INITIAL CORE DESCRIPTIONS

DEEP SEA DRILLING PROJECT

LEG 43

WESTERN NORTH ATLANTIC OCEAN

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

UNIVERSITY OF CALIFORNIA, SAN DIEGO

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SCRIPPS INSTITUTION OF OCEANOGRAPHY

POST OFFICE BOX 1529
LA JOLLA, CALIFORNIA 92093

Dear Colleague:

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

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

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

Sincerely,

David G. Moore
Chief Scientist
Deep Sea Drilling Project

INITIAL CORE DESCRIPTION (ICD)

DEEP SEA DRILLING PROJECT

LEG 43

June 13, 1975 — August 12, 1975

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

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INITIAL CORE DESCRIPTIONS - LEG 43

INTRODUCTION

Leg 43 marked the return of the GLOMAR CHALLENGER to the western North Atlantic, an area that had remained undrilled since the earlier phases of the Deep Sea Drilling Project. Drilling during Leg 43 had three specific objectives: (1) to drill into the lower flanks of the New England seamounts in order to see if there is an age progression in volcanism along this chain; (2) to determine the nature of the oceanic crust beneath the J anomaly, a prominent high-amplitude magnetic anomaly that is locally observed at the young end of the Keathley or M-series of anomalies in the North Atlantic; and (3) to determine the nature and age of a series of seismic reflection horizons on the Bermuda Rise that are used for stratigraphic mapping in the North American Basin.

Six sites were drilled during Leg 43, two to fulfill each of these objectives (Figure 1). Lithology and Stratigraphy of the sites are indicated in Figure 2, and site data are given in Table 1.

Sites 382 and 385 penetrated the lower flanks of Nashville and Vogel seamounts, respectively and recovered upper Cretaceous volcaniclastic breccias that probably represent the last phases of volcanism at these sites. Unfortunately, poor paleontological age control in the volcanics does not allow any firm conclusions to be drawn about the relative age of volcanism at these two sites.

Sites 383 and 384 were drilled on the J anomaly, Site 383, on the Sohm abyssal plain, was terminated prematurely because of severe hole instability problems due to caving of coarse Pleistocene turbidite sands. Site 384 was drilled further north where the basement ridge that underlies the J anomaly rises above the level of the Sohm abyssal plain. Basement here is overlain by Aptian reef carbonates, an upper Cretaceous through lower Eocene calcareous pelagic ooze sequence, and a highly condensed Neogene section (uncored). Basement, on first examination, appears to be a rather normal diabasic basalt of mid-ocean-ridge affinities. Additional work will be needed to establish the origin of the J anomaly.

Sites 386 and 387 were cored to basement on the Bermuda Rise. The oldest sediments at Site 386 are black Aptian claystones, while at Site 387 the lowest sediments are gray lower Cretaceous limestones. Both sites reaffirm the now well documented Cretaceous stagnation phase that affected large portions of the Atlantic. They also show that the timing and duration of stagnant conditions were subject to local physiographic controls. Whereas the euxinic phase at Site 386 ended in the late Cenomanian, black clays at Site 387 continue well into the upper Cretaceous, with short intervals persisting into the Danian. Paleogene deposition on the Bermuda Rise was characterixed by rapid accumulation of siliceous muds and the Neogene by poorly fossiliferous silty clays.

The present volume contains descriptions of Leg 43 core materials. The core descriptions for each site are prefaced by a brief summary

of principal geological results. For a fuller discussion of Leg 43 results, reference is made to the report published in Geotimes (December, 1975, v. 20, no. 12). Leg 43 core materials become available for distribution to interested scientists on August 12, 1976. For purposes of sample selection it is recommended that the following section of explanatory material be read.

TABLE 1. SITE DATA.

Leg 43—drilling and coring summary hole	dates (1975)	latitude longitude	water depth (m)	penetration	no. of cores	oldest sediment	deepest unit
382	July 5-9	34°25.04'N 56°32.25'W	5,527	520.5m	25	Coniacian- Santonian	volcaniclastic breccia
383	July 10-12	39°14.88'N 53°21.18'W	5,277	120.3m	2	Pleistocene	sand
384	July 12-15	40°21.65'N 51°39.80'W	3,910	330.3m	22	Aptian or older	basalt
385	July 18-20	37°22.17'N 60°09.45'W	4,956	392.9m	24	Lower Maestrichtian or older	volcaniclastic breccia
386	July 24-31	31°11.21'N 64°14.94'W	4,783	973.8m	66	Upper Aptian- Lower Albian	basalt
387	Aug. 1-7	32°19.2'N 67°40'W	5,118	794.5m	50	Upper Berriasian- Lower Valanginian	basalt
			totals	3132.3m	189		

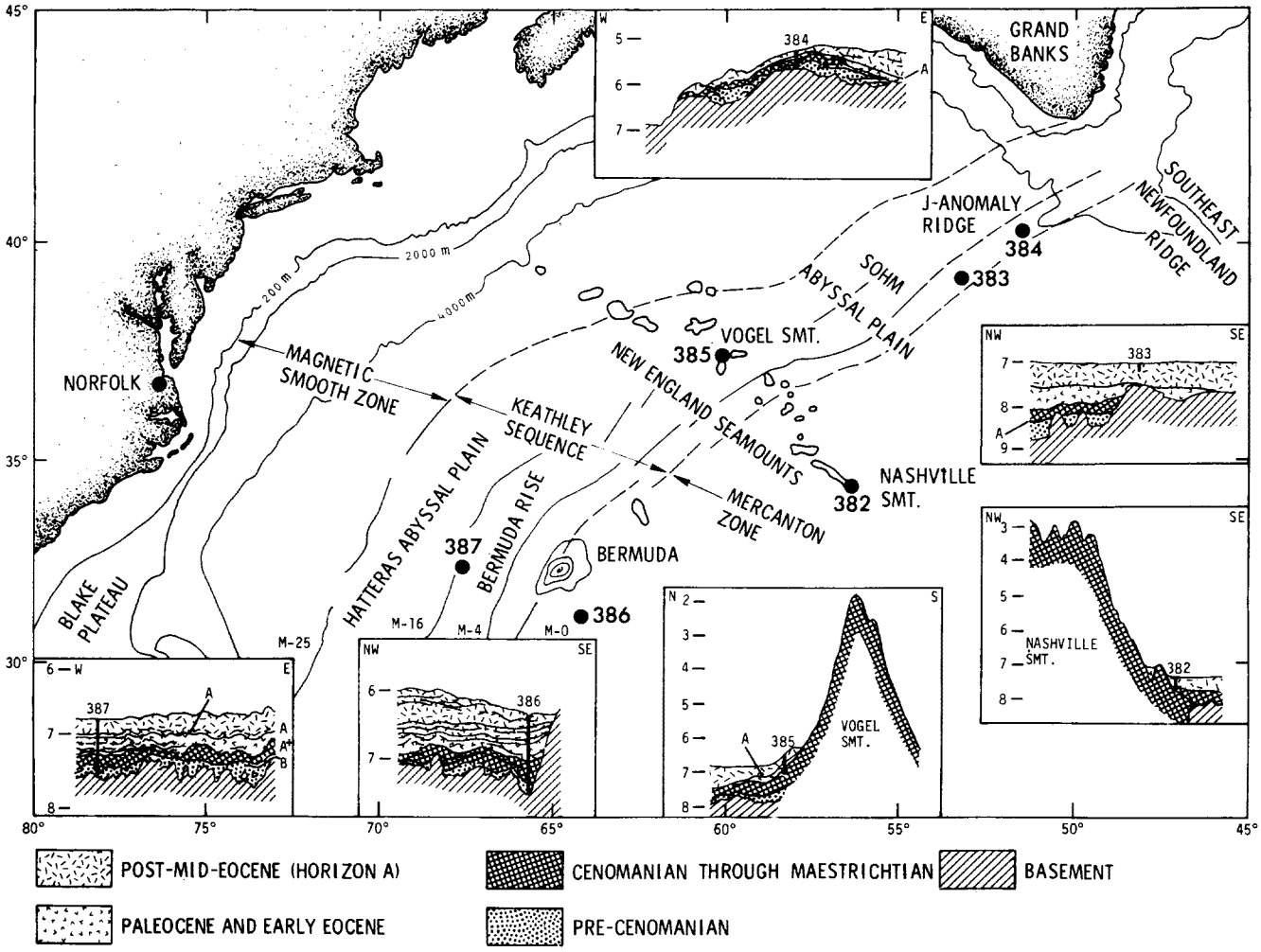

Figure 1. LEG 43 DRILL SITES

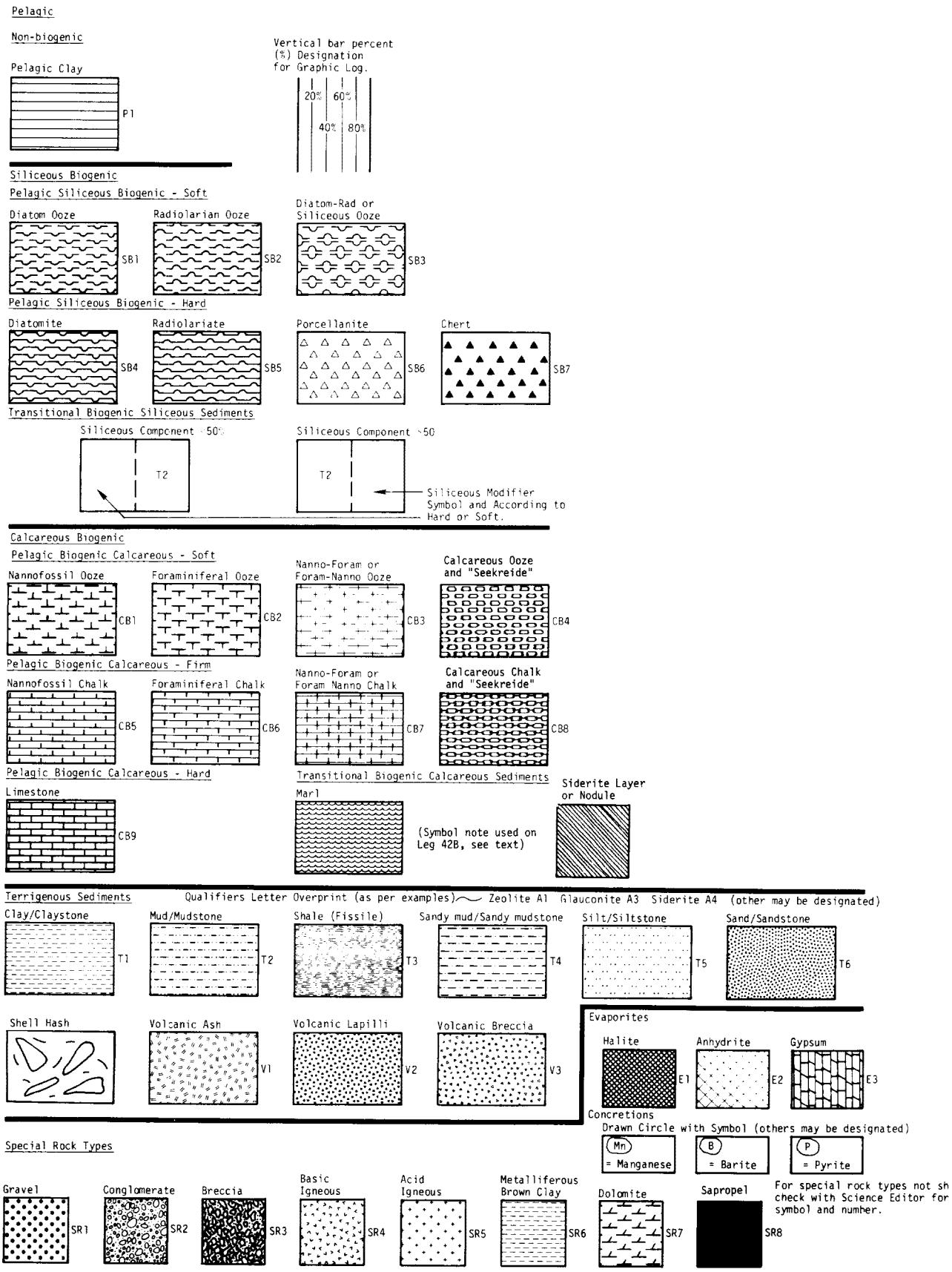

Figure 2. Graphic symbols to accompany the lithologic classification scheme.

EXPLANATORY NOTES

Introduction

Persons wishing to obtain samples are directed to the DSDP-NSF sample distribution policy (reproduced herein, p. 20). Sample requests must be submitted on standard DSDP request forms which may be obtained from:

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

The following material is intended as an aid in understanding:

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

(2) the sediment classification and biostratigraphic framework used on Leg 42A; and

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

Numbering of Sites, Hole, Cores, Samples

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

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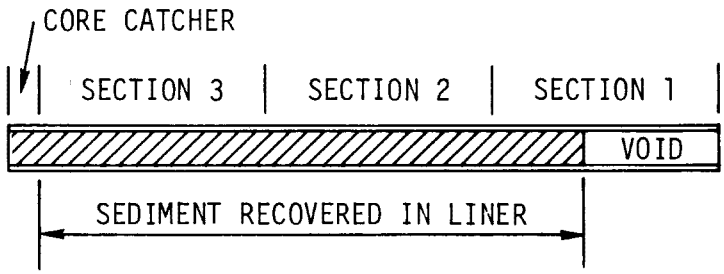
The first (or only) hole drilled at a site takes the site number. Additional holes at the same site are further distinguished by a letter suffix. The first hole has only the site number; the second has the site number with suffix A; the third has the site number with suffix B; and so forth. It is important, for sampling purposes, to distinguish the holes drilled at a site, since recovered sediments or rocks usually do not come from equivalent positions in the stratigraphic column at different holes.

Cores are number sequentially from the top down. In the ideal case, they consist of 9 meters of sediment or rock in a plastic liner of 6.6 cm diameter. In addition, a short sample is obtained from the core catcher (a multi-fingered device at the bottom of the core barrel which prevents cored materials from sliding out during core-barrel recovery). This usually amounts to about 20 cm of sediment or rock. During Leg 43 the core catcher sample was split, described, and stored along with the rest of the core, if at all possible, taking care to maintain its proper vertical orientation. This sample represents the lowest stratum recovered in a particular cored interval. The core catcher sample is designated by CC (e.g., 382-4, CC is the core catcher sample of the fourth core taken at Site 382).

The cored interval is the interval in meters below the sea floor measured from the point at which coring for a particular core was started to the point at which it was terminated. This interval is generally 9.5 meters (nominal length of a core barrel) but may be shorter if conditions dictate. Cores and cored intervals need not be contiguous. In soft sediment, the drill string can be "washed

ahead" without recovering core by applying sufficiently high pump pressure to wash sediment out of the way of the bit. In a similar manner, a center bit, which fills the opening in the bit face, can replace the core barrel if drilling ahead in hard sediments without coring is necessary.

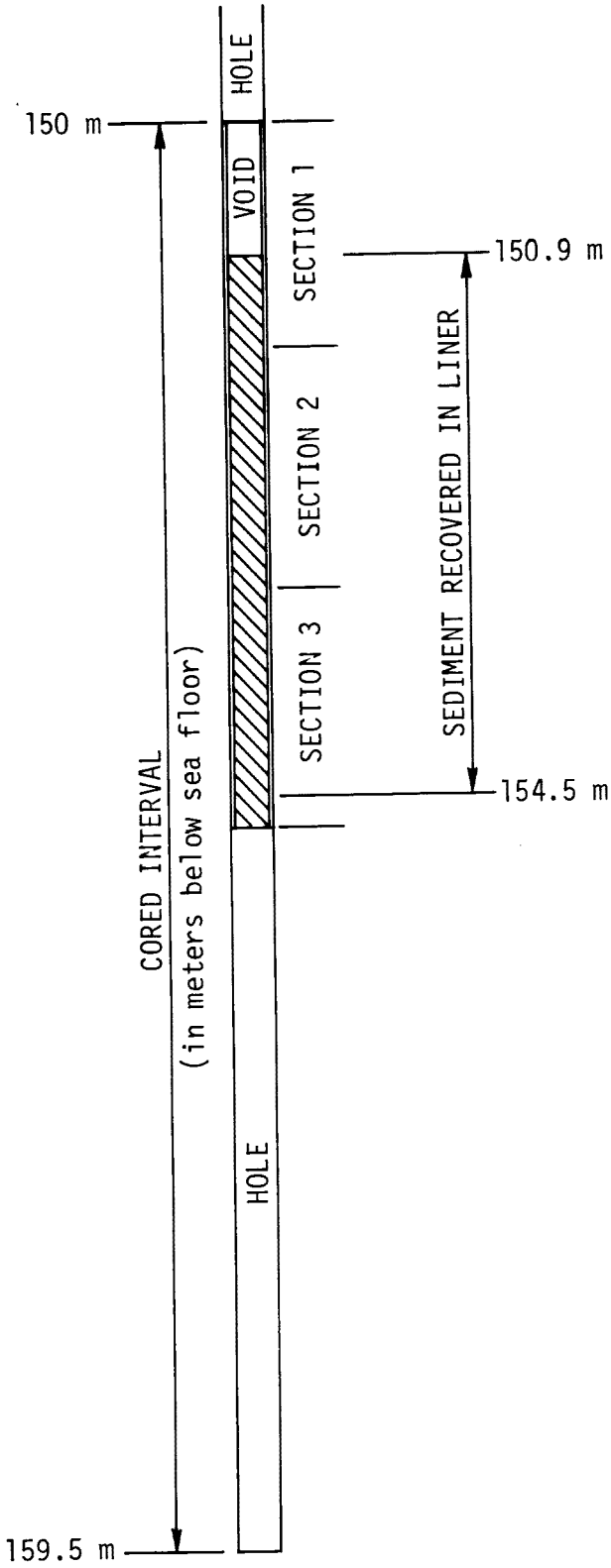
When a core is brought aboard the GLOMAR CHALLENGER it is labeled and the plastic liner and core cut into 1.5-meter sections. A full, 9-meter core would thus consist of six sections, numbered from the top down, 1 to 6. (The discrepancy between the 9-meter core and 9.5-meter cored interval is discussed below.) Generally, something less than 9 meters is recovered. In this case, the sections are still numbered starting with one at the top, but the number of sections is the number of 1.5-meter intervals needed to accomodate the length of core recovered; this is illustrated below:



Thus, as shown, recovery of 3.6 meters of sediment would result in a core with 3 sections, with a void of 0.9 meters at the top of the first section. By convention, and for convenience in routine data handling at the Deep Sea Drilling Project, if a core contains a length of material less than the length of the cored interval, the

recovered material is placed in the top of the cored interval, with the top of Section 1, rather than the top of the sediment, equal to the top of the cored interval. This is shown below for the core in the above example. Thus, the depth below the sea floor of the top of the sediment of this hypothetical core would lie at 150.9 meters (not 150.0 m) and the bottom at 154.5 meters.

It was noted above that a discrepancy exists between the usual coring interval of 9.5 meters and the 9-meter length of core recovered. The core liners used are actually 9.28 meters in length, and the core catcher accounts for another 0.2 meters. In cases where the core liner is recovered full to the top, the core is still cut into six 1.5-meter sections,



measured from the bottom of the liner, and the extra 0.28-meter section at the top is designated Section 0, or the "Zero Section". On Leg 43 every attempt was made to split and describe all zero sections. In the case of cores with zero sections, depth below sea floor is calculated by placing the top of Section 0 at the top of the cored interval.

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

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

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

Site 382-1-3, 122-124 cm (10cc) designates a 10cc sample taken from Section 2 of Core 1 from the second hole drilled at Site 382. The depth below the sea floor for this sample would then be the depth to the top of the cored interval (46 meters in the example above) plus 3 meters for Sections 1 and 2, plus 122 cm (depth below the top of Section 3), or 50.2 meters. Note, however, that subsequent

sample requests should refer to a specific interval within a core section (in centimeters) rather than depth in meters below the sea floor.

Core Disturbance

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

---- Slightly deformed; bedding contacts slight bent.

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

≀ Highly deformed; bedding completely disturbed, often showing symmetrical diapir-like structures.

o o o Soupy, or drilling breccia; water-saturated intervals that have lost all aspects of original bedding and sediment cohesiveness.

Consolidated sediments and rocks seldom show much internal deformation, but are usually broken by drilling into cylindrical pieces of varying length. There is frequently no indication if adjacent pieces in the core liner are actually contiguous or if intervening sediment has been lost during drilling. The symbol (-o-o-o-) was used for cylindrical pieces of core separated by intervals of drilling breccia or injected (remolded) softer sediment.

Smear Slides

The lithologic classification of sediments is based on visual

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

Carbonate Data

During Leg 43, extensive use was made of the carbonate bomb device as an aid in sediment classification. This device is basically a cylindrical vessel with pressure gauge in which a sediment sample of known weight is reacted with acid. The pressure of CO_2 generated is measured and converted to percent carbonate. Accuracy to within ±5% total carbonate has been quoted for the device. Shipboard carbonate bomb data are listed in a separate column on the core description sheet.

Samples were taken from DSDP shore-base carbon-carbonate analysis using the Leco 70-second Analyser. These are also listed on the core description sheet and are distinguished from carbonate bomb values by italic type. Organic carbon content values obtained in the

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Leco analyses are given in tabular form following core description sheets for each site.

X-ray Mineralogical Analyses

X-ray mineralogical analyses of Leg 43 sediments were provided by P. Rothe of the Leg 43 staff. These data are presented in tabular form following the core description sheets of each site. The percentages of constituent minerals are summed to 100% and are normalized to percent carbonate as determined by the bomb technique. The clay-mineral composition of the <2μm fraction is also given. At the time of this compilation, sediment names are based on the shipboard description of smear slides and have not been changed to resolve any discrepancies with the X-ray data.

Sediment Induration

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

a). Calcareous sediments

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

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

Hard:Cemented rocks are termed limestones.

b). The following criteria are used for other sediments:

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

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

Sediment Classification

The sediment classification scheme used on Leg 43 is basically that devised by the JOIDES Panel on Sedimentary Petrology and Physical Properties and adopted for use by the JOIDES Planning Committee in March, 1974, with minor modifications. The classification is outlined below.

I. General rules for class limits and order of components in a sediment name.

A. Sediment assumes the names of those components present only in quantities greater than 15%.

B. Where more than one component is present, the component in greatest abundance is listed farthest to the right, and other components are listed progressively to the left in order of decreasing abundance.

C. The class limits are based on percentage intervals given below for various sediment types.

II. Pelagic Clay

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

III. Pelagic Siliceous BIogenic Sediments

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

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

IV. Transitional Biogenic Siliceous Sediments

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

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

V. Pelagic Biogenic Calcareous Sediments

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

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

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

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

VI. Transitional Biogenic Calcareous Sediments

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

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

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

If $CaCO_3$ >60%:

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

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

VII. Terrigenous Sediments

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

Sediments in this category are subdivided into textural groups on the basis of the relative proportions of three grain-size components, i.e. sand, silt and clay. Sediments coarser than sand-size are treated as "Special Rock Types." The size limits are those defined by Wentworth (1922). The textural classification is according to the triangular diagram of Shepard (1954) (Figure). The suffix "-stone" is used to indicate hard or consolidated equivalents of the unconsolidated sediments.

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

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

VIII. Volcanogenic Sediments

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

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

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

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

IX. Special Rock Types

A. Volcanogenic sediments cored at Sites 382 and 385 include units with clastic volcanic components >32 mm in size which appear to have been displaced to deep water by gravitational processes and which may include pyroclastic debris. These rocks are referred to as "volcaniclastic breccias."

B. Limestones cored at Site 384 contain shallow-water reefal debris with a variety of calcite cement. These bioclastic limestones are classified according to the format of Folk (1962, 1968).

Biostratigraphy

At the time of this compilation biostratigraphic studies of Leg 43 material are still in progress. Revisions in nannofossil ages to date have been incorporated. A radiolarian specialist was not on board CHALLENGER during Leg 43; radiolarian zonal assignments should therefore by regarded as tentative. Major changes in the position of principal boundaries, however, are unlikely.

The Cenozoic planktonic foraminifer zonation used follows the letter/number scheme of Blow (1969). Cretaceous foraminifer zones follows the definitions of Cita and Gartner (1971) and van Hinte (1972). The nannofossil zonation is a composite one based on those of Martini (1971), Bukry (1975), and Gartner (1974). The letter/number designations of Martini are used with subzones distinguished by lower-case letters that follow the zone number.

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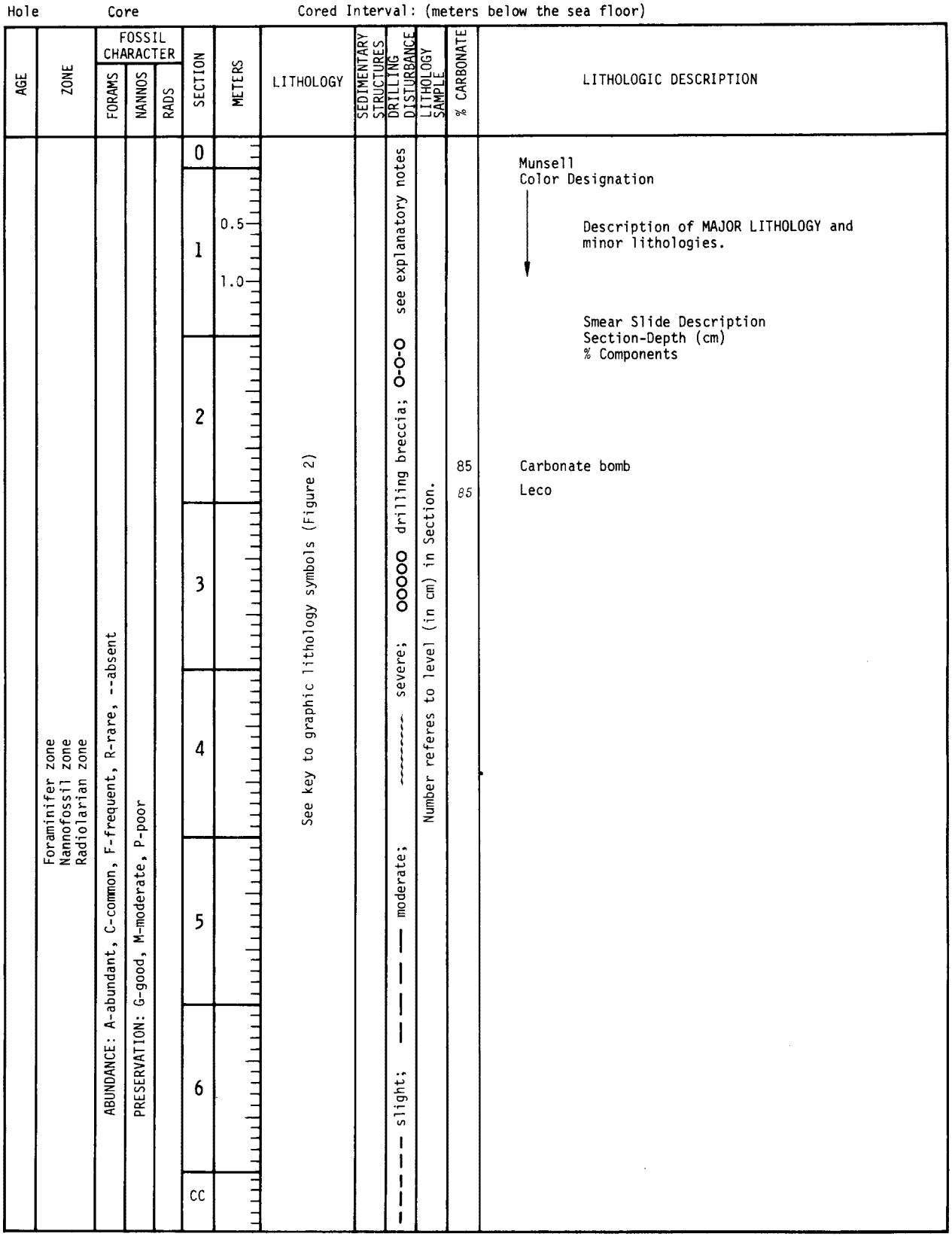

Figure 3. Sample core form.

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, (2) provide individual investigators with material to conduct detailed studies beyond the scope of the Initial Reports, and (3) provide reference material for up to five reference centers where paleontologic materials are or will be available for reference/comparison purposes.

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.

1. 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 Chief Scientist, Deep Sea Drilling Project, Scripps Institution of Oceanography, University of California, San Diego, La Jolla, California 92093, 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 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 DSDP Chief Scientist who will authorize distribution of the samples. The Deep Sea Drilling Project and cruise Chief Scientists will strive to ensure that there is 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 though it is expected that they will normally be published as an appendix in a later Initial Report volume.

2. Distribution of Samples for Publication Other Than in Initial Reports

(A) Researchers intending to request samples for studies beyond the scope of the Initial Reports should first obtain a sample request form from the Curator, Deep Sea Drilling Project, Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093. 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 the publication of an Initial Report, requests for samples from a cruise can be based on the Initial Core Descriptions (ICDs). Copies of the ICDs will be kept on open file at Scripps Institution of Oceanography and other designated institutions. The only exceptions to this policy will be for specific instances involving requests for sands with 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 and handled in a like manner.

(B) The Deep Sea Drilling Project's 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 Institution of Oceanography by the Curator or his designated representative.

(C) (i) Samples up to 50 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 or limited supply, 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 also generally require Panel review. (ii) All requests for samples in excess of (C) (i) above will be referred to the Sample Distribution Panel. (iii) 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.

(D) 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.

(E) 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 five (5) copies of all reprints of published results to the Curator, Deep Sea Drilling Project, Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093; (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.

(F) 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 (C) (i) (ii) (iii) and (E) above, and with the specific permission of the Curator or his delegate.

(G) 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.

(H) The Deep Sea Drilling Project routinely processes by computer most of the quantitative data presented in the Initial Reports. Space limitations in the Initial Reports preclude the detailed presentation of all such data. However, copies of the computer readout are available for those who wish the data for further analysis or as an aid in selecting samples.

3. Reference Centers

As a separate and special category, samples may be distributed for the purpose of establishing up to five reference centers where paleontologic materials are available for reference/comparison purposes. Such reference centers shall be approved by the National Science Foundation before sample distribution. Samples will be distributed to the institution managing the reference center. Therefore assurance of adequate long-term curatorial management is a requisite of the establishment of any such reference center.

4. Other Records

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

Requests for these data may be made to Director, Science Services, Deep Sea Drilling Project, Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093.

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

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.

DEEP SEA DRILLING PROJECT

LEG 43 SITE 382

SITE SUMMARY SHEET

POSITION: Latitude: 34°25.05'N Longitude: 56°32.25'W

Water depth (sea level): 5526 corrected meters, echo sounding

Bottom felt at: 5537 meters, drill pipe Penetration: 520.5 meters

Number of holes: 1 Number of cores: 25

Total length of cored section: 232.2 meters

Total core recovered: 163.4 meters

OLDEST SEDIMENT CORED:

Depth subbottom: 520.5 meters Nature: Volcaniclastic breccia

Age: Coniacian-Santonian or older

BASEMENT*:

Depth subbottom: 520.5 meters Nature: Volcaniclastic breccia

Velocity range: 3.4-4.2 km/s

PRINCIPAL RESULTS:

The sedimentary section above the buried eastern flank of Nashville Seamount was sampled down to subbottom depth of 520.5 meters. The hole bottomed in coarse volcaniclastic breccia attributed to volcanism on Nashville Seamount. Slow progress of penetrating the breccia and consideration of time restrictions led us to abandon the hole at this level.

The sedimentary sequence at Site 382 can be summarized as follows, (with average sedimentation rates in parentheses): 0 to 232 meters subbottom depth, Quaternary clays, silty clays, and silts (120 m/m.y.);

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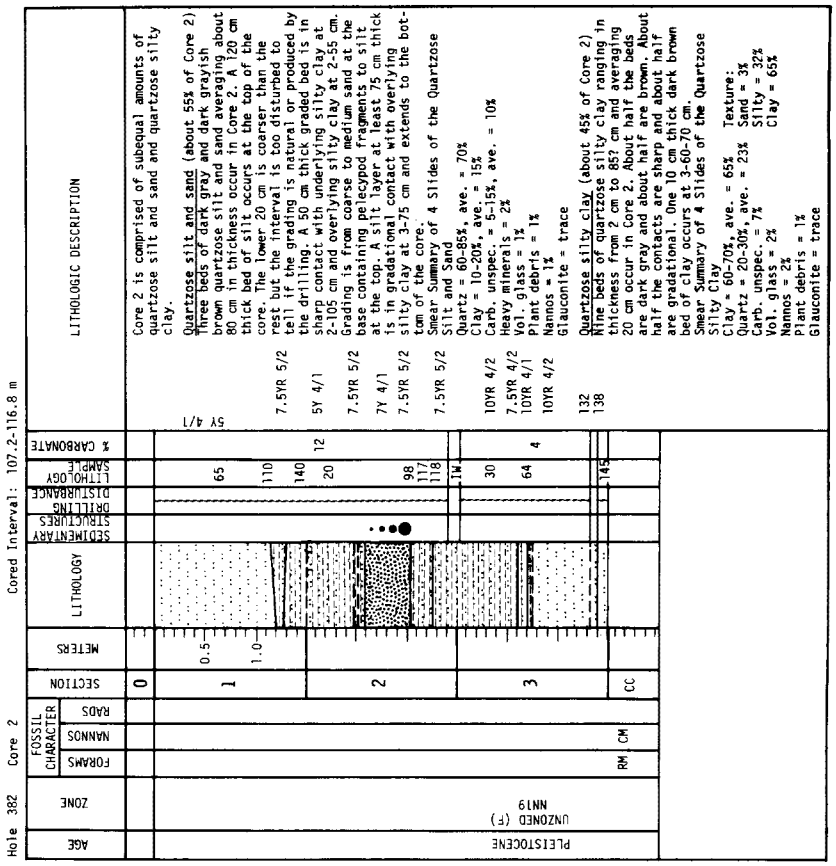
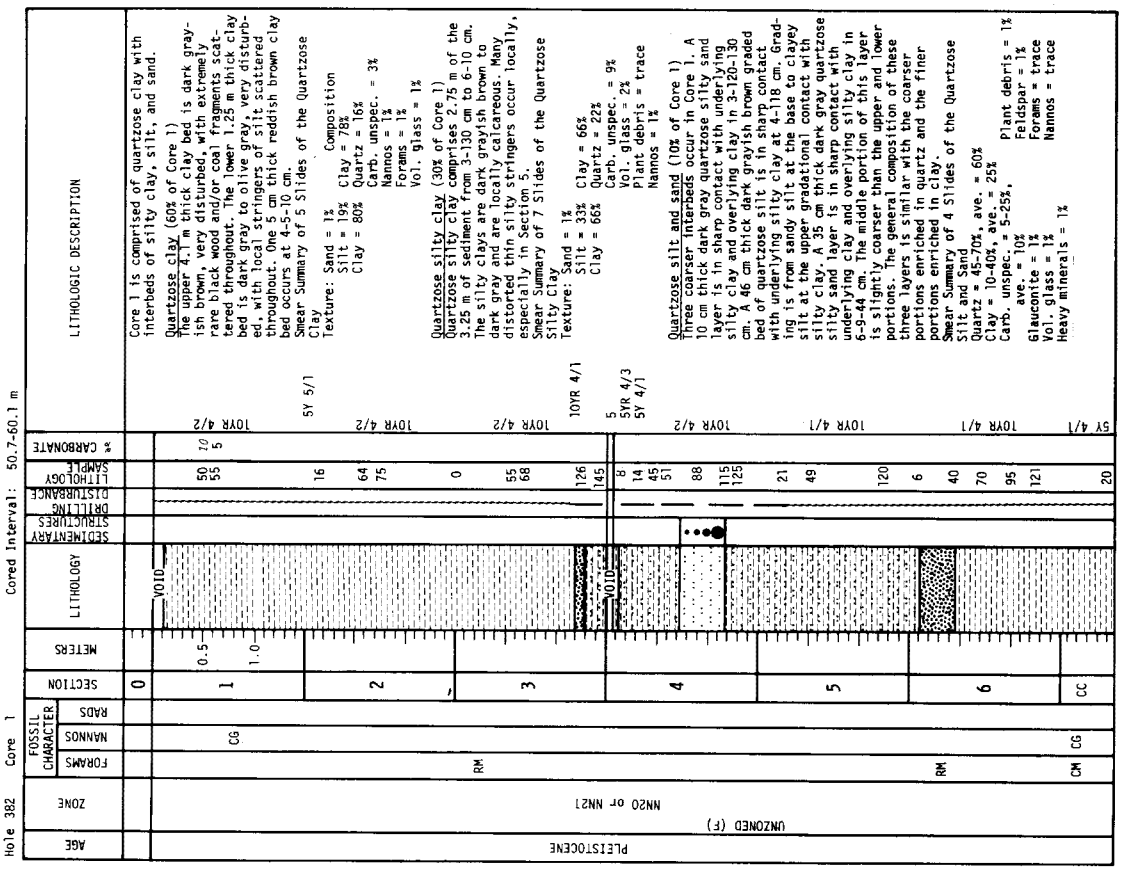
*Basement here is the top of seamount flank volcanics, and not original oceanic basement which lies an indeterminate distance further down.

25

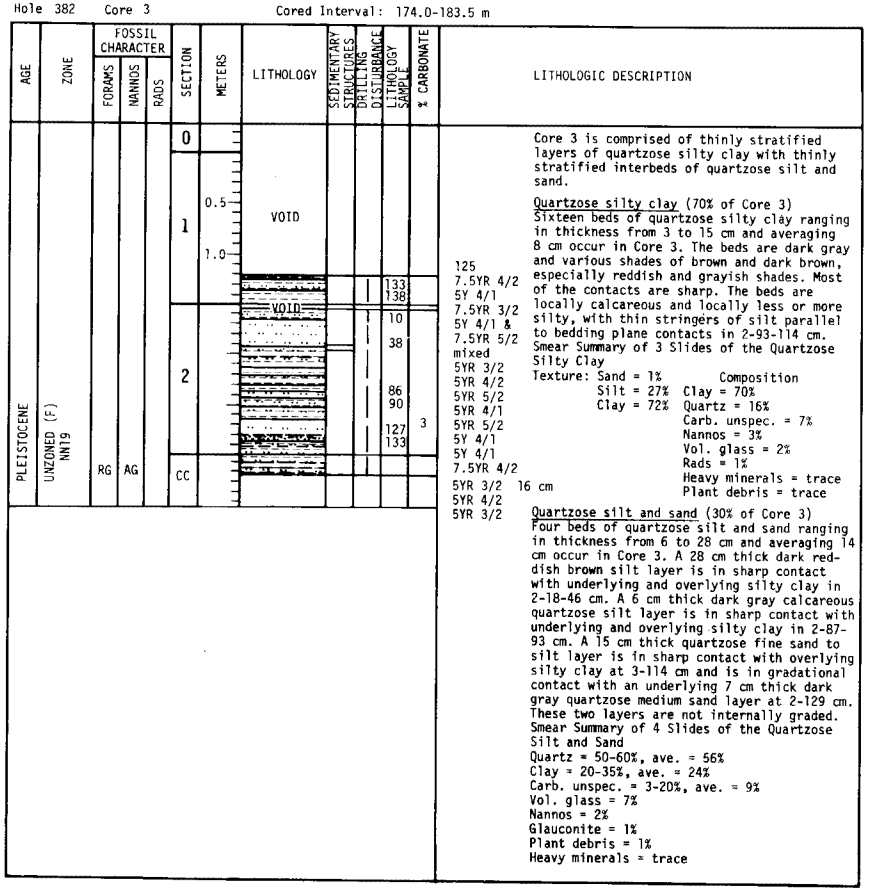
232-352 meters, mid-Pliocene to lower Miocene hemipelagic clays (8 m/m.y.); 352-385 meters, Maestrichtian to Campanian varicolored (volcanogenic) silty clays (2 m/m.y.); 385-520.5 meters, lower Campanian volcanogenic clay, silty clay, marly limestone and volcaniclastic breccia overlying Coniacian-Santonian volcanogenic claystones and sandstones over breccia (12 m/m.y.). A hiatus of some 40 m.y. occurs between the lower Miocene and the Maestrichtian. The rapidly deposited Quaternary silty clays represent a succession of distal turbidites and show that the Sohm abyssal plain did not spread this far until the early Pleistocene. The 40 m.y. hiatus probably reflects some combination of current erosion and local slumping off the seamount's flanks. Volcanic activity on Nashville Seamount was already in progress in the Coniacian-Santonian and continued to produce coarse volcaniclastic debris into the Campanian. This volcanism helps explain the relatively high sedimentation rate (12 m/m.y.) during this interval. High vesicularity of basaltic clasts indicates that the summit of Nashville Seamount was close to sea level, or even emergent, during the interval Coniacian-Santonian to Campanian. Finer-grained deposits and lower sedimentation rates during the Maestrichtian suggest a waning of volcanic activity, if in fact the material was not introduced from more distant sources. Numerous Campanian to lower Maestrichtian ash horizons encountered 450 km away at DSDP Site 10 may have been derived from Nashville Seamount.

Although the "original" basement was probably not reached, we estimated that about 10-15 m.y. elapsed between formation of basement and the lowermost breccia. Measured along the flow lines of plate motion, Site 382 lies exactly midway between anomaly J-6 and DSDP Site 10. The former is believed to date from 113-117 m.y. BP and the latter (lower to mid-Campanian) from 75-80 m.y. BP. If the late Cretaceous to Eocene sedimentation rate (2 m/m.y.) measured at Stie 9 also applies at Site 382, a minimum of 20-30 meters of sediment may be present between the lower breccia and original basement.


Hole 382 Core 2 Cored Interval: 107.2-116.8 m
AGE
ZONE
FORAMS
NANNOS
RADS
FOSSIL CHARACTER
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
PLEISTOCENE
UNZONED (F)
NN19
RM CM
Core 2 is comprised of subequal amounts of quartzose silt and sand and quartzose silty clay.
Quartzose silt and sand (about 55% of Core 2) Three beds of dark gray and dark grayish brown quartzose silt and sand averaging about 80 cm in thickness occur in Core 2. A 120 cm thick bed of silt occurs at the top of the core. The lower 20 cm is coarser than the rest but the interval is too disturbed to tell if the grading is natural or produced by the drilling. A 50 cm thick graded bed is in sharp contact with underlying silty clay at 2-105 cm and overlying silty clay at 2-55 cm. Grading is from coarse to medium sand at the base containing pelecypod fragments to silt at the top. A silt layer at least 75 cm thick is in gradational contact with overlying silty clay at 3-75 cm and extends to the bottom of the core.
Smear Summary of 4 Slides of the Quartzose Silt and Sand
Quartz = 60-85%, ave. = 70%
Clay = 10-20%, ave. = 15%
Carb. unspec. = 5-15%, ave. = 10%
Heavy minerals = 2%
Vol. glass = 1%
Plant debris = 1%
Nannos = 1%
Glauconite = trace
Quartzose silty clay (about 45% of Core 2) Nine beds of quartzose silty clay ranging in thickness from 2 cm to 857 cm and averaging 20 cm occur in Core 2. About half the beds are dark gray and about half are brown. About half the contacts are sharp and about half are gradational. One 10 cm thick dark brown bed of clay occurs at 3-60-70 cm.
Smear Summary of 4 Slides of the Quartzose Silty Clay
Clay = 60-70%, ave. = 65%
Quartz = 20-30%, ave. = 23%
Carb. unspec. = 7%
Vol. glass = 2%
Nannos = 2%
Plant debris = 1%
Glauconite = trace
Texture:
Sand = 3%
Silty = 32%
Clay = 65%


Hole 382 Core 1 Cored Interval: 50.7-60.1 m
AGE
ZONE
FORAMS
NANNOS
RADS
FOSSIL CHARACTER
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
PLEISTOCENE
UNZONED (F)
NN20 or NN21
RM CM CG
Core 1 is comprised of quartzose clay with interbeds of silty clay, silt, and sand.
Quartzose clay (60% of Core 1) The upper 4.1 m thick clay bed is dark grayish brown, very disturbed, with extremely rare black wood and/or coal fragments scattered throughout. The lower 1.25 m thick clay bed is dark gray to olive gray, very disturbed, with local stringers of silt scattered throughout. One 5 cm thick reddish brown clay bed occurs at 4-5-10 cm.
Smear Summary of 5 Slides of the Quartzose Clay
Texture: Sand = 1% Silt = 19% Clay = 80%
Composition
Clay = 78%
Quartz = 16%
Carb. unspec. = 3%
Nannos = 1%
Forams = 1%
Vol. glass = 1%
Quartzose silty clay (30% of Core 1) Quartzose silty clay comprises 2.75 m of the 3.25 m of sediment from 3-130 cm to 6-10 cm. The silty clays are dark grayish brown to dark gray and are locally calcareous. Many distorted thin silty stringers occur locally, especially in Section 5.
Smear Summary of 7 Slides of the Quartzose Silty Clay
Texture: Sand = 1% Silt = 33% Clay = 66%
Clay = 66%
Quartz = 22%
Carb. unspec. = 9%
Vol. glass = 2%
Plant debris = trace
Nannos = 1%
Quartzose silt and sand (10% of Core 1) Three coarser interbeds occur in Core 1. A 10 cm thick dark gray quartzose silty sand layer is in sharp contact with underlying silty clay and overlying clay in 3-120-130 cm. A 46 cm thick dark grayish brown graded bed of quartzose silt is in sharp contact with underlying silty clay at 4-118 cm. Grading is from sandy silt at the base to clayey silt at the upper gradational contact with silty clay. A 35 cm thick dark gray quartzose silty sand layer is in sharp contact with underlying clay and overlying silty clay in 6-9-44 cm. The middle portion of this layer is slightly coarser than the upper and lower portions. The general composition of these three layers is similar with the coarser portions enriched in quartz and the finer portions enriched in clay.
Smear Summary of 4 Slides of the Quartzose Silt and Sand
Quartz = 45-70%, ave. = 60%
Clay = 10-40%, ave. = 25%
Carb. unspec. = 5-25%, ave. = 10%
Glauconite = 1%
Vol. glass = 1%
Heavy minerals = 1%
Plant debris = 1%
Feldspar = 1%
Forams = trace
Nannos = trace
VOID
5Y 5/1
10YR 4/2
10YR 4/1
10YR 4/2
5YR 4/3
5Y 4/1
10YR 4/2
10YR 4/1
5Y 4/1

Hole 382 Core 3 Cored Interval: 174.0-183.5 m



LITHOLOGIC DESCRIPTION

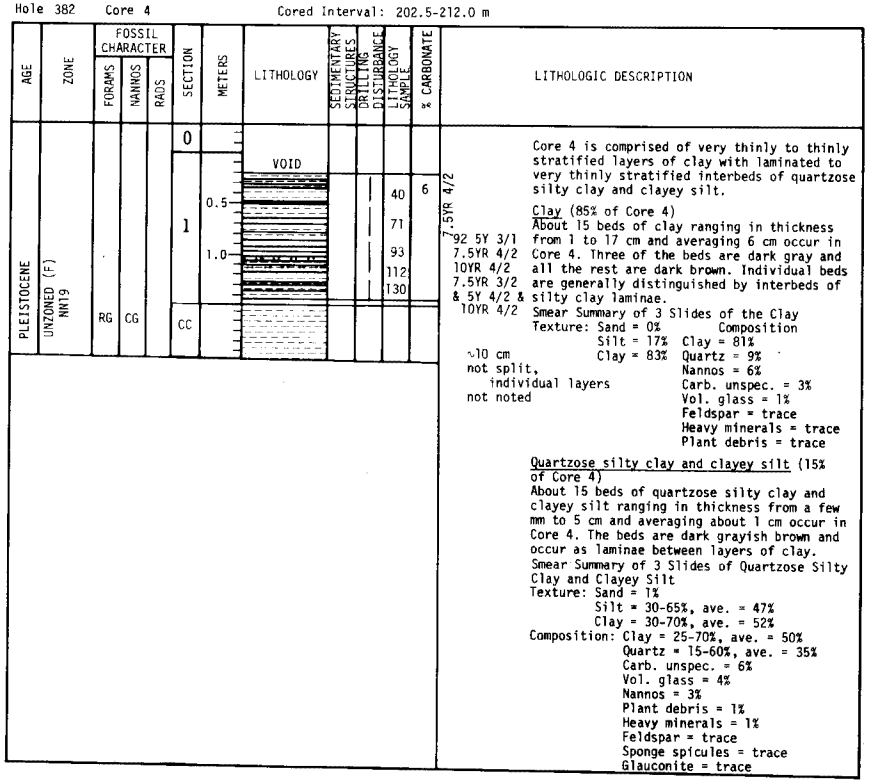
Core 3 is comprised of thinly stratified layers of quartzose silty clay with thinly stratified interbeds of quartzose silt and sand.

Quartzose silty clay (70% of Core 3)
Sixteen beds of quartzose silty clay ranging in thickness from 3 to 15 cm and averaging 8 cm occur in Core 3. The beds are dark gray and various shades of brown and dark brown, especially reddish and grayish shades. Most of the contacts are sharp. The beds are locally calcareous and locally less or more silty, with thin stringers of silt parallel to bedding plane contacts in 2-93-114 cm.
Smear Summary of 3 Slides of the Quartzose Silty Clay

Texture		Composition	
Sand = 1%			
Silt = 27%		Clay = 70%	
Clay = 72%		Quartz = 16%	
		Carb. unspec. = 7%	
		Nannos = 3%	
		Vol. glass = 2%	
		Rads = 1%	
		Heavy minerals = trace	
		Plant debris = trace	

Quartzose silt and sand (30% of Core 3)
Four beds of quartzose silt and sand ranging in thickness from 6 to 28 cm and averaging 14 cm occur in Core 3. A 28 cm thick dark reddish brown silt layer is in sharp contact with underlying and overlying silty clay in 2-18-46 cm. A 6 cm thick dark gray calcareous quartzose silt layer is in sharp contact with underlying and overlying silty clay in 2-87-93 cm. A 15 cm thick quartzose fine sand to silt layer is in sharp contact with overlying silty clay at 3-114 cm and is in gradational contact with an underlying 7 cm thick dark gray quartzose medium sand layer at 2-129 cm. These two layers are not internally graded.
Smear Summary of 4 Slides of the Quartzose Silt and Sand
Quartz = 50-60%, ave. = 56%
Clay = 20-35%, ave. = 24%
Carb. unspec. = 3-20%, ave. = 9%
Vol. glass = 7%
Nannos = 2%
Glauconite = 1%
Plant debris = 1%
Heavy minerals = trace

Hole 382 Core 4 Cored Interval: 202.5-212.0 m



LITHOLOGIC DESCRIPTION

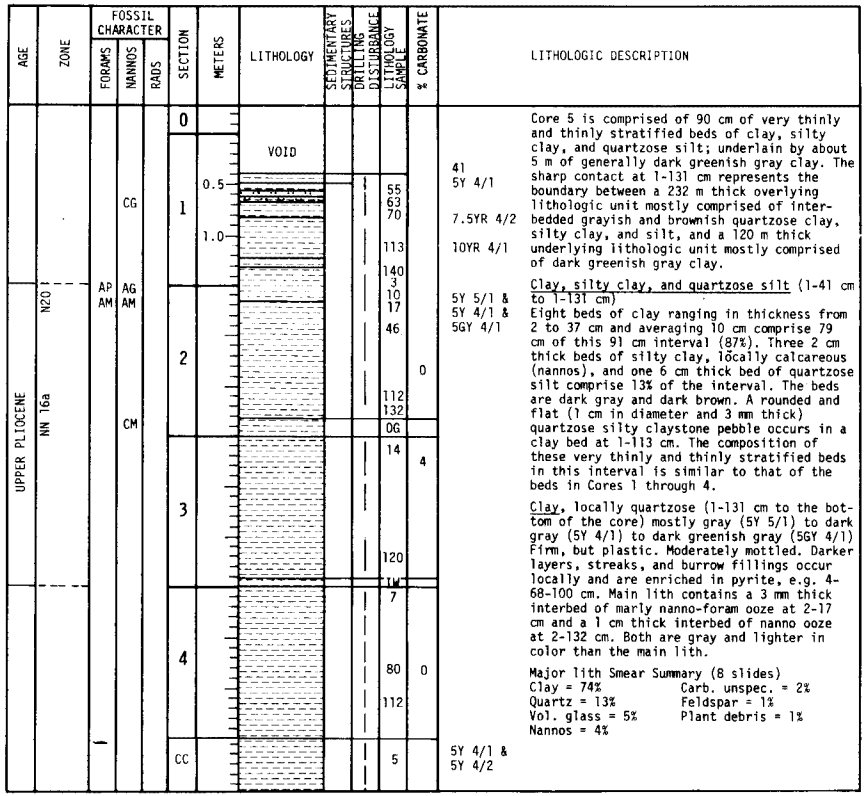
Core 4 is comprised of very thinly to thinly stratified layers of clay with laminated to very thinly stratified interbeds of quartzose silty clay and clayey silt.

Clay (85% of Core 4)
About 15 beds of clay ranging in thickness from 1 to 17 cm and averaging 6 cm occur in Core 4. Three of the beds are dark gray and all the rest are dark brown. Individual beds are generally distinguished by interbeds of silty clay laminae.
Smear Summary of 3 Slides of the Clay

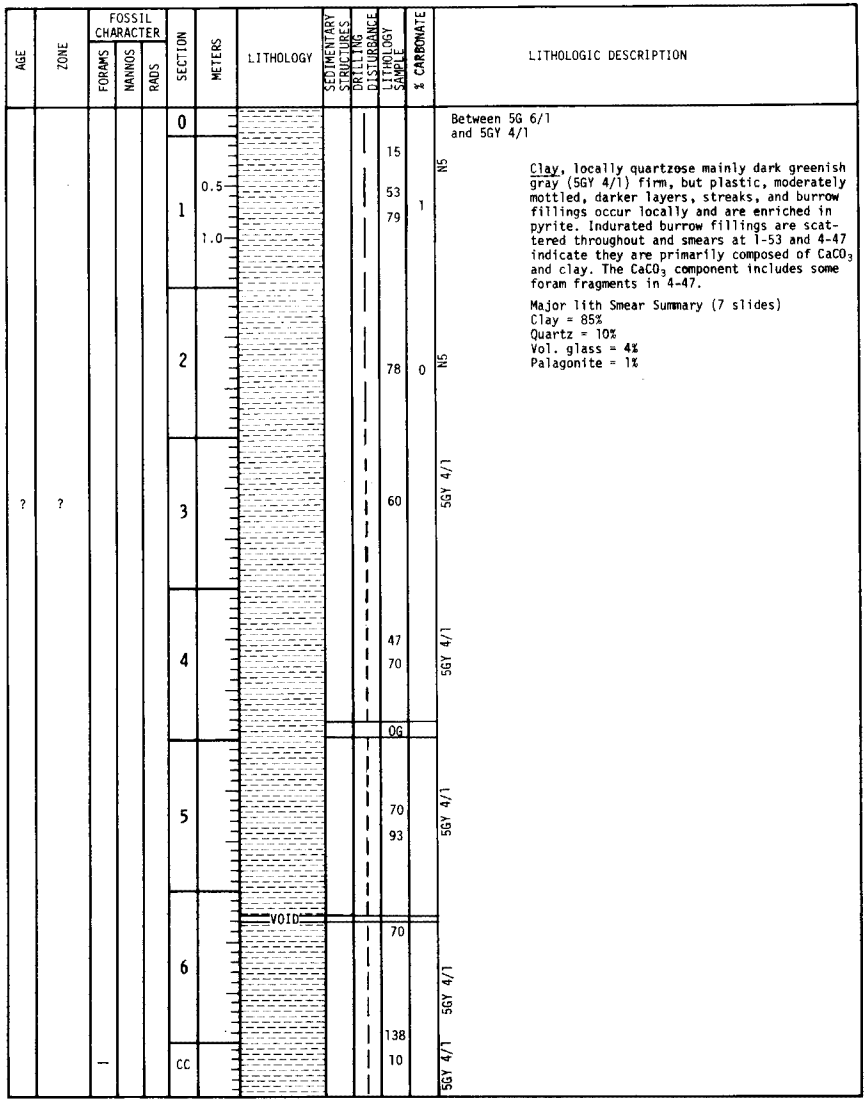
Texture		Composition	
Sand = 0%			
Silt = 17%		Clay = 81%	
Clay = 83%		Quartz = 9%	
		Nannos = 6%	
		Carb. unspec. = 3%	
		Vol. glass = 1%	
		Feldspar = trace	
		Heavy minerals = trace	
		Plant debris = trace	

Quartzose silty clay and clayey silt (15% of Core 4)
About 15 beds of quartzose silty clay and clayey silt ranging in thickness from a few mm to 5 cm and averaging about 1 cm occur in Core 4. The beds are dark grayish brown and occur as laminae between layers of clay.
Smear Summary of 3 Slides of Quartzose Silty Clay and Clayey Silt
Texture: Sand = 1%
Silt = 30-65%, ave. = 47%
Clay = 30-70%, ave. = 52%
Composition: Clay = 25-70%, ave. = 50%
Quartz = 15-60%, ave. = 35%
Carb. unspec. = 6%
Vol. glass = 4%
Nannos = 3%
Plant debris = 1%
Heavy minerals = 1%
Feldspar = trace
Sponge spicules = trace
Glauconite = trace

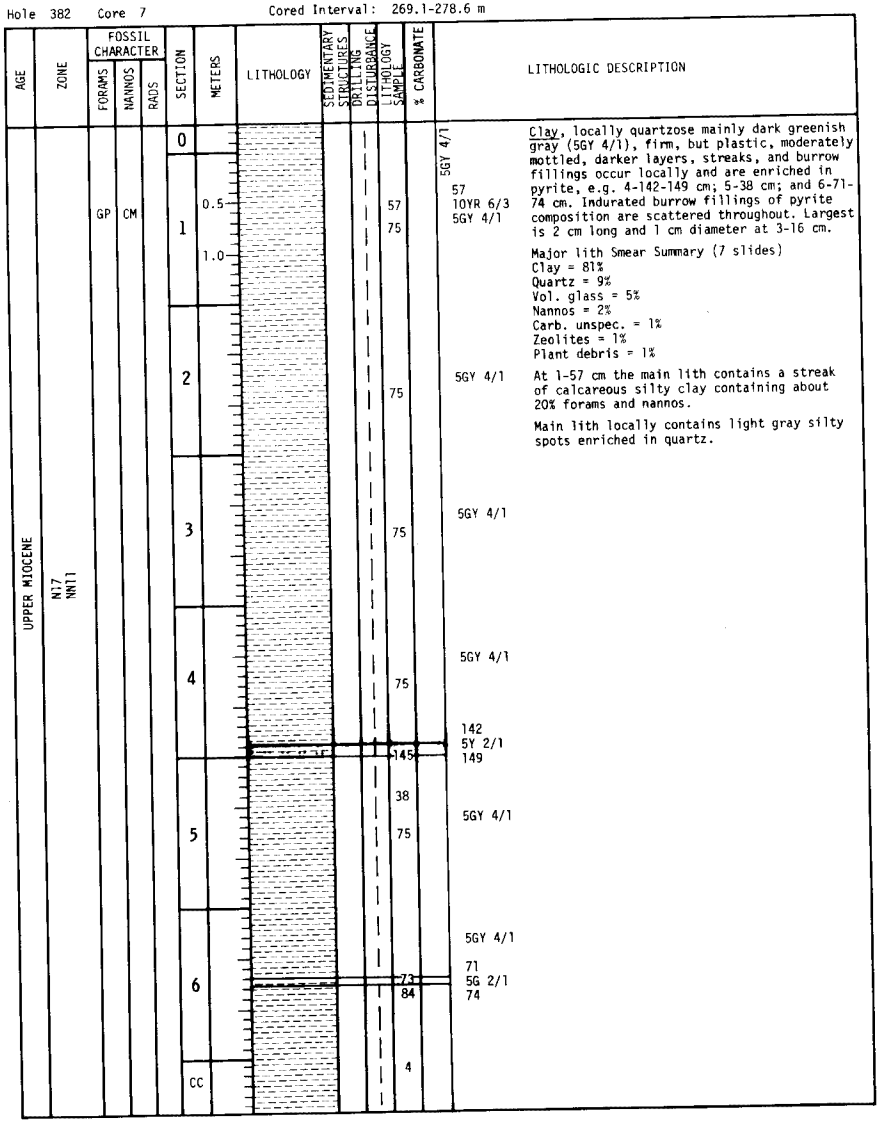
Hole 382 Core 5 Cored Interval: 231.0-240.5 m



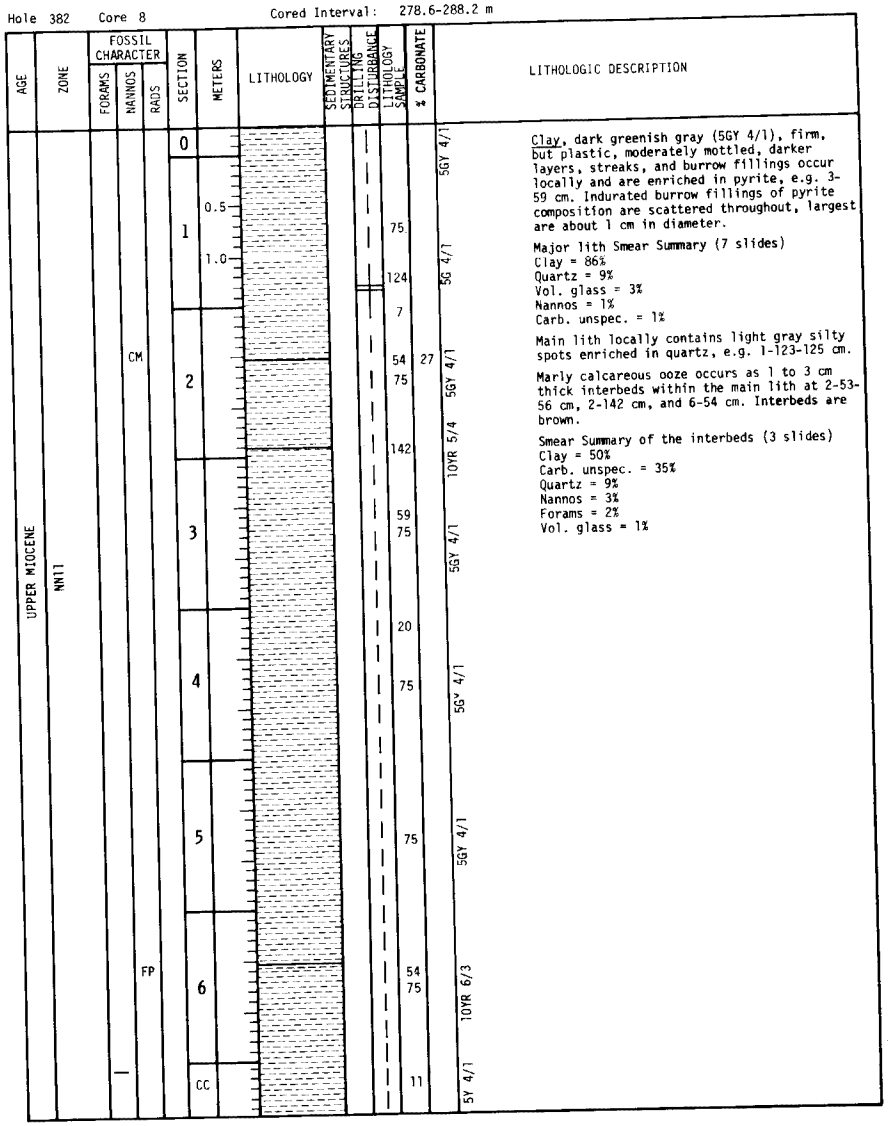
Hole 382 Core 6 Cored Interval: 250.1-259.6 m



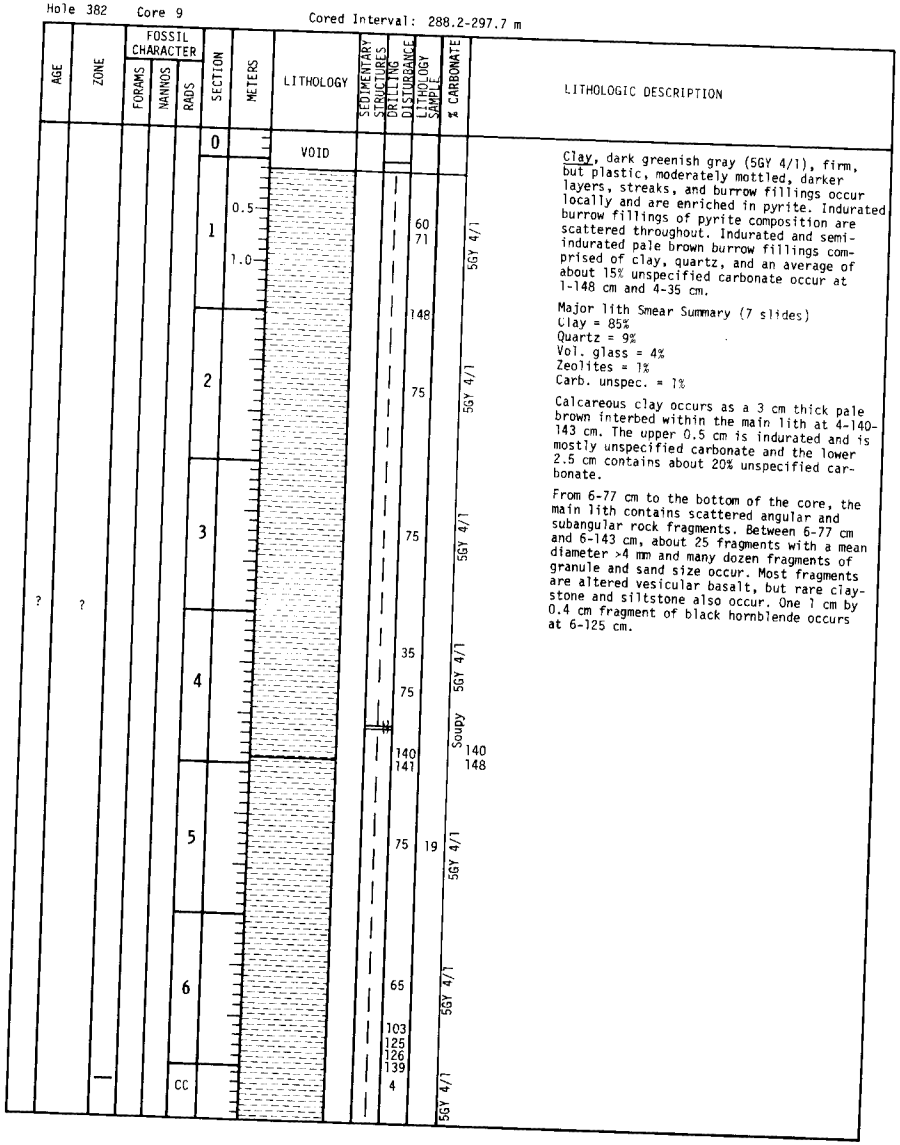
Hole 382 Core 7 Cored Interval: 269.1-278.6 m



Hole 382 Core 8 Cored Interval: 278.6-288.2 m



Hole 382 Core 9 Cored Interval: 288.2-297.7 m



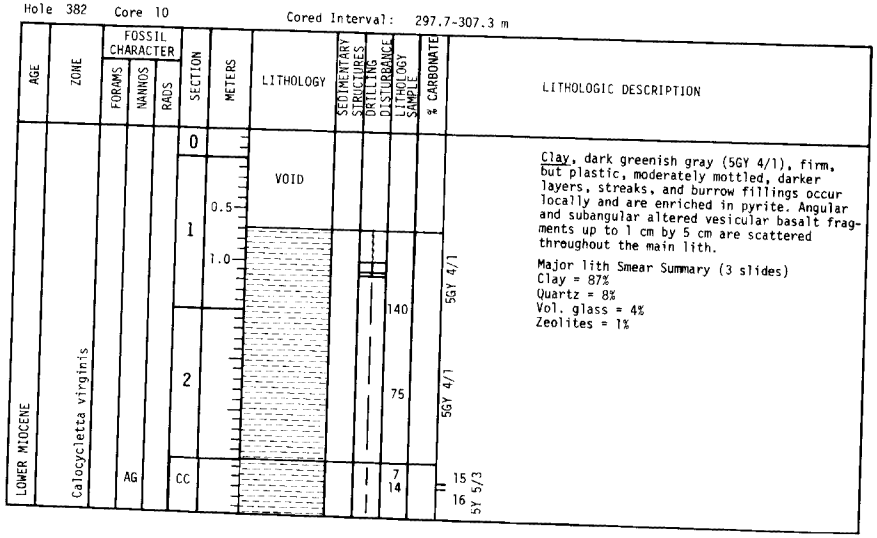
Clay, dark greenish gray (5GY 4/1), firm, but plastic, moderately mottled, darker layers, streaks, and burrow fillings occur locally and are enriched in pyrite. Indurated burrow fillings of pyrite composition are scattered throughout. Indurated and semi-indurated pale brown burrow fillings comprised of clay, quartz, and an average of about 15% unspecified carbonate occur at 1-148 cm and 4-35 cm.

Major lith Smear Summary (7 slides)
Clay = 85%
Quartz = 9%
Vol. glass = 4%
Zeolites = 1%
Carb. unspec. = 1%

Calcareous clay occurs as a 3 cm thick pale brown interbed within the main lith at 4-140-143 cm. The upper 0.5 cm is indurated and is mostly unspecified carbonate and the lower 2.5 cm contains about 20% unspecified carbonate.

From 6-77 cm to the bottom of the core, the main lith contains scattered angular and subangular rock fragments. Between 6-77 cm and 6-143 cm, about 25 fragments with a mean diameter >4 mm and many dozen fragments of granule and sand size occur. Most fragments are altered vesicular basalt, but rare claystone and siltstone also occur. One 1 cm by 0.4 cm fragment of black hornblende occurs at 6-125 cm.

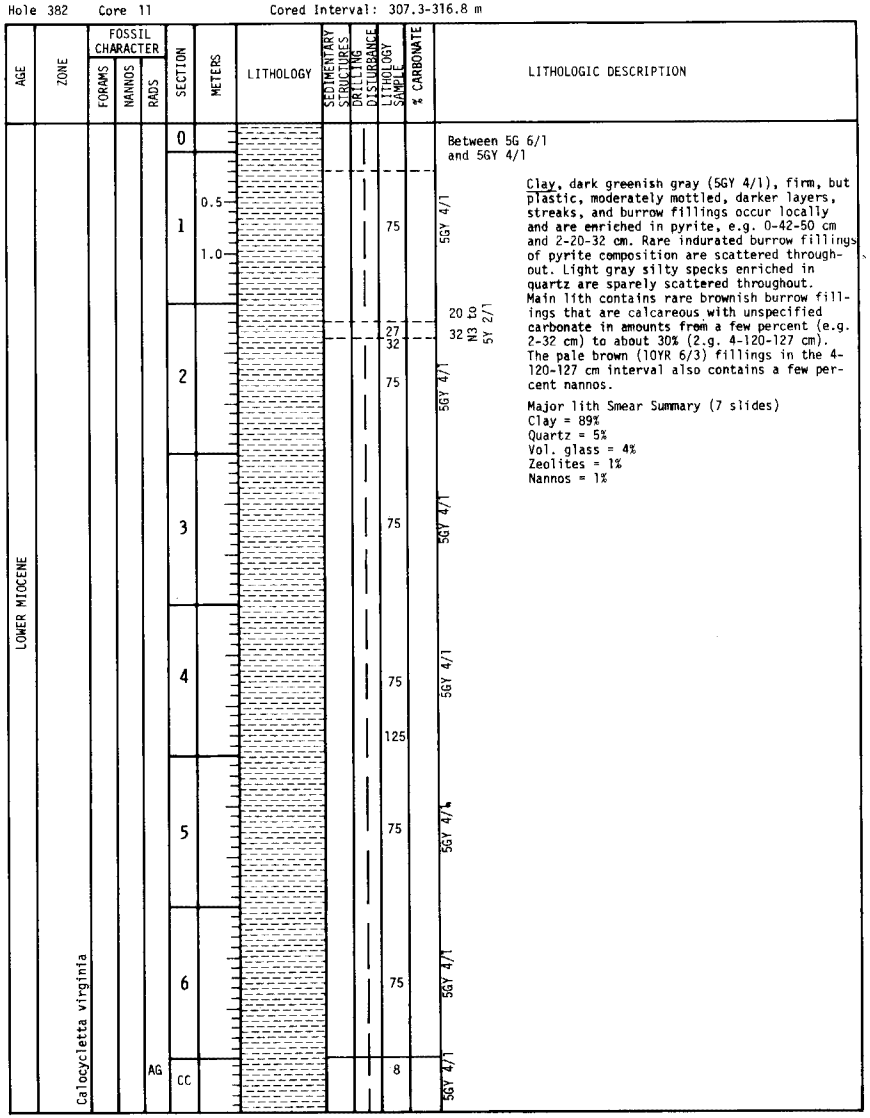
Hole 382 Core 10 Cored Interval: 297.7-307.3 m



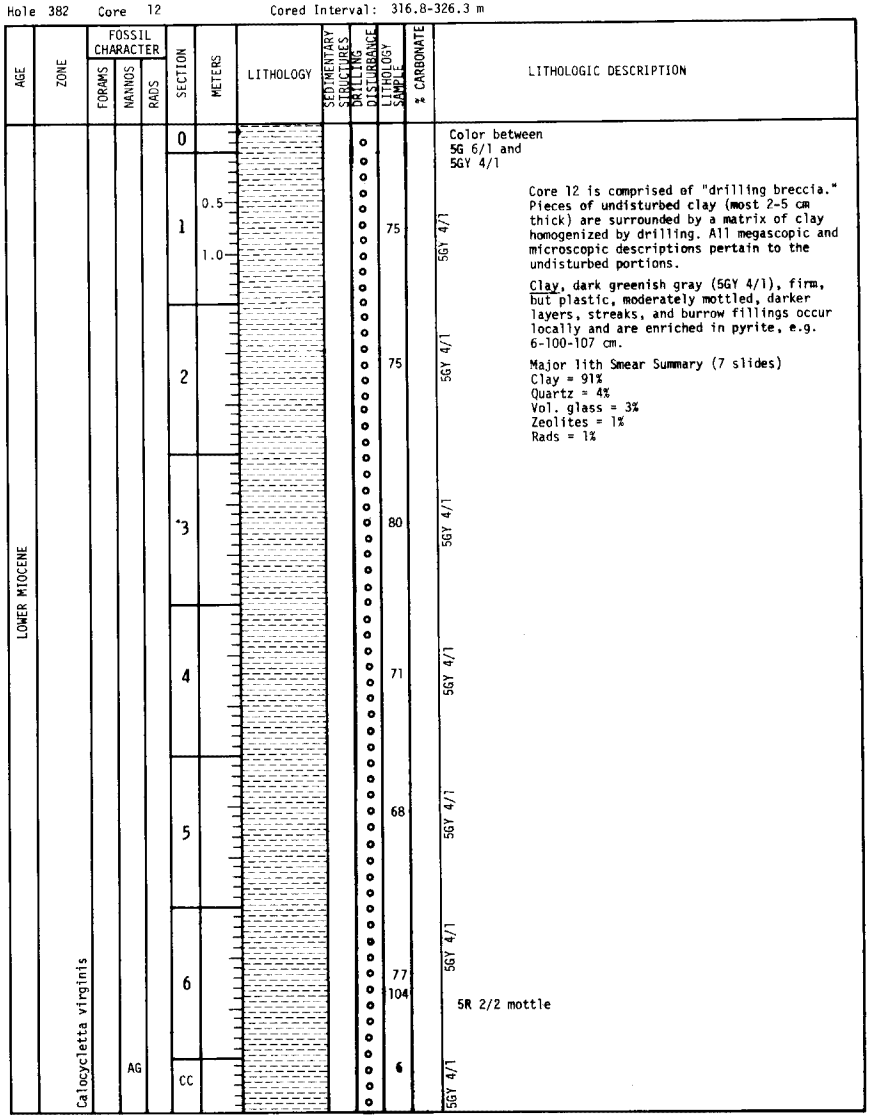
Clay, dark greenish gray (5GY 4/1), firm, but plastic, moderately mottled, darker layers, streaks, and burrow fillings occur locally and are enriched in pyrite. Angular and subangular altered vesicular basalt fragments up to 1 cm by 5 cm are scattered throughout the main lith.

Major lith Smear Summary (3 slides)
Clay = 87%
Quartz = 8%
Vol. glass = 4%
Zeolites = 1%

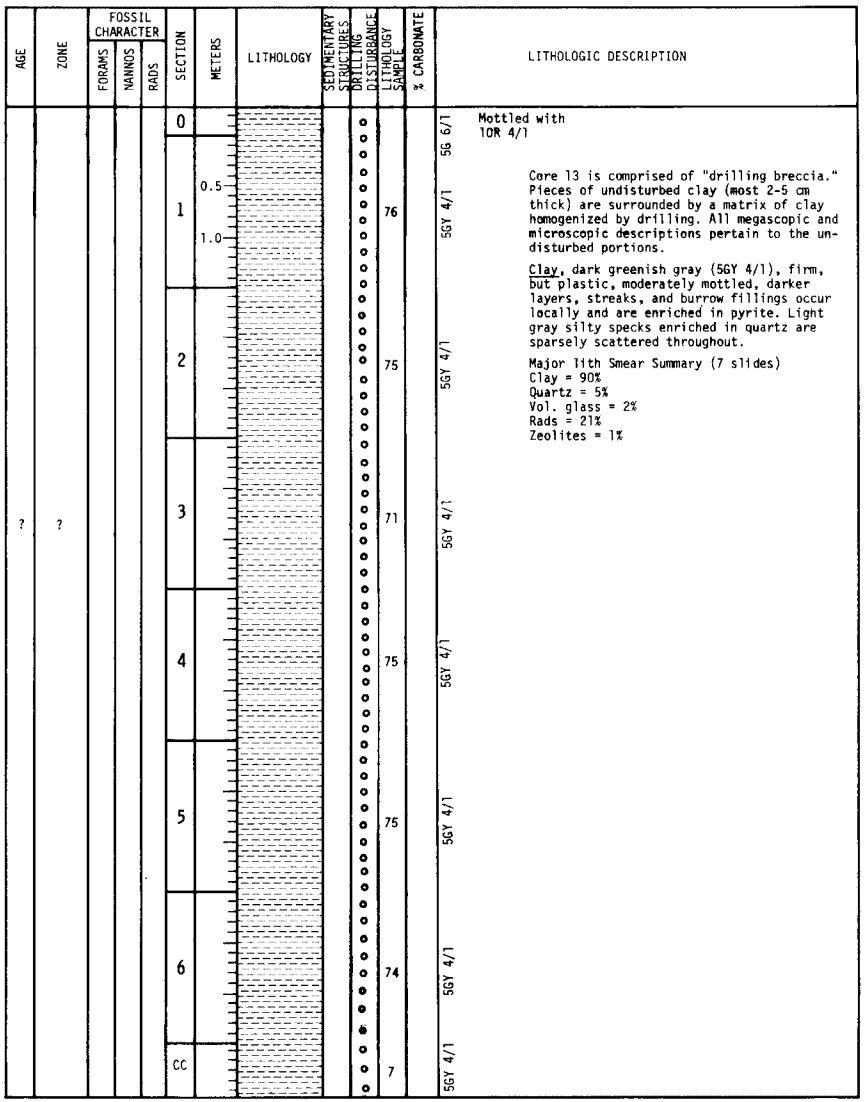
Hole 382 Core 11 Cored Interval: 307.3-316.8 m



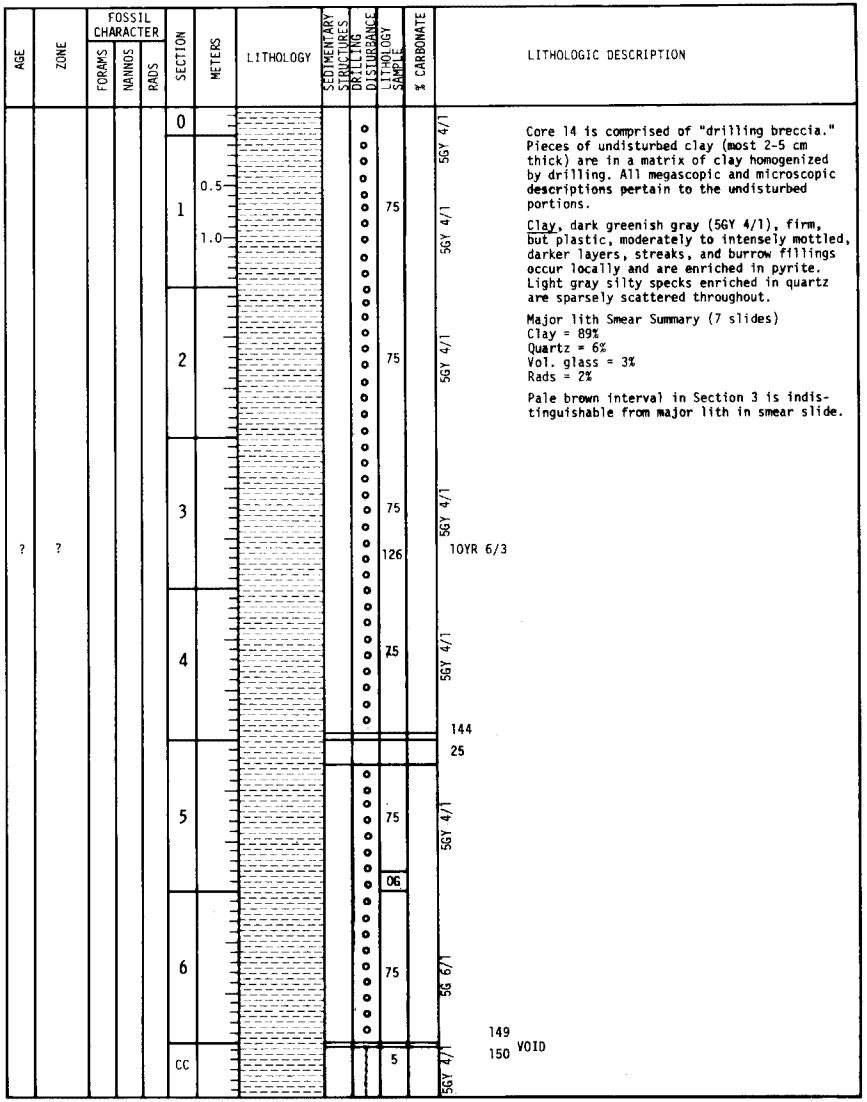
Hole 382 Core 12 Cored Interval: 316.8-326.3 m



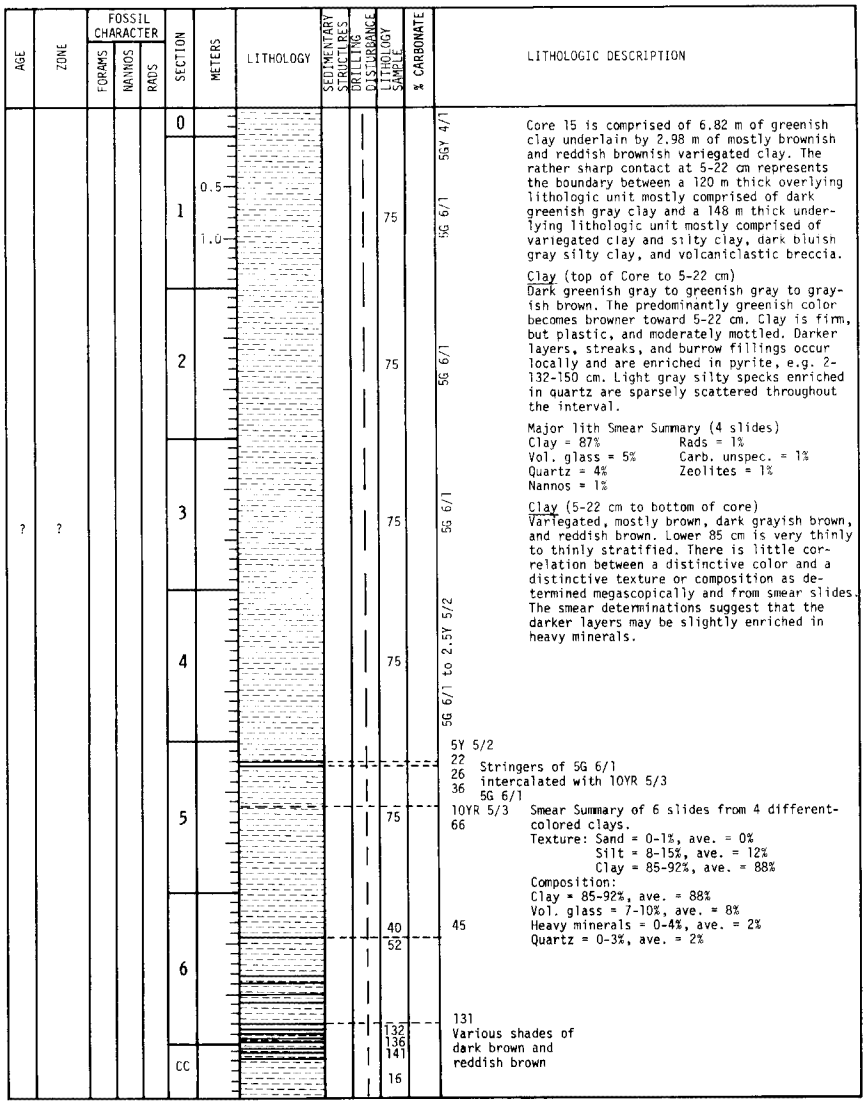
Hole 382 Core 13 Cored Interval: 326.3-335.8 m



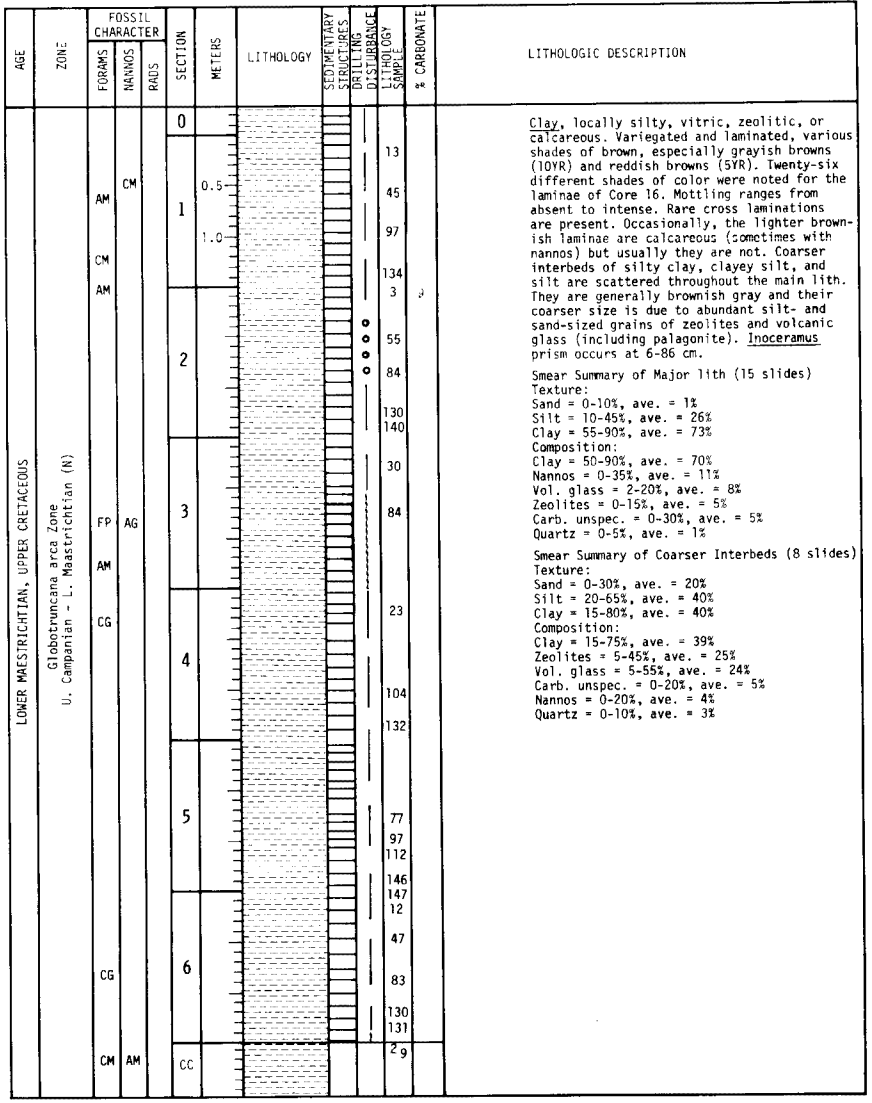
Hole 382 Core 14 Cored Interval: 335.8-345.3 m



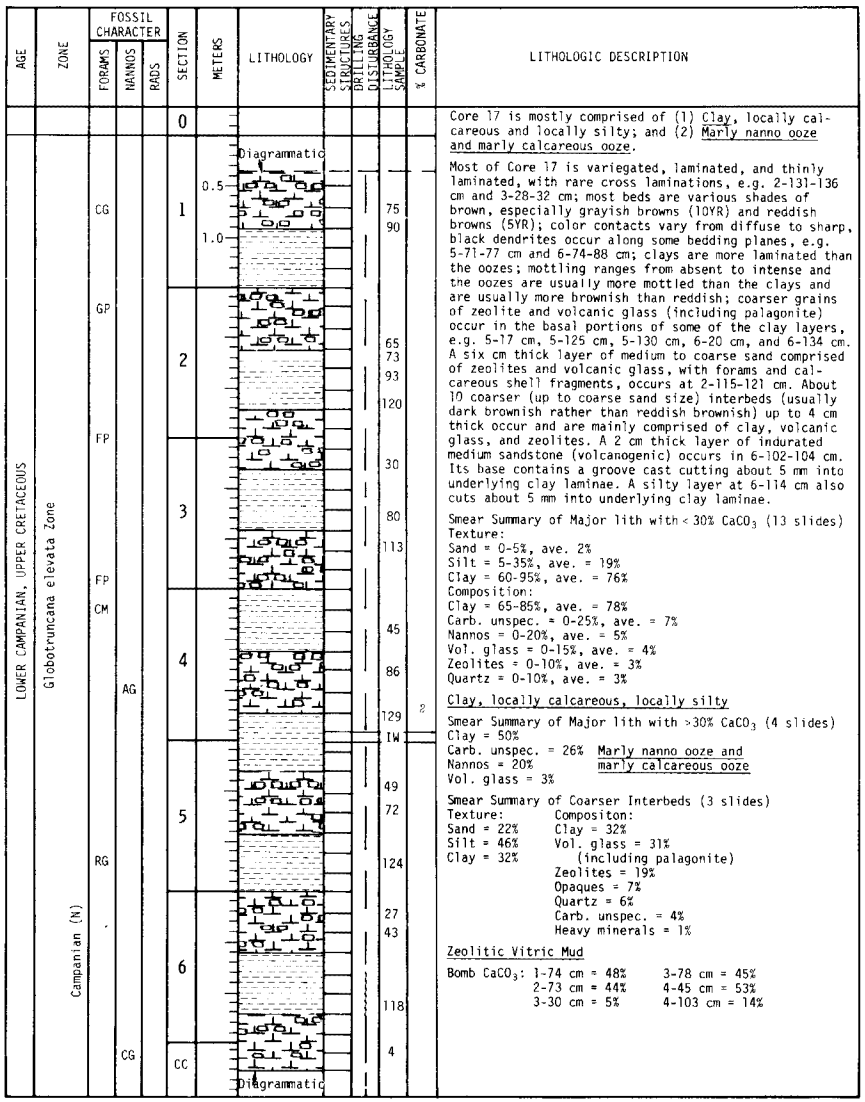
Hole 382 Core 15 Cored Interval: 345.3-354.8 m



Hole 382 Core 16 Cored Interval: 354.8-364.4 m



Hole 382 Core 17 Cored Interval: 364.4-373.8 m



Core 17 is mostly comprised of (1) Clay, locally calcareous and locally silty; and (2) Marly nanno ooze and marly calcareous ooze.

Most of Core 17 is variegated, laminated, and thinly laminated, with rare cross laminations, e.g. 2-131-136 cm and 3-28-32 cm; most beds are various shades of brown, especially grayish browns (10YR) and reddish browns (5YR); color contacts vary from diffuse to sharp, black dendrites occur along some bedding planes, e.g. 5-71-77 cm and 6-74-88 cm; clays are more laminated than the oozes; mottling ranges from absent to intense and the oozes are usually more mottled than the clays and are usually more brownish than reddish; coarser grains of zeolite and volcanic glass (including palagonite) occur in the basal portions of some of the clay layers, e.g. 5-17 cm, 5-125 cm, 5-130 cm, 6-20 cm, and 6-134 cm. A six cm thick layer of medium to coarse sand comprised of zeolites and volcanic glass, with forams and calcareous shell fragments, occurs at 2-115-121 cm. About 10 coarser (up to coarse sand size) interbeds (usually dark brownish rather than reddish brownish) up to 4 cm thick occur and are mainly comprised of clay, volcanic glass, and zeolites. A 2 cm thick layer of indurated medium sandstone (volcanogenic) occurs in 6-102-104 cm. Its base contains a groove cast cutting about 5 mm into underlying clay laminae. A silty layer at 6-114 cm also cuts about 5 mm into underlying clay laminae.

Smear Summary of Major lith with < 30% $CaCO_3$ (13 slides)
Texture:
Sand = 0-5%, ave. 2%
Silt = 5-35%, ave. = 19%
Clay = 60-95%, ave. = 76%
Composition:
Clay = 65-85%, ave. = 78%
Carb. unspec. = 0-25%, ave. = 7%
Nannos = 0-20%, ave. = 5%
Vol. glass = 0-15%, ave. = 4%
Zeolites = 0-10%, ave. = 3%
Quartz = 0-10%, ave. = 3%

Clay, locally calcareous, locally silty

Smear Summary of Major lith with >30% $CaCO_3$ (4 slides)
Clay = 50%
Carb. unspec. = 26%
Nannos = 20%
Vol. glass = 3%

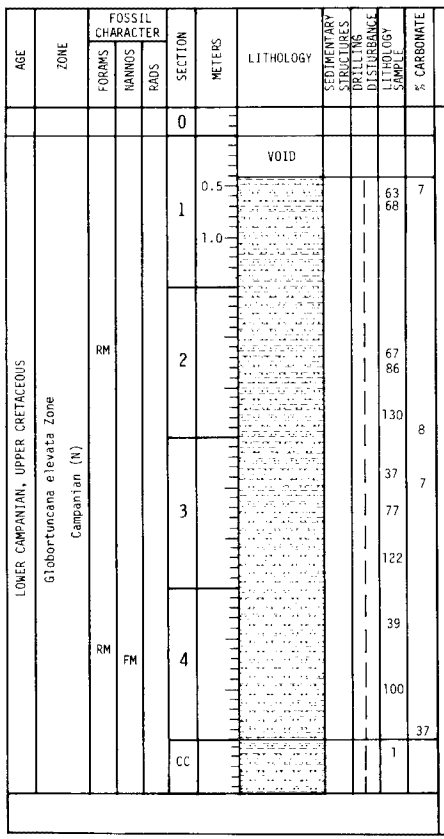
Marly nanno ooze and marly calcareous ooze

Smear Summary of Coarser Interbeds (3 slides)
Texture:
Sand = 22%
Silt = 46%
Clay = 32%
Compositon:
Clay = 32%
Vol. glass = 31% (including palagonite)
Zeolites = 19%
Opaques = 7%
Quartz = 6%
Carb. unspec. = 4%
Heavy minerals = 1%

Zeolitic Vitric Mud

Bomb $CaCO_3$: 1-74 cm = 48%, 2-73 cm = 44%, 3-30 cm = 5%, 3-78 cm = 45%, 4-45 cm = 53%, 4-103 cm = 14%

Hole 382 Core 18 Cored Interval: 373.8-383.3 m



Core 18 is mostly comprised of variegated silty clay with interbeds of siltstone and sandstone.

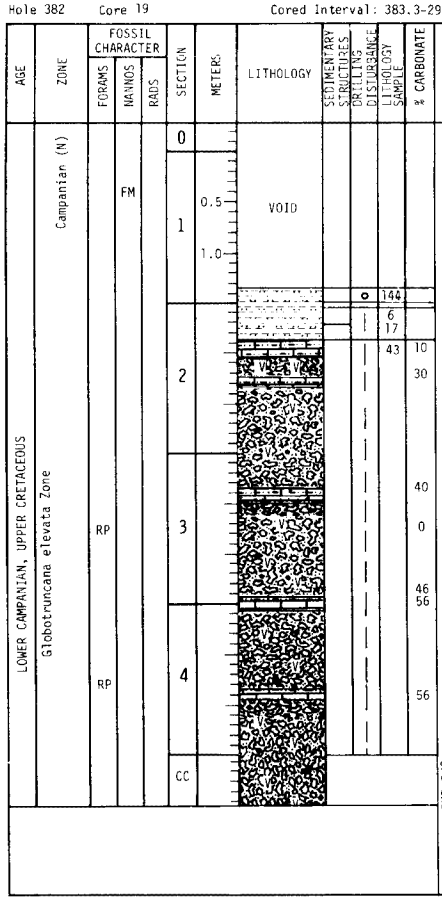
Silty clay, locally calcareous, variegated firm, but plastic; intervals vary from nonlaminated to laminated and thinly laminated, with rare cross laminations, e.g. 1-125-140 cm, most intervals are various shades of brown, especially reddish browns (5YR) and grayish browns (10YR), color contacts vary from diffuse to sharp; rare black dendrites, e.g. 4-57-61 cm, some along bedding planes, e.g. 2-148-150 cm and 3-26 cm; mottling ranges from absent to intense, rare burrow mottles occur parallel to bedding, e.g. 1-65-92 cm, Zoophycus burrow mottle occurs at 4-104 cm; zeolite grains 1 to 3 mm in diameter are scattered in some clay intervals, e.g. 1-137 cm, 2-32 cm, 3-79 cm, 3-81 cm.

Smear Summary of Major lith (7 slides)
Texture:
Sand = 1-5%, ave. = 2%
Silt = 20-45%, ave. = 35%
Clay = 50-80%, ave. = 63%
Composition:
Clay = 45-80%, ave. = 62%
Carb. unspec. = 5-25%, ave. = 16%
Zeolites = 8%
Nannos = 4%
Vol. glass = 3%
Quartz = 4%
Heavy minerals = 2%
Opaques = 1%

Siltstone and sandstone (indurated)
Generally darker-colored than the clays, mostly shades of dark grayish brown, dark brown, and dark reddish brown; occur as stringers and interbeds in this predominantly silty clay core, thickness ranges from about 1 mm to 3 cm; grain size ranges from silt to very coarse sand; some interbeds are crudely graded, e.g. 3-125-127 cm and 3-133-134 cm; a 4 cm thick pale brown interval in 2-64-68 cm grades from sand at the base to clay in the middle to silt at the top; a 1 cm thick ss layer at 1-140 cm contains two 5 mm diameter clay biebs; the stringers are generally in gradational contact with the clay, the 1 cm to 3 cm thick beds are generally in sharp contact with underlying and overlying clay. The siltstones and sandstones are mostly comprised of clay, zeolites, and volcanic glass (including palagonite).

Smear Summary of Coarser Interbeds (4 slides)
Composition:
Clay = 15-50%, ave. = 40%
Zeolites = 5-35%, ave. = 22%
Vol. glass = 15-20%, ave. = 17%
Carb. unspec. = 0-20%, ave. = 7%
Heavy minerals and opaques = 8%
Quartz = 5%
Nannos = 1%
Texture:
Sand = 5-40%, ave. = 16%
Silt = 40-50%, ave. = 46%
Clay = 15-50%, ave. = 38%

Hole 382 Core 19 Cored Interval: 383.3-293.8 m



Core 19 is mostly comprised of 4.22 m of volcaniclastic breccia interbedded with marly limestone, overlain by 53 cm of variegated calcareous silty clay.

Calcareous silty clay, variegated mostly shades of reddish brown (top of core to 2-38 cm) firm, but plastic, laminated, one cm thick interbed of coarse sand at 2-27 cm, unit is virtually identical to lith in Core 18.

Smear Summary of Calcareous Silty Clay (3 slides)

Texture:	Composition:	
Sand = 1%	Clay = 65%	Quartz = 3%
Silt = 34%	Carb. unspec. = 23%	Nannos = 2%
Clay = 65%	Vol. glass = 6%	Heavy minerals = 1%

Calcareous Cylindrichnus burrow fillings up to 1 mm diameter and 5 mm length occur at 2-18-20 cm.

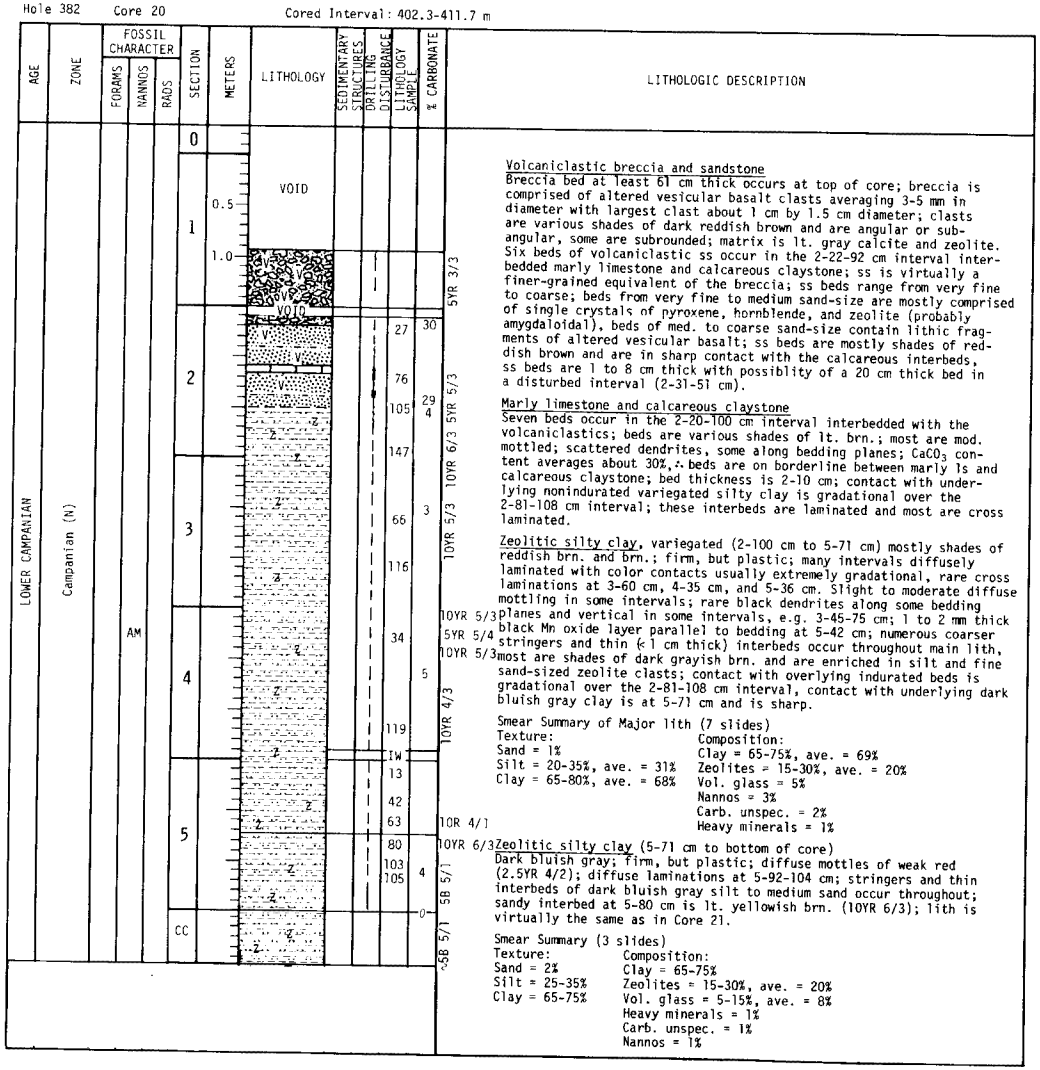
Volcaniclastic breccia

Seven beds and a few thin interbeds of volcaniclastic breccia occur from 2-54 cm to the bottom of the core catcher; beds range from 5 to 97 cm and average 50 cm in thickness; breccia is interbedded with marly ls and calcareous claystone; breccia is comprised of altered vesicular basalt clasts, most in the 2-5 mm diameter range with the max. clast size < 1 cm diameter in all but one bed; the two largest clasts occur in the core catcher and are 2 cm by 4 cm and 3 cm by 3 cm; in general, all the breccias are poorly sorted; clasts are mostly angular or subangular, some are subrounded; most clasts are various shades of reddish brown, less altered clasts are shades of dark gray; matrix is lt. gray zeolite and calcite and is volumetrically much less abundant than the clasts; most of the basal contacts with the interbeds are sharp, about half the upper contacts are sharp, half are gradational, dendrites occur along some of the sharp contacts; interbedded breccia and volcaniclastic ss at 2-128-134 cm are cross bedded; breccia at 3-41-46 cm appears to be reversely graded and the basal contact dips at about 10°; bed at 3-48-145 cm is crudely graded; bed at 4-9-85 cm is crudely graded with the 13-40 cm interval cross bedded with dips up to 20°; bed at 4-95-150 cm has much cross bedding with 5-10°dips.

Marly Limestone and Calcareous Claystone

Seven beds in the 2-38 cm to 4-95 cm interval are interbedded with the breccia; beds range from 2 to 11 cm and ave. 8 cm in thickness; beds are mostly comprised of unspecified carbonate and clay. Bomb results show most beds are marly ls (40-56% $CaCO_3$) but some are claystone; beds are slightly to intensely mottled, laminated, and cross laminated; all beds are shades of grayish brown except the 4-86-94 cm interval which is shades of reddish brown with the lower 5 cm laminated, the middle 2 cm cross laminated with an erosional basal contact, and the upper cm thinly laminated with an erosional basalt contact; black dendrites occur throughout and are concentrated on some bedding planes, vertical fracture containing dendrites extends from 4-89-100 cm, i.e. from ls into breccia; Inoceramus plate occurs at 3-38 cm.

Hole 382 Core 20 Cored Interval: 402.3-411.7 m



Volcaniclastic breccia and sandstone

Breccia bed at least 61 cm thick occurs at top of core; breccia is comprised of altered vesicular basalt clasts averaging 3-5 mm in diameter with largest clast about 1 cm by 1.5 cm diameter; clasts are various shades of dark reddish brown and are angular or subangular, some are subrounded; matrix is lt. gray calcite and zeolite. Six beds of volcaniclastic ss occur in the 2-22-92 cm interval interbedded marly limestone and calcareous claystone; ss is virtually a finer-grained equivalent of the breccia; ss beds range from very fine to coarse; beds from very fine to medium sand-size are mostly comprised of single crystals of pyroxene, hornblende, and zeolite (probably amygdaloidal), beds of med. to coarse sand-size contain lithic fragments of altered vesicular basalt; ss beds are mostly shades of reddish brown and are in sharp contact with the calcareous interbeds, ss beds are 1 to 8 cm thick with possiblity of a 20 cm thick bed in a disturbed interval (2-31-51 cm).

Marly limestone and calcareous claystone

Seven beds occur in the 2-20-100 cm interval interbedded with the volcaniclastics; beds are various shades of lt. brn.; most are mod. mottled; scattered dendrites, some along bedding planes; $CaCO_3$ content averages about 30%, ∴ beds are on borderline between marly ls and calcareous claystone; bed thickness is 2-10 cm; contact with underlying nonindurated variegated silty clay is gradational over the 2-81-108 cm interval; these interbeds are laminated and most are cross laminated.

Zeolitic silty clay, variegated (2-100 cm to 5-71 cm) mostly shades of reddish brn. and brn.; firm, but plastic; many intervals diffusely laminated with color contacts usually extremely gradational, rare cross laminations at 3-60 cm, 4-35 cm, and 5-36 cm. Slight to moderate diffuse mottling in some intervals; rare black dendrites along some bedding planes and vertical in some intervals, e.g. 3-45-75 cm; 1 to 2 mm thick black Mn oxide layer parallel to bedding at 5-42 cm; numerous coarser stringers and thin (< 1 cm thick) interbeds occur throughout main lith, most are shades of dark grayish brn. and are enriched in silt and fine sand-sized zeolite clasts; contact with overlying indurated beds is gradational over the 2-81-108 cm interval, contact with underlying dark bluish gray clay is at 5-71 cm and is sharp.

Smear Summary of Major lith (7 slides)

Texture:	Composition:
Sand = 1%	Clay = 65-75%, ave. = 69%
Silt = 20-35%, ave. = 31%	Zeolites = 15-30%, ave. = 20%
Clay = 65-80%, ave. = 68%	Vol. glass = 5%
	Nannos = 3%
	Carb. unspec. = 2%
	Heavy minerals = 1%

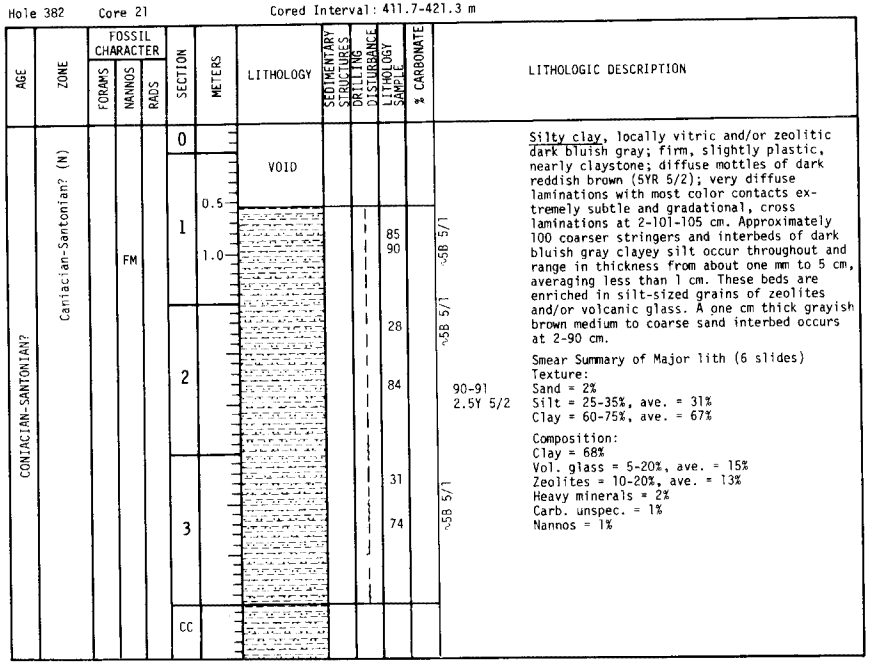
Zeolitic silty clay (5-71 cm to bottom of core)

Dark bluish gray; firm, but plastic; diffuse mottles of weak red (2.5YR 4/2); diffuse laminations at 5-92-104 cm; stringers and thin interbeds of dark bluish gray silt to medium sand occur throughout; sandy interbed at 5-80 cm is lt. yellowish brn. (10YR 6/3); lith is virtually the same as in Core 21.

Smear Summary (3 slides)

Texture:	Composition:
Sand = 2%	Clay = 65-75%
Silt = 25-35%	Zeolites = 15-30%, ave. = 20%
Clay = 65-75%	Vol. glass = 5-15%, ave. = 8%
	Heavy minerals = 1%
	Carb. unspec. = 1%
	Nannos = 1%

Hole 382 Core 21 Cored Interval: 411.7-421.3 m

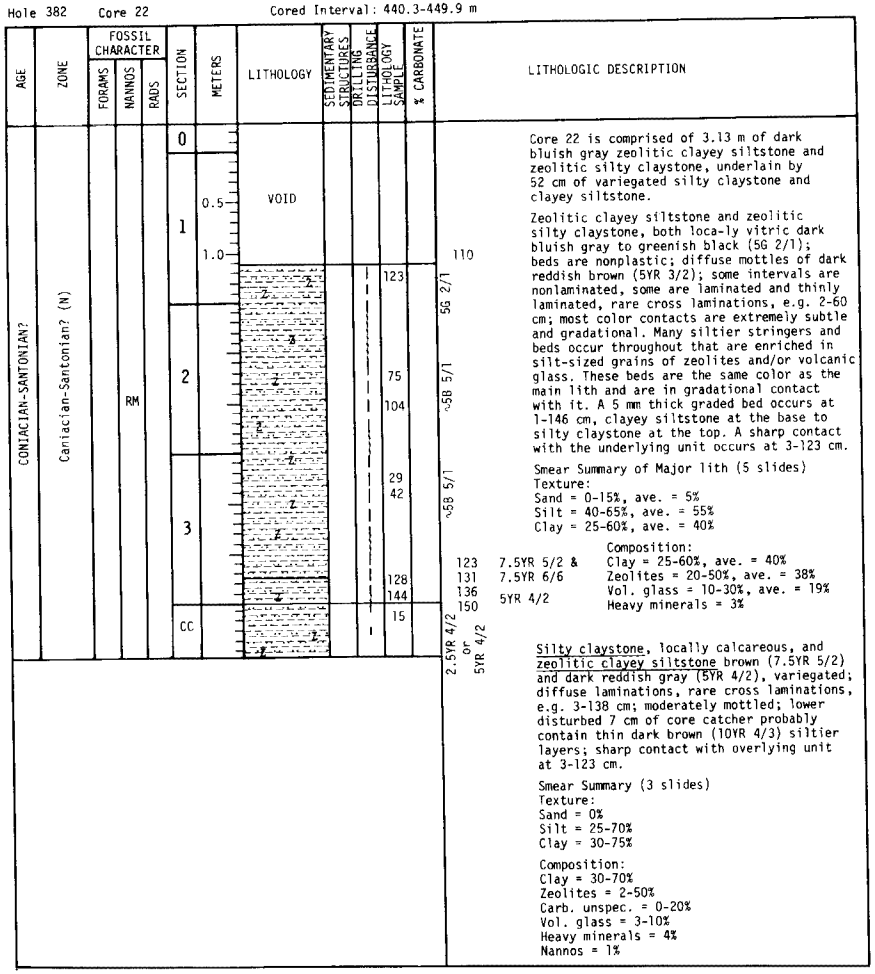


Silty clay, locally vitric and/or zeolitic dark bluish gray; firm, slightly plastic, nearly claystone; diffuse mottles of dark reddish brown (5YR 5/2); very diffuse laminations with most color contacts extremely subtle and gradational, cross laminations at 2-101-105 cm. Approximately 100 coarser stringers and interbeds of dark bluish gray clayey silt occur throughout and range in thickness from about one mm to 5 cm, averaging less than 1 cm. These beds are enriched in silt-sized grains of zeolites and/or volcanic glass. A one cm thick grayish brown medium to coarse sand interbed occurs at 2-90 cm.

Smear Summary of Major lith (6 slides)
Texture:
Sand = 2%
Silt = 25-35%, ave. = 31%
Clay = 60-75%, ave. = 67%

Composition:
Clay = 68%
Vol. glass = 5-20%, ave. = 15%
Zeolites = 10-20%, ave. = 13%
Heavy minerals = 2%
Carb. unspec. = 1%
Nannos = 1%

Hole 382 Core 22 Cored Interval: 440.3-449.9 m



Core 22 is comprised of 3.13 m of dark bluish gray zeolitic clayey siltstone and zeolitic silty claystone, both loca-ly vitric dark bluish gray to greenish black (5G 2/1); beds are nonplastic; diffuse mottles of dark reddish brown (5YR 3/2); some intervals are nonlaminated, some are laminated and thinly laminated, rare cross laminations, e.g. 2-60 cm; most color contacts are extremely subtle and gradational. Many siltier stringers and beds occur throughout that are enriched in silt-sized grains of zeolites and/or volcanic glass. These beds are the same color as the main lith and are in gradational contact with it. A 5 mm thick graded bed occurs at 1-146 cm, clayey siltstone at the base to silty claystone at the top. A sharp contact with the underlying unit occurs at 3-123 cm.

Smear Summary of Major lith (5 slides)
Texture:
Sand = 0-15%, ave. = 5%
Silt = 40-65%, ave. = 55%
Clay = 25-60%, ave. = 40%

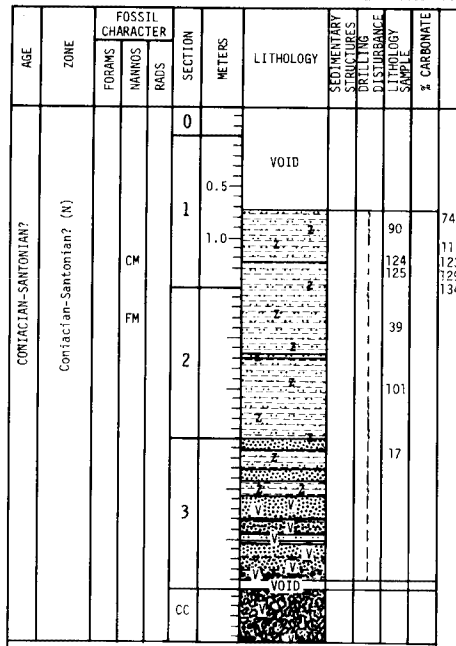
Composition:
Clay = 25-60%, ave. = 40%
Zeolites = 20-50%, ave. = 38%
Vol. glass = 10-30%, ave. = 19%
Heavy minerals = 3%

Silty claystone, locally calcareous, and zeolitic clayey siltstone brown (7.5YR 5/2) and dark reddish gray (5YR 4/2), variegated; diffuse laminations, rare cross laminations, e.g. 3-138 cm; moderately mottled; lower disturbed 7 cm of core catcher probably contain thin dark brown (10YR 4/3) siltier layers; sharp contact with overlying unit at 3-123 cm.

Smear Summary (3 slides)
Texture:
Sand = 0%
Silt = 25-70%
Clay = 30-75%

Composition:
Clay = 30-70%
Zeolites = 2-50%
Carb. unspec. = 0-20%
Vol. glass = 3-10%
Heavy minerals = 4%
Nannos = 1%

Hole 382 Core 23 Cored Interval: 468.9-478.4 m



LITHOLOGIC DESCRIPTION

Zeolitic silty claystone (1-74 cm to 1-123 cm)
Medium bluish gray (5B 5/1), diffuse mottles and laminations of shades of bluish gray and weak red; this 49 cm interval is virtually identical in appearance and composition with dark bluish gray interval from 20-5-71 cm to 22-3-123 cm, i.e. mostly clay and zeolites with virtually no carbonate.

Zeolitic silty claystone and zeolitic clayey siltstone (1-123 cm to 3-56 cm)
These lith types comprise about 75% of this 2.33 m interval with lith types described below comprising 25%. Mostly brown (10YR 5/3) and reddish brown (2.5YR 4/4); intervals that are nonlaminated alternate with intervals with diffiuse laminations and occasional cross laminations, e.g. at 1-123-129 cm and 2-103 cm. Coarser stringers and thin (<1 cm thick) interbeds of siltstone and fine ss occur throughout, most are shades of dark brown and dark grayish brown. Altered basalt frags up to 4 mm diameter occur in claystone at 3-48 cm. A 1 cm thick graded ss bed occurs at 2-120 cm with coarse sand at base in sharp contact with underlying silty claystone and medium sand at top in gradational contact with overlying silty claystone. Thicker interbeds of coarser volcaniclastic siltstone and ss as described below occur at 2-66-70 cm, 2-136-138 cm, 3-0-12 cm, and 3-31-40 cm, most appear to be in erosional contact with underlying silty claystone and clayey siltstone.

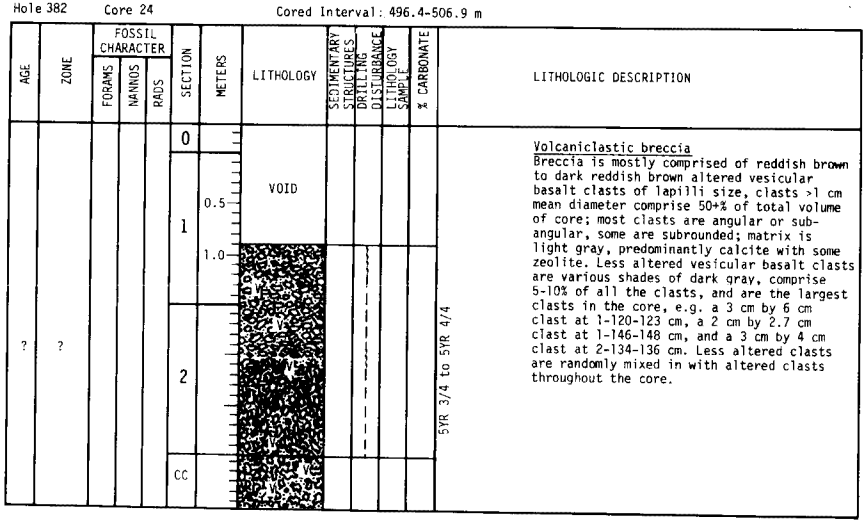
Smear Summary (4 slides)

Texture:	Composition:	
Sand = 0-10%	Clay = 45-50%	Heavy minerals = 5%
Silt = 40-50%	Zeolites = 20-40%	Carb. unspec. = 4%
Clay = 45-50%	Vol. glass = 10%	Nannos = 1%

Volcaniclastic siltstone and sandstone (3-56 cm to 3-130 cm)
These lith types occur in beds up to 23 cm in thickness and comprise about 90% of this 74 cm interval with lith types as described above comprising 10%. Mostly shades of grayish brn., grains mostly silt to fine sand-size except in a crudely graded, poorly sorted interval at 3-118-130 cm in which the upper portion is mainly silt-size and in gradational contact with overlying very fine ss and the lower portion is coarse sand-size and in gradational contact with underlying volcaniclastic breccia. Some beds are moderately burrow mottled with burrow fillings of reddish brown claystone. Thin sections show that the beds have a clay matrix with clastis in the upper portion of the interval mostly comprised of single crystals of plagioclase, pyroxene, and hornblende, and rounded amygdule-like grains of zeolites. The coarser clasts closer to the contact with the underlying breccia are mostly altered vesicular basalt fragments.

Volcaniclastic breccia (30 cm of sample from 3-130 cm to bottom of core catcher)
Breccia is comprised of reddish brown altered vesicular basalt clasts of lapilli size (max. size is 1 cm by 1 cm) in a light gray matrix of calcite and zeolites, most clasts are angular or subangular, some are subrounded, bedding is distinguished by intervals of different average clast size and appears to be horizontal in 3-130-140 cm and dipping at about 10° in the core catcher sample. Contact with overlying volcaniclastic sandstone is gradational.

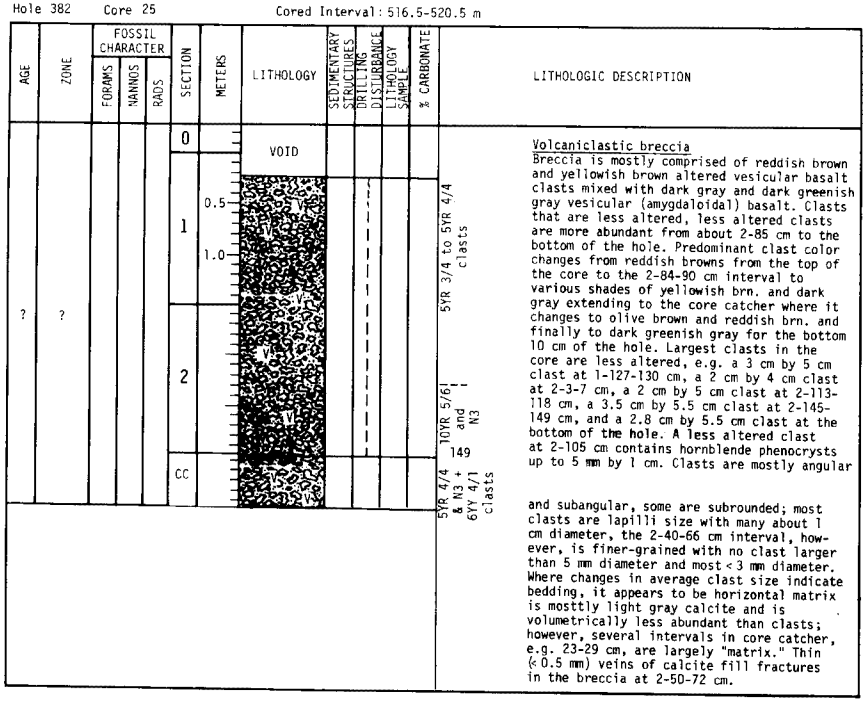
Hole 382 Core 24 Cored Interval: 496.4-506.9 m



LITHOLOGIC DESCRIPTION

Volcaniclastic breccia
Breccia is mostly comprised of reddish brown to dark reddish brown altered vesicular basalt clasts of lapilli size, clasts >1 cm mean diameter comprise 50+% of total volume of core; most clasts are angular or sub-angular, some are subrounded; matrix is light gray, predominantly calcite with some zeolite. Less altered vesicular basalt clasts are various shades of dark gray, comprise 5-10% of all the clasts, and are the largest clasts in the core, e.g. a 3 cm by 6 cm clast at 1-120-123 cm, a 2 cm by 2.7 cm clast at 1-146-148 cm, and a 3 cm by 4 cm clast at 2-134-136 cm. Less altered clasts are randomly mixed in with altered clasts throughout the core.

Hole 382 Core 25 Cored Interval: 516.5-520.5 m



Volcaniclastic breccia
Breccia is mostly comprised of reddish brown and yellowish brown altered vesicular basalt clasts mixed with dark gray and dark greenish gray vesicular (amygdaloidal) basalt. Clasts that are less altered, less altered clasts are more abundant from about 2-85 cm to the bottom of the hole. Predominant clast color changes from reddish browns from the top of the core to the 2-84-90 cm interval to various shades of yellowish brn. and dark gray extending to the core catcher where it changes to olive brown and reddish brn. and finally to dark greenish gray for the bottom 10 cm of the hole. Largest clasts in the core are less altered, e.g. a 3 cm by 5 cm clast at 1-127-130 cm, a 2 cm by 4 cm clast at 2-3-7 cm, a 2 cm by 5 cm clast at 2-113-118 cm, a 3.5 cm by 5.5 cm clast at 2-145-149 cm, and a 2.8 cm by 5.5 cm clast at the bottom of the hole. A less altered clast at 2-105 cm contains hornblende phenocrysts up to 5 mm by 1 cm. Clasts are mostly angular and subangular, some are subrounded; most clasts are lapilli size with many about 1 cm diameter, the 2-40-66 cm interval, however, is finer-grained with no clast larger than 5 mm diameter and most < 3 mm diameter. Where changes in average clast size indicate bedding, it appears to be horizontal matrix is mosttly light gray calcite and is volumetrically less abundant than clasts; however, several intervals in core catcher, e.g. 23-29 cm, are largely "matrix." Thin (< 0.5 mm) veins of calcite fill fractures in the breccia at 2-50-72 cm.

X-RAY MINERALOGICAL ANALYSES, SITE 382

Core	Section	Interval (cm)	Total Carbonate	Composition, %														Distribution in <2μm Fraction			
				Calcite	Dolomite	Siderite	Rhodochrosite	Quartz	Feldspar	Clay Minerals	Palygorskite	Clinoptilolite	Phillipsite	Analcime	Pyrite	Disordered Cristobalite	Other	Kaolinite	Mica	Chlorite	Montmorillonite
1	4	8- 10	8	8				30	10[P]	52											
1	4	49- 51	16	16				25	13[P]	44							Hbl - 2%		76	24	
2	2	95- 97	4	4				60	25	12											
2	2	109-111	7	7				30	10	53											
2	3	84- 86	4	4				50	25	21											
3	2	83- 85	11	11				25	15	49											
4	1	41- 43	7	7				25	10[P]	58											
5	3	51- 53						30	10[P]	60											
5	4	59- 61						25	8[P]	67											
6	3	67- 69						30	8[P]	62								6	19	5	70
6	6	79- 81						35	8[P]	57											
7	3	64- 66						35	10[P]	55											
7	6	79- 81						25	8	67											
8	3	71- 73						15	5	80											
9	2	72- 74						22	5	73											
9	6	108-110						15	5	80											
11	3	78- 80						14	2	84											
12	2	75- 77						20	4	76											
12	6	66- 68						15	2	83											
13	3	64- 66						17	3	80											
13	6	126-128						23	4	73			tr								
14	3	78- 80						20	5	75		1	tr								
14	5	68- 70						22	5	73		?	?								
15	2	98-100						22	7	71											
15	4	125-127						20	4	75		1									
15	5	128-130						10	5	82		3						1	22	1	76
15	6	119-121						11	5	81		3									
16	1	2- 3						9	8	83											
16	1	85- 87	52	52						48											100
16	1	95- 97	14	14				10	8	66		2	tr								
16	2	2- 3	14	14				14	15[O]	70			1								
16	2	48- 50							18[P]	78		2									
16	3	28- 30	40	40					10[P]	50											
16	3	83- 84	6	6					25	60		2	2				Pyroxene ?				
16	4	107-109	4	4					6	88			2								
16	5	138-146	4	4					25[P]	70		1									
16	6	45- 48	4	4					22[O]	70		3	1								
17	1	109-111	13	13					2	85											
17	4	116-118							30	70							Pyroxene ?				
17	6	117-119	9	9					10[O]	79		2									100
18	1	68	41	41				3	10[O]	40							Hbl - 6%				
18	1	124-129	7	7					15	75			3								
18	1	137	100														Calcite				
18	2	32- 33	50	50					40[P/O]	10											
18	2	67- 68	6	6					22	70			2				Pyroxene ?				
18	3	68- 70	25	25					20	48			7	tr							
18	3	128-130	25	25					20[O]	50			4								
18	4	29- 30	28	28				5	15	47							Hbl - 5%				
20	2	123-125	5	5					15	75			2	3							
20	3	65- 66	6	6					10	78		2	4								
20	5	11- 12	1	1					16	83		?						21		28	51
20	5	107-109	2	2					4	94											
21	1	88- 91	1	1					5	90		1		3							
21	1	84- 87	3	3					15	75		1		3			Pyroxene 3%				
21	3	23- 25	1	1					10	88		2									100
21	3	28- 29	1	1				5	15	77		2									
22	3	127-129	3	3						97											
23	1	79- 81	1	1					10	87				2							100
23	2	48- 50	2	2					4	94			?								

[O]Orthoclase

[P]Plagioclase

SITE 382, ORGANIC CARBON DETERMINATIONS

Core	Section	Top of Interval (cm)	% C_{org}[a]
1	1	50	0.4
16	2	4	-
17	4	116	-
20	5	148	-

[a] A dash indicates 0% C_{org}

DEEP SEA DRILLING PROJECT

LEG 43 SITE 383

SITE SUMMARY SHEET

POSITION: Latitude: 39°14.88'N Longitude: 53°21.18'W

Water depth (sea level): 5283 corrected meters, echo sounding

Bottom felt at: 5277 meters, drill pipe Penetration: 120.3 meters

Number of holes: 1 Number of cores: 2

Total length of cored section: 120.3 meters

Total core recovered: 4.9 meters

OLDEST SEDIMENT CORED:

Depth subbottom: 63.3 meters Nature: Coarse sand

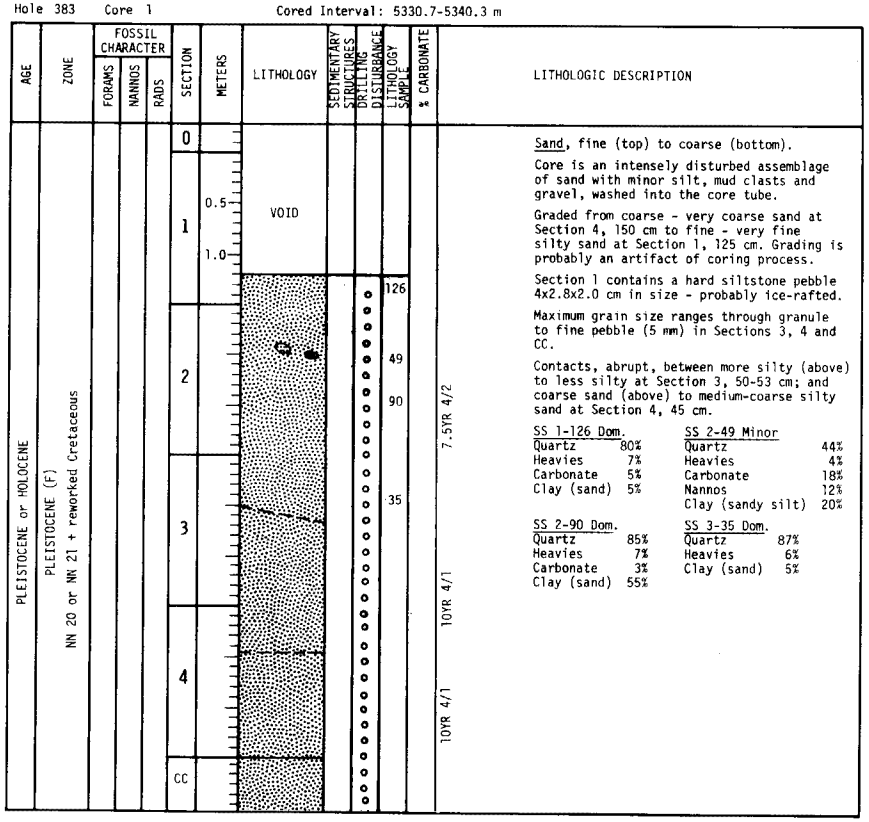
Age: Pleistocene

BASEMENT: Not reached

PRINCIPAL RESULTS:

Site 383 was drilled to 120 meters in the Sohm abyssal plain before deteriorating hole conditions and the risk of losing the bottom-hole assembly in caving sands forced abandonment. The single core recovered consists of 4.9 meters of graded Pleistocene sand. The grading here is undoubtedly an artifact produced by flushing of sand into the core barrel during a break in circulation.

Hole 383 Core 1 Cored Interval: 5330.7-5340.3 m



Sand, fine (top) to coarse (bottom).

Core is an intensely disturbed assemblage of sand with minor silt, mud clasts and gravel, washed into the core tube.

Graded from coarse - very coarse sand at Section 4, 150 cm to fine - very fine silty sand at Section 1, 125 cm. Grading is probably an artifact of coring process.

Section 1 contains a hard siltstone pebble 4x2.8x2.0 cm in size - probably ice-rafted.

Maximum grain size ranges through granule to fine pebble (5 mm) in Sections 3, 4 and CC.

Contacts, abrupt, between more silty (above) to less silty at Section 3, 50-53 cm; and coarse sand (above) to medium-coarse silty sand at Section 4, 45 cm.

SS 1-126 Dom.		SS 2-49 Minor	
Quartz	80%	Quartz	44%
Heavies	7%	Heavies	4%
Carbonate	5%	Carbonate	18%
Clay (sand)	5%	Nannos	12%
		Clay (sandy silt)	20%

SS 2-90 Dom.		SS 3-35 Dom.	
Quartz	85%	Quartz	87%
Heavies	7%	Heavies	6%
Carbonate	3%	Clay (sand)	5%
Clay (sand)	55%		

43

DEEP SEA DRILLING PROJECT

LEG 43 SITE 384

SITE SUMMARY SHEET

POSITION: Latitude: 40°21.65'N Longitude: 51°39.80'W

Water depth (sea level): 3909 corrected meters, echo sounding

Bottom felt at: 3920 meters, drill pipe Penetration: 330.3 meters

Number of holes: 1 Number of cores: 22

Total length of cored section: 195.3 meters

Total core recovered: 110.52 meters

OLDEST SEDIMENT CORED:

Depth subbottom: 324.5 meters Nature: Shallow water limestone

Age: Aptian or older Measured velocity: 2.05 km/s

BASEMENT:

Depth subbottom: 324.8 meters Nature: Vesicular basalt

Velocity range: 3.46-4.32 km/s

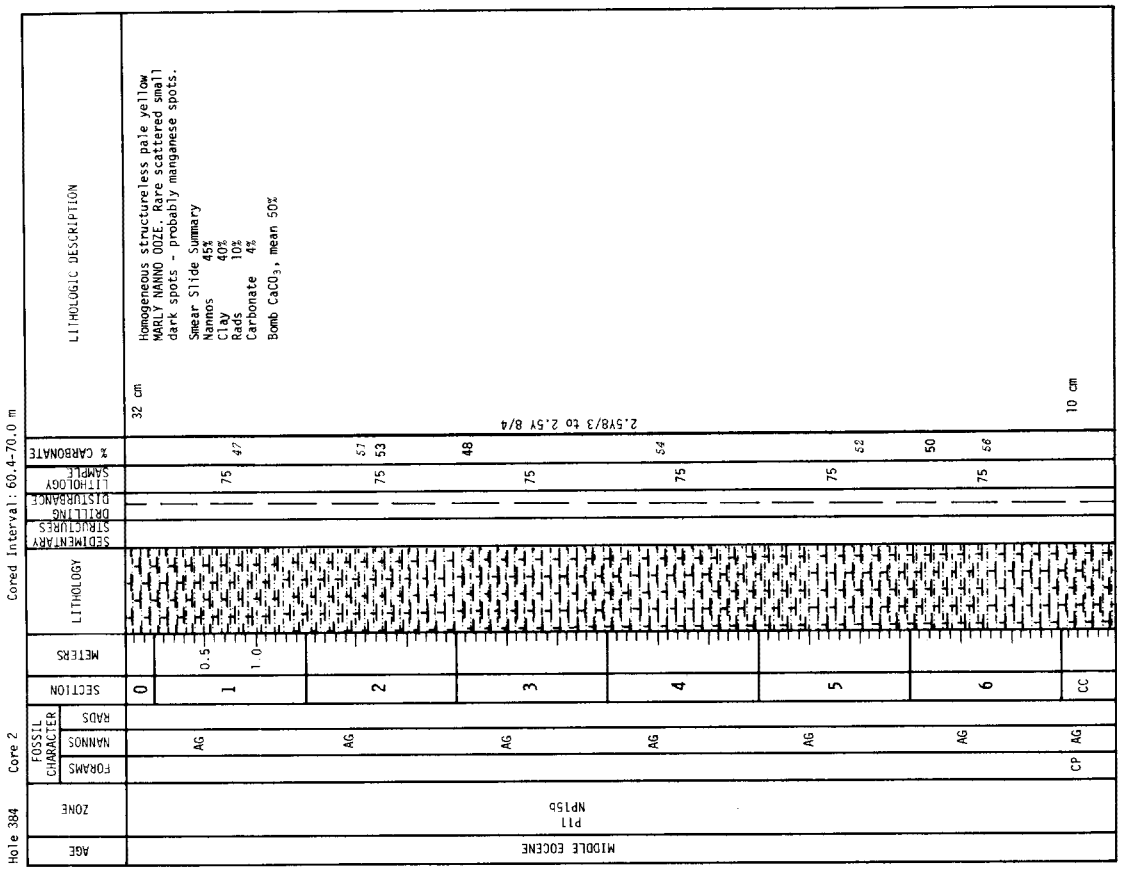
PRINCIPAL RESULTS:

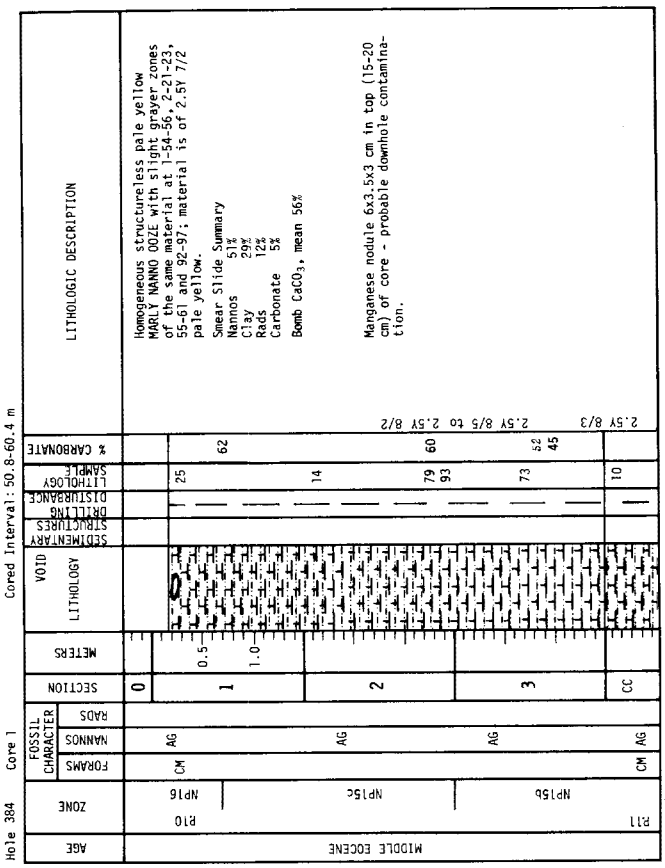
A 330.3-meter section was drilled on the "J-anomaly" ridge where it emerges above the lower continental rise south of the Grand Banks. The hole bottomed in altered vesicular basalt which plugged the bit and jammed the core barrel in the drill string. We anticipated that a prominent reflector within the acoustically nonlaminated sediments covering the ridge might correlate with Horizon A, which previously had been identified only to the south of the Sohm Abyssal Plain. Reduced drilling rates and recovery of chert fragments and silicified limestone of lower Eocene age at the level of the reflector confirmed this evaluation. The section drilled consists of the following three major lithofacies (top to bottom): (1) marly nanno ooze, nanno ooze, nanno chalk and foraminiferal nanno chalk of middle Eocene to lower Maestrichtian age (50-200 meters). This calcareous unit contains excellently preserved foraminifers and nannoplankton in a nearly continuous sequence across the Cretaceous-Tertiary transition, as well as an excellent assemblage of radiolarians down to the lower

Paleocene. High carbonate content (50-100%) and nearly uniform sedimentation rates (0.5 g/cm^2/k.y. for Cretaceous and Paleocene, 1.5 g/cm^2/k.y. for Eocene) indicate deposition in a quiescent environment, probably in relatively shallow water, well above the CCD. We find no evidence for the hypothetical Maestrichtian/Paleocene rise in CCD. (2) ?Coniacian-Santonian to Aptian shallow-water bioclastic limestones with minor interbedded calcareous clays (200-325 m), indicating more than 4000 meters subsidence for this part of the "J-anomaly" ridge in the last 80-87 m.y. (3) The bioclastic limestones are underlain below 325 meters by highly vesicular, weathered basalt, apparently formed as a subaerial or shallow-water flow. The Aptian age of the overlying sediment indicates that anomaly M-1 (J-4) is at least 105 m.y. old. A total of 2.36 meters of basalt was cored, representing portions of two flows.

Hole 384 Core 1 Cored Interval: 50.8-60.4 m

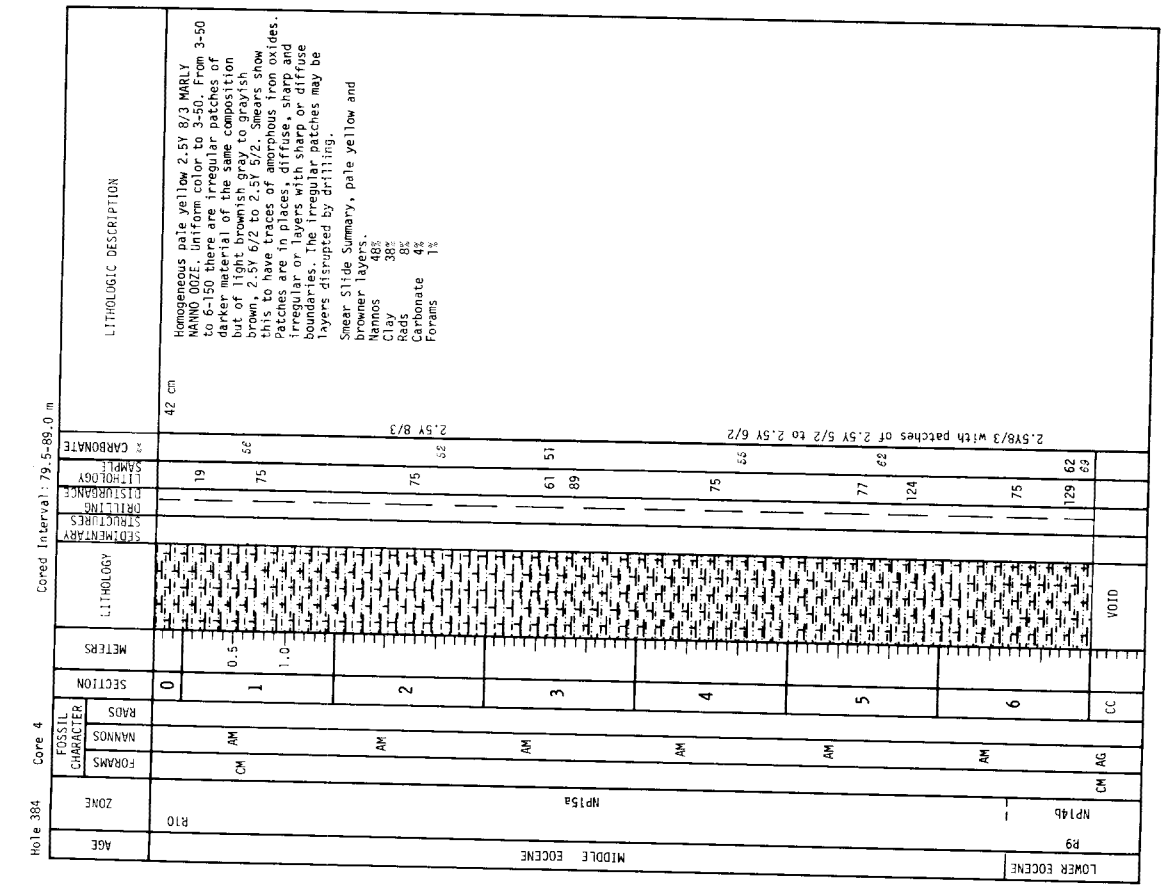
AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
MIDDLE EOCENE	P10 NP16	CM	AG		0							Homogeneous structureless pale yellow MARLY NANNO OOZE with slight grayer zones of the same material at 1-54-56, 2-21-23, 55-61 and 92-97; material is of 2.5Y 7/2 pale yellow.
					1	0.5 1.0				25	62	Smear Slide Summary Nannos 51% Clay 29% Rads 12% Carbonate 5% Bomb $CaCO_3$, mean 56%
	NP15c		AG		2					14 79 93	60	Manganese nodule 6x3.5x3 cm in top (15-20 cm) of core - probable downhole contamination.
	NP15b		AG		3					73	52 45	2.5Y 8/5 to 2.5Y 8/2
	P11	CM	AG		CC					10		2.5Y 8/3

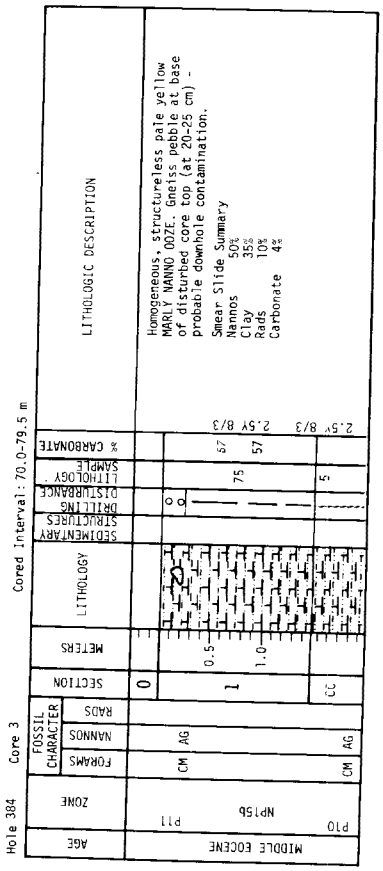




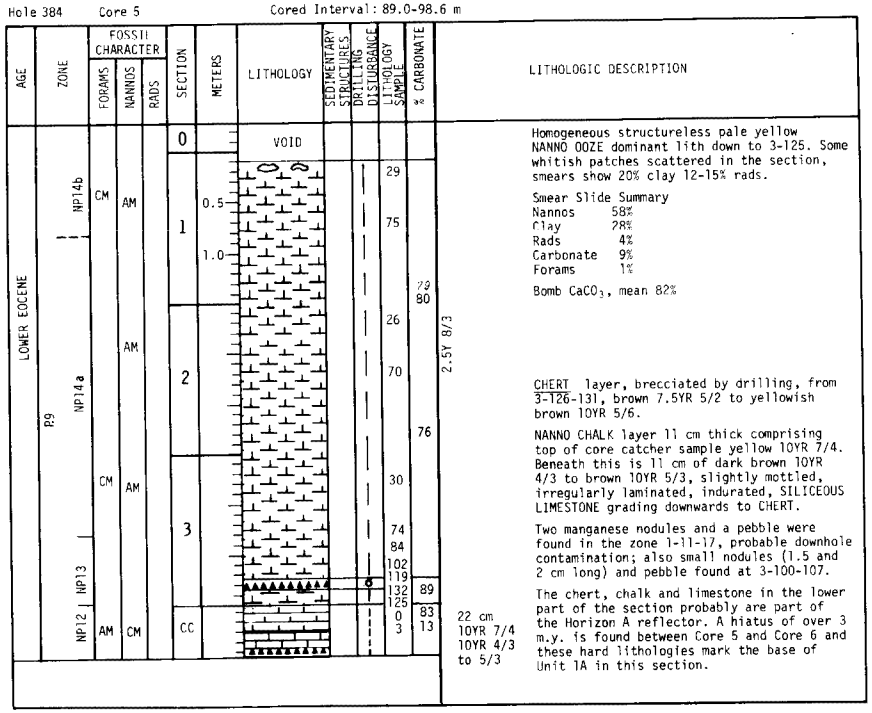
Hole 384 Core 2 Cored Interval: 60.4-70.0 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
MIDDLE EOCENE	P11 NP15b				0							32 cm
			AG		1	0.5 1.0				75	47	Homogeneous structureless pale yellow MARLY NANNO OOZE. Rare scattered small dark spots - probably manganese spots. Smear Slide Summary Nannos 45% Clay 40% Rads 10% Carbonate 4% Bomb $CaCO_3$, mean 50%
			AG		2					75	51 53	
			AG		3					75	48	2.5Y8/3 to 2.5Y 8/4
			AG		4					75	54	
			AG		5					75	52	
			AG		6					75	50 56	
		CP	AG		CC							10 cm


Hole 384
Core 4
Cored Interval: 79.5-89.0 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
MIDDLE EOCENE
LOWER EOCENE
R10
P9
NP15a
NP14b
CM
AM
AG
0
1
2
3
4
5
6
CC
0.5
1.0
VOID
42 cm
2.5Y 8/3
2.5Y8/3 with patches of 2.5Y 5/2 to 2.5Y 6/2
Homogeneous pale yellow 2.5Y 8/3 MARLY NANNO OOZE. Uniform color to 3-50. From 3-50 to 6-150 there are irregular patches of darker material of the same composition but of light brownish gray to grayish brown, 2.5Y 6/2 to 2.5Y 5/2. Smears show this to have traces of amorphous iron oxides. Patches are in places, diffuse, sharp and irregular or layers with sharp or diffuse boundaries. The irregular patches may be layers disrupted by drilling.
Smear Slide Summary, pale yellow and browner layers.
Nannos 48%
Clay 38%
Rads 8%
Carbonate 4%
Forams 1%


Hole 384
Core 3
Cored Interval: 70.0-79.5 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
MIDDLE EOCENE
P10
NP15b
P11
CM
AG
0
1
CC
0.5
1.0
2.5Y 8/3
2.5Y 8/3
Homogeneous, structureless pale yellow MARLY NANNO OOZE. Gneiss pebble at base of disturbed core top (at 20-25 cm) - probable downhole contamination.
Smear Slide Summary
Nannos 50%
Clay 35%
Rads 10%
Carbonate 4%

Hole 384 Core 5 Cored Interval: 89.0-98.6 m



Homogeneous structureless pale yellow NANNO OOZE dominant lith down to 3-125. Some whitish patches scattered in the section, smears show 20% clay 12-15% rads.

Smear Slide Summary
Nannos 58%
Clay 28%
Rads 4%
Carbonate 9%
Forams 1%

Bomb $CaCO_3$, mean 82%

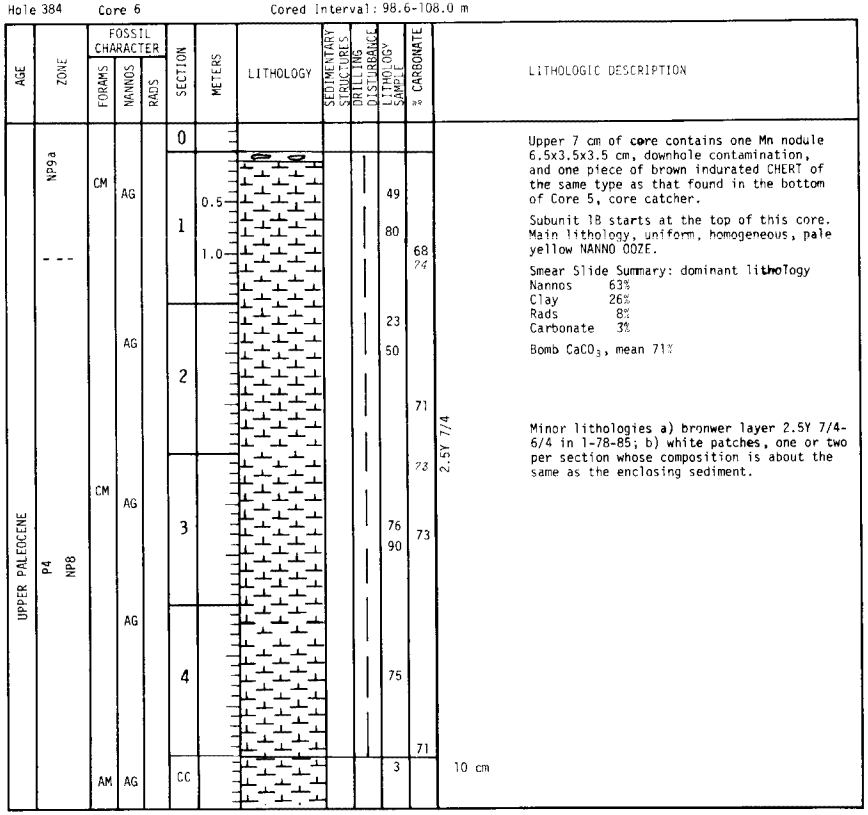
CHERT layer, brecciated by drilling, from 3-126-131, brown 7.5YR 5/2 to yellowish brown 10YR 5/6.

NANNO CHALK layer 11 cm thick comprising top of core catcher sample yellow 10YR 7/4. Beneath this is 11 cm of dark brown 10YR 4/3 to brown 10YR 5/3, slightly mottled, irregularly laminated, indurated, SILICEOUS LIMESTONE grading downwards to CHERT.

Two manganese nodules and a pebble were found in the zone 1-11-17, probable downhole contamination; also small nodules (1.5 and 2 cm long) and pebble found at 3-100-107.

The chert, chalk and limestone in the lower part of the section probably are part of the Horizon A reflector. A hiatus of over 3 m.y. is found between Core 5 and Core 6 and these hard lithologies mark the base of Unit 1A in this section.

Hole 384 Core 6 Cored Interval: 98.6-108.0 m



Upper 7 cm of core contains one Mn nodule 6.5x3.5x3.5 cm, downhole contamination, and one piece of brown indurated CHERT of the same type as that found in the bottom of Core 5, core catcher.

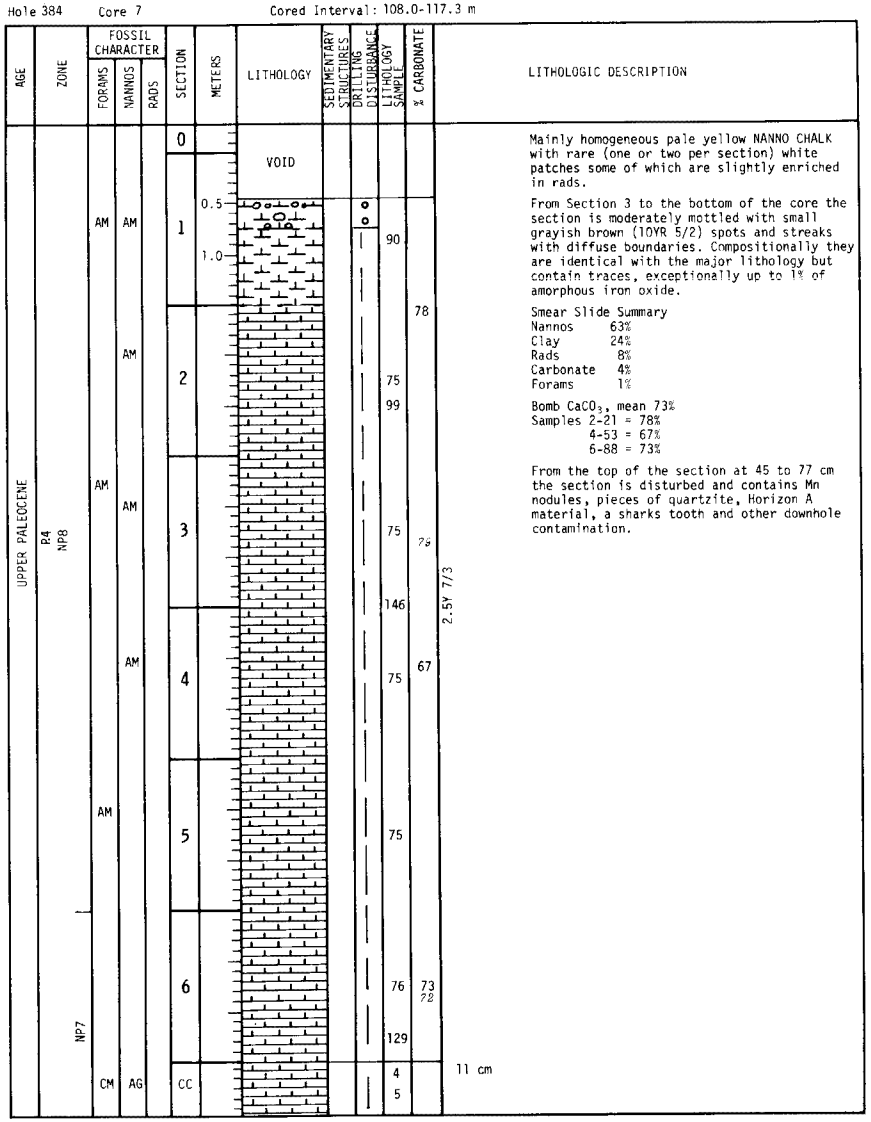
Subunit 1B starts at the top of this core. Main lithology, uniform, homogeneous, pale yellow NANNO OOZE.

Smear Slide Summary: dominant lithology
Nannos 63%
Clay 26%
Rads 8%
Carbonate 3%

Bomb $CaCO_3$, mean 71%

Minor lithologies a) bronwer layer 2.5Y 7/4-6/4 in 1-78-85; b) white patches, one or two per section whose composition is about the same as the enclosing sediment.

Hole 384 Core 7 Cored Interval: 108.0-117.3 m



Mainly homogeneous pale yellow NANNO CHALK with rare (one or two per section) white patches some of which are slightly enriched in rads.

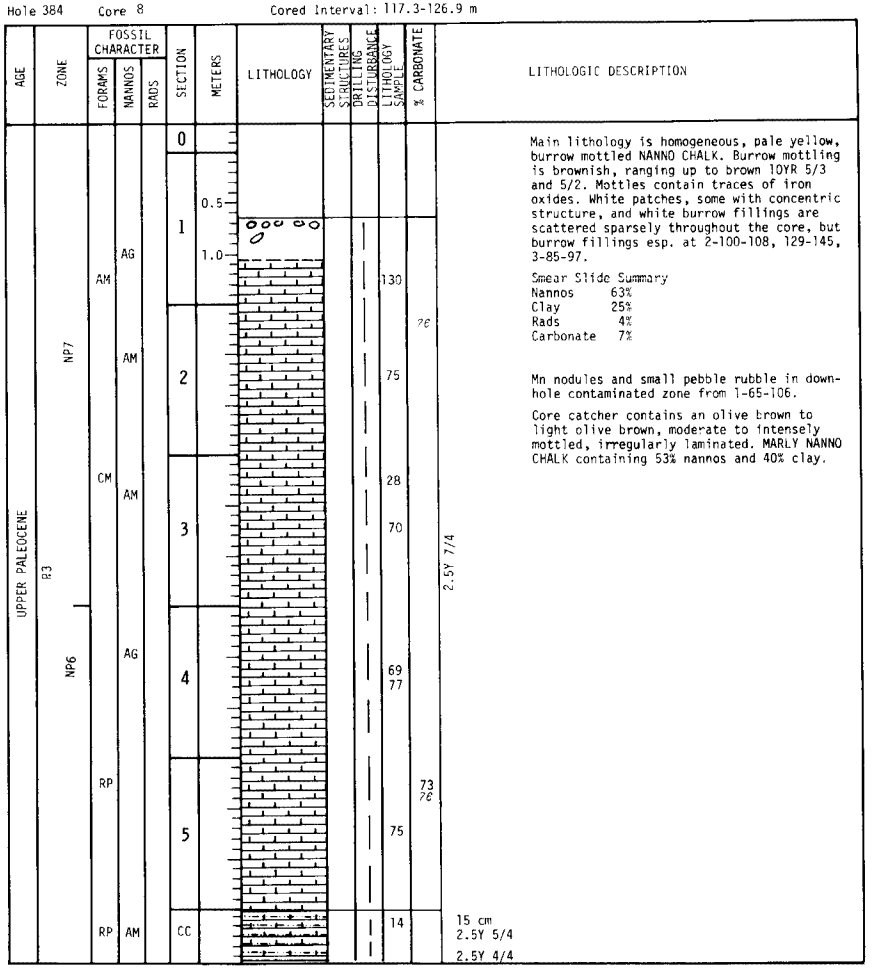
From Section 3 to the bottom of the core the section is moderately mottled with small grayish brown (10YR 5/2) spots and streaks with diffuse boundaries. Compositionally they are identical with the major lithology but contain traces, exceptionally up to 1% of amorphous iron oxide.

Smear Slide Summary
Nannos 63%
Clay 24%
Rads 8%
Carbonate 4%
Forams 1%

Bomb $CaCO_3$, mean 73%
Samples 2-21 = 78%
4-53 = 67%
6-88 = 73%

From the top of the section at 45 to 77 cm the section is disturbed and contains Mn nodules, pieces of quartzite, Horizon A material, a sharks tooth and other downhole contamination.

Hole 384 Core 8 Cored Interval: 117.3-126.9 m



Main lithology is homogeneous, pale yellow, burrow mottled NANNO CHALK. Burrow mottling is brownish, ranging up to brown 10YR 5/3 and 5/2. Mottles contain traces of iron oxides. White patches, some with concentric structure, and white burrow fillings are scattered sparsely throughout the core, but burrow fillings esp. at 2-100-108, 129-145, 3-85-97.

Smear Slide Summary
Nannos 63%
Clay 25%
Rads 4%
Carbonate 7%

Mn nodules and small pebble rubble in downhole contaminated zone from 1-65-106.

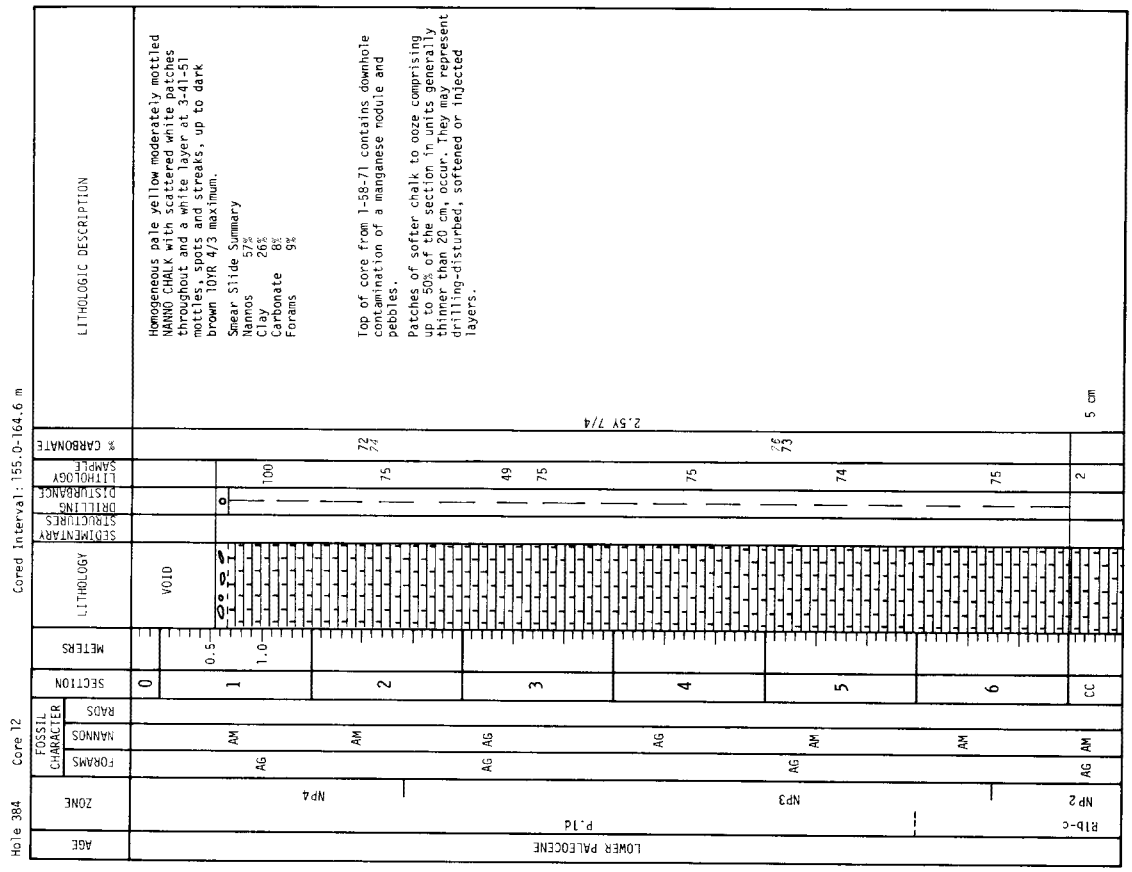
Core catcher contains an olive brown to light olive brown, moderate to intensely mottled, irregularly laminated. MARLY NANNO CHALK containing 53% nannos and 40% clay.

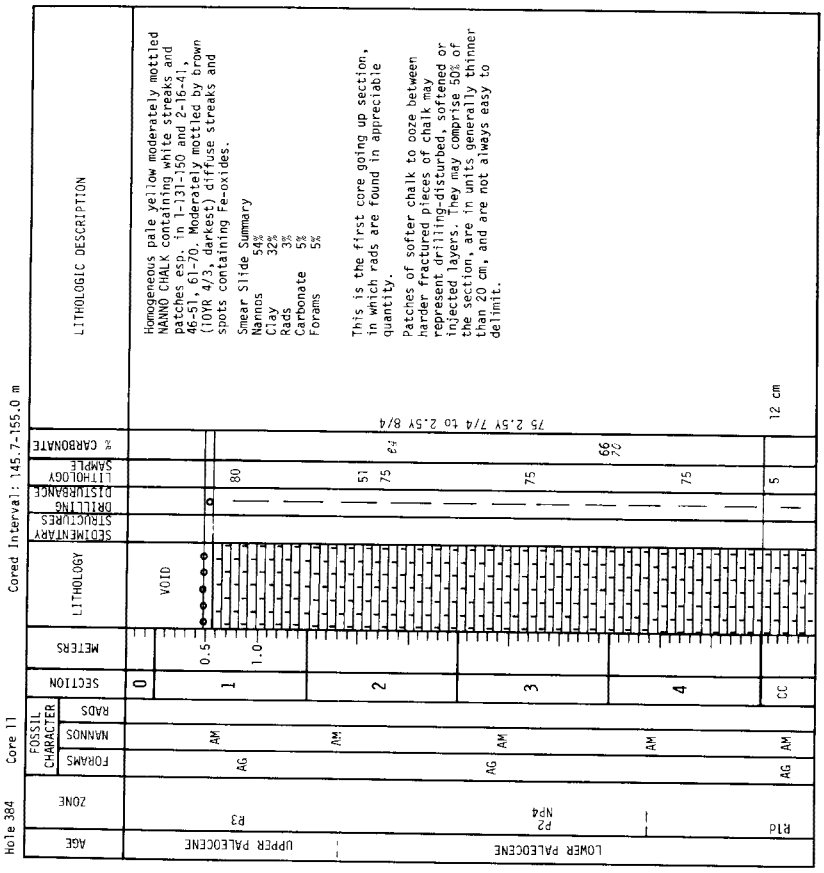
Hole 384 Core 9 Cored Interval:126.9-136.4 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
UPPER PALEOCENE	P3 NP5	RP	CM		0							53 cm
					1	0.5 1.0				75		Homogeneous, pale yellow to light yellowish brown, moderately mottled NANNO CHALK containing white (2.5Y 8/2) patches, some with concentric structure resembling burrow fillings, and brown diffuse mottles as spots and streaks (10YR 5/3). Smear Slide Summary Nannos 59% Clay 30% Rads 6% Carbonate 5%
		RP			2					75		Upper 20 cm of 0 section is highly disturbed and contains manganese nodule rubble of downhole contamination.
					3					77	66	
										128		
					4					50 75		2.5Y 6/4 to 2.5Y 7/4
		CM			5					70 104	70 69	
					6					73 82 110		
		AG	AG		CC					3		9 cm

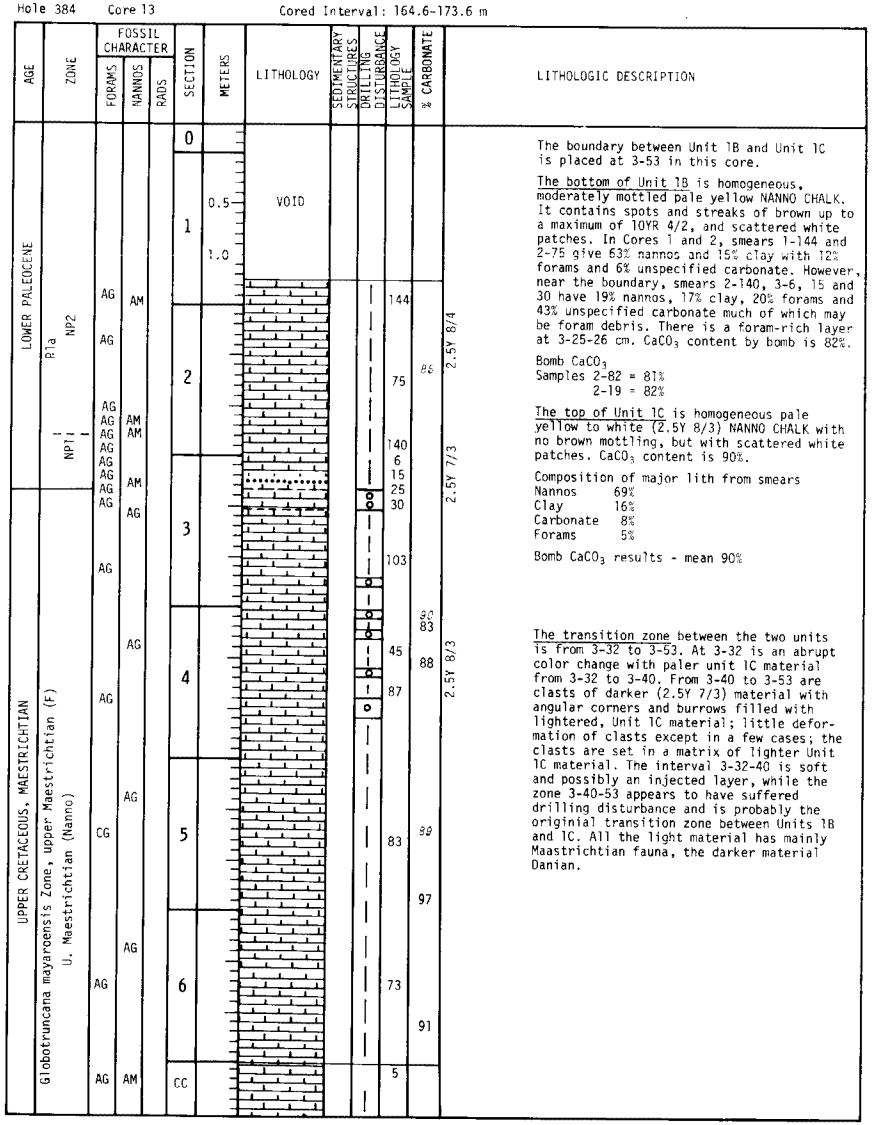
Hole 384 Core 10 Cored Interval:136.5-145.7 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
UPPER PALEOCENE	NP5	AG	AM		0		VOID					Homogeneous pale yellow to light yellowish brown, moderately mottled NANNO CHALK containing white patches scattered throughout and in zones 1-119-131 and 6-47-56. The sediment is moderately mottled by brown (10YR 4/3 darkest) diffuse spots and streaks containing a little more Fe-oxide than the most sediment. There are some small scale fracture structures at 5-129-144 showing slight movement. Smear Slide Summary Nannos 58% Clay 26% Rads 8% Carbonate 6% Forams 2% Bomb $CaCO_3$, mean 70%
					1	0.5 1.0				90		
		AG	AM		2		VOID			13 75	69	In this core and lower in the section, forams are present in more than trace quantities. Above this they are present as trace to 1% only. There are patches of softer chalk between harder lumps which may show fractures. These softer zones are rarely thicker than 10 cm and may represent drilling-disturbed, softened or injected layers.
					3					70 73		
			AM		4					75		2.5Y 6/5 to 2.5Y 8/4
	P3 NP4	AG	AM		5					75		
			AM		6					75		
		AG	AM		CC					3	69 66	One piece 4 cm long NANNO CHALK


Hole 384
Core 12
Cored Interval: 155.0-164.6 m
AGE
ZONE
FORAMS
NANNOS
RADS
FOSSIL CHARACTER
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER PALEOCENE
NP4
NP3
NP2
P.1d
R1b-c
AG
AM
VOID
2.5Y 7/4
5 cm
Homogeneous pale yellow moderately mottled NANNO CHALK with scattered white patches throughout and a white layer at 3-41-51 mottles, spots and streaks, up to dark brown 10YR 4/3 maximum.
Smear Slide Summary
Nannos 57%
Clay 26%
Carbonate 8%
Forams 9%
Top of core from 1-58-71 contains downhole contamination of a manganese nodule and pebbles.
Patches of softer chalk to ooze comprising up to 50% of the section in units generally thinner than 20 cm occur. They may represent drilling-disturbed, softened or injected layers.


Hole 384
Core 11
Cored Interval: 145.7-155.0 m
AGE
ZONE
FORAMS
NANNOS
RADS
FOSSIL CHARACTER
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
UPPER PALEOCENE
LOWER PALEOCENE
R3
P2
NP4
R1d
AG
AM
VOID
75 2.5Y 7/4 to 2.5Y 8/4
12 cm
Homogeneous pale yellow moderately mottled NANNO CHALK containing white streaks and patches esp. in 1-131-150 and 2-16-41, 46-51, 61-70. Moderately mottled by brown (10YR 4/3, darkest) diffuse streaks and spots containing Fe-oxides.
Smear Slide Summary
Nannos 54%
Clay 32%
Rads 3%
Carbonate 5%
Forams 5%
This is the first core going up section, in which rads are found in appreciable quantity.
Patches of softer chalk to ooze between harder fractured pieces of chalk may represent drilling-disturbed, softened or injected layers. They may comprise 50% of the section, are in units generally thinner than 20 cm, and are not always easy to delimit.

Hole 384 Core 13 Cored Interval: 164.6-173.6 m



The boundary between Unit 1B and Unit 1C is placed at 3-53 in this core.

The bottom of Unit 1B is homogeneous, moderately mottled pale yellow NANNO CHALK. It contains spots and streaks of brown up to a maximum of 10YR 4/2, and scattered white patches. In Cores 1 and 2, smears 1-144 and 2-75 give 63% nannos and 15% clay with 12% forams and 6% unspecified carbonate. However, near the boundary, smears 2-140, 3-6, 15 and 30 have 19% nannos, 17% clay, 20% forams and 43% unspecified carbonate much of which may be foram debris. There is a foram-rich layer at 3-25-26 cm. $CaCO_3$ content by bomb is 82%.

Bomb $CaCO_3$
Samples 2-82 = 81%
2-19 = 82%

The top of Unit 1C is homogeneous pale yellow to white (2.5Y 8/3) NANNO CHALK with no brown mottling, but with scattered white patches. $CaCO_3$ content is 90%.

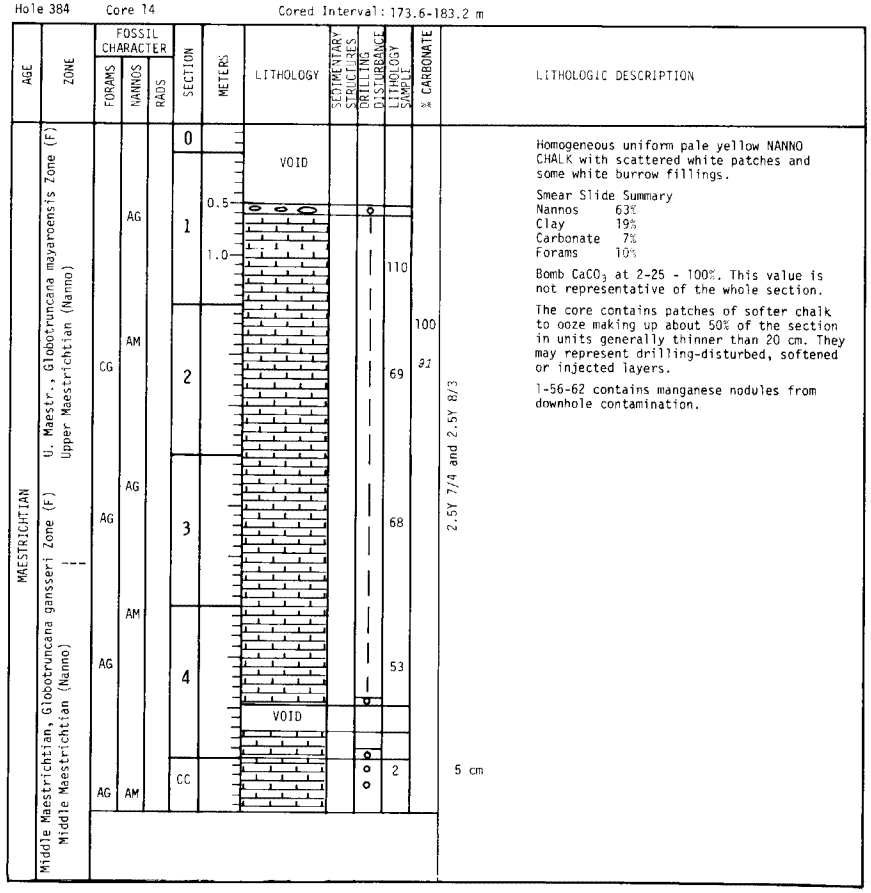
Composition of major lith from smears

Nannos	69%
Clay	16%
Carbonate	8%
Forams	5%

Bomb $CaCO_3$ results - mean 90%

The transition zone between the two units is from 3-32 to 3-53. At 3-32 is an abrupt color change with paler unit 1C material from 3-32 to 3-40. From 3-40 to 3-53 are clasts of darker (2.5Y 7/3) material with angular corners and burrows filled with lightered, Unit 1C material; little deformation of clasts except in a few cases; the clasts are set in a matrix of lighter Unit 1C material. The interval 3-32-40 is soft and possibly an injected layer, while the zone 3-40-53 appears to have suffered drilling disturbance and is probably the originial transition zone between Units 1B and 1C. All the light material has mainly Maastrichtian fauna, the darker material Danian.

Hole 384 Core 14 Cored Interval: 173.6-183.2 m



Homogeneous uniform pale yellow NANNO CHALK with scattered white patches and some white burrow fillings.

Smear Slide Summary

Nannos	63%
Clay	19%
Carbonate	7%
Forams	10%

Bomb $CaCO_3$ at 2-25 - 100%. This value is not representative of the whole section.

The core contains patches of softer chalk to ooze making up about 50% of the section in units generally thinner than 20 cm. They may represent drilling-disturbed, softened or injected layers.

1-56-62 contains manganese nodules from downhole contamination.

Hole 384 Core 15 Cored Interval: 183.2-192.7 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
MAESTRICHTIAN	Lower Maestrichtian, Globotruncana arca Zone (F) — Middle Maestrichtian, Globotruncana ganssen Zone — Lower Maestrichtian (Nanno) — Middle Maestrichtian (Nanno)	CG	AM		1	0.5–1.0				66	92 / 91	9 cm Homogeneous, uniform, pale yellow NANNO CHALK with scattered white patches and quite foram rich. Smear Slide Summary Nannos 67% Clay 14% Carbonate 5% Forams 14% Bomb $CaCO_3$, mean 91%
		CG	AM		2					71		Patches of softer chalk to ooze comprise up to 50% of the core in units generally thinner than 20 cm. They may represent drilling-disturbed, softened or injected layers.
		AG	AG		3					64 75	92	
		AG	AG		4					99		2.5Y 8/3
		AG	AM		5					75		
			AM		6					14		
		FG								79	87 89	
		AG	AM		CC					11		21 cm

Hole 384 Core 16 Cored Interval: 202.2-211.5 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
APTIAN?-SANTONIAN	Coniacian-Santonian (N)?		FM		0		VOID					A mixture of lithologies representing the bottom of Unit 3 and the top of Unit 4. The whole mass is drilling breccia and no stratigraphic significance should be attached to the order of lithologies. At 29-70, 86-100, 104-114, is a moderately sorted, white, coarse CARBONATE SAND composed largely of skeletal debris. Between 70 and 86 cm are three lumps of brown 2.5Y 5/4 NANNO OOZE. One lump also contains partly cemented shallow water LIMESTONE-BIOSPARITE (Folk). This is stratified and suggests transition from the NANNO OOZE/CHALK of Unit 3 to the LIMESTONES of Unit 4. At 100-104 cm is a similar stratified piece with brown ooze and white limestone. From 114-150 the drilling breccia consists of limestone rubble. The material is white BIOSPARRUDITE (Folk) containing mainly broken but some whole gastropods, pelecypods inc. rudists, brachiopods, possibly algae, echinoids, with, sparry calcite cement. In addition there are lumps of INTRABIOMICRITE, BIOMICRITE and INTRABIOMICRUDITE with the same fossil components.
					1	0.5				74 84 103	N9	
					CC						N9	

Site 384, Core 17, 211.5-220.7 m: ZERO RECOVERY

Hole 384 Core 18 Cored Interval: 220.7-229.9 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							Core catcher contains two pieces (2x1.5x 1.5 cm and 4x3x2 cm) of white BIOMICRUDITE (Folk), containing pelecypods and gastropods.
					CC						N9	

Hole 384 Core 19 Cored Interval: 229.9-239.4 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							The core catcher contains about 10 cm^3 of coarse carbonate sand and a few pieces of BIOMICRUDITE (Folk) containing pelecypods, gastropods, algae? and corals?.
					CC						N9	

Hole 384 Core 20 Cored Interval: 296.2-305.4 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
APTIAN?		FP			0		VOID					The upper 30 cm, from 80-110 cm comprise lumps of biomicrudite and white carbonate sand encountered higher in the section. Possibly downhole contamination here. From 120-140 cm there is indurated undisturbed yellow CHALK. Smear slides give 75% carbonate and 25% clay while a Bomb $CaCO_3$ value on the same material in the core catcher gives 90% $CaCO_3$. Fragments of forams, echinoids and estracods? were detected.
					1	0.5				134		
						1.0						
					CC					5 26	2.5Y 7/5 N7	The core catcher contains 20 cm of this yellow CHALK, underlain by light gray LIMESTONE - BIOMICRITE (Folk). This is as drilling breccia and some soft gray mud was also found in this mixture.

Hole 384 Core 21 Cored Interval: 324.3-324.8 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
APTIAN		AG			0		VOID					From 76 to 129 the drilling breccia comprises lumps of light gray BIOMICRITE, white CARBONATE SAND, soft fragments of pale yellow nanno ooze, benthic foraminifera (Orbitolives?) and fragments of the dark blue green rock described below from the core catcher.
					1	0.5				130		
						1.0				136		From 129 to 150 there is rubble of light gray (N7) BIOMICRITE dark blue-green rock and soft dark bluish-gray sandy mud (5B 3/1) containing 15% pyrite.
					CC					5 15 16	N7 5BG 1/2	The core catcher contains 5 fragments light gray biomicrite in the top 8 cm. From 15 to 17 cm are two pieces of cored, horizontally stratified dark blue-green (5BG 1/2) fine to medium clayey siltstone lighter in color) with interbeds of dark blue-green clay. The silt-sized particles contain large amounts of epidote, vesicular fragments, and some chlorite.

Hole 384 Core 22 Cored Interval: 324.8-330.3 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							BASALT TOTAL = 1.865 m
					1	0.5	VOID					MEGASCOPIC DESCRIPTION Medium dark gray, moderately altered hypocrystalline porphyritic basalt with amygdaloidal vesicle fillings. Some pyroxene and amphibole phenocrysts (to 1.5 mm) in aphanitic matrix. Plagioclase phenocrysts of slightly smaller size suspected. 5-20% elliptical amygdules of calcite and/or chlorite. Vesicle linings of iron oxides and a white massive mineral (calcite?) commonly encase amygdules. Common veining with calcite. Vein surfaces frequently lined with chlorite displaying fine slicken sides.
						1.0				119		
							VOID					
					2					15 36 57 65 81 98 107 128		
					CC					110 147		

112
N4 &
N3
180
8.5
N3

74 cm. In Section 2 there is a sharp color change to dark yellowish brown. Texture unchanged. Magnetite (anhedral) and iron oxides appear more commonly along veins.

10YR 4/2

THIN SECTION COMPOSITE

5YR 4/2
150
93
10YR 3/2
N2.5
57 cm CC

TEXTURE: Hypocrystalline. GRANULARITY: Porphyritic, amygdalogidal. FABRIC: Pliotaxitic (Diabasic) with minor fluxion of groundmass plagioclase. PHENOCRYSTS: 1) Pyroxene-colorless to pale purplish brown, subhedral, broken and corroded prismatic crystals of augite (N=1.70; 0.5-1.4 mm; 8-15%) partly altered to uralite (tremolite plus minor amounts of another amphibole phase) as single crystals or crystal aggregates plus chlorite with or without calcite. Alteration greatest along cleavage planes and is accompanied by irregular bleaching of the crystal flecked with small patches of magnetite. 2) Scarce patches of bowlingite suggest former existence of an olivine phenocryst phase. 3) Plagioclase (An 62) phenocrysts are smaller (0.5-1.0 mm) and rare (< 1%). The GROUNDMASS: consists of pyroxene (10-20%) altered partly to chlorite, polkilitic plagioclase (An 51; 60-70%) partially altered to zeolite plus chlorite, and rare brown glass, mostly devitrified. Patches of interstitial chlorite, smectite, plus zeolite probably represent former glass. ALTERATION: As noted above. Many alteration products, especially calcite, chlorite, and zeolite fill vesicles commonly vesicles are lined with opaques. Amygdules average 10-20% in cross section. The lower dark yellowish brown unit starting at 74 cm in Section 2 contains relict glass and opaques, more oxidized iron, less chlorite, and fresher plagioclase.

CHARACTERISTIC THIN SECTION

Plagioclase	60-70%	Zeolite	Tr- 4%
Glass	Tr- 1%	Amphibole	Tr- 5%
Pyroxene	10-25%	Bowlingite	Tr- 1%
Smectite	2- 5%	Opaques	Tr- 2%
Chlorite	5-20%	Epidote	Tr
Calcite	8-15%		

X-RAY MINERALOGICAL ANALYSES, SITE 384

Core	Section	Interval (cm)	Total Carbonate	Composition, %														Distribution in <2μm Fraction			
				Calcite	Dolomite	Siderite	Rhodochrosite	Quartz	Feldspar	Clay Minerals	Palygorskite	Clinoptilolite	Phillipsite	Analcime	Pyrite	Disordered Cristobalite	Other	Kaolinite	Mica	Chlorite	Montmorillonite
1	1	120-122	66	66				3	2	29								17	37	11	35
2	5	80- 81	53	53				7		40								8	35	6	51
4	3	78- 80	56	56				7	2	33		2						7	17	5	71
5	3	72- 74	90	90				1		9		?						12	19	3	66
6	2	54- 56	66	66				2		30		2						7	5	5	83
7	4	22- 24	80	80				2		18								6	7	5	82
8	2	70- 72	70	70				2	2	26		?						6	13	5	76
9	3	128-130	73	73				2		25								8	8	3	81
9	5	102-104	73	73				1		26								6	9	4	81
10	3	110-112	73	73				2		25								12	6	5	77
10	6	126-128	70	70				2		26		2						2	8	2	88
11	2	137-139	66	66				3		27		4							14		86
11	4	30- 32	70	70				3		21		6							17		83
12	2	45- 47	76	76				2		16		6									100
12	5	68- 70	90	90				1		7		2						1	15	2	82
13	2	30- 32	80	80				3		15		2							28	3	69
13	5	8- 10	90	90				2		8											
14	2	68- 70	90	90						10		?							38	2	60
15	3	90- 92	96	96						4											
15	6	54- 56	93	93				2		4								9	37	3	51
21	CC	13- 14								100											100

55

SITE 384, ORGANIC CARBON DETERMINATIONS

Core	Section	Top of Interval (cm)	% C_{org}[a]
1	3	80.0	0.1
2	1	90.0	-
2	2	50.0	0.1
2	4	50.0	-
2	5	100.0	-
2	6	80.0	-
3	1	50.0	0.1
4	1	60.0	-
4	2	100.0	-
4	4	100.0	-
4	5	90.0	-
4	6	139.0	-
5	1	120.0	-
6	1	118.0	-
6	3	10.0	-
7	3	88.0	-
7	6	96.0	-
8	2	25.0	-
8	5	46.0	-
9	3	116.0	-
9	5	82.0	-
10	2	61.0	-
10	3	75.0	-
10	6	140.0	-
11	2	71.0	-
11	4	16.0	-
12	2	39.0	-
12	5	5.0	-
13	2	62.0	-
13	4	18.0	-
13	5	75.0	-
14	2	60.0	-
15	1	66.0	-
15	6	125.0	-

[a] A dash indicates 0% C_{org}

DEEP SEA DRILLING PROJECT

LEG 43 SITE 385

SITE SUMMARY SHEET

POSITION: Latitude: 37°22.17'N Longitude: 60°09.45'W

Water depth (sea level): 4936 corrected meters, echo sounding

Bottom felt at: 4966 meters, drill pipe Penetration: 392.9 meters

Number of holes: 1 Number of cores: 24

Total length of cored section: 227.6 meters

Total core recovered: 63.43 meters

OLDEST SEDIMENT CORED:

Depth subbottom: 392.9 meters Nature: Volcaniclastic breccia

Age: Lower Maestrichtian or older

BASEMENT*:

Depth subbottom: 392.9 meters Nature: Volcaniclastic breccia

PRINCIPAL RESULTS:

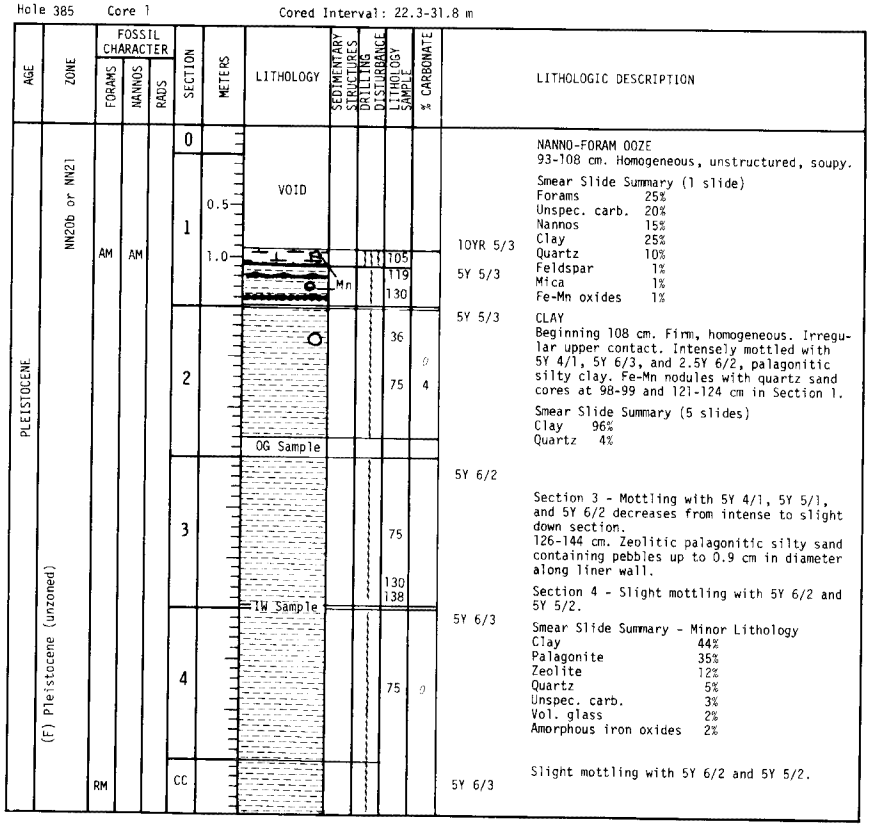
Site 385 was drilled 392.9 meters through a transparent sediment layer and into the underlying volcaniclastic apron forming the north flank of Vogel Seamount. Horizon A can be traced from beneath the Sohm Abyssal Plain to the drill site, where it occurs 0.2 s subbottom and 0.17 s above the volcaniclastic apron. A total of 24 cores (227.6 m) were taken; the low overall recovery (63.4 m) reflects poor coring performance in cherts and uncemented volcaniclastic sands and gravels.

Formations encountered are as follows: A spot-cored section of Pleistocene to lower Miocene clays overlies continuously cored lower-middle to upper-lower Eocene clays and chert (138-165 m subbottom) containing rich and well preserved radiolarian fauna. Horizon A is correlated with an alternating chert and radiolarian ooze interval approximately 153-165 meters subbottom. The section from 165 to 206 meters consists of zeolitic silty clay containing poorly preserved and unidentified radiolarian assemblages. Lower Danian to Maestrichtian

marly ooze (206-251 m) overlies volcanic sediments older than mid or lower Maestrichtian that continue to 393 meters. A thin (18 cm) layer of aphanitic basalt was cored at 283 meters; this may be either a sill or a flow, although the possiblity that it is a displaced boulder cannot be excluded. The deepest volcanic material penetrated is a volcaniclastic breccia very similar to those recovered at Site 382 on Nashville Seamount.

Unfortunately, the volcanogenic unit is unfossiliferous except for a few long-ranging benthonic Foraminifera, and the deepest dates in the hole are for the marly ooze above the unit. However, we can make some meaningful estimates of the ages from extrapolated and assumed sedimentation rates. If sedimentation rates were fairly uniform in the marly ooze unit, then the top of the volcanogenic debris probably dates from the late Campanian. A good estimate for accumulation rates in the volcanogenic unit is probably that determinated at Site 382 (12 m/m.y.). This places the top of the volcaniclastic breccia at Site 385 within the Santonian at about 81-82 m.y. The similar spacing in time of the two peak volcanic phases at Sites 382 and 385 is suggestive that in reality they may be coeval. In fact, by using a slightly reduced, but reasonable, sedimentation rate (8 m/m.y.) for the volcanogenic section at Site 385, we can bring the peak episodes almost exactly into phase. Thus, there exists a strong possibility that volcanism at Nashville and Vogel Seamounts was essentially synchronous in the late Cretaceous, rather than migratory.

Hole 385 Core 1 Cored Interval: 22.3-31.8 m



LITHOLOGIC DESCRIPTION

NANNO-FORAM OOZE
93-108 cm. Homogeneous, unstructured, soupy.

Smear Slide Summary (1 slide)

Forams	25%
Unspec. carb.	20%
Nannos	15%
Clay	25%
Quartz	10%
Feldspar	1%
Mica	1%
Fe-Mn oxides	1%

10YR 5/3

5Y 5/3

5Y 5/3

CLAY
Beginning 108 cm. Firm, homogeneous. Irregular upper contact. Intensely mottled with 5Y 4/1, 5Y 6/3, and 2.5Y 6/2, palagonitic silty clay. Fe-Mn nodules with quartz sand cores at 98-99 and 121-124 cm in Section 1.

Smear Slide Summary (5 slides)

Clay	96%
Quartz	4%

5Y 6/2

Section 3 - Mottling with 5Y 4/1, 5Y 5/1, and 5Y 6/2 decreases from intense to slight down section.
126-144 cm. Zeolitic palagonitic silty sand containing pebbles up to 0.9 cm in diameter along liner wall.

Section 4 - Slight mottling with 5Y 6/2 and 5Y 5/2.

5Y 6/3

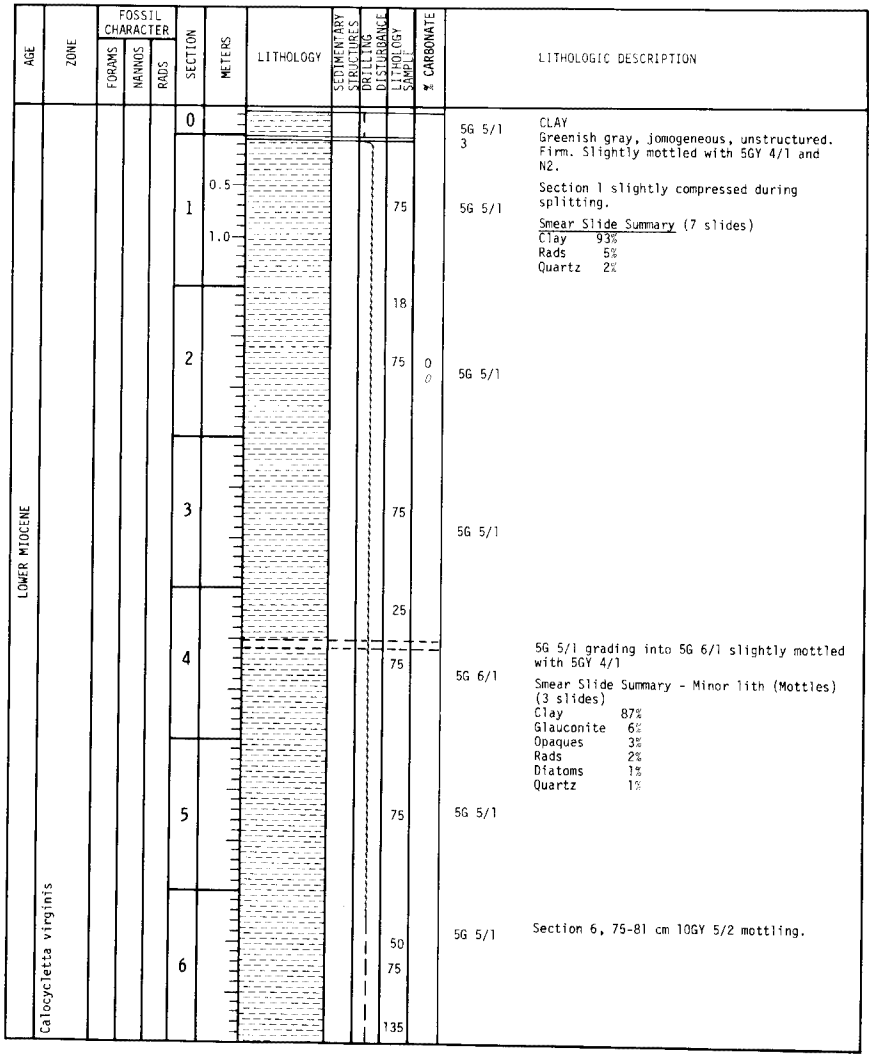
Smear Slide Summary - Minor Lithology

Clay	44%
Palagonite	35%
Zeolite	12%
Quartz	5%
Unspec. carb.	3%
Vol. glass	2%
Amorphous iron oxides	2%

Slight mottling with 5Y 6/2 and 5Y 5/2.

5Y 6/3

Hole 385 Core 2 Cored Interval: 60.4-70.0 m



5G 5/1
3

5G 5/1

5G 5/1

5G 5/1

5G 6/1

5G 5/1

5G 5/1

CLAY
Greenish gray, homogeneous, unstructured. Firm. Slightly mottled with 5GY 4/1 and N2.

Section 1 slightly compressed during splitting.

Smear Slide Summary (7 slides)

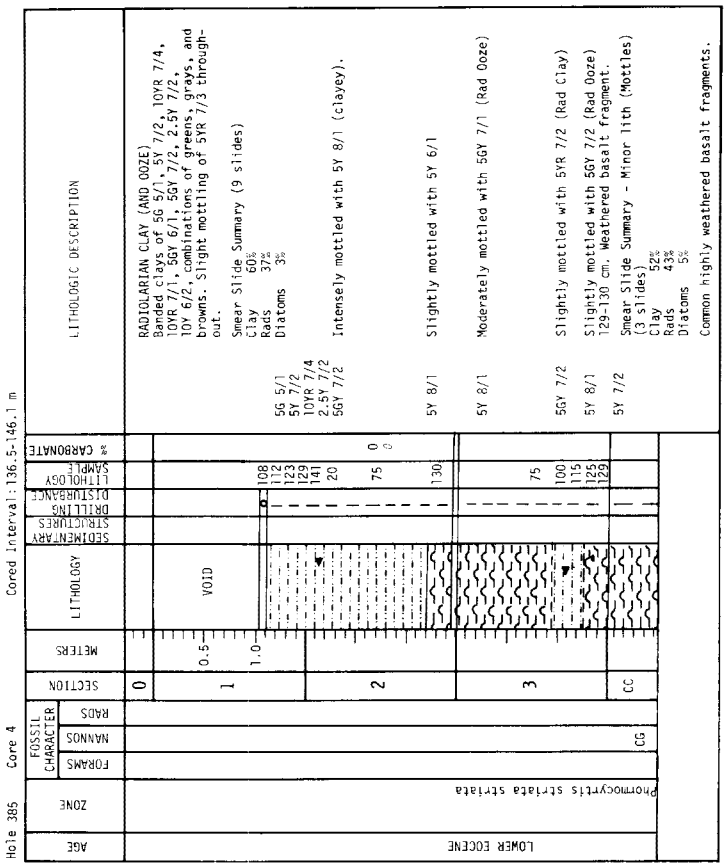
Clay	93%
Rads	5%
Quartz	2%

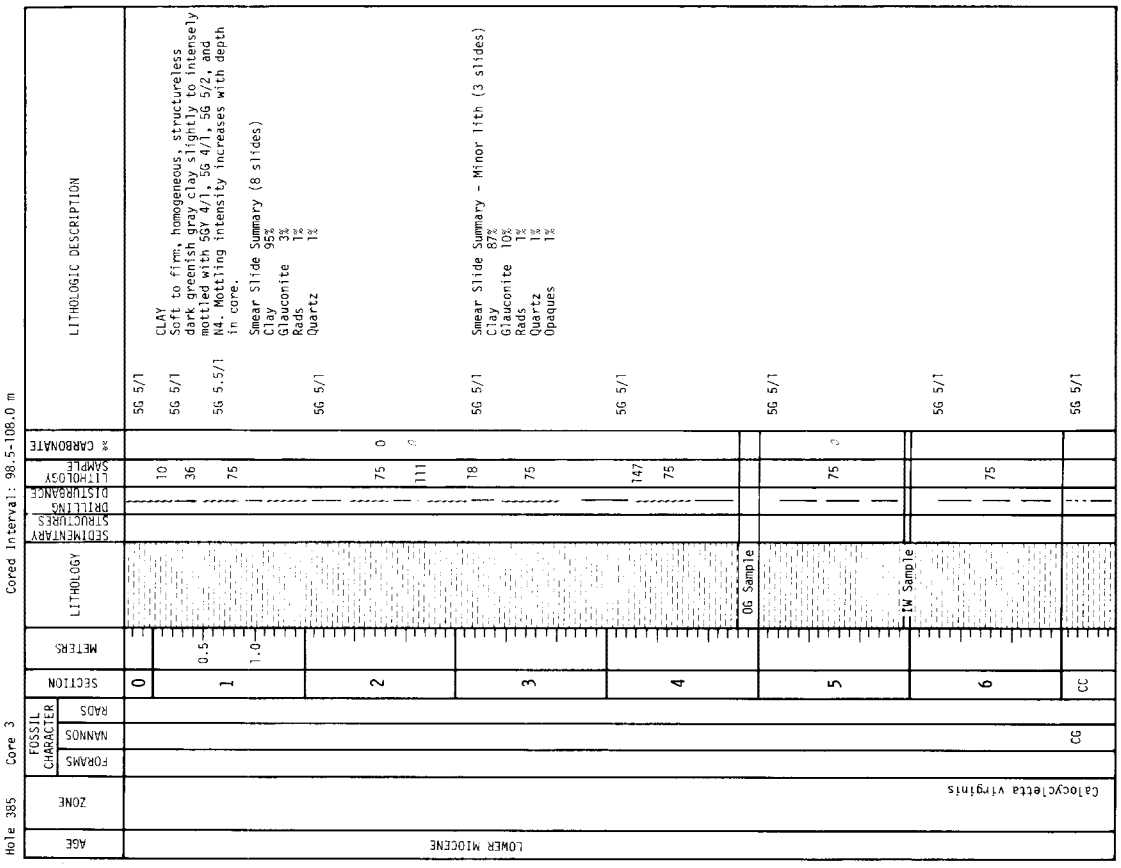
5G 5/1 grading into 5G 6/1 slightly mottled with 5GY 4/1

Smear Slide Summary - Minor lith (Mottles) (3 slides)

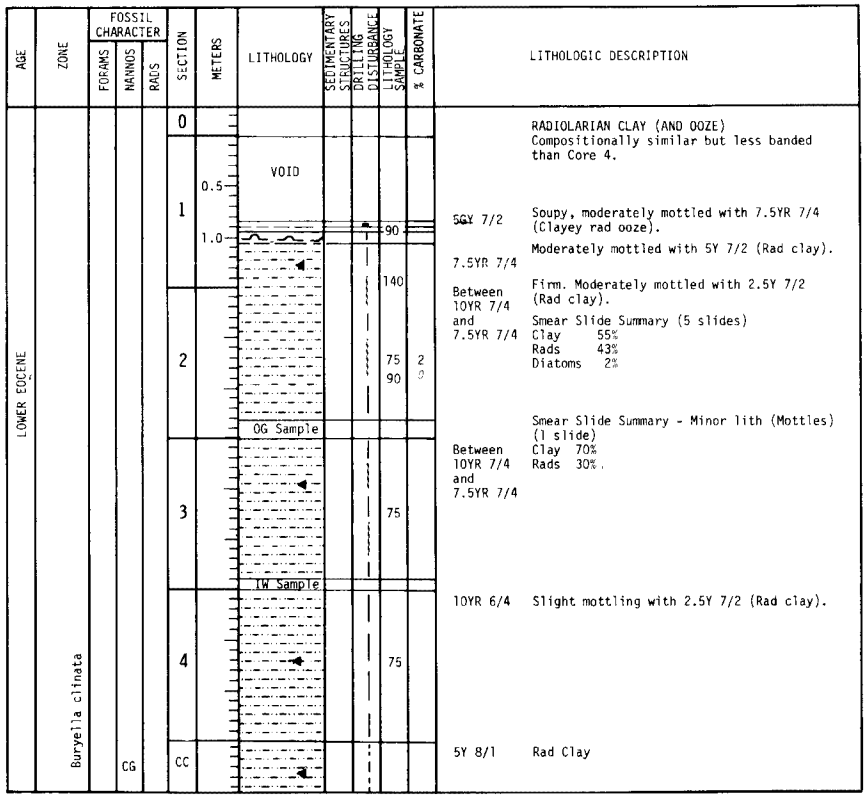
Clay	87%
Glauconite	6%
Opaques	3%
Rads	2%
Diatoms	1%
Quartz	1%

Section 6, 75-81 cm 10GY 5/2 mottling.

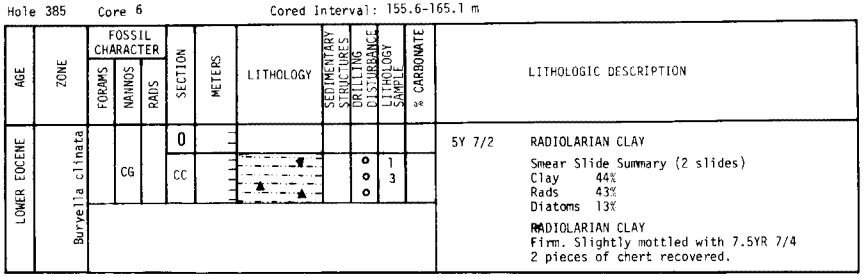

Hole 385 Core 4 Cored Interval: 136.5-146.1 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER EOCENE
Protmocyrtis striata striata
CG
VOID
RADIOLARIAN CLAY (AND OOZE)
Banded clays of 5G 5/1, 5Y 7/2, 10YR 7/4, 10YR 7/1, 5GY 6/1, 5GY 7/2, 2.5Y 7/2, 10Y 6/2, combinations of greens, grays, and browns. Slight mottling of 5YR 7/3 throughout.
Smear Slide Summary (9 slides)
Clay 60%
Rads 37%
Diatoms 3%
Intensely mottled with 5Y 8/1 (clayey).
Slightly mottled with 5Y 6/1
Moderately mottled with 5GY 7/1 (Rad Ooze)
Slightly mottled with 5YR 7/2 (Rad Clay)
Slightly mottled with 5GY 7/2 (Rad Ooze)
129-130 cm. Weathered basalt fragment.
Smear Slide Summary - Minor lith (Mottles) (3 slides)
Clay 52%
Rads 43%
Diatoms 5%
Common highly weathered basalt fragments.


Hole 385 Core 3 Cored Interval: 98.5-108.0 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER MIOCENE
Calocycletta virginis
CG
OG Sample
IW Sample
CLAY
Soft to firm, homogeneous, structureless dark greenish gray clay slightly to intensely mottled with 5GY 4/1, 5G 4/1, 5G 5/2, and N4. Mottling intensity increases with depth in core.
Smear Slide Summary (8 slides)
Clay 95%
Glauconite 3%
Rads 1%
Quartz 1%
Smear Slide Summary - Minor lith (3 slides)
Clay 87%
Glauconite 10%
Rads 1%
Quartz 1%
Opaques 1%

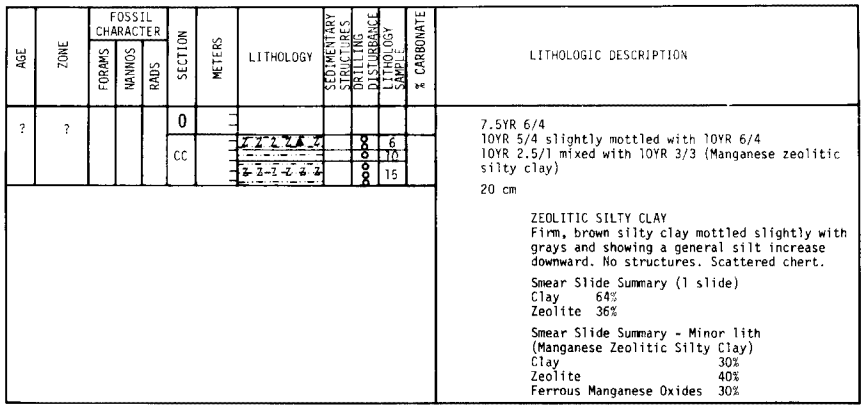
Hole 385 Core 5 Cored Interval: 146.1-155.6 m



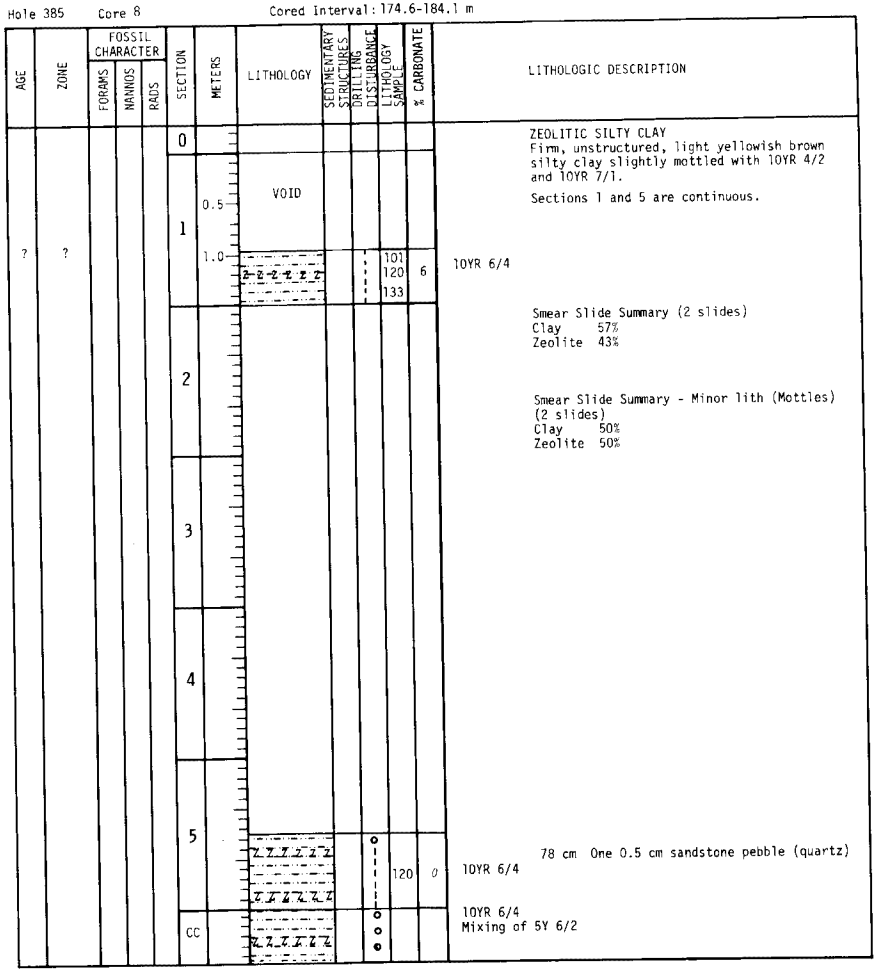
Hole 385 Core 6 Cored Interval: 155.6-165.1 m



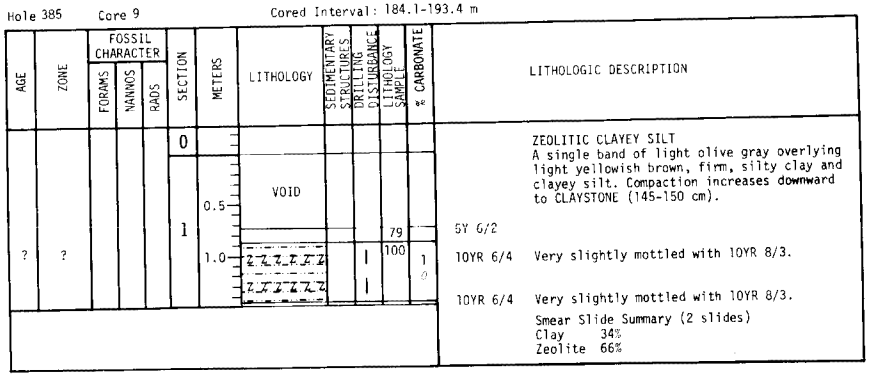
Hole 385 Core 7 Cored Interval: 165.1-174.6 m



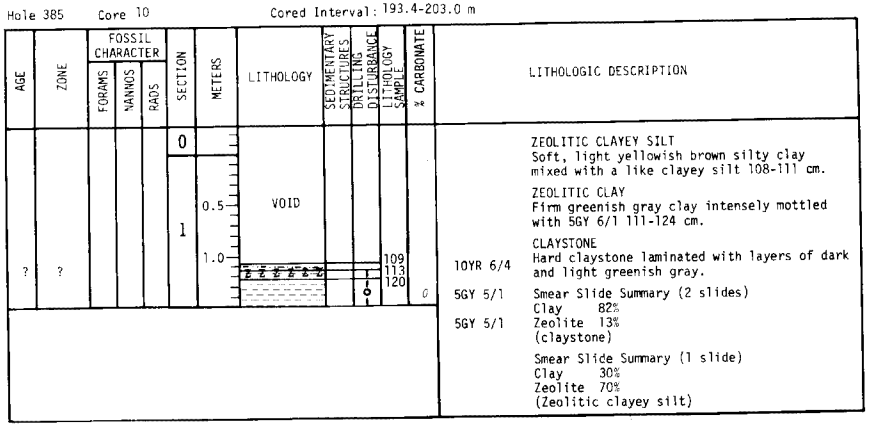
Hole 385 Core 8 Cored Interval: 174.6-184.1 m



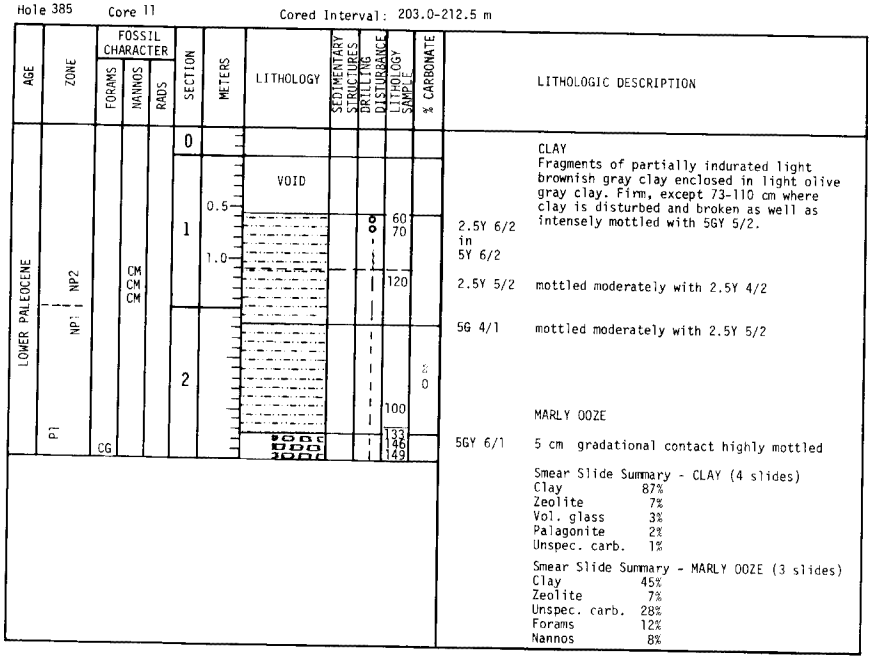
Hole 385 Core 9 Cored Interval: 184.1-193.4 m



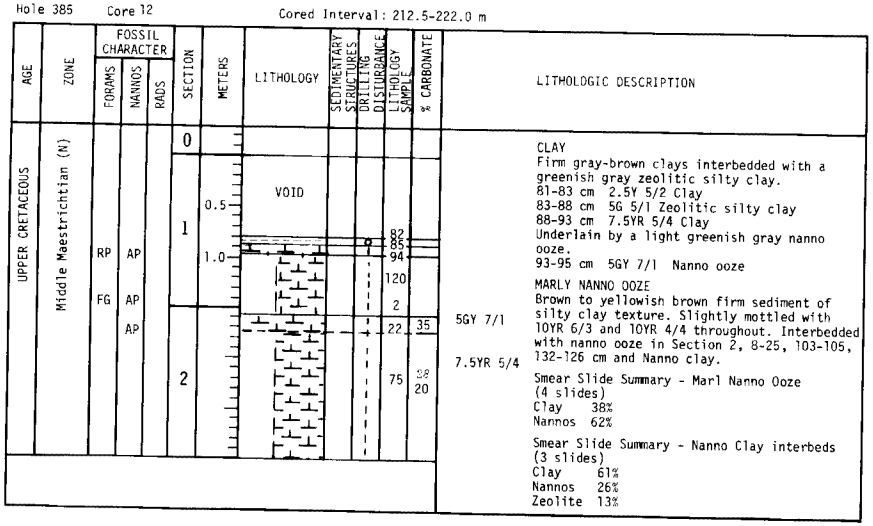
Hole 385 Core 10 Cored Interval: 193.4-203.0 m



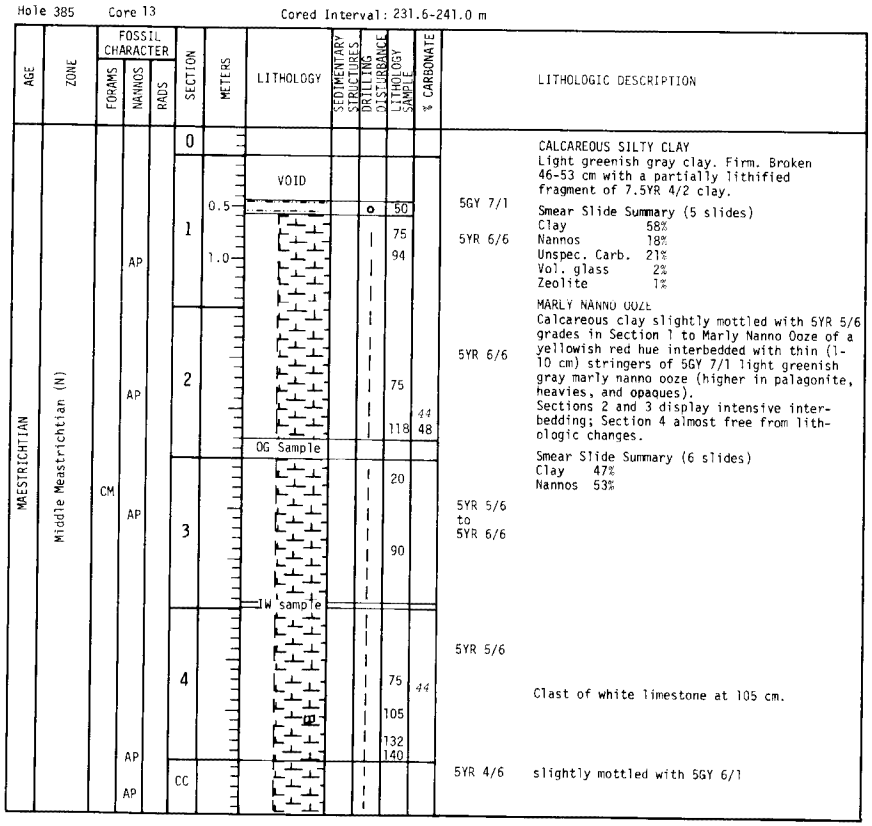
Hole 385 Core 11 Cored Interval: 203.0-212.5 m



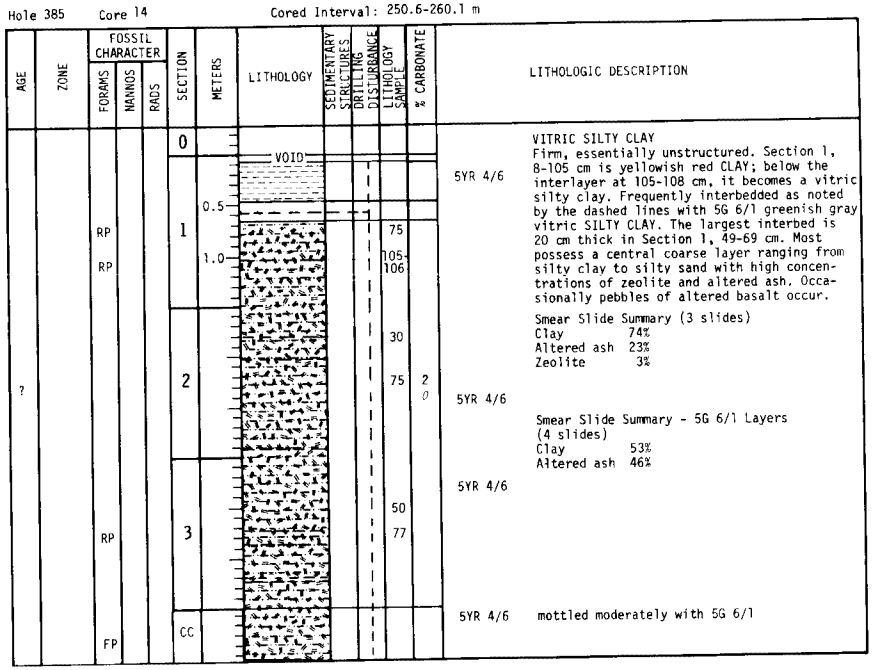
Hole 385 Core 12 Cored Interval: 212.5-222.0 m



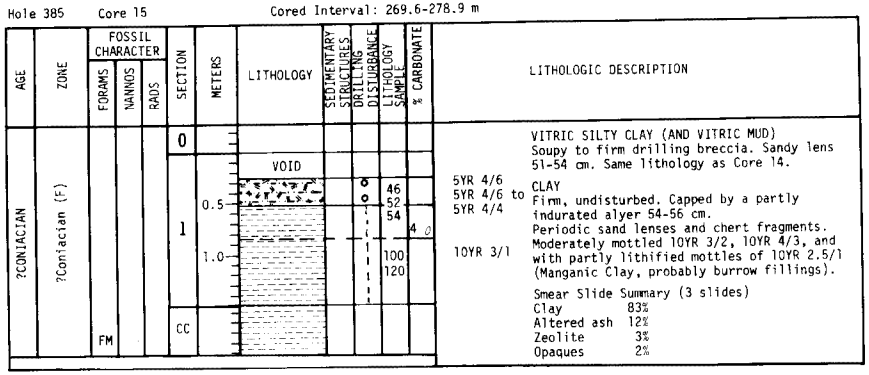
Hole 385 Core 13 Cored Interval: 231.6-241.0 m



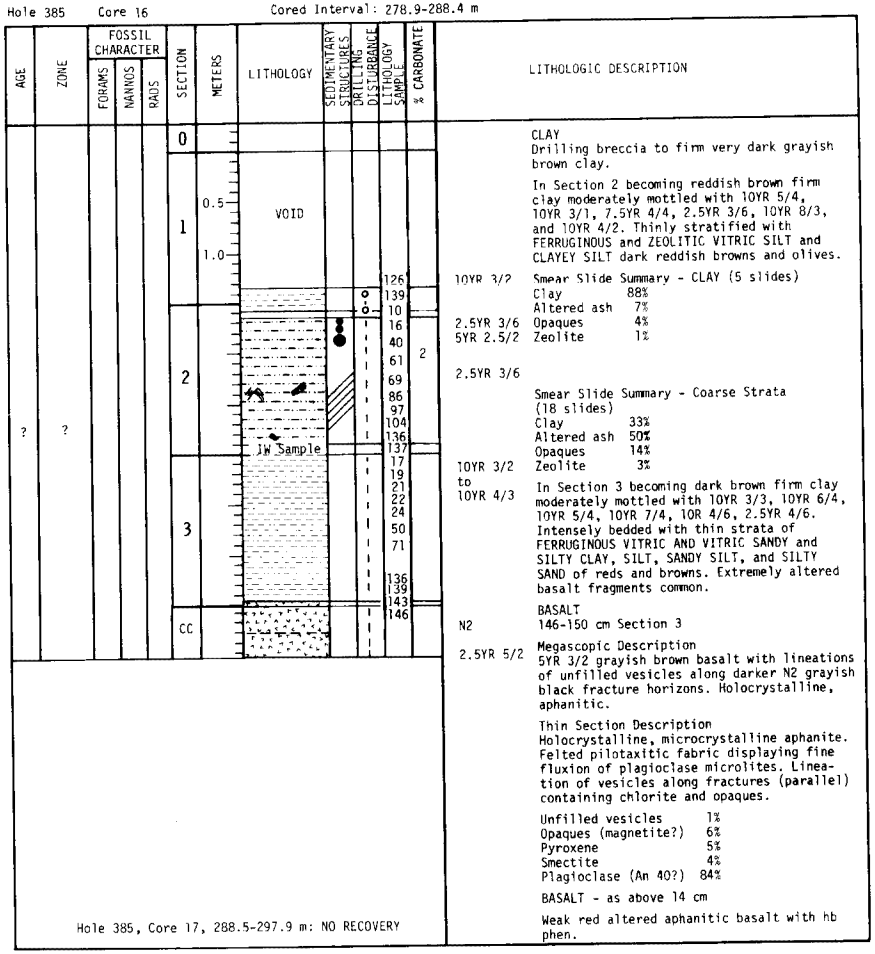
Hole 385 Core 14 Cored Interval: 250.6-260.1 m



Hole 385 Core 15 Cored Interval: 269.6-278.9 m

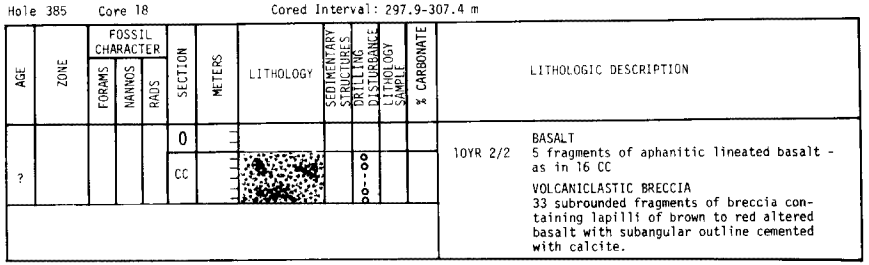


Hole 385 Core 16 Cored Interval: 278.9-288.4 m

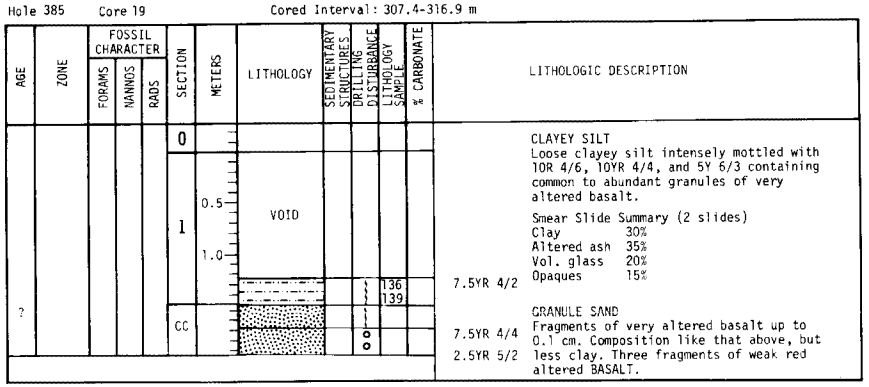


Hole 385, Core 17, 288.5-297.9 m: NO RECOVERY

Hole 385 Core 18 Cored Interval: 297.9-307.4 m



Hole 385 Core 19 Cored Interval: 307.4-316.9 m



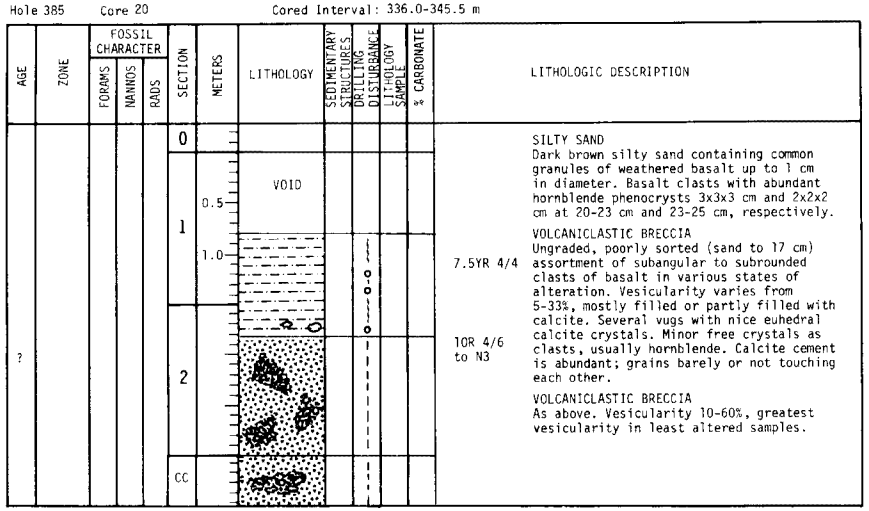
CLAYEY SILT
Loose clayey silt intensely mottled with 10R 4/6, 10YR 4/4, and 5Y 6/3 containing common to abundant granules of very altered basalt.

Smear Slide Summary (2 slides)

Clay	30%
Altered ash	35%
Vol. glass	20%
Opaques	15%

GRANULE SAND
Fragments of very altered basalt up to 0.1 cm. Composition like that above, but less clay. Three fragments of weak red altered BASALT.

Hole 385 Core 20 Cored Interval: 336.0-345.5 m

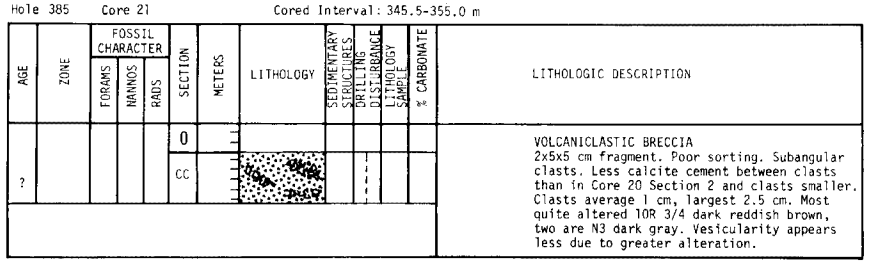


SILTY SAND
Dark brown silty sand containing common granules of weathered basalt up to 1 cm in diameter. Basalt clasts with abundant hornblende phenocrysts 3x3x3 cm and 2x2x2 cm at 20-23 cm and 23-25 cm, respectively.

VOLCANICLASTIC BRECCIA
Ungraded, poorly sorted (sand to 17 cm) assortment of subangular to subrounded clasts of basalt in various states of alteration. Vesicularity varies from 5-33%, mostly filled or partly filled with calcite. Several vugs with nice euhedral calcite crystals. Minor free crystals as clasts, usually hornblende. Calcite cement is abundant; grains barely or not touching each other.

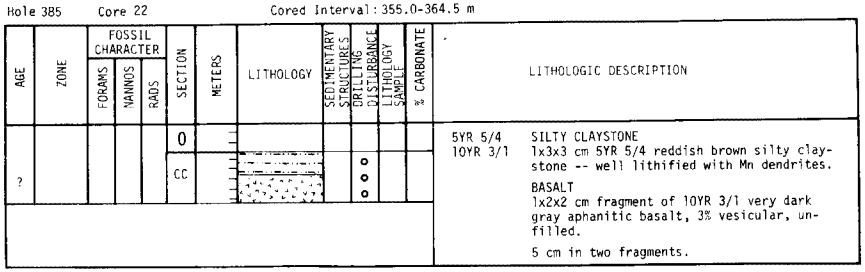
VOLCANICLASTIC BRECCIA
As above. Vesicularity 10-60%, greatest vesicularity in least altered samples.

Hole 385 Core 21 Cored Interval: 345.5-355.0 m



VOLCANICLASTIC BRECCIA
2x5x5 cm fragment. Poor sorting. Subangular clasts. Less calcite cement between clasts than in Core 20 Section 2 and clasts smaller. Clasts average 1 cm, largest 2.5 cm. Most quite altered 10R 3/4 dark reddish brown, two are N3 dark gray. Vesicularity appears less due to greater alteration.

Hole 385 Core 22 Cored Interval: 355.0-364.5 m

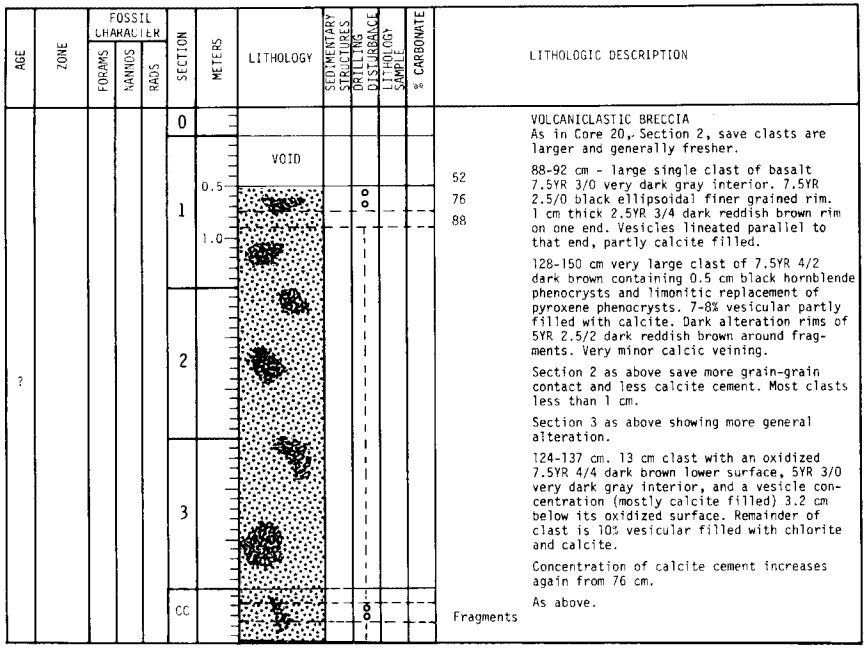


SILTY CLAYSTONE
1x3x3 cm 5YR 5/4 reddish brown silty claystone -- well lithified with Mn dendrites.

BASALT
1x2x2 cm fragment of 10YR 3/1 very dark gray aphanitic basalt, 3% vesicular, unfilled.

5 cm in two fragments.

Hole 385 Core 23 Cored Interval: 374.0-383.5 m



VOLCANICLASTIC BRECCIA
As in Core 20, Section 2, save clasts are larger and generally fresher.

88-92 cm - large single clast of basalt 7.5YR 3/0 very dark gray interior. 7.5YR 2.5/0 black ellipsoidal finer grained rim. 1 cm thick 2.5YR 3/4 dark reddish brown rim on one end. Vesicles lineated parallel to that end, partly calcite filled.

128-150 cm very large clast of 7.5YR 4/2 dark brown containing 0.5 cm black hornblende phenocrysts and limonitic replacement of pyroxene phenocrysts. 7-8% vesicular partly filled with calcite. Dark alteration rims of 5YR 2.5/2 dark reddish brown around fragments. Very minor calcic veining.

Section 2 as above save more grain-grain contact and less calcite cement. Most clasts less than 1 cm.

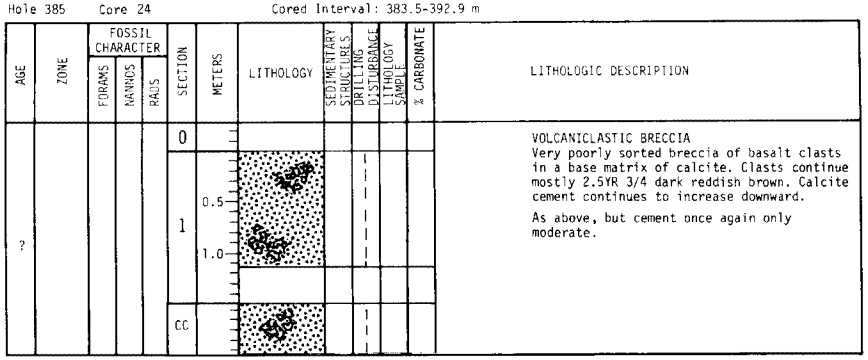
Section 3 as above showing more general alteration.

124-137 cm. 13 cm clast with an oxidized 7.5YR 4/4 dark brown lower surface, 5YR 3/0 very dark gray interior, and a vesicle concentration (mostly calcite filled) 3.2 cm below its oxidized surface. Remainder of clast is 10% vesicular filled with chlorite and calcite.

Concentration of calcite cement increases again from 76 cm.

As above.

Hole 385 Core 24 Cored Interval: 383.5-392.9 m



VOLCANICLASTIC BRECCIA
Very poorly sorted breccia of basalt clasts in a base matrix of calcite. Clasts continue mostly 2.5YR 3/4 dark reddish brown. Calcite cement continues to increase downward.

As above, but cement once again only moderate.

X-RAY MINERALOGICAL ANALYSES, SITE 385

Core	Section	Interval (cm)	Total Carbonate	Composition, %														Distribution in <2μm Fraction			
				Calcite	Dolomite	Siderite	Rhodochrosite	Quartz	Feldspar	Clay Minerals	Palygorskite	Clinoptilolite	Phillipsite	Analcime	Pyrite	Disordered Cristobalite	Other	Kaolinite	Mica	Chlorite	Montmorillonite
1	2	109-111						24	6	70								9	24	4	63
1	4	40- 42						30	7	63								6	12	2	80
2	2	100-102						20	7	73								6	12	2	80
2	5	50- 52						15	6	77			2					9	9	2	80
3	2	40- 42						18	4	76		1	1								
3	5	40- 42						17	5	75		1	2					3	5	2	90
4	2	118-120						8	4	87		?	1								
5	2	50- 52						5	6	86		3									
5	4	90- 92						7	4	86		3	?					7	16		77
8	1	110-112						11	2	64		16	2					1	25	1	73
9	1	86- 88						10	5	69		16	?						31		69
10	1	137-140						9	3	64		7			17				36		64
11	2	20- 22						13	4	76		7						1	13		86
12	2	90- 92	23	23				16	3	58		?						22	44	6	28
13	2	40- 42	30	30				16	3	51		?						23	36	12	29
13	4	9- 11	36	36				10	3	50		1						30	38	11	21
14	2	11- 13						20	6	74								10	15	2	73
15	1	122-125						13	5	80		2						29	33	9	29
16	2	92- 94								97		3									94

SITE 385, ORGANIC CARBON DETERMINATIONS

Core	Section	Top of Interval (cm)	% C_{org}[a]
1	2	50.0	0.2
1	4	75.0	0.1
2	2	80.0	0.2
3	2	100.0	0.2
3	5	75.0	0.2
4	2	68.0	0.1
5	2	80.0	0.1
8	5	113.0	0.1
9	1	115.0	0.1
10	1	133.0	0.1
11	2	70.0	0.1
12	2	70.0	0.1
13	2	95.0	0.1
13	4	77.0	0.0
14	2	84.0	0.1
15	1	80.0	0.1

[a] A dash indicates 0% C_{org}

DEEP SEA DRILLING PROJECT

LEG 43 SITE 386

SITE SUMMARY SHEET

POSITION: Latitude: 31°11.21'N Longitude: 64°14.94'W

Water depth (sea level): 4792 corrected meters, echo sounding

Bottom felt at: 4793 meters, drill pipe Penetration: 973.8 meters

Number of holes: 1 Number of cores: 66

Total length of cored section: 626.70 meters

Total core recovered: 438.15 meters

OLDEST SEDIMENT CORED:

Depth subbottom: 964.2 meters Nature: Black claystone

Age: Upper Aptian-lowest Albian (103-106.5 m.y.)

Measured velocity: 1.95-2.46 km/s

BASEMENT:

Depth subbottom: 966.2 meters Nature: Basalt

Velocity range: 3.90-4.45 km/s

PRINCIPAL RESULTS:

Site 386 was drilled to a depth of 966.2 meters on the central Bermuda Rise, 140 km SSE of Bermuda. Sixty six cores were taken, of which the lowest recovered 1.90 meters of altered basalt. Basement age was established as upper Aptian-lower Albian on the basis of nannoplankton in the overlying green/black claystones. The section consists of discontinuously cored Pleistocene marly nanno ooze (0-62 m) overlying Pleistocene to lower Miocene zeolitic clays (62-148 m); continuously cored lower Miocene calcareous turbidites grading downward into Oligocene and upper Eocene volcaniclastic turbidites (148-328 m); middle Eocene siliceous (328-410 m) and calcareous (410-482 m) cyclic successions (turbidites?) overlying middle Eocene to Paleocene rad and cherty rad mudstones (482-613 m); upper Maestrichtian to upper Cenomanian multicolored claystone (613-724 m) above upper Cenomanian

to upper Aptian/lower Albian black and green claystones (724-964 m); and basalt (cored from 964-974 m).

Deposition was predominately continuous although highly variable in rate. Short hiatuses are indicated in the mid to late Oligocene and mid to late Eocene; high rates characterize the sapropelic claystones (18 m/m.y.), middle Eocene calcareous-siliceous turbidites (33-47 m/m.y.), late Paleocene to early Eocene radiolarian mudstones (5 to 26 m/m.y.), and volcaniclastic turbidites (19 m/m.y.).

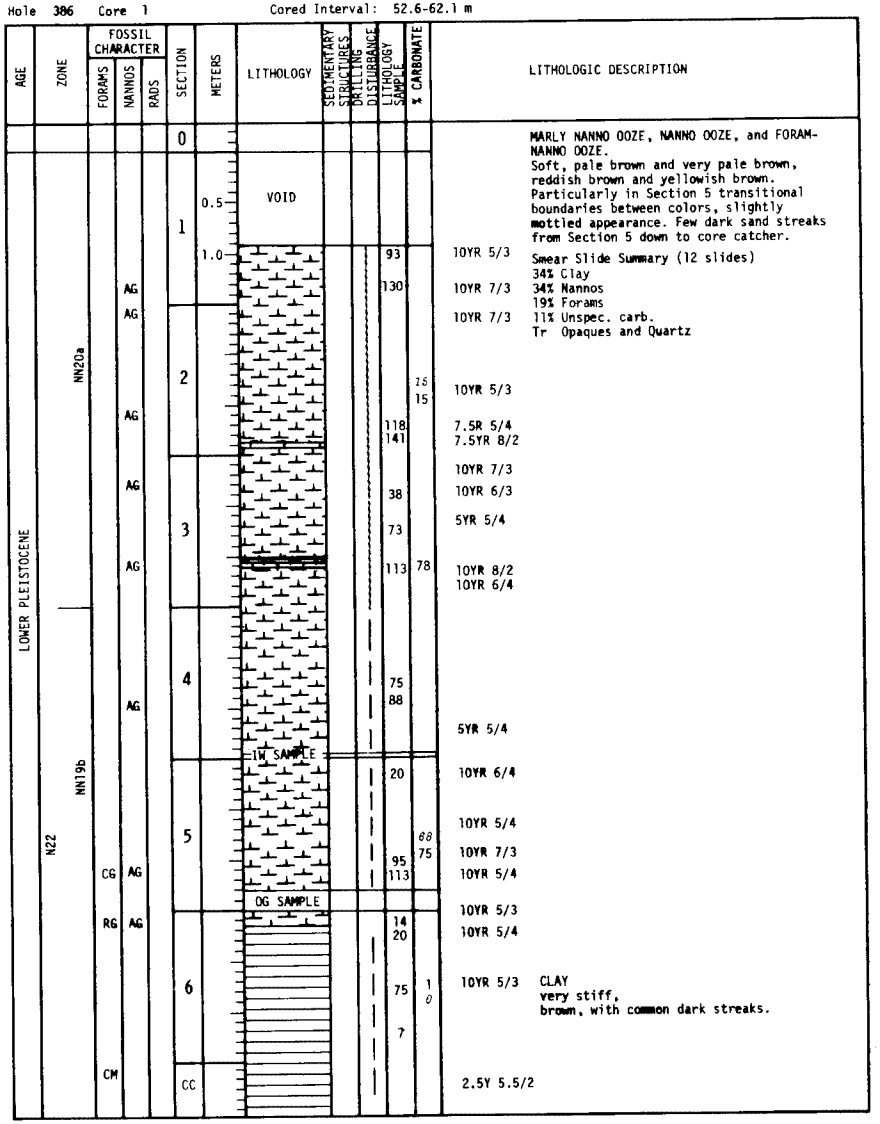
Volcaniclastic turbidites with shallow water detritus indicate the Bermuda volcano was emergent by middle or late Eocene (41 m.y.) but had been leveled by erosion by middle to late Oligocene (22-30 m.y.). This result corroborates the 33 m.y. published date of lamprophyric dikes drilled on Bermuda. A 30-meter section of upper Cenomanian zeolitic multicolored claystone suggests an earlier volcanic phase at 92-96 m.y., possibly correlative with a 90 m.y. drill hole date on Bermuda.

Organic carbon analyses in the sapropelic claystones show carbon maxima (7%) in mid-late Cenomanian and late Aptian/early Albian; this double peaked character of the mid-Cretaceous stagnation possibly correlates with carbon distribution in the black clays of Site 105.

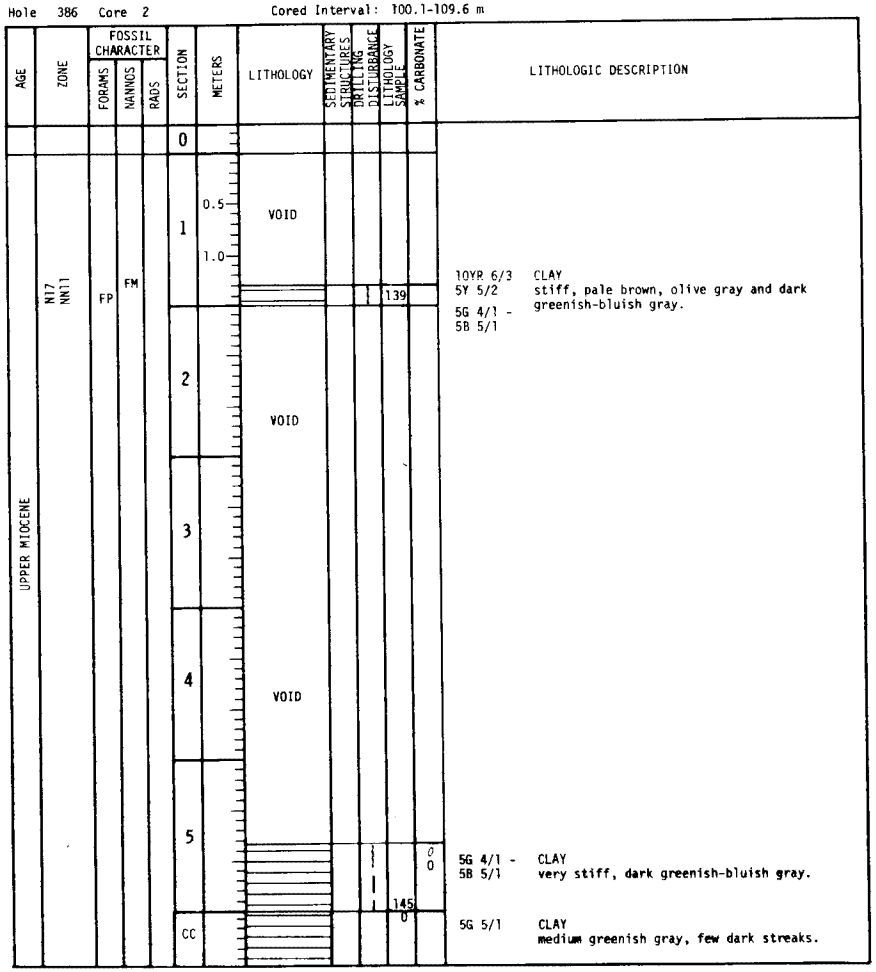
The top of the Oligocene volcaniclastic turbidites is seismically continuous with the Bermuda Pedestal and masks Horizon A at the drill site. Horizon A matches the top of the siliceous mid-Eocene section and a short hiatus. Horizon A* corresponds to the boundary between the Tertiary siliceous claystones and the upper Cretaceous multi-colored claystones.

The upper Aptian-lower Albian date on the basement confirms that crust forming the east flank of the Bermuda Rise was generated at the relatively rapid rate of about 2.5 cm/yr.

Hole 386 Core 1 Cored Interval: 52.6-62.1 m



Hole 386 Core 2 Cored Interval: 100.1-109.6 m



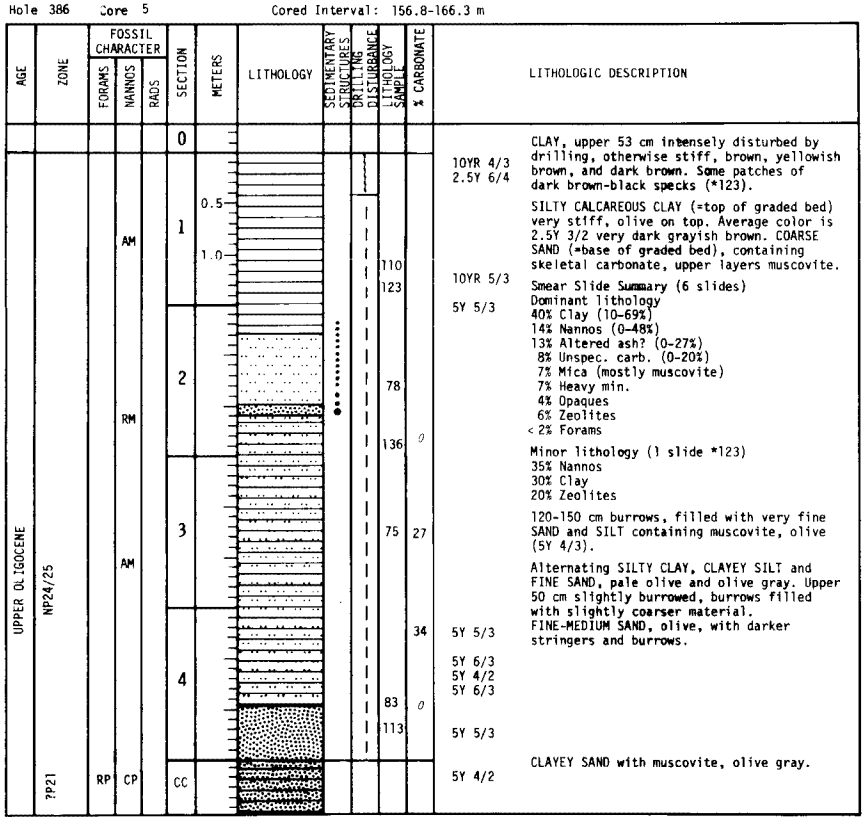
Hole 386 ' Core 3 Cored Interval: 138.0-147.2 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							
					1	0.5	VOID					
						1.0					5 6	SILTY CLAY very stiff, completely drilling-disturbed down to 135 cm, medium greenish gray.
										140		5G 5/1
	?	-			CC							5GY 5/1 CLAY medium greenish gray.

Hole 386 Core 4 Cored Interval: 147.2-156.8 m

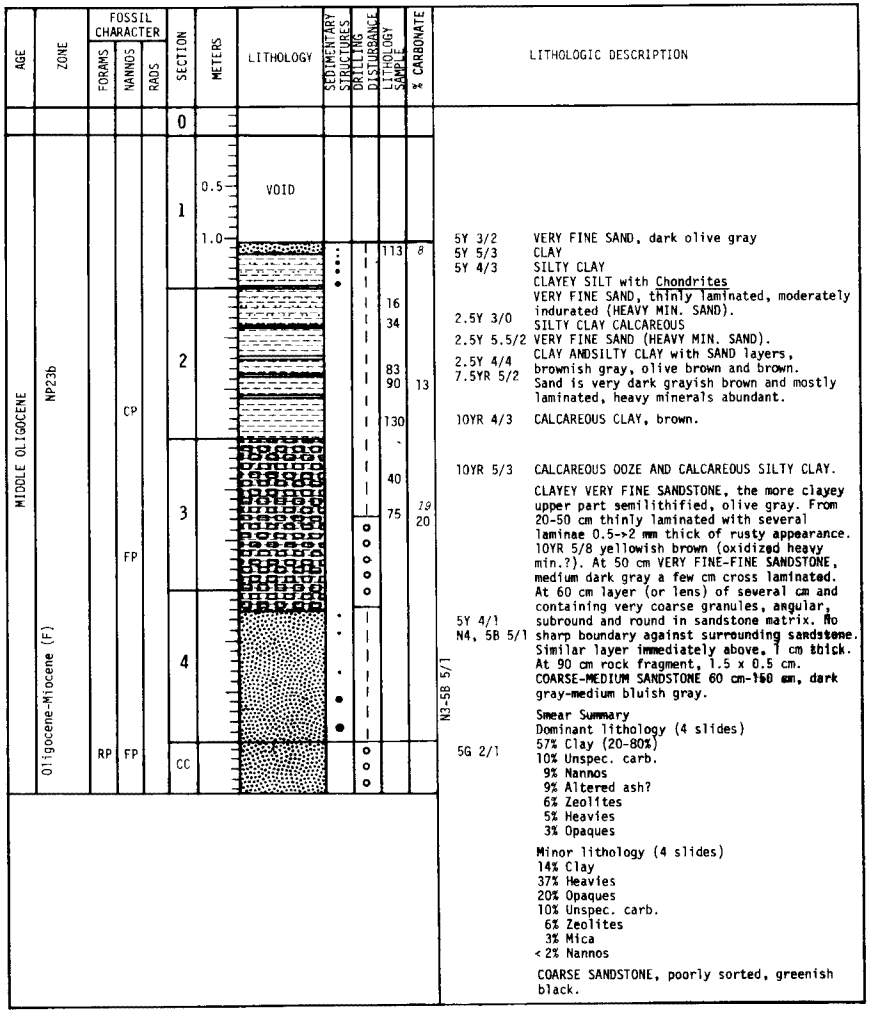
AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							
LOWER MIOCENE	NN5	CM	AM		1	0.5	VOID					
						1.0				107	0	5Y 5/2 5G 6/1-5B 7/1
										120		5Y 5/3 CLAY, ZEOLITIC CLAYEY SILT, and SILT. Very
										135		5Y 6/1 stiff, olive gray and dark olive gray,
										4		slightly-moderately mottled, with SANDY
					2					27		layer 103-111 cm (*107).
												CLAY moderately mottled, brown-dark brown and yellowish brown, with small silty patches, dark brown-black between 95-100 cm.
											4 0	Smear Slide Summary (9 slides)
										107		Dominant lithology
												2.5Y 5/2 48% Clay (range 15-95%)
												27% Nannos (range 0-77%)
												8% Altered ash? (range 0-40%)
												4% Forams (0-38%)
												10YR 4/3 4% Unspec. carb. (0-10%)
												4% Zeolites (0-10%)
					3							1- 2% Heavy min., Mica & Opaques
										75		Minor lithology (8 slides)
										96		45% Clay (10-90%)
												20% Zeolites (0-75%)
												8% Unspec. carb. (0-40%)
												7% Altered ash? (0-45%)
												7% Forams (0-35%)
												6% Nannos (0-20%)
					4							< 1- 2% Opaques, Heavies, Mica
											9 32	
		AG	AM							101		5Y 7/2 NANNO OOZE, yellowish gray
												grading into
												VERY FINE SAND, underlain by
												5Y 4.5/2 CLAY, light yellowish brown and brown
							IW SAMPLE					2.5Y 6/4 (10YR 4.5/3).
	NN2									36		2.5Y 6.5/4 NANNO OOZE, pale yellow and light yellow
										58		brown.
										63		5Y 6/2 FINE-VERY FINE SAND, laminated, clayey,
					5							mostly white and pale yellow (2.5Y 8/2).
			AM							90	48	10YR 5/3 CLAY, 61-65 cm brown, below all is pale
										116		10YR 6/3 brown.
												5Y 6/2 VERY FINE SAND, laminated, clayey, light
							OG SAMPLE					10YR 6/3 olive gray, erosional irregular contact
											8	10YR 4.5/2 with underlying clay.
	NN1											CLAY, pale brown and grayish brown-dark
												grayish brown, diffusely mottled with pale
			AM							41	59	10YR 7/3 brown clay.
					6						48	NANNO OOZE, very pale brown
												grading into
										83		5Y 5/2 NANNO FORAM OOZE, olive gray.
U. OLIGO.	NP26	RP	CM		CC							2.5Y 4/2 SILTY FINE SAND
												10YR 6/3 CLAY

Hole 386 Core 5 Cored Interval: 156.8-166.3 m



AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							CLAY, upper 53 cm intensely disturbed by drilling, otherwise stiff, brown, yellowish brown, and dark brown. Some patches of dark brown-black specks (*123).
UPPER OLIGOCENE	NP24/25		AM		1	0.5 – 1.0				110		10YR 4/3 2.5Y 6/4 SILTY CALCAREOUS CLAY (=top of graded bed) very stiff, olive on top. Average color is 2.5Y 3/2 very dark grayish brown. COARSE SAND (=base of graded bed), containing skeletal carbonate, upper layers muscovite.
										123		10YR 5/3 Smear Slide Summary (6 slides) Dominant lithology
					2					78		5Y 5/3 40% Clay (10-69%) 14% Nannos (0-48%) 13% Altered ash? (0-27%) 8% Unspec. carb. (0-20%) 7% Mica (mostly muscovite) 7% Heavy min. 4% Opaques 6% Zeolites < 2% Forams
			RM							136	0	Minor lithology (1 slide *123) 35% Nannos 30% Clay 20% Zeolites
					3					75	27	120-150 cm burrows, filled with very fine SAND and SILT containing muscovite, olive (5Y 4/3).
			AM									Alternating SILTY CLAY, CLAYEY SILT and FINE SAND, pale olive and olive gray. Upper 50 cm slightly burrowed, burrows filled with slightly coarser material.
					4						34	FINE-MEDIUM SAND, olive, with darker stringers and burrows.
										83	0	5Y 5/3 5Y 6/3 5Y 4/2 5Y 6/3
										113		5Y 5/3
?P21		RP	CP		CC							CLAYEY SAND with muscovite, olive gray. 5Y 4/2

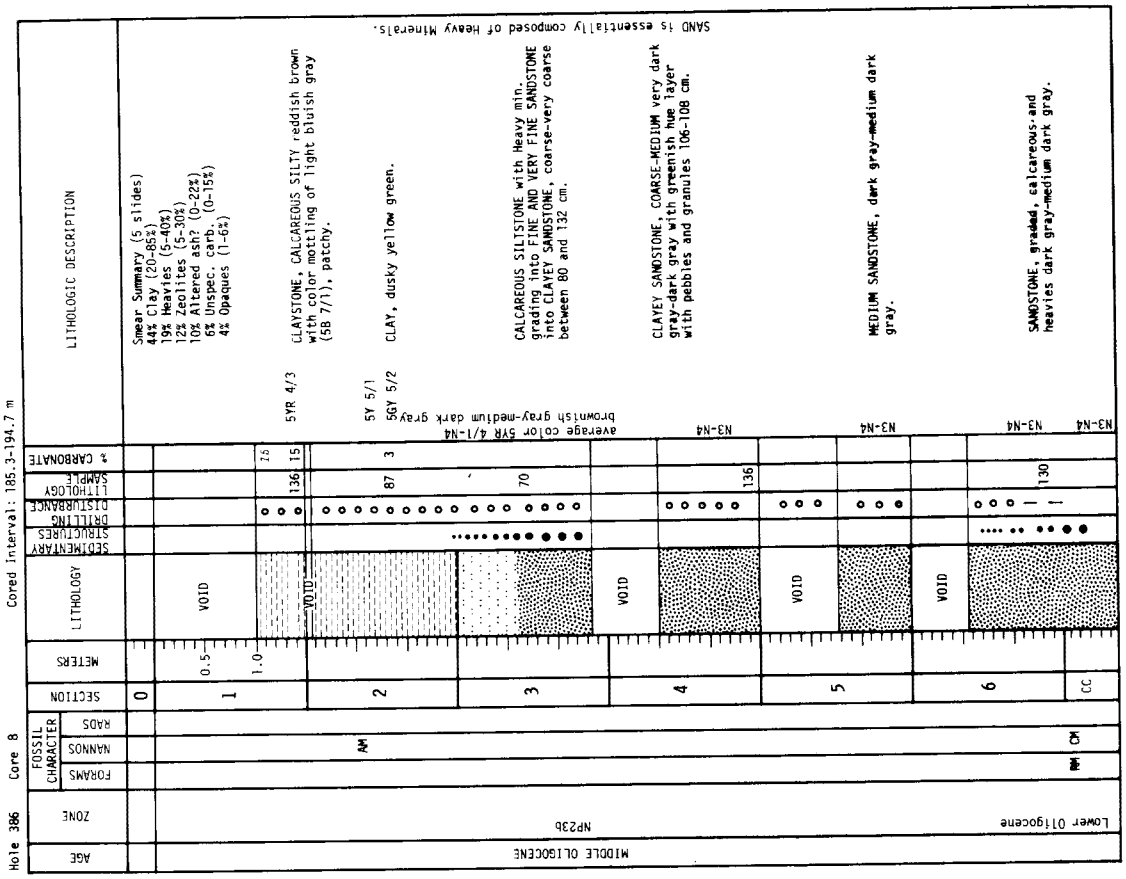
Hole 386 Core 6 Cored Interval: 166.3-175.8 m

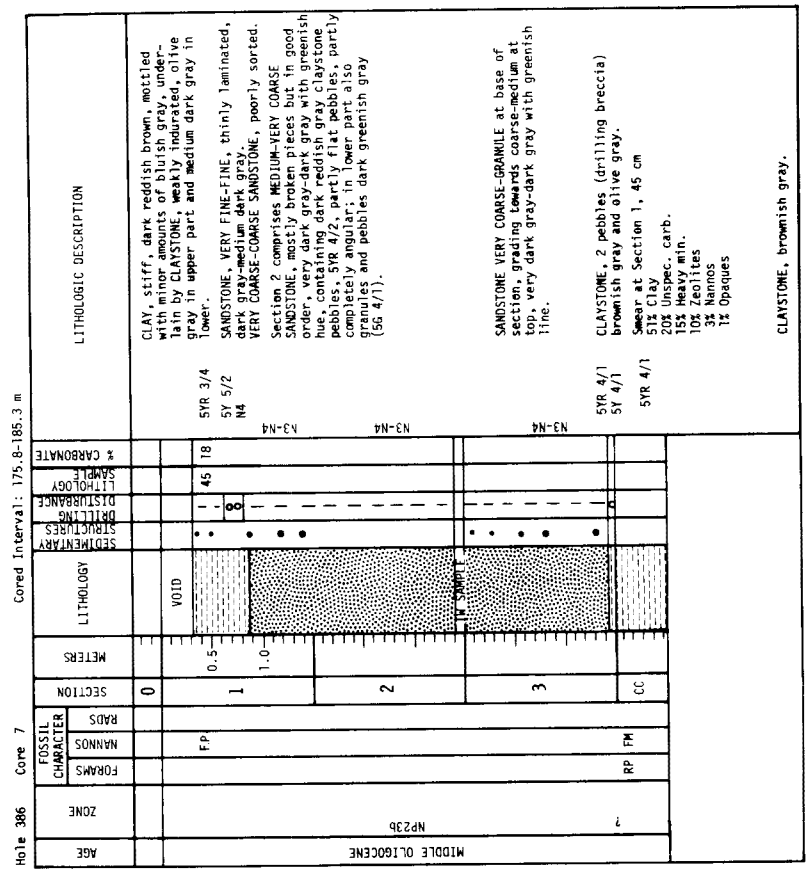


AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							
MIDDLE OLIGOCENE	NP23b				1	0.5 – 1.0	VOID			113	8	5Y 3/2 VERY FINE SAND, dark olive gray 5Y 5/3 CLAY 5Y 4/3 SILTY CLAY CLAYEY SILT with Chondrites VERY FINE SAND, thinly laminated, moderately indurated (HEAVY MIN. SAND).
										16		
					2					34		2.5Y 3/0 SILTY CLAY CALCAREOUS 2.5Y 5.5/2 VERY FINE SAND (HEAVY MIN. SAND).
										83		2.5Y 4/4 7.5YR 5/2 CLAY ANDSILTY CLAY with SAND layers, brownish gray, olive brown and brown. Sand is very dark grayish brown and mostly laminated, heavy minerals abundant.
			CP							90	13	
										130		10YR 4/3 CALCAREOUS CLAY, brown.
					3					40		10YR 5/3 CALCAREOUS OOZE AND CALCAREOUS SILTY CLAY.
										75	19 20	CLAYEY VERY FINE SANDSTONE, the more clayey upper part semilithified, olive gray. From 20-50 cm thinly laminated with several laminae 0.5-->2 mm thick of rusty appearance. 10YR 5/8 yellowish brown (oxidized heavy min.?). At 50 cm VERY FINE-FINE SANDSTONE, medium dark gray a few cm cross laminated. At 60 cm layer (or lens) of several cm and containing very coarse granules, angular, subround and round in sandstone matrix. No sharp boundary against surrounding sandstone. Similar layer immediately above, 1 cm thick. At 90 cm rock fragment, 1.5 x 0.5 cm. COARSE-MEDIUM SANDSTONE 60 cm-150 cm, dark gray-medium bluish gray.
			FP									5Y 4/1 N4, 5B 5/1
Oligocene-Miocene (F)					4						N3-5B 5/1	
		RP	FP		CC							5G 2/1 Smear Summary Dominant lithology (4 slides) 57% Clay (20-80%) 10% Unspec. carb. 9% Nannos 9% Altered ash? 6% Zeolites 5% Heavies 3% Opaques Minor lithology (4 slides) 14% Clay 37% Heavies 20% Opaques 10% Unspec. carb. 6% Zeolites 3% Mica < 2% Nannos COARSE SANDSTONE, poorly sorted, greenish black.

Hole 386 Core 7 Cored Interval: 175.8-185.3 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE		LITHOLOGIC DESCRIPTION
					0								CLAY, stiff, dark reddish brown, mottled with minor amounts of bluish gray, underlain by CLAYSTONE, weakly indurated, olive gray in upper part and medium dark gray in lower.
MIDDLE OLIGOCENE	NP23b		F.P.		1	0.5	VOID			45	18	5YR 3/4	SANDSTONE, VERY FINE-FINE, thinly laminated, dark gray-medium dark gray.
						1.0						5Y 5/2 N4	VERY COARSE-COARSE SANDSTONE, poorly sorted.
					2							N3-N4	Section 2 comprises MEDIUM-VERY COARSE SANDSTONE, mostly broken pieces but in good order, very dark gray-dark gray with greenish hue, containing dark reddish gray claystone pebbles, 5YR 4/2, partly flat pebbles, partly completely angular; in lower part also granules and pebbles dark greenish gray (5G 4/1).
							IW SAMPLE					N3-N4	
					3							N3-N4	SANDSTONE VERY COARSE-GRANULE at base of section, grading towards coarse-medium at top, very dark gray-dark gray with greenish line.
	?	RP	FM		CC							5YR 4/1 5Y 4/1	CLAYSTONE, 2 pebbles (drilling breccia) brownish gray and olive gray.
												5YR 4/1	Smear at Section 1, 45 cm 51% Clay 20% Unspec. carb. 15% Heavy min. 10% Zeolites 3% Nannos 1% Opaques
													CLAYSTONE, brownish gray.



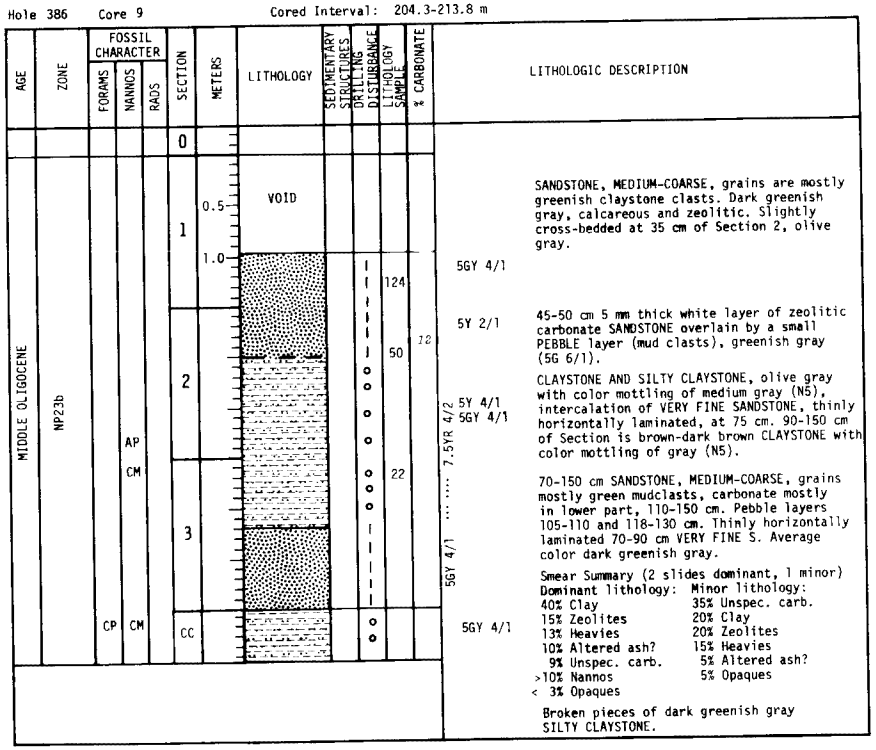


Hole 386 Core 8 Cored Interval: 185.3-194.7 m

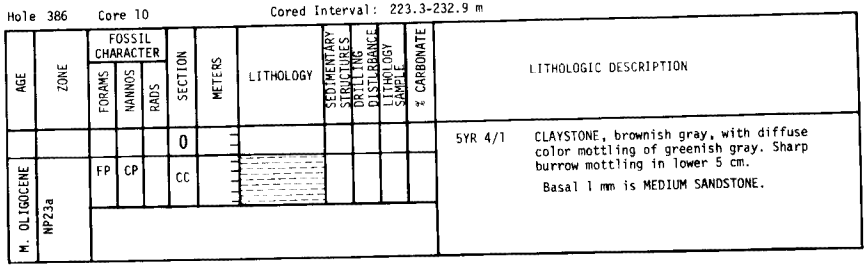
AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE		LITHOLOGIC DESCRIPTION
					0								Smear Summary (5 slides) 44% Clay (20-85%) 19% Heavies (5-40%) 12% Zeolites (5-30%) 10% Altered ash? (0-22%) 6% Unspec. carb. (0-15%) 4% Opaques (1-6%)
MIDDLE OLIGOCENE	NP23b				1	0.5	VOID						
						1.0				136	15	5YR 4/3	CLAYSTONE, CALCAREOUS SILTY reddish brown with color mottling of light bluish gray (5B 7/1), patchy.
							VOID						
			AM		2					87	3	5Y 5/1 5GY 5/2	CLAY, dusky yellow green.
					3					70		average color 5YR 4/1-N4 brownish gray-medium dark gray	CALCAREOUS SILTSTONE with Heavy min. grading into FINE AND VERY FINE SANDSTONE into CLAYEY SANDSTONE, coarse-very coarse between 80 and 132 cm.
					4		VOID			136		N3-N4	CLAYEY SANDSTONE, COARSE-MEDIUM very dark gray-dark gray with greenish hue layer with pebbles and granules 106-108 cm.
					5		VOID					N3-N4	MEDIUM SANDSTONE, dark gray-medium dark gray.
					6		VOID			130		N3-N4	SANDSTONE, graded, calcareous and heavies dark gray-medium dark gray.
	Lower Oligocene	RM	CM		CC							N3-N4	

SAND is essentially composed of Heavy Minerals.

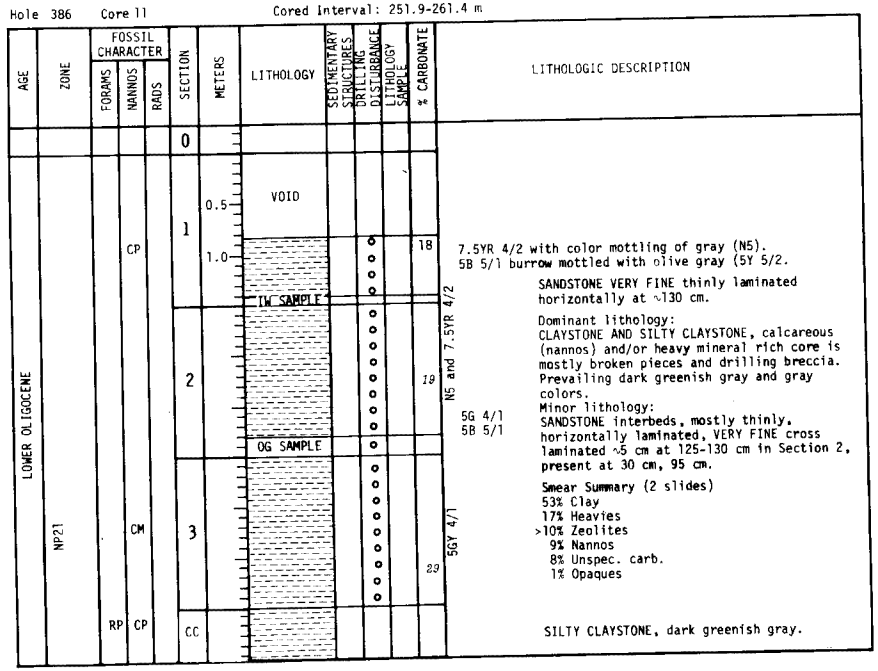
Hole 386 Core 9 Cored Interval: 204.3-213.8 m



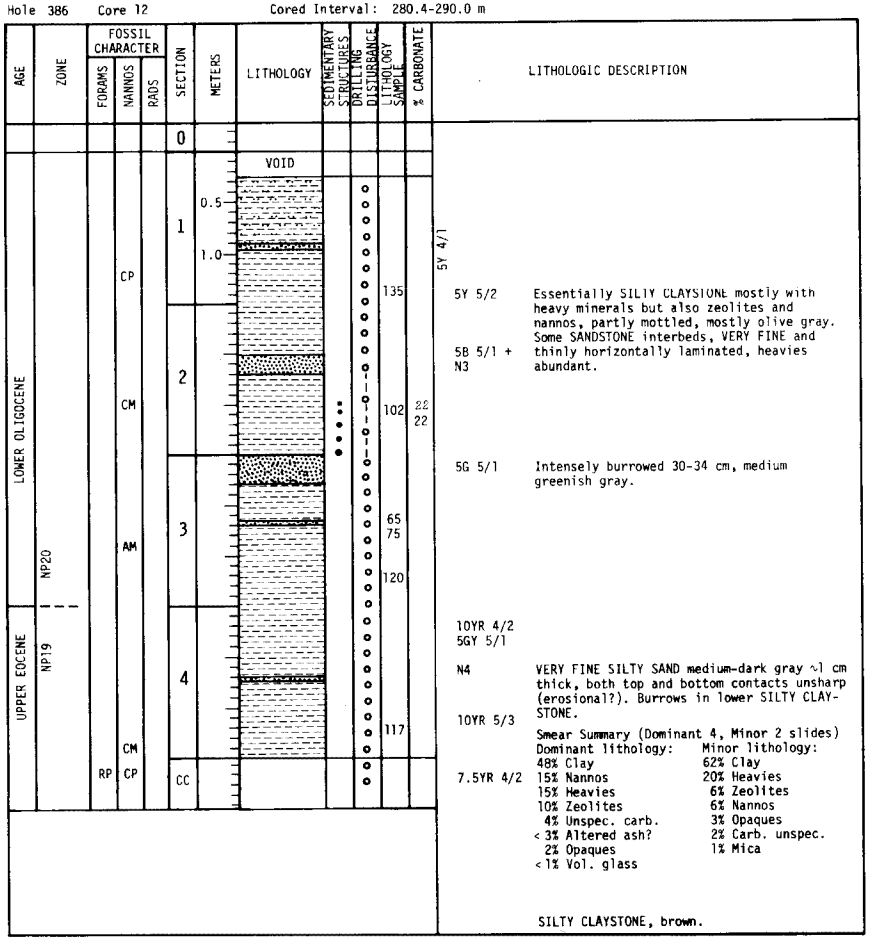
Hole 386 Core 10 Cored Interval: 223.3-232.9 m



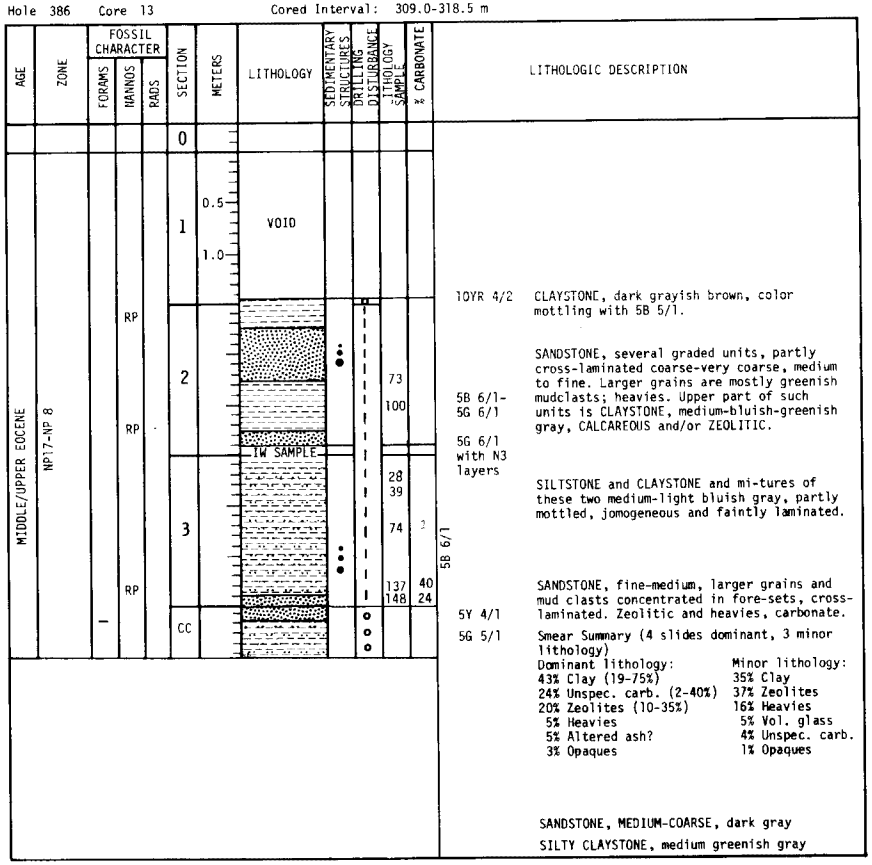
Hole 386 Core 11 Cored Interval: 251.9-261.4 m



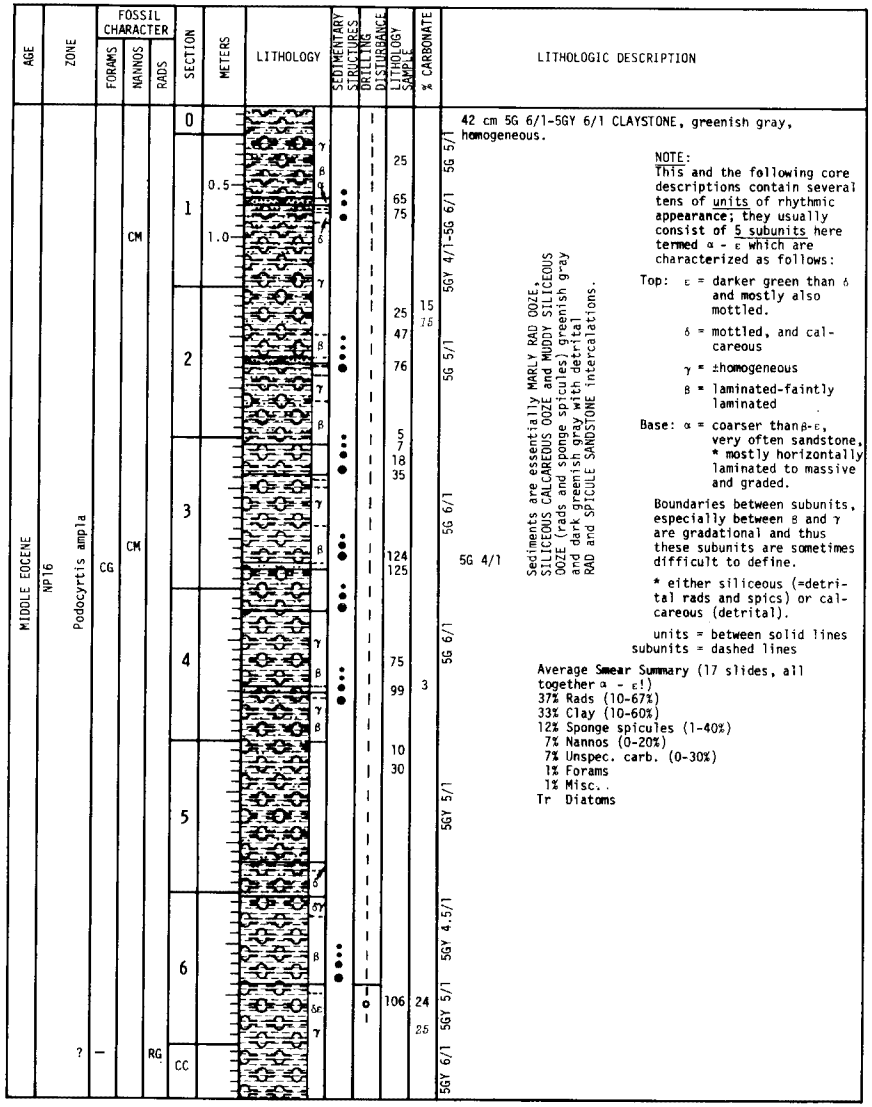
Hole 386 Core 12 Cored Interval: 280.4-290.0 m



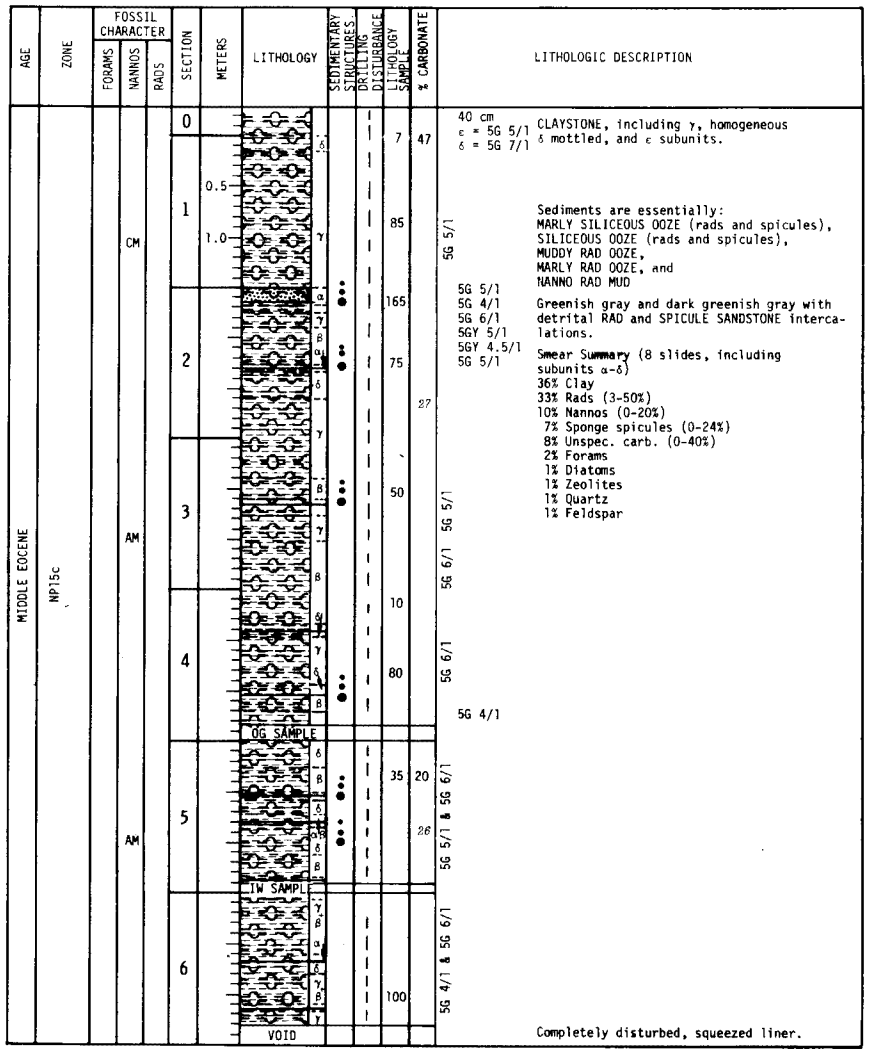
Hole 386 Core 13 Cored Interval: 309.0-318.5 m



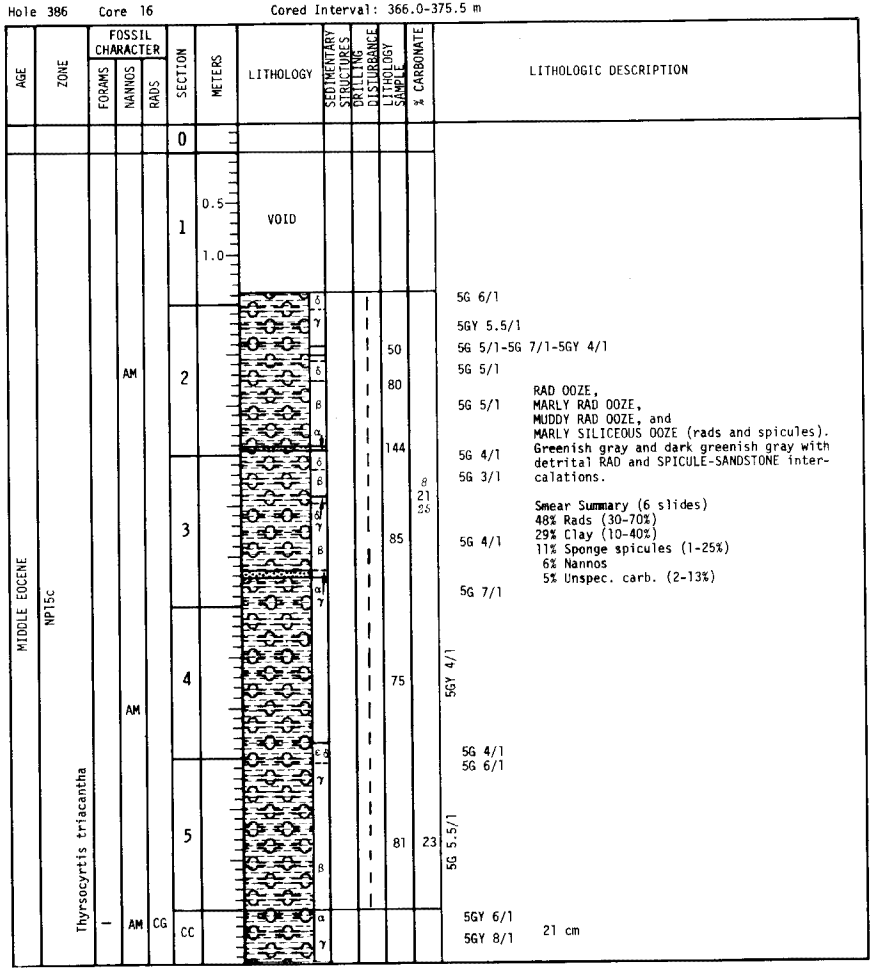
Hole 386 Core 14 Cored Interval: 328.0-337.4 m



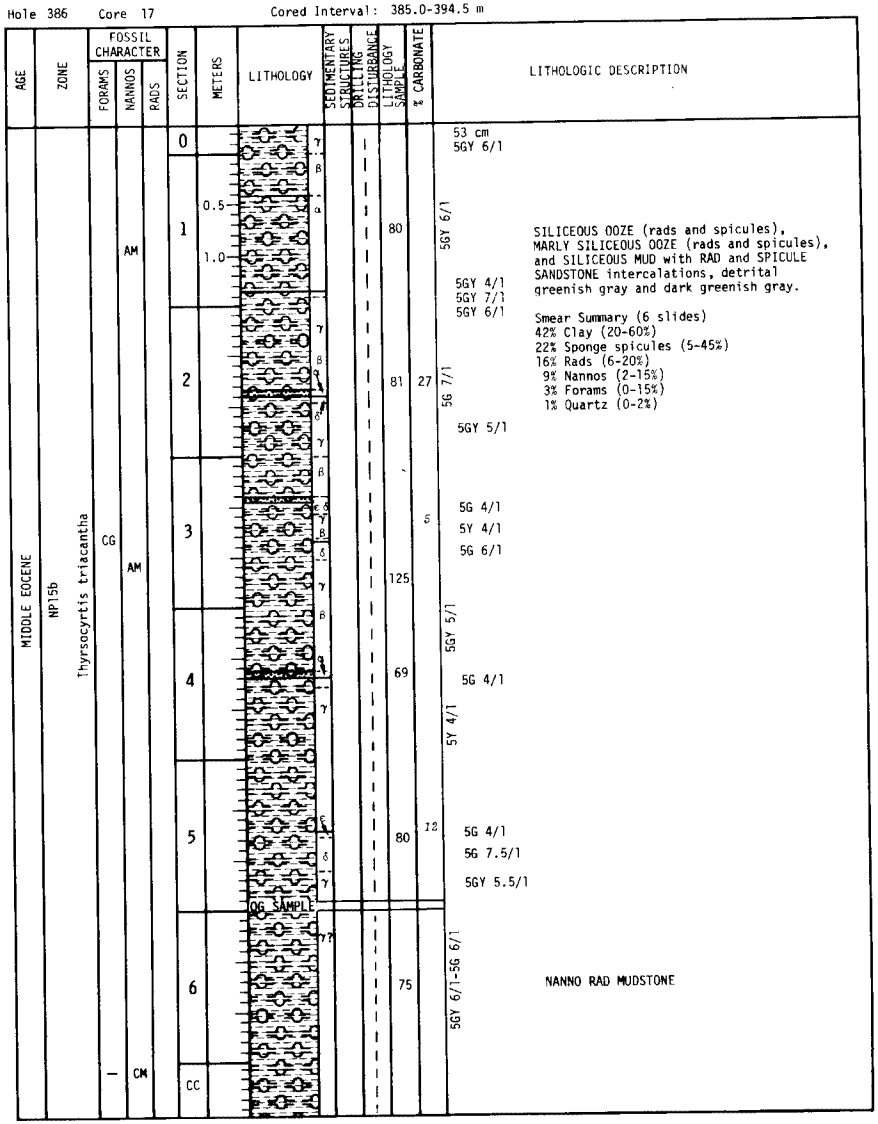
Hole 386 Core 15 Cored Interval: 346.9-356.4 m



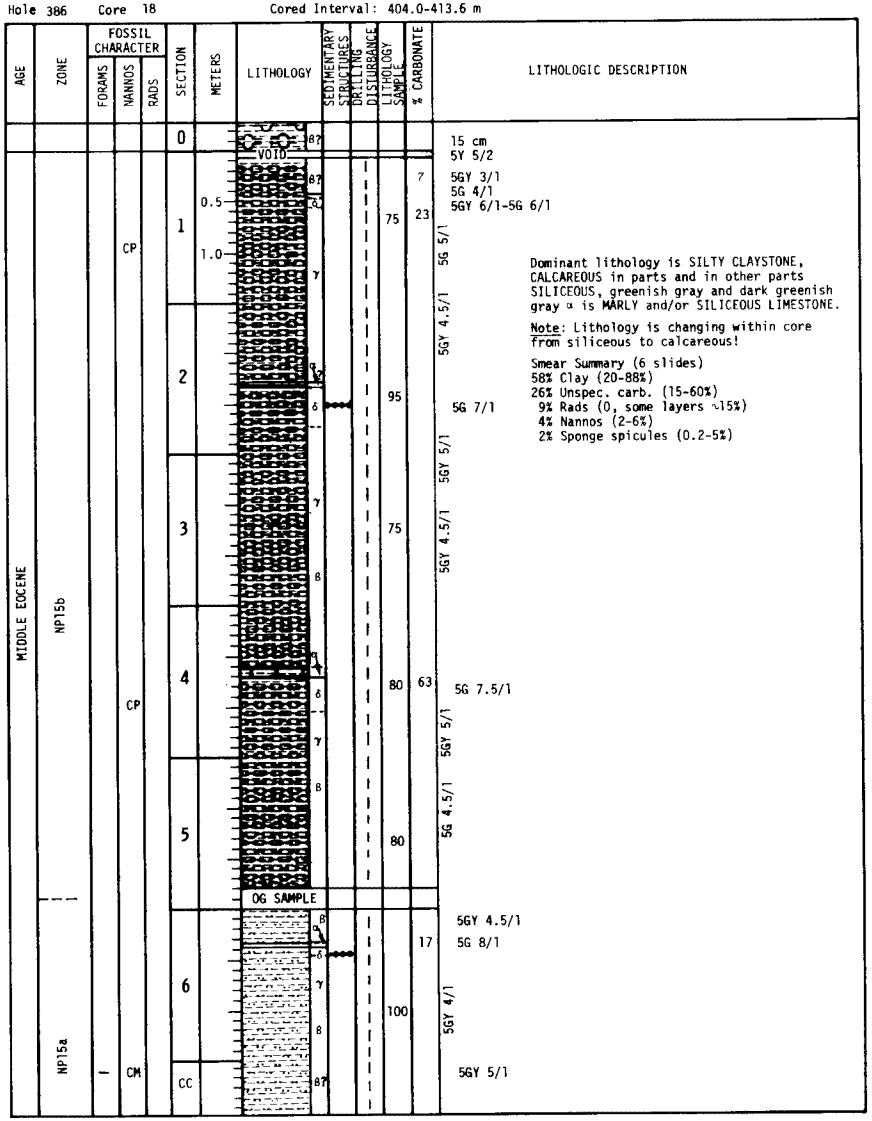
Hole 386 Core 16 Cored Interval: 366.0-375.5 m



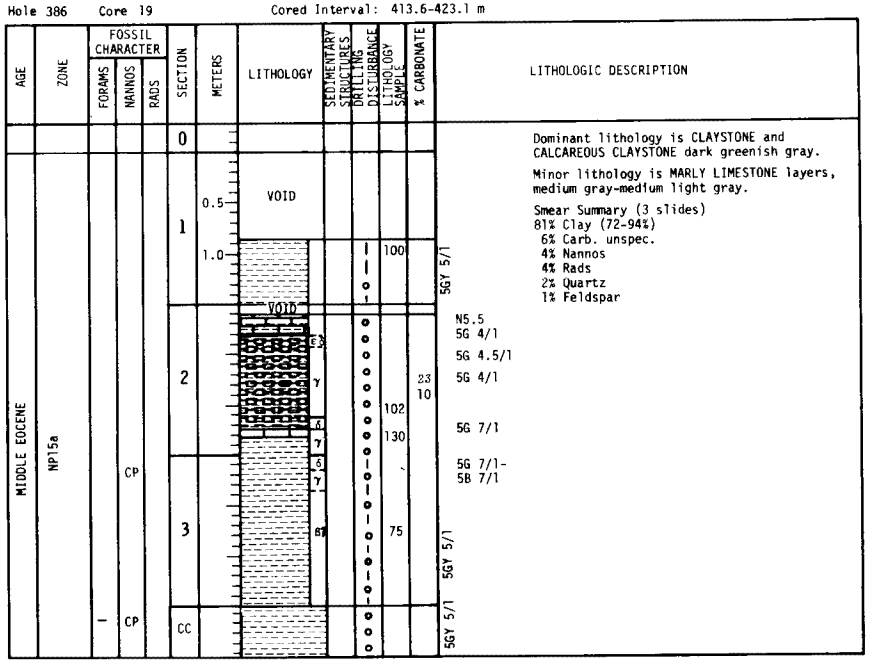
Hole 386 Core 17 Cored Interval: 385.0-394.5 m



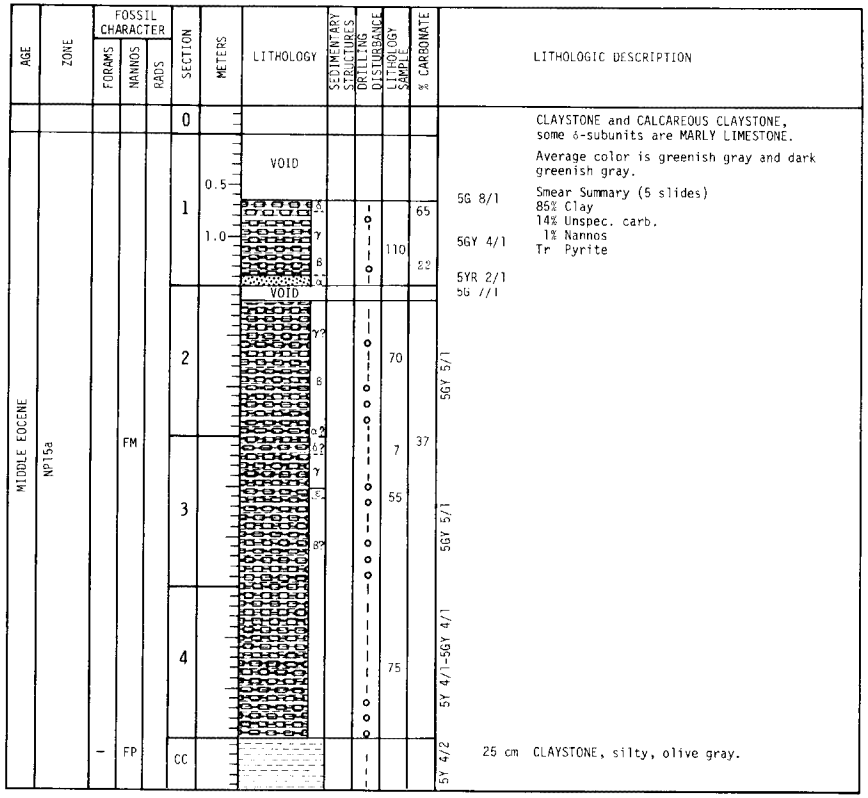
Hole 386 Core 18 Cored Interval: 404.0-413.6 m



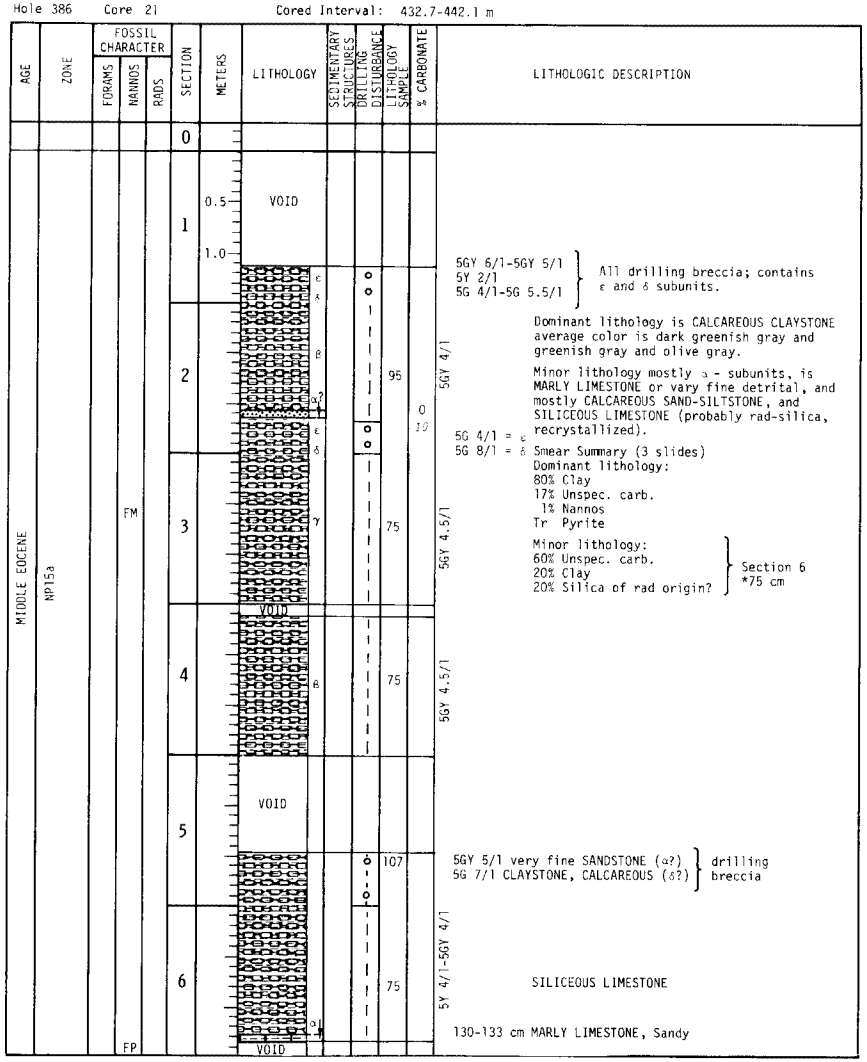
Hole 386 Core 19 Cored Interval: 413.6-423.1 m

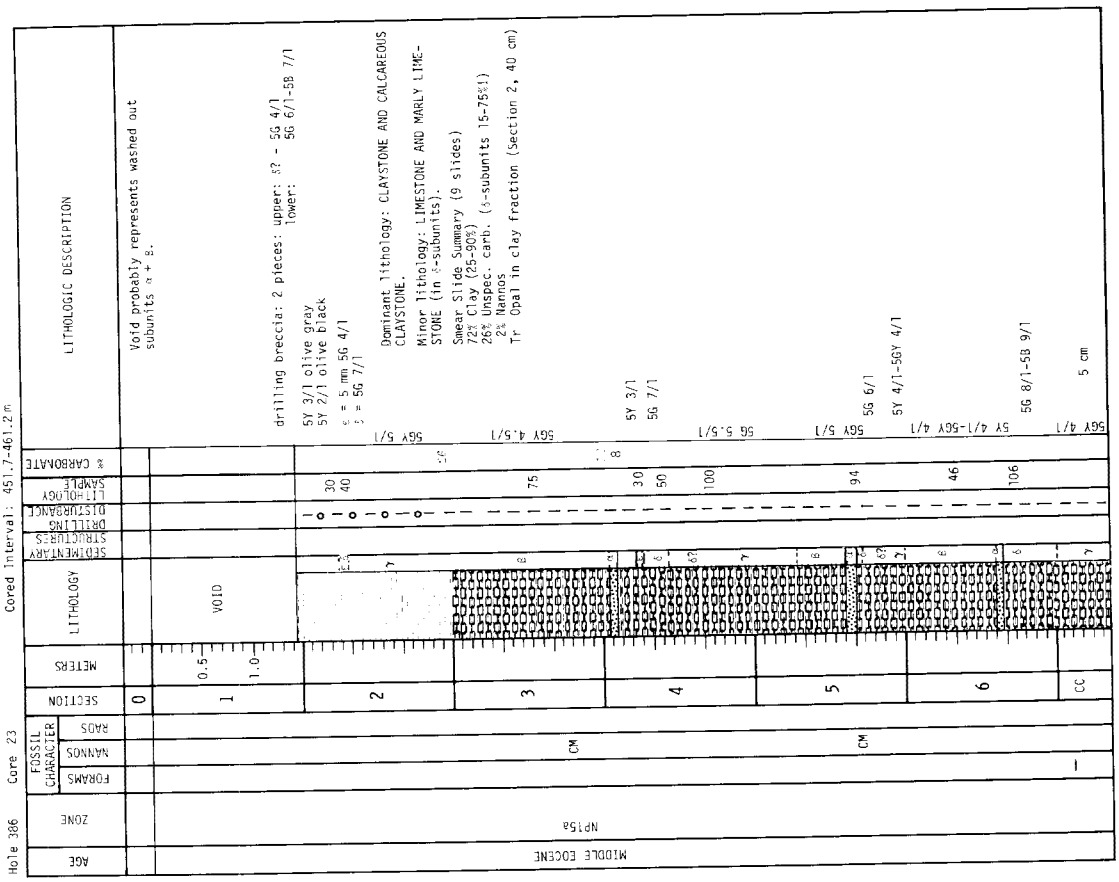


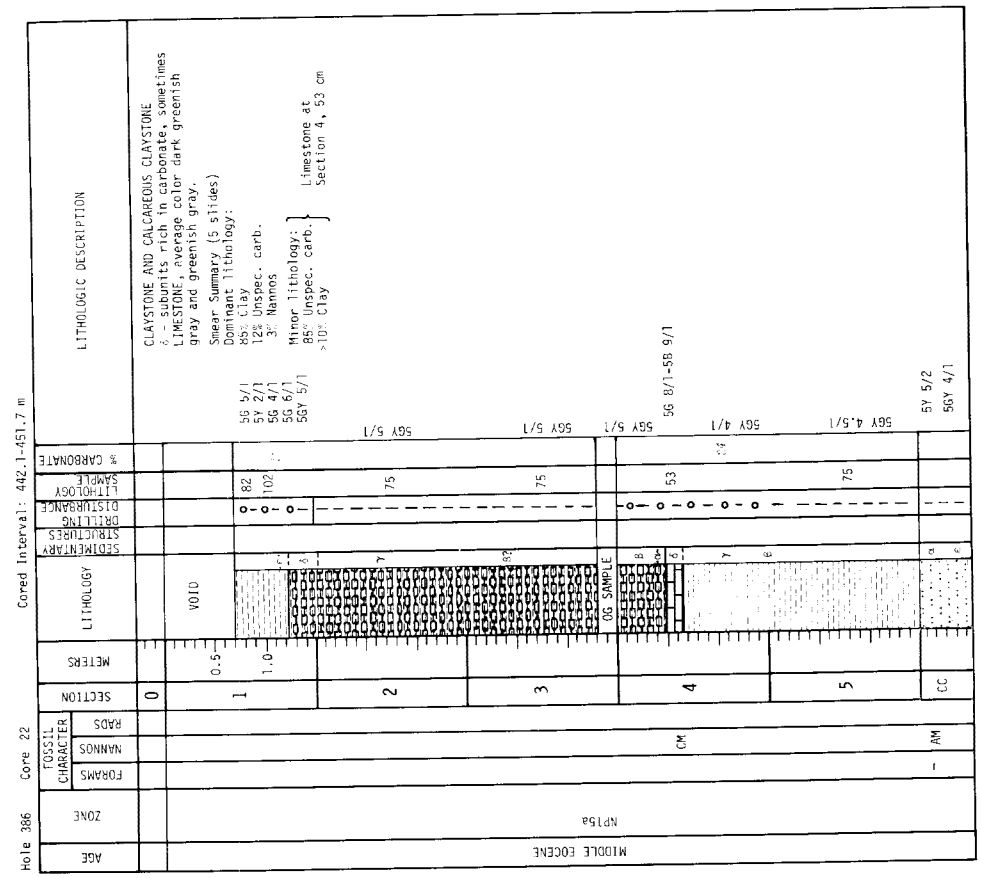
Hole 386 Core 20 Cored Interval: 423.1-432.7 m

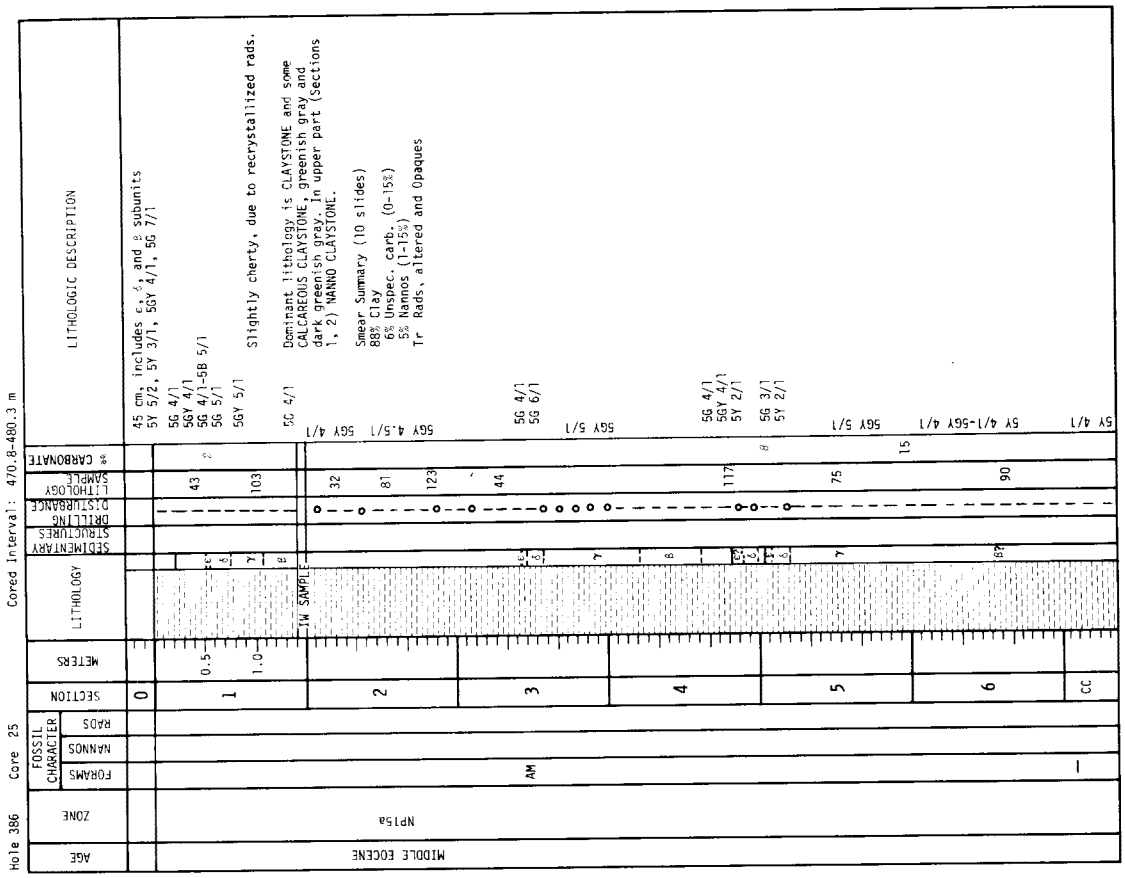


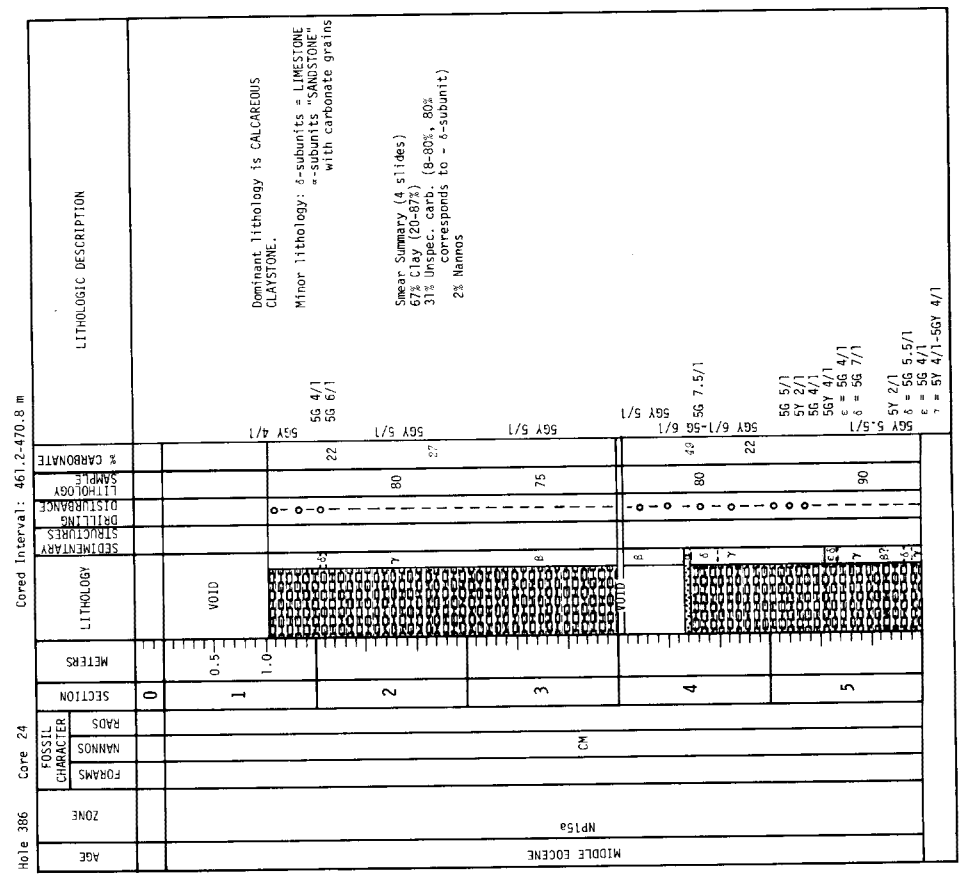
Hole 386 Core 21 Cored Interval: 432.7-442.1 m




Hole 386 Core 23 Cored Interval: 451.7-461.2 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
SAMPLE LITHOLOGY
% CARBONATE
LITHOLOGIC DESCRIPTION
MIDDLE EOCENE
NP15a
CM
VOID
Void probably represents washed out subunits α + β.
drilling breccia: 2 pieces: upper: 5? - 5G 4/1
lower: 5G 6/1-5B 7/1
5Y 3/1 olive gray
5Y 2/1 olive black
α = 5 mm 5G 4/1
β = 5G 7/1
Dominant lithology: CLAYSTONE AND CALCAREOUS CLAYSTONE.
Minor lithology: LIMESTONE AND MARLY LIMESTONE (in β-subunits).
Smear Slide Summary (9 slides)
72% Clay (25-90%)
26% Unspec. carb. (β-subunits 15-75%!)
2% Nannos
Tr Opal in clay fraction (Section 2, 40 cm)
5 cm


Hole 386 Core 22 Cored Interval: 442.1-451.7 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
SAMPLE LITHOLOGY
% CARBONATE
LITHOLOGIC DESCRIPTION
MIDDLE EOCENE
NP15a
CM
AM
VOID
OS SAMPLE
CLAYSTONE AND CALCAREOUS CLAYSTONE
β - subunits rich in carbonate, sometimes LIMESTONE, average color dark greenish gray and greenish gray.
Smear Summary (5 slides)
Dominant lithology:
85% Clay
12% Unspec. carb.
3% Nannos
Minor lithology: 85% Unspec. carb. >10% Clay
Limestone at Section 4, 53 cm





Hole 386 Core 24 Cored Interval: 461.2-470.8 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							
MIDDLE EOCENE	NP15a		CM		1	0.5, 1.0	VOID					
					2					80	22, 27	5G 4/1, 5G 6/1; 5GY 4/1; 5GY 5/1
					3					75		5GY 5/1
					4		VOID			80	49, 22	5GY 5/1; 5GY 6/1-5G 6/1; 5G 7.5/1
					5					90		5G 5/1, 5Y 2/1, 5G 4/1, 5GY 4/1, ε = 5G 4/1, δ = 5G 7/1; 5GY 5.5/1; 5Y 2/1, δ = 5G 5.5/1, ε = 5G 4/1, γ = 5Y 4/1-5GY 4/1

Dominant lithology is CALCAREOUS CLAYSTONE.

Minor lithology: δ-subunits = LIMESTONE
α-subunits "SANDSTONE" with carbonate grains

Smear Summary (4 slides)
67% Clay (20-87%)
31% Unspec. carb. (8-80%, 80% corresponds to - δ-subunit)
2% Nannos

Hole 386 Core 25 Cored Interval: 470.8-480.3 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							45 cm, includes ε, δ, and β subunits; 5Y 5/2, 5Y 3/1, 5GY 4/1, 5G 7/1
MIDDLE EOCENE	NP15a				1	0.5, 1.0	IW SAMPLE			43, 103	2	5G 4/1, 5GY 4/1, 5G 4/1-5B 5/1, 5G 5/1; 5GY 5/1; 5G 4/1
					2					32, 81, 123		5GY 4/1; 5GY 4.5/1
		AM			3					44		5G 4/1, 5G 6/1; 5GY 5/1
					4					117	8	5G 4/1, 5GY 4/1, 5Y 2/1; 5G 3/1, 5Y 2/1
					5					75	15	5GY 5/1
					6					90		5Y 4/1-5GY 4/1
		—			CC							5Y 4/1

Slightly cherty, due to recrystallized rads.

Dominant lithology is CLAYSTONE and some CALCAREOUS CLAYSTONE, greenish gray and dark greenish gray. In upper part (Sections 1, 2) NANNO CLAYSTONE.

Smear Summary (10 slides)
88% Clay
6% Unspec. carb. (0-15%)
5% Nannos (1-15%)
Tr Rads, altered and Opaques

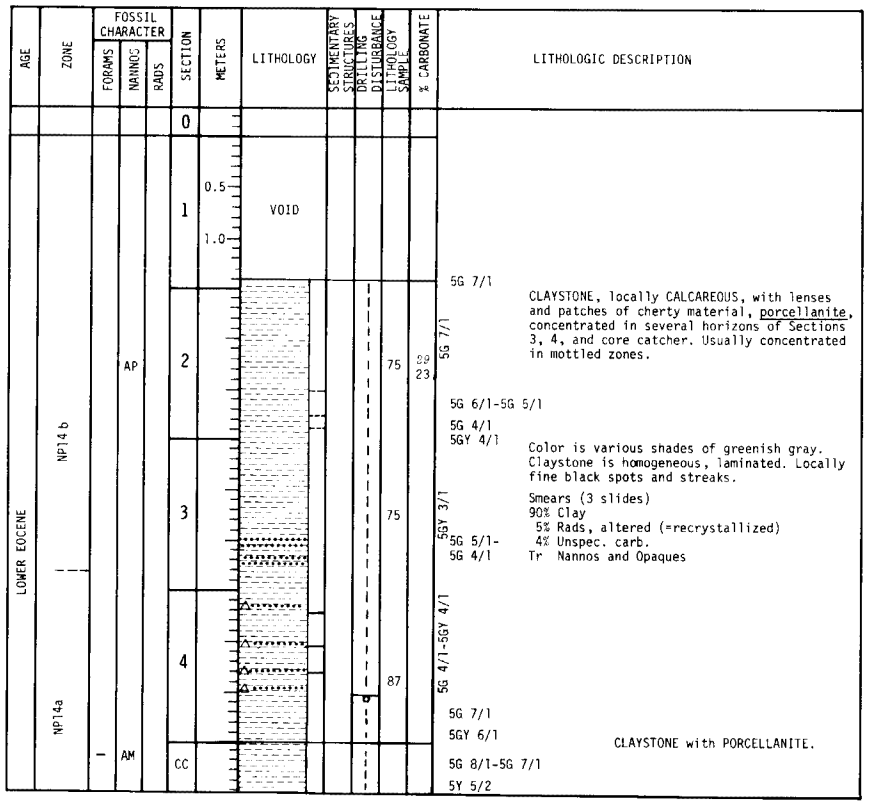
Hole 386 Core 26 Cored Interval: 480.3-489.8 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							NOTE: Dip ~5°, locally 5-10°
LOWER EOCENE	NP14b		AM		1	0.5 1.0	VOID					5Y 4/1-5GY 4/1
					2					46 55		5GY 6/1-5G 6/1 Dominant lithology is CLAYSTONE and some CALCAREOUS CLAYSTONE. Minor lithology is RAD MUDSTONE (*75, Section 3) and CALCAREOUS SILTY SANDSTONE (*46, Section 2, α-subunit). Colors are dark greenish gray, greenish gray and olive gray. Smear Summary (9 slides) 84% Clay 7% Unspec. carb. 3% Nannos 1% Rads 2% Altered ash? Tr Quartz, Feldspar, Mica, Heavies, Zeolite
					3					75	24 18	5Y 4/1-5GY 4/1
			CP		4					80		5G 3/1 5G 4/1 5G 6/1 5G 4/1 5Y 4/1-5GY 4/1
					5					1 24 68 80 90	1 0	5G 4/1 5G 5.5/1 5GY 4/1 5G 4/1 5Y 2/1 5G 4/1 5Y 2/1 5G 4/1 5G 6/1
		—	CM		CC							5GY 7/1-5G 7/1

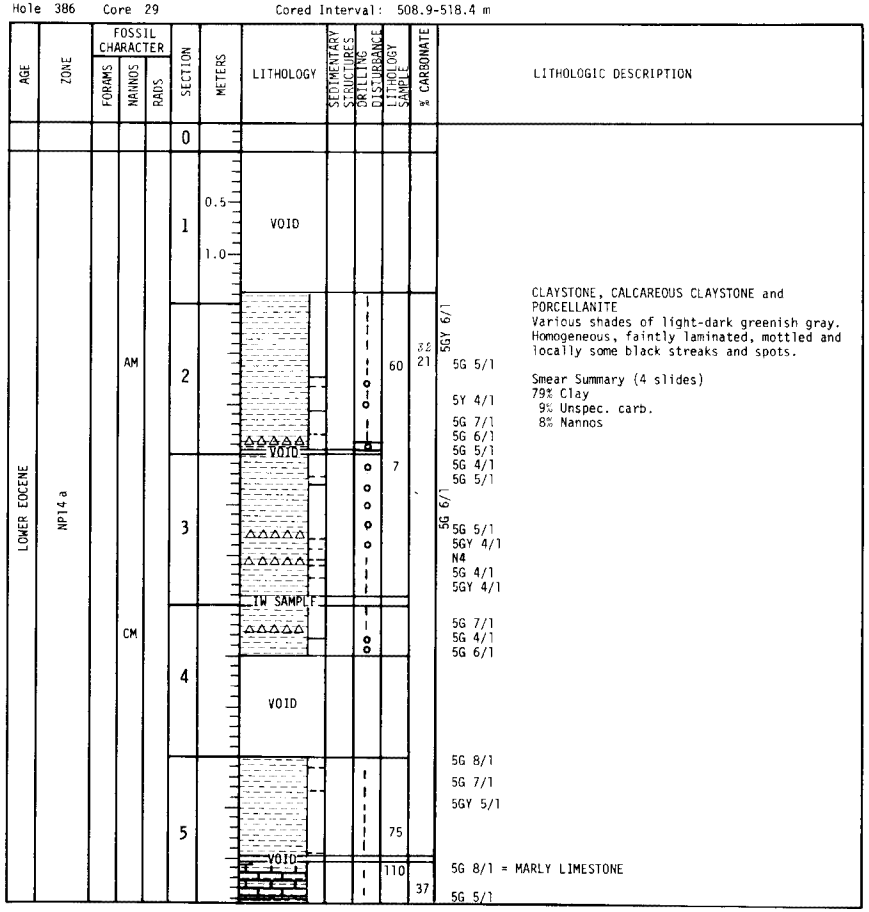
Hole 386 Core 27 Cored Interval: 489.9-499.4 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							Note: Dip ~5°
LOWER EOCENE	NP14b				1	0.5 1.0	VOID OG SAMPLE					5GY 4.5/1 5G 4/1 5Y 2/1 CLAYSTONE Various shades of greenish gray, partly homogeneous; faintly, moderately and intensely mottled, and partly laminated. Some black spots, patches and fine streaks. The mottles zones locally contain incipient chert. △△△△
					2					35	7 0	5GY 4/1 5GY 4/1 5Y 2/1 5G 4/1 5Y 2/1 5G 4/1 5G 6/1 5G 7/1 Smear Slides (2): 99 and 94% Clay ~2% Nannos Tr Rads and Unspec. carb. Minor lithology: *35 Section 2 = 100% Porcellanite
				RP	3					85		5G 6/1-5G 4/1 5Y 3/1 5G 5/1-4/1 5Y 3/1 5G 5/1
					4					28	2 17	5G 5/1 5G 6/1 5Y 3/1 5G 5/1 5G 6/1 5Y 5/1 5G 6/1
				AP								
		—		RM	CC							

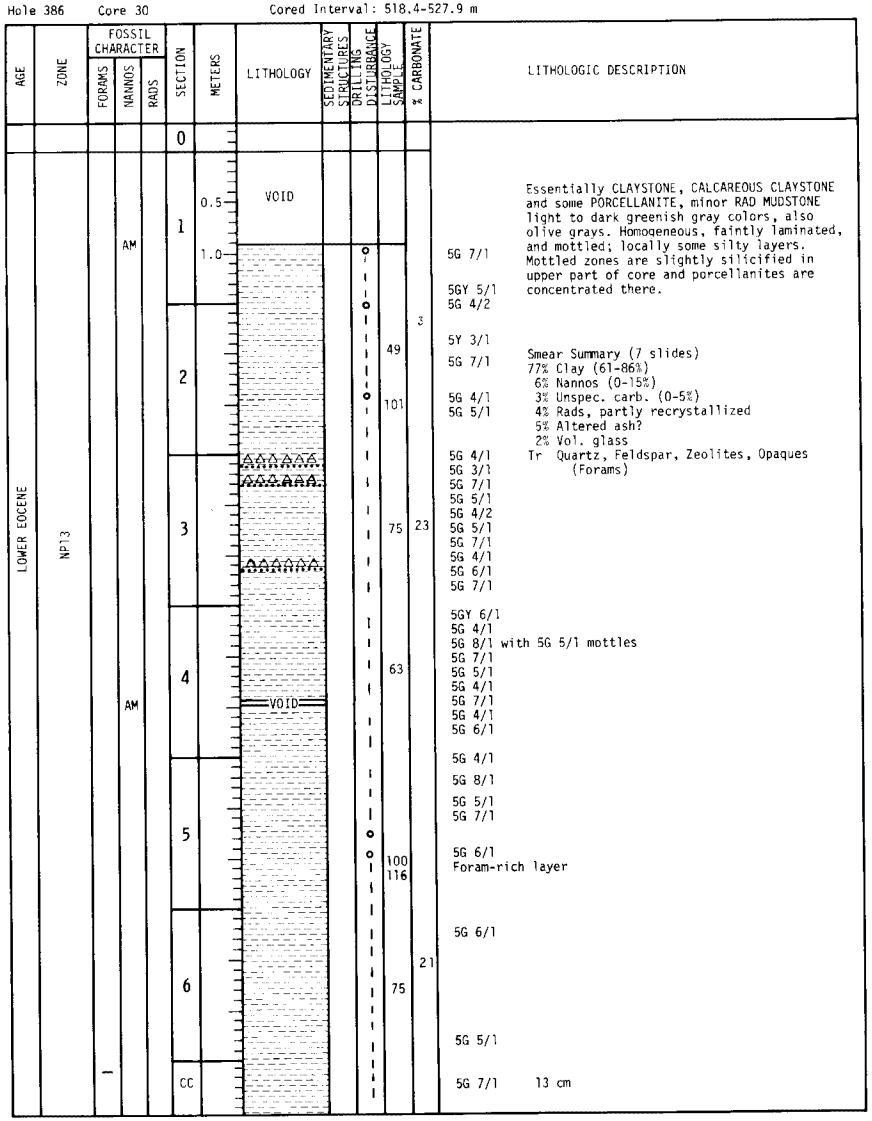
Hole 386 Core 28 Cored Interval: 499.4-508.9 m



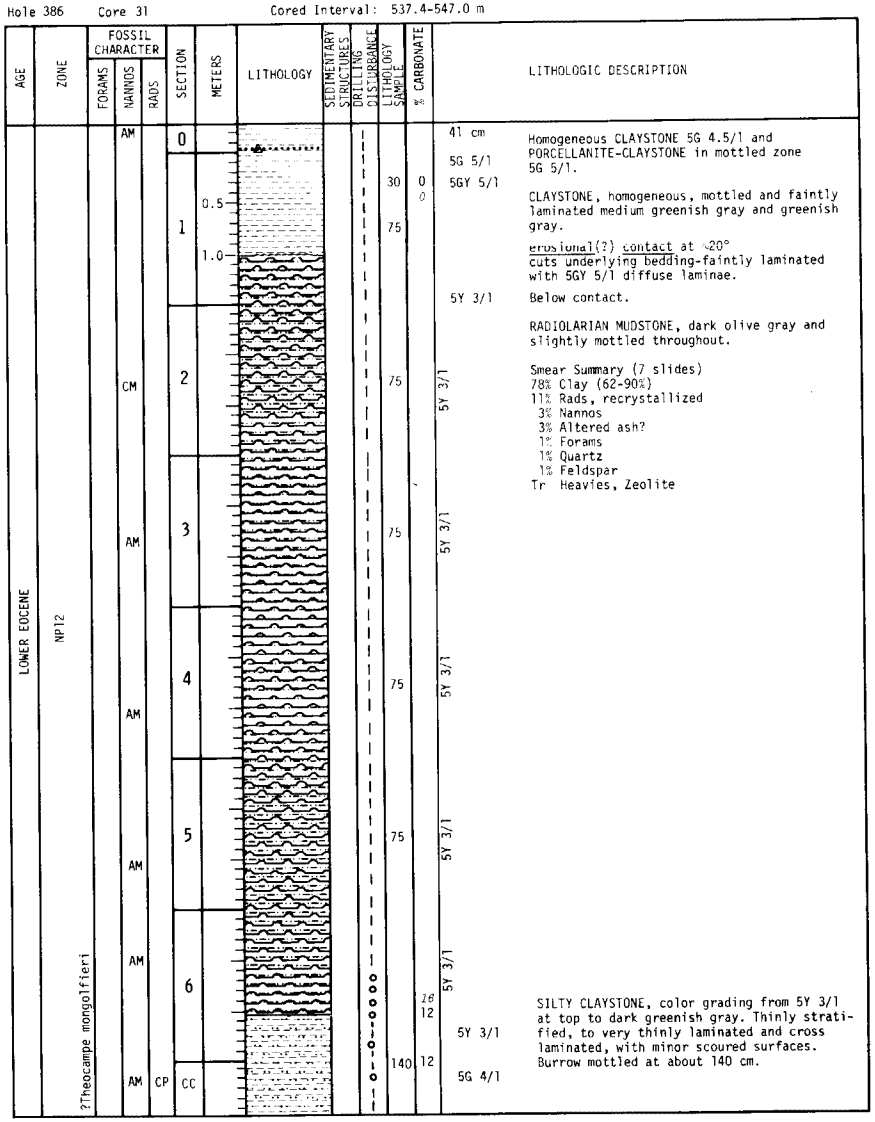
Hole 386 Core 29 Cored Interval: 508.9-518.4 m



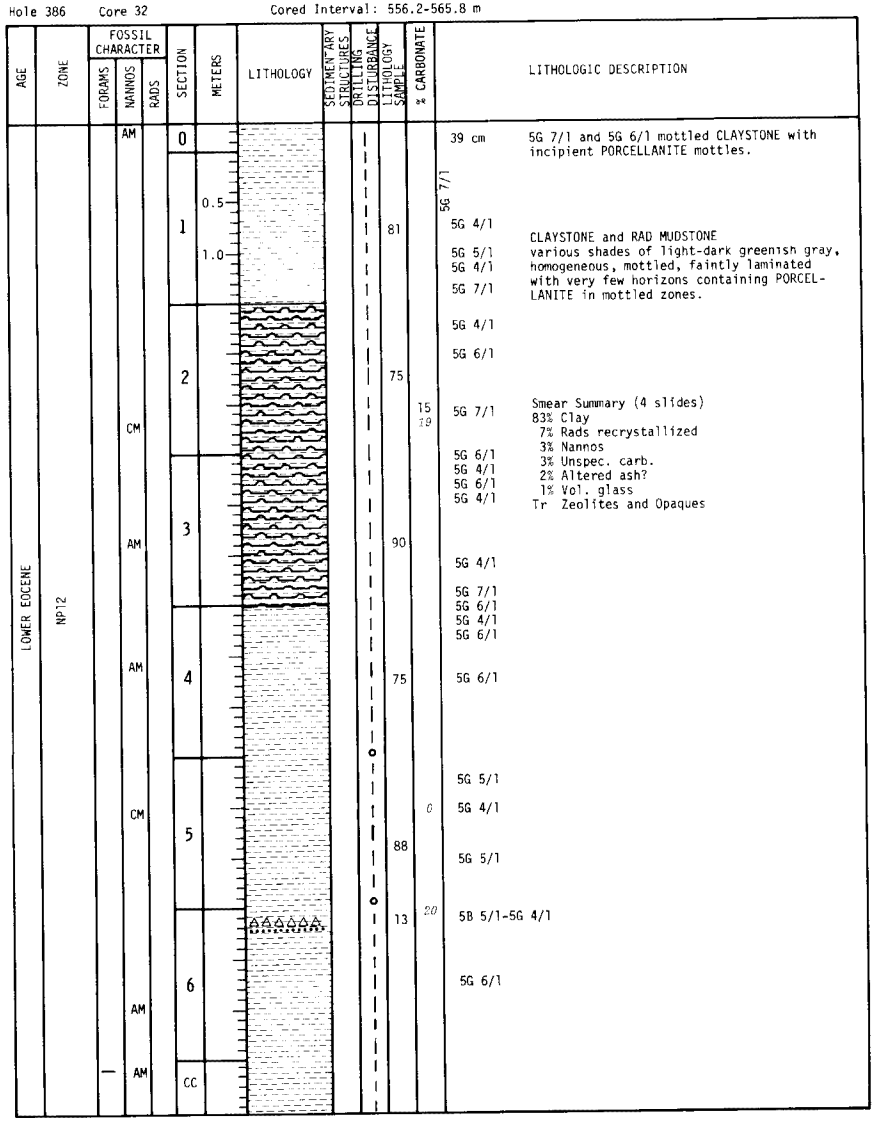
Hole 386 Core 30 Cored Interval: 518.4-527.9 m



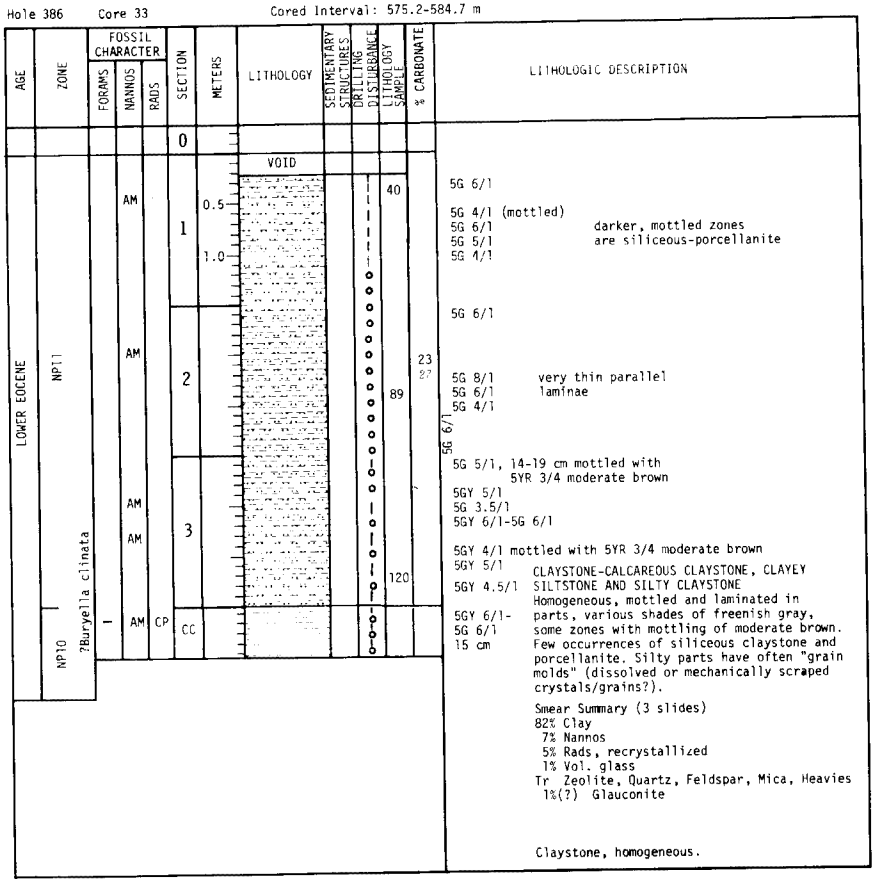
Hole 386 Core 31 Cored Interval: 537.4-547.0 m



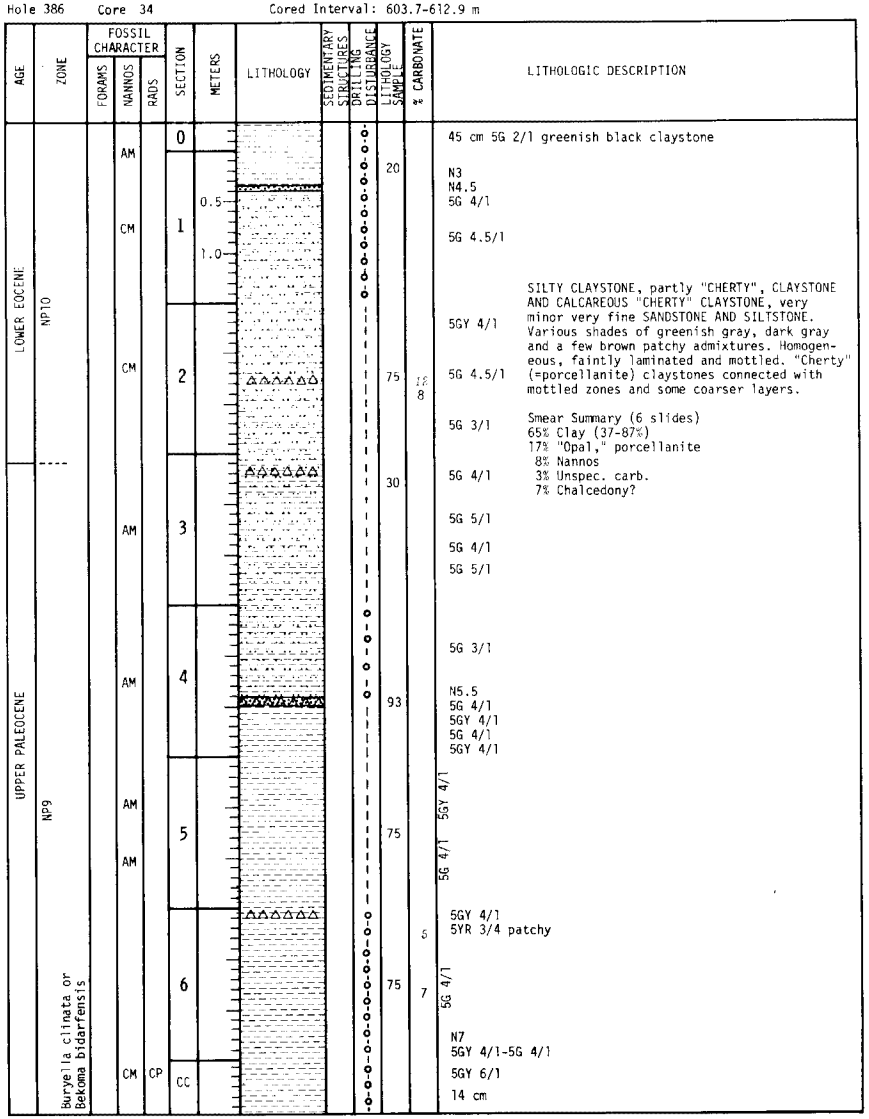
Hole 386 Core 32 Cored Interval: 556.2-565.8 m



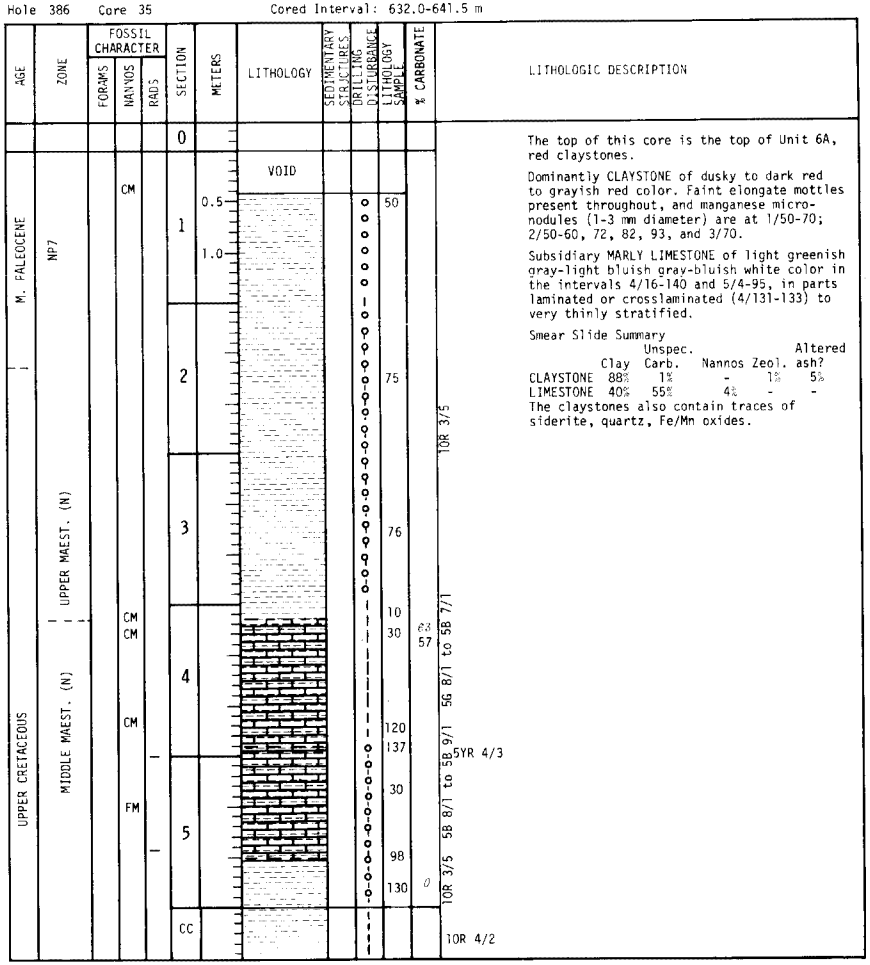
Hole 386 Core 33 Cored Interval: 575.2-584.7 m



Hole 386 Core 34 Cored Interval: 603.7-612.9 m



Hole 386 Core 35 Cored Interval: 632.0-641.5 m



The top of this core is the top of Unit 6A, red claystones.

Dominantly CLAYSTONE of dusky to dark red to grayish red color. Faint elongate mottles present throughout, and manganese micronodules (1-3 mm diameter) are at 1/50-70; 2/50-60, 72, 82, 93, and 3/70.

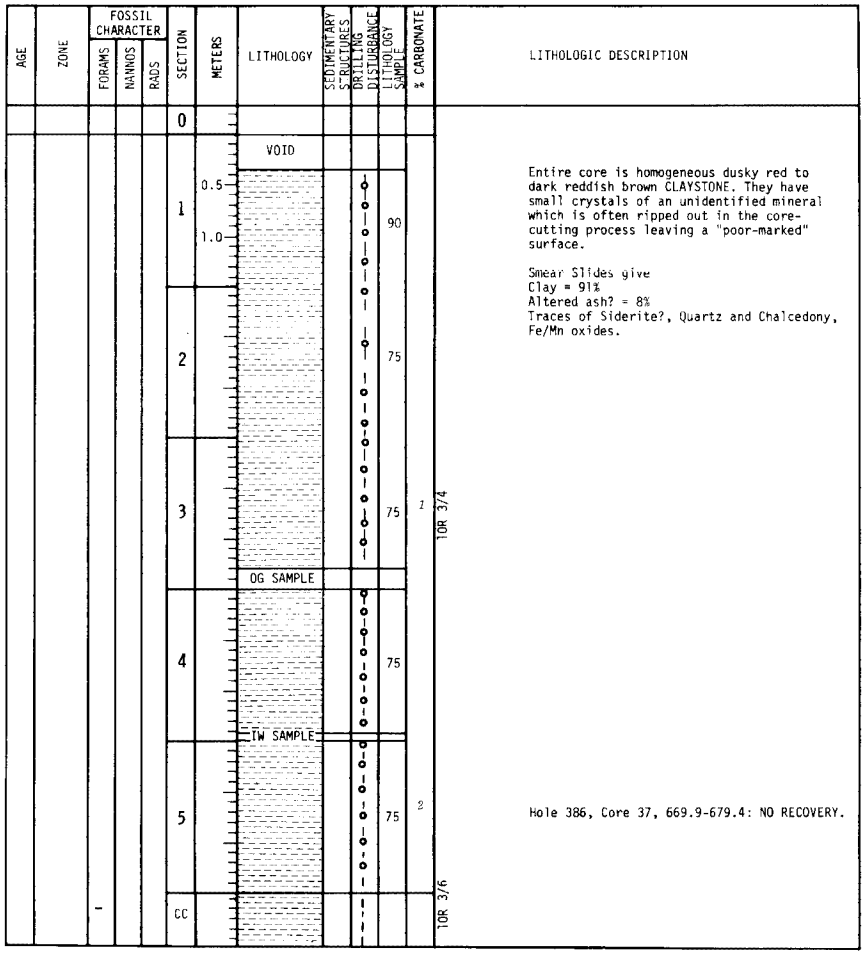
Subsidiary MARLY LIMESTONE of light greenish gray-light bluish gray-bluish white color in the intervals 4/16-140 and 5/4-95, in parts laminated or crosslaminated (4/131-133) to very thinly stratified.

Smear Slide Summary

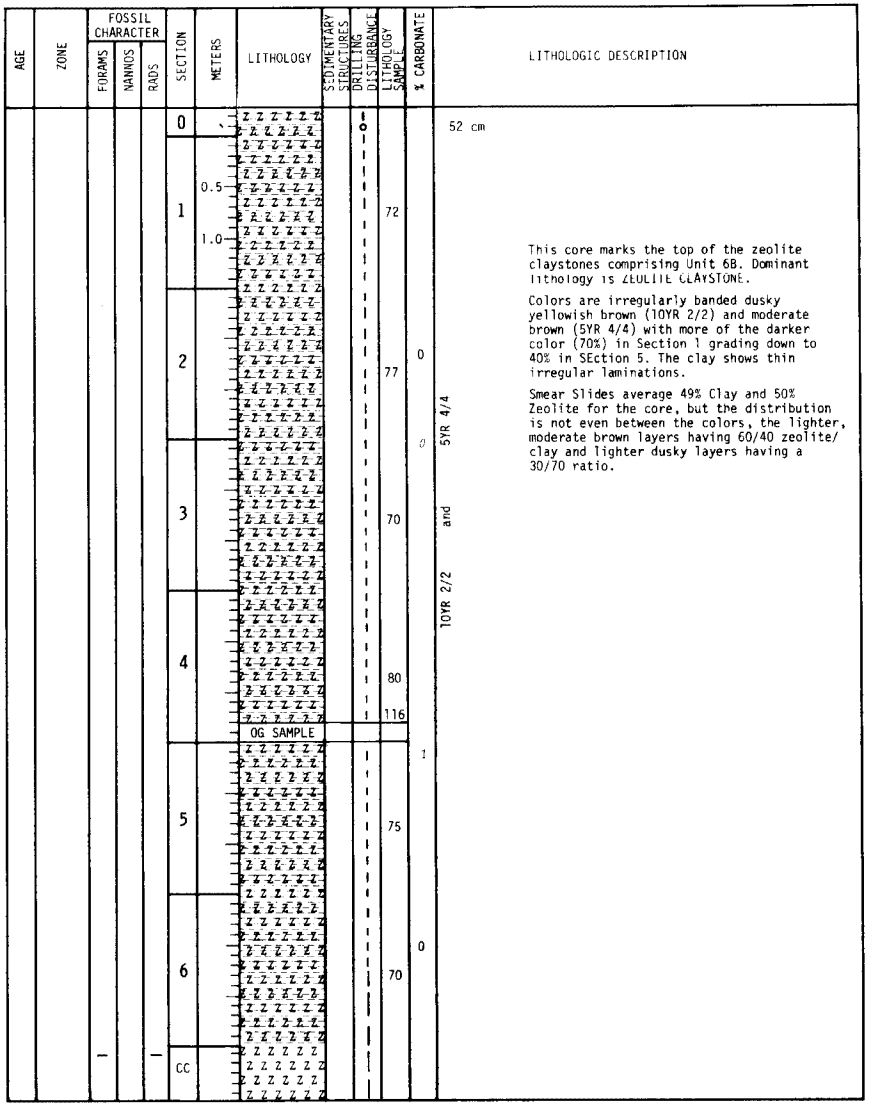
	Clay	Unspec. Carb.	Nannos	Zeol.	Altered ash?
CLAYSTONE	88%	1%	-	1%	5%
LIMESTONE	40%	55%	4%	-	-

The claystones also contain traces of siderite, quartz, Fe/Mn oxides.

Hole 386 Core 36 Cored Interval: 641.5-650.8 m



Hole 386 Core 38 Cored Interval: 688.9-698.5 m



Hole 386 Core 39 Cored Interval: 698.5-708.0 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
UPPER CRETACEOUS	UPPER CENOMANIAN			CP	0						0	46 cm 5YR 4/4 and 10YR 2/2
					1	0.5 1.0				75	0	5YR 4/4 10YR 2/2 Dominant lithology is ZEOLITE CLAYSTONE in many shades of red and brown including moderate brown, dusky yellow brown, reddish brown, red, and some bleached(?) horizons of light greenish gray (5G 8/1). Smear Slide Summary gives Clay - 52% and Zeolite 48%. A minor lithology of fine sand at 2/70 is 60%(?) Siderite.
					2					69 70		2.5YR 4/6
					3					75		2.5YR 4/4, 5YR 3/4 to 4/4
					4					80		
					5					70	0 1	2.5YR 4/6 with 5YR 4/4
					6					60		
					CC							5YR 4/4

Hole 386 Core 40 Cored Interval: 708.0-717.5 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0							Dip ≈5°.
UPPER CRETACEOUS	UPPER CENOMANIAN			CP	1	0.5 1.0	VOID			75 95		Dominant lithology is ZEOLITIC CLAYSTONE colored red to moderate brown with bleached(?) patches and layersof light greenish gray (5G8 /1). Claystone a irregularly thinly laminated throughout. Grain molds (where crystals have been removed by the core-splitting saw) are found in most of the core. Smear Slides reveal the composition to be quite uniform with Clay-78%, Zeolite-18% and Fe/Mn oxides 3%.
					2		VOID TW SAMPLE			70		2.5YR 4/6 to 5YR 4/4 with 5G 8/1 horizons
					3		VOID			60	0 1	
					CC							5YR 4/4

Hole 386 Core 41 Cored Interval: 717.5-727.0 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0		VOID					
					1	0.5 1.0			o	70	0 0	5YR 3/4
					2					75		5YR 3/4
					3					1.5 3.5 86		5YR 3/4
					4					75	0	5YR 3/4
					5					93	0	5YR 3/4 + 5G 5/1 5G 4/1 to 5G 2/1 with N1
		—		—	CC					126		

Dominant lithology is CLAYSTONE. The main color is dark reddish brown with bands of dark greenish gray in Sections 1, 3 at 0-15 and 83-94, 4 scattered through the lower half of the section and 5 at 0-10 and 80 to the bottom of the section. The color change at 41-5/80 marks the top of Unit 7 and the base of Unit 6C, the transition zone from red claystones to green and black claystones. Reddish brown claystones are faintly irregularly laminated to homogeneous. Greenish gray claystones in Section 5 are irregularly to horizontally laminated.

Smear Slides of dominant lithology average 92% Clay and 7% Fe+Mn oxides.

Dip in Section 5 is 5°.

Hole 386 Core 42 Cored Interval: 727.0-736.3 m

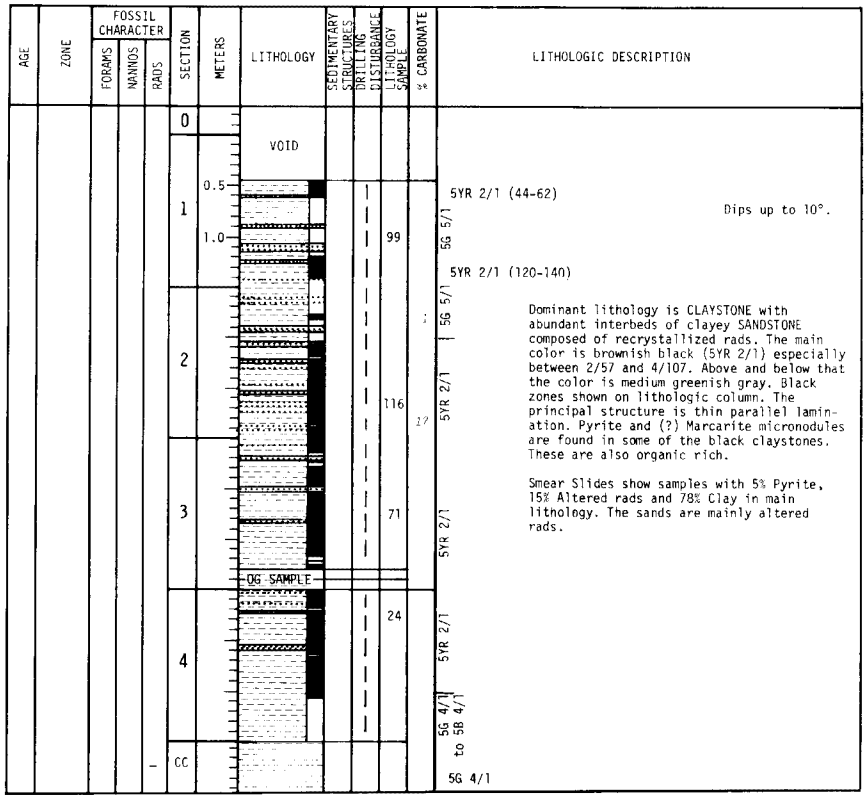
AGE	ZONE	FOSSIL CHARACTER: FORAMS	FOSSIL CHARACTER: NANNOS	FOSSIL CHARACTER: RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
					0		VOID					
					1	0.5 1.0			o o	60		N1 (43-45) N1 (80-85) 5G 3/1 (85-108)
					2					85		5G 5/1-5B 5/1 N2 (105-108)
					3		VOID			55 72		5G 5/1 5YR 2/1 (51-57)
					4					79	0 0	5YR 2/1 (26-30) 5YR 2/1 (57-60) Rad sand layers 71-81
					5					127 91		5G 5/1 N1 (138-146) N2 (32-35) 5G 5/1 N2 (77-80) 5Y 2/1 (86-98)
				—	CC							5G 5/1

Dips up to 10°.

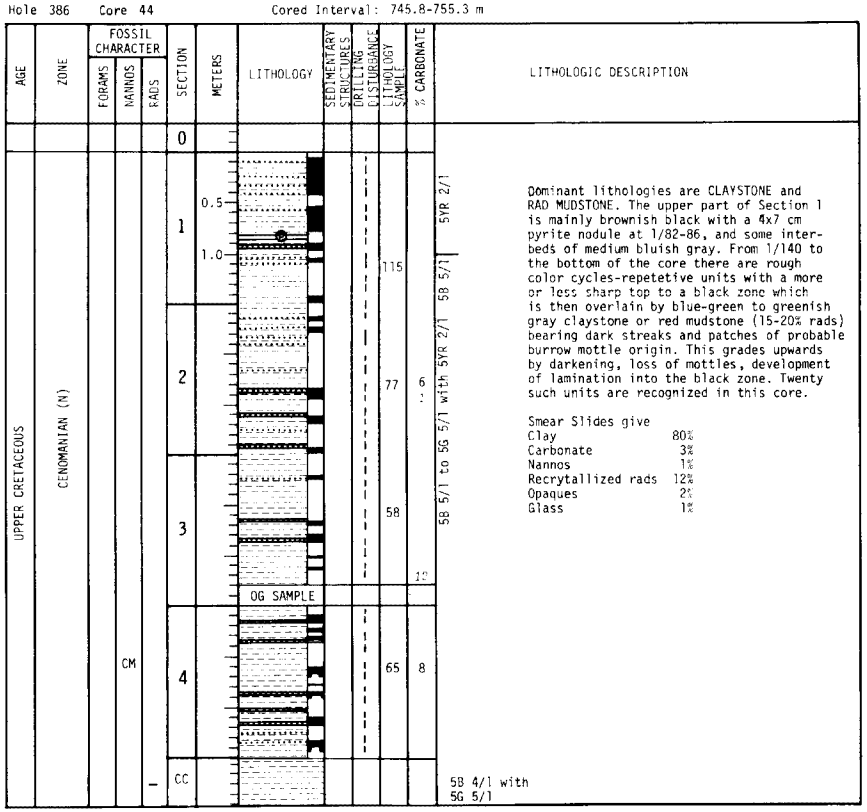
Dominant lithology is CLAYSTONE. Principal color is greenish gray (5G 5/1) with a number of layers of dark grays and blacks (shown on lithologic column). Siderite is found in some sandy layers, especially scattered in 1/50-70. Many of the sand layers indicated are of recrystallized rads. Layers 1-3 cm thick. Claystones are laminated, mainly parallel but some irregularly with indication of mottling.

Smear Slides of main lithology give 95% Clay, 5%(?) Siderite. Minor lithologies include sideritic sand. Altered Rad sand, pyrite micronodules, organic rich claystone.

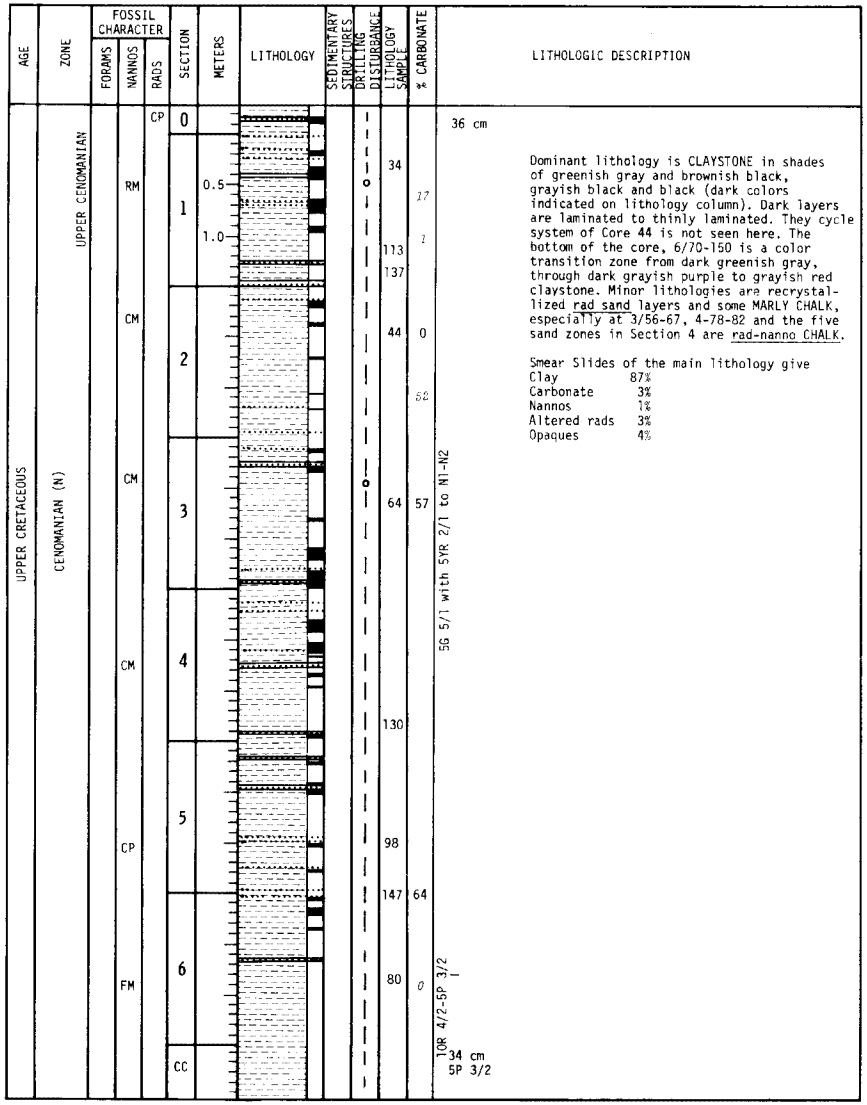
Hole 386 Core 43 Cored Interval: 736.3-745.8 m



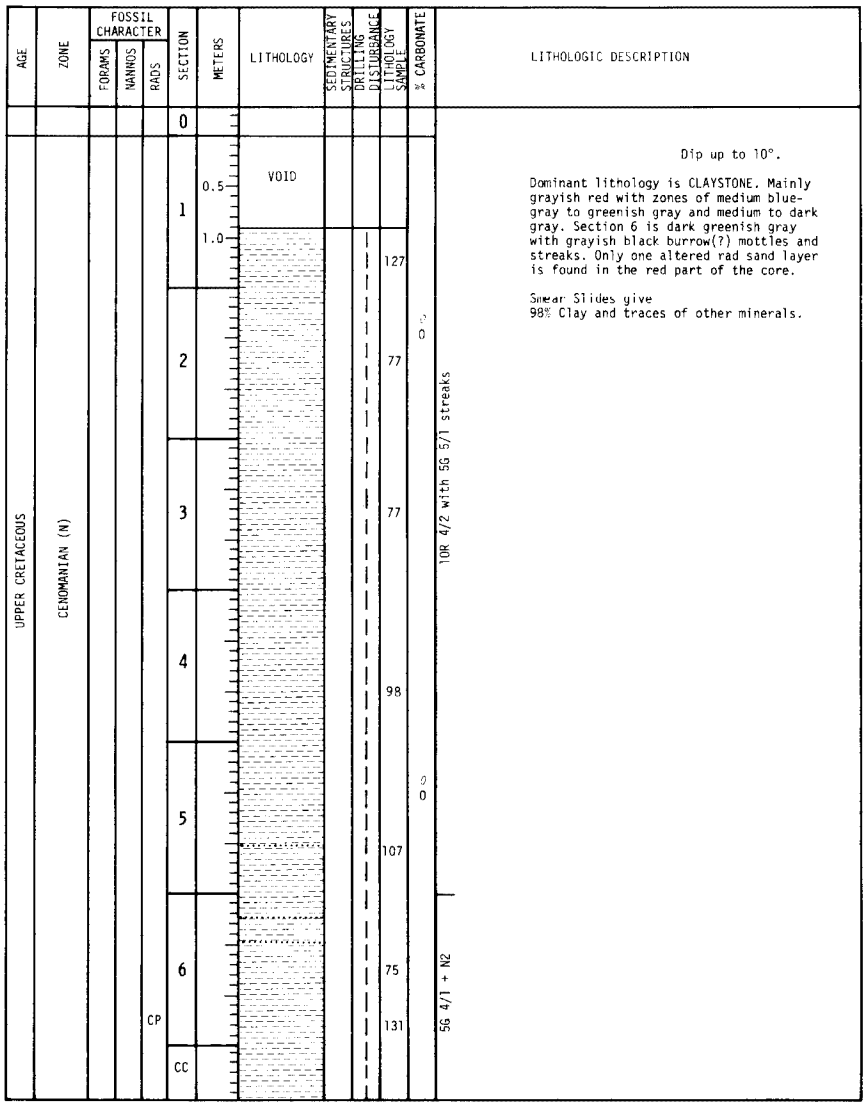
Hole 386 Core 44 Cored Interval: 745.8-755.3 m



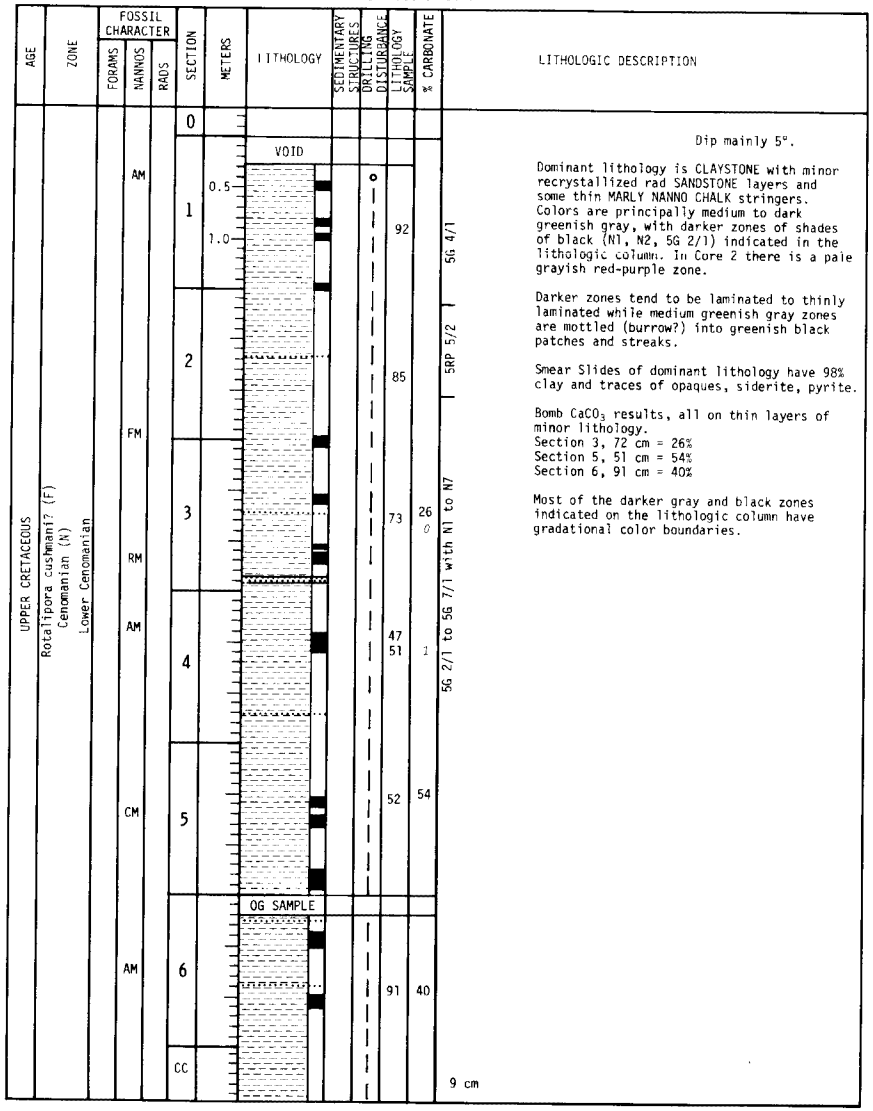
Hole 386 Core 45 Cored Interval: 764.8-774.4 m



Hole 386 Core 46 Cored Interval: 774.4-783.8 m



Hole 386 Core 47 Cored Interval: 783.8-793.3 m



Dip mainly 5°.

Dominant lithology is CLAYSTONE with minor recrystallized rad SANDSTONE layers and some thin MARLY NANNO CHALK stringers. Colors are principally medium to dark greenish gray, with darker zones of shades of black (N1, N2, 5G 2/1) indicated in the lithologic column. In Core 2 there is a pale grayish red-purple zone.

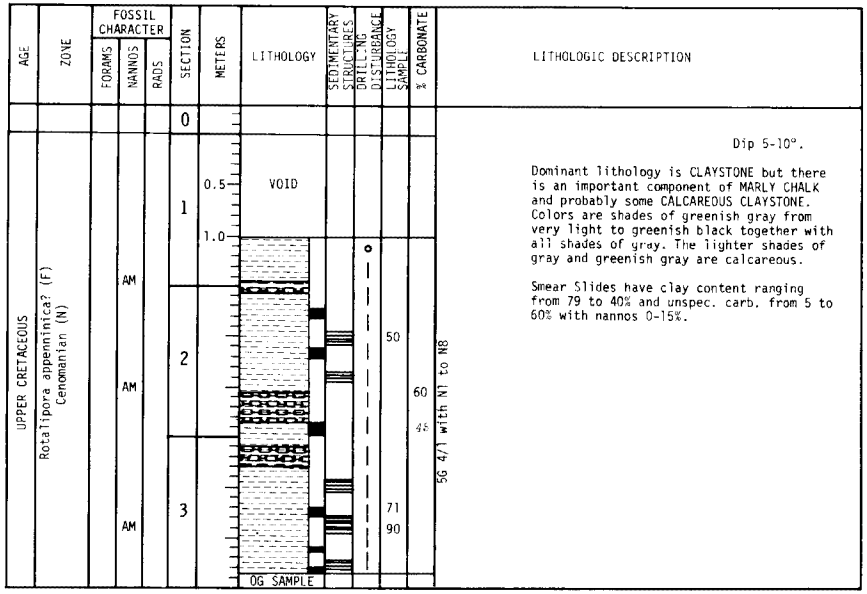
Darker zones tend to be laminated to thinly laminated while medium greenish gray zones are mottled (burrow?) into greenish black patches and streaks.

Smear Slides of dominant lithology have 98% clay and traces of opaques, siderite, pyrite.

Bomb $CaCO_3$ results, all on thin layers of minor lithology.
Section 3, 72 cm = 26%
Section 5, 51 cm = 54%
Section 6, 91 cm = 40%

Most of the darker gray and black zones indicated on the lithologic column have gradational color boundaries.

Hole 386 Core 48 Cored Interval: 793.3-802.8 m

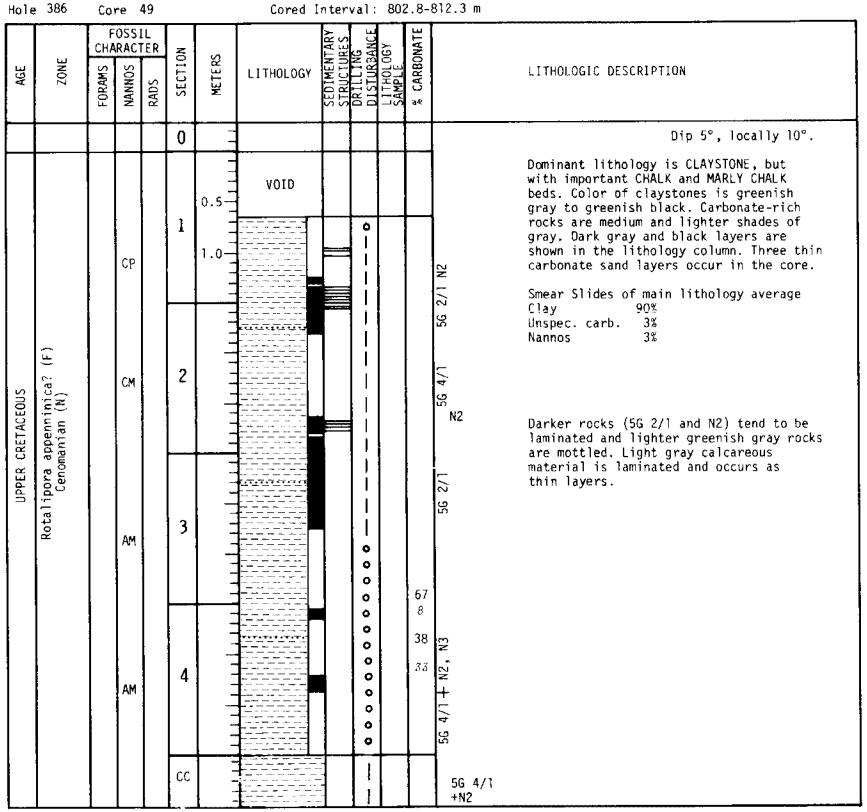


Dip 5-10°.

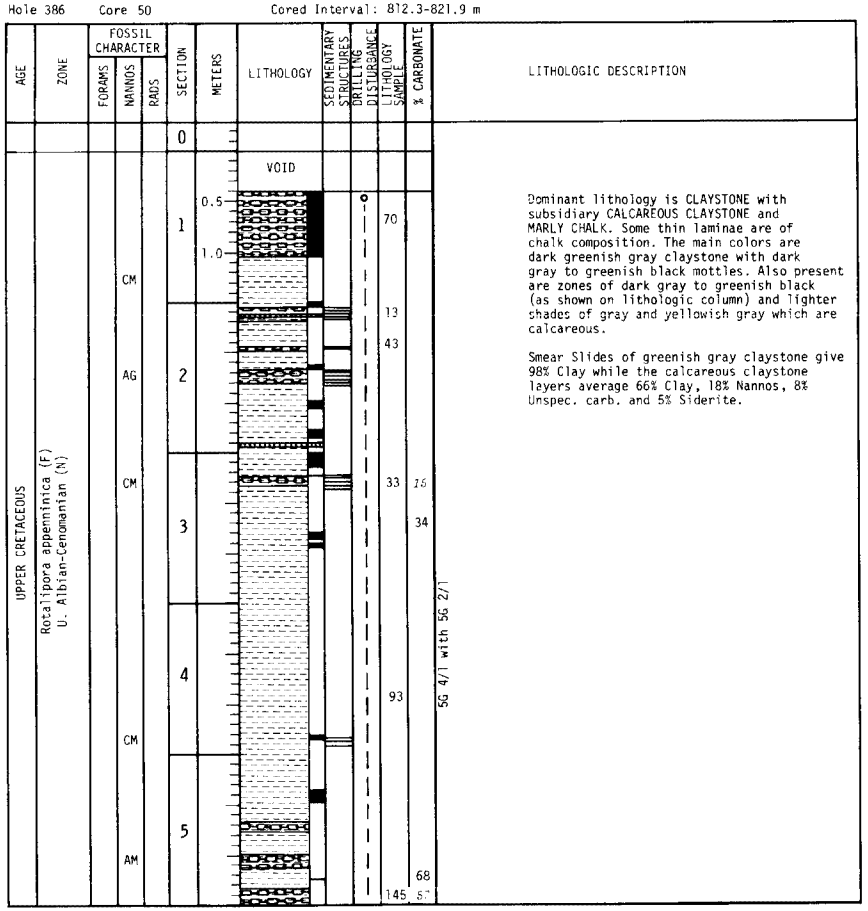
Dominant lithology is CLAYSTONE but there is an important component of MARLY CHALK and probably some CALCAREOUS CLAYSTONE. Colors are shades of greenish gray from very light to greenish black together with all shades of gray. The lighter shades of gray and greenish gray are calcareous.

Smear Slides have clay content ranging from 79 to 40% and unspec. carb. from 5 to 60% with nannos 0-15%.

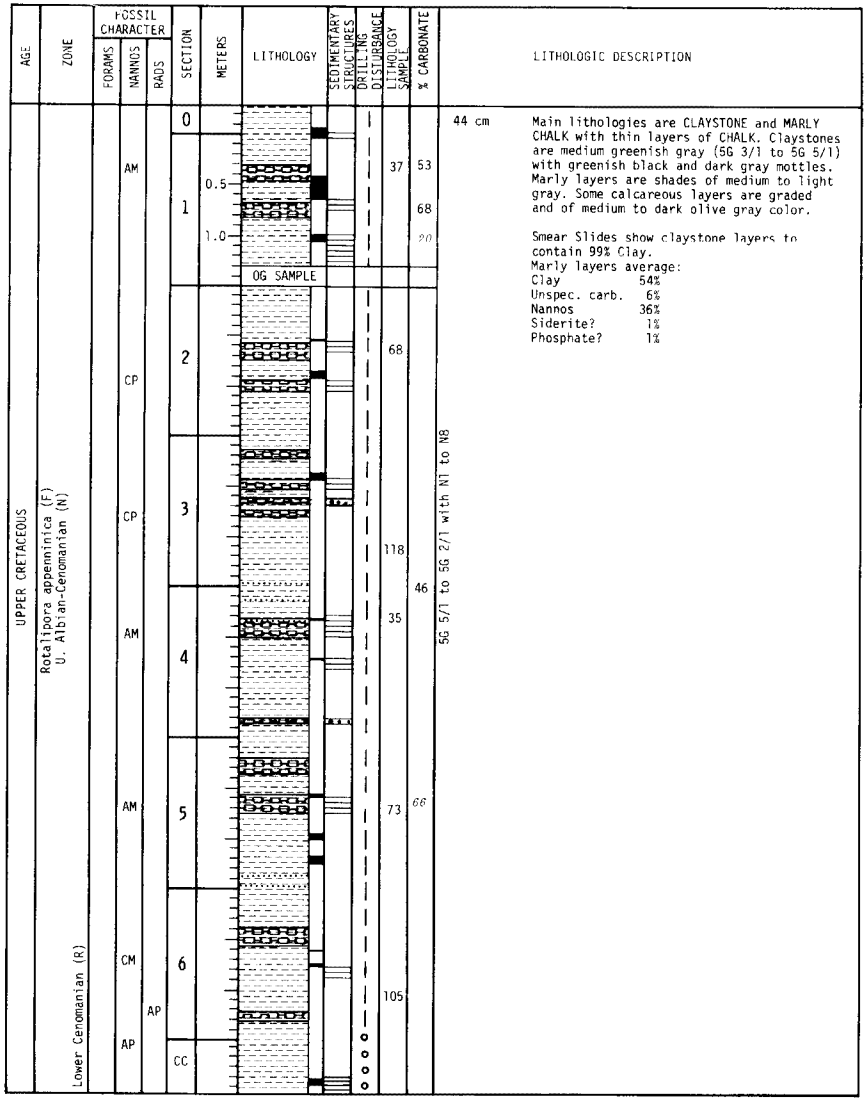
Hole 386 Core 49 Cored Interval: 802.8-812.3 m



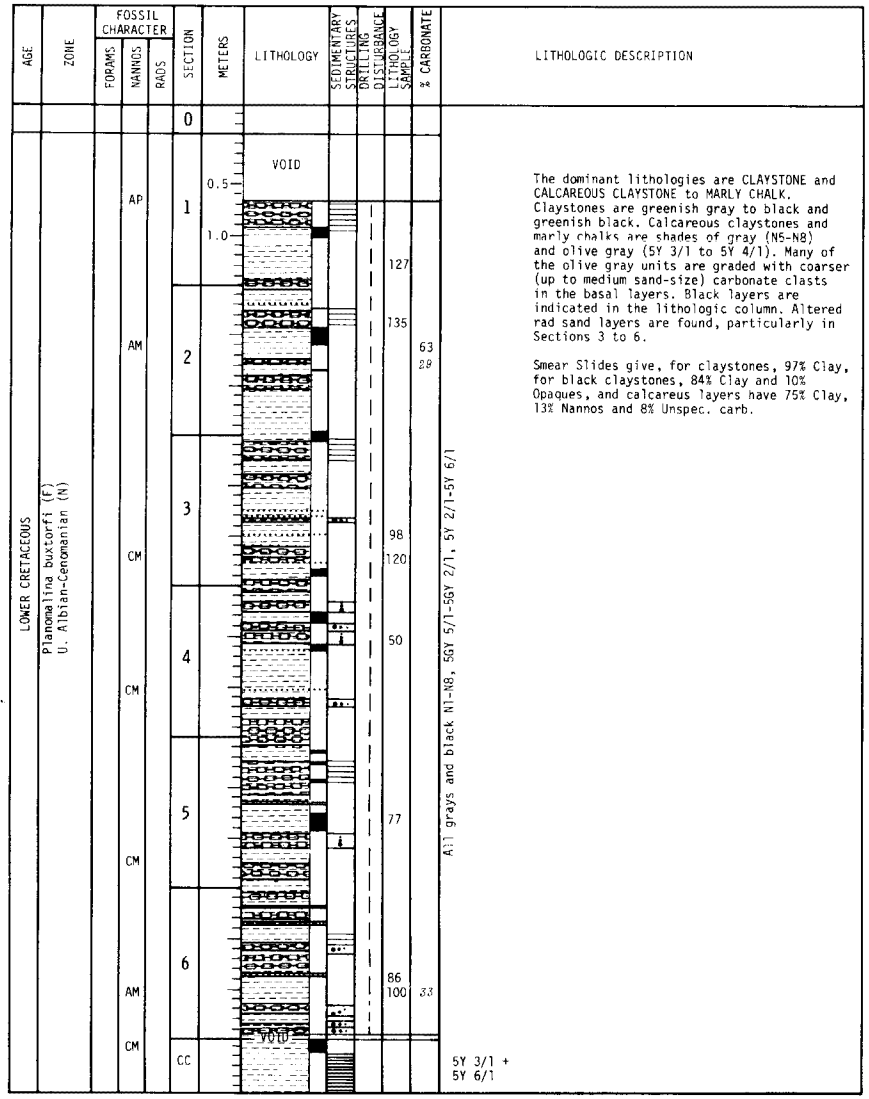
Hole 386 Core 50 Cored Interval: 812.3-821.9 m

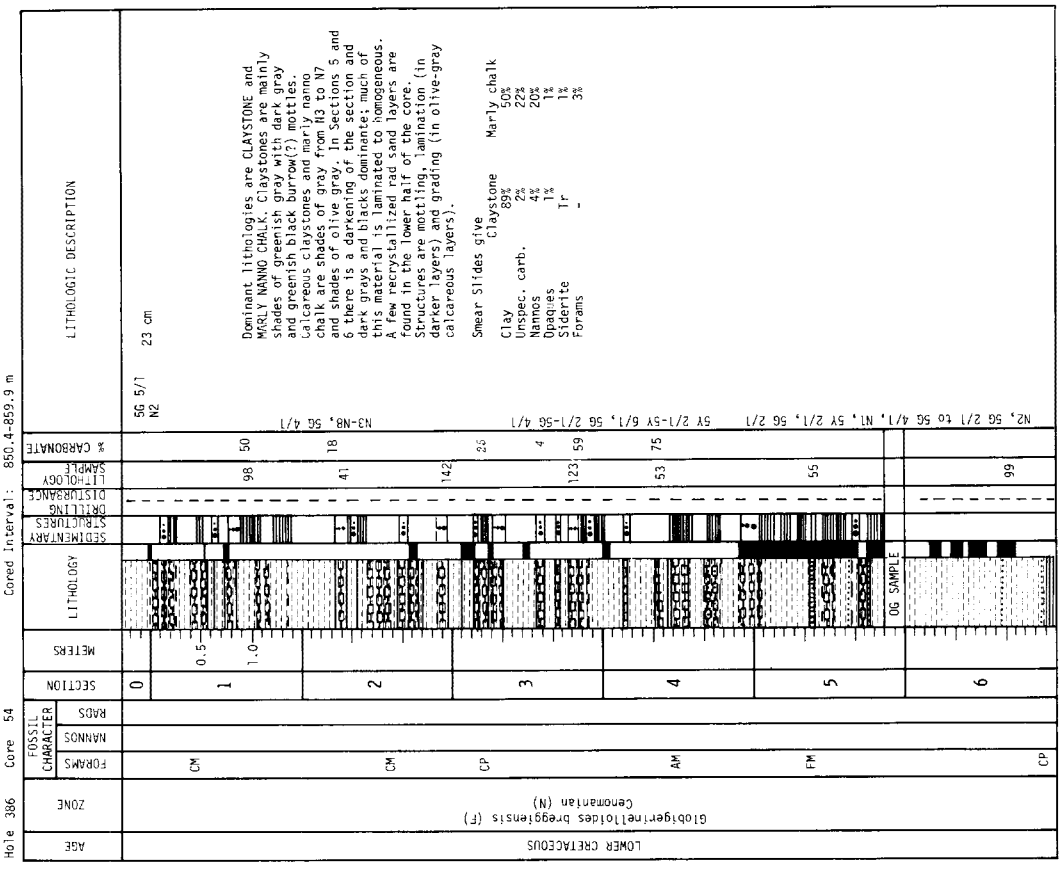


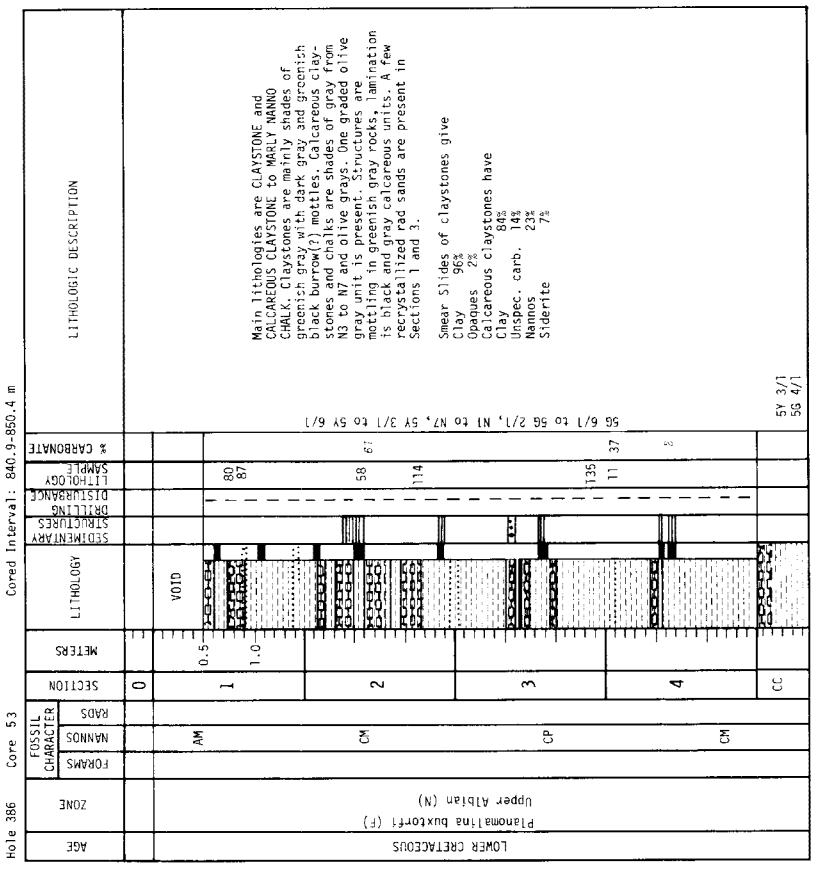
Hole 386 Core 51 Cored Interval: 821.9-831.4 m



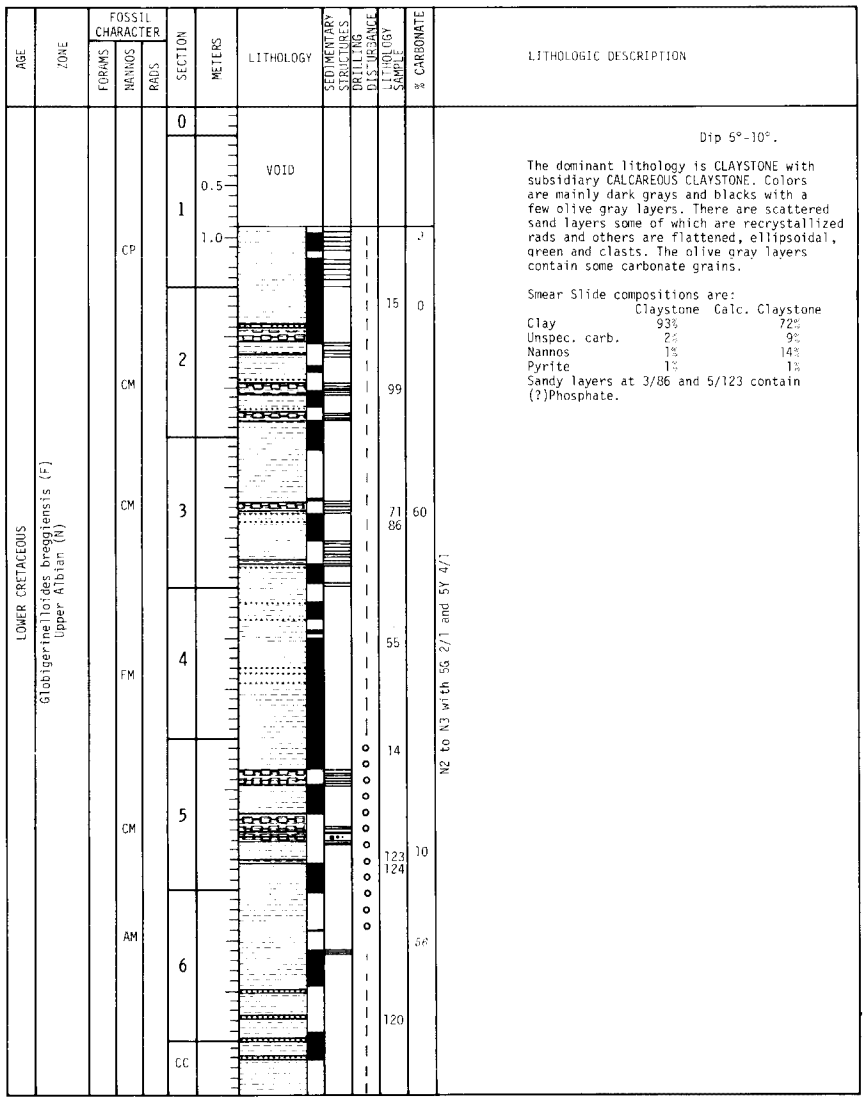
Hole 386 Core 52 Cored Interval: 831.4-840.9 m



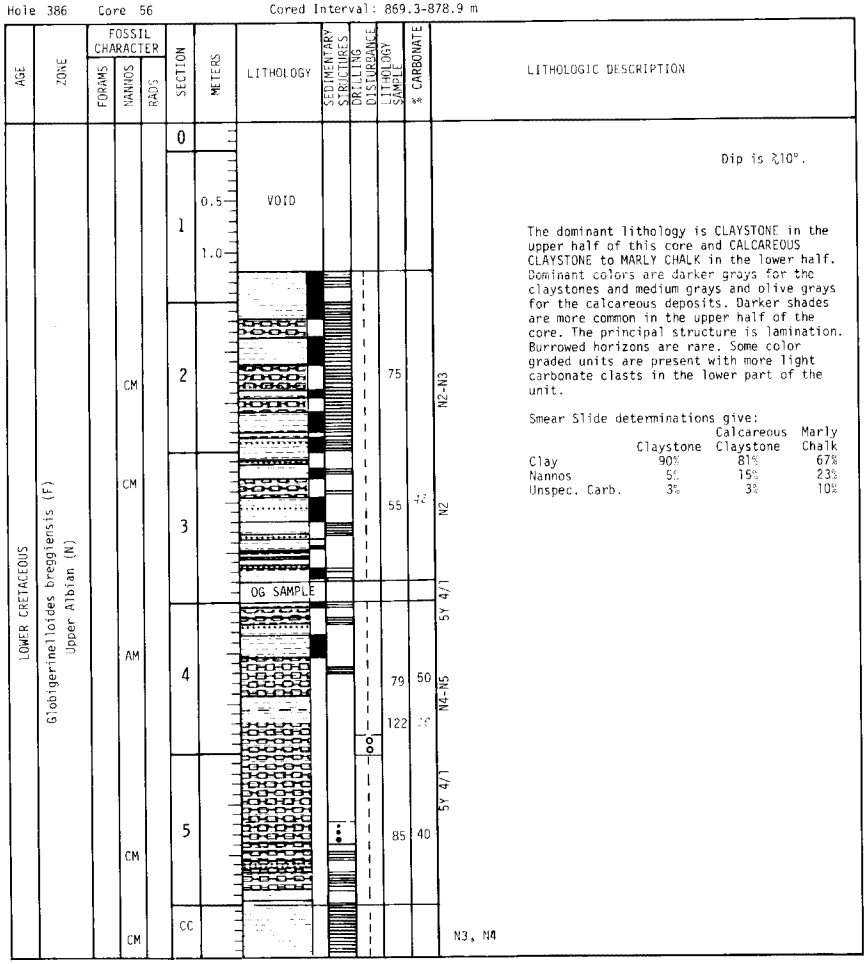

Hole 386 Core 54 Cored Interval: 850.4-859.9 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER CRETACEOUS
Globigerinelloides bregglensis (F)
Cenomanian (N)
CM
CM
CP
AM
FM
CP
OG SAMPLE
5G 5/1
N2
23 cm
Dominant lithologies are CLAYSTONE and MARLY NANNO CHALK. Claystones are mainly shades of greenish gray with dark gray and greenish black burrow(?) mottles. Calcareous claystones and marly nanno chalk are shades of gray from N3 to N7 and shades of olive gray. In Sections 5 and 6 there is a darkening of the section and dark grays and blacks dominante; much of this material is laminated to homogeneous. A few recrystallized rad sand layers are found in the lower half of the core. Structures are mottling, lamination (in darker layers) and grading (in olive-gray calcareous layers).
Smear Slides give Claystone Marly chalk
Clay 89% 50%
Unspec. carb. 2% 22%
Nannos 4% 20%
Opaques 1% 1%
Siderite Tr 1%
Forams - 3%
N3-N8, 5G 4/1
5Y 2/1-5Y 6/1, 5G 2/1-5G 4/1
N2, 5G 2/1 to 5G 4/1, N1, 5Y 2/1, 5G 2/1


Hole 386 Core 53 Cored Interval: 840.9-850.4 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER CRETACEOUS
Planomalina buxtorfi (F)
Upper Albian (N)
AM
CM
CP
CM
VOID
5G 6/1 to 5G 2/1, N1 to N7, 5Y 3/1 to 5Y 6/1
5Y 3/1
5G 4/1
Main lithologies are CLAYSTONE and CALCAREOUS CLAYSTONE to MARLY NANNO CHALK. Claystones are mainly shades of greenish gray with dark gray and greenish black burrow(?) mottles. Calcareous claystones and chalks are shades of gray from N3 to N7 and olive grays. One graded olive gray unit is present. Structures are mottling in greenish gray rocks, lamination is black and gray calcareous units. A few recrystallized rad sands are present in Sections 1 and 3.
Smear Slides of claystones give
Clay 96%
Opaques 2%
Calcareous claystones have
Clay 84%
Unspec. carb. 14%
Nannos 23%
Siderite 7%

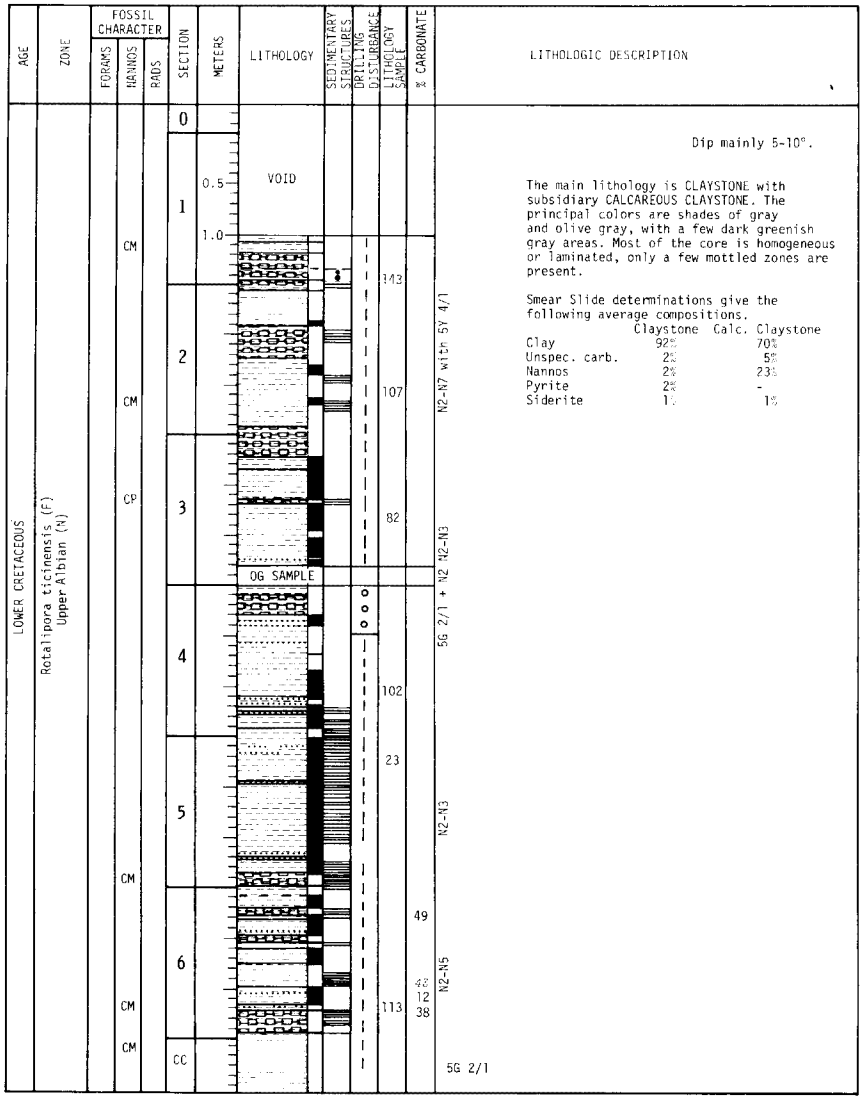
Hole 386 Core 55 Cored Interval: 859.9-869.3 m



Hole 386 Core 56 Cored Interval: 869.3-878.9 m



Hole 386 Core 57 Cored Interval: 878.9-888.3 m



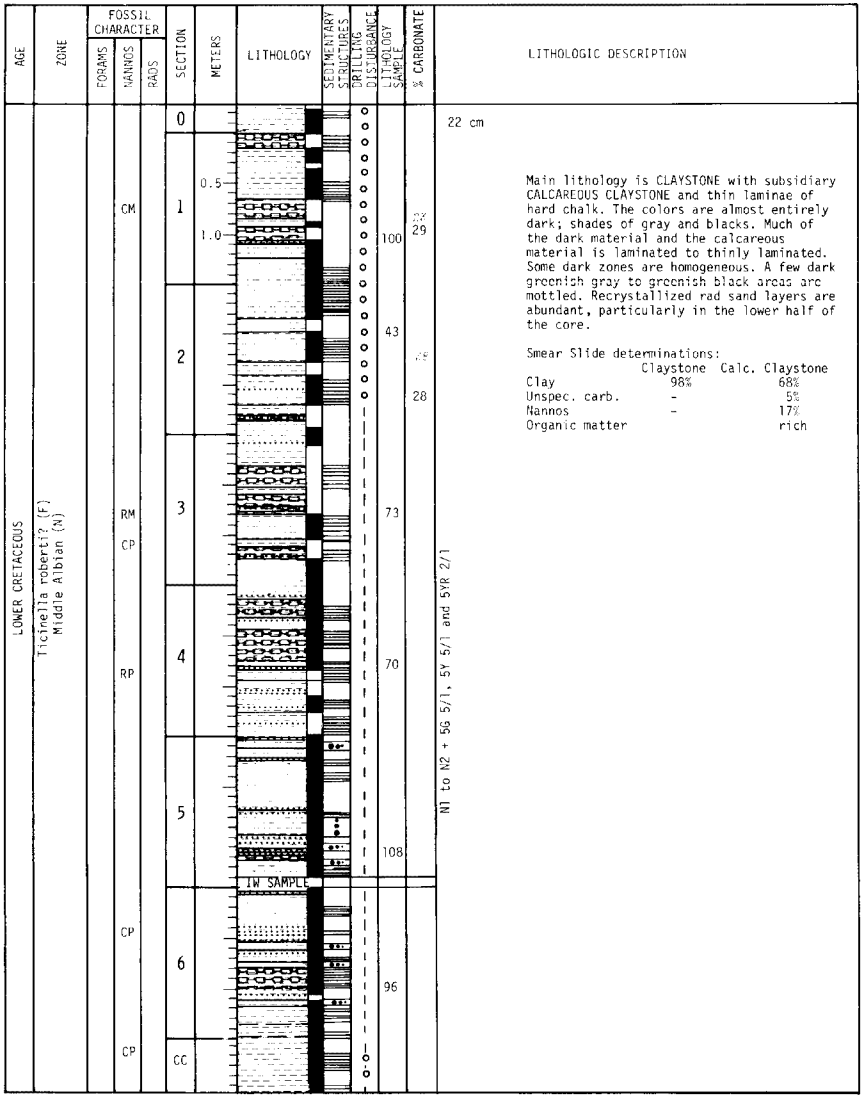
Dip mainly 5-10°.

The main lithology is CLAYSTONE with subsidiary CALCAREOUS CLAYSTONE. The principal colors are shades of gray and olive gray, with a few dark greenish gray areas. Most of the core is homogeneous or laminated, only a few mottled zones are present.

Smear Slide determinations give the following average compositions.

	Claystone	Calc. Claystone
Clay	92%	70%
Unspec. carb.	2%	5%
Nannos	2%	23%
Pyrite	2%	-
Siderite	1%	1%

Hole 386 Core 58 Cored Interval: 888.3-897.7 m

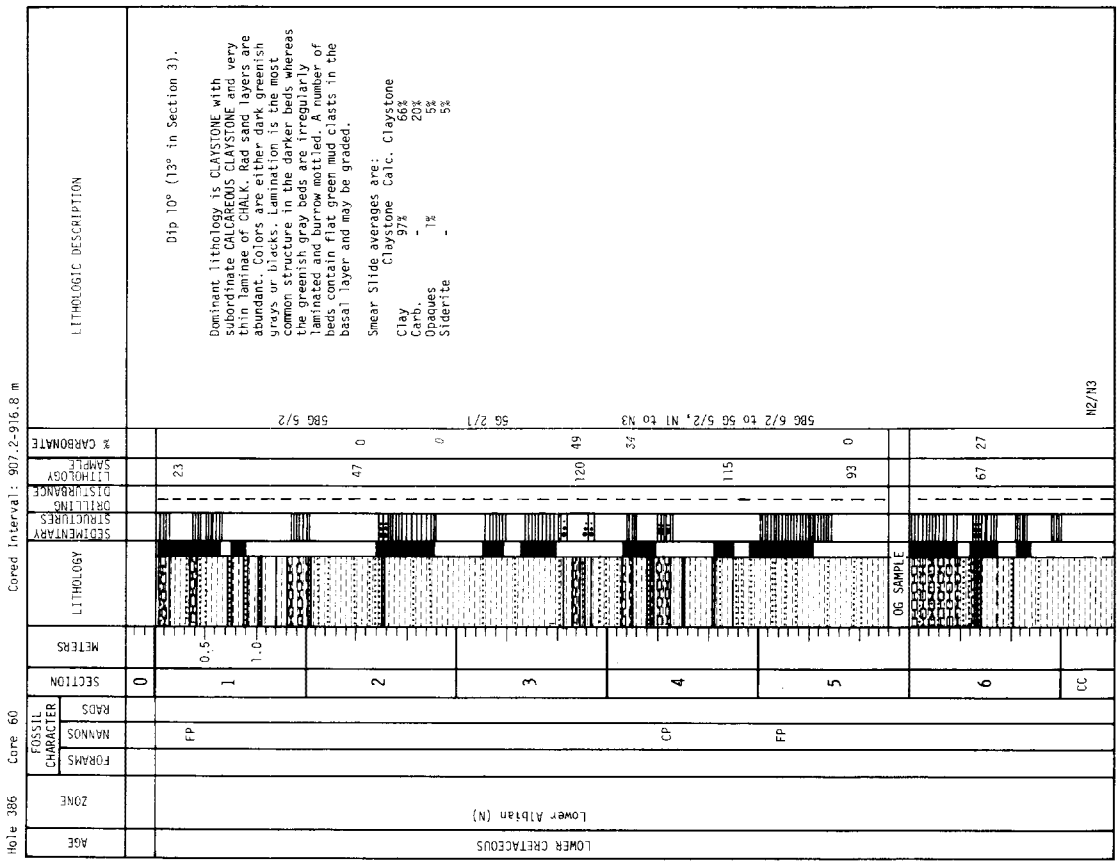


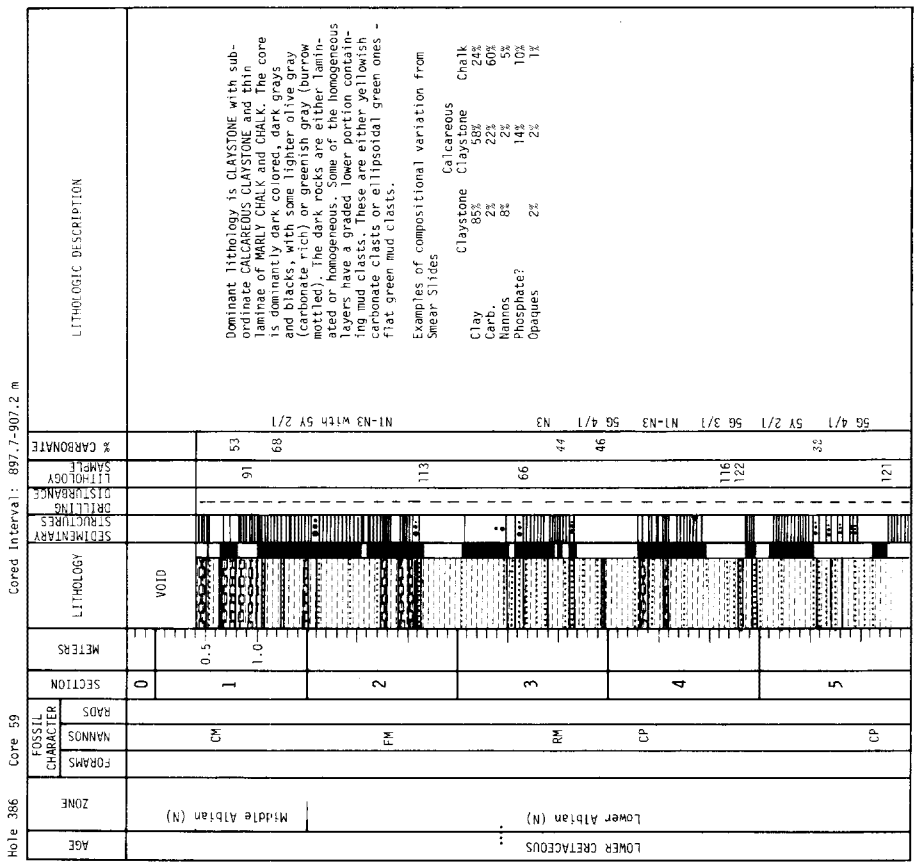
22 cm

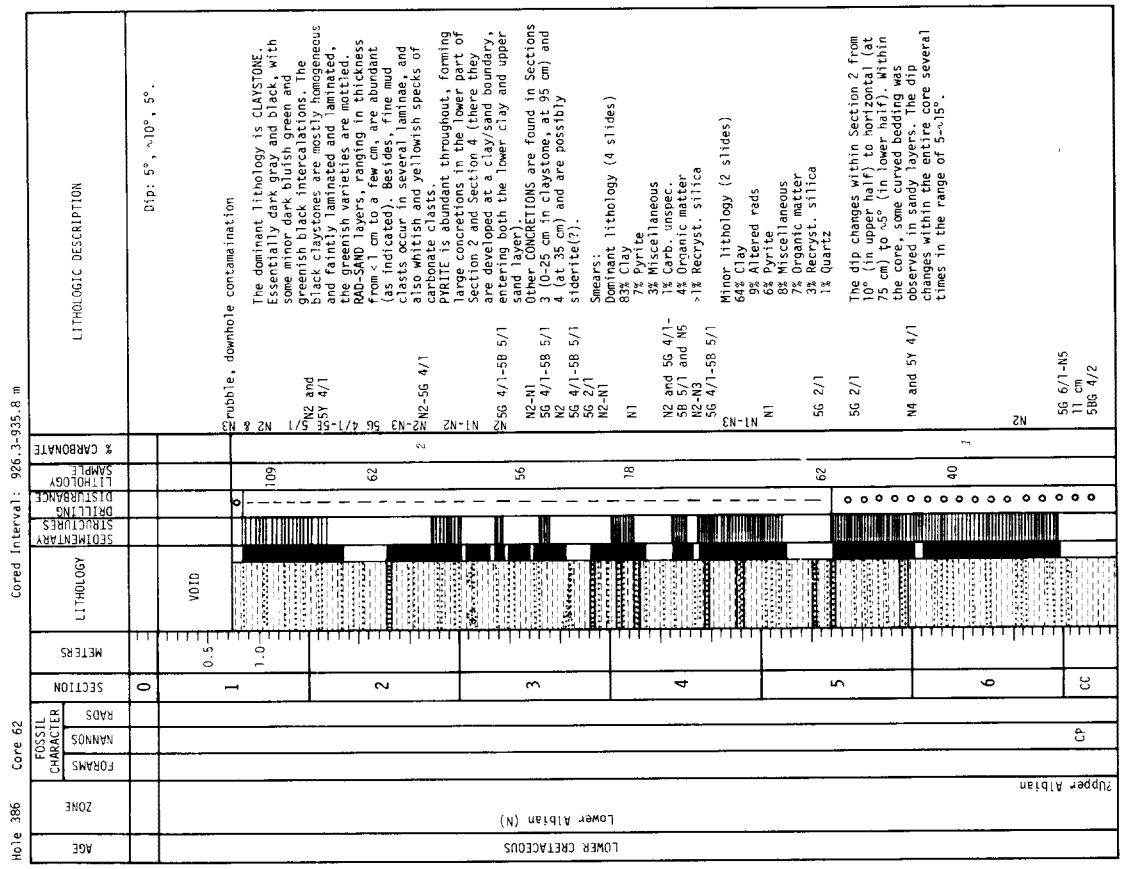
Main lithology is CLAYSTONE with subsidiary CALCAREOUS CLAYSTONE and thin laminae of hard chalk. The colors are almost entirely dark; shades of gray and blacks. Much of the dark material and the calcareous material is laminated to thinly laminated. Some dark zones are homogeneous. A few dark greenish gray to greenish black areas are mottled. Recrystallized rad sand layers are abundant, particularly in the lower half of the core.

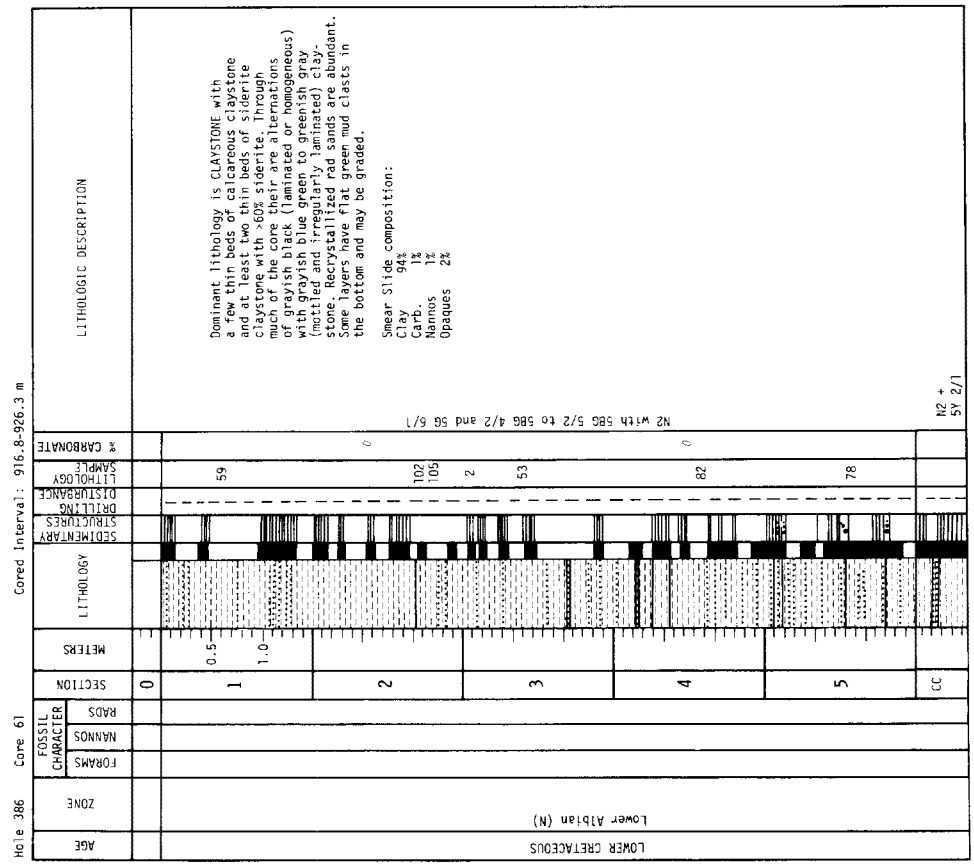
Smear Slide determinations:

	Claystone	Calc. Claystone
Clay	98%	68%
Unspec. carb.	-	5%
Nannos	-	17%
Organic matter		rich

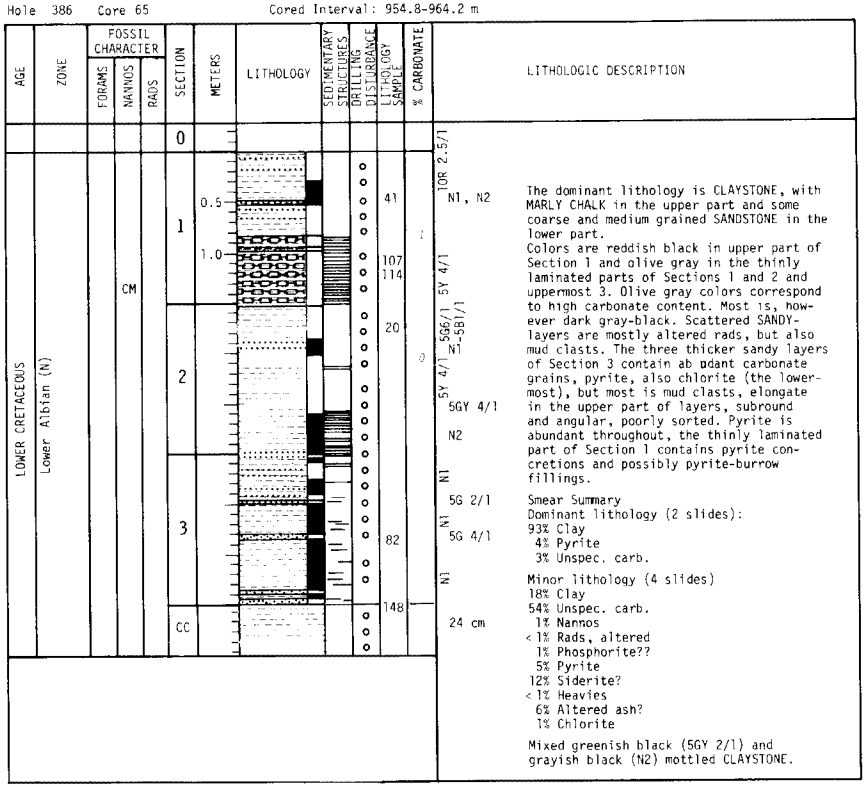

Hole 386
Core 60
Cored Interval: 907.2-916.8 m
AGE
ZONE
FORAMS
NANNOS
RADS
FOSSIL CHARACTER
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER CRETACEOUS
Lower Albian (N)
FP
CP
FP
OG SAMPLE
5B6 5/2
5G 2/1
5B6 6/2 to 5G 5/2, N1 to N3
N2/N3
Dip 10° (13° in Section 3).
Dominant lithology is CLAYSTONE with subordinate CALCAREOUS CLAYSTONE and very thin laminae of CHALK. Rad sand layers are abundant. Colors are either dark greenish grays or blacks. Lamination is the most common structure in the darker beds whereas the greenish gray beds are irregularly laminated and burrow mottled. A number of beds contain flat green mud clasts in the basal layer and may be graded.
Smear Slide averages are:
Claystone Calc. Claystone
Clay 97% 66%
Carb. - 20%
Opaques 1% 5%
Siderite - 5%


Hole 386
Core 59
Cored Interval: 897.7-907.2 m
AGE
ZONE
FORAMS
NANNOS
RADS
FOSSIL CHARACTER
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER CRETACEOUS
Lower Albian (N)
Middle Albian (N)
CM
FM
RM
CP
CP
VOID
N1-N3 with 5Y 2/1
N3
5G 4/1
N1-N3
5G 3/1
5Y 2/1
5G 4/1
Dominant lithology is CLAYSTONE with subordinate CALCAREOUS CLAYSTONE and thin laminae of MARLY CHALK and CHALK. The core is dominantly dark colored, dark grays and blacks, with some lighter olive gray (carbonate rich) or greenish gray (burrow mottled). The dark rocks are either laminated or homogeneous. Some of the homogeneous layers have a graded lower portion containing mud clasts. These are either yellowish carbonate clasts or ellipsoidal green ones - flat green mud clasts.
Examples of compositional variation from Smear Slides
Claystone Calcareous Claystone Chalk
Clay 85% 58% 24%
Carb. 2% 22% 60%
Nannos 8% 2% 5%
Phosphate? 14% 10%
Opaques 2% 2% 1%


Hole 386
Core 62
Cored Interval: 926.3-935.8 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER CRETACEOUS
Lower Albian (N)
?Upper Albian
CP
VOID
Dip: 5°, ~10°, 5°.
Drubble, downhole contamamination
The dominant lithology is CLAYSTONE. Essentially dark gray and black, with some minor dark bluish green and greenish black intercalations. The black claystones are mostly homogeneous and faintly laminated and laminated, the greenish varieties are mottled. RAD-SAND layers, ranging in thickness from <1 cm to a few cm, are abundant (as indicated). Besides, fine mud clasts occur in several laminae, and also whitish and yellowish specks of carbonate clasts. PYRITE is abundant throughout, forming large concretions in the lower part of Section 2 and Section 4 (there they are developed at a clay/sand boundary, entering both the lower clay and upper sand layer). Other CONCRETIONS are found in Sections 3 (0-25 cm in claystone, at 95 cm) and 4 (at 35 cm) and are possibly siderite(?).
Smears:
Dominant lithology (4 slides)
83% Clay
7% Pyrite
3% Miscellaneous
1% Carb. unspec.
4% Organic matter
>1% Recryst. silica
Minor lithology (2 slides)
64% Clay
9% Altered rads
6% Pyrite
8% Miscellaneous
7% Organic matter
3% Recryst. silica
1% Quartz
The dip changes within Section 2 from 10° (in upper half) to horizontal (at 75 cm) to ~5° (in lower half). Within the core, some curved bedding was observed in sandy layers. The dip changes within the entire core several times in the range of 5-~15°.
N2 & N3
N2 and 5Y 4/1
N2-5G 4/1
5G 4/1-5B 5/1
N2-N1
5G 2/1
N1
N2 and 5G 4/1-5B 5/1 and N5
N2-N3
5G 6/1-N5
11 cm
5BG 4/2


Hole 386
Core 61
Cored Interval: 916.8-926.3 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER CRETACEOUS
Lower Albian (N)
Dominant lithology is CLAYSTONE with a few thin beds of calcareous claystone and at least two thin beds of siderite claystone with >60% siderite. Through much of the core their are alternations of grayish black (laminated or homogeneous) with grayish blue green to greenish gray (mottled and irregularly laminated) claystone. Recrystallized red sands are abundant. Some layers have flat green mud clasts in the bottom and may be graded.
Smear Slide composition:
Clay 94%
Carb. 1%
Nannos 1%
Opaques 2%
N2 with 5BG 5/2 to 5BG 4/2 and 5G 6/1
N2 + 5Y 2/1

Hole 386 Core 65 Cored Interval: 954.8-964.2 m



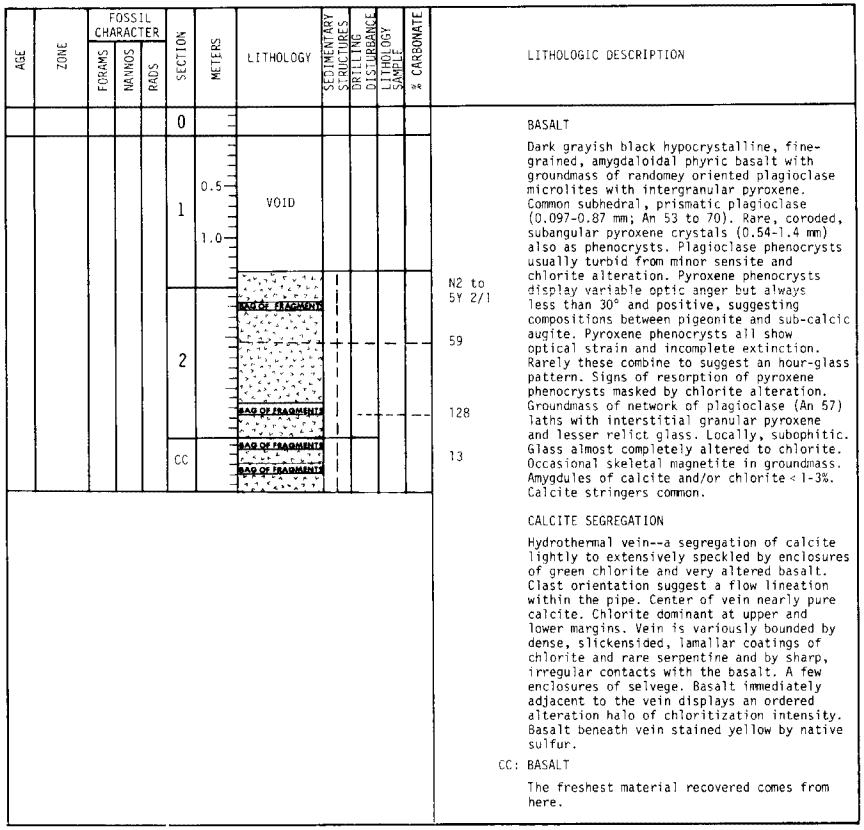
The dominant lithology is CLAYSTONE, with MARLY CHALK in the upper part and some coarse and medium grained SANDSTONE in the lower part.
Colors are reddish black in upper part of Section 1 and olive gray in the thinly laminated parts of Sections 1 and 2 and uppermost 3. Olive gray colors correspond to high carbonate content. Most is, however dark gray-black. Scattered SANDY-layers are mostly altered rads, but also mud clasts. The three thicker sandy layers of Section 3 contain ab ndant carbonate grains, pyrite, also chlorite (the lowermost), but most is mud clasts, elongate in the upper part of layers, subround and angular, poorly sorted. Pyrite is abundant throughout, the thinly laminated part of Section 1 contains pyrite concretions and possibly pyrite-burrow fillings.

Smear Summary
Dominant lithology (2 slides):
93% Clay
4% Pyrite
3% Unspec. carb.

Minor lithology (4 slides)
18% Clay
54% Unspec. carb.
1% Nannos
< 1% Rads, altered
1% Phosphorite??
5% Pyrite
12% Siderite?
< 1% Heavies
6% Altered ash?
1% Chlorite

Mixed greenish black (5GY 2/1) and grayish black (N2) mottled CLAYSTONE.

Hole 386 Core 66 Cored Interval: 964.2-973.8 m



BASALT

Dark grayish black hypocrystalline, fine-grained, amygdaloidal phyric basalt with groundmass of randomey oriented plagioclase microlites with intergranular pyroxene. Common subhedral, prismatic plagioclase (0.097-0.87 mm; An 53 to 70). Rare, coroded, subangular pyroxene crystals (0.54-1.4 mm) also as phenocrysts. Plagioclase phenocrysts usually turbid from minor sensite and chlorite alteration. Pyroxene phenocrysts display variable optic anger but always less than 30° and positive, suggesting compositions between pigeonite and sub-calcic augite. Pyroxene phenocrysts all show optical strain and incomplete extinction. Rarely these combine to suggest an hour-glass pattern. Signs of resorption of pyroxene phenocrysts masked by chlorite alteration. Groundmass of network of plagioclase (An 57) laths with interstitial granular pyroxene and lesser relict glass. Locally, subophitic. Glass almost completely altered to chlorite. Occasional skeletal magnetite in groundmass. Amygdules of calcite and/or chlorite < 1-3%. Calcite stringers common.

CALCITE SEGREGATION

Hydrothermal vein--a segregation of calcite lightly to extensively speckled by enclosures of green chlorite and very altered basalt. Clast orientation suggest a flow lineation within the pipe. Center of vein nearly pure calcite. Chlorite dominant at upper and lower margins. Vein is variously bounded by dense, slickensided, lamallar coatings of chlorite and rare serpentine and by sharp, irregular contacts with the basalt. A few enclosures of selvege. Basalt immediately adjacent to the vein displays an ordered alteration halo of chloritization intensity. Basalt beneath vein stained yellow by native sulfur.

CC: BASALT

The freshest material recovered comes from here.

X-RAY MINERALOGICAL ANALYSES, SITE 386

Core	Section	Interval (cm)	Total Carbonate	Composition, %														Distribution in <2μm Fraction			
				Calcite	Dolomite	Siderite	Rhodochrosite	Quartz	Feldspar	Clay Minerals	Palygorskite	Clinoptilolite	Phillipsite	Analcime	Pyrite	Disordered Cristobalite	Other	Kaolinite	Mica	Chlorite	Montmorillonite
1	2/5	110-112	12	12				20	6[p]	62											
1	5	60- 62	43	43				8	5[p]	44								10	45	11	34
1	6	50- 52						15	4	81											
2	1	133-135	3	3				15	3	79								14	31	7	48
2	5	130-132						14	6	80						?					
3	1	146-148						14	4	82											
4	2	3- 5								50							Carbonate-apatite 50%				
4	2	40- 42						15	5	77		1	2								
4	5	30- 32	63	63				3		34											
5	1	118-120	30	30				3	4	62		1	?								
5	4	100-102	13	13				2	4	79			2				Muscovite ?				
6	2	71- 73								90			4	3			Pyroxene 3%				
6	3	92- 94	16	16						72			5	3			Pyroxene 4%				
7	1	51- 53	10	10					5	76			4	3			Pyroxene 2%	9	50	12	29
8	1	136-138	13	13						78			4	2			Pyroxene 3%				
8	2	96- 98								95			2	?			Pyroxene 3% ?				
9	3	39- 41	14	14					2	78			4	2							
11	1	103-105	13	13						76			4	2			(Pyroxene ?) 5%				
12	1	96- 98								95			3	2							
12	3	46- 49	15	15				2	2	81											
13	3	99-101	26	26				2	5	65			2								
14	2	10- 12	15	15				5		80									12		88
14	6	33- 35	17	17				3		80											
15	2	70- 72	17	17				4		79											
15	5	22- 24	20	20				5	2	73											
15	6	101-104	13	13				5		82											
16	3	69- 71	20	20				4		76											
16	5	60- 65	23	23				4	2	71											
17	2	39- 41	28	28				3		69											
17	4	136-138	13	13				9		78											
18	1	104-106	31	31				3		63						3					
19	2	77- 79	26	26				4		65						5					
20	2	74- 76	26	26				3		62						9			26		74
20	3	54- 56						8	4	85						3					
21	2	132-134	13	13				7	2	72						6					
22	1	100-102	12	12				9	5	74			?			tr					
22	4	43- 47	66	66				1		30						2					
23	2	25- 28	13	13				8	5	72						2	Gypsum ?				
23	4	4- 6	21	21				5	2	56						16			36		64
24	2	6- 10	33	33				3	2	52						10					
24	4	63- 65	25	25				8		56			?			11					
25	1	135-137						10	6	84						?					
25	5	6- 11	9	9				7	2	63						19					
26	2	44- 46	18	18				6	2	61						13					
26	5	4- 6	22	22				7	3	63						5					
27	2	30- 32						8	4	76						12					
27	4	33- 36						3	2	73		2				20					
28	2	79- 81						14	5	77		1	?			3					
29	2	90- 92	30	30				3		59						8					
30	2	89- 91						20		56						24					
30	3	108-110						3		75		3				19					
31	1	27- 30						7		80		6				6					
31	6	13- 16	15	15				14	2	60						9					
32	2	105-107						6		81		?				13					
32	5	0- 3	16	16				6	2	64						12					
33	2	55- 57	26	26				7	2	62						3					
34	2	50- 52	12	12				10	3	72		3									
34	6	81- 84	9	9				15	3	70		3									
35	4	10- 12						14	3	83		?									
35	5	0- 3	11	6	5			15	3	71											
36	3	1- 3						14	5	81											
36	3	41- 44						14	5	81											
38	3	6- 9						12	3	73		6				6					
38	4	120-123						14	2	60		18	2			4					
39	1	8- 10						13	2	70		9	1			5					
39	1	131-133						12	2	69		11	1			5					
39	5	118-120						11	3	60		16	?			10			17		83
40	2	4- 5						11	3	78		6				2					
41	1	146-147						28	2	70											
41	5	108-111						38	4	58											
42	3	44- 45						70		30											
42	4	140-143						50	2	48									27		73

X-RAY MINERALOGICAL ANALYSES, SITE 386

Core	Section	Interval (cm)	Total Carbonate	Composition, %													Distribution in <2μm Fraction			
				Calcite	Dolomite	Siderite	Rhodochrosite	Quartz	Feldspar	Clay Minerals	Palygorskite	Clinoptilolite	Phillipsite	Analcime	Pyrite	Disordered Cristobalite	Other	Kaolinite	Mica	Chlorite	Montmorillonite
43	1	87- 88						60		40											
43	2	139-140						5	2	33?						60?					
44	2	65- 67						80		20											
44	4	49- 50						50	3	47											
45	2	52- 54						60	2	38											
45	4	78- 80	65	65				12		21						2					
45	5	100-102						40	3	57											
46	2	105-107						40	3	57											
46	5	53- 57						40	3	57											
47	2	78- 82						45	2	53											
47	5	101-104	41	41				12		47											
48	3	58- 59	5	5				40	3	52											
49	3	148-150	63	63	?			9	2	26											
50	3	112-115						35	3	62											
50	5	134-136	60	47				8		32							Mangano-calcite 13%				
51	1	30- 33	43	43				18	2	40											
51	4	60- 65	46	46				12		42											
52	2	70- 71	76	76				7		17											
52	6	50- 52	47	47				25	2	26											
53	4	29- 33	11	11				50	2	37											
53	4	63- 65	40	38	2			25		35											
54	1	123-124	50	47	3			13		37											
54	4	70- 74	64	62				13		23							Mangano-calcite 2%				
54	6	42- 44	80		80			2		18											
55	2	68- 71	10	10				40	3	47											
55	4	118-119	30		30			10		60											
56	2	101-103	7	7				25	3	65											
56	2	113-116	40		28	12															
56	4	132-135	66	66				25		9											
56	5	121-125	43	25	18[a]																
57	4	13- 15	22	22				17		61											
57	5	5- 6	20	9	11																
58	1	148-150						50	3	37						10					
58	3	52- 53	66	9	20			6		28							High-Magnesian-Calcite 37%				
59	3	65- 67	33	24	9			9		58											
59	4	116-117						70		30											
59	5	118-120	6	6				35	2	57											
60	2	47- 49						50		50											
60	3	119-121	60				60	5		35											
60	5	93- 95						40		60											
61	2	28- 31						45		55											
61	4	25- 27						50		50								3	84	3	10
62	3	24- 25						50		50											
62	3	120-122						70		30											
62	4	46- 47	66					10		20							Baryto 4% Mangano - calcite				
62	6	146-150						60		40											
63	3	146-147						55		43							Apatite 3%				
63	4	77- 78	40				40	8		52											
64	5	113-115	46			24	22			24							Baryte 30%				
64	6	61- 63	66			60	6	5		29											
65	1	109-111	20	20[b]				2		38						40					
65	2	62- 64						60		40											

[a] Ca-Dolomite

[b] High-Magnesian-Calcite (8 Mol % $MgCO_3$)

[p] Plagioclase

SITE 386, ORGANIC CARBON DETERMINATIONS

Core	Section	Top of Interval (cm)	% C_{org}[a]	Core	Section	Top of Interval (cm)	% C_{org}[a]
1	2	70.0	0.2	33	2	67.0	0.1
1	5	80.0	0.1	34	2	88.0	0.1
1	6	80.0	0.1	34	6	23.0	0.1
2	5	91.0	0.2	35	4	46.0	0.1
3	1	118.0	0.2	35	5	119.0	0.1
4	1	120.0	0.1	36	3	58.0	0.1
4	2	80.0	0.1	36	5	56.0	0.1
4	4	80.0	0.1	38	3	6.0	-
5	2	130.0	-	38	5	7.0	-
5	4	90.0	0.1	39	1	11.0	-
6	1	101.0	-	39	6	7.0	-
6	3	70.0	-	39	6	30.0	0.1
8	1	100.0	0.1	40	3	130.0	-
9	2	33.0	0.1	41	1	119.0	-
11	2	73.0	0.1	41	5	78.0	0.1
11	3	113.0	0.1	42	4	54.0	0.1
12	2	103.0	0.1	43	2	14.0	0.1
13	3	69.0	-	43	2	135.0	11.5
14	2	25.0	0.3	44	2	82.0	2.0
14	6	135.0	0.3	44	3	126.0	0.2
15	2	121.0	0.2	45	1	63.0	1.9
15	5	89.0	0.1	45	1	100.0	0.1
16	3	34.0	0.3	45	2	102.0	1.9
16	3	46.0	0.1	45	6	93.0	0.1
17	3	61.0	0.7	46	2	42.0	0.1
17	5	51.0	0.5	46	5	53.0	0.2
18	1	27.0	0.7	47	3	88.0	0.1
19	2	88.0	0.2	47	4	58.0	0.6
20	3	122.0	0.5	48	2	145.0	0.5
21	2	123.0	0.3	49	3	145.0	0.8
21	5	9.0	0.1	49	4	66.0	0.2
22	1	110.0	1.0	50	3	31.0	1.6
22	4	105.0	0.4	50	5	134.0	2.8
23	2	141.0	0.5	51	1	105.0	1.7
23	4	15.0	0.6	51	5	57.0	2.4
24	2	118.0	0.4	52	2	83.0	1.8
24	4	69.0	0.1	52	6	100.0	1.5
25	1	51.0	0.2	53	2	67.0	0.7
25	5	2.0	0.8	53	4	59.0	0.6
26	2	131.0	0.3	54	3	24.0	1.3
26	5	87.0	0.7	54	3	86.0	0.4
27	2	60.0	0.6	55	1	92.0	1.0
27	4	30.0	0.4	55	6	49.0	2.2
28	2	79.0	0.1	56	3	47.0	1.7
29	2	60.0	0.2	56	4	121.0	1.7
30	2	20.0	0.7	57	1	53.0	1.3
31	1	30.0	0.1	57	6	94.0	1.2
31	6	80.0	0.3	58	1	85.0	0.3
32	2	119.0	0.1	58	2	65.0	1.9
32	5	52.0	0.1	59	3	98.0	1.4
32	5	149.0	0.2	59	5	49.0	2.2
				60	2	127.0	0.5

SITE 386, ORGANIC CARBON DETERMINATIONS

Core	Section	Top of Interval (cm)	% C_{org}[a]	Core	Section	Top of Interval (cm)	% C_{org}[a]
1	2	70.0	0.2	33	2	67.0	0.1
1	5	80.0	0.1	34	2	88.0	0.1
1	6	80.0	0.1	34	6	23.0	0.1
2	5	91.0	0.2	35	4	46.0	0.1
3	1	118.0	0.2	35	5	119.0	0.1
4	1	120.0	0.1	36	3	58.0	0.1
4	2	80.0	0.1	36	5	56.0	0.1
4	4	80.0	0.1	38	3	6.0	-
5	2	130.0	-	38	5	7.0	-
5	4	90.0	0.1	39	1	11.0	-
6	1	101.0	-	39	6	7.0	-
6	3	70.0	-	39	6	30.0	0.1
8	1	100.0	0.1	40	3	130.0	-
9	2	33.0	0.1	41	1	119.0	-
11	2	73.0	0.1	41	5	78.0	0.1
11	3	113.0	0.1	42	4	54.0	0.1
12	2	103.0	0.1	43	2	14.0	0.1
13	3	69.0	-	43	2	135.0	11.5
14	2	25.0	0.3	44	2	82.0	2.0
14	6	135.0	0.3	44	3	126.0	0.2
15	2	121.0	0.2	45	1	63.0	1.9
15	5	89.0	0.1	45	1	100.0	0.1
16	3	34.0	0.3	45	2	102.0	1.9
16	3	46.0	0.1	45	6	93.0	0.1
17	3	61.0	0.7	46	2	42.0	0.1
17	5	51.0	0.5	46	5	53.0	0.2
18	1	27.0	0.7	47	3	88.0	0.1
19	2	88.0	0.2	47	4	58.0	0.6
20	3	122.0	0.5	48	2	145.0	0.5
21	2	123.0	0.3	49	3	145.0	0.8
21	5	9.0	0.1	49	4	66.0	0.2
22	1	110.0	1.0	50	3	31.0	1.6
22	4	105.0	0.4	50	5	134.0	2.8
23	2	141.0	0.5	51	1	105.0	1.7
23	4	15.0	0.6	51	5	57.0	2.4
24	2	118.0	0.4	52	2	83.0	1.8
24	4	69.0	0.1	52	6	100.0	1.5
25	1	51.0	0.2	53	2	67.0	0.7
25	5	2.0	0.8	53	4	59.0	0.6
26	2	131.0	0.3	54	3	24.0	1.3
26	5	87.0	0.7	54	3	86.0	0.4
27	2	60.0	0.6	55	1	92.0	1.0
27	4	30.0	0.4	55	6	49.0	2.2
28	2	79.0	0.1	56	3	47.0	1.7
29	2	60.0	0.2	56	4	121.0	1.7
30	2	20.0	0.7	57	1	53.0	1.3
31	1	30.0	0.1	57	6	94.0	1.2
31	6	80.0	0.3	58	1	85.0	0.3
32	2	119.0	0.1	58	2	65.0	1.9
32	5	52.0	0.1	59	3	98.0	1.4
32	5	149.0	0.2	59	5	49.0	2.2
				60	2	127.0	0.5

SITE 386, ORGANIC CARBON DETERMINATIONS

Core	Section	Top of Interval (cm)	% C_{org}[a]
60	4	23.0	4.0
61	2	56.0	1.1
61	4	65.0	0.3
62	2	117.0	1.2
62	6	54.0	2.9
63	3	114.0	1.8
63	4	140.0	0.1
64	2	108.0	0.1
64	4	61.0	1.4
65	1	81.0	3.5
65	2	60.0	0.2

[a] A dash indicates 0% C_{org}

DEEP SEA DRILLING PROJECT

LEG 43 SITE 387

SITE SUMMARY SHEET

POSITION: Latitude: 32°19.2'N Longitude: 67°40'W

Water depth (sea level): 5117 corrected meters, echo sounding

Bottom felt at: 5128 meters, drill pipe Penetration: 794.5 meters

Number of holes: 1 Number of cores: 50

Total length of cored section: 467.9 meters

Total core recovered: 178.2 meters

OLDEST SEDIMENT CORED:

Depth subbottom: 791.6 meters Nature: Limestone

Age: U. Berriasian-L. Valanginian Measured velocity: 2.77-3.88 km/s

BASEMENT:

Depth subbottom: 791.6-794.5 meters Nature: Basalt

Velocity range: 4.59-498 km/s

PRINCIPAL RESULTS:

Site 387 penetrated 791.6 meters of sediment and 2.9 meters of basalt. Eight major lithologic units and their approximate subbottom depths are (1) Pleistocene clay and zeolitic clay (0->42 m); (2) upper Oligocene to middle Eocene radiolarian mud (98-175 m); (3) middle Eocene to lower Paleocene siliceous turbidites, silicified claystones, rad mudstone, and chert (175-444 m); (4) Maestrichtian marly chalk (444-469 m); (5) lower Maestrichtian-upper Campanian multicolored claystone (469-479 m); (6) middle Cenomanian/Turonian to Aptian green-gray and black claystone and rad mudstone (479-584 m); (7) lower Barremain-upper Hauterivian to upper Berriasian-lower Valanginian chalk and limestone (584-791.9 m); and (8) hypocrystalline phyric basalt (>791.9 m).

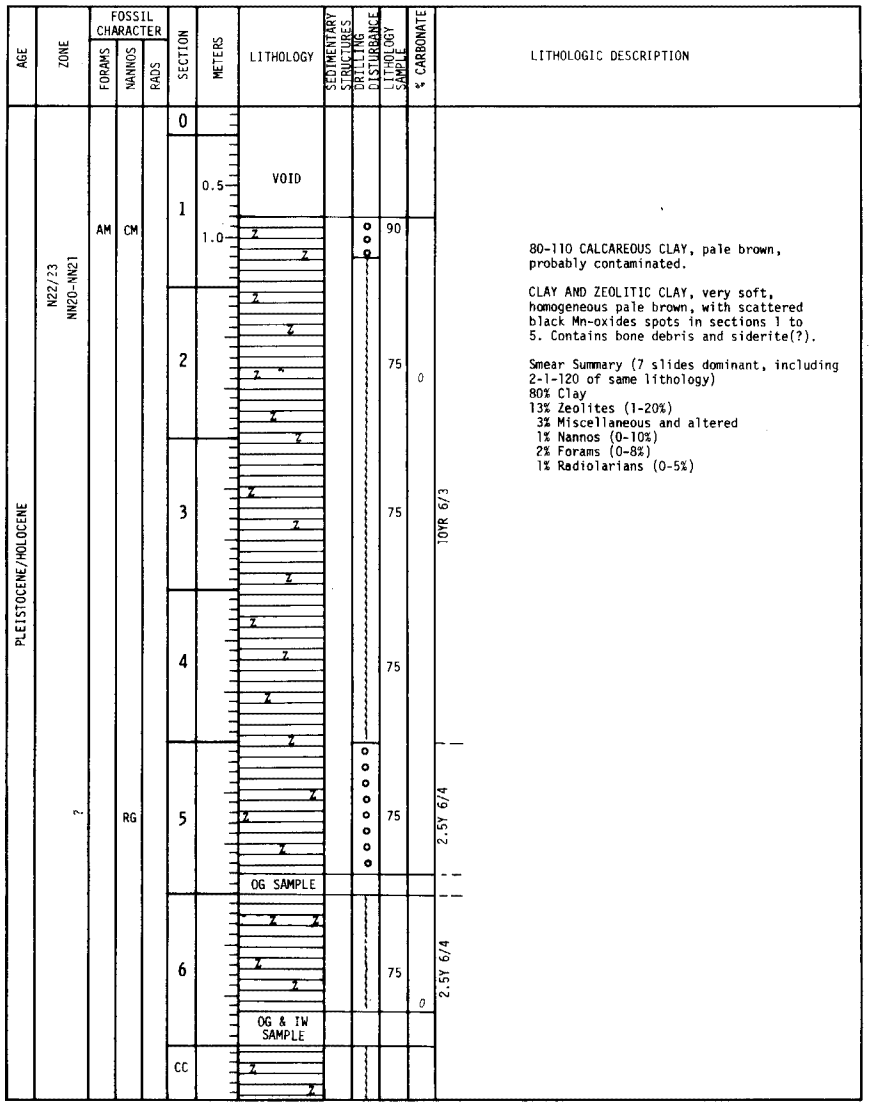
As at Site 386, a hiatus of about 5 m.y. between the lower upper and lower middle Eocene was preceded by an interval of extremely rapid

sedimentation (100 m/m.y. or greater) of upper lower to lower middle Eocene siliceous claystones. During Cenomanian to Maestrichtian time black to gray claystones, interbedded with only minor multicolored claystones near the top, were deposited at Site 387, while Site 386 higher on the Bermuda Rise received multicolored claystones. This may mean only the deepest part of the basin (i.e. Site 387) was stagnant during this period or that Site 387 was receiving more organic material from productive surface waters. Sedimentation rates of 15-20 m/m.y. for the limestone unit are typical for a ridge crest environment.

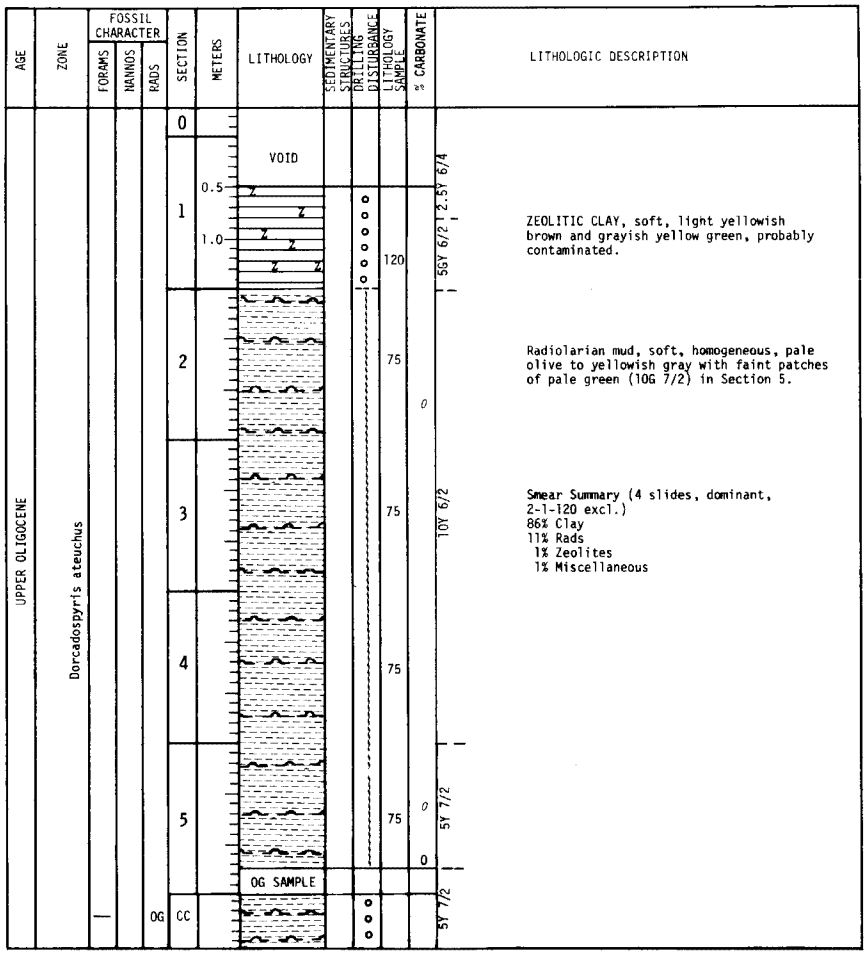
Acoustic reflectors A, A*, and BETA are correlated with tops of (a) middle Eocene cherts, (b) middle Maestrichtian red claystone, and (c) Neocomian limestone, respectively. The contact between the green/black claystones and adjacent units is gradational; scattered carbon-rich layers occur in the underlying limestones and in the overlying Maestrichtian to Paleocene sediments. The beginning of the most extensive black clay deposition may coincide with uplift of the M.A.R. crest at the end of "Keathley time" (Aptian-Barremian) and consequent reduced deep circulation.

Calcareous clay directly overlying the basalt dates anomaly M-15/M-16 of the Keathley Sequence (M-Series) as upper Berriasian/lower Valanginian. If the basalt was intrusive it was probably emplaced very close to the contemporary mid-Atlantic Ridge crest.

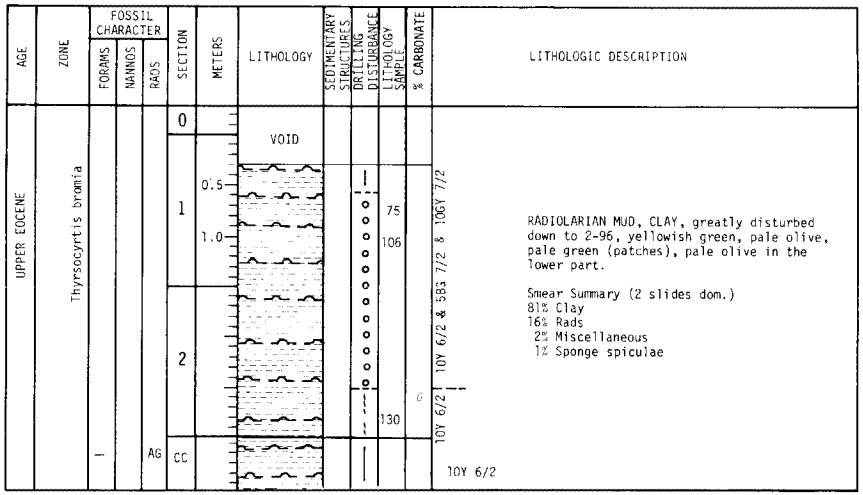
Hole 387 Core 1 Cored Interval: 31.8-41.3 m



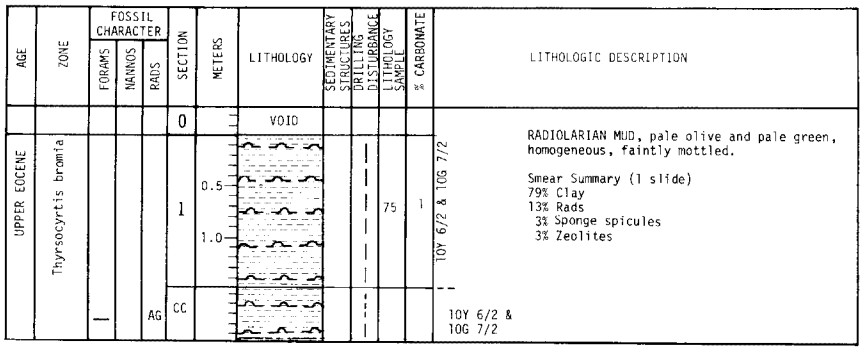
Hole 387 Core 2 Cored Interval: 98.5-108.0 m



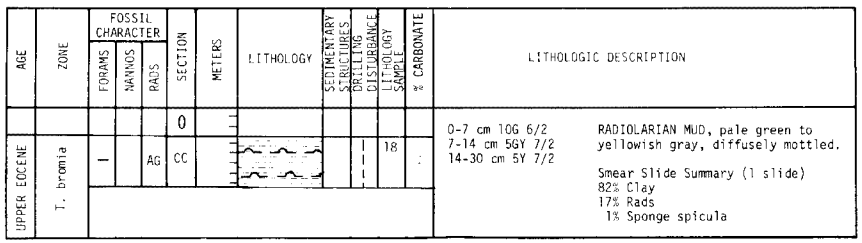
Hole 387 Core 3 Cored Interval: 136.6-146.1 m



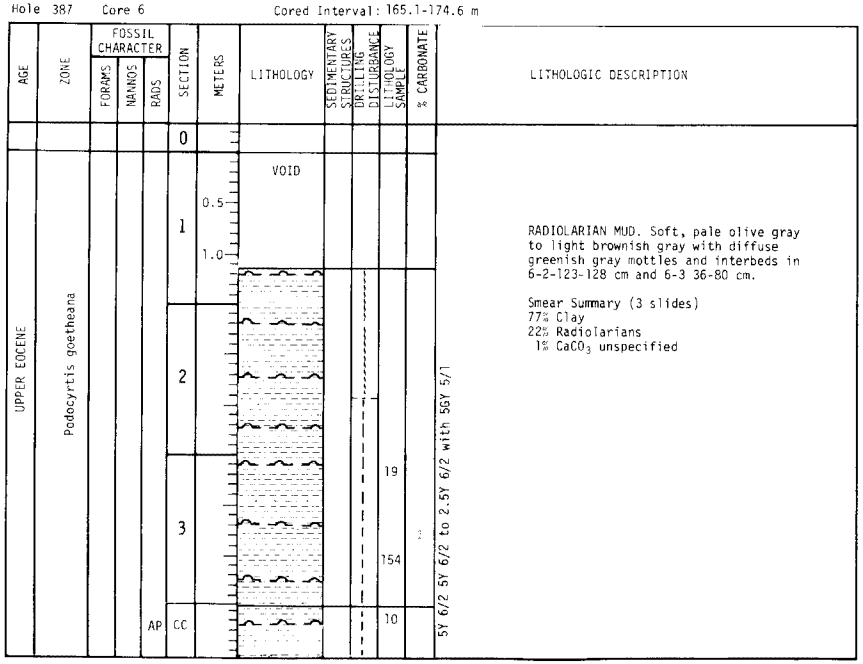
Hole 387 Core 4 Cored Interval: 146.1-155.6 m

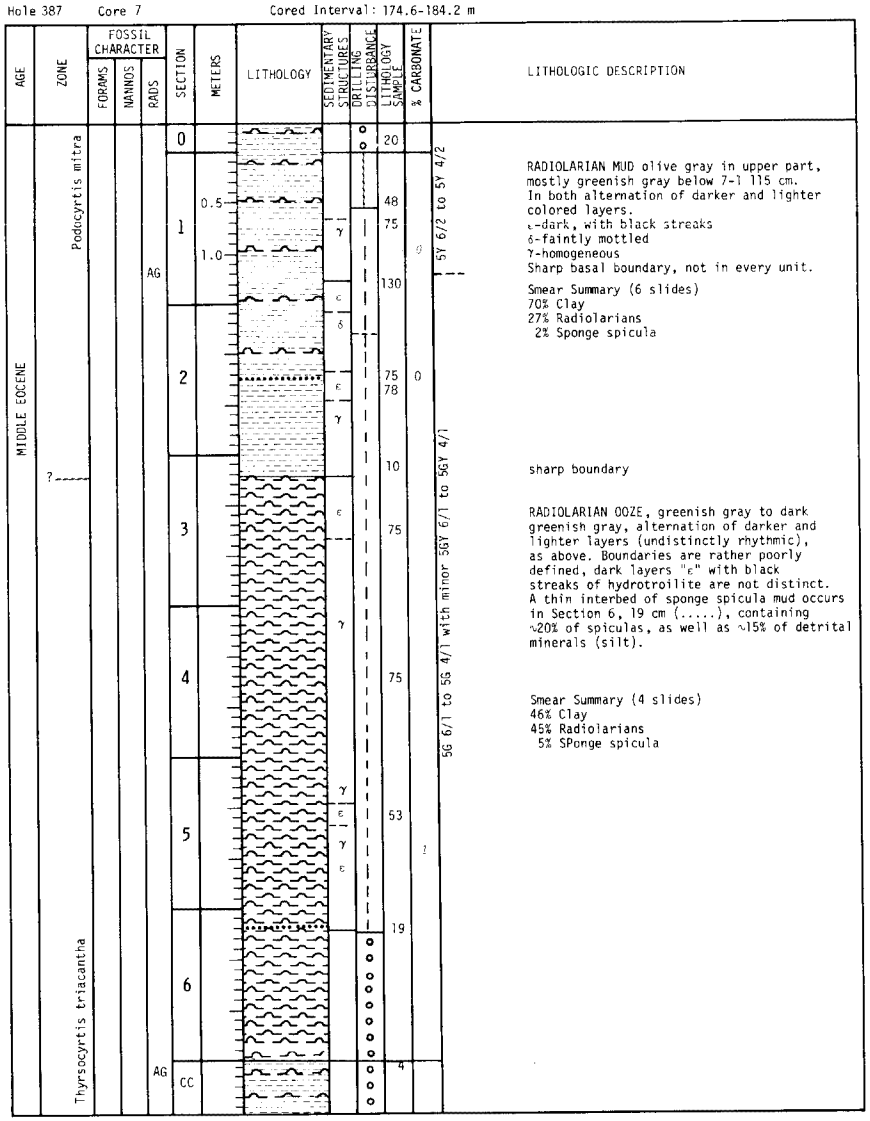


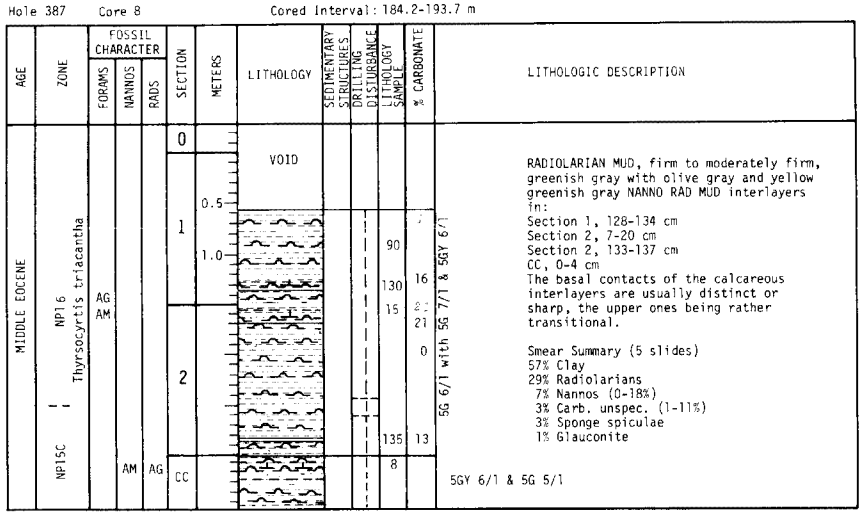
Hole 387 Core 5 Cored Interval: 155.6-165.1 m



Hole 387 Core 6 Cored Interval: 165.1-174.6 m







Hole 387 Core 7 Cored Interval: 174.6-184.2 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
MIDDLE EOCENE	Podocyrtis mitra			AG	0					20		
					1	0.5, 1.0		γ, ε, δ		48, 75, 130	0	RADIOLARIAN MUD olive gray in upper part, mostly greenish gray below 7-1 115 cm. In both alternation of darker and lighter colored layers. ε-dark, with black streaks δ-faintly mottled γ-homogeneous Sharp basal boundary, not in every unit. Smear Summary (6 slides) 70% Clay 27% Radiolarians 2% Sponge spicula
					2			ε, γ		75, 78, 10	0	sharp boundary
	?				3			ε, γ		75		RADIOLARIAN OOZE, greenish gray to dark greenish gray, alternation of darker and lighter layers (undistinctly rhythmic), as above. Boundaries are rather poorly defined, dark layers "ε" with black streaks of hydrotroilite are not distinct. A thin interbed of sponge spicula mud occurs in Section 6, 19 cm (.....), containing ~20% of spiculas, as well as ~15% of detrital minerals (silt).
					4					75		Smear Summary (4 slides) 46% Clay 45% Radiolarians 5% SPonge spicula
					5			γ, ε, γ, ε		53	?	
	Thyrsocyrtis triacantha				6					19		
				AG	CC					4		

5Y 6/2 to 5Y 4/2

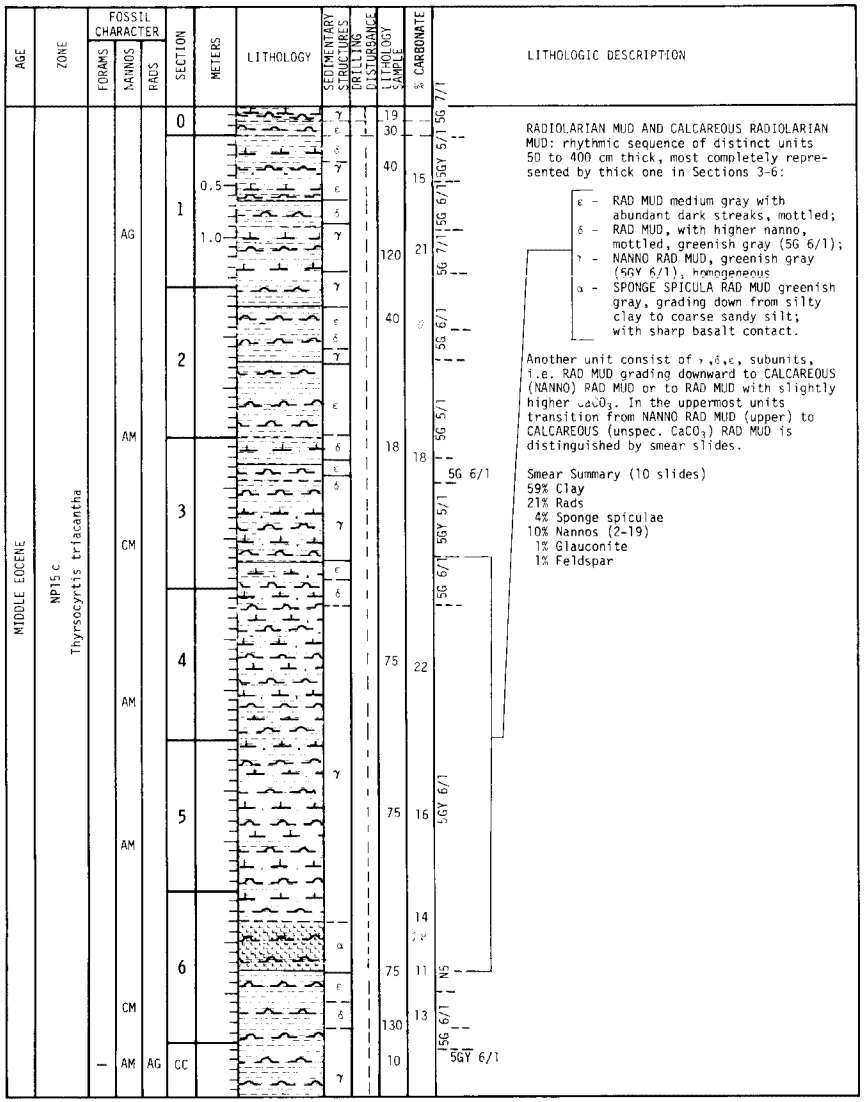
5G 6/1 to 5G 4/1 with minor 5GY 6/1 to 5GY 4/1

Hole 387 Core 8 Cored Interval: 184.2-193.7 m

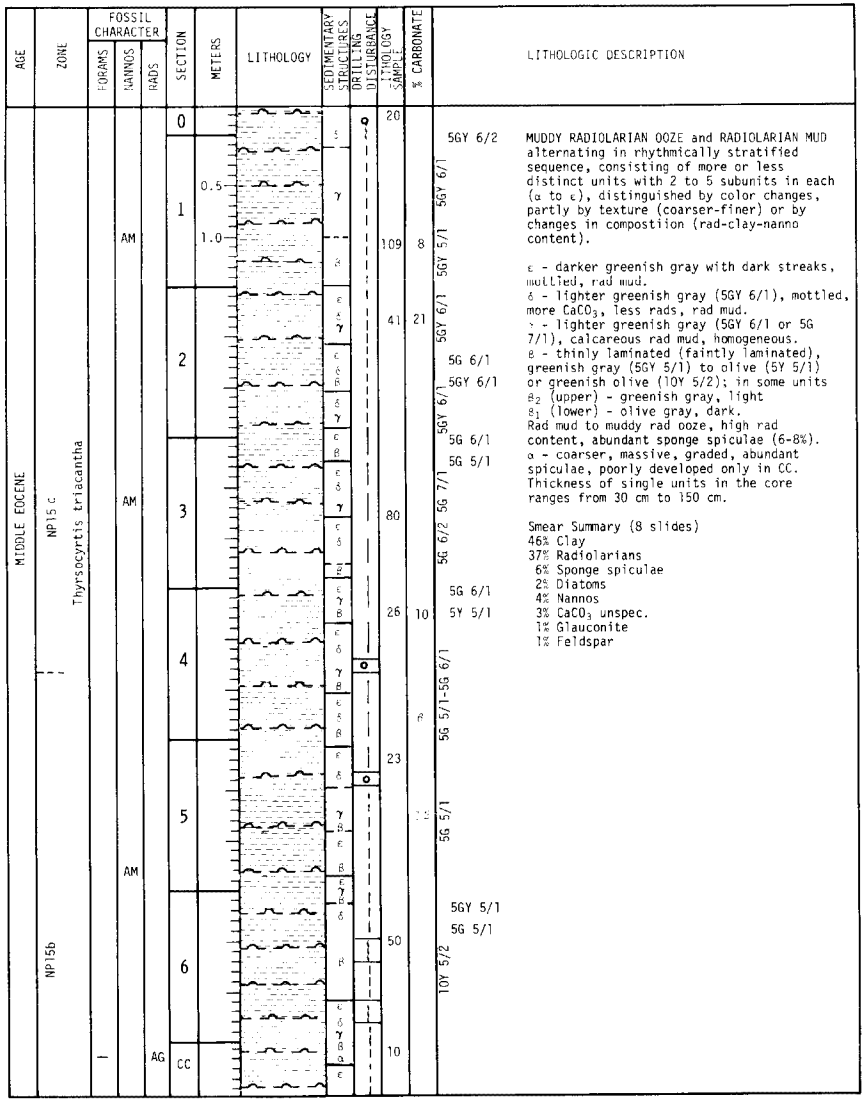
AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE	LITHOLOGIC DESCRIPTION
MIDDLE EOCENE	NP16 Thyrsocyrtis triacantha	AG AM			0		VOID					
					1	0.5, 1.0				90, 130, 15	16, 21, 0	RADIOLARIAN MUD, firm to moderately firm, greenish gray with olive gray and yellow greenish gray NANNO RAD MUD interlayers in: Section 1, 128-134 cm Section 2, 7-20 cm Section 2, 133-137 cm CC, 0-4 cm The basal contacts of the calcareous interlayers are usually distinct or sharp, the upper ones being rather transitional. Smear Summary (5 slides) 57% Clay 29% Radiolarians 7% Nannos (0-18%) 3% Carb. unspec. (1-11%) 3% Sponge spiculae 1% Glauconite
					2					135	13	
	NP15C		AM	AG	CC					8		5GY 6/1 & 5G 5/1

5G 6/1 with 5G 7/1 & 5GY 6/1

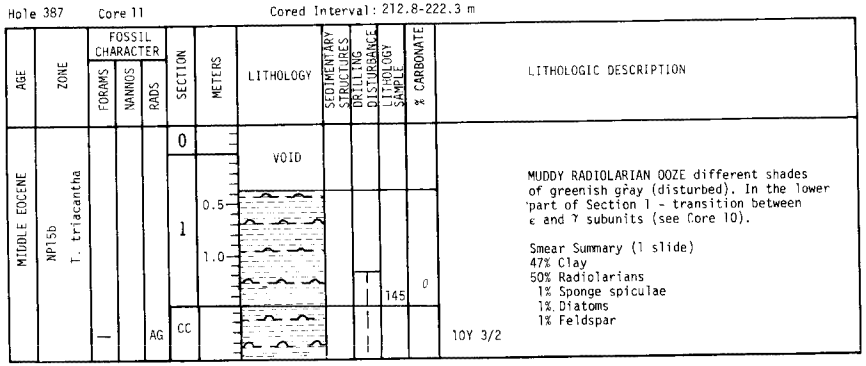
Hole 387 Core 9 Cored Interval: 193.7-203.2 m



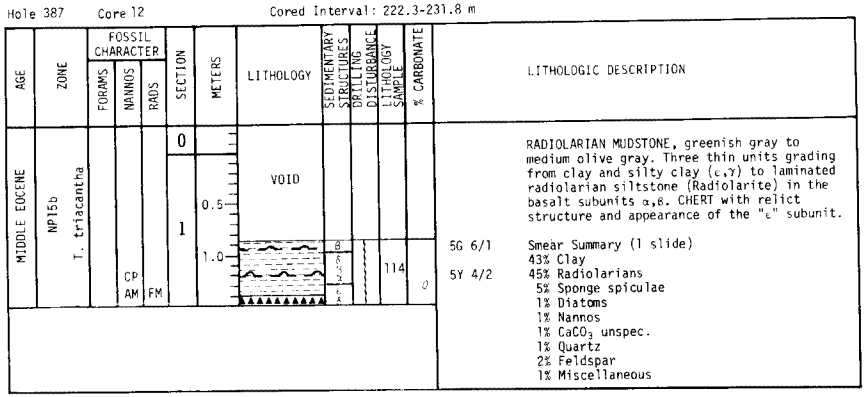
Hole 387 Core 10 Cored Interval: 203.2-212.8 m



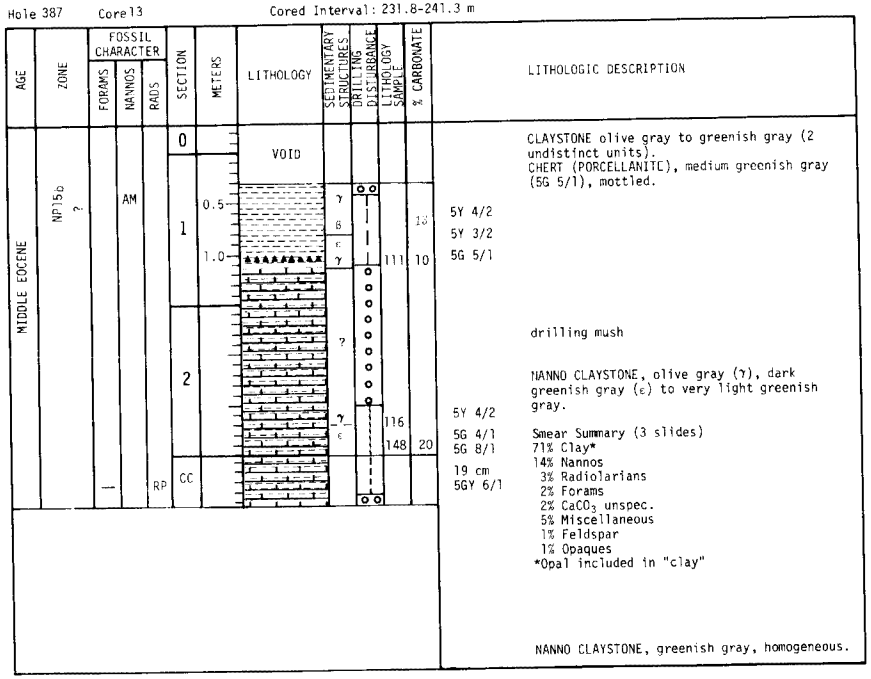
Hole 387 Core 11 Cored Interval: 212.8-222.3 m



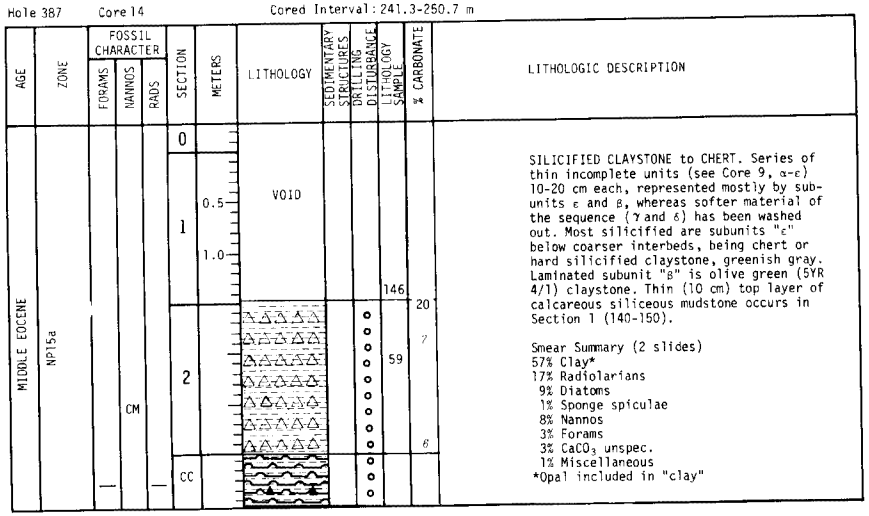
Hole 387 Core 12 Cored Interval: 222.3-231.8 m



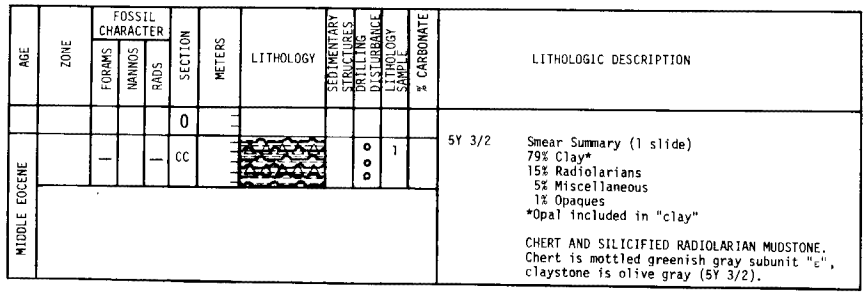
Hole 387 Core 13 Cored Interval: 231.8-241.3 m



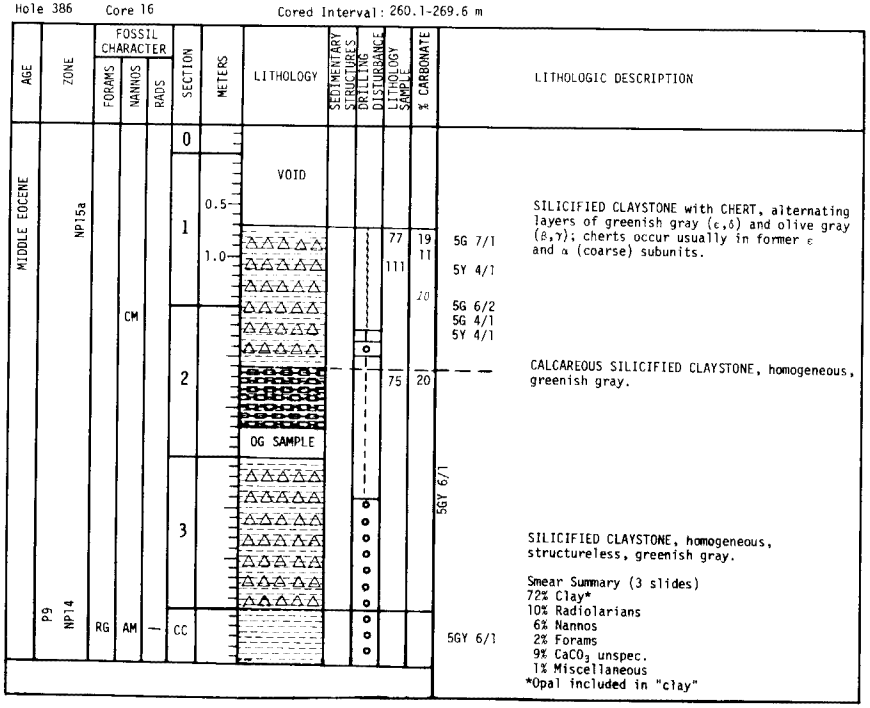
Hole 387 Core 14 Cored Interval: 241.3-250.7 m



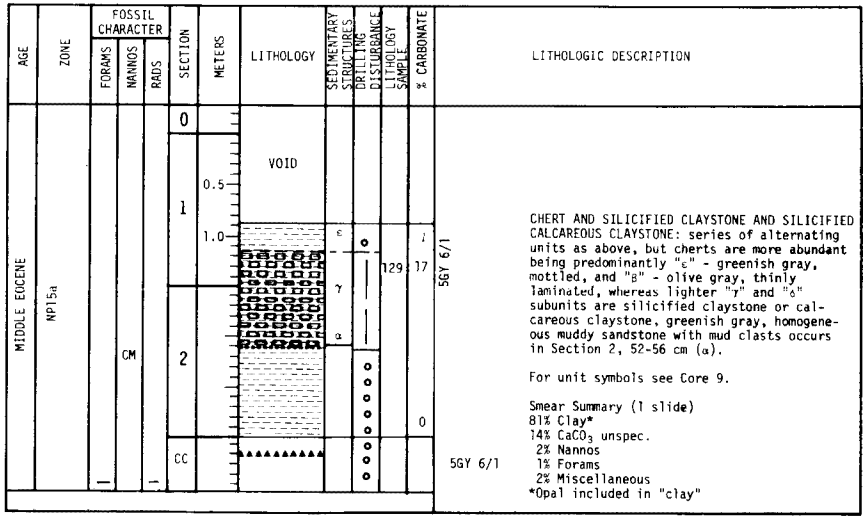
Hole 387 Core 15 Cored Interval: 250.7-260.1 m



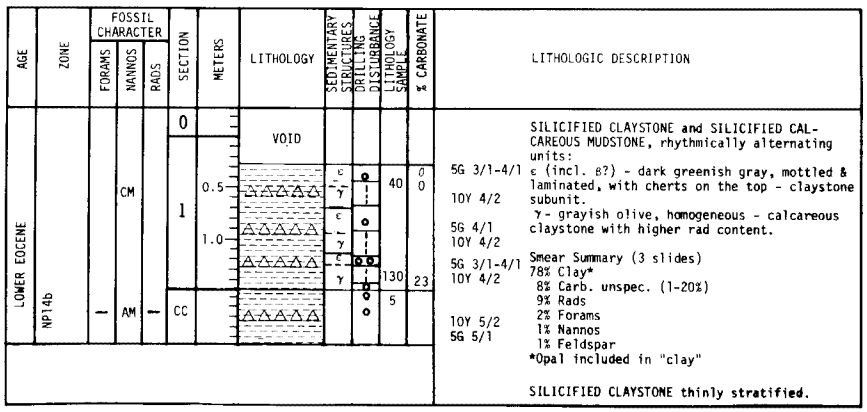
Hole 386 Core 16 Cored Interval: 260.1-269.6 m



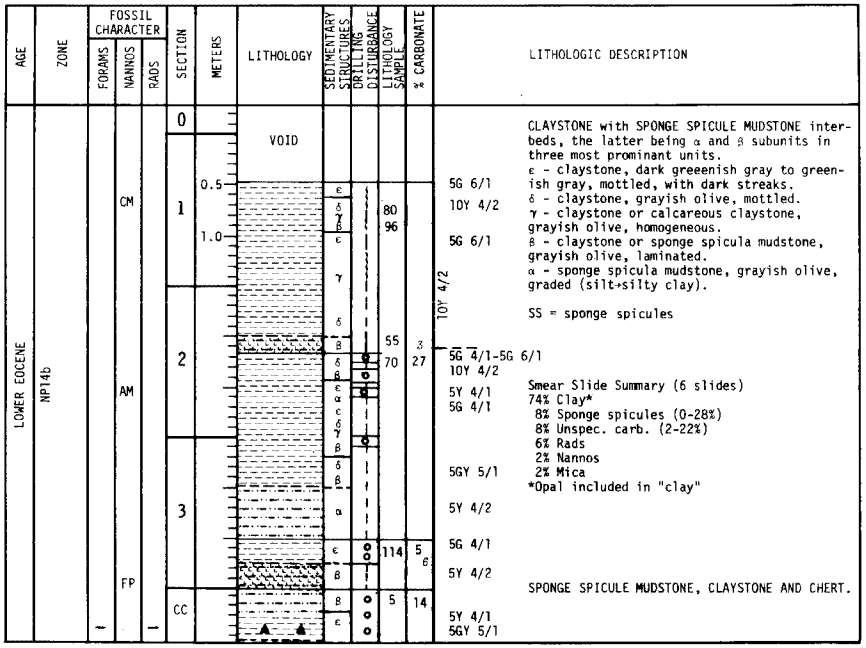
Hole 387 Core 17 Cored Interval: 269.6-279.1 m



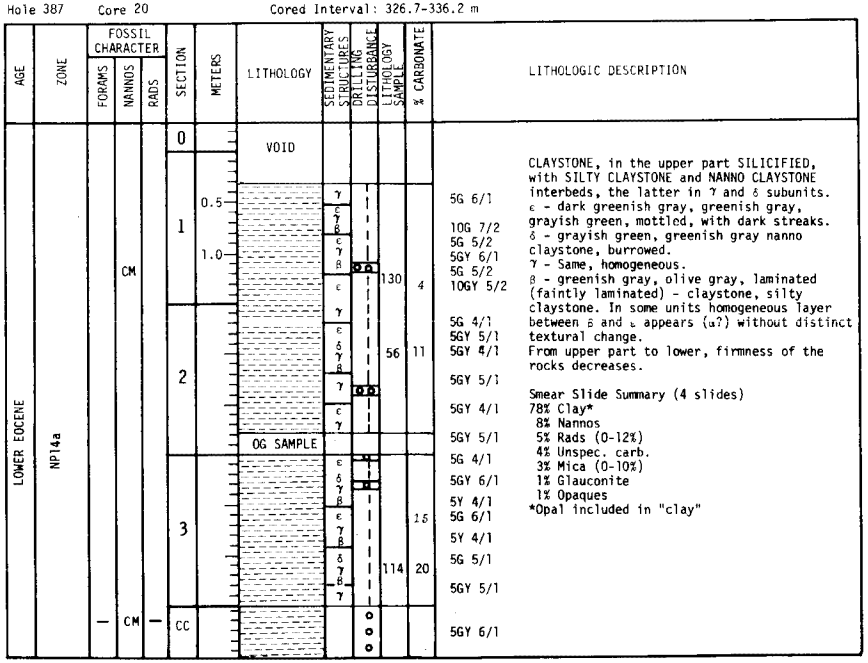
Hole 387 Core 18 Cored Interval: 288.7-298.2 m



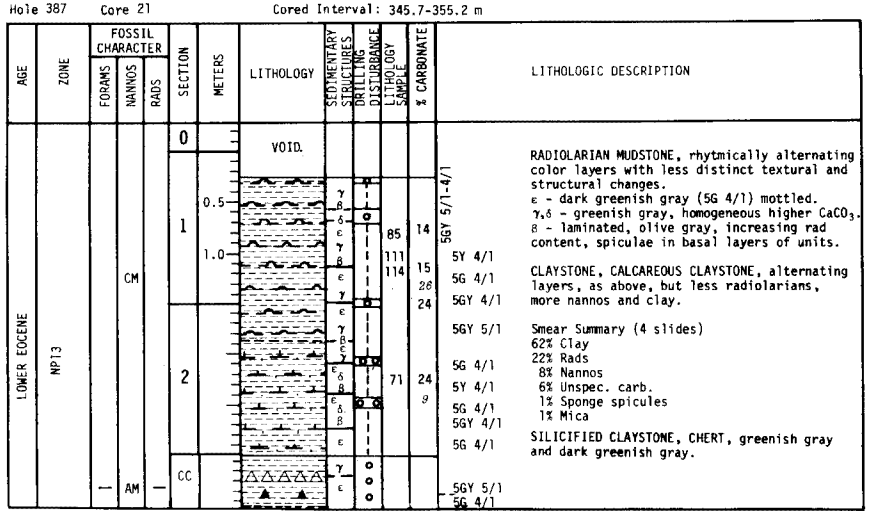
Hole 387 Core 19 Cored Interval: 307.7-317.2 m

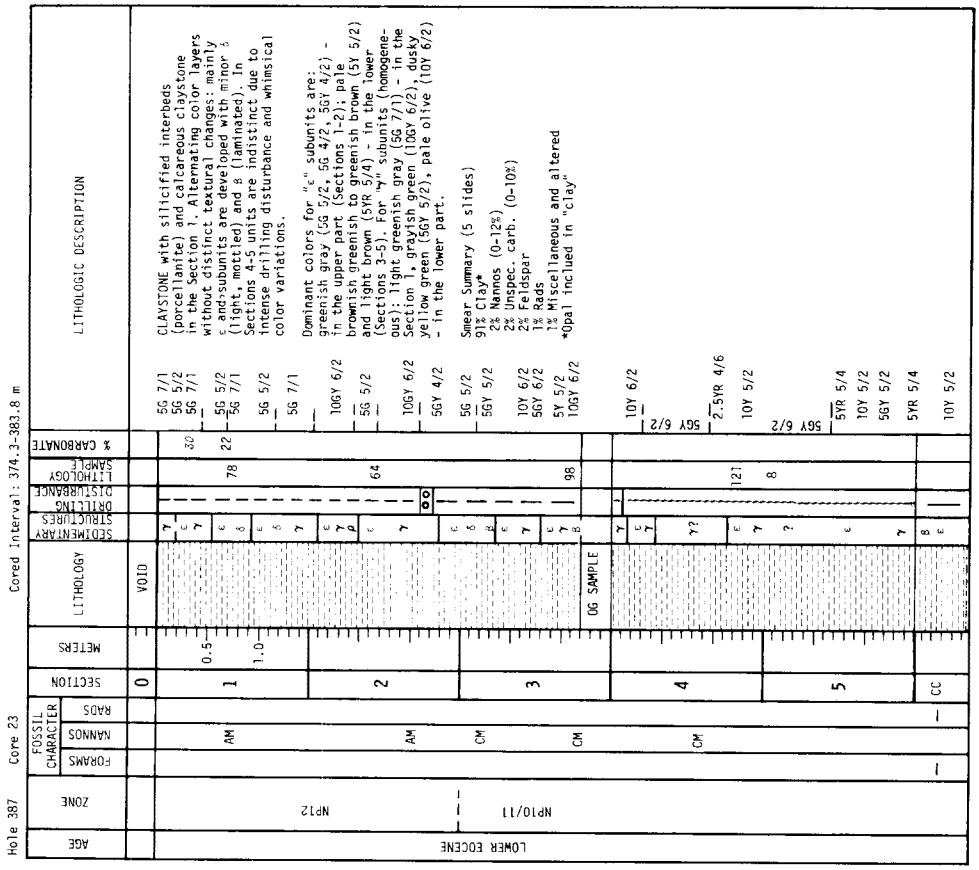


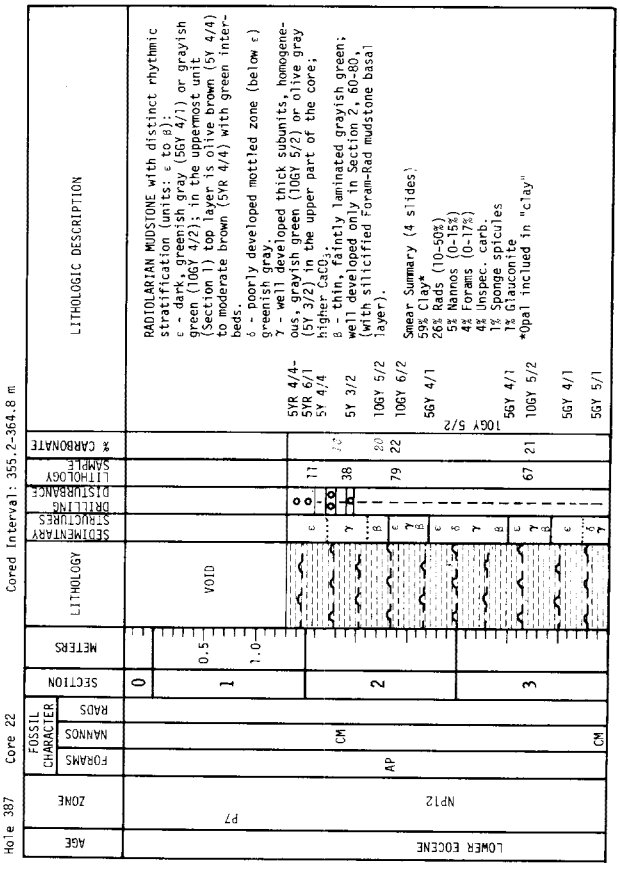
Hole 387 Core 20 Cored Interval: 326.7-336.2 m



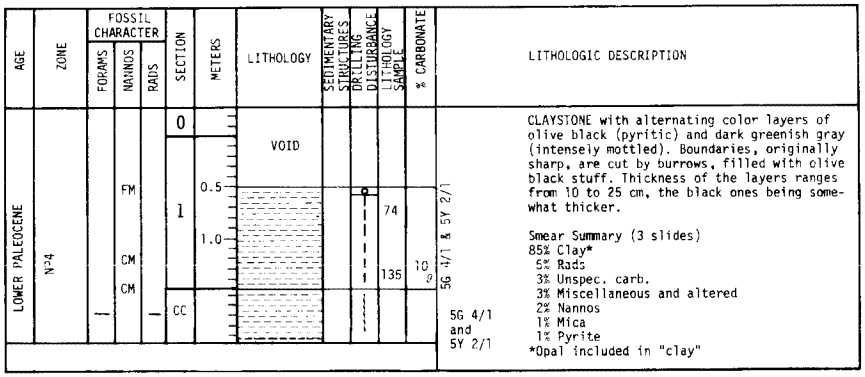
Hole 387 Core 21 Cored Interval: 345.7-355.2 m



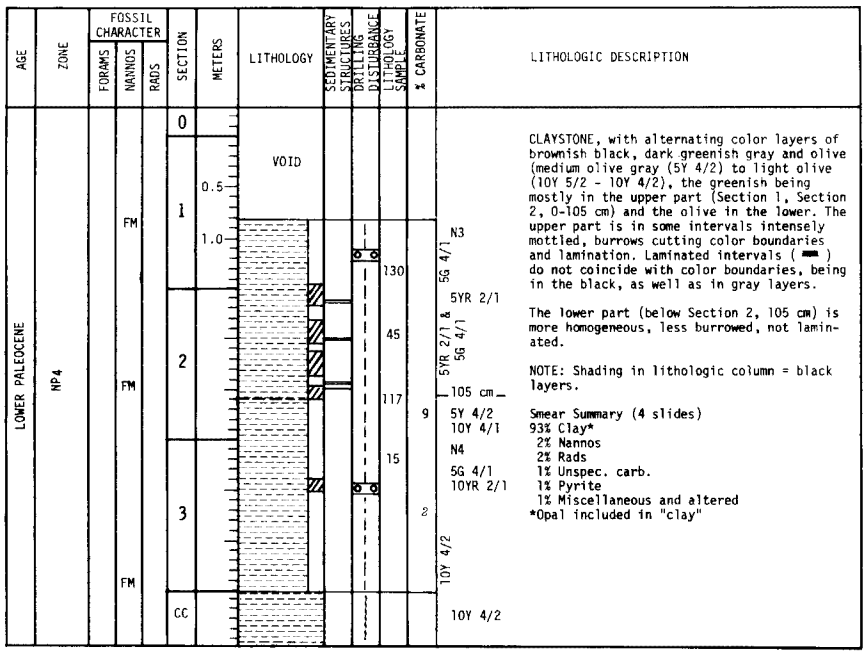

Hole 387 Core 23 Cored Interval: 374.3-383.8 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER EOCENE
NP12
NP10/11
AM
CM
VOID
OG SAMPLE
CLAYSTONE with silicified interbeds (porcellanite) and calcareous claystone in the Section 1. Alternating color layers without distinct textural changes: mainly ε and δ subunits are developed with minor β (light, mottled) and ε (laminated). In Sections 4-5 units are indistinct due to intense drilling disturbance and whimsical color variations.
Dominant colors for "ε" subunits are: greenish gray (5G 5/2, 5G 4/2) - in the upper part (Sections 1-2); pale brownish green to greenish brown (5Y 5/2) and light brown (5YR 5/4) - in the lower (Sections 3-5). For "γ" subunits (homogeneous): light greenish gray (5G 7/1) - in the Section 1, grayish green (10GY 6/2), dusky yellow green (5GY 5/2), pale olive (10Y 6/2) - in the lower part.
Smear Summary (5 slides)
91% Clay*
2% Nannos (0-12%)
2% Unspec. carb. (0-10%)
2% Feldspar
1% Rads
1% Miscellaneous and altered
*Opal inclued in "clay"


Hole 387 Core 22 Cored Interval: 355.2-364.8 m
AGE
ZONE
FOSSIL CHARACTER
FORAMS
NANNOS
RADS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
LOWER EOCENE
P7
NP12
AP
CM
VOID
RADIOLARIAN MUDSTONE with distinct rhythmic stratification (units: ε to β):
ε - dark, greenish gray (5GY 4/1) or grayish green (10GY 4/2); in the uppermost unit (Section 1) top layer is olive brown (5Y 4/4) to moderate brown (5YR 4/4) with green interbeds.
δ - poorly developed mottled zone (below ε) greenish gray
γ - well developed thick subunits, homogeneous, grayish green (10GY 5/2) or olive gray (5Y 3/2) in the upper part of the core; higher CaCO3
β - thin, faintly laminated grayish green; well developed only in Section 2, 60-80, (with silicified Foram-Rad mudstone basal layer).
Smear Summary (4 slides)
59% Clay*
26% Rads (10-50%)
5% Nannos (0-15%)
4% Forams (0-17%)
4% Unspec. carb.
1% Sponge spicules
1% Glauconite
*Opal inclued in "clay"

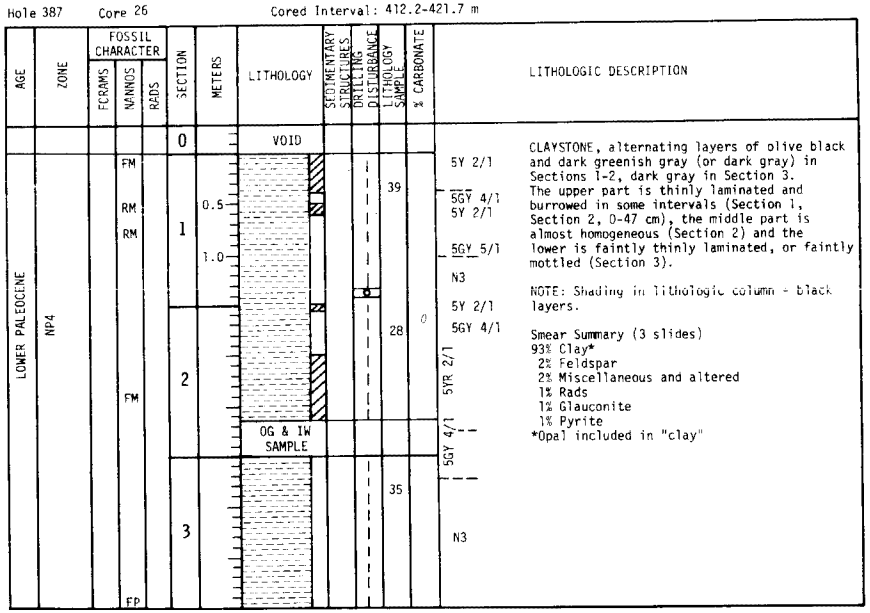
Hole 387 Core 24 Cored Interval: 393.3-402.8 m

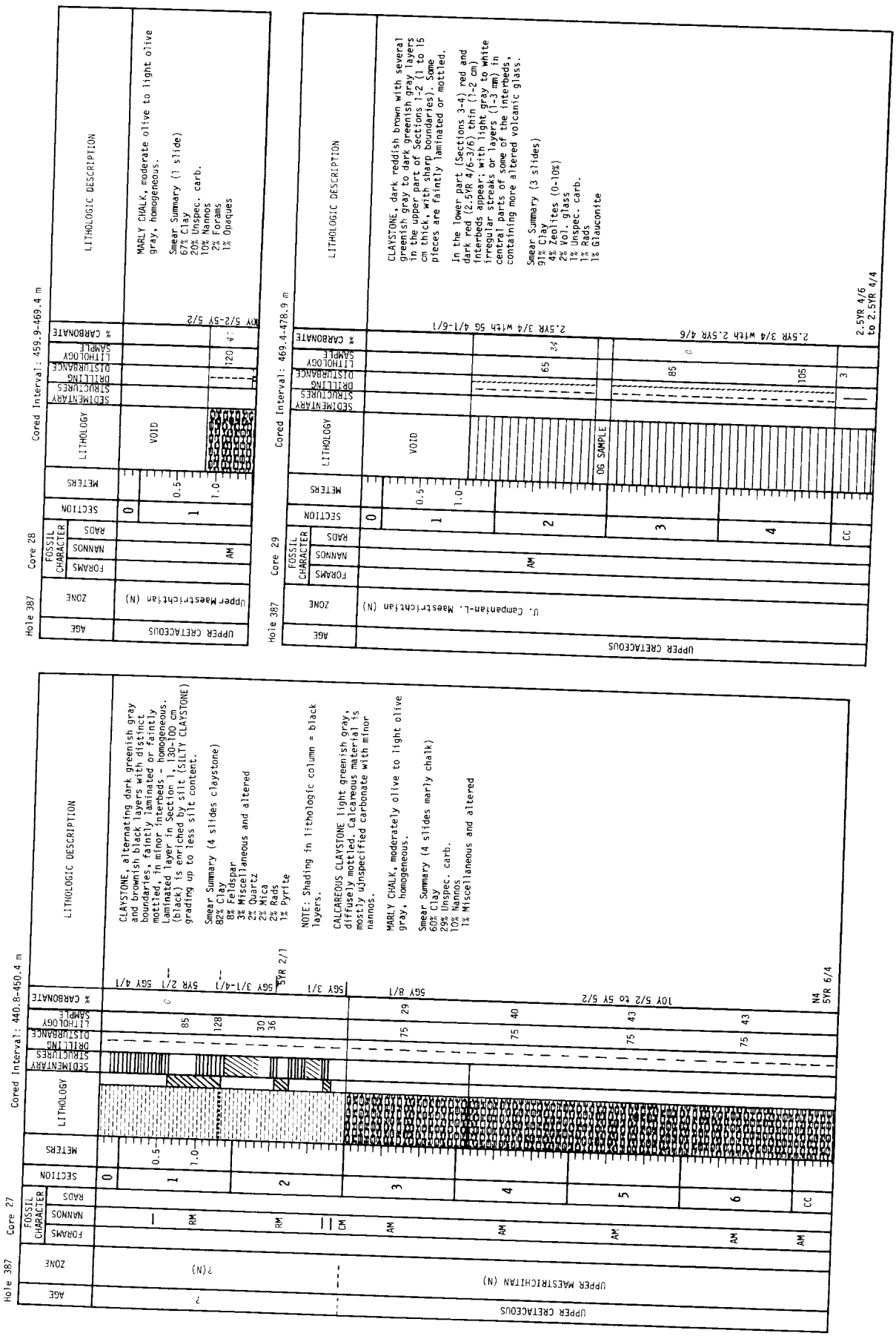


Hole 387 Core 25 Cored Interval: 402.8-412.2 m

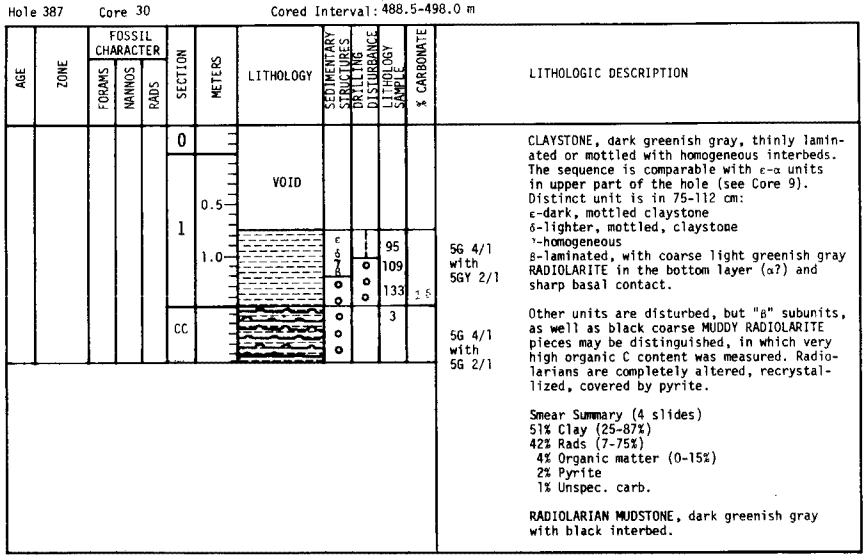


Hole 387 Core 26 Cored Interval: 412.2-421.7 m




Hole 387
Core 27
Cored Interval: 440.8-450.4 m
AGE
ZONE
FOSSIL CHARACTER
RADS
NANNOS
FORAMS
SECTION
METERS
LITHOLOGY
SEDIMENTARY STRUCTURES
DRILLING DISTURBANCE
LITHOLOGY SAMPLE
% CARBONATE
LITHOLOGIC DESCRIPTION
UPPER CRETACEOUS
?
?(N)
UPPER MAESTRICHTIAN (N)
RM
CM
AM
CC
CLAYSTONE, alternating dark greenish gray and brownish black layers with distinct boundaries, faintly laminated or faintly mottled, in minor interbeds. - homogeneous. Laminated layer in Section 1, 130-100 cm (black) is enriched by silt (SILTY CLAYSTONE) grading up to less silt content.
Smear Summary (4 slides claystone)
82% Clay
8% Feldspar
3% Miscellaneous and altered
2% Quartz
2% Mica
2% Rads
1% Pyrite
NOTE: Shading in lithologic column = black layers.
CALCAREOUS CLAYSTONE light greenish gray, diffusely mottled. Calcareous material is mostly unspecified carbonate with minor nannos.
MARLY CHALK, moderately olive to light olive gray, homogeneous.
Smear Summary (4 slides marly chalk)
60% Clay
29% Unspec. carb.
10% Nannos
1% Miscellaneous and altered
5GY 2/1
5GY 3/1
5GY 3/1-4/1
5YR 2/1
5GY 4/1
5GY 8/1
10Y 5/2 to 5Y 5/2
N4
5YR 6/4
Hole 387
Core 29
Cored Interval: 469.4-478.9 m
U. Campanian-L. Maestrichtian (N)
CLAYSTONE, dark reddish brown with several greenish gray to dark greenish gray layers in the upper part of Sections 1-2 (1 to 15 cm thick, with sharp boundaries). Some pieces are faintly laminated or mottled.
In the lower part (Sections 3-4) red and dark red (2.5YR 4/6-3/6) thin (1-2 cm) interbeds appear, with light gray to white irregular streaks or layers (1-3 mm) in central parts of some of the interbeds, containing more altered volcanic glass.
Smear Summary (3 slides)
91% Clay
4% Zeolites (0-10%)
2% Vol. glass
1% Unspec. carb.
1% Rads
1% Glauconite
2.5YR 3/4 with 5G 4/1-6/1
2.5YR 3/4 with 2.5YR 4/6
2.5YR 4/6 to 2.5YR 4/4
OG SAMPLE
Hole 387
Core 28
Cored Interval: 459.9-469.4 m
Upper Maestrichtian (N)
MARLY CHALK, moderate olive to light olive gray, homogeneous.
Smear Summary (1 slide)
67% Clay
20% Unspec. carb.
10% Nannos
2% Forams
1% Opaques
10Y 5/2-5Y 5/2
VOID

Hole 387 Core 30 Cored Interval: 488.5-498.0 m



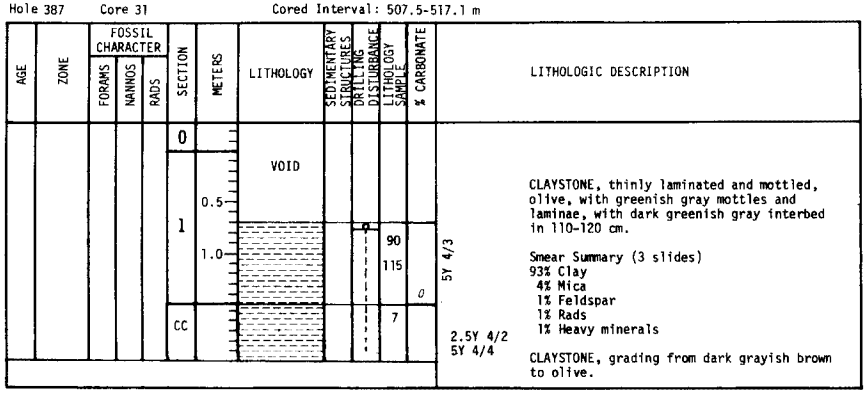
CLAYSTONE, dark greenish gray, thinly laminated or mottled with homogeneous interbeds. The sequence is comparable with ε-α units in upper part of the hole (see Core 9). Distinct unit is in 75-112 cm:
ε-dark, mottled claystone
δ-lighter, mottled, claystone
γ-homogeneous
β-laminated, with coarse light greenish gray RADIOLARITE in the bottom layer (α?) and sharp basal contact.

Other units are disturbed, but "β" subunits, as well as black coarse MUDDY RADIOLARITE pieces may be distinguished, in which very high organic C content was measured. Radiolarians are completely altered, recrystallized, covered by pyrite.

Smear Summary (4 slides)
51% Clay (25-87%)
42% Rads (7-75%)
4% Organic matter (0-15%)
2% Pyrite
1% Unspec. carb.

RADIOLARIAN MUDSTONE, dark greenish gray with black interbed.

Hole 387 Core 31 Cored Interval: 507.5-517.1 m

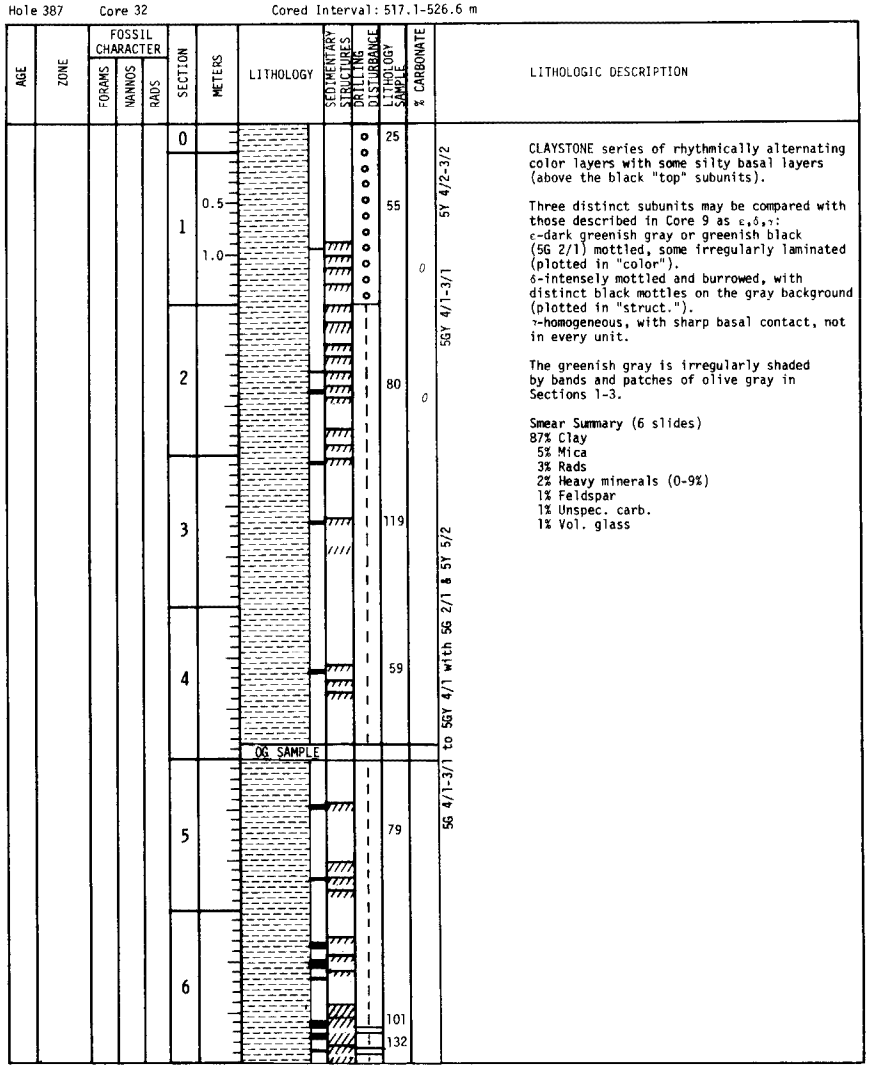


CLAYSTONE, thinly laminated and mottled, olive, with greenish gray mottles and laminae, with dark greenish gray interbed in 110-120 cm.

Smear Summary (3 slides)
93% Clay
4% Mica
1% Feldspar
1% Rads
1% Heavy minerals

CLAYSTONE, grading from dark grayish brown to olive.

Hole 387 Core 32 Cored Interval: 517.1-526.6 m



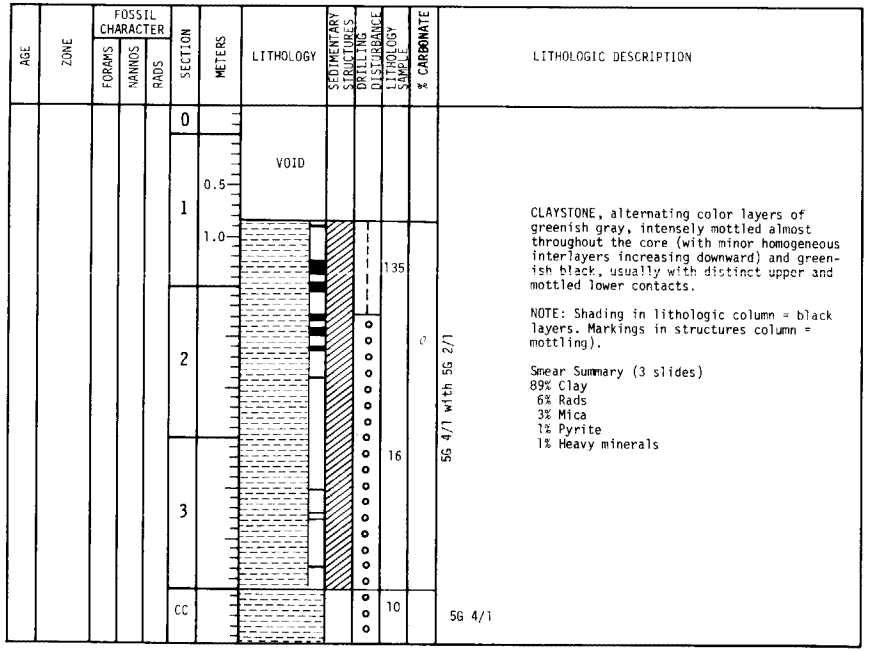
CLAYSTONE series of rhythmically alternating color layers with some silty basal layers (above the black "top" subunits).

Three distinct subunits may be compared with those described in Core 9 as ε,δ,γ:
ε-dark greenish gray or greenish black (5G 2/1) mottled, some irregularly laminated (plotted in "color").
δ-intensely mottled and burrowed, with distinct black mottles on the gray background (plotted in "struct.").
γ-homogeneous, with sharp basal contact, not in every unit.

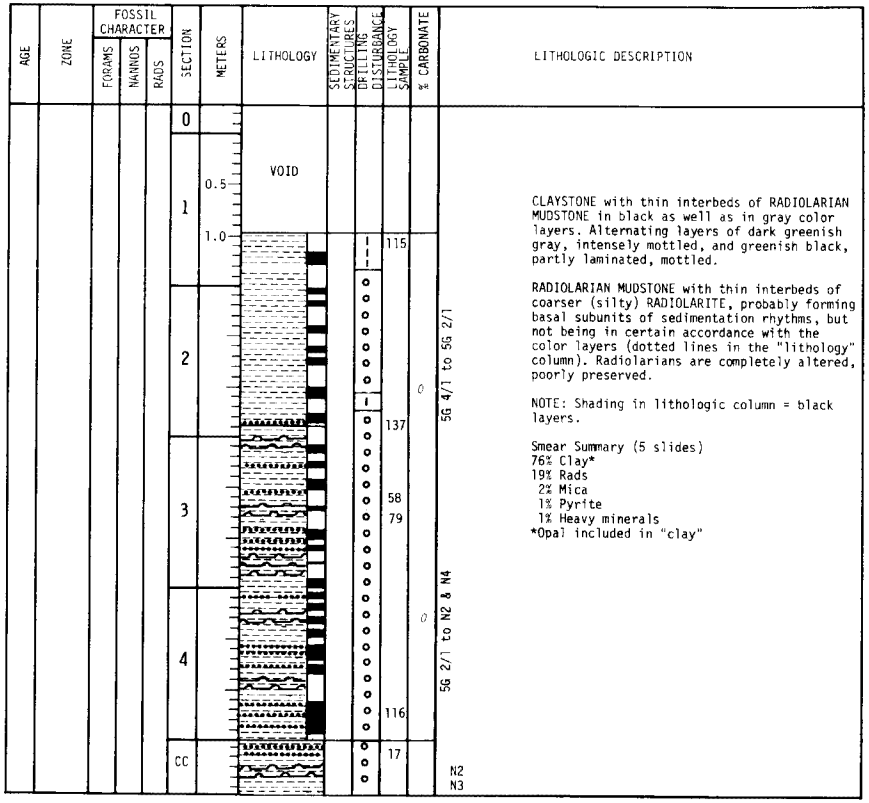
The greenish gray is irregularly shaded by bands and patches of olive gray in Sections 1-3.

Smear Summary (6 slides)
87% Clay
5% Mica
3% Rads
2% Heavy minerals (0-9%)
1% Feldspar
1% Unspec. carb.
1% Vol. glass

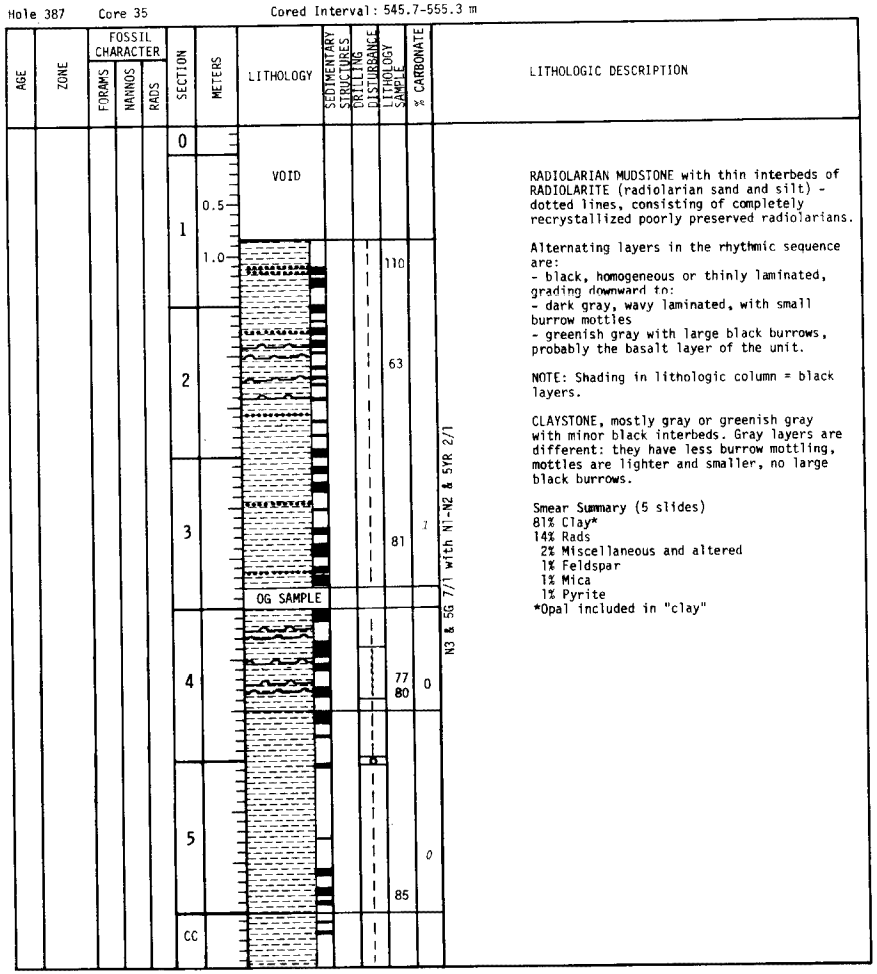
Hole 387 Core 33 Cored Interval: 526.6-536.2 m



Hole 387 Core 34 Cored Interval: 536.2-545.7 m



Hole 387 Core 35 Cored Interval: 545.7-555.3 m



RADIOLARIAN MUDSTONE with thin interbeds of RADIOLARITE (radiolarian sand and silt) - dotted lines, consisting of completely recrystallized poorly preserved radiolarians.

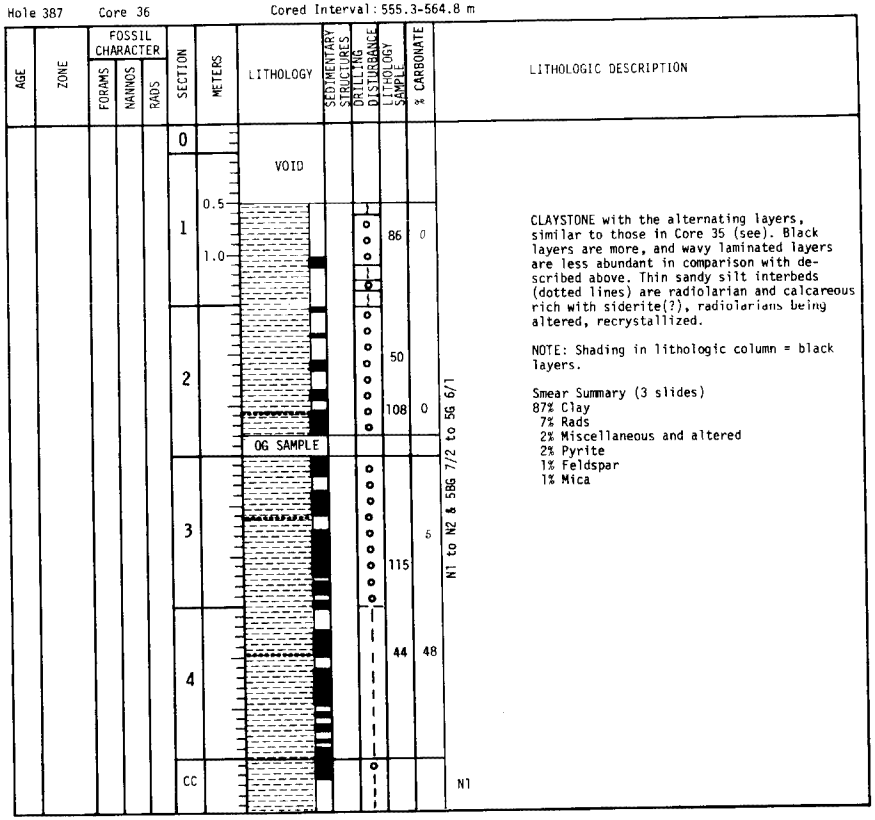
Alternating layers in the rhythmic sequence are:
- black, homogeneous or thinly laminated, grading downward to:
- dark gray, wavy laminated, with small burrow mottles
- greenish gray with large black burrows, probably the basalt layer of the unit.

NOTE: Shading in lithologic column = black layers.

CLAYSTONE, mostly gray or greenish gray with minor black interbeds. Gray layers are different: they have less burrow mottling, mottles are lighter and smaller, no large black burrows.

Smear Summary (5 slides)
81% Clay*
14% Rads
2% Miscellaneous and altered
1% Feldspar
1% Mica
1% Pyrite
*Opal included in "clay"

Hole 387 Core 36 Cored Interval: 555.3-564.8 m

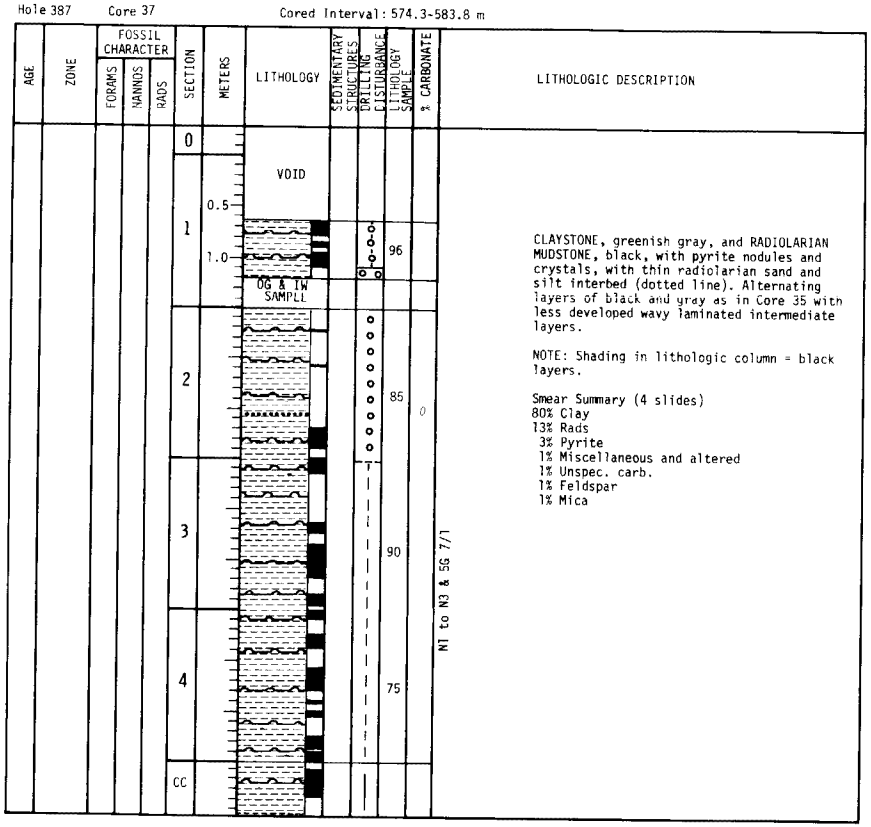


CLAYSTONE with the alternating layers, similar to those in Core 35 (see). Black layers are more, and wavy laminated layers are less abundant in comparison with described above. Thin sandy silt interbeds (dotted lines) are radiolarian and calcareous rich with siderite(?), radiolarians being altered, recrystallized.

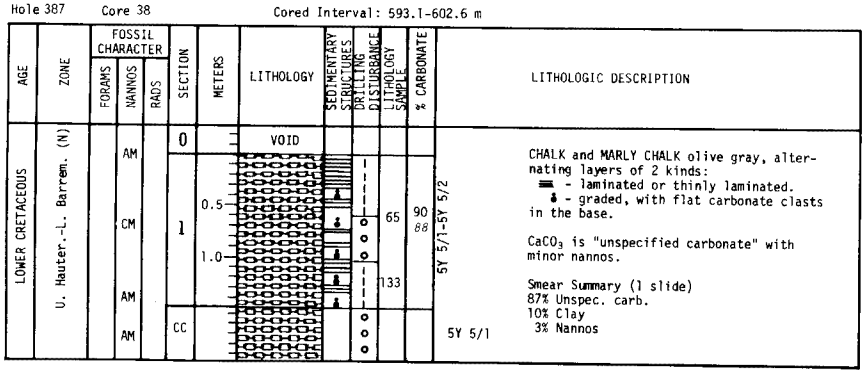
NOTE: Shading in lithologic column = black layers.

Smear Summary (3 slides)
87% Clay
7% Rads
2% Miscellaneous and altered
2% Pyrite
1% Feldspar
1% Mica

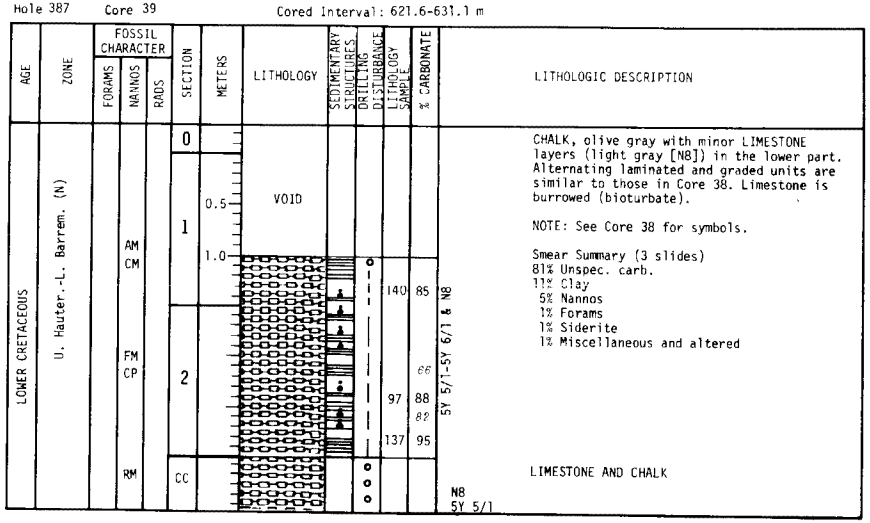
Hole 387 Core 37 Cored Interval: 574.3-583.8 m



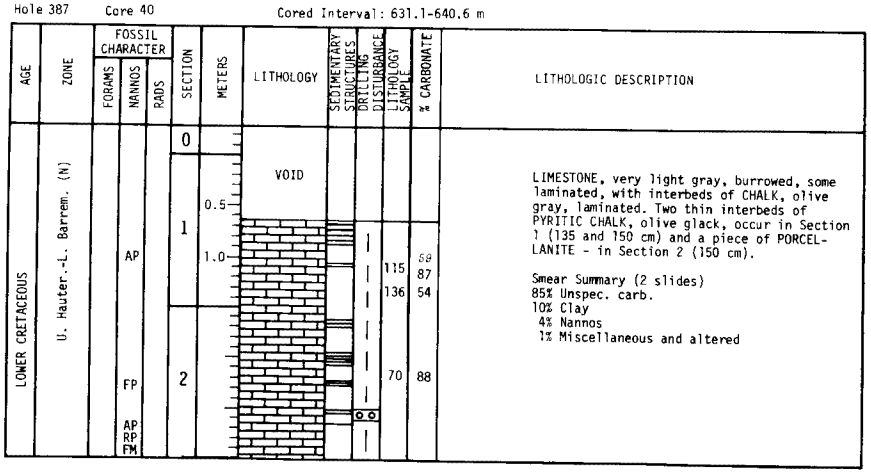
Hole 387 Core 38 Cored Interval: 593.1-602.6 m



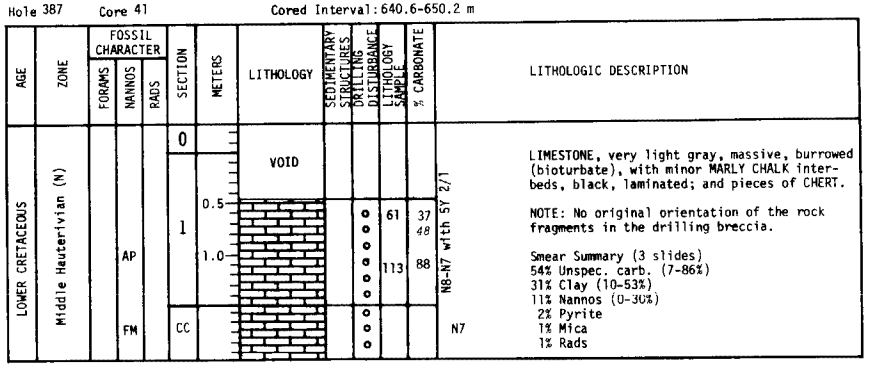
Hole 387 Core 39 Cored Interval: 621.6-631.1 m



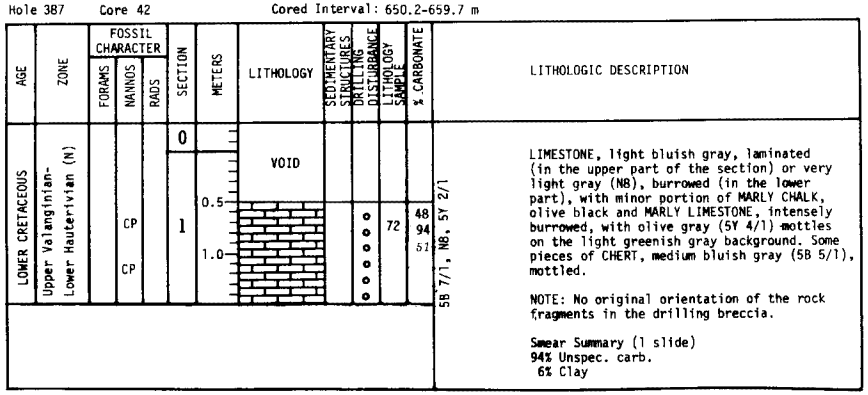
Hole 387 Core 40 Cored Interval: 631.1-640.6 m



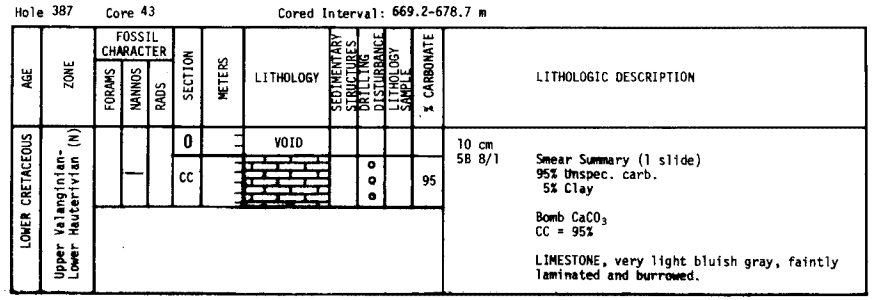
Hole 387 Core 41 Cored Interval: 640.6-650.2 m



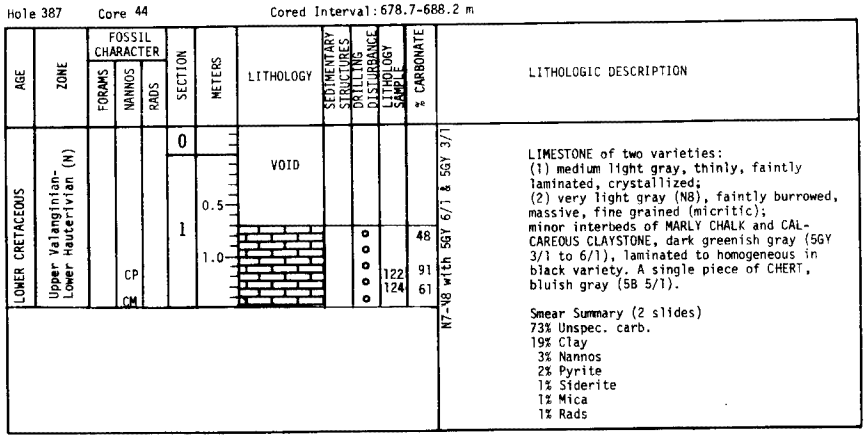
Hole 387 Core 42 Cored Interval: 650.2-659.7 m



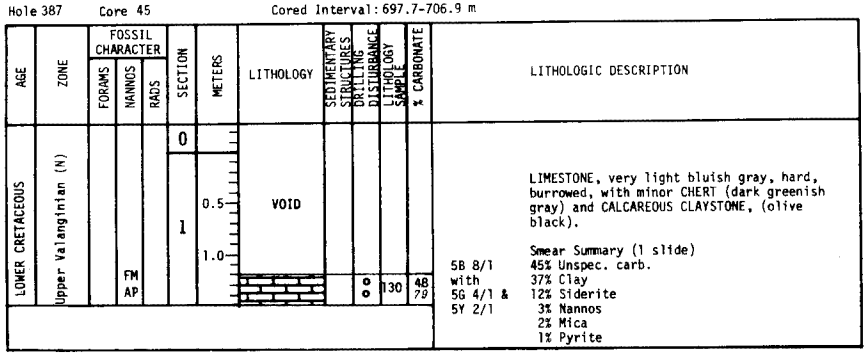
Hole 387 Core 43 Cored Interval: 669.2-678.7 m



Hole 387 Core 44 Cored Interval: 678.7-688.2 m



Hole 387 Core 45 Cored Interval: 697.7-706.9 m



Hole 387 Core 46 Cored Interval: 726.0-735.4 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE
LOWER CRETACEOUS	Upper Valanginian (N)		CP RM		0						
					1	0.5 1.0				120	71 84
										37	28
					2					51	82 84
			FP CP							82	37

LITHOLOGIC DESCRIPTION

LIMESTONE, very light gray, homogeneous or burrowed, massive, with minor interbeds and loose pieces of: SIDERITIC MARLY LIMESTONE dark olive gray (5Y 4/1), laminated, relatively coarse (very fine sand and silt-size); MARLY CHALK, dark olive gray to black; CHERT, medium bluish gray (5B 5/1).

NOTE: Laminated sideritic limestone and chalk are ≡ in "sediment structure" column; cherts ▲ in "lithology" column, according to their stratigraphic position in the core.

Smear Summary (3 slides)
56% Unspec. carb. (25-79%)
17% Clay
12% Siderite (0-21%)
7% Miscellaneous and altered (0-20%)
6% Nannos
1% Pyrite

N8 with 5Y 6/1 & 5B 5/1

Hole 387 Core 47 Cored Interval: 744.9-754.4 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE
LOWER CRETACEOUS	Middle Valanginian (N)				0						
			CP CP		1	0.5 1.0	VOID			102	95 78

LITHOLOGIC DESCRIPTION

LIMESTONE, very light gray, burrow mottled, with some pieces of SIDERITIC LIMESTONE, medium olive gray, laminated. Sideritic bands and irregular laminae occur in some limestone pieces, probably produced by solution and concentration of siderite.

NOTE: Broken pieces of the rocks, without original orientation.

Smear Summary (1 slide)
65% Unspec. carb.
15% Nannos
15% Siderite
5% Clay

N8 with 5Y 5/1

Hole 387 Core 48 Cored Interval: 763.7-773.1 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE
LOWER CRETACEOUS	Middle Valanginian (N)		CP AM		0						
					1	0.5 1.0				89 93	86 91

LITHOLOGIC DESCRIPTION

LIMESTONE, very light gray to SIDERITIC LIMESTONE, dark olive gray (5Y 3/1) with most shades in between. Alternating layers of homogeneous or burrowed limestone with laminated one and with dark, sideritic limestone, containing fine laminae, enriched by organic matter and pyrite.

Some pieces of chert appear, one with pyrite.

Smear Summary (1 slide)
89% Unspec. carb.
6% Clay
2% Nannos
2% Miscellaneous and altered
1% Siderite

N8 to 5Y 3/1

Hole 387 Core 49 Cored Interval: 782.4-791.9 m

AGE	ZONE	FOSSIL CHARACTER: FORAMS	NANNOS	RADS	SECTION	METERS	LITHOLOGY	SEDIMENTARY STRUCTURES	DRILLING DISTURBANCE	LITHOLOGY SAMPLE	% CARBONATE
LOWER CRETACEOUS	Lower Valanginian (N)		CP		0						
					1	0.5 1.0	VOID			128 134 147	27 85 88
					2					72 73	58 68
			AM		3					70	85
					4					12 22	
			CP				OG SAMPLE				73
					5						67
			CP								
	Upper Berriasian-Lower Valanginian (N)		AG		CC					140	92

LITHOLOGIC DESCRIPTION

LIMESTONE with interbeds of MARLY (SIDERITIC) LIMESTONE grading to CALCAREOUS SIDERITIC MUDSTONE. Main kinds of the rocks in the rhythmic?) sequence are:
(1) Limestone - massive, burrowed, very light gray (N8 or 5B 8/1) with thin cherty(?) veinlets
(2) Limestone (to marly limestone) with minor siderite and pyrite, thinly laminated (rhythmic lamination with ≤1 cm thick micro-units). Wood fragments occur.
Grades to:
(3) Marly (sideritic) limestone, distinctly laminated with alternating dark greenish gray (5GY 4/1) and light (5GY 7/1) laminae (less than 1 mm thick)
(4) Calcareous sideritic mudstone (minor interbeds, shown as black in "Lithologic" column), dark greenish gray (5GY 4/1 to 3/1 or to 5Y 4/1), thinly laminated, with pyrite nodules.

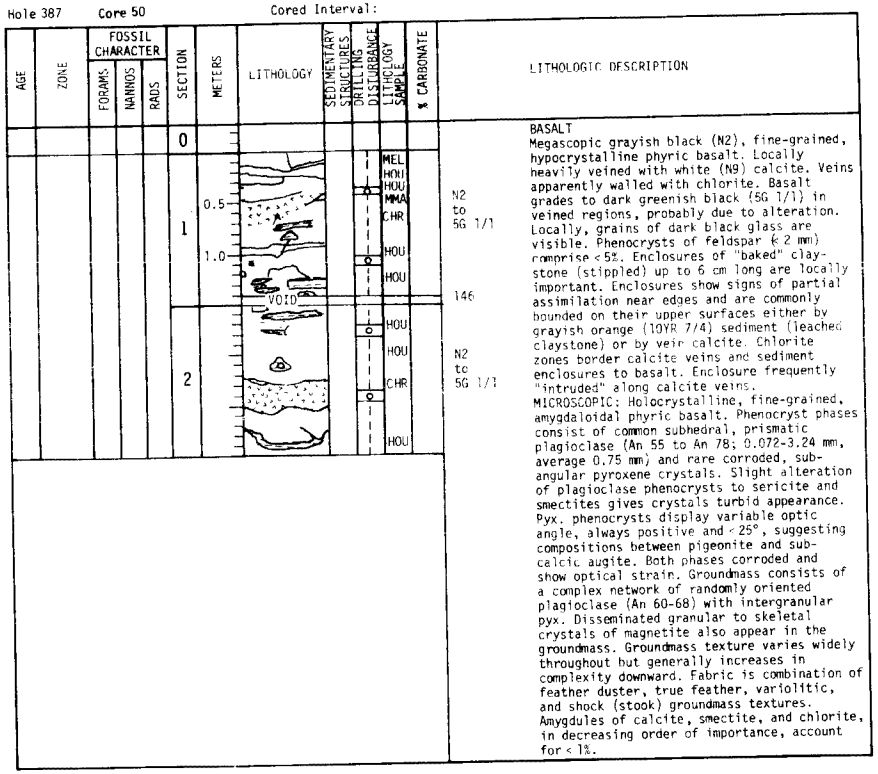
There are gradational transitions between (2)-(3)-(4) and sharp contacts (4)-(1). Some cherts occur in Sections 1, 2, 5, CC.

Smear Summary (8 slides)
55% Unspec. carb. (7-90%)
26% Clay (5-66%)
12% Siderite (5-20%)
6% Nannos (0-15%)
1% Mica

5GY 6/1-7/1 & 5GY 4/1-3/1 with N8, 5Y 4/1-5Y 6/1

40 cm

Hole 387 Core 50 Cored Interval:



BASALT

Megascopic grayish black (N2), fine-grained, hypocrystalline phyric basalt. Locally heavily veined with white (N9) calcite. Veins apparently walled with chlorite. Basalt grades to dark greenish black (5G 1/1) in veined regions, probably due to alteration. Locally, grains of dark black glass are visible. Phenocrysts of feldspar (≤ 2 mm) comprise < 5%. Enclosures of "baked" claystone (stippled) up to 6 cm long are locally important. Enclosures show signs of partial assimilation near edges and are commonly bounded on their upper surfaces either by grayish orange (10YR 7/4) sediment (leached claystone) or by vein calcite. Chlorite zones border calcite veins and sediment enclosures to basalt. Enclosure frequently "intruded" along calcite veins.

MICROSCOPIC: Holocrystalline, fine-grained, amygdaloidal phyric basalt. Phenocryst phases consist of common subhedral, prismatic plagioclase (An 55 to An 78; 0.072-3.24 mm, average 0.75 mm) and rare corroded, subangular pyroxene crystals. Slight alteration of plagioclase phenocrysts to sericite and smectites gives crystals turbid appearance. Pyx. phenocrysts display variable optic angle, always positive and < 25°, suggesting compositions between pigeonite and subcalcic augite. Both phases corroded and show optical strain. Groundmass consists of a complex network of randomly oriented plagioclase (An 60-68) with intergranular pyx. Disseminated granular to skeletal crystals of magnetite also appear in the groundmass. Groundmass texture varies widely throughout but generally increases in complexity downward. Fabric is combination of feather duster, true feather, variolitic, and shock (stook) groundmass textures. Amygdules of calcite, smectite, and chlorite, in decreasing order of importance, account for < 1%.

X-RAY MINERALOGICAL ANALYSES, SITE 387

Core	Section	Interval (cm)	Total Carbonate	Composition, %														Distribution in <2μm Fraction			
				Calcite	Dolomite	Siderite	Rhodochrosite	Quartz	Feldspar	Clay Minerals	Palygorskite	Clinoptilolite	Phillipsite	Analcime	Pyrite	Disordered Cristobalite	Other	Kaolinite	Mica	Chlorite	Montmorillonite
1	2	75- 77						15	4	81								12	42	7	39
2	2	34- 36						15	4	81											
2	5	90- 92						12	4	84											
3	1	80- 82						9	2	88		1									
4	1	48- 50						10	3	85		2									
5	4	20- 22						7	2	89	?	2						18	27	5	50
6	3	31- 34						4	3	91		2									
7	1	70- 73						11	2	87											
7	2	90- 93						5	2	91											
8	2	15- 18	17	17				15		68											
8	2	44- 46						7	3	90											
9	1	80- 83						7	3	90								1	34	1	64
9	6	50- 53	15	15				11	3	71											
10	1	50- 52	16	16				4	2	78									65		35
10	6	80- 82						12	2	86											
11	1	138-140						5	2	93											
12	1	102-104						9	2	89											
13	1	64- 66	8	8				7	3	82								5	22	3	70
14	2	53- 55						5		85						10					
16	1	106-108	16	16				7	3	71						3					
17	1	96- 98	5	5				9	4	73						9					
18	1	30- 33						9	5	68	tr	tr				18			40		60
19	2	63- 65	13	13				35		40						12					
19	3	100-103						10	3	75						12					
20	2	93- 96	7	7				24	2	63						4					
20	3	101-103	30	30				3		55		tr				12			40		60
21	1	40- 43	40	40				4	2	43		2				9					
21	2	90- 93	10	10				15		73						2					
22	1	143-146						3	2	67	4	6				18					
22	2	78- 81	20	20				14	2	50		4				10					
23	1	84- 86	26					8		62						4					
23	5	29- 31						12	2	84		2									
24	1	82- 84	8	8				9	5	65		tr				13					
25	3	74- 76	4	4				7	3	68		2				16					
26	1	48- 50						35	5	50					5	tr	Gypsum 5%				
27	1	84- 86						22	4	71		3									
27	3	97- 99	43	43				9	2	46											
27	6	59- 61	50	50				6		44											
28	1	114-116	40	40				7		53											
29	2	64- 66	30	15				15	4	51							High-Magnesian-Calcite[b] 15%	17	48	11	24
29	2	105-108						15	2	83											
30	1	135-136						23	2	64		5			3		Gypsum 3%				
31	1	136-139						18	2	80		tr									
32	1	10- 13						25	4	71											
32	4	84- 87						35	4	61											
33	2	91- 93						35	4	61									36		64
34	2	136-138						35	2	63											
34	4	92- 94						50	3	47		tr									
35	2	132-134						50	3	47		tr									
35	4	88- 90						50	3	47											
36	1	47- 49						50	2	48											
36	3	43- 45						50		50											
37	2	87- 89						45	2	53									49		51
37	3	113-115						45	3	52											
38	1	140-142	91	91				2		7											
39	2	63- 65	70	70				8		22											
39	2	146-148	93	93				1		6											
40	1	88- 90	60	60				6		34											
41	1	92- 94	56	54	2			9		35											
41	1	108-111	93	93				1		4											
42	1	139-141	98	98				1		1											
44	1	64- 70	95	95				1		4		tr?									
44	1	125-129	80					2				tr?									
45	1	120-122	94	93	1			2		4											
46	1	119-121	73	19	54			5		22		tr?									
47	1	140-142	83	83				3		14											
48	1	101-102	55	35	20			6		39											
49	2	54- 56	93	83	10			1		6											
49	5	111-113	56	24	32			10		34								4	91	2	3

[b] High-Magnesian-Calcite (8 Mol % $MgCO_3$)

Core	Section	Top of Interval (cm)	% C_{org}[a]
1	2	85.0	0.1
1	6	117.0	0.1
2	2	100.0	0.1
2	5	60.0	0.1
3	2	110.0	0.1
4	1	70.0	0.1
5	CC	10.0	0.1
6	3	90.0	0.1
7	1	90.0	0.3
7	5	90.0	0.1
8	1	70.0	0.1
8	2	9.0	0.2
9	2	40.0	0.1
9	6	40.0	0.1
10	4	130.0	0.2
10	5	70.0	0.1
11	1	135.0	0.1
12	1	132.0	0.2
13	1	74.0	0.6
14	2	42.0	0.2
16	1	139.0	0.1
17	1	95.0	0.4
18	1	32.0	0.1
19	2	65.0	0.1
19	3	111.0	0.1
20	1	132.0	0.2
20	3	65.0	0.2
21	1	128.0	0.1
21	2	89.0	0.5
22	2	29.0	0.3
22	2	79.0	0.1
23	1	29.0	0.1
24	1	140.0	1.3
25	3	73.0	0.1
26	2	21.0	0.1
27	1	64.0	1.0
28	1	116.0	0.7
29	2	71.0	0.1
29	3	88.0	-
30	1	136.0	11.3
31	1	138.0	0.1
32	1	111.0	0.1
32	2	79.0	0.7
33	2	60.0	0.5
34	2	71.0	0.5
34	4	33.0	0.3
35	3	69.0	2.8
35	5	90.0	0.1
36	1	80.0	0.1
36	3	80.0	3.7
37	2	127.0	0.2
38	1	65.0	0.9
39	2	68.0	3.1
39	2	113.0	0.4
40	1	90.0	2.6
41	1	68.0	3.0
42	1	93.0	4.8
44	1	76.0	3.8
45	1	125.0	1.5
46	1	125.0	0.3
46	2	56.0	-
47	1	140.0	1.6
48	1	85.0	0.7
49	2	89.0	1.5
49	5	111.0	1.1

[a] A dash indicates 0% C_{org}