3. SITE 507[1]

Shipboard Scientific Party[2]

HOLES 507, 507A

Date occupied: November 20, 1979

Date departed: November 20, 1979

Position (latitude; longitude): 0°34.0′N; 86°05.4′W

Water depth (sea level; corrected m, echo-sounding): 2690.8

Water depth (rig floor; corrected m, echo-sounding): 2700.8

Bottom felt (m, drill pipe): 2712

Penetration (m): 3

Number of cores: 1

Total length of cored section (m): 3.0

Total core recovered (m): 2.95

Core recovery (%): 98

Oldest sediment cored:
Depth sub-bottom (m): 2714.5
Nature: Foraminifer nannofossil ooze
Age: 270–440 × 10^3 y.
Measured seismic velocity (km/s) Pelagic: 1.52
Hydrothermal: 1.56

Basement:
Depth sub-bottom (m): 28.0
Nature: Basalt
Seismic velocity range (km/s): 4.94–5.58

Principal results: Six holes were cored or drilled in the mounds sediments (Holes 507, B, C, D, F, H) and four heat-flow and *in situ* pore-water samples collected (Holes 507A, E, G, I). Hole 507D was located on a mound; 507F was cored at the edge of the same mound; and Holes 507 and 507H were cored north and south of the same mound. Hydrothermal deposits extend virtually up to the mound surface where a thin manganese-oxide crust is present, suggesting that some hydrothermal material was recently deposited.

The sediments were the same as those found at Site 506. Stratigraphically, a unit of interbedded and intermixed hydrothermal sediment and foraminifer nannofossil ooze is found between an upper and lower unit of siliceous foraminifer nannofossil ooze and foraminifer nannfossil ooze. Pore-water chemistry and heat-flow data from mounds sites suggest upward convecting solutions. The basalts recovered are either fine-grained aphyric to sparsely plagioclase phyric or coarse-grained subophitic. The basalt displays black alteration halos indicating a low temperature alteration with filling of pore spaces by green smectites and iron hydroxides. No sign of hydrothermal alteration has been observed. The shape of the alteration halos demonstrates that the basalt pieces belong to a fragmented basement which has been further broken during drilling. The basalts have high magnetization intensities, high ratios of remanence to induced magnetization, and shallow inclinations. This is consistent with the high amplitude magnetic anomalies and equatorial location of the site.

Heat-flow measurements and pore-water sampling were conducted at Hole 507A, E, G, and I.

HOLE 507B

Date occupied: November 20, 1979

Date departed: November 20, 1979

Time on hole: 7 hr.

Position (latitude; longitude): 0°34.0′N; 86°05.4′W

Water depth (sea level; corrected m, echo-sounding): 2690.8

Water depth (rig floor; corrected m, echo-sounding): 2700.8

Bottom felt (m, drill pipe): 2711.8

Penetration (m): 7

Number of cores: 1

Total length of cored section (m): 7

Total core recovered (m): 0.69

Core recovery (%): 9

Oldest sediment cored:
Depth sub-bottom (m): 31.0
Nature: Foraminifer nannofossil ooze
Age: 270–440 × 10^3 y.
Measured seismic velocity (km/s): Pelagic: 1.52
Hydrothermal: 1.56

Basement:
Depth sub-bottom (m): 38.0
Nature: Basalt
Seismic velocity range (km/s): 4.94–5.58

Principal results: Basement drilling; hole abandoned.

HOLE 507C

Date occupied: November 21, 1979

Date departed: November 21, 1979

Time on hole: 9 hr., 28 min.

Position (latitude; longitude): 0°34.0′N; 86°05.4′W

Water depth (sea level; corrected m, echo-sounding): 2709.8

Water depth (rig floor; corrected m, echo-sounding): 2719.8

Bottom felt (m, drill pipe): 2715.5

Penetration (m): 29.5

Number of cores: 3

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[1] Honnorez, J., Von Herzen, R. P., et al., *Init. Repts. DSDP*, 70: Washington (U.S. Govt. Printing Office).

[2] Jose Honnorez (Co-Chief Scientist), Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Miami, Florida; Richard P. Von Herzen (Co-Chief Scientist), Woods Hole Oceanographic Institution, Woods Hole, Massachusetts; Timothy J. Barrett, Mineralogisches Institut, Universitat Tübingen, Tübingen, Federal Republic of Germany (present address: University of Toronto, Toronto, Ontario, Canada); Keir Becker, Marine Physical Laboratory, Scripps Institution of Oceanography, La Jolla, California; Michael L. Bender, Graduate School of Oceanography, University of Rhode Island, Kingston, Rhode Island; Peter E. Borella, Deep Sea Drilling Project, Scripps Institution of Oceanography, La Jolla, California (present address: Saddleback College, Mission Viejo, California); Hans-Wolfgang Hubberten, Institut für Petrographie und Geochemie der Universität Karlsruhe, Federal Republic of Germany; Steven C. Jones, Department of Geology, Florida State University, Tallahassee, Florida (present address: Mobil Oil Company, New Orleans, Louisiana); Shun-ichiro Karato, Ocean Research Institute, University of Tokyo, Tokyo, Japan (present address: The Australian National University, Canberra, Australia); Christine Laverne, Laboratoire de Geologie, Université de l'Ocean Indian, Ste. Clothilde, Réunion, France; Shaul Levi, School of Oceanography, Oregon State University, Corvallis, Oregon; Areg A. Migdisov, Vernadsky Institute of Geochemistry and Analytical Chemistry, USSR Academy of Sciences, Moscow, USSR; S. Anthony Moorby, Department of Geology, Imperial College, London, United Kingdom; Ed L. Schrader, Department of Geology and Geography, University of Alabama, University, Alabama (present address: J. M. Huber Corporation, Macon, Georgia).

Total length of cored section (m): 13.5

Total core recovered (m): 8.45

Core recovery (%): 63

Oldest sediment cored:
Depth sub-bottom (m): 24.5
Nature: Foraminifer nannofossil ooze
Age: 270–240 × 10^3 y.
Measured seismic velocity (km/s): Pelagic: 1.52 (av.)
Hydrothermal: 1.56 (av.)

Basement:
Depth sub-bottom (m): 29.5
Nature: Basalt
Seismic velocity range (km/s): 4.94–5.58

Principal results: Basement drilling.

HOLES 507D, 507E

Date occupied: November 22, 1979

Date departed: November 22, 1979

Time on hole: 8 hr., 26 min.

Position (latitude; longitude): 0°34.0′N; 86°05.4′W

Water depth (sea level; corrected m, echo-sounding): 2689.1

Water depth (rig floor; corrected m, echo-sounding): 2699.1

Bottom felt (m, drill pipe): 2699.1

Penetration (m): 38.7

Number of cores: 10

Total length of cored section (m): 38.7

Total core recovered (m): 36.59

Core recovery (%): 94

Oldest sediment cored:
Depth sub-bottom (m): 38.7
Nature: Foraminifer nannofossil ooze
Age: 270–240 × 10^3 y.
Measured seismic velocity (km/s): Pelagic: 1.52 (av.)
Hydrothermal: 1.56 (av.)

Principal results: Hole 507D was located on a mound. The sediments are the same type as were found at Site 506. Hydrothermal sediments extend virtually to the surface, where a thin manganese-oxide crust is found. Stratigraphically, a unit of interbedded and mixed hydrothermal sediments and pelagic ooze is found between an upper and lower unit of siliceous foraminifer nannofossil ooze. Heat-flow measurements and pore-water sampling were conducted at Hole 507E.

HOLES 507F, 507G

Date occupied: November 22, 1979

Date departed: November 23, 1979

Time on hole: 7 hr., 11 min.

Position (latitude; longitude): 0°34.0′N; 86°05.4′W

Water depth (sea level; corrected m, echo-sounding): 2694.8

Water depth (rig floor; corrected m, echo-sounding): 2704.8

Bottom felt (m, drill pipe): 2704.8

Penetration (m): 31.3

Number of cores: 9

Total length of cored section (m): 31.3

Total core recovered (m): 31.12

Core recovery (%): 99

Oldest sediment cored:
Depth sub-bottom (m): 31.3
Nature: Foraminifer nannofossil ooze
Age: 270–440 × 10^3 y.
Measured seismic velocity (km/s): Pelagic: 1.52
Hydrothermal: 1.56

Basement:
Depth sub-bottom (m): 31.3
Nature: Basalt
Velocity range (km/s): 4.94–5.58

Principal results: Hole 507F was taken on the edge of a mound and consisted primarily of siliceous foraminifer nannofossil ooze (29 m). One 2-meter-thick layer of hydrothermal sediment was found between 3.5 and 5.5 meters sub-bottom. Heat-flow measurements and pore-water sampling were conducted at Hole 507G.

HOLES 507H, 507I

Date occupied: November 23, 1979

Date departed: November 23, 1979

Time on hole: 6 hr., 25 min.

Position (latitude; longitude): 0°34.0′N; 86°05.4′W

Water depth (sea level; corrected m, echo-sounding): 2691.8

Water depth (rig floor; corrected m, echo-sounding): 2701.8

Bottom felt (m, drill pipe): 2699.6

Penetration (m): 32.9

Number of cores: 8

Total length of cored section (m): 32.9

Total core recovered (m): 33.62

Percentage core recovery (%): 100

Oldest sediment cored:
Depth sub-bottom (m): 32.9
Nature: Foraminifer nannofossil ooze
Age: 270–440 × 10^3 y.
Measured velocity (km/s): Pelagic: 1.52
Hydrothermal: 1.56

Principal results: Hole 507H was drilled south of a mound and consisted of 32 meters of siliceous and foraminifer nannofossil ooze. The upper 13–14 meters consists of siliceous foraminifer nannofossil ooze below which is a transitional zone of 3–4 meters where the siliceous component decreases. Below the transitional layer is 14–15 meters of foraminifer nannofossil ooze. Heat-flow measurements and pore-water sampling were conducted at Hole 507I.

BACKGROUND AND OBJECTIVES

Site 507 is in a mounds field (Fig. 1) which is similar in areal extent to that of Site 506—i.e., approximately 1 × 2 km. The general background is the same as for Site 506, and the reader is therefore referred to that site summary for details.

The mounds occur on the north flank of a relatively broad elevation, the slope of which appears interrupted by small faults. Some differences in the geologic setting of Site 507 as compared to Site 506 are the following:

1) Site 507 is about 4 to 5 km south of Site 506 and 23.5 km south of the Galapagos Spreading Center; therefore, the crust beneath Site 507 is presumably 1.1 to 1.4 × 10^5 y. older than at Site 506.

2) Site 507 is located over a more pronounced topographic high than 506.

3) From Lonsdale's (1977) map, minor faulting more commonly appears at Site 507 than at Site 506.

Only two "deep-tow" tracks are available to define the disposition of the mounds around Site 507.

The objectives of Site 507 were the same as those of Site 506, i.e., to collect undisturbed continuous sequences of sediments and basement; to make *in situ* temperature measurements through the entire sediment column and obtain pore-water samples both from the mounds and from off-mounds areas (see Objectives, Site 506). The high heat-flow region of Site 506 was to be compared with that of Site 507.

OPERATIONS

Site 507 was selected to be on a group of mounds ridges about 5 km south of Site 506 (Fig. 1). The beacon was deployed by dead-reckoning positioning and from depth soundings along the track leaving Site 506 at about mid-day, November 19, 1979. The beacon was dropped nearly on the crest of a ridge with about 30 meters of sediment cover (Fig. 2), on the north flank of which several mounds chains are found. At this site, the bit selected for the first part of drilling was standard for rotary coring in basement rock, in which the scanning sonar tool could be deployed.

After running the drill pipe to near bottom, the sonar scanning tool was lowered with the logging cable. It was believed that mounds were seen initially after turning on the scan of the tool; but, upon moving the vessel toward the west, they disappeared. Unfortunately, the bottom depth at this site was not as uniform as at Site 506, deepening instead by several tens of meters to the west over most of the survey track. Hence the sonar beam, directed only 8° below the horizontal, may have missed any mounds in this region because of our inability to lower the pipe to the proper depth with the sonar tool and log-

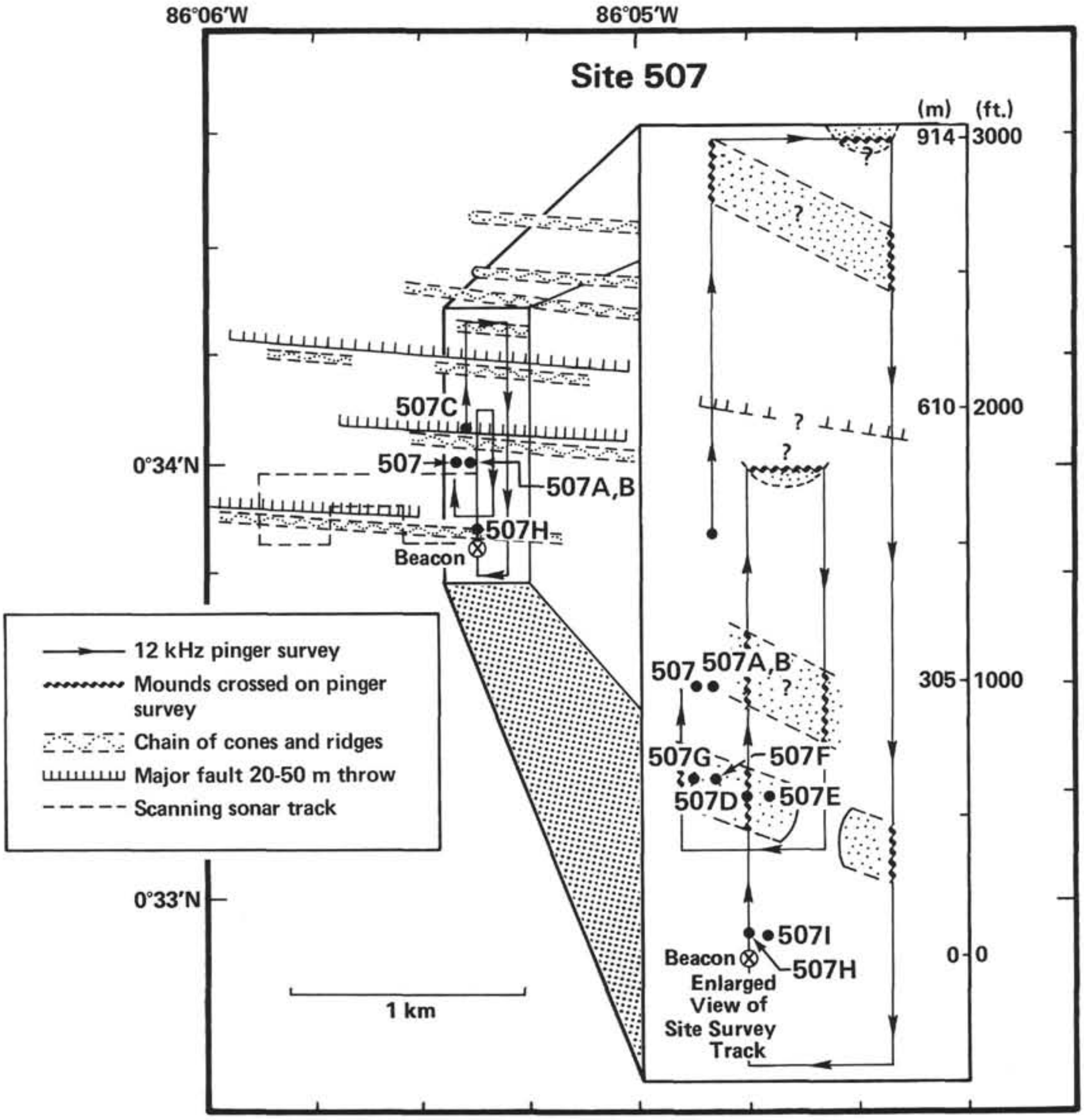

Figure 1. Survey tracks at Site 507. (Small-scale part of figure shows tracks superimposed over the mounds map by Lonsdale [1977]; enlargement shows mounds and scarps located during survey.)

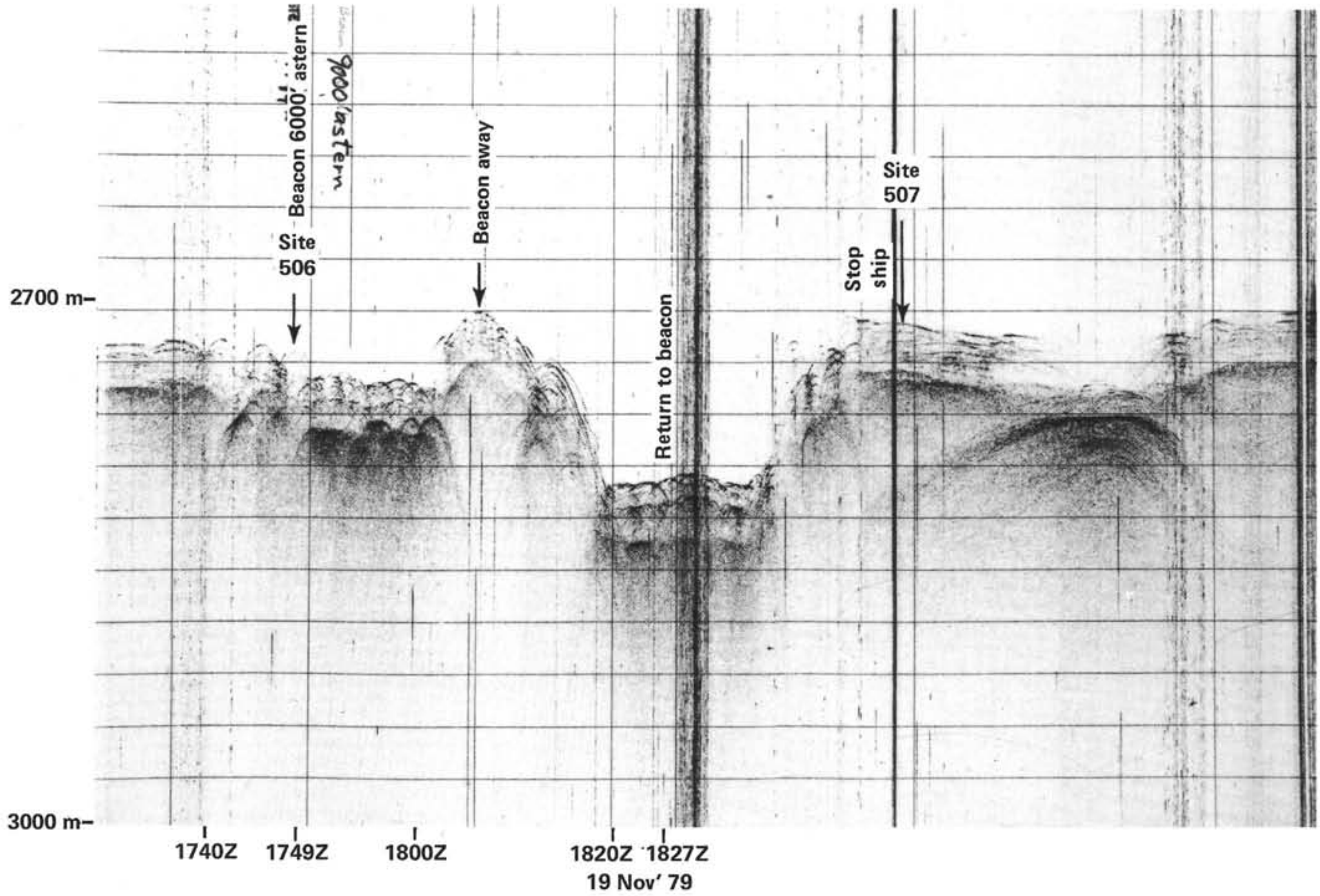

Figure 2. 3.5-kHz record during travel of vessel between Sites 506 and 507 and environs.

ging cable in it. Mounds ridges were not seen again until near the end of the approximately 5-hour survey, as we appeared to approach a chain of mounds on an easterly track. For the first coring site, we stopped within about 75 ft. of part of this mound chain, 1100 ft. N × 200 ft. W of the beacon (Fig. 3).

At this position, Hole 507 was washed down to basement to determine sediment thickness in preparation for heat-flow measurement and pore-water sampling (Table 1). Sediments were 25.5 meters thick (basement was contacted at 2740 m drill string depth), and the vessel was offset 50 ft. to the east for the *in situ* temperature measurements and pore-water sample (Hole 507A). At the same location, basement drilling was attempted for about 7 hours (Hole 507B). Penetration was about 7 meters into basement (2749.5 m drill-string depth), with only about 0.6 meter recovered. Poor drilling conditions, as at Site 506, caused abandonment of this hole. The bottom-hole assembly was stuck for some time and finally pulled free about 2300 hours, 20 November 1979.

The vessel was moved about 450 ft. north to Hole 507C (1550 ft. N × 150 ft. W offset from beacon) to begin another basement drilling attempt. After washing down through 24.5 meters of sediment cover, basement drilling was attempted for about 7 hours, during which about 5 meters penetration was achieved. A total of only about 0.2 meter of basalt was recovered from two cores. Similar drilling conditions as at Hole 507B prevailed. The hole was completed about 1300 hours (L), November 21, 1979, and the drill string retrieved to the surface to replace the bit for hydraulic piston coring.

After lowering the pipe to near the seafloor with the 12-kHz drill-string pinger positioned as usual about 102 meters above the drill bit, a survey to locate mounds was implemented beginning at Hole 507C (Fig. 1). This survey, similar to that at Site 506, was carried out from about 0100L to 0622L. Several mounds or mounds ridges and scarps were located, but not always coincident with those mapped by Lonsdale (1977). The chains of mounds appeared much less continuous and not as prominent as those found at Site 506. Upon completion of the survey, the vessel was positioned 600 ft. N × 0 ft. W of the beacon over a mound for a piston coring site (Hole 507D).

Hydraulic piston coring at Hole 507D was carried out between about 0630 and 1600 hours (L). After raising the HPC bit above mudline, both *in situ* temperature measurements and pore-water sampling were attempted (Hole 507E, 600 ft. N × 50 ft. E). Then the vessel was moved about 200 ft. WNW to another piston coring site (Hole 507F, 650 ft. N × 150 ft. W) on, or at the edge of, the same mound (or mound ridge). Coring took place

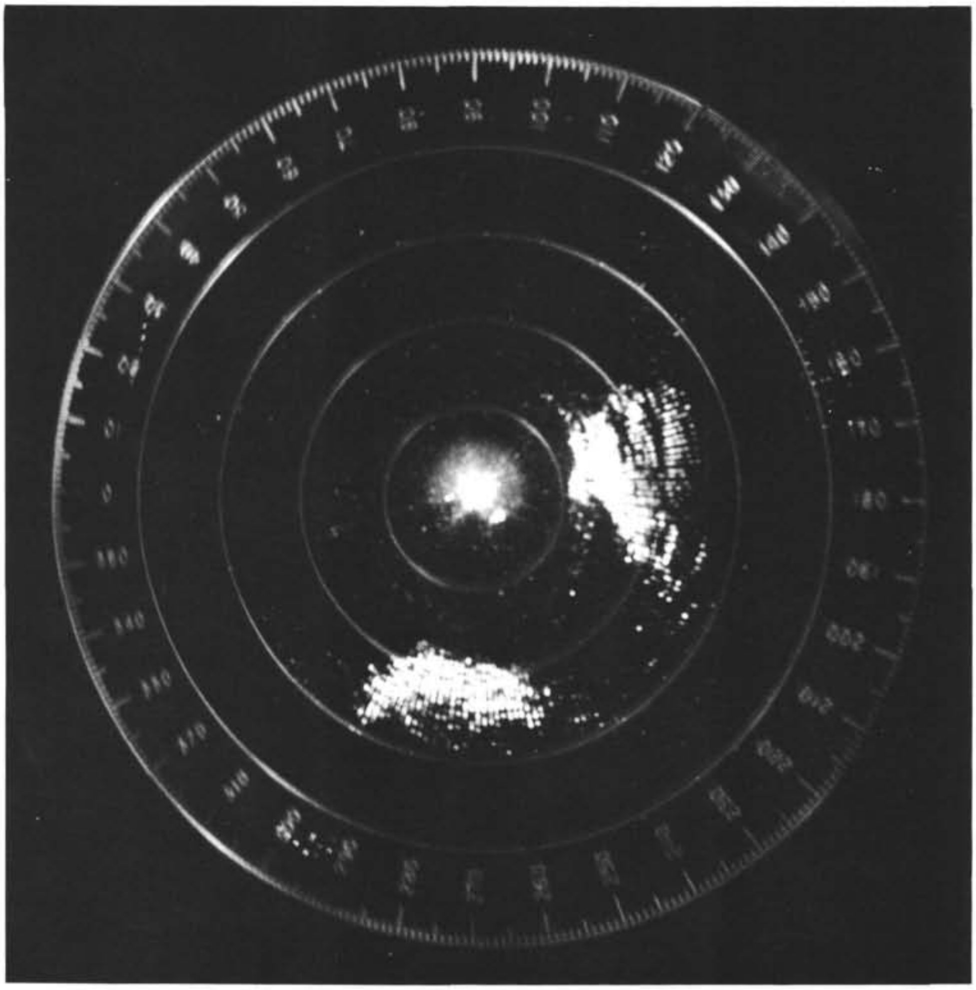

Figure 3. Sonar scan view of mounds at Hole 507, 1100′N × 200′W of beacon. (Scale 250 ft. from center to outside periphery of scan. Mounds probably aligned to form a ridge just to north of site in nearly E-W direction.)

between about 2000 hours, November 22, and 0500 hours (L), November 23, 1979. The vessel was subsequently moved 50 ft. farther west for another suite of *in situ* temperature measurements and pore-water sampling (Hole 507G, 650 ft. N × 200 ft. W).

Another piston coring site away from a mound was occupied to the south near the beacon (Hole 507H, 100 ft. N × 0 ft. W). The vessel was then displaced 50 ft. farther east for *in situ* temperature measurements and pore-water sampling at Hole 507I (100′N × 50′E). The recovery of the instrumentation at this location at 0830 hours (L), November 23, 1979, completed the downhole operations at Site 507, and the drill string was recovered aboard the vessel.

SEDIMENT LITHOLOGY AND STRATIGRAPHY

The sediments found at Site 507 were similar to those recovered at Site 506. Three holes (Fig. 4) were continuously cored with the hydraulic piston corer. Hole 507D, on a mound, consists of an upper 26-meter-thick unit of hydrothermal sediments interbedded with foraminifer nannofossil ooze (Fig. 4). Core 1 consists of 0.75 meters of siliceous foraminifer nannofossil ooze (the upper 60 cm is brown) (Fig. 5). Mixed within this upper 60 cm of brown pelagic ooze are Mn-oxide and Fe-oxide crust fragments (Fig. 6). Beneath this is 0.3 meter of green hydrothermal clay. At the top of Core 2 is a 20-cm interval consisting of broken, individually laminated fragments of black Mn-oxide crust (up to 3 cm long and 0.5 cm thick) and brownish yellowish Fe-oxide fragments mixed with brown pelagic ooze. This is underlain by green hydrothermal clay. The presence of the Mn-oxide fragments and the brown pelagic ooze at the top of Core 2 and the void at its base suggest that this core is also a mudline core.

The total thickness of green clay in Hole 507D is 15.5 meters. Contacts between the green clay and the pelagic oozes are mainly gradational over distances of up to 10 cm. In some parts of Core 2 and occasionally in cores deeper in the hole, granular hydrothermal clay has a dark yellowish brown to dark olive color. This may suggest that oxygenated waters are permeating through the hydrothermal sediments. Examination of smear slides of these zones reveals the presence of brownish green to brownish clays in addition to green granules. Up to 1-2% brown to colorless volcanic glass is disseminated

Table 1. Coring Summary, Site 507.

Core	Date	Time	Depth from Drill Floor (m) Top Bottom	Depth below Seafloor (m) Top Bottom	Length Cored (m)	Length Recovered (m)	Recovered (%)
Hole 507							
1	11/20/79	1005	2711.5–2714.5	0.0–3.0	3.0	2.95	98
Hole 507B							
1	11/21/79	0107	2742.5–2749.5	31.0–38.0	7.0	0.63	9
Hole 507C							
1	11/21/79	0313	2715.5–2724.0	0.0–8.5	8.5	(sed.) 8.16	96
2	11/21/79	0617	2740.0–2743.0	24.5–27.5	3.0	(igneous) 0.10	3.3
3	11/21/79	1241	2743.0–2745.0	27.5–29.5	2.0	(igneous) 0.11	5.5
Total:					13.5	8.37	
Hole 507D							
1	11/22/79	0751	2699.1–2700.1	0.0–1.0	1.0	1.0	100
2	11/22/79	0900	2700.1–2704.5	1.0–5.4	4.4	2.65	60.23
3	11/22/79	0940	2704.5–2708.9	5.4–9.8	4.4	4.03	91.60
4	11/22/79	1037	2708.9–2713.3	9.8–14.2	4.4	4.20	95.45
5	11/22/79	1130	2713.3–2717.7	14.2–18.6	4.4	4.42	100
6	11/22/79	1230	2717.7–2722.1	18.6–23.0	4.4	4.60	100
7	11/22/79	1325	2722.1–2726.5	23.0–27.4	4.4	4.50	100
8	11/22/79	1425	2726.5–2730.9	27.4–31.8	4.4	4.37	99
9	11/22/79	1524	2730.9–2735.3	31.8–36.2	4.4	4.26	97
10	11/22/79	1617	2735.3–2737.8	36.2–38.7	4.4	2.55	58
Total:					40.6	36.58	
Hole 507F							
1	11/22/79	2103	2704.4–2706.8	0.0–2.4	2.40	2.39	99
2	11/22/79	2201	2706.8–2711.2	2.4–6.8	4.4	4.57	100
3	11/22/79	2248	2711.2–2715.6	6.8–11.2	4.4	4.32	98
4	11/22/79	2340	2715.6–2720.0	11.2–15.6	4.4	4.20	95
5	11/23/79	0035	2720.0–2724.4	15.6–20.0	4.4	4.44	100
6	11/23/79	0134	2724.4–2728.8	20.0–24.4	4.4	4.32	98
7	11/23/79	0233	2728.8–2733.2	24.4–28.8	4.4	4.28	97
8	11/23/79	0442	2733.2–2734.7	28.8–30.3	1.5	1.6	100
9	11/23/79	0554	2734.7–2735.7	30.3–31.3	1.0	1.0	100
Total:					31.3	31.12	
Hole 507G							
1	11/23/79	1008	2699.6–2703.1	0.0–3.5	3.5	3.22	92
2	11/23/79	1110	2703.1–2707.5	3.5–7.9	4.4	4.68	100
3	11/23/79	1158	2707.5–2711.9	7.9–12.3	4.4	4.63	100
4	11/23/79	1248	2711.9–2716.3	12.3–16.7	4.4	4.66	100
5	11/23/79	1337	2716.3–2720.7	16.7–21.1	4.4	4.60	100
6	11/23/79	1435	2720.7–2725.1	21.1–25.5	4.4	4.55	100
7	11/23/79	1530	2725.1–2729.5	25.5–29.9	4.4	4.53	100
8	11/23/79	16.31	2729.5–2732.5	29.9–32.9	3.0	2.75	92
Total:					32.9	33.62	

throughout both pelagic ooze and green clay sediments. The volcanic glass also occurs rarely as thin (<1 cm) layers.

We intended to drill Hole 507F along the strike of the mound ridge. As a result of the difficulty in positioning to better than ±10 meters, we believe the hole was actually drilled slightly off a mound. The uppermost sediment in this hole is a 3.5-meter-thick layer of siliceous foraminifer nannofossil ooze. Beneath this are 2 meters of green clay followed by pelagic ooze which continues to the bottom of the hole. Down to a depth of 15 meters, the pelagic sediment is a siliceous foraminifer nannofossil ooze. Then this sediment type changes downward, over 2 to 3 meters, into a foraminifer-nannofossil ooze which is approximately 14 meters thick (Fig. 4).

Hole 507H was drilled off a mound. Siliceous foraminifer nannofossil ooze constitutes the upper 13 to 14 meters of sediment. Below this there is a decrease in siliceous microfossils over about a 4-meter interval. This is underlain by 14 to 15 meters of foraminifer nannofossil ooze.

BIOSTRATIGRAPHY

Calcareous nannofossils, foraminifers, diatoms, radiolarians, and silicoflagellates are observed in the pelagic sediments recovered at Site 507. Calcareous nannofossils and planktonic foraminifers were used for biostratigraphic interpretation, although the relative abundance of the other microfossil groups were noted (see core descriptions).

Planktonic foraminifers were generally common and moderately preserved throughout the section, in contrast to the calcareous nannofossils which are generally poorly preserved. Poor preservation and the small size of the nannofossils made species identification and age determination impossible at many sample intervals. Fortunately the nannofossils at the base of each hole are well preserved and suitable for age determination. The base of Holes 507D, 507F, and 507H are assigned to the *Gephyrocapsa oceanica* Zone (0.27 to 0.44 Ma). Paleomagnetic data indicate a crustal age of 0.69 Ma, which would place the sediments overlying the crust in the *Pseudoemiliania* Zone of Gartner (1977). However, not a single specimen of *P. lacunosa* was observed. The absence of *P. lacunosa* indicates that the stratigraphic record is incomplete. This hiatus might have resulted from the nondeposition of sediments along the flanks of the crust near the spreading center (Klitgord and Mudie, 1974). Planktonic foraminifers also suggest a Quaternary age for the basal sediments.

Diatoms, radiolarians, and silicoflagellates are generally more abundant in the top 15 meters of Holes 507D, 507F, and 507H. From 0 to 15 meters sub-bottom, diatoms and radiolarians are generally common and moderately to well preserved. Within this interval silicoflagellates are rare, but well preserved. Below 15 meters sub-bottom all siliceous microfossil groups decrease in both abundance and preservation.

Calcareous Nannofossils

The nannofossil assemblages and zonal succession examined at Site 507 are the same as those observed at Site 506 except for a reduction in the state of preservation in cores taken both on and off mound sites. *Gephyrocapsa oceanica*, small *G.* spp. *Helicopontosphaera kamptneri*, and *Cycloccolithina leptopora* are the dominant species in all samples. Rarely occurring species include *Ceratolithus cristatus* and *Discoaster decorus* (reworked).

Planktonic Foraminifers

Planktonic foraminifers are common and generally moderately preserved above 17 meters sub-bottom. Below this level foraminifers are generally poorly preserved. The most abundant species found throughout the section is *Globoquadrina dutertrei. Globigerina bulloides, Globigerinoides sacculifer, G. ruber, Orbulina universa, Globorotalia menardii, G. scitula, G. tumida* and *Pulleniatina obiquiloculata* are generally common. *Globigerinella aequilateralis* is rare in all samples. No specimens of *Globorotalia truncatulinoides* were observed.

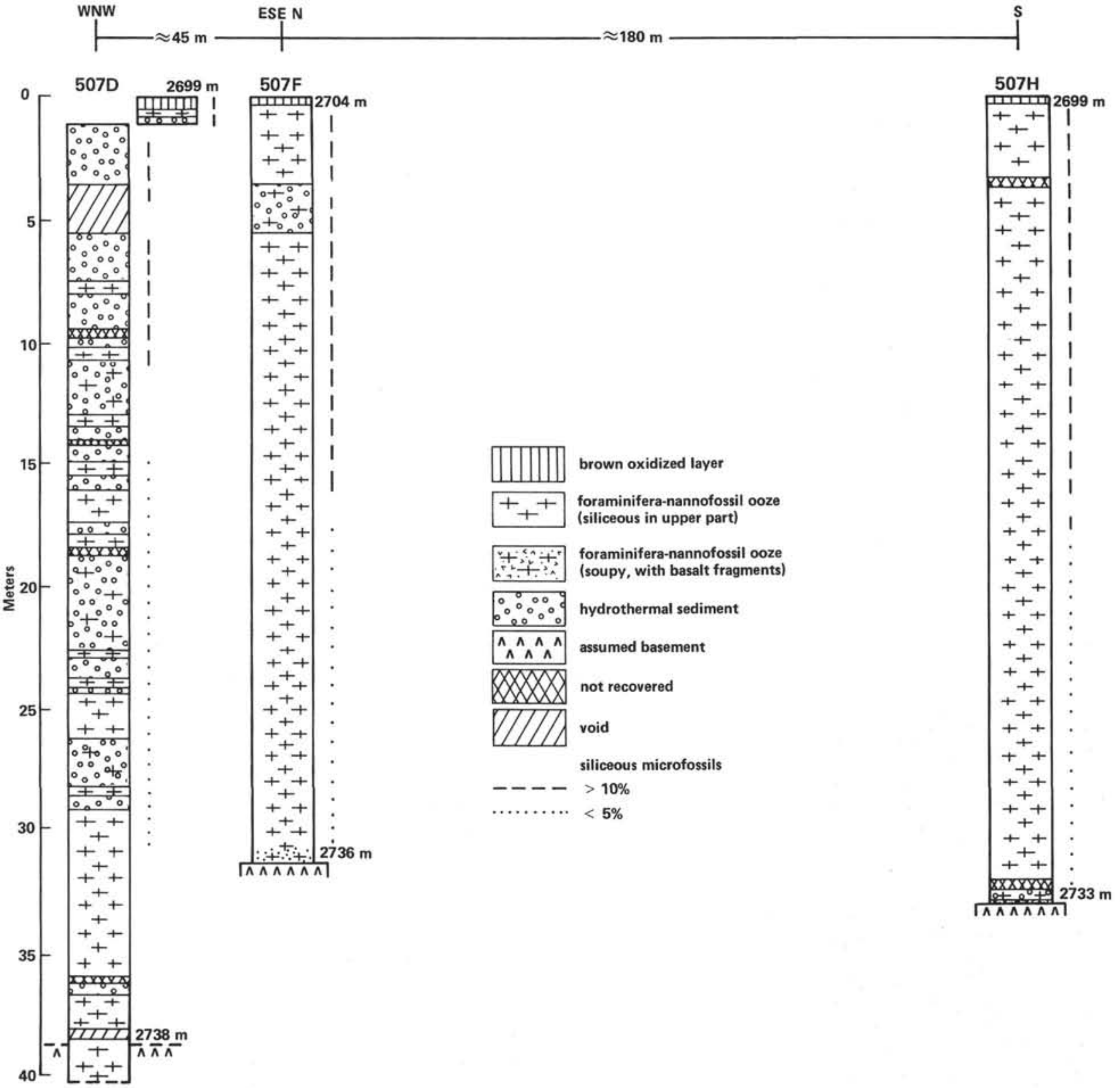

Figure 4. Lithostratigraphy, Site 507.

X-RAY DIFFRACTION ANALYSIS

Fifteen sediment samples from Site 507 were analyzed (Table 2). Sample preparation techniques and analytical methods are given in the Site 506 summary.

Results

One Mn-oxide sample from the uppermost 10 cm of core, Hole 507D was studied by X-ray diffraction. Todorokite was identified on the basis of two peaks, one at 9.9 Å and one at 4.9 Å. The d-spacings are slightly higher than those normally reported for todorokite (e.g., Burns and Burns, 1977). The sample was then treated with a 25% solution of hydroxylamine hydrochloride for 2 hr. at room temperature. After this treatment both the 9.9 Å and 4.9 Å peaks disappeared, confirming the presence of todorokite.

Nine samples were run in which nontronite was identified on the basis of one or more peaks. These samples were from Holes 507D and 507F.

Three samples were analyzed which had been selected from areas that appeared visually to be transitional between pelagic ooze and green clay. In two of these samples no clay peaks were identified. The third sample (Sample 507F-2-3, 37–39 cm) was split into two subsamples on the basis of color. Both subsamples contain nontronite, but the peaks are sharper and larger in the darker material. The darker material therefore probably contains more nontronite.

One sample of pelagic ooze was analyzed from Site 507C. The sample contains calcite and possibly a zeolite mineral which gives peaks close to those of a clinoptilolite standard from Datil, New Mexico, which was analyzed on board for comparison.

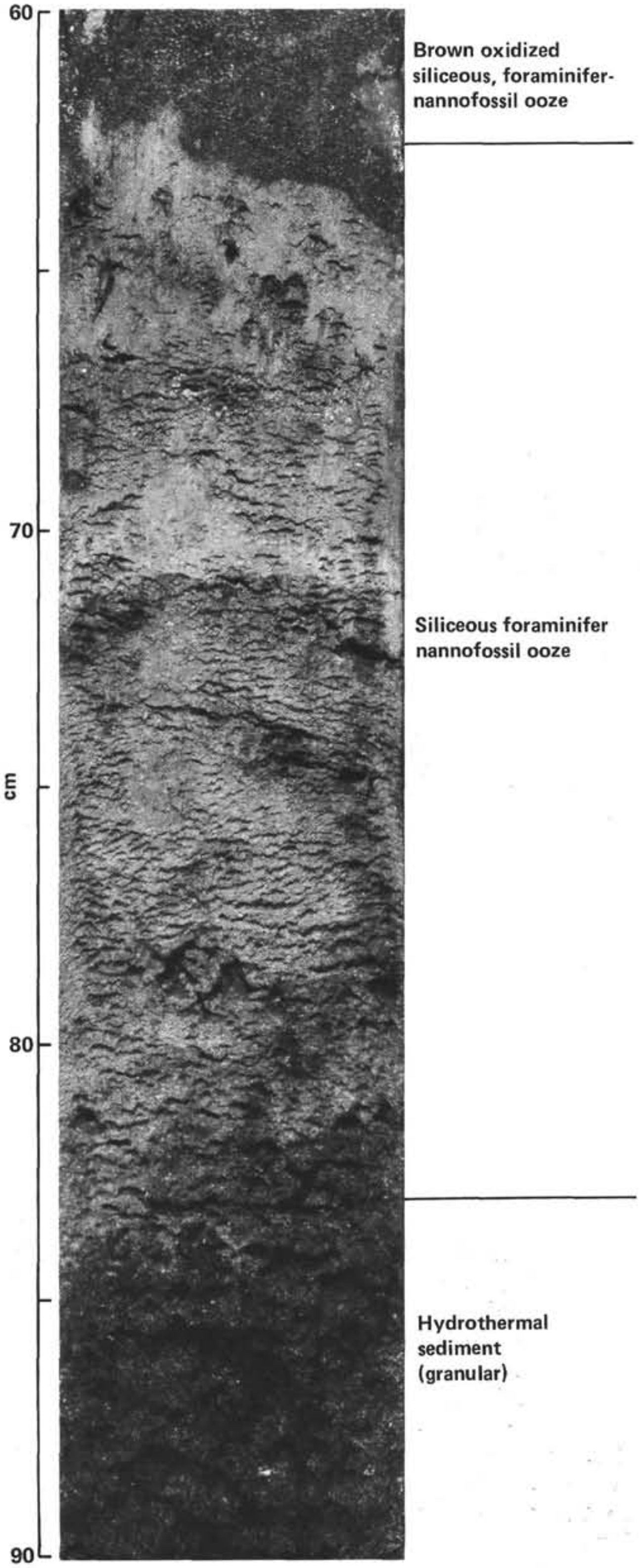

Figure 5. Surface core showing brown oxidized layer lying above normal pelagic ooze, which in turn overlies hydrothermal sediment, Sample 507D-1-1, 60-90 cm.

SEDIMENTATION RATES

A summary of estimates of sedimentation and accumulation rates appears in Table 3. Excluding the mounds site because of dissolution of pelagic sediments by hydrothermal activity, sedimentation and accumulation rates for the pelagic sediments are fairly uniform. Discrepancies between rates based on paleontologic and paleomagnetic data probably result from the difficulty in subdividing the biostratigraphic record over this short interval of geologic time or from the fact that the stratigraphic record is incomplete (see Biostratigraphy, Site 507).

PORE-WATER GEOCHEMISTRY

Pore-water data for Site 507 (Tables 4 and 5) are plotted in Figure 7 for Holes 507D (mounds hole) and 507F (off-mounds hole). The results show the three characteristics of mounds area holes (Sites 506, 507, and 509) outlined in the Site 506 report. These are:

1) A Ca enrichment of 0.5 to 2.0 mM and a Mg depletion of 1 to 3 mM with respect to bottom water, reflecting seawater–basalt exchange in the basement prior to the flow of water up through the sediments.

2) Variable and low Si concentrations in mounds sediments (507D), with somewhat higher and more constant silica concentrations in off-mounds sediments (507F). The low silica of mounds sediments probably reflects a low Si concentration in the ascending formation waters.

3) Low NH_3 concentrations in mounds sediments resulting from rapid flushing, and NH_3 concentrations in adjacent pelagic sediments which are higher and decrease with depth as a result of slower upward convection.

In situ samples 4, 5, and 6 had surface water chemistry and show contamination from drilling fluid. ISPW 7 was taken at the location of Hole 507I, from which hole no pore waters were centrifuged. It has the usual Ca excess, Mg deficiency, and high Si concentration.

With modified Reeburgh squeezes in an N_2-filled glove bag, six sections were squeezed (at room temperature) to collect pore waters for helium and neon analysis. Silica concentrations for these samples are tabulated at the end of Table 3. Since these samples were squeezed in an N_2 atmosphere, they cannot have lost silica by precipitation, with Fe^{2+} oxidized during squeezing. The low silica values in the top two samples thus show that the low values obtained by centrifugation do not result from silica removal with oxidized iron during pore-water separation. Silica values of deeper squeeze samples are higher than those of centrifuge samples, as a result of the higher sampling temperature.

PHYSICAL PROPERTIES

The wet-bulk density of pelagic sediments from this site ranges from 1.12 to 1.42 g/cm^3 and that of granular green clays from 1.24 to 1.54 g/cm^3. The porosity of pelagic sediments ranges from 76.1 to 93.9% and that of granular green clays from 70.7 to 87.5%. The sonic velocity of pelagic sediments ranges from 1.49 to 1.57 km/s and that of granular green clays from 1.52 to 1.64 km/s. The thermal conductivity of pelagic sediments is

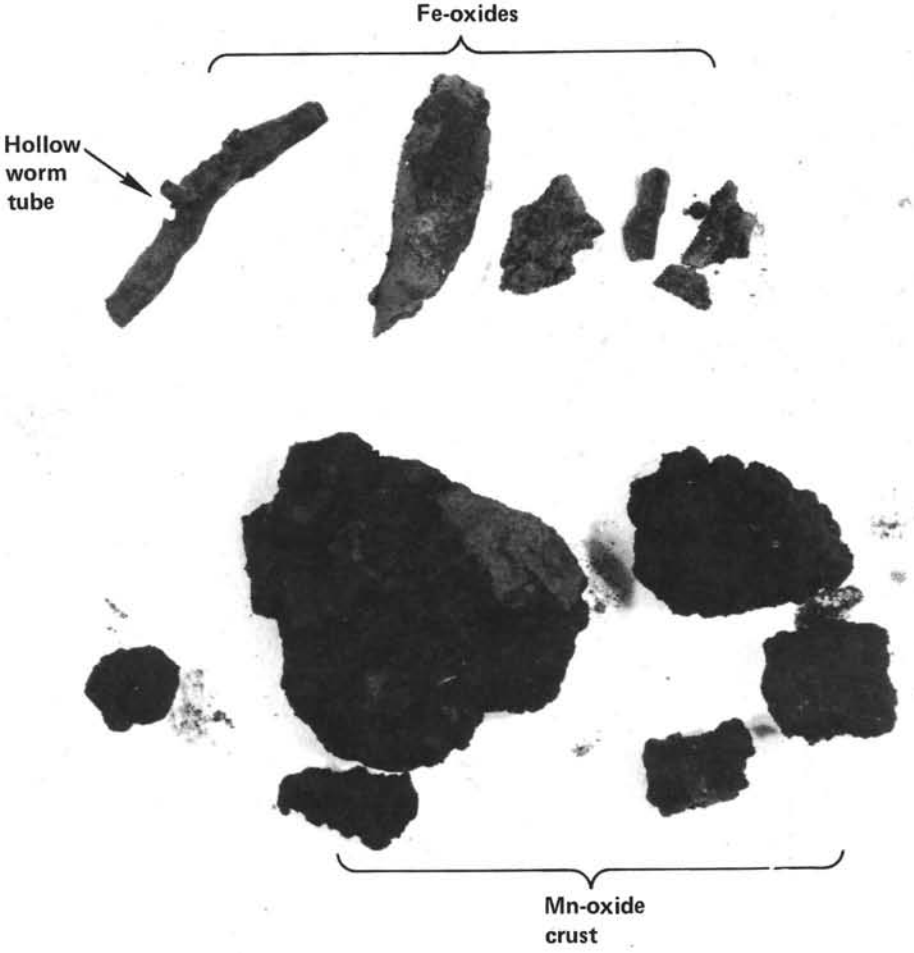

Figure 6. Manganese-oxide crust and Fe-oxide worm tubes, Sample 507D-1-1, 14–20 cm.

from 0.70 to 1.06 W/m•K and that of granular green clays from 0.72 to 0.85 W/m•K.

The wet-bulk density and thermal conductivity of pelagic sediments increase with depth. The sonic velocity of pelagic sediments is, on the other hand, fairly constant with depth.

HEAT FLOW

Thermal gradient measurements were made in four holes at Site 507: 507A, 507E, 507G, and 507I. The first of these was located near attempted basement cores, 507, 507B, 507C; the latter three were located adjacent to HPC sites, respectively 507D, 507F, and 507H. Detailed thermal conductivity studies on these three sediment cores allows the precise assessment of the effect of lateral and vertical variation in conductivity on local heat fluxes (Karato and Becker, this volume; Becker et al., this volume). All four heat-flow measurements were made in a zone of high heat flow at a field of mounds ridges. Holes 507A and 507I were apparently located between ridges, whereas 507E and 507G were taken along the strike of a single ridge. At Hole 507A, conductive heat flow of 436 mW/m^2 was measured. At Hole 507G hydrothermal discharge is indicated at about 20 cm/y., with a total heat flow of 530 mW/m^2. At Hole 507E, recharge is indicated at a similar rate, with a total heat flow of 234 mW/m^2. Temperatures suggested the possibility of slower discharge at Hole 507E, with a heat flow near 327 mW/m^2. See Becker et al. (this volume) for detailed discussion of these measurements.

SEDIMENT PALEOMAGNETISM

Site 507 was located about 24 km south of the Galapagos Spreading Center, where the basement age is approximately 0.69×10^6 years, based on 3.4 cm/y. half spreading rate, determined by Klitgord and Mudie (1974). The sediments at Site 507 were retrieved with the hydraulic piston corer, and reconnaissance paleomagnetic measurements were obtained using the long core vertical spinner magnetometer, which measures the horizontal components of remanence of whole (unsplit) sections of core up to 150 cm long. (Note: because of the equatorial location of all Leg 70 sites, the average inclination should be very near zero, so that the remanence is predominantly horizontal). Measurements were usually made at 10-cm intervals.

Preliminary paleomagnetic observations of Site 507 are very similar to those of Site 506. First, the upper seg-

Table 2. X-ray diffraction analysis, Site 507.

Sample (interval in cm)	Mineral	Major Peak (uncorr.)		Major Peak (corr.)	
		2θ	d(Å)	2θ	d(Å)
507C-1-1, 4–6	Calcite	35.7	2.51	35.9	2.50
	Halite	31.1	2.88	31.3	2.85
	Calcite	29.2	3.06	29.4	3.04
	Sylvite (internal std.)	28.1	3.18	28.8	3.15
507C-1-5, 12–14 (Nanno ooze)	Clinoptilolite(?)	39.2	23.0	39.4	2.29
	Clinoptilolite(?)	35.7	2.51	35.9	2.50
	Halite	31.5	2.86	31.5	2.84
	Sylvite	28.1	3.17	28.3	3.15
	(internal std.)	22.8	3.90	23.0	3.87
507D-1-1, 7–9		17.8	4.98	18.0	4.93
	Todorokite	8.7	10.2	8.9	9.94
		8.0	11.1	3.2	10.78
		7.8[a]	11.3	8.1	10.92
507D-1-1, 30–31 (Contact)	Halite	31.4	2.85	31.6	2.83
	Calcite	29.15	3.06	29.35	3.04
	Sylvite (internal std.)	28.1	3.18	28.3	3.15
507D-1-1, 85–88	Nontronite (smectite)	34.6	2.61	34.8	2.58
	Halite	31.4	2.85	31.6	2.83
		28.1	3.18	28.3	3.15
	Nontronite (smectite)	9.4	4.58	19.6	4.53
	Nontronite (smectite)	7.9	11.2	8.1	10.9
	Nontronite	7.4	11.95	7.6	11.63
	(smectite)	6.4	13.8	6.6	13.39
507D-1-1, 63–64 (Contact) (Brown to tan brown nanno ooze)	Calcite	39.1	2.30	39.3	2.29
	Calcite	35.7	2.51	35.9	2.50
	Halite	31.4	2.85	31.6	2.83
	Calcite	29.1	3.07	29.3	3.05
	Sylvite (internal std.)	28.1	3.18	28.3	3.15
507D-1-1, 63–64		22.75	3.91	22.95	3.88
507D-3-2, 144–145		32.5	2.75	32.7	2.74
	Sylvite (internal std.)	28.1	3.18	28.3	3.15
	Nontronite	19.3	4.60	19.5	4.55
	Nontronite	7.8	11.30	8.0	11.05
507D-4-1, 0–1	Nontronite	19.2	7.62	19.4	4.58
		19.9	4.46	20.1	4.42
	Nontronite	8.05	11.0	8.25	10.72
	Nontronite	7.8	11.3	8.0	11.05
		7.55	11.7	7.75	11.41
	Nontronite	7.3	12.1	7.50	11.79
	Nontronite	6.6	13.4	6.8	13.00
		5	17.7	5.2	16.99
		4.15	21.2	4.35	20.31
507D-4-2, 149–150		34.3	2.61	34.5	2.60
	Sylvite (internal std.)	28.1	3.18	28.3	3.15
	Nontronite	19.3	4.60	19.5	4.55
	Nontronite	7.8	11.3	8.0	11.05
		7.2	12.3	7.4	11.95
		6.7	13.2	6.9	12.81
507D-10-1, 32–35 (Light green mixture of ooze and green clay)	Calcite	29.1	3.07	29.3	3.05
		27.5	3.24	27.7	3.22
		27.0	3.30	27.2	3.29
	Nontronite	19.3	4.60	19.5	4.55
		15.3	5.79	15.5	5.72
		11.0	8.04	11.2	7.90
	Nontronite	7.8–6.6	11.5–13.4	8.0–6.8	11.05–13.00
507F-2-2, 89–91	Halite	31.5	2.84	31.7	2.82
	Sylvite (internal std.)	28.15	3.17	28.35	3.15
507F-2-2, 89–91	Nontronite	19.3	4.60	19.50	4.55
		8.0	11.05	8.2	10.78
	Nontronite	6.3–7.3	14.0–12.1	6.5–7.5	13.50–11.79
507F-2-3, 37–39 (Dark green in "green" clay)	Nontronite	34.7	2.61	34.9	2.57
		27.8	3.21	28.0	3.19
		19.8	4.48	20.1	4.42
	Nontronite	19.3	4.60	19.5	4.55
		7.9	11.2	8.1	10.92
	Nontronite	7.6	11.6	7.8	11.33
		6.6	13.4	6.8	13.00
507F-2-3, 37–39 (Light material of green clay)	Nontronite	34.5	2.60	34.7	2.59
	Halite	31.4	2.85	31.6	2.83
	Sylvite	28.2	3.16	28.4	3.14
	(internal std.)	19.4	4.58		

[a] A plane glass slide gives a peak at 7.8°2θ. An overlay of this diffractogram is used to subtract out any effects of the glass slide.

Table 3. Sedimentation rates, Site 507.

Hole	S^a (m)	Sedimentation Rate (cm/10^3 y.)		P^b (%)	Sediment Accumulation Rate (cm/10^3 yrs.)		Average Grain Density (g/cm^3)	Accumulation Rate (g/cm^2/10^3 y.)	
		A	B		A	B		A	B
507D	38.7	8.80	5.76	84.83	1.33	0.875	2.79	3.71	2.44
(mounds)		14.33							
507F	31.3	7.11	4.66	82.34	1.25	0.824	2.62	3.28	2.19
(mound flank)		11.60			2.05			5.37	
507H	32.9	7.48	4.90	82.51	1.31	0.857	2.61	3.40	2.23
(off-mound)		12.19			2.13			5.55	

Note: Sedimentation accumulation rate = $[(1 - P) \times \text{sediment thickness}/t]$, where t = time. Accumulation rate = sedimentation accumulation rates × average grain density. Columns lettered "A" show minimum and maximum values based on paleontological evidence. Paleontological evidence estimates the age at the bottom of each hole to be $270–440 \times 10^3$ y. Columns lettered "B" are values based on spreading rates taken from Klitgord and Mudie (1974). Spreading rate estimates assign an age of approximately 540×10^3 y. for the ocean crust in the area.

[a] S = Sediment thickness (recorded drilling thickness).

[b] P = Porosity (fractional void space) = (void space)/(total volume); values are averages taken from the Physical Properties section.

Table 4. Shipboard pore-water data, Holes 507D, 507F.

Core-Section	ISPW No.	Sub-bottom Depth (m)	SiO_2 (μM)	NH_3 (μM)	S^{2-} (μM)	Ca^{2+} (mM)	Mg^{2+} (mM)	Cl (‰)	S (‰)
Hole 507D									
3-1	63	6.79–6.90	160	<4[a]	n.d.	10.40	51.74	18.19	35.5
3-3	64	9.19–9.29	270		n.d.				
4-1	65	11.19–11.30	350	<4	n.d.	11.56	51.93	18.32	35.2
4-3	67	13.79–13.90	250		n.d.	11.70			
5-1	68	15.60–15.70			n.d.	11.41			
5-3	69	18.39–18.50	350	<4	n.d.	10.66	51.61	18.09	35.5
6-3	70	22.95–23.06	260	9	n.d.	10.82	51.85	17.96	35.2
7-1	71	24.40–24.50	410		n.d.				
8-1	72	28.79–28.90	310		n.d.				
8-3	73	31.57–31.67	400	<4	n.d.	10.61	51.48	18.06	35.2
9-1	74	33.20–33.30	450		n.d.				
9-3	75	35.80–35.90	370	<4	n.d.	10.68	51.76	18.18	35.2
2-2	56	3.48–3.55	150						
3-2	57	7.60–7.67	340						
5-2	59	16.84–16.91	490						
7-2	60	25.93–26.00	460						
8-2	61	30.33–30.47	460						
9-2	62	34.72–34.90	480						
Hole 507F									
1-1	76	1.40–1.50	570	24	n.d.	10.11	51.92	17.90	34.9
2-1	77	3.80–3.90	340	11	n.d.	10.18			
2-2	78	5.30–5.40	410		n.d.	11.32	52.57	18.22	35.5
2-3	79	6.79–6.89	390		n.d.				
3-3	80	10.91–11.02	510	7	n.d.	11.22	51.80	18.25	35.2
4-1	81	12.59–12.70	490		n.d.				
4-3	82	15.19–15.30	410		n.d.	10.86	51.92	18.09	35.2
5-1	83	16.99–17.10	420	<4	n.d.				
5-3	85	19.85–19.96	450		n.d.				
6-1	86	21.39–21.50	430	<4	n.d.	11.01	51.95	18.22	35.2
7-1	87	25.79–25.90	440	<4	n.d.				
7-3	88	28.57–28.67	410			10.86	51.92	18.03	35.2

Note: n.d. = not determined.

[a] Upper limit taken as 4 μM, from largest blank absorbance range on one day.

Table 5. Shipboard pore-water data for *in situ* samples, Site 507.

Sample	SiO_2 (μM)	Ca^{2+} (mM)	Mg^{2+} (mM)	Cl (‰)	S (‰)
Hole 507A 1W84 ISPW #4	61	10.19		17.58	
Hole 507G 1W84 ISPW #6		9.84	50.32	17.16	33.3
Hole 507I 1W89 ISPW #7	540	11.60	51.44	19.02	34.4

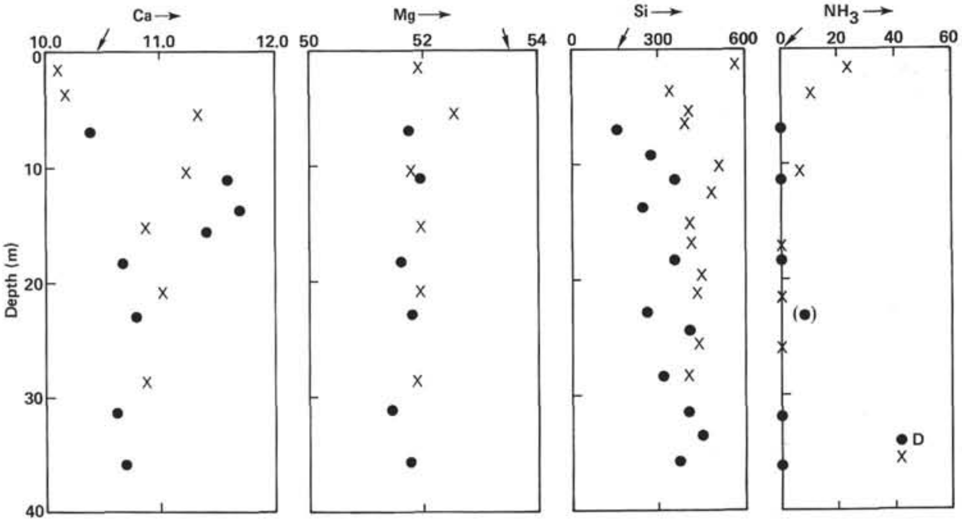

Figure 7. Pore-water chemistry, Site 507. (Ca and Mg concentrations in mM/l; Si and NH_3 concentrations in μM/l. Arrows indicate bottom water concentrations.)

ments of almost all cores, from 50 to more than 150 cm, were usually disturbed magnetically, primarily as a result of rust flakes from the drilling pipe which were embedded in the sediment. Such disturbance was exhibited both by incoherent relative declinations and sudden jumps in the remanence intensity, spanning as much as three orders of magnitude. Second, no reversals were detected in any of the Site 507 sediment columns. Third, whenever lithologic transitions occurred within lower and magnetically less disturbed portions of the cores, there were no significant differences between the magnetic directions and remanence intensities of the foraminifer nannofossil ooze and the green black hydrothermal clays.

IGNEOUS PETROLOGY AND LITHOSTRATIGRAPHY

Basalt was retrieved from five holes at Site 507 (Table 6). The same basement drilling characteristics existed here as at Site 506. At two holes (507B, 507C) hardrock drilling produced a total penetration of only 12 meters with about 1.5 meters recovered. Basalt shards and small fragments were also recovered in the HPC from Holes 507D, 507F, and 507H. As at Site 506, the recovered basalt is fragmented.

Table 6. Results of basalt coring activities.

Hole	Sediment Thickness above Basalt (m)	Penetration into Basalt (m)	Recovery (%)
507B	31	7	11
507C	24.5	5	15
507D	83.7	*	*
507F	31.3	*	*
507H	32.9	*	*

Note: * = fragments of basalt retrieved in core catcher of hydraulic piston corer.

At Hole 507B, the basalts are fine- to coarse-grained, aphyric to very sparsely plagioclase phyric, and partly altered. Three lithologic units are tentatively defined (on the basis of grain-size variation, degree of vesiculation, and the presence or absence of a glassy rim):

1) Unit 1, 0–15 cm, is fine-grained aphyric basalt (Pieces 1 and 2) with numerous pinpoint vesicles.

2) Unit 2, 16–62 cm, is coarse-grained aphyric basalt, with numerous round or irregularly shaped vesicles.

3) Unit 3, 62–80 cm, is fine-grained aphyric or very sparsely plagioclase phyric basalt. Piece 26 has a glassy rim. The pinpoint vesicles are numerous.

At Core 507C-2, the three recovered fragments are fine-grained aphyric basalts, with numerous pinpoint vesicles. No cooling unit can be determined. At Core 507C-3, two cooling units can be tentatively determined.

1) Unit 1, 0–28 cm, fine-grained aphyric basalt with numerous pinpoint vesicles.

2) Unit 2, 28–35 cm, very fine-grained aphyric basalt with a glassy rim on one side.

Almost all basalts show an altered rim (see Basalt Alteration).

In thin sections two textural types were delineated: hyalopilitic and ophitic to intergranular. Three thin sections reveal hyalopilitic textures (Samples 507B-1-1, 11 cm; 507C-2-1, 13 cm; and 507C-3-1, 32 cm). They are all aphyric to very sparsely plagioclase phyric basalts with 30 to 60% plagioclase and 25 to 30% pyroxene. Three thin sections show ophitic to intergranular textures (Samples 507B-1-1, 13 cm; 507B-1-1, 45 cm; and 507B-1-1, 54 cm). They all are aphyric, coarse-grained, or medium coarse-grained, with about 50% plagioclase and 25 to 35% clinopyroxene. Some intersertal areas have been found in one sample (Hole 507B, Piece 21).

The dominant opaque mineral present is titanomagnetite (comprising 95–98% of the opaques); alteration of this phase to titanomaghemite was observed in a few grains from Sample 507B-1-1, 53–55 cm. Opaques constitute from less than 5% to 12% by volume in each of the samples from Site 507. Other opaque minerals present are pyrite, pyrrhotite, and chalcopyrite. Sulfides occur as primary spherules in a silicate matrix, or as secondary grains and very minor veinlets. The only secondary sulfide recognized is pyrite. The other sulfide species are multiple-phase sulfide spheres. These spheres are often flattened against titanomagnetite or rimmed with a fine-grained titanomagnetite.

Basement Alteration

The subophitic basalts are fresh. Macroscopically, most of the hyalopilitic samples clearly show an altered rim, which occurs all around the fragments of basalt when the pieces have not been broken by drilling. Some gradation in the color of this alteration rim can sometimes be observed (from the fresh basalt to an exposed surface: dark gray, brown, dark brown, black). These altered rims are rather thicker (average: 8 mm; maximum: 15 mm) than in Hole 506. In these altered rims, almost all the vesicles are filled with or coated by green, yellow, or brown material, whereas vesicles in the fresh basalt are empty.

Microscopic examination confirms the presence of different zones of alteration. For instance, from the exterior to the interior of the Sample 507C-3-1 (Piece 36), the vesicles are successively filled by:

1) Iron hydroxides;

2) Iron hydroxides and green smectite; smectite occurs as an external rim of the vesicles, with iron hydroxides filling the vesicle interior. Such vesicles may occasionally be present in Zones 1 and 3;

3) Green smectite (filling or coating);

4) Void.

Smectite and iron hydroxides also fill irregularly shaped voids between silicates or replace glass. In the altered area of this sample, the amount of smectite is about 10%, and the amount of iron hydroxide is 5%. Thus, most of the fragments of the hyalopilitic basalts are slightly altered (green smectite and iron hydroxide formation). As in Site 506, this alteration may be the result of the interaction of seawater with the basalt. No sign of hydrothermal alteration was observed.

Physical Properties (basement)

The wet-bulk density of three basalts (Samples 507B-1-1, 18–20 cm; 507B-1-1, 43–45 cm; and 507C-3-1, 28–30 cm) from Site 507 ranges from 2.92 to 2.99 g/cm³; porosity from 3.1 to 6.5%; velocity from 5.42 to 5.58 km/s; and thermal conductivity from 1.73 to 1.76 W/m•K.

BASEMENT PALEOMAGNETISM

Site 507 is located about 24 km south of the Galapagos Spreading Center. Using a 3.4 cm/y. half spreading rate (Klitgord and Mudie, 1974), its basement age is about 0.69×10^6 years. Because of poor penetration and recovery at Site 507, only three oriented and two unoriented minicores were sampled for shipboard paleomagnetic investigations. The paleomagnetic measurements and the discussions associated with the results are essentially identical to those for Site 506. The uncertainties below, associated with the mean values of the magnetic parameters, represent one standard deviation.

$\overline{J}_{NRM} = 22 \pm 12 \times 10^{-3}$ gauss (G), a value indistinguishable from that at Site 506.

$\overline{\chi} = 2.38 \pm 0.58 \times 10^{-3}$ G/Oe.

$\overline{Q} = 33 \pm 28$, illustrating the dominance of remanent relative to induced magnetization.

The stability of the remanence with respect to AF demagnetization is characterized by peak median demagnetizing fields between 73 and 188 Oe, and the stable directions are always very similar to the NRM directions.

The inclinations at Site 507 are shallow. $I_{NRM} = 10°$, 14°, and $-12°$, and $I_{STABLE} = 8°$ and 8°.

Thus, all the magnetic results of the Site 507 samples are consistent with the observed high amplitude magnetic anomalies and the site's proximity to the equator.

CONCLUSIONS

Site 507, centered at 0°34.0′N, 86°05.4′W, is located within a concentrated grouping of mounds and mound ridges. It is about 4 km south of Site 506 and 23.5 km south of the Galapagos Spreading Center. Mounds occur on the north flank of a relatively broad elevation, the slope of which appears interrupted by small faults. Six holes were cored or drilled, four heat-flow measurements and *in situ* pore-water samples were collected.

Hole 507D was cored in the mounds sediments (penetration, 38.7 m; recovery, 94%). Hole 507F was cored at the edge of the same mound (penetration, 31.3 m; recovery, 99%), and Holes 507 and 507H were cored north and south of the same mound, respectively (penetrations, 3 and 33 m, respectively; recovery, 98%). We attempted to drill two holes into the basement off the mounds with little success. Hole 507B penetrated 7 meters with a 9% recovery, whereas Hole 507C penetrated 29.5 meters with a 96% recovery in sediments and 6% recovery in the basement.

Holes 507A, 507E, 507G and 507I were drilled for heat-flow measurements and pore-water samples. The first two holes are located, respectively, north and south of the mound hole 507D, whereas the last two holes are located, respectively, near the edge and center of the same mound (Hole 507D).

Hole 507D, cored into a mound, recovered 26 meters of interbedded green hydrothermal clays and pelagic sediments, separated from the basement by 8 meters of pelagic oozes. In contrast to Site 506, the hydrothermal products extend virtually up to the mound surface where a thin manganese-oxide crust is present, suggesting that some hydrothermal materials were recently deposited. At Hole 507F, apparently on a mound flank, 2 meters of green hydrothermal clays were found in the upper portion of a 31-meter-thick core composed of calcareous ooze. Smectite, todorokite, and clinoptilolite were identified by X-ray diffraction in the green clays, the Mn-oxides, and the pelagic oozes, respectively.

The fossil assemblages at Site 507 were essentially the same as at Site 506. However, the radiolarians and diatoms are less abundant and more poorly preserved, especially below 12 meters sub-bottom depth. An age of 0.27 to 0.44 m.y. is inferred for the basal sediments from the paleontological data, leaving a hiatus of at least 0.25 m.y. with the age of the basement, estimated to be 0.69 m.y. from the spreading rate.

There appears to be better evidence at this site for the formation of the green clays by coating and partial replacement of the siliceous organisms. But the possibility of sediment slumping from the mounds down to off-mounds areas still exists.

Pore-water chemistry, as at Site 506, is characterized by slight Ca excess and Mg deficiency relative to bottom water, reflecting reaction with basement. Low ammonia concentrations and constant calcium concentrations indicate rapid convection.

Physical and thermal properties are basically the same as in the sediments of Site 506. Heat-flow measurements agree with previous short probe determinations. Nearly linear temperature gradients suggest a present conductive thermal regime.

The basalts recovered in the various holes of Site 507 are either fine-grained aphyric to sparsely plagioclase phyric or coarse-grained subophitic. The latter appear to be fresh whereas the former display black halos, indicating a low temperature alteration with infilling of pore spaces by green smectites and iron hydroxides. No sign of hydrothermal alteration is observed. The shape of the alteration bands indicate that the basalt pieces belonged to a fragmented basement which has been further broken during drilling.

Like those of Site 506, the basalts of Site 507 have high magnetization intensities (average NRM intensity of 22 mG), high ratios of remanence to induced magnetization (average Q of 33), and shallow inclinations (both positive and negative, less than 15%), consistent with the high-amplitude magnetic anomalies and equatorial location of the site.

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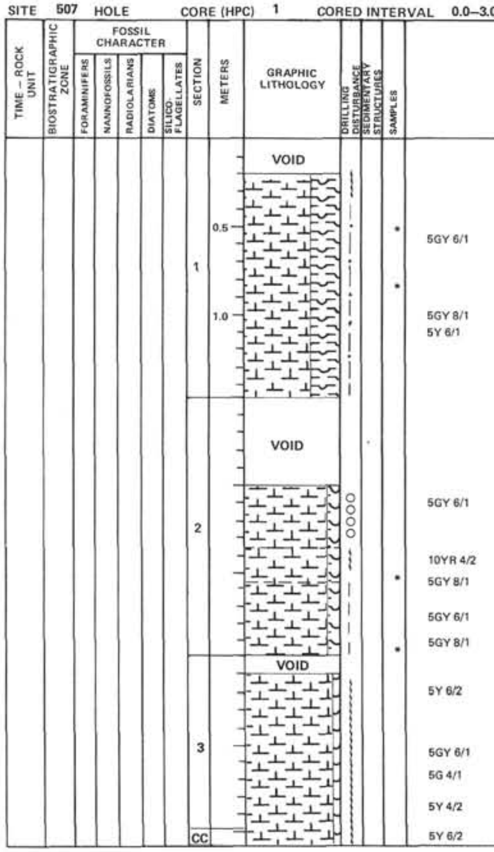
SITE 507 HOLE CORE (HPC) 1 CORED INTERVAL 0.0–3.0 m



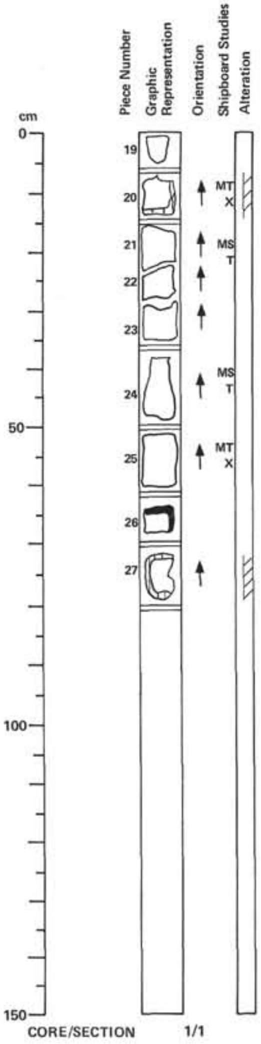
LITHOLOGIC DESCRIPTION

DIATOM NANNOFOSSIL OOZE

Variegated multicolored greenish gray to light greenish gray diatom nannofossil ooze. Lenses and mottles of green clay scattered throughout. No biogenic sedimentary structures observed because of drilling disturbance.

SMEAR SLIDE SUMMARY (%)

	1-54	1-86	2-104	2-149
COMPOSITION:				
Clay minerals	5	5	2	–
Volcanic glass (light)	–	2	TR	TR
Micronodules	–	TR	2	TR
Carbonate unspc.	10	–	10	5
Foraminifers	5	5	5	5
Calc. nannofossils	5	65	65	50
Diatoms	35	15	15	7
Radiolarians	5	5	5	5
Sponge spicules	5	TR	–	TR
Silicoflagellates	TR	TR	TR	TR
Green clay	30	TR	–	25



70-507B-1 **Depth: 31.0–38.0 m**

1-1, Pieces 19–27

Dominant Lithology: Fine- to coarse-grained, aphyric to very sparsely phyric basalt. Seven out of the nine recovered pieces are oriented and the division of the cored samples into three cooling units is mainly based on the grain-size variation, texture, and phenocryst composition of these stratigraphically valid samples. The cooling units are: Unit 1) Pieces 19 and 20; Unit 2) Pieces 21 through 25; and Unit 3) Pieces 26 and 27. Vesicles are scattered throughout the samples and partly filled or rimmed with blue and/or green smectite, iron-oxides, or calcite [or zeolite(?) in Pieces 22, 23, and 24]. This incipient alteration is restricted to dark rinds on most samples.

Thin Section Descriptions

1-1, 10–13 cm (Piece 20):

Name: Sparsely plagioclase phyric basalt

Texture: Hyalopilitic

Phenocrysts: Less than or equal to 1% lathy plagioclase (0.5x0.3 mm)

Groundmass: 43% plagioclase (0.04x0.5 mm) microlites; 24% clinopyroxene (0.04x0.25 mm) anhedral; 5% magnetite (0.003x0.06 mm) skeletal; 20% glass

Vesicles: 4% (0.03–0.3 mm) scattered spherical with smectite fillings or empty

1-1, 16–22 cm (Piece 21):

Name: Subophitic basalt

Texture: Ophitic to intergranular

Phenocrysts: None

Groundmass: 50% plagioclase (0.1–0.8x0.00–0.02 mm) laths; 35% clinopyroxene (0.05–0.05x0.2 mm) anhedral grains; 10% titanomagnetite, skeletal; 5% glass

Vesicles: None

1-1, 43–46 cm (Piece 24):

Name: Coarse-grained subophitic basalt

Texture: Ophitic to intergranular

Phenocrysts: None

Groundmass: 46% plagioclase (0.2–0.6x0.05–1 mm) laths; 38% clinopyroxene (0.1x0.5 mm) anhedral grains; 7% titanomagnetite (0.05x0.2 mm) skeletal crystals; 8% glass

Vesicles: 1% (empty)

1-1, 53–55 cm (Piece 25):

Name: Subophitic basalt

Texture: Ophitic to intergranular

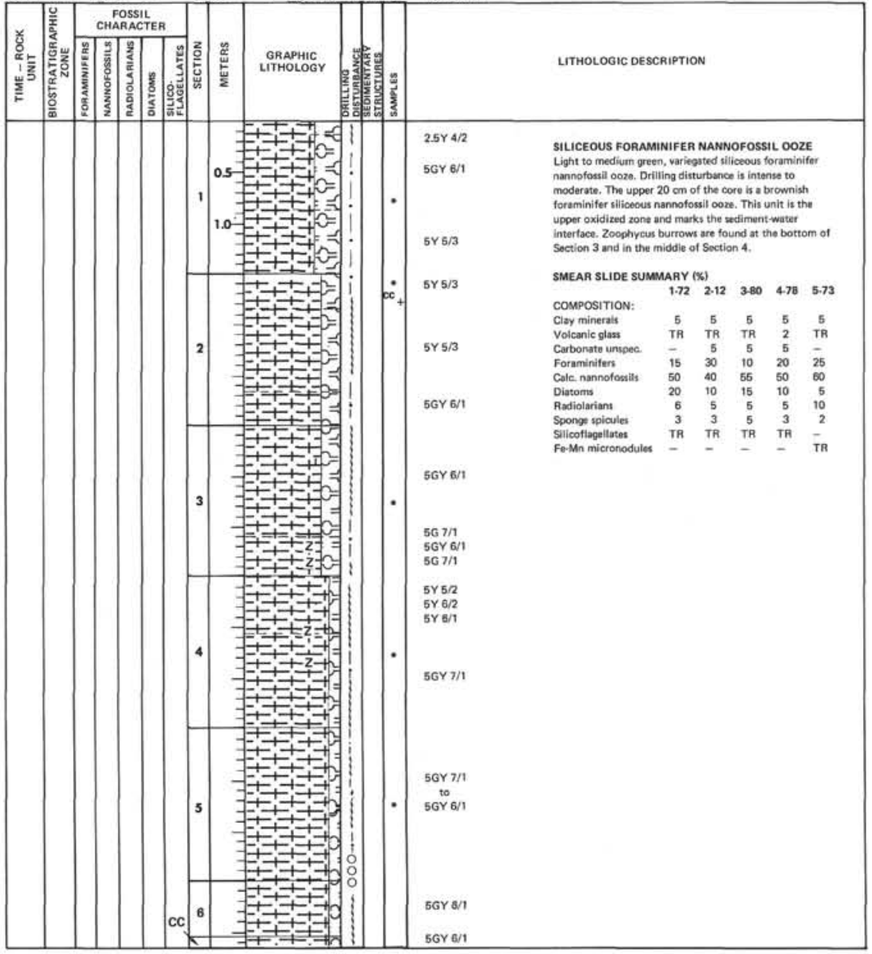
Phenocrysts: None

Groundmass: 46% plagioclase (0.2–0.4x0.05–0.1 mm) laths; 34% clinopyroxene (0.3x0.1 mm) anhedral grains; 5% titanomagnetite, (0.04x0.1 mm) skeletal crystals; 10% glass

Vesicles: 4%, empty

Alteration: Less than 1% carbonate in glassy areas

SITE 507 HOLE C CORE 1 CORED INTERVAL 0.0–8.5 m



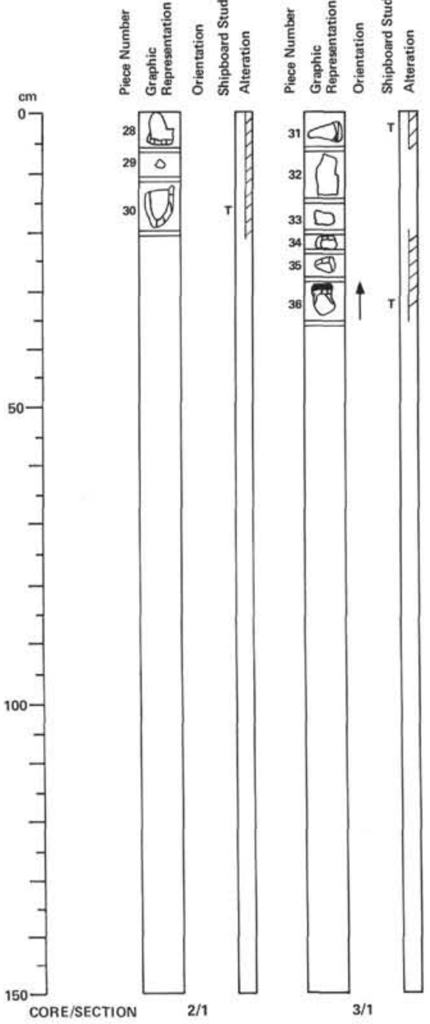
LITHOLOGIC DESCRIPTION

SILICEOUS FORAMINIFER NANNOFOSSIL OOZE

Light to medium green, variegated siliceous foraminifer nannofossil ooze. Drilling disturbance is intense to moderate. The upper 20 cm of the core is a brownish foraminifer siliceous nannofossil ooze. This unit is the upper oxidized zone and marks the sediment-water interface. Zoophycus burrows are found at the bottom of Section 3 and in the middle of Section 4.

SMEAR SLIDE SUMMARY (%)

	1-72	2-12	3-80	4-78	5-73
COMPOSITION:					
Clay minerals	5	5	5	5	5
Volcanic glass	TR	TR	TR	2	TR
Carbonate unspec.	–	5	5	5	–
Foraminifers	15	30	10	20	25
Calc. nannofossils	50	40	55	50	60
Diatoms	20	10	15	10	5
Radiolarians	6	5	5	5	10
Sponge spicules	3	3	5	3	2
Silicoflagellates	TR	TR	TR	TR	–
Fe-Mn micronodules	–	–	–	–	TR



70-507C-2

2-1, Pieces 28–30

Dominant Lithology: Fine-grained, aphyric basalt. Three pieces of basalt were recovered and none of the pieces are orientable. Vesicles (approximately 0.5 mm in diameter) are common, scattered throughout the samples. Vesicles are often coated or filled with blue or green smectite. Also, the vesicles in Piece 30 have a few larger vesicles (0.1–0.3 mm) partly filled with calcite(?) and Fe-oxides.

Thin Section Description

2-1, 12–14 cm (Piece 30):

Name: Very sparsely phyric, fine-grained basalt

Phenocrysts: Less than 1% euhedral plagioclase (0.2x0.2 mm)

Groundmass: 45% plagioclase (0.08x0.5 mm) microlites; 25% clinopyroxene (0.02x0.05 mm) anhedral grains; 4% skeletal titanomagnetite (less than 10 cm); 12% glass

Vesicles: 7%, scattered, some filled with smectite toward edge of sample

Alteration: 3% smectite filling vesicles and replacing glass, 4% Fe-oxide associated with smectite and filling vesicles

70-507C-3

3-1, Pieces 31–36

Dominant Lithology: Fine-grained aphyric basalt. The top 5 pieces of basalt are grouped into one cooling unit based on textural similarity, vesiculation, and grain size variation. Piece 36 (the 6th and last piece of basalt recovered in this section) has a glassy rim, is finer grain size in general and has a slightly different mineralogy than the upper 5 pieces; therefore it is grouped alone as cooling unit number 2. Alteration rinds exist on 4 of the 6 recovered samples. The alteration comprises smectite filled voids, slight Fe-oxide staining, void filling and minor secondary pyrite associated with the smectite.

Thin Section Descriptions

3-1, 12–14 cm (Piece 32):

Name: Fine-grained aphyric basalt

Phenocrysts: None

Groundmass: 5% plagioclase (0.3x0.01 mm) microlites; 30% clinopyroxene (0.05x0.03 mm) grains; 8% titanomagnetite (0.02 microns diameter) skeletal grains; 7% glass

Vesicles: 5%, scattered, 0.5 mm diameter, empty

3-1, 31–35 cm (Piece 36):

Name: Fine-grained, very sparsely phyric basalt

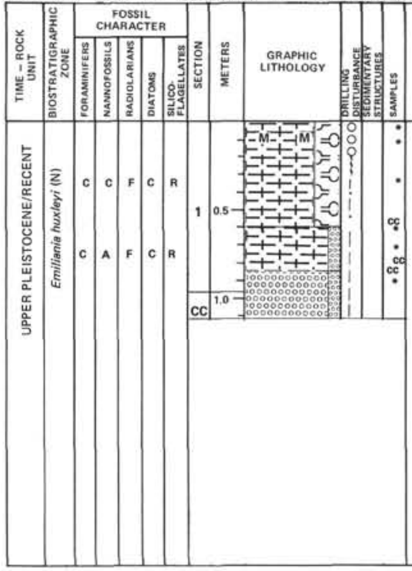
Phenocrysts: 2% plagioclase (0.5x0.3 mm) large, blocky laths

Groundmass: 30% plagioclase (0.01x0.2 mm) microlites, 28% (0.02x0.1 mm) clinopyroxene grains; 20% magnetite(?), 0.01 diameter; skeletal crystals; 15% glass

Vesicles: 5%, (0.15 mm diameter) some filled with smectite

Alteration: In altered rim, 10% smectite and 5% Fe-hydroxides, filling vesicles and replacing glass

SITE 507 HOLE D CORE (HPC) 1 CORED INTERVAL 0.1–1.0 m



5YR 2.5/2
5YR 2.5/1
5YR 2.5/2
(5Y 6/4)
5GY 6/4
5GY 6/1
N2 to 5G 2/6
5GY 4/1
5GY 2/1

LITHOLOGIC DESCRIPTION

SILICEOUS FORAMINIFER NANNOFOSSIL OOZE

Multicolored, variegated, dark brown, light to dark green siliceous foraminifer nannofossil ooze. The dark brown soupy sediment-water interface is more siliceous in composition. As the sediment becomes firmer mottles appear. They are lighter (5Y 6/4).

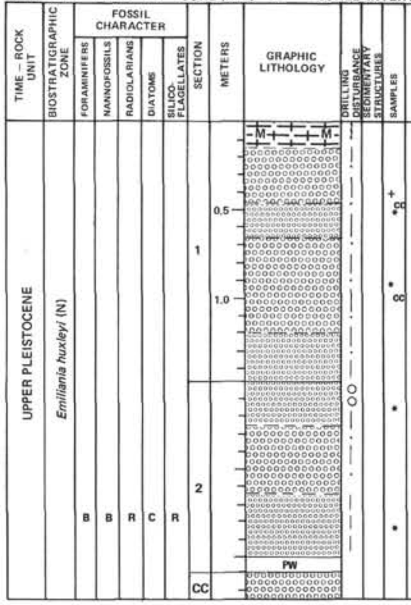
HYDROTHERMAL SEDIMENT

82–94 cm: granular greenish black to black clay in bottom ten centimeters of core and in the Core-Catcher. The upper contact of this unit with nannofossil ooze is gradational with some interlaminations of both sediment types occurring from 62–82 cm.

SMEAR SLIDE SUMMARY (%)

	1-1	1-11	1-33 (M)	1-64	1-78	1-90
COMPOSITION:						
Amor. iron-oxide	–	15	35	15	–	–
Clay minerals	–	–	–	15	–	–
Volcanic glass (light)	–	–	–	TR	3	
Micronodules	–	5	–	5	–	
Carbonate unspec.	–	–	–	5	5	
Foraminifers	20	10	10	15	30	2
Calc. nannofossils	50	40	35	45	30	2
Diatoms	15	15	10	10	10	3
Radiolarians	15	15	10	10	5	3
Sponge spicules	–	TR	–	2	2	–
Green clay	–	–	–	–	15	90

SITE 507 HOLE D CORE (HPC) 2 CORED INTERVAL 1.0–5.4 m



5YR 4/4
5YR 4/4
5YR 4/4
5Y 2/1
2.5Y 4/4
5GY 2/1
2.5Y 4/4
2.5Y 4/4
5GY 2/1
5GY 2/1
5G 4/1
5GY 2/1
5G 4/1

LITHOLOGIC DESCRIPTION

HYDROTHERMAL SEDIMENTS

Moderate brown pelagic ooze coating granular particles of brownish black Mn-oxide crusts (0–14 cm). The remainder of the core is composed of greenish black to olive black hydrothermal clay. The hydrothermal clays alternate from granular (SR9) to finer grained (SR10) textures. The more coherent layers are fine grained. This repeating coarse to fine grained stratigraphy cannot be interpreted as graded bedding because of the severe drilling disturbance and the possible hydrothermal origin for these sediments.

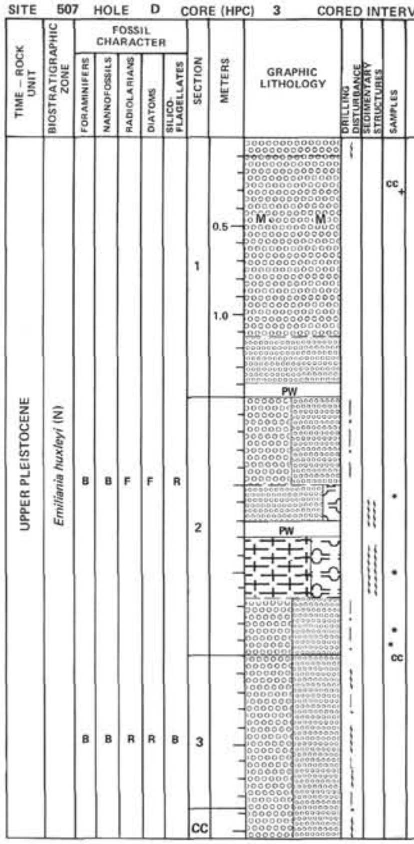
SMEAR SLIDE SUMMARY (%)

	1-56	1-100	2-18	2-85
COMPOSITION:				
Volcanic glass (light)	–	–	–	TR
Micronodules	TR	1	TR	–
Carbonate unspec.	5	TR	TR	7
Calc. nannofossils	–	–	TR	–
Diatoms	TR	–	TR	7
Radiolarians	5	TR	TR	10
Sponge spicules	TR	TR	–	TR
Silicoflagellates	–	–	TR	–
Green clay	90	95	98	75

CARBON-CARBONATE (%)

	1, 45–47
Organic Carbon	0.39
Total Carbonate	0.00

SITE 507 HOLE D CORE (HPC) 3 CORED INTERVAL 5.4–9.8 m



5GY 2/1
5GY 2/1
5G 4/1
5GY 2/1
5G 4/1
5GY 6/1
5GY 4/1
5GY 6/1
5GY 4/1
N7
5GY 2/1
5G 4/1
5GY 2/1
5G 4/1
5G 6/1
5G 6/1
5G 4/1

LITHOLOGIC DESCRIPTION

HYDROTHERMAL SEDIMENT

Greenish black to dark greenish gray, granular, lumpy to fine grained hydrothermal clay. The drilling disturbance is intense to moderate. The granular character of the upper green clay section makes it impossible to determine the nature of disturbance. The green clay in areas where drilling disturbance is not intense show mottling which is probably due to biologic organisms.

PELAGIC OOZE

A greenish gray to dark greenish gray siliceous nannofossil ooze is present between green clay layers (Section 2, 50–112 cm). It is moderately bioturbated.

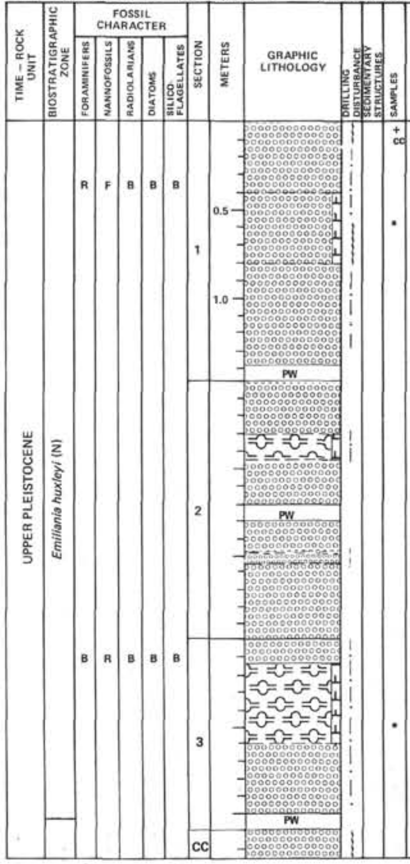
SMEAR SLIDE SUMMARY

	2-56 (M)	2-100	2-132	2-145
COMPOSITION:				
Clay minerals	2	–	–	–
Volcanic glass (light)	90	TR	–	–
Palagonite	–	–	–	1
Carbonate unspec.	–	7	TR	–
Diatoms	5	5	TR	–
Radiolarians	3	15	5	1
Sponge spicules	2	5	–	–
Silicoflagellates	–	TR	–	–
Discoasters	–	–	–	TR
Green clay	–	65	95	98

CARBON-CARBONATE (%)

	1, 23–25
Organic Carbon	0.77
Total Carbonate	0.00

SITE 507 HOLE D CORE (HPC) 4 CORED INTERVAL 9.8–14.2 m



LITHOLOGIC DESCRIPTION

HYDROTHERMAL SEDIMENT

Greenish black granular clay. Drilling disturbance cannot be determined because of the nature of the sediment. Mixed with the green clay are pockets of pelagic ooze (siliceous nannofossil oozes). In each section there are also beds of pelagic ooze located between green clay layers.

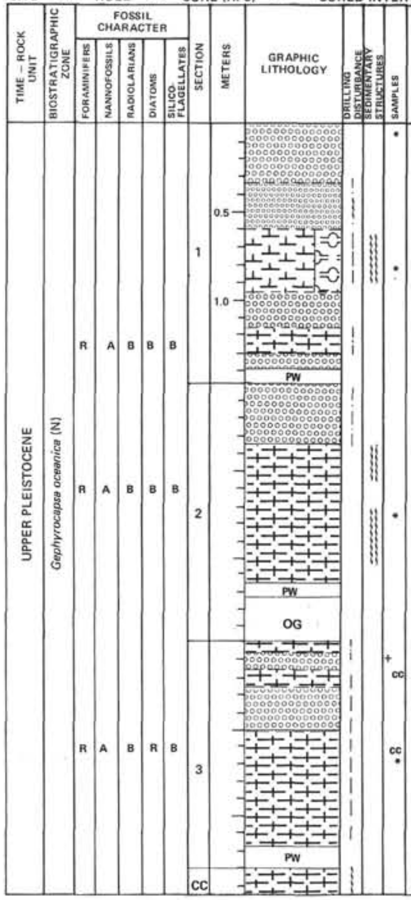
SMEAR SLIDE SUMMARY (%)

	1-56	3-47
COMPOSITION:		
Quartz	TR	TR
Unid. opaques	–	TR
Volcanic glass (light)	TR	TR
Micronodules	–	TR
Diatoms	TR	–
Radiolarians	5	
Sponge spicules	5	
Silicoflagellates	TR	–
Green clay	90	100

CARBON-CARBONATE (%)

	1, 8–10
Organic Carbon	0.19
Total Carbonate	0.00

SITE 507 HOLE D CORE (HPC) 5 CORED INTERVAL 14.2–18.6 m



LITHOLOGIC DESCRIPTION

HYDROTHERMAL SEDIMENT

Greenish black to black granular clay. The sediment is disturbed. A fine grained green clay layer is present in Section 1, 34–62 cm.

FORAMINIFER NANNOFOSSIL OOZE

Light greenish gray to greenish gray foraminifer nannofossil ooze. It is mottled and variegated which may be due to bioturbation. Mottles of green clay are mixed in the pelagic ooze layers.

SILICEOUS NANNOFOSSIL OOZE

A light olive gray, olive gray siliceous nannofossil ooze. Mottled throughout with variegated zones of green clay.

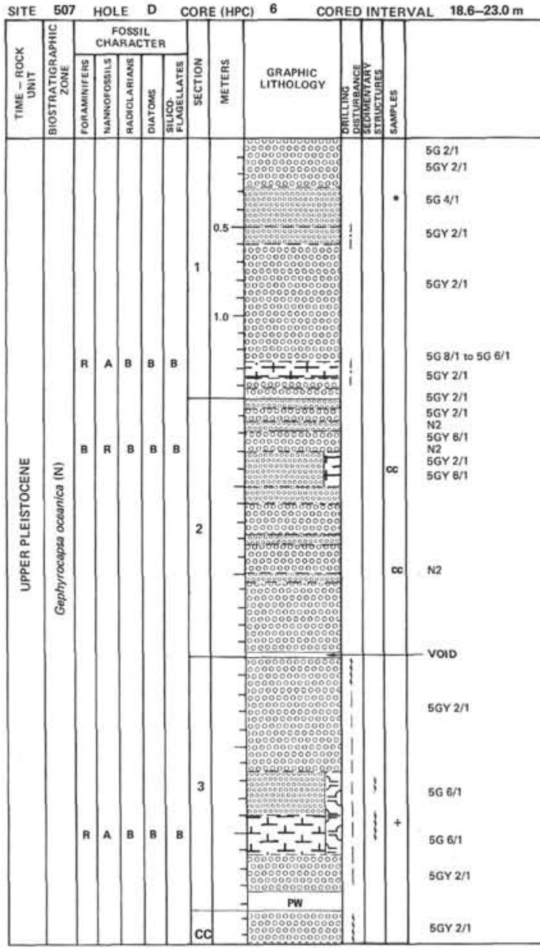
SMEAR SLIDE SUMMARY (%)

	1-5	1-82 (M)	2-78	3-70
COMPOSITION:				
Unspec. opaques	2	–	–	–
Clay minerals	–	–	TR	TR
Micronodules	–	–	TR	–
Carbonate unspec.	–	–	5	–
Foraminifers	–	–	20	10
Calc. nannofossils	–	–	75	85
Diatoms	–	5	–	–
Radiolarians	–	2	TR	1
Sponge spicules	–	TR	TR	–
Silicoflagellates	–	TR	–	–
Green clay	98	90	–	–

CARBON-CARBONATE (%)

	3, 17–19
Organic Carbon	0.99
Total Carbonate	34.0

SITE 507 HOLE D CORE (HPC) 6 CORED INTERVAL 18.6–23.0 m



LITHOLOGIC DESCRIPTION

HYDROTHERMAL SEDIMENT
Greenish black to black, granular to fine grained, moderate to intensely deformed, clay. Some of this green clay has zones of foraminifer nannofossil ooze mixed within the unit. In many areas the disturbance cannot be determined because of the granular, crumbly texture of the green clay.

FORAMINIFER NANNOFOSSIL OOZE and SILICEOUS NANNOFOSSIL OOZE
Zones and interbeds of foraminifer nannofossil ooze and siliceous nannofossil ooze oocur. They are light greenish gray to greenish gray in color and are mottled. The mottling may be due to bioturbation.

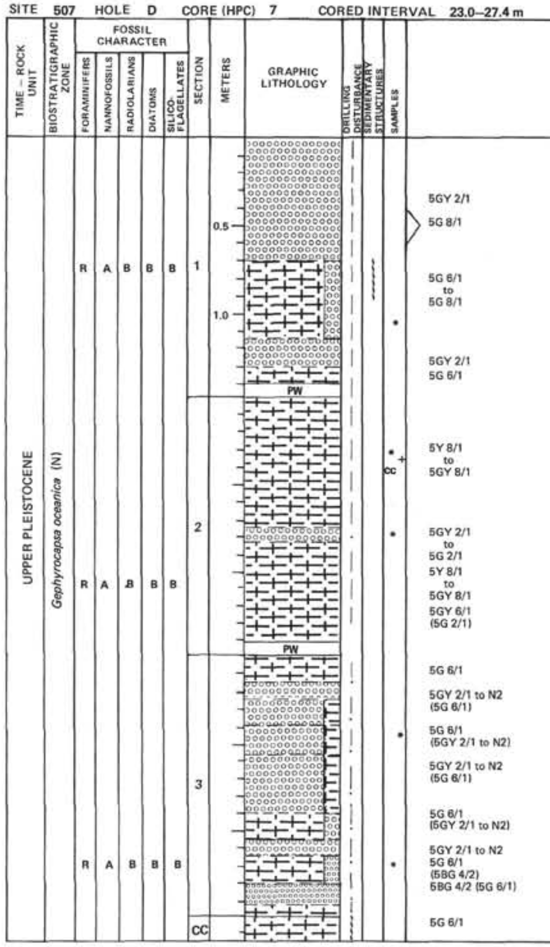
SMEAR SLIDE SUMMARY (%)

	1-35
COMPOSITION:	
Carbonate unspec.	5
Foraminifers	5
Calc. nannofossils	40
Green clay	50

CARBON-CARBONATE (%)

	3, 92–94
Organic Carbon	0.86
Total Carbonate	43.0

SITE 507 HOLE D CORE (HPC) 7 CORED INTERVAL 23.0–27.4 m



LITHOLOGIC DESCRIPTION

HYDROTHERMAL SEDIMENT
Greenish black to black granular to lumpy clay, highly distorted and disturbed by drilling. A finer grained, more coherent green clay is also present. It is grayish blue green to dusky blue-green in color. The hydrothermal sediment is interbedded and mixed with the pelagic ooze (foraminifer nannofossil ooze).

FORAMINIFER NANNOFOSSIL OOZE
Multicolored, variegated and mottled, greenish gray, yellowish gray foraminifer nannofossil ooze. Pdckets or mottles of green clay are present in the ooze.

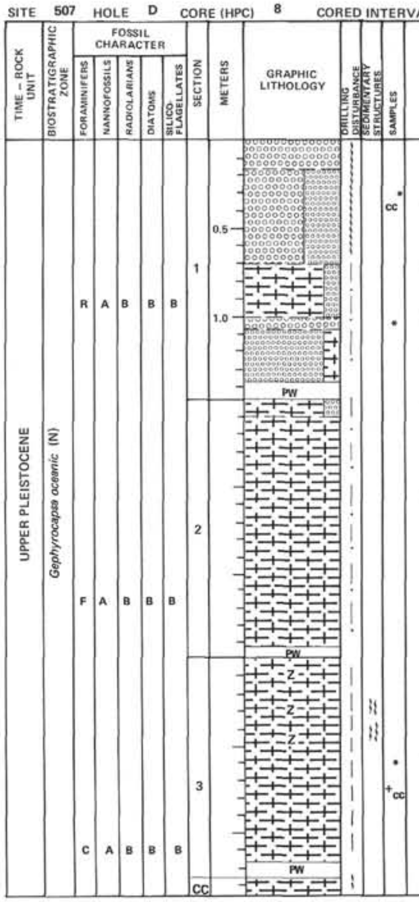
SMEAR SLIDE SUMMARY (%)

	1-109	2-32	2-82	3-43	3-117
COMPOSITION:					
Quartz	–	–	–	TR	–
Micas	–	–	–	TR	–
Clay minerals	–	10	–	–	–
Volcanic glass (light)	–	–	–	TR	–
Micronodules	–	–	1	–	–
Carbonate unspec.	5	5	TR	5	5
Foraminifer	15	13	–	10	25
Calc. nannofossils	80	70	–	65	55
Diatoms	–	2	TR	–	–
Green clay	–	–	98	20	15

CARBON-CARBONATE (%)

	2, 32–34
Organic Carbon	1.16
Total Carbonate	72.0

SITE 507 HOLE D CORE (HPC) 8 CORED INTERVAL 27.4–31.8 m



5GY 2/1
(N2)

5GY 2/1
+ minor
N2, 5BG 4/2

5G 6/1
(5BG 4/2)

5GY 2/1 to N2

5GY 2/1 to N2
5BG 4/2
(5G 6/1)

5BG 4/2
(5GY 8/1)

5GY 8/1
to 5G 6/1
(5GY 2/1 to N2)

5GY 8/1

5GY 8/1

LITHOLOGIC DESCRIPTION

HYDROTHERMAL SEDIMENT mixed with PELAGIC OOZE
Multicolored, granular to fine grained greenish black, black, grayish blue-green hydrothermal clay mixed with pelagic ooze (foraminifer nannofossil ooze). The upper section is dominated by green clay which shows interbedding of the granular sediment with the fine textured green clay.

FORAMINIFER NANNOFOSSIL OOZE
Multicolored, greenish gray, greenish black to light greenish gray foraminifer nannofossil ooze. The ooze dominates the lower two-thirds of the core. *Zoophycus* burrows occur in Section 3 and are well preserved. The mottles that occur in the lower two-thirds of the core are interpreted to be biologic in origin. Some green clay mottles are contained within the ooze.

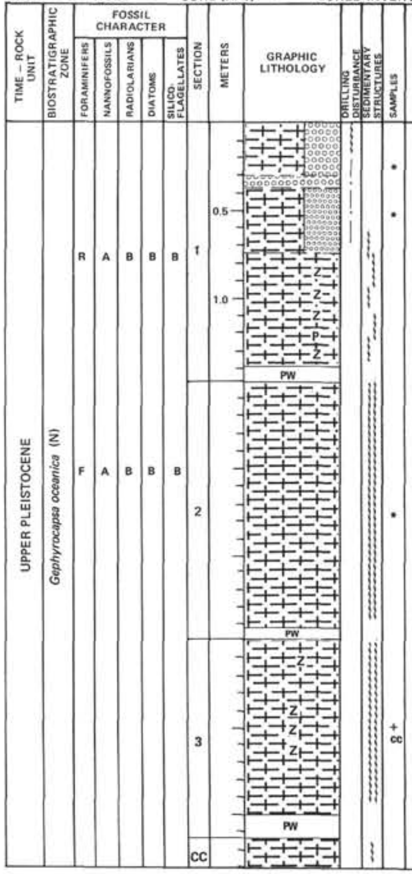
SMEAR SLIDE SUMMARY (%)

	1-37	1-103	3-61
COMPOSITION:			
Clay minerals	–	–	7
Volcanic glass (light)	–	–	TR
Carbonate unspec.	5	3	3
Foraminifers	15	10	15
Calc. nannofossils	65	50	75
Diatoms	TR	2	–
Green clay	15	35	–

CARBON-CARBONATE (%)

	3, 77–79
Organic Carbon	1.49
Total Carbonate	78.0

SITE 507 HOLE D CORE (HPC) 9 CORED INTERVAL 31.8–36.2 m



5G 4/1

5GY 2/1

5G 8/1
5GY 8/1

5G 8/1

5GY 8/1

5G 8/1
5GY 8/1

LITHOLOGIC DESCRIPTION

PELAGIC OOZE mixed with HYDROTHERMAL SEDIMENT
Variegated, mottled, multicolored light greenish gray foraminifer nannofossil ooze mixed in interlayers with greenish black clay of possible hydrothermal origin. The foraminifer nannofossil ooze dominates the lower sections. It is not disturbed by drilling, and shows well preserved burrows (*zoophycus* and *planolites*?). Mottling exists throughout the core.

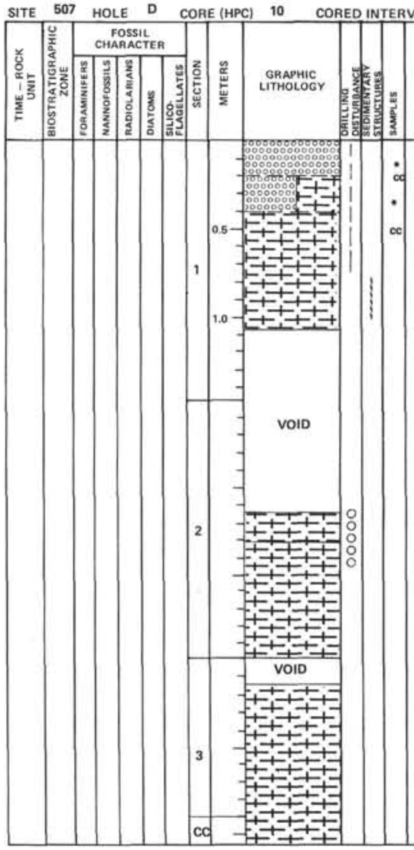
SMEAR SLIDE SUMMARY (%)

	1-24	1-86	2-75
COMPOSITION:			
Quartz	–	TR	–
Micas	–	TR	TR
Clay minerals	–	5	5
Carbonate unspec.	–	5	5
Foraminifers	10	10	15
Calc. nannofossils	50	80	75
Green clay	40	–	–

CARBON-CARBONATE (%)

	3, 52–54
Organic Carbon	1.12
Total Carbonate	66.0

SITE 507 HOLE D CORE (HPC) 10 CORED INTERVAL 36.2–38.7 m



5GY 2/1

5GY 2/1

5GY 8/1 to 5G 8/1

5G 8/1

5GY 8/1

5G 7/1

5G 7/1

5G 7/1

5G 7/1

LITHOLOGIC DESCRIPTION

HYDROTHERMAL SEDIMENT

Greenish black granular clay mixed with light green sand to pebble sized grains. The hydrothermal? sediment is mixed with pelagic ooze in Section 1.

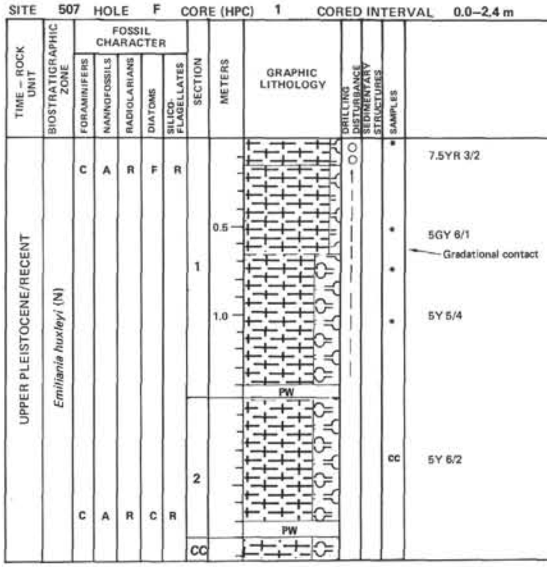
FORAMINIFER NANNOFOSSIL OOZE

Variegated, multicolored greenish gray to light greenish gray foraminifer nannofossil ooze. Large foraminifer and volcanic glass shards are visible in the last section. Section 1 may have hit the basement because Sections 2 and 3 contain voids and are extremely soupy in parts.

SMEAR SLIDE SUMMARY (%)

	1-13	1-35
COMPOSITION:		
Micas	TR	–
Amor. iron-oxide	10	
Foraminifers	5	10
Calc. nannofossils	50	80
Diatoms	TR	–
Radiolarians	TR	–
Sponge spicules	TR	–
Green clay	35	10

SITE 507 HOLE F CORE (HPC) 1 CORED INTERVAL 0.0–2.4 m



LITHOLOGIC DESCRIPTION

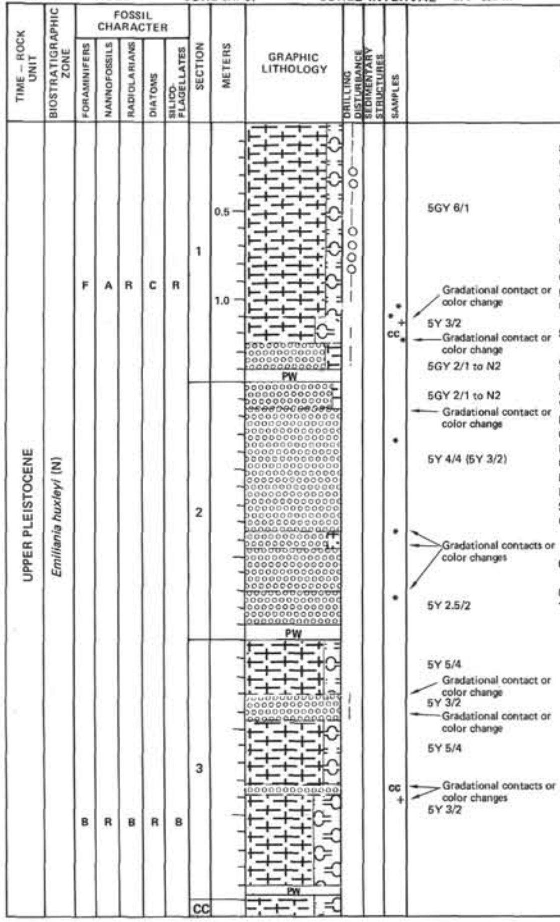
SILICEOUS FORAMINIFER NANNOFOSSIL OOZE

A multicolored light green, light olive brown to pale olive siliceous foraminifer nannofossil ooze. The uppermost 15 cm in the core is a brown pelagic ooze which is interpreted to represent oxidized sediment. This ooze marks the sediment water interface. Mottling occurs throughout the core with the best preserved ichnofossils in the lower half of Section 1. Some dark green clay mottles are present.

SMEAR SLIDE SUMMARY (%)

	1-8	1-52	1-79	1-107 (M)
COMPOSITION:				
Clay minerals	10	5	–	5
Micronodules	5	–	–	–
Carbonate unspec.	5	–	–	–
Foraminifers	12	5	20	15
Calc. nannofossils	50	80	50	30
Diatoms	5	5	15	10
Radiolarians	10	5	15	15
Sponge spicules	3	TR	TR	–
Silicoflagellates	TR	TR	TR	5
Green clay	–	–	–	20

SITE 507 HOLE F CORE (HPC) 2 CORED INTERVAL 2.4–6.8 m



LITHOLOGIC DESCRIPTION

SILICEOUS FORAMINIFER NANNOFOSSIL OOZE

Green, light green to light olive variegated siliceous foraminifer nannofossil ooze. The ooze is highly mottled with clots, patches and wisps of green granular clay scattered throughout. Contacts between units are gradational.

HYDROTHERMAL SEDIMENT

Greenish black, dark olive brown to dark brown granular clay. Size of granules is approximately 1–3 cm. The green clay is commonly interbedded or mixed with nannofossil ooze.

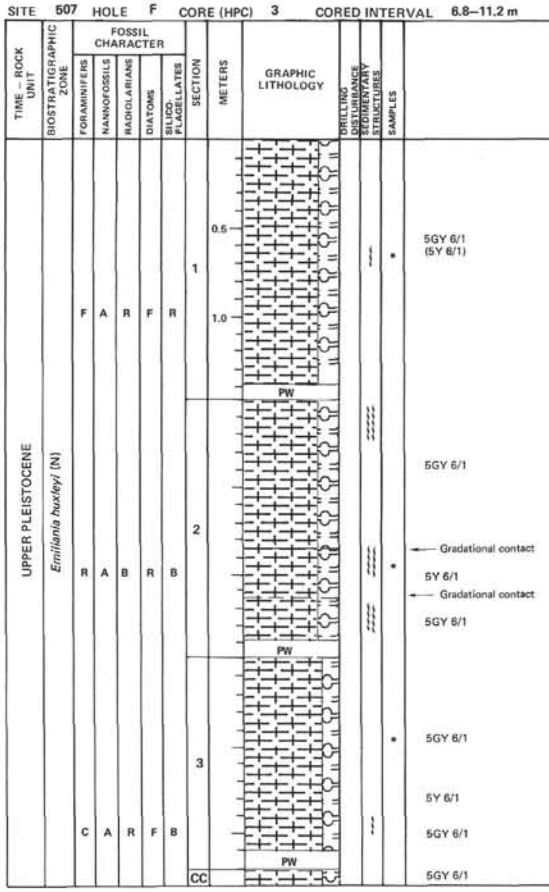
SMEAR SLIDE SUMMARY (%)

	1-107	1-115	1-123	2-38	2-89	2-126
COMPOSITION:						
Feldspar (plag.)	–	–	–	–	3	–
Amor. iron-oxide	–	3	–	–	–	–
Volcanic glass (light)	–	5	–	–	2	TR
Micronodules	–	–	3	–	2	–
Carbonate unspec.	–	5	–	–	–	–
Foraminifers	20	10	2	TR	4	–
Calc. nannofossils	60	40	5	–	–	5
Diatoms	10	15	5	–	4	TR
Radiolarians	10	15	5	–	–	–
Sponge spciules	–	5	–	–	–	–
Green clay	–	–	80	100	85	95

CARBON-CARBONATE (%)

	1, 111–113	3, 85–87
Organic Carbon	3.46	0.15
Total Carbonate	1.00	0.00

SITE 507 HOLE F CORE (HPC) 3 CORED INTERVAL 6.8–11.2 m



LITHOLOGIC DESCRIPTION

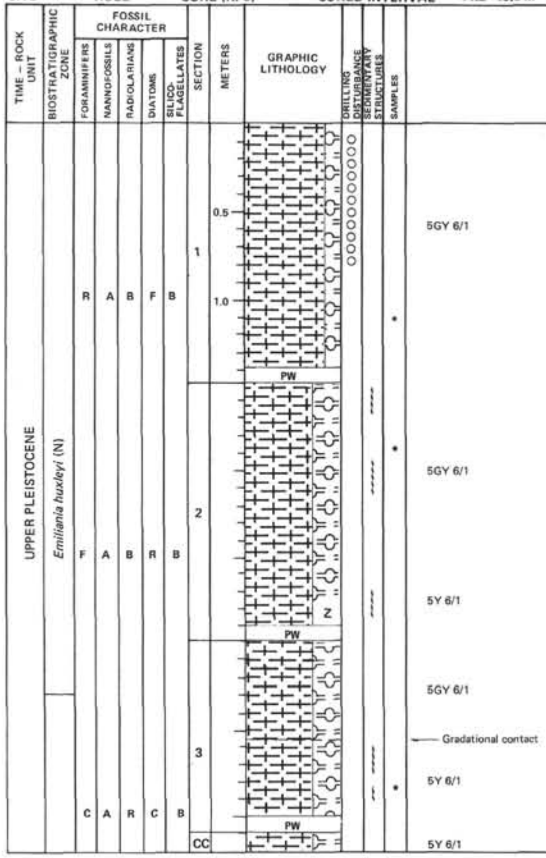
SILICEOUS FORAMINIFER NANNOFOSSIL OOZE

Multicolored, light green, light olive green to dark green siliceous foraminifer nannofossil ooze. The unit is mottled throughout and planolites? type burrows are observed. Occasionally dark green clay granules are found. This green clay is also found in mottles within the pelagic ooze.

SMEAR SLIDE SUMMARY (%)

	1-64	2-94	3-46
COMPOSITION:			
Clay minerals	–	10	–
Volcanic glass (light)	–	–	TR
Micronodules	–	–	TR
Carbonate unspec.	–	5	2
Foraminifers	25	10	20
Calc. nannofossils	50	50	40
Diatoms	10	10	10
Radiolarians	15	15	10
Sponge spicules	–	–	3
Silicoflagellates	–	TR	–
Green clay	–	TR	15

SITE 507 HOLE F CORE (HPC) 4 CORED INTERVAL 11.2–15.6 m



LITHOLOGIC DESCRIPTION

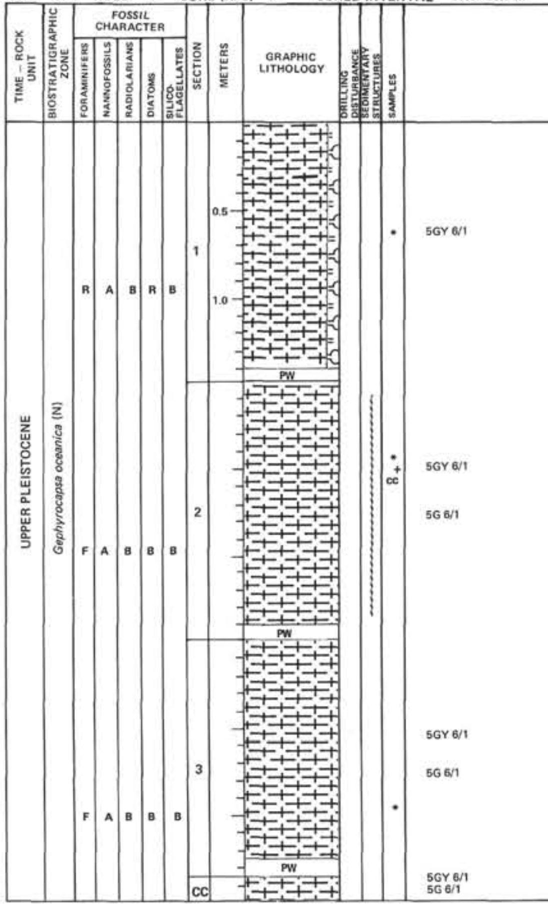
SILICEOUS FORAMINIFER NANNOFOSSIL OOZE

Variegated light green to light olive green siliceous foraminifer nannofossil ooze. Mottling, due to bioturbation is present throughout the core. Zoophycus burrows are present in Section 2. Gradational contacts in ooze sediments are determined by a color change.

SMEAR SLIDE SUMMARY (%)

	1-118	2-40	3-81
COMPOSITION:			
Foraminifers	20	10	15
Calc. nannofossils	60	60	55
Diatoms	10	15	15
Radiolarians	10	15	15

SITE 507 HOLE F CORE (HPC) 5 CORED INTERVAL 15.6–20.0 m



LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL OOZE

Greenish gray, dark gray to light olive gray foraminifer nannofossil ooze. The upper section is more siliceous (siliceous foraminifer nannofossil ooze). The entire core is mottled, with well preserved trace fossils in each section. Planolites? type burrows are observed in Section 3.

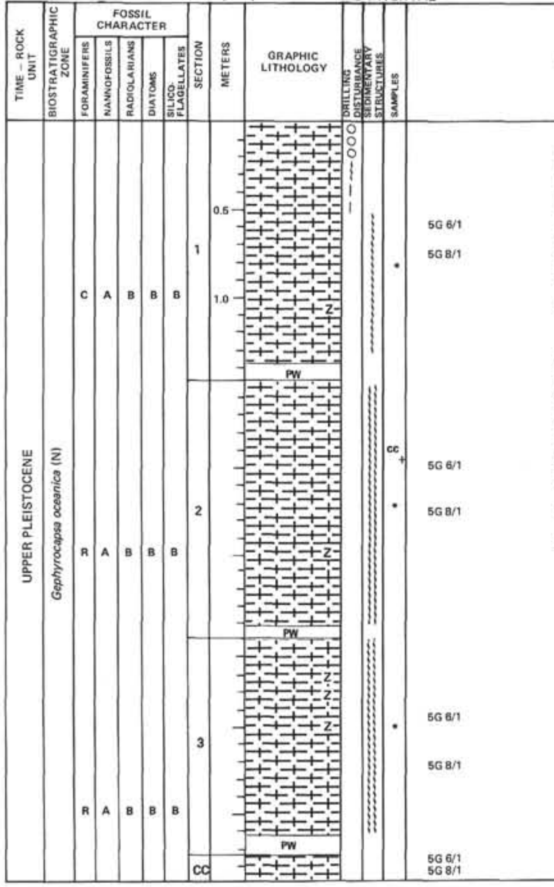
SMEAR SLIDE SUMMARY (%)

	1-62	2-44	3-93
COMPOSITION:			
Clay minerals	15	10	10
Volcanic glass (light)	3	TR	TR
Carbonate unspec.	5	5	5
Foraminifers	10	10	15
Calc. nannofossils	45	70	65
Diatoms	5	1	3
Radiolarians	10	3	2
Sponge spicules	1	TR	–
Silicoflagellates	TR	–	TR
Green clay	5	–	–

CARBON-CARBONATE (%)

	2, 58–60
Organic Carbon	1.48
Total Carbonate	76.0

SITE 507 HOLE F CORE (HPC) 6 CORED INTERVAL 20.0–24.4 m



LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL OOZE

Variegated, greenish gray, light greenish gray to grayish blue green foraminifer nannofossil ooze. Moderate bioturbation is present throughout the core. Zoophycus burrows are present. Also present are faint traces of horizontal bedding. These bedding traces are determined by changes in color. Vertical black wisps occur in Sections 2 and 3. These resemble chondrites? somewhat, but may also be drilling grease and fragments or be volcanic glass shards.

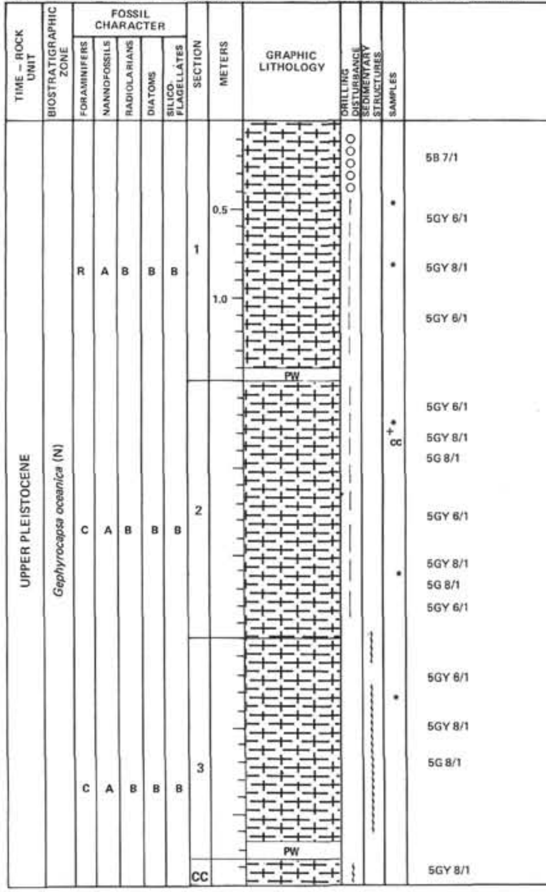
SMEAR SLIDE SUMMARY (%)

	1-80 (M)	2-70	3-45
COMPOSITION:			
Clay minerals	15	15	15
Volcanic glass (light)	TR	–	TR
Carbonate unspec.	5	5	10
Foraminifers	30	25	10
Calc. nannofossils	35	50	55
Diatoms	5	2	TR
Radiolarians	5	2	TR
Sponge spicules	TR	–	–
Green clay	5	–	–

CARBON-CARBONATE (%)

	2, 40–42
Organic Carbon	1.24
Total Carbonate	76.0

SITE 507 HOLE F CORE (HPC) 7 CORED INTERVAL 24.4–28.8 m



LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL OOZE

Greenish gray to light greenish gray foraminifer nannofossil ooze. The core shows alternating thin bands of nannofossil ooze which are differentiated by color. Horizontal burrows are present which also tend to produce horizontal bedding surfaces.

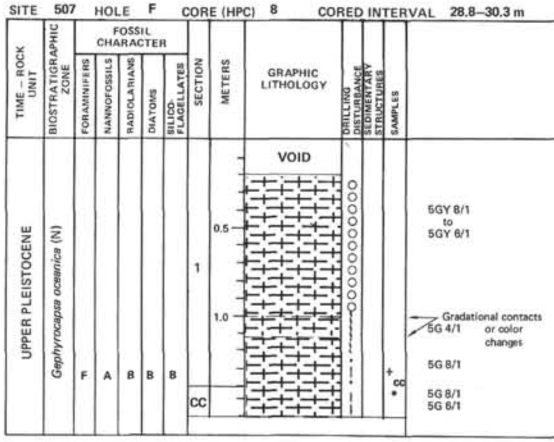
SMEAR SLIDE SUMMARY (%)

	1-45	1-80	2-22	2-112	3-30
COMPOSITION:					
Quartz	TR	–	–	–	–
Clay minerals	–	–	TR	TR	–
Volcanic glass (light)	5	TR	TR	–	TR
Zeolite	–	TR	TR	TR	TR
Micronodules	–	TR	2	–	–
Carbonate unspec.	5	5	5	5	5
Foraminifers	10	10	10	10	10
Calc. nannofossils	80	85	80	85	85
Diatoms	TR	–	TR	–	TR
Radiolarians	TR	TR	TR	TR	TR
Sponge spicules	–	–	–	–	TR

CARBON-CARBONATE (%)

	2, 31–33
Organic Carbon	1.32
Total Carbonate	72.0

SITE 507 HOLE F CORE (HPC) 8 CORED INTERVAL 28.8–30.3 m



LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL OOZE

Light greenish gray to greenish gray foraminifera nannofossil ooze. Numerous glass fragments and rust platelets are present. The core is soupy and may indicate contact with basement.

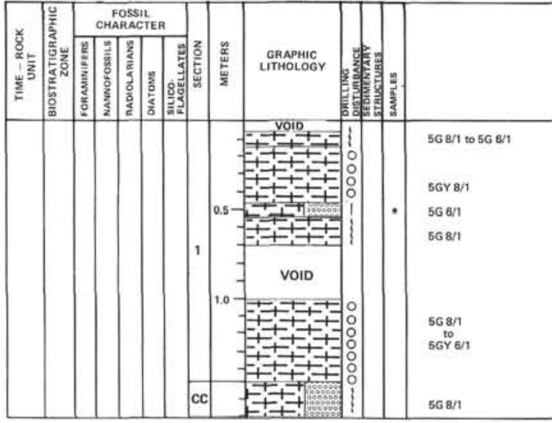
SMEAR SLIDE SUMMARY (%)

	CC-2
COMPOSITION:	
Quartz	TR
Clay minerals	TR
Carbonate unspec.	2
Foraminifers	15
Calc. nannofossils	80

CARBON-CARBONATE (%)

	1, 135–137
Organic Carbon	0.39
Total Carbonate	83.0

SITE 507 HOLE F CORE (HPC) 9 CORED INTERVAL 30.3–31.3 m



LITHOLOGIC DESCRIPTION

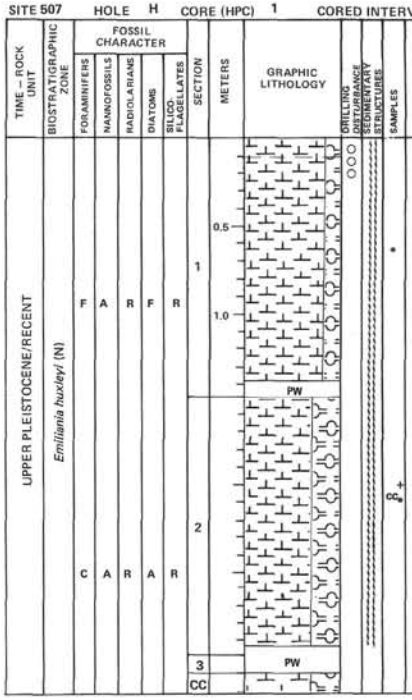
FORAMINIFER NANNOFOSSIL OOZE

Light greenish gray to greenish gray foraminifer nannofossil ooze. At 46–54 cm the nannofossil ooze is mixed with green clay. This green hydrothermal clay may have been present as thin layers. However the drilling disturbance makes it impossible to be certain.

SMEAR SLIDE SUMMARY (%)

	1-50
COMPOSITION:	
Foraminifer	35
Calc. nannofossils	25
Green clay	35

SITE 507 HOLE H CORE (HPC) 1 CORED INTERVAL 0.0–3.5 m



LITHOLOGIC DESCRIPTION

5YR 3/2

5G 4/1

5G 6/1

5GY 8/1

5GY 6/1

5Y 6/1

5GY 6/1

FORAMINIFER SILICEOUS NANNOFOSSIL OOZE

Dark greenish gray, greenish gray, light greenish gray to light olive gray siliceous foraminifer nannofossil ooze to foraminifer siliceous nannofossil ooze. Bioturbation is moderate throughout the core which explains the variegated and mottled character. The upper 7 cm of the core is a grayish brown siliceous foraminifer nannofossil ooze. It is oxidized and is interpreted as *the mudline (sediment-water interface).*

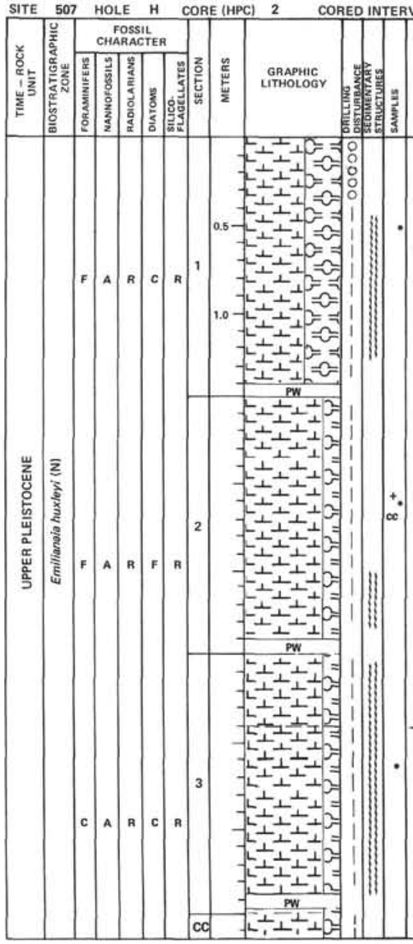
SMEAR SLIDE SUMMARY (%)

	1-6	1-68	2-62
COMPOSITION:			
Amor. iron-oxide	3	–	–
Clay minerals	2	2	2
Volcanic glass (light)	–	TR	TR
Zeolite	TR	TR	–
Carbonate unspec.	5	5	5
Foraminifers	10	10	5
Calc. nannofossils	60	55	65
Diatoms	15	15	15
Radiolarians	5	15	10
Sponge spicules	–	1	1
Silicoflagellates	–	TR	TR

CARBON-CARBONATE (%)

	2, 57–59
Organic Carbon	2.20
Total Carbonate	63.0

SITE 507 HOLE H CORE (HPC) 2 CORED INTERVAL 3.5–7.9 m



LITHOLOGIC DESCRIPTION

5GY 6/1
to
5Y 6/1

5GY 6/1

5GY 8/1

5GY 6/1

5G 6/1

5GY 6/1

← Gradational contact due to color change

5Y 4/3

5G 6/1

5GY 6/1

SILICEOUS NANNOFOSSIL OOZE

Variegated, mottled, greenish gray to light olive gray *siliceous nannofossil ooze. Larger foraminifer are* visible with the naked eye. The smear slides are most likely biased toward siliceous microfossils because of their smaller size as compared to foraminifer. Biogenic structures are observed throughout the core. In Section 3, 40–85 cm, circular burrow (planolites?) are present.

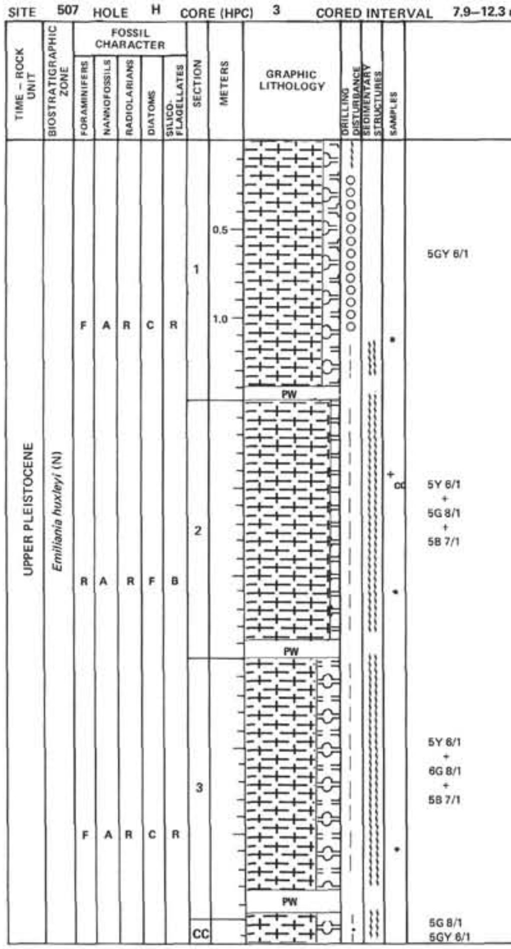
SMEAR SLIDE SUMMARY (%)

	1-52	2-62	3-63
COMPOSITION:			
Clay minerals	TR	TR	2
Volcanic glass (light)	TR	TR	TR
Zeolite	–	TR	–
Micronodules	–	–	TR
Carbonate unspec.	2	5	3
Foraminifers	5	5	5
Calc. nannofossils	50	65	70
Diatoms	25	10	10
Radiolarians	15	10	10
Sponge spicules	2	1	1
Silicoflagellates	TR	TR	TR

CARBON-CARBONATE (%)

	2, 61–63
Organic Carbon	1.23
Total Carbonate	56.0

SITE 507 HOLE H CORE (HPC) 3 CORED INTERVAL 7.9–12.3 m



LITHOLOGIC DESCRIPTION

SILICEOUS FORAMINIFER NANNOFOSSIL OOZE

Light olive gray, light greenish gray to light bluish gray siliceous foraminifer nannofossil ooze. The colors alternate in many places with respect to the horizontal to sub-horizontal burrows. The burrows are filled with light greenish gray ooze which are embedded in light olive gray ooze. Large foraminifer are visible with the naked eye.

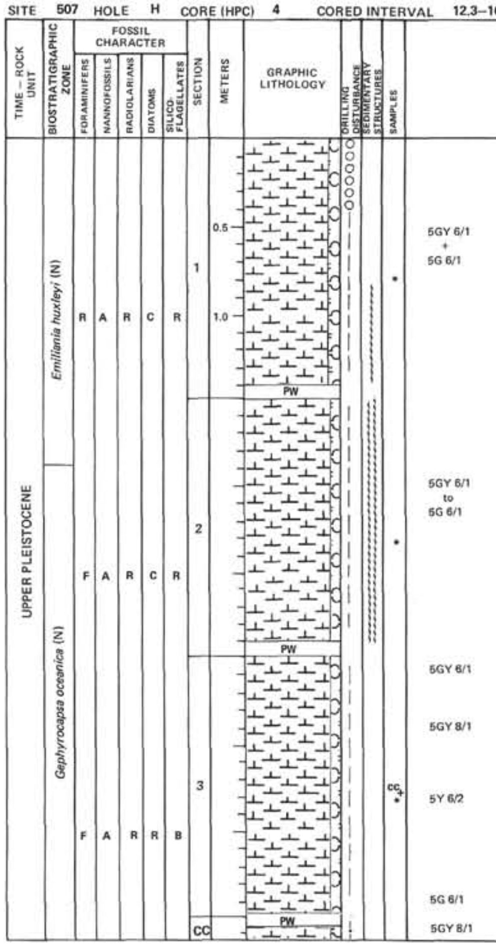
SMEAR SLIDE SUMMARY (%)

	1-110	2-110	3-110
COMPOSITION:			
Clay minerals	TR	TR	TR
Volcanic glass (light)	TR	–	–
Zeolite	TR	TR	–
Carbonate unspec.	5	3	5
Foraminifers	5	5	5
Calc. nannofossils	65	70	75
Diatoms	5	5	15
Radiolarians	15	5	8
Sponge spicules	5	2	2
Silicoflagellates	–	TR	TR

CARBON-CARBONATE (%)

	2, 40–42
Organic Carbon	1.45
Total Carbonate	54.0

SITE 507 HOLE H CORE (HPC) 4 CORED INTERVAL 12.3–16.7 m



LITHOLOGIC DESCRIPTION

FORAMINIFER SILICEOUS NANNOFOSSIL OOZE

Mottled greenish gray foraminifer siliceous nannofossil ooze. Large foraminifer are observed in the cores. Mottling is due to bioturbation. Sub-horizontal burrows are present throughout the core. Some patches of green clay, along with some mottles of gray ash are found in very minor amounts.

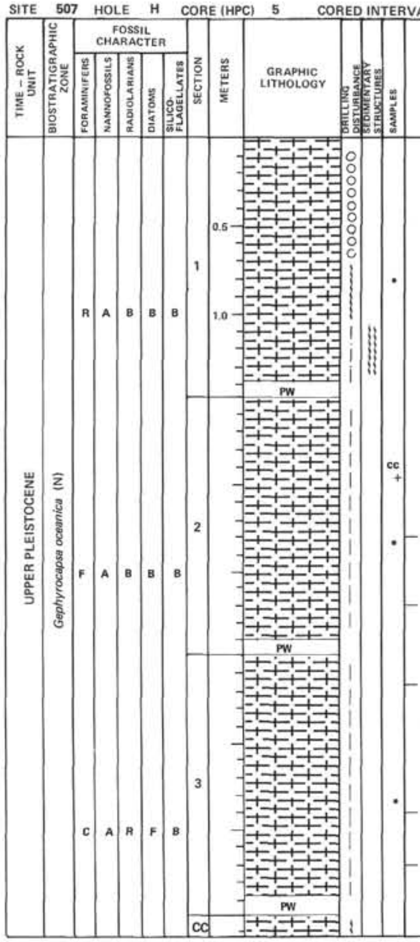
SMEAR SLIDE SUMMARY (%)

	1-80	2-80	3-80
COMPOSITION:			
Clay minerals	TR	–	–
Volcanic glass (light)	TR	–	–
Zeolite	TR	–	TR
Micronodules	–	TR	–
Carbonate unspec.	5	5	2
Foraminifers	5	2	5
Calc. nannofossils	75	80	80
Diatoms	10	5	5
Radiolarians	5	5	5
Sponge spicules	1	TR	TR
Silicoflagellates	TR	TR	TR

CARBON-CARBONATE (%)

	3, 75–77
Organic Carbon	2.80
Total Carbonate	69.0

SITE 507 HOLE H CORE (HPC) 5 CORED INTERVAL 16.7–21.1 m



LITHOLOGIC DESCRIPTION

5G 6/1
+
5G 4/1
+
5B 5/1

5G 8/1
to
5GY 8/1

5Y 6/2

5G 8/1
to
5GY 8/1

5Y 6/2

5GY 8/1

5GY 6/1

5Y 5/2

5GY 8/1

5GY 8/1

FORAMINIFER NANNOFOSSIL OOZE

Variegated, bioturbated, greenish gray, dark greenish gray to bluish gray foraminifer nannofossil ooze. Sub-horizontal burrows of zoophycus are observed.

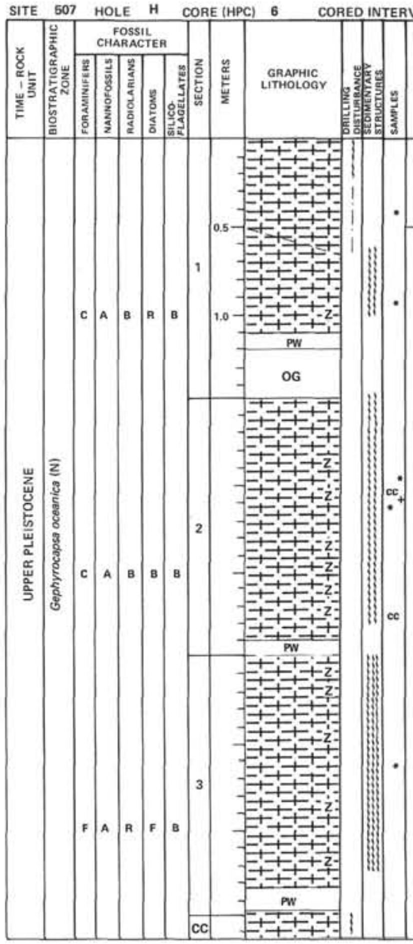
SMEAR SLIDE SUMMARY (%)

COMPOSITION:	1-80	2-80	3-80
Clay minerals	–	TR	TR
Zeolite	–	TR	TR
Micronodules	1	–	–
Carbonate unspec.	10	10	10
Foraminifers	10	5	5
Calc. nannofossils	75	85	85
Diatoms	2	TR	TR
Radiolarians	5	TR	TR
Sponge spicules	TR	–	TR

CARBON-CARBONATE (%)

	2, 39–41
Organic Carbon	1.43
Total Carbonate	75.0

SITE 507 HOLE H CORE (HPC) 6 CORED INTERVAL 21.1–25.5 m



LITHOLOGIC DESCRIPTION

5GY 8/1

5G 8/1

5Y 6/1

5GY 8/1

5G 8/1

5GY 8/1
+
5G 8/1

5Y 6/1

5GY 8/1
to
5G 8/1

5GY 8/1

FORAMINIFER NANNOFOSSIL OOZE

Multicolored, highly bioturbated foraminifer nannofossil ooze. Horizontal burrows of zoophycus, and circular burrows of planolites? are present. Black blebs and vertical wisps are present. These may be volcanic glass fragments, or ash. The vertical wisps of black material may be related to the ichnofossil chondrites(?).

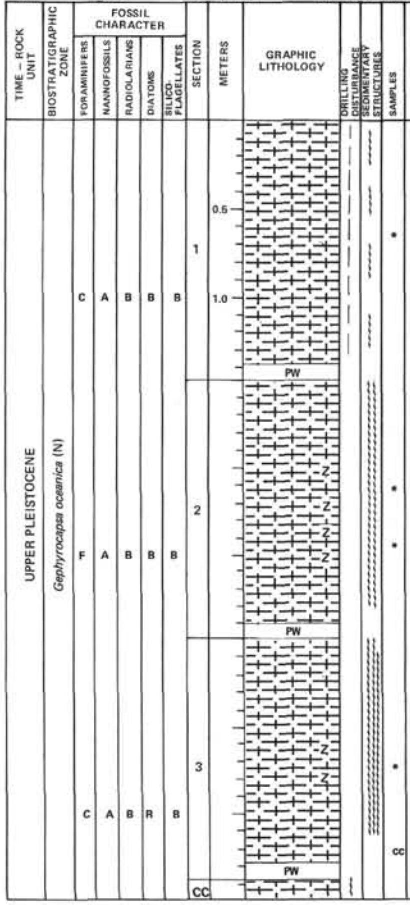
SMEAR SLIDE SUMMARY (%)

	1-40	1-90	2-50	2-65	3-65
COMPOSITION:			(M)		
Feldspar (plag.)	TR	–	–	–	–
Clay minerals	5	5	TR	10	2
Volcanic glass (light)	TR	–	–	1	–
Carbonate unspec.	10	5	–	10	–
Foraminifers	15	10	10	10	10
Calc. nannofossils	60	70	45	65	75
Diatoms	5	5	–	–	3
Radiolarians	3	5	5	5	10
Sponge spicules	TR	TR	–	–	TR
Silicoflagellates	TR	TR	–	–	–
Discoasters	TR	–	–	–	–
Black opaques	–	–	40	–	–

CARBON-CARBONATE (%)

	2, 50–51
Organic Carbon	1.35
Total Carbonate	73.0

SITE 507 HOLE H CORE (HPC) 7 CORED INTERVAL 25.5–29.9 m



5GY 8/1 to 5G 8/1

5G 8/1 + 5GY 8/1 + 5G 6/1

5GY 8/1 + 5G 8/1 + 5G 6/1

5GY 8/1

LITHOLOGIC DESCRIPTION

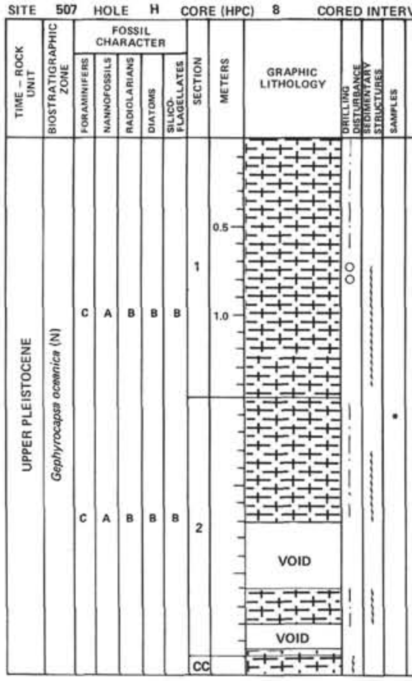
FORAMINIFER NANNOFOSSIL OOZE

Bioturbated, light greenish gray to pale blue green foraminifer nannofossil ooze. Large foraminifer are visible in the cores. Zoophycus burrows are present. They are horizontal, cross the entire core and are 0.5–1.0 cm in width. Planolites? may also be present . They are oval to circular and are identified by a color change. Vertical black wisps are present in Sections 2 and 3. They resemble the trace fossil chondrites but this is tentative. Volcanic glass fragments are observed in minor amounts.

SMEAR SLIDE SUMMARY (%)

	1-65	2-65	2-93	3-72 (M)
COMPOSITION:				
Clay minerals	TR	2	2	10
Volcanic glass (light)	–	1	TR	3
Carbonate unspec.	5	–	5	5
Foraminifers	10	10	5	15
Calc. nannofossils	80	85	80	40
Diatoms	2	–	2	–
Radiolarians	3	2	5	7
Sponge spicules	TR	TR	–	–
Silicoflagellates	TR	–	–	–
Black opaques	–	–	–	30

SITE 507 HOLE H CORE (HPC) 8 CORED INTERVAL 29.9–32.9 m



5GY 8/1 + 5G 8/1 (5Y 6/1)

5GY 8/1 + 5G 8/1

5GY 8/1

5G 8/1

5GY 8/1 + 5G 8/1
5GY 8/1

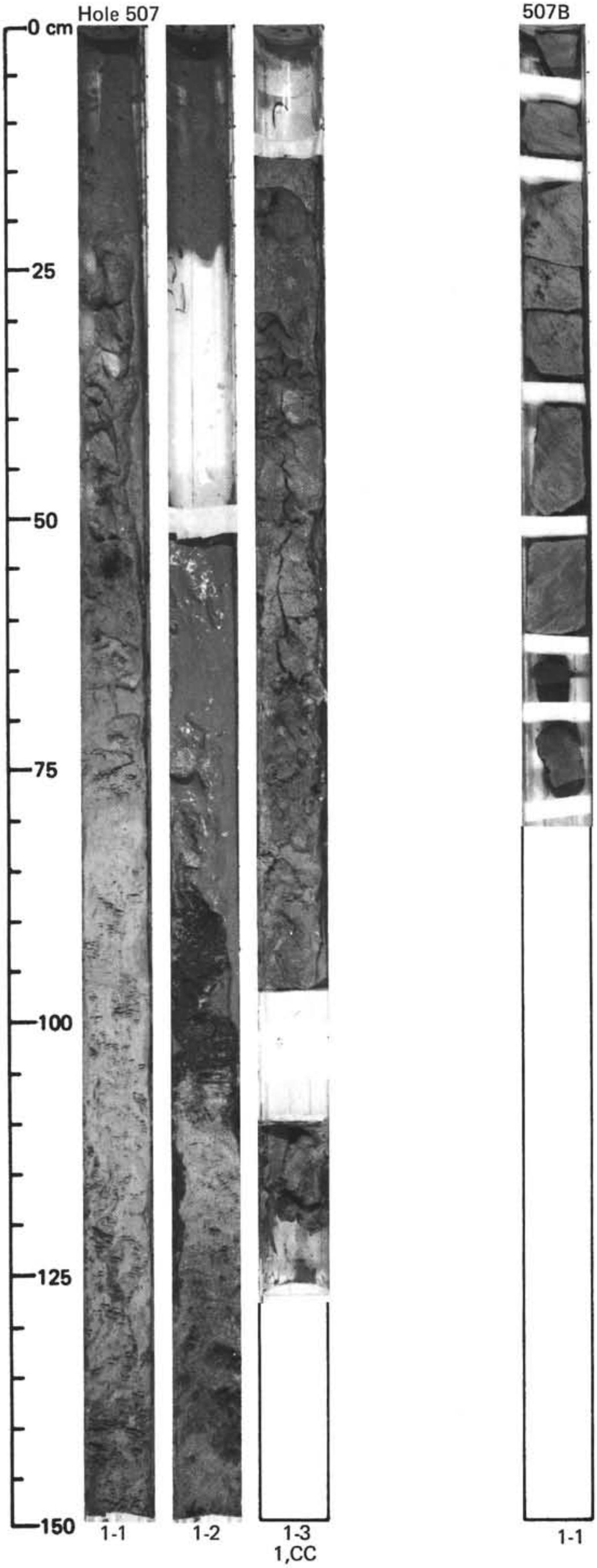
LITHOLOGIC DESCRIPTION

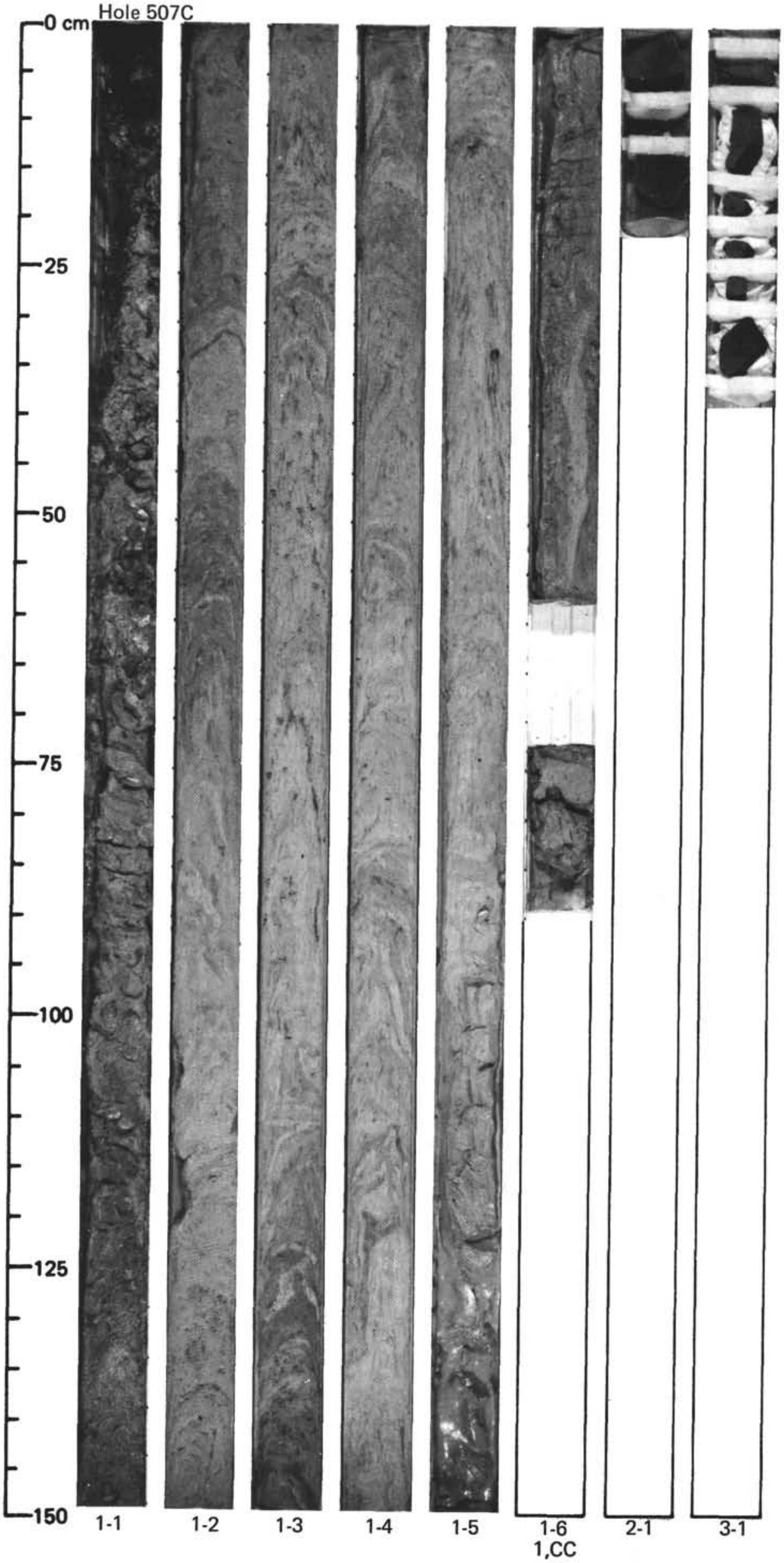
FORAMINIFER NANNOFOSSIL OOZE

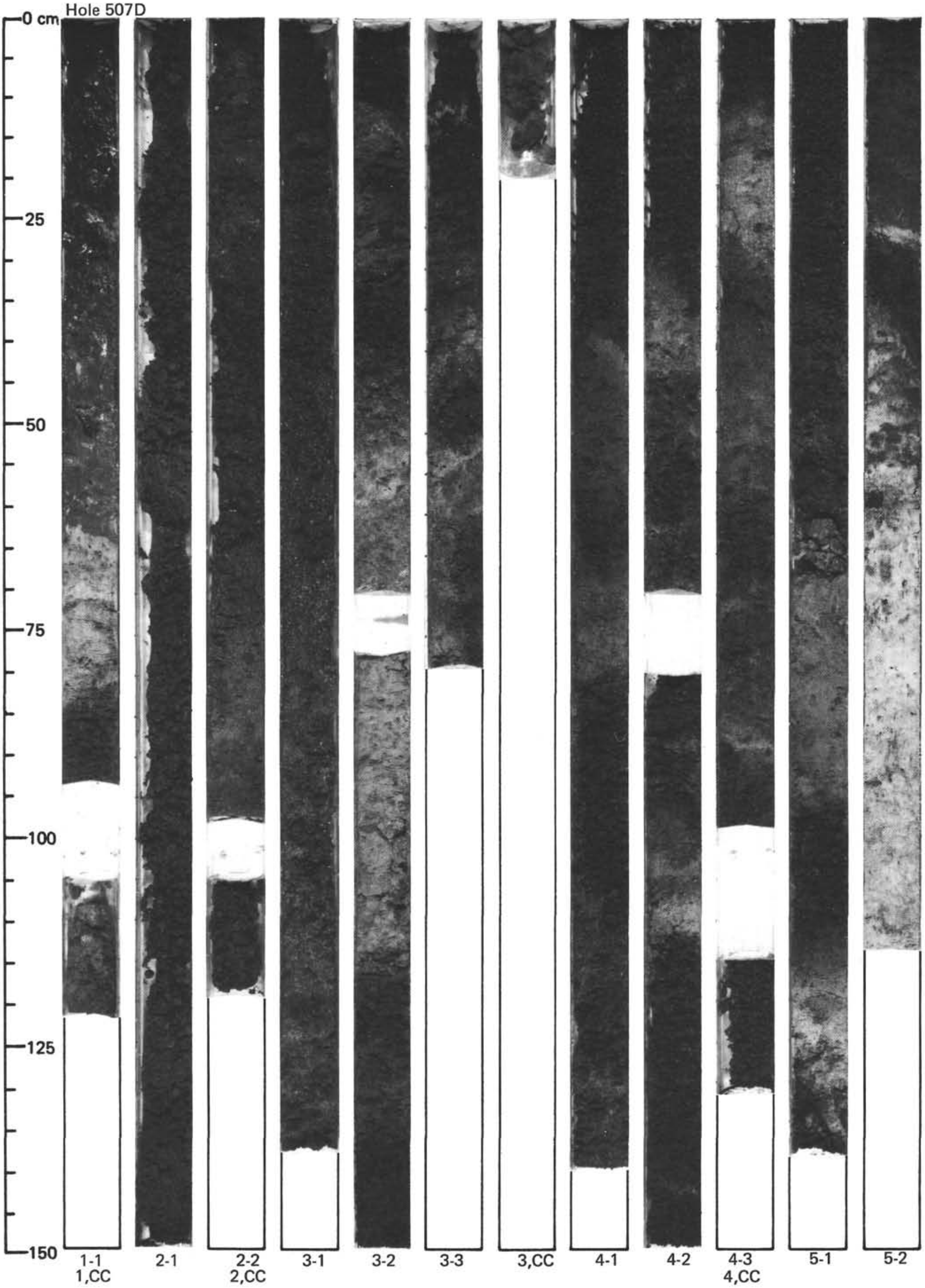
Variegated, light greenish gray to pale blue green foraminifer nannofossil ooze. Some possible planolites burrows are present. Large vertical to subvertical black burrows (15 cm long) are present at the top of Section 2. The black color is probably due to some dark opaque clay material which is present in minor amounts (see smear slide). Black specks of volcanic glass are present in the soupy zones in Section 1.

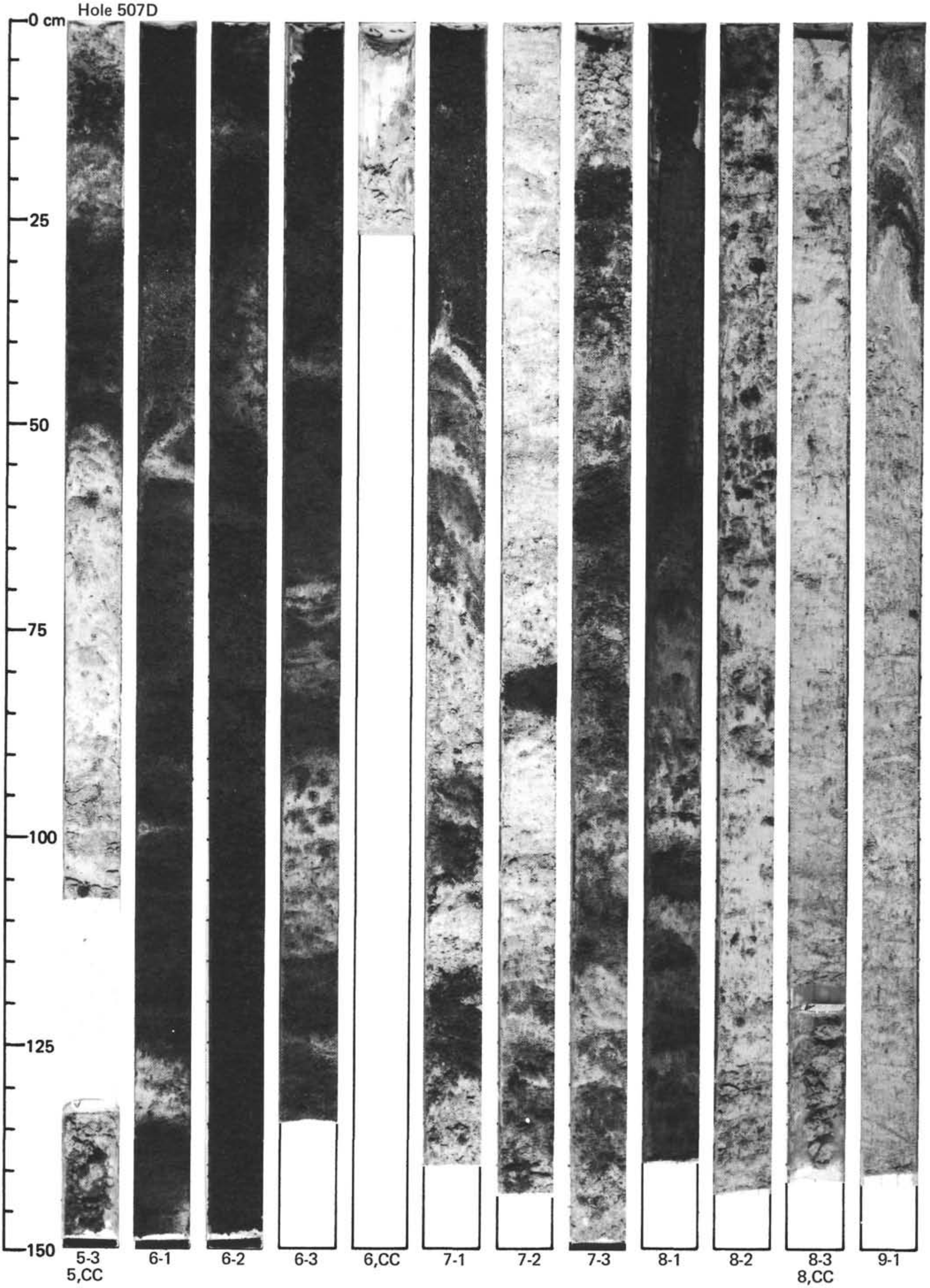
SMEAR SLIDE SUMMARY (%)

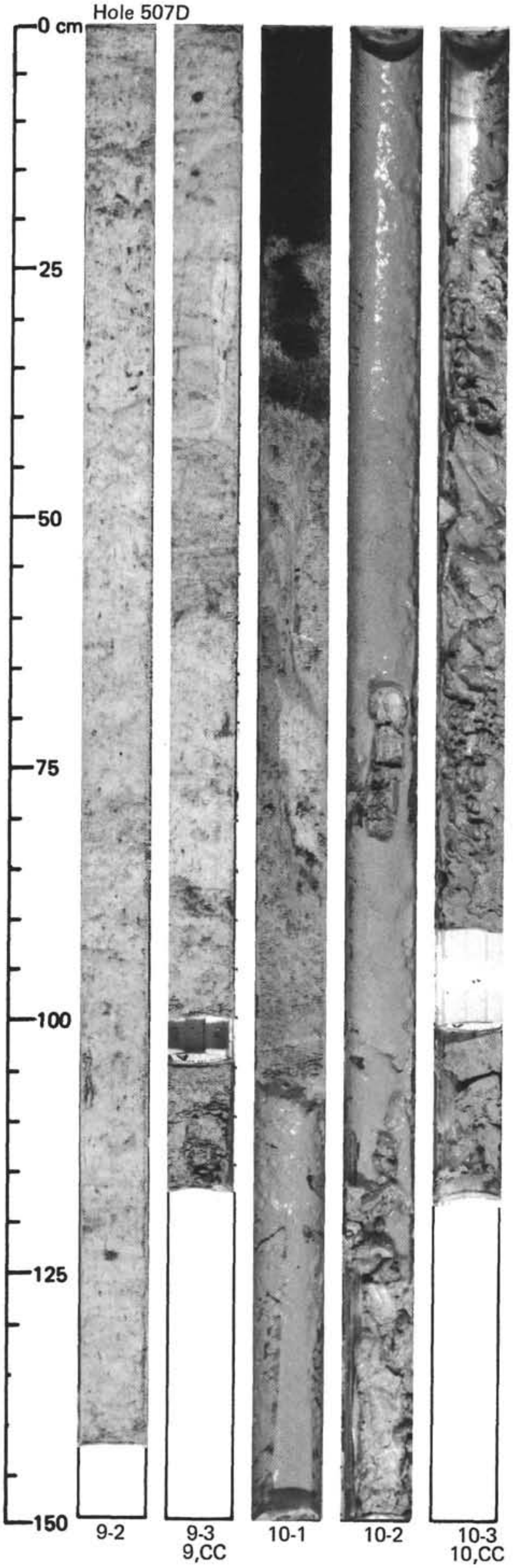
	2-11 (M)
COMPOSITION:	
Clay minerals	10
Volcanic glass (light)	3
Foraminifers	30
Calc. nannofossils	58
Diatoms	3
Black opaques	TR

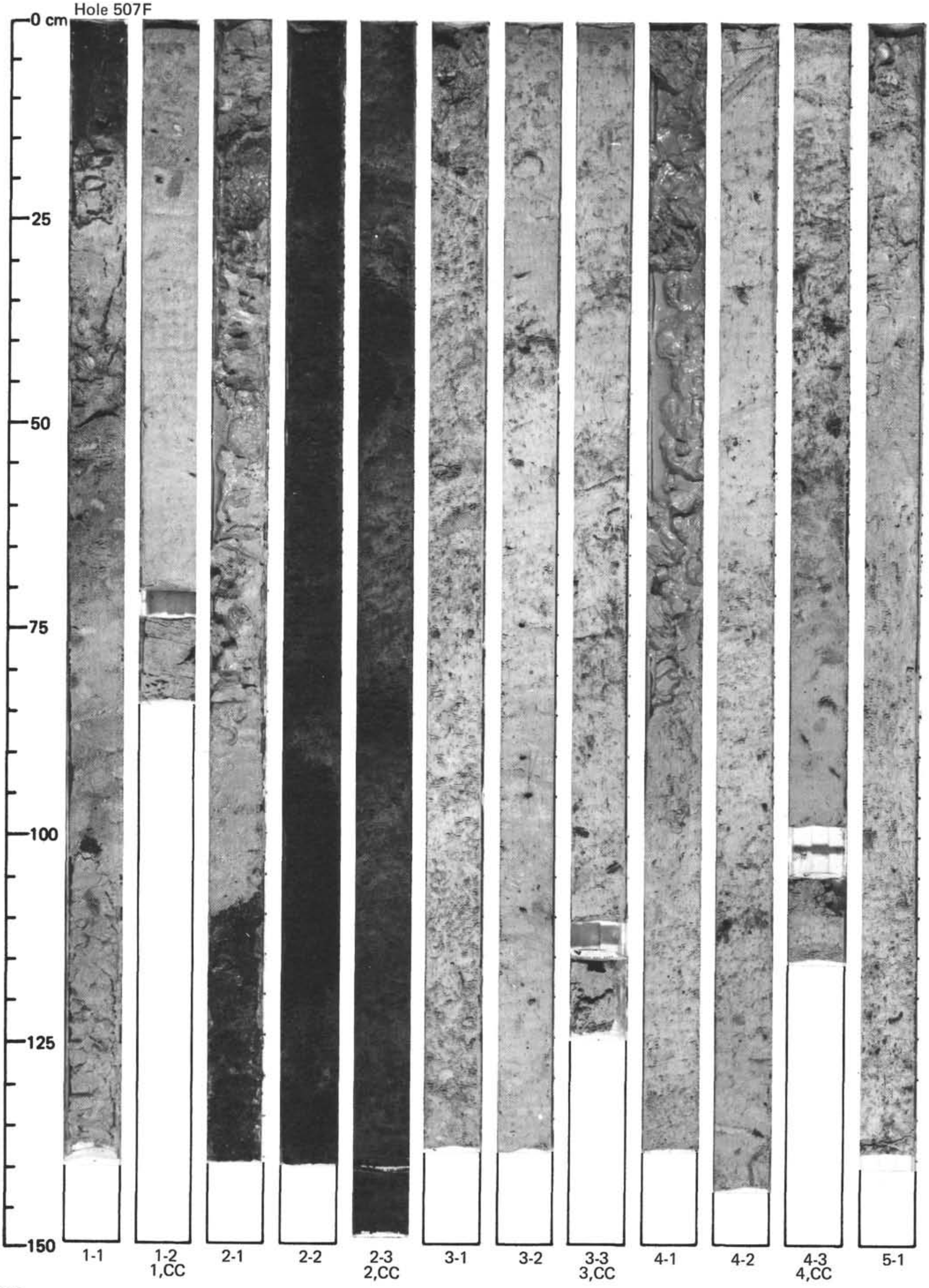

Hole 507
507B
0 cm
25
50
75
100
125
150
1-1
1-2
1-3
1,CC
1-1

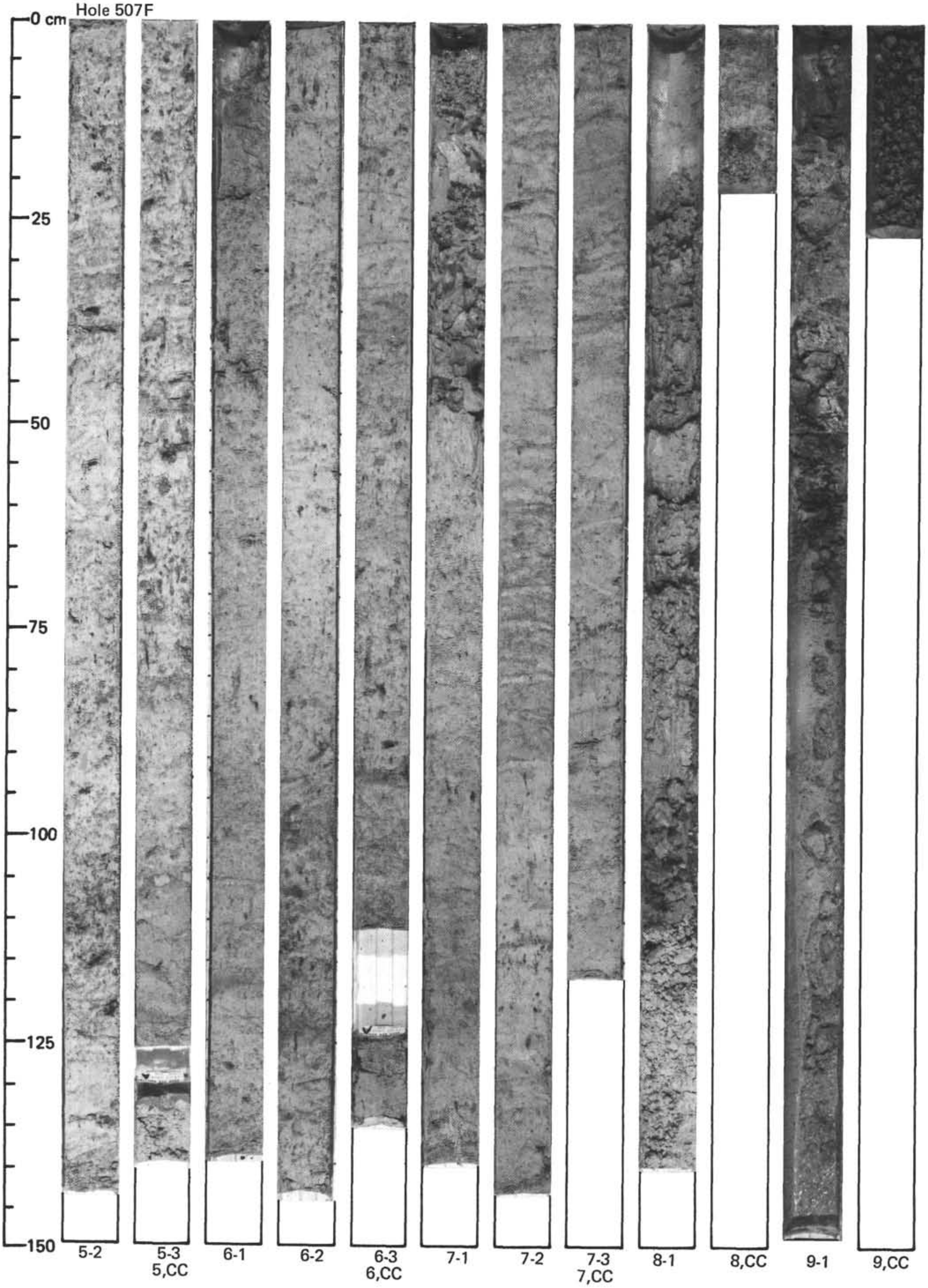

Hole 507C
0 cm
25
50
75
100
125
150
1-1
1-2
1-3
1-4
1-5
1-6
1,CC
2-1
3-1

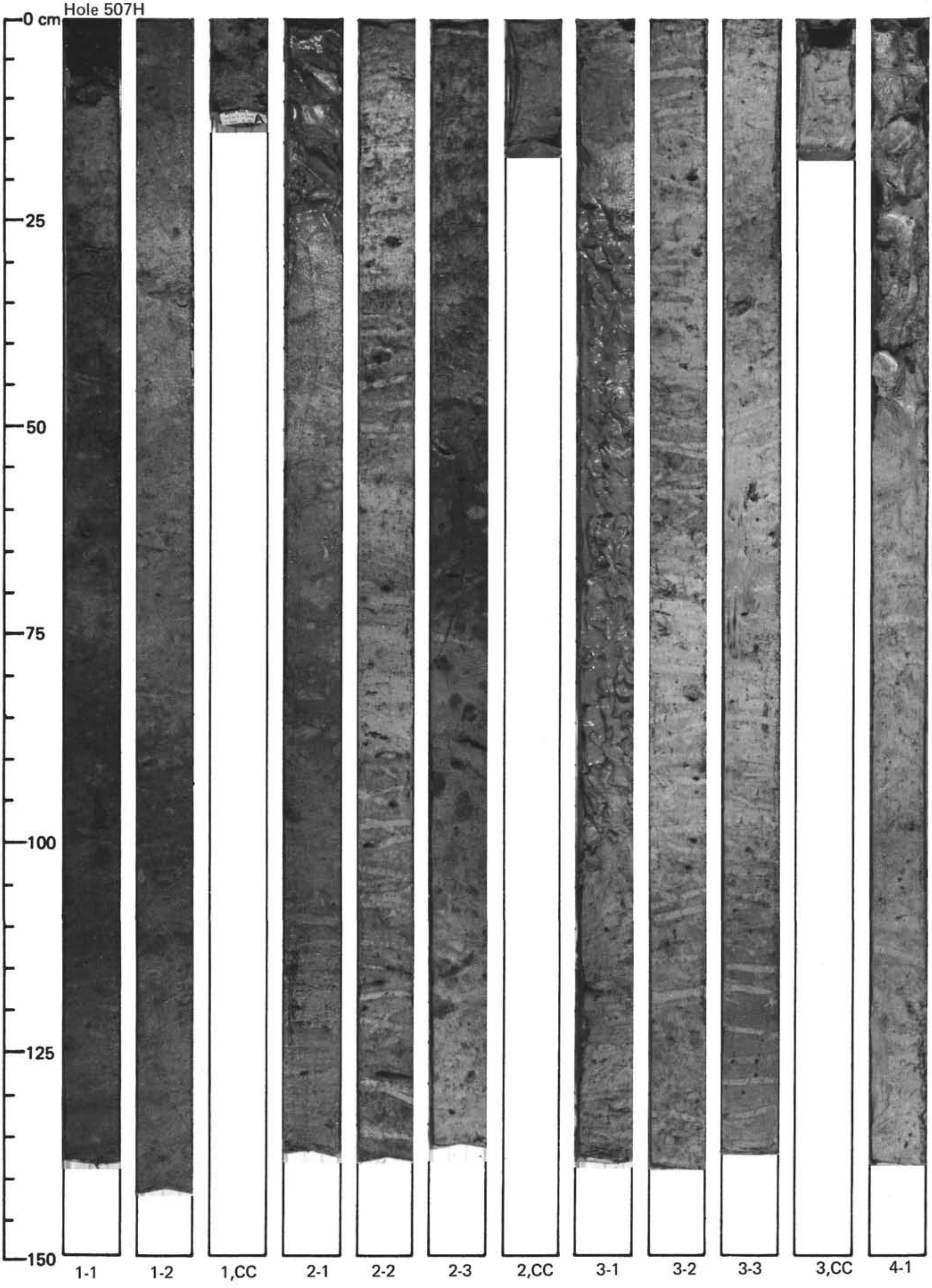

Hole 507D
0 cm
25
50
75
100
125
150
1-1
1,CC
2-1
2-2
2,CC
3-1
3-2
3-3
3,CC
4-1
4-2
4-3
4,CC
5-1
5-2

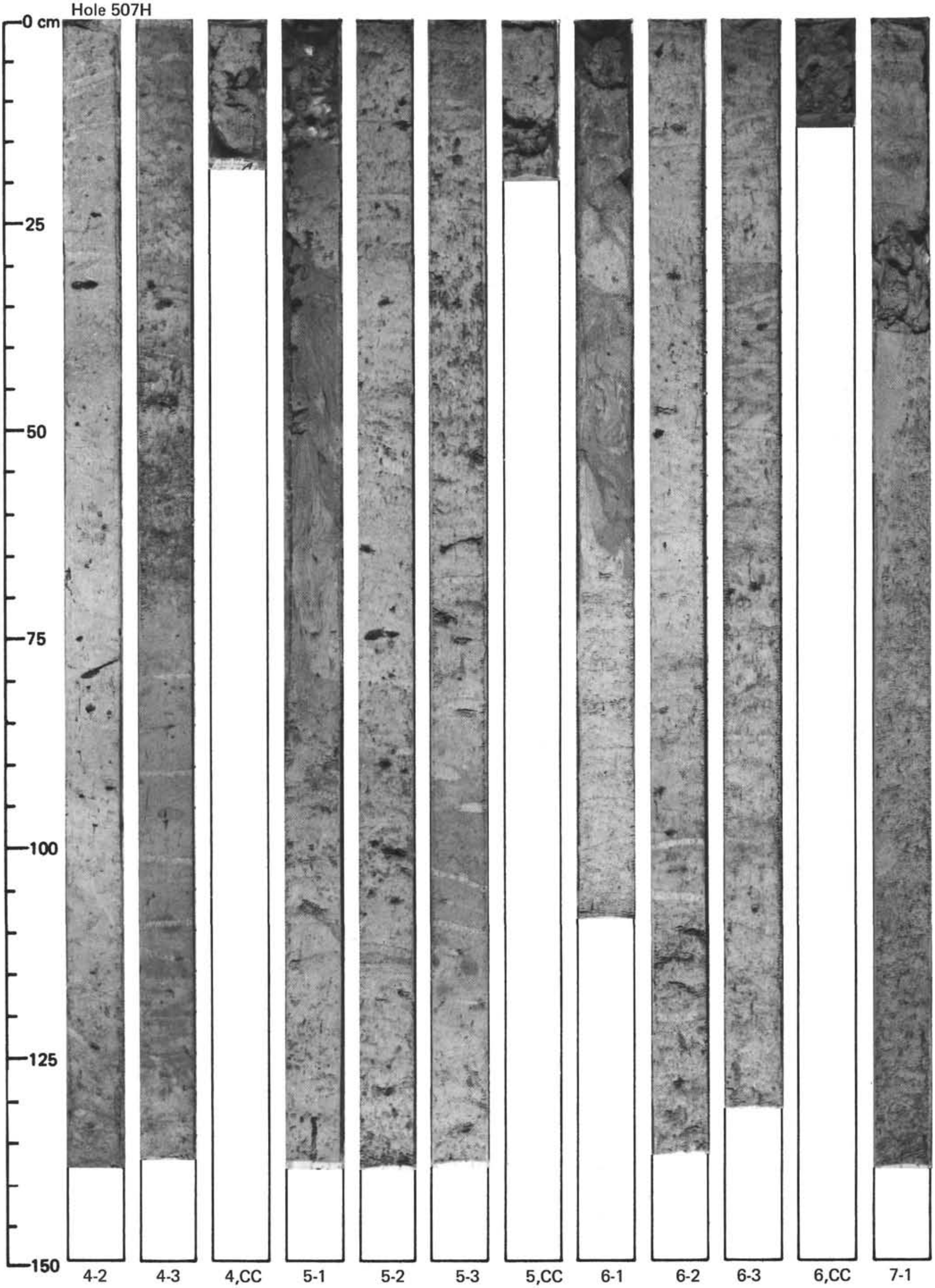

Hole 507D
0 cm
25
50
75
100
125
150
5-3
5,CC
6-1
6-2
6-3
6,CC
7-1
7-2
7-3
8-1
8-2
8-3
8,CC
9-1

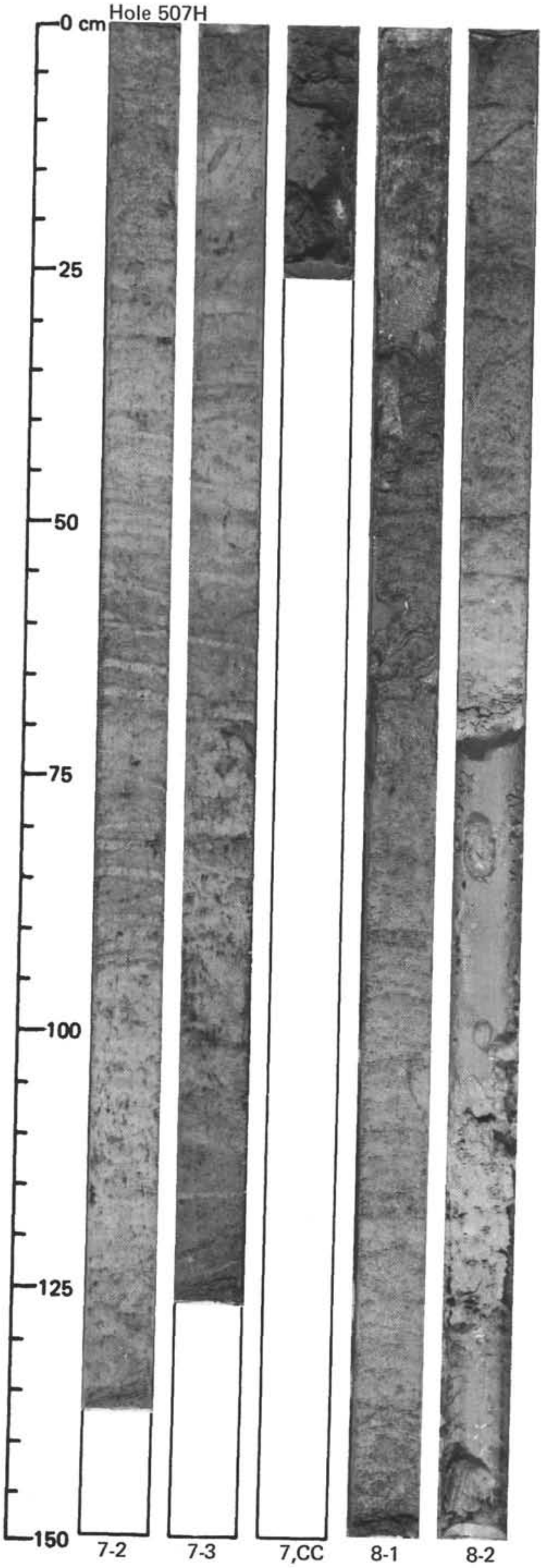

Hole 507D
0 cm
25
50
75
100
125
150
9-2
9-3
9,CC
10-1
10-2
10-3
10,CC


Hole 507F
0 cm
25
50
75
100
125
150
1-1
1-2
1,CC
2-1
2-2
2-3
2,CC
3-1
3-2
3-3
3,CC
4-1
4-2
4-3
4,CC
5-1


Hole 507F
0 cm
25
50
75
100
125
150
5-2
5-3
5,CC
6-1
6-2
6-3
6,CC
7-1
7-2
7-3
7,CC
8-1
8,CC
9-1
9,CC


Hole 507H
0 cm
25
50
75
100
125
150
A
1-1
1-2
1,CC
2-1
2-2
2-3
2,CC
3-1
3-2
3-3
3,CC
4-1


Hole 507H
0 cm
25
50
75
100
125
150
4-2
4-3
4,CC
5-1
5-2
5-3
5,CC
6-1
6-2
6-3
6,CC
7-1


Hole 507H
0 cm
25
50
75
100
125
150
7-2
7-3
7,CC
8-1
8-2