4. SITE 484[1]

Shipboard Scientific Party[2]

HOLE 484

Date occupied: 1000 March 3, 1979

Date departed: 1800 March 3, 1979

Time on hole: 8 hours

Position: 23°11.32′N; 108°23.60′W

Water depth (sea level; corrected m, echo-sounding): 2891

Water depth (rig floor; corrected m, echo-sounding): 2901

Bottom felt (m, drill pipe): 2906

Penetration (m): 5

Number of cores: 1

Total length of cored section (m): 5.0

Total core recovered (m): 5.0

Core recovery (%): 100

Oldest sediment cored:
Depth sub-bottom (m): 5.0
Nature: Silty clay
Age: Quaternary
Measured velocity (km/s): About 1.6

Principal results: Hole 484 was drilled as a pilot hole for Site 484. Since the sediments were too thin to spud into the basement, the hole was abandoned.

HOLE 484A

Date occupied: 2355 March 3, 1979

Date departed: 1600 March 4, 1979

Time on hole: 16 hours

Position: 23°11.15′N; 108°23.62′W

Water depth (sea level; corrected m, echo-sounding): 2883

Water depth (rig floor; corrected m, echo-sounding): 2893

Bottom felt (m, drill pipe): 2899.5

Penetration (m): 62

Number of cores: 8

Total length of cored section (m): 62.0

Total core recovered (m): 41.15

Core recovery (%): 67

Oldest sediment cored:
Depth sub-bottom (m): 55.5
Nature: Clayey siliceous nannofossil ooze
Age: Quaternary
Measured velocity (km/s): About 1.6

Basement:
Depth sub-bottom (m): 55.5
Nature: Possibly basalt

Principal results: Hole 484A was drilled into a small sediment pond perched on top of a magnetic diapir(?) located in the Northern Trough of the Tamayo Fracture Zone. One small cobble of tholeiitic basalt was recovered beneath a thin section of late Quaternary hemipelagic sediments containing minor terrigenous deposits near the top of the section. The hole was abandoned because of excessive torquing.

BACKGROUND AND OBJECTIVES

During the pre-drilling site surveys at the mouth of the Gulf of California, several basement hills with very strong magnetic anomalies were discovered in the Tamayo Fracture Zone. One such feature, with a magnetic anomaly greater than 3000 gammas, was found by deep-tow surveys (MacDonald et al., 1979) to be 75 meters high and to have a 40-meter-thick pond of presumed Quaternary sediments at the top. Based on seismic reflection profiles and the presence of the perched sediments, this feature was interpreted as a possible diapir, perhaps representing an intrusion of serpentine or other highly magnetic material from deeper crustal levels. Knowledge of the composition of such highly magnetic material would help in understanding the nature of the lower crust and upper mantle. We also thought that drilling at this site would allow comparison of basalts found in fracture zones with those erupted along the crest of the East Pacific Rise. As a result, we planned to drill a single bit hole into the diapir in hope of reaching through the sediments to a sub-basement depth of 100 m.

OPERATIONS

After profiling from Site 483 to the vicinity of Site 484 using Omega navigation, we located the diapir at 23°11.3′N, 108°23.4′W in about 2890 meters of water. We dropped a beacon while passing over the structure at about 1000 hours (1800Z) on March 3. The first beacon did not work, so we dropped a second beacon as we

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[1] Lewis, B. T. R., Robinson, P., et al., *Init. Repts. DSDP*, 65: Washington (U.S. Govt. Printing Office).

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drifted back over the diapir. After offsetting north and south of the beacon, while running the 3.5 kHz bathymetric system to establish the location of the sediment pond, we spudded in the first hole, Hole 484, at about 1800 hours directly over the beacon. In this hole we found only 5.0 meters of sediments overlying the basement, so we offset 250 feet west and 1000 feet south in order to try again. Based on profiles obtained during this maneuvering and on satellite fixes, we believe that the position indicated by MacDonald et al. (1979) for the diapir is probably mislocated to the northeast by several thousand feet. The general location of Site 484 is shown in Figure 1, and a seismic reflection profile which includes a cross section through the site is shown in Figure 2. A more detailed map in the immediate vicinity of the diapir and a cross section through the structure itself, both prepared from deep-tow surveys (MacDonald et al., 1979), are presented in Figures 3 and 4, respectively.

On March 4 at 0200 hours, we began coring sediments in Hole 484A and reached basement 12 hours later at 55.5 meters sub-bottom (Table 1). At 1600 on March 4, the ship lost position, and we pulled out of the hole. Since the sediments were still too thin to bury the bumper subs, we decided to offset just to the north of the diapir in order to intercept it on its flank, where the sediments were thicker. While offsetting, however, we experienced a weight loss which was later found to be due to a lost bit and core. Therefore, we had to pull the pipe and decided to abandon the site. The pipe was on deck at 2200, after which we left for Site 485, a few miles east of Site 482.

SEDIMENT LITHOLOGY

Hole 484

The 5.0 meters of sediments recovered in Hole 484, located on the northern boundary of the sediment pond, consist predominantly of very fine-grained hemipelagic material (Table 2, Fig. 5). The uppermost 3.50 meters are represented by soft, greenish gray, clayey nannofossil and diatom ooze. The detrital mineral content is low (2–15%) and clay is abundant (32–69%). Rare, thin sandy layers could represent small turbidite deposits. The lowermost 1.5 meters consist of greenish gray, sandy silty clay (20% sand, 35% silt) with thin interbedded layers of greenish black (5G2/1) silty clayey sand. The amount of silty clayey sand is less abundant in the lowermost 80 cm. The detrital minerals are predominantly quartz (30%) and minor amounts of pyroxene, glauconite, and feldspar. The siliceous fossils and calcareous nannofossils found in the sediments are partially reworked.

Hole 484A

The 55.5 meters of sediments drilled in Hole 484A near the center of the sediment pond are subdivided into two lithologic units, as follows:

Unit I (0–14.5 m)

Unit I consists of soft, grayish olive siliceous clay with diatoms, radiolarians, and siliceous sponge spicules present in more or less equal proportions in the clay matrix. Interbedded in the clays are thin, grayish olive silty clay turbidite layers which show clear graded bedding and which increase in frequency and thickness toward the base of the unit. The thickness of the layers, in particular, increases from a few centimeters in Core 1 to 20–30 cm near the base of Core 2. The silt-size detrital grains in the turbidites consist mainly of quartz (15%), feldspar (5%), and heavy minerals (1–5%). Fossils are rare in these layers, except for a few nannofossils and foraminifers. Reworked foraminifers are particularly concentrated at the base of the turbidites.

Unit II (14.5–55.5 m)

Unit II consists of a very fine-grained, homogeneous hemipelagic sequence. The sediment is moderately firm to firm and grayish olive (10Y4/2) in color. A few olive gray layers are interbedded in the section, particularly near the top between 19.5 meters and 21 meters.

In the upper part of the unit (14.5–41.3 m) siliceous fossils, including diatoms, radiolarians, and sponge spicules, are dominant (30–50%) in a clay matrix. The amount of silt-size detrital material is low (1%–8%). Calcareous nannofossils are 10–20% of the total sediment, but they increase suddenly to 20–40% in the lowermost part of the section between 41.3 meters and the basement. On the other hand, siliceous fossils decrease in this interval, and the silt-size detrital mineral content is very low (0–2%).

In sum, the sediments recovered in Hole 484A show that the structure drilled was subjected to hemipelagic sedimentation supplemented by minor terrigenous sedimentation near the top of the section. This indicates that the structure was isolated from the hemipelagic and terrigenous sedimentation that one would expect in the Tamayo Fracture Zone.

BIOSTRATIGRAPHY

The late Quaternary sediments recovered above the basement at Site 484 contain common to abundant calcareous nannofossils and foraminifers, both with good to moderate preservation, and abundant, well-preserved radiolarians.

Cores 484-1 (0–5.0 m) and 484A-1 through 5 (0–46.0 m) are assigned to calcareous nannofossil Zones NN20/21 (undifferentiated). Core 6, Section 5 (55.0–55.5 m) is assigned to Zone NN19 (0.44–1.65 m.y.). Reworked fossils from the lower part of Zone NN19 were found in Cores 484-1 and 484A-1 through 3.

The sedimentary section above 42.9 meters is less than 0.41 m.y. old. The highest occurrence of the radiolarian *Axoprunum angelinum* is in 484A-5,CC (5–7 cm). The sediments just above the basement, therefore, are older than 0.41 m.y. and are perhaps as old as about 0.45 m.y.

Calcareous Nannofossils

Most of the sediments recovered at Site 484 have paleontological features similar to those of the sediments drilled at Site 483. Site 484 differed from Site 483, however, in that: (1) the amount of sediment drilled above the basement was less (only 55.5 m); (2) no sedi-

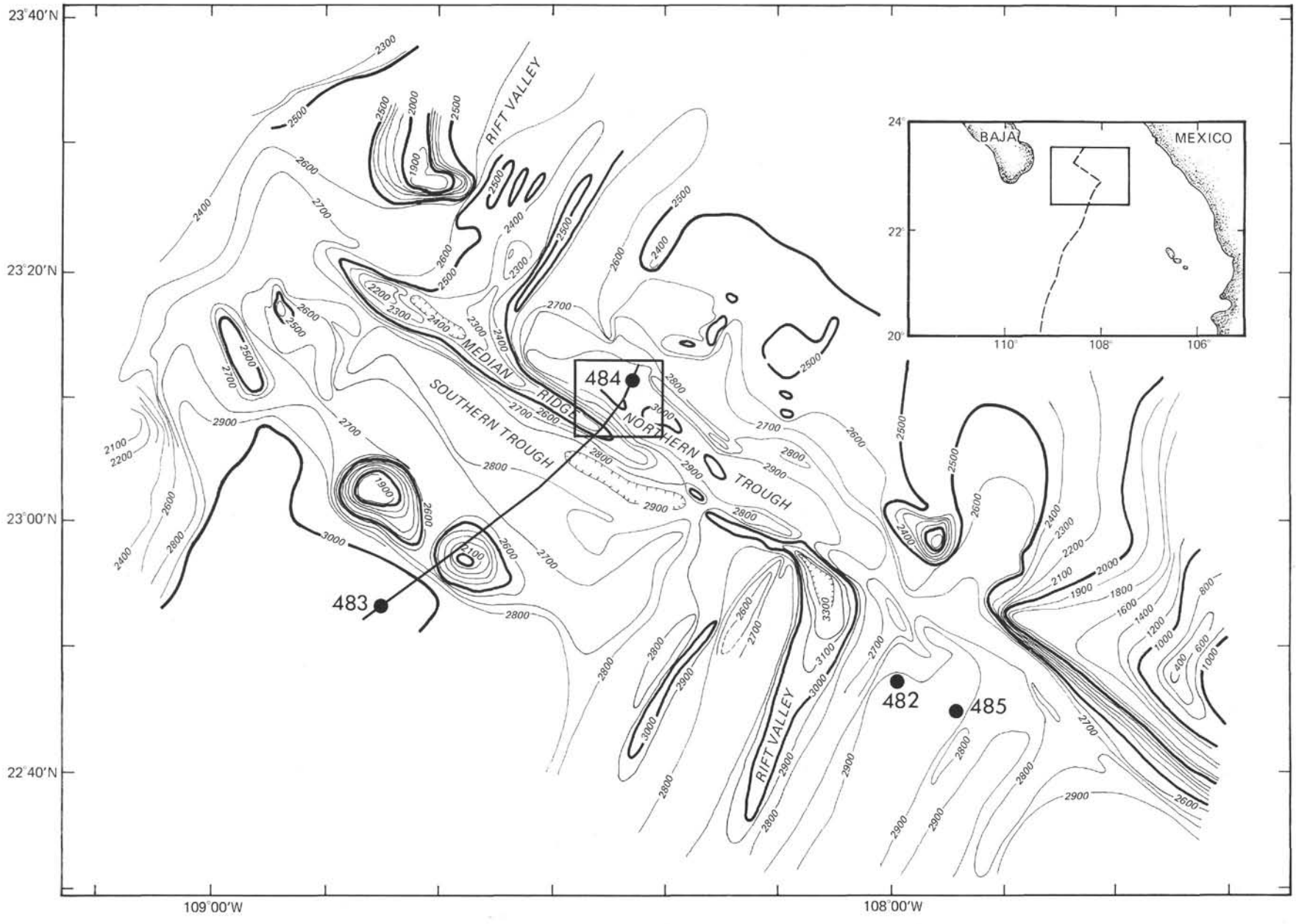

Figure 1. Bathymetric map of the Tamayo Fracture Zone showing general location of Site 484. Line connecting Sites 483 and 484 indicates location of *Challenger* profile shown in Figure 2. (Box around site shows position of detailed map presented in Fig. 3. Depths in m, corrected.)

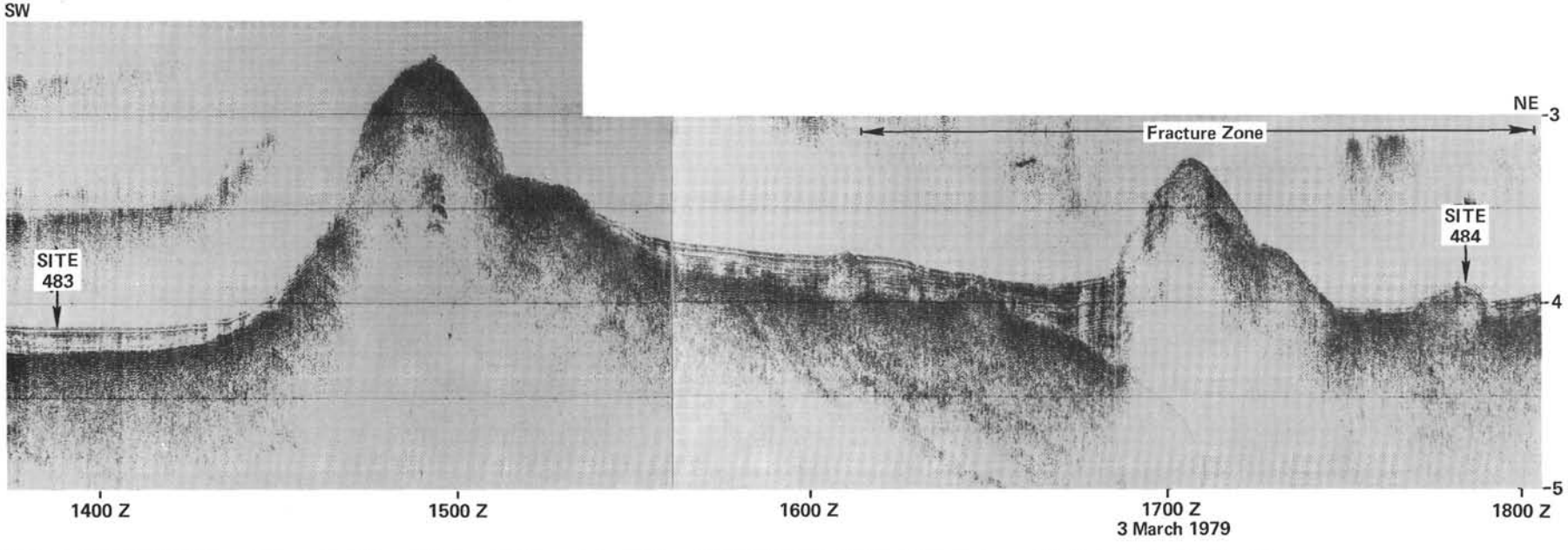

Figure 2. Seismic reflection profile recorded aboard *Glomar Challenger* between Sites 483 and 484 with an airgun sound source. (Vertical scale in seconds of two-way reflection time. Horizontal scale is given in time along ship's track. One hour represents about 10 km.)

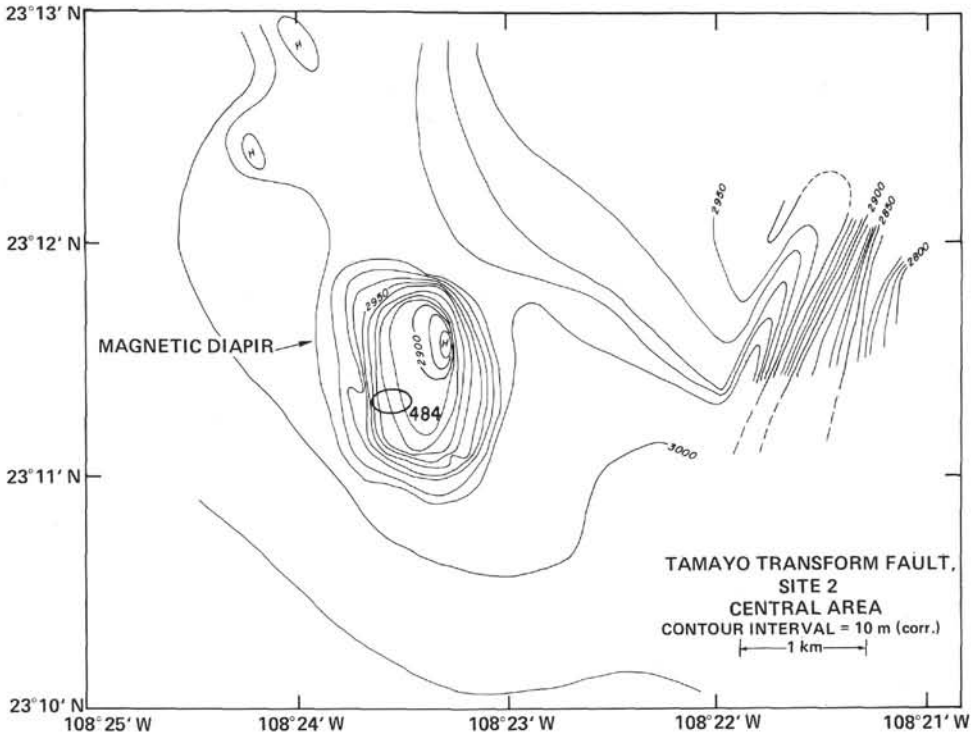

Figure 3. Detailed map in the vicinity of the magnetic "diapir" drilled on Leg 65 at Site 484 (after MacDonald et al., 1979).

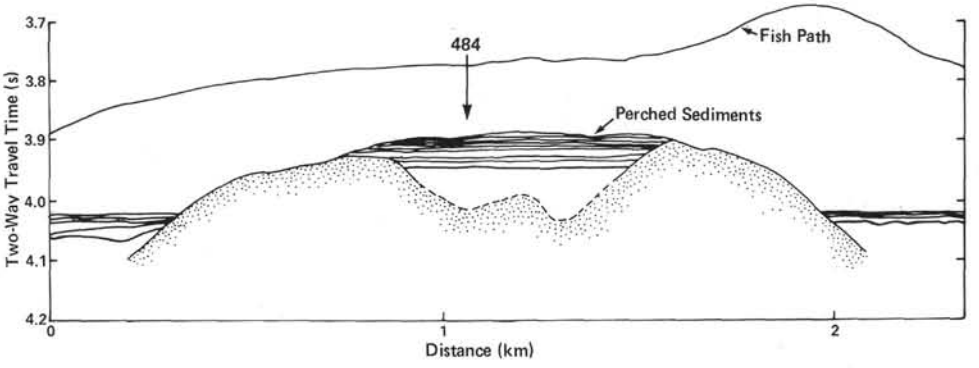

Figure 4. Cross section through the magnetic "diapir" drilled at Site 484 on Leg 65 (after MacDonald et al., 1979).

Table 1. Coring summary, Site 484.

Core	Date	Time	Depth from Drill Floor (m)	Depth below Seafloor (m)	Length Cored (m)	Length Recovered (m)	Recovery (%)
Hole 484							
1	3/3/79	1845	2899.5-2904.5	0.0-5.0	5.0	5.0	100
Hole 484A							
1	3/4/79	0243	2906.0-2914.0	0.0-8.0	8.0	7.60	95
2	3/4/79	0343	2914.0-2923.5	8.0-17.5	9.5	7.08	75
3	3/4/79	0445	2923.5-2933.0	17.5-27.0	9.5	8.26	87
4	3/4/79	0554	2933.0-2942.5	27.0-36.5	9.5	5.43	57
5	3/4/79	0655	2942.5-2952.0	36.5-46.0	9.5	6.22	65
6	3/4/79	0810	2952.0-2961.5	46.0-55.5	9.5	6.49	68
7	3/4/79	1134	2961.5-2967.0	55.5-61.0	5.5	0.07	1
8	3/4/79	2200	2967.0-2968.0	61.0-62.0	1.0	0.00	0

Table 2. Sedimentary lithologic units from Site 484.

Unit	Lithology	Age	Depth (m)	Thickness (m)	Core-Section
Hole 484					
	Clayey nannofossil-diatom ooze with thin turbidites	Late Quaternary	0-5.0	5.0	1-1, 0 through 1,CC
Hole 484A					
I	Siliceous clay with numerous turbidites	Late Quaternary	0-14.5	14.5	1-1, 0 through 2-5, 55 cm
II	Siliceous silty clay, clayey siliceous ooze, and nannofossil ooze	Late Quaternary	14.5-55.5	41.0	2-5, 55 through 6,CC

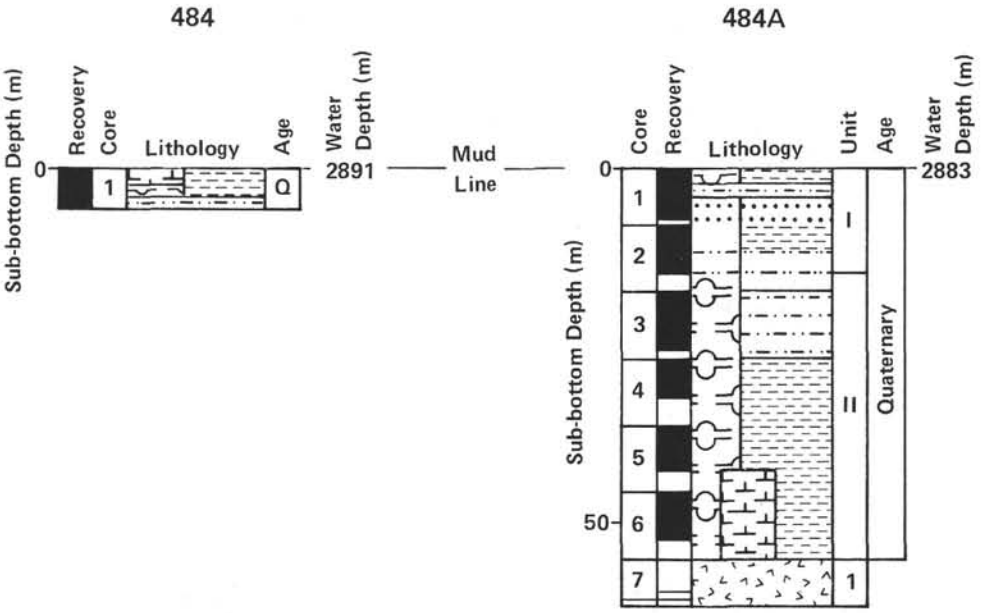

Figure 5. Sediment lithology at Site 484. (For explanation of symbols, see Explanatory Notes, this volume.)

ment was recovered within the basement; and (3) only Zones NN19 and NN20/21 were identified.

The same nannofossil assemblages and zonal successions sampled above the basalt at Site 483 were observed at Site 484. Generally, the sediments contain common to abundant nannofossils with good to moderate preservation. However, in the interval between Cores 484A-1, Section 3, and 484A-2, Section 4, few nannofossils were observed, and these displayed moderate preservation.

Cores 484-1 and 484A-1 through 3 (0–27.0 m) contain some reworked older fossils. The upper meter of both Cores 484-1 and 484A-1 contains the highest percentage of reworked fossils, with the presence of *Cyclococcolithina macintyrei* detected only within this interval. Cores 484-1 and 484A-1 through 5 are assigned to Zone NN20/21. Core 484A-6-2 (50–52 cm) is assigned to Zone NN19 based on the appearance of common *Pseudoemiliania lacunosa* and the occurrence of only a single specimen in Section 484A-5,CC. The boundary between Zones NN20/21 and NN19 is therefore assigned to the base of Core 484A-5 at 46.0 meters.

Radiolarians

Radiolarians are abundant and well preserved in all of the samples examined from Site 484 (5–52 m). The Quaternary assemblages are diverse and are dominated by the same species as those which dominate at Sites 482 and 483.

The highest occurrence of *Axoprunum angelinum* (=*Stylatractus universus*) was in Sample 484A-5,CC (5–7 cm). A few reworked specimens were also observed in Samples 484A-1,CC (6–8 cm); 484A-3-1 (80–82 cm); 484A-5-1 (80–82 cm); and 484A-5-2 (80–82 cm). As noted above, reworked nannofossils from Zone NN19 were also found in the upper cores. At its highest occurrence, both here and in the other sites drilled on Leg 65, the two polar spines characteristic of *A. angelinum* were reduced in several specimens to the length of the accessory spines. This may be characteristic of the last occurrence in time of this species.

Foraminifers

Foraminifers are common to abundant and are well to moderately well preserved in all samples examined from Site 484. Planktonic foraminifers comprise about 90% of the tests from each sample.

The same Quaternary assemblages of planktonic foraminifers observed at Sites 482 and 483 are present at Site 484. *Globorotalia truncatulinoides*, the species used to define sediments of Quaternary age, was not found. The dominant species are the same as those reported from Sites 482 and 483. The common occurrences of *Pullenia tina obliquiloculata* in 484A-1,CC (8.0 m) and of *Globorotalia menardii* in Sections 484A-1,CC and 484A-3, Section 1 (8–18 m), suggest the presence of more nearly tropical waters during deposition of the sediments near the top of the section at Site 484. Otherwise, the dominance of all of the assemblages by *Globoquadrina dutertrei, G. pachyderma* (dextral), and *Globigerina bulloides* indicates an assemblage characteristic of the subtropical province and the California Current system. The benthic foraminiferal assemblages are similar to those at Site 483 and are representative of lower bathyal to abyssal water depths. Tests displaced from shallower waters (*Bolivina* spp., *Brizalina* spp., *Buliminella elegantissima, Buliminella* spp., *Elphidium*(?) sp., *Nonionella* sp., and others) are present in a sandy sediment from 484-1,CC. This supports the interpretation that sandy intervals in the sediments from Site 484 are turbidites.

SEDIMENT ACCUMULATION RATE

In the samples examined from Site 484, the highest occurrence of *Axoprunum angelinum* is at a sub-bottom

depth of about 43 meters. Since calcareous nannofossil Zone NN19, which ended 0.44 m.y. ago, is recognized immediately below a depth of 46 meters in Core 484A-6, the *A. angelinum* extinction datum of 0.41 m.y. is a reasonable approximation of the age of the sediments at a sub-bottom depth of 43 meters. The sediment accumulation rate, therefore, is about 105 m/m.y.

Since the sediments at Site 484 have been shown to be perched on a basement high which is presumably the result of relatively recent uplift, there is the possibility that because of erosion and/or nondeposition one or more hiatuses within the sedimentary section may exist. There are no means at present to detect hiatuses paleontologically in such late Quaternary sediments. Therefore, the rate of sediment accumulation as determined above is a minimum one.

SEDIMENT GEOCHEMISTRY

The $CaCO_3$ and reduced (organic) carbon contents of the sediments from Site 484 were measured on shipboard using the Carbonate Bomb technique described by Müller and Gastner (1971) in conjunction with CHN analysis (Table 3). The results of this analysis were supplemented by shore-based studies conducted with a LECO WR-12 analyzer (Table 4) using the technique described by Boyce and Bode (1972). Measurements of the interstitial water chemistry are presented by Gieskes and Nevsky (this volume).

As can be seen in Tables 3 and 4, the $CaCO_3$ content is moderate throughout the site but increases to more than 10% by weight in the nannofossil oozes near the base of the section. The organic carbon content, on the other hand, is low (2–4%) but nearly constant throughout the section.

Table 3. $CaCO_3$ (bomb) and reduced carbon determinations, Site 484.

Sample (interval in cm)	$CaCO_3$ (%)	Reduced Carbon (%)	Lithology
Hole 484			
1-2, 15-17	7	—	Clayey nannofossil ooze
23-25	6	2.7	Clayey nannofossil ooze
Hole 484A			
1-2, 110-112	2	—	Siliceous clay
118-120	2	2.8	Siliceous clay
2-2, 126-128	1	—	Clayey siliceous ooze
134-136	1	2.6	Clayey siliceous ooze
3-2, 20-22	1	—	Nannofossil-bearing siliceous silty clay
27-29	1	3.6	Nannofossil-bearing siliceous silty clay
4-2, 10-12	8	—	Muddy siliceous ooze
18-20	8	3.3	Muddy siliceous ooze
5-2, 120-122	1	—	Clayey siliceous ooze
128-130	4	4.0	Clayey siliceous ooze
6-2, 90-92	10	2.5	Nannofossil ooze
98-100	11.5	—	Nannofossil ooze
6-4, 123-125	11.5	—	Nannofossil ooze

Note: — = not determined.

Table 4. Carbon and carbonate analyses, Hole 484A.

Sample (level in cm)	Depth (m)	Total Carbon (%)	Organic Carbon (%)	$CaCO_3$	Lithology
1-2, 108	2.58	3.0	2.1	7	Siliceous clay
2-2, 125	10.75	2.5	2.0	4	Clayey siliceous ooze
3-2, 19	19.19	3.3	2.3	9	Nannofossil-bearing siliceous silty clay
4-2, 8	28.58	3.5	2.1	12	Muddy siliceous ooze
6-2, 88	48.38	3.4	1.9	13	Nannofossil ooze

PHYSICAL PROPERTIES

The physical properties of the sediment recovered in Holes 484 and 484A are anomalous, both with respect to those observed at Sites 482 and 483 and with respect to general drilling experience. As can be seen in Table 5 and Figure 6, wet-bulk density at Site 484 averages about 1.47 g/cm^3, compressional-wave velocity (V_p) averages 1.52 km/s but occasionally reaches values as high as 1.68 km/s, porosity averages about 71%, and shear strength ranges from 0.08 tons/ft.^{2} at the mud line to 0.39 tons/ft.^{2} at a depth of 51 meters sub-bottom near the basement contact. Although these values are not unusual, they are atypical of shallow sediments. The wet-bulk density, the compressional-wave velocity, and especially the shear strength at the base of the section, for example, seem more characteristic of the more compacted sediments recovered at about 100 meters sub-bottom at Sites 482 and 483. This suggests that a portion of the sediment column has been removed by scouring or that the sediments have been consolidated by some other unspecified mechanism.

IGNEOUS PETROGRAPHY AND CHEMISTRY

A single piece of basalt was recovered at Site 484 in Core 7, Section 1. The basalt is fine grained with a chilled margin. Plagioclase phenocrysts, possibly associated with a trace of olivine, comprise approximately 2% of the rock. The groundmass displays a quenched texture containing numerous variolitic sheaves of poorly crystallized glass and rare olivine crystals. We observed no evidence for secondary alteration.

As can be seen in Table 6, the chemical composition of the basalt is that of an evolved olivine tholeiite. The MgO content is low (5.6%), the Mg/Mg + Fe^{+2} ratio (0.514) is the lowest recorded to date, and the K_2O content (0.33%) is the second highest observed on the leg.

Table 5. Sediment physical properties, Site 484.

Sample (interval in cm)	Wet-Bulk Density (g/cm^3)	*P*-Wave[a] Velocity (km/s)	Acoustic Impedance ($\times 10^5$ g/cm^2·s)	Shear[b] Strength (tons/ft.^{2})	Porosity (vol.%)	Remarks
Hole 484						
1-1, 112-115	—	1.49	—	—	—	Soft
1-2, 107-124	1.45	1.51	2.19	0.09	72	Soft
1-4, 12-30	—	1.50	—	0.13	—	Stiff
Hole 484A						
1-3, 93-110	1.42	1.50	2.13	0.09	74	Soft
1-4, 61-100	1.50	1.53	2.30	0.08	69	Soft
2-4, 99-116	1.56	1.52	2.37	0.14	65	Stiff
2-5, 80-94	1.40	1.51	2.11	0.14	75	Stiff
3-4, 105-142	1.50	1.51	2.52	0.25	69	Firm
3-6, 4-15	1.51	1.47	2.22	0.24	68	Firm
4-3, 23-26	1.48	1.48	2.19	0.18	70	Firm
4-4, 44-68	1.44	1.48	2.13	0.11	72	Stiff
5-4, 65-87	1.44	1.52	2.35	0.16	73	Stiff
6-4, 127-142	1.50	1.48	2.22	0.39	69	Firm
6-5, 13-32	1.46	1.44	2.10	0.33	72	Firm

[a] Measured parallel to bedding at atmospheric pressure.
[b] Torvane measurement.
[c] Assuming a grain density of 2.60 g/cm^3.

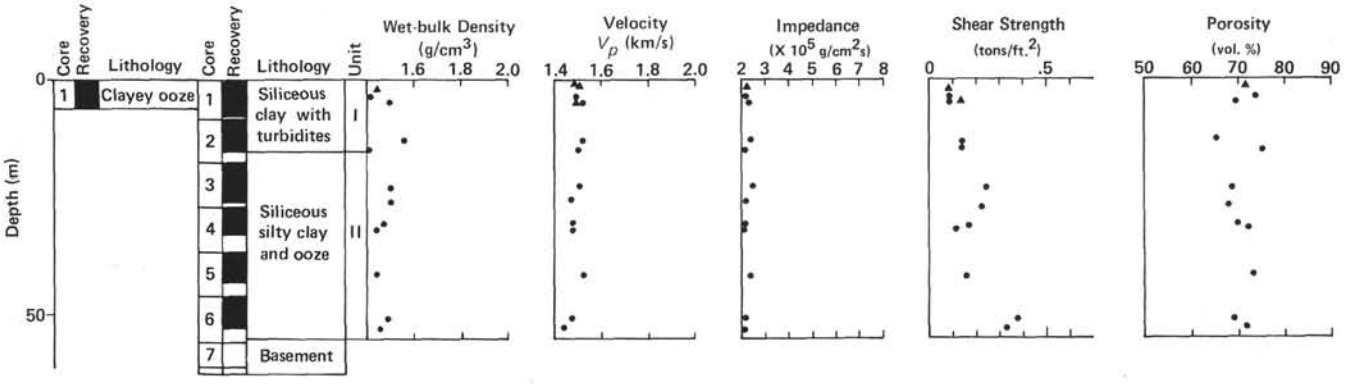

Figure 6. Sediment physical properties, Site 484. (Hole 484: triangles; Hole 484A: circles.)

Table 6. Shipboard X-ray fluorescence analyses of basalts, Hole 484A.

Sample (interval in cm)	Major Elements (wt.%)											Volatiles (wt.%)			Trace Elements (ppm)		
	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Total	LOI	H_2O^{+a}	CO_2^a	Ni	Sr	Zr
7-1, 5-7	48.56	2.10	16.00	11.60	0.19	5.60	11.91	2.73	0.33	0.21	99.23	1.93	0.64	0.09	101	161	140

[a] Percent composition after baking off H_2O^-.

SUMMARY AND CONCLUSIONS

Two holes were drilled at Site 484, located on top of a basement high interpreted as a magnetic "diapir." Hole 484 penetrated 5 meters of sediment before encountering basement; Hole 484A was drilled to a sub-bottom depth of 62 meters: 55.5 meters in sediment and 6.5 meters in basement. Recovery in the sediment section was 69%, but only one small piece of basalt was recovered from the basement.

Sediment Lithology

The sediments at Site 484 are largely grayish olive, hemipelagic clay with minor nannofossil and diatom ooze and interlayered beds of clayey silt and sand. The relatively coarse-grained silt and sand layers are generally a few centimeters thick and are confined to the upper 15 meters of the section. They consist of quartz, feldspar, pyroxene, and glauconite with some reworked foraminifers. The clays contain varying proportions of diatoms, radiolarians, and sponge spicules which range up to a maximum of about 50%. Calcareous nannofossils generally make up 10 to 20% of the sediment, but increase to as much as 40% in the lowest 15 meters.

The sediments contain relatively high proportions of sand and silt of probable turbidite origin. The presence of such sediments on top of an isolated basement hill suggests uplift of the hill following sediment deposition.

All of the recovered sediments are late Quaternary in age. The boundary between nannofossil zones NN19 and NN20 is at the base of Core 5, about 45 meters sub-bottom. Above 43 meters sub-bottom, the sediments are younger than 0.41 m.y. in age, based on the disappearance of *Axoprunum angelinum*, while the sediments just above basement are estimated to be about 0.45 m.y. old, giving a sedimentation rate of about 105 m/m.y.

Physical Properties

The physical properties of the sediments recovered at Site 394 are more characteristic of the slightly older, more consolidated sediments recovered at Sites 482, 483, and 485 than of young sediments. The wet bulk density averages 1.47 g/cm³, compressional wave velocity 1.52 km/s, and porosity about 71%. Only the shear strength shows significant downhole variation, ranging from 0.08 tons/ft.² near the mud line to 0.39 tons/ft.² at a sub-bottom depth of 51 meters.

Basalt Petrography and Chemistry

The one piece of basement recovered consists of sparsely plagioclase-olivine-spinel(?)-phyric basalt with a quench-textured groundmass. Plagioclase and rare olivine and spinel(?) phenocrysts make up about 2% of the rock. Excellent skeletal plagioclase crystals and rare skeletal olivine crystals also occur in the groundmass, which consists largely of sheaf-like intergrowths of poorly crystallized clinopyroxene, plagioclase, and magnetite. With an MgO content of 5.6% and an $Mg/Mg + Fe^{+2}$ ratio of 0.514, this basalt is the most chemically evolved of any drilled on the leg and is more characteristic of transform fault or off-ridge volcanism than of rift zone volcanism.

Conclusions

The magnetic "diapir" drilled at Site 484 appears to consist of a basalt basement hill with a sediment pond at the top. Some other lithology could exist beneath the

basalt, but penetration was insufficient to identify the source of the magnetic anomaly. The sediments are mostly hemipelagic muds and clays but include significant proportions of silt and sand of probable turbidite origin. The presence of these sediments on a basement high suggests relative uplift of this feature following sedimentation. The physical properties of the sediments are characteristic of moderately compacted clays and silts, suggesting possible removal of the upper part of the sediment section by erosion.

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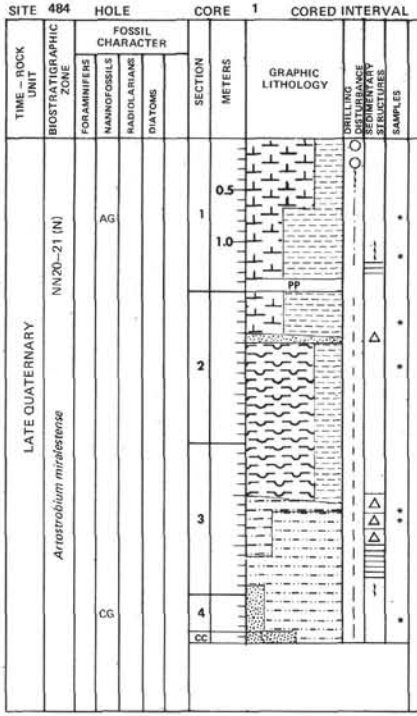
MacDonald, K. C., Kastens, K., Miller, S. P., et al., 1979. The Tamayo Transform Fault in the mouth of the Gulf of California. *Mar. Geophys. Res.*, 4:300–325.

Müller, G., and Gastner, M., 1971. The "Carbonate Bomb," a simple device for the determination of the carbonate content in sediments, soils and other materials. *N. Jahrb. Mineral.*, 10:466–469.

SITE 484 HOLE CORE 1 CORED INTERVAL 0.0–5.0 m



LITHOLOGIC DESCRIPTION

5GY 4/1

Section 1, 0 cm–Section 3, 50 cm:
Very soft to soft, green gray (5GY 4/1) CLAYEY NANNOFOSSIL OOZE and CLAYEY DIATOM OOZE with a thin layer of SANDY SILT near the top of Section 2 (45–50 cm) and rare concretions composed of spong spicules.

Section 3, 50–110 cm:
Thin turbidite layers composed of greenish black (5G 2/1) MUDDY SAND alternating with greenish gray (5GY 4/1) SANDY MUD.

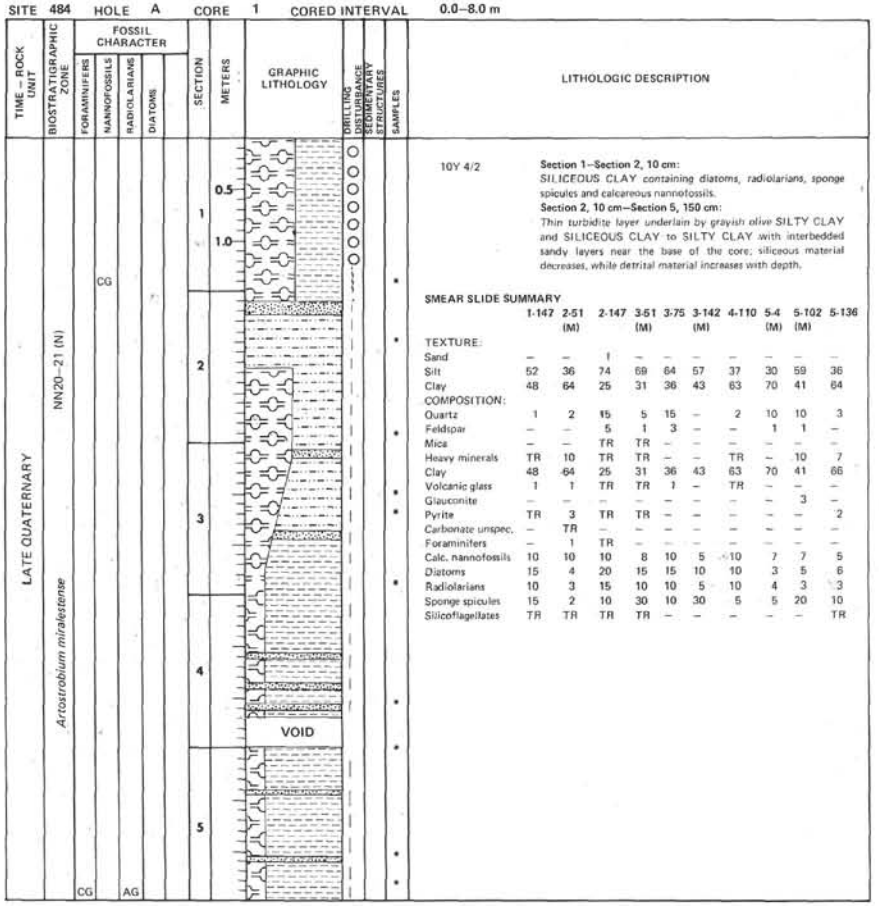
Section 3, 110 cm–Core-Catcher:
Discrete layers of greenish gray (5GY 4/1) to greenish black (5G 2/1) SILTY CLAY with minor amounts of SANDY SILT.

5G 2/1
5GY 4/1
5G 2/1
5GY 4/1

SMEAR SLIDE SUMMARY

	1-75	1-121 (M)	2-30 (M)	2-75	3-70	3-80 (M)	4-26
TEXTURE:							
Sand	–	20	70	TR	20	38	–
Silt	60	21	15	65	35	30	31
Clay	40	59	15	34	45	32	69
COMPOSITION:							
Quartz	TR	10	10	TR	30	30	1
Feldspar	TR	2	5	–	1	1	TR
Mica	–	TR	TR	TR	TR	1	TR
Heavy minerals	TR	TR	TR	TR	–	TR	TR
Clay	40	59	15	34	45	32	69
Volcanic glass	TR	1	–	TR	–	TR	TR
Pyroxenes	–	TR	–	–	3	5	–
Glauconite	–	–	–	–	–	TR	TR
Pyrite	TR	TR	TR	TR	1	1	TR
Carbonate unspec.	–	TR	–	–	TR	TR	TR
Foraminifers	TR	TR	–	–	7	10	TR
Calc. nannofossils	60	25	TR	5	4	2	15
Diatoms	TR	2	TR	50	5	2	10
Radiolarians	TR	2	TR	10	4	15	5
Sponge spicules	–	TR	70	TR	–	–	–
Silicoflagellates	–	–	–	TR	TR	TR	–
Other	–	–	–	–	–	1	–

SITE 484 HOLE A CORE 1 CORED INTERVAL 0.0–8.0 m



10Y 4/2

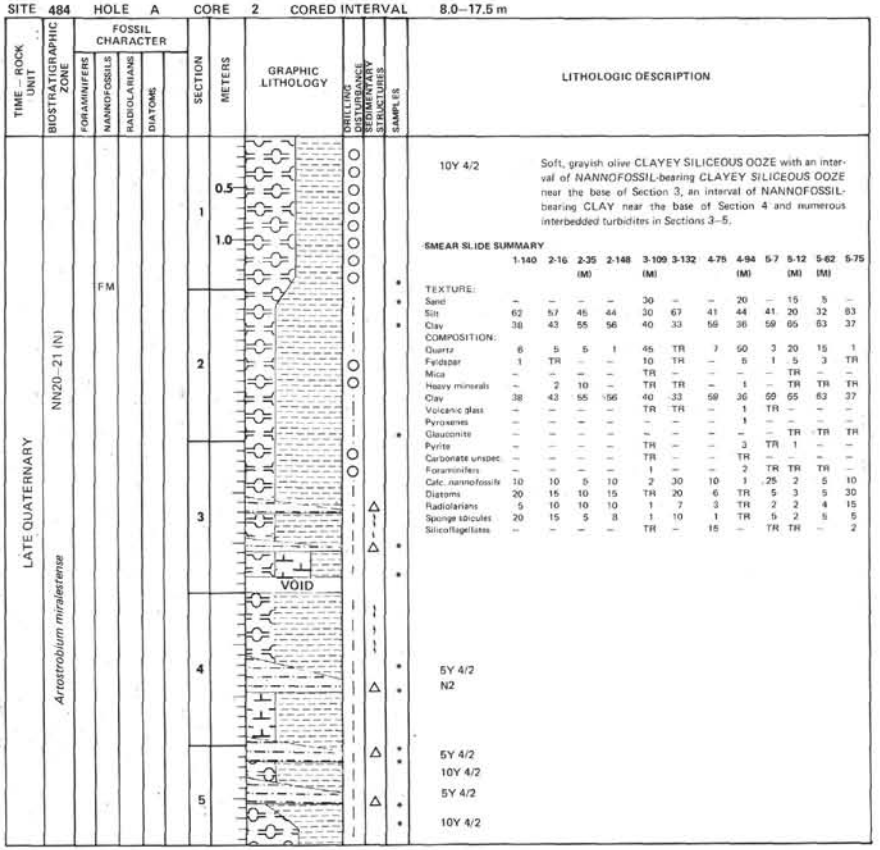
Section 1–Section 2, 10 cm:
SILICEOUS CLAY containing diatoms, radiolarians, sponge spicules and calcareous nannofossils.

Section 2, 10 cm–Section 5, 150 cm:
Thin turbidite layer underlain by grayish olive SILTY CLAY and SILICEOUS CLAY to SILTY CLAY with interbedded sandy layers near the base of the core; siliceous material decreases, while detrital material increases with depth.

SMEAR SLIDE SUMMARY

	1-147	2-51 (M)	2-147	3-51 (M)	3-75	3-142 (M)	4-110	5-4 (M)	5-102 (M)	5-136
TEXTURE:										
Sand	–	–	1	–	–	–	–	–	–	–
Silt	52	36	74	69	64	57	37	30	59	36
Clay	48	64	25	31	36	43	63	70	41	64
COMPOSITION:										
Quartz	1	2	15	5	15	–	2	10	10	3
Feldspar	–	–	5	1	3	–	–	1	1	–
Mica	–	–	TR	TR	–	–	–	–	–	–
Heavy minerals	TR	10	TR	TR	–	–	TR	–	10	7
Clay	48	64	25	31	36	43	63	70	41	66
Volcanic glass	1	1	TR	TR	1	–	TR	–	–	–
Glauconite	–	–	–	–	–	–	–	–	3	–
Pyrite	TR	3	TR	TR	–	–	–	–	–	2
Carbonate unspec.	–	TR	–	–	–	–	–	–	–	–
Foraminifers	–	1	TR	–	–	–	–	–	–	–
Calc. nannofossils	10	10	10	8	10	5	10	7	7	5
Diatoms	15	4	20	15	15	10	10	3	5	6
Radiolarians	10	3	15	10	10	5	10	4	3	3
Sponge spicules	15	2	10	30	10	30	5	5	20	10
Silicoflagellates	TR	TR	TR	TR	–	–	–	–	–	TR

SITE 484 HOLE A CORE 2 CORED INTERVAL 8.0–17.5 m



10Y 4/2

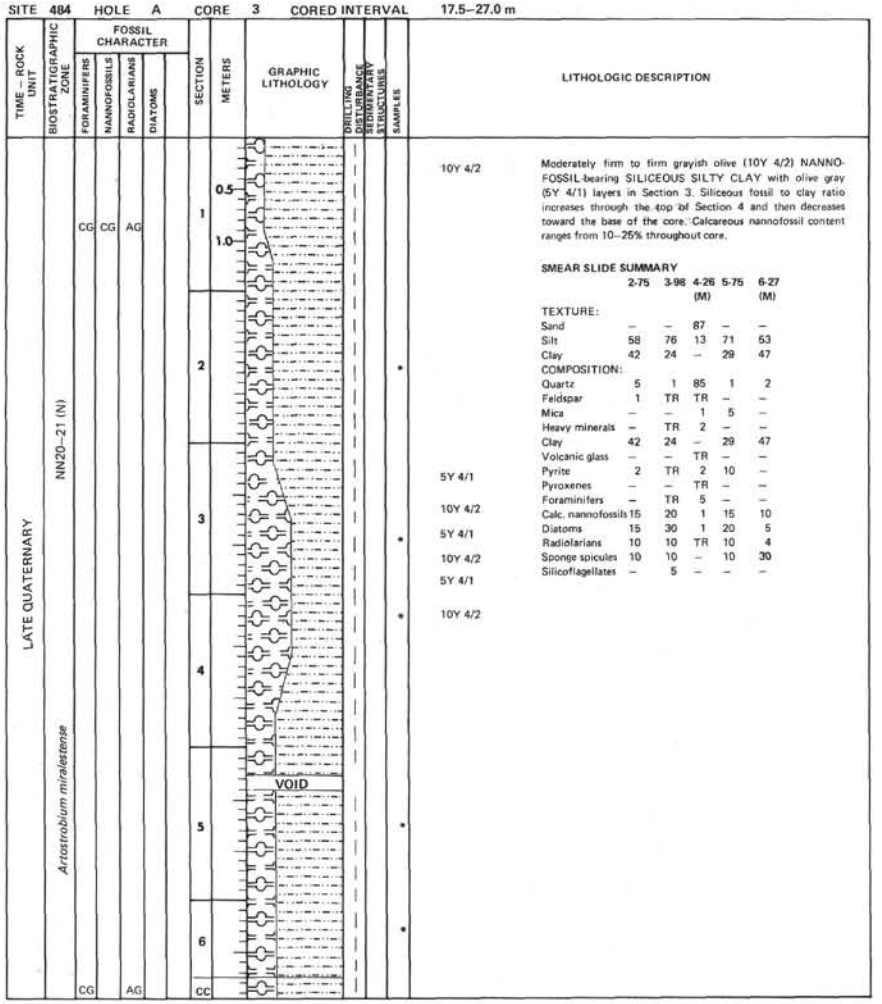
Soft, grayish olive CLAYEY SILICEOUS OOZE with an interval of *NANNOFOSSIL-bearing* CLAYEY *SILICEOUS OOZE* near the base of Section 3, an interval of NANNOFOSSIL-bearing CLAY near the base of Section 4 and numerous interbedded turbidites in Sections 3–5.

SMEAR SLIDE SUMMARY

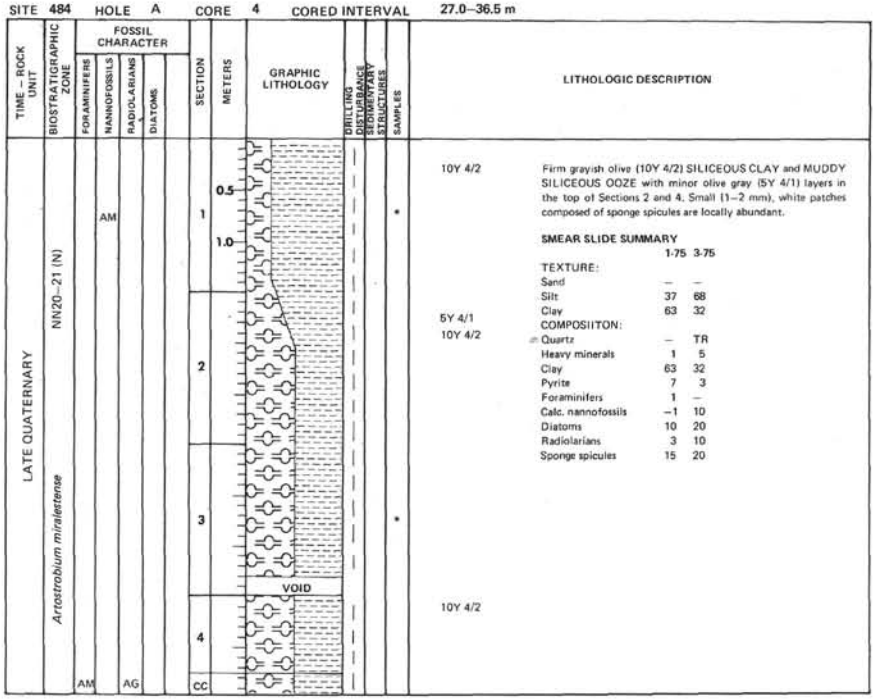
	1-140	2-16	2-35 (M)	2-148	3-109 (M)	3-132	4-75	4-94 (M)	5-7	5-12 (M)	5-62 (M)	5-75
TEXTURE:												
Sand	–	–	–	–	30	–	–	20	–	15	5	–
Silt	62	57	45	44	30	67	41	44	41	20	32	83
Clay	38	43	55	56	40	33	59	36	59	65	63	37
COMPOSITION:												
Quartz	6	5	5	1	45	TR	7	50	3	20	15	1
Feldspar	1	TR	–	–	10	TR	–	5	1	5	3	TR
Mica	–	–	–	–	TR	–	–	–	–	TR	–	–
Heavy minerals	–	2	10	–	TR	TR	–	1	–	TR	TR	TR
Clay	38	43	55	56	40	33	59	36	59	65	63	37
Volcanic glass	–	–	–	–	TR	TR	–	1	TR	–	–	–
Pyroxenes	–	–	–	–	–	–	–	1	–	–	–	–
Glauconite	–	–	–	–	–	–	–	–	–	TR	TR	TR
Pyrite	–	–	–	–	TR	–	–	3	TR	1	–	–
Carbonate unspec.	–	–	–	–	TR	–	–	TR	–	–	–	–
Foraminifers	–	–	–	–	1	–	–	2	TR	TR	TR	–
Calc. nannofossils	10	10	5	10	2	30	10	1	25	2	5	10
Diatoms	20	15	10	15	TR	20	6	TR	5	3	5	30
Radiolarians	5	10	10	10	1	7	3	TR	2	2	4	15
Sponge spicules	20	15	5	8	1	10	1	TR	5	2	5	5
Silicoflagellates	–	–	–	–	TR	–	15	–	TR	TR	–	2

5Y 4/2
N2
5Y 4/2
10Y 4/2
5Y 4/2
10Y 4/2

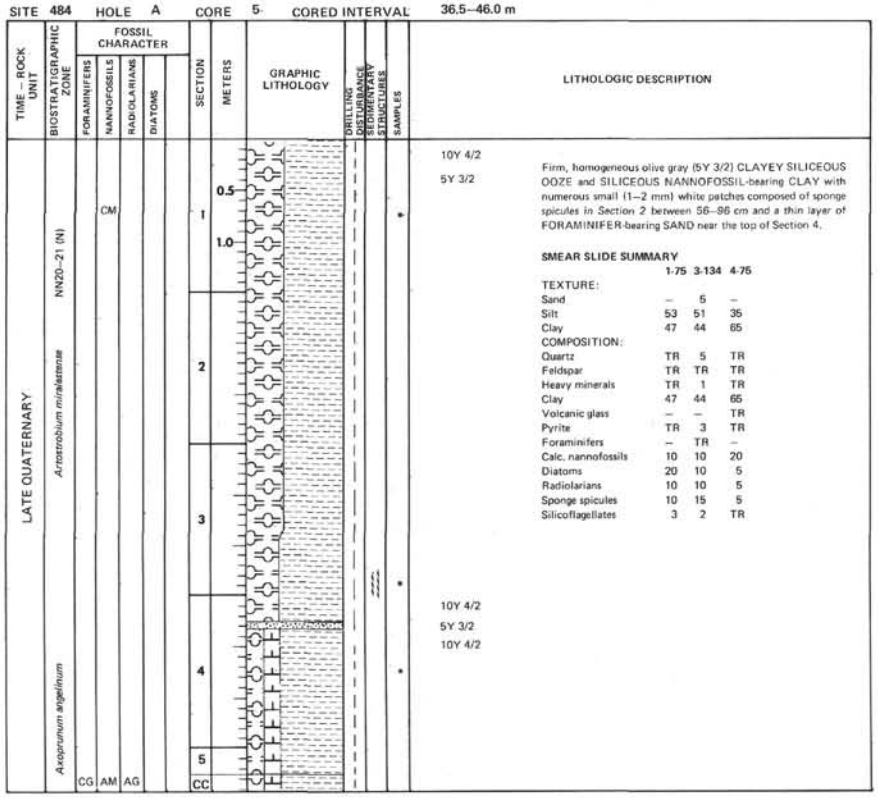
SITE 484 HOLE A CORE 3 CORED INTERVAL 17.5–27.0 m



SITE 484 HOLE A CORE 4 CORED INTERVAL 27.0–36.5 m



SITE 484 HOLE A CORE 5 CORED INTERVAL 36.5–46.0 m

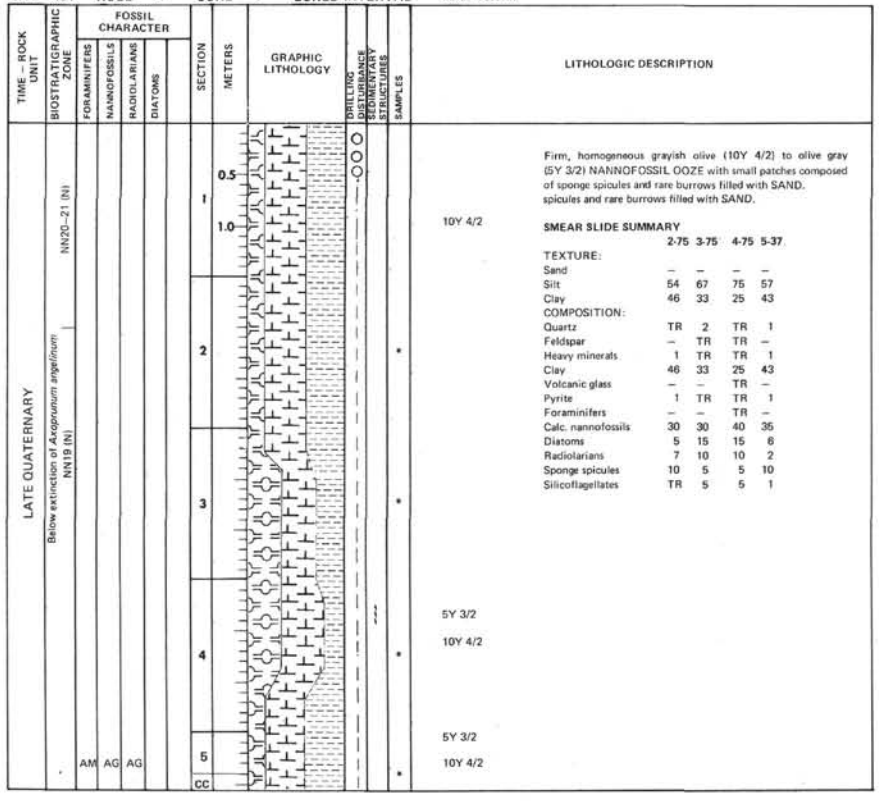


Firm, homogeneous olive gray (5Y 3/2) CLAYEY SILICEOUS OOZE and SILICEOUS NANNOFOSSIL-bearing CLAY with numerous small (1–2 mm) white patches composed of sponge spicules in Section 2 between 56–96 cm and a thin layer of FORAMINIFER-bearing SAND near the top of Section 4.

SMEAR SLIDE SUMMARY

	1-75	3-134	4-75
TEXTURE:			
Sand	–	5	–
Silt	53	51	35
Clay	47	44	65
COMPOSITION:			
Quartz	TR	5	TR
Feldspar	TR	TR	TR
Heavy minerals	TR	1	TR
Clay	47	44	65
Volcanic glass	–	–	TR
Pyrite	TR	3	TR
Foraminifers	–	TR	–
Calc. nannofossils	10	10	20
Diatoms	20	10	5
Radiolarians	10	10	5
Sponge spicules	10	15	5
Silicoflagellates	3	2	TR

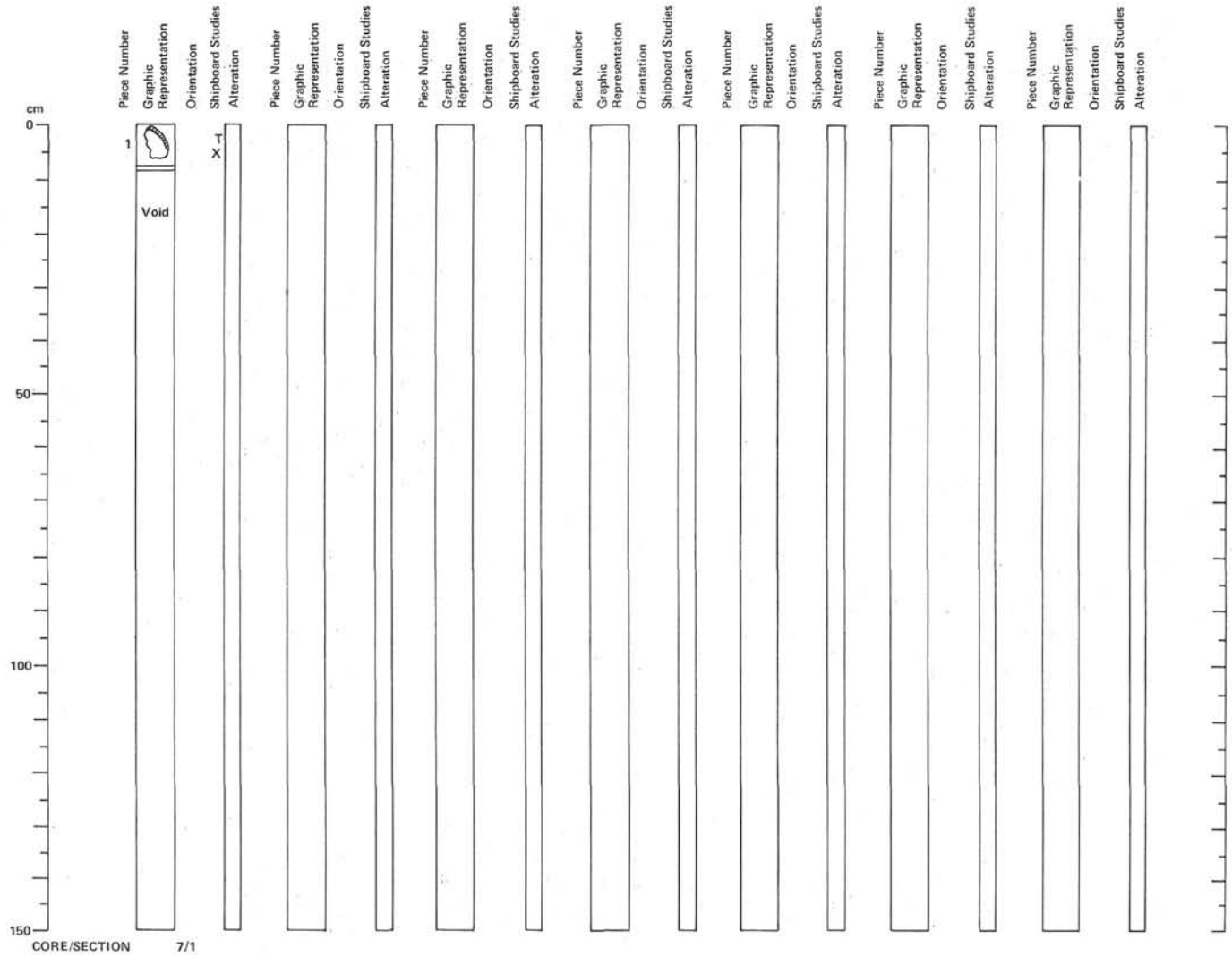
SITE 484 HOLE A CORE 6 CORED INTERVAL 46.0–55.5 m



Firm, homogeneous grayish olive (10Y 4/2) to olive gray (5Y 3/2) NANNOFOSSIL OOZE with small patches composed of sponge spicules and rare burrows filled with SAND.
spicules and rare burrows filled with SAND.

SMEAR SLIDE SUMMARY

	2-75	3-75	4-75	5-37
TEXTURE:				
Sand	–	–	–	–
Silt	54	67	75	57
Clay	46	33	25	43
COMPOSITION:				
Quartz	TR	2	TR	1
Feldspar	–	TR	TR	–
Heavy minerals	1	TR	TR	1
Clay	46	33	25	43
Volcanic glass	–	–	TR	–
Pyrite	1	TR	TR	1
Foraminifers	–	–	TR	–
Calc. nannofossils	30	30	40	35
Diatoms	5	15	15	6
Radiolarians	7	10	10	2
Sponge spicules	10	5	5	10
Silicoflagellates	TR	5	5	1



HOLE 484A, CORE 7

Visual Description

Section 1, 0–6 cm: Single piece, gray sparsely phyric, basalt. Rock fine-grained wih chilled margin along one side. Plagioclase phenocrysts, 1–2%, subhedral laths, 1–3 mm, fresh, occasionally in glomerophyric clots, trace of olivine replaced by smectite. Rock generally fresh. Vesicles 1–2%, <2 mm, filled with smectite.

Thin Section Description

Location: Section 1, 5–7 cm

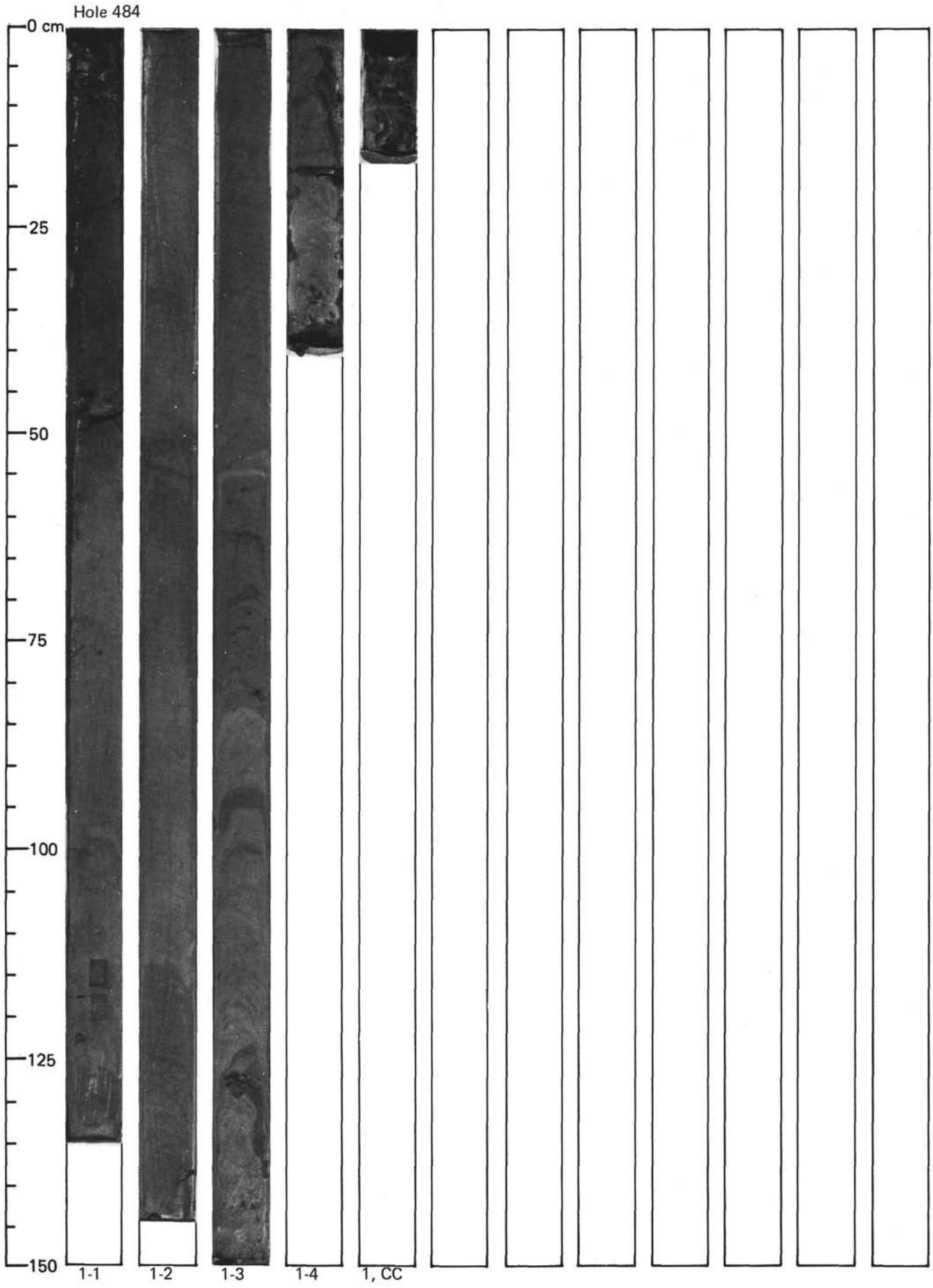
Texture: Sparsely phyric, quench

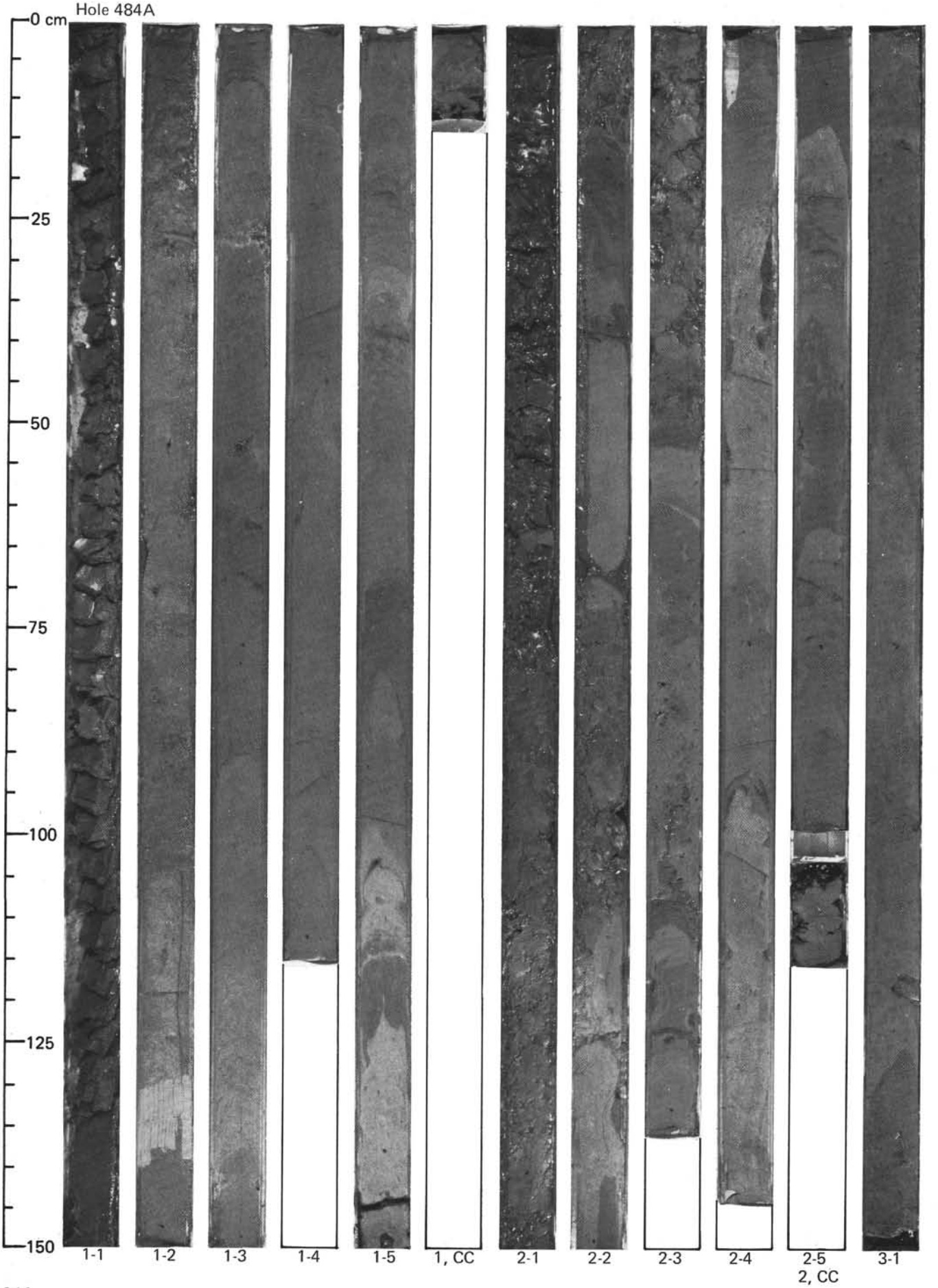
Phenocrysts: Plagioclase 1–2%, 0.5–2.5 mm, subhedral prisms, fresh, strongly zoned; olivine <1%, 0.5 mm, subhedral, fresh

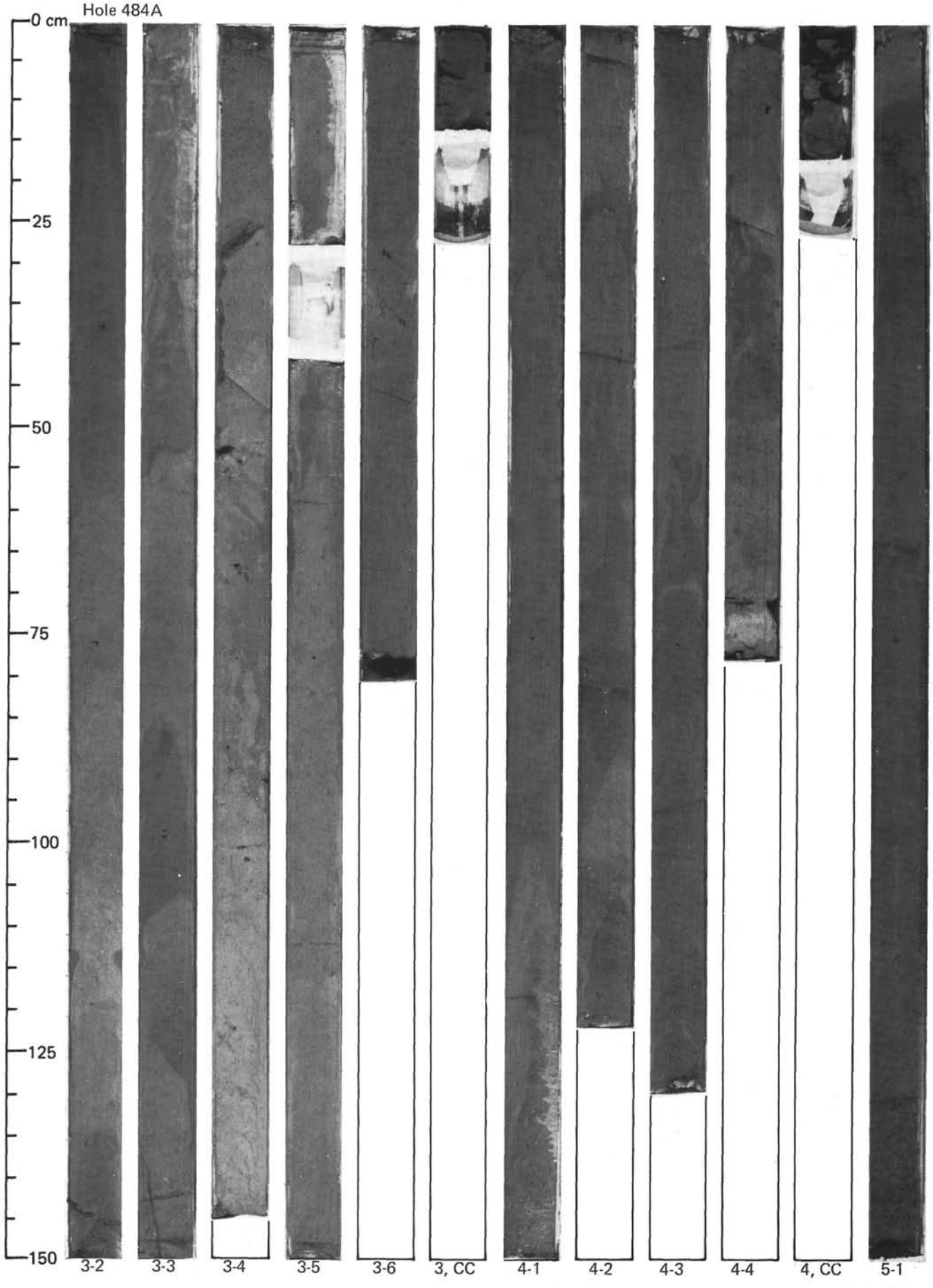
Groundmass: 97–98%, quench mixture of plagioclase microlites, granular opaques and poorly crystallized clinopyroxene with a few minute olivine crystals; generally fresh

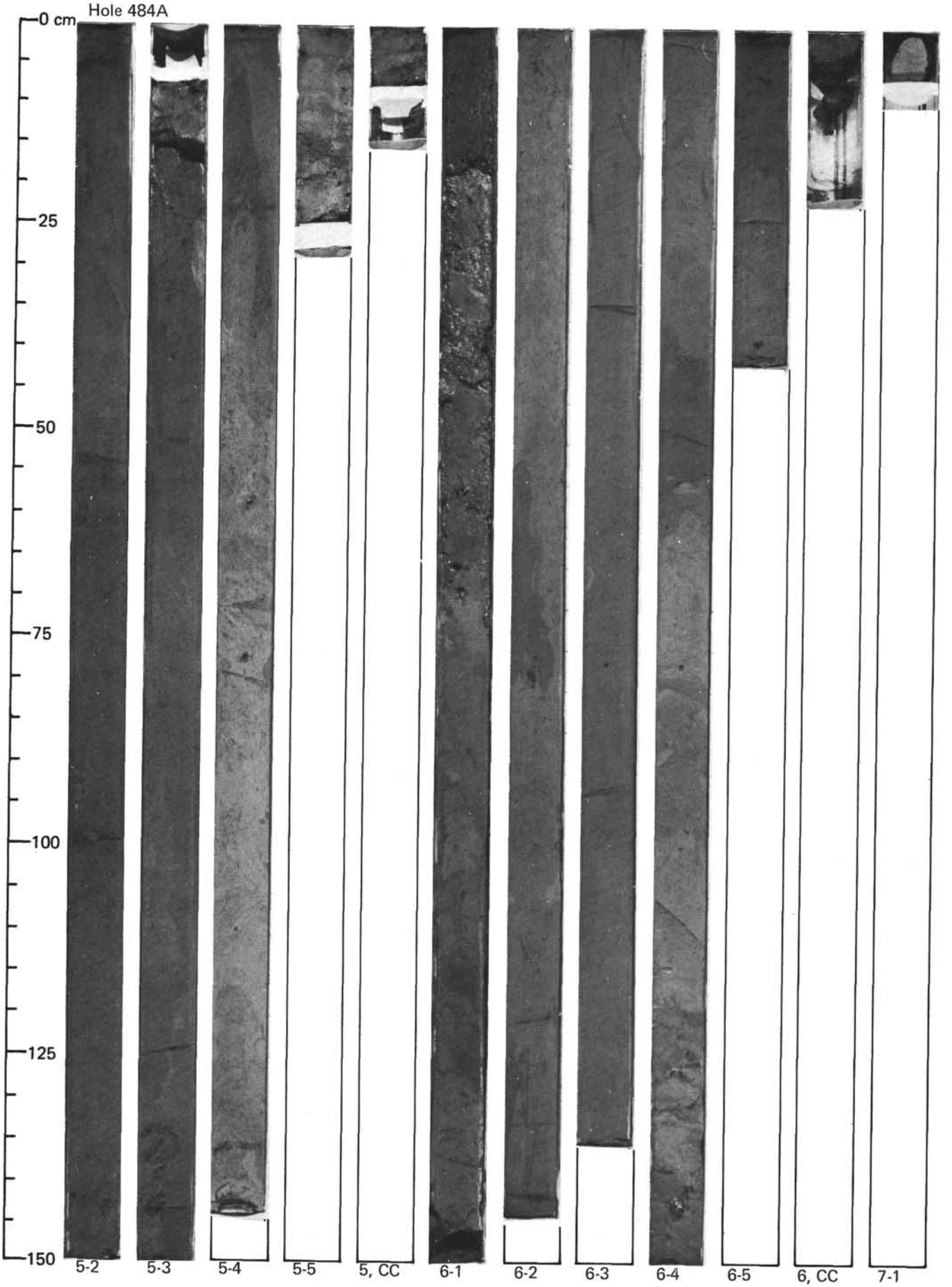
Vesicles: <1%, 0.3–0.5 mm, round, open, some segregation vesicles

Alteration: Some disseminated pyrite in groundmass


Hole 484
0 cm
25
50
75
100
125
150
1-1
1-2
1-3
1-4
1, CC


Hole 484A
0 cm
25
50
75
100
125
150
1-1
1-2
1-3
1-4
1-5
1, CC
2-1
2-2
2-3
2-4
2-5
2, CC
3-1


Hole 484A
0 cm
25
50
75
100
125
150
3-2
3-3
3-4
3-5
3-6
3, CC
4-1
4-2
4-3
4-4
4, CC
5-1


Hole 484A
0 cm
25
50
75
100
125
150
5-2
5-3
5-4
5-5
5, CC
6-1
6-2
6-3
6-4
6-5
6, CC
7-1