4. SITE 586[1]

Shipboard Scientific Party[2,3]

HOLE 586

Date occupied: 19 November 1982

Date departed: 19 November 1982

Time on hole: 15 hr., 52 min.

Position: 00°29.84′S; 158°29.89′E

Water depth (sea level; corrected m, echo-sounding): 2208

Water depth (rig floor; corrected m, echo-sounding): 2218

Bottom felt (m, drill pipe): 2223.1. Note: water depth of 2218 m from rig floor from 586C logs used as site datum.

Penetration (m): 39.3

Number of cores: 5

Total length of cored section (m): 39.3

Total core recovered (m): 38.98

Core recovery (%): 99.2

Oldest sediment cored:
Depth sub-bottom (m): 39.3
Nature: Foraminifer-bearing nannofossil ooze
Age: latest Pliocene
Measured velocity (km/s): Not measured

Basement: Not encountered

Principal results: This was to be the first of two overlapping sets of cores obtained by the HPC (hydraulic piston corer) on the edge of the Ontong-Java Plateau. While we were attempting to retract the barrel of Core 6, the barrel broke and was left outside the bit, forcing us to abandon the hole early.

HOLE 586A

Date occupied: 19 November 1982

Date departed: 20 November 1982

Time on hole: 1 day, 3 hr., 46 min.

Position: 00°29.84′S; 158°29.89′E

Water depth (sea level; corrected m, echo-sounding): 2208

Water depth (rig floor; corrected m, echo-sounding): 2218

Bottom felt (m, drill pipe): Not felt. Note: water depth of 2218 m from rig floor from 586C logs used as site datum.

Penetration (m): 300.2

Number of cores: 31

Total length of cored section (m): 260.9

Total core recovered (m): 257.03

Core recovery (%): 98.5

Oldest sediment cored:
Depth sub-bottom (m): 300.2
Nature: Nannofossil ooze and minor nannofossil chalk
Age: earliest late Miocene
Measured velocity (km/s): 1.6

Basement: Not encountered

Principal results: Hole 586A was washed to the 39.3 m depth at which Hole 586 had to be abandoned. A Neogene section of foraminifer-bearing nannofossil ooze was recovered. With depth, foraminifer content decreases. Below 260 m the first thin chalk beds appear and foraminifers are few. Fossils examined from this site show a mixture of two components—whole specimens whose age increases with core depth, and broken and corroded specimens reworked and transported to the site.

HOLE 586B

Date occupied: 20 November 1982

Date departed: 22 November 1982

Time on hole: 1 day, 1 hr., 3 min.

Position: 00°29.84′S; 158°29.89′E

Water depth (sea level; corrected m, echo-sounding): 2208

Water depth (rig floor; corrected m, echo-sounding): 2218

Bottom felt (m, drill pipe): At or above 2219.4. Note: water depth of 2218 m from rig floor from 586C logs used as site datum.

Penetration (m): 240.3

Number of cores: 25

Total length of cored section (m): 240.3

Total core recovered (m): 234.93

Core recovery (%): 97.8

Oldest sediment cored:
Depth sub-bottom (m): 240.3
Nature: Foraminifer-bearing nannofossil ooze
Age: late Miocene

Basement: Not encountered

Principal results: The hole was terminated after an equipment failure (piston of HPC) at 240.3 m sub-bottom depth. These cores were delivered unopened for the use of the Leg 90 shipboard scientific party.

HOLE 586C

Date occupied: 22 November 1982

Date departed: 23 November 1982

Time on hole: 1 day, 8 hr., 2 min.

Position: 00°29.84′S; 158°29.89′E

[1] Moberly, R., Schlanger, S. O., et al., *Init. Repts. DSDP*, 89: Washington (U.S. Govt. Printing Office).

[2] Ralph Moberly (Co-Chief Scientist), Hawaii Institute of Geophysics, University of Hawaii, Honolulu, HI; Seymour O. Schlanger (Co-Chief Scientist), Department of Geological Sciences, Northwestern University, Evanston, IL; Miriam Baltuck, Deep Sea Drilling Project, Scripps Institution of Oceanography, La Jolla, CA (present address: Geology Department, Tulane University, New Orleans, LA); James A. Bergen, Department of Geology, Florida State University, Tallahassee, FL (present address: UNOCAL, P.O. Box 76, Brea, CA 92631); Walter Dean, U.S. Geological Survey, Denver Federal Center, Denver, CO; Peter A. Floyd, Department of Geology, University of Keele, Keele, Staffordshire, United Kingdom; Naoyuki Fujii, Department of Earth Sciences, Kobe University, Kobe, Japan; Janet A. Haggerty, Department of Geosciences, University of Tulsa, Tulsa, OK; James G. Ogg, Department of Geology and Geophysics, University of Wyoming, Laramie, WY; Isabella Premoli Silva, Istituto di Paleontologia, Milan, Italy (present address: Dipartimento di Scienze della Terra, Universitá di Milano, Milan, Italy); André Schaaf, Institut de Geologie, Strasbourg, France (present address: Université de Bretagne Occidentale, GIS Océanologie et Géodynamique, 29287 Brest Cedex France); Rainer G. Schaefer, Institut für Erdöl und Organische Geochemie, KFA Jülich, Federal Republic of Germany; William V. Sliter, Branch of Paleontology and Stratigraphy, U.S. Geological Survey, Reston, VA (present address: U.S. Geological Survey, Menlo Park, CA); Jill M. Whitman, Geological Research Division, Scripps Institution of Oceanography, La Jolla, CA.

[3] An account of this site will also appear in Volume 90 of the *Initial Reports* (Kennett, von der Borch, et al., in press).

Water depth (sea level; corrected m, echo-sounding): 2208

Water depth (rig floor; corrected m, echo-sounding): 2218

Bottom felt (m, drill pipe): Not felt; 2218 m by gamma logs

Penetration (m): 623.1

Number of cores: 1

Total length of cored section (m): 9.6

Total core recovered (m): 2.18

Core recovery (%): 23

Oldest sediment cored:
Depth sub-bottom (m): 623.1
Nature: Nannofossil chalk and ooze
Age: early Miocene

Basement: Not encountered

Principal results: This hole was drilled to log a thick section of carbonate ooze. A suite of excellent logs was obtained.

BACKGROUND AND OBJECTIVES

The 1981–1983 *Glomar Challenger* drilling plan included three traverses designed to provide detailed information about Neogene paleoceanography and biostratigraphy through the recovery of sets of relatively complete and undisturbed cores of highly fossiliferous deep-sea sediment. The hydraulic piston corer (HPC) is the means of obtaining sections of undisturbed sediment longer than 30 m. The seafloor below areas of moderate to high productivity and above the calcite compensation depth (CCD) allows calcareous foraminifers and nannofossils to accumulate and remain in a good state of preservation. Of the three traverses in areas of thick Neogene calcareous ooze, Leg 85 cored at sites in the eastern equatorial Pacific, where cyclic productivity presumably controls cyclic sedimentation, and Leg 94 cored at sites in the eastern North Atlantic to examine paleoceanographic changes across latitudinal belts.

A third series of sites also extends across latitudinal oceanographic boundaries, but in the Southwest Pacific. Broad areas of the seafloor elevated well above the CCD extend, with interruptions, from Ontong-Java Plateau at the equator, past various rises between Melanesia and Australia, to the Bounty Trough, between Chatham Rise and Campbell Plateau, east of New Zealand. Sites deemed valuable for Neogene paleoceanographic studies in the Southwest Pacific have been designated in the southwest series. Boundaries of water masses may have shifted in response to changes in ocean circulation, owing to changing positions of land masses as the Australian lithospheric plate moved northward and the Melanesian island arcs evolved. Particular assemblages of fossil plankton characterize the various water masses between the equator and the Antarctic. Changes in the assemblages of ecologically dependent fossils through time at a drilling site are the records of past oceanographic changes there. The objective of Leg 90 was to use the HPC at several of these Neogene pelagic sites. JOIDES Planning Committee, however, assigned the northernmost site, SW-9, to Leg 89 to reduce the total amount of Leg 90 traveltime.

SW-9 (Site 586) is the tropical end of the traverse. It lies on the northeastern upper slope of the Ontong-Java Plateau on a broad northeast-trending ridge between two swales that are the heads of submarine canyon systems. Although mass wasting at the plateau margins has been documented (Berger and Mayer, 1978), and regional surveys suggest that a more complete section lies near the crest of the plateau 200 to 300 km to the southwest (Kroenke, 1972), SW-9 is located at existing DSDP Site 289 at 00°29.92′S, 158°30.69′E (Fig. 1). During Leg 30 that site was continuously cored by a rotary bit for 1262.5 m, with a 56% average recovery, through Cenozoic and Cretaceous sediments into basaltic basement of Aptian or earlier age (Andrews, Packham, et al., 1975b). The JOIDES Ocean Paleoenvironment Panel chose to schedule the HPC site at an existing continuously cored site in order to have a standard section that could be pieced from the work of the two legs, rather than at spot-cored DSDP Site 64 (which terminated in the Eocene) or at a new site that might not reach basement. Moreover, even though the Site 289 Neogene cores were disturbed and not complete in their recovery, so that HPC cores were needed for detailed work, they did not show any major discontinuities in the section above the lower Oligocene. The upper Oligocene and Miocene section is about 750 m thick at Site 289 (Fig. 2).

The principal aim at SW-9 (Site 586), therefore, was to obtain piston cores using the HPC to about 250 m sub-bottom depth or shallower, in the event that the resistance to shear by the sediment as it consolidated under burial increased to the degree that penetration died off significantly. Then, a second hole at the site was to

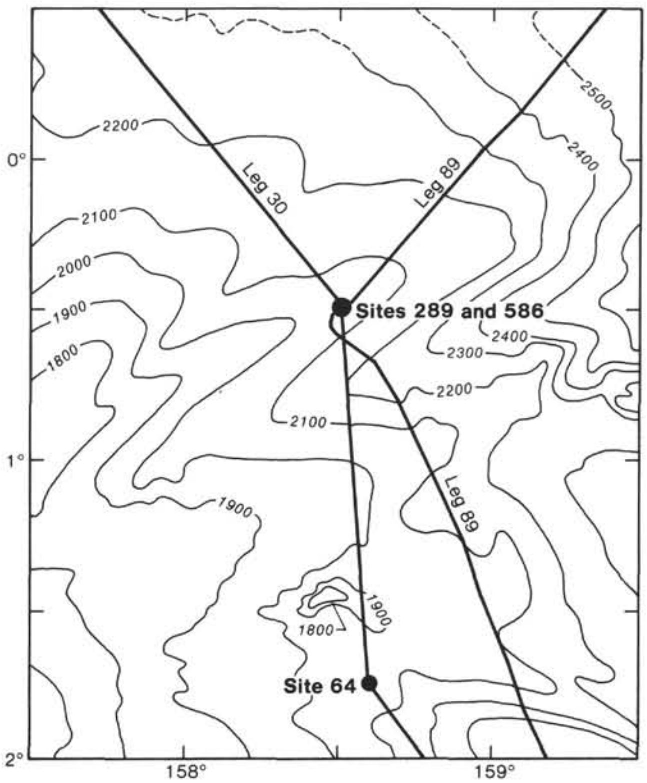

Figure 1. Location of Sites 586 (Leg 89), 289 (Leg 30), and 64 (Leg 7 and crossed again by Leg 30) on the Ontong-Java Plateau. Bathymetry from Kroenke (1972), uncorrected for changes in the velocity of sound in seawater.

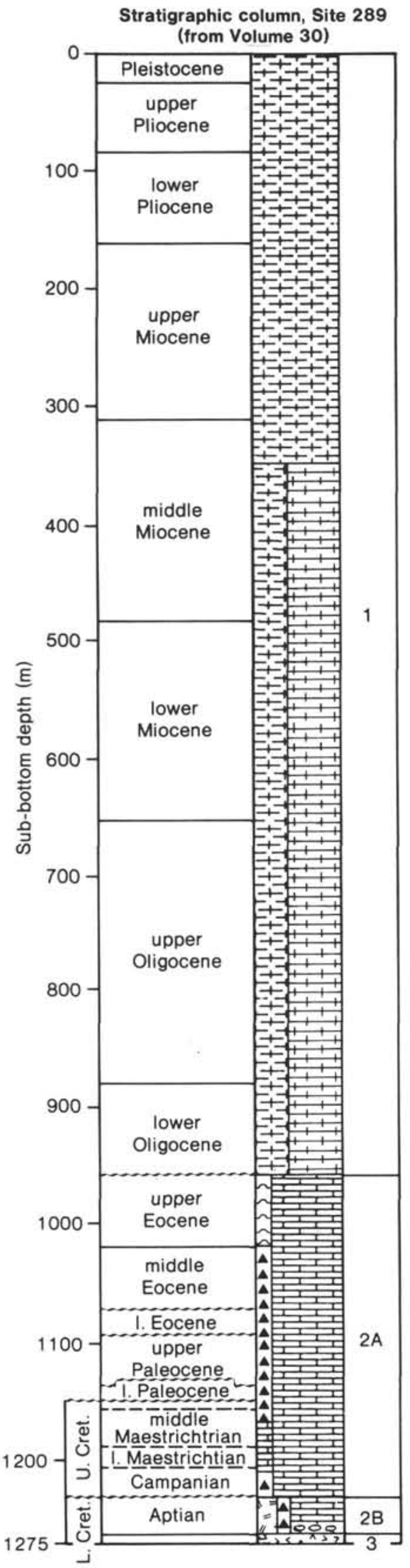

Figure 2. Stratigraphic section encountered during drilling of DSDP 289 (from Andrews, Packham, et al., 1975b).

be cored, offset slightly in distance and with the depth intervals of the second set of HPC cores adjusted so as to place the midpoints of the second set opposite the depths of the tops and bottoms of the first set. The pair of HPC holes, with overlapping cored intervals, was thereby expected to provide a continuous record: gaps in one set of cores should be filled by recovery in the other set. According to the Leg 30 paleontology report, 250 m depth would be within the upper Miocene, and it was expected that we would acquire a good record of late Neogene oceanographic events in the tropical belt of the western Pacific.

A number of lesser objectives also exist for SW-9; we attempted as many as could be fitted into the time remaining for Leg 89. The cause for the widespread, closely spaced seismic reflectors common in the carbonate oozes and chalks of oceanic plateaus has been studied on the Ontong-Java Plateau (Winterer, Riedel, et al., 1971; Moberly and Heath, 1971; Andrews, Packham, et al., 1975b; van der Lingen and Packham, 1975) and elsewhere (Schlanger and Douglas, 1974). There was no logging, however, at Site 289, and it was planned, if time permitted after the HPC, to drill into the ooze/chalk transition and log that hole. Density and velocity logs would give the opportunity to relate the petrography and laboratory-determined physical properties of specimens with downhole measurements of their geophysical parameters. Further, the logs could be processed so that real reflectors could be distinguished from acoustic artifacts. By dating these reflectors paleontologically by their depths in Hole 289, it would then be possible to confirm or reject the hypothesis that reflectors represent paleoceanographic events, as proposed by Schlanger and Douglas (1974).

Other objectives of secondary importance included sampling for organic geochemistry (sweet to musty odors in fresh cores at DSDP 64; hydrogen sulfide at DSDP 289), for paleomagnetism, and for diatom biostratigraphy. Periodic use of the heat-flow probe would allow a geothermal gradient to be determined. The origin of the Ontong-Java Plateau and of other oceanic plateaus remains controversial, and every type of high-quality geophysical information is of great value. Finally, if time remained during drilling of the logging hole, it was planned to take some cores from the lower Miocene interval to attempt to resolve better the nannofossil and foraminifer correlations in the lower Miocene of the Pacific area.

Most of the detailed studies of SW-9 material have been made by the Leg 90 Scientific Party and appear in Volume 90 of the *Initial Reports*.

OPERATIONS

The *Glomar Challenger's* route southwest from Site 462 generally traversed the bathymetric slope that rises up from the Nauru Basin onto the Ontong-Java Plateau. Clear sight of Kusaie Island and our profiler records of crossings of some of the distributary channels between the Plateau and Basin confirmed our conclusions about the sources of young ash and reworked Cenozoic fossils that are so abundant in the upper part of the Nauru Basin section at Site 462.

As we approached the position of Site 289 we slowed to 7 knots to improve the seismic reflection record. The ship's track is shown in Figure 3. There was no need to reoccupy the exact spot of the site, and so the beacon was dropped on a dead reckoning position at 0527 hr. on 19 November. Our water depth, corrected from the PDR (precision depth recorder), was 2207 m. Later, satellite navigation fixes showed that Site 586 is about 1300 m west-northwest of Site 289. Our surveying gear was retrieved, and the drilling crew commenced to assemble the components for using a variable length hydraulic piston corer (VLHPC) prior to lowering the drill string.

On the assumption that the seafloor was 2217 m from the drill floor, and taking into account the height of drill pipe joints above the rotary table (for ease in adding new lengths of pipe), we triggered the first core from 2214.8 m. When it was retrieved on board at 1420 hr., only the lower 1.3 m of the 9.6-m "shot" held sediment. The uppermost few centimeters of the core showed brownish colors, indicative of oxidation to the depth of burrowing at the seafloor, above the generally pale greenish colors of reduced pigment in the rest of that core (and of subsequent cores). The sediment/water interface would have been established at 2223.1 m below the drill floor (2213 m below sea level), but the PDR record already mentioned, the Core 586B-1 recovery, and Hole 586C logging indicated that the figure of 2218 m below drill floor (2208 m below sea level) is a more correct value for all holes at this site.[4]

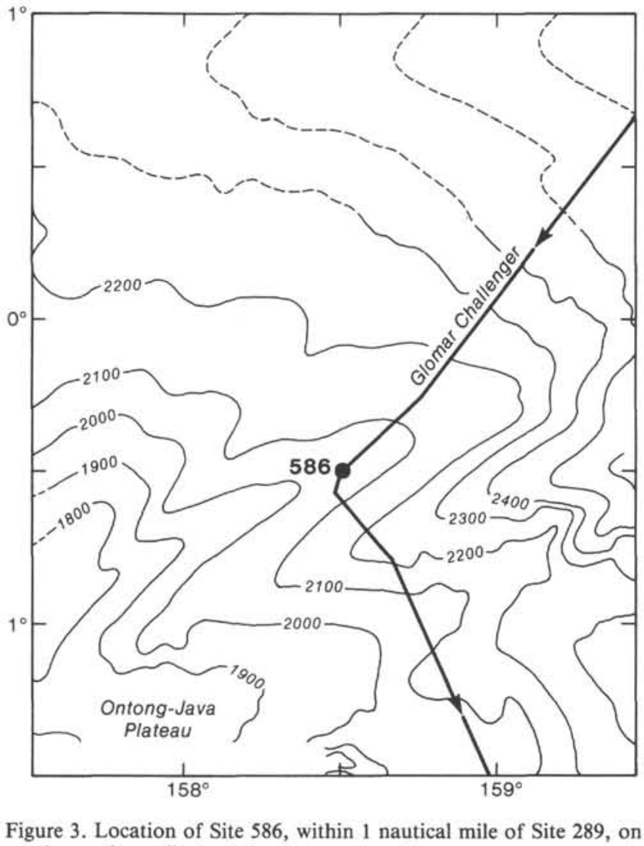

Figure 3. Location of Site 586, within 1 nautical mile of Site 289, on the northeast flank of the Ontong-Java Plateau, western equatorial Pacific. Bathymetric contours (from Kroenke, 1972) are based on an assumed sound-velocity structure of 1500 m s^{-1}.

Five cores with virtually complete recovery (99.2%) were easily and speedily obtained from the foraminifer-bearing nannofossil ooze (Table 1). Only the upper half of the sixth core barrel, however, came back on deck at 1919 hr. on the same afternoon. After the VLHPC inner barrel has been shot hydraulically from its core barrel housing down through the hole in the bit and out into the ooze, it broke off from the barrel and was lost in the sediment. The von Herzen heat-flow probe with its miniaturized electronics and battery packages was left in the shoe of the lost inner barrel. Because that was the only remaining probe, the heat-flow program ended. The five cores recovered were not oriented, owing to malfunctioning of the Kuster single-shot system.

After that termination of Hole 586, the drill string was raised slightly, then lowered, and Hole 586A was started by washing to the 39.3-m total depth of the first hole. The broken VLHPC was repaired and put to use. The first 25 cores were retrieved from 586A at an average interval of 40 min. from these shallow depths. Virtually all of these cores attempted a full 9.6-m stroke and recovered a full barrel. By 270.6 m coring depth, the frictional resistance to withdrawal of the core barrel from the sediment reached 30,000 to 50,000 lb., and so to lessen the risk of structural failure of the tool again, the driller shifted to the use of a 5-m-stroke HPC. The last four cores, ending with Core 31 at 300.2 m sub-bottom, were so taken, with excellent results. Coincidentally, the Kuster system provided orientation data for the last cores. Overall there was 98.5% recovery from Hole 586A. The calcareous oozes and, below 230 m, a few thin chalk beds had cored easily. Probably we could have continued for a few more cores, but we pulled the drill string up above the seafloor at 0008 hr. on 22 November to maintain our schedule for the site.

After redressing the VLHPC, the crew commenced coring Hole 586B, which, as noted earlier, was to be a duplicate of the 586-586A section, with overlapping depths of individual cores. The first core was shot from 2119.4-m depth, presumably slightly above the 2223.1-m seafloor, with the intention of recovering 5.9 m. The entire 9.6-m barrel, however, was recovered full of sediment, raising the question about the true depth of the seafloor. Again, coring proceeding quickly, with 25 cores obtained in a 17-hr. span. Actually, there were 26 wire line trips in that time; Core 2 had to be repeated when the core catcher failed to close. Orientation was good for these cores; except for the leakage of light, which fogged parts of the film, the Kuster device was working.

When the 25th core was brought on board during the evening of 21 November, it was discovered that the piston had jammed tightly inside the top of the core barrel, because the plastic core liner had collapsed. The lengthy process of removing the core from the barrel, and the

[4] Note that prime data for Hole 586 and 586A collected aboard ship may reflect the originally established water depths and sub-bottom depths and may be in error by 5.1 m in the sub-bottom depths.

Table 1. Coring summary, Site 586.

Core no.	Date (Nov., 1982)	Time	Depth from drill floor (m) top bottom	Depth below seafloor (m) top bottom	Length cored (m)	Length recovered (m)	Percent recovered
Hole 586							
1	19	1420	2218.0-2224.4	0.0-1.3	1.3	1.28	98.5
2	19	1527	2224.4-2233.9	1.3-10.8	9.5	9.52	100.2
3	19	1608	2233.9-2243.4	10.8-20.3	9.5	9.44	99.4
4	19	1701	2243.4-2252.9	20.3-29.8	9.5	9.68	101.9
5	19	1742	2252.9-2262.4	29.8-39.3	9.5	9.06	95.4
					39.3	38.98	99.2
Hole 586A (washed to 39.3 m)							
1	19	2305	2262.4-2272.0	39.3-48.9	9.6	9.45	98.4
2	19	2349	2272.0-2281.6	48.9-58.5	9.6	9.44	98.3
3	20	0043	2281.6-2291.2	58.5-68.1	9.6	9.57	99.7
4	20	0125	2291.2-2300.8	68.1-77.7	9.6	9.54	99.4
5	20	0155	2300.8-2310.4	77.7-87.3	9.6	9.38	97.7
6	20	0237	2310.4-2320.0	87.3-96.9	9.6	9.37	97.6
7	20	0316	2320.0-2329.6	96.9-106.5	9.6	9.52	99.2
8	20	0400	2329.6-2339.2	106.5-116.1	9.6	9.50	99.0
9	20	0445	2339.2-2348.8	116.1-125.7	9.6	9.50	99.0
10	20	0523	2348.8-2358.4	125.7-135.3	9.6	9.40	97.9
11	20	0602	2358.4-2368.0	135.3-144.9	9.6	9.52	99.2
12	20	0640	2368.0-2377.6	144.9-154.5	9.6	9.56	99.6
13	20	0730	2377.6-2384.9	154.5-161.8	7.3	7.30	100.0
14	20	0815	2384.9-2389.8	161.8-166.7	4.9	4.87	99.4
15	20	0900	2389.8-2398.8	166.7-175.7	9.0	9.03	100.3
16	20	0940	2398.8-2408.4	175.7-185.3	9.6	9.56	99.6
17	20	1022	2408.4-2418.0	185.3-194.9	9.6	9.44	98.3
18	20	1105	2418.0-2427.6	194.9-204.5	9.6	9.48	98.8
19	20	1140	2427.6-2436.1	204.5-213.0	8.5	8.54	100.5
20	20	1230	2436.1-2445.7	213.0-222.6	9.6	9.22	96.0
21	20	1305	2445.7-2455.3	222.6-232.2	9.6	9.84	102.5
22	20	1340	2455.3-2464.9	232.2-241.8	9.6	9.50	99.0
23	20	1430	2464.9-2474.5	241.8-251.4	9.6	9.57	99.7
24	20	1512	2474.5-2484.1	251.4-261.0	9.6	9.57	99.7
25	20	1607	2484.1-2493.7	261.0-270.6	9.6	9.47	98.6
26	20	1645	2493.7-2499.7	270.6-276.6	6.0	4.14	69.0
27	20	1750	2499.7-2503.9	276.6-280.8	4.2	4.15	98.8
28	20	1908	2503.9-2508.3	280.8-285.2	4.4	4.26	96.8
29	20	1955	2508.3-2513.3	285.2-290.2	5.0	5.08	101.6
30	20	2050	2513.3-2518.3	290.2-295.2	5.0	5.15	103.0
31	20	2130	2518.3-2523.3	295.2-300.2	5.0	5.11	102.2
					260.9	257.03	98.5
Hole 586B							
1	21	0200	2219.4-2229.0	1.4-11.0	9.6	9.62	100
2	21	0320	2229.0-2238.6	11.0-20.6	9.6	9.49	99
3	21	0410	2238.6-2248.2	20.6-30.2	9.6	9.66	100
4	21	0500	2248.2-2257.8	30.2-39.8	9.6	9.31	97
5	21	0545	2257.8-2267.4	39.8-49.4	9.6	9.36	98
6	21	0630	2267.4-2277.0	49.4-59.0	9.6	9.62	100
7	21	0715	2277.0-2286.6	59.0-68.6	9.6	9.10	95
8	21	0800	2286.6-2296.2	68.6-78.2	9.6	9.61	100
9	21	0840	2296.2-2305.8	78.2-87.8	9.6	9.64	100
10	21	0916	2305.8-2314.3	87.8-96.3	8.5	8.01	94
11	21	0950	2314.3-2323.9	96.3-105.9	9.6	9.70	100
12	21	1025	2323.9-2333.5	105.7-115.5	9.6	9.63	100
13	21	1110	2333.5-2343.1	115.5-125.1	9.6	9.69	100
14	21	1145	2343.1-2352.7	125.1-134.7	9.6	9.63	100
15	21	1220	2352.7-2362.3	134.7-144.3	9.6	9.47	99
16	21	1300	2362.3-2371.9	144.3-153.9	9.6	9.41	98
17	21	1348	2371.9-2381.5	153.9-163.5	9.6	9.05	94
18	21	1430	2381.5-2391.1	163.5-173.1	9.6	9.60	100
19	21	1513	2391.1-2400.7	173.1-182.7	9.6	9.60	100
20	21	1550	2400.7-2410.3	182.7-192.3	9.6	9.54	99
21	21	1628	2410.3-2419.9	192.3-201.9	9.6	9.55	99
22	21	1710	2419.9-2429.5	201.9-211.5	9.6	9.63	100
23	21	1749	2429.5-2439.1	211.5-221.1	9.6	9.68	100
24	21	1837	2439.1-2448.7	221.1-230.7	9.6	8.89	93
25	21	1910	2448.7-2458.3	230.7-240.3	9.6	8.84	88
					240.3	234.93	98
Hole 586C							
H1	22	1255	2218.0-2831.5	0.0-613.5	—	—	—
1	22	1350	2831.5-2841.1	613.5-623.1	9.6	2.18	23
					9.6	2.18	23

Note: Data in this table have been corrected to accord with a water depth of 2218 m established by logging at Hole 586C.

additional line that would be needed to remove the piston and redress the tool, caused us to abandon Hole 586B at a total depth of 240.3 m. The average recovery was an excellent 97.8%. The drill string was recovered by 0008 hr. on 22 November.

Hole 586B cores were preserved uncut for the use of Leg 90 scientists. The admixture in the cores from Holes 586 and 586A of transported microfossil components dampened the interest of many of the Leg 89 scientists in using this site for detailed stratigraphy. The barrel sheets for Hole 586B, prepared by the Leg 90 scientific party, are presented in Volume 90.

Hole 586C was spudded at 0541 hr. with a used bit and a hydraulic bit released in the bottom hole assembly (BHA). More than 600 m of Neogene ooze and chalk were drilled nearly as fast as the pipe could be added to the string. The "wash" core barrel was retrieved with virtually nothing in it, and the only 9.6-m-long core taken from Hole 586C ended at 623.1 m sub-bottom depth. In preparation for logging, the bit was released, and a slurry of fresh water and bentonite mud was pumped into the hole to displace the seawater. The drill string was pulled up close to the seafloor and the derrick was rigged for logging.

Three logging runs were made with the Schlumberger equipment. The logs appeared to be excellent. The first run included measurements of sonic velocity, electrical spontaneous potential, electrical induction-spherically focused log, natural gamma radiation, and hole diameter by caliper. Then a second sonde replaced the first one. The other two runs were made with that second sonde, but the final log was through a shorter interval and the sonde was pulled up the bore more rapidly. That sonde included measurements of formation density (compensated) and neutron porosity, along with a repeat of the gamma ray and caliper measurements.

All three gamma radiation logs showed, through the drill pipe, the increase above sediment background from ^{234}U and other short-lived isotopes immediately below the seafloor, and then a sharp drop in radiation as the tool was pulled up into seawater. The seafloor in 586C was at about 2218 m. In retrospect, it seems that the filling of Core 586B-1, the gamma ray logs, and the PDR depths were correctly identifying the seafloor at about 2217 or 2218 m from the drill floor (2207 or 2208 m from sea level), and that the 2223.1-m (2213 m from sea level) determination from Core 586-1 may have resulted from some fluke, such as partial loss of the core through a faulty core catcher, or spudding into a depression of the seafloor. We have used 2218 m for all holes.

After the logging was completed and its rigging removed, the drill string was retrieved and the ship made ready for sea. We got under way at 0810 hr. on 23 November, moving northward while streaming the geophysical gear. The *Glomar Challenger* then passed over the beacon, taking water gun records (Fig. 4). Three attempts to obtain ASPER records failed, because of sonobuoys that did not work. They had been stored for about four years in a part of the ship's hold without temperature control; probably their batteries had died months before.

For the next several hours as we crossed the Ontong-Java Plateau, the reflection profiles (e.g., Fig. 5) showed some of the numerous fault scarps that expose older sediment and probably account for some of the sediment reworked into the sediments of Site 586. We continued on a southward course toward the Solomon Islands and on to Noumea.

LITHOLOGIC SUMMARY

Site 586 is located on the Ontong-Java Plateau, about 1 nautical mi. northwest of DSDP Site 289 at a water depth of 2208 m. Hole 586 was cored continuously to a sub-bottom depth of 39.3 m. Coring in Hole 586A began at 39.3 m and continued to 300.2 m. The sedimentary section from 0 to 240.3 m sub-bottom was collected again in 25 cores from Hole 586B. The cores from Hole 586B were stored unopened for use by the Leg 90 scientists. A fourth hole, Hole 586C, was rotary drilled for logging to a total depth of 623.1 m sub-bottom. The sediments recovered from Holes 586, 586A, and 586C comprise a single lithologic unit that consists of pale green to white foraminifer-nannofossil ooze and foraminifer-bearing nannofossil ooze and minor chalk (bottom of Hole 586C) of early Miocene to Recent age.

The Pleistocene to Recent part of the sedimentary sequence recovered at Site 586 (Cores 586-1 through -5) is 39 m thick and contains higher concentrations of foraminifers than the rest of the sequence. These foraminifer-rich sediments contain more than 20 and up to 60% foraminifers (Figs. 6 and 7) and are classified as foraminifer-nannofossil and nannofossil-foraminifer ooze. Texturally they are silty clay and sandy silty clay. Sediments recovered in Hole 586A (upper Miocene through Pliocene; 39-300 m sub-bottom) are composed of more than 80% nannofossils and less than 20% foraminifers, and are classified as foraminifer-bearing nannofossil ooze. Results of analyses of 38 samples for $CaCO_3$ range from 78 to 99% and average 93% (Table 2; Fig. 6). All other components in the sediments are very minor (Fig. 7). Siliceous biogenic components, mainly radiolarians and diatoms, are present in minor amounts (up to several percent) throughout the section. They increase in abundance at the base of the recovered section (Figs. 6 and 7), but the total of siliceous biogenic components rarely exceeds 5%. Texturally, all of the upper Miocene to Pliocene sediments are clay or silty clay.

The ooze generally does become somewhat stiffer with depth, and firmer pieces ("biscuits") of chalk occur within stiff ooze in Cores 586A-25 through -31. Soft, soupy ooze does occur, however, even between some of the chalk pieces in the lower part of Hole 586A. The single core recovered from the base of Hole 586C (613.5-623.1 m; lower Miocene) also consists of interbedded foraminifer-bearing nannofossil chalk and stiff ooze, although some of the ooze is still soft and soupy. The chalk undoubtedly occurs as continuous layers, and its appearance in the cores as biscuits is a result of breaking and rounding of the harder chalk layers by the drilling process. There does not appear to be any systematic pattern to the occurrence of the chalk layers, although chalk pieces in Section 586A-27-3 seem to occur with a rhythmic spacing of 15 to 20 cm.

The top 15 cm of sediment in Hole 586 has been oxidized to pale brown (5Y 8/1), but the rest of the sedi-

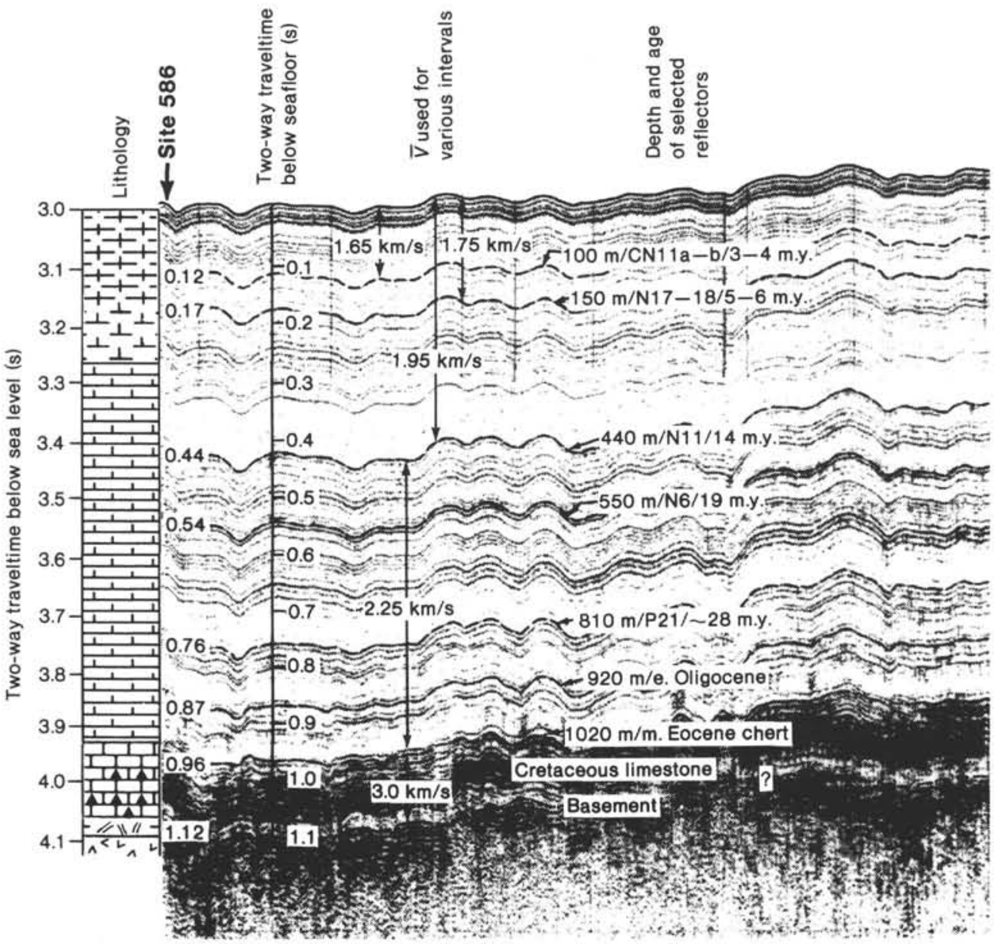

Figure 4. Interpretation of seismic reflection profile at Site 586, northeastern Ontong-Java Plateau. (Source, 80 in.^{3} water gun, 40–60 Hz filter. See text for explanation.)

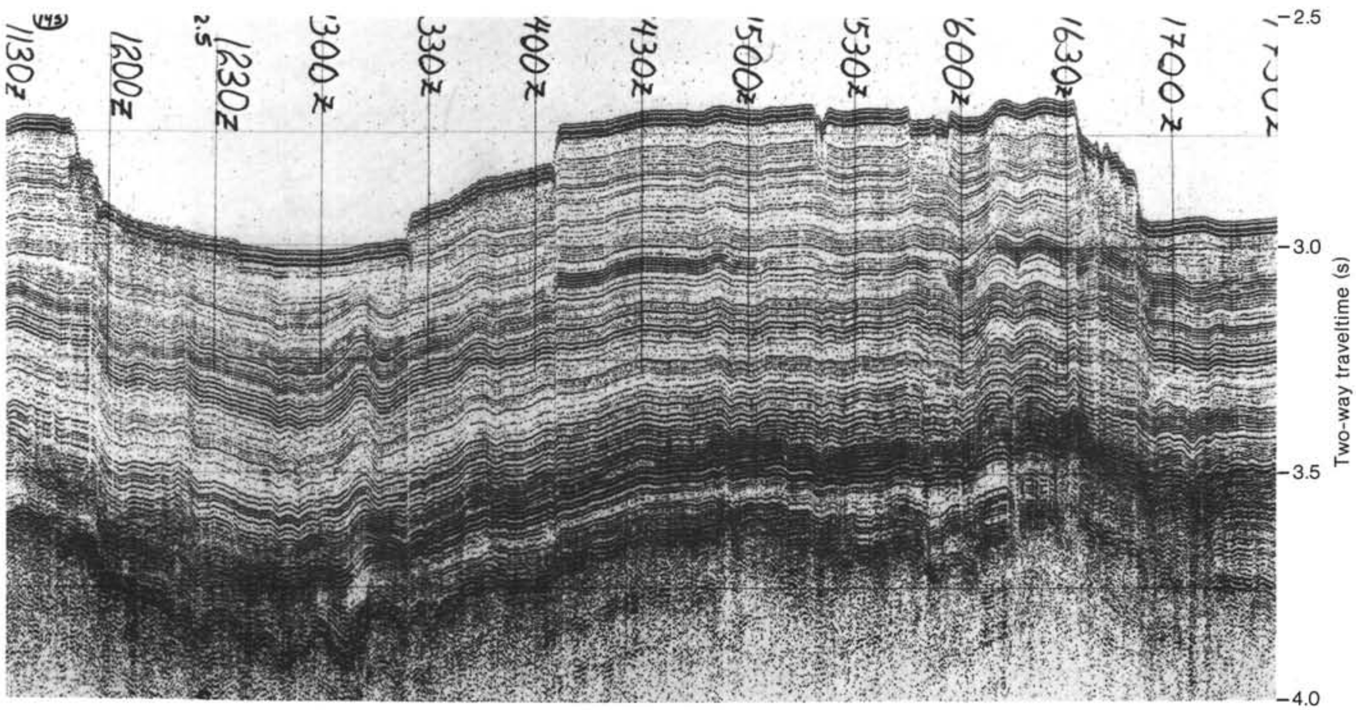

Figure 5. Fault-scarp topography shown by seismic reflection profile near Site 586. Local elevations and slopes such as these may have provided the redeposited sediment mixed with the autochthonous sediment at Site 586.

ments are reduced and have the general overall appearance of very pale green. The change from oxidized to reduced sediment at 15 cm probably indicates depth of burrowing. Sediment colors from the Munsell color chart are white (N9 and 5YR 5/2), bluish white (5B 9/1), pale greenish yellow (5Y 7/3), light greenish gray (5GY 8/1), and various other subtle tints of pale green. Thin layers (mostly less than 1 cm) of slightly darker pale green, pale yellow, and light to medium gray sediment are common above 135 and below 280 m. Most of the slightly darker-colored sediment occurs as mottles in highly bioturbated pale green ooze, and are somewhat coarser. The gray color of some layers and burrow mottles apparently is due to the presence of pyrite, which occurs as small spherical framboids. Compositional differences between the slightly darker green and yellow layers and mottles and the dominant pale green ooze could not be resolved by smear slides. Some qualitative observations suggest that the darker materials may contain slightly higher concentrations of altered volcanic glass and, as mentioned earlier, they tend to be somewhat coarser. In addition to the overall pale green color of the sediment and the presence of pyrite, the reduced nature of the sediment is indicated by the odor of H_2S emitted when the cores were opened.

BIOSTRATIGRAPHY

Holes 586 and 586A

The almost 300 m of sediments recovered in Holes 586 and 586A span the time interval from Recent through almost all of the late Miocene. The three major planktonic groups are well represented throughout and display a moderate to good state of preservation.

As shown by the foraminifer record, the sediments, which at first sight appear to display the sedimentological characteristics of a foraminifer–nannofossil ooze, were affected by mechanical transport that caused (1) an accumulation of foraminifer tests within the range of the sand fraction, and (2) an admixture of forms from different environments, ranging from shallow-water platforms to bathyal depths. Thus the sediments encountered at this site were transported and are more properly defined as a graded foraminifer–nannofossil silty sand. Evidence of such transport is also shown by the radiolarian assemblages, which display a large variation in the size distribution of the microfauna.

In spite of these sedimentological characteristics, the sedimentary succession appears to be almost continuous, as revealed by the biostratigraphic record. A synthesis of the biostratigraphic succession based on the three fossil groups is shown in Figure 8, where the major events within the foraminifer faunas are also plotted against absolute ages. Some minor reworking of older nannofossils and radiolarians was detected in the upper half of the sequence.

The major biostratigraphic events from the three groups correlate well except for the interval from Cores 586A-3 to -5. There, a major discrepancy concerns the location of the boundary between the early and late Pliocene according to the planktonic foraminifers and calcareous nannofossils. Following the planktonic foraminifers, the early/late Pliocene boundary is equated by definition to the last appearance datum (LAD) of *Globorotalia margaritae*, which in Hole 586A occurs between the core catcher samples of Cores 3 and 4. According to the nannofossils, the same boundary should occur between Zone CN11b and Zone CN12a; this boundary is present in Core 586A-5 between Sections 4 and 6. Further studies will clarify if such a discrepancy (1) is due to reworking of planktonic foraminifers in higher levels, (2) is related to an erroneous correlation between the two zonal schemes, or (3) results from the erroneous positioning of the early/late Pliocene boundary with respect to the nannofossil zonal scheme by the nannofossil specialists. The same succession of biostratigraphic events among the planktonic foraminifers, such as the LAD of *Globoquadrina altispira* and the first appearance datum (FAD) of *Globigerinoides fistulosus* and of *Truncorotalia tosaensis*, was described in the same order by Srinivasan and Kennett (1981) from Site 289 and by Vincent (1981) from Site 463. In addition, these events occur within the same nannofossil biozone at the three sites. The third hypothesis of a mislocation of the early/late Pliocene boundary with respect to the nannofossil zonation becomes a real possibility.

Hole 586C

The only core from Hole 586C yielded very well preserved and abundant radiolarian faunas whereas planktonic foraminifers and calcareous nannofossils are very poorly preserved. All the three fossil groups speak for an early Miocene age. The zonal assemblages in the three groups, however, are not coeval. A possible interpretation is that the planktonic foraminifers are reworked, whereas the nannofossil assemblages are mixed with downhole contaminants. Thus, the age based on the radiolarians is retained as the only valid one.

Foraminifers

Holes 586 and 586A

Planktonic foraminifers are abundant in the sediments recovered from Hole 586 and 586A. The washed residues obtained from the core-catcher samples, however, show clear evidence of mechanical transport in the accumulation of foraminifer tests >250 μm, whereas the fraction <250 μm contains a large amount of test fragments, sometimes up to 50% of the total fraction. Moreover, the amount of residue for the 250 to 150 μm and the 150 to 45 μm fractions is one-half or one-third of the amount obtained from a typical pure nannofossil–foraminifer ooze. Thus, the sediments recovered at Site 586 might better be defined as a planktonic foraminifer silty sand.

Both planktonic and benthic foraminifers from the same sample show different preservation, the same species occurring with transparent and chalky tests. It is not clear if the best preserved tests indicate that the specimens are autochthonous or allochthonous.

In addition, each residue contains few to several specimens of *Quinqueloculina*, coarse agglutinated foraminifers, large nodosariids (one chamber was over 2 mm in

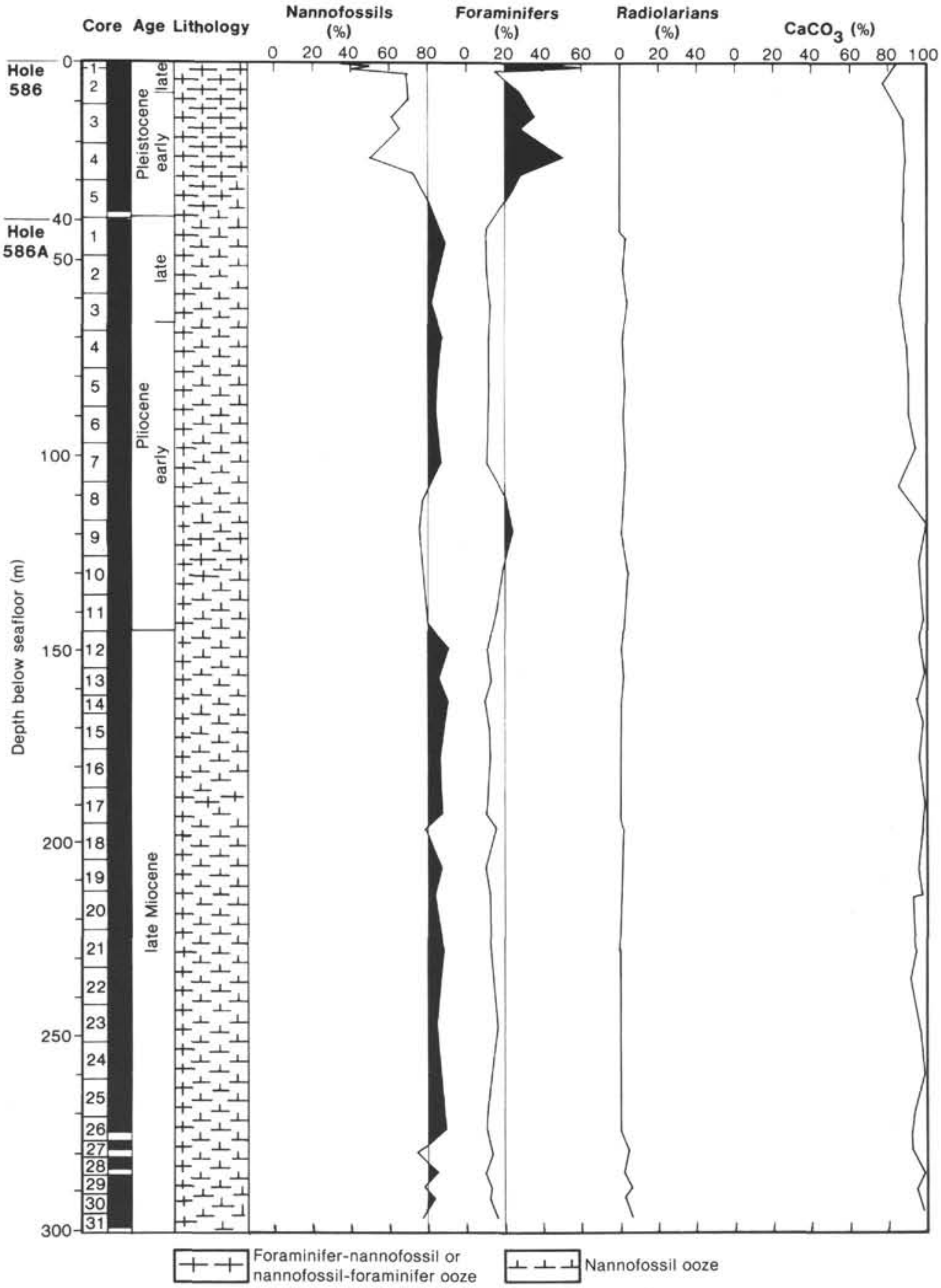

Figure 6. Summary lithology column.

size), and highly ornamented ostracodes indicative of an environment much shallower than the present water depth at Site 586 (2208 m below sea level) or than the estimated bathyal paleodepth based on the autochthonous benthic foraminifers. It is worth mentioning that evidence of obvious reworking among planktonic foraminifers could not be detected in this preliminary study, although it cannot be ruled out. In spite of the mechanical transport and mixing of material from shallower depths, the biostratigraphic signal appears to be undisturbed.

The uppermost 39.3 m of the sequence was recovered in Cores 586-1 to -5. Below the mud line, the 1 m of Holocene sediments in Core 586-1 yielded a very rich planktonic assemblage. Abundant species include *Globigerina rubescens* (red), *Globigerinoides ruber* (red), *G. mitra* (red), *G. sacculifer, Globorotalia tumida, Pulleniatina finalis*, and *Neogloboquadrina dutertrei*. Traces of sulfur, pyrite, and organic matter partially coat or fill the planktonic foraminifer tests. The core-catcher sample of Core 586-1 belongs to late Pleistocene Zone N23. The planktonic foraminifer assemblage consists of *Truncorotalia truncatulinoides*[5], *Globorotalia crassaformis,*

[5] The genus known as *Truncorotalia* in this chapter is now referred to as *Globorotalia* (see Site 586 report, Kennett, von der Borch, et al., in press).

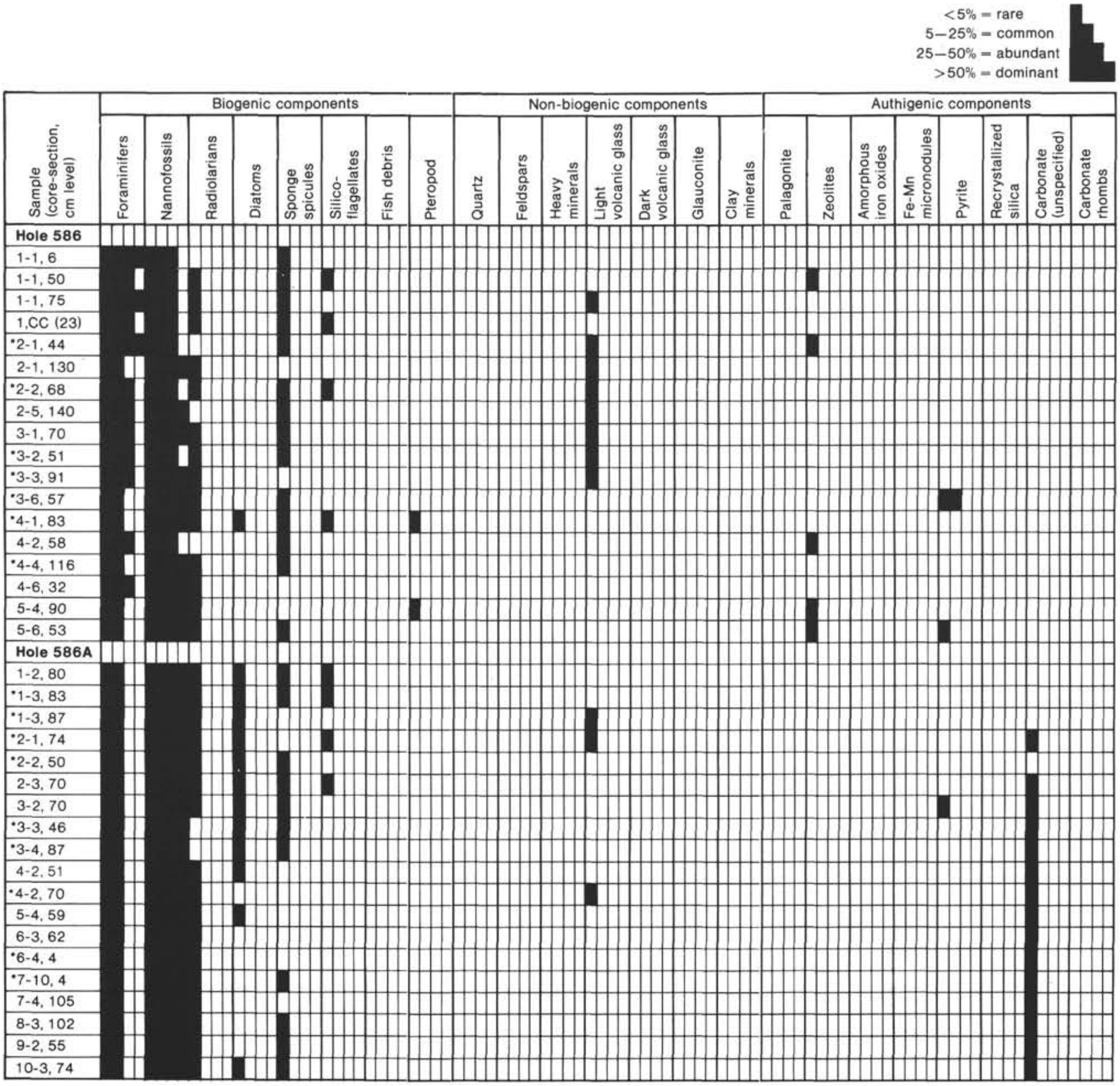

Figure 7. Smear slide summary (asterisk by sample numbers indicates minor lithology).

G. crassula, and *Globigerinoides conglobatus*, besides the species mentioned above. The tests of *Globigerina rubescens* and *Globigerinoides ruber* are still red in color.

From Core 586-2 to Section 586-5-6 planktonic foraminifer assemblages are early Pleistocene in age (Zone N22). Common to abundant species are *Globorotalia tumida* and *G. tumida flexuosa*, *Truncorotalia truncatulinoides*, *Pulleniatina obliquiloculata*, *Globigerinoides ruber* (white), and *G. sacculifer*, among others. Few specimens of *Truncorotalia tosaensis* and *Globigerinoides* aff. *fistulosus* and the unusual abundance of *Streptochilus tokelauae* in Sample 586-4,CC indicate early Zone N22. The late Pleistocene planktonic assemblage of Zone N21 occurs in core-catcher Sample 586-5,CC (the last core in Hole 586) and in Cores 586A-1 and -2, where coring started at the same level at which Hole 586 was discontinued. This zonal assemblage is characterized by the occurrence of *Pulleniatina obliquiloculata*, *Truncorotalia tosaensis*, *T. tenuitheca*, *Globorotalia crassaformis*, and by common to abundant *Globigerinoides fistulosus* and *Streptochilus tokelauae*. Accompanying species are *Globorotalia tumida*, *G. tumida flexuosa*, *G. exilis*, *G. ungulata*, sphaeroidinellids, *Globigerinoides ruber*, and rare *G. extremus*.

The core-catcher sample of Core 586A-3 yielded a planktonic foraminifer assemblage similar to those occurring in overlying Cores 586A-1 and -2 except for the occurrence of common, well developed specimens of *Globoquadrina altispira*. According to Blow (1969), the latter taxon should not co-occur with *T. tosaensis* and *T. tenuitheca*, which are also present in Sample 586A-3,CC. Further studies will clarify if the range of *G. altispira* in

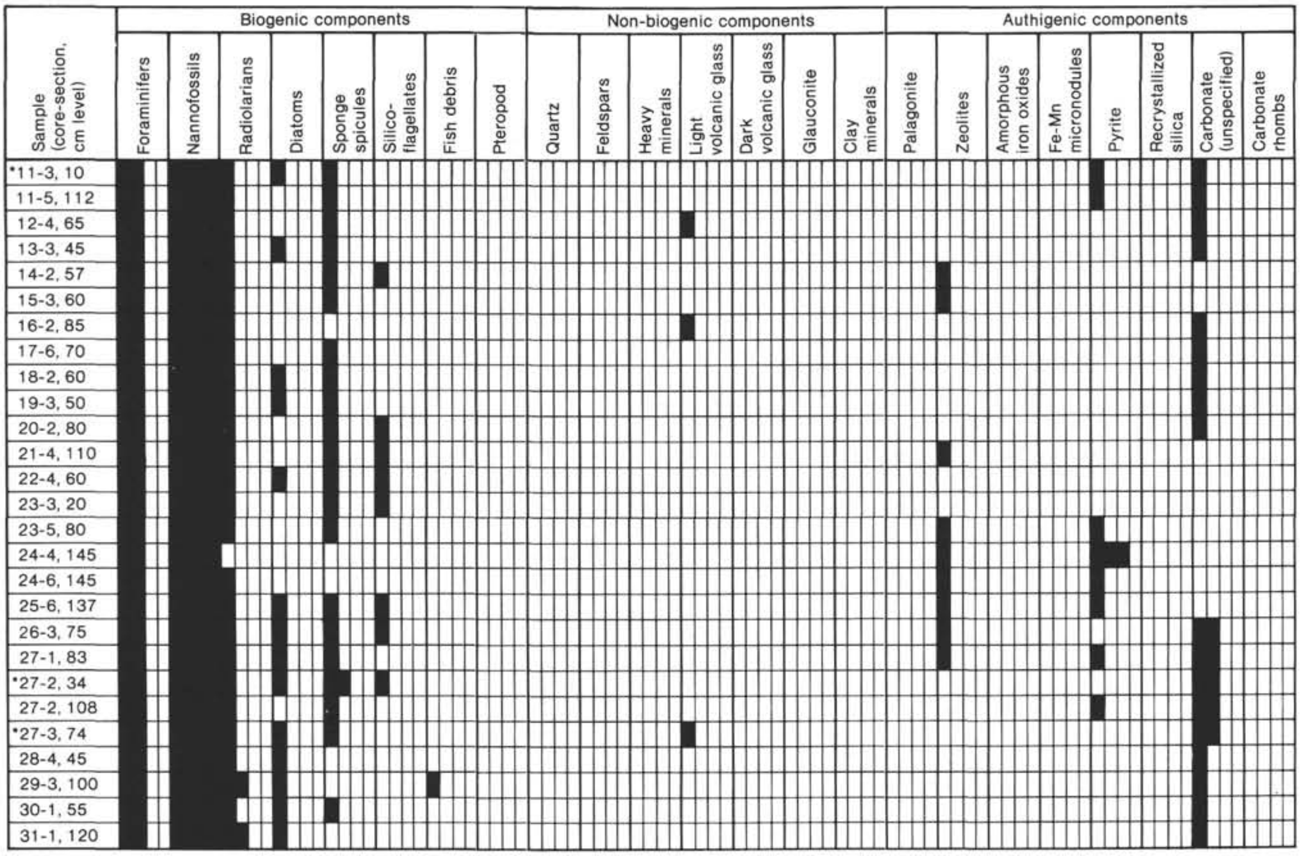

Figure 7 (continued).

fact overlaps with that of *T. tosaensis* and *T. tenuitheca* or if the occurrence of *G. altispira* in Sample 586A-3,CC is anomalous and due to reworking. For the time being, Core 586A-3 to Section 586A-4-3 are attributed to Zone N20, the oldest zone in the Pliocene.

The interval from Section 586A-4-4 to Core 586A-8 is attributed to the early Pliocene Zone N19 on the basis of the occurrence of *Globorotalia margaritae* with *Pulleniatina obliquiloculata, Globoquadrina altispira, Globorotalia tumida, G. tumida flexuosa, Neogloboquadrina humerosa*, and *Globigerinoides extremus*, and including *Streptochilus tokelauae*, which was limited to Core 586A-4. The planktonic foraminifer assemblages in Cores 586A-7 and -8 are differentiated from those contained in Cores 4 to 6 by the occurrence of *Globigerina nepenthes, Pulleniatina spectabilis, P. praecursor*, and *Streptochilus latum. Globorotalia margaritae* is very rare in some samples. The boundary between Zones N19 and N18, still early Pliocene in age, is placed tentatively between Cores 586A-8 and -9, based on a single specimen of *Sphaeroidinella* that occurs in Sample 586A-8,CC. Remarkably, *Sphaeroidinellopsis* and *Sphaeroidinella* are rare components of most of the assemblages recovered at Site 586. The interval from Cores 586A-9 through -12 yielded a planktonic foraminifer fauna characteristic of Zone N18 of latest Miocene to early Pliocene age. The lower boundary of Zone N18 corresponds to the FAD of *Globorotalia tumida* in the evolutionary transition from *G. plesiotumida,* which occurs in Sample 586A-12,CC.

Two biostratigraphic events occur in this zone. The first is the FAD of *Pulleniatina praecursor* in Core 586A-10, an early Pliocene event, whereas the second event corresponds to the LAD of *Globoquadrina dehiscens*, which occurs in Section 586A-12-4. The latter event is equated with the Miocene/Pliocene boundary by Berggren (1977), but according to the calcareous nannoplankton present *G. dehiscens* apparently disappears slightly earlier. Common species in Zone N18 are *Neogloboquadrina humerosa, N. acostaensis, Globigerina nepenthes, Pulleniatina primalis, P. spectabilis, Globorotalia scitula, G. cultrata, Globigerinoides sacculifer, G. extremus, G. obliquus, Globoquadrina altispira, G. baroemoenensis*, and *Streptochilus latum*.

The interval from Core 586A-13 through Section 586A-21-4 yielded a planktonic foraminifer assemblage characteristic of late Miocene Zone N17, the lower boundary of which corresponds to the FAD of *Globorotalia plesiotumida* evolving from *G. merotumida*. The major biostratigraphic event within Zone N17 is the FAD of *Pulleniatina* s.l., which occurs in Core 586A-16. Rare specimens of *Globorotalia margaritae* are recorded from Core 586A-15 upward. Beside the events mentioned above, the assemblages of Zone N17 are similar to those of Zone N18.

The interval from Core 586A-21-5 to total depth (Core 586A-31) contains planktonic faunas attributable to the late Miocene Zone N16. Two major biostratigraphic events occur within this zone: the FAD of *Neogloboquadrina*

Table 2. Carbonate bomb results.

Sample (core-section, cm interval)	Sub-bottom depth[a] (m)	% $CaCO_3$	Lithology
Hole 586			
1-1, 31-32	5.89	84	Nannofossil-foraminiferal ooze
2-3, 110-111	10.50	78	Foraminifer-nannofossil ooze
3-3, 76-77	19.66	88	
4-4, 92-94	30.82	89	
5-2, 105-106	37.45	89	
Hole 586A			
1-2, 79-80	45.69	88	Foraminifer-nannofossil ooze
2-1, 75-76	54.75	88	
2-3, 70-71	56.70	88	
3-2, 69-70	65.79	86	
4-2, 48-49	75.18	89	
5-2, 75-76	85.05	90	
6-2, 29-30	94.19	90	
7-2, 35-36	103.85	94	
8-2, 31-32	113.41	85	
9-2, 27-28	122.97	99	
10-2, 30-32	132.60	95	
11-5, 100-101	147.40	97	
12-2, 64-65	152.14	96	
13-2, 60-61	161.70	99	
14-2, 24-25	168.64	95	
15-2, 60-61	173.90	98	
16-2, 70-71	183.00	96	
17-6, 70-71	198.60	99	
18-2, 60-61	202.10	99	
19-3, 49-50	213.09	96	
20-2, 20-21	219.80	98	
20-2, 82-83	220.42	93	
21-4, 108-109	233.28	95	
22-3, 60-61	240.90	92	
23-5, 82-83	253.72	97	
24-6, 145-146	265.45	99	
25-6, 137-138	274.97	94	
26-3, 75-76	279.45	93	
27-2, 105-106	284.25	93	Foraminifer-bearing nannofossil soft ooze and chalk
28-4, 45-46	290.85	99	
29-3, 99-100	294.29	96	Foraminifer-bearing nannofossil ooze and chalk
30-1, 54-55	295.84	96	
31-1, 121-122	301.51	98	

[a] Sub-bottom depths reflect original shipboard calculations and are probably in error by 5.1 m.

humerosa, evolving from *N. acostaensis*, and of *Globigerinoides extremus*, that evolves from *G. obliquus* in Core 586A-27. Common species in this interval include the index-species *N. acostaensis* and *Globorotalia merotumida, Globigerina nepenthes, Globorotalia cultrata* (which is very abundant in some samples), *Globigerinoides obliquus, G. sacculifer, Globoquadrina altispira, G. baroemoenensis, G. dehiscens*, and *Streptochilus latum*.

Globoquadrinids, *Globorotalia lenguaensis*, and *G. praelenguaensis* are particularly abundant in the two lowermost cores.

Hole 586C

Only one core was recovered from Hole 586C in addition to a washed core at the sub-bottom depth of 614 m. Planktonic foraminifers are abundant but very poorly preserved. Rare *Globigerinoides immaturus*, and common *Globorotalia kugleri* and *G. pseudokugleri* are associated with large globigerinids, primitive *Globoquadrina altispira, G. praedehiscens*, and very rare *G. binaiensis*. This assemblage is characteristic of the upper part of Zone N4 which is early Miocene in age. Reworked Oligocene faunas may be present.

Nannofossils

Holes 586 and 586A

Core-catcher samples from Holes 586 and 586A were examined to provide an outline of the nannofossil biostratigraphy. Smear-slide preparations were made from intervals within cores when it was necessary to locate zonal boundaries and important datums. Nannofossils are abundant in every sample examined. A reduction in the nannofossil content was seen in samples from Core 586-4 in and the top of Core 586A-2 and the base of Core 586A-1. The preservation of assemblages fluctuates between moderate and good, although there was an overall decrease in the quality of preservation downhole. This deterioration in preservation is represented as overgrowths on the discoasters in lowermost Pliocene and upper Miocene sediments. Discoasters in samples from Cores 586A-12 through -16 are slightly to moderately overgrown and those in sediments below these cores are moderately to heavily overgrown. Heavy overgrowths of certain species in Cores 586A-25 through -31 made identification of these forms difficult. Placoliths are well preserved throughout and are only slightly etched in samples where the discoasters are overgrown.

Figure 9 shows the nannofossil datums in relation to the cores recovered in Holes 586 and 586A and the zonation schemes of Okada and Bukry (1980), Ellis (1982), Martini (1971), and Gartner (1977). The section appears to be continuous, as all the nannofossil zones from the *Discoaster hamatus* Zone through the *Emiliania huxleyi* Zone are present. The only reworking detected was in Cores 586A-7 through -9, where some upper Miocene discoasters were reworked into Pliocene sediments.

Some of the zonal boundaries in the biostratigraphic zonations just mentioned could not be accurately determined. The first occurrence of *Emiliania huxleyi* could extend much lower than indicated, because this species is best identified on the electron microscope. If so, it is possible that a hiatus may be present within the upper Pleistocene sediments in Cores 586-1 and -2. The first appearances of *Gephyrocapsa caribbeanica* and *G. oceanica*, which are used as successive datums in the lower Pleistocene by Okada and Bukry (1980) and Ellis (1982), are synchronous in this section, and the *Gephyrocapsa caribbeanica* Subzone (CN13b/WPN30b) could not be recognized. It is more likely that this is a problem inherent in these stratigraphies rather than being indicative of a hiatus in this section (see Gartner, 1977). There is, however, the possibility that part of Core 1 was lost through the core catcher (see Operations section).

Amaurolithus tricorniculatus did not occur in any of the samples examined. Both Okada and Bukry (1980) and Martini (1971) use the last occurrence of this species in lower Pliocene sediments to define a zonal boundary, and thus some resolution is lost when applying these zonations to this section. Ellis (1982) also found this to be true in sediments from the Mariana Trench and used the acme of *Sphenolithus neoabies* to resolve the boundary problem between the *Sphenolithus neoabies* Subzone and *Ceratolithus rugosus* Subzone. The extinction of *Amau-*

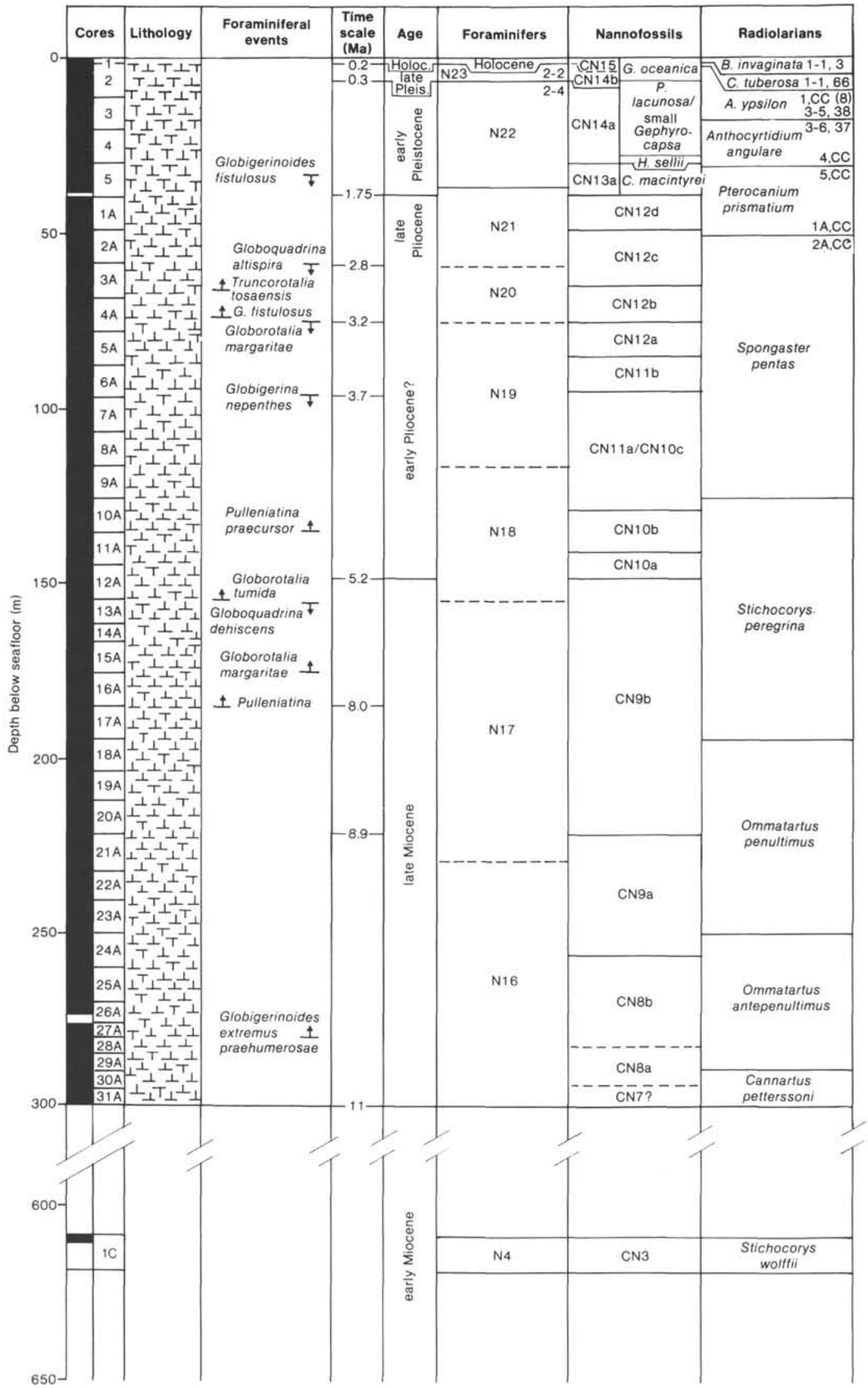

Figure 8. Biostratigraphy of Holes 586 and 586A plotted against lithology and planktonic foraminifer biostratigraphic events calibrated to the absolute ages. Core recovery in black. A after core number indicates Hole 586A cores.

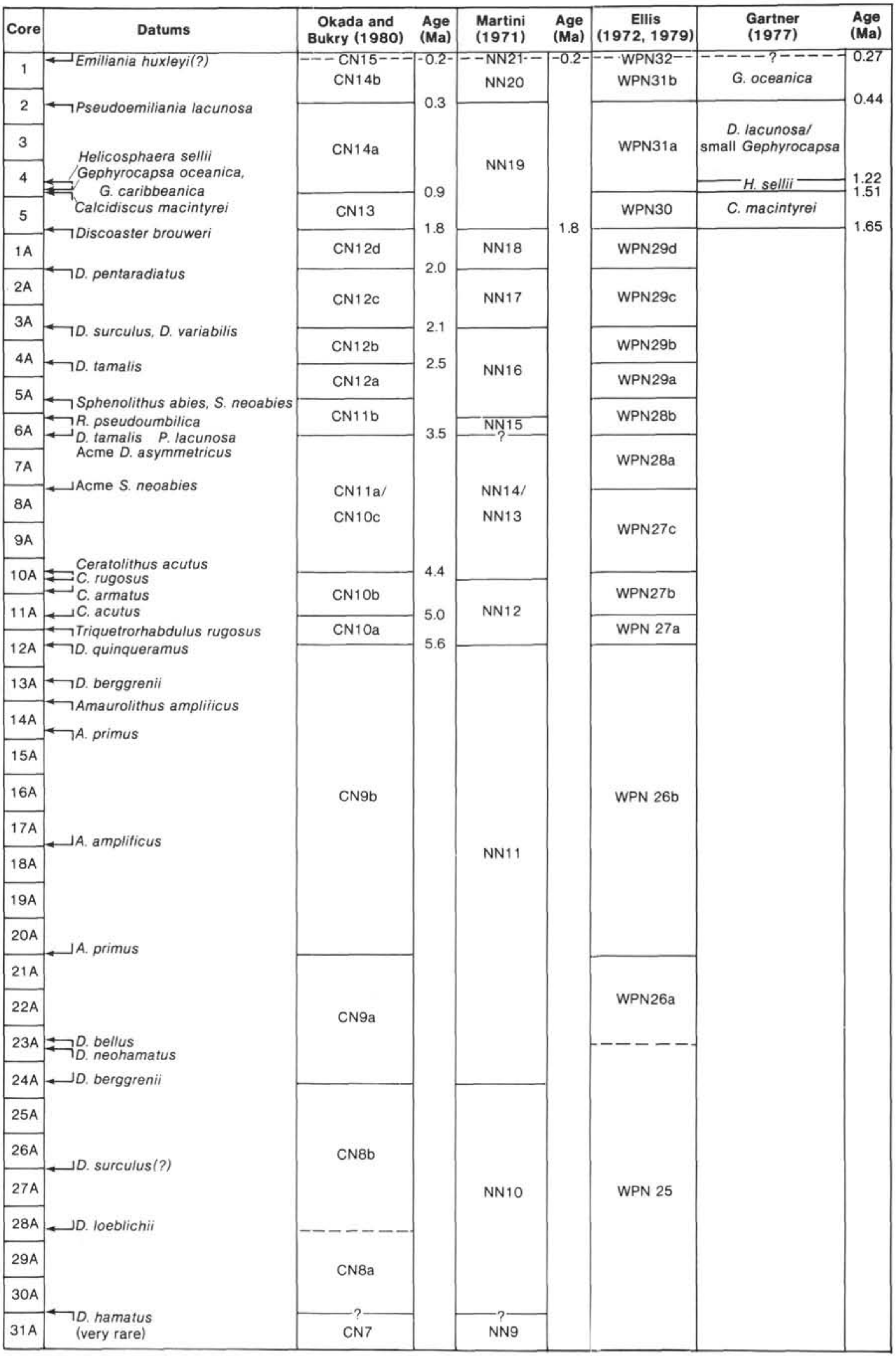

Figure 9. Nannofossil datums, Holes 586 and 586A.

rolithus primus is used in conjunction with that of *Amaurolithus tricorniculatus* in the Okada and Bukry (1980) zonation to define this same boundary. This species is restricted to the *Amaurolithus primus* Subzone in these cores except for Sample 586A-9-4, 36–37 cm, into which it is reworked with other upper Miocene species. The last occurrence of this species in upper Miocene sediments at Sites 541 and 542 in the equatorial Atlantic is further evidence that this lower Pliocene datum is not reliable.

Problems were also encountered in locating the lower boundary of the *Discoaster quinqueramus* Zone. It has been placed within Core 586A-24 at the first occurrence of *Discoaster berggrenii* because all three zonal schemes recognize this datum. The first occurrence of *D. surculus*, which is used in addition to *D. berggrenii* by both Okada and Bukry (1980) and Ellis (1982), is first seen in Core 586A-26. Ellis (1982) utilized the extinctions of *D. bellus* and *D. neohamatus* to define this boundary further. These two species, although rare, are found in Core 586A-23 above the first occurrence of *D. berggrenii*. The last common occurrence of *D. bellus*, however, is coincident with the entry of *D. berggrenii*.

A few specimens of *Discoaster hamatus* (five rays) were found in Samples 586A-30,CC and 586A-31,CC and these sediments are tentatively placed in the *Discoaster hamatus* Zone. *D. neohamatus* is common in these samples, whereas *D. bellus* and *D. pentaradiatus* are rare. Ellis (1982) uses the first occurrence of *D. pentaradiatus* to mark the top of the *Discoaster hamatus* Zone. Thus it appears that the top of the *Discoaster hamatus* Zone was reached in Core 586A-31, or it may be that these extremely rare specimens of *D. hamatus* are reworked. Species of the genus *Catinaster*, which are normally found in sediments of those ages, are not present.

Radiolarians

For Site 586 one sample per section was studied for the first four cores; only the core-catcher samples were examined from Cores 586-4 to 586A-31 and 586C-1.

For the biostratigraphic zonation we followed Nigrini (1971) for the Quaternary, and Riedel and Sanfilippo (1978) for the remainder of the Cenozoic. The use of the evolutionary transition from *Lamprocyrtis neoheteroporos* to *Lamprocyrtis nigrinae* instead of the upper morphotypic limit of *Pterocanium prismatium* is adopted here for the definition of the upper limit of the *Pterocanium prismatium* Zone. This change greatly reduces the range of the *Anthocyrtidium angulare* Zone. Because *Spongaster berminghami* is rare, we have adopted the first appearance of *P. prismatium* to define the base of the *Spongaster pentas* Zone. This datum is essentially synchronous with that of the standard zonation.

The preservation of the radiolarian fauna is moderate except for some levels where the specimens are broken (Cores 586-2, 586A-6, and 5865A-13). The abundance of the fauna permits us to recognize three assemblages: (1) Core 586-1 with a common fauna; (2) Cores 586-2 to 586A-14 with a few to common fauna; (3) Cores 586A-15 to 586A-31, and 586C-1 with a common to abundant fauna, often accompanied by diatoms.

The uppermost Quaternary radiolarian zone, *Buccinosphaera invaginata* was identified in Sample 586-1-1, 2–3 cm. Sample 586-1-1, 66–67 cm is related to the *Collosphaera tuberosa* Zone. The *Amphirhopalum ypsilon* Zone extends from Samples 586-1,CC to Core 586-3-5, 37–38 cm. Some reworked specimens from the lower Pleistocene occur in Core 586-3. The *Anthocyrtidium angulare* Zone extends from Sample 586-3-6, 36–37 cm to Sample 586-4,CC; *Pterocanium prismatium* Zone from 586-5,CC to 586A-1,CC; *Spongaster pentas* Zone from 586A-2,CC to 586A-9,CC; *Stichocorys peregrina* from 586A-10,CC to 586A-17,CC; *Ommatartus penultimus* Zone from 586A-18,CC to 586A-23,CC; *Ommatartus antepenultimus* Zone from 586A-24,CC to 586A-29,CC; and the *Cannartus petterssoni* Zone was found below 586A-30,CC. Core 586C-1 is from the *Stichocorys wolffii* Zone.

There is a large variation in the size of the microfauna. The size fraction >150 μm is large in some samples and small in others. For example, in 586A-8,CC less than 1% of the assemblage is >150 μm. A high percentage of small tests can be interpreted to result from an allochthonous, transported fauna; a high percentage of large tests indicates an autochthonous fauna.

SEDIMENTATION RATES

Sedimentation rates for Holes 586 and 586A are shown in Figure 10. In Figure 11 sedimentation rates for Hole 586C are shown from 305 m sub-bottom to total depth of 623.1 m (the upper part of this figure shows sedimentation rates from the previous holes, plotted at a different scale).

Accumulation rates vary consistently throughout the sequence drilled in the first two holes. The maximum rate occurred in the early late Pliocene to the latest early Pliocene (from 2.8–3.2 Ma) when sediments accumulated at a rate of about 40 m/m.y. A minimum rate of 13 m/m.y. occurred in the latest Miocene between 8 and 5.2 Ma.

In the younger part of the sequence, sediments were deposited at rates ranging from 22 to 20 m/m.y. Rates of about 36 and 37 m/m.y. were calculated for the remaining part of the early Pliocene and the early late Miocene.

The lower part of the sequence was deposited at an average rate of about 39 m/m.y. Change in sedimentation rate with depth cannot be determined because Hole 586C was washed nearly to its total depth.

ORGANIC GEOCHEMISTRY

The organic carbon contents were determined for two samples from Hole 586 and 14 samples from Hole 586A, covering the cored section from 0 to 296 m sub-bottom. For analytical details see the organic geochemistry section in the Site 585 report (this volume). As is obvious from the data summarized in Table 3, the organic carbon contents vary from 0.62% (based on dry sediment weight) to less than 0.01% (i.e., near detection limit). The higher values are found in the upper part of the section penetrated (mean value of 0.35% for Cores 586-1, 586-5, 586A-1 to 586A-8). An abrupt decrease in organic carbon contents occurs between Cores 586A-8 and -9.

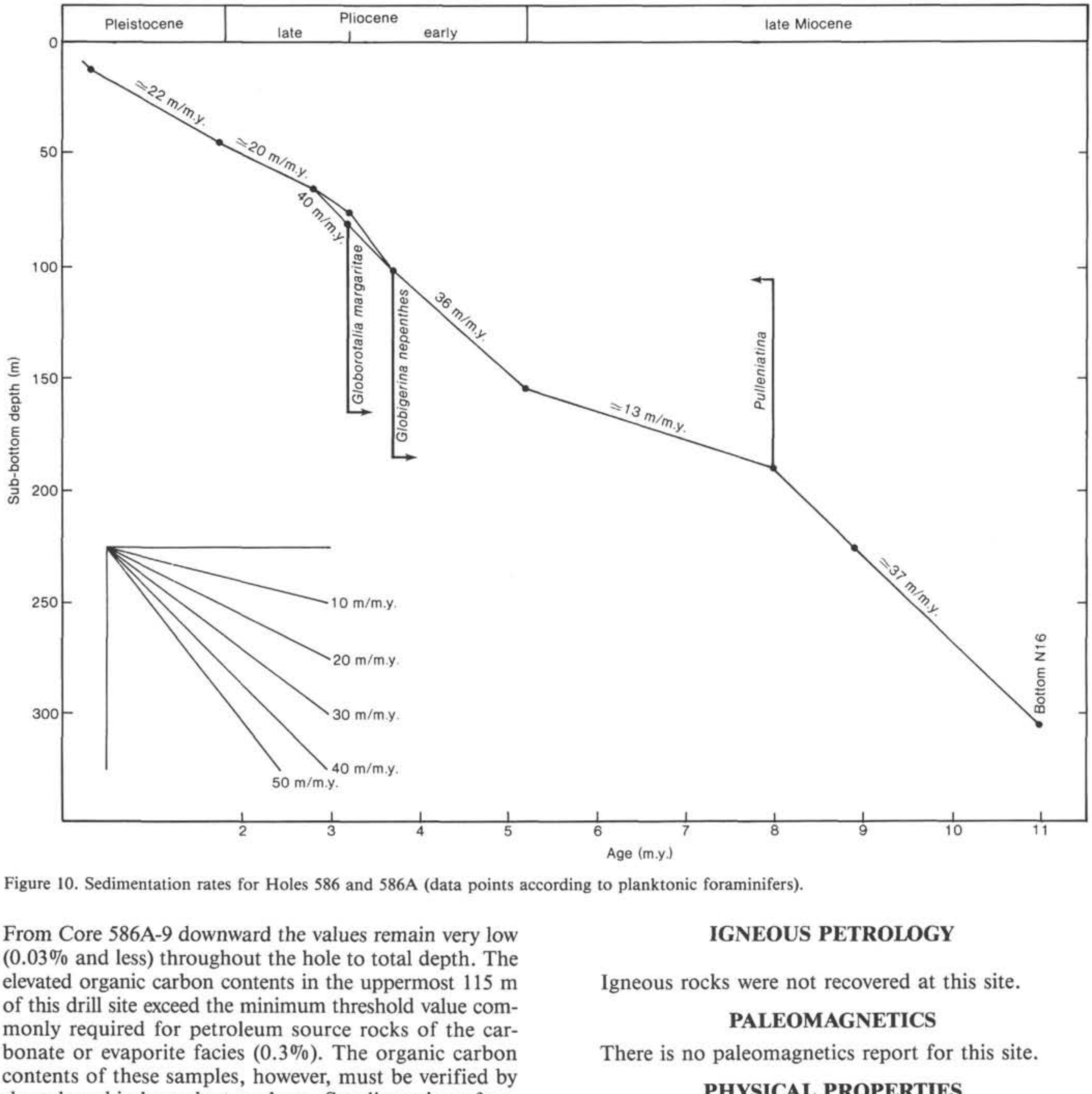

Figure 10. Sedimentation rates for Holes 586 and 586A (data points according to planktonic foraminifers).

From Core 586A-9 downward the values remain very low (0.03% and less) throughout the hole to total depth. The elevated organic carbon contents in the uppermost 115 m of this drill site exceed the minimum threshold value commonly required for petroleum source rocks of the carbonate or evaporite facies (0.3%). The organic carbon contents of these samples, however, must be verified by shore-based independent analyses. See discussion of analytical limitations of the CHN-Analyzer and sample pretreatment procedures in the Organic Geochemistry section of the Site 585 report (this volume).

The elevated organic carbon contents found from 0 to 115 m depth are associated with relatively lower $CaCO_3$ contents of the sediments (84 to 90%), as compared to Cores 586A-9 to -30, where $CaCO_3$ contents in excess of 93% (in some even 99%) were measured.

INORGANIC GEOCHEMISTRY

Tables 4 and 5 and Figure 12 constitute this section of the report; there is no text.

IGNEOUS PETROLOGY

Igneous rocks were not recovered at this site.

PALEOMAGNETICS

There is no paleomagnetics report for this site.

PHYSICAL PROPERTIES

Compressional wave velocity (V_p) measurements were made on whole core samples in the liner for every section from 586A-22-5 to 586A-31-3 and for one section of each core from 586B-1 to 586B-25 after the temperature of the cores equilibrated with that of the core lab. These measurements are of the horizontal (parallel to bedding). Continuous GRAPE measurements were made on every other section of cores from Holes 586 and 586A, and on almost all sections of cores from Hole 586B. Using samples taken with a minicore-sized metal cylinder from every other section of Hole 586A cores, water content, porosity, and wet-bulk density were measured by

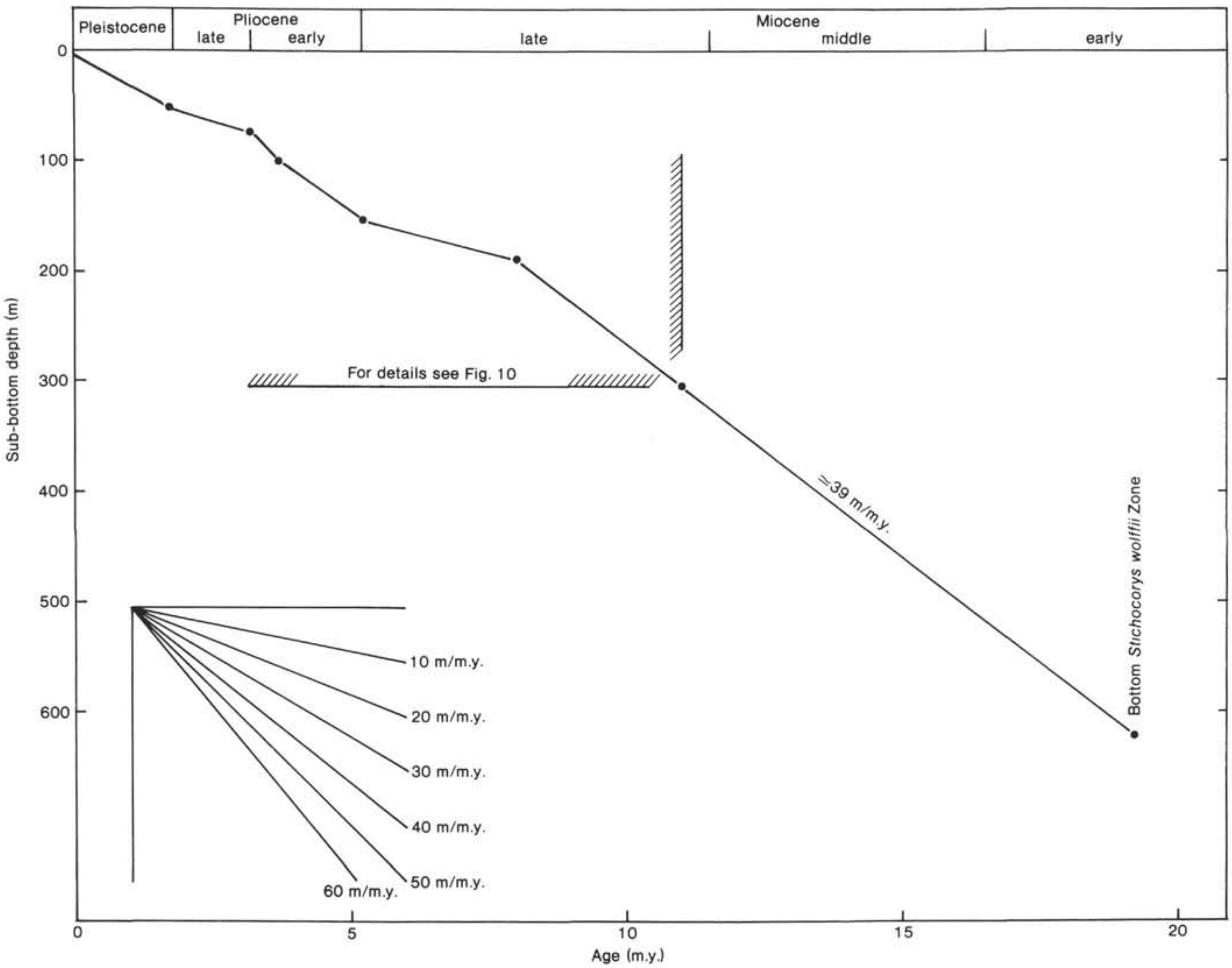

Figure 11. Sedimentation rates of Hole 586C from 300 m sub-bottom to total depth. The upper part is replotted from Figure 10 at a different (larger) scale.

Table 3. Carbonate carbon and organic carbon (C_{org}) data from Site 586.

Sample (hole-core-section, cm interval)	% $CaCO_3$	% C_{org}
586-1-1, 31-32	84	0.36
586-5-2, 105-106	89	0.29
586A-1-2, 79-80	88	0.29
586A-2-3, 70-71	88	0.24
586A-5-2, 75-76	90	0.28
586A-8-2, 31-32	85	0.62
586A-9-2, 27-28	99	<0.01
586A-12-2, 64-65	96	<0.01
586A-15-2, 60-61	98	0.02
586A-18-2, 60-61	99	0.01
586A-20-2, 82-83	98	0.01
586A-21-4, 108-109	95	0.03
586A-23-5, 82-83	97	<0.01
586A-26-3, 75-76	93	<0.01
586A-28-4, 45-46	99	<0.01
586A-30-1, 54-55	96	<0.01

means of the gravimetric method. All methods used to make these measurements are described in Boyce (1976a).

Tables 6 and 7 present physical properties of Site 586 sediments (wet-bulk density values measured by the continuous GRAPE are listed in Table 7 only). Values of wet-bulk density on Table 6 corresponding to the locations of velocity measurements are tentatively estimated from the hard copy graphs of continuous GRAPE and used for the calculation of impedance. Figure 13 shows the variations of physical properties with depth.

Because the sediment layer down to a depth of 300 m at Site 586 consists of a single lithologic unit of foraminifer-nannofossil ooze and chalk, variations in physical properties are very small. Variations of compressional wave velocity in horizontal direction range between 1.55 and 1.63 km/s, and show gradual increase with depth, with a gradient of 1.5%/100 m (Fig. 13). These properties are concordant with those previously obtained at Site 289 (Andrews, Packham, et al., 1975b), which is located within 2 km southeast of Site 586.

Values of compressional wave velocity measured under laboratory conditions are, however, considerably

Table 4. Shipboard inorganic chemistry summary, Site 586.

Laboratory sample no.	Sample (core-section, cm interval)	pH	Alkalinity (meq/l)	Salinity (‰)	Calcium (mmoles/l)	Magnesium (mmoles/l)	Chlorinity (‰)
Surface seawater		7.13	2.97	34.1	10.69	51.38	19.44
Hole 586							
1	2-2, 140–150	7.31	4.10	34.9	11.01	52.79	17.05
Hole 586A							
2	2-5, 140–150	6.83	4.93	34.9	11.10	54.59	20.02
3	7-5, 140–150	7.12	5.432	34.9	11.70	49.40	19.92
4	14-5, 140–150	7.18	5.906	33.6	13.35	47.86	21.67
5	21-5, 140–150	7.10	6.29	34.1	15.08	46.50	19.88
6	28-2, 140–150	7.07	5.804	34.6	15.98	43.17	20.25
IAPSO standard					10.33	52.32	19.24

Table 5. Titration summary: Ca, Mg, Cl, Site 586.

Sample	A. ml titrant	B. Std conc.	Factor C = B/A
Calcium	0.525/0.526	10.55 mM/l	20.10
Magnesium	1.125/1.126	64.54 mM/l	57.37
Chlorinity	0.576/0.577	19.375 ‰	

Sample	Calcium		Magnesium			Chlorinity	
	ml E.G.T.A.	× factor 20.10	ml E.D.T.A.	× factor 57.37	minus Ca	ml $AgNO_3$	× factor 33.70
Surface seawater	0.532	10.69	1.082	62.07	51.38	0.577	19.44
Hole 586							
2-2, 140–150	0.548	11.01	1.112	63.80	52.79	0.506	17.05
Hole 586A							
2-5, 140–150	0.552	11.10	1.145	65.69	54.59	0.594	20.02
7-5, 140–150	0.582	11.70	1.065	61.10	49.40	0.591	19.92
14-5, 140–150	0.664	13.35	1.067	61.21	47.86	0.643	21.67
21-5, 140–150	0.750	15.08	1.089	62.48	46.50	0.590	19.83
28-2, 140–150	0.795	15.98	1.031	59.15	43.17	0.601	20.25
IAPSO standard	0.514	10.33	1.091	62.65	52.32	0.571	19.24

smaller than those obtained by the Schlumberger Borehole Compensated Velocity Log, as shown in Figure 14, in which a fluctuating curve indicates the logging data. Relative differences of core-averaged values indicate nearly linear increase with depth from just below the bottom of the casing to 300 m sub-bottom depth (as shown in Fig. 14 at the right). This discrepancy can be explained by porosity rebound, as pointed out by Boyce (1976b), Hamilton (1976), and Shepard et al. (1982).

For unconsolidated sediments, especially those which under laboratory conditions include gas bubbles, the release of pressure causes a considerable increase of porosity and decrease of velocity. The first appearance of tiny bubbles was at a sub-bottom depth of about 150 m after the cores were equilibrated with room temperature. During the velocity measurements, effects of bubbles on the weakening of signal amplitude were noticeable only for the sections indicated by "Gas" in the Remarks column of Table 7. To estimate *in situ* values by using laboratory measurements, it is necessary to know the amount of dissolved gas components in pore water at depth or volume fractions of gas bubbles under laboratory conditions. It is recommended that a technique be developed to measure physical properties of unconsolidated sediments under bubble-free conditions in the shipboard laboratory.

LOGGING AND DOWNHOLE MEASUREMENTS

Two complete logging runs were made in Hole 586C, covering the interval from the mud line to a total depth of 623 m in the hole. Strata at that depth are lower Miocene nannofossil chalks. The first log run included caliper, gamma ray, resistivity, and sonic velocity; a spontaneous potential log (SP) was taken but not printed. The second run included gamma ray, formation density compensated log (FDC), compensated neutron log (CNL), and caliper. A third, repeat run, was made following the second run (see Figures 15 and 16). Shore-based work in the future will include an impedance log to be made by combining sonic velocity and density logs. From this log

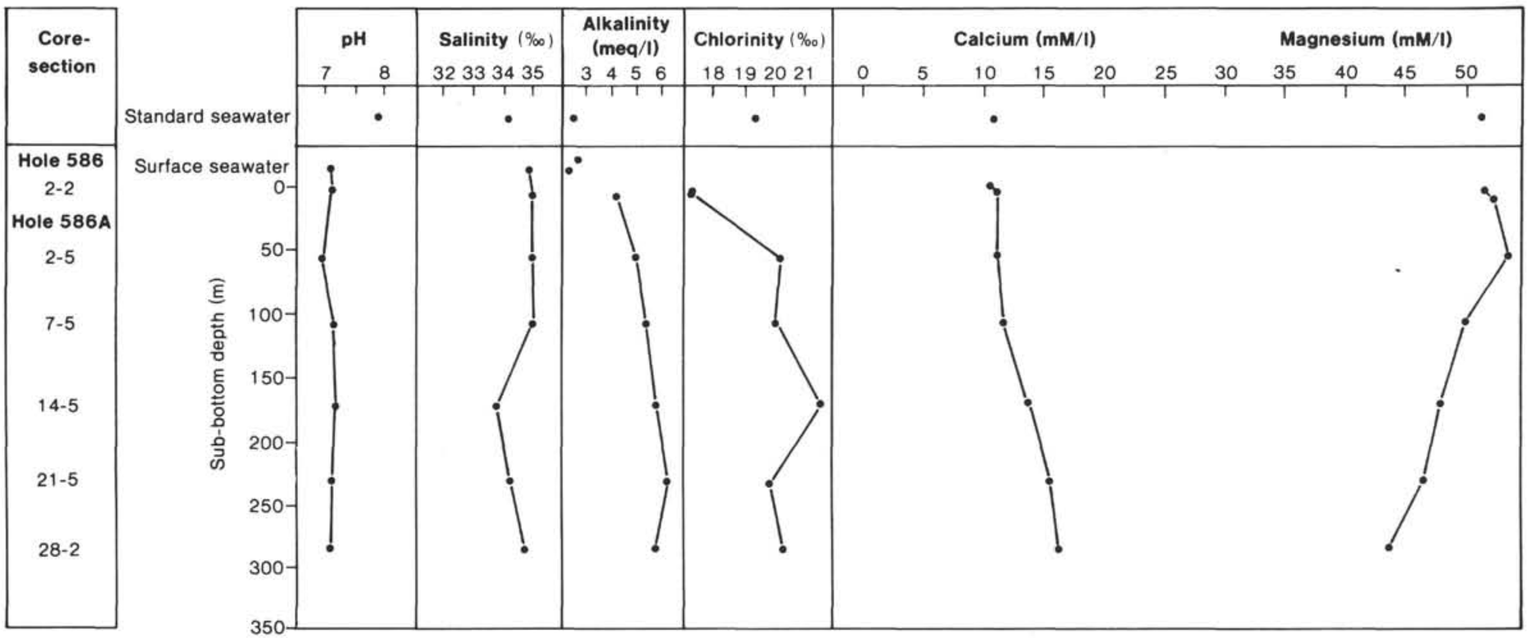

Figure 12. Interstitial water chemistry, Holes 586 and 586A.

Table 6. Shipboard measurements of physical properties of sediments, Site 586.

Sample (core-section, cm level)	Sub-bottom depth (m)	Porosity (%)	Wet-bulk density[a] (g/cm^3)	Water content (%)	Grain density (g/cm^3)
Hole 586A					
2-1, 60	6.0	66.0	1.47	44.8	2.39
2-3, 75	9.2	48.6	1.49	32.6	1.95
2-5, 75	12.2	64.4	1.47	43.7	2.34
4-1, 72	26.1	68.0	1.56	43.5	2.76
4-3, 75	29.2	60.0	1.55	38.6	2.38
4-5, 75	32.2	63.0	1.59	39.7	2.59
5-1, 70	35.6	66.1	1.60	41.4	2.76
5-3, 71	38.6	63.5	1.54	41.2	2.49
5-5, 75	41.7	67.9	1.58	43.0	2.81
Hole 586A					
1-1, 71	45.1	58	1.48	39	2.16
1-3, 71	48.1	54	1.34	40	1.73
1-5, 71	51.1	64	1.53	42	2.49
2-1, 71	54.7	63	1.49	43	2.30
2-3, 71	57.7	57	1.60	36	2.39
2-5, 71	60.7	62	1.66	38	2.70
3-3, 75	67.4	63	1.54	41	2.45
3-5, 75	70.4	64	1.56	41	1.53
4-1, 70	73.9	68	1.56	44	2.71
4-3, 70	76.9	69	1.55	45	2.74
4-5, 70	79.9	61	1.51	41	2.28
5-1, 70	83.5	68	1.58	43	2.78
5-3, 70	86.5	62	1.56	40	2.50
5-5, 70	89.5	70	1.61	44	2.99
6-2, 70	94.6	72	1.63	44	3.25
6-4, 70	97.6	68	1.56	43	2.78
6-6, 70	100.6	64	1.64	39	2.68
7-1, 70	102.7	67	1.65	40	3.00
7-3, 70	105.7	62	1.50	41	2.37
7-5, 70	108.7	65	1.61	40	2.75
8-1, 70	112.3	64	1.60	40	2.65
8-3, 70	115.7	64	1.58	41	2.58
8-5, 70	118.3	65	1.62	40	2.79
9-1, 70	121.9	87	1.71	51	1.49
9-3, 70	124.9	31	1.28	24	1.41
9-6, 70	127.9	58	1.40	41	1.95
10-1, 70	131.5	55	1.62	34	2.39
10-3, 70	134.5	58	1.55	37	2.32
10-5, 70	137.5	61	1.62	38	2.59
11-1, 70	141.1	59	1.51	39	2.21
11-3, 70	144.1	62	1.57	40	2.48
11-5, 70	147.1	58	1.51	38	2.22
12-1, 70	150.7	57	1.46	39	2.06
12-3, 70	153.7	50	1.29	39	1.57
12-5, 70	156.7	62	1.71	36	2.85
13-1, 70	160.3	47	1.25	38	1.45
13-3, 70	163.3	65	1.59	41	2.72
13-5, 70	166.3	61	1.51	40	2.31
14-1, 70	167.6	47	1.25	38	1.45
14-3, 70	170.6	63	1.62	39	2.64
15-1, 70	182.5	59	1.65	36	2.58
15-3, 70	175.5	63	1.65	39	2.71
15-5, 70	178.5	51	1.45	35	1.89
16-1, 70	181.5	63	1.66	38	2.77
16-3, 70	184.5	56	1.57	36	2.30
16-5, 70	187.5	70	1.64	43	3.11
17-1, 70	191.1	61	1.67	36	2.70
17-3, 70	194.1	71	1.78	40	3.74
17-5, 70	197.1	54	1.46	37	1.97
18-1, 70	200.7	54	1.56	34	2.24
18-3, 70	203.7	62	1.69	37	2.81
18-5, 70	206.7	53	1.57	34	2.21
19-1, 70	210.3	67	1.75	38	3.31
19-3, 70	213.3	58	1.64	35	2.53
19-5, 70	216.3	53	1.54	34	2.17
20-1, 70	218.8	51	1.52	34	2.03
20-3, 70	221.8	59	1.54	38	2.59
20-5, 70	224.8	48	1.32	36	1.63
21-3, 71	228.4	57	1.62	35	2.46
21-5, 70	231.4	52	1.55	34	2.15
21-7, 70	234.4	66	1.58	42	2.72

Table 6 (continued).

Sample (core-section, cm level)	Sub-bottom depth (m)	Porosity (%)	Wet-bulk density[a] (g/cm^3)	Water content (%)	Grain density (g/cm^3)
Hole 586A (Cont.)					
22-1, 70	238.0	58	1.66	35	2.61
22-3, 70	241.0	56	1.61	35	2.40
22-5, 70	244.0	55	1.52	36	2.15
23-1, 70	247.6	56	1.52	37	2.17
23-3, 70	250.6	57	1.61	35	2.43
23-5, 70	253.6	58	1.64	35	2.53
24-1, 70	257.2	55	1.62	34	2.36
24-3, 70	260.2	58	1.58	37	2.38
24-5, 70	263.2	58	1.65	35	2.54
25-1, 70	266.8	57	1.62	35	2.44
25-3, 70	269.8	56	1.50	38	2.12
25-5, 70	272.8	58	1.63	36	2.51
26-1, 71	276.4	48	1.61	30	2.17
26-2, 71	277.9	72	1.57	46	3.04
26-3, 71	279.4	34	1.24	27	1.37
27-1, 71	282.4	62	1.62	38	2.65
27-3, 71	285.4	59	1.50	39	2.21
28-3, 71	289.6	55	1.56	35	2.22
29-1, 71	291.0	49	1.38	36	1.72
29-3, 71	294.0	53	1.49	36	2.04
30-1, 71	296.0	54	1.48	37	2.02
30-3, 71	299.0	54	1.56	34	2.24
31-1, 71	301.0	52	1.48	35	2.00
31-3, 71	304.0	52	1.56	33	2.17

Note: Sub-bottom depths are based on original shipboard calculations and are probably in error by 5.1 m.
[a]Measured by the gravimetric method.

a synthetic seismogram will be generated and compared to the air and water gun profiles made during the leg.

The logs will also be used as comparative material with which to evaluate shipboard velocity and porosity measurements (see section on Physical Properties). Finally, when the log data are combined with paleontological data (see Biostratigraphy section), the numerous reflectors seen on seismic profiles across the Ontong-Java Plateau may be realistically interpreted in terms of their nature, origin, and relationship to paleoceanographic events.

SEISMIC STRATIGRAPHY

Seismic profiles that are run across oceanic areas in which thick caps of relatively pure nannofossil- and foraminifer-rich oozes, chalks, and limestones have accumulated generally display numerous, closely spaced reflectors that persist laterally for tens of miles or more. The "signature" and spacing of these reflectors change, of course, with the seismic source and the filter band pass settings used for recording. The development or expression of these reflectors is particularly marked on oceanic plateaus such as the Ontong-Java Plateau (Fig. 4) and the Magellan Rise, among others.

Drilling at such DSDP sites as 64, 288, and 289 on the Ontong-Java Plateau produced an enormous amount of physical properties data, which, when combined with paleontological and, in some cases, drilling rate data, resulted in numerous attempts to date and explain the origin of the reflectors. It had become clear by the middle of the 1970s that although the source of the reflectors lay in subtle acoustic impedance differences between

Table 7. Physical properties of Site 586 sediments: compressional wave velocity, wet-bulk density, and impedance.

Sample (core-section, cm level)	Sub-bottom depth (m)	Compressional wave velocity (km/s)	Wet-bulk density[a] (g/cm^3)	Impedance[b] (10^5 g/cm^2s)	Remarks[c]
Hole 586A					
22-5, 50	243.8	1.62			
22-5, 100	244.3	1.62			
22-6, 50	245.3	1.63			
22-6, 100	246.3	1.62			
23-1, 50	247.3	1.60			
23-1, 100	247.9	1.61			
23-2, 50	248.9	1.61	1.77	2.85	
23-2, 100	249.4	1.62	1.75	2.84	
23-3, 50	250.4	1.60			Gas
23-3, 100	250.9	1.59			Gas
23-4, 50	251.9	1.60	1.76	2.82	
23-4, 100	252.4	1.59	1.76	2.80	
23-5, 50	253.4	1.61			
23-5, 100	253.9	1.60			
23-6, 50	254.9	1.60	1.77	2.83	
23-6, 100	255.4	1.61	1.77	2.85	
24-1, 50	257.0	1.60			
24-1, 100	257.5	1.61			
24-2, 50	258.5	1.60	1.75	2.80	
24-2, 100	259.0	1.58	1.75	2.77	
24-3, 50	260.0	1.58			
24-3, 100	260.5	1.58			
24-4, 50	261.5	1.58	1.73	2.73	
24-4, 100	262.5	1.59	1.73	2.75	
24-4, 50	262.5	1.58			
24-5, 100	263.0	1.59			
24-6, 50	264.0	1.59			
24-6, 100	264.5	1.61			
25-1, 50	266.6	1.61			
25-1, 100	267.1	1.60			
25-2, 50	268.1	1.61	1.76	2.83	
25-2, 100	268.6	1.59	1.76	2.80	
25-3, 50	269.6	1.59			
25-3, 100	270.1	1.60			
25-4, 50	271.1	1.60	1.72	2.75	
25-4, 100	271.6	1.60	1.73	2.77	
25-5, 50	272.6	1.61			
25-5, 100	273.1	1.61			
25-6, 50	274.1	1.61			
25-6, 100	274.6	1.63			
26-1, 50	276.2	1.62			
26-1, 100	276.7	1.62			
26-2, 50	277.7	1.63	1.80	2.93	
26-2, 100	278.2	1.64	1.77	2.90	
26-3, 50	279.2	1.66			
27-1, 50	282.2	1.62			Gas
27-1, 100	282.7	1.60			Gas
27-2, 50	283.7	1.61	1.74	2.80	Gas
27-2, 100	284.2	1.60	1.74	2.78	Gas
27-3, 50	285.2	1.58			Gas
28-2, 50	286.6	1.60			
28-2, 100	287.1	1.60			
28-3, 50	287.9	1.60	1.73	2.77	
28-3, 100	288.4	1.61	1.73	2.79	
28-4, 50	289.4	1.62			
29-1, 50	290.8	1.60			
29-1, 100	291.3	1.61			
29-2, 50	292.3	1.59	1.77	2.81	Gas
29-2, 100	292.8	1.59	1.75	2.78	Gas
29-3, 50	293.8	1.62			Gas
29-3, 100	294.3	1.61			
30-1, 50	295.8	1.61			
30-1, 100	296.3	1.61			
30-2, 50	297.3	1.62	1.75	2.84	
30-2, 100	297.8	1.62	1.73	2.80	
30-3, 50	298.8	1.61			
30-3, 100	299.3	1.62			
31-1, 50	300.0	1.60			
31-1, 100	301.3	1.59	1.73	2.75	
31-2, 50	302.3	1.60	1.76	2.82	
31-2, 100	302.8	1.60	1.78	2.85	
31-3, 50	303.8	1.60	1.75	2.80	
31-3, 100	304.3	1.60	1.77	2.83	
Hole 586B					
1-4, 50	10.1	1.55	1.60	2.48	
1-4, 100	10.6	1.56	1.62	2.53	
2-4, 50	16.0	1.58	1.62	2.56	
2-4, 100	16.5	1.56	1.62	2.53	
3-4, 50	25.6	1.59	1.65*	2.62	
3-4, 100	27.1	1.56	1.65*	2.57	
4-4, 50	35.2	1.57	1.63	2.56	
4-4, 100	35.7	1.56	1.65	2.57	
5-4, 50	44.8	1.54	1.65	2.54	
5-4, 100	45.3	1.57	1.63	2.56	
6-4, 50	54.4	1.56	1.67	2.61	
6-4, 100	54.9	1.60	1.63	2.67	
7-4, 50	64.0	1.55	1.65*	2.56	
7-4, 100	64.5	1.53	1.65*	2.52	

Table 7 (continued).

Sample (core-section, cm level)	Sub-bottom depth (m)	Compressional wave velocity (km/s)	Wet-bulk density[a] (g/cm^3)	Impedance[b] (10^5 g/cm^2s)	Remarks[c]
Hole 586B (Cont.)					
8-4, 50	73.6	1.58	1.65*	2.61	
8-4, 100	74.1	1.57	1.65*	2.59	
9-4, 50	83.2	1.55	1.60	2.48	
9-4, 100	83.7	1.56	1.63	2.54	
10-4, 50	92.8	1.58	1.67	2.64	
10-4, 100	93.3	1.58	1.68	2.65	
11-4, 50	101.3	1.57	1.69	2.65	
11-4, 100	101.8	1.57	1.70	2.67	
12-4, 50	110.9	1.57	1.70	2.67	
12-4, 100	111.4	1.58	1.70	2.69	
13-4, 50	120.5	1.59	1.74	2.77	
13-4, 100	121.0	1.56	1.74	2.71	
14-4, 50	130.1	1.57	1.68	2.64	
14-4, 100	130.6	1.57	1.70	2.67	
15-4, 50	139.7	1.59	1.68	2.67	
15-4, 100	140.2	1.56	1.65	2.57	
16-4, 50	149.3	1.58	1.73	2.73	
16-4, 100	149.8	1.58	1.74	2.75	
17-4, 50	158.9	1.61	1.72	2.77	
17-4, 100	159.4	1.58	1.68	2.65	
18-4, 50	168.5	1.58	1.71	2.70	
18-4, 100	169.0	1.57	1.70	2.67	
19-4, 50	178.1	1.59	1.72	2.73	
19-4, 100	178.6	1.58	1.72	2.72	
20-4, 50	187.7	1.60	1.71	2.74	Gas
20-4, 100	188.2	1.61	1.70	2.74	
21-4, 50	197.3	1.60	1.70	2.72	Gas
21-4, 100	197.8	1.59	1.72	2.73	Gas
22-4, 50	206.9	1.62	1.75	2.84	Gas
22-4, 100	207.4	1.62	1.73	2.80	Gas
23-4, 50	216.5	1.60	1.70	2.72	Gas
23-4, 100	217.0	1.59	1.72	2.73	Gas
24-4, 50	226.1	1.58	1.73	2.73	
24-4, 100	226.6	1.60	1.75	2.80	
25-4, 50	235.7	1.60	1.76	2.82	
25-4, 100	236.2	1.61	1.78	2.87	

Note: Sub-bottom depths are based on original shipboard calculations and are probably in error by 5.1 m. Blank spaces indicate no data.
[a] Measured by continuous GRAPE.
[b] Calculated from wet-bulk density measured by continuous GRAPE.
[c] "Gas" indicates the noticeable weakening of acoustic signals by gas bubbles.

carbonate layers, it was not obvious if these impedance differences were due to some combination of sedimentation rate changes, variations in microfossil content, and diagenetic effects. If a section of pure carbonate of invariant texture simply underwent compaction, no marked impedance differences would develop in the column and so there would be no reflectors. One problem that arose early in the interpretation of the origin of the reflectors derived from the fact that the acoustic velocities and density values measured aboard ship showed very little variation downhole, particularly in the upper several hundreds of meters.

The discovery, by drilling, that chalk layers could be interbedded with relatively uncemented oozes led to the idea that cementation within these carbonate columns was not strictly depth dependent but might be a function of the original composition of the layers, which, in turn, might be a function of paleoceanographic conditions. Schlanger and Douglas (1974) applied these ideas to the development of a model for the carbonate ooze–chalk–limestone transition and related certain reflectors to paleoceanographic events such as glaciations.

All of this history is built into the interpretation of the seismic stratigraphy of the Site 289 area shown on Figure 4. What is new about this version is that logging was carried out to a depth of 623 m in Hole 586C (see sections on Physical Properties and Logging and Downhole Measurements). The sonic velocity log showed that

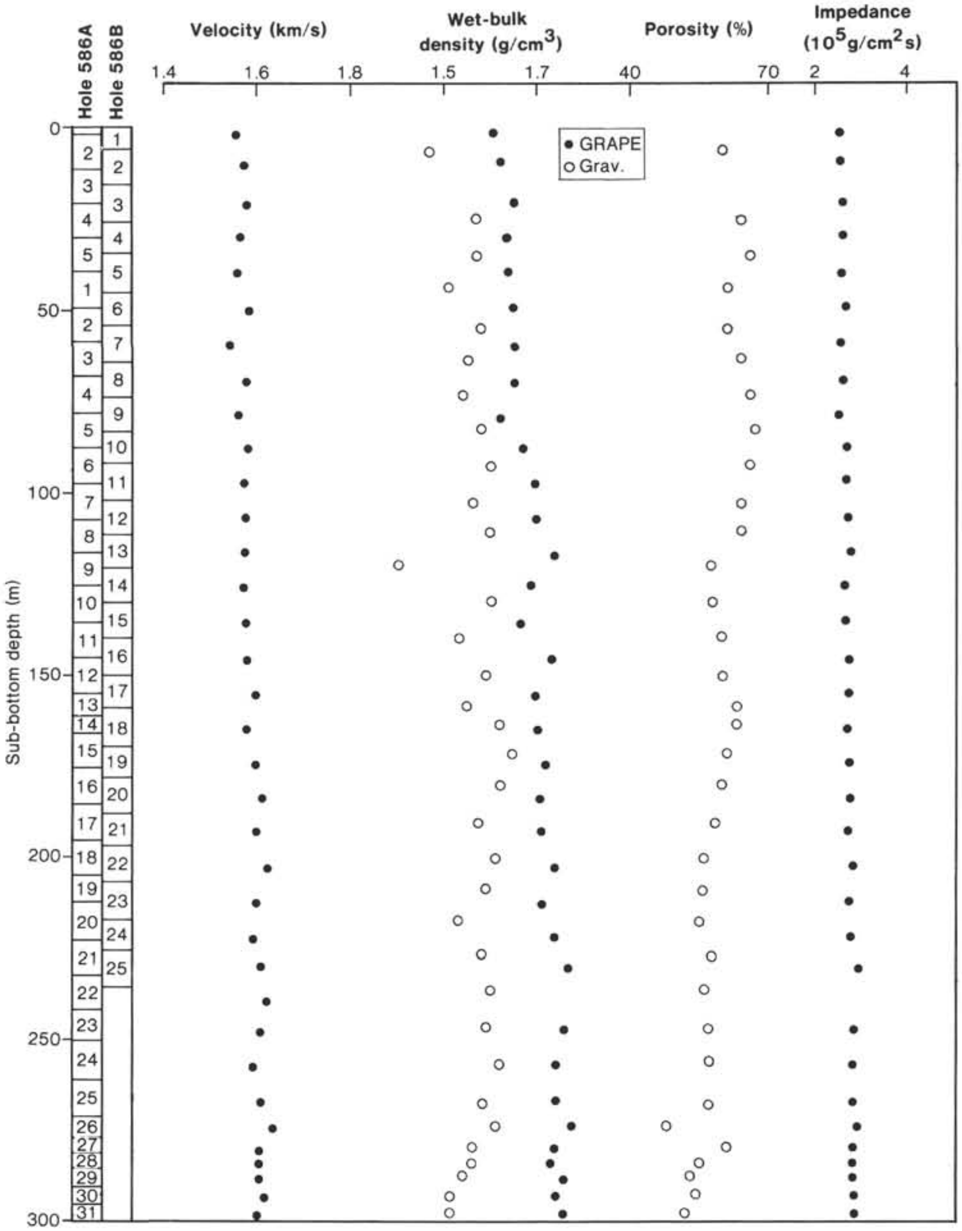

Figure 13. Variations of physical properties with depth at Site 586.

in situ velocities are considerably higher than those measured aboard ship. A preliminary impedance log showed significant vertical variation.

The interpretation shown on Figure 4 is based on:

1. The sonic velocity, formation density, and compensated neutron logs.
2. Data from the drilling of Site 289 on Leg 30.
3. Paleontological data from Site 289.
4. Paleontological and sedimentation rate data from Leg 89.

This interpretation is provisional and will be revised after the logs run in the hole are processed ashore, at which time we will be provided with a refined impedance log and a reflection coefficient log; these can then be used in further studies to produce synthetic seismograms which will eliminate most acoustic artifacts.

SUMMARY AND CONCLUSIONS

Site 586 was planned by the Ocean Paleoenvironment Panel of JOIDES essentially as a redrilling—using the hydraulic piston corer—of the upper section of DSDP Site 289 (which was originally drilled on Leg 30 by a rotary bit continuously for 1262.5 m, bottoming in Aptian limestones underlain by basalt). Details of the original results can be referred to in Andrews, Packham, et al. (1975b). The purpose of reoccupying Site 289 was to obtain a detailed record of the Neogene paleoceanography of an equatorial shallow-water rise that had accumulated almost pure foraminiferal and nannofossil carbonates at high sedimentation rates. Site 586 is the northernmost of a series of HPC sites, the rest of which were drilled on Leg 90 in the southwest Pacific.

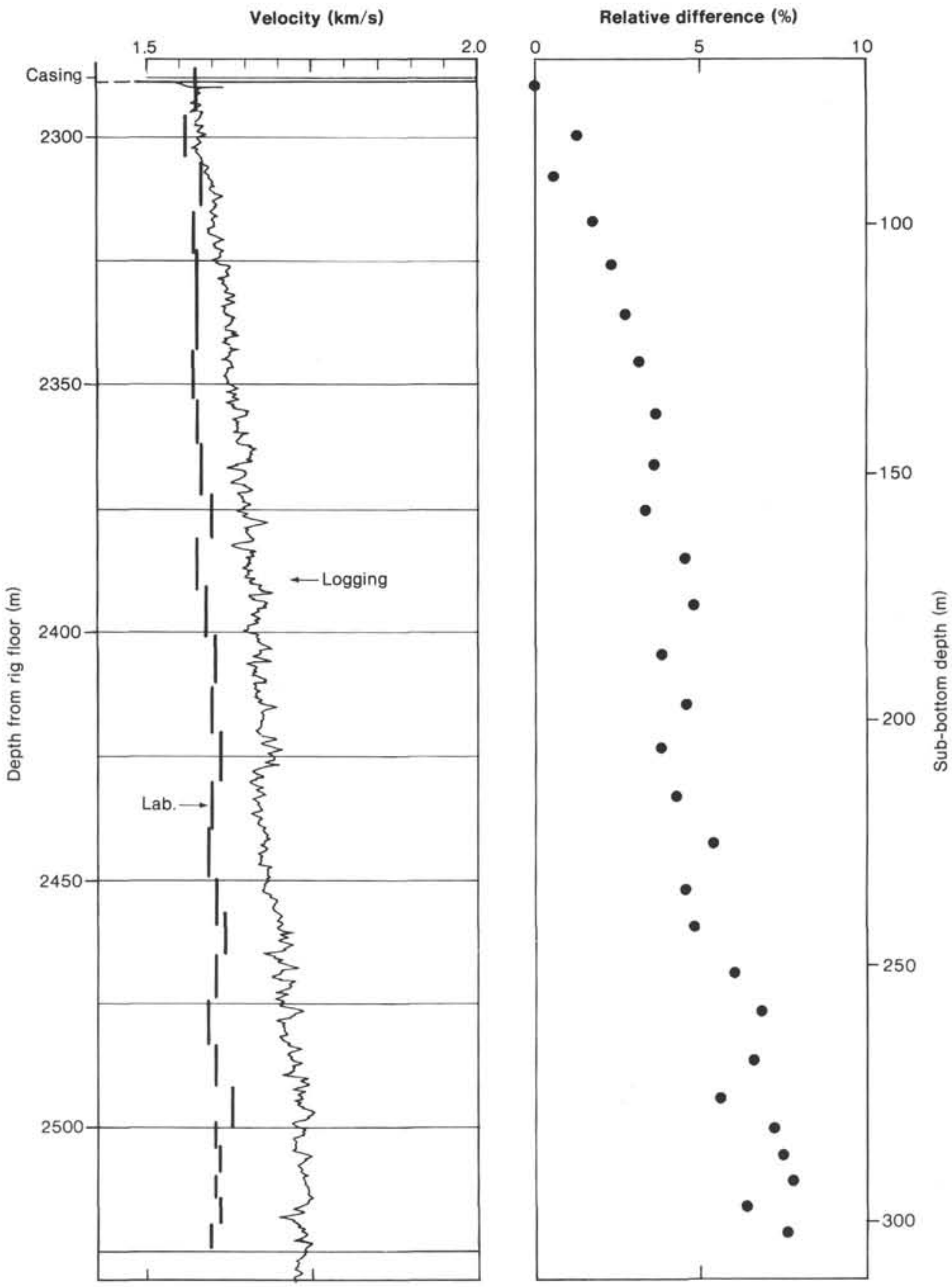

Figure 14. Variations of compressional wave velocities from shipboard measurements and velocity logs with depth at Site 586. Relative differences between these as a function of depth are shown at the right.

Four holes were drilled at Site 586; Hole 586 ended when a core barrel sub broke at 39.3 m depth; Hole 586A was continuously cored between 39.3 and 300.2 m; Hole 586B penetrated to 240.3 m sub-bottom. The entire section consists of foraminiferal and nannofossil ooze, which became chalky at a depth of approximately 260 m. In Hole 586A the oldest sediments cored are of late Miocene age in the foraminifer N16 Zone, the nannofossil CN7 Zone, and the radiolarian *C. pettersoni* Zone. A fourth hole, 586C, was washed to a depth of 613.5 m, and a single core was taken from 613.5 to 623.1 m in the early Miocene *S. wolffii* radiolarian Zone. The purpose of 586C was to create an opportunity to log the pure carbonate section known to exist from Leg 30 data so as to acquire logs that would enable us to (1) compare shipboard physical properties data with *in situ* data on sonic velocities, densities, and impedance contrasts, and (2) be better able to interpret the seismic stratigraphy of the Ontong-Java Plateau. To these ends the logging program was successful. Sonic velocities measured in the hole are significantly higher than shipboard measurements. These data combined with paleontological data allowed a new reinterpretation of the seismic reflectors (see section on Seismic Stratigraphy).

An important result of the paleontological studies is the recognition that the carbonate section on the Ontong-Java Plateau is not the product of a purely pelagic "rain," but that the sediments probably contain allochthonous elements, as discussed below.

As shown by the foraminifer record, the sediments, which at first sight appear to display the sedimentological characteristics of a foraminifer-nannofossil ooze, were affected by mechanical transport, which caused (1) an accumulation of foraminiferal tests within the range of the sand fraction, and (2) an admixture of forms from different environments, ranging from shallow-water platforms to bathyal depths. Thus the sediments encountered at this site are more properly defined as a graded foraminifer-nannofossil silty sand.

Both planktonic and benthic foraminifers from the same sample show different preservation, the same species occurring with both transparent and chalky tests. It is not clear if the best preserved tests are autochthonous or allochthonous.

In addition, each residue contains specimens of *Quinqueloculina*, coarse agglutinated foraminifers, large nodosariids (one chamber was over 2 mm in size), and highly ornamented ostracodes indicative of an environment much shallower than the present water depth at Site 586, 2208 m, or than the estimated bathyal paleodepth based on the supposed autochthonous benthic foraminifers. It is worth mentioning that evidence of obvious reworking could not be detected in this preliminary study, although it cannot be ruled out.

There is a large variation in the size of the radiolarian microfauna. The size fraction greater than 150 μm is large in some samples and small in others. For example, in 586A-8,CC less than 1% of the assemblage is greater than 150 μm. A high percentage of small tests can be interpreted to result from an allochthonous, transported fauna; a high percentage of large tests indicates an autochthonous fauna.

Sedimentation rates at the site varied considerably through time from a low of 13 m/m.y. in the late Miocene to a high of 40 m/m.y. in mid-Pliocene, 2.8 to 3.7 Ma.

These cores will be studied further by the Leg 90 scientific staff.

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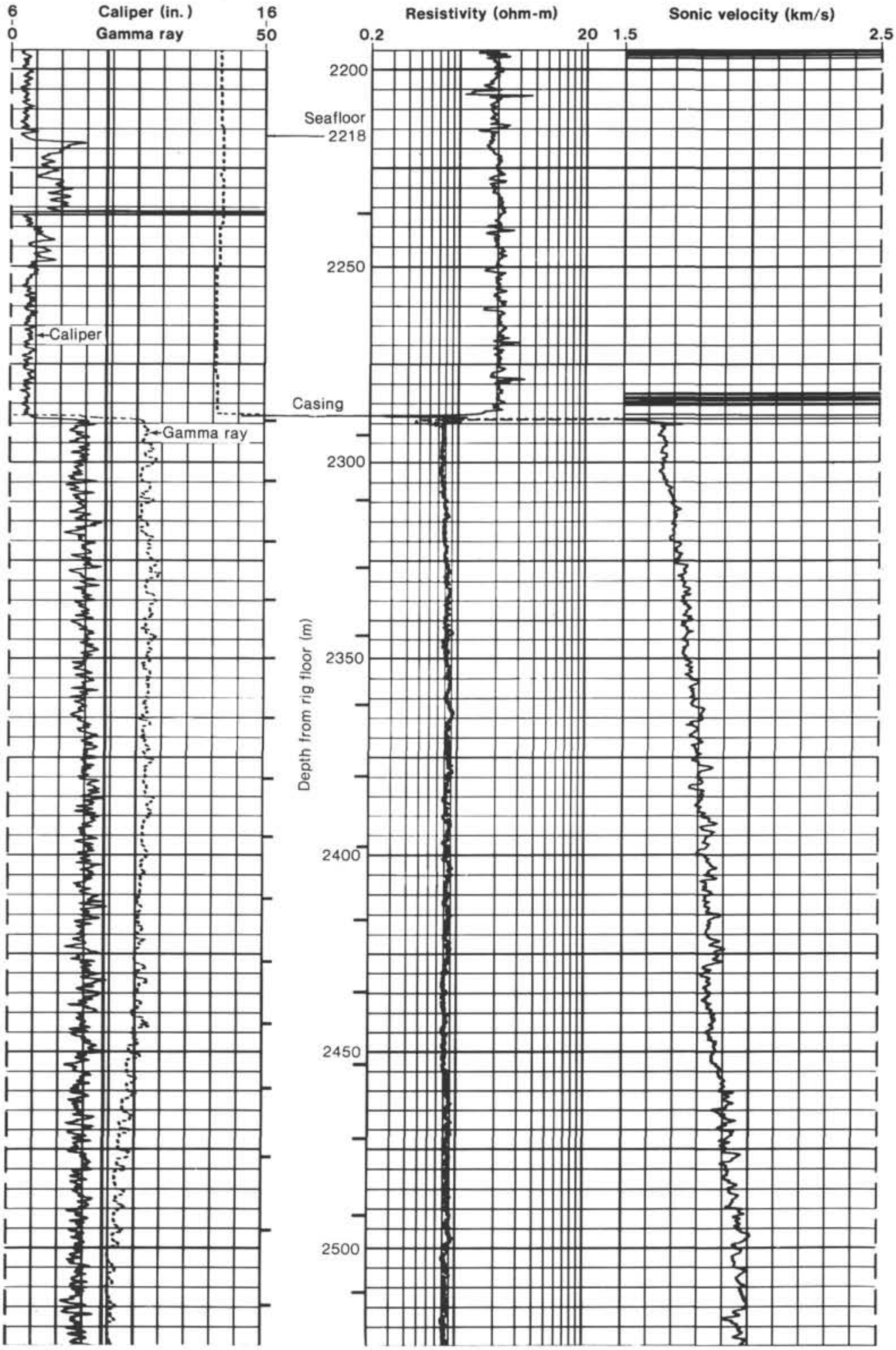


Figure 15. Logging results, Hole 586C, showing caliper, gamma ray, resistivity, and sonic velocity.

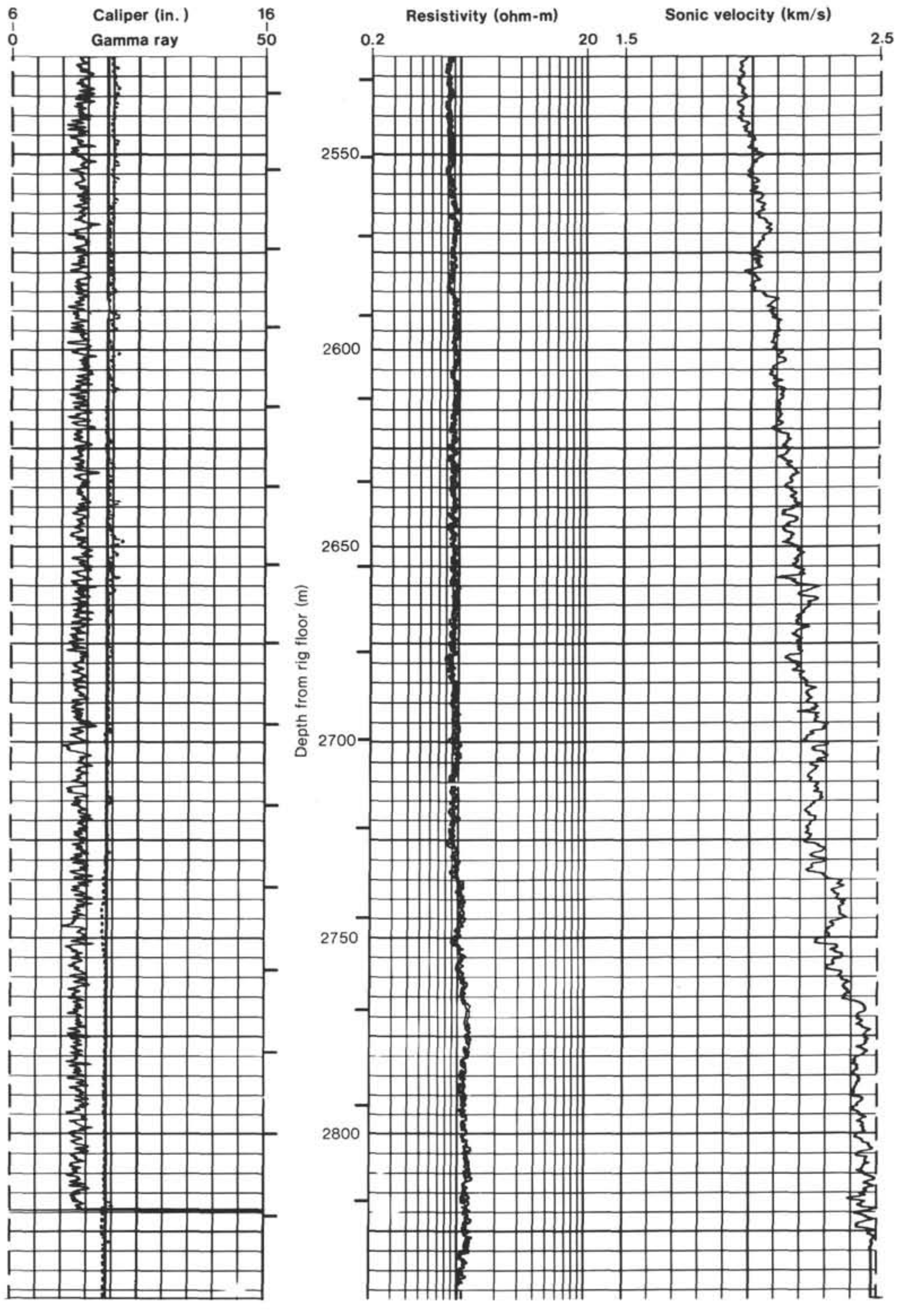


Figure 15 (continued).

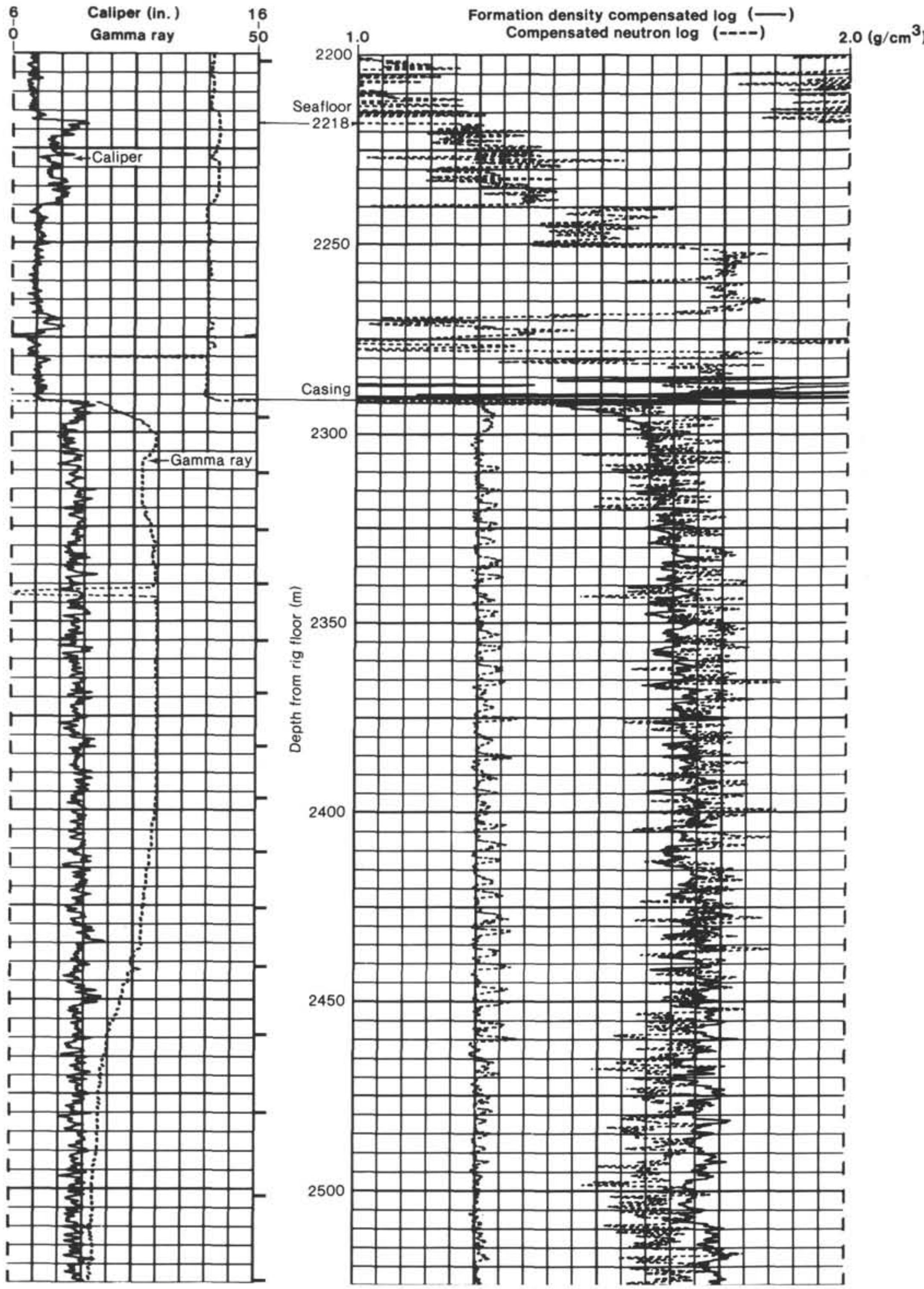


Figure 16. Logging results, Hole 586C, showing caliper, gamma ray, formation density compensated log, and compensated neutron log.

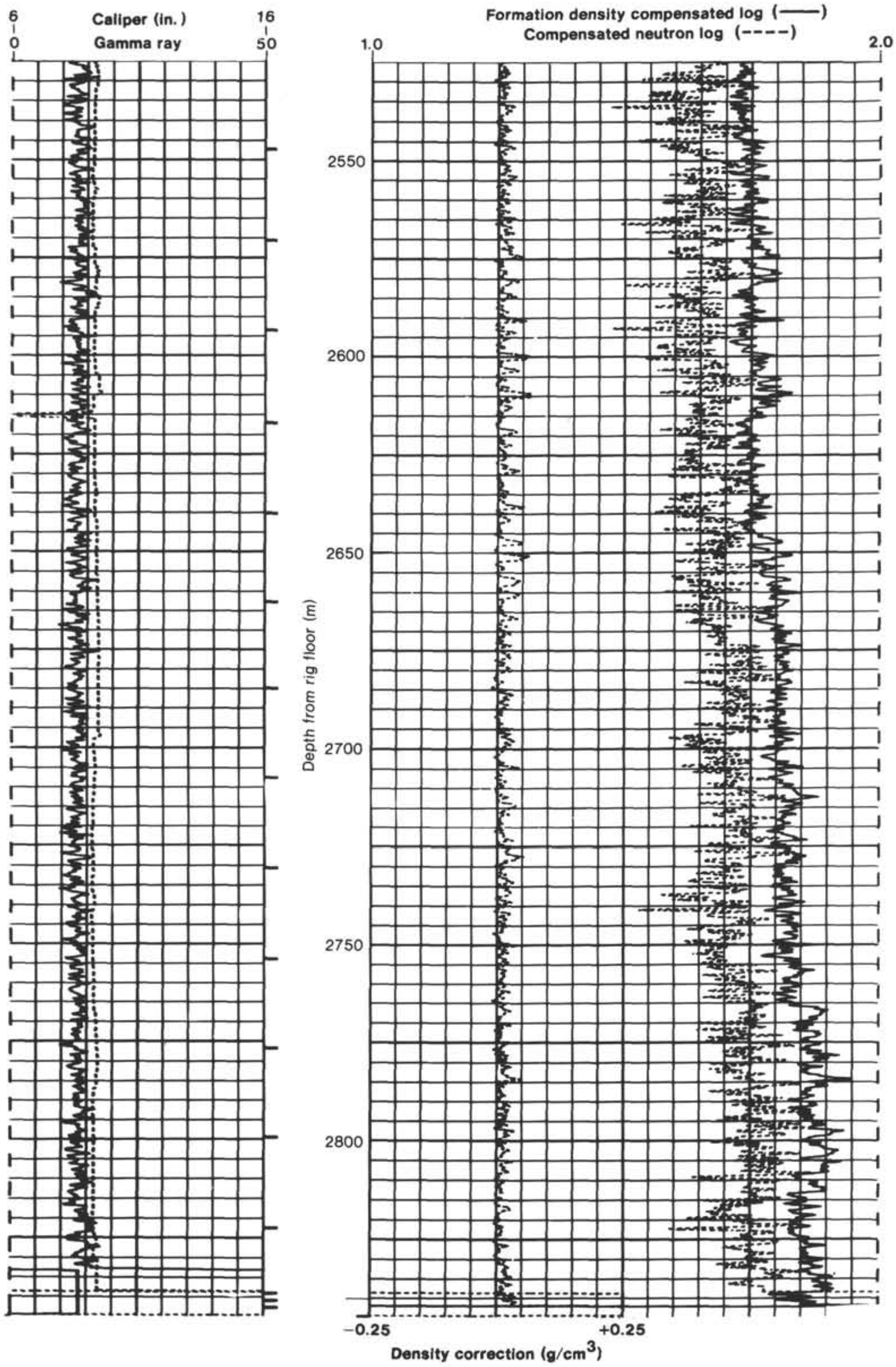


Figure 16 (continued).

SITE 586 HOLE CORE (HPC) 1 CORED INTERVAL 0.0–1.3 m sub-bottom; 2218.0–2224.4 m below rig floor

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
Holocene	*Buccinosph. invaginata* (R); *Emiliania huxleyi* zone (N); *Collosphaera tuberosa* (R)	AG	AG	CM, CM		1	0.5, 1.0
late Pleistocene	N23 (F); *Amphirhopalum ypsilon* (R); *Gephyrocapsa oceanica* (N)	AG	AG	CM, FM		CC	

LITHOLOGIC DESCRIPTION

5Y 8/1
5GY 7/1
↓
5Y 8/1
5GY 7/1
5Y 8/1

FORAMINIFER NANNOFOSSIL and NANNOFOSSIL FORAMINIFER OOZE
Oxidized (pale brown) top 15 cm; shades of pale green.

Dark gray (N3) mottles scattered throughout.

SMEAR SLIDE SUMMARY (%):

	1, 6	1, 50	1, 75	CC, 23
	D	D	D	D
Texture:				
Sand	35	10	30	10
Silt	30	40	30	40
Clay	35	50	40	50
Composition:				
Volcanic glass	–	–	<1	–
Zeolite	–	<1	–	–
Foraminifers	65	50	60	50
Calc. nannofossils	35	50	40	50
Radiolarians	–	<1	<1	<1
Sponge spicules	<1	<1	<1	<1
Silicoflagellates	–	<1	–	<1

ORGANIC CARBON AND CARBONATE (%):

	1, 31–32
Organic carbon	0.36
Carbonate	84

SITE 586 HOLE CORE 2 CORED INTERVAL 1.3–10.8 m sub-bottom; 2224.4–2233.9 m below rig floor

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS
late Pleistocene	N23 (F); *Amphirhopalum ypsilon* (R); *Gephyrocapsa oceanica* (N)		AG	CM, CM, FM		1, 2, 3	0.5, 1.0
early Pleistocene	N22 (F); *Pseudoemiliania lacunosa*/small *Gephyrocapsa* (N)	AM	AG, AG	RP, FP, FP, FP		4, 5, 6, 7, CC	

LITHOLOGIC DESCRIPTION

5Y 8/1
5G 5/2
5Y 8/1
IW
5G 5/2
5G 5/2
5G 5/2
5G 5/2
5G 5/2
5G 5/2
5G 5/2
5G 5/2
5G 5/2
5G 5/2
5G 5/2

FORAMINIFER-NANNOFOSSIL OOZE with minor NANNOFOSSIL-FORAMINIFER OOZE
Mostly shades of pale green; dominant color = white (5Y 8/1); several brighter green (grayish green [5G 5/2]) bands as indicated; dark gray (N3) mottles throughout; darker, greener (5G 5/2) bands generally coarser, more foraminifer-rich.

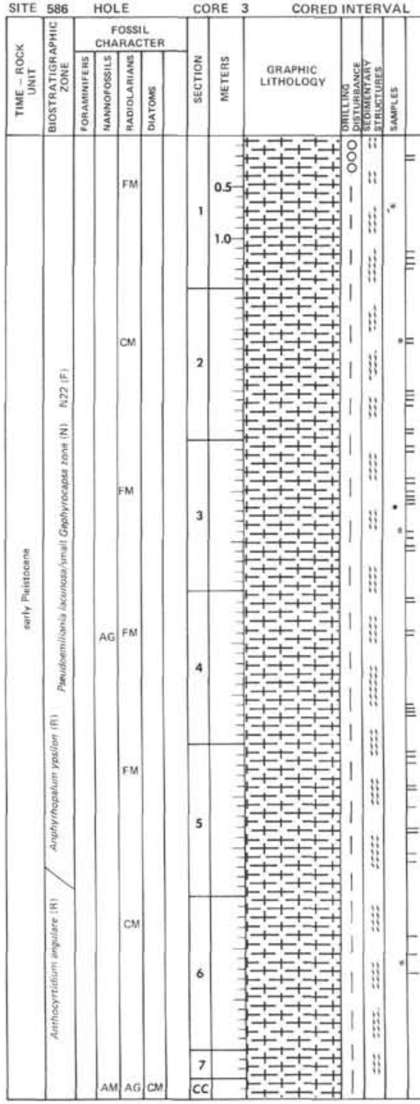
SMEAR SLIDE SUMMARY (%):

	1, 44	1, 130	2, 68	5, 140
	M	D	M	D
Texture:				
Sand	15	2	7	2
Silt	40	30	45	28
Clay	45	68	48	70
Composition:				
Volcanic glass	<1	<1	2	<1
Zeolite	<1	–	–	–
Carbonate unspec.	–	15	–	3
Foraminifers	55	15	50	27
Calc. nannofossils	45	69	46	70
Radiolarians	–	<1	2	–
Sponge spicules	<1	–	<1	<1
Silicoflagellates	–	–	<1	–

ORGANIC CARBON AND CARBONATE (%):

	3, 110–111
Organic carbon	–
Carbonate	78

SITE 586 HOLE CORE 3 CORED INTERVAL 10.8–20.3 m sub-bottom; 2233.9–2243.4 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-NANNOFOSSIL OOZE with minor NANNOFOSSIL FORAMINIFER OOZE

Dominant color is white (5Y 8/1) with faint, coarser greener layers (pale green [5G 7/2]) as indicated and minor layers and mottles of yellow gray (5Y 7/2) and grayish yellow (5Y 8/4) which also are coarser than the dominant white (5Y 8/1).

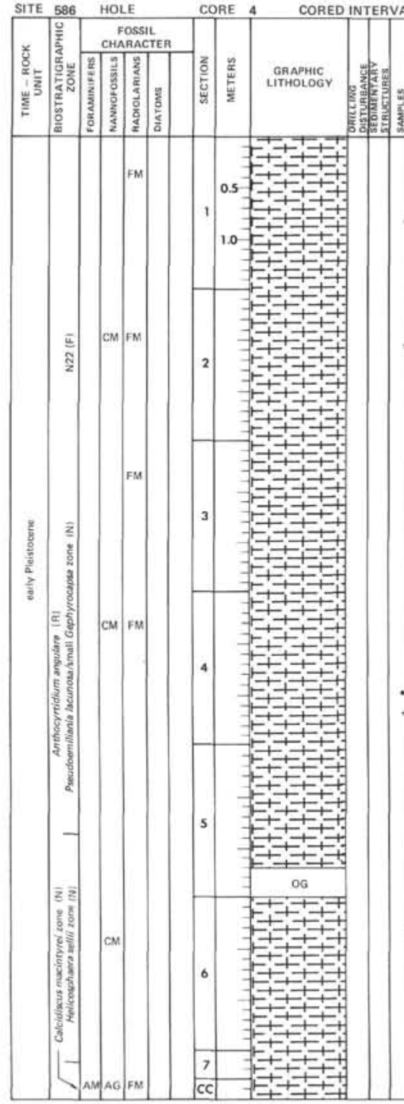
SMEAR SLIDE SUMMARY (%):

	1, 70	2, 51	3, 91	6, 57
	D	M	M	M
Texture:				
Sand	5	15	10	12
Silt	35	35	25	15
Clay	60	50	65	83
Composition:				
Volcanic glass	1	<1	1	–
Pyrite	–	–	–	12
Carbonate unspec.	2	10	5	–
Foraminifers	35	40	28	5
Calc. nannofossils	60	50	65	83
Radiolarians	2	<1	1	<1
Sponge spicules	<1	<1	–	<1

ORGANIC CARBON AND CARBONATE (%):

	3, 76–77
Organic carbon	–
Carbonate	88

SITE 586 HOLE CORE 4 CORED INTERVAL 20.3–29.8 m sub-bottom; 2243.4–2252.9 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-NANNOFOSSIL OOZE

Dominant color is white (5Y 8/1) with mottles of pale yellow (5Y 9/3); thin beds (<1 cm) of pale green (5G 7/2) occur throughout; many are very faint and appear mainly as greener tinges; 5G 7/2 and 5Y 7/3 layers and mottles are somewhat coarser; blebs and small mottles (mostly <1 cm) of dark gray (N3) pyrite-bearing material are common throughout.

SMEAR SLIDE SUMMARY (%):

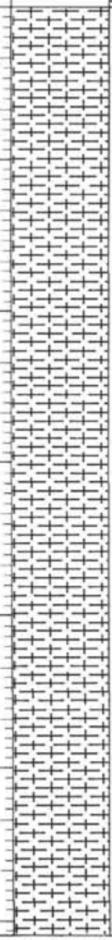
	1, 83	2, 58	4, 116	6, 32
	M	D	M	D
Texture:				
Sand	1	15	2	3
Silt	15	35	13	25
Clay	84	50	85	72
Composition:				
Zeolite	–	<1	–	–
Foraminifers	16	50	15	28
Calc. nannofossils	84	50	85	72
Diatoms	<1	–	–	–
Radiolarians	–	–	<1	<1
Sponge spicules	<1	<1	<1	–
Silicoflagellates	<1	–	–	–
Pteropod	<1	–	–	–

ORGANIC CARBON AND CARBONATE (%):

	4, 92–94
Organic carbon	–
Carbonate	89

SITE 586 HOLE CORE 5 CORED INTERVAL 29.8–39.3 m sub-bottom; 2252.9–2262.4 m below rig floor

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
early Pleistocene	N22 (F)					1	0.5, 1.0				
			AG			2					•
						3					
			CG			4					*
	Pterocanium prismatium (R) *Calcidiscus macintyrei* zone (N)					5					
			CM			6					*
late Pliocene	N21 (F) CN12d (N)	AM	AG	FM		CC					



LITHOLOGIC DESCRIPTION

FORAM-BEARING NANNOFOSSIL OOZE

Dominant color appears as very pale green (about white [5Y 8/1] to pale greenish yellow [10Y 8/2]) with mottles of pale yellow (5Y 7/3); thin layers (most < 1 cm) of darker green (pale green [5G 7/2] to grayish green [5G 5/2]) occur throughout – most are very faint and appear as more or less distinct color tinges in paler green background ooze. Dark gray (N3) blebs and small mottles (<1 cm) also occur throughout and probably represent burow fills.

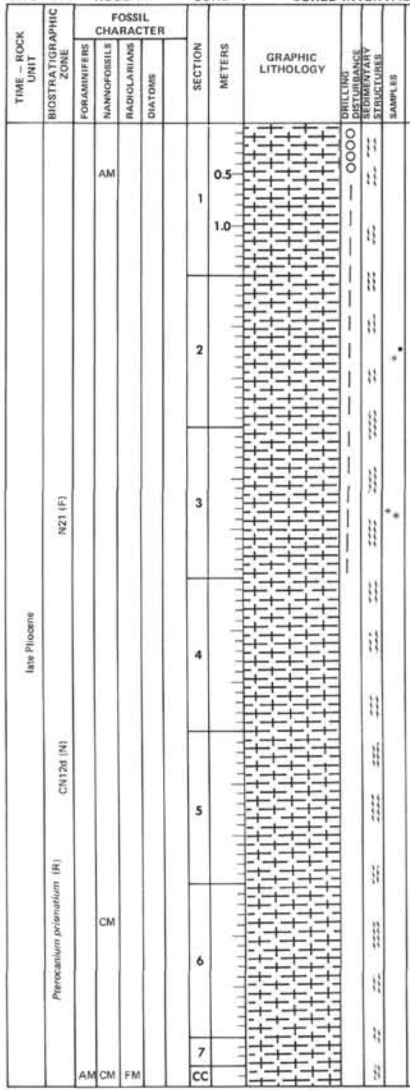
SMEAR SLIDE SUMMARY (%):

	4, 90	6, 53
	D	M
Texture:		
Sand	2	1
Silt	18	18
Clay	80	81
Composition:		
Pyrite	–	2
Zeolite	<1	<1
Foraminifers	20	17
Calc. nannofossils	80	81
Radiolarians	<1	<1
Sponge spicules	–	<1
Pteropods	<1	–

ORGANIC CARBON AND CARBONATE (%):

	2, 105–106
Organic carbon	0.29
Carbonate	89

SITE 586 HOLE A CORE 1 CORED INTERVAL 39.3–48.9 m sub-bottom; 2262.4–2272.0 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (5Y 8/1) and pale greenish gray (10Y 8/2) with very indistinct layers of light greenish gray (5GY 8/1); gray burrow mottles (slightly pyritiferous) N7–N3 throughout.

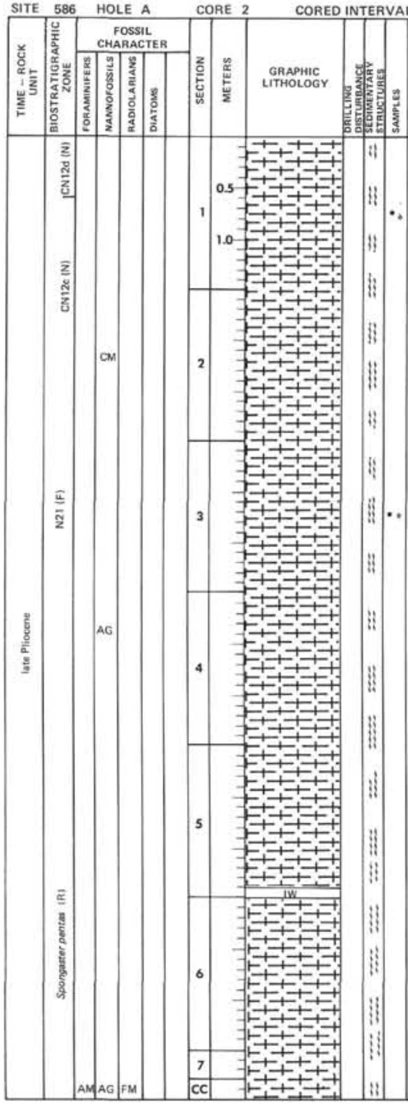
SMEAR SLIDE SUMMARY (%):

	2, 80	3, 88	3, 82
	D	M	M
Texture:			
Sand	8	3	12
Silt	12	10	3
Clay	80	87	85
Composition:			
Volcanic glass	–	<1	–
Pyrite	–	1	–
Foraminifers	10	10	15
Calc. nannofossils	86	89	82
Diatoms	1	<1	1
Radiolarians	2	<1	1
Sponge spicules	<1	–	1
Silicoflagellates	<1	–	1

ORGANIC CARBON AND CARBONATE (%):

	2, 79–80
Organic carbon	0.29
Carbonate	88

SITE 586 HOLE A CORE 2 CORED INTERVAL 48.9–58.5 m sub-bottom; 2272.0–2281.6 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is "pale green" – approximately white (5Y 8/1) to light greenish gray (5GY 8/1).

Mottles of pale yellow (5Y 7/3) occur throughout.

Dark gray (N3) burrow mottles scattered throughout.

Thin (<1 cm) beds of pale green (5G 7/2) occur throughout. Only a few are very distinct; most are very faint and appear mainly as slightly greener tinges in pale green dominant ooze.

SMEAR SLIDE SUMMARY (%):

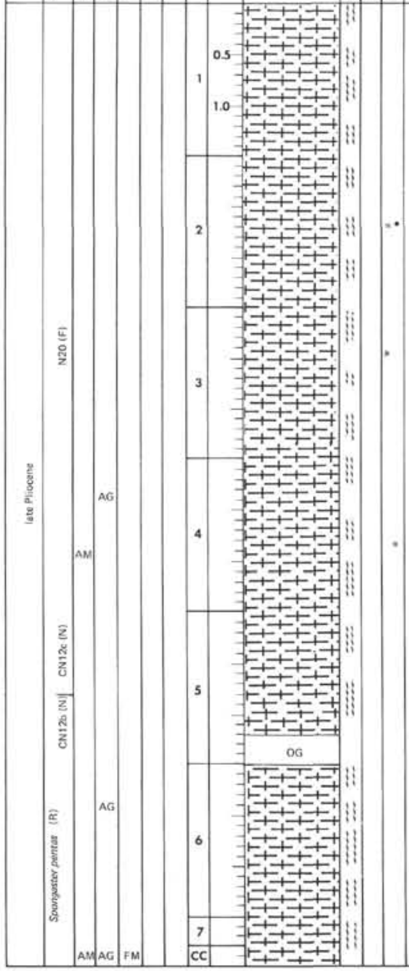
	1, 75	2, 50	3, 70
	M	M	D
Texture:			
Sand	18	13	5
Silt	2	5	3
Clay	80	78	92
Composition:			
Volcanic glass	<1	<1	–
Carbonate unspec.	1	1	1
Foraminifers	20	15	10
Calc. nannofossils	78	83	85
Diatoms	<1	<1	1
Radiolarians	<1	1	1
Sponge spicules	–	<1	2
Silicoflagellates	<1	<1	<1

ORGANIC CARBON AND CARBONATE (%):

	1, 75–76	3, 70–71
Organic carbon	–	0.24
Carbonate	88	88

SITE 586 HOLE A CORE 3 CORED INTERVAL 58.5–68.1 m sub-bottom; 2281.6–2291.2 m below rig floor

TIME-ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION



FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (5Y 8/1) to light greenish gray (5GY 8/1). Mottles of pale yellow (5Y 7/3) throughout. Burrow mottles, dark gray (N3) throughout.

Very, very faint beds (<1 cm) of pale green (5G 7/2) occur throughout; most appear as only slightly greener tinges in dominant 'pale green' ooze.

SMEAR SLIDE SUMMARY (%):

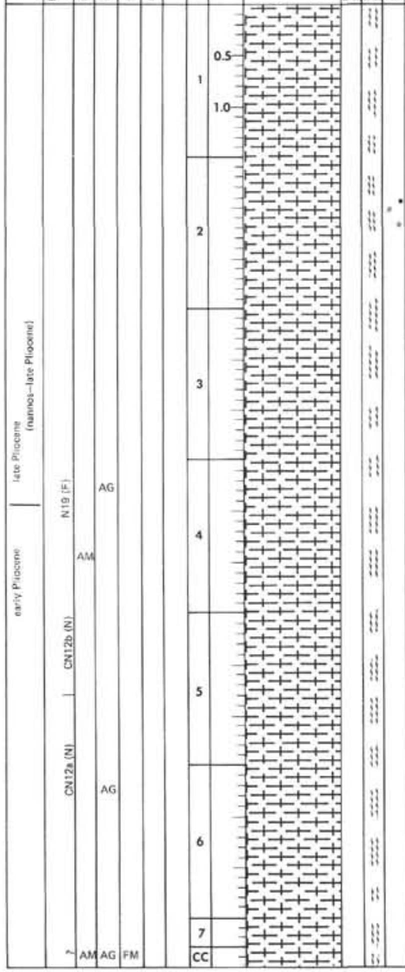
	2, 70	3, 46	4, 87
	D	M	M
Texture:			
Sand	12	8	12
Silt	5	5	5
Clay	83	87	83
Composition:			
Heavy minerals	–	<1	–
Volcanic glass	–	–	<1
Pyrite	–	<1	–
Carbonate unspec.	3	5	<1
Foraminifers	12	11	12
Calc. nannofossils	81	83	86
Diatoms	<1	–	–
Radiolarians	3	1	1
Sponge spicules	1	<1	<1
Plant debris	–	<1	–

ORGANIC CARBON AND CARBONATE (%):

	2, 69–70
Organic carbon	–
Carbonate	86

SITE 586 HOLE A CORE 4 CORED INTERVAL 68.1–77.7 m sub-bottom; 2291.2–2300.8 m below rig floor

TIME-ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION



FORAMINIFERA-BEARING NANNOFOSSIL OOZE

Dominant color is white (5Y 8/1) to light greenish gray (5GY 8/1). Mottles of pale yellow (5Y 7/3) occur throughout. Burrow mottles of dark gray (N3) common throughout.

Thin beds (mostly <1 cm) of pale green (5G 7/2) material throughout; most appear as slightly greener material in light green ooze that is dominant lithology.

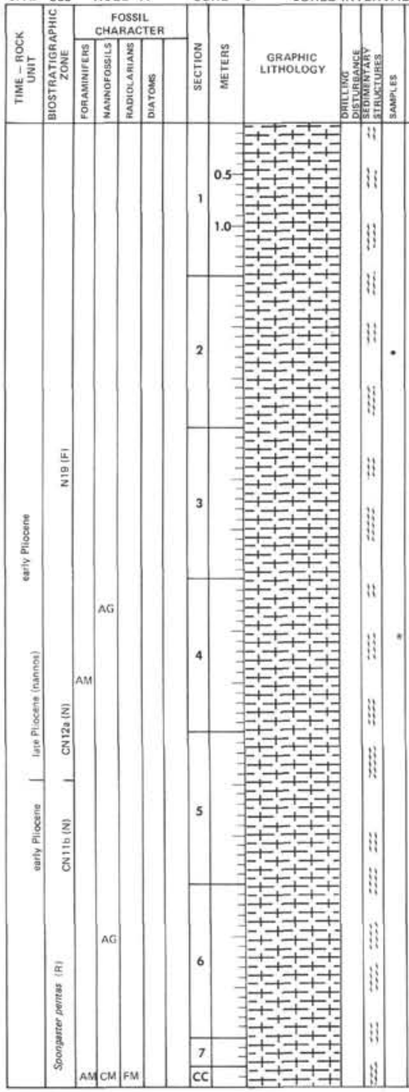
SMEAR SLIDE SUMMARY (%):

	2, 51	2, 70
	D	M
Texture:		
Sand	12	9
Silt	4	3
Clay	84	88
Composition:		
Volcanic glass	–	<1
Pyrite	–	<1
Carbonate unspec.	1	3
Foraminifers	11	10
Calc. nannofossils	87	85
Diatoms	–	<1
Radiolarians	1	<1
Fish remains	–	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 48–49
Organic carbon	–
Carbonate	89

SITE 586 HOLE A CORE 5 CORED INTERVAL 77.7–87.3 m sub-bottom; 2300.8–2310.4 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFERA-BEARING NANNOFOSSIL OOZE

Dominant color is white (5Y 8/1) to light greenish gray (5GY 8/1).

Mottles of pale yellow (5Y 7/3) occur throughout. Burrow mottles of dark gray (N3) common throughout.

Thin beds (mostly <1 cm) of pale green (5G 7/2) material throughout; most appear as slightly greener material in light green ooze that is dominant lithology.

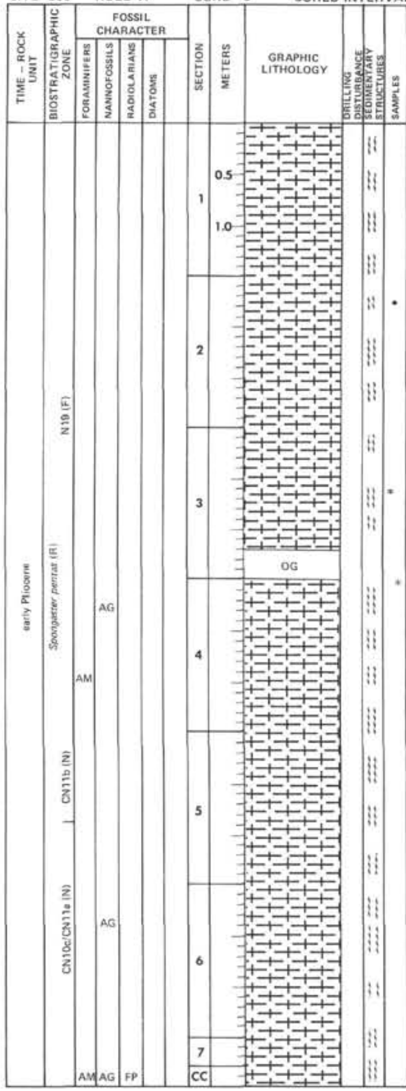
SMEAR SLIDE SUMMARY (%):

	4, 59
	D
Texture:	
Sand	10
Silt	3
Clay	87
Composition:	
Carbonate unspec.	3
Foraminifers	11
Calc. nannofossils	84
Diatoms	Tr
Radiolarians	2
Fish remains	Tr

ORGANIC CARBON AND CARBONATE (%):

	2, 75–76
Organic carbon	0.28
Carbonate	90

SITE 586 HOLE A CORE 6 CORED INTERVAL 87.3–96.9 m sub-bottom; 2310.4–2320.0 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (5Y 8/1) to light greenish gray (5GY 8/1) with mottles of pale yellow (5Y 7/3) throughout.

Burrow mottles of dark gray (N3) throughout.

Thin beds (mostly <1 cm) of pale green (5G 7/2) occur throughout, but most are too faint to clearly distinguish and appear mostly as slightly darker green tinges in pale green ooze that makes up dominant lithology. Pale green layers appear to be slightly coarser than background ooze.

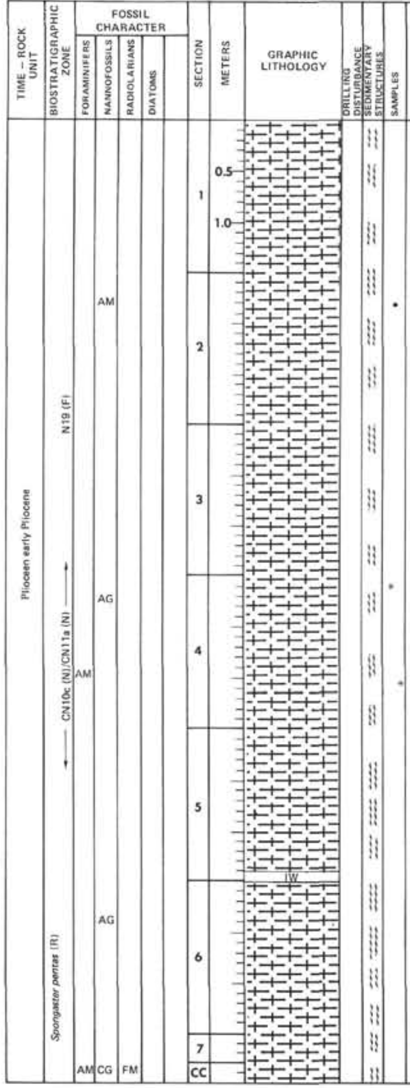
SMEAR SLIDE SUMMARY (%):

	3, 62	4, 4
	D	M
Texture:		
Sand	8	11
Silt	9	9
Clay	83	80
Composition:		
Carbonate unspec.	5	4
Foraminifers	10	14
Calc. nannofossils	84	82
Radiolarians	1	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 29–30
Organic carbon	–
Carbonate	90

SITE 586 HOLE A CORE 7 CORED INTERVAL 96.9–106.5 m sub-bottom; 2320.0–2329.6 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE
Dominant color is white (5Y 8/1) to light greenish gray (5GY 8/1) with abundant mottles of pale yellow (5Y 7/3) and burrow mottles of dark gray (N3) throughout.

Thin beds of pale green (5G 7/2) are present throughout but most are too faint to distinguish.

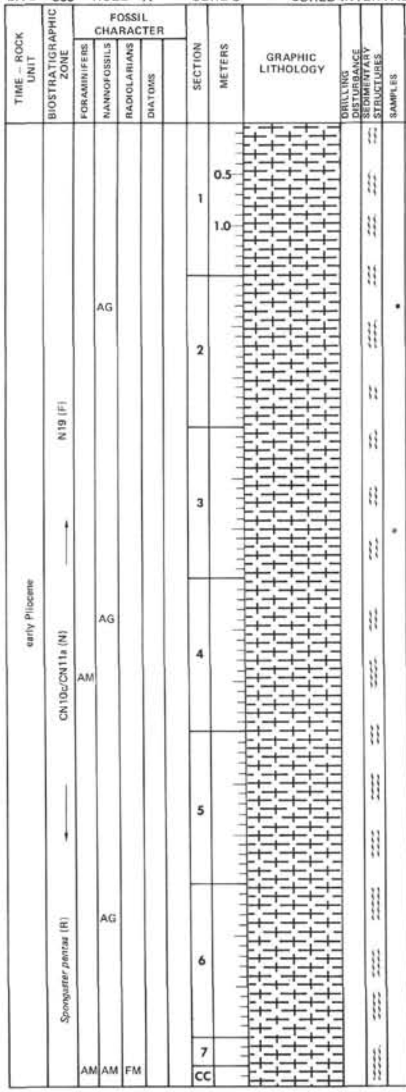
SMEAR SLIDE SUMMARY (%):

	4, 10	4, 105
	M	D
Texture:		
Sand	14	8
Silt	5	7
Clay	81	85
Composition:		
Carbonate unspec.	4	2
Foraminifers	16	10
Calc. nannofossils	78	86
Radiolarians	2	2
Sponge spicules	<1	–

ORGANIC CARBON AND CARBONATE (%):

	2, 35–36
Organic carbon	–
Carbonate	94

SITE 586 HOLE A CORE 8 CORED INTERVAL 106.5–116.1 m sub-bottom; 2329.6–2339.6 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE
Dominant color is white (5Y 8/1) to light greenish gray (5GY 8/1), with abundant mottles of pale yellow (5Y 7/3) and burrow mottles of dark gray (N3) throughout. Thin beds of slightly darker pale green (5G 7/2) occur throughout dominant ooze but most are too faint to distinguish clearly.

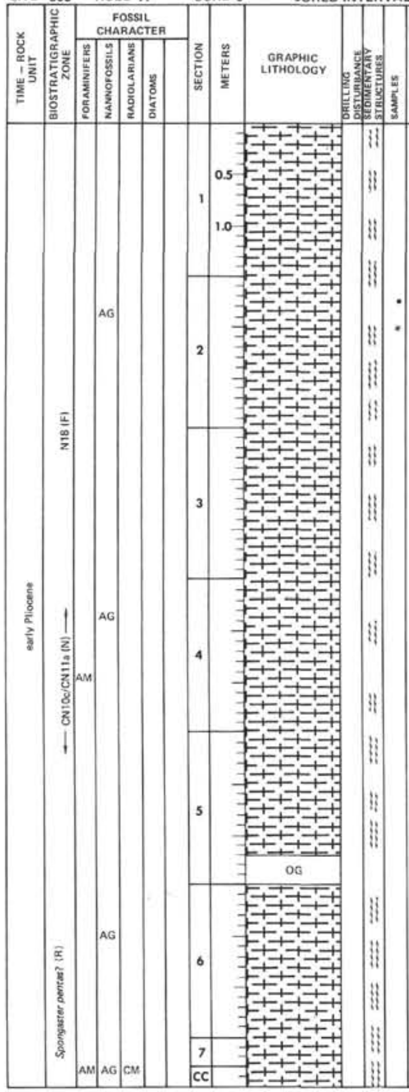
SMEAR SLIDE SUMMARY (%):

	3, 102
	D
Texture:	
Sand	17
Silt	3
Clay	80
Composition:	
Carbonate unspec.	2
Foraminifers	20
Calc. nannofossils	77
Radiolarians	1
Sponge spicules	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 31–32
Organic carbon	0.62
Carbonate	85

SITE 586 HOLE A CORE 9 CORED INTERVAL 116.1–125.7 m sub-bottom; 2339.6–2348.8 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (5Y 8/1) to light greenish gray (5GY 8/1) with mottles of dark gray (N3) material as burrow fill and larger mottles of pale green (5G 7/2) and pale yellow (5Y 7/3).

Thin beds (most <1 cm) of paler green (5G 7/2) material occur throughout although most are too faint to distinguish clearly.

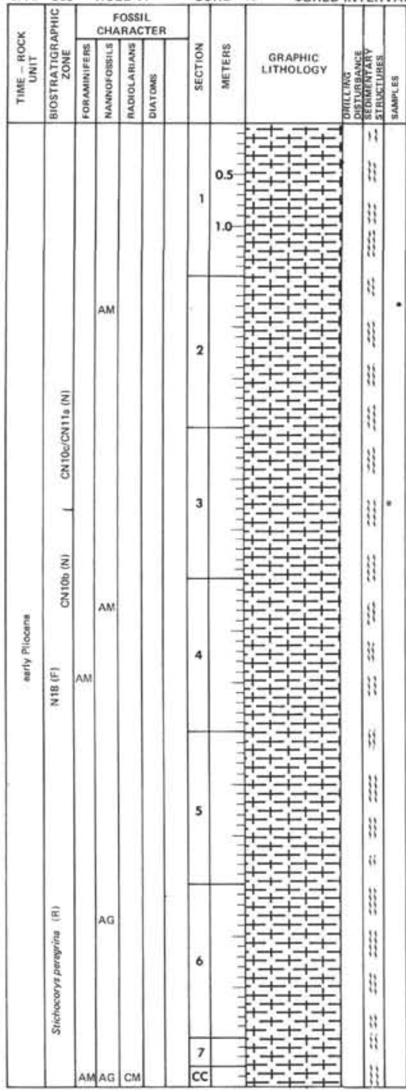
SMEAR SLIDE SUMMARY (%):

	2, 55
	D
Texture:	
Sand	5
Silt	15
Clay	80
Composition:	
Carbonate unspec.	2
Foraminifers	23
Calc. nannofossils	75
Radiolarians	<1
Sponge spicules	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 27–28
Organic carbon	0.007
Carbonate	99

SITE 586 HOLE A CORE 10 CORED INTERVAL 125.7–135.3 m sub-bottom; 2348.8–2358.4 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (N8 and 5Y 8/1) to light greenish gray (5GY 8/1) with mottles of pale yellow (5Y 7/3) and burrow mottles of dark gray (N3) common throughout. Thin layers of pale green (5G 7/2) material (slightly coarser) occur throughout but most are too faint to be clearly distinguished and appear mainly as faint, slightly darker green tinges and mottles in dominant white to pale green ooze.

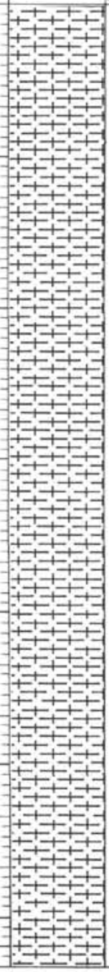
SMEAR SLIDE SUMMARY (%):

	3, 74
Texture:	
Sand	14
Silt	4
Clay	82
Composition:	
Pyrite	<1
Carbonate unspec.	3
Foraminifers	18
Calc. nannofossils	77
Diatoms	<1
Radiolarians	2
Sponge spicules	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 30–32
Organic carbon	—
Carbonate	95

SITE 586 HOLE A CORE 11 CORED INTERVAL 135.3–144.9 m sub-bottom; 2358.4–2368.0 m below rig floor

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
early Pliocene	N18 (F); CN10b (N); CN10a (N); *Stichocorys peregrina* (R)	AM; AM	AM; AM; AM; AG	FM		1; 2; 3; 4; 5; 6; 7; CC	0.5; 1.0				

LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Section 1 to Section 5, 35 cm: dominant color is white (5Y 8/1) to light greenish gray (5GY 8/1). Material is entirely bioturbated with burrow mottles of medium gray (N5) and slightly darker shades of pale green (about 5G 7/2) than dominant "pale green" ooze. There are no clearly distinguishable beds of green material.

Section 5, 35 cm to bottom: homogeneous white (N8 to 5Y 8/1) ooze.

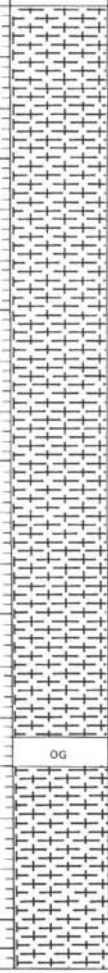
SMEAR SLIDE SUMMARY (%):

	3, 10	5, 112
	M	D
Texture:		
Sand	15	12
Silt	4	7
Clay	81	81
Composition:		
Pyrite	<1	<1
Carbonate unspec.	2	2
Foraminifers	19	17
Calc. nannofossils	77	79
Diatoms	<1	–
Radiolarians	2	2
Sponge spicules	<1	<1

ORGANIC CARBON AND CARBONATE (%):

	5, 100–101
Organic carbon	–
Carbonate	97

SITE 586 HOLE A CORE 12 CORED INTERVAL 144.9–154.5 m sub-bottom; 2368.0–2377.6 m below rig floor

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
early Pliocene; late Miocene	CN10a (N); N18 (F); CN9b (N); *Stichocorys peregrina* (R)	AM; AM	AM; AM; AM	FM		1; 2; 3; 4; 5; 6; 7; CC	0.5; 1.0				

LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (5Y 8/1) to light greenish gray (5GY 8/1). Entirely bioturbated with burrow mottles of medium gray (N5) and slightly darker pale green (5G 7/2) than the dominant pale green ooze. There are no clearly distinguishable beds.

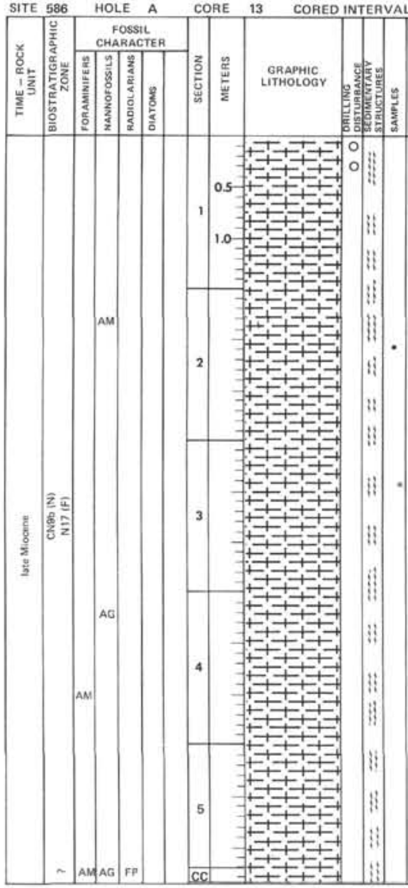
SMEAR SLIDE SUMMARY (%):

	4, 65
	D
Texture:	
Sand	2
Silt	8
Clay	90
Composition:	
Volcanic glass	<1
Foraminifers	10
Calc. nannofossils	90
Radiolarians	<1
Sponge spicules	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 64–65
Organic carbon	0
Carbonate	96

SITE 586 HOLE A CORE 13 CORED INTERVAL 154.5–161.8 m sub-bottom; 2377.6–2384.9 m below rig floor



LITHOLOGIC DESCRIPTION

FORAM-BEARING NANNOFOSSIL OOZE
Dominant color is white (5Y 8/1) to light greenish gray (5GY 8/1). Extensively bioturbated with burrow fill material of medium gray (N5) and slightly darker shades of pale green (5G 7/2) than the dominant "pale green" background ooze. No clearly distinguishable beds.

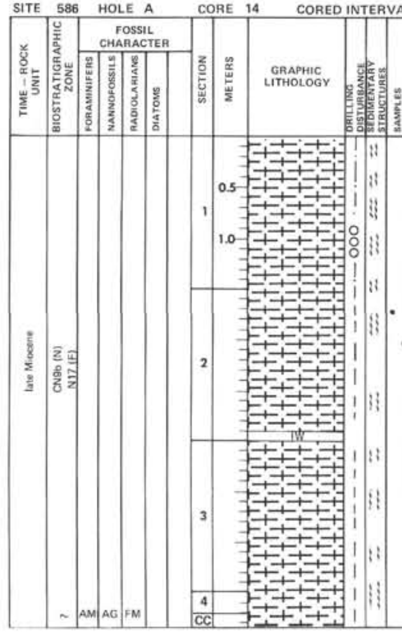
SMEAR SLIDE SUMMARY (%):

	3, 45
	D
Texture:	
Sand	3
Silt	10
Clay	87
Composition:	
Carbonate unspec.	2
Foraminifers	12
Calc. nannofossils	85
Radiolarians	1
Sponge spicules	<1
Silicoflagellates	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61
Organic carbon	–
Carbonate	99

SITE 586 HOLE A CORE 14 CORED INTERVAL 161.8–166.7 m sub-bottom; 2384.9–2389.8 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE
Dominant color is white (5Y 8/1) with burrow mottling of light to medium gray (N5–N5) and very slightly darker pale green and pale yellow (5Y 7/3).

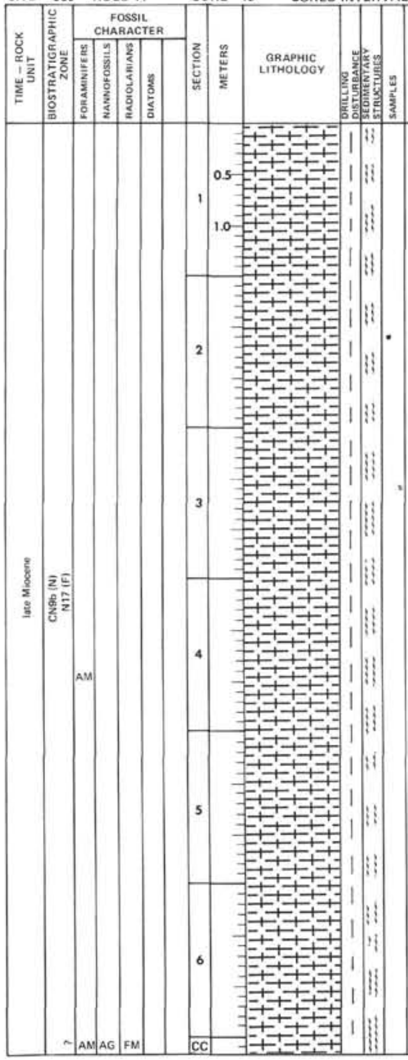
SMEAR SLIDE SUMMARY (%):

	2, 57
	D
Texture:	
Sand	1
Silt	9
Clay	90
Composition:	
Zeolite	< 1
Foraminifers	10
Calc. nannofossils	90
Radiolarians	<1
Sponge spicules	<1
Silicoflagellates	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 24–25
Organic carbon	–
Carbonate	95

SITE 586 HOLE A CORE 15 CORED INTERVAL 166.7–175.7 m sub-bottom; 2389.8–2398.8 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (5Y 8/1) with light to medium gray (N7–N5), pale yellow, and pale green burrow mottles throughout. Outlines of burrow mottles are indistinct.

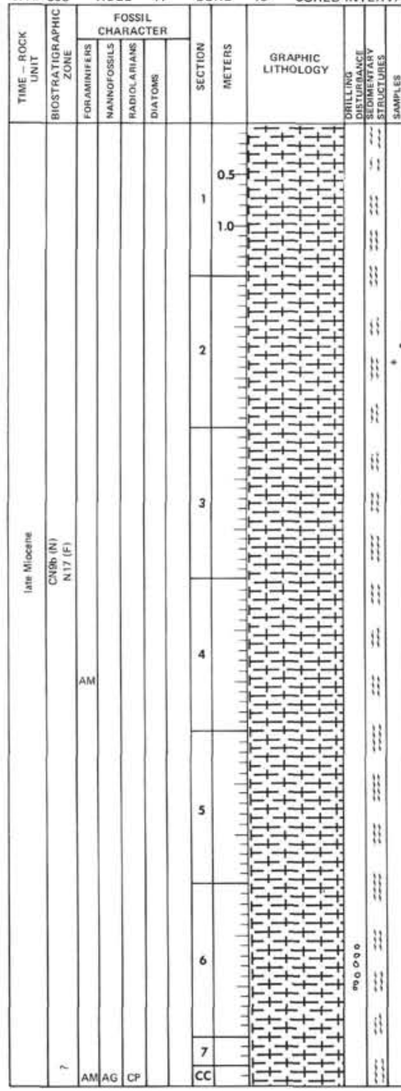
SMEAR SLIDE SUMMARY (%):

	3, 60
	D
Texture:	
Sand	2
Silt	10
Clay	88
Composition:	
Zeolite	<1
Foraminifers	12
Calc. nannofossils	88
Radiolarians	<1
Sponge spicules	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61
Organic carbon	0.02
Carbonate	98

SITE 586 HOLE A CORE 16 CORED INTERVAL 175.7–185.3 m sub-bottom; 2398.8–2408.4 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (N9 and 5Y 8/1) and light greenish gray (5GY 8/1). Intensely bioturbated throughout with burrow mottles of pale yellow (5Y 7/3), medium gray (N5) and pale green (5G 7/2) material.

SMEAR SLIDE SUMMARY (%):

	2, 85
	D
Texture:	
Sand	2
Silt	10
Clay	88
Composition:	
Volcanic glass	<1
Carbonate unspec.	2
Foraminifers	12
Calc. nannofossils	86
Radiolarians	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 70–71
Organic carbon	–
Carbonate	96

SITE 586 HOLE A CORE 17 CORED INTERVAL 185.3–194.9 m sub-bottom; 2408.4–2418.0 m below rig floor

TIME – ROCK UNIT: late Miocene

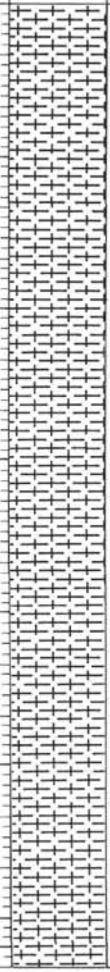
BIOSTRATIGRAPHIC ZONE: CN9b (N); N17 (F); *Stichocorys peregrina* (R)

FOSSIL CHARACTER (FORAMINIFERS / NANNOFOSSILS / RADIOLARIANS / DIATOMS): AM; AM AM CM

SECTION: 1, 2, 3, 4, 5, 6, 7, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (N9) to bluish white (5B 9/1) with burrow mottlings of pale yellow (5Y 7/3), medium gray (N5), and pale green (5G 7/2) abundant throughout.

SMEAR SLIDE SUMMARY (%):

	6, 70
	D
Texture:	
Sand	2
Silt	10
Clay	88
Composition:	
Volcanic glass	<1
Carbonate unspec.	3
Foraminifers	10
Calc. nannofossils	87
Sponge spicules	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 70–71
Organic carbon	–
Carbonate	99

SITE 586 HOLE A CORE 18 CORED INTERVAL 194.9–204.5 m sub-bottom; 2418.0–2427.6 m below rig floor

TIME – ROCK UNIT: late Miocene

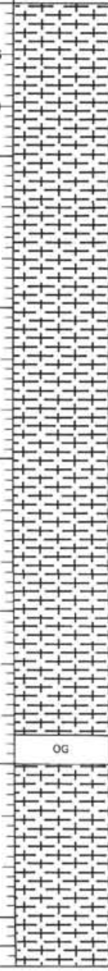
BIOSTRATIGRAPHIC ZONE: CN9b (N); N17 (F); *Ommatartus penultimus* (R)

FOSSIL CHARACTER (FORAMINIFERS / NANNOFOSSILS / RADIOLARIANS / DIATOMS): AM; AM; AM; AM AM CM

SECTION: 1, 2, 3, 4, 5, 6, 7, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (N9) to bluish white (5B 9/1) with abundant burrow mottlings of pale yellow (5Y 7/3), medium gray (N5), and pale green (5G 7/2) material throughout.

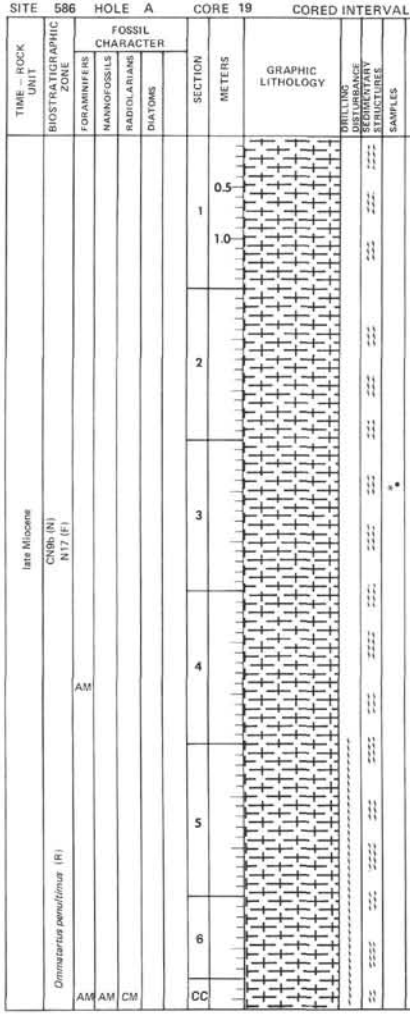
SMEAR SLIDE SUMMARY (%):

	2, 60
	D
Texture:	
Sand	8
Silt	12
Clay	80
Composition:	
Carbonate unspec.	5
Foraminifers	15
Calc. nannofossils	79
Diatoms	<1
Radiolarians	1
Sponge spicules	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 60–61
Organic carbon	0.01
Carbonate	99

SITE 586 HOLE A CORE 19 CORED INTERVAL 204.5–213.0 m sub-bottom; 2427.6–2436.1 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE
Dominant color is white (N9) to bluish white (5B 8/1). Intense bioturbation throughout with burrow mottling of pale yellow (5Y 7/3), medium gray (N5), and pale green (5G 7/2).

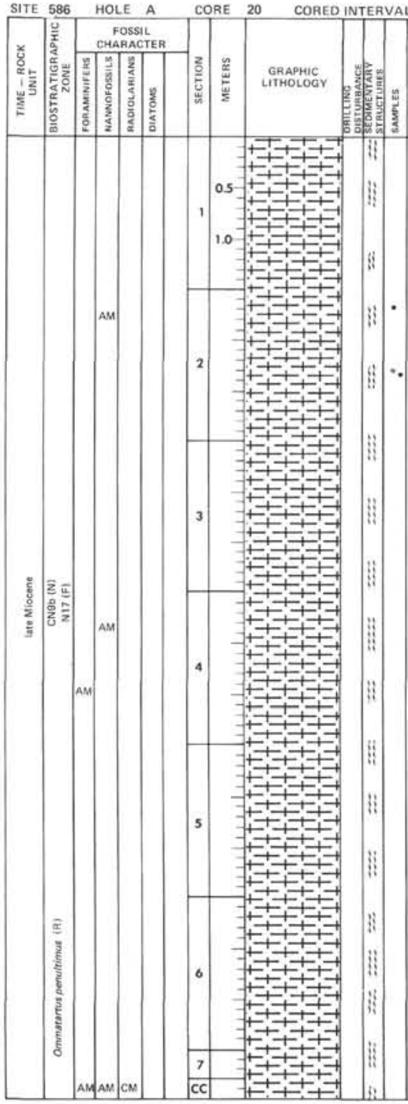
SMEAR SLIDE SUMMARY (%):

	3, 50
	D
Texture:	
Sand	8
Silt	10
Clay	82
Composition:	
Carbonate unspec.	2
Foraminifers	10
Calc. nannofossils	87
Diatoms	<1
Radiolarians	1
Sponge spicules	<1

ORGANIC CARBON AND CARBONATE (%):

	3, 49–50
Organic carbon	–
Carbonate	98

SITE 586 HOLE A CORE 20 CORED INTERVAL 213.0–222.6 m sub-bottom; 2436.1–2445.7 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE
Dominant color is white (N9) to bluish white (5B 9/1). Intensely bioturbated throughout with burrow mottles of pale yellow (5Y 7/3), medium gray (N5), and pale green (5G 7/2).

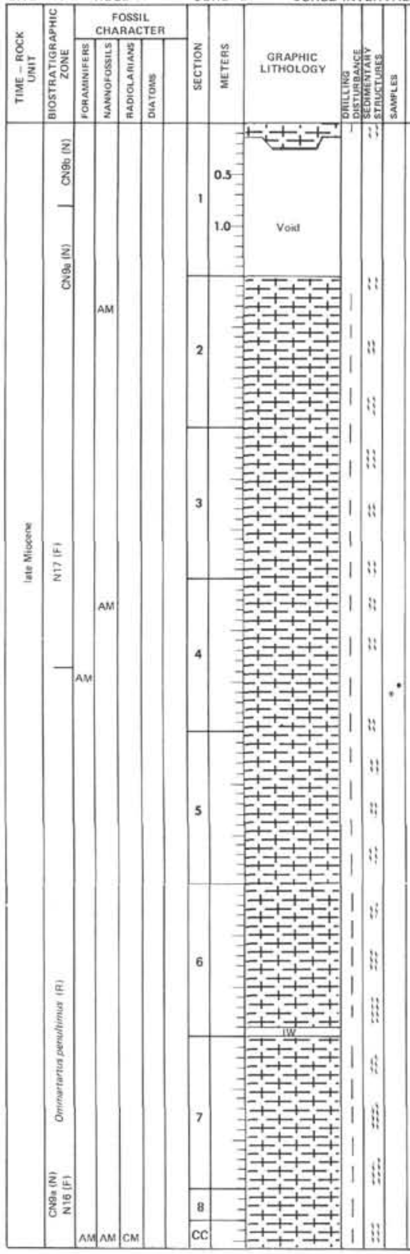
SMEAR SLIDE SUMMARY (%):

	2, 80
	D
Texture:	
Sand	3
Silt	12
Clay	85
Composition:	
Volcanic glass	<1
Carbonate unspec.	3
Foraminifers	12
Calc. nannofossils	83
Radiolarians	1
Sponge spicules	1
Silicoflagellates	<1

ORGANIC CARBON AND CARBONATE (%):

	2, 20–21	2, 82–83
Organic carbon	0.01	–
Carbonate	98	93

SITE 586 HOLE A CORE 21 CORED INTERVAL 222.6–232.2 m sub-bottom; 2445.7–2455.3 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (N9) to bluish white (5B 9/1). Intense bioturbation throughout, with burrow mottles of pale yellow (5Y 7/3), light to medium gray (N5–N5), and pale green (5G 7/2).

Note: Section 1 is an extra piece found in the barrel after the liner had been removed and sectioned. It was added on as Section 1.

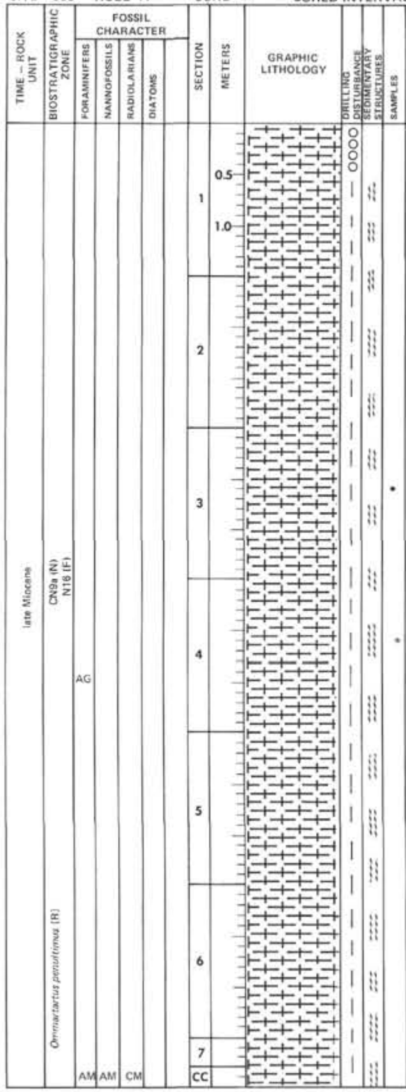
SMEAR SLIDE SUMMARY (%):

	4, 110
	D
Texture:	
Sand	2
Silt	10
Clay	88
Composition:	
Zeolite	<1
Foraminifers	12
Calc. nannofossils	88
Radiolarians	<1
Sponge spicules	<1
Silicoflagellates	<1

ORGANIC CARBON AND CARBONATE (%):

	4, 108–109
Organic carbon	0.03
Carbonate	95

SITE 586 HOLE A CORE 22 CORED INTERVAL 232.2–241.8 m sub-bottom; 2455.3–2464.9 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

0–50 cm: soupy; flow-in; homogeneous white (N9 to 5B 9/1) ooze.

Rest of core: dominant color is white (N9) to bluish white (5B 9/1). Intensely bioturbated throughout with burrow mottles of pale yellow (5Y 7/3) and some pale green (5G 7/2) and light to medium gray (N7–N5) material.

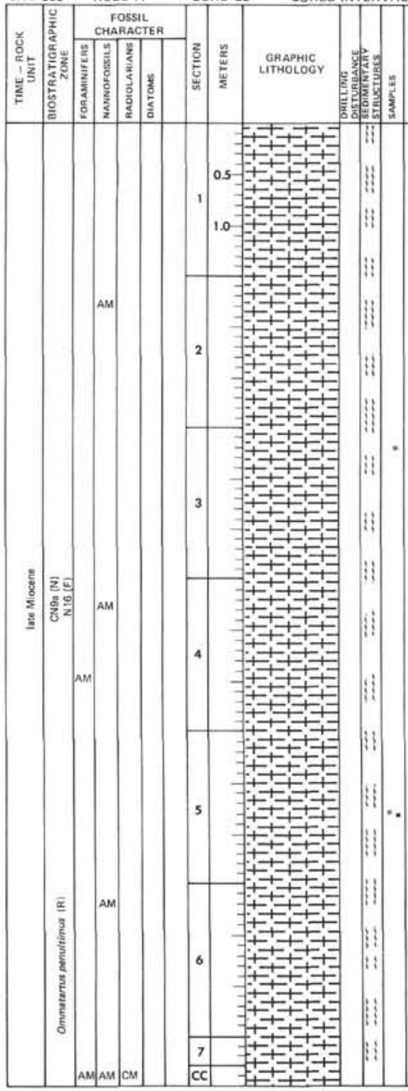
SMEAR SLIDE SUMMARY (%):

	4, 60
	D
Texture:	
Sand	2
Silt	12
Clay	86
Composition:	
Zeolite	<1
Foraminifers	14
Calc. nannofossils	86
Radiolarians	<1
Sponge spicules	<1
Silicoflagellates	<1

ORGANIC CARBON AND CARBONATE (%):

	3, 60–61
Organic carbon	–
Carbonate	92

SITE 586 HOLE A CORE 23 CORED INTERVAL 241.8–251.4 m sub-bottom; 2464.9–2474.5 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (N9) to bluish white (5B 9/1). Intensely bioturbated throughout with burrow mottles of light to medium gray (N7–N3), pale green (5G 7/2) and pale yellow (5Y 7/3), latter being most abundant and forms dominant material in a few parts of core (see SS 3, 20).

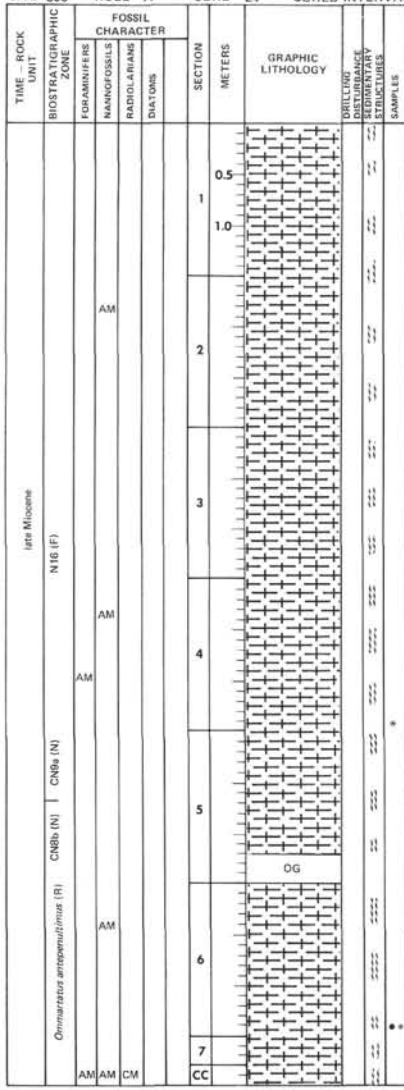
SMEAR SLIDE SUMMARY (%):

	3, 20	5, 80
	M	D
Texture:		
Sand	2	2
Silt	14	14
Clay	84	84
Composition:		
Volcanic glass	<1	–
Pyrite	<1	–
Zeolite	–	<1
Foraminifers	15	16
Calc. nannofossils	84	84
Radiolarians	1	<1
Sponge spicules	<1	<1
Silicoflagellates	<1	–

ORGANIC CARBON AND CARBONATE (%):

	5, 82–83
Organic carbon	0
Carbonate	97

SITE 586 HOLE A CORE 24 CORED INTERVAL 251.4–261.0 m sub-bottom; 2474.5–2484.1 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (N9) to bluish white (5B 9/1). Intensely bioturbated throughout with burrow mottles of light to medium gray (N7 to N5), pale green (5GY 8/1), and pale yellow (5Y 8/3) materials.

SMEAR SLIDE SUMMARY (%):

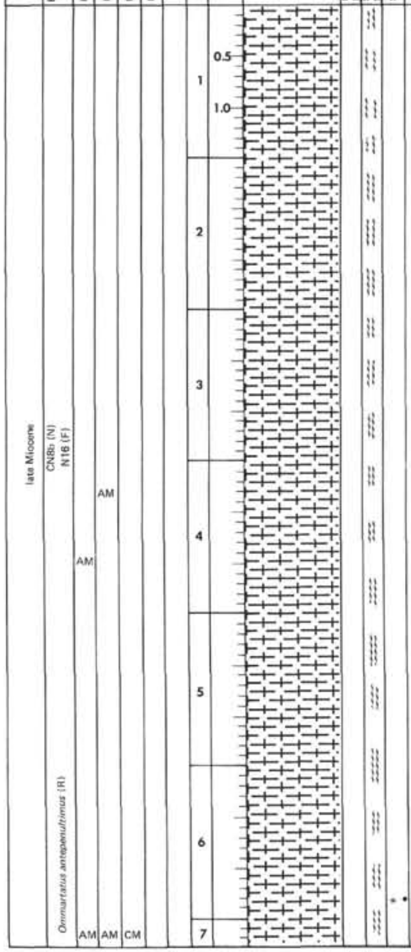
	4, 145	6, 145
	M	D
Texture:		
Sand	4	1
Silt	12	12
Clay	84	87
Composition:		
Pyrite	30	–
Zeolite	1	<1
Carbonate unspec.	1	1
Foraminifers	10	13
Calc. nannofossils	58	86
Radiolarians	–	<1

ORGANIC CARBON AND CARBONATE (%):

	6, 145–146
Organic carbon	–
Carbonate	99

SITE 586 HOLE A CORE 25 CORED INTERVAL 261.0–270.6 m sub-bottom; 2484.1–2493.7 m below rig floor

TIME–ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION



FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (N9) to bluish white (5B 9/1). Intensely bioturbated throughout, with burrow mottling of light to medium gray (N7–N5), pale yellow (5Y 8/3), and pale green (5GY 8/1) material.

SMEAR SLIDE SUMMARY (%):

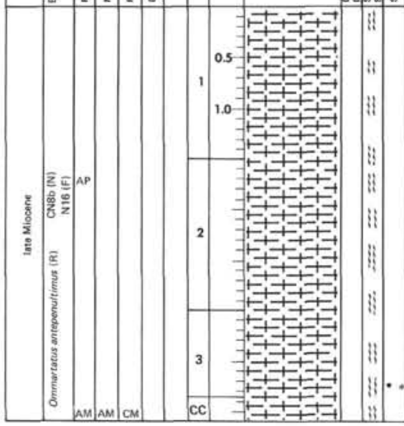
	6, 137
	D
Texture:	
Sand	1
Silt	10
Clay	89
Composition:	
Zeolite	<1
Carbonate unspec.	1
Foraminifers	10
Calc. nannofossils	88
Diatoms	<1
Radiolarians	1
Sponge spicules	<1
Silicoflagellates	<1

ORGANIC CARBON AND CARBONATE (%):

	6, 137–138
Organic carbon	–
Carbonate	94

SITE 586 HOLE A CORE 26 CORED INTERVAL 270.6–276.6 m sub-bottom; 2493.7–2499.7 m below rig floor

TIME–ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION



FORAMINIFER-BEARING NANNOFOSSIL OOZE

Dominant color is white (N9) to bluish white (5B 9/1). Bioturbated throughout with burrow mottling of light-gray (N7–N5), pale yellow (5Y 8/1), and light greenish gray (5GY 8/1) material.

SMEAR SLIDE SUMMARY (%):

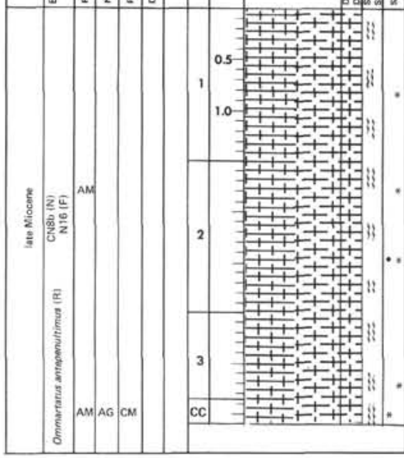
	3, 75
	D
Texture:	
Sand	1
Silt	10
Clay	89
Composition:	
Zeolite	<1
Carbonate unspec.	10
Foraminifers	11
Calc. nannofossils	79
Diatoms	<1
Radiolrians	<1
Sponge spicules	<1
Silicoflagellates	<1

ORGANIC CARBON AND CARBONATE (%):

	3, 75–76
Organic carbon	0
Carbonate	93

SITE 586 HOLE A CORE 27 CORED INTERVAL 276.6–280.8 m sub-bottom; 2499.7–2503.4 m below rig floor

TIME–ROCK UNIT | BIOSTRATIGRAPHIC ZONE | FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS) | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURBANCE | SEDIMENTARY STRUCTURES | SAMPLES | LITHOLOGIC DESCRIPTION



FORAMINIFER-BEARING NANNOFOSSIL STIFF OOZE TO CHALK

Sections 1 and 2 are mostly ooze. By Section 3, chalk "nodules" occur about every 15–20 cm with firm ooze between.

Dominant color is white (N9) to bluish white (5B 9/1).

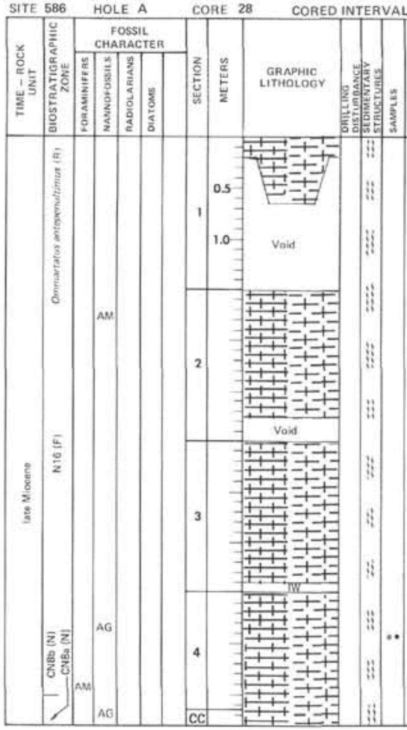
SMEAR SLIDE SUMMARY (%):

	1, 83	2, 34	2, 108	3, 74	CC, 8
	D	M	D	M	D
Texture:					
Sand	8	5	10	13	10
Silt	5	3	2	5	3
Clay	87	92	88	82	87
Composition:					
Clay	–	6	–	–	3
Volcanic glass	–	–	–	<1	<1
Pyrite	<1	–	<1	–	–
Carbonate unspec.	5	7	7	10	9
Foraminifers	12	10	13	15	15
Calc. nannofossils	80	66	74	72	67
Diatoms	<1	1	–	<1	1
Radiolarians	3	4	4	3	5
Sponge spicules	<1	7	2	<1	–
Silicoflagellates	–	1	–	–	–

ORGANIC CARBON AND CARBONATE (%):

	2, 105–106
Organic carbon	–
Carbonate	93

SITE 586 HOLE A CORE 28 CORED INTERVAL 280.8–285.2 m sub-bottom; 2503.9–2508.3 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL FIRM OOZE AND CHALK

Dominant color is white (N9) to bluish white (5B 9/1).

Bioturbated throughout but not as much as above cores. Burrow mottles of light to medium gray (N7–N5), pale yellow (5Y 8/1), and light greenish gray (5GY 8/1) are common, but distinguishable, continuous layers of these colors also are common.

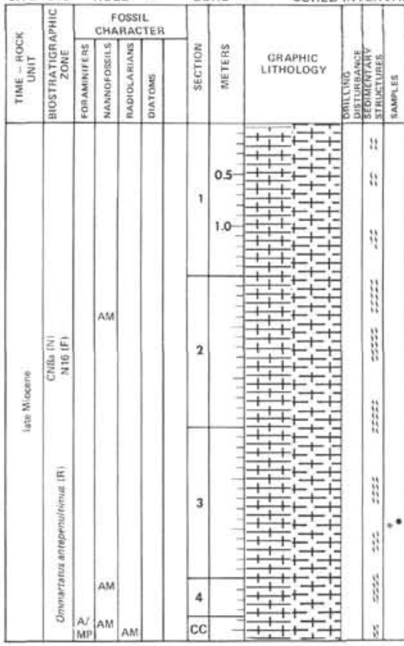
SMEAR SLIDE SUMMARY (%):

	4, 45
	D
Texture:	
Sand	10
Silt	3
Clay	87
Composition:	
Carbonate unspec.	3
Foraminifers	10
Calc. nannofossils	85
Diatoms	<1
Radiolarians	2

ORGANIC CARBON AND CARBONATE (%):

	4, 45–46
Organic carbon	0
Carbonate	99

SITE 586 HOLE A CORE 29 CORED INTERVAL 285.2–290.2 m sub-bottom; 2508.3–1513.3 m below rig floor



LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL STIFF OOZE AND CHALK

Dominant color is white (N9) to bluish white (5B 9/1).

Bioturbated throughout. Burrow mottles of light to medium gray (N7–N5), pale yellow (10Y 8/2), and greenish gray (5G 6/1) are common. Continuous layers of gray and greenish gray also are common.

SMEAR SLIDE SUMMARY (%):

	3, 100
	D
Texture:	
Sand	15
Silt	4
Clay	81
Composition:	
Carbonate unspec.	4
Foraminifers	12
Calc. nannofossils	78
Diatoms	<1
Radiolarians	6
Fish remains	<1

ORGANIC CARBON AND CARBONATE (%):

	3, 99–100
Organic carbon	–
Carbonate	96

SITE 586 HOLE A CORE 30 CORED INTERVAL 290.2–295.2 m sub-bottom; 2513.3–2518.3 m below rig floor

TIME – ROCK UNIT: late Miocene

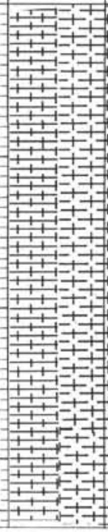
BIOSTRATIGRAPHIC ZONE: *Cannartus petterssoni* (R); N16 (F); CN8a (N) / CN7 (N)

FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS): AM; AM; AM AM CM

SECTION: 1, 2, 3, 4, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL STIFF OOZE AND CHALK

Dominant color is white (N9) to bluish white (5B 9/1).

Bioturbated throughout, with burrow mottles of light to medium gray (N7–N5), pale greenish yellow (5Y 8/2), and greenish gray (5G 6/1). Continuous layers of greenish gray and gray also are common.

SMEAR SLIDE SUMMARY (%):

	1, 55
	D
Texture:	
Sand	13
Silt	4
Clay	83
Composition:	
Carbonate unspec.	2
Foraminifers	12
Calc. nannofossils	83
Diatoms	<1
Radiolarians	3
Sponge spicules	<1

ORGANIC CARBON AND CARBONATE (%):

	1, 54–55
Organic carbon	0
Carbonate	96

SITE 586 HOLE A CORE 31 CORED INTERVAL 295.2–300.2 m sub-bottom; 2518.3–2523.3 m below rig floor

TIME – ROCK UNIT: late Miocene

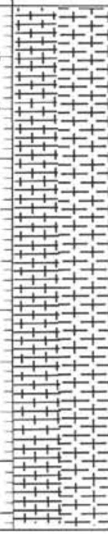
BIOSTRATIGRAPHIC ZONE: CN7(?) (N); N16 (F); *Cannartus petterssoni* (R)

FOSSIL CHARACTER (FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS): AM; AM; AM AM AM

SECTION: 1, 2, 3, 4, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY



DRILLING DISTURBANCE / SEDIMENTARY STRUCTURES / SAMPLES

LITHOLOGIC DESCRIPTION

FORAMINIFER-BEARING NANNOFOSSIL STIFF OOZE AND CHALK

Dominant color is white (N9) to bluish white (5B 9/1). Bioturbated throughout but not as much as above cores. Burrow mottles of light to medium gray (N7–N5), pale greenish yellow (10Y 6/1), and greenish gray (5G 6/1) material are common. Continuous layers of gray, and greenish gray also are common.

SMEAR SLIDE SUMMARY (%):

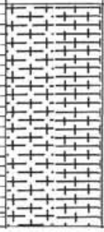
	1, 120
	D
Texture:	
Sand	15
Silt	4
Clay	81
Composition:	
Carbonate unspec.	2
Foraminifers	15
Calc. nannofossils	77
Diatoms	<1
Radiolarians	6

ORGANIC CARBON AND CARBONATE (%):

	1, 121–122
Organic carbon	–
Carbonate	98

SITE 586 HOLE C CORE 1 CORED INTERVAL 613.5–623.1 m sub-bottom; 2831.5–2841.1 m below rig floor

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES
early Miocene	*Stichocorys wolffii* (R)	CP	AP	AG		1	0.5, 1.0				*
	CN3 (N) N4 (F)		AP	CM		2					
		CP	AP	CG		CC					



LITHOLOGIC DESCRIPTION

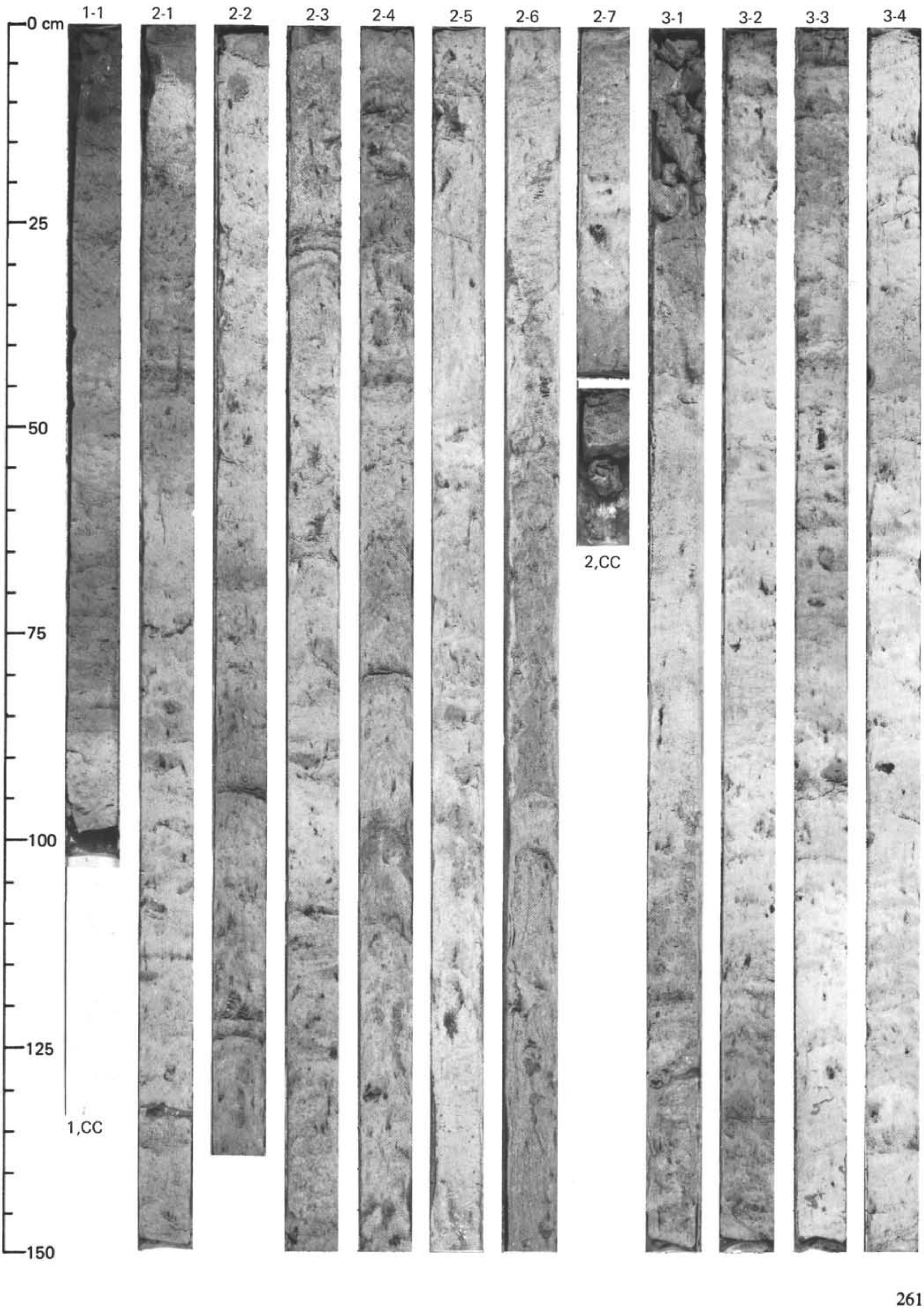
FORAMINIFER-BEARING NANNOFOSSIL OOZE AND MINOR CHALK

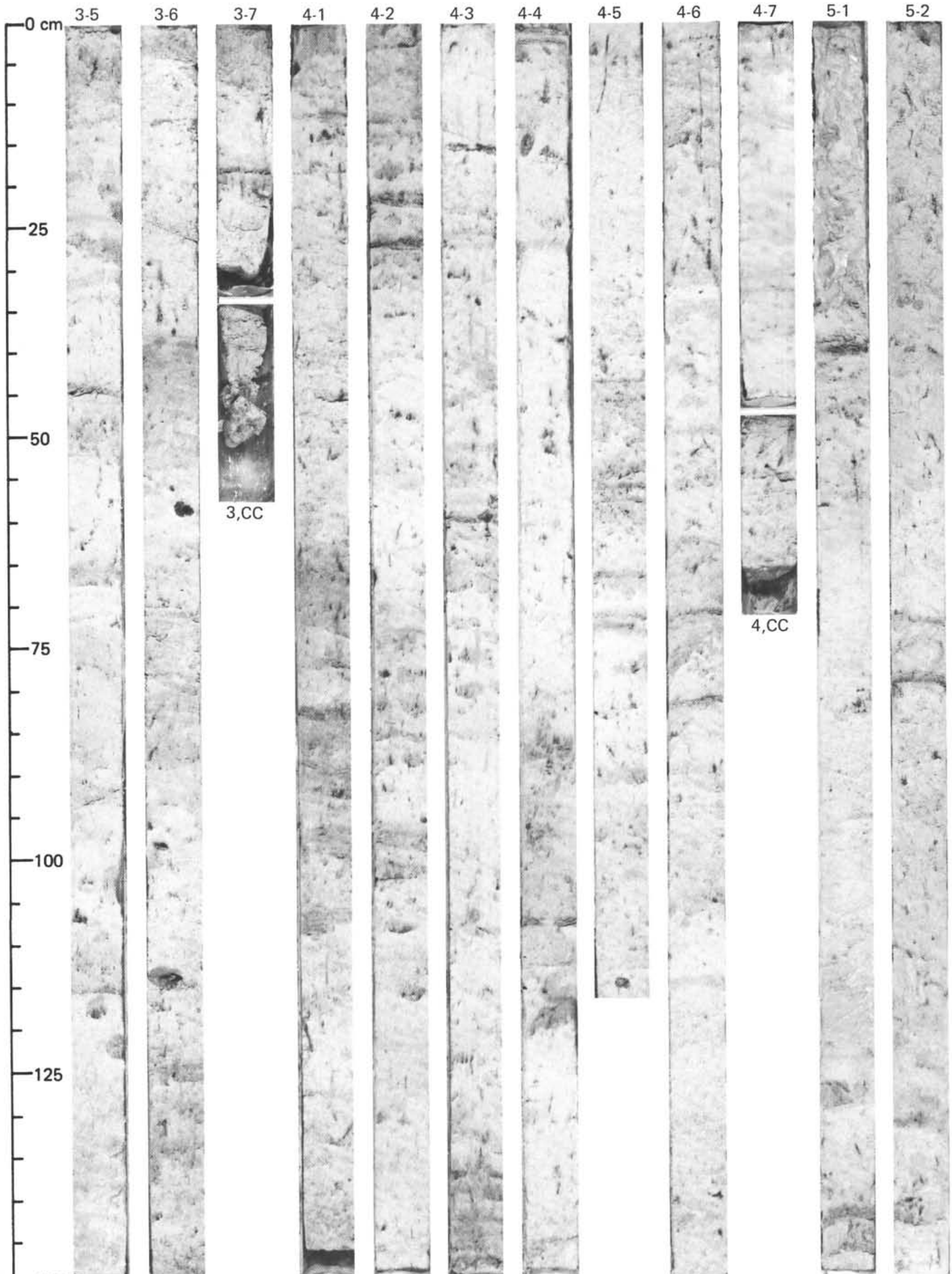
Dominant color is white (N9) to bluish white (5B 9/1) and is homogeneous throughout.

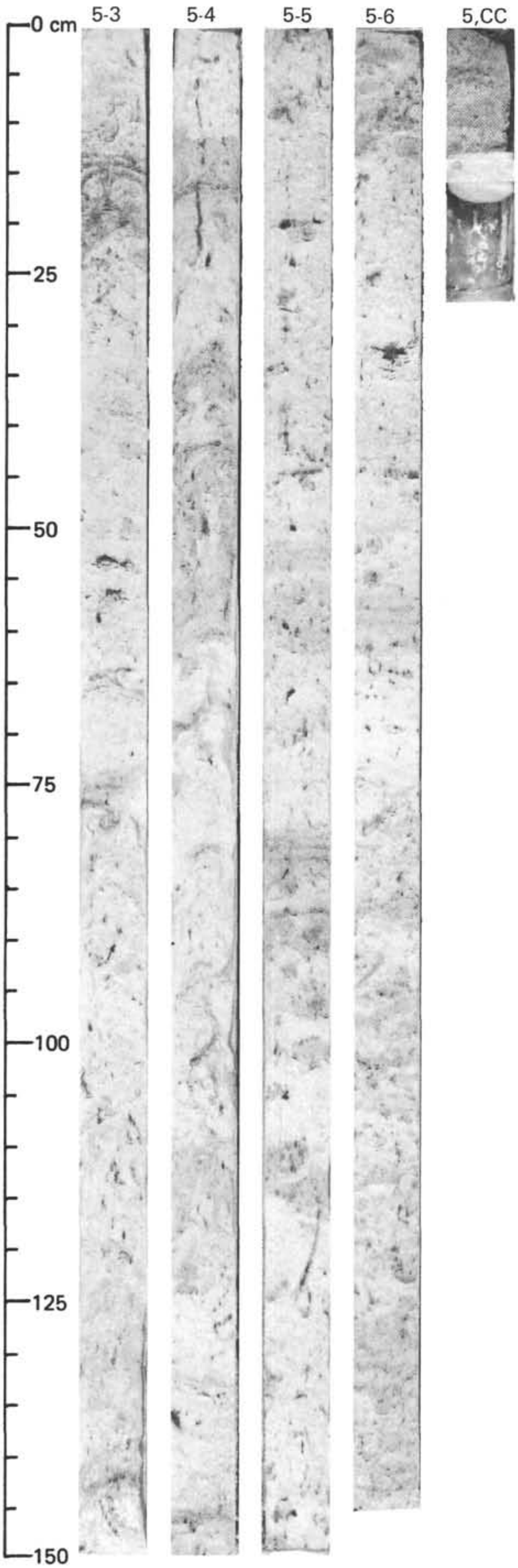
Chalk occurs mainly as nodules and brecciated pieces that undoubtedly were continuous layers that were broken during the drilling process.

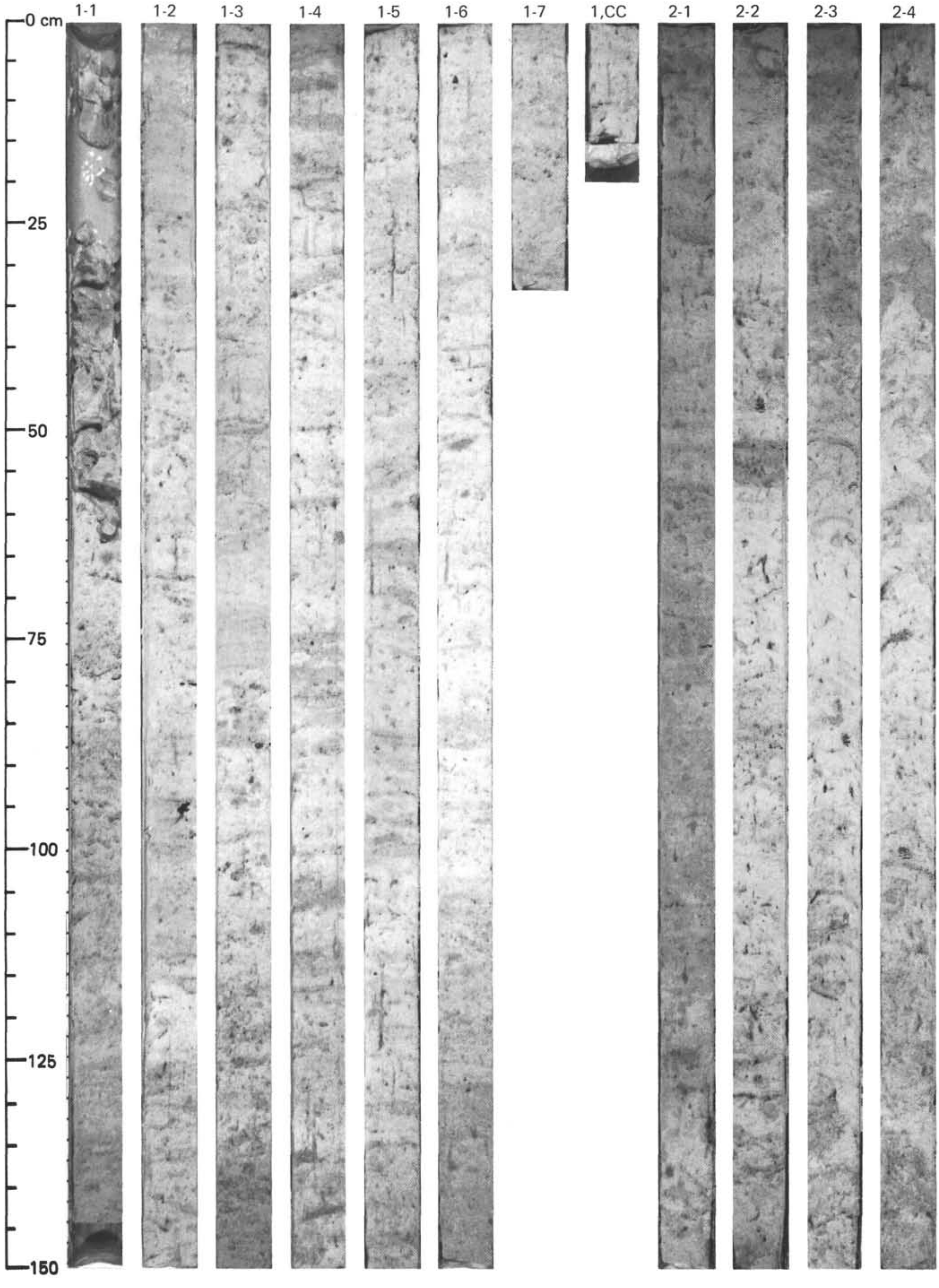
SMEAR SLIDE SUMMARY (%):

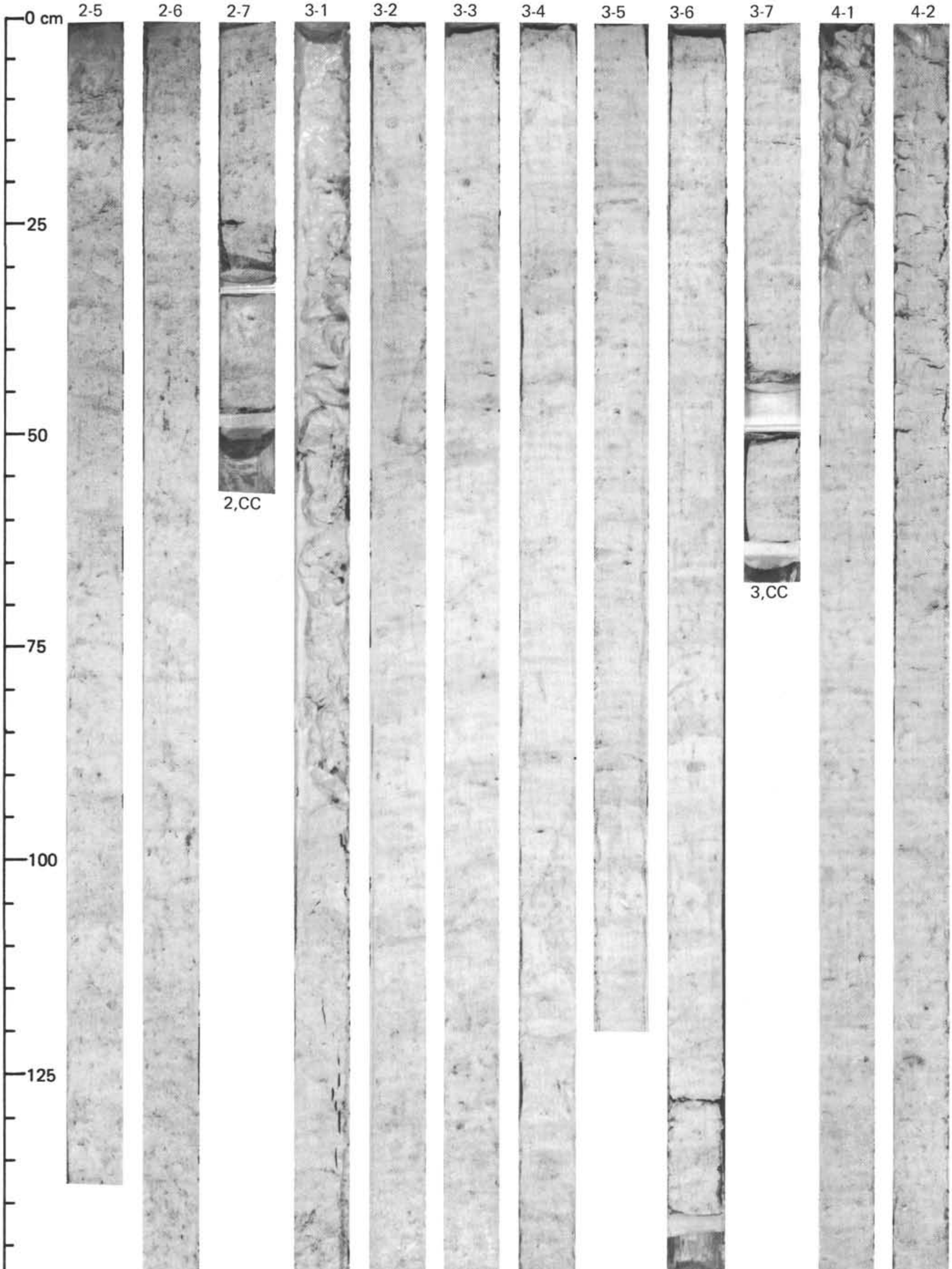
	1, 100
	D
Texture:	
Sand	10
Silt	2
Clay	88
Composition:	
Pyrite	<1
Carbonate unspec.	9
Foraminifers	10
Calc. nannofossils	81
Radiolarians	<1
Sponge spicules	<1

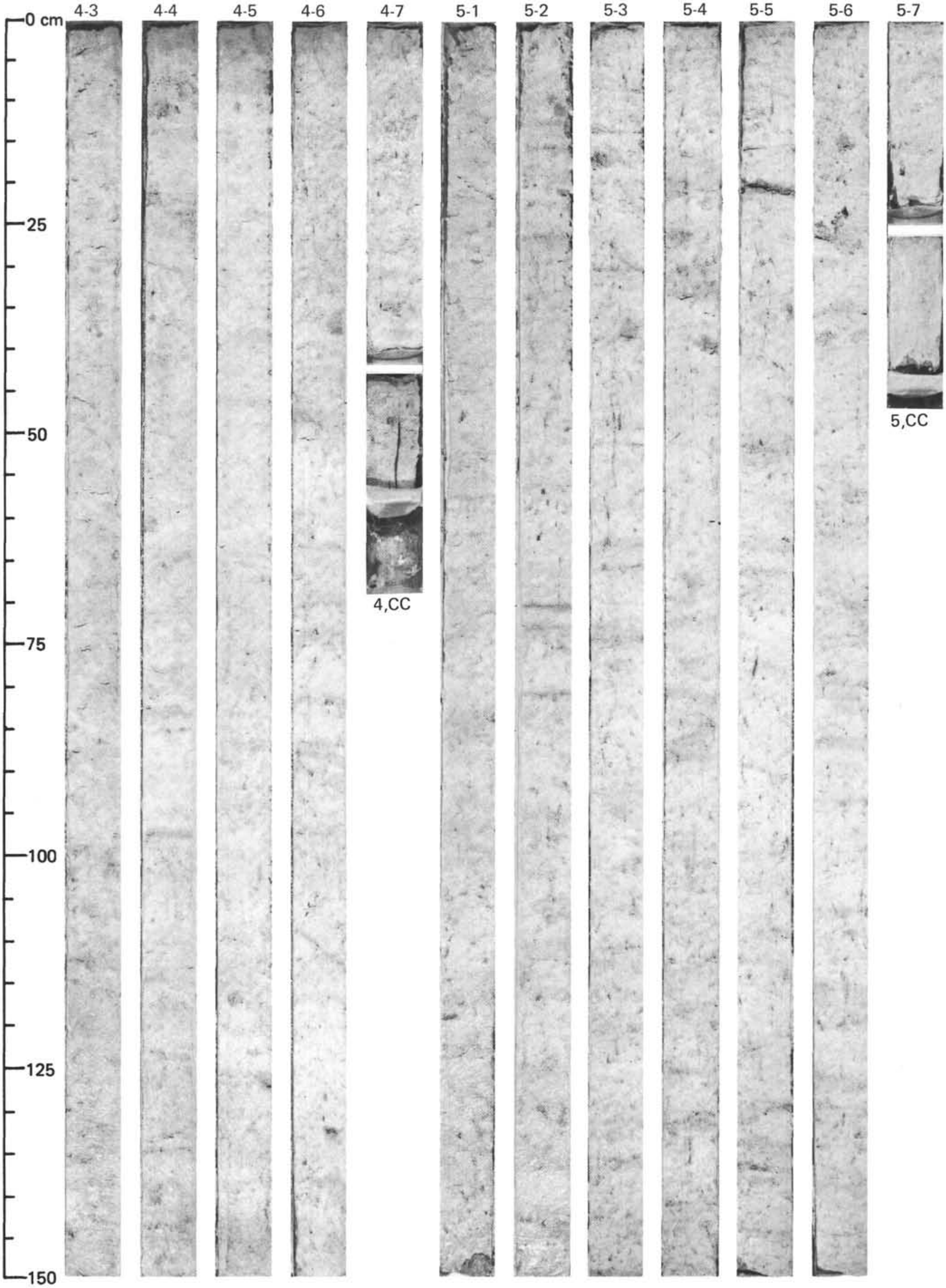

1-1
2-1
2-2
2-3
2-4
2-5
2-6
2-7
3-1
3-2
3-3
3-4
0 cm
25
50
75
100
125
150
1,CC
2,CC


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


0 cm
25
50
75
100
125
150
5-3
5-4
5-5
5-6
5,CC


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


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


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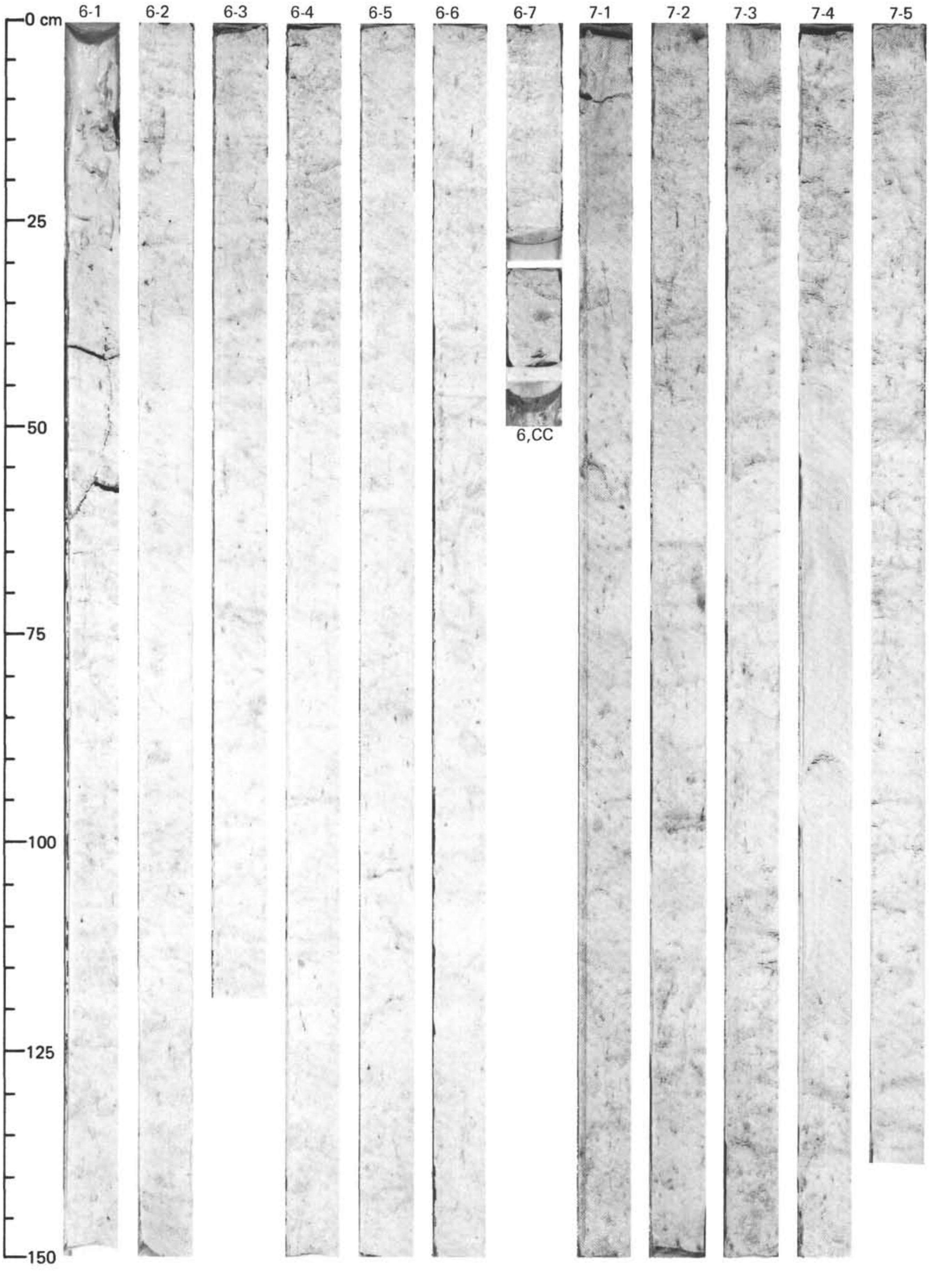
5,CC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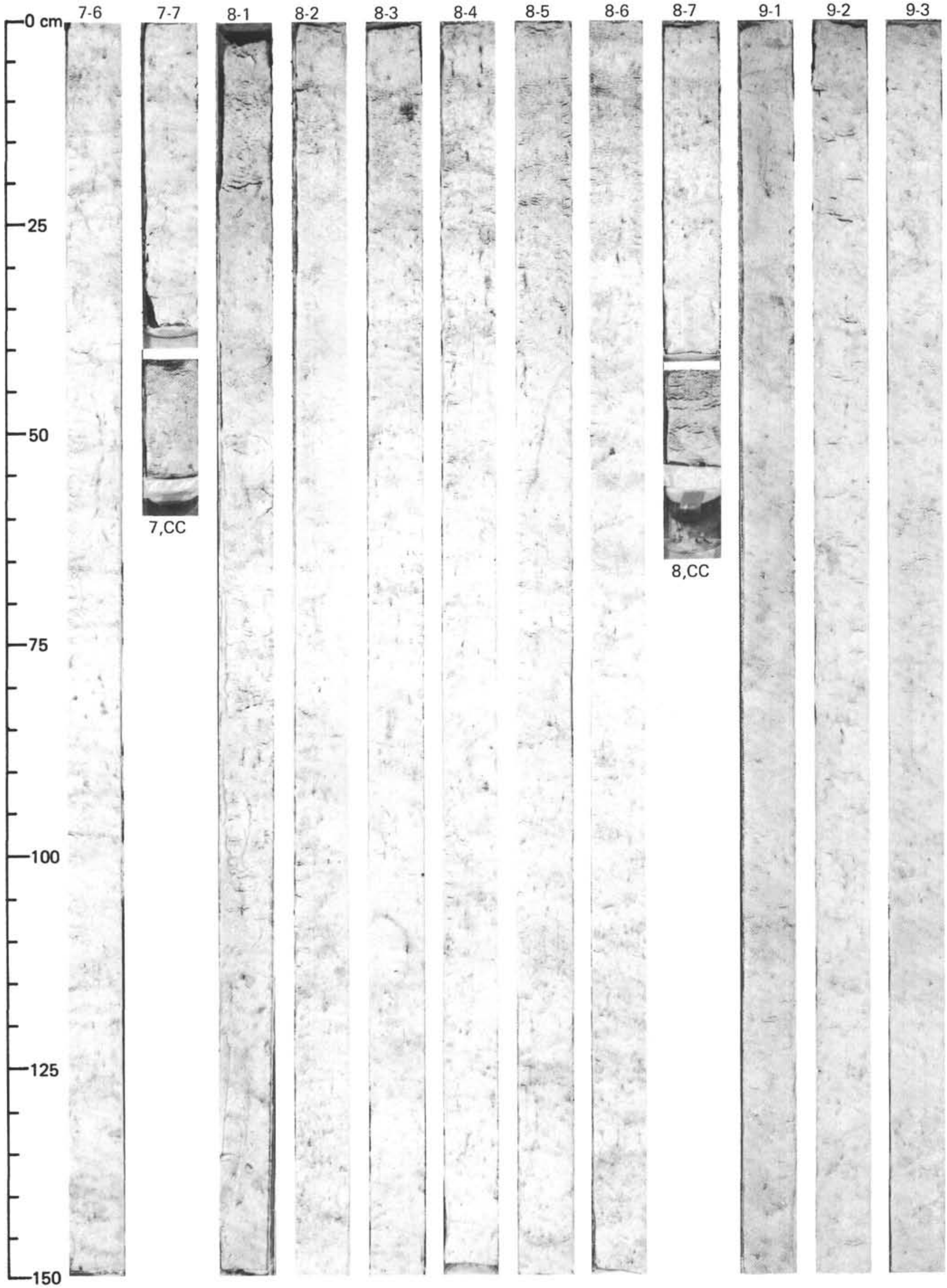

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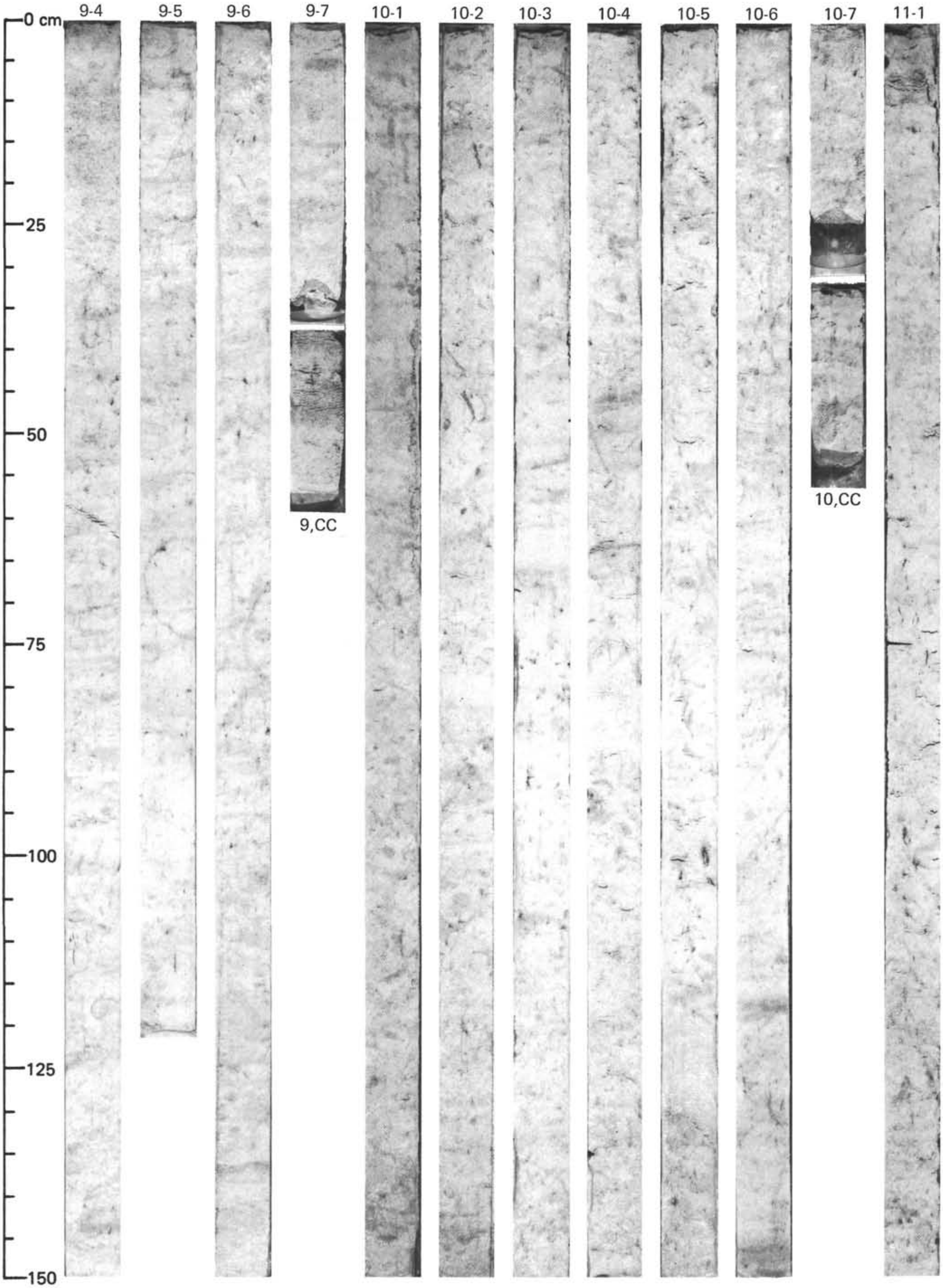
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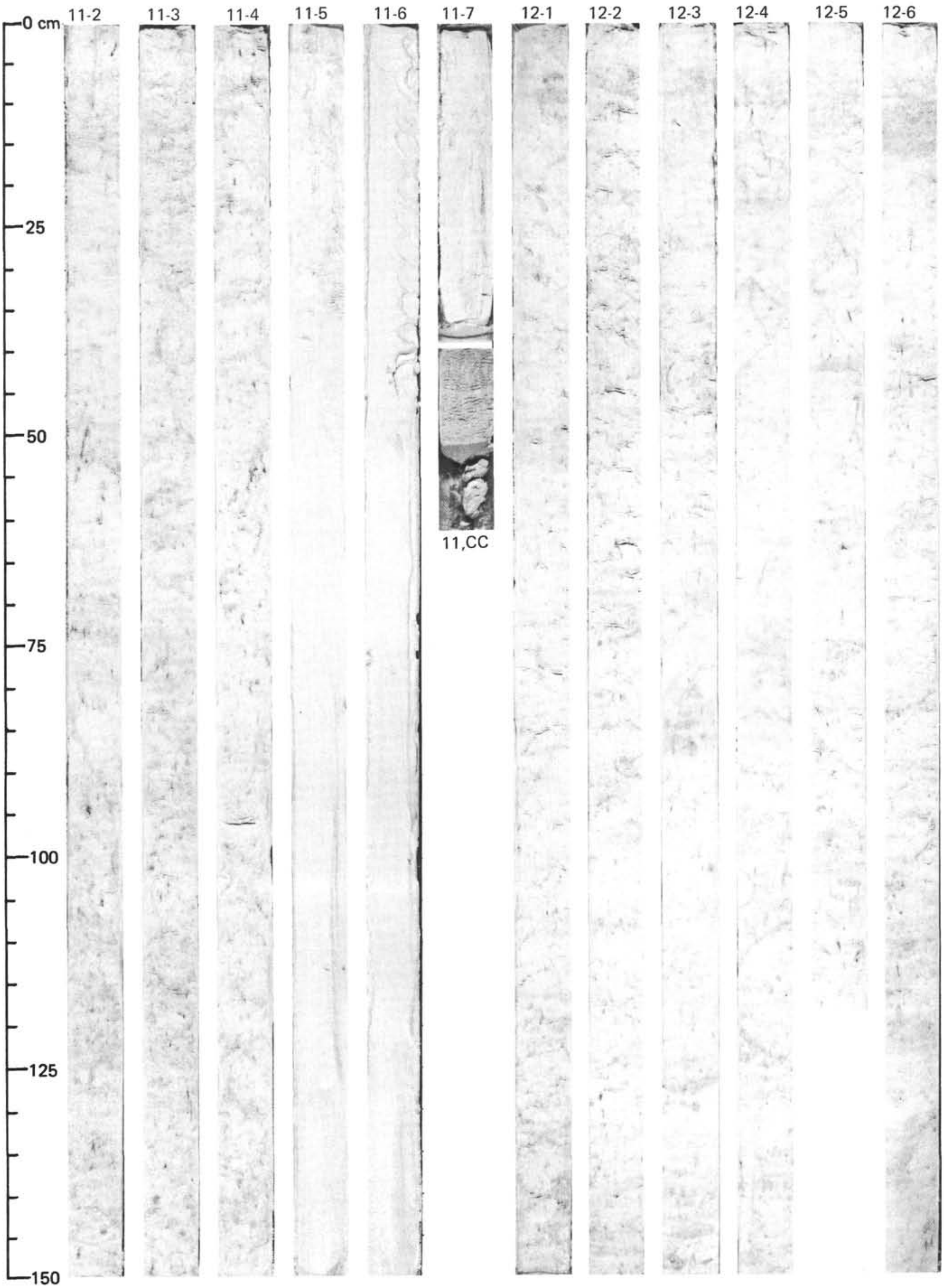
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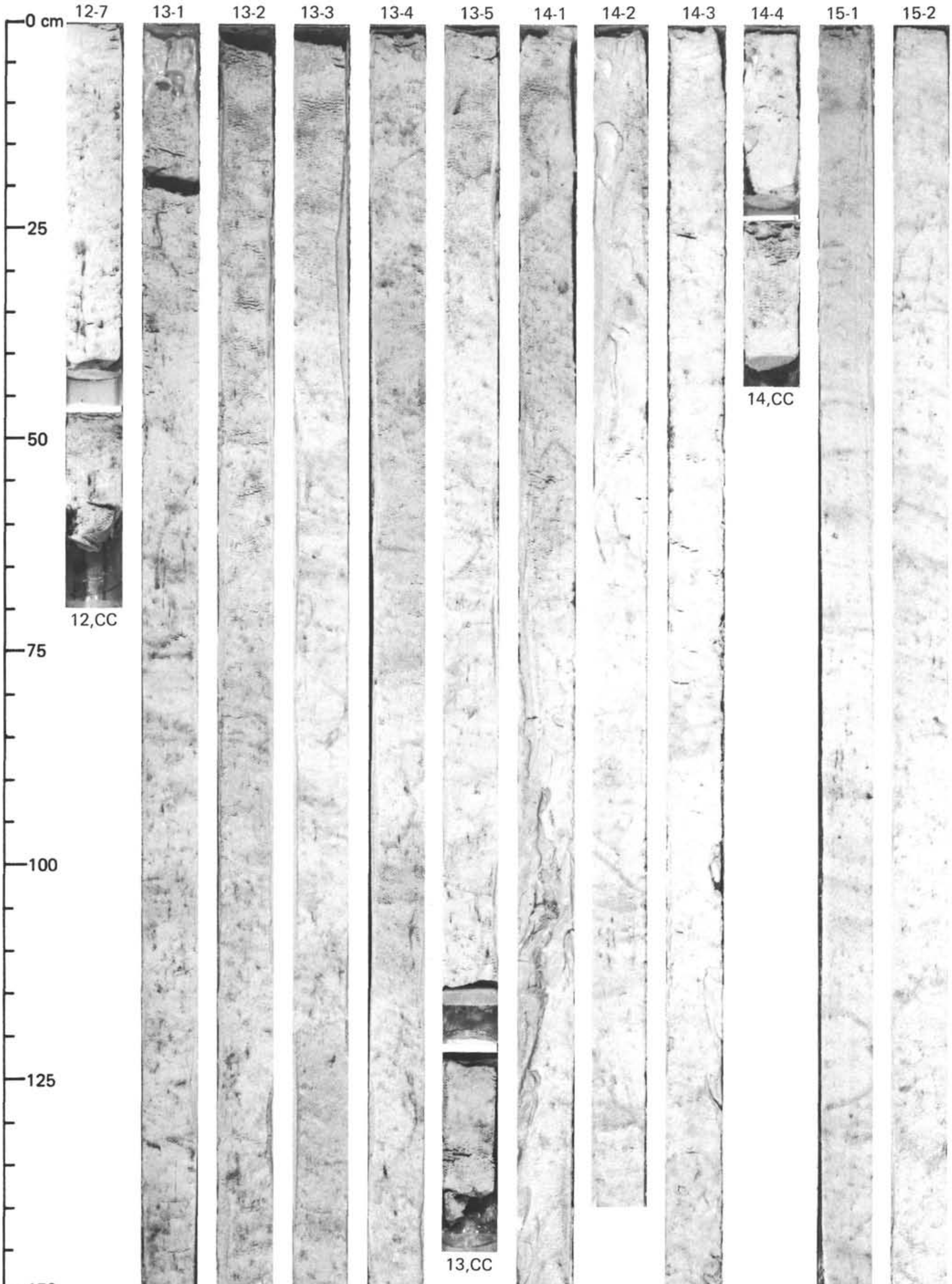
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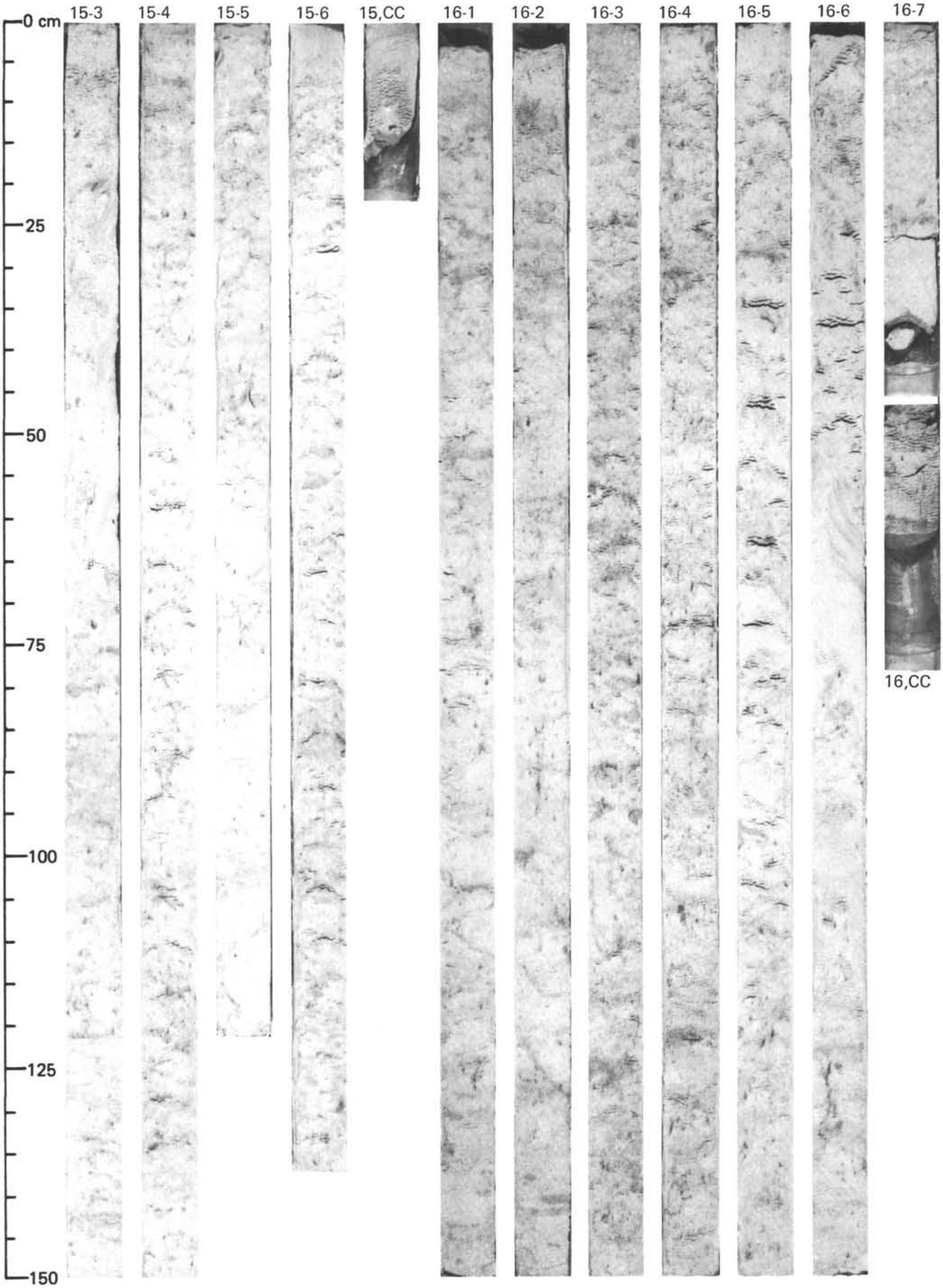
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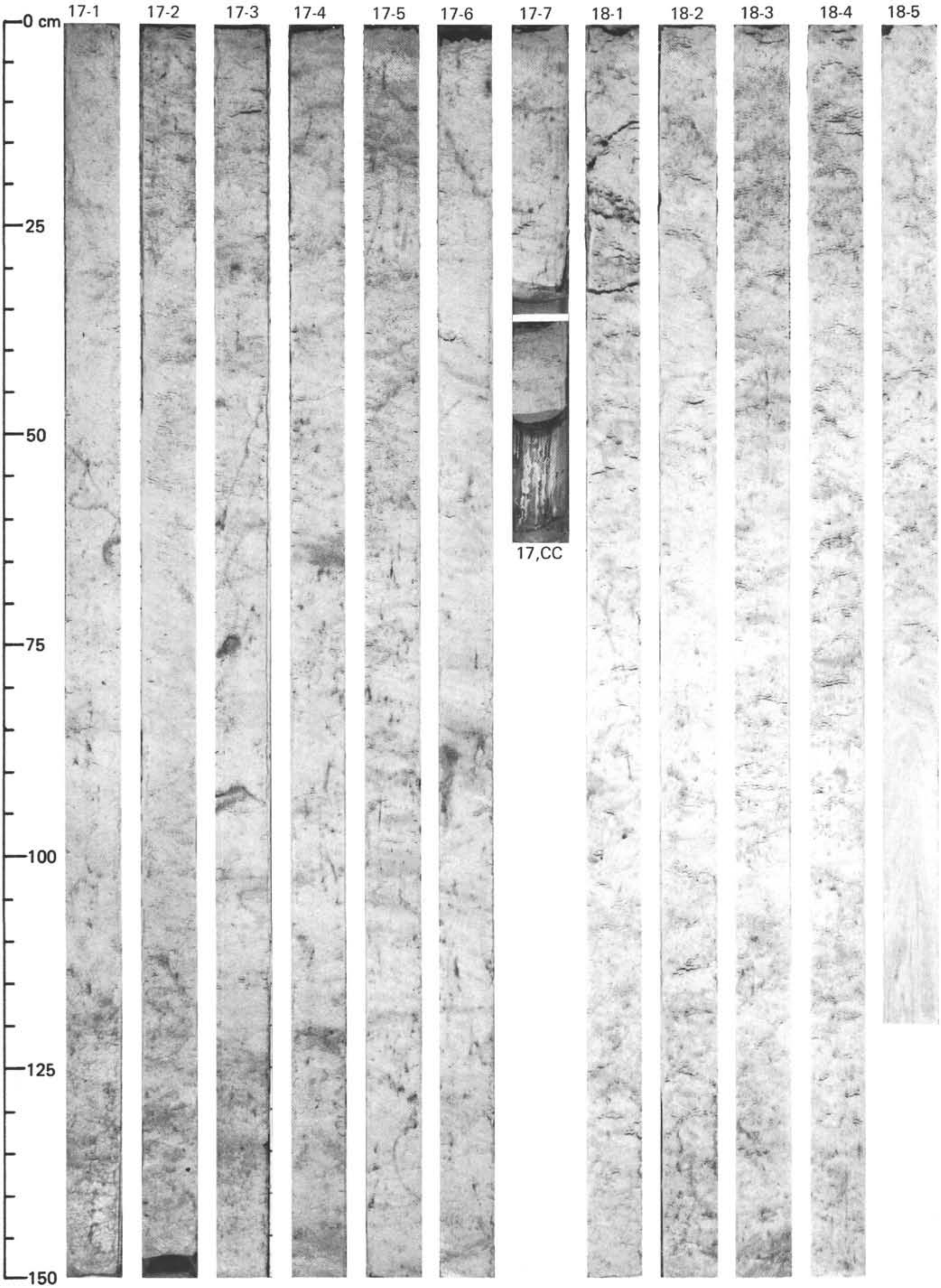
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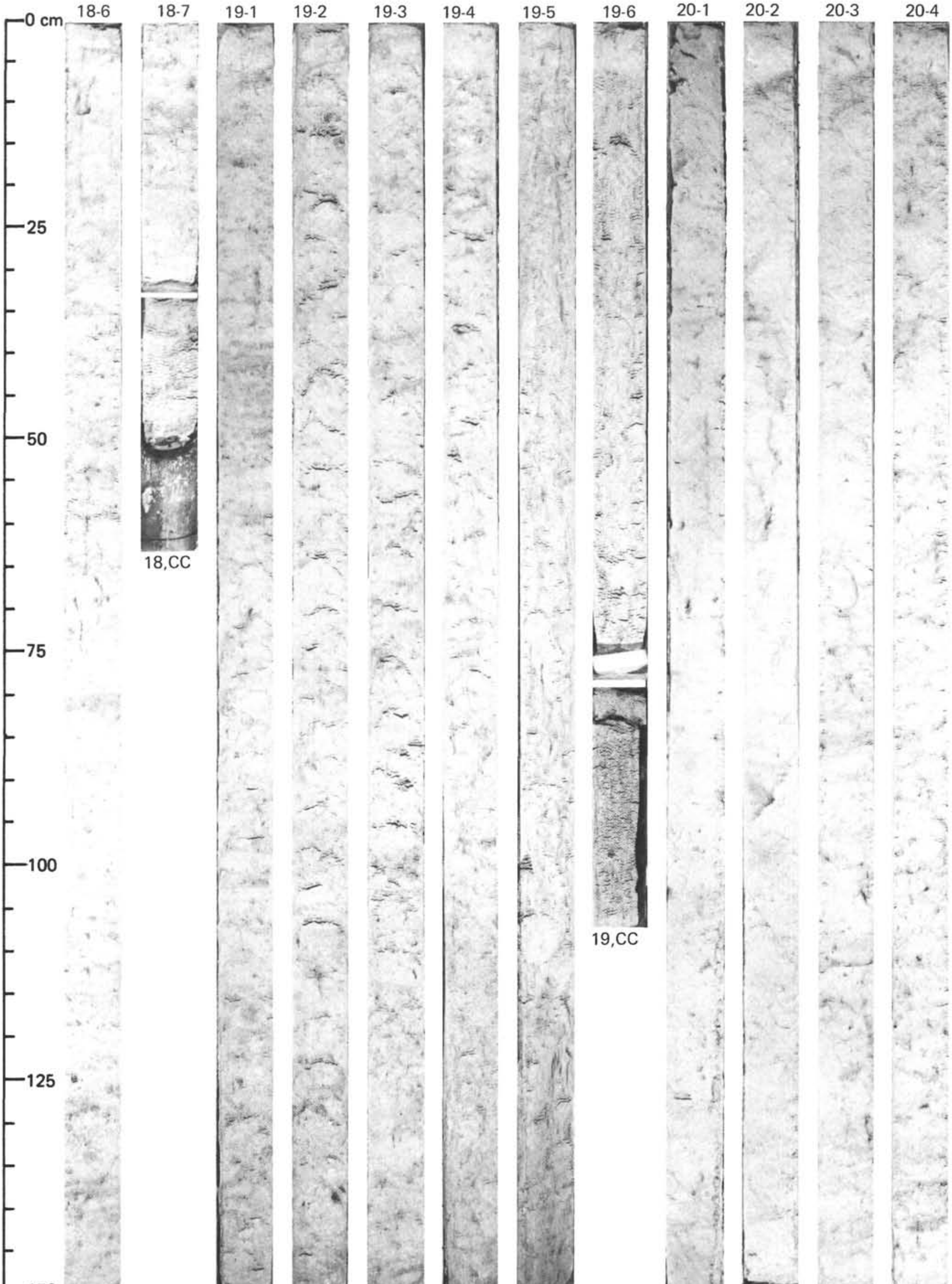
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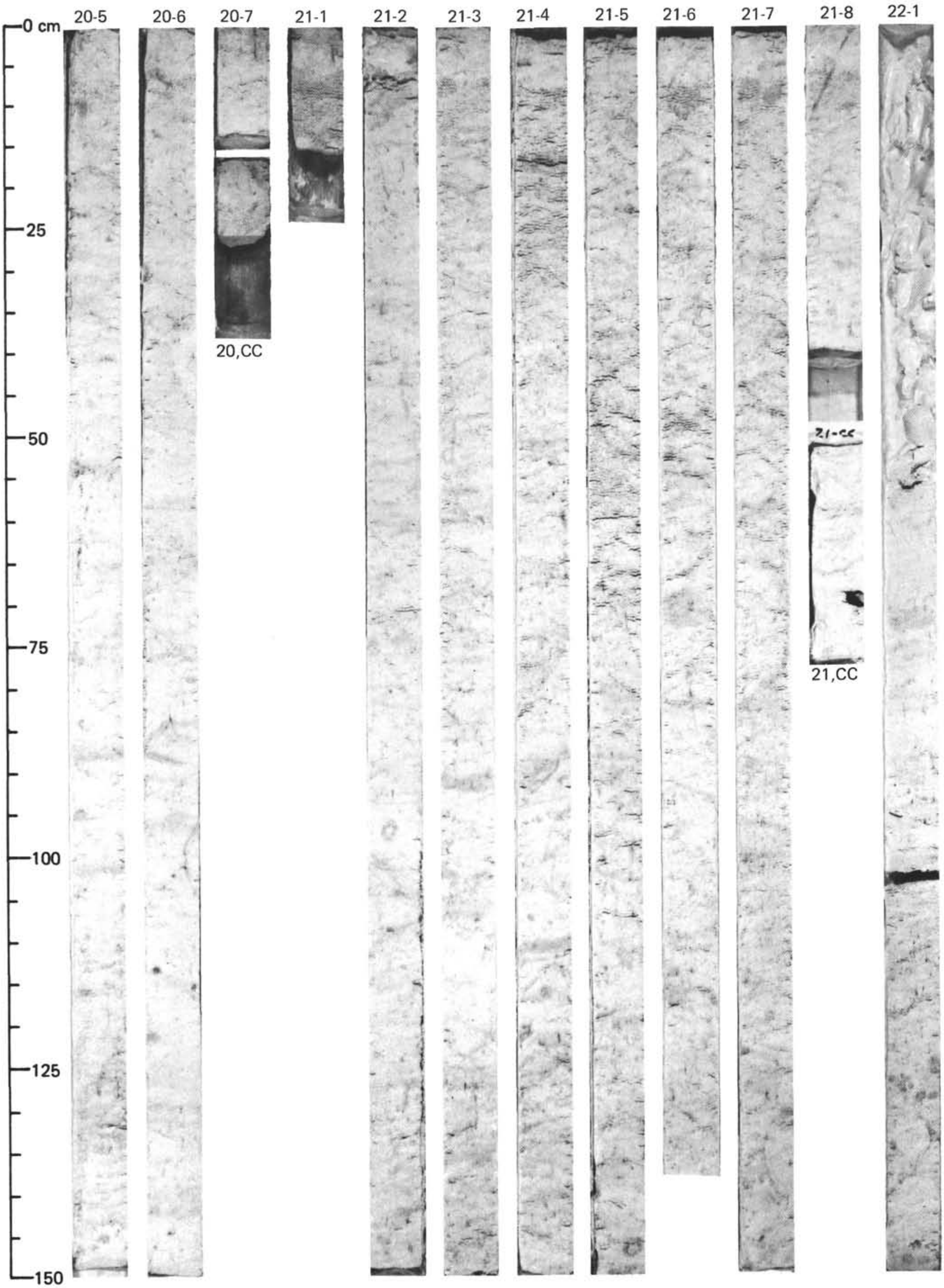
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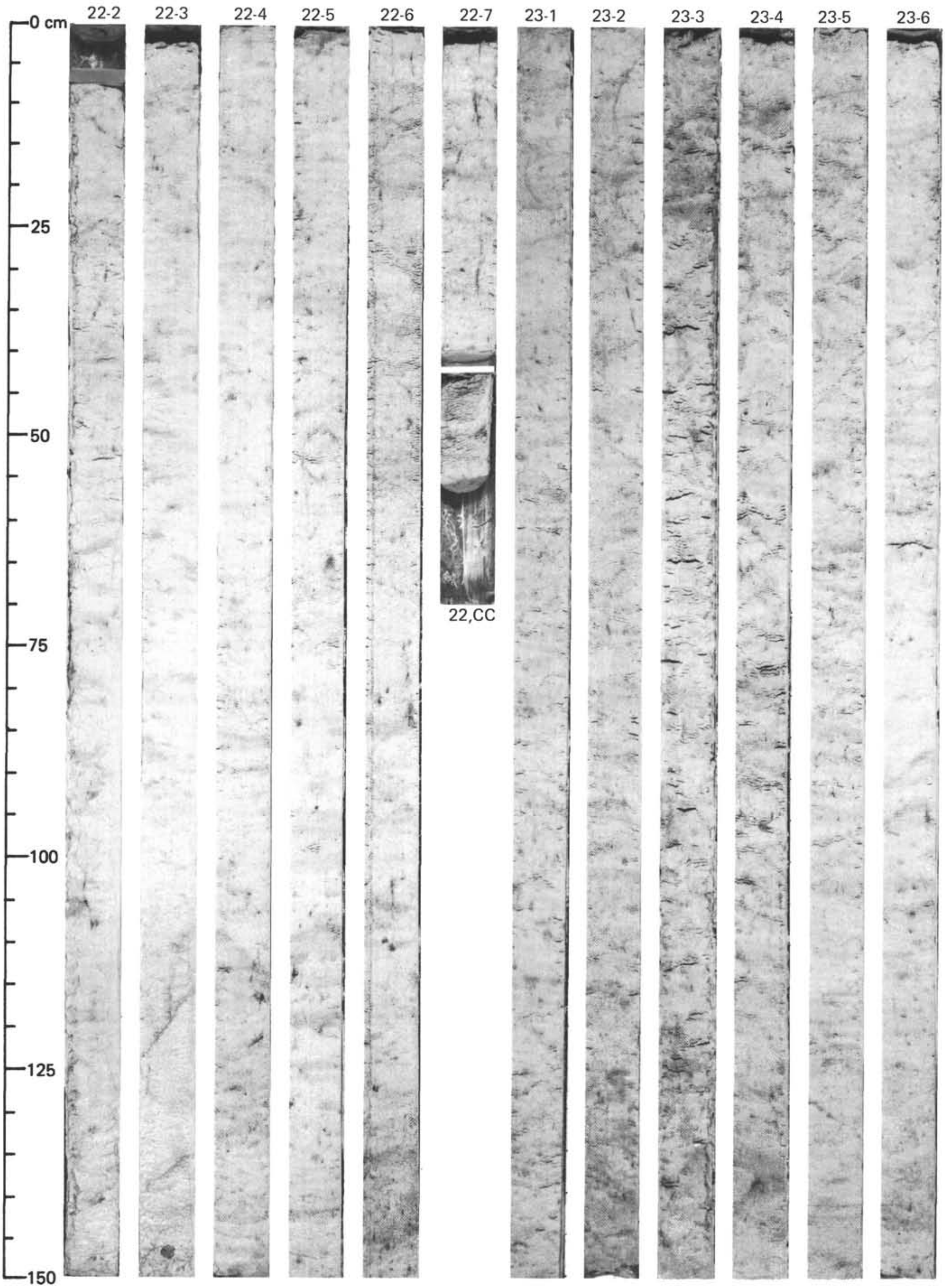
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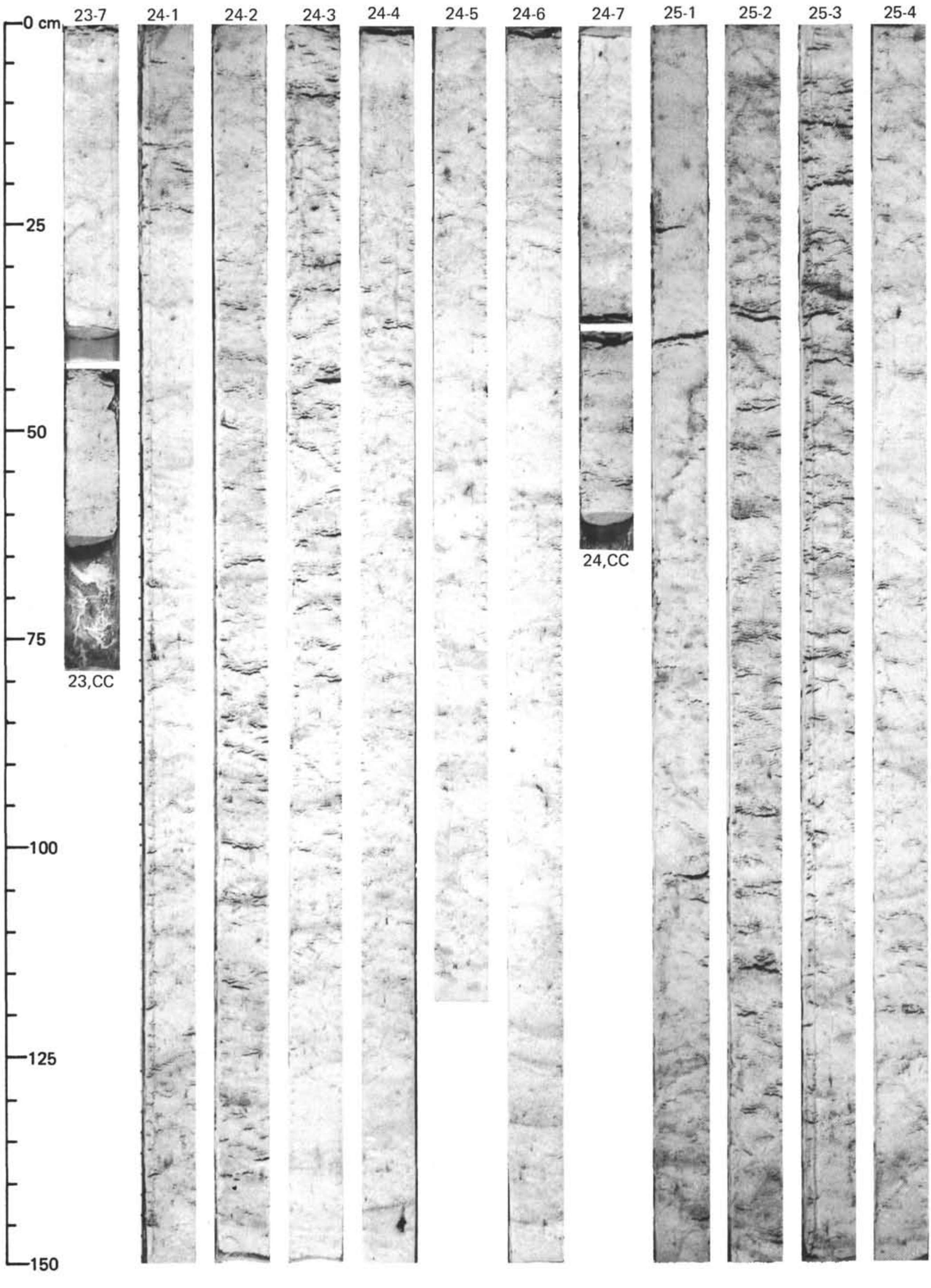
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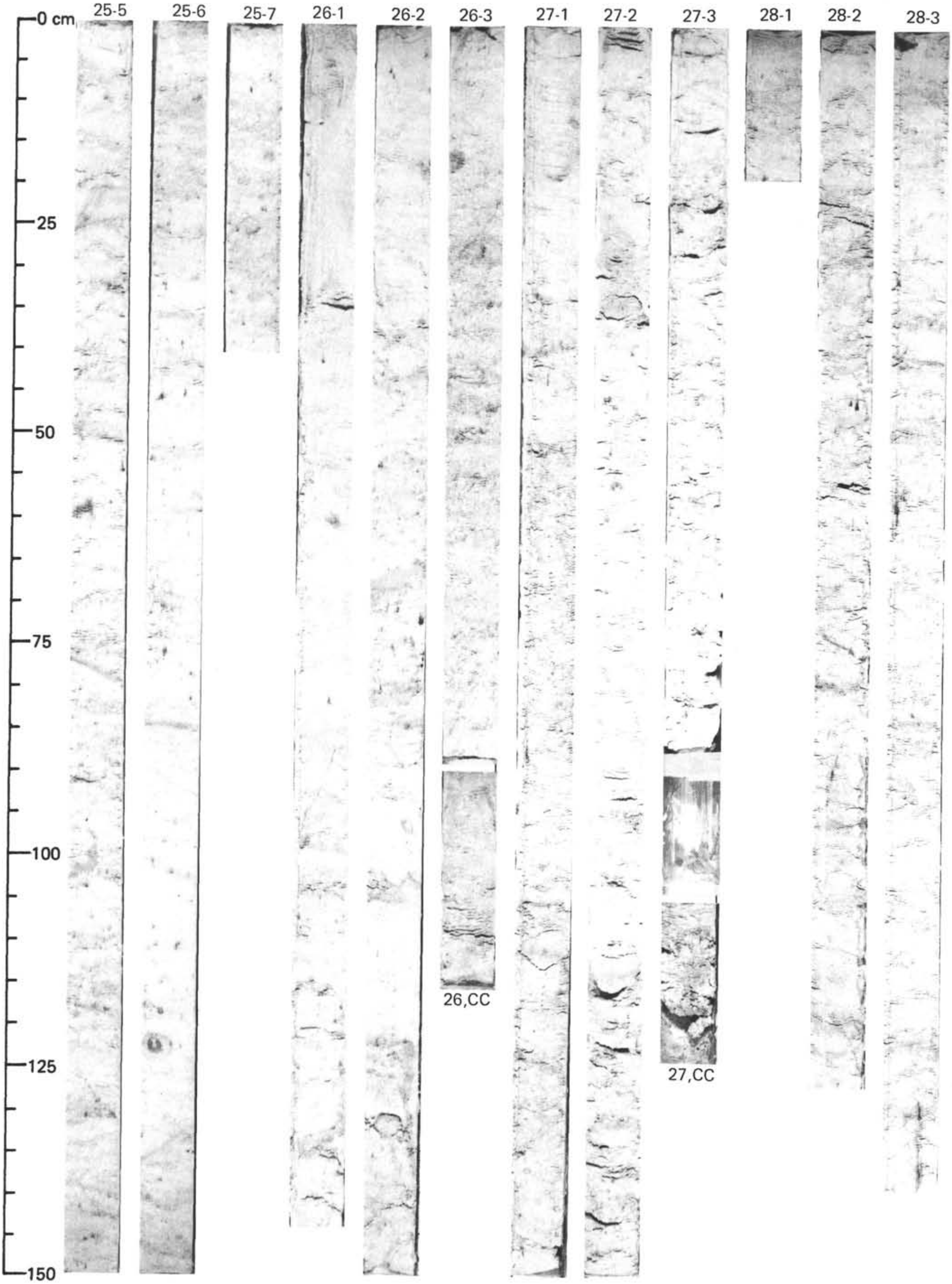
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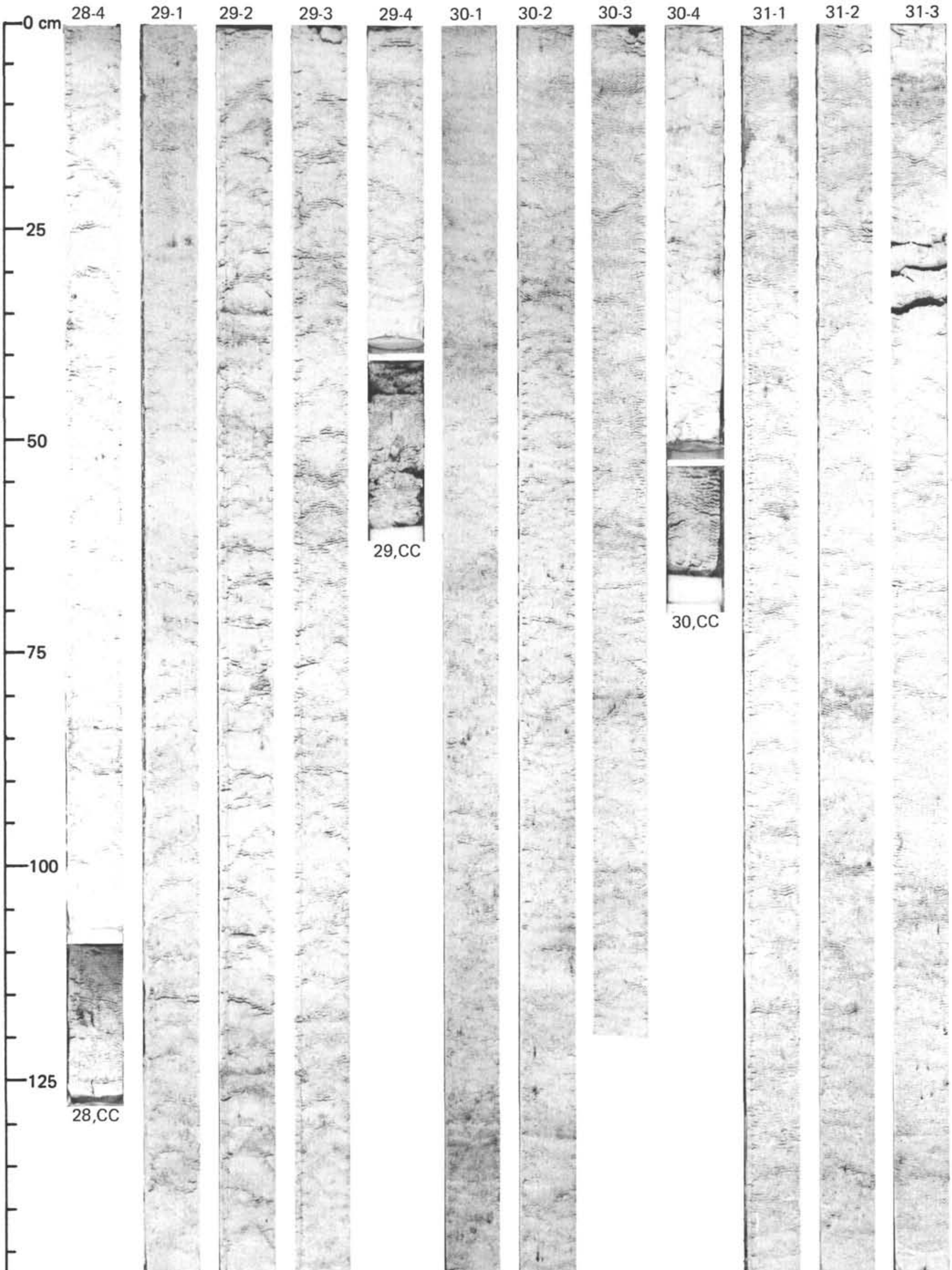
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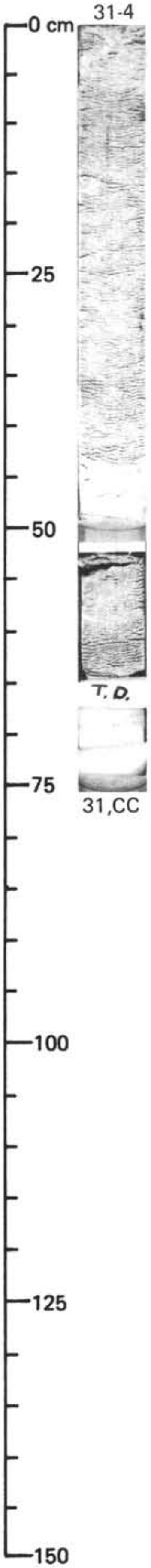
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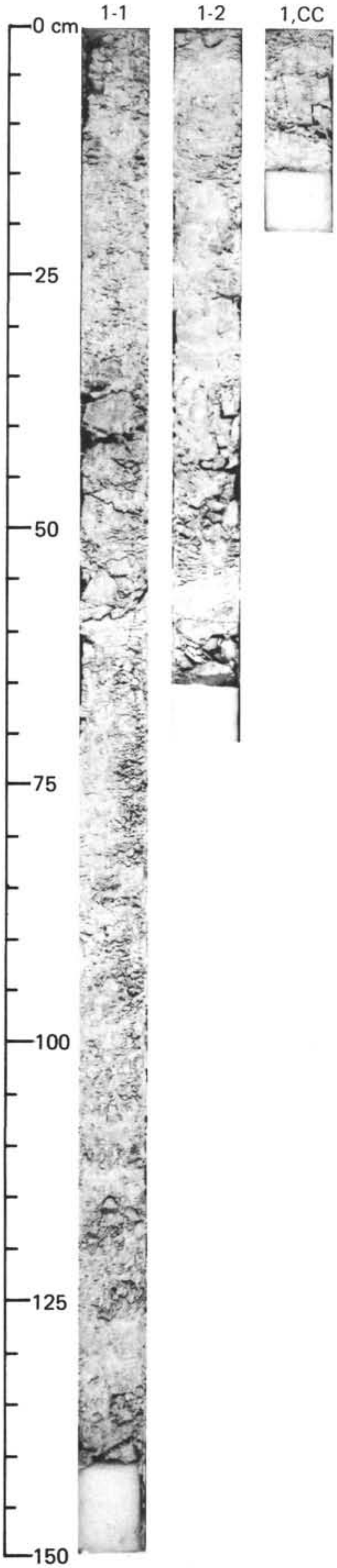
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