 CORED INTERVAL: 274.0-283.5 m



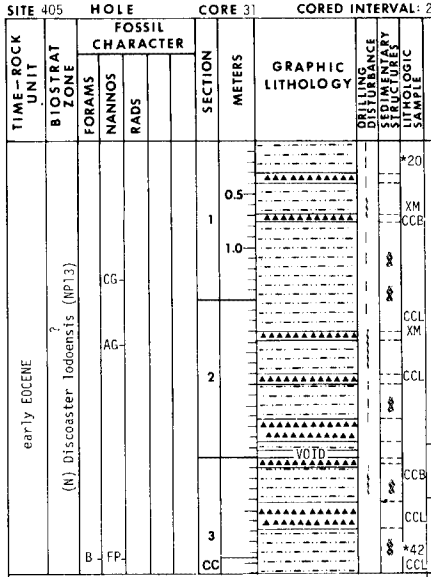
5GY 4/1

Chert
dark greenish gray (5GY 4/1). Fragments 3-5 cm long. Hard brecciated, slightly calcareous clasts have mottles of olive gray (5Y 4/1) in burrows.

X-ray Analysis

Bulk	1, CC-7	<2μ (Partial)	1, CC-7
Qtz.	--	Smec.	--
Cal.	3	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	97	Silica	100

SITE 405 HOLE CORE 31 CORED INTERVAL: 283.5-293.0 m



hard
hard
dark greenish gray (5GY 4/1)
hard
hard
hard
olive black (5Y 2/1)
hard
brownish black (5YR 2/1)

Silicified Calcareous Mudstone
dark greenish gray (5GY 4/1), olive black (5Y 2/1) and brownish black (5YR 2/1), mottled greenish black (5GY 2/1) and olive gray (5Y 4/1) with interbeds of chert. Zoophycus and halo burrows are common. Burrowing slight to moderate. The flattened burrows may be due to load compaction.

Smear Slides

	1-20	3-92
clay	50	60
glauconite		tr
carb. unspec.	8	7
forams		tr
nannos	40	20
sp. spic.	tr	
plant frag.	2	3

Carbonate Bomb

1-80	15%
3-15	22%

Carbon Carbonate

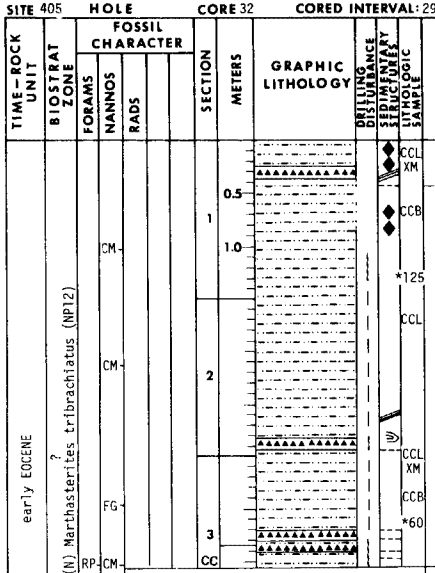
	Total C	Org. C	$CaCO_3$
2-19	3.2	0.1	25.7
2-74	1.7	0.1	13.6
3-59	1.5	0.2	11.4
3-100	2.1	0.3	15.4

X-ray Analysis

Bulk	1-74	2-23
Qtz.	--	--
Cal.	--	20
K-Feld.	--	--
Plag.	--	--
Other	100	80

<2μ (Partial)	1-74	2-23
Smec.	24	55
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Silica	76	45

SITE 405 HOLE CORE 32 CORED INTERVAL: 293.0-302.5 m



LITHOLOGIC DESCRIPTION

dark greenish gray (5G 4/1)

hard

Silicified Calcareous Mudstone
dark greenish gray (5GY 4/1) mottled throughout with olive gray (5Y 4/1) with interbeds of chert. Burrows (moderate) flattened parallel to bedding. Fractures inclined up to 10°.

dark greenish gray (5GY 4/1)

laminae

slump structure

hard

hard

hard

Smear Slides

	1-125	3-60
quartz		3
clay	80	67
vol. glass		tr
opal		10
carb. unspec.	5	8
forams		2
nannos	15	10
plant frag.	tr	tr

Carbonate Bomb

1-70	23%
3-40	12%

Carbon Carbonate

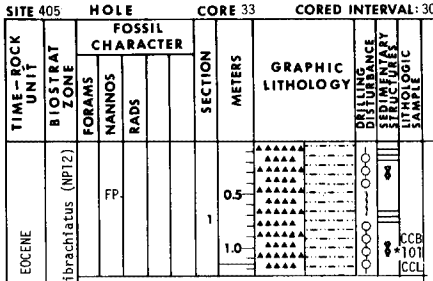
	Total C	Org. C	$CaCO_3$
1-17	1.8	0.2	13.5
2-22	1.9	0.2	13.8
3-4	3.2	0.2	25.4

X-ray Analysis

Bulk	1-20	3-8
Qtz.	--	--
Cal.	10	20
K-Feld.	--	--
Plag.	--	--
Other	90	80

<2μ (Partial)	1-20	3-8
Smec.	--	tr
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Silica	100	100

SITE 405 HOLE CORE 33 CORED INTERVAL: 302.5-312.0 m



LITHOLOGIC DESCRIPTION

olive black (5Y 2/1)

Calcareous Silicified Mudstone
olive black (5Y 2/1). Hard and dense, well cemented, moderately burrowed, well laminated. Burrows flattened parallel to laminations, moderate to intense disking.

Smear Slides

	1-101
quartz	2
clay	50
opal	30
carb. unspec.	8
forams	3
nannos	7

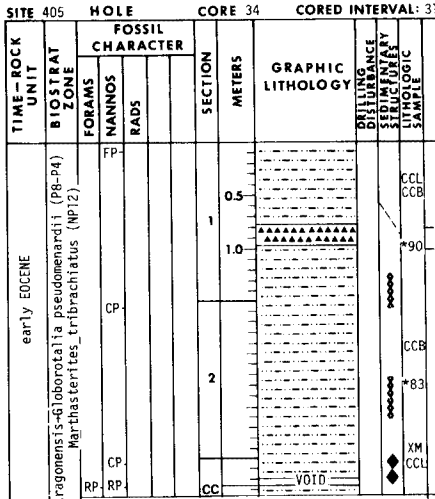
Carbonate Bomb

1-100	6%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-112	2.1	0.3	15.0

SITE 405 HOLE CORE 34 CORED INTERVAL: 312.0-321.5 m



LITHOLOGIC DESCRIPTION

dark greenish gray (5GY 4/1)

fault

dark greenish gray (5GY 4/1)

greenish black

large composite burrows

Calcareous Mudstone
dark greenish gray (5GY 4/1) and greenish black, moderate burrowing with burrows filled by olive black (5Y 2/1). Most burrows are flattened parallel to bedding. Bedding inclined up to 15°.

Chert
dark greenish gray (5GY 4/1), no burrows.

Smear Slides

	1-90	2-83
clay	20	88
pyrite	3	1
carb. unspec.	2	3
forams		tr
nannos		7
opal	75	1

Carbonate Bomb

1-50	17%
2-43	11%

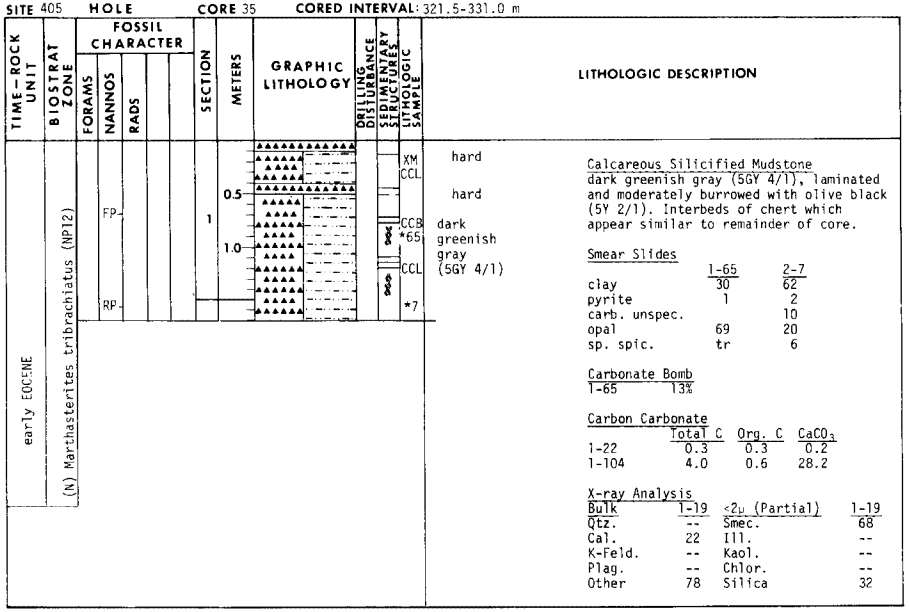
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-30	2.1	0.1	16.6
2-146	2.0	0.1	16.1

X-ray Analysis

Bulk	2-144	<2μ (Partial)	2-144
Qtz.	tr	Smec.	20
Cal.	15	Ill.	--
K-Feld.	2	Kaol.	--
Plag.	3	Chlor.	--
Other	80	Silica	80

SITE 405 HOLE CORE 35 CORED INTERVAL: 321.5-331.0 m



Calcareous Silicified Mudstone
dark greenish gray (5GY 4/1), laminated and moderately burrowed with olive black (5Y 2/1). Interbeds of chert which appear similar to remainder of core.

Smear Slides

	1-65	2-7
clay	30	62
pyrite	1	2
carb. unspec.		10
opal	69	20
sp. spic.	tr	6

Carbonate Bomb

1-65	13%

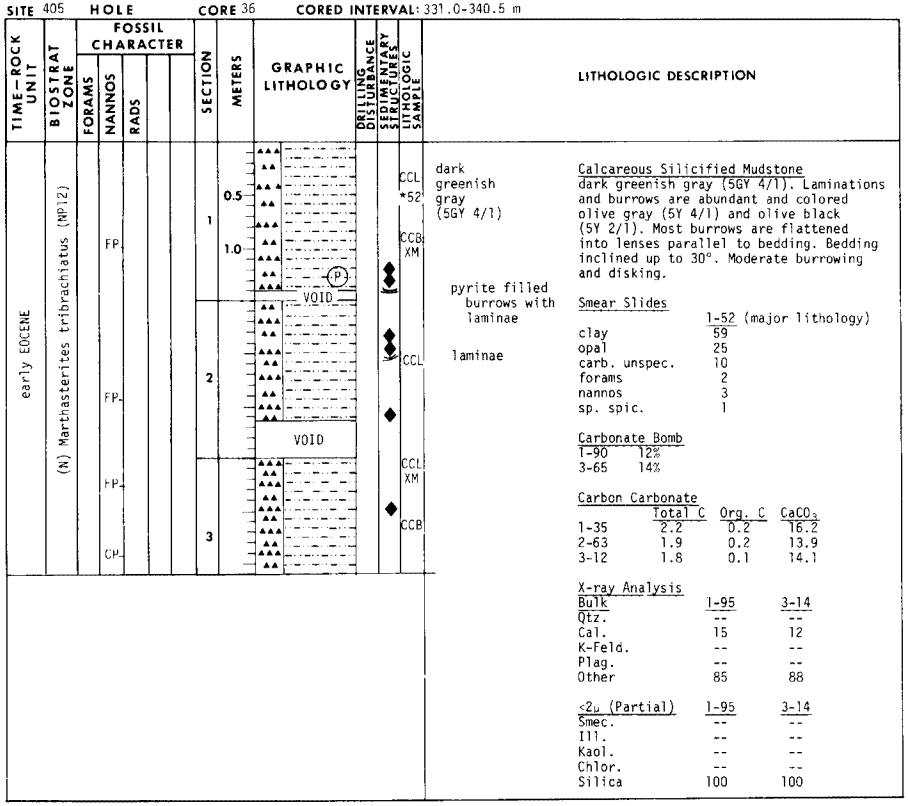
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-22	0.3	0.3	0.2
1-104	4.0	0.6	28.2

X-ray Analysis

Bulk	1-19	<2μ (Partial)	1-19
Qtz.	--	Smec.	68
Cal.	22	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	78	Silica	32

SITE 405 HOLE CORE 36 CORED INTERVAL: 331.0-340.5 m



Calcareous Silicified Mudstone
dark greenish gray (5GY 4/1). Laminations and burrows are abundant and colored olive gray (5Y 4/1) and olive black (5Y 2/1). Most burrows are flattened into lenses parallel to bedding. Bedding inclined up to 30°. Moderate burrowing and disking.

Smear Slides

	1-52 (major lithology)
clay	59
opal	25
carb. unspec.	10
forams	2
nannos	3
sp. spic.	1

Carbonate Bomb

1-90	12%
3-65	14%

Carbon Carbonate

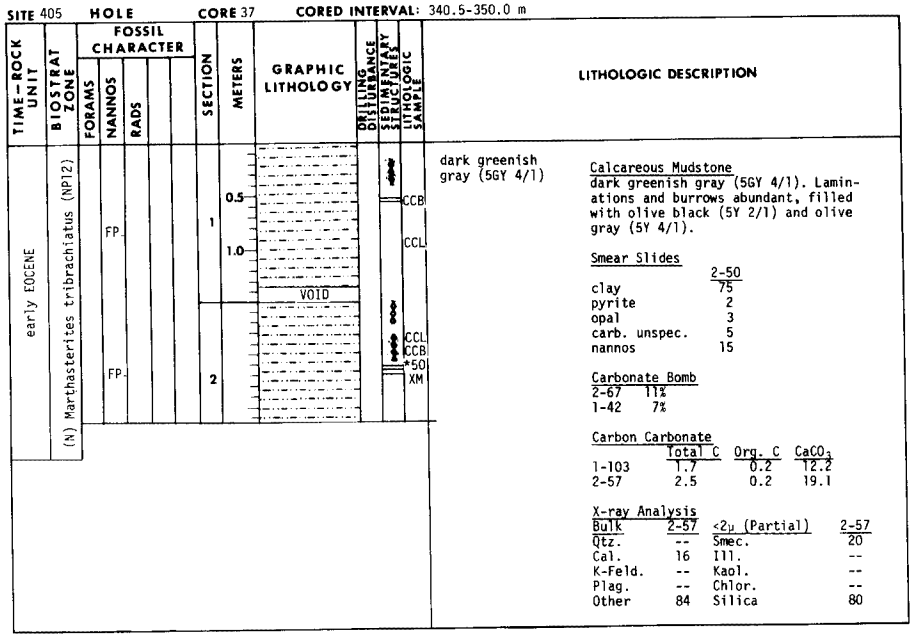
	Total C	Org. C	$CaCO_3$
1-35	2.2	0.2	16.2
2-63	1.9	0.2	13.9
3-12	1.8	0.1	14.1

X-ray Analysis

Bulk	1-95	3-14
Qtz.	--	--
Cal.	15	12
K-Feld.	--	--
Plag.	--	--
Other	85	88

<2μ (Partial)	1-95	3-14
Smec.	--	--
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Silica	100	100

SITE 405 HOLE CORE 37 CORED INTERVAL: 340.5-350.0 m



dark greenish gray (5GY 4/1)

Calcareous Mudstone
dark greenish gray (5GY 4/1). Laminations and burrows abundant, filled with olive black (5Y 2/1) and olive gray (5Y 4/1).

Smear Slides

	2-50
clay	75
pyrite	2
opal	3
carb. unspec.	5
nannos	15

Carbonate Bomb

2-67	11%
1-42	7%

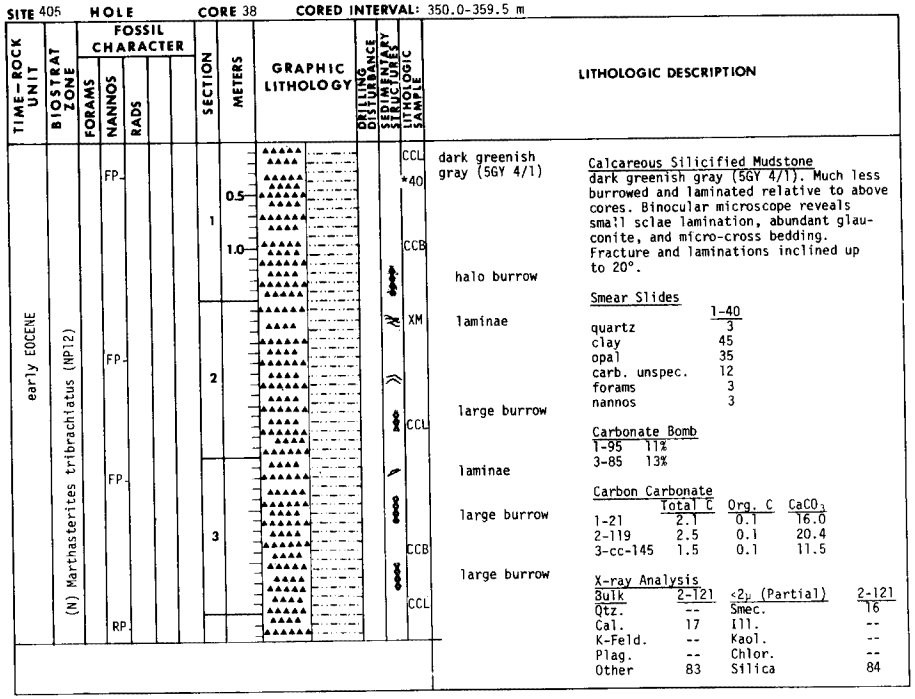
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-103	1.7	0.2	12.2
2-57	2.5	0.2	19.1

X-ray Analysis

Bulk	2-57	<2μ (Partial)	2-57
Qtz.	--	Smec.	20
Cal.	16	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	84	Silica	80

SITE 405 HOLE CORE 38 CORED INTERVAL: 350.0-359.5 m



dark greenish gray (5GY 4/1)

halo burrow

laminae

large burrow

laminae

large burrow

large burrow

Calcareous Silicified Mudstone
dark greenish gray (5GY 4/1). Much less burrowed and laminated relative to above cores. Binocular microscope reveals small sclae lamination, abundant glauconite, and micro-cross bedding. Fracture and laminations inclined up to 20°.

Smear Slides

	1-40
quartz	3
clay	45
opal	35
carb. unspec.	12
forams	3
nannos	3

Carbonate Bomb

1-95	11%
3-85	13%

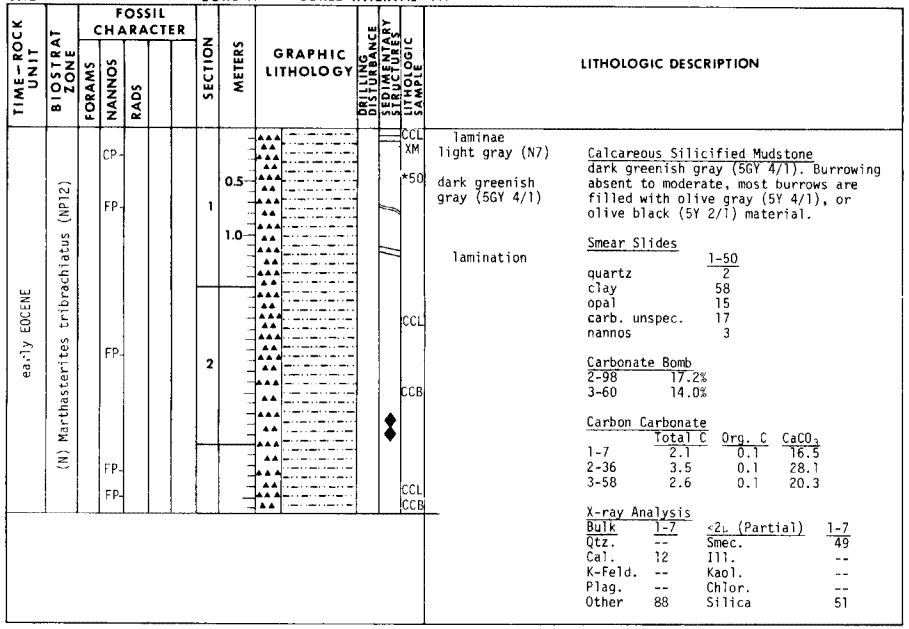
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-21	2.1	0.1	16.0
2-119	2.5	0.1	20.4
3-cc-145	1.5	0.1	11.5

X-ray Analysis

Bulk	2-121	<2μ (Partial)	2-121
Qtz.	--	Smec.	16
Cal.	17	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	83	Silica	84

SITE 405 HOLE CORE 39 CORED INTERVAL: 359.5-369.0 m



Calcareous Silicified Mudstone
dark greenish gray (5GY 4/1). Burrowing absent to moderate, most burrows are filled with olive gray (5Y 4/1), or olive black (5Y 2/1) material.

Smear Slides

	1-50
quartz	2
clay	58
opal	15
carb. unspec.	17
nannos	3

Carbonate Bomb

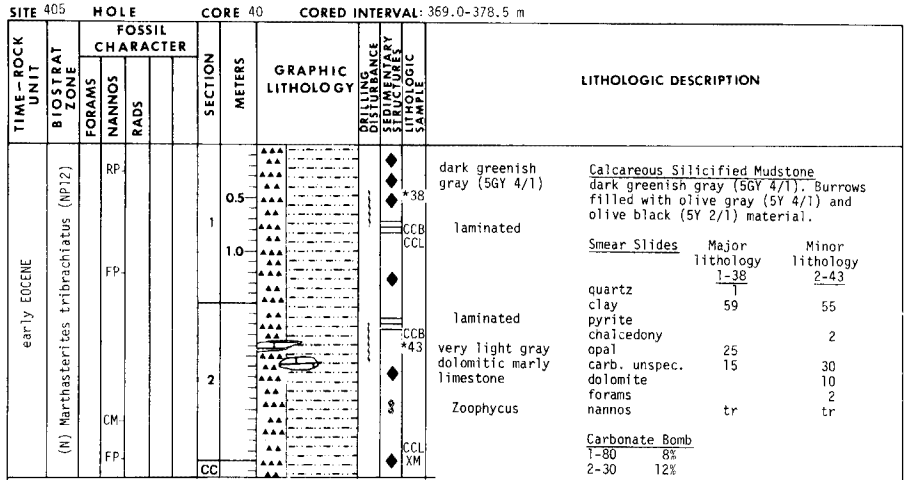
2-98	17.2%
3-60	14.0%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-7	2.1	0.1	16.5
2-36	3.5	0.1	28.1
3-58	2.6	0.1	20.3

X-ray Analysis

Bulk	1-7	<2μ (Partial)	1-7
Qtz.	--	Smec.	49
Cal.	12	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	88	Silica	51

SITE 405 HOLE CORE 40 CORED INTERVAL: 369.0-378.5 m



Calcareous Silicified Mudstone
dark greenish gray (5GY 4/1). Burrows filled with olive gray (5Y 4/1) and olive black (5Y 2/1) material.

Smear Slides	Major lithology 1-38	Minor lithology 2-43
quartz	1	
clay	59	55
pyrite		
chalcedony		2
opal	25	
carb. unspec.	15	30
dolomite		10
forams		2
nannos	tr	tr

Carbonate Bomb

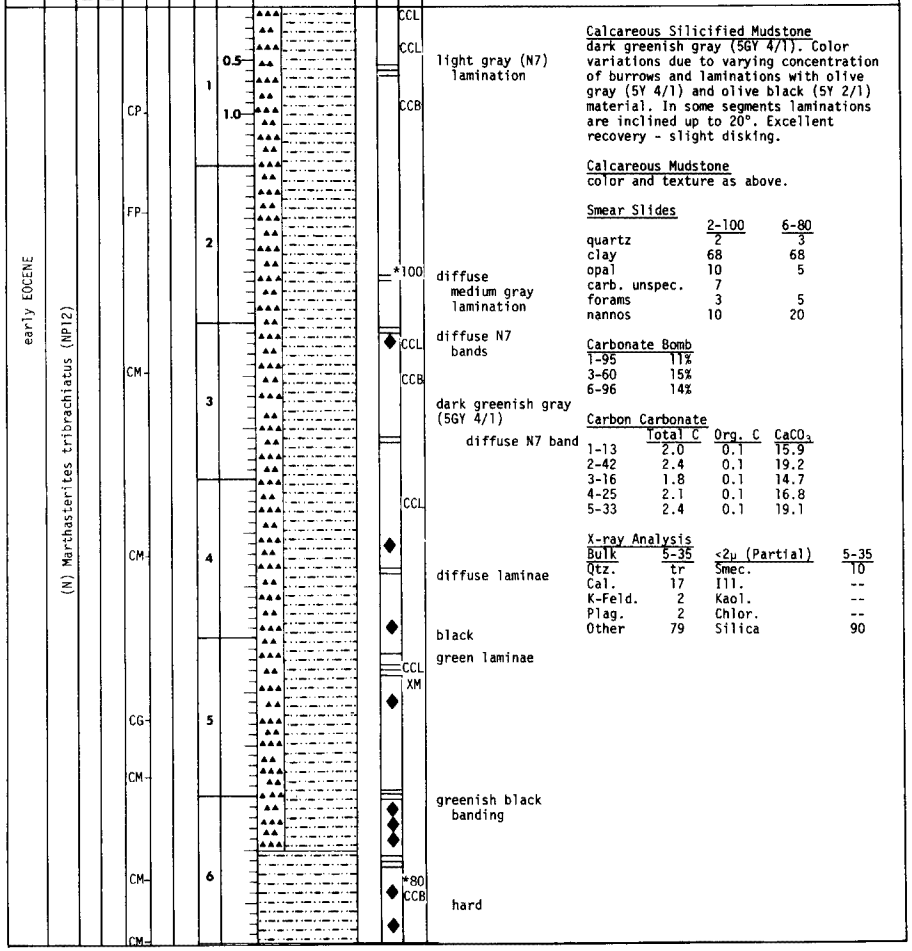
1-80	8%
2-30	12%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-89	2.4	0.1	19.1
2-136	2.6	0.1	21.0

X-ray Analysis

Bulk	2-139	<2μ (Partial)	2-139
Qtz.	--	Smec.	40
Cal.	17	Ill.	--
K-Feld.	--	Kaol.	--
Plag.	--	Chlor.	--
Other	83	Silica	60

SITE 405 HOLE CORE 41 CORED INTERVAL: 378.5-388.0 m



LITHOLOGIC DESCRIPTION

light gray (N7) lamination

diffuse medium gray lamination

diffuse N7 bands

dark greenish gray (5GY 4/1) diffuse N7 band

diffuse laminae

black green laminae

greenish black banding

hard

Calcareous Silicified Mudstone
dark greenish gray (5GY 4/1). Color variations due to varying concentration of burrows and laminations with olive gray (5Y 4/1) and olive black (5Y 2/1) material. In some segments laminations are inclined up to 20°. Excellent recovery - slight disking.

Calcareous Mudstone
color and texture as above.

Smear Slides

	2-100	6-80
quartz	2	3
clay	68	68
opal	10	5
carb. unspec.	7	
forams	3	5
nannos	10	20

Carbonate Bomb

1-95	11%
3-60	15%
6-96	14%

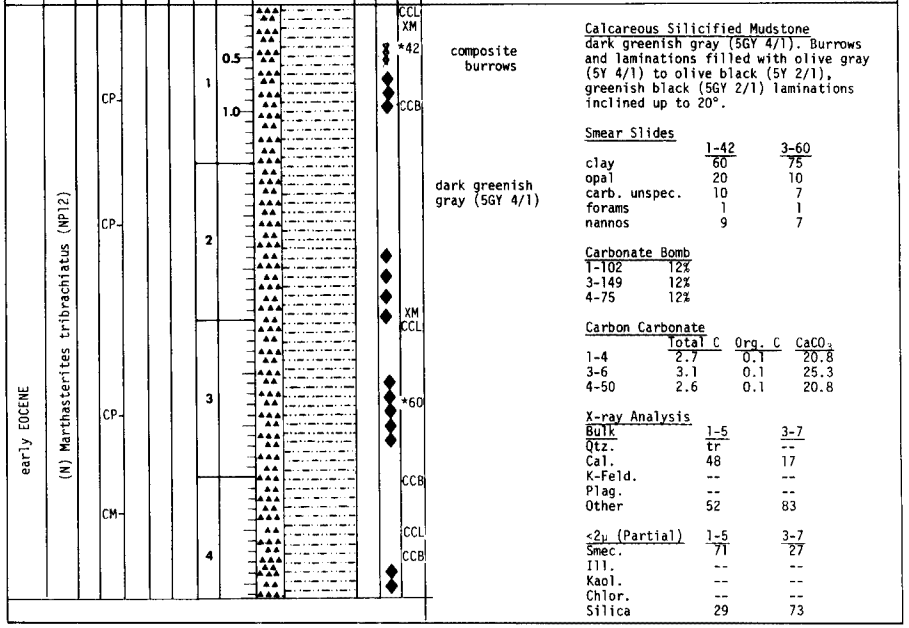
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-13	2.0	0.1	15.9
2-42	2.4	0.1	19.2
3-16	1.8	0.1	14.7
4-25	2.1	0.1	16.8
5-33	2.4	0.1	19.1

X-ray Analysis

Bulk	5-35	<2μ (Partial)	5-35
Qtz.	tr	Smec.	10
Cal.	17	Ill.	--
K-Feld.	2	Kaol.	--
Plag.	2	Chlor.	--
Other	79	Silica	90

SITE 405 HOLE CORE 42 CORED INTERVAL: 388.0-397.5 m



LITHOLOGIC DESCRIPTION

composite burrows

dark greenish gray (5GY 4/1)

Calcareous Silicified Mudstone
dark greenish gray (5GY 4/1). Burrows and laminations filled with olive gray (5Y 4/1) to olive black (5Y 2/1), greenish black (5GY 2/1) laminations inclined up to 20°.

Smear Slides

	1-42	3-60
clay	60	75
opal	20	10
carb. unspec.	10	7
forams	1	1
nannos	9	7

Carbonate Bomb

1-102	12%
3-149	12%
4-75	12%

Carbon Carbonate

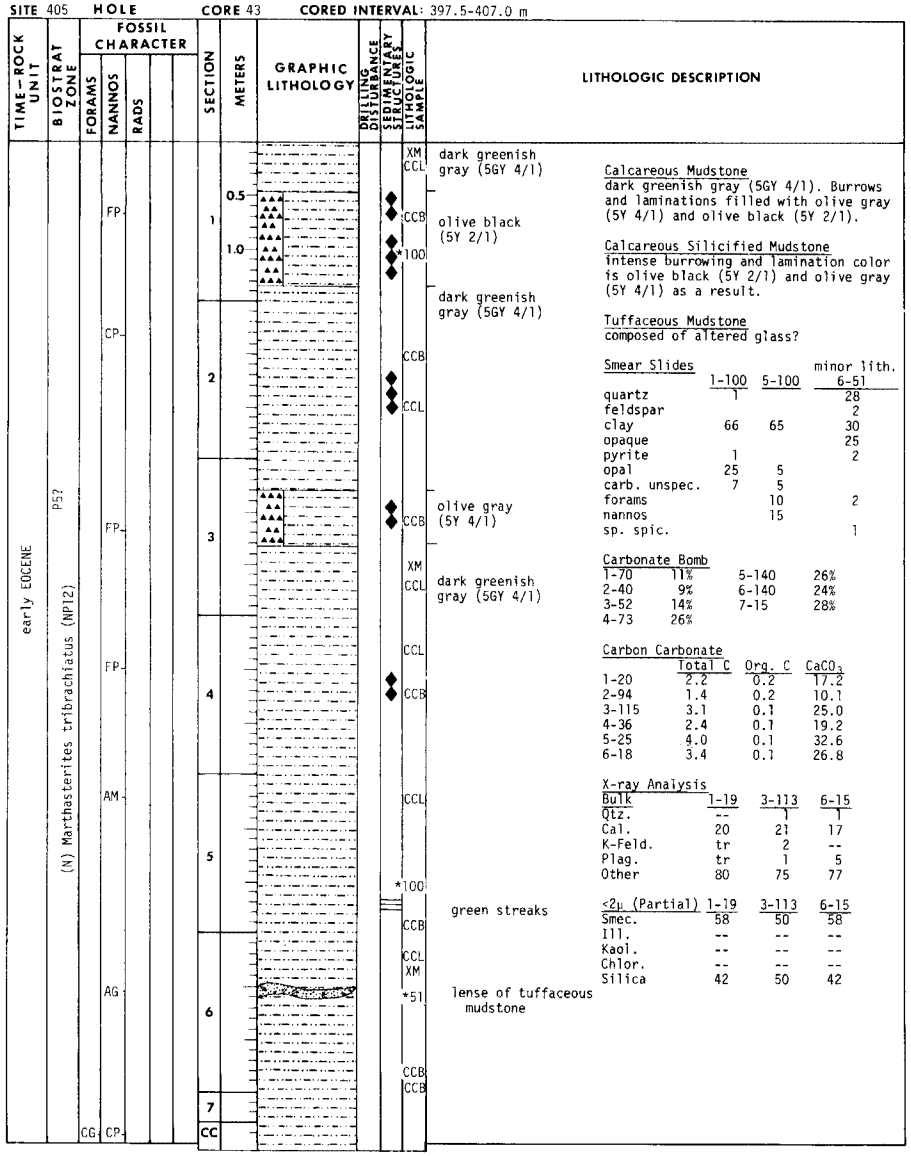
	Total C	Org. C	$CaCO_3$
1-4	2.7	0.1	20.8
3-6	3.1	0.1	25.3
4-50	2.6	0.1	20.8

X-ray Analysis

Bulk	1-5	3-7
Qtz.	tr	--
Cal.	48	17
K-Feld.	--	--
Plag.	--	--
Other	52	83

<2μ (Partial)	1-5	3-7
Smec.	71	27
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Silica	29	73

SITE 405 HOLE CORE 43 CORED INTERVAL: 397.5-407.0 m



Calcareous Mudstone
dark greenish gray (5GY 4/1). Burrows and laminations filled with olive gray (5Y 4/1) and olive black (5Y 2/1).

Calcareous Silicified Mudstone
intense burrowing and lamination color is olive black (5Y 2/1) and olive gray (5Y 4/1) as a result.

Tuffaceous Mudstone
composed of altered glass?

Smear Slides

	1-100	5-100	minor lith. 6-51
quartz	1		28
feldspar			2
clay	66	65	30
opaque			25
pyrite	1		2
opal	25	5	
carb. unspec.	7	5	
forams		10	2
nannos		15	
sp. spic.			1

Carbonate Bomb

1-70	11%	5-140	26%
2-40	9%	6-140	24%
3-52	14%	7-15	28%
4-73	26%		

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-20	2.2	0.2	17.2
2-94	1.4	0.2	10.1
3-115	3.1	0.1	25.0
4-36	2.4	0.1	19.2
5-25	4.0	0.1	32.6
6-18	3.4	0.1	26.8

X-ray Analysis

Bulk	1-19	3-113	6-15
Qtz.	--	1	1
Cal.	20	21	17
K-Feld.	tr	2	--
Plag.	tr	1	5
Other	80	75	77

<2μ (Partial)	1-19	3-113	6-15
Smec.	58	50	58
Ill.	--	--	--
Kaol.	--	--	--
Chlor.	--	--	--
Silica	42	50	42

Leg 48 Site 405
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
405	1	1	0.00	0.17	8.4	0.1	69.1
405	1	2	0.00	2.39	5.7	0.1	46.6
405	1	4	0.00	5.86	2.3	0.1	18.7
405	1	6	0.00	8.12	10.7	0.1	88.9
405	2	2	8.00	10.19	1.9	0.1	14.5
405	2	2	8.00	10.89	9.9	0.1	81.6
405	2	4	8.00	13.22	9.7	0.1	80.0
405	2	6	8.00	15.63	5.5	0.1	44.6
405	3	1	17.50	18.46	9.3	0.1	76.9
405	3	3	17.50	21.17	5.0	0.1	40.4
405	4	1	27.00	27.59	8.4	0.1	69.2
405	5	1	36.50	37.21	4.9	0.1	40.0
405	5	3	36.50	39.74	5.1	0.1	41.7
405	6	1	46.00	47.19	11.3	0.0	94.1
405	7	1	55.50	55.56	10.5	0.0	86.8
405	8	1	65.00	65.11	8.5	0.1	70.1
405	8	5	65.00	71.15	8.5	0.1	70.0
405	8	7	65.00	74.22	8.1	0.1	67.0
405	9	1	74.50	75.03	6.2	0.1	50.7
405	10	4	84.00	89.78	4.1	0.1	34.0
405	10	7	84.00	93.21	4.6	0.1	37.6
405	12	1	103.00	103.91	3.7	0.1	30.4
405	12	3	103.00	106.90	3.2	0.1	25.2
405	12	6	103.00	111.42	3.6	0.1	28.5
405	13	1	112.50	113.12	3.3	0.1	26.5
405	13	3	112.50	116.14	2.8	0.1	22.4
405	13	5	112.50	119.09	2.3	0.1	18.3
405	14	2	122.00	123.71	4.8	0.2	39.0
405	15	1	131.50	132.00	3.3	0.1	26.4
405	15	3	131.50	135.30	2.9	0.1	23.2
405	15	6	131.50	140.18	3.0	0.1	24.0
405	16	1	141.00	141.50	2.3	0.1	18.4
405	16	6	141.00	149.75	2.4	0.1	18.9
405	17	1	150.50	151.55	2.7	0.2	21.2
405	17	5	150.50	157.38	2.5	0.2	19.8
405	18	1	160.00	160.79	2.6	0.2	20.2
405	19	1	169.50	170.36	3.1	0.2	24.2
405	19	3	169.50	173.42	3.4	0.1	27.0
405	27	1	245.50	245.70	5.2	0.2	41.7
405	28	1	255.00	255.34	3.6	0.2	28.4
405	29	CC	264.50	264.60	3.5	0.2	27.8
405	31	2	283.50	285.19	3.2	0.1	25.7
405	31	2	283.50	285.74	1.7	0.1	13.6
405	31	3	283.50	287.09	1.5	0.2	11.4
405	31	3	283.50	287.50	2.1	0.3	15.4
405	32	1	293.00	293.17	1.8	0.2	13.5
405	32	2	293.00	294.77	1.9	0.2	13.8
405	32	3	293.00	296.04	3.2	0.2	25.4

#

Leg 48 Site 405
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
405	33	1	302.50	303.62	2.1	0.3	15.0
405	34	1	312.00	312.30	2.1	0.1	16.6
405	34	2	312.00	314.96	2.0	0.1	16.1
405	35	1	321.50	321.72	0.3	0.3	0.2
405	35	1	321.50	322.54	4.0	0.6	28.2
405	36	1	331.00	331.35	2.2	0.2	16.2
405	36	2	331.00	333.13	1.9	0.2	13.9
405	36	3	331.00	334.12	1.8	0.1	14.1
405	37	1	340.50	341.53	1.7	0.2	12.2
405	37	2	340.50	342.57	2.5	0.2	19.1
405	38	1	350.00	350.21	2.1	0.1	16.0
405	38	2	350.00	352.69	2.5	0.1	20.4
405	38	CC	350.00	354.45	1.5	0.1	11.5
405	39	1	359.50	359.57	2.1	0.1	16.5
405	39	2	359.50	361.36	3.5	0.1	28.1
405	39	3	359.50	363.08	2.6	0.1	20.3
405	40	1	369.00	370.39	2.4	0.1	19.1
405	40	2	369.00	371.86	2.6	0.1	21.0
405	41	1	378.50	378.63	2.0	0.1	15.9
405	41	2	378.50	380.42	2.4	0.1	19.2
405	41	3	378.50	381.66	1.8	0.1	14.7
405	41	4	378.50	383.25	2.1	0.1	16.8
405	41	5	378.50	384.83	2.4	0.1	19.1
405	42	1	388.00	388.04	2.7	0.1	20.8
405	42	1	388.00	388.04	2.7	0.1	20.8
405	42	3	388.00	391.06	3.1	0.1	25.3
405	42	4	388.00	393.00	2.6	0.1	20.8
405	43	1	397.50	397.70	2.2	0.2	17.2
405	43	2	397.50	399.94	1.4	0.2	10.1
405	43	3	397.50	401.65	3.1	0.1	25.0
405	43	4	397.50	402.36	2.4	0.1	19.2
405	43	5	397.50	403.75	4.0	0.1	32.6
405	43	6	397.50	405.18	3.4	0.1	26.8

#

Leg 48 Site 405
DSDP Shore Laboratory Grain Size Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Sand	Silt	Clay
405	1	1	0.00	0.18	76.9	11.1	12.0
405	1	2	0.00	2.42	84.3	8.9	6.8
405	1	4	0.00	5.88	21.0	40.6	38.4
405	1	6	0.00	8.13	15.4	18.1	66.6
405	2	2	8.00	10.17	12.5	49.7	37.8
405	2	2	8.00	10.90	32.1	11.4	56.6
405	2	4	8.00	13.24	47.4	23.6	29.0
405	2	6	8.00	16.57	48.6	28.2	23.2
405	3	1	17.50	18.36	54.0	10.8	35.3
405	3	3	17.50	21.24	42.1	29.3	28.7
405	4	1	27.00	27.62	39.9	19.9	40.2
405	5	1	36.50	37.22	37.7	25.6	36.7
405	5	2	36.50	38.22	39.5	23.7	36.8
405	6	2	46.00	47.61	4.7	36.3	58.9
405	7	1	55.50	55.54	10.3	32.7	57.1
405	8	1	65.00	65.21	16.4	47.8	35.7
405	8	5	65.00	71.12	11.1	46.9	42.0
405	8	7	65.00	74.21	13.5	46.9	39.6
405	9	1	74.50	75.54	6.2	51.5	42.3
405	10	4	84.00	89.80	0.5	30.9	68.6
405	10	7	84.00	93.24	1.8	36.2	62.0
405	12	1	103.00	104.00	0.5	42.8	56.7
405	12	5	103.00	110.01	2.3	48.3	49.4
405	13	3	112.50	116.20	0.5	33.2	66.3
405	13	5	112.50	119.04	2.0	50.5	47.5
405	14	2	122.00	123.68	0.2	38.9	60.9
405	15	1	131.50	132.07	4.6	48.9	46.6
405	15	3	131.50	135.40	0.4	39.3	60.3
405	16	1	141.00	141.57	1.7	51.7	46.6
405	16	6	141.00	149.66	2.2	46.5	51.3
405	17	1	150.50	151.53	1.4	48.4	50.2
405	19	1	169.50	170.30	1.8	53.6	44.6

#

DEEP SEA DRILLING PROJECT
LEG 48 SITE 406
SITE SUMMARY SHEET

Date occupied	1521 July 4, 1976
Date departed	0945 July 8, 1976
Time on site	
Position: latitude	55°15.50'N
longitude	22°05.41'W
Water depth (sea level)	2907 corrected meters, echo sounding
Water depth (rig floor)	2923 meters, drill pipe
Penetration	831.5 meters
Number of holes	1
Number of cores	52
Total length of cored section	489.5 meters
Total core recovered	189.42 meters
Percentage of core recovery	38.69%
Oldest Sediment Cored	
Depth subbottom	831.5 meters
Nature	Calcareous mudstone
Age	Lower Eocene
Measured velocity	2.1 km sec^{-1}
Basement	Not reached

PRINCIPAL RESULTS:

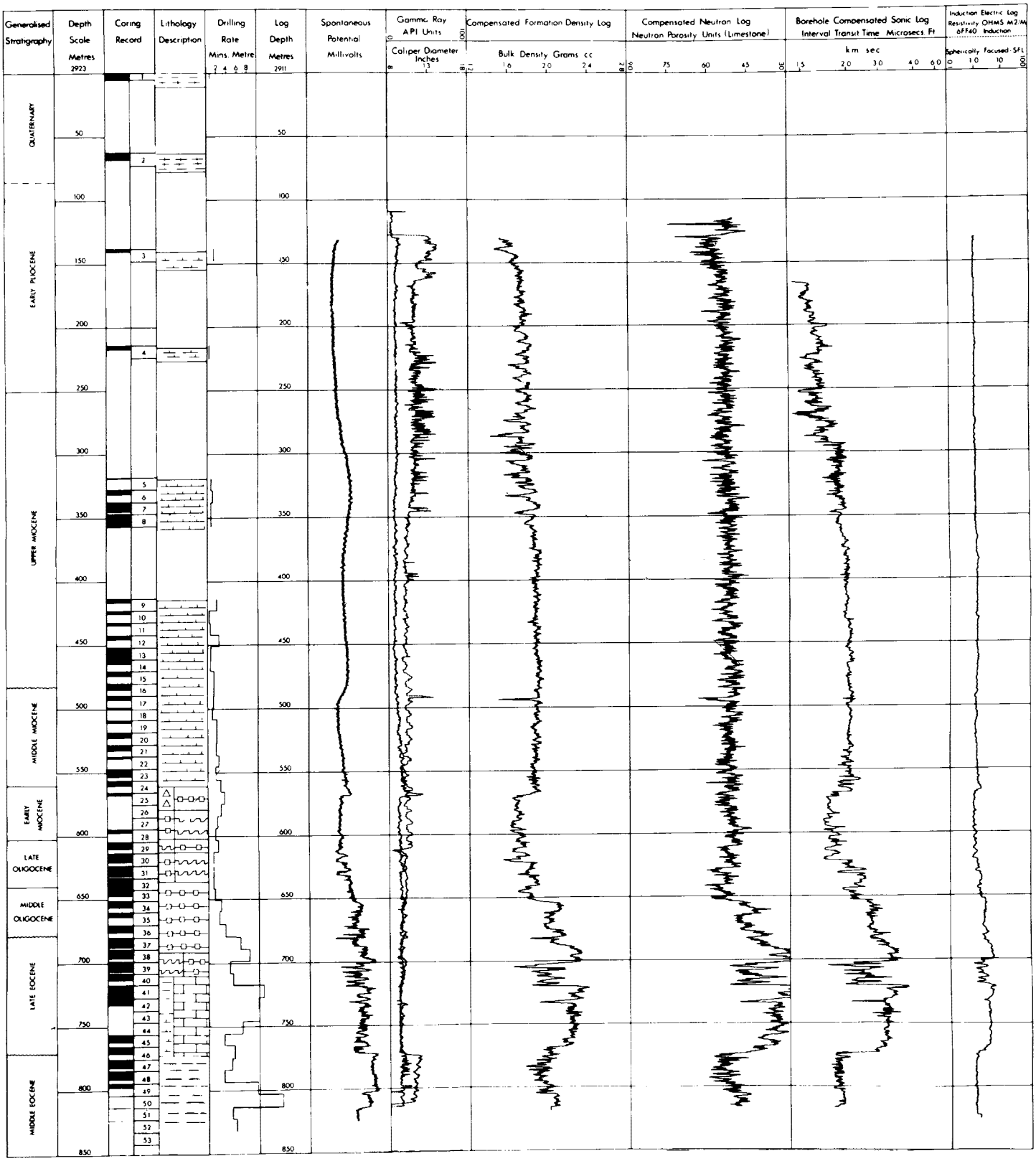
Site 406 is situated about five miles south of Site 405 and was designed to penetrate the Pliocene to early Eocene section which is missing at 405. The hole was spot cored to a depth of 413.5 meters and then cored continuously to the final subbottom depth of 822 meters.

Five main lithologic units were distinguished in the section. Unit 1 (0-71.5 meters) is made up of interbedded calcareous mud, marly foram nanno ooze and foram nanno ooze of Quaternary to Pliocene age. Unit 2 (138-557.5 meters) of upper-middle Miocene age consists dominantly of bluish white nanno ooze but grades downward to greenish gray siliceous chalk at the base. Unit 3 (557-613 meters) is composed principally of diatomaceous chalk and greenish yellow, well-laminated diatomite of lower Miocene to Oligocene age. Unit 4 (613-765 meters) ranges in age from Oligocene to upper Eocene. Light greenish gray calcareous chalk dominates the Oligocene part of the section whereas the upper Eocene includes interbedded diatomaceous chalk, calcareous chalk and marly limestone. Varied sedimentary structures are common in this unit and include striking contorted (slump) lamination, varve-like horizontal lamination, occasional graded bedding and microfaults. The lowermost unit (765-822 meters) of middle Eocene age consists of dark greenish gray marly chalk and marks an abrupt drop in carbonate content compared to most of the overlying section.

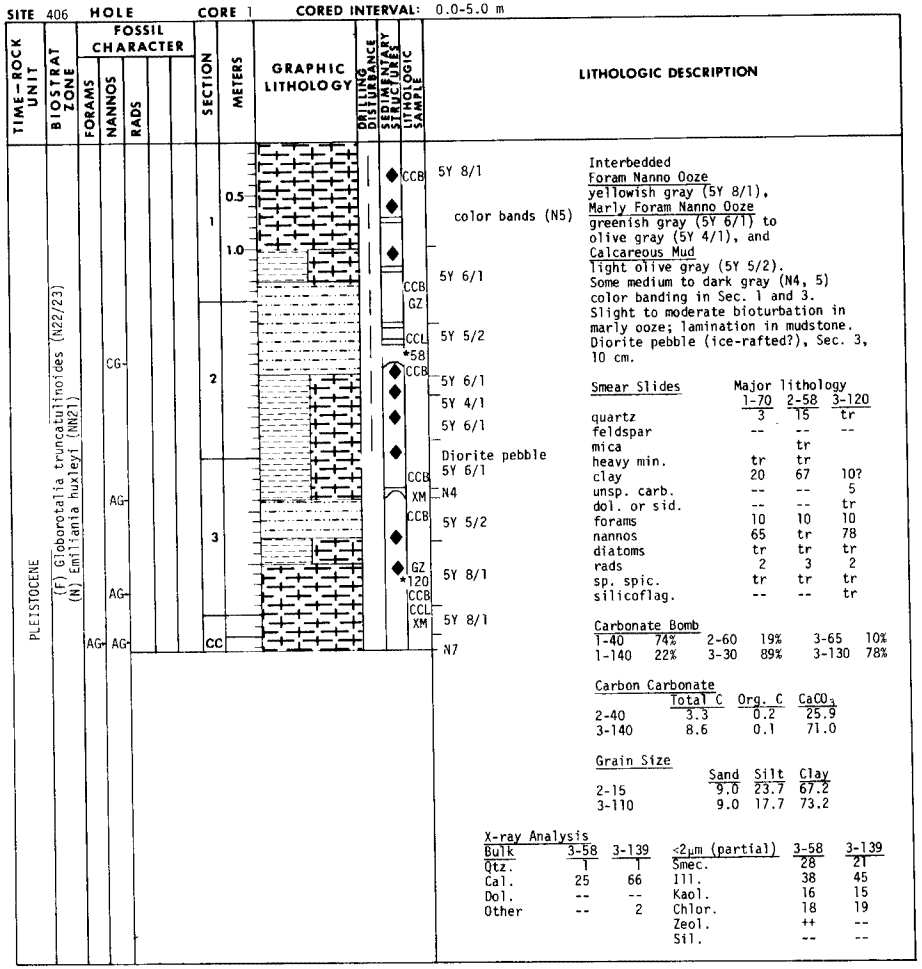
The lower-middle Eocene sediments drilled at Sites 405-406 are interpreted to represent a large submarine fan built seaward from the foot of the transform fault in bathyal depths. The clays may have been derived from the shallower Hatton-Rockall basin to the northeast. Nearby shallow depths are indicated by the presence of incorporated upper slope-shelf edge benthonic forams. Hiatuses occur between the upper and middle Eocene and between the middle Oligocene and upper Eocene. These are tentatively attributed to periods of increased bottom currents related perhaps to changes in circulation pattern. The alternation of carbonate and diatomite as well as intervals of slumping likwise may owe to circulation and attendent upwelling effects. The thick section of Miocene calcareous ooze is probably the product of sediment drifting as noted elsewhere on the Rockall Plateau.

DOWNHOLE LOGS AND GENERALIZED STRATIGRAPHY

DSDP LEG 48 SITE 406



SITE 406 HOLE CORE 1 CORED INTERVAL: 0.0-5.0 m



Interbedded
Foram Nanno Ooze
yellowish gray (5Y 8/1),
Marly Foram Nanno Ooze
greenish gray (5Y 6/1) to
olive gray (5Y 4/1), and
Calcareous Mud
light olive gray (5Y 5/2).
Some medium to dark gray (N4, 5) color banding in Sec. 1 and 3.
Slight to moderate bioturbation in marly ooze; lamination in mudstone.
Diorite pebble (ice-rafted?), Sec. 3, 10 cm.

Smear Slides	Major lithology 1-70	2-58	3-120
quartz	3	15	tr
feldspar	--	--	--
mica		tr	
heavy min.	tr	tr	
clay	20	67	10?
unsp. carb.	--	--	5
dol. or sid.	--	--	tr
forams	10	10	10
nannos	65	tr	78
diatoms	tr	tr	tr
rads	2	3	2
sp. spic.	tr	tr	tr
silicoflag.	--	--	tr

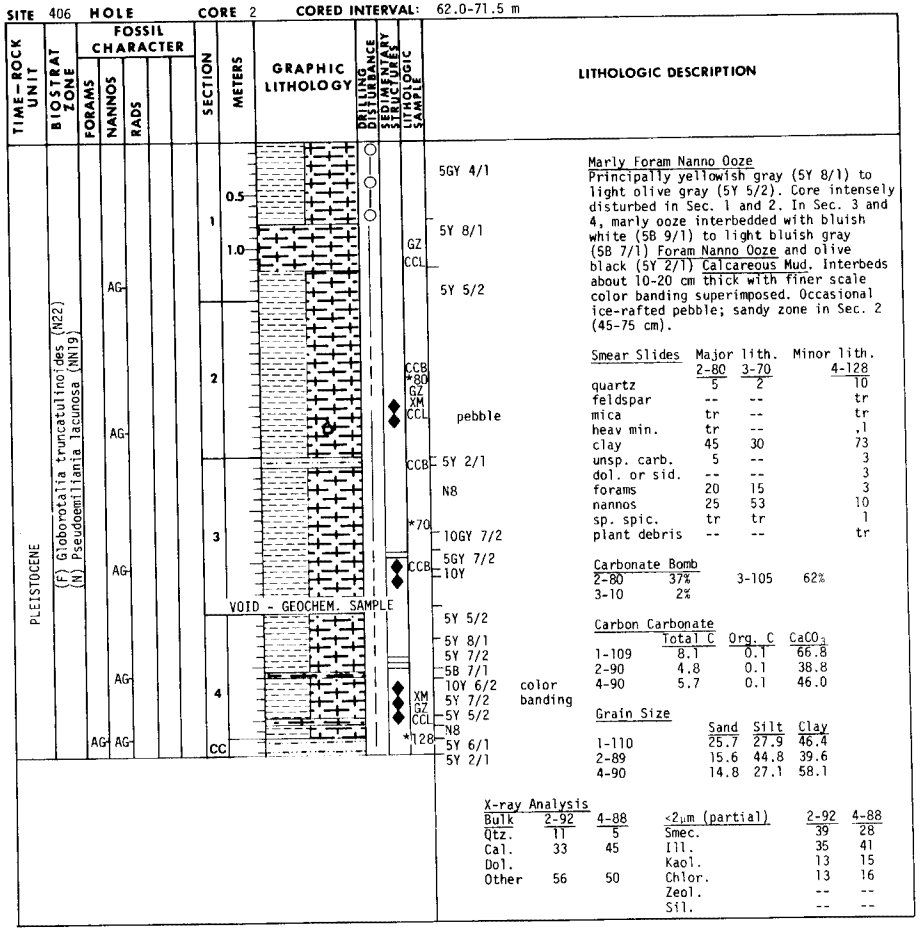
Carbonate Bomb					
1-40	74%	2-60	19%	3-65	10%
1-140	22%	3-30	89%	3-130	78%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
2-40	3.3	0.2	25.9
3-140	8.6	0.1	71.0

Grain Size	Sand	Silt	Clay
2-15	9.0	23.7	67.2
3-110	9.0	17.7	73.2

X-ray Analysis Bulk	3-58	3-139	<2μm (partial)	3-58	3-139
Qtz.	1	1	Smec.	28	21
Cal.	25	66	Ill.	38	45
Dol.	--	--	Kaol.	16	15
Other	--	2	Chlor.	18	19
			Zeol.	++	--
			Sil.	--	--

SITE 406 HOLE CORE 2 CORED INTERVAL: 62.0-71.5 m



Marly Foram Nanno Ooze
Principally yellowish gray (5Y 8/1) to light olive gray (5Y 5/2). Core intensely disturbed in Sec. 1 and 2. In Sec. 3 and 4, marly ooze interbedded with bluish white (5B 9/1) to light bluish gray (5B 7/1) Foram Nanno Ooze and olive black (5Y 2/1) Calcareous Mud. Interbeds about 10-20 cm thick with finer scale color banding superimposed. Occasional ice-rafted pebble; sandy zone in Sec. 2 (45-75 cm).

Smear Slides	Major lith. 2-80	3-70	Minor lith. 4-128
quartz	5	2	10
feldspar	--	--	tr
mica	tr	--	tr
heav min.	tr	--	,1
clay	45	30	73
unsp. carb.	5	--	3
dol. or sid.	--	--	3
forams	20	15	3
nannos	25	53	10
sp. spic.	tr	tr	1
plant debris	--	--	tr

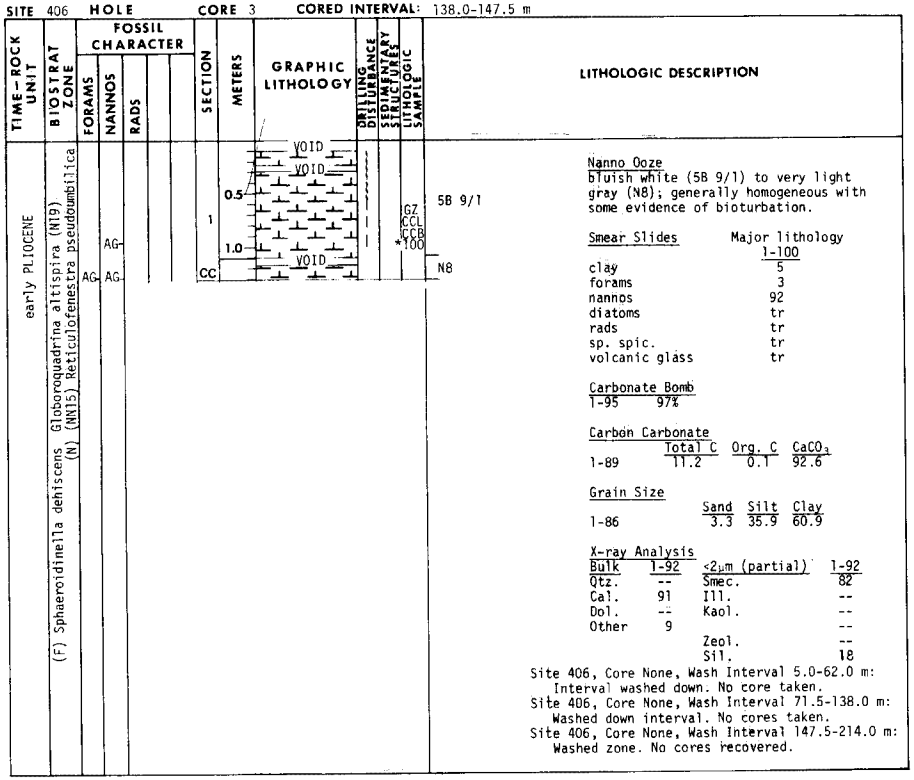
Carbonate Bomb			
2-80	37%	3-105	62%
3-10	2%		

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-109	8.1	0.1	66.8
2-90	4.8	0.1	38.8
4-90	5.7	0.1	46.0

Grain Size	Sand	Silt	Clay
1-110	25.7	27.9	46.4
2-89	15.6	44.8	39.6
4-90	14.8	27.1	58.1

X-ray Analysis Bulk	2-92	4-88	<2μm (partial)	2-92	4-88
Qtz.	11	5	Smec.	39	28
Cal.	33	45	Ill.	35	41
Dol.			Kaol.	13	15
Other	56	50	Chlor.	13	16
			Zeol.	--	--
			Sil.	--	--

SITE 406 HOLE CORE 3 CORED INTERVAL: 138.0-147.5 m



LITHOLOGIC DESCRIPTION

Nanno Ooze
bluish white (5B 9/1) to very light gray (N8); generally homogeneous with some evidence of bioturbation.

Smear Slides	Major lithology 1-100
clay	5
forams	3
nannos	92
diatoms	tr
rads	tr
sp. spic.	tr
volcanic glass	tr

Carbonate Bomb
1-95 97%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-89	11.2	0.1	92.6

Grain Size

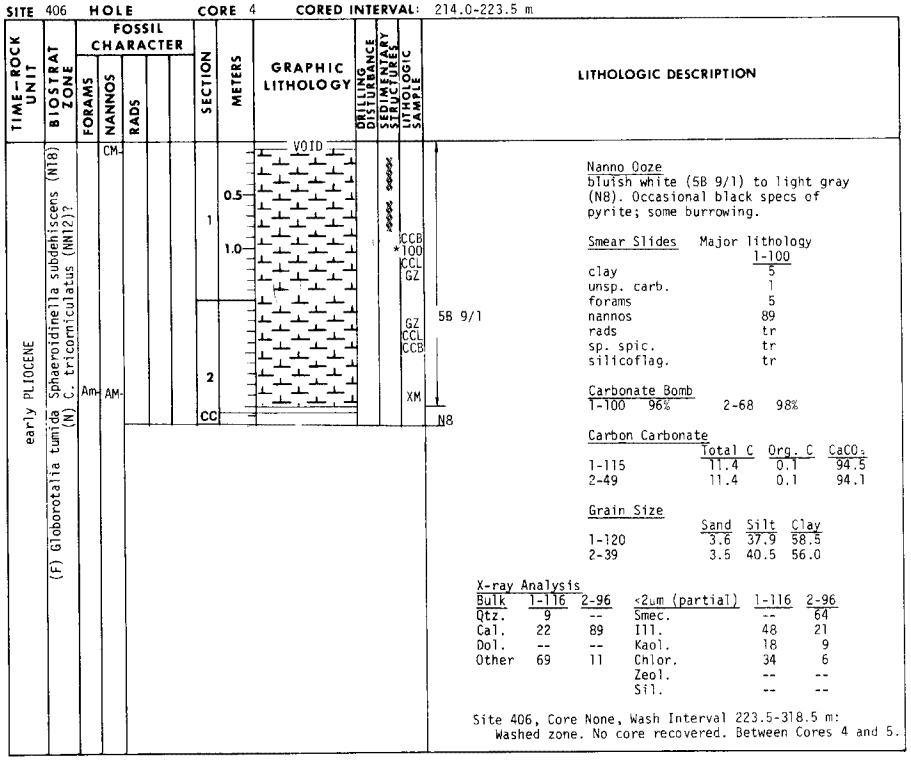
	Sand	Silt	Clay
1-86	3.3	35.9	60.9

X-ray Analysis

Bulk	1-92	<2μm (partial)	1-92
Qtz.	--	Smec.	82
Cal.	91	Ill.	--
Dol.	--	Kaol.	--
Other	9		--
		Zeol.	--
		Sil.	18

Site 406, Core None, Wash Interval 5.0-62.0 m: Interval washed down. No core taken.
Site 406, Core None, Wash Interval 71.5-138.0 m: Washed down interval. No cores taken.
Site 406, Core None, Wash Interval 147.5-214.0 m: Washed zone. No cores recovered.

SITE 406 HOLE CORE 4 CORED INTERVAL: 214.0-223.5 m



LITHOLOGIC DESCRIPTION

Nanno Ooze
bluish white (5B 9/1) to light gray (N8). Occasional black specs of pyrite; some burrowing.

Smear Slides	Major lithology 1-100
clay	5
unsp. carb.	1
forams	5
nannos	89
rads	tr
sp. spic.	tr
silicoflag.	tr

Carbonate Bomb
1-100 96% 2-68 98%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-115	11.4	0.1	94.5
2-49	11.4	0.1	94.1

Grain Size

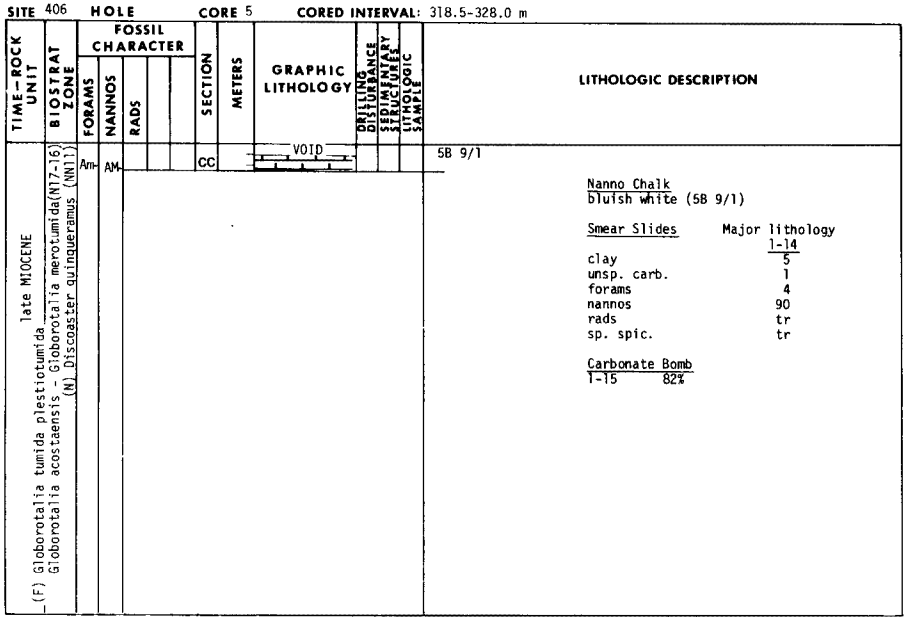
	Sand	Silt	Clay
1-120	3.6	37.9	58.5
2-39	3.5	40.5	56.0

X-ray Analysis

Bulk	1-116	2-96	<2μm (partial)	1-116	2-96
Qtz.	9	--	Smec.	--	64
Cal.	22	89	Ill.	48	21
Dol.	--	--	Kaol.	18	9
Other	69	11	Chlor.	34	6
			Zeol.	--	--
			Sil.	--	--

Site 406, Core None, Wash Interval 223.5-318.5 m: Washed zone. No core recovered. Between Cores 4 and 5.

SITE 406 HOLE CORE 5 CORED INTERVAL: 318.5-328.0 m

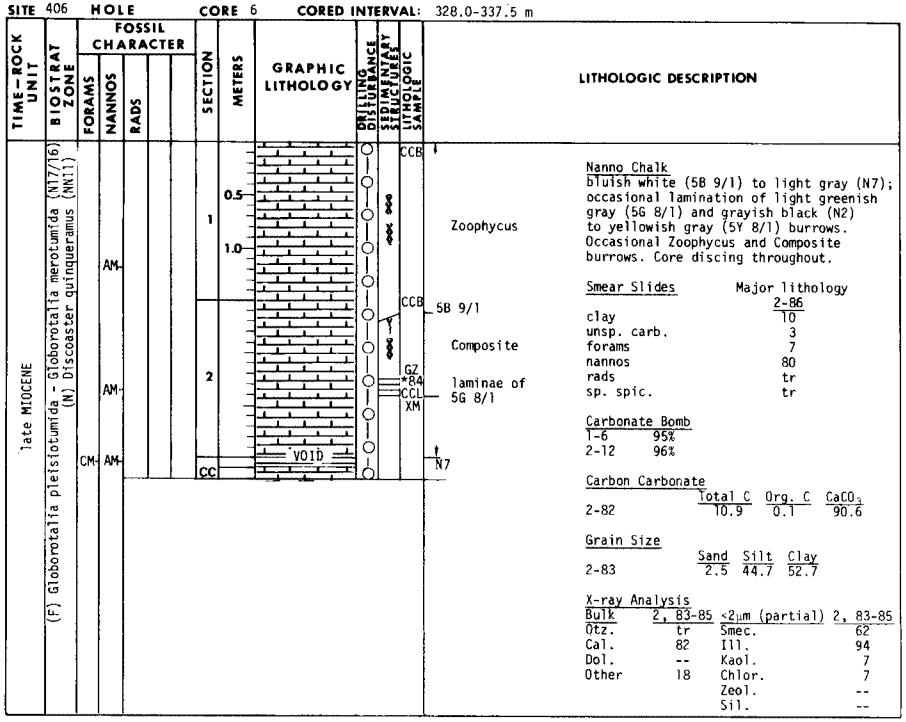


Nanno Chalk
bluish white (5B 9/1)

Smear Slides	Major lithology 1-14
clay	5
unsp. carb.	1
forams	4
nannos	90
rads	tr
sp. spic.	tr

Carbonate Bomb
1-15 82%

SITE 406 HOLE CORE 6 CORED INTERVAL: 328.0-337.5 m



Nanno Chalk
bluish white (5B 9/1) to light gray (N7); occasional lamination of light greenish gray (5G 8/1) and grayish black (N2) to yellowish gray (5Y 8/1) burrows. Occasional Zoophycus and Composite burrows. Core discing throughout.

Smear Slides	Major lithology 2-86
clay	10
unsp. carb.	3
forams	7
nannos	80
rads	tr
sp. spic.	tr

Carbonate Bomb
1-6 95%
2-12 96%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
2-82	10.9	0.1	90.6

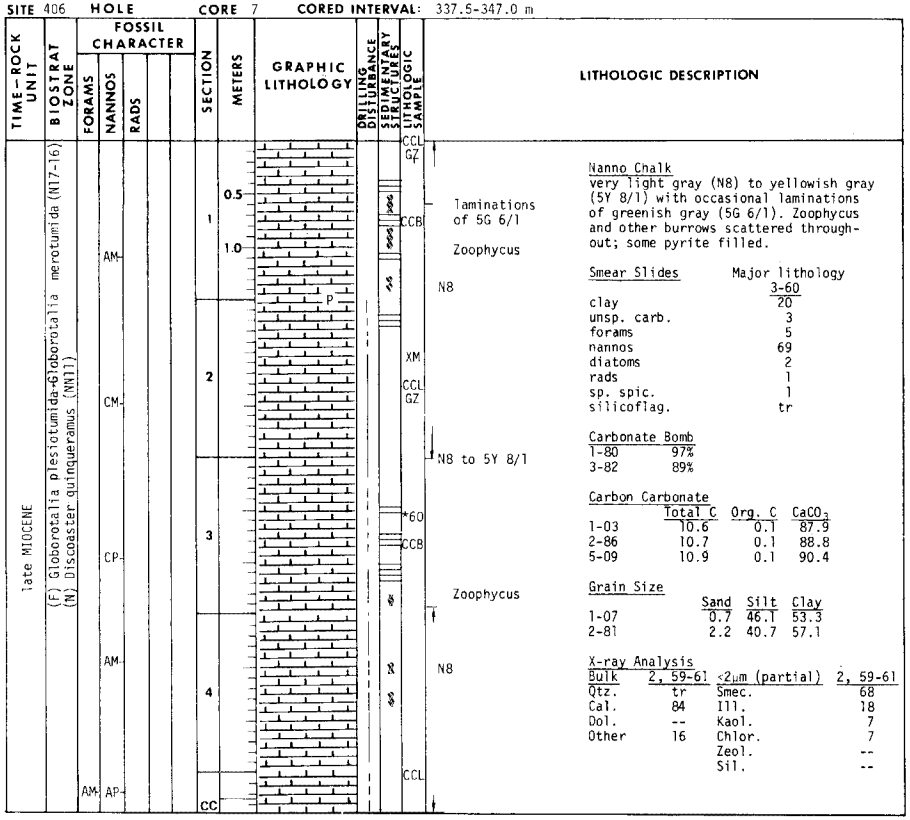
Grain Size

	Sand	Silt	Clay
2-83	2.5	44.7	52.7

X-ray Analysis

Bulk	2, 83-85	<2μm (partial)	2, 83-85
Otz.	tr	Smec.	62
Cal.	82	Ill.	94
Dol.	--	Kaol.	7
Other	18	Chlor.	7
		Zeol.	--
		Sil.	--

SITE 406 HOLE CORE 7 CORED INTERVAL: 337.5-347.0 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
very light gray (N8) to yellowish gray (5Y 8/1) with occasional laminations of greenish gray (5G 6/1). Zoophycus and other burrows scattered throughout; some pyrite filled.

Smear Slides	Major lithology 3-60
clay	20
unsp. carb.	3
forams	5
nannos	69
diatoms	2
rads	1
sp. spic.	1
silicoflag.	tr

Carbonate Bomb

1-80	97%
3-82	89%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-03	10.6	0.1	87.9
2-86	10.7	0.1	88.8
5-09	10.9	0.1	90.4

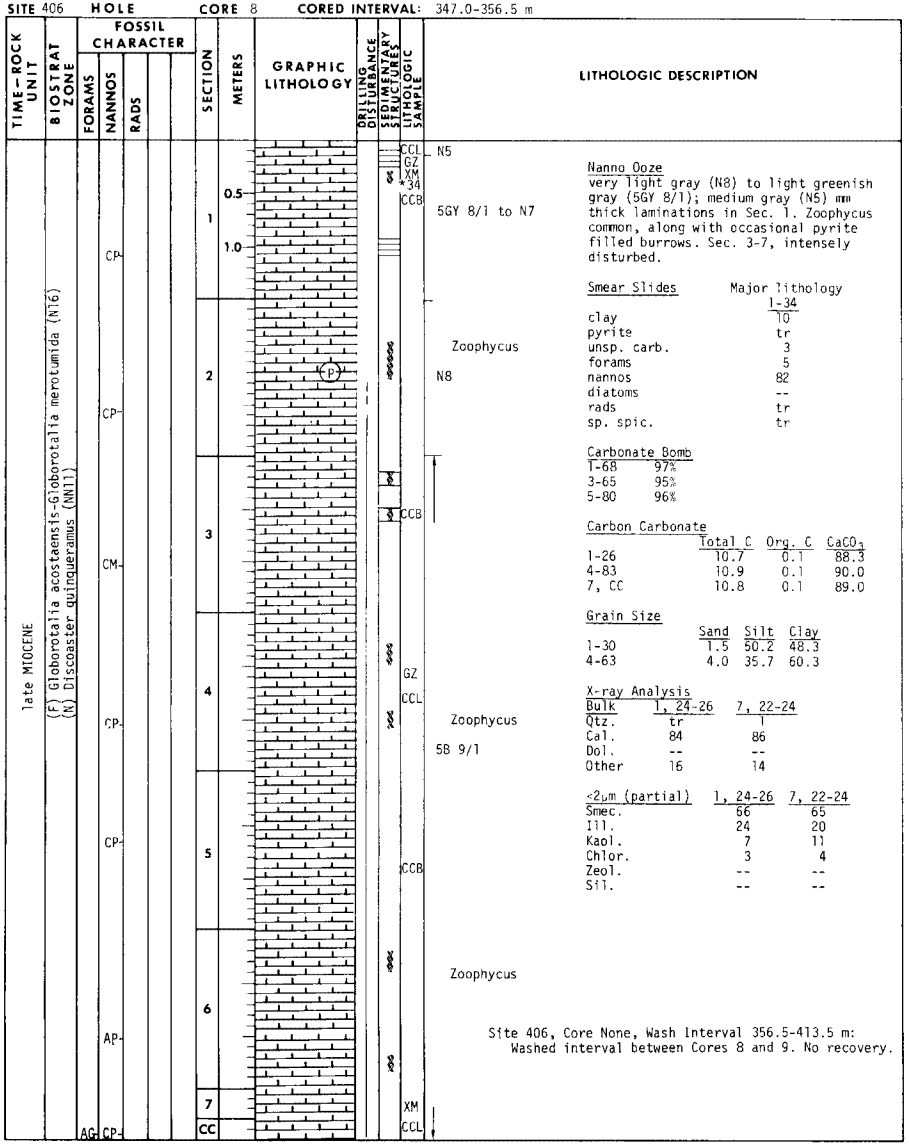
Grain Size

	Sand	Silt	Clay
1-07	0.7	46.1	53.3
2-81	2.2	40.7	57.1

X-ray Analysis

Bulk	2, 59-61	<2μm (partial)	2, 59-61
Qtz.	tr	Smec.	68
Cal.	84	Ill.	18
Dol.	--	Kaol.	7
Other	16	Chlor.	7
		Zeol.	--
		Sil.	--

SITE 406 HOLE CORE 8 CORED INTERVAL: 347.0-356.5 m



LITHOLOGIC DESCRIPTION

Nanno Ooze
very light gray (N8) to light greenish gray (5GY 8/1); medium gray (N5) mm thick laminations in Sec. 1. Zoophycus common, along with occasional pyrite filled burrows. Sec. 3-7, intensely disturbed.

Smear Slides	Major lithology 1-34
clay	10
pyrite	tr
unsp. carb.	3
forams	5
nannos	82
diatoms	--
rads	tr
sp. spic.	tr

Carbonate Bomb

1-68	97%
3-65	95%
5-80	96%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-26	10.7	0.1	88.3
4-83	10.9	0.1	90.0
7, CC	10.8	0.1	89.0

Grain Size

	Sand	Silt	Clay
1-30	1.5	50.2	48.3
4-63	4.0	35.7	60.3

X-ray Analysis

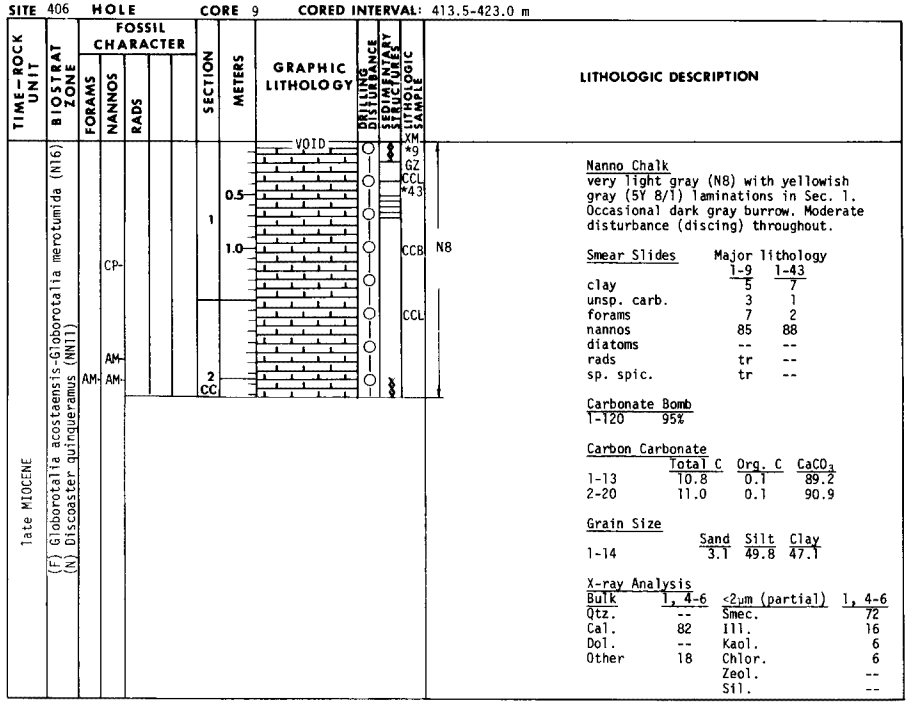
Bulk	1, 24-26	7, 22-24
Qtz.	tr	1
Cal.	84	86
Dol.	--	--
Other	16	14

<2μm (partial)	1, 24-26	7, 22-24
Smec.	56	65
Ill.	24	20
Kaol.	7	11
Chlor.	3	4
Zeol.	--	--
Sil.	--	--

Zoophycus

Site 406, Core None, Wash Interval 356.5-413.5 m: Washed interval between Cores 8 and 9. No recovery.

SITE 406 HOLE CORE 9 CORED INTERVAL: 413.5-423.0 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
very light gray (N8) with yellowish gray (5Y 8/1) laminations in Sec. 1. Occasional dark gray burrow. Moderate disturbance (discing) throughout.

Smear Slides	Major lithology 1-9	1-43
clay	5	7
unsp. carb.	3	1
forams	7	2
nannos	85	88
diatoms	--	--
rads	tr	--
sp. spic.	tr	--

Carbonate Bomb
1-120 95%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-13	10.8	0.1	89.2
2-20	11.0	0.1	90.9

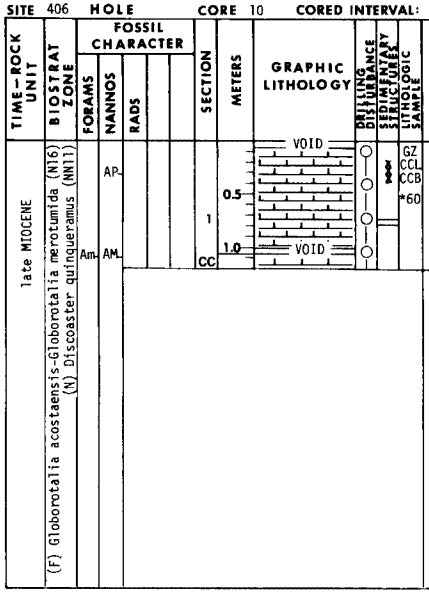
Grain Size

	Sand	Silt	Clay
1-14	3.1	49.8	47.1

X-ray Analysis

Bulk	1, 4-6	<2μm (partial)	1, 4-6
Qtz.	--	Smec.	72
Cal.	82	Ill.	16
Dol.	--	Kaol.	6
Other	18	Chlor.	6
		Zeol.	--
		Sil.	--

SITE 406 HOLE CORE 10 CORED INTERVAL: 423.0-432.5 m



5B 9/1

LITHOLOGIC DESCRIPTION

Nanno Chalk
bluish white (5B 9/1); occasional lamination, Zoophycus burrow, and pyrite specs. Core discing throughout.

Smear Slides	Major lithology 1-60
clay	5
unsp. carb.	5
forams	7
nannos	83
rads	tr
sp. spic.	tr

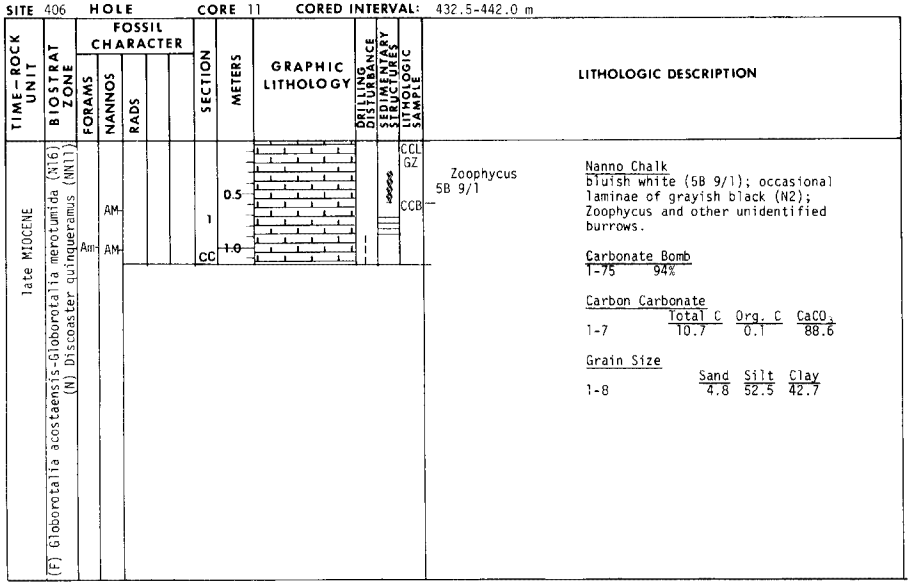
Carbonate Bomb
1-67 94%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-24	11.2	0.1	92.4

Grain Size

	Sand	Silt	Clay
1-22	4.2	39.9	55.9

SITE 406 HOLE CORE 11 CORED INTERVAL: 432.5-442.0 m



Nanno Chalk
bluish white (5B 9/1); occasional laminae of grayish black (N2); Zoophycus and other unidentified burrows.

Carbonate Bomb
1-75 94%

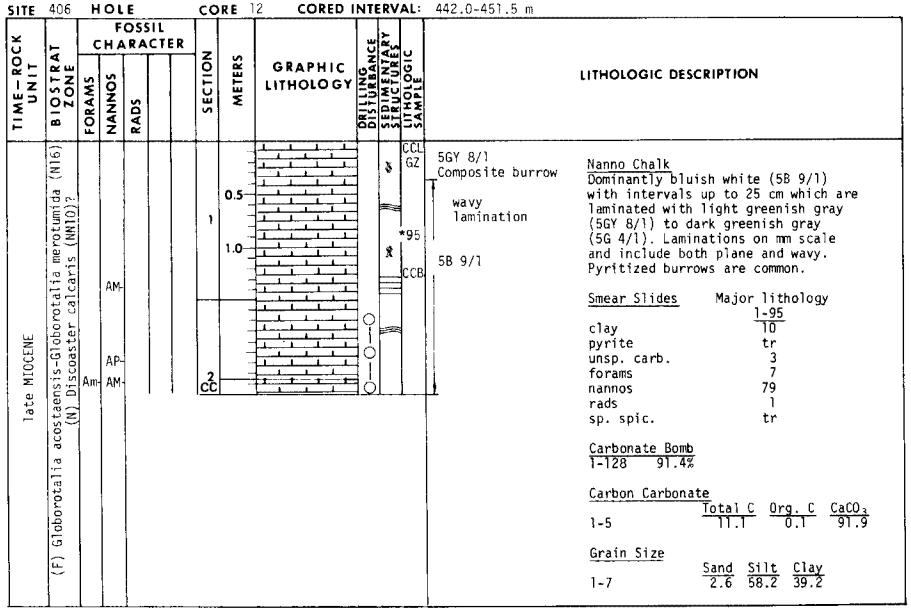
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-7	10.7	0.1	88.6

Grain Size

	Sand	Silt	Clay
1-8	4.8	52.5	42.7

SITE 406 HOLE CORE 12 CORED INTERVAL: 442.0-451.5 m



Nanno Chalk
Dominantly bluish white (5B 9/1) with intervals up to 25 cm which are laminated with light greenish gray (5GY 8/1) to dark greenish gray (5G 4/1). Laminations on mm scale and include both plane and wavy. Pyritized burrows are common.

Smear Slides	Major lithology 1-95
clay	10
pyrite	tr
unsp. carb.	3
forams	7
nannos	79
rads	1
sp. spic.	tr

Carbonate Bomb
1-128 91.4%

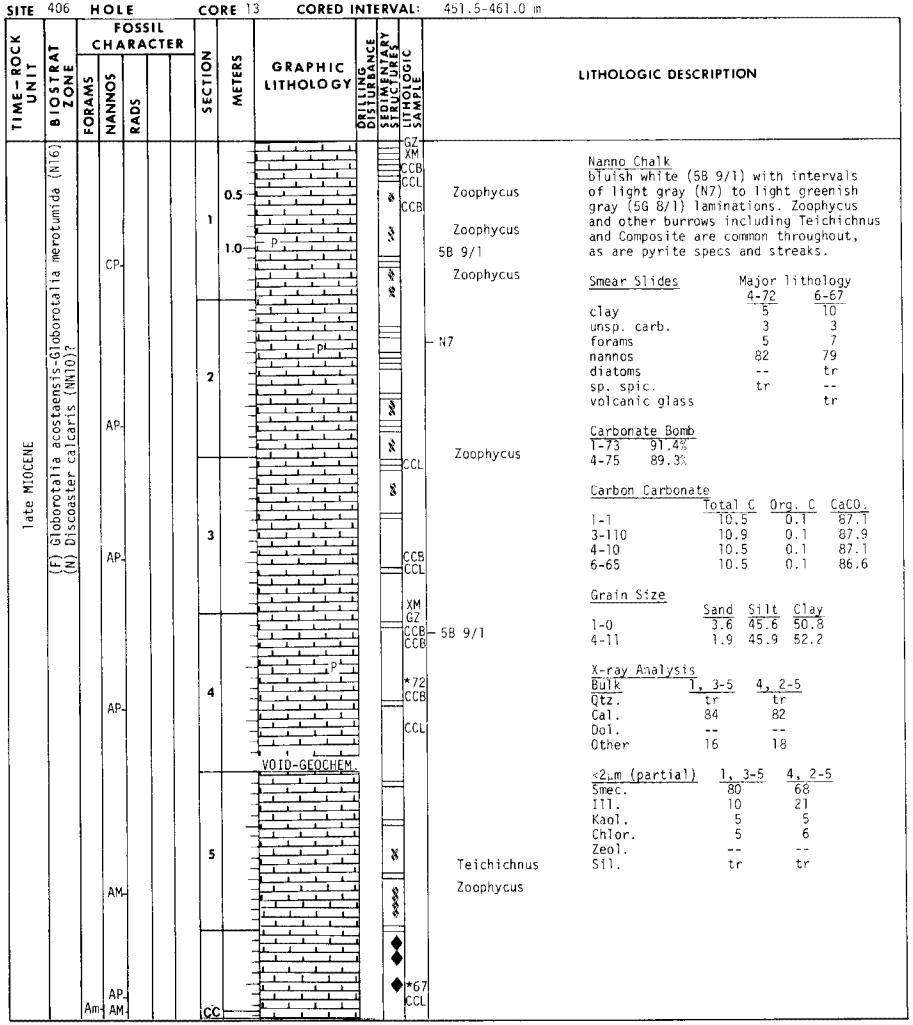
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-5	11.1	0.1	91.9

Grain Size

	Sand	Silt	Clay
1-7	2.6	58.2	39.2

SITE 406 HOLE CORE 13 CORED INTERVAL: 451.5-461.0 m



Nanno Chalk
bluish white (5B 9/1) with intervals of light gray (N7) to light greenish gray (5G 8/1) laminations. Zoophycus and other burrows including Teichichnus and Composite are common throughout, as are pyrite specs and streaks.

Smear Slides	Major lithology 4-72	6-67
clay	5	10
unsp. carb.	3	3
forams	5	7
nannos	82	79
diatoms	--	tr
sp. spic.	tr	--
volcanic glass		tr

Carbonate Bomb
1-73 91.4%
4-75 89.3%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-1	10.5	0.1	87.1
3-110	10.9	0.1	87.9
4-10	10.5	0.1	87.1
6-65	10.5	0.1	86.6

Grain Size

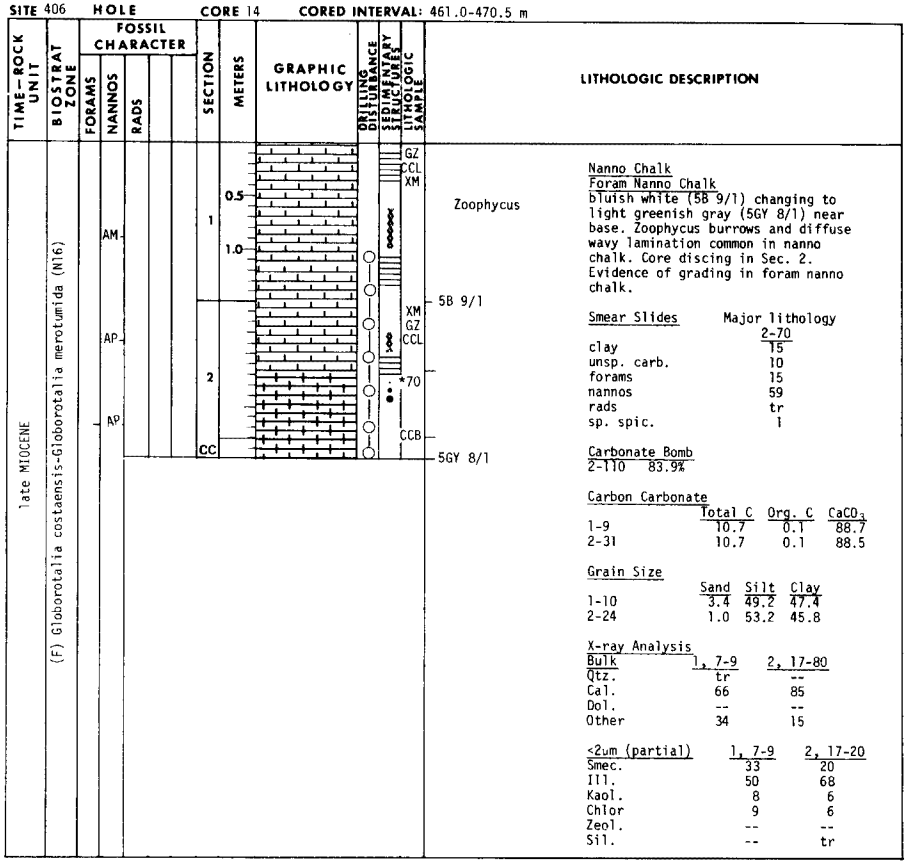
	Sand	Silt	Clay
1-0	3.6	45.6	50.8
4-11	1.9	45.9	52.2

X-ray Analysis

Bulk	1, 3-5	4, 2-5
Qtz.	tr	tr
Cal.	84	82
Dol.	--	--
Other	16	18

<2μm (partial)	1, 3-5	4, 2-5
Smec.	80	68
Ill.	10	21
Kaol.	5	5
Chlor.	5	6
Zeol.	--	--
Sil.	tr	tr

SITE 406 HOLE CORE 14 CORED INTERVAL: 461.0-470.5 m



Nanno Chalk
Foram Nanno Chalk
bluish white (5B 9/1) changing to light greenish gray (5GY 8/1) near base. Zoophycus burrows and diffuse wavy lamination common in nanno chalk. Core discing in Sec. 2. Evidence of grading in foram nanno chalk.

Smear Slides	Major lithology 2-70
clay	15
unsp. carb.	10
forams	15
nannos	59
rads	tr
sp. spic.	1

Carbonate Bomb
2-110 83.9%

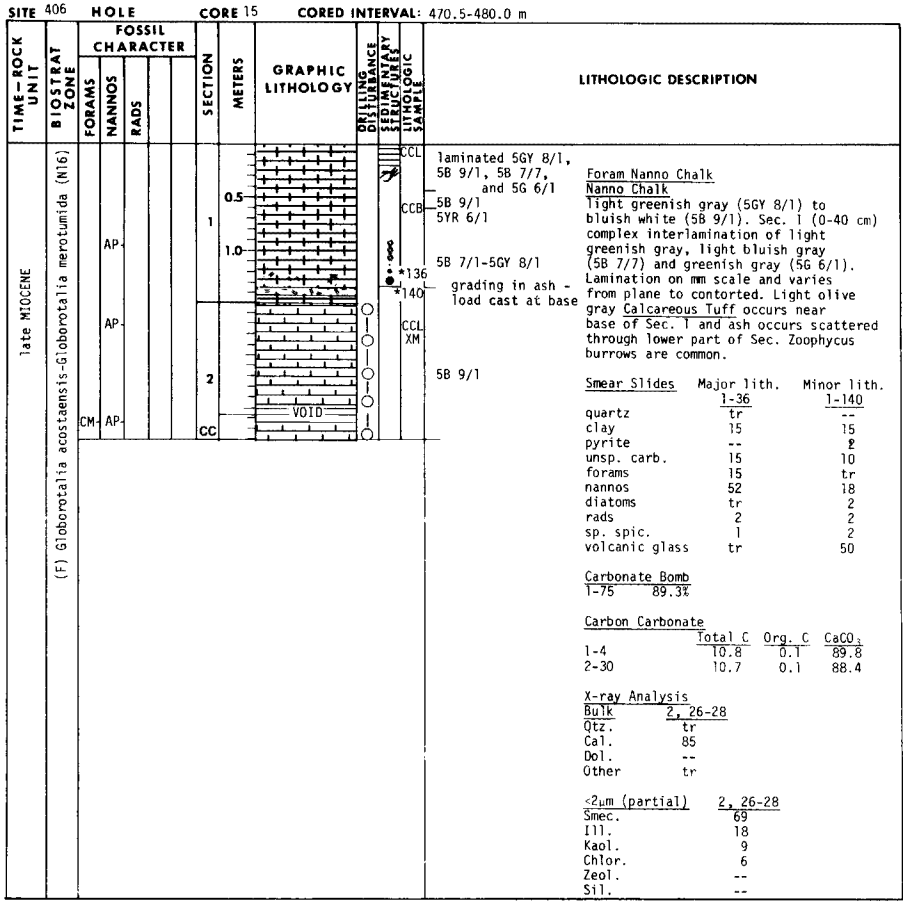
Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-9	10.7	0.1	88.7
2-31	10.7	0.1	88.5

Grain Size	Sand	Silt	Clay
1-10	3.4	49.2	47.4
2-24	1.0	53.2	45.8

X-ray Analysis Bulk	1, 7-9	2, 17-80
Qtz.	tr	--
Cal.	66	85
Dol.	--	--
Other	34	15

<2um (partial)	1, 7-9	2, 17-20
Smec.	33	20
Ill.	50	68
Kaol.	8	6
Chlor	9	6
Zeol.	--	--
Sil.	--	tr

SITE 406 HOLE CORE 15 CORED INTERVAL: 470.5-480.0 m



Foram Nanno Chalk
Nanno Chalk
light greenish gray (5GY 8/1) to bluish white (5B 9/1). Sec. 1 (0-40 cm) complex interlamination of light greenish gray, light bluish gray (5B 7/7) and greenish gray (5G 6/1). Lamination on mm scale and varies from plane to contorted. Light olive gray Calcareous Tuff occurs near base of Sec. 1 and ash occurs scattered through lower part of Sec. Zoophycus burrows are common.

Smear Slides	Major lith. 1-36	Minor lith. 1-140
quartz	tr	--
clay	15	15
pyrite	--	2
unsp. carb.	15	10
forams	15	tr
nannos	52	18
diatoms	tr	2
rads	2	2
sp. spic.	1	2
volcanic glass	tr	50

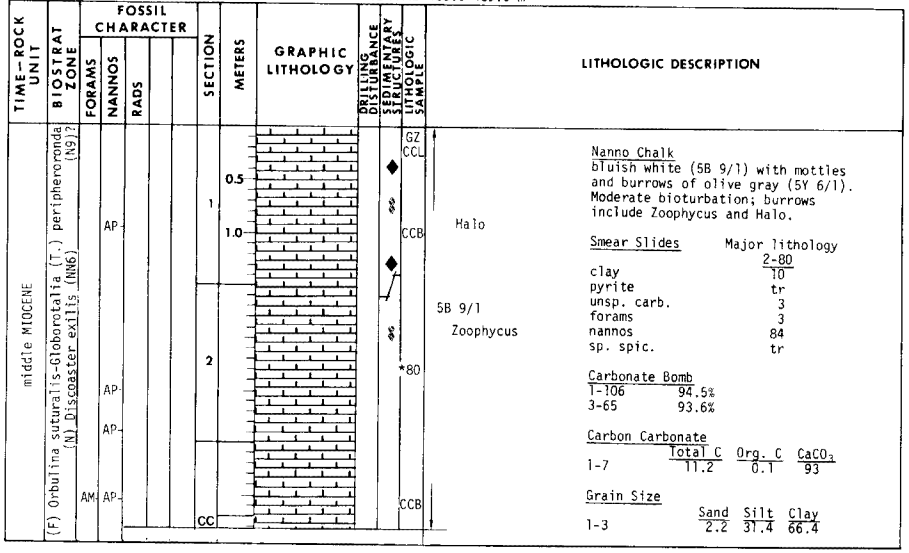
Carbonate Bomb
1-75 89.3%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-4	10.8	0.1	89.8
2-30	10.7	0.1	88.4

X-ray Analysis Bulk	2, 26-28
Qtz.	tr
Cal.	85
Dol.	--
Other	tr

<2µm (partial)	2, 26-28
Smec.	69
Ill.	18
Kaol.	9
Chlor.	6
Zeol.	--
Sil.	--

SITE 406 HOLE CORE 16 CORED INTERVAL: 480.0-489.5 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
bluish white (5B 9/1) with mottles and burrows of olive gray (5Y 6/1). Moderate bioturbation; burrows include Zoophycus and Halo.

Smear Slides	Major lithology 2-80
clay	10
pyrite	tr
unsp. carb.	3
forams	3
nannos	84
sp. spic.	tr

Carbonate Bomb
1-106 94.5%
3-65 93.6%

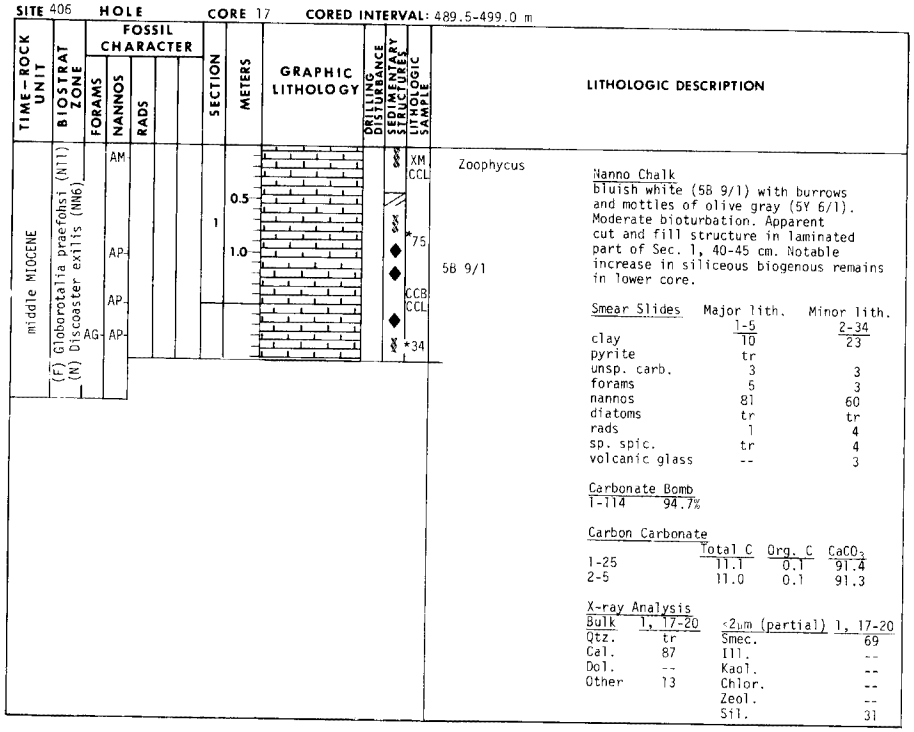
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-7	11.2	0.1	93

Grain Size

	Sand	Silt	Clay
1-3	2.2	31.4	66.4

SITE 406 HOLE CORE 17 CORED INTERVAL: 489.5-499.0 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
bluish white (5B 9/1) with burrows and mottles of olive gray (5Y 6/1). Moderate bioturbation. Apparent cut and fill structure in laminated part of Sec. 1, 40-45 cm. Notable increase in siliceous biogenous remains in lower core.

Smear Slides	Major lith. 1-5	Minor lith. 2-34
clay	10	23
pyrite	tr	
unsp. carb.	3	3
forams	5	3
nannos	81	60
diatoms	tr	tr
rads	1	4
sp. spic.	tr	4
volcanic glass	--	3

Carbonate Bomb
1-114 94.7%

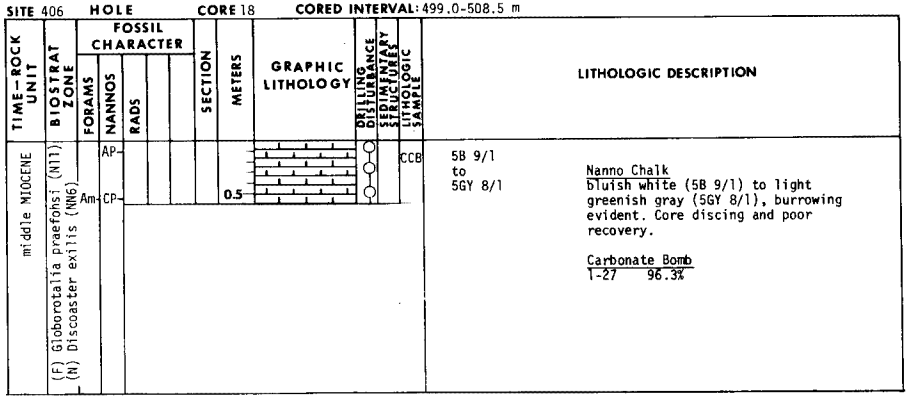
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-25	11.1	0.1	91.4
2-5	11.0	0.1	91.3

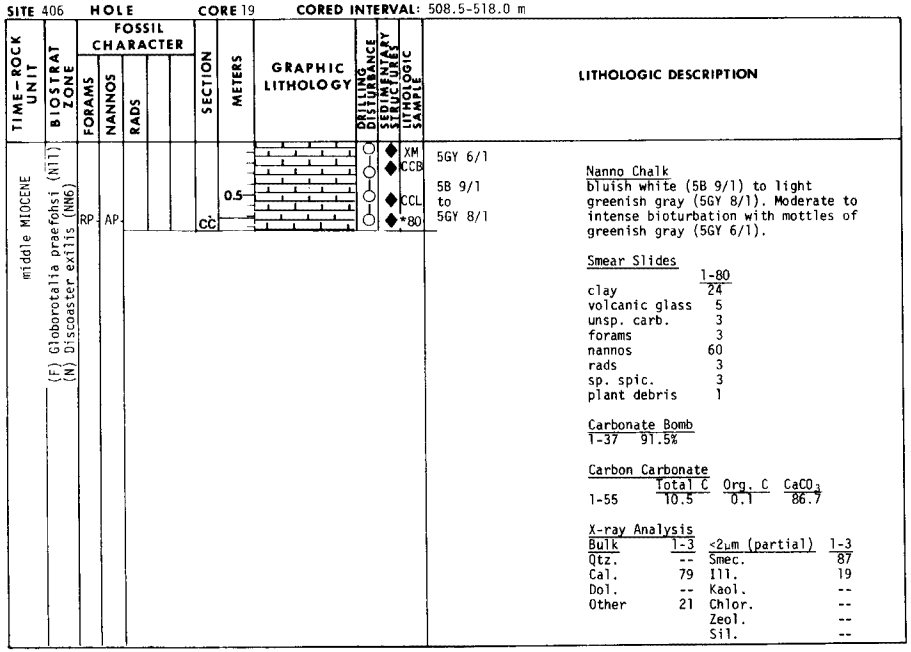
X-ray Analysis

Bulk	1, 17-20	<2μm (partial)	1, 17-20
Qtz.	tr	Smec.	69
Cal.	87	Ill.	--
Dol.	--	Kaol.	--
Other	13	Chlor.	--
		Zeol.	--
		Sil.	31

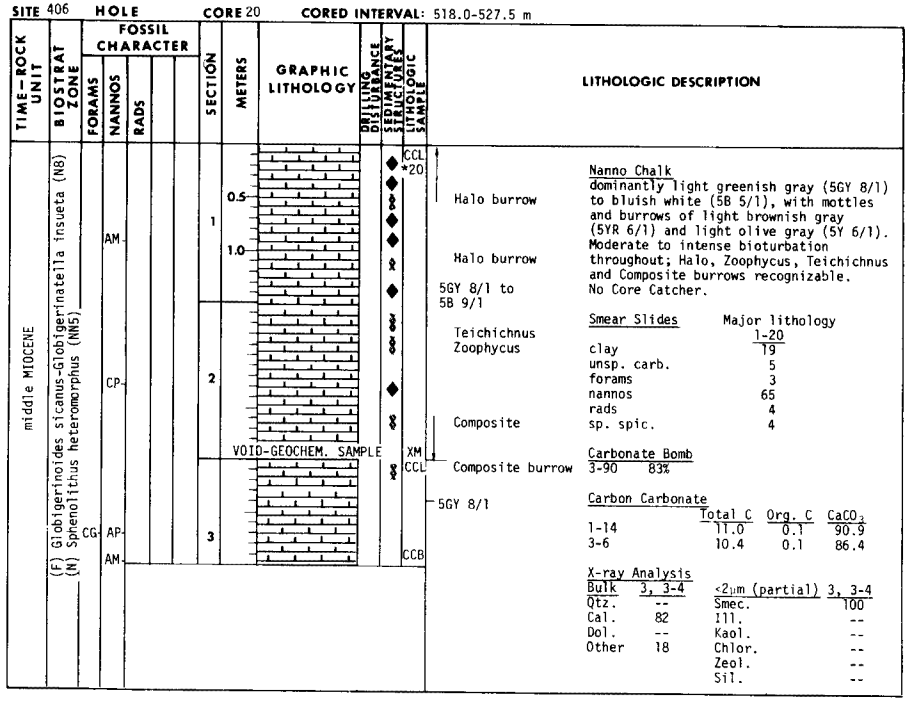
SITE 406 HOLE CORE 18 CORED INTERVAL: 499.0-508.5 m



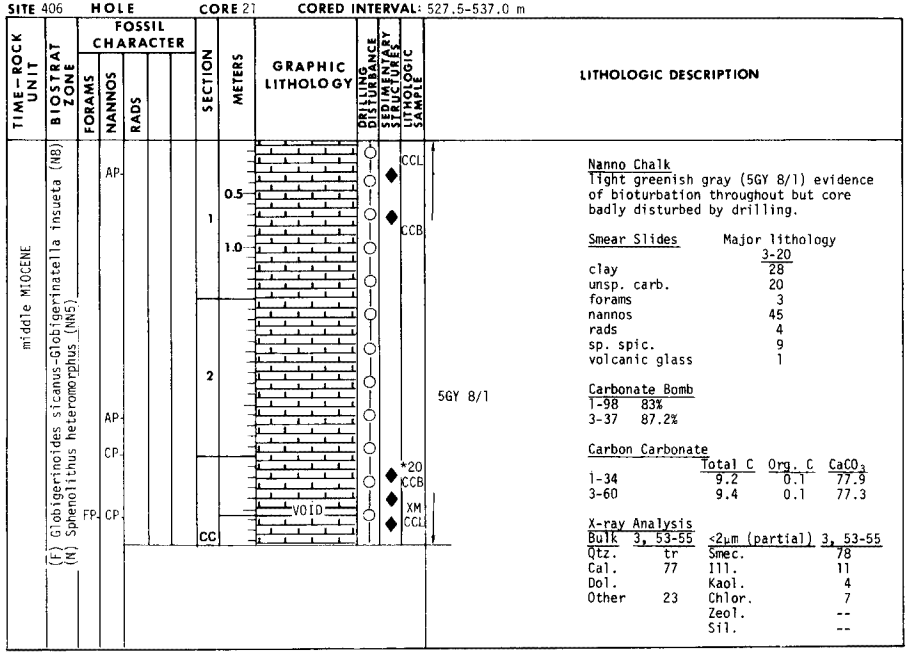
SITE 406 HOLE CORE 19 CORED INTERVAL: 508.5-518.0 m



SITE 406 HOLE CORE 20 CORED INTERVAL: 518.0-527.5 m



SITE 406 HOLE CORE 21 CORED INTERVAL: 527.5-537.0 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
light greenish gray (5GY 8/1) evidence of bioturbation throughout but core badly disturbed by drilling.

Smear Slides	Major lithology 3-20
clay	28
unsp. carb.	20
forams	3
nannos	45
rads	4
sp. spic.	9
volcanic glass	1

Carbonate Bomb
1-98 83%
3-37 87.2%

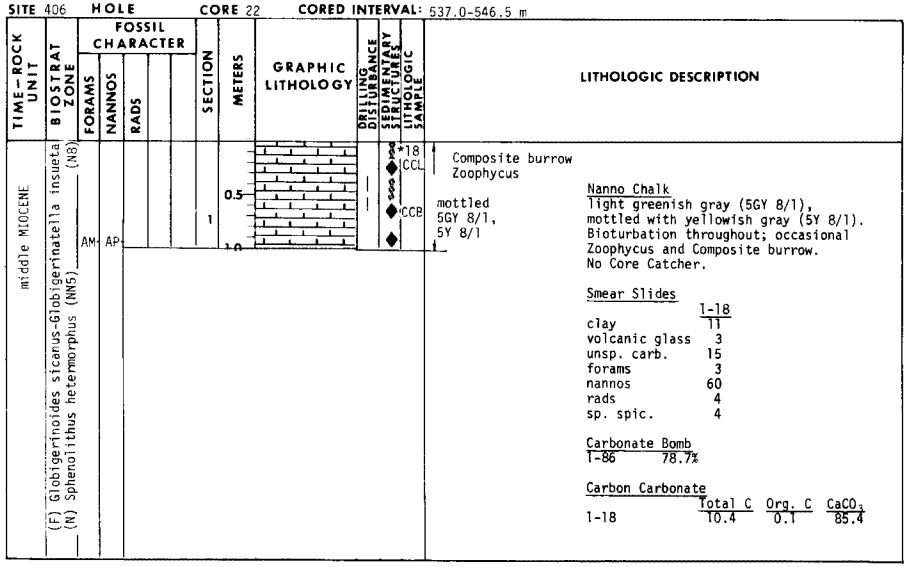
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-34	9.2	0.1	77.9
3-60	9.4	0.1	77.3

X-ray Analysis

Bulk	3, 53-55	<2μm (partial)	3, 53-55
Qtz.	tr	Smec.	78
Cal.	77	Ill.	11
Dol.		Kaol.	4
Other	23	Chlor.	7
		Zeol.	--
		Sil.	--

SITE 406 HOLE CORE 22 CORED INTERVAL: 537.0-546.5 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
light greenish gray (5GY 8/1), mottled with yellowish gray (5Y 8/1). Bioturbation throughout; occasional Zoophycus and Composite burrow. No Core Catcher.

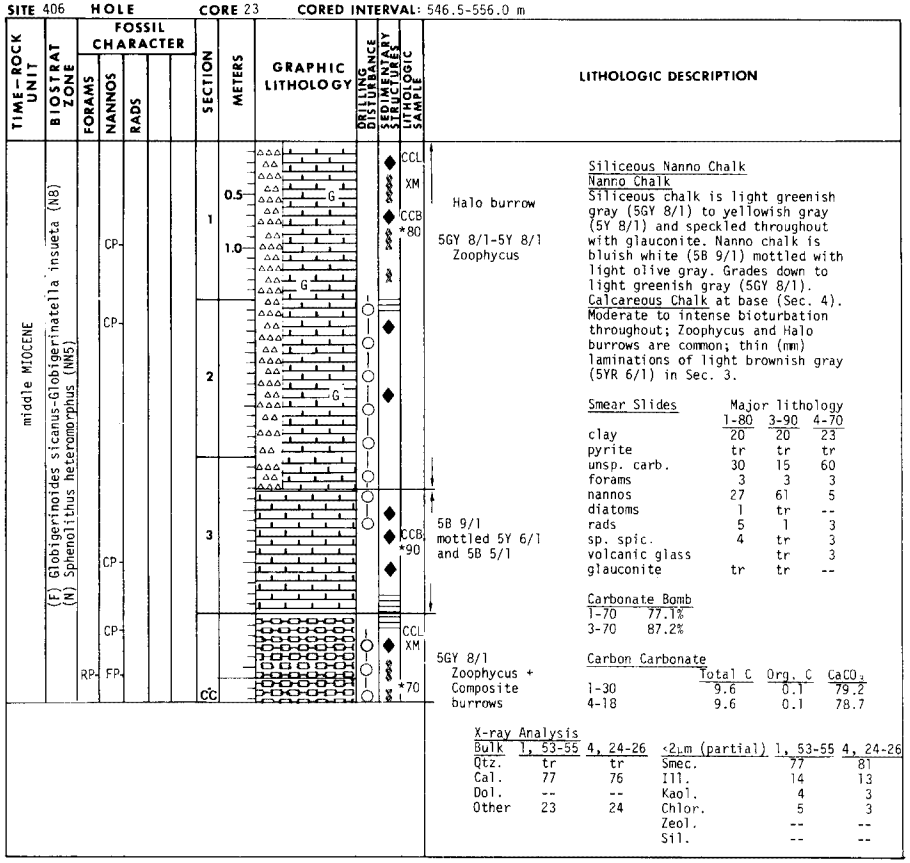
Smear Slides	1-18
clay	11
volcanic glass	3
unsp. carb.	15
forams	3
nannos	60
rads	4
sp. spic.	4

Carbonate Bomb
1-86 78.7%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-18	10.4	0.1	85.4

SITE 406 HOLE CORE 23 CORED INTERVAL: 546.5-556.0 m



LITHOLOGIC DESCRIPTION

Siliceous Nanno Chalk
Nanno Chalk
Siliceous chalk is light greenish gray (5GY 8/1) to yellowish gray (5Y 8/1) and speckled throughout with glauconite. Nanno chalk is bluish white (5B 9/1) mottled with light olive gray. Grades down to light greenish gray (5GY 8/1). Calcareous Chalk at base (Sec. 4). Moderate to intense bioturbation throughout; Zoophycus and Halo burrows are common; thin (mm) laminations of light brownish gray (5YR 6/1) in Sec. 3.

Smear Slides	Major lithology 1-80	3-90	4-70
clay	20	20	23
pyrite	tr	tr	tr
unsp. carb.	30	15	60
forams	3	3	3
nannos	27	61	5
diatoms	1	tr	--
rads	5	1	3
sp. spic.	4	tr	3
volcanic glass		tr	3
glauconite	tr	tr	--

Carbonate Bomb
1-70 77.1%
3-70 87.2%

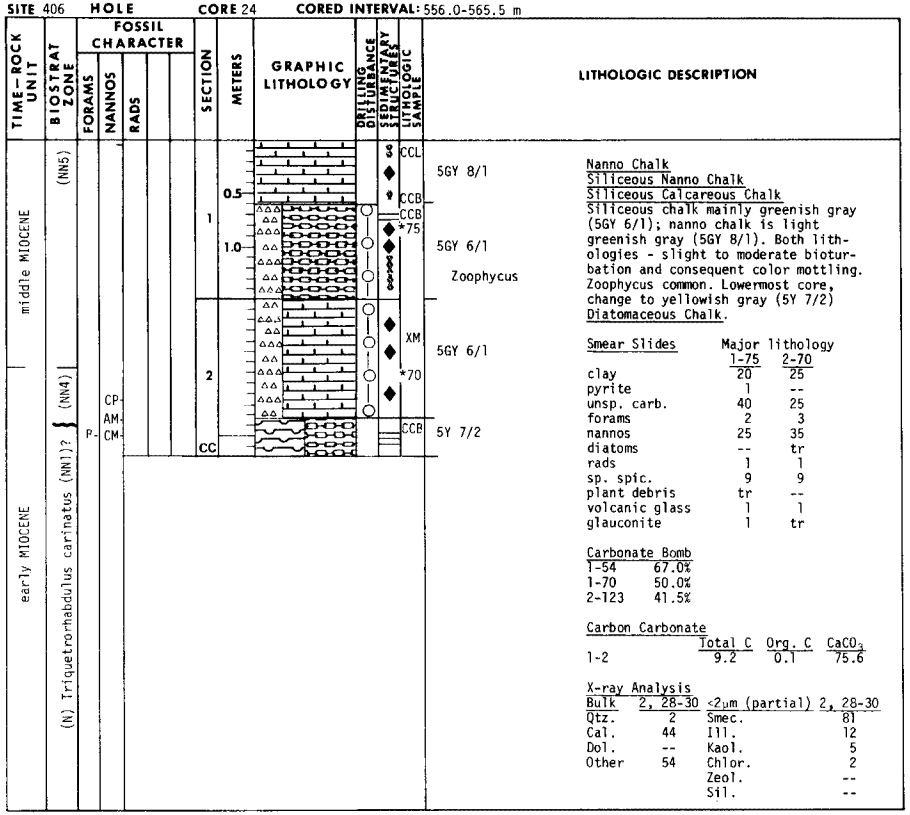
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-30	9.6	0.1	79.2
4-18	9.6	0.1	78.7

X-ray Analysis

Bulk	1, 53-55	4, 24-26	<2μm (partial)	1, 53-55	4, 24-26
Qtz.	tr	tr	Smec.	77	81
Cal.	77	76	Ill.	14	13
Dol.	--	--	Kaol.	4	3
Other	23	24	Chlor.	5	3
			Zeol.	--	--
			Sil.	--	--

SITE 406 HOLE CORE 24 CORED INTERVAL: 556.0-565.5 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
Siliceous Nanno Chalk
Siliceous Calcareous Chalk
Siliceous chalk mainly greenish gray (5GY 6/1); nanno chalk is light greenish gray (5GY 8/1). Both lithologies - slight to moderate bioturbation and consequent color mottling. Zoophycus common. Lowermost core, change to yellowish gray (5Y 7/2) Diatomaceous Chalk.

Smear Slides	Major lithology 1-75	2-70
clay	20	25
pyrite	1	--
unsp. carb.	40	25
forams	2	3
nannos	25	35
diatoms	--	tr
rads	1	1
sp. spic.	9	9
plant debris	tr	--
volcanic glass	1	1
glauconite	1	tr

Carbonate Bomb
1-54 67.0%
1-70 50.0%
2-123 41.5%

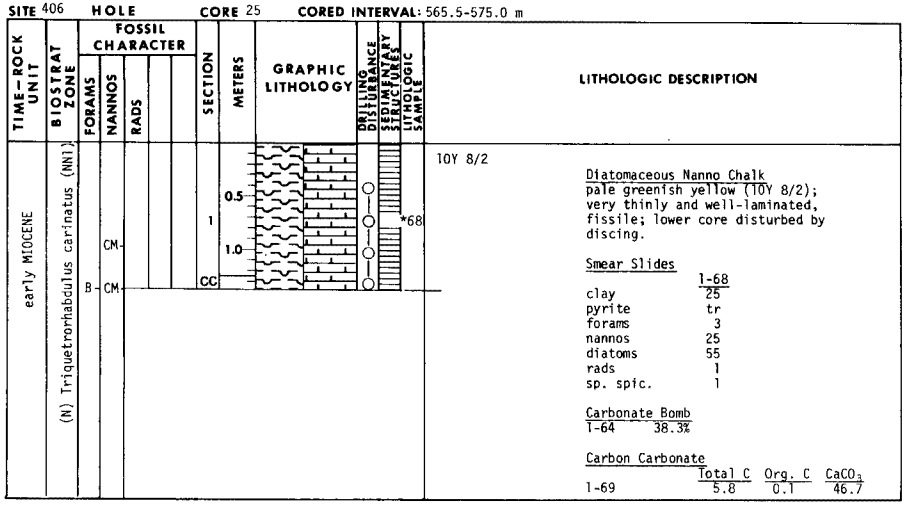
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-2	9.2	0.1	75.6

X-ray Analysis

Bulk	2, 28-30	<2μm (partial)	2, 28-30
Qtz.	2	Smec.	81
Cal.	44	Ill.	12
Dol.	--	Kaol.	5
Other	54	Chlor.	2
		Zeol.	--
		Sil.	--

SITE 406 HOLE CORE 25 CORED INTERVAL: 565.5-575.0 m



Diatomaceous Nanno Chalk
pale greenish yellow (10Y 8/2); very thinly and well-laminated, fissile; lower core disturbed by discing.

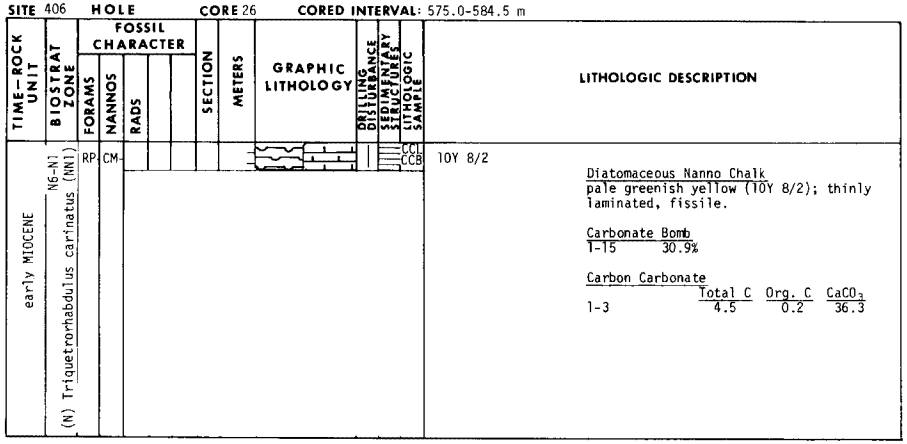
Smear Slides	1-68
clay	25
pyrite	tr
forams	3
nannos	25
diatoms	55
rads	1
sp. spic.	1

Carbonate Bomb
1-64 38.3%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-69	5.8	0.1	46.7

SITE 406 HOLE CORE 26 CORED INTERVAL: 575.0-584.5 m



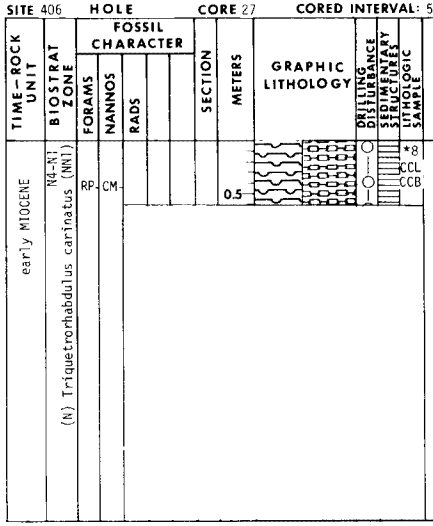
Diatomaceous Nanno Chalk
pale greenish yellow (10Y 8/2); thinly laminated, fissile.

Carbonate Bomb
1-15 30.9%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-3	4.5	0.2	36.3

SITE 406 HOLE CORE 27 CORED INTERVAL: 584.5-594.0 m



10Y 8/2

Diatomaceous Calcareous Chalk
pale greenish yellow (10Y 8/2) with occasional thin bed of very light gray (N8). Very fine lamination throughout; fissile. Lower core intensely disturbed.

Smear Slides

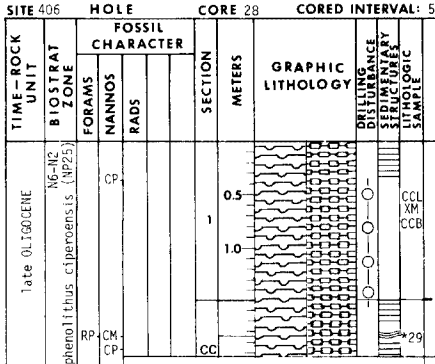
	1-8
quartz	1
clay	60
unsp. carb.	20
forams	5
nannos	10
diatoms	43
rads	1
sp. spic.	5

Carbonate Bomb
1-30 47.9%

Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-22	5.3	0.1	43

SITE 406 HOLE CORE 28 CORED INTERVAL: 594.0-603.5 m



10Y 8/2,
5GY 8/1
interbedded

small scale ripple marks

Diatomaceous Chalk
pale greenish yellow (10Y 8/2) interbedded with light greenish gray (5GY 8/1). Well developed very thin lamination, fissile. Possible ripple lamination in Sec. 2.

Smear Slides	Major lithology 2-29
clay	10
pyrite	tr
unsp. carb.	20
nannos	9
diatoms	61
rads	tr
sp. spic.	tr

Carbonate Bomb
1-70 41%

Carbon Carbonate

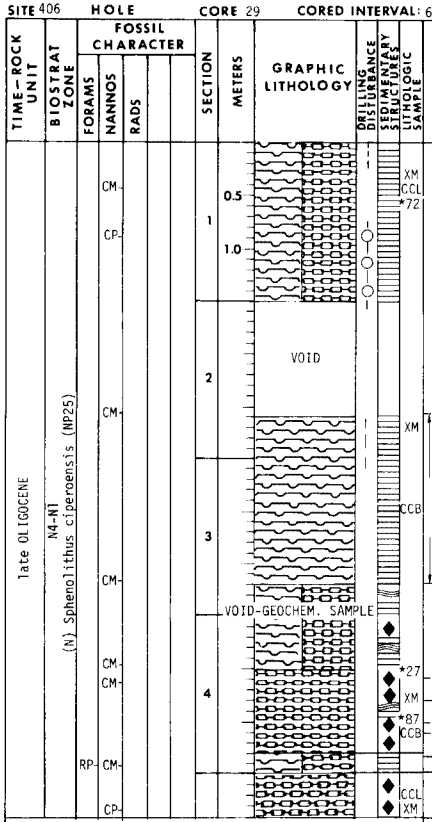
	Total C	Org. C	$CaCO_3$
1-53	6.2	0.2	50.1

X-ray Analysis

Bulk	1, 58-61
Qtz.	--
Cal.	51
Dol.	--
Other	49

<2μm (partial)	1, 58-61
Smec.	100
Ill.	--
Kaol.	--
Chlor.	--
Zeol.	--
Sil.	--

SITE 406 HOLE CORE 29 CORED INTERVAL: 603.5-613.0 m



Interbedded
Diatomaceous Chalk
Calcareous Diatomite
Calcareous Chalk
Diatomaceous chalk mainly light greenish gray (5GY 8/1) with thin interbeds and interlamination of light olive gray (5Y 6/1); well laminated, fissile. Diatomite is yellowish gray (5Y 8/1) and thinly laminated. Calcareous Chalk mainly light greenish gray, light olive gray, or very light gray (N8) but commonly mottled with variety of other colons. Parts are laminated, parts bioturbated. Various lithologies occur interstratified on mm to cm scale in Sec. 3 (115-140 cm), Sec. 4 (0-50 cm). Lenticular lamination suggestive of nippling occurs in this section.

Smear Slides	Major lith. 1-72	4-27	4-87	Minor lith. 3-114
clay	15	15	20	21
pyrite	tr	tr	1	tr
unsp. carb.	15	20	55	70
forams	3	5	0	tr
nannos	10	7	15	--
diatoms	54	45	2	4
rads	tr	1	2	3
sp. spic.	3	7	5	2

Carbonate Bomb
3-50 16.1%
4-88 70.1%

Carbon Carbonate

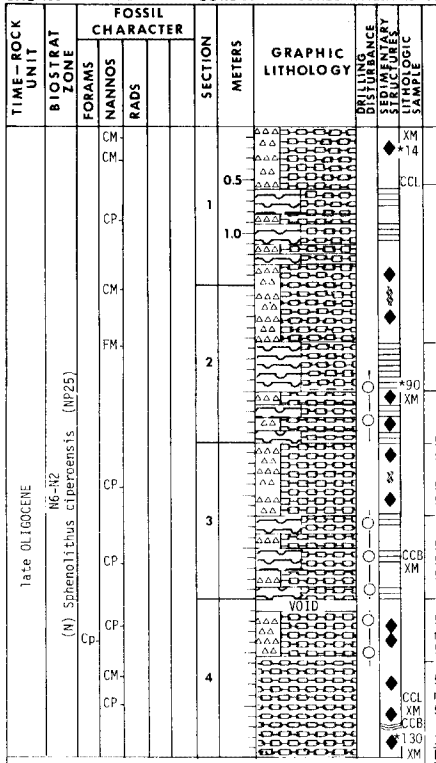
	Total C	Org. C	$CaCO_3$
1-43	7.4	0.1	60.6
5-44	9.1	0.1	75.3

X-ray Analysis

Bulk	1, 41-43	2, 118-120	4, 58-60	5, 42-44
Qtz.	1	--	--	tr
Cal.	50	20	74	74
Dol.	--	--	--	--
Other	49	80	26	26

<2μm (partial)	1, 41-43	2, 118-120	4, 58-60	5, 42-44
Smec.	100	--	100	100
Ill.	tr	--	tr	tr
Kaol.	tr	--	tr	tr
Chlor.	tr	--	tr	tr
Zeol.	--	--	--	--
Sil.	--	--	--	--

SITE 406 HOLE CORE 30 CORED INTERVAL: 613.0-622.5 m



N8 mottles of 5B 5/1

interbedded 5Y 6/1, 5G 8/1

Teichichnus 5B 9/1, 5B 5/1

5Y 6/1

interbedded 5B 9/1 and 5Y 6/1

5B 9/1 to 5GY 8/1

interbedded 5B 9/1, 5GY 8/1, 5GY 6/1

5G 8/1 mottled with 5Y 8/1

5B 9/1 mottled with 5G 8/1

Siliceous Calcareous Chalk
Diatomaceous Chalk

Siliceous chalk mainly bluish white (5B 9/1) to light greenish gray (5GY 8/1, 5G 8/1) with some medium bluish gray (5B 5/1) and very light gray (N8). Typically shows moderate bioturbation with occasional burrows of Zoophycus, Teichichnus and Halo. Diatomaceous Chalk is yellowish gray (5Y 8/1) to light olive gray (5Y 6/1). Fine lamination is characteristic. In several intervals the two lithologies occur interbedded at a scale of a few cm.

Smear Slides	Major lith 1-14	Major lith 2-90	Minor lith 4-130
clay	18	15	20
pyrite	1	tr	
unsp. carb.	40	15	50
dol. or sid.	--	--	1
forams	--	2	2
nannos	30	20	20
diatoms	1	35	1
rads	5	tr	2
sp. spic.	4	3	4
volcanic glass	1		

Carbonate Bomb	
3-113	51.6%
4-58	75.3%

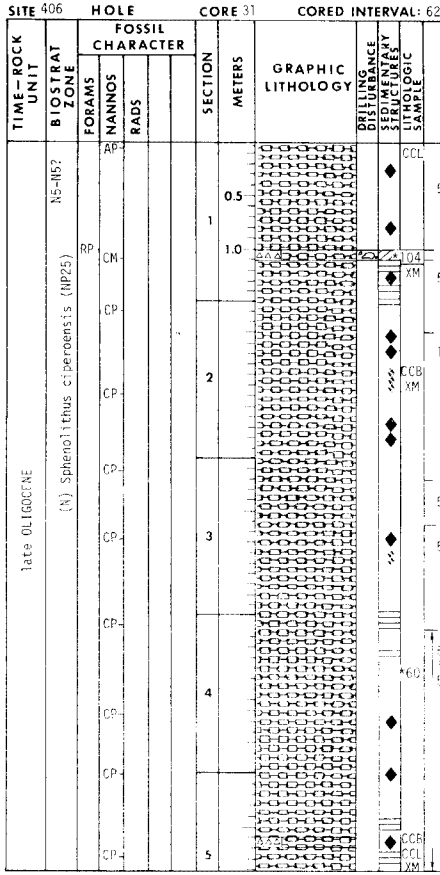
Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-56	9.1	0.1	74.8
4-104	9.9	0.1	87.4

X-ray Analysis

Bulk	1, 11-12	3, 105-107	3, 125-127	4, 113-115	4, 131-133
Qtz.	--	--	tr	tr	tr
Cal.	79	77	74	74	71
Dol.	--	--	--	--	--
Other	21	23	26	26	29

<2μm (partial)	1, 11-12	3, 105-107	3, 125-127	4, 113-115	4, 131-133
Smec.	100	100	83	100	100
Ill.	--	--	17	tr	tr
Kaol.	--	--	--	--	--
Chlor.	--	--	--	--	--
Zeol.	tr	--	--	--	--
Sil.	--	--	--	--	--

SITE 406 HOLE CORE 31 CORED INTERVAL: 622.5-632.0 m



5GY 6/1

micro cross lamination 5GY 8/1

10Y 8/2

Zoophycus

5G 8/1

5B 9/1

5GY 8/1 with interbedded 5G 8/1

Calcareous Chalk

Dominantly bluish white (5B 9/1), light greenish gray (5GY 8/1), pale yellowish greenish (10Y 8/2) and greenish gray (5GY 6/1). Slight to moderate bioturbation with Zoophycus burrows. Occasional foram rich "gritty" layers and thin (1-10 cm) interbeds of yellowish gray (5Y 8/1) Siliceous Chalk.

Smear Slides	Major lithology 1-104	Major lithology 4-60	Major lithology 5-76
quartz	tr	tr	
clay	10	20	9
unsp. carb.	61	60	tr
forams	7	5	
nannos	10	15	15
diatoms	1	tr	1
rads	1	tr	3
sp. spic.	10	5	6
volcanic glass	tr		

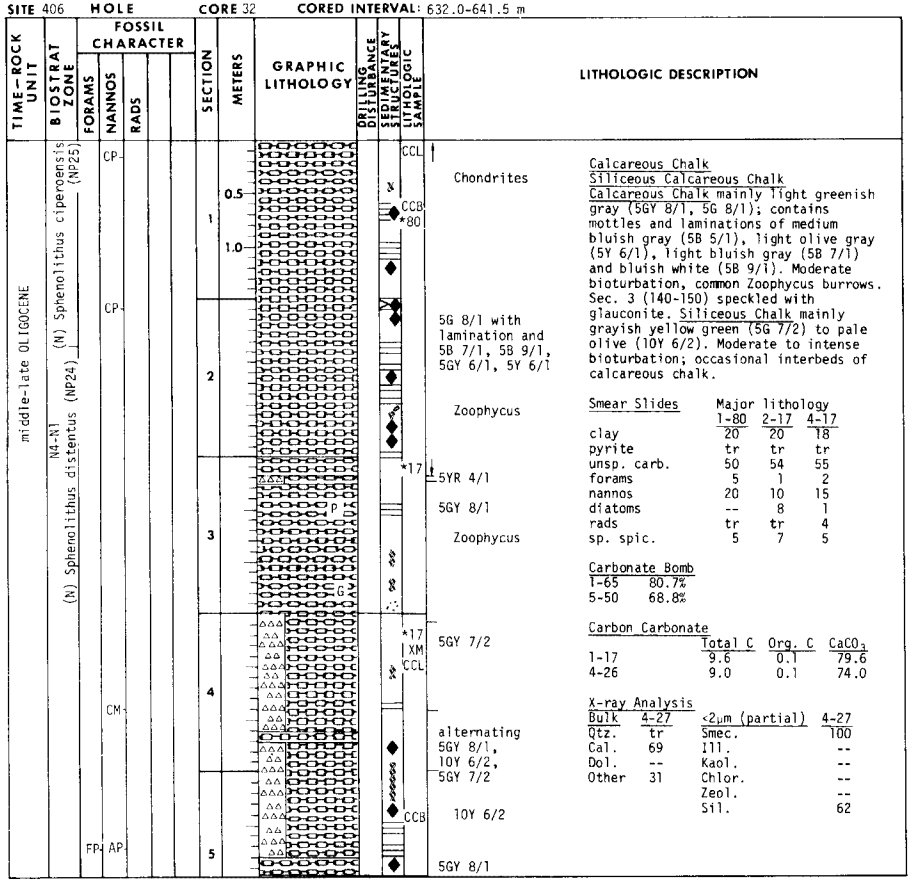
Carbonate Bomb	
2-75	76.3%
5-78	76.9%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-5	10	0.1	82.6
5-82	8.2	0.1	67.6

X-ray Analysis

<2μm (partial)	1, 109-111	2, 84-86	5, 85-87
Smec.	100	100	100
Ill.	tr	tr	tr
Kaol.	--	--	--
Chlor.	--	--	--
Zeol.	--	--	--
Sil.	--	--	--

SITE 406 HOLE CORE 32 CORED INTERVAL: 632.0-641.5 m



Calcareous Chalk
Siliceous Calcareous Chalk
Calcareous Chalk mainly light greenish gray (5GY 8/1, 5G 8/1); contains mottles and laminations of medium bluish gray (5B 5/1), light olive gray (5Y 6/1), light bluish gray (5B 7/1) and bluish white (5B 9/1). Moderate bioturbation, common Zoophycus burrows. Sec. 3 (140-150) speckled with glauconite. Siliceous Chalk mainly grayish yellow green (5G 7/2) to pale olive (10Y 6/2). Moderate to intense bioturbation; occasional interbeds of calcareous chalk.

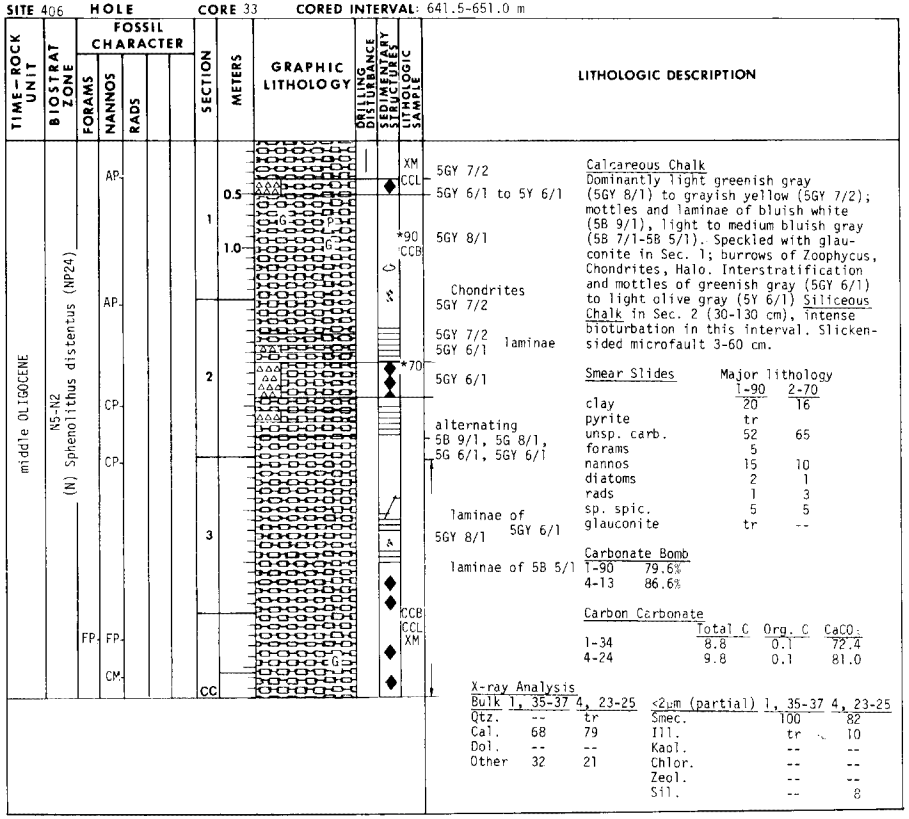
Smear Slides	Major lithology 1-80	2-17	4-17
clay	20	20	18
pyrite	tr	tr	tr
unsp. carb.	50	54	55
forams	5	1	2
nannos	20	10	15
diatoms	--	8	1
rads	tr	tr	4
sp. spic.	5	7	5

Carbonate Bomb	
1-65	80.7%
5-50	68.8%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-17	9.6	0.1	79.6
4-26	9.0	0.1	74.0

X-ray Analysis Bulk	4-27	<2μm (partial)	4-27
Qtz.	tr	Smec.	100
Cal.	69	Ill.	--
Dol.	--	Kaol.	--
Other	31	Chlor.	--
		Zeol.	--
		Sil.	62

SITE 406 HOLE CORE 33 CORED INTERVAL: 641.5-651.0 m



Calcareous Chalk
Dominantly light greenish gray (5GY 8/1) to grayish yellow (5GY 7/2); mottles and laminae of bluish white (5B 9/1), light to medium bluish gray (5B 7/1-5B 5/1). Speckled with glauconite in Sec. 1; burrows of Zoophycus, Chondrites, Halo. Interstratification and mottles of greenish gray (5GY 6/1) to light olive gray (5Y 6/1) Siliceous Chalk in Sec. 2 (30-130 cm), intense bioturbation in this interval. Slickensided microfault 3-60 cm.

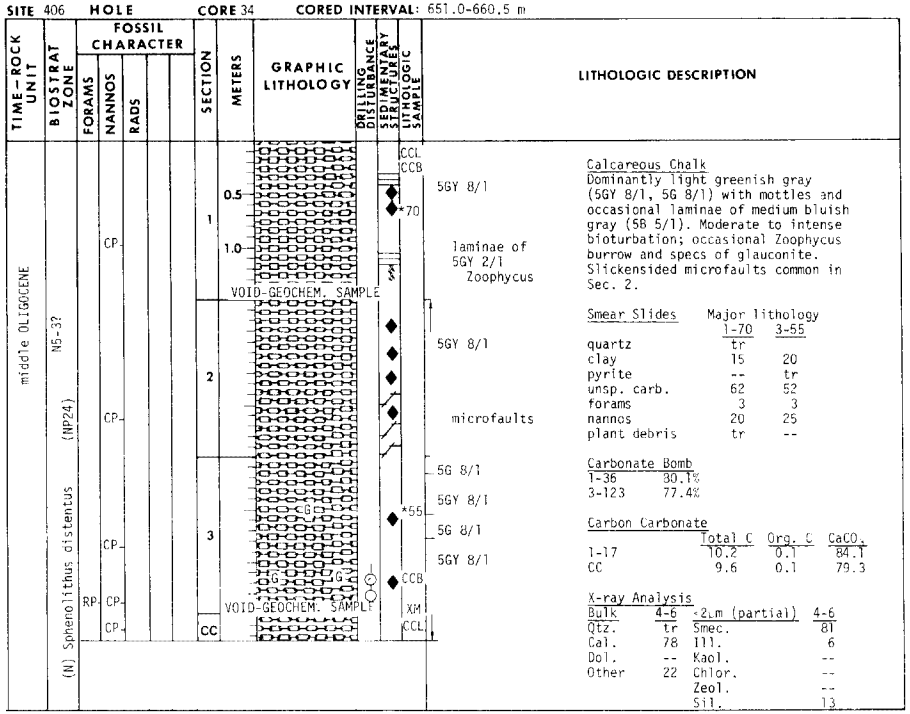
Smear Slides	Major lithology 1-90	2-70
clay	20	16
pyrite	tr	
unsp. carb.	52	65
forams	5	
nannos	15	10
diatoms	2	1
rads	1	3
sp. spic.	5	5
glauconite	tr	--

Carbonate Bomb	
1-90	79.6%
4-13	86.6%

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-34	8.8	0.1	72.4
4-24	9.8	0.1	81.0

X-ray Analysis Bulk	1, 35-37	4, 23-25	<2μm (partial)	1, 35-37	4, 23-25
Qtz.	--	tr	Smec.	100	82
Cal.	68	79	Ill.	tr	10
Dol.	--	--	Kaol.	--	--
Other	32	21	Chlor.	--	--
			Zeol.	--	--
			Sil.	--	8

SITE 406 HOLE CORE 34 CORED INTERVAL: 651.0-660.5 m



LITHOLOGIC DESCRIPTION

Calcareous Chalk
Dominantly light greenish gray (5GY 8/1, 5G 8/1) with mottles and occasional laminae of medium bluish gray (5B 5/1). Moderate to intense bioturbation; occasional Zoophycus burrow and specs of glauconite. Slickensided microfaults common in Sec. 2.

Smear Slides	Major lithology 1-70	3-55
quartz	tr	
clay	15	20
pyrite	--	tr
unsp. carb.	62	52
forams	3	3
nannos	20	25
plant debris	tr	--

Carbonate Bomb
1-36 30.1%
3-123 77.4%

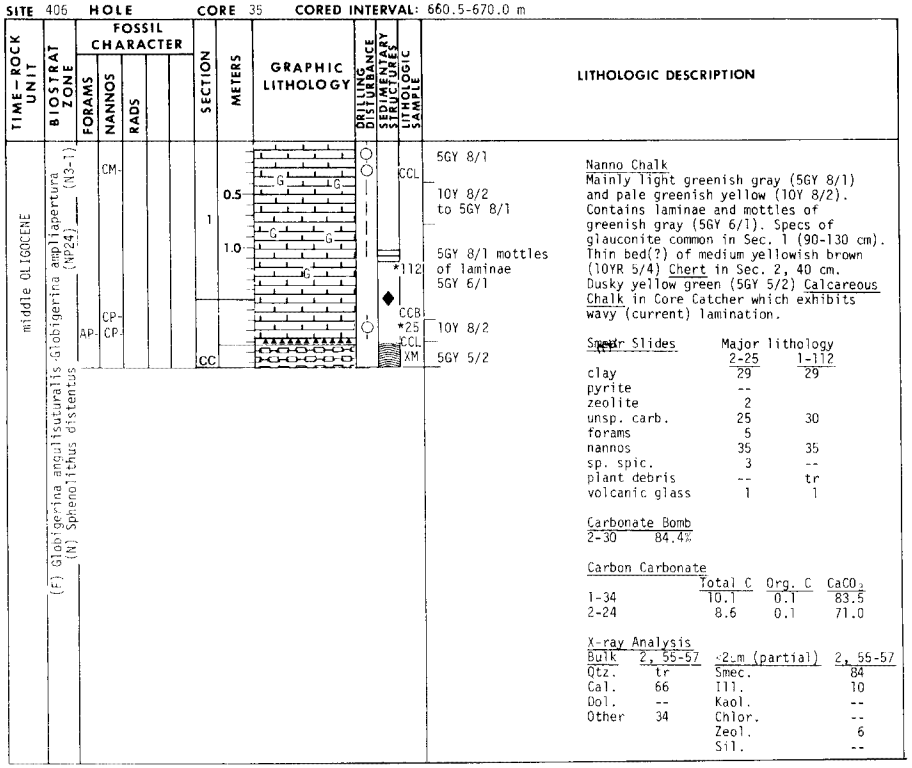
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-17	10.2	0.1	84.1
CC	9.6	0.1	79.3

X-ray Analysis

Bulk	4-6	<2 μm (partial)	4-6
Qtz.	tr	Smec.	81
Cal.	78	Ill.	6
Dol.	--	Kaol.	--
Other	22	Chlor.	--
		Zeol.	--
		Sil.	13

SITE 406 HOLE CORE 35 CORED INTERVAL: 660.5-670.0 m



LITHOLOGIC DESCRIPTION

Nanno Chalk
Mainly light greenish gray (5GY 8/1) and pale greenish yellow (10Y 8/2). Contains laminae and mottles of greenish gray (5GY 6/1). Specs of glauconite common in Sec. 1 (90-130 cm). Thin bed(?) of medium yellowish brown (10YR 5/4) Chert in Sec. 2, 40 cm. Dusky yellow green (5GY 5/2) Calcareous Chalk in Core Catcher which exhibits wavy (current) lamination.

Smear Slides	Major lithology 2-25	1-112
clay	29	29
pyrite	--	
zeolite	2	
unsp. carb.	25	30
forams	5	
nannos	35	35
sp. spic.	3	--
plant debris	--	tr
volcanic glass	1	1

Carbonate Bomb
2-30 84.4%

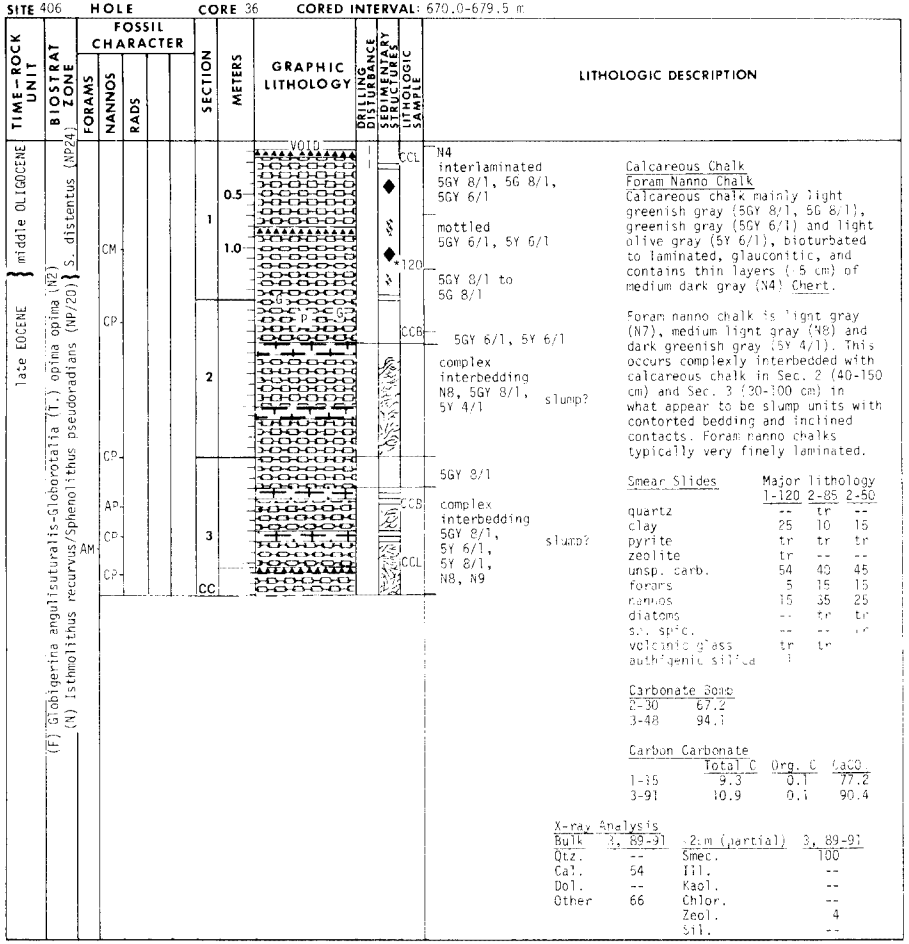
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-34	10.1	0.1	83.5
2-24	8.6	0.1	71.0

X-ray Analysis

Bulk	2, 55-57	<2 μm (partial)	2, 55-57
Qtz.	tr	Smec.	84
Cal.	66	Ill.	10
Dol.	--	Kaol.	--
Other	34	Chlor.	--
		Zeol.	6
		Sil.	--

SITE 406 HOLE CORE 36 CORED INTERVAL: 670.0-679.5 m



Calcareous Chalk

Foram Nanno Chalk

Calcareous chalk mainly light greenish gray (5GY 8/1, 5G 8/1), greenish gray (5GY 6/1) and light olive gray (5Y 6/1), bioturbated to laminated, glauconitic, and contains thin layers (<5 cm) of medium dark gray (N4) Chert.

Foram nanno chalk is light gray (N7), medium light gray (N8) and dark greenish gray (5Y 4/1). This occurs complexly interbedded with calcareous chalk in Sec. 2 (40-150 cm) and Sec. 3 (30-100 cm) in what appear to be slump units with contorted bedding and inclined contacts. Foram nanno chalks typically very finely laminated.

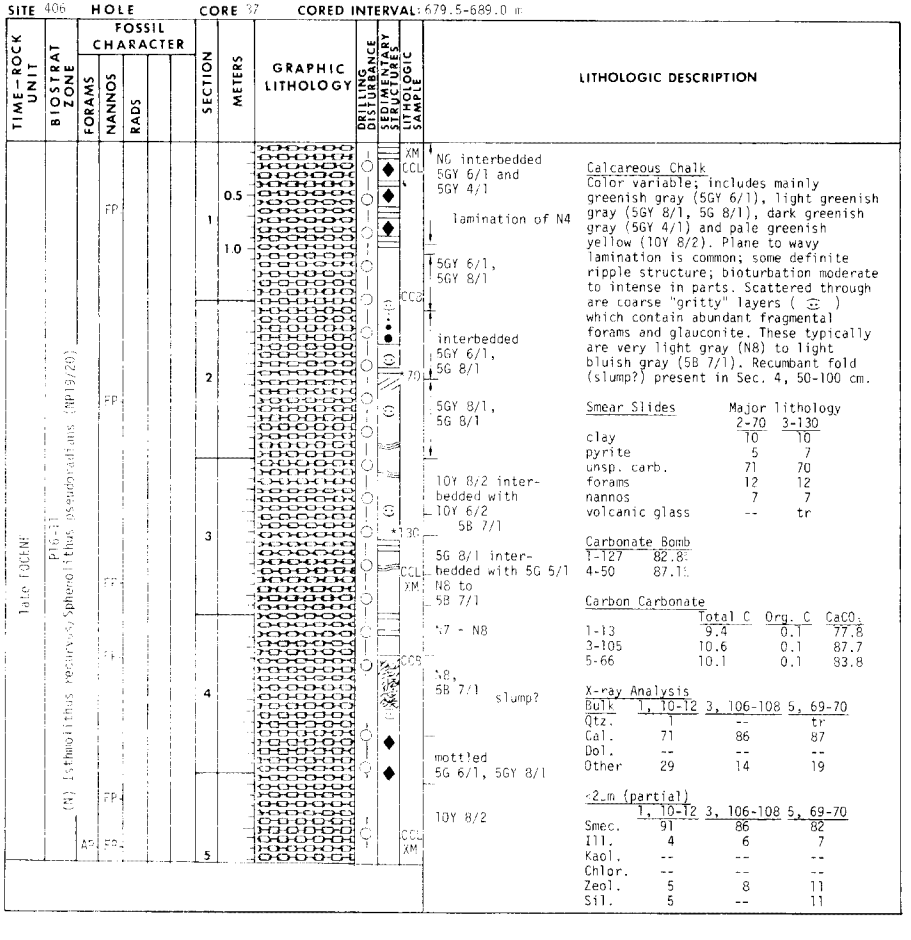
Smear Slides	Major lithology 1-120	2-85	2-50
quartz	--	tr	--
clay	25	10	15
pyrite	tr	tr	tr
zeolite	tr	--	--
unsp. carb.	54	40	45
forams	5	15	15
nannos	15	35	25
diatoms	--	tr	tr
s.s. spic.	--	--	--
volcanic glass	tr	tr	
authigenic silica			

Carbonate Bomb	
2-30	67.2
3-48	94.1

Carbon Carbonate	Total C	Org. C	CaCO3
1-35	9.3	0.1	77.2
3-91	10.9	0.1	90.4

X-ray Analysis	Bulk 3, 89-91	<2 m (partial)	3, 89-91
Qtz.	--	Smec.	100
Cal.	54	Ill.	--
Dol.	--	Kaol.	--
Other	66	Chlor.	--
		Zeol.	4
		Sil.	--

SITE 406 HOLE CORE 37 CORED INTERVAL: 679.5-689.0 m



Calcareous Chalk

Color variable; includes mainly greenish gray (5GY 6/1), light greenish gray (5GY 8/1, 5G 8/1), dark greenish gray (5GY 4/1) and pale greenish yellow (10Y 8/2). Plane to wavy lamination is common; some definite ripple structure; bioturbation moderate to intense in parts. Scattered through are coarse "gritty" layers (⊙) which contain abundant fragmental forams and glauconite. These typically are very light gray (N8) to light bluish gray (5B 7/1). Recumbant fold (slump?) present in Sec. 4, 50-100 cm.

Smear Slides	Major lithology 2-70	3-130
clay	10	10
pyrite	5	7
unsp. carb.	71	70
forams	12	12
nannos	7	7
volcanic glass	--	tr

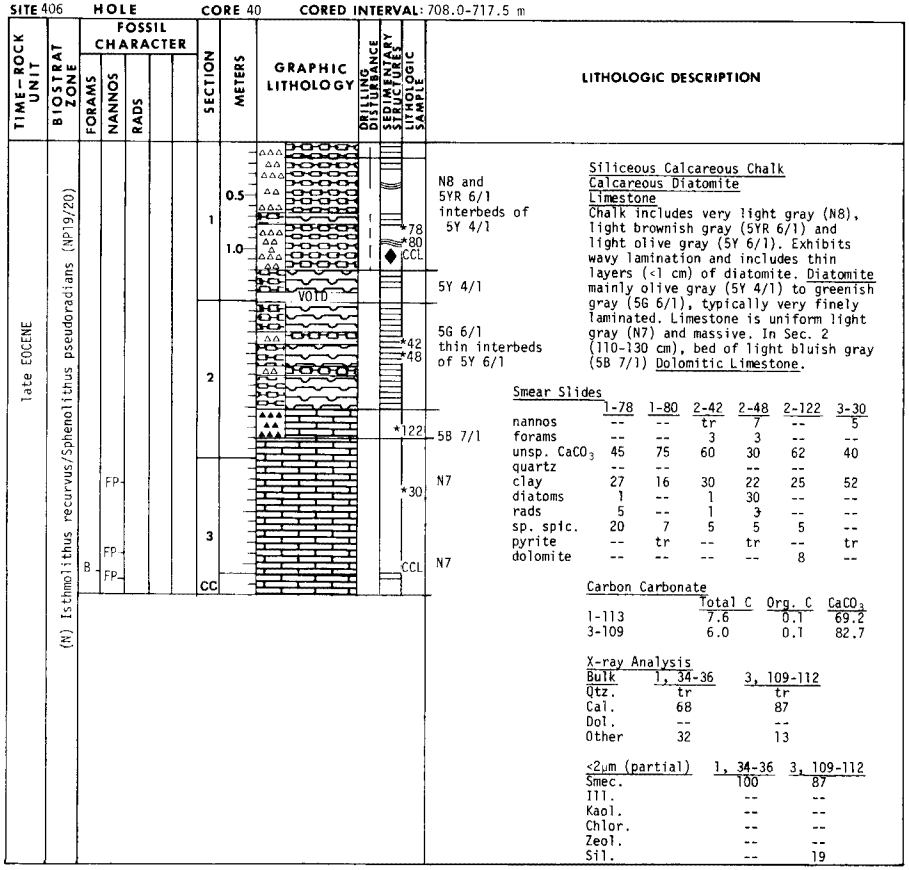
Carbonate Bomb	
1-127	82.8
4-50	87.1

Carbon Carbonate	Total C	Org. C	CaCO3
1-13	9.4	0.1	77.8
3-105	10.6	0.1	87.7
5-66	10.1	0.1	83.8

X-ray Analysis	Bulk 1, 10-12	3, 106-108	5, 69-70
Qtz.	1	--	tr
Cal.	71	86	87
Dol.	--	--	--
Other	29	14	19

<2 m (partial)	1, 10-12	3, 106-108	5, 69-70
Smec.	91	86	82
Ill.	4	6	7
Kaol.	--	--	--
Chlor.	--	--	--
Zeol.	5	8	11
Sil.	5	--	11

SITE 406 HOLE CORE 40 CORED INTERVAL: 708.0-717.5 m



Smear Slides

	1-78	1-80	2-42	2-48	2-122	3-30
nannos	--	--	tr	7	--	5
forams	--	--	3	3	--	--
unsp. $CaCO_3$	45	75	60	30	62	40
quartz	--	--		--	--	
clay	27	16	30	22	25	52
diatoms	1	--	1	30	--	--
rads	5	--	1	3	--	--
sp. spic.	20	7	5	5	5	--
pyrite	--	tr	--	tr	--	tr
dolomite	--	--	--	--	8	--

Carbon Carbonate

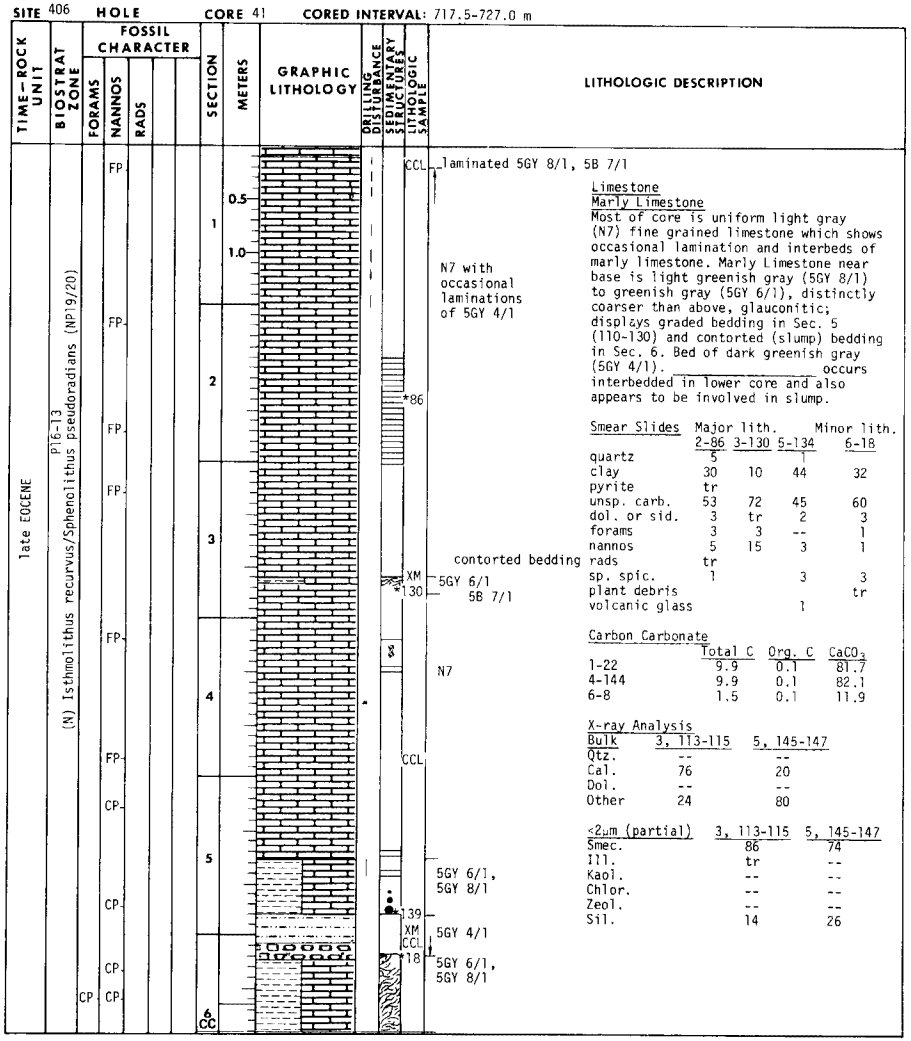
	Total C	Org. C	$CaCO_3$
1-113	7.6	0.1	69.2
3-109	6.0	0.1	82.7

X-ray Analysis

Bulk	1, 34-36	3, 109-112
Qtz.	tr	tr
Cal.	68	87
Dol.	--	--
Other	32	13

<2μm (partial)	1, 34-36	3, 109-112
Smec.	100	87
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--
Sil.	--	19

SITE 406 HOLE CORE 41 CORED INTERVAL: 717.5-727.0 m



Smear Slides	Major lith. 2-86	3-130	Minor lith. 5-134	6-18
quartz	5		tr	
clay	30	10	44	32
pyrite	tr			
unsp. carb.	53	72	45	60
dol. or sid.	3	tr	2	3
forams	3	3	--	1
nannos	5	15	3	1
rads	tr			
sp. spic.	1		3	3
plant debris				tr
volcanic glass			1	

Carbon Carbonate

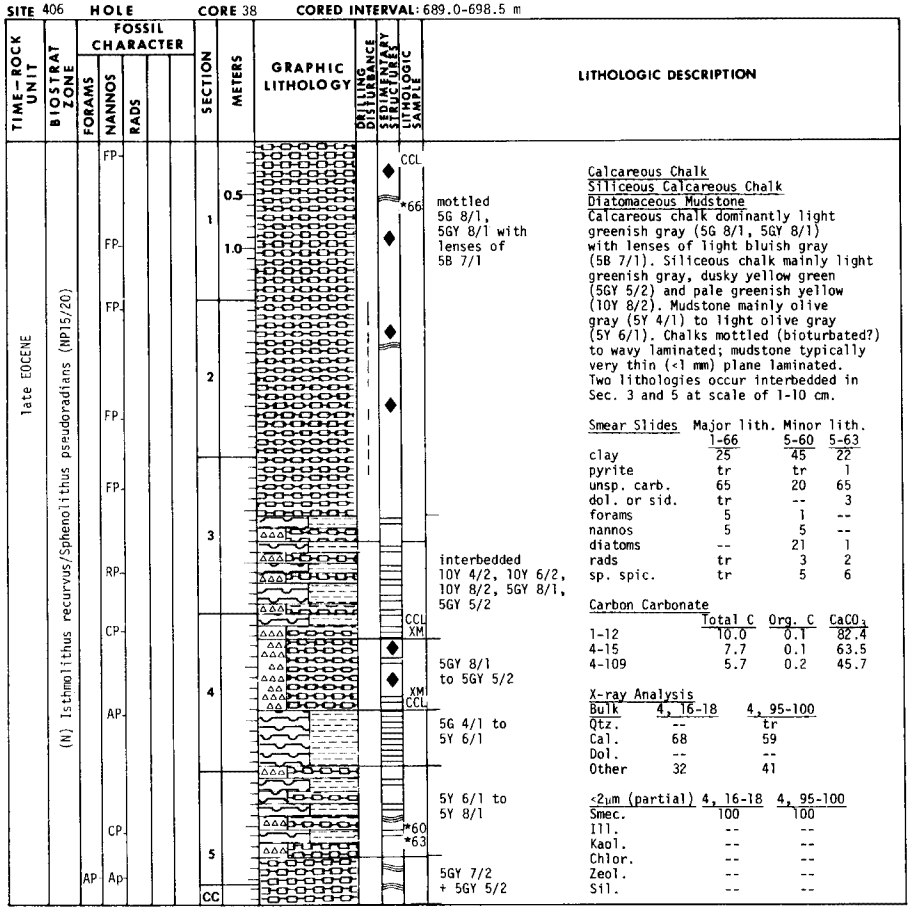
	Total C	Org. C	$CaCO_3$
1-22	9.9	0.1	81.7
4-144	9.9	0.1	82.1
6-8	1.5	0.1	11.9

X-ray Analysis

Bulk	3, 113-115	5, 145-147
Qtz.	--	--
Cal.	76	20
Dol.	--	--
Other	24	80

<2μm (partial)	3, 113-115	5, 145-147
Smec.	86	74
Ill.	tr	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--
Sil.	14	26

SITE 406 HOLE CORE 38 CORED INTERVAL: 689.0-698.5 m



mottled 5G 8/1, 5GY 8/1 with lenses of 5B 7/1

interbedded 10Y 4/2, 10Y 6/2, 10Y 8/2, 5GY 8/1, 5GY 5/2

5GY 8/1 to 5GY 5/2

5G 4/1 to 5Y 6/1

5Y 6/1 to 5Y 8/1

5GY 7/2 + 5GY 5/2

Calcareous Chalk
Siliceous Calcareous Chalk
Diatomaceous Mudstone

Calcareous chalk dominantly light greenish gray (5G 8/1, 5GY 8/1) with lenses of light bluish gray (5B 7/1). Siliceous chalk mainly light greenish gray, dusky yellow green (5GY 5/2) and pale greenish yellow (10Y 8/2). Mudstone mainly olive gray (5Y 4/1) to light olive gray (5Y 6/1). Chalks mottled (bioturbated?) to wavy laminated; mudstone typically very thin (<1 mm) plane laminated. Two lithologies occur interbedded in Sec. 3 and 5 at scale of 1-10 cm.

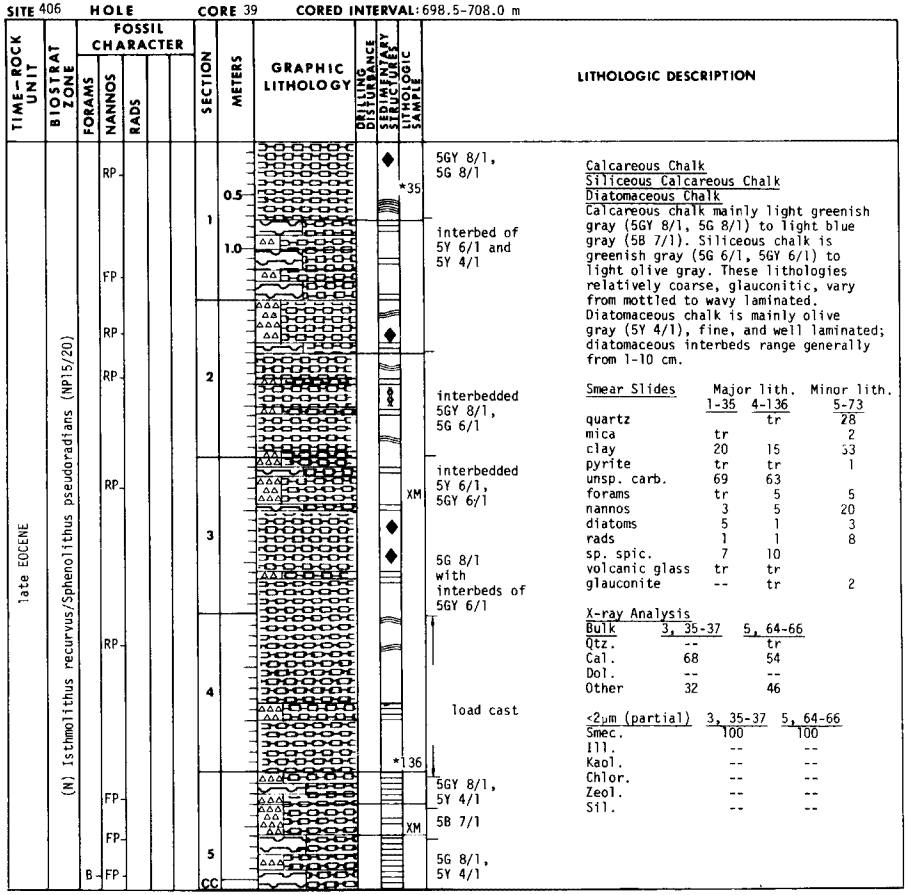
Smear Slides	Major lith. 1-66	Minor lith. 5-60	Minor lith. 5-63
clay	25	45	22
pyrite	tr	tr	1
unsp. carb.	65	20	65
dol. or sid.	tr	--	3
forams	5	1	--
nannos	5	5	--
diatoms	--	21	1
rads	tr	3	2
sp. spic.	tr	5	6

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-12	10.0	0.1	82.4
4-15	7.7	0.1	63.5
4-109	5.7	0.2	45.7

X-ray Analysis Bulk	4, 16-18	4, 95-100
Qtz.	--	tr
Cal.	68	59
Dol.	--	--
Other	32	41

<2μm (partial)	4, 16-18	4, 95-100
Smec.	100	100
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--
Sil.	--	--

SITE 406 HOLE CORE 39 CORED INTERVAL: 698.5-708.0 m



5GY 8/1, 5G 8/1

interbed of 5Y 6/1 and 5Y 4/1

interbedded 5GY 8/1, 5G 6/1

interbedded 5Y 6/1, 5GY 6/1

5G 8/1 with interbeds of 5GY 6/1

load cast

5GY 8/1, 5Y 4/1

5B 7/1

5G 8/1, 5Y 4/1

Calcareous Chalk
Siliceous Calcareous Chalk
Diatomaceous Chalk

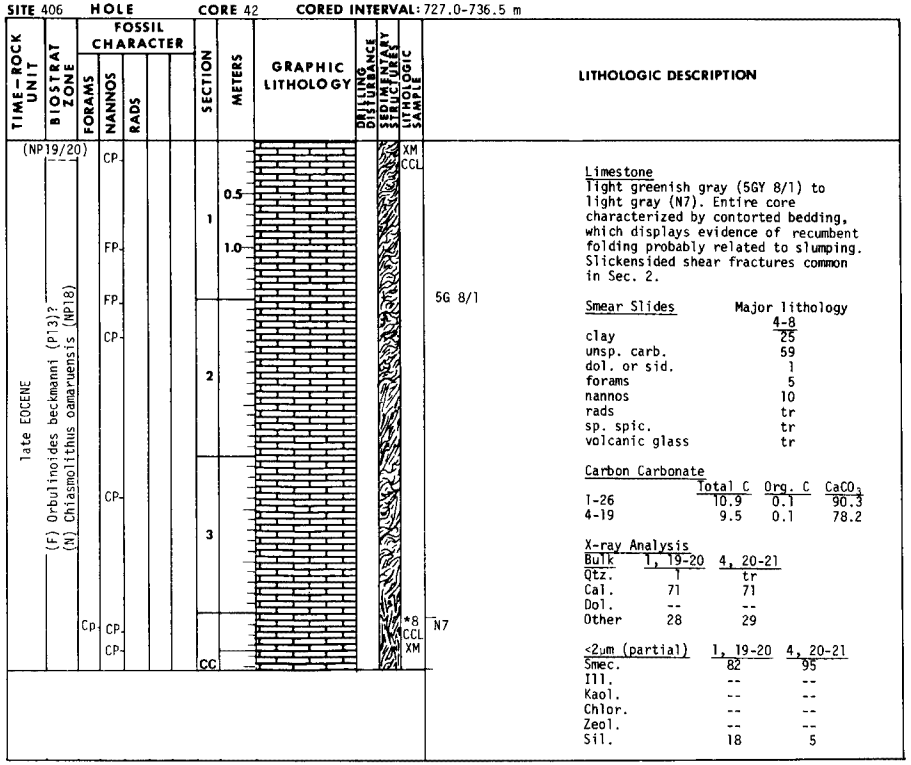
Calcareous chalk mainly light greenish gray (5GY 8/1, 5G 8/1) to light blue gray (5B 7/1). Siliceous chalk is greenish gray (5G 6/1, 5GY 6/1) to light olive gray. These lithologies relatively coarse, glauconitic, vary from mottled to wavy laminated. Diatomaceous chalk is mainly olive gray (5Y 4/1), fine, and well laminated; diatomaceous interbeds range generally from 1-10 cm.

Smear Slides	Major lith. 1-35	Major lith. 4-136	Minor lith. 5-73
quartz		tr	28
mica	tr		2
clay	20	15	53
pyrite	tr	tr	1
unsp. carb.	69	63	
forams	tr	5	5
nannos	3	5	20
diatoms	5	1	3
rads	1	1	8
sp. spic.	7	10	
volcanic glass	tr	tr	
glauconite	--	tr	2

X-ray Analysis Bulk	3, 35-37	5, 64-66
Qtz.	--	tr
Cal.	68	54
Dol.	--	--
Other	32	46

<2μm (partial)	3, 35-37	5, 64-66
Smec.	100	100
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--
Sil.	--	--

SITE 406 HOLE CORE 42 CORED INTERVAL: 727.0-736.5 m



LITHOLOGIC DESCRIPTION

Limestone
light greenish gray (5GY 8/1) to light gray (N7). Entire core characterized by contorted bedding, which displays evidence of recumbent folding probably related to slumping. Slickensided shear fractures common in Sec. 2.

Smear Slides	Major lithology 4-8
clay	25
unsp. carb.	59
dol. or sid.	1
forams	5
nannos	10
rads	tr
sp. spic.	tr
volcanic glass	tr

Carbon Carbonate

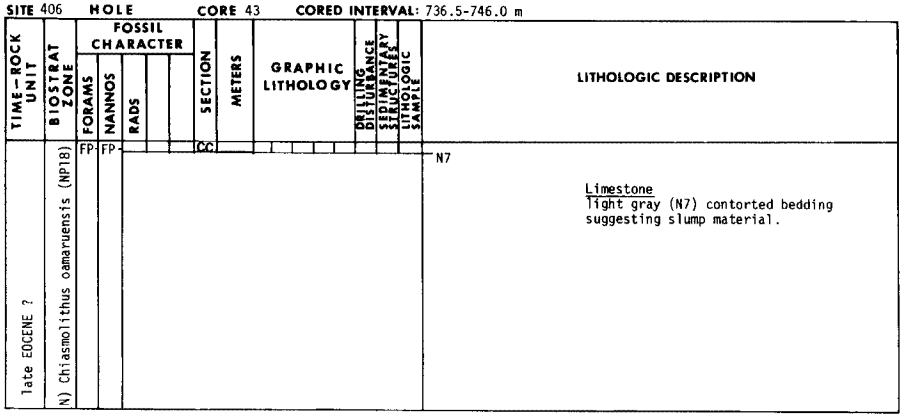
	Total C	Org. C	$CaCO_3$
1-26	10.9	0.1	90.3
4-19	9.5	0.1	78.2

X-ray Analysis

Bulk	1, 19-20	4, 20-21
Qtz.	1	tr
Cal.	71	71
Dol.	--	--
Other	28	29

<2μm (partial)	1, 19-20	4, 20-21
Smec.	82	95
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--
Sil.	18	5

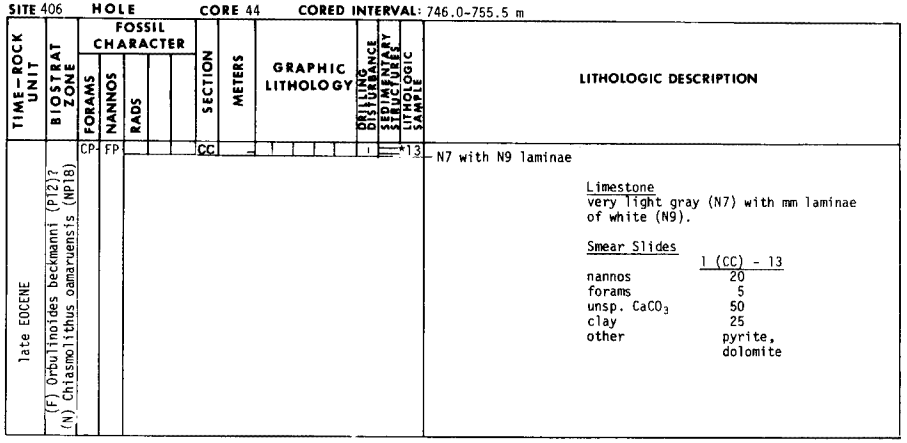
SITE 406 HOLE CORE 43 CORED INTERVAL: 736.5-746.0 m



LITHOLOGIC DESCRIPTION

Limestone
light gray (N7) contorted bedding suggesting slump material.

SITE 406 HOLE CORE 44 CORED INTERVAL: 746.0-755.5 m

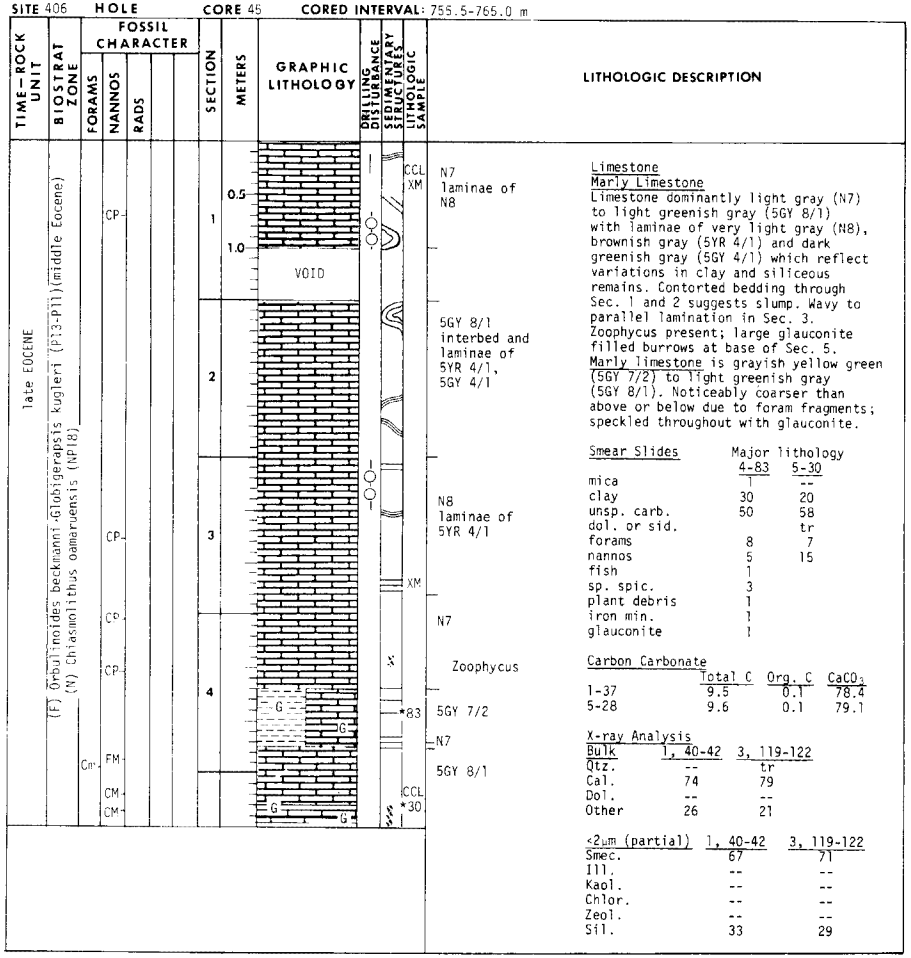


LITHOLOGIC DESCRIPTION

Limestone
very light gray (N7) with mm laminae of white (N9).

Smear Slides	1 (CC) - 13
nannos	20
forams	5
unsp. $CaCO_3$	50
clay	25
other	pyrite, dolomite

SITE 406 HOLE CORE 45 CORED INTERVAL: 755.5-765.0 m



LITHOLOGIC DESCRIPTION

Limestone
Marly Limestone
Limestone dominantly light gray (N7) to light greenish gray (5GY 8/1) with laminae of very light gray (N8), brownish gray (5YR 4/1) and dark greenish gray (5GY 4/1) which reflect variations in clay and siliceous remains. Contorted bedding through Sec. 1 and 2 suggests slump. Wavy to parallel lamination in Sec. 3. Zoophycus present; large glauconite filled burrows at base of Sec. 5. Marly limestone is grayish yellow green (5GY 7/2) to light greenish gray (5GY 8/1). Noticeably coarser than above or below due to foram fragments; speckled throughout with glauconite.

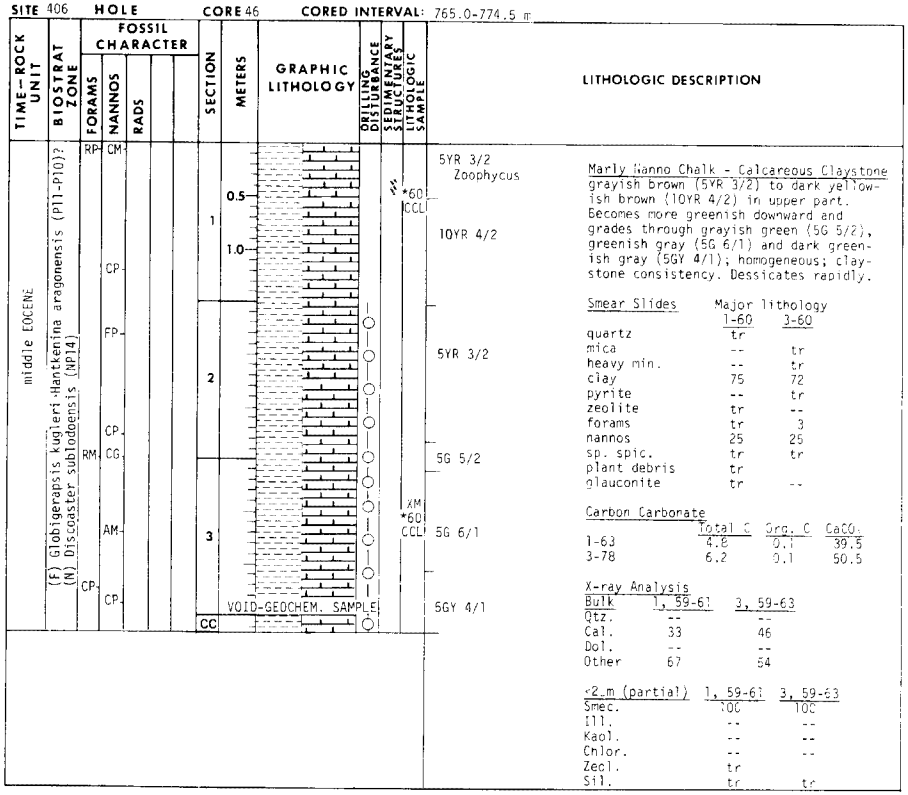
Smear Slides	Major lithology 4-83	5-30
mica	1	--
clay	30	20
unsp. carb.	50	58
dol. or sid.		tr
forams	8	7
nannos	5	15
fish	1	
sp. spic.	3	
plant debris	1	
iron min.	1	
glauconite	1	

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-37	9.5	0.1	78.4
5-28	9.6	0.1	79.1

X-ray Analysis Bulk	1, 40-42	3, 119-122
Qtz.	--	tr
Cal.	74	79
Dol.	--	--
Other	26	21

<2μm (partial)	1, 40-42	3, 119-122
Smec.	67	71
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--
Sil.	33	29

SITE 406 HOLE CORE 46 CORED INTERVAL: 765.0-774.5 m



LITHOLOGIC DESCRIPTION

Marly Nanno Chalk - Calcareous Claystone
grayish brown (5YR 3/2) to dark yellowish brown (10YR 4/2) in upper part. Becomes more greenish downward and grades through grayish green (5G 5/2), greenish gray (5G 6/1) and dark greenish gray (5GY 4/1); homogeneous; claystone consistency. Dessicates rapidly.

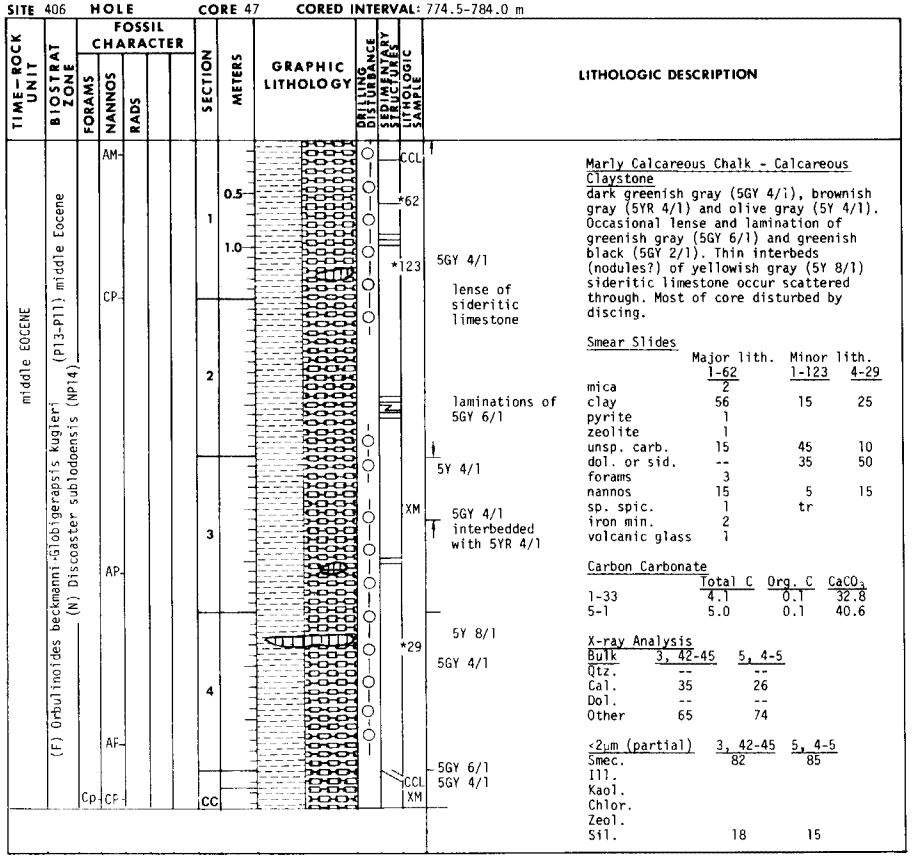
Smear Slides	Major lithology 1-60	3-60
quartz	tr	
mica	--	tr
heavy min.	--	tr
clay	75	72
pyrite	--	tr
zeolite	tr	--
forams	tr	3
nannos	25	25
sp. spic.	tr	tr
plant debris	tr	
glauconite	tr	--

Carbon Carbonate	Total C	Org. C	$CaCO_3$
1-63	4.8	0.1	39.5
3-78	6.2	0.1	50.5

X-ray Analysis Bulk	1, 59-61	3, 59-63
Qtz.	--	--
Cal.	33	46
Dol.	--	--
Other	67	54

<2 m (partial)	1, 59-61	3, 59-63
Smec.	100	100
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	tr	
Sil.	tr	tr

SITE 406 HOLE CORE 47 CORED INTERVAL: 774.5-784.0 m



LITHOLOGIC DESCRIPTION

Marly Calcareous Chalk - Calcareous Claystone
dark greenish gray (5GY 4/i), brownish gray (5YR 4/1) and olive gray (5Y 4/1). Occasional lense and lamination of greenish gray (5GY 6/1) and greenish black (5GY 2/1). Thin interbeds (nodules?) of yellowish gray (5Y 8/1) sideritic limestone occur scattered through. Most of core disturbed by discing.

Smear Slides

	Major lith. 1-62	Minor lith. 1-123	Minor lith. 4-29
mica	2		
clay	56	15	25
pyrite	1		
zeolite	1		
unsp. carb.	15	45	10
dol. or sid.	--	35	50
forams	3		
nannos	15	5	15
sp. spic.	1	tr	
iron min.	2		
volcanic glass	1		

Carbon Carbonate

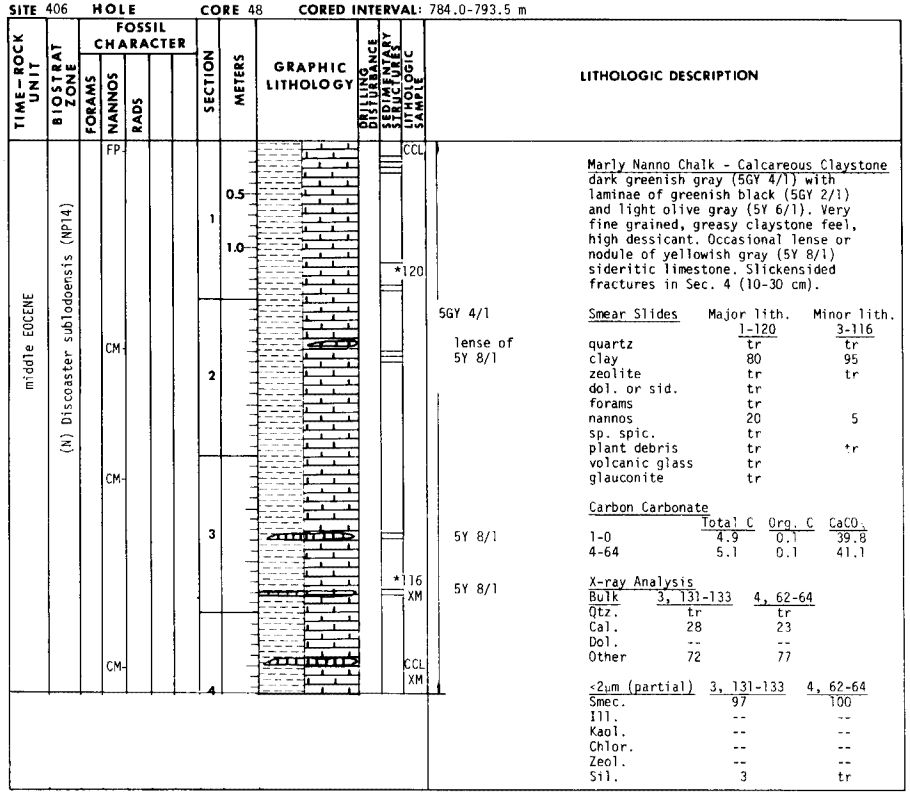
	Total C	Org. C	$CaCO_3$
1-33	4.1	0.1	32.8
5-1	5.0	0.1	40.6

X-ray Analysis

Bulk	3, 42-45	5, 4-5
Qtz.	--	--
Cal.	35	26
Dol.	--	--
Other	65	74

<2μm (partial)	3, 42-45	5, 4-5
Smec.	82	85
Ill.		
Kaol.		
Chlor.		
Zeol.		
Sil.	18	15

SITE 406 HOLE CORE 48 CORED INTERVAL: 784.0-793.5 m



LITHOLOGIC DESCRIPTION

Marly Nanno Chalk - Calcareous Claystone
dark greenish gray (5GY 4/1) with laminae of greenish black (5GY 2/1) and light olive gray (5Y 6/1). Very fine grained, greasy claystone feel, high dessicant. Occasional lense or nodule of yellowish gray (5Y 8/1) sideritic limestone. Slickensided fractures in Sec. 4 (10-30 cm).

Smear Slides

	Major lith. 1-120	Minor lith. 3-116
quartz	tr	tr
clay	80	95
zeolite	tr	tr
dol. or sid.	tr	
forams	tr	
nannos	20	5
sp. spic.	tr	
plant debris	tr	*tr
volcanic glass	tr	
glauconite	tr	

Carbon Carbonate

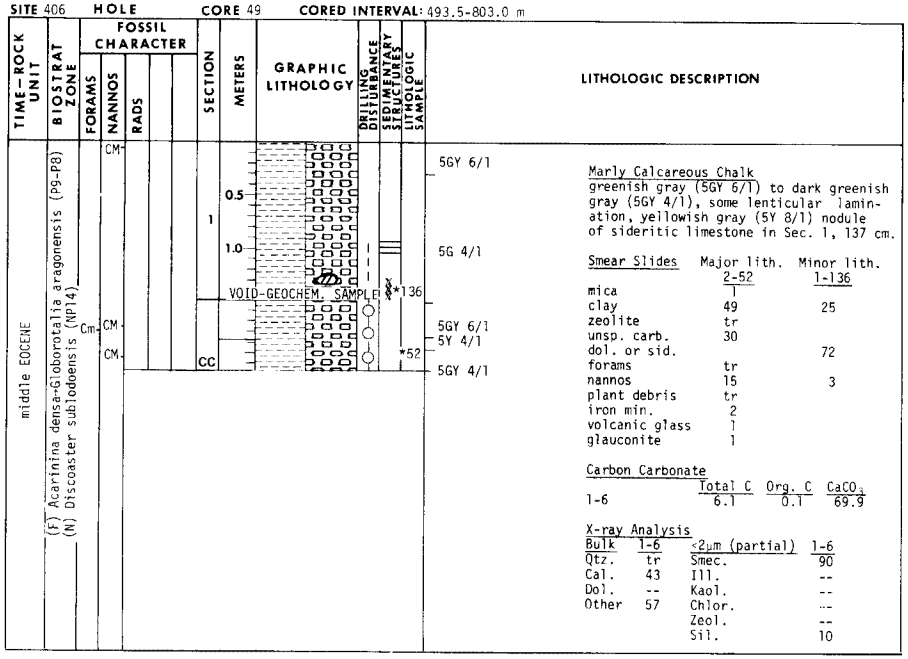
	Total C	Org. C	$CaCO_3$
1-0	4.9	0.1	39.8
4-64	5.1	0.1	41.1

X-ray Analysis

Bulk	3, 131-133	4, 62-64
Qtz.	tr	tr
Cal.	28	23
Dol.	--	--
Other	72	77

<2μm (partial)	3, 131-133	4, 62-64
Smec.	97	100
Ill.	--	--
Kaol.	--	--
Chlor.	--	--
Zeol.	--	--
Sil.	3	tr

SITE 406 HOLE CORE 49 CORED INTERVAL: 493.5-803.0 m



Marly Calcareous Chalk
greenish gray (5GY 6/1) to dark greenish gray (5GY 4/1), some lenticular lamination, yellowish gray (5Y 8/1) nodule of sideritic limestone in Sec. 1, 137 cm.

Smear Slides	Major lith. 2-52	Minor lith. 1-136
mica	1	
clay	49	25
zeolite	tr	
unsp. carb.	30	
dol. or sid.		72
forams	tr	
nannos	15	3
plant debris	tr	
iron min.	2	
volcanic glass	1	
glauconite	1	

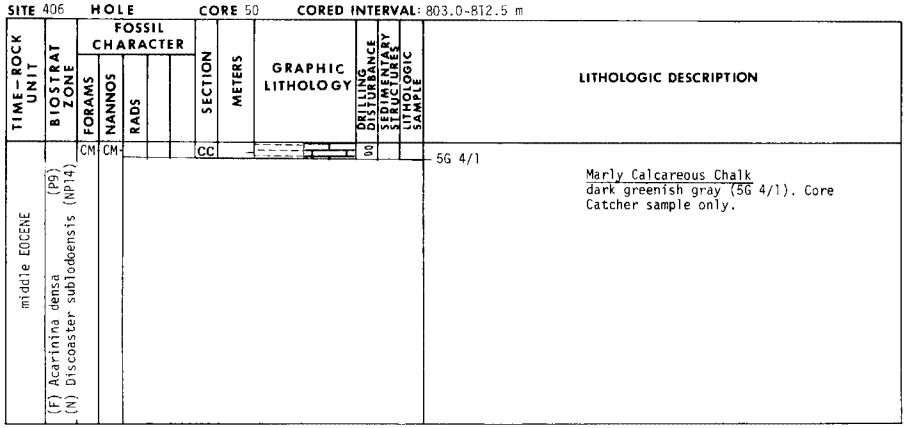
Carbon Carbonate

	Total C	Org. C	$CaCO_3$
1-6	6.1	0.1	69.9

X-ray Analysis

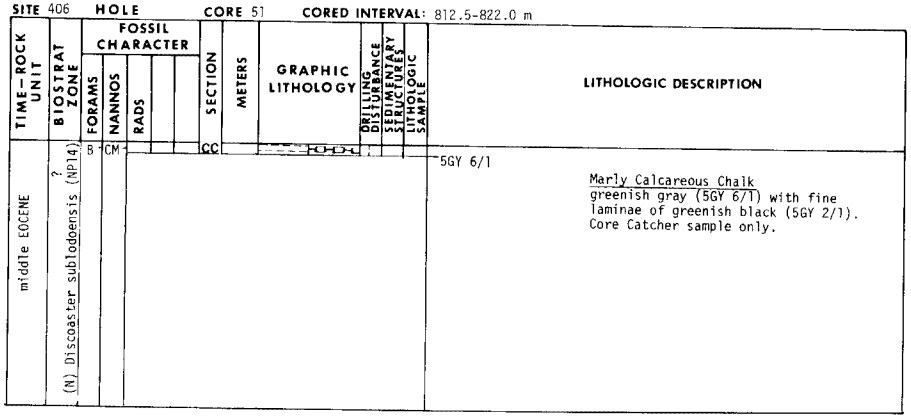
Bulk	1-6	<2μm (partial)	1-6
Qtz.	tr	Smec.	90
Cal.	43	Ill.	--
Dol.	--	Kaol.	--
Other	57	Chlor.	--
		Zeol.	--
		Sil.	10

SITE 406 HOLE CORE 50 CORED INTERVAL: 803.0-812.5 m



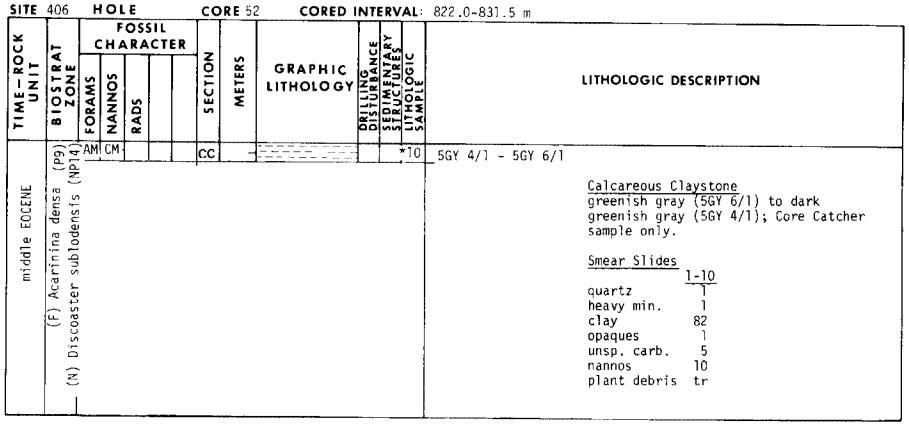
Marly Calcareous Chalk
dark greenish gray (5G 4/1). Core Catcher sample only.

SITE 406 HOLE CORE 51 CORED INTERVAL: 812.5-822.0 m



Marly Calcareous Chalk
greenish gray (5GY 6/1) with fine laminae of greenish black (5GY 2/1). Core Catcher sample only.

SITE 406 HOLE CORE 52 CORED INTERVAL: 822.0-831.5 m



Calcareous Claystone
greenish gray (5GY 6/1) to dark greenish gray (5GY 4/1); Core Catcher sample only.

Smear Slides	1-10
quartz	1
heavy min.	1
clay	82
opaques	1
unsp. carb.	5
nannos	10
plant debris	tr

Leg 48 Site 406
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
406	1	2	0.00	1.90	3.3	0.2	25.9
406	1	3	0.00	4.40	8.6	0.1	71.0
406	2	1	62.00	63.09	8.1	0.1	66.8
406	2	2	62.00	64.40	4.8	0.1	38.8
406	2	4	62.00	67.40	5.7	0.1	46.0
406	3	1	138.00	138.89	11.2	0.1	92.6
406	4	1	214.00	215.15	11.4	0.1	94.5
406	4	2	214.00	215.99	11.4	0.1	94.1
406	6	2	328.00	330.32	10.9	0.1	90.6
406	7	1	337.50	337.53	10.6	0.1	87.9
406	7	2	337.50	339.86	10.7	0.1	88.8
406	7	5	337.50	343.59	10.9	0.1	90.4
406	8	1	347.00	347.26	10.7	0.1	88.3
406	8	4	347.00	352.33	10.9	0.1	90.0
406	8	7	347.00	356.18	10.8	0.1	89.0
406	9	1	413.50	413.62	10.8	0.1	89.2
406	9	2	413.50	415.20	11.0	0.1	90.9
406	10	1	423.00	423.24	11.2	0.1	92.4
406	11	1	432.50	432.57	10.7	0.1	88.6
406	12	1	442.00	442.05	11.1	0.1	91.9
406	13	1	451.50	451.56	10.5	0.1	87.1
406	13	3	451.50	455.56	10.9	0.1	89.9
406	13	4	451.50	456.09	10.5	0.1	87.1
406	13	4	451.50	457.12	10.5	0.1	86.6
406	13	6	451.50	459.65	11.1	0.1	91.4
406	14	1	461.00	461.09	10.7	0.1	88.7
406	14	2	461.00	462.81	10.7	0.1	88.5
406	15	1	470.50	470.54	10.8	0.1	89.8
406	15	2	470.50	472.30	10.7	0.1	88.4
406	16	1	480.00	480.07	11.2	0.1	93.1
406	17	1	489.50	489.75	11.1	0.1	91.4
406	17	2	489.50	491.05	11.0	0.1	91.3
406	19	1	508.50	508.55	10.5	0.1	86.7
406	20	1	518.00	518.14	11.0	0.1	90.9
406	20	3	518.00	521.06	10.4	0.1	86.4
406	21	1	527.50	527.84	9.2	0.1	75.9
406	21	3	527.50	531.10	9.4	0.1	77.3
406	22	1	537.00	537.18	10.4	0.1	85.4
406	23	1	546.50	546.80	9.6	0.1	79.2
406	23	4	546.50	551.18	9.6	0.1	78.7
406	24	1	556.00	556.02	9.2	0.1	75.6
406	25	1	565.50	566.19	5.8	0.1	46.7
406	26	1	575.00	575.03	4.5	0.2	36.3
406	26	1	575.00	576.25	5.5	0.1	44.7
406	27	1	584.50	584.72	5.3	0.1	43.0
406	28	1	594.00	594.53	6.2	0.2	50.1
406	29	1	603.50	603.93	7.4	0.1	60.6
406	29	5	603.50	609.94	9.1	0.1	75.3

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Leg 48 Site 406
DSDP Shore Laboratory Carbonate Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Total Carbon	Organic Carbon	Carbonate
406	30	1	613.00	613.56	9.1	0.1	74.8
406	30	4	613.00	618.54	9.9	0.1	81.4
406	31	1	622.50	622.55	10.0	0.1	82.6
406	31	5	622.50	629.32	8.2	0.1	67.6
406	32	1	632.00	632.17	9.6	0.1	79.6
406	32	4	632.00	636.76	9.0	0.1	74.0
406	33	1	641.50	641.84	8.8	0.1	72.4
406	33	4	641.50	646.24	9.8	0.1	81.0
406	34	1	651.00	651.17	10.2	0.1	84.1
406	34	CC	651.00	655.50	9.6	0.1	79.3
406	35	1	660.50	660.84	10.1	0.1	83.5
406	35	2	660.50	662.24	8.6	0.1	71.0
406	36	1	670.00	670.15	9.3	0.1	77.2
406	36	3	670.00	673.91	10.9	0.1	90.4
406	37	1	679.50	679.63	9.4	0.1	77.8
406	37	3	679.50	683.55	10.6	0.1	87.7
406	37	5	679.50	686.16	10.1	0.1	83.8
406	38	1	689.00	689.12	10.0	0.1	82.4
406	38	4	689.00	693.65	7.7	0.1	63.5
406	38	4	689.00	694.59	5.7	0.2	45.7
406	40	1	708.00	709.13	7.6	0.1	62.2
406	40	3	708.00	712.09	10.0	0.1	82.7
406	41	1	717.50	717.72	9.9	0.1	81.7
406	41	4	717.50	723.44	9.9	0.1	82.1
406	41	6	717.50	725.08	1.5	0.1	11.9
406	42	1	727.00	727.26	10.9	0.1	90.3
406	42	4	727.00	731.69	9.5	0.1	78.2
406	45	1	755.50	755.87	9.5	0.1	78.4
406	45	5	755.50	761.78	9.6	0.1	79.1
406	46	1	765.00	765.63	4.8	0.1	39.5
406	46	3	765.00	768.78	6.2	0.1	50.5
406	47	1	774.50	774.83	4.1	0.1	32.8
406	47	5	774.50	780.51	5.0	0.1	40.6
406	48	1	784.00	784.00	4.9	0.1	39.8
406	48	4	784.00	789.14	5.1	0.1	41.1
406	49	1	793.50	793.56	6.1	0.1	49.9

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Leg 48 Site 406
DSDP Shore Laboratory Grain Size Determinations

Hole	Core	Section	Top of Core Depth	Sample Depth	Sand	Silt	Clay
406	1	2	0.00	1.65	9.0	23.7	67.2
406	1	3	0.00	4.10	9.0	17.7	73.2
406	2	1	62.00	63.10	25.7	27.9	46.4
406	2	2	62.00	64.39	15.6	44.8	39.6
406	2	4	62.00	67.40	14.8	27.1	58.1
406	3	1	138.00	138.86	3.3	35.9	60.9
406	4	1	214.00	215.20	3.6	37.9	58.5
406	4	2	214.00	215.89	3.5	40.5	56.0
406	6	2	328.00	330.33	2.5	44.7	52.7
406	7	1	337.50	337.57	0.7	46.1	53.3
406	7	2	337.50	339.81	2.2	40.7	57.1
406	8	1	347.00	347.30	1.5	50.2	48.3
406	8	4	347.00	352.13	4.0	35.7	60.3
406	9	1	413.50	413.64	3.1	49.8	47.1
406	10	1	423.00	423.22	4.2	39.9	55.9
406	11	1	432.50	432.58	4.8	52.5	42.7
406	12	1	442.00	442.07	2.6	58.2	39.2
406	13	1	451.50	451.50	3.6	45.6	50.8
406	13	4	451.50	456.11	1.9	45.9	52.2
406	13	6	451.50	459.71	5.3	50.9	43.8
406	14	1	461.00	461.10	3.4	49.2	47.4
406	14	2	461.00	462.74	1.0	53.2	45.8
406	16	1	480.00	480.03	2.2	31.4	66.4

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