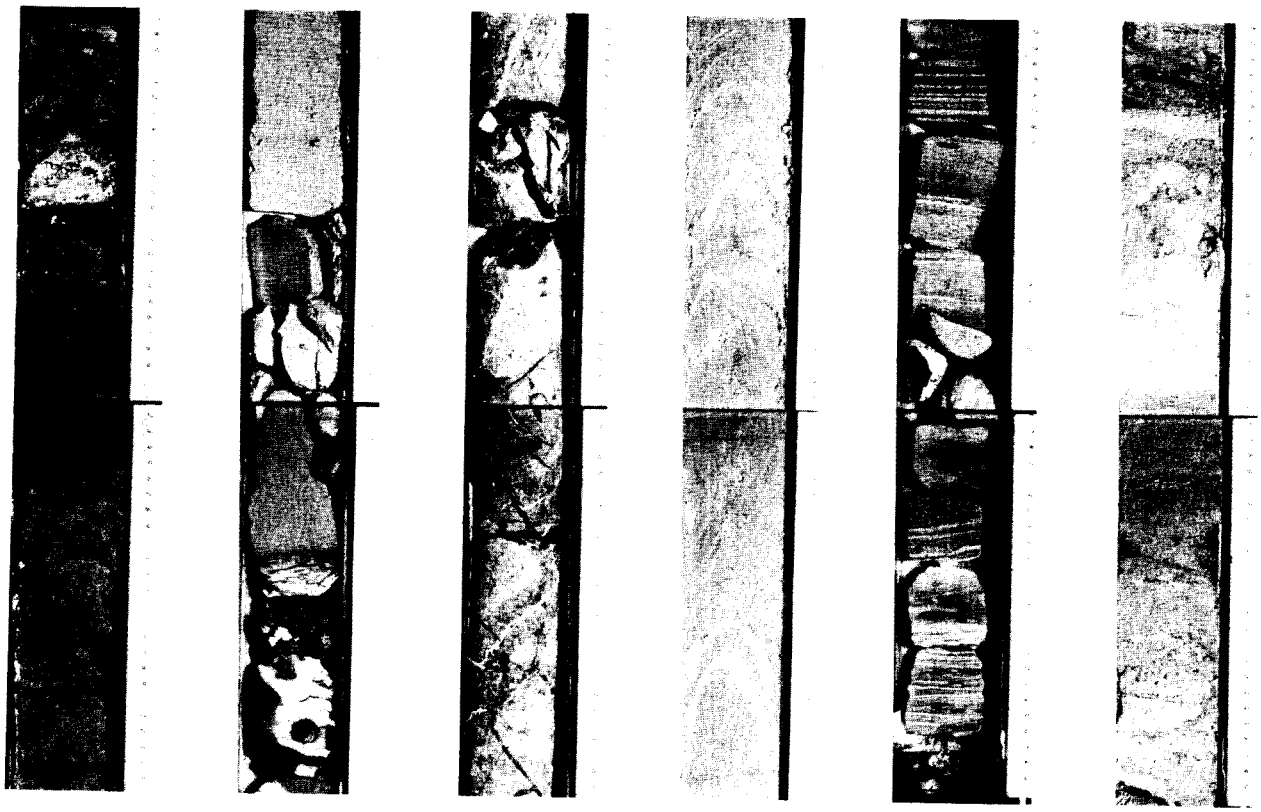
INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 36

SOUTHWEST ATLANTIC OCEAN



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

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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 being honored one year after 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 as known six (6) months post-cruise. These data, while completely adequate for almost all sample selection needs, will be subject to possible slight change by the time of issue of the formal cruise report, 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,

N. Terence Edgar
Chief Scientist
Deep Sea Drilling Project

NTE:eb

INITIAL CORE DESCRIPTIONS
DEEP SEA DRILLING PROJECT
LEG 36
Apr. 4, 1974 - May 22, 1974

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

MEMBER ORGANIZATIONS

Lamont-Doherty Geological Observatory, Columbia University
Rosenstiel School of Marine and Atmospheric Science, University of Miami
Scripps Institution of Oceanography, University of California
University of Washington
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INITIAL CORE DESCRIPTIONS - LEG 36

INTRODUCTION

The original Leg 36 cruise plan was aimed largely at problems of Scotia Sea evolution and development of the Circum-Polar Current system; six sites lay in the Scotia Sea region south of 55°S, two at about 50°S and one in the Argentine Basin at 38°S. However, the bad weather and extended darkness encountered in the early part of the Leg, plus the loss of 3800 meters of drill string and a consequent entanglement with Argentinian authorities mid-Leg caused a complete reorganization of the aims. The emphasis was consequently shifted to problems of the evolution of the Falkland Plateau and southernmost Atlantic.

Between leaving Ushuaia on 4 April and reaching Rio de Janeiro on 22 May, 10 holes were drilled at 6 sites. Figure 1 shows ship tracks and site locations, Figure 2 summaries and compares the lithologic sections and Table 1 is a coring summary.

Four successful sites were drilled, the other two (326 and 331), resulting in only one and two near-surface cores, respectively. Three of the good sites (327, 329 and 330), lie on the western nose of the eastern elevated portion of the Falkland Plateau, and constitute an interesting stratigraphic section which extends down to M. Jurassic shallow-water sediments above a metamorphic continental basement. Site 328 in the Falkland Outer Basin, east of the Plateau, complements these in providing a history of deep water circulation in the region.

LEG 36 DRILL SITES

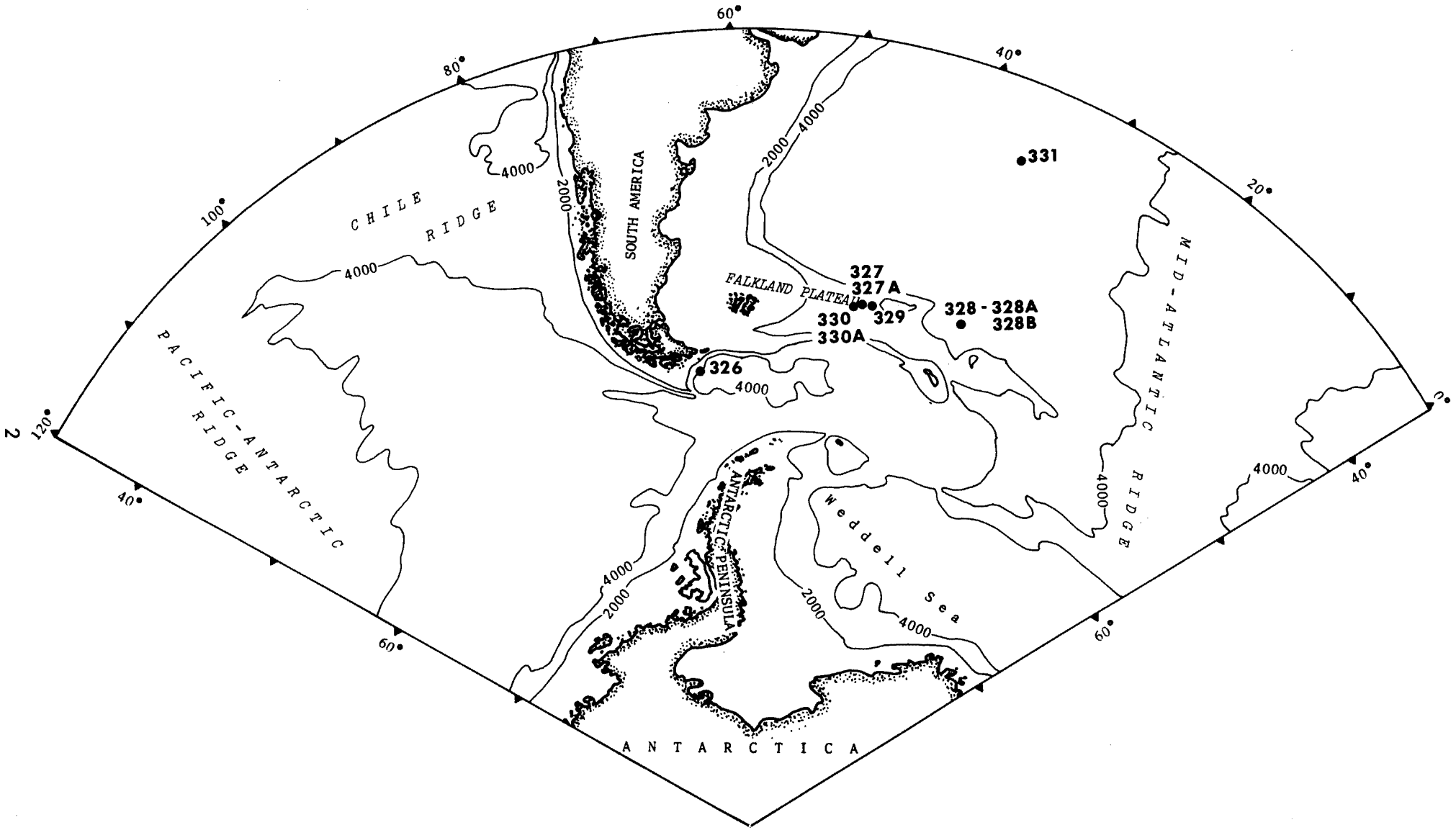

Figure 1.

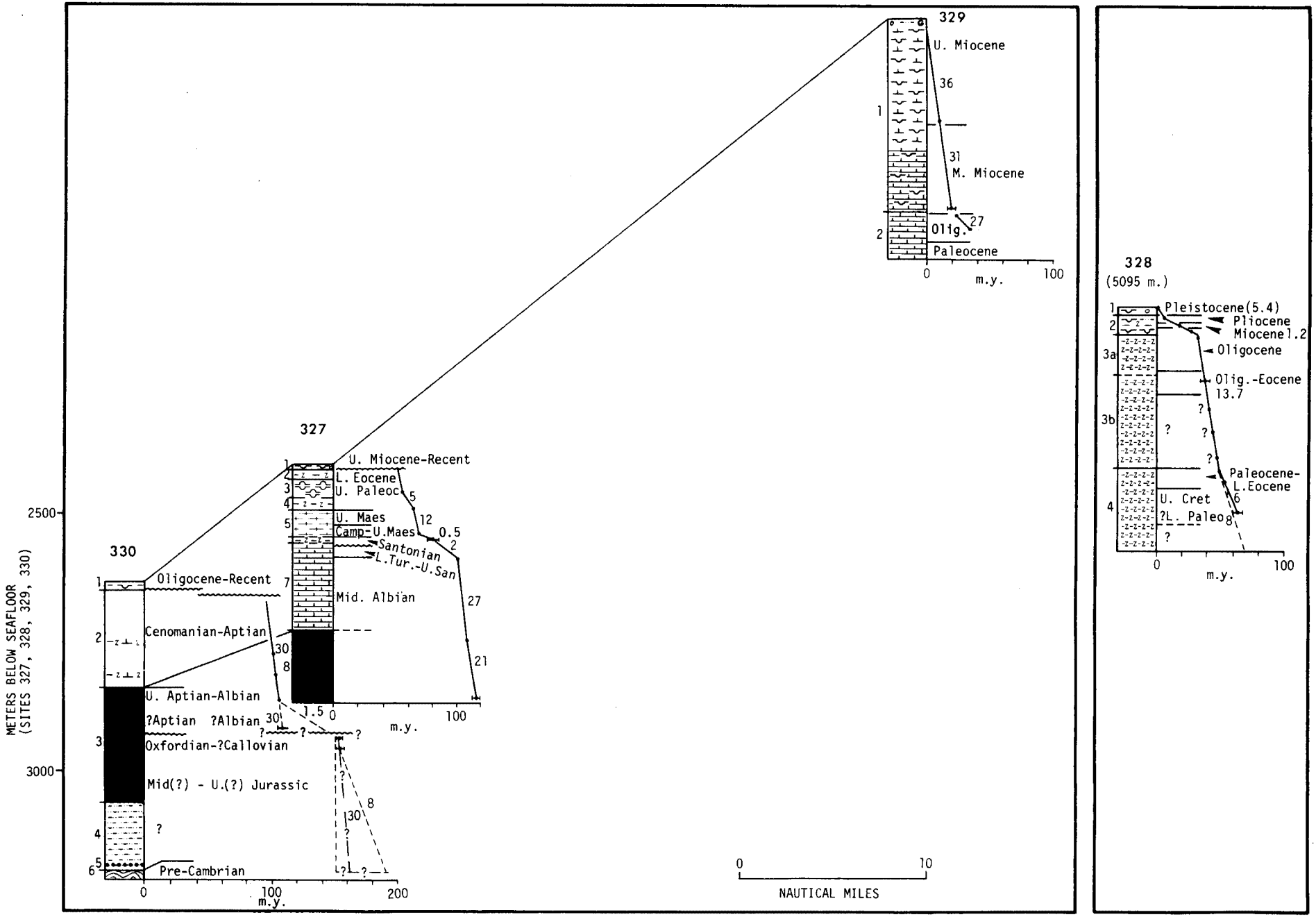

Figure 2. Stratigraphic Columns Leg 36

TABLE 1.

LEG XXXVI CORING SUMMARY

HOLE	DATES (1974)	LATITUDE	LONGITUDE	WATER DEPTH	PENETRATION	NO. OF CORES	METERS CORED	METERS RECOVERED	PERCENT OF RECOVERY
326	5 - 6 April	56°35.00'S	65°18.20'W	3812 m	9.5	1	9.5	0.5	05
327	13 - 14 April	50°52.28'S	46°47.02'W	2401	5.5	1	5.5	5.5	100
327A	14 - 17 April	50°52.38'S	46°47.02'W	2401	469.5	27	256.5	128.1	50
328	24 - 27 April	49°48.67'S	36°39.53'W	5059	397.0	12	112.0	62.1	55
328A	27 - 28 April	49°48.67'S	36°39.53'W	5059	17.0	2	17.0	7.4	44
328B	28 - 30 April	49°48.67'S	36°39.53'W	5059	471.0	8	67.0	63.0	94
329	4 - 6 May	50°39.31'S	46°05.73'W	1519	464.5	33	312.5	215.1	69
330	6 - 8 May	50°55.19'S	46°53.00'W	2626	575.5	17	161.5	85.5	53
330A	8 May	50°55.19'S	46°53.00'W	2626	53.0	5	47.5	4.0	08
331	13 - 16 May	37°53.00'S	38°06.92'W	5067	18.0	2	18.0	8.5	47
					2480.5	108	1007.0	579.7	57.6

EXPLANATORY NOTES

Core Labeling

The following material should aid in understanding the terminology, labeling and numbering conventions in use at the Deep Sea Drilling Project. Also included are explanations of the core logs and of some of the data that have been assembled up to this time. The sediment classification used on Leg 36 and a sample distribution policy appear near the end of this section.

Numbering of Sites, Holes, Cores, Samples

Drill site numbers run consecutively from the first site drilled by GLOMAR CHALLENGER in 1968. The site number is unique; thus, use of a Leg number is optional. 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. For purposes of compiling the stratigraphy of the site, the stratigraphic sections at each of the holes are assumed to be similar or identical, although this has not always proved to be the case.

Holes drilled at a site take the particular site number, and are distinguished by a letter suffix. The first hole has only the site number; the second has the site number with suffix A; the third has the site number with suffix B, and so forth. It is important, for sampling purposes, to distinguish the holes drilled at a site, since recovered sediments or rocks usually do not come

from equivalent positions in the stratigraphic column at different holes.

Cores are numbered sequentially from the top down. In the ideal case, they consist of 9 meters of sediment or rock in a plastic liner of 6.6 cm diameter. In addition, a short sample is obtained from the core catcher (a multi-fingered device at the bottom of the core barrel which prevents cored materials from sliding out during core-barrel recovery). This usually amounts to about 20 cm of sediment and is stored separately. It represents the lowest stratum recovered in the particular cored interval. The Core Catcher sample is designated by CC (e.g., 319A-4 CC = Core Catcher sample of the fourth core taken in the second hole at Site 319).

The cored interval is the interval in meters below the sea floor, measured from the point at which coring for a particular core was begun to the point at which it was terminated. This interval generally spans 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 sediments, 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, when drilling hard formations, a center bit filling the opening in the bit face can replace the core barrel if drilling ahead without coring is necessary. This, however, is seldom used and continuous coring

is generally practiced.

When a core is brought aboard the GLOMAR CHALLENGER it is labeled and the plastic liner and core cut into 1.5-meter sections. A full, 9-meter core would thus consist of six sections, numbered from the top down 1 to 6. Generally something less than 9 meters is recovered. In this case, the sections are still numbered with one at the top, but the number of sections is the number of 1.5-meter intervals needed to accommodate the length of core recovered. This is illustrated below (Figure 3).

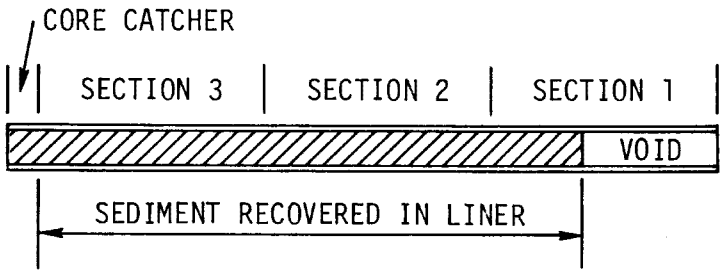

Figure 3.

Thus, as shown, recovery of 3.6 meters of sediment would result in a core with 3 sections, with a void of 0.9 meters at the top of the first section. By convention, and for convenience in routine data handling at the Deep Sea Drilling Project, if a core contains a length of material less than the length of the cored interval, the recovered material is arbitrarily placed at the top of the cored interval, with the top of Section 1 rather than the top of the sediment being the top of the cored interval. This is shown below for the core in the above example (Figure 4).

Thus, the depth below the sea floor of the top of the sediment

of this hypothetical core would lie at 150.9 meters (not 150.0 m) and the bottom at 154.5 meters, with the Core Catcher sample being regarded as dimensionless.

A discrepancy may exist between the usual coring interval of 9.5 meters and the 9-meter length of core actually recovered. The core liners used are 9.28 meters in length, and the Core Catcher accounts for another 0.2 meters. In cases where the core liner is recovered full to the top, the core is still cut into six 1.5-meter sections, measured from the bottom of the liner, and the extra 0.28-meter section at the top is designated Section 0, or the "zero section." The zero section is ignored in calculations of depth below the sea floor of cores or levels within cores.

In the core laboratory on the GLOMAR CHALLENGER, after some steps of routine processing, the

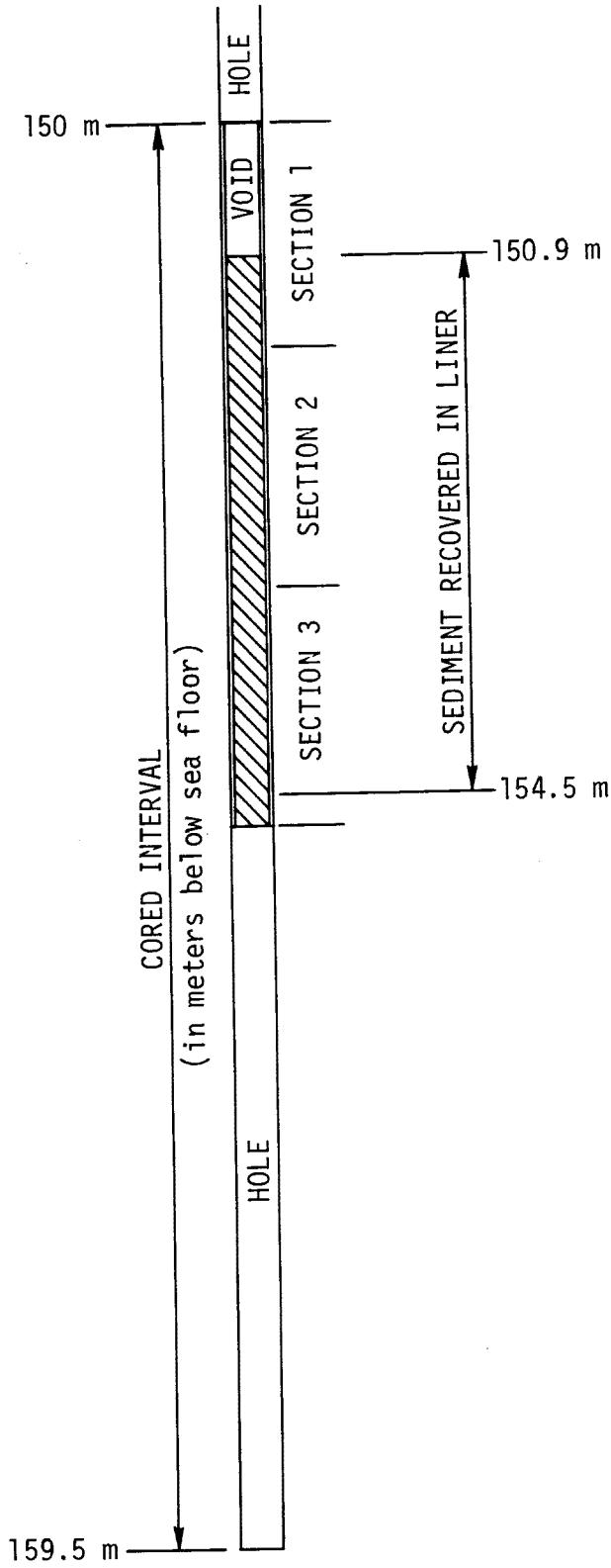

Figure 4.

1.5-meter sections of sediment core and liner are split in half lengthwise. One half is designated the "archive" half, which is photographed, described and then stored. 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 designated by the interval in centimeters from the top of the core section from which the sample was extracted. Sample volume, 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

567A-4-3, 122-124 cm (10cc) designates a 10cc sample taken from Section 3 of Core 4 from the second hole drilled at Site 567. The depth below the sea floor for this sample would then be the depth to the top of the cored interval - 150 meters in the example above - plus 3 meters for Sections 1 and 2, plus 122 cm (depth below the top of Section 3), or 154.2 meters. (Note, however, that sample requests should refer to a specific interval within a core section rather than level below sea floor.)

Core Disturbance

The rotary drill-coring technique quite often results in

a high degree of disturbance of the cored sediments. This is especially true in the case of the softer unconsolidated sediments. Core disturbance has been treated at great length in volumes of the Initial Reports of the Deep Sea Drilling Project, and will not be elaborated upon here. A qualitative estimate of the degree of deformation is given on the core logs.

Downhole Contamination

Downhole contamination is a serious problem. Hard objects (manganese nodules, chert, lithic fragments, and pebbles) are often washed or dragged hundreds of meters downhole. They commonly are lodged in the top of cores or will become incorporated into the middle of cores at levels far below their proper stratigraphic position. Displaced manganese nodules can usually be recognized. However, displaced chert, lithic fragments, and pebbles are more difficult to recognize as such. This information is recorded on the core forms.

Carbon-carbonate

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

Total carbon	±0.3% (absolute)
Organic carbon	±0.06% (absolute)
$CaCO_3$	±3% (absolute)

X-ray Mineralogy

Semiquantitative determinations of the mineral composition

of bulk samples are tabulated on the core logs. In each listing the percentage of "amorphous scattering" (noncrystalline, unidentifiable material) is shown along with the crystalline, identified fraction. The percentages of identified minerals sum up to 100 percent. The analytical methods used are described in Volumes 1 and 2 of the Initial Reports of the Deep Sea Drilling Project and in Appendix III of Volume 4.

Grain Size Analyses

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

X-ray Diffractometer Analyses

X-ray data are those collected by the DSDP X-ray mineralogy laboratory at the University of California, Riverside.

Sediment Classification for Leg 36

I. Rules for class limits and sequential listing of constituents in a sediment name.
   A. Major constituents
      1. Sediment assumes name of those constituents present in major amounts (major defined as >25%). See example in rule 1A3.
      2. Where more than one major constituent is present, the one in greatest abundance is listed farthest to the right. In order of decreasing abundance, the remaining major constituents are listed progressively farther to the left.
      3. Class limits when two or more major constituents are present in a sediment are based on 25% intervals, thusly: 0-25, 25-50, 50-75, 75-100.
      Example illustrating rules 1A and 1B and the resulting sediment names:

% Clay	% Nannos	
0- 25	75-100	= Nanno ooze
25- 50	50- 75	= Clayey nanno ooze
50- 75	25- 50	= Nanno clay
75-100	0- 25	= Clay

B. Minor constituents
   1. At the discretion of the geologist, constituents present in amounts of 10-25% may be prefixed to the sediment name by the term rich.
   Example: 50% nannofossils, 30% radiolarians, 20% zeolites would be called a zeolite-rich rad nanno ooze.

C. Trace constituents. Constituents present in amounts of <10% may follow the sediment name with addition of the word trace. This again is at the discretion of the geologist.

II. Specific rules for calcareous and siliceous tests
   A. Nannofossil is applied only to the calcareous tests of coccolithophorids, discoasters, etc.
   B. The term calcareous or siliceous, depending on skeletal composition, is applied where no attempt is made to distinguish fossils as to major subgroup. Thus, if no percent estimate is made, a mixture of radiolarians, diatoms, and silicoflagellates would be called siliceous ooze. Where this distinction is made, the appropriate fossil name is used.
   C. Fossil tests are not qualified by a textural term unless very obviously redeposited.
   D. Abbreviations, as nanno for nannofossil, rad for radiolarian, etc., may be used in the sediment name.
   E. The term ooze follows a microfossil taxonomic group whenever it is the dominant sediment constituent.
   F. The term chalk is used to designate a compacted calcareous ooze. The form limestone is used to designate a completely indurated calcareous sediment.

III. Clastic sediments
   A. Clastic constituents, whether detrital, volcanic, biogenous or authigenic, are given a textural designation. When detrital[1] grains are the sole clastic constituents of a sediment, a simple textural term suffices for its name. The appropriate term is derived from Shepard's triangle diagram. The textural term can be preceded by a mineralogical term when this seems warranted. Such mineralogical terms are applied as per rules 1A and B.

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[1]Detrital = all clastic grains derived from the erosion of preexisting rocks except for those of biogenous, authigenic, or volcanic origin.

B. When the tests of a fossil biocoenosis or authigenic and detrital grains occur together, the fossil or authigenic material is not given a textural designation (as per rule IIC). However, the detrital material is classified texturally be recalculating its size components to 100%. With the presence of other constituents in the sediment, the detrital fraction now requires a compositional term.

C. Clastic volcanics
Redeposited pyroclastics also become a clastic component. They are again recognized by the term volcanic and receive a textural term such as gravel, sand, silt, etc. It is particularly difficult at times to differentiate between volcanic sand (i.e., transported by tractive mechanisms) and crystal ash (i.e., direct outfall resulting from explosion of a volcano).

D. Clastic authigenic constituents
Where authigenic minerals are recognized as being a redeposited constituent, they are given a textural designation in addition to their mineral names.

IV. Volcanic and authigenic constituents

A. Volcanic constituents
Pyroclastics are given textural designations already established in the literature. Thus, volcanic breccia = >32mm, volcanic lapilli = <32mm to >4mm, and volcanic ash = <4mm. It is at times useful to further refine the textural designations by using such modifiers as coarse or fine. An ash wholly, or almost wholly, of glass shards is termed vitric ash.

B. Authigenic constituents

1. Authigenic minerals enter the sediment name in a fashion similar to that outlined under rules 1A and B. Normally, as with a fossil biocoenosis, the authigenic minerals are not given a textural designation and texture.
2. The terms ooze and chalk are applied to carbonate minerals of all types using the same rules that apply to biogenous constituents.

V. Color

A. Color is not formally part of the sediment name. However, its employment for sediment description is important particularly as it provides one of the criteria used to distinguish pelagic and terrigenous sediments.

B. Common usage dictates that it is no longer expendent to employ the term red for sediments (usually pelagic) which are various shades of red, yellow, and brown. The proper color designation should be used.

Accompanying the above classification is a set of standard

Deep Sea Drilling Project lithologic symbols (Figure 5) which are used on core, barrel and hole logs.

Smear slides are the basic means of mineral identification for sediments on shipboard, whilst thin sections and mineral grain mounts are used in studies of indurated sediments and igneous rocks.

Smear slide estimates of mineral abundances are based on a visual estimate of the area of the smear slide covered by each component. Past experience has shown that an absolute accuracy no better than 10 to 20% can be expected for these estimates. Of more importance to the geologist than absolute accuracy are relative changes in component abundances.

The smear slide descriptions include very fine-grained micrite or clay. X-ray analysis suggests that micrite may also include amorphous silica, cristobalite, tridymite and clay minerals, whereas clay may include amorphous silica and other clay-sized particles. Smear slide estimates of zeolite have not always been confirmed by X-ray analysis.

Biostratigraphy

Biostratigraphic boundaries given in this initial description are of a preliminary nature. Although no major changes in age assignments are anticipated, adjustments of some boundaries are likely to be made prior to issuing of the Initial Report Volume for Leg 36.

Microfossil assemblages recovered on Leg 36 are high latitude. Low latitude biostratigraphic zonations are not applicable for most

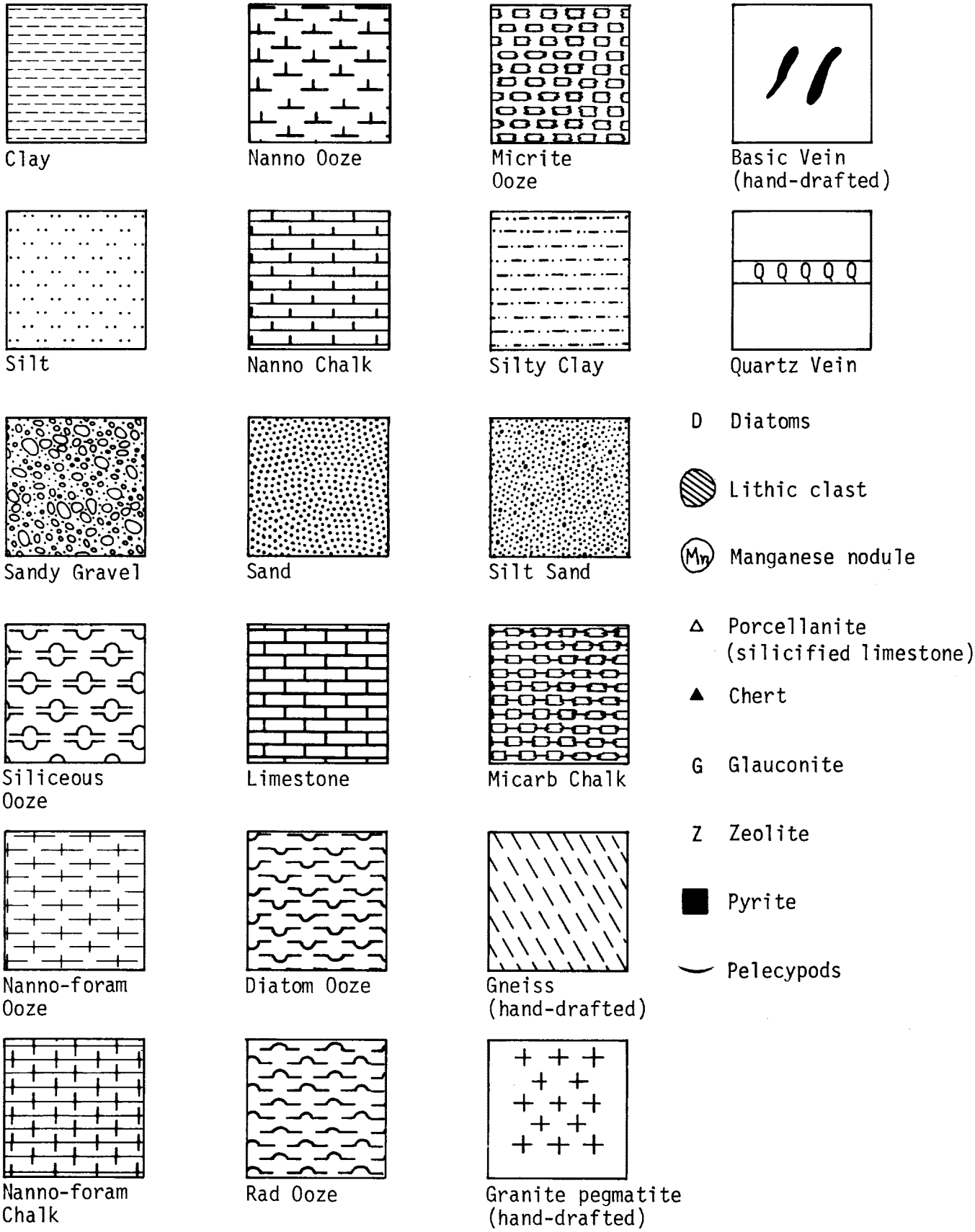
Clay
Nanno Ooze
Micrite Ooze
Basic Vein (hand-drafted)
Silt
Nanno Chalk
Silty Clay
Quartz Vein
Sandy Gravel
Sand
Silt Sand
D Diatoms
Lithic clast
Mn Manganese nodule
Siliceous Ooze
Limestone
Micarb Chalk
Porcellanite (silicified limestone)
Chert
G Glauconite
Z Zeolite
Nanno-foram Ooze
Diatom Ooze
Gneiss (hand-drafted)
Pyrite
Pelecypods
Nanno-foram Chalk
Rad Ooze
Granite pegmatite (hand-drafted)

Figure 5.

groups other than calcareous nannofossils of Mesozoic and early Paleogene age. Zonal schemes used are as follows:

1. Planktonic foraminifera: Neogene -- Kennett, 1973.
   Paleogene -- Blow, 1969.
2. Calcareous nannofossils: Cenozoic -- Bukry, 1973.
   Mesozoic -- Roth and Thierstein, 1972; Thierstein, 1973.
3. Radiolarians: Hays, 1965.
4. Diatoms: McCollum, 1975.

A sample core form is given in Figure 6. It is designed to show the organization, abbreviations, and symbols that are used on core forms in the subsequent part of this report.

Site Hole Core Cored Interval: Meters below sea floor.

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
		D=Diatom, F=Foraminifera, N=Nannoplankton, R=Radiolaria, S=Silicoflagellate	B=Barren, R=Rare, C=Common, F=Few, A=Abundant	VP=Very Poor, P=Poor, M=Moderate, G=Good	0 1 2 3 4 5 6 Core Catcher	0.5 1.0	SEE EXPLANATORY NOTES	Undisturbed (blank); Slight deformation —— ——; Moderate deformation — — —; Intense deformation ~~~~~; Brecciated o o o	Smear slide depth in centimeters within a section.	

Sediment or rock name.

General description: lithologies, colors, and specific characteristics.

Smear slide descriptions of representative lithologies. Abbreviations are:

qtz.	=	quartz
feld.	=	feldspar
rads.	=	Radiolaria
zeol.	=	zeolites
nannos	=	nannofossils
spic.	=	sponge spicules
palag.	=	palagmite
glauc.	=	glauconite
silico.	=	silicoflagellates
forams	=	foraminifera
micronod.	=	micronodules
dolom.	=	dolomite
pyr.	=	pyrite

Grain size, carbon-carbonate, bulk X-ray, and smear slide intervals are given by section and centimeter depth within the section. For example, 6-40 is a sample that was taken at 40 centimeters in Section 6.

Grain size determinations are given in wt percent sand, silt, and clay.

Carbon/carbonate determinations are given in percent total carbon, organic carbon, and calcium carbonate.

Bulk X-ray determinations are given in percentages of amorphous and crystalline components. Percentages of minerals listed are from the crystalline component and are summed to 100%.

Figure 6. Sample core form and descriptions.

sample-distribution policy

Distribution of Deep Sea Drilling samples will be undertaken in order to (1) provide supplementary data for inclusion in the appropriate Initial Report to support *Glomar Challenger* scientists in achieving the scientific objectives of their particular cruise, and (2) provide individual investigators with material to conduct detailed studies beyond the scope of the Initial Reports.

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

Distribution of samples for contributions to Initial Reports

Any investigator who wishes to contribute a paper to a given volume of the Initial Reports may write to the Curator, Deep Sea Drilling Project, Scripps Institution of Oceanography, University of California at San Diego, La Jolla, 92037, requesting samples from a forthcoming cruise. The request should include the nature of the study, and type, size, number of samples, particular sampling techniques or equipment that might be required, and an estimate of the time required to complete the study. The requests will be reviewed by shipboard scientists, and, if they are deemed suitable and pertinent to the objectives of the leg, and shipboard workload permits, the requested samples will be taken during the cruise (provided, of course, material suitable to the investigation is obtained during the drilling). In the case of multiple requests to perform the same investigation, selection of investigator will be made by the shipboard scientific party.

Proposals should be of a scope appropriate to complete the sampling and study in time for publication in the Initial Reports. Studies deemed acceptable will be referred to the Curator who will, with the consent of the NSF Sample Distribution Panel, authorize distribution of the samples. The Sample Distribution Panel and the Deep Sea Drilling Project will strive to ensure a reasonable degree of continuity in the investigations among the various cruises, that the studies are pertinent to goals of the cruise, and that they are consistent with the publication policy for the Initial Reports. Subject to these same provisions, the shipboard scientific party may elect to have special studies of selected core samples of its recently completed cruise made by other investigators.

Investigations not completed in time for inclusion in the Initial Report may not be published in other journals until publication of the Initial Report for which it was intended.

Distribution of samples for publication other than in Initial Reports

1. Researchers intending to request samples for studies beyond the scope of the Initial Reports should first obtain a sample request form from the Curator. Requests should specify the quantities and intervals of the core required, a statement of the proposed research, the possibility of returning residue to the Curator, the estimated time required to complete and publish the results, and the availability or need of funding and availability of equipment and space foreseen for the research.

In order to ensure that requests for highly desirable but limited samples can all be considered, approval of requests and distribution of samples will not be made prior to 12 months after date of completion of the cruise that collected the cores. Prior to publication of an Initial Report, requests for samples from a cruise can be based on the preliminary shipboard core logs. Copies of these logs will be kept on open file at Scripps and other designated institutions. The only exceptions will be for specific instances involving ephemeral properties.

Requests for samples from researchers in industrial laboratories will be handled in the same manner as those from academic organizations, and there will be the same obligation to publish results promptly. Requests from foreign scientists or organizations will also be considered.

2. The Curator has the responsibility for distributing samples, controlling quality of samples, and preserving core material. He also has the responsibility for maintaining a record of requests for samples that have been processed and filled indicating the investigator and subjects to be studied. This record will be available to investigators.

The distribution of samples will be made directly from the two repositories at Lamont-Doherty Geological Observatory and Scripps by the Curator or his designated representative.

3. (a) Samples up to 10 cc/m of core length can be automatically distributed by the Curator, Deep Sea Drilling Project or his authorized representative to any qualified investigator who requests them. The Curator will refrain from making automatic distribution of any parts of the cores which appear to be in particularly high demand, and any requests for these parts of the cores will be referred to the Sample Distribution Panel for review. Requests for samples from thin layers or important stratigraphic boundaries will generally require Panel review.

(b) All requests for samples in excess of 3(a) above will be referred to the Sample Distribution Panel.

(c) If, in the opinion of scientific investigators, certain properties they wish to study may deteriorate prior to the normal availability of the samples, such investigators may request that the normal waiting period not apply. All such requests must be approved by the Sample Distribution Panel.

4. 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 1). If a sample request is dependent, either wholly or in part, on proposed funding, the Curator will provide to the organization to whom the funding proposal has been submitted any information on the availability (or potential availability) of samples that it may request.

5. Investigators receiving samples are responsible for:

i) promptly publishing significant results.

ii) acknowledging, in publications, that samples were supplied through the assistance of the National Science Foundation.

iii) submitting 4 copies of all reprints of published results to the Curator.

iv) notifying the Curator of any work done on the samples that is additional to that stated in the original request for samples.

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

6. Cores will be made available at repositories for investigators to examine and specify exact samples in such instances as this may be necessary for the scientific purposes of the sampling, subject to the limitations of 3 (a), (b), (c), and 5, above, and with the specific permission of the Curator or his delegate.

7. Cores of igneous and metamorphic rocks will also remain at the repositories where they will be available for observation and description and where selected samples may be taken for thin-section preparation and other work.

8. The Deep Sea Drilling Project routinely processes by computer most of the quantitative data presented in the Initial Reports. Space limits in the Initial Reports preclude 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.

Magnetics, seismic-reflection and bathymetric data collected under way by the *Glomar Challenger* will also be available for distribution 12 months after completion of the cruise.

Requests for these data may be made to the Coordinating Staff Geologist of the Deep Sea Drilling Project, at Scripps.

A charge will be made to recover the expenses of responding to individual requests. Estimated charges can be furnished before the request is processed, if required.

9. This policy has the approval of the National Science Foundation and is designed to help ensure that the greatest possible scientific benefit is gained from the materials obtained, and that samples will be made widely available to interested geologists.

(Slightly condensed from the official sample distribution policy of the Deep Sea Drilling Project.)

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DEEP SEA DRILLING PROJECT

LEG 36 SITE 326

SITE SUMMARY SHEET

Position: Latitude:	56°35.0'S
Longitude:	65°18.2'W
Water depth (rig floor)	3822 corrected meters, echo sounding
Bottom felt at:	3822 meters, drill pipe
Penetration:	9.5 meters
Number of holes:	1
Number of cores:	1
Total length of cored section:	9.5 meters
Total core recovered:	0.5 meters
Percentage core recovery:	5.2%

Oldest Sediment Cored

Depth subbottom:	9.5(?) meters
Nature:	Sandy silt
Age:	Quaternary
Measured velocity:	---

Basement

Depth subbottom (top)	not reached
Penetration:	---
Nature:	---
Velocity:	---

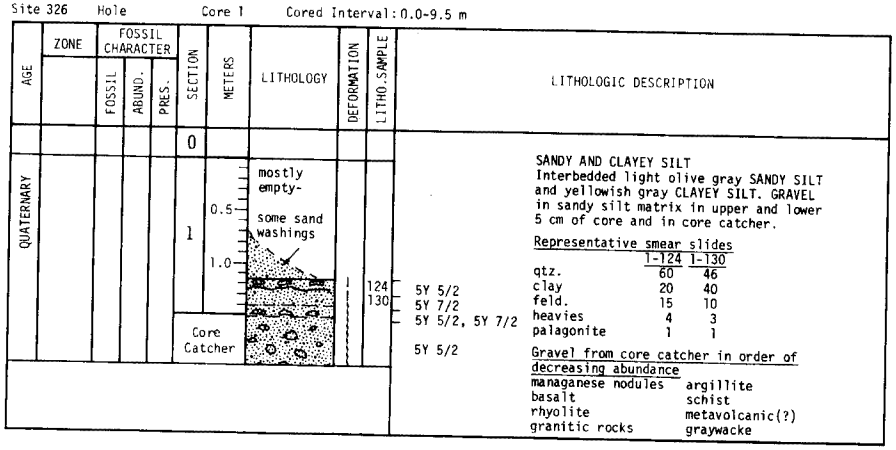
Principal Results

The major objectives, not achieved, were to date basement in Drake Passage and study the variability of Circum-Polar Current and Antarctic Convergence.

LEG 36 SITE 326
SITE SUMMARY SHEET, con't.

Only one surface core was obtained, owing to loss of 3800 meters of drill string and a combination of high winds and strong currents. The Quaternary sediments, were derived in large part from the adjacent continental margin by turbidity current action, with contributions from ice rafting, and deposited in an environment of strong bottom currents.

Site 326 Hole Core 1 Cored Interval: 0.0-9.5 m



SANDY AND CLAYEY SILT
Interbedded light olive gray SANDY SILT and yellowish gray CLAYEY SILT. GRAVEL in sandy silt matrix in upper and lower 5 cm of core and in core catcher.

Representative smear slides

	1-124	1-130
qtz.	60	46
clay	20	40
feld.	15	10
heavies	4	3
palagonite	1	1

Gravel from core catcher in order of decreasing abundance

manganese nodules	argillite
basalt	schist
rhyolite	metavolcanic(?)
granitic rocks	graywacke

DEEP SEA DRILLING PROJECT

LEG 36 SITE 327

SITE SUMMARY SHEET

Position: Latitude:	50°52.28'S
Longitude:	46°47.02'W
Water depth (rig floor):	2410 corrected meters, echo sounding
Bottom felt at:	2411 meters, drill pipe
Penetration:	469.5 meters
Number of holes:	2
Number of cores:	28
Total length of cored section:	262 meters
Total core recovered:	133.6 meters
Percentage core recovery:	51%
Oldest Sediment Cored	
Depth subbottom:	469.5 meters
Nature:	Pyrite - and zeolite - bearing claystone
Age:	?Barremian
Measured velocity:	= 2 - 3 km/sec
Basement	
Depth subbottom (top):	Not reached

Principal Results

Site 327, on the elevated eastern part of the Falkland Plateau, was chosen to examine Southern Ocean shallow water biostratigraphy and to identify seismic reflectors of regional importance. One surface core was taken from Hole 327 before pulling out for bad weather. Hole 327A was cored continuously to 118 meters, then semicontinuously to 470 meters before being abandoned because of rolling exceeding 9°.

Below 10 meters of Quaternary sands and gravels the hole penetrated a sequence of calcareous and siliceous oozes, zeolitic clays and clay-

stones. These are of Eocene to Neocomian age, with upper Paleocene, upper Maastrichtian and upper Aptian particularly well represented. The section includes an unique siliceous flora and fauna at the Eocene-Paleocene boundary, with many new forms, and unusual upper Cretaceous high latitude assemblages, showing climatic deterioration in the Maastrichtian tending to provincialism of nannoflora. Maastrichtian fossils are excellently preserved.

Site 327 Hole Core 1 Cored Interval: 0.0-5.4 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
					0					
?PLEISTOCENE					1	0.5, 1.0				SANDY GRAVEL
					2					
					3					
					4					

Site 327 Hole A Core 1 Cored Interval: 0.0-13.5

AGE	ZONE: FORAMS	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
					0					
QUATERNARY	Globorotalia truncatulinoides (of Kennett, 1970)	N	R	P	1	0.5, 1.0	VOID			SANDY GRAVEL Olive gray. Graded bed, granules at base, medium sand at top.
		S	F	M					118	5Y 4/1 SILTY DIATOM OOZE Light olive gray mottled with grayish orange. Rare 1-5 cm clasts of gneiss, hornfels, schist and basalt. Glauconite in some layers.
		S	R	P	2					Characteristic smear slide: 2-145 — diatoms 50; clay 40; qtz. 6; rads 5
		N	B							
		R	R	P						5Y 6/1 and 10YR 7/6
		D	C	P					25	Bulk X-ray: 3-24 — amor. 39.7; quar. 50.8; K-Fe. 12.5; plag. 21.2; mica 9.8; chlo. 2.7; mont. 2.9
		D	F	P	3				145	SANDY MUDDY GRAVEL Dusky yellow brown. 1-5 cm clasts of various lithologies. One small manganese nodule.
		R	R	P	4				108	10YR 2/2 Characteristic smear slide: 3-108 — qtz. 50; glauc. 25; heavies 4; micronods. 2; diatoms 2; rads 2
		F	R	G	Core Catcher					

Site 327 Hole A Core 2 Cored Interval: 13.5-23.0 m

AGE	ZONE NANNOS	FOSSIL CHARACTER FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
EARLY EOCENE	Tribrachiatus orthostylus	N	F	P	1	0.5	VOID			
		N	F	M		1.0				
		D	R	P						
		F	R	P						
		N	R	P	2					
		N	R	P						
		N	R	M	3		(Mn)		120	10YR 7/4
		N	B		4					
		N	B							
		N	R	P	5					
		N	B							
		R	R	P	Core Catcher				CC	
		N	R	P						

ZEOLITIC SILTY CLAY
Grayish orange. Granule and pebble-sized clasts in Sections 2 and 5, including manganese nodules, shale, granodiorite, siltstone and porphyry.

Characteristic smear slide

	3-120	CC
clay	78	40
zeol.	20	40
qtz.	TR	TR
palagonite	TR	-
glauc.	1	-
micronods.	1	20
rads.	TR	TR
feld.	-	TR
glass	-	TR
fish debris	-	TR

Bulk X-ray

	3-98
amor.	59.7
quar.	7.6
K-Fe.	7.2
plag.	5.4
kaol.	0.5
mica	7.3
chlo.	0.6
mont.	12.1
clin.	57.8

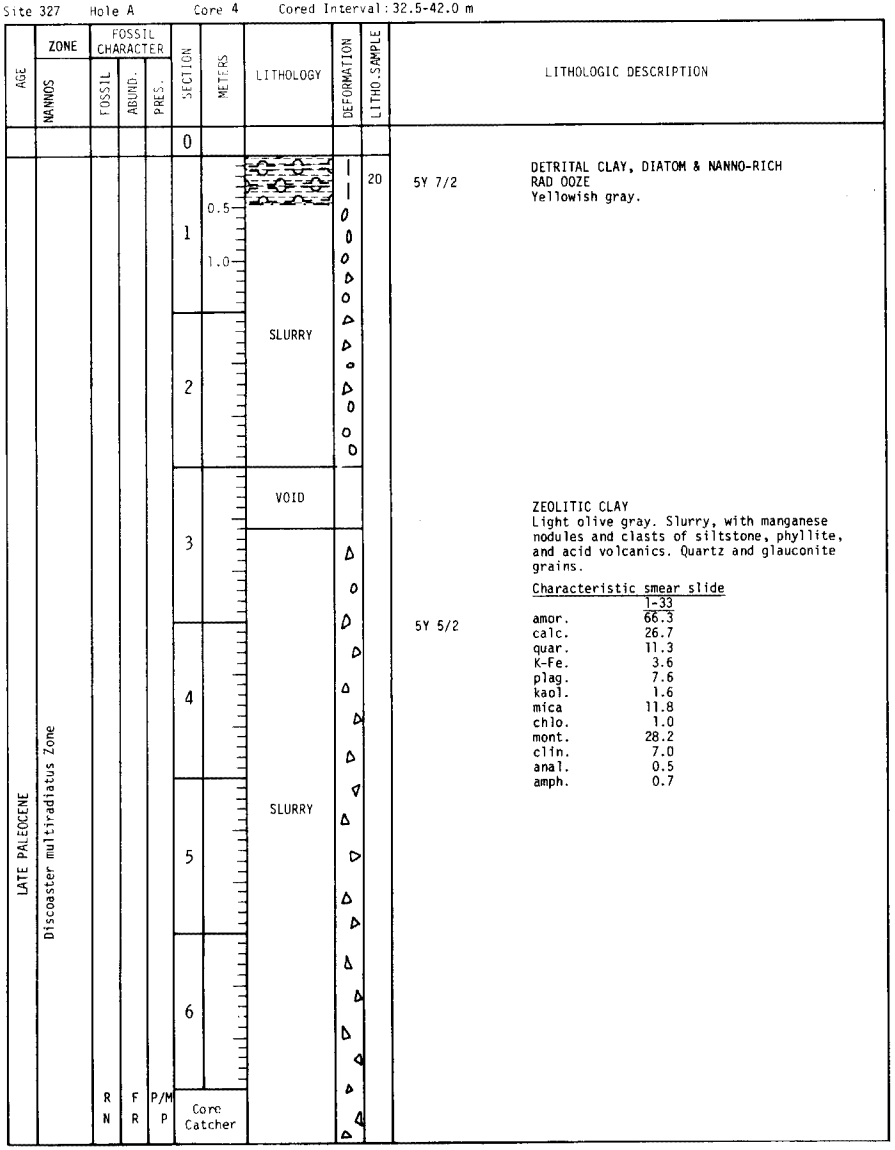
Site 327 Hole A Core 3 Cored Interval: 23.0-32.5 m

AGE	ZONE NANNOS	FOSSIL CHARACTER FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
LATE PALEOCENE-EARLY EOCENE	Discoaster multiradiatus(?)	N	R	P	1	0.5				ZEOLITIC SILTY CLAY
						1.0				Grayish orange.
		N	R	P	2					10YR 7/4
		N	F	G					90	
		R	R	VP	Core Catcher				CC	
		N	F	M						

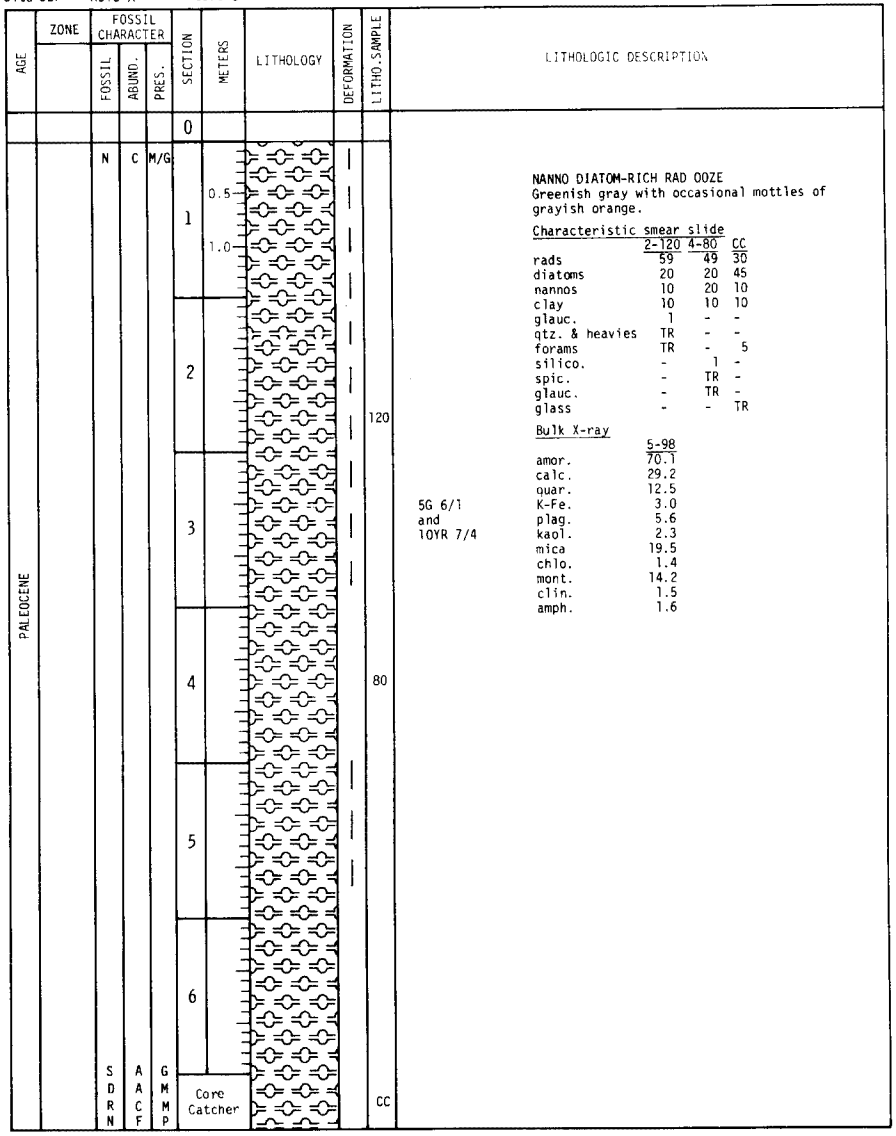
Characteristic smear slide

	2-90	CC
clay	59	60
zeol.	35	35
nannos	5	TR
qtz. & feld.	TR	TR
mica	TR	-
spic.	TR	-
fish debris	TR	-
palag.	-	TR
glauc.	-	TR
glass	-	3

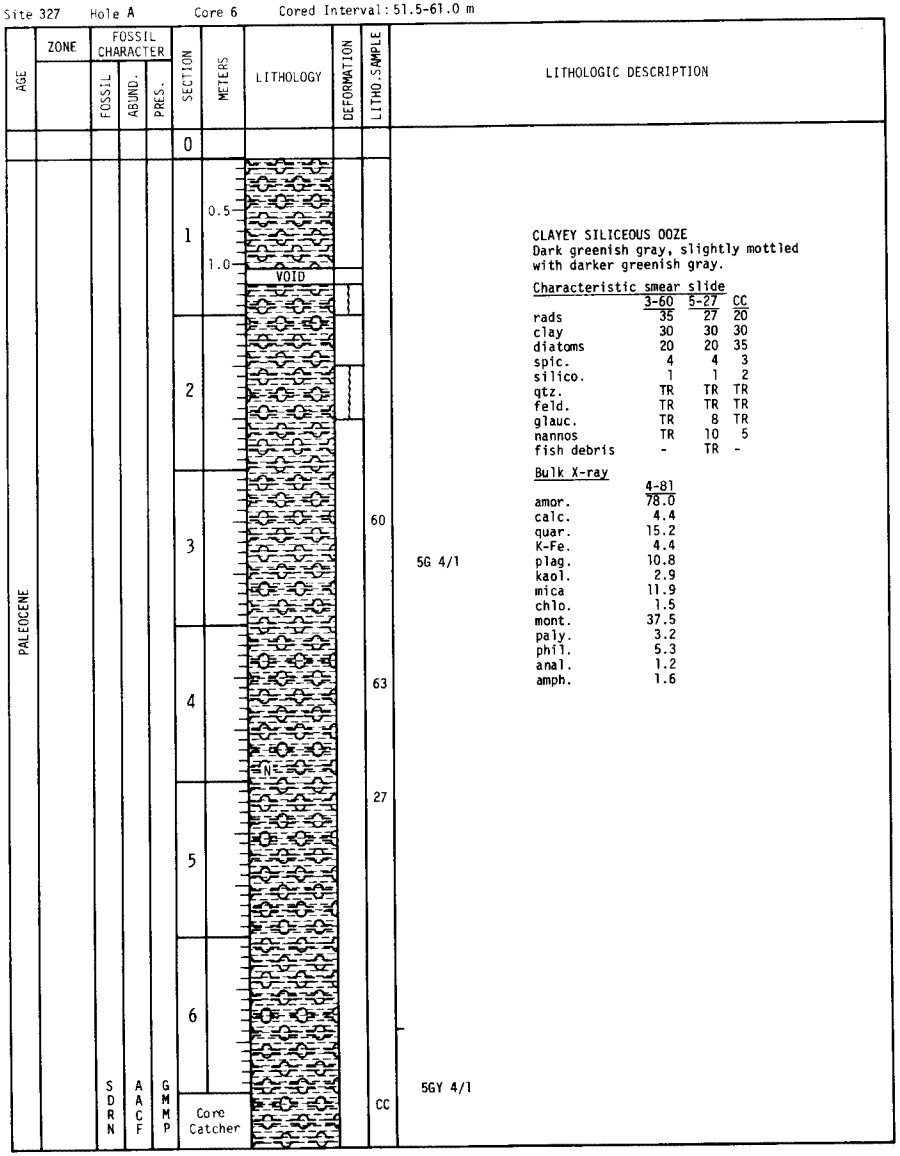
Site 327 Hole A Core 4 Cored Interval: 32.5-42.0 m



Site 327 Hole A Core 5 Cored Interval: 42.0-51.5 m



Site 327 Hole A Core 6 Cored Interval: 51.5-61.0 m

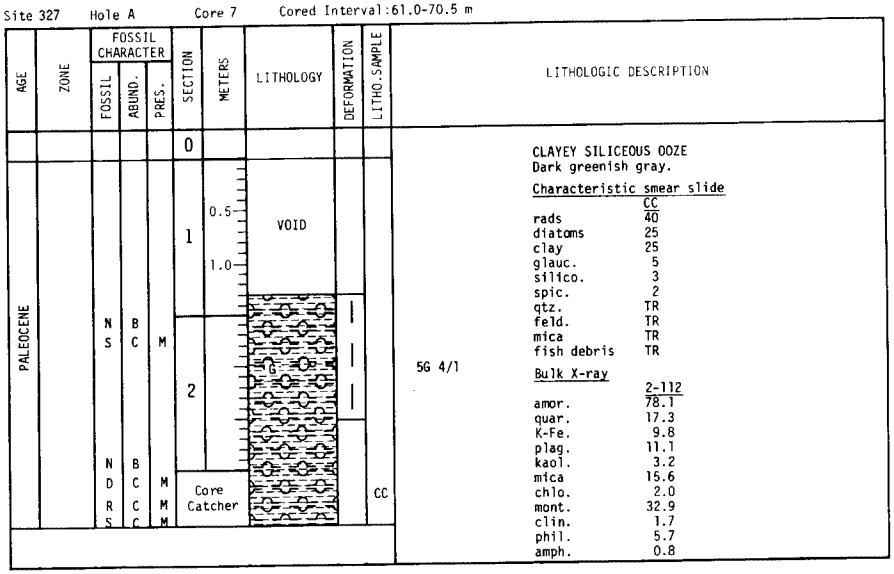


CLAYEY SILICEOUS OOZE
Dark greenish gray, slightly mottled with darker greenish gray.

Characteristic smear slide	3-60	5-27	CC
rads	35	27	20
clay	30	30	30
diatoms	20	20	35
spic.	4	4	3
silico.	1	1	2
qtz.	TR	TR	TR
feld.	TR	TR	TR
glauc.	TR	8	TR
nannos	TR	10	5
fish debris	-	TR	-

Bulk X-ray	4-81
amor.	78.0
calc.	4.4
quar.	15.2
K-Fe.	4.4
plag.	10.8
kaol.	2.9
mica	11.9
chlo.	1.5
mont.	37.5
paly.	3.2
phil.	5.3
anal.	1.2
amph.	1.6

Site 327 Hole A Core 7 Cored Interval: 61.0-70.5 m

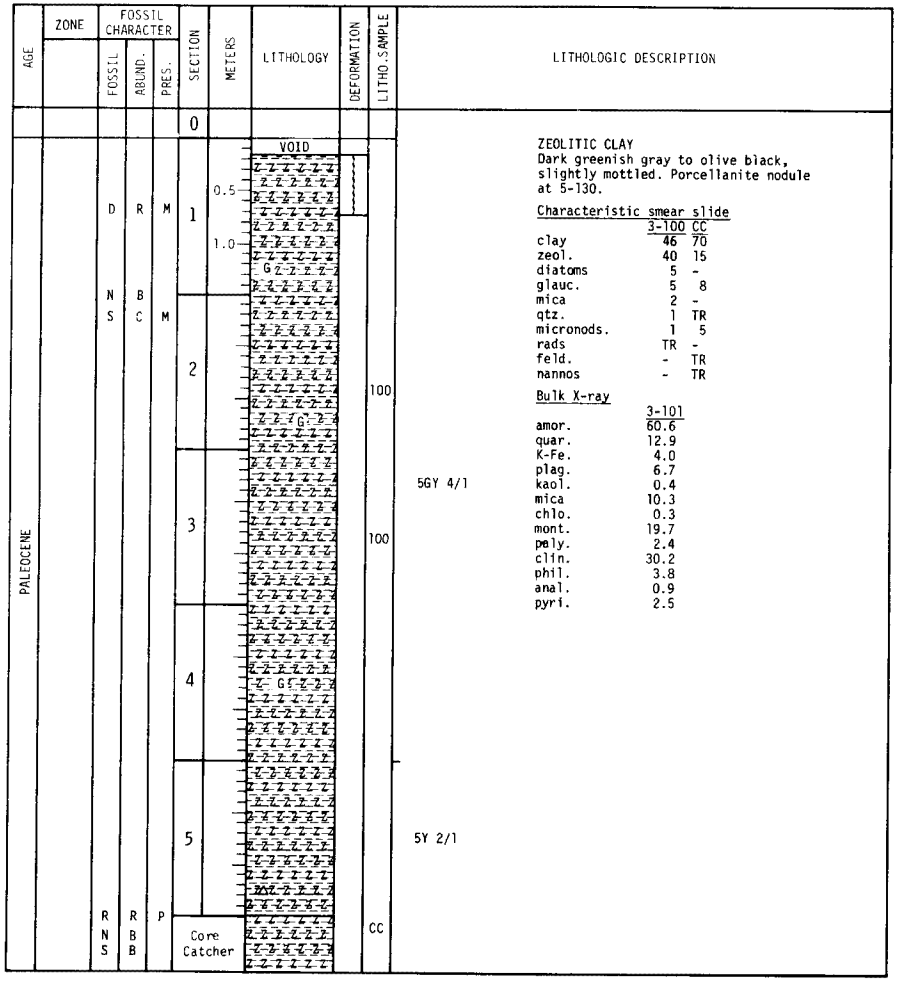


CLAYEY SILICEOUS OOZE
Dark greenish gray.

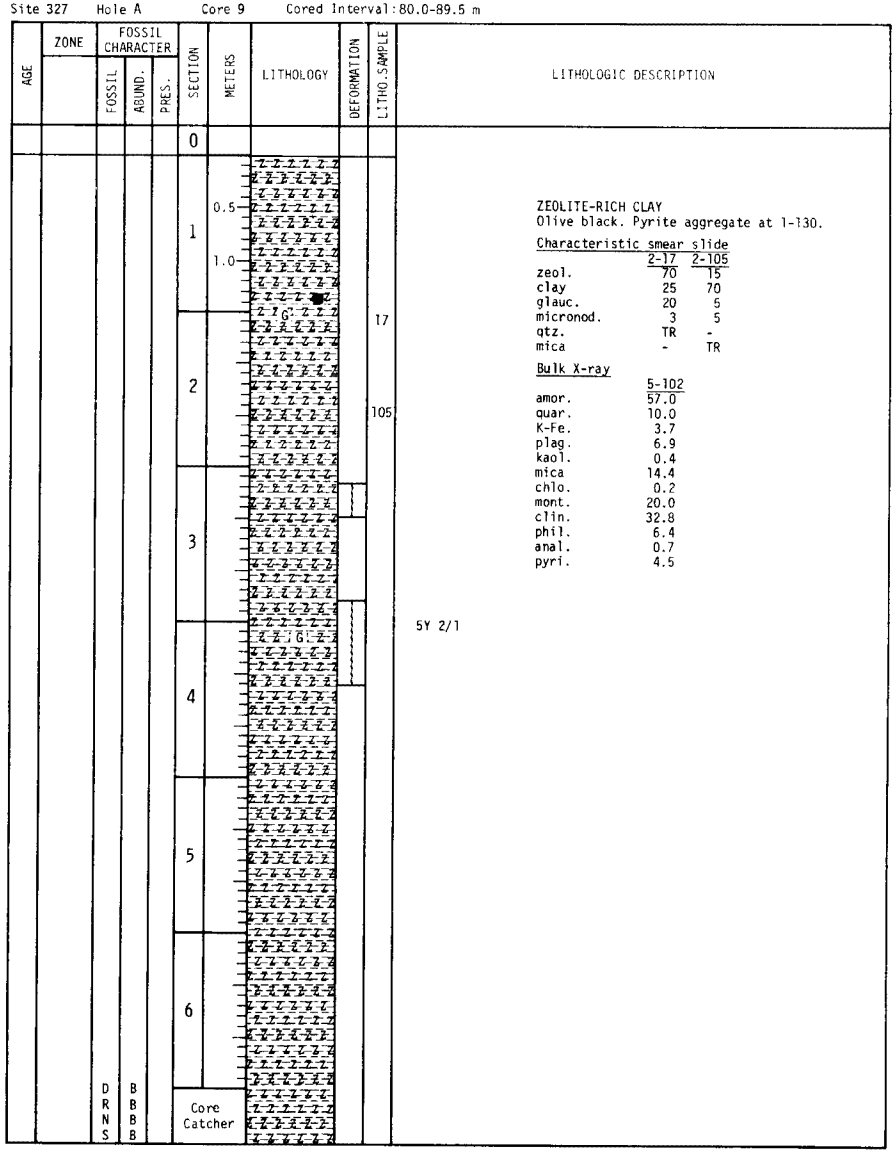
Characteristic smear slide	CC
rads	40
diatoms	25
clay	25
glauc.	5
silico.	3
spic.	2
qtz.	TR
feld.	TR
mica	TR
fish debris	TR

Bulk X-ray	2-112
amor.	78.1
quar.	17.3
K-Fe.	9.8
plag.	11.1
kaol.	3.2
mica	15.6
chlo.	2.0
mont.	32.9
clin.	1.7
phil.	5.7
amph.	0.8

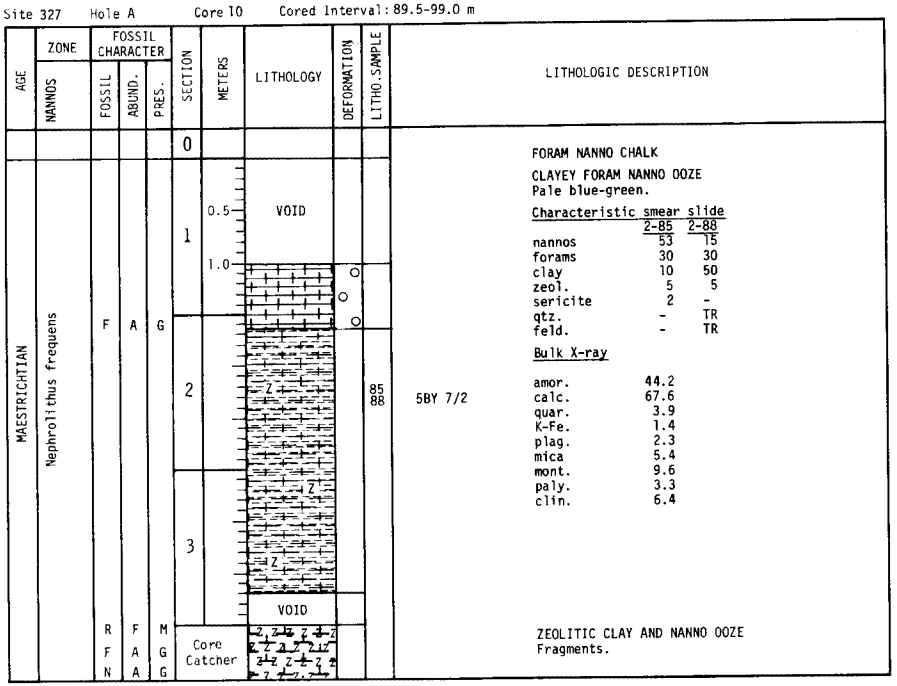
Site 327 Hole A Core 8 Cored Interval: 70.5-80.0 m



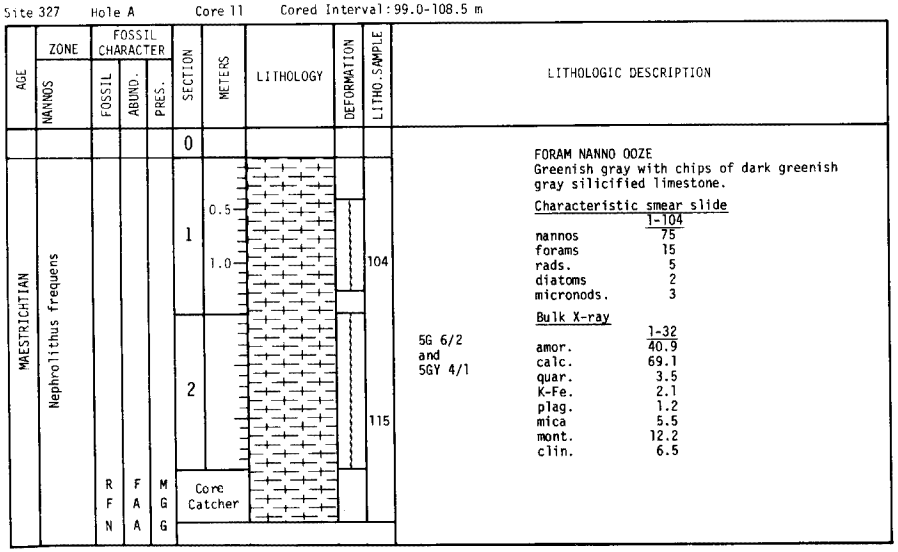
Site 327 Hole A Core 9 Cored Interval: 80.0-89.5 m



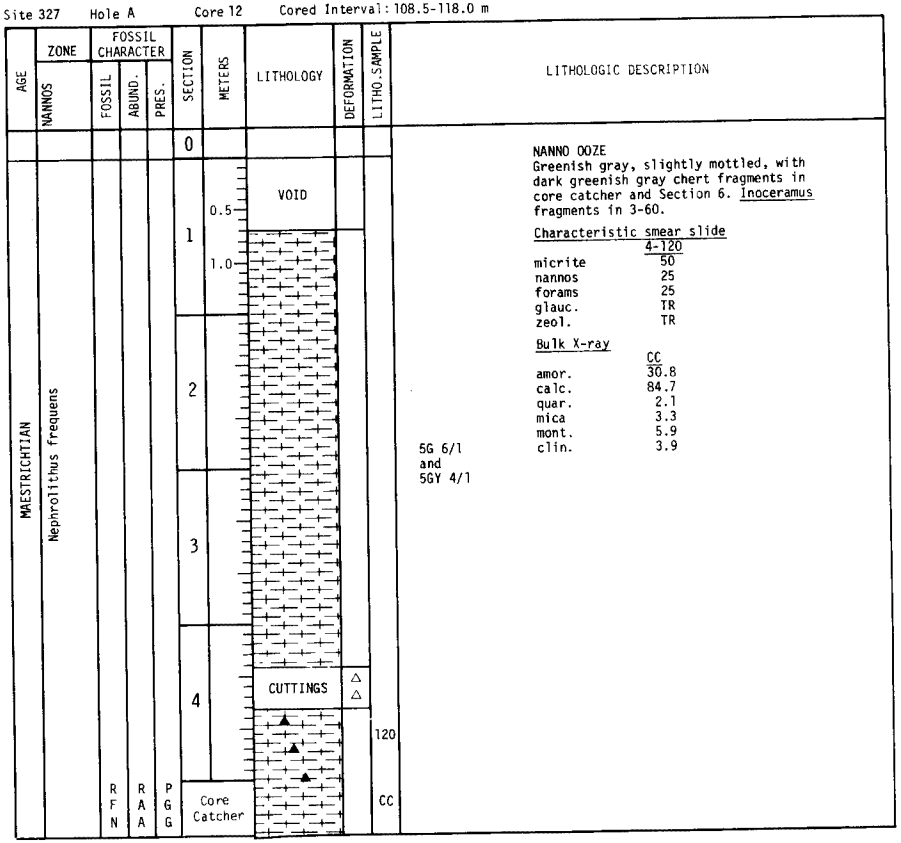
Site 327 Hole A Core 10 Cored Interval: 89.5-99.0 m



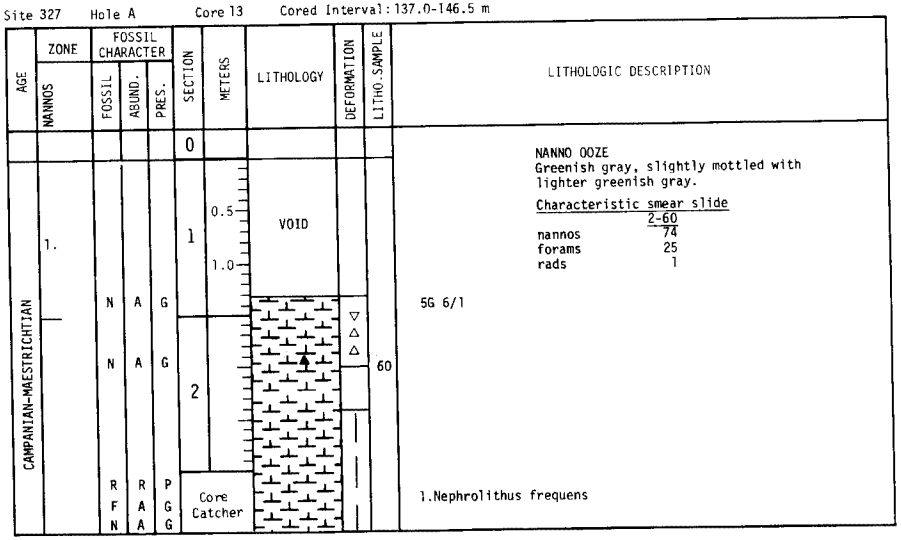
Site 327 Hole A Core 11 Cored Interval: 99.0-108.5 m



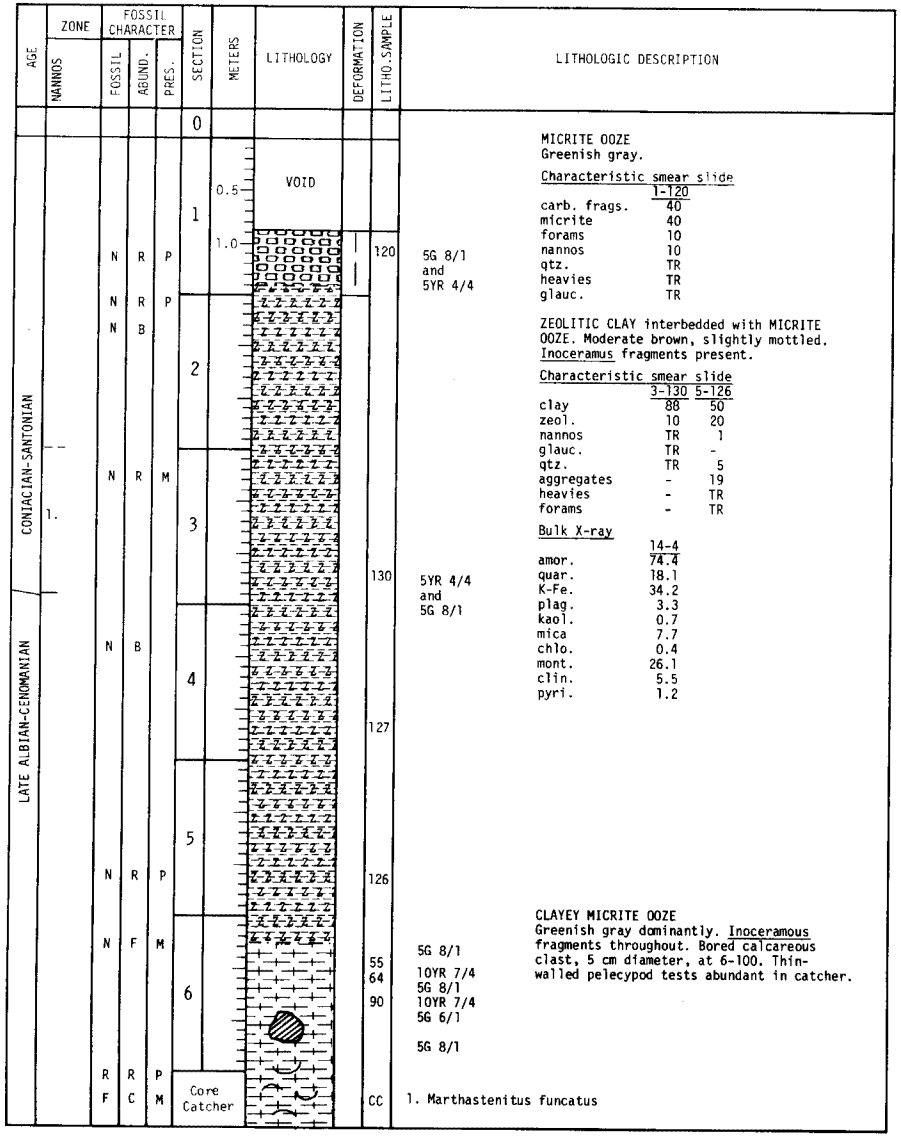
Site 327 Hole A Core 12 Cored Interval: 108.5-118.0 m



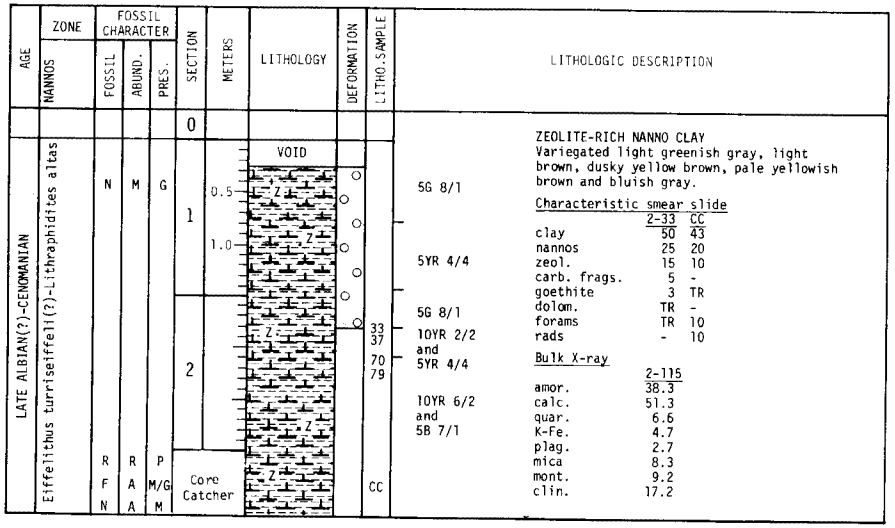
Site 327 Hole A Core 13 Cored Interval: 137.0-146.5 m



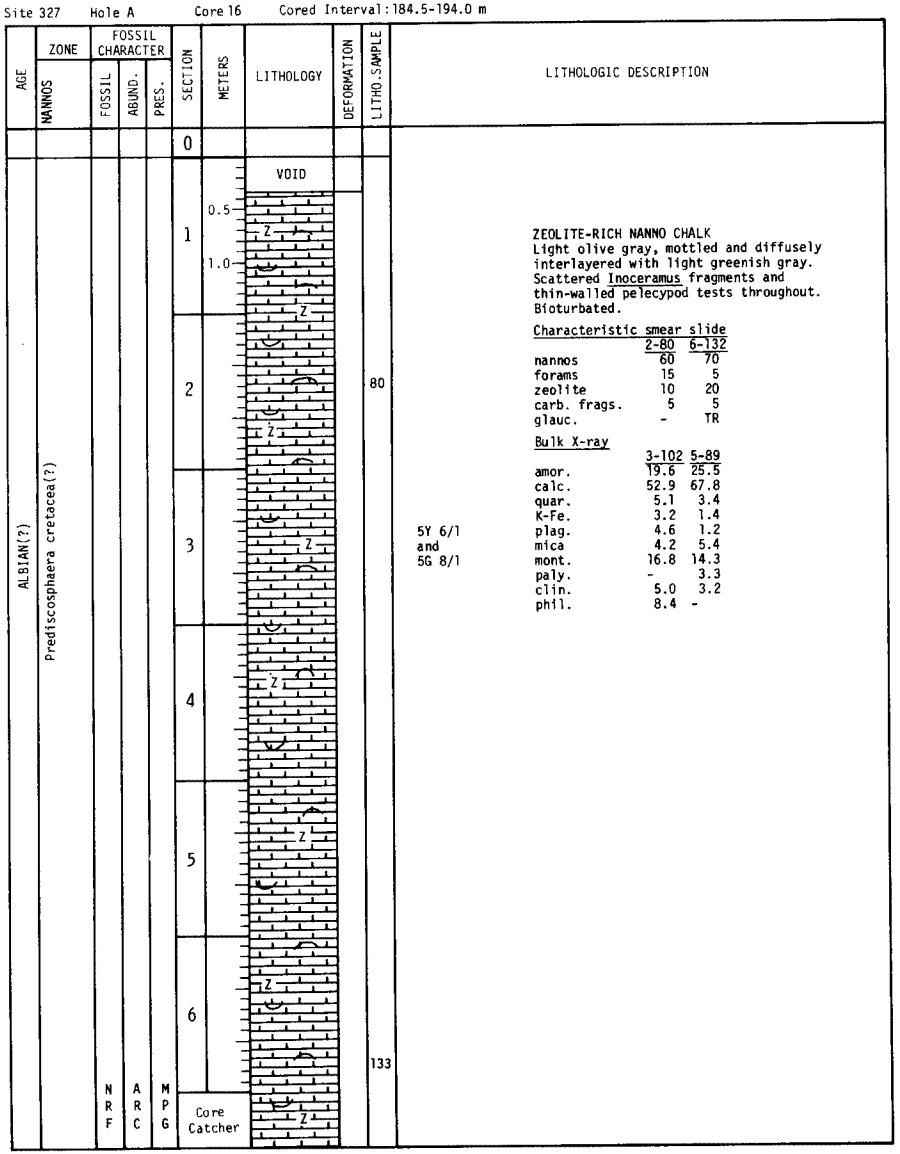
Site 327 Hole A Core 14 Cored Interval: 146.5-156.0 m



Site 327 Hole A Core 15 Cored Interval: 125.0-184.5 m



Site 327 Hole A Core 16 Cored Interval: 184.5-194.0 m

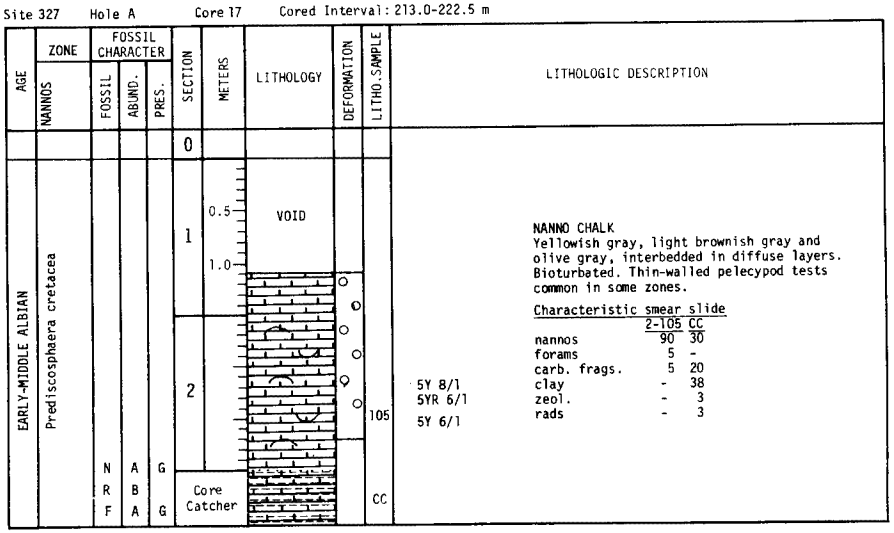


ZEOLITE-RICH NANNO CHALK
Light olive gray, mottled and diffusely interlayered with light greenish gray. Scattered Inoceramus fragments and thin-walled pelecypod tests throughout. Bioturbated.

Characteristic	smear slide 2-80	6-132
nannos	60	70
forams	15	5
zeolite	10	20
carb. frags.	5	5
glauc.	-	TR

Bulk X-ray	3-102	5-89
amor.	19.6	25.5
calc.	52.9	67.8
quar.	5.1	3.4
K-Fe.	3.2	1.4
plag.	4.6	1.2
mica	4.2	5.4
mont.	16.8	14.3
paly.	-	3.3
clin.	5.0	3.2
phil.	8.4	-

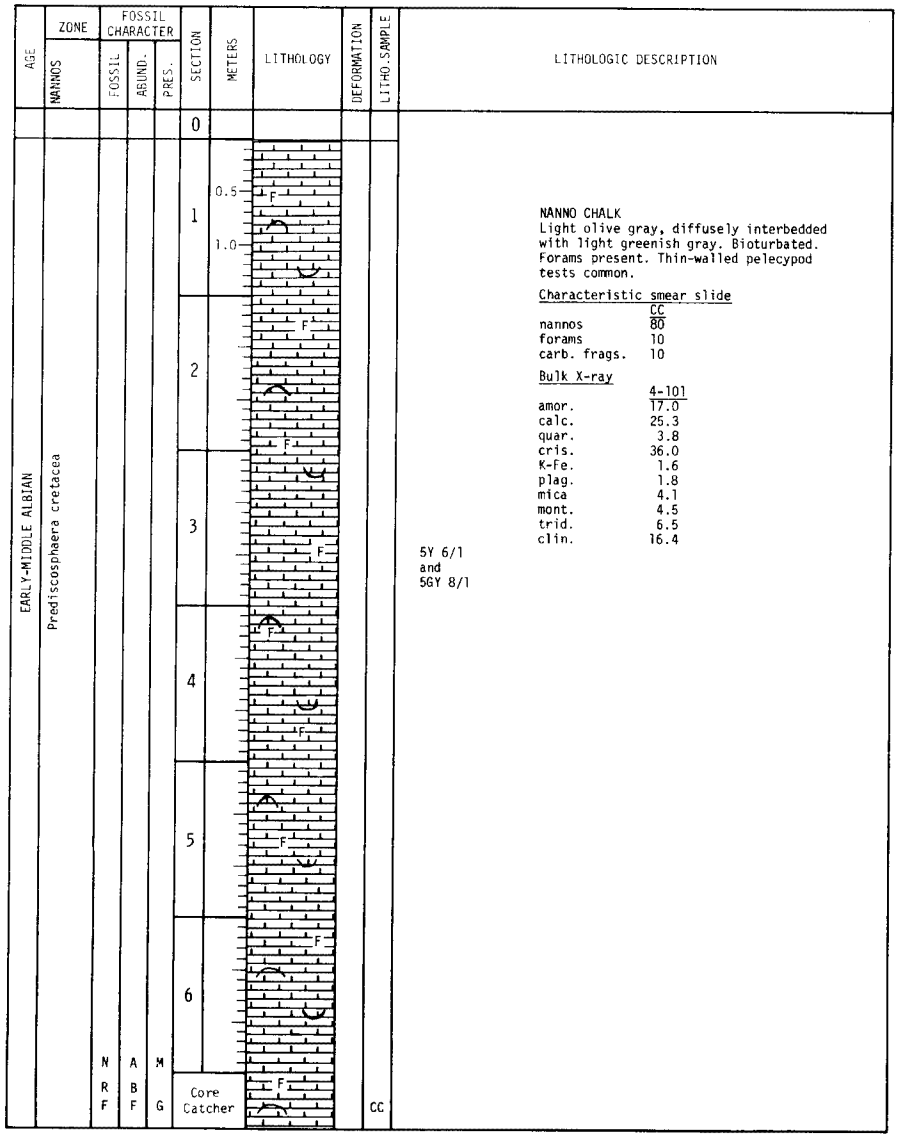
Site 327 Hole A Core 17 Cored Interval: 213.0-222.5 m



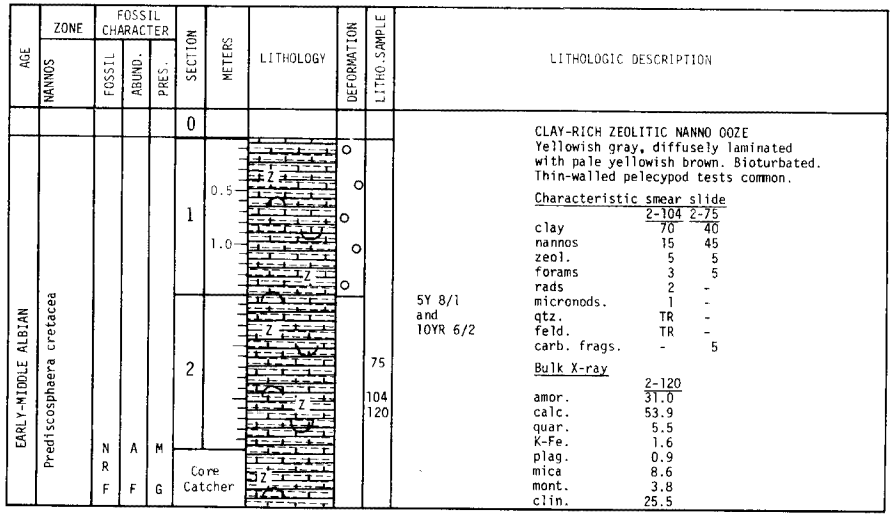
NANNO CHALK
Yellowish gray, light brownish gray and olive gray, interbedded in diffuse layers. Bioturbated. Thin-walled pelecypod tests common in some zones.

Characteristic	smear slide 2-105	CC
nannos	90	30
forams	5	-
carb. frags.	5	20
clay	-	38
zeol.	-	3
rads	-	3

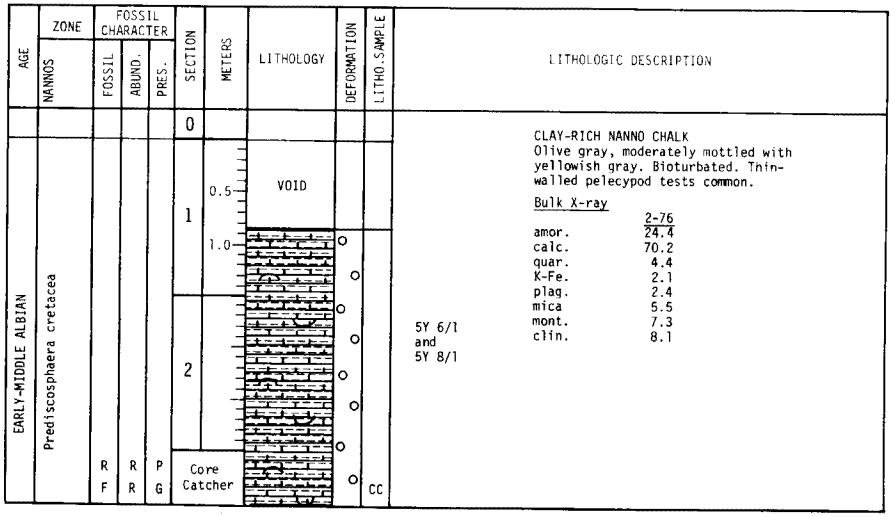
Site 327 Hole A Core 18 Cored Interval: 222.5-232.0 m



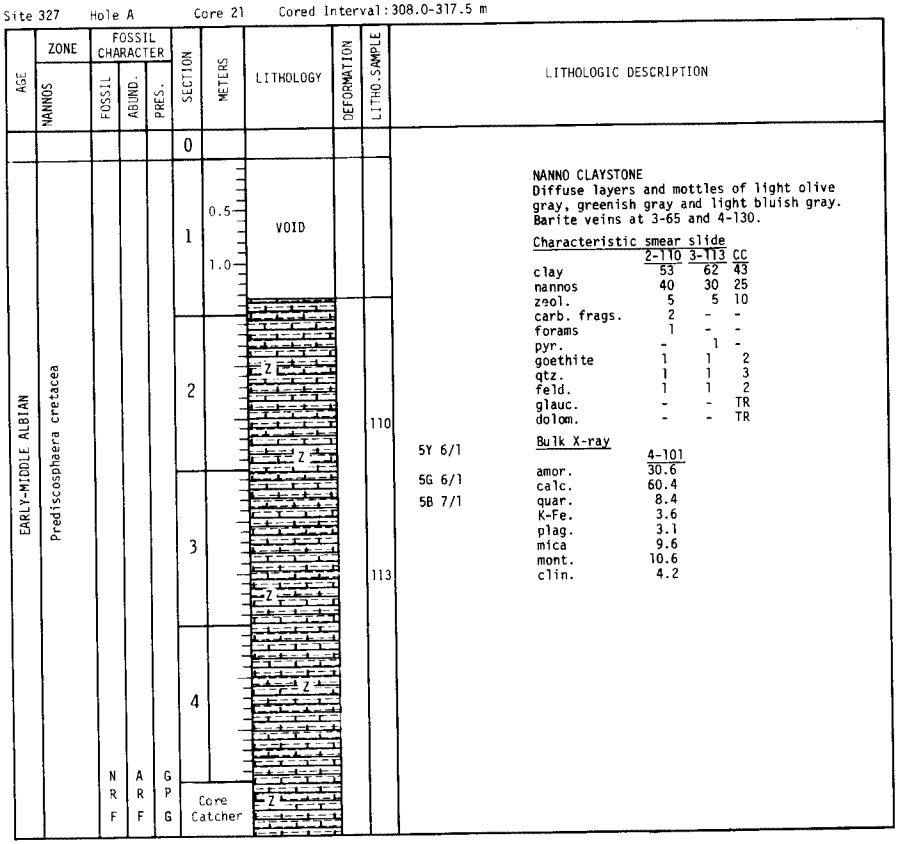
Site 327 Hole A Core 19 Cored Interval: 251.0-260.5 m



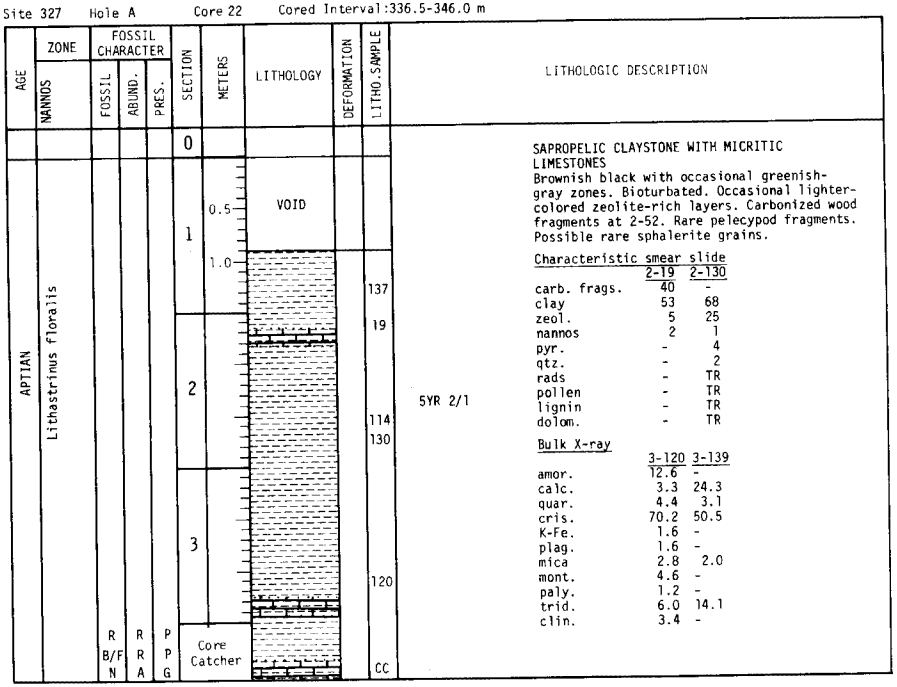
Site 325 Hole A Core 20 Cored Interval: 279.5-289.0 m



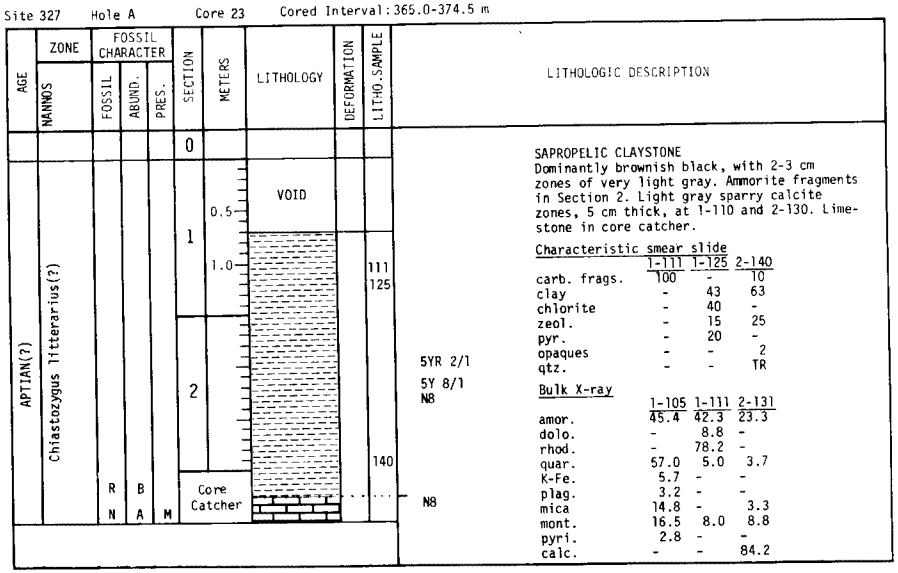
Site 327 Hole A Core 21 Cored Interval: 308.0-317.5 m



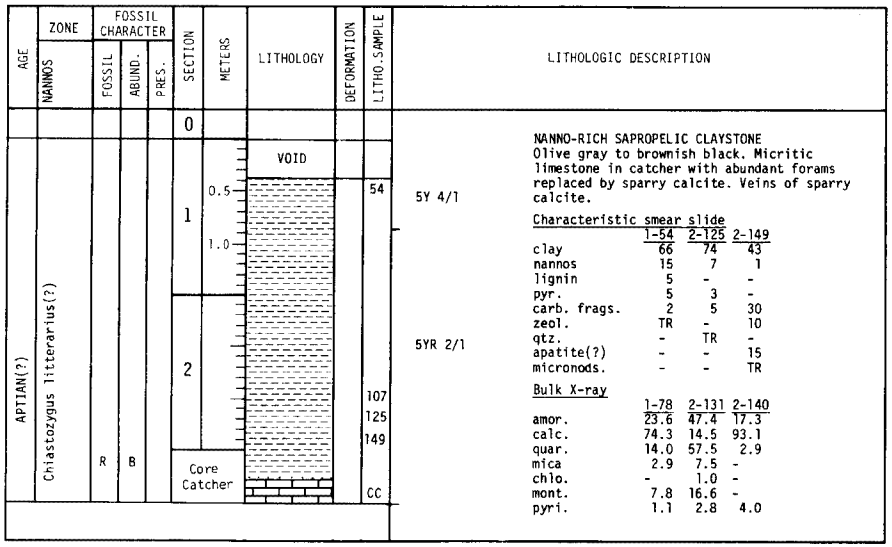
Site 327 Hole A Core 22 Cored Interval: 336.5-346.0 m



Site 327 Hole A Core 23 Cored Interval: 365.0-374.5 m



Site 327 Hole A Core 24 Cored Interval: 393.5-403.0 m



NANNO-RICH SAPROPELIC CLAYSTONE
Olive gray to brownish black. Micritic limestone in catcher with abundant forams replaced by sparry calcite. Veins of sparry calcite.

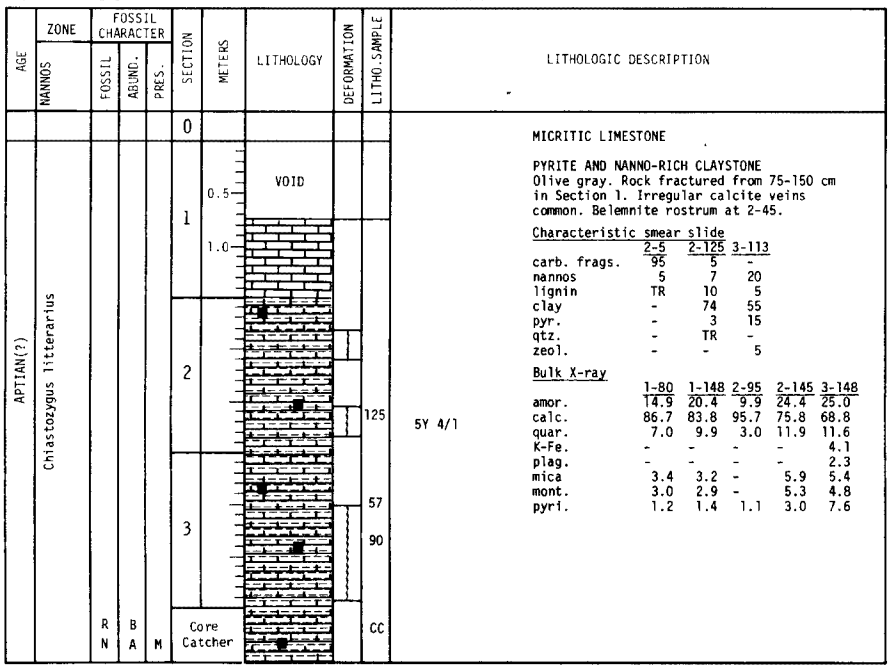
Characteristic smear slide

	1-54	2-125	2-149
clay	66	74	43
nannos	15	7	1
lignin	5	-	-
pyr.	5	3	-
carb. frags.	2	5	30
zeol.	TR	-	10
qtz.	-	TR	-
apatite(?)	-	-	15
micronods.	-	-	TR

Bulk X-ray

	1-78	2-131	2-140
amor.	23.6	47.4	17.3
calc.	74.3	14.5	93.1
quar.	14.0	57.5	2.9
mica	2.9	7.5	-
chlo.	-	1.0	-
mont.	7.8	16.6	-
pyri.	1.1	2.8	4.0

Site 327 Hole A Core 25 Cored Interval: 422.0-431.5 m



MICRITIC LIMESTONE

PYRITE AND NANNO-RICH CLAYSTONE
Olive gray. Rock fractured from 75-150 cm in Section 1. Irregular calcite veins common. Belemnite rostrum at 2-45.

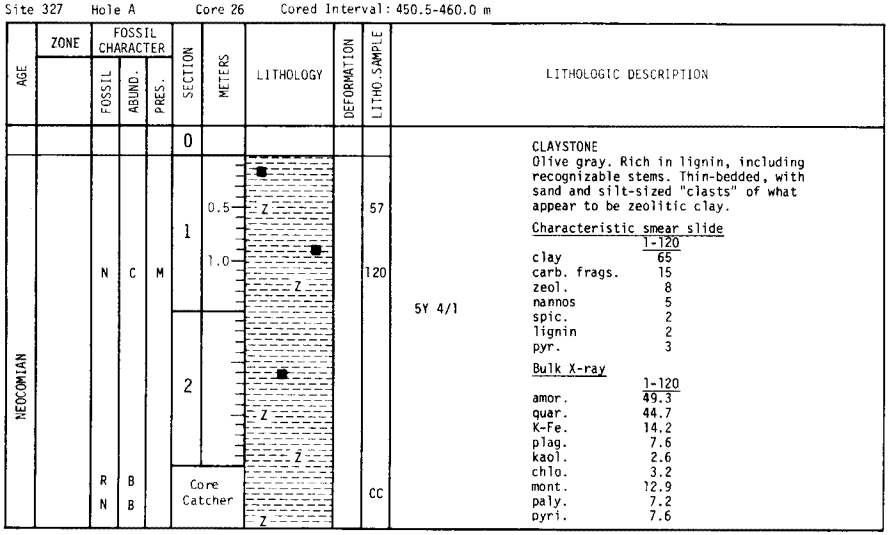
Characteristic smear slide

	2-5	2-125	3-113
carb. frags.	95	5	-
nannos	5	7	20
lignin	TR	10	5
clay	-	74	55
pyr.	-	3	15
qtz.	-	TR	-
zeol.	-	-	5

Bulk X-ray

	1-80	1-148	2-95	2-145	3-148
amor.	14.9	20.4	9.9	24.4	25.0
calc.	86.7	83.8	95.7	75.8	68.8
quar.	7.0	9.9	3.0	11.9	11.6
K-Fe.	-	-	-	-	4.1
plag.	-	-	-	-	2.3
mica	3.4	3.2	-	5.9	5.4
mont.	3.0	2.9	-	5.3	4.8
pyri.	1.2	1.4	1.1	3.0	7.6

Site 327 Hole A Core 26 Cored Interval: 450.5-460.0 m



CLAYSTONE
Olive gray. Rich in lignin, including recognizable stems. Thin-bedded, with sand and silt-sized "clasts" of what appear to be zeolitic clay.

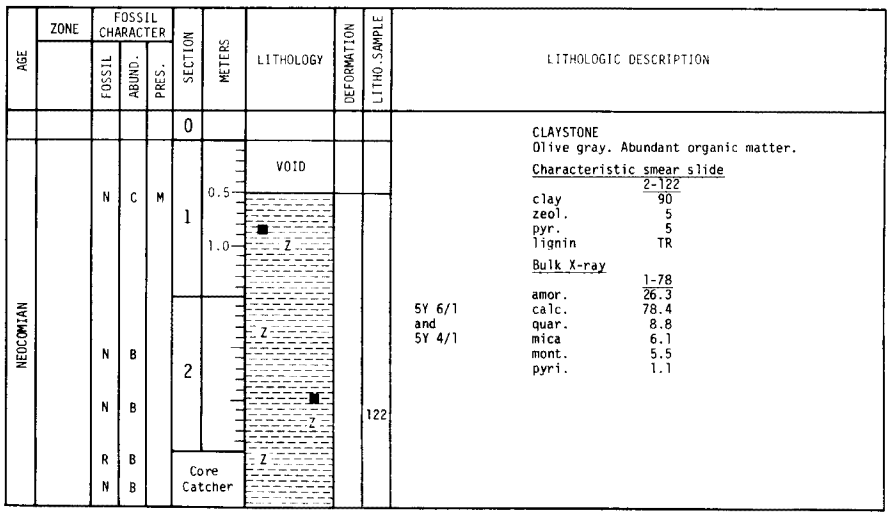
Characteristic smear slide

	1-120
clay	65
carb. frags.	15
zeol.	8
nannos	5
spic.	2
lignin	2
pyr.	3

Bulk X-ray

	1-120
amor.	49.3
quar.	44.7
K-Fe.	14.2
plag.	7.6
kaol.	2.6
chlo.	3.2
mont.	12.9
paly.	7.2
pyri.	7.6

Site 327 Hole A Core 27 Cored Interval: 460.0-469.5 m



CLAYSTONE
Olive gray. Abundant organic matter.

Characteristic smear slide

	2-122
clay	90
zeol.	5
pyr.	5
lignin	TR

Bulk X-ray

	1-78
amor.	26.3
calc.	78.4
quar.	8.8
mica	6.1
mont.	5.5
pyri.	1.1

DEEP SEA DRILLING PROJECT

LEG 36 SITE 328

SITE SUMMARY SHEET

Position: Latitude:	49°48.67'S
Longitude:	36°39.53'W
Water depth (rig floor):	5105 corrected meters, echo sounding
Bottom felts at:	5103 meters, drill pipe
Penetration:	471 meters
Number of holes:	3
Number of cores:	22
Total length of cored section:	196 meters
Total core recovered:	133 meters
Percentage core recovery:	68%

Oldest Sediment Cored

Depth subbottom:	444.5 meters
Nature:	brown zeolitic clay
Age:	? Upper Cretaceous
Measured velocity:	1.92

Basement

Depth subbottom (top):	Not reached

Principal Results

Site 328 in the Falkland Outer Basin was intended to sample the correlatives of sedimentary horizons "A" and "B" of the Argentine Basin, date the oceanic crust and examine the history of Antarctic Bottom Water transport.

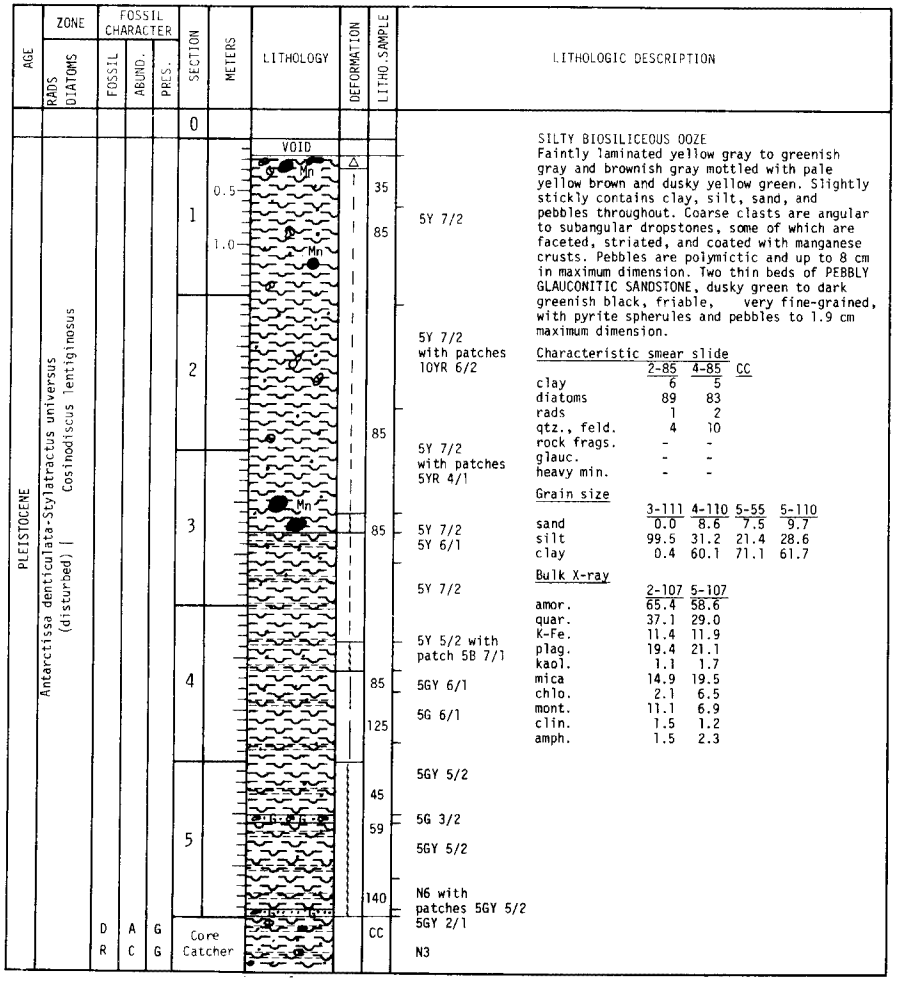
Three holes were drilled; combined they represent continuous coring (with some overlap) to 65 meters and intermittent coring thence to 445 meters. Hole 328 was abandoned for bad weather at

397 meters, 328A because of poor recovery in the second core, and 328B for the close approach (0.5 miles) of an iceberg. The site was abandoned finally on receipt of an unfavorable long-range weather forecast, an estimated 90 meters above acoustic basement. The top 50 meters consists of a Plio-Pleistocene siliceous ooze, underlain by Oligocene to Miocene silty siliceous and zeolitic clay. There is a sudden transition in mid-Oligocene times to a zeolitic clay which alone constitutes the remainder of the section. Sparse and long-ranging radiolaria suggest that the base of the section reaches the Upper Cretaceous, which gives a high sedimentation rate for the clays of = 1 cm/1,000 years. The weak and diffuse mid-section acoustic reflector which may be analogous to Horizon "A" of the Argentine Basin represents increased compaction (and possibly oxidation) within the clays, without lithologic change, close to the Cretaceous-Tertiary boundary.

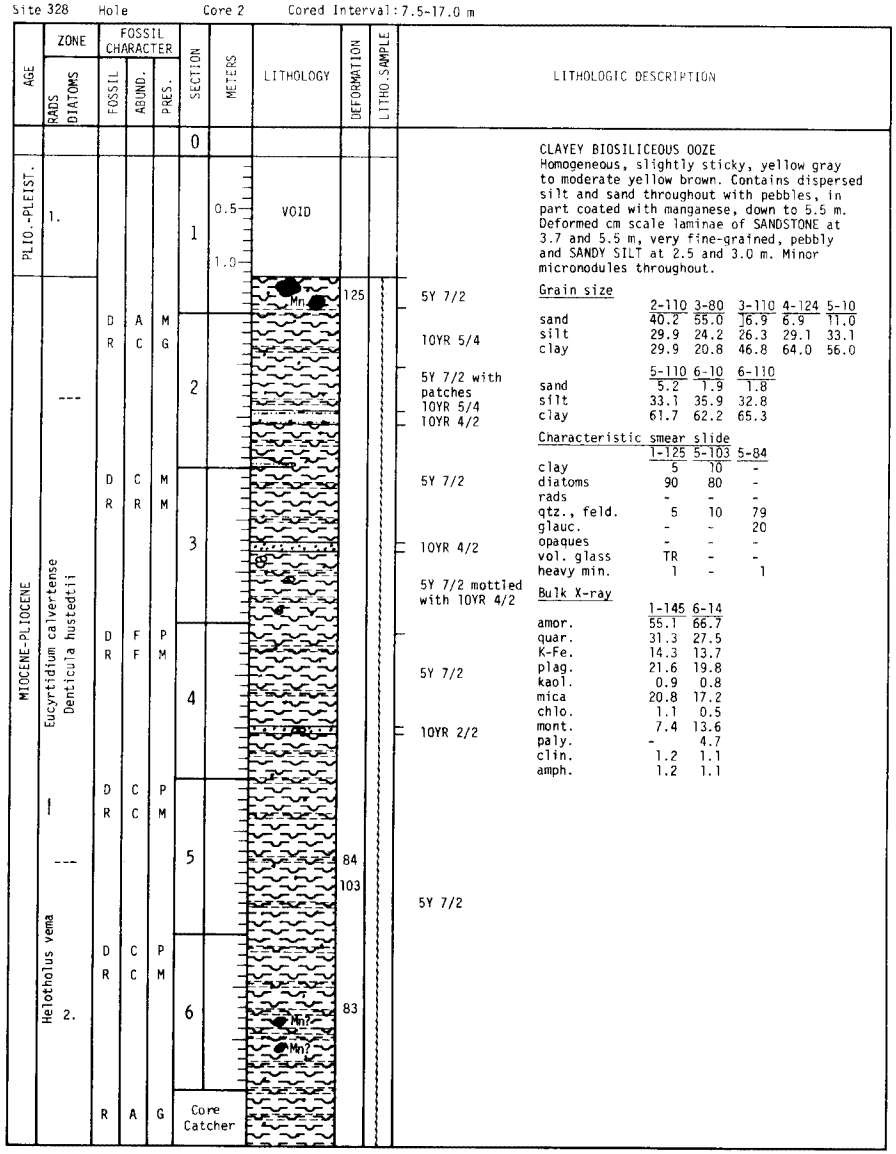
In the upper layers, rafted pebbles occur only down to the middle Pliocene, but the fossil assemblages suggest that cold-water conditions extended back to middle Miocene times.

NB Core 8 of 328B was recovered when the core barrel came on deck and probably comes from the greatest depth drilled (471 meters).

Site 328 Hole Core 1 Cored Interval: 0.0-7.5 m



Site 328 Hole Core 2 Cored Interval: 7.5-17.0 m



Site 328 Hole Core 3 Cored Interval: 17.0-26.5 m

AGE: PLIOCENE / LATE MIOCENE

ZONE: Helotholus vema / Denticula lauta/ Denticula antarctica — Theocalyptra-bicornis sporgothorax

FOSSIL CHARACTER: RADS DIATOMS; FOSSIL; ABUND.; PRES.

SECTION	METERS	FOSSIL	ABUND.	PRES.
0				
1	0.5–1.0	D	C	M
		R	C	M
2		D	C	P
		R	C	M
3		D	R	P
		R	C	M
4		D	R	P
		R	F	M
5		D	R	P
		R	R	P
6				
Core Catcher				

LITHOLOGY; DEFORMATION; LITHO.SAMPLE

LITHOLOGIC DESCRIPTION

5Y 7/2

BIOSILICEOUS OOZE, BIOSILICEOUS CLAY, AND BIOSILICEOUS ZEOLITIC CLAY
Slightly sticky to sticky and lumpy. Moderate yellow brown to grayish orange. Manganese nodules to 8 cm diameter, silt, and rare sand throughout.

Characteristic smear slide

	1-100	3-92	4-11	6-69
qtz., feld.	20	5	2	5
clay	20	65	88	74
diatoms	55	15	-	-
rads	5	5	-	-
micronods.	-	1	-	-
zeol.	-	-	5	15
diatoms, rads	-	-	5	6

10YR 7/4

Carbon-carbonate

	1-113
t. carb.	0.1
o. carb	0.1
$CaCO_3$	0.0

Grain size

	1-10	1-110	2-114	3-110	4-110
sand	2.1	0.8	0.7	1.3	0.7
silt	40.2	32.7	32.2	24.7	26.1
clay	57.7	66.5	67.2	74.0	73.3

10YR 5/4 10YR 8/2 mottled with 10YR 7/4

	5-110	6-112
sand	0.5	0.5
silt	22.2	24.2
clay	77.3	75.2

Bulk X-ray

	2-17	3-113	4-113	5-14	5-113
amor.	61.8	58.5	58.5	59.6	57.6
quar.	22.4	20.4	17.4	18.9	16.9
K-Fe.	10.8	6.6	5.6	6.4	3.9
plag.	20.2	19.8	20.7	19.6	21.5
kaol.	0.7	0.6	-	1.2	1.1
mica	17.1	18.6	20.2	20.6	19.8
chlo.	0.9	0.8	-	1.1	0.7
mont.	19.4	25.4	26.9	22.0	28.7
paly.	5.7	5.3	6.2	5.1	4.6
clin.	1.8	1.7	2.2	4.1	2.2
amph.	0.9	0.8	0.7	0.8	0.7

10YR 5/4

	6-10	6-115
amor.	61.1	58.7
quar.	17.5	20.0
K-Fe.	6.0	4.2
plag.	21.2	19.3
kaol.	0.6	0.6
mica	20.6	17.3
chlo.	1.1	0.8
mont.	25.2	28.1
paly.	4.8	7.1
clin.	2.3	1.7
amph.	0.8	0.9

10YR 7/4

10YR 5/4 with patches 10YR 7/4

Site 328 Hole Core 4 Cored Interval: 45.5-55.0 m

AGE: OLIGOCENE

SECTION	METERS	FOSSIL	ABUND.	PRES.
0				
1	0.5–1.0			
2		D	C	M
		R	C	M
3		D	F	P/M
		R	C	M
4		D	R	P
		R	F	M
5		D	VR	P
		R	F	M
Core Catcher		R	R	P

LITHOLOGY: VOID; Mn

DEFORMATION; LITHO.SAMPLE: 50, 55, 121

LITHOLOGIC DESCRIPTION

BIOSILICEOUS CLAY
Slightly sticky, grayish orange with dark streaks and patches manganese, silty.

Representative smear slide

	2-50
qtz., feld.	5
clay	62
diatoms	30
rads	3

Carbon-carbonate

	3-22
t. carb	0.1
o. carb	0.1
$CaCO_3$	0.0

10YR 7/4

Bulk X-ray

	2-50	3-20	3-113	4-10	4-60
amor.	67.8	68.1	67.2	63.4	65.9
quar.	21.1	21.1	21.9	21.6	20.0
K-Fe.	3.5	4.8	7.2	7.6	5.6
plag.	15.2	12.7	13.6	14.1	13.4
kaol.	2.0	2.1	2.1	1.4	2.0
mica	23.0	20.1	25.1	23.2	25.1
chlo.	1.7	1.3	1.3	1.7	1.6
mont.	29.9	27.5	22.3	19.3	21.0
paly.	-	5.7	-	3.8	-
clin.	2.7	3.7	5.6	6.4	11.4
amph.	0.9	0.9	0.9	0.9	-

MANGANESE NODULES to 2.9 cm diameter.

ZEOLITIC CLAY
Sticky, very pale orange to grayish orange with dark streaks and patches manganese. Fish debris in core catcher.

Representative smear slide

	4-55	5-121
qtz., feld.	1	-
clay	58	73
zeol.	41	20
goethite?	-	4
opaques	-	3

Carbon-carbonate

	5-62
t. carb	0.1
o. carb	0.1
$CaCO_3$	0.0

10YR 8/2 to 10YR 7/4

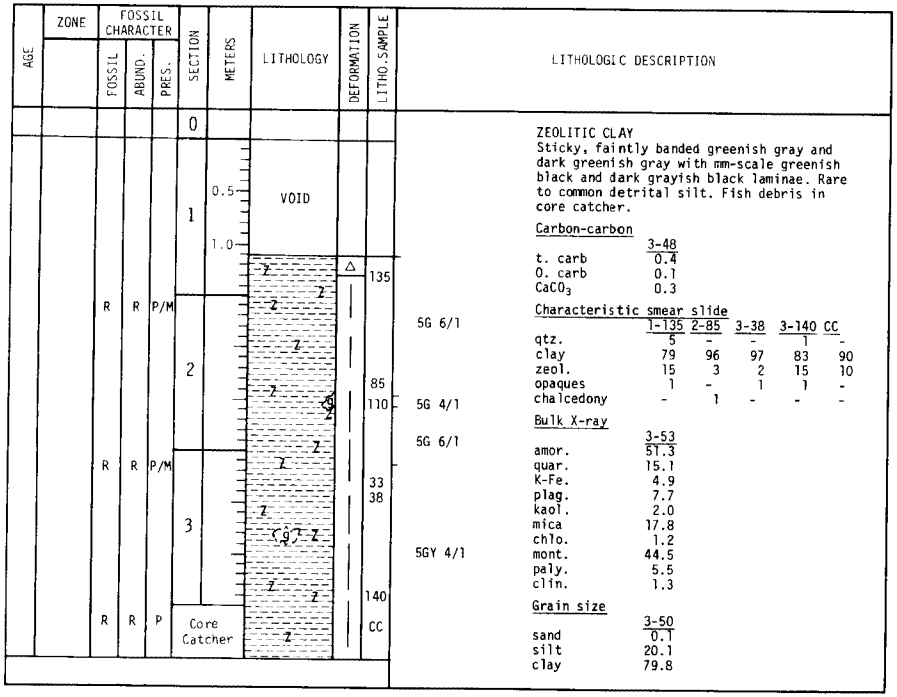
Bulk X-ray

	4-60	4-114	5-10	5-60	5-123
amor.	67.8	68.1	67.2	63.4	65.1
quar.	21.1	21.1	21.9	21.6	20.0
K-Fe.	3.5	4.8	7.2	7.6	5.6
plag.	15.2	12.7	13.6	14.1	13.4
kaol.	2.0	2.1	2.1	1.4	2.0
mica	23.0	20.1	25.1	23.2	25.1
chlo.	1.7	1.3	1.3	1.7	1.6
mont.	29.9	27.5	32.3	19.3	21.0
paly.	-	5.7	-	3.8	-
clin.	2.7	3.7	5.6	6.4	11.4
amph.	0.9	0.9	0.9	0.9	-

Grain size

	2-110
sand	0.8
silt	25.4
clay	73.8

Site 328 Hole Core 5 Cored Interval: 93.0-102.5 m



ZEOLITIC CLAY
Sticky, faintly banded greenish gray and dark greenish gray with mm-scale greenish black and dark grayish black laminae. Rare to common detrital silt. Fish debris in core catcher.

Carbon-carbon

	3-48
t. carb	0.4
O. carb	0.1
$CaCO_3$	0.3

Characteristic smear slide

	1-135	2-85	3-38	3-140	CC
qtz.	5	-	-	1	-
clay	79	96	97	83	90
zeol.	15	3	2	15	10
opaques	1	-	1	1	-
chalcedony	-	1	-	-	-

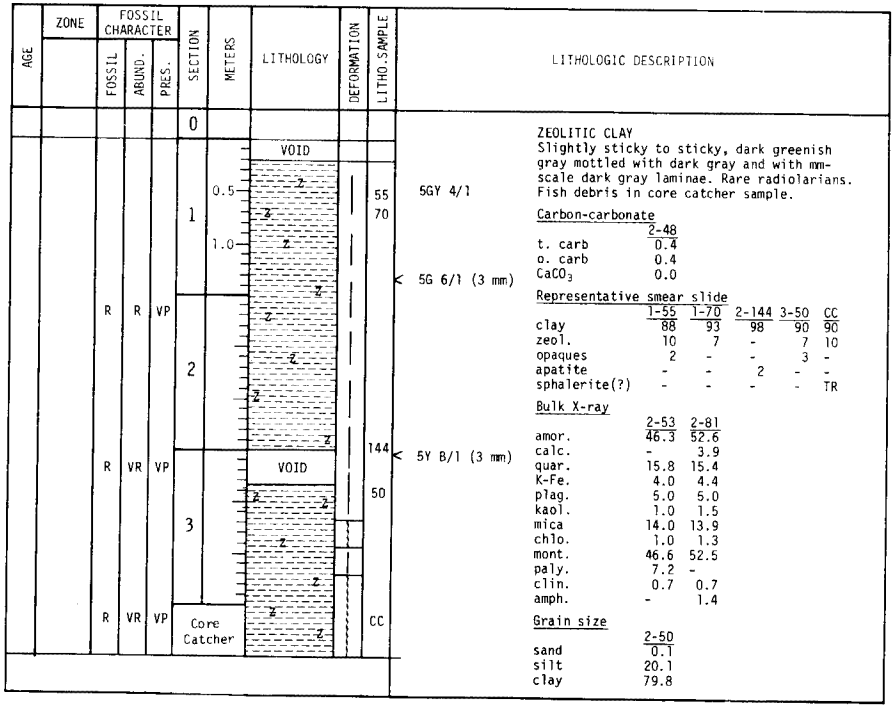
Bulk X-ray

	3-53
amor.	51.3
quar.	15.1
K-Fe.	4.9
plag.	7.7
kaol.	2.0
mica	17.8
chlo.	1.2
mont.	44.5
paly.	5.5
clin.	1.3

Grain size

	3-50
sand	0.1
silt	20.1
clay	79.8

Site 328 Hole Core 6 Cored Interval: 140.5-150.0 m



ZEOLITIC CLAY
Slightly sticky to sticky, dark greenish gray mottled with dark gray and with mm-scale dark gray laminae. Rare radiolarians. Fish debris in core catcher sample.

Carbon-carbonate

	2-48
t. carb	0.4
o. carb	0.4
$CaCO_3$	0.0

Representative smear slide

	1-55	1-70	2-144	3-50	CC
clay	88	93	98	90	90
zeol.	10	7	-	7	10
opaques	2	-	-	3	-
apatite	-	-	2	-	-
sphalerite(?)	-	-	-	-	TR

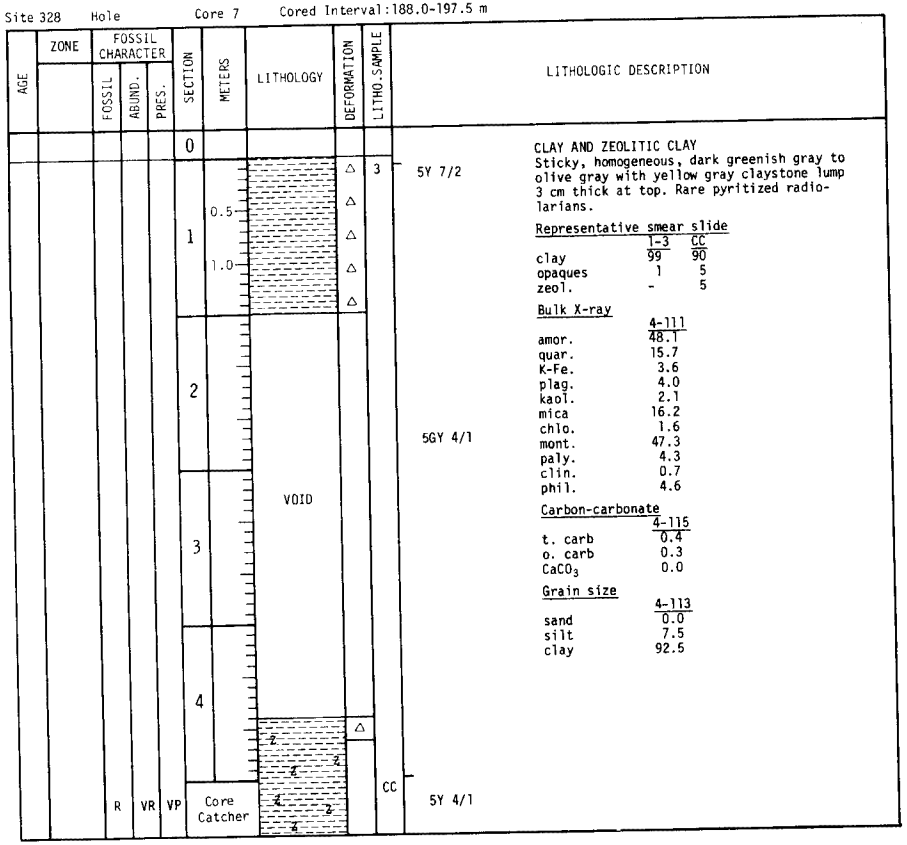
Bulk X-ray

	2-53	2-81
amor.	46.3	52.6
calc.	-	3.9
quar.	15.8	15.4
K-Fe.	4.0	4.4
plag.	5.0	5.0
kaol.	1.0	1.5
mica	14.0	13.9
chlo.	1.0	1.3
mont.	46.6	52.5
paly.	7.2	-
clin.	0.7	0.7
amph.	-	1.4

Grain size

	2-50
sand	0.1
silt	20.1
clay	79.8

Site 328 Hole Core 7 Cored Interval: 188.0-197.5 m



CLAY AND ZEOLITIC CLAY
Sticky, homogeneous, dark greenish gray to olive gray with yellow gray claystone lump 3 cm thick at top. Rare pyritized radiolarians.

Representative smear slide

	1-3	CC
clay	99	90
opaques	1	5
zeol.	-	5

Bulk X-ray

	4-111
amor.	48.1
quar.	15.7
K-Fe.	3.6
plag.	4.0
kaol.	2.1
mica	16.2
chlo.	1.6
mont.	47.3
paly.	4.3
clin.	0.7
phil.	4.6

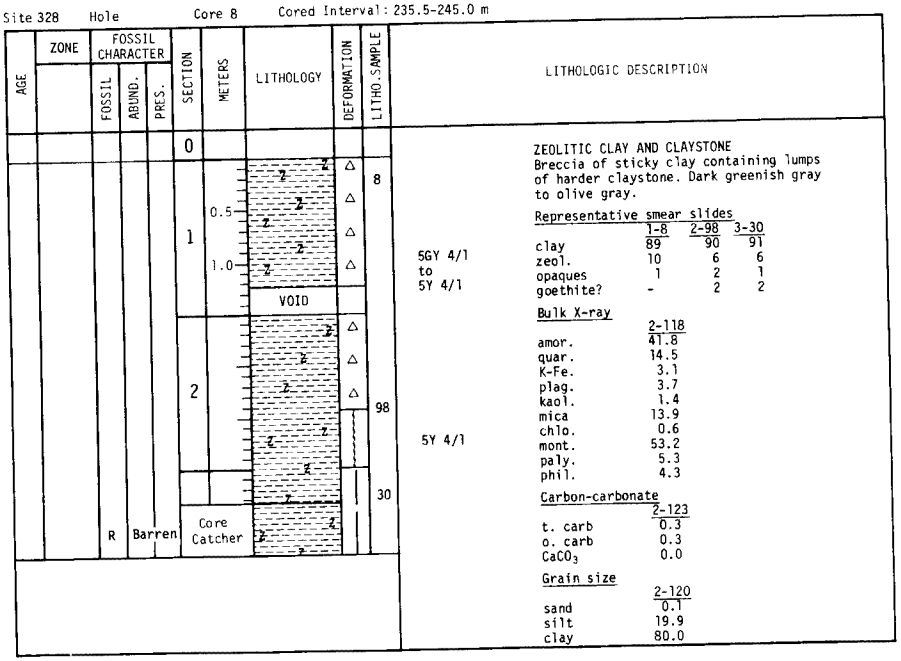
Carbon-carbonate

	4-115
t. carb	0.4
o. carb	0.3
$CaCO_3$	0.0

Grain size

	4-113
sand	0.0
silt	7.5
clay	92.5

Site 328 Hole Core 8 Cored Interval: 235.5-245.0 m



ZEOLITIC CLAY AND CLAYSTONE
Breccia of sticky clay containing lumps of harder claystone. Dark greenish gray to olive gray.

Representative smear slides

	1-8	2-98	3-30
clay	89	90	91
zeol.	10	6	6
opaques	1	2	1
goethite?	-	2	2

Bulk X-ray

	2-118
amor.	41.8
quar.	14.5
K-Fe.	3.1
plag.	3.7
kaol.	1.4
mica	13.9
chlo.	0.6
mont.	53.2
paly.	5.3
phil.	4.3

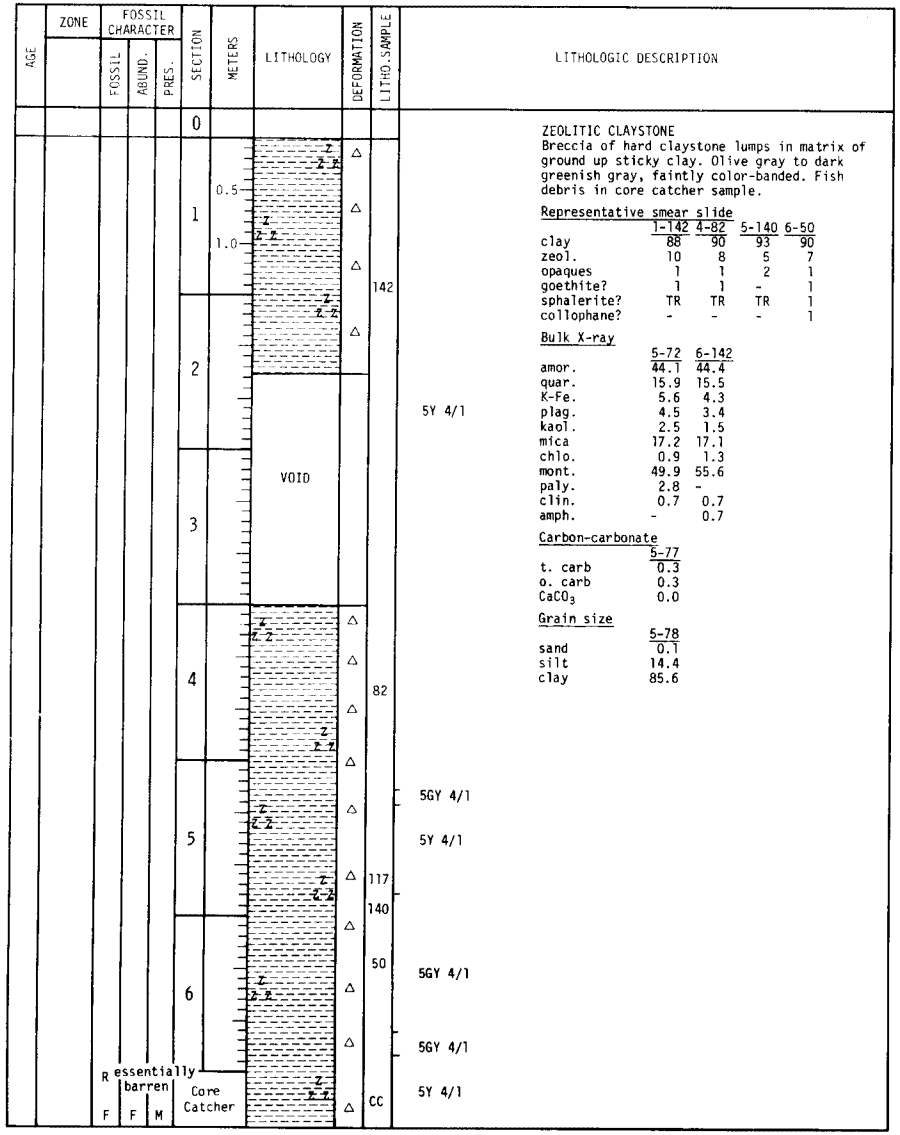
Carbon-carbonate

	2-123
t. carb	0.3
o. carb	0.3
$CaCO_3$	0.0

Grain size

	2-120
sand	0.1
silt	19.9
clay	80.0

Site 328 Hole Core 9 Cored Interval: 283.0-292.5 m



ZEOLITIC CLAYSTONE
Breccia of hard claystone lumps in matrix of ground up sticky clay. Olive gray to dark greenish gray, faintly color-banded. Fish debris in core catcher sample.

Representative smear slide

	1-142	4-82	5-140	6-50
clay	88	90	93	90
zeol.	10	8	5	7
opaques	1	1	2	1
goethite?	1	1	-	1
sphalerite?	TR	TR	TR	1
collophane?	-	-	-	1

Bulk X-ray

	5-72	6-142
amor.	44.1	44.4
quar.	15.9	15.5
K-Fe.	5.6	4.3
plag.	4.5	3.4
kaol.	2.5	1.5
mica	17.2	17.1
chlo.	0.9	1.3
mont.	49.9	55.6
paly.	2.8	-
clin.	0.7	0.7
amph.	-	0.7

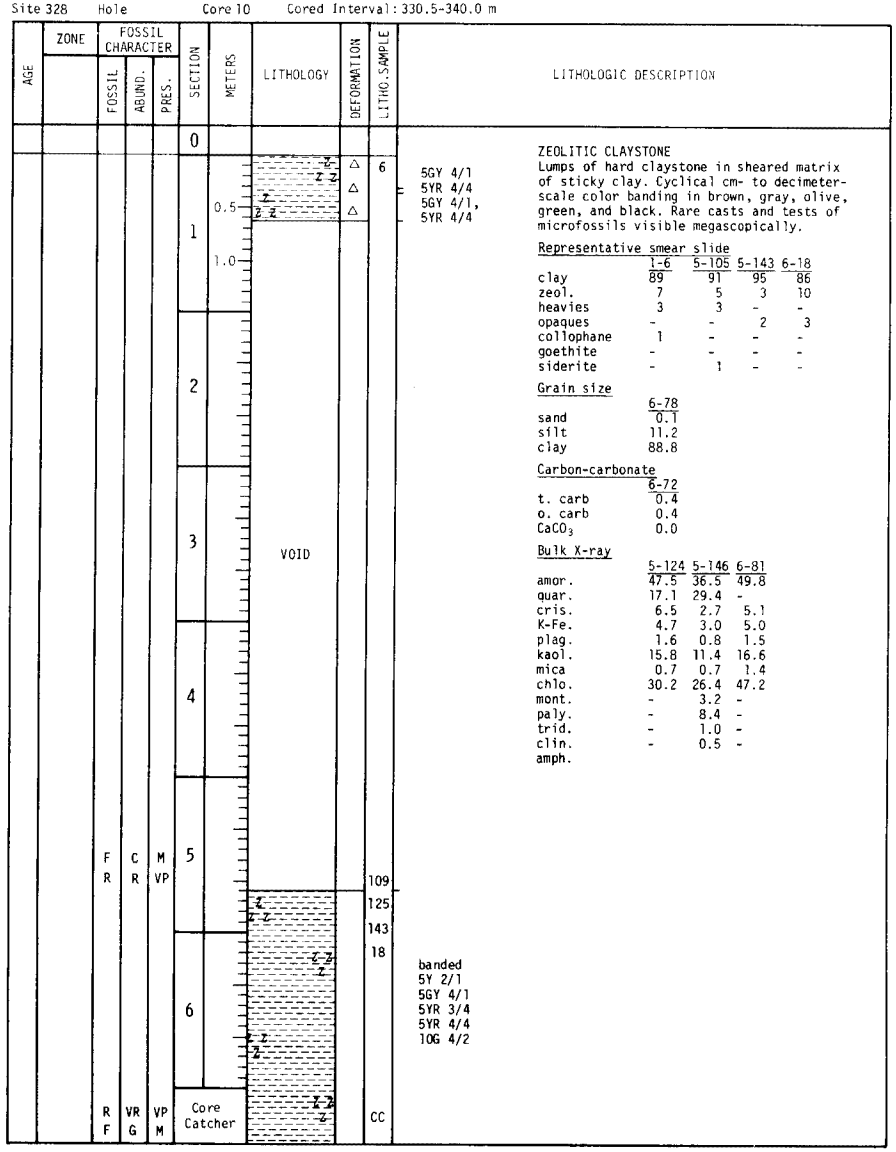
Carbon-carbonate

	5-77
t. carb	0.3
o. carb	0.3
$CaCO_3$	0.0

Grain size

	5-78
sand	0.1
silt	14.4
clay	85.6

Site 328 Hole Core 10 Cored Interval: 330.5-340.0 m



ZEOLITIC CLAYSTONE
Lumps of hard claystone in sheared matrix of sticky clay. Cyclical cm- to decimeter-scale color banding in brown, gray, olive, green, and black. Rare casts and tests of microfossils visible megascopically.

Representative smear slide

	1-6	5-105	5-143	6-18
clay	89	91	95	86
zeol.	7	5	3	10
heavies	3	3	-	-
opaques	-	-	2	3
collophane	1	-	-	-
goethite	-	-	-	-
siderite	-	1	-	-

Grain size

	6-78
sand	0.1
silt	11.2
clay	88.8

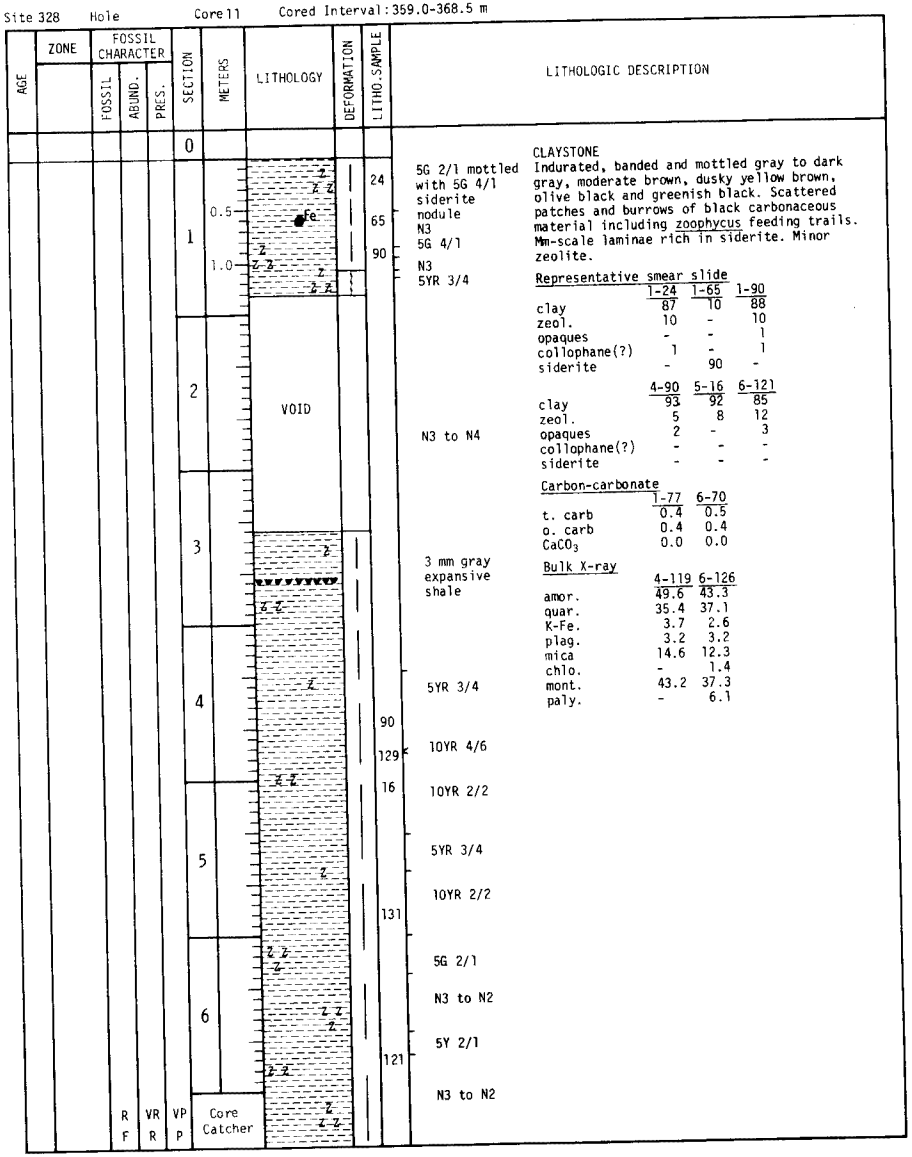
Carbon-carbonate

	6-72
t. carb	0.4
o. carb	0.4
$CaCO_3$	0.0

Bulk X-ray

	5-124	5-146	6-81
amor.	47.5	36.5	49.8
quar.	17.1	29.4	-
cris.	6.5	2.7	5.1
K-Fe.	4.7	3.0	5.0
plag.	1.6	0.8	1.5
kaol.	15.8	11.4	16.6
mica	0.7	0.7	1.4
chlo.	30.2	26.4	47.2
mont.	-	3.2	-
paly.	-	8.4	-
trid.	-	1.0	-
clin.	-	0.5	-
amph.			

Site 328 Hole Core 11 Cored Interval: 359.0-368.5 m



CLAYSTONE
Indurated, banded and mottled gray to dark gray, moderate brown, dusky yellow brown, olive black and greenish black. Scattered patches and burrows of black carbonaceous material including zoophycus feeding trails. Mm-scale laminae rich in siderite. Minor zeolite.

Representative smear slide

	1-24	1-65	1-90
clay	87	10	88
zeol.	10	-	10
opaques	-	-	1
collophane(?)	1	-	1
siderite	-	90	-

	4-90	5-16	6-121
clay	93	92	85
zeol.	5	8	12
opaques	2	-	3
collophane(?)	-	-	-
siderite	-	-	-

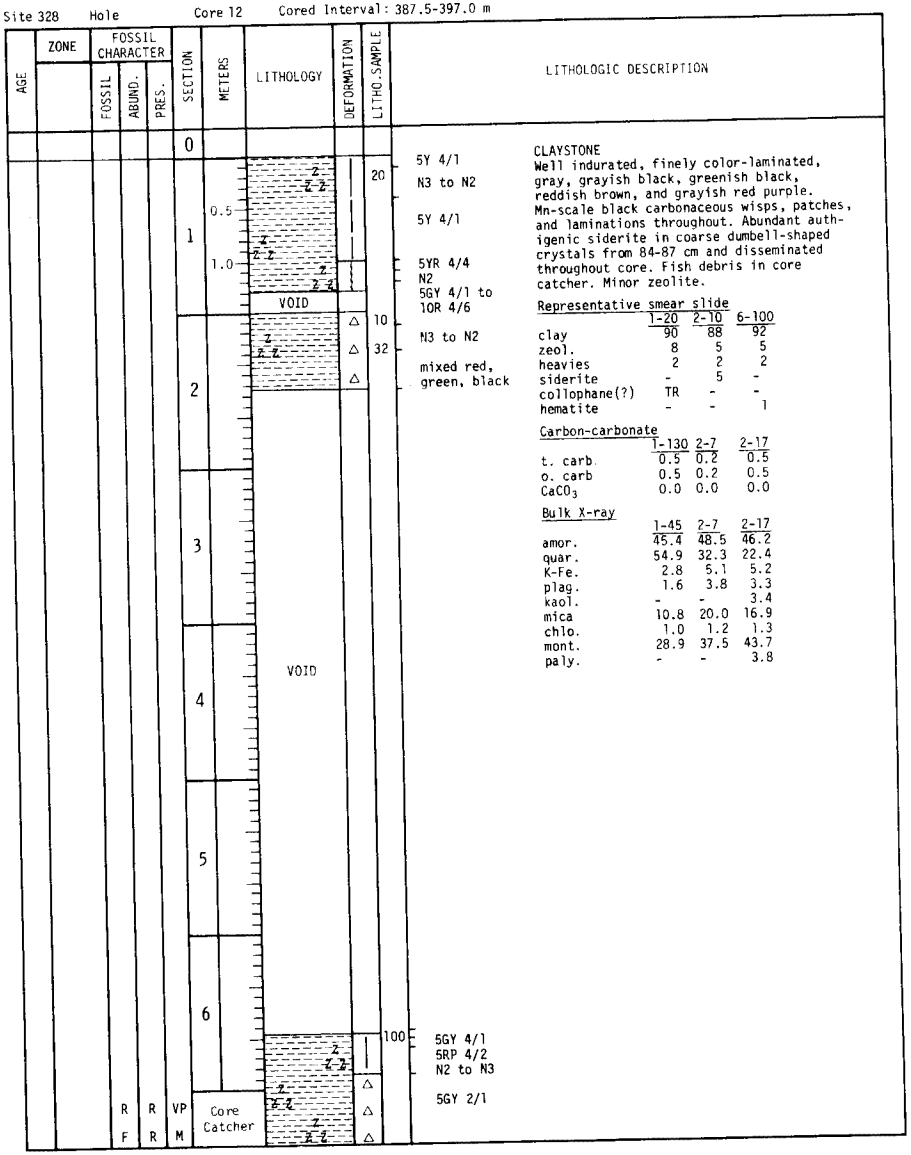
Carbon-carbonate

	1-77	6-70
t. carb	0.4	0.5
o. carb	0.4	0.4
$CaCO_3$	0.0	0.0

Bulk X-ray

	4-119	6-126
amor.	49.6	43.3
quar.	35.4	37.1
K-Fe.	3.7	2.6
plag.	3.2	3.2
mica	14.6	12.3
chlo.	-	1.4
mont.	43.2	37.3
paly.	-	6.1

Site 328 Hole Core 12 Cored Interval: 387.5-397.0 m



CLAYSTONE
Well indurated, finely color-laminated, gray, grayish black, greenish black, reddish brown, and grayish red purple. Mn-scale black carbonaceous wisps, patches, and laminations throughout. Abundant authigenic siderite in coarse dumbell-shaped crystals from 84-87 cm and disseminated throughout core. Fish debris in core catcher. Minor zeolite.

Representative smear slide

	1-20	2-10	6-100
clay	90	88	92
zeol.	8	5	5
heavies	2	2	2
siderite	-	5	-
collophane(?)	TR	-	-
hematite	-	-	1

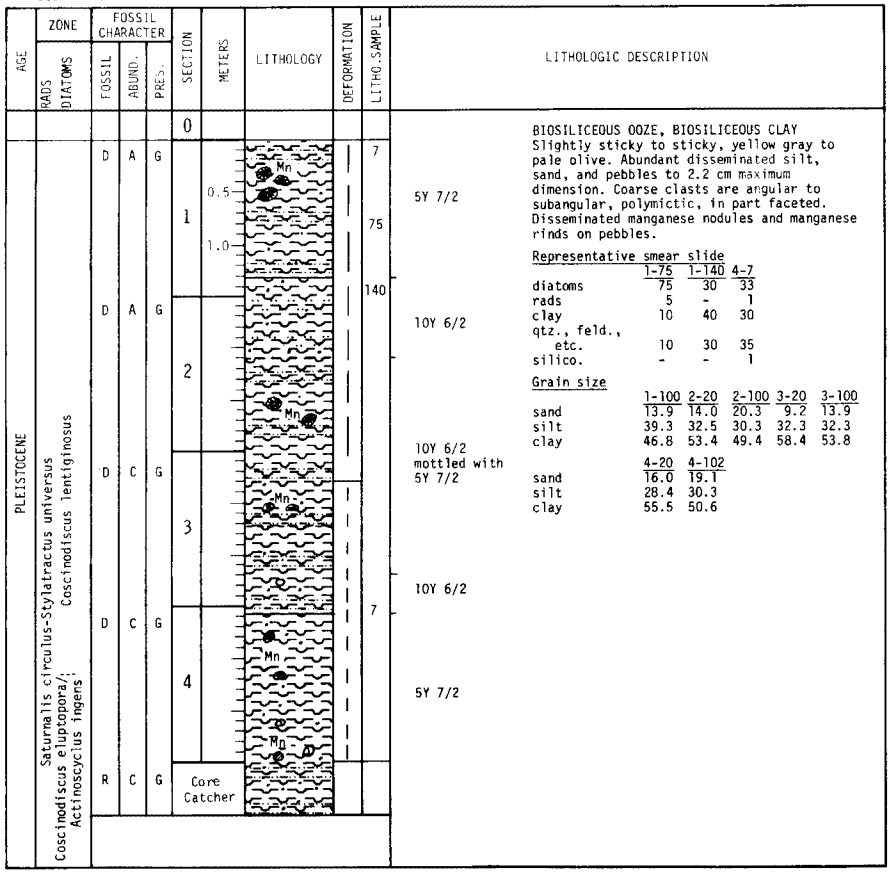
Carbon-carbonate

	1-130	2-7	2-17
t. carb	0.5	0.2	0.5
o. carb	0.5	0.2	0.5
$CaCO_3$	0.0	0.0	0.0

Bulk X-ray

	1-45	2-7	2-17
amor.	45.4	48.5	46.2
quar.	54.9	32.3	22.4
K-Fe.	2.8	5.1	5.2
plag.	1.6	3.8	3.3
kaol.	-	-	3.4
mica	10.8	20.0	16.9
chlo.	1.0	1.2	1.3
mont.	28.9	37.5	43.7
paly.	-	-	3.8

Site 328 Hole A Core 1 Cored Interval: 0.0-7.5 m



BIOSILICEOUS OOZE, BIOSILICEOUS CLAY
Slightly sticky to sticky, yellow gray to pale olive. Abundant disseminated silt, sand, and pebbles to 2.2 cm maximum dimension. Coarse clasts are angular to subangular, polymictic, in part faceted. Disseminated manganese nodules and manganese rinds on pebbles.

Representative smear slide

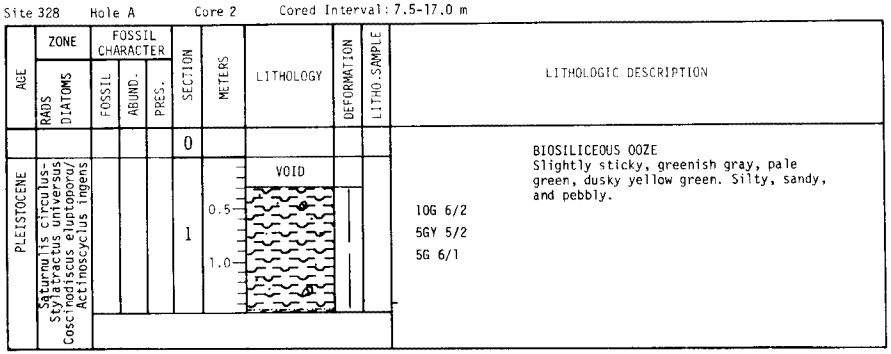
	1-75	1-140	4-7
diatoms	75	30	33
rads	5	-	1
clay	10	40	30
qtz., feld., etc.	10	30	35
silico.	-	-	1

Grain size

	1-100	2-20	2-100	3-20	3-100
sand	13.9	14.0	20.3	9.2	13.9
silt	39.3	32.5	30.3	32.3	32.3
clay	46.8	53.4	49.4	58.4	53.8

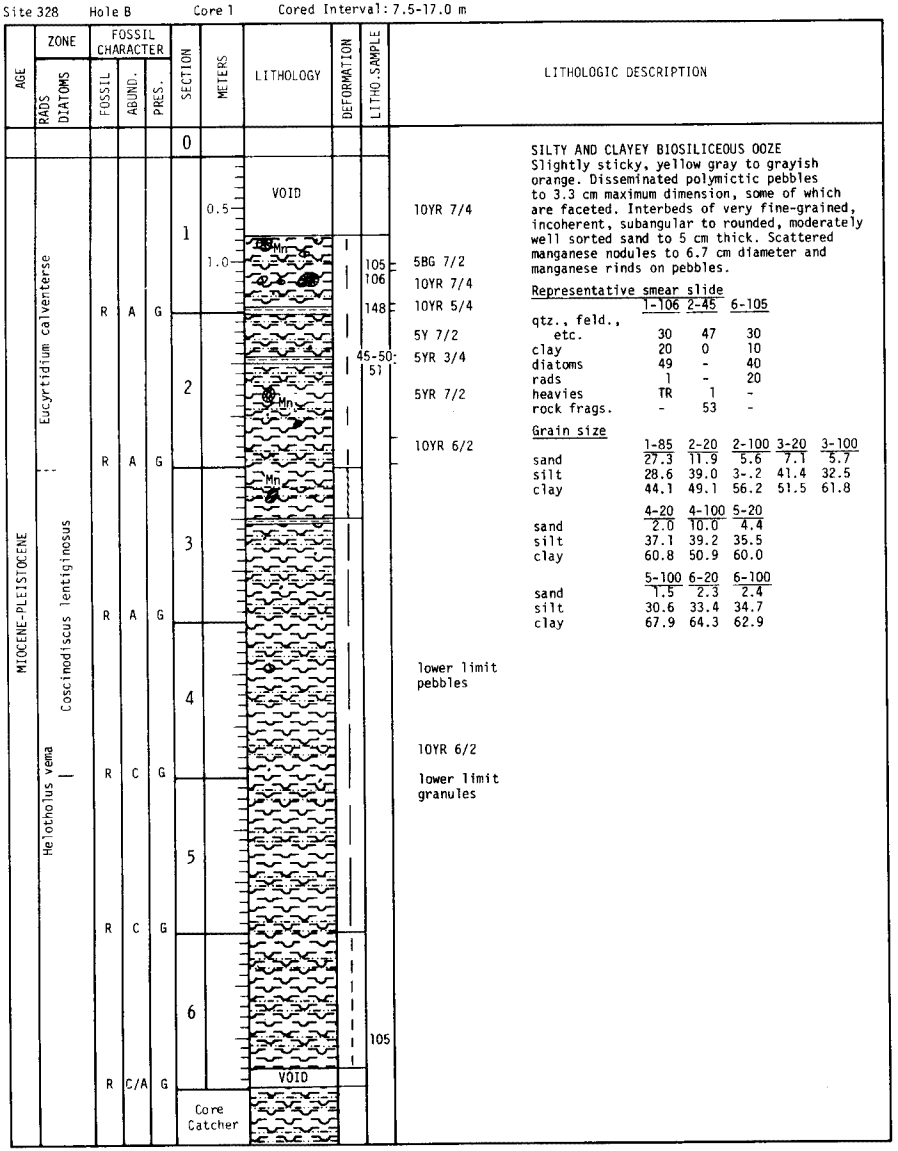
	4-20	4-102
sand	16.0	19.1
silt	28.4	30.3
clay	55.5	50.6

Site 328 Hole A Core 2 Cored Interval: 7.5-17.0 m

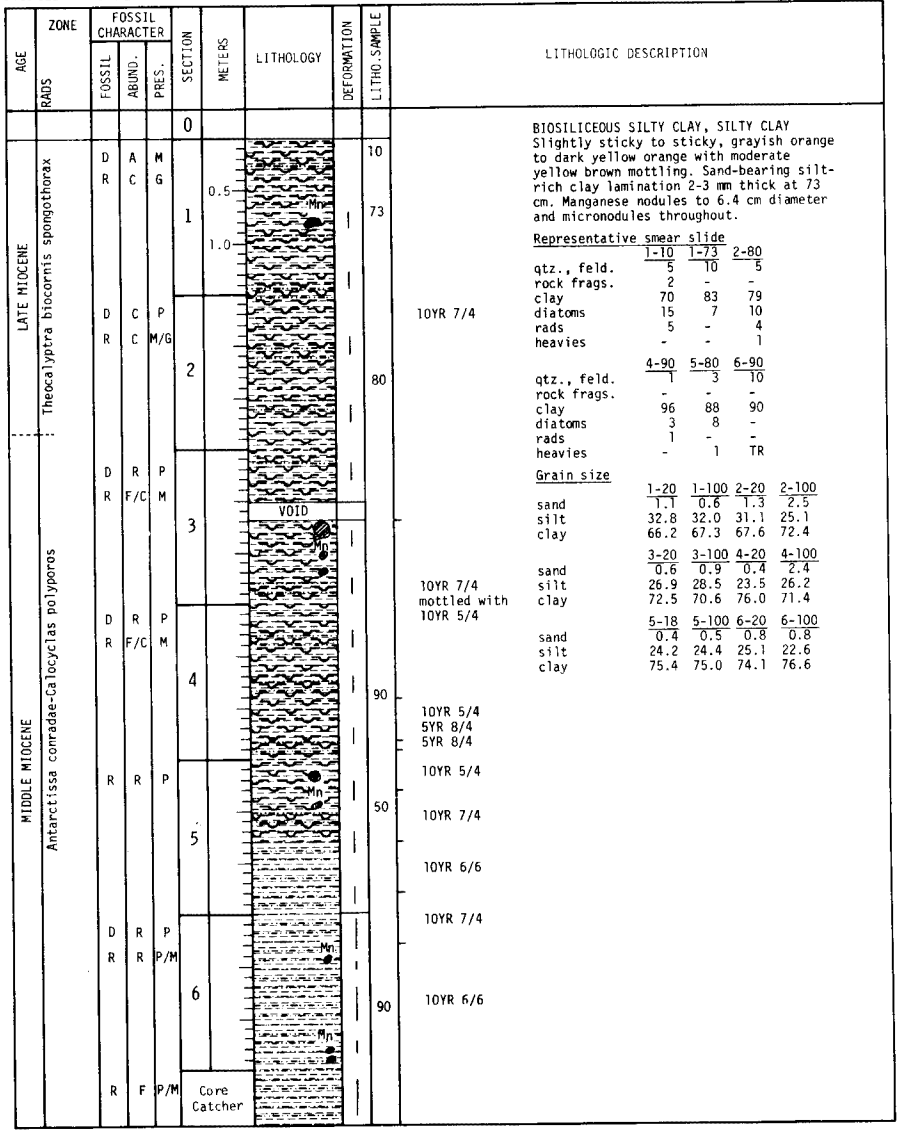


BIOSILICEOUS OOZE
Slightly sticky, greenish gray, pale green, dusky yellow green. Silty, sandy, and pebbly.

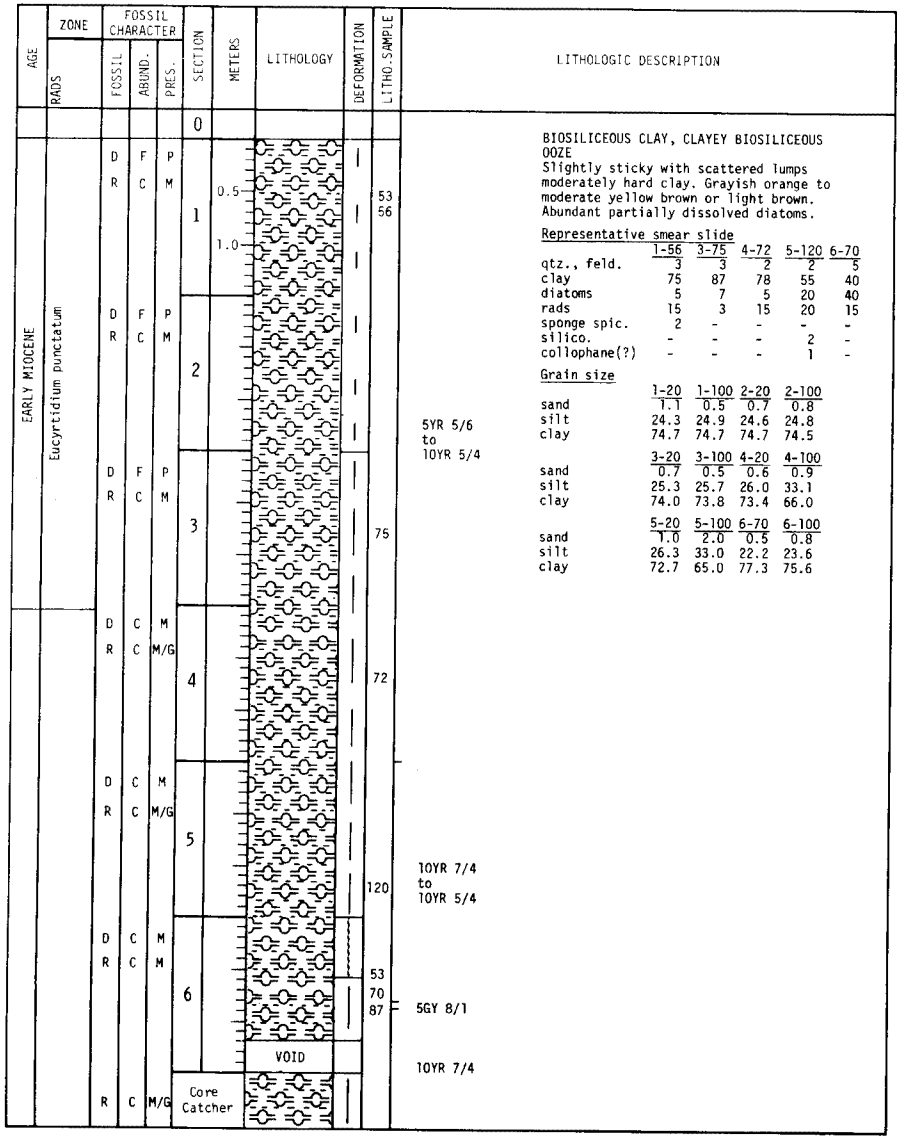
Site 328 Hole B Core 1 Cored Interval: 7.5-17.0 m



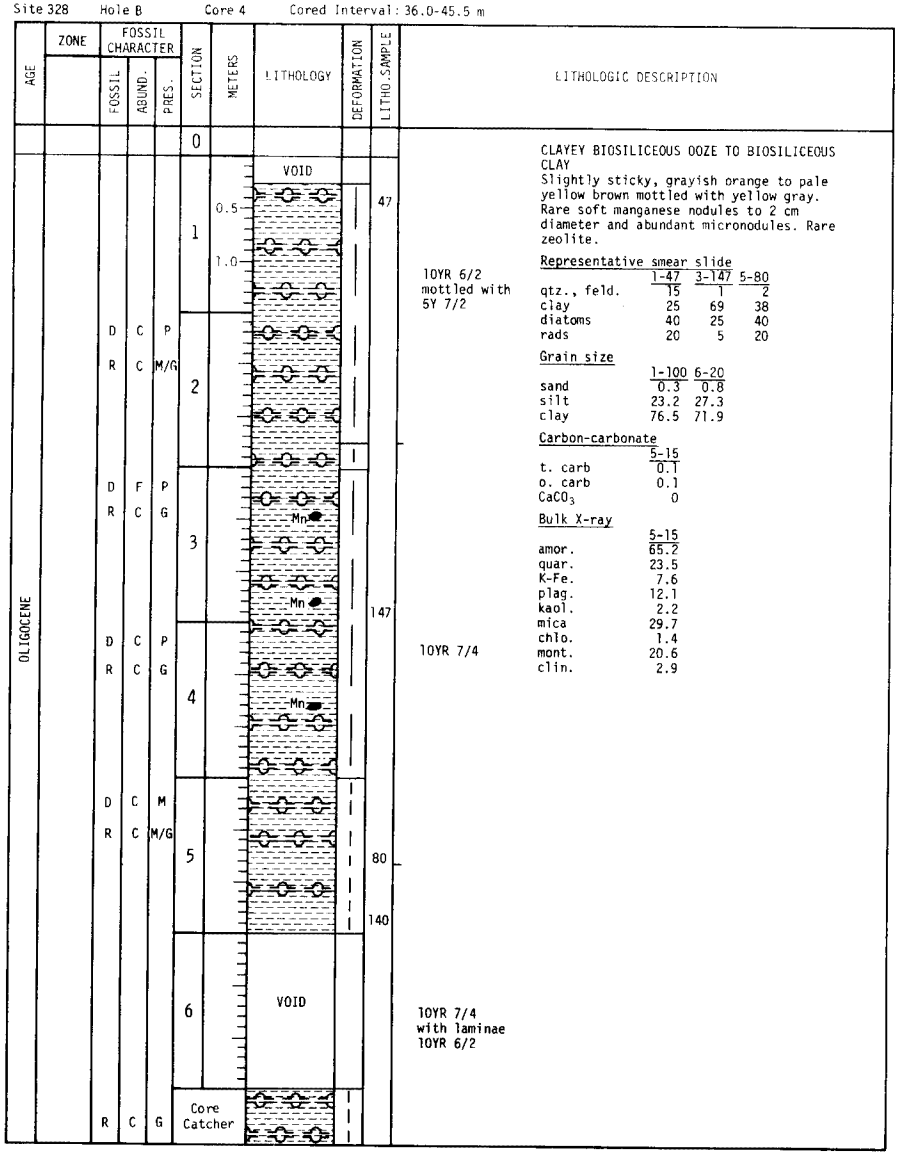
Site 328 Hole B Core 2 Cored Interval: 17.0-26.5 m



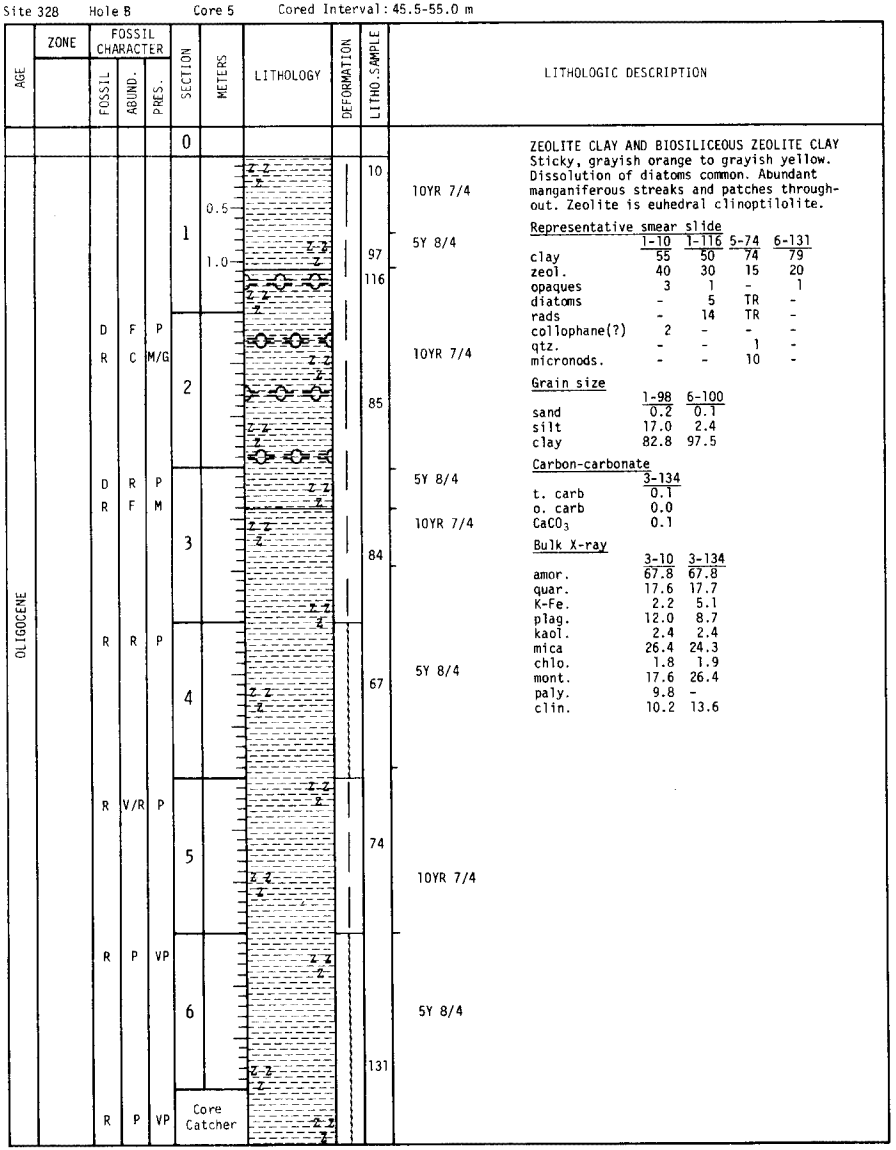
Site 328 Hole B Core 3 Cored Interval: 26.5-36.0 m



Site 328 Hole B Core 4 Cored Interval: 36.0-45.5 m



Site 328 Hole B Core 5 Cored Interval: 45.5-55.0 m



ZEOLITE CLAY AND BIOSILICEOUS ZEOLITE CLAY
Sticky, grayish orange to grayish yellow. Dissolution of diatoms common. Abundant manganiferous streaks and patches throughout. Zeolite is euhedral clinoptilolite.

Representative smear slide

	1-10	1-116	5-74	6-131
clay	55	50	74	79
zeol.	40	30	15	20
opaques	3	1	-	1
diatoms	-	5	TR	-
rads	-	14	TR	-
collophane(?)	2	-	-	-
qtz.	-	-	1	-
micronods.	-	-	10	-

Grain size

	1-98	6-100
sand	0.2	0.1
silt	17.0	2.4
clay	82.8	97.5

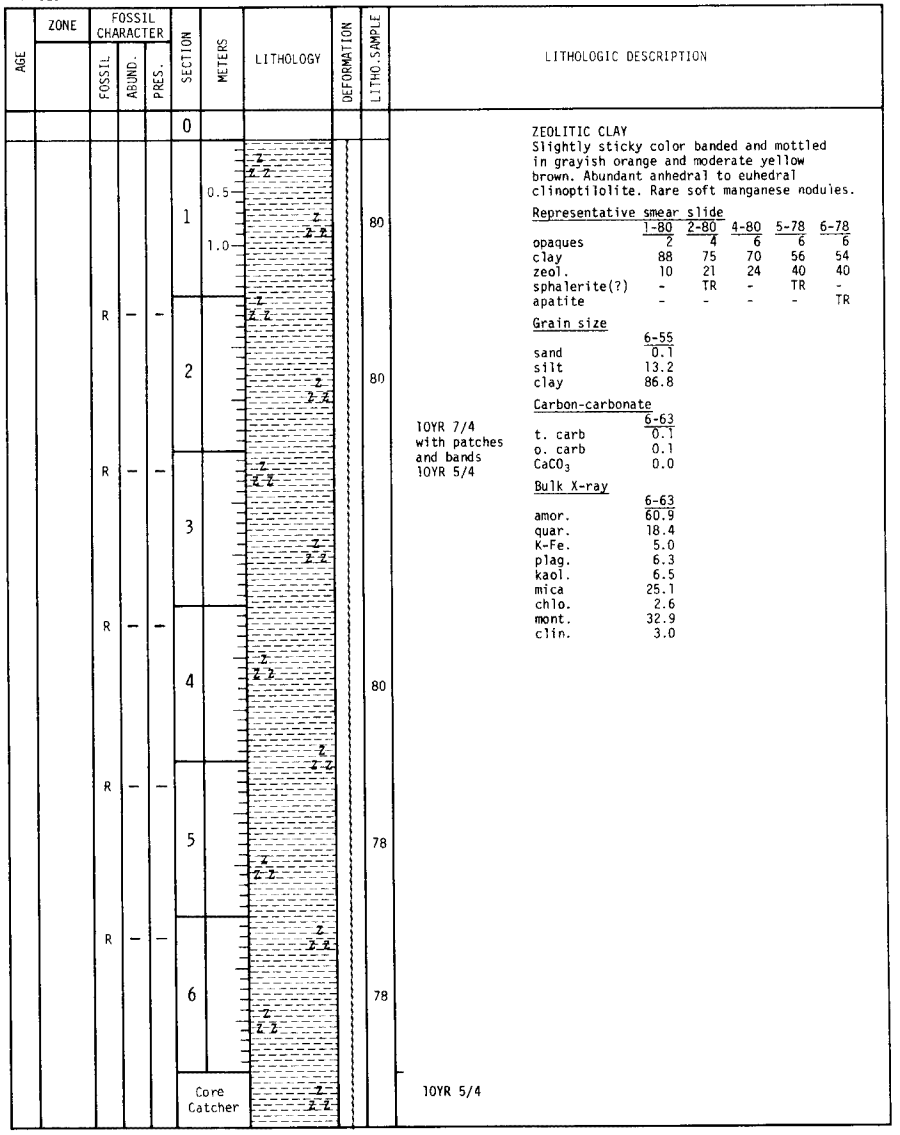
Carbon-carbonate

	3-134
t. carb	0.1
o. carb	0.0
$CaCO_3$	0.1

Bulk X-ray

	3-10	3-134
amor.	67.8	67.8
quar.	17.6	17.7
K-Fe.	2.2	5.1
plag.	12.0	8.7
kaol.	2.4	2.4
mica	26.4	24.3
chlo.	1.8	1.9
mont.	17.6	26.4
paly.	9.8	-
clin.	10.2	13.6

Site 328 Hole B Core 6 Cored Interval: 55.0-64.5 m



ZEOLITIC CLAY
Slightly sticky color banded and mottled in grayish orange and moderate yellow brown. Abundant anhedral to euhedral clinoptilolite. Rare soft manganese nodules.

Representative smear slide

	1-80	2-80	4-80	5-78	6-78
opaques	2	4	6	6	6
clay	88	75	70	56	54
zeol.	10	21	24	40	40
sphalerite(?)	-	TR	-	TR	-
apatite	-	-	-	-	TR

Grain size

	6-55
sand	0.1
silt	13.2
clay	86.8

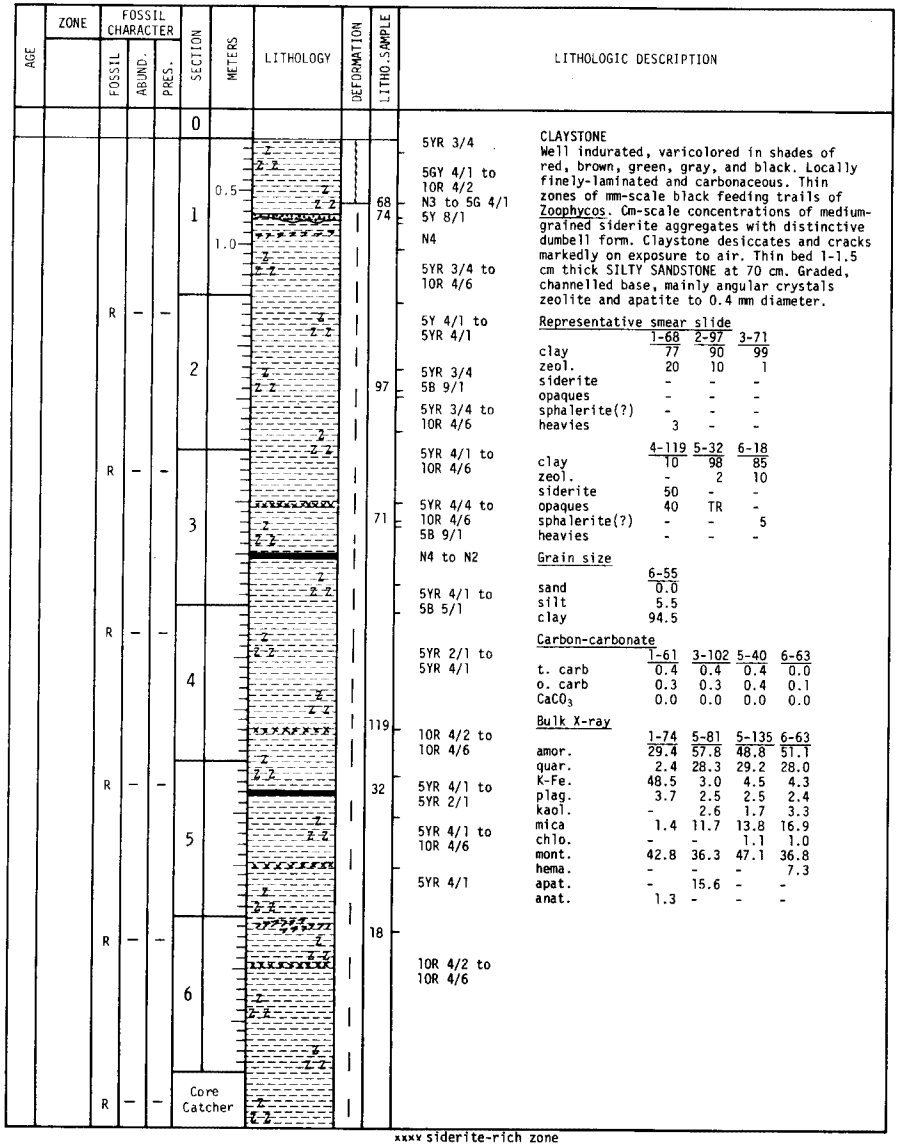
Carbon-carbonate

	6-63
t. carb	0.1
o. carb	0.1
$CaCO_3$	0.0

Bulk X-ray

	6-63
amor.	60.9
quar.	18.4
K-Fe.	5.0
plag.	6.3
kaol.	6.5
mica	25.1
chlo.	2.6
mont.	32.9
clin.	3.0

Site 328 Hole B Core 7 Cored Interval: 435.0-444.5 m



CLAYSTONE
Well indurated, varicolored in shades of red, brown, green, gray, and black. Locally finely-laminated and carbonaceous. Thin zones of mm-scale black feeding trails of Zoophycos. Cm-scale concentrations of medium-grained siderite aggregates with distinctive dumbell form. Claystone desiccates and cracks markedly on exposure to air. Thin bed 1-1.5 cm thick SILTY SANDSTONE at 70 cm. Graded, channelled base, mainly angular crystals zeolite and apatite to 0.4 mm diameter.

Representative smear slide

	1-68	2-97	3-71
clay	77	90	99
zeol.	20	10	1
siderite	-	-	-
opaques	-	-	-
sphalerite(?)	-	-	-
heavies	3	-	-

	4-119	5-32	6-18
clay	10	98	85
zeol.	-	2	10
siderite	50	-	-
opaques	40	TR	-
sphalerite(?)	-	-	5
heavies	-	-	-

Grain size

	6-55
sand	0.0
silt	5.5
clay	94.5

Carbon-carbonate

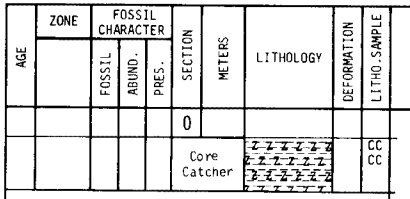
	1-61	3-102	5-40	6-63
t. carb	0.4	0.4	0.4	0.0
o. carb	0.3	0.3	0.4	0.1
$CaCO_3$	0.0	0.0	0.0	0.0

Bulk X-ray

	1-74	5-81	5-135	6-63
amor.	29.4	57.8	48.8	51.1
quar.	2.4	28.3	29.2	28.0
K-Fe.	48.5	3.0	4.5	4.3
plag.	3.7	2.5	2.5	2.4
kaol.	-	2.6	1.7	3.3
mica	1.4	11.7	13.8	16.9
chlo.	-	-	1.1	1.0
mont.	42.8	36.3	47.1	36.8
hema.	-	-	-	7.3
apat.	-	15.6	-	-
anat.	1.3	-	-	-

xxxx siderite-rich zone
▬ carbonaceous zone
>>>> feeding trail

Site 328 Hole B Core 8 Cored Interval: 444.5-453.9 m



CLAYSTONE
Fragments of rounded drilling breccia from unknown stratigraphic interval. Varicolored in moderate reddish brown, grayish red, and medium gray. Possible local bioturbation. Strong desiccation cracking on exposure to air.

10R 4/6
10R 4/2
N5

Characteristic smear slide

	CC
clay	90
zeol.(?)	8
opaques	2

DEEP SEA DRILLING PROJECT

LEG 36 SITE 329

SITE SUMMARY SHEET

Position: Latitude:	50°39.21'S
Longitude:	46°05.73'W
Water depth (rig floor):	1529 corrected meters, echo sounding
Bottom felt at:	1531.5 meters, drill pipe
Penetration:	464.5 meters
Number of holes:	1
Number of cores:	33
Total length of cored section:	312.5 meters
Total core recovered:	215.1 meters
Percentage core recovery:	69%

Oldest Sediment Cored

Depth subbottom:	464.5 meters
Nature:	Limestone
Age:	Upper Paleocene
Measured velocity:	2.20 km/sec

Basement

Depth subbottom (top)	Not reached

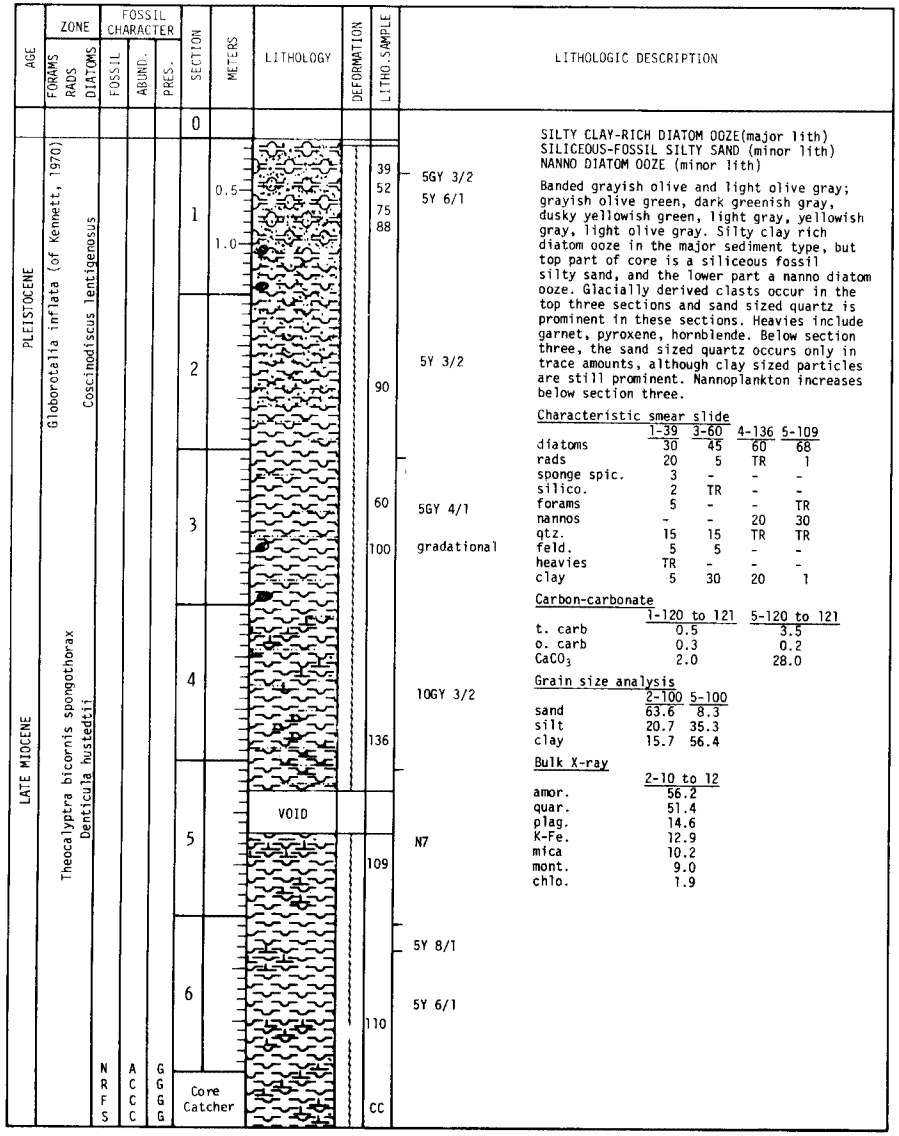
Principal Results

Site 329 on the elevated eastern part of the Falkland Plateau was chosen to examine Neogene shallow water biostratigraphy in the Southern Ocean, specifically, by sampling that part of the sedimentary cover of the Falkland Plateau overlying the lower Eocene and older sediments and sedimentary rocks cored at the nearby Site 327. Site 329 was cored continuously to 179.5 meters and abandoned at 464.5 meters when rocks equivalent in age to the Paleocene section of Site 327 were encountered.

LEG 36 SITE 329
SITE SUMMARY SHEET, con't.

A thick section (375 meters) of middle-upper Miocene nanno and diatom ooze was penetrated. This overlies Oligocene and questionable Paleocene nanno chalk in which the hole bottomed. Lower Miocene and Eocene sediments were not cored but could be present in two uncored 19 meter intervals. Rates of deposition were shown to have exceeded 30 m/Ma within the Miocene, compared with one-tenth of that for the Oligocene. The increased rate in the Miocene reflects increased phytoplankton productivity. This is possibly enhanced by local accumulation of sediments due to eddying of currents flowing over the Falkland Plateau, since the Miocene ooze contains reworked Oligocene species.

Site 329 Hole Core 1 Cored Interval: 0.0-8.5 m



SILTY CLAY-RICH DIATOM OOZE(major lith)
SILICEOUS-FOSSIL SILTY SAND (minor lith)
NANNO DIATOM OOZE (minor lith)

Banded grayish olive and light olive gray; grayish olive green, dark greenish gray, dusky yellowish green, light gray, yellowish gray, light olive gray. Silty clay rich diatom ooze in the major sediment type, but top part of core is a siliceous fossil silty sand, and the lower part a nanno diatom ooze. Glacially derived clasts occur in the top three sections and sand sized quartz is prominent in these sections. Heavies include garnet, pyroxene, hornblende. Below section three, the sand sized quartz occurs only in trace amounts, although clay sized particles are still prominent. Nannoplankton increases below section three.

Characteristic smear slide

	1-39	3-60	4-136	5-109
diatoms	30	45	60	68
rads	20	5	TR	1
sponge spic.	3	-	-	-
silico.	2	TR	-	-
forams	5	-	-	TR
nannos	-	-	20	30
qtz.	15	15	TR	TR
feld.	5	5	-	-
heavies	TR	-	-	-
clay	5	30	20	1

Carbon-carbonate

	1-120 to 121	5-120 to 121
t. carb	0.5	3.5
o. carb	0.3	0.2
$CaCO_3$	2.0	28.0

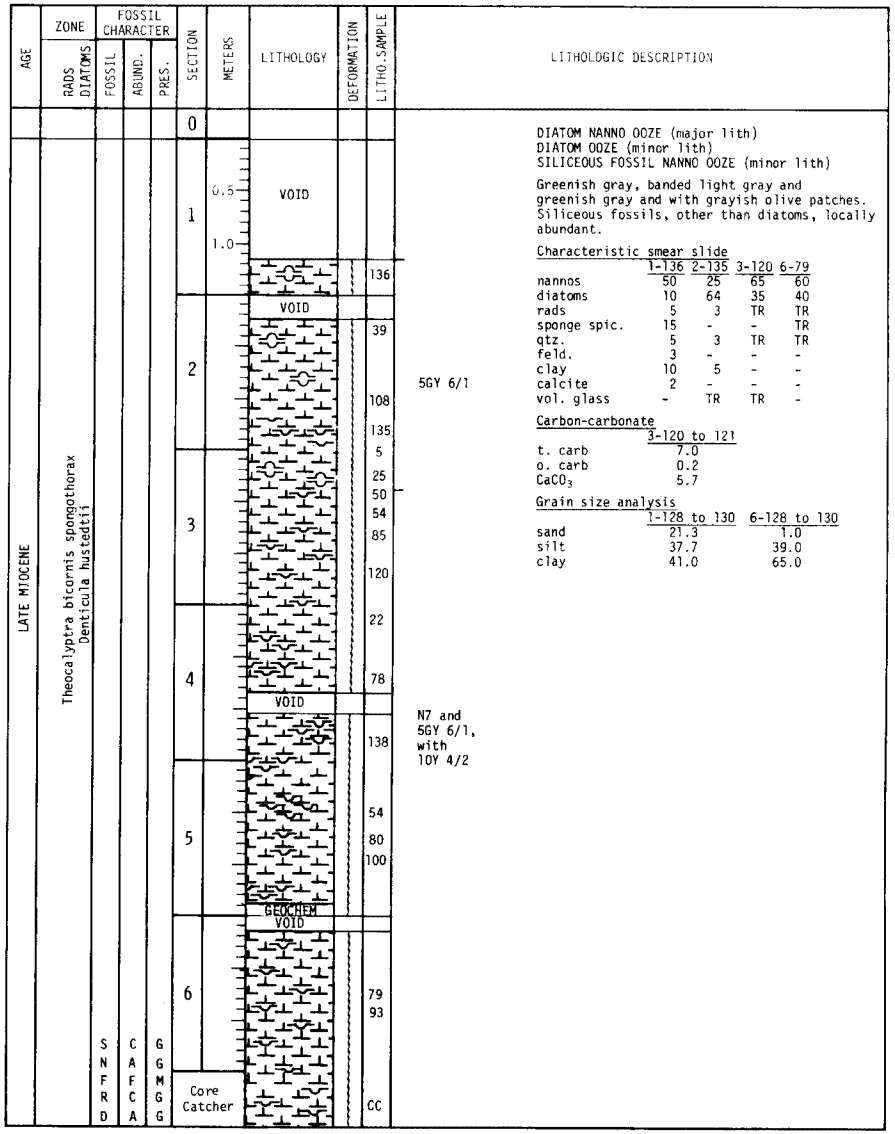
Grain size analysis

	2-100	5-100
sand	63.6	8.3
silt	20.7	35.3
clay	15.7	56.4

Bulk X-ray

	2-10 to 12
amor.	56.2
quar.	51.4
plag.	14.6
K-Fe.	12.9
mica	10.2
mont.	9.0
chlo.	1.9

Site 329 Hole Core 2 Cored Interval: 8.5-19.0 m



DIATOM NANNO OOZE (major lith)
DIATOM OOZE (minor lith)
SILICEOUS FOSSIL NANNO OOZE (minor lith)

Greenish gray, banded light gray and greenish gray and with grayish olive patches. Siliceous fossils, other than diatoms, locally abundant.

Characteristic smear slide

	1-136	2-135	3-120	6-79
nannos	50	25	65	60
diatoms	10	64	35	40
rads	5	3	TR	TR
sponge spic.	15	-	-	TR
qtz.	5	3	TR	TR
feld.	3	-	-	-
clay	10	5	-	-
calcite	2	-	-	-
vol. glass	-	TR	TR	-

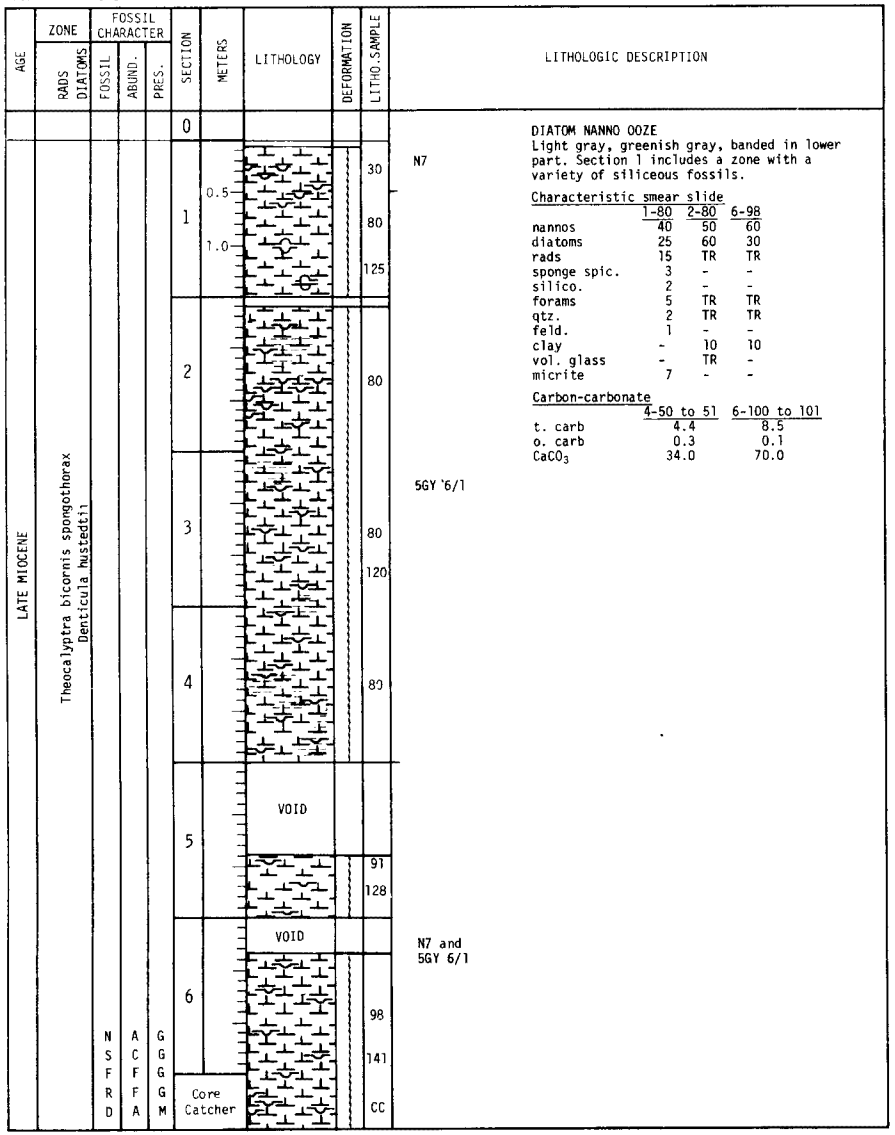
Carbon-carbonate

	3-120 to 121
t. carb	7.0
o. carb	0.2
$CaCO_3$	5.7

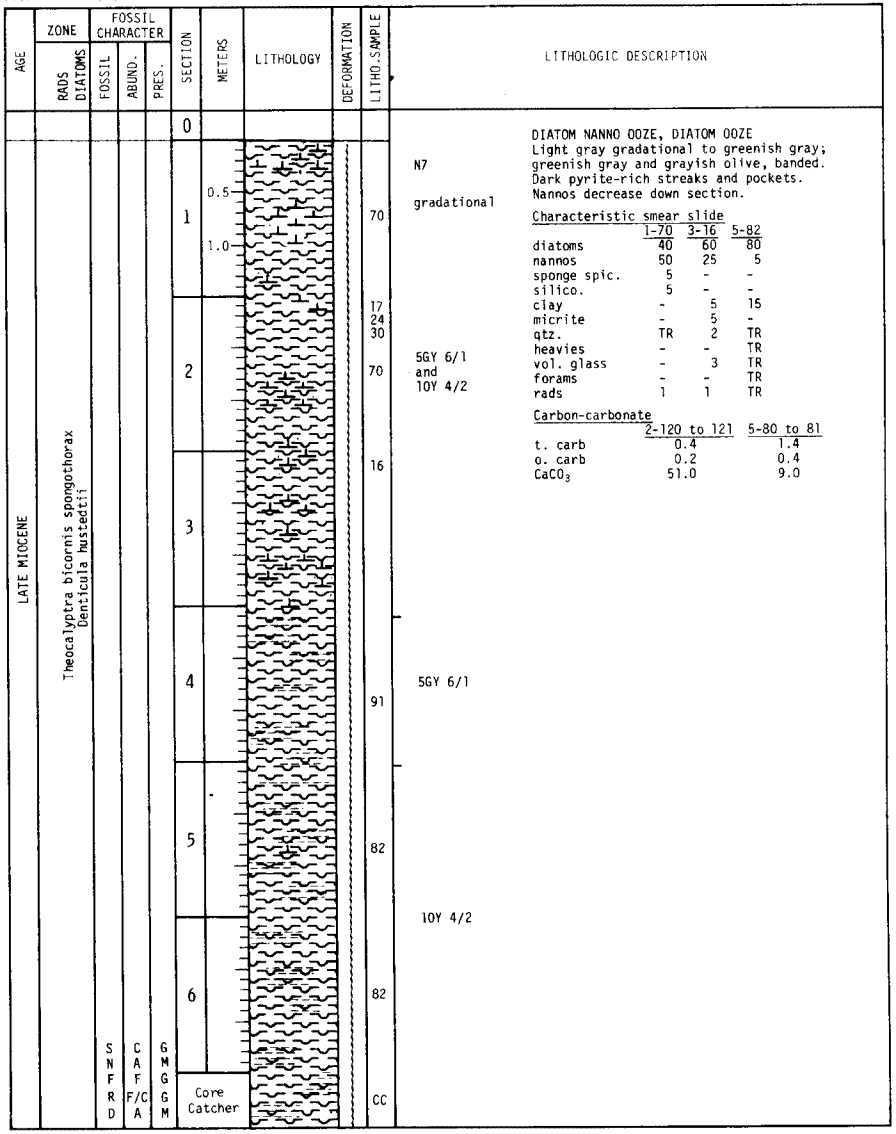
Grain size analysis

	1-128 to 130	6-128 to 130
sand	21.3	1.0
silt	37.7	39.0
clay	41.0	65.0

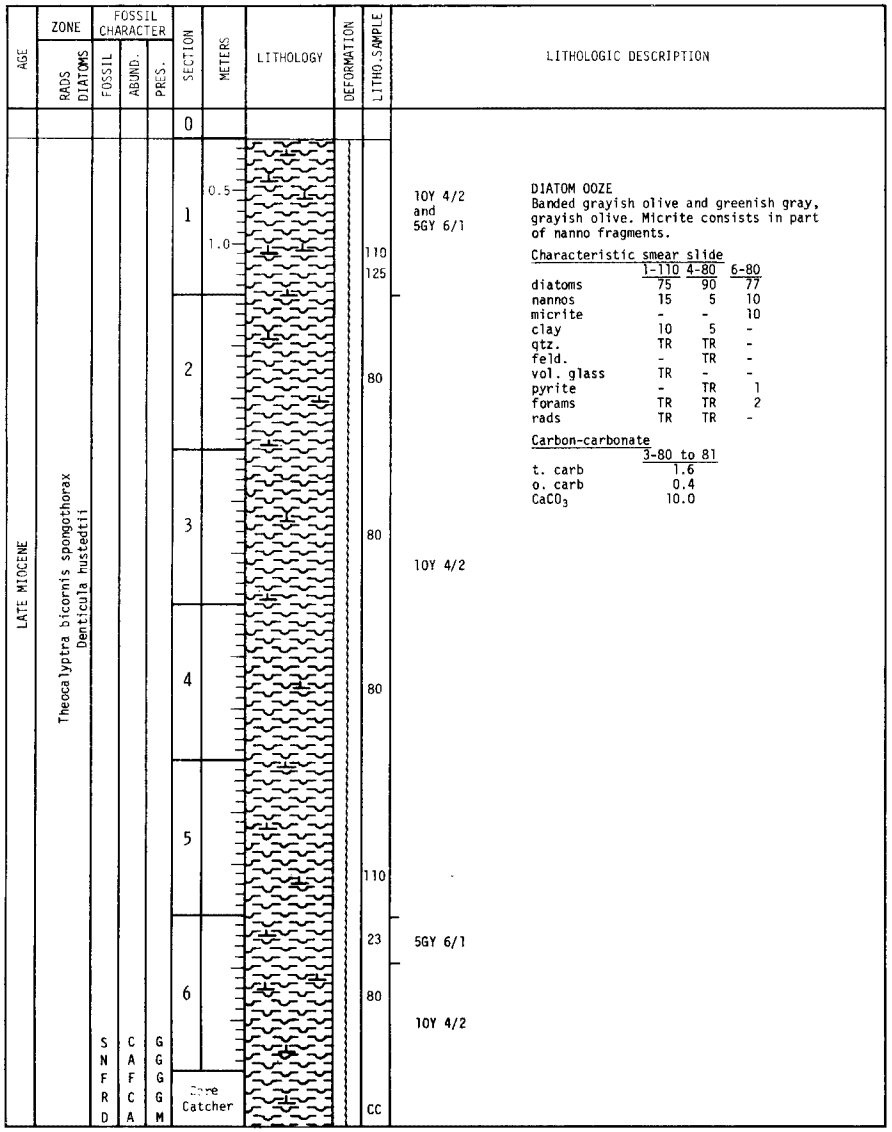
Site 329 Hole Core 3 Cored Interval: 18.0-27.5 m



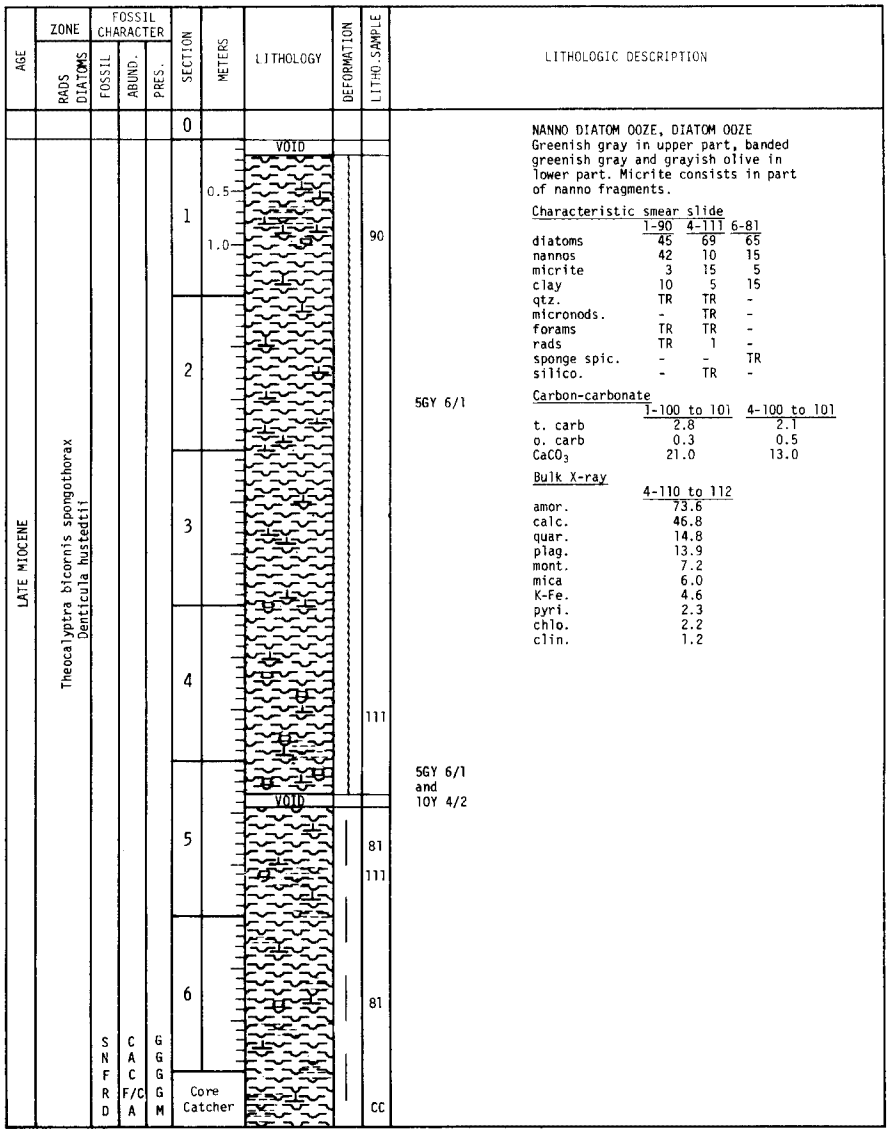
Site 329 Hole Core 4 Cored Interval: 27.5-37.0 m



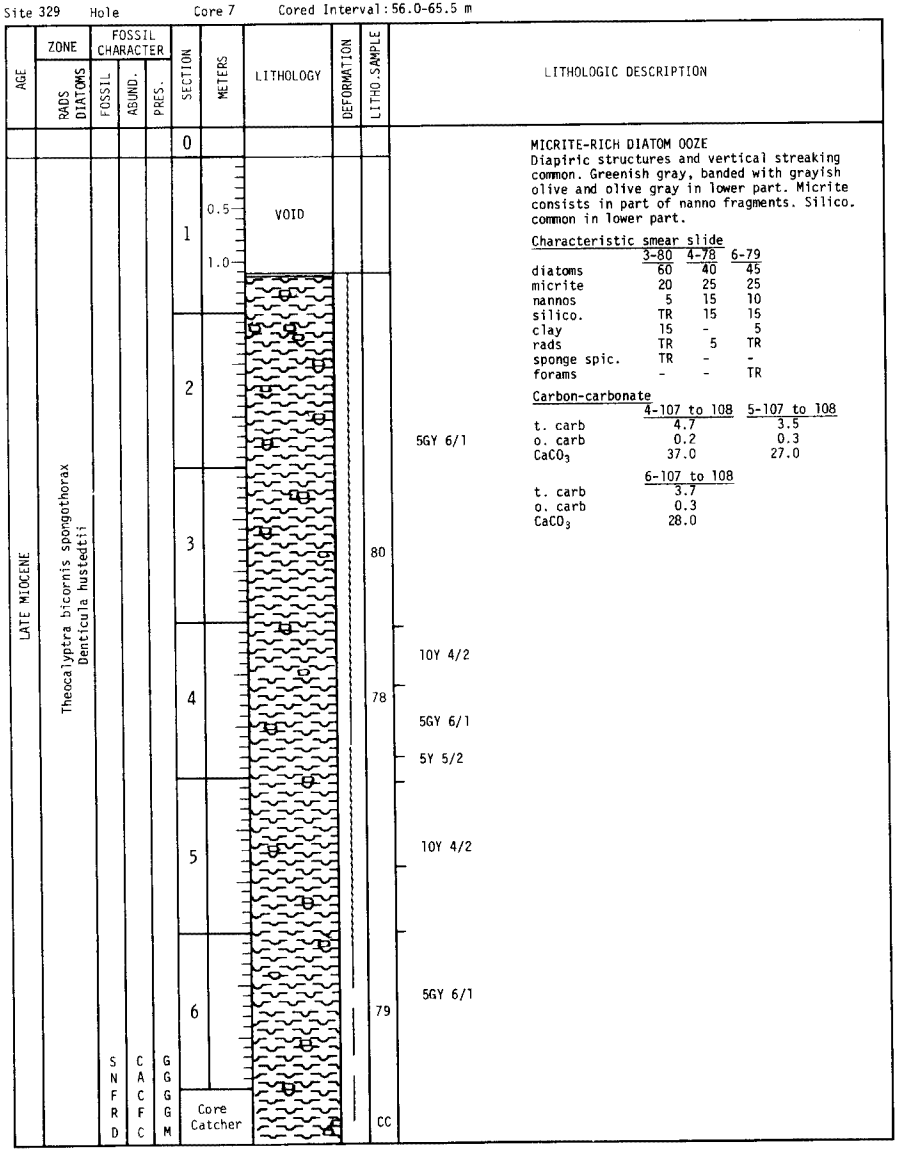
Site 329 Hole Core 5 Cored Interval: 37.0-46.5 m



Site 329 Hole Core 6 Cored Interval: 46.5-56.0 m



Site 329 Hole Core 7 Cored Interval: 56.0-65.5 m



MICRITE-RICH DIATOM OOZE
Diapiric structures and vertical streaking common. Greenish gray, banded with grayish olive and olive gray in lower part. Micrite consists in part of nanno fragments. Silico. common in lower part.

Characteristic smear slide

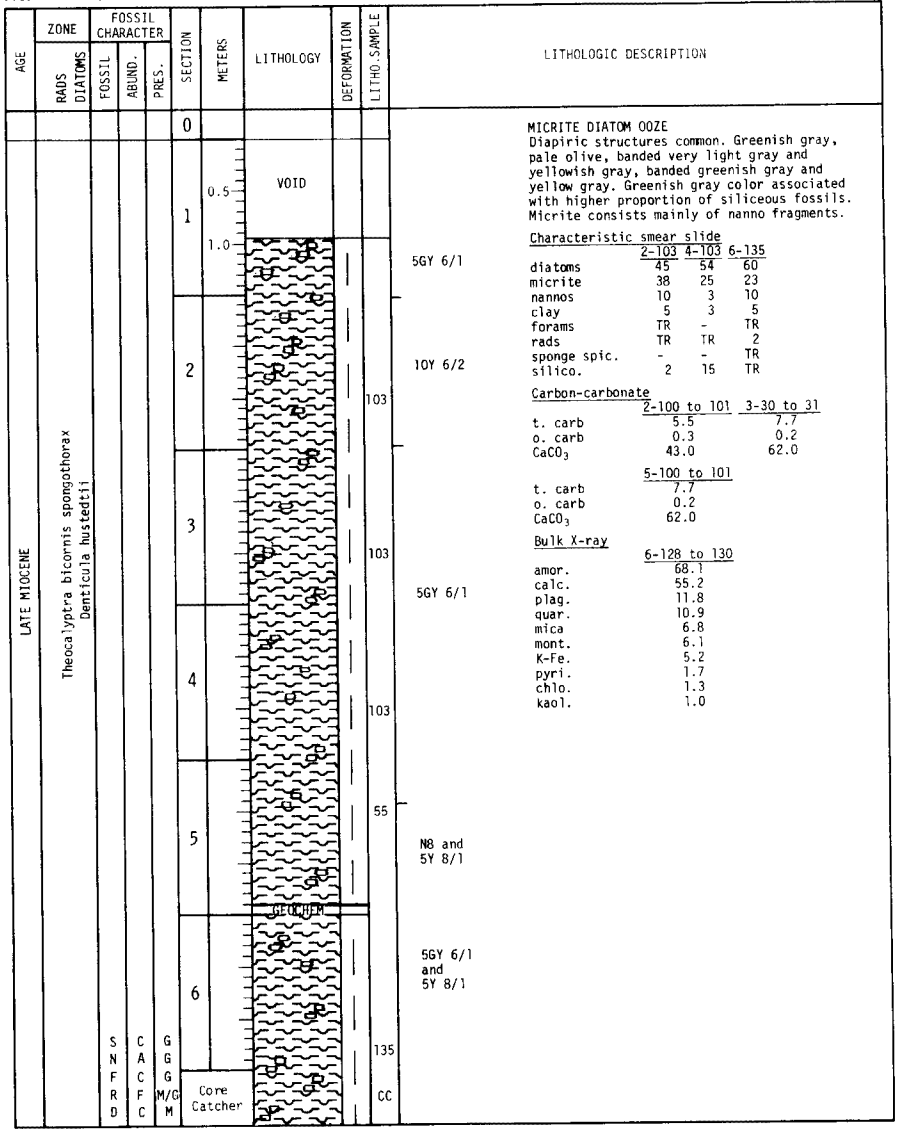
	3-80	4-78	6-79
diatoms	60	40	45
micrite	20	25	25
nannos	5	15	10
silico.	TR	15	15
clay	15	-	5
rads	TR	5	TR
sponge spic.	TR	-	-
forams	-	-	TR

Carbon-carbonate

	4-107 to 108	5-107 to 108
t. carb	4.7	3.5
o. carb	0.2	0.3
$CaCO_3$	37.0	27.0

	6-107 to 108
t. carb	3.7
o. carb	0.3
$CaCO_3$	28.0

Site 329 Hole Core 8 Cored Interval: 65.5-75.0 m



MICRITE DIATOM OOZE
Diapiric structures common. Greenish gray, pale olive, banded very light gray and yellowish gray, banded greenish gray and yellow gray. Greenish gray color associated with higher proportion of siliceous fossils. Micrite consists mainly of nanno fragments.

Characteristic smear slide

	2-103	4-103	6-135
diatoms	45	54	60
micrite	38	25	23
nannos	10	3	10
clay	5	3	5
forams	TR	-	TR
rads	TR	TR	2
sponge spic.	-	-	TR
silico.	2	15	TR

Carbon-carbonate

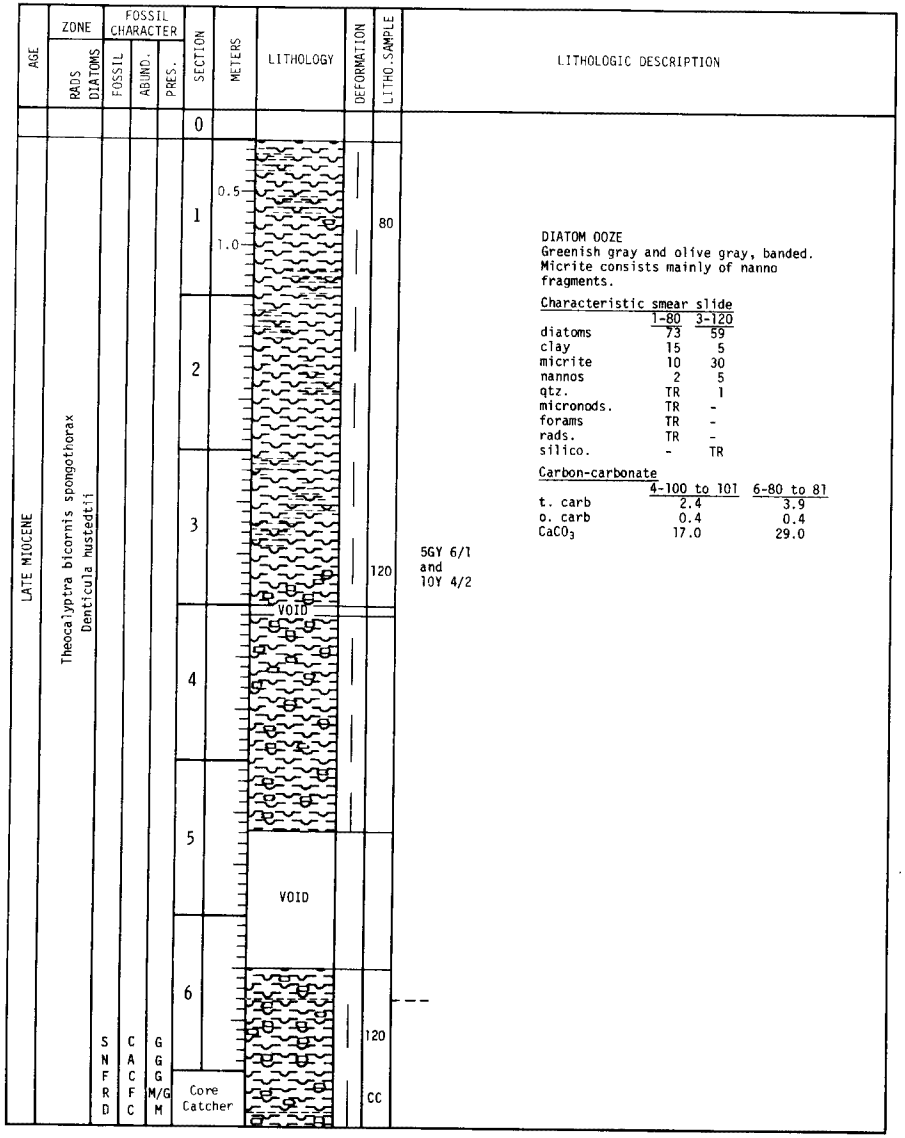
	2-100 to 101	3-30 to 31
t. carb	5.5	7.7
o. carb	0.3	0.2
$CaCO_3$	43.0	62.0

	5-100 to 101
t. carb	7.7
o. carb	0.2
$CaCO_3$	62.0

Bulk X-ray

	6-128 to 130
amor.	68.1
calc.	55.2
plag.	11.8
quar.	10.9
mica	6.8
mont.	6.1
K-Fe.	5.2
pyri.	1.7
chlo.	1.3
kaol.	1.0

Site 329 Hole Core 9 Cored Interval: 75.0-84.5 m



DIATOM OOZE
Greenish gray and olive gray, banded.
Micrite consists mainly of nanno fragments.

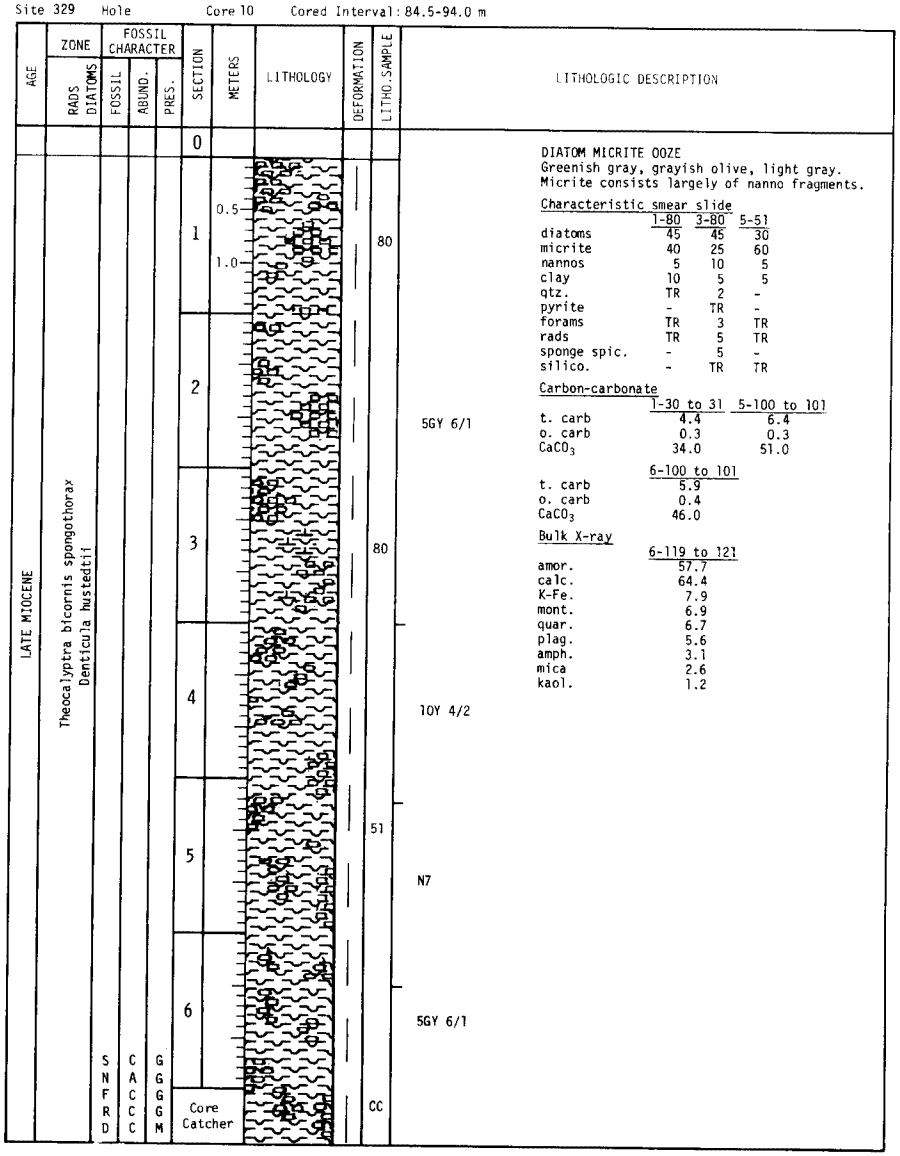
Characteristic smear slide

	1-80	3-120
diatoms	73	59
clay	15	5
micrite	10	30
nannos	2	5
qtz.	TR	1
micronods.	TR	-
forams	TR	-
rads.	TR	-
silico.	-	TR

Carbon-carbonate

	4-100 to 101	6-80 to 81
t. carb	2.4	3.9
o. carb	0.4	0.4
$CaCO_3$	17.0	29.0

Site 329 Hole Core 10 Cored Interval: 84.5-94.0 m



DIATOM MICRITE OOZE
Greenish gray, grayish olive, light gray.
Micrite consists largely of nanno fragments.

Characteristic smear slide

	1-80	3-80	5-51
diatoms	45	45	30
micrite	40	25	60
nannos	5	10	5
clay	10	5	5
qtz.	TR	2	-
pyrite	-	TR	-
forams	TR	3	TR
rads	TR	5	TR
sponge spic.	-	5	-
silico.	-	TR	TR

Carbon-carbonate

	1-30 to 31	5-100 to 101
t. carb	4.4	6.4
o. carb	0.3	0.3
$CaCO_3$	34.0	51.0

	6-100 to 101
t. carb	5.9
o. carb	0.4
$CaCO_3$	46.0

Bulk X-ray

	6-119 to 121
amor.	57.7
calc.	64.4
K-Fe.	7.9
mont.	6.9
quar.	6.7
plag.	5.6
amph.	3.1
mica	2.6
kaol.	1.2

Site 329 Hole Core 11 Cored Interval: 94.0-103.5 m

AGE: LATE MIOCENE

ZONE: RADS DIAMOTHS: Theocalyptra bicornis spongothorax / Denticula hustedtii

FOSSIL CHARACTER: FOSSIL S N F R D; ABUND. C A C C A; PRES. G G G G M

SECTION: 1, 2, 3, 4, 5, 6, Core Catcher

METERS: 0.5, 1.0

LITHOLOGY

DEFORMATION

LITHO. SAMPLE: 80, 60, CC

LITHOLOGIC DESCRIPTION

MICRITE-RICH DIATOM OOZE
Pale olive with diapirs of light olive.
Micrite consists largely of nanno fragments.

Characteristic smear slide	3-80	6-60
diatoms	45	45
micrite	40	35
nannos	10	10
clay	-	10
rads		TR
sponge spic.	5	TR
silico.		TR
forams	TR	TR
qtz.	TR	-
pyrite	-	TR

Carbon-carbonate	3-70 to 71	6-70 to 71
t. carb	5.5	3.0
o. carb	0.2	0.4
$CaCO_3$	44.0	22.0

10Y 6/2

Site 329 Hole Core 12 Cored Interval: 103.5-113.0 m

AGE: LATE MIOCENE

ZONE: RADS DIAMOTHS: Theocalyptra bicornis spongothorax / Denticula hustedtii

FOSSIL CHARACTER: FOSSIL S N F R D; ABUND. C A F C A; PRES. G G G G M

SECTION: 1, 2, 3, 4, 5, 6, Core Catcher

METERS: 0.5, 1.0

LITHOLOGY

DEFORMATION

LITHO. SAMPLE: 112, 115, 10, 137, CC

LITHOLOGIC DESCRIPTION

DIATOM MICRITE OOZE
Bluish white, pale olive with band of light greenish gray in lower part.
Sparse dark streaks and mottling.
Micrite largely consists of nanno fragments.

Characteristic smear slide	4-112	6-10
micrite	70	40
diatoms	15	30
nannos	10	5
rads	5	10
sponge spic.	TR	5
silico.	TR	
zeol.	-	TR

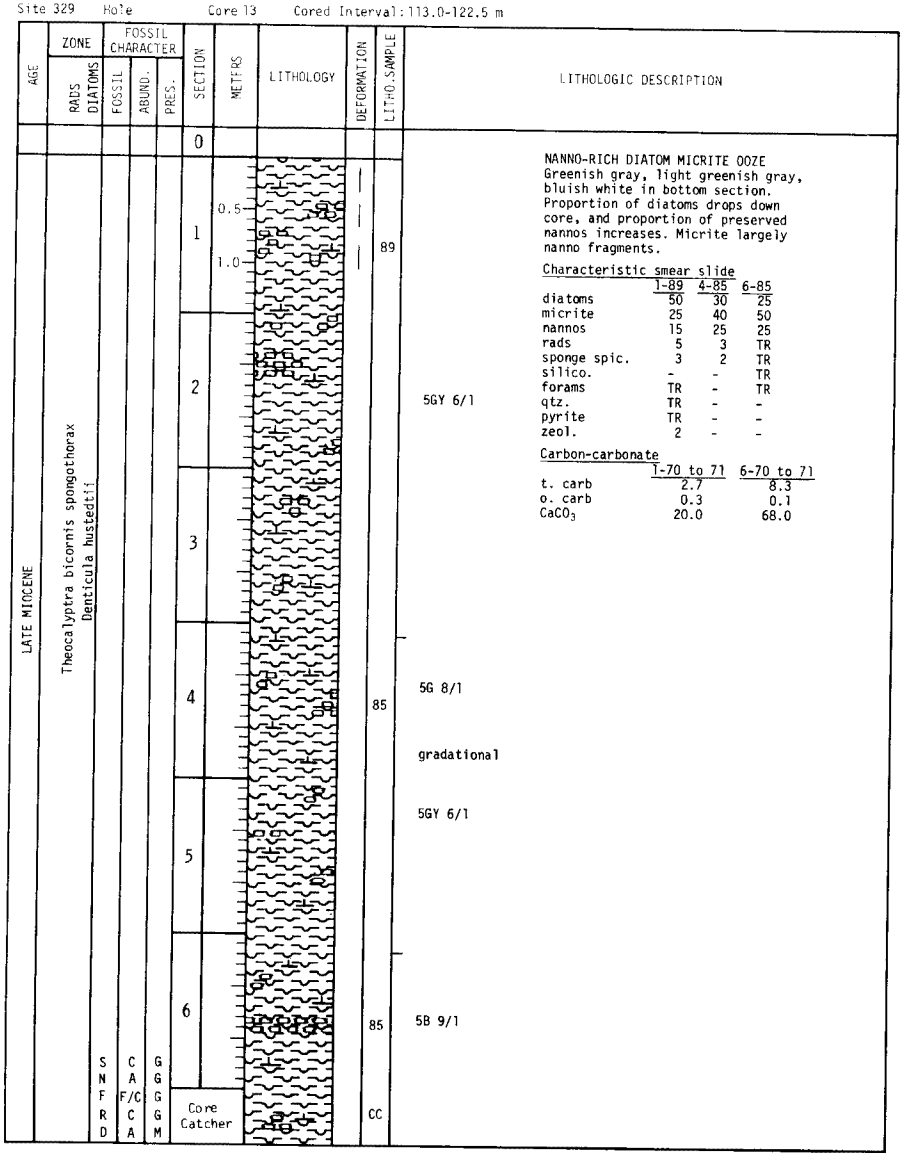
Carbon-carbonate	4-70 to 71	6-70 to 71
t. carb	9.5	3.6
o. carb	0.1	0.4
$CaCO_3$	78.0	27.0

Bulk X-ray	6-30 to 32
amor.	73.9
calc.	50.5
plag.	12.0
quar.	10.2
K-Fe.	8.1
mont.	7.6
mica	4.3
amph.	2.5
pyri.	1.5
clin.	1.3
chlo.	1.2

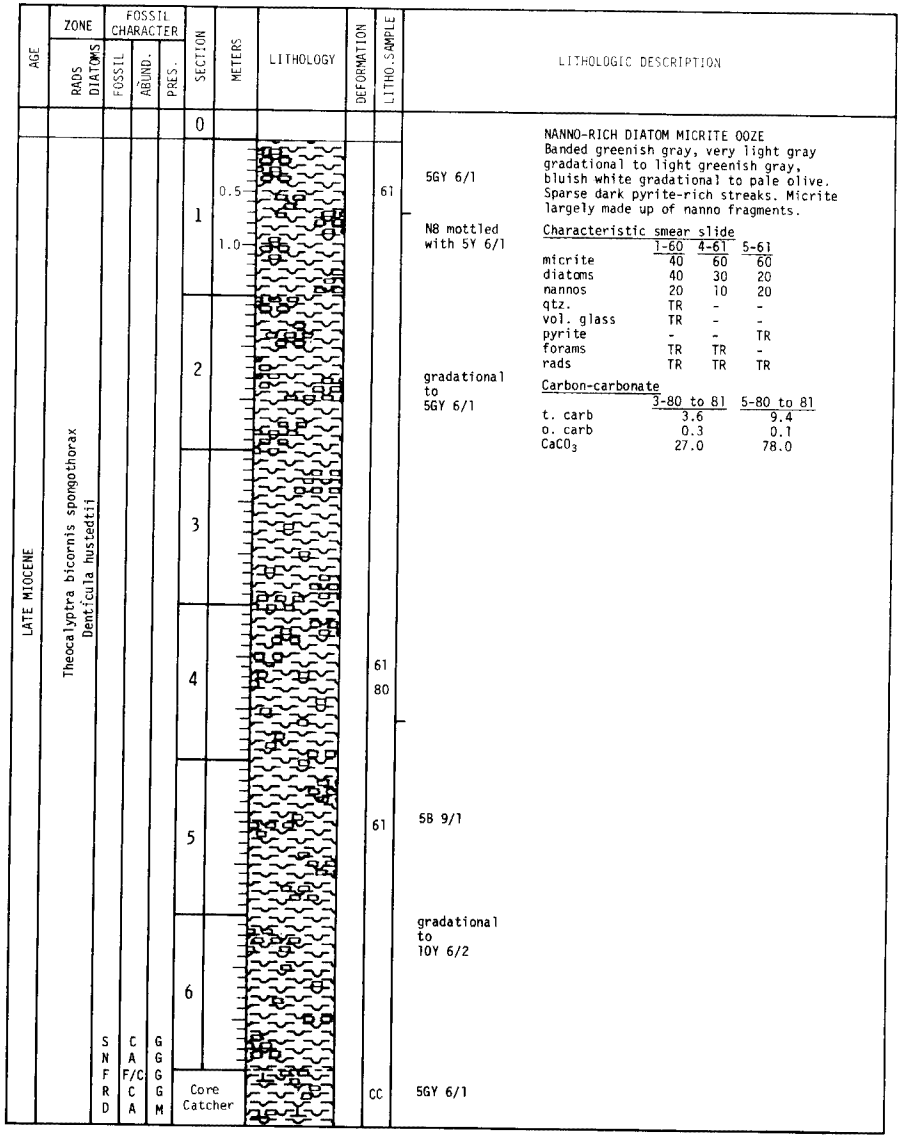
5B 9/1

10Y 6/2 with band of 5G 8/1

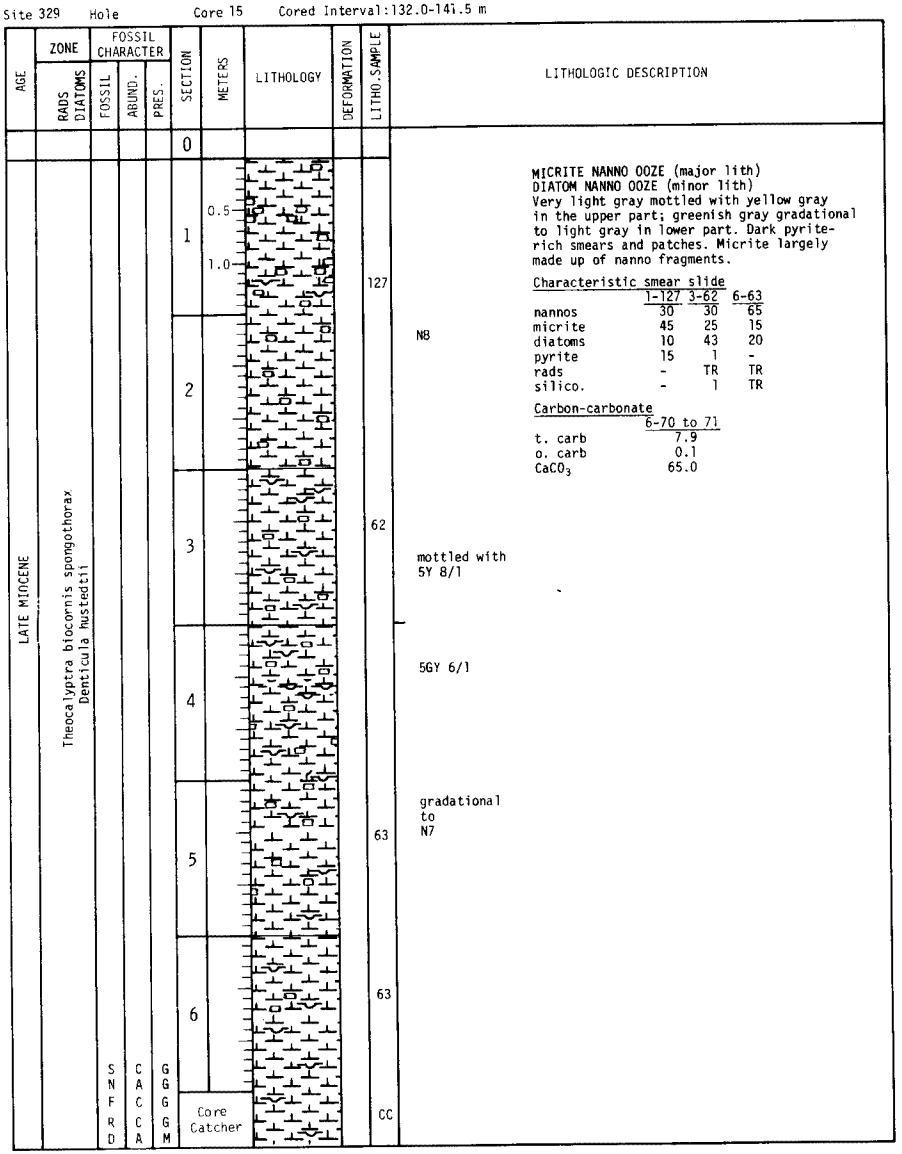
Site 329 Hole Core 13 Cored Interval: 113.0-122.5 m



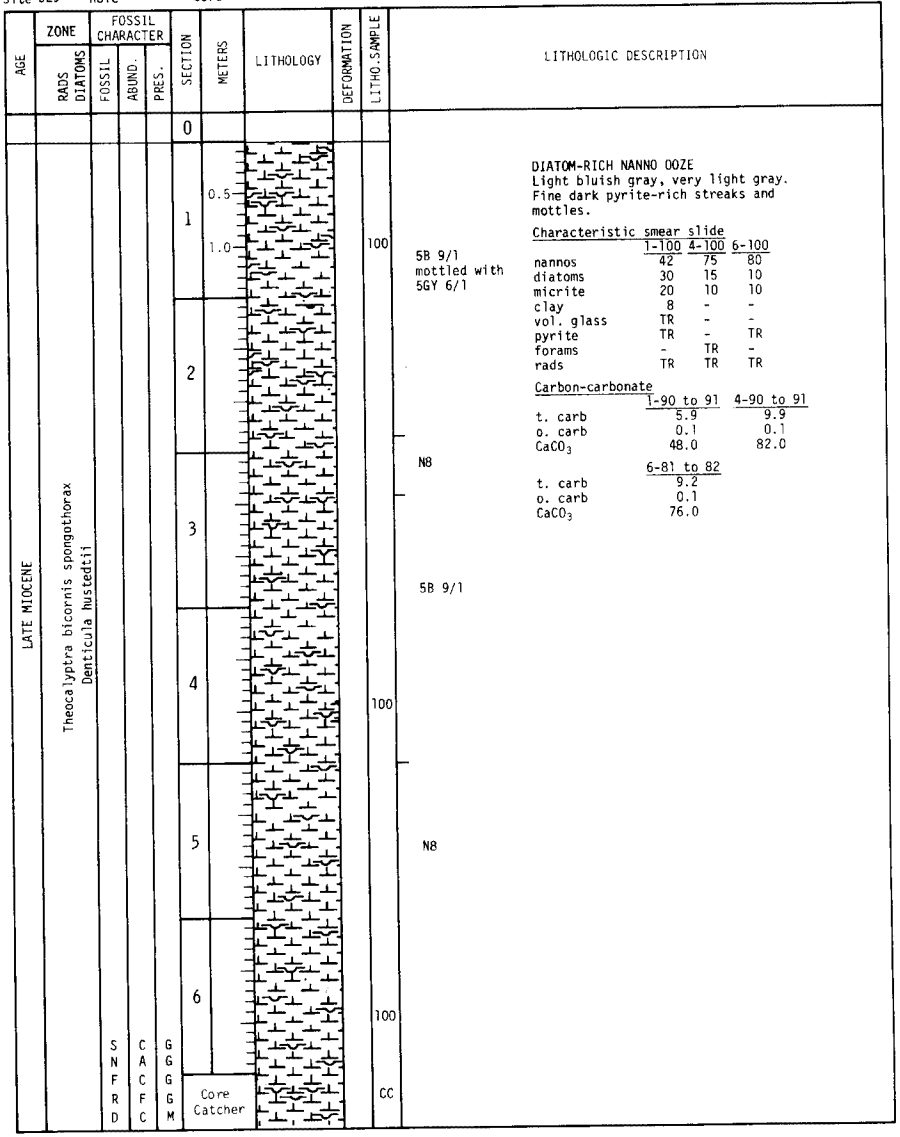
Site 329 Hole Core 14 Cored Interval: 122.5-132.0 m



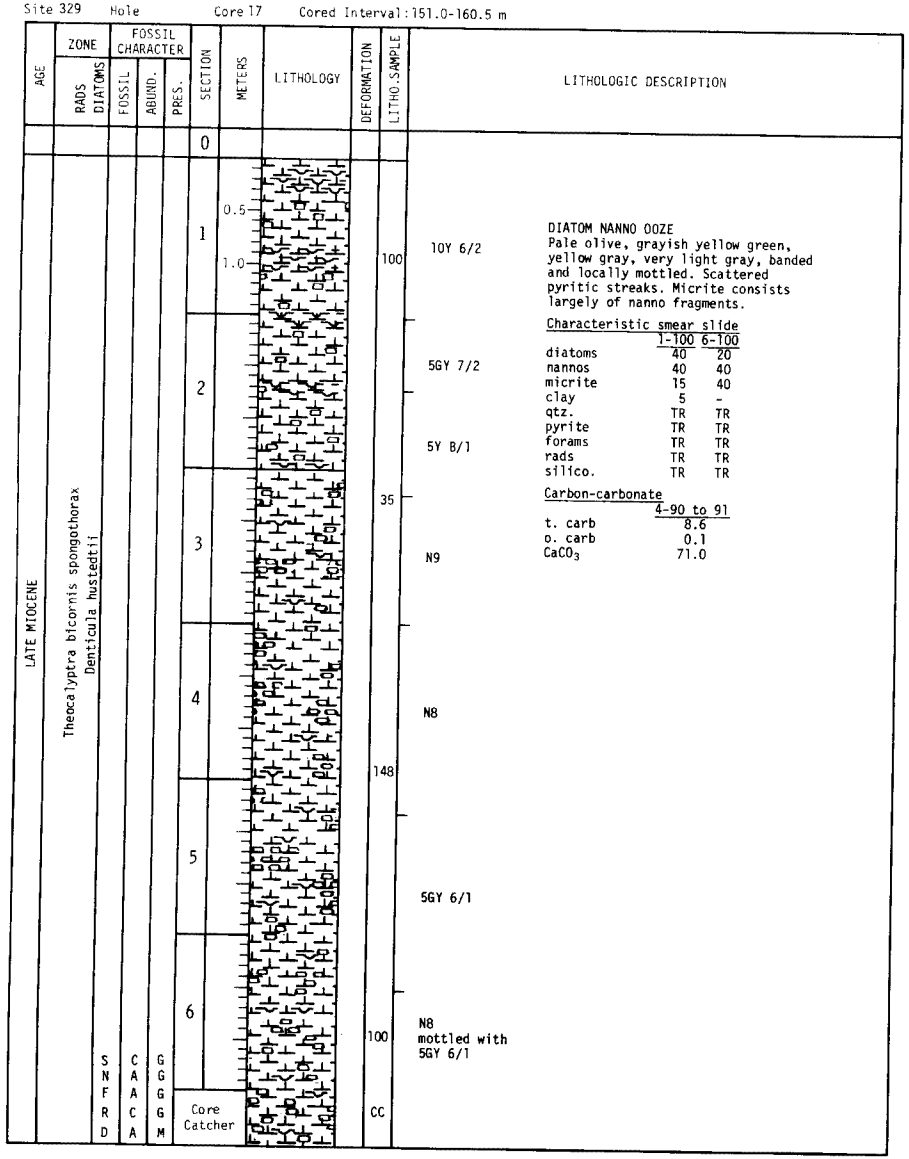
Site 329 Hole Core 15 Cored Interval: 132.0-141.5 m



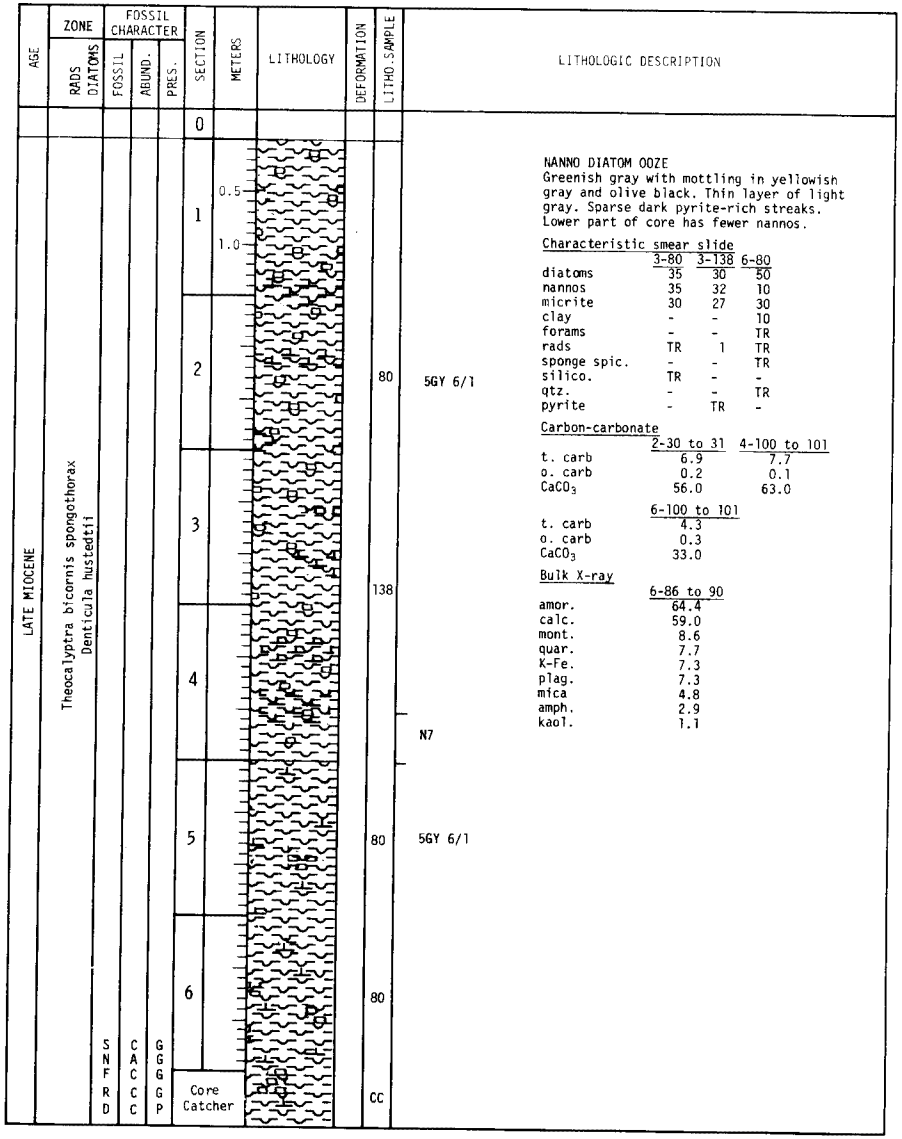
Site 329 Hole Core 16 Cored Interval: 141.5-151.0 m



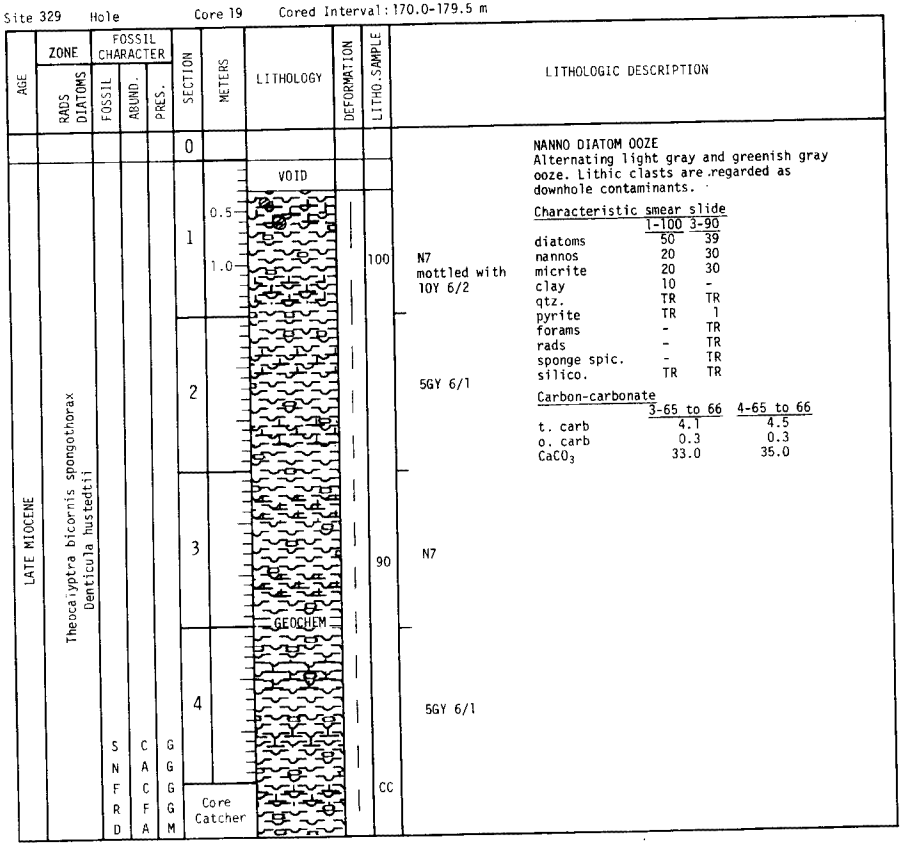
Site 329 Hole Core 17 Cored Interval: 151.0-160.5 m



Site 329 Hole Core 18 Cored Interval: 160.5-170.0 m



Site 329 Hole Core 19 Cored Interval: 170.0-179.5 m

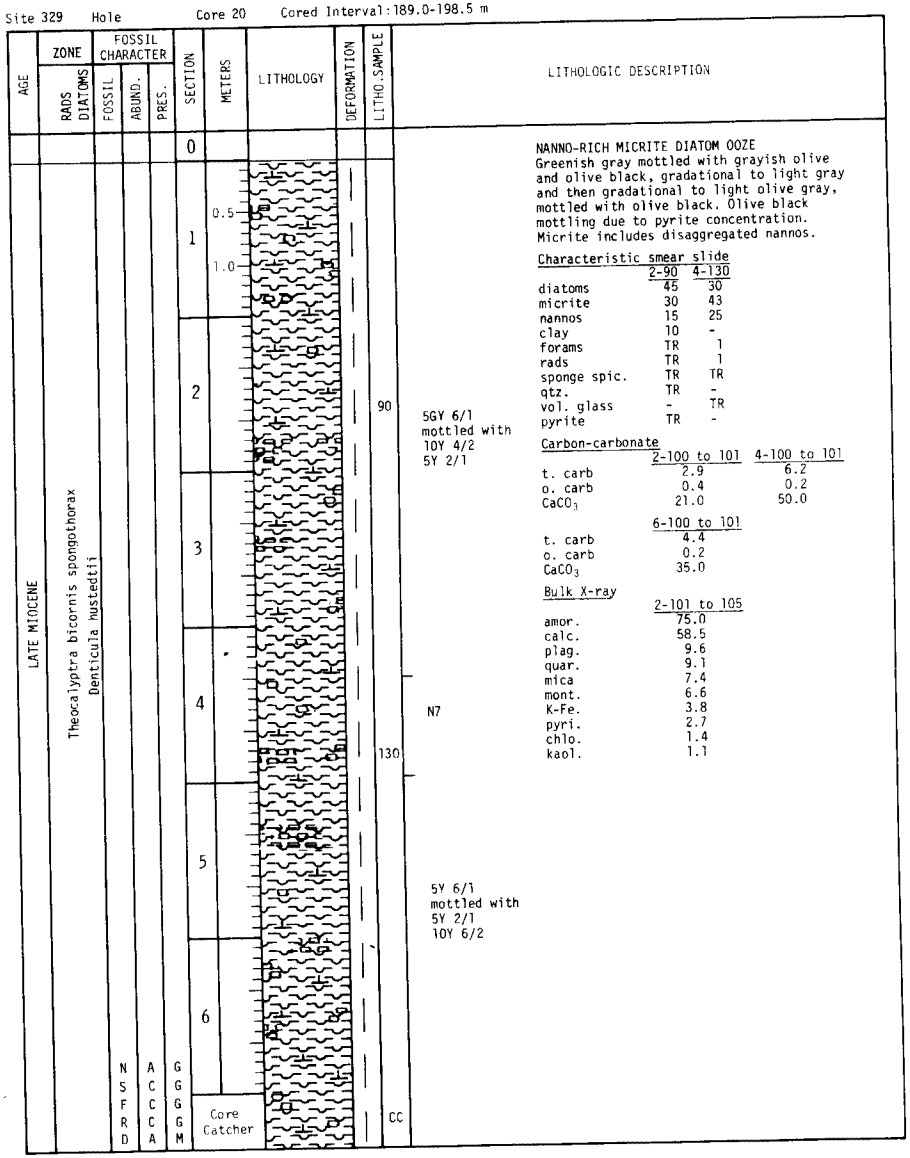


NANNO DIATOM OOZE
Alternating light gray and greenish gray ooze. Lithic clasts are regarded as downhole contaminants.

Characteristic	smear slide 1-100	smear slide 3-90
diatoms	50	39
nannos	20	30
micrite	20	30
clay	10	-
qtz.	TR	TR
pyrite	TR	1
forams	-	TR
rads	-	TR
sponge spic.	-	TR
silico.	TR	TR

Carbon-carbonate	3-65 to 66	4-65 to 66
t. carb	4.1	4.5
o. carb	0.3	0.3
$CaCO_3$	33.0	35.0

Site 329 Hole Core 20 Cored Interval: 189.0-198.5 m



NANNO-RICH MICRITE DIATOM OOZE
Greenish gray mottled with grayish olive and olive black, gradational to light gray and then gradational to light olive gray, mottled with olive black. Olive black mottling due to pyrite concentration. Micrite includes disaggregated nannos.

Characteristic	smear slide 2-90	smear slide 4-130
diatoms	45	30
micrite	30	43
nannos	15	25
clay	10	-
forams	TR	1
rads	TR	1
sponge spic.	TR	TR
qtz.	TR	-
vol. glass	-	TR
pyrite	TR	-

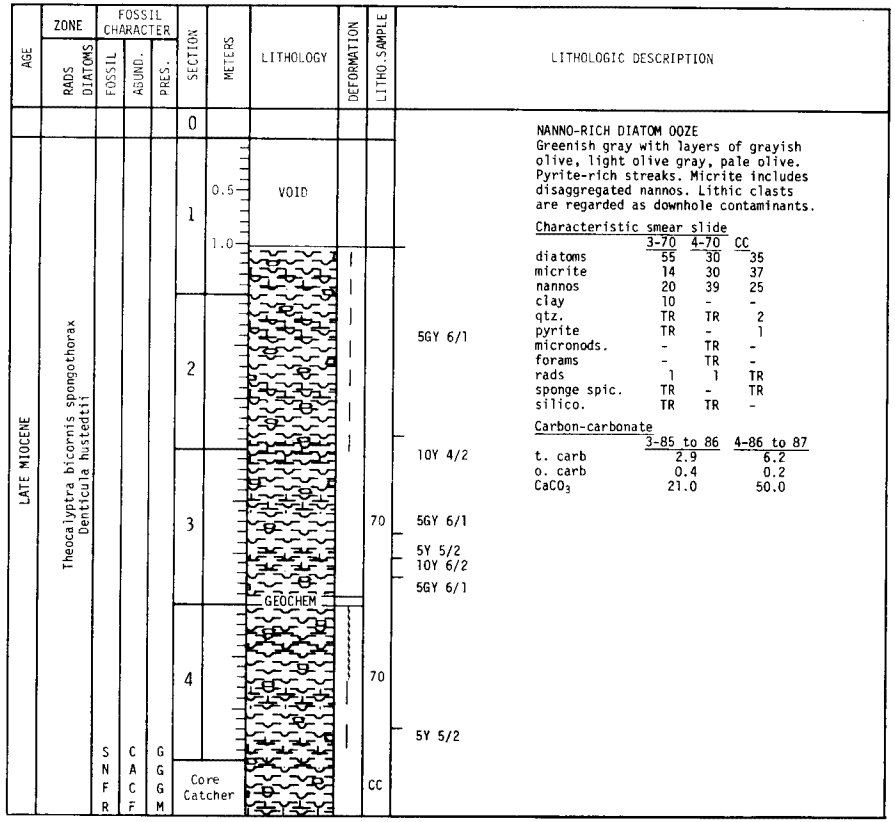
Carbon-carbonate	2-100 to 101	4-100 to 101
t. carb	2.9	6.2
o. carb	0.4	0.2
$CaCO_3$	21.0	50.0

	6-100 to 101
t. carb	4.4
o. carb	0.2
$CaCO_3$	35.0

Bulk X-ray

	2-101 to 105
amor.	75.0
calc.	58.5
plag.	9.6
quar.	9.1
mica	7.4
mont.	6.6
K-Fe.	3.8
pyri.	2.7
chlo.	1.4
kaol.	1.1

Site 329 Hole Core 21 Cored Interval: 208.0-217.5 m



NANNO-RICH DIATOM OOZE
Greenish gray with layers of grayish olive, light olive gray, pale olive. Pyrite-rich streaks. Micrite includes disaggregated nannos. Lithic clasts are regarded as downhole contaminants.

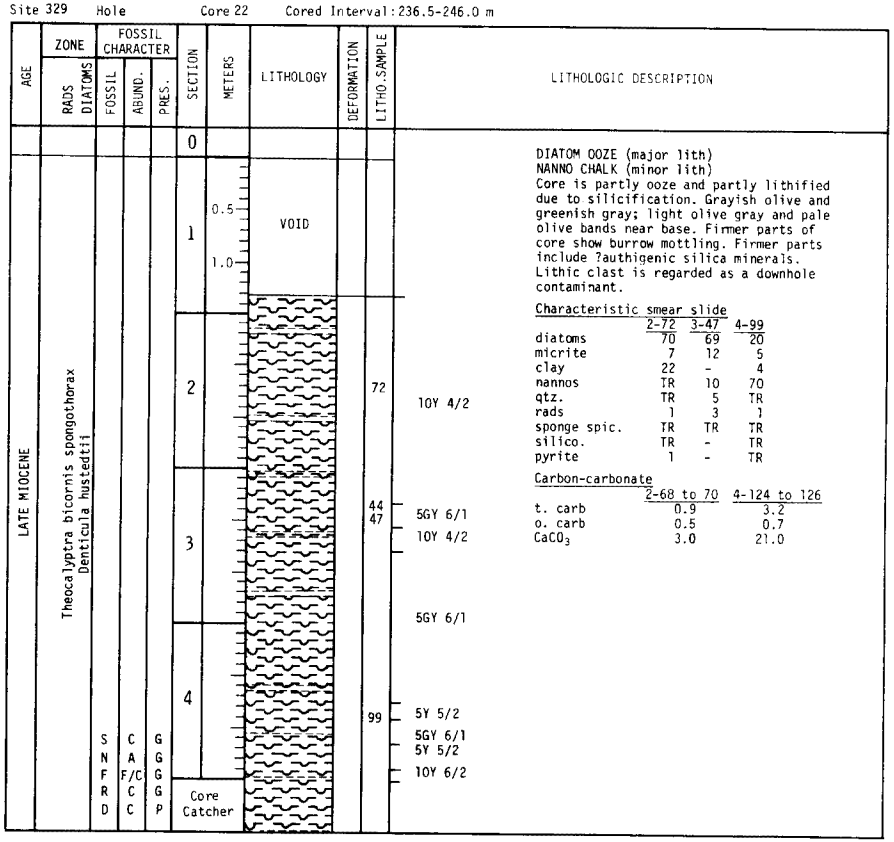
Characteristic smear slide

	3-70	4-70	CC
diatoms	55	30	35
micrite	14	30	37
nannos	20	39	25
clay	10	-	-
qtz.	TR	TR	2
pyrite	TR	-	1
micronods.	-	TR	-
forams	-	TR	-
rads	1	1	TR
sponge spic.	TR	-	TR
silico.	TR	TR	-

Carbon-carbonate

	3-85 to 86	4-86 to 87
t. carb	2.9	6.2
o. carb	0.4	0.2
$CaCO_3$	21.0	50.0

Site 329 Hole Core 22 Cored Interval: 236.5-246.0 m



DIATOM OOZE (major lith)
NANNO CHALK (minor lith)
Core is partly ooze and partly lithified due to silicification. Grayish olive and greenish gray; light olive gray and pale olive bands near base. Firmer parts of core show burrow mottling. Firmer parts include ?authigenic silica minerals. Lithic clast is regarded as a downhole contaminant.

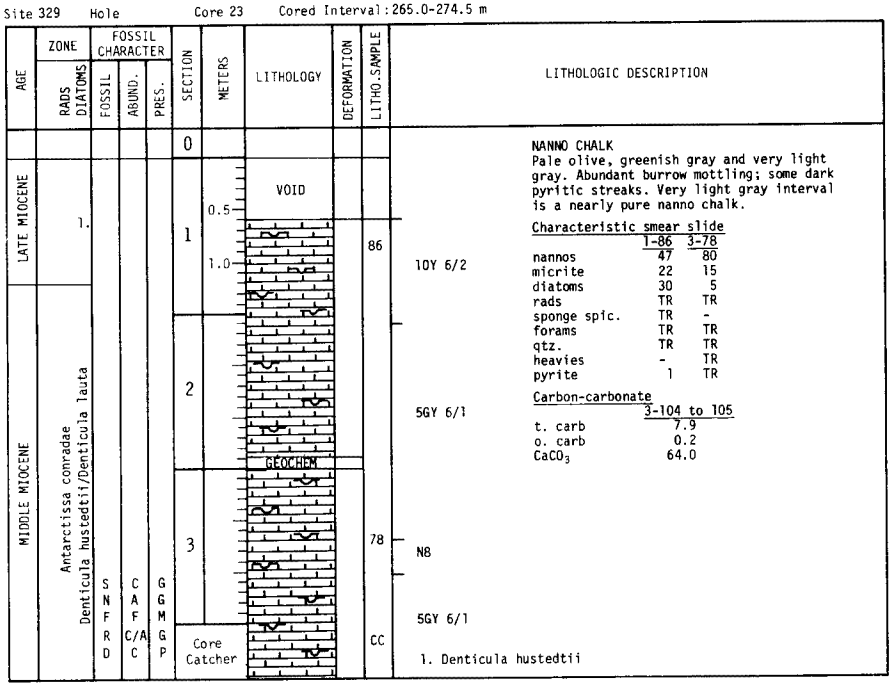
Characteristic smear slide

	2-72	3-47	4-99
diatoms	70	69	20
micrite	7	12	5
clay	22	-	4
nannos	TR	10	70
qtz.	TR	5	TR
rads	1	3	1
sponge spic.	TR	TR	TR
silico.	TR	-	TR
pyrite	1	-	TR

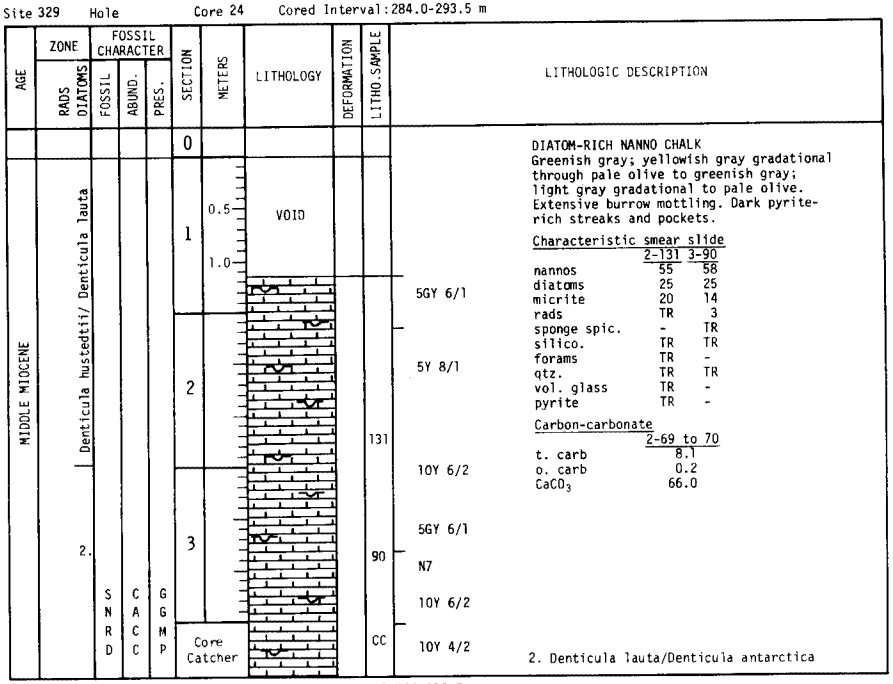
Carbon-carbonate

	2-68 to 70	4-124 to 126
t. carb	0.9	3.2
o. carb	0.5	0.7
$CaCO_3$	3.0	21.0

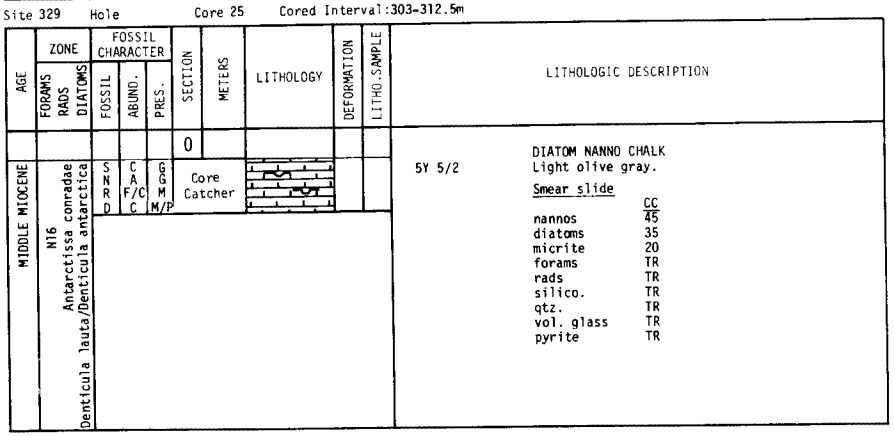
Site 329 Hole Core 23 Cored Interval: 265.0-274.5 m



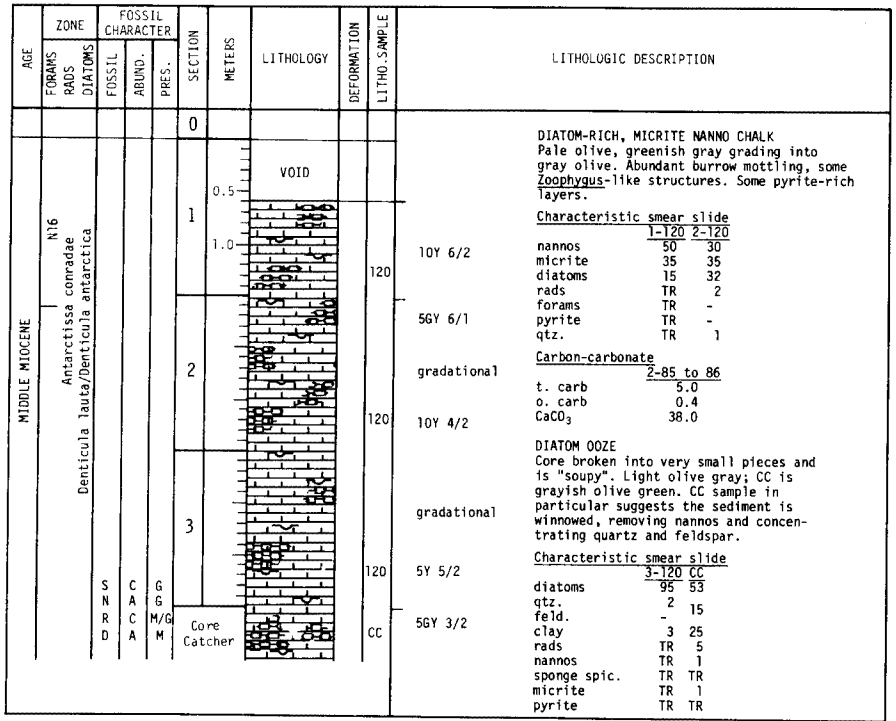
Site 329 Hole Core 24 Cored Interval: 284.0-293.5 m



Site 329 Hole Core 25 Cored Interval: 303-312.5m



Site 329 Hole Core 26 Cored Interval: 331.5-341.0 m



DIATOM-RICH, MICRITE NANNO CHALK
Pale olive, greenish gray grading into gray olive. Abundant burrow mottling, some Zoophygus-like structures. Some pyrite-rich layers.

Characteristic smear slide

	1-120	2-120
nannos	50	30
micrite	35	35
diatoms	15	32
rads	TR	2
forams	TR	-
pyrite	TR	-
qtz.	TR	1

Carbon-carbonate

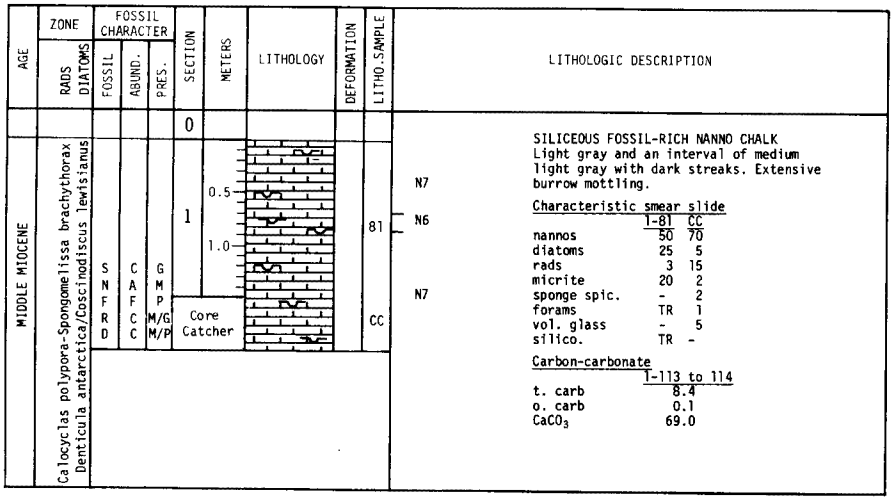
	2-85 to 86
t. carb	5.0
o. carb	0.4
$CaCO_3$	38.0

DIATOM OOZE
Core broken into very small pieces and is "soupy". Light olive gray; CC is grayish olive green. CC sample in particular suggests the sediment is winnowed, removing nannos and concentrating quartz and feldspar.

Characteristic smear slide

	3-120	CC
diatoms	95	53
qtz.	2	15
feld.	-	
clay	3	25
rads	TR	5
nannos	TR	1
sponge spic.	TR	TR
micrite	TR	1
pyrite	TR	TR

Site 329 Hole Core 27 Cored Interval: 360.0-369.5 m



SILICEOUS FOSSIL-RICH NANNO CHALK
Light gray and an interval of medium light gray with dark streaks. Extensive burrow mottling.

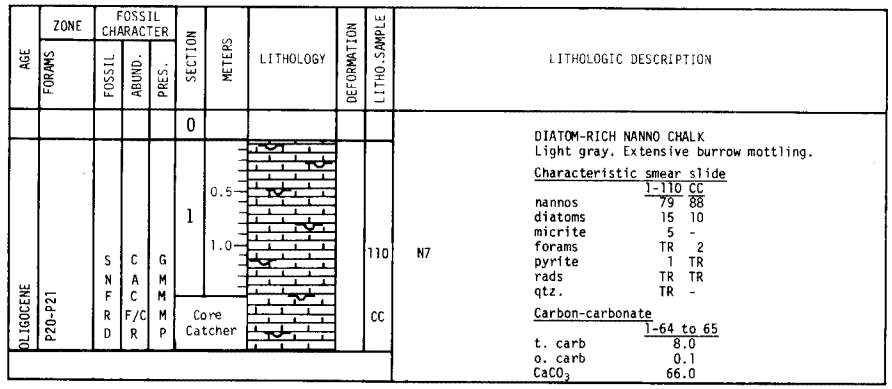
Characteristic smear slide

	1-81	CC
nannos	50	70
diatoms	25	5
rads	3	15
micrite	20	2
sponge spic.	-	2
forams	TR	1
vol. glass	-	5
silico.	TR	-

Carbon-carbonate

	1-113 to 114
t. carb	8.4
o. carb	0.1
$CaCO_3$	69.0

Site 329 Hole Core 28 Cored Interval: 388.5-398.0 m



DIATOM-RICH NANNO CHALK
Light gray. Extensive burrow mottling.

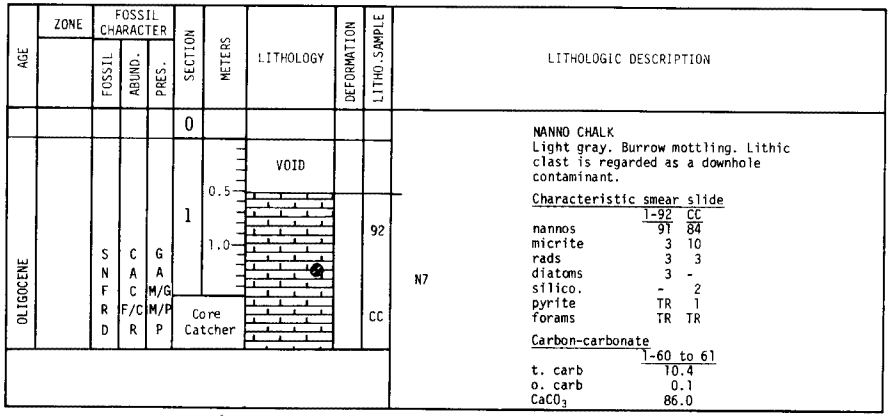
Characteristic smear slide

	1-110	CC
nannos	79	88
diatoms	15	10
micrite	5	-
forams	TR	2
pyrite	1	TR
rads	TR	TR
qtz.	TR	-

Carbon-carbonate

	1-64 to 65
t. carb	8.0
o. carb	0.1
$CaCO_3$	66.0

Site 329 Hole Core 29 Cored Interval: 398.0-407.5 m



NANNO CHALK
Light gray. Burrow mottling. Lithic clast is regarded as a downhole contaminant.

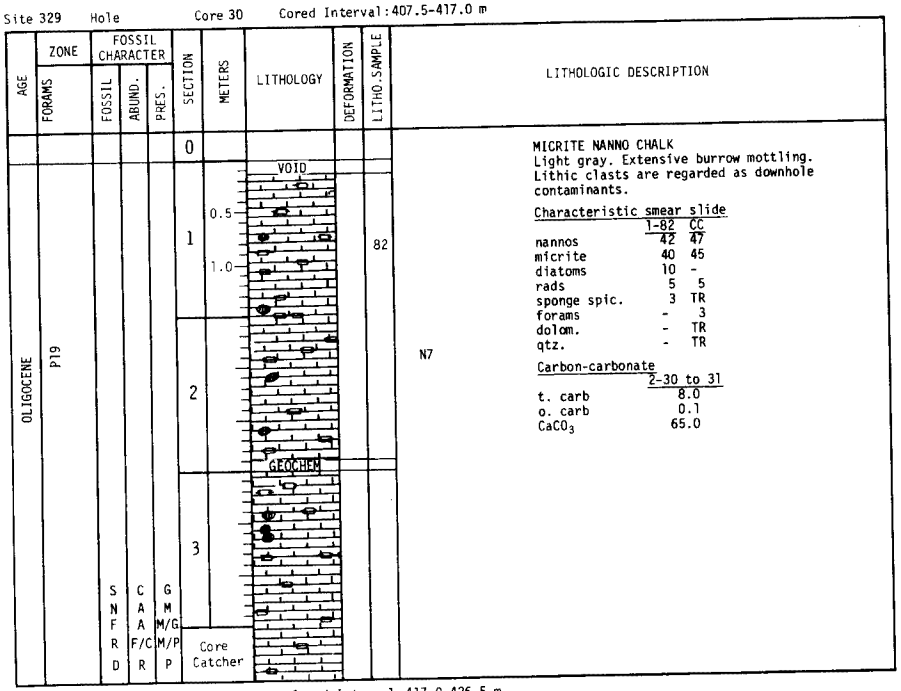
Characteristic smear slide

	1-92	CC
nannos	91	84
micrite	3	10
rads	3	3
diatoms	3	-
silico.	-	2
pyrite	TR	1
forams	TR	TR

Carbon-carbonate

	1-60 to 61
t. carb	10.4
o. carb	0.1
$CaCO_3$	86.0

Site 329 Hole Core 30 Cored Interval: 407.5-417.0 m



MICRITE NANNO CHALK
Light gray. Extensive burrow mottling. Lithic clasts are regarded as downhole contaminants.

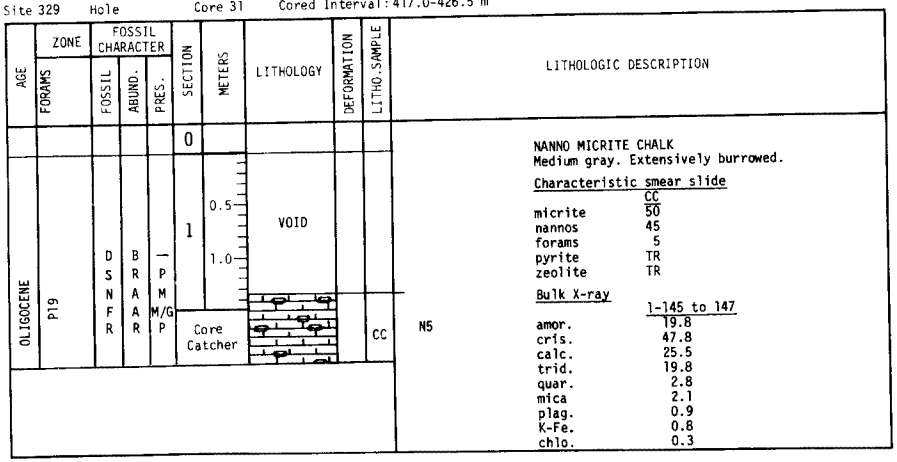
Characteristic smear slide

	1-82	CC
nannos	42	47
micrite	40	45
diatoms	10	-
rads	5	5
sponge spic.	3	TR
forams	-	3
dolom.	-	TR
qtz.	-	TR

Carbon-carbonate

	2-30 to 31
t. carb	8.0
o. carb	0.1
$CaCO_3$	65.0

Site 329 Hole Core 31 Cored Interval: 417.0-426.5 m



NANNO MICRITE CHALK
Medium gray. Extensively burrowed.

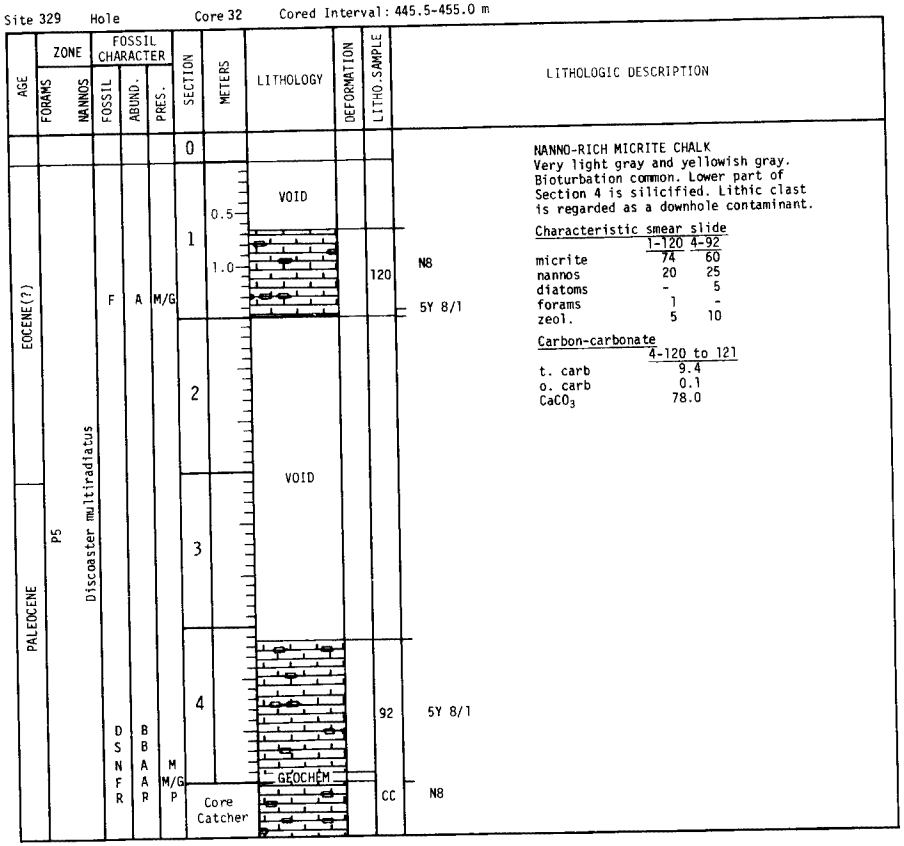
Characteristic smear slide

	CC
micrite	50
nannos	45
forams	5
pyrite	TR
zeolite	TR

Bulk X-ray

	1-145 to 147
amor.	19.8
cris.	47.8
calc.	25.5
trid.	19.8
quar.	2.8
mica	2.1
plag.	0.9
K-Fe.	0.8
chlo.	0.3

Site 329 Hole Core 32 Cored Interval: 445.5-455.0 m



NANNO-RICH MICRITE CHALK
Very light gray and yellowish gray. Bioturbation common. Lower part of Section 4 is silicified. Lithic clast is regarded as a downhole contaminant.

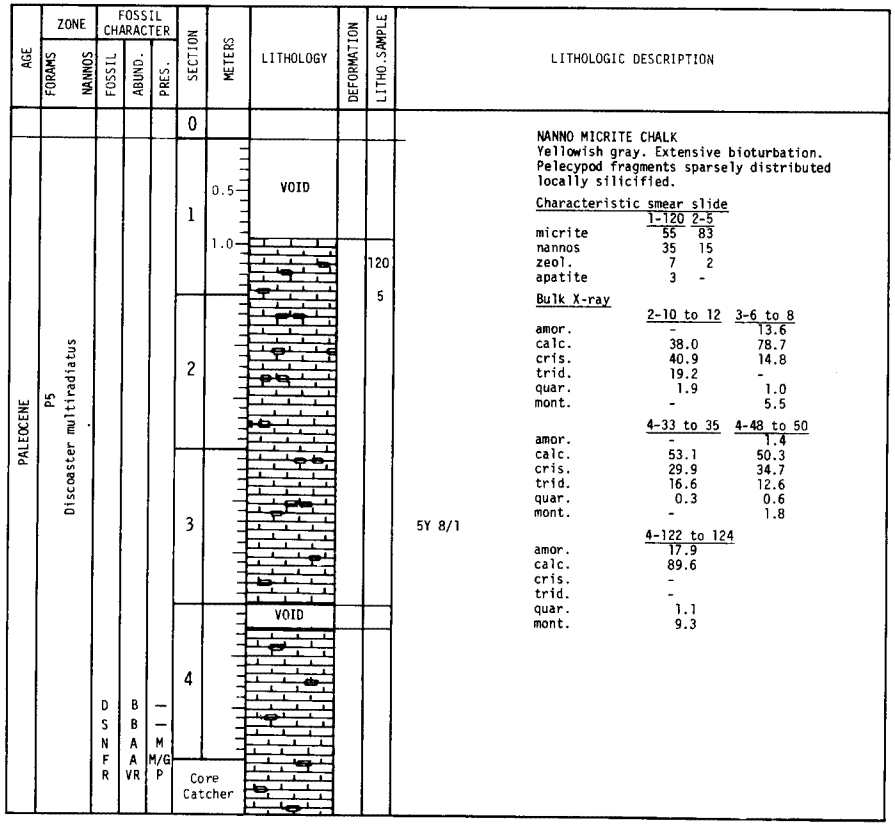
Characteristic smear slide

	1-120	4-92
micrite	74	60
nannos	20	25
diatoms	-	5
forams	1	-
zeol.	5	10

Carbon-carbonate

	4-120 to 121
t. carb	9.4
o. carb	0.1
$CaCO_3$	78.0

Site 329 Hole Core 33 Cored Interval: 455.0-464.5 m



NANNO MICRITE CHALK
Yellowish gray. Extensive bioturbation. Pelecypod fragments sparsely distributed locally silicified.

Characteristic smear slide

	1-120	2-5
micrite	55	83
nannos	35	15
zeol.	7	2
apatite	3	-

Bulk X-ray

	2-10 to 12	3-6 to 8
amor.	-	13.6
calc.	38.0	78.7
cris.	40.9	14.8
trid.	19.2	-
quar.	1.9	1.0
mont.	-	5.5

	4-33 to 35	4-48 to 50
amor.	-	1.4
calc.	53.1	50.3
cris.	29.9	34.7
trid.	16.6	12.6
quar.	0.3	0.6
mont.	-	1.8

	4-122 to 124
amor.	17.9
calc.	89.6
cris.	-
trid.	-
quar.	1.1
mont.	9.3

DEEP SEA DRILLING PROJECT

LEG 36 SITE 330

SITE SUMMARY SHEET

Position: Latitude:	50°55.19'S
Longitude:	46°53.00'W
Water depth (rig floor):	2636 corrected meters, echo sounding
Bottom felt at:	2636 meters, drill pipe
Penetration:	575.5 meters
Number of holes:	2
Number of cores:	22
Total length of cored section:	209 meters
Total core recovered:	89.5 meters
Percentage core recovery:	43%

Oldest Sediment Cored

Depth subbottom:	556.5 meters
Nature:	Sandstone, siltstone, lignite
Age:	M? - Upper Jurassic
Measured velocity:	2.05 km/sec

Basement

Depth subbottom (top):	556.5 meters
Penetration:	19 meters
Nature:	Gneiss and granite
Velocity:	5.35 km/sec

Principal Results

The primary objective at Site 330 ath the eastern end of the Falkland Plateau was to penetrate deeper than the mid-Cretaceous

stratigraphic level reached at the nearby Site 327 in order to learn more of the early history of the Plateau, the opening of the South Atlantic, and paleocirculation.

Two holes were drilled; Hole 330 penetrated 556.5 meters of Cretaceous, upper and possibly middle Jurassic sediments and sedimentary rocks, and 19 meters of gneissose and granitic continental basement. The bottom hole assembly was buried before any coring was attempted (129 meters). Thereafter coring was intermittent (1 in 5 down to the stratigraphic level reached in Hole 327A and then 1 in 3). Continuous coring was undertaken only at the estimated depth of an acoustic reflector directly below the level reached in Hole 327A (300-328.5 meters) and near the basement contact (547-575.5 meters).

Zeolite-rich sapropelic claystone of upper Aptian-Albian age similar to the mid-Cretaceous carbonaceous claystone at the bottom of Hole 327A was penetrated at 200 meters. This lithic unit continues down to 425 meters, becoming less sapropelic with depth. ?Aptian-Albian microfossils were obtained between 271.5 and 281 meters and an Oxfordian-?Callovian flora between 300 and 328.5 meters. Hence there appears to be a major late Jurassic-early Cretaceous hiatus in the vicinity of the reflector mentioned above. The sedimentary rocks between the sapropelic claystones and the basement consist principally of clayey silt and lignitic clayey silt with thin interbedded limestones, sandstones, and siltstones. They reflect various shallow water to subaerial sedimentary environments and contain a ?middle to upper Jurassic microflora. Hence the sedimentary record at Site 330 reflects a marine transgression and the gradual establishment of open ocean conditions, possibly interrupted by a late Jurassic-early Cretaceous hiatus. The latter could have resulted from upwarping related to the fragmentation of Gondwanaland.

The basement rocks, which are calcified at the top, consist of highly foliated gneiss with lit - par - lit lenses and foliae of pink pegmatite and, towards the bottom of the hole, pink granite. Hence the Mesozoic sedimentary cover of the Falkland Plateau unconformably overlies a metamorphic and igneous basement with continental affinities. Since the upper Paleozoic rocks of the Falkland (Malvinas) Islands, South Africa and southern South America are deformed but otherwise unmetamorphosed, a Precambrian age for the basement at Site 330 is most likely.

An attempt to core the upper part of the section at the site in Hole 330A was thwarted by the presence in and above the drill

bit of large fragments of basement rock. However, before the hole was abandoned at 53.0 meters, 4 meters of soft Oligocene-Recent sediment were cored, and an Albian-Cenomanian nanno-flora was recovered from the drill bit and from water in the core barrel.

Site 330 Hole Core 1 Cored Interval: 129.0-138.5 m

AGE: EARLY-MIDDLE ALBIAN
ZONE: NANNOS: Prediscosphaerna cretacea
FOSSIL CHARACTER: FOSSIL F N; ABUND. C A; PRES. G M

SECTION 1: 0.5 – 1.0
SECTION 2
SECTION 3
SECTION 4
SECTION 5
SECTION 6
Core Catcher

LITHO.SAMPLE: 90 (Sections 1-3); 90 (Sections 3-4); 122 (Sections 4-5); 22 (Sections 5-6); 35 (Core Catcher)

ZEOLITE RICH NANNO CLAY
Mainly light brown and pinkish gray in bands of 10-20 cm; parts are variegated. Contains minor amounts of micrite, forams and diatoms. Fragments of thin shelled pelecypod and Inoceramus occur throughout. Moderate to intense bioturbation in Sections 3, 4, and 5.

banded:
5YR 6/4
5YR 8/1
shells

Characteristic smear slide

	1-90	4-122	CC
clay	54	98	50
nannos	20	TR	25
zeol.	15	TR	15
micrite	10	-	10
qtz.	-	2	TR
opaque	1	-	TR
forams	TR	-	-
diatoms	TR	TR	-

Carbon-carbonate

	4-60	4-120
t. carb	5.5	2.3
o. carb	0.1	0.1
$CaCO_3$	45.0	19.0

variegated:
5YR 5/6
5YR 6/4
5YR 8/1
shells

Bulk X-ray

	4-125
amor.	31.0
calc.	2.6
quar.	1.6
K-Fe.	9.3
plag.	4.4
mica	2.0
mont.	78.8
clin.	1.2

banded:
5YR 6/4
5YR 8/1
5B 9/1
5GY 6/1
shells

Site 330 Hole Core 2 Cored Interval: 176.5-186.0 m

AGE: EARLY-MIDDLE ALBIAN
ZONE: NANNOS RADS: Prediscosphaena cretacea RK5-RK5
FOSSIL CHARACTER: FOSSIL R N; ABUND. F A; PRES. M M

SECTION 1: 0.5 – 1.0; VOID
SECTION 2: VOID; P; P
Core Catcher

LITHO.SAMPLE: 144; 41; 115

NANNO CLAY
Greenish gray wiht occasional bands of grayish orange and light brown. Inoceramus and other pelecypod fragments occur throughout. Forams and pyrite (occasionally in large nodules) occur in trace quantities. Entire core shows moderate bioturbation including Zoophygus at 2-90. Very firm.

Core catcher includes fragments of:
1) NANNO CLAYSTONE (as above)
2) LIMESTONE (olive gray [5Y 4/1])
3) PORCELLANITE (olive gray [5Y 4/1])

banded:
10YR 7/4
5YR 6/4
N7
pyrite nodule
5GY 6/1

Characteristic smear slide

	2-115
clay	55
nannos	30
zeol.	15
pyrite	TR
forams	TR
micrite	TR
qtz.	TR

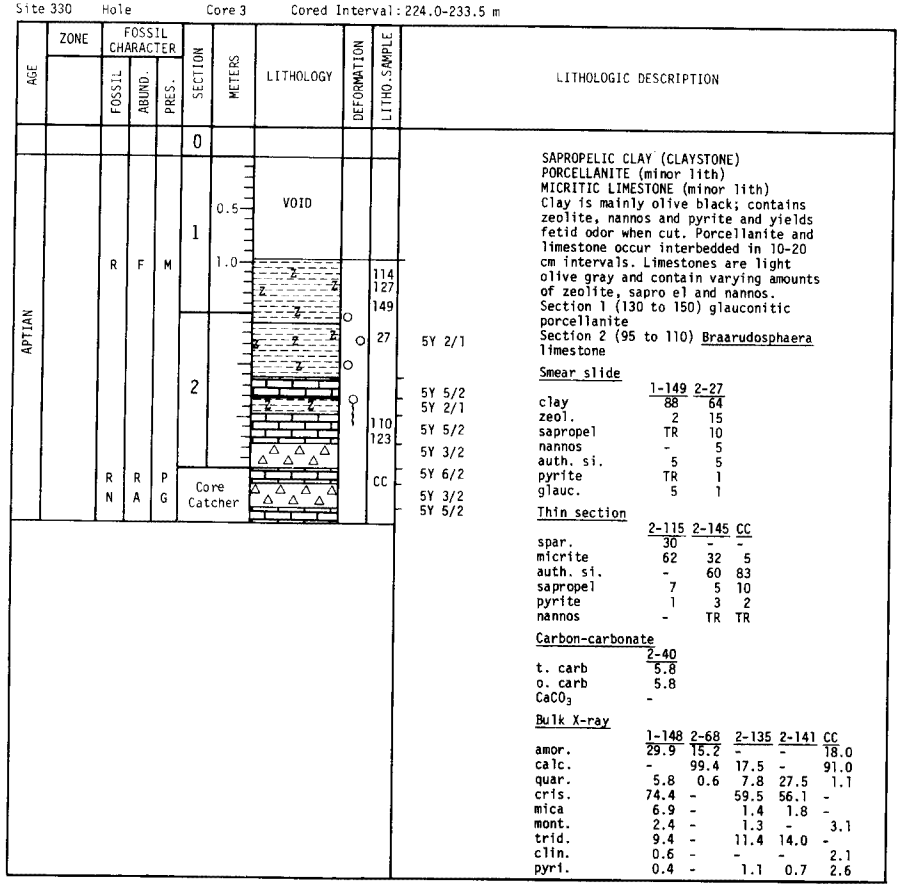
Carbon-carbonate

	2-108
t. carb	5.0
o. carb	0.1
$CaCO_3$	41.0

Bulk X-ray

	2-105	CC
amor.	36.7	12.5
calc.	65.6	-
quar.	5.4	2.3
cris.	-	80.3
K-Fe.	-	2.1
plag.	-	1.4
mica	5.2	1.6
mont.	6.9	1.4
trid.	-	10.4
clin.	16.9	0.3
pyri.	-	0.2

Site 330 Hole Core 3 Cored Interval: 224.0-233.5 m



SAPROPELIC CLAY (CLAYSTONE)
PORCELLANITE (minor lith)
MICRITIC LIMESTONE (minor lith)
Clay is mainly olive black; contains zeolite, nannos and pyrite and yields fetid odor when cut. Porcellanite and limestone occur interbedded in 10-20 cm intervals. Limestones are light olive gray and contain varying amounts of zeolite, sapro el and nannos. Section 1 (130 to 150) glauconitic porcellanite
Section 2 (95 to 110) Braarudosphaera limestone

Smear slide

	1-149	2-27
clay	88	64
zeol.	2	15
sapropel	TR	10
nannos	-	5
auth. si.	5	5
pyrite	TR	1
glauc.	5	1

Thin section

	2-115	2-145	CC
spar.	30	-	-
micrite	62	32	5
auth. si.	-	60	83
sapropel	7	5	10
pyrite	1	3	2
nannos	-	TR	TR

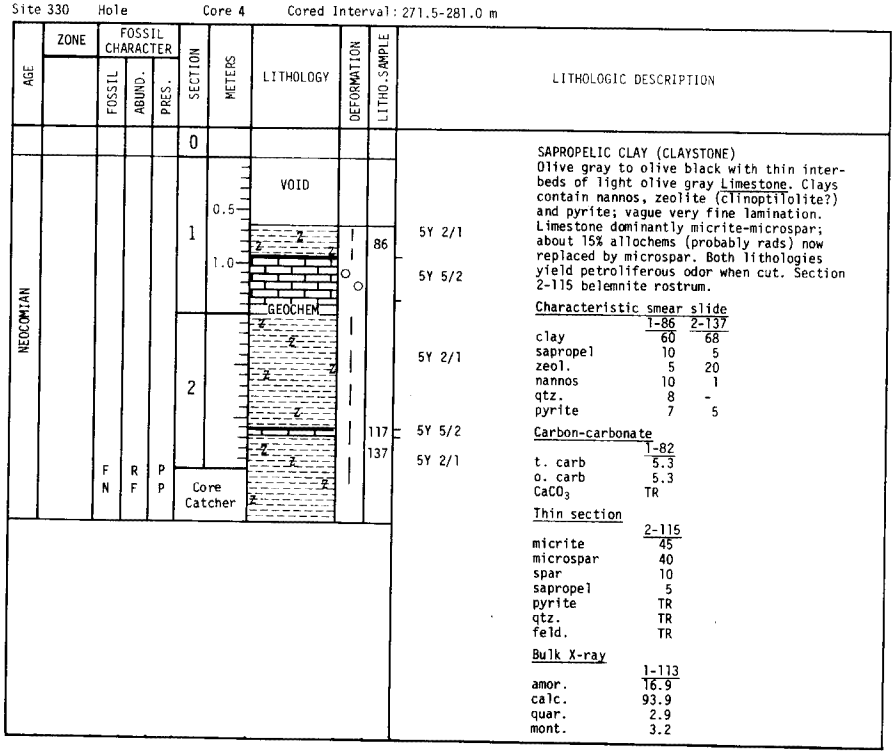
Carbon-carbonate

	2-40
t. carb	5.8
o. carb	5.8
$CaCO_3$	-

Bulk X-ray

	1-148	2-68	2-135	2-141	CC
amor.	29.9	15.2	-	-	18.0
calc.	-	99.4	17.5	-	91.0
quar.	5.8	0.6	7.8	27.5	1.1
cris.	74.4	-	59.5	56.1	-
mica	6.9	-	1.4	1.8	-
mont.	2.4	-	1.3	-	3.1
trid.	9.4	-	11.4	14.0	-
clin.	0.6	-	-	-	2.1
pyri.	0.4	-	1.1	0.7	2.6

Site 330 Hole Core 4 Cored Interval: 271.5-281.0 m



SAPROPELIC CLAY (CLAYSTONE)
Olive gray to olive black with thin interbeds of light olive gray Limestone. Clays contain nannos, zeolite (clinoptilolite?) and pyrite; vague very fine lamination. Limestone dominantly micrite-microspar; about 15% allochems (probably rads) now replaced by microspar. Both lithologies yield petroliferous odor when cut. Section 2-115 belemnite rostrum.

Characteristic smear slide

	1-86	2-137
clay	60	68
sapropel	10	5
zeol.	5	20
nannos	10	1
qtz.	8	-
pyrite	7	5

Carbon-carbonate

	1-82
t. carb	5.3
o. carb	5.3
$CaCO_3$	TR

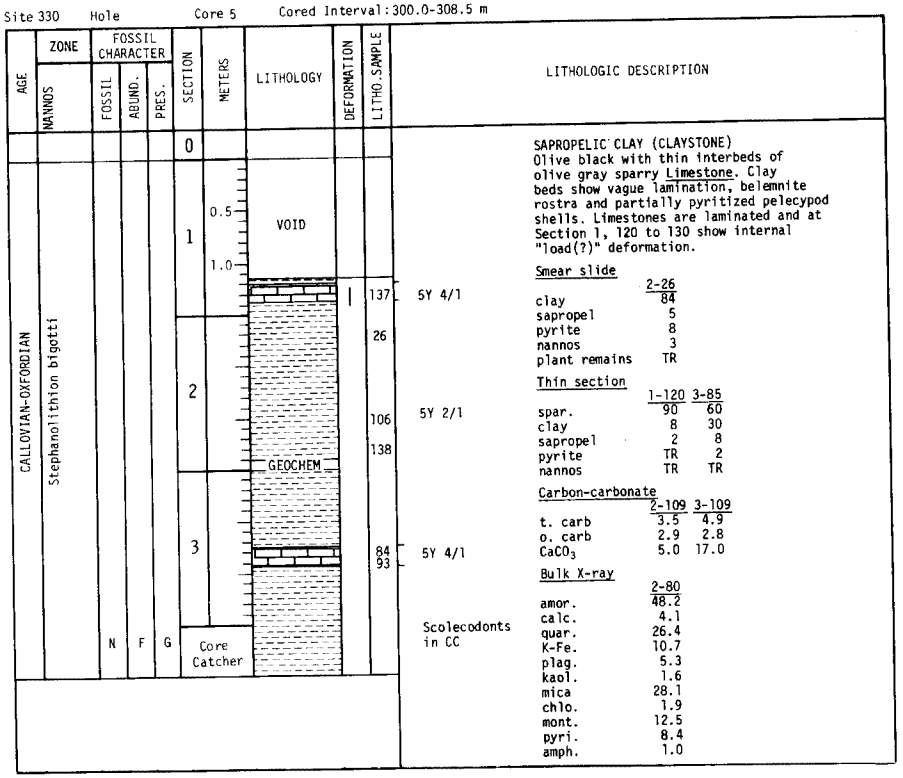
Thin section

	2-115
micrite	45
microspar	40
spar	10
sapropel	5
pyrite	TR
qtz.	TR
feld.	TR

Bulk X-ray

	1-113
amor.	16.9
calc.	93.9
quar.	2.9
mont.	3.2

Site 330 Hole Core 5 Cored Interval: 300.0-308.5 m



SAPROPELIC CLAY (CLAYSTONE)
Olive black with thin interbeds of olive gray sparry Limestone. Clay beds show vague lamination, belemnite rostra and partially pyritized pelecypod shells. Limestones are laminated and at Section 1, 120 to 130 show internal "load(?)" deformation.

Smear slide

	2-26
clay	84
sapropel	5
pyrite	8
nannos	3
plant remains	TR

Thin section

	1-120	3-85
spar.	90	60
clay	8	30
sapropel	2	8
pyrite	TR	2
nannos	TR	TR

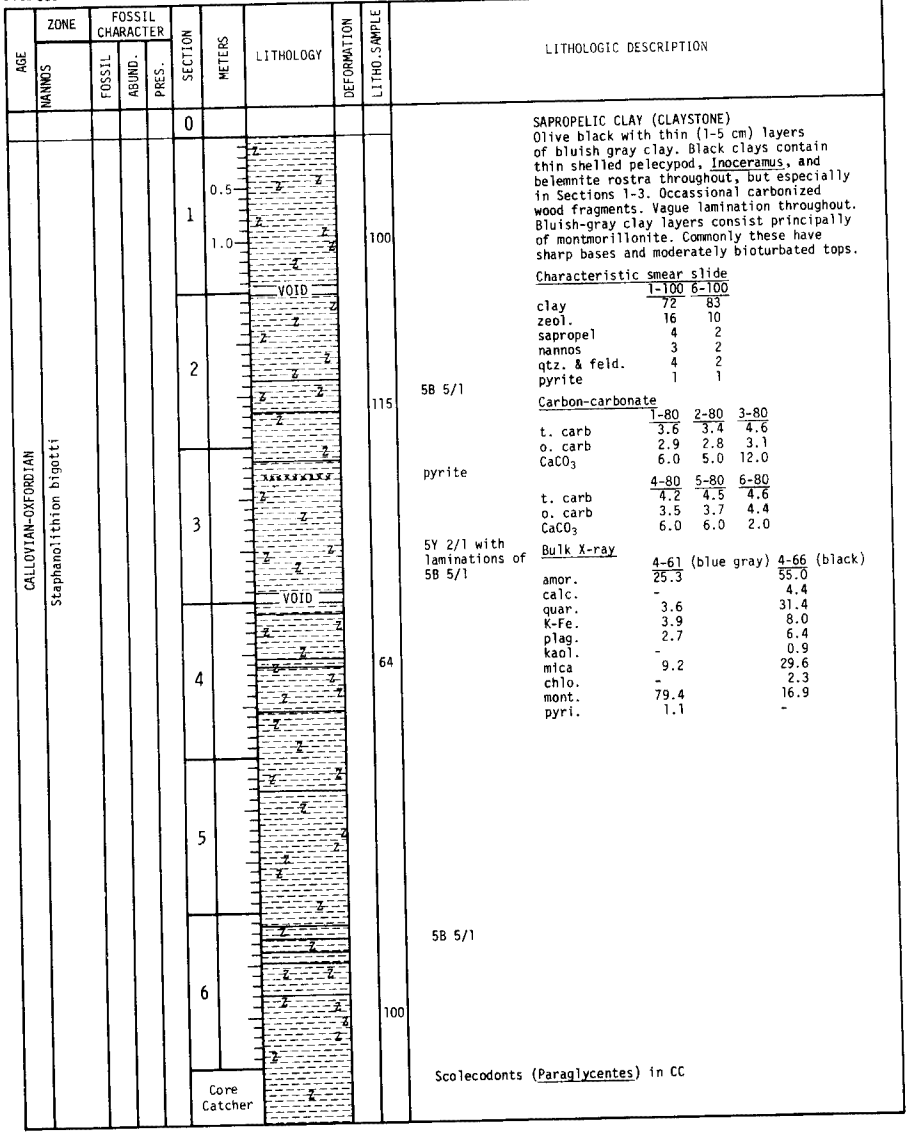
Carbon-carbonate

	2-109	3-109
t. carb	3.5	4.9
o. carb	2.9	2.8
$CaCO_3$	5.0	17.0

Bulk X-ray

	2-80
amor.	48.2
calc.	4.1
quar.	26.4
K-Fe.	10.7
plag.	5.3
kaol.	1.6
mica	28.1
chlo.	1.9
mont.	12.5
pyri.	8.4
amph.	1.0

Site 330 Hole Core 6 Cored Interval: 309.5-319.0 m



SAPROPELIC CLAY (CLAYSTONE)
Olive black with thin (1-5 cm) layers of bluish gray clay. Black clays contain thin shelled pelecypod, Inoceramus, and belemnite rostra throughout, but especially in Sections 1-3. Occassional carbonized wood fragments. Vague lamination throughout. Bluish-gray clay layers consist principally of montmorillonite. Commonly these have sharp bases and moderately bioturbated tops.

Characteristic smear slide

	1-100	6-100
clay	72	83
zeol.	16	10
sapropel	4	2
nannos	3	2
qtz. & feld.	4	2
pyrite	1	1

Carbon-carbonate

	1-80	2-80	3-80
t. carb	3.6	3.4	4.6
o. carb	2.9	2.8	3.1
$CaCO_3$	6.0	5.0	12.0

	4-80	5-80	6-80
t. carb	4.2	4.5	4.6
o. carb	3.5	3.7	4.4
$CaCO_3$	6.0	6.0	2.0

Bulk X-ray

	4-61 (blue gray)	4-66 (black)
amor.	25.3	55.0
calc.	-	4.4
quar.	3.6	31.4
K-Fe.	3.9	8.0
plag.	2.7	6.4
kaol.	-	0.9
mica	9.2	29.6
chlo.	-	2.3
mont.	79.4	16.9
pyri.	1.1	-

Scolecodonts (Paraglycentes) in CC

Site 330 Hole Core 7 Cored Interval: 319.0-328.5 m

AGE	ZONE (NANNOS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
CALLOVIAN-OXFORDIAN	Stephanolithion bigotti	N	A	G	0				
					1	0.5, 1.0	VOID		101
					2				
					3				40, 41
					4				37, 39
					5				
					6				
					Core Catcher				

5B 5/1 lamination

shell rich

5Y 2/1

shell rich

shell rich

Scolecodonts in CC

SAPROPELIC CLAYSTONE
Olive black with occasional thin laminations of bluish gray clay. Thin shelled pelecypod remains, Inoceramus prisms and belemnite rostra occur throughout but are especially common in zones indicated as shell rich.

Sections 1 and 2 - vague lamination on mm scale.

Sections 3 to 6 - regular lamination at 1 to 3 cm scale which reflects variations in nanno content. Slight bioturbation in shelly layers.

large pelecypod casts.

Characteristic smear slide

	1-101	3-40	3-41
clay	55	72	73
zeol.	15	20	20
nannos	15	1	TR
sapropel	10	5	5
pyrite	5	2	2
auth. Si.	-	TR	-

Grain size

	3-100	6-20
sand	0.6	4.6
silt	30.0	28.8
clay	69.4	66.5

Carbon-carbonate

	1-100	3-100	4-100	5-100	6-100
t. carb	4.0	3.9	4.0	4.2	4.1
o. carb	3.6	3.3	3.2	3.0	2.8
$CaCO_3$	4.0	5.0	7.0	10.0	11.0

Site 330 Hole Core 8 Cored Interval: 347.5-357 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
MIDDLE(?)-LATE JURASSIC		N	C	G	0				
					1	0.5, 1.0	VOID		101
					2				68, 140
					3		GEOCHEM		
					4				103
					Core Catcher				

5Y 2/1

5Y 4/1

5Y 2/1

5Y 4/1

5Y 2/1

5Y 4/1

vein calcite

5Y 2/1

laminae of 5B 5/1

SAPROPELIC CLAY (CLAYSTONE)
MICROSPAR LIMESTONE (minor lith)
Olive black zeolite nanno-rich claystone with intersparsed 5-10 cm beds of microspar limestone. Occasional laminae of bluish gray clay. Claystones contain fragments of pelecypods (including Inoceramus) and belemnite rostra. Vague lamination throughout.

Limestones dominantly microspar with sparry allochems probably representing replaced radiolaria and forams. Parts laminated, parts burrow mottled.

Smear slide

	1-101 (black)	2-68 (blue gray)
clay	62	99
nannos	20	-
zeol.	10	-
sapropel	5	-
pyrite	3	TR
auth. Si.	-	1

Thin section

	2-50	2-59	2-140
spar.	10	20	5
microspar	40	57	50
micrite	40	15	39
sapropel	7	7	1
pyrite	3	1	5

Grain size

	1-122
sand	0.2
silt	33.9
clay	65.9

Carbon-carbonate

	1-101	2-101	3-75
t. carb	4.3	3.9	5.5
o. carb	2.9	3.0	3.6
$CaCO_3$	11.0	7.0	15.0

Site 330 Hole Core 9 Cored Interval: 376.0-385.5 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
MIDDLE(?)-LATE JURASSIC		N	R	M	0				
					1	0.5, 1.0	VOID		97, 127
					2				114
					Core Catcher				

5Y 2/1

5Y 4/1

5Y 2/1

5Y 4/1

5Y 2/1

nodules of 10YR 5/4

SAPROPELIC CLAYSTONE
MICROSPAR LIMESTONE (minor lith)
Principally olive black zeolite rich claystone with interbeds (5-10 cm) of olive gray micrite-microspar limestone. Contains thin shelled pelecypod fragments, sapropel and carbonized plant remains. Bluish gray clay laminae at 1-101 and 2-145. Yellowish brown siliceous "clay" nodules at 2-110 to 120. Scolecodonts in core catcher.

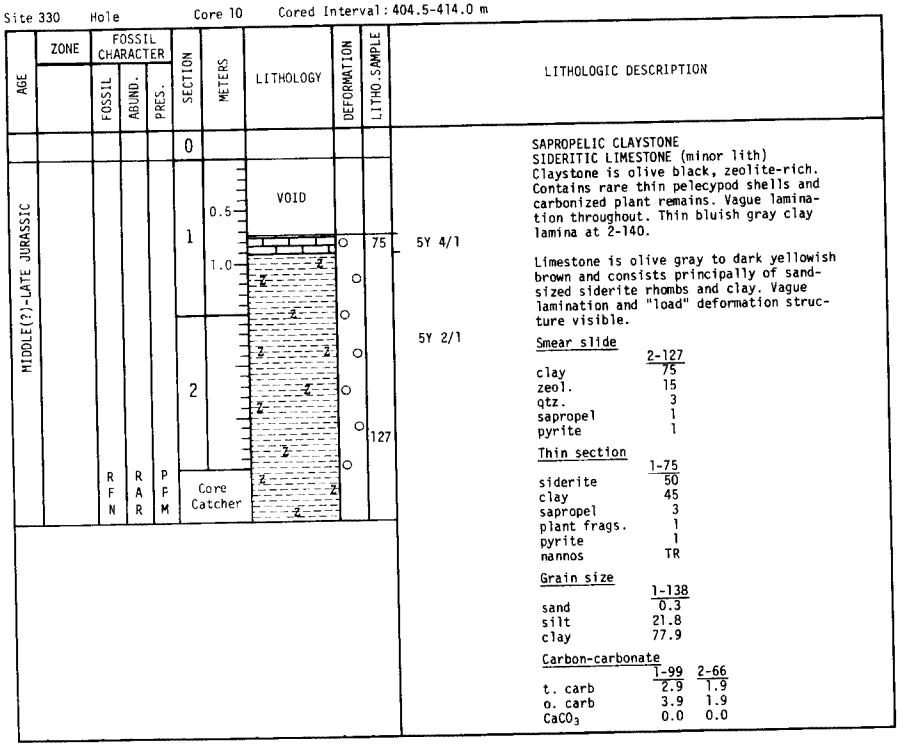
Smear slide

	1-97	CC
clay	87	78
zeol.	10	15
siderite	2	-
nannos	1	TR
pyrite	-	4
sapropel	TR	2
plant frags.	TR	1

Carbon-carbonate

	1-114	2-80
t. carb	3.4	2.8
o. carb	3.0	2.8
$CaCO_3$	4.0	0.0

Site 330 Hole Core 10 Cored Interval: 404.5-414.0 m



SAPROPELIC CLAYSTONE
SIDERITIC LIMESTONE (minor lith)
Claystone is olive black, zeolite-rich. Contains rare thin pelecypod shells and carbonized plant remains. Vague lamination throughout. Thin bluish gray clay lamina at 2-140.

Limestone is olive gray to dark yellowish brown and consists principally of sand-sized siderite rhombs and clay. Vague lamination and "load" deformation structure visible.

Smear slide

	2-127
clay	75
zeol.	15
qtz.	3
sapropel	1
pyrite	1

Thin section

	1-75
siderite	50
clay	45
sapropel	3
plant frags.	1
pyrite	1
nannos	TR

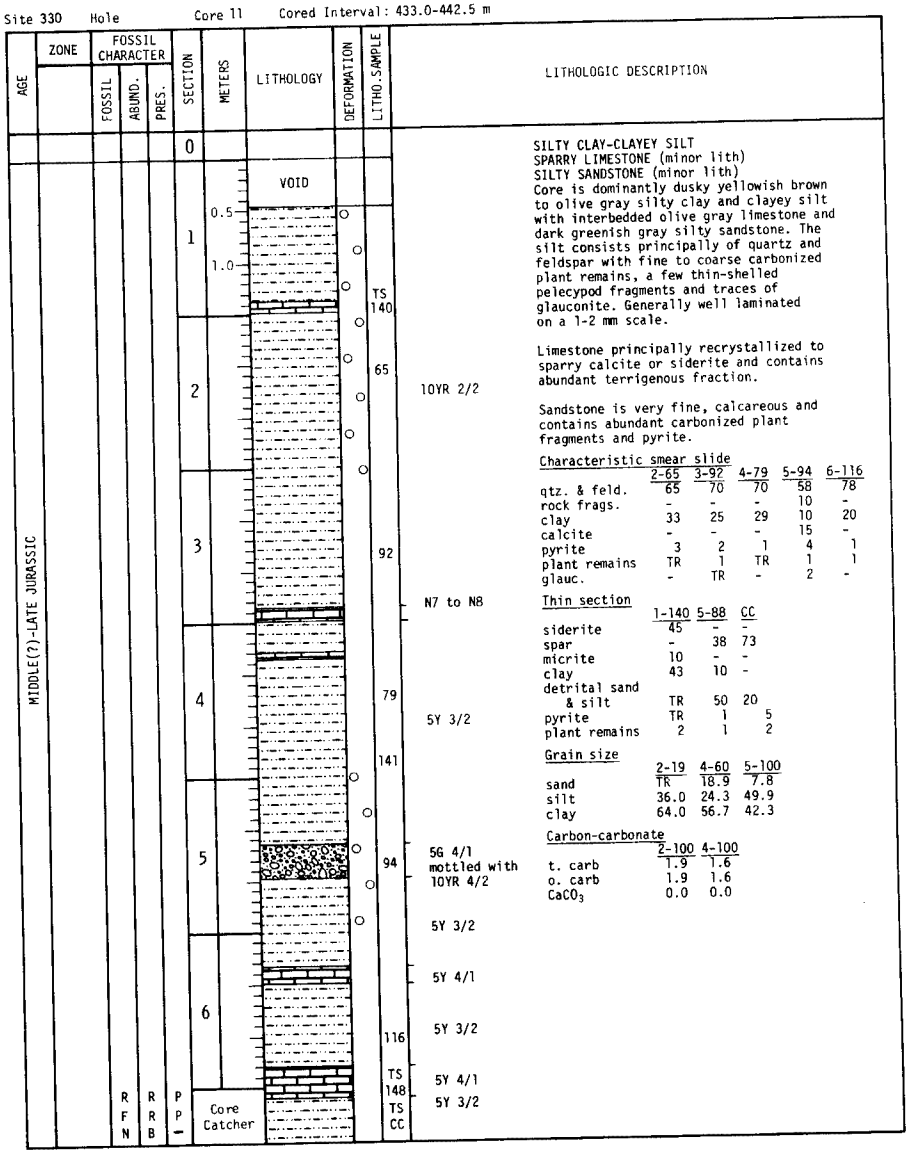
Grain size

	1-138
sand	0.3
silt	21.8
clay	77.9

Carbon-carbonate

	1-99	2-66
t. carb	2.9	1.9
o. carb	3.9	1.9
$CaCO_3$	0.0	0.0

Site 330 Hole Core 11 Cored Interval: 433.0-442.5 m



SILTY CLAY-CLAYEY SILT
SPARRY LIMESTONE (minor lith)
SILTY SANDSTONE (minor lith)
Core is dominantly dusky yellowish brown to olive gray silty clay and clayey silt with interbedded olive gray limestone and dark greenish gray silty sandstone. The silt consists principally of quartz and feldspar with fine to coarse carbonized plant remains, a few thin-shelled pelecypod fragments and traces of glauconite. Generally well laminated on a 1-2 mm scale.

Limestone principally recrystallized to sparry calcite or siderite and contains abundant terrigenous fraction.

Sandstone is very fine, calcareous and contains abundant carbonized plant fragments and pyrite.

Characteristic smear slide

	2-65	3-92	4-79	5-94	6-116
qtz. & feld.	65	70	70	58	78
rock frags.	-	-	-	10	-
clay	33	25	29	10	20
calcite	-	-	-	15	-
pyrite	3	2	1	4	1
plant remains	TR	1	TR	1	1
glauc.	-	TR	-	2	-

Thin section

	1-140	5-88	CC
siderite	45	-	-
spar	-	38	73
micrite	10	-	-
clay	43	10	-
detrital sand & silt	TR	50	20
pyrite	TR	1	5
plant remains	2	1	2

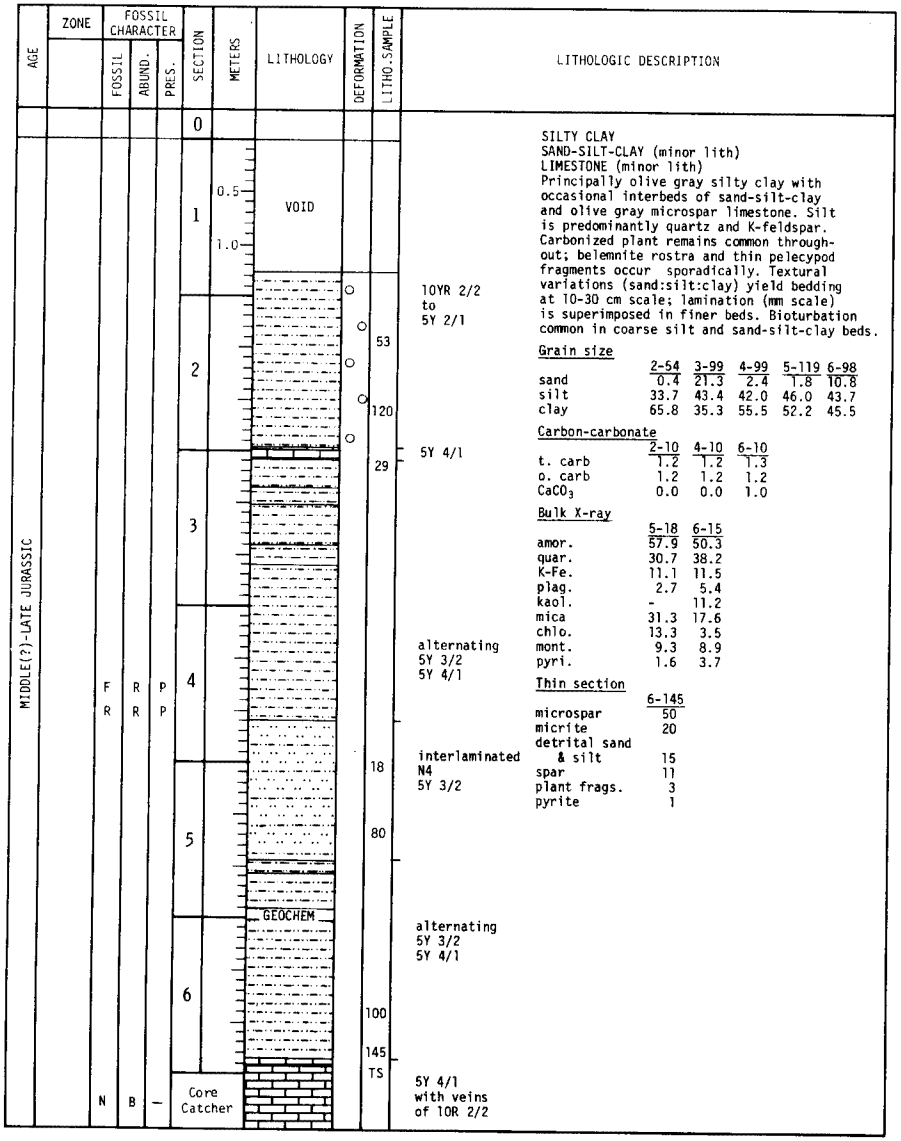
Grain size

	2-19	4-60	5-100
sand	TR	18.9	7.8
silt	36.0	24.3	49.9
clay	64.0	56.7	42.3

Carbon-carbonate

	2-100	4-100
t. carb	1.9	1.6
o. carb	1.9	1.6
$CaCO_3$	0.0	0.0

Site 330 Hole Core 12 Cored Interval: 461.7-471.0 m



SILTY CLAY
SAND-SILT-CLAY (minor lith)
LIMESTONE (minor lith)
Principally olive gray silty clay with occasional interbeds of sand-silt-clay and olive gray microspar limestone. Silt is predominantly quartz and K-feldspar. Carbonized plant remains common throughout; belemnite rostra and thin pelecypod fragments occur sporadically. Textural variations (sand:silt:clay) yield bedding at 10-30 cm scale; lamination (mm scale) is superimposed in finer beds. Bioturbation common in coarse silt and sand-silt-clay beds.

Grain size

	2-54	3-99	4-99	5-119	6-98
sand	0.4	21.3	2.4	1.8	10.8
silt	33.7	43.4	42.0	46.0	43.7
clay	65.8	35.3	55.5	52.2	45.5

Carbon-carbonate

	2-10	4-10	6-10
t. carb	1.2	1.2	1.3
o. carb	1.2	1.2	1.2
$CaCO_3$	0.0	0.0	1.0

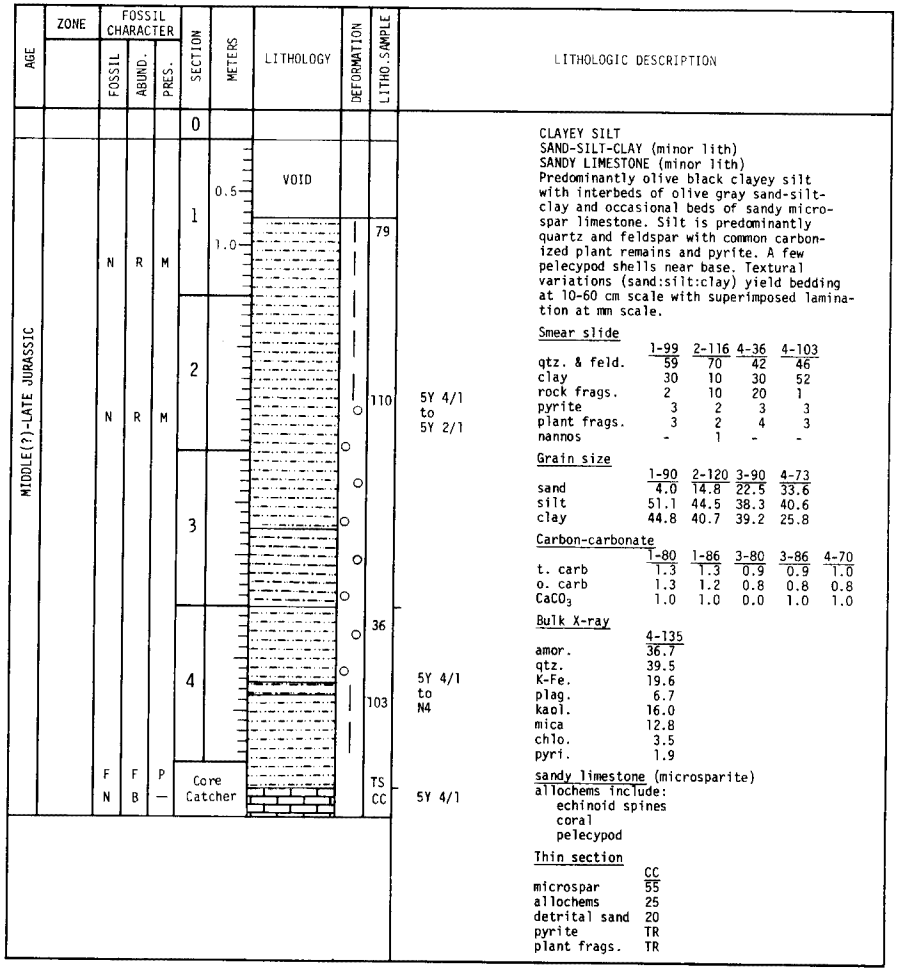
Bulk X-ray

	5-18	6-15
amor.	57.9	50.3
quar.	30.7	38.2
K-Fe.	11.1	11.5
plag.	2.7	5.4
kaol.	-	11.2
mica	31.3	17.6
chlo.	13.3	3.5
mont.	9.3	8.9
pyri.	1.6	3.7

Thin section

	6-145
microspar	50
micrite	20
detrital sand & silt	15
spar	11
plant frags.	3
pyrite	1

Site 330 Hole Core 13 Cored Interval: 490.0-499.5 m



CLAYEY SILT
SAND-SILT-CLAY (minor lith)
SANDY LIMESTONE (minor lith)
Predominantly olive black clayey silt with interbeds of olive gray sand-silt-clay and occasional beds of sandy microspar limestone. Silt is predominantly quartz and feldspar with common carbonized plant remains and pyrite. A few pelecypod shells near base. Textural variations (sand:silt:clay) yield bedding at 10-60 cm scale with superimposed lamination at mm scale.

Smear slide

	1-99	2-116	4-36	4-103
qtz. & feld.	59	70	42	46
clay	30	10	30	52
rock frags.	2	10	20	1
pyrite	3	2	3	3
plant frags.	3	2	4	3
nannos	-	1	-	-

Grain size

	1-90	2-120	3-90	4-73
sand	4.0	14.8	22.5	33.6
silt	51.1	44.5	38.3	40.6
clay	44.8	40.7	39.2	25.8

Carbon-carbonate

	1-80	1-86	3-80	3-86	4-70
t. carb	1.3	1.3	0.9	0.9	1.0
o. carb	1.3	1.2	0.8	0.8	0.8
$CaCO_3$	1.0	1.0	0.0	1.0	1.0

Bulk X-ray

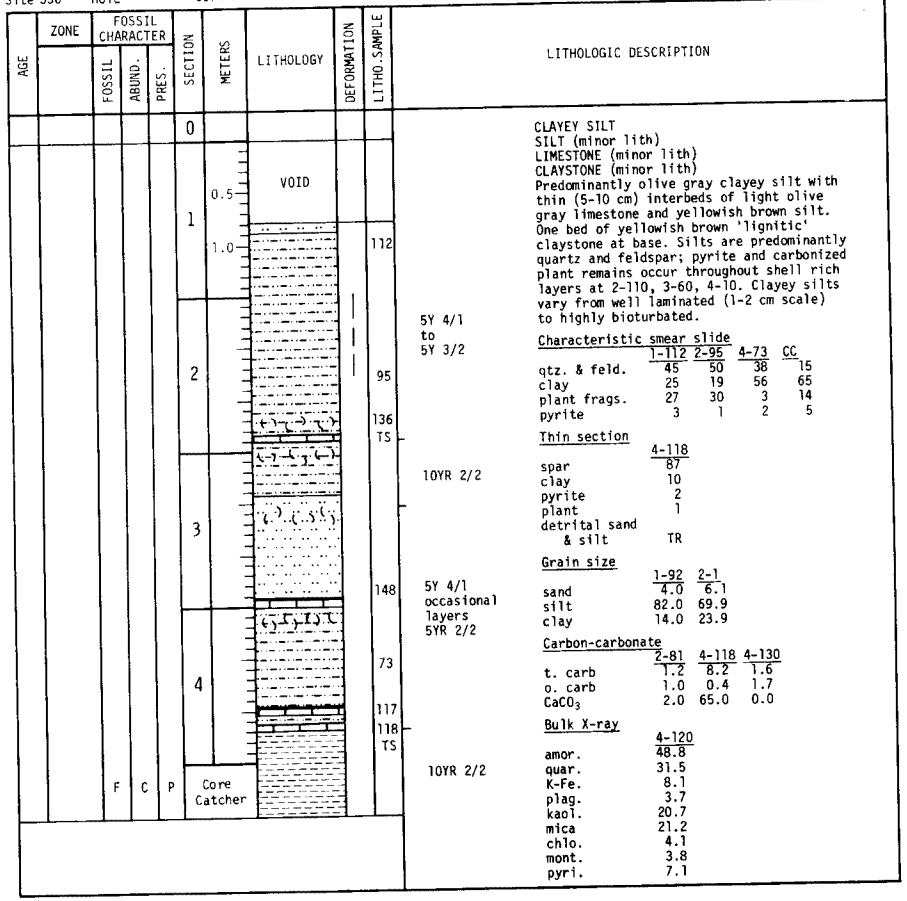
	4-135
amor.	36.7
qtz.	39.5
K-Fe.	19.6
plag.	6.7
kaol.	16.0
mica	12.8
chlo.	3.5
pyri.	1.9

sandy limestone (microsparite)
allochems include:
echinoid spines
coral
pelecypod

Thin section

	CC
microspar	55
allochems	25
detrital sand	20
pyrite	TR
plant frags.	TR

Site 330 Hole Core 14 Cored Interval: 518.5-528.0 m



CLAYEY SILT
SILT (minor lith)
LIMESTONE (minor lith)
CLAYSTONE (minor lith)
Predominantly olive gray clayey silt with thin (5-10 cm) interbeds of light olive gray limestone and yellowish brown silt. One bed of yellowish brown 'lignitic' claystone at base. Silts are predominantly quartz and feldspar; pyrite and carbonized plant remains occur throughout shell rich layers at 2-110, 3-60, 4-10. Clayey silts vary from well laminated (1-2 cm scale) to highly bioturbated.

5Y 4/1 to 5Y 3/2

10YR 2/2

5Y 4/1 occasional layers 5YR 2/2

10YR 2/2

Characteristic smear slide

	1-112	2-95	4-73	CC
qtz. & feld.	45	50	38	15
clay	25	19	56	65
plant frags.	27	30	3	14
pyrite	3	1	2	5

Thin section

	4-118
spar	87
clay	10
pyrite	2
plant	1
detrital sand & silt	TR

Grain size

	1-92	2-1
sand	4.0	6.1
silt	82.0	69.9
clay	14.0	23.9

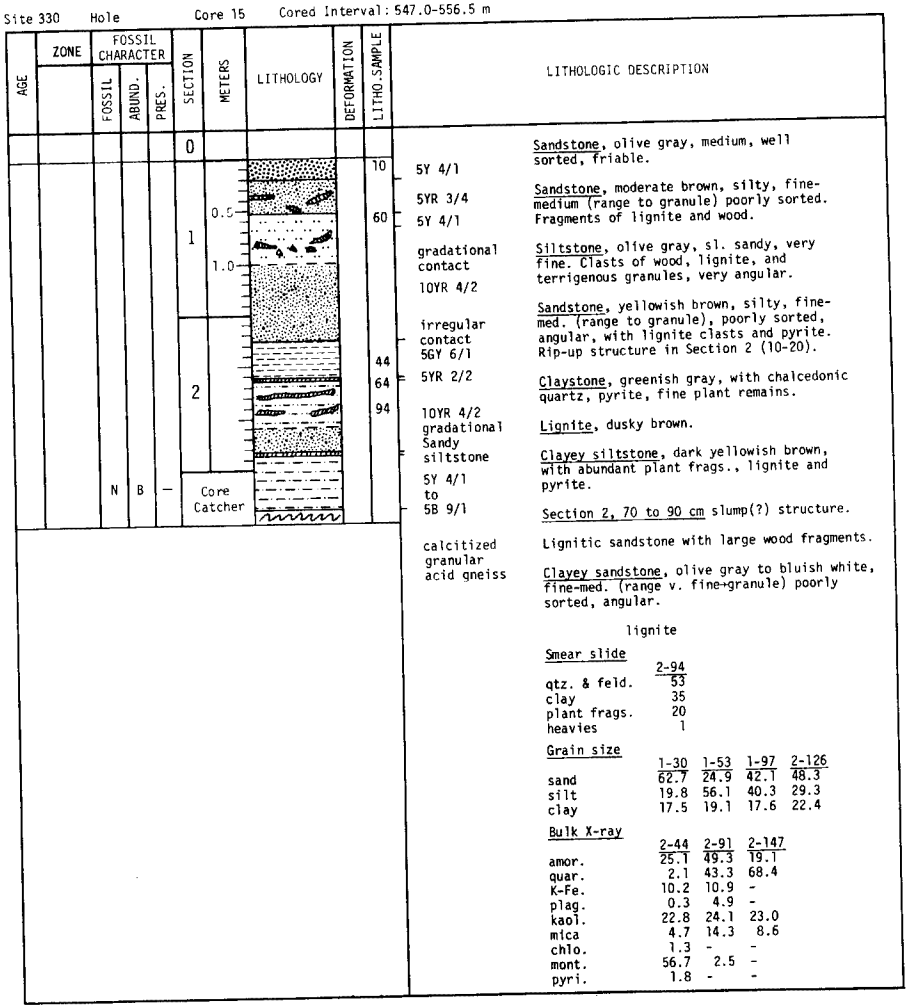
Carbon-carbonate

	2-81	4-118	4-130
t. carb	1.2	8.2	1.6
o. carb	1.0	0.4	1.7
$CaCO_3$	2.0	65.0	0.0

Bulk X-ray

	4-120
amor.	48.8
quar.	31.5
K-Fe.	8.1
plag.	3.7
kaol.	20.7
mica	21.2
chlo.	4.1
mont.	3.8
pyri.	7.1

Site 330 Hole Core 15 Cored Interval: 547.0-556.5 m



5Y 4/1

Sandstone, olive gray, medium, well sorted, friable.

5YR 3/4
5Y 4/1

Sandstone, moderate brown, silty, fine-medium (range to granule) poorly sorted. Fragments of lignite and wood.

gradational contact

10YR 4/2

Siltstone, olive gray, sl. sandy, very fine. Clasts of wood, lignite, and terrigenous granules, very angular.

irregular contact

5GY 6/1

Sandstone, yellowish brown, silty, fine-med. (range to granule), poorly sorted, angular, with lignite clasts and pyrite. Rip-up structure in Section 2 (10-20).

5YR 2/2

Claystone, greenish gray, with chalcedonic quartz, pyrite, fine plant remains.

10YR 4/2 gradational Sandy siltstone

Lignite, dusky brown.

Clayey siltstone, dark yellowish brown, with abundant plant frags., lignite and pyrite.

5Y 4/1 to 5B 9/1

Section 2, 70 to 90 cm slump(?) structure.

calcitized granular acid gneiss

Lignitic sandstone with large wood fragments.

Clayey sandstone, olive gray to bluish white, fine-med. (range v. fine→granule) poorly sorted, angular.

lignite

Smear slide

	2-94
qtz. & feld.	53
clay	35
plant frags.	20
heavies	1

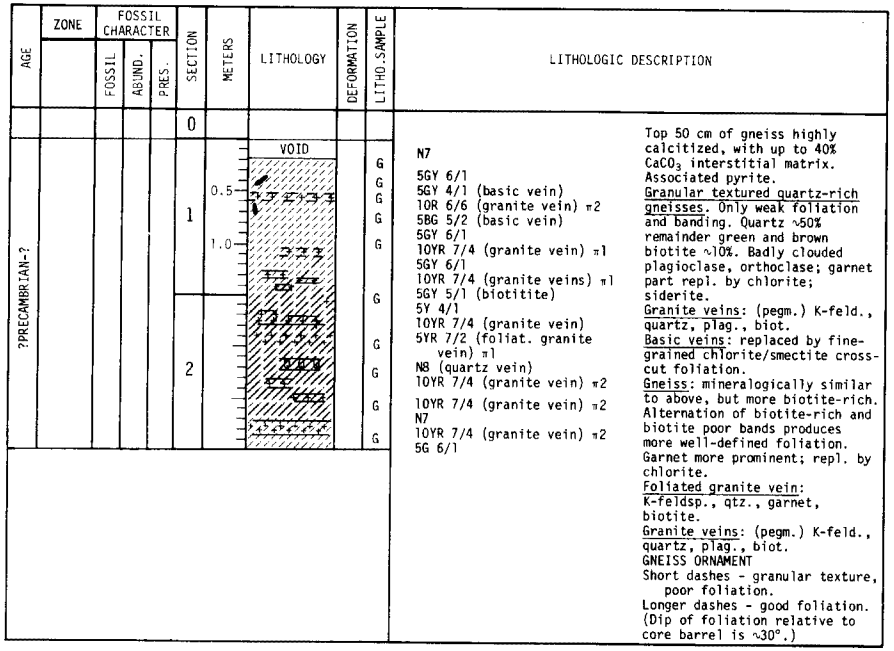
Grain size

	1-30	1-53	1-97	2-126
sand	62.7	24.9	42.1	48.3
silt	19.8	56.1	40.3	29.3
clay	17.5	19.1	17.6	22.4

Bulk X-ray

	2-44	2-91	2-147
amor.	25.1	49.3	19.1
quar.	2.1	43.3	68.4
K-Fe.	10.2	10.9	-
plag.	0.3	4.9	-
kaol.	22.8	24.1	23.0
mica	4.7	14.3	8.6
chlo.	1.3	-	-
mont.	56.7	2.5	-
pyri.	1.8	-	-

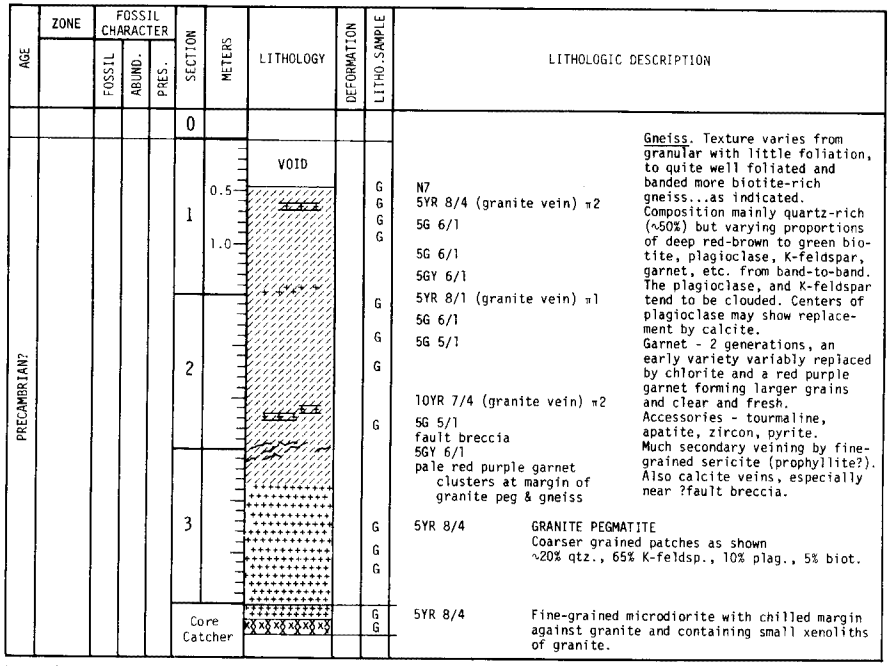
Site 330 Hole Core 16 Cored Interval: 556.5-566.0 m



N7
5GY 6/1
5GY 4/1 (basic vein)
10R 6/6 (granite vein) π2
5BG 5/2 (basic vein)
5GY 6/1
10YR 7/4 (granite vein) π1
5GY 6/1
10YR 7/4 (granite veins) π1
5GY 5/1 (biotitite)
5Y 4/1
10YR 7/4 (granite vein)
5YR 7/2 (foliat. granite vein) π1
N8 (quartz vein)
10YR 7/4 (granite vein) π2
10YR 7/4 (granite vein) π2
N7
10YR 7/4 (granite vein) π2
5G 6/1

Top 50 cm of gneiss highly calcitized, with up to 40% $CaCO_3$ interstitial matrix. Associated pyrite.
Granular textured quartz-rich gneisses. Only weak foliation and banding. Quartz ~50% remainder green and brown biotite ~10%. Badly clouded plagioclase, orthoclase; garnet part repl. by chlorite; siderite.
Granite veins: (pegm.) K-feld., quartz, plag., biot.
Basic veins: replaced by fine-grained chlorite/smectite cross-cut foliation.
Gneiss: mineralogically similar to above, but more biotite-rich. Alternation of biotite-rich and biotite poor bands produces more well-defined foliation. Garnet more prominent; repl. by chlorite.
Foliated granite vein: K-feldsp., qtz., garnet, biotite.
Granite veins: (pegm.) K-feld., quartz, plag., biot.
GNEISS ORNAMENT
Short dashes - granular texture, poor foliation.
Longer dashes - good foliation.
(Dip of foliation relative to core barrel is ~30°.)

Site 330 Hole Core 17 Cored Interval: 566.0-575.5 m



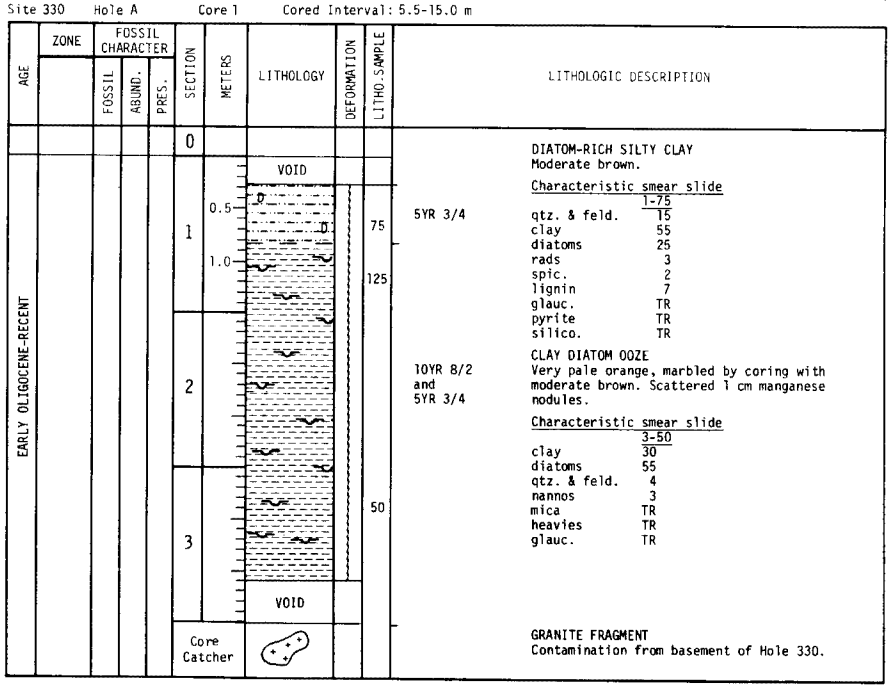
N7
5YR 8/4 (granite vein) π2
5G 6/1
5G 6/1
5GY 6/1
5YR 8/1 (granite vein) π1
5G 6/1
5G 5/1
10YR 7/4 (granite vein) π2
5G 5/1
fault breccia
5GY 6/1
pale red purple garnet clusters at margin of granite peg & gneiss
5YR 8/4
5YR 8/4

Gneiss. Texture varies from granular with little foliation, to quite well foliated and banded more biotite-rich gneiss...as indicated. Composition mainly quartz-rich (~50%) but varying proportions of deep red-brown to green biotite, plagioclase, K-feldspar, garnet, etc. from band-to-band. The plagioclase, and K-feldspar tend to be clouded. Centers of plagioclase may show replacement by calcite.
Garnet - 2 generations, an early variety variably replaced by chlorite and a red purple garnet forming larger grains and clear and fresh.
Accessories - tourmaline, apatite, zircon, pyrite.
Much secondary veining by fine-grained sericite (prophyllite?). Also calcite veins, especially near ?fault breccia.

GRANITE PEGMATITE
Coarser grained patches as shown ~20% qtz., 65% K-feldsp., 10% plag., 5% biot.

Fine-grained microdiorite with chilled margin against granite and containing small xenoliths of granite.

Site 330 Hole A Core 1 Cored Interval: 5.5-15.0 m



DIATOM-RICH SILTY CLAY
Moderate brown.

Characteristic smear slide

	1-75
qtz. & feld.	15
clay	55
diatoms	25
rads	3
spic.	2
lignin	7
glauc.	TR
pyrite	TR
silico.	TR

5YR 3/4

CLAY DIATOM OOZE
Very pale orange, marbled by coring with moderate brown. Scattered 1 cm manganese modules.

10YR 8/2 and 5YR 3/4

Characteristic smear slide

	3-50
clay	30
diatoms	55
qtz. & feld.	4
nannos	3
mica	TR
heavies	TR
glauc.	TR

GRANITE FRAGMENT
Contamination from basement of Hole 330.

DEEP SEA DRILLING PROJECT

LEG 36 SITE 331

SITE SUMMARY SHEET

Position: Latitude:	37°53.00'S
Longitude:	38°06.92'W
Water depth (rig floor):	5077 corrected meters, echo sounding
Bottom felt at:	5073.5 meters, drill pipe
Penetration:	18 meters
Number of holes:	1
Number of cores:	2
Total length of cored section:	18.0 meters
Total core recovered:	8.5 meters
Percentage core recovery:	47%

Oldest Sediment Cored

Depth subbottom:	18.0 meters
Nature:	Clay and silt
Age:	Lower Pleistocene
Measured velocity:	1.53 km/sec

Basement

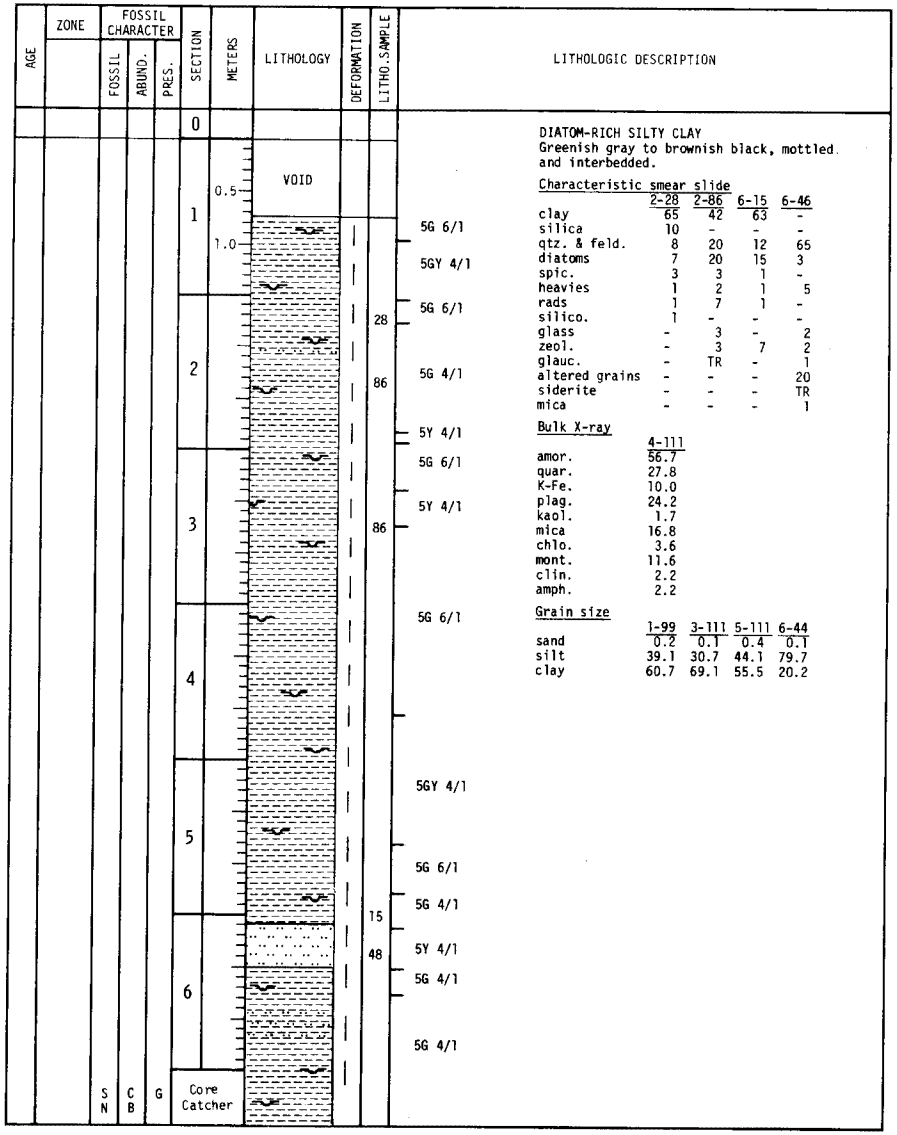
Depth subbottom (top):	---
Penetration:	---
Nature:	---
Velocity:	---

Principal Results

The site was abandoned after only 18 meters of penetration because of bad weather and irreparable damage to the motor powering

the man lift on the rig. The sediment recovered consists of lower Pleistocene diatomaceous clay with quartz silt layers. The fine-grained sediment contains diatoms and radiolaria endemic to cool circum-polar waters as well as more temperate forms. It consists of fine winnowed material derived partly from Antarctica and partly from the South American continental margin, and deposited from a current of Antarctic Bottom Water. The much more successful Site 358 of Leg 39 lies only about 100 miles east of Site 331.

Site 331 Hole Core 1 Cored Interval: 0.0-8.5 m



DIATOM-RICH SILTY CLAY
Greenish gray to brownish black, mottled and interbedded.

Characteristic smear slide

	2-28	2-86	6-15	6-46
clay	65	42	63	-
silica	10	-	-	-
qtz. & feld.	8	20	12	65
diatoms	7	20	15	3
spic.	3	3	1	-
heavies	1	2	1	5
rads	1	7	1	-
silico.	1	-	-	-
glass	-	3	-	2
zeol.	-	3	7	2
glauc.	-	TR	-	1
altered grains	-	-	-	20
siderite	-	-	-	TR
mica	-	-	-	1

Bulk X-ray

	4-111
amor.	56.7
quar.	27.8
K-Fe.	10.0
plag.	24.2
kaol.	1.7
mica	16.8
chlo.	3.6
mont.	11.6
clin.	2.2
amph.	2.2

Grain size

	1-99	3-111	5-111	6-44
sand	0.2	0.1	0.4	0.1
silt	39.1	30.7	44.1	79.7
clay	60.7	69.1	55.5	20.2