4. SITE 532: WALVIS RIDGE[1]

Shipboard Scientific Party[2]

HOLE 532

Date occupied: 20 August 1980

Date departed: 21 August 1980

Time on hole: 1 day, 20 hr., 15 min.

Position: 19°44.61′S; 10°31.13′E

Water depth (sea level; corrected m, echo-sounding): 1331

Water depth (rig floor; corrected m, echo-sounding): 1341

Bottom felt (m, drill pipe): 1340.9

Penetration (m): 250.8

Number of cores: 61

Total length of cored section (m): 250.8

Total core recovered (m): 232.44

Core recovery (%): 92.7

Oldest sediment cored:
Depth sub-bottom (m): 246.8
Nature: Nannofossil marl
Age: early Pliocene

HOLE 532A

Date occupied: 21 August 1980

Date departed: 23 August 1980

Time on hole: 1 day, 4 hr.

Position: 19°44.64′S; 10°31.13′E

Water depth (sea level; corrected m, echo-sounding): 1331

Water depth (rig floor; corrected m, echo-sounding): 1341

Bottom felt (m, drill pipe): 1339.5

Penetration (m): 199.6

Number of cores: 47

Total length of cored section (m): 199.6

Total core recovered (m): 161.15

Core recovery (%): 80.7

Oldest sediment cored:
Depth sub-bottom (m): 199.6
Nature: Nannofossil marl
Age: early Pliocene

HOLE 532B

Date occupied: 23 August 1980

Date departed: 25 August 1980

Time on hole: 2 days, 1 hr., 24 min.

Position: 19°44.66′S; 10°31.13′E

Water depth (sea level; corrected m, echo-sounding): 1331

Water depth (rig floor; corrected m, echo-sounding): 1341

Bottom felt (m, drill pipe): 1339.5

Penetration (m): 291.3

Number of cores: 74

Total length of cored section (m): 291.3

Total core recovered (m): 267.0

Core recovery (%): 91.7

Oldest sediment cored:
Depth sub-bottom (m): 291.3
Nature: Nannofossil marl
Age: late Miocene

PRINCIPAL CONCLUSIONS

1. High pelagic sedimentation rates (4-6 cm/1000 yr.) were encountered through the latest Miocene, Plio–Pleistocene section.

2. The calcareous and siliceous marls and oozes, some of which contain more than 6% organic carbon, reflect an increase in surface productivity during the Pliocene.

3. Conditions of sedimentation were not anoxic—the sediments are thoroughly bioturbated. Cyclic sedimentation of more and less organic-rich deposits occurs within a range of 30,000–130,000 yr., the average period being 55,000 yr.

4. The organic matter is of marine origin.

5. Variations in sediment coloration follow the organic carbon contents, reflecting the cyclic sedimentation.

6. Significant amounts of biogenic gases (H_2S, CO_2, CH_4) attest to the presence of bacterial sulfate reduction and methanogenesis in the sediments.

7. Samples from Site 532 permit revision of foraminiferal lineage concepts and taxonomy of the upper Miocene–Recent boreal fauna.

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[1] Hay, W. W., Sibuet, J.-C., et al., *Init. Repts. DSDP*, 75: Washington (U.S. Govt. Printing Office).

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8. Good measurements of physical properties of the upper 300 m of the section were obtained using undisturbed sediments in hydraulic piston cores.

BACKGROUND AND OBJECTIVES

Because the time remaining for drilling and coring on this leg would not permit completion of the objectives outlined for Leg 75, hydraulic piston coring (HPC) at a relatively shallow site was deemed the best use of available time. Operations at Site 530 had yielded the unexpected result that the Pliocene and Pleistocene sediments were rich in diatoms and organic carbon and reflected a considerable expansion of the Benguela upwelling system. However, the stratigraphic record there had been obscured by turbidite and debris flows, so that no details of the history of upwelling could be ascertained.

The upper part of Site 362 had been continuously cored by rotary drilling during Leg 40 in 1975 (Bolli, Ryan et al., 1978), but all of the cores taken above a subbottom depth of 200 m were badly disturbed. The cores had been noted to be rich in diatoms and calcareous plankton and also had a high content of organic carbon. It had been recognized that the sediments were a product of the upwelling system associated with the Benguela Current, and Siesser (1980) used these cores to show that upwelling started in the Miocene. A detailed record of the changes in the upwelling system off southwest Africa would be an important key to understanding the general patterns of the Neogene paleoceanography and in particular would provide constraints on the upwelling process. The upwelling system off southwest Africa has been considered a classic model for geological analogy since Brongersma-Sanders (1948) studied it and discussed its implications for the origin of petroleum.

Site 362 is located within the seasonally developed divergence zone off the southwest African coast (see Fig. 1). The sluggish Benguela Current flows northward at velocities not exceeding 25 cm/s and may be underlain by a countercurrent. Beneath the countercurrent is Antarctic Intermediate Water (AAIW), which may be the source of the upwelled water. Deep water of North Atlantic origin underlies the AAIW with a boundary at about 3000 m.

OPERATIONS

Site Approach

Glomar Challenger was underway to Site 532 (DSDP Leg 40, Site 362) at 1637 on 19 July 1980. The approach to Site 532 was on a course of 95° at 9.0 knots mean speed. A 15 c.i. chamber size for the air gun was used at Site 531 departure in order to have good definition in the upper part of the sedimentary sequence since only HPC coring was planned at Site 532. The approach duplicated the BGR-36 seismic line. At 2312 hours the beacon was dropped. At 2332 we reversed track and commenced pulling gear. Figure 2 shows the ship's track for the approach to Site 532, and Figure 3 is the vessel's seismic record.

The *Challenger* arrived at Site 532 and dropped a beacon at 2312 on 19 August. After retrieving the seismic profiling gear and turning, the *Challenger* returned to the site, but the first beacon was silent so a second was dropped. The ship was on station at 0104 on 20 August.

The bottom-hole assembly was made up for HPC and the drilling string run in with a 12-kHz beacon attached to the pipe 250 m above the bit. Hole 532 was spudded in at 0737, and the first hydraulic piston core was on deck at 0744. Hydraulic piston coring continued until 2106 on 21 August, with 61 cores taken to reach a depth of 250.8 m. The site was terminated to avoid losing the 12-kHz beacon attached to the pipe.

The drill string was pulled to the mudline, and the ship moved on a heading of 170°, so that Hole 532A was offset about 50 m to the south-southeast. Spud-in was at 2250 on 21 August and continuous hydraulic piston coring proceeded until 0054 on 23 August. Forty-seven cores had been taken to reach a depth of 199.6 m (Table 1). This set of cores was taken for the JOIDES Sedimentary Petrology and Physical Properties Panel; the cores were sealed and not opened for examination aboard ship.

The drill string was pulled up to remove the 12-kHz beacon, and the ship moved about 30 m south to offset Hole 532B. Spud-in was at 0709 on 23 August and continuous hydraulic piston coring proceeded until 0008 on 25 August. Seventy-four cores were taken to reach a depth of 291.3 m. The hole was terminated because of

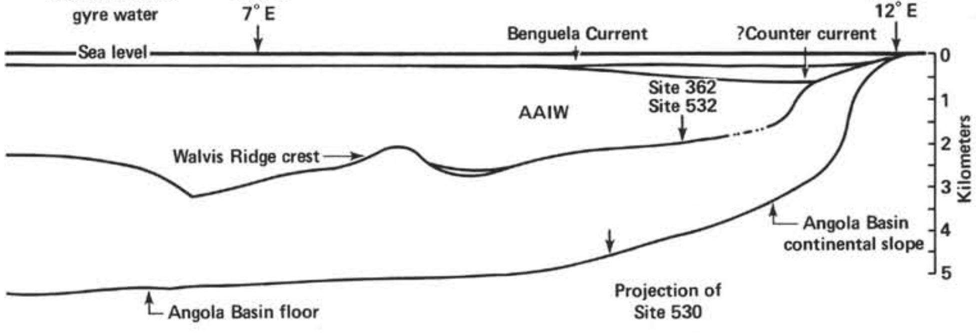

Figure 1. SSE-NNW section showing the crest of the Walvis Ridge, floor of the Angola Basin, and major ocean water masses of the southeastern Atlantic.

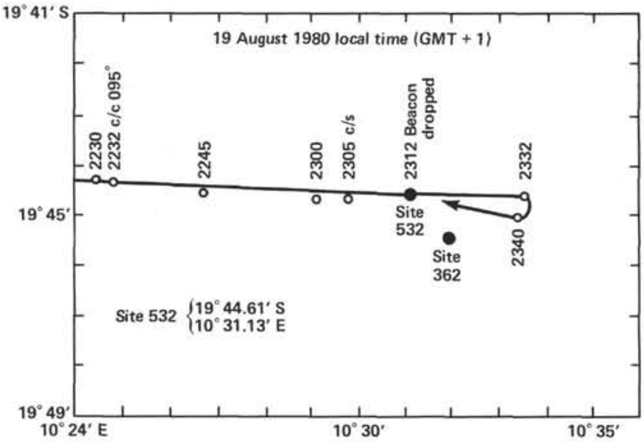

Figure 2. Map of *Glomar Challenger* shiptrack on approach to Site 532.

time required for the transit to Recife. Cores 1 through 56 were not opened but were frozen for later use in geochemical studies. The remainder of the cores were studied in the usual manner. The drill string was pulled up; the bit arrived on deck at 0354. All gear having been secured, we departed Site 532 for Recife at 0422 on 25 August.

LITHOLOGIC SUMMARY

Introduction

A thick (291.3 m) Holocene to late Miocene section was continuously cored by HPC at Site 532 on the Walvis Ridge close to Site 362 (Leg 40). Recovery for the most part was good to excellent, so that the section is relatively complete. However, the top 50 to 150 cm of nearly all of Cores 532-1 through 532-26 were badly disturbed. From Core 532-27 down, the disturbance was less common, although parts of cores were severely gas cracked.

The following lithologic summary is based on Cores 532-1 through 61 (0–250.8 m sub-bottom) and Cores 532B-57 through 74 (232.4–291.3 m sub-bottom). Only one lithologic unit was recognized; this comprises nannofossil ooze, marl, and clay, and diatom sarl and smarl. We have subdivided this unit into three subunits based on the relative proportions of biogenic components and clay (Appendix A, Fig. 4, Table 2).

Shipboard sedimentological techniques included visual core description, smear slide analysis, and X-ray diffraction analysis. In addition, we have used shipboard geochemical data (bomb carbonate and organic carbon analysis) in characterizing the subunits.

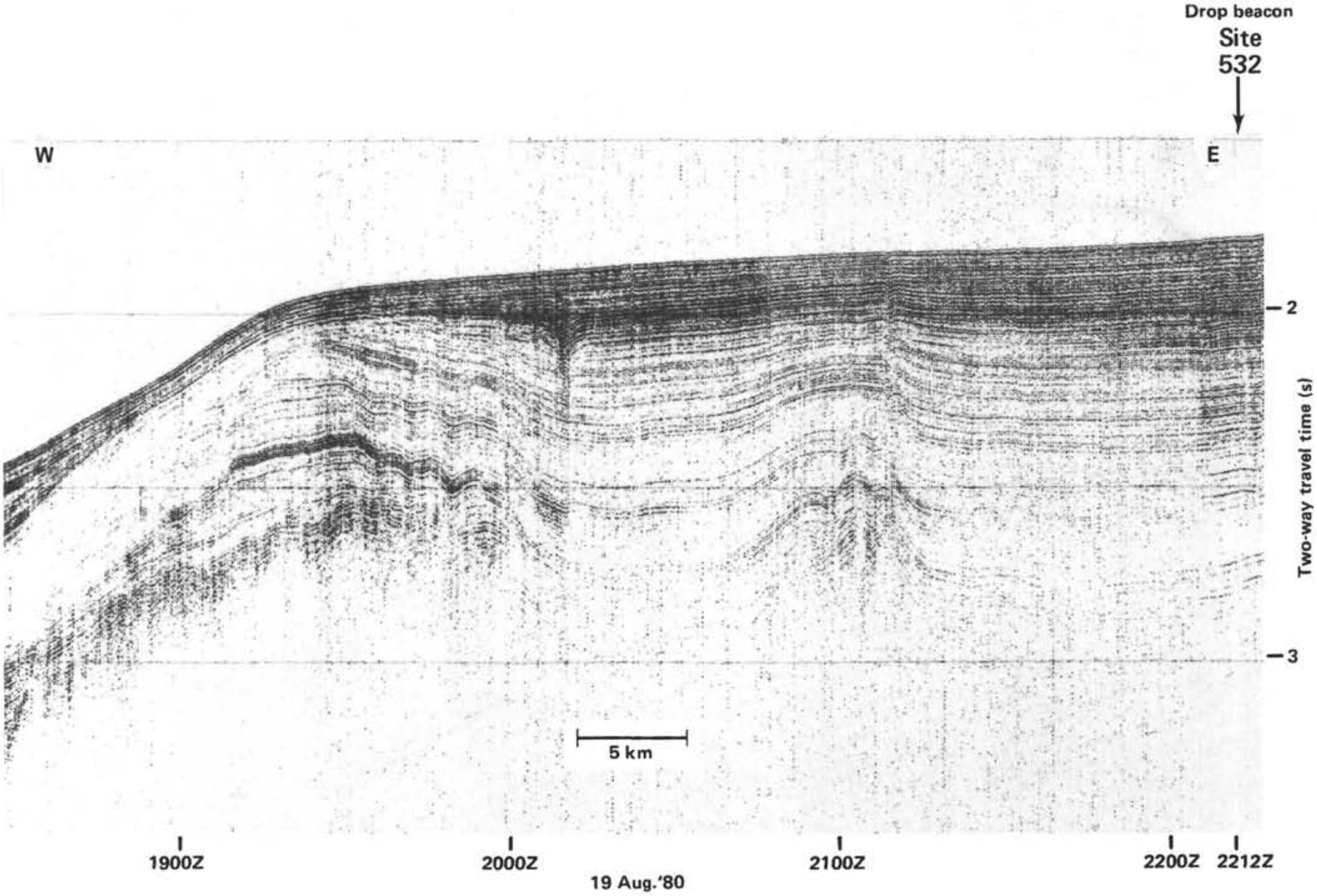

Figure 3. *Glomar Challenger* seismic profile approaching Site 532.

Table 1. Coring summary, Site 532.

Core	Date (August 1980)	Time (local)	Depth from drill floor (m) Top Bottom	Depth below seafloor (m) Top Bottom	Length cored (m)	Length recovered (m)	Percent recovery
Hole 532							
1	20	0764	1340.9–1344.9	0.0–4.0	4.0	4.26	107
2	20	0826	1344.9–1349.3	4.0–8.4	4.4	4.39	100
3	20	0855	1349.3–1353.7	8.4–12.8	4.4	4.83	110
4	20	0929	1353.7–1358.1	12.8–17.2	4.4	4.53	103
5	20	1008	1358.1–1362.5	17.2–21.6	4.4	4.57	104
6	20	1041	1362.5–1366.9	21.6–26.0	4.4	4.46	101
7	20	1116	1366.9–1371.3	26.0–30.4	4.4	4.94	112
8	20	1150	1371.3–1375.7	30.4–34.8	4.4	4.11	93
9	20	1224	1375.7–1380.1	34.8–39.2	4.4	4.71	107
10	20	1256	1380.1–1384.5	39.2–43.6	4.4	3.91	89
11	20	1328	1384.5–1388.9	43.6–48.0	4.4	4.89	111
12	20	1402	1388.9–1393.3	48.0–52.4	4.4	3.73	85
13	20	1432	1393.3–1397.7	52.4–56.8	4.4	4.52	103
14	20	1502	1397.7–1402.1	56.8–61.2	4.4	4.03	92
15	20	1530	1402.1–1406.5	61.2–65.6	4.4	4.87	111
16	20	1606	1406.5–1410.9	65.6–70.0	4.4	4.53	102
17	20	1635	1410.9–1415.3	70.0–74.4	4.4	4.32	98
18	20	1706	1415.3–1419.7	74.4–78.8	4.4	4.40	100
19	20	1739	1419.7–1424.1	78.8–83.2	4.4	4.26	97
20	20	1812	1424.1–1428.5	83.2–87.6	4.4	4.54	103
21	20	1841	1428.5–1432.9	87.6–92.0	4.4	4.50	102
22	20	1912	1432.9–1437.3	92.0–96.4	4.4	4.56	104
23	20	1947	1437.3–1441.7	96.4–100.8	4.4	3.95	90
24	20	2020	1441.7–1446.1	100.8–105.2	4.4	4.17	9
25	20	2058	1446.1–1450.5	105.2–109.6	4.4	3.38	77
26	20	2129	1450.5–1454.9	109.6–114.0	4.4	3.33	76
27	20	2210	1454.9–1458.3	114.0–117.4	3.4	3.42	101
28	20	2253	1458.3–1461.7	117.4–120.8	3.4	3.43	101
29	20	2326	1461.7–1465.3	120.8–124.4	3.6	3.65	101
30	21	0002	1465.3–1468.3	124.4–127.4	3.0	0.01	0
31	21	0038	1468.3–1472.7	127.4–131.8	4.4	4.15	94
32	21	0116	1472.7–1476.1	131.8–135.2	3.4	3.53	104
33	21	0201	1476.1–1480.1	135.2–139.2	4.0	4.38	109
34	21	0245	1480.1–1483.5	139.2–142.6	3.4	3.34	98
35	21	0316	1483.5–1487.5	142.6–146.6	4.0	4.16	104
36	21	0500	1487.5–1491.5	146.6–150.6	4.0	4.10	102
37	21	0542	1491.5–1494.7	150.6–153.8	3.2	3.26	102
38	21	0617	1494.7–1497.7	153.8–156.8	3.0	3.48	116
39	21	0652	1497.7–1501.7	156.8–160.8	4.0	4.55	114
40	21	0724	1501.7–1506.1	160.8–165.2	4.4	4.60	105
41	21	0800	1506.1–1510.5	165.2–169.6	4.4	4.47	102
42	21	0850	1510.5–1514.9	169.6–174.0	4.4	4.37	99
43	21	0928	1514.9–1519.3	174.0–178.4	4.4	4.49	102
44	21	1004	1519.3–1523.7	178.4–182.8	4.4	4.52	103
45	21	1041	1523.7–1527.7	182.8–186.8	4.0	2.22	55
46	21	1126	1527.7–1532.1	186.8–191.2	4.4	4.40	100
47	21	1204	1532.1–1536.5	191.2–195.6	4.4	4.4	100
48	21	1239	1536.5–1540.5	195.6–199.6	4.0	4.05	101
49	21	1323	1540.5–1544.5	199.6–203.6	4.0	4.28	107
50	21	1355	1544.5–1548.5	203.6–207.6	4.0	1.04	26
51	21	1441	1548.5–1552.5	207.6–211.6	4.0	3.75	94
52	21	1519	1552.5–1556.9	211.6–216.0	4.4	4.22	96
53	21	1555	1556.9–1560.9	216.0–220.0	4.0	0	0
54	21	1630	1560.9–1564.4	220.0–224.0	4.0	4.03	100
55	21	1704	1564.4–1568.9	224.0–228.0	4.0	3.76	94
56	21	1742	1568.9–1572.3	228.0–231.4	3.4	3.49	103
57	21	1821	1572.3–1575.7	231.4–234.8	3.4	3.80	112
58	21	1914	1575.7–1579.7	234.8–238.8	4.0	3.96	99
59	21	1954	1579.7–1583.7	238.8–242.8	4.0	0	0
60	21	2028	1583.7–1587.7	242.8–246.8	4.0	3.90	93
61	21	2106	1587.7–1591.7	246.8–250.8	4.0	0.54	13.5
					250.8	232.44	92.7
Hole 532A							
1	21	2254	1339.5–1342.9	0.0–3.4	3.4	3.34	98
2	21	2325	1342.9–1347.3	3.4–7.8	4.4	4.05	92
3	22	0016	1347.3–1351.7	7.8–12.2	4.4	4.45	101
4	22	0047	1351.7–1356.1	12.2–16.6	4.4	4.44	101
5	22	0133	1356.1–1360.5	16.6–21.0	4.4	3.14	71
6	22	0201	1360.5–1364.9	21.0–25.4	4.4	4.18	95
7	22	0235	1364.9–1369.3	25.4–29.8	4.4	3.74	85
8	22	0303	1369.3–1373.7	29.8–34.2	4.4	4.34	99
9	22	0335	1373.7–1378.1	34.2–38.6	4.4	3.72	85
10	22	0406	1378.1–1382.5	38.6–43.0	4.4	3.91	89
11	22	0435	1382.5–1386.9	43.0–47.4	4.4	3.83	87
12	22	0507	1386.9–1391.3	47.4–51.8	4.4	3.97	90
13	22	0537	1391.3–1395.7	51.8–56.2	4.4	3.44	78
14	22	0617	1395.7–1400.1	56.2–60.6	4.4	3.59	82
15	22	0644	1400.1–1404.5	60.6–65.0	4.4	2.11	48
16	22	0712	1404.5–1408.9	65.0–69.4	4.4	4.23	96
17	22	0750	1408.9–1413.3	69.4–73.8	4.4	4.34	99
18	22	0821	1413.3–1417.7	73.8–78.2	4.4	4.27	97
19	22	0849	1417.7–1422.1	78.2–82.6	4.4	4.17	95
20	22	0920	1422.1–1426.5	82.6–87.0	4.4	4.20	95
21	22	0948	1426.5–1430.9	87.0–91.4	4.4	3.87	88
22	22	1020	1430.9–1435.3	91.4–95.8	4.4	3.80	86
23	22	1049	1435.3–1439.8	95.8–100.2	4.4	4.31	98
24	22	1122	1439.8–1444.1	100.2–104.6	4.4	4.18	95
25	22	1159	1444.1–1448.5	104.6–109.0	4.4	4.06	92
26	22	1233	1448.5–1452.9	109.0–113.4	4.4	3.50	80
27	22	1302	1452.9–1457.3	113.4–117.8	4.4	0.23	5
28	22	1333	1457.3–1461.7	117.8–122.2	4.4	4.34	99
29	22	1406	1461.7–1466.1	122.2–126.6	4.4	3.96	90
30	22	1435	1466.1–1470.5	126.6–131.0	4.4	4.33	98
31	22	1512	1470.5–1474.9	131.0–135.4	4.4	2.34	53
Hole 532A (Cont.)							
32	22	1543	1474.9–1479.3	135.4–139.8	4.4	3.64	83
33	22	1612	1479.3–1483.7	139.8–144.2	4.4	3.56	81
34	22	1642	1483.7–1487.7	144.2–148.2	4.0	3.87	97
35	22	1713	1487.7–1492.1	148.2–152.6	4.4	4.36	99
36	22	1749	1492.1–1496.5	152.6–157.0	4.4	4.35	99
37	22	1821	1496.5–1500.5	157.0–161.0	4.0	0	0
38	22	1856	1500.5–1504.9	161.0–165.4	4.4	4.46	101
39	22	1926	1504.9–1507.9	165.4–168.4	3.0	0	0
40	22	1955	1507.9–1512.3	168.4–172.8	4.4	4.49	102
41	22	2032	1512.3–1516.3	172.8–176.8	4.0	3.47	87
42	22	2104	1516.3–1520.7	176.8–181.2	4.4	4.48	102
43	22	2134	1520.7–1523.7	181.2–184.2	3.0	0	0
44	22	2210	1523.7–1527.7	184.2–188.2	4.0	3.81	95
45	22	2333	1527.7–1531.7	188.2–192.2	4.0	0	0
46	23	0017	1531.7–1534.7	192.2–195.2	3.0	0	0
47	23	0054	1534.2–1539.7	195.2–199.6	4.4	4.28	97
					199.6	161.15	80.7
Hole 532B							
1	23	0715	1339.5–1342.9	0–3.4	3.4	3.33	98
2	23	0748	1342.9–1347.3	3.4–7.8	4.4	4.19	95
3	23	0815	1347.3–1351.7	7.8–12.2	4.4	3.09	93
4	23	0842	1351.7–1356.1	12.2–16.6	4.4	4.35	99
5	23	0916	1356.1–1360.5	16.6–21.0	4.4	4.03	92
6	23	0944	1360.5–1364.9	21.0–25.4	4.4	3.55	81
7	23	1009	1364.9–1369.3	25.4–29.8	4.4	4.59	104
8	23	1037	1369.3–1373.7	29.8–34.2	4.4	4.42	100
9	23	1103	1373.7–1378.1	34.2–38.6	4.4	4.20	95
10	23	1132	1378.1–1382.5	38.6–43.0	4.4	4.54	103
11	23	1204	1382.5–1386.9	43.0–47.4	4.4	4.68	106
12	23	1233	1386.9–1391.3	47.4–51.8	4.4	2.64	60
13	23	1310	1391.3–1395.7	51.8–56.2	4.4	3.86	88
14	23	1340	1395.7–1400.1	56.2–60.6	4.4	4.67	106
15	23	1414	1400.1–1404.5	60.6–65.0	4.4	3.12	71
16	23	1440	1404.5–1408.9	65.0–69.4	4.4	3.71	84
17	23	1506	1408.9–1413.3	69.4–73.8	4.4	3.84	87
18	23	1530	1413.3–1417.7	73.8–78.2	4.4	1.74	40
19	23	1600	1417.7–1422.1	78.2–82.6	4.4	3.98	90
20	23	1629	1422.1–1426.5	82.6–87.0	4.4	2.57	58
21	23	1657	1426.5–1430.9	87.0–91.4	4.4	3.66	83
22	23	1724	1430.9–1435.3	91.4–95.8	4.4	4.24	96
23	23	1754	1435.3–1439.7	95.8–100.2	4.4	3.81	87
24	23	1822	1439.7–1444.1	100.2–104.6	4.4	3.12	71
25	23	1849	1444.1–1448.5	104.6–109.0	4.4	4.19	95
26	23	1918	1448.5–1452.5	109.0–113.0	4.0	3.87	97
27	23	1950	1452.5–1456.5	113.0–117.0	4.0	4.32	108
28	23	2018	1456.5–1460.9	117.0–121.4	4.4	4.26	97
29	23	2051	1460.9–1464.9	121.4–125.4	4.0	3.93	98
30	23	2129	1464.9–1468.9	125.4–129.4	4.0	3.98	100
31	23	2204	1468.9–1473.3	129.4–133.8	4.4	4.52	103
32	23	2237	1473.3–1477.3	133.8–137.8	4.0	3.90	98
33	23	2311	1477.3–1481.3	137.8–141.8	4.0	3.28	82
34	23	2343	1481.3–1485.3	141.8–145.8	4.0	4.01	100
35	24	0021	1485.3–1489.7	145.8–150.2	4.4	4.32	98
36	24	0055	1489.7–1493.7	150.2–154.2	4.0	4.02	100
37	24	0134	1493.7–1497.7	154.2–158.2	4.0	3.92	98
38	24	0213	1497.7–1501.1	158.2–161.6	3.4	3.30	97
39	24	0250	1501.1–1505.5	161.6–166.0	4.4	3.97	90
40	24	0319	1505.5–1509.3	166.0–169.8	3.8	3.84	101
41	24	0358	1509.3–1513.7	169.8–174.2	4.4	4.42	100
42	24	0433	1513.7–1516.7	174.2–177.2	3.0	3.11	104
43	24	0505	1516.7–1520.1	177.2–180.6	3.4	3.64	107
44	24	0536	1520.1–1523.7	180.6–184.2	3.6	3.65	101
45	24	0613	1523.7–1527.6	184.2–188.1	3.9	3.93	101
46	24	0652	1527.6–1531.6	188.1–192.1	4.0	0	0
47	24	0726	1531.6–1535.7	192.1–196.2	4.1	4.21	103
48	24	0757	1535.7–1540.1	196.2–200.6	4.4	2.27	52
49	24	0826	1540.1–1543.1	200.6–203.6	3.0	tr.	0
50	24	0857	1543.1–1547.1	203.6–207.6	4.0	4.00	100
51	24	0929	1547.1–1551.5	207.6–212.0	4.4	4.39	100
52	24	1001	1551.5–1555.5	212.0–216.0	4.0	4.08	102
53	24	1034	1555.5–1559.5	216.0–220.0	4.0	3.30	83
54	24	1104	1559.5–1563.5	220.0–224.0	4.0	4.02	101
55	24	1136	1563.5–1567.9	224.0–228.4	4.4	4.47	102
56	24	1217	1567.9–1571.9	228.4–232.4	4.0	4.02	101
57	24	1250	1571.9–1575.3	232.4–235.8	3.4	3.51	103
58	24	1323	1575.3–1579.3	235.8–239.8	4.0	3.91	98
59	24	1405	1579.3–1583.3	239.8–243.8	4.0	4.04	101
60	24	1500	1583.3–1586.7	243.8–247.2	3.4	3.53	104
61	24	1536	1586.7–1590.7	247.2–251.2	4.0	3.68	92
62	24	1611	1590.7–1544.2	251.2–254.7	3.5	3.71	106
63	24	1711	1544.2–1597.2	254.7–257.7	3.0	3.24	108
64	24	1747	1597.2–1599.2	257.7–259.7	2.0	1.93	96
65	24	1819	1599.2–1603.2	259.7–263.7	4.0	4.26	107
66	24	1856	1603.2–1606.6	263.7–267.1	3.4	3.55	104
67	24	1933	1606.6–1611.0	267.1–271.5	4.4	4.32	9
68	24	2012	1611.0–1615.0	271.5–275.5	4.0	3.98	100
69	24	2056	1615.0–1618.8	275.5–279.3	3.8	3.85	101
70	24	2137	1618.8–1621.8	279.3–282.3	3.0	2.91	97
71	24	2225	1621.8–1624.8	282.3–285.3	3.0	3.07	102
72	24	2300	1624.8–1627.8	285.3–288.3	3.0	3.16	105
73	24	2332	1627.8–1629.8	288.3–290.3	2.0	2.22	111
74	25	0008	1629.8–1630.8	290.3–291.3	1.0	0.27	27
					291.3	267.0	91.7

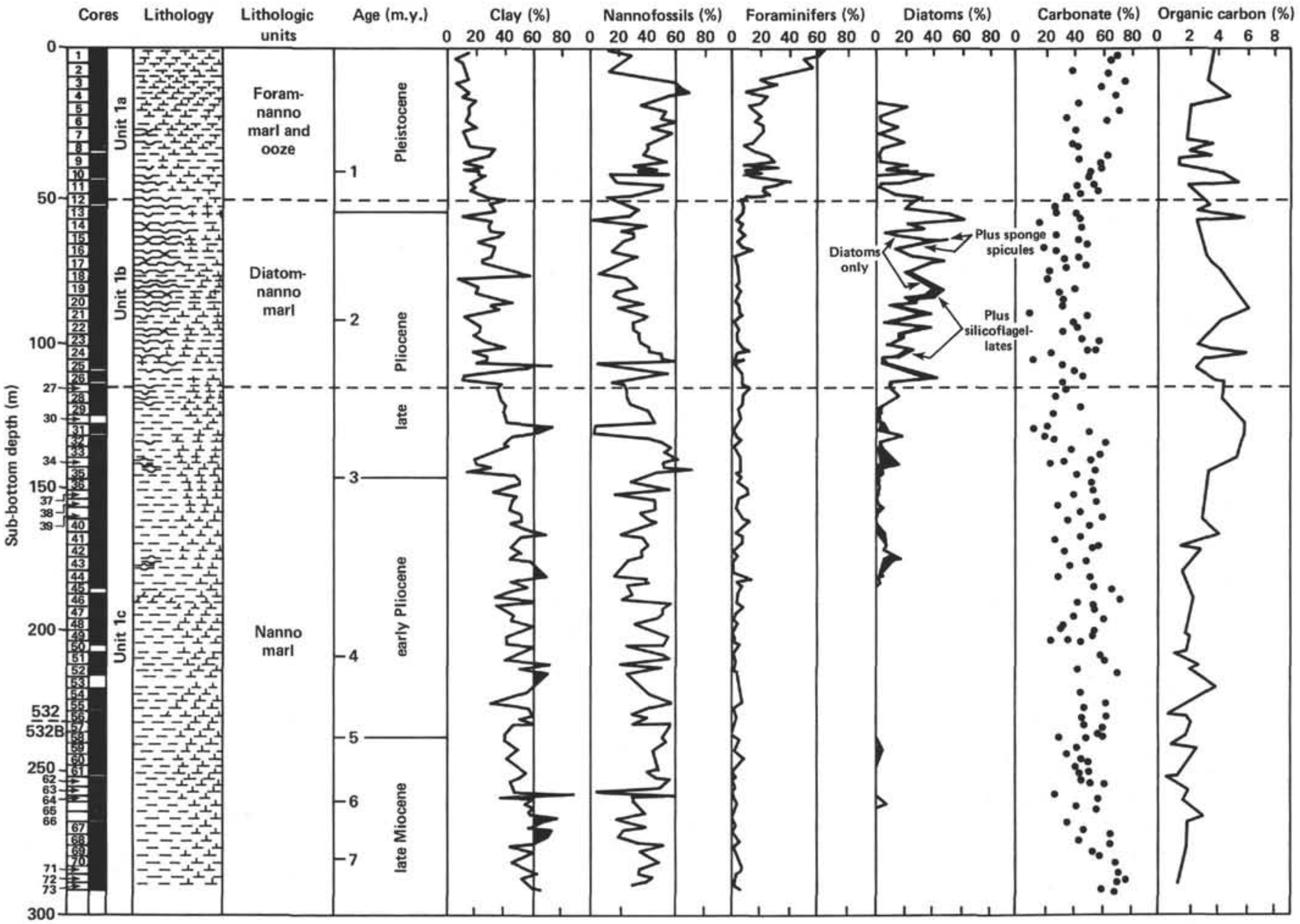

Figure 4. Lithology and components of sediments cored at Site 532. Percentages of clay, nannofossils, foraminifers, and diatoms are from smear-slide estimates. Percent carbonate is from Tables 5 and 6, and percent organic carbon is from Table 7.

Table 2. Lithologic units, Site 532.

Unit	Lithology	Core	Sub-bottom depth (m)	Thickness (m)	Age	Sedimentation rate (m/m.y.)
1a	Foram-nannofossil marl and ooze	Hole 532, Core 1-Core 12, Section 1	0-49.5	49.5	Pleistocene	41
1b	Diatom-nannofossil marl	Hole 532, Cores 2-26	49.5-114.0	64.5	late Pliocene	52
1c	Nannofossil marl	Hole 532, Cores 27-61 Hole 532B, Cores 57-74	114.0-291.3	177.3	late Pliocene to late Miocene	40

Unit 1: Calcareous, Siliceous, and Clayey Biogenic Sediments

Subunit 1a: Cores 532-1 through 12, Section 1; 0 to 49.5 m. The dominant lithologies in Subunit 1a are nanno-foraminiferal and foraminiferal-nannofossil ooze and marl. Some of these have a significant diatom component. The colors are various hues of yellowish brown (5Y) and greenish olive (10Y) with either lighter or darker chroma values.

Pelagic foraminifers form 50–60% of the sediment in Cores 1–3 but rapidly decline to an average value of 20% in Cores 4–12. Nannofossils increase to a maximum of 60–70% in Core 4, then decline gradually to 40–50% in Core 12. Diatoms first appear in Core 5 and vary from 20–40% through the rest of the subunit. Radiolarians, sponge spicules, silicoflagellates, shell fragments, and echinoderm remains make up the remaining biogenic component (<3%).

The clay-size fraction increases from 10 to 20% from top to bottom within the subunit. X-ray diffraction (XRD) analyses of the sediment show the presence of quartz, apatite (and carbonate-apatite?), pyrite, feldspar, and illite in addition to the dominant calcite. Other clay minerals may be masked by the overwhelming calcite. Carbonate bomb analysis of 27 samples yields an average of 49% carbonate; the actual values decrease from 60–70% at the top to 40–50% at the base of the subunit. Most of the sediments are also rich in organic carbon (2–4%) which is mainly amorphous and of marine origin.

Texturally the sediments are about 50% silt and 50% clay, but with a sand-size component that varies with the percentage of foraminifers. Some of the diatom-rich sediments appear to have a rougher, flakey texture when cut.

The only primary sedimentary structure visible in the cores is a color variation, with darker layers (mostly 20–40 cm thick) interbedded with lighter sediments at irregular intervals of about 1–2 meters, especially from Core 4 down. The darker layers are richer in organic carbon, clay, and pyrite, but do not appear to be systematically related to any particular biogenic component. All of the sediments are thoroughly bioturbated, and the gradational contacts between light and dark layers are usually extensively burrowed.

Subunit 1b: Cores 532-12, Section 2, through 532-26; 49.5–114.0 m. The dominant lithologies in Subunit 1b are nannofossil diatom smarl and sarl. There are also minor amounts of siliceous ooze and nannofossil ooze and marl. The colors are the same hues of yellowish brown and greenish olive found in Subunit 1a.

Subunit 1b is more dominantly siliceous than Subunit 1a. Diatoms commonly form 30–50% of the sediment in Cores 12 through 19 and 10–30% in the lower cores (Fig. 4). Radiolarians and silicoflagellates may each form up to 4%, and sponge spicules locally as much as 10–15% of the sediment. Nannofossils increase from 10–30% to 30–50% downwards; foraminifers are minor throughout the subunit. Rare echinoderm and shell fragments were also noted.

The proportion of clay-size material averages about 30% through the subunit but, like the biogenic components, varies considerably (10–60%). Carbonate is less abundant than in Subunit 1a; the average carbonate content of 36 samples was 34.5%, although there is a general increase from Core 22 down (Fig. 4). Authigenic dolomite was recognized in some smear slides (up to 20%) and also on some XRD traces. Quartz, apatite, and minor pyrite and feldspar are the other nonclay minerals present (Appendix A). The clay minerals include illite, kaolinite–chlorite, and either smectite or a mixed-layer expanding mineral. The organic carbon content is variable and generally high (3–6%) and has notably different pyrolysis characteristics from those in the other subunits, perhaps reflecting the diatom contribution to the organic matter.

Texturally, the sediments have a minor sand-size component (< 5%) and are generally more silty than clayey (55:45, silt:clay). The rough, flakey texture noted for diatomaceous sediments in Subunit 1a is more prevalent throughout Subunit 1b.

The only clear primary structure is the alternation of lighter and darker layers, both of which are highly bioturbated and burrowed, and commonly grade into one another. The darker layers are most common in the upper part of the subunit (Cores 12 through 21) where they are 20–50 cm thick with an average spacing of 1–1.5 m. The dark layers tend to be more clay and organic-rich and to contain less carbonate than the lighter layers.

Subunit 1c: Cores 532-27 through 61 and Cores 532B-57 through 74, 114.0–291.3 m.

Subunit 1c comprises a thick, monotonous sequence of nannofossil marl. Rarely these may be termed ooze or clay. The colors are the same as in the overlying subunits, although from about Core 532-40 down, the yellowish brown colors disappear, and the dominant colors are pale and dark greenish olive. In the bottom few cores the colors are very light, with a slight bluish gray tint.

The composition of Subunit 1c is equally monotonous. Diatoms rarely form more than a few percent of the sediment and are most commonly absent. Sponge spicules and radiolarians are locally up to 5–10% of the sediment. Foraminifers remain consistently less than 10%, with a few scattered large broken forms. Nannofossils are the dominant (20–50%) biogenic component (Fig. 4).

The clay-size fraction (30–60%) shows an overall increase downward, as does the carbonate (average 43% for 97 samples). Dolomite forms as much as 30% of the sediment in a few samples. Quartz, feldspar, and pyrite are all present, but the apatite noted in previous subunits appears to be a (?) more impure carbonate–apatite variety (Appendix A). The clay minerals include illite, chlorite–kaolinite, a mixed-layer mineral, and clinoptilolite. Organic carbon content is variable and decreases from a high of 6% to about 1% at the bottom of the subunit.

The sediments are mostly very fine grained, with a clay:silt ratio of about 65:35. The dark–light interbedding in this subunit is clearly a result of a more clay and organic-rich (dark) and a more nannofossil-rich (light) composition. There is an overall tendency toward less frequent and less intense dark layers with depth. The average spacing of the cycles in Cores 25–43 of Hole 532 is 1.7 m and 2.6 m in Cores 44–60. Bioturbation and burrowing have effectively destroyed any other primary sedimentary structures which may have been present.

Discussion

Site 532 is located on the eastern part of the Walvis Ridge in a trough with a relatively thick sediment fill, at a position close to Site 362. The uppermost section at Site 362 was badly disturbed by rotary coring, and the HPC program at Site 532 was an attempt to recover an undisturbed upper section close to the Walvis Bay zone of upwelling and high biotic productivity. Our results are in general agreement with those from the earlier site, although we recovered 235 m of Pleistocene and Pliocene sediments, as opposed to 169 m of sediment of these ages recovered at Site 362.

The sediments are biogenic (calcareous and siliceous), open-marine pelagic deposits with variable amounts of terrigenous clay and a high organic carbon content. They accumulated very rapidly at rates of between 35 and 60 m/m.y. The overall variations through the unit are illustrated in Figure 4. These variations can be summarized as follows:

Color: Becomes darker from late Miocene to mid-Pleistocene; dark layers increase in intensity and frequency; becomes lighter in uppermost Pleistocene.

Foraminifers: Generally less than 10%; rapid increase through Pleistocene to Recent.

Nannofossils: Generally 20–50%; lower in late Pliocene.

Diatoms: Only become significant (10–40%) in late Pliocene.

Carbonate: Decreases from late Miocene to late Pliocene (60–70% to 20–40%); increases through the Pleistocene.

Organic carbon: Increases from late Miocene (1–2%) to late Pliocene (3–6%); slight decrease in Pleistocene (3–4%).

Clays: Decrease from late Miocene (50–60%) to Pleistocene (10–20%).

Interstitial water chemistry: Salinity, chlorinity, Ca^{2+}, and Mg^{2+} decrease with depth; pH and alkalinity increase with depth.

Sedimentation rates: Latest Miocene (>8 m/m.y.), Pliocene (~40–60 m/m.y.), Pleistocene (~43–45 m/m.y.).

These general features can be interpreted in terms of (1) biotic productivity, (2) terrigenous input, and (3) early diagenesis within the sediment.

There appears to have been an overall increase in productivity from the late Miocene to a maximum in the late Pliocene and a slight subsequent decrease. This is clearly reflected by the sediment color, organic carbon content, and siliceous biogenic component. The increases in pH and alkalinity with depth reflect sulfate reduction within the sediment beneath the high productivity area. The pelagic sedimentation rate is very high because of the extremely high productivity. The consequent increase in biogenic remains has resulted in an overall decrease in clay content. The increase in productivity may be related to climatic cooling through the Pliocene (and associated effects) and to the northward drift of Site 532, resulting in an increased or expanded upwelling in the area.

Several diagenetic effects are evident within the sediments. The drastic decrease in foraminifers through the Pleistocene and the occurrence of broken tests through the remaining sequence may be a function of selective carbonate dissolution. The carbonate content of the sediment, however, remains high and generally increases with depth through the Pliocene. Some recrystallization of nannofossils appears to be occurring in the late Miocene sediments. Authigenic dolomite is noted irregularly below Core 532-22, while apatite or (?)carbonate-apatite and pyrite are present throughout. The formation of these minerals is in part correlated with the loss of Mg and Ca cations from the interstitial water.

In addition to the overall trends noted above, there are clearly defined light and dark sediment fluctuations over 1–3 m intervals probably ranging from 30,000 to 130,000 yr. in duration and having an average time span of 55,000 yr. The dark layers are richer in organic carbon, clays, and pyrite. One explanation for this cyclicity might be the periodic increase in productivity, leading to the relative increase of planktonic species lacking preservable skeletons. Increased ingestion of clays and organic matter resulted in their rapid sedimentation as fecal pellets and eventual preservation as the darker sediment layers. The increased nonbiogenic component of the dark layers may be, in part, the result of an increased terrestrial (wind-borne) input of clay-size material. There is little evidence that the light-dark cycles were caused by carbonate dissolution within the sediment.

BIOSTRATIGRAPHY

Calcareous Nannoplankton

Holes 532 and 532B

Continuous hydraulic piston coring in Hole 532 resulted in complete recovery from the mudline to total depth below Core 61 (250.8 m), except for two empty core liners (53 and 59). In Hole 532B, hydraulic piston cores collected from the mudline through Core 60 (247.2 m) were saved for organic geochemical studies and were neither opened nor examined. From Core 532B-61 (247.2 m) to total depth below Core 532B-74 (291.3 m) core-catcher samples were examined. Control from the rig floor was so exact that Cores 532-61 and 532B-61 correlate within 0.4 m and can be considered to have been taken at the same level. Hence, coring is continuous from the mudline to the total depth of 291.3 m in Core 532B-74.

The youngest sediment recovered (in 532-1,CC) is Holocene/Pleistocene (NN21/20), the oldest (in 532B-74,CC) is late Miocene (NN11); calcareous nannofossils are common to abundant, showing moderate to good preservation in all samples. No barren intervals were encountered; only core-catcher samples were examined.

Quaternary

Holocene/Pleistocene assemblages occur in 532-1,CC through 532-4,CC (to 17.4 m). Typically present are the following species:

Coccolithus pelagicus	*Umbilicosphaera mirabilis*
Cyclococcolithus leptoporus	*Gephyrocapsa oceanica*
Helicosphaera carteri	

This interval is assigned to Zones NN20/21. The presence or absence of *Emiliania huxleyi* will be determined using electron microscopy in the shore-based studies.

The early Pleistocene *Pseudoemiliania lacunosa* (= *Emiliania ovata*) Zone, NN19, begins in 532-5,CC (21.6 m) with the last occurrence of *Emiliania ovata* and continues down to 532-17,CC (74.4 m). Typical of the assemblage in this interval are:

Coccolithus pelagicus	*Crenalithus doronicoides*
Cyclococcolithus leptoporus	*Emiliania ovata*
Helicosphaera carteri	*Helicosphaera sellii*

Pliocene

The Plio/Pleistocene boundary occurs in Core 532-18 because the highest occurrence of *Discoaster brouweri*, signaling the *D. brouweri* Zone, NN18, occurs in 532-18,CC (78.8 m). This zone continues through 532-21,CC

(92.0 m). The assemblage is characterized by the following species:

Coccolithus pelagicus
Cyclococcolithus leptoporus
Cyclococcolithus macintyrei
Helicosphaera carteri
Crenalithus doronicoides
Emiliania ovata
Discolithina sp.
Discoaster brouweri

The *D. pentaradiatus* Zone, NN17, is not distinguished, although it might be present in a condensed section within Core 532-22. A hiatus may be present at this level.

From 532-23,CC (100.8 m) down to 532-35,CC (150.2 m), the lower part of the upper Pliocene, the *D. surculus* Zone, NN16, is recognized. It is bounded by the highest occurrence of *Sphenolithus abies* in 532-36,CC (154.2 m) and ranges up to the highest occurrence of *D. tamalis* in 532-22,CC (96.5 m). Typically present in this interval are the following species:

Coccolithus pelagicus
Cyclococcolithus leptoporus
Cyclococcolithus macintyrei
Helicosphaera carteri
Reticulofenestra pseudoumbilica
Discoaster brouweri
Discoaster variabilis
Discoaster asymmetricus
Discoaster surculus
Discoaster tamalis

The interval between 532-36,CC (154.2 m) and 532B-62,CC (254.7 m) cannot be subdivided because there are no reliable markers and is denoted NN12/NN14. Typically present are the following:

Sphenolithus abies
Coccolithus pelagicus
Helicosphaera carteri
Reticulofenestra pseudoumbilica
Cyclococcolithus macintyrei
Coronocyclus nitescens
Discoaster variabilis
Discoaster surculus
Discoaster brouweri
Discoaster pentaradiatus
Amaurolithus delicatus
Amaurolithus tricorniculatus

Pliocene/Miocene

The *Discoaster quinqueramus* Zone, NN11, is readily distinguished and occurs in the interval from 532B-63,CC (259.2 m) to the terminal depth in 532B-74,CC (291.3 m). Characteristically present are the following:

Discoaster quinqueramus
Discoaster pentaradiatus
Discoaster brouweri
Discoaster surculus
Discoaster variabilis
Sphenolithus abies
Amaurolithus primus
Amaurolithus delicatus
Coccolithus pelagicus
Helicosphaera carteri
Cyclococcolithus macintyrei
Reticulofenestra pseudoumbilica

Planktonic Foraminifers

The distribution of the planktonic foraminifers is indicated in Figure 5.

As noted in the remarks on Site 530, the planktonic foraminiferal zonation for this area rests primarily upon the lineages of *Globorotalia puncticulata-inflata* and *G. miozea*, s.l. The gradation between species is long in the HPC cores taken at Site 532.

Only *G. puncticulata* and *G. inflata* of the first lineage were used. The nomen *puncticulata* was restricted to forms with a well-developed final chamber of at least somewhat larger size than the penultimate chamber.

The complexities of the *G. miozea* group required some expediency in handling for this chapter. Species concepts inferred from the reports of Leg 40 (Jenkins, 1978, p. 736, pl. 2) were followed. *G. miotumida* and *G. conoidea* were combined because of close similarity (Jenkins, 1971, p. 91) and distinguished from other forms by small increasing height of the final chambers, a final chamber of largest size, and a distinct lobulation of peripheral outline around the final chamber. The dorsal aspect is distinctly menardian, and the shape is essentially plano-convex.

G. conomiozea is also essentially plano-convex, but less so than the two above. *G. miozea* appears to be essentially biconvex, but differences in convexity could not be applied with confidence. Hence *G. conomiozea* and *G. miozea* were combined and distinguished from other forms by tight coiling and consequently circular outline, a smallish final chamber, and little or no lobulation of outline around it.

The *G. inflata* Zone and the *G. puncticulata* Zone are recognizable by the appearance of the nominate species (Jenkins, 1978, p. 728), and their position and extent conform to the correlations with the older tropical zonation of Bolli (1966) and of others that were proposed for Leg 40 (Ryan et al., 1978, p. 14). The occurrence of *G. margaritae* provides a check on the position of these zones at Site 532 and provides support for selection of the top of the *G. conomiozea* Zone, which is not marked by extinction of the nominate species at Site 532.

One of the most impressive aspects of the boreal fauna at both this site and at Site 530 is the frequency of secondary shell deposits on globorotalids. Specimens with thick, rounded tests often bear a delicate final chamber. There is opportunity for both taxonomic and ecophenotypic studies in these assemblages.

ACCUMULATION RATES

The method of calculating accumulation rates is described in the Accumulation Rates section of the Site 530 chapter 1. The results of the calculations for Site 532 are shown in Tables 3 and 4.

Accumulation rates for $CaCO_3$, opal, organic matter, and nonbiogenic material are as shown graphically in Figure 6. $CaCO_3$ and opal show an inverse relationship, with carbonate decreasing in almost the same proportion that opal increases. Because the carbonate is primarily contributed by calcareous nannoplankton, its replacement by opal suggests simple replacement of the coccolithophores by diatoms in the upwelling system. There is no appreciable net increase in the total output of biologically fixed mineral material.

INORGANIC GEOCHEMISTRY

The Holocene to late Miocene sediments from Site 532, located 1.1 km north of Site 362 (Leg 40) on the Walvis Ridge, consist mainly of light olive foraminiferal-

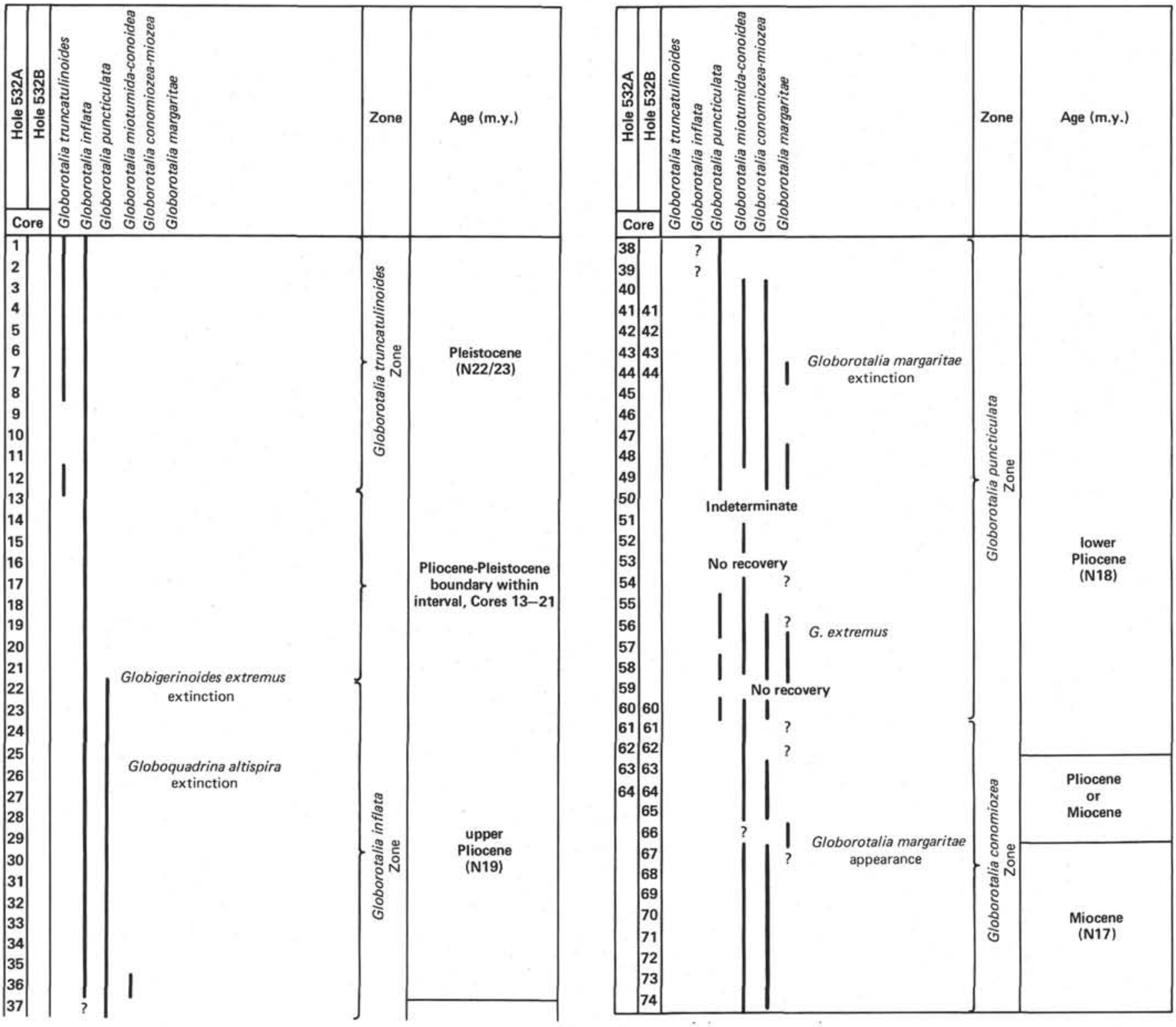

Figure 5. Distribution of selected planktonic foraminiferal species in Holes 532A and 532B.

nannofossil marl-ooze in the upper 49.5 m (Hole 532, Core 1 through Core 12, Section 1) dark green diatom nannofossil marl from 49.5–114 m (Hole 532, Core 12, Section 2 through Core 26) and light-dark olive nannofossil marl in the deeper section (Cores 532-27 through 61; Cores 532B-57 through 74). The sediments at this site are characterized by high sedimentation rates (35–60 m/m.y.), high organic carbon content (up to 6%+), and a strong H_2S odor throughout the section.

Six samples from Hole 532 and 34 samples from Hole 532B were analyzed for pH, alkalinity, chlorinity, salinity, and calcium and magnesium contents on board ship. Results are given in Figure 7 for Hole 532 and Figure 8 for Hole 532B.

The high sedimentation rates and high organic carbon contents of sediments are reflected in the alkalinity changes. Alkalinity shows a sharp increase with depth, reaching a maximum at about 150 m. This concentration-depth profile indicates sulfate reduction and methane production in this zone, and a remarkable increase in methane content was observed. These processes are always accompanied by phosphate generation in the sediment column, leading to precipitation of authigenic Ca-phosphate minerals. Calcium shows a slight decrease in the upper section, but below 50 m calcium values are nearly constant, suggesting no net removal from the interstitial waters. Magnesium decreases rapidly in the upper 100 m, then more gradually downward to about 200 m, where the values stabilize. This suggests that there is a sink of magnesium in the upper 200 m, presumably involving partial dolomitization of the nannofossil carbonates. The unusual single high value for magnesium and chlorinity at about 160 m is probably a result of contamination by surface seawater.

The chlorinity depth profile is remarkably uniform throughout the sections, except in the upper 20 m. The

Table 3. Sedimentation and accumulation rates.

	Base of interval								Wet-bulk density			
Interval	Hole	Core[a]	Sub-bottom depth (m)	Base of nannofossil zone	Age of base of interval (m.y.)	Interval thickness (m)	Length of interval (m.y.)	Sedimentation rate (m/m.y.)	n	$\overline{X}$	S_x	Porosity (%)
A						19.40	0.45	43.11	3	1.46	0.6	73
	532	5[a]	19.40	NN20	0.45							
B						57.20	1.25	45.76	11	1.49	0.8	71
		18[a]	76.60	NN19	1.70							
C						17.60	0.3	58.67	1	1.39	—	77
		22[a]	94.20	NN18	2.0							
D						54.40	1.0	54.40	6	1.49	0.9	71
		36[a]	148.60	NN16	3.0							
E						107.60	2.8	38.43	16	1.72	0.5	58
	532B	63[a]	256.2	NN12	5.8							
						35.10	<4.2	>8.36	5	1.73	0.9	57
F		74,CC	291.3	(NN11) ↓	10.0 ↓							

[a] Section taken from middle of core.

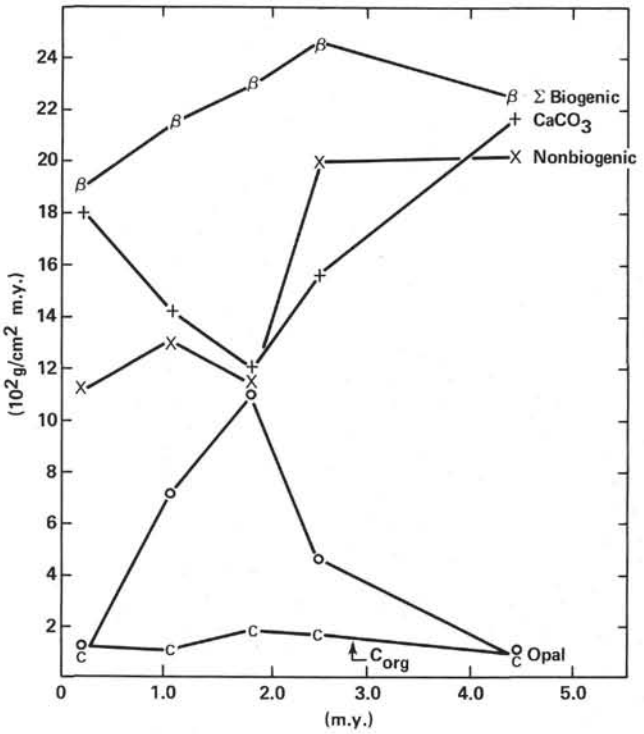

Figure 6. Accumulation rates of biogenic and nonbiogenic sediment components through time at Site 532.

distribution of salinity shows a slight decrease with depth. Below 150 m, salinity values are nearly constant, except for a high value at about 290 m, probably the result of contamination by surface seawater; pH varies but slightly throughout the section.

Carbonate Bomb

One hundred thirty-one samples from Hole 532 and 29 samples from Hole 532B were analyzed for carbonate content. The results are shown in Figure 4 and Tables 5 and 6. Generally, carbonate contents are high (50–70%) in Cores 532-27 through 61 and Cores 532B-57 through 74. The diatom nannofossil marl sediments show relatively low carbonate contents (about 20–40%). High carbonate contents are also observed through the upper sections (Cores 1 through 12).

ORGANIC GEOCHEMISTRY

Organic carbon and nitrogen contents of 67 samples from Holes 532 and 532B were determined; their organic carbon values are plotted in Figure 4, and given in Table 7 with the carbonate percentage and C/N atomic ratios. Table 8 presents the data obtained from Rock-Eval pyrolysis of 96 samples from this site. The methods used for these analyses have been described in the introductory chapter.

The organic carbon values of the succession of calcareous and siliceous, biogenic, and pelagic sediments from Site 532 are markedly higher than those typical of pelagic sediments, which average 0.2% organic carbon (Degens and Mopper, 1976). These sediments are thoroughly bioturbated, making their high organic carbon contents even more remarkable. The S_2 responses are also high for Plio–Pleistocene sediments.

In general, the organic carbon contents appear to be higher in Hole 532 between Cores 14 and 34 (ca. 60–140 m) than above and below this section of the sedimentary sequence. This trend is clearly shown by the average organic carbon values for specific time intervals (Table 9) and by the downhole profile of organic carbon contents (Fig. 9). The increase in organic carbon values from ca. 2–3% in upper Miocene–lower Pliocene sediments to 3–6% in upper Pliocene to lower Pleistocene oozes and subsequent decrease to 2–4% in upper Pleistocene strata parallels the general trend of Site 362 (Erdman and Schorno, 1978; Kendrick et al., 1979) and also that of Site 530. As proposed by Siesser (1980), these patterns in the organic carbon contents appear to reflect: (1) the advent of the Benguela upwelling system in late Miocene time with a concomitant increase in the input of organic matter to the underlying sediments, (2) an intensifica-

Table 3. (Continued).

Accumulation rate (g/cm^2•m.y.)	% carbonate			Carbonate accumulation rate (g/cm^2•m.y)	% opaline silica			Opaline silica accumulation rate (g/cm^2•m.y.)	% organic carbon			C_{org} accumulation rate (g/cm^2•m.y.)	Other accumulation rate (g/cm^2•m.y.)
	n	$\overline{X}$	S_x		n	$\overline{X}$	S_x		n	$\overline{X}$	S_x		
3150	9	57.2	13.8	1802	11	3.2	7.3	101	3	3.91	0.79	123	1124
3561	35	40.1	13.7	1428	32	20.2	15.9	719	17	3.08	1.38	110	1304
3634	8	33.2	12.1	1206	10	29.9	11.5	1087	2	5.24	1.58	190	1151
4234	30	37.1	14.9	1571	31	11.2	11.0	474	12	4.24	1.32	180	2009
4395	59	49.5	11.3	2176	57	20	3.1	88	28	2.15	0.90	94	2037
>970	17	59.5	13.9	>577	14	1.0	2.5	>10	5	2.18	0.60	>21	>362

Table 4. Accumulation rate (10^2 g/cm^2=m.y.) in 0.5 m.y. increments.

Time interval	Σ	$CaCO_3$	Opal	C_{org}	Organic matter (C_{org}•1.8)	Nonbiogenic	Depth of base of interval in hole (m)
0–0.5	31.91	17.65	1.63	1.22	2.20	10.43	21.7
0.5–1.0	35.61	14.28	7.19	1.10	1.98	12.16	44.6
1.0–1.5	35.61	14.28	7.19	1.10	1.98	12.16	67.4
1.5–2.0	36.05	12.95	9.40	1.58	2.84	10.86	94.2
2.0–2.5	42.34	15.71	4.74	1.80	3.24	18.65	121.4
2.5–3.0	42.34	15.71	4.74	1.80	3.24	18.65	148.6
3.0–3.5	43.95	21.76	0.88	0.94	1.69	19.62	167.8
3.5–4.0	43.95	21.76	0.88	0.94	1.69	19.62	187.0
4.0–4.5	43.95	21.76	0.88	0.94	1.69	19.62	206.2
4.5–5.0	43.95	21.76	0.88	0.94	1.69	19.62	225.5
5.0–5.5	43.95	21.76	0.88	0.94	1.69	19.62	244.7

tion of upwelling and productivity through to the upper Pliocene–lower Pleistocene, and (3) a subsequent decrease in productivity levels during the Pleistocene.

The downhole log of the Rock-Eval S_2 response values (Fig. 10) shows a generally similar trend to that of the organic carbon values (Fig. 9), although the upper Pliocene–lower Pleistocene maximum is not so apparent, probably as a result of sample selection.

The organic carbon values and the S_2 responses both show considerable variability within individual core sections (Tables 7 and 8). In general, the lighter colored oozes possess lower organic carbon contents and give

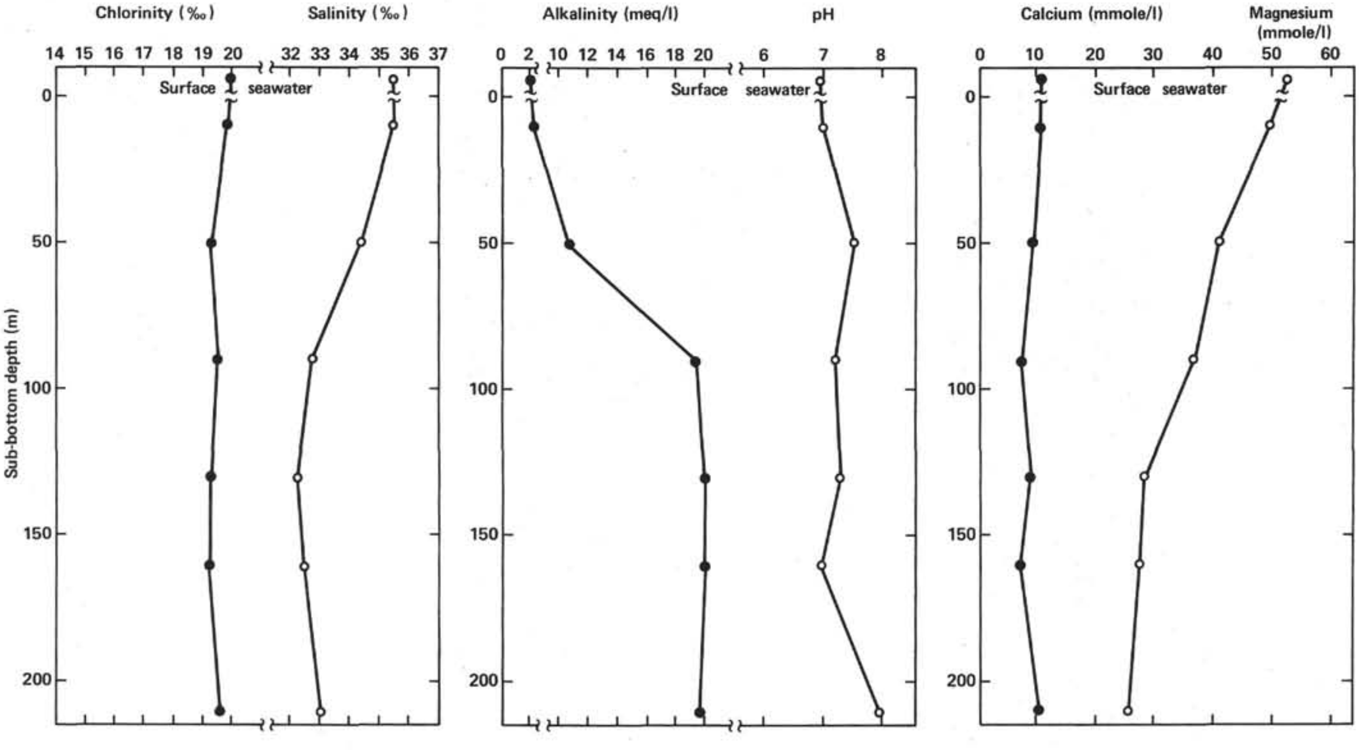

Figure 7. Inorganic chemistry of interstitial waters in cores from Hole 532.

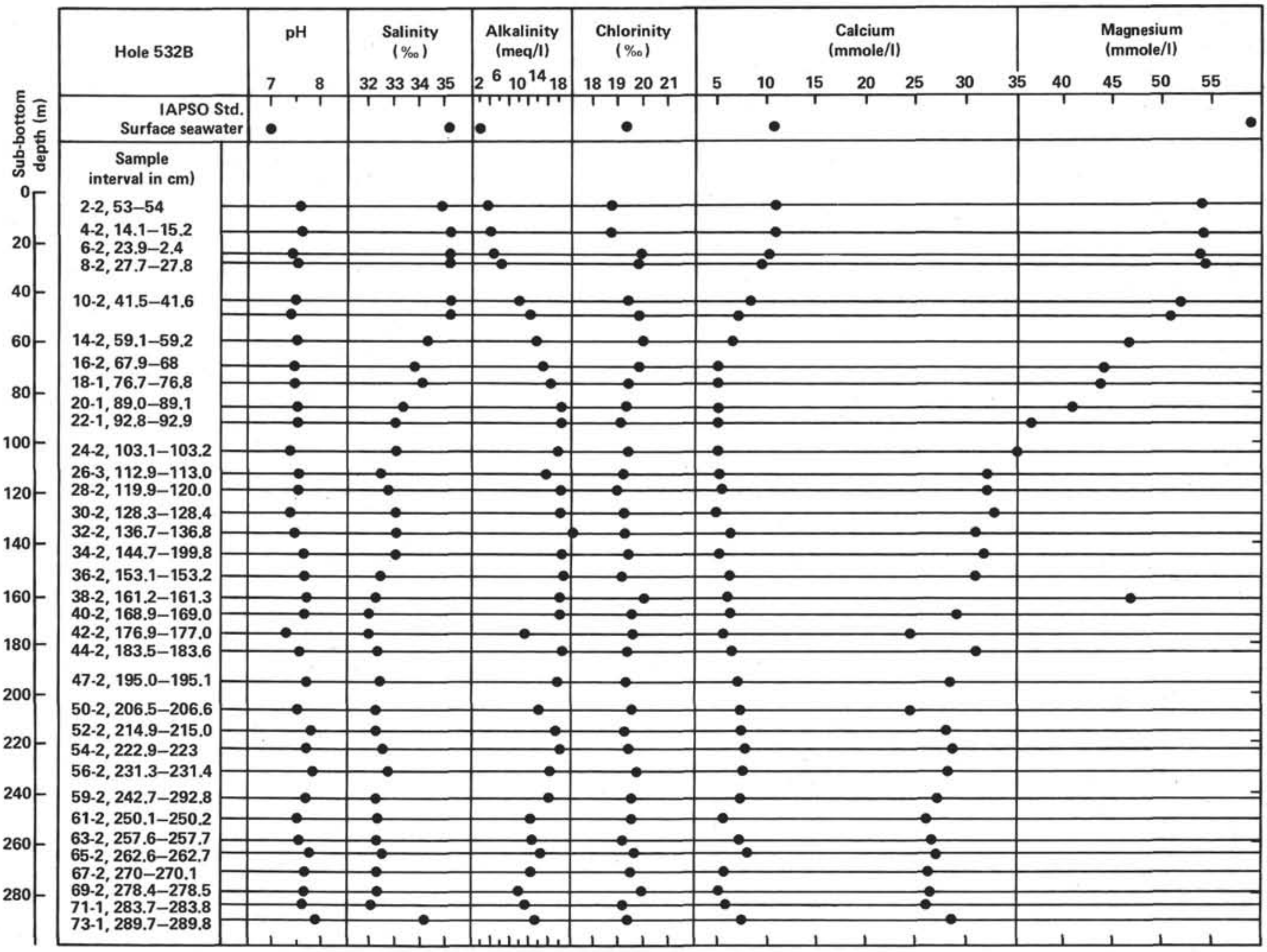

Figure 8. Inorganic chemistry of interstitial waters in cores from Hole 532B.

smaller S_2 responses than the darker, olive-colored samples. These variations suggest that there are additional factors superimposed upon the overall trend in upwelling and productivity that influence the accumulation of organic matter in the underlying sediments. In many parts of the sedimentary section the color appears to change from dark to light in rhythmic cycles. One such cycle, in Hole 532, Core 10, was studied by Rock-Eval pyrolysis to assess the relationship between sediment color and organic matter content. As Figure 11 shows, the S_2 response is high (ca. 1500 mg HC/100 g sediment) for the darker (5Y 4/4) sediment horizons and decreases to low values (ca. 300) for the lighter(?) (10Y 7/2) sediment intervals. Hence, the color of the sediments is indeed related to their organic matter content, and its fluctuations may reflect episodes of midwater or bottom anoxia, variations in upwelling strength or in pelagic biological populations, or changes in sediment accumulation rates.

In contrast to the variability and depth changes in the organic carbon contents of Site 532 sediments, the atomic C/N ratios remain fairly uniform (ca. 15) throughout the sediment sequence. This monotonous depth trend shows that the character of the organic matter has not changed significantly since the initiation of the Benguela upwelling system. A C/N ratio of ca. 15, as found here and in the upper 200 m of sediments recovered at Site 530, suggests a preferential loss of proteinaceous material from phytoplankton organic detritus (C/N = 6; according to Goodell, 1972). Since C/N values of upper water column particulate matter average 7.3 in this area of the Atlantic Ocean (Bishop et al., 1978), a loss of nitrogen may occur after particles settle out from the photic zone, but prior to their incorporation into the bottom sediments. However, problems associated with representative sampling of particulate matter in seawater complicate the issue.

The values of the hydrogen and oxygen indices calculated for Site 532 sediments from Rock-Eval pyrolysis data and from their organic carbon contents suggest that the sedimentary organic matter is predominantly of marine origin, as is that of the upper sediment section of Site 530. In addition, the lipid indicators in sediments from Site 362 (Boon et al., 1979) and those from Site 532 (Meyers and Dunham, this volume) are mainly derived from marine sources. Thus, the organic geochemi-

Table 5. Carbonate bomb results, Hole 532.

Core-Section (interval in cm)	$CaCO_3$ (%)	Lithology
1-2, 7–9	68	Lt. olive nanno foram ooze
1-3, 72–74	67	Lt. yellow nanno foram ooze
2-3, 6–8	38	Dark olive nanno foram marl
2-3, 60–62	62	Lt. olive nanno foram ooze
3-2, 29–31	73	Lt. olive nanno foram ooze
3-3, 106–108	58	Lt. olive nanno foram ooze
4-2, 17–19	68	Lt. olive nanno foram ooze
4,CC —	40	Olive nanno foram marl
5-1, 96–98	41	Olive nanno foram marl
5-3, 96–98	70	Lt. olive diatom foram ooze
6-2, 55–56	34	Dark olive foram nanno marl
6-2, 144–145	62	Lt. olive foram nanno ooze
7-1, 75–76	40	Lt. olive diatom nanno marl
8-2, 70–71	39	Lt. olive diatom nanno marl
8-2, 100–101	41	Lt. olive diatom nanno marl
9-1, 16–18	62	Dark olive foram nanno ooze
9-2, 108–110	42	Lt. olive foram nanno marl
9-3, 123–124	58	Lt. olive foram nanno ooze
10-2, 64–66	58	Lt. olive nanno ooze
10-2, 105–107	50	Lt. olive nanno marl
10-3, 44–45	50	Olive foram nanno marl
10,CC (9–11)	23	Dark olive nanno diatom ooze
11-2, 69–70	53	Lt. olive foram nanno ooze
11-3, 53–54	41	Lt. olive diatom foram nanno ooze
11-3, 149–150	55	Dark olive foram nanno ooze
12-1, 79–80	42	Lt. olive diatom foram nanno ooze
12-2, 79–80	33	Dark olive diatom nanno marl
13-1, 69–71	25	Dark olive diatom nanno marl
13-2, 53–56	27	Dark olive diatom nanno marl
13-3, 89–92	41	Lt. olive diatom nanno marl
13,CC (13–15)	43	Lt. olive diatom nanno marl
14-2, 38–39	15	Dark olive diatom nanno marl
14-3, 38–39	44	Lt. olive diatom nanno marl
15-2, 34–35	27	Lt. olive diatom nanno marl
15-3, 34–35	42	Lt. olive diatom nanno marl
16-1, 118–120	48	Lt. olive nanno diatom ooze
16-2, 122–124	19	Dark olive nanno diatom ooze
16-3, 40–42	25	Med olive diatom nanno marl
17-1, 81–83	43	Lt. grn.-gray diatom nanno ooze
17-2, 81–83	32	Dark olive diatom nanno marl
17-3, 81–83	47	Dark olive nanno diatom marl
17-3, 91–93	32	Light olive nanno diatom marl
18-1, 91–93	21	Dark olive nanno diatom marl
18-2, 91–93	20	Lt. olive nanno diatom marl
19-2, 82–84	39	Lt. olive diatom nanno marl
19-3, 81–83	28	Lt. olive diatom nanno marl
20-1, 70–72	31	Dark olive nanno clay ooze
20-3, 71–73	31	Lt. olive nanno diatom ooze
21-2, 29–30	8	Dark olive smarl
21-3, 88–90	48	Lt. olive smarl
22-1, 136–139	40	Lt. olive smarl
22-2, 136–139	41	Dark olive smarl
23-3, 130–133	32	Lt. olive smarl
23-1, 59–61	45	Lt. olive dolomitic smarl
23-3, 34–36	58	Lt. olive dolomitic smarl
24-1, 109–112	55	Lt. olive dolomitic nanno marl
25-2, 127–130	50	Lt. olive dolomitic nanno marl
25-3, 93–96	23	Dark olive diatom nanno ooze
25-1, 51–52	11	Dark olive nanno clay
25-2, 51–52	31	Lt. olive nanno clay
26-1, 49–50	40	Lt. olive diatom nanno ooze
26-2, 5–6	45	Lt. olive diatom nanno ooze
27-1, 86–88	32	Olive nanno marl
27-2, 66–68	13	Dark olive nanno marl
27-2, 86–88	34	Lt. olive foram nanno marl

Table 5. (Continued).

Core-Section (interval in cm)	$CaCO_3$ (%)	Lithology
28-2, 18–20	27	Olive diatom nanno marl
29-2, 10–13	45	Lt. olive nanno marl
29-3, 10–13	25	Dark olive nanno marl
31-1, 144–145	21	Dark olive clay
31-2, 64–65	12	Dark olive clay
31-3, 18–19	46	Lt. olive nanno marl
32-1, 11–13	20	Dark olive silty clay
32-2, 46–49	26	Lt. olive diatom nanno marl
32-2, 147–149	62	Lt. olive nanno marl
33-2, 61–62	39	Dark nanno marl
33-3, 41–43	59	Lt. nanno marl
34-1, 121–122	53	Lt. olive silic. nanno marl
34-2, 49–51	33	Dark olive silic. nanno marl
34-2, 71–72	25	Lt. olive silic. nanno marl
35-2, 94–96	55	Lt. olive silic. nanno ooze
35-3, 70–72	43	Dark olive silic. nanno marl
36-1, 71–72	53	Lt. olive silic. nanno marl
37-1, 109–110	54	Lt. olive foram nanno ooze
37-2, 39–40	40	Dark olive foram nanno marl
38-1, 65–68	57	Lt. olive nanno marl
38-2, 50–53	29	Dark olive nanno marl
39-2, 60–62	45	Dark olive nanno marl
39-3, 60–62	60	Lt. olive nanno marl
40-1, 75–76	37	Dark olive nanno marl
40-3, 75–76	51	Lt. olive nanno marl
41-2, 80–82	45	Lt. olive nanno clay
41-3, 4–5	27	Dark olive nanno clay
42-2, 71–72	58	Lt. olive nanno marl
42-2, 79–80	54	Lt. olive nanno marl
42-2, 140–141	34	Dark olive nanno marl
43-1, 71–72	50	Lt. olive nanno marl
43-1, 117–118	38	Dark olive nanno marl
44-3, 36–37	30	Dark olive nanno clay
44-3, 110–111	53	Lt. olive nanno marl
45-1, 116–119	55	Lt. olive nanno marl
45-2, 42–45	68	Lt. olive nanno marl
46-1, 100–101	73	Lt. olive nanno dolomitic marl
46-2, 100–101	44	Lt. olive nanno marl
46-3, 96–99	55	Lt. olive nanno marl
47-2, 69–71	56	Lt. olive nanno marl
47-3, 110–112	41	Dark olive nanno marl
48-1, 64–67	62	Lt. olive nanno marl
48-2, 142–145	34	Lt. olive nanno marl
48-3, 5–11	33	Dark olive nanno marl
49-1, 70–71	55	Lt. olive nanno marl
49-2, 86–92	55	Lt. olive nanno marl
49,CC (3–4)	37	Dark olive nanno marl
50-1, 20–21	24	Lt. olive nanno marl
50-1, 82–83	46	Dark olive nanno marl
51-1, 144–150	61	Lt. olive nanno marl
51-2, 75–78	63	Lt. olive nanno marl
52-1, 64–70	44	Lt. olive nanno marl
52-2, 141–147	72	Dark olive nanno clay
54-1, 81–87	47	Lt. olive nanno marl
55-1, 109–110	64	Lt. olive nanno marl
55-2, 109–110	48	Lt. olive nanno marl
56-1, 100–104	65	Lt. olive nanno marl
56-2, 34–39	47	Dark olive nanno marl
57-1, 109–110	49	Dark olive nanno marl
57-2, 79–80	62	Lt. olive nanno marl
58-1, 67–68	60	Lt. olive nanno marl
58-2, 67–68	32	Dark olive nanno clay
60-2, 42–48	48	Lt. olive nanno marl
61-1, 27–29	49	Lt. olive nanno marl
61,CC (20–21)	50	Lt. olive nanno marl

Table 6. Carbonate bomb results, Hole 532B.

Core-Section (interval in cm)	$CaCO_3$ (%)	Lithology
58-2, 93–99	62	Lt. olive nanno marl
58-3, 0–6	51	Lt. olive nanno marl
59-1, 80–86	45	Lt. olive nanno marl
59-2, 106–112	37	Dark olive nanno marl
60-1, 80–81	48	Lt. olive nanno marl
60-2, 63–64	52	Lt. olive nanno marl
61-1, 110–112	44	Lt. olive nanno marl
61-2, 8–10	53	Lt. olive nanno marl
61-3, 5–11	46	Dark olive nanno marl
62-1, 116–119	48	Dark olive nanno marl
62-2, 80–81	54	Lt. olive nanno marl
62-2, 124–130	64	Lt. olive nanno marl
63,CC (4–5)	29	Dark olive clay
64-1, 80–81	60	Lt. olive nanno ooze
65-1, 51–54	44	Dark olive nanno marl
65-2, 109–111	59	Lt. olive nanno marl
66,CC (7–13)	38	Dark olive nanno clay
67-2, 54–55	49	Lt. olive nanno marl
67-3, 54–55	69	Lt. olive nanno marl
68-1, 54–55	47	Lt. olive nanno marl
68-2, 54–55	68	Lt. olive nanno marl
69-2, 19–20	57	Lt. olive nanno marl
69-2, 89–90	61	Lt. olive nanno marl
70-2, 70–71	73	Lt. olive nanno marl
71-2, 76–82	74	Lt. olive nanno marl
72-1, 34–36	78	Lt. olive nanno marl
72-2, 34–36	72	Lt. olive nanno marl
73-2, 14–20	63	Lt. olive nanno marl
74,CC —	71	Lt. olive nanno marl

cal studies suggest that local aquatic productivity is the primary origin of most of the organic matter in the Site 532 sediments.

The proximity of Site 532 to Site 362 meant that significant quantitites of gas would almost certainly be encountered. At Site 362 gas pockets had formed quickly as the cores expanded on deck, causing the polypropylene end caps to bulge, and sometimes forcing them from the core liner. The major constituents of the gas pockets, excluding air, were methane and carbon dioxide, with traces of hydrogen sulfide and free nitrogen. No shipboard analysis of C_2 to C_5 hydrocarbons was made at Site 362, and an analysis program involving gas sampling from such cores was envisaged for Site 532 using the methods described in the introductory chapter to this volume.

However, few gas pockets were observed in the first 30 cores recovered (down to 130 m sub-bottom depth), so such sampling was consequently reduced. In Hole 532, methane first appeared at 123 m sub-bottom depth (Core 29) and was present through Core 57 (232 m). Gas samples were taken when the cores first arrived on deck. Considerable degassing of Cores 33 through 51 occurred prior to their splitting. In several instances the end caps were punctured to release the pressure buildup, causing sediment extrusion or spurting through the hole. Cores recovered from Hole 532A expanded as had those from Hole 532. Similar gas expansion affected the sections of Hole 532B, causing caps to be forced from their core liners in the deep freeze. No gas samples were taken for

Table 7. Carbonate and organic carbon contents and C/N ratios of Site 532 sediments.

Sample (interval in cm)	$CaCO_3$ (%)	C_{org} (%)	C/N (atomic)
Hole 532			
1-2, 7–9	68	3.66	12.1
3-3, 106–108	58	3.28	14.7
4,CC	40	4.80	14.8
5-3, 96–98	70	1.98	15.2
8-2, 70–71	47	1.70	13.2
8-2, 100–101	39	2.93	14.7
8-2, 145–146	41	3.64	15.0
9-1, 16–18	62	2.01	13.5
9-2, 108–110	42	3.57	14.9
9-3, 123–124	58	1.16	12.0
10-2, 64–66	58	1.26	12.4
10,CC 9–11	23	4.30	14.9
11-3, 53–54	41	5.52	15.9
11-3, 149–150	55	1.88	13.3
13-1, 69–71	25	3.48	14.8
13-2, 53–56	27	2.74	13.5
14-2, 38–39	15	5.91	15.5
14-3, 38–39	44	2.68	14.8
17-2, 81–83	32	3.20	14.6
18-2, 91–93	20	4.30	15.3
21-2, 29–30	8	6.35	15.5
22-2, 138–139	41	4.12	21.4
24-2, 127–130	50	2.65	17.1
24-3, 93–96	23	3.40	15.0
25-1, 51–52	11	6.04	16.4
25-2, 51–52	31	3.03	13.9
26-1, 49–50	40	2.47	15.4
27-1, 86–88	32	3.87	16.2
27-2, 66–68	13	4.48	14.8
29-3, 10–13	25	4.44	15.2
31-2, 64–65	12	5.87	16.5
32-1, 11–13	20	5.86	16.5
34-2, 71–72	25	5.47	16.1
35-3, 70–72	43	3.27	14.9
37-2, 39–40	40	2.99	15.1
38-2, 50–53	29	3.12	15.5
40-1, 75–76	37	2.99	15.4
41-3, 4–5	27	4.11	16.6
42-2, 79–80	54	1.54	14.2
42-2, 140–141	34	2.90	14.4
44-3, 110–111	53	1.69	13.8
46-3, 100–101	44	2.44	14.7
49,CC (3–4)	37	2.02	13.9
50-1, 82–83	46	2.24	14.8
51-1, 144–150	61	2.02	24.7
51-2, 75–78	63	1.03	14.0
52-1, 64–70	44	2.86	26.2
52-2, 141–147	72	2.24	17.5
54-1, 81–87	47	3.95	30.1
56-1, 100–104	65	0.68	14.2
56-2, 34–39	47	1.99	14.7
57-1, 109–110	49	2.20	15.0
58-2, 67–68	32	3.11	15.0
60-2, 42–48	48	1.23	13.9
Hole 532B			
58-3, 0–6	51	2.04	15.0
59-1, 80–86	45	1.02	13.0
59-2, 106–112	37	2.66	17.6
61-3, 5–11	46	1.66	18.9
62-1, 116–119	48	1.43	13.6
62-2, 124–130	64	0.57	10.8
63,CC (4–5)	29	2.17	13.9
65-1, 80–81	44	1.84	14.9
66,CC (7–13)	38	3.27	14.5
67-2, 54–55	49	2.15	14.3
69-2, 19–20	57	2.11	20.1
73-2, 14–20	63	1.51	15.6

Table 8. Rock-Eval pyrolysis results.

Sample (interval in cm)	S_2	S_3	HI	OI	C_{org} (%)
	(mg/100 g sediment)		(mg/g C_{org})		
Hole 532					
1-2, 7-9	1320	640	360	175	
1,CC	964	582			
2,CC	700	531			
3,CC	744	498			
4,CC	1887	733			
5,CC	1385	528			
6,CC	1833	624			
7,CC	1173	612			
8,CC	1810	673			
9-3, 123-124	222	289	191	249	1.16
9,CC	673	436			
11,CC	719	494			
12,CC	1449	647			
13,CC	319	427			
14-2, 38-39	2249	622	381	105	5.91
14,CC	1060	554			
15,CC	938	541			
16,CC	1929	390			
17,CC	1924	596			
18,CC	656	467			
19,CC	1163	518			
20,CC	1242	481			
21,CC	649	380			
22,CC	664	355			
23,CC	406	293			
24,CC	1592	511			
25-2, 51-52	953	466	315	154	3.03
25,CC	542	354			
26,CC	977	428			
27,CC	688	418			
28,CC	981	287			
29,CC	692	281			
30,CC	754	281			
31,CC	1323	328			
32,CC	1236	332			
33,CC	502	248			
34-2, 71-72	2231	479	1108	98	5.47
34,CC	458	193			
35,CC	380	174			
36,CC	449	170			
37,CC	334	254			
38,CC	486	217			
39,CC	416	184			
40,CC	850	250			
41-3, 4-5	1592	423	103	103	4.11
41,CC	574	222			
42,CC	1243	292			
43,CC	1041	315			
44,CC	565	268			
45,CC	150	153			
46-2, 100-101	497	325	203	133	2.44
46,CC	578	246			
47,CC	404	246			
48,CC	386	230			
49,CC	464	257			
50,CC	1076	301			
51,CC	802	284			
52,CC	710	356			
Hole 532 (Cont.)					
54,CC	172	65			
55,CC	166	272			
56,CC	69	255			
57,CC	119	258			
58,CC	134	270			
60,CC	140	235			
61,CC	37	281			
Hole 532B					
10-2, 8-10	985	397			
10-2, 30-31	1673	525			
10-2, 51-53	327	327			
10-2, 89-91	379	364			
10-2, 137-139	740	417			
10-3, 6-8	673	362			
10-3, 38-40	728	395			
10-3, 76-78	1131	385			
10,CC (4-6)	1447	494			
11-1, 32-33	900	385			
57,CC	182	339			
58,CC	838	403			
59,CC	250	334			
60,CC	156	340			
61,CC	125	306			
62,CC	114	297			
63,CC	282	285			
64,CC	196	332			
65,CC	269	310			
66,CC	451	353			
67,CC	122	274			
68,CC	110	191			
69,CC	323	226			
70,CC	201	226			
71,CC	91	176			
72,CC	97	206			
73,CC	119	216			
74,CC	97	186			
61-3, 5-11	214	240	123	145	1.66
66,CC (7-13)	1030	369	315	113	3.27

Table 9. Average organic carbon contents for specific sediment intervals.

Interval	Hole	Core	Sub-bottom depth (m)	Base of nannofossil zone	Age of base interval	Mean percent organic carbon	No. of analyses
A						3.91	3
	532	5	19.4	NN20	0.45		
B						3.08	17
	532	18	76.6	NN19	1.7		
C						5.24	2
	532	22	94.2	NN18	2.0		
D						4.24	12
	532	36	148.6	NN16	3.0		
E						2.15	28
	532B	63	256.2	NN12	5.8		
F						2.18	5
	532B	74	291.3	(NN11) ↓	10.0 ↓		

shipboard analysis from Hole 532A, but three samples from Hole 532B were taken and analyzed. The method of shipboard gas sampling precludes the accurate quantitative evaluation of gas shows and therefore largely limits gas descriptions to qualitative terms. Methane was by far the dominant component of all gas samples, and the composition of C_2 to C_5 hydrocarbons showed little downhole variation. The compositions of the C_2 to C_5 hydrocarbons in each sample, excluding 2, 2-dimethylpropane which was always $<0.1\%$, are plotted against depth in Figure 12, and a typical gas chromatogram (using the Hewlett-Packard instrument) is shown in Figure

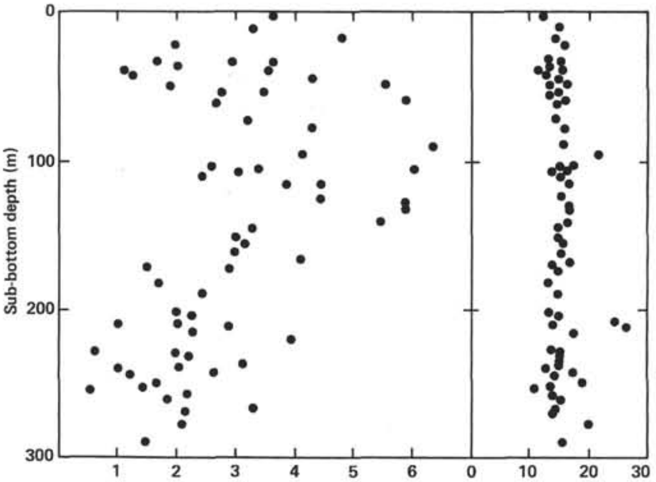

Figure 9. Downhole organic carbon and C/N ratio profiles at Site 532.

13. The chromatogram for the vacutainer blank analysis shows prominent peaks in the C_6 region, but no significant contamination from the vacutainer in the C_2 to C_5 range. Gas chromatographic analysis using the Carle instrument showed that significant amounts of carbon dioxide were present in all the samples, in addition to methane. Attempts to measure hydrogen sulfide using this instrument were unsuccessful, suggesting that levels were below detection limits; however, no hydrogen sulfide standard was available with which to calibrate the instrumental response. The odor of hydrogen sulfide was sufficiently prominent, however, to indicate that significant quantities of the gas were present. No attempts were made to quantify the intensity of the H_2S odor versus core depth, although the smell in the core lab increased from faintly unpleasant to thoroughly obnoxious as successive cores were split, much as had been noted at Site 362 (Bolli et al., 1978).

The composition of gaseous hydrocarbons at Site 532 is consistent with their origin from biogenic processes. Their composition remains almost constant with depth (Fig. 12), and there are few variations in gas ratios with depth (Fig. 14). Such "in phase" behavior has been previously reported in the Black Sea and the Moroccan Basin (Hunt and Whelan, 1978; Whelan, 1979). It indicates that the gases are formed *in situ* and have not migrated from depth. However, without knowledge of the microbial processes operating within the sediment, it is uncertain whether *in situ* formation of gaseous hydrocarbons occurs in a discrete shallow zone of the sediment or continues to depth. The one depth trend that is apparent, the downhole decrease in the ethane/propane ratio (Fig. 14), might reflect a difference in the composition of the products of microbial activity at depth. It is more probable, however, that it reflects a gradual diffusive loss with increasing depth of ethane relative to propane.

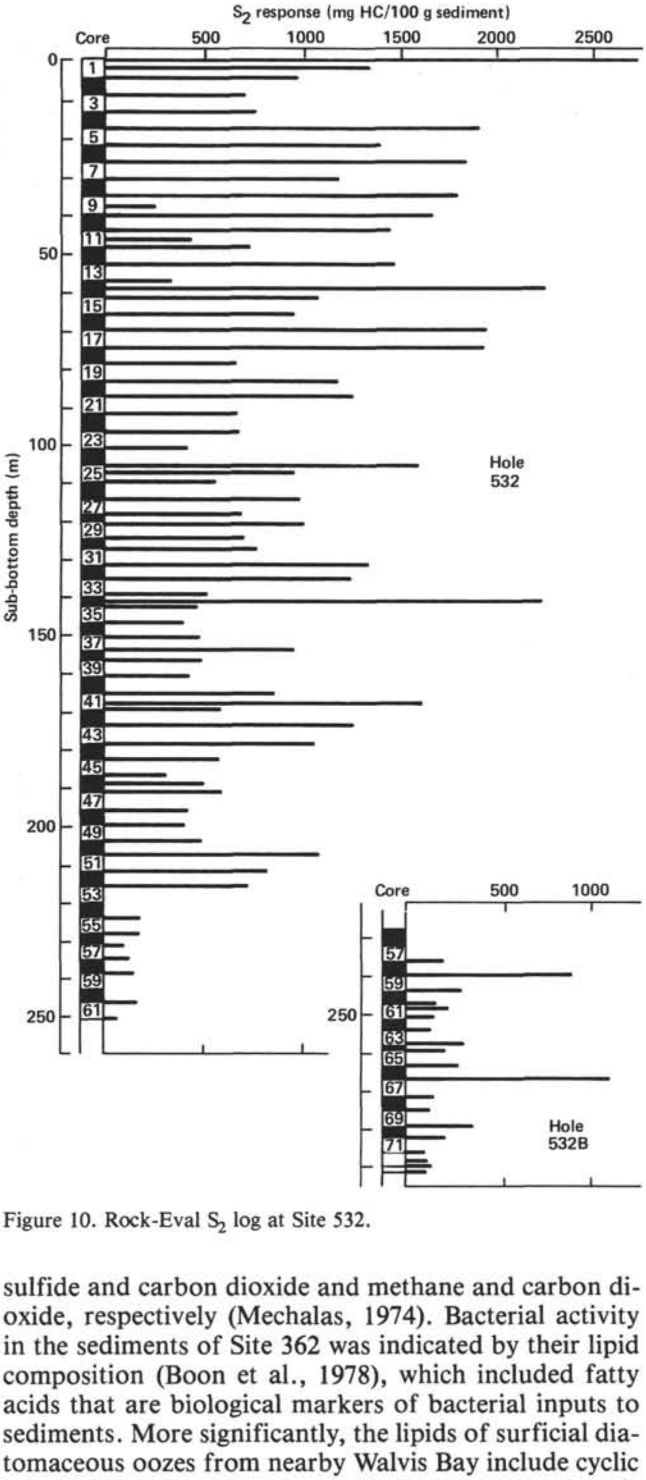

Figure 10. Rock-Eval S_2 log at Site 532.

The presence of significant amounts of methane and of carbon dioxide in the Site 532 sediments may reflect the association of sulfate reduction and methanogenesis in these sediments. These processes liberate hydrogen sulfide and carbon dioxide and methane and carbon dioxide, respectively (Mechalas, 1974). Bacterial activity in the sediments of Site 362 was indicated by their lipid composition (Boon et al., 1978), which included fatty acids that are biological markers of bacterial inputs to sediments. More significantly, the lipids of surficial diatomaceous oozes from nearby Walvis Bay include cyclic isoprenoid alkanes characteristic of methanogens in addition to their high methane concentrations (Brassell et al., 1981). These compounds also occur in the Site 532 sediments (Brassell, this volume).

There exists, therefore, various evidence for the presence and activity of bacteria in the sediments underlying the highly productive water column. Among the manifestations of their existence are the high concentrations of biogenic gas, including hydrogen sulfide, at Sites 532 and 362.

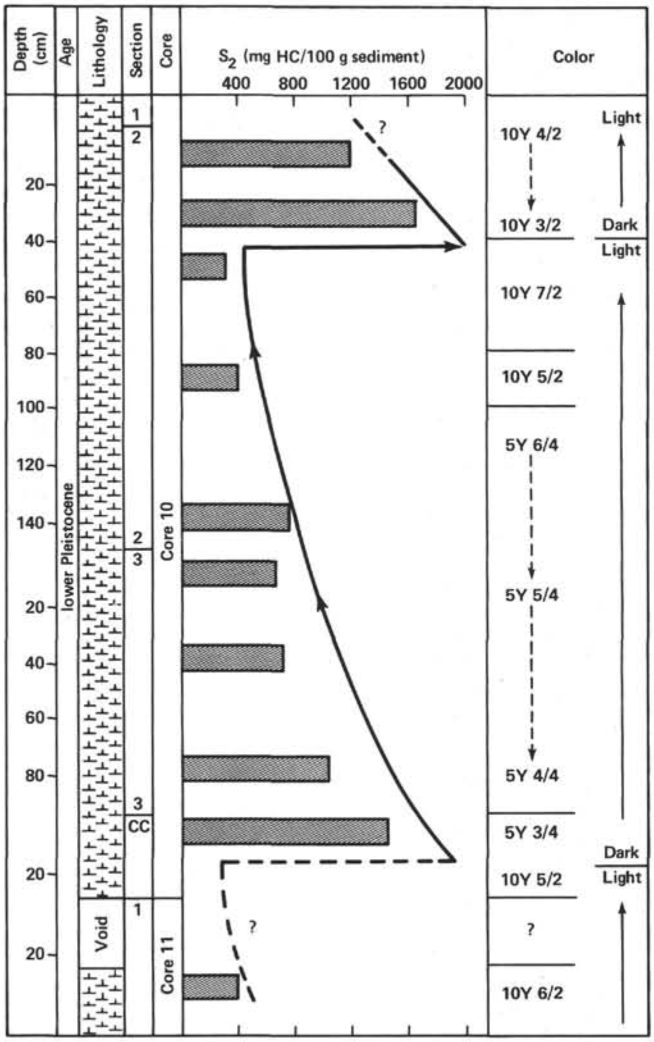

Figure 11. Rock-Eval S_2 log for light–dark cycle in Hole 532.

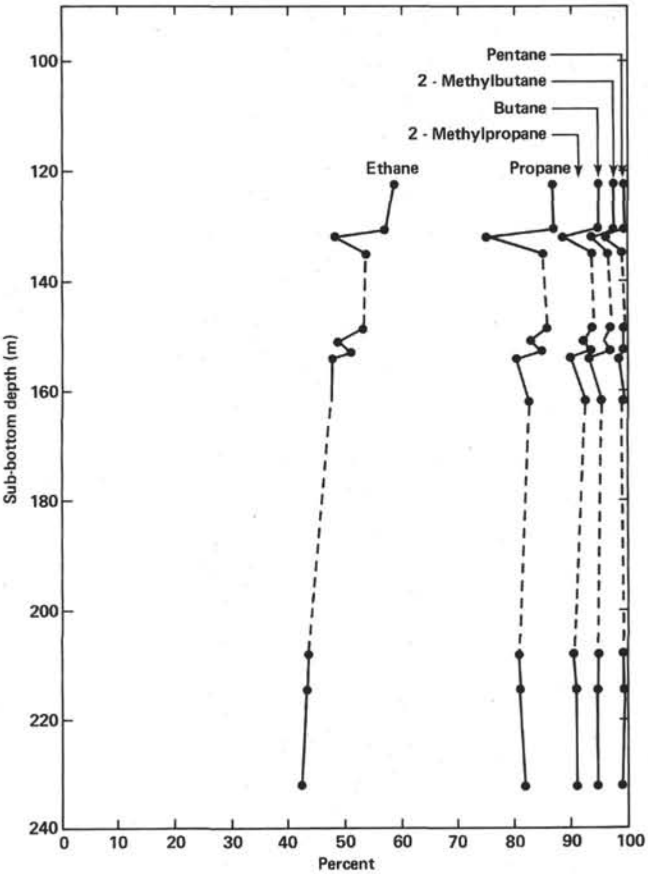

Figure 12. Composition of C_2–C_5 hydrocarbons (except 2,2-dimethylpropane).

PALEOMAGNETICS

Paleomagnetic samples were collected from Cores 532-6 through 60. The dominant lithology within this interval was green marlstone. The sediments were poorly indurated, and sampling was accomplished by pressing cubic sample holders into the sediments, centered on a vertical orientation line scribed upon the core. The cubes were then removed by cutting them from the core with a spatula.

These cubes were measured on the shipboard single-specimen spinner magnetometer and were found to be weakly magnetized for the most part. The range in intensity was from 1.7×10^{-6} to 1.8×10^{-8} e.m.u.

As with the previous sites, only natural remanent magnetization (NRM) studies were attempted on board. Further studies were required using much more sensitive measuring equipment than was available on the ship. For this reason, the samples were remeasured at the University of Hawaii using a ScT cryogenic magnetometer. The measurement and analytical techniques are described in the paleomagnetics section of the Site 530 summary. A stratigraphic plot of the individual inclinations is shown in Figure 15. It illustrates the sequence of polarity changes which occur in the hole. The stratigraphic sequence is characterized by mixed polarity, with three normal polarity intervals and four reversed polarity intervals.

The uppermost reversed polarity interval is Pleistocene in age and is characterized by nannofossil zone NN19. It appears to correlate with the reversed polarity interval between the Jaramillo and Olduvai events within the Matuyama polarity epoch. Cores 20 to 21 are characterized by normal polarity and correspond to the nannofossil zone NN18. We correlate this polarity interval to the Olduvai event. Based upon the biostratigraphy and lithostratigraphy there may be a hiatus between Cores 22 and 23. Below this interval there appears to be a continuous magnetostratigraphic sequence of the Gauss polarity epoch, including the Kaena and Mammoth polarity events.

PHYSICAL PROPERTIES

METHODS

Sound velocity (compressional), 2-minute GRAPE wet-bulk density (ratio of the sediment weight to its volume), and continuous

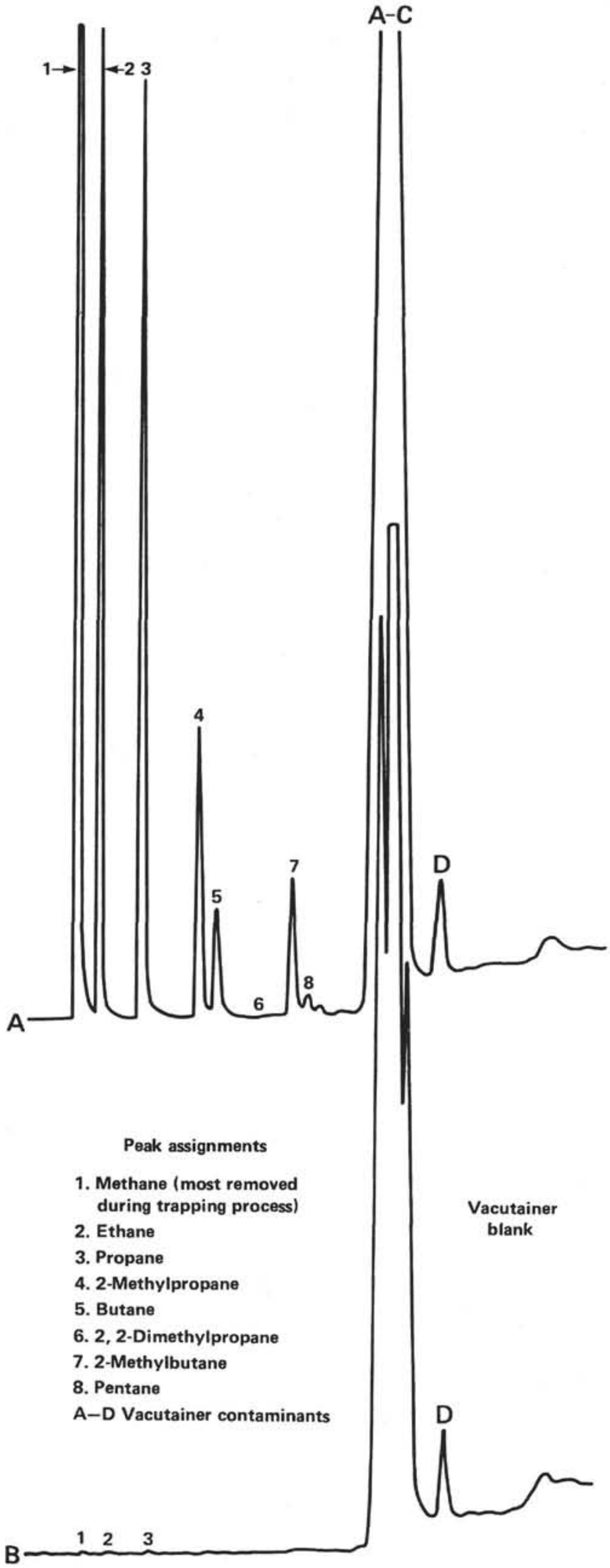

Figure 13. Gas chromatogram of (A) gas show from Section 532-51-1, (B) vacutainer blank.

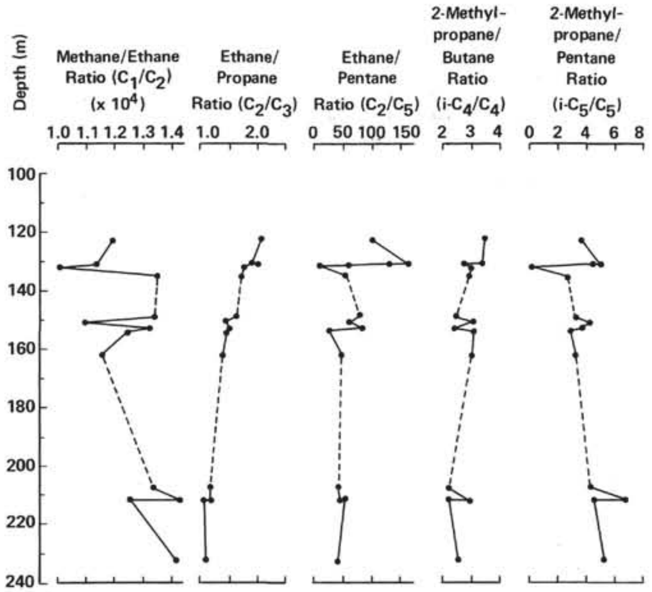

Figure 14. Downhole ratios for selected gas ratios at Site 532.

GRAPE wet-bulk density measurements were performed using methods described by Boyce (1976). To calculate the wet-bulk density (g/cm^3) of sediments by the GRAPE technique, a grain density and an Evans (1965) "corrected" grain density of 2.7 was assumed. These methods are discussed in detail by Boyce (this volume).

Cohesion or shear strength (g/cm^2) of clayey sediments was measured using the techniques described by Boyce (1977) using 1.28 cm (diameter) × 1.26 cm (height) vane size. The vane was rotated with axis parallel to bedding on a split core.

Gravimetric wet-bulk density, wet water content (the ratio of the "weight of pore-water" to "weight of the wet saturated sediment or rock," expressed as a percent), and porosity (ratio of "pore volume" to the "volume of the wet-saturated rock," expressed as percent) were also determined by traditional gravimetric techniques. These gravimetric measurements were done by Meyer on board ship on 10-g samples using weight in air and weight in water to determine volume. The sample was then dried at 105°C for 24 hours and cooled in a desiccator for at least two hours before weighing (Ohaus Triple Beam Balance; Rocker, 1974). While waiting to be processed, the samples were wrapped in plastic and sealed in vials with damp tissue; the vials were refrigerated at a temperature above freezing. These data are salt-corrected for an interstitial water salinity of 35 ppt. The density data, with good firm samples, have an accuracy and precision of <0.01 g/cm.[3]

Shipboard gravimetric determinations of density may be less accurate with softer samples, which may crumble or flake off during measurement or which are simply too soft to handle properly. To avoid these problems in softer sediment a "cylinder technique"[3] (15 cm^3) sample is taken and stored under seawater; its gravimetric porosity and density are determined at DSDP headquarters in La Jolla. Precision is ±1% relative error. This technique uses a 2 cm high and ~3 cm diameter metal cylinder, which is inserted in the sediment, then carefully removed and cleaned; the sediment is carefully scraped flush to the top of the cylinder, then two plastic plates are placed over the cylinder ends.

Before the plastic plates are placed on the cylinder, a 2-minute GRAPE count is done through them. Then another 2-minute count is made through the same plates plus the sediment (through axis of the cylinder) so that a 2-minute GRAPE density value can also be calcu-

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[3] Gravimetric measurements using the cylinder technique were done at G. Bode's laboratory at DSDP headquarters.

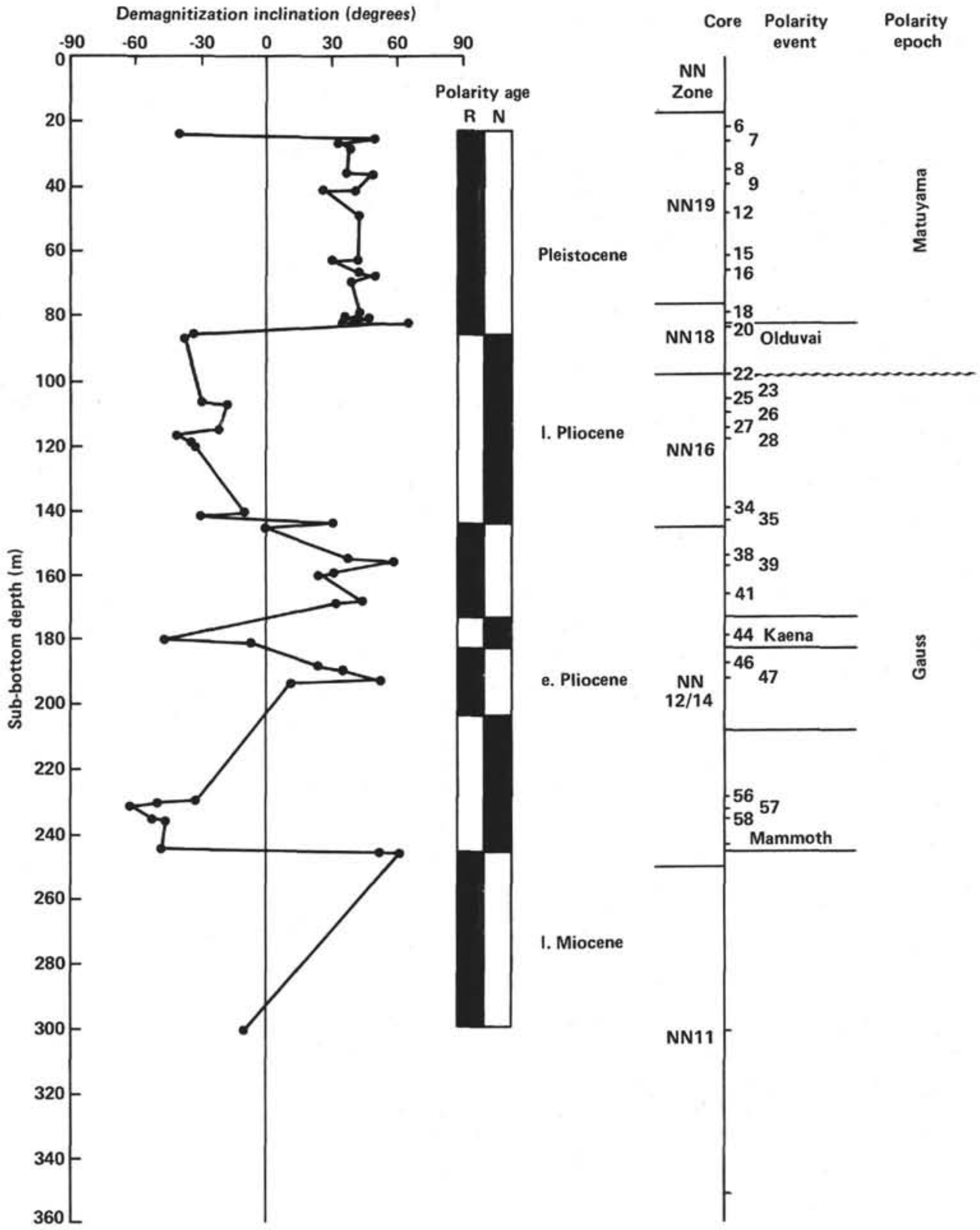

Figure 15. Stratigraphic plot of paleomagnetic sample inclinations, Site 532 (demonstration intensity: 75 Oe). Positive inclination represents normal polarity. In the black vs. white polarity sequence to right, normal polarity is indicated by black in the column labeled N and by white in the column labeled R. Ages, nannoplankton zones, core numbers, polarity events, and polarity epochs appear in columns to the right. (The depth in meters is shown on the left.)

lated. Almost all data on the hydraulic piston cores were acquired using this technique.

In general, sound velocity samples were allowed to reach room temperature (4 hours in unsplit cores) before immediate sampling.

Results

All sound velocity, wet-bulk density, porosity, water content, vane shear strength, and acoustic impedance measurements, made at laboratory pressure and temperature, are listed in Table 10 and Figures 16 to 19. Vane shear strength data are plotted versus depth in Figure 20. The data can best be appreciated in the figures and tables provided and need not be discussed. All analog GRAPE data are plotted for each core; these plots appear in Appendix B, this chapter.

CORRELATION WITH SEISMIC PROFILES

Since only hydraulic piston coring was planned for Site 532, the *Glomar Challenger* profile was run with a 15 c.i. chamber size, in order to have high resolution in the upper part of the sedimentary sequence. In the time since Site 362 was drilled, the Bundesanstalt für Geowissenschaften und Rohstoffe had run a seismic line (BGR-36) between Sites 362 and 363. At the position of Site 532, a 2-second direct travel time thick sedimentary sequence overlies the basement. The presence of oblique reflectors within the basement suggests that it may be of continental origin (Fig. 21). In the upper part of the sedimentary sequence two acoustic discontinuities can be recognized on seismic profiles. Assuming a mean sound

Table 10. Physical property data, Holes 532, 532B.

Core-section (interval in cm)	Depth in hole (m)	Compressional-sound velocity					GRAPE "special" wet-bulk density[a] (2-minute count) (g/cm^3)		Gravimetric[b,c]			Acoustic impedance[d] (g·10^5/cm^2·s)	Vane shear strength		Lithology (G.S.A. color number)
		∥ beds (km/s)	⊥ beds (km/s)	Anisotropy		Temp. (°C)	∥ beds	⊥ beds	Wet-bulk density (g/cm^3)	Wet water content (salt corr.) (%)	Porosity (salt corr.) (%)		Original (g/cm^2)	Remolded (g/cm^2)	
				∥-⊥ (km/s)	(∥-⊥)/⊥ (%)										
Hole 532															
1-2, 70–72	2.20	—	—	—	—	—	—	—	—	—	—	—	84	34	Clayey nannofossil foraminifer ooze (5Y 4/1)
1-2, 75–79	2.25	1.498	—	—	—	20	—	—	—	—	—	2.04	—		Clayey nannofossil foraminifer ooze (5Y 4/1)
1-2, 80–82	2.30	—	—	—	—	—	1.39	—	1.36^{c}	59.2^{c}	78.4^{c}	—	—		Clayey nannofossil foraminifer ooze (5Y 4/1)
2-3, 70–72	7.70	—	—	—	—	—	—	—	—	—	—	—	156	45	Mottled clayey nannofossil foraminifer ooze (5Y 4/1)
2-3, 75–77	7.75	1.527	—	—	—	20	1.46	—	1.45^{c}	51.1^{c}	72.5^{c}	2.21	—		Mottled clayey nannofossil foraminifer ooze (5Y 4/1)
4-2, 120–122	15.50	—	—	—	—	—	—	—	—	—	—	—	262	23	Clayey foraminifer nannofossil ooze (5Y 4/1)
4-2, 130–132	15.60	1.660	—	—	—	20	1.52	—	1.53^{c}	46.1^{c}	68.8^{c}	2.54	—		Clayey foraminifer nannofossil ooze (5Y 4/1)
5-3, 120–125	21.35	—	—	—	—	—	—	—	—	—	—	—	333	58	Mottled clayey diatom nannofossil ooze (5Y 4/1)
5-3, 125–127	21.45	1.522	—	—	—	20	1.53	—	1.50^{c}?	50.0^{c}?	73.1^{c}?	2.28	—		Mottled clayey diatom nannofossil ooze (5Y 4/1)
6-1, 130–133	22.90	—	—	—	—	—	—	—	—	—	—	—	304	40	Mottled clayey diatom nannofossil ooze (5Y 4/1)
6-1, 135–137	22.95	1.523	—	—	—	20	1.49	—	1.42^{c}?	53.1^{c}?	73.6^{c}?	2.16	—		Mottled clayey diatom nannofossil ooze (5Y 4/1)
7-1, 100–102	27.00	—	—	—	—	—	—	—	—	—	—	—	224	72	Mottled clayey diatom nannofossil ooze (5Y 4/1)
7-1, 105–107	27.05	1.536	—	—	—	20	1.47	—	1.49^{c}	49.3^{c}	71.6^{c}	2.29	—		Mottled clayey diatom nannofossil ooze (5Y 4/1)
8-3, 35–37	33.75	—	—	—	—	—	—	—	—	—	—	—	593	Cracked	Clayey foraminifer nannofossil ooze (5Y 3/1)
8-3, 45–47	33.85	1.484	Gassy: sonic wave attenuation			20	1.58		1.45^{c}	51.8^{c}	73.3^{c}	2.15	—		Clayey foraminifer nannofossil ooze (5Y 3/1)
9-2, 130–133	37.60	—	—	—	—	—	—	—	—	—	—	—	303	Cracked	Mottled foraminifer nannofossil ooze (5Y 4/2)
9-2, 135–137	37.65	1.532	—	—	—	20	1.55	—	1.48^{c}?	50.9^{c}?	73.4^{c}?	2.27	—		Mottled foraminifer nannofossil ooze (5Y 4/2)
10-3, 60–63	42.80	—	—	—	—	—	—	—	—	—	—	—	616	28	Mottled foraminifer nannofossil ooze (5Y 4/2)
10-3, 65–66	42.85	1.510	—	—	—	20	1.52	—	1.51^{c}	48.6^{c}	71.7^{c}	2.28	—		Mottled foraminifer nannofossil ooze (5Y 4/2)
11-2, 120–122	46.30	—	—	—	—	—	—	—	—	—	—	—	420	Cracked	Mottled foraminifer nannofossil ooze (10Y 4/2)
11-2, 125–127	46.35	1.486	—	—	—	20	1.55	—	1.46^{c}?	53.5^{c}?	76.1^{c}?	2.17	—		Mottled foraminifer nannofossil ooze (10Y 4/2)
12-3, 5–7	51.05	—	—	—	—	—	—	—	—	—	—	—	667	168	Mottled diatom foraminifer nannofossil ooze (5Y 6/4)
12-3, 10–12	51.10	1.506	—	—	—	20	1.37	—	1.39^{c}	55.7^{c}	75.7^{c}	2.09	—		Mottled diatom foraminifer nannofossil ooze (5Y 6/4)
13-3, 48–50	55.88	—	—	—	—	—	—	—	—	—	—	—	537	Cracked	Mottled diatom foraminifer nannofossil ooze (5Y 3/2)
13-3, 55–57	55.95	1.487	—	—	—	20	Poor	—	1.37^{c}	59.6^{c}	79.5^{c}	2.04	—		Mottled diatom foraminifer nannofossil ooze (5Y 3/2)
14-3, 50–52	60.30	—	—	—	—	—	—	—	—	—	—	—	502	Cracked	Mottled diatom nannofossil ooze (5Y 6/4)
14-3, 55–57	60.35	1.519	—	—	—	20	1.42	—		Bad sample		2.16	—		Mottled diatom nannofossil ooze (5Y 6/4)
16-3, 80–83	62.00	—	—	—	—	—	—	—	—	—	—	—	1045	Cracked	Clayey nannofossil diatom ooze (5Y 3/2)
16-3, 85–87	65.05	1.532	—	—	—	20	1.46	—	1.45^{c}	54.9^{c}	77.7^{c}	2.22	—		Clayey nannofossil diatom ooze (5Y 3/2)
19-3, 90–92	82.70	—	—	—	—	—	—	—	—	—	—	—	665	Cracked	Mottled diatom nannofossil marl (5Y 4/1)
19-3, 95–97	82.75	1.488	—	—	—	20	1.38	—	1.39^{c}	58.9^{c}	79.8^{c}	2.07	—		Mottled diatom nannofossil marl (5Y 4/1)
22-3, 110–112	96.10	—	—	—	—	—	—	—	—	—	—	—	1306	619	Diatom nannofossil ooze (disturbed) (5Y 5/2)
22-3, 115–117	96.15	1.487	—	—	—	20	1.35	—	1.38^{c}	59.8^{c}	80.7^{c}	2.05	—		Diatom nannofossil ooze (disturbed) (5Y 5/2)
23-2, 80–83	98.70	—	—	—	—	—	—	—	—	—	—	—	831	Cracked	Diatom nannofossil marl (5Y 4/1)
23-2, 85–87	98.75	1.488	—	—	—	19	1.51	—	1.51^{c}	50.2^{c}	74.0^{c}	2.25	—		Diatom nannofossil marl (5Y 4/1)
24-3, 60–63	104.40	—	—	—	—	—	—	—	—	—	—	—	1359	363	Diatom nannofossil marl (5Y 3/1)
24-3, 65–67	104.45	1.514	—	—	—	19	1.55	—	1.58^{c}	45.5^{c}	70.3^{c}	2.39	—		Diatom nannofossil marl (5Y 3/1)
25-2, 95–97	107.65	—	—	—	—	—	—	—	—	—	—	—	1463	Cracked	(Org. rich) diatom nannofossil marl (5Y 2/1)
25-2, 100–103	107.70	1.498	—	—	—	19	1.56	—	1.54^{c}	48.7^{c}	73.2^{c}	2.31	—		(Org. rich) diatom nannofossil marl (5Y 2/1)
26-3, 10–13	112.70	—	—	—	—	—	—	—	—	—	—	—	460	Cracked	Nannofossil diatom marl (5Y 5/1)
26-3, 15–17	112.75	1.482	—	—	—	19	1.40	—	1.41^{c}	56.8^{c}	78.3^{c}	2.09	—		Nannofossil diatom marl (5Y 5/1)
29-3, ?20–22?	124.00?	—	—	—	—	—	—	—	—	—	—	—	425	Cracked	(Org. rich) nannofossil marl (5Y 3/1)
29-3, 35–37	124.15	1.485	—	—	—	20	1.56	—	1.54^{c}	47.3^{c}	71.0^{c}	2.20	—		(Org. rich) nannofossil marl (5Y 3/1)

31-2, 110-112	130.00	—	—	—	—	—	—	—	—	—	—	—	1097	Cracked	Nannofossil marl (5Y 6/1)
31-2, 115-118	130.05	1.464	Gassy: sonic wave attenuated			20	1.70	—	1.64^c	42.1^c	67.6^c	2.40	—		Nannofossil marl (5Y 6/1)
38-2, 110-113	156.40	—	—	—	—	—	—	—	—	—	—	—	1150	100	Nannofossil marl (5Y 6/1)
38-2, 115-118	156.45	—	Gassy: sonic wave attenuated			—	1.78	—	1.72^c	37.6^c	63.1^c	—	—		Nannofossil marl (5Y 6/1)
41-3, 100-103	169.20	—	—	—	—	—	—	—	—	—	—	—	1439	206	Nannofossil marl (5Y 6/1)
41-3, 105-107	169.25	—	Gassy: sonic wave attenuated			—	1.74	—	1.73^c	38.7^c	65.2^c	—	—		Nannofossil marl (5Y 6/1)
43-2, 75-77	176.25	—	—	—	—	—	—	—	—	—	—	—	973	Cracked	Nannofossil marl (5Y 6/1)
43-2, 80-82	176.30	1.584	Gassy: sonic wave attenuated			19	1.67	—	1.64^c	42.0^c	67.2^c	2.60	—		Nannofossil marl (5Y 6/1)
44-2, 130-132	181.20	—	—	—	—	—	—	—	—	—	—	—	1239	118	Nannofossil marl (5Y 6/1)
44-2, 135-137	181.25	—	Gassy: sonic wave attenuated			—	1.75	—	1.71^c	37.8^c	62.9^c	—	—		Nannofossil marl (5Y 6/1)
47-3, 125-127	195.48	—	—	—	—	—	—	—	—	—	—	—	2052	236	Nannofossil marl (5Y 6/1)
47-3, 131-133	195.54	—	Gassy: sonic wave attenuated			19	1.75	—	1.75^c	36.7^c	62.7^c	—	—		Nannofossil marl (5Y 6/1)
48-2, 85-87	197.95	—	—	—	—	—	—	—	—	—	—	—	885	106	Nannofossil marl (5Y 6/1)
48-2, 90-93	198.00	—	Gassy: sonic wave attenuated			—	1.78	—	1.75^c?	36.5^c?	62.2^c?	—	—		Nannofossil marl (5Y 6/1)
49-1, 110-115	200.70	—	—	—	—	—	—	—	—	—	—	—	1486	—	Nannofossil marl (5Y 5/1)
49-1, 115-117	200.75	—	Gassy: sonic wave attenuated			—	1.70	—	1.62^c?	37.9^c?	59.8^c?	—	—		Nannofossil marl (5Y 5/1)
52-3, 50-53	215.10					—	—	—	—	—	—	—	1911	(cracked)	Nannofossil marl (5Y 5/1)
52-3, 55-57	215.15		Gassy: sonic wave attenuated			—	1.66	—	1.70^c	38.1^c	63.2^c	—	—		Nannofossil marl (5Y 5/1)
54-3, 60-63	223.60	—	—	—	—	—	—	—	—	—	—	—	1321	139	Nannofossil marl (5G 6/1)
54-3, 65-68	223.65	—	Gassy: sonic wave attenuated			—	1.67	—	1.75^c	34.9^c	59.8^c	—	—		Nannofossil marl (5G 6/1)
55-3, 30-33	227.30	—	—	—	—	—	—	—	—	—	—	—	1386	59	Nannofossil marl (5G 6/1)
55-3, 35-37	227.35		Gassy: sonic wave attenuated			—	1.76	—		Bad sample?		—	—		Nannofossil marl (5G 6/1)
57-3, 40-42	234.80	—	—	—	—	—	—	—	—	—	—	—	672	48	Disturbed nannofossil marl (5G 6/1)
57-3, 45-47	234.85		Gassy: sonic wave attenuated			—	1.76	—	1.76^c	34.4^c	59.0^c	—	—		Disturbed nannofossil marl (5G 6/1)
60-3, 56-58	246.36	—	—	—	—	—	—	—	—	—	—	—	1357	271	Nannofossil marl (5G 6/1)
60-3, 60-62	246.40					—	1.66?	—	1.67^c	37.5^c	61.3^c	—	—		Nannofossil marl (5G 6/1)
Hole 532B															
57-1, 70-73	233.10	—	—	—	—	—	—	—	—	—	—	—	1085	171	Nannofossil marl (5Y 6/1), layered
57-1, 75-77	233.15		Gassy: sonic wave attenuated				1.77	—	1.71^c	37.1^c	61.9^c	—	—		Nannofossil marl (5Y 6/1), layered
59-2, 35-37	241.65	—	—	—	—	—	—	—	—	—	—	—	1498	106	Mottled nannofossil marl (5Y 6/1)
59-2, 40-42	241.70		Gassy: sonic wave attenuated			—	1.67	—	1.71^c	39.0^c?	65.2^c	—	—		Mottled nannofossil marl (5Y 6/1)
62-2, 15-17	252.85	—	—	—	—	—	—	—	—	—	—	—	1427	206	Mottled nannofossil marl (5Y 6/1)
62-2, 20-23	252.90		Gassy: sonic wave attenuated			—	1.77	—	1.78^c	35.5^c	61.7^c	—	—		Mottled nannofossil marl (5Y 6/1)
65-2, 70-73	261.90	—	—	—	—	—	—	—	—	—	—	—	1244	159	Mottled nannofosisl marl (5Y 6/1)
65-2, 75-77	261.95		Gassy: sonic wave attenuated			—	1.72	—	1.74^c	36.4^c	61.8^c	—	—		Mottled nannofossil marl (5Y 6/1)
66-2, 80-83	266.00	—	—	—	—	—	—	—	—	—	—	—	1227	142	Layered, mottled nannofossil marl (5Y 4/1)
66-2, 85-87	266.05		Gassy: sonic wave attenuated			—	1.69	—	1.71^c	37.4^c	62.5^c	—	—		Layered, mottled nannofossil marl (5Y 4/1)
67-2, 10-12	268.70	—	—	—	—	—	—	—	—	—	—	—	944	Cracked	Layered nannofossil marl (5Y 6/1)
67-2, 12-14	268.72		Gassy: sonic wave attenuated			—	1.74	—	1.76^c	36.9^c	63.5^c	—	—		Layered nannofossil marl (5Y 6/1)
68-1, 120-123	272.70	—	—	—	—	—	—	—	—	—	—	—	778	Cracked	Layered nannofossil marl (5Y 6/1)
68-1, 127-130	272.77		Gassy: sonic wave attenuated			—	1.72	—		Bad sample		—	—		Layered nannofossil marl (5Y 6/1)
70-2, 10-13	280.90	—	—	—	—	—	—	—	—	—	—	—	472	Cracked	Nannofossil marl (5Y 6/1)
70-2, 15-17	280.95	1.510	Gassy: sonic wave attenauted			19	1.78	—	1.78^c	34.5^c	60.0^c	2.69	—		Nannofossil marl (5Y 6/1)

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[a] The calculation used the following parameters: ϱ_g, $\varrho_{gc} = 2.7$ g/cm^3 for sediments and 3.0 g/cm^3 for basalt; $\varrho_f = 1.025$ g/cm^3; $\varrho_{fc} = 1.128$ g/cm^3. There was a linear interpolation between 0.10126 cm^2/g, for the 6.61 cm aluminum standard, and 0.10056 cm^2/g, for the 2.54 cm aluminum standard, based on the sample's own diameter.

[b] Gravimetric data were done on ship by weight in air and weight in water using Ohaus centrogram balance; these were done by W. Meyers.

[c] Gravimetric data used the cylinder technique with the samples processed through G. Bode's laboratory at DSDP.

[d] Impedance is product of vertical velocity and gravimetric density; when gravimetric density is not available the 2-minute GRAPE density is used to calculate impedance. Where vertical velocity was not available, then horizontal velocity was used to calculate impedance.

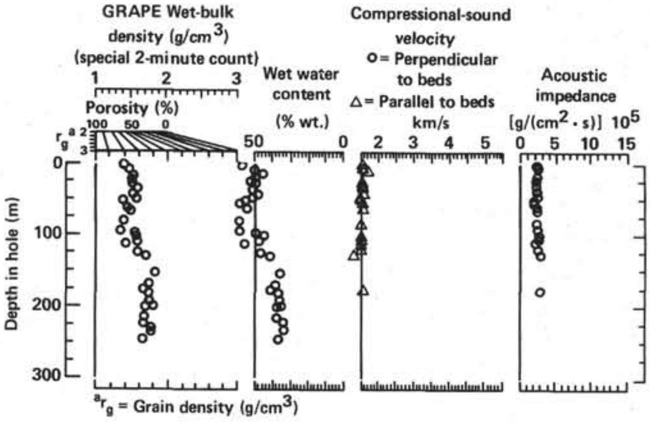

Figure 16. Laboratory velocity and associated laboratory data from Hole 532 at a condensed scale. The data are at laboratory temperatures and pressures.

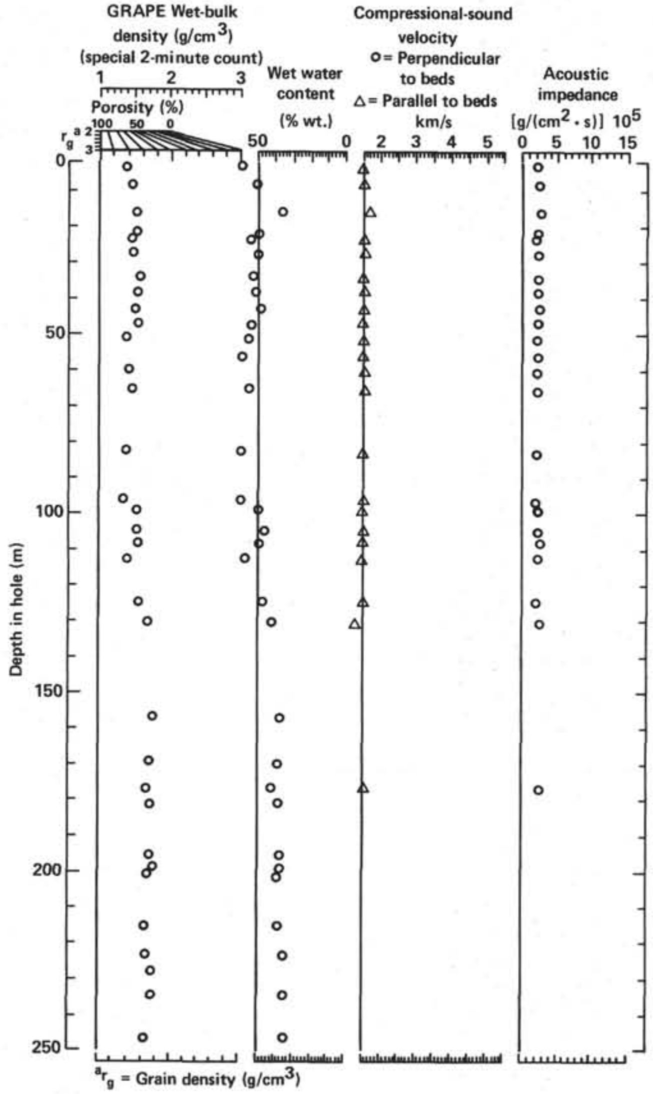

Figure 17. Laboratory velocity and associated laboratory data from Hole 532 versus depth at an expanded vertical scale. The data are at laboratory temperatures and pressures.

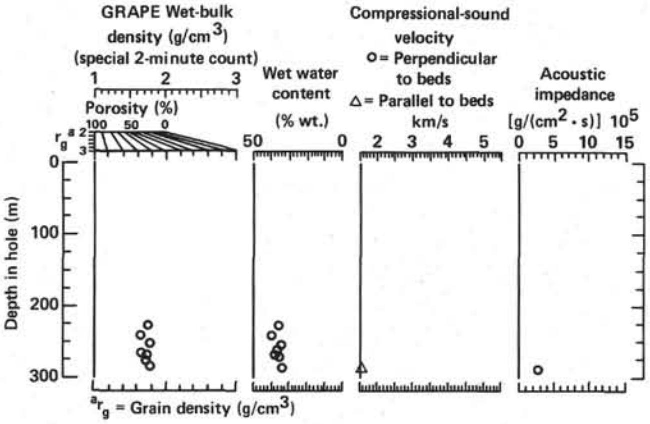

Figure 18. Laboratory velocity and associated laboratory data from Hole 532B at a condensed vertical scale. The data are at laboratory temperatures and pressures.

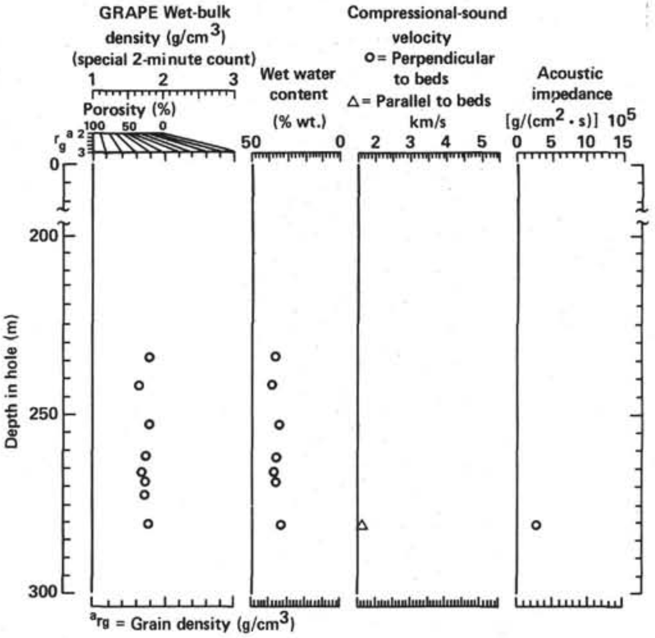

Figure 19. Laboratory velocity and associated laboratory data from Hole 532B at an expanded vertical scale. The data are at laboratory temperatures and pressures.

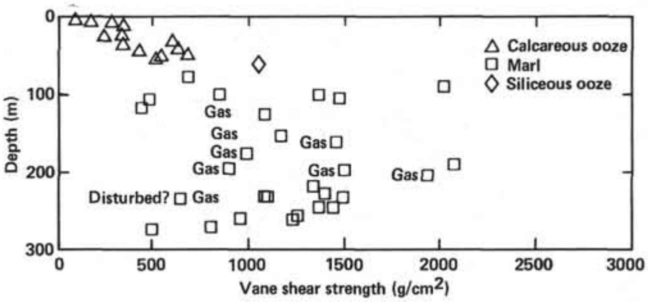

Figure 20. Vane shear strength at Site 532.

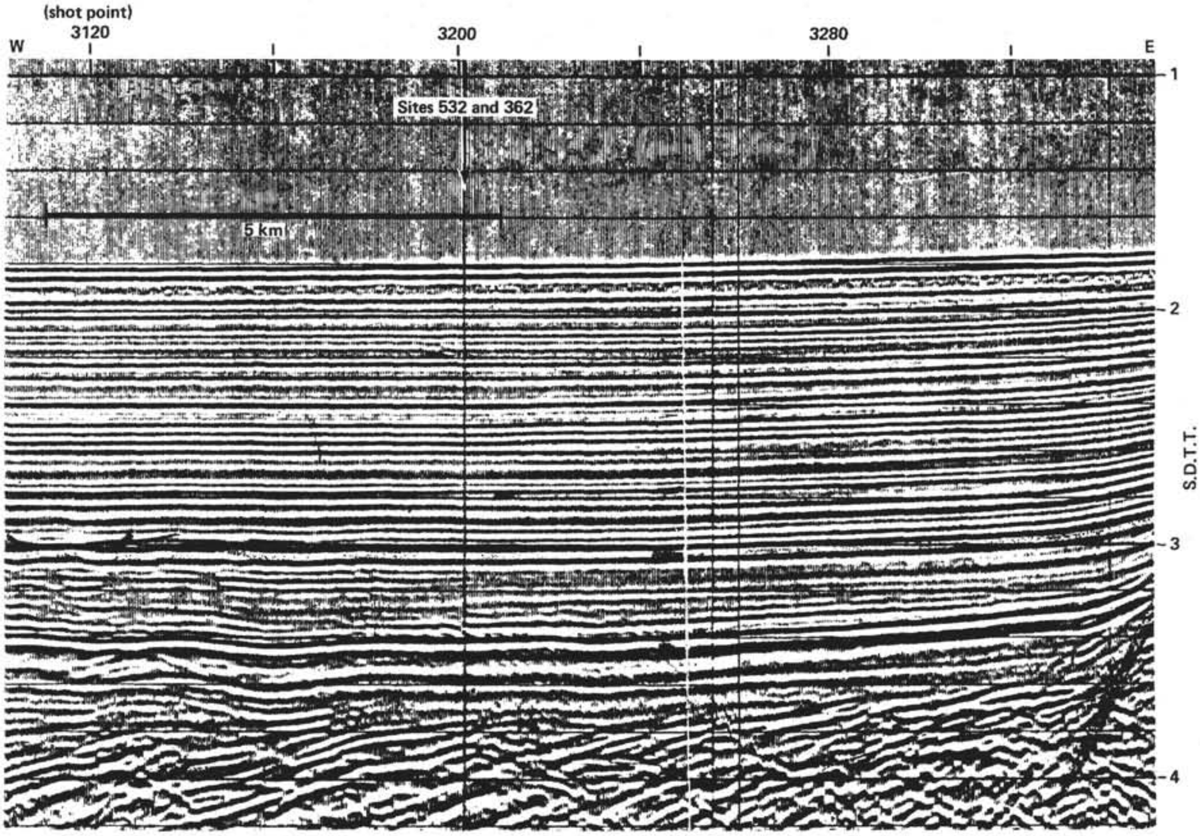

Figure 21. Processed seismic line BGR-36 showing location of Site 532.

velocity of 1.5 km/s, the acoustic discontinuity at 0.13 s is at 97 m sub-bottom depth and corresponds to a probable hiatus between calcareous nannoplankton zones NN18 and NN16. The acoustic discontinuity at 0.22 s cannot be linked to any change in lithology or physical properties. These acoustic discontinuities are indicated on the velocity-depth diagram for Site 532 (Fig. 22).

SUMMARY AND CONCLUSIONS

The upper part of Site 362 had been continuously cored by rotary drilling during Leg 40 in 1975, but all of the cores taken above a sub-bottom depth of 200 m were badly disturbed. The cores were rich in diatoms and calcareous plankton and also had a high content of organic carbon. It had been recognized that the sediments were a product of the Benguela upwelling system which started in the Miocene.

We arrived at Site 532 late on 19 August. Hole 532 was spudded in on 20 August, and hydraulic piston coring continued until the evening of 21 August, with 61 cores taken to a depth of 250.8 m.

Hole 532A was offset, spudded in, and continuous hydraulic piston coring proceeded until 23 August. Forty-seven cores were taken to reach a depth of 199.6 m. Since these cores were taken for the JOIDES Sedimentary Petrology and Physical Properties Panel, they were sealed, and only the core catchers were examined aboard ship.

Hole 532B was offset and spudded in on 23 August; continuous hydraulic piston coring proceeded until 25 August. Seventy-four cores were taken to a depth of

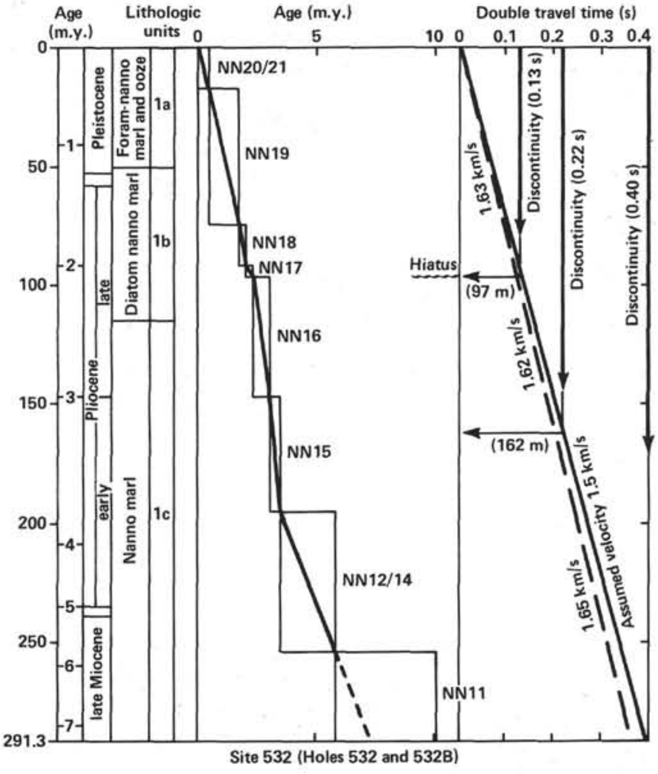

Figure 22. Velocity-depth profile showing major discontinuities. Dashed line: Site 362 velocity-depth profile. Time scale after Vincent (1977).

291.3 m. The hole was terminated because of the time necessary for the transit to Recife. Cores 1 through 56 were not opened but were frozen to be used later for geochemical studies. The remainder of the cores were studied in the usual manner.

Recovery with the HPC was good to excellent, but in the cores we opened, the top 50–150 cm of nearly all of the cores in the upper 100 m were badly disturbed. Below 100 m, the disturbance was less common, although parts of cores were gas cracked.

Site 532 was located on the eastern part of the Walvis Ridge in a trough with relatively thick sediment fill, about 1.1 nautical miles from Site 362. Our results are in general agreement with those from the earlier site, although we recovered 235 m of Pleistocene and Pliocene sediments, as opposed to 169 m recovered at Site 362.

The sediments are calcareous and siliceous biogenic open-marine pelagic deposits with variable amounts of terrigenous clay and a high organic carbon content. They accumulated rapidly at rates of between 25 and 60 m/m.y. The overall variations through the single unit we recognized can be summarized as follows (see Fig. 4):

Color: Light olive in uppermost Pleistocene, becoming darker in mid-Pleistocene with dark layers increasing in intensity and frequency; becoming lighter into the late Miocene.

Foraminifers: Common in the Pleistocene, decreasing to generally less than 10% in the early Pleistocene and older sediments.

Nannofossils: Generally 20–50%, lower in late Pliocene.

Diatoms: Only become significant (10–40%) in late Pliocene.

Carbonate: Decreases from the Pleistocene to late Pliocene (60–70% to 20–40%); increases into the late Miocene.

Organic carbon: About 3–4% in the Pleistocene, increasing to 3–6% in the late Pliocene, and decreasing to 1–2% in the late Miocene.

Clays: Increase from Pleistocene (10–20%) to late Miocene (50–60%).

Interstitial water chemistry: Salinity, chlorinity, Ca^{2+}, and Mg^{2+} decrease with depth; pH and alkalinity increase with depth.

Sedimentation rates: Pleistocene (40 m/m.y.), Pliocene (up to 62 m/m.y.), latest Miocene (25 m/m.y.).

These general features can be interpreted in terms of (1) biotic productivity, (2) terrigenous input, and (3) early diagenesis within the sediment.

Several diagenetic effects are evident within the sediments. The drastic decrease in quantity of planktonic foraminifers in the older Pleistocene and the occurrence of broken tests through the older sequence may be a function of either selective carbonate dissolution or exclusion of the planktonic foraminifers from the upwelling area. The carbonate content of the sediment remains high and generally increases with depth through the Pliocene. Some recrystallization of nannofossils appears to be occurring in the late Miocene sediments. Authigenic dolomite is noted irregularly below 100 m, while apatite or (?)carbonate-apatite and pyrite are present throughout, suggesting that the sediments beneath the upwelling system may be a significant sink for phosphorous. The formation of these minerals is in part correlated with the loss of Mg and Ca cations from the interstitial water.

In addition to the overall trends noted above, there are clearly defined light-and-dark sediment fluctuations over 1–3 m intervals having an average time span of 55,000 yr. The dark layers are richer in organic carbon, clays, and pyrite. One explanation for this cyclicity might be a periodic increase in productivity, leading to a relative increase of planktonic species without preservable skeletons. Such organisms would ingest clays and organic matter, causing their rapid sedimentation as fecal pellets and eventual preservation as the darker sediment layers. The increased nonbiogenic component of the dark layers may be, in part, the result of an increased terrestrial (wind-borne) input of clay-size material. There is little evidence that the light–dark cycles were caused by carbonate dissolution within the sediment.

Biogenic sediment accumulation rates show the development and decay of the Benguela upwelling system. Figure 23 is a cumulative plot of the accumulation rates of the three materials (calcite, silica, and organic matter) fixed by the plankton. The total of the two mineral phases remains nearly constant, but during the Pliocene opal replaces carbonate, and during the Pleistocene carbonate replaces opal. The total output of the three biogenic phases was slightly higher during the Pliocene but only by about 25% over the late Pleistocene. This suggests that the upwelling condition permits diatoms to replace calcareous nannoplankton though the overall out-

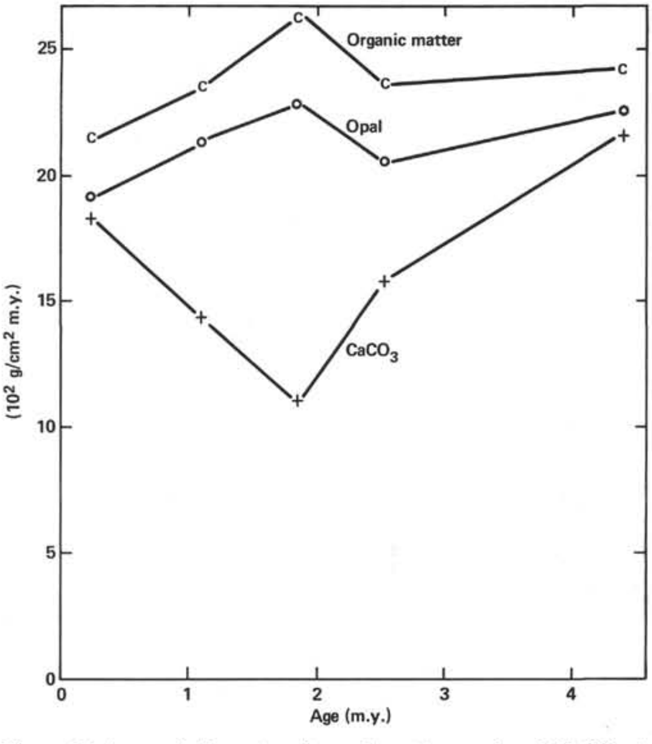

Figure 23. Accumulation rates of organic matter, opal, and $CaCO_3$ at Site 532.

put remains almost constant. Planktonic foraminiferal tests are a significant component of the calcium carbonate fraction in the late Pleistocene, but become rare in the older Pleistocene and Pliocene; they are abundant again in the late Miocene. This suggests that the planktonic foraminifers were excluded from the area during the time of strongest upwelling or that the foraminiferal lysocline was very high beneath the upwelling system or that a combination of both factors is active. Quantitative data on the phosphate content of the sediments is not yet available, but it is expected that the sediments rich in organic matter will also be enriched in phosphates, so that the sediment regime beneath the upwelling system serves as a phosphate sink. Figure 24 shows the output of the three components expressed as percent. Figure 25 shows the partitioning of carbon between organic and biogenic mineral phases. Figure 26 shows the biogenic sediment accumulation beneath the upwelling system as a triangle diagram and suggests that four stages can be recognized. Development of the system (6–4 m.y. ago) involves marked increase in incorporation of opal and organic matter in the sediment. Once organic matter becomes about 13% of the biogenic sediment (about 2.8 m.y. ago) its proportion tends to remain constant as the proportion of diatom opal increases sharply to >40% about 1.7 m.y. ago. Both organic matter and opal decreased until about 1 m.y. ago. Since then opal content of the system has decreased rapidly, but organic matter rose to more than 10% before dropping back close to its late Miocene proportion in the recent sediments.

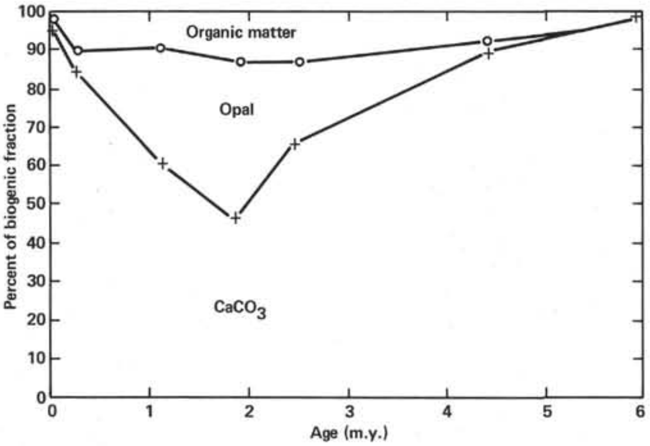

Figure 24. Output of organic matter, opal, and $CaCO_3$ expressed as percent of total biogenic sediment.

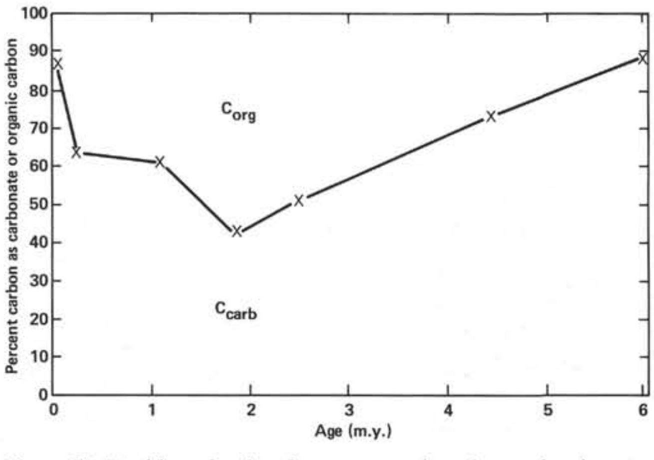

Figure 25. Partition of carbon between organic carbon and carbonate carbon through time.

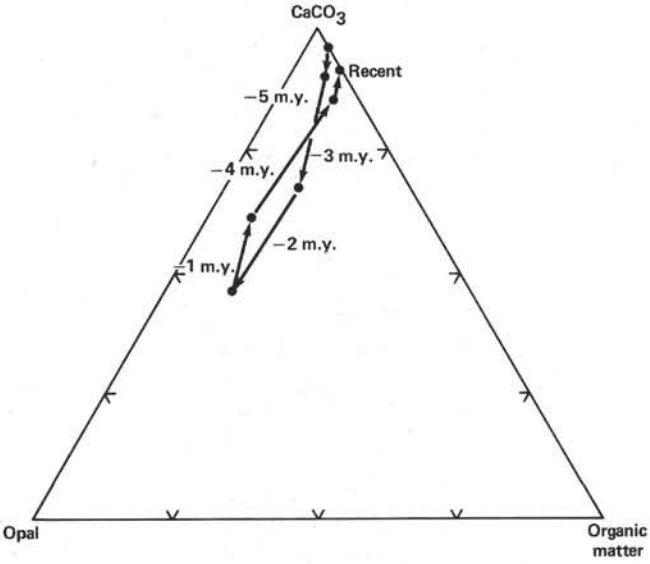

Figure 26. Triangular diagram showing changes in the relative properties of $CaCO_3$, opal, and organic matter through time, illustrating the development of the Benguela upwelling system.

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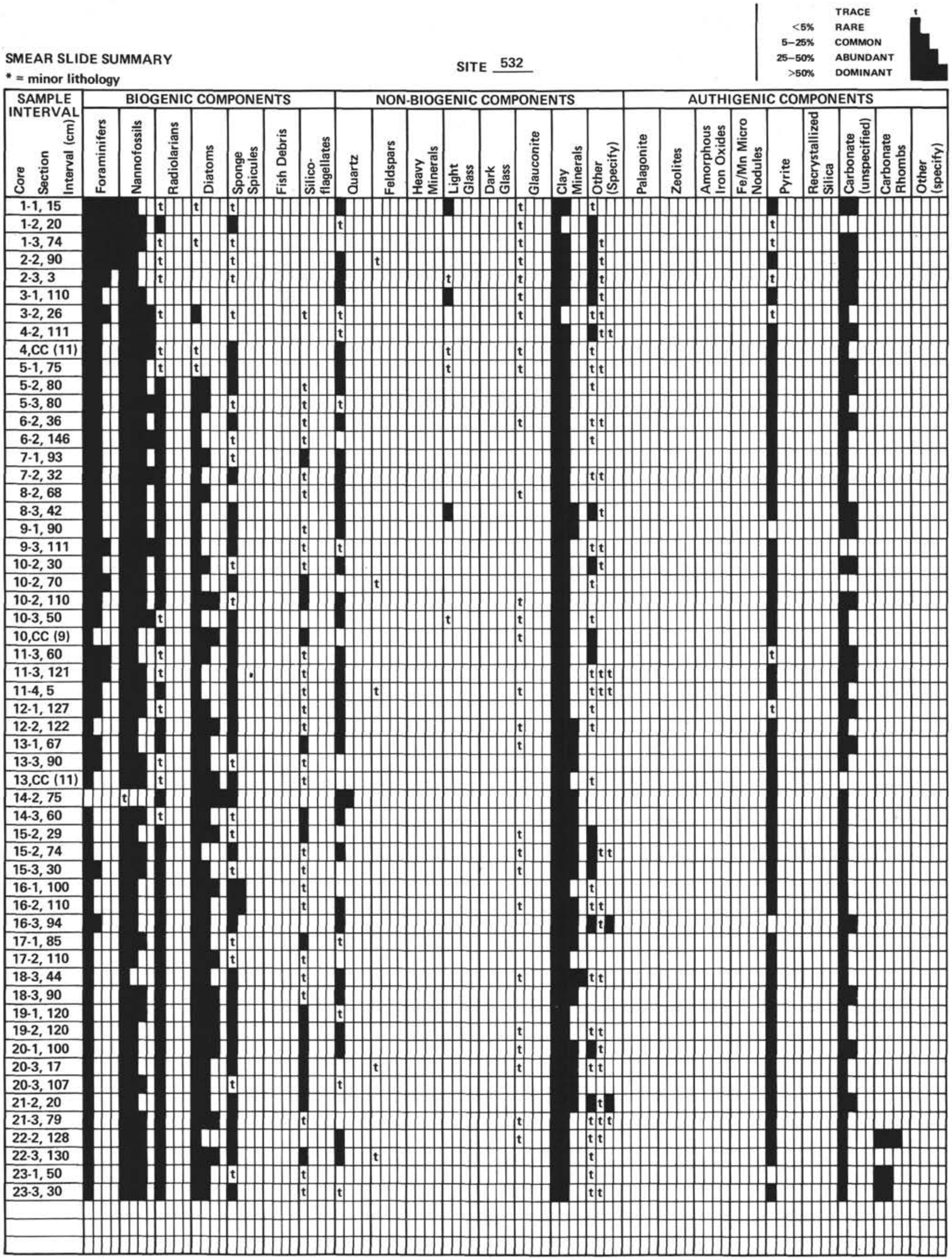
Date of Initial Receipt: July 21, 1982

APPENDIX A
Smear Slide Summary, Site 532



Appendix A. (Continued).

TRACE t
<5% RARE
5–25% COMMON
25–50% ABUNDANT
>50% DOMINANT

SMEAR SLIDE SUMMARY

* = minor lithology

SITE 532

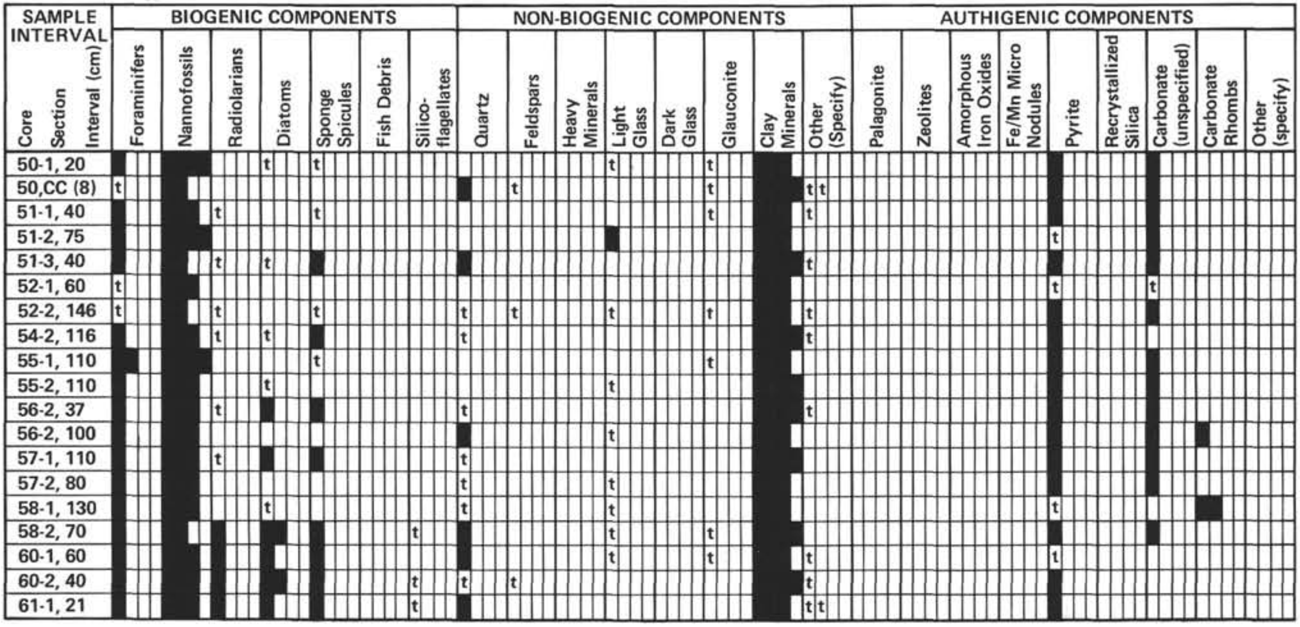
Appendix A. (Continued).

	TRACE t
<5%	RARE
5–25%	COMMON
25–50%	ABUNDANT
>50%	DOMINANT

SMEAR SLIDE SUMMARY

* = minor lithology

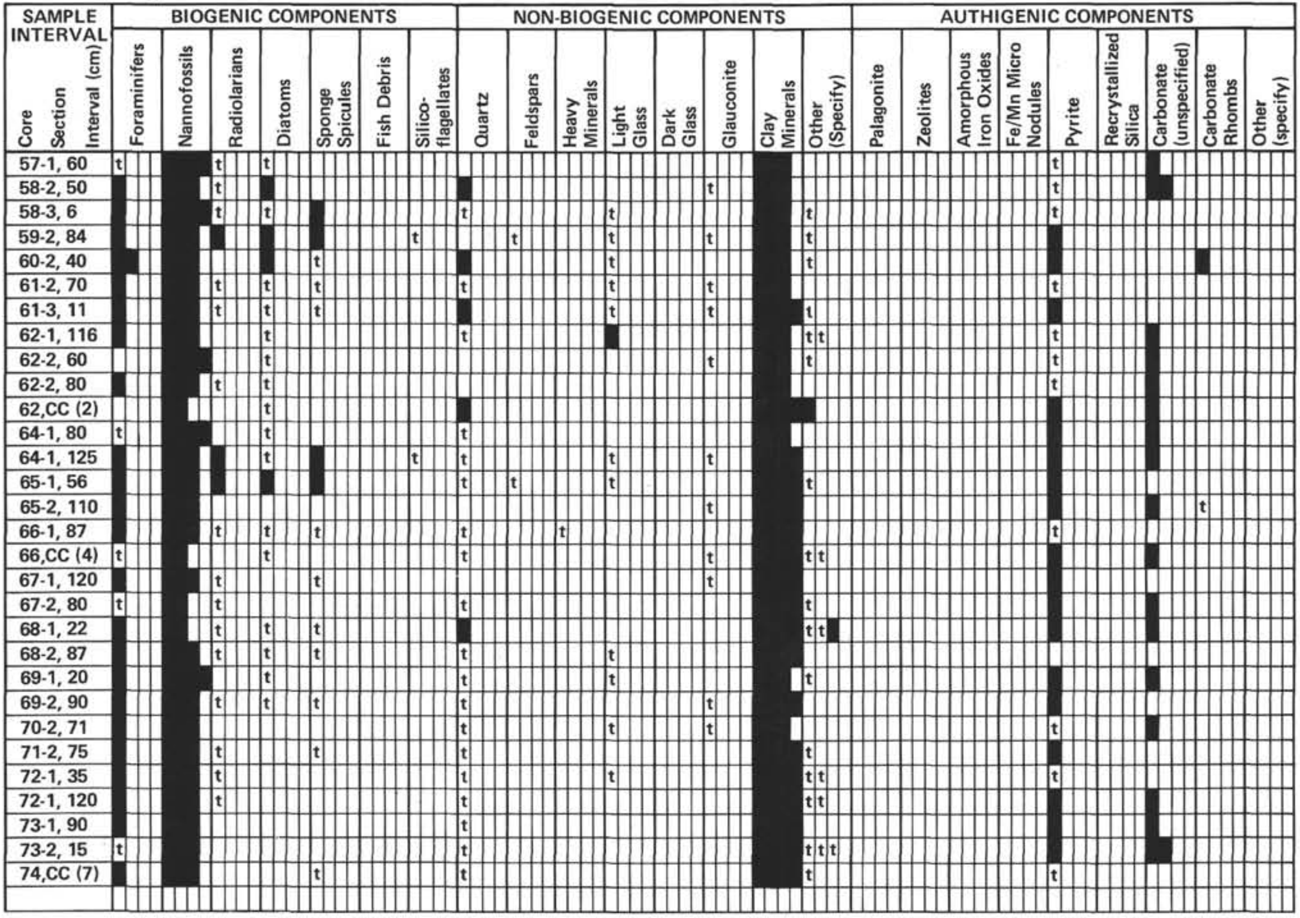
SITE 532



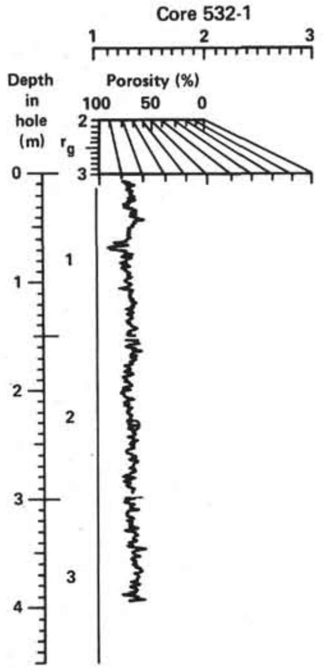
SMEAR SLIDE SUMMARY

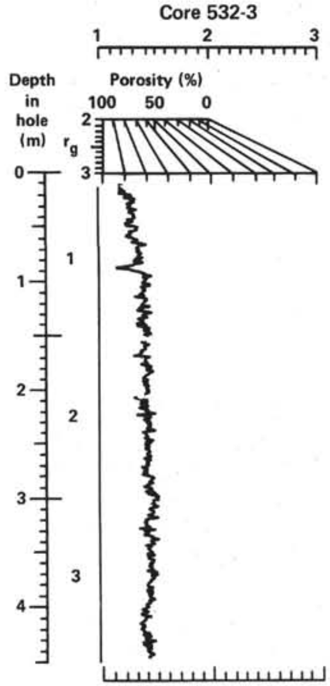
* = minor lithology

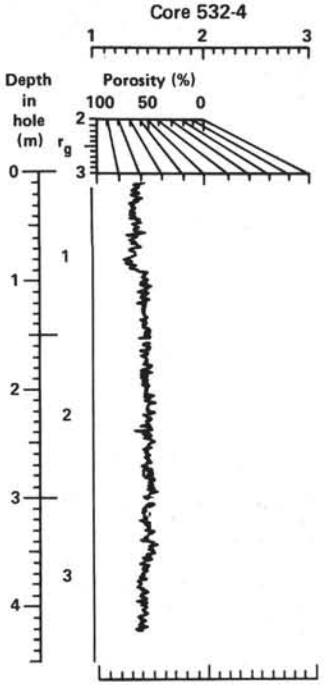
HOLE 532B

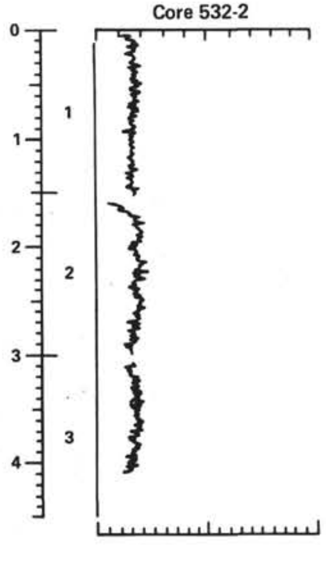


APPENDIX B
GRAPE Analog Computer Data, Site 532







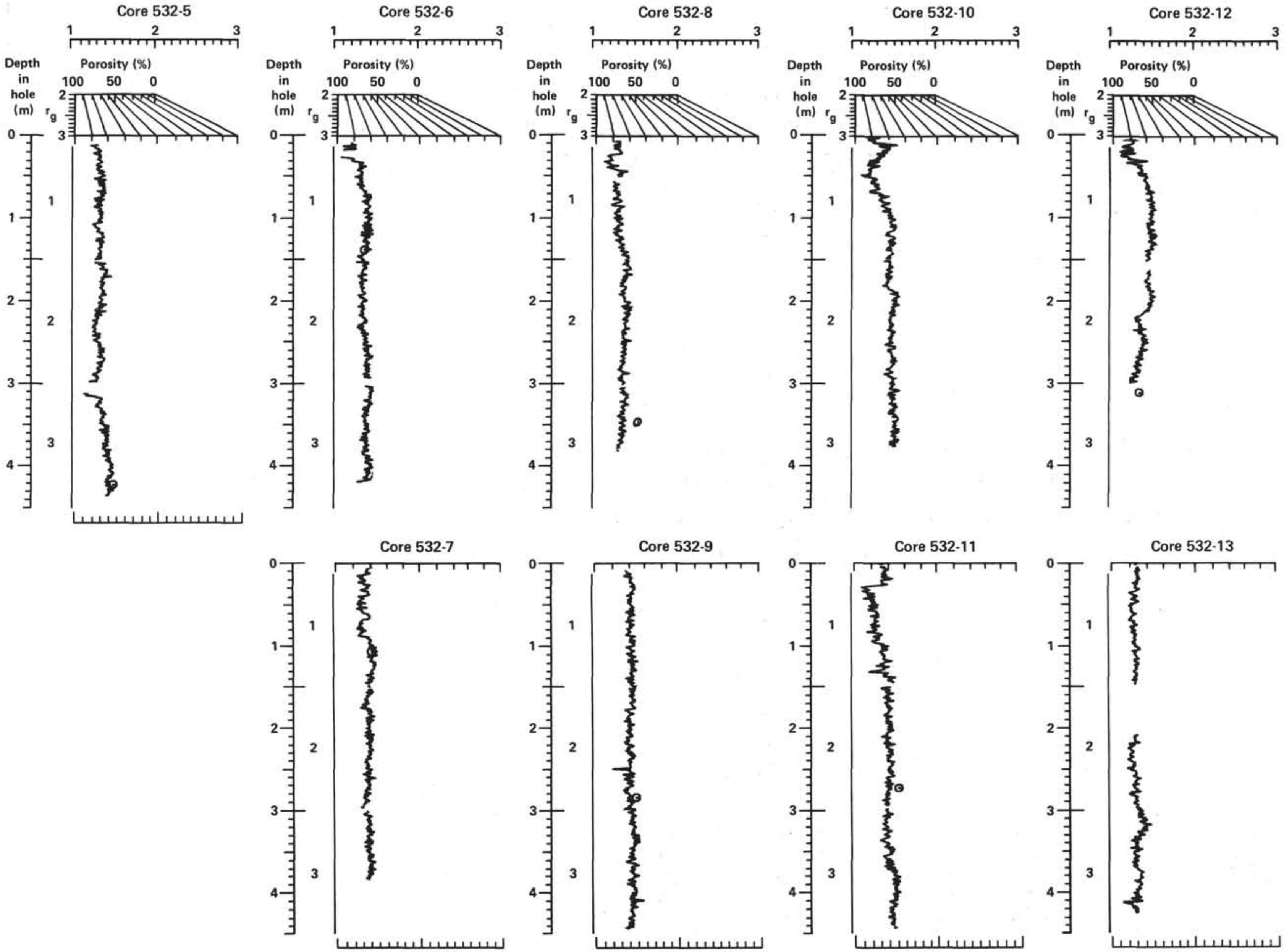


GRAPE Analog Computer Data

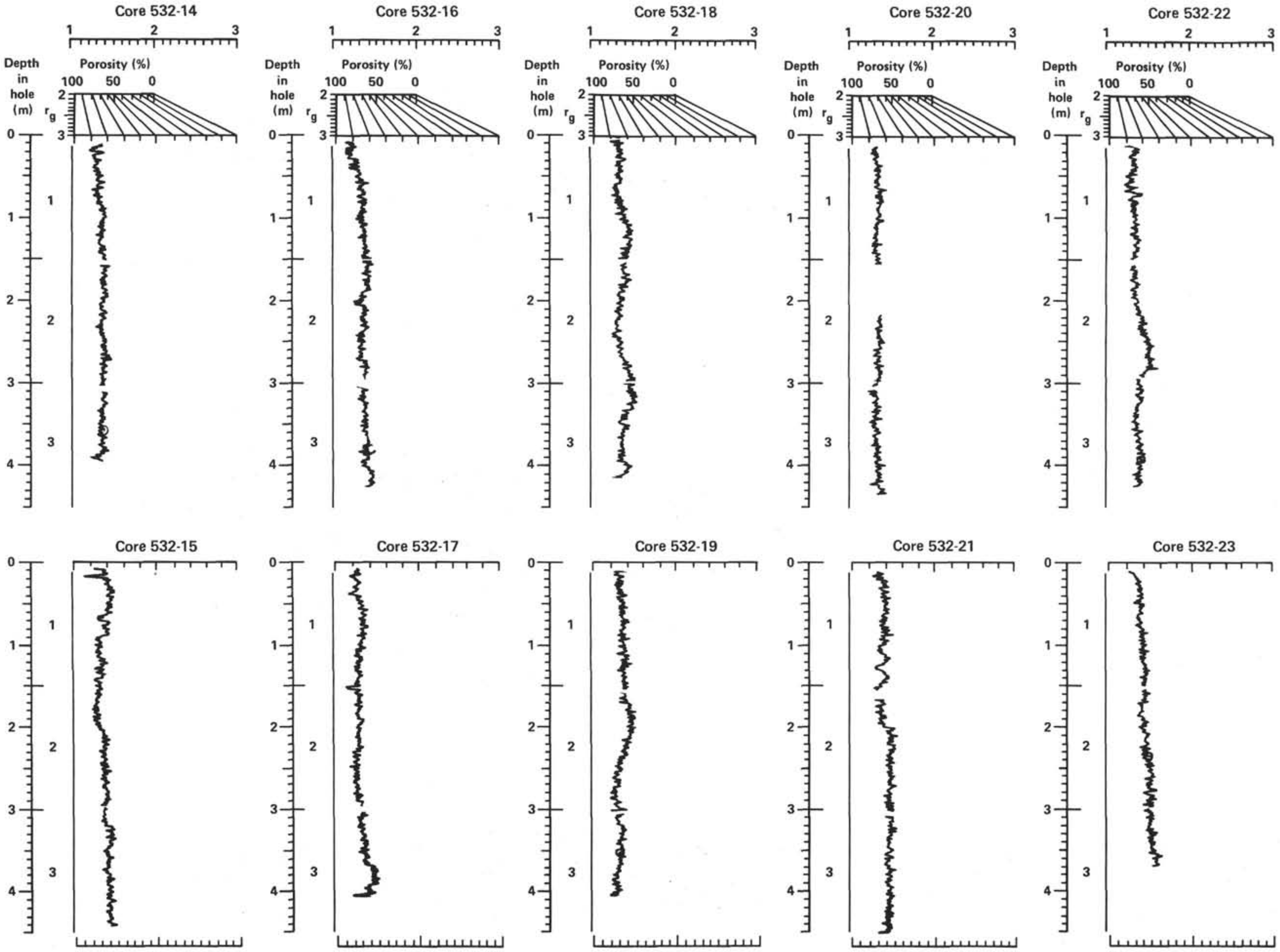
The analog GRAPE data contain disturbed and undisturbed portions of the cores; investigators should therefore consult core forms and photographs in order to distinguish valid and invalid data.

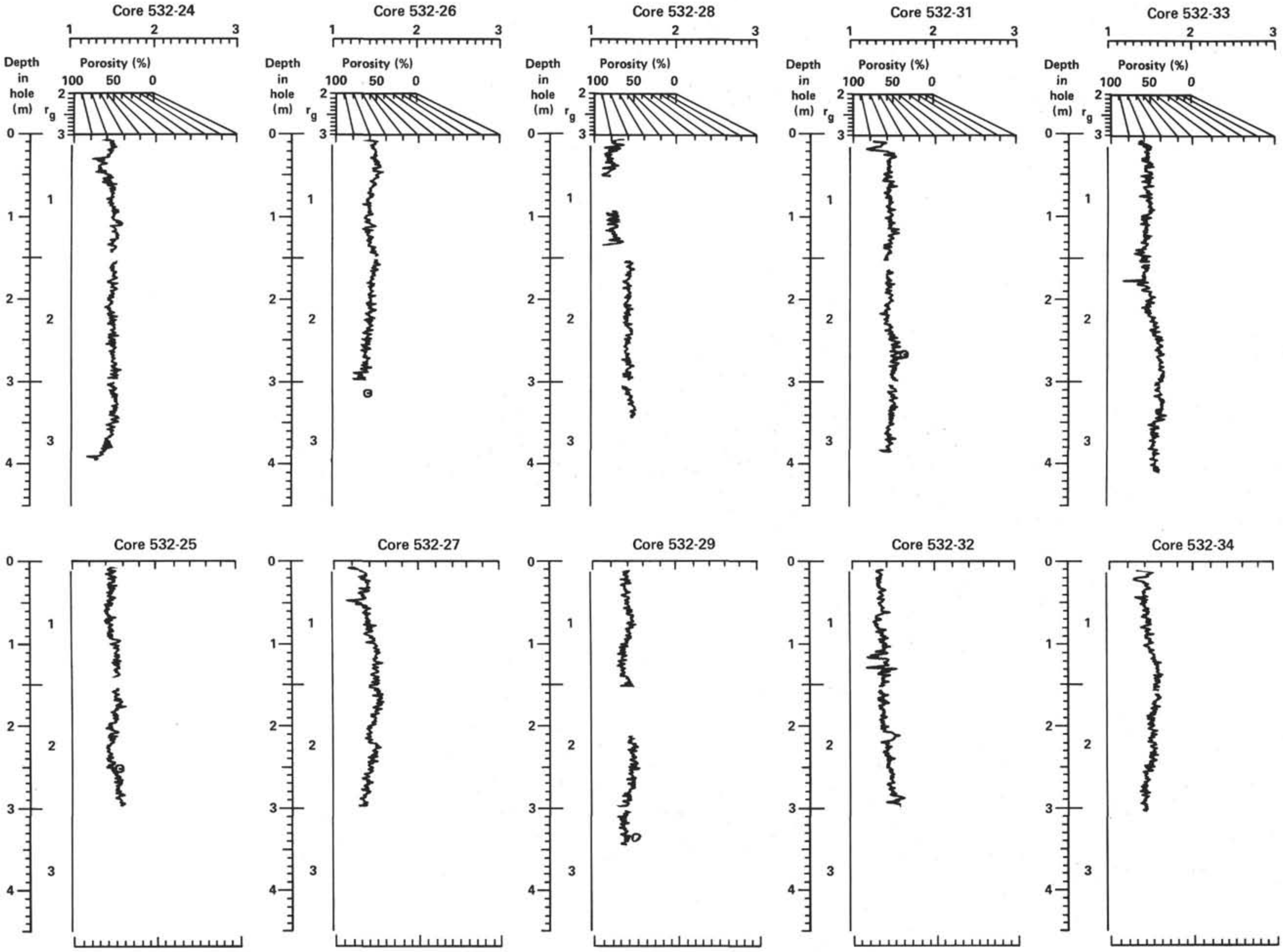
These data have been severely edited for publication. All rock diameters were measured by hand, usually one measurement per 5 cm of core segment. The core segments are very rough and irregular; therefore, when these diameters (and assuming offset from the gamma-ray beam as described by Equation 36 in Boyce, 1976) are applied to the raw GRAPE data, the resulting adjusted data (dotted lines) are subject to huge errors, particularly when core segments with small irregular diameters are scanned and the calculated (Equation 38) offset is incorrect, thus causing extremely bad data. As a result, the unadjusted GRAPE data are plotted as a solid line with "diameter adjusted" data presented as a dotted line. This allowed the obvious errors to be corrected by hand using white correction fluid and an ink pen. More importantly, this presentation allows investigators to manipulate the data. Investigators interested in the density of a specific layer or rock piece should check the sample diameter from the core photographs and make the appropriate diameter corrections as discussed in Boyce (1976).

Note: The upper scale is GRAPE wet-bulk density (1.0 to 3.0 g/cm^3); solid lines (———) are GRAPE analog data assuming a 6.61-cm core diameter; circled dots (⊙) are the wet-bulk density calculated from 2-minute counts on a stationary sample; the porosity nomogram allows a porosity scale to be determined by selecting the proper grain density (r_g) and extrapolating horizontally.


Core 532-5
Core 532-6
Core 532-8
Core 532-10
Core 532-12
Core 532-7
Core 532-9
Core 532-11
Core 532-13
1
2
3
Depth in hole (m)
Porosity (%)
100
50
0
r_g
0
1
2
3
4

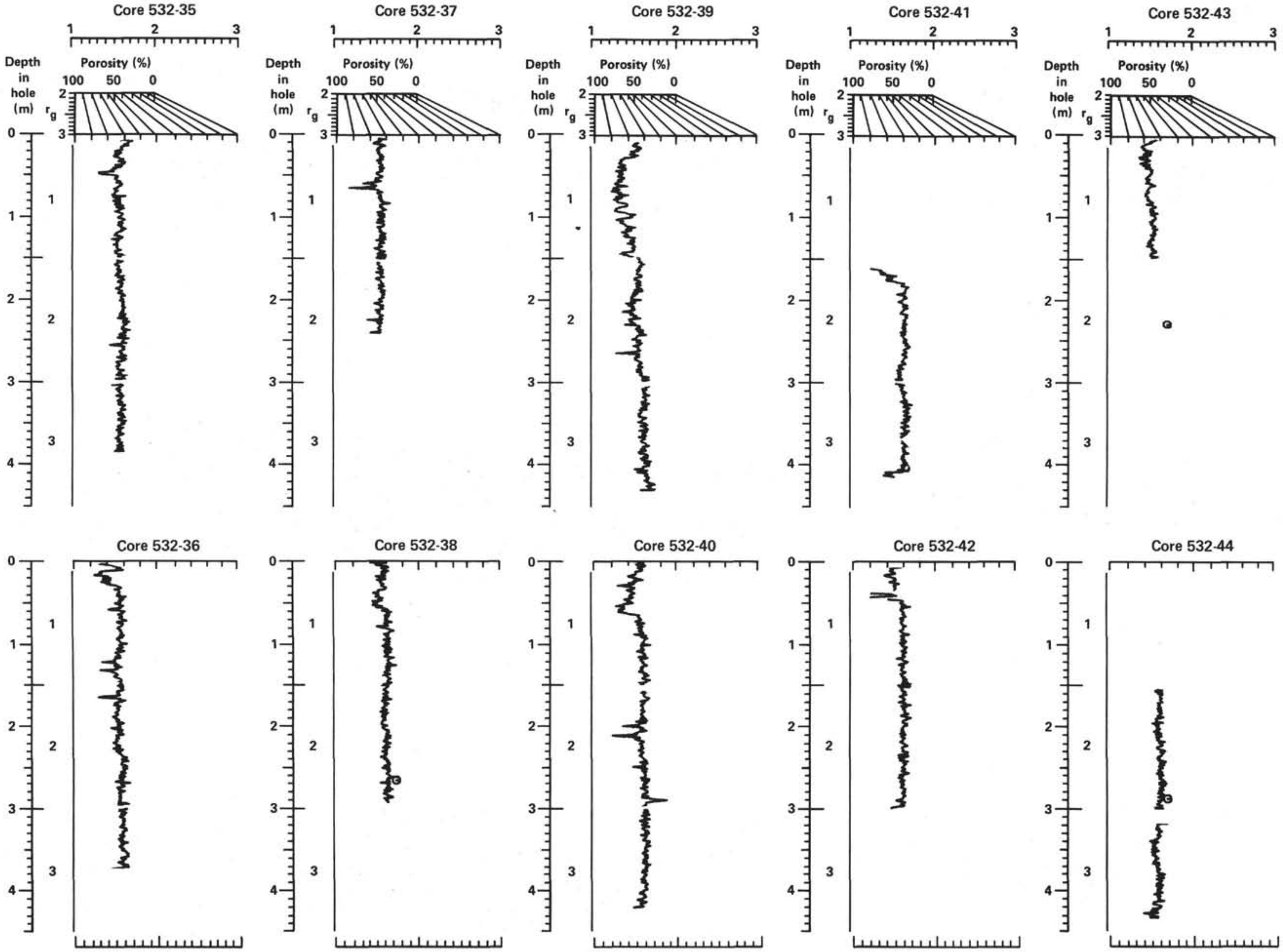
Appendix B. (Continued).

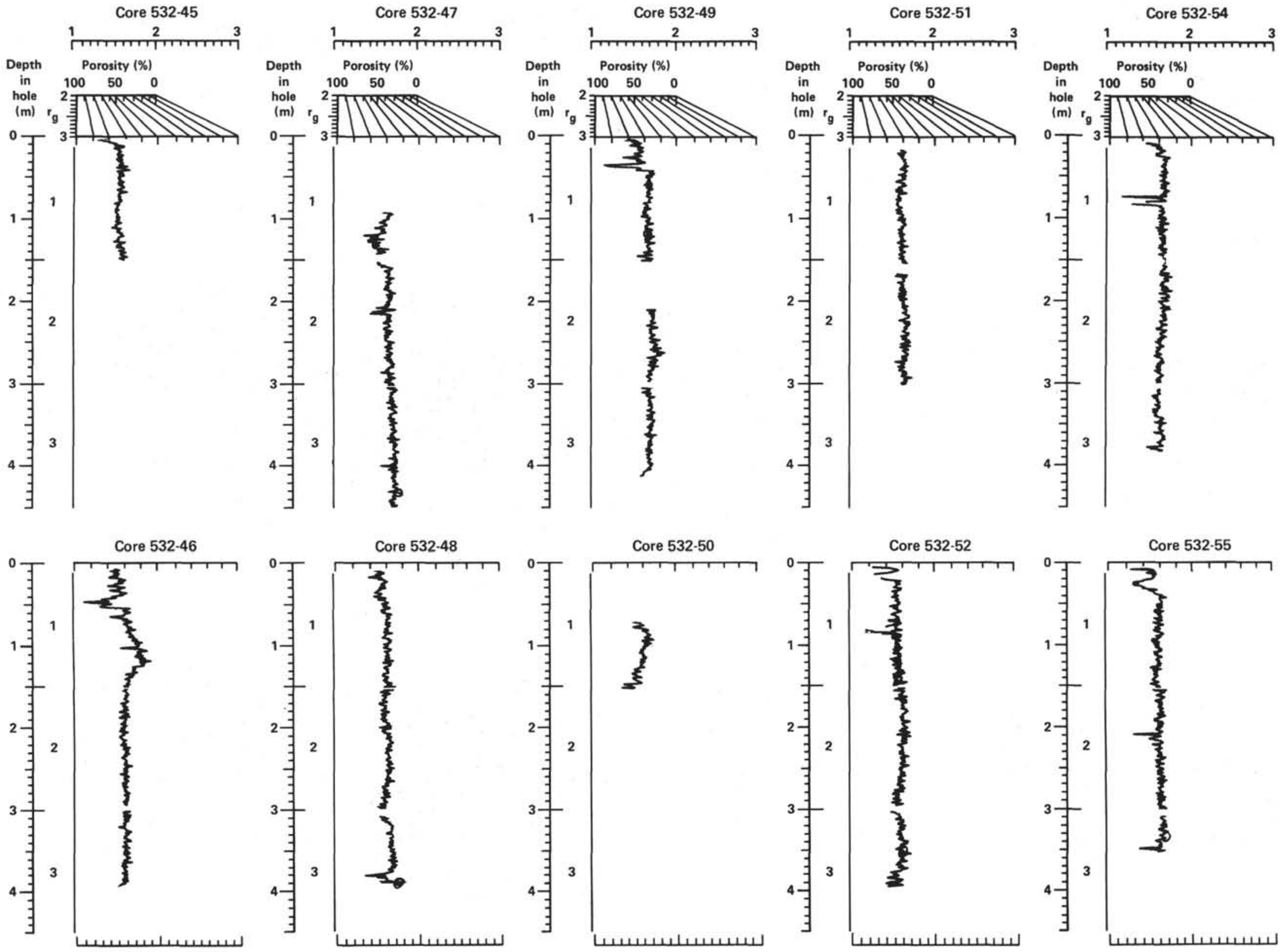




Note: no data for Core 30.

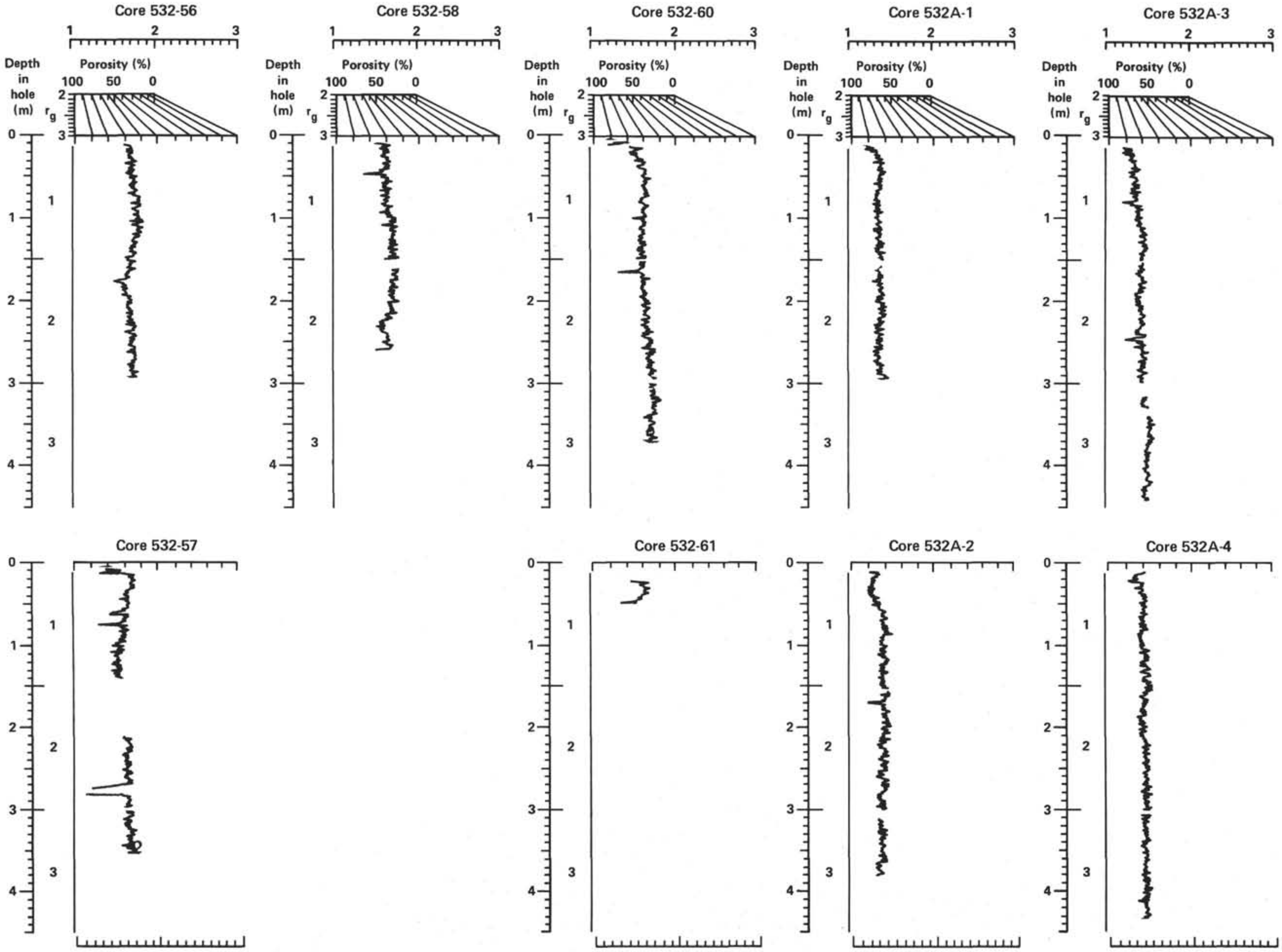
Appendix B. (Continued).



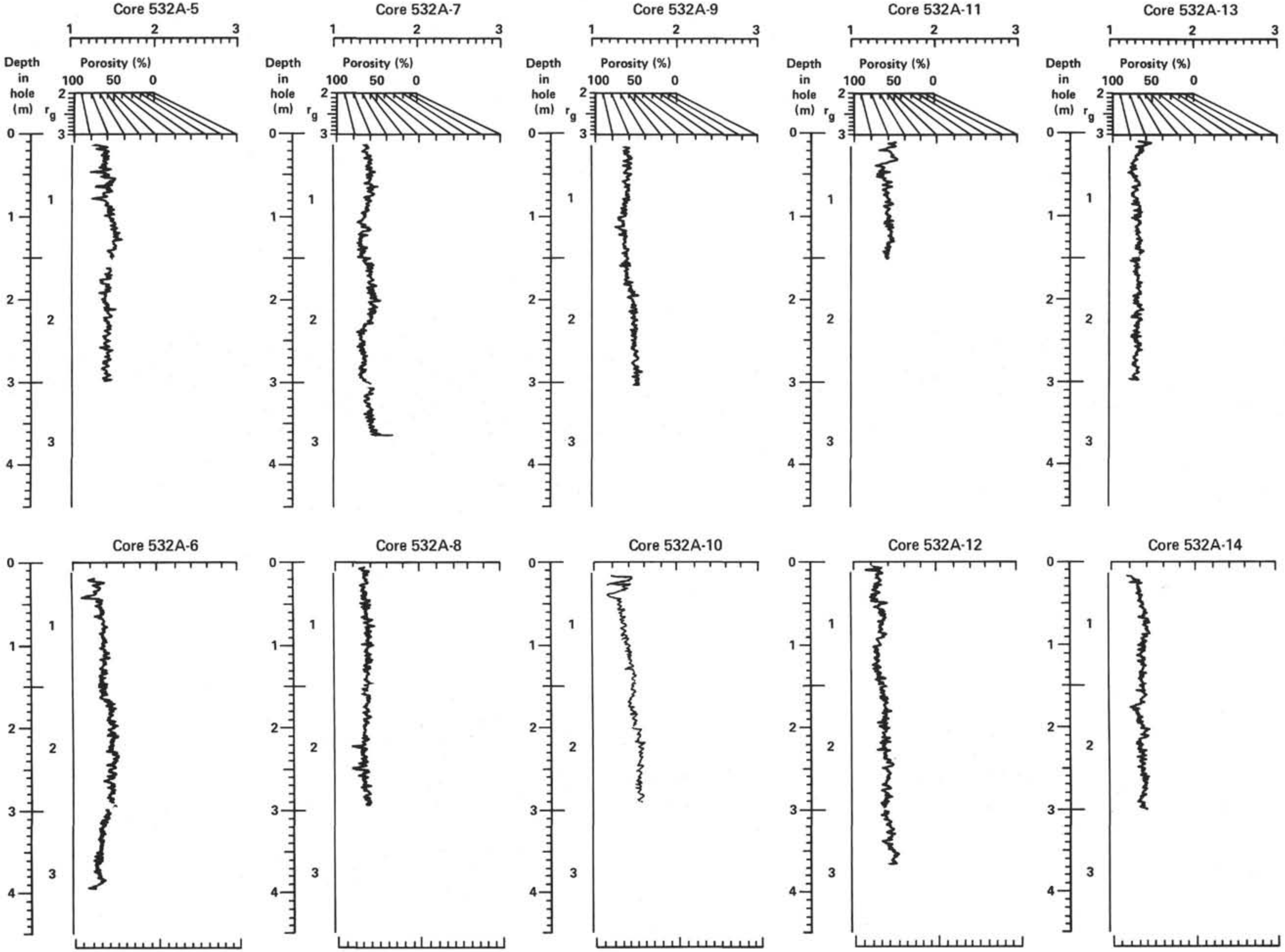


Note: no data for Core 53.

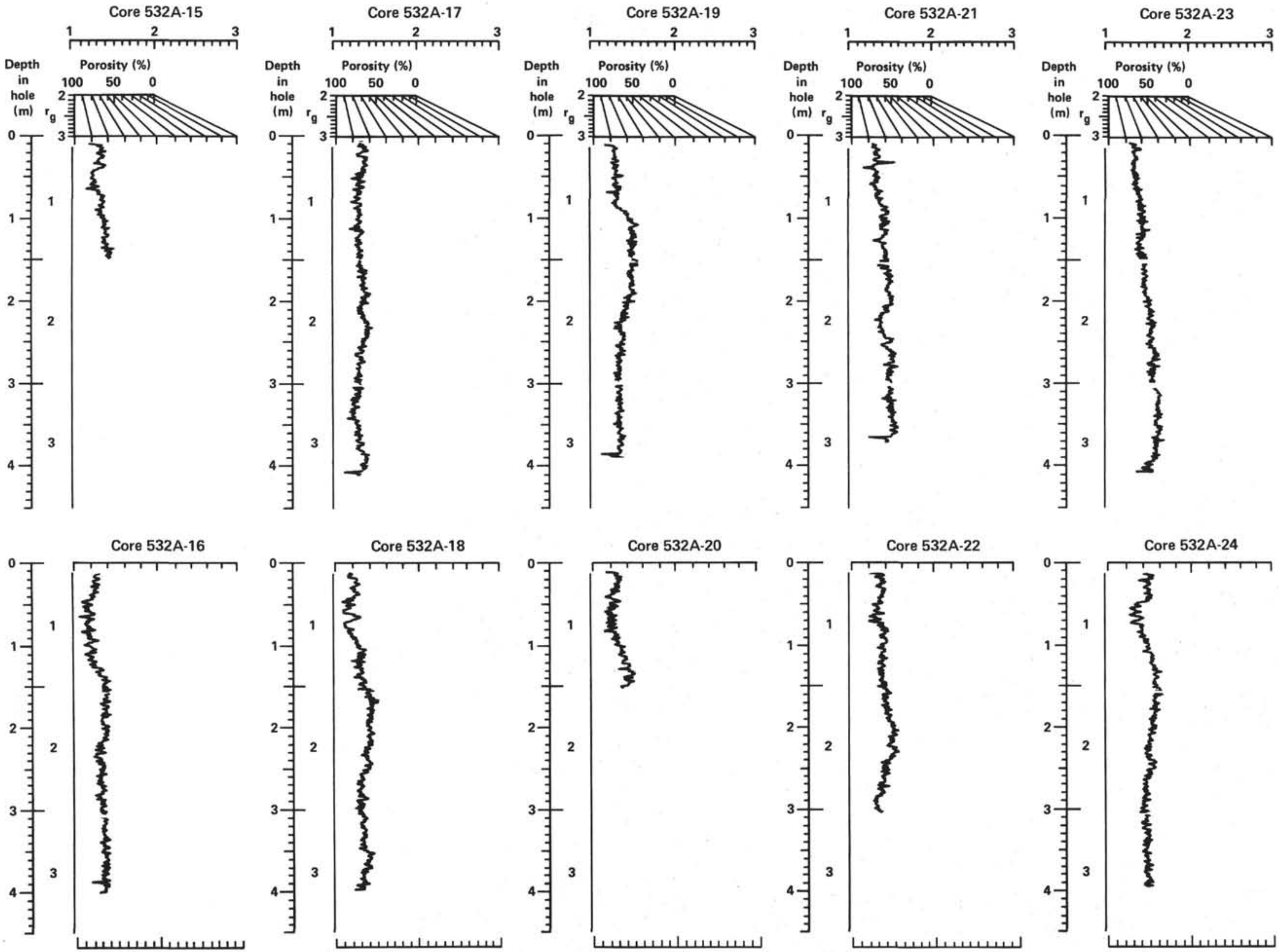
Appendix B. (Continued).

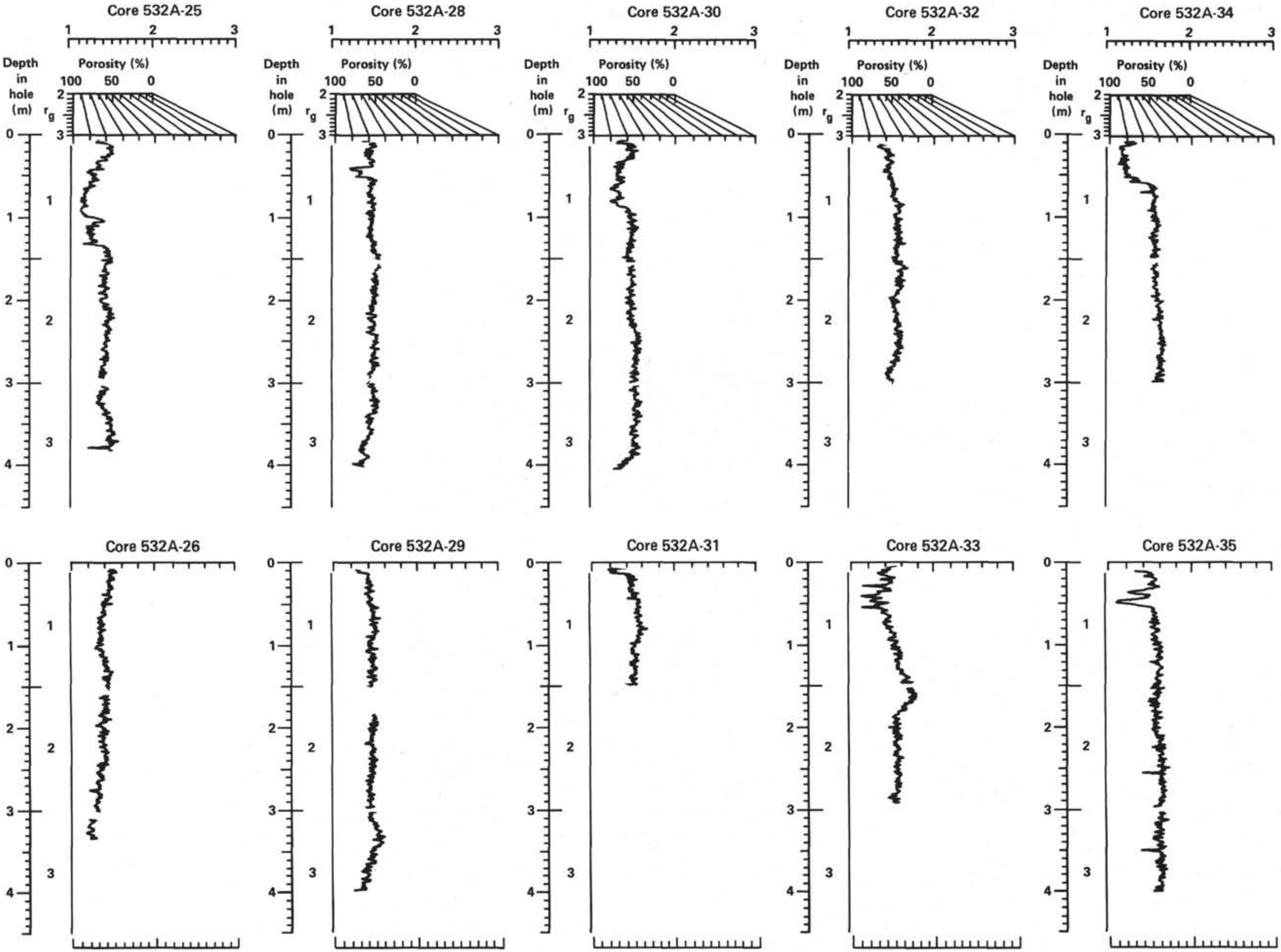


Note: no data for Core 532-59.


Core 532A-5
Core 532A-7
Core 532A-9
Core 532A-11
Core 532A-13
Core 532A-6
Core 532A-8
Core 532A-10
Core 532A-12
Core 532A-14
1
2
3
Depth in hole (m)
Porosity (%)
100
50
0
r_g
2
3
0
1
2
3
4

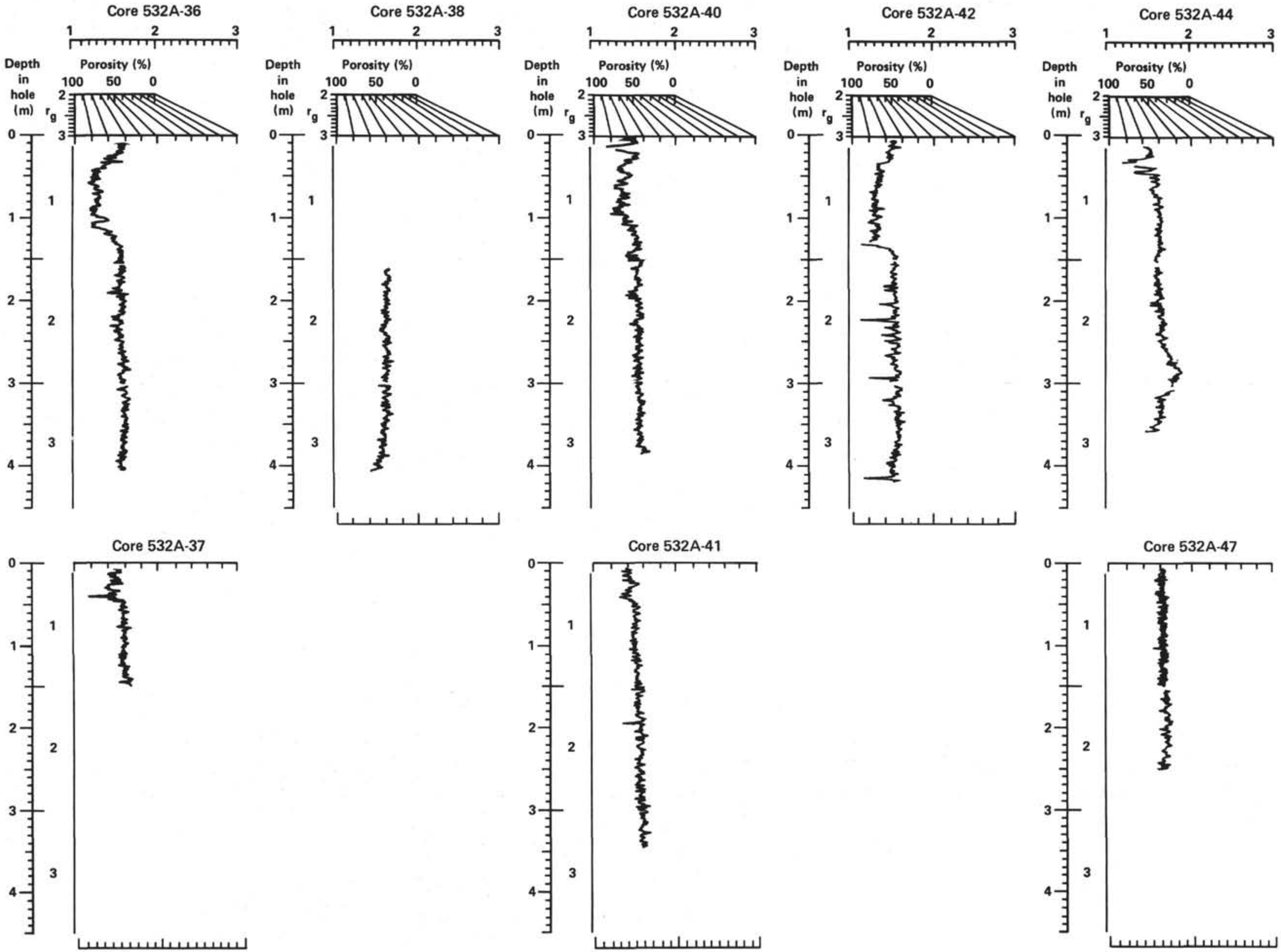
Appendix B. (Continued).





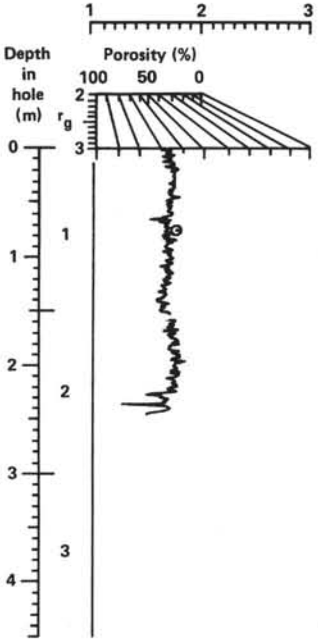
Note: no data for Core 532A-27.

Appendix B. (Continued).

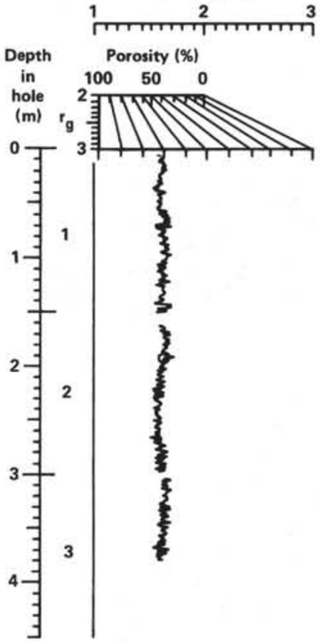


Note: no data for Cores 532A-39, 43, 45, 46.

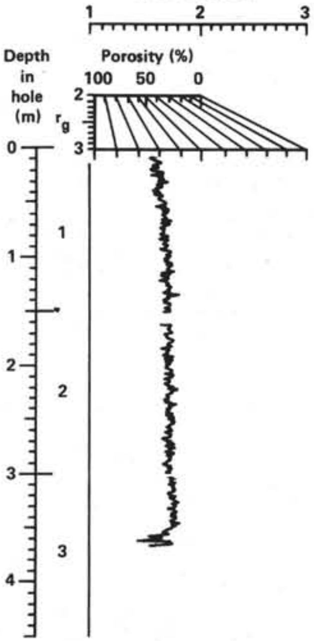
Core 532B-57



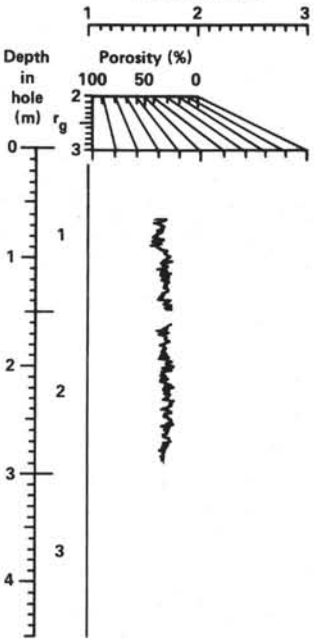
Core 532B-59



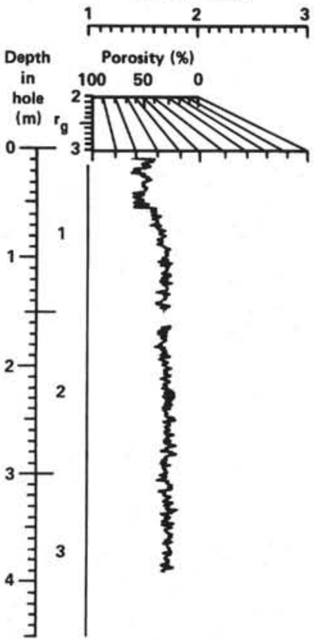
Core 532B-61



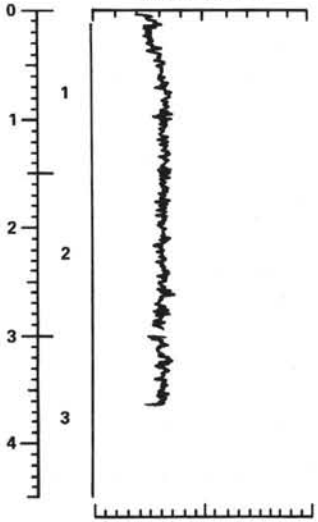
Core 532B-63



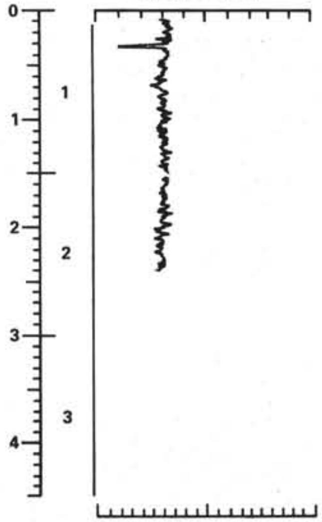
Core 532B-65



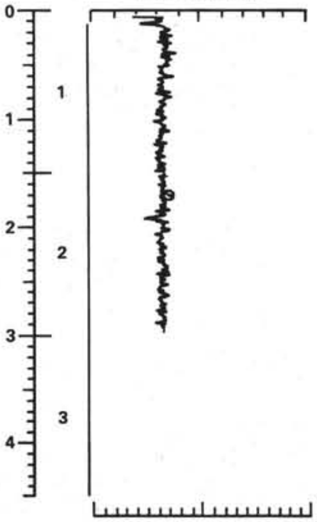
Core 532B-58



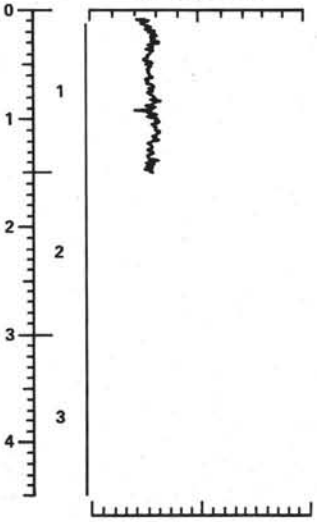
Core 532B-60



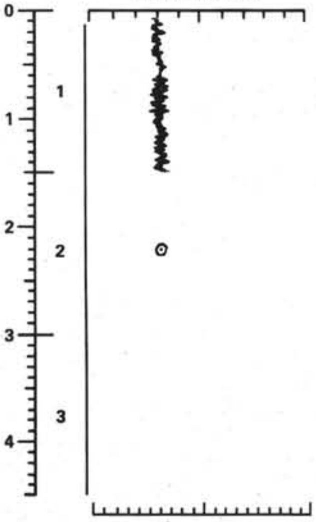
Core 532B-62



Core 532B-64

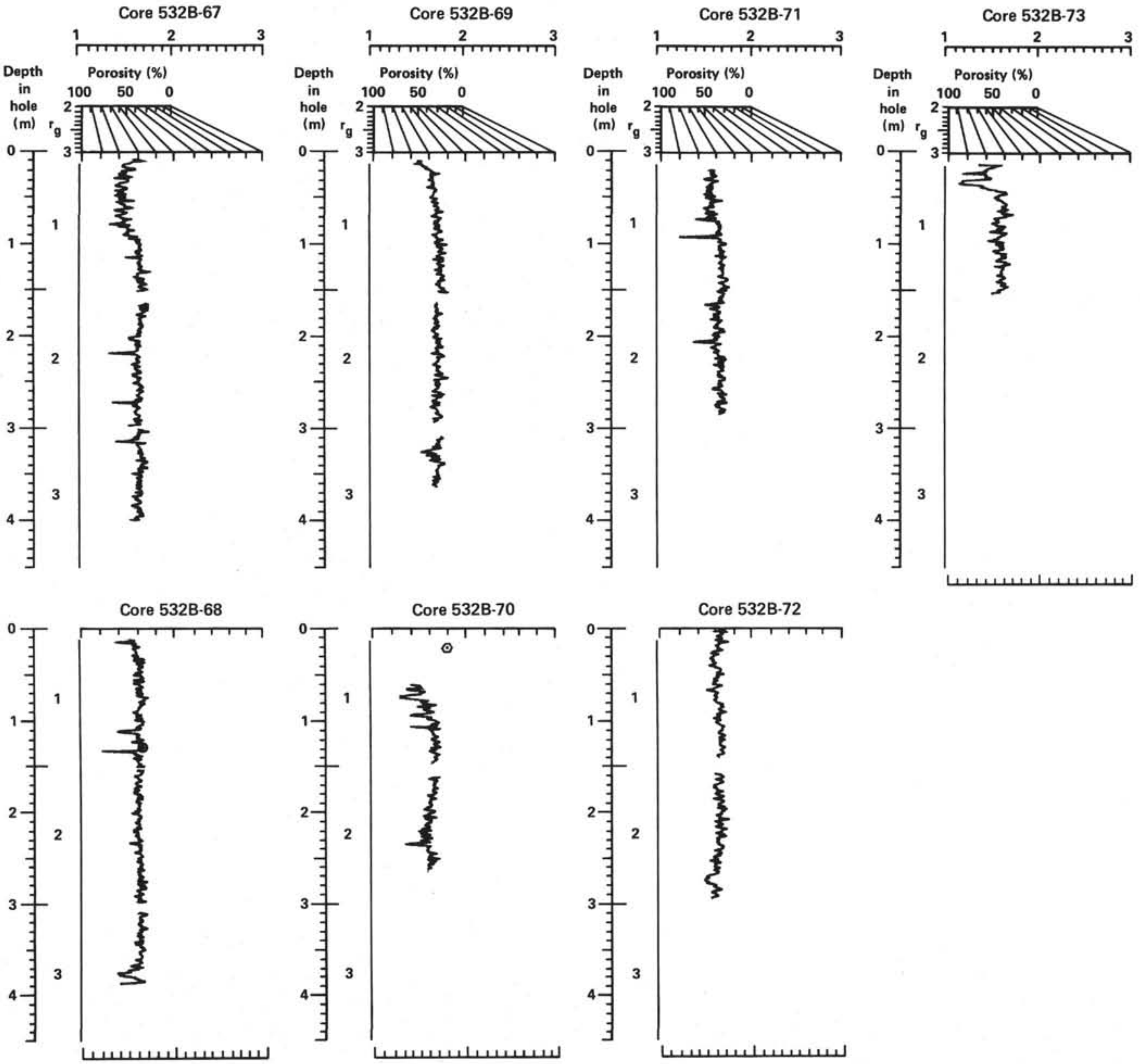


Core 532B-66

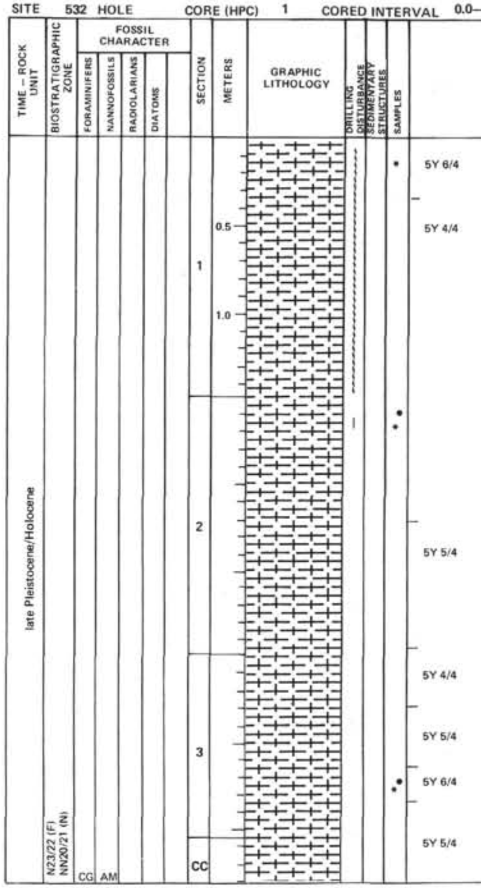


Note: no data for Cores 532B-1 through 56.

Appendix B. (Continued).



SITE 532 HOLE CORE (HPC) 1 CORED INTERVAL 0.0–4.0 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL FORAMINIFER OOZE:

Green, bioturbated, and organic-rich.

Colors: medium olive gray (5Y 4/4) is the darkest and is the most organic-rich; light olive brown (5Y 5/4) is medium dark and is medium organic-rich; and dusky yellow brown (5Y 6/4) is the lightest and is the least organic-rich(?) and has more nannofossils.

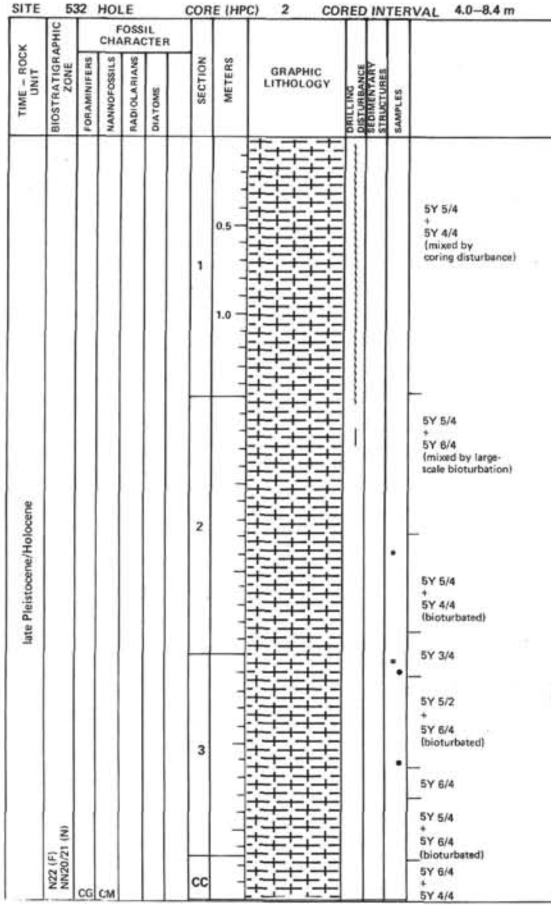
There is bioturbation throughout and rare, dark, FeS mottles.

SMEAR SLIDE SUMMARY (%):

	Nannofossil foraminifer ooze	Nannofossil foraminifer ooze	Nannofossil foraminifer ooze
Section, Depth (cm)	1, 15	2, 20	3, 74
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	51	10	35
Silt	31	60	40
Clay	19	30	25
Composition:			
Quartz	1	<1	<1
Heavy minerals	–	–	<1
Clay	14	5	10
Volcanic glass	1	–	–
Glauconite	<1	<1	<1
Pyrite	1	<1	–
Carbonate unspec.	6	–	10
Foraminifers	65	60	50
Calc. nannofossils	12	30	27
Diatoms	<1	–	<1
Radiolarians	<1	1	<1
Sponge spicules	<1	1	<1
Organic matter?	<1	2	3

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 7–9 cm = 68:3.66
3, 72–74 cm = 87

SITE 532 HOLE CORE (HPC) 2 CORED INTERVAL 4.0–8.4 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL FORAMINIFER OOZE:

Green, bioturbated, and organic-rich.

Colors:

Decreasing organic content ↓

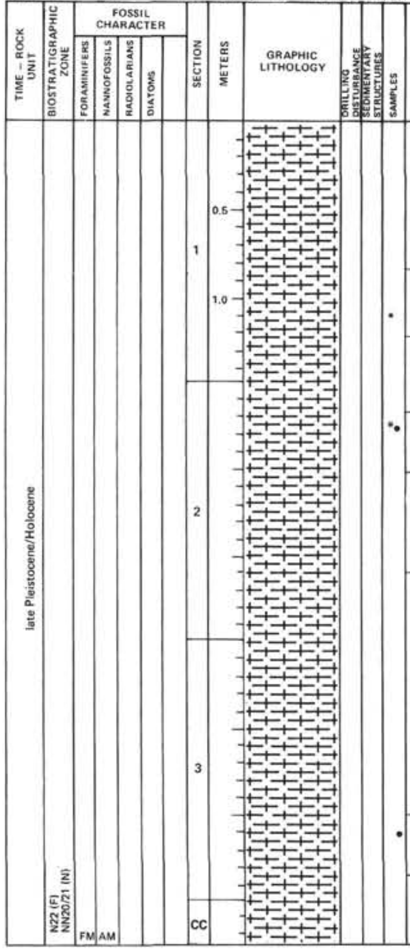
Darkest = dark olive brown (5Y 3/4)
Dark = 5Y 4/4
Medium = 5Y 5/4
Lightest = 5Y 6/4

SMEAR SLIDE SUMMARY (%):

	Nannofossil foraminifer ooze	Nannofossil foraminifer ooze
Section, Depth (cm)	2, 90	3, 3
Lith. (D = Dominant; M = Minor)	D	M
Texture:		
Sand	40	30
Silt	45	45
Clay	15	25
Composition:		
Quartz	2	1
Feldspar	<1	–
Clay	13	15
Glauconite	–	<1
Pyrite	1	<1
Carbonate unspec.	15	10
Foraminifers	55	45
Calc. nannofossils	12	25
Radiolarians	<1	<1
Sponge spicules	<1	<1
Plant debris	<1	–
Amorphous organics	2	3

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 80–90 cm = 38:3.74
3, 6–8 cm = 38:2.70
3, 60–62 cm = 82:1.42

SITE 532 HOLE CORE (HPC) 3 CORED INTERVAL 8.4–12.8 m



5Y 4/4

5Y 6/4

5Y 5/4

5Y 7/4
+ 5Y 5/4
(bioturbated colors)

5Y 6/4
+
5Y 5/4 and 5Y 7/4
(bioturbated colors)

5Y 5/4
+
5Y 6/4
(bioturbated colors)

5Y 4/4
(+ 5Y 5/4 in
burrows)

5Y 6/4
(+ 5Y 5/4 in
burrows)

LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL OOZE:
Green and bioturbated.

Colors:

Decreasing organics?

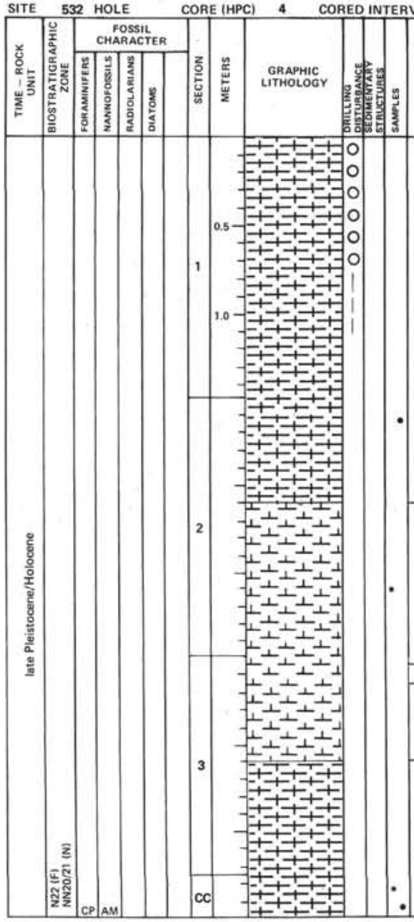
Darkest = medium olive brown (5Y 4/4)
Medium = light olive brown (5Y 5/4)
Lightest = dusky yellow (5Y 6/4) and medium grayish yellow (5Y 7/4)

SMEAR SLIDE SUMMARY (%):

	Foraminifer nannofossil ooze	Foraminifer nannofossil ooze
Section, Depth (cm)	1, 110	2, 26
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	15	15
Silt	40	30
Clay	45	55
Composition:		
Quartz	2	<1
Clay	15	5
Volcanic glass	1	–
Glauconite	<1	<1
Pyrite	1	<1
Carbonate unspec.	15	1
Foraminifers	18	30
Calc. nannofossils	46	60
Diatoms	–	3
Radiolarians	–	<1
Sponge spicules	–	<1
Silicoflagellates	–	<1
Plant debris	<1	<1
Amorphous organics	2	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 29–31 cm = 73:0.99
3, 106–108 cm = 68:3.28

SITE 532 HOLE CORE (HPC) 4 CORED INTERVAL 12.8–17.2 m



5Y 5/4

Gradational color change

5Y 6/4
(+5Y 5/4
bioturbated)

5Y 5/4 (+ 5Y 6/4
in burrows)

5Y 6/4
(+ 5Y 5/4
in burrows)

5Y 5/4
(+ 5Y 6/4
in burrows)

5Y 4/4

LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL OOZE and NANNOFOSSIL OOZE:
Green and bioturbated.

Colors:

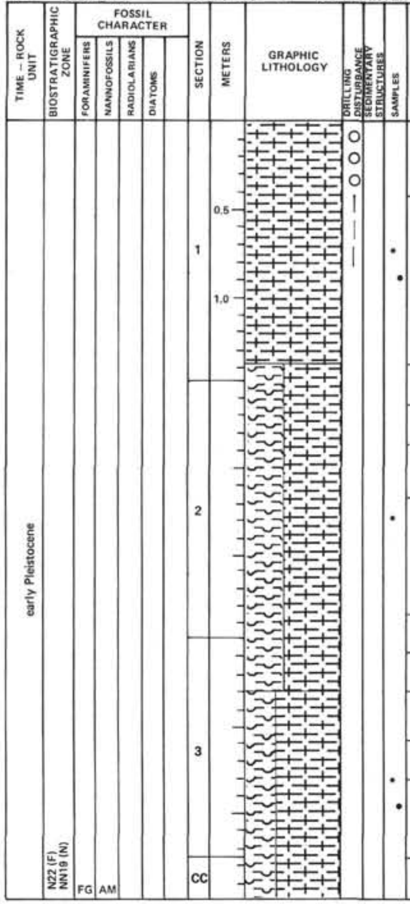
Darkest = medium olive brown (5Y 4/4)
Medium = light olive brown (5Y 5/4)
Lightest = dusky yellowish brown (5Y 6/4)

SMEAR SLIDE SUMMARY (%):

	Nannofossil ooze	Foraminifer nannofossil ooze
Section, Depth (cm)	2, 110	CC, 7
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	2	15
Silt	53	30
Clay	45	55
Composition:		
Quartz	<1	1
Mica	<1	–
Clay	15	10
Volcanic glass	–	<1
Pyrite	2	1
Carbonate unspec.	6	5
Foraminifers	8	25
Calc. nannofossils	68	55
Diatoms	–	<1
Radiolarians	–	<1
Sponge spicules	–	2
Plant debris	<1	–
Amorphous organics	2	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 17–19 cm = 68:1.83
CC = 40:4.88

SITE 532 HOLE CORE (HPC) 5 CORED INTERVAL 17.2–21.6 m



LITHOLOGIC DESCRIPTION

5Y 4/4 (+ 5Y 6/4 mottles)

5Y 4/4

5Y 3/4

5Y 5/4

5Y 3/4

5Y 4/4

5Y 3/4

5Y 4/4

5Y 7/4

5Y 6/4

5Y 7/4 (+ 5Y 5/4 in burrows)

5Y 5/4

One definite color cycle

DOMINANTLY NANNOFOSSIL OOZES:
Green and bioturbated.

FORAMINIFER NANNOFOSSIL OOZE:
Smear slide Section 1, 75 cm.

↓

FORAMINIFER DIATOM NANNOFOSSIL OOZE:
Smear slide Section 2, 80 cm.

↓

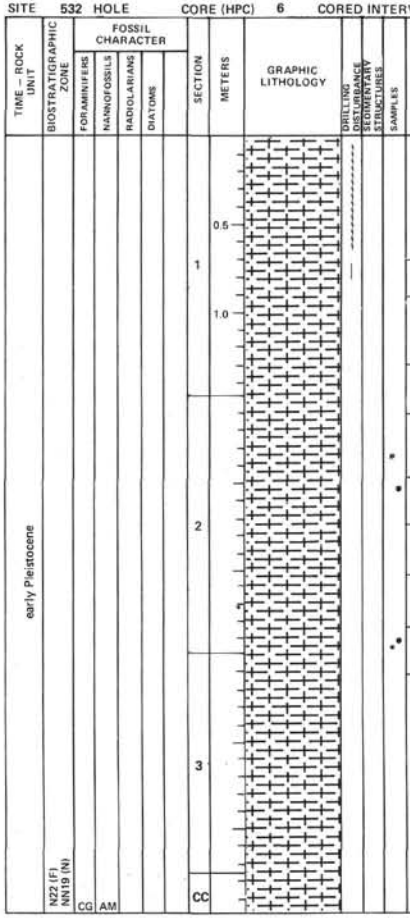
DIATOM FORAMINIFER NANNOFOSSIL OOZE:
Smear slide Section 3, 80 cm.

SMEAR SLIDE SUMMARY (%):

	Foraminifer nannofossil ooze	Foraminifer diatom nannofossil ooze	Diatom foraminifer nannofossil ooze
Section, Depth (cm)	1, 75	2, 80	3, 80
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	10	15	8
Silt	45	55	47
Clay	45	30	45
Composition:			
Quartz	1	1	<1
Clay	20	15	15
Pyrite	–	2	1
Carbonate unspec.	10	8	3
Foraminifers	20	10	15
Calc. nannofossils	45	36	55
Diatoms	<1	20	10
Radiolarians	<1	1	1
Sponge spicules	1	2	<1
Silicoflagellates	–	<1	<1
Fish remains	<1	–	–
Plant debris	–	<1	–
Amorphous organics?	–	3	–

● CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 90–98 cm = 41:5.64
2, 100–110 cm = 4:9.75
3, 96–98 cm = 70:1.98

SITE 532 HOLE CORE (HPC) 6 CORED INTERVAL 21.6–26.0 m



LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL OOZE:
Bioturbated throughout.

5Y 7/4

5Y 6/4

5Y 5/4

5Y 4/4

5Y 3/4

5Y 5/4

5Y 6/4

5Y 7/4

5Y 4/4 (+ 5Y 7/4 in burrows)

5Y 4/4

Complete dark/light cycle

Light

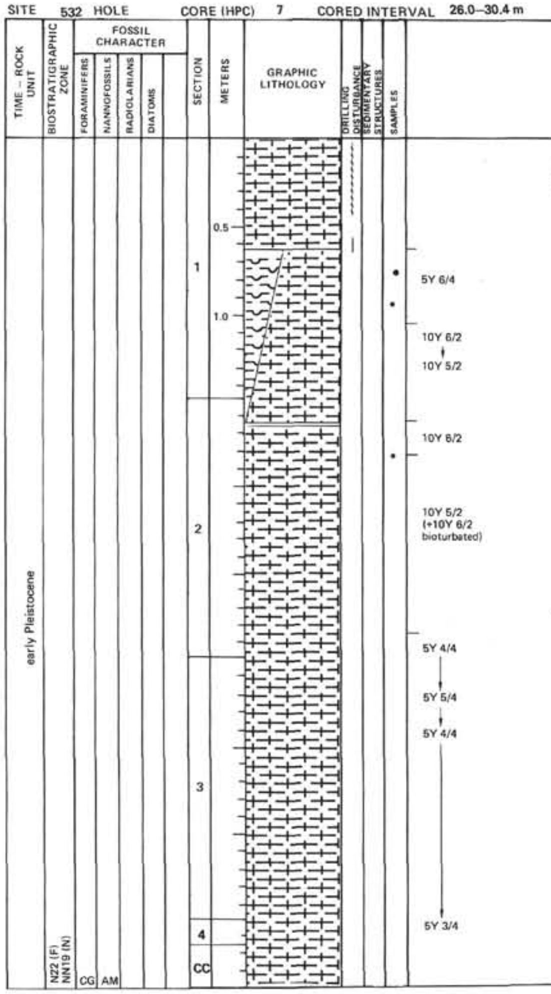
Dark

SMEAR SLIDE SUMMARY (%):

	Foraminifer nannofossil ooze	Foraminifer nannofossil ooze
Section, Depth (cm)	2, 36	2, 146
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	15	7
Silt	35	68
Clay	50	25
Composition:		
Quartz	1	–
Mica	<1	–
Clay	12	15
Glauconite	<1	–
Pyrite	1	2
Carbonate unspec.	10	3
Foraminifers	20	15
Calc. nannofossils	49	62
Diatoms	2	3
Radiolarians	1	1
Sponge spicules	3	<1
Silicoflagellates	<1	<1
Plant debris	<1	<1

● CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 55–56 cm = 34:6.06
2, 144–145 cm = 82:2.26

SITE 532 HOLE CORE (HPC) 7 CORED INTERVAL 26.0–30.4 m



LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL OOZE (dominant) and DIATOM FORAMINIFER NANNOFOSSIL OOZE:

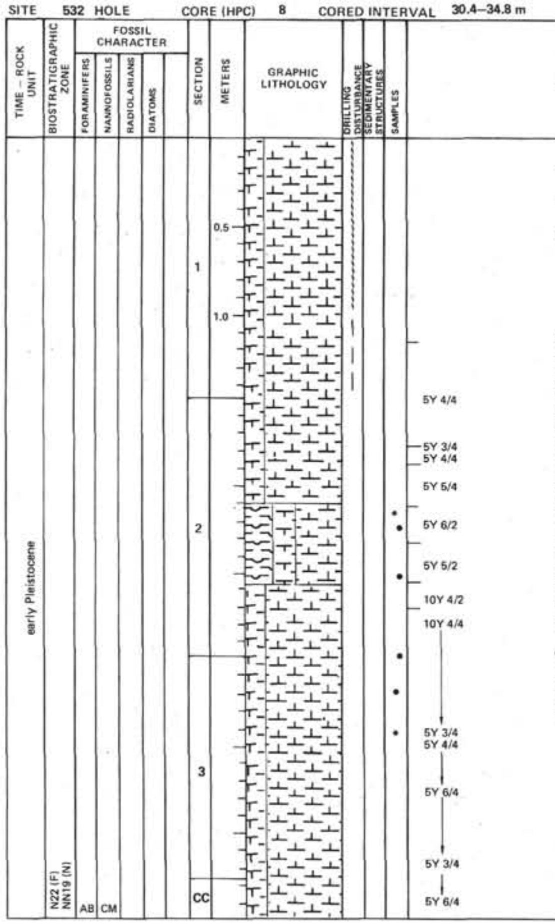
Bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Diatom foraminifer nannofossil ooze	Foraminifer nannofossil ooze
Section, Depth (cm)	1, 93	2, 32
Lith. (D = Dominant; M = minor)	D	D
Texture:		
Sand	15	15
Silt	45	30
Clay	40	55
Composition:		
Quartz	1	1
Clay	20	10
Pyrite	1	2
Carbonate unspec.	2	5
Foraminifers	20	20
Calc. nannofossils	43	58
Diatoms	15	1
Radiolarians	1	1
Sponge spicules	<1	1
Silicoflagellates	1	<1
Plant debris	–	<1
Amorphous organics	1	–

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 75–76 cm = 40:2.53

SITE 532 HOLE CORE (HPC) 8 CORED INTERVAL 30.4–34.8 m



LITHOLOGIC DESCRIPTION

FORAMINIFER NANNOFOSSIL OOZE and MARL:

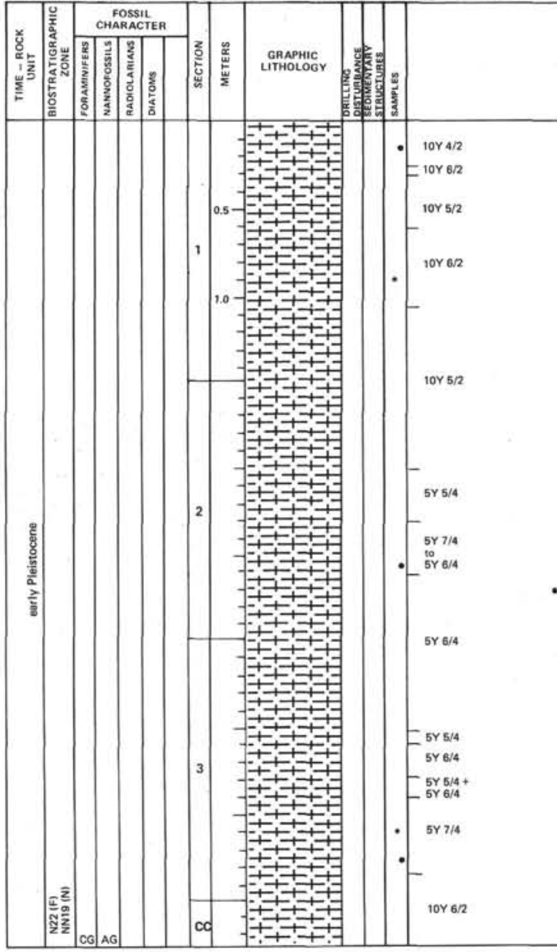
Clay and silt content appears to be increasing; diatom content is variable and bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Foraminifer diatom nannofossil ooze	Nannofossil marl
Section, Depth (cm)	2, 68	3, 42
Lith. (D = Dominant; M = Minor)	D	
Texture:		
Sand	15	2
Silt	40	48
Clay	45	50
Composition:		
Quartz	1	3
Clay	16	32
Volcanic glass	–	1
Glauconite	<1	–
Pyrite	1	1
Carbonate unspec.	5	8
Foraminifers	15	8
Calc. nannofossils	40	40
Diatoms	20	2
Radiolrians	1	1
Sponge spicules	–	2
Silicoflagellates	<1	<1
Plant debris	–	<1
Amorphous organics?	–	2

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 70–71 cm = 47:1.70
2, 100–101 cm = 39:2.93
2, 145–146 cm = 41:3.64
3, 20–30 cm = 12:5.41

SITE 532 HOLE CORE (HPC) 9 CORED INTERVAL 34.8–39.2 m



LITHOLOGIC DESCRIPTION

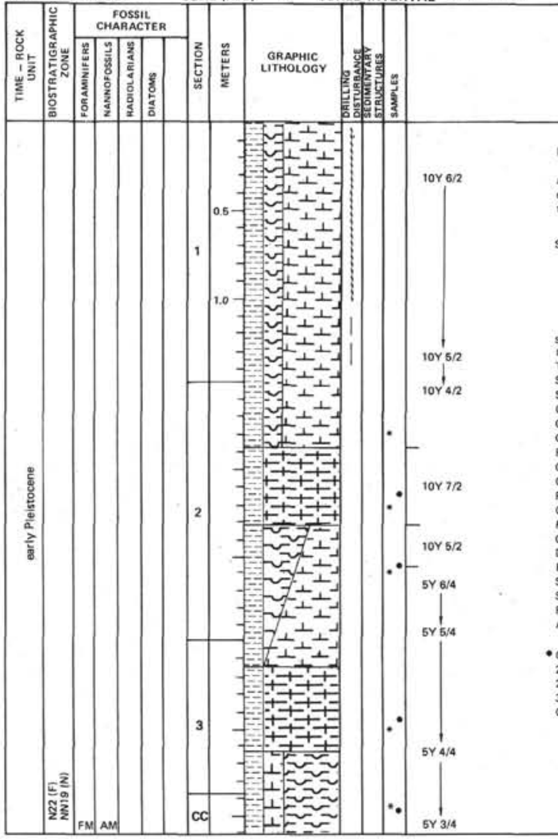
FORAMINIFER NANNOFOSSIL OOZE:
Large-scale burrowing occurs throughout and color boundaries indicated are highly gradational and burrowed.

SMEAR SLIDE SUMMARY (%):

	Foraminifer nannofossil ooze	Foraminifer nannofossil ooze
Section, Depth (cm)	1, 90	3, 111
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	15	20
Silt	45	20
Clay	40	66
Composition:		
Quartz	1	<1
Clay	28	10
Pyrite	–	1
Carbonate unspec.	6	–
Foraminifers	24	30
Calc. nannofossils	38	54
Diatoms	1	1
Radiolarians	1	1
Sponge spicules	1	2
Silicoflagellates	<1	<1
Plant debris	–	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 16–18 cm = 62:2.01
2, 108–110 cm = 42:3.57
3, 123–124 cm = 58:1.16

SITE 532 HOLE CORE (HPC) 10 CORED INTERVAL 39.2–43.6 m



LITHOLOGIC DESCRIPTION

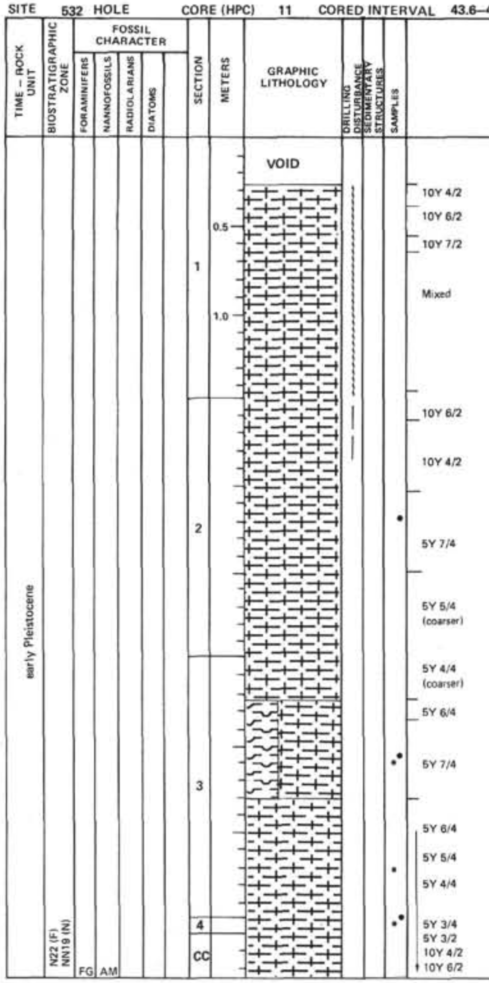
DOMINANTLY NANNOFOSSIL OOZE and MARL:
These have variable but common CLAY, DIATOMS, and FORAMINIFERS and are bioturbated. Light to dark cycle beginning at the top of Section 2, 45 cm down to the bottom of the Core-Catcher.

SMEAR SLIDE SUMMARY (%):

	Diatom nannofossil marl	Foraminifer nannofossil ooze	Diatom nannofossil ooze	Foraminifer nannofossil ooze	Nannofossil ooze
Section, Depth (cm)	2, 30	2, 70	2, 110	3, 50	CC, 9
Lith. (D = Dominant; M = Minor)	D	D	D	D	D
Texture:					
Sand	1	10	2	5	1
Silt	59	35	63	30	64
Clay	40	55	35	65	35
Composition:					
Quartz	3	<1	1	1	–
Feldspar	–	<1	–	–	–
Clay	25	10	22	20	25
Glauconite	–	–	<1	<1	<1
Pyrite	2	1	2	1	3
Carbonate unspec.	10	–	15	5	3
Foraminifers	6	30	7	20	5
Calc. nannofossils	30	48	33	55	15
Diatoms	20	5	28	1	40
Radiolarians	1	1	1	<1	2
Sponge spicules	<1	3	<1	1	2
Silicoflagellates	<1	1	1	–	1
Plant debris	<1	–	–	<1	–
Amorphous organics	3	–	–	–	4

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 64–66 cm = 58:1.26
2, 105–107 cm = 50:2.20
3, 44–45 cm = 50:3.11
CC, 9–11 cm = 23:4.30

SITE 532 HOLE CORE (HPC) 11 CORED INTERVAL 43.6–48.0 m



LITHOLOGIC DESCRIPTION

DOMINANTLY FORAMINIFER NANNOFOSSIL OOZE with minor DIATOM NANNOFOSSIL FORAMINIFER OOZE:

These are bioturbated.

Increasing foraminifers and diatoms ↑

Increasing Nannofossils ↓

Smear slide 3, 60 cm: DIATOM NANNOFOSSIL FORAMINIFER OOZE

Smear slide 3, 121 cm: FORAMINIFER NANNOFOSSIL OOZE

Smear slide 4, 5 cm: FORAMINIFER NANNOFOSSIL OOZE

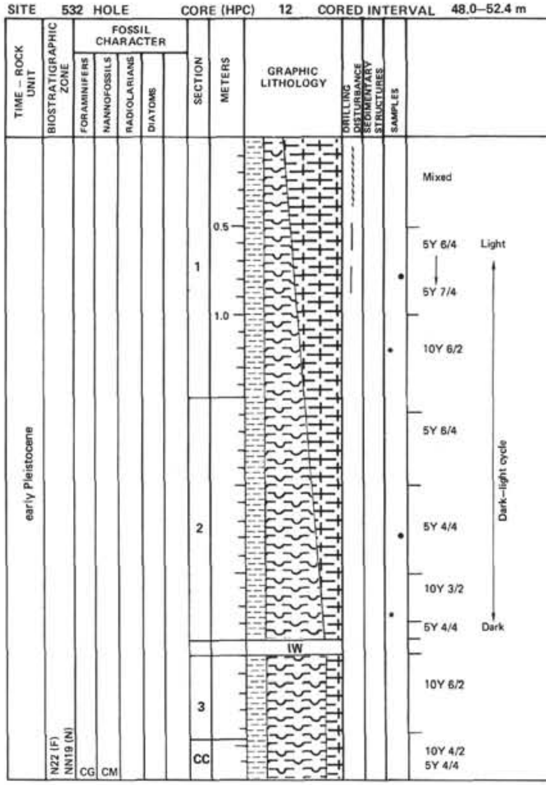
The above represents a well-developed dark to light color cycle between Section 3, 22 cm–Core-Catcher.

SMEAR SLIDE SUMMARY (%):

	Diatom nannofossil foraminifer ooze	Foraminifer nannofossil ooze	Foraminifer nannofossil ooze
Section, Depth (cm)	3, 60	3, 121	4, 5
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	25	10	10
Silt	50	35	30
Clay	25	55	60
Composition:			
Quartz	1	1	2
Feldspar	–	<1	<1
Mica	–	–	<1
Clay	15	10	15
Glauconite	–	–	1
Pyrite	<1	1	2
Carbonate unspec.	8	5	5
Foraminifers	40	30	20
Calc. nannofossils	18	50	50
Diatoms	15	1	1
Radiolarians	<1	<1	1
Sponge spicules	1	1	2
Silicoflagellates	<1	<1	<1
Plant debris	–	<1	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 69–70 cm = 53:1.80
3, 10–20 cm = 41:5.52
3, 53–54 cm = 41:6.52
3, 149–150 cm = 55.188

SITE 532 HOLE CORE (HPC) 12 CORED INTERVAL 48.0–52.4 m



LITHOLOGIC DESCRIPTION

DOMINANTLY FORAMINIFER NANNOFOSSIL OOZE and MARL and DIATOM SARL:

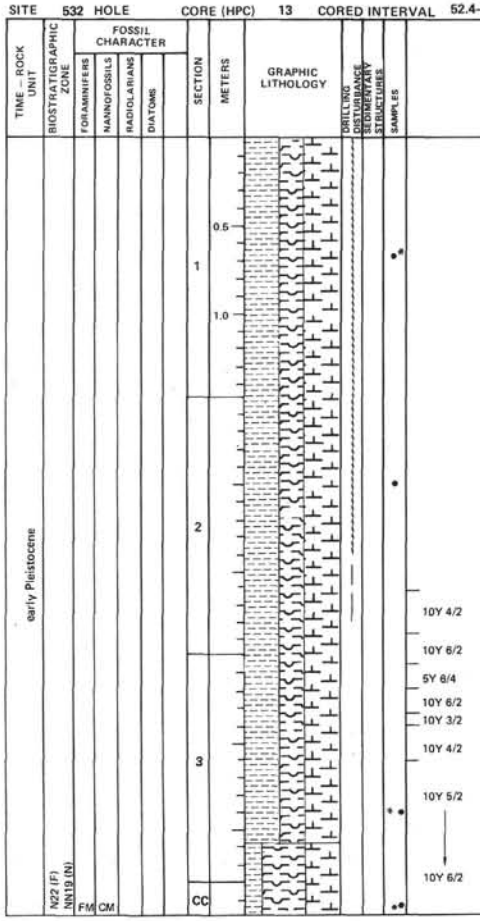
Foraminifer content is variable. Bioturbated throughout. Dark to light cycle beginning Section 1, 70 cm down to Section 2, 130 cm.

SMEAR SLIDE SUMMARY (%):

	Diatom foraminifer nannofossil ooze (light)	Diatom sarl (dark)
Section, Depth (cm)	1, 127	2, 123
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	10	5
Silt	55	50
Clay	35	45
Composition:		
Quartz	1	1
Clay	23	40
Glauconite	–	<1
Pyrite	4	2
Carbonate unspec.	7	5
Foraminifers	25	5
Calc. nannofossils	33	10
Diatoms	10	30
Radiolarians	<1	1
Sponge spicules	1	4
Silicoflagellates	<1	<1
Plant debris	<1	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 79–80 cm = 42:2.95
2, 79–80 cm = 33:5.04

SITE 532 HOLE CORE (HPC) 13 CORED INTERVAL 52.4–56.8 m



LITHOLOGIC DESCRIPTION

DIATOM NANNOFOSSIL MARL and SARL:

Dominant is *DIATOM NANNOFOSSIL MARL from* Section 1, 0 cm to Section 2, 110 cm is disturbed with flow-in mixture of 10Y 6/2 and 10Y 4/2 MARL and SARL.

Below Section 2, 110 cm is green–olive dark/light *cycles. Bioturbated throughout.*

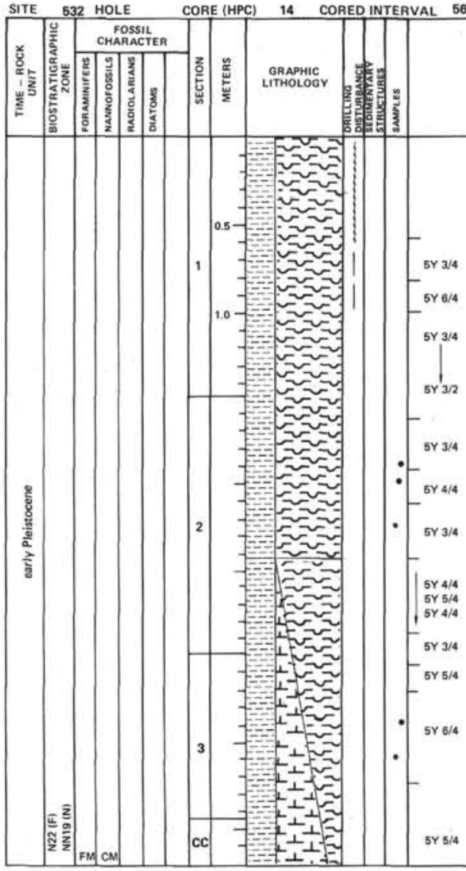
Dominant colors are as indicated, but all are very mixed by bioturbation.

SMEAR SLIDE SUMMARY (%):

	Diatom nannofossil marl	Diatom nannofossil marl	Diatom nannofossil ooze
Section, Depth (cm)	1, 67	3, 90	CC, 13
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	3	–	10
Silt	62	40	45
Clay	36	60	45
Composition:			
Quartz	4	–	–
Clay	30	35	10
Volcanic glass	–	<1	<1
Glauconite	<1	–	–
Pyrite	2	1	1
Carbonate unspec.	8	4	–
Foraminifers	7	7	5
Calc. nannofossils	24	35	30
Diatoms	21	18	50
Radiolarians	2	<1	<1
Sponge spicules	1	<1	3
Silicoflagellates	1	<1	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 69–71 cm = 25:3.48
2, 53–56 cm = 27:2.74
3, 89–92 cm = 41:2.65
CC, 13–15 cm = 43:1.52

SITE 532 HOLE CORE (HPC) 14 CORED INTERVAL 56.8–61.2 m



LITHOLOGIC DESCRIPTION

CLAYEY DIATOM SARL and OOZE; and DIATOM *NANNOFOSSIL MARL and OOZE:*

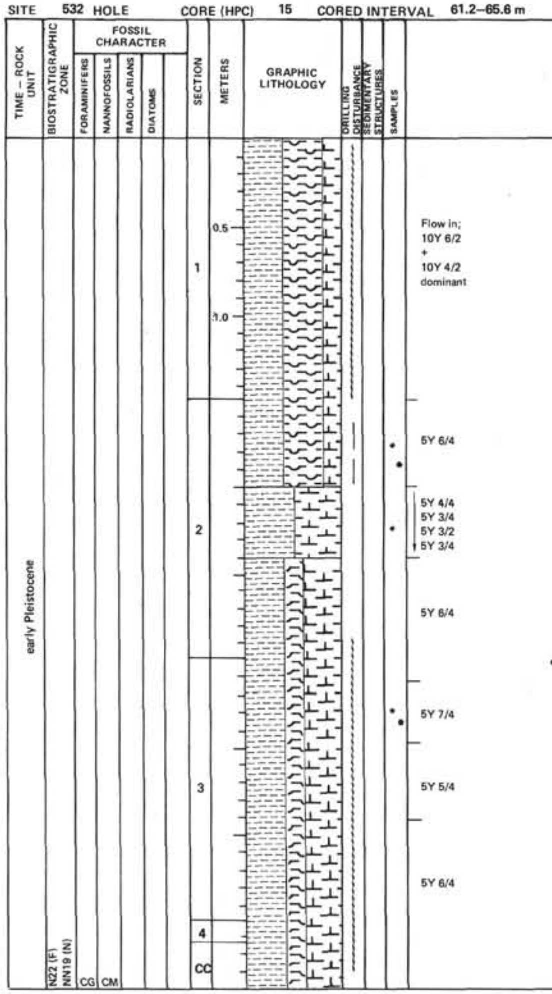
Green to olive, light and dark cycles. Core is bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Diatom ooze	Clayey diatom nannofossil marl
Section, Depth (cm)	2, 75	3, 60
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	2	1
Silt	67	59
Clay	31	40
Composition:		
Quartz	10	1
Clay	31	29
Pyrite	2	1
Carbonate unspec.	3	3
Foraminifers	–	5
Calc. nannofossils	<1	40
Diatoms	60	20
Radiolarians	1	<1
Sponge spicules	2	<1
Silicoflagellates	–	1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 38–39 cm = 15:5.91
2, 55–65 cm = 9:6.18
3, 38–39 cm = 44:2.68

SITE 532 HOLE CORE (HPC) 15 CORED INTERVAL 61.2–65.6 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL DIATOM OOZE and DIATOM NANNOFOSSIL MARL, SARLS, and SMARL:

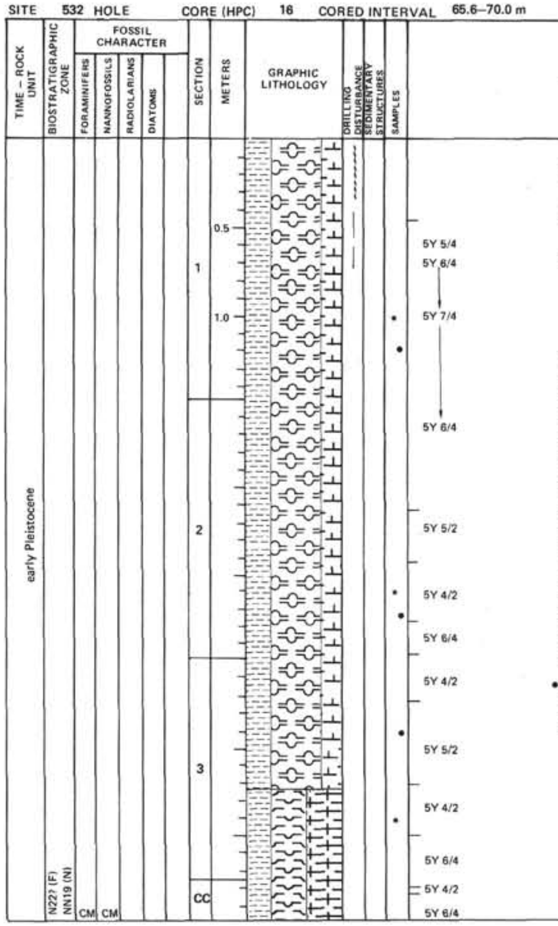
Nannofossils + clay + diatoms; these are bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil diatom ooze	Siliceous nannofossil clay	Diatom nannofossil marl
Section, Depth (cm)	2, 29	2, 74	3, 30
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	1	–	2
Silt	59	–	53
Clay	40	–	45
Composition:			
Quartz	–	3	–
Clay	30	40	35
Glauconite	<1	<1	<1
Pyrite	2	2	1
Carbonate unspec.	3	3	4
Foraminifers	4	5	8
Calc. nannofossils	22	30	30
Diatoms	35	5	15
Radiolarians	1	2	1
Sponge spicules	1	3	<1
Silicoflagellates	1	<1	<1
Plant debris	–	<1	1
Amorphous organics	2	5	–

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 34–35 cm = 27:3.45
3, 34–35 cm = 42

SITE 532 HOLE CORE (HPC) 16 CORED INTERVAL 65.6–70.0 m



LITHOLOGIC DESCRIPTION

SPONGE SPICULE NANNOFOSSIL DIATOM SARL OOZE and DIATOM NANNOFOSSIL MARL:

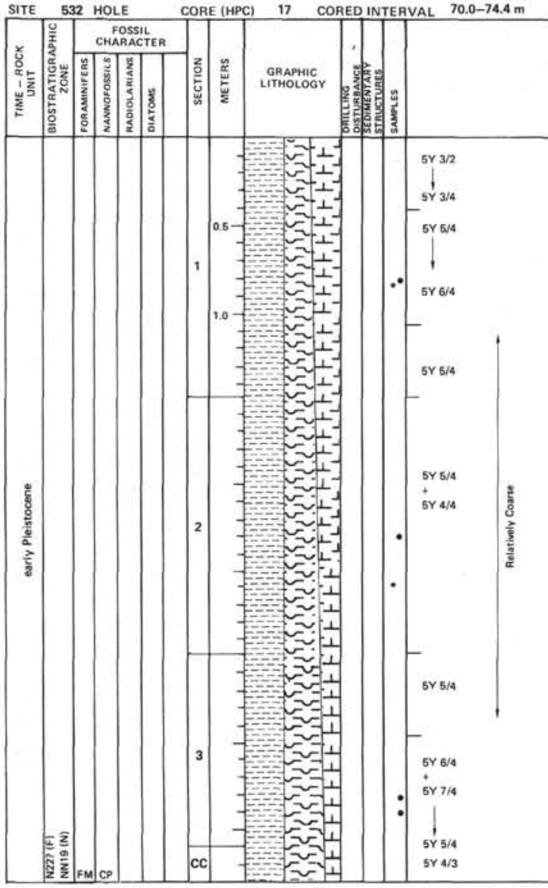
Core is bioturbated throughout. Relatively coarse grain-size occurs from bottom of Section 1 to top of Section 3.

SMEAR SLIDE SUMMARY (%):

	Sponge spicule nannofossil diatom ooze	Sponge spicule nannofossil diatom ooze	Foraminifer diatom nannofossil marl
Section, Depth (cm)	1, 100	2, 110	3, 94
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	3	5	3
Silt	67	45	62
Clay	30	50	35
Composition:			
Quartz	–	2	2
Mica	–	–	1
Clay	20	33	32
Volcanic glass	<1	–	–
Glauconite	–	<1	<1
Pyrite	2	2	–
Carbonate unspec.	3	5	10
Foraminifers	2	5	12
Calc. nannofossils	23	20	15
Diatoms	35	20	15
Radiolarians	1	1	2
Sponge spicules	15	10	1
Silicoflagellates	<1	<1	<1
Plant debris	–	<1	–
Amorphous organics	<1	–	4

•CARBONATE BOMB (% $CaCO_3$):
1, 118–120 cm = 48
2, 122–124 cm = 19
3, 40–42 cm = 25

SITE 532 HOLE CORE (HPC) 17 CORED INTERVAL 70.0–74.4 m



LITHOLOGIC DESCRIPTION

DIATOM NANNOFOSSIL OOZE and NANNOFOSSIL DIATOM OOZE:

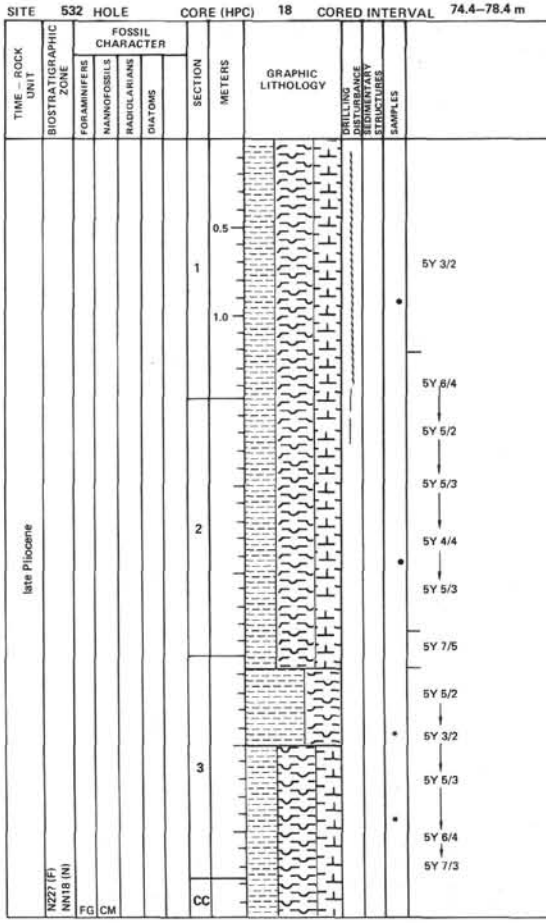
Good examples of smarls which are mixtures of clay and diatoms and nannofossils – no clear dominant constituent. The core is bioturbated. There is a relatively coarse layer in the center of the core.

SMEAR SLIDE SUMMARY (%):

	Diatom nannofossil ooze (smarl)	Diatom nannofossil ooze (smarl)
Section, Depth (cm)	1, 85	2, 110
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	2	10
Silt	58	55
Clay	40	35
Composition:		
Quartz	<1	–
Clay	29	23
Pyrite	2	1
Carbonate unspec.	3	5
Foraminifers	–	2
Calc. nannofossils	35	25
Diatoms	25	43
Radiolarians	2	1
Sponge spicules	<1	<1
Silicoflagellates	1	<1

● CARBONATE BOMB (% $CaCO_3$):
1, 81–83 cm = 43
2, 81–83 cm = 32
3, 81–83 cm = 47
3, 91–93 cm = 32

SITE 532 HOLE CORE (HPC) 18 CORED INTERVAL 74.4–78.4 m



LITHOLOGIC DESCRIPTION

SMARL:

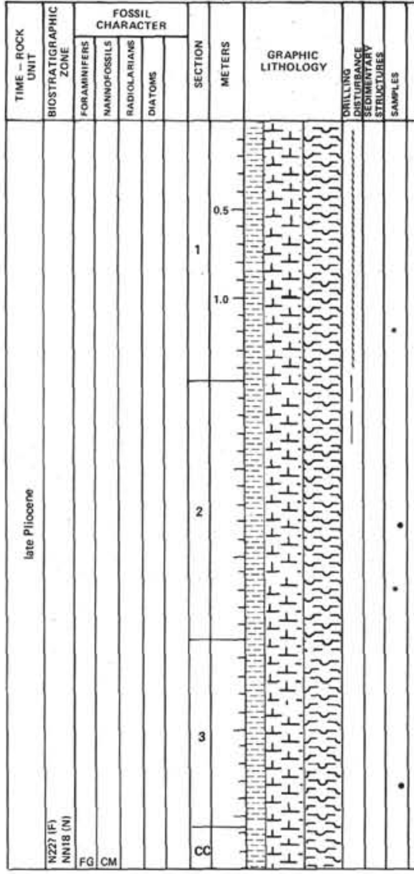
Dominantly more or less equal mixtures of clay, calcareous microfossils, and siliceous microfossils. SMARL which is called DIATOM NANNOFOSSIL MARL or NANNOFOSSIL DIATOM MARL. Core is bioturbated and (or) disturbed throughout. Color boundaries are mostly gradational.

SMEAR SLIDE SUMMARY (%):

	Calcareous diatom clay	Nannofossil diatom marl
Section, Depth (cm)	3, 44	3, 90
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	5
Silt	–	59
Clay	–	36
Composition:		
Quartz	2	2
Mica	<1	–
Clay	58	26
Glauconite	<1	–
Pyrite	3	–
Carbonate unspec.	5	10
Foraminifers	3	3
Calc. nannofossils	5	26
Diatoms	20	28
Radiolarians	1	1
Sponge spicules	2	1
Silicoflagellates	<1	<1
Plant debris	<1	–

● CARBONATE BOMB (% $CaCO_3$):
1, 91–93 cm = 21
2, 91–93 cm = 20

SITE 532 HOLE CORE (HPC) 19 CORED INTERVAL 78.4–83.2 m



LITHOLOGIC DESCRIPTION

5Y 5/4

SMARL:

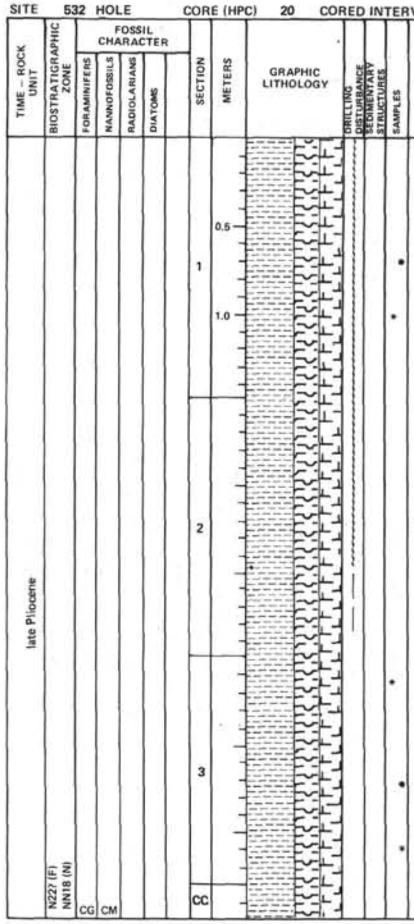
Mixtures of diatoms, nannofossils and clay in roughly decreasing order of abundance is called DIATOM NANNOFOSSIL SMARL and CLAYEY NANNOFOSSIL DIATOM OOZE and (or) DIATOM NANNOFOSSIL MARL. All core is bioturbated. Throughout Sections 1, 2, and 3 are several slightly lighter and darker zones.

SMEAR SLIDE SUMMARY (%):

	Nannofossil diatom smarl	Nannofossil diatom smarl
Section, Depth (cm)	1, 120	2, 120
Lith. (D = Dominant; M = minor)	D	D
Texture:		
Sand	8	–
Silt	57	–
Clay	35	–
Composition:		
Quartz	<1	1
Clay	22	19
Volcanic glass	<1	–
Glauconite	–	<1
Pyrite	1	2
Carbonate unspec.	3	5
Foraminifers	2	5
Calc. nannofossils	32	20
Diatoms	36	40
Radiolarians	1	2
Sponge spicules	2	4
Silicoflagellates	1	1

•CARBONATE BOMB:(% $CaCO_3$):
2, 82–84 cm = 39
3, 81–83 cm = 28

SITE 532 HOLE CORE (HPC) 20 CORED INTERVAL 83.2–87.6 m



LITHOLOGIC DESCRIPTION

5Y 3/4
+
5Y 4/4

NANNOFOSSIL DIATOM SMARL:

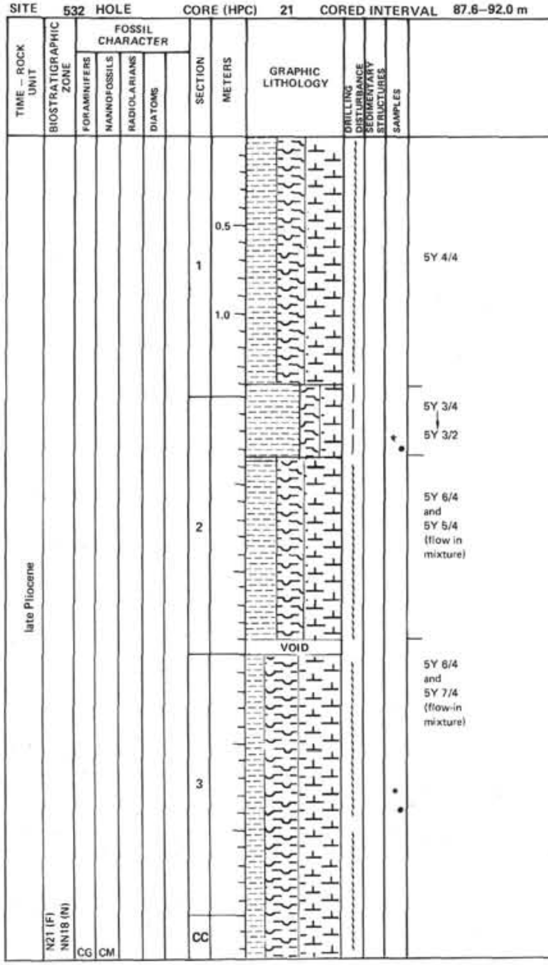
Mixtures of clay, diatoms, and nannofossils in roughly that order of abundance equals NANNOFOSSIL DIATOM SMARL; highly disturbed core.

SMEAR SLIDE SUMMARY (%):

	Nannofossil clayey diatom smarl	Nannofossil diatom clay smarl	Diatom nannofossil smarl
Section, Depth (cm)	1, 100	3, 17	3, 107
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	10	5	4
Silt	55	35	51
Clay	35	60	45
Composition:			
Quartz	2	–	<1
Feldspar	–	<1	–
Clay	30	45	29
Volcanic glass	–	1	–
Glauconite	<1	<1	–
Pyrite	–	1	2
Carbonate unspec.	8	3	3
Foraminifers	2	1	3
Calc. nannofossils	15	20	35
Diatoms	35	20	24
Radiolarians	2	2	3
Sponge spicules	2	5	<1
Silicoflagellates	1	1	1
Plant debris	<1	<1	–

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 70–72 cm = 31:3.15
3, 71–73 cm = 31:4.91

SITE 532 HOLE CORE (HPC) 21 CORED INTERVAL 87.6–92.0 m



LITHOLOGIC DESCRIPTION

DIATOM NANNOFOSSIL OOZE and MINOR DIATOM NANNOFOSSIL MARL:

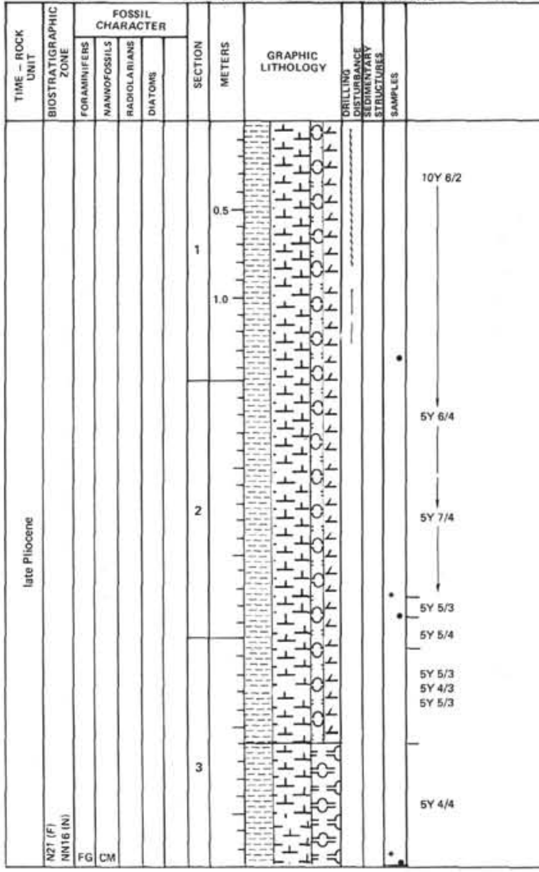
In Section 1, 0–140 cm; Section 2, 35–140 cm; and Section 3 + Core-Catcher is drill-induced flow in.

SMEAR SLIDE SUMMARY (%):

	Diatom nannofossil marl	Diatom nannofossil ooze (dark)
Section, Depth (cm)	2, 26	3, 79
Lith. (D = Dominant; M = Minor)	D	M
Texture:		
Sand	6	5
Silt	54	55
Clay	40	40
Composition:		
Quartz	–	<1
Mica	–	<1
Clay	35	10
Glauconite	–	<1
Pyrite	3	1
Carbonate unspec.	15	5
Foraminifers	4	5
Calc. nannofossils	19	40
Diatoms	10	30
Radiolarians	3	2
Sponge spicules	1	5
Silicoflagellates	2	4
Plant debris	<1	<1
Echinoid fragments	3	<1
Amorphous organics	5	–

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 29–30 cm = 8:6.35
3, 88–90 cm = 48:1.36

SITE 532 HOLE CORE (HPC) 22 CORED INTERVAL 92.0–96.4 m



LITHOLOGIC DESCRIPTION

SILICEOUS NANNOFOSSIL MARL and NANNOFOSSIL SILICEOUS SARL:

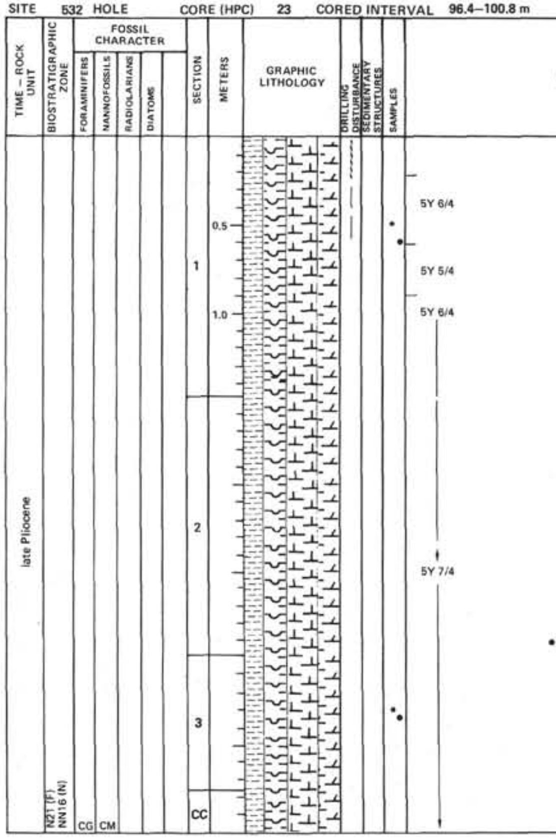
Mostly light green (olive) colors as indicated; dark zone as indicated. It is bioturbated. DOLOMITE is 30% in smear slide Section 2, 128 cm.

SMEAR SLIDE SUMMARY (%):

	Siliceous dolomitic nannofossil marl	Nannofossil siliceous ooze
Section, Depth (cm)	2, 128	3, 130
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	5	5
Silt	50	50
Clay	45	45
Composition:		
Quartz	1	1
Feldspar	–	<1
Clay	21	21
Glauconite	<1	–
Pyrite	1	1
Carbonate unspec.	5	5
Foraminifers	1	3
Calc. nannofossils	30	30
Diatoms	4	30
Radiolarians	3	3
Sponge spicules	3	5
Silicoflagellates	–	1
Plant debris	<1	–
Dolomite	30	–

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 136–139 cm = 40:2.56
2, 136–139 cm = 41:4.12
3, 130–133 cm = 32:2.76

SITE 532 HOLE CORE (HPC) 23 CORED INTERVAL 96.4–100.8 m



LITHOLOGIC DESCRIPTION

DIATOM NANNOFOSSIL MARL:

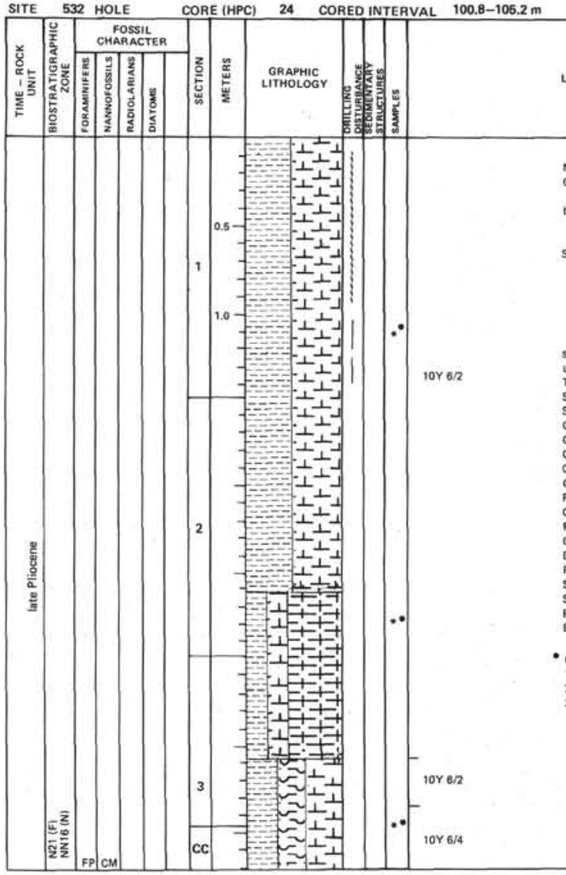
Authigenic DOLOMITE RHOMBS are 20+% in smear slides. Unlike previous cores, this one is very uniform in color (generally lighter than above) and texture.

SMEAR SLIDE SUMMARY (%):

	Dolomitic diatom nannofossil ooze	Dolomitic diatom nannofossil marl
Section, Depth (cm)	1, 50	3, 30
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	1	5
Silt	64	45
Clay	35	50
Composition:		
Quartz	–	<1
Clay	25	17
Pyrite	–	1
Carbonate unspec.	2	5
Foraminifers	2	2
Calc. nannofossils	34	34
Diatoms	15	15
Radiolarians	2	1
Sponge spicules	<1	5
Silicoflagellates	<1	<1
Plant debris	–	<1
Dolomite	20	20

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 59–61 cm = 45
3, 34–36 cm = 58:4.05

SITE 532 HOLE CORE (HPC) 24 CORED INTERVAL 100.8–105.2 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL and DIATOM NANNOFOSSIL OOZE:

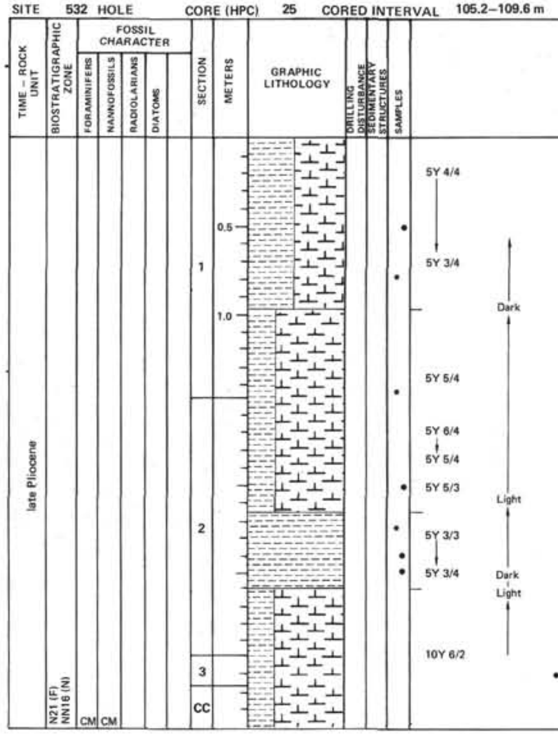
Uniform color (10Y 6/2) and texture (slightly darker at base); and is bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Foraminifer diatom nannofossil ooze	Diatom nannofossil ooze
Section, Depth (cm)	1, 111	2, 130	3, 96
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	1	15	12
Silt	44	35	18
Clay	55	50	70
Composition:			
Quartz	<1	1	<1
Clay	40	16	27
Glauconite	–	<1	<1
Pyrite	1	2	2
Carbonate unspec.	8	–	–
Foraminifers	5	10	2
Calc. nannofossils	40	40	50
Diatoms	5	20	15
Radiolarians	<1	3	1
Sponge spicules	1	5	2
Silicoflagellates	<1	<1	<1
Plant debris	–	<1	<1
Echinoderm fragments	–	3	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 109–112 cm = 55:2.31
2, 127–130 cm = 50:2.65
3, 93–96 cm = 23:3.40

SITE 532 HOLE CORE (HPC) 25 CORED INTERVAL 105.2–109.6 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE AND MARL:

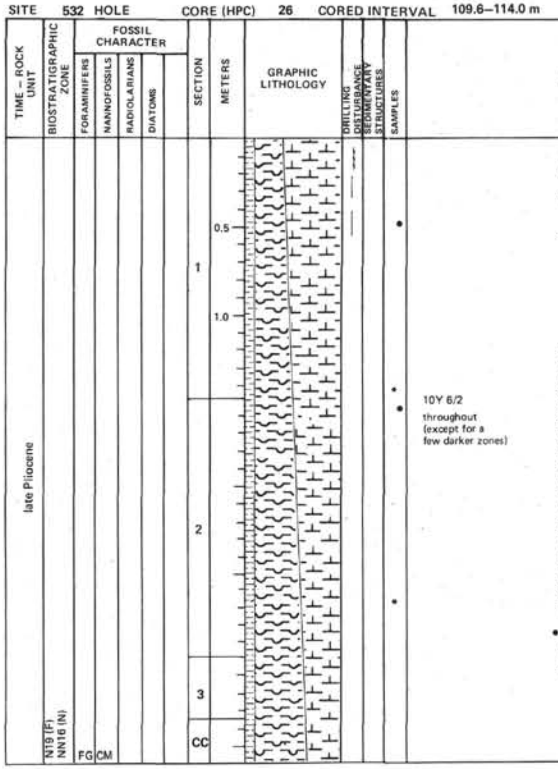
Several light–dark cycles appear to be variations in more clay-rich (darker) and more nannofossil-rich (lighter). Core is bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Calcareous clay	Nannofossil ooze
Section, Depth (cm)	1, 80	1, 144	2, 76
Lith. (D = Dominant; M = Minor)	D		D
Texture:			
Sand	5	5	–
Silt	30	25	20
Clay	65	70	80
Composition:			
Quartz	–	1	5
Feldspar	5	–	<1
Mica	–	–	<1
Clay	27	20	73
Volcanic glass	<1	<1	–
Glauconite	–	–	<1
Pyrite	3	2	–
Carbonate unspec.	5	–	3
Foraminifers	–	10	2
Calc. nannofossils	50	60	5
Diatoms	3	3	1
Radiolarians	1	1	1
Sponge spicules	2	3	2
Silicoflagellates	–	<1	1
Plant debris	<1	<1	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 51–52 cm = 11:6.04
2, 51–52 cm = 31:3.03
2, 80–90 cm = 16:6.41

SITE 532 HOLE CORE (HPC) 26 CORED INTERVAL 109.6–114.0 m



LITHOLOGIC DESCRIPTION

DIATOM NANNOFOSSIL OOZE:

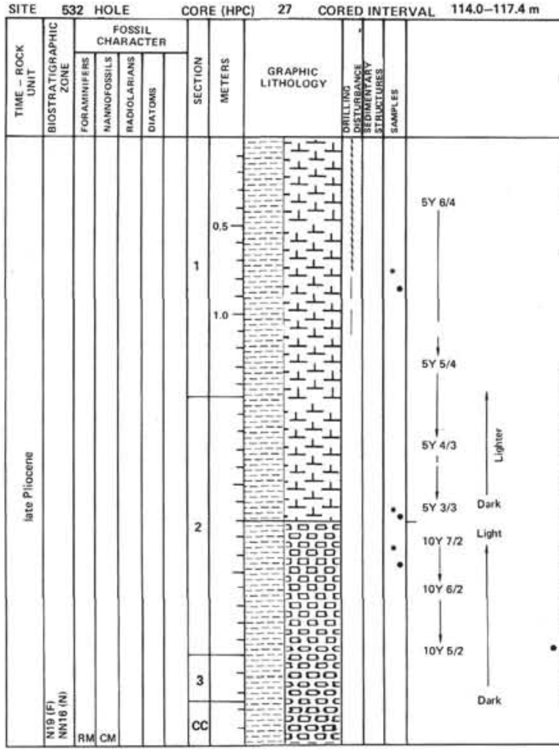
The core is more or less uniform. Color is greenish olive (10Y 6/2); and is bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Diatom nannofossil ooze	Diatom nannofossil ooze
Section, Depth (cm)	1, 145	2, 116
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	15
Silt	–	40
Clay	–	45
Composition:		
Quartz	<1	–
Clay	10	10
Volcanic glass	–	<1
Palagonite	–	<1
Pyrite	1	1
Foraminifers	5	5
Calc. nannofossils	55	40
Diatoms	25	35
Radiolarians	1	2
Sponge spicules	2	5
Silicoflagellates	<1	1
Plant debris	<1	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 49–50 cm = 40:2.47
2, 5–6 cm = 45:1.56

SITE 532 HOLE CORE (HPC) 27 CORED INTERVAL 114.0–117.4 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL and CALCAREOUS MARL:

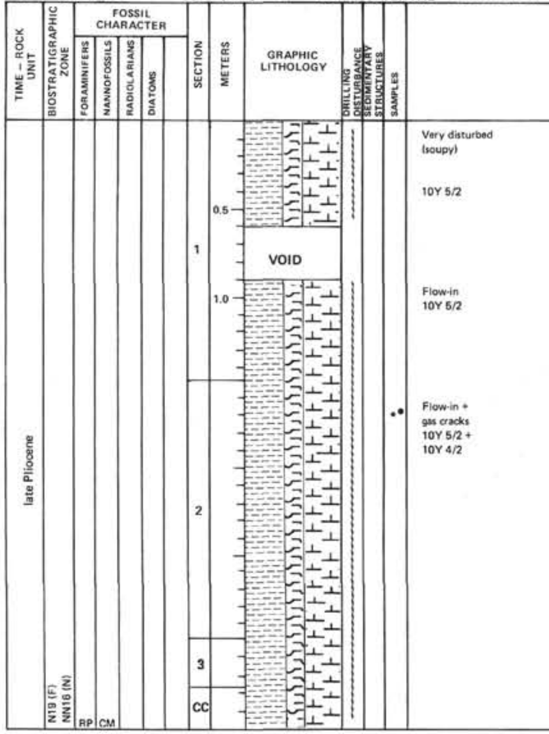
Calcareous marl has nannofossils, foraminifers, and unspecified carbonates. Several light–dark cycles occur as indicated. Core is bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Calcareous marl	Calcareous marl
Section, Depth (cm)	1, 79	2, 63	2, 79
Lith. (D = Dominant; M = Minor)	D		
Texture:			
Sand	1	2	4
Silt	39	48	56
Clay	60	50	40
Composition:			
Quartz	2	5	2
Clay	38	37	33
Pyrite	3	4	3
Carbonate unspec.	6	15	15
Foraminifers	2	6	12
Calc. nannofossils	40	21	25
Diatoms	6	8	8
Radiolarians	1	1	1
Sponge spicules	1	<1	1
Silicoflagellates	<1	<1	<1
Plant debris	<1	<1	–
Amorphous organics	–	3	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 86–88 cm = 32:3.87
2, 66–68 cm = 13:4.48
2, 86–88 cm = 34:1.99

SITE 532 HOLE CORE (HPC) 28 CORED INTERVAL 117.4–120.8 m



LITHOLOGIC DESCRIPTION

DIATOM NANNOFOSSIL MARL:

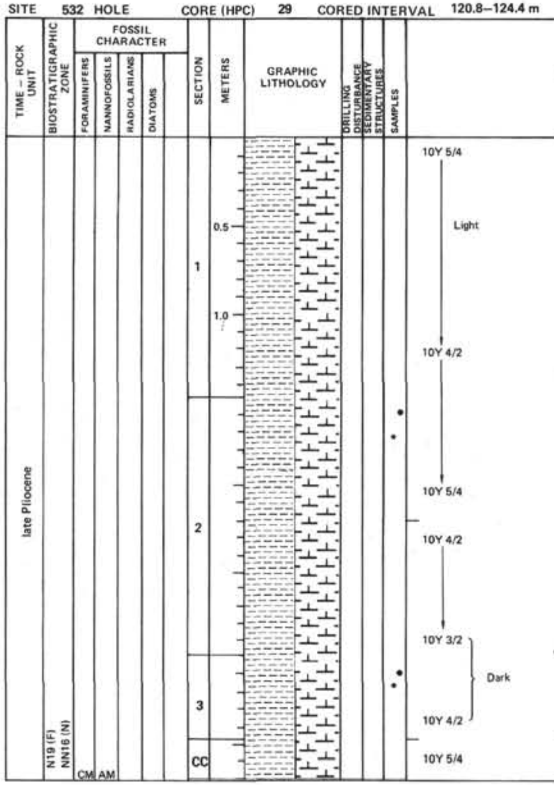
Very disturbed core, which is caused by coring and gas cracks.

SMEAR SLIDE SUMMARY (%):

	Diatom nannofossil marl
Section, Depth (cm)	2, 20
Lith. (D = Dominant; M = Minor)	D
Texture:	
Sand	1
Silt	59
Clay	40
Composition:	
Quartz	3
Clay	35
Glauconite	<1
Pyrite	3
Carbonate unspec.	10
Foraminifers	8
Calc. nannofossils	25
Diatoms	15
Radiolarians	1
Sponge spicules	<1
Silicoflagellates	<1
Plant debris	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 18–20 cm = 27:2.26

SITE 532 HOLE CORE (HPC) 29 CORED INTERVAL 120.8–124.4 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

Core is bioturbated throughout. Top 100 cm of core is moderately gas-cracked.

Color gradations are as indicated; burrow mottles are mostly of the dominant colors 10Y 5/4 and 10Y 4/2 and occur throughout. There is one dark–light cycle.

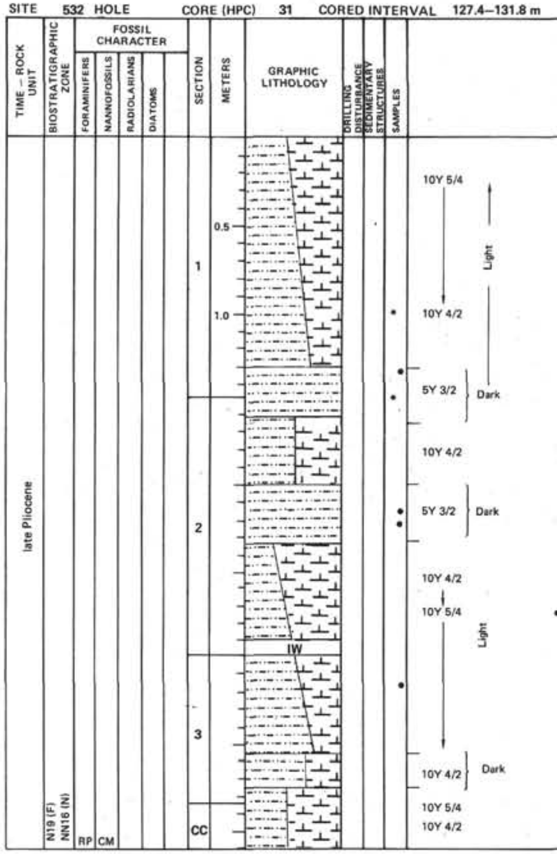
SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Nannofossil marl (dark)
Section, Depth (cm)	2, 20	3, 19
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	1	–
Silt	49	55
Clay	50	45
Composition:		
Quartz	2	4
Clay	40	38
Volcanic glass	–	2
Glauconite	<1	<1
Pyrite	–	3
Carbonate unspec.	15	6
Foraminifers	7	4
Calc. nannofossils	27	39
Diatoms	5	1
Radiolarians	<1	2
Sponge spicules	1	<1
Amorphous organics	–	1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 10–13 cm = 45:2.51
3, 10–13 cm = 25:4.44

Note: Core 30, 124.4–127.4 m: No recovery.

SITE 532 HOLE CORE (HPC) 31 CORED INTERVAL 127.4–131.8 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL AND CLAY:

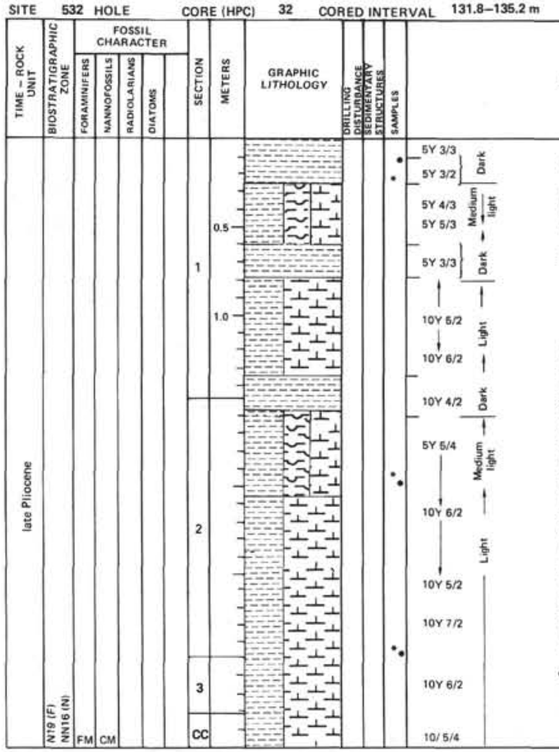
Several occurences of well-developed dark (clay)–light (marl) cycles; and color boundaries are approximate (gradational). Core is bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Clay (dark)
Section, Depth (cm)	1, 100	2, 2
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	50	19
Clay	50	81
Composition:		
Quartz	1	5
Feldspar	<1	<1
Clay	40	74
Glauconite	–	<1
Pyrite	3	5
Carbonate unspec.	6	1
Foraminifers	5	2
Calc. nannofossils	44	2
Diatoms	<1	1
Radiolarians	<1	2
Sponge spicules	<1	2
Amorphous organic	<1	5

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 144–145 cm = 21:3.86
2, 64–65 cm = 12:5.87
2, 65–75 cm = 36:3.71
3, 18–19 cm = 46:2.26

SITE 532 HOLE CORE (HPC) 32 CORED INTERVAL 131.8–135.2 m



LITHOLOGIC DESCRIPTION

DIATOMACEOUS NANNOFOSSIL MARL and CLAY:

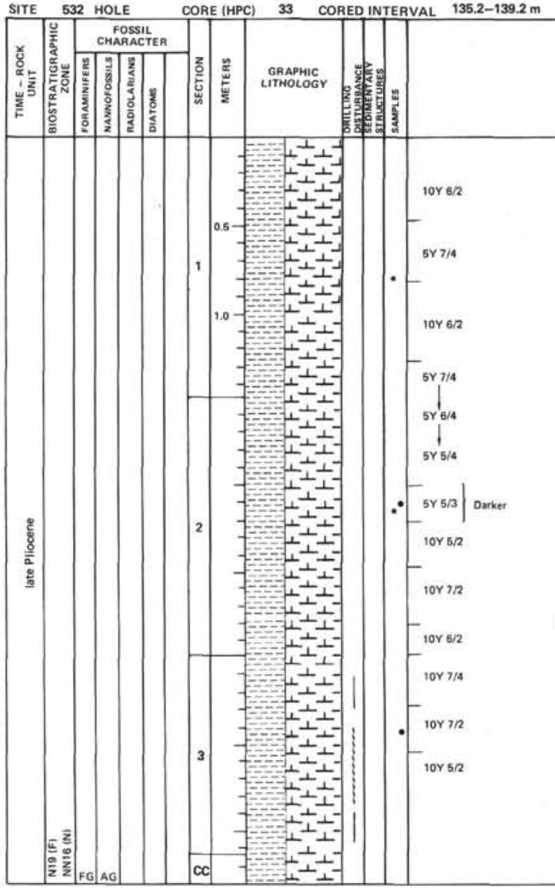
Several occurences of well-developed dark (CLAY) to light (NANNOFOSSIL MARL) cycles; the color boundaries are gradational and only approximately shown. Core is bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Pyrite-rich silty clay (dark)	Diatom nannofossil marl (medium light)	Nannofossil marl (light)
Section, Depth (cm)	1, 22	2, 45	2, 144
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	2	–	–
Silt	30	55	40
Clay	68	45	60
Composition:			
Quartz	10	2	1
Feldspar	1	–	–
Clay	63	35	38
Volcanic glass	–	1	1
Glauconite	<1	<1	–
Pyrite	5	3	1
Carbonate unspec.	4	4	3
Foraminifers	1	2	5
Calc. nannofossils	<1	35	50
Diatoms	1	18	1
Radiolarians	5	<1	<1
Sponge spicules	3	<1	<1
Silicoflagellates	<1	–	–
Plant debris	<1	–	<1
Amorphous organics	5	<1	–

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 11–13 cm = 20:5.86
2, 46–49 cm = 26:1.80
2, 147–149 cm = 62

SITE 532 HOLE CORE (HPC) 33 CORED INTERVAL 135.2–139.2 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

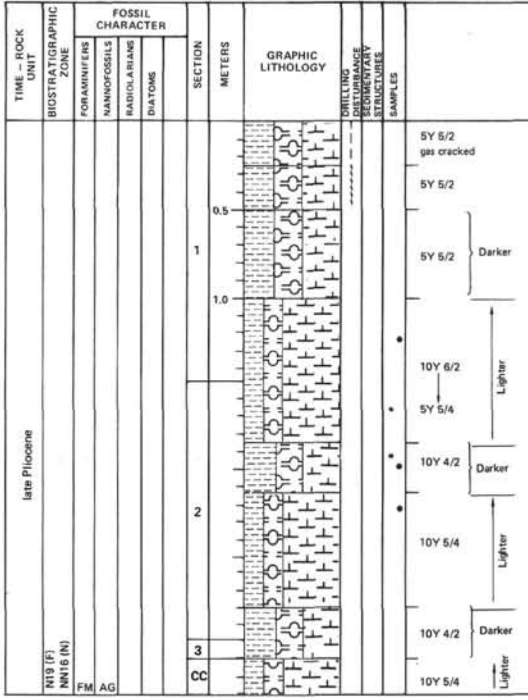
Fairly uniform LIGHT *colored marl; some more yellowish*, some more greenish; and color boundaries are approximately shown (actually gradation). Core is gas-cracked and bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Nannofossil marl (dark)
Section, Depth (cm)	1, 80	2, 64
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	35	20
Clay	65	80
Composition:		
Quartz	1	1
Clay	41	30
Glauconite	<1	–
Pyrite	2	3
Carbonate unspec.	3	3
Foraminifers	1	2
Calc. nannofossils	50	55
Diatoms	2	1
Radiolarians	<1	2
Sponge spicules	–	2
Silicoflagellates	–	<1
Plant debris	–	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 61–62 cm = 39:2.98
3, 41–43 cm = 59:0.80

SITE 532 HOLE CORE (HPC) 34 CORED INTERVAL 139.2–142.6 m



LITHOLOGIC DESCRIPTION

SILICEOUS NANNOFOSSIL OOZE and MARL:

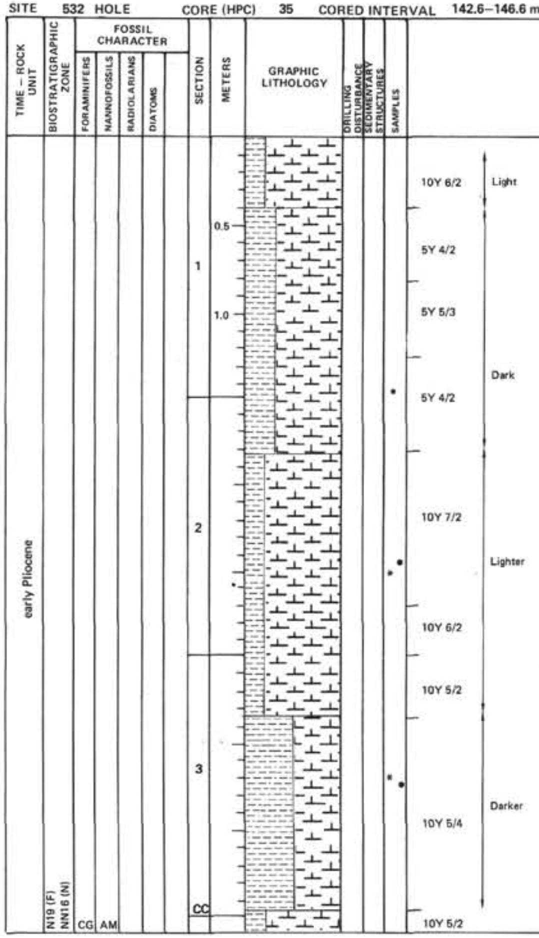
These occur in dark and light color cycles as indicated; and are bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Siliceous nannofossil ooze (light)	Siliceous nannofossil marl (dark)
Section, Depth (cm)	2, 19	2, 46
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	5	–
Silt	35	–
Clay	60	–
Composition:		
Quartz	<1	3
Clay	18	19
Volcanic glass	–	<1
Glauconite	<1	<1
Pyrite	2	3
Carbonate unspec.	2	5
Foraminifers	5	5
Calc. nannofossils	60	50
Diatoms	3	3
Radiolarians	5	5
Sponge spicules	3	5
Silicoflagellates	1	1
Plant debris	–	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 121–122 cm = 53:0.91
2, 49–51 cm = 33:2.13
2, 71–72 cm = 25:5.47

SITE 532 HOLE CORE (HPC) 35 CORED INTERVAL 142.6–146.6 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL OOZE and MARL:

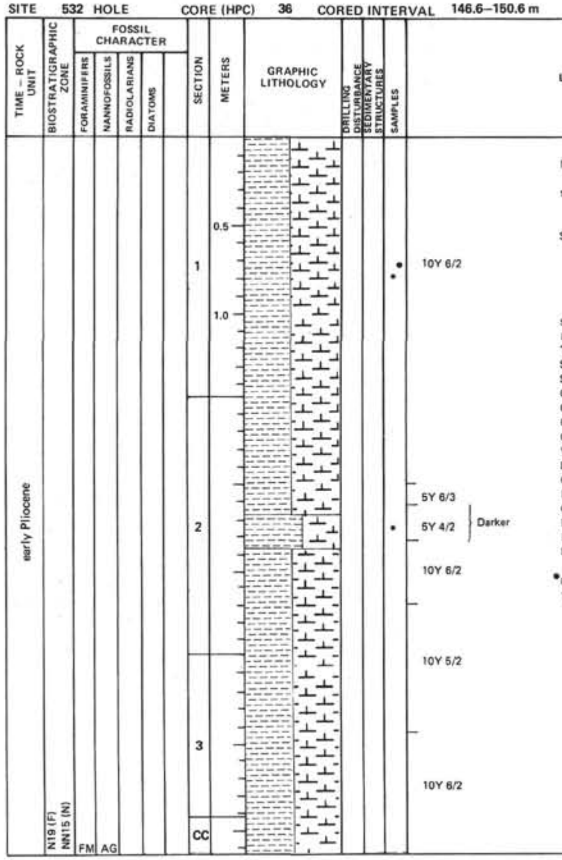
Lighter (ooze) and darker (marl) lithologies alternate; and are bioturbated.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (dark)	Nannofossil ooze (light)	Nannofossil marl (dark)
Section, Depth (cm)	1, 147	2, 101	3, 70
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	5	–	–
Silt	35	25	35
Clay	60	75	65
Composition:			
Quartz	5	–	–
Feldspar	<1	<1	–
Mica	–	<1	–
Clay	30	13	43
Volcanic glass	–	–	2
Glauconite	<1	<1	–
Pyrite	5	1	2
Carbonate unspec.	–	5	5
Foraminifers	5	5	3
Calc. nannofossils	50	70	45
Diatoms	<1	1	<1
Radiolarians	1	1	<1
Sponge spicules	2	3	–
Silicoflagellates	<1	–	–
Plant debris	<1	–	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 94–96 cm = 56:2.17
3, 70–72 cm = 43:3.27

SITE 532 HOLE CORE (HPC) 36 CORED INTERVAL 146.6–150.6 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

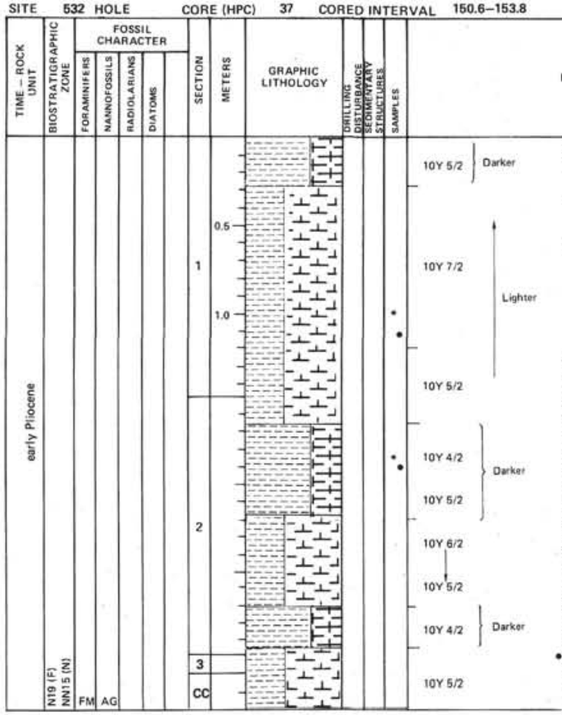
Marls are mostly light-colored, greenish olive (with one thin darker zone); and are bioturbated.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Nannofossil marl (dark)
Section, Depth (cm)	1, 80	2, 75
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	40	30
Clay	60	70
Composition:		
Quartz	1	3
Clay	49	50
Volcanic glass	<1	–
Pyrite	4	5
Carbonate unspec.	5	8
Foraminifers	6	4
Calc. nannofossils	35	27
Diatoms	<1	1
Radiolarians	<1	<1
Plant debris	<1	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 71–72 cm = 53:2.47

SITE 532 HOLE CORE (HPC) 37 CORED INTERVAL 150.6–153.8



LITHOLOGIC DESCRIPTION

FORAMINIFER RICH NANNOFOSSIL OOZE and FORAMINIFER NANNOFOSSIL MARL:

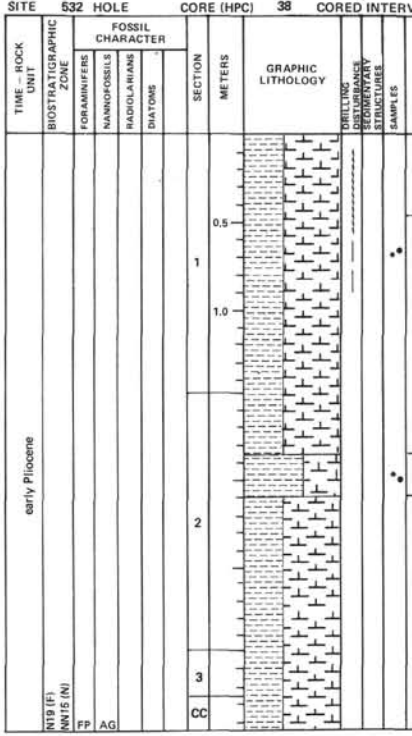
Alternate dark and light layers as indicated; and are bioturbated.

SMEAR SLIDE SUMMARY (%):

	Foraminifer nannofossil ooze (light)	Foraminifer nannofossil marl (dark)
Section, Depth (cm)	1, 101	2, 36
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	5	6
Silt	20	39
Clay	75	55
Composition:		
Quartz	1	6
Feldspar	<1	1
Clay	30	48
Volcanic glass	–	6
Glauconite	<1	<1
Pyrite	–	3
Carbonate unspec.	–	10
Foraminifers	10	10
Calc. nannofossils	55	15
Diatoms	–	<1
Radiolarians	1	–
Sponge spicules	1	–
Silicoflagellates	<1	–
Plant debris	–	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 109–110 cm = 54
2, 39–40 cm = 40
2, 45–55 cm = 39:2.31

SITE 532 HOLE CORE (HPC) 38 CORED INTERVAL 153.8–156.8 m



Mixed light + dark colors

10Y 7/2

10Y 6/2

5Y 5/4

5Y 4/3 } Dark

10Y 6/2

LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

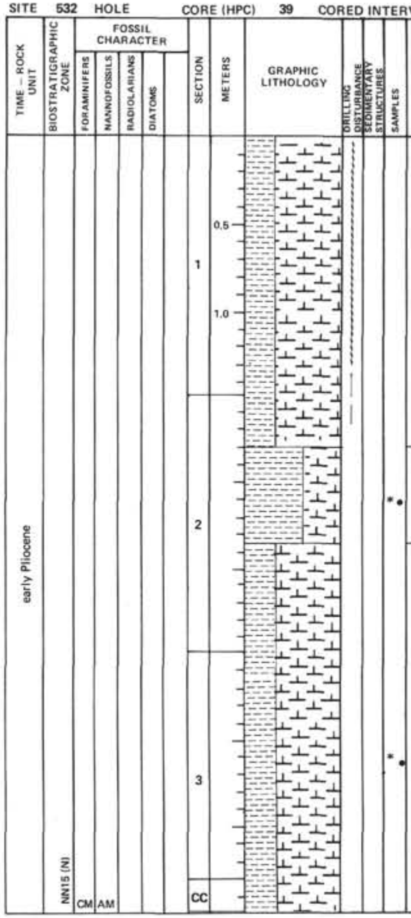
Marl is mainly light olive with one darker, more clay-rich bed; and is bioturbated.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Nannofossil marl (dark)
Section, Depth (cm)	1, 70	2, 49
Lith. (D = Dominant; M = Minor)	D	
Texture:		
Sand	1	2
Silt	29	23
Clay	70	75
Composition:		
Quartz	1	3
Feldspar	–	<1
Clay	45	54
Glauconite	–	<1
Pyrite	1	–
Carbonate unspec.	4	–
Foraminifers	4	5
Calc. nannofossils	45	30
Diatoms	<1	–
Radiolarians	–	1
Sponge spicules	–	1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 65–68 cm = 57:0.94
2, 50–53 cm = 29:3.12

SITE 532 HOLE CORE (HPC) 39 CORED INTERVAL 156.8–160.8 m



O - mostly gassy soup (light-colored 10Y 6/2)

10Y 6/2

5Y 7/4

10Y 6/2

LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

Mostly uniform, pale olive with one darker zone (10Y 7/4); and is disturbed by considerable gas.

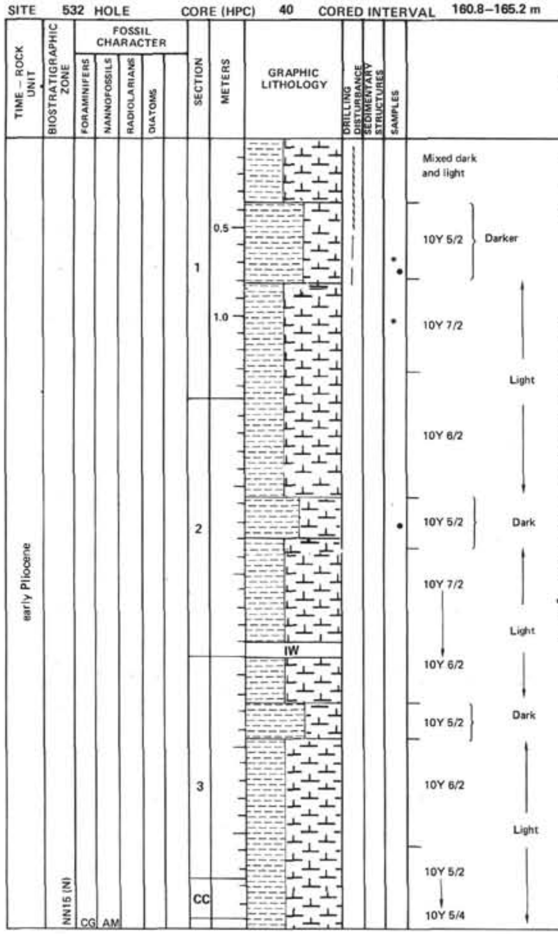
Bioturbation occurs throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (dark)	Nannofossil marl (light)
Section, Depth (cm)	2, 60	3, 60
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	20	35
Clay	80	65
Composition:		
Quartz	1	–
Clay	43	50
Pyrite	2	<1
Carbonate unspec.	3	12
Foraminifers	1	3
Calc. nannofossils	45	35
Diatoms	1	<1
Radiolarians	1	<1
Sponge spicules	2	–
Silicoflagellates	<1	–
Plant debris	<1	–

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 60–62 cm = 45:1.31
3, 60–62 cm = 80:3.56

SITE 532 HOLE CORE (HPC) 40 CORED INTERVAL 160.8–165.2 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

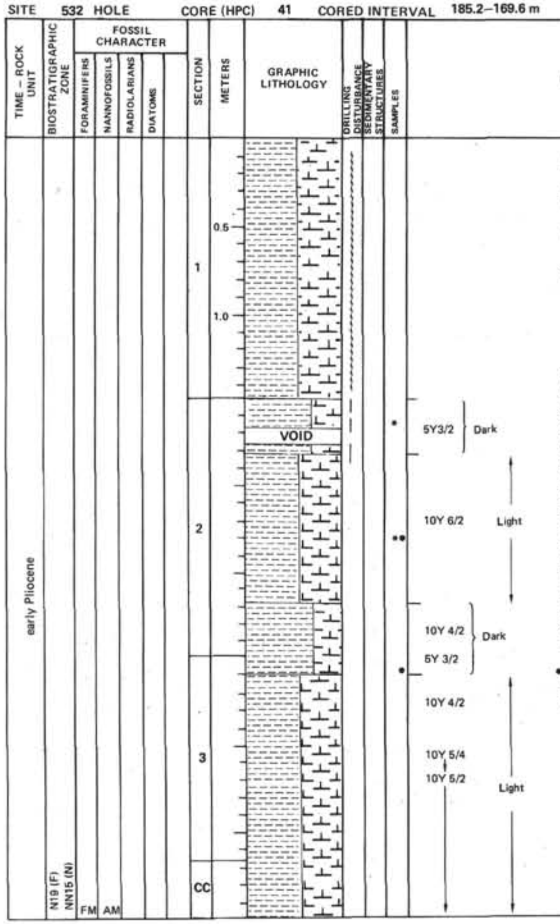
Marl is light and dark olive colors; bioturbated; and has some gas cracks.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (dark)	Nannofossil marl (light)
Section, Depth (cm)	1, 70	1, 107
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	2	3
Silt	13	17
Clay	85	80
Composition:		
Quartz	1	1
Feldspar	<1	<1
Mica	<1	–
Clay	50	42
Glauconite	<1	<1
Pyrite	2	1
Foraminifers	5	10
Calc. nannofossils	40	45
Diatoms	<1	<1
Radiolarians	<1	<1
Sponge spicules	1	<1
Plant debris	<1	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 75–76 cm = 37:2.99
3, 75–76 cm = 51

SITE 532 HOLE CORE (HPC) 41 CORED INTERVAL 185.2–169.6 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL and CLAY:

Section 1 is highly drill-disturbed. Sediment is dominantly 10Y 6/2; and has one zone 5 cm thick of darker (5Y 3/2) clay-rich material.

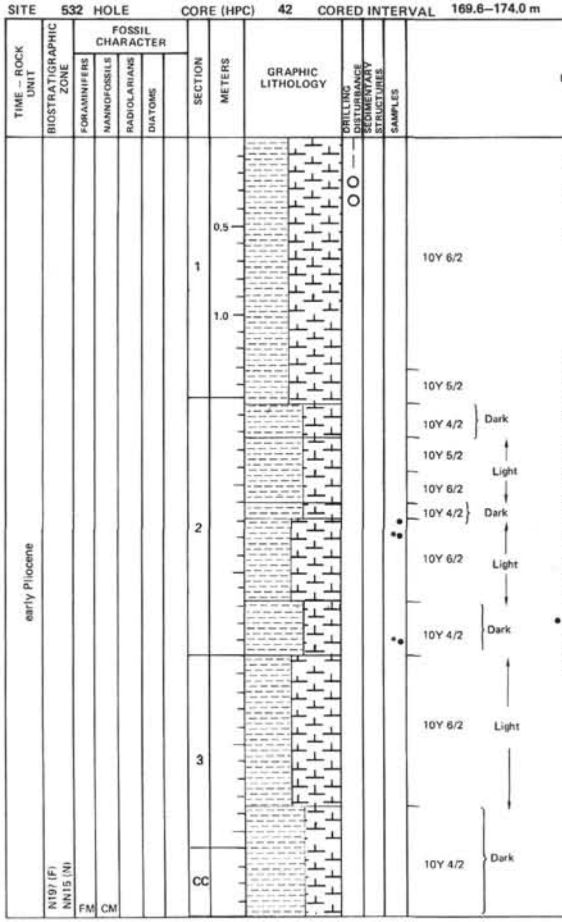
Below Section 1 is mostly light colored NANNOFOSSIL MARL with beds of darker CLAY which are bioturbated.

SMEAR SLIDE SUMMARY (%):

	Nannofossil clay (dark)	Nannofossil clay (light)
Section, Depth (cm)	2, 15	2, 81
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	2	5
Silt	18	25
Clay	80	70
Composition:		
Quartz	1	1
Feldspar	<1	–
Clay	67	50
Glauconite	–	<1
Pyrite	1	2
Carbonate unspec.	3	–
Foraminifers	2	5
Calc. nannofossils	20	35
Diatoms	1	2
Radiolarians	2	2
Sponge spicules	3	2
Silicoflagellates	<1	<1
Plant debris	–	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 80–82 cm = 46:2.37
3, 4–5 cm = 27:4.11

SITE 532 HOLE CORE (HPC) 42 CORED INTERVAL 169.6–174.0 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

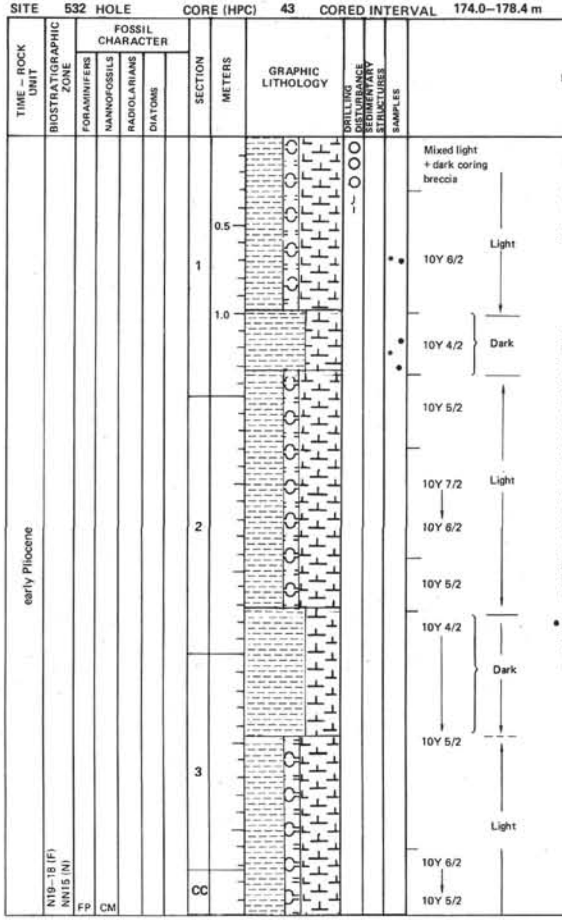
Marl has light and dark cycles as indicated and is bioturbated. Darker beds have a greater amount of clay.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Nannofossil marl (darker)
Section, Depth (cm)	2, 80	2, 141
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	4	–
Silt	40	45
Clay	60	55
Composition:		
Quartz	1	<1
Mica	<1	–
Clay	43	50
Glauconite	<1	–
Pyrite	–	1
Carbonate unspec.	6	3
Foraminifers	4	<1
Calc. nannofossils	40	37
Diatoms	5	4
Radiolarians	<1	1
Plant debris	<1	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 71–72 cm = 58:1.91
2, 79–80 cm = 54:1.54
2, 140–141 cm = 34:2.90

SITE 532 HOLE CORE (HPC) 43 CORED INTERVAL 174.0–178.4 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

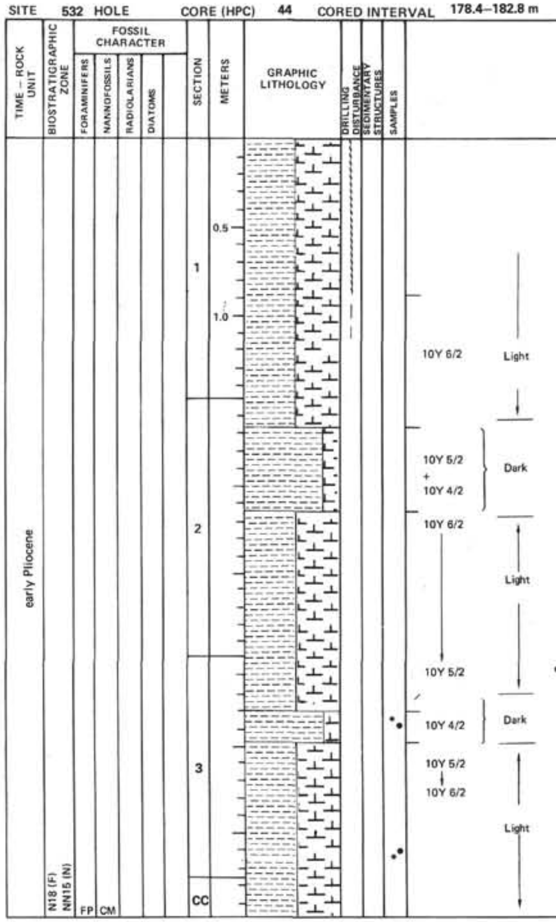
Marl was a greater SILICEOUS component relative to cores above; and has alternating light and dark cycles with slight differences in clay and nannofossil contents.

SMEAR SLIDE SUMMARY (%):

	Diatom nannofossil marl (dark)	Diatom nannofossil marl (light)
Section, Depth (cm)	1, 70	1, 120
Lith. (D = Dominant; M=Minor)	D	D
Texture:		
Sand	–	1
Silt	30	29
Clay	70	70
Composition:		
Quartz	3	1
Clay	57	42
Glauconite	–	<1
Pyrite	1	1
Carbonate unspec.	2	3
Foraminifers	1	2
Calc. nannofossils	25	35
Diatoms	5	10
Radiolarians	2	1
Sponge spicules	3	4
Silicoflagellates	<1	<1
Plant debris	<1	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 71–72 cm = 50:1.30
1, 117–118 cm = 38:3.22
1, 130–140 cm = 24:3.92

SITE 532 HOLE CORE (HPC) 44 CORED INTERVAL 178.4–182.8 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL and CLAY:

These occur in alternating light and dark beds; and are bioturbated.

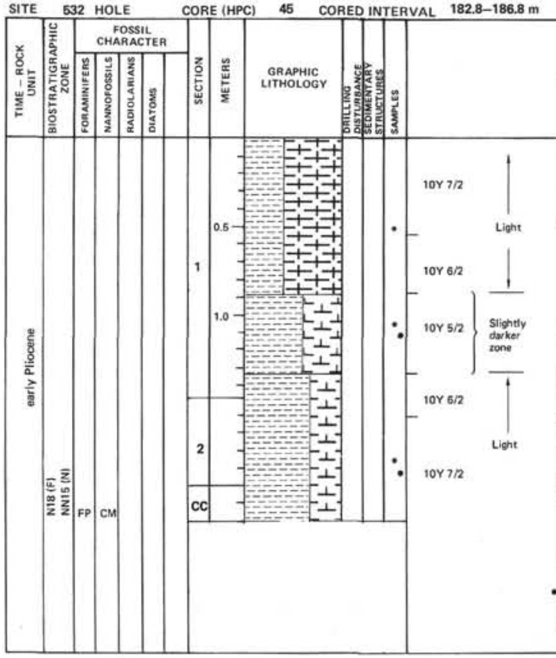
In Section 1, 0–85 cm highly drill-disturbed mixture of light and dark colors.

SMEAR SLIDE SUMMARY (%):

	Nannofossil clay (dark)	Nannofossil marl (light)
Section, Depth (cm)	3, 39	3, 115
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	30	40
Clay	70	60
Composition:		
Quartz	2	1
Clay	70	48
Volcanic glass	1	–
Glauconite	<1	–
Pyrite	2	2
Carbonate unspec.	4	–
Foraminifers	1	5
Calc. nannofossils	15	40
Diatoms	1	1
Radiolarians	1	1
Sponge spicules	–	2
Silicoflagellates	–	<1
Plant debris	<1	<1
Amorphous organics	3	–

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
3, 36–37 cm = 30:4.24
3, 110–111 cm = 53:1.69

SITE 532 HOLE CORE (HPC) 45 CORED INTERVAL 182.8–186.8 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

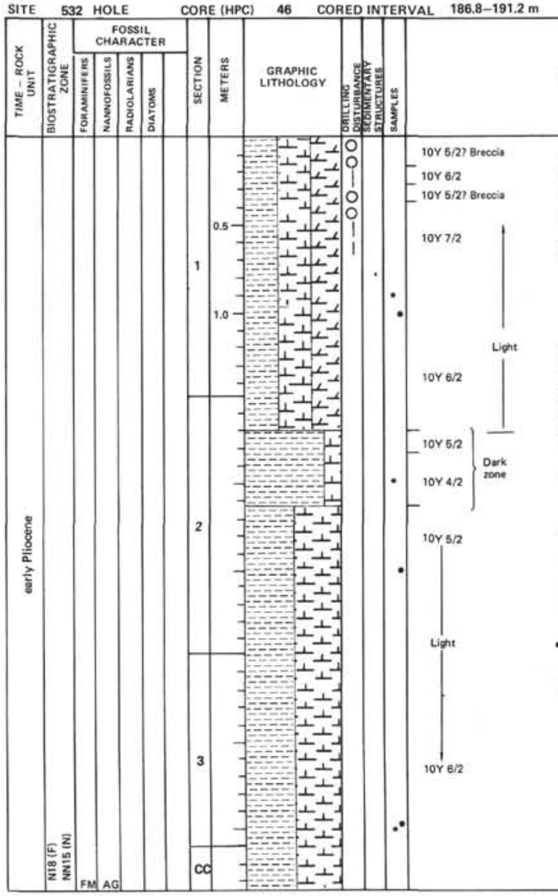
Marl is fairly uniform with very light olive color with one slightly darker zone as indicated; and is bioturbated.

SMEAR SLIDE SUMMARY (%):

	Foraminifer nannofossil ooze (light)	Nannofossil marl (dark)	Nannofossil marl (light)
Section, Depth (cm)	1, 50	1, 108	2, 38
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	1	–	2
Silt	54	40	28
Clay	45	60	70
Composition:			
Quartz	<1	1	1
Clay	45	50	56
Volcanic glass	<1	1	–
Pyrite	1	1	1
Carbonate unspec.	8	3	10
Foraminifers	12	2	5
Calc. nannofossils	36	40	25
Diatoms	–	1	–
Radiolarians	–	1	<1
Sponge spicules	–	<1	1
Plant debris	–	–	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 116–119 cm = 55:2.20
2, 42–45 cm = 68:0.55

SITE 532 HOLE CORE (HPC) 46 CORED INTERVAL 186.8–191.2 m



LITHOLOGIC DESCRIPTION

Dominantly NANNOFOSSIL MARL with MINOR DOLOMITIC NANNOFOSSIL MARL and NANNOFOSSIL CLAY:

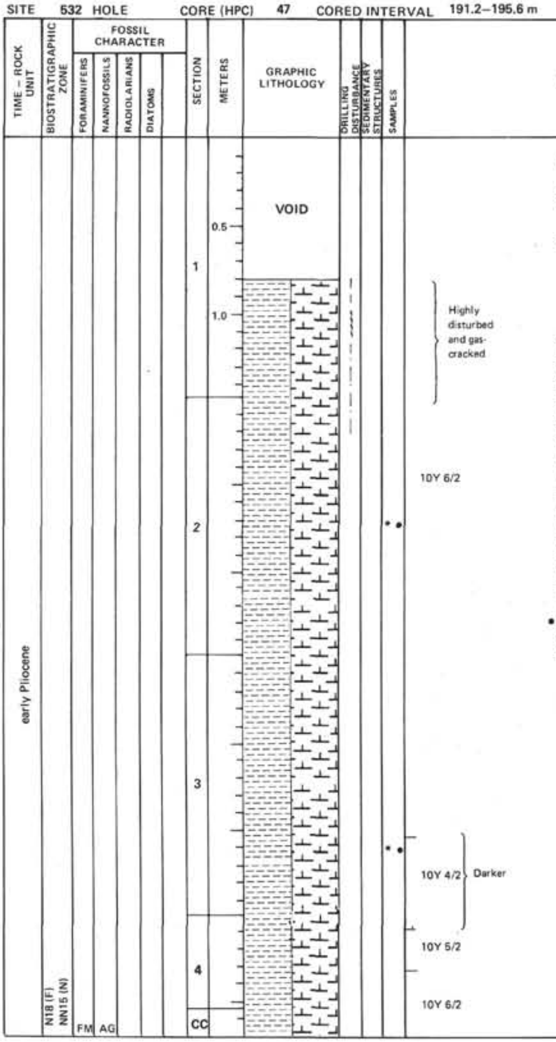
These are a fairly uniform light color with one dark, more clay-rich zone as indicated; and are bioturbated.

SMEAR SLIDE SUMMARY (%):

	Nannofossil dolomitic marl (light)	Nannofossil clay (dark)	Nannofossil marl (light)
Section, Depth (cm)	1, 90	2, 49	3, 100
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	–	–	–
Silt	55	35	50
Clay	44	65	50
Composition:			
Quartz	1	5	1
Feldspar	–	<1	–
Clay	32	60	41
Volcanic glass	–	6	<1
Glauconite	–	<1	–
Pyrite	2	2	1
Carbonate unspec.	–	3	2
Foraminifers	2	1	<1
Calc. nannofossils	28	20	55
Radiolarians	–	<1	<1
Sponge spicules	–	1	<1
Silicoflagellates	–	1	–
Dolomite	36	<1	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 100–101 cm = 73
2, 100–101 cm = 44:2.44
3, 96–99 cm = 55:1.75

SITE 532 HOLE CORE (HPC) 47 CORED INTERVAL 191.2–195.6 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

These marls are mostly light-colored (10Y 6/2) with several slightly darker zones (10Y 4/2) are bioturbated; and have some gas cracking (Sections 1 and 2).

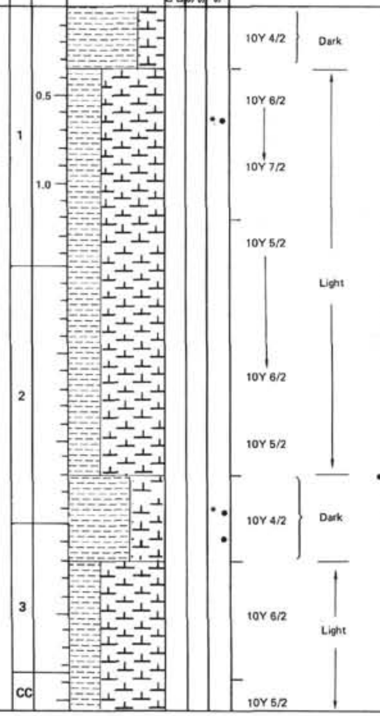
SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Nannofossil marl (dark)
Section, Depth (cm)	2, 70	3, 110
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	40	35
Clay	60	65
Composition:		
Quartz	–	1
Mica	–	<1
Clay	40	45
Volcanic glass	1	<1
Pyrite	2	2
Carbonate unspec.	2	3
Foraminifers	6	1
Calc. nannofossils	49	48
Diatoms	<1	<1
Radiolarians	<1	<1
Sponge spicules	–	<1
Plant debris	<1	–

• CARBONATE BOMB (% $CaCO_3$: % organic carbon):
2, 69–71 cm = 56
3, 110–112 cm = 41:2.59

SITE 532 HOLE CORE (HPC) 48 CORED INTERVAL 195.6–199.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS
early Pliocene	N18 (F) NN12–14 (N)	RP	AG		



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

Light and dark layers alternate as indicated. Dark layers have more clay, more organics, and more siliceous microfossils, but still classify as marl.

These are bioturbated and have minor gas cracks.

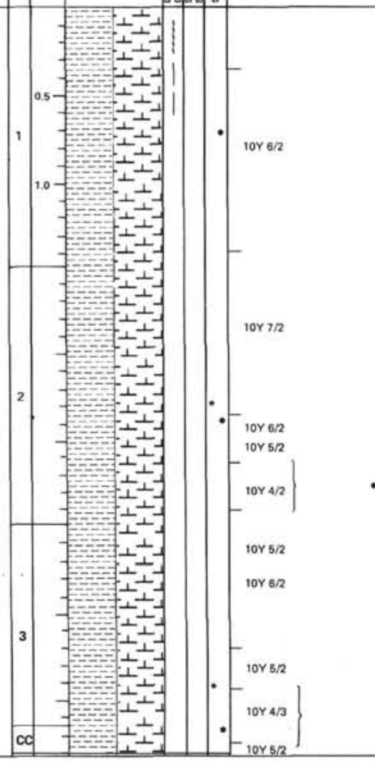
SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Nannofossil marl (dark)
Section, Depth (cm)	1, 66	2, 142
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	40	40
Clay	60	60
Composition:		
Clay	44	58
Volcanic glass	–	<1
Glauconite	–	<1
Pyrite	1	4
Carbonate unspec.	10	5
Foraminifers	–	1
Calc. nannofossils	45	30
Diatoms	–	<1
Radiolarians	–	1
Sponge spicules	–	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 64–67 cm = 62:0.96
2, 142–145 cm = 34:3.75
3, 5–11 cm = 33

SITE 532 HOLE CORE (HPC) 49 CORED INTERVAL 199.6–203.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS
early Pliocene	N18 (F) NN12–14 (N)	FP	AM		



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

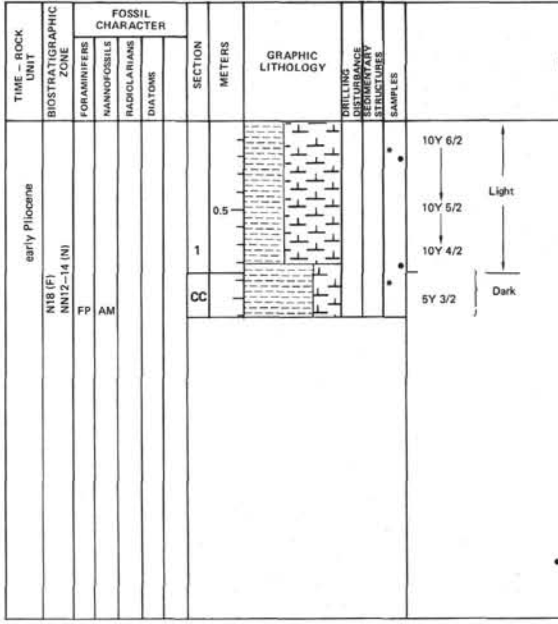
These marls are mostly lighter olive colors (rare dark zones occur as indicated); and are bioturbated (common large-scale [2x6 cm] burrows).

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Nannofossil marl
Section, Depth (cm)	2, 80	3, 90
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	56	30
Clay	44	70
Composition:		
Quartz	–	<1
Clay	44	40
Volcanic glass	<1	–
Glauconite	<1	<1
Pyrite	–	2
Carbonate unspec.	–	1
Foraminifers	<1	1
Calc. nannofossils	54	55
Diatoms	<1	–
Radiolarians	<1	<1
Sponge spicules	–	1
Plant debris	1	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 70–71 cm = 55:1.65
2, 86–92 cm = 55:0.45
CC, 3–4 cm = 37:2.02

SITE 532 HOLE CORE (HPC) 50 CORED INTERVAL 203.6–207.6 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL AND CLAY:

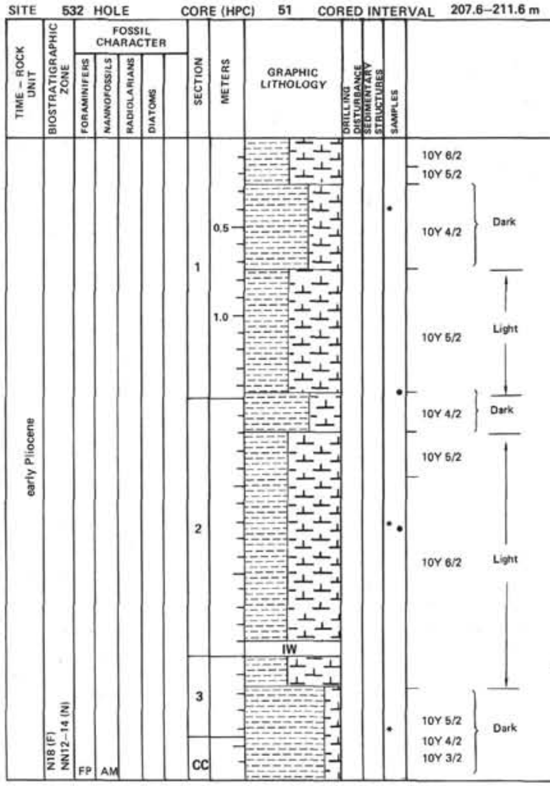
There is one well-defined dark (clay)/light (marl) cycle; and the core is bioturbated.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Nannofossil clay (dark)
Section, Depth (cm)	1, 20	CC, 8
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	55	25
Clay	45	75
Composition:		
Quartz	–	5
Feldspar	–	<1
Clay	40	61
Glauconite	<1	<1
Pyrite	1	5
Carbonate unspec.	3	3
Foraminifers	4	<1
Calc. nannofossils	52	25
Diatoms	<1	–
Sponge spicules	1	–
Plant debris	–	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 20–21 cm = 24
1, 82–83 cm = 46:2.24

SITE 532 HOLE CORE (HPC) 51 CORED INTERVAL 207.6–211.6 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL with minor CLAY:

Light to dark (less clay/more clay) cycles alternate. These are nannofossil marls with subtle differences in clay content which manifested relatively large color difference.

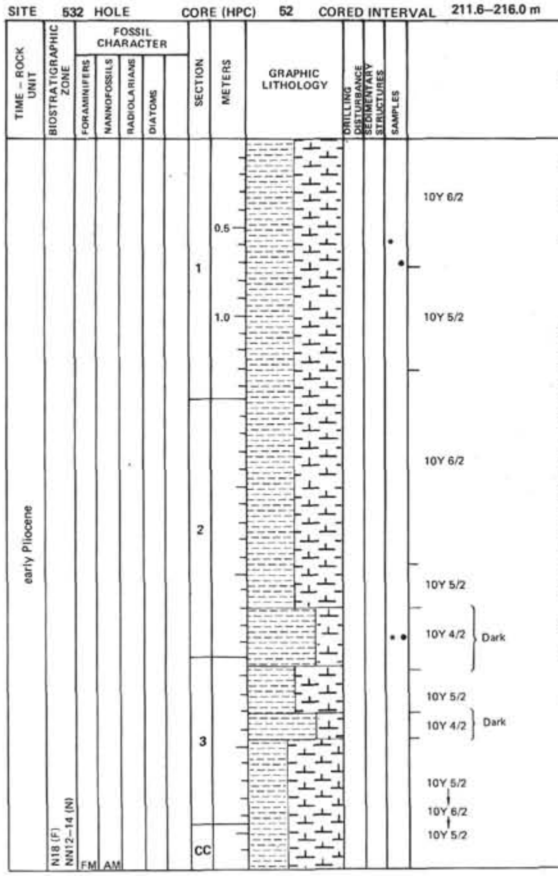
Core is bioturbated throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Nannofossil marl	Nannofossil clay
Section, Depth (cm)	1, 40	2, 75	3, 40
Lith. (D = Dominant; M = Minor)	D	D	D
Texture:			
Sand	–	–	–
Silt	50	55	20
Clay	50	45	80
Composition:			
Quartz	–	–	2
Clay	47	41	70
Volcanic glass	–	1	–
Glauconite	<1	–	–
Pyrite	1	<1	2
Carbonate unspec.	1	2	2
Foraminifers	1	1	1
Calc. nannofossils	50	55	20
Diatoms	–	–	<1
Radiolarians	–	–	1
Sponge spicules	–	–	2
Plant debris	<1	–	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 144–150 cm = 81:2.02
2, 75–78 cm = 83:1.03

SITE 532 HOLE CORE (HPC) 52 CORED INTERVAL 211.6–216.0 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL AND CLAY:

These are mostly light colored (pale olive – 10Y 6/2) with some dark beds as indicated; bioturbated; and some gas cracks.

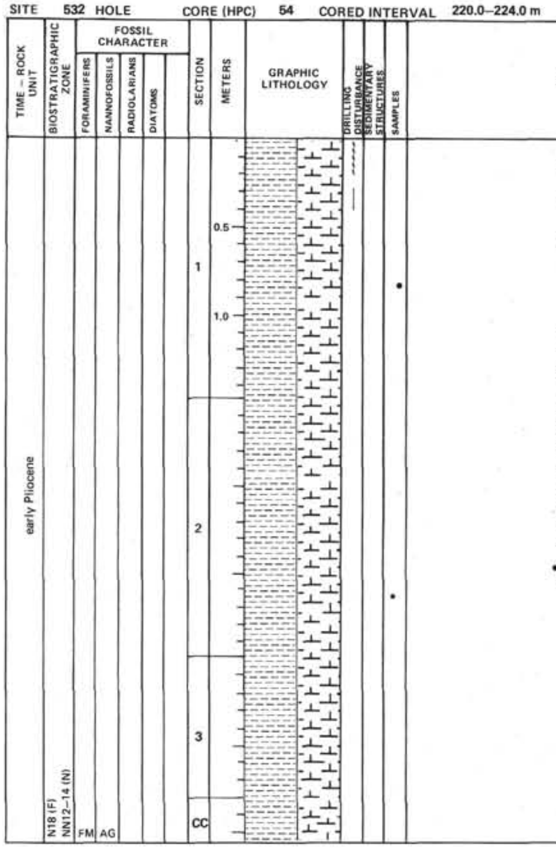
SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Nannofossil clay (dark)
Section, Depth (cm)	1, 60	2, 146
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	50	15
Clay	50	85
Composition:		
Quartz	–	<1
Feldspar	–	<1
Clay	50	70
Volcanic glass	–	<1
Glauconite	–	<1
Pyrite	<1	1
Carbonate unspec.	<1	2
Foraminifers	<1	1
Calc. nannofossils	50	25
Diatoms	–	<1
Radiolarians	–	<1
Sponge spicules	–	<1
Plant debris	–	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 64–70 cm = 44:2.86
2, 141–147 cm = 72:2.24

Note: Core 53, 216.0–220.0 m: No recovery.

SITE 532 HOLE CORE (HPC) 54 CORED INTERVAL 220.0–224.0 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

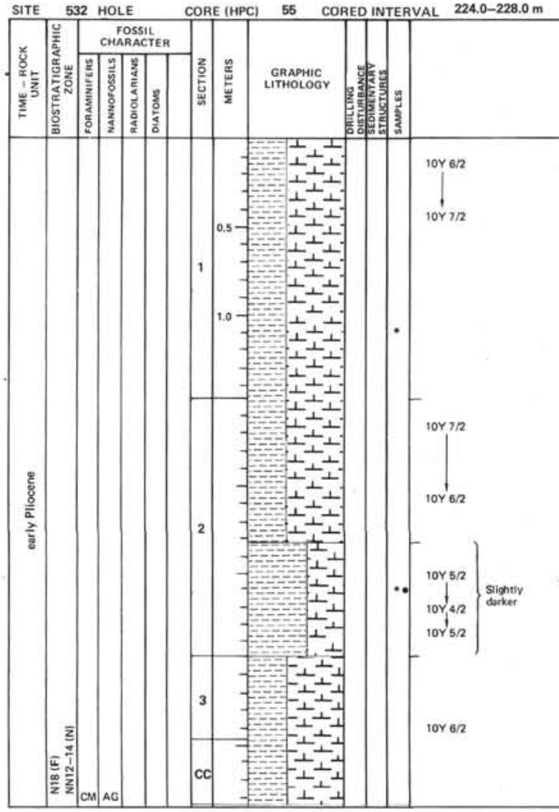
It is mostly light colored (pale olive – 10Y 6/2), bioturbated, and some gas cracks.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl
Section, Depth (cm)	2, 116
Lith. (D = Dominant; M = Minor)	D
Texture:	
Sand	–
Silt	20
Clay	80
Composition:	
Quartz	<1
Clay	57
Pyrite	1
Foraminifers	5
Calc. nannofossils	40
Diatoms	<1
Radiolarians	<1
Sponge spicules	1
Plant debris	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 81–87 cm = 47:3.95

SITE 532 HOLE CORE (HPC) 55 CORED INTERVAL 224.0–228.0 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

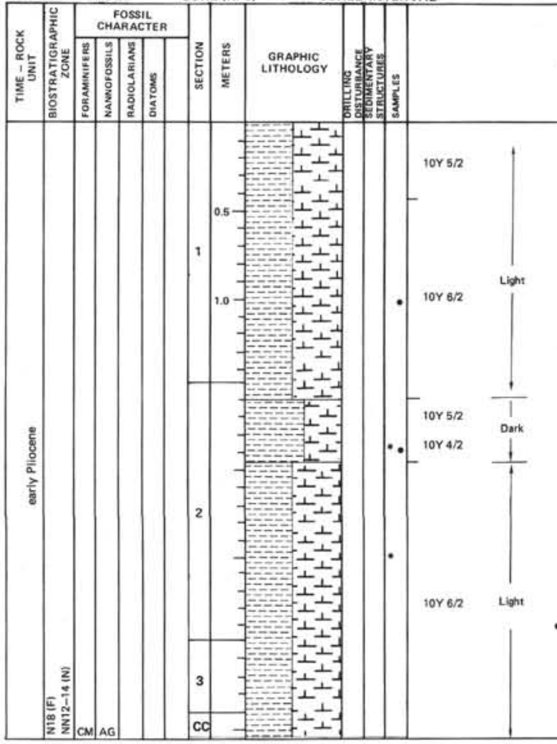
It is uniform pale olive (10Y 6/2 and 10Y 7/2), bioturbated, and gas cracked throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil ooze	Nannofossil marl
Section, Depth (cm)	1, 110	2, 110
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	1	–
Silt	64	40
Clay	35	60
Composition:		
Clay	30	57
Glauconite	<1	–
Pyrite	2	1
Carbonate unspec.	4	1
Foraminifers	6	1
Calc. nannofossils	58	40
Diatoms	–	<1
Sponge spicules	<1	–
Plant debris	<1	–

•CARBONATE BOMB (% $CaCO_3$):
2, 109–110 cm = 48

SITE 532 HOLE CORE (HPC) 56 CORED INTERVAL 228.0–231.4 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

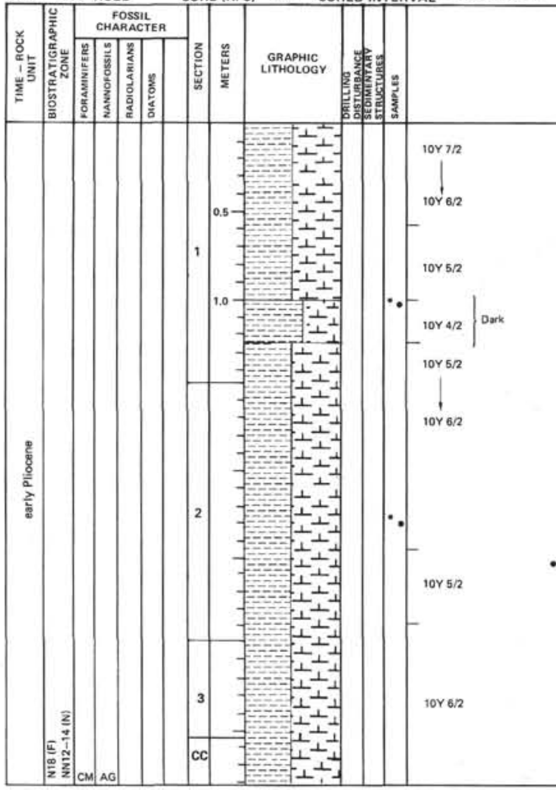
It is mostly light olive with several darker beds as indicated; and is bioturbated.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (dark)	Nannofossil marl (light)
Section, Depth (cm)	2, 37	2, 100
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	15	50
Clay	85	50
Composition:		
Quartz	<1	1
Clay	60	50
Volcanic glass	–	<1
Pyrite	2	1
Carbonate unspec.	2	1
Foraminifers	2	2
Calc. nannofossils	31	40
Diatoms	1	–
Radiolarians	<1	–
Sponge spicules	1	–
Plant debris	<1	–
Dolomite	–	5

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 100–104 cm = 86:0.68
2, 34–39 cm = 47:1.99

SITE 532 HOLE CORE (HPC) 57 CORED INTERVAL 231.4–234.8 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL AND CLAY:

Dark and light (more clay-rich/less clay-rich) cycles are interbedded as indicated.

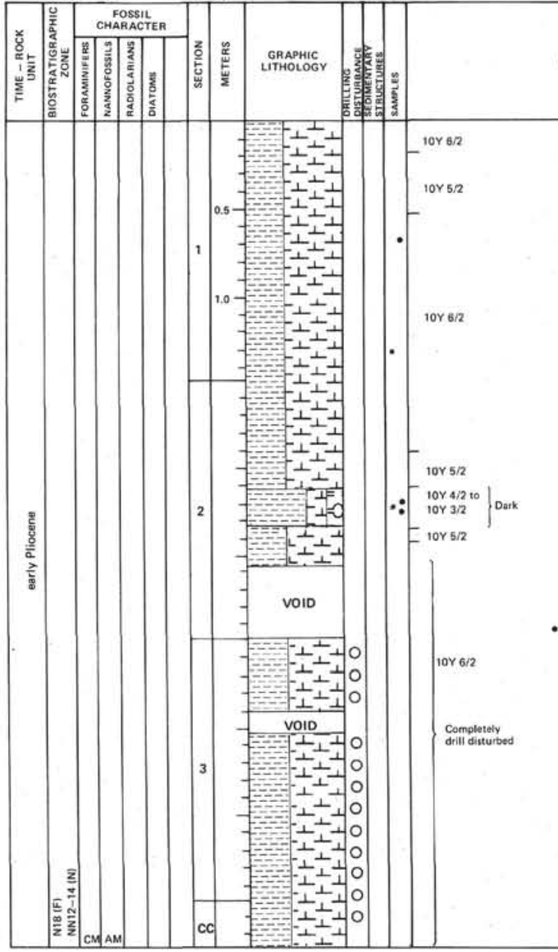
Core is bioturbated.

SMEAR SLIDE SUMMARY (%):

	Nannofossil clay (dark)	Nannofossil marl (light)
Section, Depth (cm)	1, 110	2, 80
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	–
Silt	15	54
Clay	85	46
Composition:		
Quartz	<1	<1
Clay	63	46
Volcanic glass	–	<1
Pyrite	1	1
Carbonate unspec.	2	2
Foraminifers	1	1
Calc. nannofossils	30	50
Diatoms	1	–
Radiolarians	<1	–
Sponge spicules	1	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 109–110 cm = 49:2.20
2, 79–80 cm = 62

SITE 532 HOLE CORE (HPC) 58 CORED INTERVAL 234.8–238.8 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL and CLAY:

These have some dolomite and siliceous fossils both minor. Most of core is uniform light olive with one darker bed as indicated.

Void in Section 2 may be due to severely drill-disturbed material below.

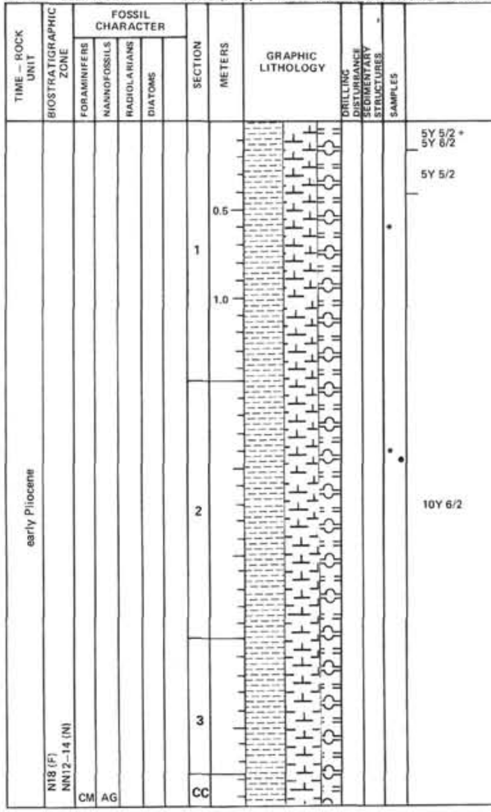
SMEAR SLIDE SUMMARY (%):

	Dolomitic nannofossil marl (light)	Siliceous nannofossil clay (dark)
Section, Depth (cm)	1, 130	2, 70
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	1	1
Silt	64	24
Clay	35	75
Composition:		
Quartz	<1	2
Clay	30	60
Volcanic glass	<1	<1
Glauconite	–	<1
Pyrite	<1	2
Carbonate unspec.	–	2
Foraminifers	4	2
Calc. nannofossils	50	21
Diatoms	<1	6
Radiolarians	–	2
Sponge spicules	–	2
Silicoflagellates	–	<1
Dolomite	15	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 67–68 cm = 80
2, 67–68 cm = 32:3.11
2, 80–90 cm = 44:2.06

Note: Core 59, 238.8–242.8 m: No recovery.

SITE 532 HOLE CORE (HPC) 60 CORED INTERVAL 242.8–246.8 m



LITHOLOGIC DESCRIPTION

SILICEOUS NANNOFOSSIL MARL:

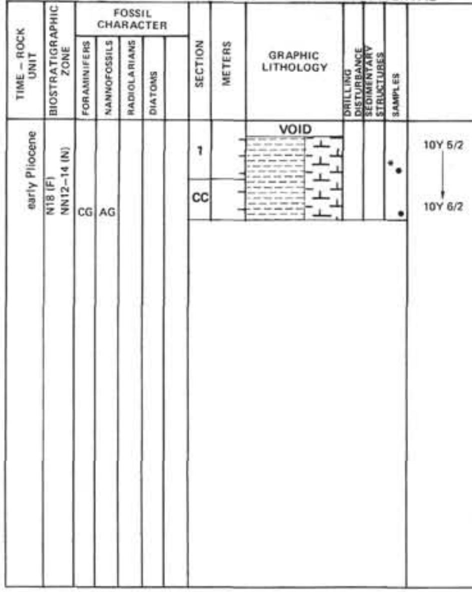
These are uniform pale olive with slightly darker horizons at top; and are bioturbated.

SMEAR SLIDE SUMMARY (%):

	Siliceous nannofossil marl	Siliceous nannofossil marl
Section, Depth (cm)	1, 60	2, 40
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	5	1
Silt	20	24
Clay	70	75
Composition:		
Quartz	1	<1
Feldspar	–	<1
Clay	45	54
Volcanic glass	<1	–
Glauconite	<1	–
Pyrite	–	2
Foraminifers	5	2
Calc. nannofossils	37	30
Diatoms	5	6
Radiolarians	2	2
Sponge spicules	2	3
Silicoflagellates	–	<1
Fish remains	–	<1

CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 42–48 cm = 48:1.23

SITE 532 HOLE CORE (HPC) 61 CORED INTERVAL 246.8–250.8 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

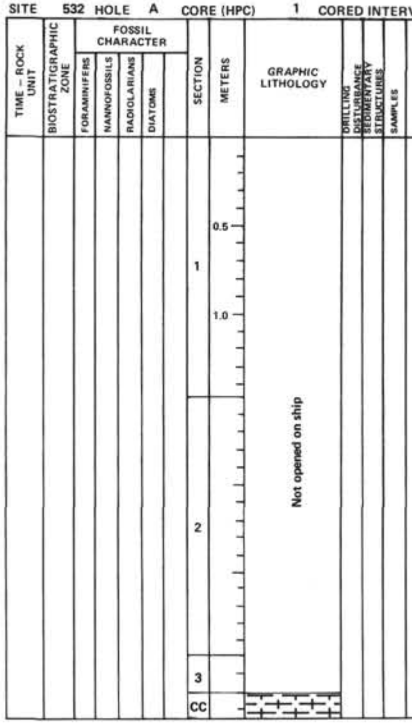
Core is bioturbated.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl
Section, Depth (cm)	1, 21
Lith. (D = Dominant; M = Minor)	
Texture:	
Sand	5
Silt	20
Clay	75
Composition:	
Quartz	1
Clay	50
Pyrite	1
Foraminifers	5
Calc. nannofossils	36
Diatoms	2
Radiolarians	2
Sponge spicules	2
Silicoflagellates	<1
Plant debris	<1

• CARBONATE BOMB (% $CaCO_3$):
1, 27–29 cm = 49
CC, 20–21 cm = 50

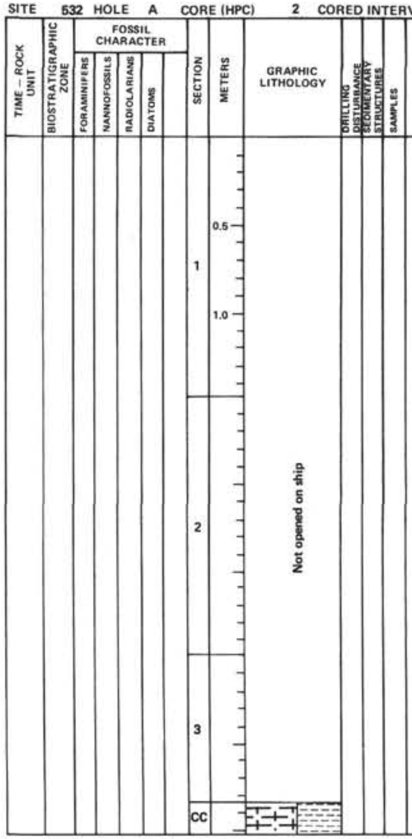
SITE 532 HOLE A CORE (HPC) 1 CORED INTERVAL 0.0–3.4 m



LITHOLOGIC DESCRIPTION

Moderate olive brown (5Y 4/4) FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

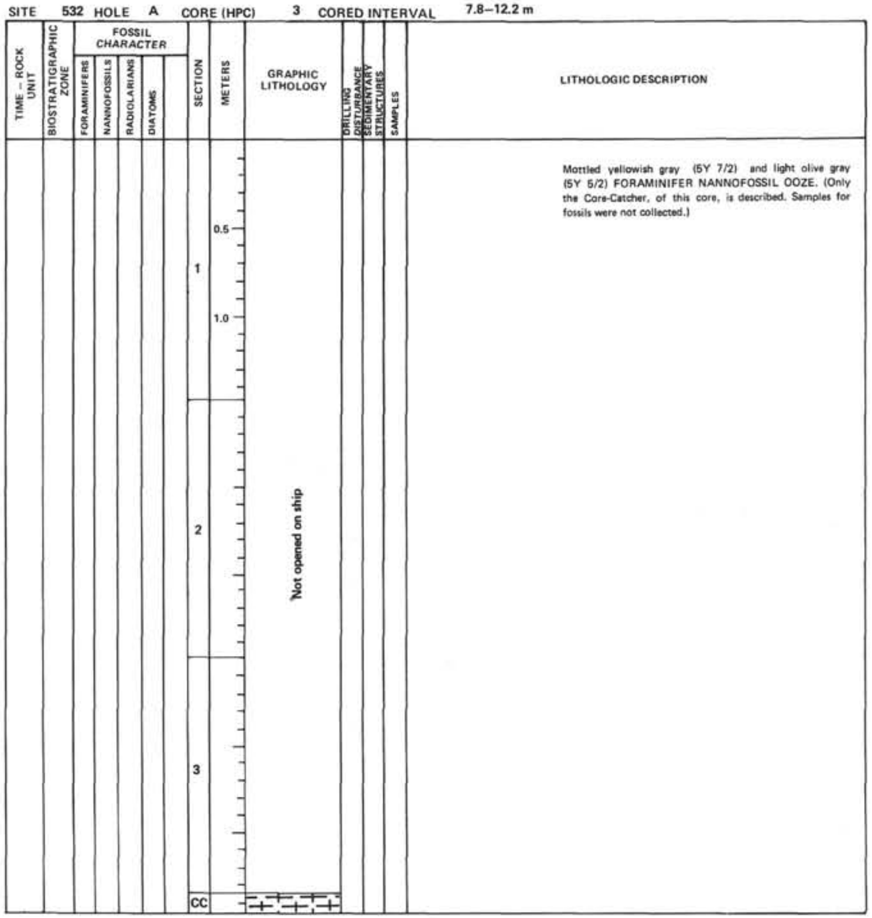
SITE 532 HOLE A CORE (HPC) 2 CORED INTERVAL 3.4–7.8 m



LITHOLOGIC DESCRIPTION

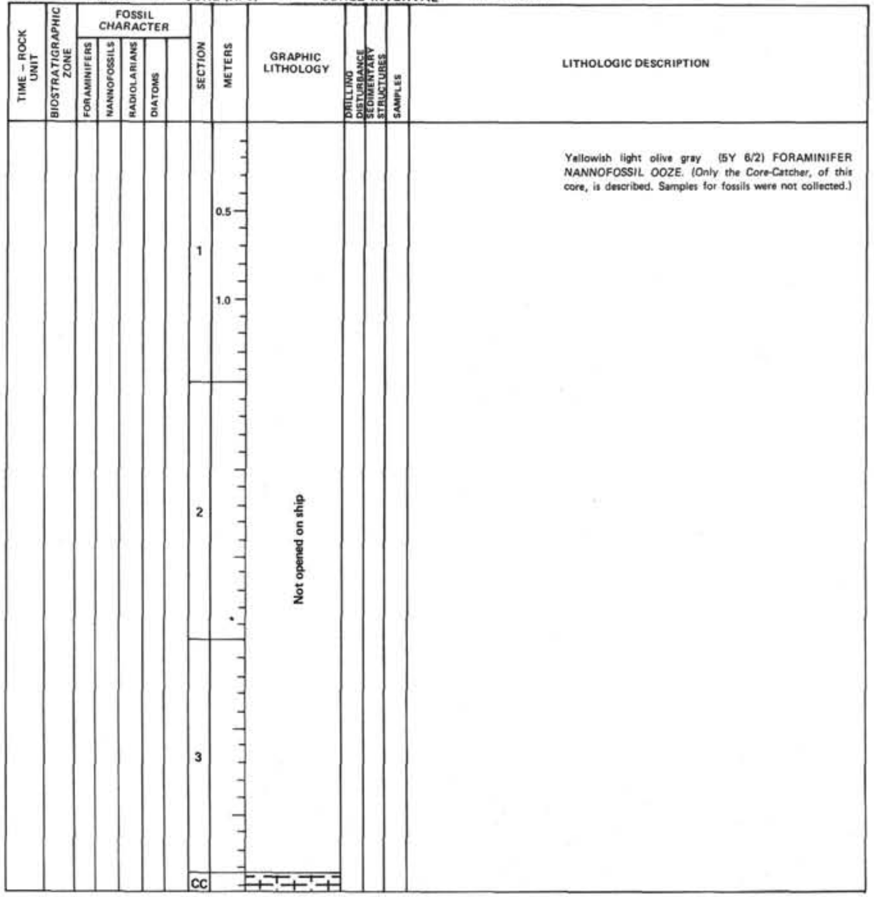
Moderate olive brown (5Y 4/4) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 3 CORED INTERVAL 7.8–12.2 m



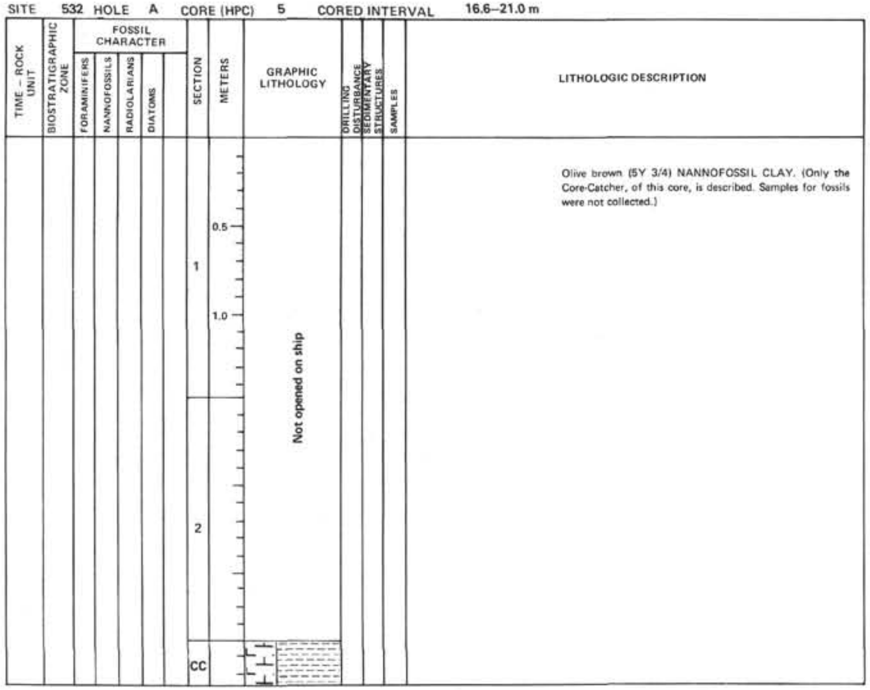
Mottled yellowish gray (5Y 7/2) and light olive gray (5Y 5/2) FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 4 CORED INTERVAL 12.2–16.6 m



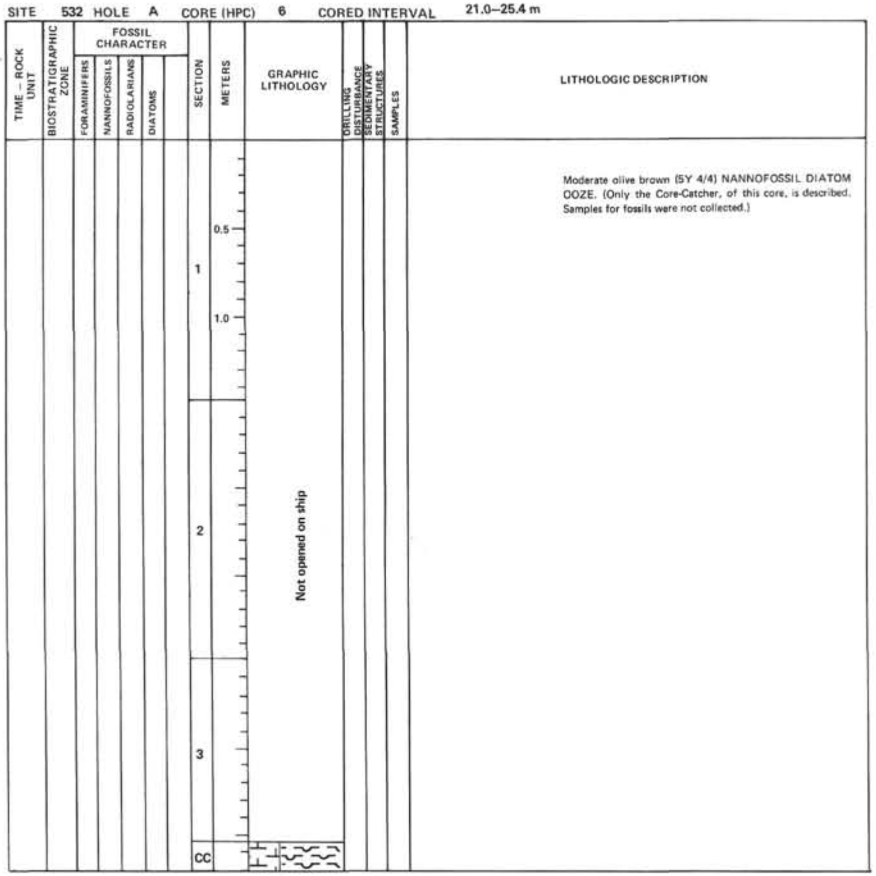
Yellowish light olive gray (5Y 6/2) FORAMINIFER *NANNOFOSSIL OOZE. (Only the Core-Catcher, of this* core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 5 CORED INTERVAL 16.6–21.0 m



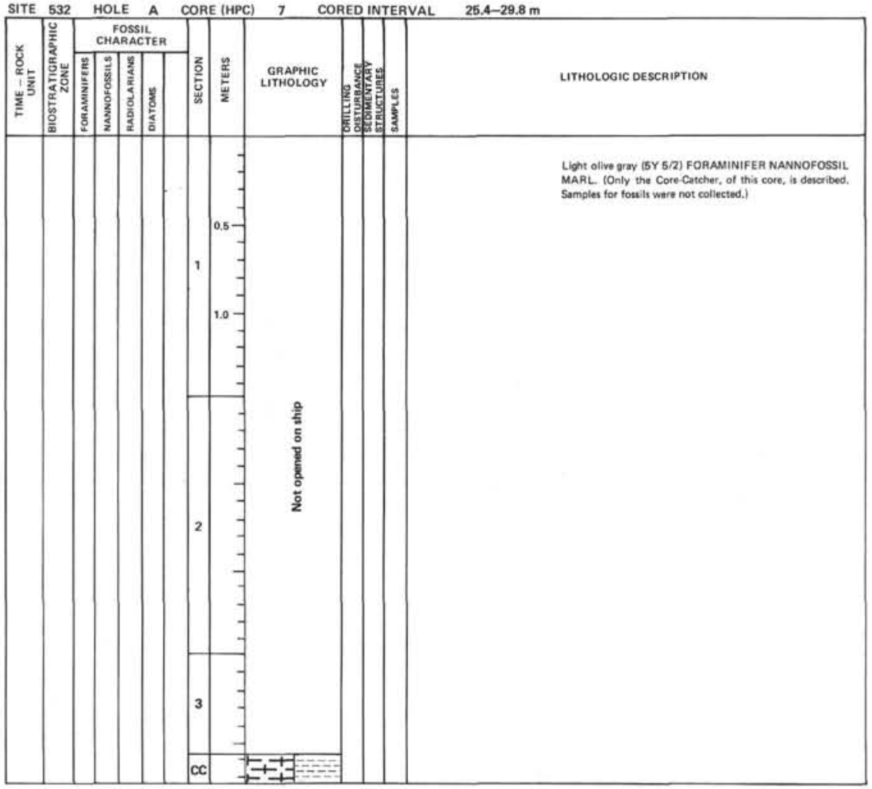
Olive brown (5Y 3/4) NANNOFOSSIL CLAY. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 6 CORED INTERVAL 21.0–25.4 m



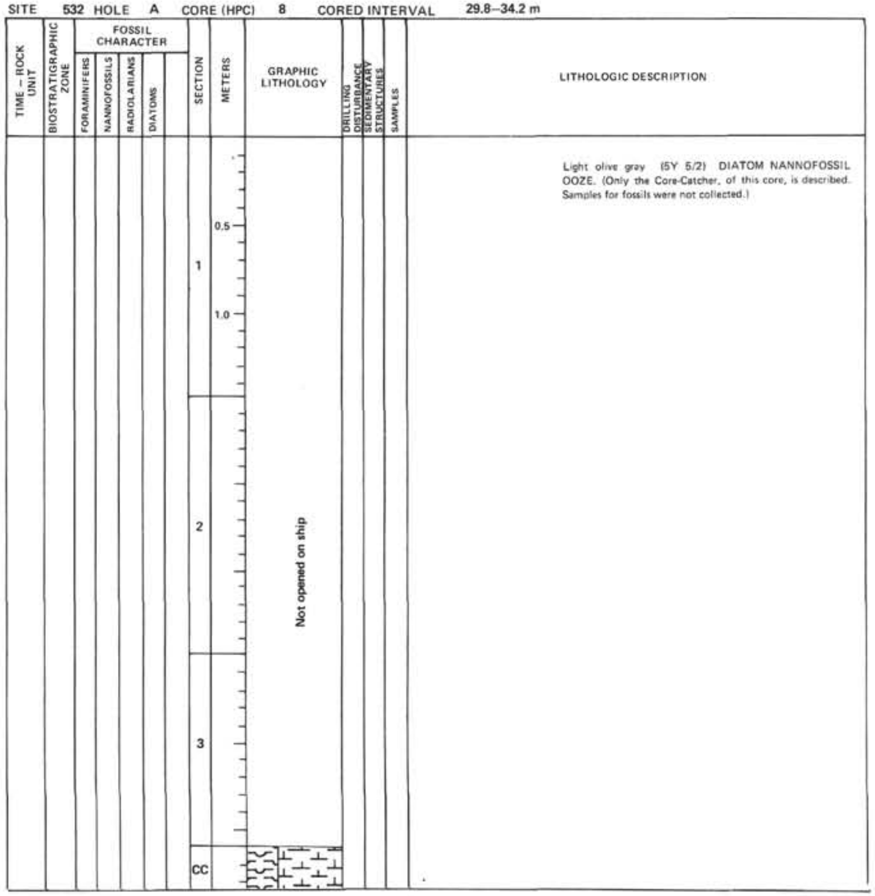
Moderate olive brown (5Y 4/4) NANNOFOSSIL DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 7 CORED INTERVAL 25.4–29.8 m



Light olive gray (5Y 5/2) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 8 CORED INTERVAL 29.8–34.2 m



Light olive gray (5Y 5/2) DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

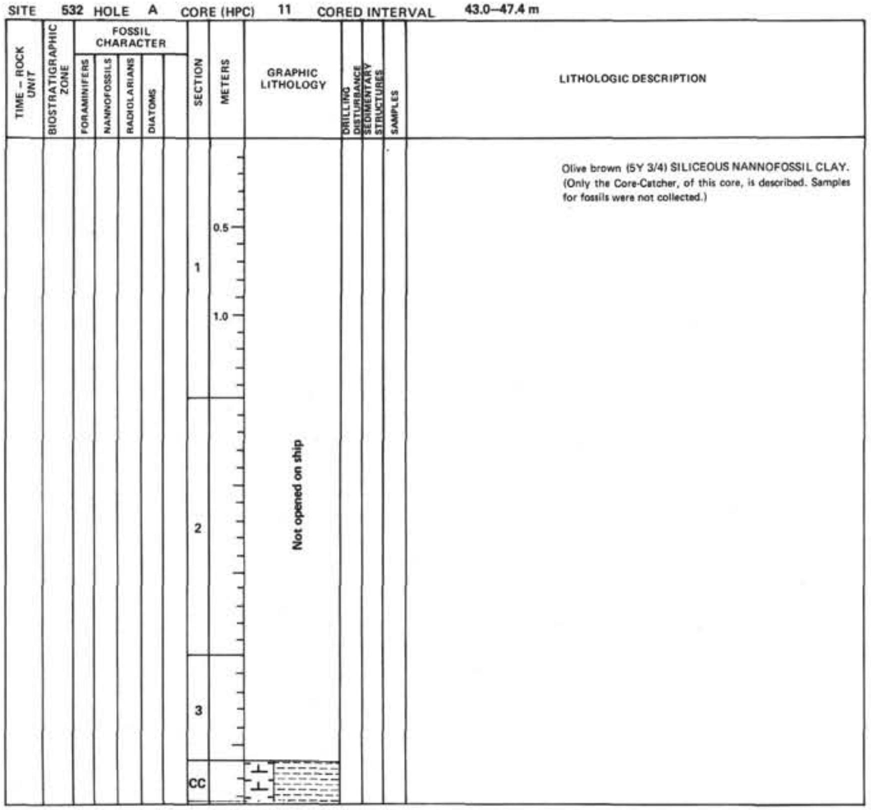
SITE 532 HOLE A CORE (HPC) 9 CORED INTERVAL 34.2–38.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Moderate olive brown (5Y 4/4) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

SITE 532 HOLE A CORE (HPC) 10 CORED INTERVAL 38.6–43.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Light olive brown (5Y 5/4) mottled SILICEOUS FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

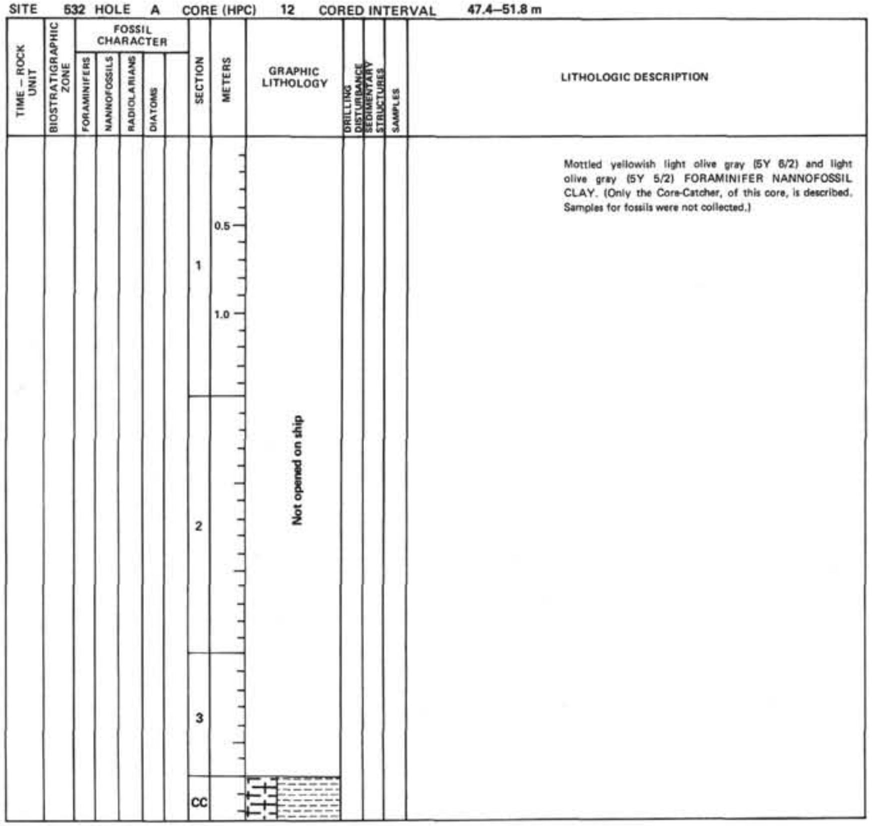
SITE 532 HOLE A CORE (HPC) 11 CORED INTERVAL 43.0–47.4 m



LITHOLOGIC DESCRIPTION

Olive brown (5Y 3/4) SILICEOUS NANNOFOSSIL CLAY. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 12 CORED INTERVAL 47.4–51.8 m



LITHOLOGIC DESCRIPTION

Mottled yellowish light olive gray (5Y 6/2) and light olive gray (5Y 5/2) FORAMINIFER NANNOFOSSIL CLAY. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 13 CORED INTERVAL 51.8–56.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Medium olive gray (5Y 4/2) NANNOFOSSIL CLAYEY DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

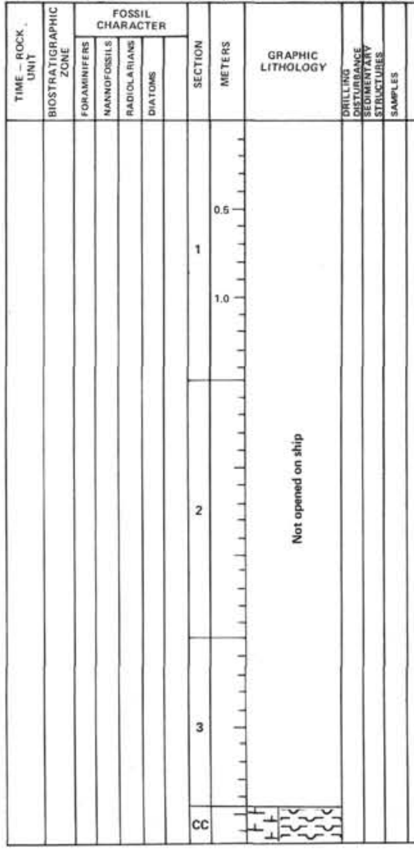
SITE 532 HOLE A CORE (HPC) 14 CORED INTERVAL 56.2–60.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Medium olive gray (5Y 4/2) and olive gray (5Y 3/2) DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

SITE 532 HOLE A CORE (HPC) 15 CORED INTERVAL 60.6–65.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Mottled light olive gray (5Y 5/2) and moderate olive gray (5Y 4/2) NANNOFOSSIL DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						CC						

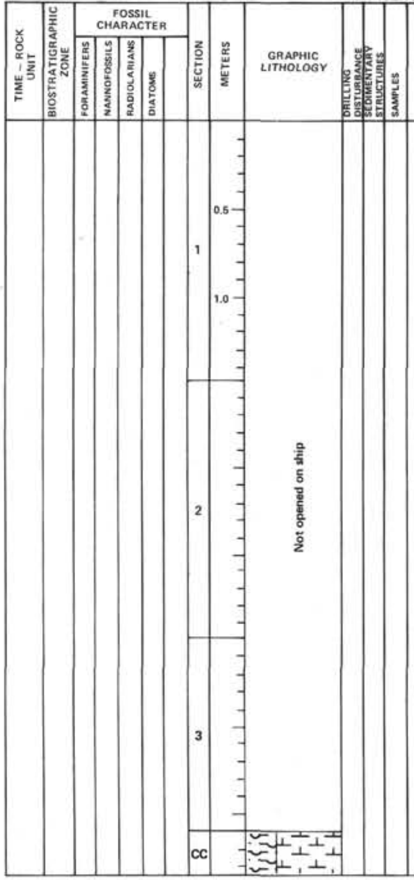
SITE 532 HOLE A CORE (HPC) 16 CORED INTERVAL 65.0–69.4 m



LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2) NANNOFOSSIL DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

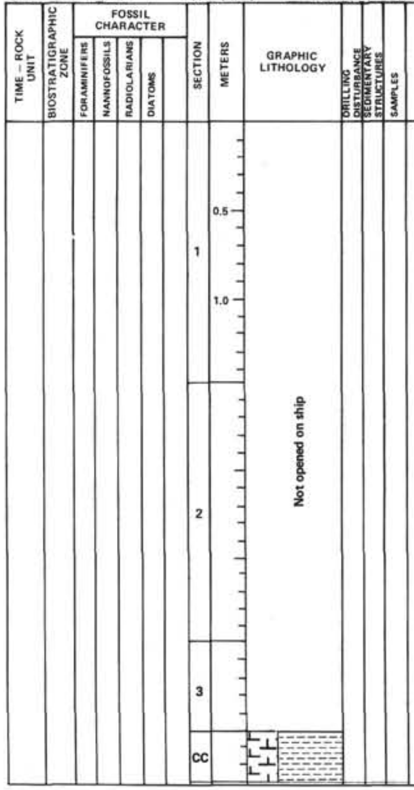
SITE 532 HOLE A CORE (HPC) 17 CORED INTERVAL 69.4–73.8 m



LITHOLOGIC DESCRIPTION

Moderate olive brown (5Y 4/4) DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

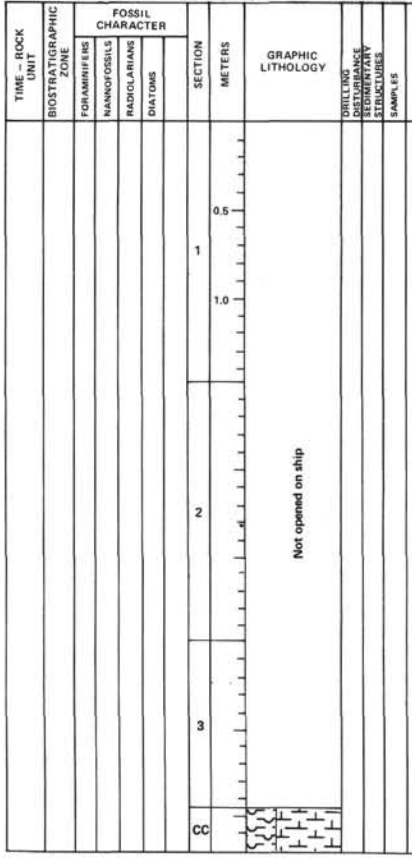
SITE 532 HOLE A CORE (HPC) 18 CORED INTERVAL 73.8–78.2 m



LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2) DIATOM NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

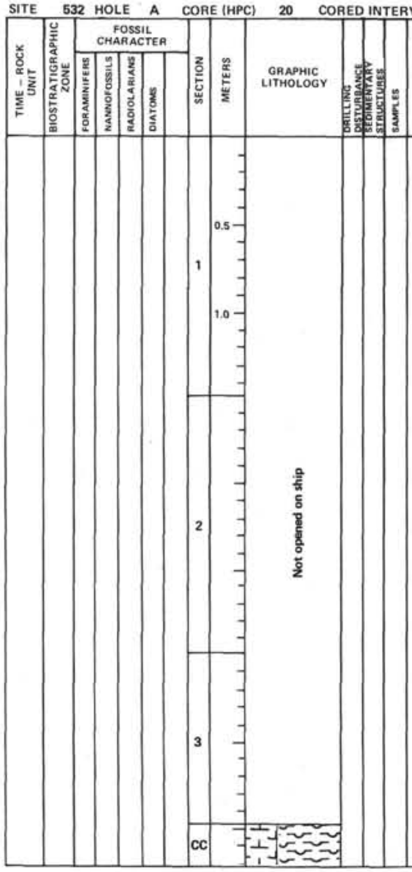
SITE 532 HOLE A CORE (HPC) 19 CORED INTERVAL 78.2–82.6 m



LITHOLOGIC DESCRIPTION

Light olive brown (5Y 5/4) DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

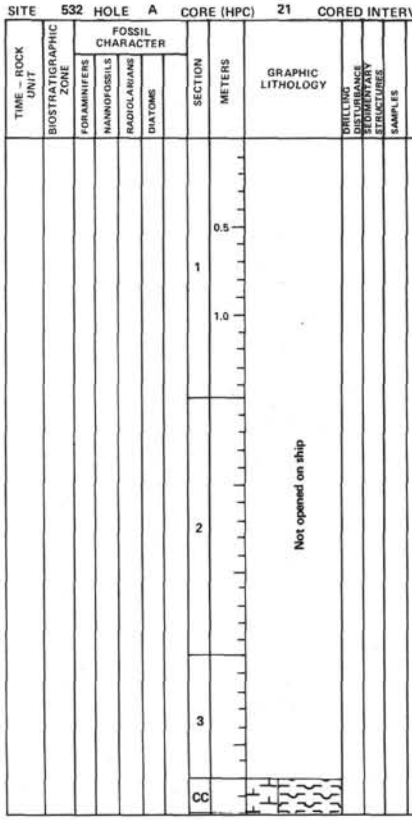
SITE 532 HOLE A CORE (HPC) 20 CORED INTERVAL 82.6–87.0 m



LITHOLOGIC DESCRIPTION

Mottled moderate olive brown (5Y 4/4) and olive brown (5Y 3/4) NANNOFOSSIL DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

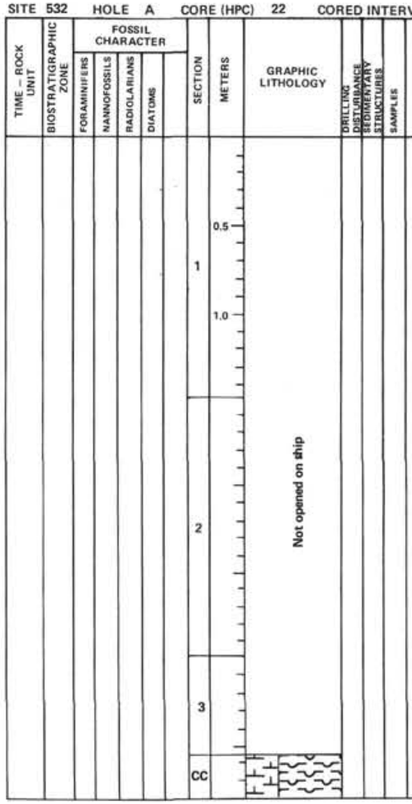
SITE 532 HOLE A CORE (HPC) 21 CORED INTERVAL 87.0–91.4 m



LITHOLOGIC DESCRIPTION

Yellowish light olive gray (5Y 6/2) CLAYEY NANNOFOSSIL DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

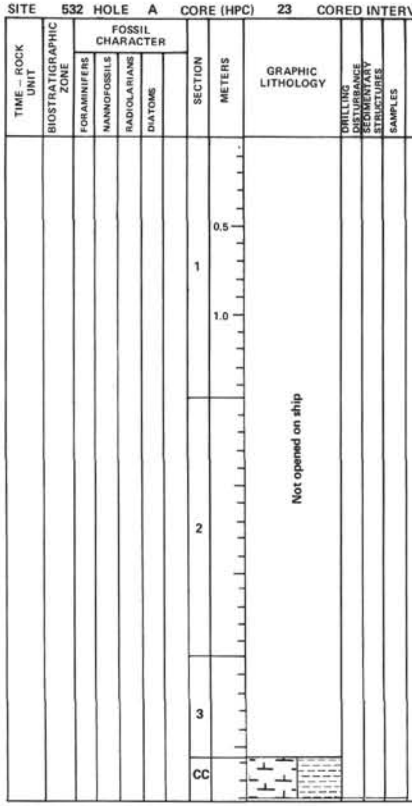
SITE 532 HOLE A CORE (HPC) 22 CORED INTERVAL 91.4–95.8 m



LITHOLOGIC DESCRIPTION

Dusky yellow (5Y 6/4) with pyritic-rich laminae, NANNOFOSSIL DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

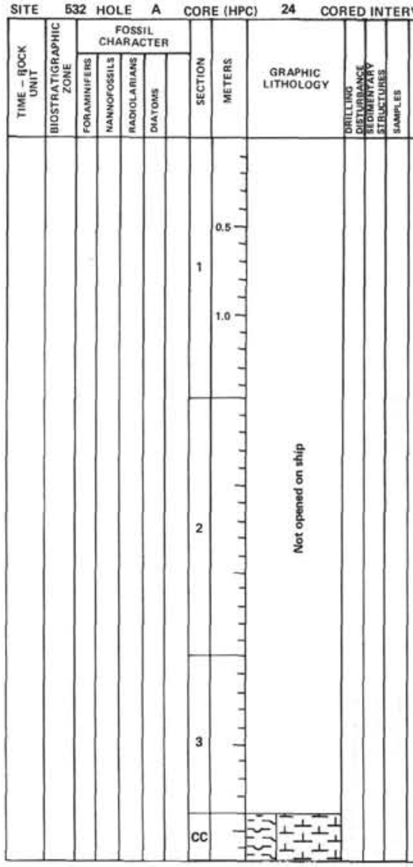
SITE 532 HOLE A CORE (HPC) 23 CORED INTERVAL 95.8–100.2 m



LITHOLOGIC DESCRIPTION

Yellowish gray (5Y 7/2) DIATOM NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

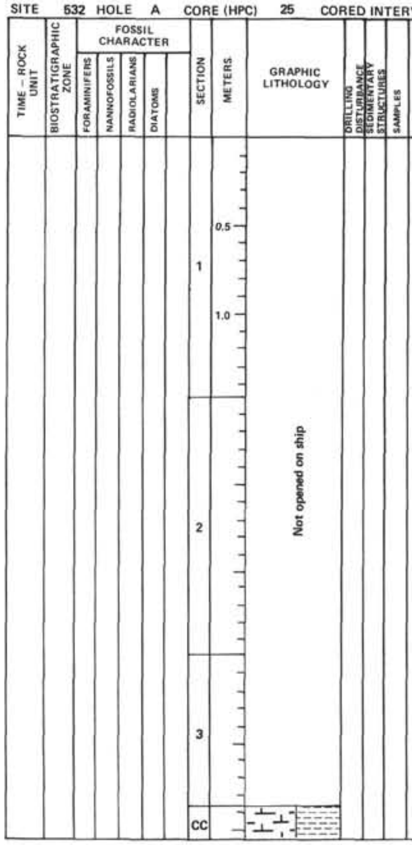
SITE 532 HOLE A CORE (HPC) 24 CORED INTERVAL 100.2–104.6 m



LITHOLOGIC DESCRIPTION

Yellowish gray (5Y 7/2) with mottles of yellowish light olive gray (5Y 6/2) DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

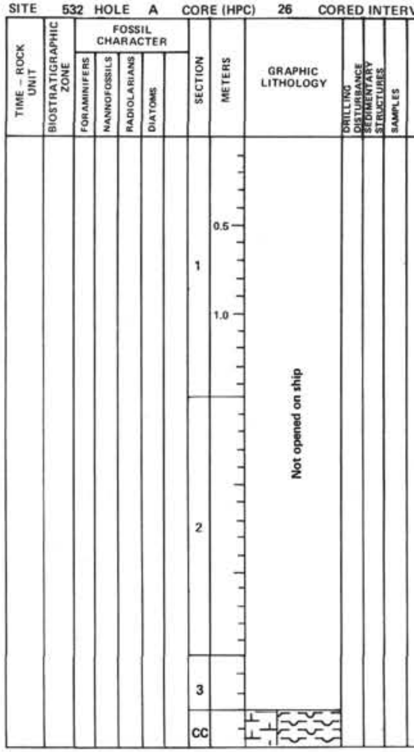
SITE 532 HOLE A CORE (HPC) 25 CORED INTERVAL 104.6–109.0 m



LITHOLOGIC DESCRIPTION

Yellowish light *olive gray* (5Y 6/2) DIATOM NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

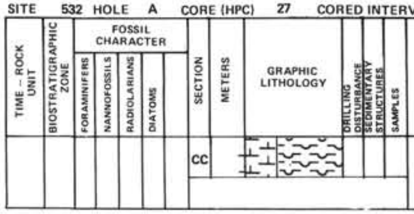
SITE 532 HOLE A CORE (HPC) 26 CORED INTERVAL 109.0–113.4 m



LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2) CLAYEY NANNOFOSSIL DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

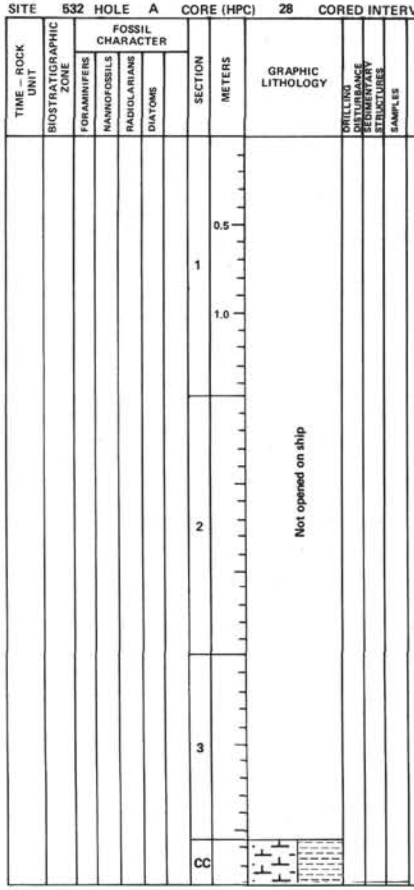
SITE 532 HOLE A CORE (HPC) 27 CORED INTERVAL 113.4–117.8 m



LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2) CLAYEY NANNOFOSSIL DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

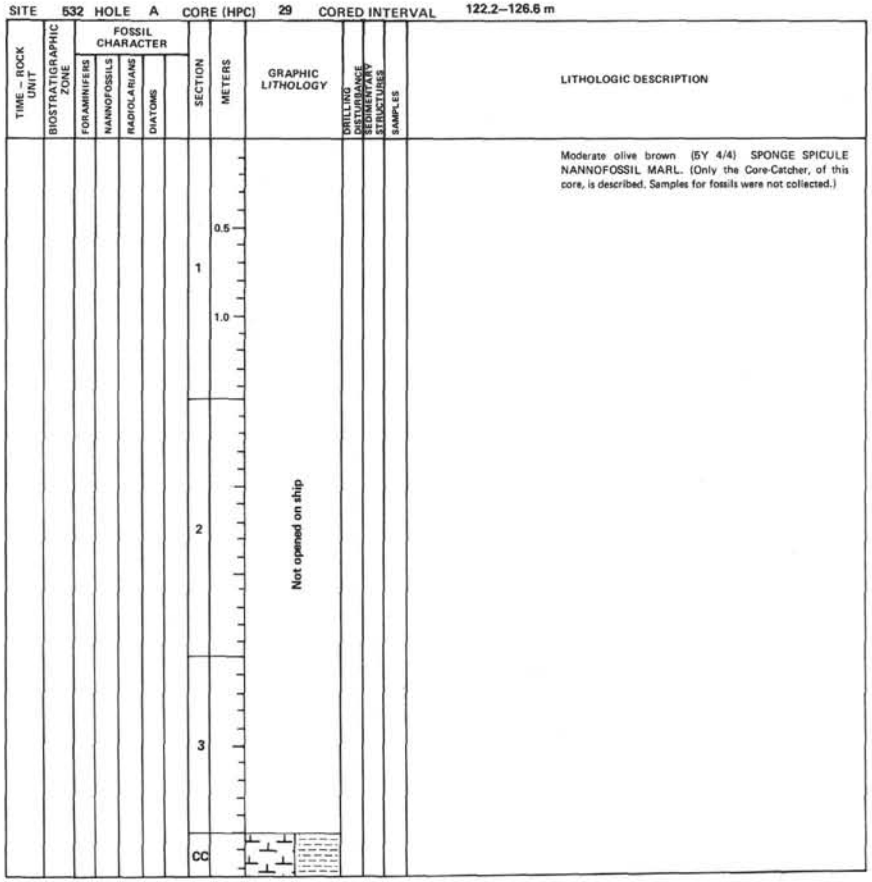
SITE 532 HOLE A CORE (HPC) 28 CORED INTERVAL 117.8–122.2 m



LITHOLOGIC DESCRIPTION

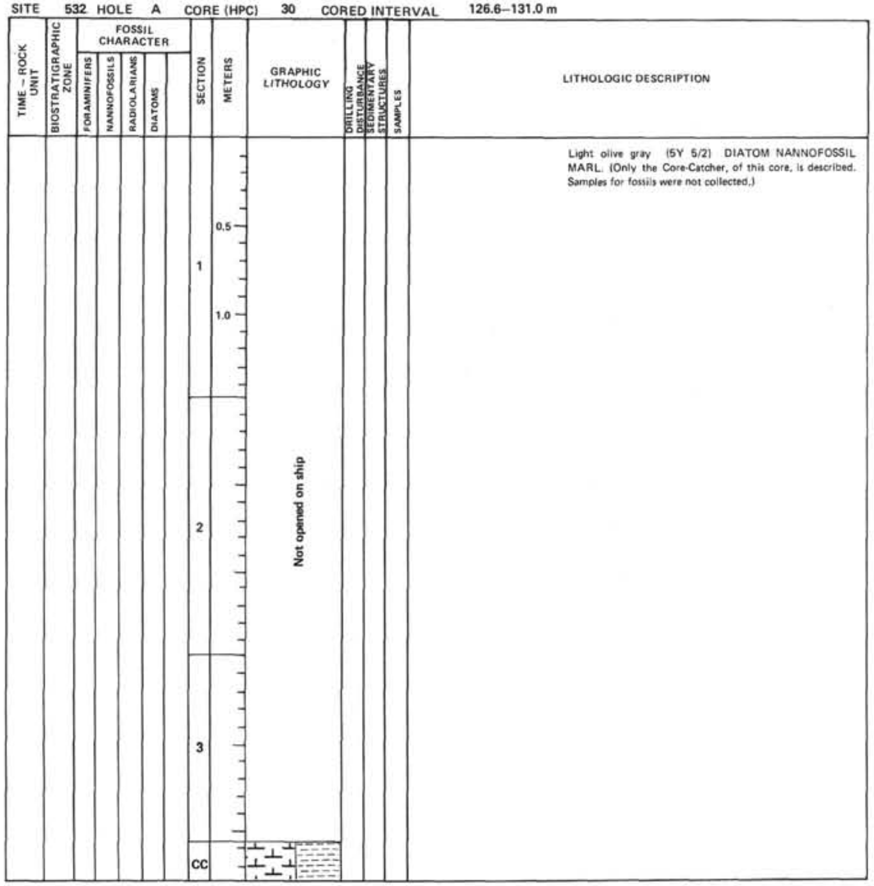
Light olive gray (5Y 5/2) with mottles of moderate olive gray (5Y 4/2) SPONGE SPICULE NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 29 CORED INTERVAL 122.2–126.6 m



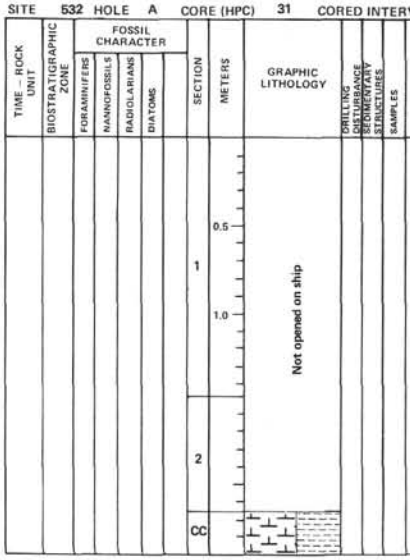
Moderate olive brown (5Y 4/4) SPONGE SPICULE NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 30 CORED INTERVAL 126.6–131.0 m



Light olive gray (5Y 5/2) DIATOM NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

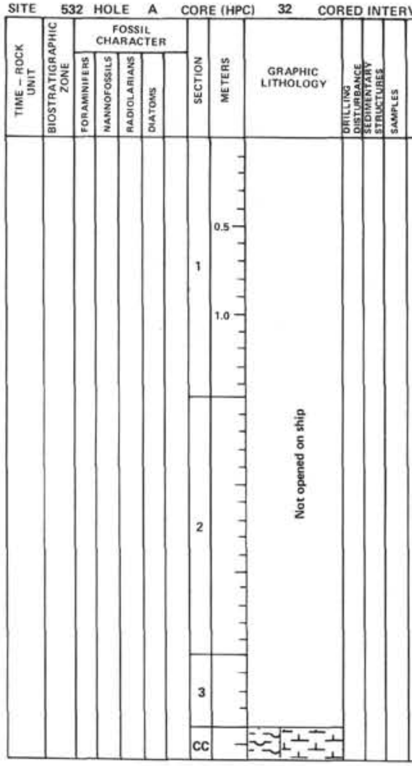
SITE 532 HOLE A CORE (HPC) 31 CORED INTERVAL 131.0–135.4 m



LITHOLOGIC DESCRIPTION

Yellowish gray (5Y 7/2) with mottles of pale yellowish gray (5Y 8/2) DIATOM NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

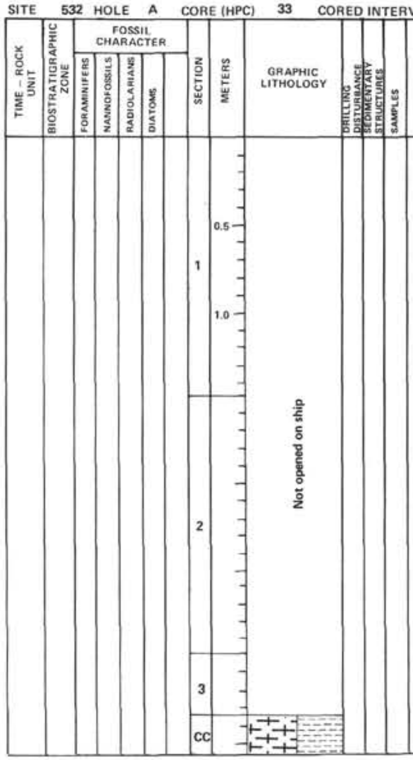
SITE 532 HOLE A CORE (HPC) 32 CORED INTERVAL 135.4–139.8 m



LITHOLOGIC DESCRIPTION

Yellowish light olive gray (5Y 6/2) with mottles of light olive gray (5Y 5/2) and yellowish gray (5Y 7/2) DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

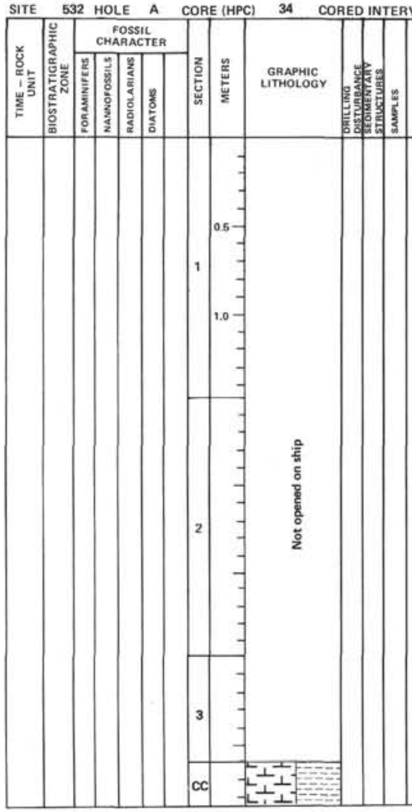
SITE 532 HOLE A CORE (HPC) 33 CORED INTERVAL 139.8–144.2 m



LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2), with yellowish light olive gray (5Y 6/2) disturbed layers, FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

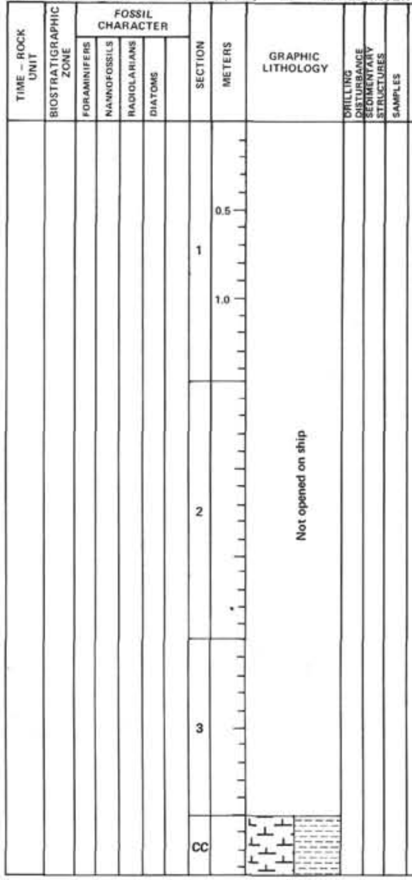
SITE 532 HOLE A CORE (HPC) 34 CORED INTERVAL 144.2–148.2 m



LITHOLOGIC DESCRIPTION

Yellowish light olive gray (5Y 6/2) and moderate olive gray (5Y 4/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

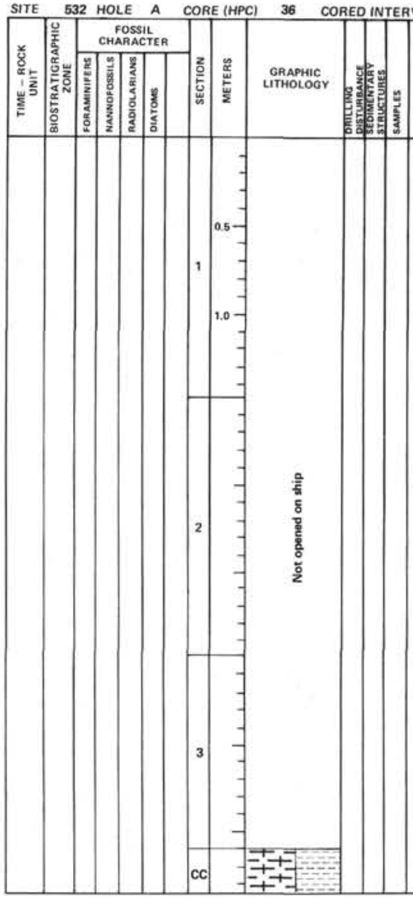
SITE 532 HOLE A CORE (HPC) 35 CORED INTERVAL 148.2–152.6 m



LITHOLOGIC DESCRIPTION

Mottled yellowish light olive gray (5Y 6/2) and moderate olive gray (5Y 4/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE A CORE (HPC) 36 CORED INTERVAL 152.6–157.0 m

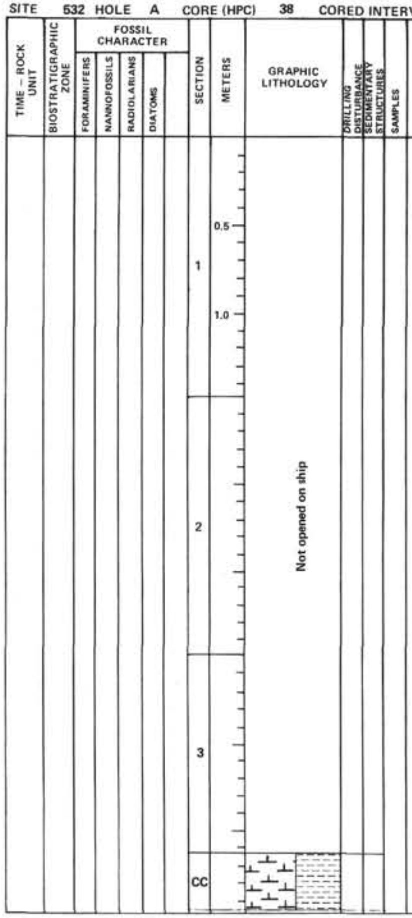


LITHOLOGIC DESCRIPTION

Yellowish gray (5Y 7/2) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

NOTE: Core 37, 157.0–161.0 m: No recovery.

SITE 532 HOLE A CORE (HPC) 38 CORED INTERVAL 161.0–165.4 m



LITHOLOGIC DESCRIPTION

Yellowish light olive gray (5Y 6/2) (bioturbated) and light olive gray (5Y 5/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

NOTE: Core 39, 165.4–168.4 m: No recovery.

SITE 532 HOLE A CORE (HPC) 40 CORED INTERVAL 168.4–172.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS								
							1	0.5 1.0	Not opened on ship				Light olive gray (5Y 5/2) with mottles of yellowish gray (5Y 7/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
							2						
							3						
							CC		▨				

SITE 532 HOLE A CORE (HPC) 41 CORED INTERVAL 172.8–176.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS								
							1	0.5 1.0	Not opened on ship				There is not a Core-Catcher sample, thus there is no lithologic description.
							2						
							3						

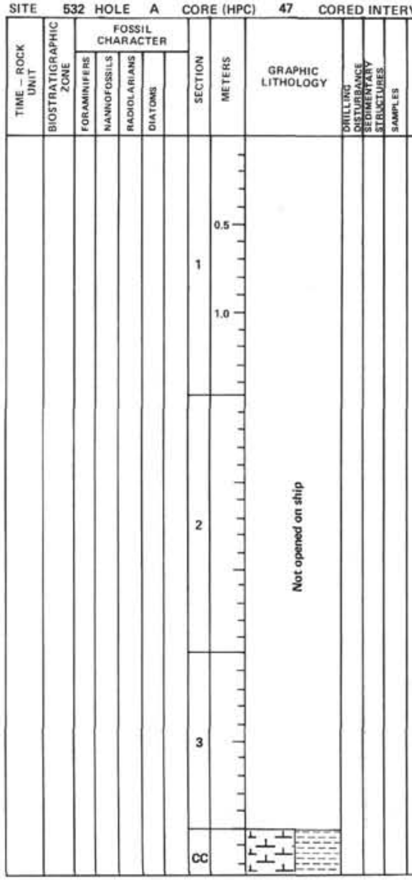
SITE 532 HOLE A CORE (HPC) 42 CORED INTERVAL 176.8–181.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Yellowish light olive gray (5Y 6/2), with moderate olive gray (5Y 4/2) mottles, NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.) **NOTE: Core 43, 181.2–184.2 m: No recovery.**
						2						
						3						
						CC		▨				

SITE 532 HOLE A CORE (HPC) 44 CORED INTERVAL 184.2–188.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Light olive gray (5Y 5/2) and moderate olive gray (5Y 4/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.) **NOTE: Core 45, 188.2–192.2 m: No recovery.** **Core 46, 192.2–195.2 m: No recovery.**
						2						
						3						
						CC		▨				

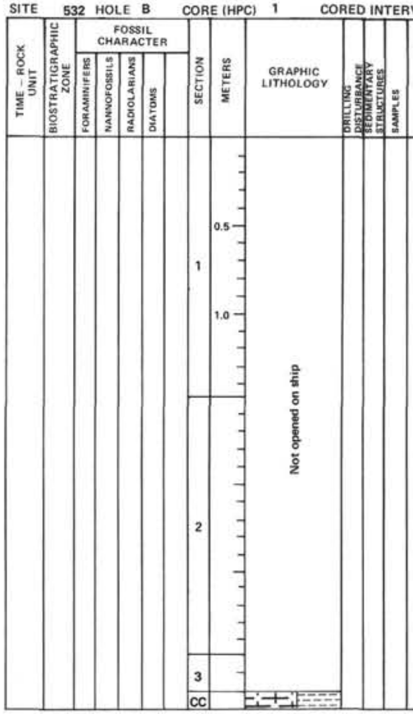
SITE 532 HOLE A CORE (HPC) 47 CORED INTERVAL 195.2–199.6 m



LITHOLOGIC DESCRIPTION

Mottled yellowish gray (5Y 7/2) and light olive gray (5Y 5/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

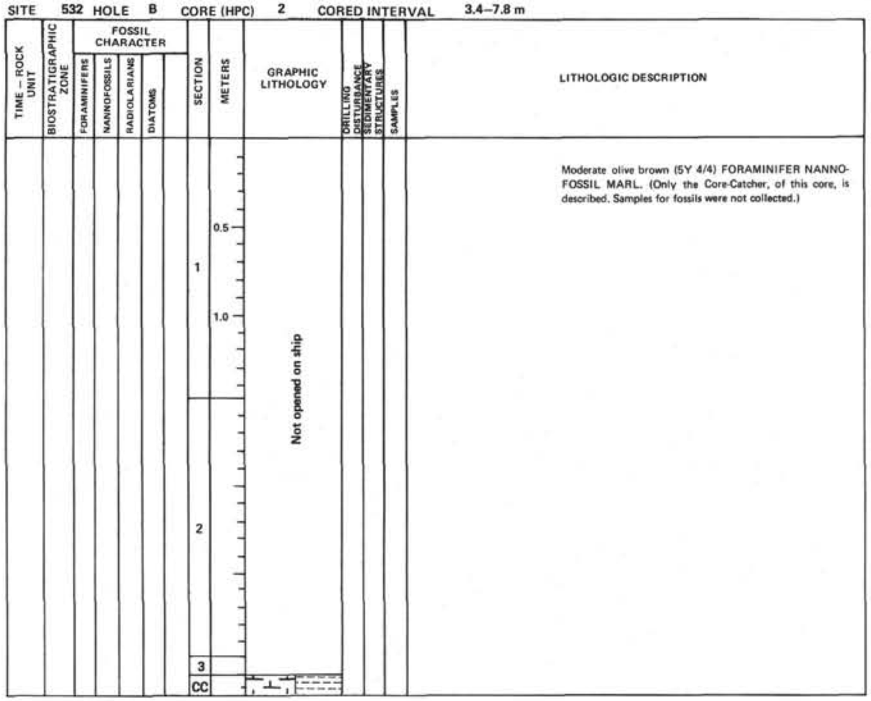
SITE 532 HOLE B CORE (HPC) 1 CORED INTERVAL 0.0–3.4 m



LITHOLOGIC DESCRIPTION

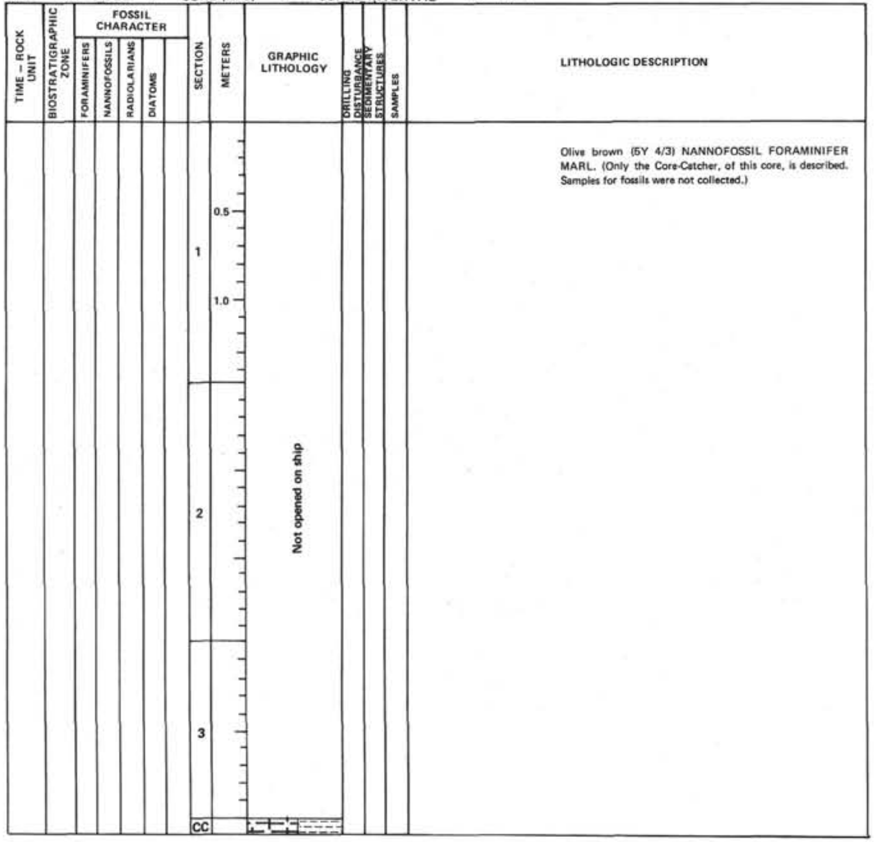
Moderate olive brown (5Y 4/4) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 2 CORED INTERVAL 3.4–7.8 m



Moderate olive brown (5Y 4/4) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 3 CORED INTERVAL 7.8–12.2 m



Olive brown (5Y 4/3) NANNOFOSSIL FORAMINIFER MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

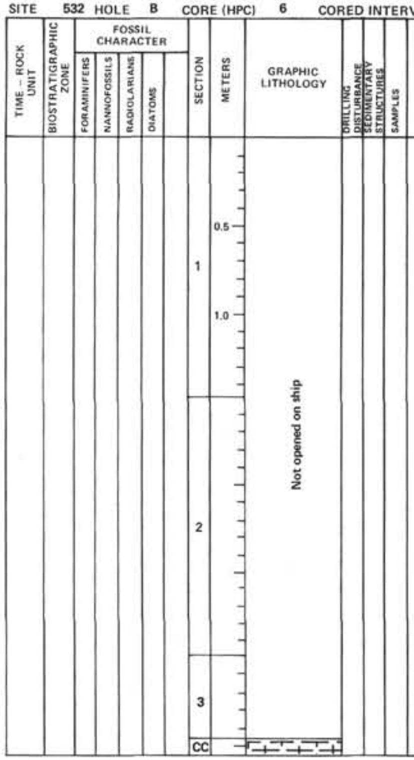
SITE 532 HOLE B CORE (HPC) 4 CORED INTERVAL 12.2–16.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Yellow olive brown (5Y 5/4) NANNOFOSSIL FORAMINIFER OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

SITE 532 HOLE B CORE (HPC) 5 CORED INTERVAL 16.6–21.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Yellow olive bcown (5Y 5/4) DIATOM FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

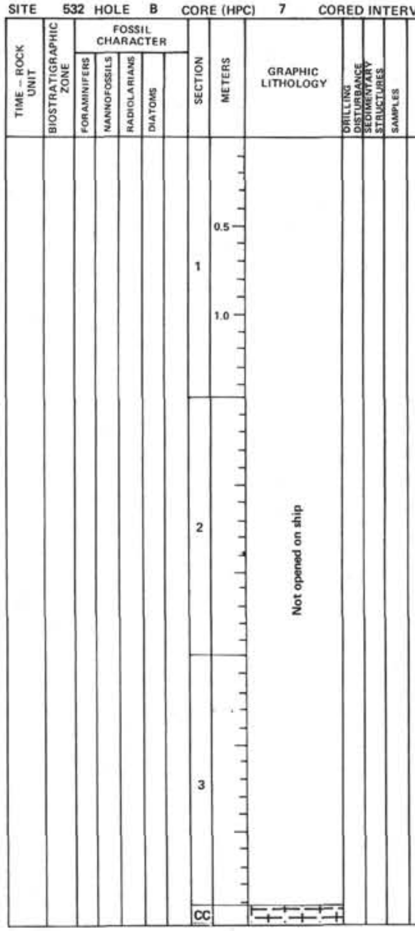
SITE 532 HOLE B CORE (HPC) 6 CORED INTERVAL 21.0–25.4 m



LITHOLOGIC DESCRIPTION

Olive gray (5Y 3/2) FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 7 CORED INTERVAL 25.4–29.8 m



LITHOLOGIC DESCRIPTION

Moderate olive brown (5Y 4/4) FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 8 CORED INTERVAL 29.8–34.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Moderate olive brown (5Y 4/4) FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

SITE 532 HOLE B CORE (HPC) 9 CORED INTERVAL 34.2–38.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Moderate olive gray (5Y 4/2) DIATOM FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

SITE 532 HOLE B CORE (HPC) 10 CORED INTERVAL 38.6–43.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
						1	0.5 1.0	Not opened on ship				Light olive gray (5Y 5/2) FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

SITE 532 HOLE B CORE (HPC) 11 CORED INTERVAL 43.0–47.4 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	FOSSIL CHARACTER: NANNOFOSSILS	FOSSIL CHARACTER: RADIOLARIANS	FOSSIL CHARACTER: DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
						1	0.5 1.0	Not opened on ship				Light olive gray (5Y 5/2) FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

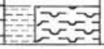
SITE 532 HOLE B CORE (HPC) 12 CORED INTERVAL 47.4–51.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Yellow olive brown (5Y 5/4) DIATOM FORAMINIFER NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						CC						

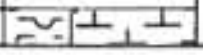
SITE 532 HOLE B CORE (HPC) 13 CORED INTERVAL 51.8–56.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Yellow olive brown (5Y 5/4) FORAMINIFER DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

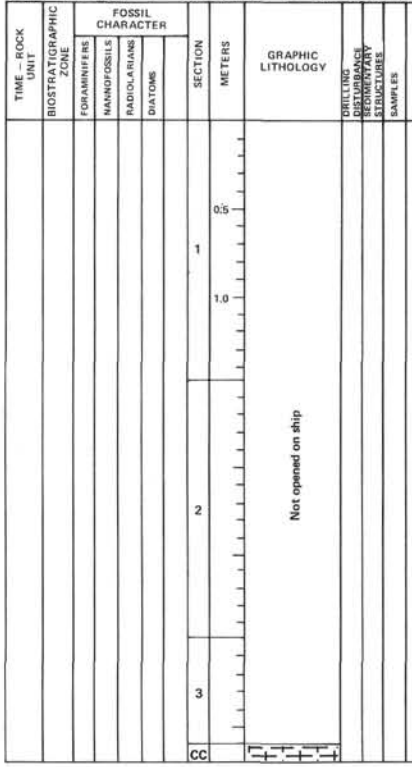
SITE 532 HOLE B CORE (HPC) 14 CORED INTERVAL 56.2–60.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS								
							1	0.5 1.0	Not opened on ship				Olive brown (5Y 3/4) to olive gray (5Y 3/2) CLAYEY DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
							2						
							3						
							CC						

SITE 532 HOLE B CORE (HPC) 15 CORED INTERVAL 60.6–65.0 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS								
							1	0.5 1.0	Not opened on ship				Dusky yellow (5Y 6/4) with mottles of moderate olive gray (5Y 4/2) DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
							2						
							CC						

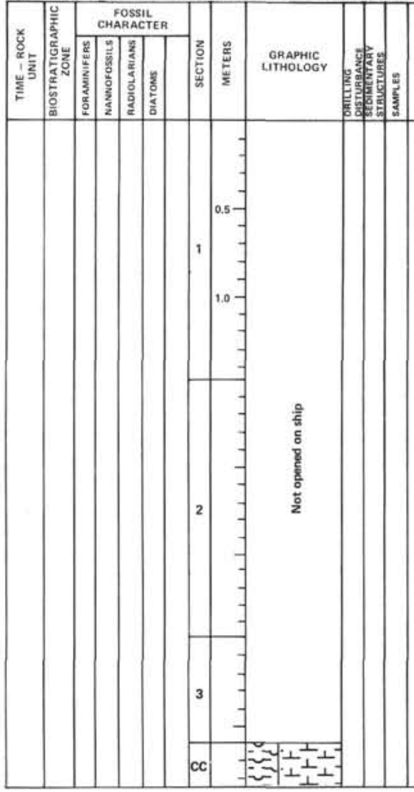
SITE 532 HOLE B CORE (HPC) 16 CORED INTERVAL 65.0–69.4 m



LITHOLOGIC DESCRIPTION

Yellow olive brown (5Y 5/4) FORAMINIFER DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

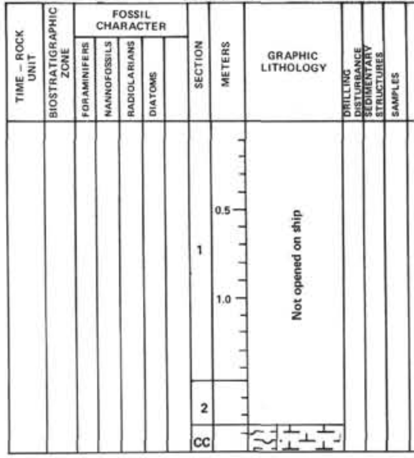
SITE 532 HOLE B CORE (HPC) 17 CORED INTERVAL 69.4–73.8 m



LITHOLOGIC DESCRIPTION

Olive brown (5Y 3/2) DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

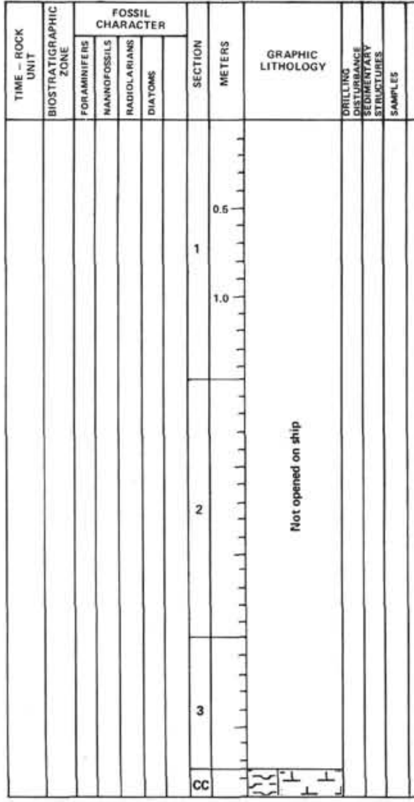
SITE 532 HOLE B CORE (HPC) 18 CORED INTERVAL 73.8–78.2 m



LITHOLOGIC DESCRIPTION

Moderate olive brown (5Y 4/4) SPONGE SPICULE DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

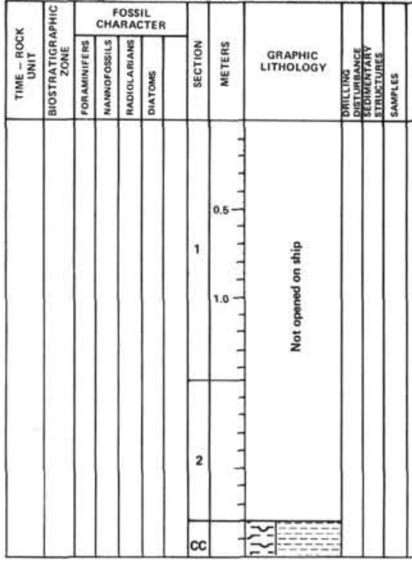
SITE 532 HOLE B CORE (HPC) 19 CORED INTERVAL 78.2–82.6 m



LITHOLOGIC DESCRIPTION

Olive brown (5Y 3/4) CLAYEY DIATOM NANNOFOSSIL OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

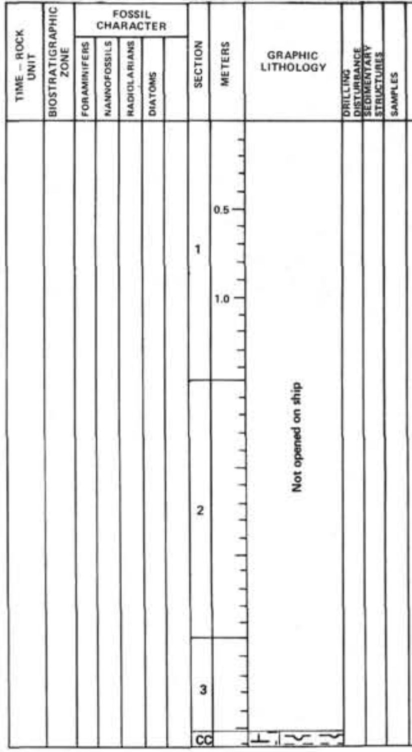
SITE 532 HOLE B CORE (HPC) 20 CORED INTERVAL 82.6–87.0 m



LITHOLOGIC DESCRIPTION

Olive brown (5Y 3/4) DIATOM NANNOFOSSIL CLAY. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

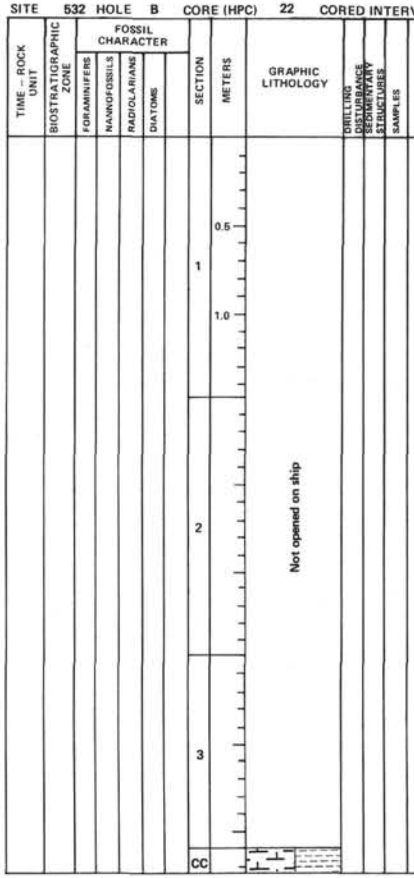
SITE 532 HOLE B CORE (HPC) 21 CORED INTERVAL 87.0–91.4 m



LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2) CLAYEY NANNOFOSSIL DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

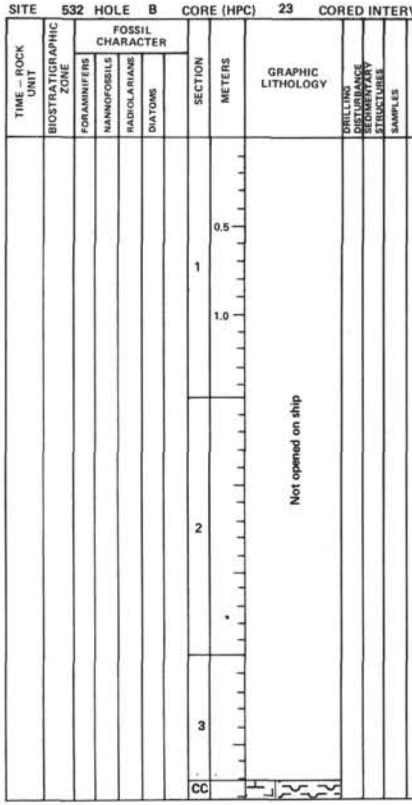
SITE 532 HOLE B CORE (HPC) 22 CORED INTERVAL 91.4–95.8 m



LITHOLOGIC DESCRIPTION

Yellowish gray (5Y 7/2) DIATOM NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

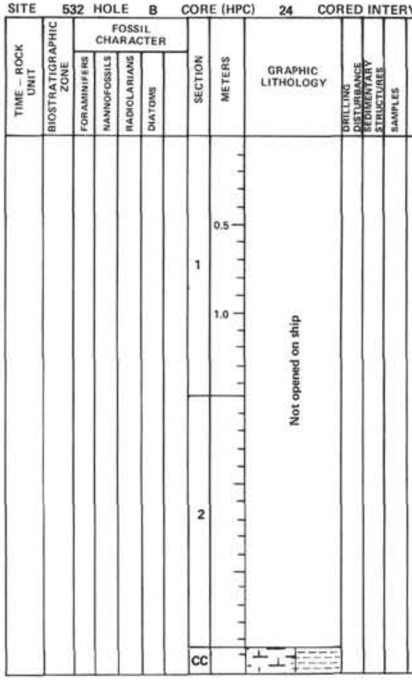
SITE 532 HOLE B CORE (HPC) 23 CORED INTERVAL 95.8–100.2 m



LITHOLOGIC DESCRIPTION

Light yellowish olive gray (5Y 6/2) CLAYEY NANNOFOSSIL DIATOM OOZE. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

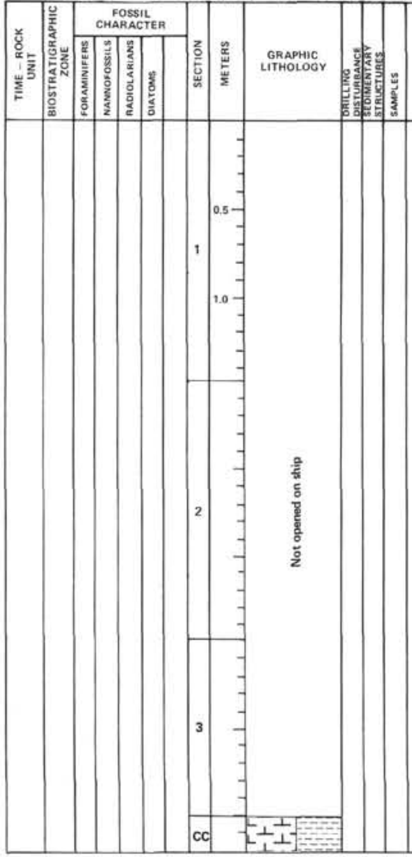
SITE 532 HOLE B CORE (HPC) 24 CORED INTERVAL 100.2–104.6 m



LITHOLOGIC DESCRIPTION

Light yellowish olive gray (5Y 6/2) SILICEOUS NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

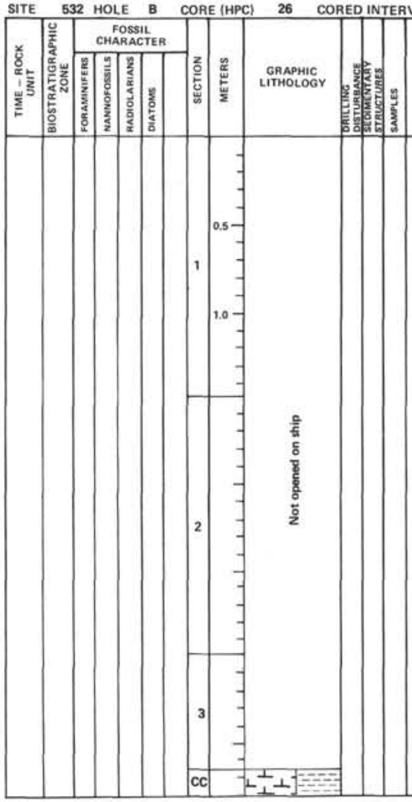
SITE 532 HOLE B CORE (HPC) 25 CORED INTERVAL 104.6–109.0 m



LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

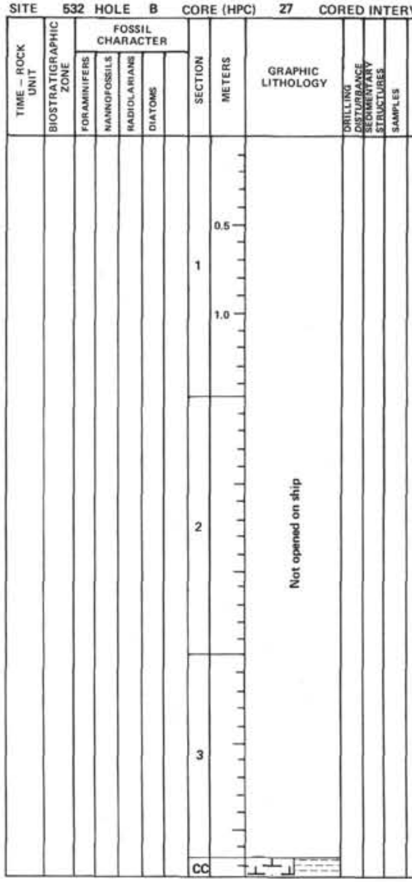
SITE 532 HOLE B CORE (HPC) 26 CORED INTERVAL 109.0–113.0 m



LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2) SILICEOUS NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

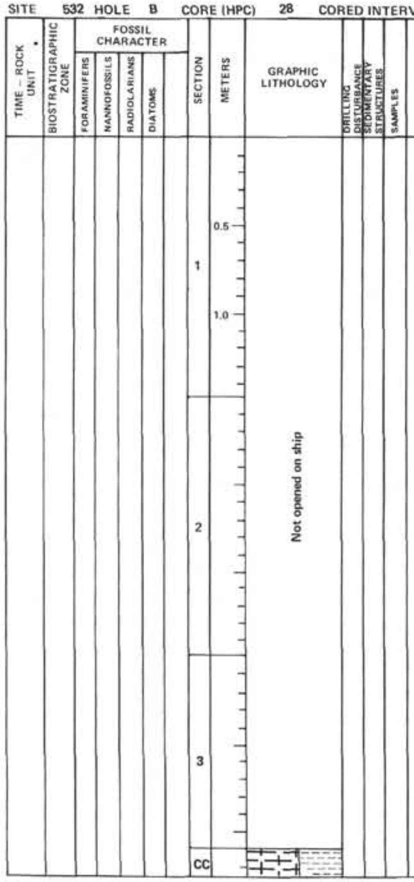
SITE 532 HOLE B CORE (HPC) 27 CORED INTERVAL 113.0–117.0 m



LITHOLOGIC DESCRIPTION

Yellowish light olive gray (5Y 4/2) DIATOM NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

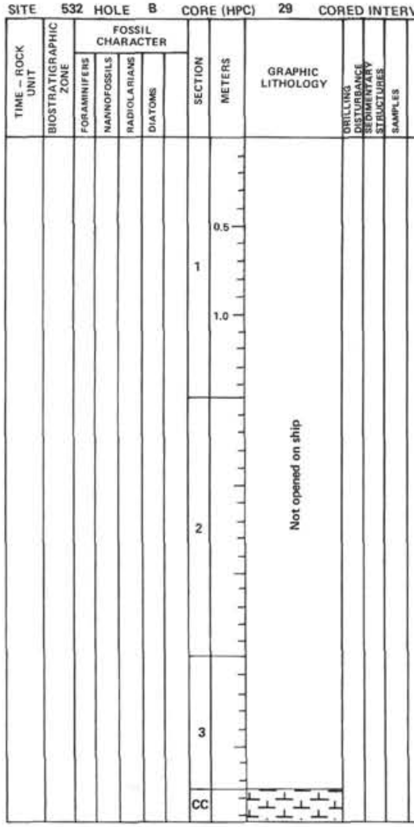
SITE 532 HOLE B CORE (HPC) 28 CORED INTERVAL 117.0–121.4 m



LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

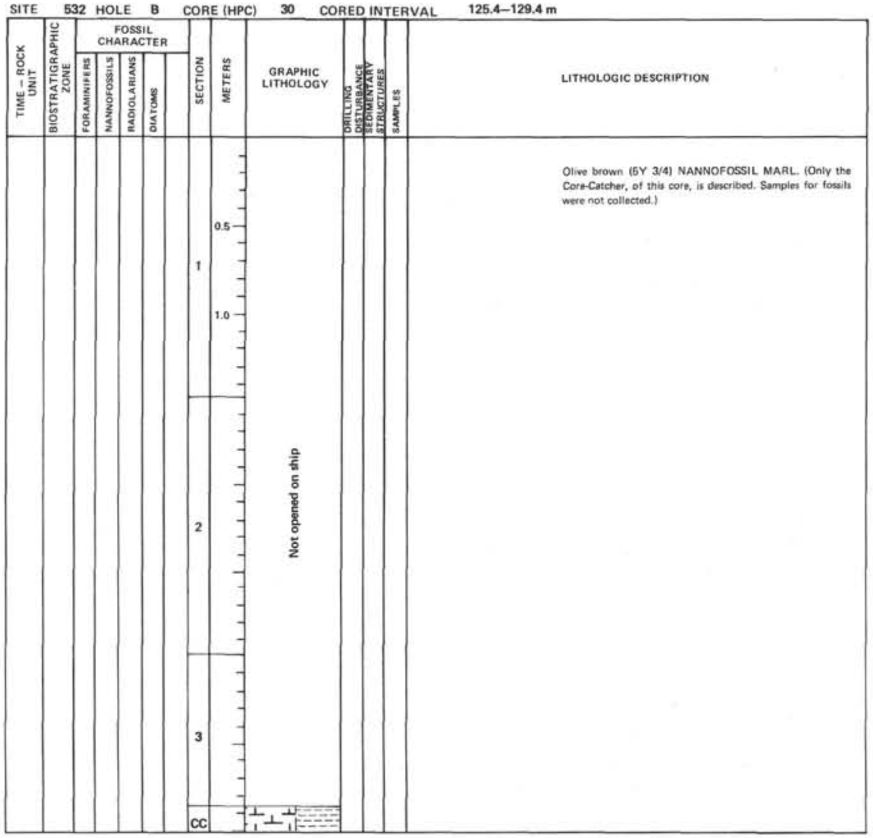
SITE 532 HOLE B CORE (HPC) 29 CORED INTERVAL 121.4–125.4 m



LITHOLOGIC DESCRIPTION

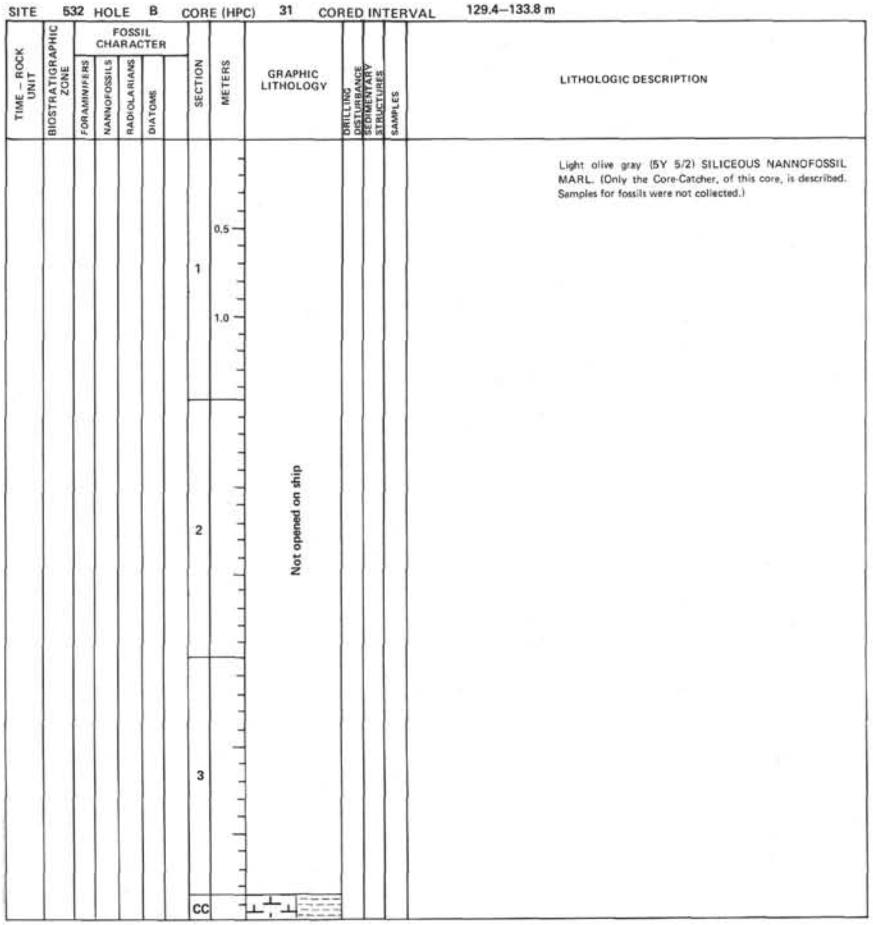
Light olive gray (5Y 5/2) SILICEOUS NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 30 CORED INTERVAL 125.4–129.4 m



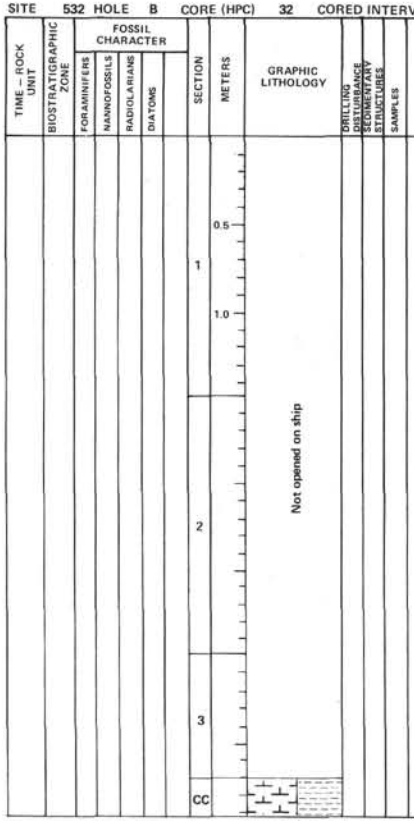
Olive brown (5Y 3/4) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 31 CORED INTERVAL 129.4–133.8 m



Light olive gray (5Y 5/2) SILICEOUS NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

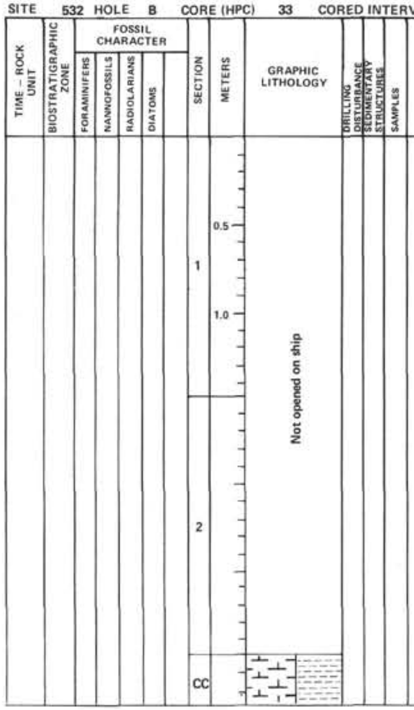
SITE 532 HOLE B CORE (HPC) 32 CORED INTERVAL 133.8–137.8 m



LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2) DIATOM NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 33 CORED INTERVAL 137.8–141.8 m



LITHOLOGIC DESCRIPTION

Yellowish gray (5Y 7/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

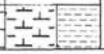
SITE 532 HOLE B CORE (HPC) 34 CORED INTERVAL 141.8–145.8 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS								
							1	0.5 1.0	Not opened on ship				Yellowish gray (5Y 6/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
							2						
							3						
							CC		▨				

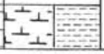
SITE 532 HOLE B CORE (HPC) 35 CORED INTERVAL 145.8–150.2 *m*

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER					SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	*LITHOLOGIC DESCRIPTION*
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS								
							1	0.5 1.0	Not opened on ship				Yellowish gray (5Y 7/2) to light olive gray (5Y 5/2) DIATOM NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
							2						
							3						
							CC		▨				

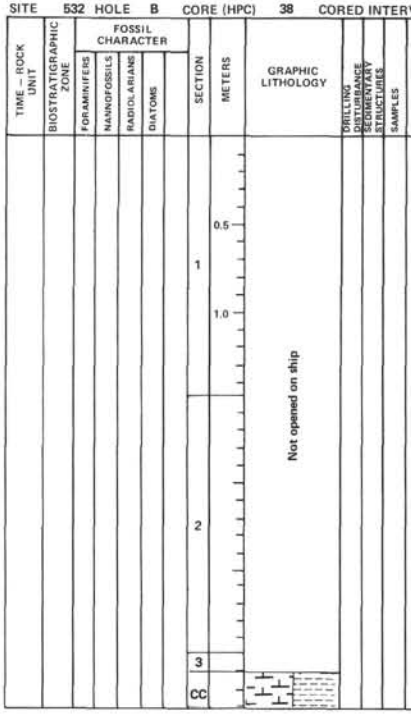
SITE 532 HOLE B CORE (HPC) 36 CORED INTERVAL 150.2–154.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Yellowish light olive gray (5Y 6/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

SITE 532 HOLE B CORE (HPC) 37 CORED INTERVAL 154.2–158.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Light olive gray (5Y 5/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

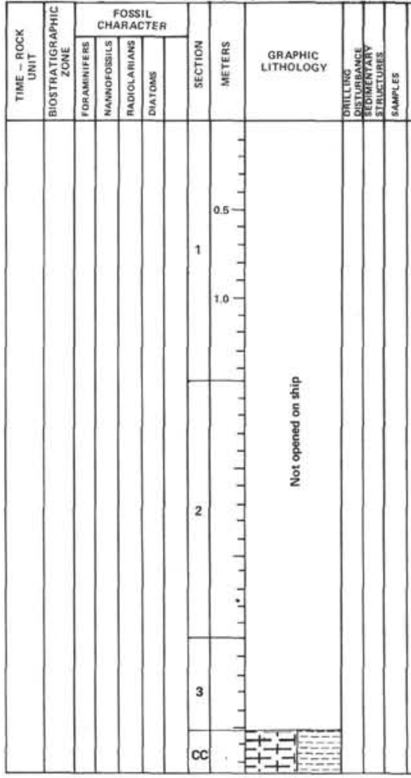
SITE 532 HOLE B CORE (HPC) 38 CORED INTERVAL 158.2–161.6 m



LITHOLOGIC DESCRIPTION

Yellowish light olive gray (5Y 6/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 39 CORED INTERVAL 161.6–166.0 m



LITHOLOGIC DESCRIPTION

Moderate olive brown (5Y 4/4) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 40 CORED INTERVAL 166.0–169.8 m

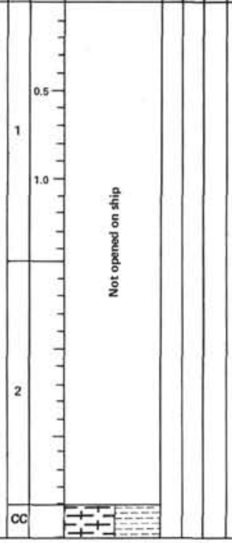
TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Light olive gray (5Y 5/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

SITE 532 HOLE B CORE (HPC) 41 CORED INTERVAL 169.8–174.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1	0.5 1.0	Not opened on ship				Light olive gray (5Y 5/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)
						2						
						3						
						CC						

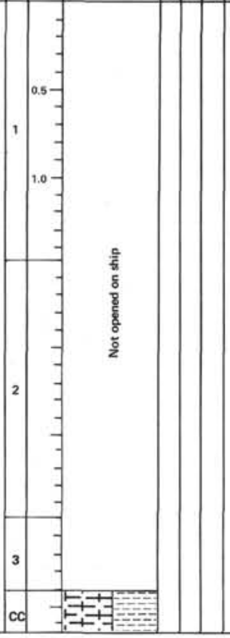
SITE 532 HOLE B CORE (HPC) 42 CORED INTERVAL 174.2–177.2 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1 2 CC	0.5 1.0	Not opened on ship				Yellowish light olive gray (5Y 6/2) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

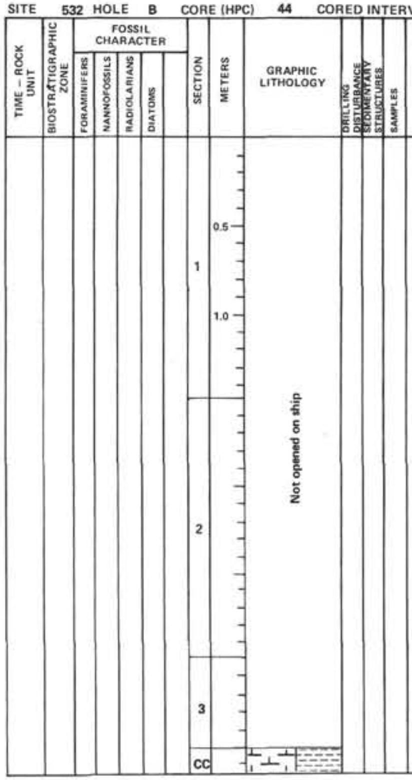


SITE 532 HOLE B CORE (HPC) 43 CORED INTERVAL 177.2–180.6 m

TIME – ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER				SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
		FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS							
						1 2 3 CC	0.5 1.0	Not opened on ship				Light olive gray (5Y 5/2) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)



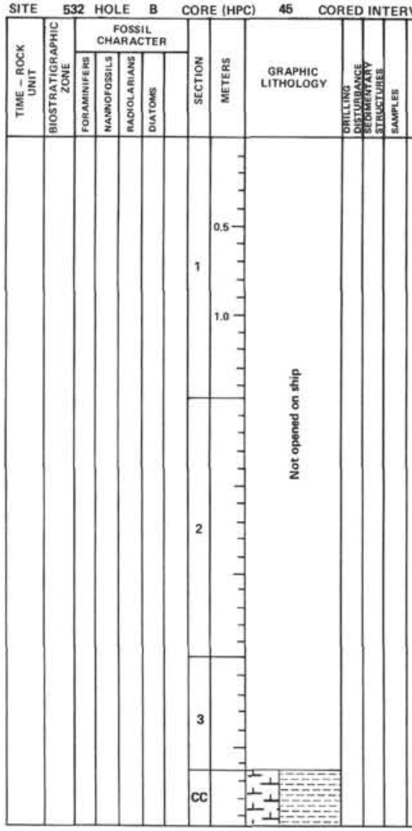
SITE 532 HOLE B CORE (HPC) 44 CORED INTERVAL 180.6–184.2 m



LITHOLOGIC DESCRIPTION

Yellowish light olive gray (5Y 6/2) DOLOMITIC NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 45 CORED INTERVAL 184.2–188.1 m

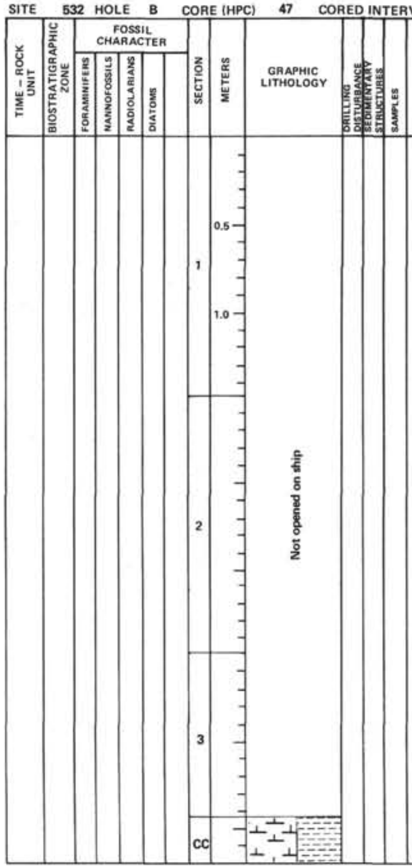


LITHOLOGIC DESCRIPTION

Light olive gray (5Y 5/2) NANNOFOSSIL CLAY. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

NOTE: Core 46, 188.1–192.1 m: No recovery.

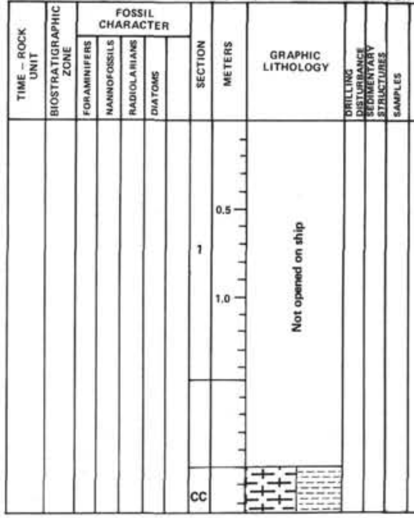
SITE 532 HOLE B CORE (HPC) 47 CORED INTERVAL 192.1–196.2 m



LITHOLOGIC DESCRIPTION

Yellowish light olive gray (5Y 6/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 48 CORED INTERVAL 196.2–200.6 m

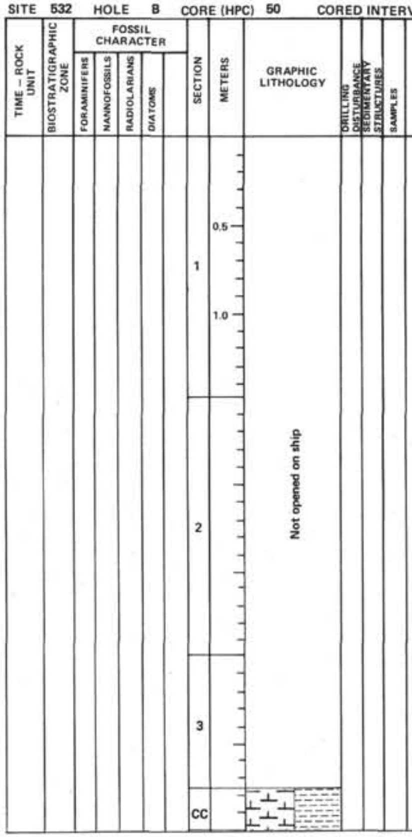


LITHOLOGIC DESCRIPTION

Moderate olive gray (5Y 4/2) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

NOTE: Core 49, 200.6–203.6 m: No recovery.

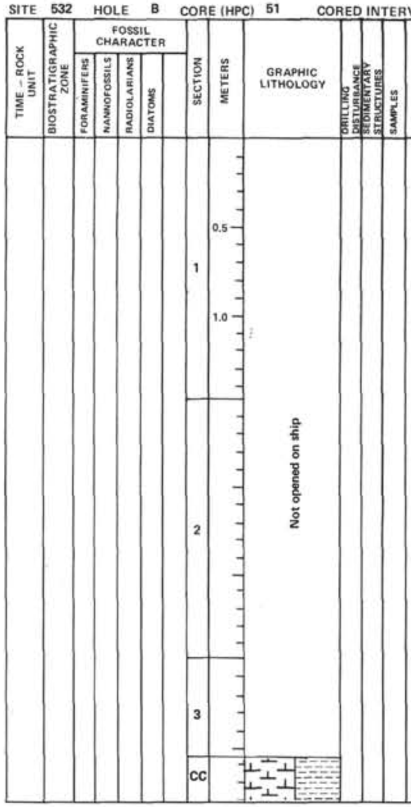
SITE 532 HOLE B CORE (HPC) 50 CORED INTERVAL 203.6–207.6 m



LITHOLOGIC DESCRIPTION

Yellowish light olive gray (5Y 6/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

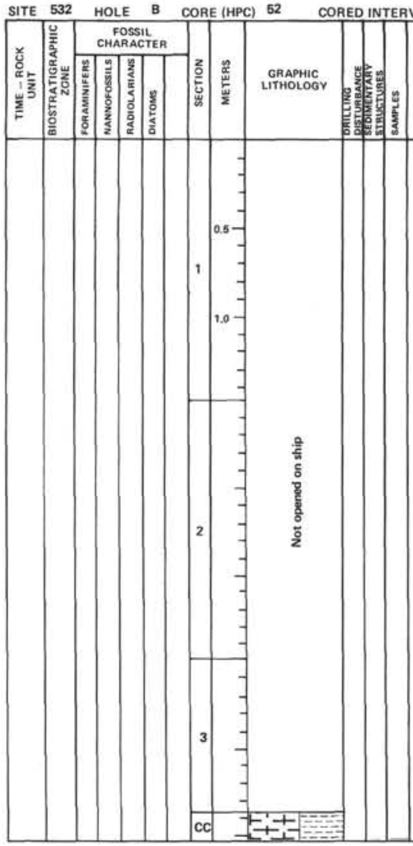
SITE 532 **HOLE** B **CORE (HPC)** 51 **CORED INTERVAL** 207.6–212.0 m



LITHOLOGIC DESCRIPTION

Yellowish light olive gray (5Y 6/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

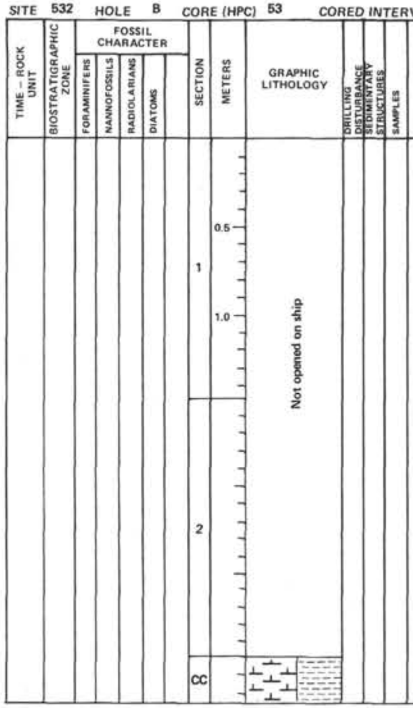
SITE 532 **HOLE** B **CORE (HPC)** 52 **CORED INTERVAL** 212.0–216.0 m



LITHOLOGIC DESCRIPTION

Yellowish gray (5Y 7/2) FORAMINIFER NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

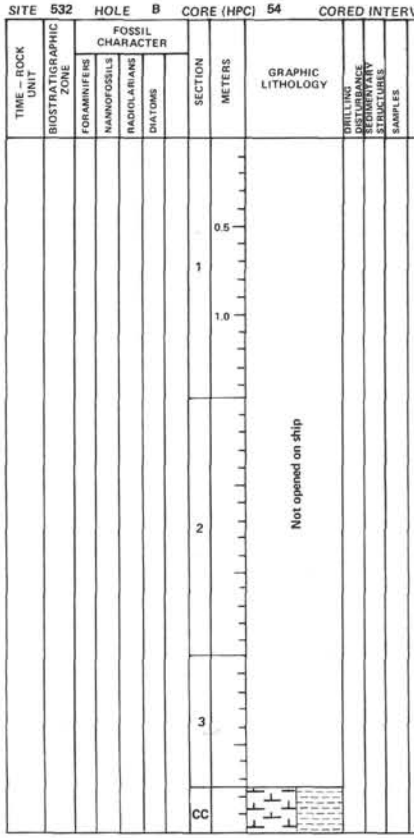
SITE 532 HOLE B CORE (HPC) 53 CORED INTERVAL 216.0–220.0 m



LITHOLOGIC DESCRIPTION

Yellowish gray (5Y 7/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

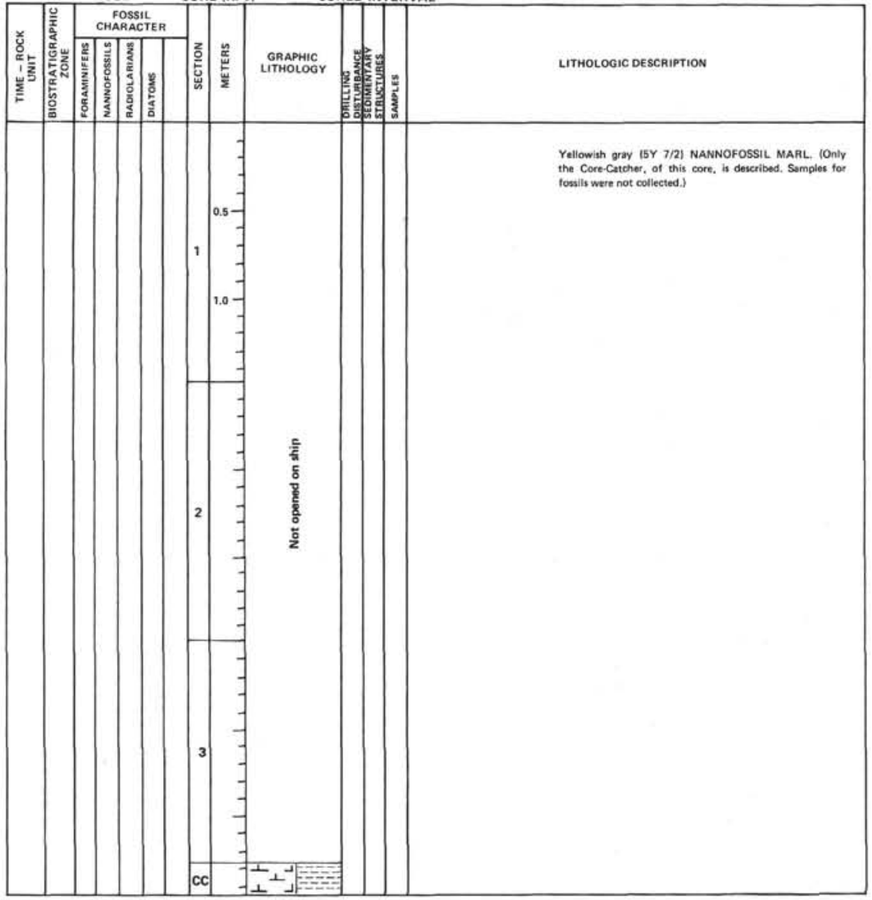
SITE 532 HOLE B CORE (HPC) 54 CORED INTERVAL 220.0–224.0 m



LITHOLOGIC DESCRIPTION

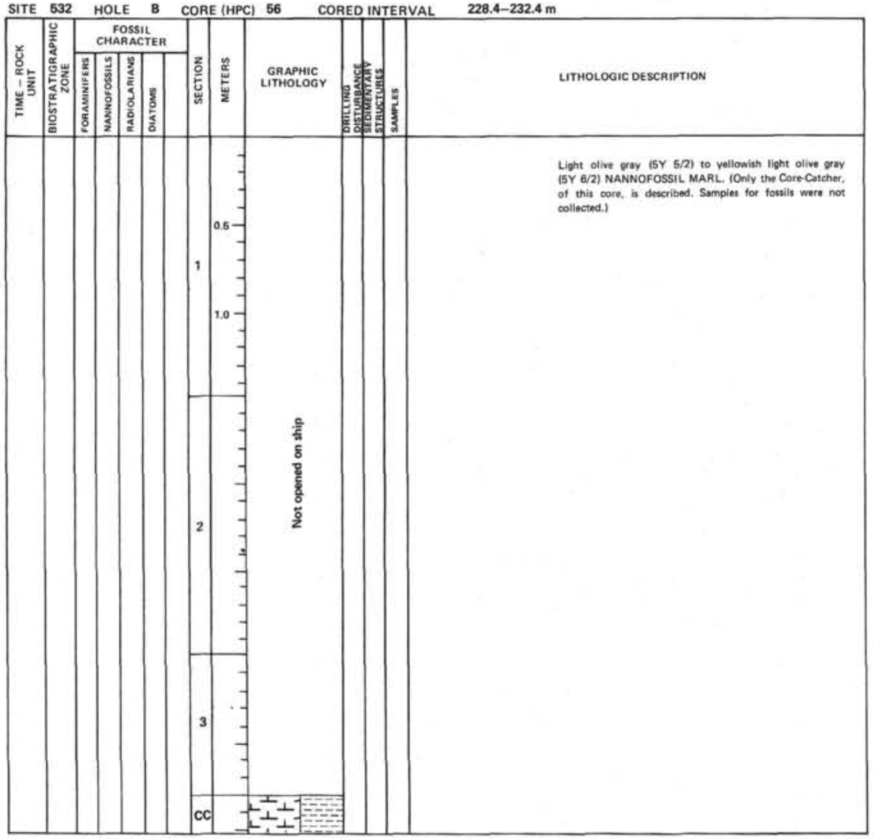
Yellowish light olive gray (5Y 6/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 55 CORED INTERVAL 228.4–232.4 m



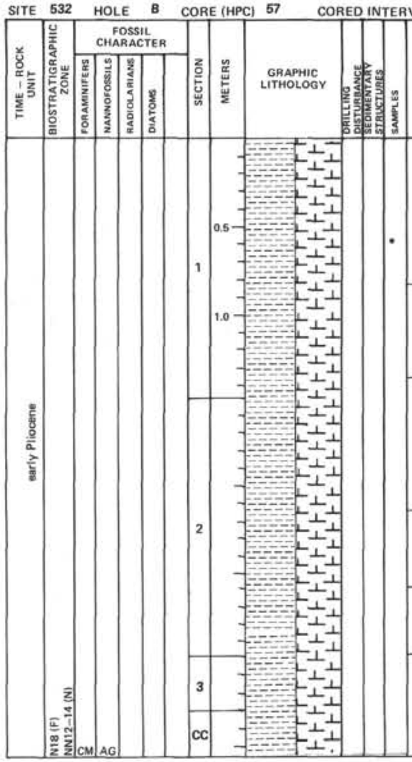
Yellowish gray (5Y 7/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 56 CORED INTERVAL 228.4–232.4 m



Light olive gray (5Y 5/2) to yellowish light olive gray (5Y 6/2) NANNOFOSSIL MARL. (Only the Core-Catcher, of this core, is described. Samples for fossils were not collected.)

SITE 532 HOLE B CORE (HPC) 57 CORED INTERVAL 232.4–235.8 m



LITHOLOGIC DESCRIPTION

10Y 7/2

10Y 6/2

10Y 5/2

10Y 7/2 –
10Y 8/2
↓
10Y 6/2

10Y 7/2

10Y 5/2

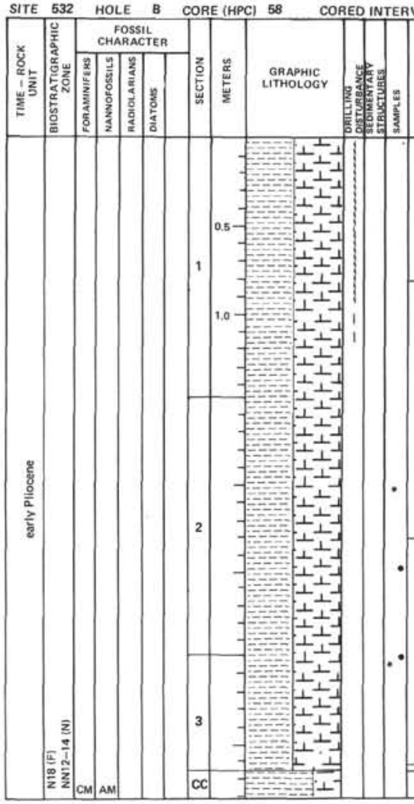
10Y 6/2

NANNOFOSSIL MARL:
Uniform pale olive colors and is bioturbated.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl
Section, Depth (cm)	1, 60
Lith. (D = Dominant; M = Minor)	D
Texture:	
Silt	55
Clay	45
Composition:	
Clay	43
Pyrite	<1
Carbonate unspec.	2
Calc. nannofossils	55
Diatoms	<1
Radiolarians	<1

SITE 532 HOLE B CORE (HPC) 58 CORED INTERVAL 235.8–239.8 m



LITHOLOGIC DESCRIPTION

10Y 4/2
and
10Y 6/2

10Y 6/2

5Y 7/2

10Y 6/2

10Y 5/2
Dark
5Y 4/4

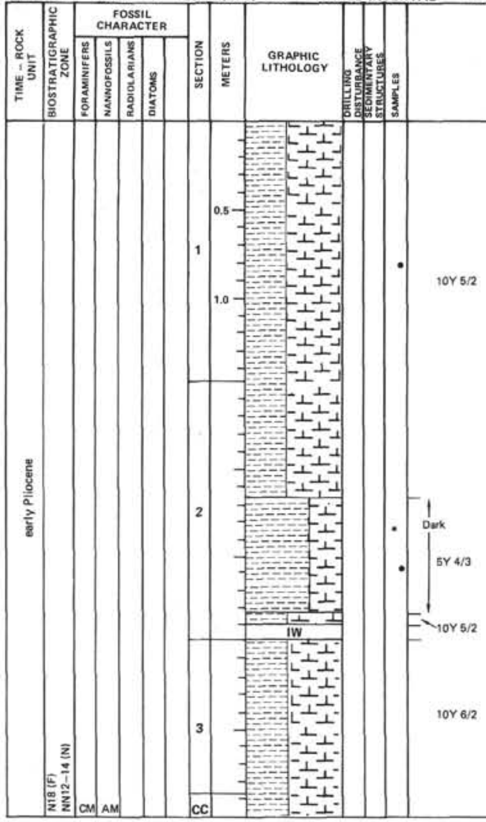
NANNOFOSSIL MARL:
Uniform pale olive colors, with darker streaks in flow-in, and one darker bed in Core-Catcher (as indicated). Bioturbated features occur throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Nannofossil marl
Section, Depth (cm)	2, 50	3, 6
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	–	3
Silt	60	17
Clay	40	80
Composition:		
Quartz	1	<1
Clay	40	40
Volcanic glass	<1	<1
Glauconite	<1	–
Pyrite	<1	<1
Carbonate unspec.	7	–
Foraminifers	1	5
Calc. nannofossils	50	52
Diatoms	1	<1
Radiolarians	<1	<1
Sponge spicules	–	1
Plant debris	–	<1

● CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 93–99 cm = 82
3, 0–8 cm = 51:2.04

SITE 532 HOLE B CORE (HPC) 59 CORED INTERVAL 239.8–243.8 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

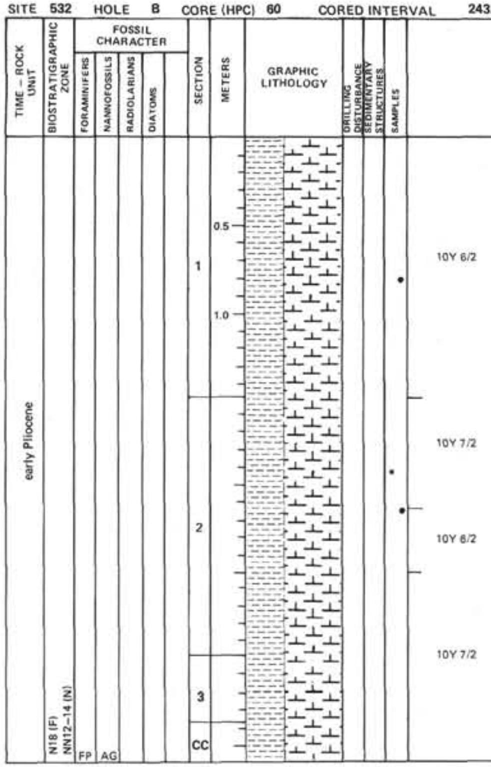
Uniform pale olive colors with one darker zone as indicated. Bioturbated features occur throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl
Section, Depth (cm)	2, 84
Lith. (D = Dominant; M = Minor)	D
Texture:	
Sand	0
Silt	15
Clay	85
Composition:	
Feldspar	<1
Clay	50
Volcanic glass	<1
Glauconite	<1
Pyrite	1
Foraminifers	1
Calc. nannofossils	44
Diatoms	1
Radiolarians	1
Sponge spicules	2
Silicoflagellates	<1

•CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 80–86 cm = 45:1.02
2, 80–90 cm = 35:1.69
2, 106–112 cm = 37:2.66

SITE 532 HOLE B CORE (HPC) 60 CORED INTERVAL 243.8–247.2 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

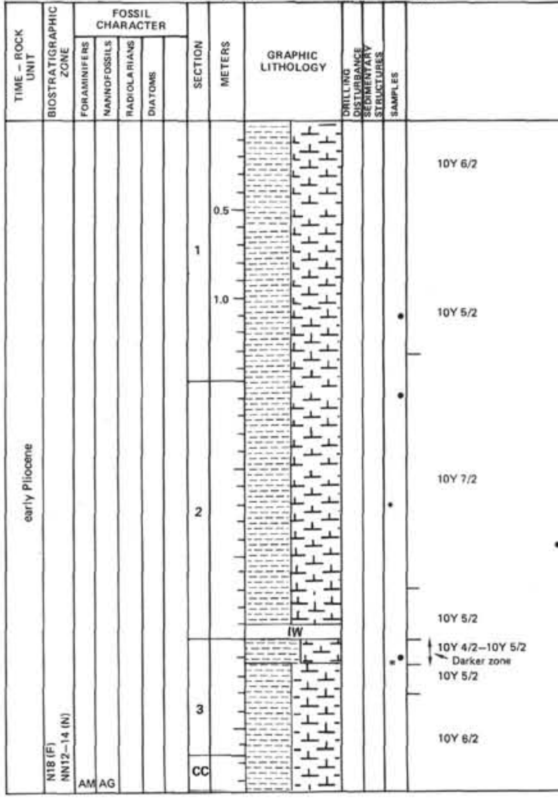
Uniform pale olive colors throughout, but appears slightly bluer than previous cores. Bioturbated features occur throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl
Section, Depth (cm)	2, 40
Lith. (D = Dominant; M = Minor)	D
Composition:	
Quartz	1
Clay	41
Volcanic glass	<1
Pyrite	1
Foraminifers	8
Calc. nannofossils	46
Diatoms	1
Sponge spicules	<1
Dolomite	2

•CARBONATE BOMB (% $CaCO_3$):
1, 80–81 cm = 48
2, 63–64 cm = 52

SITE 532 HOLE B CORE (HPC) 61 CORED INTERVAL 247.2–251.2 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

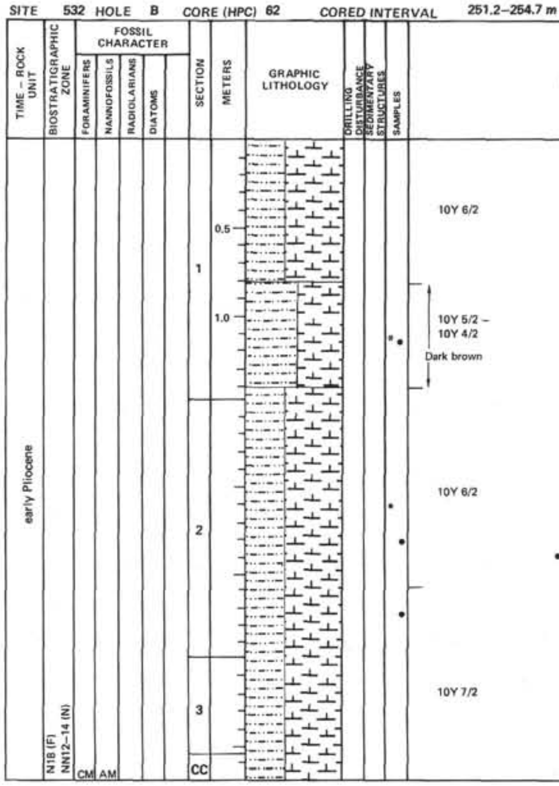
Uniform pale olive colors, one slightly darker zone as indicated. Bioturbated features occur throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Nannofossil marl (dark)
Section, Depth (cm)	2, 70	3, 11
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Silt	15	15
Clay	85	85
Composition:		
Quartz	<1	1
Clay	50	55
Volcanic glass	<1	–
Glauconite	<1	<1
Pyrite	<1	1
Foraminifers	1	1
Calc. nannofossils	47	40
Diatoms	<1	<1
Radiolarians	<1	<1
Sponge spicules	<1	<1
Plant debris	–	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 110–112 cm = 44
2, 8–10 cm = 53
3, 5–11 cm = 48:1.66
CC, 20–21 cm = 50:1.43

SITE 532 HOLE B CORE (HPC) 62 CORED INTERVAL 251.2–254.7 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

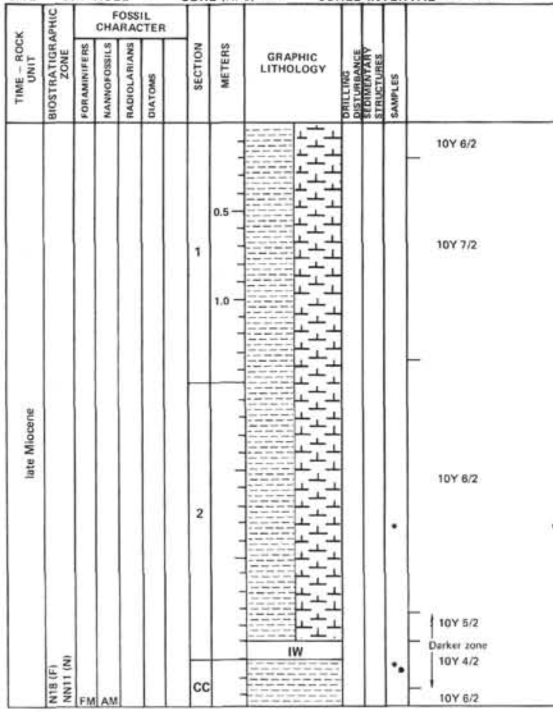
Uniform pale olive colors with one darker zone with excellent zoophycos and chondrites burrows. Bioturbated features are throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Nannofossil marl
Section, Depth (cm)	1, 116	2, 60
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Silt	50	52
Clay	50	48
Composition:		
Quartz	<1	–
Clay	48	44
Volcanic glass	1	–
Glauconite	–	<1
Pyrite	<1	<1
Carbonate unspec.	3	1
Foraminifers	2	<1
Calc. nannofossils	46	55
Diatoms	<1	–
Plant debris	<1	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 118–119 cm = 48
2, 80–81 cm = 54
2, 124–130 cm = 64:0.57

SITE 532 HOLE B CORE (HPC) 63 CORED INTERVAL 254.7–257.7 m



LITHOLOGIC DESCRIPTION

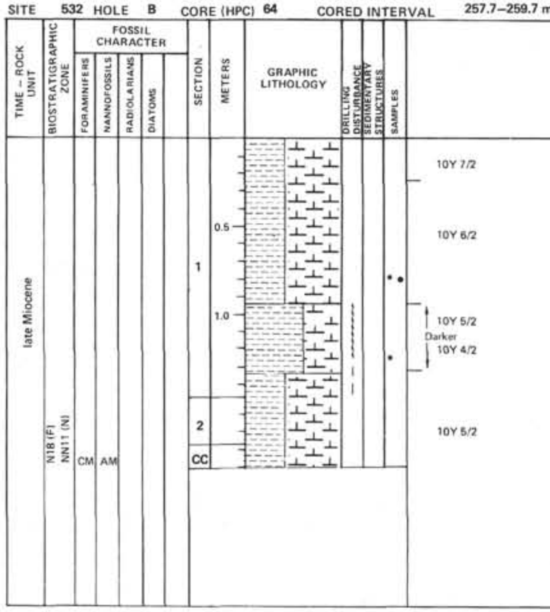
NANNOFOSSIL MARL (light) and CLAY (dark):
Mostly uniform pale olive colors.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl (light)	Clay (dark)
Section, Depth (cm)	2, 80	CC, 2
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Silt	50	10
Clay	50	90
Composition:		
Quartz	–	1
Clay	47	89
Pyrite	<1	1
Carbonate unspec.	1	2
Foraminifers	2	–
Calc. nannofossils	50	6
Diatoms	<1	<1
Radiolarians	<1	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
CC, 4–5 cm = 29:2.17

SITE 532 HOLE B CORE (HPC) 64 CORED INTERVAL 257.7–259.7 m



LITHOLOGIC DESCRIPTION

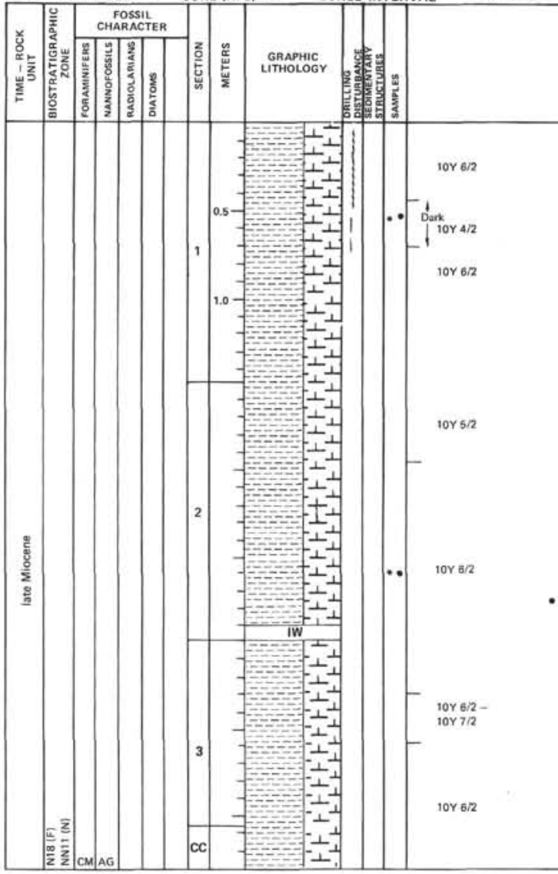
NANNOFOSSIL MARL AND OOZE:
Mainly light olive colors and one darker layer as indicated. Bioturbated features are throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil ooze (light)	Nannofossil marl (dark)
Section, Depth (cm)	1, 80	1, 125
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Silt	60	20
Clay	40	80
Composition:		
Quartz	<1	<1
Clay	37	62
Glauconite	–	<1
Pyrite	1	2
Carbonate unspec.	2	1
Foraminifers	<1	1
Calc. nannofossils	60	30
Diatoms	<1	<1
Radiolarians	–	1
Sponge spicules	–	2
Silicoflagellates	–	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 80–81 cm · 60:2.92

SITE 532 HOLE B CORE (HPC) 65 CORED INTERVAL 259.7–263.7 m



LITHOLOGIC DESCRIPTION

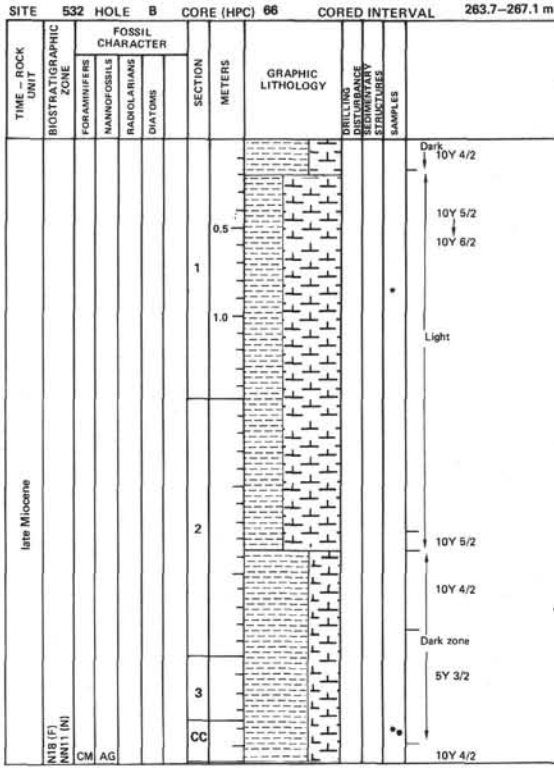
NANNOFOSSIL MARL:
Mostly pale olive colors with one dark zone. Bioturbated features are throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Nannofossil marl
Section, Depth (cm)	1, 56	2, 110
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Sand	1	–
Silt	34	35
Clay	65	65
Composition:		
Quartz	<1	–
Feldspar	<1	–
Clay	55	60
Volcanic glass	<1	–
Glauconite	–	<1
Pyrite	1	1
Carbonate unspec.	–	2
Foraminifers	2	1
Calc. nannofossils	32	37
Diatoms	5	–
Radiolarians	2	–
Sponge spicules	2	–
Plant debris	<1	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 51–54 cm = 44:1.84
2, 80–90 cm = 51:1.44
2, 109–111 cm = 59:0.21

SITE 532 HOLE B CORE (HPC) 66 CORED INTERVAL 263.7–267.1 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL (light) and CLAY (dark):

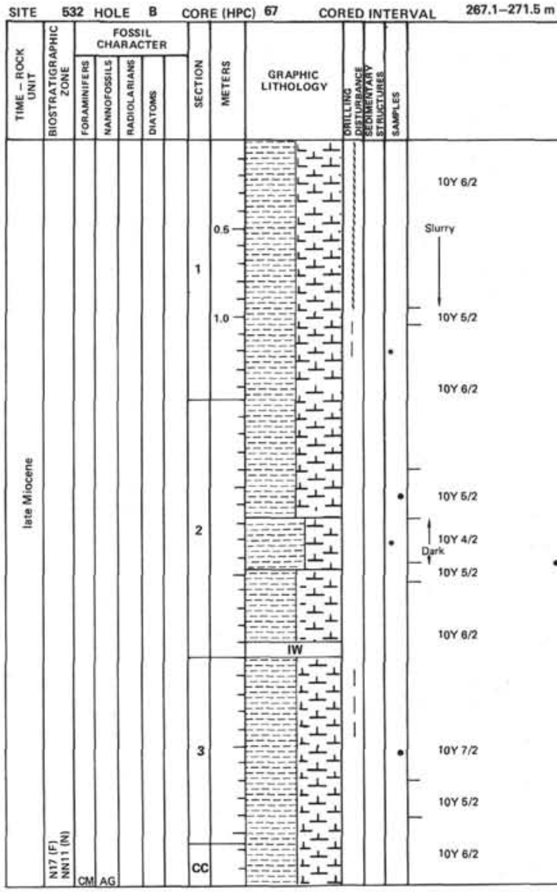
Mostly light olive colors with a thin dark zone at the top of the core and thick dark zone at its base, as indicated. Bioturbated features occur throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Nannofossil clay
Section, Depth (cm)	1, 87	CC, 4
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Silt	25	20
Clay	75	80
Composition:		
Quartz	<1	1
Heavy minerals	<1	–
Clay	58	78
Glauconite	–	<1
Pyrite	<1	2
Carbonate unspec.	–	2
Foraminifers	1	<1
Calc. nannofossils	40	18
Diatoms	<1	<1
Radiolarians	<1	–
Sponge spicules	<1	–
Plant debris	–	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
CC, 7–13 cm = 38:3.27

SITE 532 HOLE B CORE (HPC) 67 CORED INTERVAL 267.1–271.5 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL (light colored and dominant) and CLAY (dark and minor):

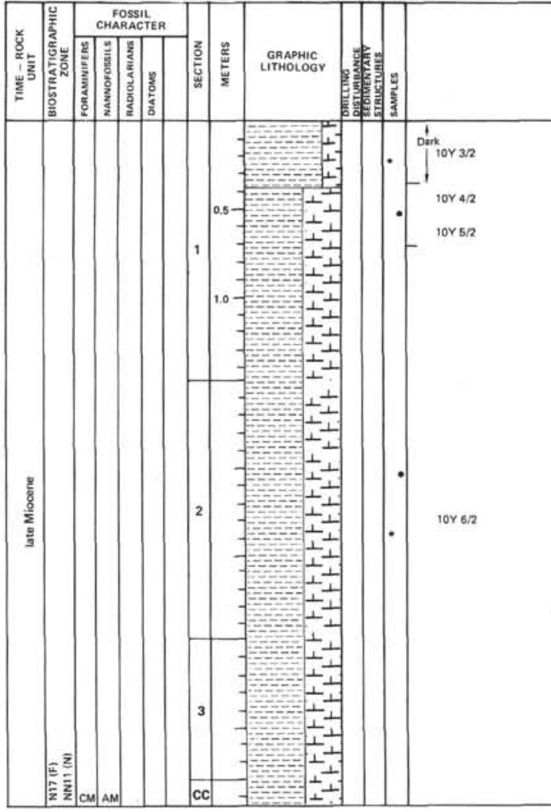
Mostly light olive colors with one darker clay-rich zone as indicated, Bioturbated features are throughtout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Nannofossil clay
Section, Depth (cm)	1, 120	2, 80
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Silt	15	20
Clay	85	80
Composition:		
Quartz	–	<1
Clay	56	74
Glauconite	<1	–
Pyrite	1	1
Carbonate unspec.	–	1
Foraminifers	2	<1
Calc. nannofossils	40	24
Radiolarians	<1	<1
Sponge spicules	<1	–
Plant debris	–	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 54–55 cm = 49:2.15
3, 54–55 cm = 69:2.61

SITE 532 HOLE B CORE (HPC) 68 CORED INTERVAL 271.5–275.5 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL (light and dominant) and CLAY (dark and minor):

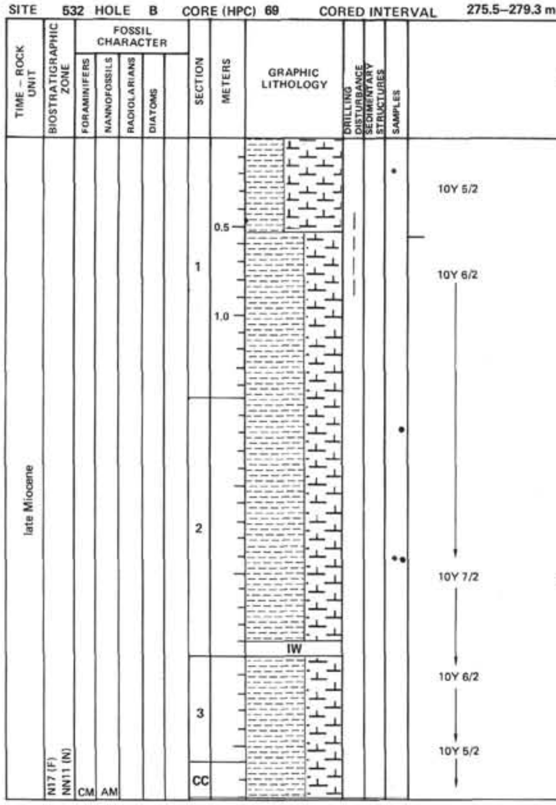
Mostly light olive colors with one dark zone as indicated. Bioturbated features are throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil clay	Nannofossil marl
Section, Depth (cm)	1, 22	2, 87
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Silt	25	14
Clay	75	85
Composition:		
Quartz	<1	<1
Mica	<1	–
Clay	72	60
Volcanic glass	–	<1
Pyrite	1	–
Carbonate unspec.	2	–
Foraminifers	3	5
Calc. nannofossils	20	34
Diatoms	<1	<1
Radiolarians	<1	<1
Sponge spicules	<1	<1
Plant debris	<1	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 54–55 cm = 47:0.68
2, 54–55 cm = 68:0.38

SITE 532 HOLE B CORE (HPC) 69 CORED INTERVAL 275.5–279.3 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

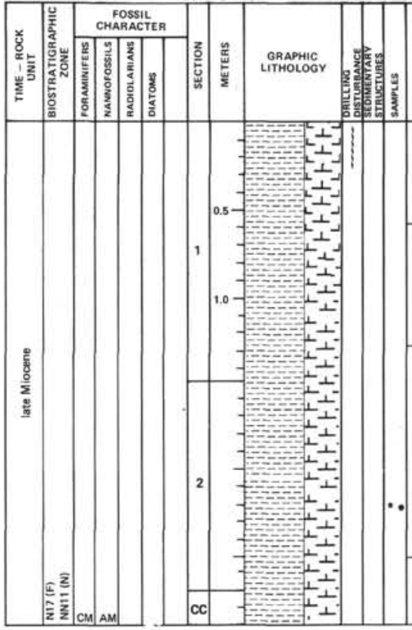
Mostly pale olive colors with some slightly darker zones. Bioturbated features are throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Nannofossil marl
Section, Depth (cm)	1, 20	2, 90
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Silt	55	20
Clay	45	80
Composition:		
Quartz	<1	<1
Clay	44	60
Volcanic glass	<1	–
Glauconite	–	<1
Pyrite	–	1
Carbonate unspec.	2	–
Foraminifers	1	3
Calc. nannofossils	52	35
Diatoms	<1	<1
Radiolarians	–	<1
Sponge spicules	–	<1
Plant debris	<1	–

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 19–20 cm = 57:2.11
2, 89–90 cm = 61:2.85

SITE 532 HOLE B CORE (HPC) 70 CORED INTERVAL 279.3–282.3 m



LITHOLOGIC DESCRIPTION

10Y 6/2

10Y 7/2

10Y 6/2

10Y 5/2

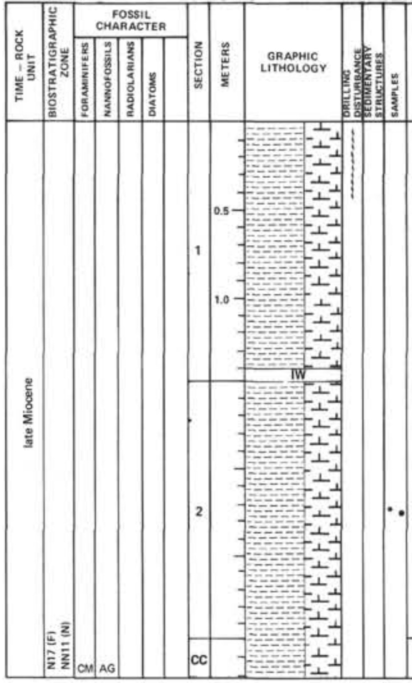
NANNOFOSSIL MARL:
Mostly pale olive colors. Bioturbated features are throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil ooze
Section, Depth (cm)	2, 71
Lith. (D = Dominant; M = Minor)	D
Texture:	
Silt	50
Clay	50
Composition:	
Quartz	<1
Clay	43
Glauconite	<1
Pyrite	<1
Foraminifers	5
Calc. nannofossils	50

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 70–71 cm = 73:0.14

SITE 532 HOLE B CORE (HPC) 71 CORED INTERVAL 282.3–285.3 m



LITHOLOGIC DESCRIPTION

10Y 6/2

10Y 7/2

10Y 6/2

10Y 7/2

10Y 6/2

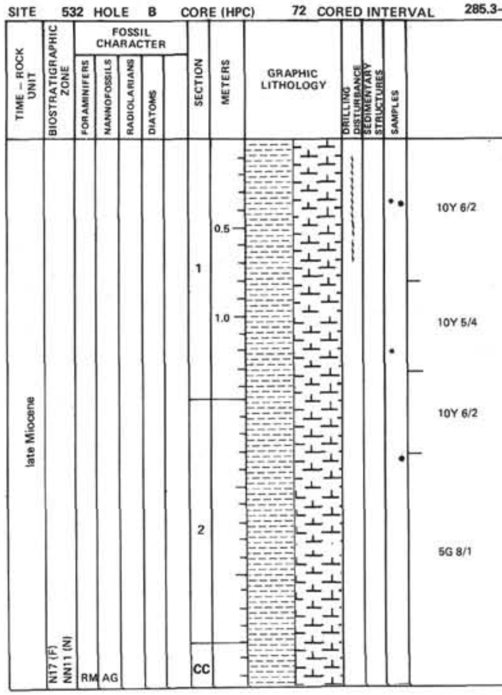
NANNOFOSSIL MARL:
Mostly uniform pale olive colors. Bioturbated features are throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl
Section, Depth (cm)	2, 75
Lith. (D = Dominant; M = Minor)	D
COMPOSITION:	
Quartz	<1
Clay	58
Pyrite	1
Foraminifers	5
Calc. nannofossils	35
Radiolarians	<1
Sponge spicules	<1
Plant debris	<1

• CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 76–82 cm = 74:0.50

SITE 532 HOLE B CORE (HPC) 72 CORED INTERVAL 285.3–288.3 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

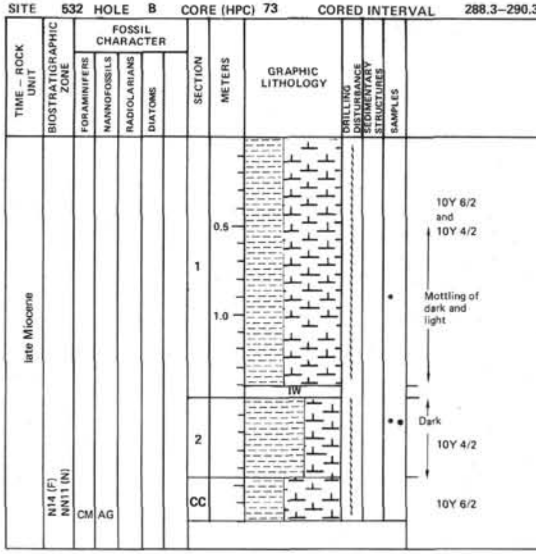
Mostly pale olive and green colors throughout. Much of core is badly gas cracked. Bioturbated features are throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Nannofossil marl
Section, Depth (cm)	1, 35	1, 120
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Silt	20	40
Clay	80	60
Composition:		
Quartz	<1	<1
Clay	62	52
Volcanic glass	<1	–
Pyrite	<1	1
Carbonate unspec.	–	3
Foraminifers	2	1
Calc. nannofossils	35	43
Radiolarians	<1	<1
Plant debris	<1	–

● CARBONATE BOMB (% $CaCO_3$:% organic carbon):
1, 34–36 cm = 78:0.98
2, 34–36 cm = 72:0.10

SITE 532 HOLE B CORE (HPC) 73 CORED INTERVAL 288.3–290.3 m



LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARL:

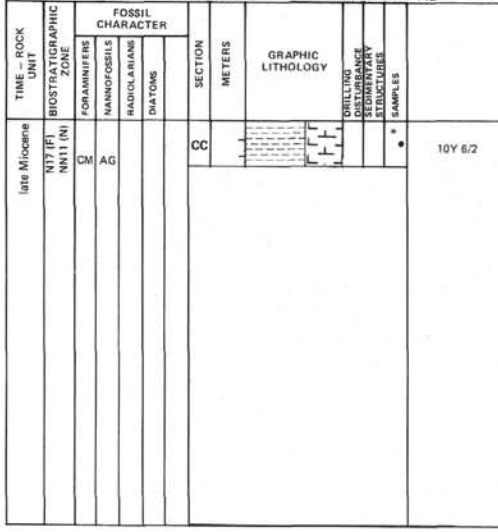
Severely disturbed by drilling and gas cracking occurs throughout.

SMEAR SLIDE SUMMARY (%):

	Nannofossil marl	Nannofossil marl
Section, Depth (cm)	1, 90	2, 15
Lith. (D = Dominant; M = Minor)	D	D
Texture:		
Silt	40	40
Clay	60	60
Composition:		
Quartz	<1	<1
Mica	–	<1
Clay	55	58
Pyrite	1	2
Carbonate unspec.	4	10
Foraminifers	1	<1
Calc. nannofossils	39	30

● CARBONATE BOMB (% $CaCO_3$:% organic carbon):
2, 14–20 cm = 63:1.51

SITE 532 HOLE B CORE (HPC) 74 CORED INTERVAL 290.3–291.3 m



LITHOLOGIC DESCRIPTION

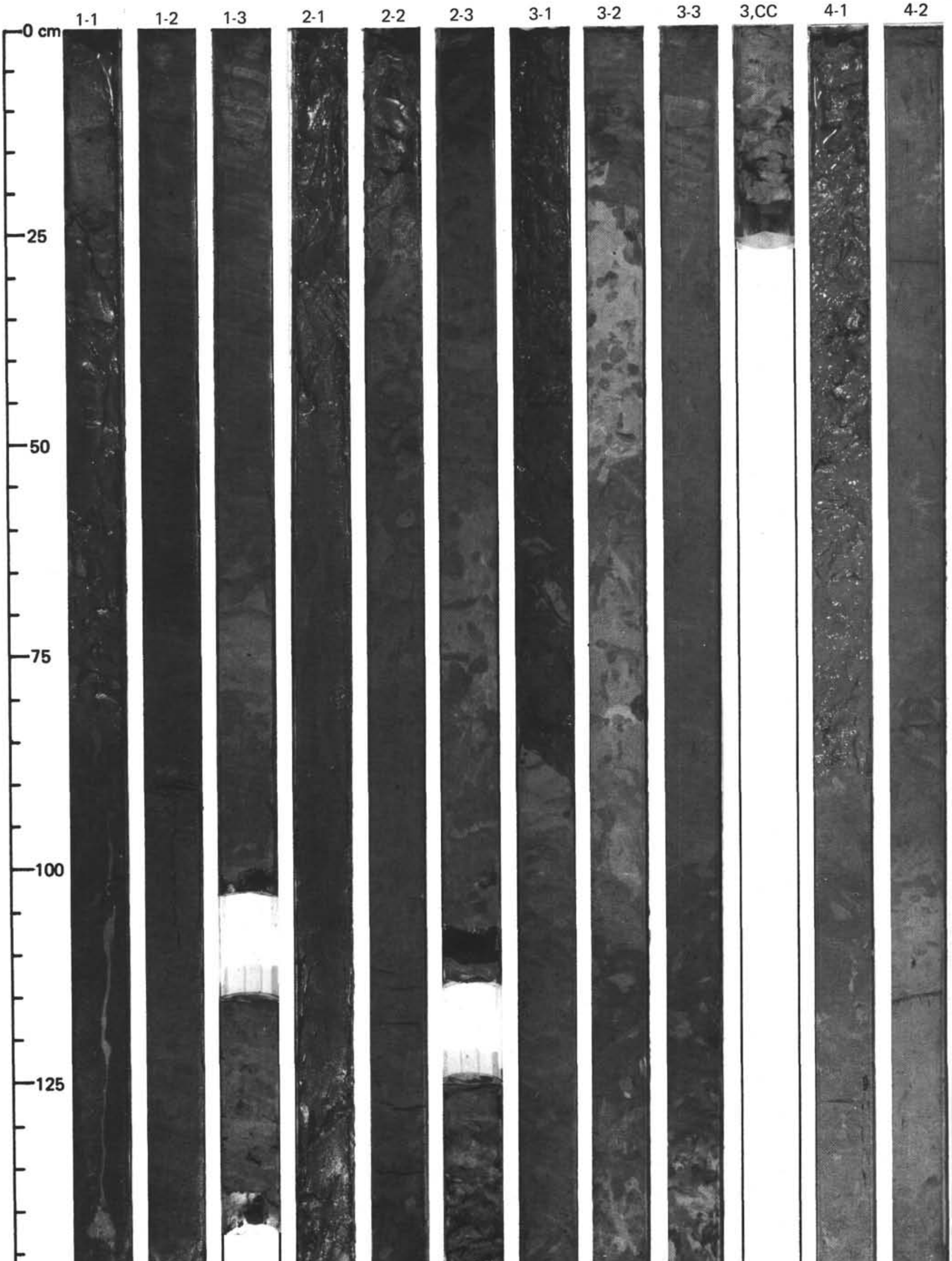
NANNOFOSSIL MARL:

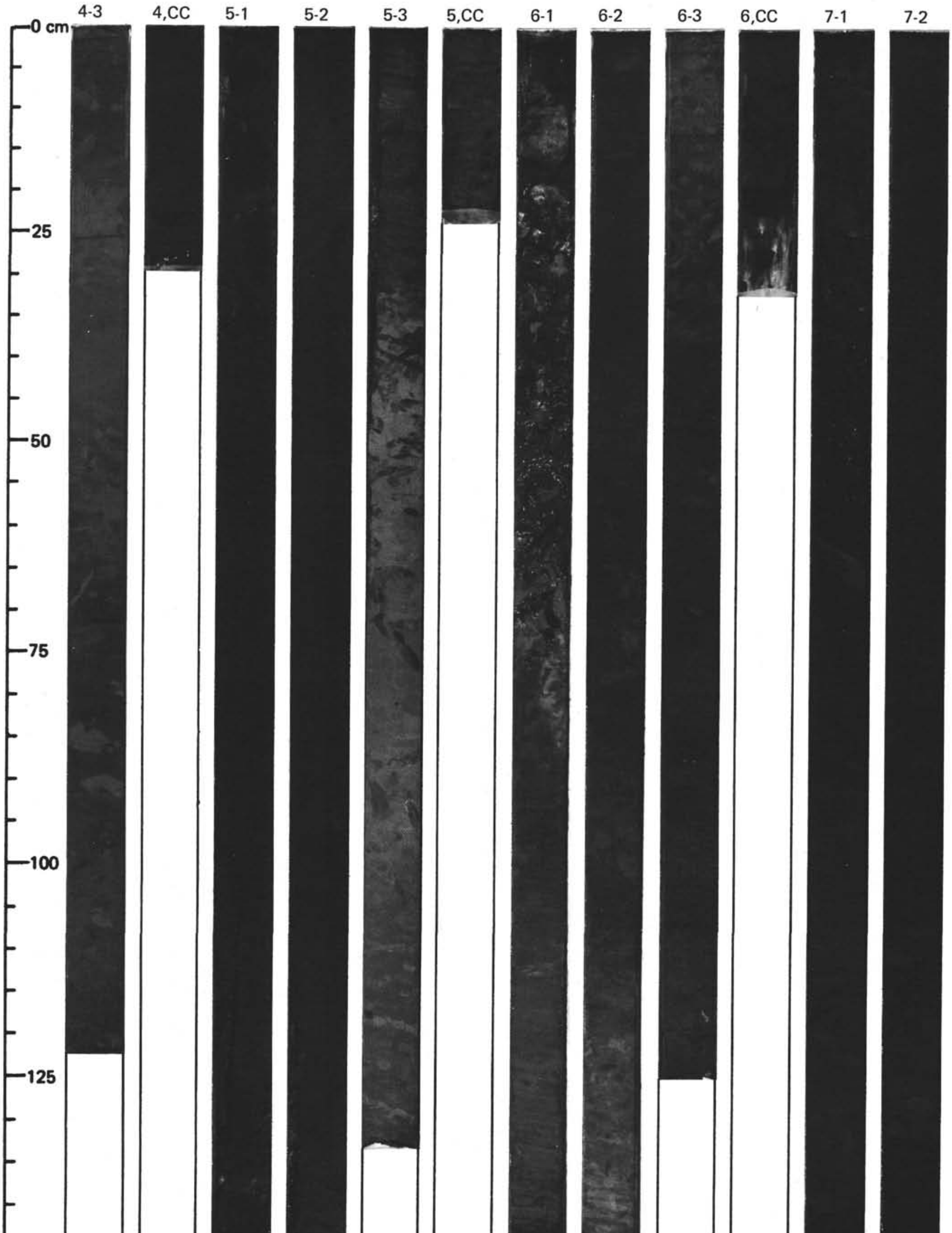
Severely disturbed by gas cracking.

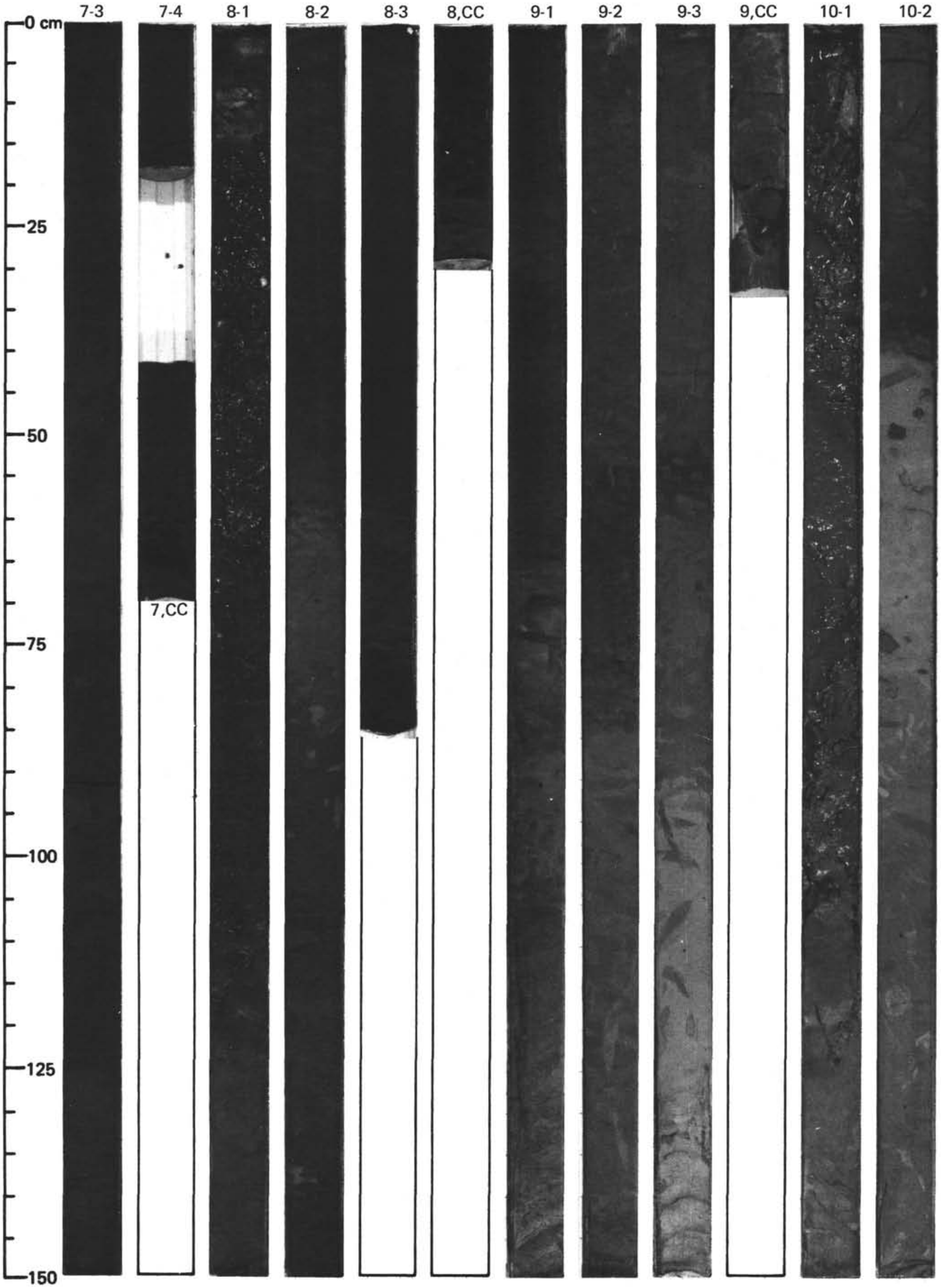
SMEAR SLIDE SUMMARY (%):

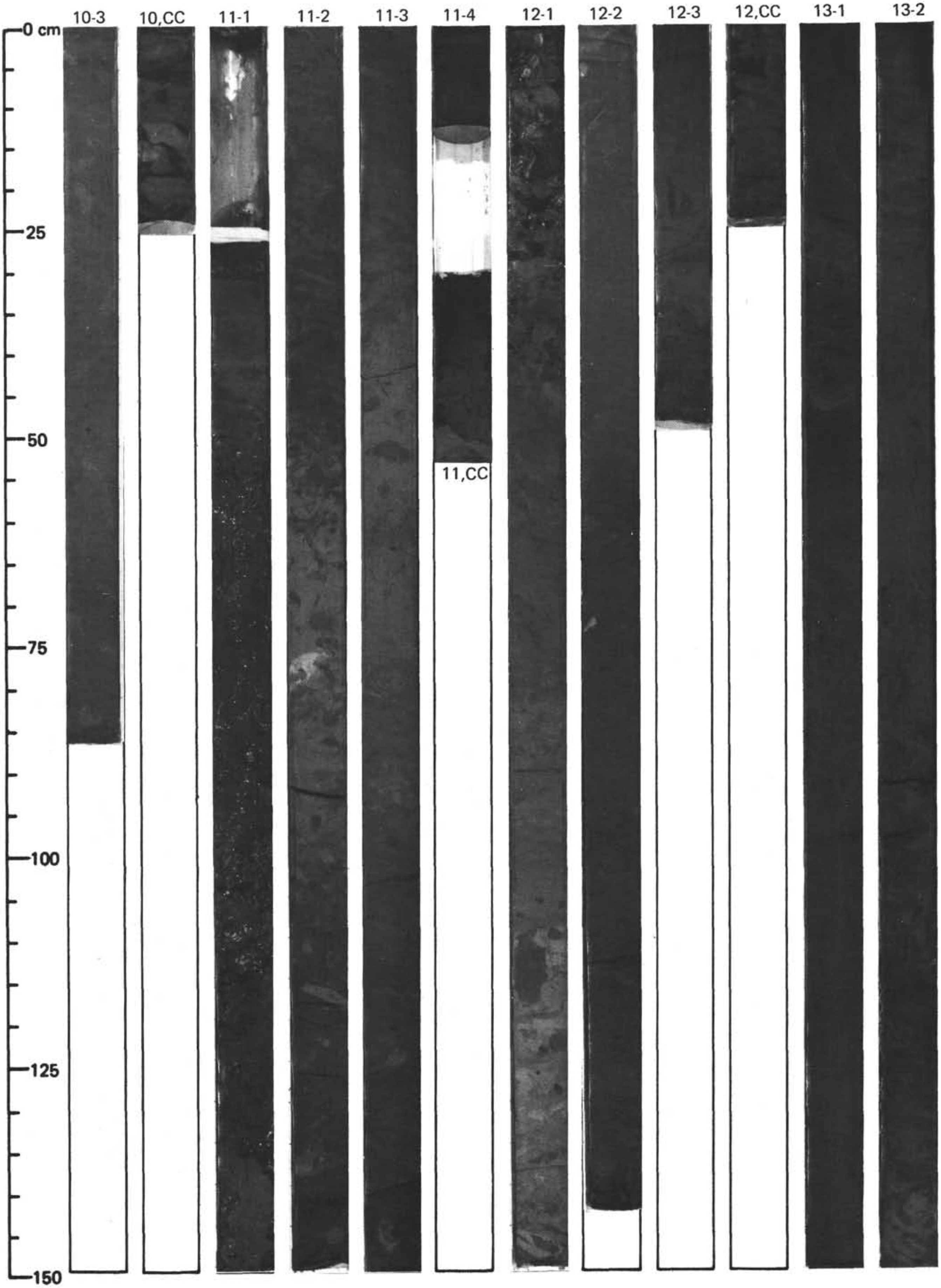
	Nannofossil Marl
Section, Depth (cm)	CC, 7
Lith. (D = Dominant; M = Minor)	D
Texture:	
Silt	14
Clay	85
Composition:	
Quartz	<1
Clay	64
Pyrite	<1
Foraminifers	5
Calc. nannofossils	30
Sponge spicules	<1
Plant debris	<1

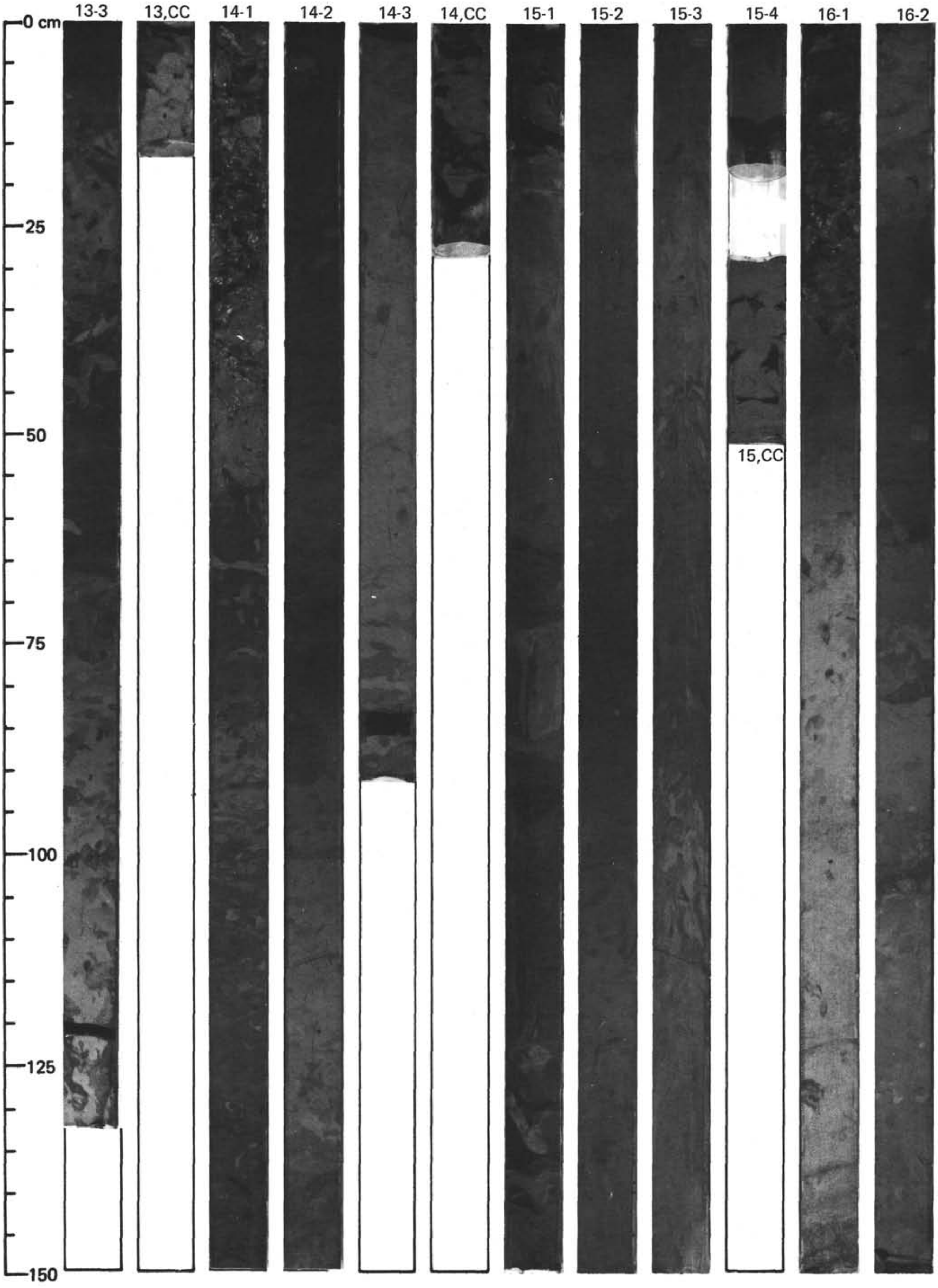
● CARBONATE BOMB (% $CaCO_3$:% organic carbon):
CC, 10 cm = 71:0.50

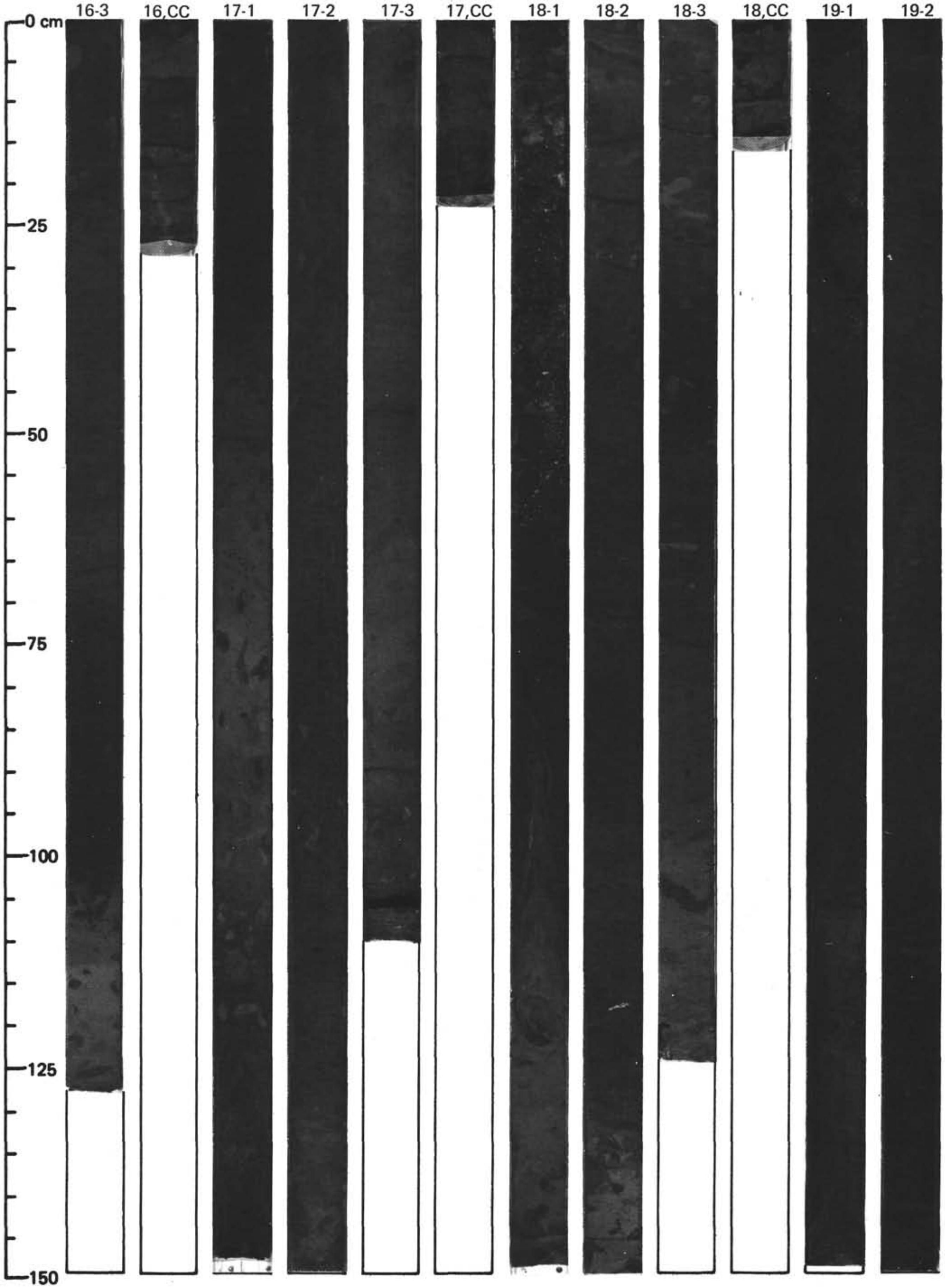

1-1
1-2
1-3
2-1
2-2
2-3
3-1
3-2
3-3
3,CC
4-1
4-2
0 cm
25
50
75
100
125
150
1,CC
2,CC

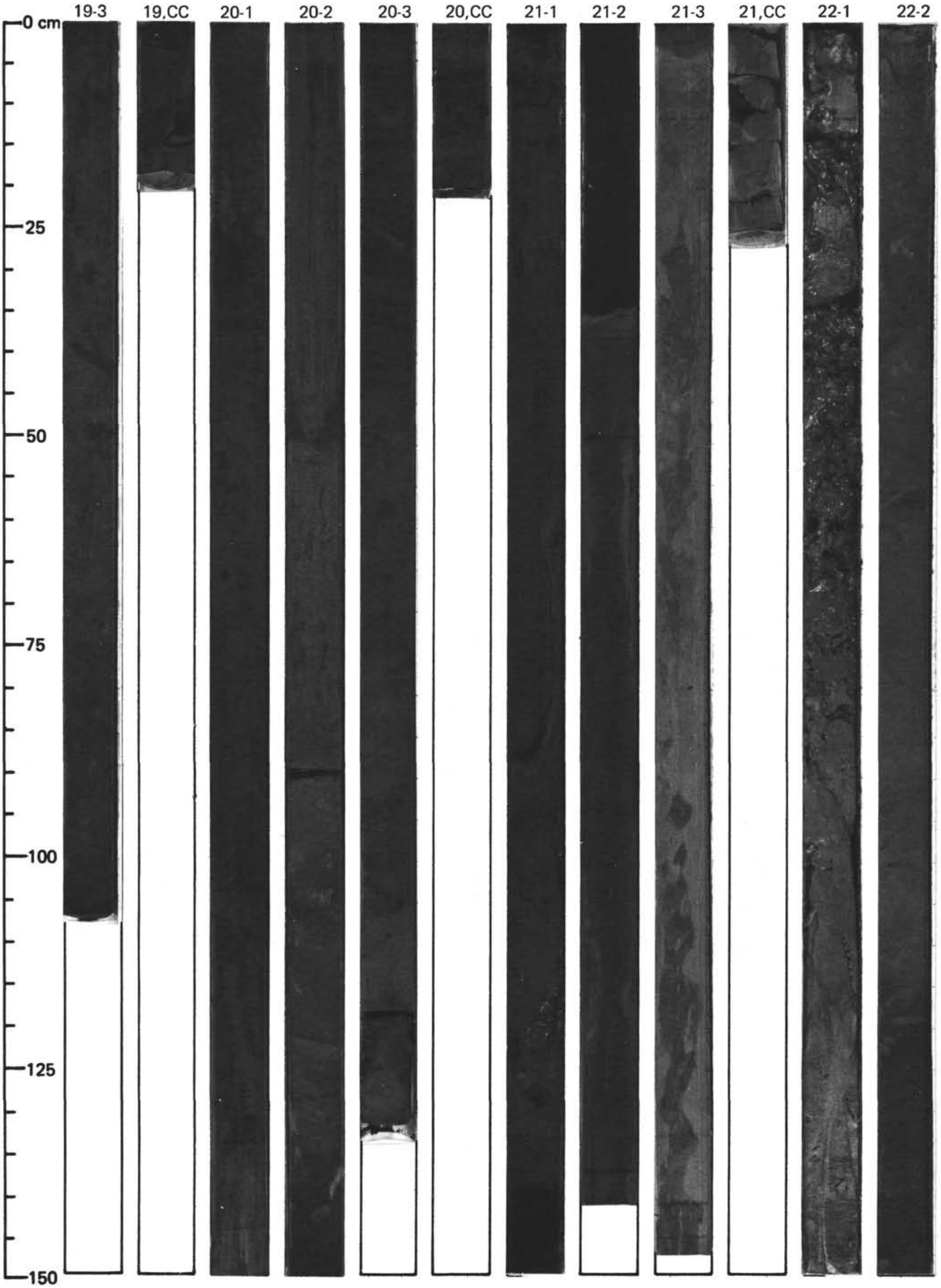

4-3
4,CC
5-1
5-2
5-3
5,CC
6-1
6-2
6-3
6,CC
7-1
7-2
0 cm
25
50
75
100
125
150

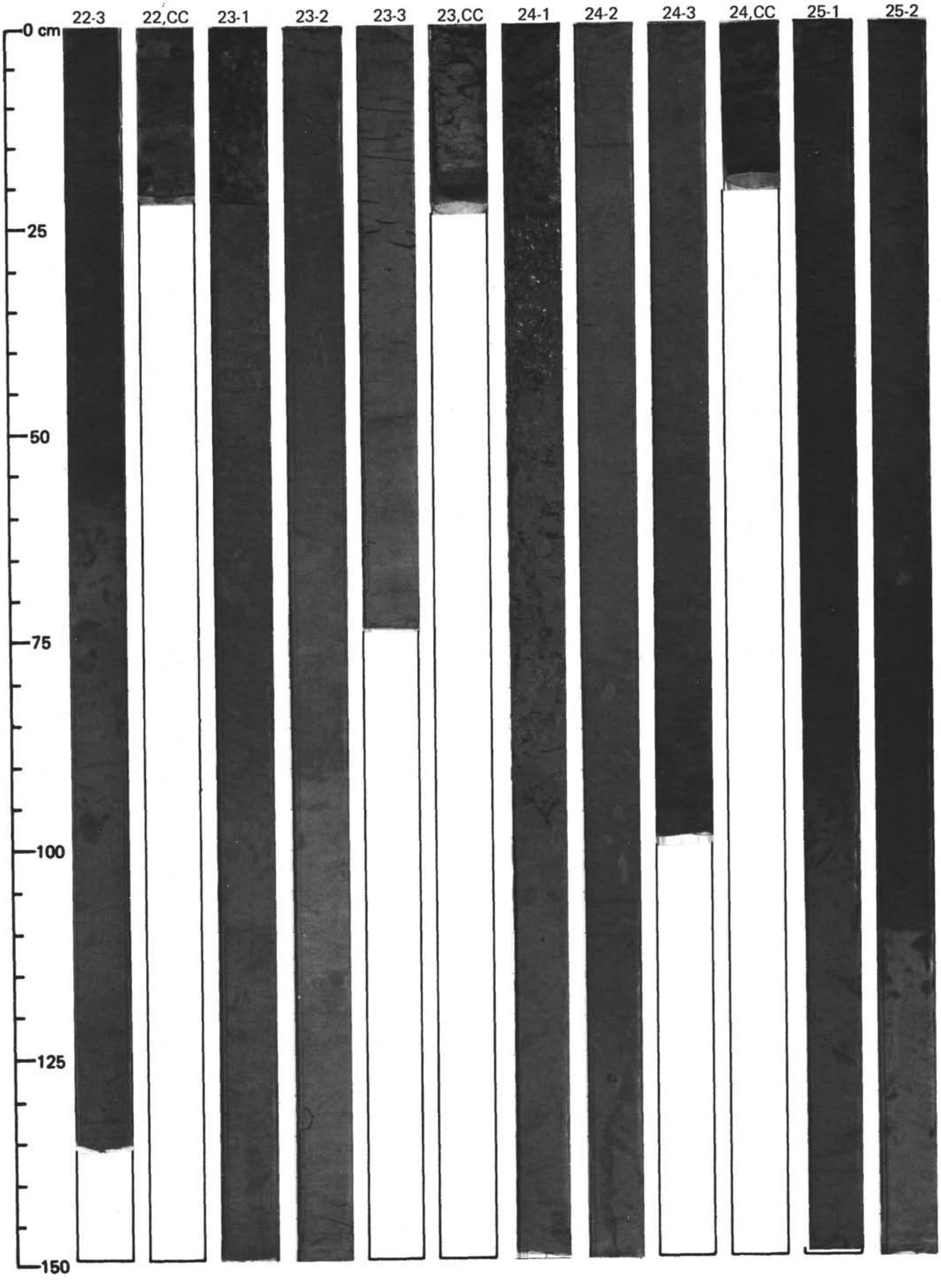

7-3
7-4
8-1
8-2
8-3
8,CC
9-1
9-2
9-3
9,CC
10-1
10-2
0 cm
25
50
75
100
125
150
7,CC

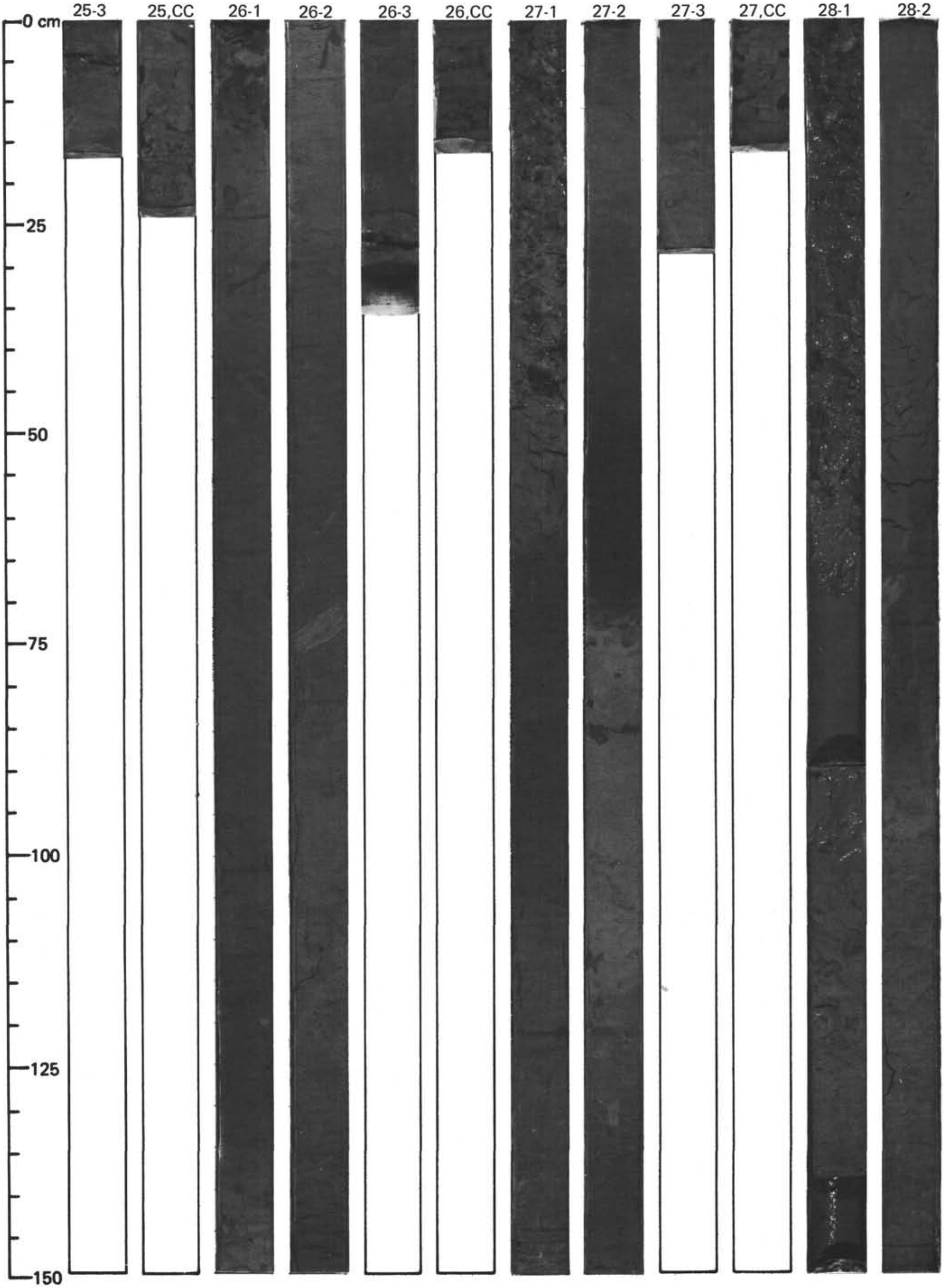

10-3
10,CC
11-1
11-2
11-3
11-4
11,CC
12-1
12-2
12-3
12,CC
13-1
13-2
0 cm
25
50
75
100
125
150

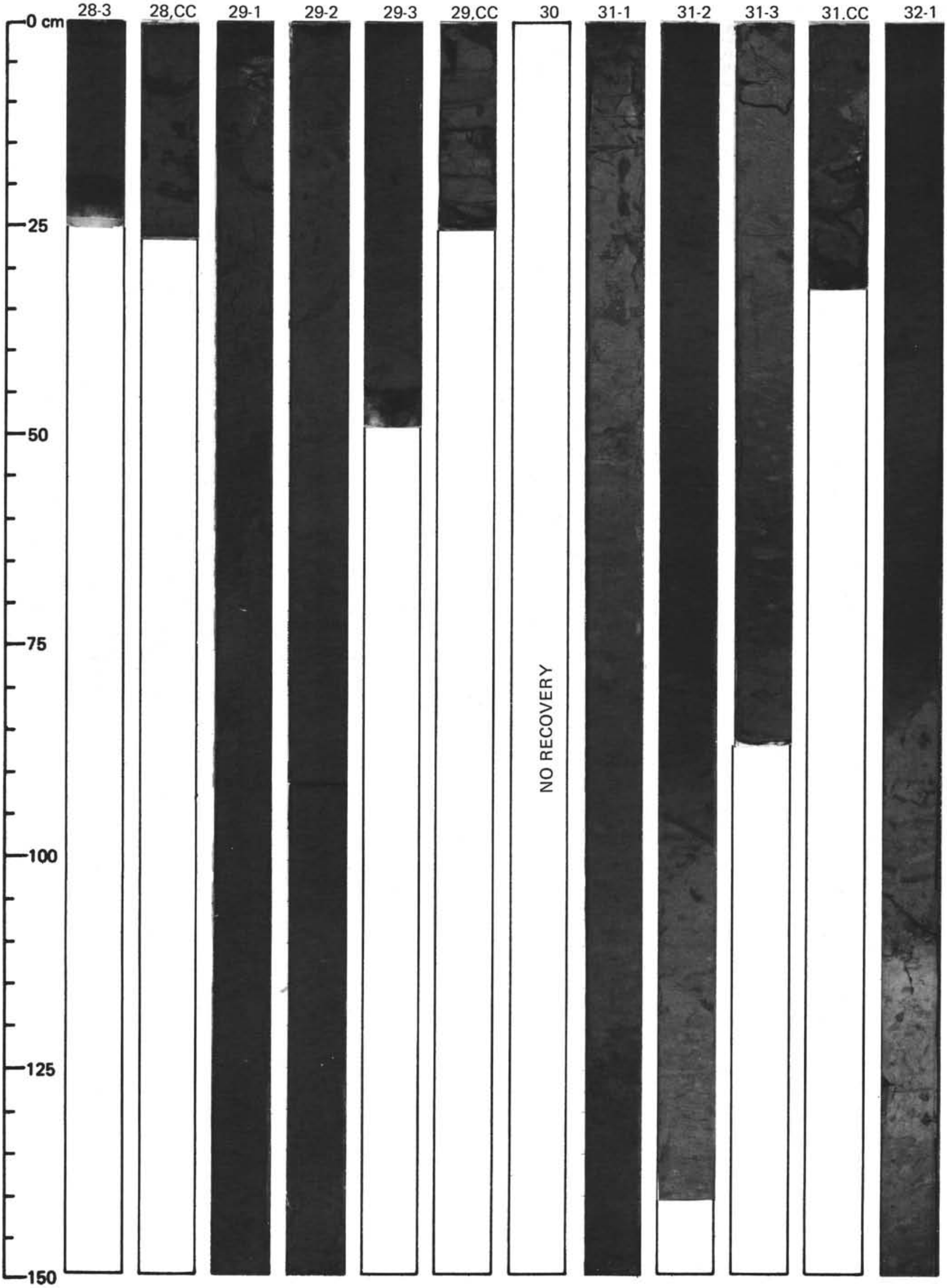

13-3
13,CC
14-1
14-2
14-3
14,CC
15-1
15-2
15-3
15-4
16-1
16-2
15,CC
0 cm
25
50
75
100
125
150

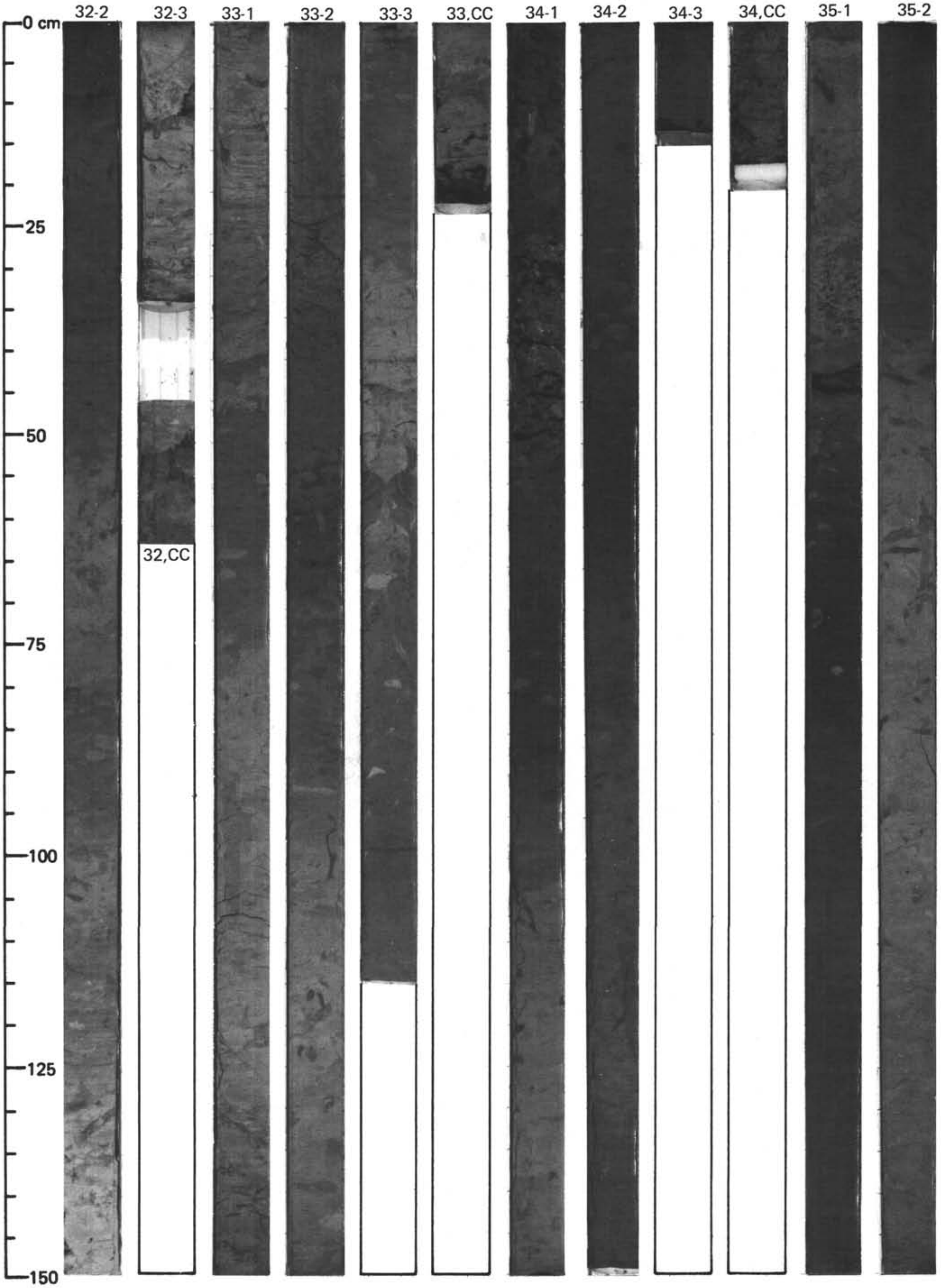

16-3
16,CC
17-1
17-2
17-3
17,CC
18-1
18-2
18-3
18,CC
19-1
19-2
0 cm
25
50
75
100
125
150

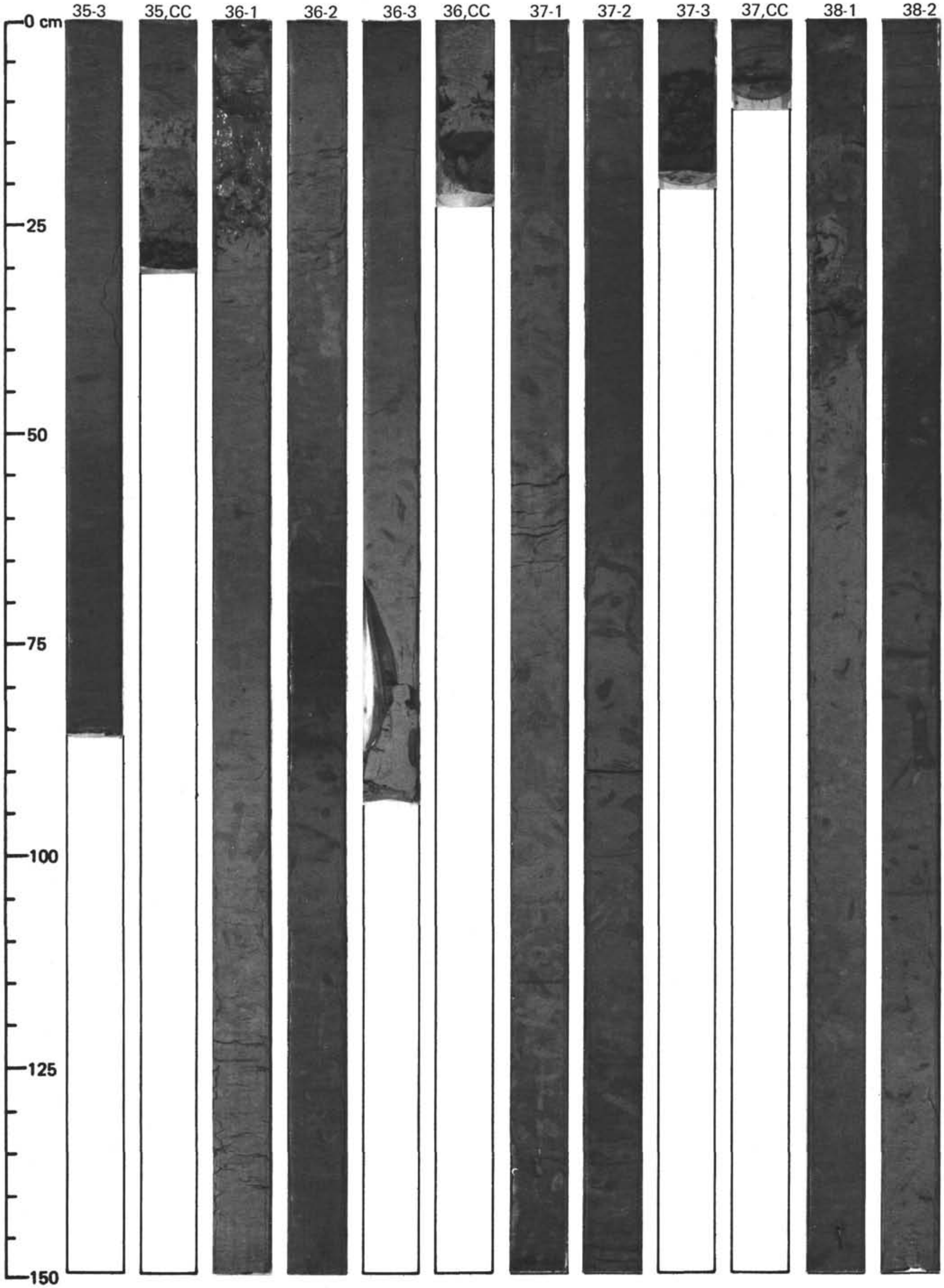

0 cm
25
50
75
100
125
150
19-3
19,CC
20-1
20-2
20-3
20,CC
21-1
21-2
21-3
21,CC
22-1
22-2

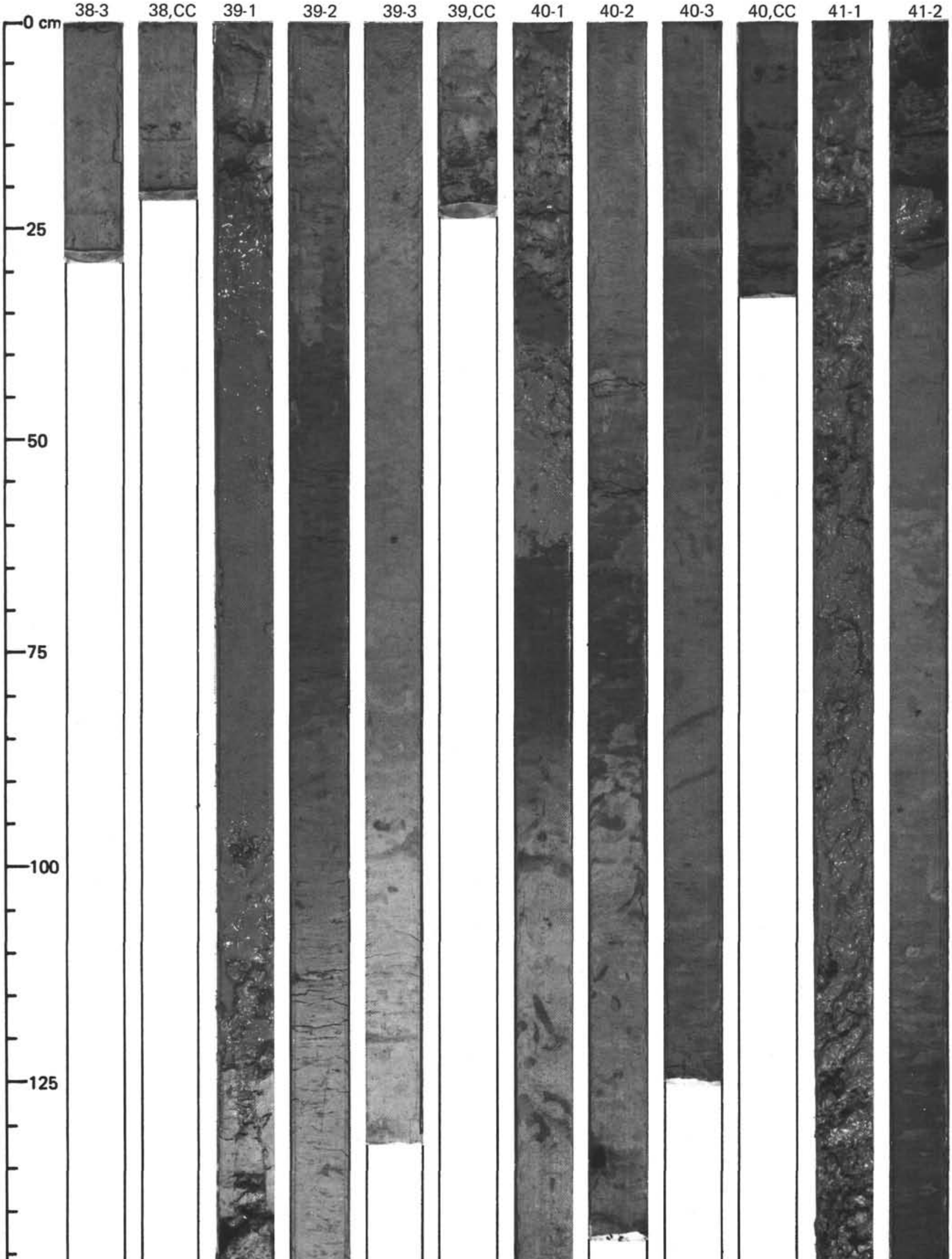

22-3
22,CC
23-1
23-2
23-3
23,CC
24-1
24-2
24-3
24,CC
25-1
25-2
0 cm
25
50
75
100
125
150

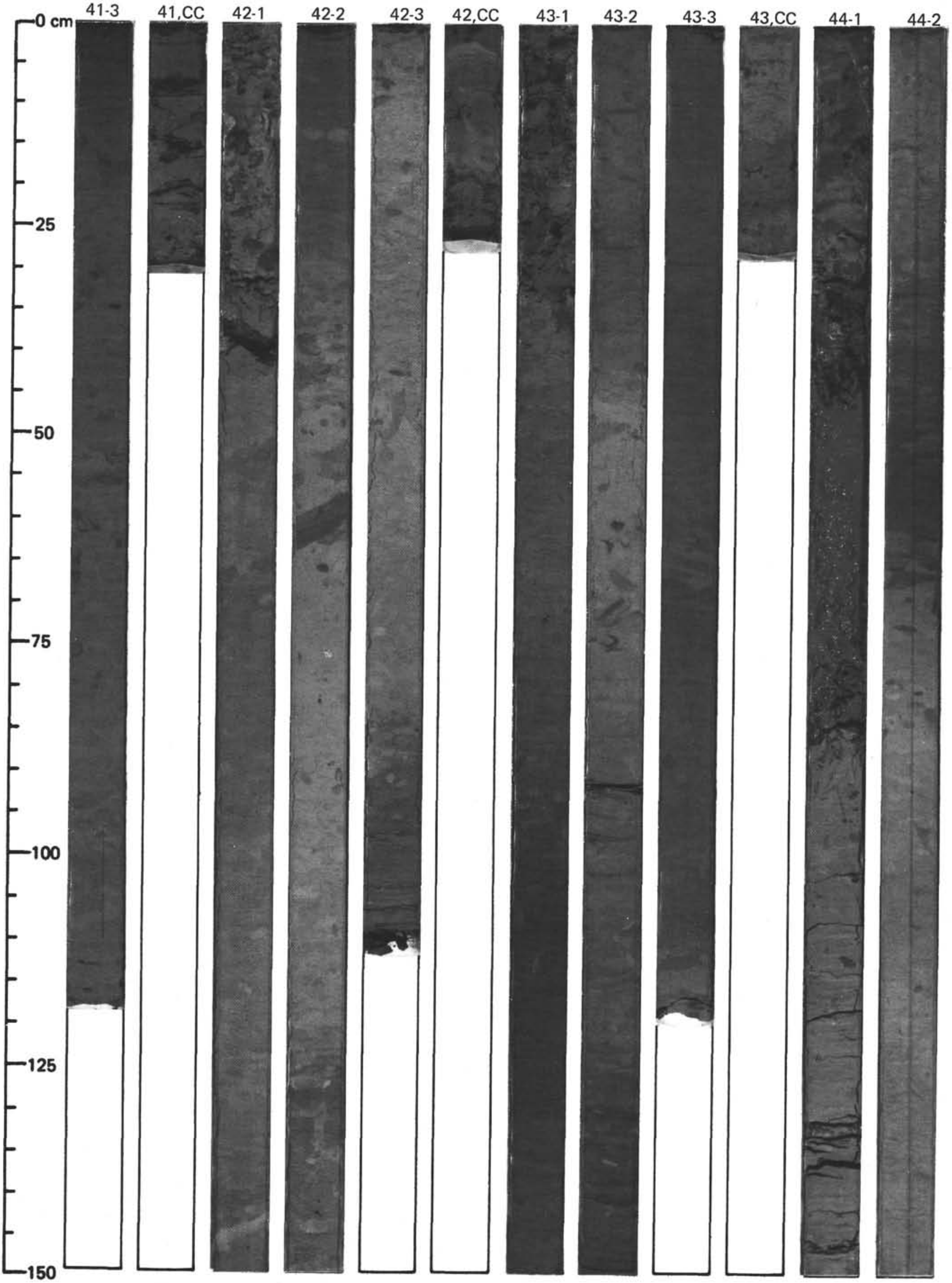

25-3
25,CC
26-1
26-2
26-3
26,CC
27-1
27-2
27-3
27,CC
28-1
28-2
0 cm
25
50
75
100
125
150


28-3
28,CC
29-1
29-2
29-3
29,CC
30
31-1
31-2
31-3
31,CC
32-1
0 cm
25
50
75
100
125
150
NO RECOVERY


0 cm
25
50
75
100
125
150
32-2
32-3
32,CC
33-1
33-2
33-3
33,CC
34-1
34-2
34-3
34,CC
35-1
35-2


35-3
35,CC
36-1
36-2
36-3
36,CC
37-1
37-2
37-3
37,CC
38-1
38-2
0 cm
25
50
75
100
125
150


38-3
38,CC
39-1
39-2
39-3
39,CC
40-1
40-2
40-3
40,CC
41-1
41-2
0 cm
25
50
75
100
125
150


0 cm
25
50
75
100
125
150
41-3
41,CC
42-1
42-2
42-3
42,CC
43-1
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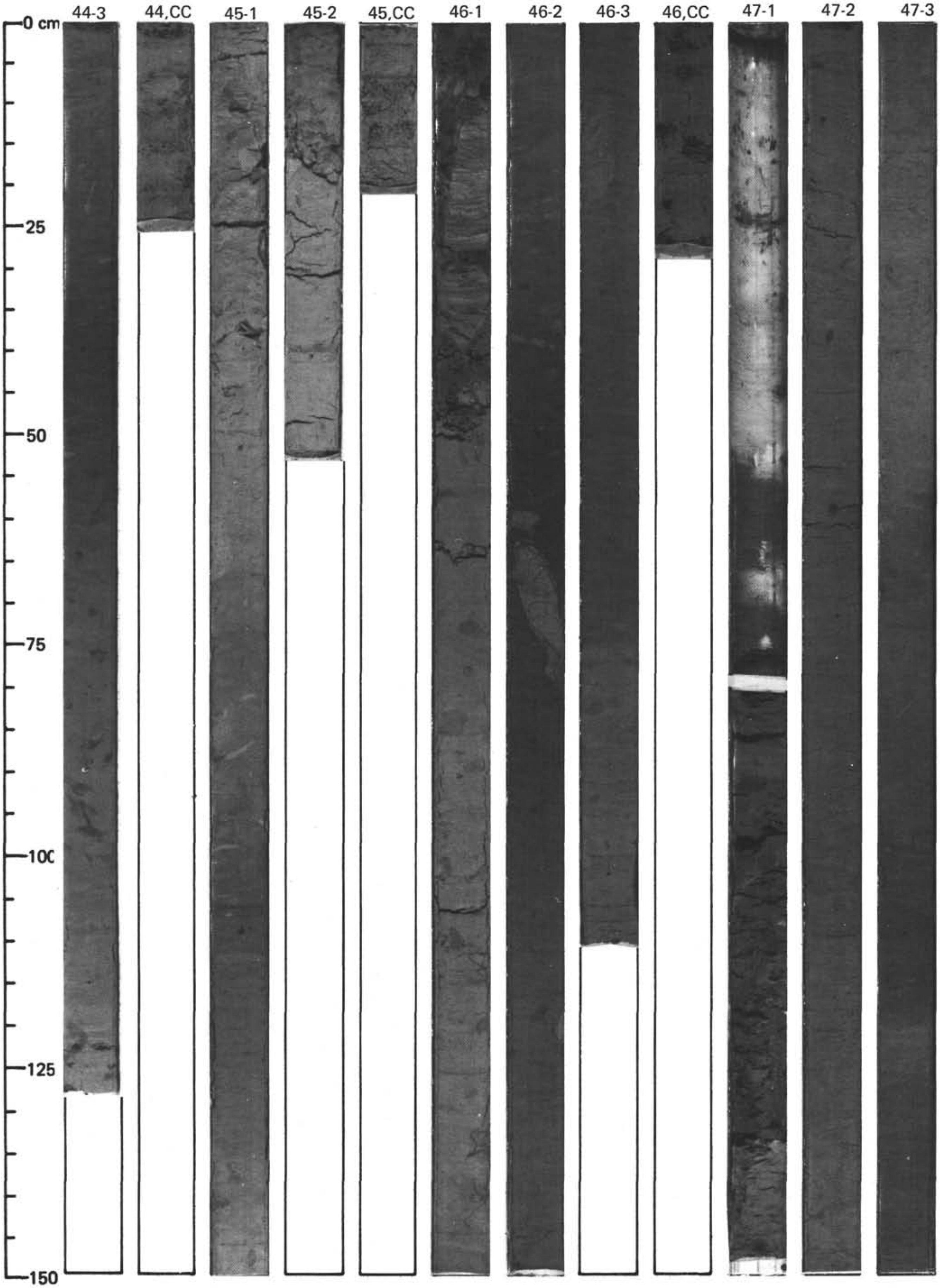
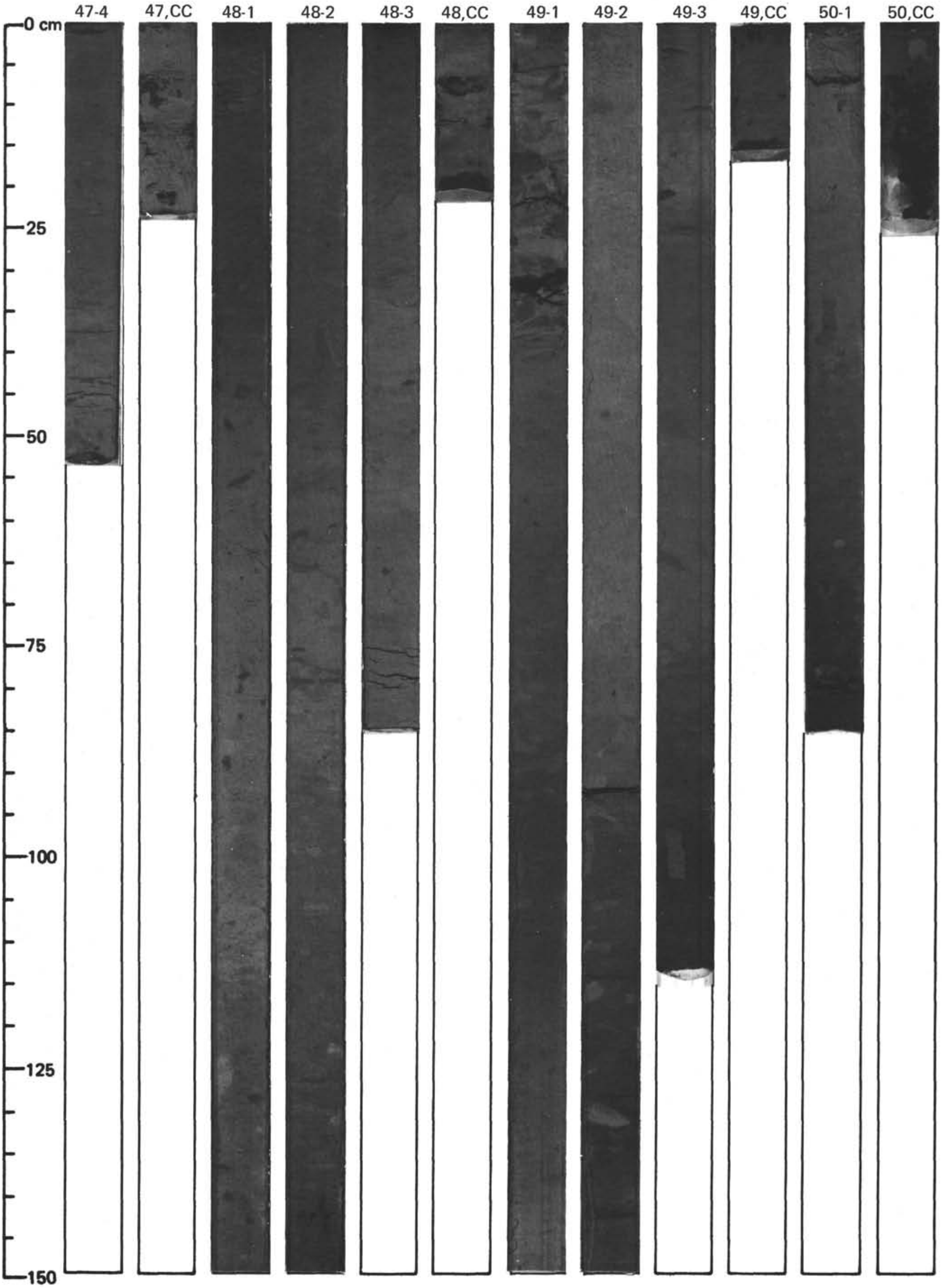
43-3
43,CC
44-1
44-2


44-3
44,CC
45-1
45-2
45,CC
46-1
46-2
46-3
46,CC
47-1
47-2
47-3
0 cm
25
50
75
100
125
150


47-4
47,CC
48-1
48-2
48-3
48,CC
49-1
49-2
49-3
49,CC
50-1
50,CC
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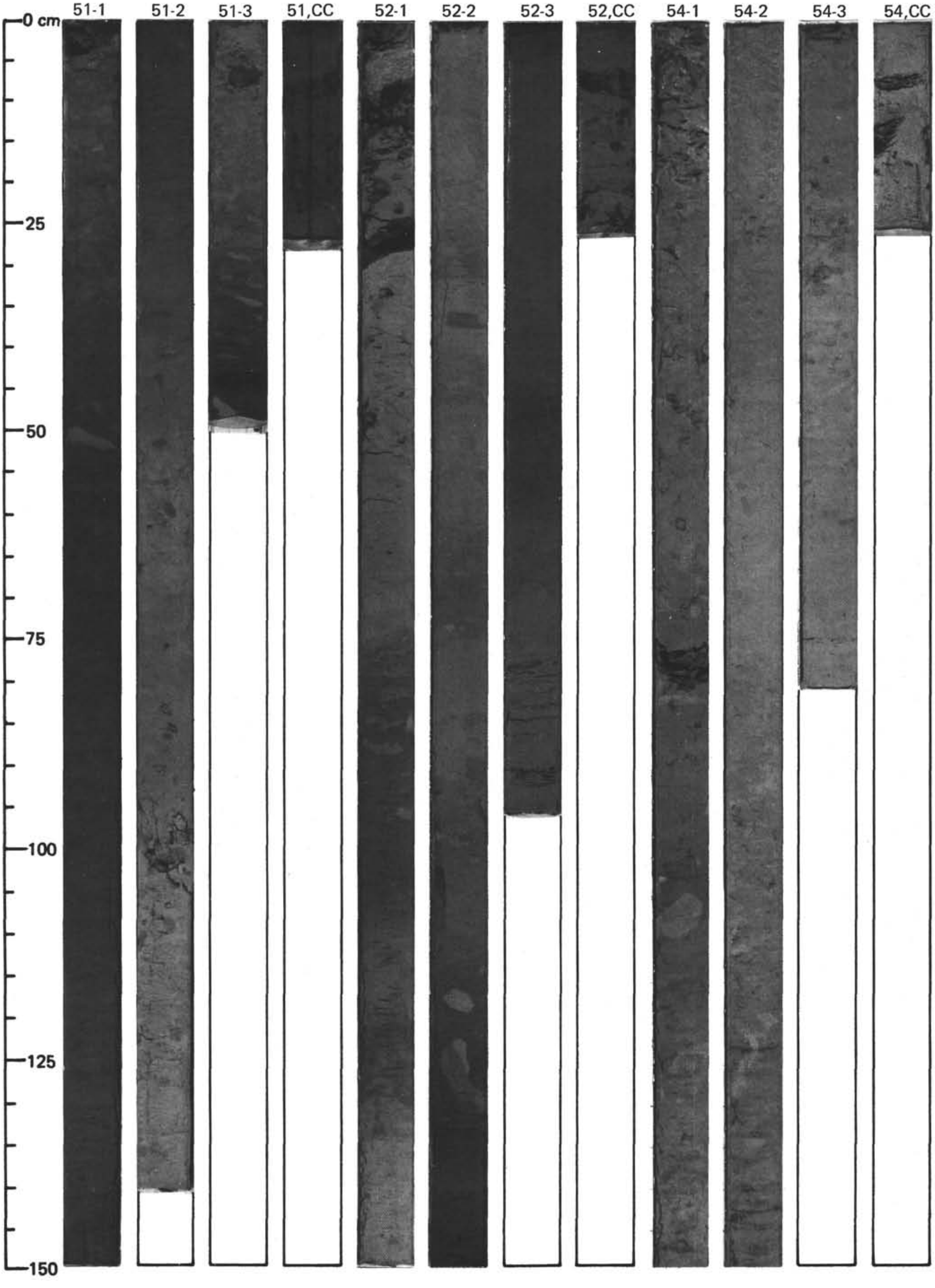
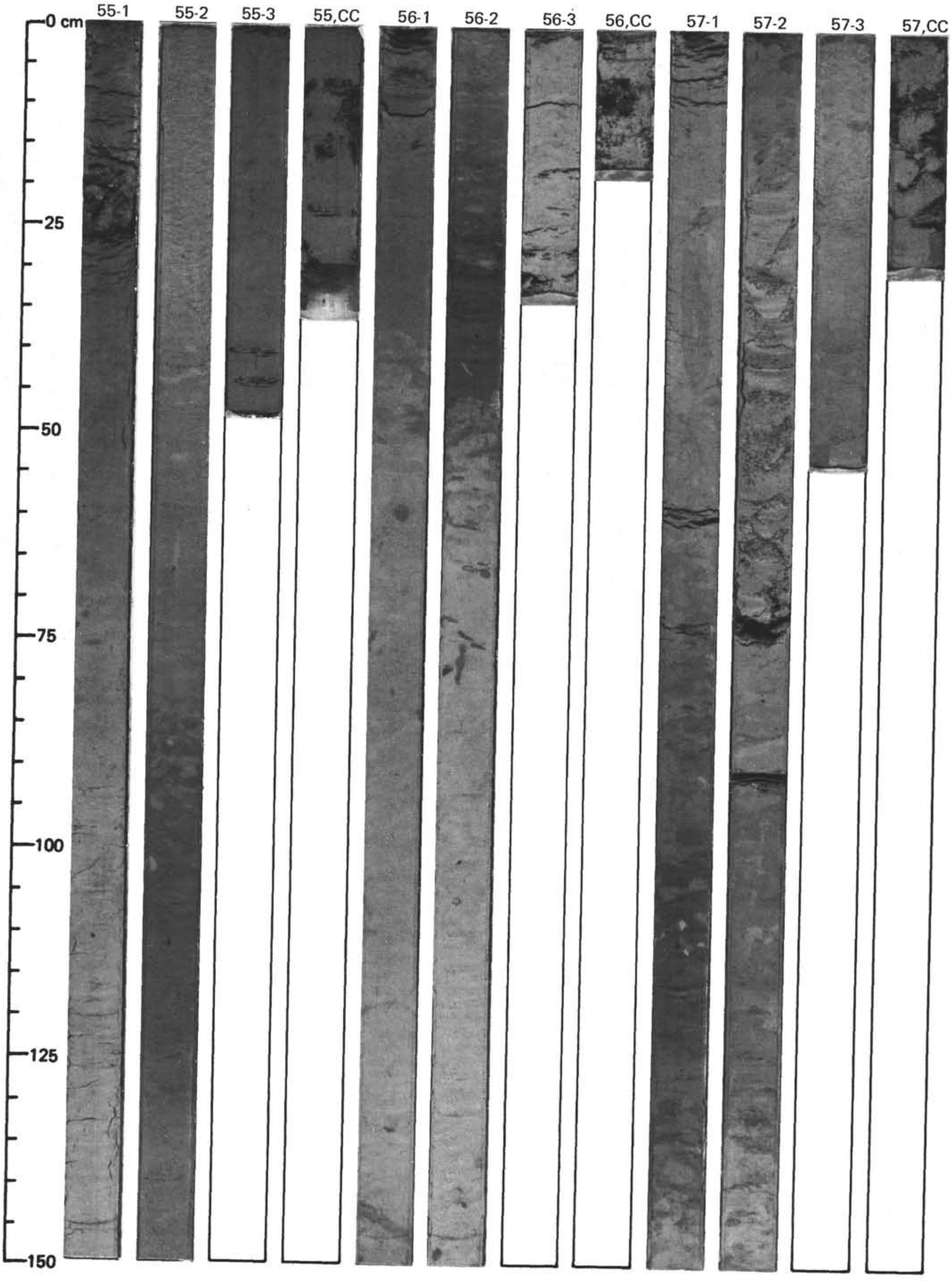
25
50
75
100
125
150


0 cm
25
50
75
100
125
150
51-1
51-2
51-3
51,CC
52-1
52-2
52-3
52,CC
54-1
54-2
54-3
54,CC


55-1
55-2
55-3
55,CC
56-1
56-2
56-3
56,CC
57-1
57-2
57-3
57,CC
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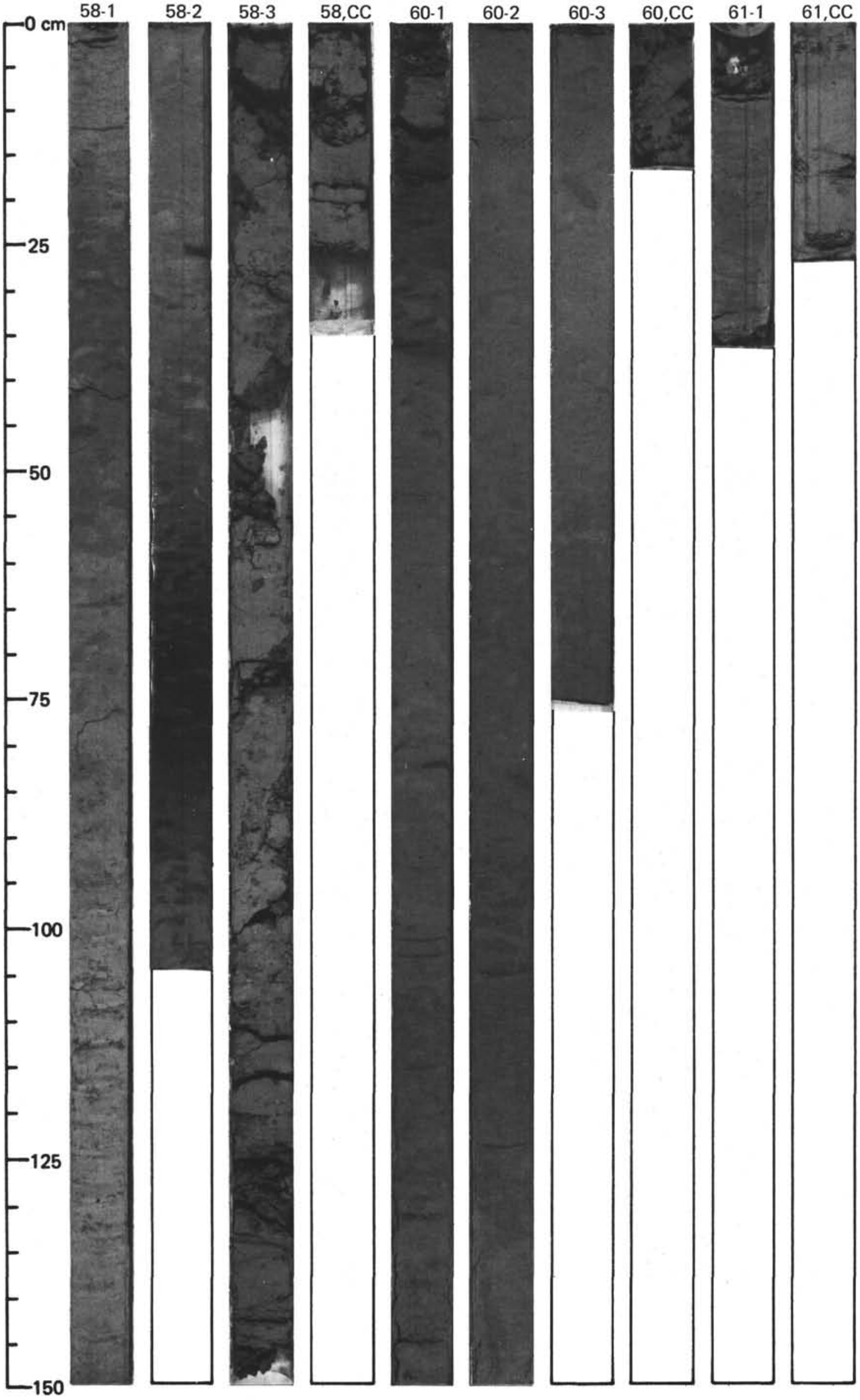
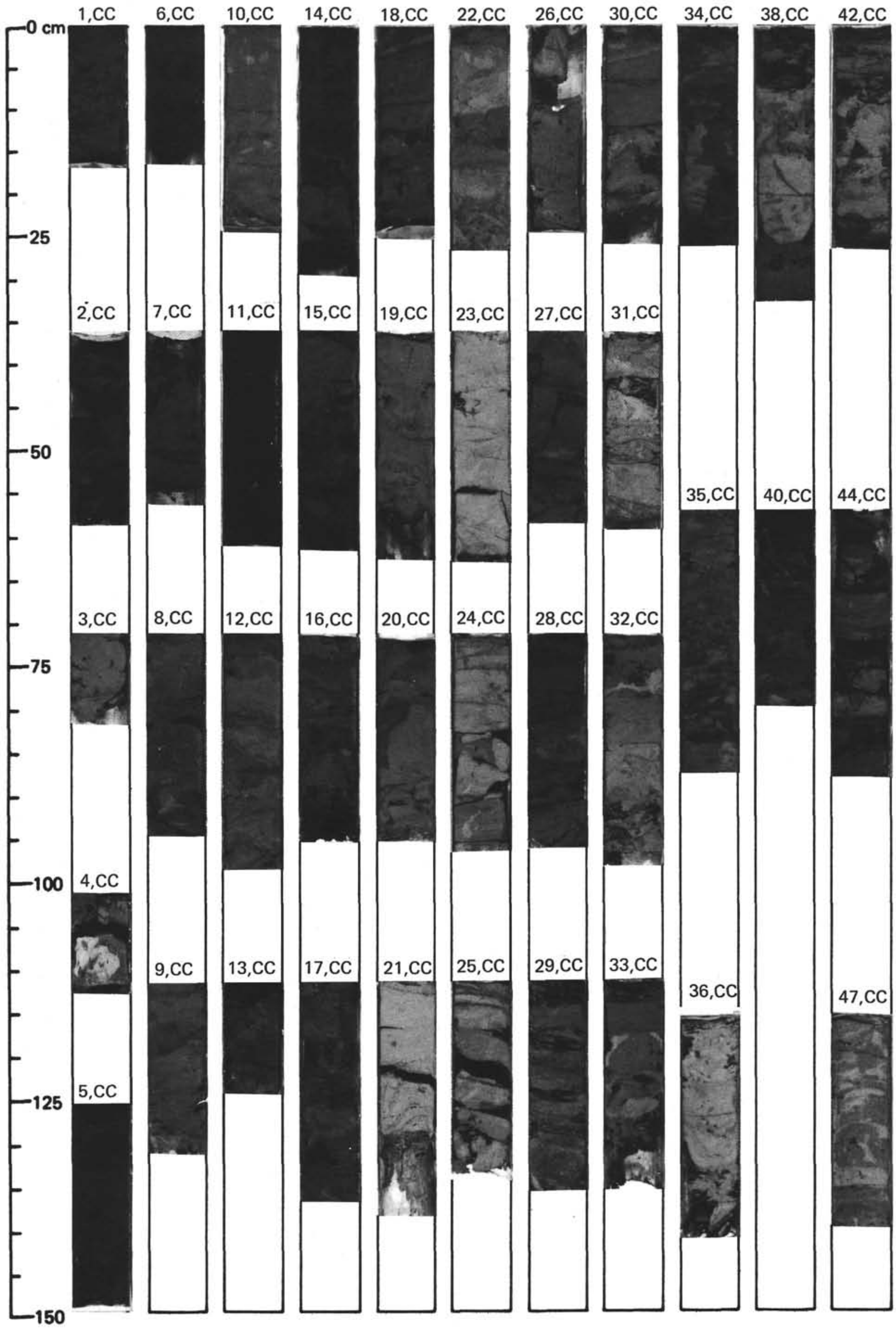
25
50
75
100
125
150


58-1
58-2
58-3
58,CC
60-1
60-2
60-3
60,CC
61-1
61,CC
0 cm
25
50
75
100
125
150


0 cm
25
50
75
100
125
150
1,CC
6,CC
10,CC
14,CC
18,CC
22,CC
26,CC
30,CC
34,CC
38,CC
42,CC
2,CC
7,CC
11,CC
15,CC
19,CC
23,CC
27,CC
31,CC
35,CC
40,CC
44,CC
3,CC
8,CC
12,CC
16,CC
20,CC
24,CC
28,CC
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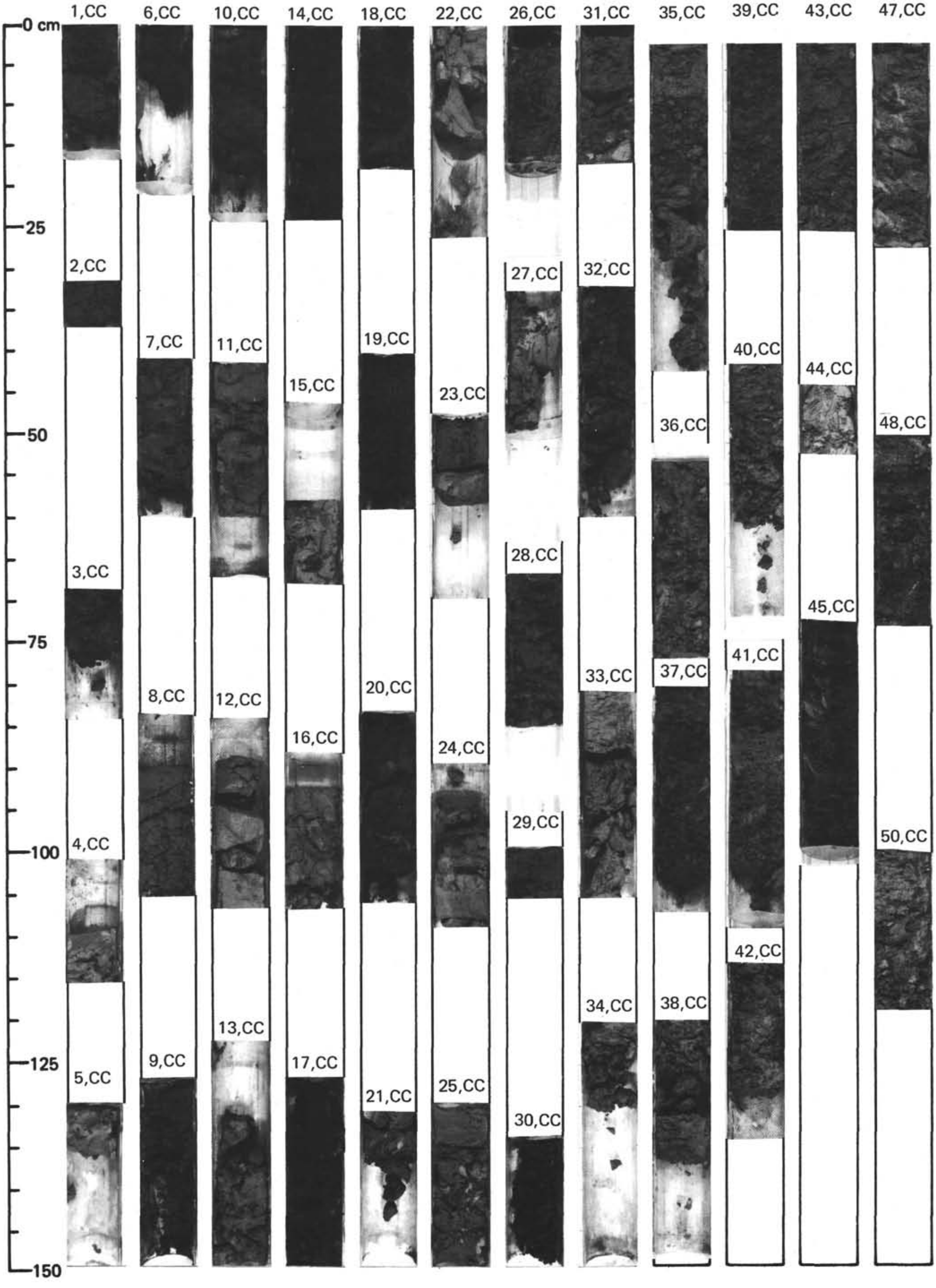
33,CC
36,CC
47,CC
5,CC


0 cm
25
50
75
100
125
150
1,CC
2,CC
3,CC
4,CC
5,CC
6,CC
7,CC
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9,CC
10,CC
11,CC
12,CC
13,CC
14,CC
15,CC
16,CC
17,CC
18,CC
19,CC
20,CC
21,CC
22,CC
23,CC
24,CC
25,CC
26,CC
27,CC
28,CC
29,CC
30,CC
31,CC
32,CC
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36,CC
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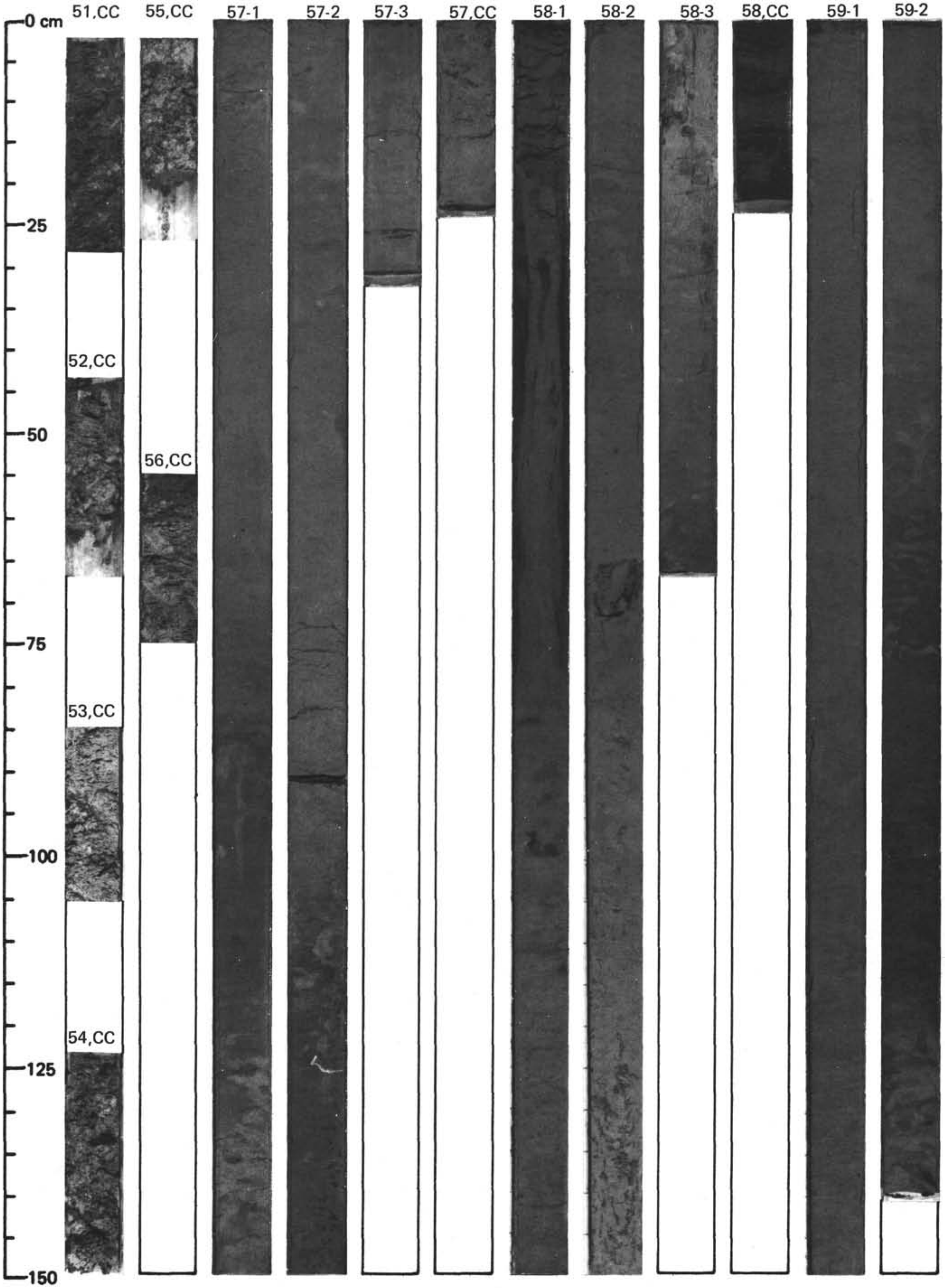
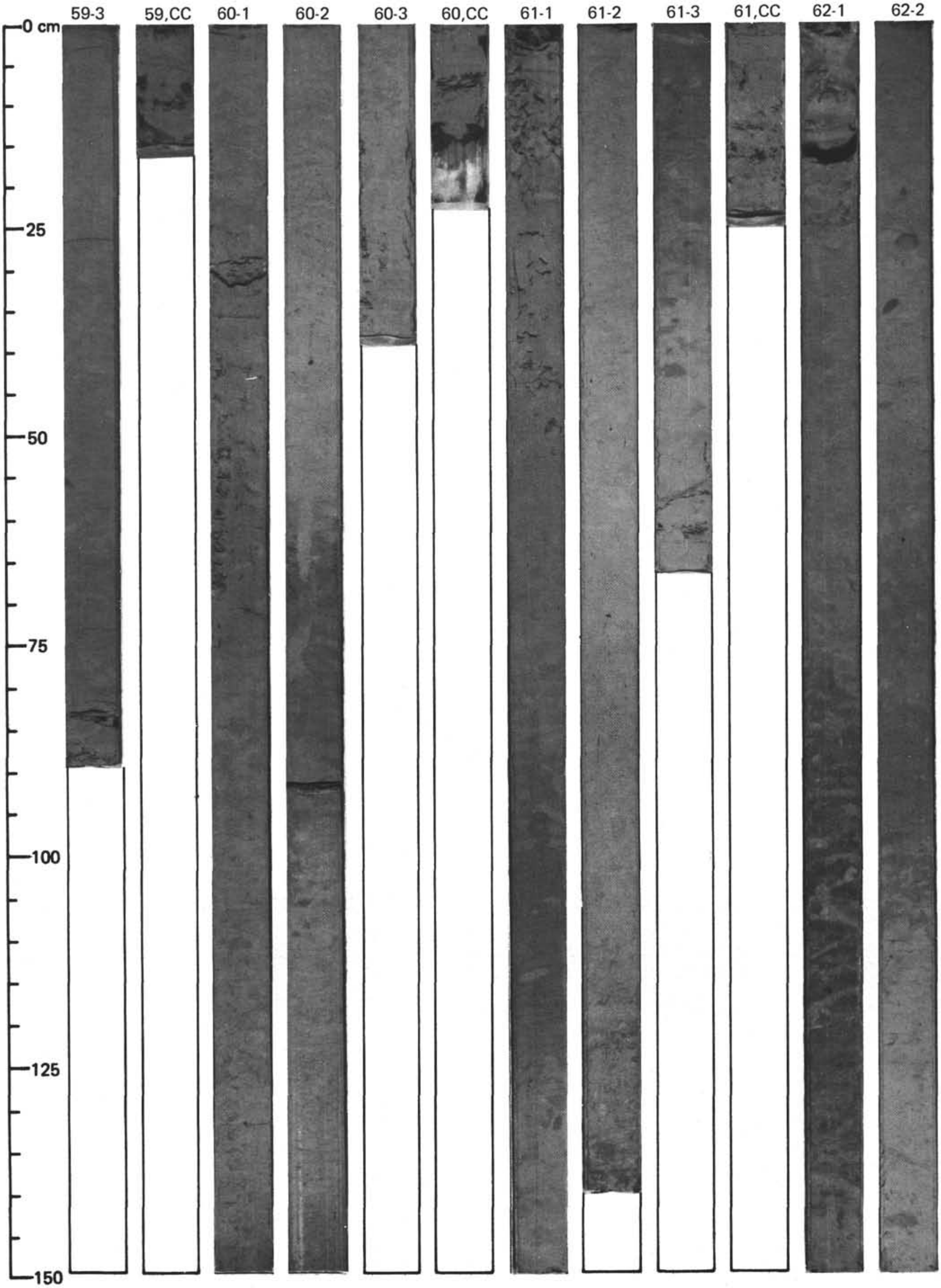
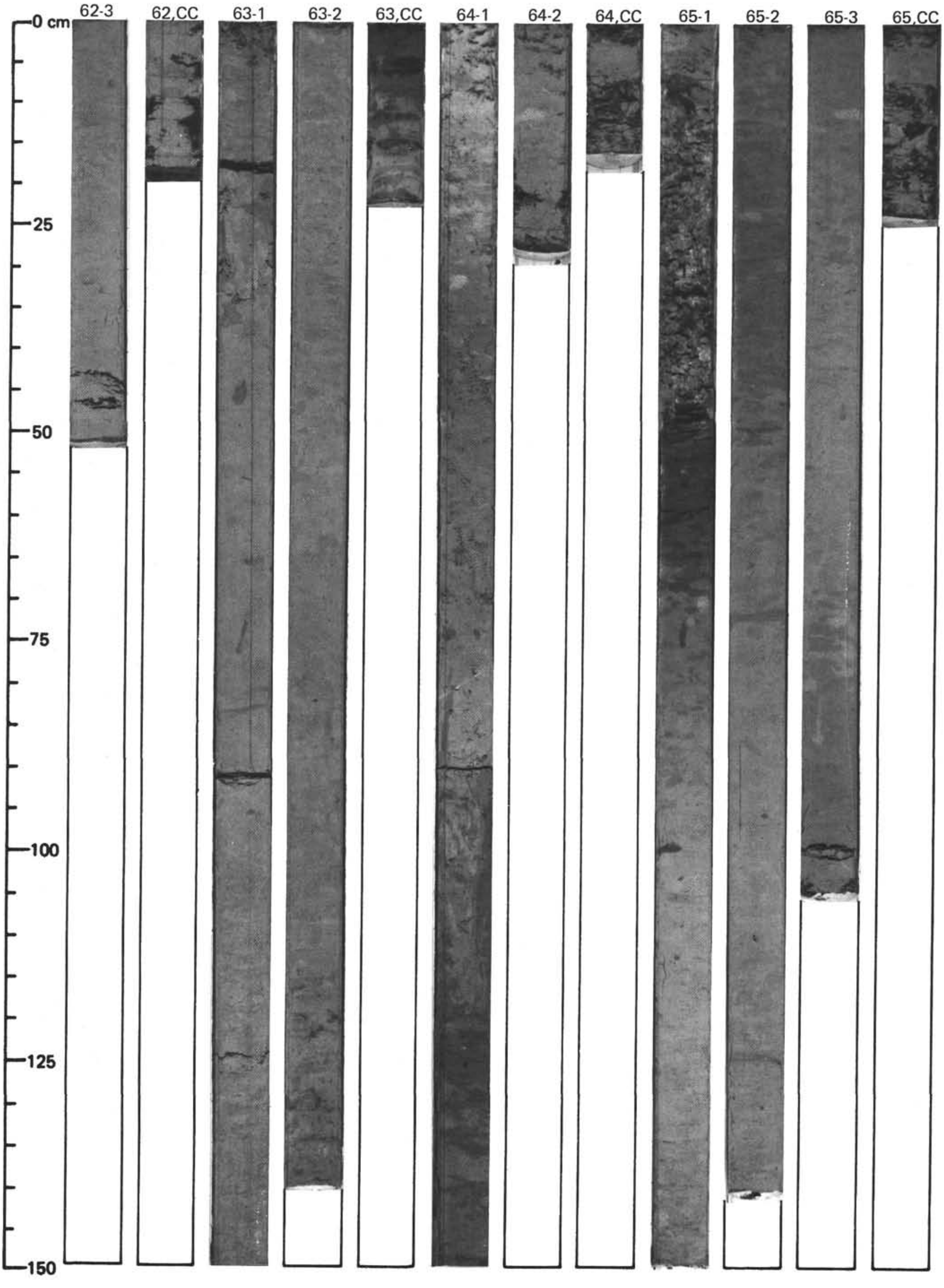
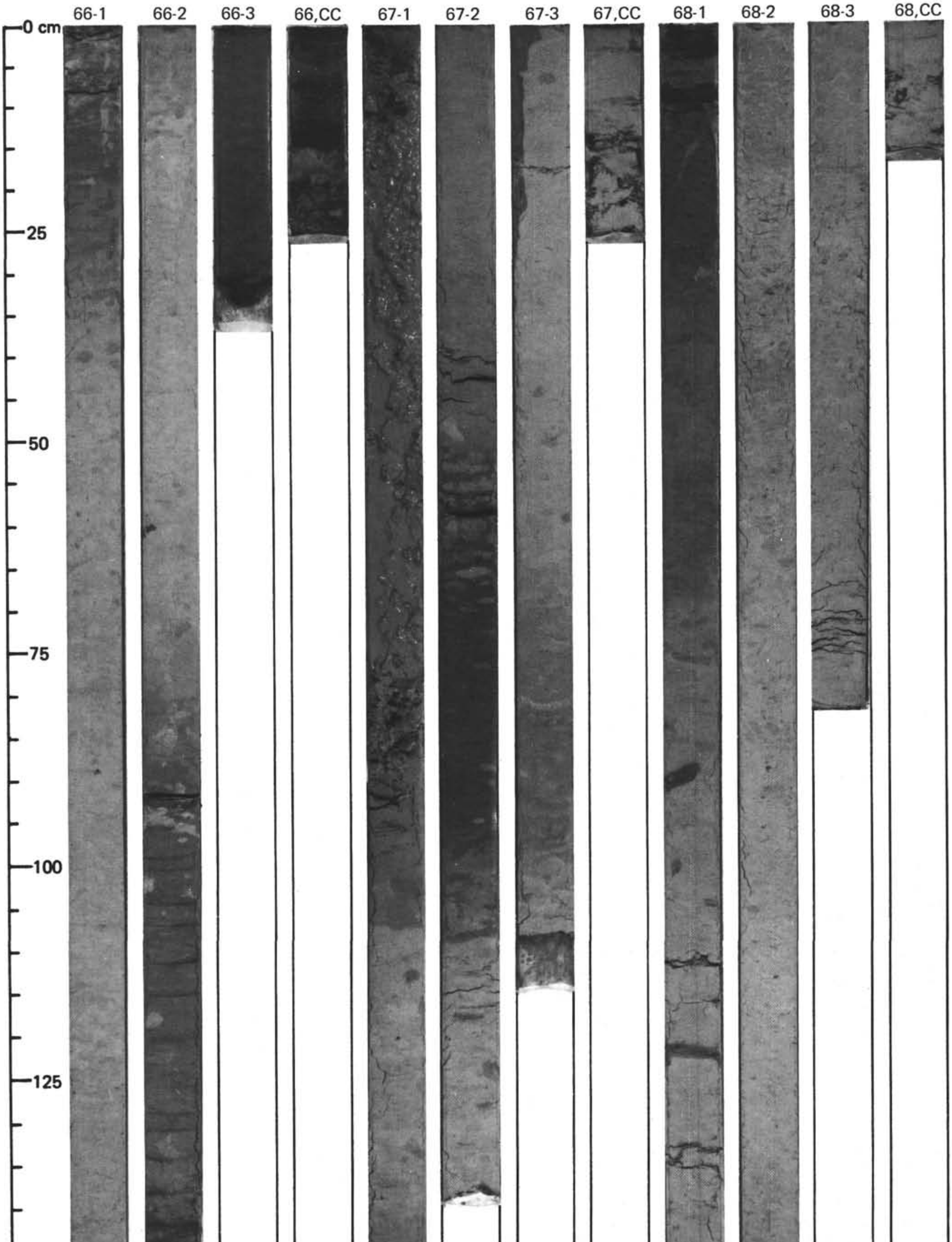
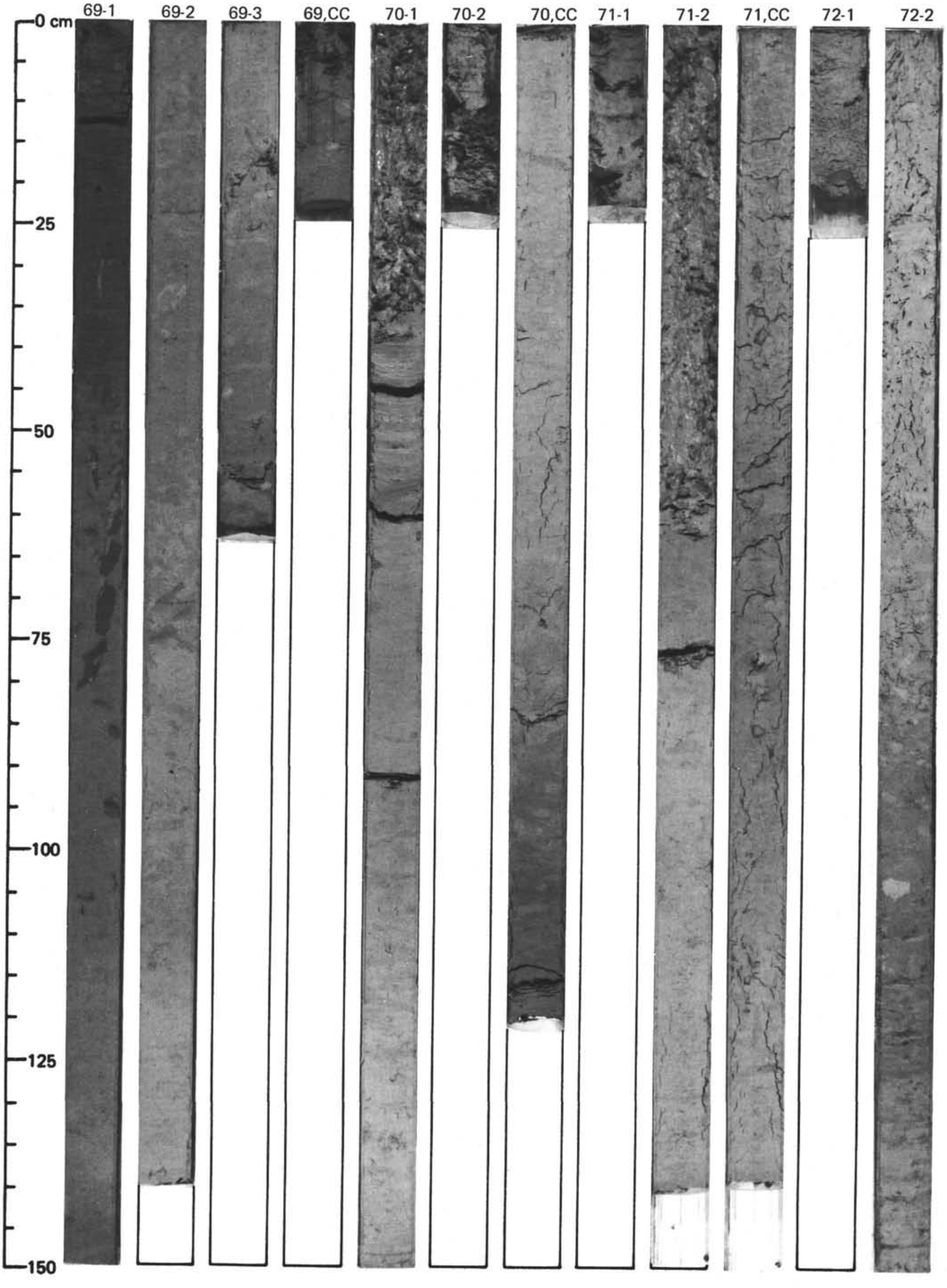
45,CC
47,CC
48,CC
50,CC

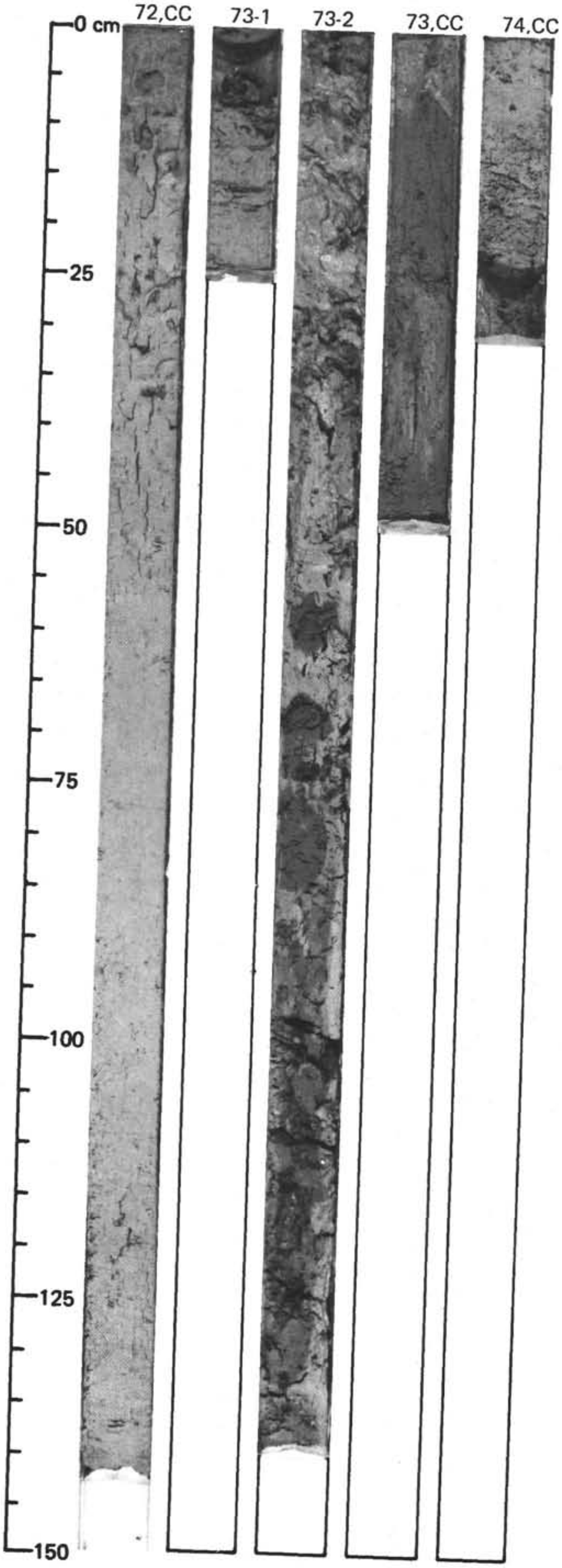

0 cm
25
50
75
100
125
150
51,CC
52,CC
53,CC
54,CC
55,CC
56,CC
57-1
57-2
57-3
57,CC
58-1
58-2
58-3
58,CC
59-1
59-2


59-3
59,CC
60-1
60-2
60-3
60,CC
61-1
61-2
61-3
61,CC
62-1
62-2
0 cm
25
50
75
100
125
150


62-3
62,CC
63-1
63-2
63,CC
64-1
64-2
64,CC
65-1
65-2
65-3
65,CC
0 cm
25
50
75
100
125
150


66-1
66-2
66-3
66,CC
67-1
67-2
67-3
67,CC
68-1
68-2
68-3
68,CC
0 cm
25
50
75
100
125
150


69-1
69-2
69-3
69,CC
70-1
70-2
70,CC
71-1
71-2
71,CC
72-1
72-2
0 cm
25
50
75
100
125
150


0 cm
25
50
75
100
125
150
72,CC
73-1
73-2
73,CC
74,CC