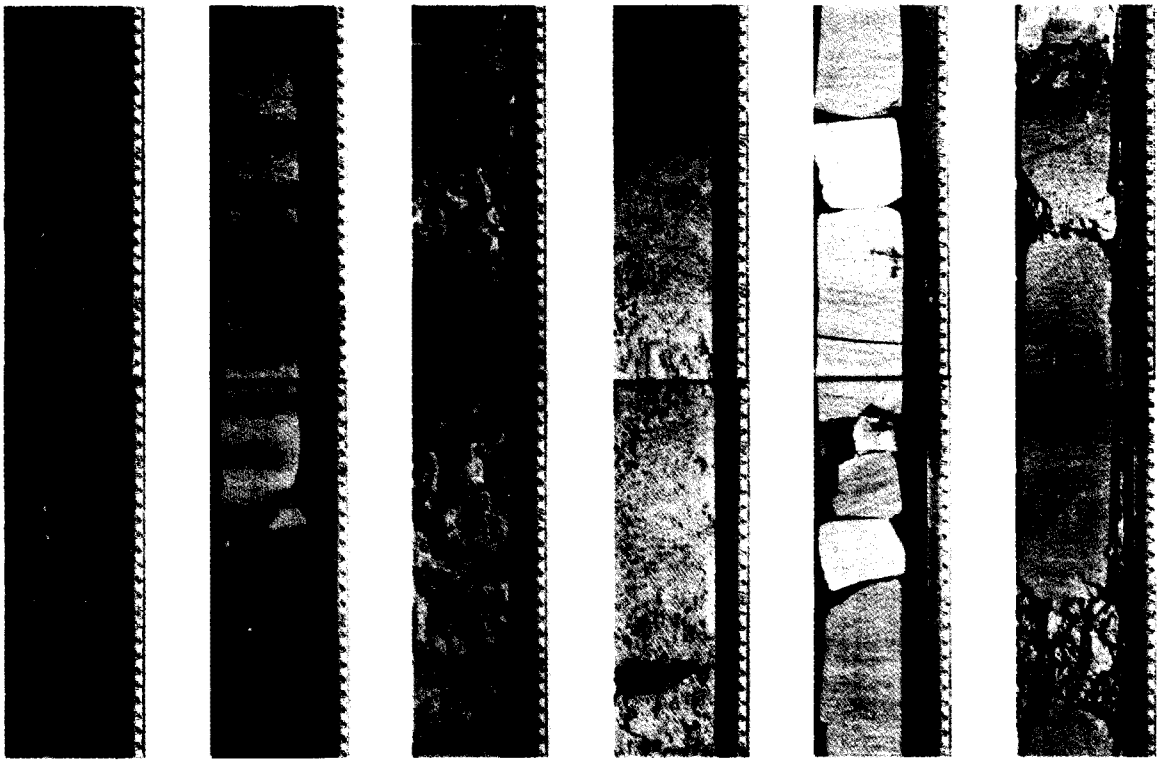
INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 29
ANTARCTIC



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

UNIVERSITY OF CALIFORNIA, SAN DIEGO

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

SANTA BARBARA · SANTA CRUZ

SCRIPPS INSTITUTION OF OCEANOGRAPHY

POST OFFICE BOX 1529
LA JOLLA, CALIFORNIA 92037

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 DESCRIPTION (ICD)

DEEP SEA DRILLING PROJECT

LEG 29

MAR. 2,73 — APR. 19,73

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
Woods Hole Oceanographic Institution
Institute of Oceanology, Moscow, USSR

PARTICIPATING SCIENTISTS

James P. Kennett, Robert E. Houtz, Anthony R. Edwards,
Victor A. Gostin, Marta Hajos, Monty Hampton, D. Graham Jenkins,
P. B. Andrews, Stanley V. Margolis, A. Thomas Ovenshine,
Katharina Perch-Nielsen

INITIAL CORE DESCRIPTION - LEG 29

INTRODUCTION

This is the third Initial Core Description document to be published by the Deep Sea Drilling Project. Some additional material is present in this report and will occur in subsequent reports, that has not been used before. First, a synopsis of Leg 29 is presented on pages 1-2. The purpose here is to specify the objectives and to indicate briefly the general nature of the cruise. Secondly, a series of Explanatory Notes are presented to provide a fuller understanding of the information contained on the Site Summary Sheets and the accompanying Core Forms, as well as explaining how this information is obtained.

Synopsis of Leg 29

Leg 29 of the Deep Sea Drilling Project was its second drilling expedition in the Antarctic region. Sites were drilled south of Australia and New Zealand and within the Tasman Sea at latitudes from 40°S to 57°S. These traverse the cooler subtropical (temperate), subantarctic and northern Antarctic water masses.

The essential problems examined during Leg 29 were the history of development relative to each other of Australia, Antarctica, and New Zealand; the nature of the magnetic quiet zone adjacent to Australia; the history of development of the circum-Antarctic current and associated bottom-water history; paleoclimatic and paleoglacial history; the history of the biogenic productivity and the establishment of subantarctic biostratigraphic zonations.

A total of 16 holes were drilled at 10 sites (Figure 1) and 1181 meters of sediment were recovered. Ages, lithology, sedimentary units are shown for each site in the core forms.

Leg 29 departed Lyttleton, New Zealand on 2 March 1973 and occupied the first site (Site 275) on the Campbell Plateau on 4 March. Hard surface layers at the first two sites severely hampered drill penetration. Profile data indicated that the third planned site on the southern part of the Campbell Plateau also had hard surface layers and hence the third site (Site 277) was drilled further north on the Campbell Plateau to obtain a Cenozoic biostratigraphic sequence. Sites were then occupied in the Emerald Basin (Site 278), and on the northern Macquarie Ridge (Site 279). The GLOMAR CHALLENGER then cruised to the Tasmanian area and sites were drilled in deep water south of the South Tasman Rise (Site 280) and in shallow water on the South Tasman Rise (Site 281). A new site (Site 282) was selected in the magnetic quiet zone to the west of Tasmania at a location where basement was readily accessible and yet where sufficient sediment thickness existed for defining a sedimentary history. This was followed by drilling in the central Tasman Sea at Site 283. Site 284 was selected on the Challenger Plateau adjacent to New Zealand to obtain a continuous late Cenozoic paleoclimatic and biostratigraphic record in subtropical waters. The leg was concluded in Wellington, New Zealand on 18 April 1973.

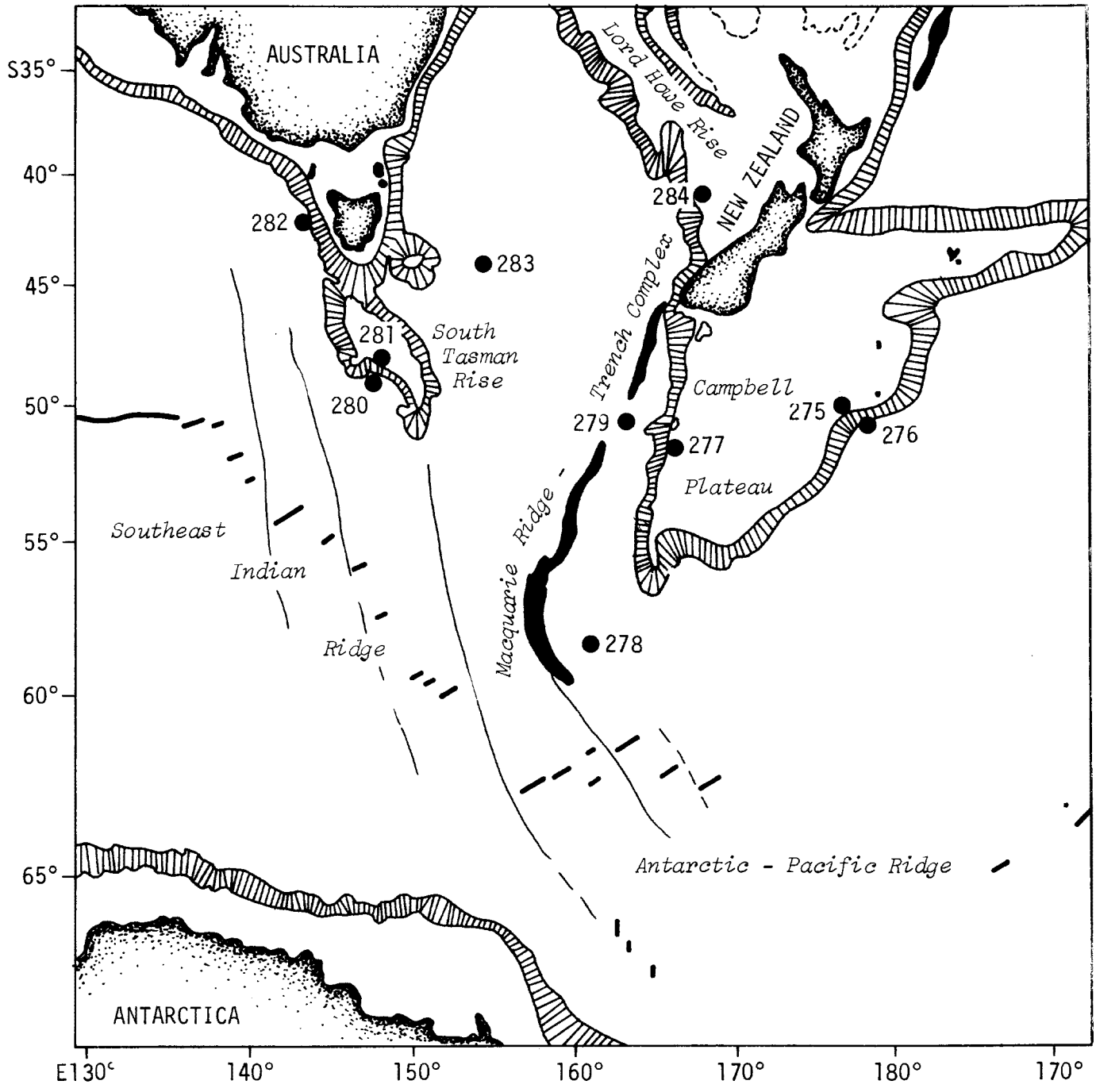


Figure 1. Location of Drill Sites, Leg 29, DSDP.

EXPLANATORY NOTES

Numbering and Depth Conventions

A site number refers to a single hole or group of holes drilled in essentially the same position using the same acoustic beacon. The first hole at a site is given the number of the site. Second or subsequent holes drilled after withdrawing from the first hole and redrilling were labeled "A", "B", etc. holes (e.g. Hole 280A).

A core is taken by dropping a core barrel down the drill string and coring for 9 meters as measured by lowering of the drill string. The sediment is retained in a plastic liner 9.28 meters long inside the core barrel and in a 0.20 meter long core catcher assembly below the liner. The liner is not normally full.

On recovery the liner is cut into sections of 1.5 meters measured from the lowest point of sediment within the liner. In general the top of the core does not coincide with the top of a section. The sections are labeled from 1 for the top (incomplete) section to a figure as high as 6 for the bottom (complete) section, depending on the total length of core recovered.

By convention, when partial recovery results, the recovered sediment is assumed to represent the top of the cored sequence. The core catcher represents sediment immediately below the lowest section.

An example of accepted convention for a sample number is "29-275-3-1 (10-20 cm)". The sample represents the interval between 10 and 20 centimeters in Section 1 of Core 3, Site 275, Leg 29.

Handling of Cores

After a core section has been cut, sealed, and labeled, it is brought into the core laboratory for processing. The routine procedure listed below was usually followed:

1) Weighing of the core section for mean bulk density measurement.
2) GRAPE analysis for bulk density and porosity.
3) Sonic velocity determination, using a Hamilton Frame.

After the physical measurements are made, the core is cut. One of the split halves is designated a working half. Samples, including those for grain size, X-ray mineralogy, water content, and carbon-carbonate are taken. Larger samples are taken from suitable cores for inorganic and organic geochemical analysis. These samples are generally taken before the core is split.

The working half is then sent to the paleontology laboratory. There, samples for shipboard and shorebased studies of nannoplankton, foraminifera, radiolarians, diatoms, and silicoflagellates or other paleontological studies are taken.

The other half of a split section is designated an archive half. The color, texture, structure, and composition of the various lithologic units within a section are described on standard visual core description sheets (one per section) and any unusual features noted. A smear slide is made, usually at 75 cm if the core was uniform. Otherwise, two or more smear slides are made, each for a sediment of distinct lithology. The smear slides are examined microscopically. The archive half of the core section is then

photographed. Both halves are sent to cold storage on board after they had been processed.

All samples are now deposited in cold storage at the DSDP East Coast Repository at Lamont-Doherty Geological Observatory and are available to investigators.

Sediment Analyses

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 in bulk samples, 2 to 20μ, and <2μ fractions is performed according to the methods described in the reports of Legs 1 and 2 and in Appendix III of Volume IV, Initial Reports of the Deep Sea Drilling Project. The mineral analyses of the 2 to 20μ and <2μ fractions are performed on $CaCO_3$-free residues.

These are reported and shown on the core forms using a ranked, semiqualitative scale as outlined below:

Trace - (TR)	(<5%); diffraction pattern is weak and identification is made on the basis of two major diagnostic peaks.

Present - (P)	(5-25%); a number of peaks of the mineral are visible in the diffraction pattern.
Abundant - (A)	(25-65%); diffraction peaks of the mineral are prominent in the total diffraction pattern, but the peaks of other minerals are of an equivalent intensity.
Major - (M)	(>65%); the diffraction peaks of the mineral dominate the diffraction pattern.

Although a certain quantity of the unidentified minerals is implied, their concentration is not included in the concentrations of the identified minerals which are summed to 100 percent.

Grain Size

Sand-silt-clay distribution is determined on 10 cc sediment samples collected at the time the cores were split and described.

The sediment classification used here is that of Shepard (1954) with the sand, silt, and clay boundaries based on the Wentworth (1922) scale. Thus the sand, silt, and clay fractions are composed of particles whose diameters range from 2000 to 62.5 microns, 62.5 to 3.91 microns, and less than 3.91 microns, respectively.

Standard sieve and pipette methods were used to determine the grain size distribution. The sand-size fraction was removed by wet sieving using 63-micron sieve, and the silt and clay fractions were analyzed by standard pipette analysis. Sampling depths and volumes

were calculated using equations derived from Stokes setling velocity equation (Krumbein and Pettijohn, 1938, 95-96).

Sediment Classification

A basic sediment classification was devised by O. E. Weser of DSDP and was first used at sea on Leg 18. The system has been reviewed and changed in-house several times, based upon experience gained during utilization at sea.

The complete DSDP sediment classification system follows.

Lithologic Symbols

Accompanying the introduction of the sediment classification to the DSDP volumes is the employment of a set of lithologic symbols (Figure 3). These symbols and their method of employment has continued, with only minor modification, through all volumes subsequent to Volume 18. These symbols have been used on all core and site summary forms. Where complex lithologies occur, each major constituent is represented by a vertical bar. The width of each bar corresponds to the percentage value of the constituent it represents in the manner shown on Figure 2. It will be noted that the class limits of the vertical bars corresponds to those of the sediment classification. With this system of graphical representation, the rich portion of the major constituents and the minor constituents may be shown.

Shipboard Mineralogic-Lithologic Determination

Smear Slides

Smear slides are the basic means of mineral identification

CLASSIFICATION AND NOMENCLATURE RULES

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 IA3.
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 IA and IB 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.**
2. At the discretion of the geologist, constituents present in amounts of 2-10% may be prefixed to the sediment name by the term **bearing.**
   Example: 50% nannofossils, 40% radiolarians, 10% zeolites would be called a **zeolite-bearing rad nanno ooze.**

C. Trace constituents. Constituents present in amounts of <2% 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. Usage of the terms **marl** and **chalk** to designate amounts of microfossils, 30-60% and >60% respectively, as used by Olausson (1960) and others, is dropped. The term **chalk** is retained to designate a compacted calcareous ooze.

III. Clastic sediments

A. Clastic constituents, whether detrital, volcanic, biogenous or authigenic, are given a textural designation. When detrital[2] 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 (see Figure 3). The textural term can be preceded by a mineralogical term when this seems warranted. Such mineralogical terms are applied as per rules IA and B.

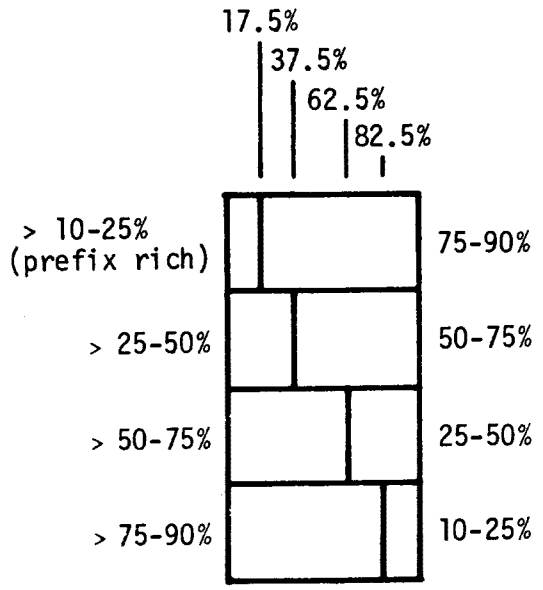


Figure 2. *Textural classification of clastic sediments, after Shepard (1954).*

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 by 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** = >32 mm, **volcanic lapilli** = <32 mm to >4 mm, and **volcanic ash** = <4 mm. 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 IA 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 expedient 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.

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

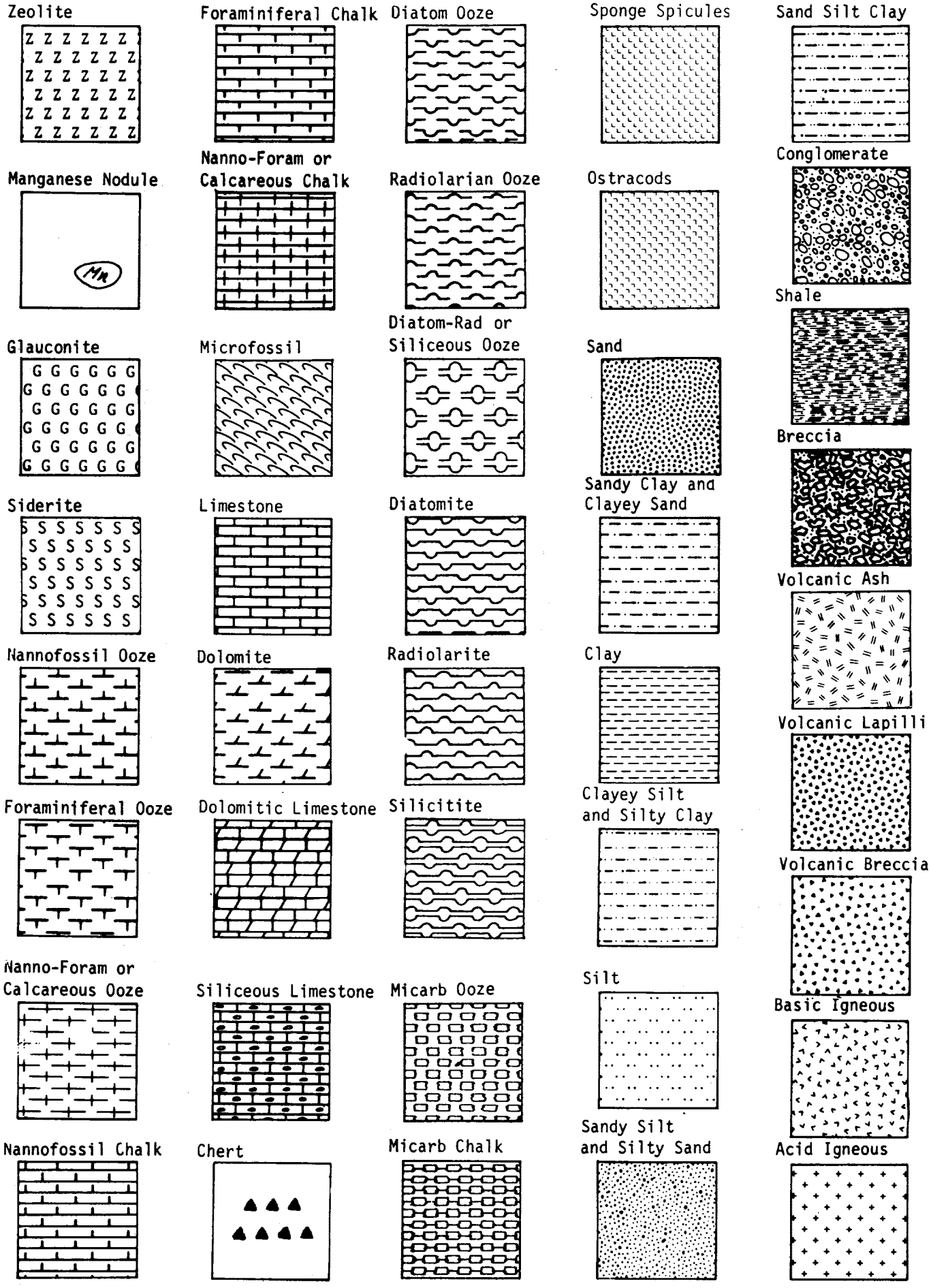


FIGURE 3 LITHOLOGIC SYMBOLS

on shipboard. The shipboard party tried to be as specific as possible with regard to mineral identifications.

Smear slide estimates of mineral abundances were based on area of the smear slide covered by each component. Specific mineral identification and quantification was attempted for sands, but for silts and clays, only the textural categories were really quantified. Past experience has shown that accuracy may approach a percent or so for very distinctive minor constituents but that, for major constituents, accuracy of ±10 to 20% is considered very good. Of more importance to the geologist than absolute accuracy are relative changes in component abundances.

A comment by shipboard sedimentologists is pertinent to this problem. The percentage of nannos was frequently overestimated in smear slides of foram nanno ooze, probably because of the smear slides that were too thin. A demonstration of this error, one recognized on earlier legs, is given by taking a 5 cc sample of ooze with a syringe (the needle tip is cut off), extruding it, screening out the 63 micron fraction, and packing this coarse fraction back into the syringe. The volume of the coarse fraction is read from the graduated scale on the syringe. In many instances smear slide and syringe estimates of foram percentages differed by as much as 70 percent.

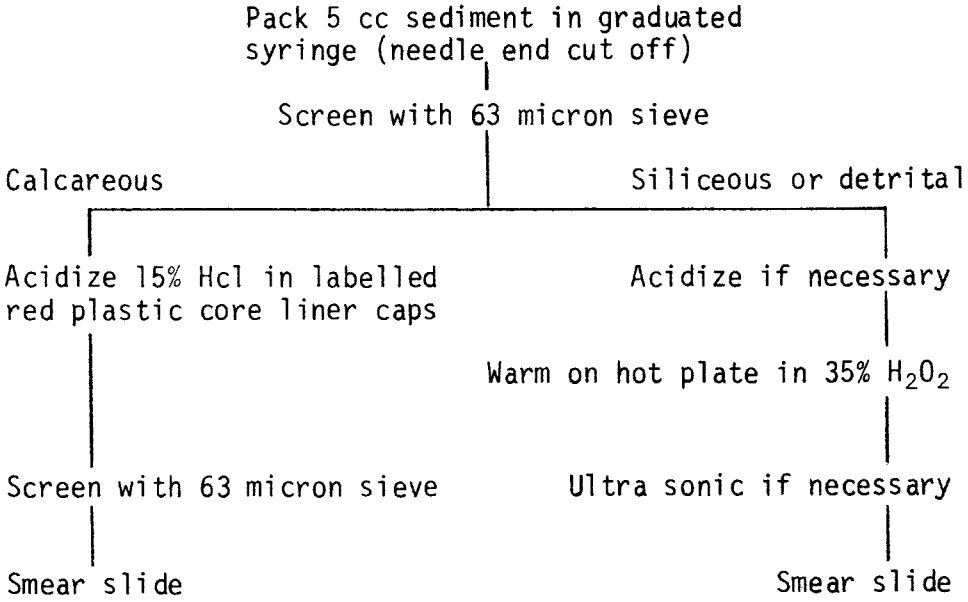
Insoluble Resides

The amounts and types of fine silt and clay-size detrital grains in calcareous oozes are difficult to determine under the microscope. Large amounts of fine-grained material commonly occurs

in calcareous ooze but is largely unrecognized in the smear slides.

It was useful to study the sand-size acid residue prepared from each core catcher sample obtained at each site. The procedure used is diagrammed below.

Diagrammatic Procedure for Sand-Size Insoluble Residues



Core Forms

The basic lithologic data are contained on core summary forms. As far as possible the data are presented in the following order:

Sediment name

Color name and Munsell or GSA number

The reader is advised that colors recorded in core barrel summaries were determined during shipboard examination immediately after splitting core sections. Experience

with carbonate sediments shows that many of the colors will fade or disappear with time after opening and storage. Colors particularly susceptible to rapid fading are purple, light and medium tints of blue, light bluish gray, dark greenish black, light tints of green, and pale tints of orange. These colors change to white or yellowish white or pale tan.

Composition

Structure(s)

X-ray, grain size, and carbon-carbonate data

Many cores contain minor important lithologies as well as a basic lithology. The description of the basic lithology is so indicated in most cases, however, descriptive information for minor lithologies is included wherever possible. X-ray data are those generated by the DSDP X-ray mineralogy laboratory at the University of California, Riverside. Grain size and carbon-carbonate results are from the DSDP laboratory at Scripps unless otherwise noted.

A sample core form precedes the site-by-site presentation of the cores (Figure 4). On this sample core form is contained all legend and explanatory notes for an understanding of the core forms.

Drilling Deformation

Four degrees of drilling deformation were recognized as follows: The symbols are on the sample core form. Slightly deformed cores exhibit a slight bending of bedding contacts; extreme bending defines moderate deformation. In highly deformed cores, injected bedding planes may approach the vertical. In extreme cases, bedding may be completely disrupted to produce a "drilling breccia". Watery intervals

generally have lost any bedding characteristics originally available.

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. This information is recorded on the core forms.

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 Chief Scientific Editor 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.)

REFERENCES

Blow, W. H., 1969. Late middle Eocene to Recent planktonic foraminiferal biostratigraphy: Intern. Conf. Planktonic Microfossils, Geneva, p. 299.

Bolli, H. M., 1966. Zonation of Cretaceous to Pliocene marine sediments based on planktonic foraminifera: Inform. Assoc. Venezolana Geologia, Min., Petrol., Bol., v. 9, p. 3-32.

Bukry, D., 1971. Cenozoic calcareous nannofossils from the Pacific Ocean: San Diego Soc. Nat. Hist. Trans., v. 16 (14), p. 303-328.

Edwards, A. R., 1971. A calcareous nannoplankton zonation of the New Zealand Paleogene: Planktonic Conf., 2nd, Roma 1970, Proc. p. 381-419.

Fleming, C. A. (editor), 1959. Lexique stratigraphique international: Paris (Centre National de la Recherche Scientifique) v. 6, Oceante, pt. 4 (New Zealand).

Hornibrook, N de B, 1968. Handbook of New Zealand Microfossils (Foraminifera and Ostracoda): New Zealand Dep. Scient. Ind. Res. Inf. Ser. 62, Wellington.

Hornibrook, N de B and Edwards, A. R., 1971. Integrated planktonic foraminiferal and calcareous nannoplankton datum levels in the New Zealand Cenozoic: Planktonic Conf., 2nd, Roma 1970, Proc. p. 649-657.

Jenkins, D. G., 1966. Planktonic foraminiferal zones and new taxa from the Danian to lower Miocene of New Zealand: New Zealand Geol. Geophys. J, v. 8 (6), p. 1088-1126.

_____, 1967. Planktonic foraminiferal zones and new taxa from the Lower Miocene to Pleistocene of New Zealand: New Zealand Geol. Geophys. J., v. 10 (4), p. 1064-1078.

Krumbein, W. C. and Pettijohn, F. J., 1938. Manual of sedimentary petrography: New York (Appleton-Century).

Martini, E., 1970. Standard Palaeogene calcareous nannoplankton zonation. Nature. 226 (5245), 560.

Martini, E. and Worsley, T., 1970. Standard Neogene calcareous nannoplankton zonation. Nature. 225 (5229), 289.

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

Moore, T., 1971. Radiolaria. In Tracey, J. I., Sutton, G. H., et al., 1971. Initial Reports of the Deep Sea Drilling Project, Volume VIII, Washington (U. S. Government Printing Office), 727.

Riedel, W. R. and Sanfilippo, A., 1971. Cenozoic radiolarians from the western Tropical Pacific, Leg 7. In Winterer, E. L., Ewing, J. I., et al., Initial Reports of the Deep Sea Drilling Project, Volume VII, Washington (U. S. Government Printing Office), 1529.

Shepard, F. P., 1954. Nomenclature based on sand-silt-clay ratios: J. Sed. Petrol., v. 24, (3), p. 151-158.

Webb, P. M., 1966. N. Z. Late Cretaceous foraminifera and stratigraphy; Utrecht, Netherlands; (Schotanus and Jens N. V.), p. 19.

_____, 1971. N. Z. Late Cretaceous (Hanmurian) foraminifera and

stratigraphy: a summary: New Zealand Geol. Geophys. J., v. 14 (4), p. 795-828.

Williams, H., Turner, F. J., and Gilbert, C. M., 1954. Petrography, an introduction to the study of rocks in thin sections: San Francisco, (W. H. Freeman and Co.), p. 406.

Figure 4 - Sample Core Form and Legends.

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 (General Design and Legend Information for Leg 29 Core Forms in Initial Core Description)
	Foraminifera Zones / Nannofossil Zones / Radiolarian Zones	D-Diatom, F-Planktonic Foraminifera, N-Nannofossil, BF-Benthonic Foraminifera, P-Palynology, R-Radiolarian	A-Abundant, C-Common, R-Rare, T-Trace	E-Excellent, G-Good, F-Fair, P-Poor, M-Moderate	1	0.5 / 1.0	SEE EXPLANATORY NOTES	Drilling Breccia; Intense Deformation; Moderate Deformation; Slight Deformation	*Smear Slide depth in centimeters in a section.	
					2					
					3					
					4					
					5					
					6					
					Core Catcher					

Area of General Description: general lithology, colors, deformation, and specific characteristics.

Smear Slide Descriptions:

EXAMPLE

SS 6-107

Section Interval in cm

Composition in % Texture in %

LEGEND

Q	- Quartz	F	- Foram
Fd	- Feldspar	D	- Diatom
Mi	- Mica	OST	- Ostracod
M	- Micarb	S	- Spicules
HM	- Heavy minerals	SI	- Silicoflag.
G	- Glauconite	B	- Bryozoa
CM	- Clay minerals	SF	- Shell frag.
RF	- Rock fragments	Ech	- Echinoid
Mn	- Mn Nodule	Di	- Discoasters
MicroN	- Micronodule	OF	- Other fossils
ORG	- Organics		
Ch	- Chlorite	Z	- Zeolite
VG	- Vol. glass	DR	- Dolo. rhombs
Bms	- Basalt mesostasis	OP	- Opaques
Dolo	- Dolomite	Py	- Pyrite
Cal	- Calcite	IM	- Iron minerals
Col	- Collophane	Pla	- Palagonite
Ch	- Chert	Sd	- Sand
DE	- Detritals	ST	- Silt
$DETCO_3$	- Det. carbonate	Cl	- Clay
R	- Radiolarian		
N	- Nanno		

X-ray, Carbon Carbonate, Grain Size Analyses.

X-ray 6-107 (Bulk)

Composition (Abbreviations are used for components)

Abundance
Tr - Trace (<5%)
P - Present (5-25%)
A - Abundant (25-65%)
M - Major (>65%)

Carbon Carbonate 6-107 (Total C, ORG. C, $CaCO_3$)

Grain Size 6-107 (Sand, Silt, Clay)

DEEP SEA DRILLING PROJECT

LEG 29 SITE 275

SITE SUMMARY SHEET

POSITION: Latitude: 50°26.34'S Longitude: 176°18.99'E

Water depth (from sea level): 2800 corrected meters (Echo sounding)

Bottom felt at: 2827 meters (drill pipe) Penetration: 62.0 meters

Number of Holes: 1 Number of Cores: 5

Total length of cored section: 43 meters Total core recovered: 17.5 m

Percentage of core recovery: 40.6%

OLDEST SEDIMENT CORED:

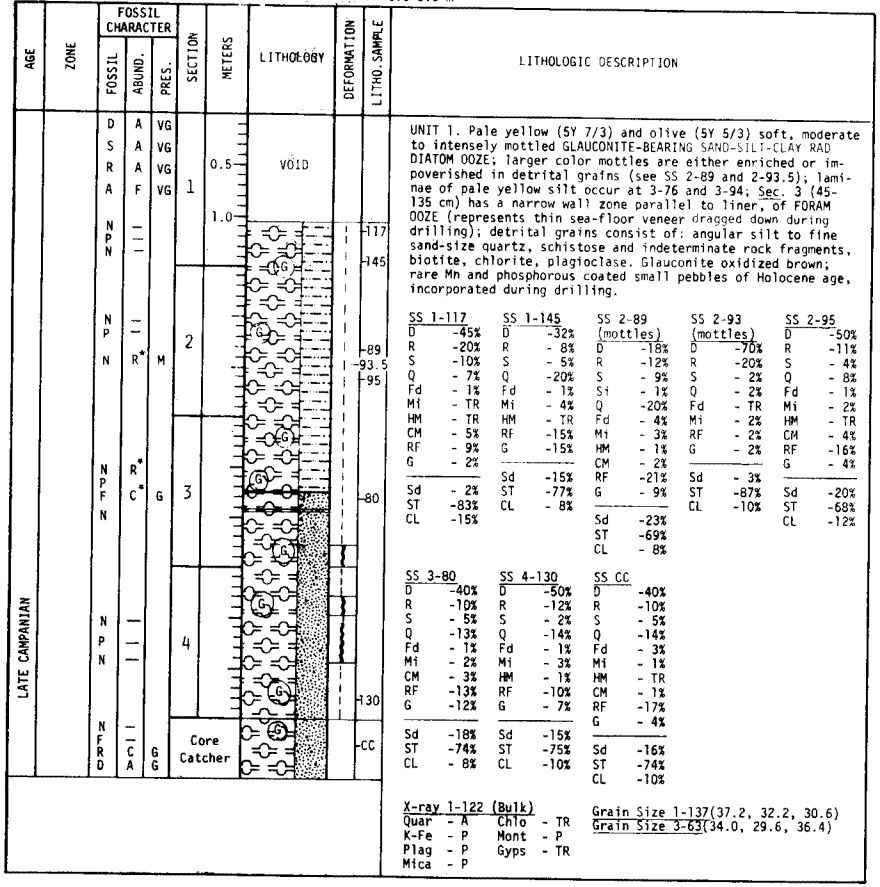
Depth below sea floor: 62 meters Nature: Detrital silty claystone (Glauconite, micronodule-bearing)

Age: Late Cretaceous

PRINCIPAL RESULTS:

Six cores representing a total penetration of 62 meters were recovered on the southeast Campbell Plateau. A thin Pleistocene veneer of foraminifera ooze and manganese nodules indicates that a western boundary current is presently active. The erosional surface immediately beneath the veneer rests on 13 meters of Late Cretaceous radiolarian diatom ooze, which in turn passes down abruptly into more than 39 meters of marine clayey silt with hard silicified layers. The area was the site of active bottom currents in the Late Cretaceous, under open ocean conditions. The calcium carbonate solution boundary was possibly shallow in Late Cretaceous as it is in present-day Antarctic latitudes. Well preserved siliceous flora and fauna.

Site 275 Hole Core 1 Cored Interval: 0.0-5.0 m



UNIT 1. Pale yellow (5Y 7/3) and olive (5Y 5/3) soft, moderate to intensely mottled GLAUCONITE-BEARING SAND-SILT-CLAY RAD DIATOM OOZE; larger color mottles are either enriched or impoverished in detrital grains (see SS 2-89 and 2-93.5); laminae of pale yellow silt occur at 3-76 and 3-94. Sec. 3 (45-135 cm) has a narrow wall zone parallel to liner, of FORAM OOZE (represents thin sea-floor veneer dragged down during drilling); detrital grains consist of: angular silt to fine sand-size quartz, schistose and indeterminate rock fragments, biotite, chlorite, plagioclase. Glauconite oxidized brown; rare Mn and phosphorous coated small pebbles of Holocene age, incorporated during drilling.

SS 1-117		SS 1-145		SS 2-89 (mottles)		SS 2-93 (mottles)		SS 2-95	
D	-45%	D	-32%	D	-18%	D	-70%	D	-50%
R	-20%	R	- 8%	R	-12%	R	-20%	R	-11%
S	-10%	S	- 5%	S	- 9%	S	- 2%	S	- 4%
Q	- 7%	Q	-20%	Si	- 1%	Q	- 2%	Q	- 8%
Fd	- 1%	Fd	- 1%	Q	-20%	Fd	- TR	Fd	- 1%
Mi	- TR	Mi	- 4%	Fd	- 4%	Mi	- 2%	Mi	- 2%
HM	- TR	HM	- TR	Mi	- 3%	HM	- TR	HM	- TR
CM	- 5%	RF	-15%	HM	- 1%	RF	- 2%	CM	- 4%
RF	- 9%	G	-15%	CM	- 2%	G	- 2%	RF	-16%
G	- 2%			RF	-21%			G	- 4%
		Sd	-15%	G	- 9%	Sd	- 3%		
Sd	- 2%	ST	-77%			ST	-87%	Sd	-20%
ST	-83%	CL	- 8%	Sd	-23%	CL	-10%	ST	-68%
CL	-15%			ST	-69%			CL	-12%
				CL	- 8%				

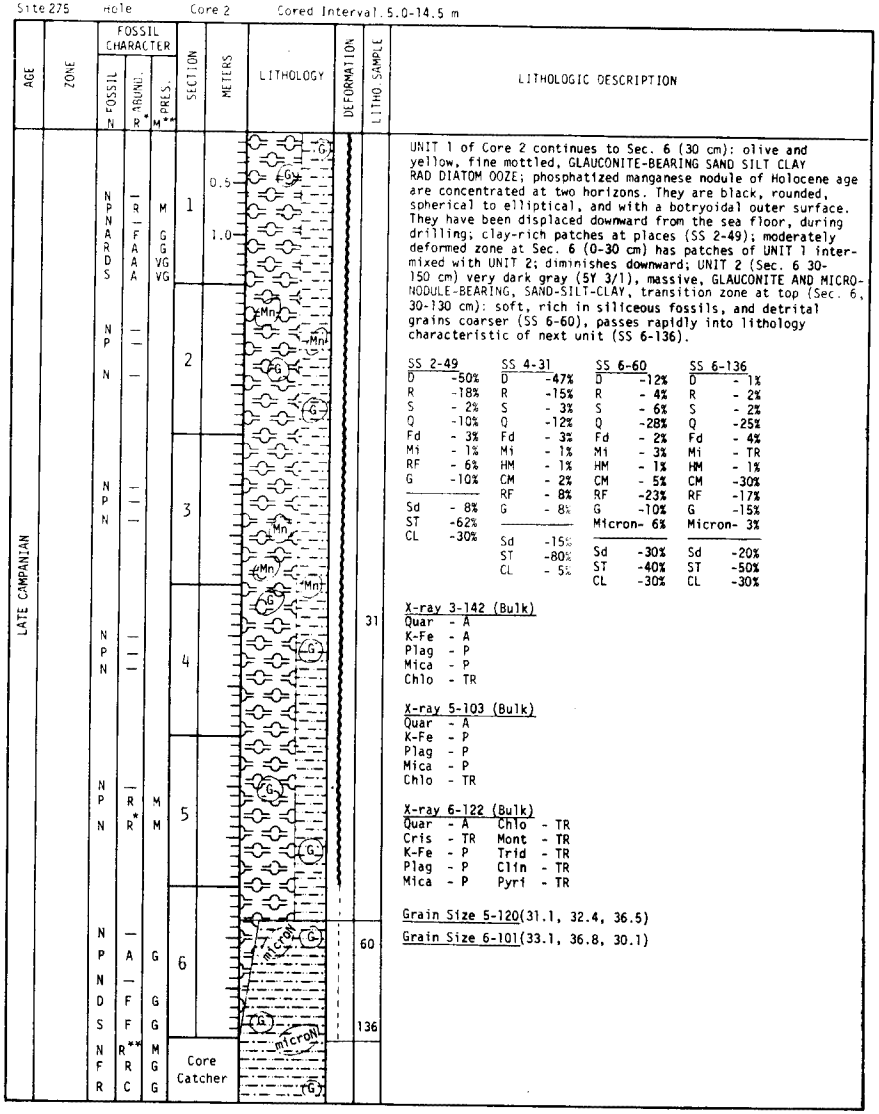
SS 3-80		SS 4-130		SS CC	
D	-40%	D	-50%	D	-40%
R	-10%	R	-12%	R	-10%
S	- 5%	S	- 2%	S	- 5%
Q	-13%	Q	-14%	Q	-14%
Fd	- 1%	Fd	- 1%	Fd	- 3%
Mi	- 2%	Mi	- 3%	Mi	- 1%
CM	- 3%	HM	- 1%	HM	- TR
RF	-13%	RF	-10%	CM	- 1%
G	-12%	G	- 7%	RF	-17%
				G	- 4%
Sd	-18%	Sd	-15%		
ST	-74%	ST	-75%	Sd	-16%
CL	- 8%	CL	-10%	ST	-74%
				CL	-10%

X-ray 1-122 (Bulk)

Quar	- A	Chlo	- TR
K-Fe	- P	Mont	- P
Plag	- P	Gyps	- TR
Mica	- P		

Grain Size 1-137(37.2, 32.2, 30.6)
Grain Size 3-63(34.0, 29.6, 36.4)

Site 275 Hole Core 2 Cored Interval: 5.0-14.5 m



UNIT 1 of Core 2 continues to Sec. 6 (30 cm): olive and yellow, fine mottled, GLAUCONITE-BEARING SAND SILT CLAY RAD DIATOM OOZE; phosphatized manganese nodule of Holocene age are concentrated at two horizons. They are black, rounded, spherical to elliptical, and with a botryoidal outer surface. They have been displaced downward from the sea floor, during drilling; clay-rich patches at places (SS 2-49); moderately deformed zone at Sec. 6 (0-30 cm) has patches of UNIT 1 intermixed with UNIT 2; diminishes downward; UNIT 2 (Sec. 6 30-150 cm) very dark gray (5Y 3/1), massive, GLAUCONITE AND MICRONODULE-BEARING, SAND-SILT-CLAY, transition zone at top (Sec. 6, 30-130 cm): soft, rich in siliceous fossils, and detrital grains coarser (SS 6-60), passes rapidly into lithology characteristic of next unit (SS 6-136).

SS 2-49		SS 4-31		SS 6-60		SS 6-136	
D	-50%	D	-47%	D	-12%	D	- 1%
R	-18%	R	-15%	R	- 4%	R	- 2%
S	- 2%	S	- 3%	S	- 6%	S	- 2%
Q	-10%	Q	-12%	Q	-28%	Q	-25%
Fd	- 3%	Fd	- 3%	Fd	- 2%	Fd	- 4%
Mi	- 1%	Mi	- 1%	Mi	- 3%	Mi	- TR
RF	- 6%	HM	- 1%	HM	- 1%	HM	- 1%
G	-10%	CM	- 2%	CM	- 5%	CM	-30%
		RF	- 8%	RF	-23%	RF	-17%
Sd	- 8%	G	- 8%	G	-10%	G	-15%
ST	-62%			Micron-	6%	Micron-	3%
CL	-30%	Sd	-15%				
		ST	-80%	Sd	-30%	Sd	-20%
		CL	- 5%	ST	-40%	ST	-50%
				CL	-30%	CL	-30%

X-ray 3-142 (Bulk)

Quar	- A
K-Fe	- A
Plag	- P
Mica	- P
Chlo	- TR

X-ray 5-103 (Bulk)

Quar	- A
K-Fe	- P
Plag	- P
Mica	- P
Chlo	- TR

X-ray 6-122 (Bulk)

Quar	- A	Chlo	- TR
Cris	- TR	Mont	- TR
K-Fe	- P	Trid	- TR
Plag	- P	Clin	- TR
Mica	- P	Pyri	- TR

Grain Size 5-120(31.1, 32.4, 36.5)
Grain Size 6-101(33.1, 36.8, 30.1)

*Downhole contamination
**From 275-2-0

Site 275 Hole Core 3 Cored Interval: 24.0-33.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
		N	—		Core Catcher		Mn Mn			Core catcher only recovery. Consists of mixed: 4-5 cm black spherical or botryoidal Mn nodules with botryoidal surfaces and 3-6 cm dark olive gray (5Y 3/2), subequant and angular fragments of GLAUCONITE-BEARING CLAYEY SILTSTONE.

*Downhole contamination

Site 275 Hole Core 4 Cored Interval: 33.5-43.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE CAMPANIAN		N P N D S R N F R	— F — R R R — —	M P P P G	1	0.5 1.0	VOID			UNIT 2 (Sec. 1 (125 cm) continued: dark olive gray (5Y 3/2), stiff, massive, GLAUCONITE AND MICRONODULE-BEARING CLAYEY SILT; some brecciated horizons of CLAYEY SILTSTONE (semi-lithified); at 2-109 cm, 1 cm lamina of GLAUCONITE-RICH SILTY CLAY; at 2-112 cm, 5 cm bed: dark gray (2.5YR N/4), slightly fine mottled NODULE-BEARING SILTY CLAY, glauconite is bright green and botryoidal throughout; core catcher composition: dark olive gray (5Y 3/2), stiff, GLAUCONITIC CLAYEY SILT and very dark gray (5Y 3/1), with lithified, discontinuous wavy-laminated GLAUCONITE-BEARING CLAYEY SILTSTONE and SILTY CLAYSTONE.
					2		G G G G G G		146 112 118	
					Core Catcher		G G			

SS 1-146

R	- 1%
S	- TR
Q	-30%
Fd	- 3%
Mi	- 4%
CM	-25%
RF	-25%
G	- 7%
Micron-	5%
Sd	- 2%
ST	-68%
CL	-30%

SS 2-112

R	- TR
Q	-15%
Fd	- 3%
Mi	- 5%
HM	- 4%
CM	-40%
RF	-30%
G	- TR
Micron-	2%
Sd	- 5%
ST	-43%
CL	-52%

SS 2-118

R	- TR
Q	-26%
Fd	- 2%
Mi	- 3%
HM	- 3%
CM	-40%
RF	-18%
G	- 4%
Micron-	4%
Sd	-12%
ST	-43%
CL	-45%

X-ray 2-68 (Bulk)

Quar	- P	Mica	- A
Cris	- P	Chlo	- TR
K-Fe	- P	Mont	- TR
Plag	- P	Trid	- TR
		Pyri	- TR

Grain Size 2-112 (5.1, 42.9, 52.0)

Carbon Carbonate 2-122 (4.3, 0.9, 29.0)

Site 275 Hole Core 5 Cored Interval: 52.5-62.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
PROBABLY LATE CAMPANIAN(?)		D S P N R P N	— — F R R R	M G G G	1	0.5 1.0	G G		65	UNIT 2 continued: dark olive gray (5Y 3/2), lithified and semi-lithified GLAUCONITE AND MICRONODULE BEARING CLAYEY SILTSTONE AND SILTY CLAYSTONE; lithified blocks show discontinuous lenticular to parallel lamination and blocky (brittle) deformation. Sand-size detrital grains comprising UNIT 2 include: quartz, biotite, chlorite, muscovite, feldspar, schistose rock fragments and indeterminate rock fragments, rare sedimentary rock fragments, chert, and colorless volcanic glass. Grains are angular. Heavy minerals in smear slides include (in order of decreasing abundance): magnetite/ilmenite, zircon, leucoxene, tourmaline, green hornblende, pyrite, sphene, and apatite; core catcher composition: angular 0.1-2 cm drilling breccia of dark olive gray (5Y 3/2) GLAUCOMITE AND MICRONODULE BEARING SILTY CLAYSTONE AND CLAYEY SILTSTONE.
							VOID			
		N R	— R	G	Core Catcher		G BASALT	▲ ▲	CC	

SS 1-65

CM	-28%
Mi	- 4%
Q	-38%
G	- 7%
HM	- 1%
Micron-	6%
R	- TR
S	- TR
Si	- TR
RF	-10%
Fd	- 5%
Sd	- 1%
ST	-59%
CL	-40%

SS CC

Q	-30%
Fd	- 3%
Mi	- 4%
HM	- 2%
CM	-30%
RF	-15%
G	- 7%
MN	- 9%
Sd	- 6%
ST	-49%
CL	-45%

DEEP SEA DRILLING PROJECT

LEG 29 SITE 276

SITE SUMMARY SHEET

POSITION: Latitude: 50°48.11'S Longitude: 176°48.40'E

Water depth (from sea level): 4671 corrected meters (Echo sounding)

Bottom felt at: 4677 meters (drill pipe) Penetration: 23 meters

Number of Holes: 1 Number of Cores: 1

Total length of cored section: 1 meter Total core recovered: 0 m

Percentage of core recovery: 0%

OLDEST SEDIMENT CORED:

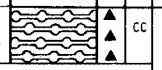
Depth below sea floor: 23 meters (possibly) Nature: Mixed scrapings from bit - nannofossils, foraminifera, silty sand opalite/glauconite, lithic fragments

Age: Paleogene

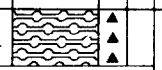
PRINCIPAL RESULTS:

Drilled to 23 meters in hard sediment and attempted to obtain surface and bottom hole samples without success. One core catcher sample and one bit sample obtained provide limited information on the section drilled. The sequence at Site 276 consists of a surficial lag of sandy gravel of possible middle Pliocene age formed by erosion and winnowing by a western boundary current. The surficial deposits are underlain by an unknown thickness of opalite of possible Oligocene age although containing a more abundant Eocene assemblage. Erosion by the current thus appears to have cut down to the Paleogene. Fragments of plutonic and metamorphic rocks in both samples indicates proximity of the Campbell Plateau to Site 276 since at least the Oligocene.

Site 276 Hole Core 1 Core catcher : 23 m below seafloor

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
see text		R S D N	T I R C R	P P P G M	Core Catcher			▲ ▲ ▲	CC	A very small amount of sand and rock fragments recovered from core catcher. The lithology is: MANGANESE AND GLAUCONITE-BEARING DETRITAL GRAVELLY-SANDY SILTY SILICITITE.

Site 276 Hole Core Bit sample Cored Interval: at 4700 m (23 m below the seafloor)

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
see text		F S N D R	A I A R C	P P P G M	Core Catcher			▲ ▲ ▲		A very small amount of sand and rock fragments recovered from bit. The lithology is: MANGANESE AND GLAUCONITE-BEARING DETRITAL GRAVELLY-SANDY SILTY SILICITITE.

DEEP SEA DRILLING PROJECT

LEG 29 SITE 277

SITE SUMMARY SHEET

POSITION: Latitude: 52°13.43'S Longitude: 166°11.48'E

Water depth (from sea level): 1214 corrected meters (Echo sounding)

Bottom felt at: 1232 meters (drill pipe) Penetration: 472.5 meters

Number of Holes: 1 Number of Cores: 46

Total length of cored section: 434.5 meters Total core recovered: 258.5 m

Percentage of core recovery: 59.6%

OLDEST SEDIMENT CORED:

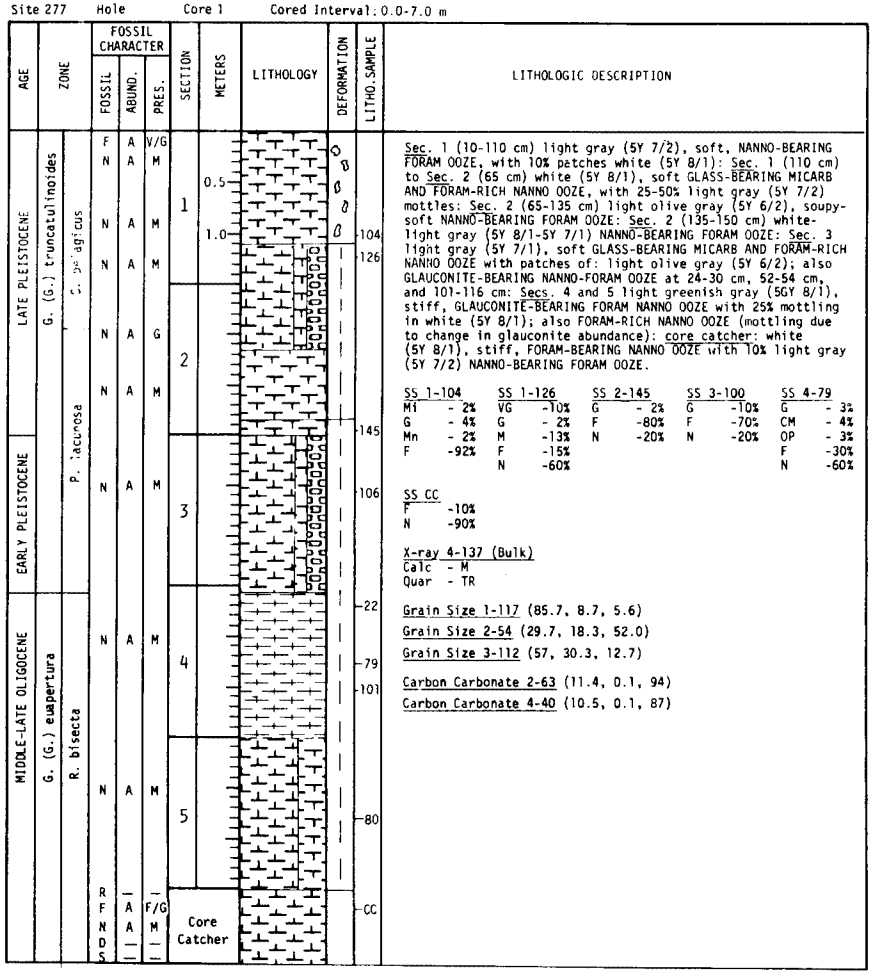
Depth below sea floor: 472.5 meters Nature: Clay-rich nannofossil chalk with chert layer

Age: Middle Paleocene

PRINCIPAL RESULTS:

Recovered 46 cores with total penetration of 472.5 meters on southern Campbell Plateau between Auckland and Campbell Islands. About 10 meters of Plio-Pleistocene foraminifera-rich nannofossil ooze separated disconformably from 462 meters of nannofossil ooze and nannofossil chalk of late Oligocene to middle Paleocene age. Thin chert layers of Eocene to early Oligocene age. Sequence represents good example of highly uniform sediments that have undergone diagenesis with depth of burial. Late Cenozoic mostly absent over Campbell Plateau reflecting major increase in bottom-water over region. Apparent uniform erosion over much of plateau to late Oligocene may be due to critical cohesion of this sediment. Remarkably complete subantarctic Paleogene sequence of nannofossils, foraminifera, and radiolaria. Zones similar to New Zealand but lower diversity. Continuous sedimentation throughout Paleogene and Neogene erosion opposite to that of Tasman Sea area (Leg 21) and related to major bottom-water changes in Cenozoic in southwest Pacific. The data at this site confirm that a widespread and prominent reflector, representing the upper interface of the layer on top of basement, is associated with the Cenozoic/Mesozoic boundary throughout the southern Campbell Plateau.

Site 277 Hole Core 1 Cored Interval: 0.0-7.0 m



Sec. 1 (10-110 cm) light gray (5Y 7/2), soft, NANNO-BEARING FORAM OOZE, with 10% patches white (5Y 8/1); Sec. 1 (110 cm) to Sec. 2 (65 cm) white (5Y 8/1), soft GLASS-BEARING MICARB AND FORAM-RICH NANNO OOZE, with 25-50% light gray (5Y 7/2) mottles: Sec. 2 (65-135 cm) light olive gray (5Y 6/2), soupy-soft NANNO-BEARING FORAM OOZE: Sec. 2 (135-150 cm) white-light gray (5Y 8/1-5Y 7/1) NANNO-BEARING FORAM OOZE: Sec. 3 light gray (5Y 7/1), soft GLASS-BEARING MICARB AND FORAM-RICH NANNO OOZE with patches of: light olive gray (5Y 6/2); also GLAUCONITE-BEARING NANNO-FORAM OOZE at 24-30 cm, 52-54 cm, and 101-116 cm: Secs. 4 and 5 light greenish gray (5GY 8/1), stiff, GLAUCONITE-BEARING FORAM NANNO OOZE with 25% mottling in white (5Y 8/1); also FORAM-RICH NANNO OOZE (mottling due to change in glauconite abundance): core catcher: white (5Y 8/1), stiff, FORAM-BEARING NANNO OOZE with 10% light gray (5Y 7/2) NANNO-BEARING FORAM OOZE.

SS 1-104
Mi - 2%
G - 4%
Mn - 2%
F -92%

SS 1-126
VG -10%
G - 2%
M -13%
F -15%
N -60%

SS 2-145
G - 2%
F -80%
N -20%

SS 3-100
G -10%
F -70%
N -20%

SS 4-79
G - 3%
CM - 4%
OP - 3%
F -30%
N -60%

SS CC
F -10%
N -90%

X-ray 4-137 (Bulk)
Calc - M
Quar - TR

Grain Size 1-117 (85.7, 8.7, 5.6)

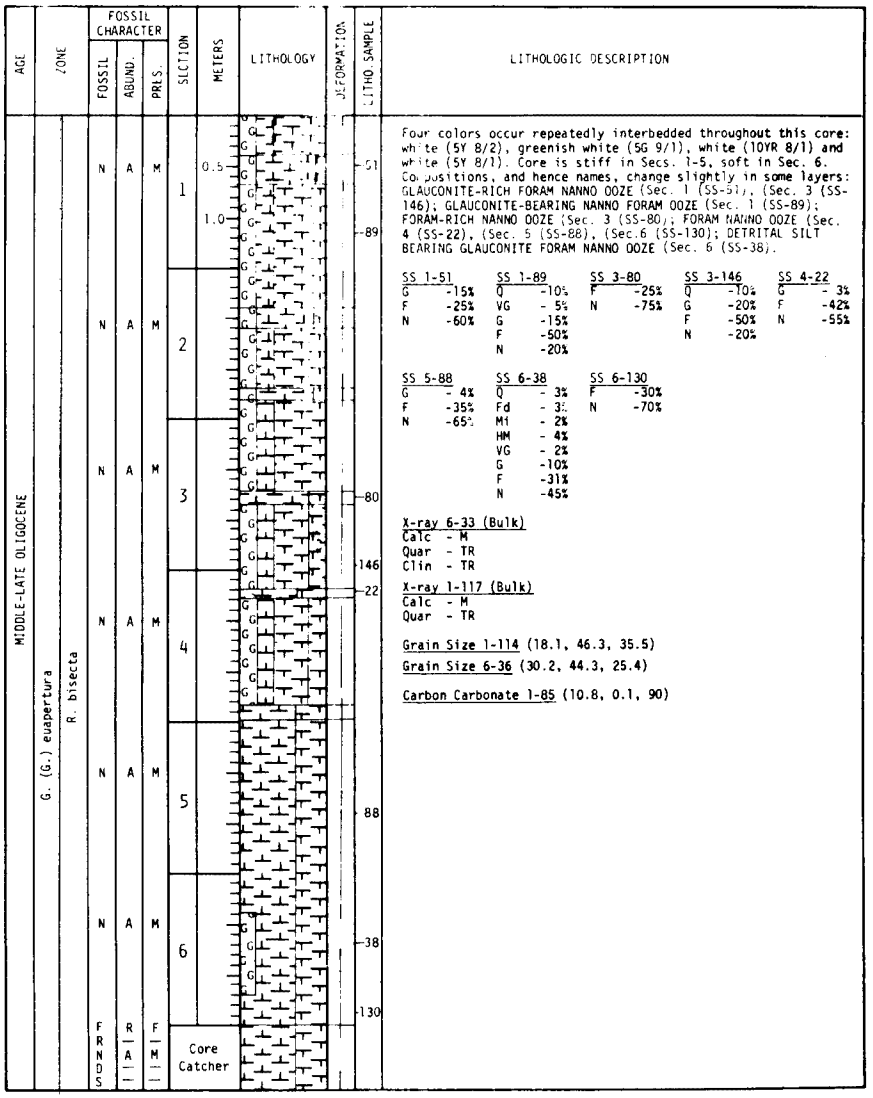
Grain Size 2-54 (29.7, 18.3, 52.0)

Grain Size 3-112 (57, 30.3, 12.7)

Carbon Carbonate 2-63 (11.4, 0.1, 94)

Carbon Carbonate 4-40 (10.5, 0.1, 87)

Site 277 Hole Core 2 Cored Interval: 7.0-16.5 m



Four colors occur repeatedly interbedded throughout this core: white (5Y 8/2), greenish white (5G 9/1), white (10YR 8/1) and white (5Y 8/1). Core is stiff in Secs. 1-5, soft in Sec. 6. Compositions, and hence names, change slightly in some layers: GLAUCONITE-RICH FORAM NANNO OOZE (Sec. 1 (SS-51), (Sec. 3 (SS-146); GLAUCONITE-BEARING NANNO FORAM OOZE (Sec. 1 (SS-89); FORAM-RICH NANNO OOZE (Sec. 3 (SS-80); FORAM NANNO OOZE (Sec. 4 (SS-22), (Sec. 5 (SS-88), (Sec.6 (SS-130); DETRITAL SILT BEARING GLAUCONITE FORAM NANNO OOZE (Sec. 6 (SS-38).

SS 1-51
G -15%
F -25%
N -60%

SS 1-89
Q -10%
VG - 5%
G -15%
F -50%
N -20%

SS 3-80
F -25%
N -75%

SS 3-146
Q -10%
G -20%
F -50%
N -20%

SS 4-22
G - 3%
F -42%
N -55%

SS 5-88
G - 4%
F -35%
N -65%

SS 6-38
Q - 3%
Fd - 3%
Mi - 2%
HM - 4%
VG - 2%
G -10%
F -31%
N -45%

SS 6-130
F -30%
N -70%

X-ray 6-33 (Bulk)
Calc - M
Quar - TR
Clin - TR

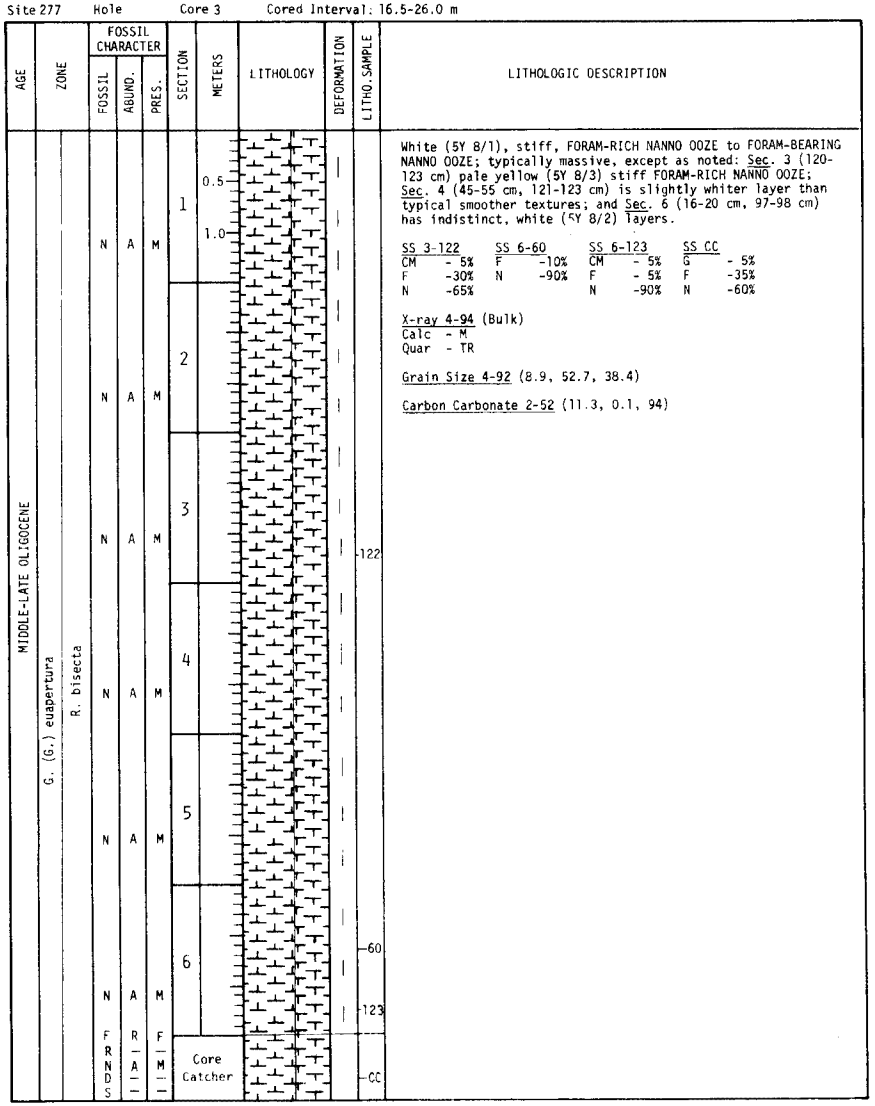
X-ray 1-117 (Bulk)
Calc - M
Quar - TR

Grain Size 1-114 (18.1, 46.3, 35.5)

Grain Size 6-36 (30.2, 44.3, 25.4)

Carbon Carbonate 1-85 (10.8, 0.1, 90)

Site 277 Hole Core 3 Cored Interval: 16.5-26.0 m



LITHOLOGIC DESCRIPTION

White (5Y 8/1), stiff, FORAM-RICH NANNO OOZE to FORAM-BEARING NANNO OOZE; typically massive, except as noted: Sec. 3 (120-123 cm) pale yellow (5Y 8/3) stiff FORAM-RICH NANNO OOZE; Sec. 4 (45-55 cm, 121-123 cm) is slightly whiter layer than typical smoother textures; and Sec. 6 (16-20 cm, 97-98 cm) has indistinct, white (5Y 8/2) layers.

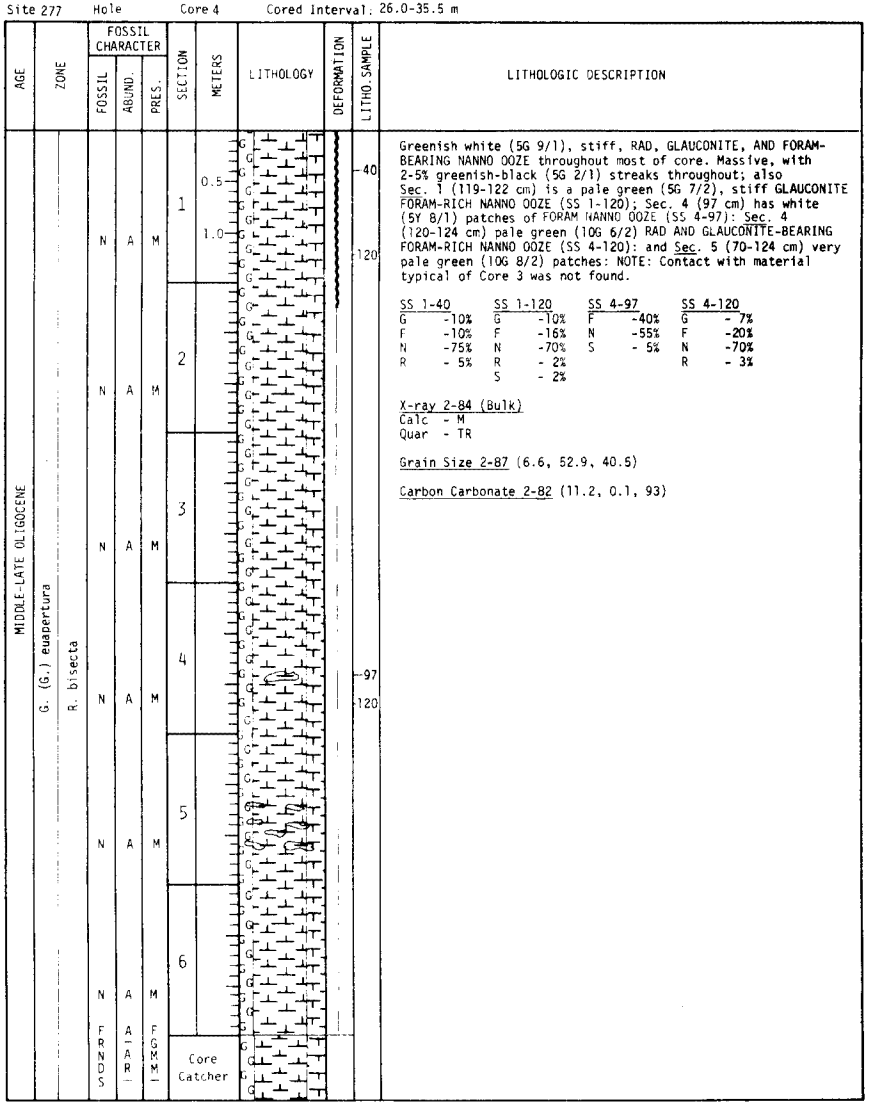
SS 3-122		SS 6-60		SS 6-123		SS CC	
CM	- 5%	F	-10%	CM	- 5%	G	- 5%
F	-30%	N	-90%	F	- 5%	F	-35%
N	-65%			N	-90%	N	-60%

X-ray 4-94 (Bulk)
Calc - M
Quar - TR

Grain Size 4-92 (8.9, 52.7, 38.4)

Carbon Carbonate 2-52 (11.3, 0.1, 94)

Site 277 Hole Core 4 Cored Interval: 26.0-35.5 m



LITHOLOGIC DESCRIPTION

Greenish white (5G 9/1), stiff, RAD, GLAUCONITE, AND FORAM-BEARING NANNO OOZE throughout most of core. Massive, with 2-5% greenish-black (5G 2/1) streaks throughout; also Sec. 1 (119-122 cm) is a pale green (5G 7/2), stiff GLAUCONITE FORAM-RICH NANNO OOZE (SS 1-120); Sec. 4 (97 cm) has white (5Y 8/1) patches of FORAM NANNO OOZE (SS 4-97): Sec. 4 (120-124 cm) pale green (10G 6/2) RAD AND GLAUCONITE-BEARING FORAM-RICH NANNO OOZE (SS 4-120): and Sec. 5 (70-124 cm) very pale green (10G 8/2) patches: NOTE: Contact with material typical of Core 3 was not found.

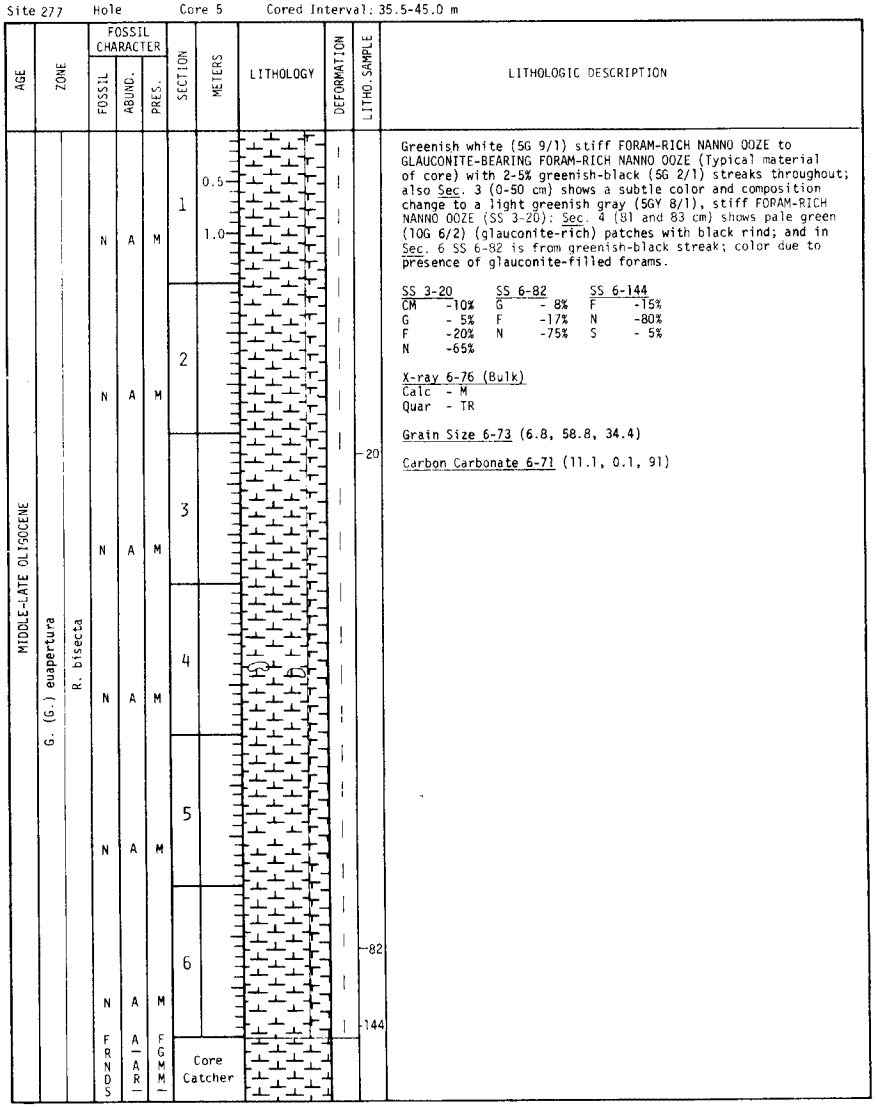
SS 1-40		SS 1-120		SS 4-97		SS 4-120	
G	-10%	G	-10%	F	-40%	G	- 7%
F	-10%	F	-16%	N	-55%	F	-20%
N	-75%	N	-70%	S	- 5%	N	-70%
R	- 5%	R	- 2%			R	- 3%
		S	- 2%				

X-ray 2-84 (Bulk)
Calc - M
Quar - TR

Grain Size 2-87 (6.6, 52.9, 40.5)

Carbon Carbonate 2-82 (11.2, 0.1, 93)

Site 277 Hole Core 5 Cored Interval: 35.5-45.0 m



LITHOLOGIC DESCRIPTION

Greenish white (5G 9/1) stiff FORAM-RICH NANNO OOZE to GLAUCONITE-BEARING FORAM-RICH NANNO OOZE (Typical material of core) with 2-5% greenish-black (5G 2/1) streaks throughout; also Sec. 3 (0-50 cm) shows a subtle color and composition change to a light greenish gray (5GY 8/1), stiff FORAM-RICH NANNO OOZE (SS 3-20): Sec. 4 (81 and 83 cm) shows pale green (10G 6/2) (glauconite-rich) patches with black rind; and in Sec. 6 SS 6-82 is from greenish-black streak; color due to presence of glauconite-filled forams.

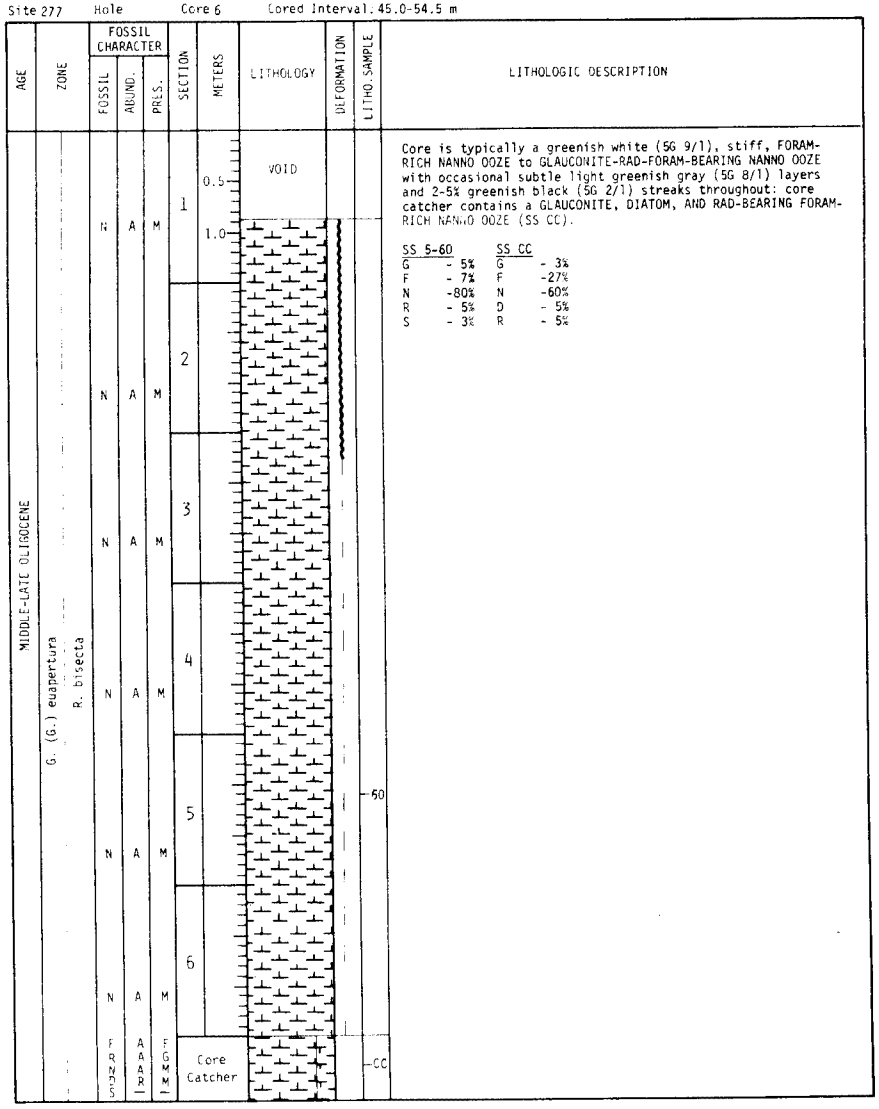
SS 3-20		SS 6-82		SS 6-144	
CM	-10%	G	- 8%	F	-15%
G	- 5%	F	-17%	N	-80%
F	-20%	N	-75%	S	- 5%
N	-65%				

X-ray 6-76 (Bulk)
Calc - M
Quar - TR

Grain Size 6-73 (6.8, 58.8, 34.4)

Carbon Carbonate 6-71 (11.1, 0.1, 91)

Site 277 Hole Core 6 Cored Interval: 45.0-54.5 m

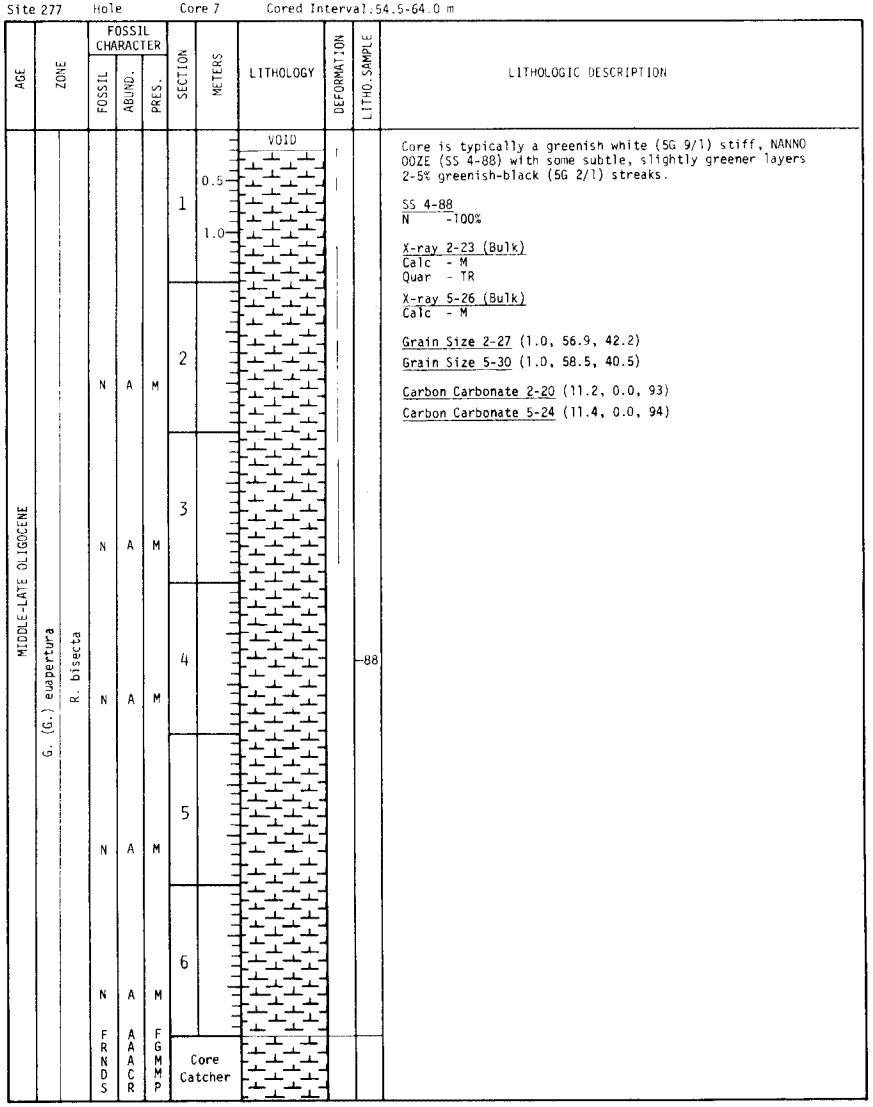


LITHOLOGIC DESCRIPTION

Core is typically a greenish white (5G 9/1), stiff, FORAM-RICH NANNO OOZE to GLAUCONITE-RAD-FORAM-BEARING NANNO OOZE with occasional subtle light greenish gray (5G 8/1) layers and 2-5% greenish black (5G 2/1) streaks throughout: core catcher contains a GLAUCONITE, DIATOM, AND RAD-BEARING FORAM-RICH NANNO OOZE (SS CC).

SS 5-60		SS CC	
G	- 5%	G	- 3%
F	- 7%	F	-27%
N	-80%	N	-60%
R	- 5%	D	- 5%
S	- 3%	R	- 5%

Site 277 Hole Core 7 Cored Interval: 54.5-64.0 m



Core is typically a greenish white (5G 9/1) stiff, NANNO OOZE (SS 4-88) with some subtle, slightly greener layers 2-5% greenish-black (5G 2/1) streaks.

SS 4-88
N -100%

X-ray 2-23 (Bulk)
Calc - M
Quar - TR

X-ray 5-26 (Bulk)
Calc - M

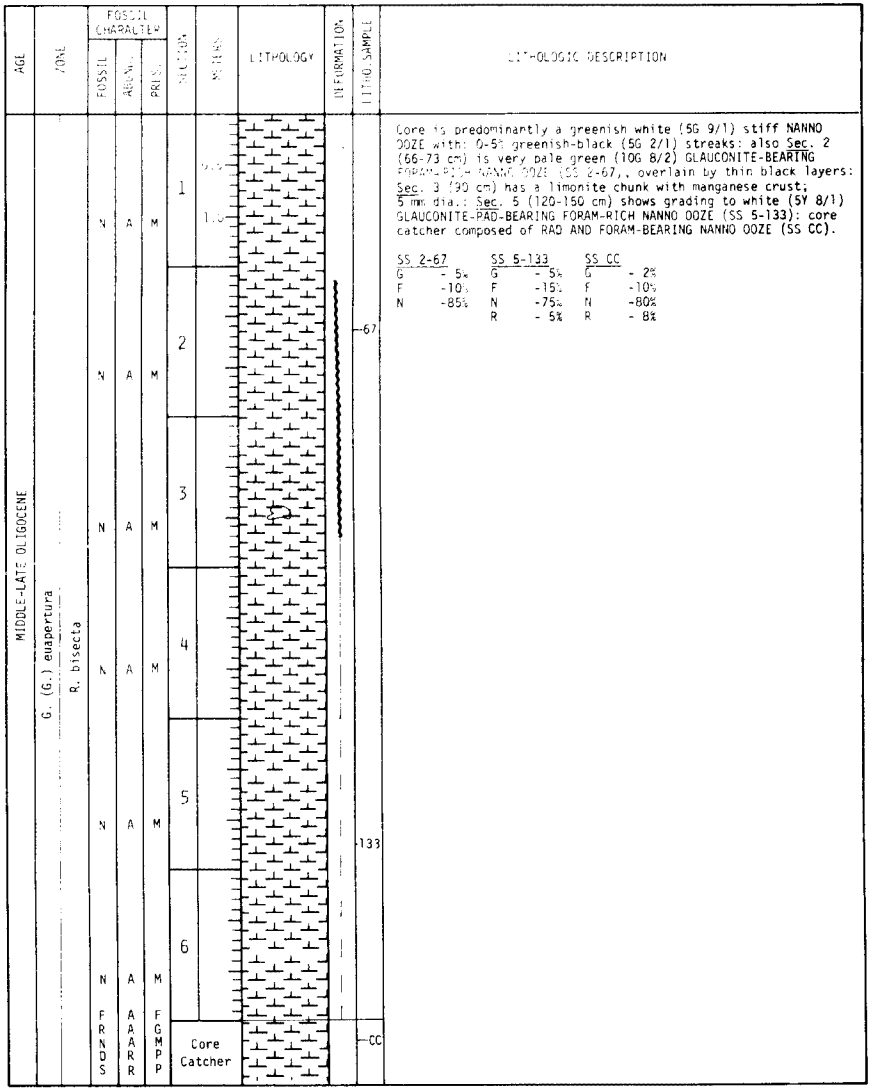
Grain Size 2-27 (1.0, 56.9, 42.2)

Grain Size 5-30 (1.0, 58.5, 40.5)

Carbon Carbonate 2-20 (11.2, 0.0, 93)

Carbon Carbonate 5-24 (11.4, 0.0, 94)

Site 277 Hole Core 8 Cored Interval: 64.0-73.5 m



Core is predominantly a greenish white (5G 9/1) stiff NANNO OOZE with: 0-5% greenish-black (5G 2/1) streaks: also Sec. 2 (66-73 cm) is very pale green (10G 8/2) GLAUCONITE-BEARING FORAM-RICH NANNO OOZE (SS 2-67), overlain by thin black layers; Sec. 3 (90 cm) has a limonite chunk with manganese crust; 5 mm dia.; Sec. 5 (120-150 cm) shows grading to white (5Y 8/1) GLAUCONITE-PAD-BEARING FORAM-RICH NANNO OOZE (SS 5-133); core catcher composed of RAD AND FORAM-BEARING NANNO OOZE (SS CC).

SS 2-67		SS 5-133		SS CC	
G	- 5%	G	- 5%	G	- 2%
F	-10%	F	-15%	F	-10%
N	-85%	N	-75%	N	-80%
		R	- 5%	R	- 8%

Site 277 Hole Core 9 Cored Interval: 73.5-83.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
MIDDLE-LATE OLIGOCENE	G. (S.) angiporoides angiporoides / G. (G.) euapertura / R. bisecta	N	A	M	1	0.5 – 1.0			
		N	A	M	2				-90
		N	A	M	3				
		N	A	M	4				
		N	A	M	5				
		F N	A A	G M	6				
		F R N D S	A A C A	G M M M	Core Catcher				-CC

LITHOLOGIC DESCRIPTION

Typically a greenish white (5G 9/1) stiff RAD-BEARING FORAM-RICH NANNO OOZE with faint slightly greener and slightly whiter layering through Sec. 4 and 0-5% faint greenish-black (5G 2/1) streaks throughout (SS 2-90): core catcher consists of a RAD-BEARING FORAM-RICH NANNO OOZE.

SS 2-90		SS CC	
F	-20%	F	-12%
N	-75%	N	-80%
R	- 5%	R	- 8%

X-ray 2-80 (Bulk)
Calc - M

Grain Size 2-83 (0.7, 57.1, 42.2)

Carbon Carbonate 2-77 (11.2, 0.1, 92)

Site 277 Hole Core 10 Cored Interval: 83.0-92.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	FORMATION	LITHO. SAMPLE
MIDDLE OLIGOCENE	G (S.) angiporoides angiporoides / R. bisecta	N	A	M	1				-26
		N	A	M	2				-141 -85
		N	A	M	3				
		N	A	M	4				
		N	A	M	5				
		N	A	M	6				
		F R N D S	A A C R	F/G G M M P	Core Catcher				

LITHOLOGIC DESCRIPTION

Typically a greenish white (5G 9/1) stiff RAD-BEARING FORAM-RICH NANNO OOZE with: 1-3, greenish-black (5G 2/1) streaks: also noted, Sec. 1 (25-34 cm, white (5Y 8/2) streak of FORAM-RICH NANNO OOZE (SS 1-26), Sec. 1 (138-143 cm) greenish white (5G 9/1) anomalously hard layer DIATOM-BEARING NANNO OOZE (SS 1-141); Sec. 2 (83-86 cm): Anomalously hard layer, as above (SS 2-85), Sec. 3 (97-100 cm, 140-143 cm) anomalously hard layers, as above; and Sec. 5 (126-129 cm) anomalously hard layer, as above.

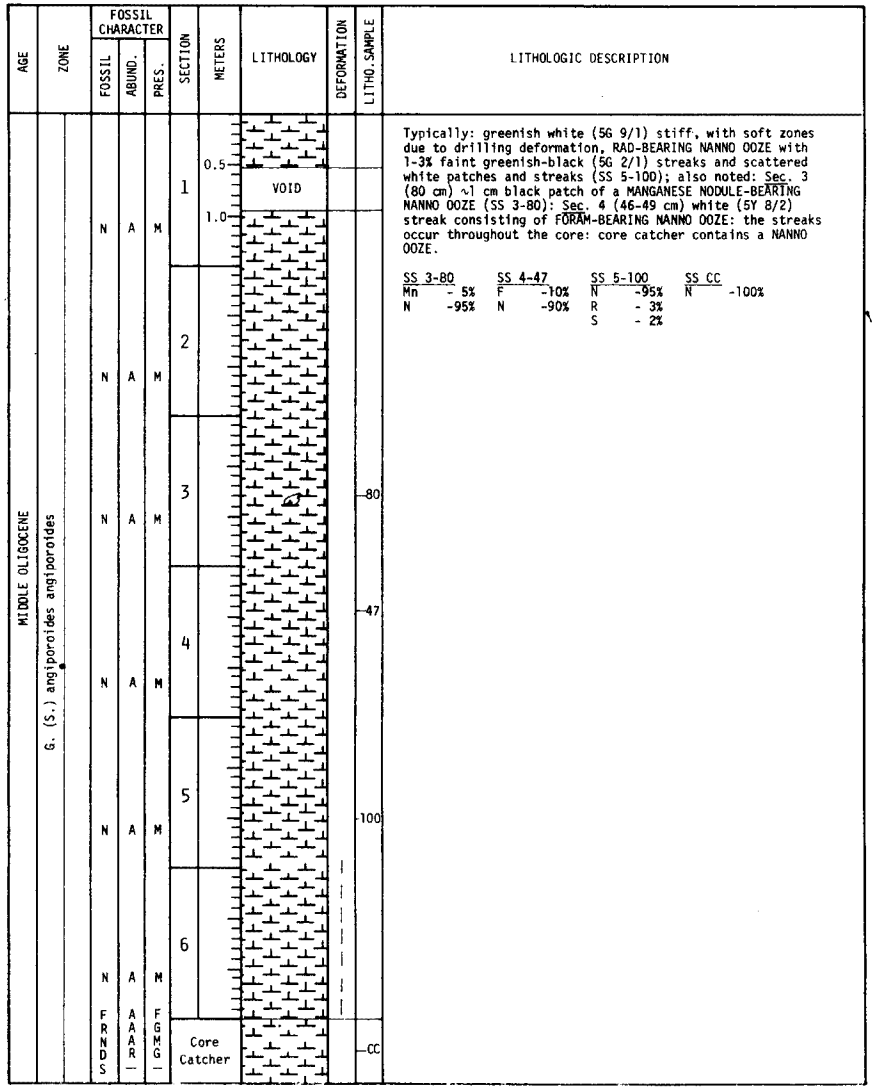
SS 1-26		SS 1-141		SS 2-85	
O	- 5%	F	- 3%	F	-15%
F	-25%	N	-90%	N	-75%
N	-65%	D	- 7%	D	- 5%
D	- 2%			R	- 2%
R	- 1%			S	- 2%
S	- 2%			Sr	- 1%

X-ray 5-98 (Bulk)
Calc - M

Grain Size 5-101 (0.8, 52.1, 47.1)

Carbon Carbonate 5-96 (11.4, 0.1, 95)

Site 277 Hole Core 11 Cored Interval: 92.5-102.0 m

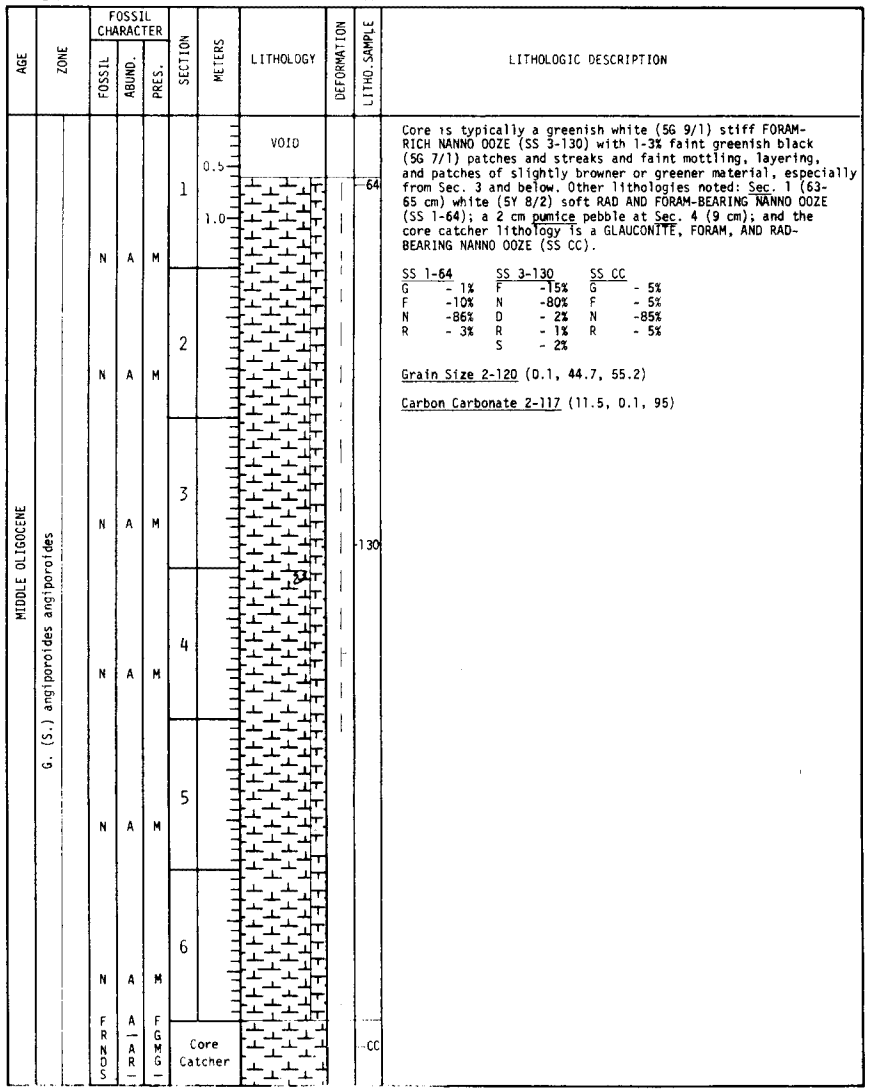


LITHOLOGIC DESCRIPTION

Typically: greenish white (5G 9/1) stiff, with soft zones due to drilling deformation, RAD-BEARING NANNO OOZE with 1-3% faint greenish-black (5G 2/1) streaks and scattered white patches and streaks (SS 5-100); also noted: Sec. 3 (80 cm) ∿1 cm black patch of a MANGANESE NODULE-BEARING NANNO OOZE (SS 3-80): Sec. 4 (46-49 cm) white (5Y 8/2) streak consisting of FORAM-BEARING NANNO OOZE: the streaks occur throughout the core: core catcher contains a NANNO OOZE.

SS 3-80		SS 4-47		SS 5-100		SS CC	
Mn	- 5%	F	-10%	N	-95%	N	-100%
N	-95%	N	-90%	R	- 3%		
				S	- 2%		

Site 277 Hole Core 12 Cored Interval: 102.0-111.5 m



LITHOLOGIC DESCRIPTION

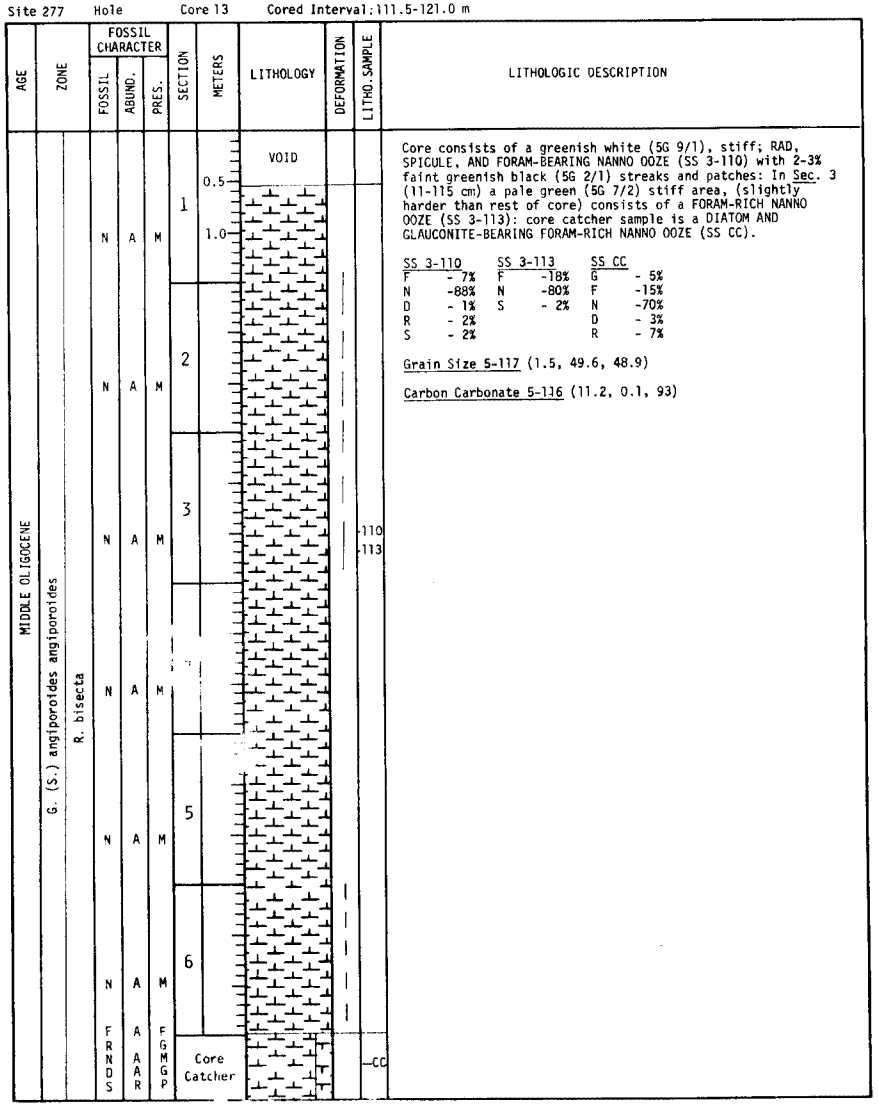
Core is typically a greenish white (5G 9/1) stiff FORAM-RICH NANNO OOZE (SS 3-130) with 1-3% faint greenish black (5G 7/1) patches and streaks and faint mottling, layering, and patches of slightly browner or greener material, especially from Sec. 3 and below. Other lithologies noted: Sec. 1 (63-65 cm) white (5Y 8/2) soft RAD AND FORAM-BEARING NANNO OOZE (SS 1-64); a 2 cm pumice pebble at Sec. 4 (9 cm); and the core catcher lithology is a GLAUCONITE, FORAM, AND RAD-BEARING NANNO OOZE (SS CC).

SS 1-64		SS 3-130		SS CC	
G	- 1%	F	-15%	G	- 5%
F	-10%	N	-80%	F	- 5%
N	-86%	D	- 2%	N	-85%
R	- 3%	R	- 1%	R	- 5%
		S	- 2%		

Grain Size 2-120 (0.1, 44.7, 55.2)

Carbon Carbonate 2-117 (11.5, 0.1, 95)

Site 277 Hole Core 13 Cored Interval: 111.5-121.0 m



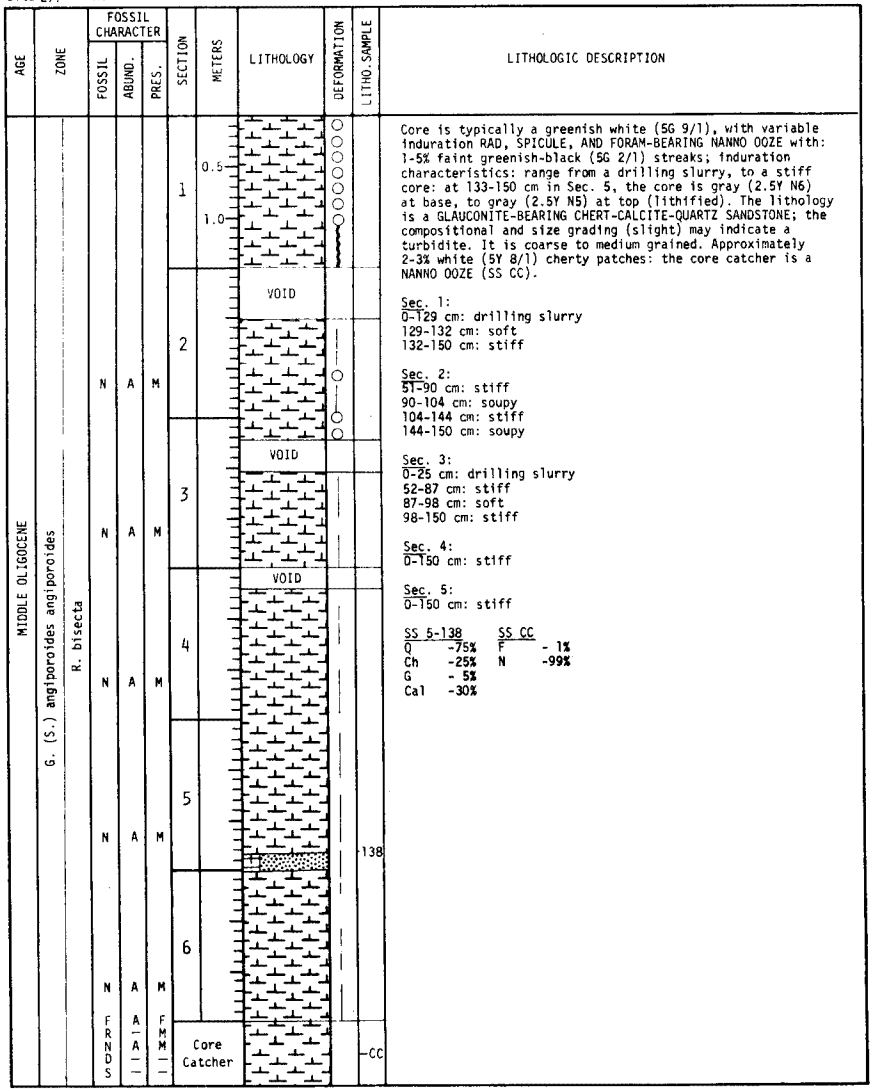
Core consists of a greenish white (5G 9/1), stiff; RAD, SPICULE, AND FORAM-BEARING NANNO OOZE (SS 3-110) with 2-3% faint greenish black (5G 2/1) streaks and patches: In Sec. 3 (11-115 cm) a pale green (5G 7/2) stiff area, (slightly harder than rest of core) consists of a FORAM-RICH NANNO OOZE (SS 3-113): core catcher sample is a DIATOM AND GLAUCONITE-BEARING FORAM-RICH NANNO OOZE (SS CC).

SS 3-110		SS 3-113		SS CC	
F	- 7%	F	-18%	G	- 5%
N	-88%	N	-80%	F	-15%
D	- 1%	S	- 2%	N	-70%
R	- 2%			D	- 3%
S	- 2%			R	- 7%

Grain Size 5-117 (1.5, 49.6, 48.9)

Carbon Carbonate 5-116 (11.2, 0.1, 93)

Site 277 Hole Core 14 Cored Interval: 121.0-130.5 m



Core is typically a greenish white (5G 9/1), with variable induration RAD, SPICULE, AND FORAM-BEARING NANNO OOZE with: 1-5% faint greenish-black (5G 2/1) streaks; induration characteristics: range from a drilling slurry, to a stiff core: at 133-150 cm in Sec. 5, the core is gray (2.5Y N6) at base, to gray (2.5Y N5) at top (lithified). The lithology is a GLAUCONITE-BEARING CHERT-CALCITE-QUARTZ SANDSTONE; the compositional and size grading (slight) may indicate a turbidite. It is coarse to medium grained. Approximately 2-3% white (5Y 8/1) cherty patches: the core catcher is a NANNO OOZE (SS CC).

Sec. 1:
0-129 cm: drilling slurry
129-132 cm: soft
132-150 cm: stiff

Sec. 2:
51-90 cm: stiff
90-104 cm: soupy
104-144 cm: stiff
144-150 cm: soupy

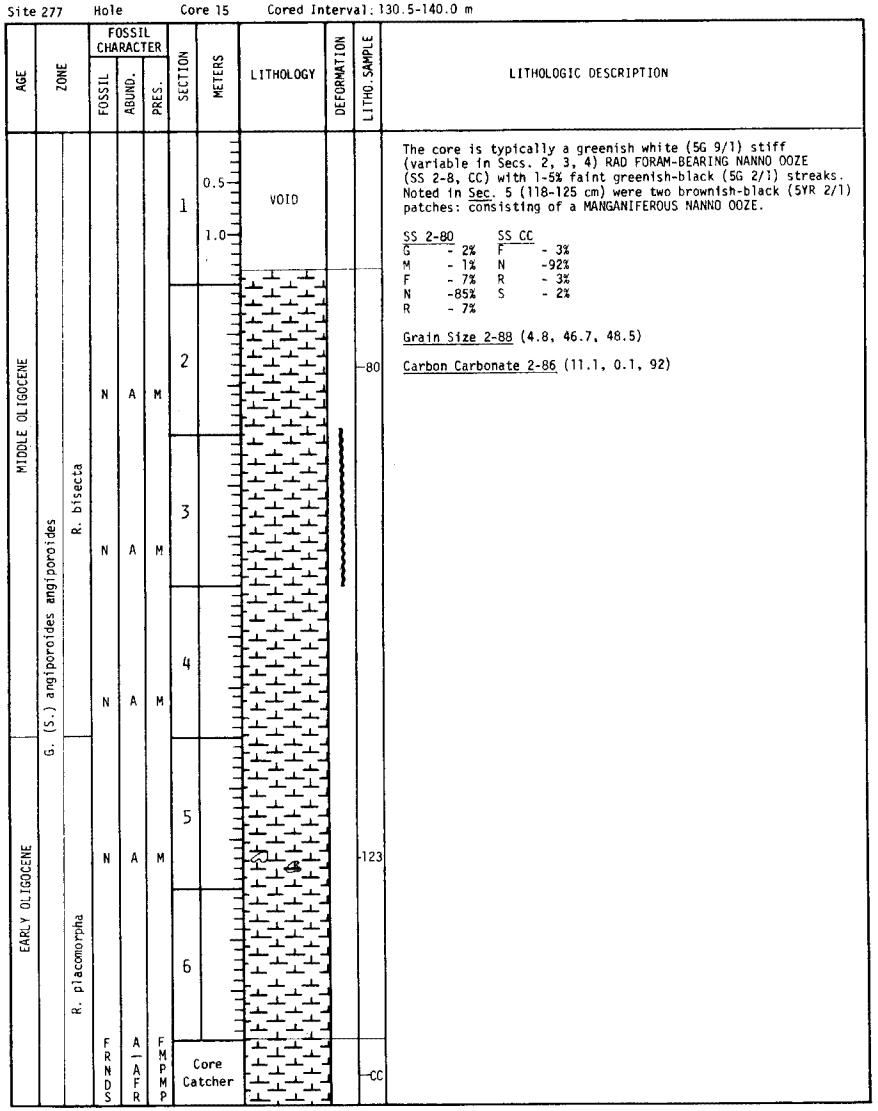
Sec. 3:
0-25 cm: drilling slurry
52-87 cm: stiff
87-98 cm: soft
98-150 cm: stiff

Sec. 4:
0-150 cm: stiff

Sec. 5:
0-150 cm: stiff

SS 5-138		SS CC	
Q	-75%	F	- 1%
Ch	-25%	N	-99%
G	- 5%		
Cal	-30%		

Site 277 Hole Core 15 Cored Interval: 130.5-140.0 m



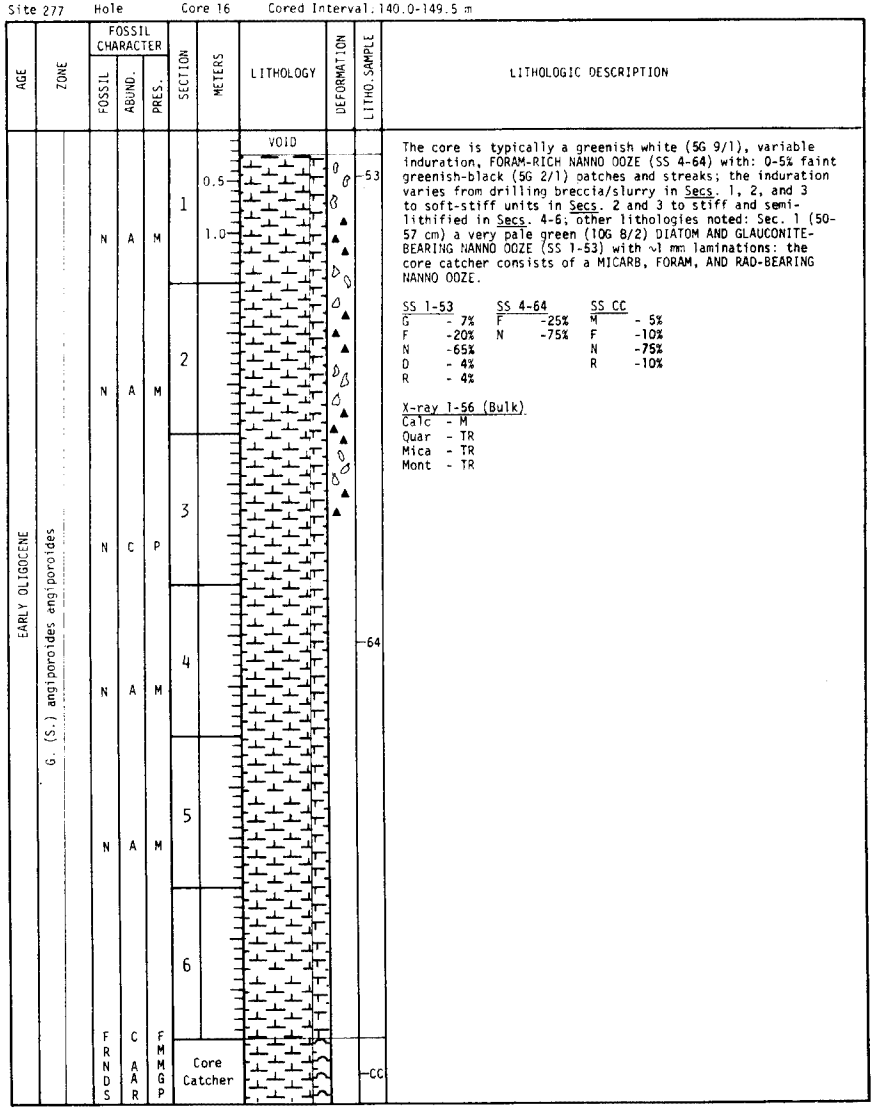
The core is typically a greenish white (5G 9/1) stiff (variable in Secs. 2, 3, 4) RAD FORAM-BEARING NANNO OOZE (SS 2-8, CC) with 1-5% faint greenish-black (5G 2/1) streaks. Noted in Sec. 5 (118-125 cm) were two brownish-black (5YR 2/1) patches: consisting of a MANGANIFEROUS NANNO OOZE.

SS 2-80		SS CC	
G	- 2%	F	- 3%
M	- 1%	N	-92%
F	- 7%	R	- 3%
N	-85%	S	- 2%
R	- 7%		

Grain Size 2-88 (4.8, 46.7, 48.5)

Carbon Carbonate 2-86 (11.1, 0.1, 92)

Site 277 Hole Core 16 Cored Interval: 140.0-149.5 m



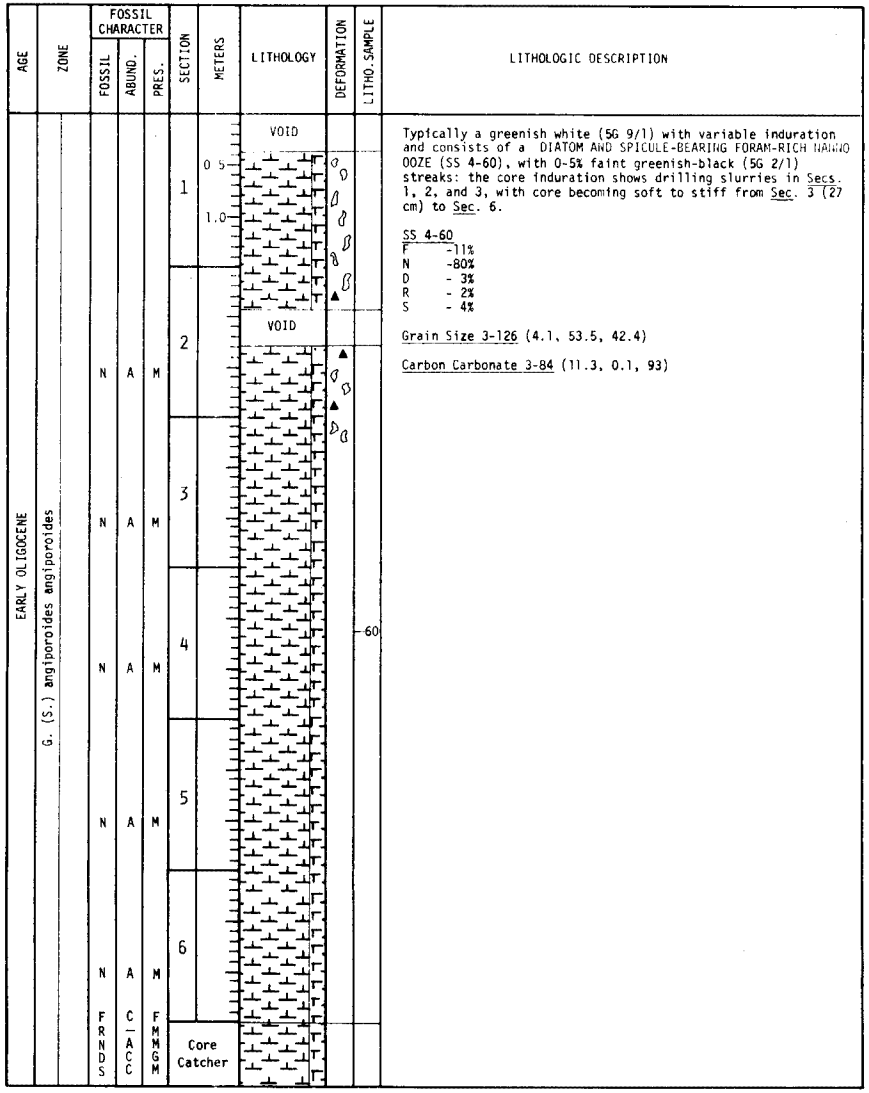
The core is typically a greenish white (5G 9/1), variable induration, FORAM-RICH NANNO OOZE (SS 4-64) with: 0-5% faint greenish-black (5G 2/1) patches and streaks; the induration varies from drilling breccia/slurry in Secs. 1, 2, and 3 to soft-stiff units in Secs. 2 and 3 to stiff and semi-lithified in Secs. 4-6; other lithologies noted: Sec. 1 (50-57 cm) a very pale green (10G 8/2) DIATOM AND GLAUCONITE-BEARING NANNO OOZE (SS 1-53) with ~1 mm laminations: the core catcher consists of a MICARB, FORAM, AND RAD-BEARING NANNO OOZE.

SS 1-53		SS 4-64		SS CC	
G	- 7%	F	-25%	M	- 5%
F	-20%	N	-75%	F	-10%
N	-65%			N	-75%
D	- 4%			R	-10%
R	- 4%				

X-ray 1-56 (Bulk)

Calc	- M
Quar	- TR
Mica	- TR
Mont	- TR

Site 277 Hole Core 17 Cored Interval: 149.5-159.0 m



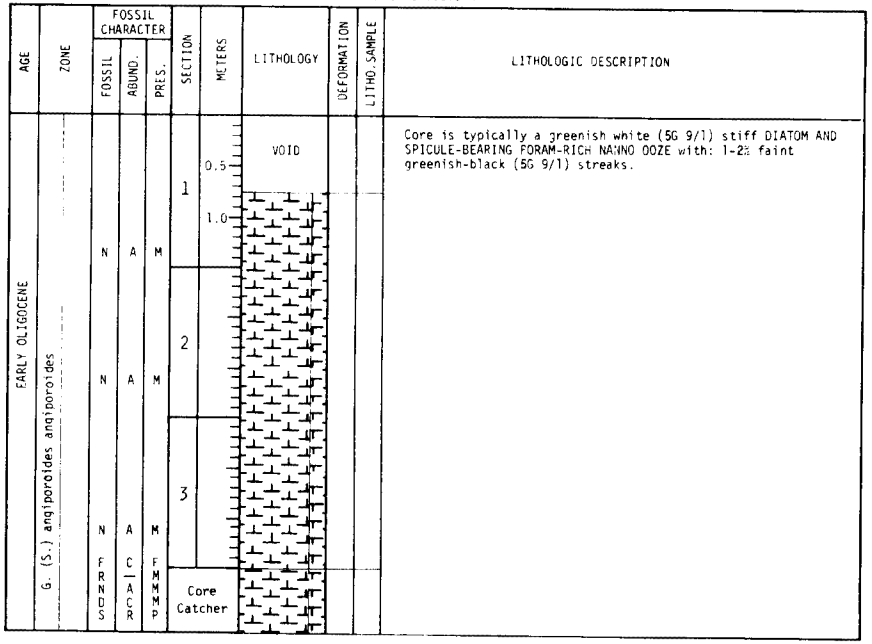
Typically a greenish white (5G 9/1) with variable induration and consists of a DIATOM AND SPICULE-BEARING FORAM-RICH NANNO OOZE (SS 4-60), with 0-5% faint greenish-black (5G 2/1) streaks: the core induration shows drilling slurries in Secs. 1, 2, and 3, with core becoming soft to stiff from Sec. 3 (27 cm) to Sec. 6.

SS 4-60
F -11%
N -80%
D - 3%
R - 2%
S - 4%

Grain Size 3-126 (4.1, 53.5, 42.4)

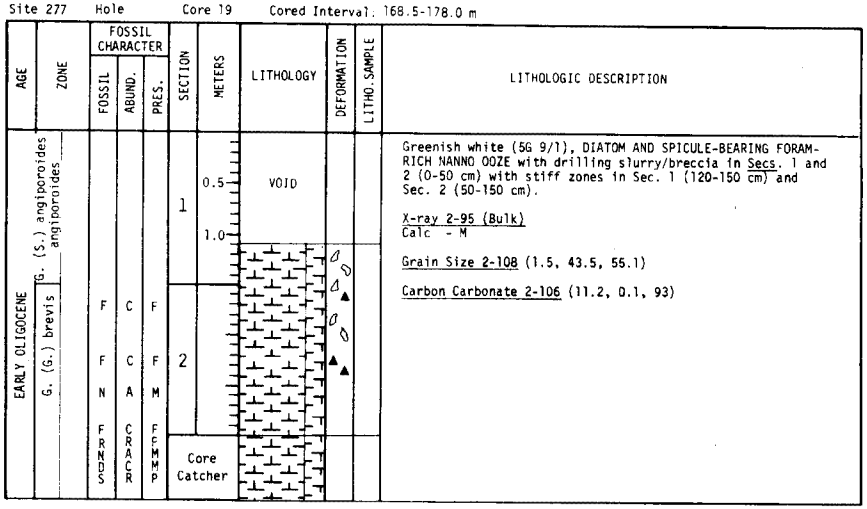
Carbon Carbonate 3-84 (11.3, 0.1, 93)

Site 277 Hole Core 18 Cored Interval: 159.0-168.5 m



Core is typically a greenish white (5G 9/1) stiff DIATOM AND SPICULE-BEARING FORAM-RICH NANNO OOZE with: 1-2% faint greenish-black (5G 9/1) streaks.

Site 277 Hole Core 19 Cored Interval: 168.5-178.0 m



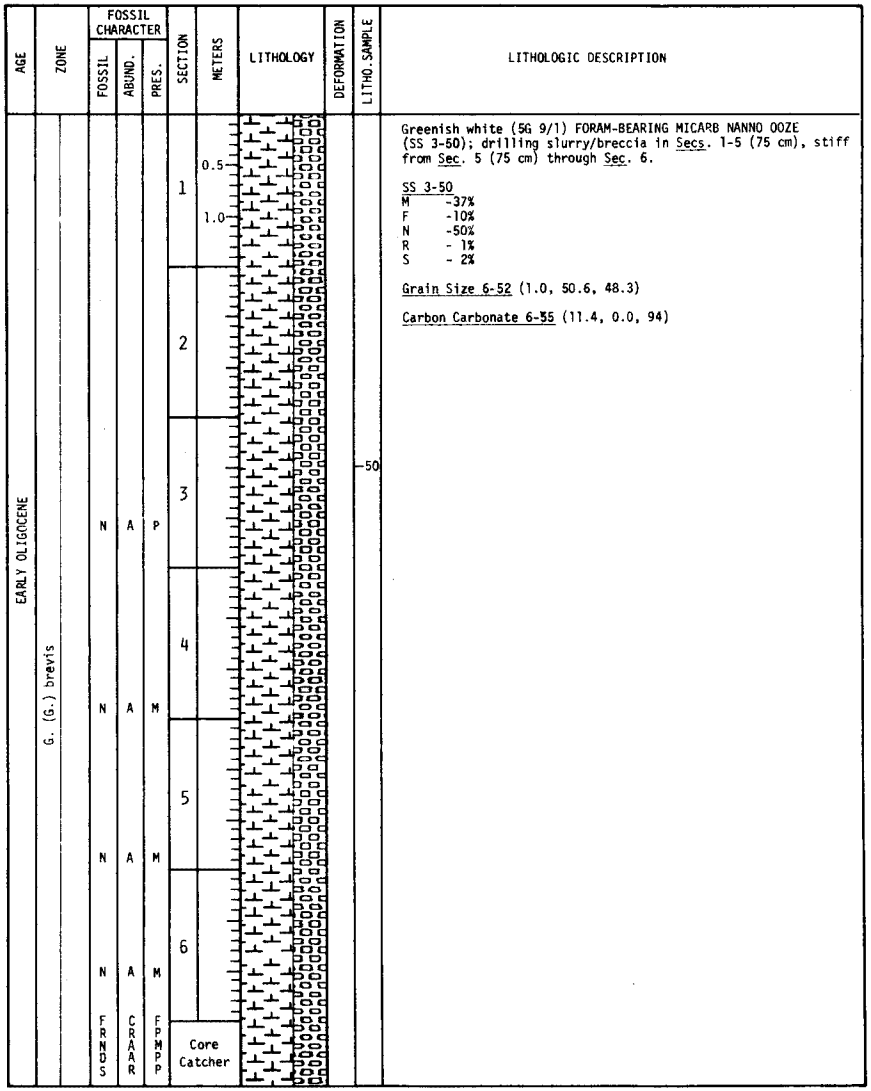
Greenish white (5G 9/1), DIATOM AND SPICULE-BEARING FORAM-RICH NANNO OOZE with drilling slurry/breccia in Secs. 1 and 2 (0-50 cm) with stiff zones in Sec. 1 (120-150 cm) and Sec. 2 (50-150 cm).

X-ray 2-95 (Bulk)
Calc - M

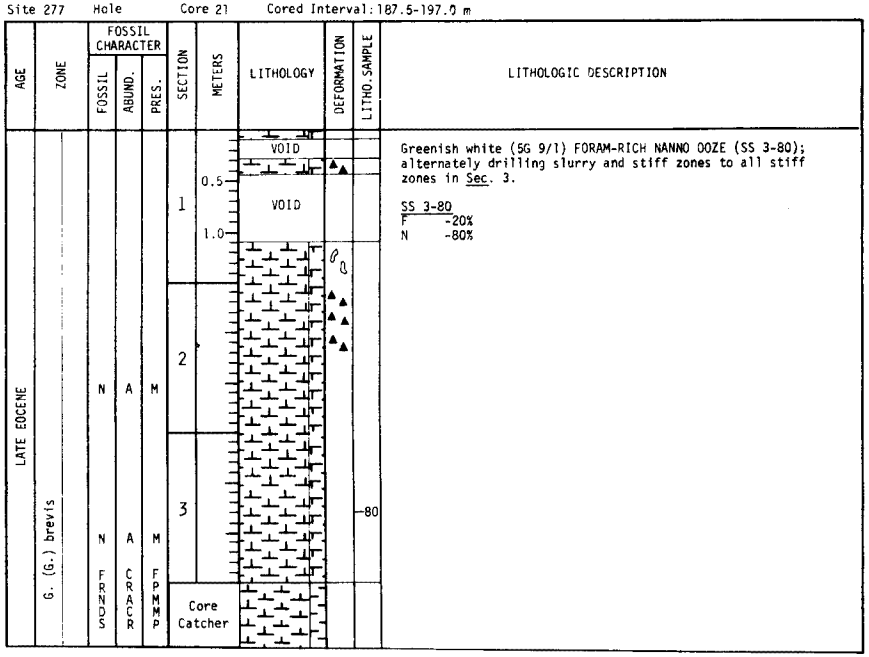
Grain Size 2-108 (1.5, 43.5, 55.1)

Carbon Carbonate 2-106 (11.2, 0.1, 93)

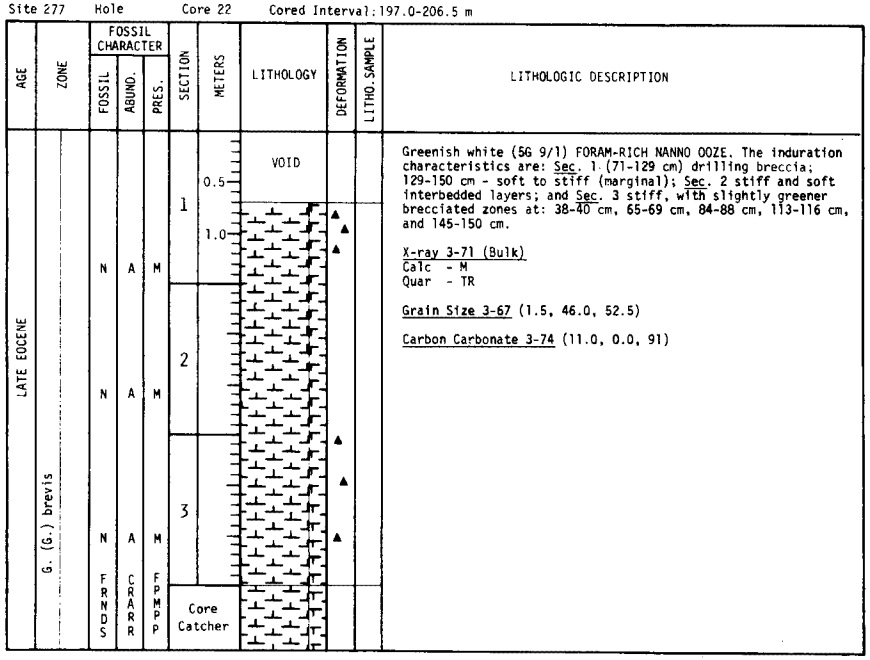
Site 277 Hole Core 20 Cored Interval: 178.0-187.5 m



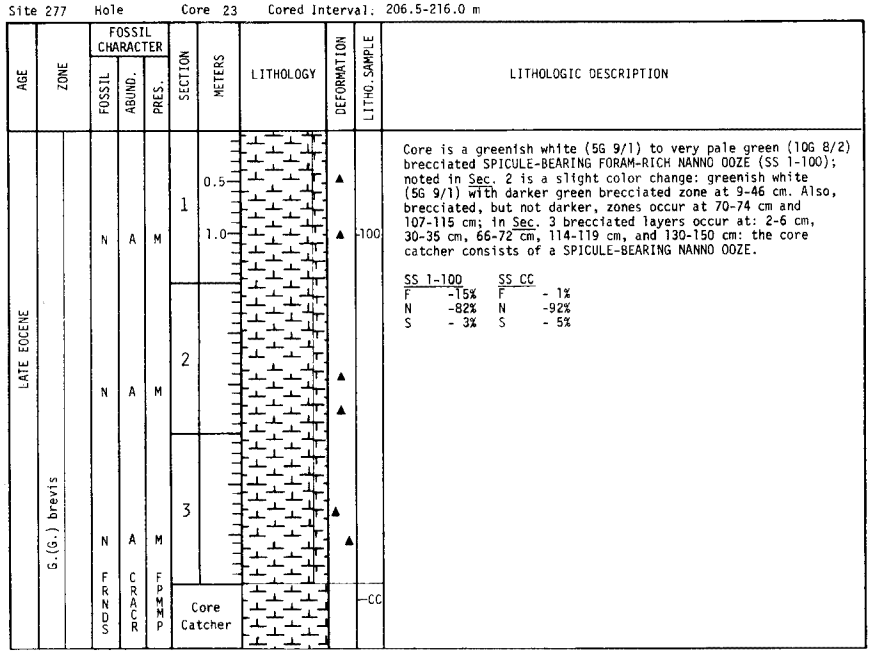
Site 277 Hole Core 21 Cored Interval: 187.5-197.0 m



Site 277 Hole Core 22 Cored Interval: 197.0-206.5 m



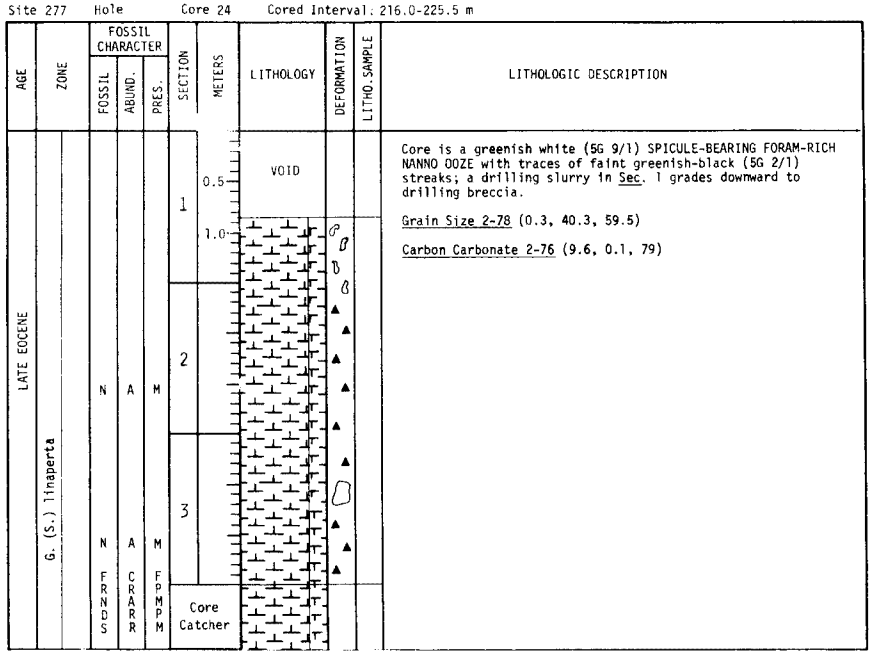
Site 277 Hole Core 23 Cored Interval: 206.5-216.0 m



Core is a greenish white (5G 9/1) to very pale green (10G 8/2) brecciated SPICULE-BEARING FORAM-RICH NANNO OOZE (SS 1-100); noted in Sec. 2 is a slight color change: greenish white (5G 9/1) with darker green brecciated zone at 9-46 cm. Also, brecciated, but not darker, zones occur at 70-74 cm and 107-115 cm; in Sec. 3 brecciated layers occur at: 2-6 cm, 30-35 cm, 66-72 cm, 114-119 cm, and 130-150 cm: the core catcher consists of a SPICULE-BEARING NANNO OOZE.

SS 1-100		SS CC	
F	-15%	F	- 1%
N	-82%	N	-92%
S	- 3%	S	- 5%

Site 277 Hole Core 24 Cored Interval: 216.0-225.5 m

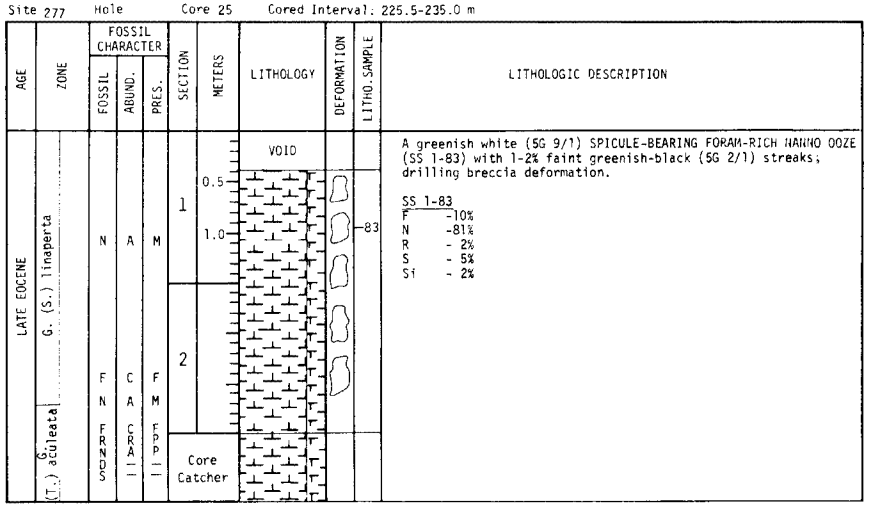


Core is a greenish white (5G 9/1) SPICULE-BEARING FORAM-RICH NANNO OOZE with traces of faint greenish-black (5G 2/1) streaks; a drilling slurry in Sec. 1 grades downward to drilling breccia.

Grain Size 2-78 (0.3, 40.3, 59.5)

Carbon Carbonate 2-76 (9.6, 0.1, 79)

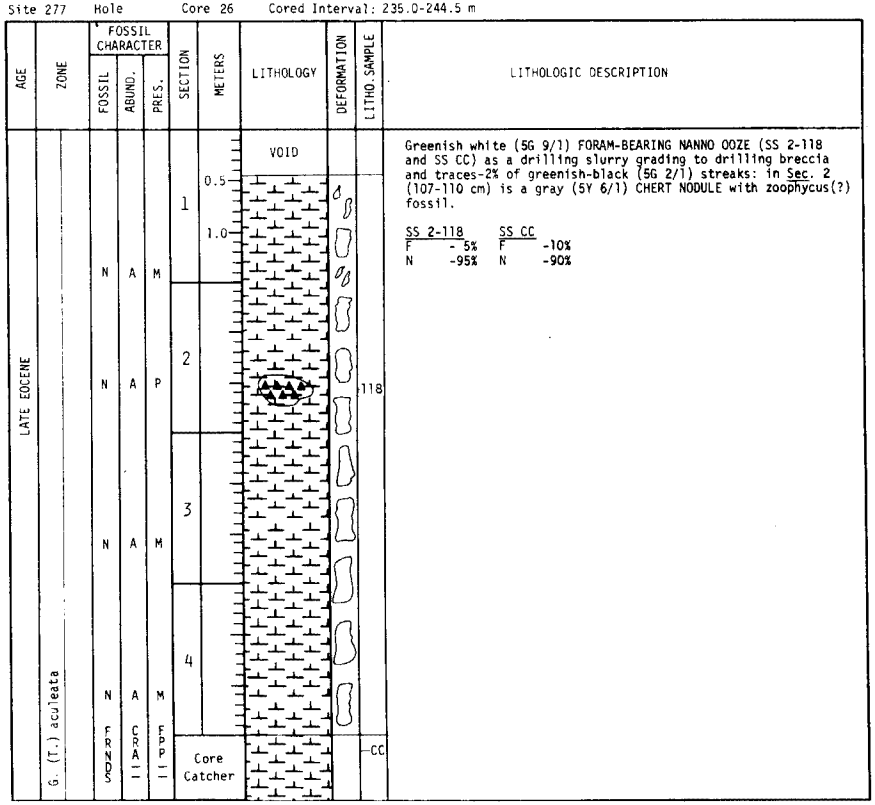
Site 277 Hole Core 25 Cored Interval: 225.5-235.0 m



A greenish white (5G 9/1) SPICULE-BEARING FORAM-RICH NANNO OOZE (SS 1-83) with 1-2% faint greenish-black (5G 2/1) streaks; drilling breccia deformation.

SS 1-83	
F	-10%
N	-81%
R	- 2%
S	- 5%
Si	- 2%

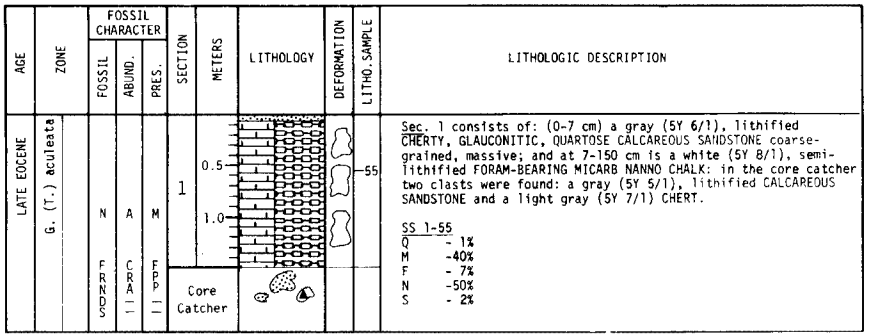
Site 277 Hole Core 26 Cored Interval: 235.0-244.5 m



Greenish white (5G 9/1) FORAM-BEARING NANNO OOZE (SS 2-118 and SS CC) as a drilling slurry grading to drilling breccia and traces-2% of greenish-black (5G 2/1) streaks: in Sec. 2 (107-110 cm) is a gray (5Y 6/1) CHERT NODULE with zoophycus(?) fossil.

SS 2-118		SS CC	
F	- 5%	F	-10%
N	-95%	N	-90%

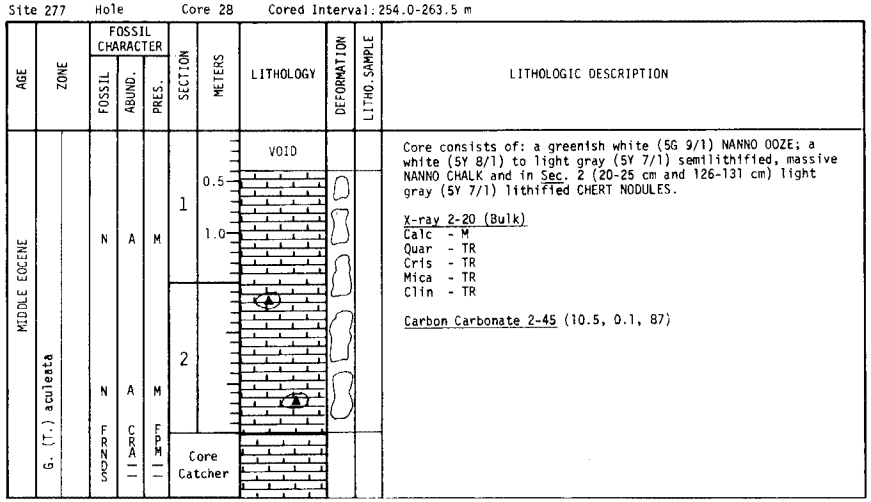
Site 277 Hole Core 27 Cored Interval: 244.5-254.0 m



Sec. 1 consists of: (0-7 cm) a gray (5Y 6/1), lithified CHERTY, GLAUCONITIC, QUARTOSE CALCAREOUS SANDSTONE coarse-grained, massive; and at 7-150 cm is a white (5Y 8/1), semi-lithified FORAM-BEARING MICARB NANNO CHALK: in the core catcher two clasts were found: a gray (5Y 5/1), lithified CALCAREOUS SANDSTONE and a light gray (5Y 7/1) CHERT.

SS 1-55
Q - 1%
M -40%
F - 7%
N -50%
S - 2%

Site 277 Hole Core 28 Cored Interval: 254.0-263.5 m

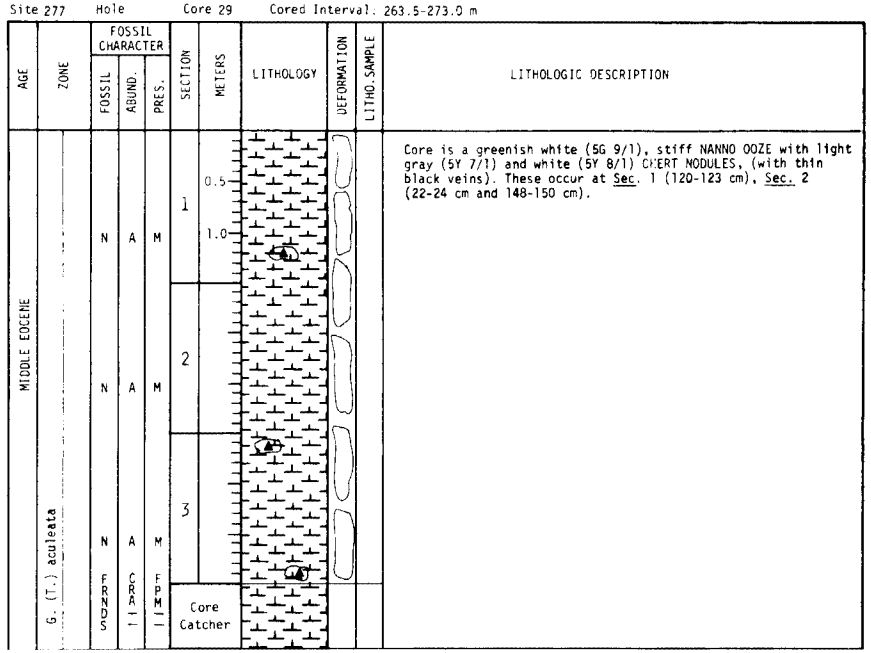


Core consists of: a greenish white (5G 9/1) NANNO OOZE; a white (5Y 8/1) to light gray (5Y 7/1) semilithified, massive NANNO CHALK and in Sec. 2 (20-25 cm and 126-131 cm) light gray (5Y 7/1) lithified CHERT NODULES.

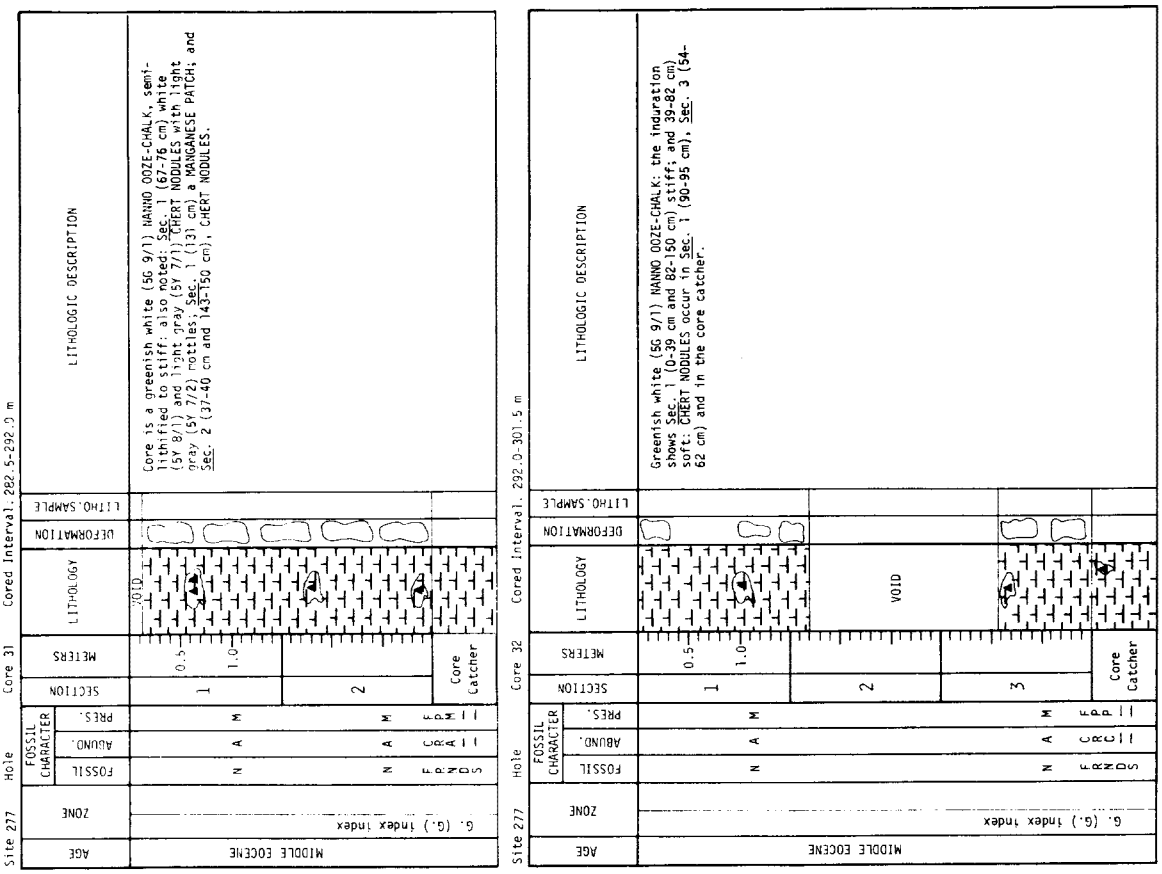
X-ray 2-20 (Bulk)
Calc - M
Quar - TR
Cris - TR
Mica - TR
Clin - TR

Carbon Carbonate 2-45 (10.5, 0.1, 87)

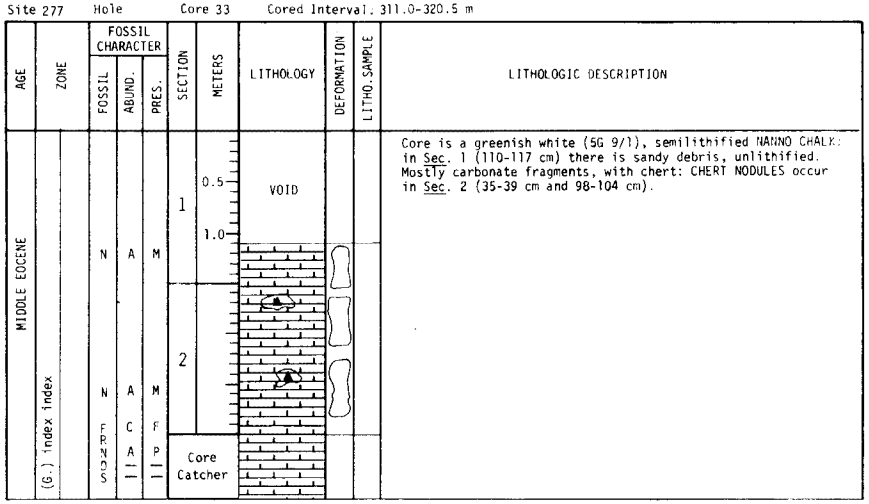
Site 277 Hole Core 29 Cored Interval: 263.5-273.0 m



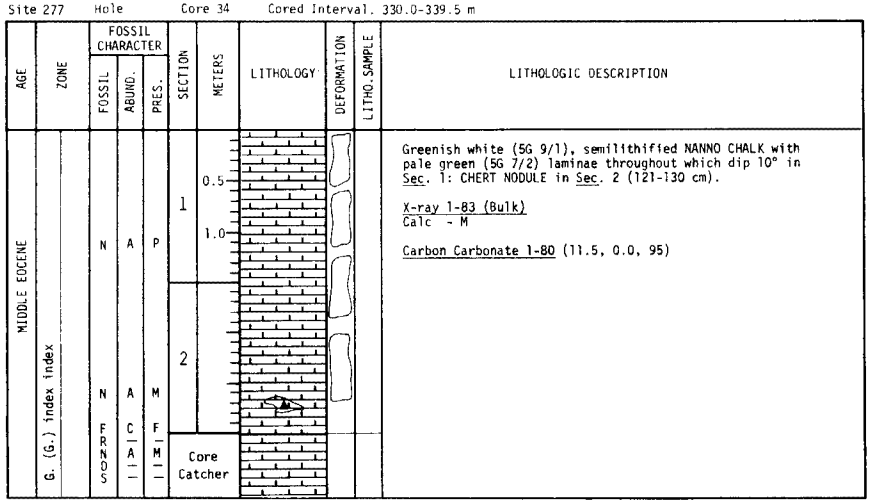
Core is a greenish white (5G 9/1), stiff NANNO OOZE with light gray (5Y 7/1) and white (5Y 8/1) CHERT NODULES, (with thin black veins). These occur at Sec. 1 (120-123 cm), Sec. 2 (22-24 cm and 148-150 cm).


Site 277 Hole Core 31 Cored Interval: 282.5-292.0 m
LITHOLOGIC DESCRIPTION
Core is a greenish white (5G 9/1) NANNO OOZE-CHALK, semi-lithified to stiff; also noted: Sec. 1 (67-76 cm) white (5Y 8/1) and light gray (5Y 7/1) CHERT NODULES with light gray (5Y 7/2) mottles; Sec. 1 (13 cm) a MANGANESE PATCH; and Sec. 2 (37-40 cm and 143-150 cm), CHERT NODULES.
LITHO. SAMPLE
DEFORMATION
LITHOLOGY
METERS
SECTION
FOSSIL CHARACTER
PRES.
ABUND.
FOSSIL
ZONE
AGE
MIDDLE EOCENE
G. (G.) index index
Core Catcher
VOID
Site 277 Hole Core 32 Cored Interval: 292.0-301.5 m
Greenish white (5G 9/1) NANNO OOZE-CHALK; the induration shows Sec. 1 (0-39 cm and 82-150 cm) stiff; and 39-82 cm) soft; CHERT NODULES occur in Sec. 1 (90-95 cm), Sec. 3 (54-62 cm) and in the core catcher.
VOID
Site 277 Hole Core 30 Cored Interval: 273.0-282.5 m
Typically: greenish white (5G 9/1) stiff to semilithified NANNO OOZE-CHALK with CHERT NODULES at Sec. 1 (130-135 cm) and Sec. 2 (114-119 cm and 148-150 cm); shows a light gray (5Y 7/1) coloration; Sec. 4 (62-70 cm) has both white (5Y 8/1) and light gray (5Y 7/1) mottled with light gray (5Y 7/2) and Sec. 5 (104-110 cm) is a light gray (5Y 6/1) with light gray (5Y 7/2) and a few black mottles; the core catcher lithology is a FORAM-BEARING NANNO OOZE (SS CC).
SS CC
F - 7%
N - 90%
R - 3%
Grain Size 2-50 (0.5, 34.4, 65.1)
Carbon Carbonate 2-45 (11.0, 0.1, 91)
VOID
CC
G. (T.) aculeata
G. (G.) index index

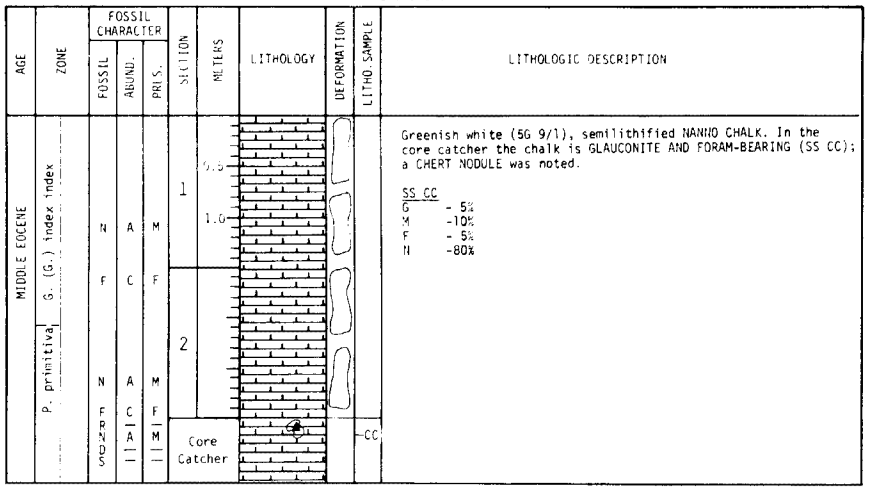
Site 277 Hole Core 33 Cored Interval: 311.0-320.5 m



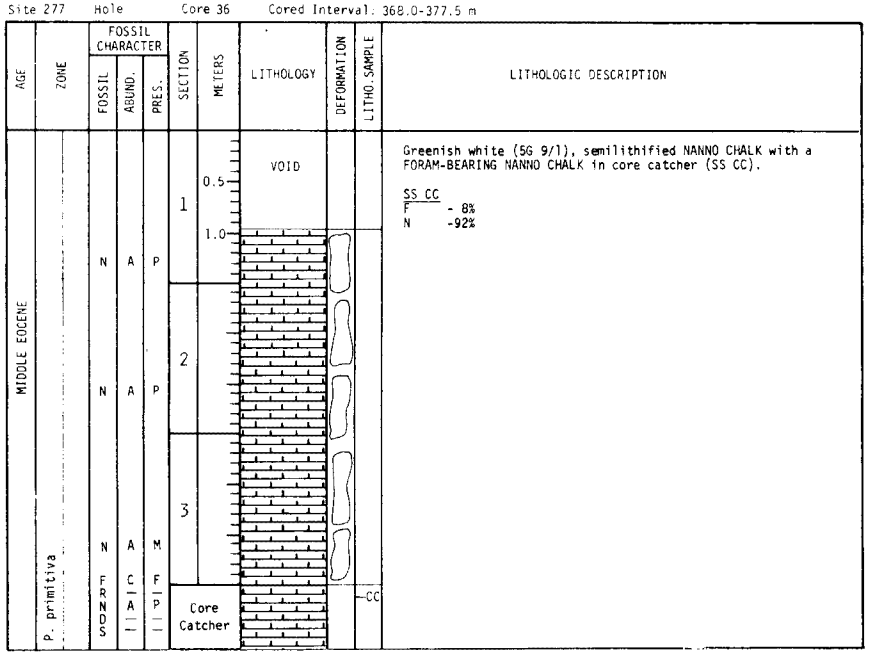
Site 277 Hole Core 34 Cored Interval: 330.0-339.5 m



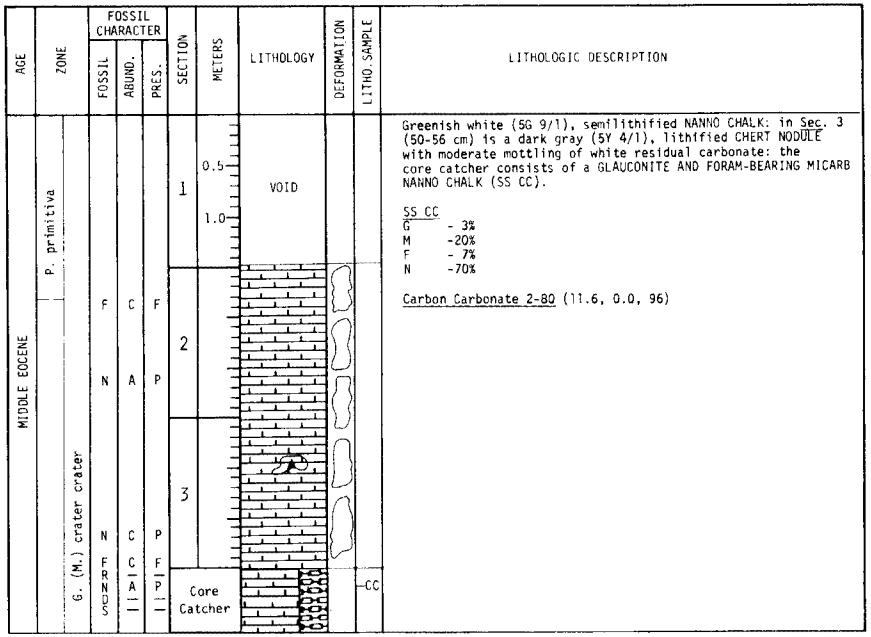
Site 277 Hole Core 35 Cored Interval: 349.0-358.5 m



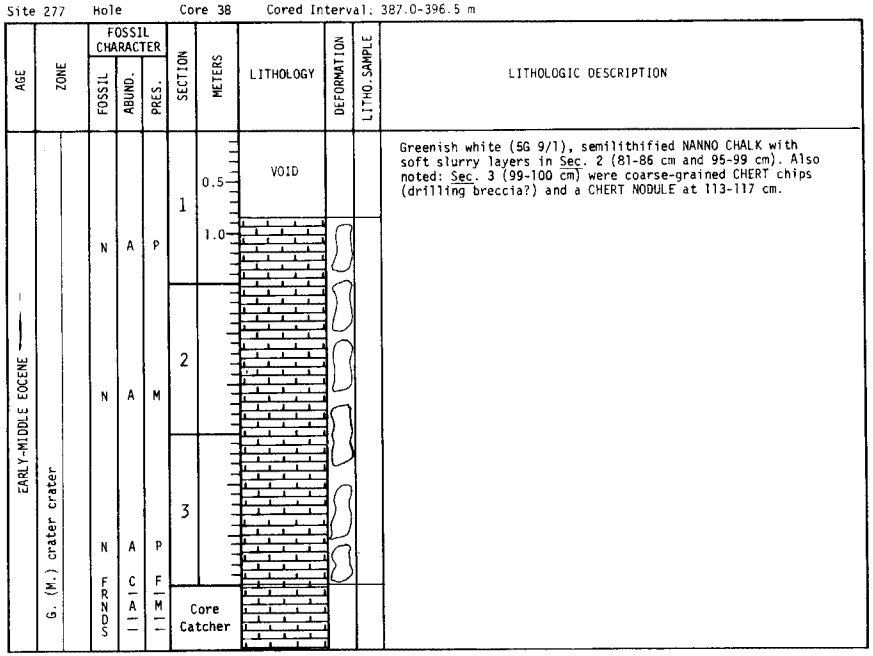
Site 277 Hole Core 36 Cored Interval: 368.0-377.5 m



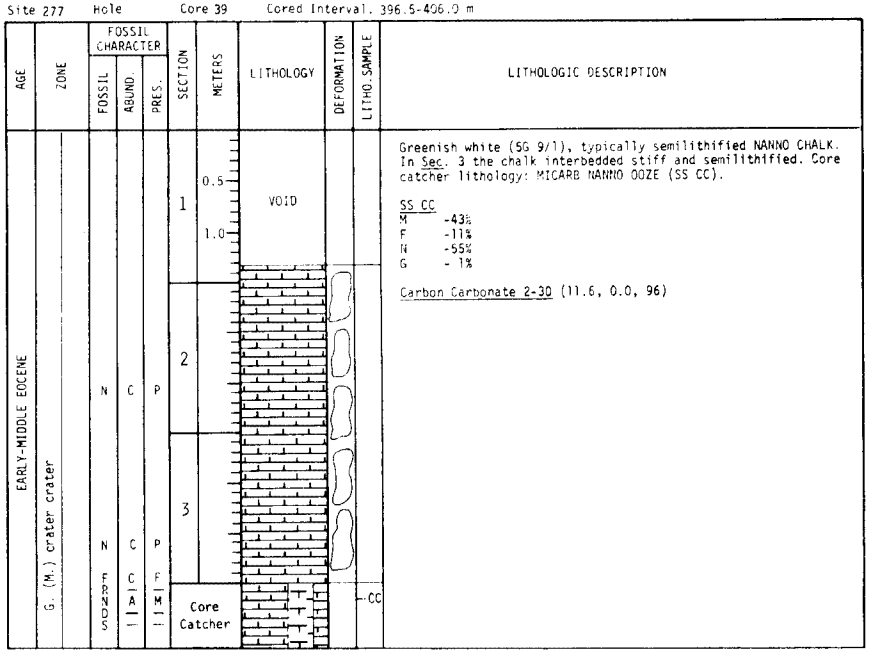
Site 277 Hole Core 37 Cored Interval: 377.5-387.0 m



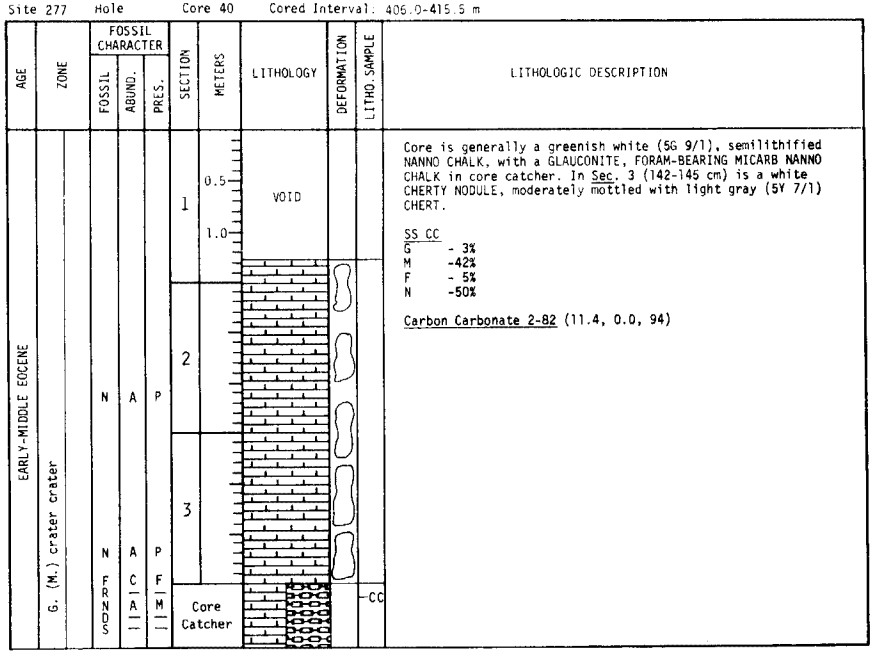
Site 277 Hole Core 38 Cored Interval: 387.0-396.5 m



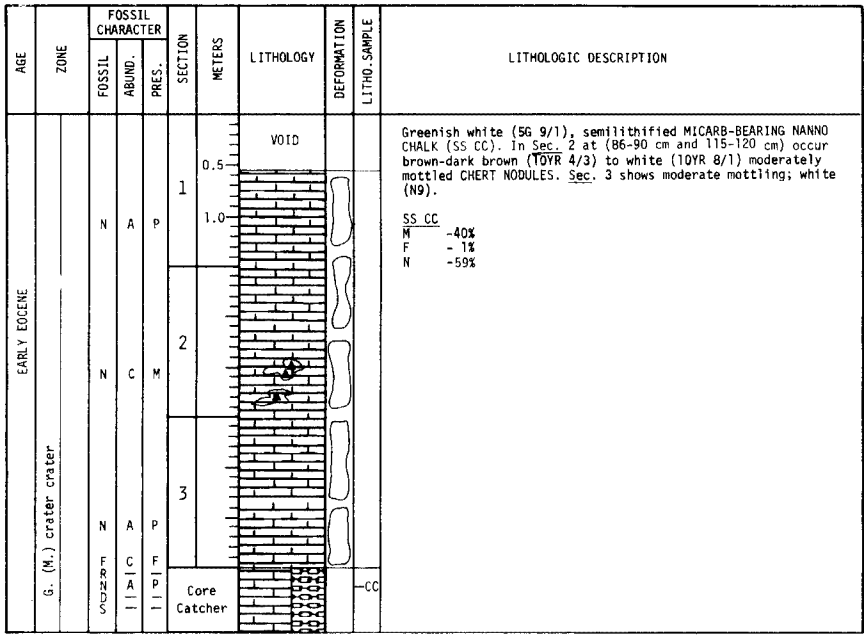
Site 277 Hole Core 39 Cored Interval: 396.5-406.0 m



Site 277 Hole Core 40 Cored Interval: 406.0-415.5 m



Site 277 Hole Core 41 Cored Interval: 415.5-425.0 m



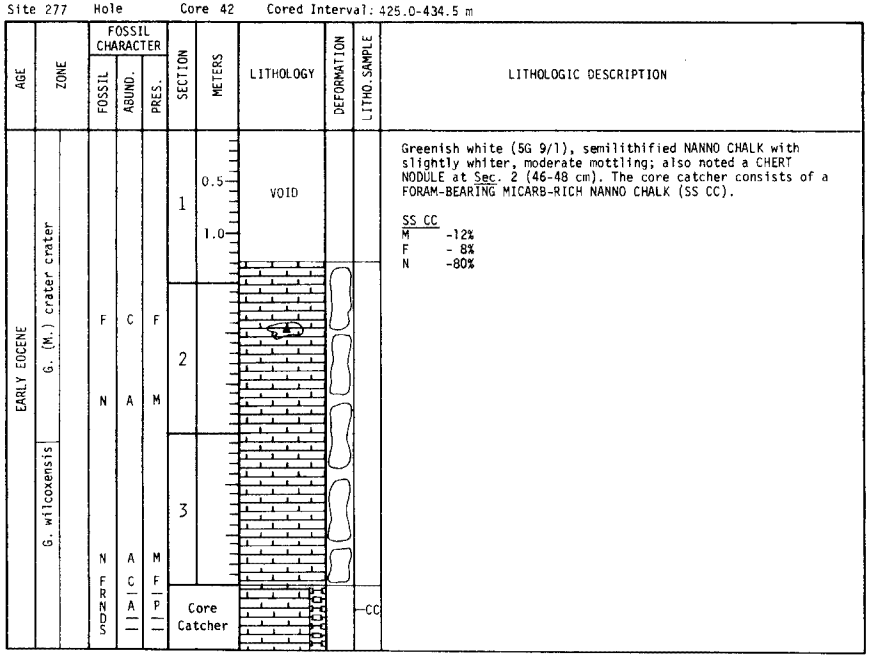
LITHOLOGIC DESCRIPTION

Greenish white (5G 9/1), semilithified MICARB-BEARING NANNO CHALK (SS CC). In Sec. 2 at (86-90 cm and 115-120 cm) occur brown-dark brown (10YR 4/3) to white (10YR 8/1) moderately mottled CHERT NODULES. Sec. 3 shows moderate mottling; white (N9).

SS CC

M	-40%
F	- 1%
N	-59%

Site 277 Hole Core 42 Cored Interval: 425.0-434.5 m



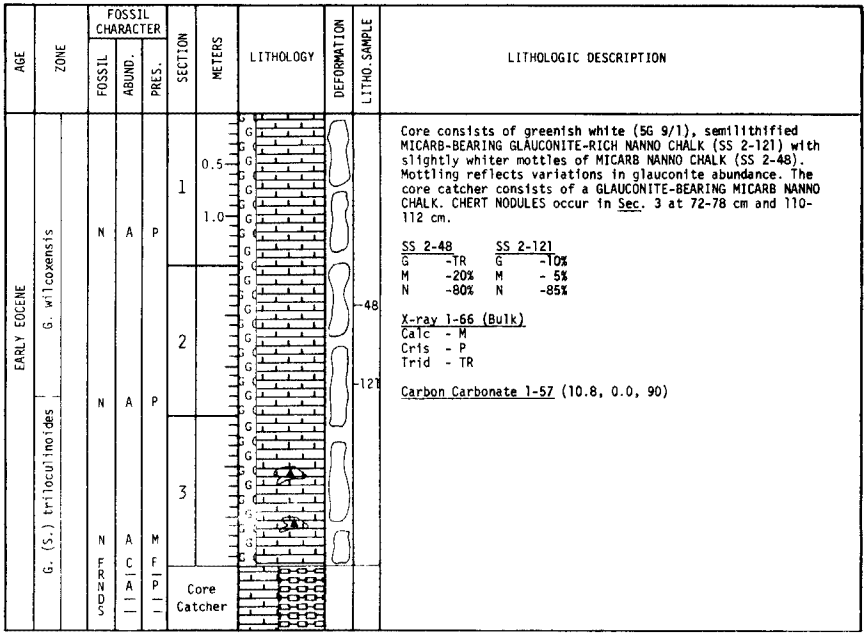
LITHOLOGIC DESCRIPTION

Greenish white (5G 9/1), semilithified NANNO CHALK with slightly whiter, moderate mottling; also noted a CHERT NODULE at Sec. 2 (46-48 cm). The core catcher consists of a FORAM-BEARING MICARB-RICH NANNO CHALK (SS CC).

SS CC

M	-12%
F	- 8%
N	-80%

Site 277 Hole Core 43 Cored Interval: 434.5-444.0 m



LITHOLOGIC DESCRIPTION

Core consists of greenish white (5G 9/1), semilithified MICARB-BEARING GLAUCONITE-RICH NANNO CHALK (SS 2-121) with slightly whiter mottles of MICARB NANNO CHALK (SS 2-48). Mottling reflects variations in glauconite abundance. The core catcher consists of a GLAUCONITE-BEARING MICARB NANNO CHALK. CHERT NODULES occur in Sec. 3 at 72-78 cm and 110-112 cm.

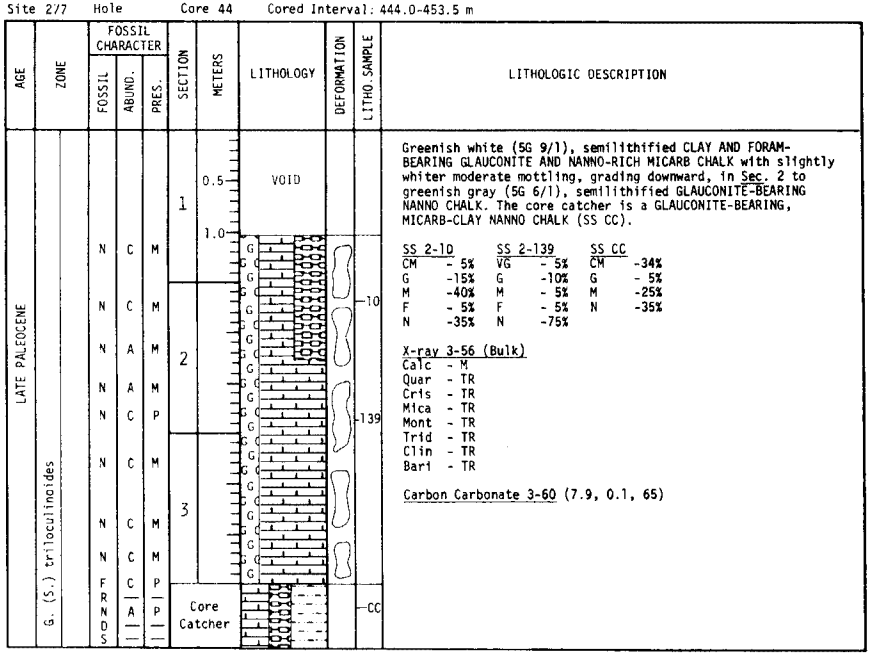
SS 2-48		SS 2-121	
G	-TR	G	-10%
M	-20%	M	- 5%
N	-80%	N	-85%

X-ray 1-66 (Bulk)

Calc	- M
Cris	- P
Trid	- TR

Carbon Carbonate 1-57 (10.8, 0.0, 90)

Site 277 Hole Core 44 Cored Interval: 444.0-453.5 m



LITHOLOGIC DESCRIPTION

Greenish white (5G 9/1), semilithified CLAY AND FORAM-BEARING GLAUCONITE AND NANNO-RICH MICARB CHALK with slightly whiter moderate mottling, grading downward, in Sec. 2 to greenish gray (5G 6/1), semilithified GLAUCONITE-BEARING NANNO CHALK. The core catcher is a GLAUCONITE-BEARING, MICARB-CLAY NANNO CHALK (SS CC).

SS 2-10		SS 2-139		SS CC	
CM	- 5%	VG	- 5%	CM	-34%
G	-15%	G	-10%	G	- 5%
M	-40%	M	- 5%	M	-25%
F	- 5%	F	- 5%	N	-35%
N	-35%	N	-75%		

X-ray 3-56 (Bulk)

Calc	- M
Quar	- TR
Cris	- TR
Mica	- TR
Mont	- TR
Trid	- TR
Clin	- TR
Bari	- TR

Carbon Carbonate 3-60 (7.9, 0.1, 65)

Site 277 Hole Core 45 Cored Interval: 453.5-463.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE PALEOCENE	G. (S.) trilocul inoides	N	C	P	1	0.5 – 1.0	VOID			Greenish gray (5G 6/1) and greenish white (5G 9/1) intervals, semilithified GLAUCONITE-BEARING NANNO CHALK. The core catcher is GLAUCONITE-BEARING MICARB CLAY NANNO CHALK (SS CC). Also noted Sec. 2 (60 cm) PYRITE NODULES (~1 cm); Sec. 3 (59-87 cm) incipient CHERT lithified; in Sec. 4 below 140 cm the core grades to lithified induration, with approximately 2% PYRITE (<1/2 mm); and PYRITE NODULES (~1 cm) in Sec. 5 (69 and 101 cm).
		N	C	M	2					SS CC CM -40% G - 5% M -25% N -30% X-ray 4-112 (Bulk) Calc - M Quar - TR Cris - P Trid - TR Clin - P Carbon Carbonate 4-112 (9.2, 0.1, 76)
		N	C	P	3					
		N	C	M	4					
		N	C	P	5					
		N	C	M	6					
		N	C	M						
		F	C	P						
		N	C	M						
		R	C	P						
		N								
		D								
		S			Core Catcher					

Site 277 Hole Core 46 Cored Interval: 463.0-472.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
MIDDLE PALEOCENE	G. (S.) trilocul inoides	N	C	P	1	0.5 – 1.0	VOID			Greenish white (5G 9/1) to light greenish gray (5G 7/1) CLAY-RICH NANNO CHALK with moderate to intense light gray (5Y 7/1) mottling throughout. PYRITE crystals and nodules evident in some places. In Sec. 4 (35-57 cm and 96-141 cm) same color as rest of core, but cherty and lithified, with larger mottles.
					2					X-ray 2-85 (Bulk) Calc - M Quar - TR Cris - P Mont - TR Trid - TR Carbon Carbonate 2-84 (10.1, 0.1, 84)
		N	C	P	3					
		N	C	P	4					
		F	R	P						
		N	C	M						
		R	C	P						
		N								
		D								
		S			Core Catcher					

DEEP SEA DRILLING PROJECT

LEG 29 SITE 278

SITE SUMMARY SHEET

POSITION: Latitude: 56°33.42'S Longitude: 160°04.29'E

Water depth (from sea level): 3675 corrected meters (Echo sounding)

Bottom felt at: 3708 meters (drill pipe) Penetration: 278 - 438.5 m
278A - 44 m

Number of Holes: 2 Number of Cores: 278 - 35; 278A - 2

Total length of cored section: 278 - 324.5 m; 278A - 19.0 m

Total core recovered: 278 - 277.8 m; 278A - 7.5 m

Percentage of core recovery: 278 - 85%; 278A - 39.0%

OLDEST SEDIMENT CORED:

Depth below sea floor: 428.3 meters Nature: (Siliceous) nannofossil chalk

Age: Middle Oligocene

BASEMENT:

Depth below sea floor: 0.50 seconds (reflection time)

Depth below sea floor: 428.3 meters (drilled)

Average velocity to basement: 1.71 km/sec Nature: Pillow basalt with palagonite

PRINCIPAL RESULTS:

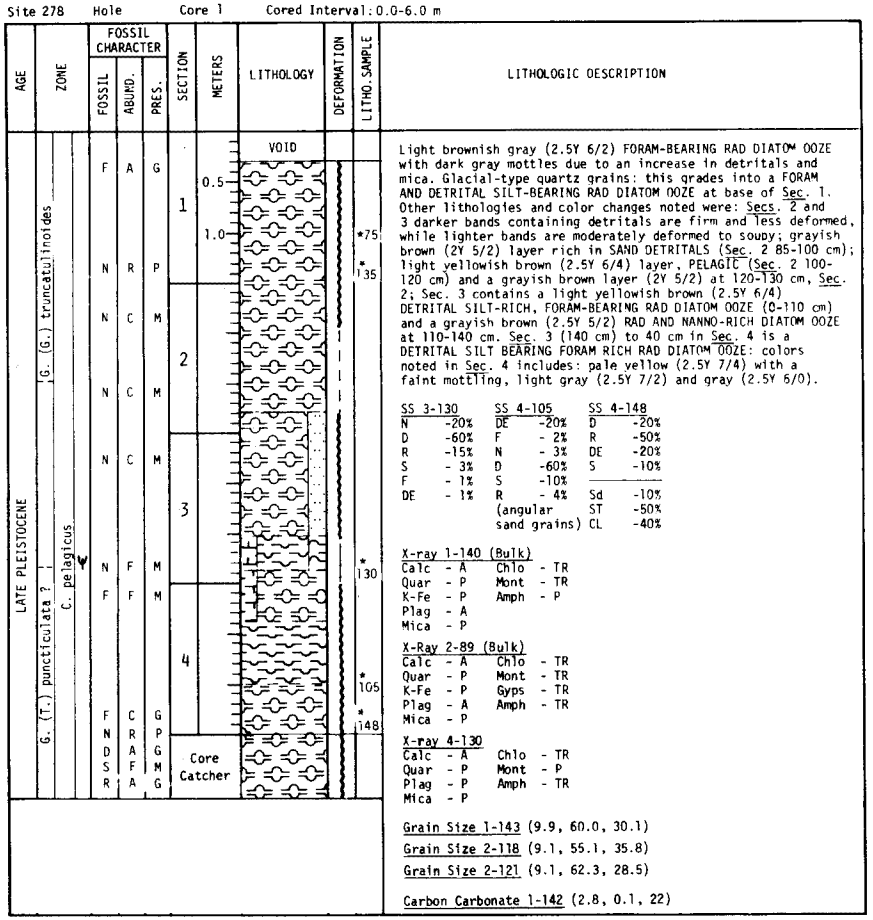
Site 278 in the southern Emerald Basin is an almost complete Quaternary to middle Oligocene sequence of 428 meters of alternating calcareous diatom and radiolarian oozes and siliceous nannofossil oozes and chalks. Six sedimentary units fall into three general categories: 172 meters of radiolarian-diatom and diatom ooze of late Pliocene to Recent age; 214 meters of alternating siliceous nannofossil ooze and nannofossil-rich siliceous ooze of early Pliocene to earliest Miocene age; and 42 meters of Oligocene nannofossil-chalk with sponge spicules. These fluctuations probably indicate changes in the locations and strength of the Antarctic Convergence. Increased sedimentation rates occur towards the Recent with very low rates for the Oligocene (0.3 cm/1000 years), moderate rates for the Miocene-early Pliocene (1.1 cm/1000 years) and spectacularly high rates in late Pliocene and Pleistocene (8.2 cm/1000 years). Rates reflect increased productivity in region throughout middle and late Cenozoic possibly with development

LEG 29 SITE 278
SITE SUMMARY SHEET, con't.

of Antarctic Convergence itself. Upward increase in dissolution of calcium carbonate supports this theory. Much of the Pliocene is missing in disconformity. Excellent radiolarian and diatom biostratigraphy although calcareous microfossils of varying abundance and preservation. Diversity low in most samples for calcareous forms but high for siliceous forms. Well dated middle Oligocene (30 m.y. old) sediments lie directly on pillow basalts.

The Oligocene age of basement will have a profound affect on the inferred plate motions of the Macquarie triple junction because no magnetic dates can be determined within the Emerald Basin, due to a poor magnetic signal. This date reveals that a 50 m.y. discontinuity exists between the Emerald Basin and the Upper Cretaceous sea floor immediately east of the basin at the southern foot of the Campbell Plateau.

Site 278 Hole Core 1 Cored Interval: 0.0-6.0 m



Light brownish gray (2.5Y 6/2) FORAM-BEARING RAD DIATOM OOZE with dark gray mottles due to an increase in detritals and mica. Glacial-type quartz grains: this grades into a FORAM AND DETRITAL SILT-BEARING RAD DIATOM OOZE at base of Sec. 1. Other lithologies and color changes noted were: Secs. 2 and 3 darker bands containing detritals are firm and less deformed, while lighter bands are moderately deformed to soupy; grayish brown (2Y 5/2) layer rich in SAND DETRITALS (Sec. 2 85-100 cm); light yellowish brown (2.5Y 6/4) layer, PELAGIC (Sec. 2 100-120 cm) and a grayish brown layer (2Y 5/2) at 120-130 cm, Sec. 2; Sec. 3 contains a light yellowish brown (2.5Y 6/4) DETRITAL SILT-RICH, FORAM-BEARING RAD DIATOM OOZE (0-110 cm) and a grayish brown (2.5Y 5/2) RAD AND NANNO-RICH DIATOM OOZE at 110-140 cm. Sec. 3 (140 cm) to 40 cm in Sec. 4 is a DETRITAL SILT BEARING FORAM RICH RAD DIATOM OOZE: colors noted in Sec. 4 includes: pale yellow (2.5Y 7/4) with a faint mottling, light gray (2.5Y 7/2) and gray (2.5Y 6/0).

SS 3-130

N	-20%
D	-60%
R	-15%
S	- 3%
F	- 1%
DE	- 1%

SS 4-105

DE	-20%
F	- 2%
N	- 3%
D	-60%
S	-10%
R	- 4% (angular sand grains)

SS 4-148

D	-20%
R	-50%
DE	-20%
S	-10%
Sd	-10%
ST	-50%
CL	-40%

X-ray 1-140 (Bulk)

Calc	- A	Chlo	- TR
Quar	- P	Mont	- TR
K-Fe	- P	Amph	- P
Plag	- A		
Mica	- P		

X-Ray 2-89 (Bulk)

Calc	- A	Chlo	- TR
Quar	- P	Mont	- TR
K-Fe	- P	Gyps	- TR
Plag	- A	Amph	- TR
Mica	- P		

X-ray 4-130

Calc	- A	Chlo	- TR
Quar	- P	Mont	- P
Plag	- P	Amph	- TR
Mica	- P		

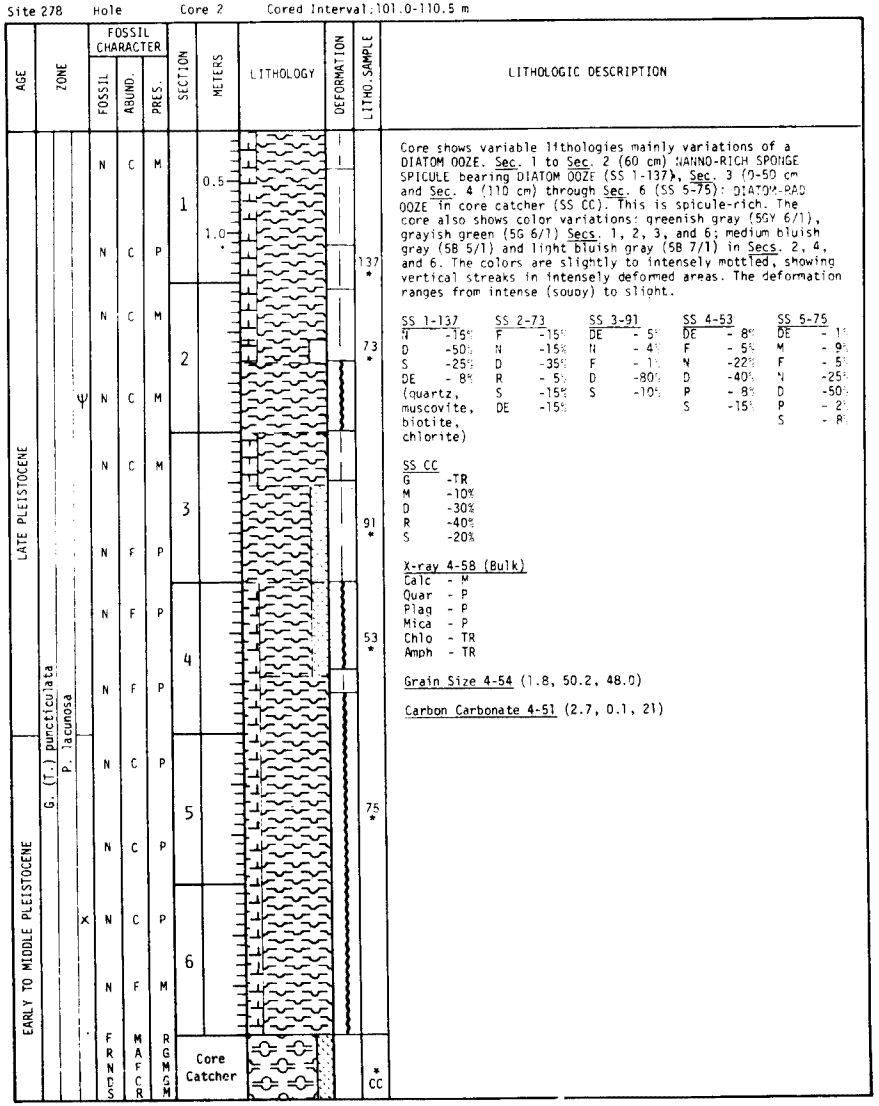
Grain Size 1-143 (9.9, 60.0, 30.1)

Grain Size 2-118 (9.1, 55.1, 35.8)

Grain Size 2-121 (9.1, 62.3, 28.5)

Carbon Carbonate 1-142 (2.8, 0.1, 22)

Site 278 Hole Core 2 Cored Interval: 101.0-110.5 m



Core shows variable lithologies mainly variations of a DIATOM OOZE. Sec. 1 to Sec. 2 (60 cm) NANNO-RICH SPONGE SPICULE bearing DIATOM OOZE (SS 1-137), Sec. 3 (0-50 cm and Sec. 4 (110 cm) through Sec. 6 (SS 5-75): DIATOM-RAD OOZE in core catcher (SS CC). This is spicule-rich. The core also shows color variations: greenish gray (5GY 6/1), grayish green (5G 6/1) Secs. 1, 2, 3, and 6; medium bluish gray (5B 5/1) and light bluish gray (5B 7/1) in Secs. 2, 4, and 6. The colors are slightly to intensely mottled, showing vertical streaks in intensely deformed areas. The deformation ranges from intense (soupy) to slight.

SS 1-137

N	-15%
D	-50%
S	-25%
DE	- 8%
(quartz, muscovite, biotite, chlorite)	

SS 2-73

F	-15%
N	-15%
D	-35%
R	- 5%
S	-15%
DE	-15%

SS 3-91

DE	- 5%
N	- 4%
F	- 1%
D	-80%
S	-10%

SS 4-53

DE	- 8%
F	- 5%
N	-22%
D	-40%
P	- 8%
S	-15%

SS 5-75

DE	- 1%
M	- 9%
F	- 5%
N	-25%
D	-50%
P	- 2%
S	- 8%

SS CC

G	-TR
M	-10%
D	-30%
R	-40%
S	-20%

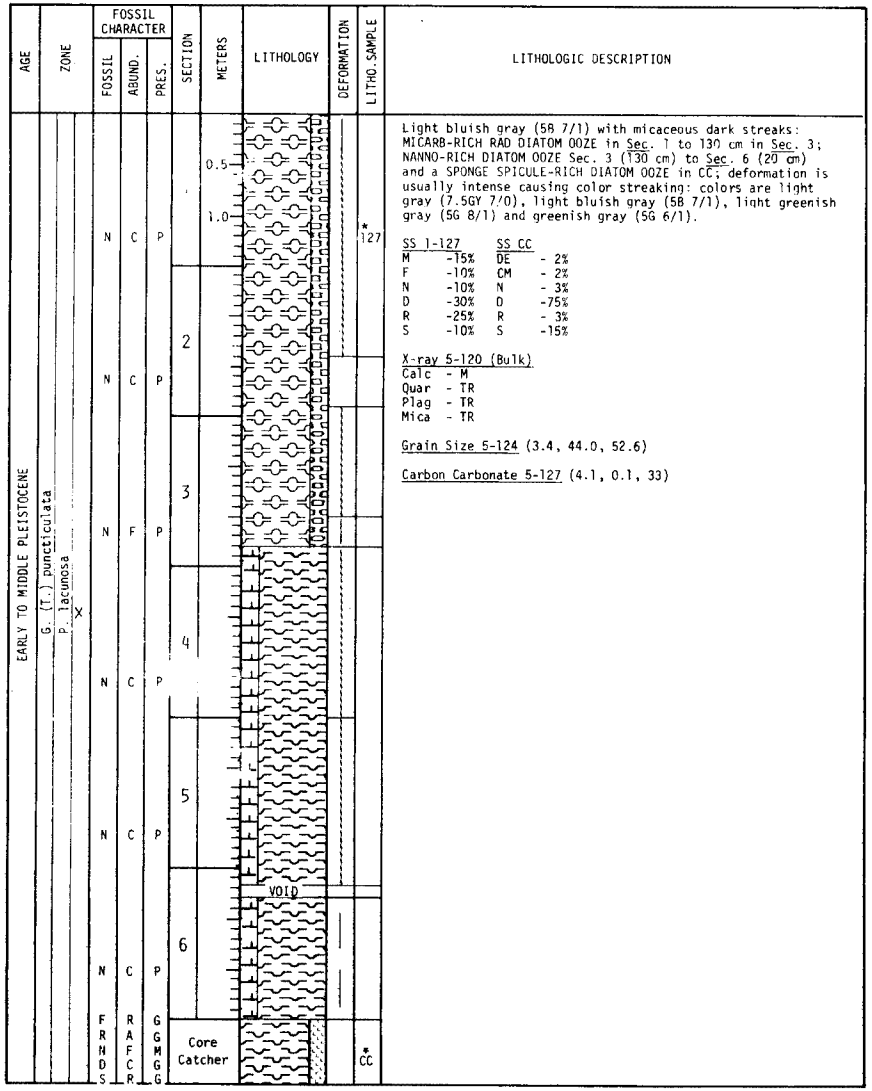
X-ray 4-58 (Bulk)

Calc	- M
Quar	- P
Plag	- P
Mica	- P
Chlo	- TR
Amph	- TR

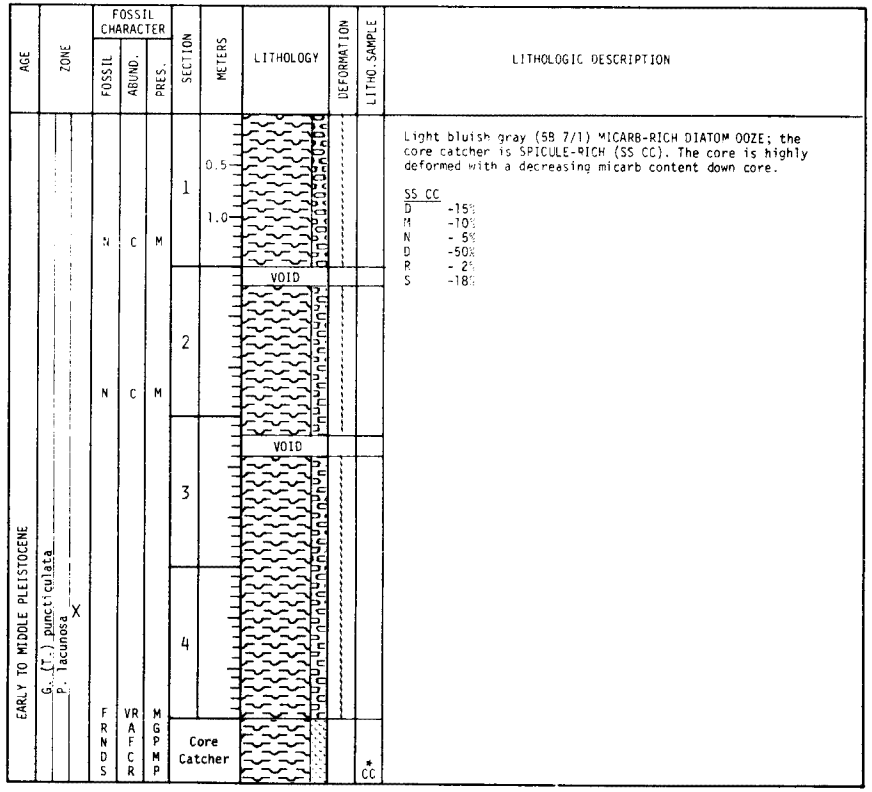
Grain Size 4-54 (1.8, 50.2, 48.0)

Carbon Carbonate 4-51 (2.7, 0.1, 21)

Site 278 Hole Core 3 Cored Interval: 110.5-120.0 m



Site 278 Hole Core 4 Cored Interval: 120.0-129.5 m



Site 278 Hole Core 5 Cored Interval: 129.5-139.0 m

AGE: EARLY TO MIDDLE PLEISTOCENE

ZONE: G. (T.) puncticulata; P. lacunosa

FOSSIL CHARACTER: FOSSIL: F R N D S; ABUND.: V R A R I; PRES.: M G P M I

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

METERS: 0.5, 1.0

LITHOLOGY: VOID

DEFORMATION

LITHO. SAMPLE: CC*

LITHOLOGIC DESCRIPTION

Light bluish gray (5B 7/1) with streaks of light greenish gray and greenish gray (5G 8/1), SPICULE-BEARING MICARB-RICH RAD DIATOM OOZE grading into a MICARB-BEARING RAD/DIATOM OOZE in Sec. 5, and to a SPONGE SPICULE AND MICARB-BEARING DIATOM OOZE in the core catcher: core shows swirling and streaking and is intensely deformed grading into moderate deformation in Secs. 3 through 6.

SS CC
DE - 4%
M - 7%
F - 2%
N - 5%
S -10%
D -70%
R - 2%

Site 278 Hole Core 6 Cored Interval: 139.0-148.5 m

AGE: EARLY TO MIDDLE PLEISTOCENE

ZONE: G. (T.) puncticulata; P. lacunosa; R. pseudoumbilica

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

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

METERS: 0.5, 1.0

LITHOLOGY: VOID

DEFORMATION

LITHO. SAMPLE: 135*, CC*

LITHOLOGIC DESCRIPTION

Light bluish gray (5B 7/1), medium bluish gray (5B 5/1) to greenish gray streaked MICARB-RICH DIATOM OOZE; intensely deformed varying with moderate deformation throughout the core. Sec. 2 shows excellent color mottling of grayish green and greenish gray colors and is a RAD DIATOM OOZE, with clay blebs and mild bioturbation: it grades into a MICARB/SPONGE SPICULE-RICH DIATOM OOZE in Sec. 3: a dusky yellow green (5GY 5/2) coloration with greenish gray streaks and intense deformation occurs in Sec. 5.

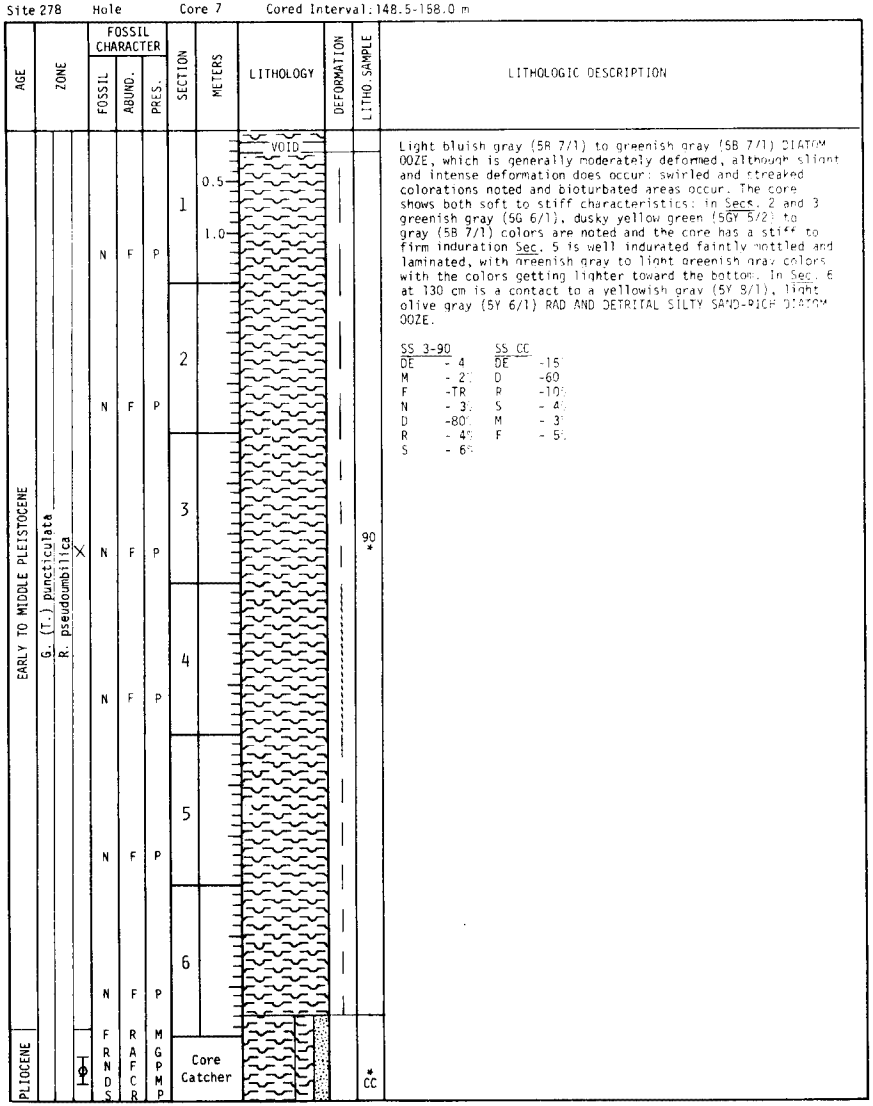
SS 3-135 / SS CC
Q -24% / M - 8%
G -TR / N -12%
M -16% / D -60%
F - 2% / R - 5%
D -60% / S -15%
R -TR / DE - 5%
S -12%

X-ray 3-105 (Bulk)
Calc - A
Quar - P
K-Fe - TR
Plag - P
Mica - P
Chlo - TR
Mont - TR
Amph - TR

Grain Size 3-108 (4.0, 50.7, 45.4)

Carbon Carbonate 3-110 (3.2, 0.1, 26)

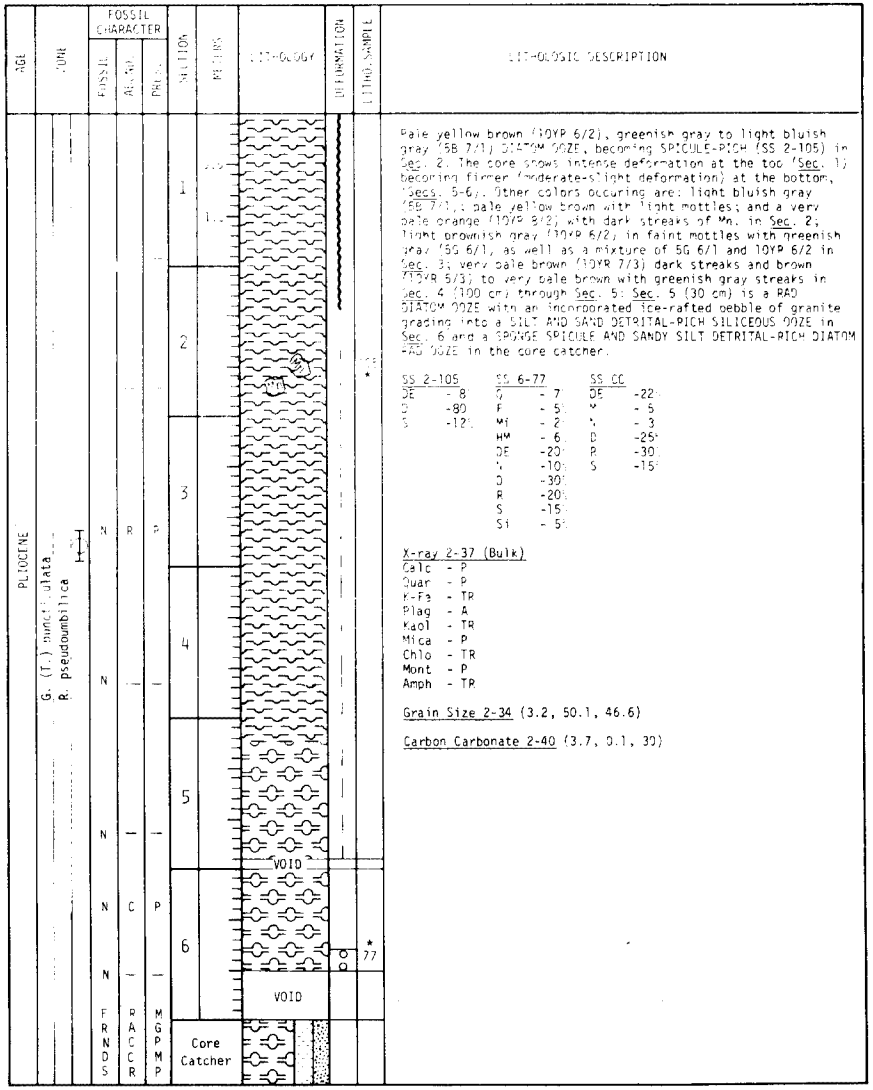
Site 278 Hole Core 7 Cored Interval: 148.5-158.0 m



Light bluish gray (5B 7/1) to greenish gray (5B 7/1) DIATOM OOZE, which is generally moderately deformed, although slight and intense deformation does occur: swirled and streaked colorations noted and bioturbated areas occur. The core shows both soft to stiff characteristics: in Secs. 2 and 3 greenish gray (5G 6/1), dusky yellow green (5GY 5/2) to gray (5B 7/1) colors are noted and the core has a stiff to firm induration Sec. 5 is well indurated faintly mottled and laminated, with greenish gray to light greenish gray colors with the colors getting lighter toward the bottom. In Sec. 6 at 130 cm is a contact to a yellowish gray (5Y 8/1), light olive gray (5Y 6/1) RAD AND DETRITAL SILTY SAND-RICH DIATOM OOZE.

SS 3-90		SS CC	
DE	- 4	DE	-15
M	- 2	D	-60
F	-TR	R	-10
N	- 3	S	- 4
D	-80	M	- 3
R	- 4	F	- 5
S	- 6		

Site 278 Hole Core 8 Cored Interval: 158.0-167.5



Pale yellow brown (10YR 6/2), greenish gray to light bluish gray (5B 7/1) DIATOM OOZE, becoming SPICULE-RICH (SS 2-105) in Sec. 2. The core shows intense deformation at the top (Sec. 1) becoming firmer (moderate-slight deformation) at the bottom, (Secs. 5-6). Other colors occuring are: light bluish gray (5B 7/1), pale yellow brown with light mottles; and a very pale orange (10YR 8/2) with dark streaks of Mn. in Sec. 2; light brownish gray (10YR 6/2) in faint mottles with greenish gray (5G 6/1, as well as a mixture of 5G 6/1 and 10YR 6/2 in Sec. 3; very pale brown (10YR 7/3) dark streaks and brown (10YR 5/3); to very pale brown with greenish gray streaks in Sec. 4 (100 cm) through Sec. 5: Sec. 5 (30 cm) is a RAD DIATOM OOZE with an incorporated ice-rafted pebble of granite grading into a SILT AND SAND DETRITAL-RICH SILICEOUS OOZE in Sec. 6 and a SPONGE SPICULE AND SANDY SILT DETRITAL-RICH DIATOM RAD OOZE in the core catcher.

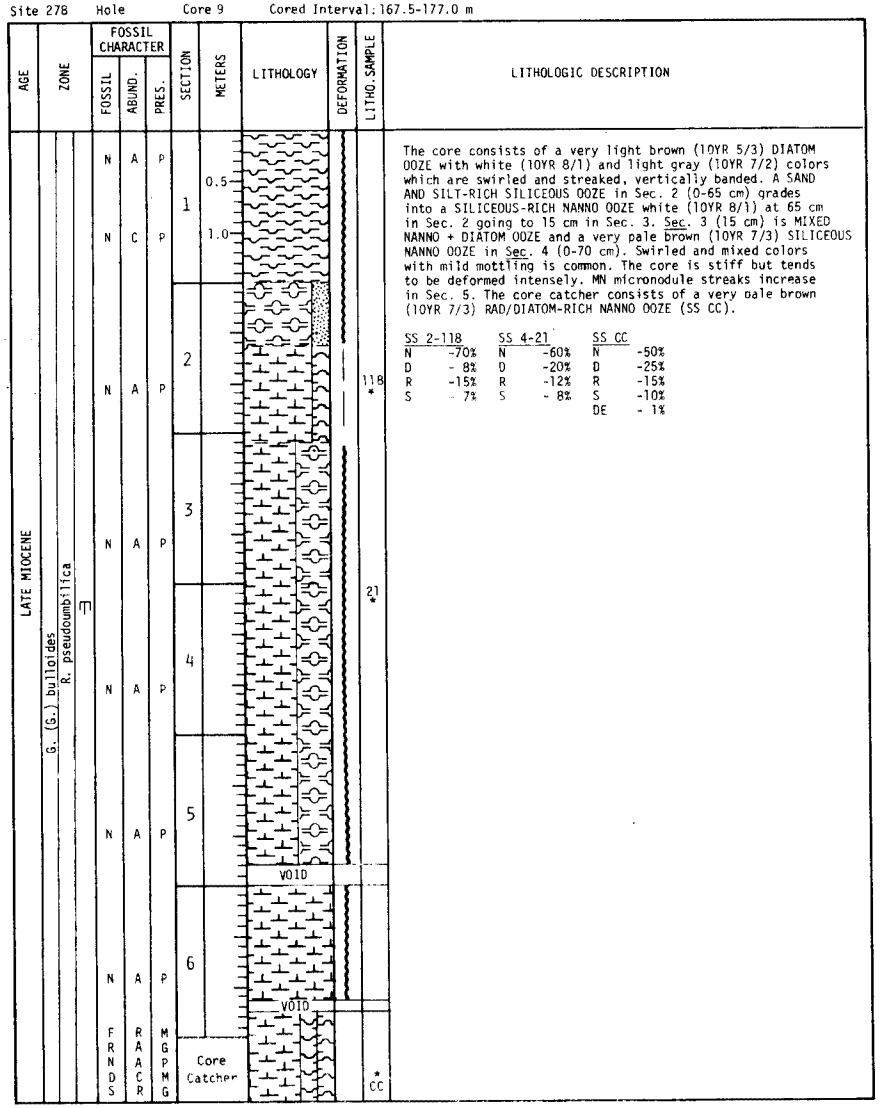
SS 2-105		SS 6-77		SS CC	
DE	- 8	C	- 7	DE	-22
D	-80	F	- 5	M	- 5
S	-12	MF	- 2	F	- 3
		HM	- 6	D	-25
		DE	-20	R	-30
		M	-10	S	-15
		D	-30		
		R	-20		
		S	-15		
		Si	- 5		

X-ray 2-37 (Bulk)
Calc - P
Quar - P
K-Fs - TR
Plag - A
Kaol - TR
Mica - P
Chlo - TR
Mont - P
Amph - TR

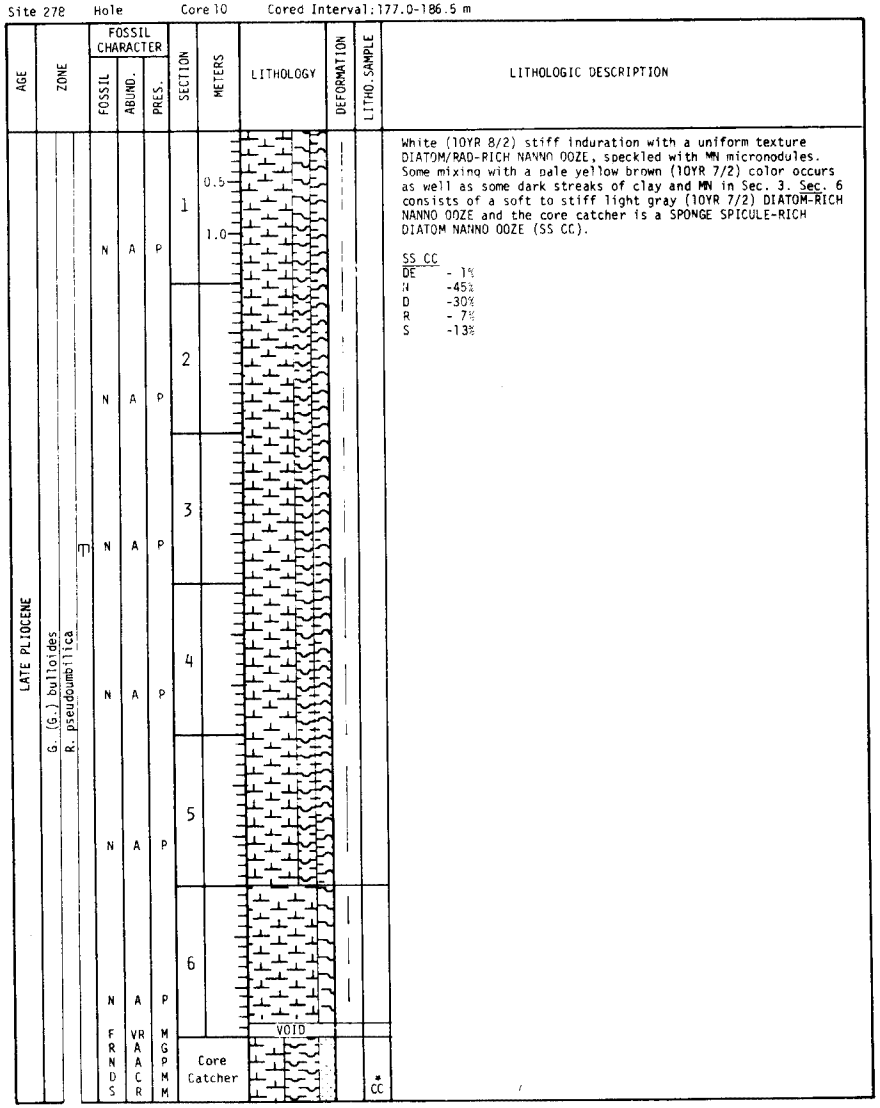
Grain Size 2-34 (3.2, 50.1, 46.6)

Carbon Carbonate 2-40 (3.7, 0.1, 30)

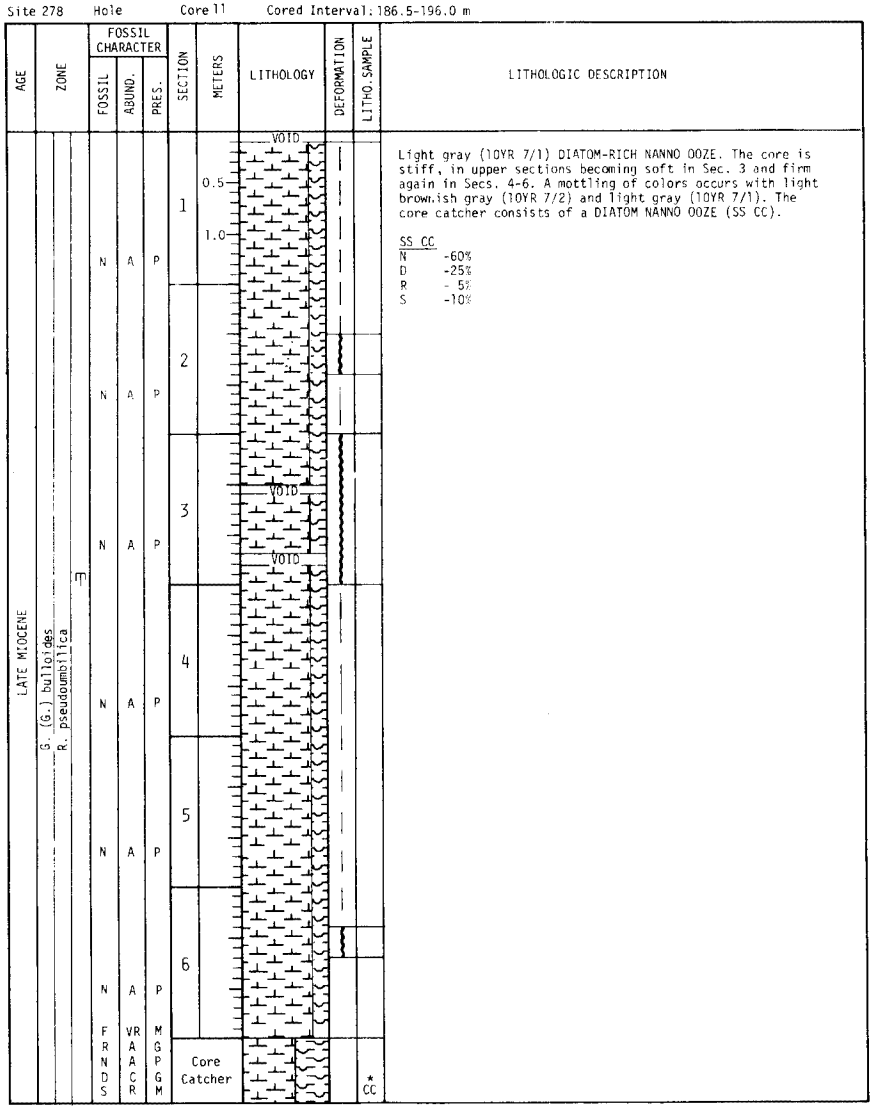
Site 278 Hole Core 9 Cored Interval: 167.5-177.0 m



Site 278 Hole Core 10 Cored Interval: 177.0-186.5 m



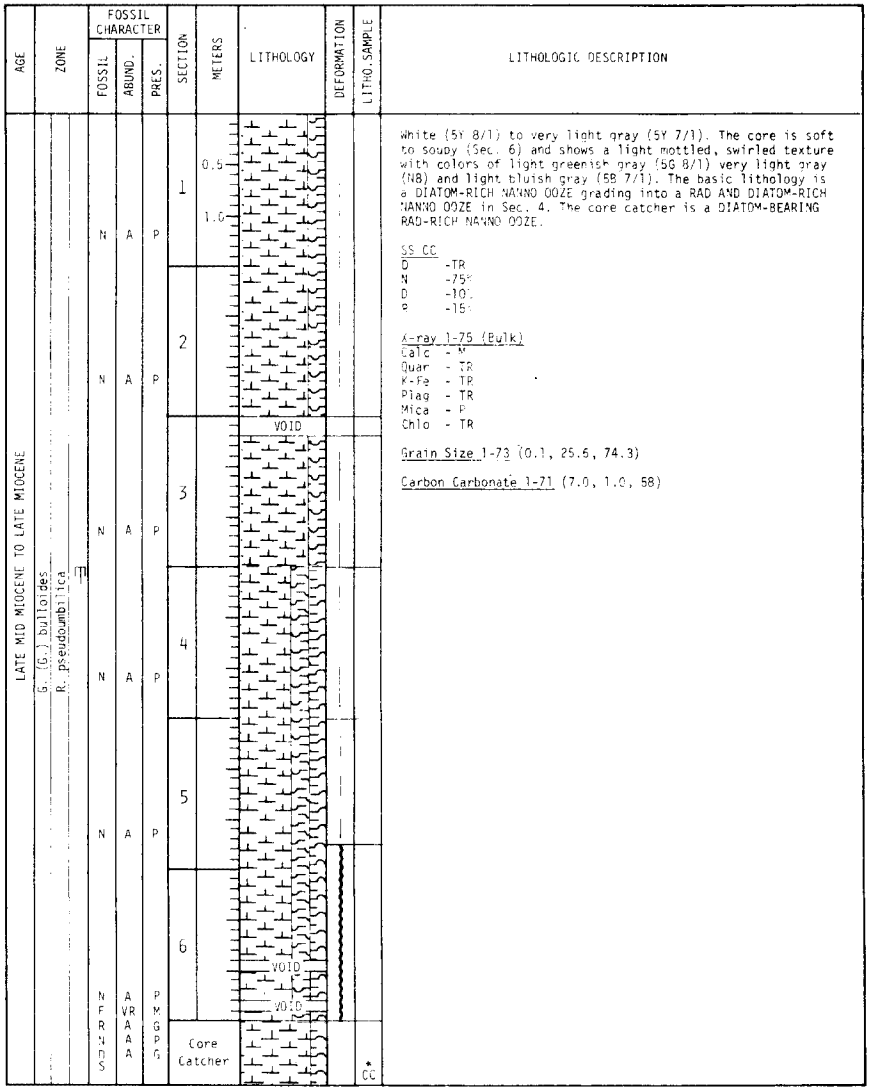
Site 278 Hole Core 11 Cored Interval: 186.5-196.0 m



Light gray (10YR 7/1) DIATOM-RICH NANNO OOZE. The core is stiff, in upper sections becoming soft in Sec. 3 and firm again in Secs. 4-6. A mottling of colors occurs with light brownish gray (10YR 7/2) and light gray (10YR 7/1). The core catcher consists of a DIATOM NANNO OOZE (SS CC).

SS CC
N -60%
D -25%
R - 5%
S -10%

Site 278 Hole Core 12 Cored Interval: 196.0-205.5 m



White (5Y 8/1) to very light gray (5Y 7/1). The core is soft to soupy (Sec. 6) and shows a light mottled, swirled texture with colors of light greenish gray (5G 8/1) very light gray (N8) and light bluish gray (5B 7/1). The basic lithology is a DIATOM-RICH NANNO OOZE grading into a RAD AND DIATOM-RICH NANNO OOZE in Sec. 4. The core catcher is a DIATOM-BEARING RAD-RICH NANNO OOZE.

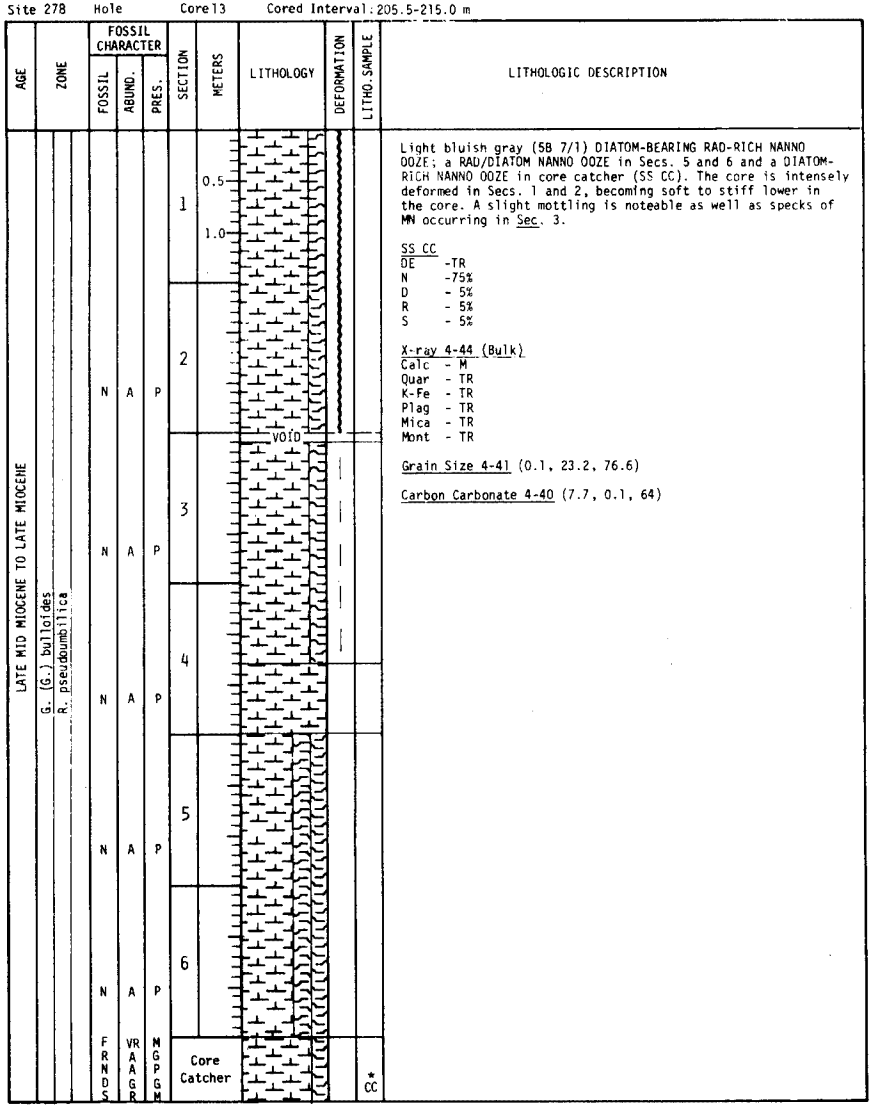
SS CC
D -TR
N -75%
D -10%
R -15%

X-ray 1-75 (Bulk)
Calc - M
Quar - TR
K-Fe - TR
Plag - TR
Mica - P
Chlo - TR

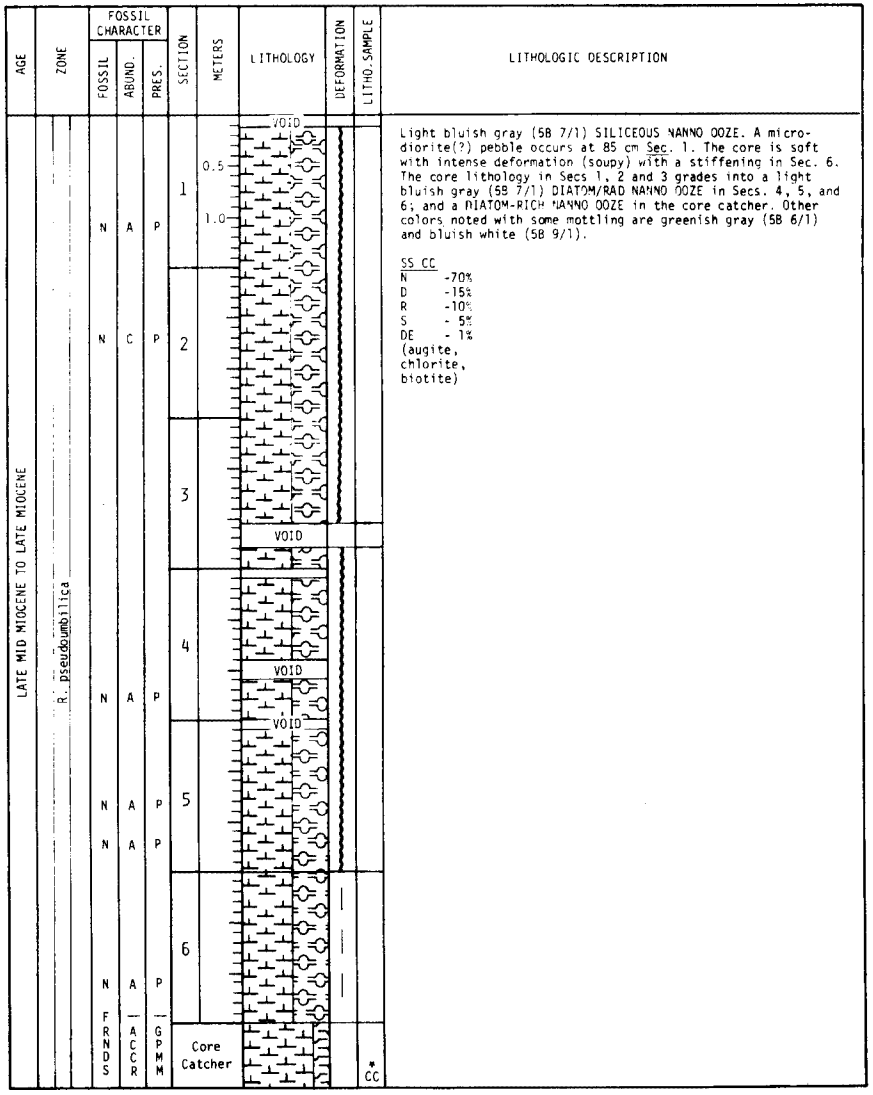
Grain Size 1-73 (0.1, 25.5, 74.3)

Carbon Carbonate 1-71 (7.0, 1.0, 58)

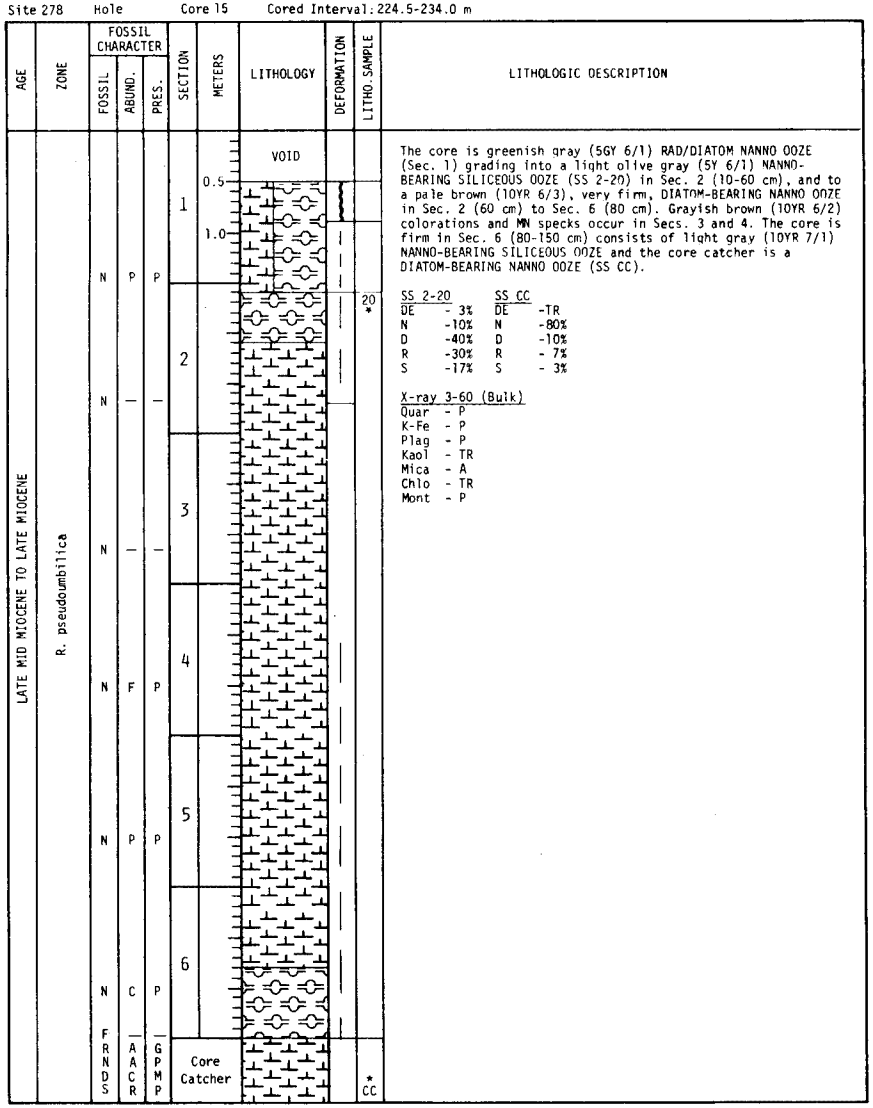
Site 278 Hole Core 13 Cored Interval: 205.5-215.0 m



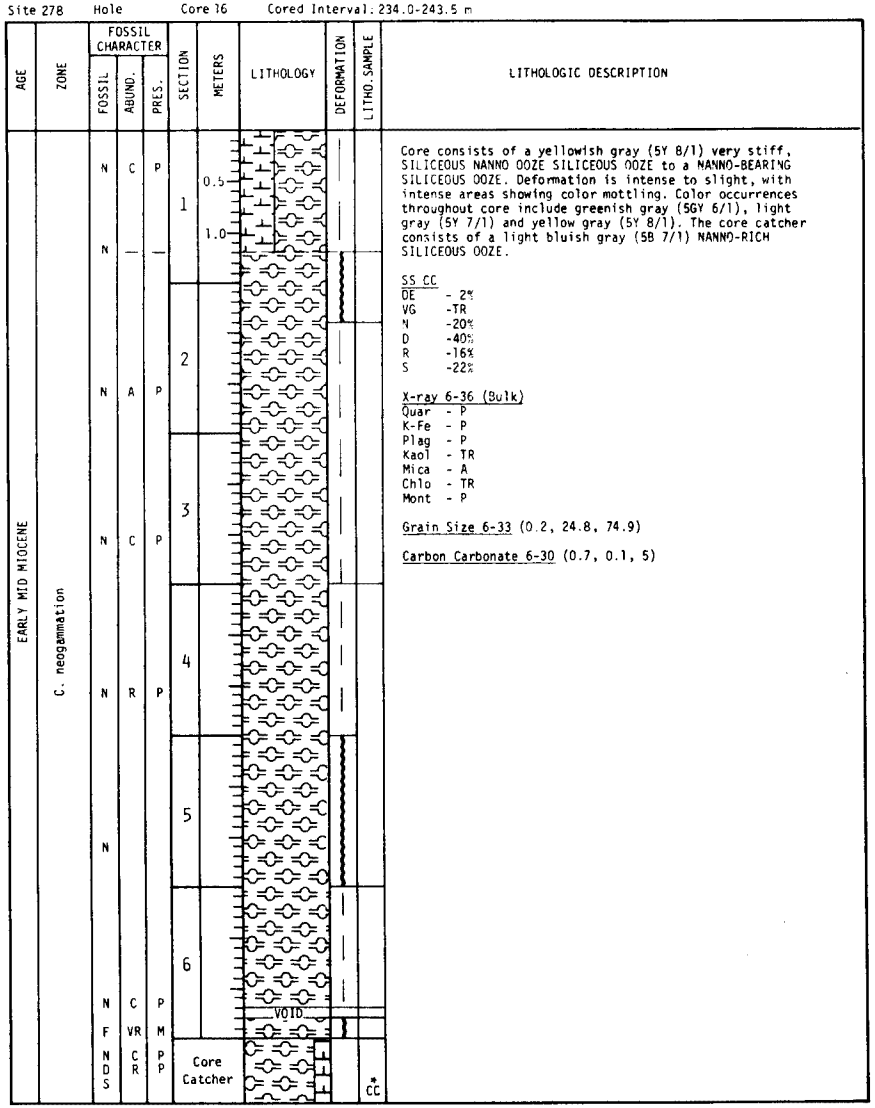
Site 278 Hole Core 14 Cored Interval: 215.0-224.5 m



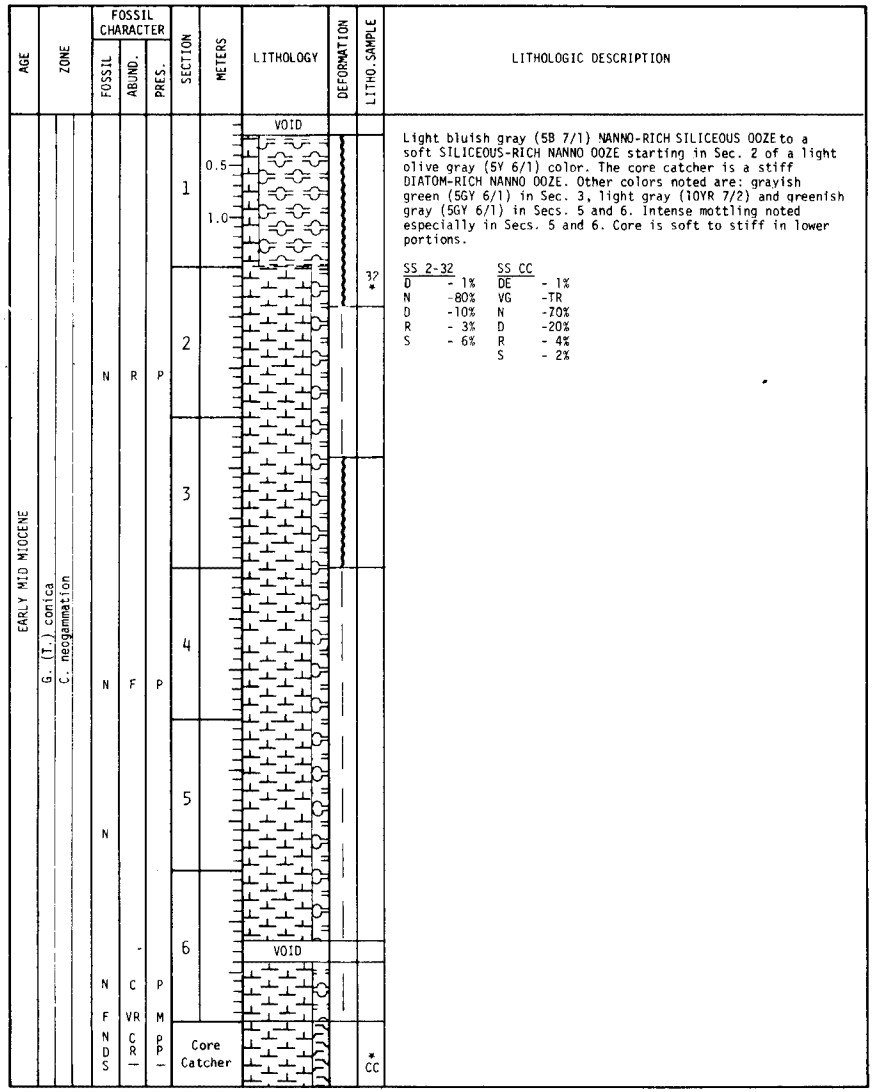
Site 278 Hole Core 15 Cored Interval: 224.5-234.0 m



Site 278 Hole Core 16 Cored Interval: 234.0-243.5 m



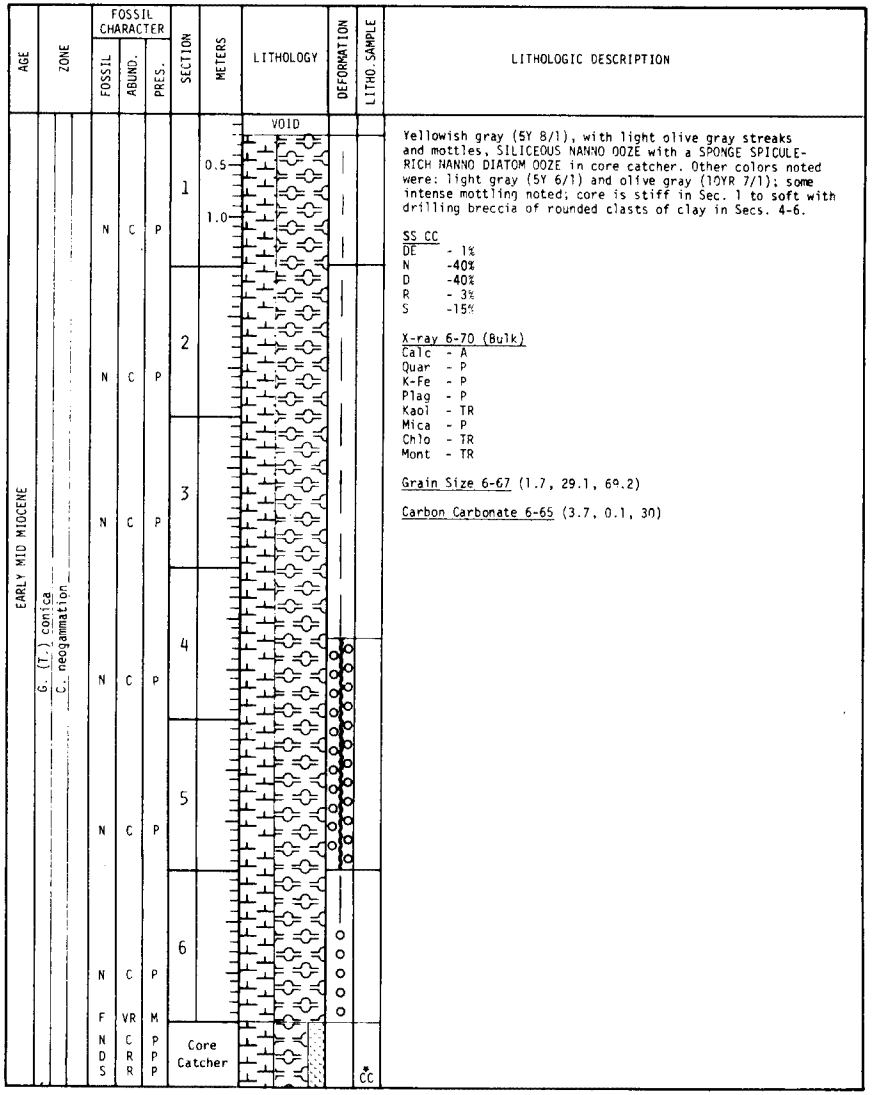
Site 278 Hole Core 17 Cored Interval: 243.5-253.0 m



Light bluish gray (5B 7/1) NANNO-RICH SILICEOUS OOZE to a soft SILICEOUS-RICH NANNO OOZE starting in Sec. 2 of a light olive gray (5Y 6/1) color. The core catcher is a stiff DIATOM-RICH NANNO OOZE. Other colors noted are: grayish green (5GY 6/1) in Sec. 3, light gray (10YR 7/2) and greenish gray (5GY 6/1) in Secs. 5 and 6. Intense mottling noted especially in Secs. 5 and 6. Core is soft to stiff in lower portions.

SS 2-32		SS CC	
D	- 1%	DE	- 1%
N	-80%	VG	-TR
D	-10%	N	-70%
R	- 3%	D	-20%
S	- 6%	R	- 4%
		S	- 2%

Site 278 Hole Core 18 Cored Interval: 253.0-262.5 m



Yellowish gray (5Y 8/1), with light olive gray streaks and mottles, SILICEOUS NANNO OOZE with a SPONGE SPICULE-RICH NANNO DIATOM OOZE in core catcher. Other colors noted were: light gray (5Y 6/1) and olive gray (10YR 7/1); some intense mottling noted; core is stiff in Sec. 1 to soft with drilling breccia of rounded clasts of clay in Secs. 4-6.

SS CC

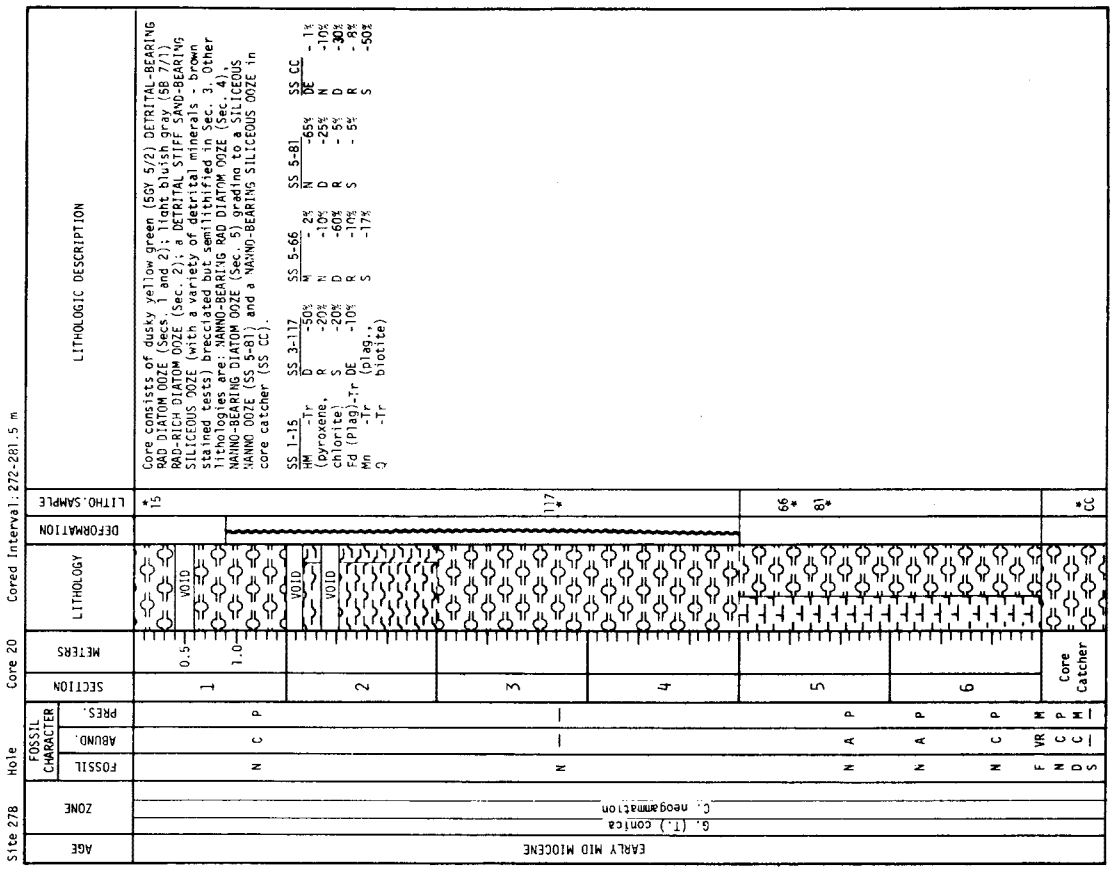
DE	- 1%
N	-40%
D	-40%
R	- 3%
S	-15%

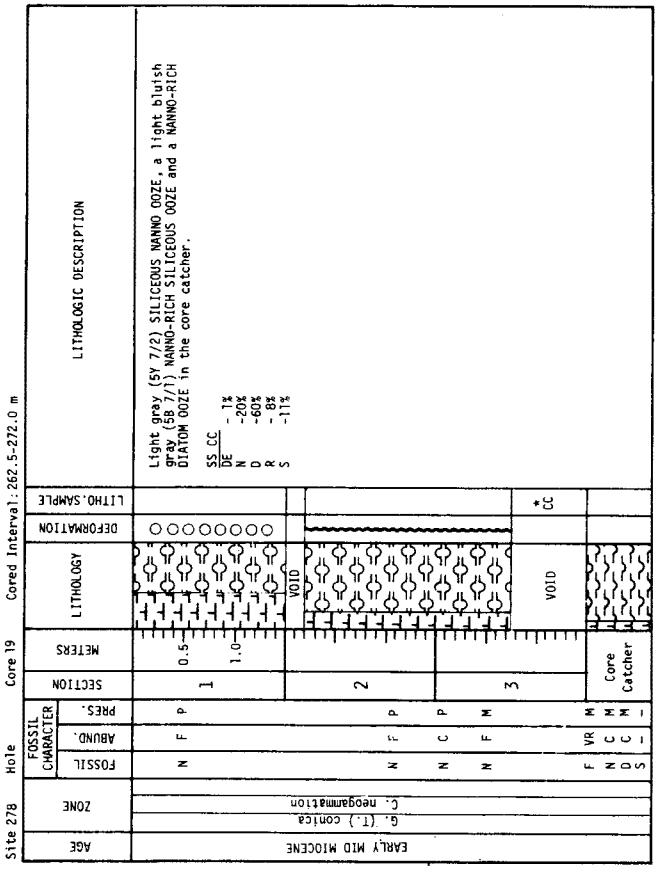
X-ray 6-70 (Bulk)

Calc	- A
Quar	- P
K-Fe	- P
Plag	- P
Kaol	- TR
Mica	- P
Chlo	- TR
Mont	- TR

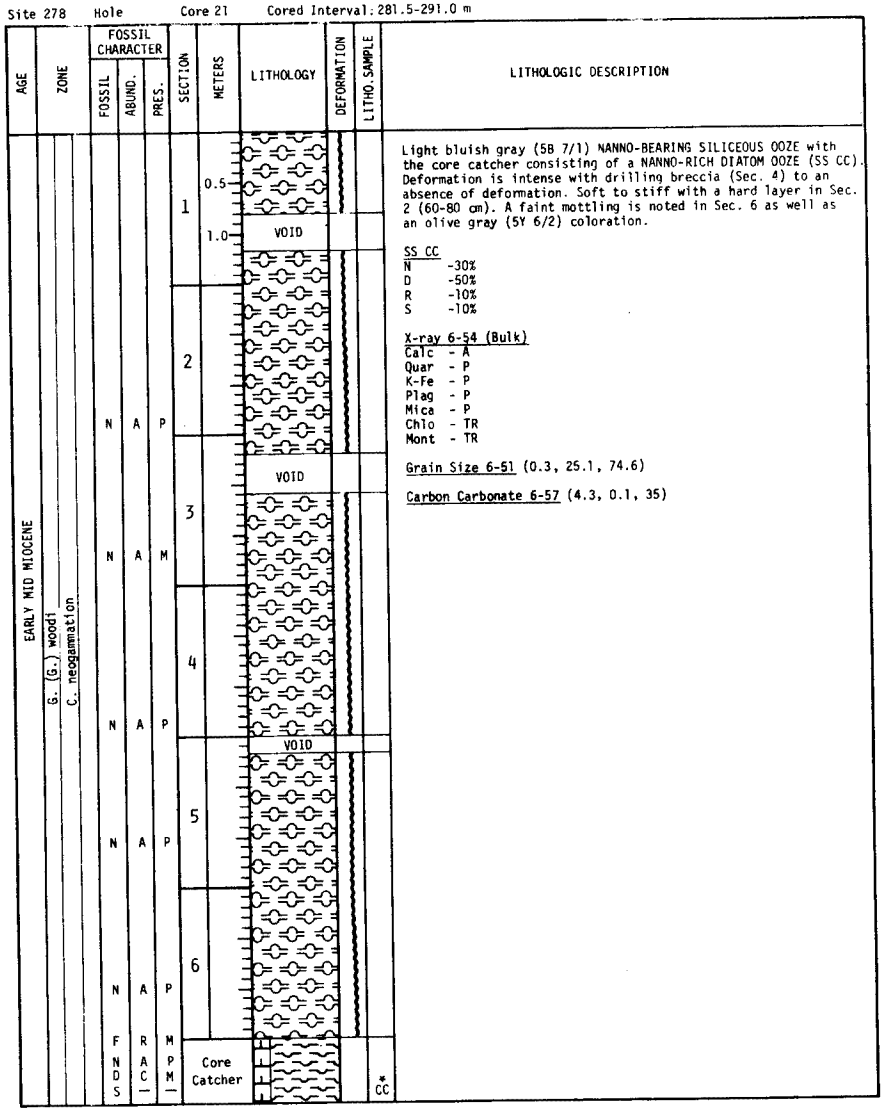
Grain Size 6-67 (1.7, 29.1, 69.2)

Carbon Carbonate 6-65 (3.7, 0.1, 30)


Site 278
Hole
Core 20
Cored Interval: 272-281.5 m
AGE
ZONE
FOSSIL CHARACTER
FOSSIL
ABUND.
PRES.
SECTION
METERS
LITHOLOGY
DEFORMATION
LITH. SAMPLE
LITHOLOGIC DESCRIPTION
EARLY MID MIOCENE
G. (T.) conica
C. neogammation
Core Catcher
VOID
Core consists of dusky yellow green (5GY 5/2) DETRITAL-BEARING RAD DIATOM OOZE (Secs. 1 and 2); light bluish gray (5B 7/1) RAD-RICH DIATOM OOZE (Sec. 2); a DETRITAL STIFF SAND-BEARING SILICEOUS OOZE (with a variety of detrital minerals - brown stained tests) brecciated but semilithified in Sec. 3. Other lithologies are: NANNO-BEARING RAD DIATOM OOZE (Sec. 4), NANNO-BEARING DIATOM OOZE (Sec. 5) grading to a SILICEOUS NANNO OOZE (SS 5-81) and a NANNO-BEARING SILICEOUS OOZE in core catcher (SS CC).
SS 1-15 SS 3-117 SS 5-66 SS 5-81 SS CC
HM -Tr D -50% M - 2% DE - 1%
(pyroxene, R -20% N -10% N -65% N -10%
chlorite) S -20% D -60% D - 5% R -30%
Fd (Plag)-Tr DE -10% R -10% R - 5% S - 8%
Mn -Tr (plag., S -17% S -50%
Q -Tr biotite)


Site 278
Hole
Core 19
Cored Interval: 262.5-272.0 m
AGE
ZONE
FOSSIL CHARACTER
FOSSIL
ABUND.
PRES.
SECTION
METERS
LITHOLOGY
DEFORMATION
LITH. SAMPLE
LITHOLOGIC DESCRIPTION
EARLY MID MIOCENE
G. (T.) conica
C. neogammation
Core Catcher
VOID
Light gray (5Y 7/2) SILICEOUS NANNO OOZE, a light bluish gray (5B 7/1) NANNO-RICH SILICEOUS OOZE and a NANNO-RICH DIATOM OOZE in the core catcher.
SS CC
DE - 1%
N -20%
D -60%
R - 8%
S -11%

Site 278 Hole Core 21 Cored Interval: 281.5-291.0 m



Light bluish gray (5B 7/1) NANNO-BEARING SILICEOUS OOZE with the core catcher consisting of a NANNO-RICH DIATOM OOZE (SS CC). Deformation is intense with drilling breccia (Sec. 4) to an absence of deformation. Soft to stiff with a hard layer in Sec. 2 (60-80 cm). A faint mottling is noted in Sec. 6 as well as an olive gray (5Y 6/2) coloration.

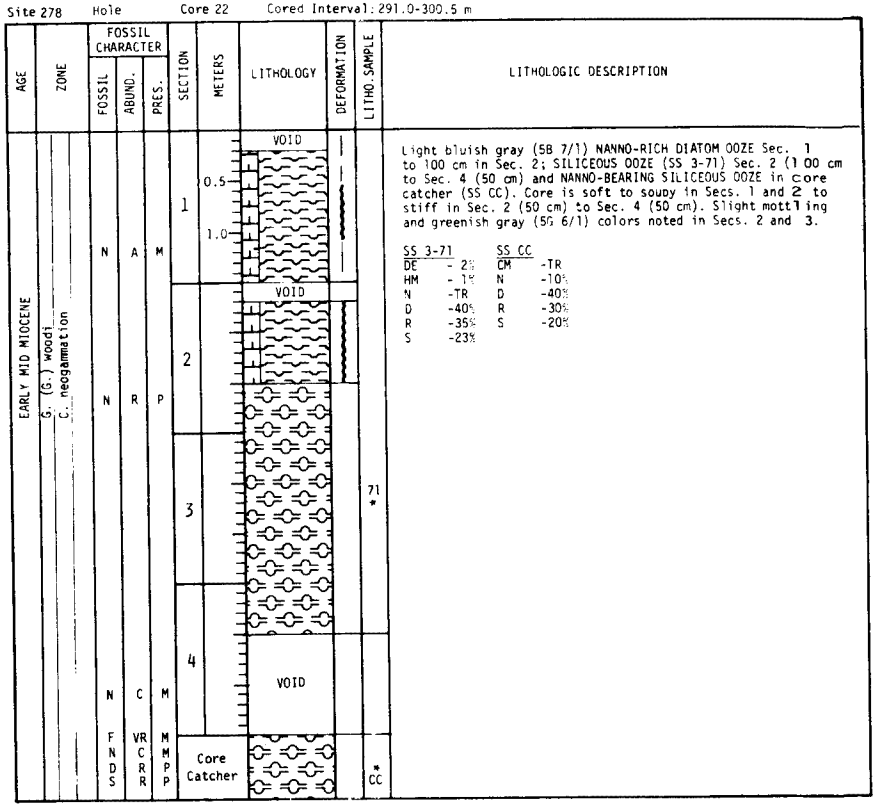
SS CC
N -30%
D -50%
R -10%
S -10%

X-ray 6-54 (Bulk)
Calc - A
Quar - P
K-Fe - P
Plag - P
Mica - P
Chlo - TR
Mont - TR

Grain Size 6-51 (0.3, 25.1, 74.6)

Carbon Carbonate 6-57 (4.3, 0.1, 35)

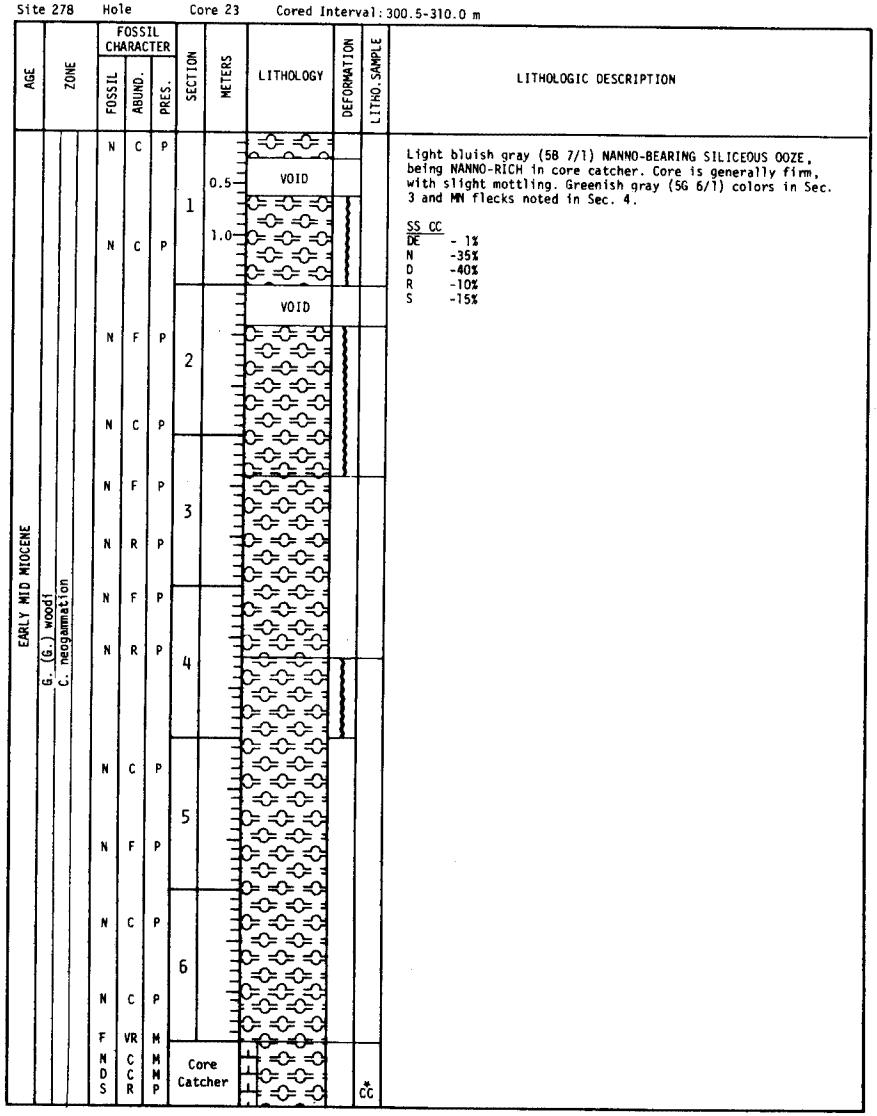
Site 278 Hole Core 22 Cored Interval: 291.0-300.5 m



Light bluish gray (5B 7/1) NANNO-RICH DIATOM OOZE Sec. 1 to 100 cm in Sec. 2; SILICEOUS OOZE (SS 3-71) Sec. 2 (100 cm to Sec. 4 (50 cm) and NANNO-BEARING SILICEOUS OOZE in core catcher (SS CC). Core is soft to soupy in Secs. 1 and 2 to stiff in Sec. 2 (50 cm) to Sec. 4 (50 cm). Slight mottling and greenish gray (5G 6/1) colors noted in Secs. 2 and 3.

SS 3-71		SS CC	
DE	- 2%	CM	-TR
HM	- 1%	N	-10%
N	-TR	D	-40%
D	-40%	R	-30%
R	-35%	S	-20%
S	-23%		

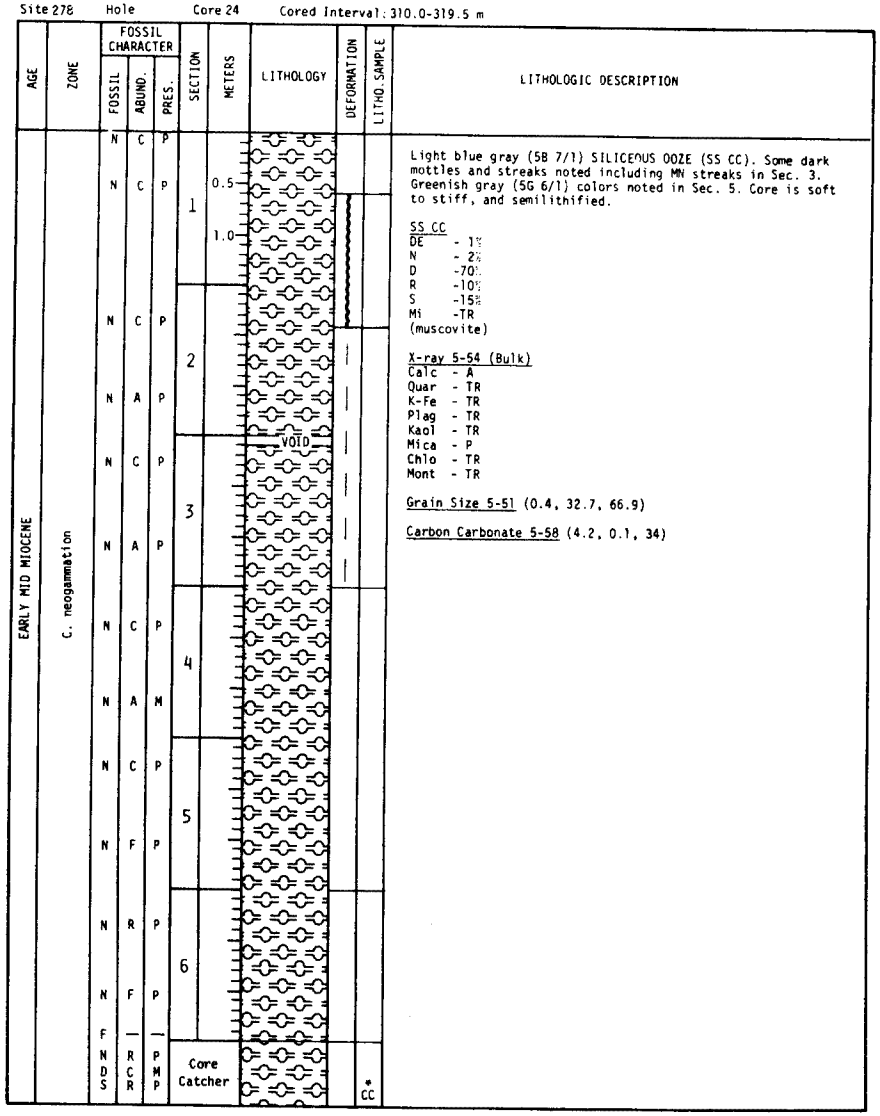
Site 278 Hole Core 23 Cored Interval: 300.5-310.0 m



Light bluish gray (5B 7/1) NANNO-BEARING SILICEOUS OOZE, being NANNO-RICH in core catcher. Core is generally firm, with slight mottling. Greenish gray (5G 6/1) colors in Sec. 3 and MN flecks noted in Sec. 4.

SS CC
DE - 1%
N -35%
D -40%
R -10%
S -15%

Site 278 Hole Core 24 Cored Interval: 310.0-319.5 m



Light blue gray (5B 7/1) SILICEOUS OOZE (SS CC). Some dark mottles and streaks noted including MN streaks in Sec. 3. Greenish gray (5G 6/1) colors noted in Sec. 5. Core is soft to stiff, and semilithified.

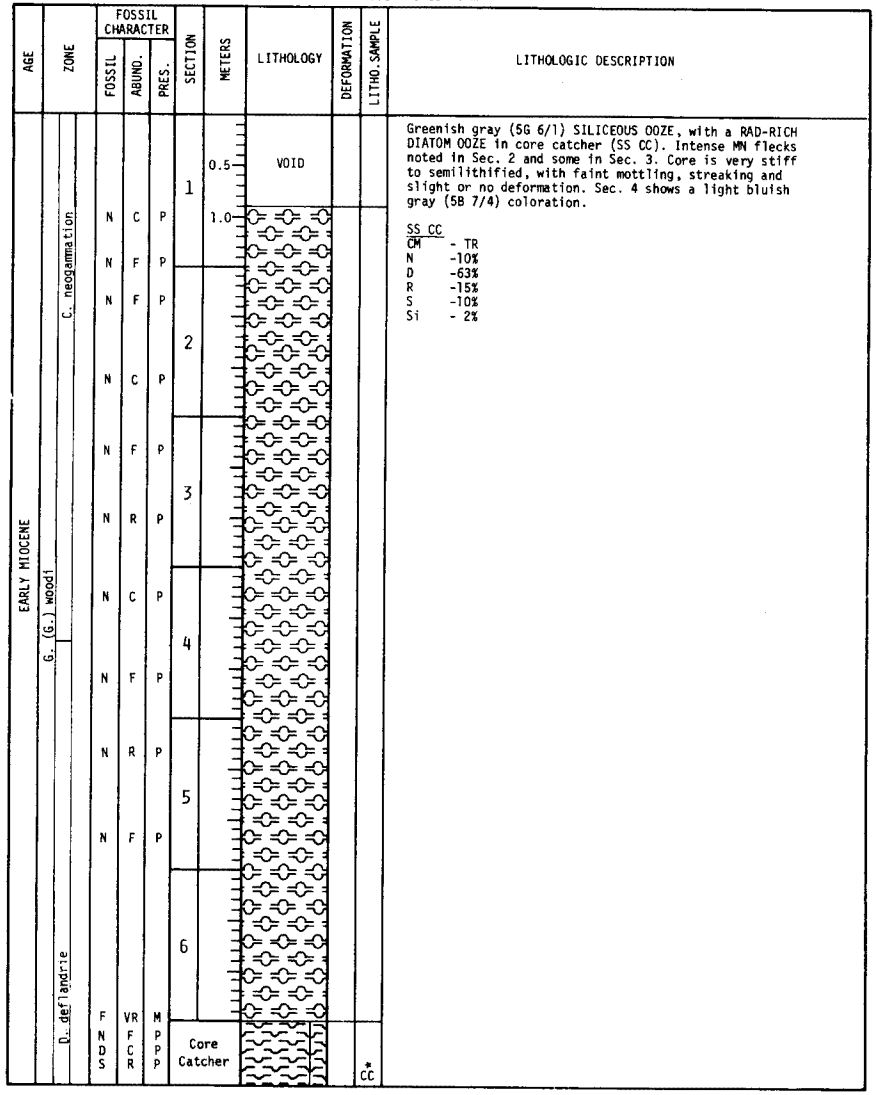
SS CC
DE - 1%
N - 2%
D -70%
R -10%
S -15%
Mi -TR
(muscovite)

X-ray 5-54 (Bulk)
Calc - A
Quar - TR
K-Fe - TR
Plag - TR
Kaol - TR
Mica - P
Chlo - TR
Mont - TR

Grain Size 5-51 (0.4, 32.7, 66.9)

Carbon Carbonate 5-58 (4.2, 0.1, 34)

Site 278 Hole Core 25 Cored Interval: 319.5-329.0 m

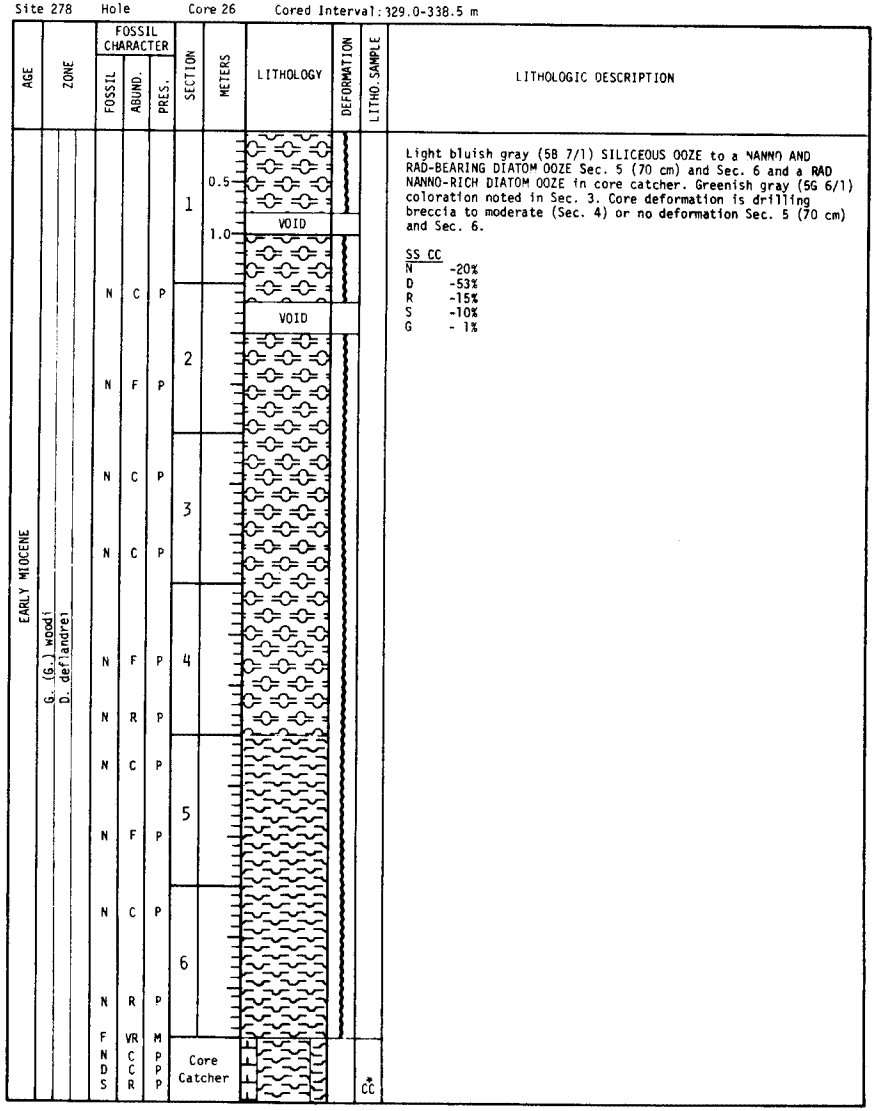


LITHOLOGIC DESCRIPTION

Greenish gray (5G 6/1) SILICEOUS OOZE, with a RAD-RICH DIATOM OOZE in core catcher (SS CC). Intense MN flecks noted in Sec. 2 and some in Sec. 3. Core is very stiff to semilithified, with faint mottling, streaking and slight or no deformation. Sec. 4 shows a light bluish gray (5B 7/4) coloration.

SS CC
CM - TR
N -10%
D -63%
R -15%
S -10%
Si - 2%

Site 278 Hole Core 26 Cored Interval: 329.0-338.5 m

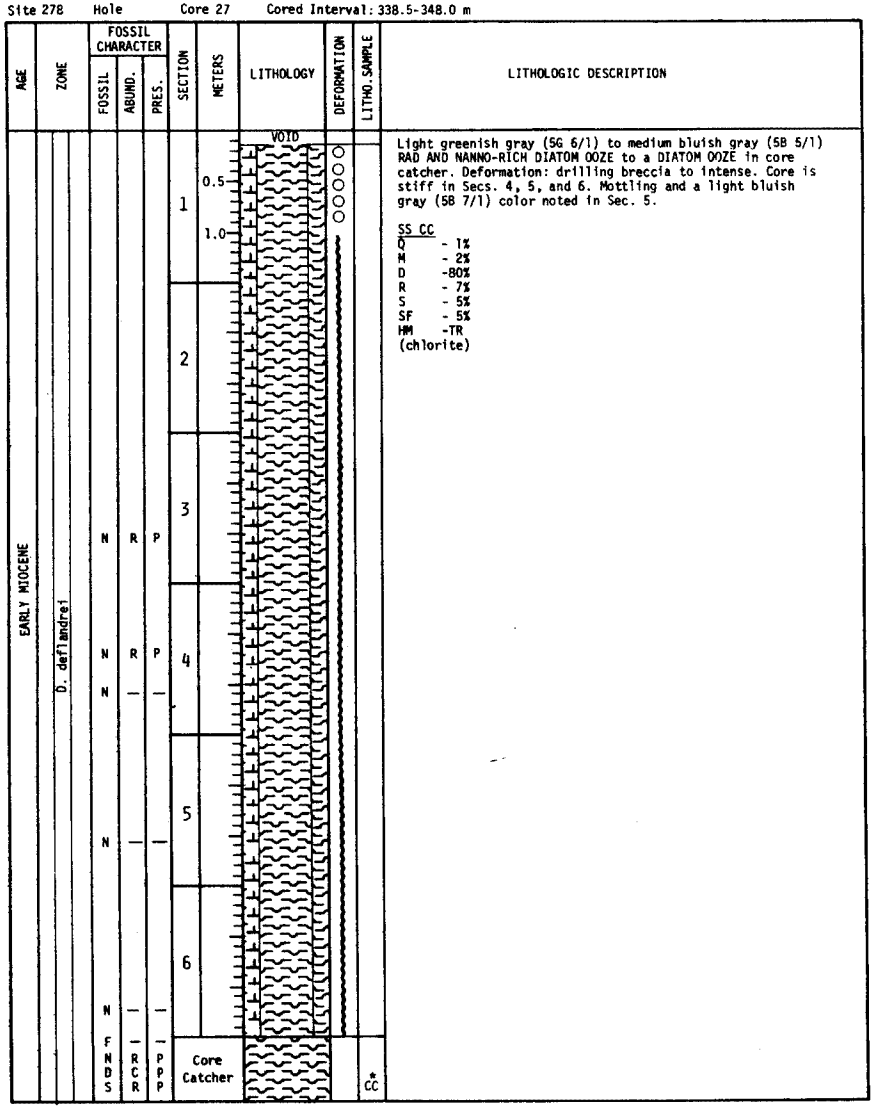


LITHOLOGIC DESCRIPTION

Light bluish gray (5B 7/1) SILICEOUS OOZE to a NANNO AND RAD-BEARING DIATOM OOZE Sec. 5 (70 cm) and Sec. 6 and a RAD NANNO-RICH DIATOM OOZE in core catcher. Greenish gray (5G 6/1) coloration noted in Sec. 3. Core deformation is drilling breccia to moderate (Sec. 4) or no deformation Sec. 5 (70 cm) and Sec. 6.

SS CC
N -20%
D -53%
R -15%
S -10%
G - 1%

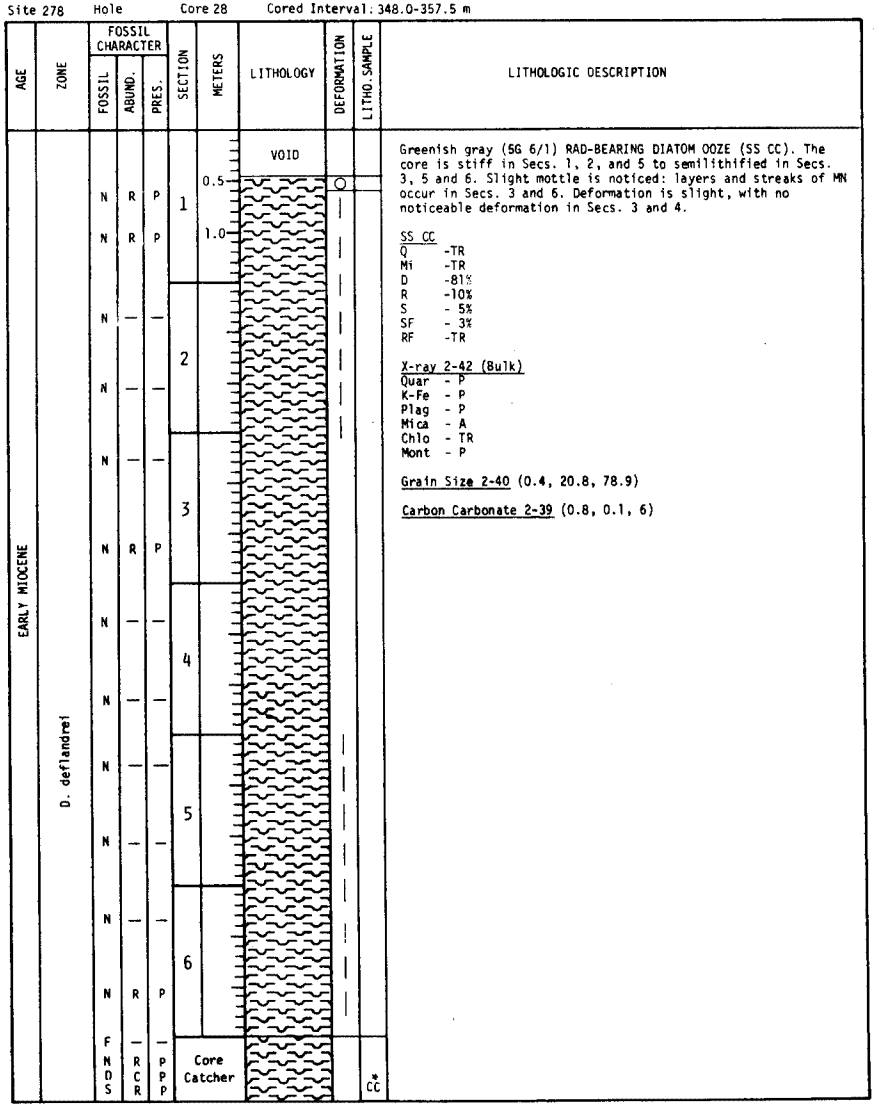
Site 278 Hole Core 27 Cored Interval: 338.5-348.0 m



Light greenish gray (5G 6/1) to medium bluish gray (5B 5/1) RAD AND NANNO-RICH DIATOM OOZE to a DIATOM OOZE in core catcher. Deformation: drilling breccia to intense. Core is stiff in Secs. 4, 5, and 6. Mottling and a light bluish gray (5B 7/1) color noted in Sec. 5.

SS CC
Q - 1%
M - 2%
D -80%
R - 7%
S - 5%
SF - 5%
HM -TR
(chlorite)

Site 278 Hole Core 28 Cored Interval: 348.0-357.5 m



Greenish gray (5G 6/1) RAD-BEARING DIATOM OOZE (SS CC). The core is stiff in Secs. 1, 2, and 5 to semilithified in Secs. 3, 5 and 6. Slight mottle is noticed: layers and streaks of MN occur in Secs. 3 and 6. Deformation is slight, with no noticeable deformation in Secs. 3 and 4.

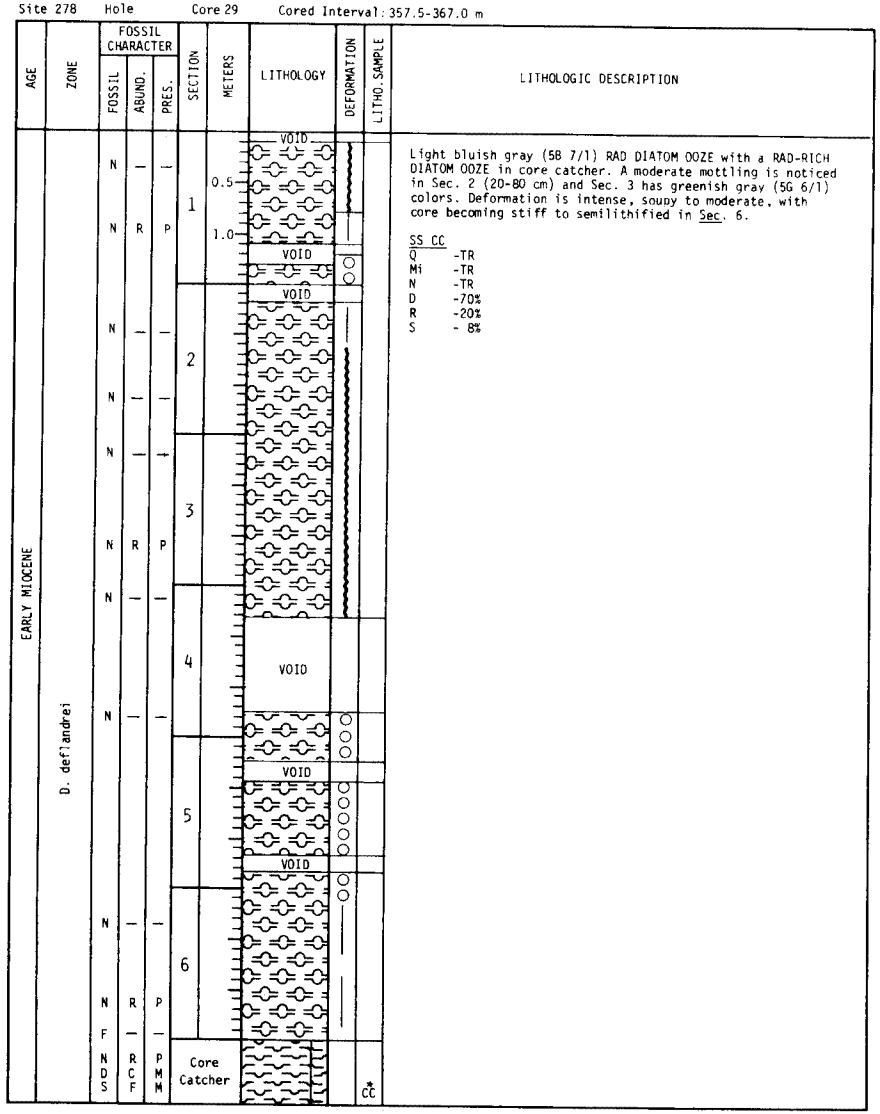
SS CC
Q -TR
Mi -TR
D -81%
R -10%
S - 5%
SF - 3%
RF -TR

X-ray 2-42 (Bulk)
Quar - P
K-Fe - P
Plag - P
Mica - A
Chlo - TR
Mont - P

Grain Size 2-40 (0.4, 20.8, 78.9)

Carbon Carbonate 2-39 (0.8, 0.1, 6)

Site 278 Hole Core 29 Cored Interval: 357.5-367.0 m

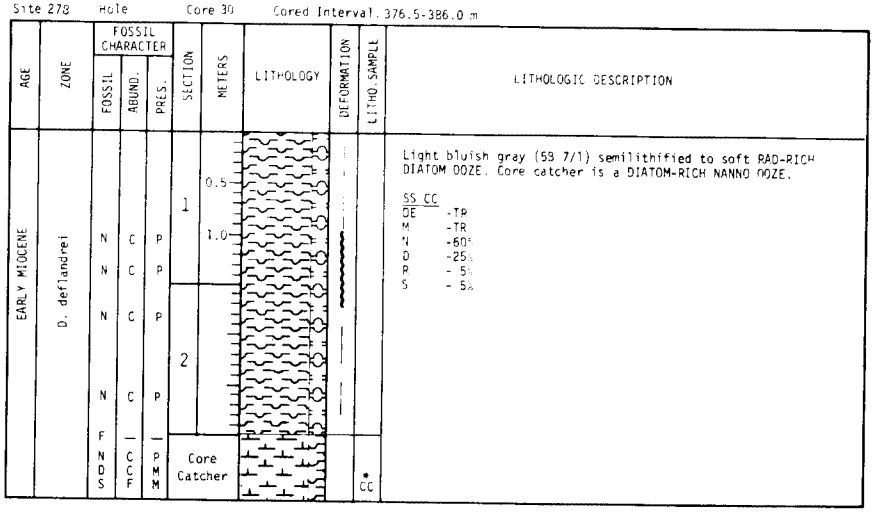


LITHOLOGIC DESCRIPTION

Light bluish gray (5B 7/1) RAD DIATOM OOZE with a RAD-RICH DIATOM OOZE in core catcher. A moderate mottling is noticed in Sec. 2 (20-80 cm) and Sec. 3 has greenish gray (5G 6/1) colors. Deformation is intense, soupy to moderate, with core becoming stiff to semilithified in Sec. 6.

SS CC
Q -TR
Mi -TR
N -TR
D -70%
R -20%
S - 8%

Site 278 Hole Core 30 Cored Interval: 376.5-386.0 m

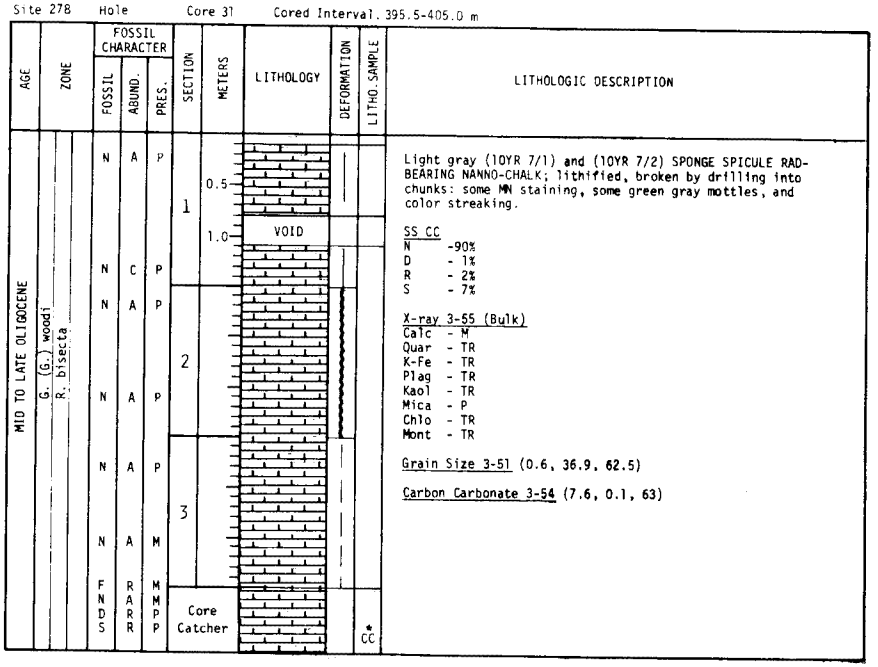


LITHOLOGIC DESCRIPTION

Light bluish gray (5B 7/1) semilithified to soft RAD-RICH DIATOM OOZE. Core catcher is a DIATOM-RICH NANNO OOZE.

SS CC
DE -TR
M -TR
N -60%
D -25%
R - 5%
S - 5%

Site 278 Hole Core 31 Cored Interval: 395.5-405.0 m



LITHOLOGIC DESCRIPTION

Light gray (10YR 7/1) and (10YR 7/2) SPONGE SPICULE RAD-BEARING NANNO-CHALK; lithified, broken by drilling into chunks: some MN staining, some green gray mottles, and color streaking.

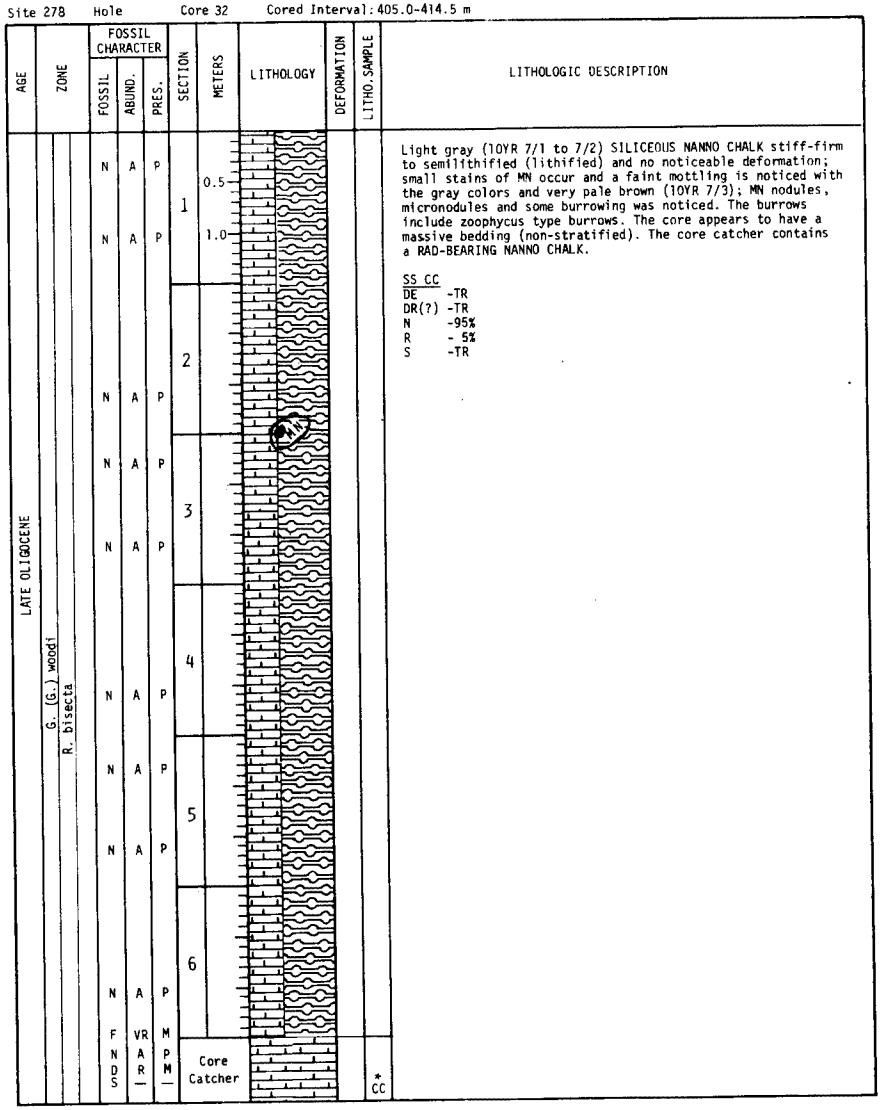
SS CC
N -90%
D - 1%
R - 2%
S - 7%

X-ray 3-55 (Bulk)
Calc - M
Quar - TR
K-Fe - TR
Plag - TR
Kaol - TR
Mica - P
Chlo - TR
Mont - TR

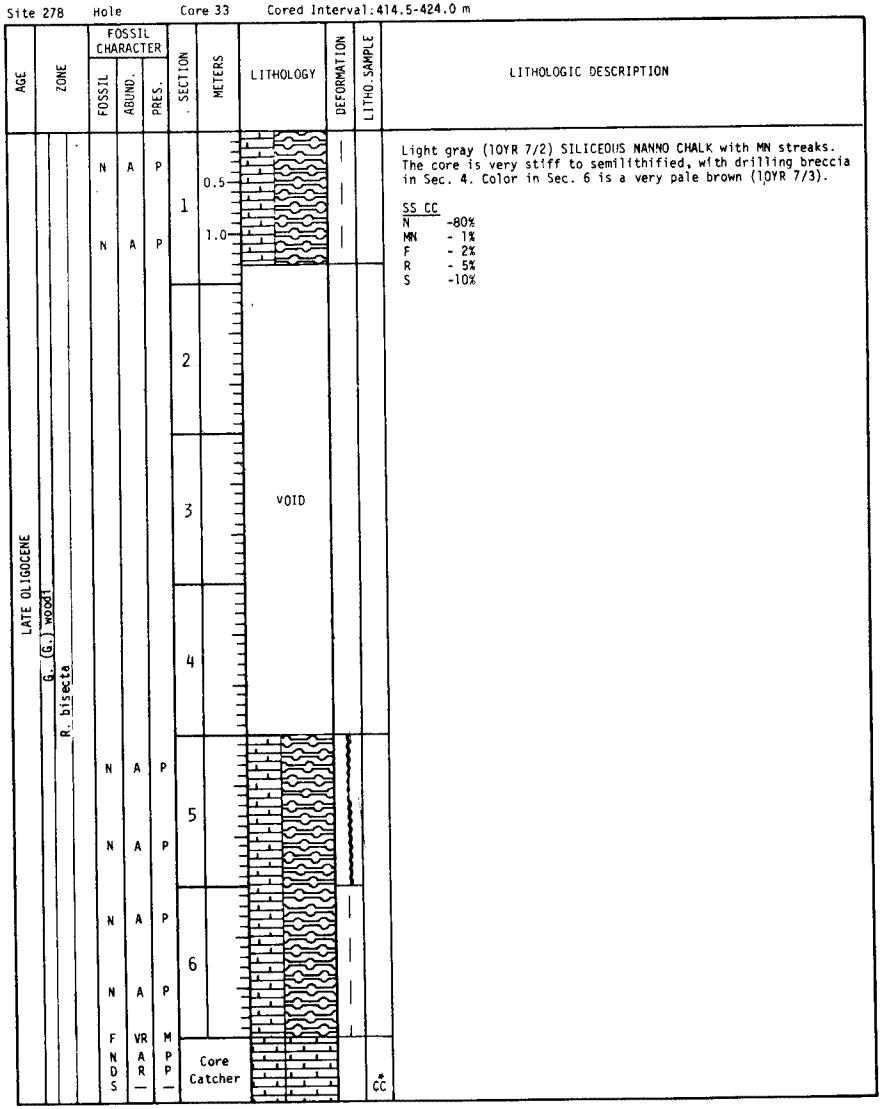
Grain Size 3-51 (0.6, 36.9, 62.5)

Carbon Carbonate 3-54 (7.6, 0.1, 63)

Site 278 Hole Core 32 Cored Interval: 405.0-414.5 m



Site 278 Hole Core 33 Cored Interval: 414.5-424.0 m



Site 278 Hole Core 34 Cored Interval: 424.0-429.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
MID OLIGOCENE	G. (S.) angiporoides angiporoides R. bisecta	N	A	P	1	0.5				Very pale brown (10YR 7/3) NANNO CHALK and light gray (10YR 7/1) SILICEOUS NANNO CHALK: deformation is intense to a drilling breccia in Sec. 3. The contact to a PLAGIOCLASE PORPHYRITIC BASALT olive black (5Y 2/1) occurs in Sec. 3 (115 cm). The basalt has black glass rinds (RI 1.598 480/ $^{\circ}SiO_2$ of palagonite. Micritic limestone inclusions are light gray (10YR 7/2), with white rare calcite filled amygdules 0.5 mm.
						1.0	VOID			
		N	A	M						
		N	A	P	2		VOID			
		N	A	M						
		N	A	P	3		VOID			
		N	A	P						
		F	C	P-M						
		N	A	P	Core Catcher					

X-ray 3-13 (Bulk)
Calc - M
Dolo - TR
Quar - TR
K-Fe - TR
Plag - TR
Kaol - TR
Mica - P
Chlo - TR
Mont - P

Grain Size 3-11 (5.9, 43.4, 50.7)

Carbon Carbonate 3-10 (6.8, 0.0, 57)

Site 278 Hole Core 35 Cored Interval: 429.0-438.5 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					1	0.5				PLAGIOCLASE PORPHYRITIC BASALT olive black (5Y 2/1) with black palagonite rinds, inclusions of micritic limestone, calcite amygdules and veins, and vesicules. Rock is altered olivine pillow basalt. Feldspar is laboradorite. Some material has been lost between segments so there is no lithologic continuity in core. Basalt has 15% plagioclase euhedra (x̄ 2-3 mm), feldspar laths, acicular pyroxene? with iddingsite after olivine and abundant palagonite. The micrite contains forams, is 2 cm thick and is bounded on either side by glass. The micrite believed to be preserved in inter-pillow area. There is no evidence of alteration or baking however. Glass is colorless, contains fresh labradorite phenocrysts and laths and olivine euhedra. Micrite may have been a NANNO OOZE 20 segments occur in Sec. 1, 12 segments in Sec. 2, and in core catcher 9 pieces of basalt were found. 3-5 mm fragments, without glass as described above.
						1.0				
					2					
					3					
					Core Catcher					

Site 278 Hole A Core 1 Cored Interval: 15.5-25.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
PLEISTOCENE		F R N D S	A F C R	G P M M	1	0.5	VOID		30	Light gray (N7) DETRITAL BEARING CALCAREOUS? DIATOM OOZE. Most of core loss was due to basalt chips caught in core catcher dogs.
						1.0				
					Core Catcher					

SS 1-30
DE - 8%
M - 7%
F - 1%
N - 2%
D - 75%
R - 2%
S - 5%

(Detrital minerals include chlorite, hornblende and quartz)

Site 278 Hole A Core 2 Cored Interval: 25.0-34.5 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
PLEISTOCENE		F R N D S	C A F A F	M G M M M	1	0.5				Medium Gray (N5), light gray (N7), DETRITAL BEARING CALCAREOUS DIATOM OOZE. Intense deformation shown by vertical color banding; some soft zones in Sec. 4 and dark greenish gray (5G 4/1) colors.
						1.0				
					2					
					3					
					4					
					Core Catcher					

DEEP SEA DRILLING PROJECT

LEG 29 SITE 279

SITE SUMMARY SHEET

POSITION: Latitude: 51°20.14'S Longitude: 162°38.10'E

Water depth (from sea level): 3341 corrected meters (Echo sounding)

Bottom felt at: 3381 meters (drill pipe) Penetration: 279 - 1 m
279A - 202 m

Number of Holes: 2 Number of Cores: 279 - 1; 279A - 13

Total length of cored section: 279 - 1.0 m; 279A - 110 m

Total core recovered: 279 - 0.6 m; 279A - 79.8 m

Percentage of core recovery: 279 - 60%; 279A - 72.55%

OLDEST SEDIMENT CORED:

Depth below sea floor: 197.0 meters Nature: Nannofossil ooze

Age: Middle early Miocene

BASEMENT:

Depth below sea floor: .23 seconds (reflection time)

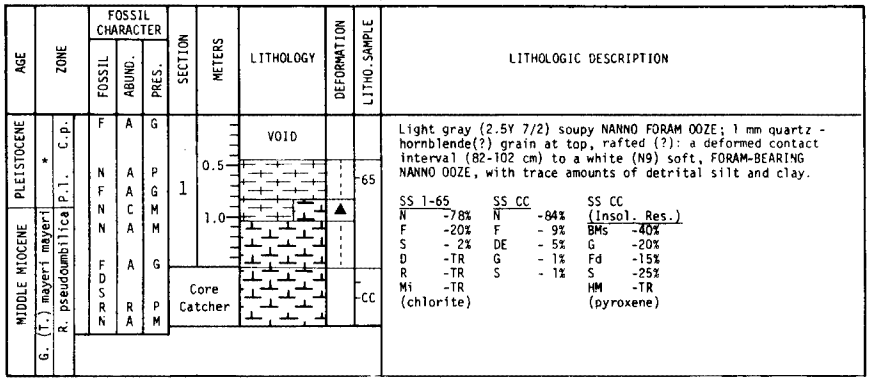
Depth below sea floor: 197 meters (drilled)

Average velocity to basement: 1.72 km/sec Nature: Vesicular basalt

PRINCIPAL RESULTS:

Thin (13 meters) Pleistocene veneer of foraminifera ooze overlies erosional surface beneath which is 185 meters of late middle Miocene to middle early Miocene foraminifera-bearing nannofossil ooze. Ash-rich at base of section. Excellent foraminiferal and nannofossil sequence. Abundance of discoasters at some Miocene intervals indicates surprising warmth for this latitude. Apparently continuous sequence with constant sedimentation at about 1.85 cm/1000 years. Cored 4 meters of vesicular basalt. Sediment overlying basement is 20 m.y. old (middle early Miocene). Unconformity near surface records increased late Cenozoic bottom erosion in deeper parts of the southern Tasman Sea region previously observed in many piston cores but extends knowledge of erosion to shallow water associated with ridge.

Site 279 Hole Core 1 Cored Interval: 0.0-1.0 m

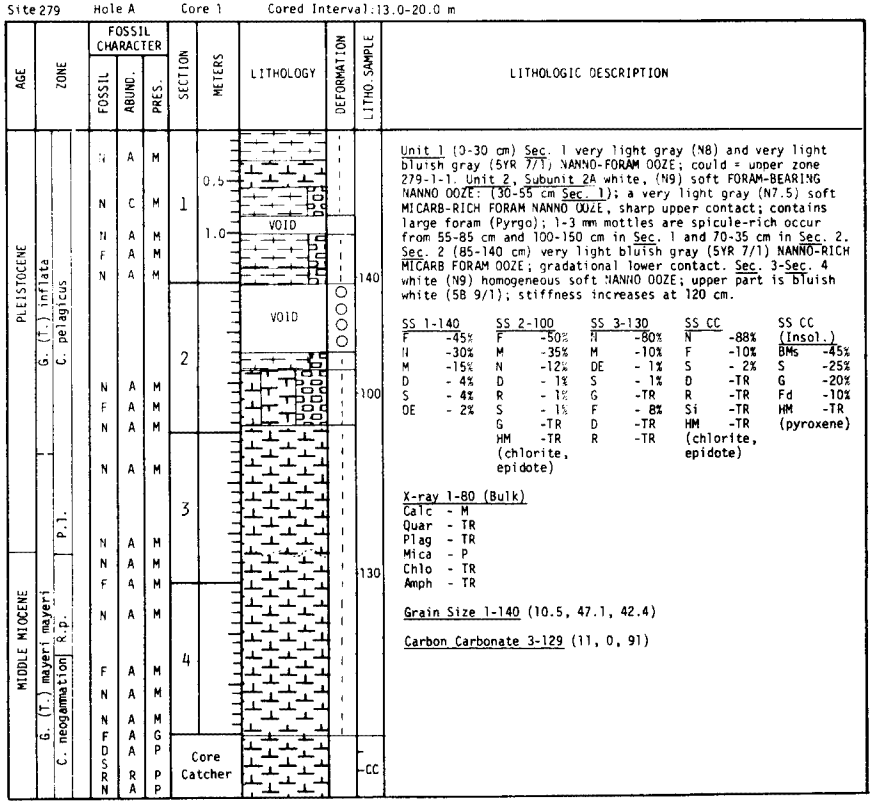


Light gray (2.5Y 7/2) soupy NANNO FORAM OOZE; 1 mm quartz - hornblende(?) grain at top, rafted (?); a deformed contact interval (82-102 cm) to a white (N9) soft, FORAM-BEARING NANNO OOZE, with trace amounts of detrital silt and clay.

SS 1-65		SS CC		SS CC (Insol. Res.)	
N	-78%	N	-84%	BMs	-40%
F	-20%	F	- 9%	G	-20%
S	- 2%	DE	- 5%	Fd	-15%
D	-TR	G	- 1%	S	-25%
R	-TR	S	- 1%	HM	-TR
Mi (chlorite)	-TR			(pyroxene)	

*G. (G.) truncatulinoides

Site 279 Hole A Core 1 Cored Interval: 13.0-20.0 m



Unit 1 (0-30 cm) Sec. 1 very light gray (N8) and very light bluish gray (5YR 7/1) NANNO-FORAM OOZE; could = upper zone 279-1-1. Unit 2, Subunit 2A white, (N9) soft FORAM-BEARING NANNO OOZE: (30-55 cm Sec. 1); a very light gray (N7.5) soft MICARB-RICH FORAM NANNO OOZE, sharp upper contact; contains large foram (Pyrgo); 1-3 mm mottles are spicule-rich occur from 55-85 cm and 100-150 cm in Sec. 1 and 70-35 cm in Sec. 2. Sec. 2 (85-140 cm) very light bluish gray (5YR 7/1) NANNO-RICH MICARB FORAM OOZE; gradational lower contact. Sec. 3-Sec. 4 white (N9) homogeneous soft NANNO OOZE; upper part is bluish white (5B 9/1); stiffness increases at 120 cm.

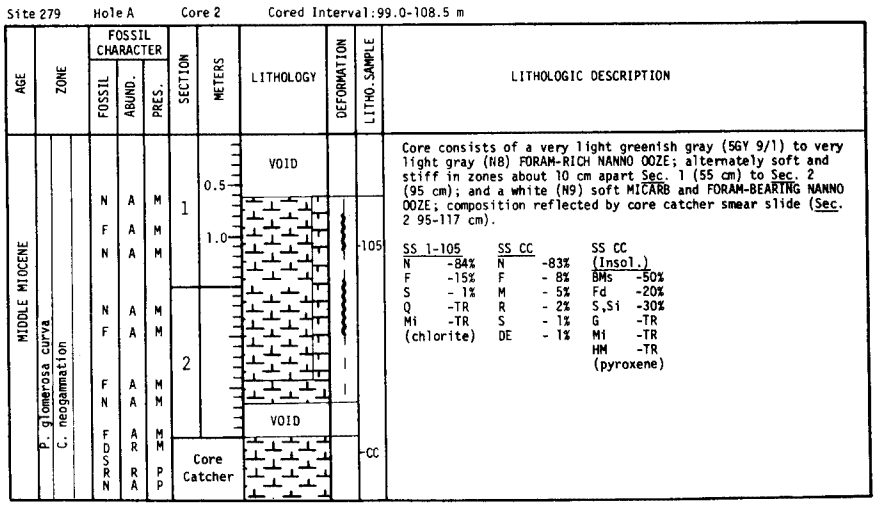
SS 1-140		SS 2-100		SS 3-130		SS CC		SS CC (Insol.)	
F	-45%	F	-50%	N	-80%	N	-88%	BMs	-45%
N	-30%	M	-35%	M	-10%	F	-10%	S	-25%
M	-15%	N	-12%	DE	- 1%	S	- 2%	Fd	-10%
D	- 4%	D	- 1%	S	- 1%	D	-TR	G	-20%
S	- 4%	R	- 1%	G	-TR	R	-TR	HM	-TR
DE	- 2%	S	- 1%	F	- 8%	Si	-TR	(pyroxene)	
		G	-TR	D	-TR	HM	-TR		
		HM	-TR	R	-TR	(chlorite, epidote)			
		(chlorite, epidote)							

X-ray 1-80 (Bulk)
Calc - M
Quar - TR
Plag - TR
Mica - P
Chlo - TR
Amph - TR

Grain Size 1-140 (10.5, 47.1, 42.4)

Carbon Carbonate 3-129 (11, 0, 91)

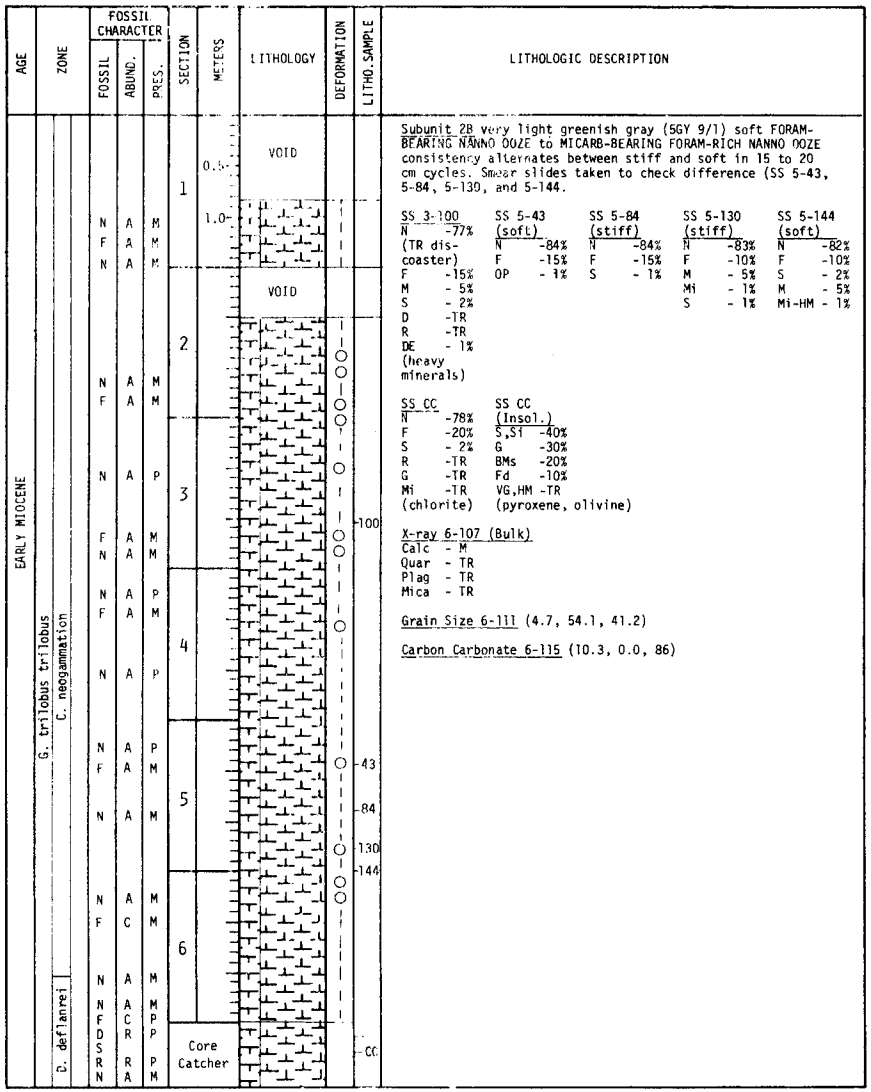
Site 279 Hole A Core 2 Cored Interval: 99.0-108.5 m



Core consists of a very light greenish gray (5GY 9/1) to very light gray (N8) FORAM-RICH NANNO OOZE; alternately soft and stiff in zones about 10 cm apart Sec. 1 (55 cm) to Sec. 2 (95 cm); and a white (N9) soft MICARB and FORAM-BEARING NANNO OOZE; composition reflected by core catcher smear slide (Sec. 2 95-117 cm).

SS 1-105		SS CC		SS CC (Insol.)	
N	-84%	N	-83%	BMs	-50%
F	-15%	F	- 8%	Fd	-20%
S	- 1%	M	- 5%	S,Si	-30%
Q	-TR	R	- 2%	G	-TR
Mi (chlorite)	-TR	S	- 1%	Mi	-TR
		DE	- 1%	HM (pyroxene)	-TR

Site 279 Hole A Core 3 Cored Interval: 108.5-118.0 m



Subunit 2B very light greenish gray (5GY 9/1) soft FORAM-BEARING NANNO OOZE to MICARB-BEARING FORAM-RICH NANNO OOZE consistency alternates between stiff and soft in 15 to 20 cm cycles. Smear slides taken to check difference (SS 5-43, 5-84, 5-130, and 5-144.

SS 3-100	SS 5-43 (soft)	SS 5-84 (stiff)	SS 5-130 (stiff)	SS 5-144 (soft)
N -77%	N -84%	N -84%	N -83%	N -82%
(TR dis-coaster)	F -15%	F -15%	F -10%	F -10%
F -15%	OP - 1%	S - 1%	M - 5%	S - 2%
M - 5%			Mi - 1%	M - 5%
S - 2%			S - 1%	Mi-HM - 1%
D -TR				
R -TR				
DE - 1%				
(heavy minerals)				

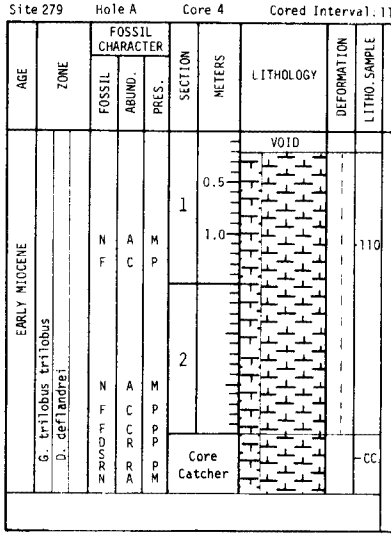
SS CC	SS CC (Insol.)
N -78%	
F -20%	S,Si -40%
S - 2%	G -30%
R -TR	BMs -20%
G -TR	Fd -10%
Mi -TR	VG,HM -TR
(chlorite)	(pyroxene, olivine)

X-ray 6-107 (Bulk)
Calc - M
Quar - TR
Plag - TR
Mica - TR

Grain Size 6-111 (4.7, 54.1, 41.2)

Carbon Carbonate 6-115 (10.3, 0.0, 86)

Site 279 Hole A Core 4 Cored Interval. 118.0-127.5 m



Lithology identical to Core 3, Sec. 1 (FORAM-BEARING NANNO OOZE to MICARB-BEARING FORAM RICH NANNO OOZE. Rare irregular black mottles, probably glauconite and fine pyrite.

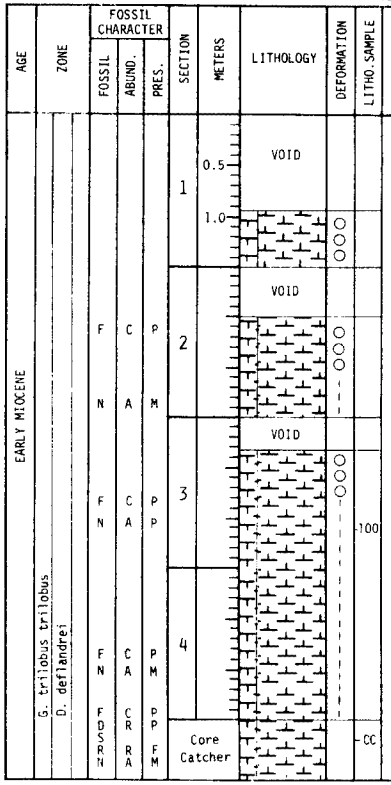
SS 1-110	SS CC	SS CC (Insol.)
N -90%	N -93%	BMs -50%
CM - 5%	F - 3%	G -10%
D -TR	M - 2%	S,Si -20%
S -TR	S - 1%	Fd -20% (Plag.)
VG -TR	R -TR	HM -TR (pyroxene)
F - 5% (some with glauconite-filled chambers)	DE - 1% (mica, quartz)	

X-ray 2-87 (Bulk)
Calc - M
Quar - TR
Plag - TR
Mica - TR

Grain Size 2-83 (10.9, 45.4, 43.6)

Carbon Carbonate 2-91 (9.9, 0.0, 82)

Site 279 Hole A Core 5 Cored Interval. 127.5-137.0 m



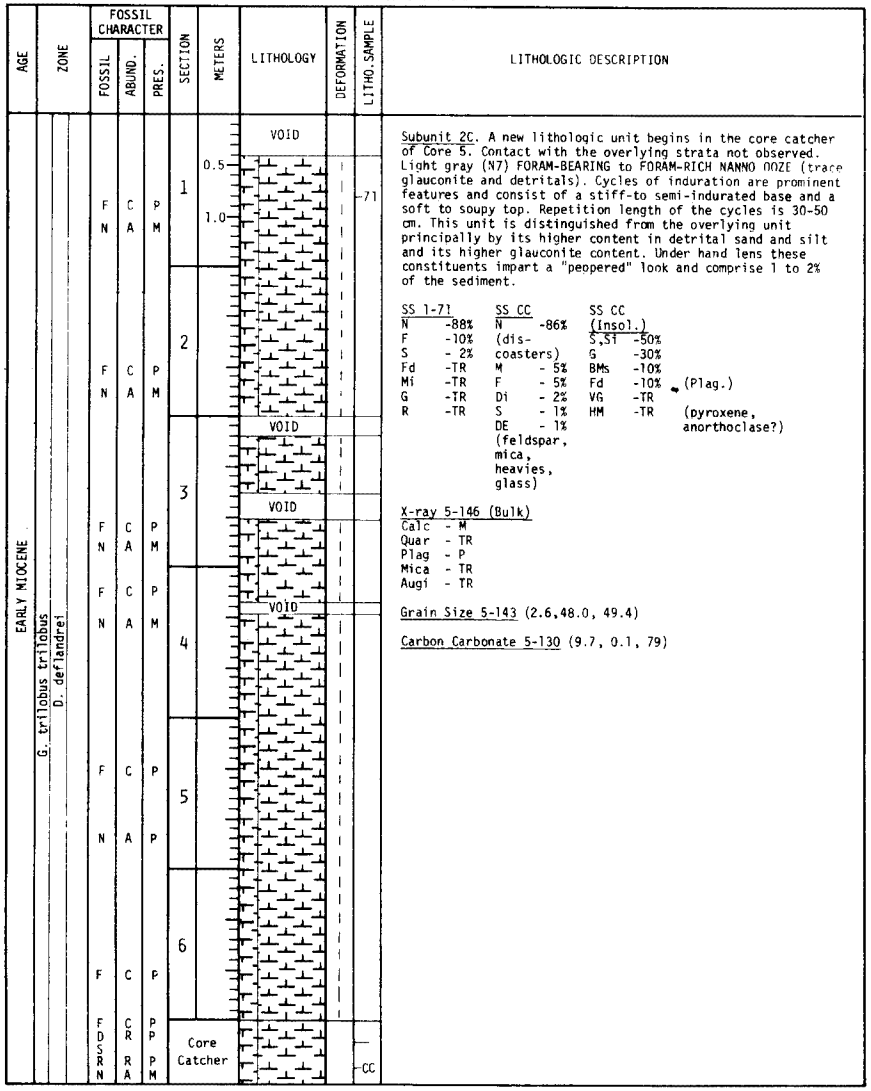
Lithology identical to Core 3, Sec. 3 MICARB-BEARING FORAM-RICH NANNO OOZE. Sec. 4 is stiff and little deformed, no primary features are visible. Bedding is generally at a scale of 10 to 20 cm in thickness and is best expressed by alternations of harder and softer zones. Within beds about 50% of the sediment shows no primary structure; about 40% exhibits faint mottling caused by burrowing organisms; about 10% of the beds shows fine laminations ranging from 0.5 to 3 mm in thickness. Burrows are typically from 2 to 5 mm in width and less than 10 mm in legth. This unit ends in the void between Sec. 4 and the core catcher.

SS 3-100	SS CC		SS CC (Insol.)	
N -87%	N	-68%	D,R	-40%
F - 5%	F	-20%	G	-25%
S - 2%	M	- 5%	BMs	-25%
OP - 1%	S	- 4%	VG	- 3%
VG -TR	R	- 2%	Fd	- 7% (Plag.)
G -TR	Mi	-TR	HM	-TR (pyroxene, olivine?)
Mi -TR	HM	-TR		
(chlorite)	VG	-TR		
	OP	-TR		
	Fd	-TR		
	(Plag.)			

Grain Size 4-65 (0.3, 38.3, 61.4)

Carbon Carbonate 4-70 (9.5, 0.0, 79)

Site 279 Hole A Core 6 Cored Interval: 137.0-146.5 m



Subunit 2C. A new lithologic unit begins in the core catcher of Core 5. Contact with the overlying strata not observed. Light gray (N7) FORAM-BEARING to FORAM-RICH NANNO OOZE (trace glauconite and detritals). Cycles of induration are prominent features and consist of a stiff-to semi-indurated base and a soft to soupy top. Repetition length of the cycles is 30-50 cm. This unit is distinguished from the overlying unit principally by its higher content in detrital sand and silt and its higher glauconite content. Under hand lens these constituents impart a "peppered" look and comprise 1 to 2% of the sediment.

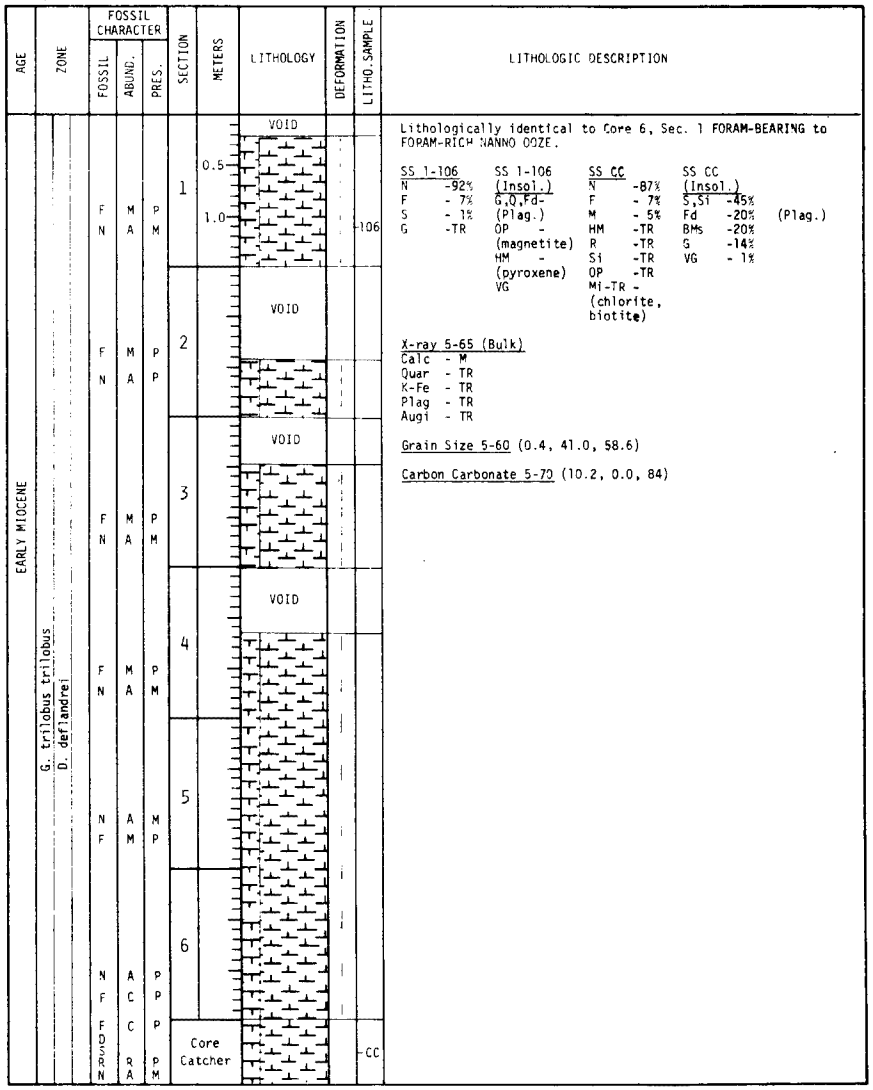
SS 1-71		SS CC		SS CC (Insol.)		
N	-88%	N	-86%	S,Si	-50%	
F	-10%	(dis-		G	-30%	
S	- 2%	coasters)		BMs	-10%	
Fd	-TR	M	- 5%	Fd	-10%	(Plag.)
Mi	-TR	F	- 5%	VG	-TR	
G	-TR	Di	- 2%	HM	-TR	(pyroxene, anorthoclase?)
R	-TR	S	- 1%			
		DE (feldspar, mica, heavies, glass)	- 1%			

X-ray 5-146 (Bulk)
Calc - M
Quar - TR
Plag - P
Mica - TR
Augi - TR

Grain Size 5-143 (2.6,48.0, 49.4)

Carbon Carbonate 5-130 (9.7, 0.1, 79)

Site 279 Hole A Core 7 Cored Interval: 146.5-156.0 m



Lithologically identical to Core 6, Sec. 1 FORAM-BEARING to FORAM-RICH NANNO OOZE.

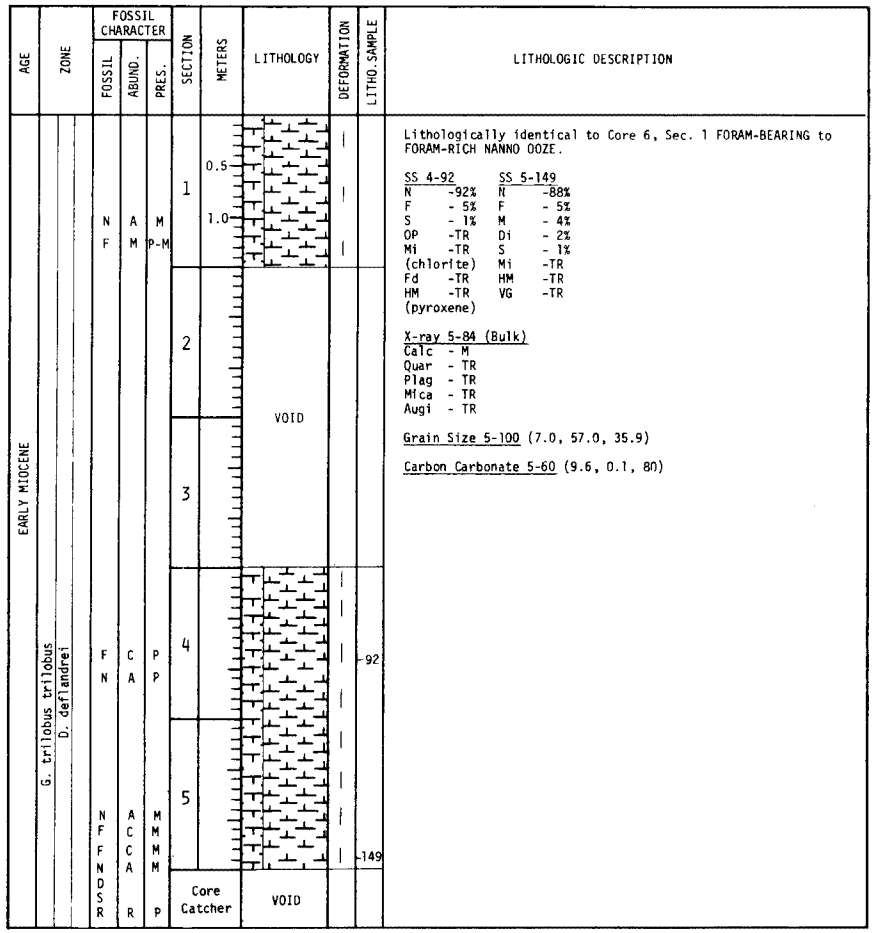
SS 1-106		SS 1-106 (Insol.)		SS CC		SS CC (Insol.)		
N	-92%	G,O,Fd-		N	-87%	S,Si	-45%	
F	- 7%	(Plag.)		F	- 7%	Fd	-20%	(Plag.)
S	- 1%	OP -	(magnetite)	M	- 5%	BMs	-20%	
G	-TR	HM -	(pyroxene)	HM	-TR	S	-14%	
		VG		R	-TR	VG	- 1%	
				Si	-TR			
				OP	-TR			
				Mi-TR -	(chlorite, biotite)			

X-ray 5-65 (Bulk)
Calc - M
Quar - TR
K-Fe - TR
Plag - TR
Augi - TR

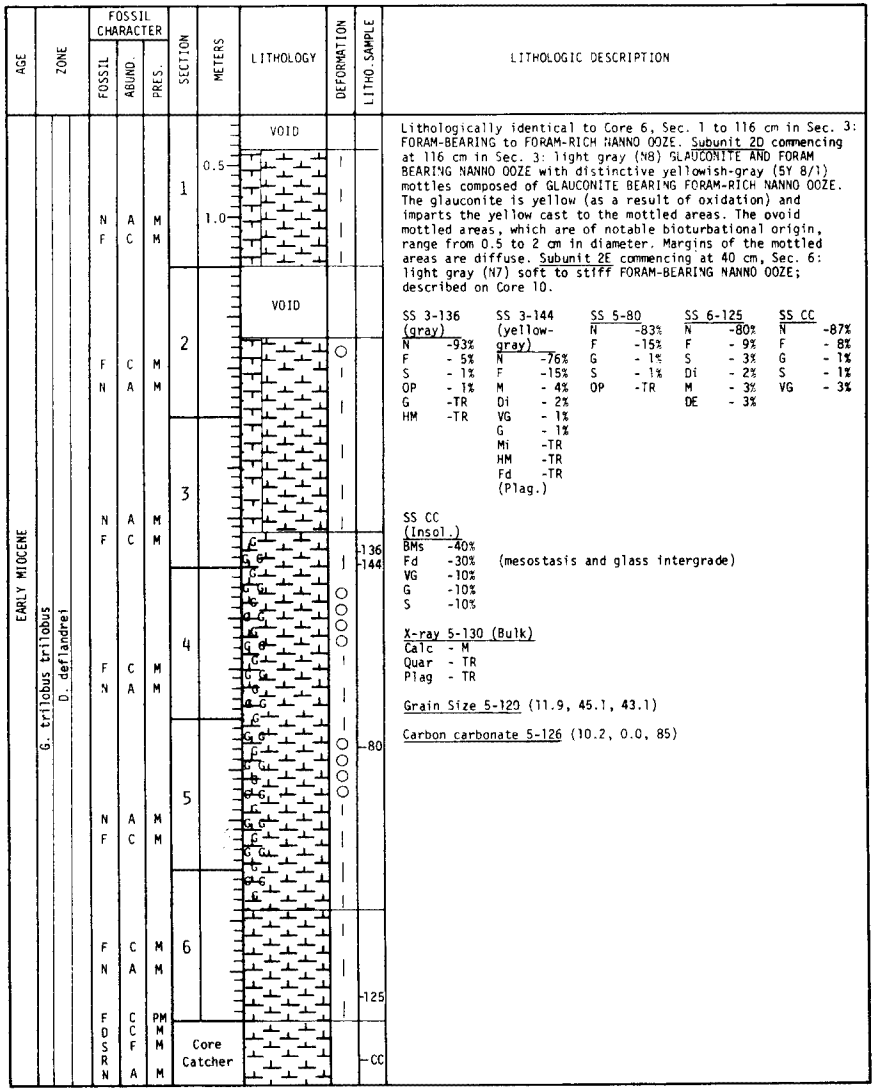
Grain Size 5-60 (0.4, 41.0, 58.6)

Carbon Carbonate 5-70 (10.2, 0.0, 84)

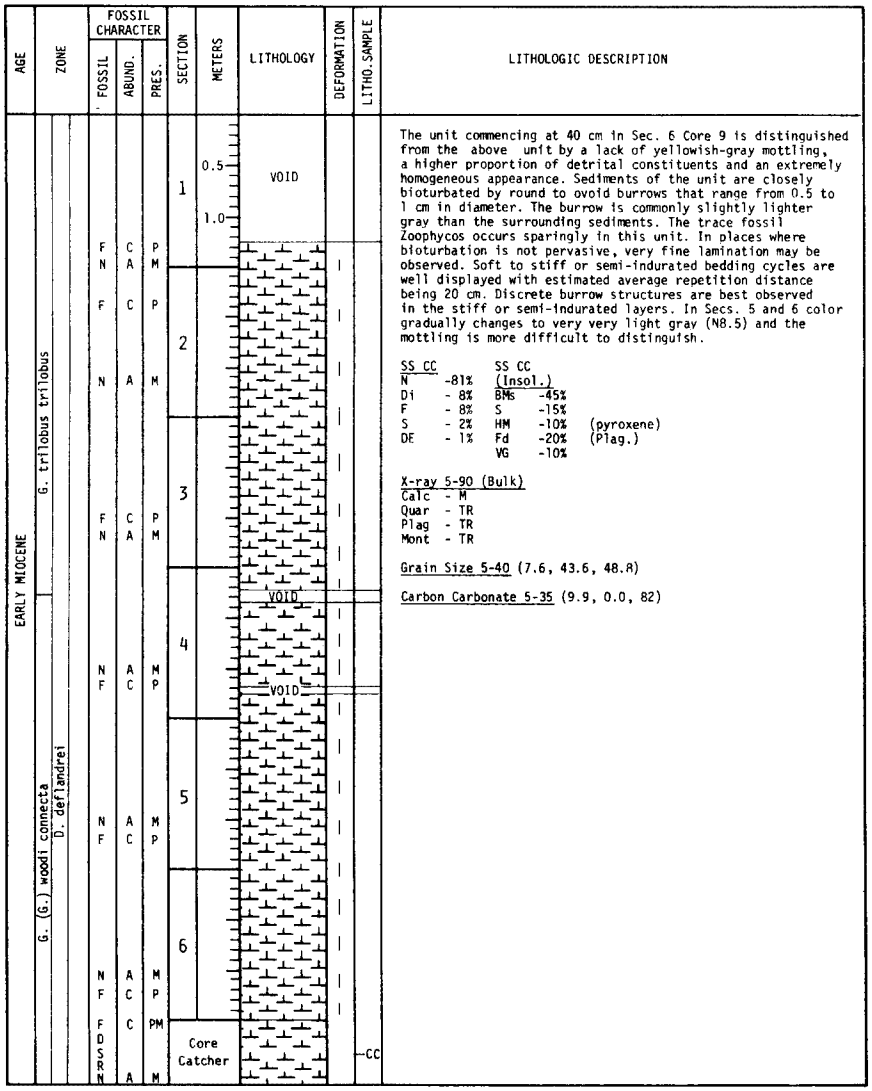
Site 279 Hole A Core 8 Cored Interval: 156.0-165.5 m



Site 279 Hole A Core 9 Cored Interval: 165.5-175.0 m



Site 279 Hole A Core 10 Cored Interval: 175.0-184.5 m



The unit commencing at 40 cm in Sec. 6 Core 9 is distinguished from the above unit by a lack of yellowish-gray mottling, a higher proportion of detrital constituents and an extremely homogeneous appearance. Sediments of the unit are closely bioturbated by round to ovoid burrows that range from 0.5 to 1 cm in diameter. The burrow is commonly slightly lighter gray than the surrounding sediments. The trace fossil Zoophycos occurs sparingly in this unit. In places where bioturbation is not pervasive, very fine lamination may be observed. Soft to stiff or semi-indurated bedding cycles are well displayed with estimated average repetition distance being 20 cm. Discrete burrow structures are best observed in the stiff or semi-indurated layers. In Secs. 5 and 6 color gradually changes to very very light gray (N8.5) and the mottling is more difficult to distinguish.

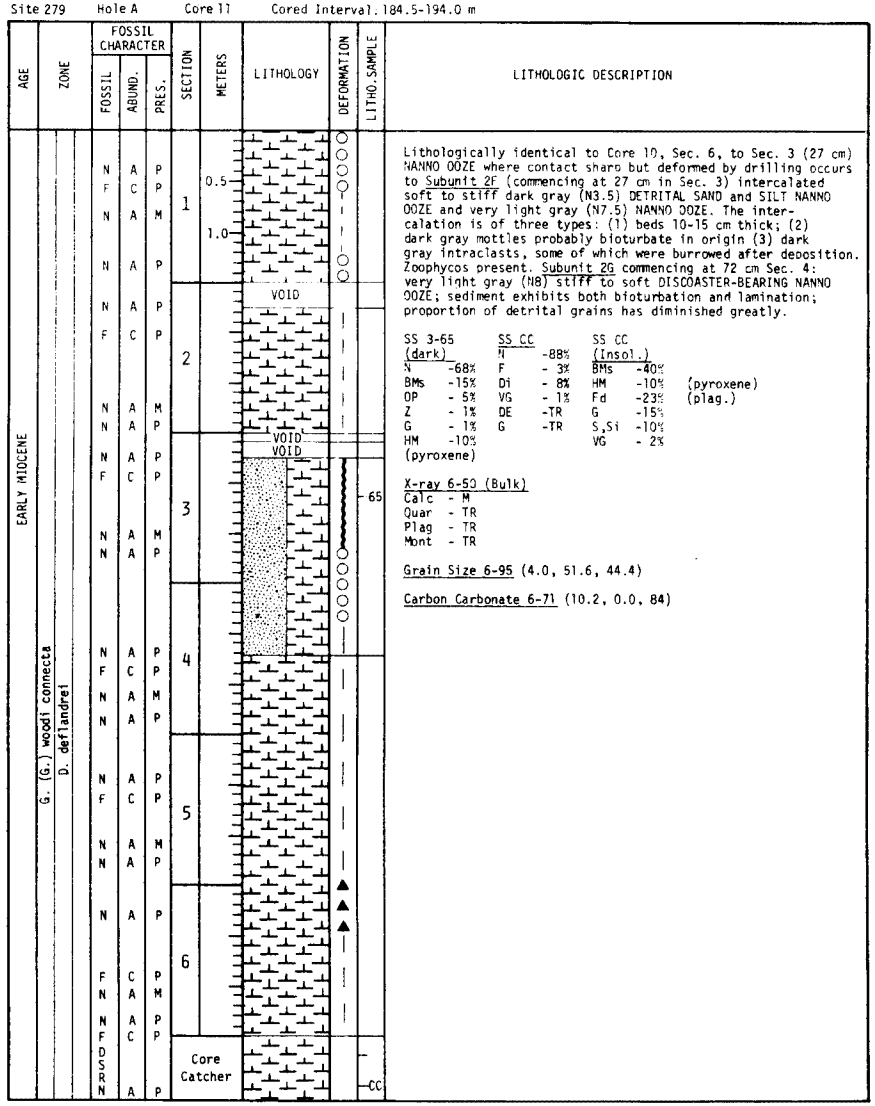
SS CC		SS CC (Insol.)		
N	-81%	BMs	-45%	
Di	- 8%	S	-15%	
F	- 8%	HM	-10%	(pyroxene)
S	- 2%	Fd	-20%	(Plag.)
DE	- 1%	VG	-10%	

X-ray 5-90 (Bulk)
Calc - M
Quar - TR
Plag - TR
Mont - TR

Grain Size 5-40 (7.6, 43.6, 48.8)

Carbon Carbonate 5-35 (9.9, 0.0, 82)

Site 279 Hole A Core 11 Cored Interval: 184.5-194.0 m



Lithologically identical to Core 10, Sec. 6, to Sec. 3 (27 cm) NANNO OOZE where contact sharp but deformed by drilling occurs to Subunit 2F (commencing at 27 cm in Sec. 3) intercalated soft to stiff dark gray (N3.5) DETRITAL SAND and SILT NANNO OOZE and very light gray (N7.5) NANNO OOZE. The intercalation is of three types: (1) beds 10-15 cm thick; (2) dark gray mottles probably bioturbate in origin (3) dark gray intraclasts, some of which were burrowed after deposition. Zoophycos present. Subunit 2G commencing at 72 cm Sec. 4: very light gray (N8) stiff to soft DISCOASTER-BEARING NANNO OOZE; sediment exhibits both bioturbation and lamination; proportion of detrital grains has diminished greatly.

SS 3-65 (dark)		SS CC		SS CC (Insol.)		
N	-68%	N	-88%			
BMs	-15%	F	- 3%	BMs	-40%	
OP	- 5%	Di	- 8%	HM	-10%	(pyroxene)
Z	- 1%	VG	- 1%	Fd	-23%	(plag.)
G	- 1%	DE	-TR	G	-15%	
HM	-10%	G	-TR	S,Si	-10%	
(pyroxene)				VG	- 2%	

X-ray 6-50 (Bulk)
Calc - M
Quar - TR
Plag - TR
Mont - TR

Grain Size 6-95 (4.0, 51.6, 44.4)

Carbon Carbonate 6-71 (10.2, 0.0, 84)

Site 279 Hole A Core 12 Cored Interval: 194.0-199.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					1	0.5 1.0	VOID		TS	Dark gray (N3) VESICULAR BASALT. The basalt recovered in Core 12-1 is vesicular to amygdaloidal very fine grained plagioclase porphyritic basalt that grades into non-vesicular non-porphyritic basalt with increasing depth in the core. In the upper 30 cm vesicles comprise up to 40% of the rock; near the base of the core they amount to less than 10%. The vesicles range from 0.5 to 4 mm in diameter, averaging 1.5 mm. An estimated 90% of the vesicles are unfilled, the remaining 10% are partly or completely filled with white calcite, chlorite or a blue zeolite(?). Pyrite subhedra occur sparingly in the amygdules. The basalt of Sec. 1 has a color index of 70 and consists of <1% white plagioclase phenocrysts ranging to 4 mm in length in a subaphanitic groundmass that appears to consist of feldspar laths (60%), pyroxene and glass(?) (40%).

Site 279 Hole A Core 13 Cored Interval: 199.0-202.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					1 2	0.5 1.0	VOID		TS	Fine grained basalt in lithic continuity with the basalt of Core 12, Sec. 1, but differing from it by the lack of phenocrysts and vesicles and by a slightly coarser grain size. Core segments are "soft" - almost friable - and have a pronounced barrel-shape as a result of abrasion.

DEEP SEA DRILLING PROJECT

LEG 29 SITE 280

SITE SUMMARY SHEET

POSITION: Latitude: 48°57.44'S Longitude: 147°14.08'E

Water depth (from sea level): 4176 corrected meters (Echo sounding)

Bottom felt at: 4191 meters (drill pipe) Penetration: 280 - 10 m
280A - 524 m

Number of Holes: 2 Number of Cores: 280 - 1; 280A - 23

Total length of cored section: 280 - 6.0 m; 280A - 201 m

Total core recovered: 280 - 5.5 m; 280A - 97.2 m

Percentage of core recovery: 280 - 92%; 280A - 48.4%

OLDEST SEDIMENT CORED:

Depth below sea floor: 519 meters Nature: Silty claystone

Age: Early to mid Eocene

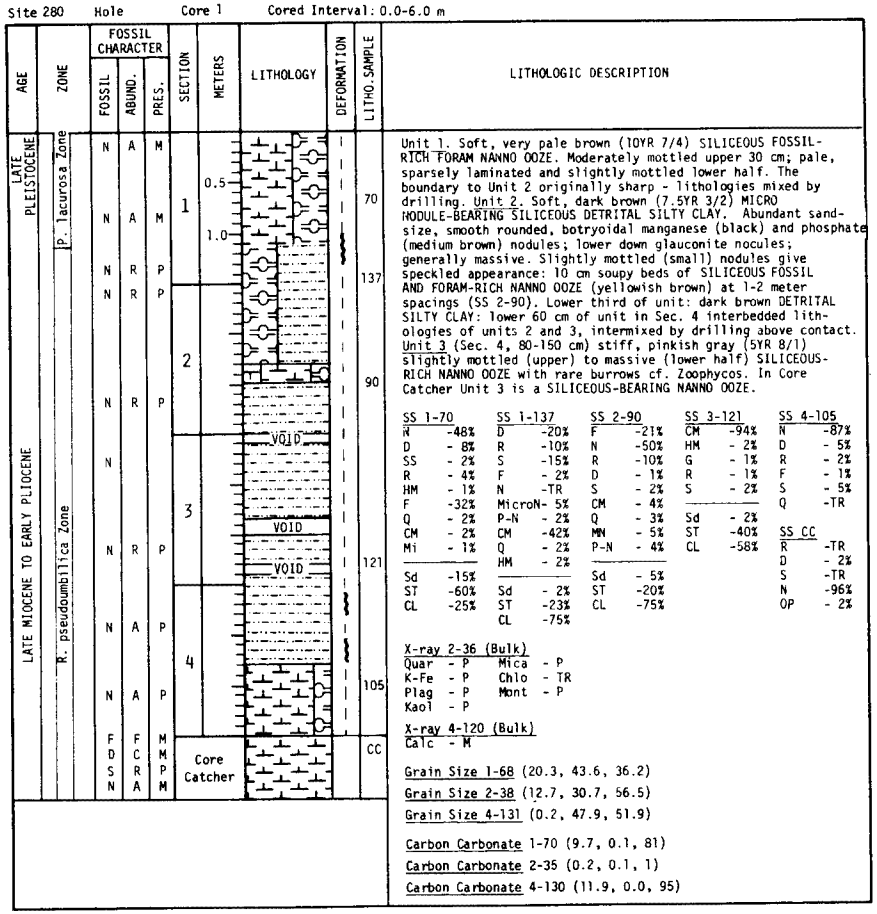
BASEMENT:

Depth below sea floor: 280 - 519 m; 280A - 524 m Nature: Basalt

PRINCIPAL RESULTS:

Pavement of manganese nodules resting on a veneer (1 meter) of Pleistocene foraminifera nannofossil ooze, in turn unconformably underlain by 5 meters of siliceous nannofossil ooze and detrital clay of early Pliocene or late Miocene age. A probable major unconformity separates this from at least 100 meters of underlying Oligocene and late Eocene silty diatom ooze, which in turn is underlain by early to mid Eocene glauconitic clayey silt with chert, and highly organic silty claystone with almost no biogenic material. Cored 5 meters of multiple body, intruded basalt which is acoustic basement. The Paleogene sedimentary sequence apparently represents change from highly restricted circulation and terrigenous deposition in early rift phase of continental separation, to oceanic biogenic sedimentation, to active bottom currents related to development of circumpolar current south of Australia. Excellent Oligocene diatom biostratigraphy.

Site 280 Hole Core 1 Cored Interval: 0.0-6.0 m



Unit 1. Soft, very pale brown (10YR 7/4) SILICEOUS FOSSIL-RICH FORAM NANNO OOZE. Moderately mottled upper 30 cm; pale, sparsely laminated and slightly mottled lower half. The boundary to Unit 2 originally sharp - lithologies mixed by drilling. Unit 2. Soft, dark brown (7.5YR 3/2) MICRO NODULE-BEARING SILICEOUS DETRITAL SILTY CLAY. Abundant sand-size, smooth rounded, botryoidal manganese (black) and phosphate (medium brown) nodules; lower down glauconite nocules; generally massive. Slightly mottled (small) nodules give speckled appearance: 10 cm soupy beds of SILICEOUS FOSSIL AND FORAM-RICH NANNO OOZE (yellowish brown) at 1-2 meter spacings (SS 2-90). Lower third of unit: dark brown DETRITAL SILTY CLAY: lower 60 cm of unit in Sec. 4 interbedded lithologies of units 2 and 3, intermixed by drilling above contact. Unit 3 (Sec. 4, 80-150 cm) stiff, pinkish gray (5YR 8/1) slightly mottled (upper) to massive (lower half) SILICEOUS-RICH NANNO OOZE with rare burrows cf. Zoophycos. In Core Catcher Unit 3 is a SILICEOUS-BEARING NANNO OOZE.

SS 1-70

N	-48%
D	- 8%
SS	- 2%
R	- 4%
HM	- 1%
F	-32%
Q	- 2%
CM	- 2%
Mi	- 1%
Sd	-15%
ST	-60%
CL	-25%

SS 1-137

D	-20%
R	-10%
S	-15%
F	- 2%
N	-TR
MicroN-	5%
P-N	- 2%
CM	-42%
Q	- 2%
HM	- 2%
Sd	- 2%
ST	-23%
CL	-75%

SS 2-90

F	-21%
N	-50%
R	-10%
D	- 1%
S	- 2%
CM	- 4%
Q	- 3%
MN	- 5%
P-N	- 4%
Sd	- 5%
ST	-20%
CL	-75%

SS 3-121

CM	-94%
HM	- 2%
G	- 1%
R	- 1%
S	- 2%
Sd	- 2%
ST	-40%
CL	-58%

SS 4-105

N	-87%
D	- 5%
R	- 2%
F	- 1%
S	- 5%
Q	-TR

SS CC

R	-TR
D	- 2%
S	-TR
N	-96%
OP	- 2%

X-ray 2-36 (Bulk)

Quar	- P	Mica	- P
K-Fe	- P	Chlo	- TR
Plag	- P	Mont	- P
Kaol	- P		

X-ray 4-120 (Bulk)

Calc	- M

Grain Size 1-68 (20.3, 43.6, 36.2)

Grain Size 2-38 (12.7, 30.7, 56.5)

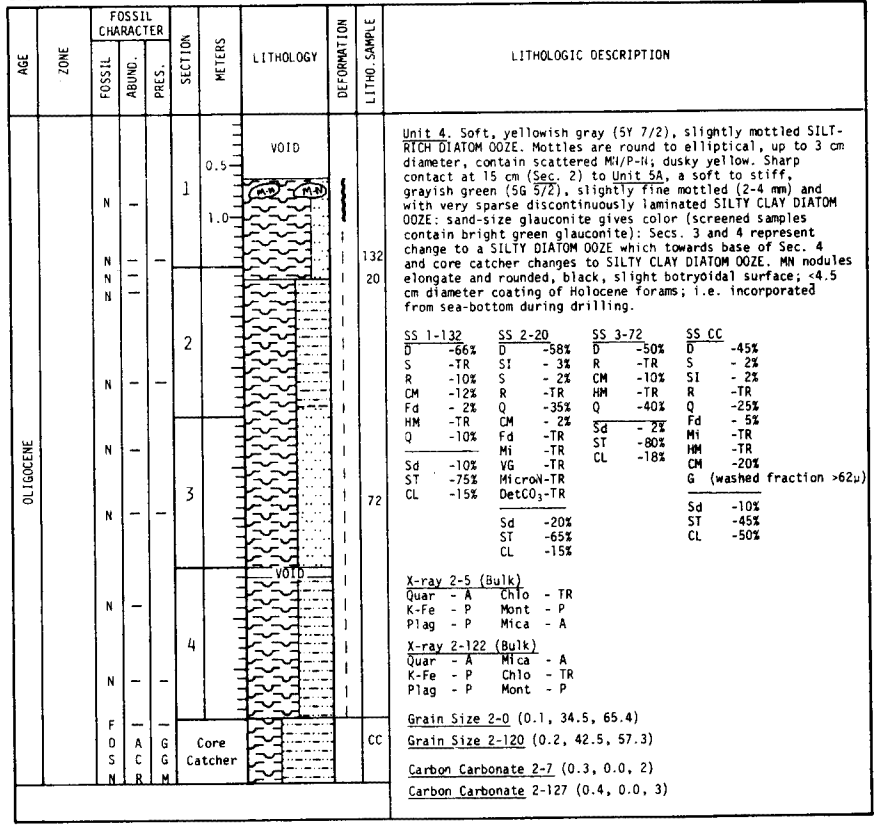
Grain Size 4-131 (0.2, 47.9, 51.9)

Carbon Carbonate 1-70 (9.7, 0.1, 81)

Carbon Carbonate 2-35 (0.2, 0.1, 1)

Carbon Carbonate 4-130 (11.9, 0.0, 95)

Site 280 Hole A Core 1 Cored Interval: 38.0-44.0 m



Unit 4. Soft, yellowish gray (5Y 7/2), slightly mottled SILT-RICH DIATOM OOZE. Mottles are round to elliptical, up to 3 cm diameter, contain scattered MN/P-N; dusky yellow. Sharp contact at 15 cm (Sec. 2) to Unit 5A, a soft to stiff, grayish green (5G 5/2), slightly fine mottled (2-4 mm) and with very sparse discontinuously laminated SILTY CLAY DIATOM OOZE: sand-size glauconite gives color (screened samples contain bright green glauconite): Secs. 3 and 4 represent change to a SILTY DIATOM OOZE which towards base of Sec. 4 and core catcher changes to SILTY CLAY DIATOM OOZE. MN nodules elongate and rounded, black, slight botryoidal surface; <4.5 cm diameter coating of Holocene forams; i.e. incorporated from sea-bottom during drilling.

SS 1-132

D	-66%
S	-TR
R	-10%
CM	-12%
Fd	- 2%
HM	-TR
Q	-10%
Sd	-10%
ST	-75%
CL	-15%

SS 2-20

D	-58%
SI	- 3%
S	- 2%
R	-TR
Q	-35%
CM	- 2%
Fd	-TR
Mi	-TR
VG	-TR
MicroN	-TR
DetCO_3	-TR
Sd	-20%
ST	-65%
CL	-15%

SS 3-72

D	-50%
R	-TR
CM	-10%
HM	-TR
Q	-40%
Sd	- 2%
ST	-80%
CL	-18%

SS CC

D	-45%
S	- 2%
SI	- 2%
R	-TR
Q	-25%
Fd	- 5%
Mi	-TR
HM	-TR
CM	-20%
G	(washed fraction >62μ)
Sd	-10%
ST	-45%
CL	-50%

X-ray 2-5 (Bulk)

Quar	- A	Chlo	- TR
K-Fe	- P	Mont	- P
Plag	- P	Mica	- A

X-ray 2-122 (Bulk)

Quar	- A	Mica	- A
K-Fe	- P	Chlo	- TR
Plag	- P	Mont	- P

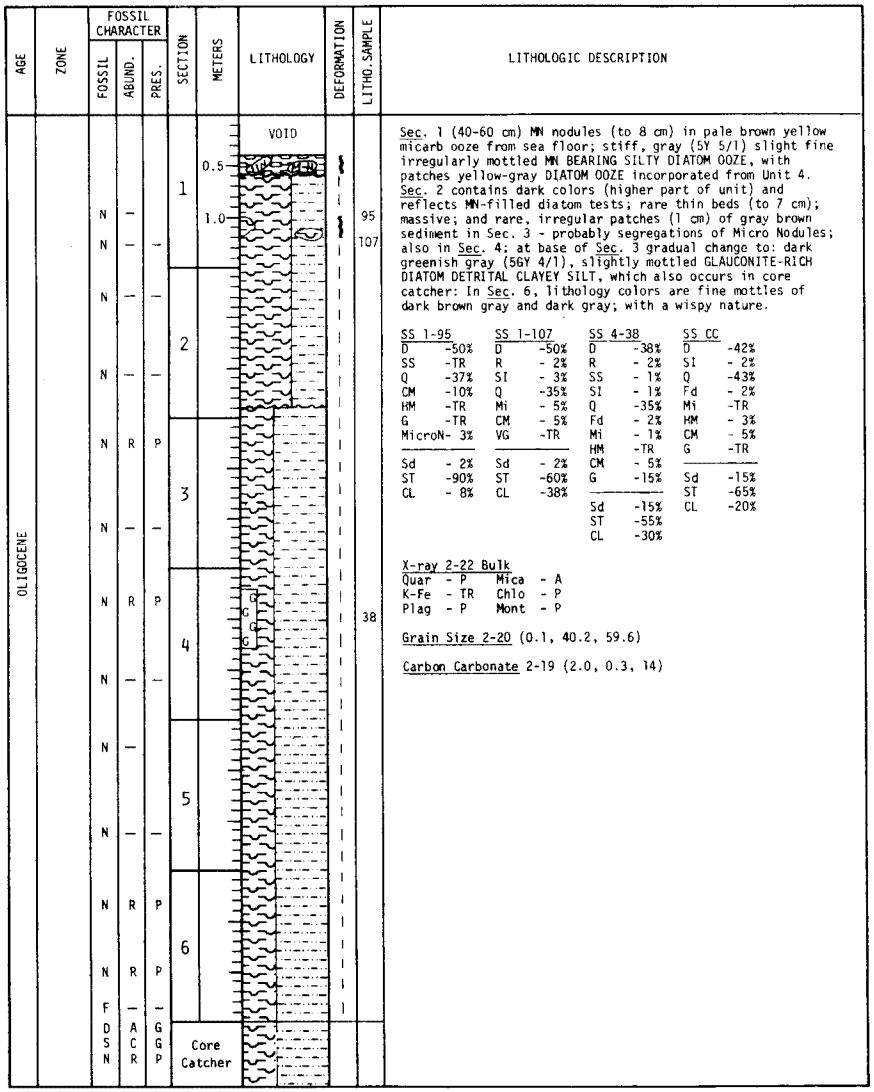
Grain Size 2-0 (0.1, 34.5, 65.4)

Grain Size 2-120 (0.2, 42.5, 57.3)

Carbon Carbonate 2-7 (0.3, 0.0, 2)

Carbon Carbonate 2-127 (0.4, 0.0, 3)

Site 280 Hole A Core 2 Cored Interval: 53.5-63.0 m



Sec. 1 (40-60 cm) MN nodules (to 8 cm) in pale brown yellow micarb ooze from sea floor; stiff, gray (5Y 5/1) slight fine irregularly mottled MN BEARING SILTY DIATOM OOZE, with patches yellow-gray DIATOM OOZE incorporated from Unit 4. Sec. 2 contains dark colors (higher part of unit) and reflects MN-filled diatom tests; rare thin beds (to 7 cm); massive; and rare, irregular patches (1 cm) of gray brown sediment in Sec. 3 - probably segregations of Micro Nodules; also in Sec. 4; at base of Sec. 3 gradual change to: dark greenish gray (5GY 4/1), slightly mottled GLAUCONITE-RICH DIATOM DETRITAL CLAYEY SILT, which also occurs in core catcher: In Sec. 6, lithology colors are fine mottles of dark brown gray and dark gray; with a wispy nature.

SS 1-95		SS 1-107		SS 4-38		SS CC	
D	-50%	D	-50%	D	-38%	D	-42%
SS	-TR	R	- 2%	R	- 2%	SI	- 2%
Q	-37%	SI	- 3%	SS	- 1%	Q	-43%
CM	-10%	Q	-35%	SI	- 1%	Fd	- 2%
HM	-TR	Mi	- 5%	Q	-35%	Mi	-TR
G	-TR	CM	- 5%	Fd	- 2%	HM	- 3%
MicroN	- 3%	VG	-TR	Mi	- 1%	CM	- 5%
				HM	-TR	G	-TR
Sd	- 2%	Sd	- 2%	CM	- 5%		
ST	-90%	ST	-60%	G	-15%	Sd	-15%
CL	- 8%	CL	-38%			ST	-65%
				Sd	-15%	CL	-20%
				ST	-55%		
				CL	-30%		

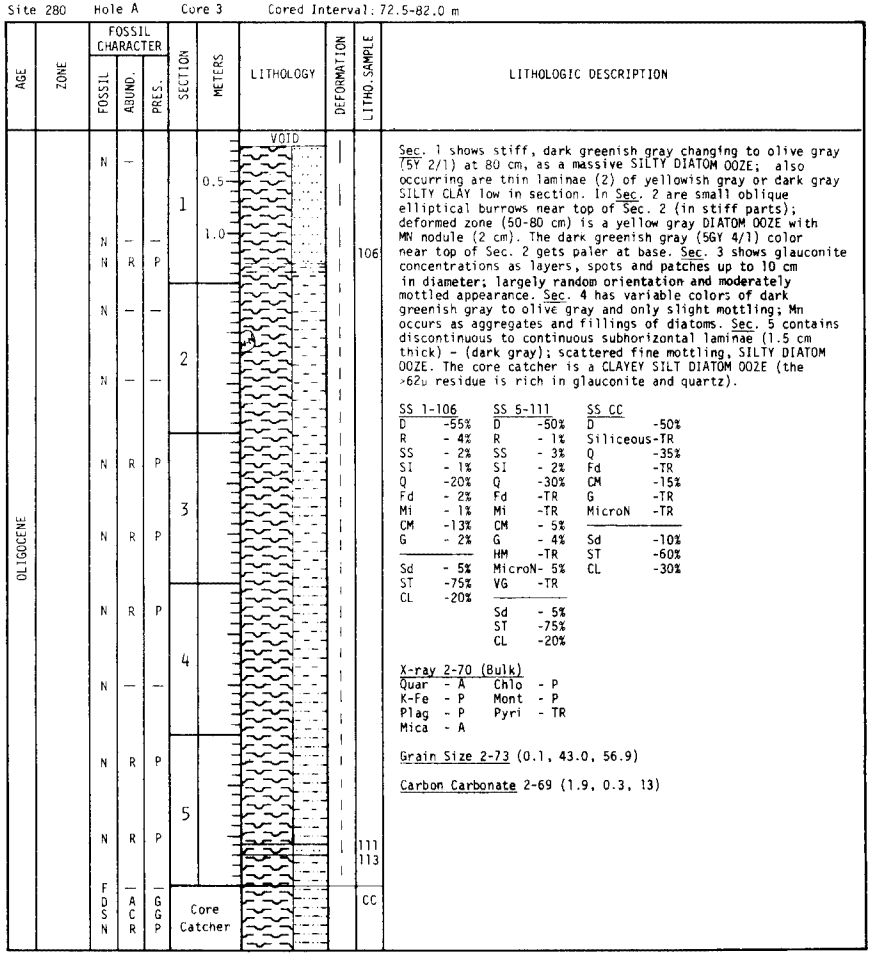
X-ray 2-22 Bulk

Quar	- P	Mica	- A
K-Fe	- TR	Chlo	- P
Plag	- P	Mont	- P

Grain Size 2-20 (0.1, 40.2, 59.6)

Carbon Carbonate 2-19 (2.0, 0.3, 14)

Site 280 Hole A Core 3 Cored Interval: 72.5-82.0 m



Sec. 1 shows stiff, dark greenish gray changing to olive gray (5Y 2/1) at 80 cm, as a massive SILTY DIATOM OOZE; also occurring are thin laminae (2) of yellowish gray or dark gray SILTY CLAY low in section. In Sec. 2 are small oblique elliptical burrows near top of Sec. 2 (in stiff parts); deformed zone (50-80 cm) is a yellow gray DIATOM OOZE with MN nodule (2 cm). The dark greenish gray (5GY 4/1) color near top of Sec. 2 gets paler at base. Sec. 3 shows glauconite concentrations as layers, spots and patches up to 10 cm in diameter; largely random orientation and moderately mottled appearance. Sec. 4 has variable colors of dark greenish gray to olive gray and only slight mottling; Mn occurs as aggregates and fillings of diatoms. Sec. 5 contains discontinuous to continuous subhorizontal laminae (1.5 cm thick) - (dark gray); scattered fine mottling, SILTY DIATOM OOZE. The core catcher is a CLAYEY SILT DIATOM OOZE (the >62μ residue is rich in glauconite and quartz).

SS 1-106		SS 5-111		SS CC	
D	-55%	D	-50%	D	-50%
R	- 4%	R	- 1%	Siliceous	-TR
SS	- 2%	SS	- 3%	Q	-35%
SI	- 1%	SI	- 2%	Fd	-TR
Q	-20%	Q	-30%	CM	-15%
Fd	- 2%	Fd	-TR	G	-TR
Mi	- 1%	Mi	-TR	MicroN	-TR
CM	-13%	CM	- 5%		
G	- 2%	G	- 4%	Sd	-10%
		HM	-TR	ST	-60%
Sd	- 5%	MicroN	- 5%	CL	-30%
ST	-75%	VG	-TR		
CL	-20%				
		Sd	- 5%		
		ST	-75%		
		CL	-20%		

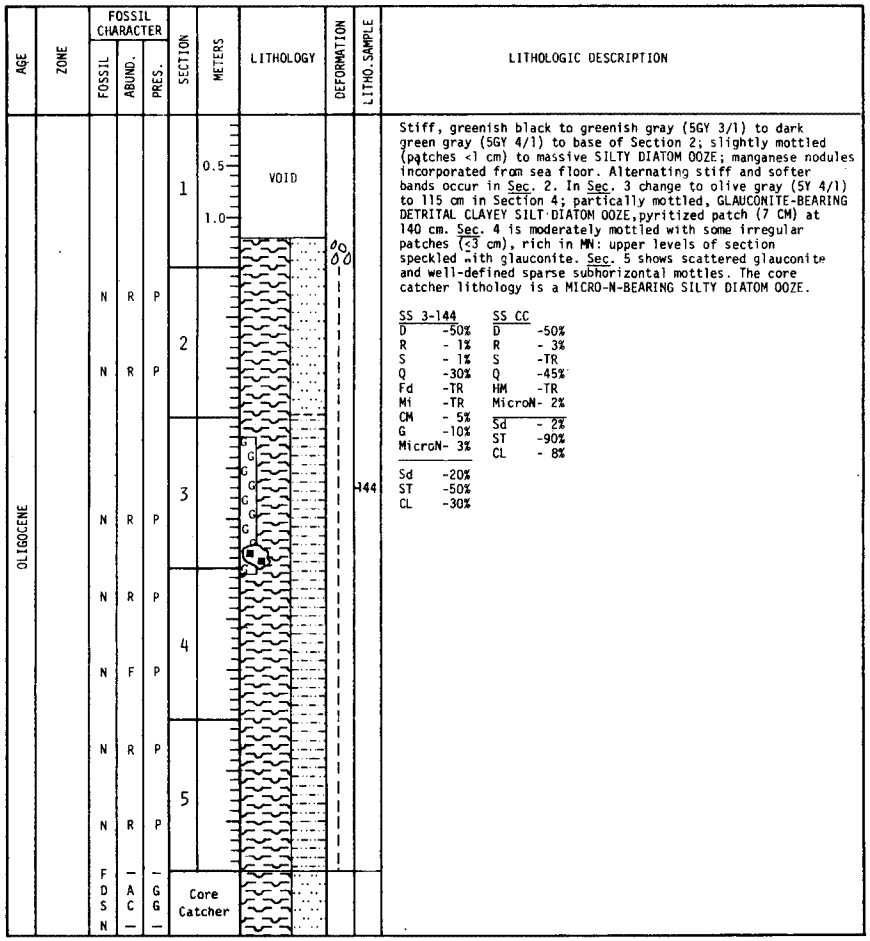
X-ray 2-70 (Bulk)

Quar	- A	Chlo	- P
K-Fe	- P	Mont	- P
Plag	- P	Pyri	- TR
Mica	- A		

Grain Size 2-73 (0.1, 43.0, 56.9)

Carbon Carbonate 2-69 (1.9, 0.3, 13)

Site 280 Hole A Core 4 Cored Interval: 82.0-91.5 m



LITHOLOGIC DESCRIPTION

Stiff, greenish black to greenish gray (5GY 3/1) to dark green gray (5GY 4/1) to base of Section 2; slightly mottled (patches <1 cm) to massive SILTY DIATOM OOZE; manganese nodules incorporated from sea floor. Alternating stiff and softer bands occur in Sec. 2. In Sec. 3 change to olive gray (5Y 4/1) to 115 cm in Section 4; partically mottled, GLAUCONITE-BEARING DETRITAL CLAYEY SILT-DIATOM OOZE, pyritized patch (7 CM) at 140 cm. Sec. 4 is moderately mottled with some irregular patches (<3 cm), rich in MN: upper levels of section speckled with glauconite. Sec. 5 shows scattered glauconite and well-defined sparse subhorizontal mottles. The core catcher lithology is a MICRO-N-BEARING SILTY DIATOM OOZE.

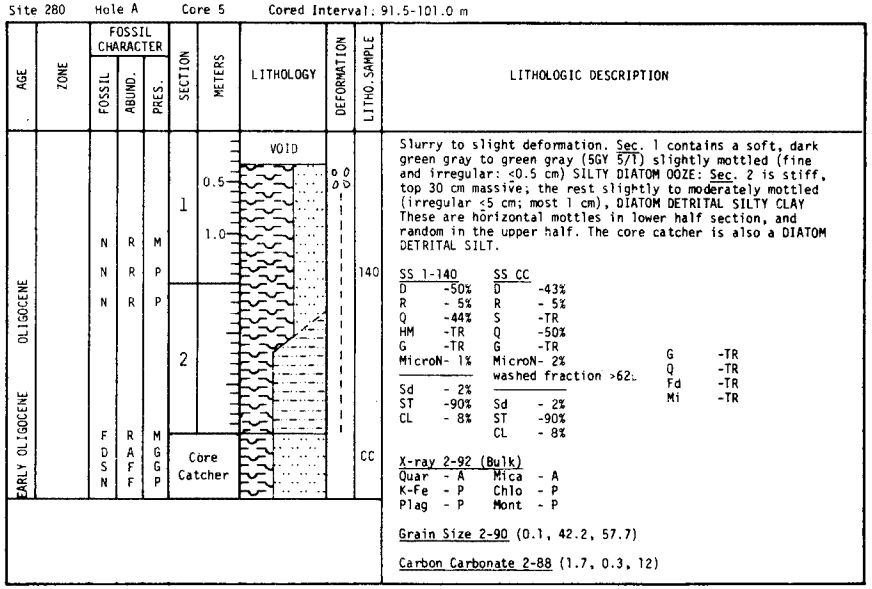
SS 3-144

D	-50%
R	- 1%
S	- 1%
Q	-30%
Fd	-TR
Mi	-TR
CM	- 5%
G	-10%
MicroN-	3%
Sd	-20%
ST	-50%
CL	-30%

SS CC

D	-50%
R	- 3%
S	-TR
Q	-45%
HM	-TR
MicroN-	2%
Sd	- 2%
ST	-90%
CL	- 8%

Site 280 Hole A Core 5 Cored Interval: 91.5-101.0 m



LITHOLOGIC DESCRIPTION

Slurry to slight deformation. Sec. 1 contains a soft, dark green gray to green gray (5GY 5/1) slightly mottled (fine and irregular: <0.5 cm) SILTY DIATOM OOZE: Sec. 2 is stiff, top 30 cm massive; the rest slightly to moderately mottled (irregular <5 cm; most 1 cm), DIATOM DETRITAL SILTY CLAY These are horizontal mottles in lower half section, and random in the upper half. The core catcher is also a DIATOM DETRITAL SILT.

SS 1-140

D	-50%
R	- 5%
Q	-44%
HM	-TR
G	-TR
MicroN-	1%
Sd	- 2%
ST	-90%
CL	- 8%

SS CC

D	-43%
R	- 5%
S	-TR
Q	-50%
G	-TR
MicroN-	2%

washed fraction >62μ

Sd	- 2%
ST	-90%
CL	- 8%
G	-TR
Q	-TR
Fd	-TR
Mi	-TR

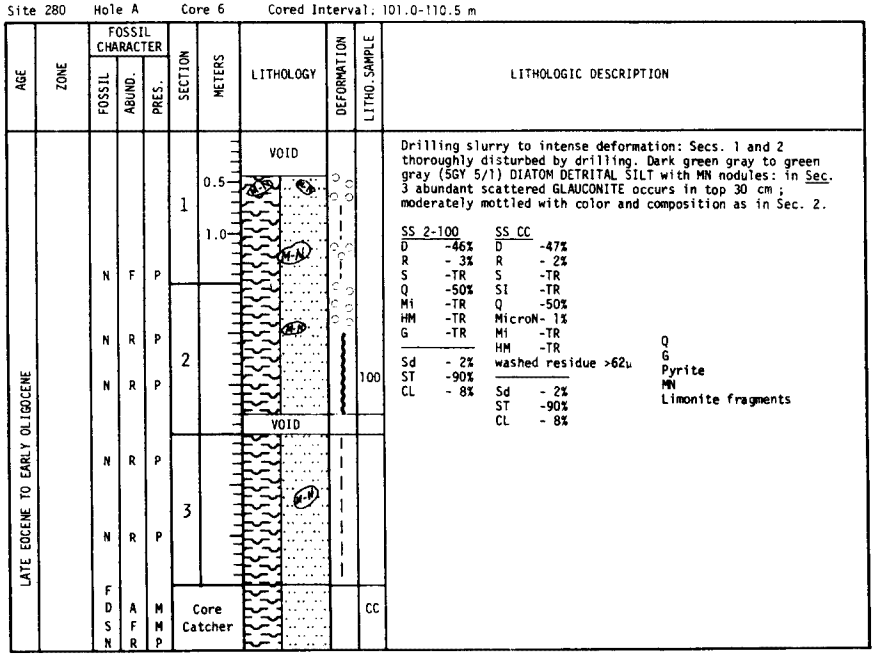
X-ray 2-92 (Bulk)

Quar	- A	Mica	- A
K-Fe	- P	Chlo	- P
Plag	- P	Mont	- P

Grain Size 2-90 (0.1, 42.2, 57.7)

Carbon Carbonate 2-88 (1.7, 0.3, 12)

Site 280 Hole A Core 6 Cored Interval: 101.0-110.5 m



LITHOLOGIC DESCRIPTION

Drilling slurry to intense deformation: Secs. 1 and 2 thoroughly disturbed by drilling. Dark green gray to green gray (5GY 5/1) DIATOM DETRITAL SILT with MN nodules: in Sec. 3 abundant scattered GLAUCONITE occurs in top 30 cm; moderately mottled with color and composition as in Sec. 2.

SS 2-100

D	-46%
R	- 3%
S	-TR
Q	-50%
Mi	-TR
HM	-TR
G	-TR
Sd	- 2%
ST	-90%
CL	- 8%

SS CC

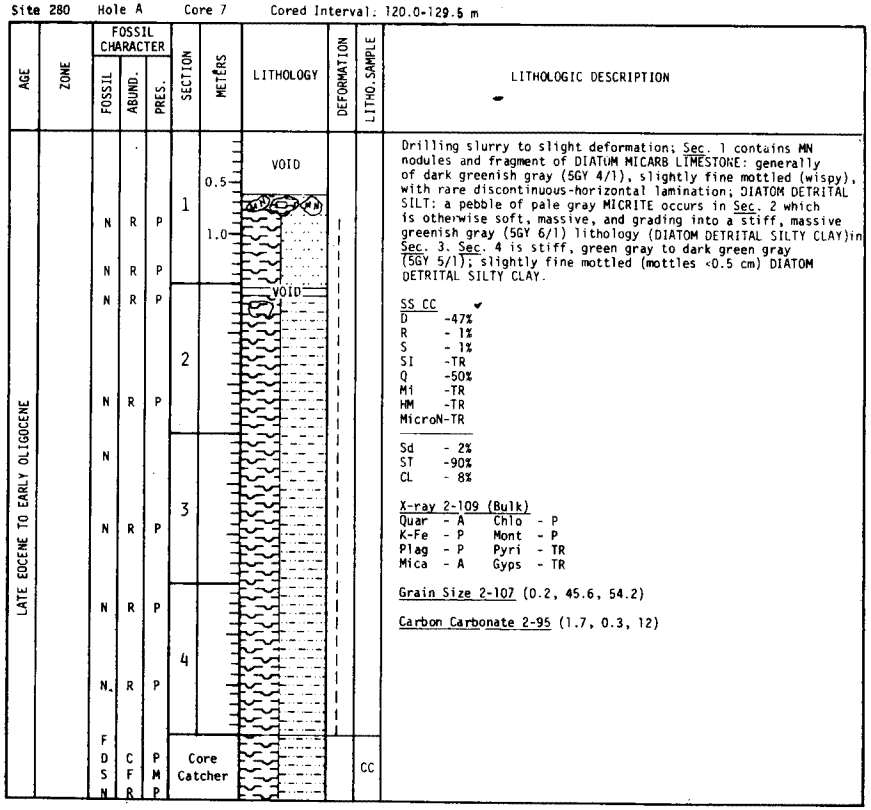
D	-47%
R	- 2%
S	-TR
SI	-TR
Q	-50%
MicroN-	1%
Mi	-TR
HM	-TR

washed residue >62μ

Sd	- 2%
ST	-90%
CL	- 8%

Q
G
Pyrite
MN
Limonite fragments

Site 280 Hole A Core 7 Cored Interval: 120.0-129.5 m



Drilling slurry to slight deformation; Sec. 1 contains MN nodules and fragment of DIATUM MICARB LIMESTONE: generally of dark greenish gray (5GY 4/1), slightly fine mottled (wispy), with rare discontinuous-horizontal lamination; DIATOM DETRITAL SILT: a pebble of pale gray MICRITE occurs in Sec. 2 which is otherwise soft, massive, and grading into a stiff, massive greenish gray (5GY 6/1) lithology (DIATOM DETRITAL SILTY CLAY)in Sec. 3. Sec. 4 is stiff, green gray to dark green gray (5GY 5/1); slightly fine mottled (mottles <0.5 cm) DIATOM DETRITAL SILTY CLAY.

SS CC

D	-47%
R	- 1%
S	- 1%
SI	-TR
Q	-50%
Mi	-TR
HM	-TR
MicroN	-TR
Sd	- 2%
ST	-90%
CL	- 8%

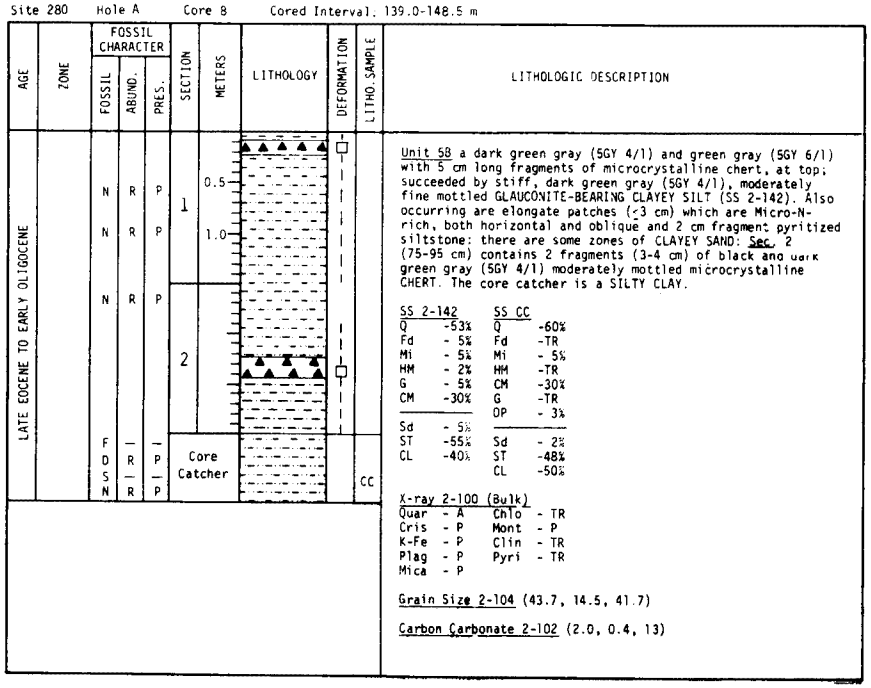
X-ray 2-109 (Bulk)

Quar	- A	Chlo	- P
K-Fe	- P	Mont	- P
Plag	- P	Pyri	- TR
Mica	- A	Gyps	- TR

Grain Size 2-107 (0.2, 45.6, 54.2)

Carbon Carbonate 2-95 (1.7, 0.3, 12)

Site 280 Hole A Core 8 Cored Interval: 139.0-148.5 m



Unit 5B a dark green gray (5GY 4/1) and green gray (5GY 6/1) with 5 cm long fragments of microcrystalline chert, at top; succeeded by stiff, dark green gray (5GY 4/1), moderately fine mottled GLAUCONITE-BEARING CLAYEY SILT (SS 2-142). Also occurring are elongate patches (<3 cm) which are Micro-N-rich, both horizontal and oblique and 2 cm fragment pyritized siltstone: there are some zones of CLAYEY SAND: Sec. 2 (75-95 cm) contains 2 fragments (3-4 cm) of black and dark green gray (5GY 4/1) moderately mottled microcrystalline CHERT. The core catcher is a SILTY CLAY.

SS 2-142		SS CC	
Q	-53%	Q	-60%
Fd	- 5%	Fd	-TR
Mi	- 5%	Mi	- 5%
HM	- 2%	HM	-TR
G	- 5%	CM	-30%
CM	-30%	G	-TR
		OP	- 3%
Sd	- 5%		
ST	-55%	Sd	- 2%
CL	-40%	ST	-48%
		CL	-50%

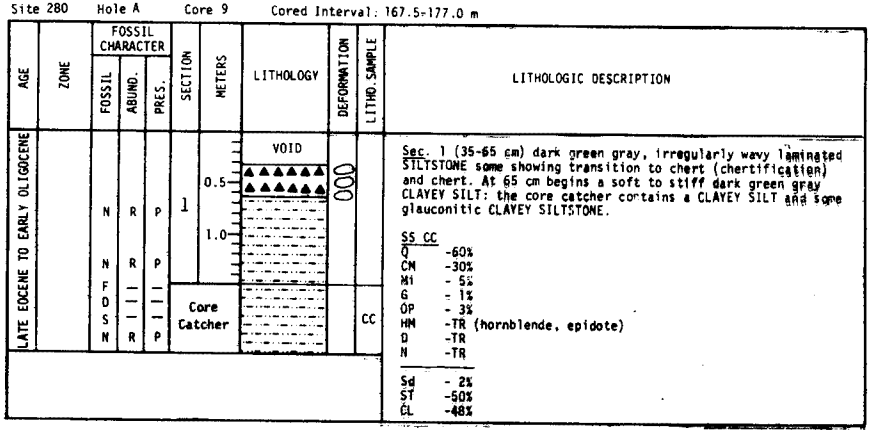
X-ray 2-100 (Bulk)

Quar	- A	Chlo	- TR
Cris	- P	Mont	- P
K-Fe	- P	Clin	- TR
Plag	- P	Pyri	- TR
Mica	- P		

Grain Size 2-104 (43.7, 14.5, 41.7)

Carbon Carbonate 2-102 (2.0, 0.4, 13)

Site 280 Hole A Core 9 Cored Interval: 167.5-177.0 m

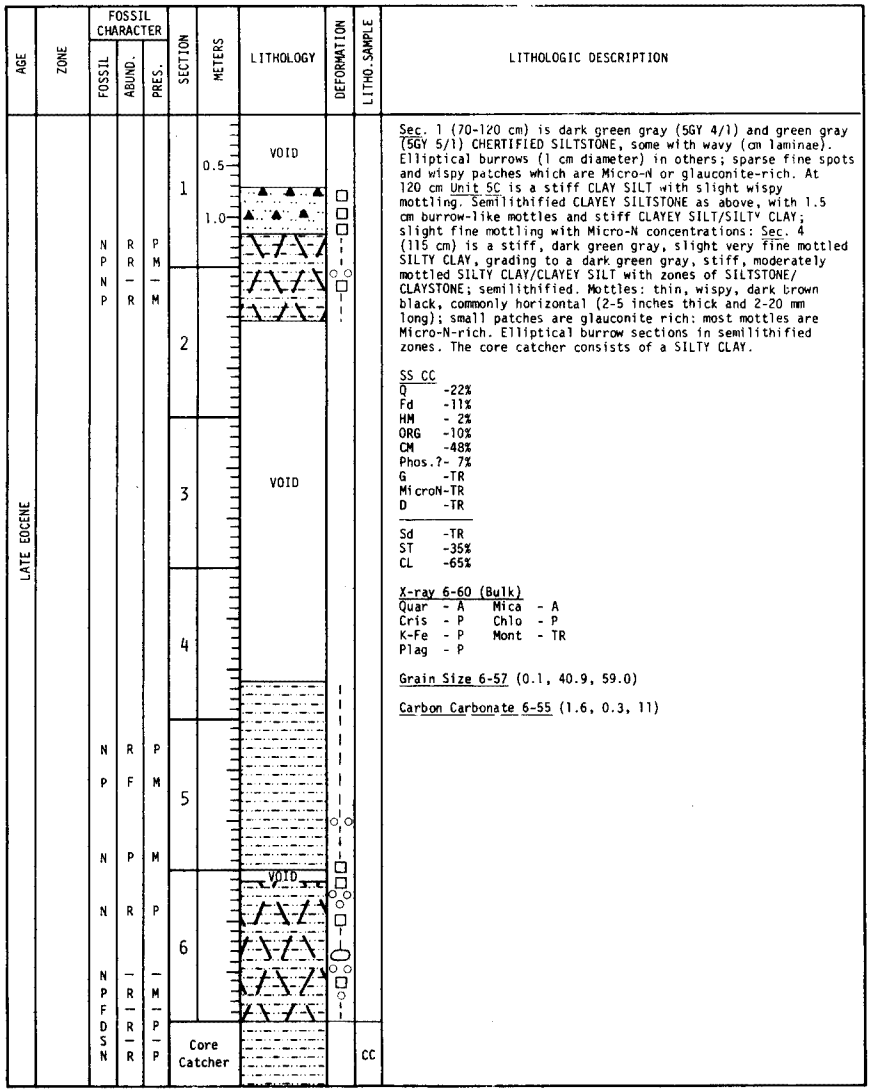


Sec. 1 (35-65 cm) dark green gray, irregularly wavy laminated SILTSTONE some showing transition to chert (chertification) and chert. At 65 cm begins a soft to stiff dark green gray CLAYEY SILT: the core catcher contains a CLAYEY SILT and some glauconitic CLAYEY SILTSTONE.

SS CC

Q	-60%
CM	-30%
Mi	- 5%
G	- 1%
OP	- 3%
HM	-TR (hornblende, epidote)
D	-TR
N	-TR
Sd	- 2%
ST	-50%
CL	-48%

Site 280 Hole A Core 10 Cored Interval: 196.0-205.5 m



Sec. 1 (70-120 cm) is dark green gray (5GY 4/1) and green gray (5GY 5/1) CHERTIFIED SILTSTONE, some with wavy (cm laminae). Elliptical burrows (1 cm diameter) in others; sparse fine spots and wispy patches which are Micro-N or glauconite-rich. At 120 cm Unit 5C is a stiff CLAY SILT with slight wispy mottling. Semilithified CLAYEY SILTSTONE as above, with 1.5 cm burrow-like mottles and stiff CLAYEY SILT/SILTY CLAY; slight fine mottling with Micro-N concentrations: Sec. 4 (115 cm) is a stiff, dark green gray, slight very fine mottled SILTY CLAY, grading to a dark green gray, stiff, moderately mottled SILTY CLAY/CLAYEY SILT with zones of SILTSTONE/ CLAYSTONE; semilithified. Mottles: thin, wispy, dark brown black, commonly horizontal (2-5 inches thick and 2-20 mm long); small patches are glauconite rich: most mottles are Micro-N-rich. Elliptical burrow sections in semilithified zones. The core catcher consists of a SILTY CLAY.

SS CC

Q	-22%
Fd	-11%
HM	- 2%
ORG	-10%
CM	-48%
Phos.?-	7%
G	-TR
MicroN-	TR
D	-TR
Sd	-TR
ST	-35%
CL	-65%

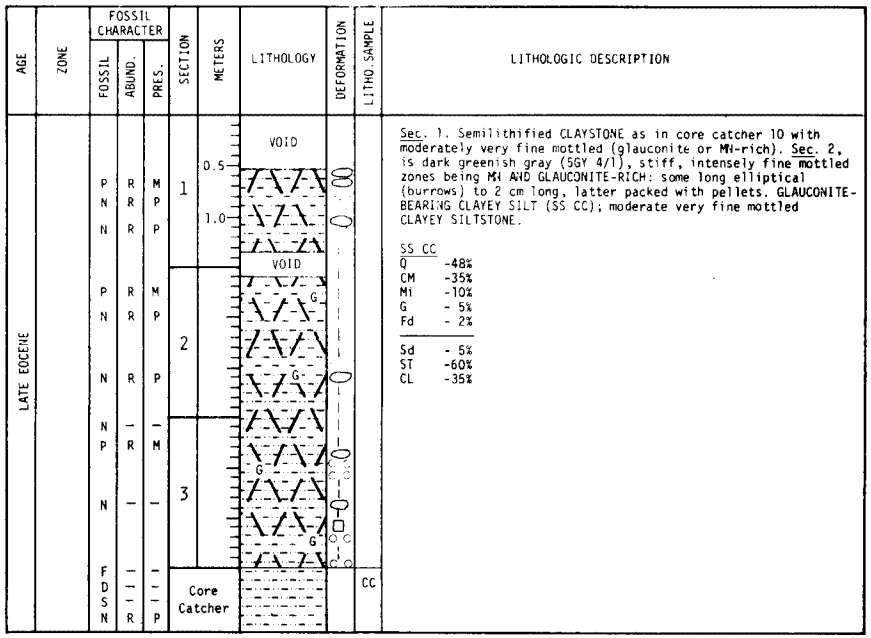
X-ray 6-60 (Bulk)

Quar	- A	Mica	- A
Cris	- P	Chlo	- P
K-Fe	- P	Mont	- TR
Plag	- P		

Grain Size 6-57 (0.1, 40.9, 59.0)

Carbon Carbonate 6-55 (1.6, 0.3, 11)

Site 280 Hole A Core 11 Cored Interval: 215.0-224.5

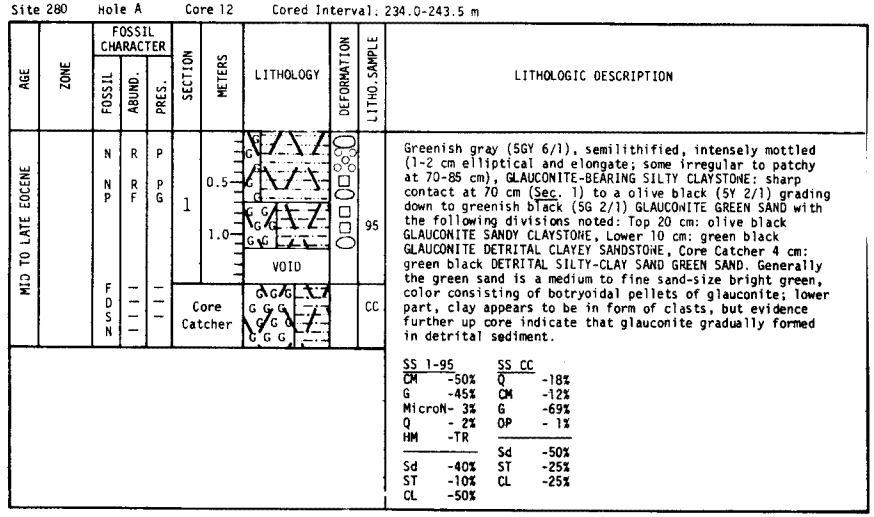


Sec. 1. Semilithified CLAYSTONE as in core catcher 10 with moderately very fine mottled (glauconite or MN-rich). Sec. 2, is dark greenish gray (5GY 4/1), stiff, intensely fine mottled zones being MN AND GLAUCONITE-RICH: some long elliptical (burrows) to 2 cm long, latter packed with pellets. GLAUCONITE-BEARING CLAYEY SILT (SS CC); moderate very fine mottled CLAYEY SILTSTONE.

SS CC

Q	-48%
CM	-35%
MN	-10%
G	- 5%
Fd	- 2%
Sd	- 5%
ST	-60%
CL	-35%

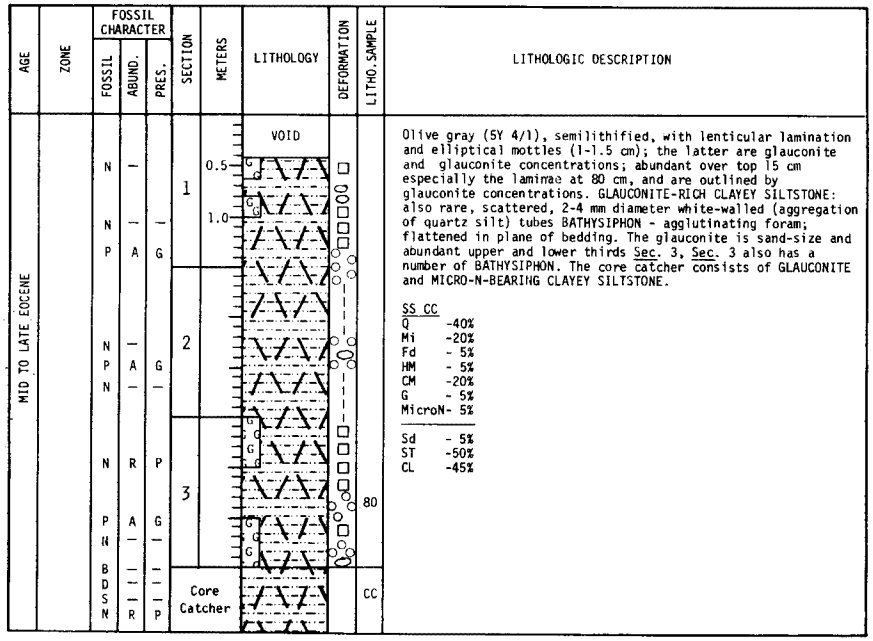
Site 280 Hole A Core 12 Cored Interval: 234.0-243.5 m



Greenish gray (5GY 6/1), semilithified, intensely mottled (1-2 cm elliptical and elongate; some irregular to patchy at 70-85 cm), GLAUCONITE-BEARING SILTY CLAYSTONE: sharp contact at 70 cm (Sec. 1) to a olive black (5Y 2/1) grading down to greenish black (5G 2/1) GLAUCONITE GREEN SAND with the following divisions noted: Top 20 cm: olive black GLAUCONITE SANDY CLAYSTONE, Lower 10 cm: green black GLAUCONITE DETRITAL CLAYEY SANDSTONE, Core Catcher 4 cm: green black DETRITAL SILTY-CLAY SAND GREEN SAND. Generally the green sand is a medium to fine sand-size bright green, color consisting of botryoidal pellets of glauconite; lower part, clay appears to be in form of clasts, but evidence further up core indicate that glauconite gradually formed in detrital sediment.

SS 1-95		SS CC	
CM	-50%	Q	-18%
G	-45%	CM	-12%
MicroN-	3%	G	-69%
Q	- 2%	OP	- 1%
HM	-TR		
Sd	-40%	Sd	-50%
ST	-10%	ST	-25%
CL	-50%	CL	-25%

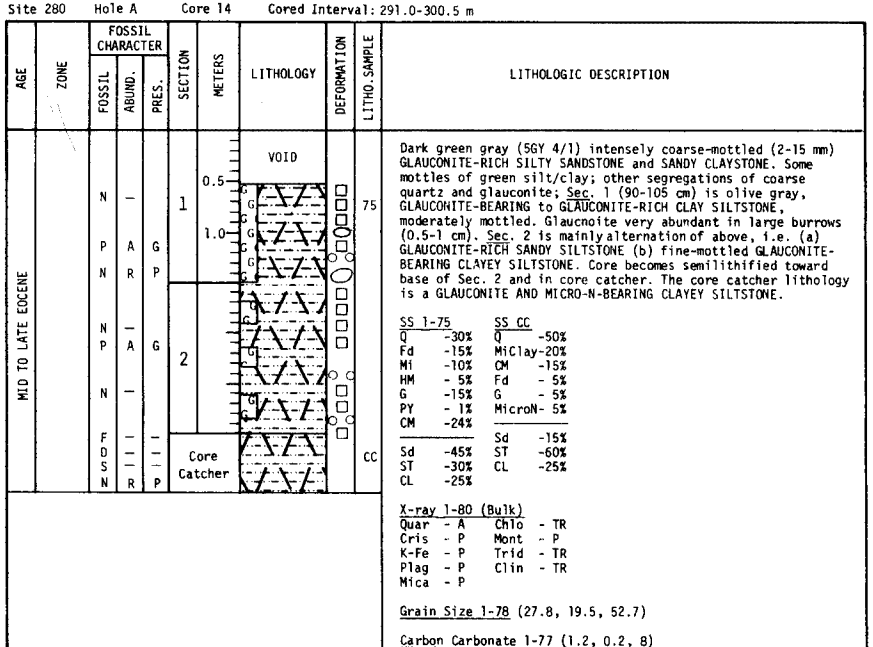
Site 280 Hole A Core 13 Cored Interval: 262.5-272.0 m



Olive gray (5Y 4/1), semilithified, with lenticular lamination and elliptical mottles (1-1.5 cm); the latter are glauconite and glauconite concentrations; abundant over top 15 cm especially the laminae at 80 cm, and are outlined by glauconite concentrations. GLAUCONITE-RICH CLAYEY SILTSTONE: also rare, scattered, 2-4 mm diameter white-walled (aggregation of quartz silt) tubes BATHYSIPHON - agglutinating foram; flattened in plane of bedding. The glauconite is sand-size and abundant upper and lower thirds Sec. 3, Sec. 3 also has a number of BATHYSIPHON. The core catcher consists of GLAUCONITE and MICRO-N-BEARING CLAYEY SILTSTONE.

SS	CC
Q -40%	
Mi -20%	
Fd - 5%	
HM - 5%	
CM -20%	
G - 5%	
MicroN- 5%	
Sd - 5%	
ST -50%	
CL -45%	

Site 280 Hole A Core 14 Cored Interval: 291.0-300.5 m



Dark green gray (5GY 4/1) intensely coarse-mottled (2-15 mm) GLAUCONITE-RICH SILTY SANDSTONE and SANDY CLAYSTONE. Some mottles of green silt/clay; other segregations of coarse quartz and glauconite; Sec. 1 (90-105 cm) is olive gray, GLAUCONITE-BEARING to GLAUCONITE-RICH CLAY SILTSTONE, moderately mottled. Glaucnoite very abundant in large burrows (0.5-1 cm). Sec. 2 is mainly alternation of above, i.e. (a) GLAUCONITE-RICH SANDY SILTSTONE (b) fine-mottled GLAUCONITE-BEARING CLAYEY SILTSTONE. Core becomes semilithified toward base of Sec. 2 and in core catcher. The core catcher lithology is a GLAUCONITE AND MICRO-N-BEARING CLAYEY SILTSTONE.

SS 1-75	SS CC
Q -30%	Q -50%
Fd -15%	MiClay-20%
Mi -10%	CM -15%
HM - 5%	Fd - 5%
G -15%	G - 5%
PY - 1%	MicroN- 5%
CM -24%	
Sd -45%	Sd -15%
ST -30%	ST -60%
CL -25%	CL -25%

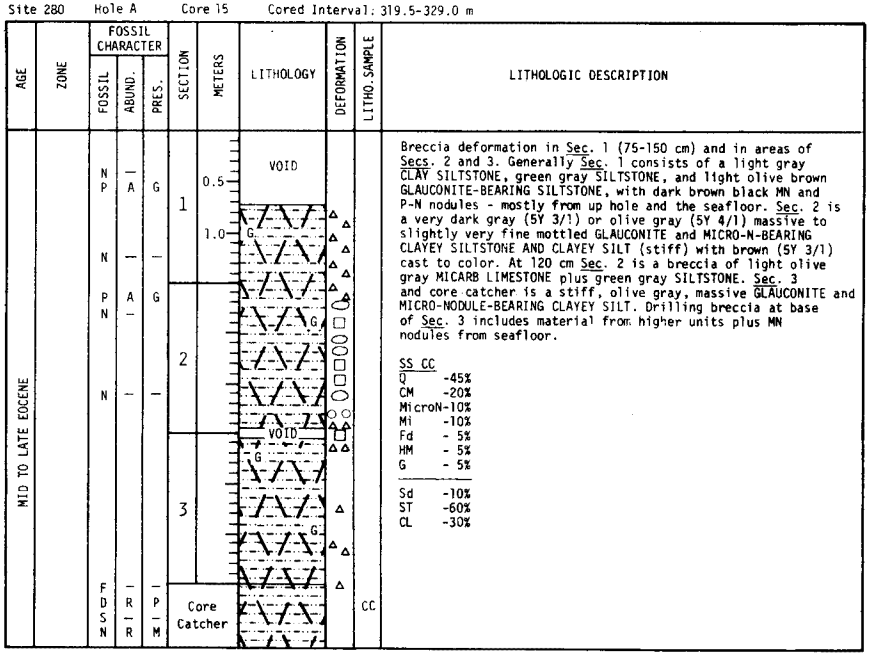
X-ray 1-80 (Bulk)

Quar	- A	Chlo	- TR
Cris	- P	Mont	- P
K-Fe	- P	Trid	- TR
Plag	- P	Clin	- TR
Mica	- P		

Grain Size 1-78 (27.8, 19.5, 52.7)

Carbon Carbonate 1-77 (1.2, 0.2, 8)

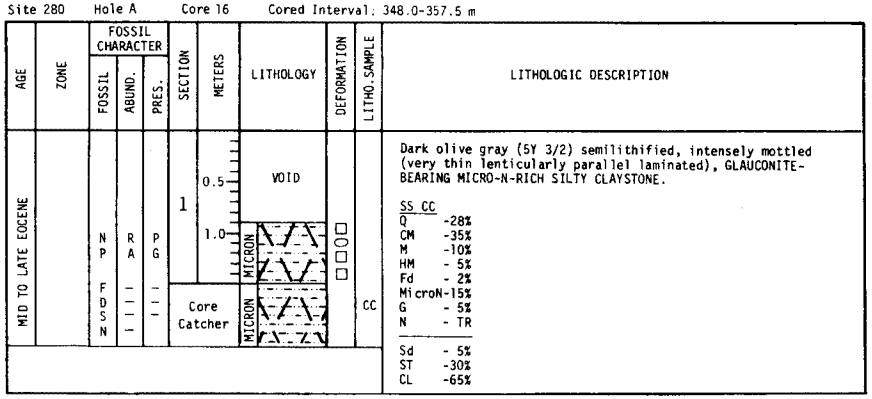
Site 280 Hole A Core 15 Cored Interval: 319.5-329.0 m



Breccia deformation in Sec. 1 (75-150 cm) and in areas of Secs. 2 and 3. Generally Sec. 1 consists of a light gray CLAY SILTSTONE, green gray SILTSTONE, and light olive brown GLAUCONITE-BEARING SILTSTONE, with dark brown black MN and P-N nodules - mostly from up hole and the seafloor. Sec. 2 is a very dark gray (5Y 3/1) or olive gray (5Y 4/1) massive to slightly very fine mottled GLAUCONITE and MICRO-N-BEARING CLAYEY SILTSTONE AND CLAYEY SILT (stiff) with brown (5Y 3/1) cast to color. At 120 cm Sec. 2 is a breccia of light olive gray MICARB LIMESTONE plus green gray SILTSTONE. Sec. 3 and core catcher is a stiff, olive gray, massive GLAUCONITE and MICRO-NODULE-BEARING CLAYEY SILT. Drilling breccia at base of Sec. 3 includes material from higher units plus MN nodules from seafloor.

SS CC	
Q -45%	
CM -20%	
MicroN-10%	
Mi -10%	
Fd - 5%	
HM - 5%	
G - 5%	
Sd -10%	
ST -60%	
CL -30%	

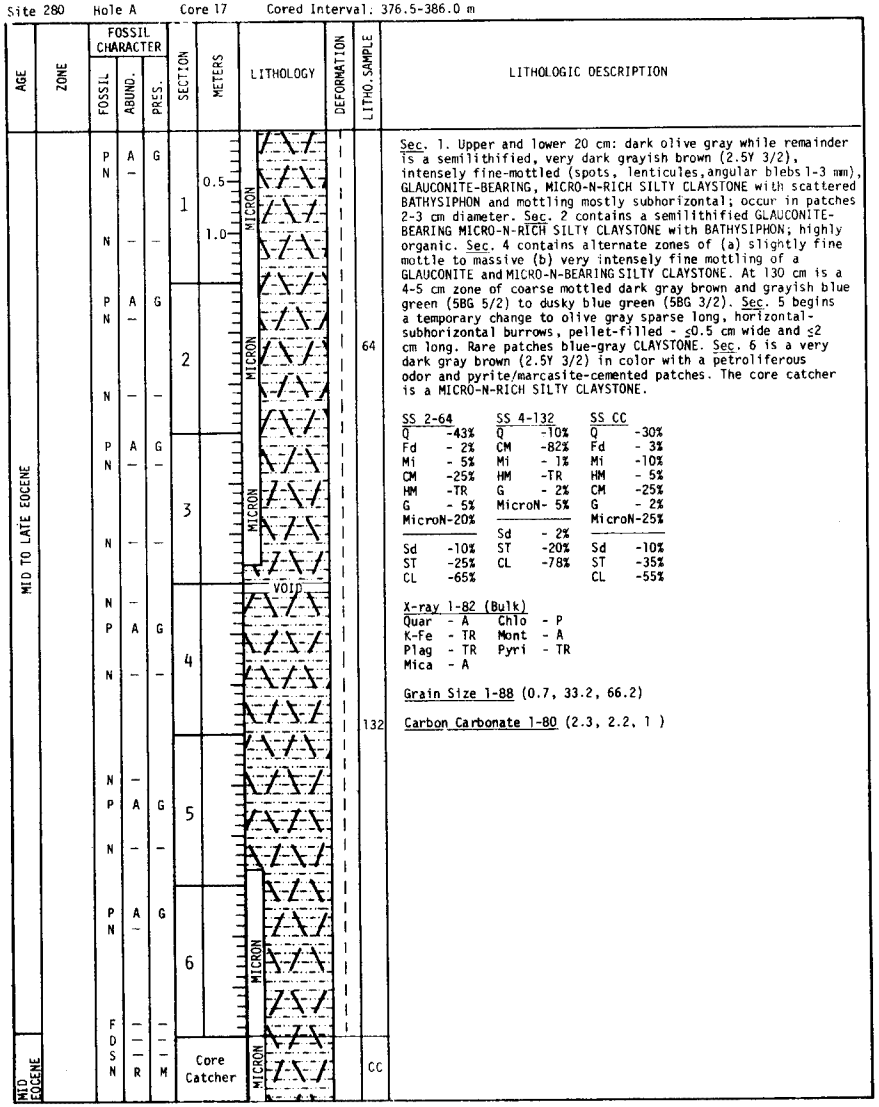
Site 280 Hole A Core 16 Cored Interval: 348.0-357.5 m



Dark olive gray (5Y 3/2) semilithified, intensely mottled (very thin lenticularly parallel laminated), GLAUCONITE-BEARING MICRO-N-RICH SILTY CLAYSTONE.

SS CC	
Q -28%	
CM -35%	
M -10%	
HM - 5%	
Fd - 2%	
MicroN-15%	
G - 5%	
N - TR	
Sd - 5%	
ST -30%	
CL -65%	

Site 280 Hole A Core 17 Cored Interval: 376.5-386.0 m



Sec. 1. Upper and lower 20 cm: dark olive gray while remainder is a semilithified, very dark grayish brown (2.5Y 3/2), intensely fine-mottled (spots, lenticules, angular blebs 1-3 mm), GLAUCONITE-BEARING, MICRO-N-RICH SILTY CLAYSTONE with scattered BATHYSIPHON and mottling mostly subhorizontal; occur in patches 2-3 cm diameter. Sec. 2 contains a semilithified GLAUCONITE-BEARING MICRO-N-RICH SILTY CLAYSTONE with BATHYSIPHON; highly organic. Sec. 4 contains alternate zones of (a) slightly fine mottle to massive (b) very intensely fine mottling of a GLAUCONITE and MICRO-N-BEARING SILTY CLAYSTONE. At 130 cm is a 4-5 cm zone of coarse mottled dark gray brown and grayish blue green (5BG 5/2) to dusky blue green (5BG 3/2). Sec. 5 begins a temporary change to olive gray sparse long, horizontal-subhorizontal burrows, pellet-filled - ≤0.5 cm wide and ≤2 cm long. Rare patches blue-gray CLAYSTONE. Sec. 6 is a very dark gray brown (2.5Y 3/2) in color with a petroliferous odor and pyrite/marcasite-cemented patches. The core catcher is a MICRO-N-RICH SILTY CLAYSTONE.

SS 2-64

Q	-43%
Fd	- 2%
Mi	- 5%
CM	-25%
HM	-TR
G	- 5%
MicroN	-20%
Sd	-10%
ST	-25%
CL	-65%

SS 4-132

Q	-10%
CM	-82%
Mi	- 1%
HM	-TR
G	- 2%
MicroN	- 5%
Sd	- 2%
ST	-20%
CL	-78%

SS CC

Q	-30%
Fd	- 3%
Mi	-10%
HM	- 5%
CM	-25%
G	- 2%
MicroN	-25%
Sd	-10%
ST	-35%
CL	-55%

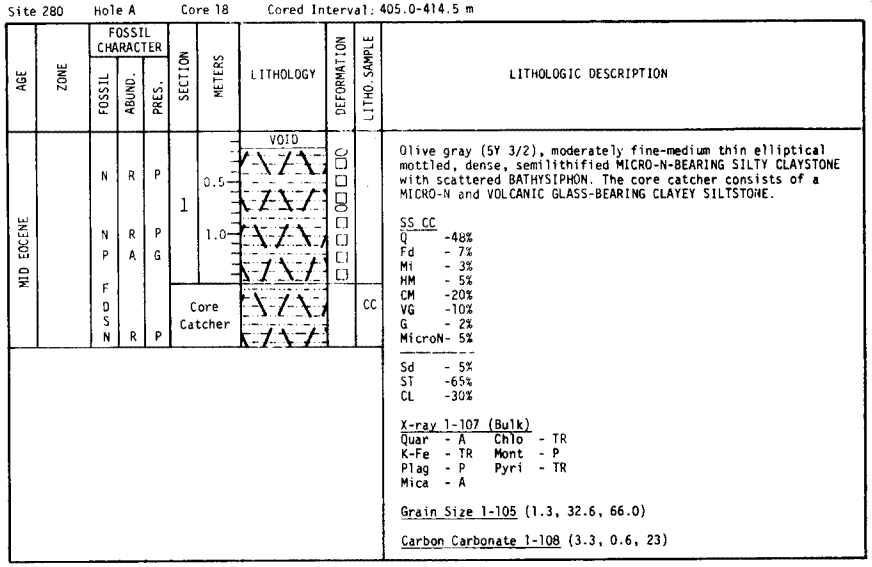
X-ray 1-82 (Bulk)

Quar	- A	Chlo	- P
K-Fe	- TR	Mont	- A
Plag	- TR	Pyri	- TR
Mica	- A		

Grain Size 1-88 (0.7, 33.2, 66.2)

Carbon Carbonate 1-80 (2.3, 2.2, 1)

Site 280 Hole A Core 18 Cored Interval: 405.0-414.5 m



Olive gray (5Y 3/2), moderately fine-medium thin elliptical mottled, dense, semilithified MICRO-N-BEARING SILTY CLAYSTONE with scattered BATHYSIPHON. The core catcher consists of a MICRO-N and VOLCANIC GLASS-BEARING CLAYEY SILTSTONE.

SS CC

Q	-48%
Fd	- 7%
Mi	- 3%
HM	- 5%
CM	-20%
VG	-10%
G	- 2%
MicroN	- 5%
Sd	- 5%
ST	-65%
CL	-30%

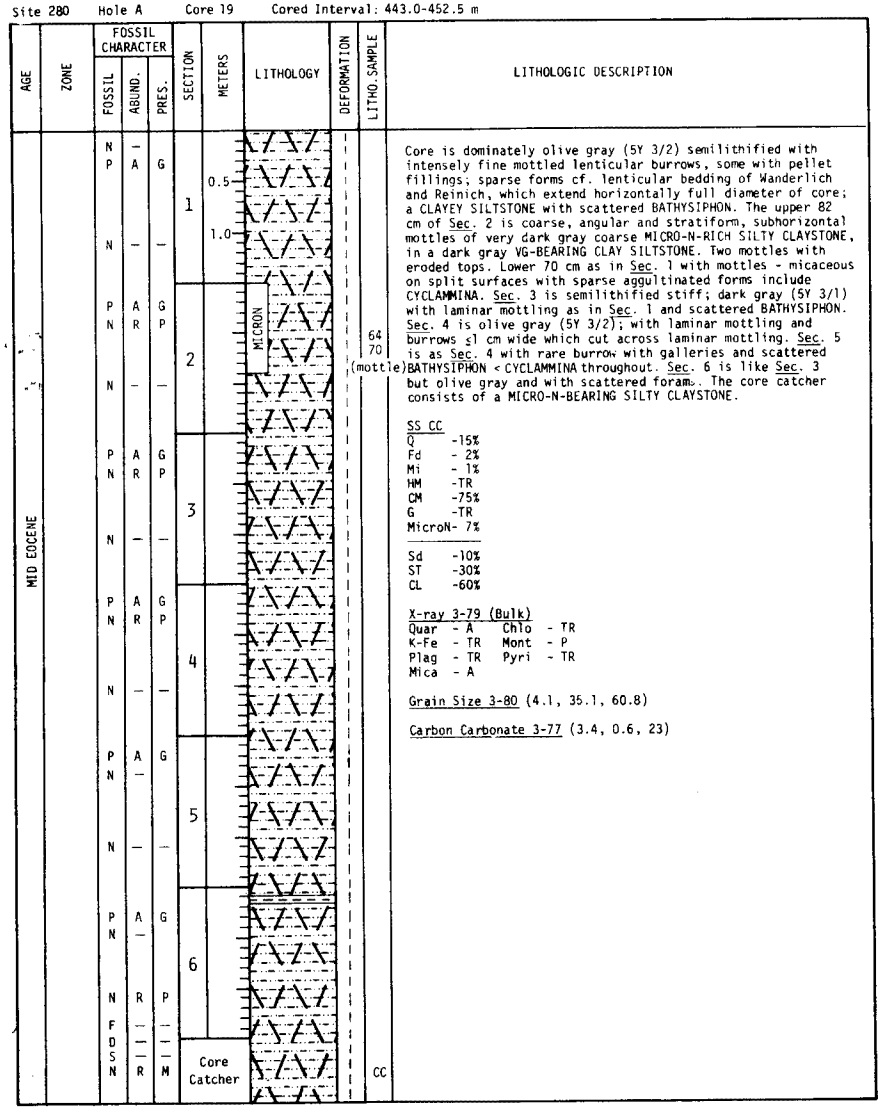
X-ray 1-107 (Bulk)

Quar	- A	Chlo	- TR
K-Fe	- TR	Mont	- P
Plag	- P	Pyri	- TR
Mica	- A		

Grain Size 1-105 (1.3, 32.6, 66.0)

Carbon Carbonate 1-108 (3.3, 0.6, 23)

Site 280 Hole A Core 19 Cored Interval: 443.0-452.5 m



Core is dominately olive gray (5Y 3/2) semilithified with intensely fine mottled lenticular burrows, some with pellet fillings; sparse forms cf. lenticular bedding of Wanderlich and Reinich, which extend horizontally full diameter of core; a CLAYEY SILTSTONE with scattered BATHYSIPHON. The upper 82 cm of Sec. 2 is coarse, angular and stratiform, subhorizontal mottles of very dark gray coarse MICRO-N-RICH SILTY CLAYSTONE, in a dark gray VG-BEARING CLAY SILTSTONE. Two mottles with eroded tops. Lower 70 cm as in Sec. 1 with mottles - micaceous on split surfaces with sparse aggultinated forms include CYCLAMMINA. Sec. 3 is semilithified stiff; dark gray (5Y 3/1) with laminar mottling as in Sec. 1 and scattered BATHYSIPHON. Sec. 4 is olive gray (5Y 3/2), with laminar mottling and burrows ≤1 cm wide which cut across laminar mottling. Sec. 5 is as Sec. 4 with rare burrow with galleries and scattered BATHYSIPHON < CYCLAMMINA throughout. Sec. 6 is like Sec. 3 but olive gray and with scattered foram.. The core catcher consists of a MICRO-N-BEARING SILTY CLAYSTONE.

SS CC
Q -15%
Fd - 2%
Mi - 1%
HM -TR
CM -75%
G -TR
MicroN- 7%

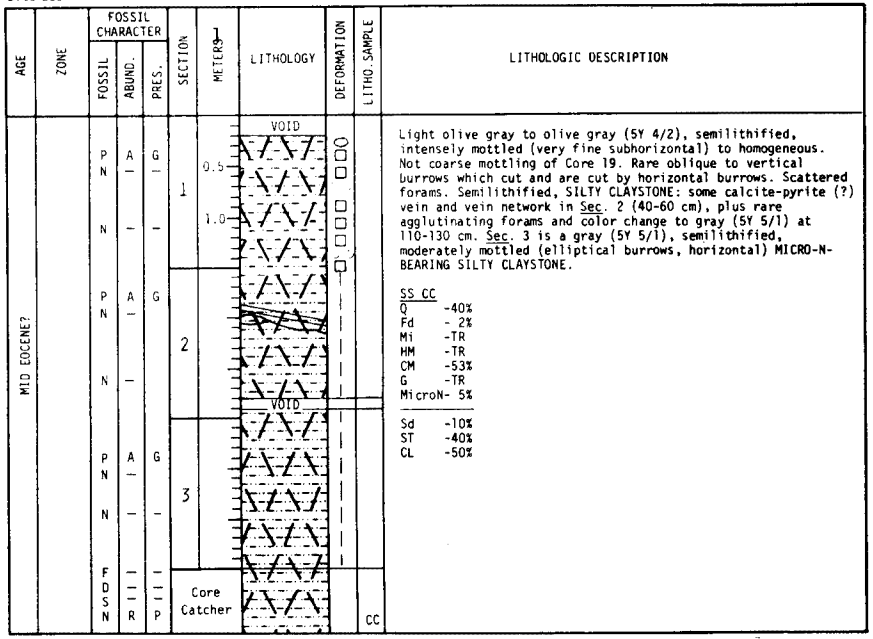
Sd -10%
ST -30%
CL -60%

X-ray 3-79 (Bulk)
Quar - A Chlo - TR
K-Fe - TR Mont - P
Plag - TR Pyri - TR
Mica - A

Grain Size 3-80 (4.1, 35.1, 60.8)

Carbon Carbonate 3-77 (3.4, 0.6, 23)

Site 280 Hole A Core 20 Cored Interval: 481.0-490.5 m

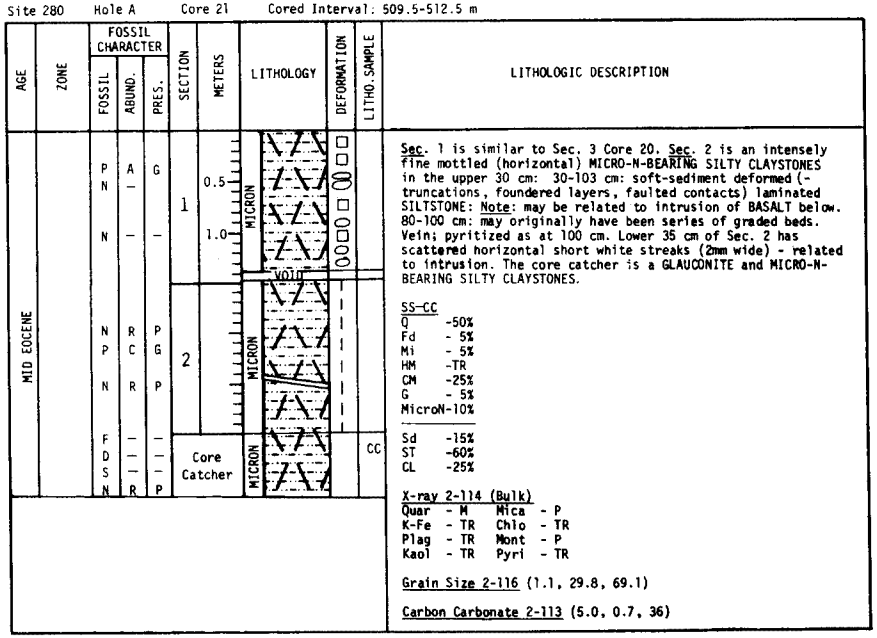


Light olive gray to olive gray (5Y 4/2), semilithified, intensely mottled (very fine subhorizontal) to homogeneous. Not coarse mottling of Core 19. Rare oblique to vertical burrows which cut and are cut by horizontal burrows. Scattered forams. Semilithified, SILTY CLAYSTONE: some calcite-pyrite (?) vein and vein network in Sec. 2 (40-60 cm), plus rare agglutinating forams and color change to gray (5Y 5/1) at 110-130 cm. Sec. 3 is a gray (5Y 5/1), semilithified, moderately mottled (elliptical burrows, horizontal) MICRO-N-BEARING SILTY CLAYSTONE.

SS CC
Q -40%
Fd - 2%
Mi -TR
HM -TR
CM -53%
G -TR
MicroN- 5%

Sd -10%
ST -40%
CL -50%

Site 280 Hole A Core 21 Cored Interval: 509.5-512.5 m



Sec. 1 is similar to Sec. 3 Core 20. Sec. 2 is an intensely fine mottled (horizontal) MICRO-N-BEARING SILTY CLAYSTONES in the upper 30 cm: 30-103 cm: soft-sediment deformed (-truncations, foundered layers, faulted contacts) laminated SILTSTONE: Note: may be related to intrusion of BASALT below. 80-100 cm: may originally have been series of graded beds. Vein; pyritized as at 100 cm. Lower 35 cm of Sec. 2 has scattered horizontal short white streaks (2mm wide) - related to intrusion. The core catcher is a GLAUCONITE and MICRO-N-BEARING SILTY CLAYSTONES.

SS-CC
Q -50%
Fd - 5%
Mi - 5%
HM -TR
CM -25%
G - 5%
MicroN-10%

Sd -15%
ST -60%
CL -25%

X-ray 2-114 (Bulk)
Quar - M Mica - P
K-Fe - TR Chlo - TR
Plag - TR Mont - P
Kaol - TR Pyri - TR

Grain Size 2-116 (1.1, 29.8, 69.1)

Carbon Carbonate 2-113 (5.0, 0.7, 36)

Site 280 Hole A Core 22 Cored Interval: 512.5-519.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
MID EOCENE		N P N F D S N	- A R - - -	- G P - - -	1	0.5, 1.0	VOID		70	Gray (5Y 5/1) semilithified to lithified, patchly mineralized (3-4 cm blotches) with authigenic calcite in a MICRO-N-BEARING SILTY CLAYSTONE: blotches irregularly and sparsely disturbed; calcite-rich. Ragged/distorted horizontal burrow mottling throughout - distortion is deformation produced by intrusion of BASALT below. Basal 10 cm has inclined fabric-diagenetic/ deformational related to intrusion. The core catcher lithology is a authigenic calcite and MICRO-N-BEARING SILTY CLAYSTONE olive black (5Y 2/1) lithified and underlain by 3 cm olive black (5Y 2/1) lithified calcite mineralized MICRO-N-BEARING SANDY SILTSTONE which is a baked sediment.
					Core Catcher				CC[1] CC[2]	

SS 1-70

Q	-50%
Mi	-TR
HM	-TR
CM	-40%
G	-TR
MicroN- Auth.	7%
Cal. -	2%
Sd	- 7%
ST	-43%
CL	-50%

SS CC[1]

Q	-50%
Mi	-TR
CM	-38%
MicroN- Auth.	7%
Cal. -	5%
Sd	-10%
ST	-40%
CL	-50%

SS CC[2]

Q	-29%
Fd	-TR
Mi	-TR
HM	-TR
CM	-60%
Py	- 1%
MicroN- Auth.	10%

CO_3 as veins

Site 280 Hole A Core 23 Cored Interval: 519.0-524.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					1	0.5, 1.0	VOID, MN			Greenish black (5GY 2/1) holocrystalline, subophitic fine-grained pyroxene-plagioclase INTRUSIVE BASALT. Extensive serpentinization also serpentine group mineralization + calcite mineralization in veins: lower veins include pyrite. The top of the core is the least altered. Rock (where mineralized) breaks up through swelling on contact with water. Highly serpentinized contact (Sec. 2, 135 cm) with close-spaced very fine veining to a greenish gray (5GY 6/1) quartz mica SILTY CLAYSTONE; lithified olive black calcite-mineralized mica-quartz SANDY SILTSTONE and a light olive gray to grayish olive intensely veined + extensively mineralized CLAYEY SILTSTONE. At 55 cm, Sec. 3 is a gradational contact to a greenish black, extensively veined and mineralized (altered) fine-grained pyroxene-plagioclase BASALT. At 110 cm, Sec. 3 is a sharp contact to very light gray chertified + pyritized SILTY CLAYSTONE, grading to olive gray, lithified, massive SANDY SILTSTONE grading to grayish olive, crinkle-veined (calcite) SANDY SILTSTONE which is lithified; olive gray again at the base. Below is a gray/very light gray chertified SILTY CLAYSTONE with abundant calcite-pyrite veins and a gradational contact to fine grained, greenish black, holocrystalline, subophitic intrusive BASALT; close-spaced veins of calcite and serpentine group minerals. Near top; wider spaced lower down. Lowest part (>10 cm) is a relatively fresh, fine-grained OLIVINE BASALT with olivine phenocrysts with serpentinized veins.
		N	-		2				140	
					3				46	
		N	-		4					

= calcite veins

= serpentine group veins

MN nodule - from seafloor?

DEEP SEA DRILLING PROJECT

LEG 29 SITE 281

SITE SUMMARY SHEET

POSITION: Latitude: 47°59.84'S Longitude: 147°45.85'E

Water depth (from sea level): 1591 corrected meters (Echo sounding)

Bottom felt at: 1601 meters (drill pipe) Penetration: 281 - 169 m
281A - 45.5 m

Number of Holes: 2 Number of Cores: 281 - 19; 281A - 3

Total length of cored section: 281 - 169 m; 281A - 28.5 m

Total core recovered: 281 - 105.6 m; 281A - 7.1 m

Percentage of core recovery: 281 - 62.5%; 281A - 24.9%

OLDEST SEDIMENT CORED:

Depth below sea floor: 169 meters Nature: Schist breccia

Age: Late Eocene

BASEMENT:

Depth below sea floor: .195 seconds (reflection time)

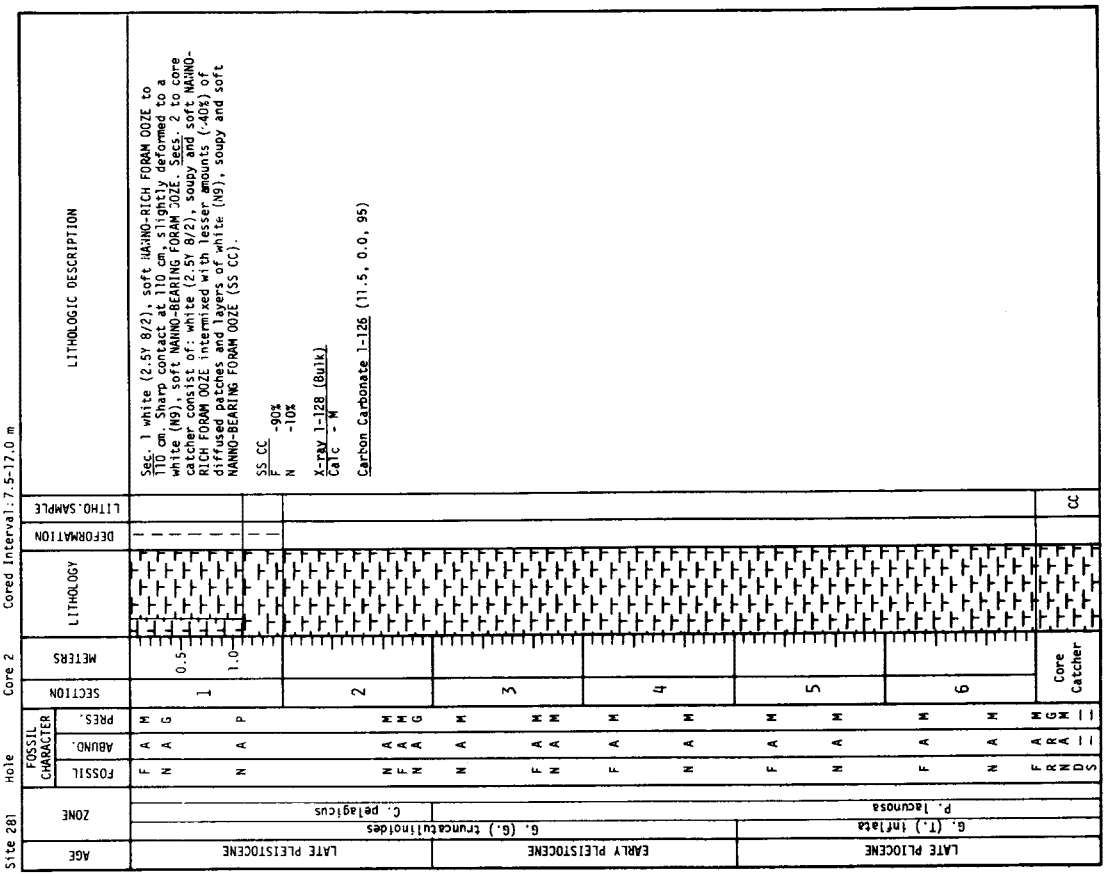
Depth below sea floor: 162.5 meters (drilled)

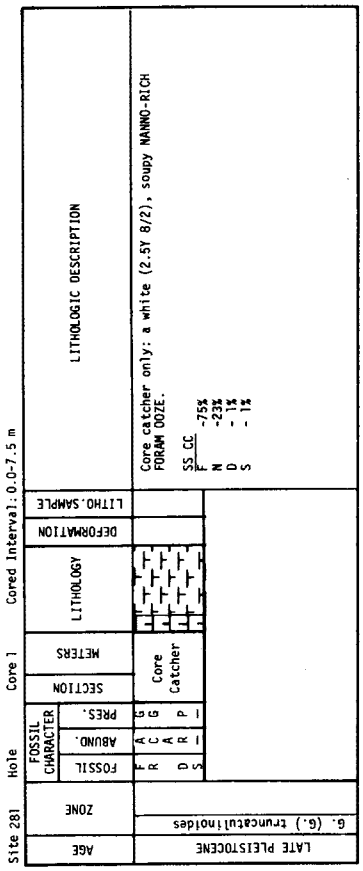
Average velocity to basement: 1.67 km/sec Nature: Schist

PRINCIPAL RESULTS:

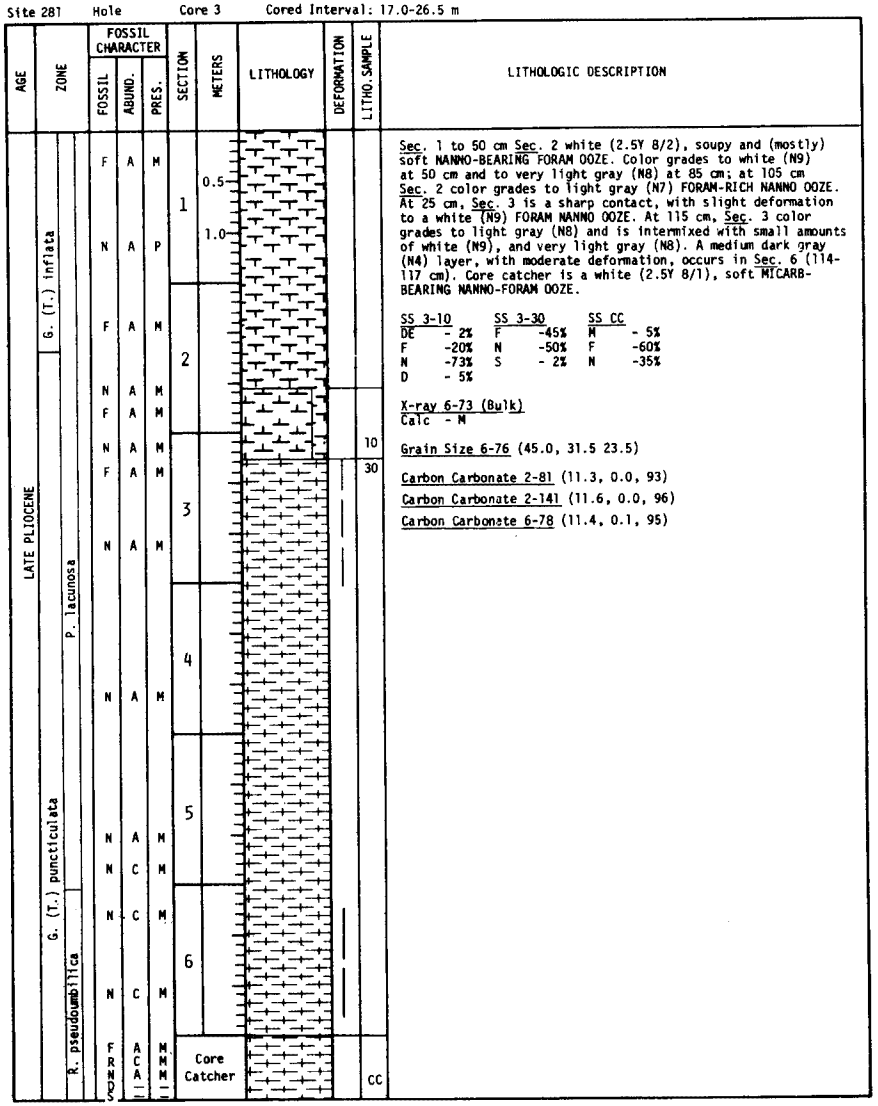
112 meters of early Miocene to Recent nannofossil-foraminifera ooze and foraminifera-nannofossil ooze underlain in continuous sequence by 9.3 meters of glauconitic sand of early Miocene age. Major unconformities span almost all Oligocene and much of the late Eocene although 0.2 meters of early Oligocene greensand occur between the unconformities. Underlain by 28.5 meters of biogenic-rich glauconitic silty sands of early late Eocene age in turn underlain by 19 meters of glauconitic sandstone and probable mica schist breccia of late Eocene age. Large fragments of schist obtained near basement prove continental nature of south Tasman Rise; hence Antarctic bottom water was not free to circulate before the rise separated from Victoria Land, even though Australia had alread detached from Antarctica. Shallow-water foraminifera and neritic nannofossils in late Eocene indicate subsidence of rise during Paleogene related with early spreading of Australia from Antarctica. Oligocene-late Eocene unconformity equivalent and genetically related

to regional unconformity in north Tasman Sea and Coral Sea (Leg 21). Sedimentary deposition at 281 almost opposite Site 280 in deep water to south and records shallow-water connection between Indian and Pacific water masses during late Eocene and Oligocene with high sustained currents followed in Neogene by uninterrupted sedimentation when deep-seated circumpolar circulation was established to south (Site 280). Site 281 has close affinities with northern Tasman Sea sites while 280 has closer affinities with sites south of New Zealand, both sites recording major middle Cenozoic paleocirculation changes in southwest Pacific related to development of circumpolar current. Excellent Pleistocene to Miocene calcareous biogenic northern sub-antarctic biostratigraphic sequence. Significant warming in early Miocene. Obvious cooling in late Miocene and earliest Pliocene.


Site 281
Hole
Core 2
Cored Interval: 7.5-17.0 m
AGE
ZONE
FOSSIL CHARACTER
FOSSIL
ABUND.
PRES.
SECTION
METERS
LITHOLOGY
DEFORMATION
LITHO. SAMPLE
LITHOLOGIC DESCRIPTION
LATE PLEISTOCENE
EARLY PLEISTOCENE
LATE PLIOCENE
G. (G.) truncatulinoides
G. (T.) inflata
C. pelagicus
P. lacunosa
Sec. 1 white (2.5Y 8/2), soft NANNO-RICH FORAM OOZE to 110 cm. Sharp contact at 110 cm, slightly deformed to a white (N9), soft NANNO-BEARING FORAM OOZE. Secs. 2 to core catcher consist of: white (2.5Y 8/2), soupy and soft NANNO-RICH FORAM OOZE intermixed with lesser amounts (~40%) of diffused patches and layers of white (N9), soupy and soft NANNO-BEARING FORAM OOZE (SS CC).
SS CC -90%
F -10%
N
X-ray 1-128 (Bulk)
Calc - M
Carbon Carbonate 1-126 (11.5, 0.0, 95)
Core Catcher
CC


Site 281
Hole
Core 1
Cored Interval: 0.0-7.5 m
AGE
ZONE
FOSSIL CHARACTER
FOSSIL
ABUND.
PRES.
SECTION
METERS
LITHOLOGY
DEFORMATION
LITHO. SAMPLE
LITHOLOGIC DESCRIPTION
LATE PLEISTOCENE
G. (G.) truncatulinoides
Core Catcher
Core catcher only: a white (2.5Y 8/2), soupy NANNO-RICH FORAM OOZE.
SS CC -75%
F -23%
N - 1%
D - 1%
S - 1%

Site 281 Hole Core 3 Cored Interval: 17.0-26.5 m



Sec. 1 to 50 cm Sec. 2 white (2.5Y 8/2), soupy and (mostly) soft NANNO-BEARING FORAM OOZE. Color grades to white (N9) at 50 cm and to very light gray (N8) at 85 cm; at 105 cm Sec. 2 color grades to light gray (N7) FORAM-RICH NANNO OOZE. At 25 cm, Sec. 3 is a sharp contact, with slight deformation to a white (N9) FORAM NANNO OOZE. At 115 cm, Sec. 3 color grades to light gray (N8) and is intermixed with small amounts of white (N9), and very light gray (N8). A medium dark gray (N4) layer, with moderate deformation, occurs in Sec. 6 (114-117 cm). Core catcher is a white (2.5Y 8/1), soft MICARB-BEARING NANNO-FORAM OOZE.

SS 3-10		SS 3-30		SS CC	
DE	- 2%	F	-45%	M	- 5%
F	-20%	N	-50%	F	-60%
N	-73%	S	- 2%	N	-35%
D	- 5%				

X-ray 6-73 (Bulk)
Calc - M

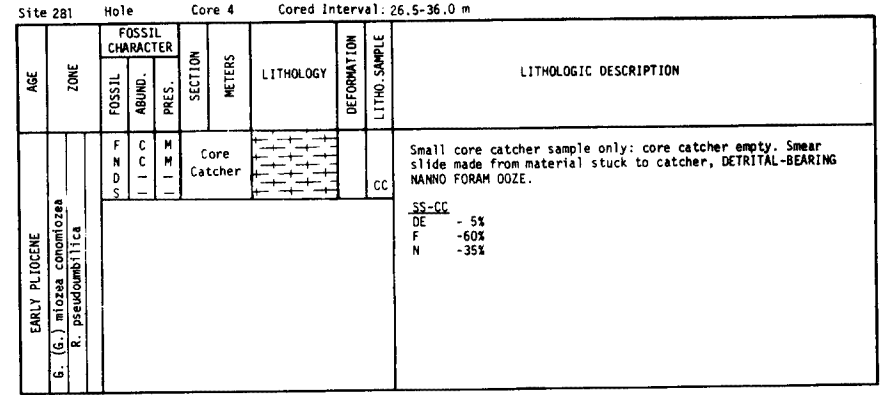
Grain Size 6-76 (45.0, 31.5 23.5)

Carbon Carbonate 2-81 (11.3, 0.0, 93)

Carbon Carbonate 2-141 (11.6, 0.0, 96)

Carbon Carbonate 6-78 (11.4, 0.1, 95)

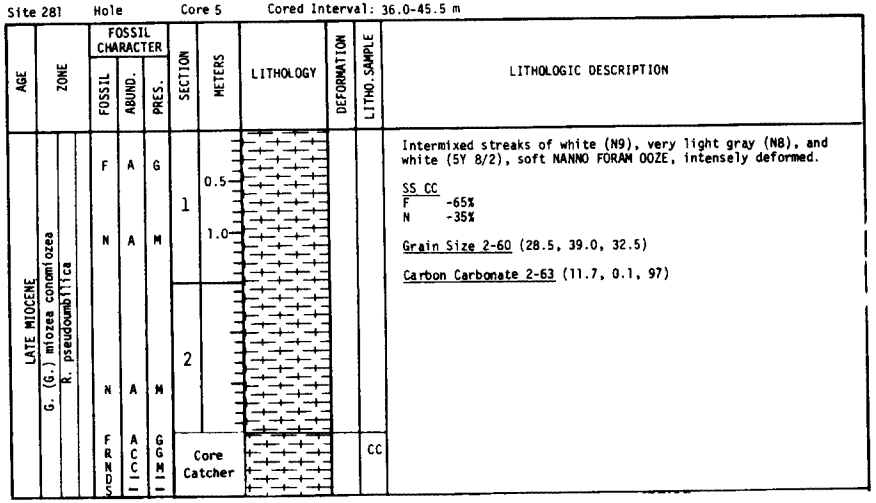
Site 281 Hole Core 4 Cored Interval: 26.5-36.0 m



Small core catcher sample only: core catcher empty. Smear slide made from material stuck to catcher, DETRITAL-BEARING NANNO FORAM OOZE.

SS-CC	
DE	- 5%
F	-60%
N	-35%

Site 281 Hole Core 5 Cored Interval: 36.0-45.5 m



Intermixed streaks of white (N9), very light gray (N8), and white (5Y 8/2), soft NANNO FORAM OOZE, intensely deformed.

SS CC
F -65%
N -35%

Grain Size 2-60 (28.5, 39.0, 32.5)

Carbon Carbonate 2-63 (11.7, 0.1, 97)

Site 281 Hole Core 6 Cored Interval: 45.5-55.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE MIOCENE	G. (G.) miotumida miotumida / R. pseudoumbilica	F	A	M	1	0.5				Core is typically a white (N9), soupy to soft NANNO FORAM OOZE. At 80-150 cm, Sec. 4 are ~10% streaks and patches of medium gray (N5), also in Sec. 5 (0-13 cm). Below 100 cm, Sec. 5 is a subtle color change to white (N8). The core catcher consists of a very light gray (N8), soft SILICEOUS-BEARING NANNO FORAM OOZE.
						1.0				SS CC DE - 2% F -55% N -35% D - 1% R - 1% S - 1% SI - 5% X-ray 5-83 (Bulk) Calc - M Grain Size 5-87 (16.6, 37.9, 45.5) Carbon Carbonate 5-90 (11.4, 0.0, 95)
					2					
		N	A	M	3					
		N	A	M	4					
		N	A	M	5					
		N	A	M	6					
		N	A	M						
		F	A	M	Core Catcher				CC	
		R	C	G						
		N	A	M						
		D	A	M						
		S	R	P						

Site 281 Hole Core 7 Cored Interval: 55.0-64.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE MIOCENE	G. (G.) miotumida miotumida / R. pseudoumbilica				1	0.5				Sec. 1 (0-150 cm): white (N9), soupy and soft FORAM NANNO OOZE. Sec. 2 (0-150 cm) white (N9) to greenish white (5GY 9/1) FORAM NANNO OOZE (soft and soupy). Sec. 3 is a greenish white (5GY 9/1), soft-stiff FORAM NANNO OOZE and Sec. 4 is a white (N9) to greenish white (5GY 9/1), soft FORAM NANNO OOZE grading to a white (N9), soft, FORAM NANNO OOZE in Sec. 5 and in Sec. 6 and core catcher.
						1.0				SS CC F -40% N -59% D - 1%
		N	A	M	2					
		N	A	M	3					
		N	A	M	4					
					5		VOID			
					6					
		F	A	M	Core Catcher				CC	
		R	C	G						
		N	A	M						
		D	A	M						
		S	R	P						

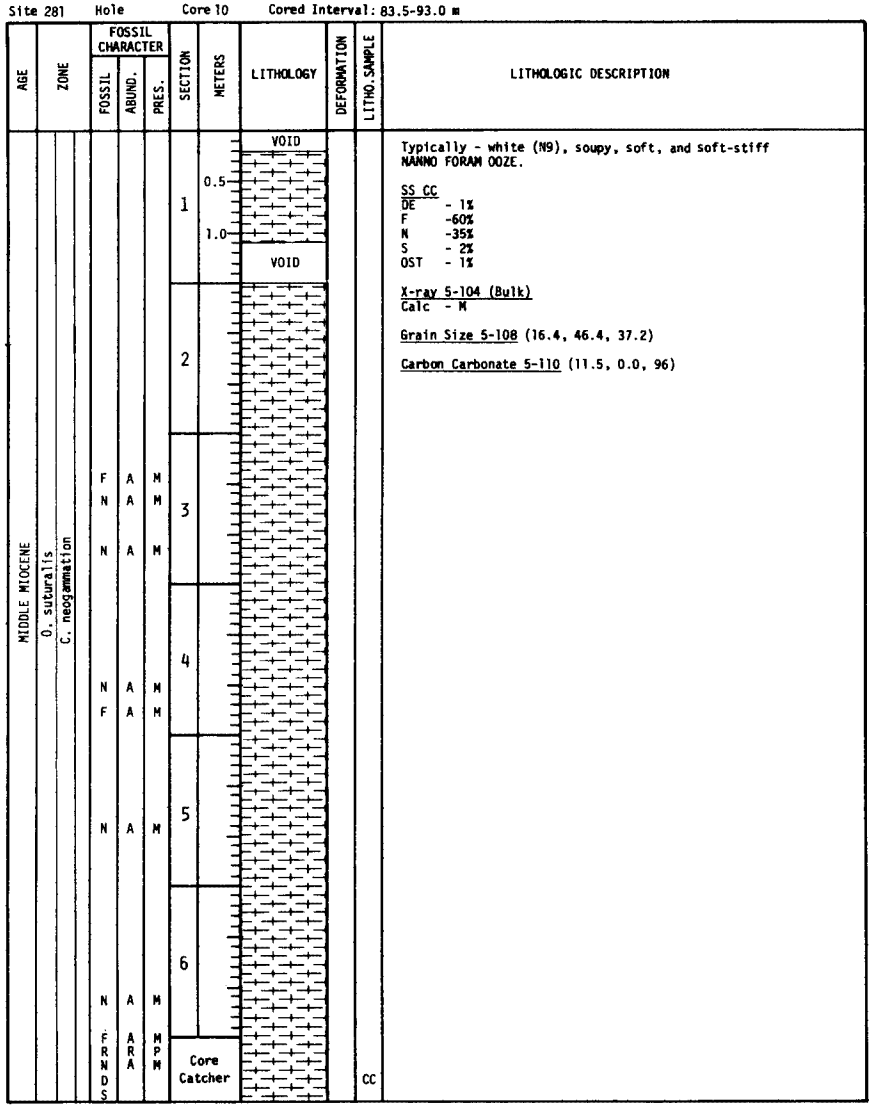
Site 281 Hole Core 8 Cored Interval: 64.5-74.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE MIOCENE	G. (G.) miotumida miotumida / R. pseudoumbilica	F R N O S	C C A R I	M G M P I	Core Catcher				CC	Core catcher only: white (N9), soft SPICULE-BEARING FORAM-RICH NANNO OOZE. SS CC F -25% N -70% S - 5%

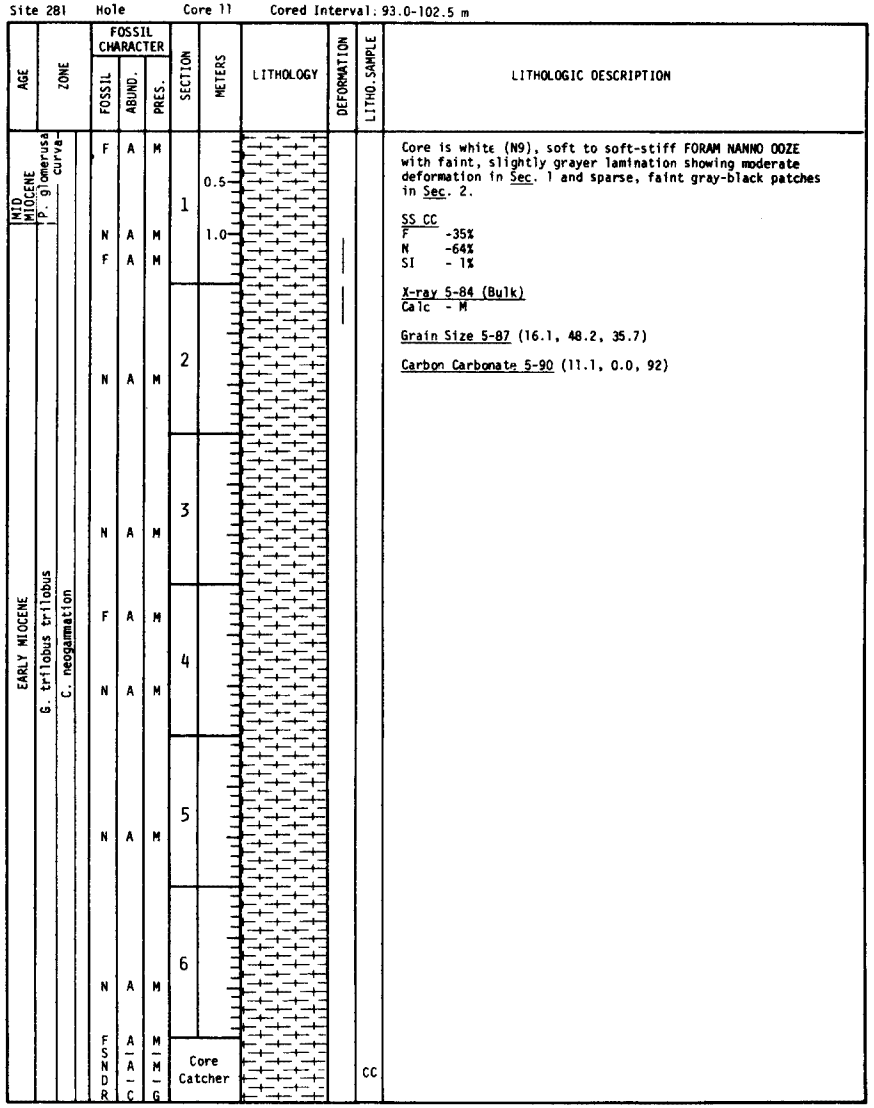
Site 281 Hole Core 9 Cored Interval: 74.0-83.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE MIOCENE	G. (G.) miotumida miotumida	N	A	M	1	0.5 1.0				Core is typically a white (N9), soft to soft-stiff FORAM NANNO OOZE with sparse faint gray-black spots in Sec. 6. SS CC F -40% N -55% OST - 1% X-ray 1-114 (Bulk) Calc - M Grain Size 1-117 (6.0, 57.4, 36.6) Carbon Carbonate 1-120 (11.3, 0.0, 94)
		F N	A A	M M	2					
		F N	A A	M M	3					
		F	A	M	4					
		N	A	M						
MIDDLE MIOCENE	G. (T.) mayeri mayeri / R. pseudoumbilica	N	A	M	5					
		N	A	M	6					
		F R N O S	A R A R	M P M P	Core Catcher					

Site 281 Hole Core 10 Cored Interval: 83.5-93.0 m



Site 281 Hole Core 11 Cored Interval: 93.0-102.5 m



Site 281 Hole Core 12 Cored Interval: 102.5-112.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
EARLY MIOCENE	G. trilobus trilobus / G. (G.) woodi connecta / D. deflandrei / C. neogammation	N	A	M	1	0.5			
						1.0			
		F	A	M	2				
		N	A	M	3				
		F	A	M					
		F	A	M					
		N	A	M	4				
		N	A	P					
		N	A	M	5				
		N	A	M	6				
		F D N S R	A I A R	M I M M	Core Catcher				CC

White (N9), soupy, soft, and soft-stiff FORAM NANNO OOZE with faint, slightly browner patches at 59-77 cm, Sec. 5 and faint, slightly brovner patches and streaks, and faint gray streak in Sec. 6 (40-75 cm).

SS CC
F -35%
N -64%
SI - 1%

X-ray 5-105 (Bulk)
Calc - M

Grain Size 5-107 (13.0, 56.5, 30.4)

Carbon Carbonate 5-110 (11.4, 0.0, 95)

Site 281 Hole Core 13 Cored Interval: 112.0-121.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
EARLY MIOCENE	G. (G.) woodi connecta / D. deflandrei				1	0.5	VOID		
						1.0			
		N	A	M	2				120
		N	A	M	3				
		F	R	M					
		N	A	M					
		P	A	M					
		N	A	M					140
		N	A	M	4				
		N	A	P					125
		N	A	M	5				
EARLY OLIGOCENE	R. bisecta / Blackites rectus	F	R	M					
		P	I	M					
		N	A	M					
		F	R	M					
		F	R	M					
		N	E	M					
		D		M					
		R	VR	M					
		F	C	M	Core Catcher				133 CC

White (N9), soft to soupy FORAM NANNO OOZE, with <1%, fine to medium-grained GLAUCONITE. Glauconite grains gradationally increase in abundance down-core and gives peppered appearance to sediment: Sec. 2 (150 cm) has ~5%, fine to medium-grained glauconite, as a GLAUCONITE-BEARING NANNO FORAM OOZE: at 100 cm in Sec. 3 the matrix becomes light greenish gray (5GY 8/1), and the lithology is a DETRITAL SAND AND GLAUCONITE-BEARING FORAM-RICH NANNO OOZE (visual estimate of glauconite from core is ~15%; greater than estimate from SS 140): Sec. 4 (115 cm) begins a light greenish gray (5GY 8/1), soupy NANNO AND FORAM-BEARING GLAUCONITE DETRITAL SAND and in Sec. 5 at 20-49 cm and 100-150 cm there is an intermixed, dusky yellowish green (10GY 3/2) (mostly) and dark yellowish green (10GY 4/4), soft DOLOMITE AND FORAM-BEARING GLAUCONITE AND NANNO-RICH DETRITAL SAND. The core catcher has colors between dark yellowish green (10GY 4/4) and dusky yellowish green (10GY 3/2), stiff; as a FELDSPAR-RICH GLAUCONITE QUARTZ SAND underlain by darker dusky green (5G 2/2) material of similar composition.

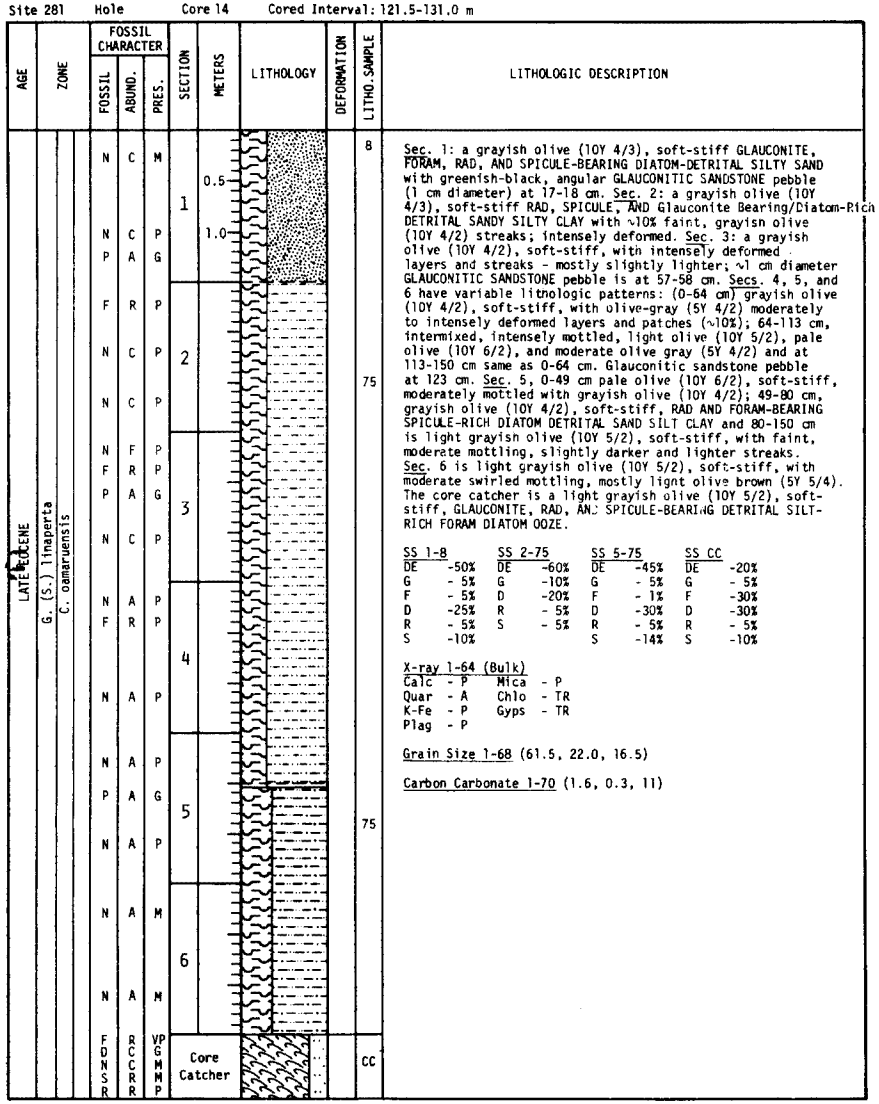
SS 2-120		SS 3-140		SS 4-125		SS 5-133		SS CC	
DE	- 1%	DE	- 7%	DE	-50%	DE	-60%	DE	-70%
G	- 2%	G	- 7%	G	-30%	G	-15%	G	-26%
F	-65%	F	-20%	F	-10%	Dolo	- 4%	F	- 1%
N	-30%	N	-66%	N	- 8%	F	- 5%	N	- 1%
				S	- 2%	N	-15%	Dolo	- 2%

X-ray 5-135 (Bulk)
Calc - TR
Quar - A
K-Fe - P
Plag - P
Dolo - TR
Mixl - P
Apat - TR

Grain Size 5-147 (61.9, 13.3, 24.8)

Carbon Carbonate 5-141 (4.3, 0.0, 35)

Site 281 Hole Core 14 Cored Interval: 121.5-131.0 m



Sec. 1: a grayish olive (10Y 4/3), soft-stiff GLAUCONITE, FORAM, RAD, AND SPICULE-BEARING DIATOM-DETRITAL SILTY SAND with greenish-black, angular GLAUCONITIC SANDSTONE pebble (1 cm diameter) at 17-18 cm. Sec. 2: a grayish olive (10Y 4/3), soft-stiff RAD, SPICULE, AND Glauconite Bearing/Diatom-Rich DETRITAL SANDY SILTY CLAY with ~10% faint, grayish olive (10Y 4/2) streaks; intensely deformed. Sec. 3: a grayish olive (10Y 4/2), soft-stiff, with intensely deformed layers and streaks - mostly slightly lighter; ~1 cm diameter GLAUCONITIC SANDSTONE pebble is at 57-58 cm. Secs. 4, 5, and 6 have variable lithologic patterns: (0-64 cm) grayish olive (10Y 4/2), soft-stiff, with olive-gray (5Y 4/2) moderately to intensely deformed layers and patches (~10%); 64-113 cm, intermixed, intensely mottled, light olive (10Y 5/2), pale olive (10Y 6/2), and moderate olive gray (5Y 4/2) and at 113-150 cm same as 0-64 cm. Glauconitic sandstone pebble at 123 cm. Sec. 5, 0-49 cm pale olive (10Y 6/2), soft-stiff, moderately mottled with grayish olive (10Y 4/2); 49-80 cm, grayish olive (10Y 4/2), soft-stiff, RAD AND FORAM-BEARING SPICULE-RICH DIATOM DETRITAL SAND SILT CLAY and 80-150 cm is light grayish olive (10Y 5/2), soft-stiff, with faint, moderate mottling, slightly darker and lighter streaks. Sec. 6 is light grayish olive (10Y 5/2), soft-stiff, with moderate swirled mottling, mostly light olive brown (5Y 5/4). The core catcher is a light grayish olive (10Y 5/2), soft-stiff, GLAUCONITE, RAD, AND SPICULE-BEARING DETRITAL SILT-RICH FORAM DIATOM OOZE.

SS 1-8		SS 2-75		SS 5-75		SS CC	
DE	-50%	DE	-60%	DE	-45%	DE	-20%
G	- 5%	G	-10%	G	- 5%	G	- 5%
F	- 5%	D	-20%	F	- 1%	F	-30%
D	-25%	R	- 5%	D	-30%	D	-30%
R	- 5%	S	- 5%	R	- 5%	R	- 5%
S	-10%			S	-14%	S	-10%

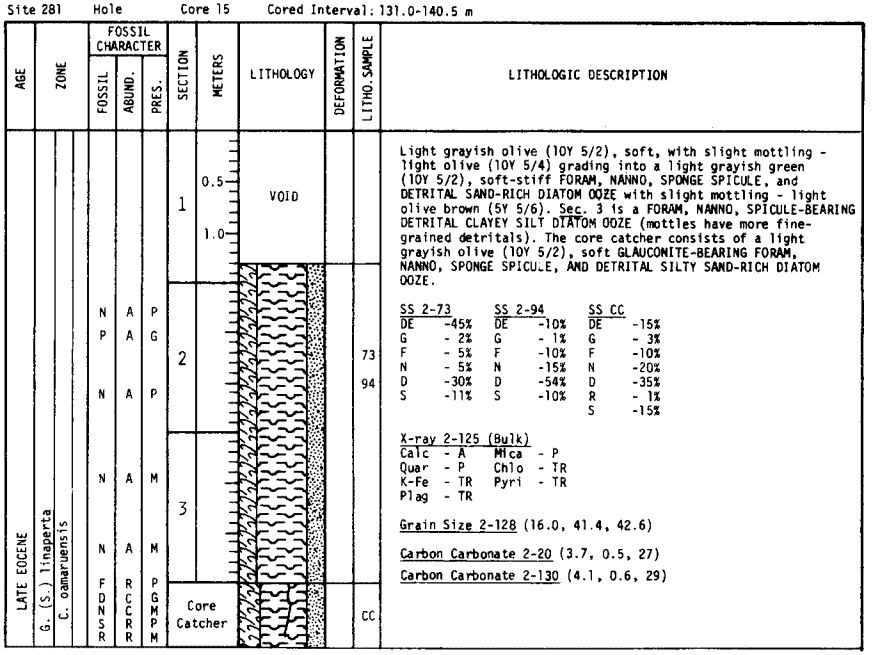
X-ray 1-64 (Bulk)

Calc	- P	Mica	- P
Quar	- A	Chlo	- TR
K-Fe	- P	Gyps	- TR
Plag	- P		

Grain Size 1-68 (61.5, 22.0, 16.5)

Carbon Carbonate 1-70 (1.6, 0.3, 11)

Site 281 Hole Core 15 Cored Interval: 131.0-140.5 m



Light grayish olive (10Y 5/2), soft, with slight mottling - light olive (10Y 5/4) grading into a light grayish green (10Y 5/2), soft-stiff FORAM, NANNO, SPONGE SPICULE, and DETRITAL SAND-RICH DIATOM OOZE with slight mottling - light olive brown (5Y 5/6). Sec. 3 is a FORAM, NANNO, SPICULE-BEARING DETRITAL CLAYEY SILT DIATOM OOZE (mottles have more fine-grained detritals). The core catcher consists of a light grayish olive (10Y 5/2), soft GLAUCONITE-BEARING FORAM, NANNO, SPONGE SPICULE, AND DETRITAL SILTY SAND-RICH DIATOM OOZE.

SS 2-73		SS 2-94		SS CC	
DE	-45%	DE	-10%	DE	-15%
G	- 2%	G	- 1%	G	- 3%
F	- 5%	F	-10%	F	-10%
N	- 5%	N	-15%	N	-20%
D	-30%	D	-54%	D	-35%
S	-11%	S	-10%	R	- 1%
				S	-15%

X-ray 2-125 (Bulk)

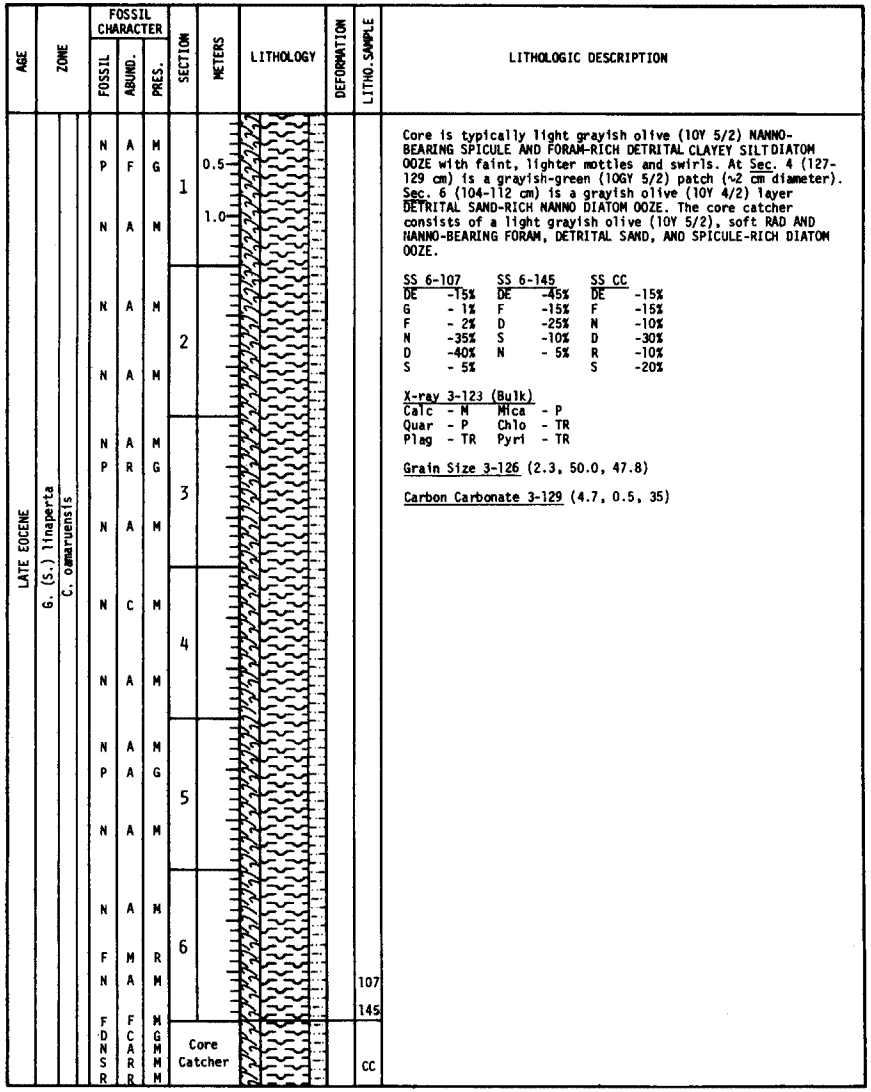
Calc	- A	Mica	- P
Quar	- P	Chlo	- TR
K-Fe	- TR	Pyri	- TR
Plag	- TR		

Grain Size 2-128 (16.0, 41.4, 42.6)

Carbon Carbonate 2-20 (3.7, 0.5, 27)

Carbon Carbonate 2-130 (4.1, 0.6, 29)

Site 281 Hole Core 16 Cored Interval: 140.5-150.0 m



Core is typically light grayish olive (10Y 5/2) NANNO-BEARING SPICULE AND FORAM-RICH DETRITAL CLAYEY SILT DIATOM OOZE with faint, lighter mottles and swirls. At Sec. 4 (127-129 cm) is a grayish-green (10GY 5/2) patch (~2 cm diameter). Sec. 6 (104-112 cm) is a grayish olive (10Y 4/2) layer DETRITAL SAND-RICH NANNO DIATOM OOZE. The core catcher consists of a light grayish olive (10Y 5/2), soft RAD AND NANNO-BEARING FORAM, DETRITAL SAND, AND SPICULE-RICH DIATOM OOZE.

SS 6-107		SS 6-145		SS CC	
DE	-15%	DE	-45%	DE	-15%
G	- 1%	F	-15%	F	-15%
F	- 2%	D	-25%	N	-10%
N	-35%	S	-10%	D	-30%
D	-40%	N	- 5%	R	-10%
S	- 5%			S	-20%

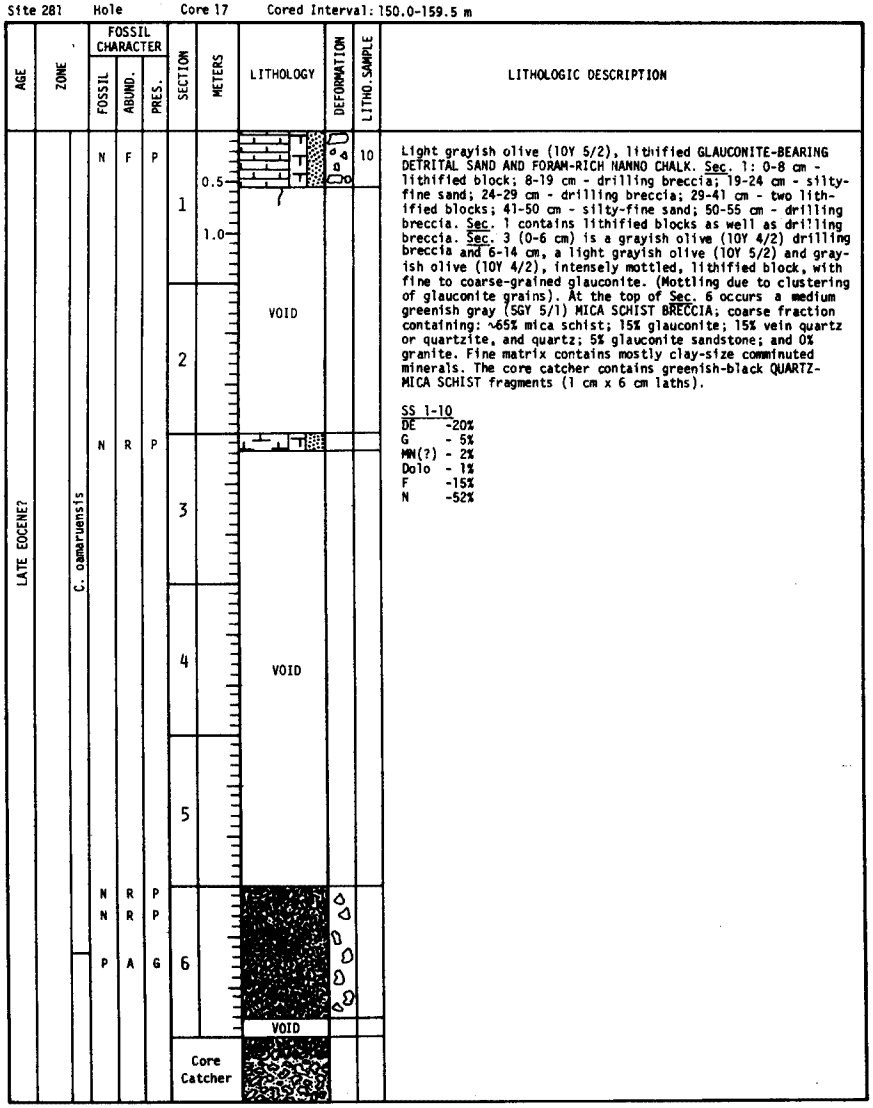
X-ray 3-123 (Bulk)

Calc	- M	Mica	- P
Quar	- P	Chlo	- TR
Plag	- TR	Pyri	- TR

Grain Size 3-126 (2.3, 50.0, 47.8)

Carbon Carbonate 3-129 (4.7, 0.5, 35)

Site 281 Hole Core 17 Cored Interval: 150.0-159.5 m



Light grayish olive (10Y 5/2), lithified GLAUCONITE-BEARING DETRITAL SAND AND FORAM-RICH NANNO CHALK. Sec. 1: 0-8 cm - lithified block; 8-19 cm - drilling breccia; 19-24 cm - silty-fine sand; 24-29 cm - drilling breccia; 29-41 cm - two lithified blocks; 41-50 cm - silty-fine sand; 50-55 cm - drilling breccia. Sec. 1 contains lithified blocks as well as drilling breccia. Sec. 3 (0-6 cm) is a grayish olive (10Y 4/2) drilling breccia and 6-14 cm, a light grayish olive (10Y 5/2) and grayish olive (10Y 4/2), intensely mottled, lithified block, with fine to coarse-grained glauconite. (Mottling due to clustering of glauconite grains). At the top of Sec. 6 occurs a medium greenish gray (5GY 5/1) MICA SCHIST BRECCIA; coarse fraction containing: ~65% mica schist; 15% glauconite; 15% vein quartz or quartzite, and quartz; 5% glauconite sandstone; and 0% granite. Fine matrix contains mostly clay-size comminuted minerals. The core catcher contains greenish-black QUARTZ-MICA SCHIST fragments (1 cm x 6 cm laths).

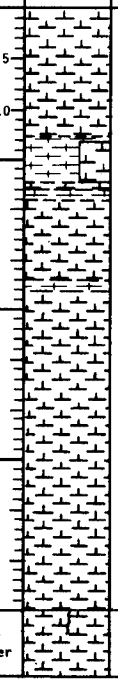
SS 1-10

DE	-20%
G	- 5%
MN(?)	- 2%
Dolo	- 1%
F	-15%
N	-52%

Site 281 Hole Core 18 Cored Interval: 159.5-162.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					Core Catcher					Core catcher contains a 2 x 5 cm lithified pebble. One half is dark gray (N4) GLAUCONITIC SANDSTONE, fine-medium-grained; and one half is light gray (5Y 7/1) SILTY LIMESTONE.

Site 281 Hole A Core 1 Cored Interval: 0.0-9.5 m

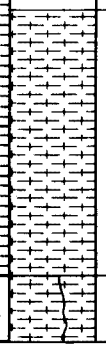
AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE PLEISTOCENE	C. pelagicus	N	A	G	1	0.5			12	Core is typically white (2.5Y 8/2), soft-stiff NANNO-BEARING FORAM OOZE grading into Sec. 1, 137-150 cm white (N9), soft-stiff FORAM-NANNO OOZE at 137 cm, Sec. 1. In Sec. 2 at 0-22 cm, 30-40 cm, and 120-130 cm - is white (N9), soft-stiff FORAM-NANNO OOZE. SS 2-12 / SS 2-75 OST - 5% / F -95% F -45% / N - 5% N -50% Grain Size 4-118 (76.0, 15.1, 9.0)
						1.0				
EARLY PLEISTOCENE	P. lacunosa				2				75	
	G. (G.) truncatulinoides	N	C	M						
					3					
		N	C	M						
					4					
		F D N S	A C	G M	Core Catcher					

Site 281 Hole A Core 2 Cored Interval: 26.5-36.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
		N	A	M[1]	Core Catcher					Core catcher contained a coarse-grained GRANITE pebble (6 x 5 cm) with coating of light red (5R 6/6) clay(?) and white (N9) nanno ooze(?).
		N	R	M[2]						

[1] From white nanno ooze
[2] From light red fine silt

Site 281 Hole A Core 3 Cored Interval: 36.0-45.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY PLIOCENE	G. (T.) puncticulata	F	A	G	1	0.5				Core is a white (N9), soft FORAM NANNO OOZE to a white (N9), soft NANNO FORAM OOZE in the core catcher. SS CC F -60% N -40% X-ray 2-120 (Bulk) Calc - M Quar - TR Grain Size 2-138 (25.5, 39.2, 35.3)
						1.0				
		F	A	G	2					
LATE MIOCENE	G. (G.) miozea conomiozea	F	A	G						
	R. pseudoumbilica	F D N S	A R A C	G P M	Core Catcher					

DEEP SEA DRILLING PROJECT

LEG 29 SITE 282

SITE SUMMARY SHEET

POSITION: Latitude: 42°14.76'S Longitude: 143°29.18'E

Water depth (from sea level): 4202 corrected meters (Echo sounding)

Bottom felt at: 4217 meters (drill pipe) Penetration: 310.5 meters

Number of Holes: 1 Number of Cores: 20

Total length of cored section: 167.5 meters Total core recovered: 63.7 m

Percentage of core recovery: 38%

OLDEST SEDIMENT CORED:

Depth below sea floor: 295 meters Nature: Clayey Siltstone (zeolite, volcanic ash-rich)

Age: Late Eocene

BASEMENT:

Depth below sea floor: 0.35 seconds (reflection time)

Depth below sea floor: 295 meters (drilled)

Average velocity to basement: 1.69 km/sec Nature: Basalt

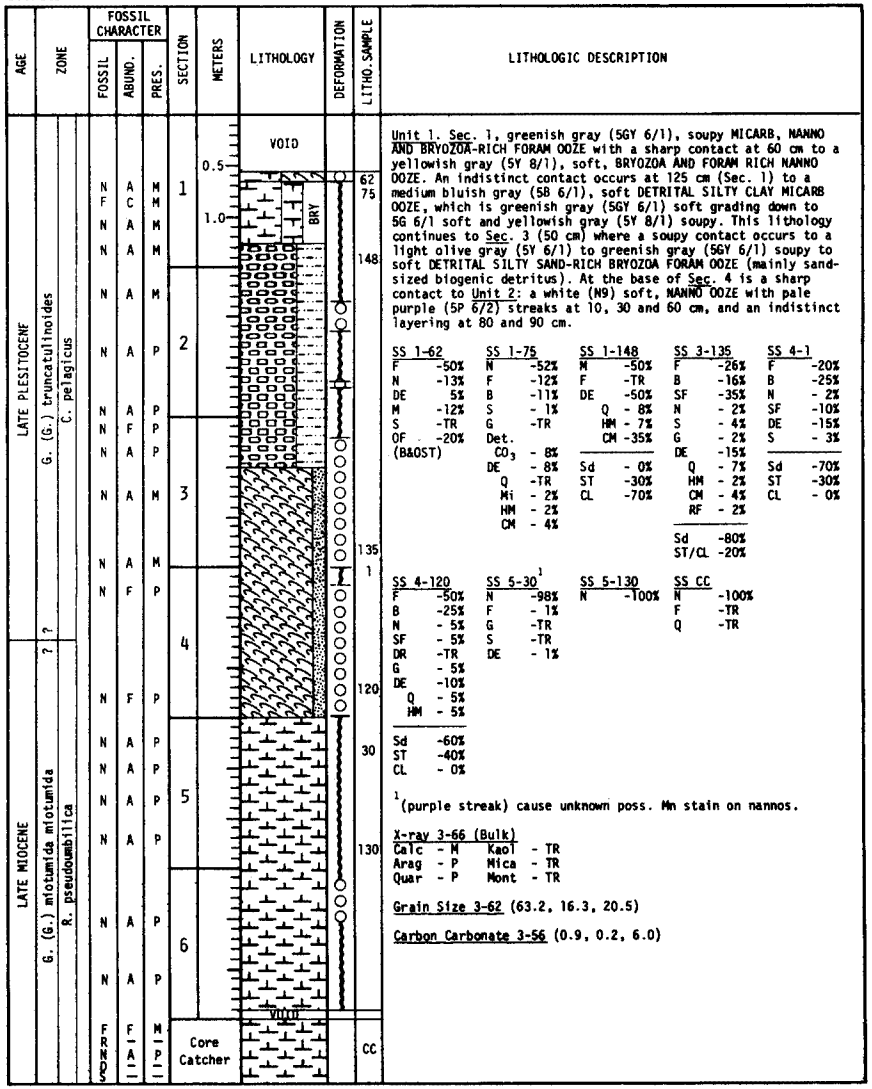
PRINCIPAL RESULTS:

Veneer 8 meters of Pleistocene nannofossil and foraminifera oozes disconformably underlain by 7 meters of nannofossil ooze of late Miocene age; in turn disconformably underlain by 42 meters of detrital-bearing nannofossil ooze of early Miocene age. This is also disconformably underlain by 59 meters of detrital clayey silt nannofossil ooze and nannofossil detrital sand-silt-clay of middle Oligocene to early Oligocene age. Conformably underlain by 103 meters of organic-rich nannofossil-bearing silty clay to clayey silt of late Eocene age immediately overlying pillow basalt. Drill site located in a magnetic quite zone. Drilled 15.5 meters of basalt and obtained 7 meters. Late Eocene sea floor here formed well after initial rifting. Basalt not unusual but mineralized with specks of native copper. Sediments not baked. As at Site 280 Paleogene mostly continuous sedimentation; Neogene highly condensed with unconformities. Detrital sediments in lower 130 meters similar

LEG 29 SITE 282
SITE SUMMARY SHEET, con't.

to 280 in character and indicates restricted circulation and terrigenous deposition within same basin during late Eocene-early Oligocene. Site 282 nearer Australian detrital source. Apparently much reworking from shallow-water throughout Cenozoic. Paleogene detrital to Neogene biogenic sedimentation reflects changing character of sedimentation in south Australia resulting from northward drift and assumed changing climatic regimes. Increasing biogenic deposition within Oligocene reflect more open ocean character. Active bottom currents initiated near Paleogene-Neogene boundary related to initiation of circumpolar current.

Site 282 Hole Core 1 Cored Interval: 0.0-9.0 m



Unit 1. Sec. 1, greenish gray (5GY 6/1), soupy MICARB, NANNO AND BRYOZOA-RICH FORAM OOZE with a sharp contact at 60 cm to a yellowish gray (5Y 8/1), soft, BRYOZOA AND FORAM RICH NANNO OOZE. An indistinct contact occurs at 125 cm (Sec. 1) to a medium bluish gray (5B 6/1), soft DETRITAL SILTY CLAY MICARB OOZE, which is greenish gray (5GY 6/1) soft grading down to 5G 6/1 soft and yellowish gray (5Y 8/1) soupy. This lithology continues to Sec. 3 (50 cm) where a soupy contact occurs to a light olive gray (5Y 6/1) to greenish gray (5GY 6/1) soupy to soft DETRITAL SILTY SAND-RICH BRYOZOA FORAM OOZE (mainly sand-sized biogenic detritus). At the base of Sec. 4 is a sharp contact to Unit 2: a white (N9) soft, NANNO OOZE with pale purple (5P 6/2) streaks at 10, 30 and 60 cm, and an indistinct layering at 80 and 90 cm.

SS 1-62
F -50%
N -13%
DE 5%
M -12%
S -TR
OF -20%
(B&OST)

SS 1-75
N -52%
F -12%
B -11%
S - 1%
G -TR
Det.
CO_3 - 8%
DE - 8%
Q -TR
Mi - 2%
HM - 2%
CM - 4%

SS 1-148
M -50%
F -TR
DE -50%
Q - 8%
HM - 7%
CM -35%
Sd - 0%
ST -30%
CL -70%

SS 3-135
F -26%
B -16%
SF -35%
N - 2%
S - 4%
G - 2%
DE -15%
Q - 7%
HM - 2%
CM - 4%
RF - 2%
Sd -80%
ST/CL -20%

SS 4-1
F -20%
B -25%
N - 2%
SF -10%
DE -15%
S - 3%
Sd -70%
ST -30%
CL - 0%

SS 4-120
F -50%
B -25%
N - 5%
SF - 5%
DR -TR
G - 5%
DE -10%
Q - 5%
HM - 5%
Sd -60%
ST -40%
CL - 0%

SS 5-30[1]
N -98%
F - 1%
G -TR
S -TR
DE - 1%

SS 5-130
N -100%

SS CC
N -100%
F -TR
Q -TR

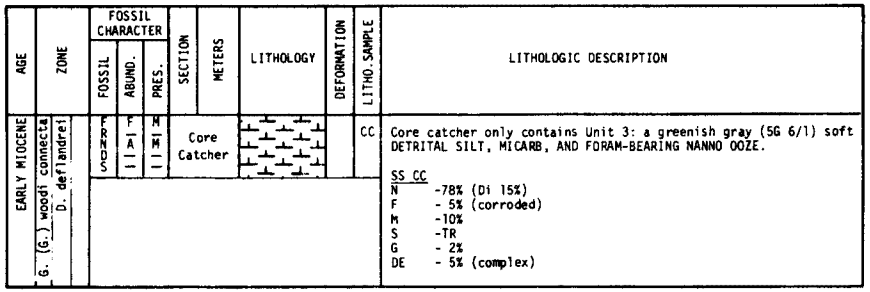
[1](purple streak) cause unknown poss. Mn stain on nannos.

X-ray 3-66 (Bulk)
Calc - M Kaol - TR
Arag - P Mica - TR
Quar - P Mont - TR

Grain Size 3-62 (63.2, 16.3, 20.5)

Carbon Carbonate 3-56 (0.9, 0.2, 6.0)

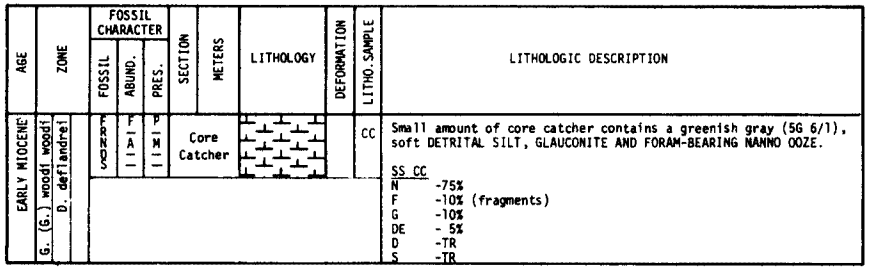
Site 282 Hole Core 2 Cored Interval: 9.0-18.5 m



Core catcher only contains Unit 3: a greenish gray (5G 6/1) soft DETRITAL SILT, MICARB, AND FORAM-BEARING NANNO OOZE.

SS CC
N -78% (Di 15%)
F - 5% (corroded)
M -10%
S -TR
G - 2%
DE - 5% (complex)

Site 282 Hole Core 3 Cored Interval: 18.5-28.0 m



Small amount of core catcher contains a greenish gray (5G 6/1), soft DETRITAL SILT, GLAUCONITE AND FORAM-BEARING NANNO OOZE.

SS CC
N -75%
F -10% (fragments)
G -10%
DE - 5%
D -TR
S -TR

Site 282 Hole Core 4 Cored Interval: 28.0-34.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
EARLY MIOCENE	G. (G.) woodi woodi D. deflandrei	N	A	M	1	0.5			120
		N	A	G		1.0			
		N	A	M	2				65
		N	A	G					
		N	A	M	3				
		N	A	M					
		N	A	M	4				
					5		VOID		
					6				
					Core Catcher				CC

Dominantly a greenish gray (5GY 6/1) stiff, GLAUCONITE-BEARING NANNO DETRITAL SILTY CLAY with color mottles of 5G 6/1, 5GY 8/1, and rarely 5Y 8/1; intensely to moderately mottled; some with sharp outlines, others with indistinct outlines. Core catcher consists of a greenish gray (5G 6/1) soft DETRITAL SILT, GLAUCONITE AND FORAM BEARING NANNO OOZE. (The carbonate content is probably over estimated).

SS 1-120		SS 2-65[1]		SS CC	
N	-53%	N	-65%	N	-80%
G	- 8%	M	-25%	F	- 5%
CM	-35%	G	- 1%	G	- 5%
DE	- 4%	DE	- 9%	DE	- 5%
HM	-TR	Q	- 2%	Q	
Q	- 4%	Mi	- 1%	Fd	
		CM	- 6%	HM	
		Sd	-10%		
		ST	-20%		
		CL	-70%		

[1] (dark green mottle) green color probably due to clay-sized glauconite.

X-ray 2-74 (Bulk)

Calc	- A	Mica	- P
Quar	- P	Mont	- P
Kaol	- P		

Grain Size 2-71 (0.2, 32.8, 67.0)

Carbon Carbonate 2-70 (4.1, 0.2, 32)

Site 282 Hole Core 5 Cored Interval: 53.5-56.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
EARLY MIOCENE	G. (G.) woodi woodi D. deflandrei	N	A	M	1	0.5	VOID		
						1.0			119
MID TO LATE OLIGOCENE	G. (G.) euapertura R. bisecta	N	A	G	2				18
		N	A	G					
		N	A	G					
		N	C	G	Core Catcher				*
		A	A	G					†
		F	A	M					
		A	A	M					

Greenish gray (5G 6/1), stiff to pale olive (2.5Y 6/4), stiff DETRITAL CLAY SILT-BEARING NANNO OOZE with interbedded color bands greenish gray (5G 6/1) and medium light gray (N6), stiff. Unit 4: (at Sec. 1, 135 cm) olive gray (5Y 4/1) to greenish gray (5GY 6/1), stiff, NANNO DETRITAL SILTY CLAY with vague color bands. Core catcher lithologies include: 0-5 cm of dark greenish gray (5GY 4/1), stiff SPONGE SPICULE RICH NANNO DETRITAL SILTY CLAY laminated, some burrows and at 5-17 cm a greenish gray (5G 6/1), stiff GLAUCONITE BEARING NANNO DETRITAL SILTY CLAY.

SS 1-119		SS 2-18		SS CC*		SS CC†	
N	-93%	N	-56%	N	-47%	N	-40%
G	- 1%	F	- 2%	F	- 7%	S	-TR
DE	- 6%	S	-TR	S	-12%	Fish Remains	-TR
Q	- 2%	MicroN	- 2%	MicroN	- 2%	G	-10%
Mi	- 1%	G	-TR	DE	-32%	DE	-50%
HM	- 2%	DE	-40%	Mi	- 1%	Q	-13%
CM	- 1%	Q	- 6%	CM	-10%	Fd	
		HM	-TR	CL/CAL aggr	-18%	Mi_1	- 3%
Sd	-10%	Mi	-TR	HM	- 3%	HM	
ST	-60%	CM	-34%	(inc. tour.)			
CL	-30%					Sd	- 1.0%
		Sd	- 5%	Sd	- 1.0%	ST	-43.0%
		ST	-10%	ST	-34.1%	CL	-56.0%
		CL	-85%	CL	-64.9%		

[1] Includes collophane, rutile, hornblende, and authigenic tourmaline.

X-ray 2-70 (Bulk)

Calc	- A	Plag	- TR
Arag	- P	Mica	- P
Quar	- P	Mont	- P
K-Fe	- TR	Pyri	- TR
Kaol	- P		

X-ray CC* (Bulk)

Calc	- A	Kaol	- P
Quar	- P	Mica	- P
K-Fe	- TR	Mont	- P
Plag	- TR	Pyri	- TR

X-ray CC† (Bulk)

Calc	- A	Kaol	- TR
Quar	- P	Mica	- P
K-Fe	- TR	Mont	- P
Plag	- TR		

Grain Size 2-40 (2.7, 49.2, 48.1)

Grain Size CC* (1.0, 43.0, 56.0)

Grain Size CC† (1.0, 34.1, 64.9)

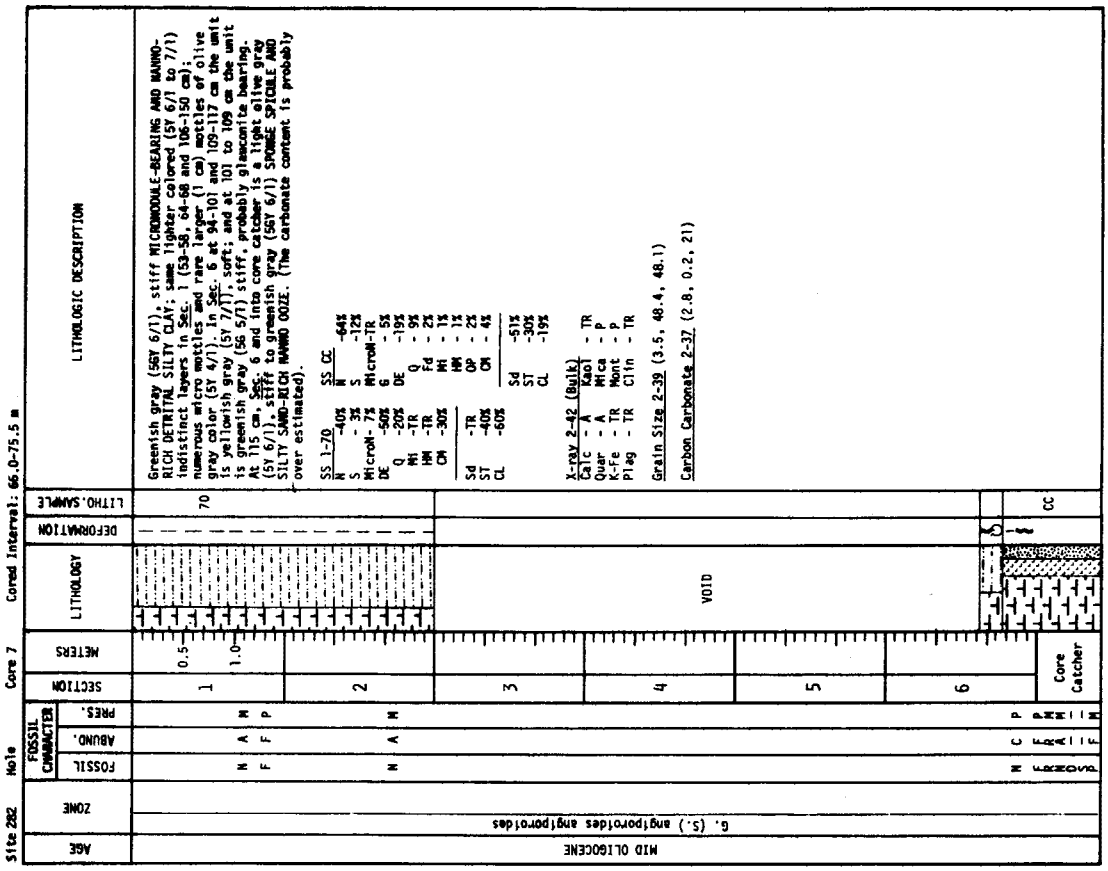
Carbon Carbonate 2-30 (3.3, 0.5, 23)

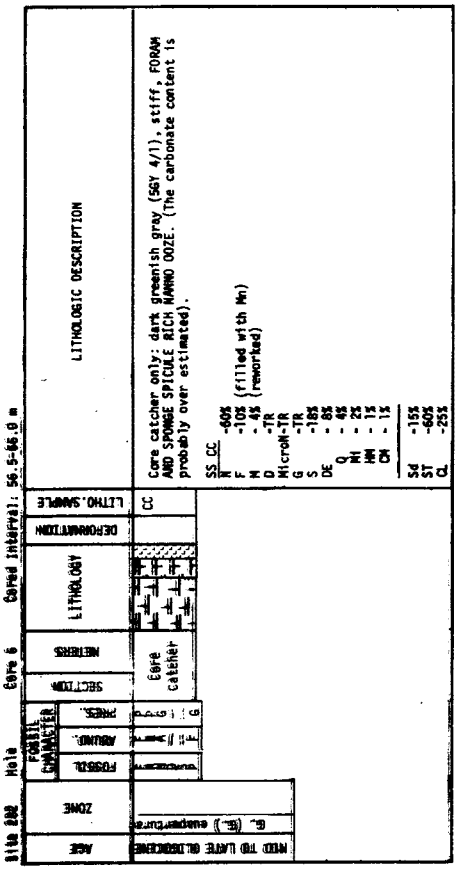
Carbon Carbonate CC* (4.4, 0.4, 33)

Carbon Carbonate CC† (3.3, 0.1, 26)

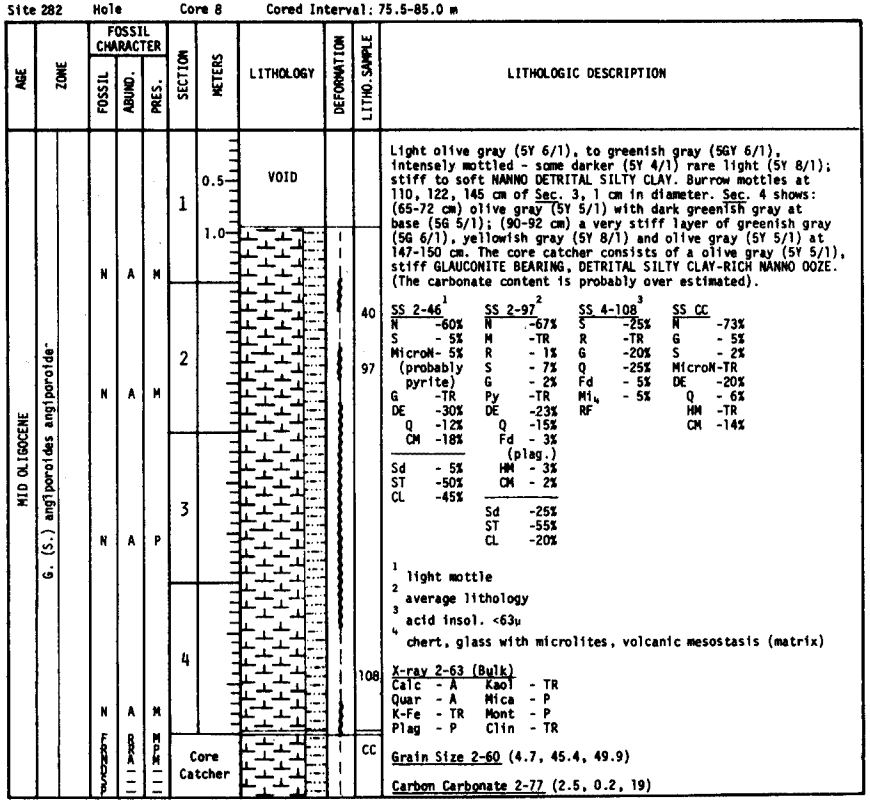
* Top of core catcher.

† Base of core catcher.


Site 282
Hole
Core 7
Cored Interval: 66.0-75.5 m
AGE
ZONE
FOSSIL CHARACTER
FOSSIL
ABUND.
PRES.
SECTION
METERS
LITHOLOGY
DEFORMATION
LITHO. SAMPLE
LITHOLOGIC DESCRIPTION
MID OLIGOCENE
6. (S.) angiporoides angiporoides
Greenish gray (5GY 6/1), stiff MICROMODULE-BEARING AND NANNO-RICH DETRITAL SILTY CLAY; same lighter colored (5Y 6/1 to 7/1) indistinct layers in Sec. 1 (53-58, 64-68 and 106-150 cm); numerous micro mottles and rare larger (1 cm) mottles of olive gray color (5Y 4/1). In Sec. 6 at 94-101 and 109-117 cm the unit is yellowish gray (5Y 7/1), soft; and at 101 to 109 cm the unit is greenish gray (5G 5/1) stiff, probably glauconite bearing. At 115 cm, Sec. 6 and into core catcher is a light olive gray (5Y 6/1), stiff to greenish gray (5GY 6/1) SPONGE SPICULE AND SILTY SAND-RICH NANNO OOZE. (The carbonate content is probably over estimated).
SS 1-70
N -40%
S - 35
MicroN- 7%
DE -50%
Q -20%
Mi -TR
HM -TR
CH -30%
Sd -TR
ST -40%
CL -60%
SS CC
N -64%
S -12%
MicroN-TR
G - 5%
DE -19%
Q - 9%
Fd - 2%
Mi - 1%
HM - 1%
CH - 4%
Sd -51%
ST -30%
CL -19%
X-ray 2-42 (Bulk)
Calc - A Kaol - TR
Quar - A Mica - P
K-Fe - TR Mont - P
Plag - TR Clin - TR
Grain Size 2-39 (3.5, 48.4, 48.1)
Carbon Carbonate 2-37 (2.8, 0.2, 21)
VOID
Core Catcher
CC


Site 282
Hole
Core 6
Cored Interval: 56.5-66.0 m
AGE
ZONE
FOSSIL CHARACTER
FOSSIL
ABUND.
PRES.
SECTION
METERS
LITHOLOGY
DEFORMATION
LITHO. SAMPLE
LITHOLOGIC DESCRIPTION
MID TO LATE OLIGOCENE
6. (S.) angiporoides
Core Catcher
Core catcher only: dark greenish gray (5GY 4/1), stiff, FORAM AND SPONGE SPICULE RICH NANNO OOZE. (The carbonate content is probably over estimated).
SS CC
N -60%
F -10% (filled with Mn)
M - 4% (reworked)
D -TR
MicroN-TR
G -TR
S -18%
DE - 8%
Q - 4%
Mi - 2%
HM - 1%
CH - 1%
Sd -15%
ST -60%
CL -25%
CC

Site 282 Hole Core 8 Cored Interval: 75.5-85.0 m



Light olive gray (5Y 6/1), to greenish gray (5GY 6/1), intensely mottled - some darker (5Y 4/1) rare light (5Y 8/1); stiff to soft NANNO DETRITAL SILTY CLAY. Burrow mottles at 110, 122, 145 cm of Sec. 3, 1 cm in diameter. Sec. 4 shows: (65-72 cm) olive gray (5Y 5/1) with dark greenish gray at base (5G 5/1); (90-92 cm) a very stiff layer of greenish gray (5G 6/1), yellowish gray (5Y 8/1) and olive gray (5Y 5/1) at 147-150 cm. The core catcher consists of a olive gray (5Y 5/1), stiff GLAUCONITE BEARING, DETRITAL SILTY CLAY-RICH NANNO OOZE. (The carbonate content is probably over estimated).

SS 2-46[1]

N	-60%
S	- 5%
MicroN- (probably pyrite)	5%
G	-TR
DE	-30%
Q	-12%
CM	-18%
Sd	- 5%
ST	-50%
CL	-45%

SS 2-97[2]

N	-67%
M	-TR
R	- 1%
S	- 7%
G	- 2%
Py	-TR
DE	-23%
Q	-15%
Fd (plag.)	- 3%
HM	- 3%
CM	- 2%
Sd	-25%
ST	-55%
CL	-20%

SS 4-108[3]

S	-25%
R	-TR
G	-20%
Q	-25%
Fd	- 5%
Mi[4]	- 5%
RF	

SS CC

N	-73%
G	- 5%
S	- 2%
MicroN	-TR
DE	-20%
Q	- 6%
HM	-TR
CM	-14%

[1] light mottle
[2] average lithology
[3] acid insol. <63μ
[4] chert, glass with microlites, volcanic mesostasis (matrix)

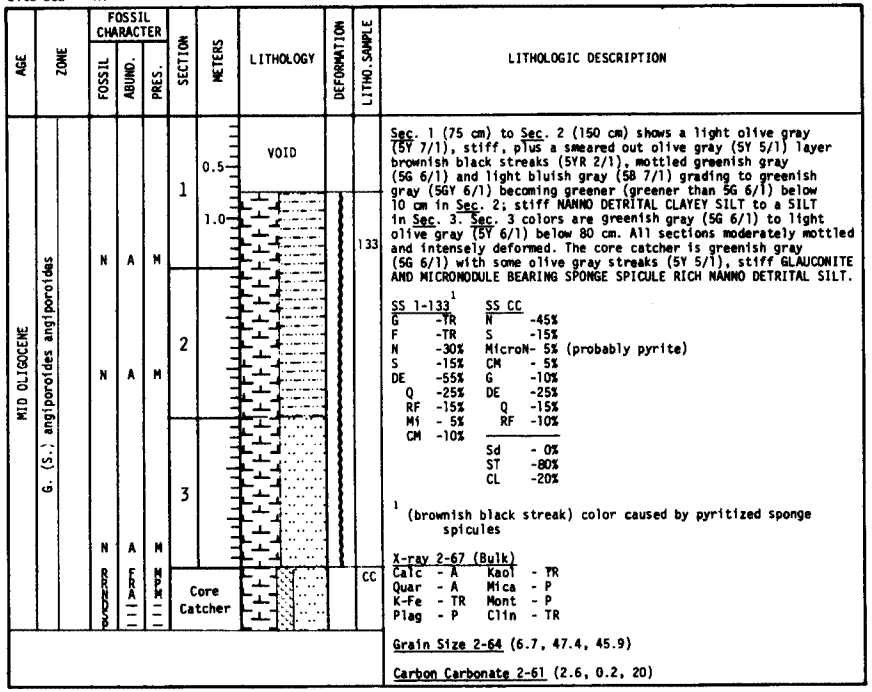
X-ray 2-63 (Bulk)

Calc	- A	Kaol	- TR
Quar	- A	Mica	- P
K-Fe	- TR	Mont	- P
Plag	- P	Clin	- TR

Grain Size 2-60 (4.7, 45.4, 49.9)

Carbon Carbonate 2-77 (2.5, 0.2, 19)

Site 282 Hole Core 9 Cored Interval: 85.0-94.5 m



Sec. 1 (75 cm) to Sec. 2 (150 cm) shows a light olive gray (5Y 7/1), stiff, plus a smeared out olive gray (5Y 5/1) layer brownish black streaks (5YR 2/1), mottled greenish gray (5G 6/1) and light bluish gray (5B 7/1) grading to greenish gray (5GY 6/1) becoming greener (greener than 5G 6/1) below 10 cm in Sec. 2; stiff NANNO DETRITAL CLAYEY SILT to a SILT in Sec. 3. Sec. 3 colors are greenish gray (5G 6/1) to light olive gray (5Y 6/1) below 80 cm. All sections moderately mottled and intensely deformed. The core catcher is greenish gray (5G 6/1) with some olive gray streaks (5Y 5/1), stiff GLAUCONITE AND MICROMODULE BEARING SPONGE SPICULE RICH NANNO DETRITAL SILT.

SS 1-133[1]

G	-TR
F	-TR
N	-30%
S	-15%
DE	-55%
Q	-25%
RF	-15%
Mi	- 5%
CM	-10%

SS CC

N	-45%
S	-15%
MicroN	- 5% (probably pyrite)
CM	- 5%
G	-10%
DE	-25%
Q	-15%
RF	-10%
Sd	- 0%
ST	-80%
CL	-20%

[1] (brownish black streak) color caused by pyritized sponge spicules

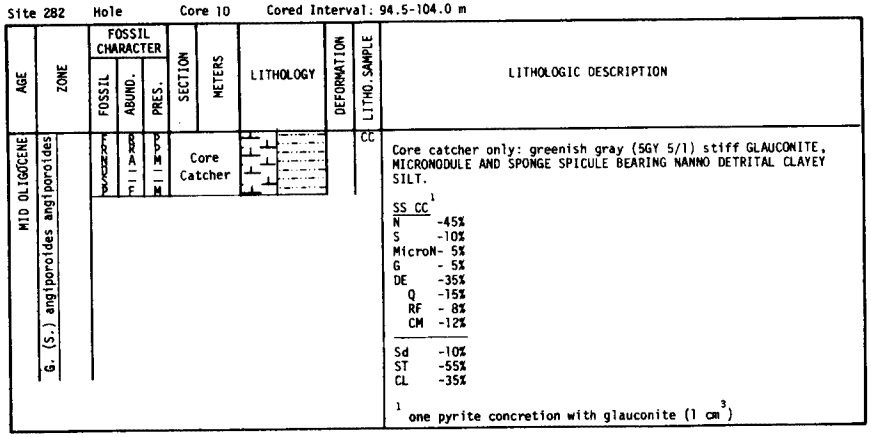
X-ray 2-67 (Bulk)

Calc	- A	Kaol	- TR
Quar	- A	Mica	- P
K-Fe	- TR	Mont	- P
Plag	- P	Clin	- TR

Grain Size 2-64 (6.7, 47.4, 45.9)

Carbon Carbonate 2-61 (2.6, 0.2, 20)

Site 282 Hole Core 10 Cored Interval: 94.5-104.0 m



LITHOLOGIC DESCRIPTION

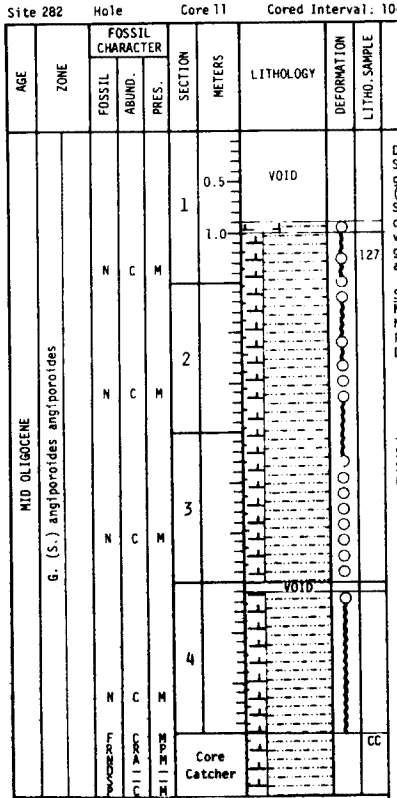
Core catcher only: greenish gray (5GY 5/1) stiff GLAUCONITE, MICRONODULE AND SPONGE SPICULE BEARING NANNO DETRITAL CLAYEY SILT.

SS CC[1]

N	-45%
S	-10%
MicroN-	5%
G	- 5%
DE	-35%
Q	-15%
RF	- 8%
CM	-12%
Sd	-10%
ST	-55%
CL	-35%

[1] one pyrite concretion with glauconite (1 cm^3)

Site 282 Hole Core 11 Cored Interval: 104.0-113.5 m



LITHOLOGIC DESCRIPTION

Drilling breccia. Greenish gray (5G 6/1), stiff. NANNO DETRITAL SILTY CLAY: at 100 cm Sec. 1 is contact to Unit 5: dark olive gray (5Y 3/1) to olive gray (5Y 4/1) with rare olive black (5Y 2/1) sandy mottles (oval, 1 cm across) NANNO-RICH DETRITAL SILTY CLAY. A few shell (bivalve?) fragments scattered throughout. Sec. 4 becomes dominantly olive gray (5Y 4/1), stiff and very intensely deformed and mottled. Core catcher: a dark olive gray (5Y 3/1), stiff NANNO RICH DETRITAL SILTY CLAY. [Includes a solitary coral (6 mm long) and bivalve fragments(?)]

SS 1-127[1]

MicroN-	7%
N	- 1%
R	- 1%
DE	-91%
Q	-55%
Fd	-13%
Mi	
HM	- 8%
CM	-15%
Sd	-65%
ST	-20%
CL	-15%

SS CC[2]

N	-30%
F	- 2%
(Mn filled)	
B	-TR
SF	- 1%
S	- 5%
MicroN-	2%
G	- 2%
DE	-58%
Q	-25%
Fd	-10%
Mi	- 5% (hornblende)
HM	
CM	-18%
Sd	-40%
ST	-30% very poor sorting
CL	-30%

SS CC[3]

S	-25%
G	-15%
Q	-35%
Fd	- 5% (incl. microcline)
Mi	- 5%
HM	- 5% (pyroxene, biotite)
RF	-15%

[1] (dark mottle) Abundant med. brown isotropic mineral and abundant organic stain.

[2] large detrital quartz with brown organic coatings

[3] Insol. residue

X-ray 4-54 (Bulk)

Calc	- P	Kaol	- P
Arag	- TR	Mica	- P
Quar	- A	Mont	- A
K-Fe	- TR	Clin	- TR
Plag	- TR	Pyri	- TR

X-ray CC (Bulk)

Calc	- P	Kaol	- P
Quar	- A	Mica	- P
K-Fe	- TR	Mont	- P
Plag	- TR	Pyri	- TR

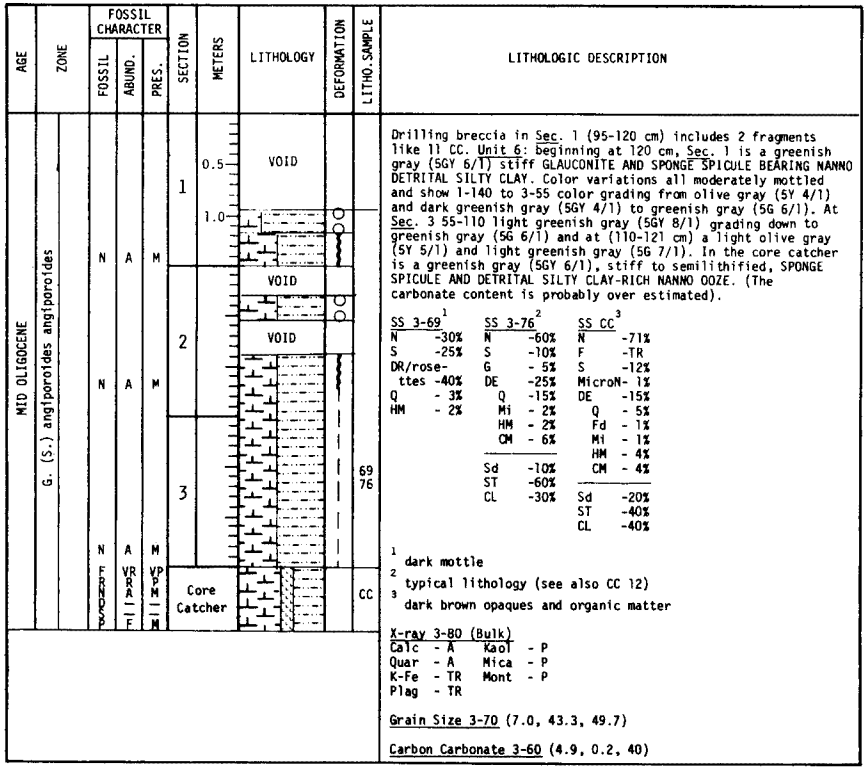
Grain Size 4-51 (6.7, 23.2, 70.0)

Grain Size CC (6.6, 32.9, 60.5)

Carbon Carbonate 4-45 (3.4, 2.4, 9)

Carbon Carbonate CC (3.7, 2.8, 7)

Site 282 Hole Core 12 Cored Interval: 113.5-123.0 m



Drilling breccia in Sec. 1 (95-120 cm) includes 2 fragments like 11 CC. Unit 6: beginning at 120 cm, Sec. 1 is a greenish gray (5GY 6/1) stiff GLAUCONITE AND SPONGE SPICULE BEARING NANNO DETRITAL SILTY CLAY. Color variations all moderately mottled and show 1-140 to 3-55 color grading from olive gray (5Y 4/1) and dark greenish gray (5GY 4/1) to greenish gray (5G 6/1). At Sec. 3 55-110 light greenish gray (5GY 8/1) grading down to greenish gray (5G 6/1) and at (110-121 cm) a light olive gray (5Y 5/1) and light greenish gray (5G 7/1). In the core catcher is a greenish gray (5GY 6/1), stiff to semilithified, SPONGE SPICULE AND DETRITAL SILTY CLAY-RICH NANNO OOZE. (The carbonate content is probably over estimated).

SS 3-69[1]

N	-30%
S	-25%
DR/rose-ttes	-40%
Q	- 3%
HM	- 2%

SS 3-76[2]

N	-60%
S	-10%
G	- 5%
DE	-25%
Q	-15%
Mi	- 2%
HM	- 2%
CM	- 6%
Sd	-10%
ST	-60%
CL	-30%

SS CC[3]

N	-71%
F	-TR
S	-12%
MicroN-	1%
DE	-15%
Q	- 5%
Fd	- 1%
Mi	- 1%
HM	- 4%
CM	- 4%
Sd	-20%
ST	-40%
CL	-40%

[1] dark mottle
[2] typical lithology (see also CC 12)
[3] dark brown opaques and organic matter

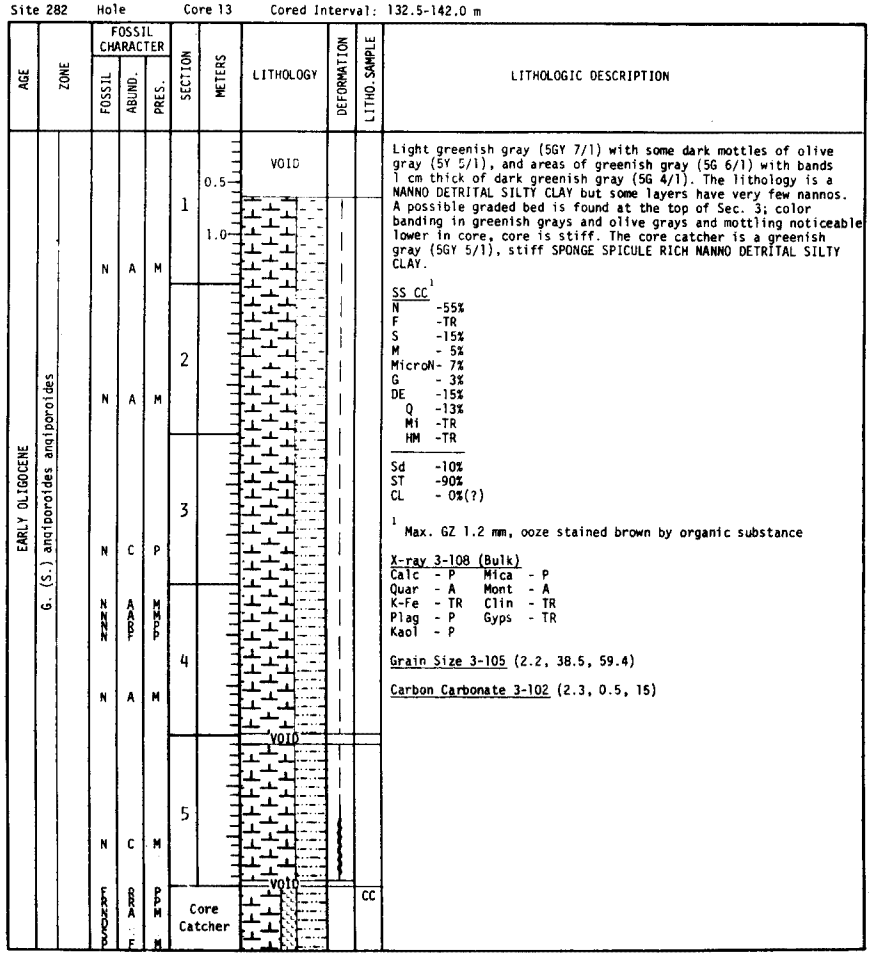
X-ray 3-80 (Bulk)

Calc	- A	Kaol	- P
Quar	- A	Mica	- P
K-Fe	- TR	Mont	- P
Plag	- TR		

Grain Size 3-70 (7.0, 43.3, 49.7)

Carbon Carbonate 3-60 (4.9, 0.2, 40)

Site 282 Hole Core 13 Cored Interval: 132.5-142.0 m



Light greenish gray (5GY 7/1) with some dark mottles of olive gray (5Y 5/1), and areas of greenish gray (5G 6/1) with bands 1 cm thick of dark greenish gray (5G 4/1). The lithology is a NANNO DETRITAL SILTY CLAY but some layers have very few nannos. A possible graded bed is found at the top of Sec. 3; color banding in greenish grays and olive grays and mottling noticeable lower in core, core is stiff. The core catcher is a greenish gray (5GY 5/1), stiff SPONGE SPICULE RICH NANNO DETRITAL SILTY CLAY.

SS CC[1]

N	-55%
F	-TR
S	-15%
M	- 5%
MicroN-	7%
G	- 3%
DE	-15%
Q	-13%
Mi	-TR
HM	-TR
Sd	-10%
ST	-90%
CL	- 0%(?)

[1] Max. GZ 1.2 mm, ooze stained brown by organic substance

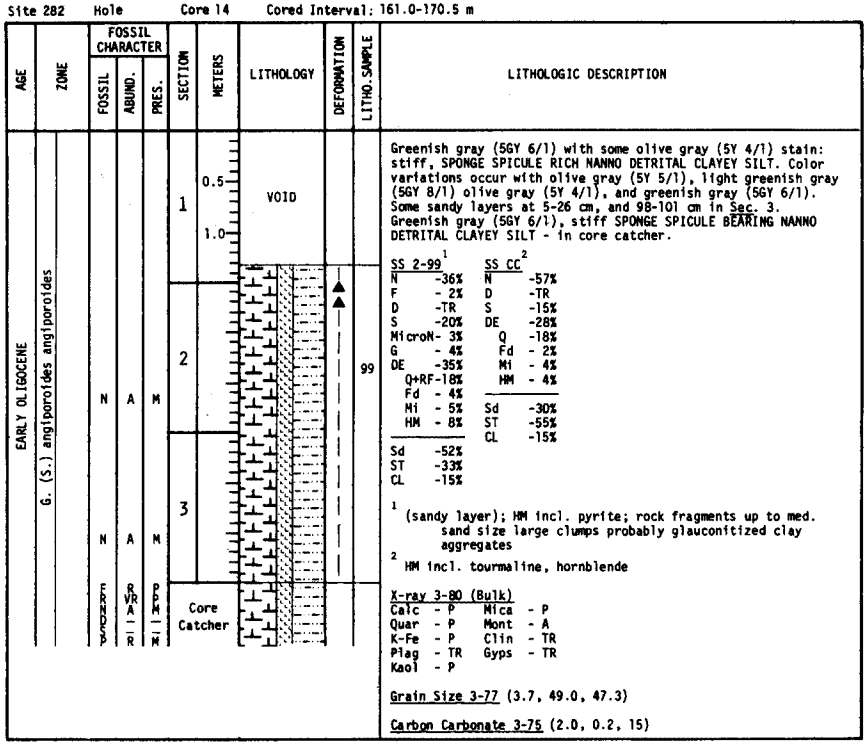
X-ray 3-108 (Bulk)

Calc	- P	Mica	- P
Quar	- A	Mont	- A
K-Fe	- TR	Clin	- TR
Plag	- P	Gyps	- TR
Kaol	- P		

Grain Size 3-105 (2.2, 38.5, 59.4)

Carbon Carbonate 3-102 (2.3, 0.5, 15)

Site 282 Hole Core 14 Cored Interval: 161.0-170.5 m



Greenish gray (5GY 6/1) with some olive gray (5Y 4/1) stain: stiff, SPONGE SPICULE RICH NANNO DETRITAL CLAYEY SILT. Color variations occur with olive gray (5Y 5/1), light greenish gray (5GY 8/1) olive gray (5Y 4/1), and greenish gray (5GY 6/1). Some sandy layers at 5-26 cm, and 98-101 cm in Sec. 3. Greenish gray (5GY 6/1), stiff SPONGE SPICULE BEARING NANNO DETRITAL CLAYEY SILT - in core catcher.

SS 2-99[1]		SS CC[2]	
N	-36%	N	-57%
F	- 2%	D	-TR
D	-TR	S	-15%
S	-20%	DE	-28%
MicroN-	3%	Q	-18%
G	- 4%	Fd	- 2%
DE	-35%	Mi	- 4%
Q+RF-	18%	HM	- 4%
Fd	- 4%		
Mi	- 5%	Sd	-30%
HM	- 8%	ST	-55%
		CL	-15%
Sd	-52%		
ST	-33%		
CL	-15%		

[1] (sandy layer); HM incl. pyrite; rock fragments up to med. sand size large clumps probably glauconitized clay aggregates

[2] HM incl. tourmaline, hornblende

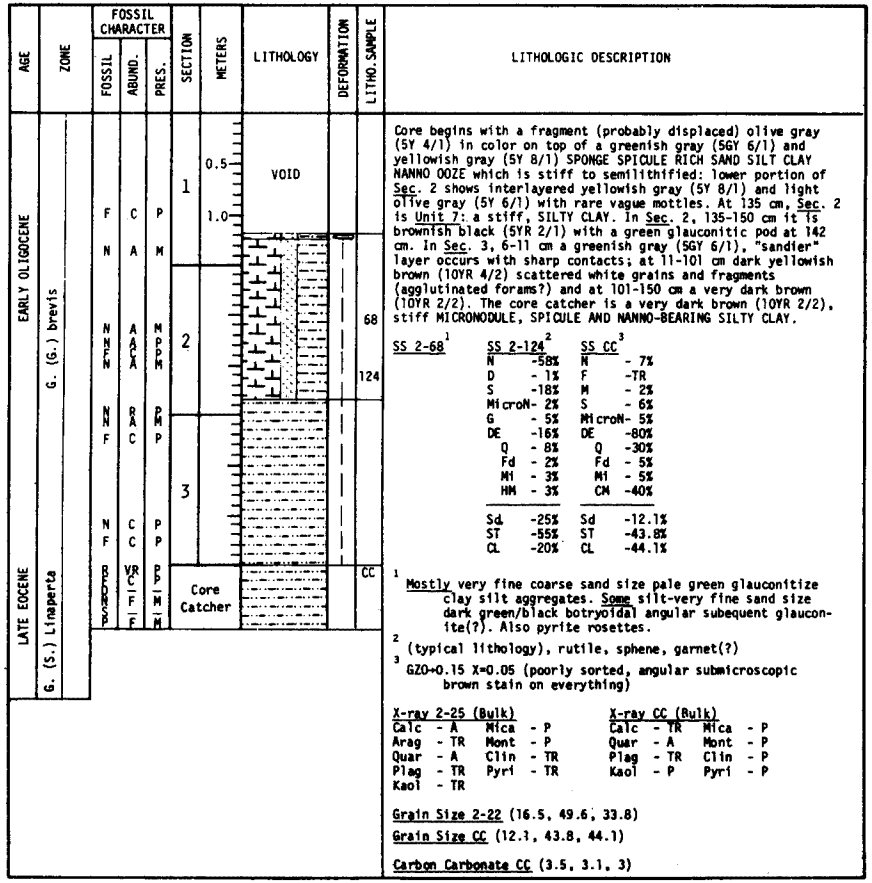
X-ray 3-80 (Bulk)

Calc	- P	Mica	- P
Quar	- P	Mont	- A
K-Fe	- P	Clin	- TR
Plag	- TR	Gyps	- TR
Kaol	- P		

Grain Size 3-77 (3.7, 49.0, 47.3)

Carbon Carbonate 3-75 (2.0, 0.2, 15)

Site 282 Hole Core 15 Cored Interval: 189.5-199.0 m



Core begins with a fragment (probably displaced) olive gray (5Y 4/1) in color on top of a greenish gray (5GY 6/1) and yellowish gray (5Y 8/1) SPONGE SPICULE RICH SAND SILT CLAY NANNO OOZE which is stiff to semilithified: lower portion of Sec. 2 shows interlayered yellowish gray (5Y 8/1) and light olive gray (5Y 6/1) with rare vague mottles. At 135 cm, Sec. 2 is Unit 7: a stiff, SILTY CLAY. In Sec. 2, 135-150 cm it is brownish black (5YR 2/1) with a green glauconitic pod at 142 cm. In Sec. 3, 6-11 cm a greenish gray (5GY 6/1), "sandier" layer occurs with sharp contacts; at 11-101 cm dark yellowish brown (10YR 4/2) scattered white grains and fragments (agglutinated forams?) and at 101-150 cm a very dark brown (10YR 2/2). The core catcher is a very dark brown (10YR 2/2), stiff MICRONODULE, SPICULE AND NANNO-BEARING SILTY CLAY.

SS 2-68[1]		SS 2-124[2]		SS CC[3]	
		N	-58%	N	- 7%
		D	- 1%	F	-TR
		S	-18%	M	- 2%
		MicroN-	2%	S	- 6%
		G	- 5%	MicroN-	5%
		DE	-16%	DE	-80%
		Q	- 8%	Q	-30%
		Fd	- 2%	Fd	- 5%
		Mi	- 3%	Mi	- 5%
		HM	- 3%	CM	-40%
Sd	-25%	Sd	-25%	Sd	-12.1%
ST	-55%	ST	-55%	ST	-43.8%
CL	-20%	CL	-20%	CL	-44.1%

[1] Mostly very fine coarse sand size pale green glauconitize clay silt aggregates. Some silt-very fine sand size dark green/black botryoidal angular subequent glauconite(?). Also pyrite rosettes.

[2] (typical lithology), rutile, sphene, garnet(?)

[3] GZO-0.15 X=0.05 (poorly sorted, angular submicroscopic brown stain on everything)

X-ray 2-25 (Bulk)

Calc	- A	Mica	- P
Arag	- TR	Mont	- P
Quar	- A	Clin	- TR
Plag	- TR	Pyri	- TR
Kaol	- TR		

X-ray CC (Bulk)

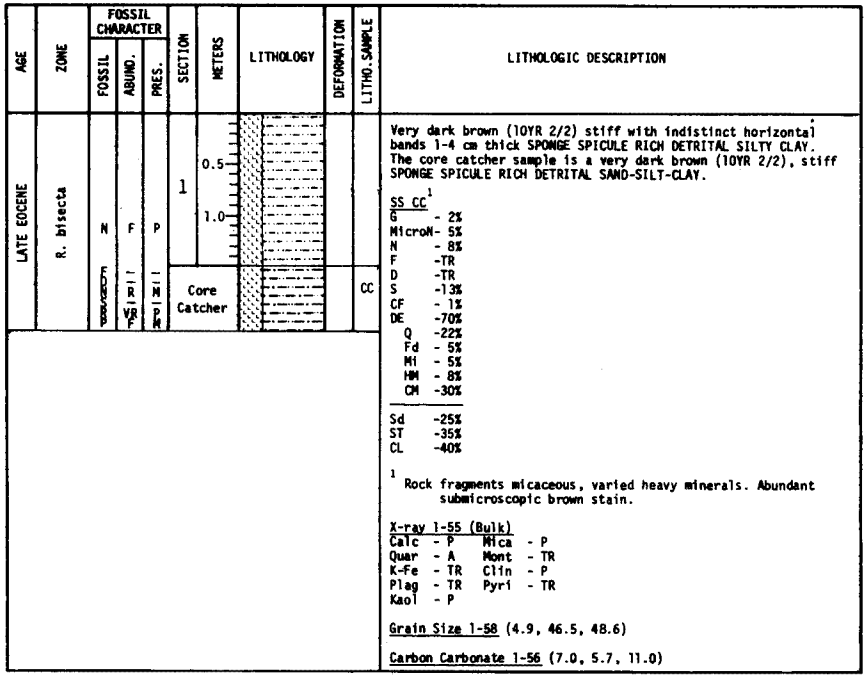
Calc	- TR	Mica	- P
Quar	- A	Mont	- P
Plag	- TR	Clin	- P
Kaol	- P	Pyri	- P

Grain Size 2-22 (16.5, 49.6, 33.8)

Grain Size CC (12.1, 43.8, 44.1)

Carbon Carbonate CC (3.5, 3.1, 3)

Site 282 Hole Core 16 Cored Interval: 218.0-227.5 m



Very dark brown (10YR 2/2) stiff with indistinct horizontal bands 1-4 cm thick SPONGE SPICULE RICH DETRITAL SILTY CLAY. The core catcher sample is a very dark brown (10YR 2/2), stiff SPONGE SPICULE RICH DETRITAL SAND-SILT-CLAY.

SS CC[1]

G	- 2%
MicroN	- 5%
N	- 8%
F	-TR
D	-TR
S	-13%
CF	- 1%
DE	-70%
Q	-22%
Fd	- 5%
Mi	- 5%
HM	- 8%
CM	-30%
Sd	-25%
ST	-35%
CL	-40%

[1] Rock fragments micaceous, varied heavy minerals. Abundant submicroscopic brown stain.

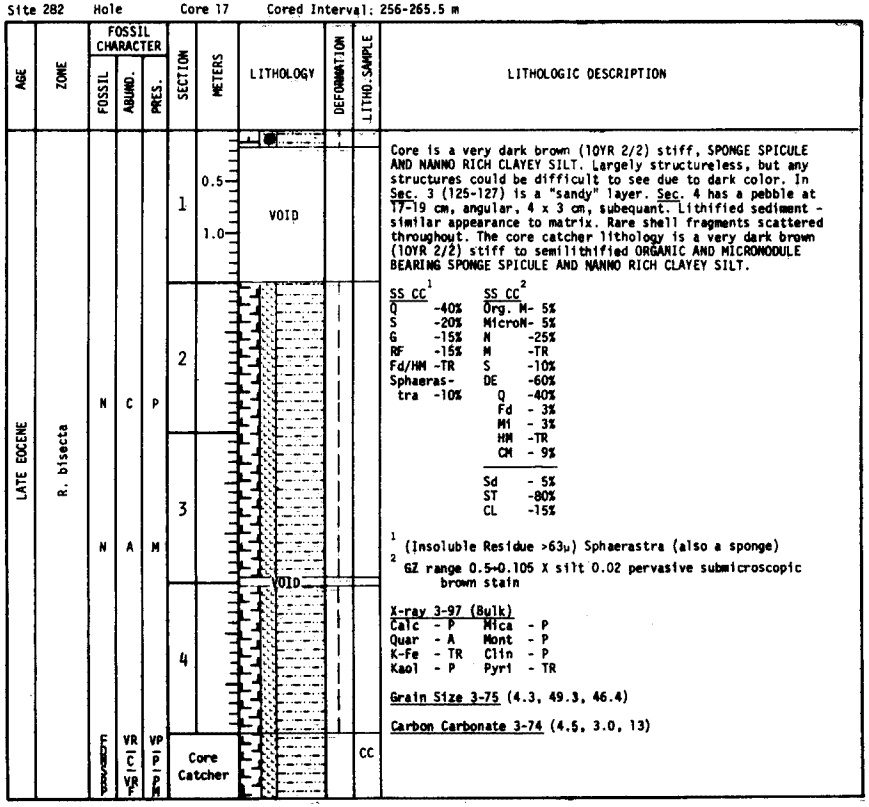
X-ray 1-55 (Bulk)

Calc	- P	Mica	- P
Quar	- A	Mont	- TR
K-Fe	- TR	Clin	- P
Plag	- TR	Pyri	- TR
Kaol	- P		

Grain Size 1-58 (4.9, 46.5, 48.6)

Carbon Carbonate 1-56 (7.0, 5.7, 11.0)

Site 282 Hole Core 17 Cored Interval: 256-265.5 m



Core is a very dark brown (10YR 2/2) stiff, SPONGE SPICULE AND NANNO RICH CLAYEY SILT. Largely structureless, but any structures could be difficult to see due to dark color. In Sec. 3 (125-127) is a "sandy" layer. Sec. 4 has a pebble at 17-19 cm, angular, 4 x 3 cm, subequant. Lithified sediment - similar appearance to matrix. Rare shell fragments scattered throughout. The core catcher lithology is a very dark brown (10YR 2/2) stiff to semilithified ORGANIC AND MICROMODULE BEARING SPONGE SPICULE AND NANNO RICH CLAYEY SILT.

SS CC[1]

Q	-40%
S	-20%
G	-15%
RF	-15%
Fd/HM	-TR
Sphaeras-tra	-10%

SS CC[2]

Org. M	- 5%
MicroN	- 5%
N	-25%
M	-TR
S	-10%
DE	-60%
Q	-40%
Fd	- 3%
Mi	- 3%
HM	-TR
CM	- 9%
Sd	- 5%
ST	-80%
CL	-15%

[1] (Insoluble Residue >63μ) Sphaerastra (also a sponge)

[2] GZ range 0.5-0.105 X silt 0.02 pervasive submicroscopic brown stain

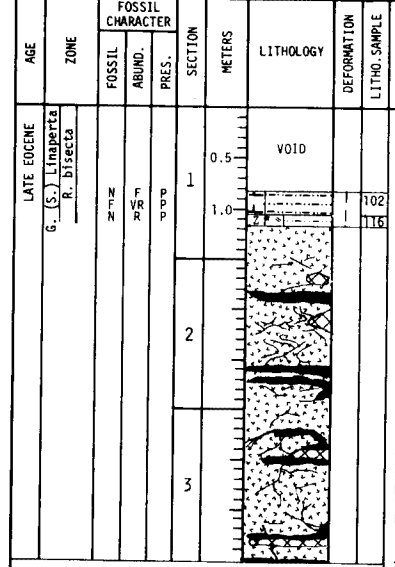
X-ray 3-97 (Bulk)

Calc	- P	Mica	- P
Quar	- A	Mont	- P
K-Fe	- TR	Clin	- P
Kaol	- P	Pyri	- TR

Grain Size 3-75 (4.3, 49.3, 46.4)

Carbon Carbonate 3-74 (4.5, 3.0, 13)

Site 282 Hole Core 18 Cored Interval: 294.0-298.0 m



Core, from 72-105 cm is a very dark brown (10YR 2/2). Dark yellowish brown (10YR 4/2) semilithified NANNO RICH DETRITAL CLAYEY SILTSTONE. At 105 cm a very dark brown (10YR 2/2) becoming paler upwards. ZEOLITE AND VOLCANIC GLASS RICH DETRITAL CLAYEY SILTSTONE. Unit 8: BASALT (basement) intensely weathered but still showing original texture. The basalt also contains: saccharoidal carbonate with lithic fragments; carbonate rock with pyrite with secondary carbonate in geode; black (N2) to greenish black (5G 2/1) glass; 1 mm thick veins of a pale green mineral (steatite?). Glass rinds up to 1 cm in thickness; carbonate (calcite) with sedimentary inclusions and polygonal dolomite(?); a saccharoidal carbonate at 130 cm, Sec. 3 which is probably a baked sediment, white (N9) with small spherical bodies (rads?); and specks of native copper in calcite veins. In the upper 1.5 m, the basalt changes in color from greenish gray (5G 8/2) and (5GY 7/2), and light bluish gray (5B 7/1) on internal surfaces downward to light olive gray (5Y 5/1) and (5GY 5/1). In Sec. 3 it becomes increasingly darker until it is olive black (5Y 2/1): calcite veins filling hairline fractures to cracks 2 mm thick are present throughout. Petrographic description with Core 20.

SS 1-102[1]		SS 1-116	
N	-35%	VG	-20%
S	- 5%	Paly	-10%
MicroN-	7%	I	-15%
VG	- 5%	MicroN-	2%
DE	-48%	S	-TR
Q	-27%	N	-TR
CM	-21%	DE	-52%
		Q	-33%
Sd	-10%	Fd	- 5%
ST	-55%	Mi	-10%
CL	-35%	HM	- 4% (euhedral tourmaline)
		Sd	-15%
		ST	-60%
		CL	-25%

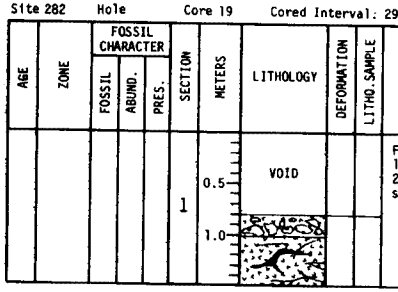
[1] deeply brown stained

X-ray 1-108 (Bulk)

Calc	- P	Mica	- P
Quar	- A	Mont	- P
K-Fe	- TR	Clin	- P
Plag	- TR	Pyri	- TR
Kaol	- P		

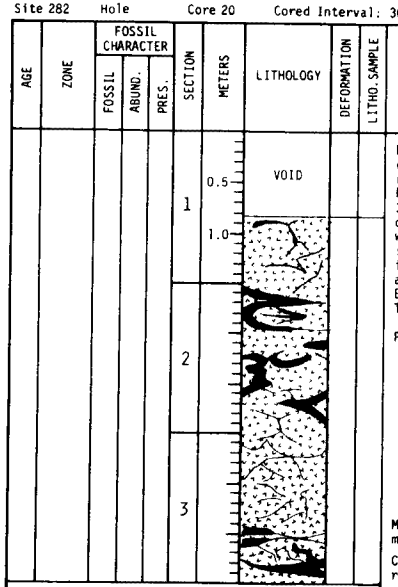
Carbon Carbonate 1-105 (4.2, 2.9, 11)

Site 282 Hole Core 19 Cored Interval: 298.0-307.0 m



Fragments of basalt with calcite veins (70 to 100 cm): at 100 cm BASALT with calcite veins, pyroxene phenocrysts up to 2 mm diameter. Petrographic description found with Core 20 summary form.

Site 282 Hole Core 20 Cored Interval: 307.0-310.5 m



PILLOW BASALT. The pillow basalt shows the following characteristics: Black glass rinds and basalt pillows with radial fractures filled with calcite; greenish gray (5GY 5/1) baked carbonate sediment and numerous calcite veins up to 3 mm thick. Most veins thin out - suggesting a contraction origin within basalt pillow; greenish gray baked sediment with some adhering black glass and glass rinds almost enclosing some baked sediment; a large (10 x 6 mm) phenocyrst of plagioclase at 100 cm in Sec. 3 and greenish black glass rinds and glass. Thin section 20.1-146-149. Petrographic description: EXTRUSIVE PILLOW BASALT.

Texture: Fine grained, hypocrystalline to holocrystalline, subophitic with subradiating plagioclase laths.

Phenocrysts: Rare (1-2% of whole rock) and average 0.5 mm in diameter. Consist of 90% equant pyroxene and 10% subequent plagioclase.

Plagioclase 55% - zoned, some with pyroxene cores
Pyroxene 33% - in shealthlike aggregates of fine-grained prismatic crystals (altered?).
Fe-Oxides 7%
Chlorite 5%
Olivine(?) Trace
Calcite, chlorite, limonite alteration products.

Most plagioclase laths are 0.2 to 1.0 mm long and 0.03 to 0.06 mm thick. They have a composition of $\sim An_{50}$.

Chlorite is interstitial (possibly after glass) and also fills rare vesicles (0.8 mm diameter).

Fe-Oxides are scattered throughout matrix and within the pyroxene.

DEEP SEA DRILLING PROJECT

LEG 29 SITE 283

SITE SUMMARY SHEET

POSITION: Latitude: 43°54.60'S Longitude: 154°16.96'E

Water depth (from sea level): 4729 corrected meters (Echo sounding)

Bottom felt at: 4766 meters (drill pipe) Penetration: 283 - 592 m
283A - 20 m

Number of Holes: 2 Number of Cores: 283 - 19; 283A - 2

Total length of cored section: 283 - 156.0 m; 283A - 11.0 m

Percentage of core recovery: 283 - 39.0%; 283A - 92.0%

OLDEST SEDIMENT CORED:

Depth below sea floor: 588.5 meters Nature: Silty clay-silty claystone

Age: Paleocene

BASEMENT:

Depth below sea floor: 588.5 meters (drilled) Nature: Altered basalt

PRINCIPAL RESULTS:

12.9 meters of fossiliferous Pleistocene zeolite clay abruptly underlain by 3 meters unfossiliferous zeolite clay, separated by major unconformity from 164 meters of late Eocene diatom ooze with calcareous nannofossils underlain by 225 meters of silty clay of Eocene age underlain by 283 meters of poorly fossiliferous silty clay and silty pyritic claystone of Paleocene age underlain by highly altered basalt. Sedimentary sequence represents abyssal sedimentation below or close to calcium carbonate compensation depth with poor biogenic record. Significant fine detrital influence. Major disconformity near surface represents non-deposition surface on very soft late Eocene. Thus lack of Oligocene and Neogene due to persistent bottom currents in central Tasman Sea genetically related to both Leg 21 Oligocene regional unconformity and circumpolar Neogene unconformity. Giant surface ripples probably on late Eocene surface.

Site 283 Hole Core 1 Cored Interval: 0.0-0.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE PLIOCENE TO MID PLEISTOCENE	P. lacunosa	F D S N	R C	P P	Core Catcher				CC	Unit 1A for Site 283 is predominantly a moderate yellowish brown (10YR 5/4), soft, SILTY ZEOLITE CLAY. Core catcher sample in this core is a moderate yellowish brown (10YR 5/4) soft ZEOLITE, IRON MINERAL, SILTY AND CLAY-BEARING, FORAM-RICH NANNO OOZE.

SS CC

Q	- 8%
CM	-10%
VG	- 1%
IM	- 5%
MicroN	- 1%
Z	- 8%
F	-15%
N	-49%
D	- 2%
S	- 1%

Site 283 Hole Core 2 Cored Interval: 10.0-19.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE EOCENE / NEOGENE (?MIOCENE)		N N N N N N N N N N F D S P N	— — — — — R — — — — A F A —	— — — — — P — — — — M-G M G	1 2 3 4 Core Catcher	0.5 1.0	VOID VOID Mn		45 120 145 CC	Core to 135 cm, Sec. 2 is a yellowish brown (10YR 5/2) MICRONODULE AND DETRITAL SAND SILTY CLAY ZEOLITE OOZE; with moderate lighter (10YR 6/4) and darker (10YR 4/2) yellowish brown mottling. Unit 1B begins with a sharp contact, with clast of Sec. 3 lithology in Sec. 2. The lithology is MICA, MICARB AND GLASS BEARING QUARTZ SILT ZEOLITE OOZE; it is very pale yellowish-brown (10YR 7/2); faintly stratified, slightly mottled. The unit is distinguished from 1A by pale color and subhomogeneous appearance. The contact suggests a disconformity. Another contact occurs in the core catcher: where Unit 1B is found overlying Unit 2 (described in Core 3); deformed contact is very sharp and suggests disconformity. The core catcher lithology is a SILT, MICRONODULE AND SPICULE BEARING CLAY ZEOLITE OOZE.

SS 1-45		SS 2-120		SS 2-145		SS CC (light)	
Q	-10%	Q	- 8%	Q	-30%	Q	- 7%
F	- 2%	F	- 1%	Mi	- 5%	F	- 1%
Mi	- 1%	CM	-40%	VG	- 5%	M	- 1%
HM	- 2%	MicroN	- 4%	M	- 5%	HM	- 1%
CM	-37%	Z	-45%	Z	-55%	CM	-44%
MicroN	- 3%					MicroN	- 3%
Z	-45%					Z	-40%
						S	- 3%

X-ray 2-25 (Bulk)

Quar	- A	Mica	- A
K-Fe	- P	Mont	- P
Plag	- P	Clin	- TR
Kaol	- P	Gyps	- TR

Grain Size 2-22 (2.5, 25.6, 71.9)

Carbon Carbonate 2-20 (0.5, 0.1, 4)

Carbon Carbonate 3-47 (0.2, 0.1, 1)

CC
UNIT 2

Site 283 Hole Core 3 Cored Interval: 29.0-38.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE EOCENE		P N F D S N	A — — A F	G — — M M	Core Catcher 1	1.0			CC	Unit 2 is a dark greenish gray (5GY 4/1), very soft SPICULE-BEARING DETRITAL SILT-RICH DIATOM OOZE.

SS CC

Q	-20%
F	- 2%
Mi	- 3%
VG	- 1%
D	-63%
S	-10%
SI	- 1%

Site 283 Hole Core 4 Cored Interval: 57.5-67.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE EOCENE		F D S P N	— A F A R	M-G M G P	Core Catcher				CC	Core catcher is a dark greenish gray (5GY 4/1), semi-stiff, CLAY, RADIOLARIAN AND SPICULE BEARING DETRITAL SILT-RICH DIATOM OOZE.

SS CC

Q	-15%
CM	- 5%
D	-60%
R	-10%
S	-10%

*Benthonic foraminifera

Site 283 Hole Core 5 Cored Interval: 86.0-95.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE EOCENE		N N N N F D S N	— — — R A F R —	— — — P M M P	1 2 Core Catcher	0.5 1.0	VOID VOID		8 CC	Core shows two lithologic variations: a SILICOFLAGELLATE, RADIOLARIAN, DETRITAL SAND AND SILT, SPICULE AND ZEOLITE BEARING DIATOM OOZE, stiff and semi-stiff with moderate mottling in Secs. 1 and 2, to a DETRITAL CLAY AND SILT, SILICOFLAGELLATE AND SPICULE-BEARING RADIOLARIAN-RICH DIATOM OOZE in the core catcher.

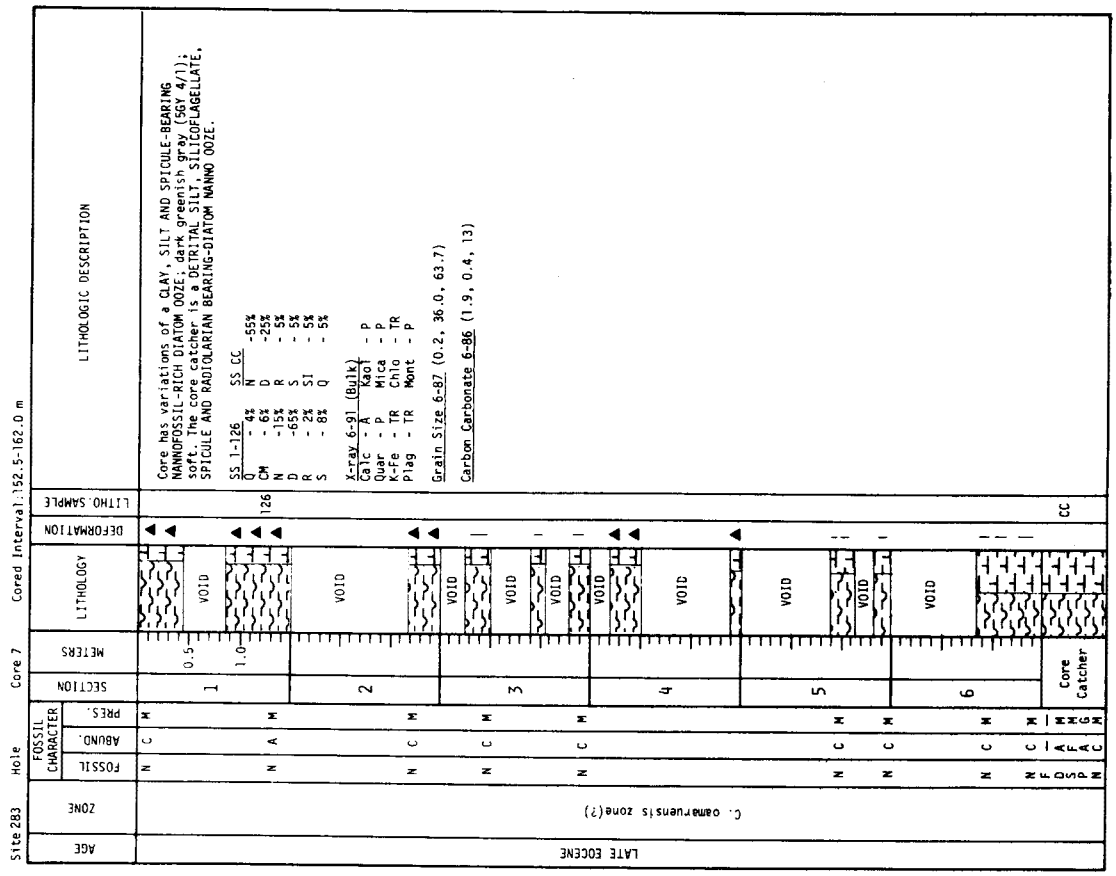
SS 1-8		SS CC	
Q	- 5%	Q	- 5%
CM	- 5%	CM	- 5%
G	- 1%	D	-60%
Z	-10%	R	-15%
D	-49%	S	-10%
R	- 5%	SI	- 5%
S	- 8%		
SI	- 4%		

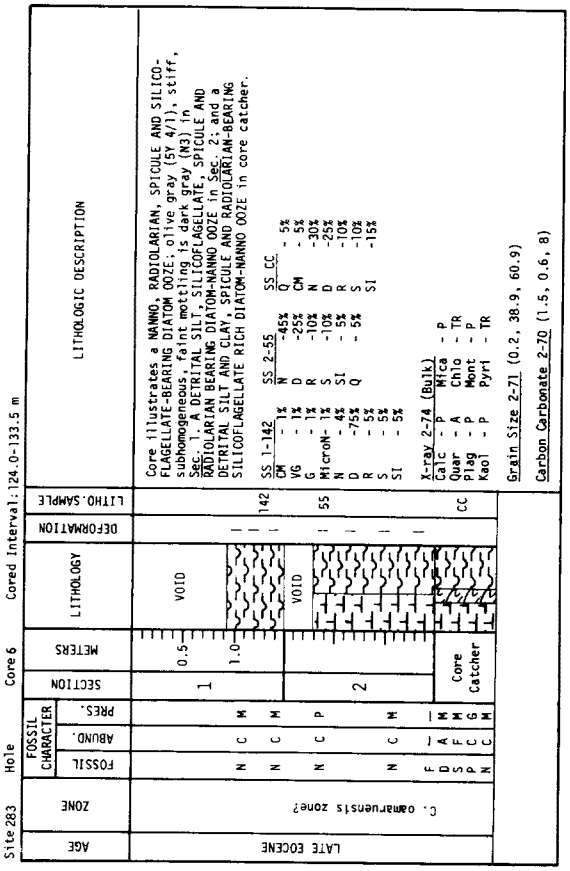
X-ray 2-98 (Bulk)

Quar	- A	Mica	- P
K-Fe	- TR	Mont	- A
Plag	- TR	Pyri	- TR
Kaol	- P	Gyps	- TR

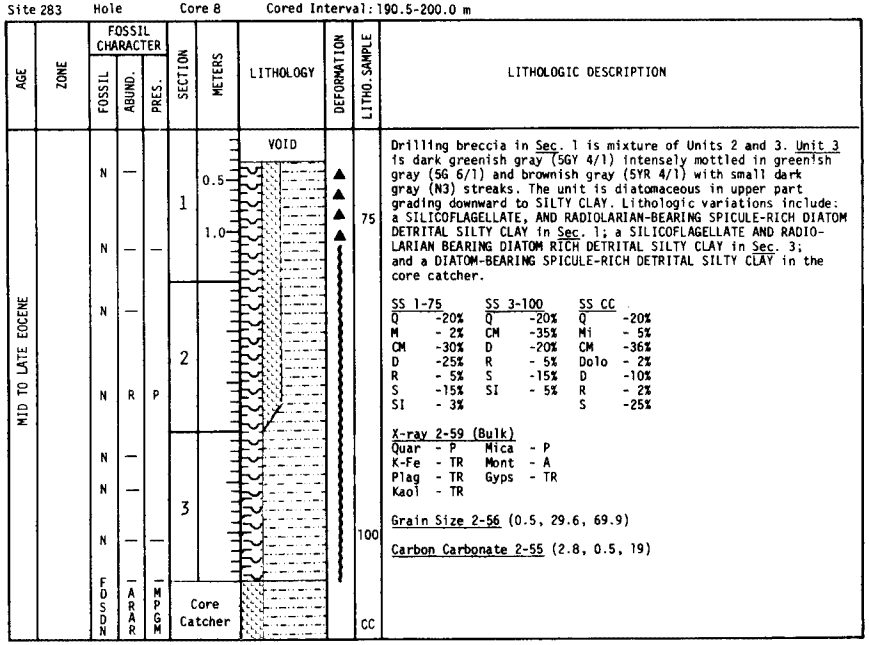
Grain Size 2-95 (0.6, 35.7, 63.7)

Carbon Carbonate 2-93 (4.5, 0.8, 31)


Site 283
Hole
Core 7
Cored Interval: 152.5-162.0 m
AGE
ZONE
FOSSIL CHARACTER
FOSSIL
ABUND.
PRES.
SECTION
METERS
LITHOLOGY
DEFORMATION
LITHO. SAMPLE
LITHOLOGIC DESCRIPTION
LATE EOCENE
C. oamaruensis zone(?)
Core has variations of a CLAY, SILT AND SPICULE-BEARING NANNOFOSSIL-RICH DIATOM OOZE; dark greenish gray (5GY 4/1); soft. The core catcher is a DETRITAL SILT, SILICOFLAGELLATE, SPICULE AND RADIOLARIAN BEARING-DIATOM NANNO OOZE.
SS 1-126
CM - 4%
VG - 6%
N - 15%
D - 65%
R - 2%
S - 8%
SS CC
N - 55%
D - 25%
R - 5%
S - 5%
SI - 5%
X-ray 6-91 (Bulk)
Calc - A
Quar - P
K-Fe - TR
Plag - TR
Kaol - P
Mica - P
Chlo - TR
Mont - P
Grain Size 6-87 (0.2, 36.0, 63.7)
Carbon Carbonate 6-86 (1.9, 0.4, 13)
VOID
Core Catcher
CC


Site 283
Hole
Core 6
Cored Interval: 124.0-133.5 m
AGE
ZONE
FOSSIL CHARACTER
FOSSIL
ABUND.
PRES.
SECTION
METERS
LITHOLOGY
DEFORMATION
LITHO. SAMPLE
LITHOLOGIC DESCRIPTION
LATE EOCENE
C. oamaruensis zone?
Core illustrates a NANNO, RADIOLARIAN, SPICULE AND SILICOFLAGELLATE-BEARING DIATOM OOZE; olive gray (5Y 4/1), stiff, subhomogeneous, faint mottling is dark gray (N3) in Sec. 1. A DETRITAL SILT, SILICOFLAGELLATE, SPICULE AND RADIOLARIAN BEARING DIATOM-NANNO OOZE in Sec. 2; and a DETRITAL SILT AND CLAY, SPICULE AND RADIOLARIAN-BEARING SILICOFLAGELLATE RICH DIATOM-NANNO OOZE in core catcher.
SS 1-142
CM - 1%
VG - 1%
G - 1%
MicroN- 1%
N - 4%
D - 75%
R - 5%
S - 5%
SI - 5%
SS 2-55
Q - 5%
CM - 5%
N - 30%
D - 25%
R - 10%
S - 10%
SI - 15%
X-ray 2-74 (Bulk)
Calc - P
Quar - A
Plag - P
Kaol - P
Mica - P
Chlo - TR
Mont - P
Pyri - TR
Grain Size 2-71 (0.2, 38.9, 60.9)
Carbon Carbonate 2-70 (1.5, 0.6, 8)
VOID
Core Catcher
CC

Site 283 Hole Core 8 Cored Interval: 190.5-200.0 m



Drilling breccia in Sec. 1 is mixture of Units 2 and 3. Unit 3 is dark greenish gray (5GY 4/1) intensely mottled in greenish gray (5G 6/1) and brownish gray (5YR 4/1) with small dark gray (N3) streaks. The unit is diatomaceous in upper part grading downward to SILTY CLAY. Lithologic variations include: a SILICOFLAGELLATE, AND RADIOLARIAN-BEARING SPICULE-RICH DIATOM DETRITAL SILTY CLAY in Sec. 1; a SILICOFLAGELLATE AND RADIOLARIAN BEARING DIATOM RICH DETRITAL SILTY CLAY in Sec. 3; and a DIATOM-BEARING SPICULE-RICH DETRITAL SILTY CLAY in the core catcher.

SS 1-75		SS 3-100		SS CC	
Q	-20%	Q	-20%	Q	-20%
M	- 2%	CM	-35%	Mi	- 5%
CM	-30%	D	-20%	CM	-36%
D	-25%	R	- 5%	Dolo	- 2%
R	- 5%	S	-15%	D	-10%
S	-15%	SI	- 5%	R	- 2%
SI	- 3%			S	-25%

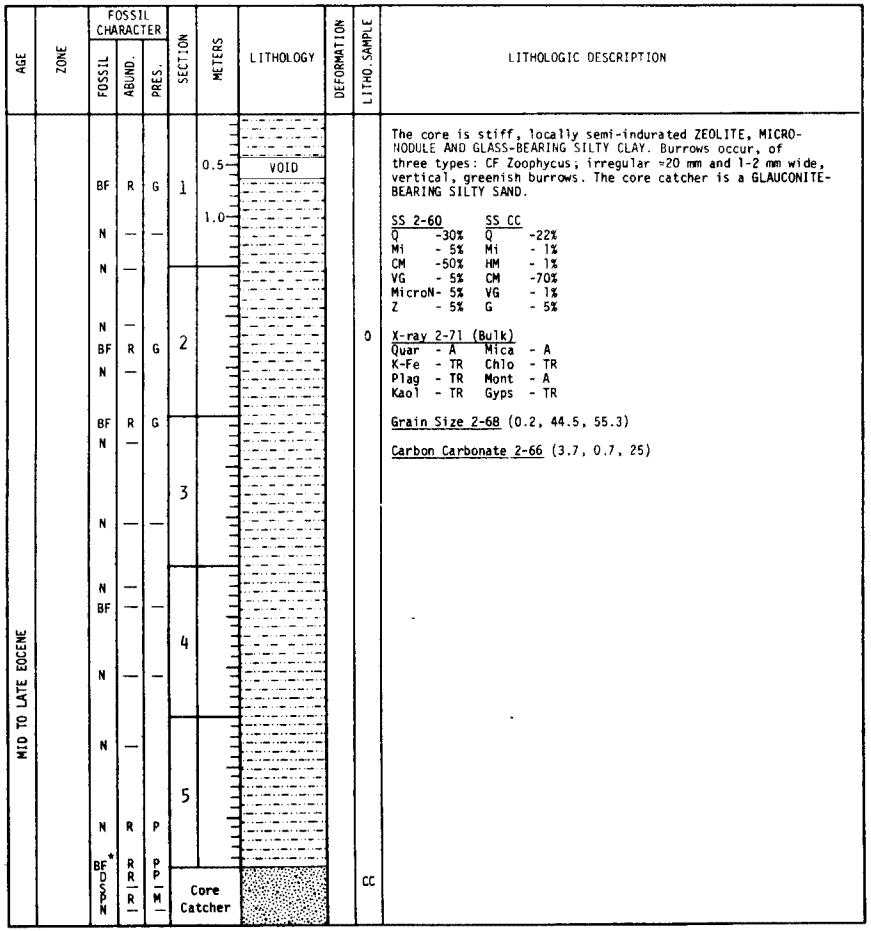
X-ray 2-59 (Bulk)

Quar	- P	Mica	- P
K-Fe	- TR	Mont	- A
Plag	- TR	Gyps	- TR
Kaol	- TR		

Grain Size 2-56 (0.5, 29.6, 69.9)

Carbon Carbonate 2-55 (2.8, 0.5, 19)

Site 283 Hole Core 9 Cored Interval: 219.0-228.5 m



The core is stiff, locally semi-indurated ZEOLITE, MICRONODULE AND GLASS-BEARING SILTY CLAY. Burrows occur, of three types: CF Zoophycus; irregular ≈20 mm and 1-2 mm wide, vertical, greenish burrows. The core catcher is a GLAUCONITE-BEARING SILTY SAND.

SS 2-60		SS CC	
Q	-30%	Q	-22%
Mi	- 5%	Mi	- 1%
CM	-50%	HM	- 1%
VG	- 5%	CM	-70%
MicroN	- 5%	VG	- 1%
Z	- 5%	G	- 5%

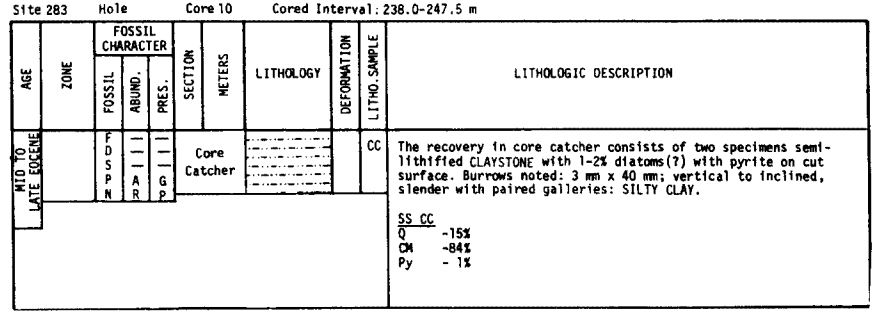
X-ray 2-71 (Bulk)

Quar	- A	Mica	- A
K-Fe	- TR	Chlo	- TR
Plag	- TR	Mont	- A
Kaol	- TR	Gyps	- TR

Grain Size 2-68 (0.2, 44.5, 55.3)

Carbon Carbonate 2-66 (3.7, 0.7, 25)

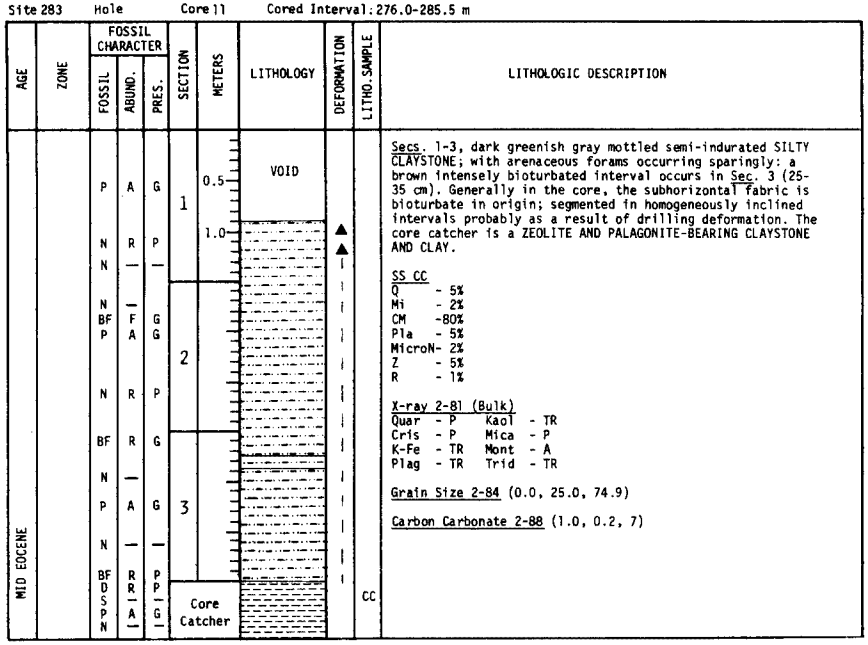
Site 283 Hole Core 10 Cored Interval: 238.0-247.5 m



The recovery in core catcher consists of two specimens semi-lithified CLAYSTONE with 1-2% diatoms(?) with pyrite on cut surface. Burrows noted: 3 mm x 40 mm; vertical to inclined, slender with paired galleries: SILTY CLAY.

SS CC	
Q	-15%
CM	~84%
Py	- 1%

Site 283 Hole Core 11 Cored Interval: 276.0-285.5 m



Secs. 1-3, dark greenish gray mottled semi-indurated SILTY CLAYSTONE; with arenaceous forams occurring sparingly: a brown intensely bioturbated interval occurs in Sec. 3 (25-35 cm). Generally in the core, the subhorizontal fabric is bioturbate in origin; segmented in homogeneously inclined intervals probably as a result of drilling deformation. The core catcher is a ZEOLITE AND PALAGONITE-BEARING CLAYSTONE AND CLAY.

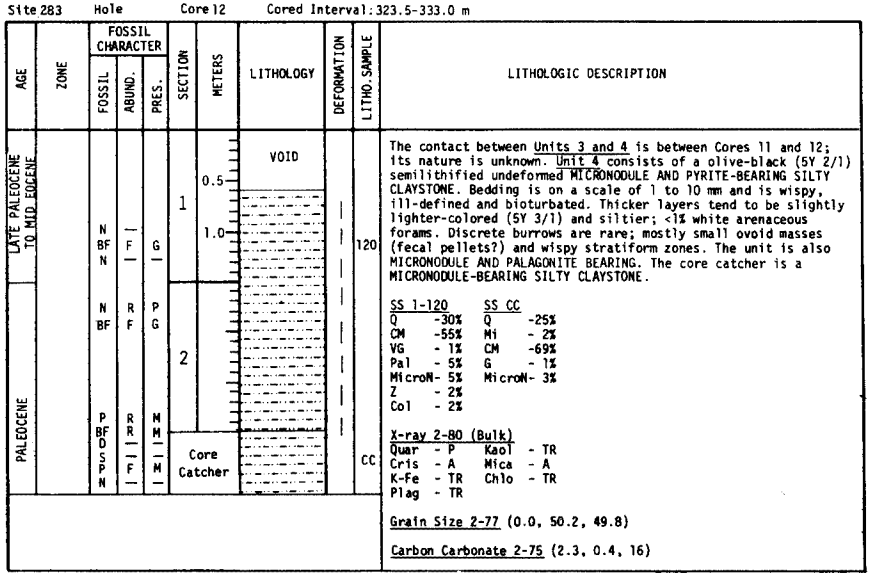
SS CC
Q - 5%
Mi - 2%
CM -80%
Pla - 5%
MicroN- 2%
Z - 5%
R - 1%

X-ray 2-81 (Bulk)
Quar - P Kaol - TR
Cris - P Mica - P
K-Fe - TR Mont - A
Plag - TR Trid - TR

Grain Size 2-84 (0.0, 25.0, 74.9)

Carbon Carbonate 2-88 (1.0, 0.2, 7)

Site 283 Hole Core 12 Cored Interval: 323.5-333.0 m



The contact between Units 3 and 4 is between Cores 11 and 12; its nature is unknown. Unit 4 consists of a olive-black (5Y 2/1) semilithified undeformed MICRONODULE AND PYRITE-BEARING SILTY CLAYSTONE. Bedding is on a scale of 1 to 10 mm and is wispy, ill-defined and bioturbated. Thicker layers tend to be slightly lighter-colored (5Y 3/1) and siltier; <1% white arenaceous forams. Discrete burrows are rare; mostly small ovoid masses (fecal pellets?) and wispy stratiform zones. The unit is also MICRONODULE AND PALAGONITE BEARING. The core catcher is a MICRONODULE-BEARING SILTY CLAYSTONE.

SS 1-120
Q -30%
CM -55%
VG - 1%
Pal - 5%
MicroN- 5%
Z - 2%
Col - 2%

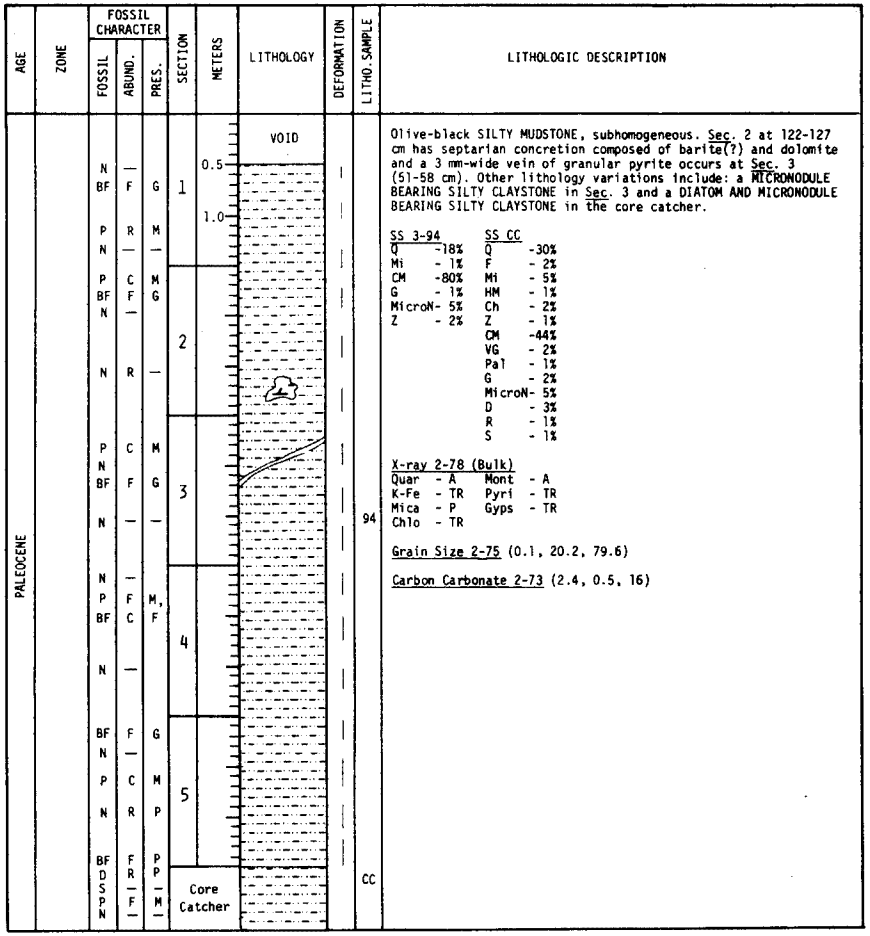
SS CC
Q -25%
Mi - 2%
CM -69%
G - 1%
MicroN- 3%

X-ray 2-80 (Bulk)
Quar - P Kaol - TR
Cris - A Mica - A
K-Fe - TR Chlo - TR
Plag - TR

Grain Size 2-77 (0.0, 50.2, 49.8)

Carbon Carbonate 2-75 (2.3, 0.4, 16)

Site 283 Hole Core 13 Cored Interval: 371.0-380.5 m



Olive-black SILTY MUDSTONE, subhomogeneous. Sec. 2 at 122-127 cm has septarian concretion composed of barite(?) and dolomite and a 3 mm-wide vein of granular pyrite occurs at Sec. 3 (51-58 cm). Other lithology variations include: a MICRONODULE BEARING SILTY CLAYSTONE in Sec. 3 and a DIATOM AND MICRONODULE BEARING SILTY CLAYSTONE in the core catcher.

SS 3-94
Q -18%
Mi - 1%
CM -80%
G - 1%
MicroN- 5%
Z - 2%

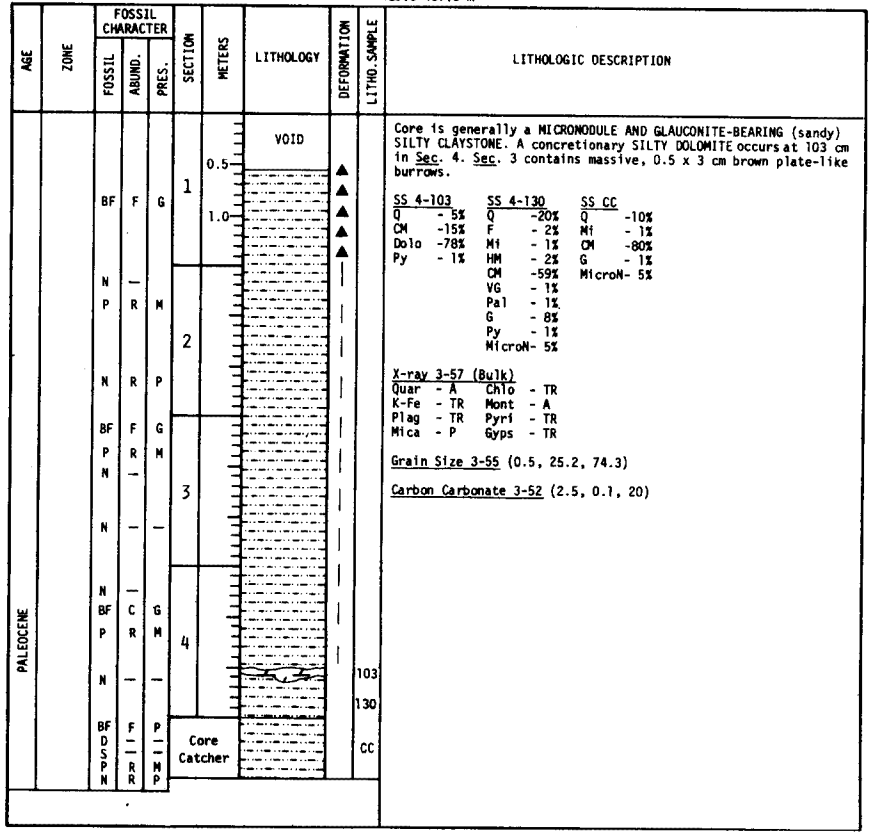
SS CC
Q -30%
F - 2%
Mi - 5%
HM - 1%
Ch - 2%
Z - 1%
CM -44%
VG - 2%
Pal - 1%
G - 2%
MicroN- 5%
D - 3%
R - 1%
S - 1%

X-ray 2-78 (Bulk)
Quar - A Mont - A
K-Fe - TR Pyri - TR
Mica - P Gyps - TR
Chlo - TR

Grain Size 2-75 (0.1, 20.2, 79.6)

Carbon Carbonate 2-73 (2.4, 0.5, 16)

Site 283 Hole Core 14 Cored Interval: 428.0-437.5 m



LITHOLOGIC DESCRIPTION

Core is generally a MICRONODULE AND GLAUCONITE-BEARING (sandy) SILTY CLAYSTONE. A concretionary SILTY DOLOMITE occurs at 103 cm in Sec. 4. Sec. 3 contains massive, 0.5 x 3 cm brown plate-like burrows.

SS 4-103		SS 4-130		SS CC	
Q	- 5%	Q	-20%	Q	-10%
CM	-15%	F	- 2%	Mi	- 1%
Dolo	-78%	Mi	- 1%	CM	-80%
Py	- 1%	HM	- 2%	G	- 1%
		CM	-59%	MicroN-	5%
		VG	- 1%		
		Pal	- 1%		
		G	- 8%		
		Py	- 1%		
		MicroN-	5%		

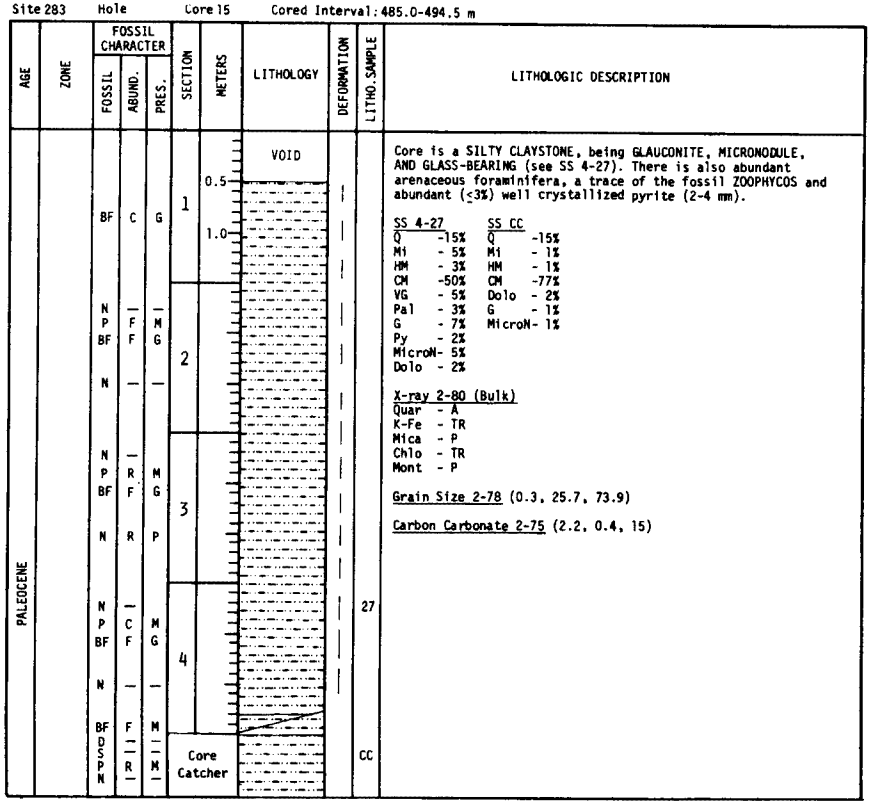
X-ray 3-57 (Bulk)

Quar	- A	Chlo	- TR
K-Fe	- TR	Mont	- A
Plag	- TR	Pyri	- TR
Mica	- P	Gyps	- TR

Grain Size 3-55 (0.5, 25.2, 74.3)

Carbon Carbonate 3-52 (2.5, 0.1, 20)

Site 283 Hole Core 15 Cored Interval: 485.0-494.5 m



LITHOLOGIC DESCRIPTION

Core is a SILTY CLAYSTONE, being GLAUCONITE, MICRONODULE, AND GLASS-BEARING (see SS 4-27). There is also abundant arenaceous foraminifera, a trace of the fossil ZOOPHYCOS and abundant (<3%) well crystallized pyrite (2-4 mm).

SS 4-27		SS CC	
Q	-15%	Q	-15%
Mi	- 5%	Mi	- 1%
HM	- 3%	HM	- 1%
CM	-50%	CM	-77%
VG	- 5%	Dolo	- 2%
Pal	- 3%	G	- 1%
G	- 7%	MicroN-	1%
Py	- 2%		
MicroN-	5%		
Dolo	- 2%		

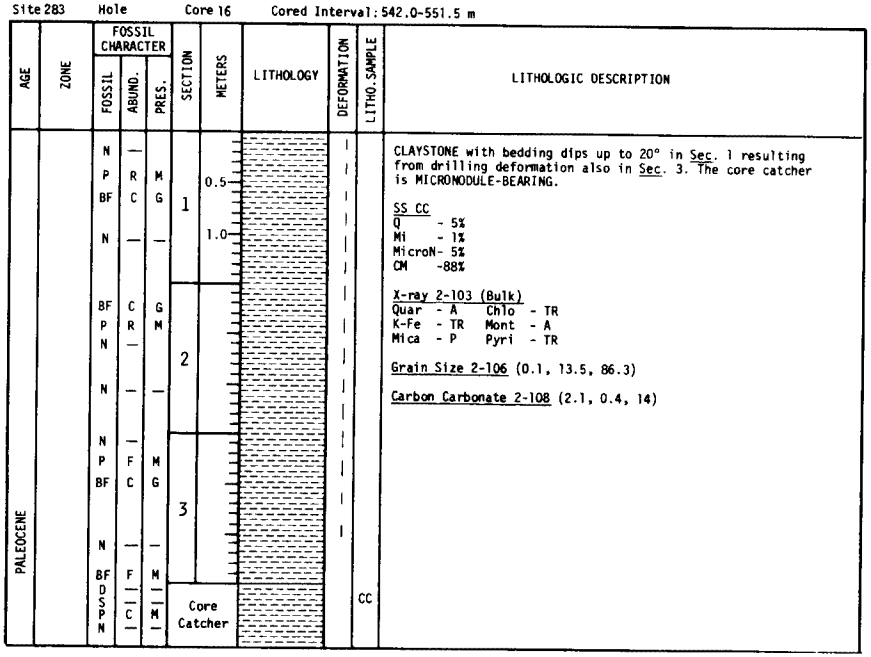
X-ray 2-80 (Bulk)

Quar	- A
K-Fe	- TR
Mica	- P
Chlo	- TR
Mont	- P

Grain Size 2-78 (0.3, 25.7, 73.9)

Carbon Carbonate 2-75 (2.2, 0.4, 15)

Site 283 Hole Core 16 Cored Interval: 542.0-551.5 m



CLAYSTONE with bedding dips up to 20° in Sec. 1 resulting from drilling deformation also in Sec. 3. The core catcher is MICRONODULE-BEARING.

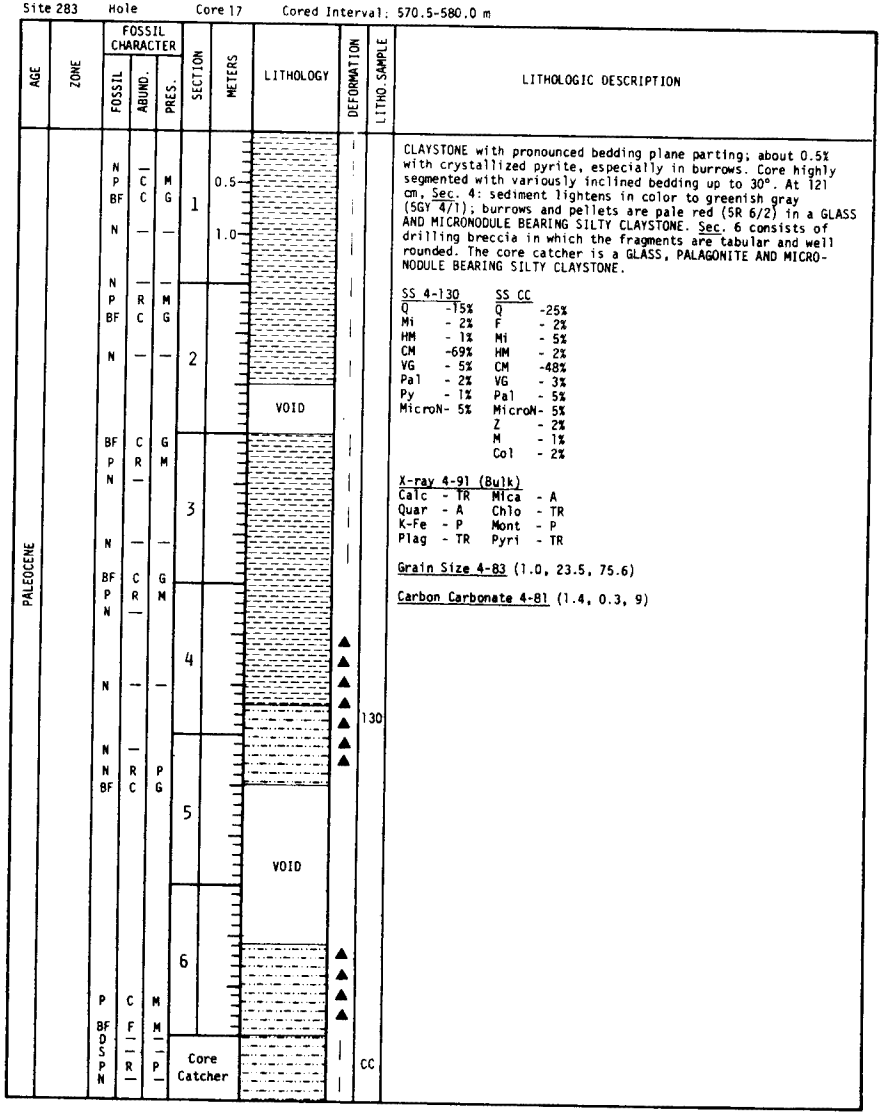
SS CC
Q - 5%
Mi - 1%
MicroN- 5%
CM -88%

X-ray 2-103 (Bulk)
Quar - A Chlo - TR
K-Fe - TR Mont - A
Mica - P Pyri - TR

Grain Size 2-106 (0.1, 13.5, 86.3)

Carbon Carbonate 2-108 (2.1, 0.4, 14)

Site 283 Hole Core 17 Cored Interval: 570.5-580.0 m



CLAYSTONE with pronounced bedding plane parting; about 0.5% with crystallized pyrite, especially in burrows. Core highly segmented with variously inclined bedding up to 30°. At 121 cm, Sec. 4: sediment lightens in color to greenish gray (5GY 4/1); burrows and pellets are pale red (5R 6/2) in a GLASS AND MICRONODULE BEARING SILTY CLAYSTONE. Sec. 6 consists of drilling breccia in which the fragments are tabular and well rounded. The core catcher is a GLASS, PALAGONITE AND MICRONODULE BEARING SILTY CLAYSTONE.

SS 4-130
Q -15%
Mi - 2%
HM - 1%
CM -69%
VG - 5%
Pal - 2%
Py - 1%
MicroN- 5%

SS CC
Q -25%
F - 2%
Mi - 5%
HM - 2%
CM -48%
VG - 3%
Pal - 5%
MicroN- 5%
Z - 2%
M - 1%
Col - 2%

X-ray 4-91 (Bulk)
Calc - TR Mica - A
Quar - A Chlo - TR
K-Fe - P Mont - P
Plag - TR Pyri - TR

Grain Size 4-83 (1.0, 23.5, 75.6)

Carbon Carbonate 4-81 (1.4, 0.3, 9)

Site 283 Hole Core 18 Cored Interval: 588.5-589.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					1	0.5 1.0	VOID			Unit 5. Thirteen core segments and fragments of altered basalt. 60-80 cm: devitrified basaltic glass, light greenish-gray (5G 7/1); calcite and serpentine veinlets; specimen (4) has a 2-cm-wide dark-red palagonite vein which suggests interpillow glass; rock consists of <2% altered feldspar laths in groundmass of clay, zeolite and serpentine. 80-100 cm: altered basaltic breccia, very dark greenish gray (5GY 3/1); tectonic or autoclastic texture; consists of amygdaloidal basalt (80%), calcite veins (15%) and dark devitrified glass fragments (5%) with minor dark green serpentine veinlets; amygdules average ~1.0 mm. 100-150 cm: altered basalt; dark greenish gray (5GY 3/1) cut by calcite-serpentine veinlets up to 1 cm thick.

Site 283 Hole Core 19 Cored Interval: 589.5-592.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					1	0.5				Fifteen core segments and fragments of altered basalt. Fragment (6) at 32-38 cm is the upper surface of a pillow showing a devitrified glass patina above a chilled rim grading downward to holocrystalline(?) altered basalt. Thin section of specimen (7): fine grained, original texture largely obscured by radial habit of alteration products; some suggestion of intersertal and subophitic texture; estimated composition: altered plagioclase laths 20% black opaque minerals 10% altered olivine/pyroxene 3% serpentine(?) after glass 10% calcite 5% clay, serpentine, zeolite 52%

Site 283 Hole A Core 1 Cored Interval: 0.0-1.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE PLIOCENE TO MID PLEISTOCENE	?	F N	— C	P*	1	0.5 1.0	Mn Mn			CLAYSTONE DRILL CUTTINGS : roundstone open framework gravel; well graded from 30 mm at base to 3 mm at top. Core catcher: two soft, botryoidal manganese nodules.

*from yellow mud attached to a Mn nodule.

Site 283 Hole A Core 2 Cored Interval: 11.0-20.5 m (?)

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE PLIOCENE TO MID PLEISTOCENE	P. lacunosa	N	A	P	1	0.5 1.0			130	: moderate yellowish brown (10YR 5/4) mottled dark yellowish brown (10YR 4/2); subhomogeneous at top. Lithologic variations include: MICARB-BEARING MICRONODULE RICH DETRITAL SILTY CLAY (Sec. 1); a ZEOLITE BEARING CLAY (Sec. 2); a ZEOLITE AND MICRONODULE BEARING CLAY (Sec. 4); a SILTY ZEOLITE CLAY (Sec. 6) and a SILTY ZEOLITE CLAY in the core catcher.
		P	—							SS 1-130: Q -12%, Mi - 8%, CM -52%, MicroN-24%, M - 4% SS 2-100: Q - 5%, CM -95%, Z - 5% SS 4-10: Q -10%, CM -80%, MicroN- 5%, Z - 5% SS 6-96: Q -10%, F - 1%, Mi - 1%, CM - 5%, VG - 5%, Pal - 5%, MicroN- 5%, Z -70% SS CC: Q -15%, F - 2%, Mi - 3%, HM - 1%, CM -20%, VG - 2%, MicroN- 3%, Z -54%
		N	—		2				100	X-ray 3-63 (Bulk): Quar - A, K-Fe - P, Plag - P, Kaol - P, Mica - P, Mont - P, Gyps - TR
		P	—							Grain Size 3-55 (0.2, 14.4, 85.4)
		P	—		3					
		P	—		4				10	
		N	—							
		P			5					
		P	—		6				96	
		P	—							
		F	VR	M	Core Catcher				CC	
		N	P	M*						

*downhole contamination

DEEP SEA DRILLING PROJECT

LEG 29 SITE 284

SITE SUMMARY SHEET

POSITION: Latitude: 40°30.48'S Longitude: 167°40.81'E

Water depth (from sea level): 1066 corrected meters (Echo sounding)

Bottom felt at: 1078 meters (drill pipe) Penetration: 284 - 208 m
284A - 75 m

Number of Hole: 2 Number of Cores: 284 - 22; 284A - 3

Total length of cored section: 284 - 208 m; 284A - 28.5 m

Percentage of core recovery: 284 - 80.2%; 284A - 78.6%

OLDEST SEDIMENT CORED:

Depth below sea floor: 284 - 208 meters Nature: Nannofossil ooze

Age: Late Miocene

PRINCIPAL RESULTS:

Site located on the Challenger Plateau. Entire section foraminifera nannofossil ooze and nannofossil-foraminifera ooze of late Miocene to latest Pleistocene age. Minor unconformity possible in middle Pleistocene, otherwise sedimentation continuous and uniform. Magnificant temperate late Cenozoic calcareous biostratigraphic sequence. Obvious climatic fluctuations in these southern subtropical waters 400 km north of subtropical convergence.

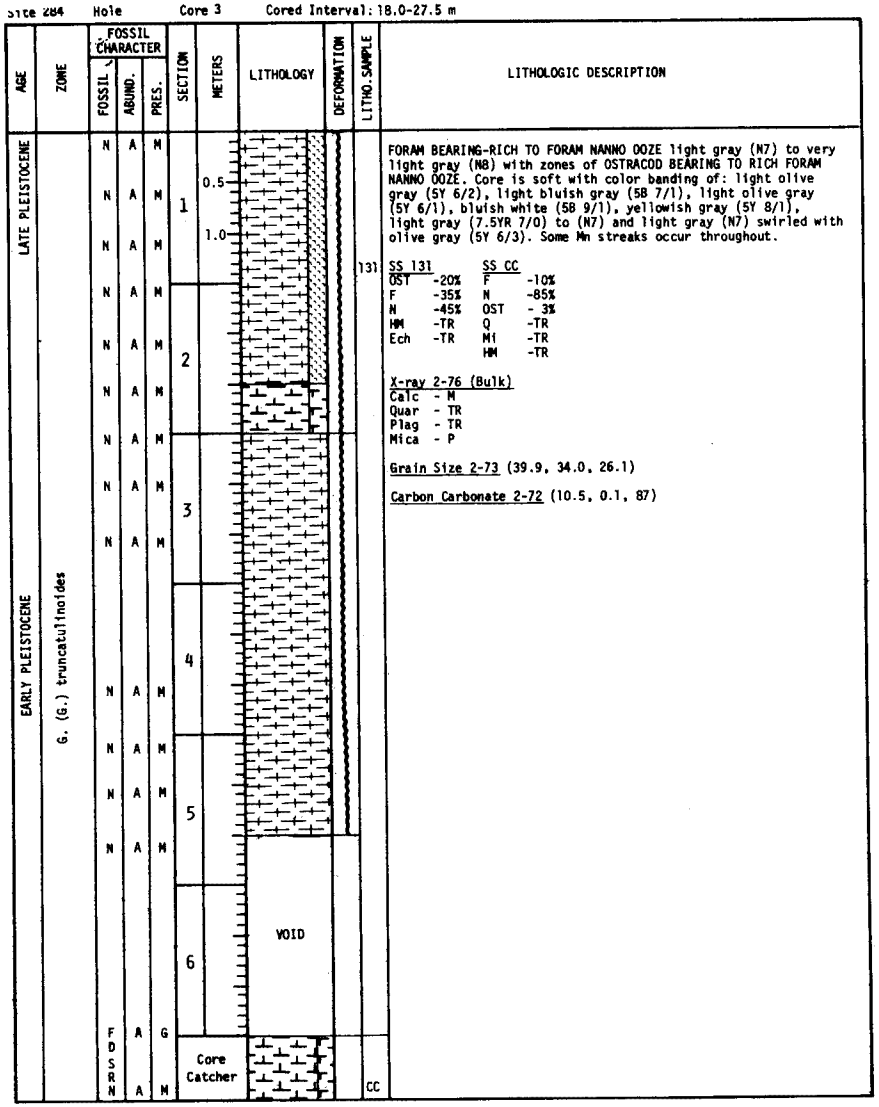
Site 284 Hole Core 1 Cored Interval: 0.0-8.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE PLEISTOCENE	G. (G.) truncatulinoides	N	A	M	1	0.5				Core contains variations of NANNO FORAM OOZE, i.e. a foram-rich nanno ooze, and nanno-rich foram ooze; ostracods generally 5% to a high of 20% at Sec. 2 (111 cm); core is soft, with Mn stains and streaks and color variations that include: very light gray (N7, N8), grayish yellow green (5GY 7/2), bluish white (5B 9/1), light greenish gray (5GY 8/1), yellowish gray (5Y 8/1) and pinkish gray (5YR 8/1).
		N	A	M		1.0				
		N	A	M					130	
		N	A	M	2					SS 1-130: N -30%, OST -5%, F -65%
		N	A	M						SS 2-111: OST -20%, F -35%, N -45%, G -TR, Op -TR
		N	A	M					111	SS 6-30: F -8%, OST -5%, N -87%
		N	A	M						SS CC: F -15%, N -85%
		N	A	M	3					X-ray 2-119 (Bulk): Calc - M, Quar - TR, Plag - TR, Mica - P
		N	A	M						Grain Size 2-117 (23.2, 30.6, 46.2)
		N	A	M	4					Carbon Carbonate 2-115 (10.5, 0.1, 87)
		N	A	M						
		N	A	M						
		N	A	M	5					
		N	A	M						
		N	A	M						
		N	A	M	6				30	
		N	A	M						
		N	A	M						
		F D S R N	A	G	Core Catcher				CC	
			A	M						

Site 284 Hole Core 2 Cored Interval: 8.5-19.0 m

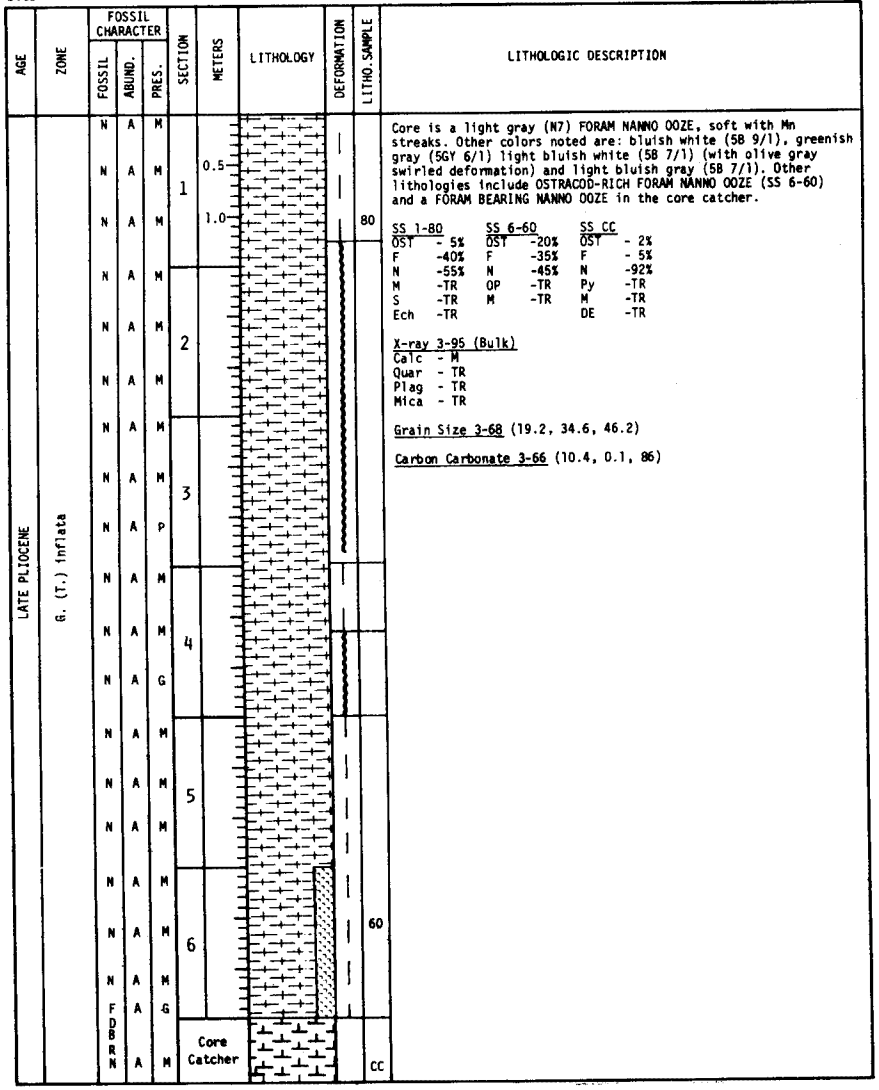
AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE PLEISTOCENE	G. (G.) truncatulinoides	F D S R N	A	G	Core Catcher					Core catcher only, a FORAM-BEARING NANNO OOZE, very light gray (N8).
			A	M						SS CC: F - 8%, N -92%, Ech -TR

Site 284 Hole Core 3 Cored Interval: 18.0-27.5 m

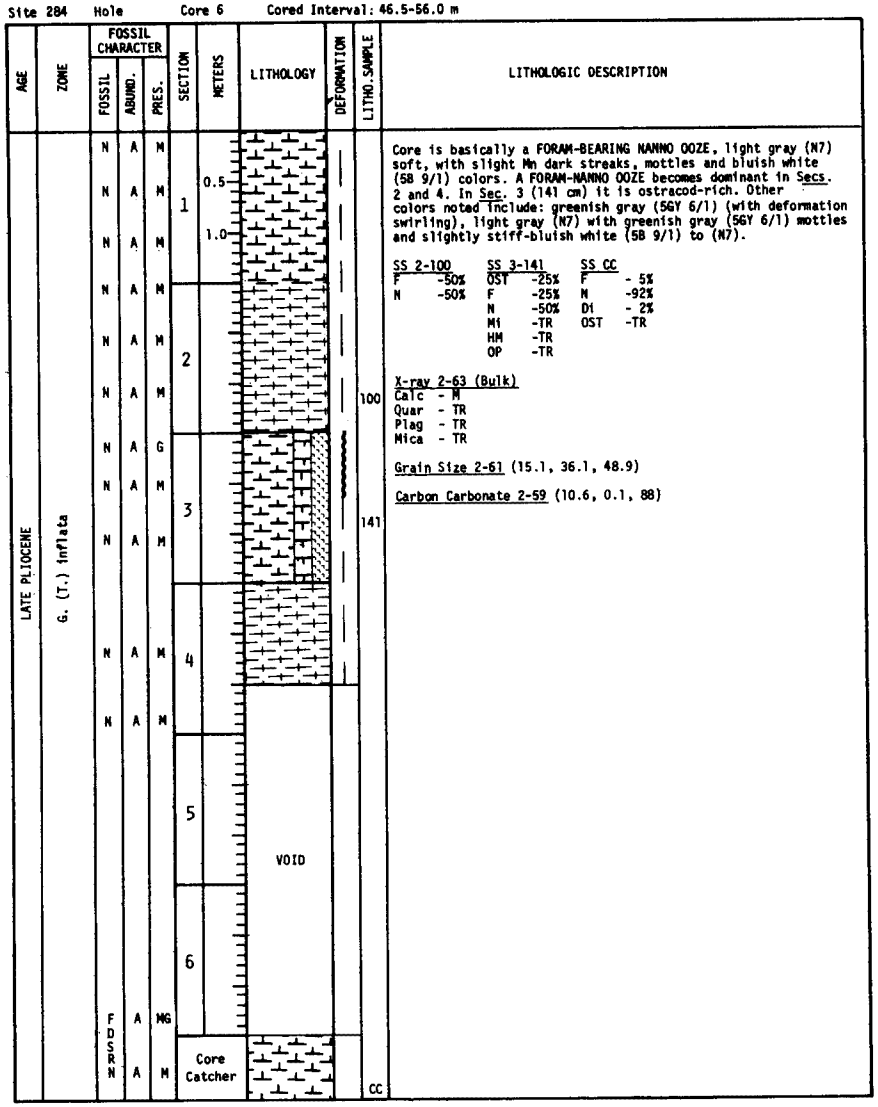


Core 4 Cored Interval: 27.5-37.0 m NO RECOVERY

Site 284 Hole Core 5 Cored Interval: 37.0-46.5 m



Site 284 Hole Core 6 Cored Interval: 46.5-56.0 m



LITHOLOGIC DESCRIPTION

Core is basically a FORAM-BEARING NANNO OOZE, light gray (N7) soft, with slight Mn dark streaks, mottles and bluish white (5B 9/1) colors. A FORAM-NANNO OOZE becomes dominant in Secs. 2 and 4. In Sec. 3 (141 cm) it is ostracod-rich. Other colors noted include: greenish gray (5GY 6/1) (with deformation swirling), light gray (N7) with greenish gray (5GY 6/1) mottles and slightly stiff-bluish white (5B 9/1) to (N7).

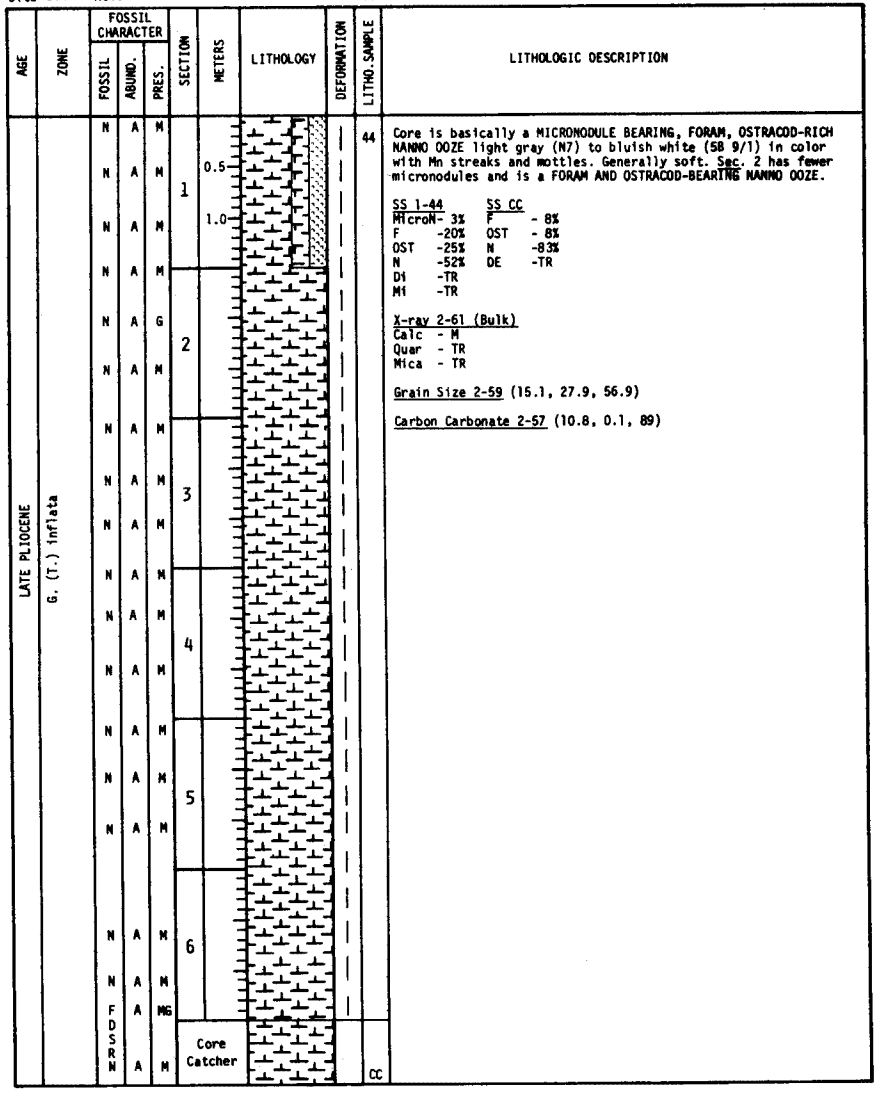
SS 2-100		SS 3-141		SS CC	
F	-50%	OST	-25%	F	- 5%
N	-50%	F	-25%	N	-92%
		N	-50%	Di	- 2%
		Mi	-TR	OST	-TR
		HM	-TR		
		OP	-TR		

X-ray 2-63 (Bulk)
Calc - M
Quar - TR
Plag - TR
Mica - TR

Grain Size 2-61 (15.1, 36.1, 48.9)

Carbon Carbonate 2-59 (10.6, 0.1, 88)

Site 284 Hole Core 7 Cored Interval: 56.0-65.5 m



LITHOLOGIC DESCRIPTION

Core is basically a MICRONODULE BEARING, FORAM, OSTRACOD-RICH NANNO OOZE light gray (N7) to bluish white (5B 9/1) in color with Mn streaks and mottles. Generally soft. Sec. 2 has fewer micronodules and is a FORAM AND OSTRACOD-BEARING NANNO OOZE.

SS 1-44		SS CC	
MicroN	- 3%	F	- 8%
F	-20%	OST	- 8%
OST	-25%	N	-83%
N	-52%	DE	-TR
Di	-TR		
Mi	-TR		

X-ray 2-61 (Bulk)
Calc - M
Quar - TR
Mica - TR

Grain Size 2-59 (15.1, 27.9, 56.9)

Carbon Carbonate 2-57 (10.8, 0.1, 89)

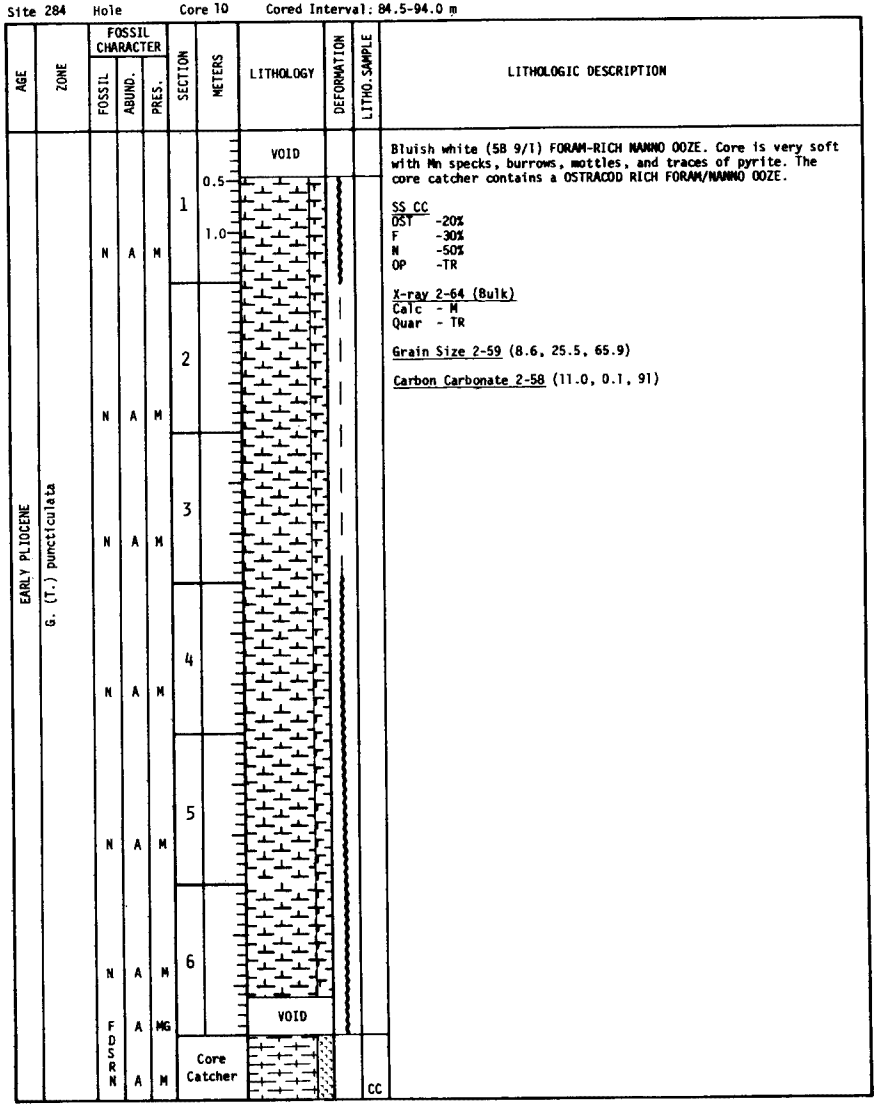
Site 284 Hole Core 8 Cored Interval: 65.5-75.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE PLIOCENE	G. (T.) inflata	CORE CATCHER	A A	MG M	Core Catcher					No recovery except for core catcher which contains a OSTRACOD FRAGMENT-RICH FORAM NANNO OOZE. SS CC OST -15% F -35% N -50% G -TR OP -TR

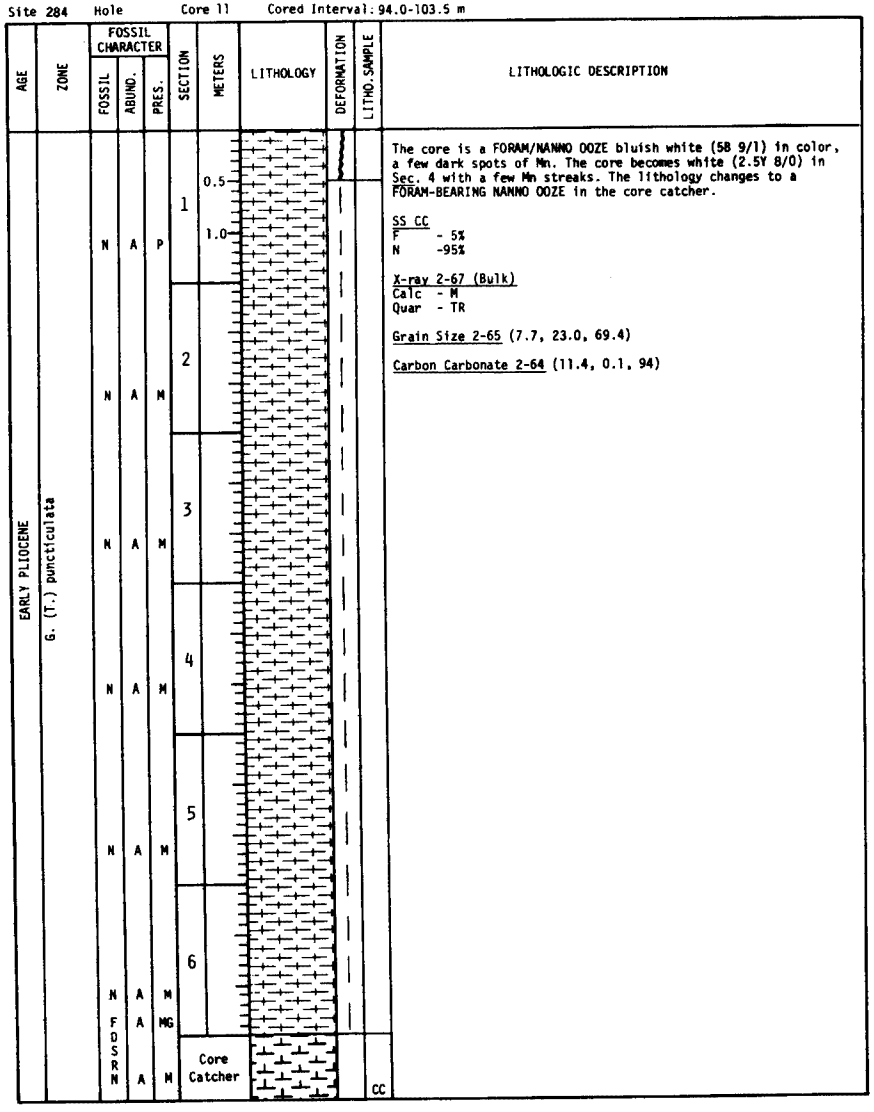
Site 284 Hole Core 9 Cored Interval: 75.0-84.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY PLIOCENE	G. (T.) inflata G. (T.) puncticulata	N N N N N N N N N N N N N F N T D S R N	A A A A A A A A A A A A A A A A A A A A	M P P M M M M M M M P M MG M MG M	1 2 3 4 5 6 Core Catcher	0.5 1.0			90 CC	FORAM NANNO OOZE, bluish white (5B 9/1), soft with some Mn mottles, streaks, and pyrite burrows appear. The core gets slightly stiffer in Sec. 6. The core catcher is a FORAM AND OSTRACOD-BEARING NANNO OOZE. SS 1-90 F -35% N -65% Di -TR OP -TR SS CC F - 7% OST - 5% N -87% Mi -TR X-ray 2-70 (Bulk) Calc - M Quar - TR Mica - TR Grain Size 2-68 (15.4, 24.8, 59.8) Carbon Carbonate 2-66 (10.9, 0.1, 90)

Site 284 Hole Core 10 Cored Interval: 84.5-94.0 m



Site 284 Hole Core 11 Cored Interval: 94.0-103.5 m



Site 284 Hole Core 12 Cored Interval: 103.5-113.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY PLIOCENE	G. (T.) puncticulata	N	A	M	1	0.5, 1.0				OSTRACOD-BEARING FORAM/NANNO OOZE bluish white (5B 9/1). Core is soft with intense deformation. The core catcher contains a FORAM AND OSTRACOD-BEARING NANNO OOZE. SS CC F - 5% OST - 5% N -90% X-ray 3-67 (Bulk) Calc - M Quar - TR Grain Size 3-55 (8.7, 29.5, 61.8) Carbon Carbonate 3-63 (11.4, 0.0, 94)
		N	A	M	2					
		N	A	M	3					
		N	A	M	4					
		N	A	M	5					
		N	A	M	6					
		F	A	MG						
		D	A	M	Core Catcher				CC	
		S								
		R								
		N								

Site 284 Hole Core 13 Cored Interval: 113.0-122.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY PLIOCENE	G. (G.) mitdzea conomiozea	F	M	MG	1	0.5, 1.0				FORAM AND OSTRACOD-BEARING NANNO OOZE, soft with a bluish white (5B 9/1) color and a few dark streaks. SS CC F - 4% OST - 2% N -94% X-ray 3-57 (Bulk) Calc - M Quar - TR Grain Size 3-55 (8.6, 25.7, 65.7) Carbon Carbonate 3-54 (11.3, 0.0, 94)
		N	A	M	2					
		N	A	M	3					
		N	A	P	4					
		N	A	M	5					
		N	A	M	6					
		F	M	AG						
		D	A	M	Core Catcher				CC	
		S								
		R								
		N								

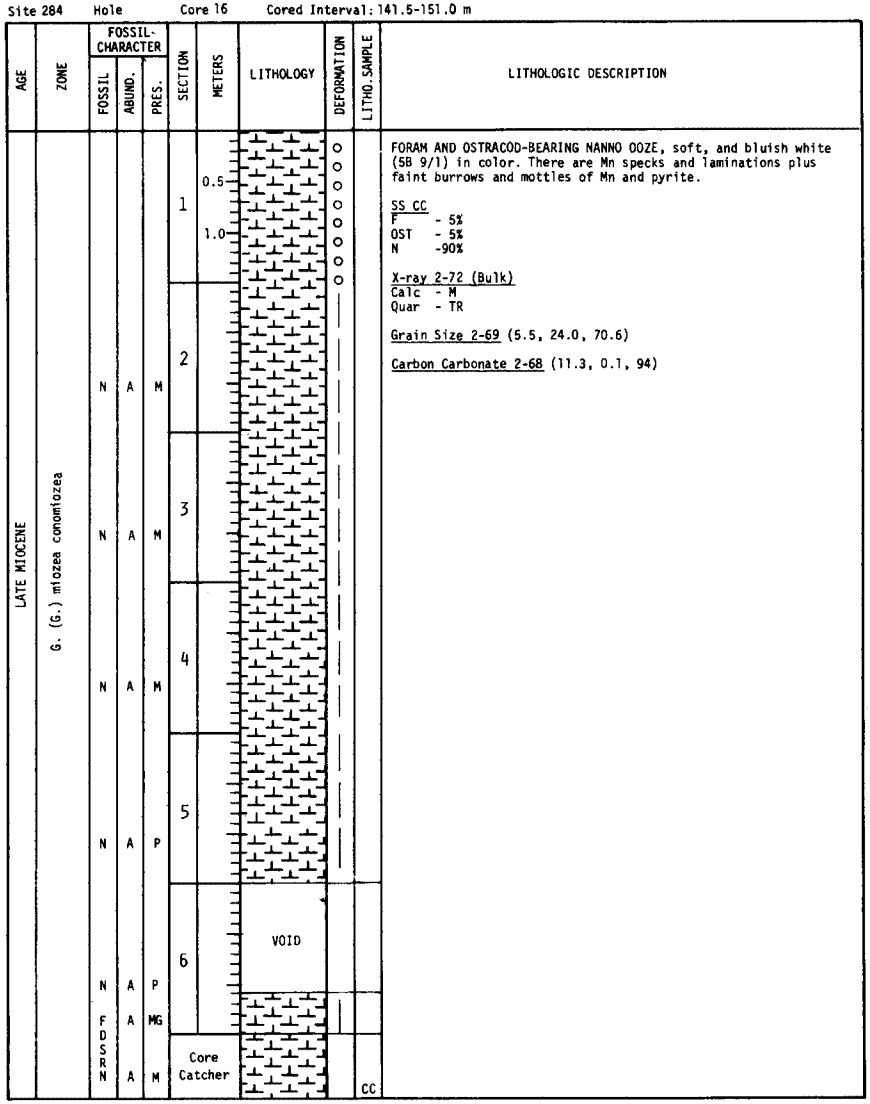
Site 284 Hole Core 14 Cored Interval: 122.5-132.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY PLIOCENE	G. (G.) mfozea conomfozea	N	A	M	1	0.5				Core is soft, FORAM AND OSTRACOD-BEARING NANNO OOZE, bluish white (5B 9/1) in color with a small amount of dark streaks which increase in Sec. 4. Secs. 4 and 5 show more dark streaking, burrowing, mottling and faint laminations to distinct dark, thin, curved laminations. There is no noticeable increase in opaques. SS CC F -10% OST - 8% N -82% X-ray 2-65 (Bulk) Calc - M Grain Size 2-62 (6.9, 25.9, 67.2) Carbon Carbonate 2-61 (11.6, 0.1, 96)
						1.0				
		N	A	M	2					
		N	A	M	3					
		N	A	M	4					
		N	A	M	5					
		N	A	M	6		VOID			
		F	M	AG						
		D								
		S								
		R								
		N	A	P	Core Catcher				CC	

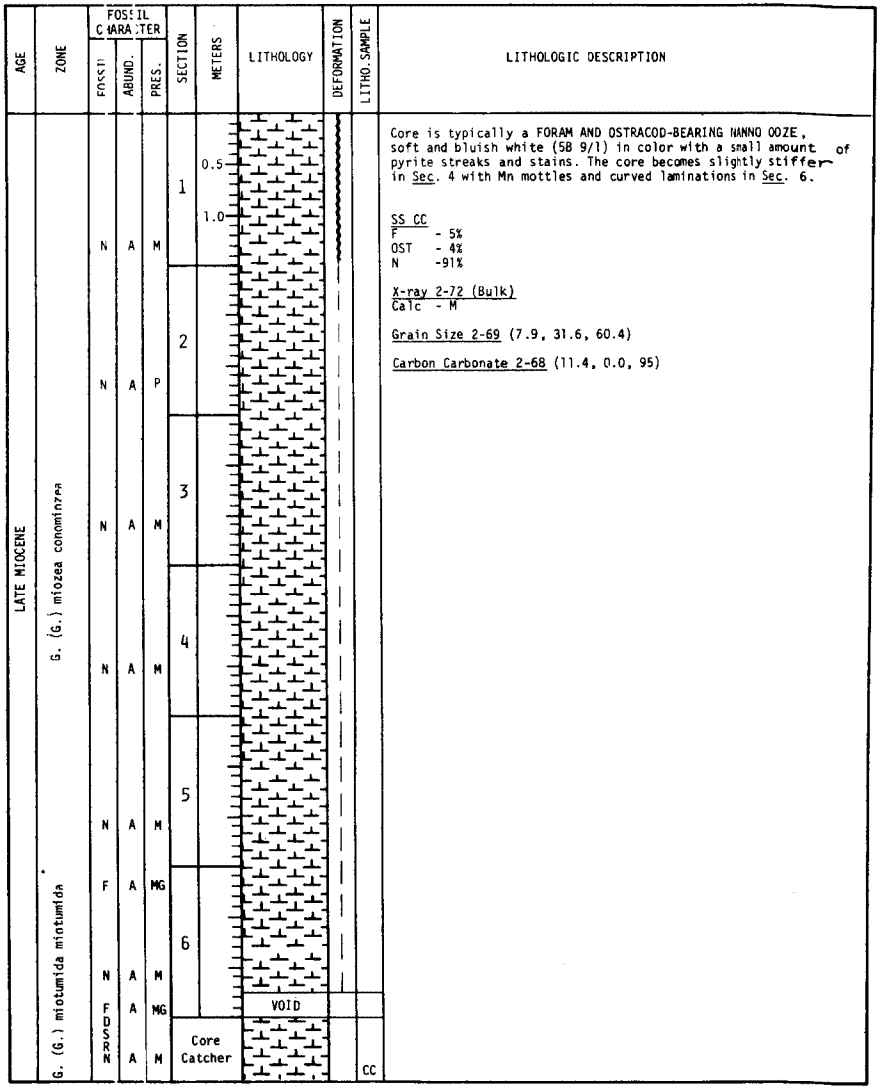
Site 284 Hole Core 15 Cored Interval: 132.0-141.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY PLIOCENE	G. (G.) mfozea conomfozea	N	A	M	1	0.5				Core is typically a FORAM AND OSTRACOD-BEARING NANNO OOZE, bluish white (5B 7/1) in color. There are some faint pyrite streaks, mottles and abundant dark stained burrows in Sec. 6. The core catcher is a FORAM-BEARING OSTRACOD-RICH NANNO OOZE. SS CC F -10% OST -25% N -65%
						1.0				
		N	A	M	2					
		N	A	M	3					
		N	A	M	4					
		N	A	M	5					
		N	A	M	6					
		F	A	MG			VOID			
		D								
		R								
		S								
		N	A	M	Core Catcher				CC	

Site 284 Hole Core 16 Cored Interval: 141.5-151.0 m



Site 284 Hole Core 17 Cored Interval: 151.0-160.5 m



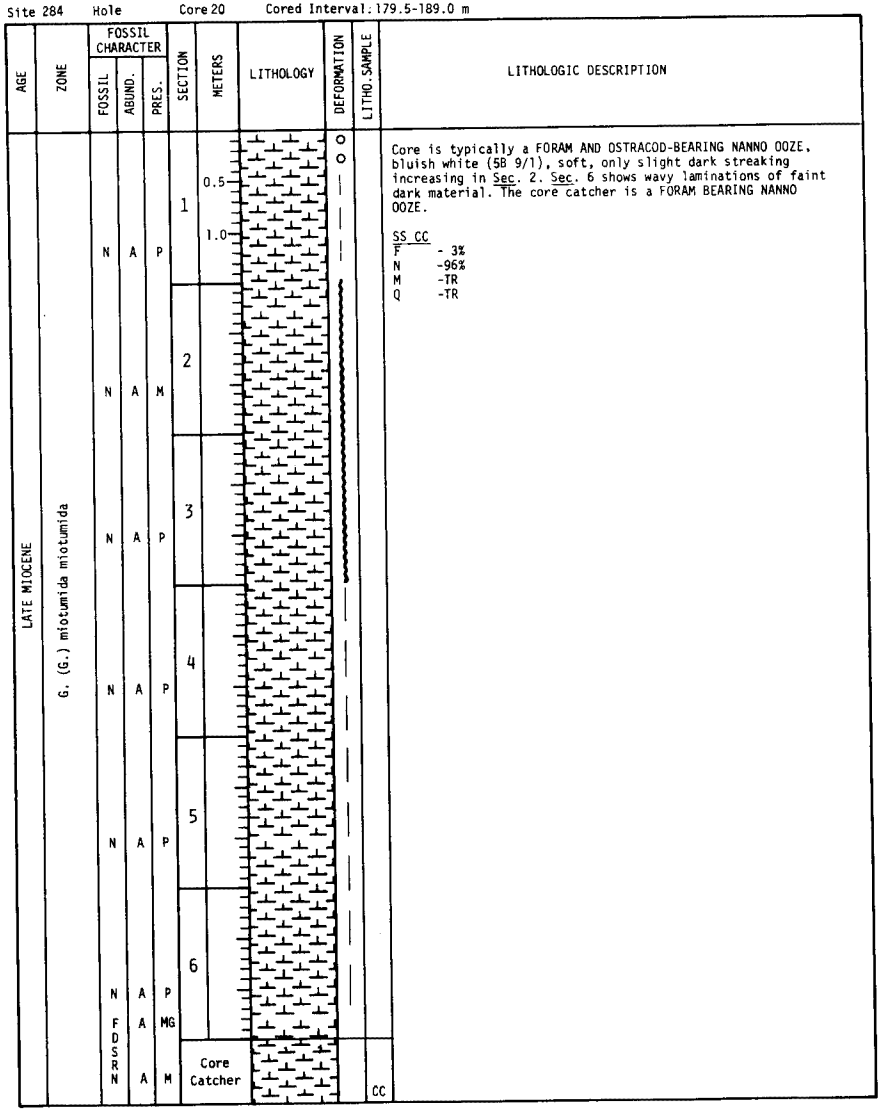
Site 284 Hole Core 18 Cored Interval: 160.5-170.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE MIOCENE	G. (G.) miotumida miotumida	N	A	M	1	0.5		o o o o o		FORAM AND OSTRACOD BEARING NANNO OOZE, bluish white (5B 9/1) with very few Mn and dark streaks, except Sec. 4 which shows an increase in dark streaks and mottles. Sec. 6 shows an increase in wavy lamination of dark material. The core catcher is a FORAM AND OSTRACOD RICH NANNO OOZE. SS CC F -10% OST -15% N -75% OP -TR
		N	A	M	2	1.0				
		N	A	M	3					
		N	A	M	4					
		N	A	M	5					
		N	A	P	6					
		F D S R N	A	MG	Core Catcher				CC	
		N	A	M						

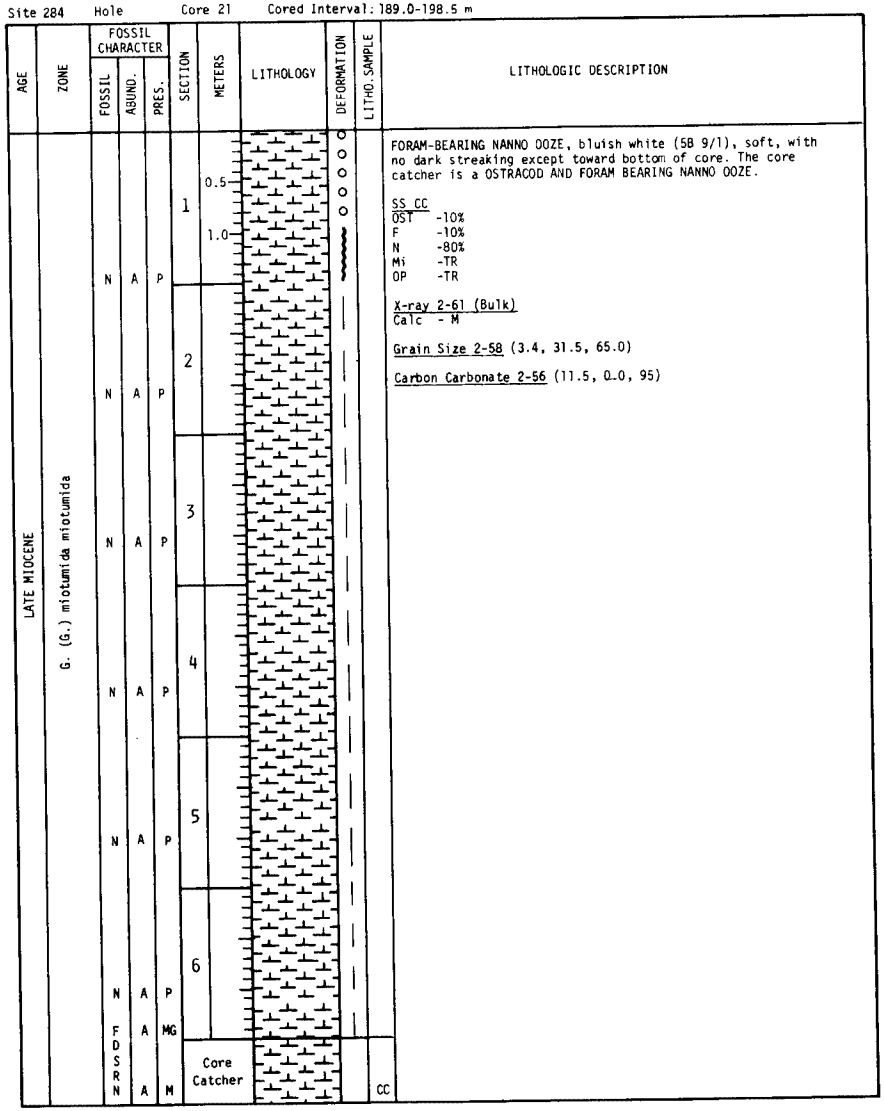
Site 284 Hole Core 19 Cored Interval: 170.0-179.5 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE MIOCENE	G. (G.) miotumida miotumida	N	A	P	1	0.5		o o o o		FORAM/NANNO OOZE, bluish white (5B 9/1). There are swirled areas of Mn streaks and greenish gray (5GY 6/1) streaks. The core catcher is a FORAM AND OSTRACOD BEARING NANNO OOZE. SS CC F - 5% OST - 3% N -92% X-ray 2-42 (Bulk) Calc - M Quar - TR Grain Size 2-39 (6.0, 38.9, 55) Carbon Carbonate 2-37 (11.3, 0.0, 94)
		N	A	P	2	1.0				
		N	A	P	3					
		N	A	P	4					
		N	A	M	5					
		N	A	P	6					
		F D S R N	A	MG	Core Catcher				CC	
		N	A	M						

Site 284 Hole Core 20 Cored Interval: 179.5-189.0 m



Site 284 Hole Core 21 Cored Interval: 189.0-198.5 m



Site 284 Hole Core 22 Cored Interval: 198.5-208.0 m

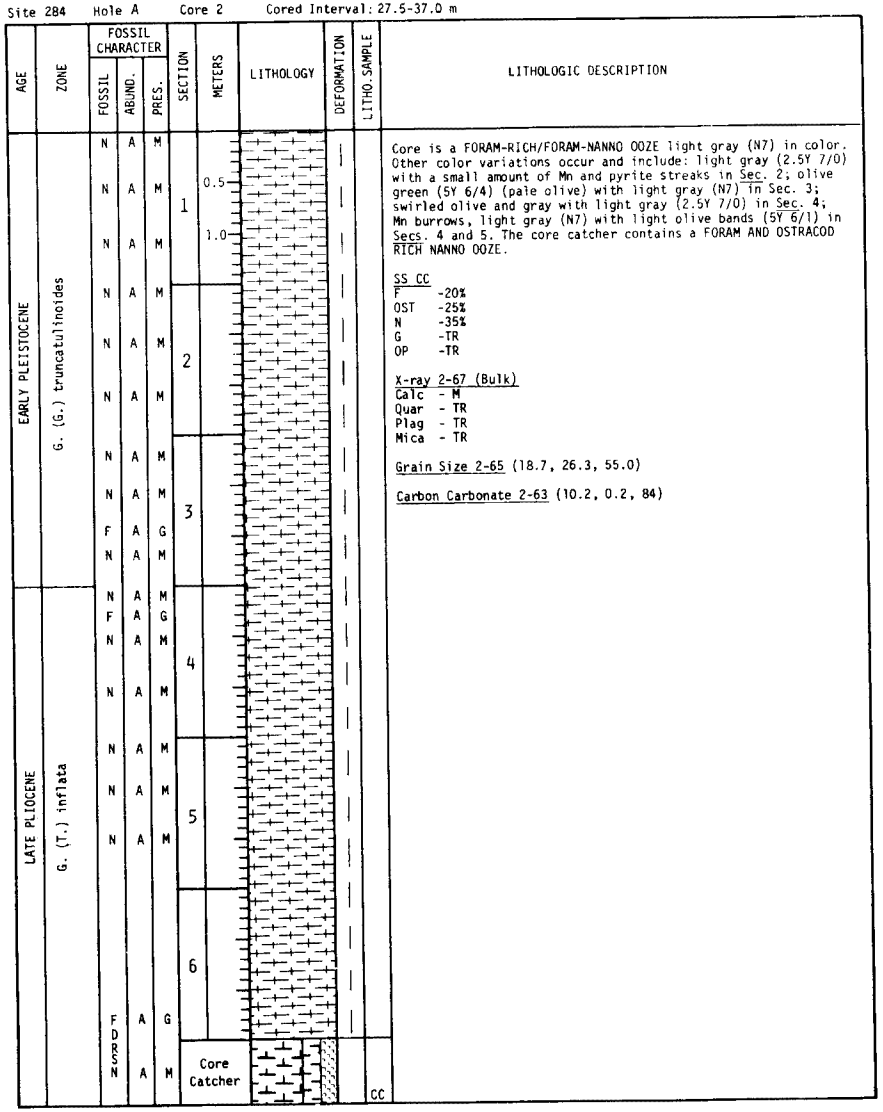
AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE MIOCENE	G. (G.) miotumida miotumida	N	A	P	1	0.5, 1.0				FORAM-BEARING NANNO OOZE bluish white (5B 9/1), soft, with some Mn, pyrite and organic streaking. Secs. 4-6 show dark mottles and laminations. Core catcher lithology: NANNO OOZE. SS CC F - 2% N -98% Mn -TR X-ray 6-62 (Bulk) Calc - M Grain Size 2-59 (3.4, 28.4, 68.2) Carbon Carbonate 6-58 (0.2, 0.0, 2)
		N	A	P	2					
		N	A	P	3					
		N	A	P	4					
		N	A	P	5					
		N	A	P	6					
		N	A	P	Core Catcher				CC	
		F	A	MG						
		D	A	M						
		S								
		R								
		N								

Site 284 Hole A Core 1 Cored Interval: 8.5-18.0 m

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY PLEISTOCENE		N	A	M	1	0.5, 1.0	VOID			Core is typically a FORAM, NANNO OOZE, very light gray (N8) to light gray (N7) in color. Sec. 5 shows a light gray with light olive gray (5Y 6/1) deformation (swirling). The core catcher contains a OSTRACOD, FORAM, NANNO OOZE. SS CC OST -30% F -30% N -40% Ech -TR
		N	A	M	2					
					3		VOID			
		N	A	M	4					
		N	A	M	5					
		N	A	M	6					
		N	A	M	Core Catcher				CC	
		F	A	G						
		D	A	M						
		S								
		R								
		N								

XC1

Site 284 Hole A Core 2 Cored Interval: 27.5-37.0 m



LITHOLOGIC DESCRIPTION

Core is a FORAM-RICH/FORAM-NANNO OOZE light gray (N7) in color. Other color variations occur and include: light gray (2.5Y 7/0) with a small amount of Mn and pyrite streaks in Sec. 2; olive green (5Y 6/4) (pale olive) with light gray (N7) in Sec. 3; swirled olive and gray with light gray (2.5Y 7/0) in Sec. 4; Mn burrows, light gray (N7) with light olive bands (5Y 6/1) in Secs. 4 and 5. The core catcher contains a FORAM AND OSTRACOD RICH NANNO OOZE.

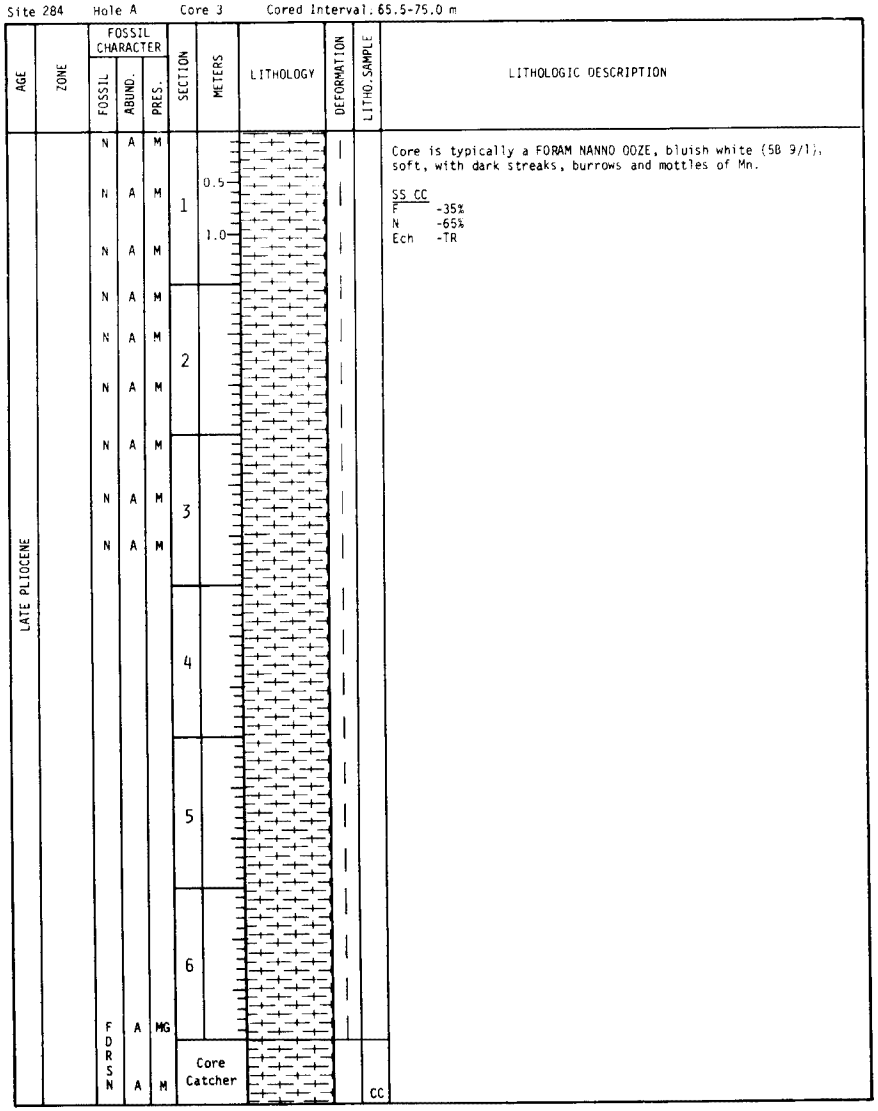
SS CC
F -20%
OST -25%
N -35%
G -TR
OP -TR

X-ray 2-67 (Bulk)
Calc - M
Quar - TR
Plag - TR
Mica - TR

Grain Size 2-65 (18.7, 26.3, 55.0)

Carbon Carbonate 2-63 (10.2, 0.2, 84)

Site 284 Hole A Core 3 Cored Interval: 65.5-75.0 m



LITHOLOGIC DESCRIPTION

Core is typically a FORAM NANNO OOZE, bluish white (5B 9/1), soft, with dark streaks, burrows and mottles of Mn.

SS CC
F -35%
N -65%
Ech -TR