4. SITE 305: SHATSKY RISE

The Shipboard Scientific Party[1]

SITE DATA

Date Occupied: 29 August 1973 (2039)

Date Departed: 3 September 1973 (1944)

Time on Site: 119 hours

Position: 32°00.13'N, 157°51.00'E

Water Depth: 2903 corrected meters (echo sounding)

Bottom Felt With Drill Pipe At: 2921 meters below rig floor

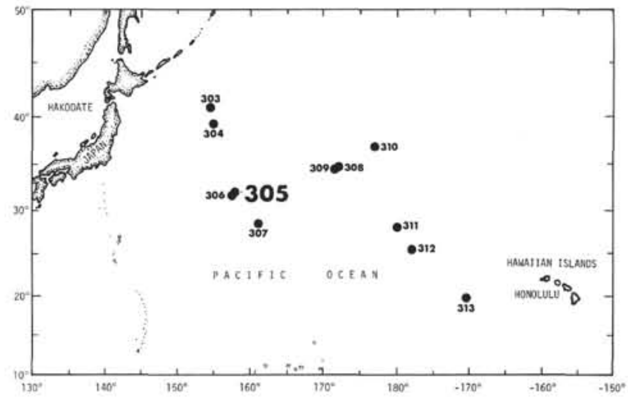
Penetration: 640.5 meters

Number of Holes: 1

Number of Cores: 68

Total Length of Cored Section: 631.0 meters

Total Core Recovered: 210.6 meters



BACKGROUND AND OBJECTIVES

A number of oceanographic expeditions have investigated Shatsky Rise, an irregular, plateau-like feature elevated above the general depth of the northwestern Pacific. Mesozoic sediments were dredged and piston-cored from Shatsky Rise, and seismic reflection profiles show a thick section of sediment to be capping the elevated basement. The rise was a high priority objective for Legs 6 and 20 during earlier phases in the Pacific of the Deep Sea Drilling Project. On Leg 6 several holes were attempted at four sites with little success. Mesozoic cherty rocks penetrated in cores and a pre-middle Miocene unconformity provided barriers to the establishment of a complete biostratigraphic record. Leg 20 was beset with operational difficulties and the Shatsky Rise site was eliminated from the actual track. The Pacific Advisory Panel of JOIDES considered no objective in the 1973 Pacific legs to be of higher priority than a continuously cored section through Shatsky Rise.

The rises and plateaus previously cored have proven to be optimum locations for the preservation of planktonic foraminifera, radiolarians, and nannofossils. Biostratigraphic zonations based on sections where all three fossil groups are present can be more discriminating than zonations based on one group alone. Parts of the earlier recovery on Shatsky Rise (Leg 6), as well as sites on the Ontong-Java Plateau (Legs 7 and 30), Magellan Rise (Leg 17), and various aseismic ridges and flanks of the mid-ocean ridge system have provided good material for biostratigraphy. A well-placed site on Shatsky Rise is expected to offer the best place in the deep oceans, certainly in the northern Pacific, for the recovery of a Late (or Middle?) Jurassic through Cretaceous pelagic section. Since Leg 6, the major problems of suitable bits and better dynamic positioning have been solved and Leg 32 was expected to have a heave compensation system to improve drilling techniques and lessen disturbance of cores even further. A continuously cored section from within the Paleogene down to seismic basement on Shatsky Rise is a prime objective of Leg 32. A Neogene section would be useful to paleontologists also, but less so than the deeper section. Site 305 is shown in Figure 1.

One of the chief results of the Deep Sea Drilling Project has been the identification by Leg 8 and confirmation by other DSDP Pacific legs of the Pacific plate's northward component of motion as evidenced by the successively deeper and northerly thickened sedimentary units that formed below the high productivity of the equatorial divergence. The actual sediment record and the model from plate-tectonics theory are in good agreement (Winterer, 1973; Lancelot et al., in preparation) even though refinement is highly desirable for the record older than about 40 m.y. (Clague and Jarrard, 1973). It seems almost certain that Shatsky Rise would have passed under the equator in the Mesozoic and thus would help control that earlier part of the model.

The carbonate sediment provided by fossil skeletons has been used for studies in addition to zoogeography and fossil morphology. In particular, the complex interrelationships of surface and deep-water temperature, carbon dioxide content, water depth, and general

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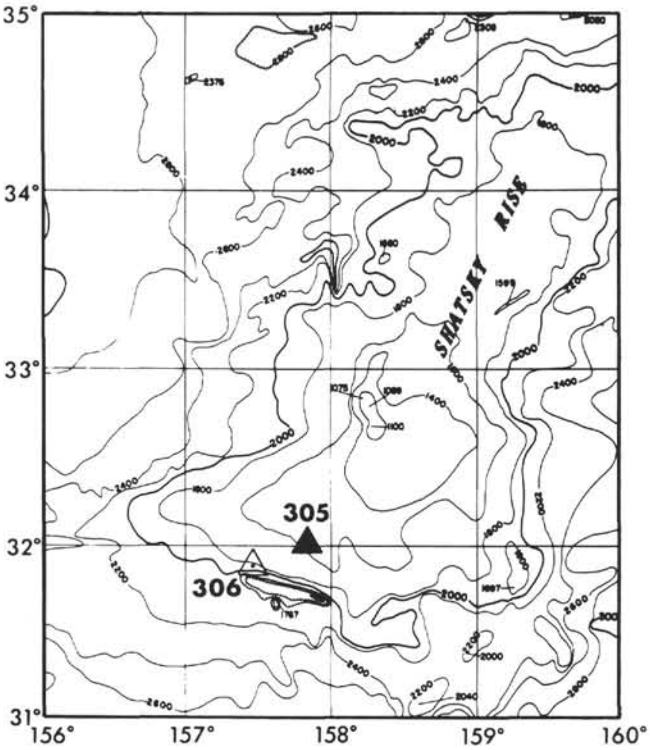

Figure 1. *Bathymetry in the region of Sites 305 and 306 (after Chase et al., 1971). Contour interval 200 fm uncorrected.*

oceanic circulation may be approached through studies of the dissolution of carbonate and of ratios of oxygen isotopes, through time. Studies of calcium carbonate compensation depths (CCD) and of isotopic temperatures are more readily understood when placed in a spatial as well as temporal framework, and the carbonate sections on Shatsky and Hess rises will thereby be especially valuable.

If sufficient Mesozoic cores are obtained as planned, their study, aided by the paleooceanographic work described above, may provide insight into whether the composition of the Mesozoic ocean differed significantly from that of the Cenozoic ocean. Abundance of silica, types of cations in authigenic silicates, magnesium content of carbonates, and types of layered and framework silicates have been suggested as clues to the geochemical balance, as well as relating to such problems as intensity of weathering on land and availability of nutrients in the ocean during the Mesozoic.

Shatsky Rise is one of the elevated areas of the sea floor, including also Hess and Magellan rises and the Ontong-Java and Manihiki plateaus in the Pacific and some similar features in other oceans that are distinct from the deep sea floor and therefore are genetically different. The age and petrography, including geochemistry, of their basement rocks will be compared with that of the deep sea floor for clues as to their origin. The rises appear to form during the early history of mid-ocean ridges where the rate of volcanism greatly exceeds the spreading rate.

Shatsky Rise is expected to provide good material for further studies of chert formation in a section of pelagic carbonate and silica. If core recovery is good, there may be primary and secondary sedimentary structures preserved which can be compared with the regional depositional stratigraphy as interpreted in the many seismic reflection records of the Shatsky area.

OPERATIONS

We approached Site 305 from the north-northwest (Figures 2 and 3), which provided us with a profile across the western portion of the top of Shatsky Rise (Figures 3 and 4). The most striking thing about this profile is that Shatsky Rise is capped at this location by a channel-like feature about 150 meters deep and 15-20 km wide that is not apparent on other profiles. Site 305 is just beyond the south edge of this feature (Figure 4) where the basement and sea floor begin to slope off the south side of the rise. Site 305 has a sediment section of about 0.75 sec that appears to contain all the reflectors present at Site 47 of Leg 6 (approximately 0700 on 29 August, Figure 4) plus additional sediment above the first reflector.

About one-half hour before we reached the site, the computer technician reported that the dynamic positioning computer was down and that we could not receive a beacon signal. We continued to steam beyond the site to go into a "holding pattern" until the computer was repaired. One hour later the computer was fix-

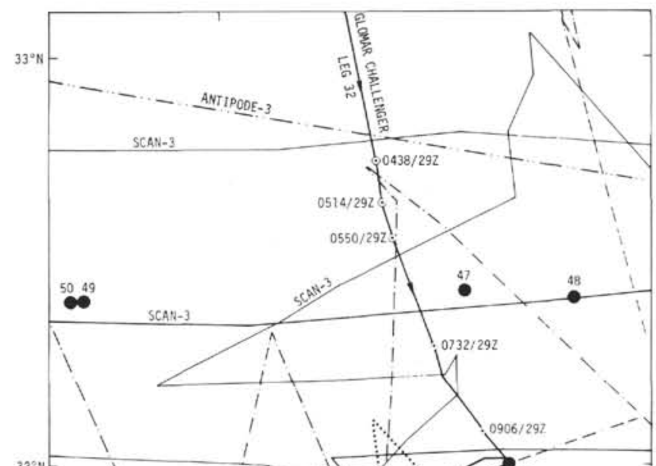

Figure 2. *Track chart for Sites 305 and 306. Heavy solid track is Leg 32* Glomar Challenger, *dotted track is* Conrad *1008, dash-dot-dot track is* Vema *2110, dash-dot track is* Conrad *1007, and light solid track is* Scan-*3. DSDP drill sites indicated by solid circles.*

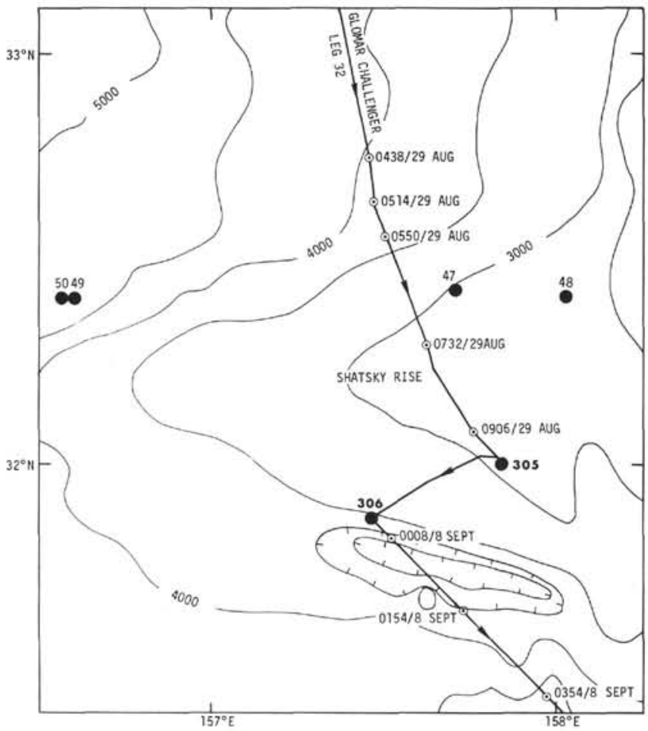

Figure 3. *Bathymetry of Sites 305 and 306. Contours in corrected meters interpolated from Chase et al. (1971). Solid line marks track of Leg 32* Glomar Challenger *and open circles mark navigation points with time/day-month.*

ed, and we returned to the site steaming northnorthwest. We dropped a beacon at 5 knots at 1039Z on 29 August 1973 in 1554 uncorrected fm (= 2913 m corrected to the rig floor). At approximately 1100Z we began to run in pipe at Site 305.

A sonobuoy was run on the last day at the site that provided about 5 hr of excellent record of the reflections at Site 305 (Figure 5).

We left this site by steaming slowly to the east-northeast, streaming the running gear, turning and coming back across the beacon enroute to Site 306 (Figure 4). Our route (Figures 2 and 3) from Site 305 to Site 306 was west-southwest that took us down the southwest slope of Shatsky Rise (Figure 4).

The mudline was reached about 6.5 hr after beginning to run in pipe, somewhat ahead of the anticipated time because power tongs were used in place of the usual spinning rope to make up the pipe joints.

Recovery percentages were generally high for the upper 250 meters of the hole until cherty sediments were encountered in nearly every core from there on down. The occurrence of chert drops the recovery figures from about 80% to 100% down to less than 10% because the other sediments present with the chert are not sufficiently lithified to withstand the circulation necessary to prevent sticking the drill string and/or plugging the circulation when coring cherts. Also, large chert fragments jam in the core catcher and prevent the entry of any additional cored material.

Regardless of the poor recoveries in the Mesozoic, the sedimentation rates were such as to provide several core-catcher samples per stage which is adequate for biostratigraphic purposes. Throughout Site 305 the weather was excellent with sunny skies and very little breeze.

The last 2 meters of Core 43 (391.5-400.5 m subbottom depth) were cored without circulation in an attempt to increase recovery. This completely plugged the circulation at the bit. The attempt to recover Core 43 with the sinker bar and overshot was unsuccessful due to material on top of the core barrel at the bottom of the drill string. Another core barrel with the center bit at-

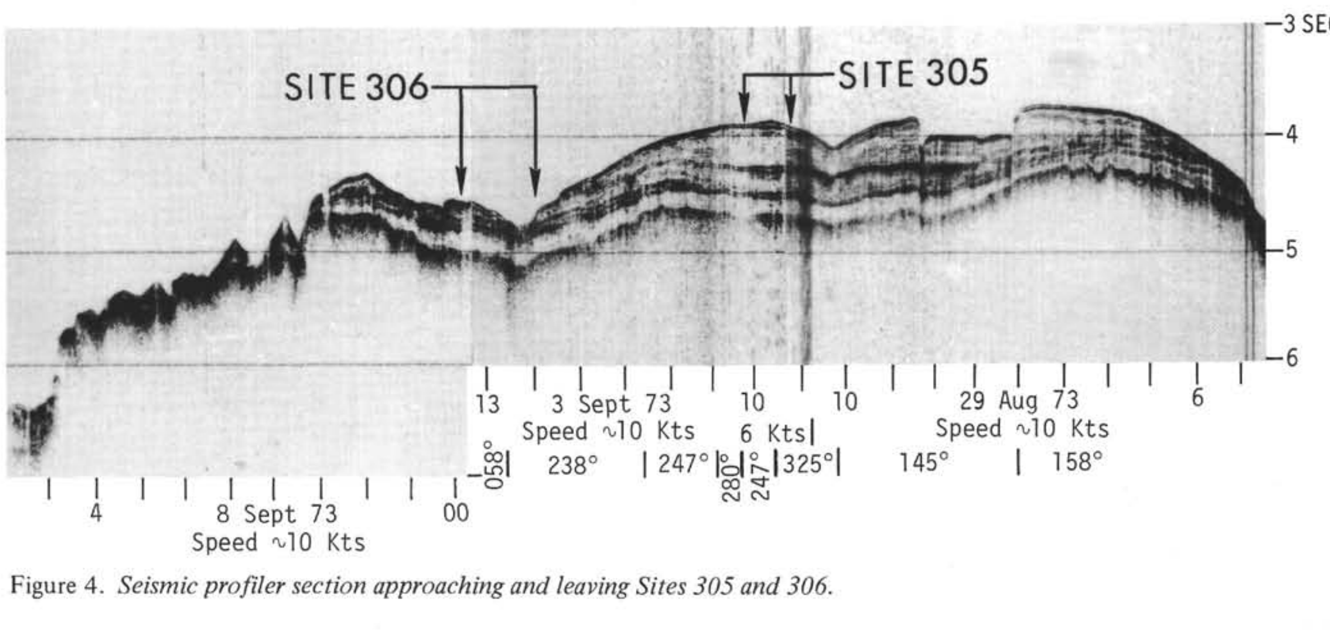

Figure 4. *Seismic profiler section approaching and leaving Sites 305 and 306.*

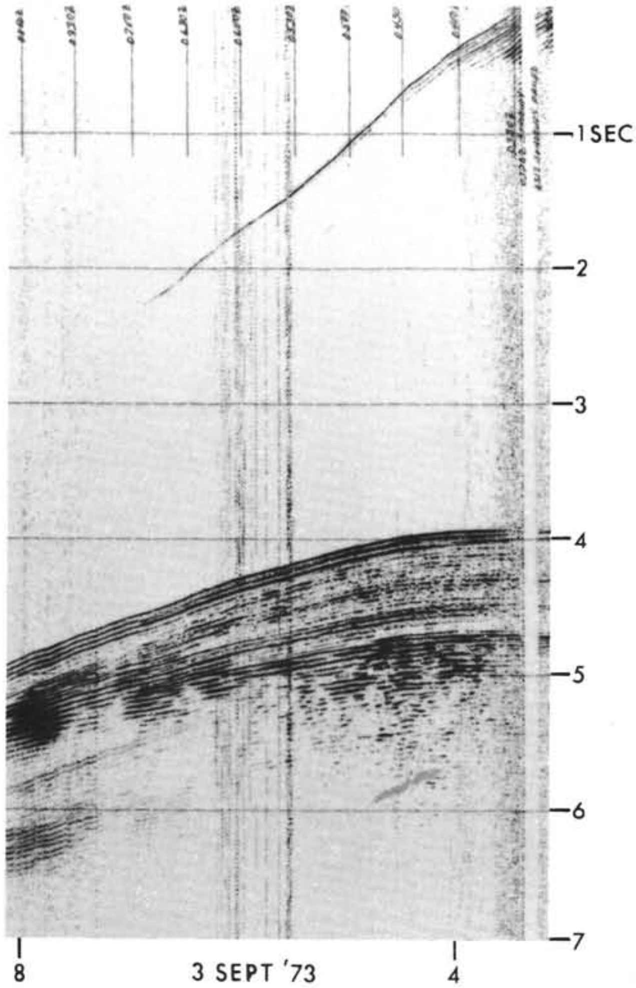

Figure 5. *Sonobuoy record taken at Site 305.*

Figure 6. *Drill bit recovered after termination of drilling at Site 305. Note two of the four cones are missing.*

tached and the check valve removed was sent falling freely down the pipe in an attempt to jam the sediment down the pipe off the top of the in-place core barrel. The center-bit core barrel was then retrieved and outfitted with a two-dog, hard-formation catcher to attempt to latch onto the in-place core barrel with the hard-formation catcher. This attempt failed, the upper core barrel was retrieved, a four-dog catcher mounted, and the core barrel sent back down the pipe. Again we failed to latch on, and the retrieval of the upper core barrel in both cases indicated we were pulling it out of a considerable amount of sediment.

Approximately 200 meters of pipe were pulled out of the hole and the circulation tested. The process of pulling the pipe had partially cleared the circulation and the sediment on top of the core barrel could be flushed away. Core 43 was retrieved by standard means and found to contain 9.5 meters of back-flow chert cuttings. For the remainder of the site the hole was cleaned more often with drilling mud.

At about Core 60 the drilling started to show signs that the bit was wearing out. Cores 63 and 64 (588.5-607 m) cut extremely slowly but did not torque the string badly. This is probably the level of the lowest hard sediment reflector on the profiler record.

From 626 to 640.5 meters very high torque developed on the drill string while cutting Core 67 and especially Core 68. It was decided to abandon the hole halfway through Core 68 for fear of overheating the power sub or twisting off the drill string. The drill string was pulled up and the bit discovered to be completely used up (Figure 6). Two of the four cones were missing and the tapered portions of the remaining two cones had been worn off. The site was abandoned, and we were underway to Site 306 at 0944Z on 3 September 1973. Table 1 gives a summary of the coring at Site 305.

LITHOLOGIC SUMMARY

The sedimentary sequence of the Shatsky Rise was sampled by continuous coring to a depth of 640.5 meters, where the hole had to be abandoned due to a worn bit.

The sediments range in age from Holocene to Hauterivian and are almost exclusively composed of biogenous carbonate and silica. Small admixtures of terrigenous material, mainly clay minerals, were noted in the uppermost part of the section, and as shale beds in the lowermost part of the hole.

The major lithologic changes, the formation of chalk, limestone, and chert, are mainly the result of diagenetic

TABLE 1
Coring Summary

Core	Date (Aug.-Sept. 1973)	Time	Depth From Drill Floor (m)	Depth Below Sea Floor (m)	Length Cored (m)	Length Recovered (m)	Recovery (%)
1	30	0430	2921.0-2929.0	0.0-8.0	8.0	7.6	95
2	30	0535	2929.0-2938.0	8.0-17.0	9.0	4.5	50
3	30	0635	2938.0-2947.5	17.0-26.5	9.5	4.5	47
4	30	0730	2947.5-2956.5	26.5-35.5	9.0	4.0	44
5	30	0830	2956.5-2966.0	35.5-45.0	9.5	6.6	69
6	30	0930	2966.0-2975.5	45.0-54.5	9.5	8.3	87
7	30	1030	2975.5-2985.0	54.5-64.0	9.5	9.5	100
8	30	1125	2985.0-2994.0	64.0-73.0	9.0	9.0	100
9	30	1230	2994.0-3003.0	73.0-82.0	9.0	9.3	100+
10	30	1330	3003.0-3012.5	82.0-91.5	9.5	7.0	74
11	30	1430	3012.5-3022.0	91.5-101.0	9.5	8.8	93
12	30	1525	3022.0-3031.5	101.0-110.5	9.5	7.2	76
13	30	1630	3031.5-3041.0	110.5-120.0	9.5	9.0	95
14	30	1730	3041.0-3050.5	120.0-129.5	9.5	6.8	72
15	30	1830	3050.5-3060.0	129.5-139.0	9.5	6.7	71
16	30	1930	3060.0-3069.5	139.0-148.5	9.5	7.8	82
17	30	2030	3069.5-3079.0	148.5-158.0	9.5	9.3	98
18	30	2135	3079.0-3088.0	158.0-167.0	9.0	8.0	89
19	30	2250	3088.0-3097.5	167.0-176.5	9.5	9.1	96
20	30	2355	3097.5-3107.0	176.5-186.0	9.5	7.5	79
21	31	0105	3107.0-3116.5	186.0-195.5	9.5	8.9	94
22	31	0200	3116.5-3126.0	195.5-205.0	9.5	tr	<1
23	31	0315	3126.0-3135.0	205.0-214.0	9.0	8.8	98
24	31	0445	3135.0-3144.5	214.0-223.5	9.5	7.0	74
25	31	0550	3144.5-3154.0	223.5-233.0	9.5	8.0	84
26	31	0710	3154.0-3163.0	233.0-242.0	9.0	6.8	76
27	31	0820	3163.0-3172.5	242.0-251.5	9.5	3.0	32
28	31	0940	3172.5-3182.0	251.5-261.0	9.5	4.0	42
29	31	1115	3182.0-3191.5	261.0-270.5	9.5	tr	<1
30	31	1235	3191.5-3201.0	270.5-280.0	9.5	tr	<1
31	31	1350	3201.0-3210.5	280.0-289.5	9.5	tr	<1
32	31	1510	3210.5-3219.5	289.5-298.5	9.0	tr	<1
33	31	1620	3219.5-3229.0	298.5-308.0	9.5	tr	<1
34	31	1730	3229.0-3238.5	308.0-317.5	9.5	0.2	2
35	31	1900	3238.5-3247.5	317.5-326.5	9.0	0.3	3
36	31	2025	3247.5-3257.0	326.5-336.0	9.5	0.4	4
37	31	2155	3257.0-3266.5	336.0-345.5	9.5	0.4	4
38	31	2315	3266.5-3275.5	345.5-354.5	9.0	0.2	2
	Sept.						
39	1	0045	3275.5-3285.0	354.5-364.0	9.5	0.2	2
40	1	0155	3285.0-3294.5	364.0-373.5	9.5	0.1	1
41	1	0330	3294.5-3303.5	373.5-382.5	9.0	0.1	1
42	1	0450	3303.5-3312.5	382.5-391.5	9.0	0.5	6
43	1	1150	3312.5-3321.5	391.5-400.5	9.0	3.6	40
44	1	1620	3331.0-3340.0	410.0-419.0	9.0	0.2	2
45	1	1945	3340.0-3349.5	419.0-428.5	9.5	0.1	1
46	1	2135	3349.5-3359.0	428.5-438.0	9.5	0.2	2
47	1	2255	3359.0-3368.5	438.0-447.5	9.5	0.7	7
48	2	0045	3368.5-3377.5	447.5-456.5	9.0	0.1	1
49	2	0235	3377.5-3387.0	456.5-466.0	9.5	tr	<1
50	2	0350	3387.0-3396.5	466.0-475.5	9.5	tr	<1
51	2	0510	3396.5-3405.5	475.5-484.5	9.0	0.1	1
52	2	0640	3405.5-3415.0	484.5-494.0	9.5	0.1	1
53	2	0820	3415.0-3424.5	494.0-503.5	9.5	0.1	1
54	2	0950	3424.5-3434.0	503.5-513.0	9.5	0.2	2
55	2	1115	3434.0-3443.0	513.0-522.0	9.0	0.1	1
56	2	1230	3443.0-3452.5	522.0-531.5	9.5	0.3	3
57	2	1410	3452.5-3462.0	531.5-541.0	9.5	0.3	3
58	2	1545	3462.0-3471.5	541.0-550.5	9.5	0.4	4
59	2	1730	3471.5-3481.0	550.5-560.0	9.5	0.5	5
60	2	1940	3481.0-3490.5	560.0-569.5	9.5	0.7	7
61	2	2130	3490.5-3500.0	569.5-579.0	9.5	0.4	4
62	2	2255	3500.0-3509.5	579.0-588.5	9.5	0.1	1
63	3	0055	3509.5-3519.0	588.5-598.0	9.5	0.8	8
64	3	0340	3519.0-3528.0	598.0-607.0	9.0	0.5	5
65	3	0620	3528.0-3537.5	607.0-616.5	9.5	1.0	11
66	3	0800	3537.5-3547.0	616.5-626.0	9.5	0.7	7
67	3	0930	3547.0-3556.5	626.0-635.5	9.5	tr	1
68	3	1035	3556.5-3561.5	635.5-640.5	5.0	tr	1
Total					631.0	210.6	33.4

processes. The first chert occurs in Core 17 at 152 meters and chert is abundant throughout the remainder of the cored section. With increasing overburden and age, the soft oozes have been gradually altered to chalk and, in the lowermost part of the sequence, to porous limestone.

The composition of the sediments is shown in the smear slide summary (Table 2). Its accuracy was improved by checking the visual estimates against carbon carbonate and X-ray data.

The following four lithologic units are recognized:

Unit 1—Siliceous foram-bearing nanno ooze (0-52 m, Cores 1 to 6, Section 5.).

Unit 2—Foram nanno ooze (52-148.5 m, Core 6, Section 5 to Core 16).

Unit 3—Foram-bearing nanno ooze, chalk, and chert (148.5-541 m, Cores 17 to 57).

Unit 4—Radiolarian nanno limestone, porcellanite, and chert (541-640.5 m, Cores 58 to 68).

Unit 1—Siliceous Foram-bearing Nanno Ooze (Cores 1 through 6, Section 5)

The major part of this unit is composed of 50% to 60% nannofossils, 10% to 20% foraminfers, 5% to 15% diatoms, up to 5% Radiolaria, rare silicoflagellates, sponge spicules, light-colored volcanic glass shards, and a few percent quartz, feldspar, and clay minerals. The total terrigenous component varies between 1% and 10%. The calcium carbonate content ranges between 60% and 70% (Table 3), whereas the organic carbon content stays consistently at 0.1%.

A more calcareous interval was recovered with Cores 3 and 4 which contain about 90% calcareous microfossils.

Small pumice fragments occur at various levels in this unit.

Because of severe drilling disturbance, primary sedimentary structures in the soft oozes were usually destroyed. Nevertheless, several graded beds, about 30 cm thick, are found in Cores 1 and 2.

The sediment color ranges from dominantly pale orange to yellow-brown.

Unit 2—Foram Nanno Ooze (Cores 6, Section 5 through Core 16)

The sediments of Unit 2, which comprises the late Maestrichtian and the whole Paleogene, differ from those of the overlying Unit 1 by the absence of siliceous fossils. The siliceous fossils decrease in abundance markedly at the Pliocene/Miocene boundary at about 40 meters and disappear completely below 52 meters (they reappear in the Mesozoic). This is also shown as an increase of the calcium carbonate content from about 80% to 95% at the same depth. The megascopic examination, however, does not reveal any lithologic break, so the unit boundaries are taken solely on the basis of the compositional change mentioned above.

Unit 2 consists of a monotonous sequence of dominantly very pale orange to occasionally yellow-brown soft, pure foraminiferal nanno oozes. Tests of nannofossils (70% to 90%) and of foraminifera (less than 5% to 25%) are the major constituents.

The calcium carbonate content averages 95%, and terrigenous minerals are virtually absent. Small amounts of phillipsite (trace to 2%), micron-sized brown volcanic glass and tiny amorphous(?) ferromanganese particles and some clay minerals make up the remaining 5%. The ferromanganese oxides cause the light orange color of these oozes. The clay size fraction always contains 10% to 20% palygorskite which is absent in Unit 1.

Phillipsite occurs as slender twinned and untwinned prisms 20 to 150μm long. Larger crystals frequently show zonation. Badly corroded crystals were observed in many samples.

The preservation of the microfossils is moderate to poor, due to dissolution.

No organic carbon was detected in Units 2 to 4, except in a few shale beds at the bottom of the hole.

Unit 3—Foram-Bearing Nanno Ooze, Chalk, and Chert (Cores 17 through 57)

The upper limit of this unit is taken by the first occurrence of chalk and chert. Below Core 26 (242 m), recovery was very poor; generally only core-catcher samples containing chert and occasionally small chalk fragments were retrieved. During the drilling process the weakly consolidated chalk is frequently ground up to soft ooze which is often washed away. This means that only the hardest sediment types encountered are sampled, and consequently a reconstruction of the lithologic sequence is almost impossible. The sequence most likely consists of chalk and chert interbeds or nodules of unknown relative proportions. The color of the chalk changes from pale orange to white below Core 28 (261 m).

The chalk is made up of 96% to 98% carbonate. The proportions of foraminifera and nannofossils vary considerably; from foram-bearing nanno chalks with 10% to 25% foraminifera versus 70% to 85% nannofossils and foram-nanno chalks with 30% to 40% foraminifera versus 50% to 60% nannofossils. Almost all samples contain a trace to 2% echinoid spines. Rare Radiolaria occur below Core 39.

Toward the base of the unit the chalk gets gradually harder. The increasing lithification due to silicification and recrystallization of nannofossils (Matter et al., this volume) is also seen in the smear slides by the presence of large amounts of structureless carbonate particles ranging from a few micrometers to 10μm in size.

Recrystallized silica is observed in many smear slides of samples from the lower part of Unit 3. Partly it comes from the chert pieces of which the chalk crusts had to be scraped off, but partly it occurs in radiolarian foram chalks. The latter are semilithified with almost all of the opal-A of the original radiolarian tests replaced by clear chalcedony and to a lesser extent also replaced by opal-CT (Jones and Segnit, 1971). These mineral also fill the chambers and may partly replace walls of foraminifera.

Silicification by opal-CT has also affected the nannofossil matrix of these radiolarian-foram limestones (Core 47, Section 1 at 128 cm) in a patchy manner. These radiolarian-foram limestones also contain scattered dolomite rhombs.

Chert is present in small amounts as thin irregular layers and displaced pieces in the upper part of the unit, but its proportion increases with depth. The chert is massive, hard, conchoidally fractured, and colored from

TABLE 2
Smear Slide Summary, Site 305

KEY: RARE <5 %; COMMON 5-25; ABUNDANT 25-75; DOMINANT 75-100 (shown below as R, C, A, D)

			EXOGENIC						AUTHIGENIC-DIAGENETIC										BIOGENIC							
CORE	SECTION	INTERVAL cm	Detrital QUARTZ	FELDSPARS	HEAVY MINERALS	LIGHT GLASS	DARK GLASS		CLAY MINER	PALAGONITE	ZEOLITES	HEMATITE	amorphous IRON OXIDE	MICRONODULES	PYRITE	recrystall. SILICA	recrystall. CALCITE	Dolomite rhombs	FORAMINIFERA	NANNOS	RADIOLARIA	DIATOMS	SPONGE SPICULES	FISH DEBRIS	SILICOFLAG-ELLATES	ECHINOID SPINES
1	1	145	R			R	R		R		R		R						C	A	R	C	R		R	
1	2	120	R			R			R										C	A	R	C			R	
1	4	80	R						R										C	A	C	C	R		R	
1	5	100	R			R	R		R				R						C	A	R	R	R	R	R	
1	CC		R			R			R										C	A	R	R			R	
2	2	100				R			R										A	A	R	C	R		R	
2	CC					R			R										A	A	C	R			R	
3	2	100				R													C	A	R	R			R	
3	CC																		C	D	R	R			R	
4	2	100																	C	D	R	R			R	
4	CC					R													A	A	R	C			R	
5	2	130	R			R			R										C	A	C	R			R	
5	4	85	R			C	R		C		R		R						R	A			R			
5	5	110				R	R		R				R						C	A						
5	CC												R						C	D	R					
6	1	130							C				C						C	A	R					
6	3	130	R			R	R		R		R		R						R	D						
6	4	90	R				R		R		R		R						R	A						
6	5	20	R			R	R		R		R		R						R	D						
6	CC										R								R	D						
7	2	100					R				R		R						R	D						
7	5	50					R				R		R						R	D						
7	6	90									R								R	D						
8	2	100									R								R	D						
8	5	100									R								C	D						
8	CC										R								C	D						
9	2	100									R								R	D						
11	CC						R												C	D						
12	2	90					R						R						C	D						
12	5	100											R						C	D						
12	CC																		A	A						
13	2	100											R						R	D						
13	CC						R						R						R	D						
14	2	100					R				R		R						C	D						
14	5	100					R						R						R	D						
15	2	140					R						R					R	R	D						R
15	5	00					R				R		R						R	D						R
15	CC						R						R						R	D						
16	2	100																	R	D						
16	5	03					R												A	A						R
16	CC																		C	A						
17	5	100					R												C	A						
17	CC						R												C	D						R
18	2	76					R						R				R		A	A						R
18	5	95															R		A	A						R
18	CC					R											R		A	A				R		R
19	5	100				R	R						R				R		A	A				R		R
19	CC																R		C	D						R
20	2	100															R		C	D						R
20	5	100					R										R		C	D						R
20	CC						R										R		A	A				R		R
21	2	70															R		A	A						R
21	5	100																	R	D						R

TABLE 2 – Continued

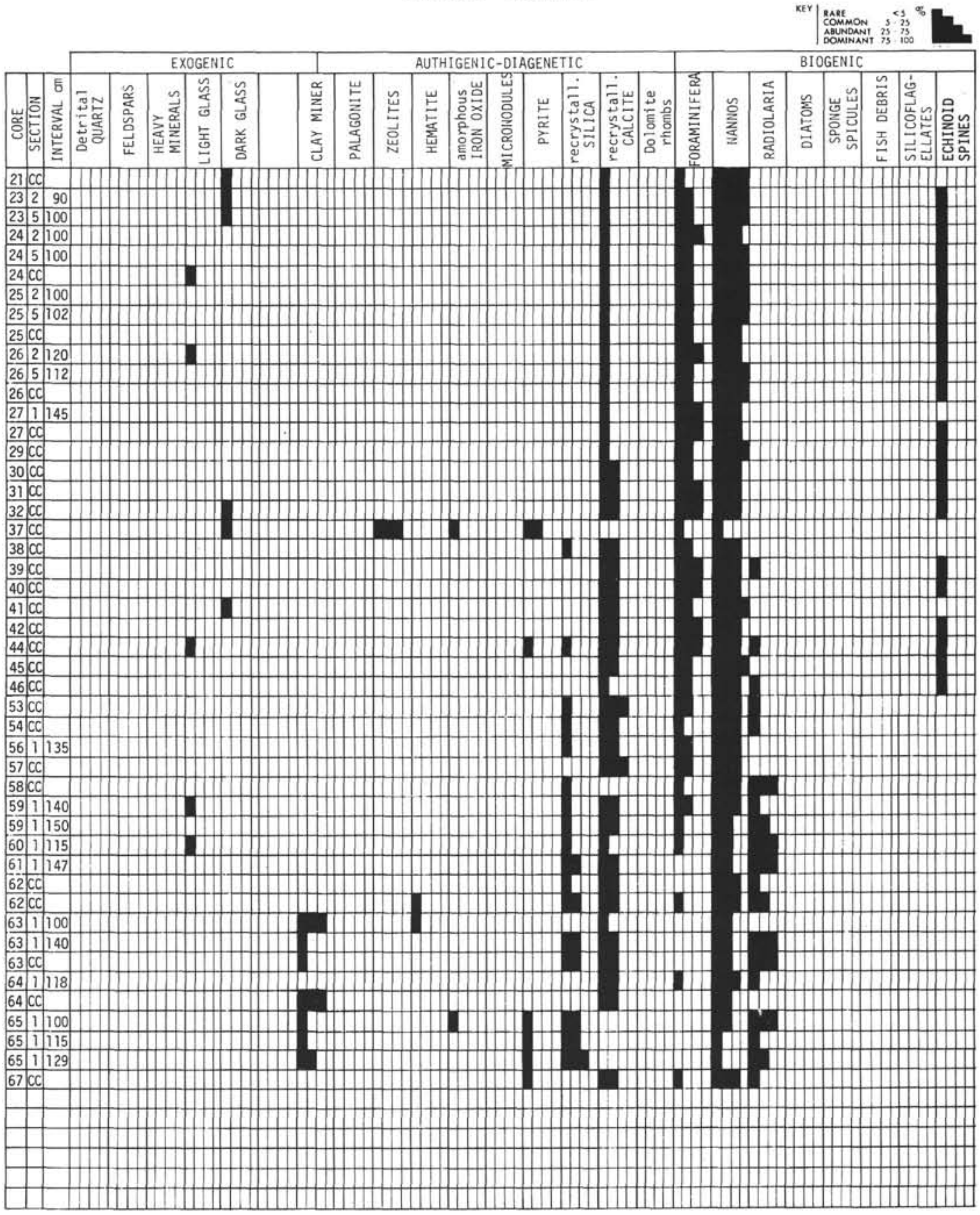

TABLE 3
Additional Carbon-Carbonate Data

Sample	Hole Depth (m)	$CaCO_3$ (%)
1-2, 20	1.70	60
1-6, 140	8.90	79
2-3, 30	11.30	84
4-3, 40	29.90	90
5-3, 50	39.0	80
6-4, 92	50.42	74
6-5, 135	52.35	95
7-4, 100	60.00	96
7-5, 60	61.10	93
9-3, 100	77.0	96
10-3, 130	86.3	97
25-3, 47	226.97	76
44, CC	419.0	57
46, CC	438.0	89
59-1, 140	551.9	86
61-1, 135	570.85	33
64-1, 100	599.0	88
66-1, 136	617.86	0

Note: Analytical method: Gasvolumetric with Scheibler apparatus.

dark gray to brown. It is commonly inhomogeneous with lighter irregular blebs and diffuse layers and also contains flat vugs less than 2 cm in size. It is impure and consists of a very fine-grained mosaic of microquartz, scattered tiny calcite crystals, and radiolarian ghosts. Some radiolarian molds which appear clear in thin section are filled with fibrous chalcedony. The ferruginous (brown) chert shows irregular concentrations with diffuse boundaries of hematite particles. The chert pieces are almost always covered with thin, partly silicified white chalk crusts which also line the vugs.

Unit 4—Radiolarian Nanno Limestone, Porcellanite, and Chert (Cores 58 through 68)

The gradational boundary between Units 3 and 4 is marked by the gradual appearance of Radiolaria. Recovery slightly improved in the latter unit, but was still poor.

The dominant lithologies are porous Radiolaria nanno limestones and radiolarian cherts. The admixture of abundant clay minerals in the lower half of the unit leads to various other lithologies, such as dark greenish-gray pelagic claystone, gray carbonaceous pelagic shale, light gray laminated or massive porcellanites, and brown nanno pelagic shale. Less commonly, dominantly white limestones with irregular wavy lamination and moderate bioturbation were also encountered. Fucoid-like burrows are present in Core 64.

Thin sections of the foram-bearing radiolarian nanno limestones show advanced recrystallization. Chambers of the foraminifera tests are filled with coarse sparry calcite.

Radiolaria occurring in limestones are generally replaced by clear chalcedony. However, partly calcitized radiolarian tests were noticed as well.

The radiolarian molds in a limestone from Sample 58, CC are rimmed with clear, merging, half-spheres each of which is composed of fibrous chalcedony, yet the remaining inner void space is now filled with brownish fibrous disordered cristobalite.

The contact of the radiolarian limestones with the irregularly shaped chert masses is generally sharp with a transitional zone up to a few millimeters.

Unit 4 has a lower proportion of chert than Unit 3, and the chert becomes more like a porcellanite. The chert is generally pinkish-gray to brownish-gray in color. Faint laminations and subhorizontal fractures now filled with chalcedony are commonly present.

True porcellanites with dull luster, lower density, and abundant clay minerals were recovered in the lowermost three cores, as well as gray carbonaceous radiolarian porcellanites that contain up to 9% organic carbon and up to 3% pyrite. These porcellanites are silicified with faintly fibrous microquartz and opal-CT, and contain phillipsite and barite. Barite was also noted in silicified radiolarian limestones.

GEOCHEMICAL MEASUREMENTS

Alkalinity, *p*H, and salinity measurements for Site 305 are summarized in Table 4 and presented graphically in Figure 7. The sediments were squeezed at 4°C to obtain the interstitial water. Seven interstitial water samples down to 239 meters (depth subbottom) were collected before the sediment became lithified and recovery decreased.

Alkalinity

Alkalinity reaches a maximum measured value of 3.03 meq/kg at 52.5 meters and then decreases gradually with depth to 2.48 meq/kg at 146.5 meters. It then remains relatively constant down to 239.0 meters. The entire section sampled was carbonate ooze and the values obtained are typical for this type of sediment.

pH

The *p*H of the interstitial water is less than seawater for all samples and remains fairly constant with depth. Using the punch-in method it varies from 7.54 to 7.70.

Salinity

The salinity of the interstitial water ranges from the surface seawater value to 34.9‰ to 35.8‰.

Carbonate Content

Table 5 presents the results of eight analyses for calcium carbonate in the sediment. The results vary from 91% to 96% $CaCO_3$.

PHYSICAL PROPERTIES

Wet Bulk Density and Porosity of Soft Sediments

The wet bulk density of the soft-stiff, moderately intensely disturbed sediments recovered at Site 305 was measured with the gamma-ray attenuation porosity evaluator (GRAPE). Because of the large volume of sediments, only Sections 2 and 5 from each core were measured. The density increases with minor fluctuations from about 1.60 g/cc in Core 1 to about 1.80 in Core 11 (100 m) and remains fairly constant down to the last sediments measured (Core 26, 240 m). Syringe samples

TABLE 4
Summary of Shipboard Geochemical Data

Sample (Interval in cm)	Depth Below Sea Floor (m)	pH Punch-in	pH Flow-through	Alkalinity (meq/kg)	Salinity (°/oo)	Remarks
Surface Seawater		8.30	8.28	2.29	34.9	8.27
1-5, 144-150	7.5	7.70	7.73	2.34	34.9	7.72
3-2, 144-150	20.0	7.63	7.72	2.30	35.2	7.69
6-5, 144-150	52.5	7.68	7.43	3.03	35.5	7.55
11-5, 144-150	99.0	7.54	7.42	2.83	35.2	7.52
16-5, 144-150	146.5	7.60	7.45	2.48	35.8	7.61
21-4, 144-150	192.0	7.55	7.56	2.48	35.5	7.60
26-4, 144-150	239.0	7.65	7.49	2.49	35.5	7.57

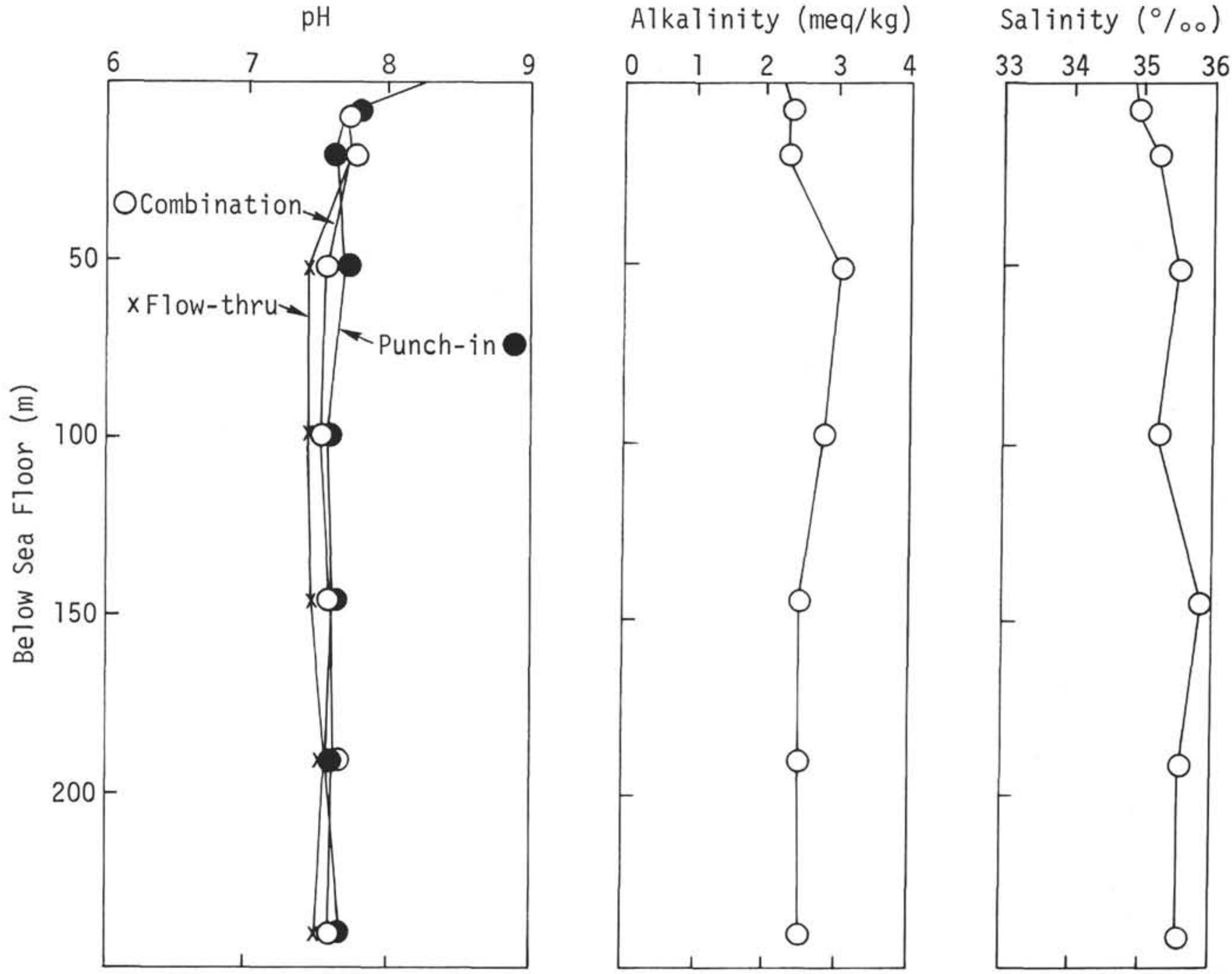

Figure 7. *Graphic summary of geochemical data taken at Site 305.*

were also taken from Sections 2 and 5 of each cores as an independent measure of bulk density and porosity. The bulk density as measured by the syringe shows the same variation with depth as that obtained by the GRAPE. The densities agree within several percent of the GRAPE values. The density of the calcareous oozes at this site (1.6-1.8 g/cc) is noticeably higher than that of the siliceous oozes (1.3 g/cc) from Sites 303 and 304. The porosity of the calcareous oozes decreased from 65% near the top to about 55%, 240 meters below the sediment-water interface. These porosity values are noticeably lower than that (~85%) of the siliceous oozes. The higher density of the calcareous oozes is due largely to their lower porosity.

TABLE 5
% $CaCO_3$ – "Carbonate Bomb" Method – Shipboard Measurement

Sample (Interval in cm)	Weight (g)	Pressure	$CaCO_3$ (%)
8-2, 100-102	0.92	1.42	94%
9-5, 100-102	0.94	1.40	91%
13-2, 103-105	0.97	1.47	93%
16-2, 103-105	0.96	1.49	95%
16-5, 3-5	0.98	1.53	96%
17-5, 101-103	0.97	1.51	96%
20-5, 105-107	0.94	1.41	92%
26-2, 120	0.97	1.49	94%

Note: $CaCO_3$ Standards: 1.0 g 99% $CaCO_3$ = 1.62 pressure (kp/cm) 0.2 g 99% $CaCO_3$ = 0.43 pressure (kp/cm).

Velocity Measurements

The compressional wave velocity, *Vp*, of the calcareous oozes and rocks was measured with a Hamilton frame. The *Vp* of the oozes was measured on the split cores, and that of the more lithified rocks was measured on fragments and core segments. The *Vp* of the soft-stiff, moderately intensely disturbed calcareous ooze increases from about 1.52 km/sec at the top of the sediments to about 1.57 km/sec at 240 meters below the water-sediment interface. The *Vp* of the calcareous ooze is quite similar to that of the siliceous ooze at Sites 303 and 304. The *Vp* of the semilithified limestones recovered near the bottom of this hole ranges from 2 to 3 km/sec. The carbonaceous and calcareous pelagic claystones have a *Vp* of 2.7 to 3.2 km/sec. The well-silicified cherts recovered throughout much of this section have a *Vp* of 4.4-5.4 km/sec.

The physical property measurements are summarized graphically in Table 6.

CORRELATION OF SEISMIC REFLECTION PROFILES WITH DRILLING RESULTS

Seismic reflection profiles recorded while approaching and leaving (Figure 4) Site 305 show a thick (0.77 sec), moderately stratified section overlying the acoustic basement. Within this section two discrete sharp reflectors can be observed, at 0.36 and 0.58 sec below the sea floor, respectively.

Due to the very poor recovery in cores from depths below the upper 150 meters of sediment, correlation of the lithology with the "acoustic stratigraphy" remains somewhat uncertain. The first (upper) reflector at 0.36 sec below the sea floor is believed to correspond with the first abundant chert encountered at about 300 meters. Some chert fragments have been recovered in the overlying sediments, but the chert nodules or layers were probably too scattered and too thin to produce any reflection. The first massive chert corresponds also with a substantial decrease in the drilling rate and with a marked decrease in the core recovery. The interval velocity computed for the uppermost interval is about 1.65 km/sec, which seems a little low as the lower half of the interval is believed to contain substantial amounts of chalk and chert, although most of the chalk was rather soft and chert was rare except in the lowermost 40 meters of the interval.

The second reflector, at 0.58 sec below the sea floor, probably corresponds with the top of the porcellanite and chert section observed at the base of the hole. Apparently most of this lowermost section consists of hard chert nodules and/or layers interbedded with well-lithified calcareous porcellanite. The top of this interval corresponds also with a marked decrease in the drilling rate at about 610 meters. The velocity computed for the interval between the two reflectors reaches 2.8 km/sec, a value comparable to that observed previously in the chert-rich sections of Sites 303 and 304.

As basement was not reached by the drill, it is impossible to determine the sound velocity in the interval between the second reflector and the acoustic basement which is probably the top of the basalt. This velocity is almost certainly above 2.8 km/sec and might reach 3.1 km/sec or more. Therefore the basement lies at least as deep as 270 meters and possibly as deep as 300 meters or more below the second reflector. The total sedimentary section can then be estimated as 880 to 910 meters thick and the basalt probably lies at 240 to 270 meters below the level reached in the last core at Site 305.

Figure 8 summarizes the correlation described above.

BIOSTRATIGRAPHIC SUMMARY

Cenozoic

A 130-meter section of Cenozoic sediment (Cores 1-14) is characterized by abundant, poorly preserved foraminifers and abundant, moderately to poorly preserved (overgrown) coccoliths. Radiolaria are well preserved, but occur only in Neogene Cores 1 to 5 (0-45 m). Diatoms are rare and poorly preserved in Cores 1 to 4 (0-36 m). Biostratigraphic zonation and age determinations are shown in the Graphic Hole Summary.

The Mesozoic-Cenozoic boundary occurs between Cores 14 and 15 at 130 meters. The early Paleocene *Globorotalia trinidadensis* Zone of foraminifers is identified from the bottom of Core 14 core-catcher sample, the late Maestrichtian *Micula mura* Zone of coccoliths from the top of Core 15. Strong dissolution is indicated in the vicinity of the boundary.

Mesozoic

A 511-meter section of Mesozoic sediment (Cores 15-68) ranges in age from Valanginian or Hauterivian to late Maestrichtian. Foraminifers furnish the most consistent biostratigraphic criteria through the section. Below Campanian Core 28, sediment recoveries are mainly limited to small core-catcher samples of chert and firm chalks. Less-consolidated intervals, where calcareous microfossils would be better preserved, were not retrieved due to the high pumping pressure needed to clear chert cuttings from the bit. Coccoliths are abundant but typically poorly preserved and provide only broad age assignments for most samples. Like coccoliths, Radiolaria provide broad age assignments and vary in preservation and abundance. In contrast to Sites 303 and 304, Radiolaria are better preserved in calcareous sediment at Site 305 than in chert.

A short interval of black bituminous shale in Core 37 (336-346 m) is dated as early Cenomanian based on the foraminifers *Rotalipora greenhornensis* and *R. gandolfii*.

TABLE 6
Distribution, Age, and Frequency of Investigated Microfossils

Core	Depth (m)	Recovery (%)	Foraminifera Plankt.	Foraminifera Benth.	Foraminifera		Calcareous Nannoplankton		Radiolaria
1	0.0-8.0	95	•	*	Quaternary	•	Quaternary	o	Pleistocene
2	8.0-17.0	50	•	*	Quaternary	•	Late Pliocene (top Quaternary)	o	Pliocene?
3	17.0-26.5	47	•	*	Pliocene	•	Late Pliocene	o	Early Pliocene/ late Miocene
4	26.5-35.5	44	•	*	Pliocene	•	Late Pliocene	o	Early Pliocene/ late Miocene
5	35.5-45.0	69	•	*	Pliocene/ late Miocene	•	Late Pliocene late Miocene	+	Early Pliocene/ late Miocene
6	45.0-54.5	87	*	+	Late Miocene/ late Oligocene	•	Late Miocene/ late Oligocene	–	–
7	54.5-64.0	100	+	+	Late? Oligocene	•	Late Oligocene	–	–
8	64.0-73.0	100–	*	+	Oligocene	•	Oligocene	–	–
9	73.0-82.0	100+	•	o	Early Oligocene late Eocene	•	Early Oligocene/ late Eocene	–	–
10	82.0-91.5	74	•	*	Late Eocene/ Middle Eocene	•	Middle Eocene	–	–
11	91.5-101.0	93	•	+	Early Eocene	•	Early Eocene	–	–
12	101.0-110.5	76	•	+	Early Eocene	•	Early Eocene	–	–
13	110.5-120.0	95	•	+	Late Paleocene	•	Late Paleocene	–	–
14	120.0-129.5	72	•	+	Late/middle Paleocene	•	Late/early Paleocene	–	–
15	129.5-139.0	71	*	*	Late Maestrichtian	•	Late Maestrichtian	–	–
16	139.0-148.5	82	•	+	Late Maestrichtian	•	Late Maestrichtian	–	–
17	148.5-158.0	98	•	+	Middle Maestrichtian	•	Maestrichtian	–	–
18	158.0-167.0	89	•	+	Early Maestrichtian	•	Early Maestrichtian/ late Campanian	–	–
19	167.0-176.5	96	•	+	Early Maestrichtian	•	E. Maestrichtian/ l. Campanian	–	–
20	176.5-186.0	79	•	+	Early Maestrichtian	•	E. Maestrichtian/ late Campanian	–	–
21	186.0-195.5	94	o		Late Campanian	•	E. Maestrichtian/ late Campanian	–	–
22	195.5-205.0	<1	–	–	–	o	E. Maestrichtian/ late Campanian	–	–
23	205.0-214.0	98	•	*	Late Campanian	•	Late Campanian	–	–
24	214.0-223.5	74	•	+	Early Campanian	•	Late/early Campanian	–	–
25	223.5-233.0	84	•	+	Early Campanian	•	Early Campanian	–	–
26	233.0-242.0	76	•	+	Early Campanian	•	Early Campanian	–	–
27	242.0-251.5	32	•	+	Early Campanian	•	Early Campanian	–	–
28	251.5-261.0	42	•	+	Early Campanian	•	Santonian/ late Turonian	–	–
29	261.0-270.5	<1	•	+	Santonian	•	Santonian/ late Turonian	–	–
30	270.5-280.0	<1	•	+	Santonian	•	Santonian/ late Turonian	–	–
31	280.0-289.5	<1	•	+	Santonian	•	Santonian/ late Turonian	+	Campanian/ Santonian
32	289.5-298.5	<1	•	+	Santonian	•	Santonian/ late Turonian	+	Campanian/ Santonian
33	298.5-308.0	<1	–	–	–	•	Santonian/ late Turonian	+	–
34	308.0-317.5	2	–	–	–	•	Early Turonian/ Cenomanian	+	–

TABLE 6 – *Continued*

Core	Depth (m)	Recovery (%)	Foraminifera Plankt.	Foraminifera Benth.	Foraminifera	Calcareous Nannoplankton	Calcareous Nannoplankton	Radiolaria	Radiolaria
35	317.5-326.5	3	+	+	Coniacian	•	Early Turonian/ Cenomanian	–	–
36	326.5-336.0	4	–	–	–	o	Early Turonian/ Cenomanian	–	–
37	336.0-345.5	4	+	–	Early Cenomanian	*	Early Turonian/ Cenomanian	*	–
38	345.5-354.5	2	–	–	–	•	Early Cenomanian/ late Albian	–	–
39	354.5-364.0	2	*	+	Early Cenomanian	•	Early Cenomanian/ late Albian	o	–
40	364.0-373.5	1	*	+	Early Cenomanian	•	Early Cenomanian/ late Albian	–	–
41	373.5-382.5	1	*	+	Early Cenomanian	•	Late Albian	+	–
42	382.5-391.5	6	*	+	Late Albian	•	Late Albian	*	–
43	391.5-400.5	40	o	+	(caved)	•	Late Albian	–	–
44	410.0-419.0	2	*	+	Late Albian	•	Late Albian	*	–
45	419.0-428.5	1	*	+	Late Albian	•	Late Albian	*	–
46	428.5-438.0	2	*	+	Late Albian	o	Late Albian	o	–
47	438.0-447.5	7	+	+	Albian	•	Late Albian	*	–
48	447.5-456.5	1	–	–	–	•	Late Albian	–	–
49	456.5-466.0	<1	+	+	Albian	o	Late Albian	o	–
50	466.0-475.5	<1	+	+	Albian	o	Late Albian	o	–
51	475.5-484.5	1	+	+	Albian	•	Late Albian	o	–
52	484.5-494.0	1	+	+	Albian	•	(Mesozoic)	•	–
53	494.0-503.5	1	–	–	(caved)	*	(Mesozoic)	–	–
54	503.5-513.0	2	+	+	Albian/Aptian	•	Early Albian	–	–
55	513.0-522.0	1	–	–	–	o	Early Albian/ late Aptian	+	–
56	522.0-531.5	3	–	–	–	*	Early Albian/ late Aptian	+	–
57	531.5-541.0	3	*	+	Aptian	o	Early Albian/ late Aptian	+	–
58	541.0-550.5	4	+	–	Aptian	•	Early Aptian/ Barremian	+	–
59	550.5-560.0	5	*	*	Aptian	•	Early Aptian/ Barremian	o	–
60	560.0-569.5	7	–	+	–	•	Early Aptian/ Barremian	o	–
61	569.5-579.0	4	–	–	–	•	Early Aptian/ Barremian	o	–
62	579.0-588.5	1	–	–	–	•	Early Aptian/ Barremian	+	–
63	588.5-598.0	8	–	+	–	•	Early Aptian/ Barremian	o	–
64	598.0-607.0	5	+	*	Aptian/ Barremian	•	Early Aptian/ Barremian	o	–
65	607.0-616.5	11	–	–	–	o	Early Aptian/ Barremian	o	–
66	616.5-626.0	7	–	+	Aptian/ Barremian	o	Hauterivian	o	–
67	626.0-635.5	1	+	+	Aptian/ Barremian	•	Hauterivian/ Valanginian	+	–
68	635.5-640.5	1	–	–	–	•	Hauterivian/ Valanginian	+	–

Note: • abundant; o common; * frequent; + rare; – absent.

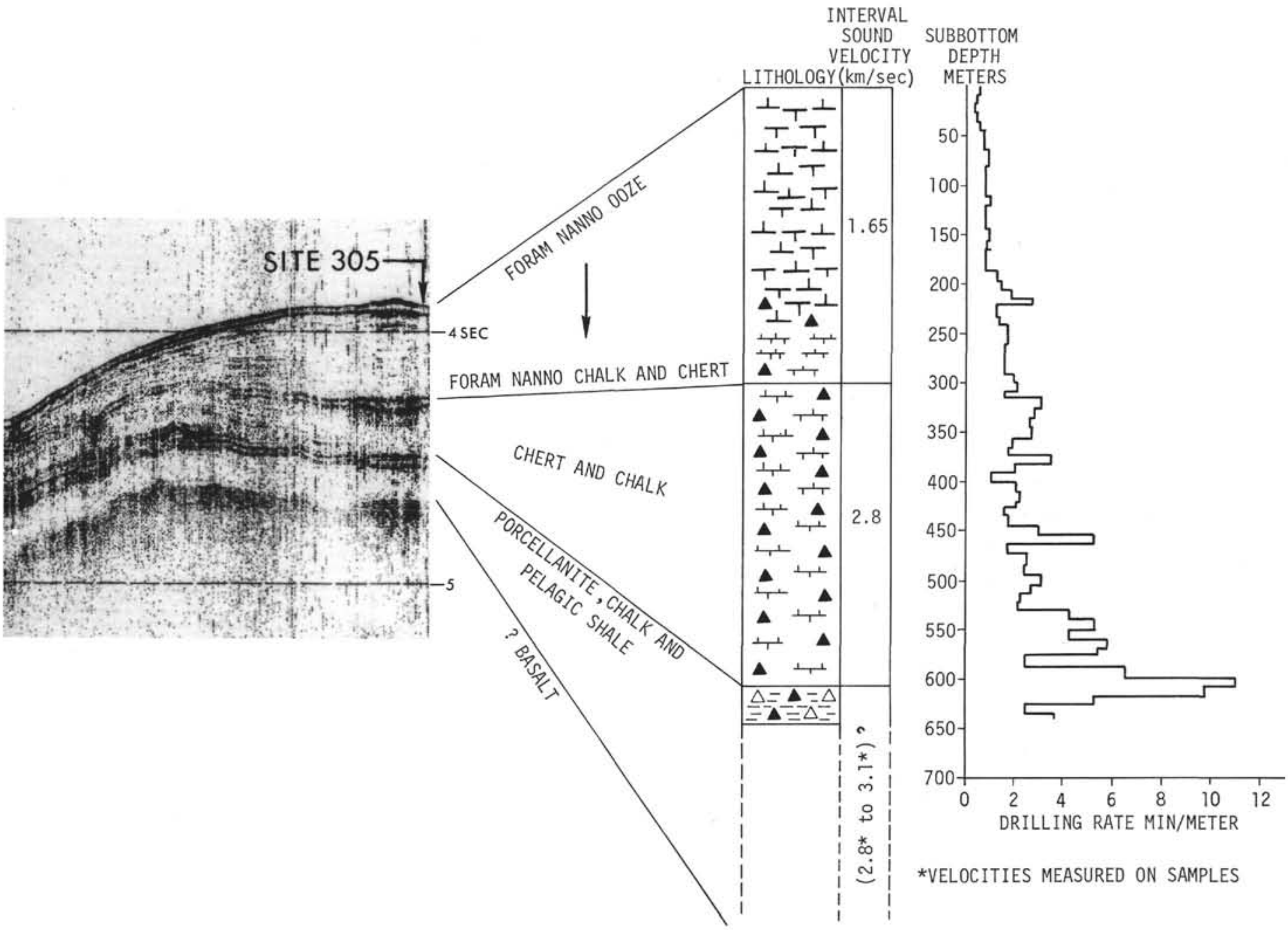

Figure 8. *Correlation of seismic reflection profile with drilling results at Site 305.*

Foraminifera

The Neogene sequence (Cores 1-6) contains abundant foraminiferal populations which show evidence throughout of intense carbonate dissolution. The assemblages which are dominated by planktonic species are characteristic of temperate water and include rare subtropical elements.

Cores 1 and 2 are attributed to the Pleistocene (N23-N22) based on the presence of *Globorotalia truncatulinoides.* The interval from Core 2 to Core 5, Section 4 are attributed to the Pliocene; the lowest occurrence of *Globorotalia inflata* marking the N21/N20 boundary (late/early Pliocene) between Sections 2 and 3 of Core 4.

Assemblages from the interval between Core 5, Section 5 to Core 6, Section 3 belong to the late Miocene Zones N16 to N17, whereas those of the lower part of Core 6, which contain mixed faunas, are attributed to the middle Miocene (N6 to N9).

Oligocene planktonic foraminifera are present reworked into younger middle Miocene assemblages in Core 6, Section 5 but the highest occurrence of Oligocene faunas in situ is in Core 6, Section 6. The fauna from the latter section, as well as from Core 7, are assigned to Zone P22, whereas those of Core 8, Sections 1 and 2 are attributed to Zone P19 and those from the remainder of Core 8 to Zone P18. Early Oligocene assemblages are present as low as Core 9, Section 2.

The limit between the early Oligocene and the late Eocene is drawn between Sections 2 and 3 of Core 9 based on the first occurrence of *Hantkenina* sp. Most of the microfaunas of Cores 9 and 10 are strongly affected by solution. In addition, a few assemblages are mixed by reworking or contamination. Therefore, no zonal subdivision of the late and middle Eocene could be established. The top of the middle Eocene is recognized in Section 5 of Core 10, whereas the core-catcher sample of the same core belongs to the older part of the middle Eocene.

Core 11 contains rich and well-preserved microfaunas which are almost exclusively composed of planktonic foraminifera. The assemblages are attributed to the upper part of the early Eocene (*Globorotalia aragonensis* Zone and *Globorotalia pentacamerata* Zone). The base of the *Globorotalia pentacamerata* Zone is drawn at the first occurrence of *Globigerina frontosa subbotina* in Sample 11-4, 20-22 cm.

All samples examined from Core 12 contain *Globorotalia formosa formosa* and other species characteristic for the homonymous zone of the early Eocene. All microfaunas are rich in well-preserved planktonic foraminifera which display no or only weak traces of dissolution. The abrupt change in the composition of the planktonic foraminiferal assemblages between the top of Core 13 and the base of Core 12 indicates the possible absence of the *Globorotalia subotinae* Zone (oldest zone of the early Eocene).

The planktonic foraminiferal assemblages from Sections 6 to 1 of Cores 13 are typical for the late Paleocene *Globorotalia velascoensis* Zone. The two samples from Sections 2 and 3 show strong indications of carbonate dissolution which affects mainly the large keeled *Globorotalia* spp.

Globorotalia pseudomenardii, the marker for the lower zone of the late Paleocene, is present in Sections 3 to 1 of Core 14 and in the core-catcher sample of Core 13. The solution of planktonic foraminiferal tests is weak except in Sample 14-3, 42-44 cm.

The core-catcher sample and those from Sections 4 and 5 of Core 14 are attributed to the middle Paleocene *Globorotalia pusilla pusilla* Zone. Lumps of white chalk in the core-catcher sample have been washed separately. They contain a rich and well-preserved microfauna of the early Paleocene *Globorotalia trinidadensis* Zone mixed with specimens from the middle Paleocene *Globorotalia uncinata* and *Globorotalia angulata* zones.

The microfaunas of Core 15 indicate strong dissolution. Well-preserved planktonic foraminifera are very rare. The benthonic foraminifera (*Neoflabellina* spp., *Bolivinita* spp., and others) are of Maestrichtian age. Cores 16 through 20 have rich and well-preserved planktonic foraminifera which are attributed to the Maestrichtian. The presence of *Globotruncana mayaroensis* in Core 16 indicates the youngest zone of the Maestrichtian, whereas Core 17 is placed into the middle Maestrichtian (zone with *Globotruncana contus* and *Globotruncana rugosa*). Cores 18 through 20 are of early Maestrichtian age (zone with *Globotruncana stuartiformis* and *Globotruncana elevata*).

Globorotruncana calcarata, the marker of the topmost zone of the Campanian, is well represented in Cores 21 and 23. No washed residues could be obtained from Core 22. Cores 24 through 29 are of early Campanian age (zone with *Globotruncana stuartiformis* and *Globorotruncana fornicata*).

Below Core 29, recovery is very poor. No washed residues are available from Cores 33, 34, and 36, whereas other samples are contaminated by cavings (e.g., core-catcher sample of Core 35).

The small core-catcher samples of Cores 30 and 31 are of late Santonian age (*Globotruncana carinata* Zone). Core 32 may be of early Santonian age.

Recovery from Cores 37 to 68 is very poor; the microfaunas are often of somewhat dubious origin ("cuttings" and "cavings"), others are very poor and badly preserved. In a few cores, only chert chips were recovered and no washed residues could be obtained (see distribution chart in chapter on Early Cretaceous foraminifera).

Slightly bituminous black shales from Section 1 of Core 37 have furnished a few planktonic foraminifera which are placed into the early Cenomanian based on the presence of *Rotalipora brotzeni*. Cores 37 to 41 are given an early Cenomanian age based on the co-occurrence of *Rotalipora brotzeni, R. greenhornensis*, and *R. gandolfii*.

The part of the section represented by Cores 42 to 46 is of late Albian (to basal Cenomanian) age ("Interval with *Rotalipora apenninica*"). The presence, composition, and preservation of the microfaunas are very irregular.

The few washed residues of Cores 47 and 49 to 52 contain representatives of the genus *Ticinella* (*T. primula, Ticinella* sp. cf. *T. raynaudi*) and *Hedbergella* sp. sp. which indicate a middle to early Albian age. The presence of *Ticinella primula* in Core 54 is uncertain because of poor preservation.

No reliable microfaunas were obtained from Cores 53, 55, and 56.

The foraminiferal faunas from Cores 57 to 59 are characterized by the presence of *Globigerinelloides ferreolensis, G. barri*, and *Hedbergella aptica* and are therefore attributed to the Aptian (probably middle to upper part).

The small samples which could be obtained from Cores 60 to 63 are dominated by Radiolaria.

Dorothia zedlerae appears first in Core 64. It marks the top of the "Interval between first occurrence of *Dorothia zedlerae* and the first occurrence of *Dorothia hauteriviana*" (Cores 64 to 67) to which a Barremian (to early Aptian?) age is assigned. Very few specimens of planktonic foraminifera are found in Cores 64 and 67. The presence of very rare *Hedbergella aptica* and *Globigerinelloides gottisi* in Core 64 may indicate that at least this core could be still of Aptian age.

No washed residues could be obtained from Core 68.

Coccoliths

Coccoliths are generally abundant throughout the 641-meter continuously cored section (Cores 1 to 68). Preservation is moderate to poor as overgrowth and fragmentation have affected most assemblages. Most of the Miocene is missing in the Cenozoic section of Cores 1 to 14 (0-130 m). The Mesozoic appears to be complete from Maestrichtian to Valanginian or Hauterivian in Cores 15 to 68 (130-641 m), however, recovery of only trace amounts of sediment below Campanian Core 28 reduces the potential value of Site 305 as a reference section.

The Cretaceous-Tertiary boundary is indicated between Cores 14 and 15 at 130 meters. Preservation immediately above and below this level is especially poor. The only definite early Paleocene was recovered as a trace of white clay in the Core 14 core-catcher sample. *Micula mura* occurs as part of a late Maestrichtian assemblage at the top of Core 15.

Among the three oldest cores at Site 305, Core 67 (626-636 m) contains the best assemblage. The presence of *Cruciellipsis cuvillieri* in Cores 66 to 68 establishes the Neocomian age of these cores. Species present in Core 67 include: *Cretarhabdus crenulatus, Cruciellipsis chiasta, C. cuvillieri, Cyclagelosphaera margerelii, Diado-*

rhombus rectus, Diazomatolithus lehmannii, Lithraphidites carniolensis, Parhabdolithus embergeri, Vagalapilla stradneri, Watznaueria barnesae, W. bayackii, and *W. ovata*.

Radiolaria

Well-preserved Radiolaria are present in all of the five Neogene cores recovered. They are common in Cores 1 to 4 and rare in Core 5.

The diagnostic fossils used by Hays (1970) in his zonation of the North Pacific are either missing or only rarely present and thus his zonation can only be tentatively applied here. The *Artostrobium tumidulum* Zone is present in Core 1 through Section 2 and the remainder of the core may possibly be attributed to the *Axoprunum angelinum* Zone, both Pleistocene. Core 2 is Pliocene, possibly *Lamprocyrtis heteroporos* Zone and Core 3 early Pliocene, above the range of *Stichocorys peregrina*. Core 4 and Core 5 are considered to belong to the *Stichocorys peregrina* Zone late Miocene or early Pliocene.

Preservation of Cretaceous Radiolaria was consistently better in the calcareous sediment samples examined than in the cherts. This is in contrast to Sites 303 and 304 where the Cretaceous Radiolaria were consistently better preserved in the cherts. In the calcareous samples Cretaceous Radiolaria are few to common and poorly preserved in Cores 44 to 47. They are few to abundant and moderately well-preserved in Cores 49 to 52, 58-61, and 63-66. Chert samples from Cores 17, 19, 21, 22, 33, 35, and 38 contained no Radiolaria. Cores 31, 32, 34, 41, 42, 44, 53-57 contained very rare to few, very poor to poor Radiolaria; Cores 39 and 49 contained common, very poor Radiolaria.

Radiolaria in Cores 31 and 32, at a depth of 280-298.5 meters are considered to be Santonian or Campanian in age. Radiolaria in Core 46 (428.5-438 m) belong to the *Dictyomitra somphedia* Zone; and those in Cores 50 to 52 (466-494 m), Cores 58-59 (541-560 m), Cores 60 and 61 (560-579 m), and Cores 63 and 64 (588-607 m) to the *Acaeniotyle umbilicata* Zone. Radiolaria in Cores 65 and 66 (607-626 m) belong to the *Eucyrtis tenuis* Zone. A summary of the biostratigraphy of Site 305 is shown in Table 6.

SEDIMENTATION RATES

Continuous coring through a 641-meter section at Site 305 allows calculation of sedimentation rates of about 8 m/m.y. for Pliocene to Pleistocene, 2 m/m.y. for early middle Eocene to late Oligocene, about 4 m/m.y. for Maestrichtian to Paleocene, and 7 m/m.y. for Hauterivian to Aptian (Figure 9). These moderate sedimentation rates are similar to those at nearby Site 47 where sedimentation rates are 8 to 14 m/m.y. for Pliocene to Pleistocene, 2 to 4 m/m.y. for Paleocene to Eocene, and 7 to 9 m/m.y. for the Maestrichtian.

An erosion surface indicated from samples within Core 6 removed portions of early Miocene, and late Oligocene. A similar break in the stratigraphic section at Site 47 is more inclusive, as the middle Eocene to upper Miocene is missing. An unconformity between Cores 10 and 11 removed most of the mid Eocene. The basal early Eocene is also missing between Cores 12 and 13.

The formation of numerous chert beds and hard chalks through compaction and diagenesis in the Cretaceous section suggests that the calculated accumulation rates of 6 to 9 m/m.y. are minimum figures. A lack of definitive late Cenomanian to Turonian assemblages might also suggest some variation of Cretaceous rates.

SUMMARY AND CONCLUSIONS

The biostratigraphic objectives at Shatsky Rise were not met at Site 305 due in large part to the abundance of chert in the Cretaceous section. A sufficient amount of the softer fossiliferous chalks interbedded with the cherts was recovered for shipboard use in determining the age of the section drilled, but there is little pre-

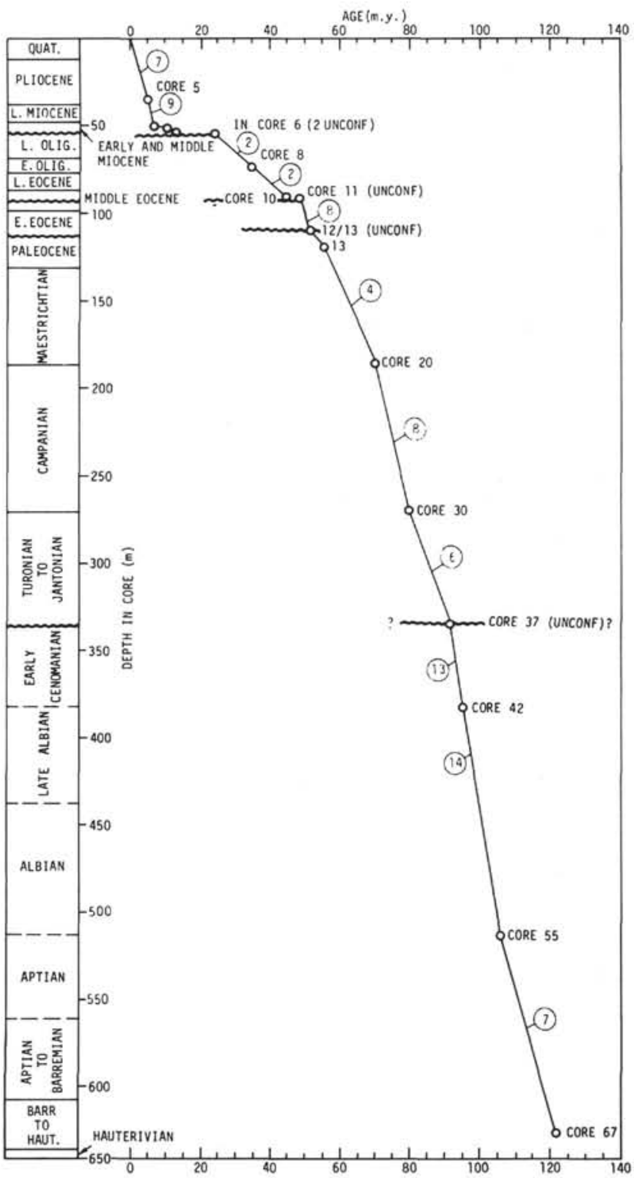

Figure 9. *Accumulation rate curve calculated for Site 305. Circled numbers give accumulation rate in m/m.y. for each segment.*

Campanian core material available for distribution to the scientific community.

The unsatisfactory state of perservation of the fossils also decreases the value of Shatsky Rise as a Paleogene and late Mesozoic microfossil reference section. The foraminifera generally were the most useful for correlation, but there was not enough noncherty rock recovered below the Albian for good foraminifer control in the lowest sediments. Coccoliths were abundant wherever any carbonate was obtained in the cores, but their value was diminished by their poor to moderate preservation. Radiolaria were absent in the Paleogene and were present only in a spotty distribution in the Cretaceous.

The sedimentation rates suggest that this southern part of Shatsky Rise was under the equator about 90 m.y. ago. Mainly that date is selected because it is the middle of the steepest slope of the sediment-accumulation curve.

We were able, as planned, to core an apparently continuous early Paleogene-latest Cretaceous section below the Miocene unconformity that had been identified on Leg 6. Unfortunately, the era boundary fell between cores.

Neither the base of the sediment section nor basement were reached at this site and so no conclusions can be drawn about pre-Valanginian events. A summary of site data is given in Figure 10.

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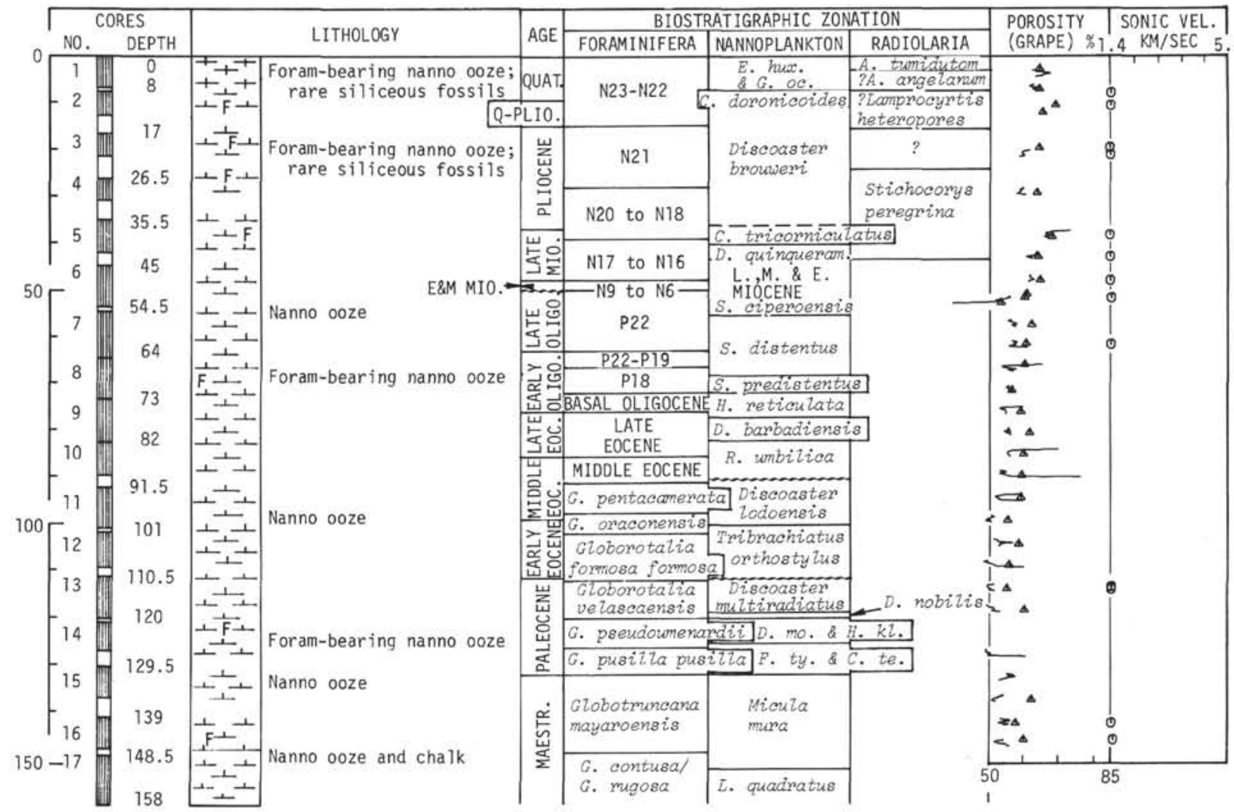


Figure 10. *Summary of coring, lithology, biostratigraphy, and physical properties at Site 305.*

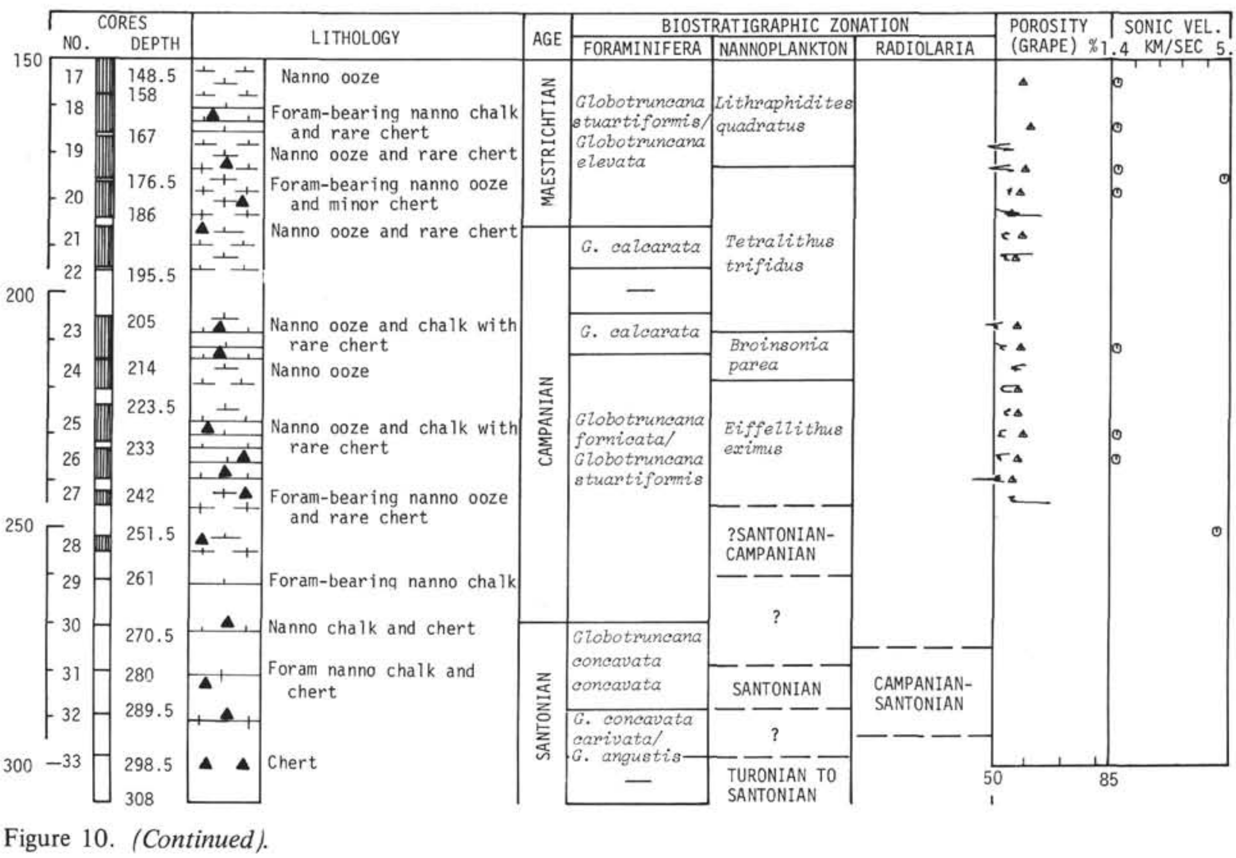


Figure 10. *(Continued).*

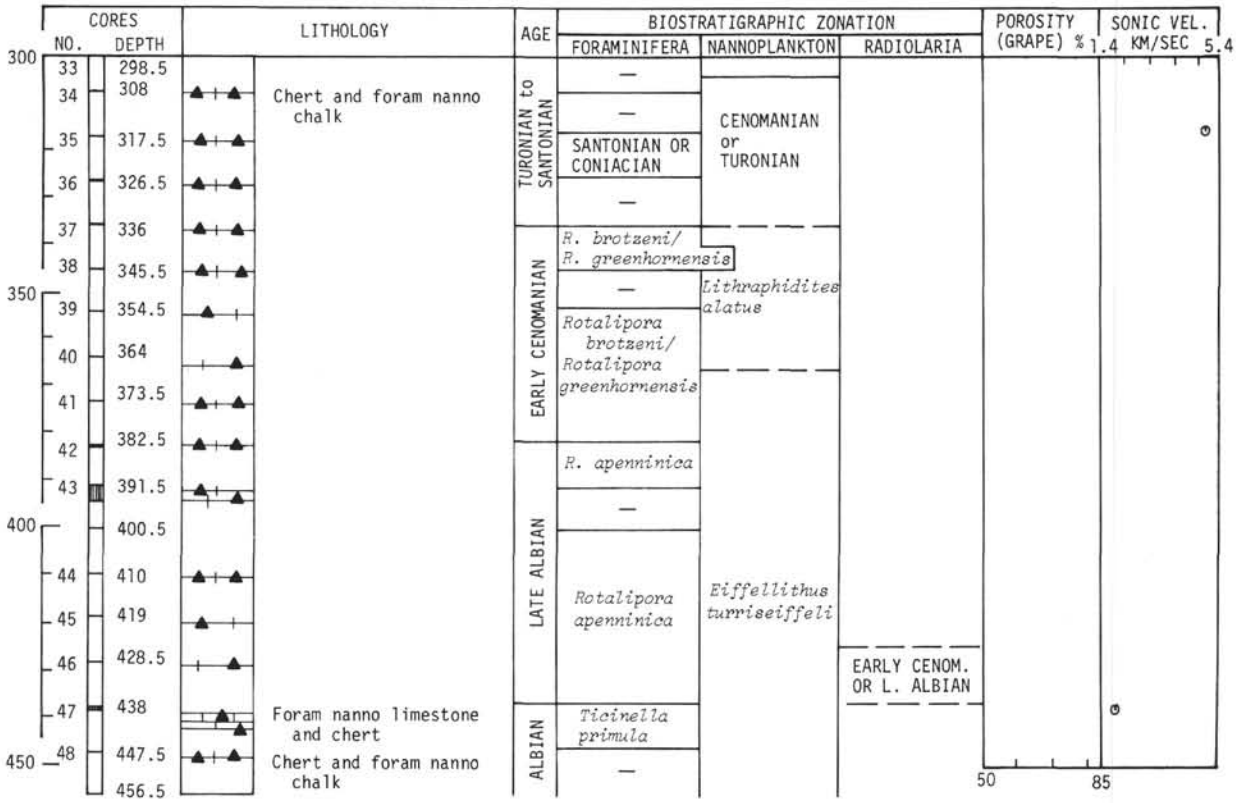


Figure 10. *(Continued)*.

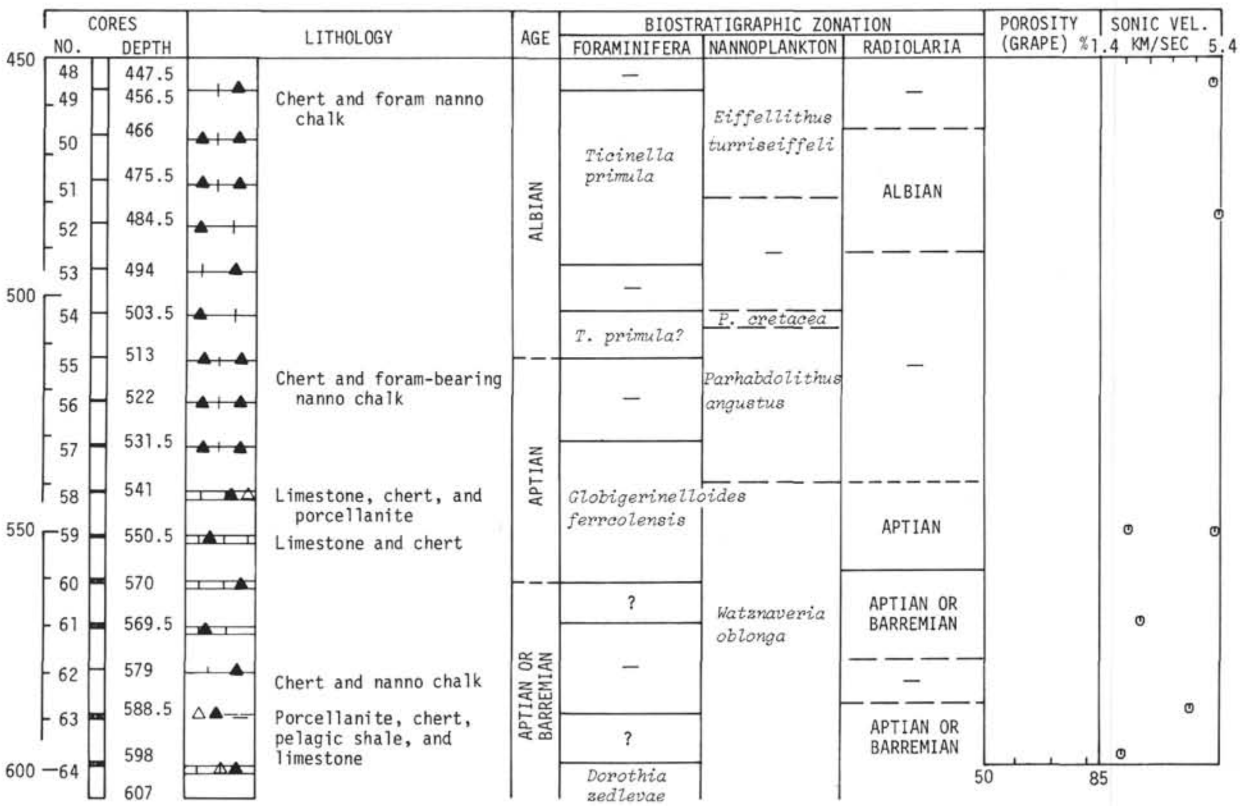


Figure 10. *(Continued)*.

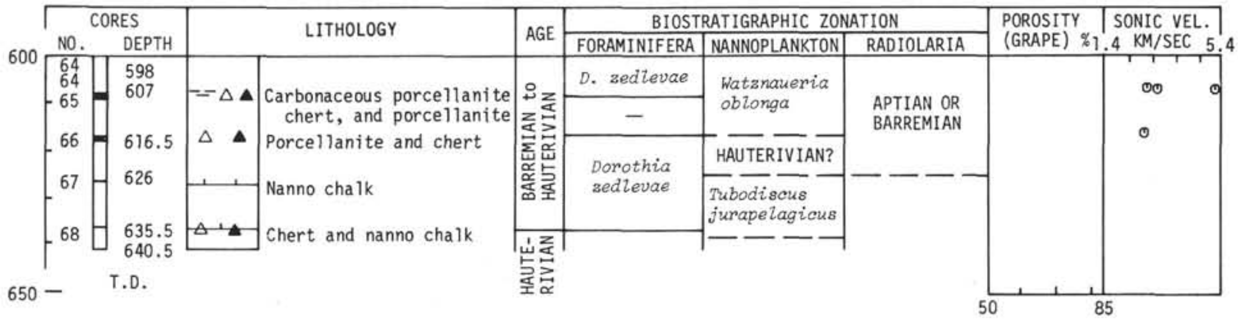


Figure 10. *(Continued).*

Site 305 Hole Core 1 Cored Interval: 0.0-8.0 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
QUATERNARY	Emiliania huxleyi; Artostrobium tumidulum; Geophyrocapsa oceanica; N22-N23; Axoprunum angelinum?	D N R F	R A C A	P M G G	0, 1, 2, 3, 4, 5, 6, Core Catcher	0.5, 1.0	VOID		*145, *120, *80, *100, *CC	

10YR 6/3

10YR 8/3 with 10YR 6/3 and 10YR 6/1 patches

10YR 7/2 grading into 10YR 8/1 — turbidite

10YR 6/3

10YR 8/3 with 10YR 6/1 patches

10YR 7/2

10YR 8/1 — turbidite

10YR 6/1

10YR 7/2 grading into 10YR 6/2

10YR 6/1

10YR 8/3

Core is moderately to severely disturbed. Sediment is soupy to soft. Colors are dominantly yellowish brown (10YR 6/3) to grayish orange (10YR 7/2). Two distinct graded beds, and pumice fragments smaller than 2 cm at 4-110 cm, 5-130 cm.

FORAM-BEARING SILICEOUS NANNO OOZE

Smear Slide at 2-120

Composition	
Nannos	A
Forams	C
Rads	R
Diatoms	C
Silicoflagellates	R
Sponge spicules	TR
Detrital clay	R
Quartz	R
Light glass	R

Grain Size
2-115 (3-24-73) silty clay
5-100 (10-37-53) silty clay

Carbon-Carbonate
2-117 (8.4-0.2-68)
5-98 (7.4-0.1-61)

Site 305 Hole Core 2 Cored Interval: 8.0-17.0 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
QUATERNARY	Emiliania annula / Gephyrocapsa caribbeanica				0, 1, 2, 3	0.5, 1.0	VOID		*100	
PLIOCENE OR QUATERNARY	Coccolithus macintyrei; N22-N23; Lamprocyrtis heteroporos ?	D N R F	R A F A	P M G G	Core Catcher				*CC	

5Y 8/1

5Y 7/1 grading into 5Y 8/1 — turbidite

5Y 7/1 grading into 5Y 8/1

5Y 7/1 grading into 5Y 8/1

5Y 7/1 grading into 5Y 8/1

5Y 7/1 grading into 5Y 8/1

Core is deformed throughout. Colors are very pale orange (5Y 8/1) and yellowish gray (5Y 7/1). They indicate several cycles, one of which is definitely due to graded bedding.

SILICEOUS FORAM-NANNO OOZE.

Smear Slide at 2-100

Composition	
Nannos	A
Forams	A
Diatoms	C
Rads	R
Silicoflagellates	R
Sponge spicules	R
Clay	R
Light glass	R

Grain Size
2-100 (12-43-45) silty clay
3-100 (6-28-66) silty clay

Carbon-Carbonate
2-101 (7.3-0.1-60)
3-102 (9.8-0.1-81)

Explanatory notes in Chapter 1

Site 305 Hole Core 3 Cored Interval: 17.0-26.5 m

AGE	ZONE (NANNOS FORAMS RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE MIOCENE TO PLIOCENE	Discoaster brouweri; N21	N D	A R	M P	0					
					1	0.5, 1.0	F			
					2				*100	
					3		F			
		N R F	A R A	M G G	Core Catcher		VOID		*CC	

5Y 8/1 and 5Y 7/1

Core is moderately deformed and soft. Regular alternation of 10 to 50 cms thick pale orange (5Y 8/1) and yellowish gray (5Y 7/1) beds.

Pumice fragments at 2-75, 3-48.

SILICEOUS FORAM-BEARING NANNO OOZE.

Smear Slide at 2-100

Composition	
Nannos	A
Forams	C
Rads	R
Diatoms	R
Silicoflagellates	R
Light glass	R

Grain Size
2-100 (4-26-70)

Carbon-Carbonate
2-102 (10.5-0.1-87)

Site 305 Hole Core 4 Cored Interval: 26.5-35.5 m

AGE	ZONE (NANNOS FORAMS RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE MIOCENE TO PLIOCENE	N21				0					
	Discoaster brouweri; Stichocorys peregrina; N18 to N19-N20				1	0.5, 1.0	VOID; F			
					2		F		*100	
					3		F			
		D N R F	R A F A	P M G G	Core Catcher		F		*CC	

5Y 8/1 with 5Y 7/1 and 10YR 6/1

Core is moderately disturbed and soft. Color is dominantly pale orange (5Y 8/1) with minor beds of yellowish gray (5Y 7/1) and pale yellowish brown (10YR 6/1).

Pumice fragment at 2-133.

SILICEOUS FORAM-BEARING NANNO OOZE.

Smear Slide at 2-100

Composition	
Nannos	D
Forams	C
Rads	R
Diatoms	R
Silicoflagellates	R

Grain Size
2-100 (1-17-82) clay

Carbon-Carbonate
2-102 (11.2-0.0-93)

X-ray 3-43

Calc	98%	K-Fe	1%
Quar	1%	Amor	31.4%

Site 305 Hole Core 5 Cored Interval: 35.5-45.0 m

AGE	ZONE (NANNOS FORAMS RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
PLIOCENE	Ceratolithus tricorniculatus; N18 to N19-N20; Stichocorys peregrina				0					
		N	A	M	1	0.5, 1.0	VOID			
					2		F		*130	
					3		F			
LATE MIOCENE	Discoaster quinqueramus; N16 to N17	N N	A A	M M	4		F		*85	
					5		F		*110	
		N R F	A R A	M G G	Core Catcher				*CC	

5Y 8/1 with 5Y 7/1 bands

10YR 8/3

5Y 8/1

10YR 8/3 with 10YR 6/2 and 10YR 6/3 patches

10YR 8/3

Core is moderately to severely deformed, soft. Colors range from very pale orange (5Y 8/1) to pale yellowish brown (10YR 6/1).

SILTY PELAGIC CLAY and FORAM-BEARING SILICEOUS NANNO OOZE.

Smear Slide at 2-130

Composition	
Nannos	A
Forams	C
Rads	C
Diatoms	R
Sponge spicules	TR
Silicoflagellates	R
Clay	R
Quartz	R
Light glass	R

Minor lithology is a FORAM-BEARING NANNO OOZE.

Smear Slide at 5-110

Composition	
Nannos	A
Forams	C
Clay	R

Grain Size
2-133 (2-31-67) silty clay
5-110 (0.5-31-68.5) silty clay

Carbon-Carbonate
2-135 (8.8-0.1-73)
4-85 (7.5-0.1-62)
5-112 (10.3-0.0-86)

X-ray	2-130	4-83
Calc	90%	76%
Quar	4%	6%
K-Fe	0%	3%
Plag	2%	4%
Kaol	0%	2%
Mica	2%	7%
Chlo	0%	1%
Bari	2%	1%
Amor	46.2%	53.5%

Explanatory notes in Chapter 1

Site 305 Hole Core 6 Cored Interval: 45.0-54.5 m

AGE: LATE MIOCENE; MIDDLE MIOCENE; E. MIO.; LATE OLIGOCENE

ZONE (NANNOS, FORAMS, RADS): Ceratolithus primus; N16 to N17; Discoaster neohamatus; Catinaster coalitus; S. heteromorphus; N6 to N9; Sphenolithus ciperoensis

FOSSIL CHARACTER (FOSSIL / ABUND. / PRES.): N / A / M; R / — / —; F / A / G

SECTION: 0, 1, 2, 3, 4, 5, 6, Core Catcher

METERS: 0.5, 1.0

LITHOLOGY: VOID

LITHO. SAMPLE: *130; *130; *90; *20; *130; CC

10YR 8/2

2.5Y 5/4

2.5Y 8/2

LITHOLOGIC DESCRIPTION

Core is moderately to severely deformed, homogeneous, soft to stiff. Colors are very pale orange (10YR 8/2), light olive brown (2.5Y 5/4) and white (2.5Y 8/2).

SILTY PELAGIC CLAY-BEARING NANNO OOZE.

Smear Slide at 4-90

Composition	
Nannos	A
Forams	R
Clay	R
Quartz and feldspar	R-C
Light and brown glass	R
Phillipsite	R

Grain Size
2-100 (1-29-70) silty clay
4-90 (3-40-57) silty clay
5-43 (2-45-53) silty clay
5-132 (1-57-42) clayey silt

Carbon-Carbonate
2-102 (9.2-0.1-76)
4-90 (8.8-0.1-73)
5-18 (9.6-0.1-79)
5-126 (11.3-0.0-94)

X-ray	4-86	5-20	5-130
Calc	86%	91%	100%
Quar	2%	1%	0%
K-Fe	2%	2%	0%
Plag	2%	1%	0%
Mica	2%	1%	0%
Phil	4%	2%	0%
Bari	2%	2%	0%
Amor	41.9%	34.5%	32.3%

Lithologic change below 5-100. Minor lithology is NANNO OOZE.

Smear Slide at CC

Composition	
Nannos	D
Forams	R
Phillipsite	R

○ Discoaster berggrenii
★ Discoaster hamatus
☆ Helicopontosphaera ampliaperta

Site 305 Hole Core 7 Cored Interval: 54.5-64.0 m

AGE: LATE OLIGOCENE

ZONE (NANNOS, FORAMS, RADS): Sphenolithus ciperoensis; Sphenolithus distentus; P22

FOSSIL CHARACTER (FOSSIL / ABUND. / PRES.): N / A / MP; F / A / G

SECTION: 0, 1, 2, 3, 4, 5, 6, Core Catcher

METERS: 0.5, 1.0

LITHO. SAMPLE: *100; *50; *90; CC

10YR 8/3

2.5Y 6/4

10YR 6/3 grading into 10YR 4/4

10YR 8/3

LITHOLOGIC DESCRIPTION

Core is soft, homogeneous and deformed throughout. Color is dominantly very pale orange (10YR 8/3) with intervals of pale, light and dark yellowish brown (10YR 6/3, 2.5Y 6/4, 10YR 4/4).

NANNO OOZE.

Grain Size
2-100 (0.2-39.8-60) silty clay
5-46 (0.3-43.4-56.3) silty clay

Carbon-Carbonate
2-102 (11.4-0-95)
5-53 (11.0-0-91)

X-ray	2-102	5-50
Calc	100%	98%
Quar	0%	0.5%
Phil	0%	1%
Amor	18.5%	38.3%

Smear Slide at 5-50

Composition	
Nannos	D
Forams	R
Dark glass	R
Phillipsite	R

Explanatory notes in Chapter 1

Site 305 Hole Core 8 Cored Interval: 64.0-73.0 m

AGE	ZONE (NANNOS FORAMS RADS)	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
LATE OLIGOCENE	Sphenolithus distentus P19-P22				0, 1, 2, 3	0.5, 1.0			*100 (Section 2)	10YR 8/3
EARLY OLIGOCENE	Sphenolithus predistentus P18				4, 5, 6				*100 (Section 5)	
	☆	N / F	A / A	M / G	Core Catcher				*CC	

Core is severely deformed, homogeneous and stiff. Color is very pale orange (10YR 8/3) with irregular patches of 10YR 8/1 shade at 3-135, 5-115 to 5-135.

NANNO OOZE.

Smear Slide at 2-100

Composition	
Nannos	D
Forams	R
Phillipsite	R

Grain Size
2-102 (1-~~56-43~~) clayey silt
5-100 (2-47-51) silty clay

Carbon-Carbonate
2-98 (11.4-0-95)
5-102 (11.5-0-95)

X-ray 2-100
Calc 100%
Amor 22.4%

☆ Helicopontosphaera reticulata

Site 305 Hole Core 9 Cored Interval: 73.0-82.0 m

AGE	ZONE (NANNOS FORAMS RADS)	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
EARLY OLIGOCENE	Helicopontosphaera reticulata; Cassigerinella chipolensis/Hastigerina micra				0, 1, 2, 3	0.5, 1.0			*100 (Section 2)	10YR 8/3; 10YR 7/3
LATE EOCENE	Discoaster barbadiensis; ? Globorotalia cerroazulensis; Globigerinatheka semiinvoluta				4, 5, 6				*100 (Section 5)	10YR 7/4; 10YR 6/4
		N R / F	A / A	P / G	Core Catcher				*CC	

Core is severely deformed throughout. Sediment is homogeneous and soft. Colors are very pale orange (10YR 8/3), shades of grayish orange (10YR 7/3 and 10YR 7/4), and yellowish brown (10YR 6/4).

NANNO OOZE.

Grain Size
2-100 (0.3-59-40.7) clayey silt
5-102 (0.2-49.5-50.3) silty clay

Carbon-Carbonate
2-102 (11.4-0-95)
5-98 (11.2-0-93)

X-ray 5-100
Calc 99.7%
Quar 0.3%
Amor 20.0%

Smear Slide at 5-100

Composition	
Nannos	D
Forams	R
Dark glass	R
Phillipsite	R
Amorphous iron oxide	R
Dolomite	TR

Explanatory notes in Chapter 1

Site 305 Hole Core 10 Cored Interval: 82.0-91.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
LATE EOCENE	Globigerinatheka semiinvoluta				1	0.5, 1.0	VOID			Core is severely disturbed. Sediment is homogeneous and soft. Colors are grayish orange (10YR 7/4) and very pale orange (10YR 8/3) with gradational contact. NANNO OOZE.
					2				*100	10YR 7/4. Grain Size: 2-98 (11.1 0-92); 4-130 (11.4-0-95); 5-98 (11.5-0-96). X-ray 5-100: Calc 100%; Amor 15.5%
					3					
	Globorotalia lehneni to Truncorotaloides rohri				4					10YR 8/3
MIDDLE EOCENE	Reticulofenestra umbilica				5				*100	Smear Slide at 5-100. Composition: Nannos D; Forams R; Dark glass R; Phillipsite R; Amorphous iron oxide R
		N / F	A / A	M / G	Core Catcher				*CC	

Site 305 Hole Core 11 Cored Interval: 91.5-101.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0		VOID			
EARLY EOCENE	Discoaster lodoensis; Globorotalia pentacamerata				1	0.5, 1.0				Core is intensely deformed. Sediment is soft and its color is grayish orange (10YR 7/4) to pale orange (10YR 8/4). Below Section 3 interbeds (5 to 10 cm thick) of yellowish brown (10YR 6/4) and very pale orange (10YR 8/1) alternate with pale orange beds. FORAM-BEARING NANNO OOZE.
					2				*70	10YR 7/4. Smear Slide at 2-70. Composition: Nannos D; Forams C; Dark glass R; Amorphous iron oxide R. Grain Size: 2-70 (2-70-28) clayey silt; 5-100 (3-69-28) clayey silt. Carbon-Carbonate: 2-72 (11.6-0-96); 5-98 (11.4-0-94). X-ray 2-66: Calc 100%; Amor 17.7%
					3					
					4					
	Globorotalia aragonensis				5					Alternating beds of 10YR 8/4, 10YR 6/4 & 10YR 8/1
					6				*70	
		N / F	A / A	P / G	Core Catcher				*CC	

Explanatory notes in Chapter 1

Site 305 Hole Core 12 Cored Interval: 101.0-110.5 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY EOCENE	Tribrachiatus orthostylus / Globorotalia formosa formosa				0		VOID			
					1	0.5, 1.0				10YR 7/4
					2				*90	
					3					
					4					10YR 7/3
					5				*100	
		N / F	A / A	P / G	Core Catcher				*CC	

Core is severely deformed. Dominant color is grayish orange (10YR 7/4 and 10YR 7/3), with some 2 to 3 cm thick layers of pale yellowish brown (10YR 6/3) between 5-70 to 95. Sediment is soft and homogeneous.

FORAM-BEARING NANNO OOZE.

Smear Slide at 2-90

Composition	
Nannos	D
Forams	C
Dark glass	R
Amorphous iron oxide	R

Grain Size
2-90 (2-56-42) clayey silt
5-100 (5-57-38) clayey silt

Carbon-Carbonate
2-92 (11.4-0-95)
5-102 (11.3-0-94)

Site 305 Hole Core 13 Cored Interval: 110.5-120.0 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE PALEOCENE	Discoaster multiradiatus / Globorotalia velascoensis				0					
					1	0.5, 1.0				
					2				*100	
					3					10YR 8/4
					4					
					5					
	Discoaster nobilis / Globorotalia pseudomenardii				6					
		N / F	A / A	M / G	Core Catcher				*CC	

Core is intensely deformed. Sediment is homogeneous and soft. Color is pale orange (10YR 8/4).

NANNO OOZE.

Smear Slide at 2-100

Composition	
Nannos	D
Forams	R
Amorphous iron oxide	R

Grain Size
2-102 (0-51-49) clayey silt
5-100 (4-47-49) silty clay

Carbon-Carbonate
2-104 (11.5-0-96)
5-102 (11.6-0-97)

X-ray 2-100
Calc 100%
Amor 20.8%

Explanatory notes in Chapter 1

Site 305 Hole Core 14 Cored Interval: 120.0-129.5 m

AGE | ZONE (NANNOS, FORAMS, RADS) | FOSSIL CHARACTER (FOSSIL, ABUND., PRES.) | SECTION | METERS | LITHOLOGY | DEFORMATION | LITHO.SAMPLE | LITHOLOGIC DESCRIPTION

Age: LATE PALEOCENE; EARLY TO MIDDLE PALEOCENE

Zones: Heliolithus kleinpelli and Discoaster mohleri / Fasciculithus tympaniformis; Globorotalia pseudomenardii; Cruciplacolithus tenuis; Globorotalia pusilla pusilla

Sections: 0, 1, 2, 3, 4, 5, Core Catcher

Section 1: VOID (0.5, 1.0); bx

Core Catcher fossil character: N A P; F A G

Litho. samples: *100 (Section 2); *100 (Section 5); CC

Colors: 10YR 7/3; 10YR 8/2; 10YR 7/3; 10YR 8/2

Core is deformed throughout. Colors are grayish orange (10YR 7/3) and very pale orange (10YR 8/2). Sediment is homogeneous and soft.

FORAM-BEARING NANNO OOZE.

Smear Slide at 2-100

Composition	
Nannos	D
Forams	C
Dark glass	R
Phillipsite	R
Amorphous iron oxide	R

Grain Size
5-100 (1-41-58) silty clay

Carbon-Carbonate
5-102 (11.6-0-96)

Site 305 Hole Core 15 Cored Interval: 129.5-139.0 m

AGE | ZONE (NANNOS, FORAMS, RADS) | FOSSIL CHARACTER (FOSSIL, ABUND., PRES.) | SECTION | METERS | LITHOLOGY | DEFORMATION | LITHO.SAMPLE | LITHOLOGIC DESCRIPTION

Age: LATE MAESTRICHTIAN

Zones: Micula mura; Globotruncana mayaroensis

Sections: 0, 1, 2, 3, 4, 5, Core Catcher

Section 1: VOID (0.5, 1.0)

Fossil character, Section 1: N A MP

Core Catcher fossil character: N A M; R; F A M

Litho. samples: *140 (Section 2); *100 (Section 5); *CC

Colors: 10YR 8/3; 10YR 8/2

Core is deformed throughout. Colors are shades of very pale orange (10YR 8/2, 10YR 8/3). Sediment is homogeneous and soft.

NANNO OOZE.

Grain Size
5-97 (0-27-73) silty clay

Carbon-Carbonate
4-130 (11.7-0-97)
5-103 (11.5-0-96)

X-ray 5-99
Calc 100%
Amor 14.8%

Smear Slide at 5-100

Composition	
Nannos	D
Forams	R
Dark glass	R
Amorphous iron oxide	R

Explanatory notes in Chapter 1

Site 305 Hole Core 16 Cored Interval: 139.0-148.5 m

AGE	ZONE (NANNOS FORAMS RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
LATE MAESTRICHTIAN	*Micula mura* *Globotruncana mayaroensis*	N R F	O — A	O — G	0, 1, 2, 3, 4, 5, Core Catcher	0.5, 1.0			*100 (Sec. 2), *03 (Sec. 5), *CC	10YR 8/1

Core is moderately deformed. Color is pale orange (10YR 8/1). Sediment is homogeneous, soft with common chalk layers in Section 5.

NANNO OOZE.

Smear Slide at 2-100

Composition	
Nannos	D
Forams	R

Grain Size
2-97 (0-28-72) silty clay
5-05 (8-31-61) silty clay

Carbon-Carbonate
2-103 (11.7-0-97)
5-05 (11.7-0-97)

X-ray	2-100	5-03
Calc	100%	100%
Amor	17.3%	22.3%

Minor lithology is FORAM NANNO CHALK.

Smear Slide at 5-03

Composition	
Nannos	A
Forams	A
Echinoid spines	TR
Dark glass	R

Site 305 Hole Core 17 Cored Interval: 148.5-158.0 m

AGE	ZONE (NANNOS FORAMS RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
LATE MAESTRICHTIAN / MIDDLE MAESTRICHTIAN	*Micula mura* *Globotruncana contusa* and *Globotruncana rugosa* / *Lithraphidites quadratus* *Globotruncana*	N R F	O — A	O — G	0, 1, 2, 3, 4, 5, 6, Core Catcher	0.5, 1.0			*100 (Sec. 5), *CC	10YR 8/3, 10YR 4/2, 10YR 8/3

Core is intensely deformed. Color is very pale orange (10YR 8/3). Sediment is soft. In Section 3 two pieces of dark yellowish brown (10YR 4/2), laminated CHERT.

FORAM-BEARING NANNO OOZE.

Grain Size
5-102 (0-25-75) silty clay

Carbon-Carbonate
5-97 (11.7-0-97)

X-ray 5-100
Calc 100%
Amor 35.5%

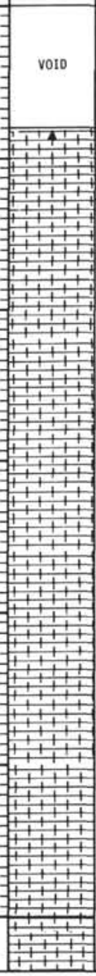
Smear Slide at 5-100

Composition	
Nannos	A
Forams	C
Dark glass	R

Explanatory notes in Chapter 1

Site 305 Hole Core 18 Cored Interval: 158.0-167.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
LATE CAMPANIAN TO EARLY MAESTRICHTIAN	Lithraphidites quadratus; Globotruncana stuartiformis and Globotruncana elevata	N, R, F	A, A	P, G	0, 1, 2, 3, 4, 5, 6, Core Catcher	0.5, 1.0	VOID		*76, *95, *CC	10YR 8/2



Core is moderately deformed. It is broken up by drilling leading to chalk lumps embedded in soft ooze. Color is very pale orange (10YR 8/2). Dark yellow brown (10YR 4/2) CHERT fragment at 1-133.

FORAM NANNO CHALK.

Smear Slide at 2-76

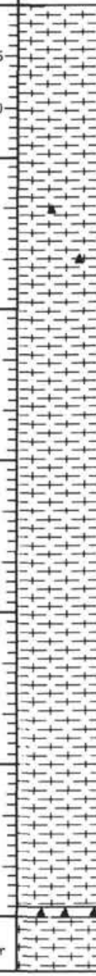
Composition	
Nannos	A
Forams	A
Echinoid spinces	R
Recrystallized calcite	R
Dark glass	R
Amorphous iron oxide	R

Grain Size
3-75 (5-25-70) silty clay
5-100 (8-23-69) silty clay

Carbon-Carbonate
3-77 (11.7-0-97)
5-97 (11.8-0-98)

Site 305 Hole Core 19 Cored Interval: 167.0-176.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
LATE CAMPANIAN TO EARLY MAESTRICHTIAN	Lithraphidites quadratus; Globotruncana stuartiformis and Globotruncana elevata; Tetralithus trifidus	N, R, F	A, A	P, G	0, 1, 2, 3, 4, 5, 6, Core Catcher	0.5, 1.0			*100, *CC	10YR 8/2; 10YR 4/2; 10YR 8/2



Core is intensely deformed. Color is very pale orange (10YR 8/2). Dark yellowish brown (10YR 4/2) CHERT chips at 2-47 to 94.

Sediment is soft and homogeneous.

FORAM NANNO OOZE.

Grain Size
5-101 (6-21-73) silty clay

Carbon-Carbonate
5-101 (11.7-0-97)

Smear Slide at 5-100

Composition	
Nannos	A
Forams	A
Echinoid spines	R
Fish remains	R
Recrystallized calcite	R
Light and dark glass	R
Amorphous iron oxide	R

Explanatory notes in Chapter 1

Site 305 Hole Core 20 Cored Interval: 176.5-186.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE CAMPANIAN TO EARLY MAESTRICHTIAN	Tetralithus trifidus; Globotruncana stuartiformis and Globotruncana elevata				0					
					1	0.5, 1.0				
					2				*100	
					3					
					4					
					5				*100	
					6					
		F	A	G	Core Catcher				*CC	

10YR 8/6

Core is intensely deformed. Color is very pale orange (10YR 8/6). Sediment is soft and homogeneous.

FORAM-BEARING NANNO OOZE.

Smear Slide at 2-100

Composition	
Nannos	D
Forams	C
Echinoid spines	R
Recrystallized calcite	R

Grain Size
2-100 (0-26-74) silty clay
5-100 (0-21-79) clay

Carbon-Carbonate
2-100 (11.7-0-97)
5-100 (11.7-0-98)

X-ray 5-102
Calc 100%
Amor 19.2%

Site 305 Hole Core 21 Cored Interval: 186.0-195.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LATE CAMPANIAN TO EARLY MAESTRICHTIAN	Tetralithus trifidus; Globotruncana calcarata				0		VOID			
					1	0.5, 1.0				
					2				*70	10YR 8/3
					3					
					4					
					5				*100	
					6					10YR 4/2
		F	A	G	Core Catcher				*CC	10YR 8/3

Sediment is soft and homogeneous. Very pale orange (10YR 8/3) ooze with dark yellow brown (10YR 4/2) CHERT layer and chips of chert.

Section 1 and 2 are FORAM NANNO OOZE.

Smear Slide at 2-70

Composition	
Nannos	A
Forams	A
Echinoid spines	R
Recrystallized calcite	R

Grain Size
2-70 (3-24-73) silty clay
5-100 (0-14-86) clay

Carbon-Carbonate
2-70 (11.6-0-97)
5-100 (11.7-0-97)

NANNO OOZE.

Smear Slide at 5-100

Composition	
Nannos	D
Forams	R
Echinoid spines	R

Site 305 Hole Core 22 Cored Interval: 195.5-205.0 m

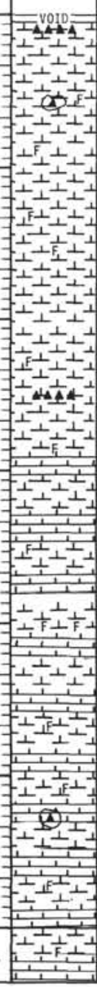
AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
*		R / F	— / —	— / —	Core Catcher				CC	10YR 4/2 — 1 piece of dark yellow brown (10YR 4/2) CHERT.

Explanatory notes in Chapter 1

* LATE CAMPANIAN TO EARLY MAESTRICHTIAN

Site 305 Hole Core 23 Cored Interval: 205.0-214.0 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
LATE CAMPANIAN	Broinsonia parca / Tetralithus trifidus; Globotruncana calcarata	F	A	G	0, 1, 2, 3, 4, 5, 6, Core Catcher	0.5, 1.0	VOID		*90 (Section 2), *100 (Section 5), *CC	10YR 8/3



Core is intensely deformed throughout. Color is very pale orange (10YR 8/3).

Below 3-130 alternation of 5 cm thick chalk layers with ooze layers. Sediment is texturally homogeneous.

CHERT layers are of dark yellowish brown (10YR 4/2) color.

FORAM-BEARING NANNO OOZE and CHALK.

Smear Slide at 2-90

Composition	
Nannos	D
Forams	C
Echinoid spines	R
Recrystallized calcite	R
Dark glass	R

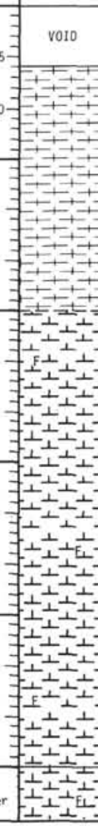
Grain Size
2-90 (1-34-65) silty clay
5-100 (0-37-63) silty clay

Carbon-Carbonate
2-90 (11.7-0-97)
5-100 (11.7-0-97)

X-ray 5-102
Calc 100%
Amor 18.9%

Site 305 Hole Core 24 Cored Interval: 214.0-223.5 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
EARLY TO LATE CAMPANIAN	Broinsonia parca; Globotruncana fornicata and Globotruncana stuartiformis	F	A	G	0, 1, 2, 3, 4, 5, Core Catcher	0.5, 1.0	VOID		*100 (Section 2), *100 (Section 5), *CC	10YR 8/3



Core is severely deformed. Sediment is soft and homogeneous, color is very pale orange (10YR 8/3).

Section 1 and 2 are FORAM NANNO OOZE.

Smear Slide at 2-100

Composition	
Nannos	A
Forams	A
Echinoid spines	R
Recrystallized calcite	R

Grain Size
5-100 (1-24-75) clay

Carbon-Carbonate
5-102 (11.8-0-98)

Remainder of core is FORAM-BEARING NANNO OOZE.

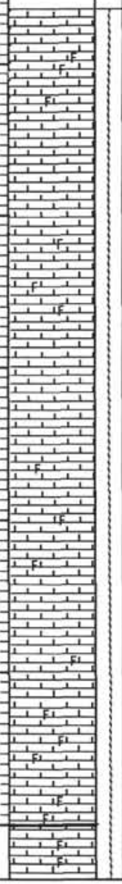
Smear Slide at 5-100

Composition	
Nannos	D
Forams	C
Echinoid spines	R
Recrystallized calcite	R

Explanatory notes in Chapter 1

Site 305 Hole Core 25 Cored Interval: 223.5-233.0 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY CAMPANIAN	Eiffellithus eximius; Globotruncana fornicata and Globotruncana stuartiformis	N / F	A / C	P / G	0, 1, 2, 3, 4, 5, 6, Core Catcher	0.5, 1.0	VOID		*100 (Section 2); *102 (Section 5); *CC	10YR 8/3



Core is deformed throughout. Chalk is partly broken up by drilling resulting in soft interbeds of ooze. Color is very pale orange (10YR 8/3). Pieces of CHERT and moderate yellowish brown (10YR 5/4). Homogeneous texture.

FORAM-BEARING NANNO OOZE/CHALK.

Smear Slide at 2-100

Composition	
Nannos	D
Forams	C
Echinoid spines	R
Recrystallized calcite	R

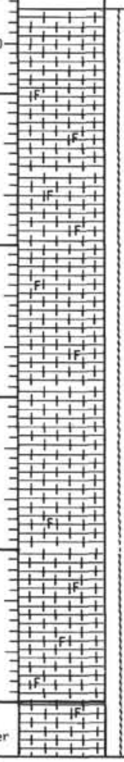
Grain Size
2-106 (2-29-69) silty clay
5-96 (4-34-62) silty clay

Carbon-Carbonate
2-102 (11.7-0-98)
5-102 (11.7-0-98)

X-ray 5-99
Calc 100%
Amor 28.7%

Site 305 Hole Core 26 Cored Interval: 233.0-242.0 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY CAMPANIAN	Eiffellithus eximius; Globotruncana fornicata and Globotruncana stuartiformis	N / F	A / A	P / G	0, 1, 2, 3, 4, 5, Core Catcher	0.5, 1.0	VOID		*120 (Section 2); *112 (Section 5); *CC	10YR 8/3



Core is deformed throughout. Most of chalk was crushed to soft ooze by drilling.

Displaced CHERT fragments and chips occur at various levels. Color is very pale orange (10YR 8/3).

FORAM-BEARING NANNO CHALK, FORAM NANNO CHALK in top part of core.

Smear Slide at 5-112

Composition	
Nannos	D
Forams	C
Echinoid spinces	R
Recrystallized calcite	R

Grain Size
2-120 (5-25-70)
5-110 (9-26-65)

Carbon-Carbonate
2-122 (11.6-0-97)
5-112 (11.8-0-98)

Explanatory notes in Chapter 1

Site 305 Hole Core 27 Cored Interval: 242.0-251.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY CAMPANIAN	Eiffellithus eximius; Globotruncana fornicata and Globotruncana stuartiformis				0					
					1	0.5, 1.0			*145	10YR 8/3
					2					
		N F	A C	P G	Core Catcher			bx	*CC	

Core is intensely deformed. Sediment is soft and homogeneous, and its color is very pale orange (10YR 8/3).

CHERT layer, moderate yellowish brown (10YR 5/4) at top, and chert fragments in core catcher.

FORAM NANNO OOZE.

Smear Slide at 1-145

Composition	
Nannos	A
Forams	A
Recrystallized calcite	R

Site 305 Hole Core 28 Cored Interval: 251.5-261.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
EARLY CAMPANIAN	Globotruncana fornicata and Globotruncana stuartiformis				0					
					1	0.5, 1.0	VOID			
					2					10YR 8/3
		N R F	— — A	— — G	Core Catcher					10YR 5/4 and 10YR 4/6

Core is intensely deformed and soupy. FORAM NANNO OOZE, very pale orange (10YR 8/3).

Below 2-120 only CHERT chips of moderate yellowish brown (10YR 5/4) and moderate reddish brown (10R 4/6).

Site 305 Hole Core 29 Cored Interval: 261.0-270.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
SANTONIAN TO LATE TURONIAN	Globotruncana fornicata and Globotruncana stuartiformis				0					
		N F	A C	P G	Core Catcher				*CC	N9

Semilithified, homogeneous white (N9).

NANNO CHALK.

Smear Slide at CC

Composition	
Nannos	D
Forams	C
Echinoid spines	R
Recrystallized calcite	R

Site 305 Hole Core 30 Cored Interval: 270.5-280.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
SANTONIAN TO LATE TURONIAN	Globotruncana concavata carinata				0					
		N F	A C	P M	Core Catcher				*CC	N9

Semilithified, homogeneous, white (N9) FORAM-BEARING NANNO CHALK and chips of pale reddish brown (10R 5/4) CHERT.

Smear Slide at CC

Composition	
Nannos	A
Forams	C
Echinoid spines	R
Recrystallized calcite	C

Explanatory notes in Chapter 1

Site 305 Hole Core 31 Cored Interval: 280.0-289.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
SANTONIAN	Globotruncana concavata carinata	N R F	A R A	P P G	0 Core Catcher				* CC	N9 Semilithified, white (N9) FORAM NANNO CHALK with chips and fragments of moderate yellowish brown (10YR 4/6) CHERT. Smear Slide at CC Composition Nannos A Forams A Echinoid spines R Recrystallized calcite C

Site 305 Hole Core 32 Cored Interval: 289.5-298.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
SANTONIAN	LATE TURONIAN TO SANTONIAN Globotruncana fornicata and Globotruncana concavata carinata and Globotruncana angusti carinata ? Artostrobium urna	N R F	A R A	P P G	0 Core Catcher			bx	* CC	N9 Chalk is completely broken up, and contains 2 large CHERT pieces and many small chips. FORAM NANNO CHALK, white (N9) and chert is moderate reddish brown (10R 4/6) and medium light gray (2.5Y 6/0). Smear Slide at CC Composition Nannos A Forams A Echinoid spines R Recrystallized calcite C Dark glass R

Site 305 Hole Core 33 Cored Interval: 298.5-308.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
LATE TURONIAN TO SANTONIAN		N N R F	A F — —	P P — —	0 Core Catcher			bx		10 YR 6/1 Fragmented by drilling. Pieces of CHERT of various shades: pale yellowish brown (10YR 6/1, 10YR 6/2), moderate reddish brown (10R 4/6). Some fragments show thin layers and pockets of weakly silicified nanno chalk.

Site 305 Hole Core 34 Cored Interval: 308.0-317.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
EARLY TURONIAN TO SANTONIAN		N R F	A R —	P P —	0 Core Catcher			bx		10YR 6/1 Fragmented by drilling. Pieces of CHERT of various shades: pale yellowish brown (10YR 6/1) with laminae of pale yellowish brown (10YR 6/3), light brown (5YR 5/6) with laminae of moderate reddish brown (10R 4/6). It shows vitreous luster and conchoidal fractures. White carbonate occurs attached to surface of some fragments and within small voids. Composition (X-ray, thin-section). Chert consists of microcrystalline quartz, common tiny calcite inclusions and iron-oxide particles. These are concentrated in irregular laminae and patches showing diffuse boundaries. The ferruginous stain causes the red-brown color of the chert. Radiolaria are present as "ghosts" only.

Explanatory notes in Chapter 1

Site 305 Hole Core 35 Cored Interval: 317.5-326.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
					0					
CONIACIAN	Globotruncana fornicata and Globotruncana concavata carinata and Globotruncana imbricata	R F	— A	— M	Core Catcher			bx		5YR 5/6

CHERT (vitreous).

Fragments of various sizes up to 5 cm (broken up by drilling).

Mottled with inclusions of less silicified areas and many open vugs lined with NANNO CHALK.

Colors:
(1) Light brown (5YR 5/6) mottled with moderate reddish brown (10R 4/6).
(2) Moderate reddish brown (10R 4/6) mottled with pale reddish brown (10R 5/4).

Site 305 Hole Core 36 Cored Interval: 326.5-336.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
EARLY TURONIAN TO CENOMANIAN					0					
					1	0.5	VOID			
		N R F	C — —	P — —	Core Catcher			bx		N4 and N7

CHERT (vitreous).

Eleven fragments. Upper 8 pieces are mottled medium dark gray (N4) and light gray (N7). Light patches often show pyrite crystals. Elongate, horizontal flattened cavities are common and are lined with white nanno chalk crust. They also contain euhedral pyrite crystals up to 5 mm.

All fragments from core catcher placed in Section 1.

Site 305 Hole Core 37 Cored Interval: 336.0-345.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
					0					
EARLY TURONIAN TO EARLY CENOMANIAN	Rotalipora brotzeni, Rotalipora greenhornensis Lithraphidites alatus				1	0.5	VOID			
		N R F	F C R	M P G	Core Catcher			bx	*CC	N3

CHERT with vitreous luster and conchoidal fractures. Ten fragments (broken up by drilling). Several pieces have a nanno chalk crust as well as vugs which are lined with white (N9), partly silicified nanno chalk, and occasionally also with euhedral quartz crystals. Color of chert is dark gray (N3) with slight mottling of light gray.

At 135 to 138 black (5Y 2.5/1), semi-lithified, fissile and slightly fluorescent layer of CARBONACEOUS ZEOLITIC PELAGIC SHALE.

Smear Slide at 1-135

Composition	
Nannos	R
Forams	R
Clay minerals	A
Zeolites	A
Dark glass	R
Pyrite	C

Site 305 Hole Core 38 Cored Interval: 335.5-354.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
EARLY CENOMANIAN TO LATE ALBIAN					0					
	Lithraphidites alatus	R F	— F	— M	Core Catcher			bx	*CC	N3 with mottling of N7

CHERT which is broken up by drilling. Color is dark gray (N3) with mottling of light gray (N7).

White FORAM-BEARING NANNO CHALK forms a thin (<5 mm) crust on several chert fragments. Chalk-lined vugs are common.

Composition of chalk crust	
Nannos	A
Forams	C
Recrystallized calcite	C
Recrystallized silica	R

Site 305 Hole Core 39 Cored Interval: 354.5-364.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
					0					
EARLY CENOMANIAN TO LATE ALBIAN	Rotalipora brotzeni, Rotalipora greenhornensis Lithrapidites alatus	R F	C C	P G	Core Catcher			bx	*CC	N3 with N7

Fragments of CHERT up to 6 cm in size. Dark gray (N3) with moderate mottling of light gray (N7).

NANNO FORAM CHALK as crust on chert pieces and as vug linings. Vugs are irregular in shape and up to 2 mm large.

NANNO FORAM CHALK very pale orange (10YR 8/2). Only few lumps recovered. Semilithified, homogeneous.

Smear Slide at CC

Composition	
Nannos	A
Forams	A
Echinoid spines	R
Rads	R
Recrystallized calcite	C

Explanatory notes in Chapter 1

Site 305 Hole Core 40 Cored Interval: 364.0-373.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
EARLY CENOMANIAN TO LATE ALBIAN	Lithrapidites alatus; Rotalipora brotzeni, Rotalipora greenhornensis	N N R F	A A — R	P M — M	0; Core Catcher			bx	*CC	N2 5Y 3/2

Sediment brecciated by drilling.

CHERT. One piece (~6 cm). Black (N2) with one vug (~2 cm) filled with yellowish gray (5Y 8/1). Foram nanno chalk.

FORAM NANNO CHALK. Laminated, alternating yellowish gray (5Y 3/2) and light gray (N7).

Smear Slide at CC

Composition	
Nannos	A
Forams	A
Echinoid spines	R
Recrystallized calcite	C

Site 305 Hole Core 41 Cored Interval: 373.5-382.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
EARLY CENOMANIAN TO LATE ALBIAN	Eiffellithus turriseiffeli; Rotalipora brotzeni, Rotalipora greenhornensis	N R F	A R R	P P M	0; Core Catcher			bx	*CC	N3

CHERT. Several fragments up to 6 cm large. Dark gray (N3) with moderate to intense mottling of light gray (N7). Vugs common and range up to 2 cm in size.

FORAM-BEARING NANNO CHALK forms a crust on chert pieces and also lines the vugs.

Smear Slide at CC

Composition	
Nannos	D
Forams	C
Recrystallized calcite	C
Dark glass	R

Site 305 Hole Core 42 Cored Interval: 382.5-391.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
LATE ALBIAN	Eiffellithus turriseiffeli; Rotalipora appenninica	N R F	A F C	P P G	0; 1 (0.5, 1.0); Core Catcher		VOID	bx	*CC	N8

FORAM NANNO OOZE with CHERT chips, soupy, completely disturbed by drilling. Unopened.

In core catcher FORAM NANNO CHALK very light gray (N8) mixed by drilling with several small (<3 cm) pieces of CHERT, grayish black (N2).

Smear Slide at CC

Composition	
Nannos	A
Forams	A
Echinoid spines	R
Recrystallized calcite	C

Site 305 Hole Core 43 Cored Interval: 391.5-400.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
LATE ALBIAN	Eiffellithus turriseiffeli	N F	A A	M G	0; 1 (0.5, 1.0); 2; 3; Core Catcher		VOID	bx		N8

CHERT chips and NANNO OOZE, homogenized by drilling and very soupy ooze to very light gray (N8), chert chips are light gray (N7), dark gray (N3) and moderate reddish brown (10R 4/6).

Unopened.

Explanatory notes in Chapter 1

Site 305 Hole Core 44 Cored Interval: 410.0-419.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
					0					
LATE ALBIAN	Eiffellithus turriseiffeli, Rotalipora apenninica	N R F	A R C	M P G	Core Catcher			bx	*CC	N3

CHERT.
Six fragments up to 6 cm in size. Dark gray (N3) with moderate to intense mottling of light gray (N7). Irregular flattish vugs common. White FORAM NANNO CHALK forms a few mm thick crust on chert and lines vugs.

Smear Slide at CC

Composition	
Nannos	A
Forams	A
Echinoid spines	R
Rads	R
Recrystallized calcite	C
Recrystallized silica	R
Pyrite	R
Light glass	R

Site 305 Hole Core 45 Cored Interval: 319.0-428.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
					0					
LATE ALBIAN	Eiffellithus turriseiffeli, Rotalipora apenninica	N R F	A R F	M P M	Core Catcher			bx	*CC	N3

Sediment brecciated by drilling. Pieces of CHERT, dark gray (N3) with slight mottling of medium gray (N5) and FORAM-BEARING NANNO CHALK very pale orange (10YR 8/1).

Smear Slide at CC

Composition	
Nannos	D
Forams	C
Echinoid spines	R
Recrystallized calcite	C

Site 305 Hole Core 46 Cored Interval: 428.5-438.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
					0					
LATE ALBIAN	Eiffellithus turriseiffeli, Rotalipora apenninica, Dictyomitra somphedia	N R F	C C C	P P G	Core Catcher			bx	*CC	10YR 8/1, N3

Sediment was fragmented by drilling. Pieces of CHERT dark gray (N3) with slight mottling of medium gray (N5). Covered with thin layer of white chalk.

FORAM-BEARING NANNO CHALK very pale orange (10YR 8/1).

Smear Slide at CC

Composition	
Nannos	A
Forams	C
Echinoid spines	R
Recrystallized calcite	R
Rads	R

Site 305 Hole Core 47 Cored Interval: 438.0-447.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
					0					
LATE ALBIAN	Eiffellithus turriseiffeli, Ticinella primula				1	0.5, 1.0	VOID	bx	*138	N8
		N R F	A F F	M P P	Core Catcher				CC	

Sediment brecciated by drilling.

FORAM-RADIOLARIAN-BEARING NANNO LIMESTONE. Color is light gray (N8) with moderate mottling in darker shade due to bioturbation. Vertical and horizontal burrows, some with infill structures.
CHERT generally brecciated. At 1-116 it occurs as less than 4 mm thick irregular layer in the limestone. Chert has a vitreous luster and conchoidal fractures.

Smear Slide at 1-138

Composition	
Nannos	A
Forams	C
Recrystallized calcite	C
Light glass	R

Carbon-Carbonate
1-110 (11.2-0-93)

In thin-section (1-103, 1-128) common Radiolaria are observed in addition to fossils listed above. Molds of rads and forams are filled with chalcedony. X-ray analysis reveals calcite, quartz and opal-CT.

Site 305 Hole Core 48 Cored Interval: 447.5-456.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
					0					
LATE ALBIAN		N F	C —	P —	Core Catcher			bx	*CC	N9, N2

Sediment fragmented by drilling. CHERT grayish black (N2) with intense mottling of medium dark gray (N4). Irregular surfaces covered with thin crust of white NANNO CHALK.

Smear Slide at CC

Composition	
Nannos	A
Forams	R
Rads	R
Recrystallized calcite	C
Recrystallized silica	R
Hematite	R
Phillipsite	R

Explanatory notes in Chapter 1

Site 305 Hole Core 49 Cored Interval: 456.5-466.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
ALBIAN	Eiffellithus turriseiffeli Ticinella primula	R F	C C	P M	Core Catcher			bx	* CC	N7

Sediment brecciated by drilling.
CHERT, one fragment light gray (N7) intensely mottled with grayish black (N2). Other fragments grayish black (N2) with white crust of FORAM NANNO CHALK.

Smear Slide at CC

Composition	
Nannos	A
Forams	A
Rads	R
Recrystallized calcite	C
Recrystallized silica	R

Site 305 Hole Core 50 Cored Interval: 466.0-475.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
ALBIAN	Eiffellithus turriseiffeli Ticinella primula Acaeniotyle umbilicata	N R F	C C F	P M M	Core Catcher			bx	* CC	N9 and N2

Sediment brecciated by drilling.
CHERT, black (N2) with intense light gray (N7) mottling and FORAM-BEARING NANNO CHALK, white (N9).

Smear Slide at CC

Composition	
Nannos	A
Forams	C
Rads	R
Recrystallized calcite	C
Recrystallized silica	R

Site 305 Hole Core 51 Cored Interval: 475.5-484.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
ALBIAN	Eiffellithus turriseiffeli Ticinella primula Acaeniotyle umbilicata	N R F	A C R	P M M	Core Catcher			bx	* CC	N7

Fragmented by drilling. CHERT, light gray (N7) with intense mottling of grayish black (N2) with crust of white (N9) FORAM-BEARING NANNO CHALK on irregular chert surfaces.

Site 305 Hole Core 52 Cored Interval: 484.5-494.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
ALBIAN	Ticinella primula Acaeniotyle umbilicata	N R F	A A C	P M M	Core Catcher			bx	* CC	N8 N2

Sediment brecciated by drilling.
CHERT, grayish black (N2) with moderate mottling of light gray (N7). Irregular CHERT surfaces covered with white (N7) CHALK and FORAM-RADIOLARIAN-BEARING NANNO CHALK, homogeneous very light gray (N8).

Smear Slide at CC

Composition	
Nannos	A
Forams	C
Rads	C
Recrystallized calcite	C
Recrystallized silica	R

Site 305 Hole Core 53 Cored Interval: 494.0-503.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
ALBIAN?		N R F	F R C	P P M	Core Catcher			bx	* CC	N7

Brecciated by drilling.
CHERT with alternating layers and mottling of light gray (N7) and grayish black (N2), and with few, partly silicified FORAM-BEARING NANNO CHALK layers.

Composition of chalk layers in chert	
Nannos	A
Forams	C
Rads	R
Recrystallized calcite	A
Recrystallized silica	R

Site 305 Hole Core 54 Cored Interval: 503.5-513.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
APTIAN TO ALBIAN	Prediscosphaera cretacea Ticinella primula ?	N R F	O R R	O P P	Core Catcher			bx	* CC	N9

Both lithologies broken up by drilling.
CHERT (vitreous).
Intensely mottled light gray (N7), medium light gray (N6) and grayish black (N2). White chalk crusts on irregular chert surfaces and in vugs.

NANNO CHALK, white, homogeneous.

Composition of chalk	
Nannos	A
Forams	R
Rads	R
Recrystallized calcite	C
Recrystallized silica	R

Explanatory notes in Chapter 1

Site 305 Hole Core 55 Cored Interval: 513.0-522.0 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
EARLY ALBIAN TO LATE APTIAN	Parhabdolithus angustus	N R F	C R —	P P —	Core Catcher			bx	* CC	N7

CHERT (vitreous), broken up by drilling. Dominantly light gray (N7), showing resilicified fractures.

Site 305 Hole Core 56 Cored Interval: 522.0-531.5 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
EARLY ALBIAN TO LATE APTIAN	Parhabdolithus angustus				1	0.5 1.0	VOID		135	
		N R F	F R	P P	Core Catcher			bx	* CC	10R 4/2

Broken up by drilling.
CHERT (vitreous), dominantly grayish red (10R 4/2) with layers and patches of white (N9) weakly silicified NANNO CHALK, which also covers the chert surfaces and partly fills vugs.

Composition of chalk layer from chert 1-135

Nannos	A
Forams	C
Recrystallized calcite	C
Recrystallized silica	R

Site 305 Hole Core 57 Cored Interval: 531.5-541.0 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
EARLY ALBIAN TO LATE APTIAN	Parhabdolithus angustus Globigerinelloides ferreolensis	N R F	C R F	P P M	Core Catcher			bx	*CC	N7

Broken up by drilling.
CHERT (vitreous) light gray (N7) with irregular contact to grayish red (10R 4/2). Surface covered with white FORAM NANNO CHALK, also partly filling vugs.
Many resilicified fractures in chert.

Composition of chalk crust

Nannos	A
Forams	C
Recrystallized calcite	A

Site 305 Hole Core 58 Cored Interval: 541.0-550.5 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
EARLY APTIAN TO BARREMIAN	Watznaueria oblonga Globigerinelloides ferreolensis Acaeniotyle umbilicata	N R F	A C R	P M P	Core Catcher			bx	*CC	N9 10YR 6/2

Sediment brecciated by drilling.
White (N9) RADIOLARIAN NANNO LIMESTONE and pale yellowish brown (10YR 6/2) CHERT with laminae of very pale orange (10YR 8/2). Chert shows many sub-parallel fractures filled with chalcedony.

Composition of limestone

Nannos	A
Rads	A
Recrystallized calcite	R
Recrystallized silica	R

Carbon-Carbonate
CC (7.6-0-63)

Site 305 Hole Core 59 Cored Interval: 550.5-560.0 m

AGE	ZONE (NANNOS / FORAMS / RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					
EARLY APTIAN TO BARREMIAN	Watznaueria oblonga Globigerinelloides ferreolensis Acaeniotyle umbilicata				1	0.5 1.0	VOID			
		R N F	C A F	M P M				bx	100 * *140	10YR 5/2 N9

Fragmented by drilling. No core catcher sample retrieved.

FORAM-RADIOLARIAN-BEARING NANNO LIMESTONE, white (N9) with medium light gray (N6) laminae.

CHERT pieces showing sharp contact with limestone. Colors of chert are dominantly pale brown (10YR 5/2) and pale yellowish brown (10YR 6/2). Chert is also found as small nodules (<3 cm) in limestone.

Smear Slide at 1-140

Composition	
Nannos	A
Forams	C
Rads	R-C
Recrystallized calcite	C
Recrystallized silica	R
Light glass	R

X-ray	1-130	1-140
Calc	38%	93%
Quar	61%	7%
Mica	1%	0%
Amor	34.9%	32.8%

Explanatory notes in Chapter 1

Site 305 Hole Core 60 Cored Interval: 560.0-569.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
EARLY APTIAN TO BARREMIAN	Watznaueria oblonga; Acaeniotyle umbilicata	R R	R C	P M	0 / 1	0.5, 1.0	VOID		*115
		N F	A —	P —	Core Catcher			bx	* CC

N9
10YR 6/2

Brecciated by drilling. Silicified RADIOLARIAN NANNO LIMESTONE white (N9), laminated.

CHERT (vitreous), pale yellowish brown (10YR 6/2) with laminae of moderate yellowish brown (10YR 5/4). Many subparallel fractures welded by silica. Sharp contacts with limestone. A few pieces are dark reddish brown (10R 3/4) and moderate brown (5YR 4/4).

Smear Slide at 1-115

Composition	
Rads	A
Nannos	C
Forams	R
Recrystallized calcite	R
Recrystallized silica	R

Carbon-Carbonate
1-104 (3.8-0-31)

X-ray 1-104
Calc 47%
Quar 53%
Amor 33.4%

Site 305 Hole Core 61 Cored Interval: 569.5-579.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
EARLY APTIAN TO BARREMIAN	Watznaueria oblonga; Acaeniotyle umbilicata	R	C	P	0 / 1	0.5, 1.0	VOID		*147
		F N	— A	— M	Core Catcher				* CC

N9
5YR 4/1

Silicified RADIOLARIAN NANNO LIMESTONE. Thinly laminated white (N9), light gray (N7) and light olive gray (5Y 6/1). Burrows common.

CHERT brownish gray (5YR 4/1) and (5YR 4/1) with sharp boundaries with limestone. No vugs.

Proportion of chert markedly lower than in upper cores.

Fragmented by drilling.

Smear Slide at 1-147

Composition	
Rads	A
Nannos	C
Recrystallized calcite	C
Recrystallized silica	C

Carbonate
1-135 (33%)

Site 305 Hole Core 62 Cored Interval: 579.0-588.5

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
EARLY APTIAN TO BARREMIAN	Watznaueria oblonga	N R F	C R —	P P —	0 / Core Catcher			bx	* CC

5YR 8/1

Fragmented by drilling.

CHERT with vitreous luster and conchoidal fractures. Mottled with pinkish gray (5YR 8/1) and medium light gray (N6) colors. Small vugs and chert surfaces lined with partly silicified RADIOLARIAN-BEARING NANNO CHALK.

Site 305 Hole Core 63 Cored Interval: 588.5-598.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
EARLY APTIAN TO BARREMIAN	Watznaueria oblonga; Acaeniotyle umbilicata	R	C	M	0 / 1	0.5, 1.0	VOID		*100
								bx	*140
		N F	A R	M P	Core Catcher				* CC

Brecciated by drilling.

PORCELLANITE with common Radiolaria. It is irregularly laminated with shades of light gray (N7) and bioturbated.

RADIOLARIAN-NANNO LIMESTONE, white (N9) with sharp contact to chert.

CHERT is partly laminated and shows a porcellaneous luster. Colors are light brownish gray (5YR 6/1) and pinkish gray (5YR 8/1).

Composition of limestone 1-140

Rads	A
Nannos	C
Recrystallized calcite	C
Recrystallized silica	C
Detrital clay	R

Minor lithology is dark yellowish brown (10YR 4/2) NANNO-BEARING PELAGIC SHALE.

Smear Slide at 1-100

Composition	
Nannos	C
Recrystallized calcite	R
Hematite	R
Clay	A

Explanatory notes in Chapter 1

Site 305 Hole Core 64 Cored Interval: 598.0-607.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	
EARLY APTIAN TO BARREMIAN	Watznaueria oblonga; Dorothia zedlerae; Acaeniotyle umbilicata	R	C	M	0 / 1	0.5 / 1.0	VOID	bx	* 118	N9
		N N F	A C F	P P P	Core Catcher				* CC	5GY 8/1 to 5G 4/1

LITHOLOGIC DESCRIPTION

Core fragmented throughout.

NANNO LIMESTONE. White (N9) with some laminae of light gray (N7). Burrows common, fucoids (?) in uppermost fragments. In lower part grading into a Porcellanite with abundant Radiolaria.

CHERT (1 piece) at base of Section 1. Colors are medium light gray (N6) with lamination in brownish gray (5YR 4/1).

Smear Slide at 1-118

Composition	
Nannos	A
Forams	R
Rads	R
Recrystallized calcite	C

NANNO-BEARING PELAGIC SHALE in core catcher. Color is light gray (5GY 8/1) to dark greenish gray (5G 4/1).

Carbonate
1-100 (88%)

Site 305 Hole Core 65 Cored Interval: 607.0-616.5

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	
EARLY APTIAN TO BARREMIAN	Watznaueria oblonga; Eucyrtis tenuis	R	C	M	0 / 1	0.5 / 1.0	VOID		*100 *115 *129	5Y 5/2 and 5Y 3/2
		N F	C —	P —	Core Catcher			bx	CC *	N5

LITHOLOGIC DESCRIPTION

Various lithologies:

CARBONACEOUS SILICIFIED CLAYEY PORCELLANITE. Shaly aspect, laminated light olive gray (5Y 5/2) and olive gray (5Y 3/2).

PORCELLANITE with alternating light bluish gray (5B 7/1) and medium bluish gray (5B 5/1) beds thinner than 1 cm. Minor bioturbation.

CHERT with dull luster. Pieces with various colors: medium gray (N5), brownish gray (5YR 4/1), light olive gray (5Y 6/2).

Smear Slide at 1-100

Composition	
Nannos	C
Rads	A
Recrystallized silica	C
Pyrite	R
Amorphous iron oxide	R
Clay minerals	R

Smear Slide at 1-129

Composition	
Nannos	R
Rads	C
Recrystallized silica	A
Pyrite	R
Clay minerals	C

Carbon-Carbonate
1-100 (10.4-9.3-9)

X-ray	1-100	1-129
Calc	3%	0%
Quar	64%	16%
Opal-CT	29%	73%
Pyri	3%	1%
Clay min.	0%	8%

Site 305 Hole Core 66 Cored Interval: 616.5-626.0 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	
APTIAN TO HAUTERIVIAN	Watznaueria oblonga; Dorothia zedlerae; Eucyrtis tenuis	R	C	P	0 / 1	0.5 / 1.0	VOID			N8 to N6 N3
		N F	C —	P —	Core Catcher			bx	* CC	N8 to N6

LITHOLOGIC DESCRIPTION

PELAGIC CLAYSTONE, light gray (N8) to medium light gray (N6) with greenish gray (5G 6/1) and light bluish gray (5B 7/1) layers scattered throughout.

PORCELLANITE with abundant rads, laminated. Generally very light gray (N8) to medium light gray (N6) with some thin light bluish gray (5B 7/1) laminae.

CHERT, dark gray (N3) or black (N2) with intense mottling of various shades of light gray (N7).

X-ray 1-120			
Calc	62.8%	Bari	1.3%
Quar	33.4%	Amor	33.9%
Paly	2.5%		

Site 305 Hole Core 67 Cored Interval: 626.0-635.5 m

AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	
APTIAN TO VALANGINIAN	Tubodiscus jurapelagicus; Dorothia zedlerae	N R F	A R R	M P M	0 / Core Catcher			bx	CC *	N9

LITHOLOGIC DESCRIPTION

NANNO CHALK white (N9) less than 3 cm semilithified.

Smear Slide at CC

Composition	
Nannos	A
Forams	R
Rads	R
Recrystallized calcite	C
Pyrite	R

Site 305 Hole Core 68 Cored Interval: 635.5-640.5 m

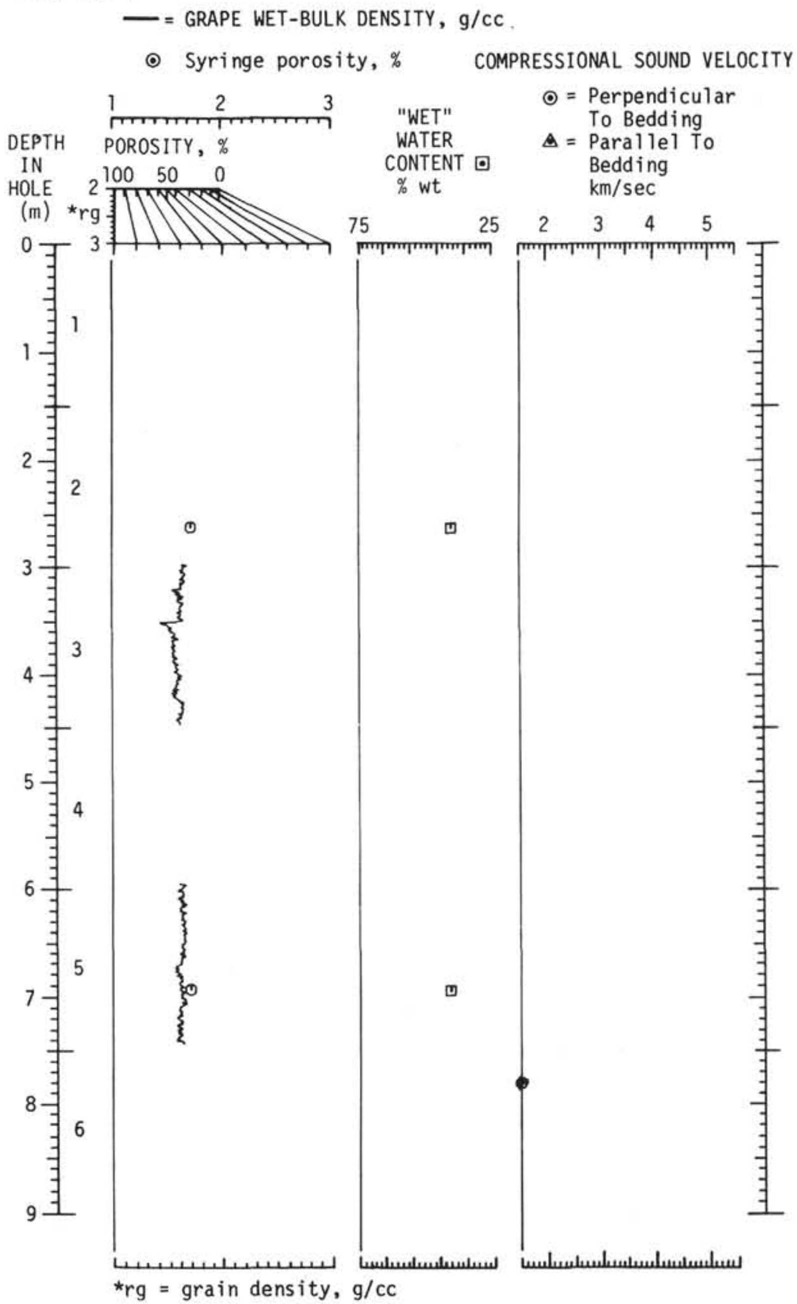
AGE	ZONE (NANNOS, FORAMS, RADS)	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	
HAUTERIVIAN TO VALANGINIAN	Tubodiscus jurapelagicus	N R F	C R —	P P —	0 / Core Catcher				CC *	N3 with N7

LITHOLOGIC DESCRIPTION

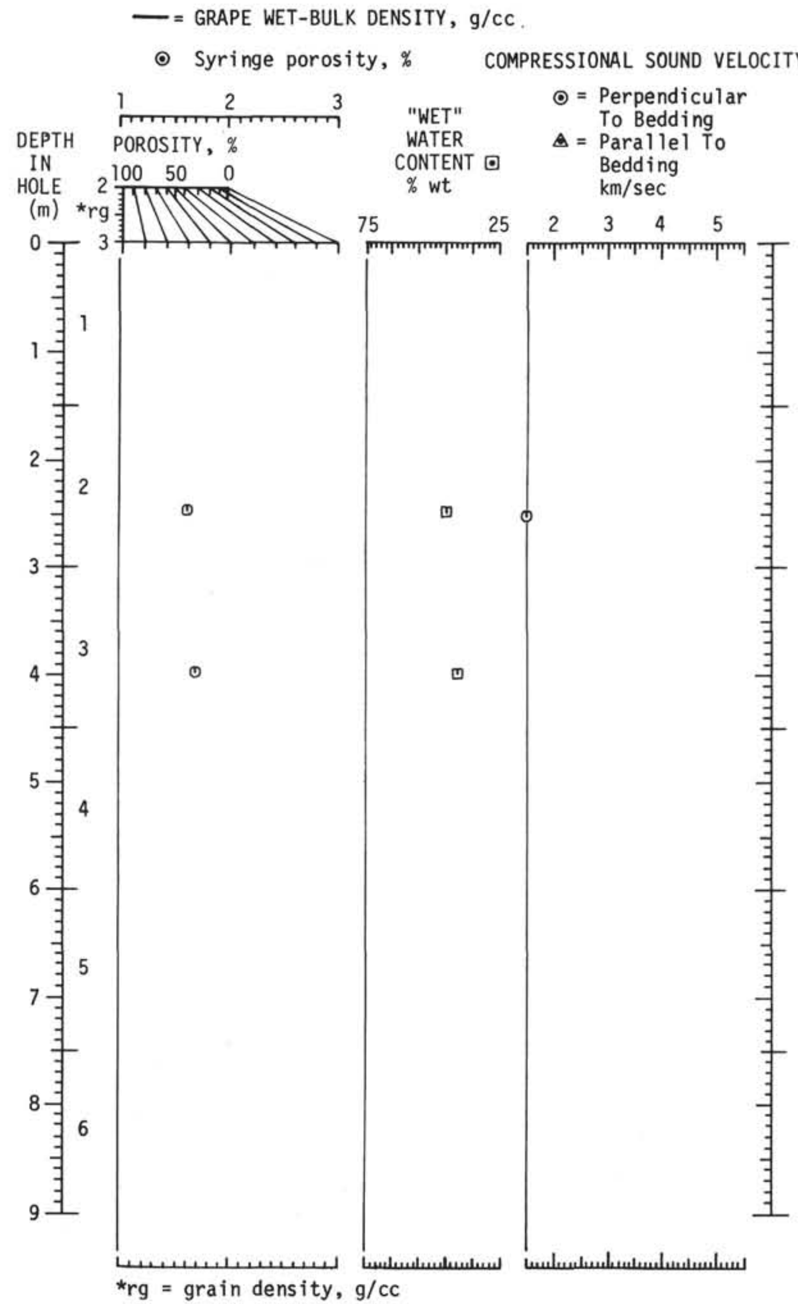
CHERT
Two pieces, dark gray (N3) mottled with shades of light gray (N7). Few vugs contain white nanno chalk.

Explanatory notes in Chapter 1

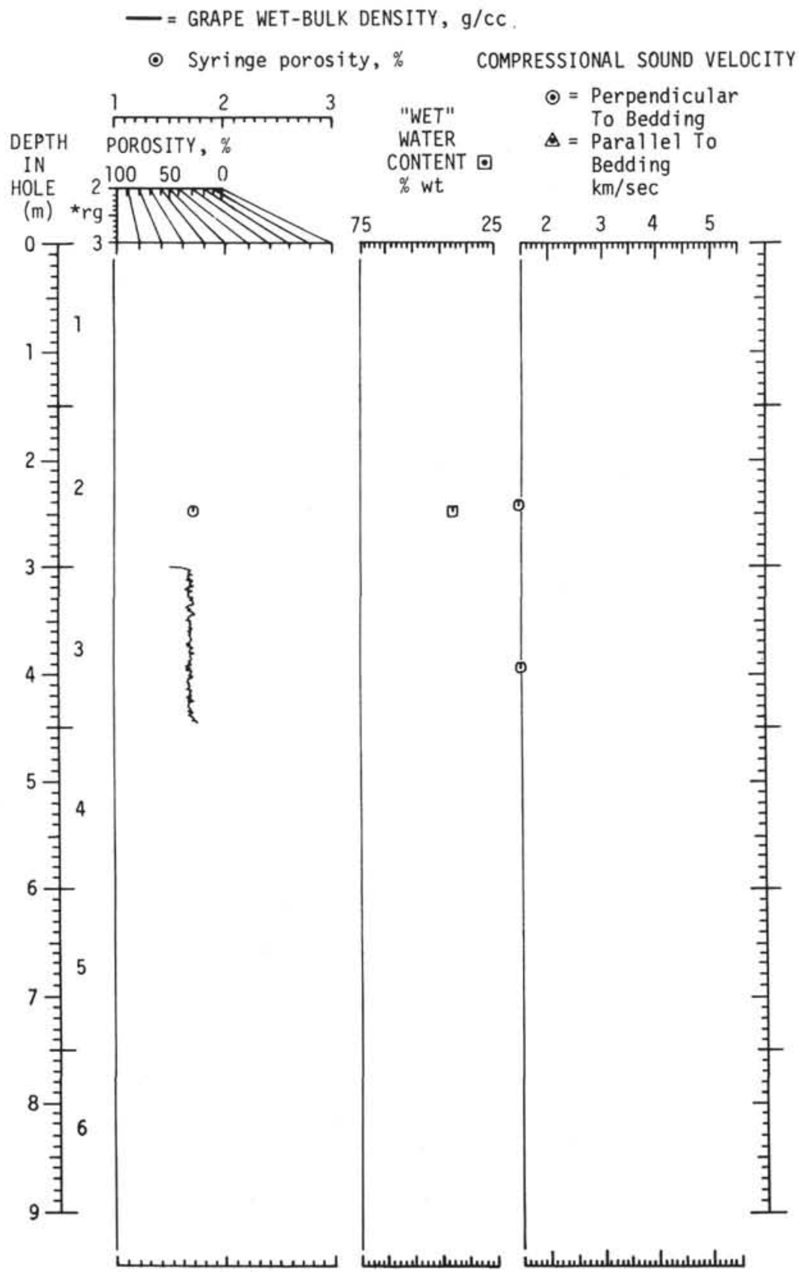
CORE 305-1



CORE 305-2

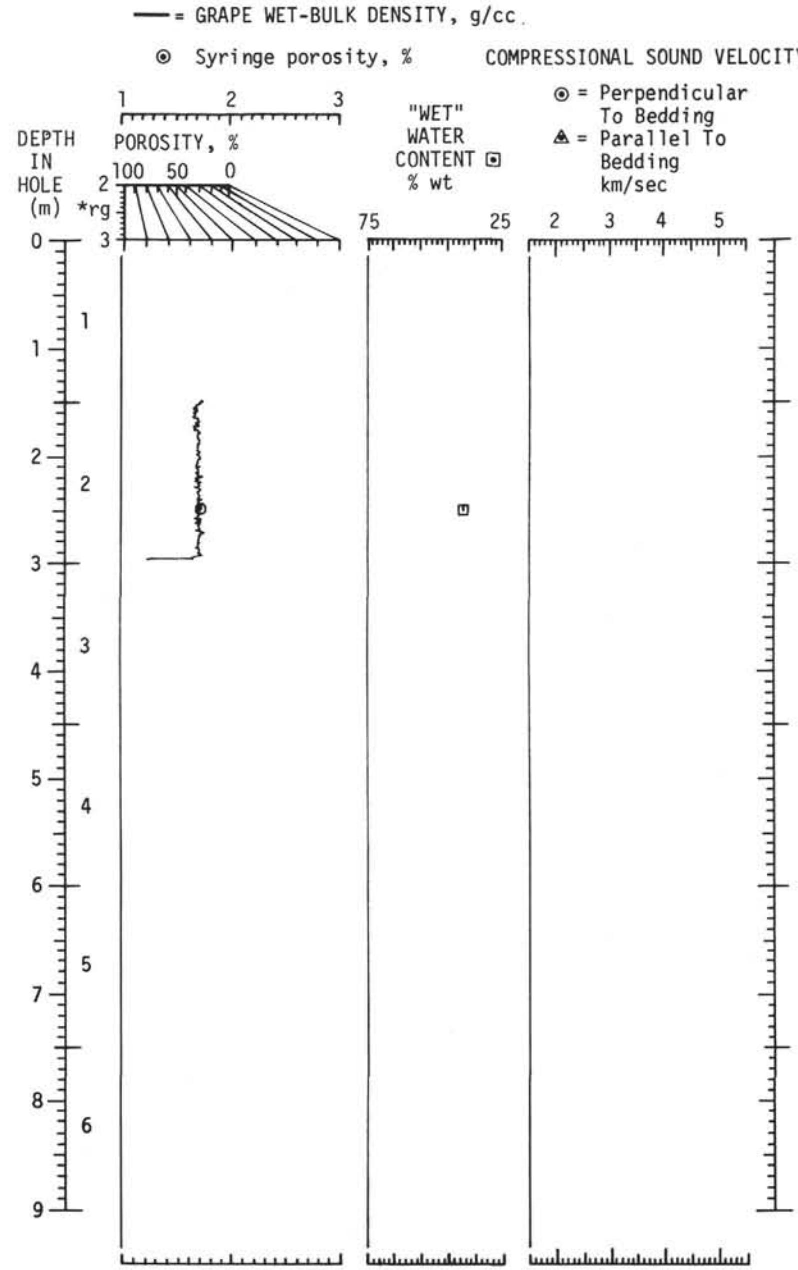


CORE 305-3



*rg = grain density, g/cc

CORE 305-4



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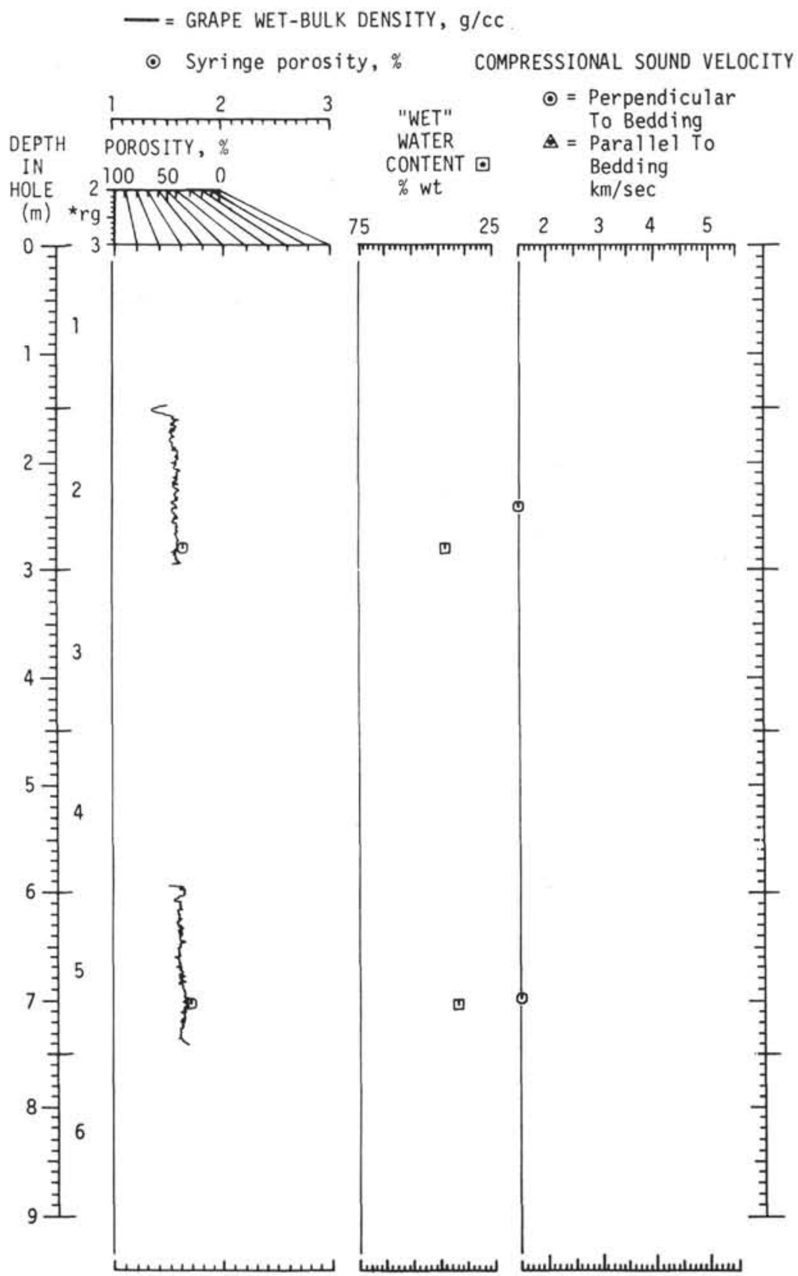
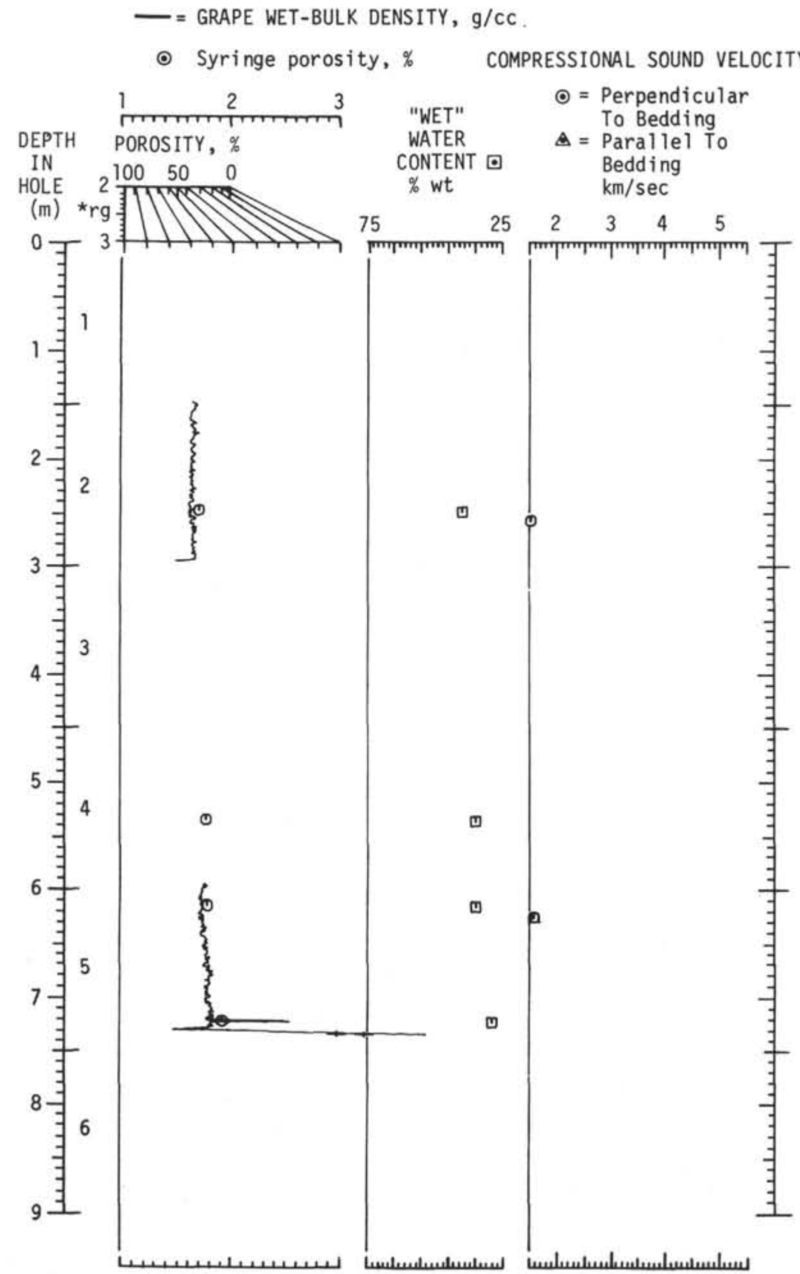
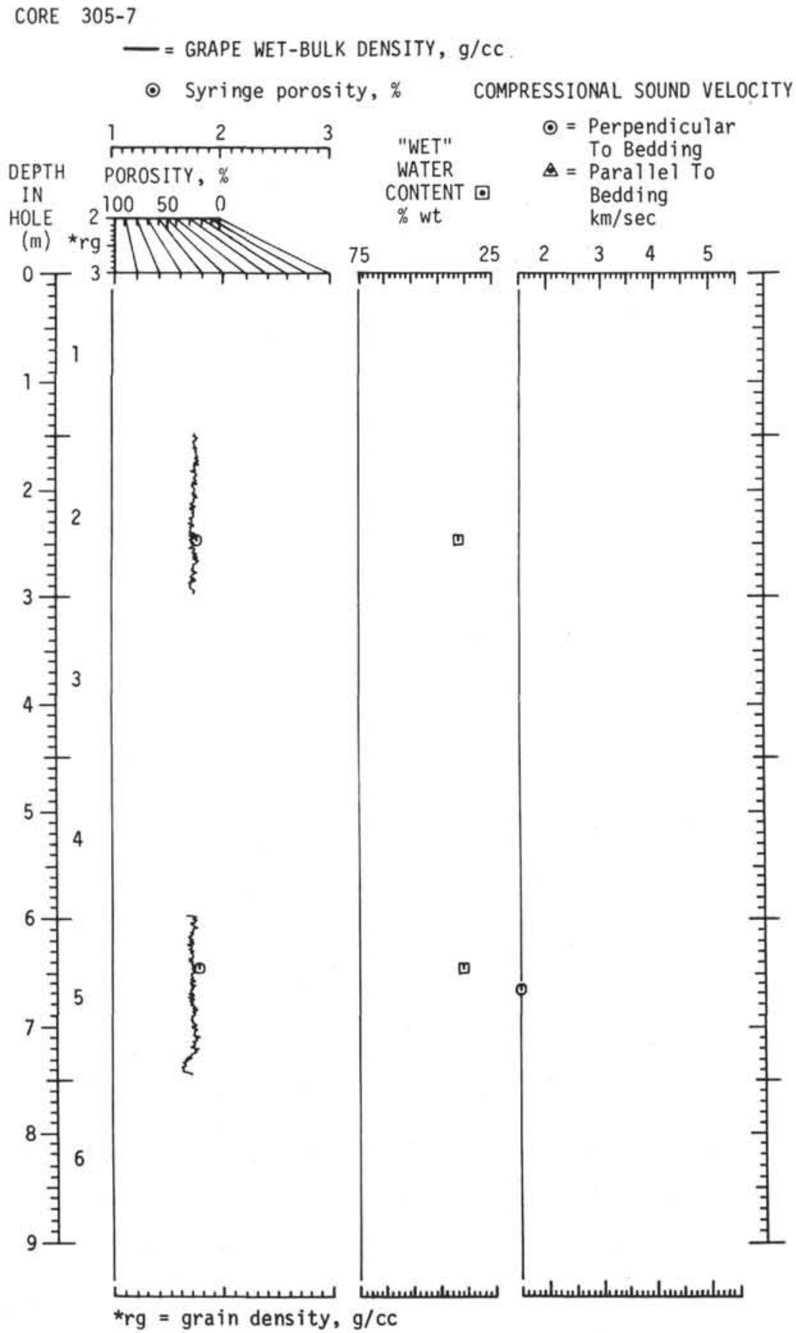
CORE 305-5



CORE 305-6




CORE 305-7
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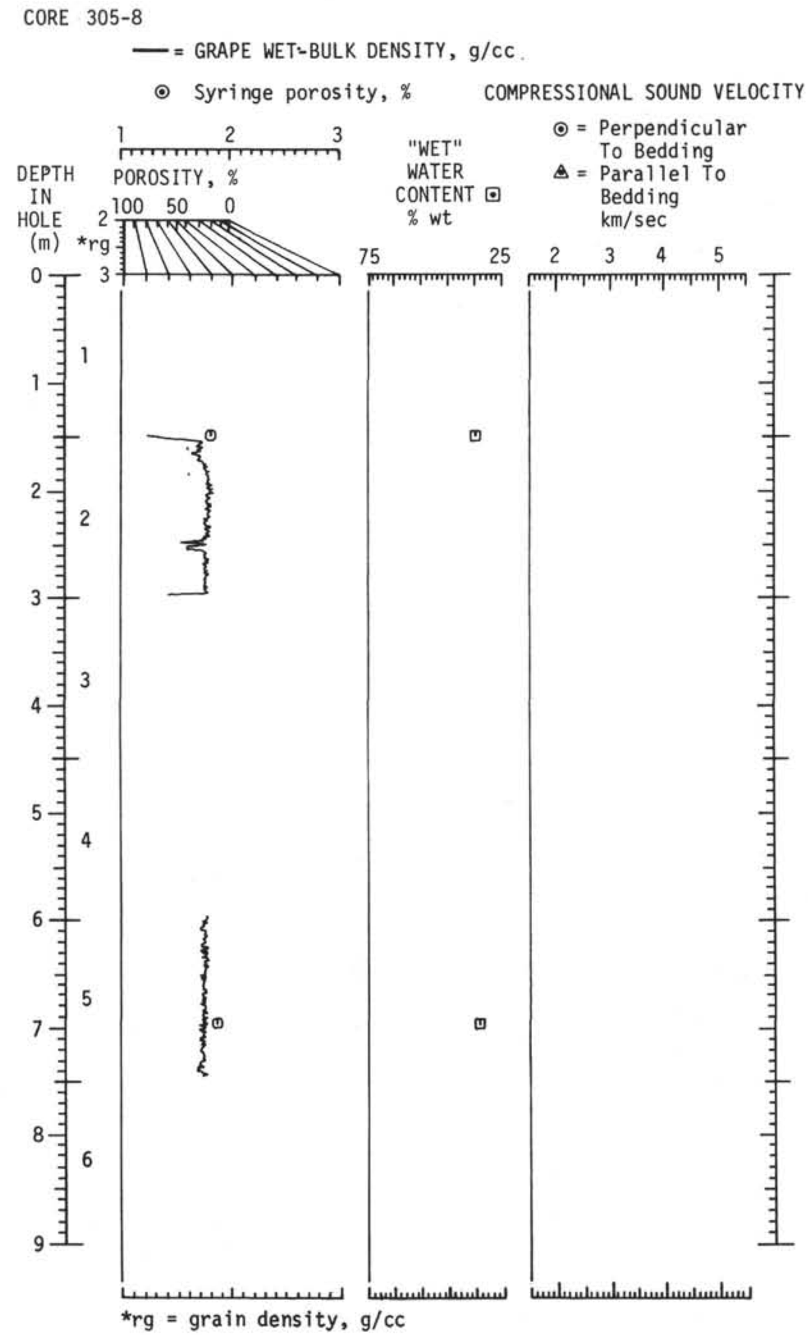
⊙ Syringe porosity, %
COMPRESSIONAL SOUND VELOCITY
⊙ = Perpendicular To Bedding
▲ = Parallel To Bedding
km/sec
DEPTH IN HOLE (m)
*rg
POROSITY, %
100 50 0
"WET" WATER CONTENT ⊡ % wt
75 25
2 3 4 5
*rg = grain density, g/cc


CORE 305-8
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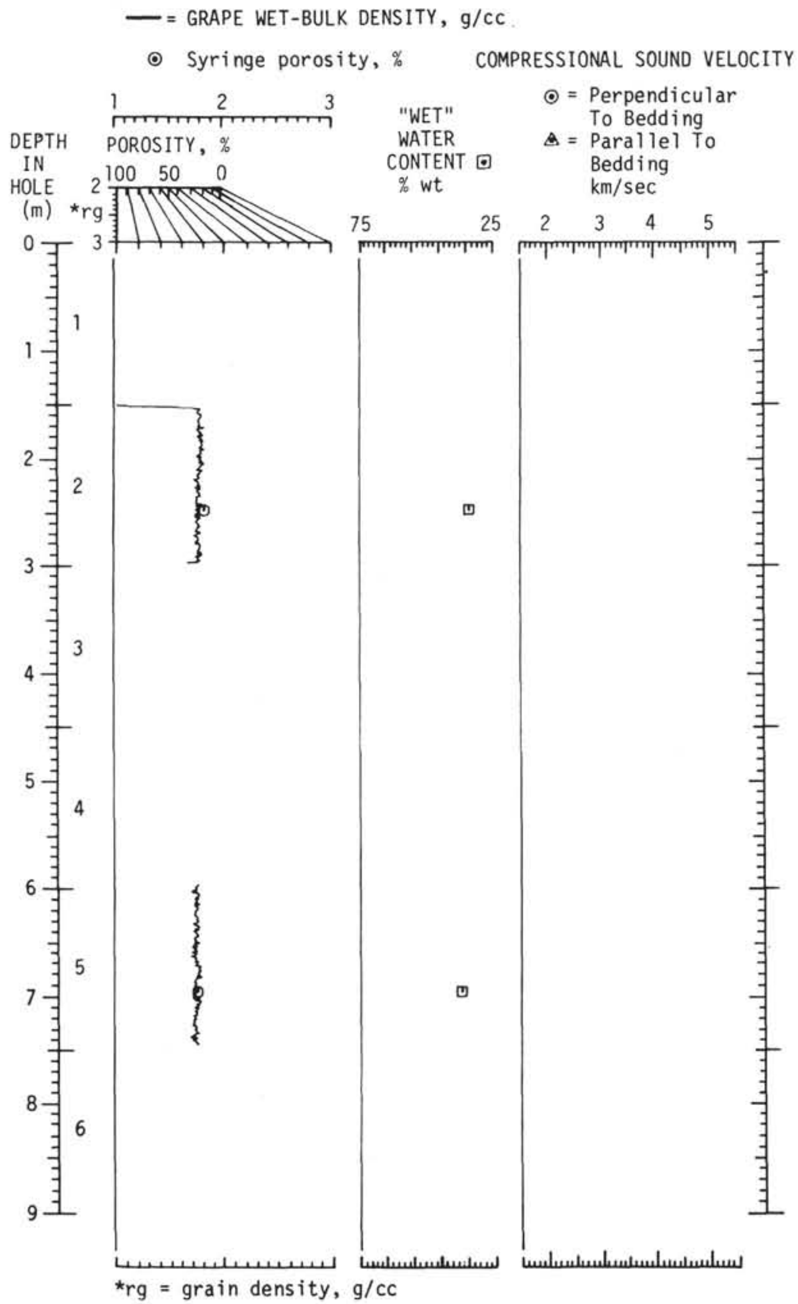
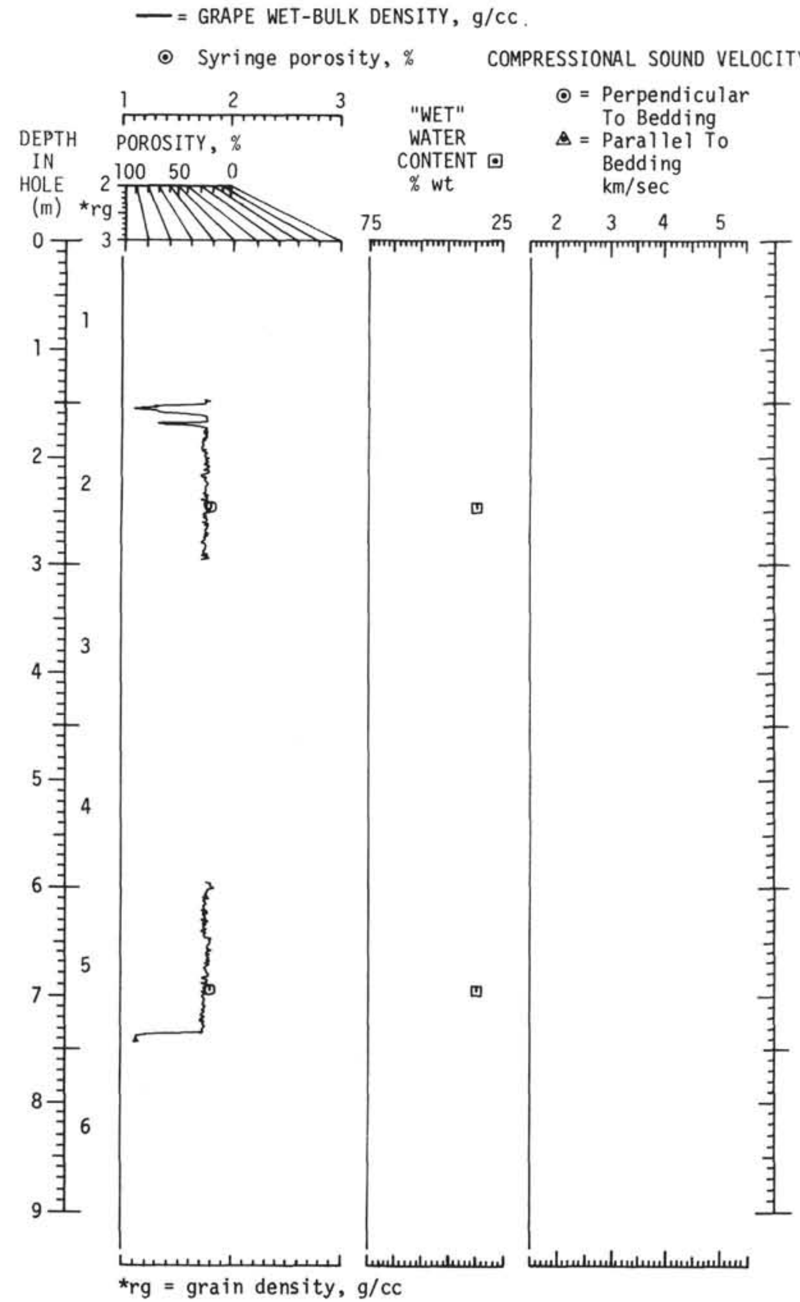
⊙ Syringe porosity, %
COMPRESSIONAL SOUND VELOCITY
⊙ = Perpendicular To Bedding
▲ = Parallel To Bedding
km/sec
DEPTH IN HOLE (m)
*rg
POROSITY, %
100 50 0
"WET" WATER CONTENT ⊡ % wt
75 25
2 3 4 5
*rg = grain density, g/cc

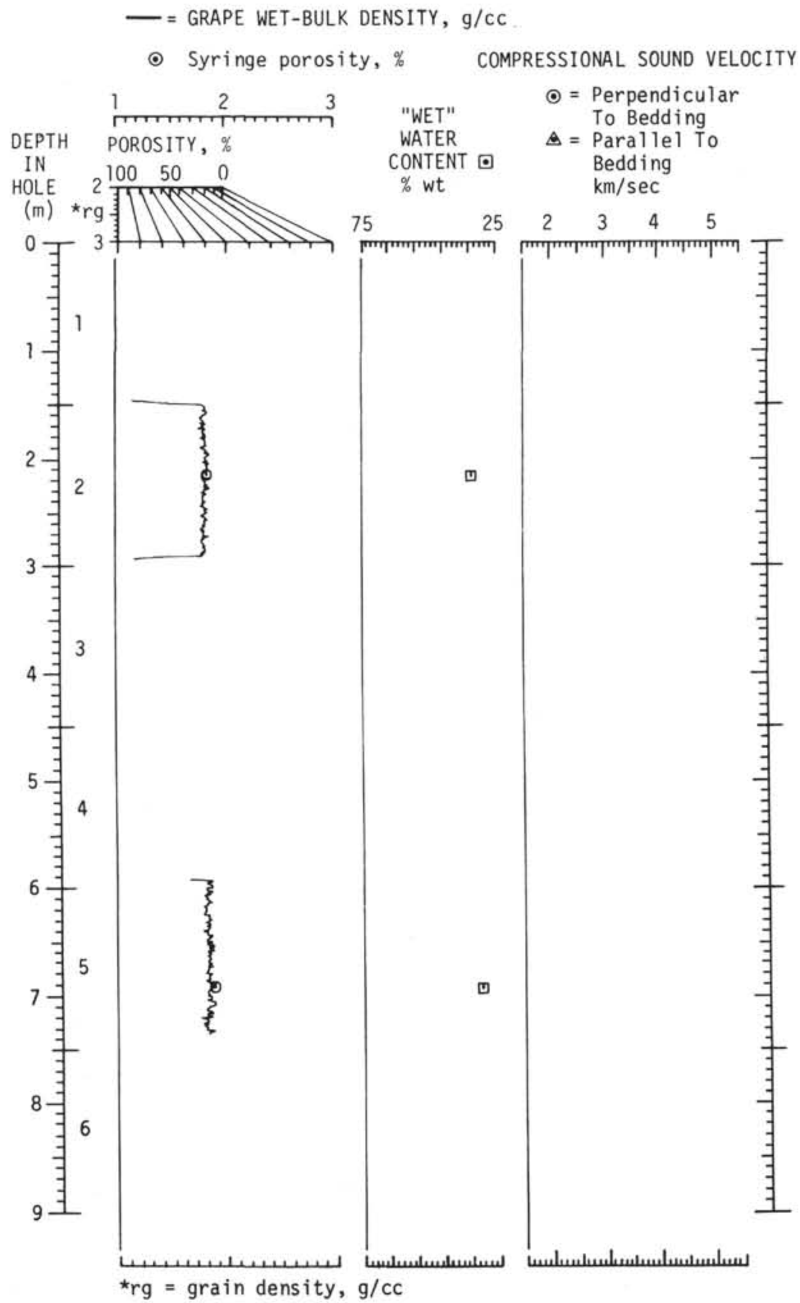
CORE 305-9



CORE 305-10



CORE 305-11



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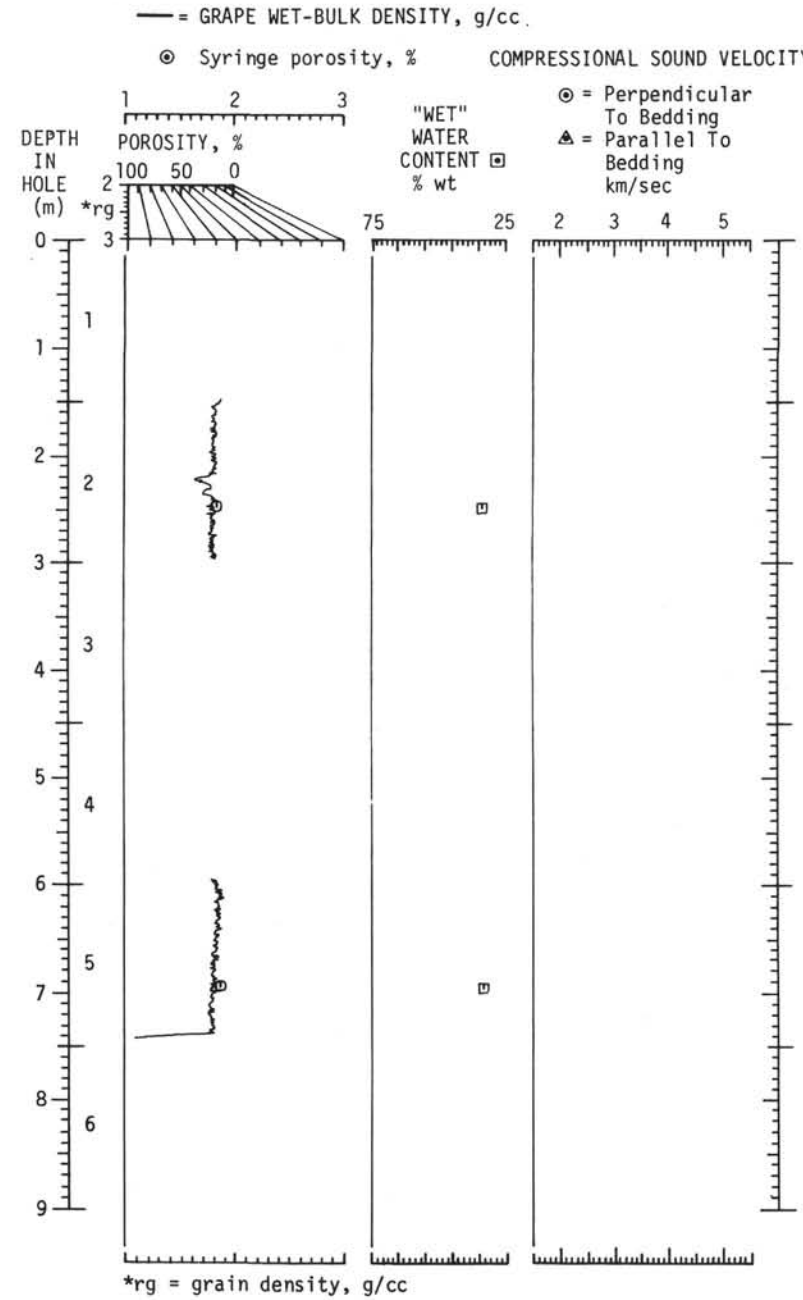
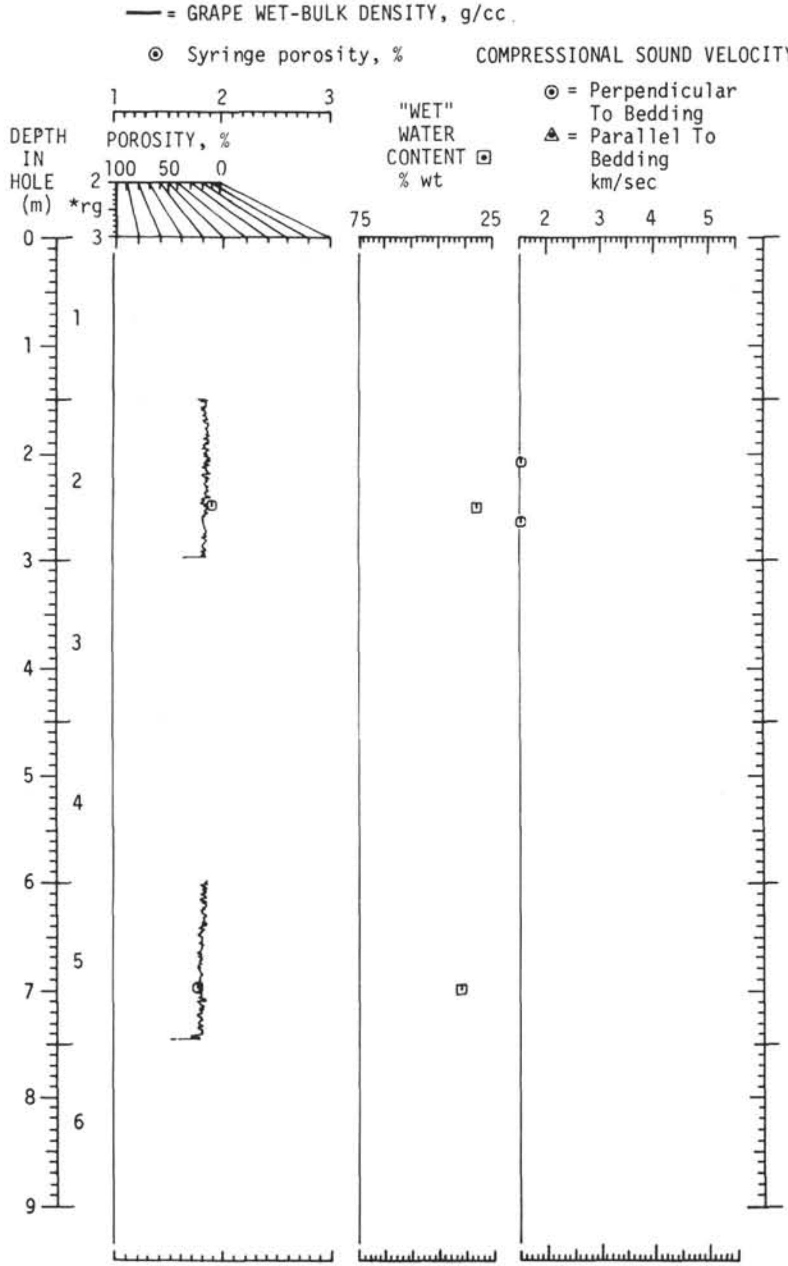
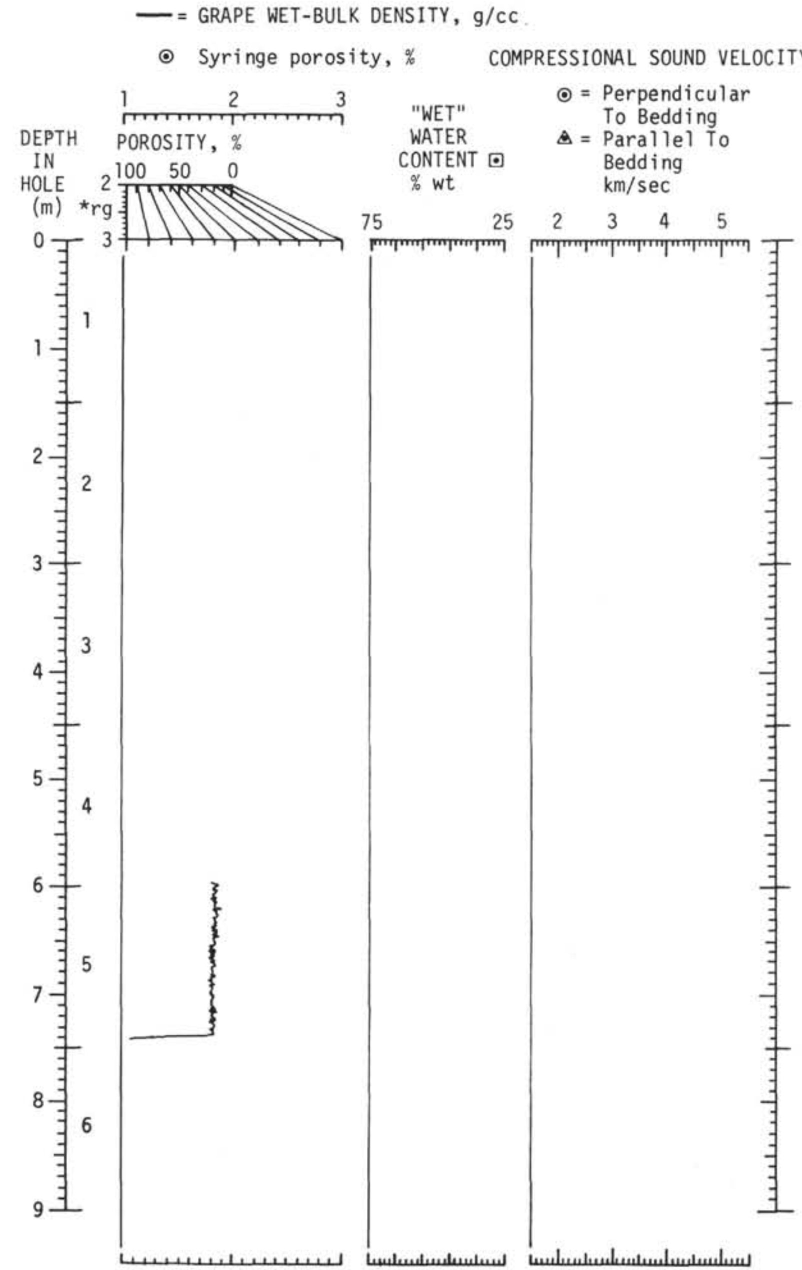


CORE 305-13

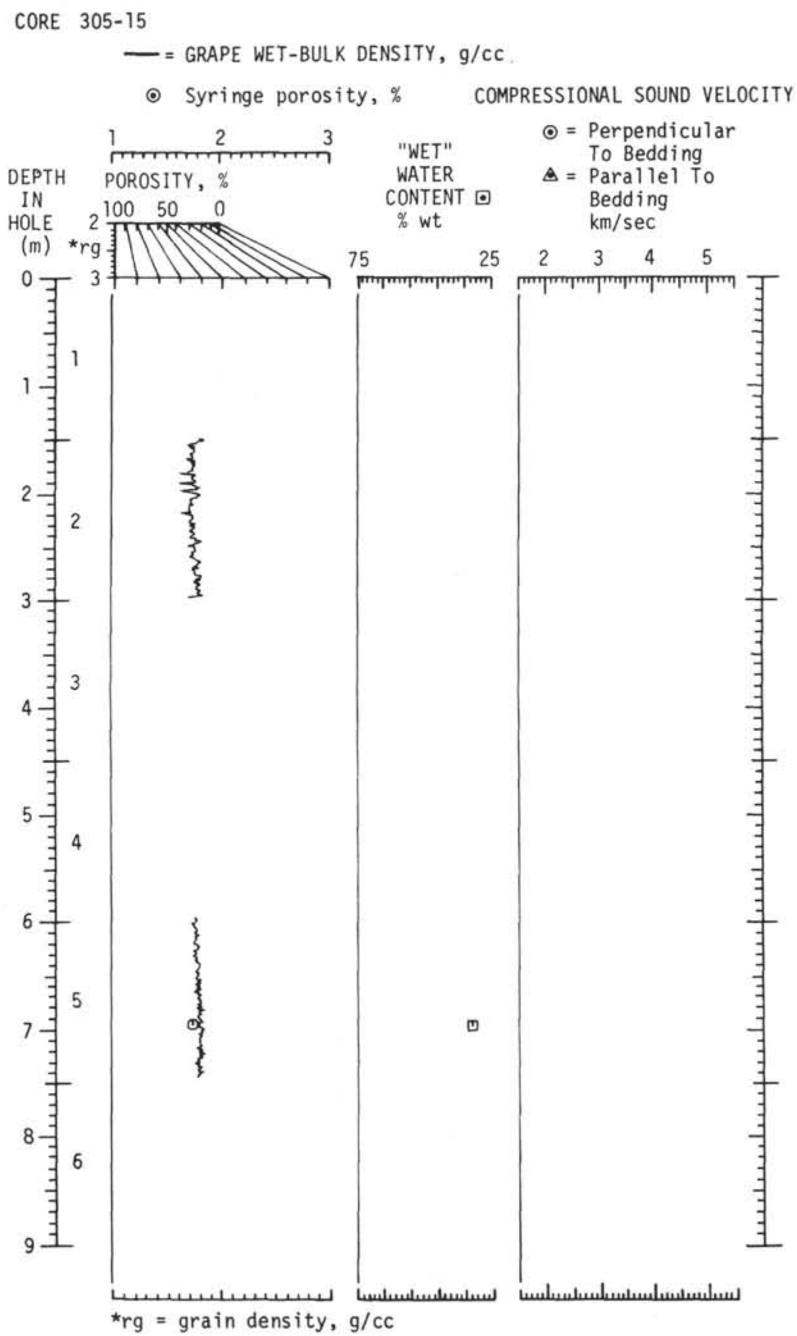


*rg = grain density, g/cc

CORE 305-14



*rg = grain density, g/cc


CORE 305-15
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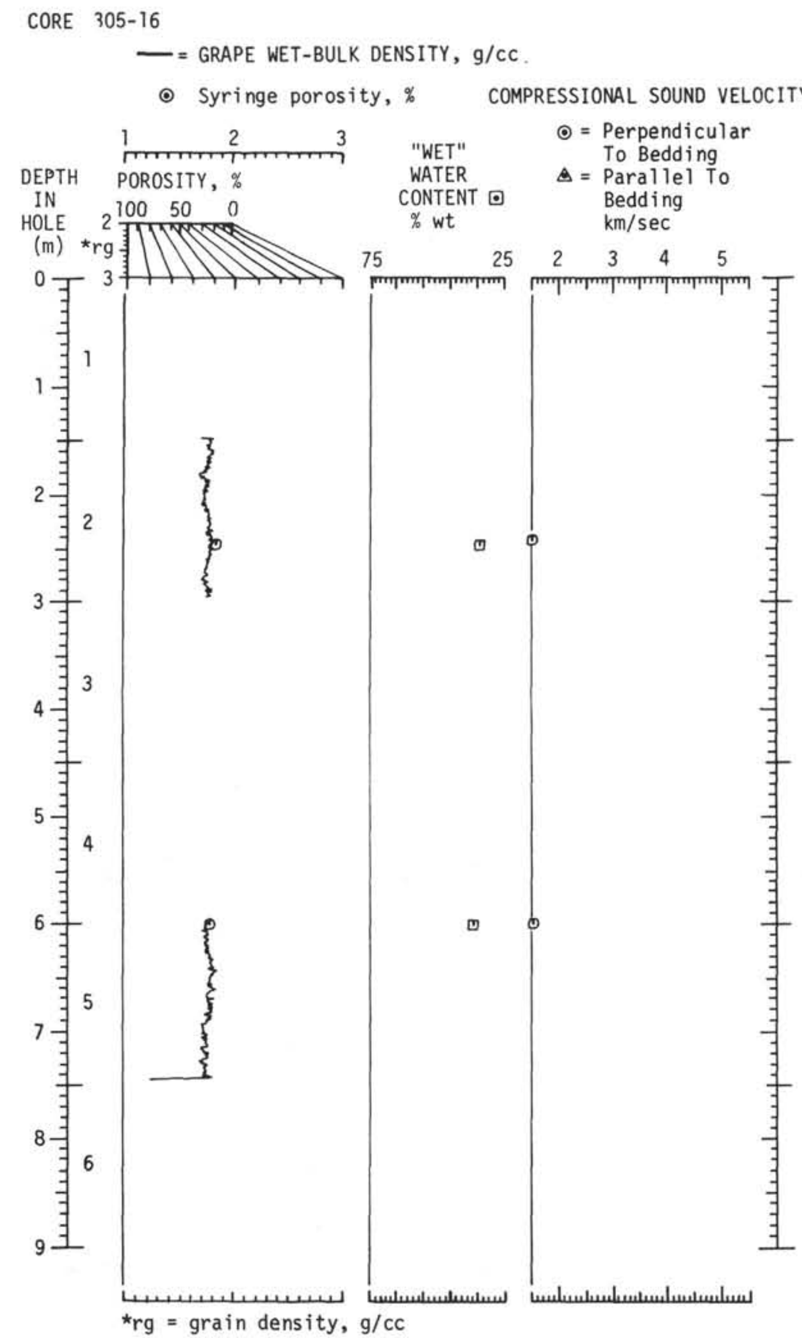
COMPRESSIONAL SOUND VELOCITY
⊙ = Perpendicular To Bedding
▲ = Parallel To Bedding
km/sec
DEPTH IN HOLE (m)
POROSITY, %
100 50 0
*rg
"WET" WATER CONTENT ⊡ % wt
75 25
2 3 4 5
*rg = grain density, g/cc


CORE 305-16
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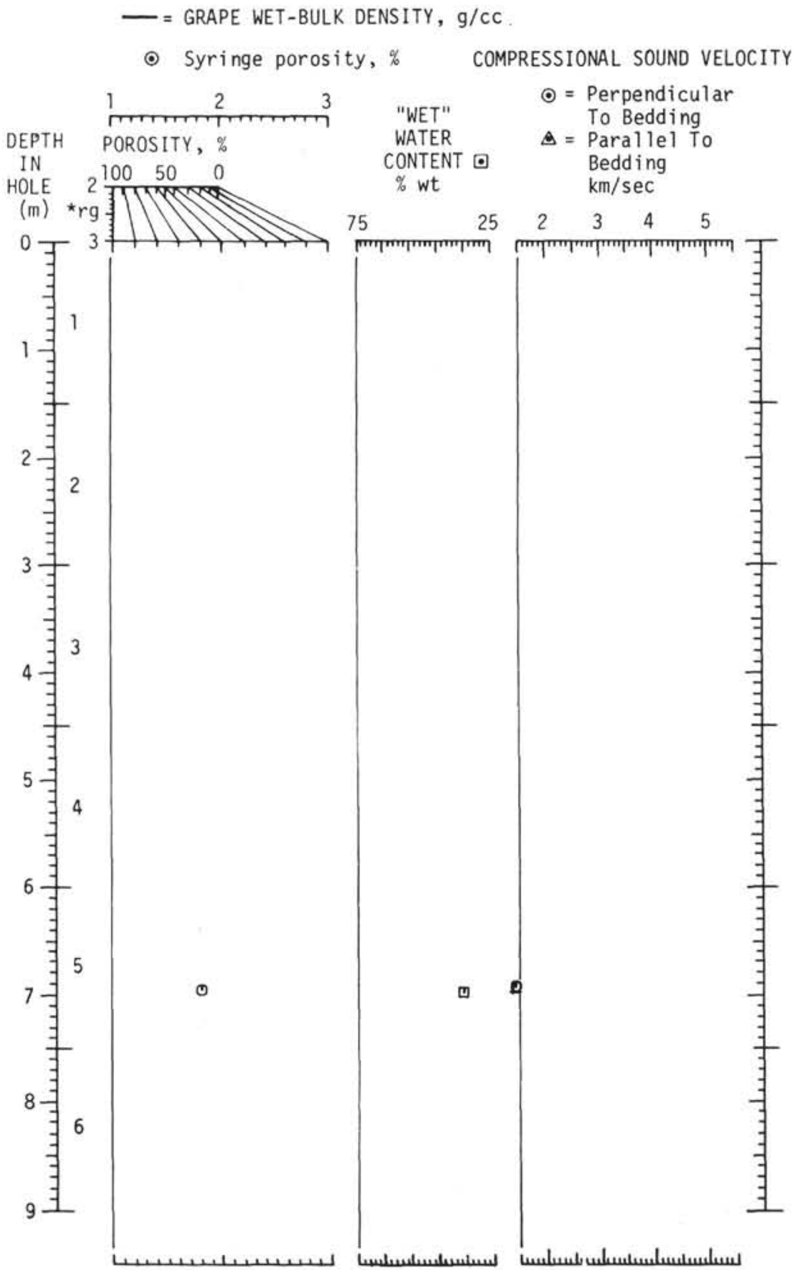
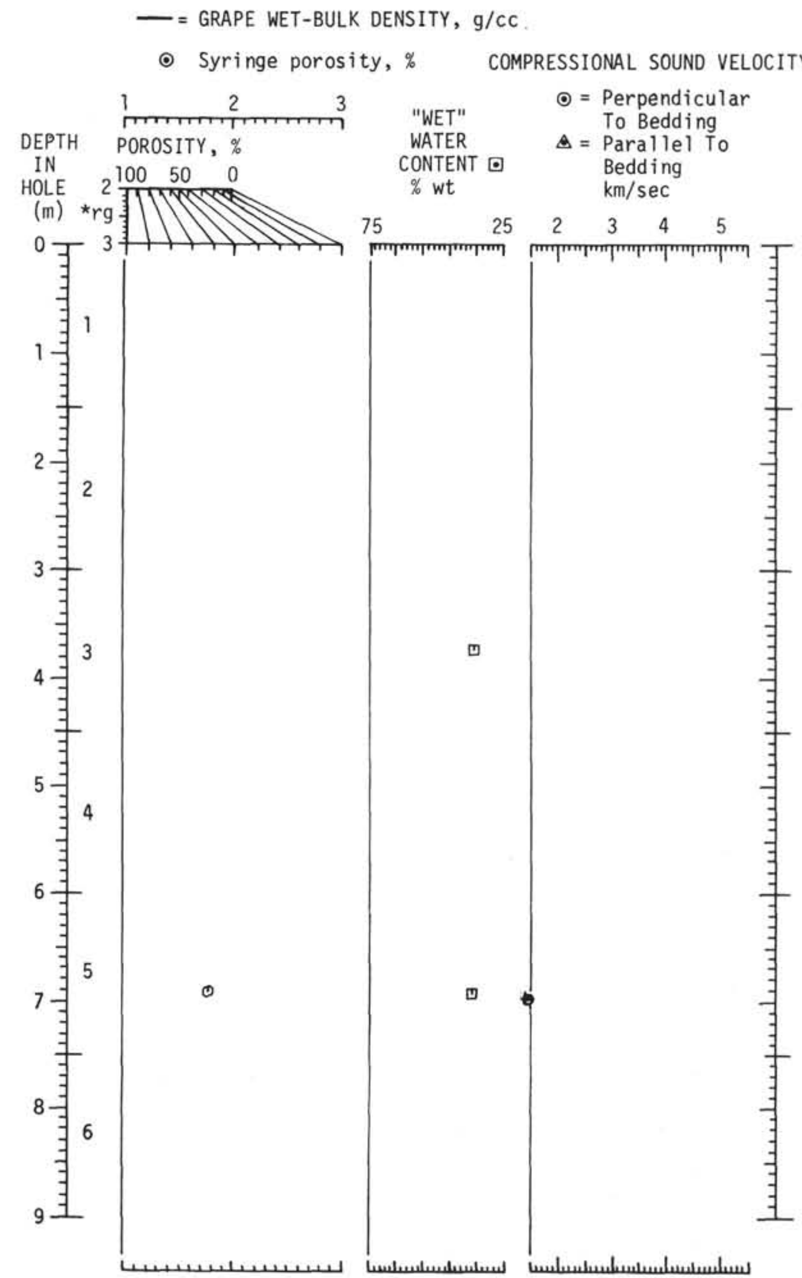
⊙ Syringe porosity, %
COMPRESSIONAL SOUND VELOCITY
⊙ = Perpendicular To Bedding
▲ = Parallel To Bedding
km/sec
DEPTH IN HOLE (m)
POROSITY, %
100 50 0
*rg
"WET" WATER CONTENT ⊡ % wt
75 25
2 3 4 5
*rg = grain density, g/cc

CORE 305-17

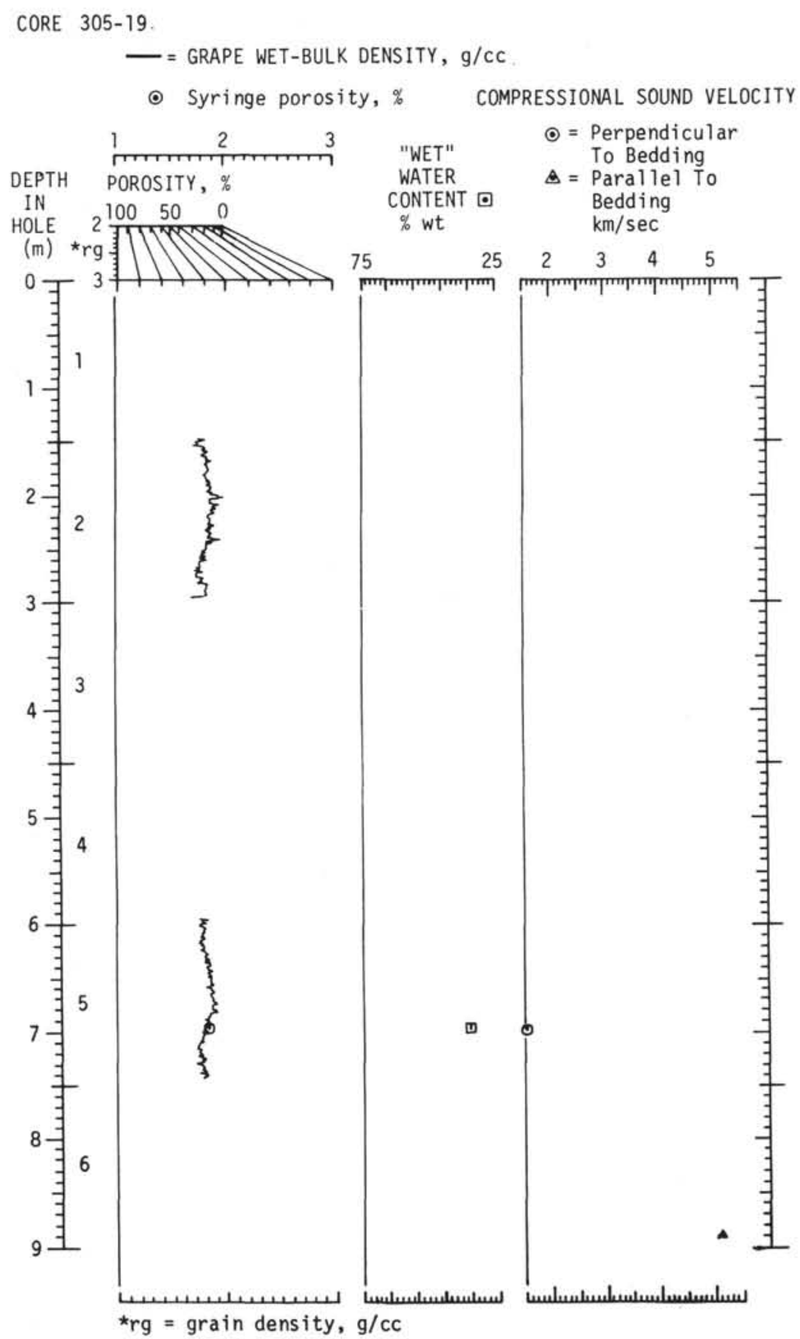


*rg = grain density, g/cc

CORE 305-18



*rg = grain density, g/cc


CORE 305-19
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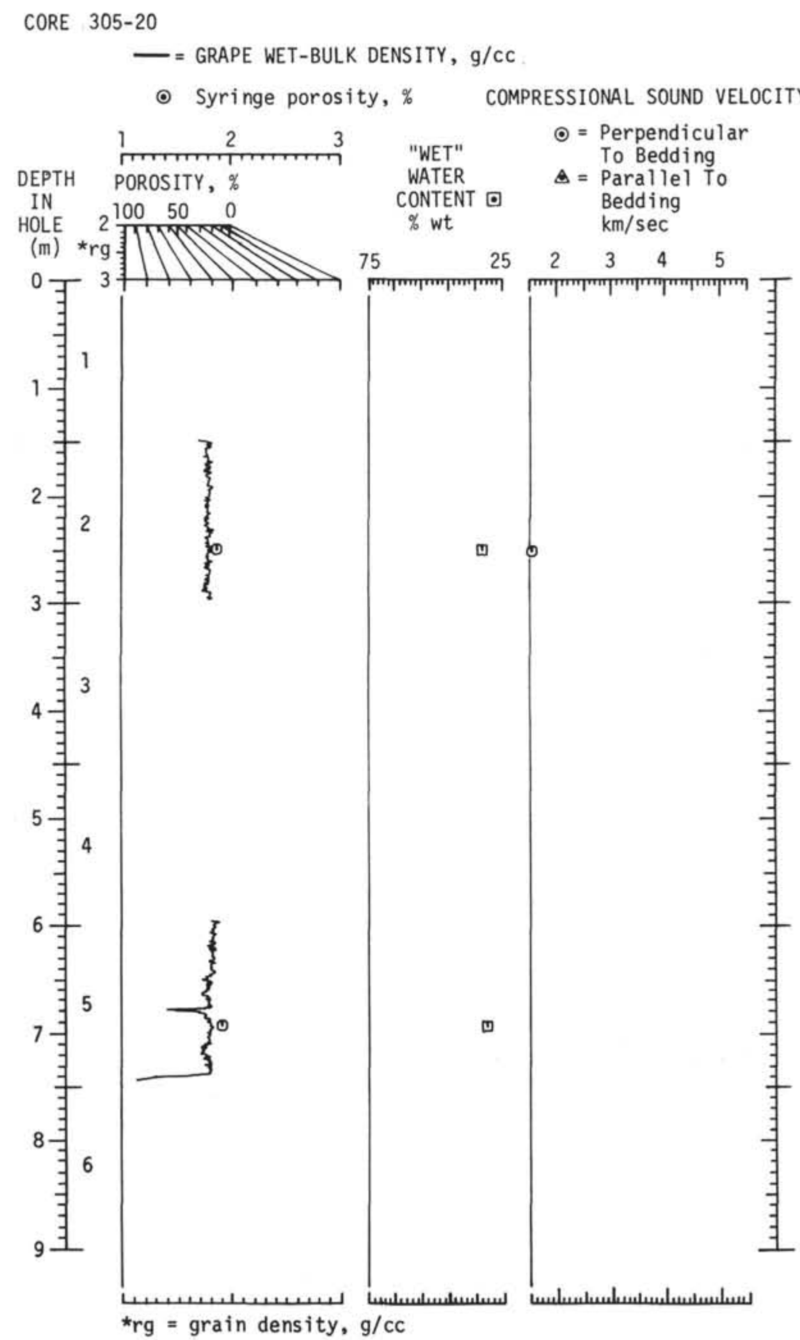
⊙ Syringe porosity, %
COMPRESSIONAL SOUND VELOCITY
⊙ = Perpendicular To Bedding
▲ = Parallel To Bedding
km/sec
DEPTH IN HOLE (m)
*rg
POROSITY, %
100 50 0
1 2 3
"WET" WATER CONTENT ⊡ % wt
75 25
2 3 4 5
*rg = grain density, g/cc


CORE 305-20
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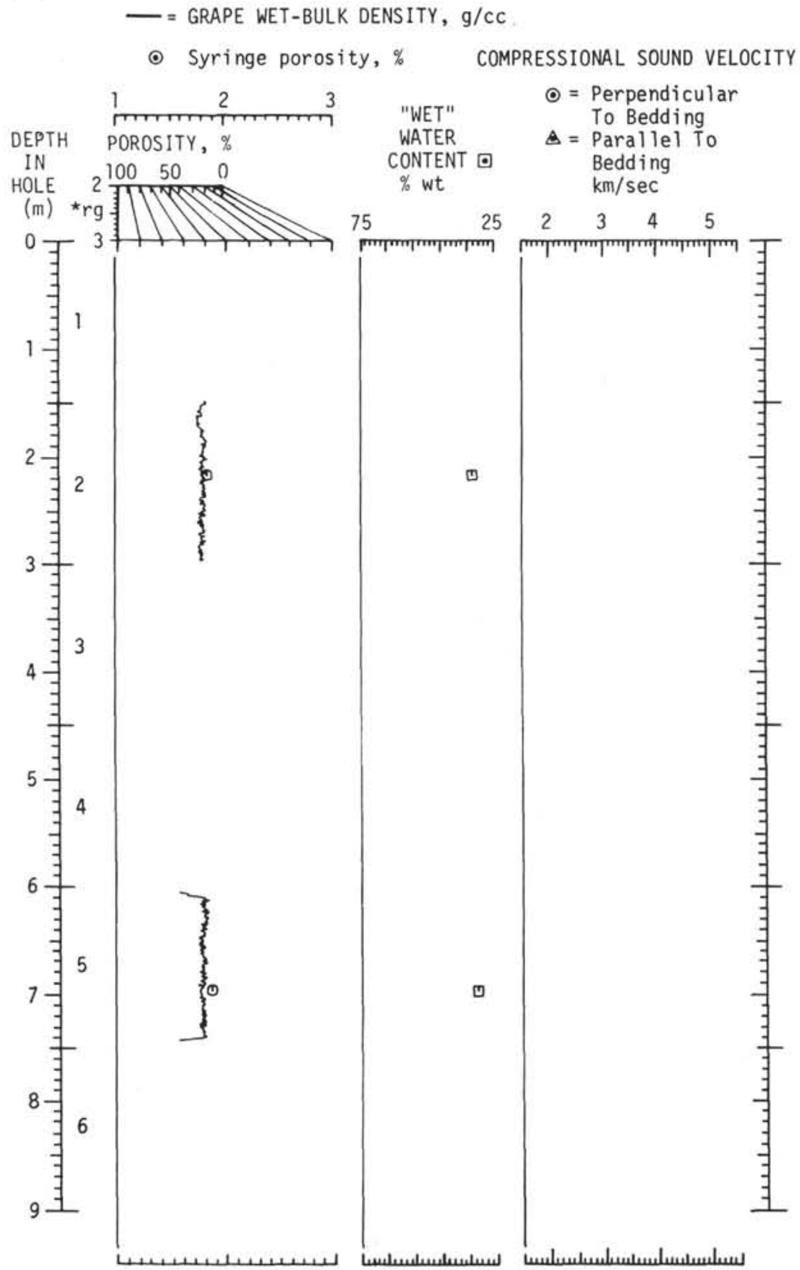
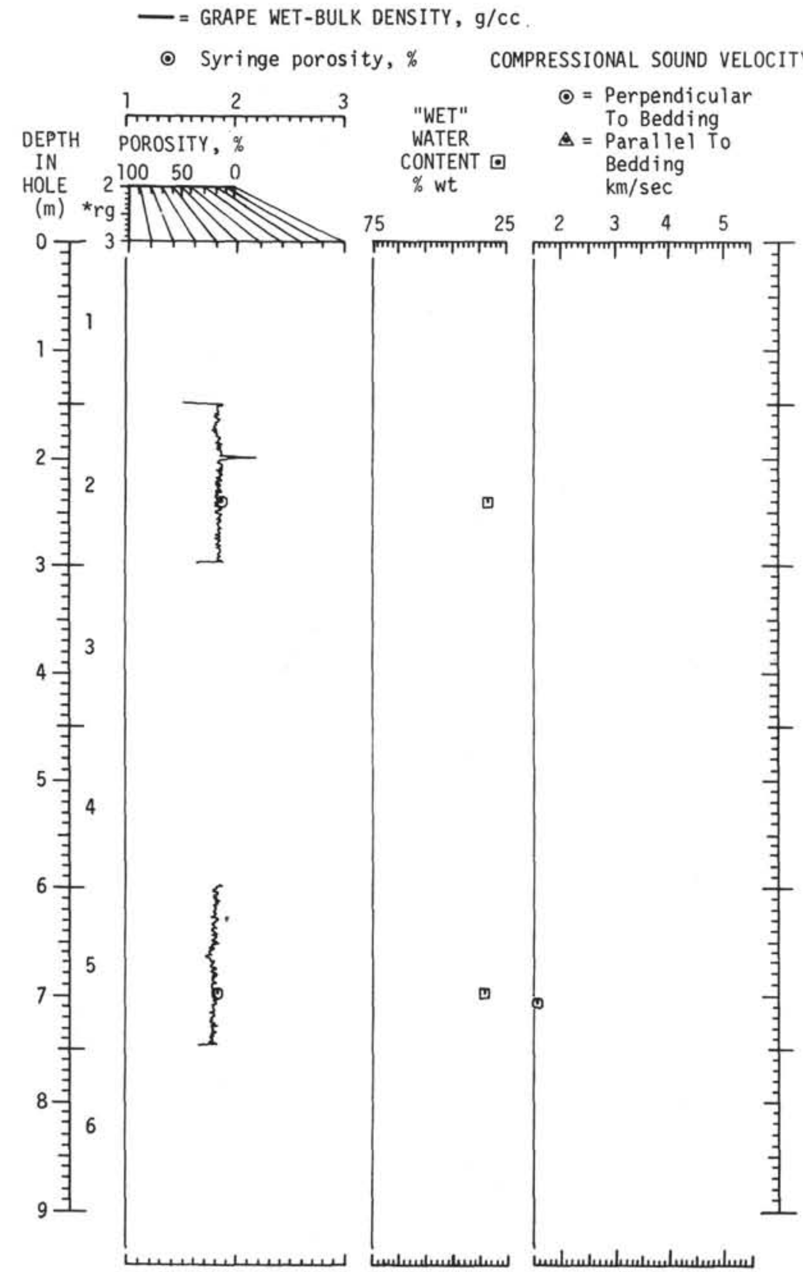
COMPRESSIONAL SOUND VELOCITY
⊙ = Perpendicular To Bedding
▲ = Parallel To Bedding
km/sec
DEPTH IN HOLE (m)
*rg
POROSITY, %
100 50 0
1 2 3
"WET" WATER CONTENT ⊡ % wt
75 25
2 3 4 5
*rg = grain density, g/cc

CORE 305-21



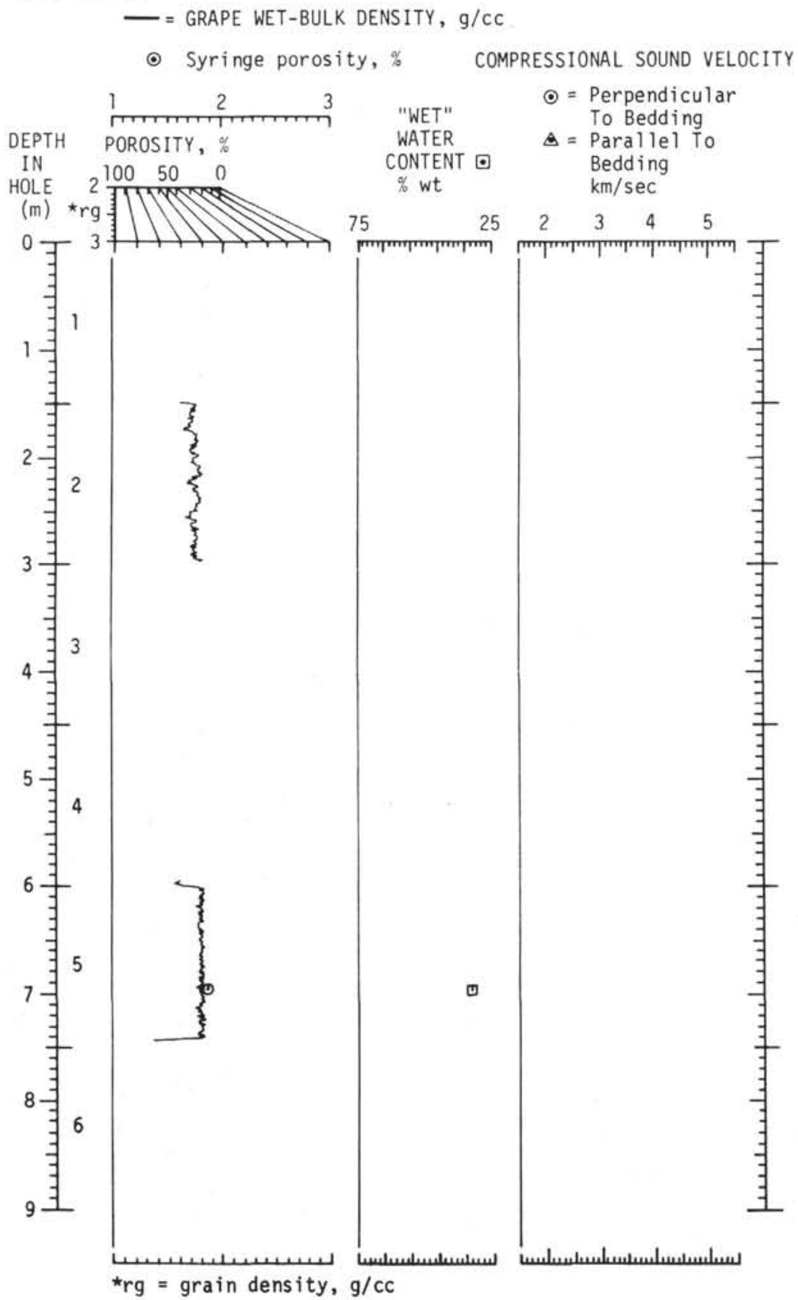
*rg = grain density, g/cc

CORE 305-23

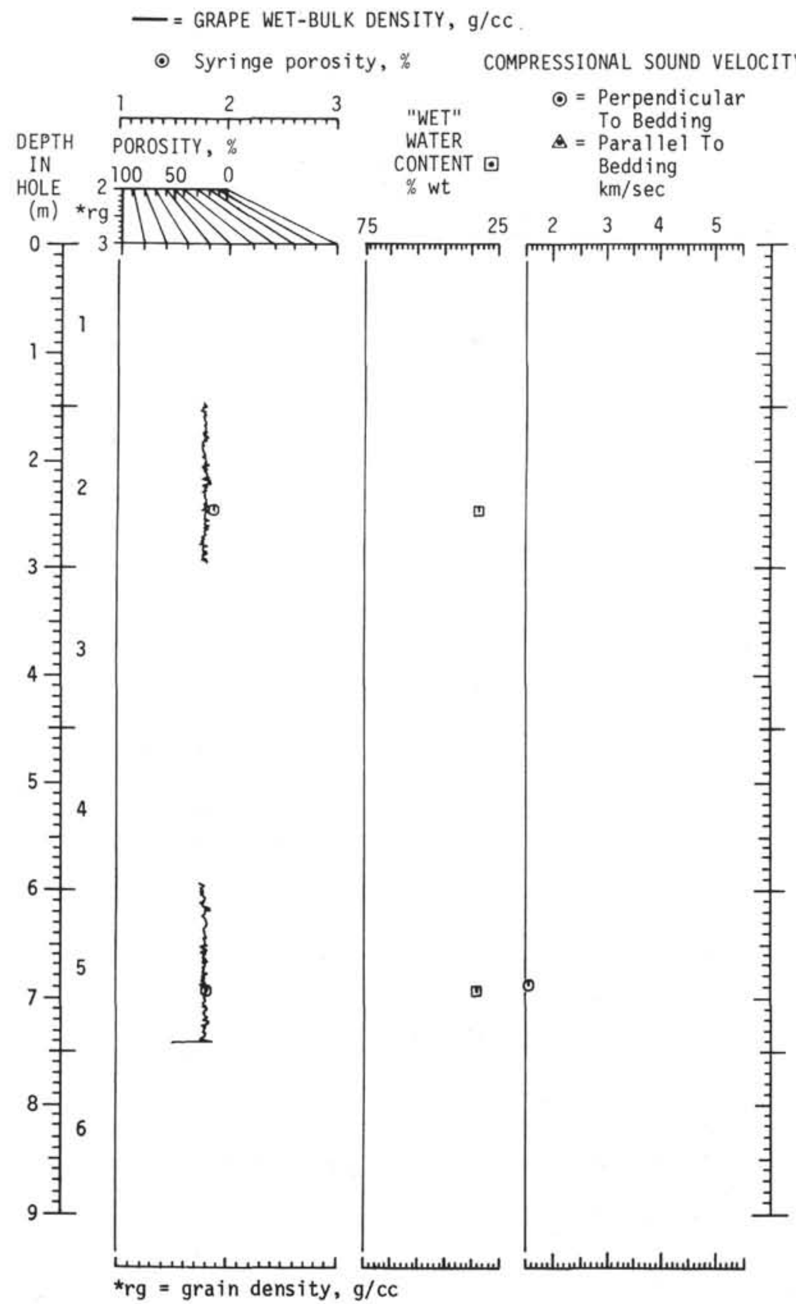


*rg = grain density, g/cc

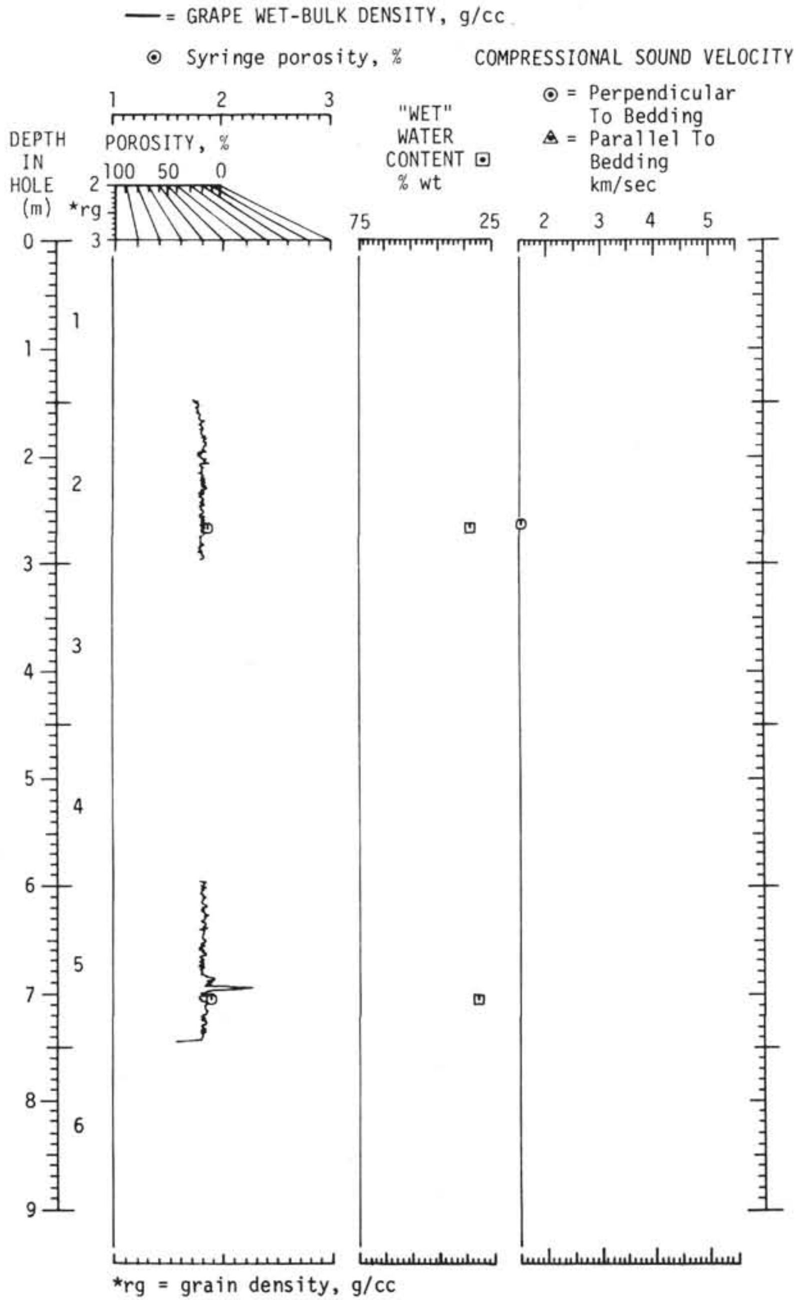
CORE 305-24



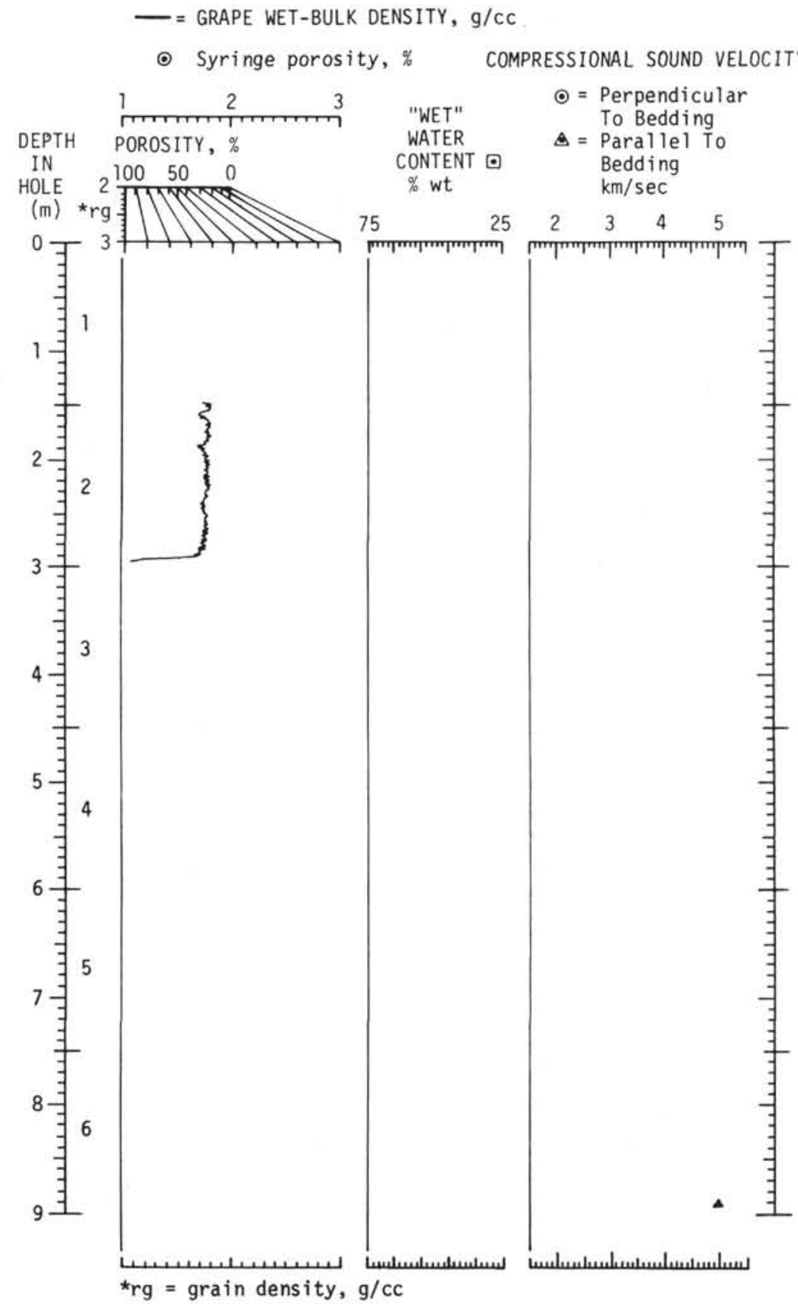
CORE 305-25

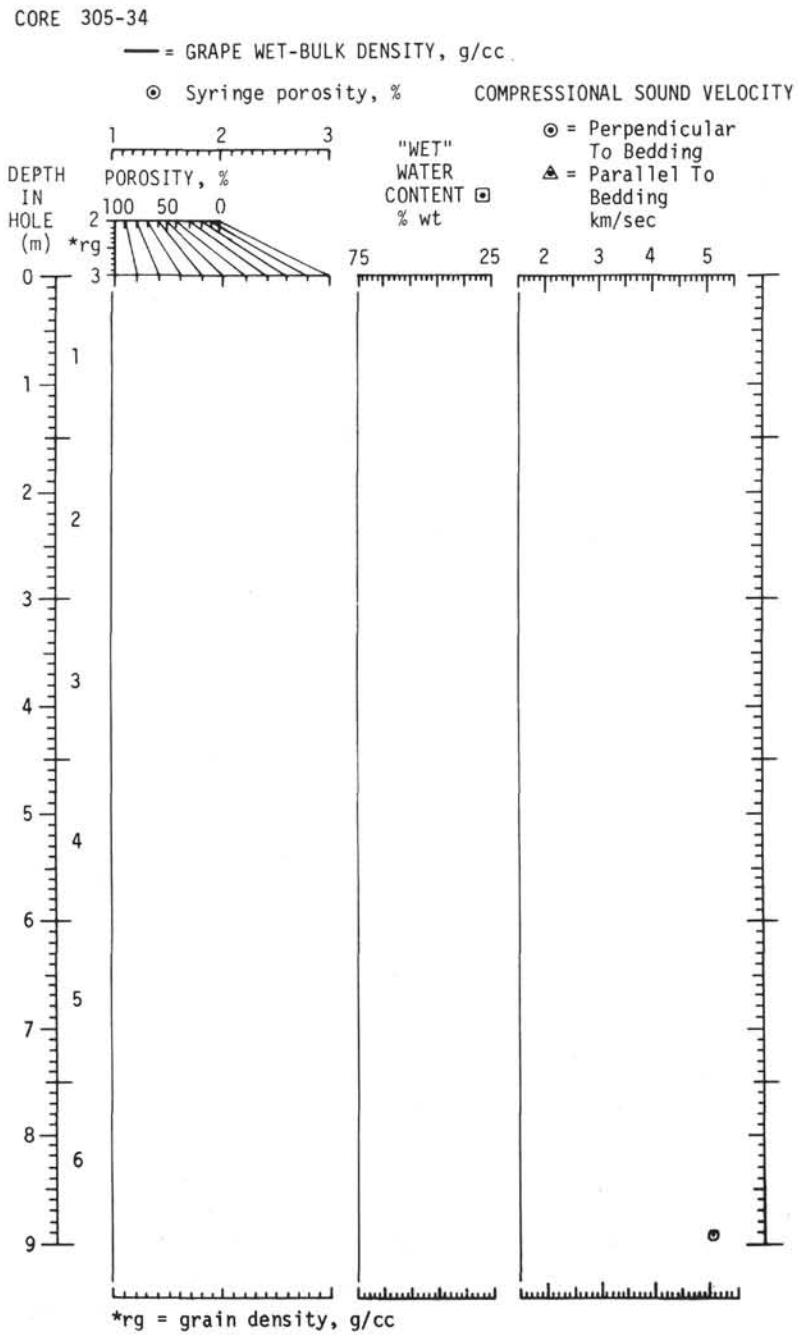


CORE 305-26



CORE 305-27

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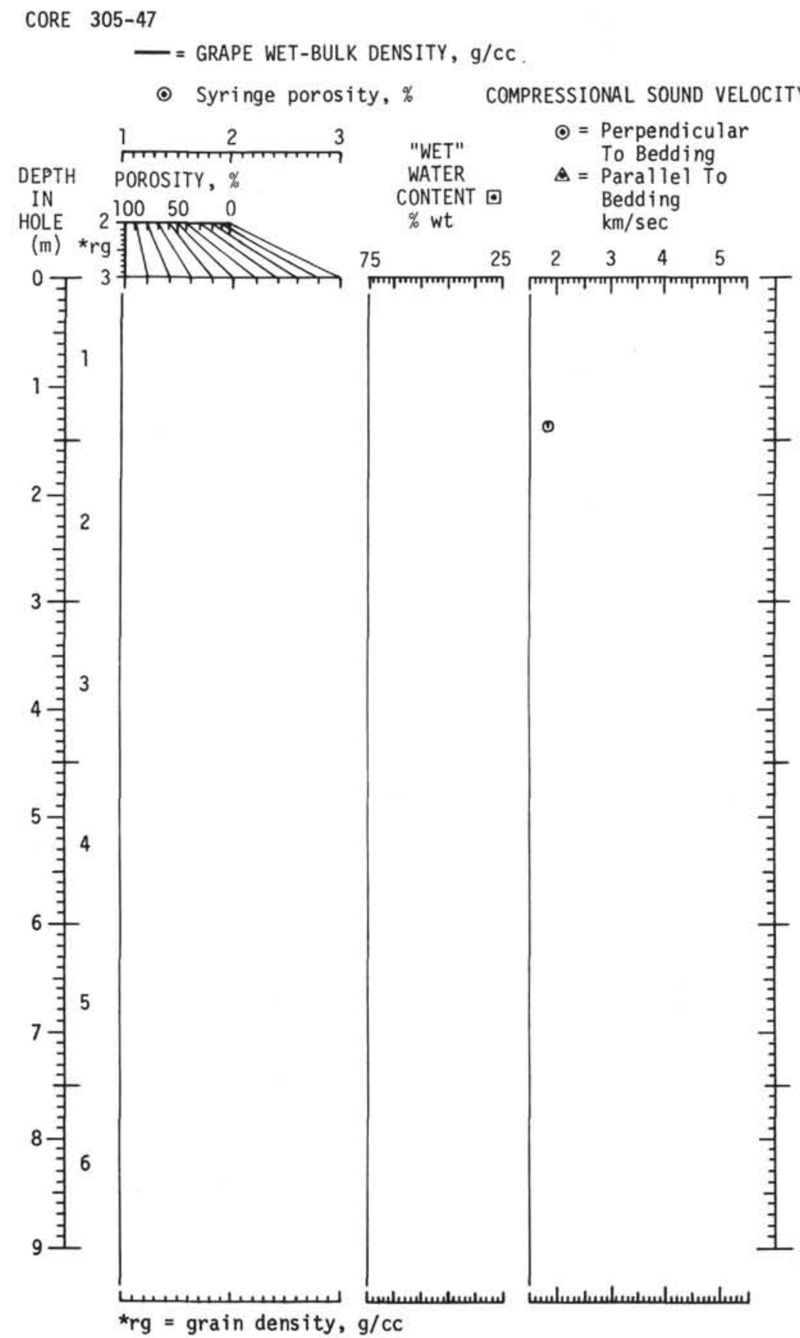
COMPRESSIONAL SOUND VELOCITY
⊙ = Perpendicular To Bedding
▲ = Parallel To Bedding
km/sec
DEPTH IN HOLE (m)
POROSITY, %
100 50 0
*rg
"WET" WATER CONTENT % wt
75 25
2 3 4 5
*rg = grain density, g/cc


CORE 305-47
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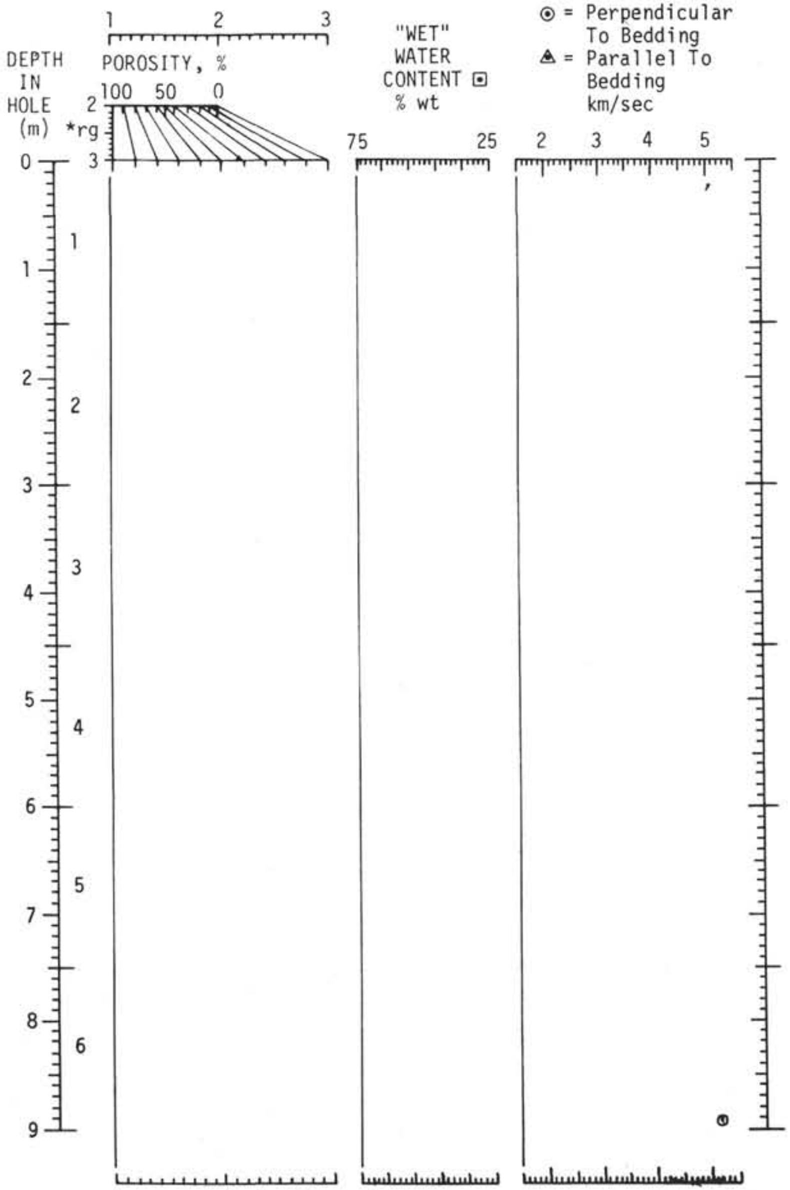
COMPRESSIONAL SOUND VELOCITY
⊙ = Perpendicular To Bedding
▲ = Parallel To Bedding
km/sec
DEPTH IN HOLE (m)
POROSITY, %
100 50 0
*rg
"WET" WATER CONTENT % wt
75 25
2 3 4 5
*rg = grain density, g/cc

CORE 305-48

— = GRAPE WET-BULK DENSITY, g/cc

⊙ Syringe porosity, %   COMPRESSIONAL SOUND VELOCITY

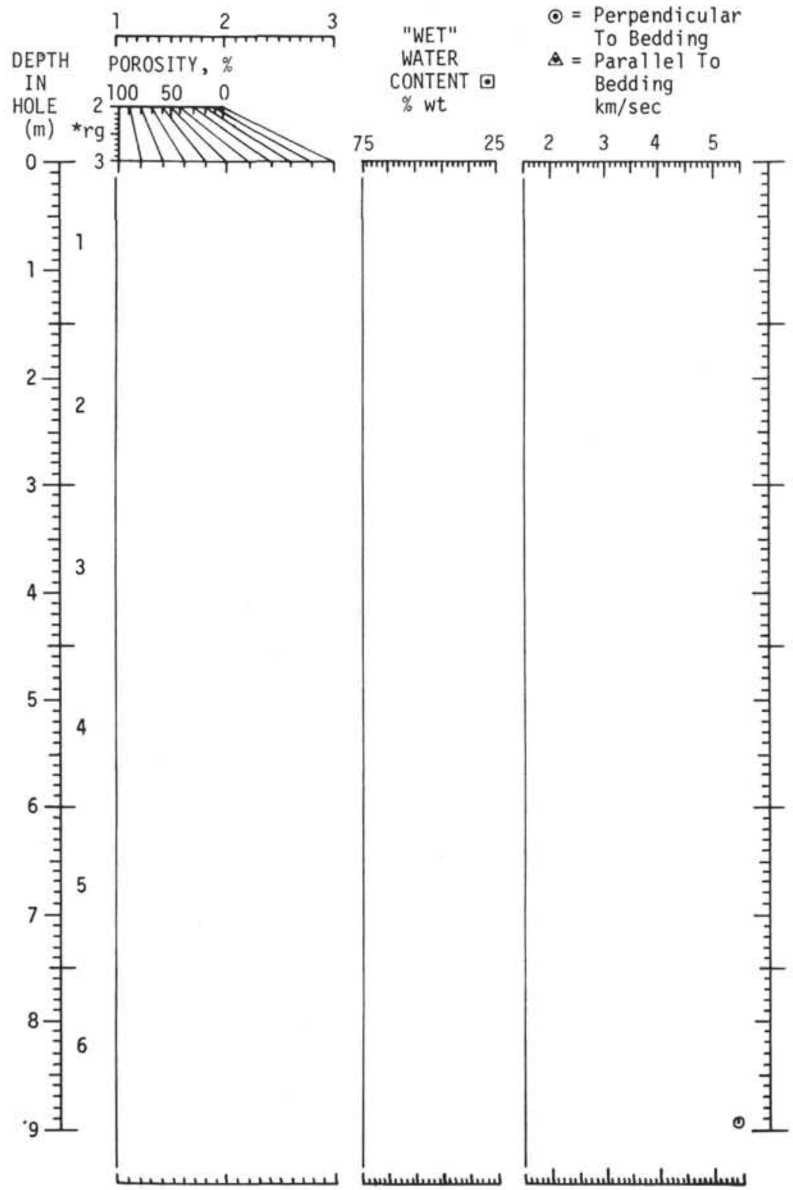


*rg = grain density, g/cc

CORE 305-51

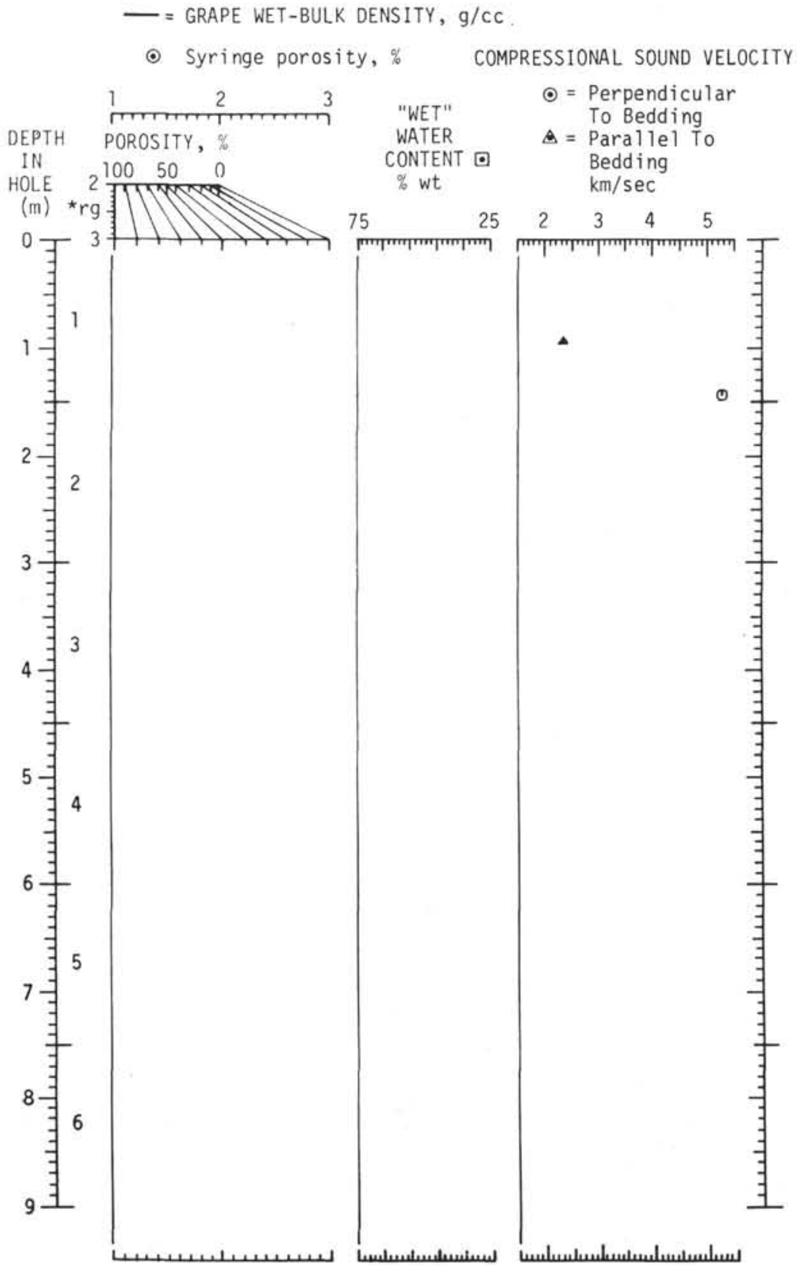
— = GRAPE WET-BULK DENSITY, g/cc

⊙ Syringe porosity, %   COMPRESSIONAL SOUND VELOCITY



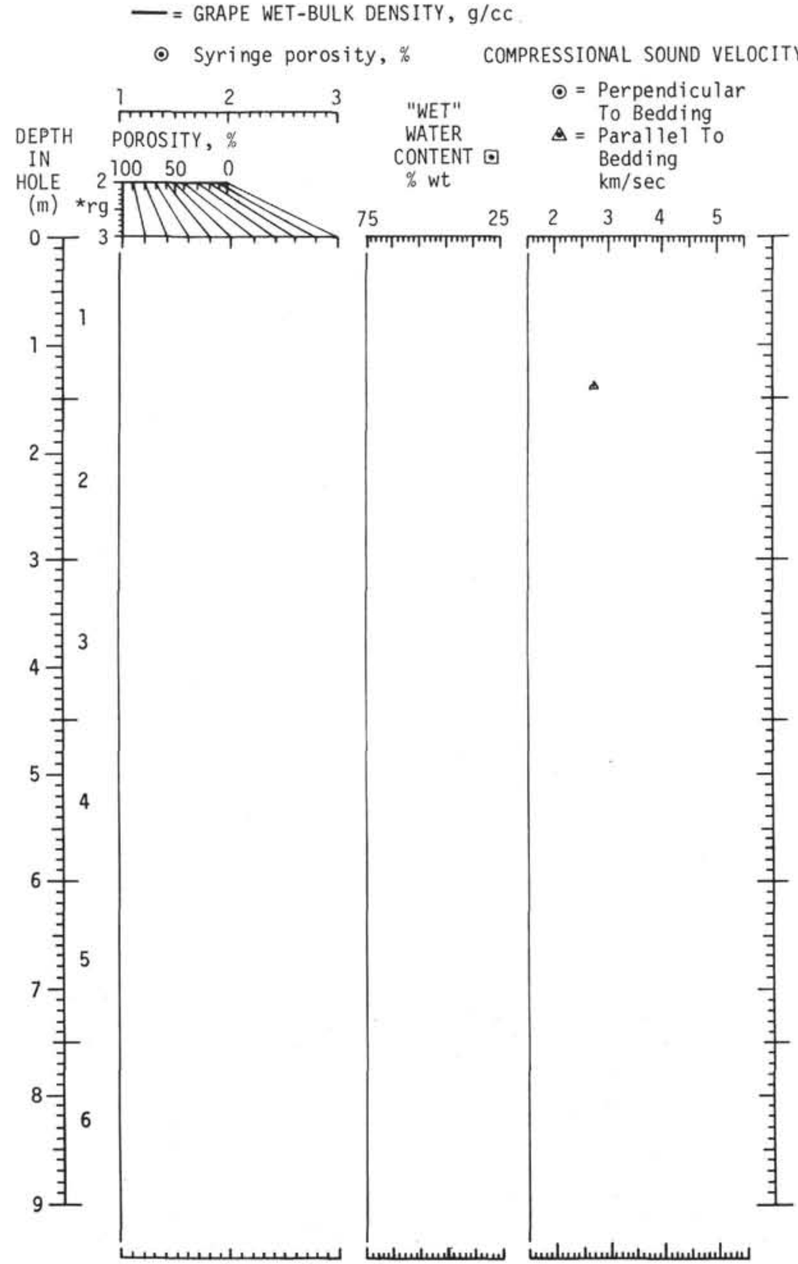
*rg = grain density, g/cc

CORE 305-59



*rg = grain density, g/cc

CORE 305-61



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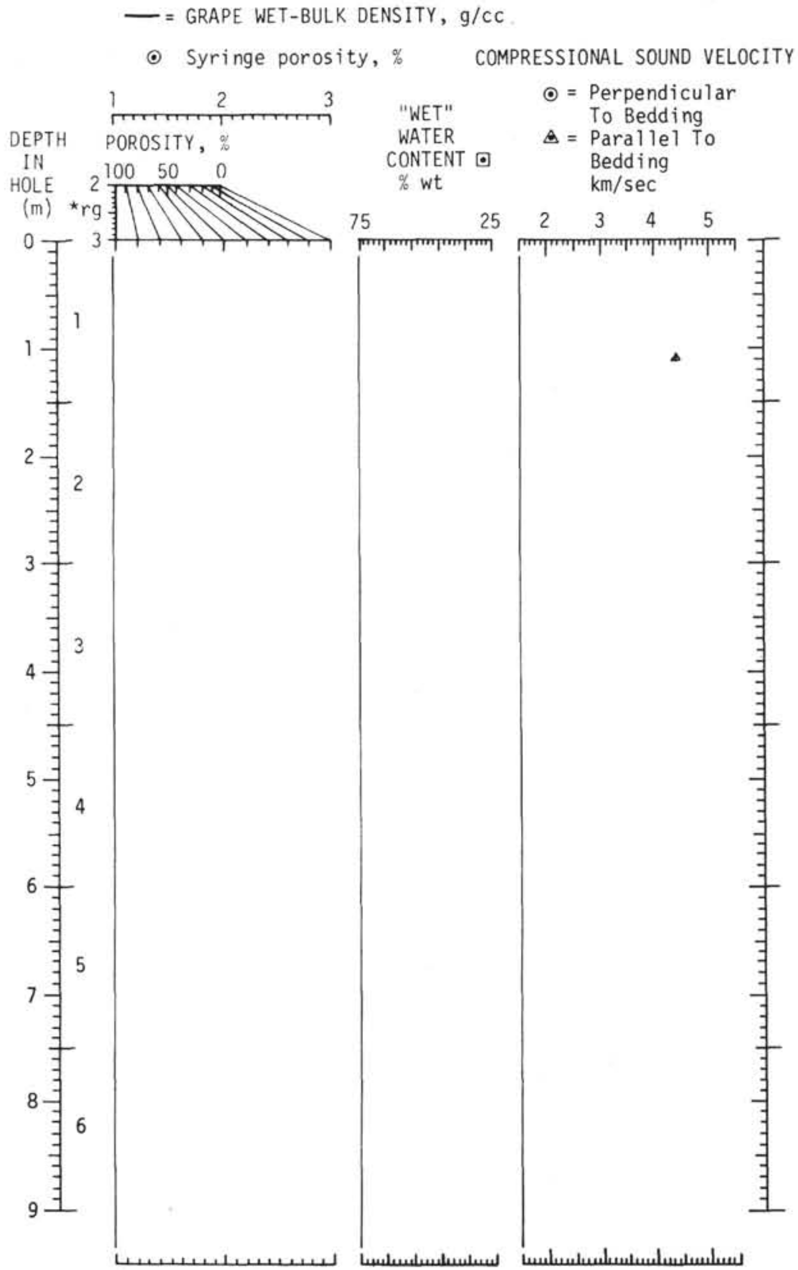
CORE 305-63



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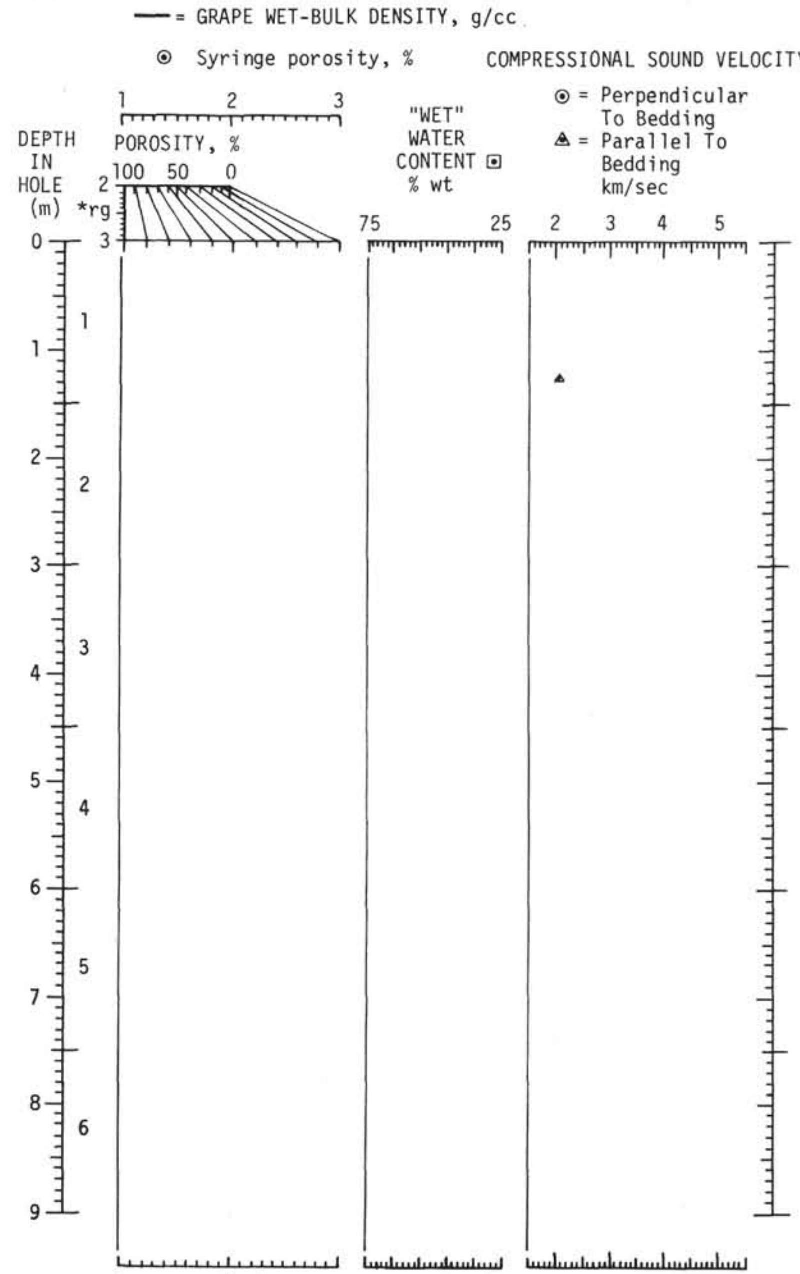
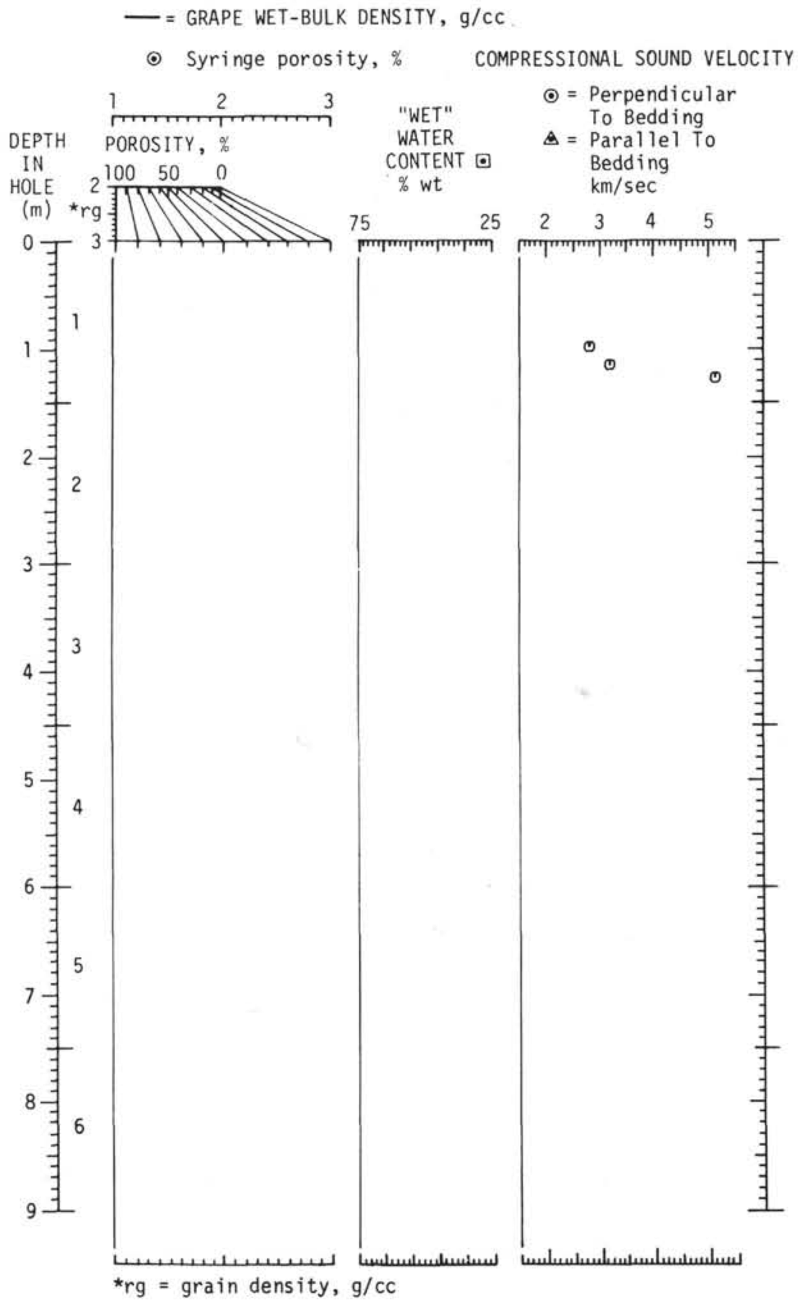
CORE 305-64

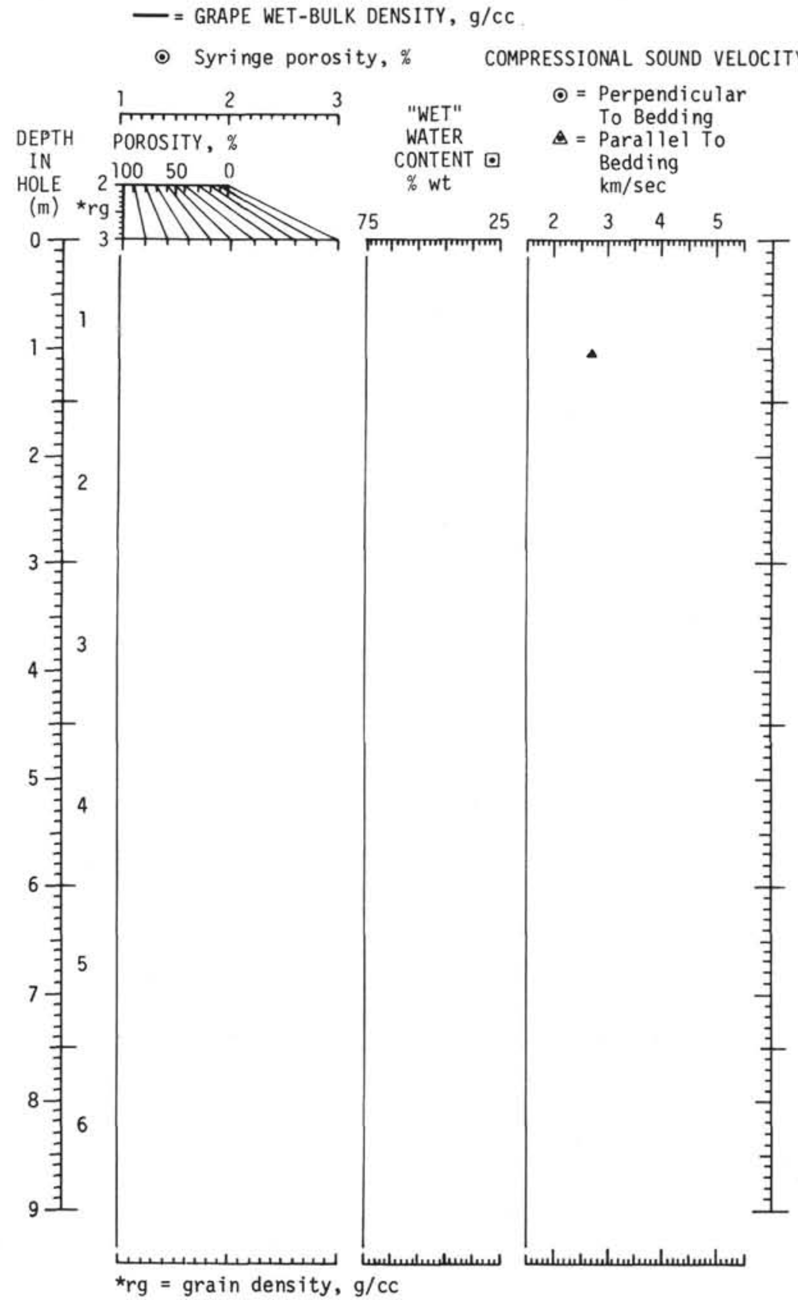


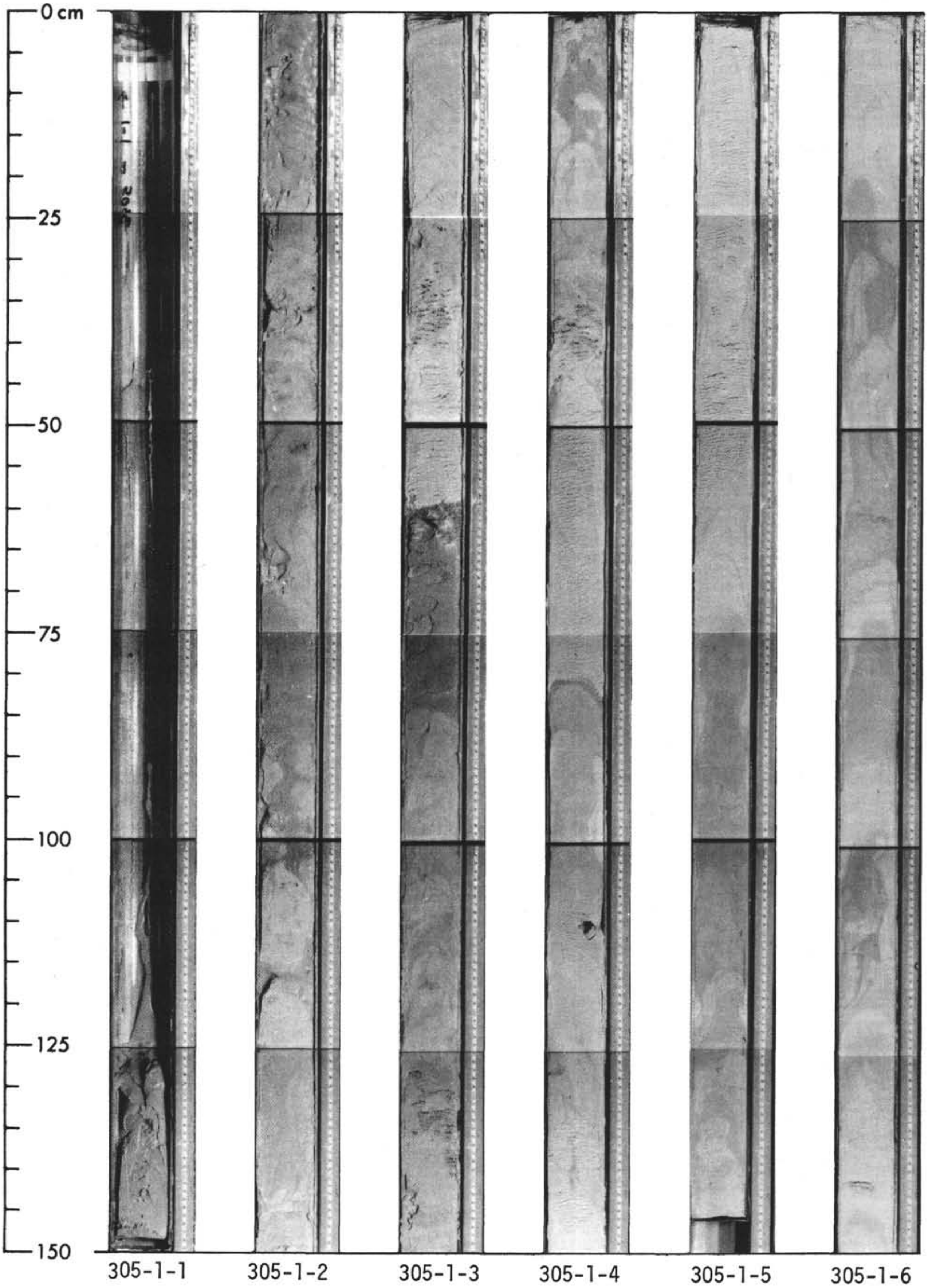
*rg = grain density, g/cc

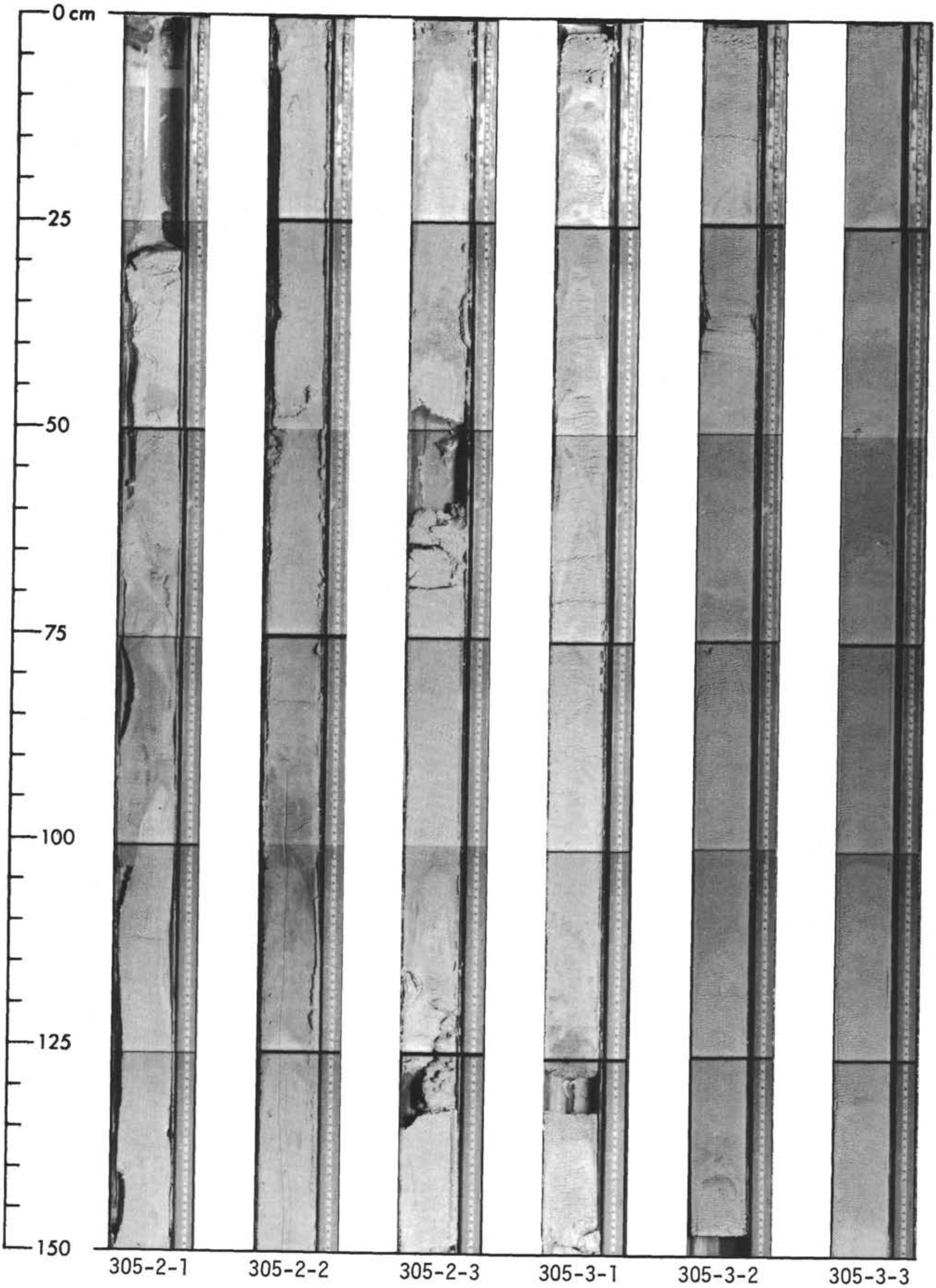
CORE 305-65

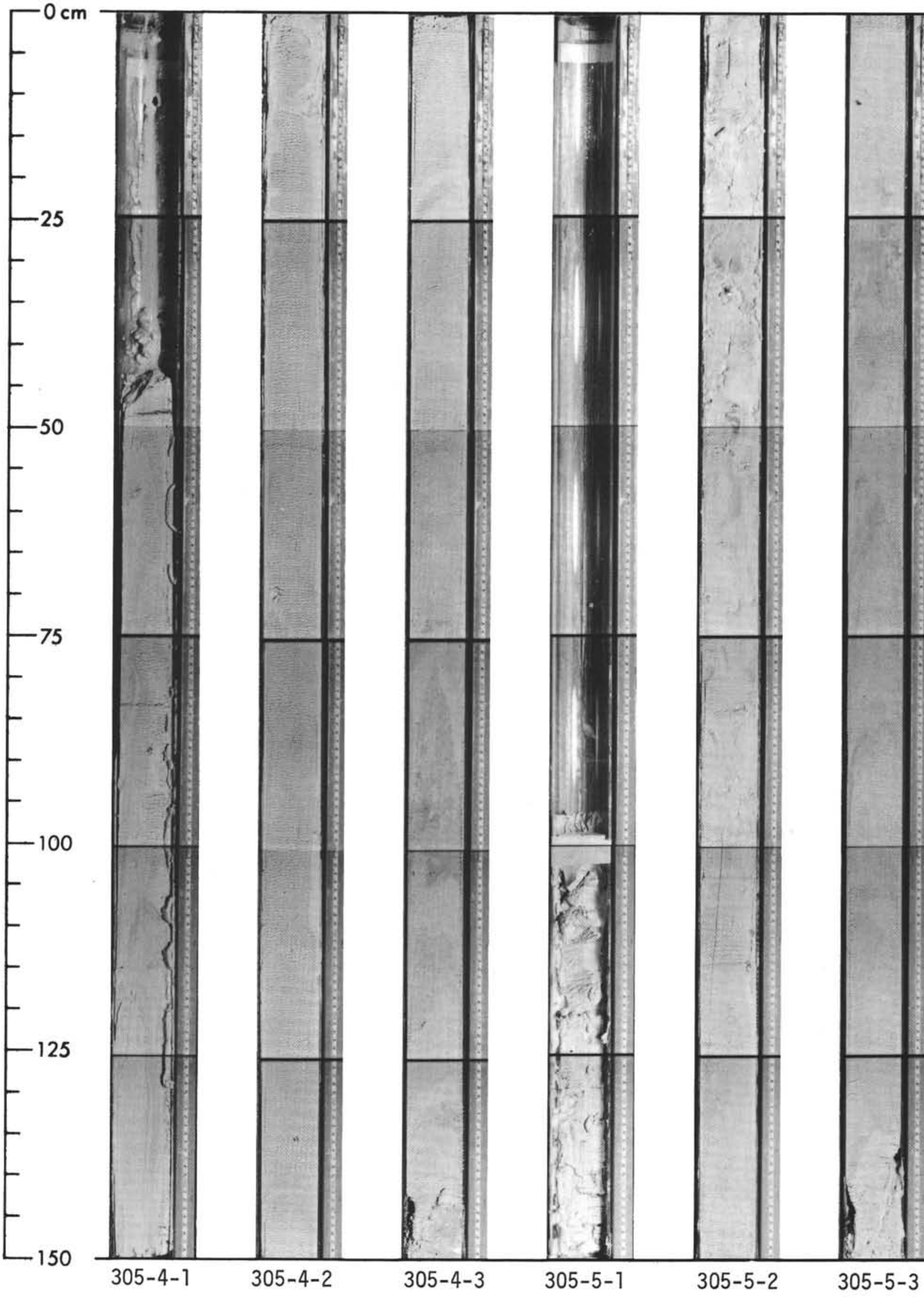


CORE 305-66




0 cm
25
50
75
100
125
150
305-1-1
305-1-2
305-1-3
305-1-4
305-1-5
305-1-6


0 cm
25
50
75
100
125
150
305-2-1
305-2-2
305-2-3
305-3-1
305-3-2
305-3-3


0 cm
25
50
75
100
125
150
305-4-1
305-4-2
305-4-3
305-5-1
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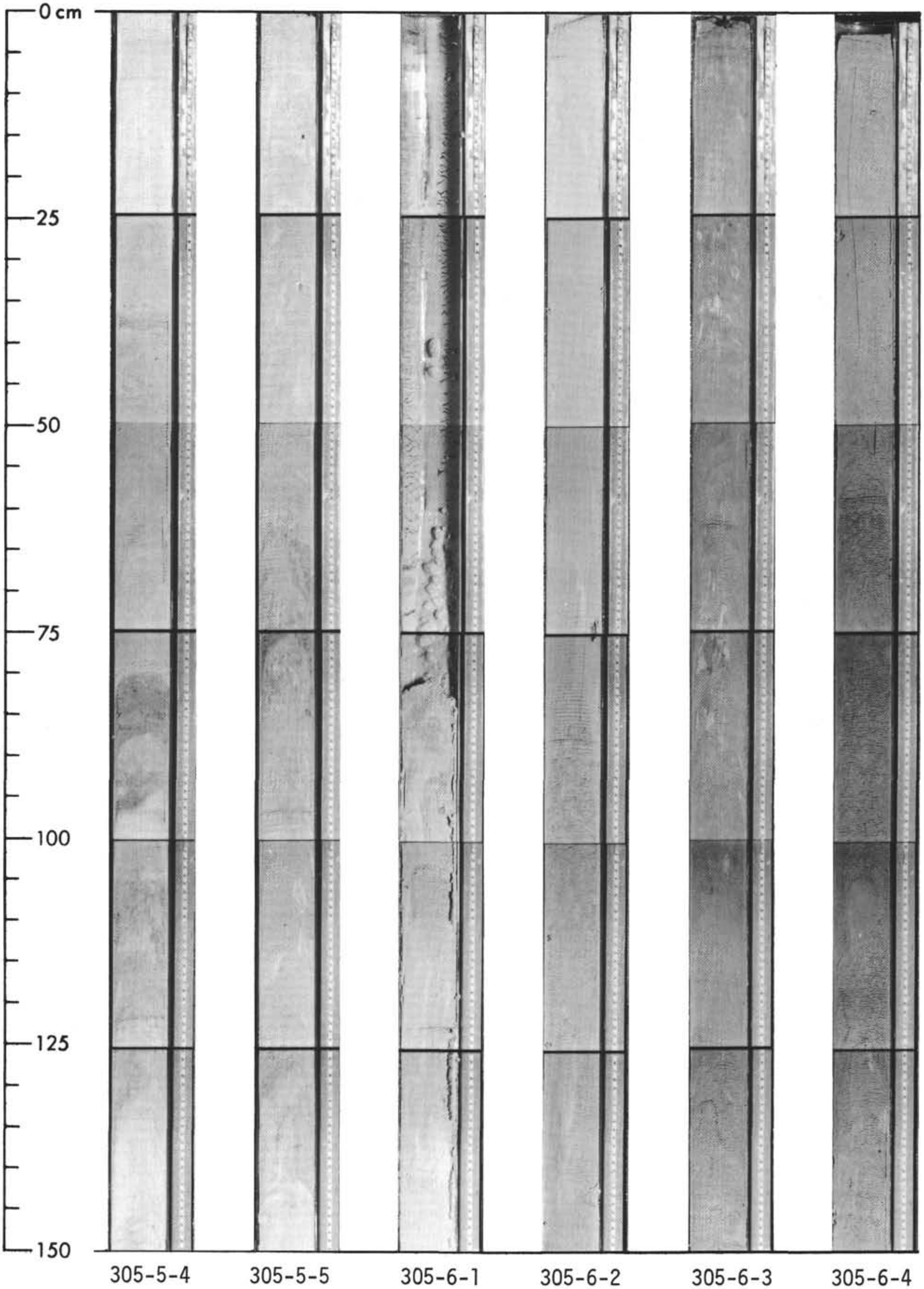
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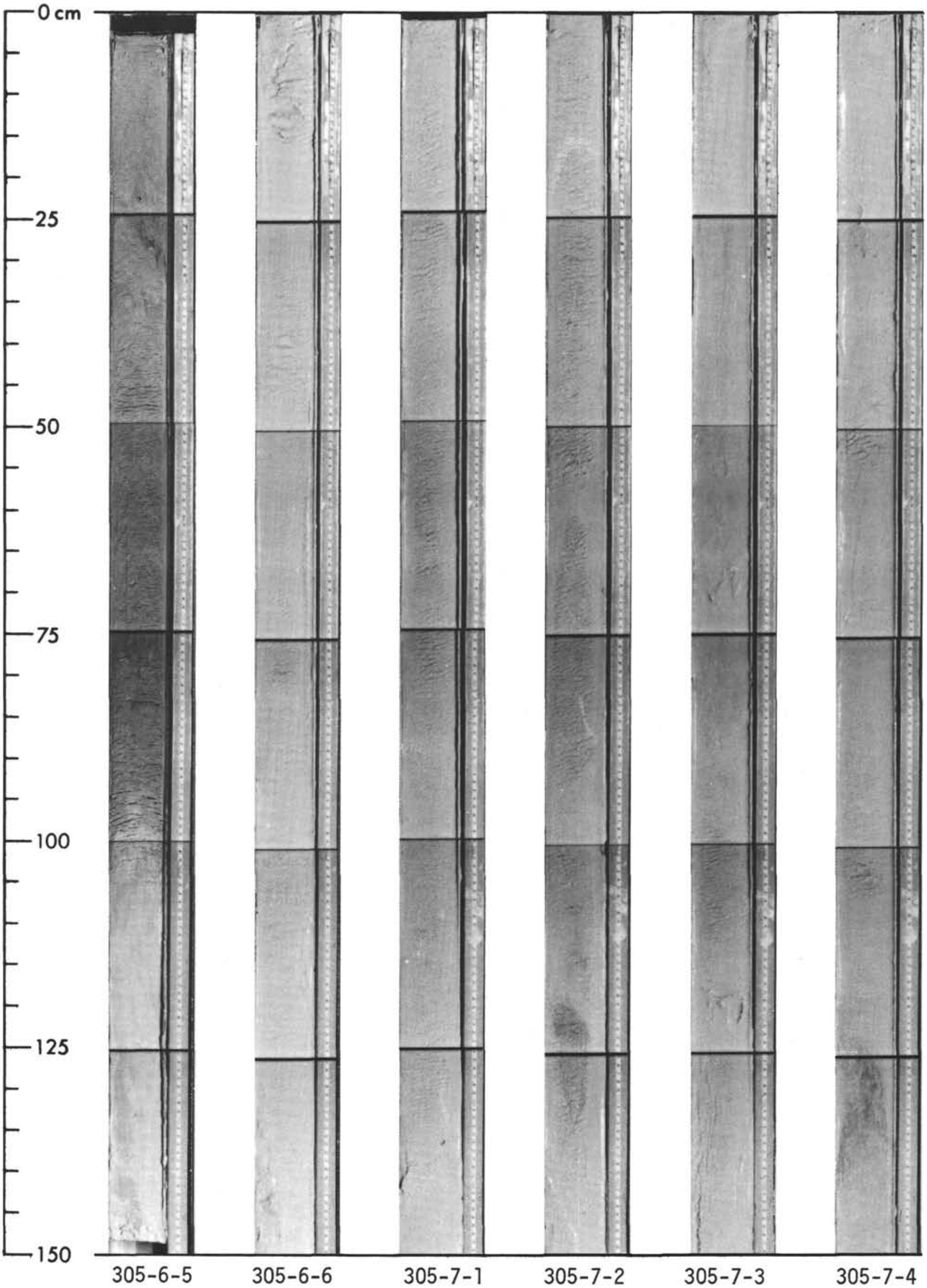
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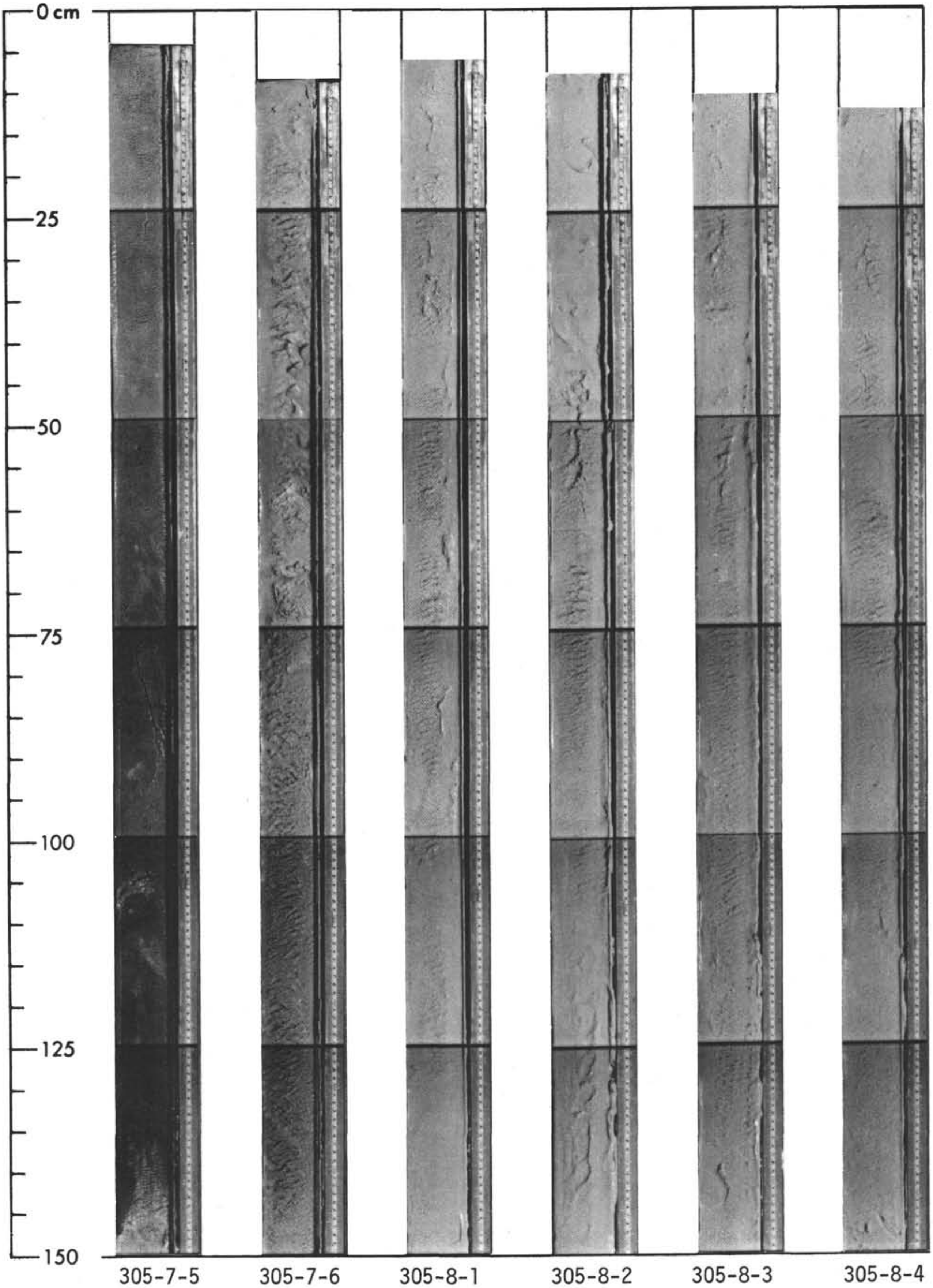
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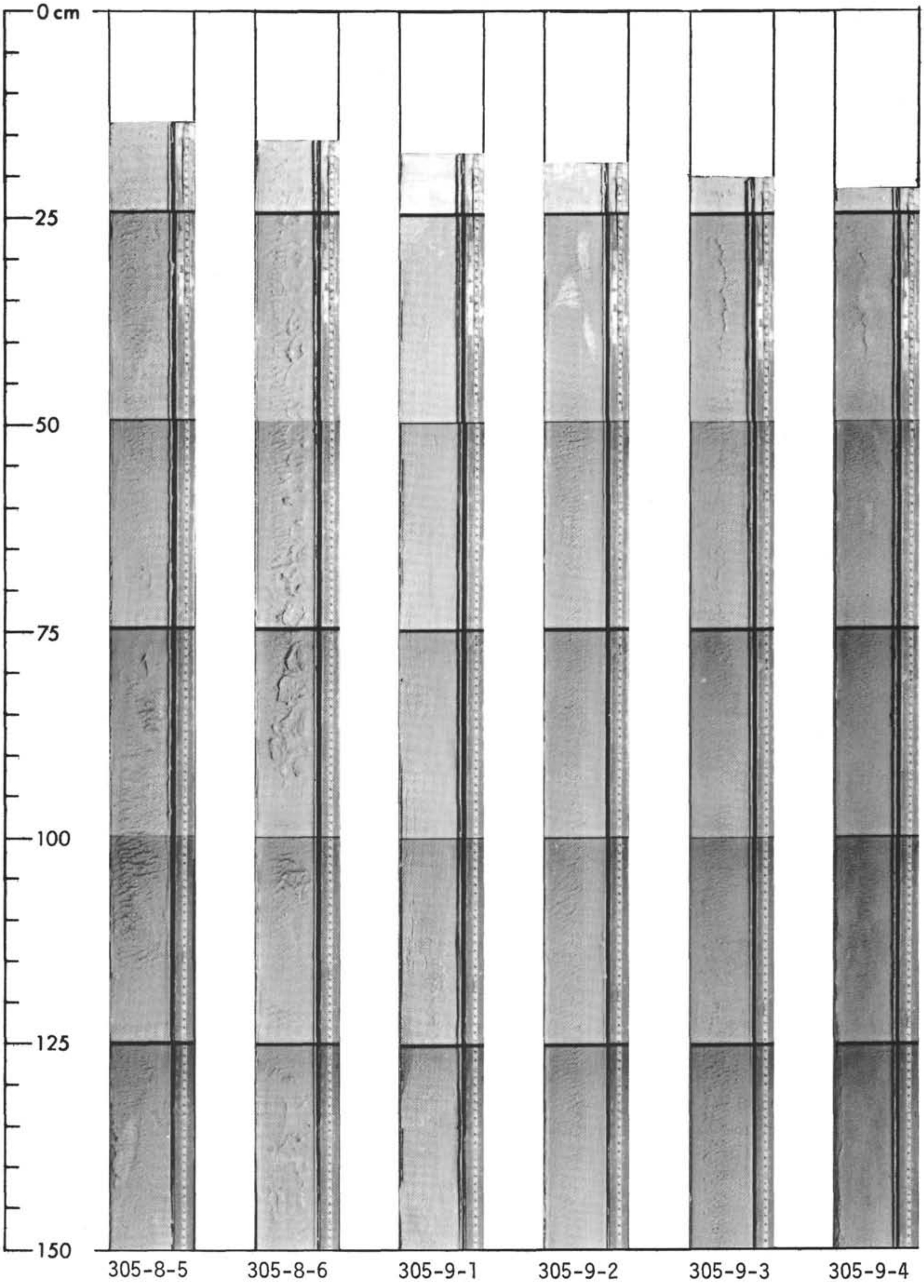
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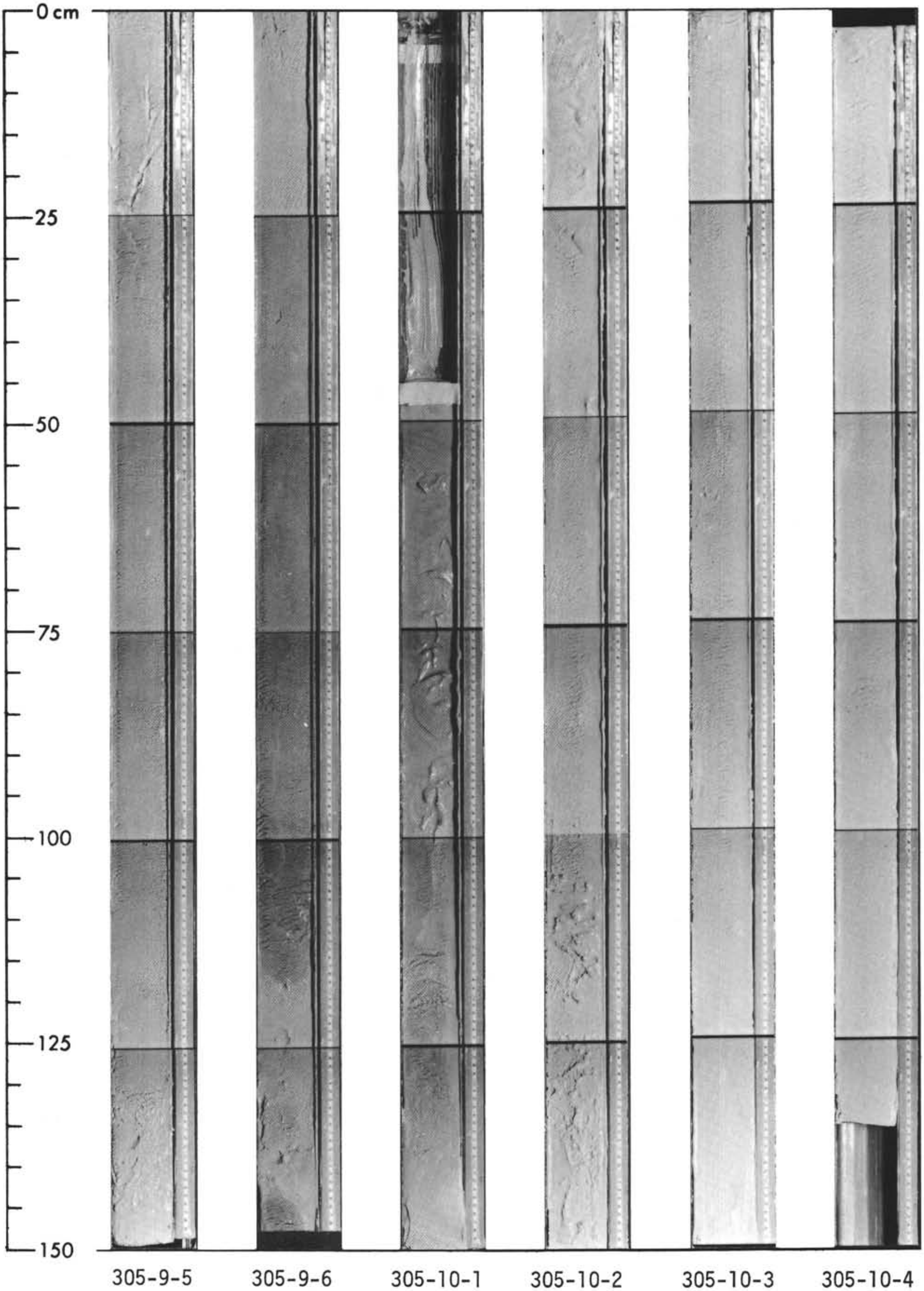
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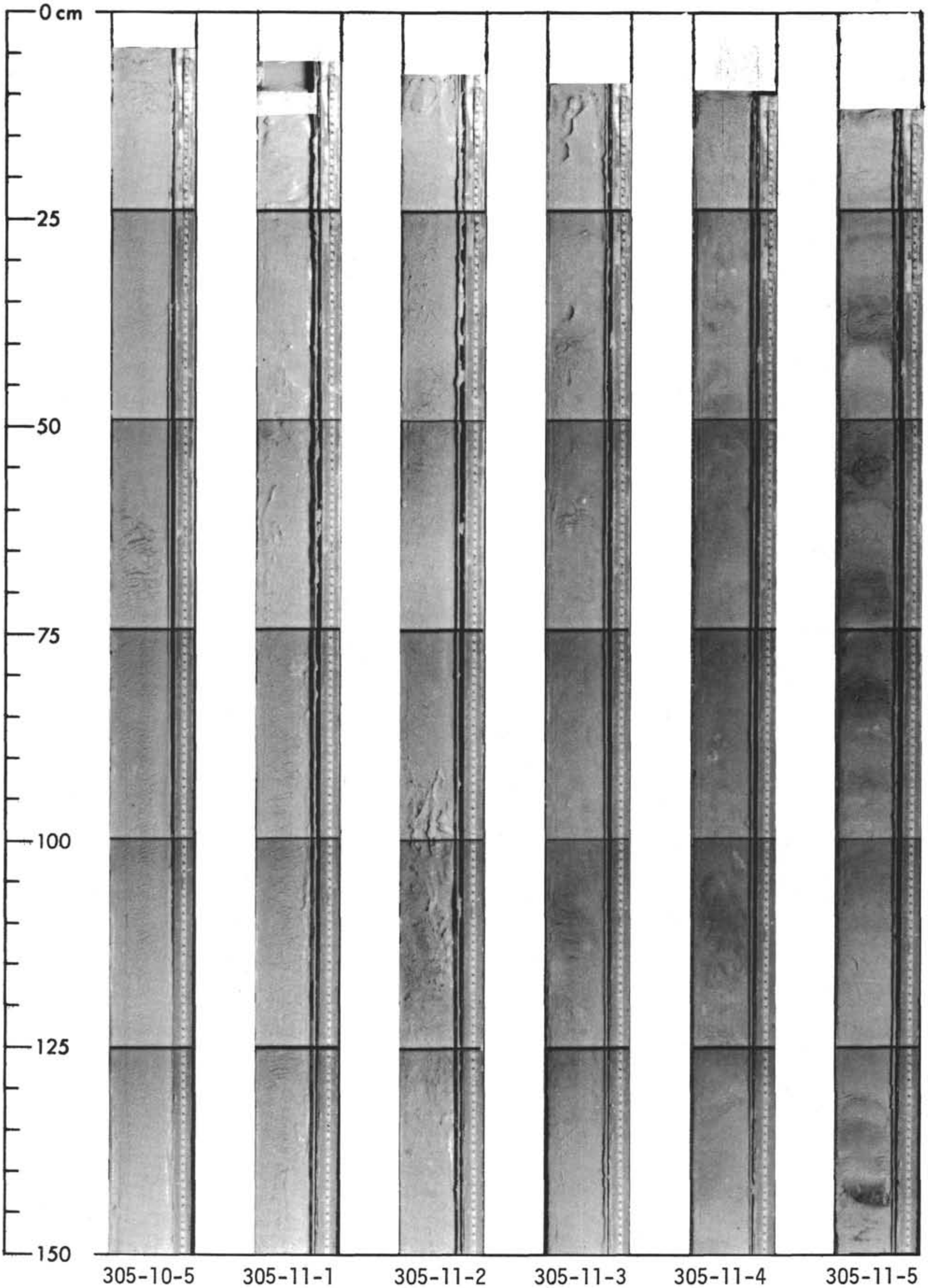
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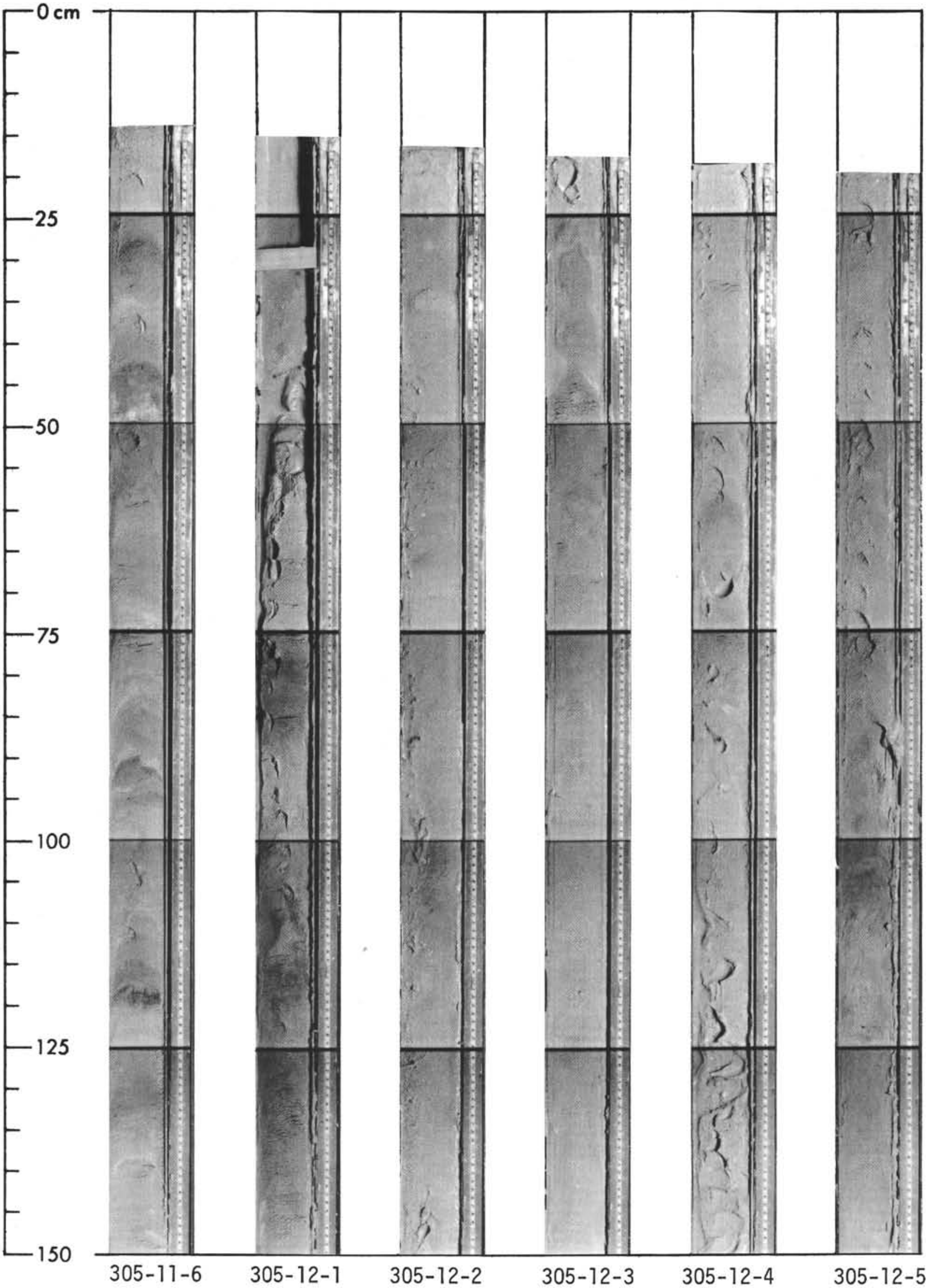
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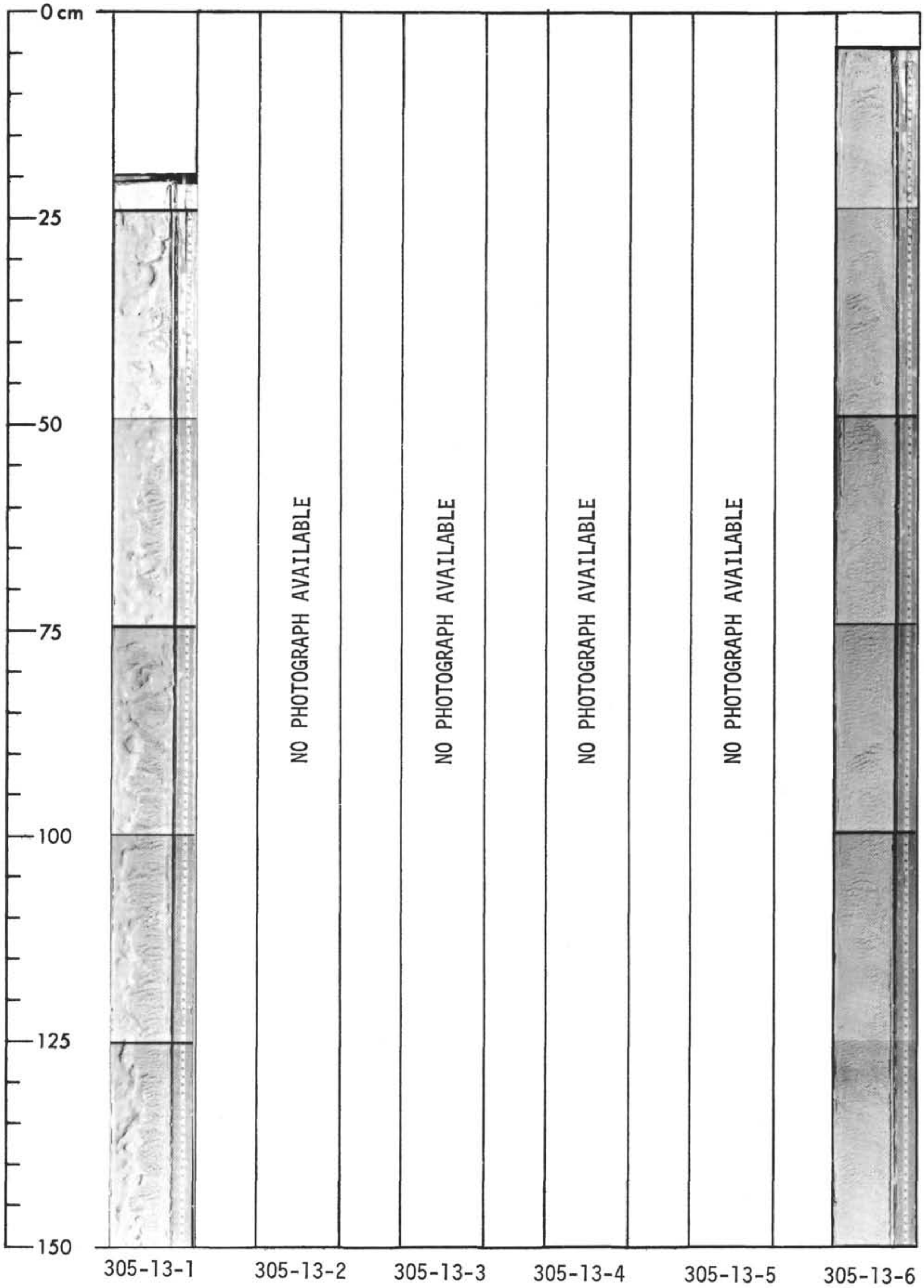
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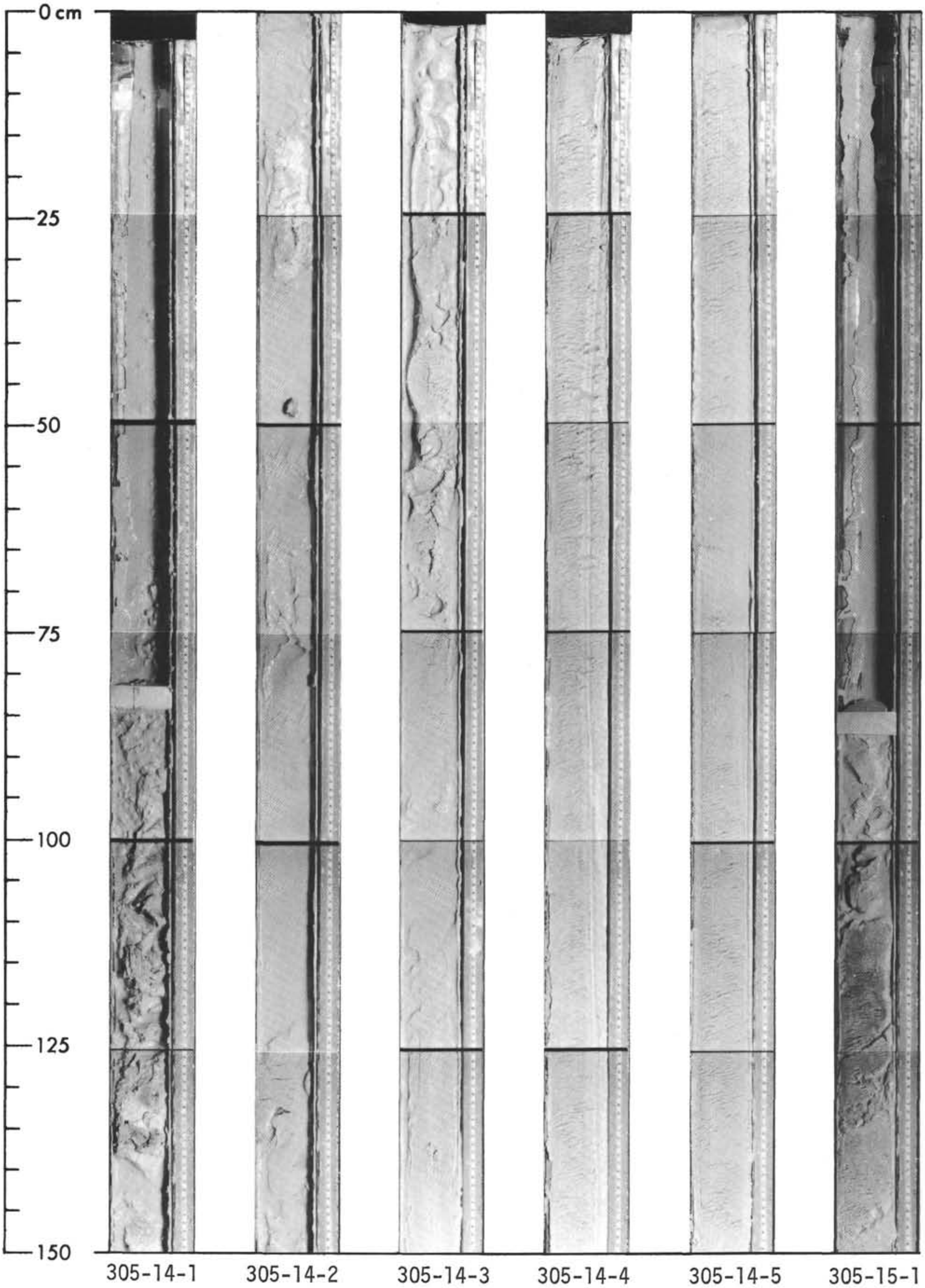
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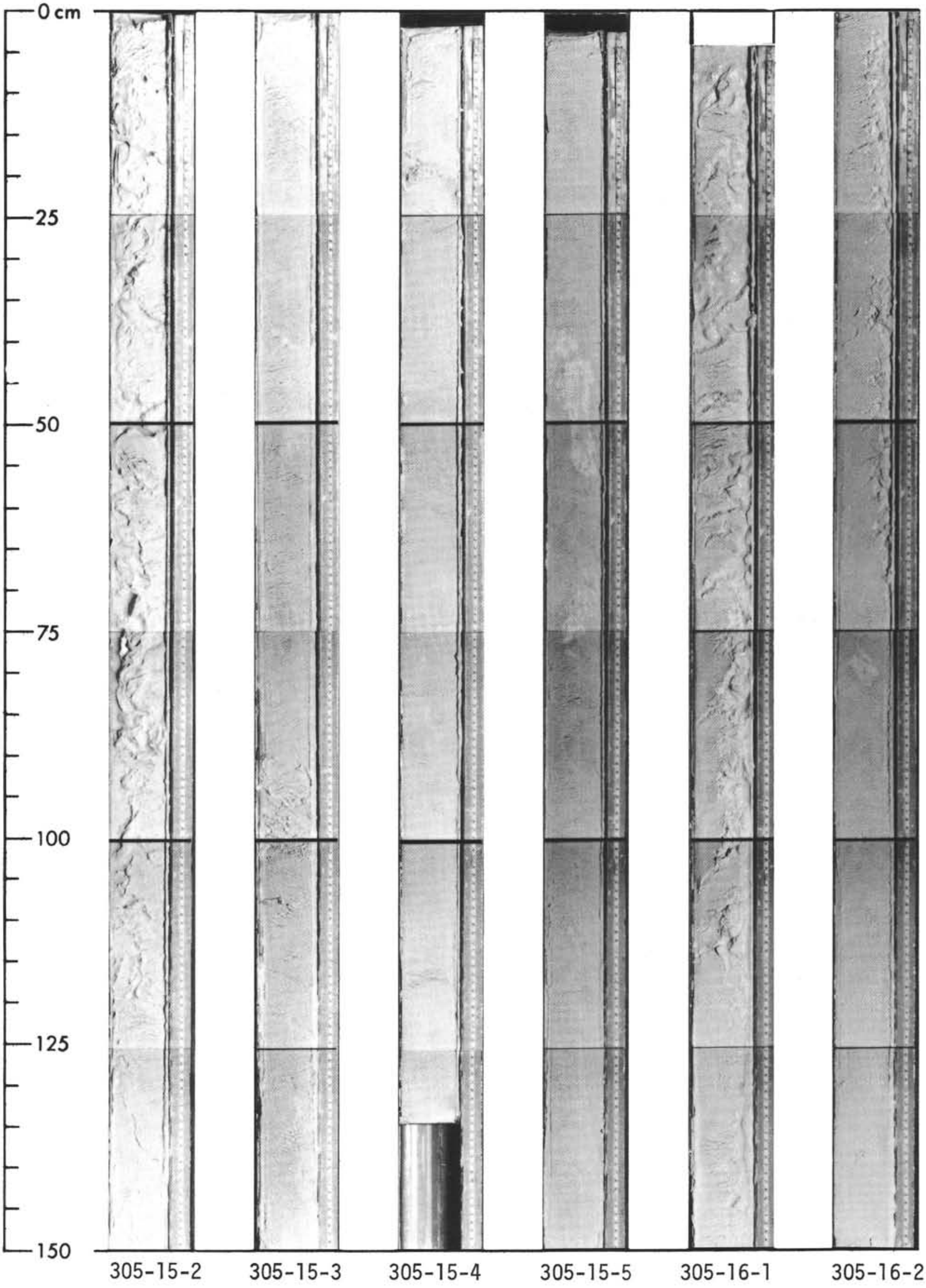
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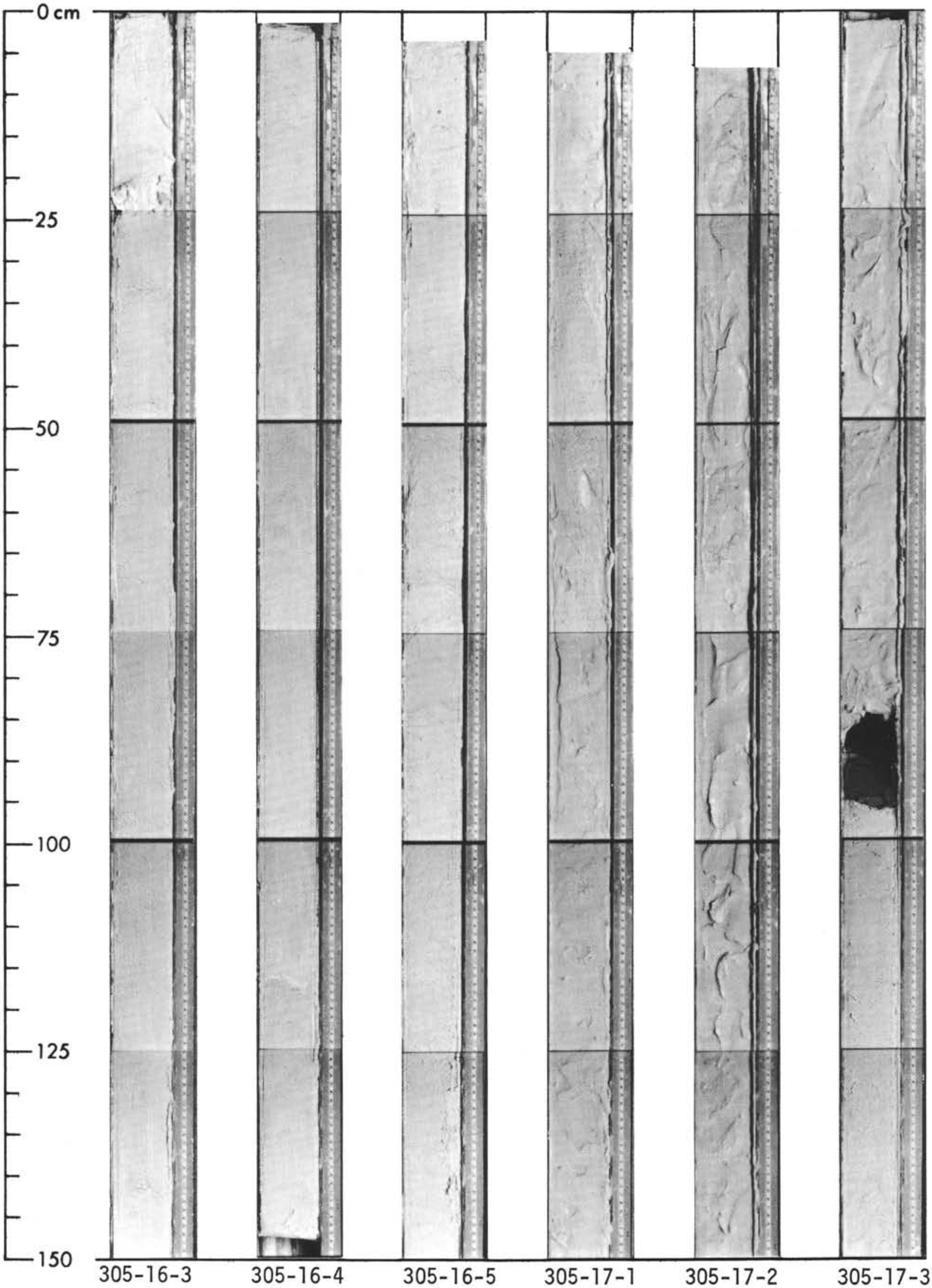
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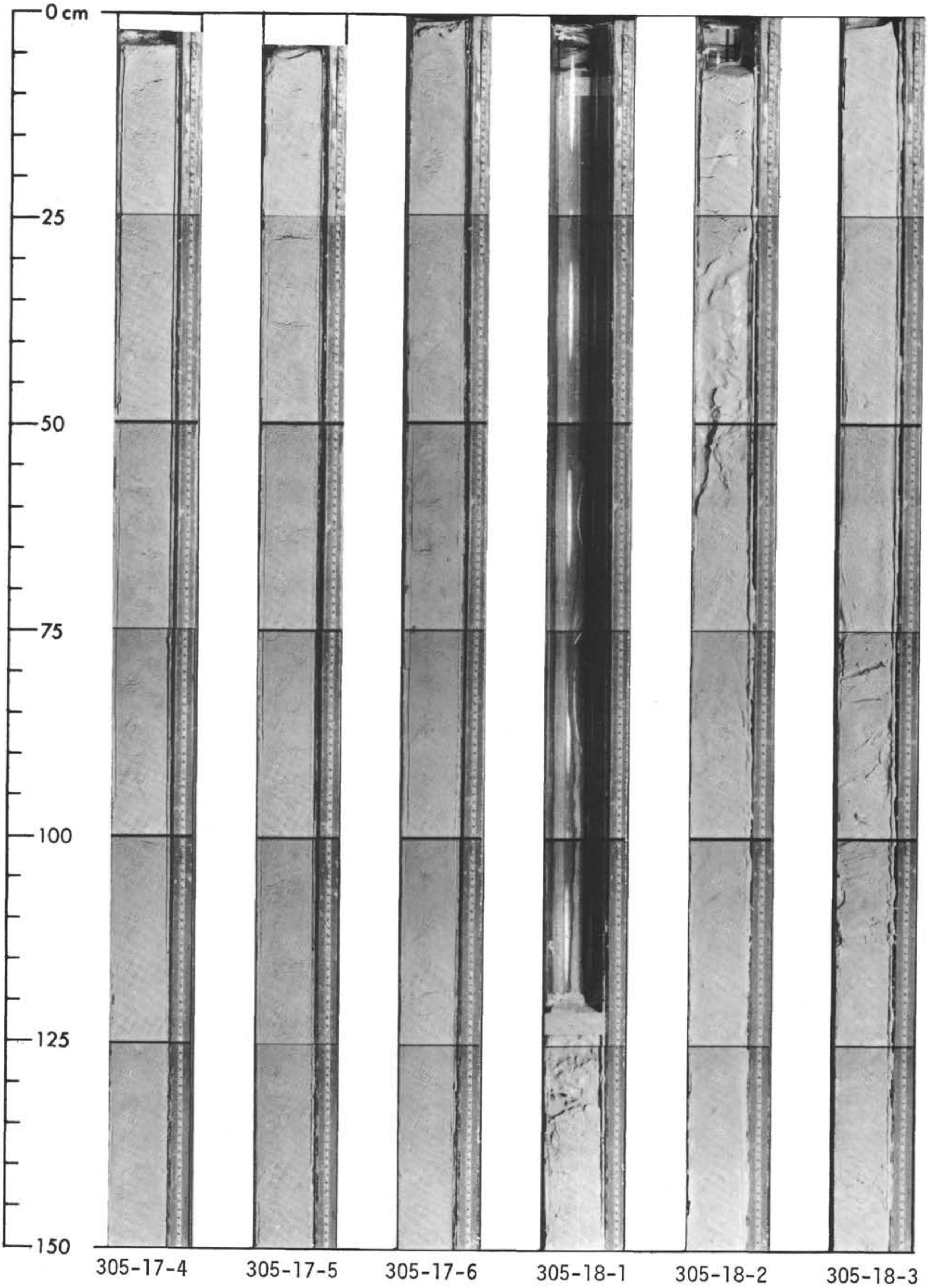
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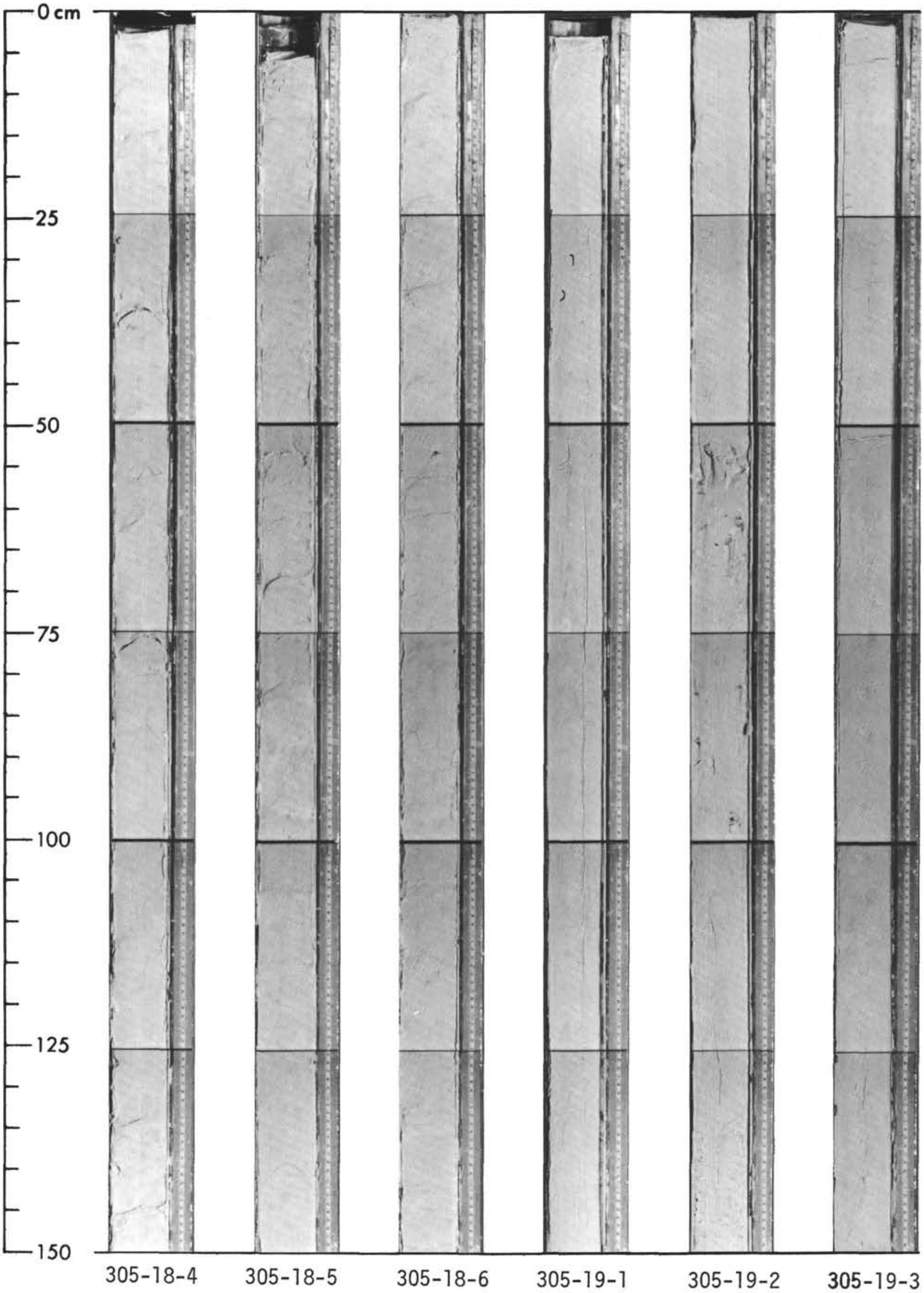
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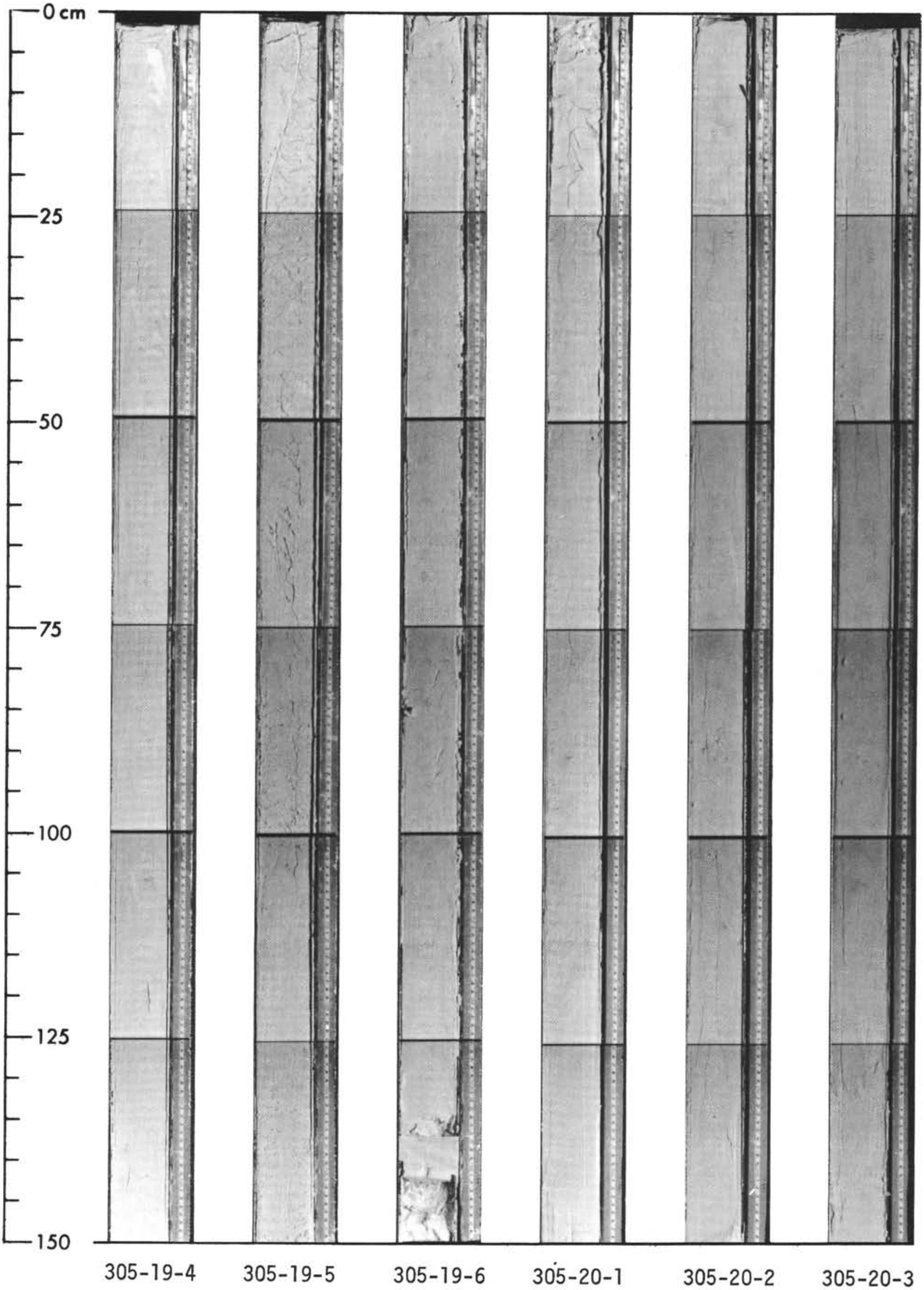
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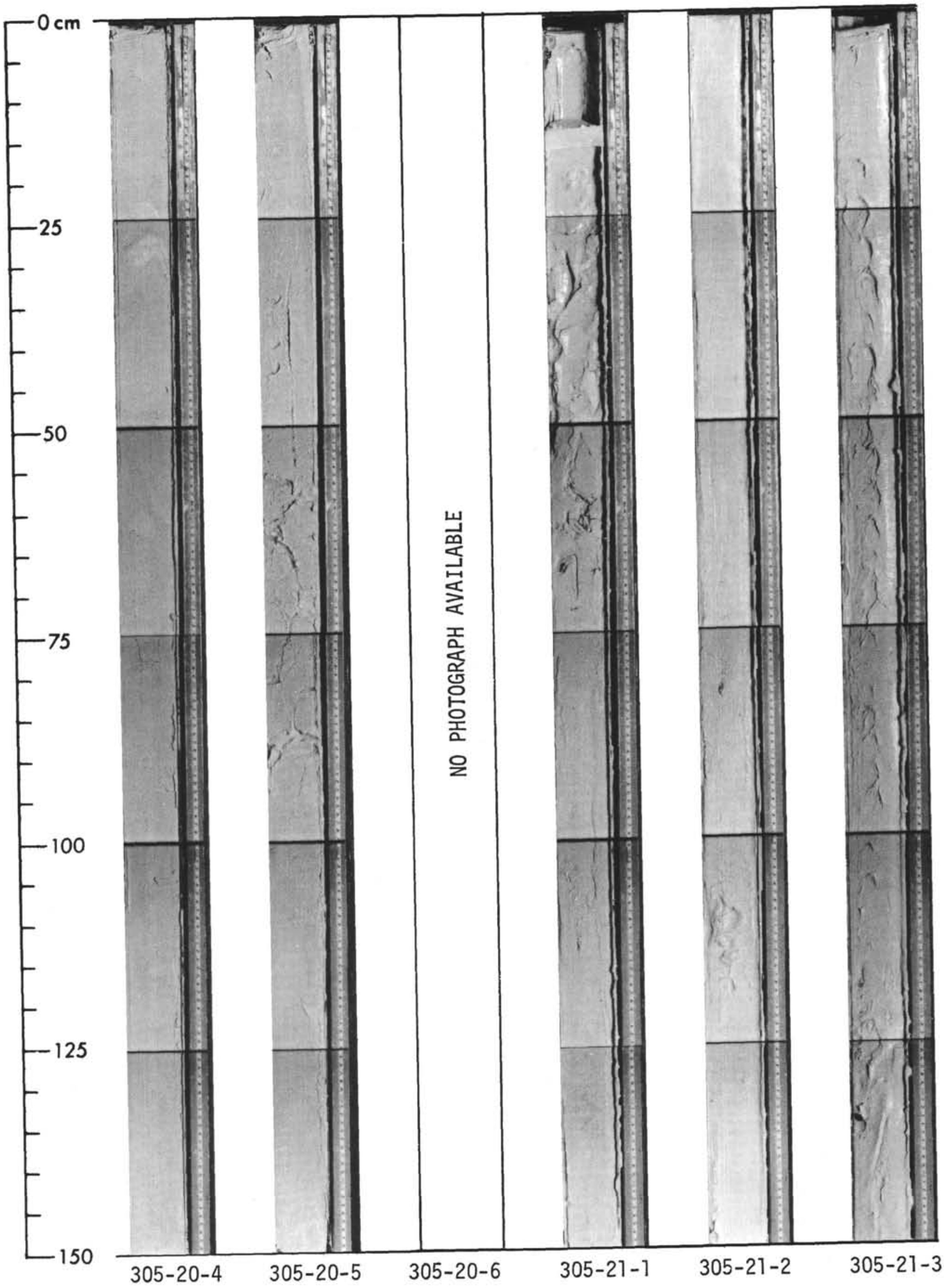
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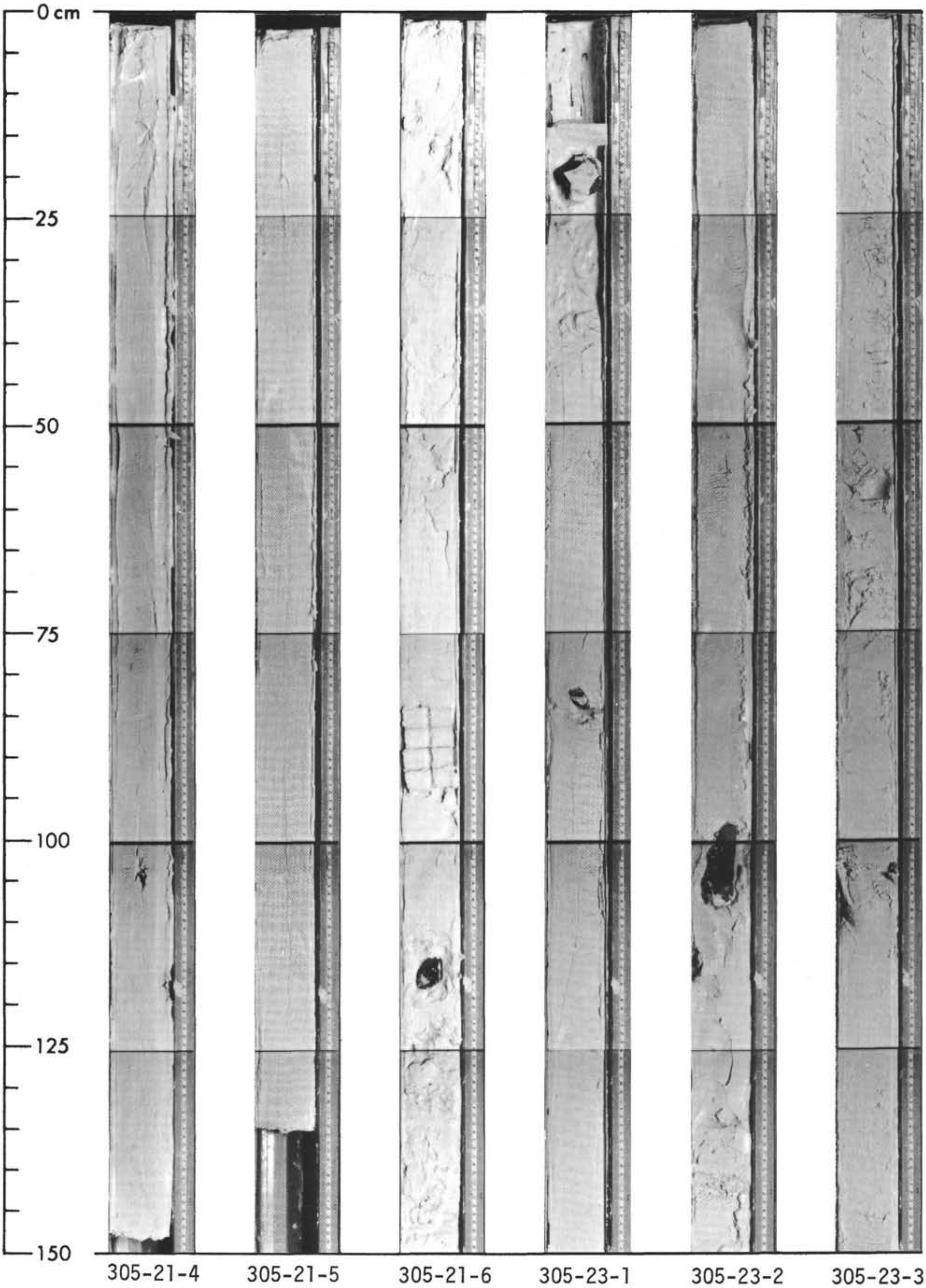
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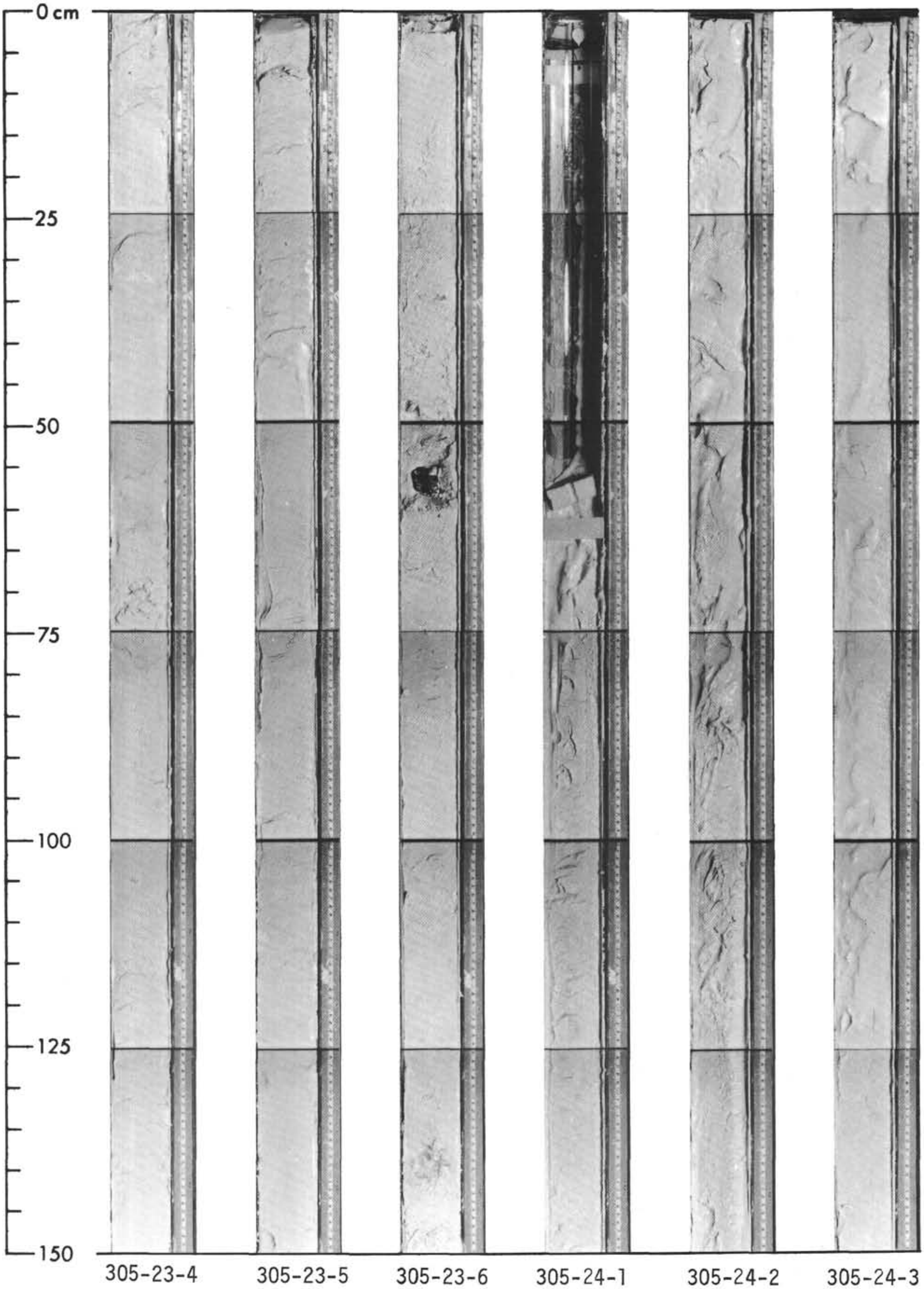
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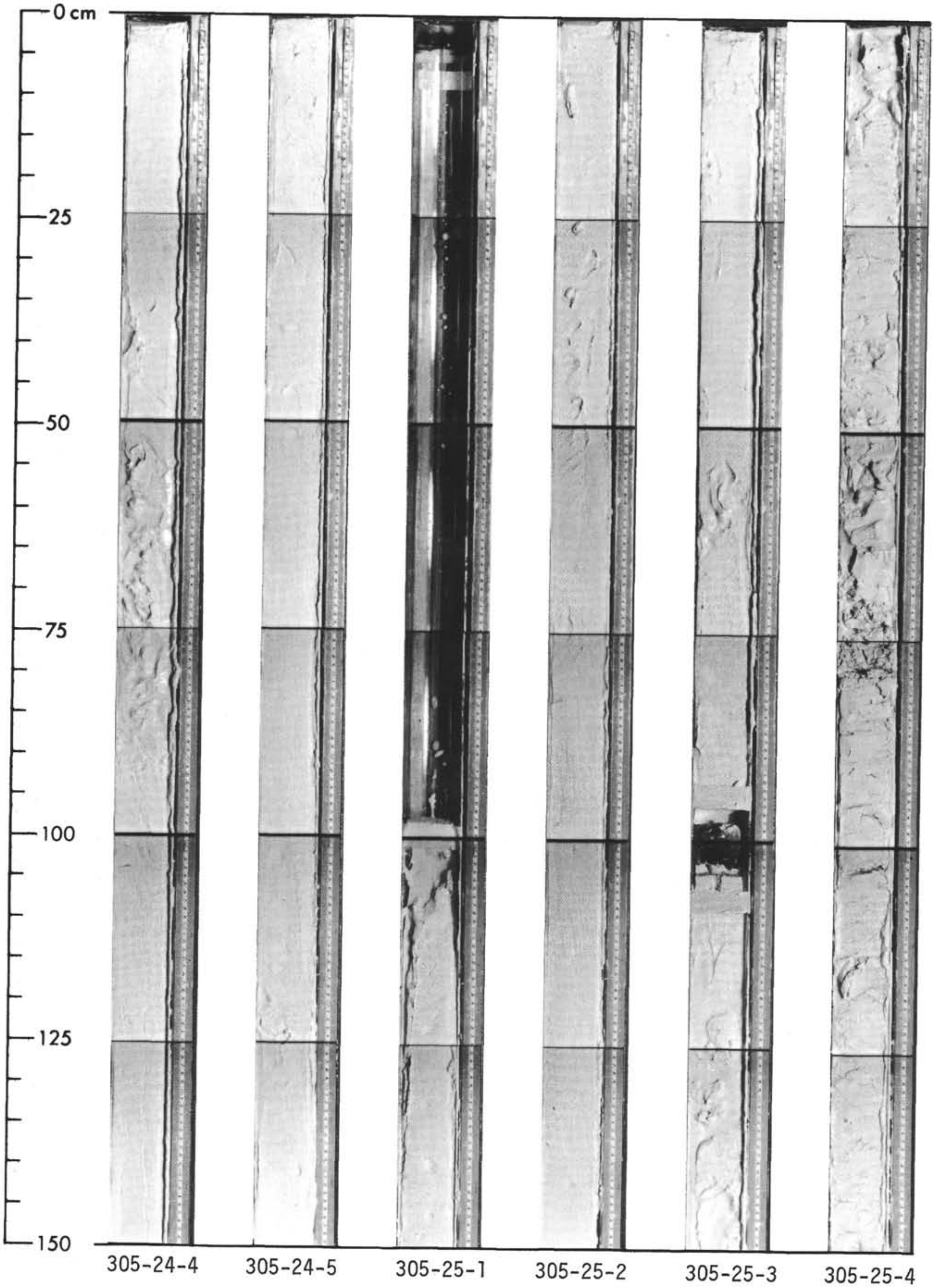
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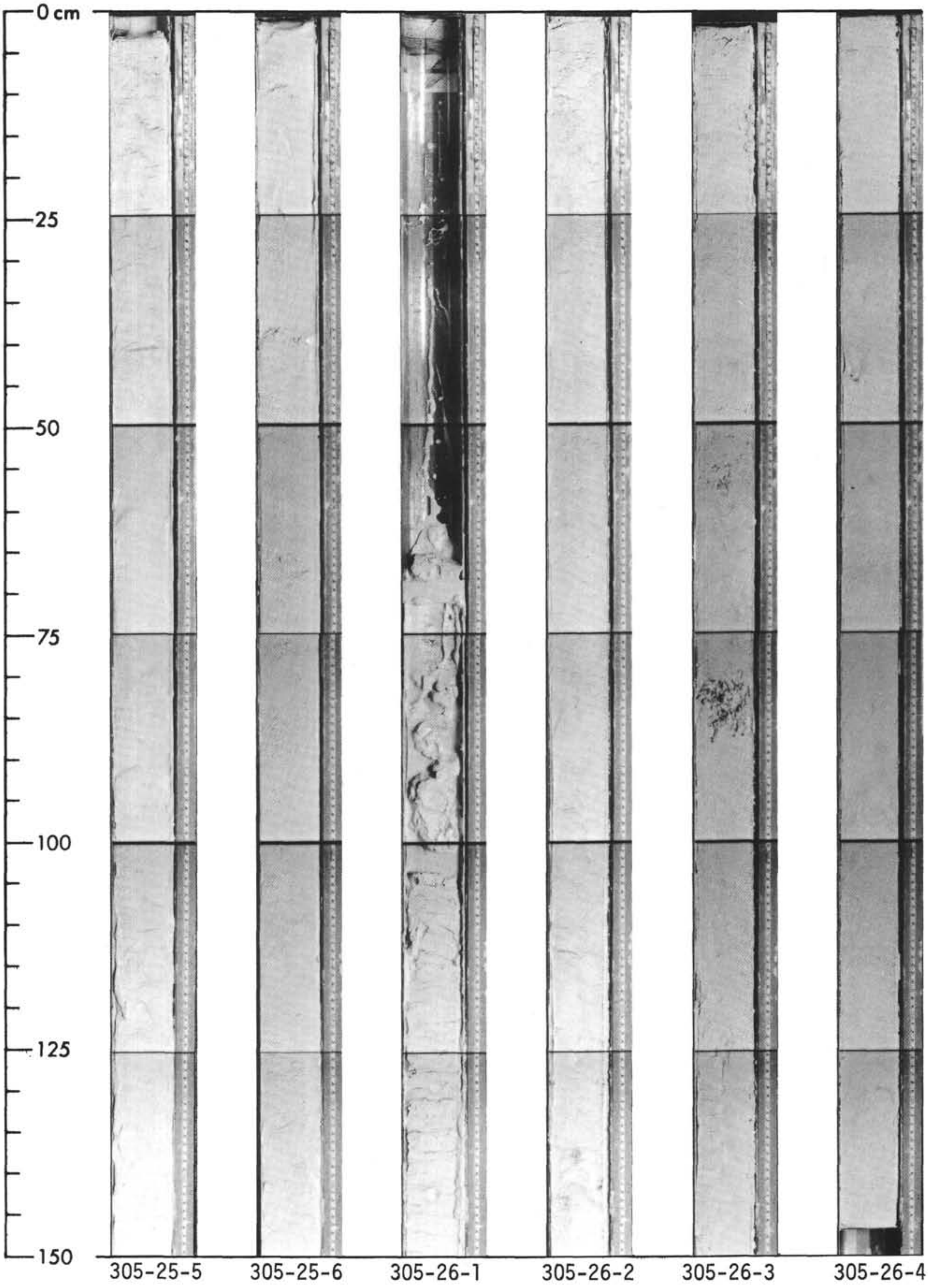

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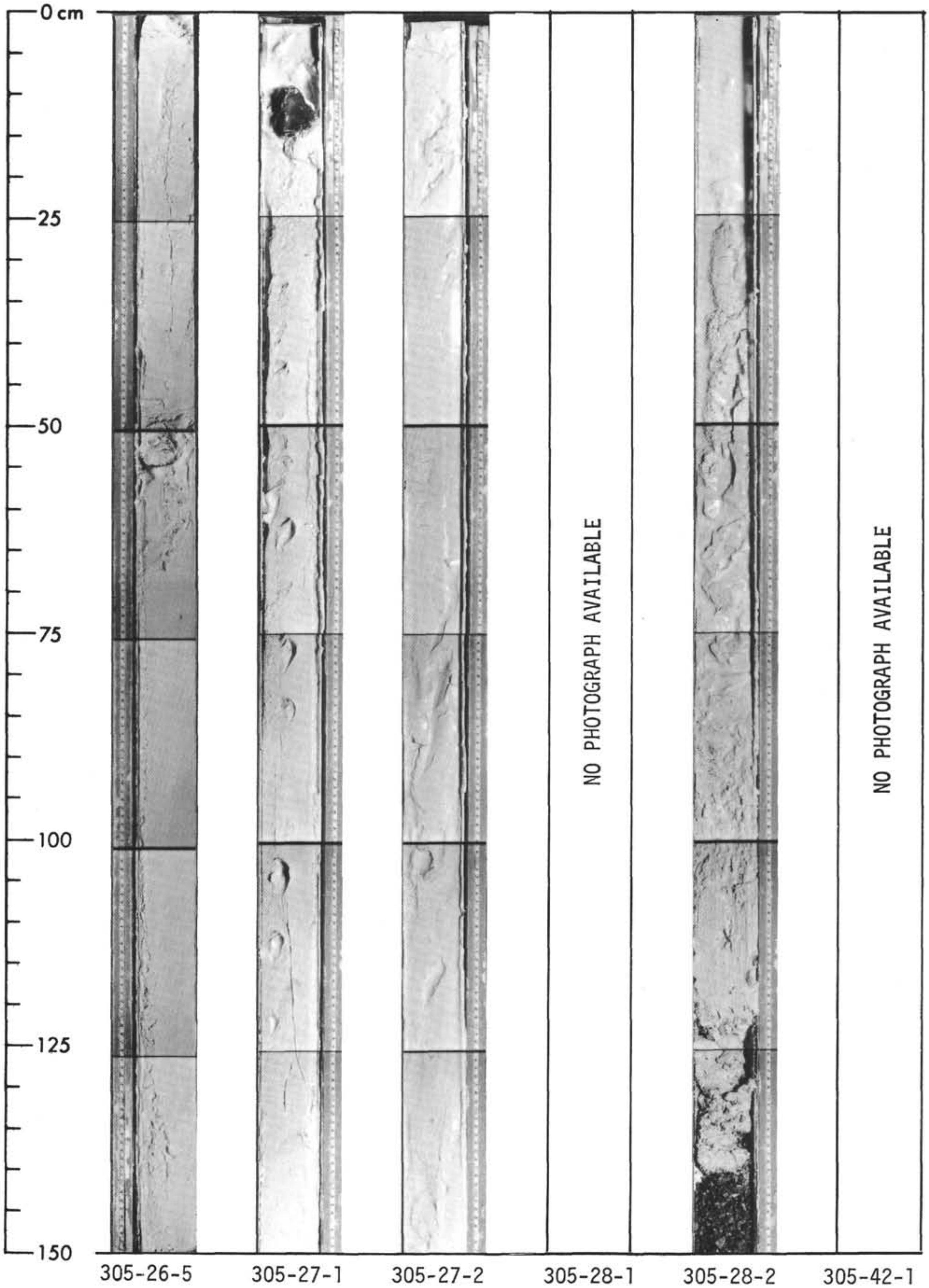
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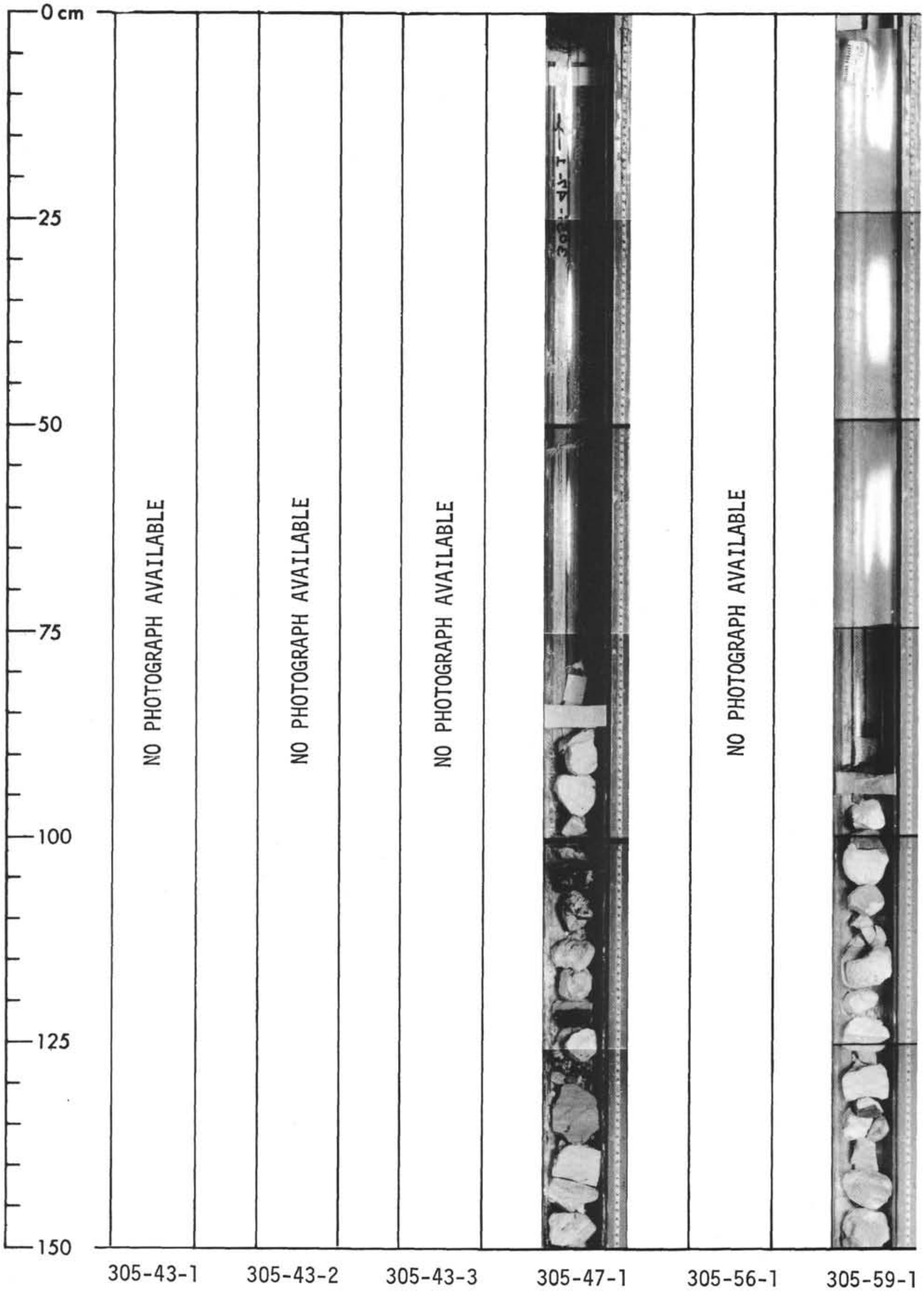
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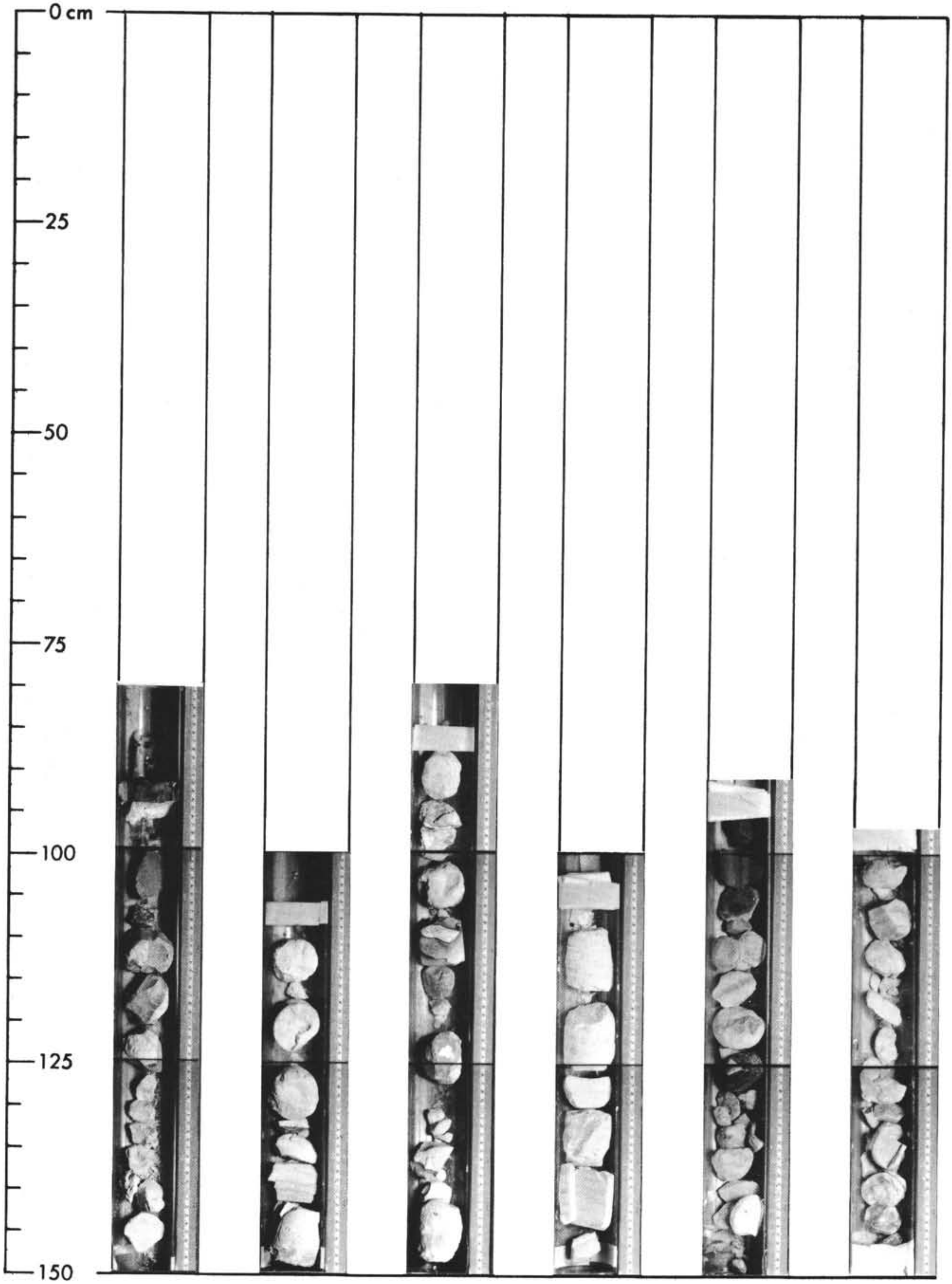

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