6. SITE 617[1]

Shipboard Scientific Party[2]

HOLE 617

Date occupied: 17 October 1983, 0608 LCT

Date departed: 18 October 1983, 1227 LCT

Time on hole: 1 day, 6 hr.

Position: 26°41.93'N, 88°31.67'W

Water depth (sea level; corrected m, echo-sounding): 2467

Water depth (rig floor; corrected m, echo-sounding): 2477

Bottom felt (m, drill pipe): 2478.5

Penetration (m): 191.2

Number of cores: 21

Total length of cored section (m): 130.1

Total core recovered (m): 111.58

Core recovery (%): 86

Oldest sediment cored:
Depth sub-bottom (m): 191.2
Nature: Clay
Age: Pleistocene (Ericson Zone Y)
Measured velocity (km/s): N/A

Basement: N/A

HOLE 617A

Date occupied: 18 October 1983, 1227 LCT

Date departed: 19 October 1983, 0555 LCT

Time on hole: 17 hr.

Position: 26°41.93'N, 88°31.67'W

Water depth (sea level; corrected m, echo-sounding): 2467

Water depth (rig floor; corrected m, echo-sounding): 2477

Bottom felt (m, drill pipe): 2477.5

Penetration (m): 73.9

Number of cores: 8

Total length of cored section (m): 73.9

Total core recovered (m): 56.94

Core recovery (%): 77

Oldest sediment cored: N/A (cores unsplit)

Basement: N/A

BACKGROUND AND OBJECTIVES

On the middle fan, the youngest fan lobe is approximately 400 m thick and is characterized by a large sinuous central channel displaying well-developed levees and overbank deposits. Side-scan sonar and seismic data indicate a wide variety of facies on which the Leg 96 drilling program was planned. Site 617 is on the western side of the large channel in 2467 m of water. The thalweg of the main channel lies 4.8 km to the northeast. The site is situated on the toe of the topographic levee in a region where the side-scan sonar and the sub-bottom profiler data show a large number of ridges and swales. The ridges tend to show either no sub-bottom penetration on the 3.5-kHz records or only a few meters at most. The swales display a large amount of fill ranging from 15 to over 50 m and show seismically well-developed conformable reflection horizons within the fill. In some instances, the uppermost seismic reflectors can be traced from one swale to another. Seafloor erosion has taken place over some of the ridge crests, as truncated seismic reflectors can be seen along the margins of the ridges. In addition, the side-scan sonar data show a highly complex seafloor morphology that in many cases can be interpreted as minor relief associated with outcropping beds.

A 200-m advance piston coring program was designed at Site 617 to satisfy the following objectives:

1. To determine the sedimentological, paleontological, geochemical, and geotechnical characteristics of the material infilling the swales and of the underlying levee deposits,

2. To use the lithologies, sedimentary structures, and faunal information to arrive at the mode of sediment transport responsible for this sequence of sediments,

3. To obtain information about the vertical sequence of sediments that will aid in determining if the sinuous main channel has displayed migration tendencies during its development,

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[1] Bouma, A. H., Coleman, J. M., Meyer, A. W., et al., *Init. Repts. DSDP*, 96: Washington (U.S. Govt. Printing Office).

[2] Addresses: Arnold H. Bouma (Co-Chief Scientist), Gulf Research and Development Company, P.O. Box 37048, Houston, TX 77236, (present address: Chevron Oil Field Research Company, P.O. Box 36506, Houston, TX 77236); James M. Coleman (Co-Chief Scientist), Coastal Studies Institute, Louisiana State University, Baton Rouge, LA 70803; Audrey W. Meyer (Shipboard Science Representative), Deep Sea Drilling Project, Scripps Institution of Oceanography, La Jolla, CA 92093, (present address: Ocean Drilling Program, 500 University Drive West, Texas A&M University, College Station, TX 77843); James Brooks, Department of Oceanography, Texas A&M University, College Station, TX 77843; William R. Bryant, Department of Oceanography, Texas A&M University, College Station, TX 77843; Richard Constans, Paleontology Section, Chevron U.S.A. Inc., 935 Gravier Street, New Orleans, LA 70112; Michel Cremer, Département de Géologie et Océanographie, Université de Bordeaux I, Avenue des Facultés, 33405 Talence Cedex, France; Laurence I. Droz, Laboratoire de Géodynamique Sous-Marine, 06230 Villefranche-sur-Mer, France; Toshio Ishizuka, Ocean Research Institute, University of Tokyo, Tokyo 164, Japan; Mahlon C. Kennicutt II, Department of Oceanography, Texas A&M University, College Station, TX 77843; Barry Kohl, Chevron U.S.A. Inc., 935 Gravier Street, New Orleans, LA 70112; William R. Normark, Pacific Branch of Marine Geology, U.S. Geological Survey (MS-999), 345 Middlefield Road, Menlo Park, CA 94025; Suzanne O'Connell, Lamont-Doherty Geological Observatory of Columbia University, Palisades, NY 10964, (present address: Ocean Drilling Program, 500 University Drive West, Texas A&M University, College Station, TX 77843); Mary Parker, Department of Geology, Florida State University, Tallahassee, FL 32306, (present address: AMOCO Production Company, P.O. Box 50879, New Orleans, LA 70150); Kevin T. Pickering, Department of Earth Sciences, University of London, Goldsmith's College, London SE14 6NW, United Kingdom, (present address: Department of Geology, University of Leicester, Leicester LE1 7RH, United Kingdom); Claudia Schroeder, Department of Geology, Dalhousie University, Halifax, Nova Scotia B3H 3J5, Canada; Charles E. Stelting, Gulf Research and Development Company, P.O. Box 37048, Houston, TX 77236, (present address: Chevron Oil Field Research Company, P.O. Box 36506, Houston, TX 77236); Dorrik A. V. Stow, University of Edinburgh, Edinburgh EH9 3JW, Scotland, United Kingdom, (present address: Geology Department, University of Nottingham, Nottingham NG7 2RD, United Kingdom); William E. Sweet, Mineral Management Service, P.O. Box 7944, Metairie, LA 77010; Andreas Wetzel, Geologisches Palaeontologisches Institut der Universität, Sigwartstrasse 10, D7400 Tübingen, Federal Republic of Germany; and Jean K. Whelan, Chemistry Department, Woods Hole Oceanographic Institution, Woods Hole, MA 02543.

4. To determine the nature of the sediments that gave the extremely high sediment velocities measured during the site survey cruise, and

5. To obtain sedimentation rates on the levees adjacent to the channel and to compare these rates with those of the adjacent channel-fill deposits.

OPERATIONS

The approach course from Site 616 to Site 617 was altered slightly to bring the vessel to a turning point just to the northeast of the operating area. A southwesterly profile then crossed the closely spaced proposed Sites 620, 621, and 617 in that order. A reciprocal line was run back across the latter two sites. Another turn was made and beacons for Sites 621 and 617 were dropped. The beacons (of alternate frequencies) were spaced only about 5½ km apart. The transit and survey were made in 15½ hr. The seismic gear was then retrieved and the vessel was positioned on offsets 575 m south and 720 m west of the second beacon.

Hole 617

At 1334 hours, 17 October the 9.5-m advanced piston corer (APC) was shot from the precision depth recorder (PDR) depth of 2477 m. The 8 m of sediment recovered established bottom depth at 2478.5 m (Table 1).

Before the second core could be attempted, shifting winds from heavy rain squalls, combined with a strong local current, carried the vessel about 120 m off station. Weather conditions stabilized and positioning became sufficiently steady to resume coring after a delay of 1½ hr.

APC coring then proceeded smoothly through clay and silty mud to a depth of 191.2 m below seafloor, where the scientific objectives were considered to be accomplished. The power sub was left in the string to lay out doubles, and the bit was pulled clear of the seafloor at 1227 hr., 18 October, to end Hole 617 operations.

Hole 617A

The unexpected absence of sand in Hole 617 led to reconsideration of plans to drill an additional hole at Site 620 for geotechnical studies. The known favorable conditions prompted the decision to relocate the middle fan geotechnical hole to Site 617. The vessel was therefore offset 30 m to the southwest to avoid the Hole 617 disturbed area, and Hole 617A was spudded at 1303 hr.

Continuous APC cores were taken to 73.9 m below seafloor without significant problems (Table 1). Two core attempts at this depth met with no recovery or apparent penetration. The corer was being lowered for a core attempt one joint (9.5 m) deeper, when operations were interrupted by weather.

The wind, which had been almost exactly opposing the strong current, shifted about 30° to the vessel's port quarter and increased in velocity. The ship's thrusters were unable to maintain heading against the resultant turning moment and the vessel broached. It was then quickly carried about 360 m off station by the current before action could be taken to arrest the excursion.

The rig was brought back over the hole after a ¾-hr. delay, and the APC was run down the pipe. With the bottom-hole assembly (BHA) not yet fully supported by the hole, damage to the BHA could be expected from a large positioning excursion. Suspicions were confirmed when the APC stopped at the approximate location of the bumper subs, indicating a bent sub. This meant that no more coring could be done in Hole 617A and that a pipe trip was necessary.

The APC was retrieved and the drill string was recovered. It was found that the mandrel of the upper bumper sub was, indeed, slightly bent. As the next stand of drill collars was brought through the rig floor, it was discovered that the lowest drill collar and the entire outer core barrel assembly had been lost when bending forces had caused the rotary-shouldered connection to fail.

During the pipe trip it had been determined that positioning could not be maintained within operating limits under the existing current and weather conditions. The only alternative was therefore to move the Orca and Pigmy Basins operating area to the west and hope for improved conditions upon the vessel's return to the middle fan.

Table 1. Site 617 coring summary.

Core[a]	Date (Oct. 1983)	Time	Depth from drill floor (m)	Depth below seafloor (m)	Length cored (m)	Length recovered (m)	Amount recovered (%)
Hole 617							
1H	17	1350	2478.5-2486.5	0.0-8.0	8.0	8.05	100
2H	17	1625	2486.5-2496.1	8.0-17.6	9.6	7.88	82
3H	17	1725	2496.1-2505.7	17.6-27.2	9.6	9.47	99
4H	17	1845	2505.7-2515.3	27.2-36.8	9.6	8.18	85
5H	17	1945	2515.3-2524.8	36.8-46.3	9.5	8.87	93
6H	17	2045	2524.8-2534.3	46.3-55.8	9.5	7.57	80
7H	17	2145	2534.3-2543.8	55.8-65.3	9.5	6.53	69
8H	17	2250	2543.8-2553.4	65.3-74.9	9.6	8.25	86
9H	17	2355	2553.4-2563.0	74.9-84.5	9.6	3.45	36
10H	18	0100	2563.0-2567.1	84.5-88.6	4.1	4.03	98
Wash	18		2567.1-2572.6	88.6-94.1	—	—	—
11H	18	0155	2572.6-2580.9	94.1-102.4	8.3	6.71	81
Wash	18		2580.9-2582.1	102.4-103.6	—	—	—
12H	18	0255	2582.1-2586.6	103.6-108.1	4.5	4.20	93
Wash	18		2586.6-2591.1	108.1-113.1	—	—	—
13H	18	0405	2591.1-2592.4	113.1-113.9	0.8	0.76	95
Wash	18		2592.4-2601.1	113.9-122.6	—	—	—
14H	18	0500	2601.1-2608.4	122.6-129.9	7.3	7.22	99
Wash	18		2608.4-2610.7	129.9-132.2	—	—	—
15H	18	0555	2610.7-2616.0	132.2-137.5	5.3	5.29	99
Wash	18		2616.0-2620.3	137.5-141.8	—	—	—
16H	18	0650	2620.3-2621.3	141.8-142.8	1.0	1.00	100
Wash	18		2621.3-2629.9	142.8-151.4	—	—	—
17H	18	0743	2629.9-2634.4	151.4-155.9	4.5	4.45	99
Wash	18		2634.4-2639.5	155.9-161.0	—	—	—
18H	18	0837	2639.5-2644.3	161.0-165.8	4.8	4.79	99
Wash	18		2644.3-2649.1	165.8-170.6	—	—	—
19H	18	0925	2649.1-2649.1	170.6-170.6	0.0	0.00	0
Wash	18		2649.1-2658.7	170.6-180.2	—	—	—
20H	18	1017	2658.7-2662.3	180.2-183.8	3.6	3.55	99
Wash	18		2662.3-2668.3	183.8-189.8	—	—	—
21H	18	1110	2668.3-2669.7	189.8-191.2	1.4	1.33	95
					130.1	111.58	86
Hole 617A							
1H	18	1325	2477.5-2484.5	0.0-7.0	7.0	6.92	99
2H	18	1415	2484.5-2494.1	7.0-16.6	9.6	8.93	93
3H	18	1500	2494.1-2503.7	16.6-26.2	9.6	8.62	90
4H	18	1540	2503.7-2513.3	26.2-35.8	9.6	8.87	92
5H	18	1635	2513.3-2522.9	35.8-45.4	9.6	3.61	38
6H	18	1730	2522.9-2532.4	45.4-54.9	9.5	9.10	96
7H	18	1830	2532.4-2542.9	54.9-64.4	9.5	5.95	63
8H	18	1930	2542.9-2552.4	64.4-73.9	9.5	4.94	52
					73.9	56.94	77

[a] H following core number indicates hydraulic piston core.

SEISMIC STRATIGRAPHY AND ACOUSTIC FACIES

Site 617 is located on the western levee on the concave side of the channel bend of the Mississippi Fan channel.

It is located about 4-¾ km from the channel thalweg, 2½ km from the levee crest, and 1 km from the nearest topographic high (see Middle Fan Introduction and Summary, this volume).

Seismic Stratigraphy

The midfan sites were surveyed prior to Leg 96 on a site survey cruise on the *Conrad* (Fig. 1). Figure 2 shows part of a single-channel seismic profile collected on that cruise, which passes approximately 325 m north of Site 617. Four, distinct seismic facies have been identified in water-gun (80 in^3) records collected during the site survey (Fig. 1). The four seismic facies are as follows: (1) high-amplitude, low-continuity reflectors; (2) semitransparent reflection zones with very short hummocky, medium-amplitude reflectors; (3) semitransparent to transparent reflection zones with relatively more continuous, curvilinear, low-amplitude reflectors; and (4) hummocky, discontinuous, medium-amplitude, subparallel reflectors. Correlation of these seismic facies with the lithologies recovered at the four sites drilled in the vicinity of the middle-fan channel indicates that seismic Facies 1 to 3 are associated with the channel systems and correspond to gravels and sands, sands and silts, and muds and clays, respectively. Seismic Facies 4, which occurs in the overbank areas, corresponds to silts and clays (Stelting et al., 1985, this volume); it is the only seismic facies encountered at Site 617.

The interpretation of channel margins during development of the youngest fan lobe suggests that deposition at Site 617 consists exclusively of overbank sediments (Fig. 2). The uniform seismic character appears to agree with core lithologies in which there was no indication of any major lithologic changes.

The upper three reflectors highlighted in Figure 2 correspond to the boundaries of the three major depositional sequences identified in the cored interval (see Lithostratigraphy, this chapter).

Acoustic Facies

The EDO deep tow profile (Fig. 3) and 3.5-kHz subbottom profiles show numerous thin subparallel reflec-

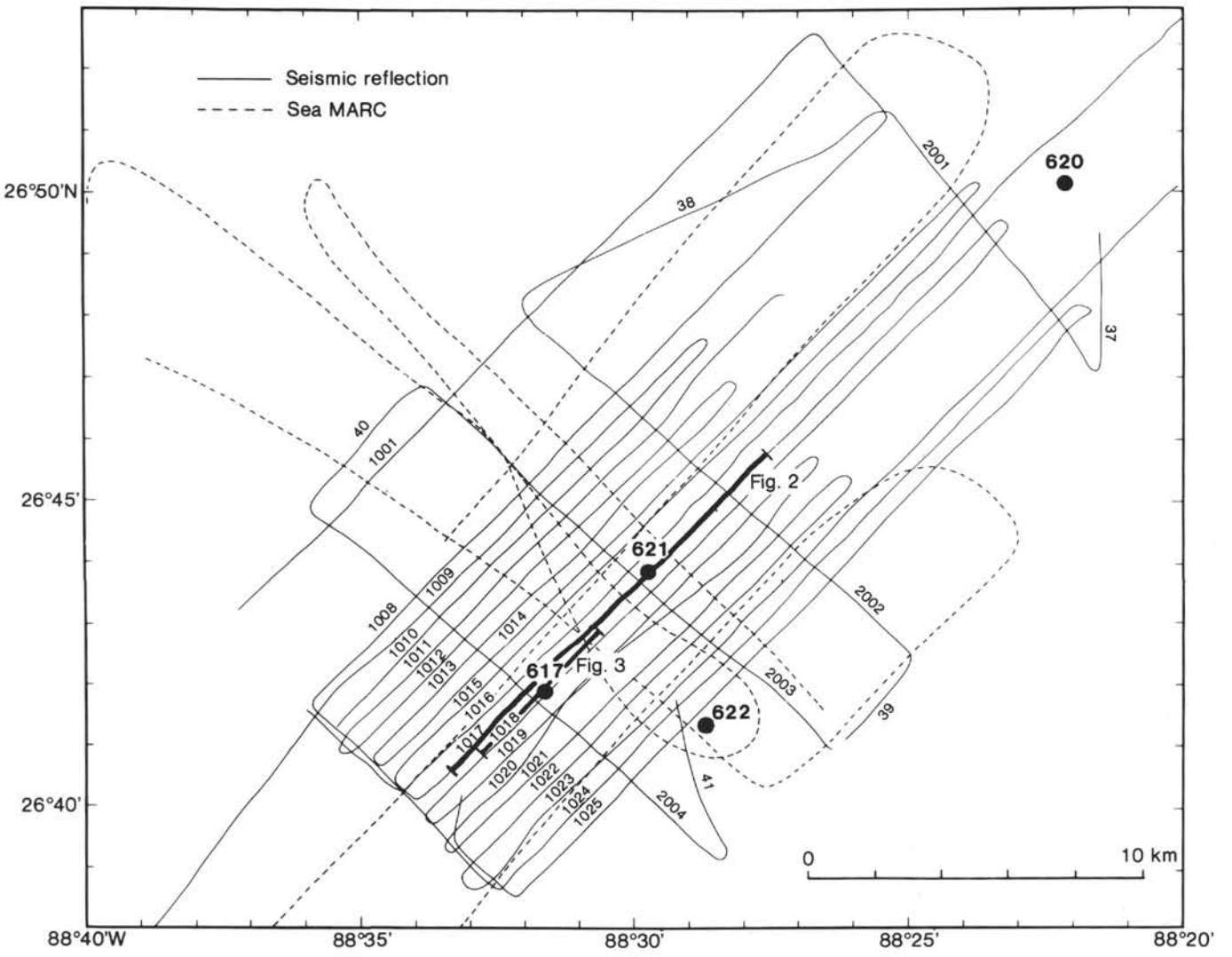


Figure 1. Map showing *Conrad* site survey tracklines with locations of midfan sites. Positions of seismic profiles shown in Figures 2 and 3 are indicated by heavy lines.

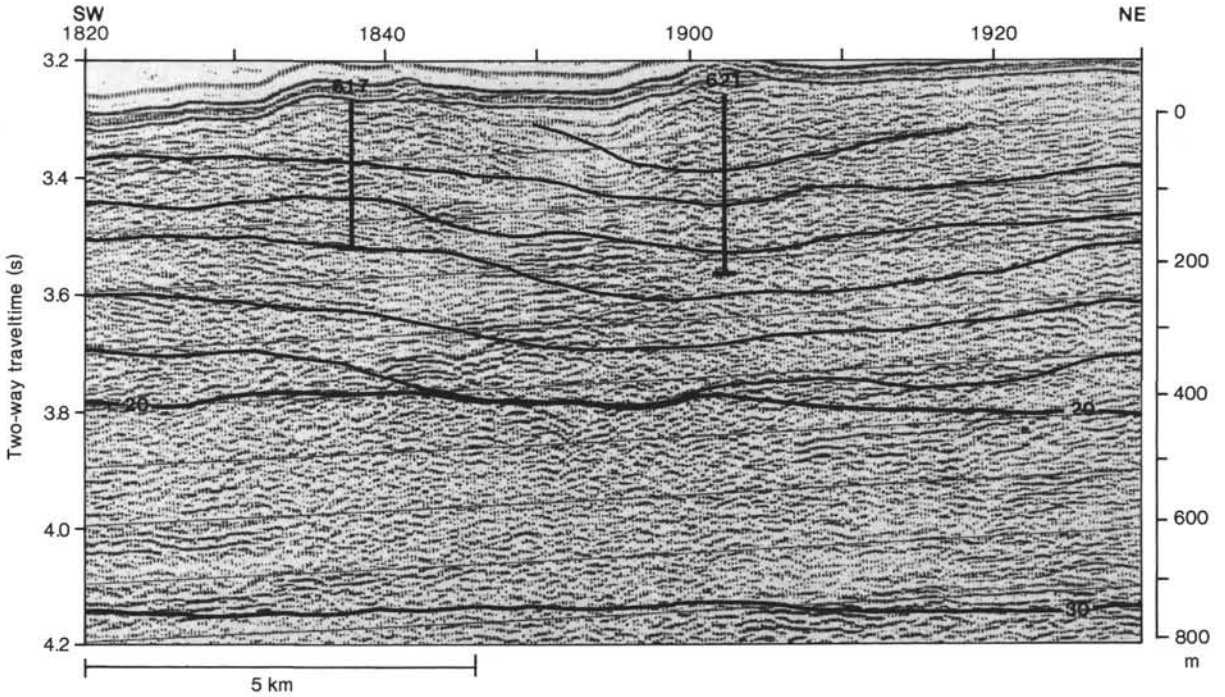


Figure 2. Water-gun seismic profile from *Conrad* Line 1017 which passes near Site 617; location of Site 621 also indicated. Enhanced reflectors (inferred channel margins) correspond to depositional intervals observed in the core; seismic Horizons 20 and 30 indicated by bold lines. See Figure 1 for location. (Modified after Stelting et al., 1985.)

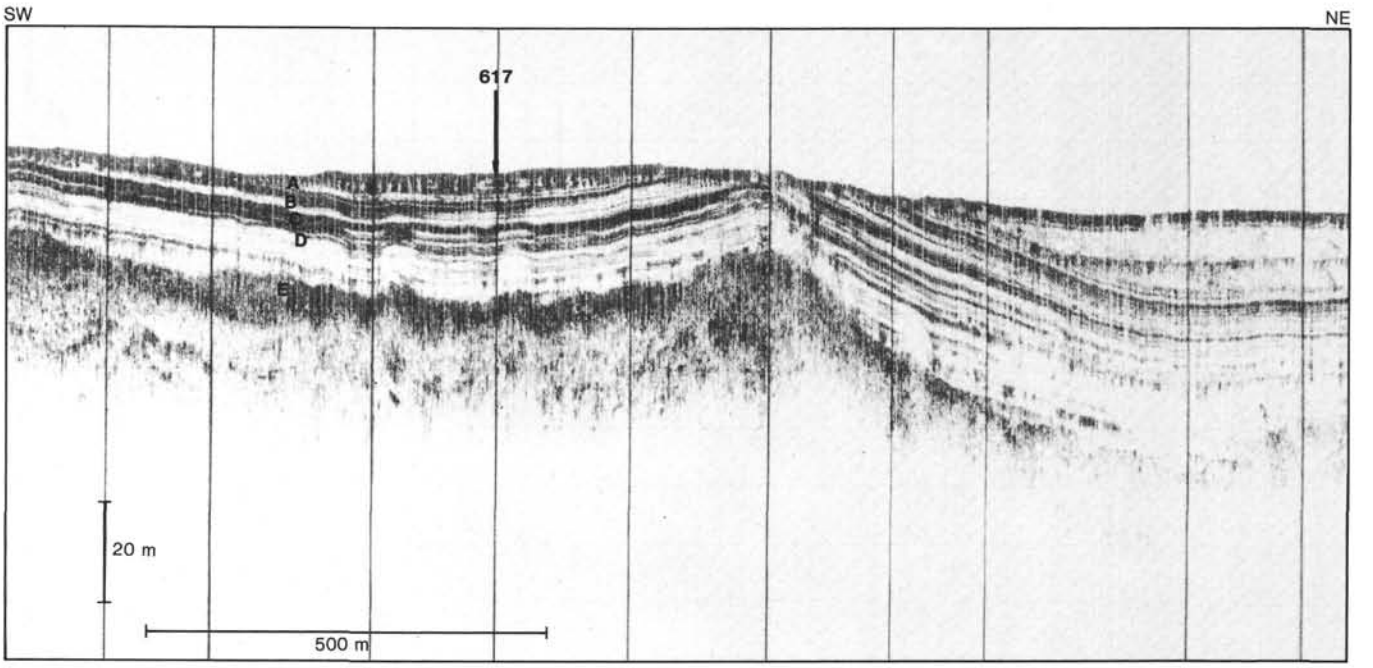


Figure 3. Deep-towed EDO profile showing seismic Reflectors A–E near Site 617. Profile collected by Racal-Decca (Prior et al., 1983); location shown in Fig. 1.

tors overlying a highly reverberant subsurface acoustic return. The reflectors are concave upward and are truncated at the seafloor. The spacing between reflectors is constant, but their depth below the seafloor is variable. Depth to the reflectors was measured on the shipboard 3.5-kHz and on the EDO deep-tow profile. Five reflectors (A–E) can be distinguished on the EDO deep-tow profile at 5, 11.5, 13, 22, and 32 m sub-bottom (Fig. 3).

Correlation between reflector depth and lithologic boundaries is not obvious at this site and may reflect the general absence of coarser beds in the upper 50 m of cored section. A major lithologic change from "homo-

geneous" mud to mud with silt laminae and thin silt layers occurs between 16 and 17.1 m sub-bottom (Cores 617-2 and 617-3). This change may be responsible for the reflector at 13 m.

The strongest reflector occurs at 22 m. At 21.6 m the thin silt beds, which were previously horizontal, begin to dip steeply and at 23.6 m the percentage of silt layers increases. Either or both of these changes may correspond to the 22-m reflector.

Conclusions

The major results from comparing seismic stratigraphy and core samples at Site 617 are

1. No major fan-wide seismic horizons were penetrated.
2. The 3.5- and 4.5-kHz profiles may show reflectors where there are no observable lithologic contrasts.
3. Shallow acoustic reflectors may relate to changes in bedding orientation rather than to lithologic changes.

BIOSTRATIGRAPHY AND SEDIMENTATION RATES

Biostratigraphy

The section penetrated in Hole 617 is Quaternary, correlating with the planktonic foraminifer Zone N23 and the calcareous nannofossil Zone NN21. The interval includes the Holocene (Ericson Zone Z; Ericson and Wollin, 1968) and the late Wisconsin glacial (Ericson Zone Y) (see Explanatory Notes, this volume). The warm interstadial of the Wisconsin (Ericson Zone X or *Globorotalia flexuosa* Zone) was not encountered to a total depth of 191.2 m (Fig. 4).

The Y Zone contains a very poorly developed Pleistocene planktonic and benthic fauna with predominantly reworked Cretaceous calcareous nannofossils in the silt-laminated mud sequence.

Rare well-preserved Pleistocene radiolarians occur in Cores 617-2 through 617-6.

Foraminifers

Foraminifers from Holes 617 and 617A are Quaternary, Zone N23 (Blow, 1969). A warm water, high diversity, Holocene (Zone Z) planktonic foraminiferal ooze occurs at the top of Core 617A-1. This ooze was not seen at Hole 617 because the sediment/water interface was not collected in Core 617-1. The fauna in Core 617A-1 contains abundant *Globorotalia menardii* and *G. tumida*, along with bathyal benthic species *Cibicides wuellerstorfi, C. kullenbergi*, and rare *Melonis pompilioides*.

Zone Y (late Wisconsin glacial) extends from Cores 617-2 through 617-21 and consists of silt-laminated mud with a very poorly developed foraminiferal fauna. Rapid sedimentation is evident by the absence of bathyal benthic species and very low abundances of planktonic foraminifers. A few reworked Cretaceous foraminifers occur in Section 617-5-3.

Calcareous Nannofossils

All samples observed at this site are interpreted to be in the *Emiliania huxleyi* Zone (NN21) of Martini (1971).

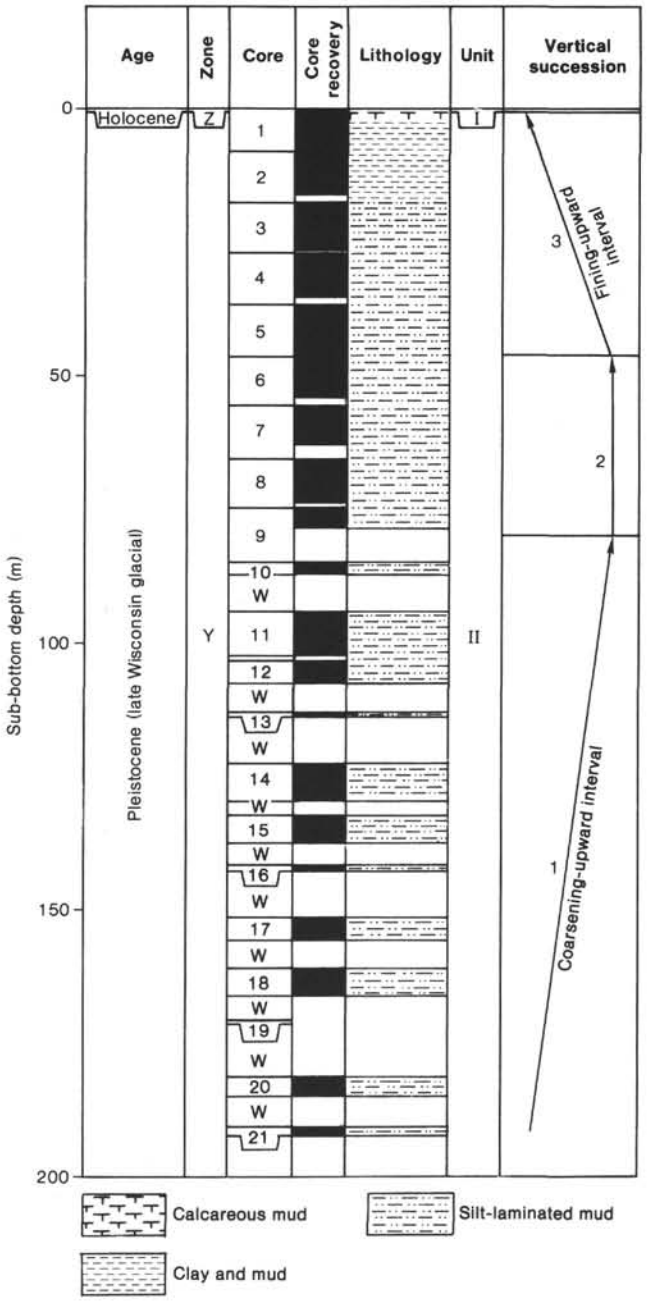


Figure 4. Lithostratigraphic summary for Hole 617 showing age, core recovery, graphic lithology, and lithologic units and intervals. Lithologic Unit I found in Hole 617A only. W = washed interval (see Table 1).

A surficial foraminiferal ooze was not recovered in Hole 617. Hole 617A, however, did contain a well-developed ooze, with abundant well-preserved calcareous nannofossils in the top of Section 617A-1-1. This sample is dominated by very small coccoliths, which can only tentatively be identified as *E. huxleyi*. Only a trace of reworked Cretaceous nannofossils are present in this ooze.

Reworked Cretaceous nannofossils are the major floral constituent in the remainder of Holes 617 and 617A. Only trace to rare Pleistocene nannofossils occur in this silt-laminated mud sequence and no significant increases in their abundance are identified.

Sedimentation Rates

The sedimentation rates are calculated on the basis of two datums. An age of 0.012 Ma is used for the Holocene/Pleistocene boundary (Z/Y zonal boundary) and 0.085 Ma for the Y/X zonal boundary (see Explanatory Notes, this volume).

A sedimentation rate of 2.1 cm/1000 yr. is computed for the Holocene. This is a minimum rate assuming complete Holocene recovery (Fig. 5).

The Y/X zonal boundary was not encountered. By using a seismic projection to the top of the X Zone (772 m for seismic Horizon "30"; see introductory chapter, this volume), a projected minimum sedimentation rate of 1057 cm/1000 yr. is computed for the Y Zone.

These calculations are based on nondecompacted sediment thicknesses.

LITHOSTRATIGRAPHY

Two lithologic units were identified in the 191.20 m of sediment recovered at Site 617 (Table 2, Fig. 4).

Lithologic Unit I: Calcareous Mud

This unit occurs as a thin layer of about 25 cm at the top of Section 617A-1. It is an olive brown foraminifer-rich mud. Foraminifers are abundant down to the gradational contact at 25 cm. They are dispersed in the structureless muds of Unit II down to 53 cm.

Lithologic Unit II: Muds and Silts

Terrigenous muds and silts were the only lithologies recovered in Hole 617. Two facies can be distinguished in this unit. They are (1) silt-laminated muds (84%) and (2) clays and muds (16%).

Silt-Laminated Mud Facies

This facies is dominant at Site 617, extending from 18.20 m sub-bottom to the base of the hole at 191.20 m sub-bottom. It is typified by numerous silt laminae within a muddy matrix. The silt laminae comprise an average of 17% of the facies ranging from 6 to 43% of the total volume. The layers vary from very thinly laminated (< 1 mm) to very thinly bedded (1–3 cm); they are typically very thin to thinly laminated. The layers are commonly irregular to discontinuous and are graded, and, in some cases, contorted, fractured, and inclined. Whereas the very thin laminae are generally planar, the thicker laminae have scoured bases and internal cross-lamination. Bases are commonly sharp with occasional load casts. Tops are sharp or gradational. Normal grading into mud commonly occurs, particularly between 46.3 and 84.5 m sub-bottom.

The silt laminae are composed of about 5% very fine sand, 75 to 80% silt, and 15 to 20% clay-sized detritus. The thicker silt layers (2–3 cm) are predominantly coarse silts. The silts are terrigenous with quartz as the primary component; altered minerals, carbonates, and heavy minerals are the dominant secondary components. The muds of this facies are composed of 20 to 30% silt-sized and 70 to 80% clay-sized detritus. Sections with increased silt content (i.e., silty mud) occur at several intervals in the core. The muds are terrigenous with dominant clay and secondary quartz; calcareous nannofossils, carbonates, and heavy minerals are the most abundant accessory components.

Table 2. Lithologic units of Site 617.

Lithologic unit	Sediment	Cored interval	Sub-bottom depth (m)
I	Calcareous mud	617A-1-1, 0–25 cm	0–0.25
II	Muds and silts	617-1-1, 0 cm through 617-21,CC; 617A-1-1, 25 cm through 617A-8,CC	0.25–191.20

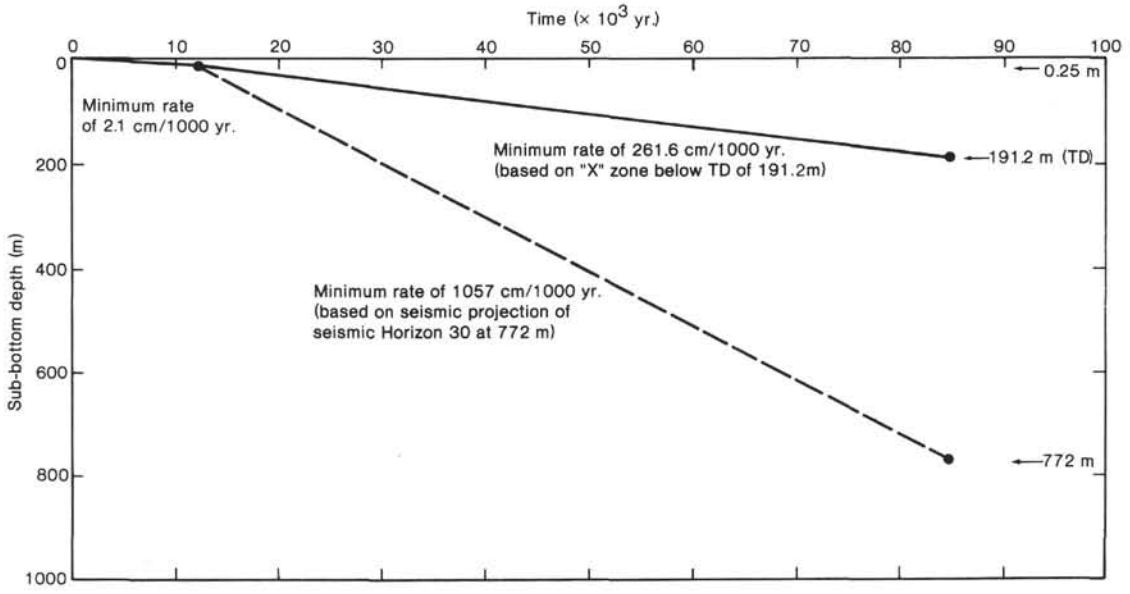


Figure 5. Site 617 sedimentation rates.

Clay and Mud Facies

Relatively structureless clays and muds with rare, very thin silt laminae occur in the upper portion of the hole from 0 to 18.20 m sub-bottom. They are composed of 25 to 40% silt-sized and 60 to 75% clay-sized detritus. Quartz is the dominant silt-sized component and carbonate is a secondary component.

This facies is characterized by systematic color banding of relatively soupy clay and mud. Typically, a 3-cm interval consists of about 2 cm of gray mud overlain by reddish mud and topped by about a 2-mm mottled black layer; all contacts are gradational. Except for a small interval of inclined and contorted bands between 0.85 and 2.15 m sub-bottom, the banding tends to be regular and horizontal.

Vertical Succession

Three intervals can be distinguished in the recovered sediment. From bottom to top, these are described in the following paragraphs.

Interval 1, from 192 to 80 m sub-bottom, comprises mainly the silt-laminated mud facies. Percentages of silt laminae range from 6 to 18% (Table 3) and average 10%. A unit of silty mud with silt laminations comprises approximately the upper 19 m (approximation because of nonrecovered core intervals) of the interval. The unit is similar in character to the unit at the base of Interval 3 (see below), lacking only deformation features. Upward through the interval, silt laminae become more abundant. They exhibit slightly scoured bases and well-developed internal cross-lamination; grading is subtle or absent.

Interval 2, from 80 to 46 m sub-bottom, consists of 34 m of silt-laminated mud and is relatively uniform in sedimentary characteristics. Silt occurs as very thin laminae to thin beds and averages 35% of the total volume (Table 3). Normal grading is the primary sedimentary structure. Load casts and flame structures are common, and internal cross-laminae are well developed. Grading occurs on two different scales: (1) as thinly laminated to thin bedded silt with a scoured base that grades into a silty mud to clay over an interval of 4–12 cm and (2) on a microscopic scale with interlaminated silts and muds (< 1 mm) over an interval of 1–3 cm. Microcross-laminations observed in the basal silts are rarely scoured. Laminae are horizontal throughout, except for the inclined beds in Core 617-6.

Interval 3, from 46 to 0.25 m sub-bottom, comprises structureless clays and muds and mud with silt laminations. Silt laminae are rare between the surficial ooze and 16 m sub-bottom, but increase from 13 to 26% of the volume at about 46 m sub-bottom (Table 3). Laminae are very thin with sharp bases and tops in the upper portion of the interval. They become thinner upward from very thin bedded to thinly laminated and exhibit a more irregular character with scoured bases, more distinct internal cross-lamination and normal grading over 5- to 15-cm intervals. Pseudo-nodules occur near the base of the interval. Inclined, contorted, and folded laminae are present between 18 and 46 m sub-bottom.

Table 3. Silt laminae: percentage of total composition and most frequently occurring structures.

Vertical succession	Core	Silt laminae (%)	Sedimentary structures	
			Principal	Secondary
	1	Trace		
	2	Trace		
Interval 3	3	13	Inclined	Micro-faulted
	4	18	Irregular	
	5	26	Contorted	Irregular
	6	43	Graded	Inclined
Interval 2	7	32	Graded	
	8	34	Graded	Irregular
	9	32	Graded	Irregular
	10	18	Graded	Irregular
	11	8	Discontinuous	Irregular
	12	8	Discontinuous	Graded
	13	10	Regular	Contorted
	14	13	Contorted	Irregular
Interval 1	15	7	Irregular	Discontinuous
	16	10	Irregular	Discontinuous
	17	8	Graded	Irregular
	18	6	Micro-faulted	Graded
	19	No recovery		
	20	15	Discontinuous	Irregular
	21	12	Irregular	Discontinuous

GEOCHEMISTRY

Organic Geochemistry

No gas, as evidenced by gas expansion cracks or pockets, was observed in the cored sections at Site 617.

Inorganic Geochemistry

The results of interstitial water analyses, discussed extensively by Presley et al., Ishizuka, Kawahata, et al., and Ishizuka, Ittekkot, et al. (all this volume), are much like many other open ocean sites, as summarized below:

1. pH values of interstitial water at Site 617 (pH 6.6–7.6) are more scattered than those at Site 616 (pH 6.7–7.2). They are lower than those at Sites 614 and 615.
2. Total alkalinity (maximum 10.3 mEq/L) of the interstitial water at Site 617 is lower than that at the other sites, but is higher than that of normal Pacific Ocean sediments. Total alkalinity values decrease, on the whole, with depth.
3. Salinity of the interstitial water ranges from 34.1 to 36.0‰ and averages about 35.5‰. These values of interstitial water salinity are typical for deep-sea sediments.

PHYSICAL PROPERTIES

Wet-bulk density increases from a low of 1.57 g/cm^3 for seafloor sediments to 1.8 g/cm^3 at a depth of 35 m and reaches 2.0 g/cm^3 at 190 m sub-bottom depth (Fig. 6A). The average rate of increase in the upper 35 m is 0.0066 g/cm^3 · m and 0.0001 g/cm^3 · m for depths between 35 and 190 m. The scattering of the data results from changes in sediment composition and reflects variations in the content of sand, silt, and clay.

Wet water content decreases from a seafloor value of 43.9% to an average value of 32% at 35 m sub-bottom and 23% at 190 m sub-bottom (Fig. 6B). The rate of decrease in wet water content from the seafloor to the 35-m

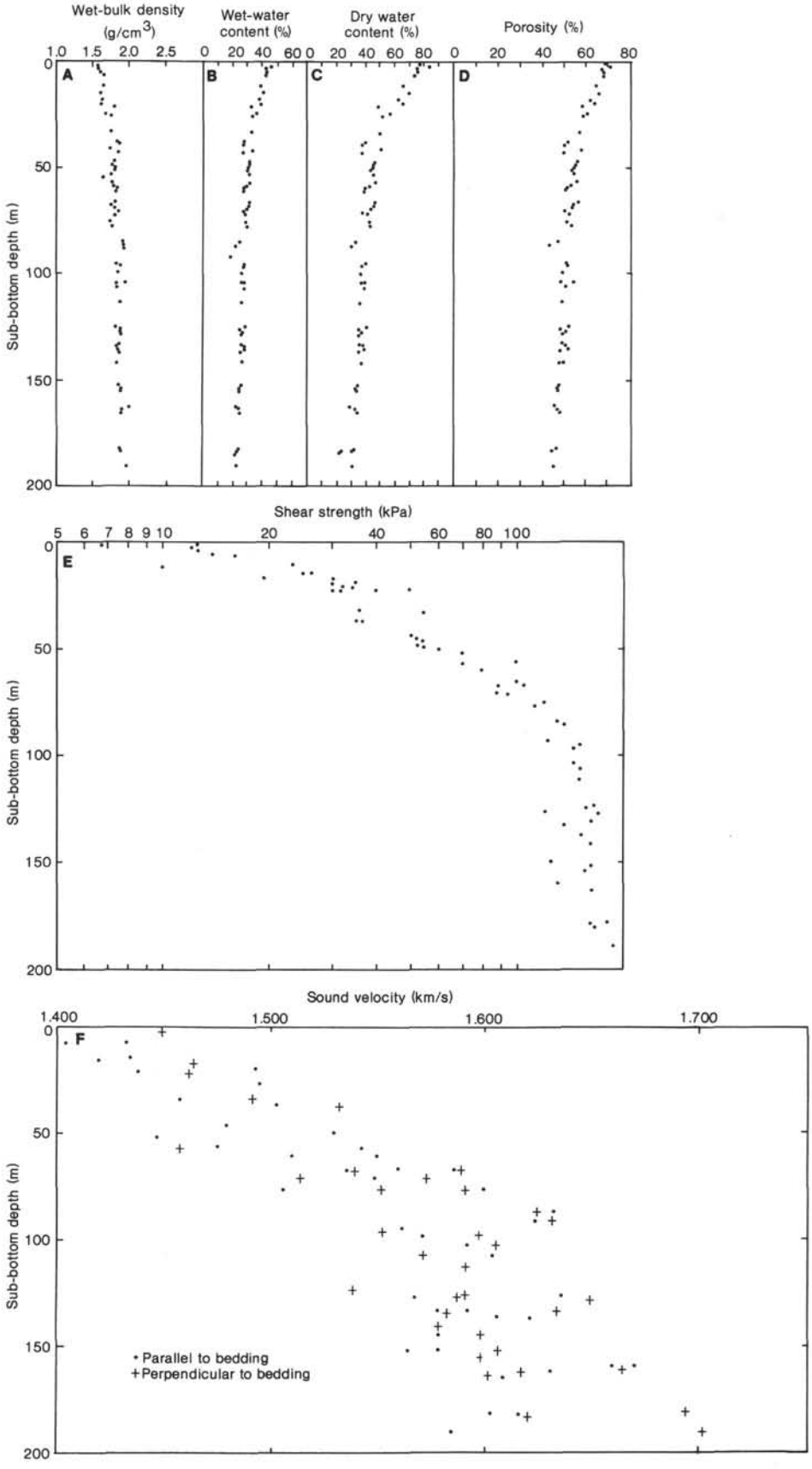


Figure 6. Mass physical properties of Site 617 sediments. A. Wet-bulk density. B. Water content related to weight of wet sediment. C. Water content related to weight of dry sediment. D. Porosity. E. Undrained shear strength. F. Sound velocity.

depth is 0.34%/m whereas from 35 to 190 m the average rate of decrease is 0.0323%/m.

Porosity of the seafloor sediments is approximately 70% and decreases to 55% in the upper 35 m and to a low of 45.2% at 190 m sub-bottom (Fig. 6D). The porosity gradient is 0.4286%/m in the upper 35 m of the section and 0.0581%/m in the interval from 35 to 190 m.

Void ratio decreases rapidly from a seafloor value of 2.20 to 1.10 at a sub-bottom depth of 35 m. The void ratio at 190-m sub-bottom is 0.83.

The average grain density is 2.72 g/cm^3.

Shear strength increases in the upper 35 m of sediment at a rate of 1.34 kPa/m. In the depth interval from 35 to 190 m, the rate of increase is 0.84 kPa/m. Values for the ratio of undrained shear strength (C_u) and overburden pressure (σ) for Site 617 are not constant but do in most cases fall below a value of 0.2, indicating that the sediments at Site 617 are underconsolidated. The underconsolidation is attributed to the high rate of deposition and low permeability due to the very fine-grained nature of the sediments. All measured values of undrained shear strength are plotted against depth in Figure 6E.

Sonic velocity increases steadily downhole from a low of 1.396 km/s at the seafloor to a high of 1.702 km/s at 190 m sub-bottom. The sediments have a high acoustic anisotropy; the velocities measured perpendicular to the bedding have the highest velocities. The velocity–depth relationship is shown in Figure 6F.

SUMMARY AND CONCLUSIONS

Site 617 was cored to a depth of 191.2 m with the advanced piston corer. Recovery was exceptionally good, averaging 86% (about 111.6 m of core were recovered). Our main objectives at the site were (1) to determine the sedimentologic, paleontologic, and physical properties of the sediments infilling the swales and the underlying levee deposits and (2) to obtain information about the vertical sequence of sediments that will aid in determining if the sinuous main channel has displayed migratory tendencies during its development.

Site 617 is located on the toe of the topographic levee in a region where the side-scan sonar and seismic-reflection data show a large number of ridges and swales. The swales display a large amount of infill, ranging from 15 to over 50 m. Seafloor erosion has taken place over some of the ridge crest, as truncated seismic reflectors can be seen along the margins of the ridges.

The main scientific conclusions were

1. The entire cored section consists of overbank-levee deposits that are characterized by thin fine-grained turbidite sequences. The vertical sequence initially increases in grain size upward, then decreases in grain size to the base of the Holocene. This vertical sequence is either related to lateral variations in channel proximity or to variations in volume of flow through time.

2. Two biostratigraphic zones were cored, Ericson's Zone Z (Holocene) and Zone Y (late Wisconsin glacial). The Holocene section is characterized by a 25-cm-thick foraminifer ooze that grades downward into a 7.5-m section of thin-bedded mud turbidites. The Holocene sedimentation rate was about 2.1 cm/1000 yr. The underlying turbidities were deposited during the latter part of the late Wisconsin glacial (Ericson's Zone Y); Ericson's Zone X (Wisconsin interstadial) was not encountered in this hole. The sedimentation rate determined by seismic correlation of Zone Y at Site 617, is 1057 cm/1000 yr. Thus sedimentation rates were extremely high and were of a magnitude similar to those in the adjacent channel fill. The computed rates are much greater for the same biostratigraphic unit at this site than for Sites 614 and 615 in the lower fan and for Site 616 on the lateral margin of the fan lobe.

REFERENCES

Blow, W. H., 1969. Late middle Eocene to Recent planktonic foraminiferal biostratigraphy. *In* Brönnimann, P., and Renz, H. H. (Eds.), *Proc. First Int. Conf. Plankt. Microfossils*: Leiden (E. J. Brill), 1: 199–421.

Ericson, D. B., and Wollin, G., 1968. Pleistocene climates and chronology in deep-sea sediments. *Science*, 162:1227–1234.

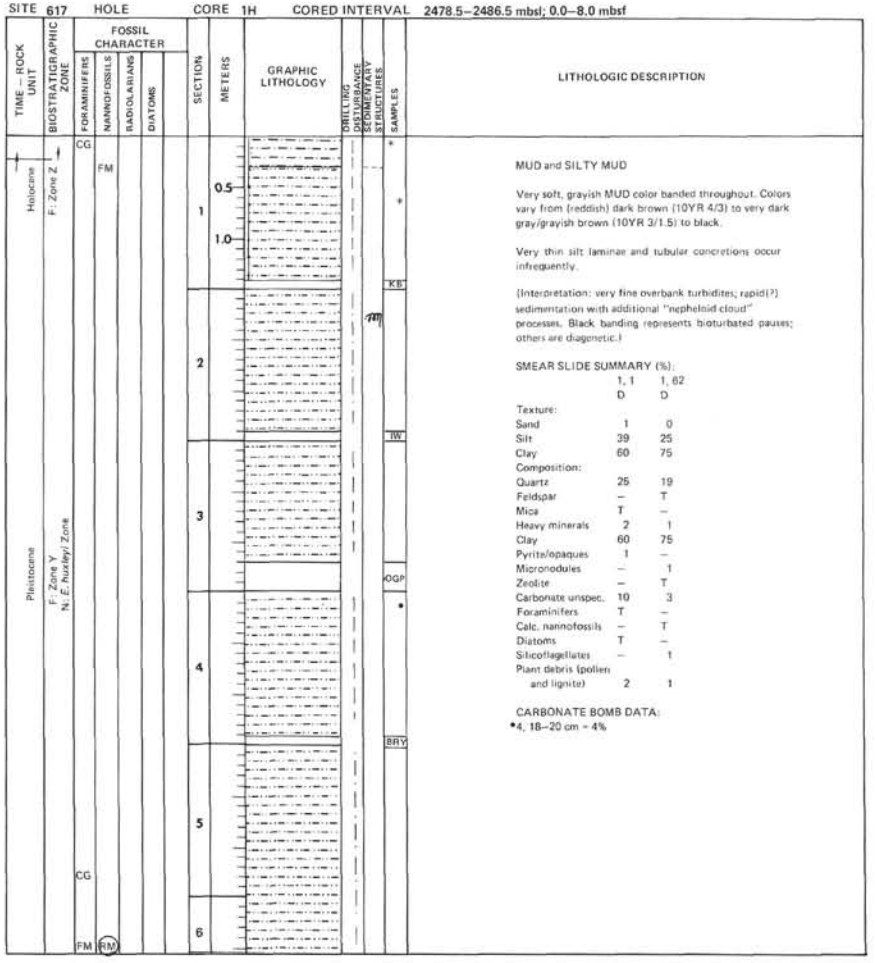
Garrison, L. E., Kenyon, N. H., and Bouma, A. H., 1982. Channel systems and lobe construction of the Eastern Mississippi fan lobe. *Geo-Mar. Lett.*, 2:31–39.

Martini, E., 1971. Standard Tertiary and Quaternary calcareous nannoplankton zonation. *In* Farinacci, A. (Ed.), *Proc. II Plankt. Conf. Roma*: Rome (Edizioni Tecnoscienza), 2:739–785.

Prior, D. B., Adams, C. E., Jr., and Coleman, J. M., 1983. Characteristics of a deep-sea channel on the middle Mississippi Fan as revealed by a high-resolution survey. *Trans. Gulf Coast Assoc. Geol. Soc.*, 33:389–394.

Stelting, C. E., and DSDP Leg 96 Shipboard Scientists, 1985. Migratory characteristics of a mid-fan meander belt., Mississippi Fan. *In* Bouma, A. H., Normark, W. R., and Barnes, N. E. (Eds.), *Submarine Fans and Related Turbidite Systems*: New York (Springer-Verlag), pp. 283–290.

SITE 617 HOLE CORE 1H CORED INTERVAL 2478.5–2486.5 mbsl; 0.0–8.0 mbsf



MUD and SILTY MUD

Very soft, grayish MUD color banded throughout. Colors vary from (reddish) dark brown (10YR 4/3) to very dark gray/grayish brown (10YR 3/1.5) to black.

Very thin silt laminae and tubular concretions occur infrequently.

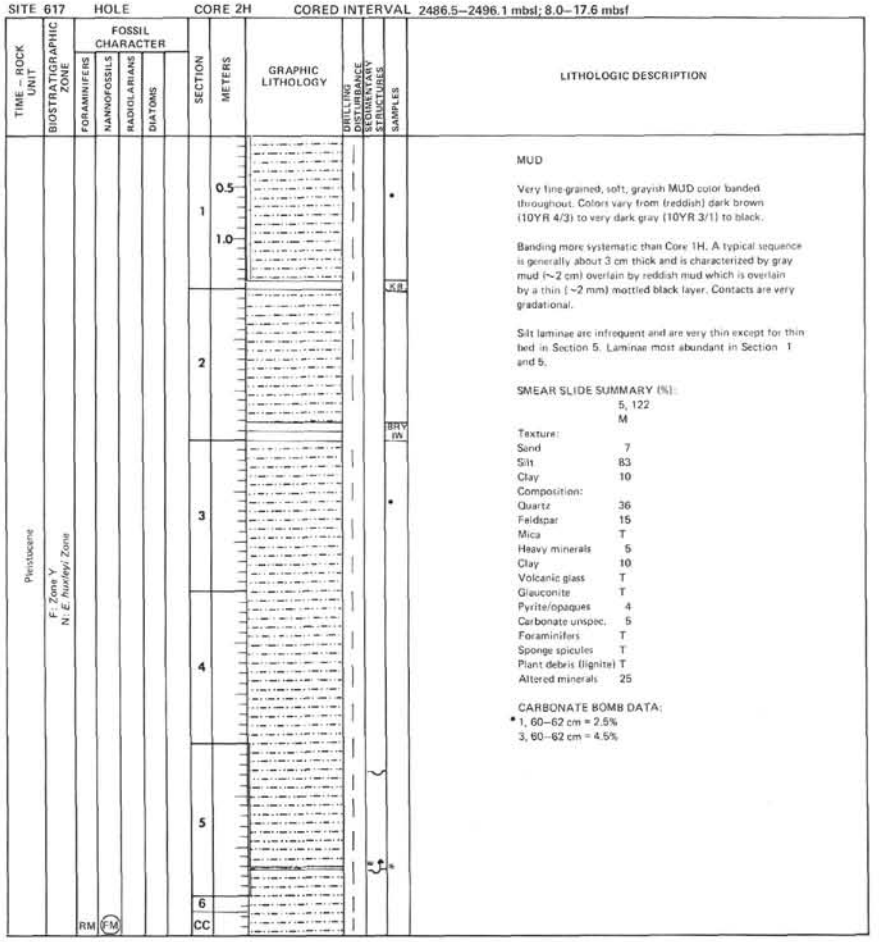
(Interpretation: very fine overbank turbidites; rapid(?) sedimentation with additional "nepheloid cloud" processes. Black banding represents bioturbated pauses; others are diagenetic.)

SMEAR SLIDE SUMMARY (%):

	1, 1 D	1, 62 D
Texture:		
Sand	1	0
Silt	39	25
Clay	60	75
Composition:		
Quartz	25	19
Feldspar	–	T
Mica	T	–
Heavy minerals	2	1
Clay	60	75
Pyrite/opaques	1	–
Micronodules	–	1
Zeolite	–	T
Carbonate unspec.	10	3
Foraminifers	T	–
Calc. nannofossils	–	T
Diatoms	T	–
Silicoflagellates	–	1
Plant debris (pollen and lignite)	2	1

CARBONATE BOMB DATA:
•4, 18–20 cm = 4%

SITE 617 HOLE CORE 2H CORED INTERVAL 2486.5–2496.1 mbsl; 8.0–17.6 mbsf



MUD

Very fine-grained, soft, grayish MUD color banded throughout. Colors vary from (reddish) dark brown (10YR 4/3) to very dark gray (10YR 3/1) to black.

Banding more systematic than Core 1H. A typical sequence is generally about 3 cm thick and is characterized by gray mud (~2 cm) overlain by reddish mud which is overlain by a thin (~2 mm) mottled black layer. Contacts are very gradational.

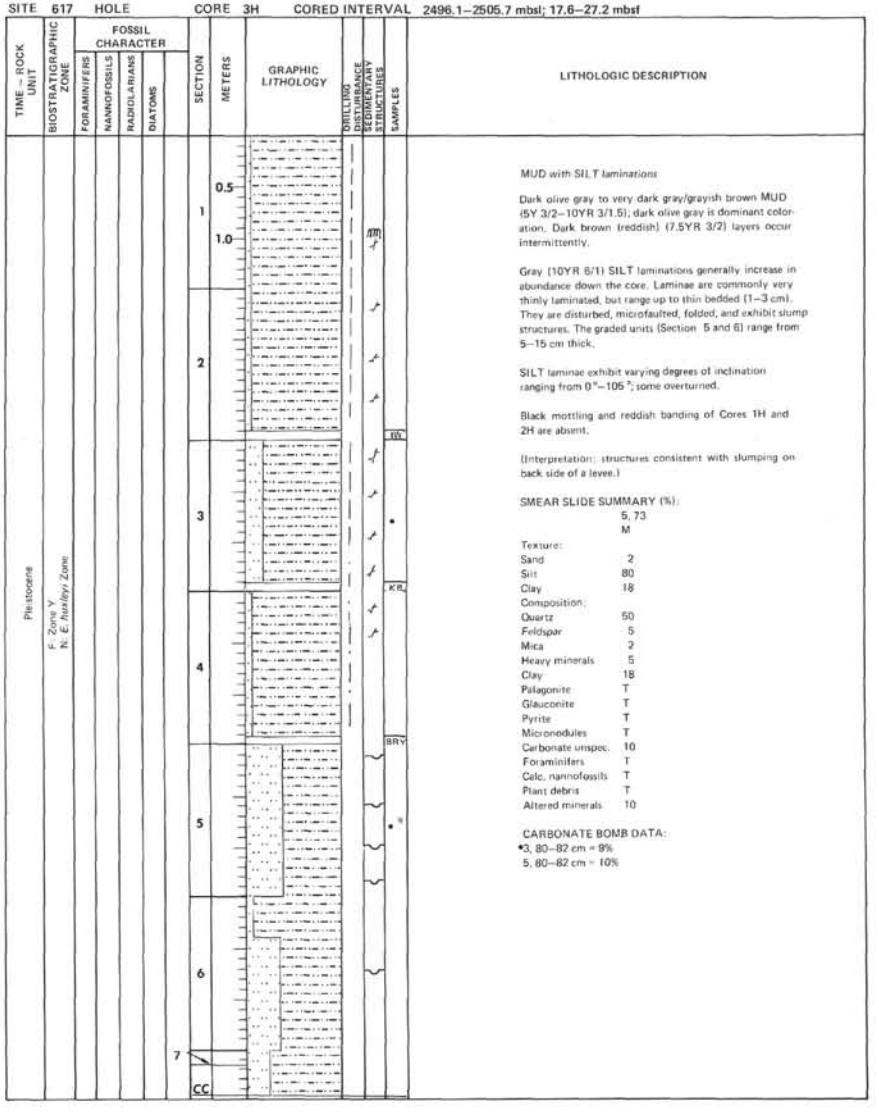
Silt laminae are infrequent and are very thin except for thin bed in Section 5. Laminae most abundant in Section 1 and 5.

SMEAR SLIDE SUMMARY (%):

	5, 122 M
Texture:	
Sand	7
Silt	83
Clay	10
Composition:	
Quartz	36
Feldspar	15
Mica	T
Heavy minerals	5
Clay	10
Volcanic glass	T
Glauconite	T
Pyrite/opaques	4
Carbonate unspec.	5
Foraminifers	T
Sponge spicules	T
Plant debris (lignite)	T
Altered minerals	25

CARBONATE BOMB DATA:
•1, 60–62 cm = 2.5%
3, 60–62 cm = 4.5%

SITE 617 HOLE CORE 3H CORED INTERVAL 2496.1–2505.7 mbsl; 17.6–27.2 mbsf



LITHOLOGIC DESCRIPTION

MUD with SILT laminations

Dark olive gray to very dark gray/grayish brown MUD (5Y 3/2–10YR 3/1.5); dark olive gray is dominant coloration. Dark brown (reddish) (7.5YR 3/2) layers occur intermittently.

Gray (10YR 6/1) SILT laminations generally increase in abundance down the core. Laminae are commonly very thinly laminated, but range up to thin bedded (1–3 cm). They are disturbed, microfaulted, folded, and exhibit slump structures. The graded units (Section 5 and 6) range from 5–15 cm thick.

SILT laminae exhibit varying degrees of inclination ranging from 0°–105°; some overturned.

Black mottling and reddish banding of Cores 1H and 2H are absmt.

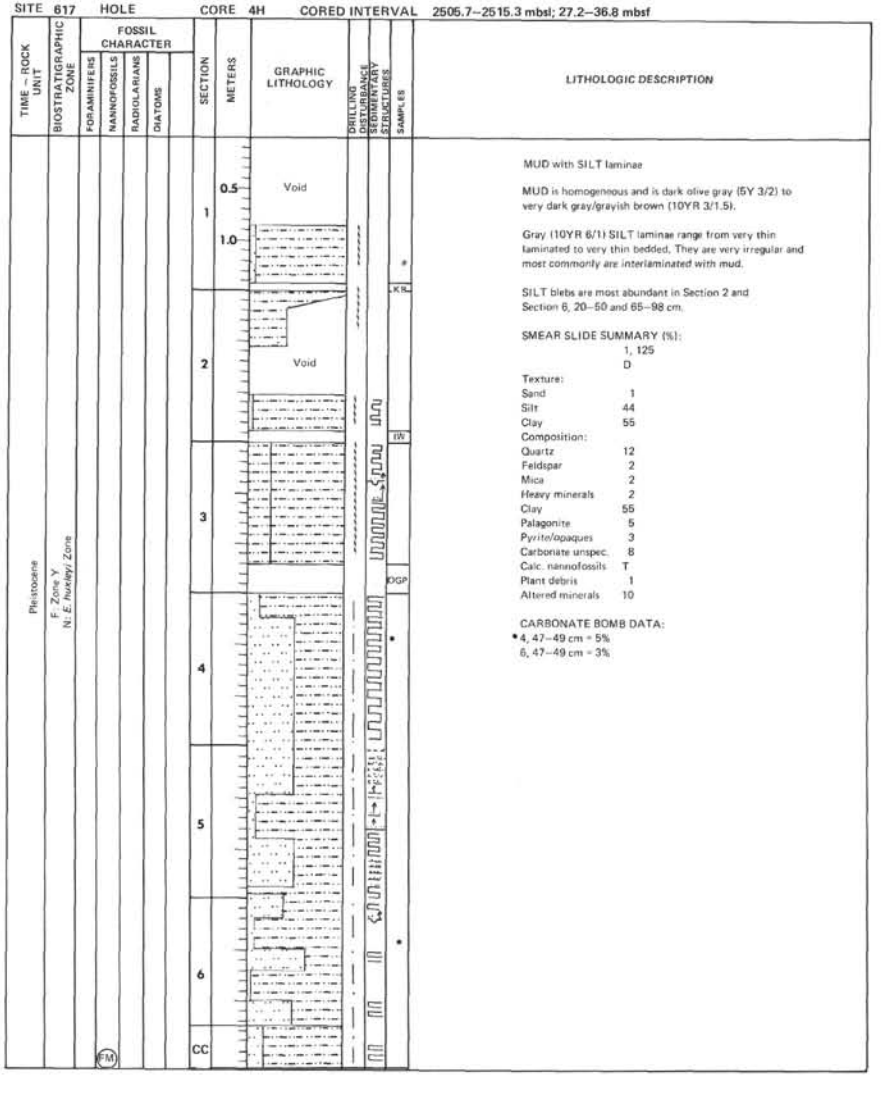
(Interpretation: structures consistent with slumping on back side of a levee.)

SMEAR SLIDE SUMMARY (%):

	5, 73 M
Texture:	
Sand	2
Silt	80
Clay	18
Composition:	
Quartz	50
Feldspar	5
Mica	2
Heavy minerals	5
Clay	18
Palagonite	T
Glauconite	T
Pyrite	T
Micronodules	T
Carbonate unspec.	10
Foraminifers	T
Calc. nannofossils	T
Plant debris	T
Altered minerals	10

CARBONATE BOMB DATA:
*3, 80–82 cm = 9%
5, 80–82 cm = 10%

SITE 617 HOLE CORE 4H CORED INTERVAL 2505.7–2515.3 mbsl; 27.2–36.8 mbsf



LITHOLOGIC DESCRIPTION

MUD with SILT laminae

MUD is homogeneous and is dark olive gray (5Y 3/2) to very dark gray/grayish brown (10YR 3/1.5).

Gray (10YR 6/1) SILT laminae range from very thin laminated to very thin bedded. They are very irregular and most commonly are interlaminated with mud.

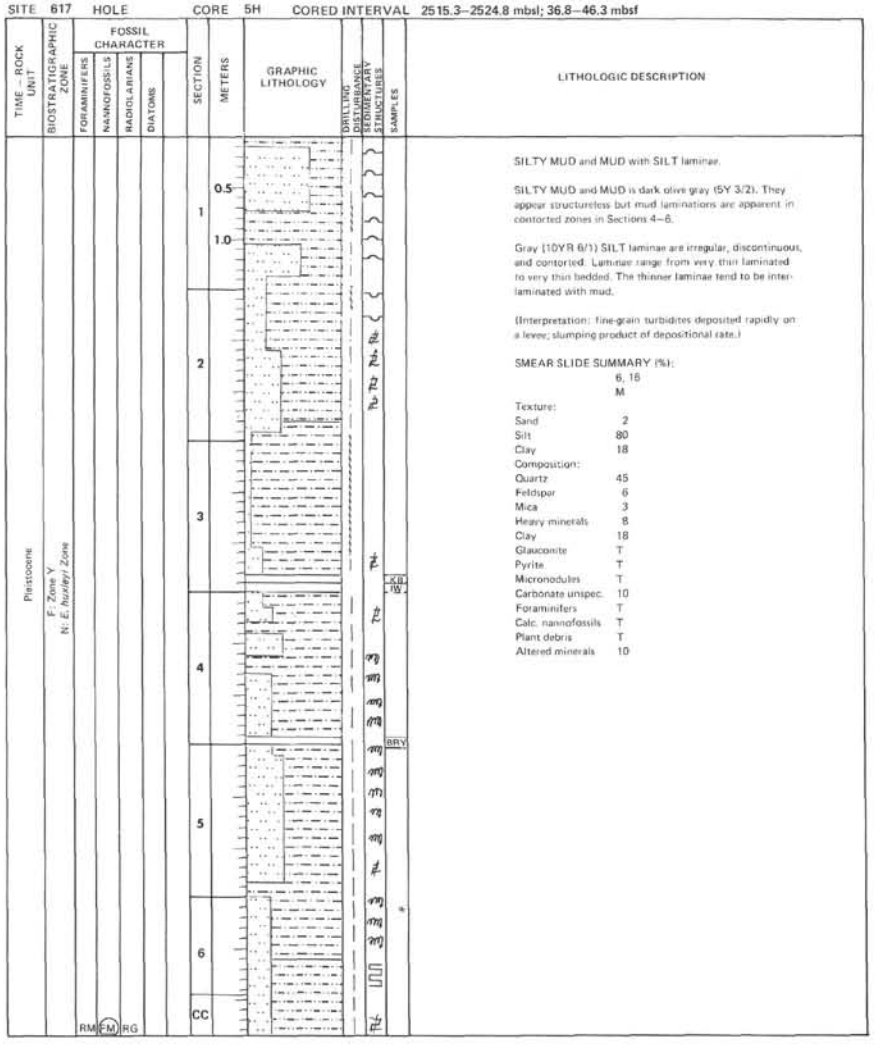
SILT blebs are most abundant in Section 2 and Section 6, 20–50 and 65–98 cm.

SMEAR SLIDE SUMMARY (%):

	1, 125 D
Texture:	
Sand	1
Silt	44
Clay	55
Composition:	
Quartz	12
Feldspar	2
Mica	2
Heavy minerals	2
Clay	55
Palagonite	5
Pyrite/opaques	3
Carbonate unspec.	8
Calc. nannofossils	T
Plant debris	1
Altered minerals	10

CARBONATE BOMB DATA:
*4, 47–49 cm = 5%
6, 47–49 cm = 3%

SITE 617 HOLE CORE 5H CORED INTERVAL 2515.3–2524.8 mbsl; 36.8–46.3 mbsf



LITHOLOGIC DESCRIPTION

SILTY MUD and MUD with SILT laminae.

SILTY MUD and MUD is dark olive gray (5Y 3/2). They appear structureless but mud laminations are apparent in contorted zones in Sections 4–6.

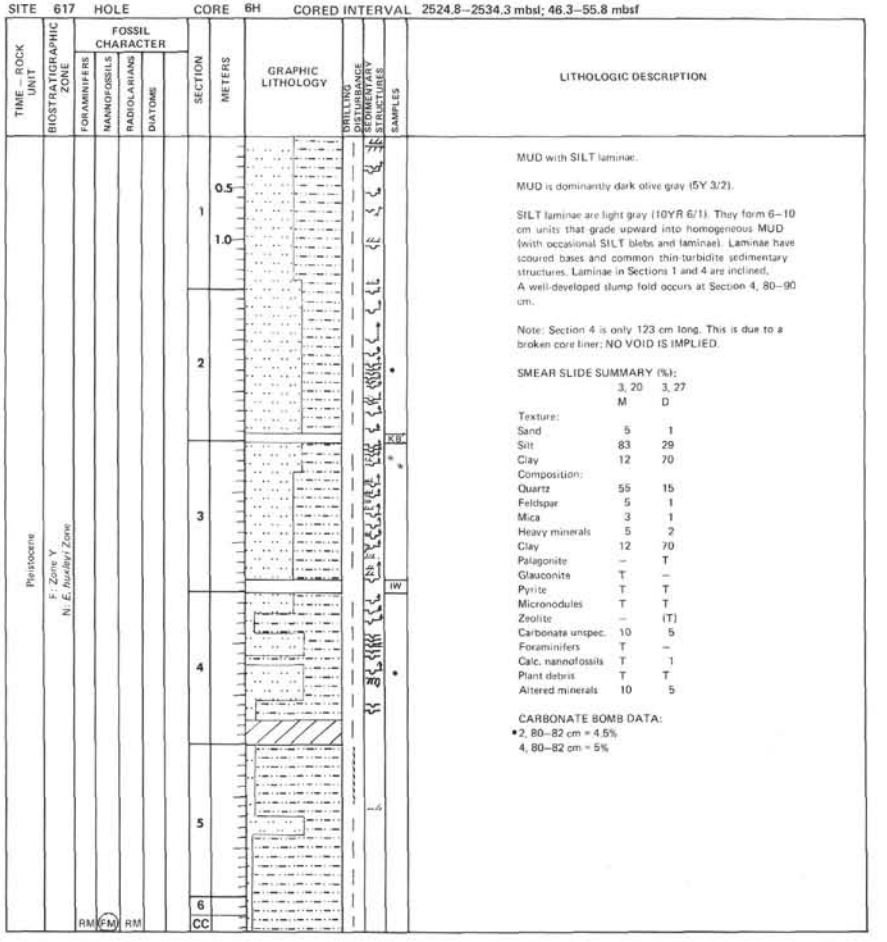
Gray (10YR 6/1) SILT laminae are irregular, discontinuous, and contorted. Laminae range from very thin laminated to very thin bedded. The thinner laminae tend to be interlaminated with mud.

(Interpretation: fine-grain turbidites deposited rapidly on a levee; slumping product of depositional rate.)

SMEAR SLIDE SUMMARY (%):

	6, 16 M
Texture:	
Sand	2
Silt	80
Clay	18
Composition:	
Quartz	45
Feldspar	6
Mica	3
Heavy minerals	8
Clay	18
Glauconite	T
Pyrite	T
Micronodules	T
Carbonate unspec.	10
Foraminifers	T
Calc. nannofossils	T
Plant debris	T
Altered minerals	10

SITE 617 HOLE CORE 6H CORED INTERVAL 2524.8–2534.3 mbsl; 46.3–55.8 mbsf



LITHOLOGIC DESCRIPTION

MUD with SILT laminae.

MUD is dominantly dark olive gray (5Y 3/2).

SILT laminae are light gray (10YR 6/1). They form 6–10 cm units that grade upward into homogeneous MUD (with occasional SILT blebs and laminae). Laminae have scoured bases and common thin-turbidite sedimentary structures. Laminae in Sections 1 and 4 are inclined.

A well-developed slump fold occurs at Section 4, 80–90 cm.

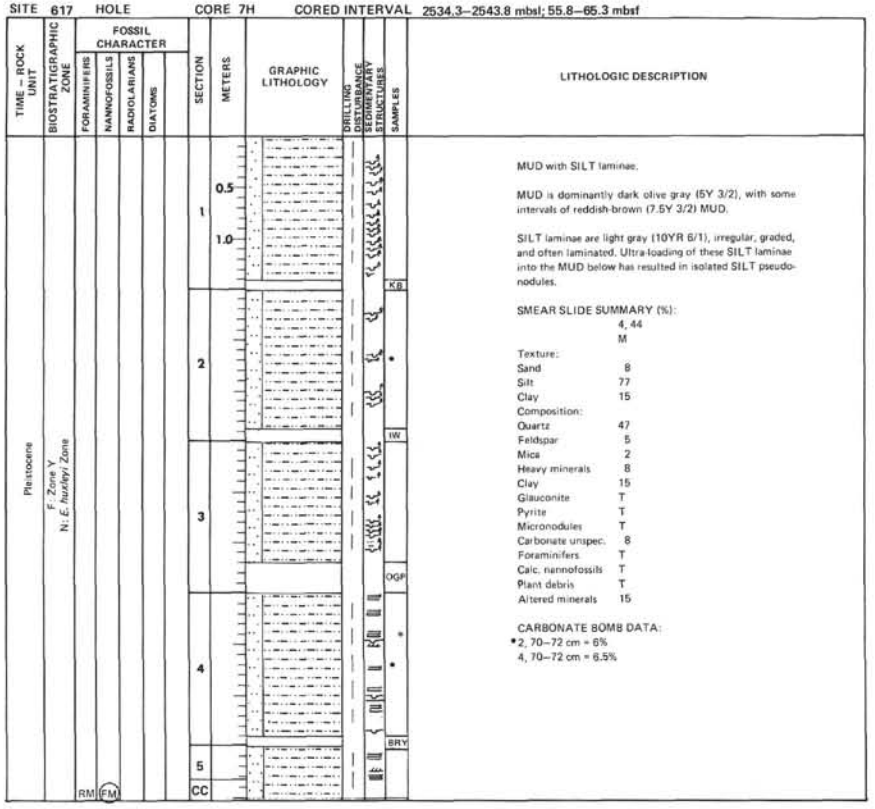
Note: Section 4 is only 123 cm long. This is due to a broken core liner; NO VOID IS IMPLIED.

SMEAR SLIDE SUMMARY (%):

	3, 20 M	3, 27 D
Texture:		
Sand	5	1
Silt	83	29
Clay	12	70
Composition:		
Quartz	55	15
Feldspar	5	1
Mica	3	1
Heavy minerals	5	2
Clay	12	70
Palagonite	–	T
Glauconite	T	–
Pyrite	T	T
Micronodules	T	T
Zeolite	–	(T)
Carbonate unspec.	10	5
Foraminifers	T	–
Calc. nannofossils	T	1
Plant debris	T	T
Altered minerals	10	5

CARBONATE BOMB DATA:
•2, 80–82 cm = 4.5%
4, 80–82 cm = 5%

SITE 617 HOLE CORE 7H CORED INTERVAL 2534.3–2543.8 mbsl; 55.8–65.3 mbsf



LITHOLOGIC DESCRIPTION

MUD with SILT laminae.

MUD is dominantly dark olive gray (5Y 3/2), with some intervals of reddish-brown (7.5Y 3/2) MUD.

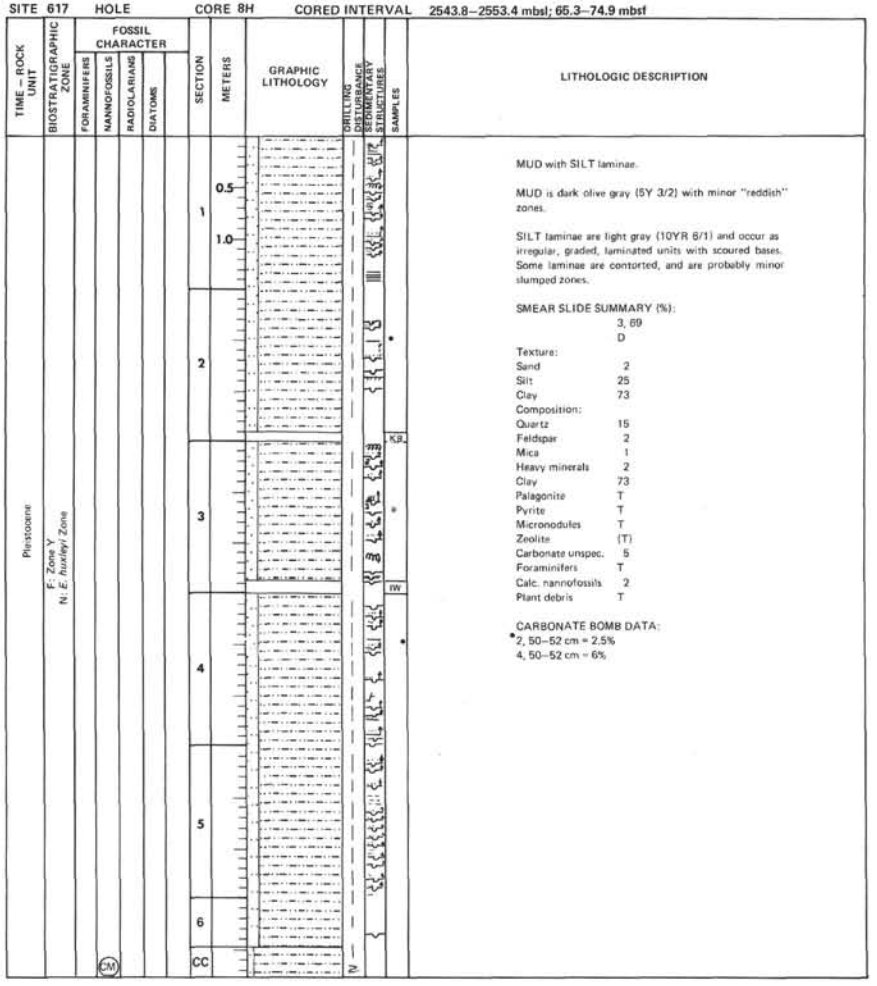
SILT laminae are light gray (10YR 6/1), irregular, graded, and often laminated. Ultra-loading of these SILT laminae into the MUD below has resulted in isolated SILT pseudo-nodules.

SMEAR SLIDE SUMMARY (%):

	4, 44 M
Texture:	
Sand	8
Silt	77
Clay	15
Composition:	
Quartz	47
Feldspar	5
Mica	2
Heavy minerals	8
Clay	15
Glauconite	T
Pyrite	T
Micronodules	T
Carbonate unspec.	8
Foraminifers	T
Calc. nannofossils	T
Plant debris	T
Altered minerals	15

CARBONATE BOMB DATA:
*2, 70–72 cm = 6%
4, 70–72 cm = 6.5%

SITE 617 HOLE CORE 8H CORED INTERVAL 2543.8–2553.4 mbsl; 65.3–74.9 mbsf



LITHOLOGIC DESCRIPTION

MUD with SILT laminae.

MUD is dark olive gray (5Y 3/2) with minor "reddish" zones.

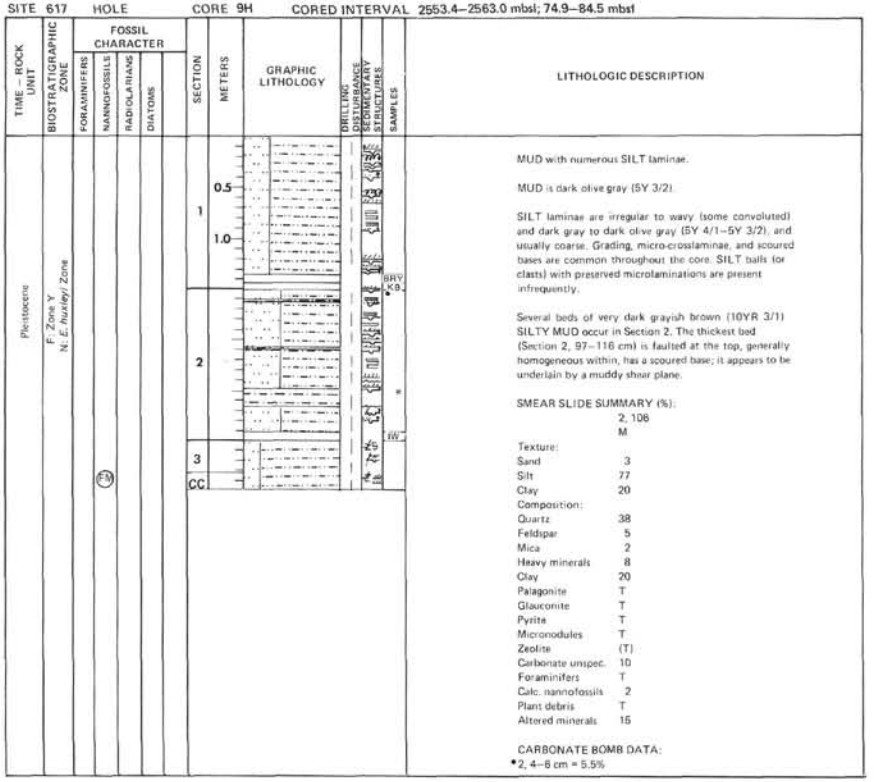
SILT laminae are light gray (10YR 6/1) and occur as irregular, graded, laminated units with scoured bases. Some laminae are contorted, and are probably minor slumped zones.

SMEAR SLIDE SUMMARY (%):

	3, 69 D
Texture:	
Sand	2
Silt	25
Clay	73
Composition:	
Quartz	15
Feldspar	2
Mica	1
Heavy minerals	2
Clay	73
Palagonite	T
Pyrite	T
Micronodules	T
Zeolite	(T)
Carbonate unspec.	5
Foraminifers	T
Calc. nannofossils	2
Plant debris	T

CARBONATE BOMB DATA:
*2, 50–52 cm = 2.5%
4, 50–52 cm = 6%

SITE 617 HOLE CORE 9H CORED INTERVAL 2553.4–2563.0 mbsl; 74.9–84.5 mbsl



LITHOLOGIC DESCRIPTION

MUD with numerous SILT laminae.

MUD is dark olive gray (5Y 3/2).

SILT laminae are irregular to wavy (some convoluted) and dark gray to dark olive gray (5Y 4/1–5Y 3/2), and usually coarse. Grading, micro-crosslaminae, and scoured bases are common throughout the core. SILT balls (or clasts) with preserved microlaminations are present infrequently.

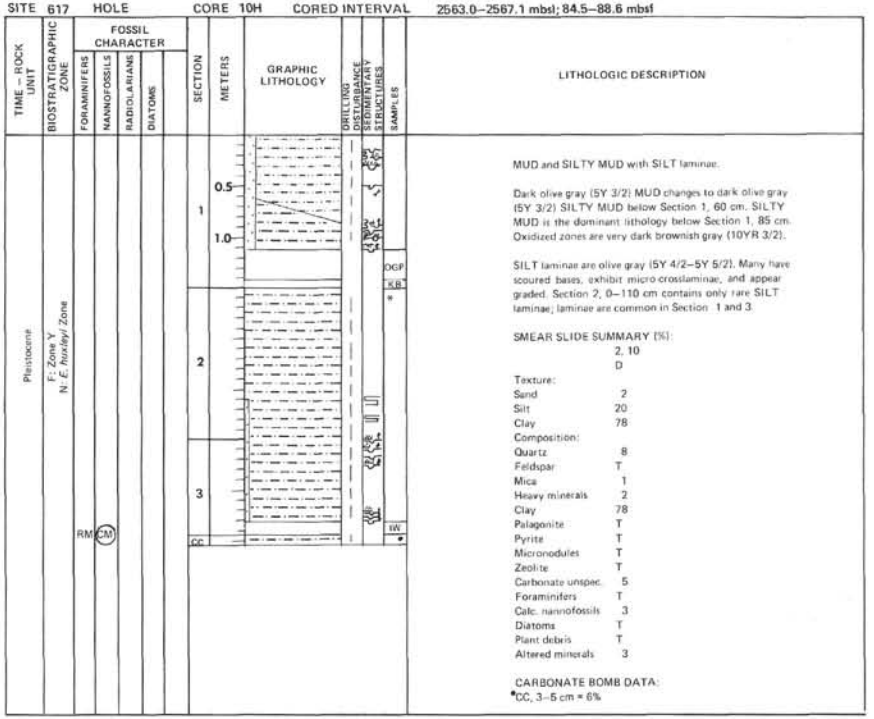
Several beds of very dark grayish brown (10YR 3/1) SILTY MUD occur in Section 2. The thickest bed (Section 2, 97–116 cm) is faulted at the top, generally homogeneous within, has a scoured base; it appears to be underlain by a muddy shear plane.

SMEAR SLIDE SUMMARY (%):

	2, 106 M
Texture:	
Sand	3
Silt	77
Clay	20
Composition:	
Quartz	38
Feldspar	5
Mica	2
Heavy minerals	8
Clay	20
Palagonite	T
Glauconite	T
Pyrite	T
Micronodules	T
Zeolite	(T)
Carbonate unspec.	10
Foraminifers	T
Calc. nannofossils	2
Plant debris	T
Altered minerals	15

CARBONATE BOMB DATA:
•2, 4–6 cm = 5.5%

SITE 617 HOLE CORE 10H CORED INTERVAL 2563.0–2567.1 mbsl; 84.5–88.6 mbsl



LITHOLOGIC DESCRIPTION

MUD and SILTY MUD with SILT laminae.

Dark olive gray (5Y 3/2) MUD changes to dark olive gray (5Y 3/2) SILTY MUD below Section 1, 60 cm. SILTY MUD is the dominant lithology below Section 1, 85 cm. Oxidized zones are very dark brownish gray (10YR 3/2).

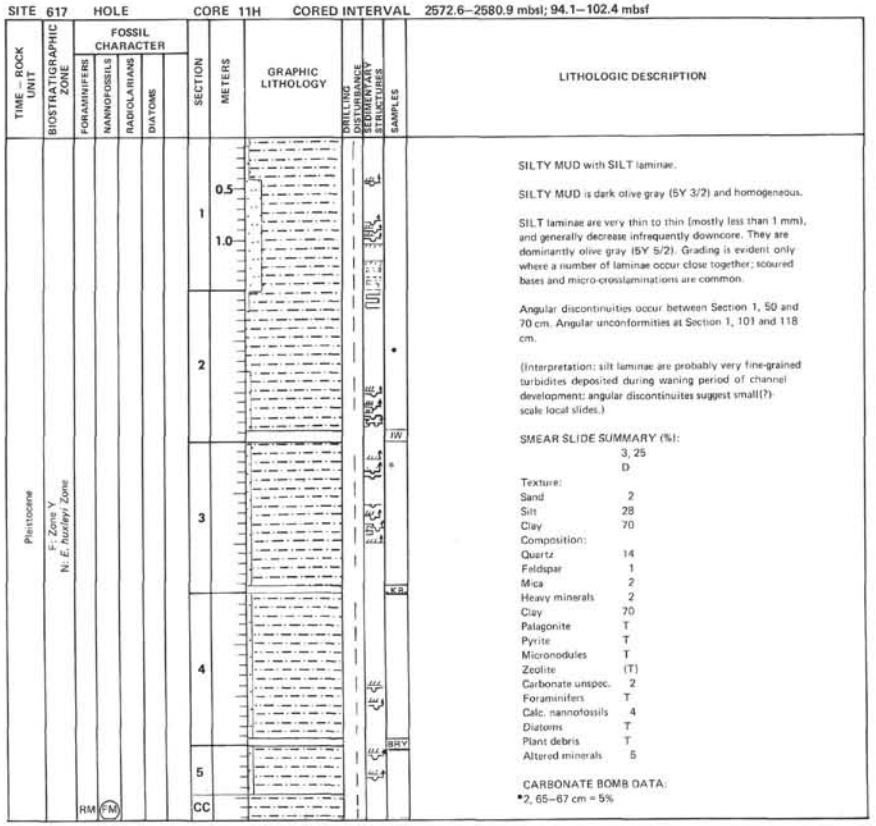
SILT laminae are olive gray (5Y 4/2–5Y 5/2). Many have scoured bases, exhibit micro-crosslaminae, and appear graded. Section 2, 0–110 cm contains only rare SILT laminae; laminae are common in Section 1 and 3.

SMEAR SLIDE SUMMARY (%):

	2, 10 D
Texture:	
Sand	2
Silt	20
Clay	78
Composition:	
Quartz	8
Feldspar	T
Mica	1
Heavy minerals	2
Clay	78
Palagonite	T
Pyrite	T
Micronodules	T
Zeolite	T
Carbonate unspec.	5
Foraminifers	T
Calc. nannofossils	3
Diatoms	T
Plant debris	T
Altered minerals	3

CARBONATE BOMB DATA:
•CC, 3–5 cm = 6%

SITE 617 HOLE CORE 11H CORED INTERVAL 2572.6–2580.9 mbsl; 94.1–102.4 mbsf



LITHOLOGIC DESCRIPTION

SILTY MUD with SILT laminae.

SILTY MUD is dark olive gray (5Y 3/2) and homogeneous.

SILT laminae are very thin to thin (mostly less than 1 mm), and generally decrease infrequently downcore. They are dominantly olive gray (5Y 5/2). Grading is evident only where a number of laminae occur close together; scoured bases and micro-crosslaminations are common.

Angular discontinuities occur between Section 1, 50 and 70 cm. Angular unconformities at Section 1, 101 and 118 cm.

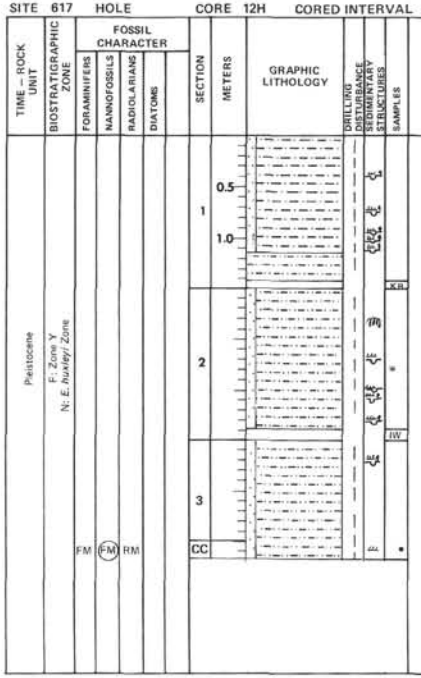
(Interpretation: silt laminae are probably very fine-grained turbidites deposited during waning period of channel development; angular discontinuites suggest small(?) scale local slides.)

SMEAR SLIDE SUMMARY (%):

	3, 25 D
Texture:	
Sand	2
Silt	28
Clay	70
Composition:	
Quartz	14
Feldspar	1
Mica	2
Heavy minerals	2
Clay	70
Palagonite	T
Pyrite	T
Micronodules	T
Zeolite	(T)
Carbonate unspec.	2
Foraminifers	T
Calc. nannofossils	4
Diatoms	T
Plant debris	T
Altered minerals	5

CARBONATE BOMB DATA:
*2, 65–67 cm = 5%

SITE 617 HOLE CORE 12H CORED INTERVAL 2582.1–2586.6 mbsl; 103.6–108.1 mbsf



LITHOLOGIC DESCRIPTION

SILTY MUD and MUD with SILT laminations.

Homogeneous, dark olive gray SILTY MUD (5Y 3/2) changes to homogeneous, dark olive gray MUD (5Y 3/2) in Section 1. Oxidation (reddish) enhanced laminations evident within contorted zone in Section 2.

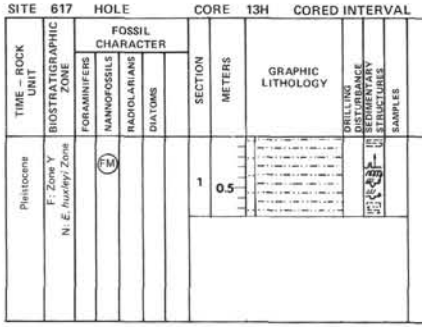
SILT laminae and blebs are gray/dark gray (5Y 4.5/1) and are generally medium- to coarse-grained. Laminae in the SILTY MUD are very thin–thin and are graded with scoured bases and micro-crosslaminae. Blebs are more common in the MUD; laminae (very thin to thin) are irregular to discontinuous and are graded with scoured bases and micro-crosslaminae. Laminae appears overturned in contorted zone (Section 2).

SMEAR SLIDE SUMMARY (%):

	2, 80 D
Texture:	
Sand	1
Silt	30
Clay	69
Composition:	
Quartz	12
Feldspar	1
Mica	1
Heavy minerals	2
Clay	69
Carbonate unspec.	7
Calc. nannofossils	3
Altered minerals	5

CARBONATE BOMB DATA:
*CC, 13–15 cm = 4.5%

SITE 617 HOLE CORE 13H CORED INTERVAL 2591.6–2592.4 mbsl; 113.1–113.9 mbsf



LITHOLOGIC DESCRIPTION

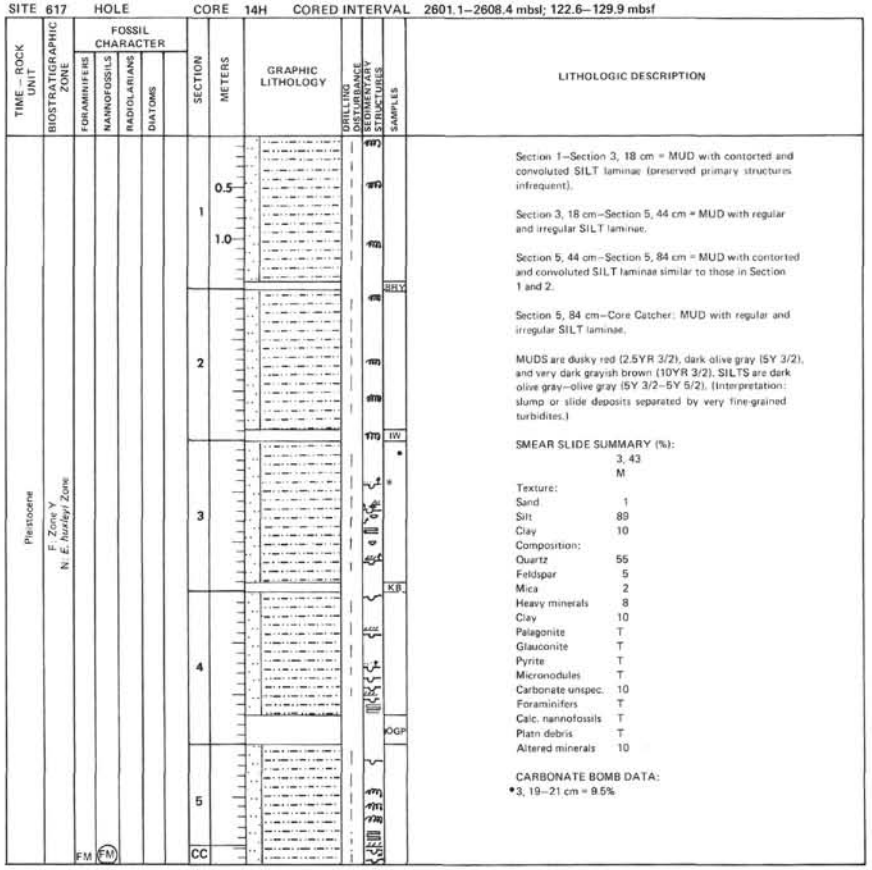
MUD with SILT laminae.

MUD is dark olive gray (5Y 3/2), and homogeneous to faintly laminated.

SILT laminae are very thin to thin and gray (5Y 5/1). Section 1, 15–35 cm consists of convoluted MUD and SILT laminae; one laminae at Section 1, 30 cm has a preserved flame structure.

NO CORE CATCHER SAMPLE RECOVERED.

SITE 617 HOLE CORE 14H CORED INTERVAL 2601.1–2608.4 mbsl; 122.6–129.9 mbsf



Section 1–Section 3, 18 cm = MUD with contorted and convoluted SILT laminae (preserved primary structures infrequent).

Section 3, 18 cm–Section 5, 44 cm = MUD with regular and irregular SILT laminae.

Section 5, 44 cm–Section 5, 84 cm = MUD with contorted and convoluted SILT laminae similar to those in Section 1 and 2.

Section 5, 84 cm–Core Catcher: MUD with regular and irregular SILT laminae.

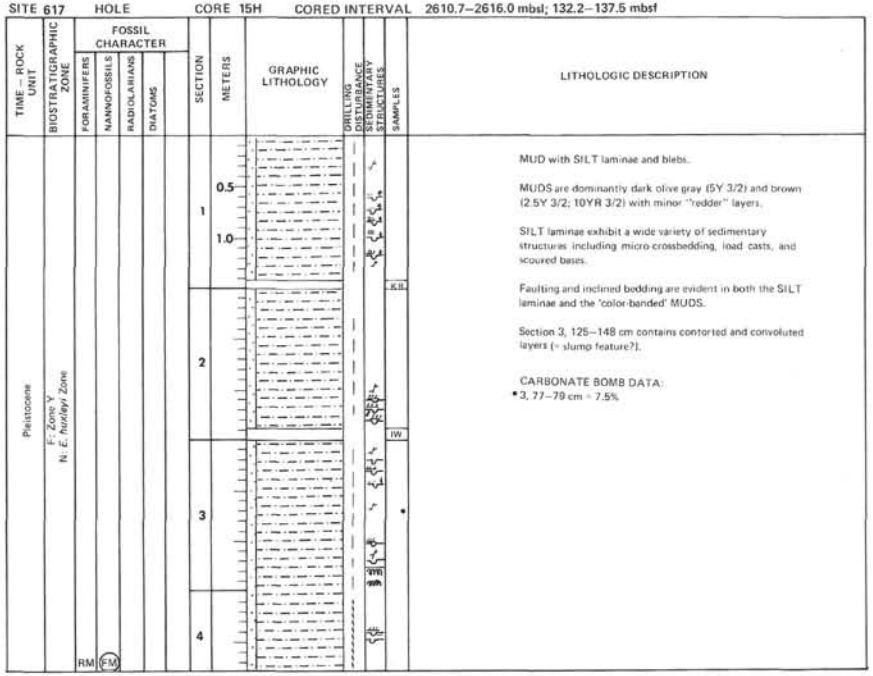
MUDS are dusky red (2.5YR 3/2), dark olive gray (5Y 3/2), and very dark grayish brown (10YR 3/2). SILTS are dark olive gray–olive gray (5Y 3/2–5Y 5/2). (Interpretation: slump or slide deposits separated by very fine-grained turbidites.)

SMEAR SLIDE SUMMARY (%):

	3, 43 M
Texture:	
Sand	1
Silt	89
Clay	10
Composition:	
Quartz	55
Feldspar	5
Mica	2
Heavy minerals	8
Clay	10
Pelagonite	T
Glauconite	T
Pyrite	T
Micronodules	T
Carbonate unspec.	10
Foraminifers	T
Calc. nannofossils	T
Platn debris	T
Altered minerals	10

CARBONATE BOMB DATA:
*3, 19–21 cm = 9.5%

SITE 617 HOLE CORE 15H CORED INTERVAL 2610.7–2616.0 mbsl; 132.2–137.5 mbsf



MUD with SILT laminae and blebs.

MUDS are dominantly dark olive gray (5Y 3/2) and brown (2.5Y 3/2; 10YR 3/2) with minor "redder" layers.

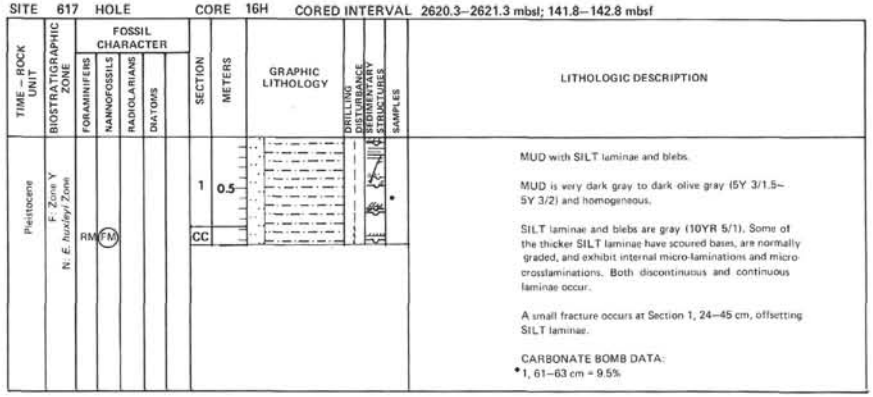
SILT laminae exhibit a wide variety of sedimentary structures including micro-crossbedding, load casts, and scoured bases.

Faulting and inclined bedding are evident in both the SILT laminae and the 'color-banded' MUDS.

Section 3, 125–148 cm contains contorted and convoluted layers (= slump feature?).

CARBONATE BOMB DATA:
*3, 77–79 cm = 7.5%

SITE 617 HOLE CORE 16H CORED INTERVAL 2620.3–2621.3 mbsl; 141.8–142.8 mbsf



MUD with SILT laminae and blebs.

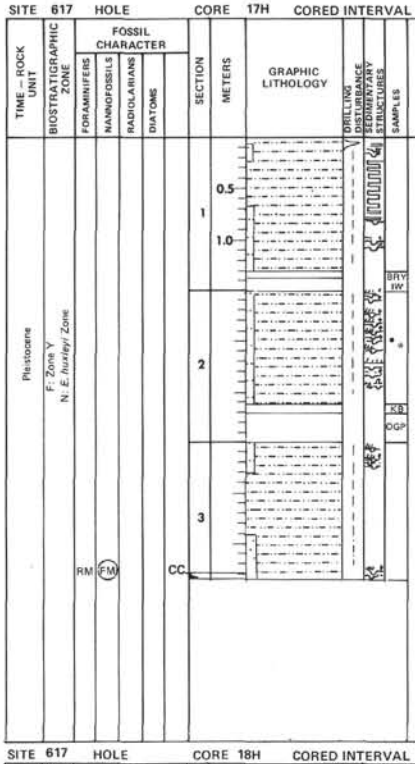
MUD is very dark gray to dark olive gray (5Y 3/1.5–5Y 3/2) and homogeneous.

SILT laminae and blebs are gray (10YR 5/1). Some of the thicker SILT laminae have scoured bases, are normally graded, and exhibit internal micro-laminations and micro-crosslaminations. Both discontinuous and continuous laminae occur.

A small fracture occurs at Section 1, 24–45 cm, offsetting SILT laminae.

CARBONATE BOMB DATA:
*1, 61–63 cm = 9.5%

SITE 617 HOLE CORE 17H CORED INTERVAL 2629.9–2634.4 mbsl; 151.4–155.9 mbsf



LITHOLOGIC DESCRIPTION

MUD with SILT laminae and blebs.

MUD is homogeneous or fine-color-laminated. Colors include very dark grayish brown (10YR 3/2) and dark olive gray (5Y 3/1.5–5Y 3/2). SILT laminae and blebs occur in both the homogeneous and the color-banded MUD sections.

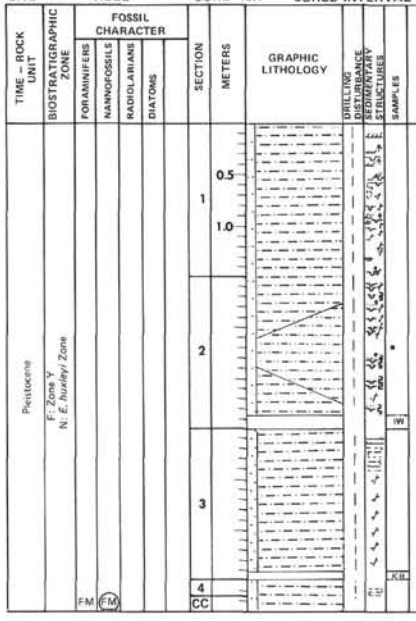
SILT laminae and blebs are gray to light gray (10YR 6/1). Laminae range from continuous to discontinuous. Some exhibit sedimentary structures, including: scoured bases, normal grading, micro-crossbedding, flame structures, and internal parallel laminations.

SMEAR SLIDE SUMMARY (%):

	2, 55 D
Texture:	
Sand	1
Silt	20
Clay	79
Composition:	
Quartz	7
Feldspar	T
Mica	1
Heavy minerals	1
Clay	79
Palagonite	T
Pyrite	T
Micronodules	T
Zeolite	*(T)*
Carbonate unspec.	2
Foraminifers	T
Calc. nannofossils	8
Plant debris	T
Altered minerals	2

CARBONATE BOMB DATA:
*2, 50–52 cm = 5.5%

SITE 617 HOLE CORE 18H CORED INTERVAL 2639.5–2644.3 mbsl; 161.0–165.8 mbsf



LITHOLOGIC DESCRIPTION

SILTY MUD and MUD with SILT laminations.

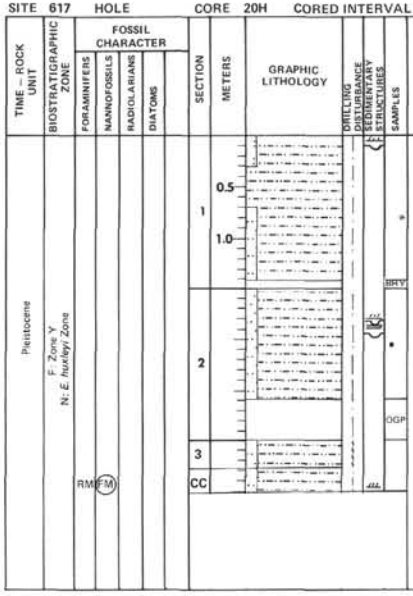
Dark olive gray (5Y 3/2) and very dark grayish brown (10YR 3/2) SILTY MUD and very dark grayish brown (10YR 3/2) MUD.

SILT laminations are dark grayish brown (10YR 4/2), gray (5Y 5.5/1), olive gray (5Y 4/2), and grayish brown (2.5Y 5/2). Laminations are irregular and often discontinuous, contorted, and fractured along micro-faults (microfaults are especially common in Section 3). Many of the laminae have scoured bases, are graded, and show micro-laminations and cross-laminations.

CARBONATE BOMB DATA:
*2, 70–72 cm = 9%

Note: Core 19H, 2649.1–2649.1 mbsl; 170.6–170.6 mbsf: no recovery.

SITE 617 HOLE CORE 20H CORED INTERVAL 2658.7–2662.3 mbsl; 180.2–183.8 mbsf



LITHOLOGIC DESCRIPTION

MUD with SILT laminations.

MUD, predominantly very dark gray (10YR 3/1), but also very dark olive gray (5Y 3/1.5). MUDS are subtly color-bands; colors separated by gradational contacts.

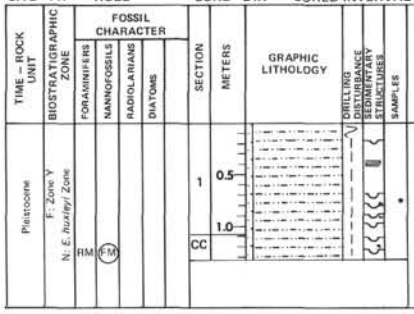
SILT laminae are grayish brown to dark grayish brown (2.5Y 5/2–10YR 4/2). Rare cross-laminations are present; the laminae are horizontal or dip slightly (maximum = 20°). Microfaulting is much less obvious than in the previous cores.

SMEAR SLIDE SUMMARY (%):

	1, 80 D
Texture:	
Sand	0
Silt	20
Clay	80
Composition:	
Quartz	10
Mica	3
Heavy minerals	1
Clay	81
Micronodules	T
Carbonate unspec.	5
Calc. nannofossils	T

CARBONATE BOMB DATA:
*2, 59–61 cm = 7%

SITE 617 HOLE CORE 21H CORED INTERVAL 2668.3–2669.7 mbsl; 189.8–191.2 mbsf



LITHOLOGIC DESCRIPTION

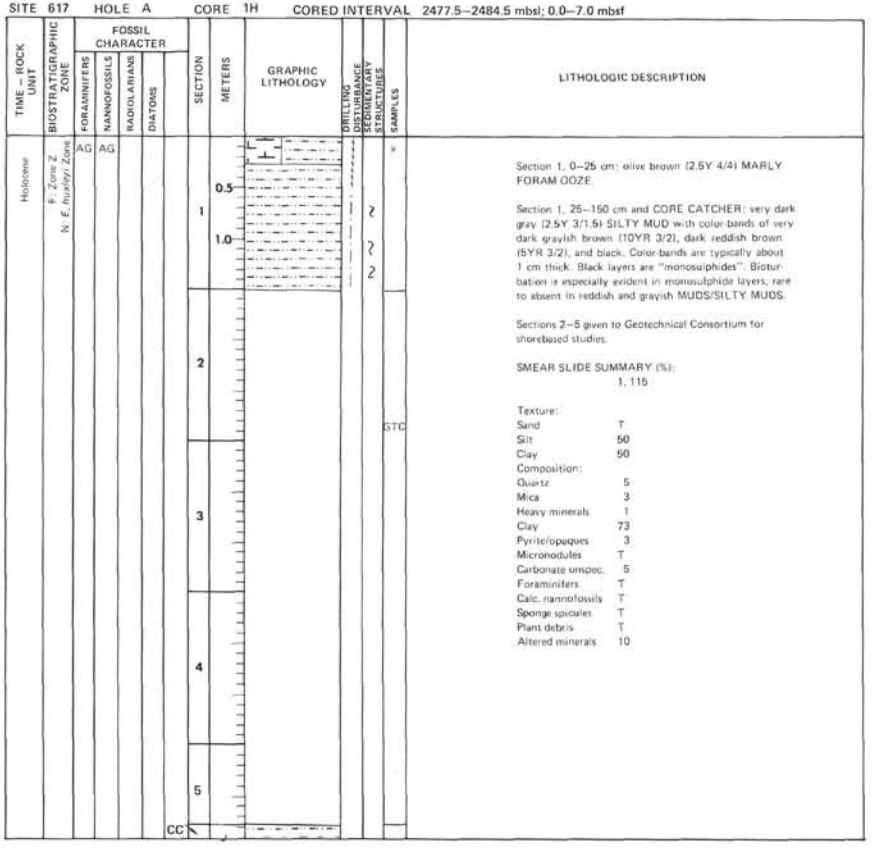
MUD with SILT laminae and blebs.

MUD is dark olive gray (5Y 3/1.5–5Y 3/2); homogeneous to very faintly color-banded.

SILT laminae olive gray (5Y 5/2) and dark grayish brown (2.5Y 4/2). A few of the SILT laminae have scoured bases and internal parallel laminations.

CARBONATE BOMB DATA:
*1, 79–81 cm = 12%

SITE 617 HOLE A CORE 1H CORED INTERVAL 2477.5–2484.5 mbsl; 0.0–7.0 mbsf



Section 1, 0–25 cm: olive brown (2.5Y 4/4) MARLY FORAM OOZE.

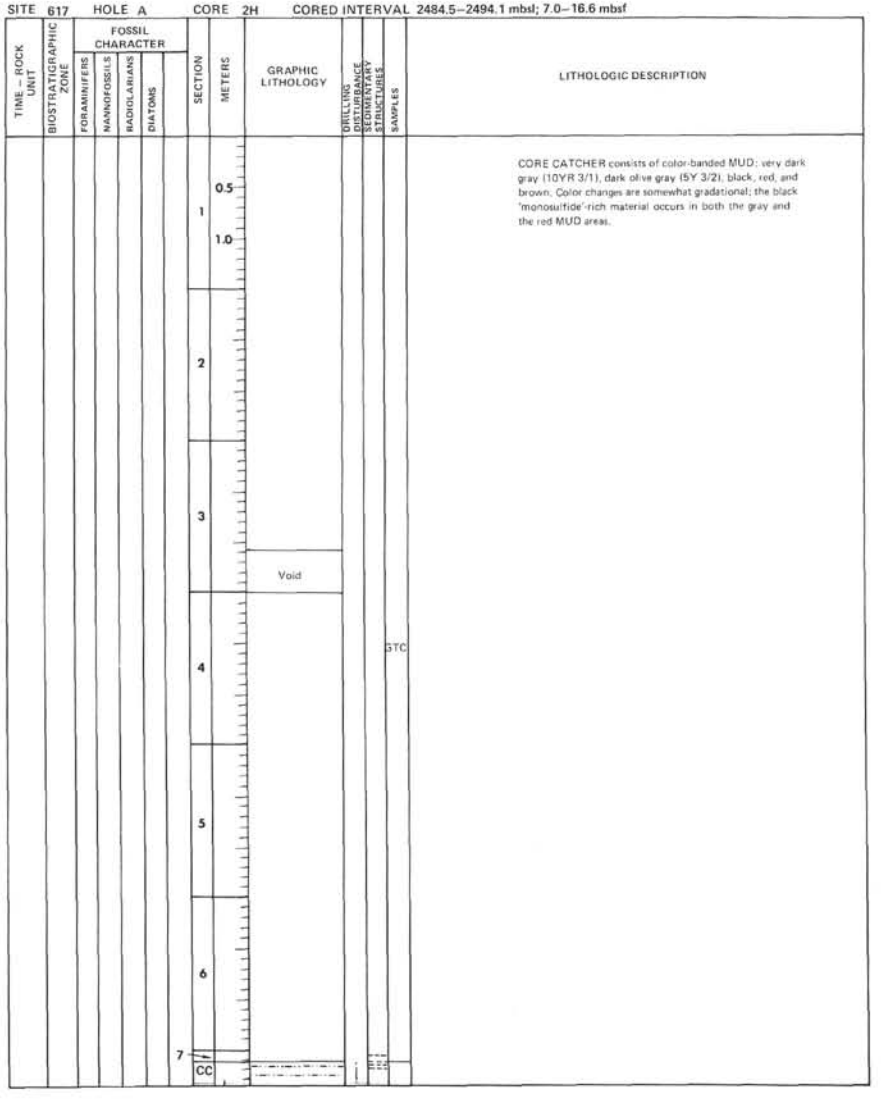
Section 1, 25–150 cm and CORE CATCHER: very dark gray (2.5Y 3/1.5) SILTY MUD with color bands of very dark grayish brown (10YR 3/2), dark reddish brown (5YR 3/2), and black. Color-bands are typically about 1 cm thick. Black layers are "monosulphides". Bioturbation is especially evident in monosulphide layers; rare to absent in reddish and grayish MUDS/SILTY MUDS.

Sections 2–5 given to Geotechnical Consortium for shorebased studies.

SMEAR SLIDE SUMMARY (%):
1, 115

Texture:	
Sand	T
Silt	50
Clay	50
Composition:	
Quartz	5
Mica	3
Heavy minerals	1
Clay	73
Pyrite/opaques	3
Micronodules	T
Carbonate unspec.	5
Foraminifers	T
Calc. nannofossils	T
Sponge spicules	T
Plant debris	T
Altered minerals	10

SITE 617 HOLE A CORE 2H CORED INTERVAL 2484.5–2494.1 mbsl; 7.0–16.6 mbsf



CORE CATCHER consists of color-banded MUD: very dark gray (10YR 3/1), dark olive gray (5Y 3/2), black, red, and brown. Color changes are somewhat gradational; the black 'monosulfide'-rich material occurs in both the gray and the red MUD areas.

SITE 617 HOLE A CORE 3H CORED INTERVAL 2494.1–2503.7 mbsl; 16.6–26.2 mbsf

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					Core Catcher, 0–8 cm: homogeneous, very dark gray (10YR 3/1) MUD. Core Catcher, 8–27 cm: very dark gray (10YR 3/1) MUD with irregular SILT blebs and laminae. Laminae are very deformed due to drilling disturbance.
							1.0					
						2						
						3					GTC	
						4						
						5						
						6						
						CC						

SITE 617 HOLE A CORE 4H CORED INTERVAL 2503.7–2513.3 mbsl; 26.2–35.8 mbsf

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					Core Catcher consists of: 1) very dark gray (10YR 3/1) deformed and contorted SILT and MUD layers (CC, 0–10 cm and CC, 17–24 cm); and 2) very dark gray (10YR 3/1), fairly homogeneous MUD with minor SILT laminae (CC, 10–17 cm).
							1.0					
						2						
						3					GTC	
						4						
						5						
						6						
						CC						

SITE 617 HOLE A CORE 5H CORED INTERVAL 2513.3–2522.9 mbsl; 35.8–45.4 mbsf

TIME—ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
						1	0.5				*	
							1.0					
						2						
						3						
						CC						

MUD with SILT laminae.

MUD is dominantly dark olive gray (5Y 3/2) with thin, minor zones of very dark grayish brown (10YR 3/2).

SILT laminae are olive gray (5Y 5/2) and grayish brown (2.5Y 5/2), and are only very poorly graded. They exhibit indistinct micro-ripples.

Note: this core was stuck in the core barrel, and was very deformed during the extrusion process. Observed micro-faults and contorted silt laminae are likely due to core disturbance.

SMEAR SLIDE SUMMARY (%):

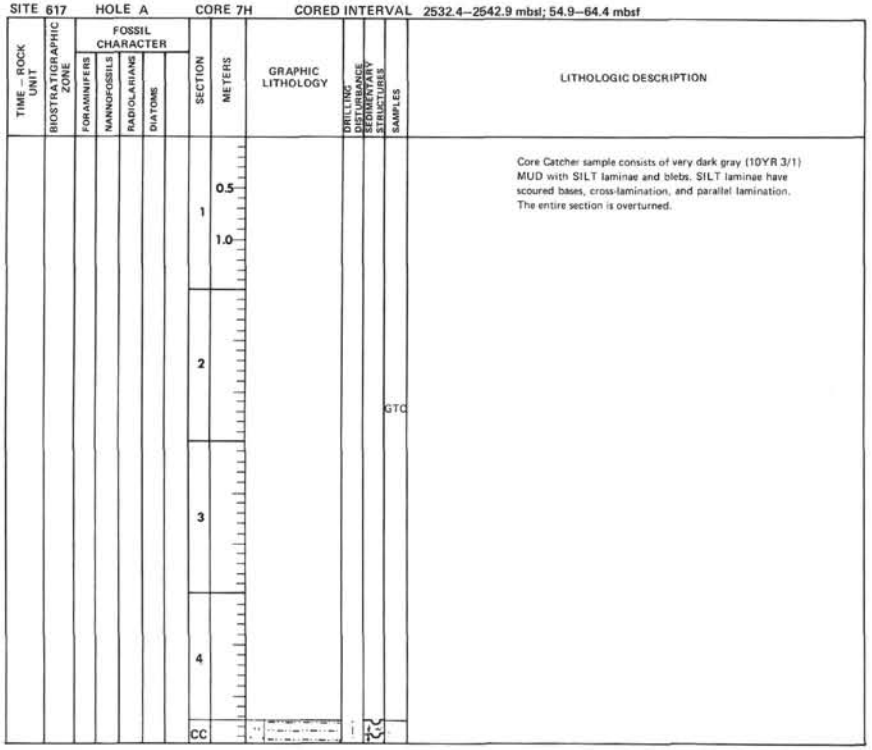
	1, 87 M
Texture:	
Sand	0
Silt	90
Clay	10
Composition:	
Quartz	75
Feldspar	4
Mica	5
Heavy minerals	2
Clay	9
Micronodules	T
Carbonate unspec.	5
Calc. nannofossils	T

SITE 617 HOLE A CORE 6H CORED INTERVAL 2522.9–2532.4 mbsl; 45.4–54.9 mbsf

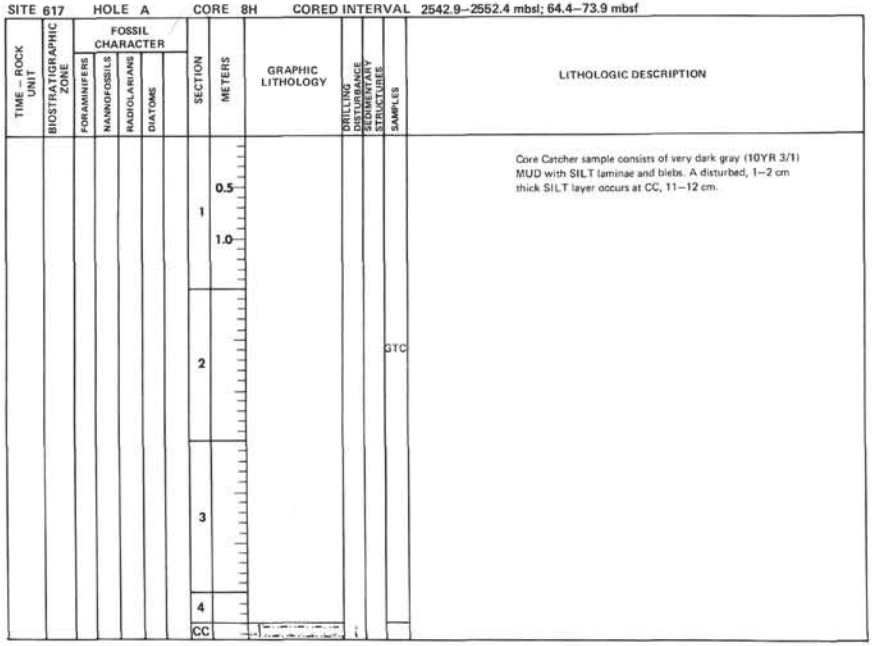
TIME—ROCK UNIT	BIOSTRATIGRAPHIC ZONE	FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURBANCE	SEDIMENTARY STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
						1	0.5					
							1.0					
						2						
						3					GTC	
						4						
						5						
						6						
						CC						

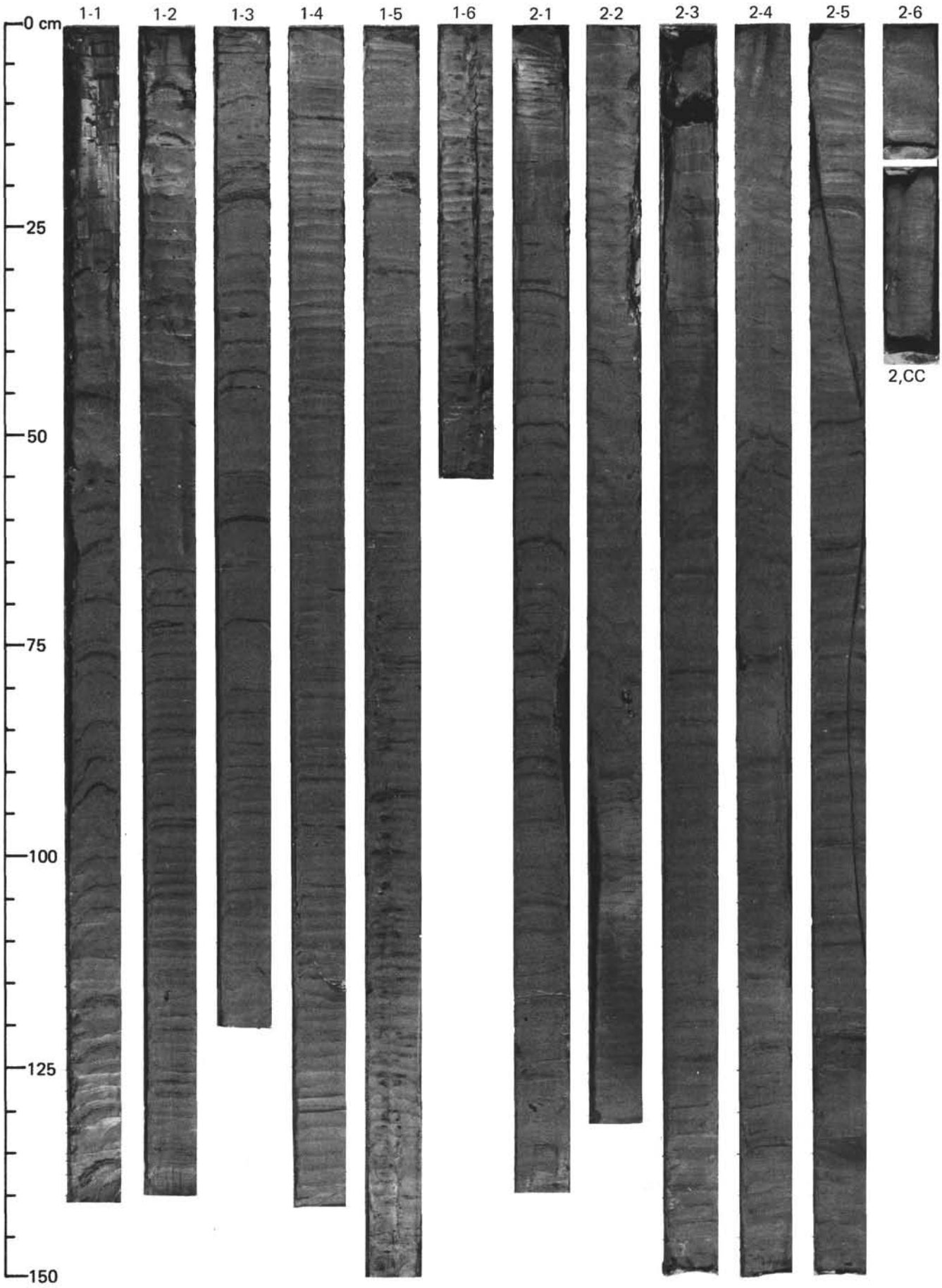
Core Catcher given to shipboard paleontologists. Rest of core unsplit for shorebased Geotechnical Consortium studies.

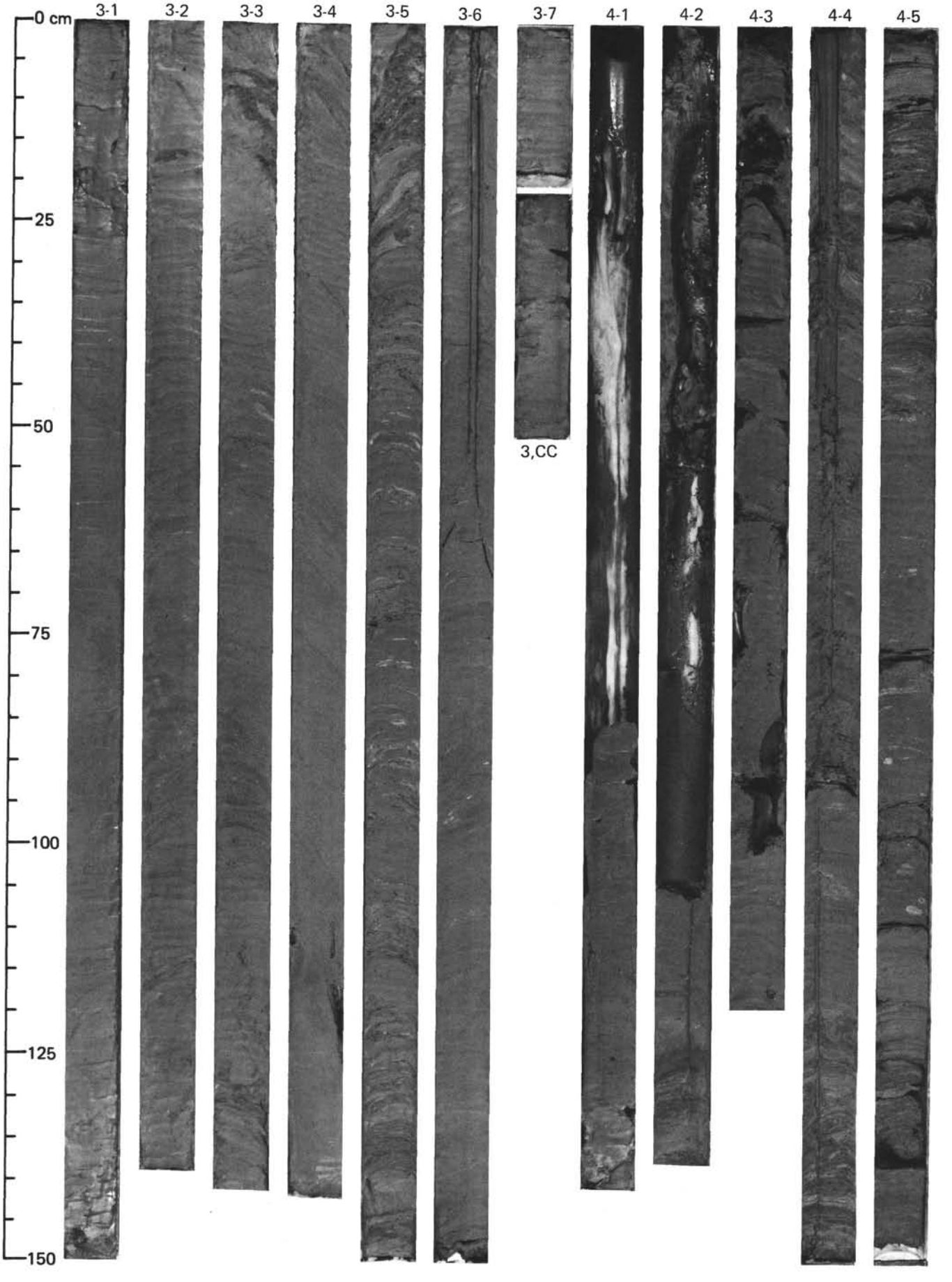
SITE 617 HOLE A CORE 7H CORED INTERVAL 2532.4–2542.9 mbsl; 54.9–64.4 mbsf



SITE 617 HOLE A CORE 8H CORED INTERVAL 2542.9–2552.4 mbsl; 64.4–73.9 mbsf




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


0 cm
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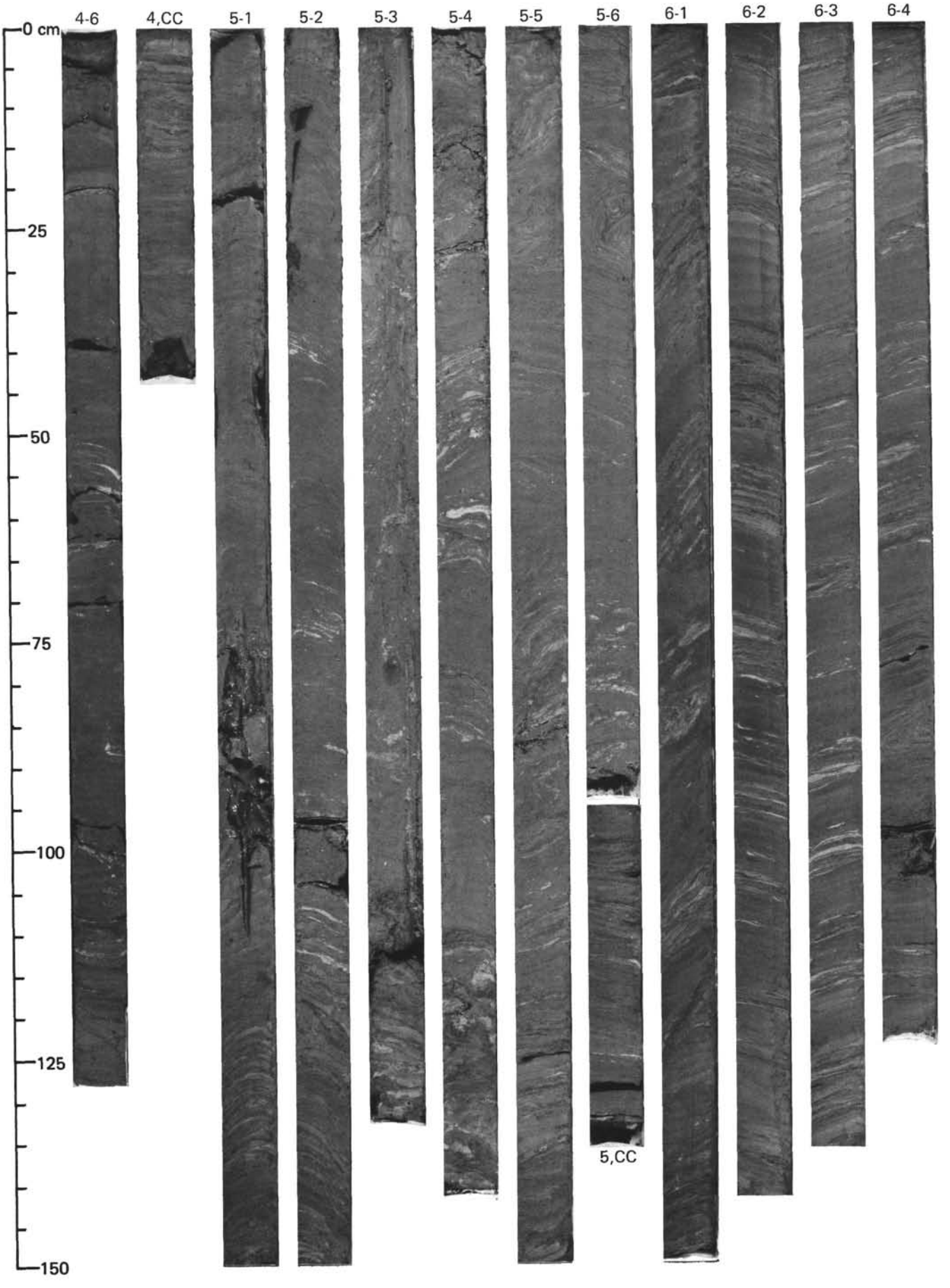
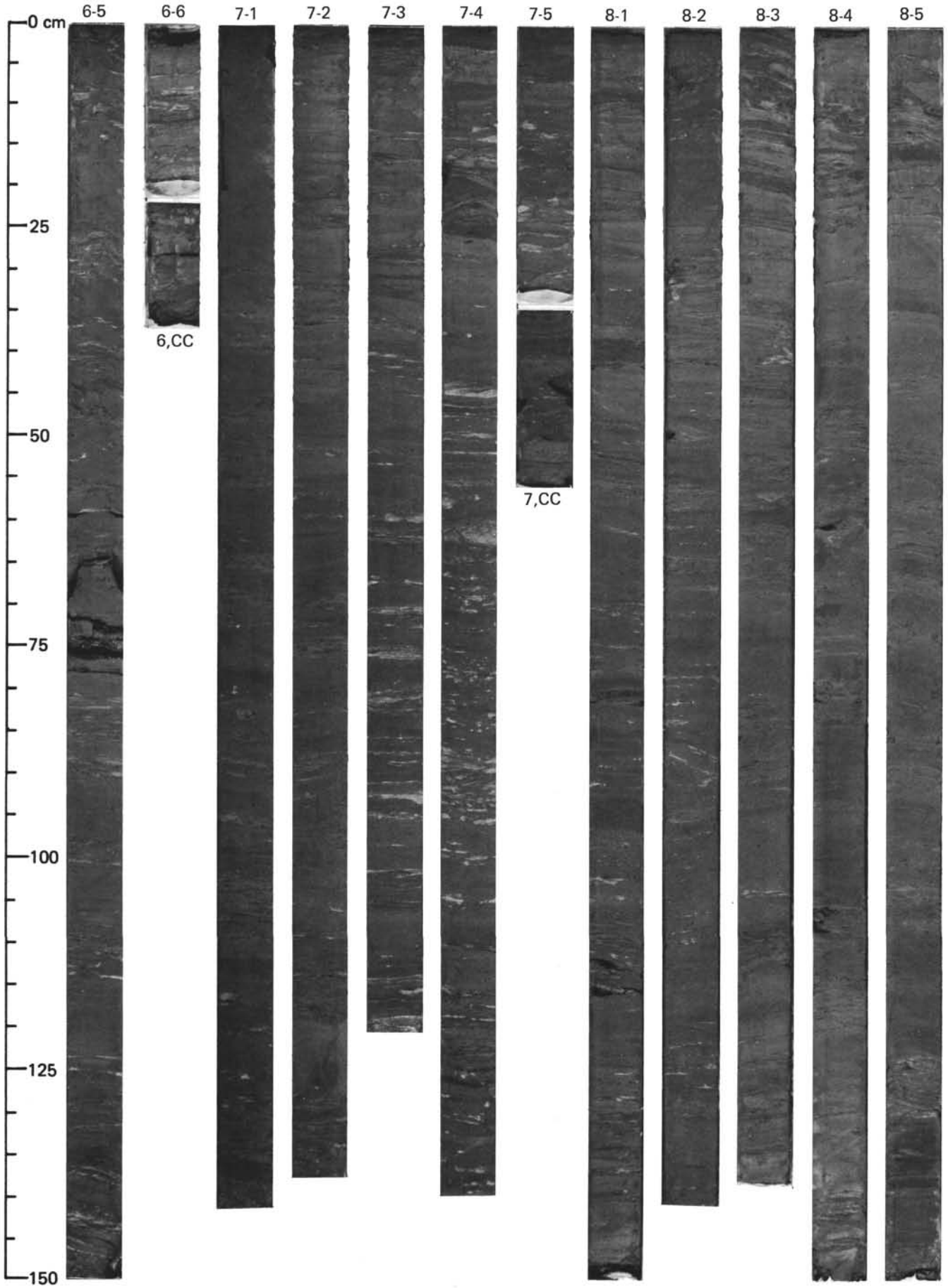
150
3-1
3-2
3-3
3-4
3-5
3-6
3-7
3,CC
4-1
4-2
4-3
4-4
4-5


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


6-5
6-6
7-1
7-2
7-3
7-4
7-5
8-1
8-2
8-3
8-4
8-5
0 cm
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50
75
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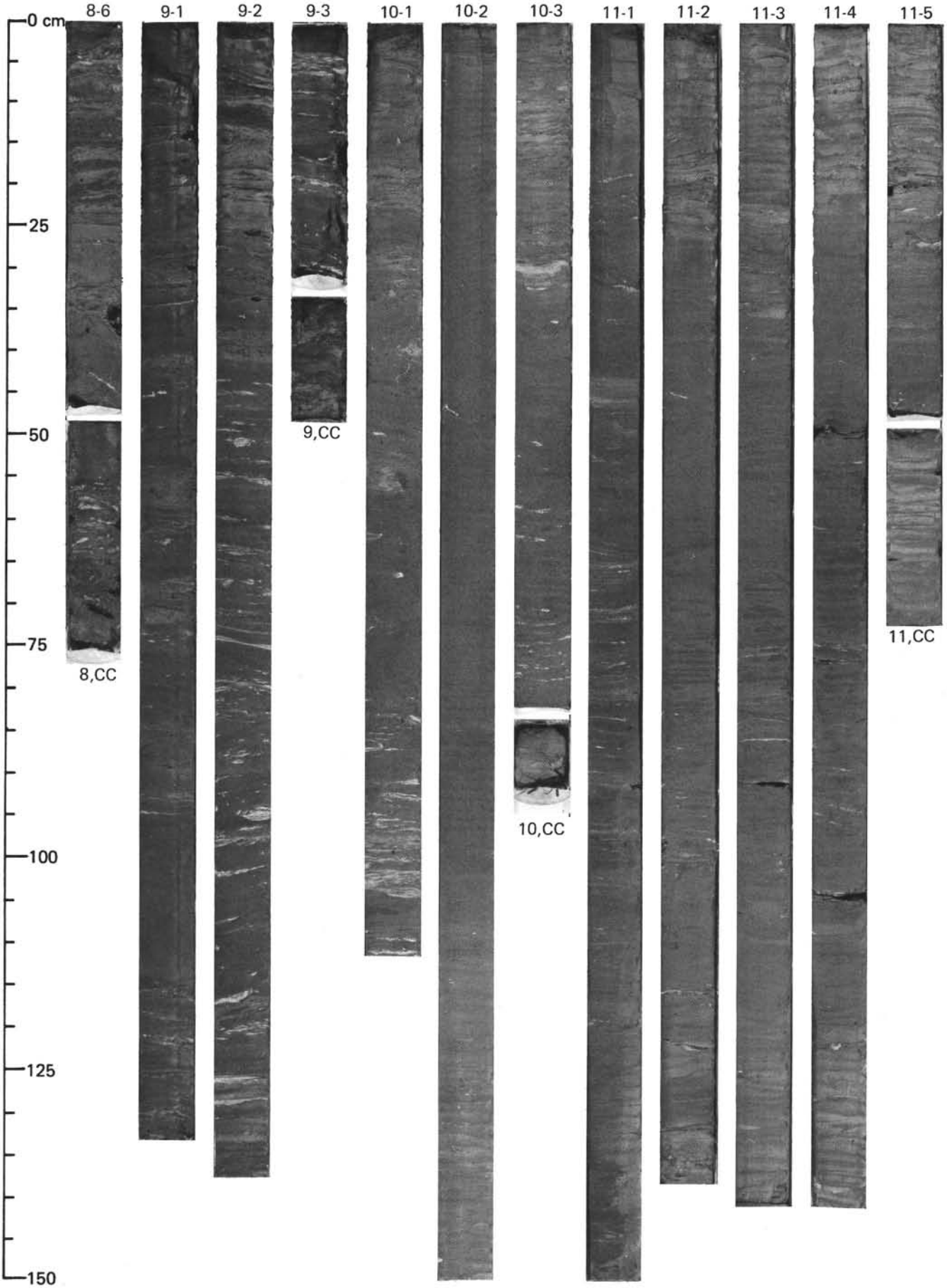
125
150
6,CC
7,CC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75
100
125
150
8-6
9-1
9-2
9-3
10-1
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10-3
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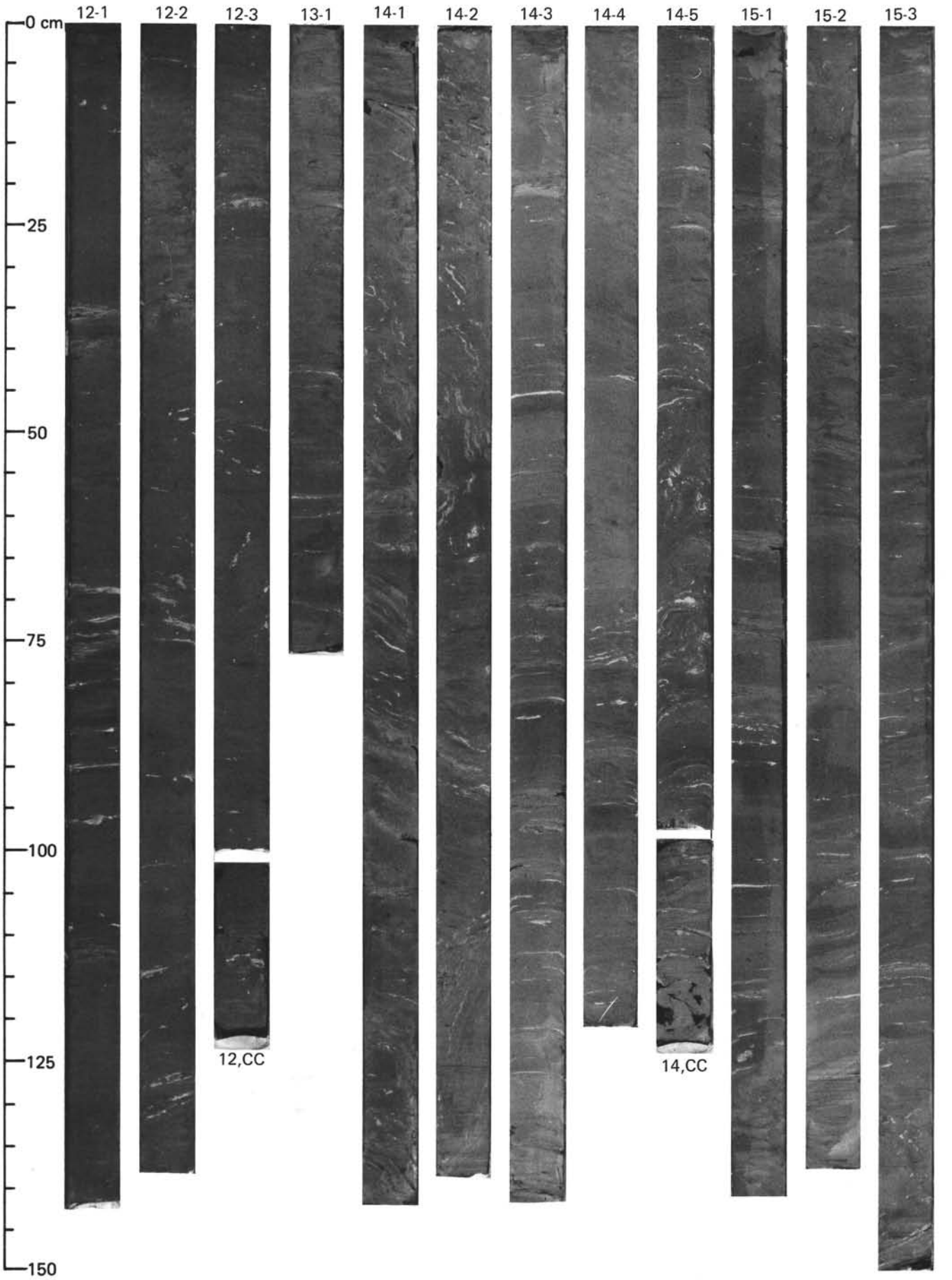
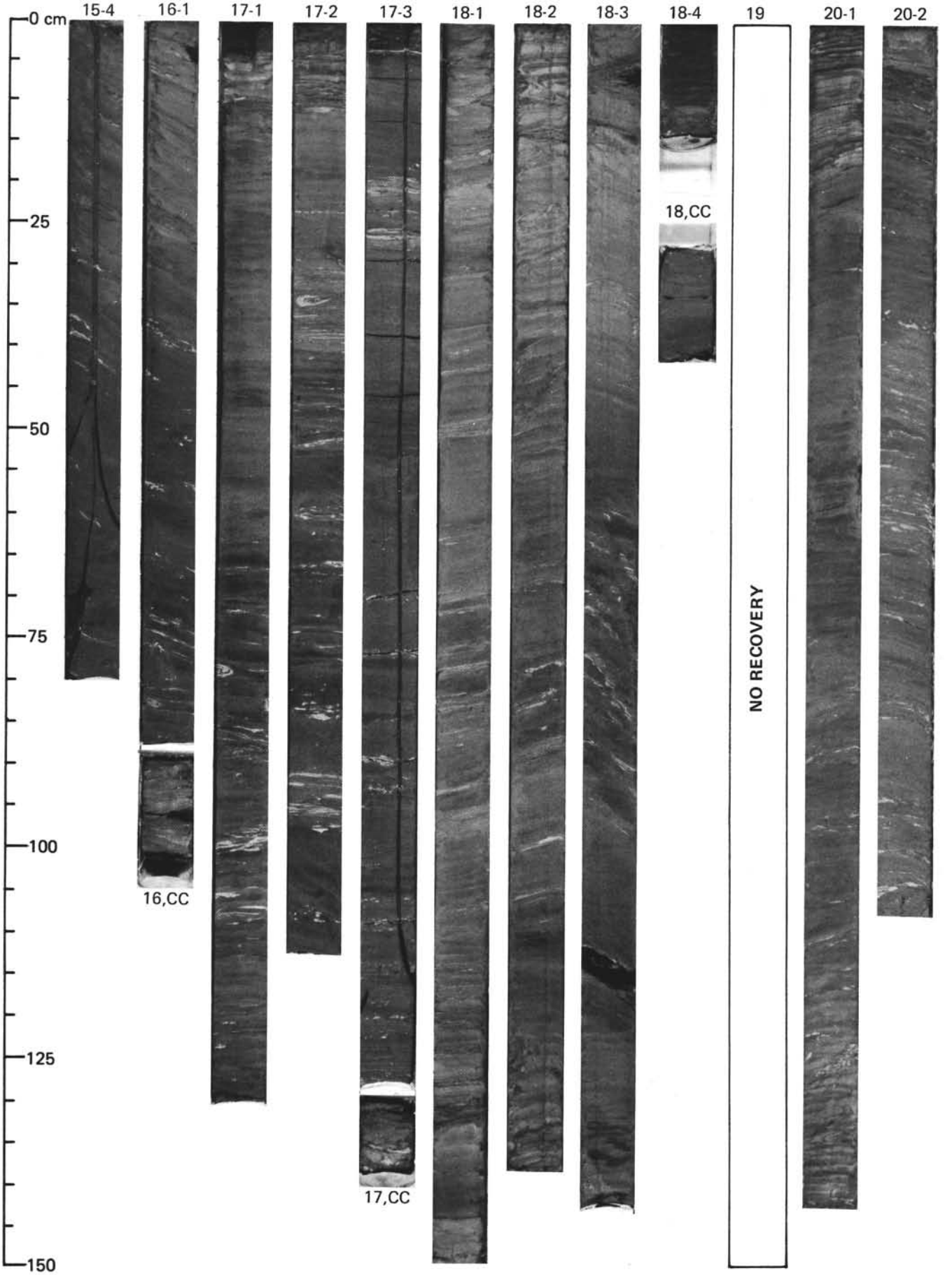
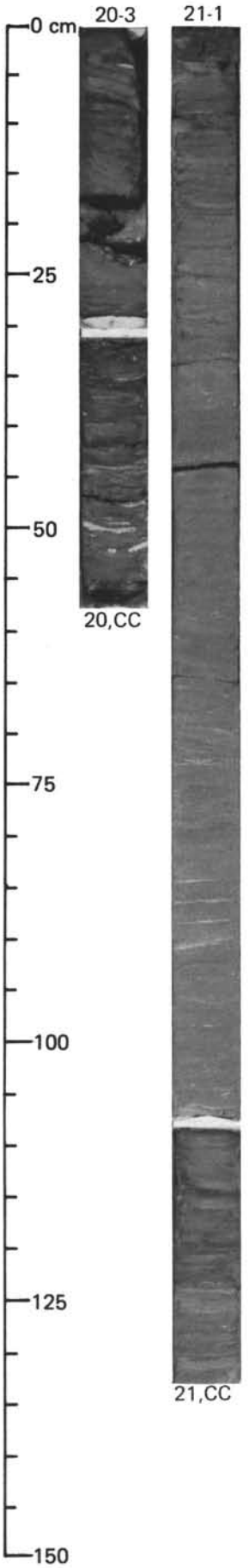
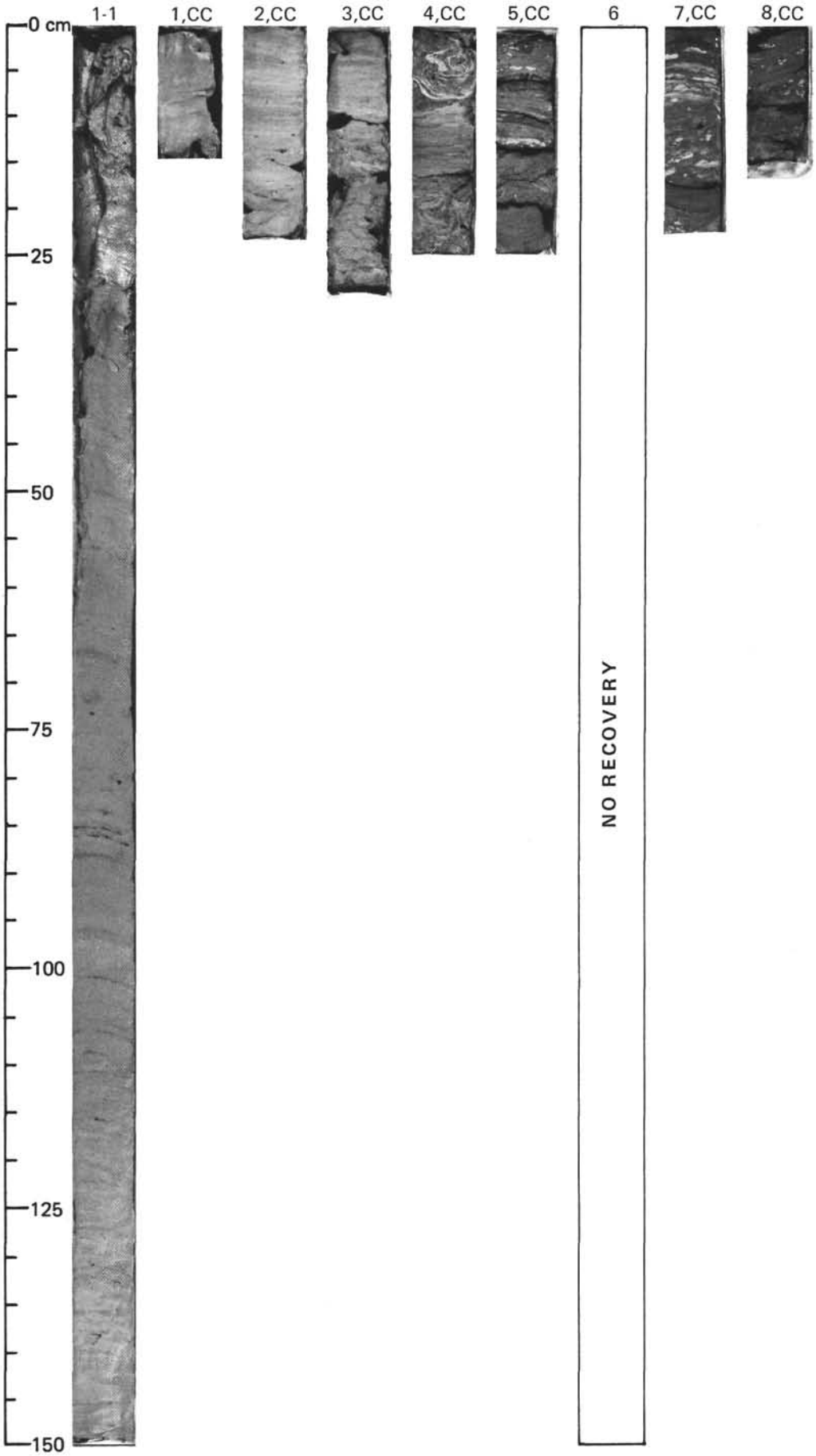
11-4
11-5
8,CC
9,CC
10,CC
11,CC


12-1
12-2
12-3
13-1
14-1
14-2
14-3
14-4
14-5
15-1
15-2
15-3
0 cm
25
50
75
100
125
150
12,CC
14,CC


0 cm
25
50
75
100
125
150
15-4
16-1
16,CC
17-1
17-2
17-3
17,CC
18-1
18-2
18-3
18-4
18,CC
19
NO RECOVERY
20-1
20-2


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


1-1
1,CC
2,CC
3,CC
4,CC
5,CC
6
7,CC
8,CC
0 cm
25
50
75
100
125
150
NO RECOVERY