2. SITE 183

The Shipboard Scientific Party[1]

SITE DATA

Date Occupied: 25-28 Jul 71.

Position:
52°34.30'N
161°12.33'W.

Water Depth: 4708 meters.

Penetration: 516 meters.

Number of Holes: One.

Number of Cores: 40.

Total Core Recovered: 149.8 meters.

Acoustic Basement:
Depth: 505 meters
Nature: Basalt
Velocity: 1.75 km/sec (above basalt).

Age of Oldest Sediment: late early Eocene.

Basement: Older than late early Eocene.

SUMMARY

Site 183 is located in water 4708 meters deep near the northern edge of the Aleutian Abyssal Plain, western Gulf of Alaska. The 505-meter-thick sedimentary sequence drilled and cored here consists of (a) Holocene through Middle Miocene pelagic deposits (0-210 m) composed of diatom-rich silty clay and diatom ooze, with ash layers intercalated above 185 meters and ice-rafted (?) pebbles above 127 meters; (b) barren Lower Miocene and Upper Oligocene, pelagic (?) clay (210-239 m); (c) Middle to Lower Oligocene nannofossil chalk (239-248 m); (d) Lower Oligocene to upper lower Eocene turbidite beds (248-501 m) consisting of clay with size-graded silt and silty sand layers increasing in abundance downward; and (e) upper lower Eocene (?) (501-505 m) nannofossil limestone, calcareous ferruginous clay, and pyritic, aragonitic limestone. Alkali olivine basalt underlies the sediment sequence (see Stewart et al., this volume).

The Holocene-Miocene siliceous fossil assemblage shows a resemblance to that of California and Japan. A dinoflagellate flora, chiefly one species, was recovered from the Eocene turbidite beds; the dominant species is geographically wide ranging and also occurs in beds of late Eocene age on nearby Adak Island, Aleutians (see Evitt, this volume). From its low diversity, the Oligocene-Eocene nannoflora appears to be a high-latitude assemblage (50° or higher (?); see Worsley, this volume). Even the two carbonate beds have remarkably low species diversity, and only three discoaster species were found throughout the entire Oligocene to middle Eocene section. In agreement, the conifer-dominated pollen assemblage in lower Oligocene and Eocene beds imply an Alaskan source area and a paleolatitude equivalent to that of the Cook Inlet area in early Tertiary time (see Wolfe, this volume).

Both the Oligocene and lower Eocene carbonate beds are bounded by pelagic clays, not turbidites, and may be considered autochthonous, indicating two downward incursions of carbonate compensation depth during this interval. The upper chalk, apparently somewhat older than the one encountered at Site 178 of Leg 18, was probably deposited at approximately 5 km below sea level.

The oldest dateable sediment above the alkali olivine basalt (late early Eocene) is approximately 12 m.y. younger than the probable age of the basalt as indicated by the associated magnetic anomaly (24). Although uncertainties remain, the occurrence of goethite-bearing calcareous ironstone and pyrite-bearing unfossiliferous aragonitic limestone, factors implying precipitation in hot brines rather than hydrothermal alteration of pelagic deposits, suggests that the age disparity is not due to intrusion of basalt into Eocene deposits (see Natland, this volume). If this is true, then perhaps the 12-m.y. hiatus can be related to nondeposition during the Paleocene, a circumstance commonly observed in the Pacific and also found at Site 192 (Meiji Guyot), or to the nonrecovery of Paleocene beds in the final core (39) containing sediment. This core recovered only 30 percent of the section penetrated. It is interesting to speculate that the alkali basalt may be related to the formation of nearby Derickson or Sirius seamounts in early Tertiary time.

The mineralogy of the buried early Tertiary turbidite sequence of sand and silt underlying the Aleutian Abyssal Plain suggests derivation from a plutonic or metamorphic provenance supplying (in order of abundance) quartz, plagioclase, and K-feldspar to the light mineral suite, and hornblende, epidote, and garnet to the heavy mineral assemblage. The species-limited but population-rich nannoflora and the Pinaceae-dominated pollen assemblage from these beds imply deposition in high northern latitudes and an Alaskan source terrane. These findings are perhaps most easily harmonized with the post-Mesozoic history of the Gulf of Alaska worked out by Hamilton (1967; in press) and Pitman and Hayes (1968). Plate solutions requiring more than about 1000 km of northwestward displacement

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of the Pacific plate relative to North America are not easily reconciled with the implied high latitude of deposition (see Scholl and Creager, this volume).

BACKGROUND AND OBJECTIVES

Site Description

Site 183 is located near the northern edge of the Aleutian Abyssal Plain, western Gulf of Alaska (Figure 1). The section was thought to consist of approximately 200 meters of pelagic ooze overlying about 300 meters of turbidites between anomalies 25 to the south and 24(?) to the north. Fossil deep-sea channels that fed the turbidite sequence appear to converge northeastward toward Alaska, but they now terminate just south of the Aleutian Trench.

Termination of turbidite sedimentation can be associated with three alternative mechanisms which relate to the amount and continuity of relative plate motion that took place between the Pacific and American plates during Cenozoic time. The first mechanism assumes little or no relative plate motion and derivation of the turbidites from Alaska in Cretaceous to middle Tertiary time, with downwarping forming the modern trench in middle Tertiary time, thereby isolating the plain from northern sediment sources (Hamilton, 1967; Pitman and Hayes, 1968). The second calls for progressive west-to-east decapitation of the several feeder channels by their subduction into the Aleutian Trench along with consumption of the Pacific plate (Mammerickx, 1970). The third mechanism suggests that the fossil plain was separated from an eastern source in Tertiary time and has been carried to its present position by the steady northward migration of the Pacific plate (Atwater, 1970; Grow and Atwater, 1970).

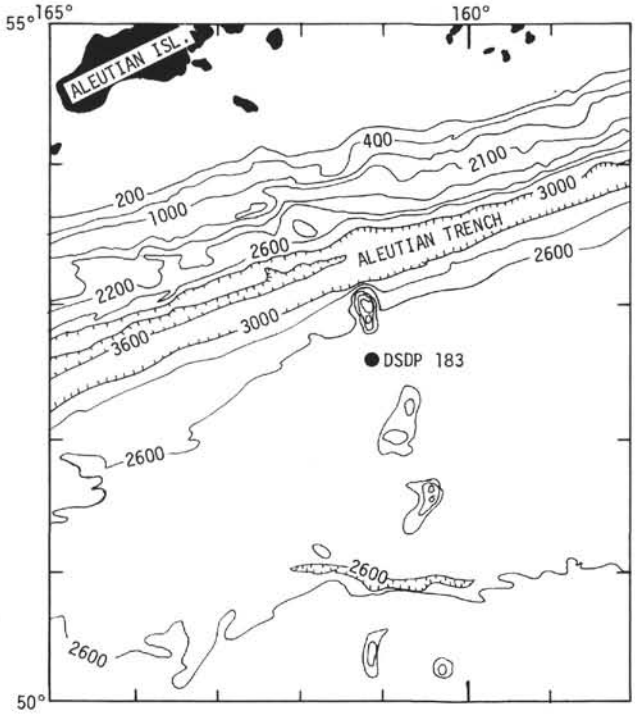

Figure 1. *Base map showing the location of Site 183.*

The time of cessation of turbidite deposition is a critical factor in determining the probable mechanism involved. For example, a late Cretaceous or even an early Tertiary age would be difficult to harmonize with modals requiring steady plate motion between the Pacific and American plates during the Cenozoic. The implication would be that the turbidite plain formed not only off western North American, but also most likely seaward of active trenches and migrating spreading centers. Conversely, a young age for cessation would eliminate the possibility that the plain is related to Mesozoic or early Tertiary sediment contribution from southwestern Alaska. It was hoped that careful mineralogic studies would allow a determination of the provenance, especially if one other than Alaska is hypothesized.

Objectives

The principal objectives were to determine, (1) the time of onset and cessation of turbidite deposition and (2) the provenance of the turbidite debris. The time of onset would appear to be earliest Tertiary, as the site is located near magnetic anomaly 25.

A secondary and perhaps equally important objective of this site was the collection of biostratigraphic data. Seismic reflection records and regional considerations suggested a complete pelagic sequence may exist here that extends back well into Tertiary time. Presumably, the section would be dominated by a siliceous microflora. It was also hoped that information about the onset of glaciation in southern Alaska (e.g., ice-rafted debris) would be obtained.

OPERATIONS

Pre- and Post-Drilling Survey

Site 183 was approached with a ship's heading of 233°T (Figure 2), the approximate reciprocal of the track (033°T) of the reference seismic reflection profile (Figure 3) (collected by E. L. Hamilton, 30 Jul 70). The air gun profile (Figure 4) taken on our approach to Site 183 revealed a stratigraphic section virtually identical to that of the reference profile, permitting the beacon to be dropped 24 Jul 71 while underway at 1815 hours.

As the site was passed (at a speed of 5 knots), beacon acquisition was immediate. After retrieving overboard geophysical gear, the *Glomar Challenger* was turned about and settled over the site at 1915 hours. A 1000-foot offset from the beacon was established to allow for dynamic positioning system to compensate for the distance between hydrophone streamers and beacon drop point.

On the reference profile (Figure 3) the location of Site 183 was picked at 52°34.2′N; 161°07.6′W. However, the beacon was dropped somewhat westward. The correct location of Site 183 is 52°34.30′N; 161°12.33′W.

A postsite air gun profile along a track of 309°T, a heading approximately normal to the presite profile (Figure 4), was also run; it is included as Figure 5. A track chart for both pre- and post-drilling surveys (*Glomar Challenger*) is included as Figure 2.

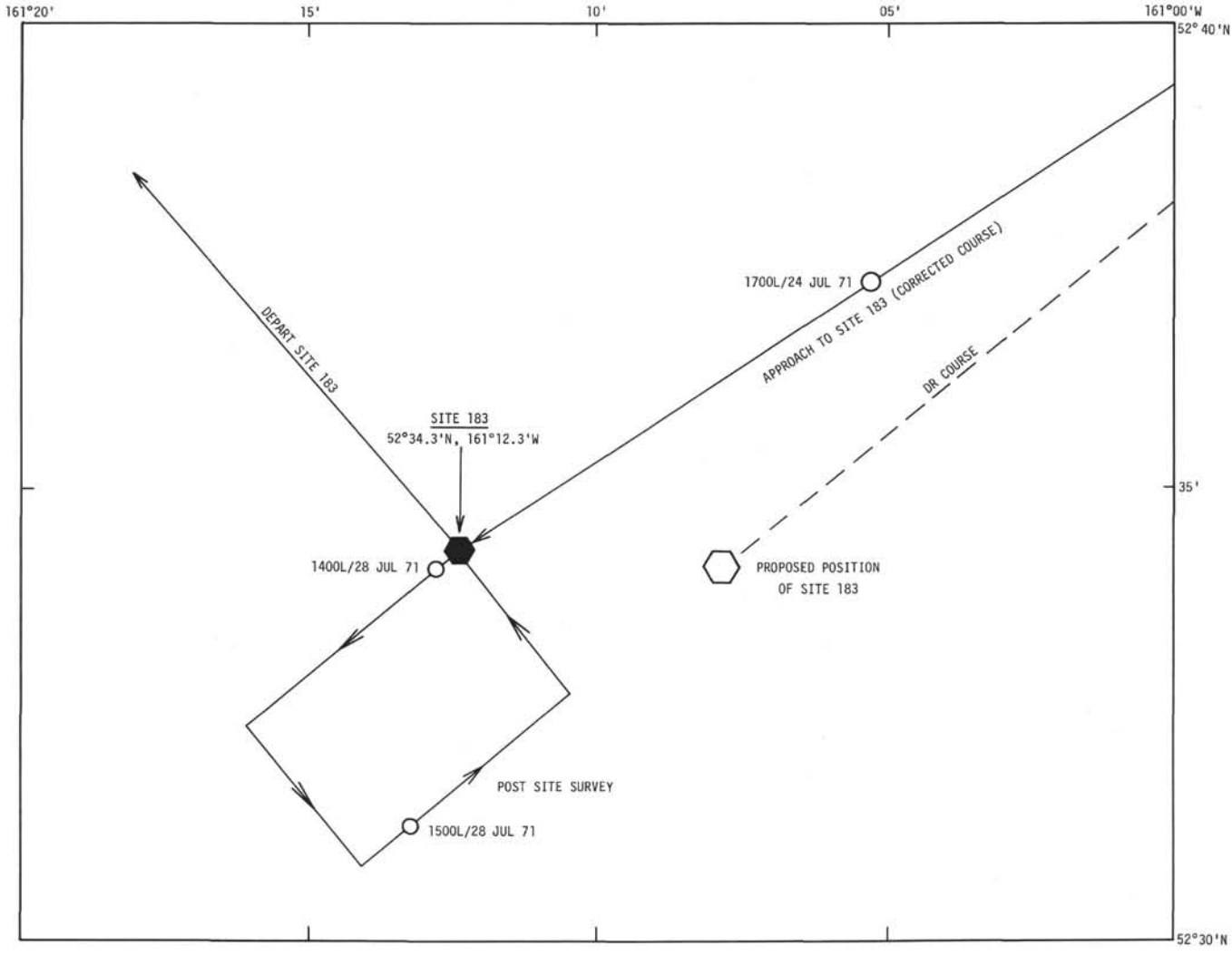

Figure 2. *Track chart showing Site 183 approach and departure.*

Drilling Program

Site 183 was occupied from 1830 hours, 25 Jul 71 (beacon away) until 1330 hours, 28 Jul 71 (ship underway) with almost continuous coring from the sea floor to 304 meters (washed 4805-4817 and 4826-4836 m) and then intermittent coring until basalt was encountered at a depth of 505 meters. Site 183 coring summary is given in Table 1. Drilling 11 meters into supposed basalt produced a few rounded basalt pebbles and a great deal of basalt cuttings that badly sanded the core barrel and the bottom hole assembly. Drilling was suspended at this time as the core barrel was stuck in the drill string. It was impossible to free the core barrel and establish circulation, which together with difficulties in freeing the drill string because of caving, required that the hole be terminated at a total depth below bottom of 516 meters.

The drill pipe reached what was estimated as bottom at about 0330 hours, 26 Jul 71 at a sonar depth of 2500 fms (uncorrected). Using recent sound velocity data provided for this area by the U.S. Navy Undersea Research and Development Center, the true subtransducer depth was calculated to be 4682 meters, or 4688 meters below the sea surface and 4698 meters below the drilling floor. Matthews Tables gave a depth correction within a few meters of that indicated by the more recent Navy data. A water core was pulled first. In the next core, sediment was recovered at 4718 meters below drill floor. This is considered to be true bottom because the surface was oxidized and consisted of Holocene diatom ooze. The source of the discrepancy between calculated and driller's depth (~20 m) is unknown. The driller s depth of 4718 meters below drill floor is accepted as true depth.

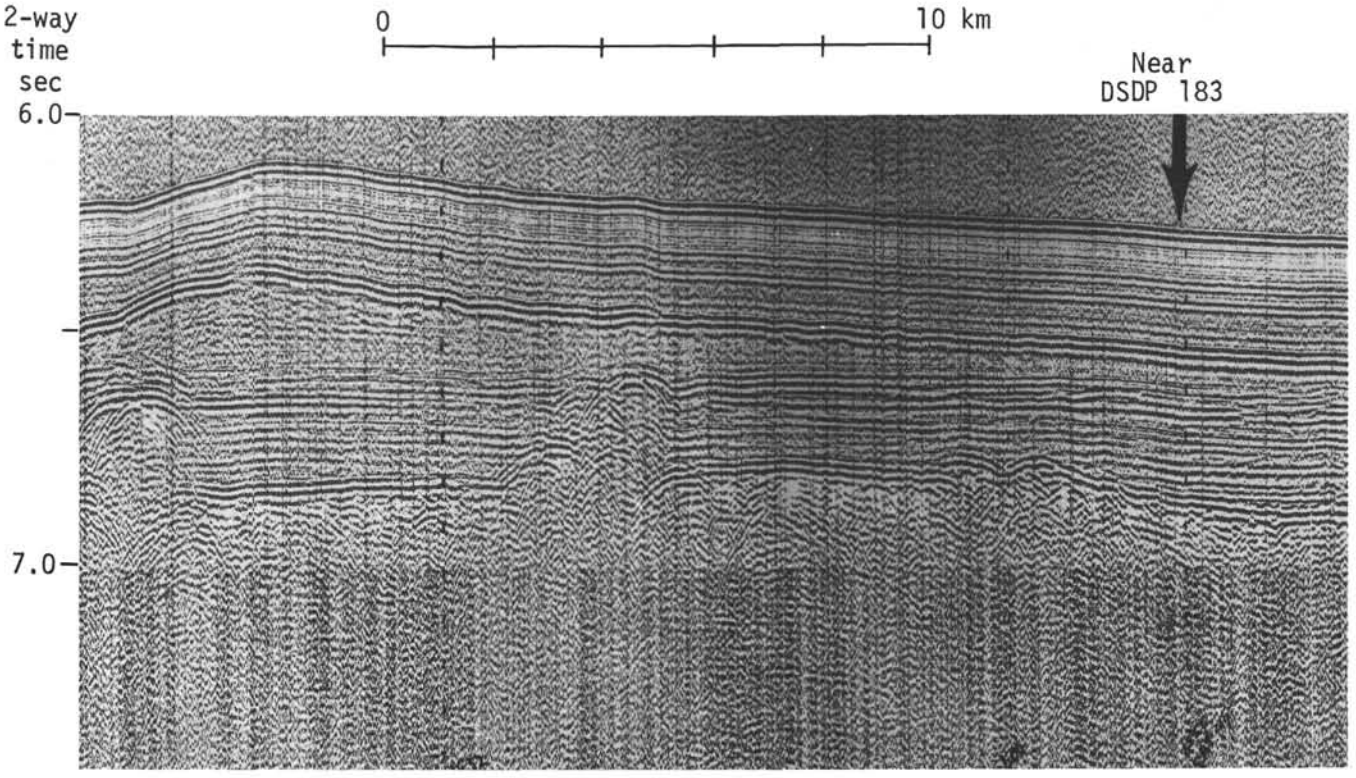

Figure 3. *References, seismic reflection profile, collected by E.L. Hamilton, 30 Jul 70.*

Through Core 24 (239 m), drilling was relatively easy with the time to drill a core gradually increasing to about 12 minutes. One exception was Core 14 which required 14 minutes and produced only 0.3 meters recovery. In Core 16 the core barrel did not lock properly, resulting in no recovery. Through Core 24, pelagic sediments were encountered consisting of diatomaceous clay and volcanic debris, and pebbles. A number of cores above Core 24 contain pebbles or coarse sand at the top of the core which appear to have been mixed with the diatom ooze during drilling. This suggests downhole caving from the erratic-rich layer above. This also suggests that the section recovered is sediment from the upper portion of the drilled section. Core 25 recovered only a core catcher sample consisting of gray mud and chalk fragments. Drilling this core was difficult with pumping of 5 strokes per minute required. Most likely the chalk was much thicker than represented by this short sample (see data for Hole 178, Leg 18). Pumping was not required in either the core above or the one below. From Core 27 downward, the pelagics gradually give way to increased quantities of silt and then sand. This is the turbidite section. The drill string became stuck in the area of Core 34, requiring considerable working of the string and the emplacement of 100 bbl. of gel mud. Alternate coring and washing was started with Core 31 to speed penetration. Recovery dropped markedly below Core 28. Sandstone (i.e., lithified) was encountered in Core 25. Relatively easy washing to the depth of this core from Core 34 suggests that this was the first occurrence of sandstone. Cores 36 through 38 were again easily cored turbidites with interbedded stiff clays and shales. After making only 5 meters of penetration in 1 hour on Core 39, 1.5 meters of stiff mud overlying chalk and basalt was recovered. Core 40 was drilled for 2 hours before the drill string and the core barrel became stuck. After pulling the entire string, the recovered section, with 11 meters of penetration was found to be several rounded basalt pebbles. The barrel was badly sanded with basalt cuttings, which also caused the downhole assembly to seize.

A total of 150 meters of core was recovered from the 361 meters cored giving a recovery rate of 41 percent. Recovery was considerably less in the turbidite sections than in the overlying pelagic sections.

LITHOSTRATIGRAPHY

At Site 183, a 505-meter section of sediments overlies olivine basalt. The sedimentary section can be divided into five units. The upper 210 meters consist of diatom-rich silty clays and pure diatom oozes, with ash layers frequently intercalated above 185 meters. Ice-rafted(?) erratic pebbles occur above 127 meters. Between 210 and 239 meters olive gray clay is present. A nannofossil chalk, recovered in the interval 239 to 248 meters, separates a dominantly pelagic section above from a thick turbidite unit below. The turbidite section, which extends from 248 to 501 meters, contains olive gray clays with interbedded size-graded silt and silty sand layers.

Nannofossil limestone and varicolored clay beds are present between the turbidites and underlying basalt.

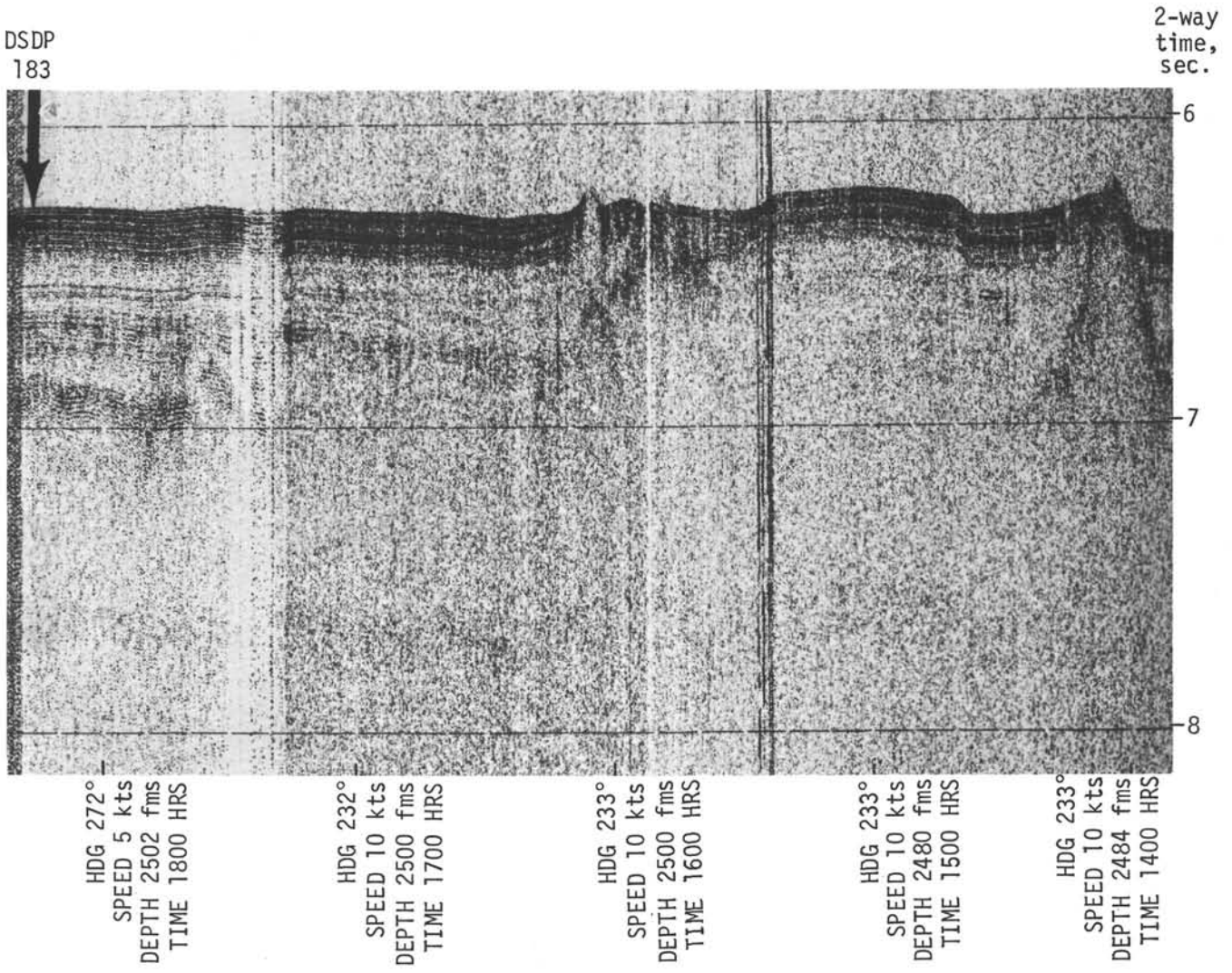

Figure 4. Glomar Challenger *airgun profile, approaching Site 183.*

Unit A – 0 to 210 meters:

The sediments in this interval include silty clay, most of which is diatom rich, and thick layers of diatom ooze. Silt-sized ash beds up to 0.4 meters thick are frequently intercalated above 185 meters, and much of the silt-sized debris in the clay and ooze is glass. Two varieties of ash are dominant: a light gray ash consisting mostly of colorless glass fragments, and dusky yellowish brown ash consisting of light brown glass particles, most of which are filled with opaque inclusions and stained with iron oxides.

Ice-rafted(?) erratics are present above 127 meters, but are particularly abundant between 0 to 11 meters, 50 to 59 meters, 77 to 78 meters, 118 to 119 meters, and 126 to 127 meters.

Between 185 and 210 meters the sediments are also diatom ooze, but discrete volcanic glass beds are not present. Volcanic glass is still present as grains in the ooze. The ooze is yellowish brown to dark brown and is usually mottled and streaked with thin reddish brown zones. Cores at 192 and 201 meters (tops of Cores 20 and 21) contain pebbles in the first 10 to 50 cm, which appeared to have been mixed into the ooze during drilling (caving?) rather than being in situ sedimentary units.

Unit B – 210 to 239 meters:

This unit consists of pale olive gray to olive gray clay which is mottled and banded with greenish gray to dark gray clay. The bands are variable in thickness (0.5 to 40 cm) with as many as fourteen alternating layers in one 1.5-meter section. Much of the recovered clay was soupy as a result of the coring process.

Unit C – 239 to 248 meters:

Coring in the interval 239 to 248 meters recovered a light gray clay-rich nannofossil chalk, here designated Unit C. The only material obtained was a small portion recovered from the core catcher.

Unit D – 248 to 501 meters:

Recovered sediments in this interval are mostly olive gray clay with interbedded silts and fine-grained sands. Graded sand beds up to one meter thick are present.

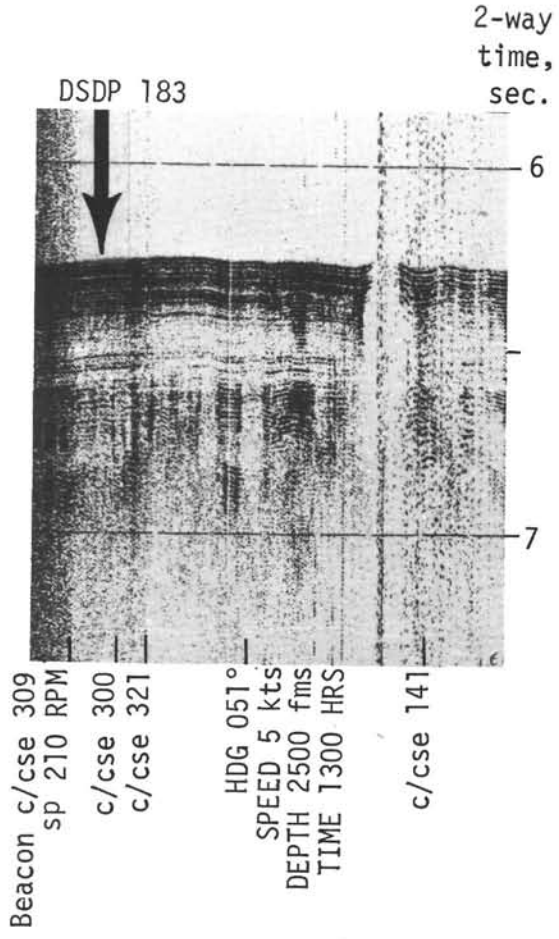

Figure 5. Glomar Challenger *airgun profile, departing Site 183.*

Greenish gray calcite-cemented sand layers occur between 388.6 and 390.5 meters. Thin sections of the sand indicate that it is feldspathic with 10 percent K-feldspar, 20 to 30 percent plagioclase, 30 to 40 percent quartz, and 30 to 40 percent calcite cement. The calcite-cemented sands are interbedded with, and gradational to, greenish gray clay.

Very finely laminated fissile shale was recovered in the core catcher over the interval 341 to 350 meters, and dark gray organic-rich shale with 5 to 10 percent wood fragments was recovered between 444.5 and 445 meters (see Wolfe, this volume).

Unit E – 501 to 504.9(?) meters:

Unit E consists of a bluish white nannofossil limestone, separated from a dark greenish gray nanno limestone by dark yellowish brown calcareous, ferruginous clay. Thicknesses are difficult to estimate, as only 1.5 meters of material was recovered over a 24-meter interval above the basalt. In any case, at least 1 meter (and possibly as much as 23 meters) of pelagic sediment is present above the basalt-sediment interface.

TABLE 1
Coring Summary–Site 183

Core	Cored Interval Below Bottom (m)	Cored (m)	Recovered (m)	Recovered (%)
1	0-3	3	2.5	83.3
2	3-12	9	2.7	30.0
3	12-21	9	1.1	12.2
4	21-30	9	4.9	54.4
5	30-40	10	7.0	70.0
6	40-49	9	7.0	77.8
7	49-59	10	5.5	55.0
8	59-68	9	5.3	58.9
9	68-78	10	6.7	67.0
10	78-87	9	2.6	28.9
Wash				
11	99-108	9	7.3	81.1
Wash				
12	118-127	9	7.3	81.1
13	127-136	9	7.9	87.8
14	136-146	10	0.3	3.0
15	146-155	9	9.2	102.2
16	155-164	9	0.0[a]	0.0
17	164-173	9	9.3	103.3
18	173-183	10	5.2	52.0
19	183-192	9	5.3	58.9
20	192-201	9	3.0	33.3
21	201-210	9	6.0	66.7
22	210-220	10	6.7	67.0
23	220-229	9	9.1	101.1
24	229-239	10	3.1	31.0
25	239-248	9	CC	–
26	248-257	9	3.7	41.1
27	257-267	10	4.6	46.0
28	267-276	9	3.4	37.8
29	276-285	9	0.4	4.4
30	285-295	10	0.4	4.0
31	295-304	9	2.9	32.2
Wash				
32	313-322	9	1.1	12.2
Wash				
33	341-350	9	CC	–
Wash				
34	360-369	9	CC	–
Wash				
35	388-397	9	1.3	14.4
Wash				
36	416-425	9	1.2	13.3
Wash				
37	444-453	9	0.7	7.8
Wash				
38	472-481	9	3.6	40.0
Wash				
39	500-505	5	1.5	30.0
40	505-516	11	CC	–
	Total/Average	361	149.8	41.0

[a]Core barrel did not lock into drill string

Alkali Olivine Basalt

Several pieces of alkali olivine basalt, the largest an 8-cm rounded chunk with a 1-cm glassy chill rind were recovered below 504.9 meters. Detailed petrography is given in an appendix to this chapter. Rock chemistry and mineralogy are discussed by Stewart et al. (this volume). The age relationship of the basalt to the oldest dateable sediments above is ambiguous because of the failure to recover the basalt-sediment contact during coring and an apparent age discrepancy between the sediment fossil date and the inferred age of basement at anomaly 25, 12 million years older than the sediments. Arguments are presented by Stewart et al. (loc cit) and Natland (this volume) that the basalt is indeed extrusive, but apparently related to seamount volcanism, and therefore probably overlies the original oceanic basaltic crust.

PHYSICAL PROPERTIES

At Site 183, measurements of natural gamma radiation, GRAPE density, acoustic velocity, vane shear strength, and syringe water content were made. The density and acoustic velocity data are on the site summary sheets. Physical properties of the sedimentary section are shown in relation to the acoustic reflection profile in Figure 6. A complete presentation of the GRAPE density data is given with the core summary sheets.

Density

The sediment density could be measured to a sediment depth slightly in excess of 300 meters with the GRAPE device. Below this point, the sediment was badly fractured and did not fill the core liner. GRAPE testing of material in this condition would not product accurate results. The GRAPE densities are supplemented by shore laboratory densities as discussed in the introduction.

As may be seen from the site summary, there are three distinct density zones at Site 183. The first extends from 0 to 120 meters and is characterized by densities with means of 1.6 to 1.7 gm/cm^3 and considerable variation over each core. By referring to the core summary sheets, it may be seen that the variation occurs primarily in the vicinity of volcanic ash layers. The ash yields a high GRAPE density while the background silts and clays yield somewhat lower values. This may represent either a real variation in density or a variation in the gamma ray absorption coefficient of the mineral grains. In either case, the GRAPE record does provide a means for identifying ash layers in sediment of this type.

The second density zone extends from about 120 to 210 meters and is characterized by very low densities. The upper and lower portions of the zone indicate a blending into zones one and three. Near the center of the second zone (150-200 meters), the density is nearly uniform and equal to about 1.4 gm/cm^3. This is a region of almost pure diatom ooze. The third density zone extends from 210 meters downward and is characterized by high, relatively constant densities (in the vicinity of 1.9 gm/cm^3). The sediment is a compact, plastic clay.

Acoustic Velocity

For the first 250 meters, the measured acoustic velocities do not deviate from the range 1.5 to 1.6 km/sec, or only slightly greater than the speed of sound in seawater. The in situ velocity is probably somewhat higher than this, since the rigidity of the sediment is disturbed during sampling.

From 250 to 500 meters, there is a consistent, almost linear, increase in the acoustic velocity with depth, reaching a value of 1.85 km/sec at 472 meters. In Core 39, the velocity increases very rapidly toward the bottom of the core, reaching a value of 6.25 km/sec in the basalt. Another significant deviation from the norm occurs in the vicinity of 380 meters where a layer of sandstone occurs.

PALEONTOLOGY

Site 183, which is below carbonate compensation level at present, contains a 210 meter pelagic sequence of siliceous microfossils from Pleistocene to middle Miocene age. From 210 to 300 meters below bottom, the sequence is unfossiliferous pelagic clay except for one thin middle to lower Oligocene chalk bed at about 240 meters (Core Catcher 25). The clay sequence grades down into turbidite sediments containing a very sparse upper, middle, and upper lower Eocene nannoflora with rare displaced foraminifera but no other fossils except for an upper lower Eocene nannofossil-rich limestone interval just above the basalt. The distribution of age with depth is shown graphically in the site summary and provides a key to sedimentation rates.

The Miocene-Recent siliceous fossil assemblage resembles that of California and Japan. The Oligocene-Eocene nannoflora appears to be a high latitude assemblage (50° or higher?). Even the carbonate beds have remarkably low species diversity and only three discoaster species are present throughout the entire section.

Both the Oligocene and Eocene carbonate beds are bounded by pelagic clay, not turbidites, and may be considered autochthonous, indicating two downward incursions of carbonate compensation depth during this interval. The chalk, apparently somewhat older than the one encountered at Site 178 of Leg 18, was probably deposited at approximately 5 km below sea level.

Onshore studies of spore and pollen and dinoflagellates are reported in Part III of this volume; see Wolfe and Evitt, respectively.

Foraminifera

A total of twenty-seven samples, most from the turbidite part of the section, were examined. Only two samples contained foraminifera; none of the foraminifera were planktonic. These forms are presumed displaced, since they occur in turbidites.

The following assemblage was obtained from Core 32, Section 1 (71-73 cm): *Cibicides lobatulus, Cassidulina armosa, Melonis pompilioides, Globobulinina* cf. *G. pacifica, Gyroidina soldanii, Stilostomella lepidula, S. longiscata,* and several other rare species not identified

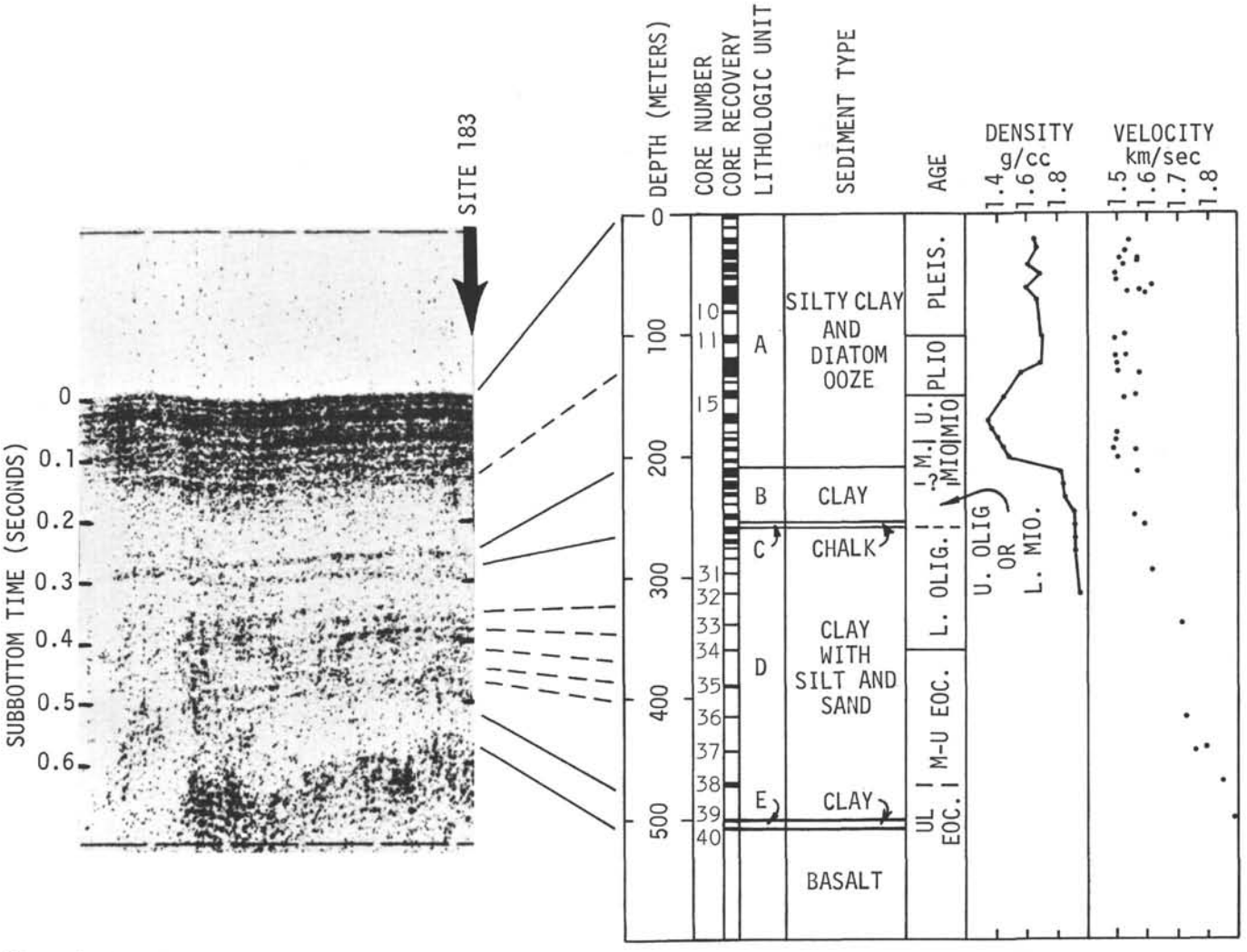

Figure 6. *Correlation of seismic reflection profile with physical properties and lithologic column, Site 183.*

because of poor preservation. The core catcher of Core 37 contained one specimen each of *C. armosa,* and *Quinqueloculina* sp. All identified species are long ranging or of uncertain biostratigraphic significance.

At least a part of the assemblage in Core 32 was picked up from the bathyal zone or deeper by the turbidity current. *Melonis pompilioides* suggests depths in excess of 2000 meters, but similar forms having finer pores than those of deep-sea populations occur at upper bathyal depths (Frerichs, 1969). The pores in specimens from Core 32 could not be observed because they are obscured by an iron-stained coating.

Calcareous Nannoflora

Nannofossils occur in the chalk beds and in the turbidites, but are exceedingly scarce in the latter (zero to a few parts per thousand sediment volume). Virtually no discoasters, helicopontosphaerids, or sphenoliths occur at Site 183, rendering most zonation schemes unusable. There is a possibility that biostratigraphic resolution may increase for this site as high latitude assemblages receive more study.

The middle to lower Oligocene age assigned to Core Catcher 25 is based mainly on the general aspect of the assemblage, comparison with chalk cored at Site 178, and the inferred sedimentation rate below the middle Miocene siliceous ooze.

Only Core 38 (upper lower Eocene), which contains several diagnostic species in its sparse assemblage, can be considered well dated at this time.

Radiolaria and Silicoflagellates

Radiolarians are generally well preserved from Core 1 through 21 but are only few to common in abundance. Among radiolarian zones proposed by Hays (1971) from the North Pacific, only the top of *Stylatractus universus* (=*Axoprunum angelinum* in this report) was recognized from the thick Pleistocene interval of Cores 1 through 10. The faunal composition in this section is similar to the eastern and central subarctic assemblage recognized from the study of surface sediments. Cores 11 through 15 yield only a few radiolarians. In Core 17 to 21, Miocene forms, such as *Stichocorys delmontensis, Lychnocanium* sp. *Cyrtocapsella tetrapera* are found. A few new forms assignable to genera *Amphymenium, Eucyrtidium,* and "*Acanthodesmid*" sp. were also recovered from Core 21. Sediments from Cores 22 through 40 are barren of siliceous microfossils.

A good microfloral sequence of silicoflagellates, ranging in age back to middle Miocene, was recovered from Site 183. As expected from previous studies in the central North Pacific (Ling, 1970), *Distephanus speculum* and *D. octangulatus* were found in the upper part of the Pleistocene section. Appearance of *Dictyocha subarctios* was noticed in Core 10. According to a recent observation by Kinoshita and Merril (personal communication), the Bruhnes Normal-Matuyana Reversed paleomagnetic boundary is slightly below the last occurrence of this species. A few *Ebriopsis antiqua* (spineless form) are found in Core 12. This form has its highest occurrence in the upper Miocene section of the Experimental Mohole samples at the Gaudalupe site.

The Miocene silicoflagellate succession, recognized by the first appearances of taxa, in descending order, is as follows:

Core 17: *Distephanus speculum* var. *pentagonus, D. crux.*

Core 18: *Mesocena circulus* var. *apiculata.*

The sequence of silicoflagellates recognized at Site 183 is in good agreement with that observed by Ling (1971; 1972) from California and Japan.

Diatoms

Abundant and well-preserved diatom microflora were recovered in cores from the surface to 201 meters below the sea floor and the entire eight diatom zones (see Koizumi, this volume) were recognized at this site.

CORRELATION BETWEEN REFLECTION PROFILES AND STRATIGRAPHIC COLUMN

The reflection profile obtained by the *Glomar Challenger* coming onto Site 183 is shown in Figure 6 along with the stratigraphic column and physical properties. The profiling system included 2 Bolt airguns (5 and 30 in.^{3}), a 25-element hydrophone streamer, and a constant gain recorder (80-320 Hz bandpass). The upper units of Pleistocene heterogeneous silty clay (A), which contain many ash layers and rafted debris, appear as the dark upper layer on the profile. Diatom ooze, with less ash and rafted debris, produces the light band between .14 and .25 seconds. The tops of Units B and C are probably the two reflectors at .25 and .28 seconds, respectively. The deeper reflectors between .35 and .50 seconds appear to correlate with the heterogeneous silts and clays in the lower turbidite sequence (D), which includes some thin calcareous sandstones. The light band just above basement may be Unit E and suggests that this unit may be thicker than the stratigraphic summary implies (there was no recovery between 481-501 m).

While the general correlation of the physical properties with the stratigraphic column and reflection profile is remarkably good at this site, a comment should be made concerning the velocities. The round-trip travel time for the sediment column is .58 second and the thickness is 505 meters, for an average velocity of 1.74 km/sec. Although the shipboard-determined sediment velocities in Unit D average about 1.75, the thick upper Unit A is closer to 1.55 km/sec. The fact that the average of the sediment velocities is 5 to 10 percent low is probably due to sample disturbance and the difference between laboratory and in situ confining pressure.

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APPENDIX
PETROGRAPHY OF BASALT, SITE 183

James H. Natland, Department of the Scripps Institution of Oceanography, University of California, San Diego, La Jolla, California
Richard J. Stewart, Department of Geological Sciences, University of Washington, Seattle, Washington

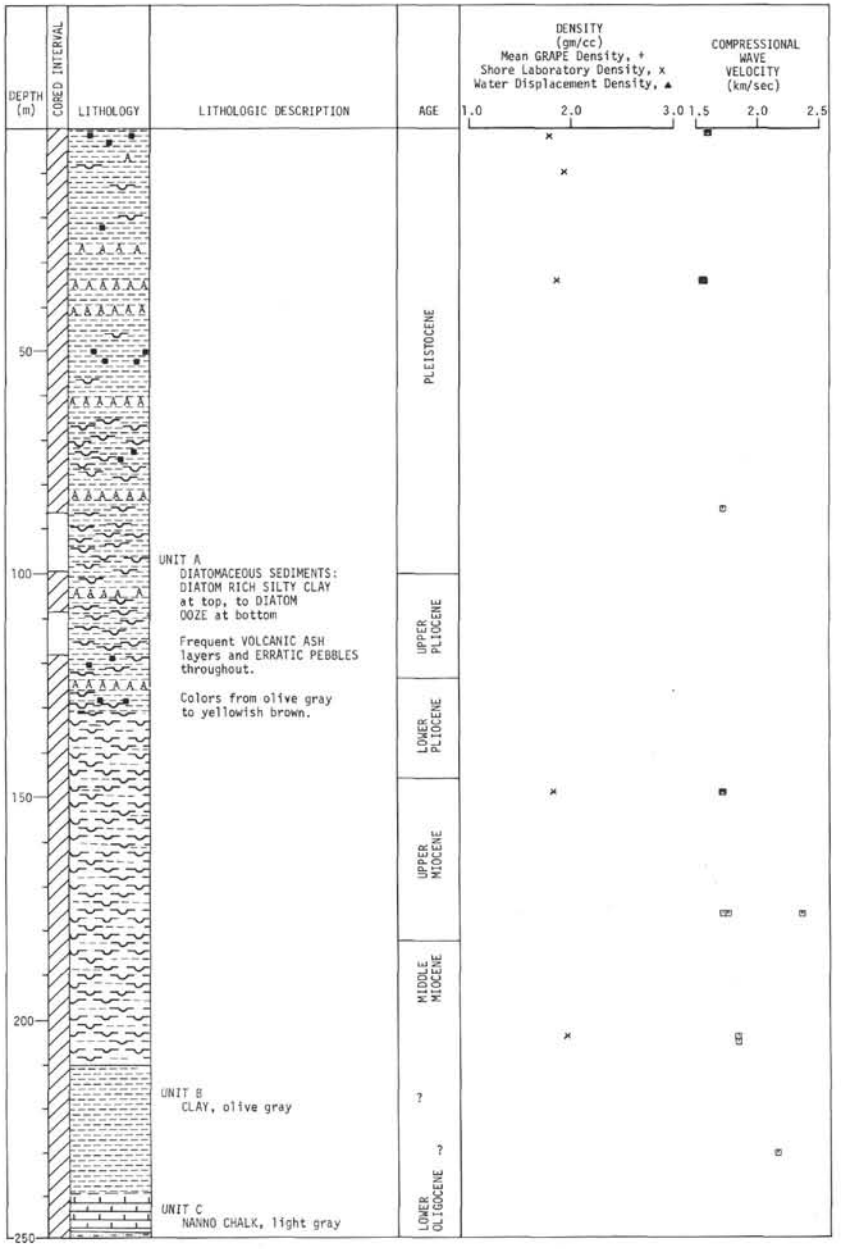
Several pieces of alkali olivine basalt, the largest a rounded chunk about 8 cm in diameter with a 1 cm cracked, glassy rind on one edge, were recovered below 504.9 meters. The basalt is comparatively fresh, having about 3 percent olivine microphenocrysts (~Fo_{80}) with only thin rims of orange iddingsite. A few have serpentine cores. Most alteration minerals that can be seen—calcite, zeolites, greenish clay minerals, and iron hydroxides—are concentrated in narrow (0.1-0.5 mm) cracks and in thin crusts on the glassy rind. Rare vesicles (0.2 mm) in the glassy rind are filled with calcite.

In thin section, the sideromelane rind is clear and brown except for bands, especially along cracks, where opaques are concentrated (see Stewart et al., this volume, Figure 4). The glass gives way sharply to tiny opaque iron oxides, giving the rock its black color and almost obscuring other

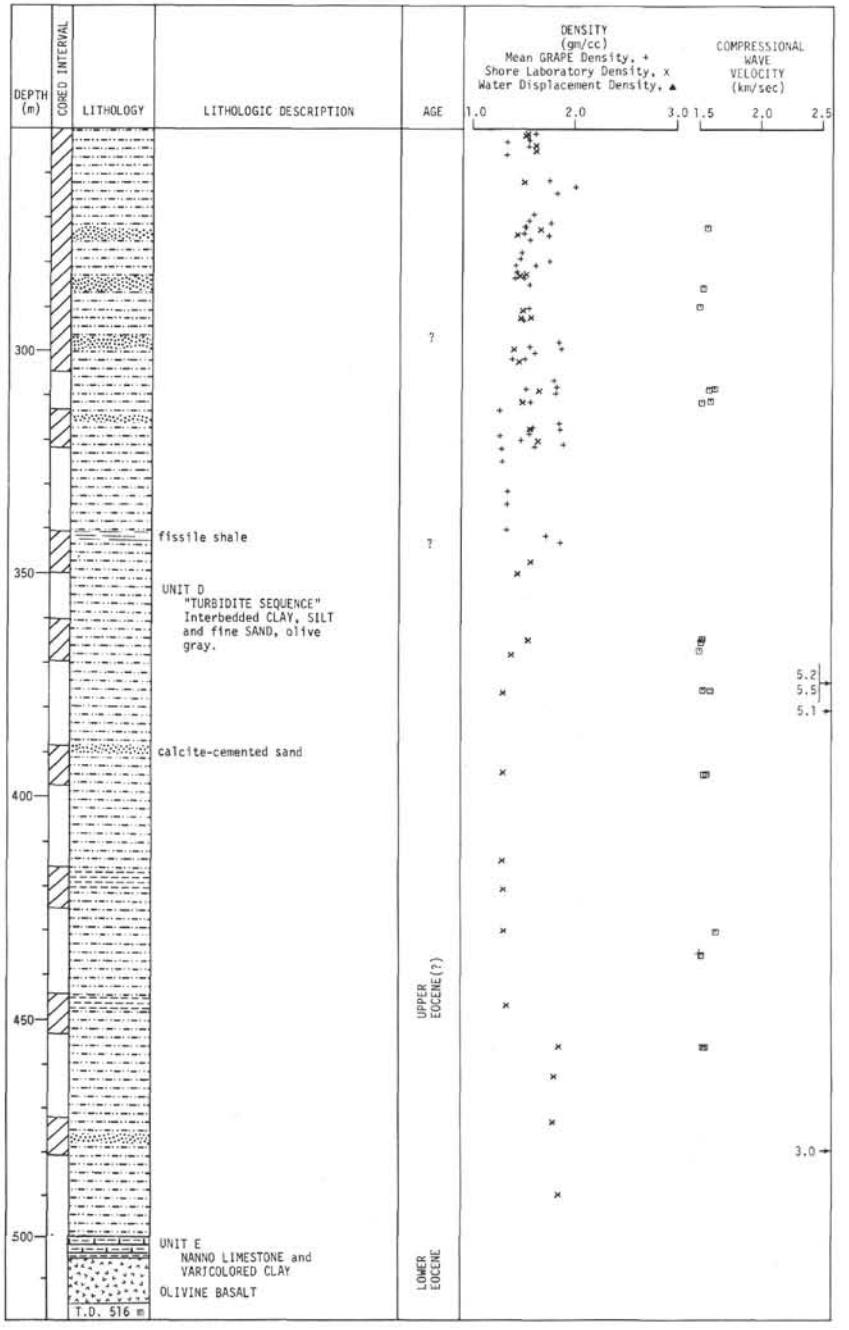
groundmass minerals. The groundmass is typified by 0.1 mm or smaller variolitic clinopyroxenes of low first order colors forming perhaps 50 percent of the rock, although considerable glass may be concealed by the feathery minerals. About 20 percent of the groundmass is narrow (0.1 mm) olivine needles up to 0.5 mm long, often completely replaced by orange iddingsite. In contrast to the phenocrysts, which are often embayed and rounded by resorption, these quench crystals are usually elongate along the crystallographic c-axis and double swallow-tailed, giving many of them an appearance like a flattened letter "X." Along with the variolitic pyroxenes, this suggests rapid crystallization, with crystal growth during quick cooling most efficient along the main crystallographic axis (Bryan, 1972). The iron oxides which give the rock its dark color are resolvable at high power to clumps or lattice-like arrays of needles concentrated along grain boundaries. They are less abundant in the 1 to 2 mm dark gray faded zones which occur adjacent to all cracks filled with alteration minerals. Plagioclase is not seen in any of the thin sections as either a phenocryst or groundmass mineral, but may be finely intergrown in the plumose pyroxenes.

Rock chemistry given in the chapter on basalts (Stewart et al., this volume) verifies that the rock is an alkali olivine basalt, as indicated by the presence of groundmass olivine, diagnostic of alkali basalts (Macdonald and Katsura, 1964).

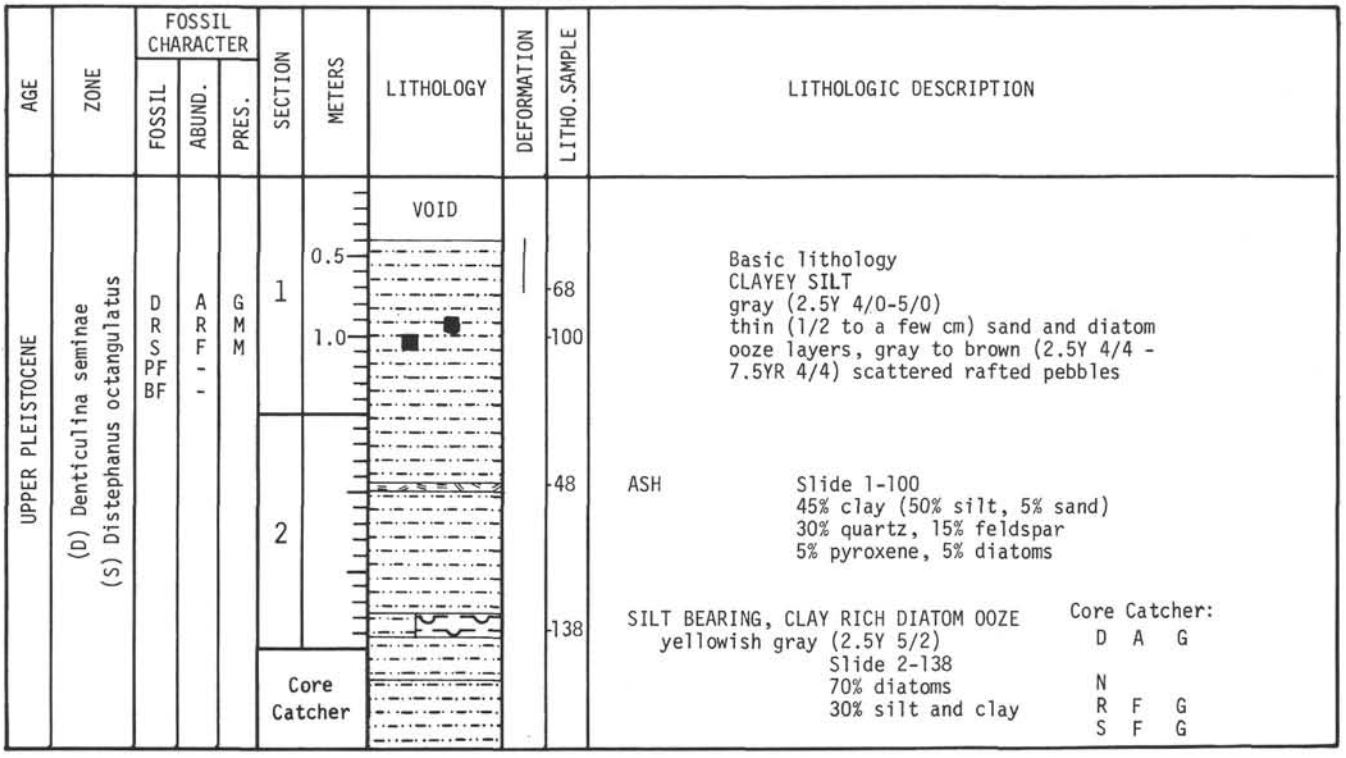
SITE 183



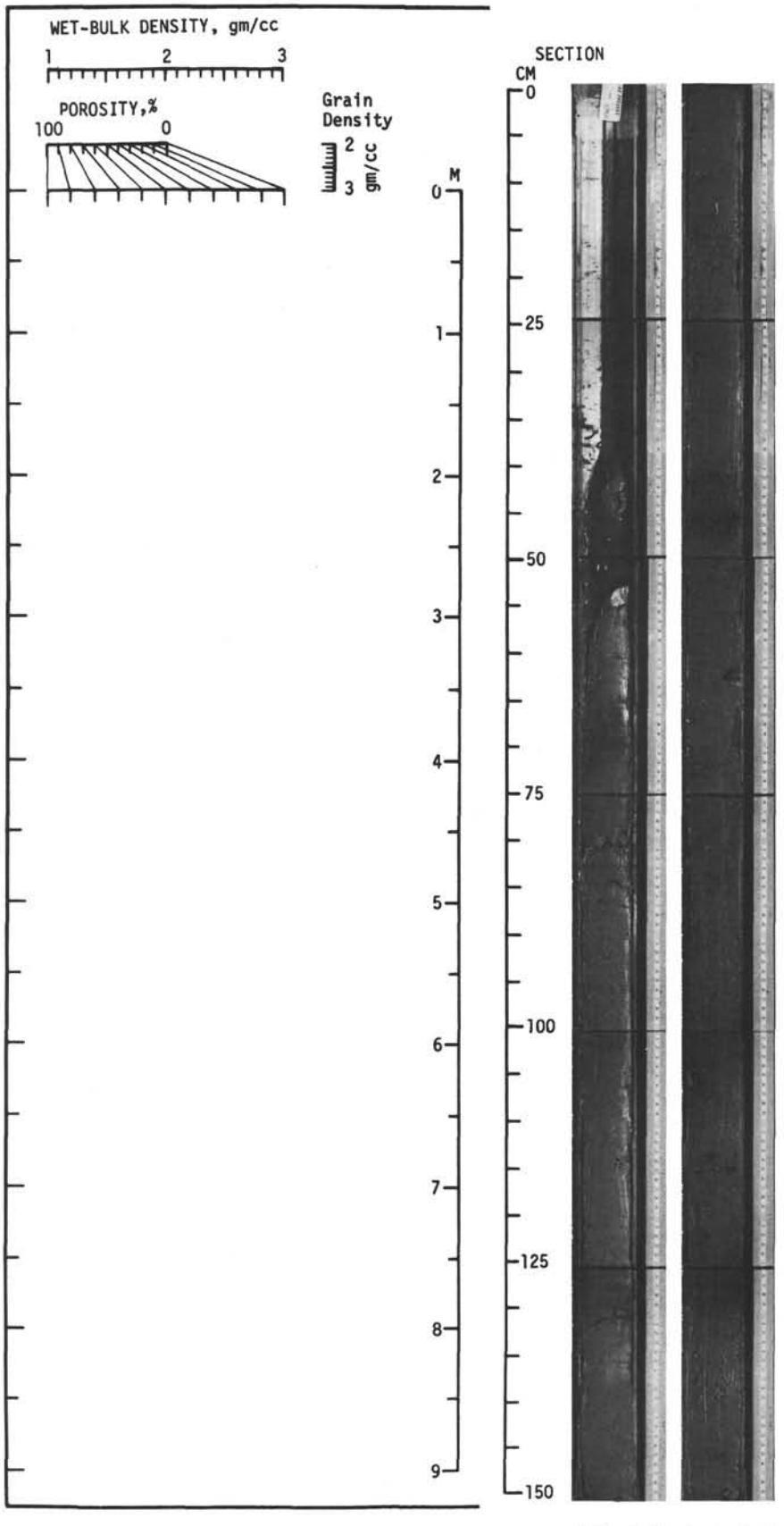
SITE 183



Site 183 Hole Core 1 Cored Interval: 0-3



Explanatory notes in Chapter 1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Grain
Density
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gm/cc
M
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2
3
4
5
6
7
8
9
SECTION
CM
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25
50
75
100
125
150
183-1-1
183-1-2

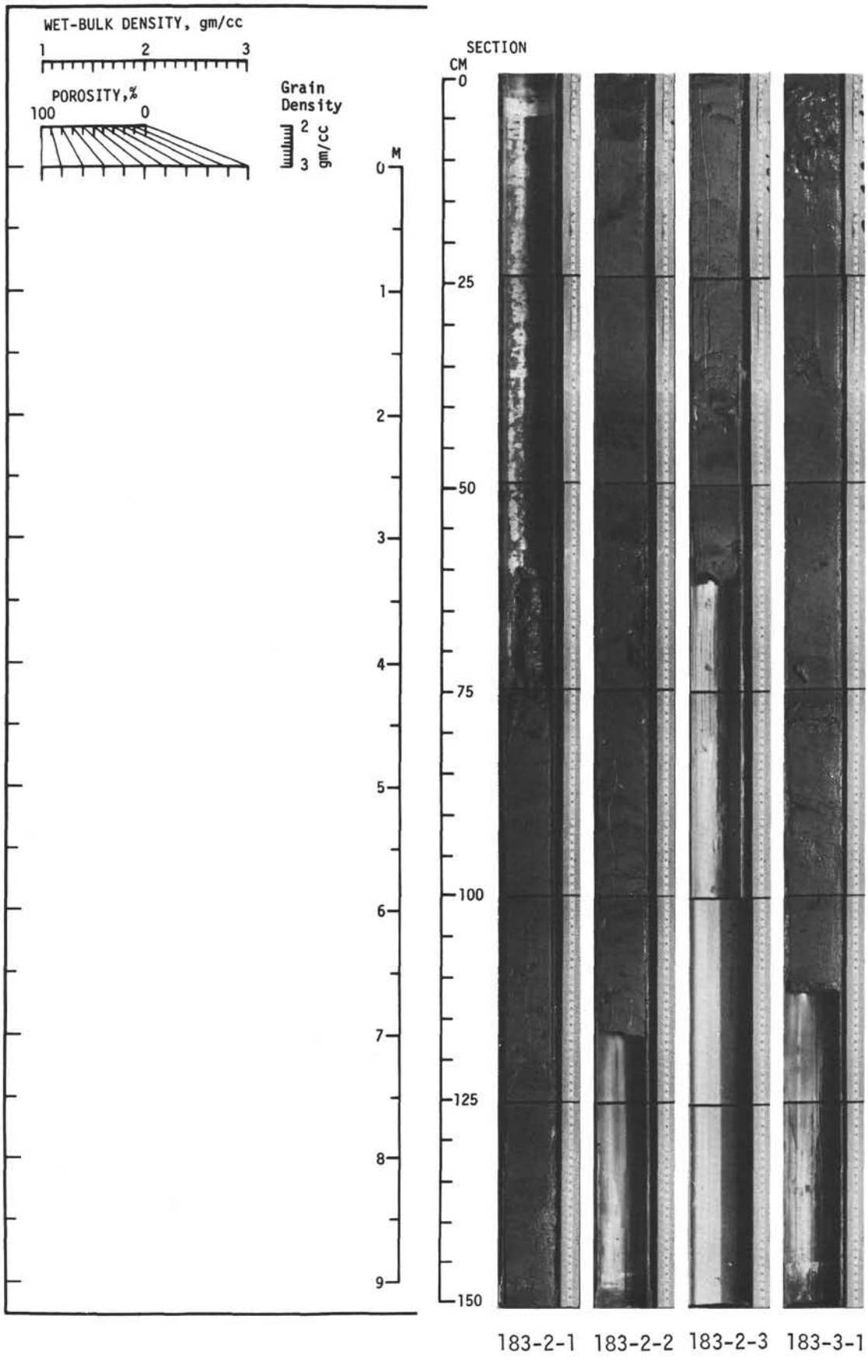
Site 183 Hole Core 2 Cored Interval: 3-12

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
UPPER PLEISTOCENE	(D) Denticulina seminae (S) Distephanus octangulatus	PF BF	- -		1	0.5 1.0	VOID			DIATOM OOZE light olive gray (5Y 5/2) ASH Basic lithology CLAYEY SILT and SILTY CLAY Olive gray (5Y 3/2) scattered rafted pebbles thin diatom ooze layers, dusky yellowish brown (10YR 2/2) and light olive gray (5Y 5/2) DIATOM RICH SILTY CLAY olive gray (5Y 3/2) Slide 3-52 60% clay 20% diatoms 20% quartz and feldspar Core Catcher: D A G F N R F G S F G
					2		VOID			
					3		VOID		20 52	
					Core Catcher					

Site 183 Hole Core 3 Cored Interval: 12-21

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
MID. PLEISTOCENE	(D) Rhizosolenia curvirostris	D N R S	A F R	G G G	1	0.5 1.0	VOID		91	Basic lithology DIATOM RICH SILTY CLAY olive gray (5Y 3/2) CLAY RICH DIATOM OOZE dusky green (5G 3/2) Slide 1-91 45% clay 10% quartz 5% feldspar 5% chlorite 35% diatoms
					Core Catcher					

Explanatory notes in Chapter 1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Grain Density
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gm/cc
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2
3
4
5
6
7
8
9
SECTION
CM
0
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100
125
150
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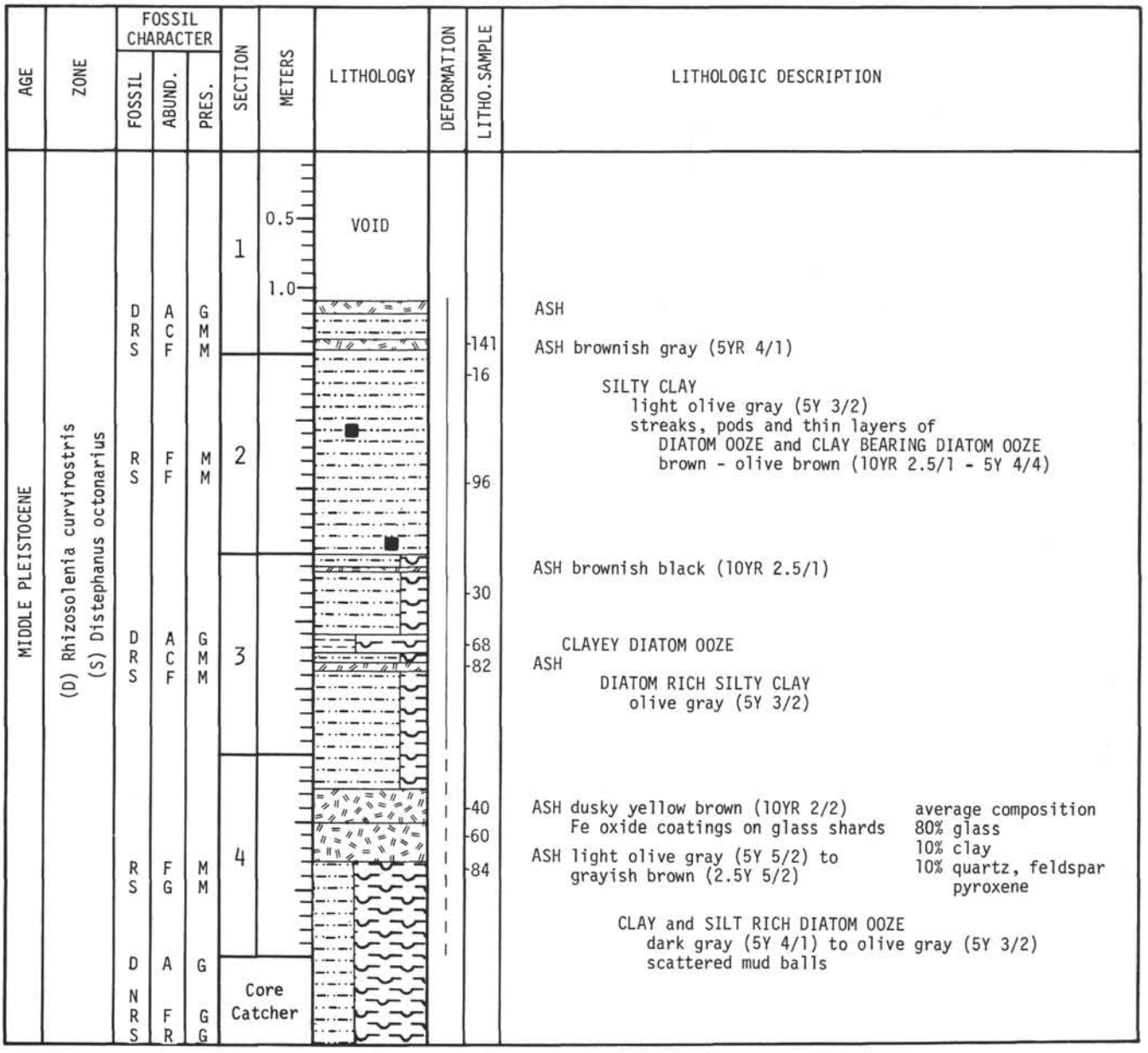
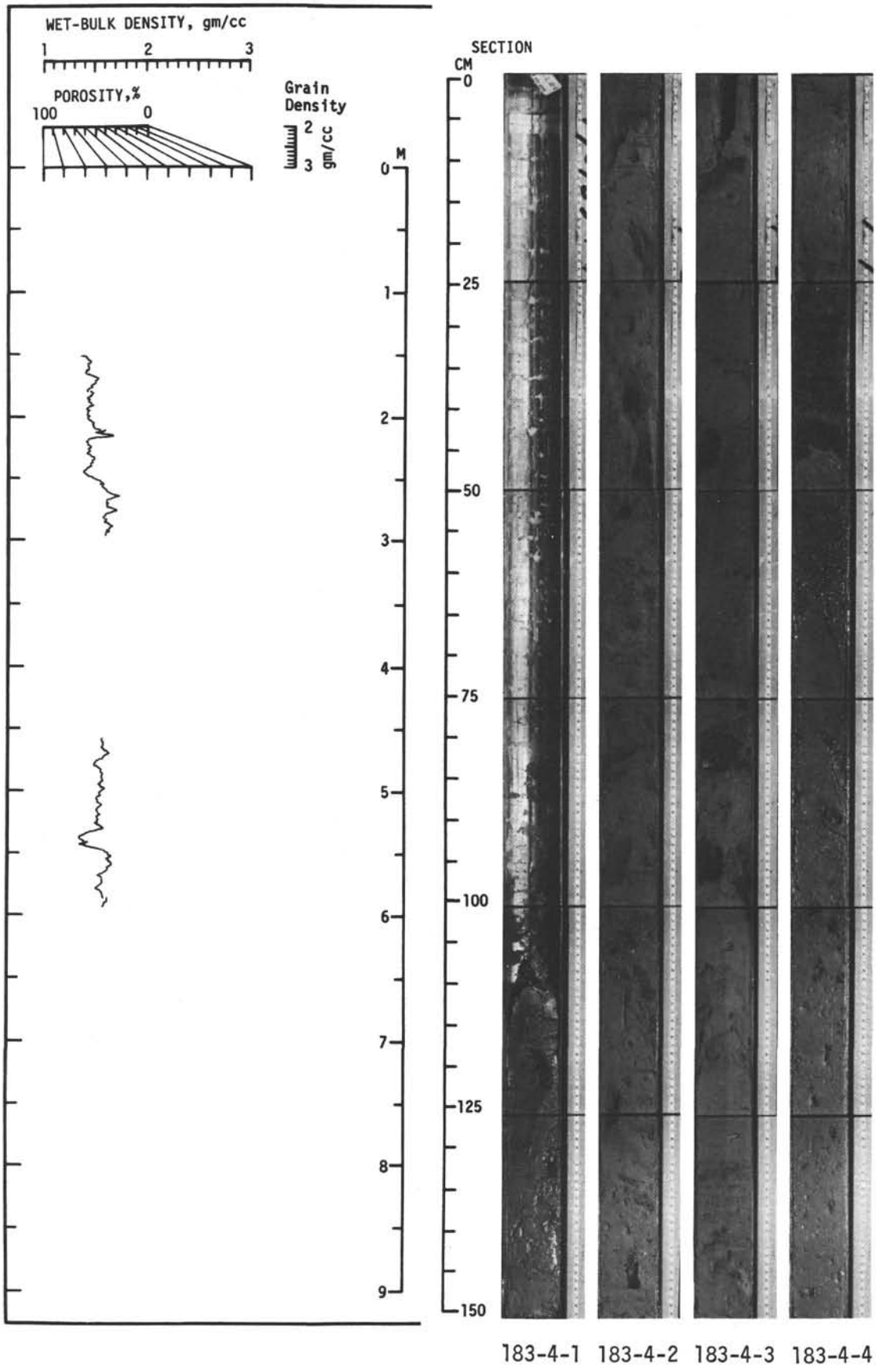
183-2-2
183-2-3
183-3-1

Site 183 Hole Core 4 Cored Interval: 21-30



Explanatory notes in Chapter 1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SECTION
CM
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125
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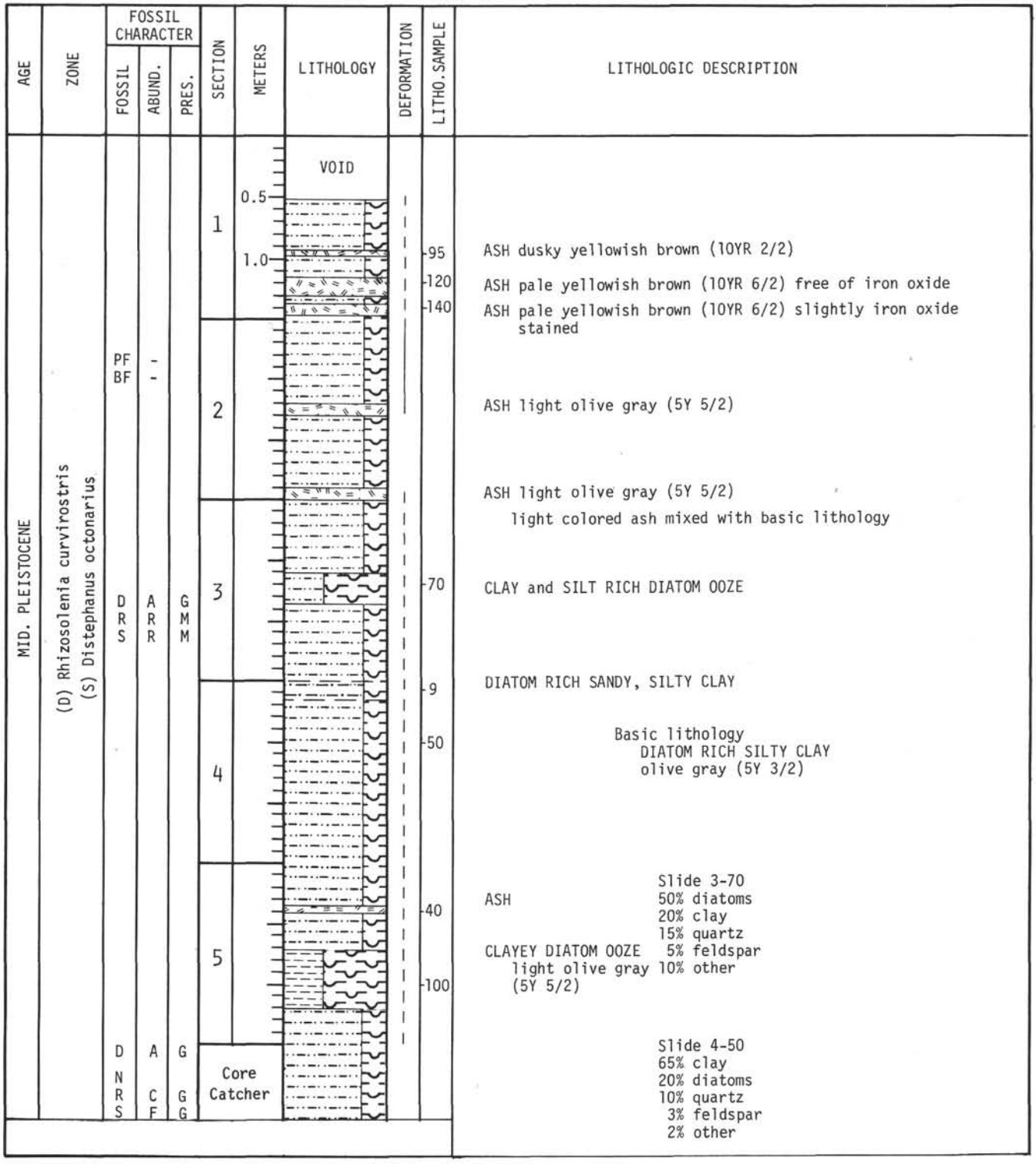
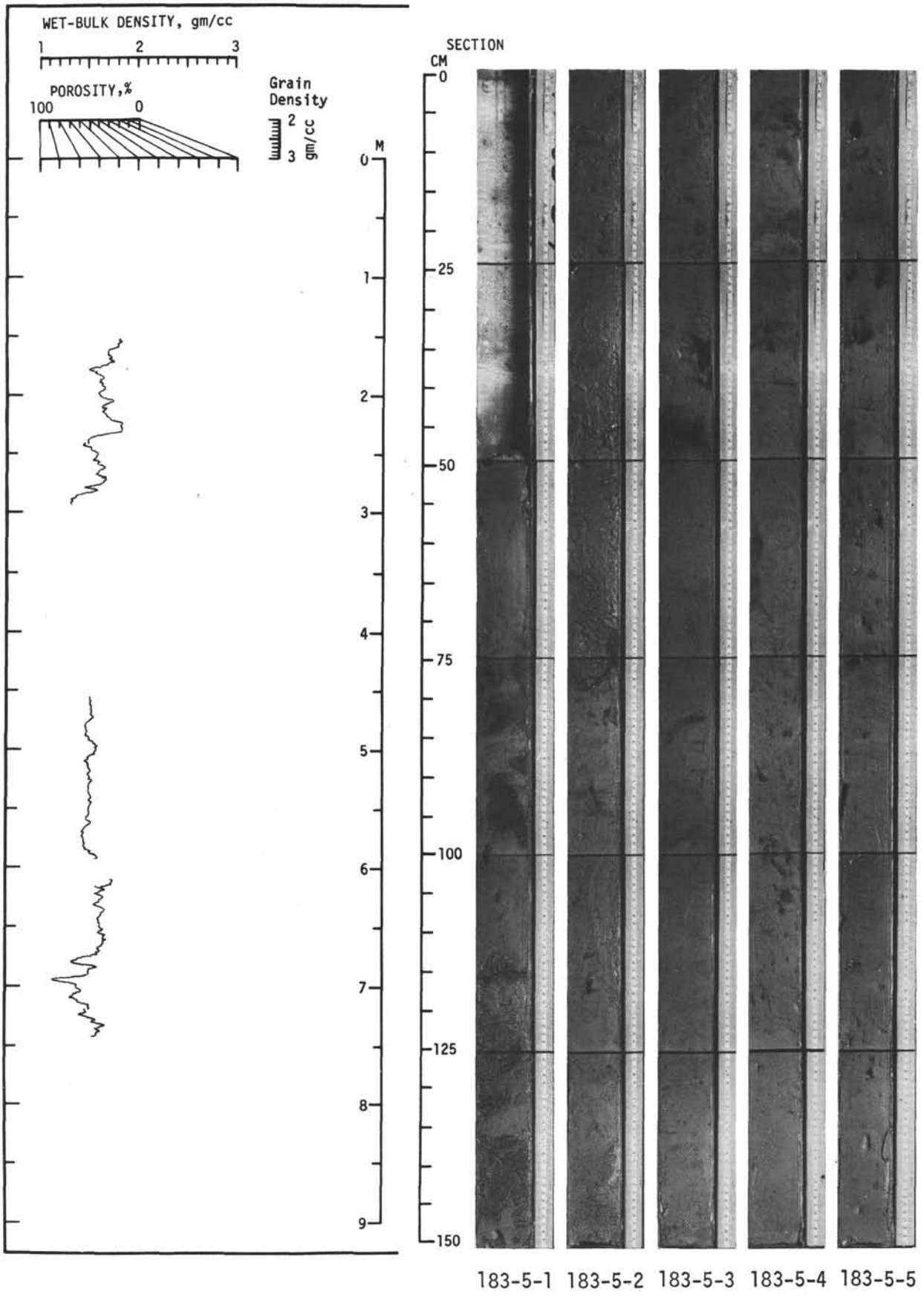
183-4-3
183-4-4

Site 183 Hole Core 5 Cored Interval: 30-40



Explanatory notes in Chapter 1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gm/cc
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SECTION
CM
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25
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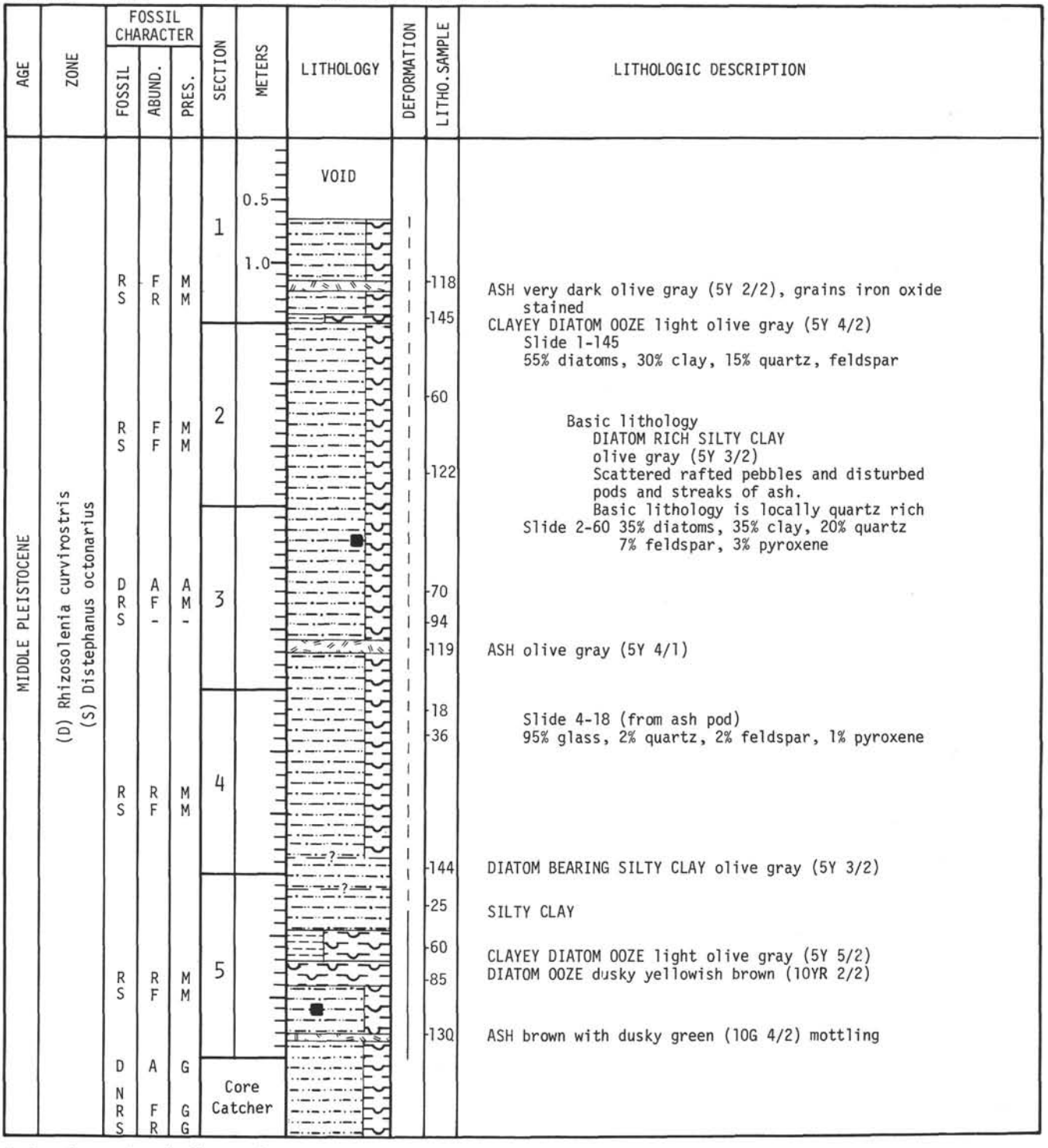
183-5-5

Site 183 Hole Core 6 Cored Interval: 40-49



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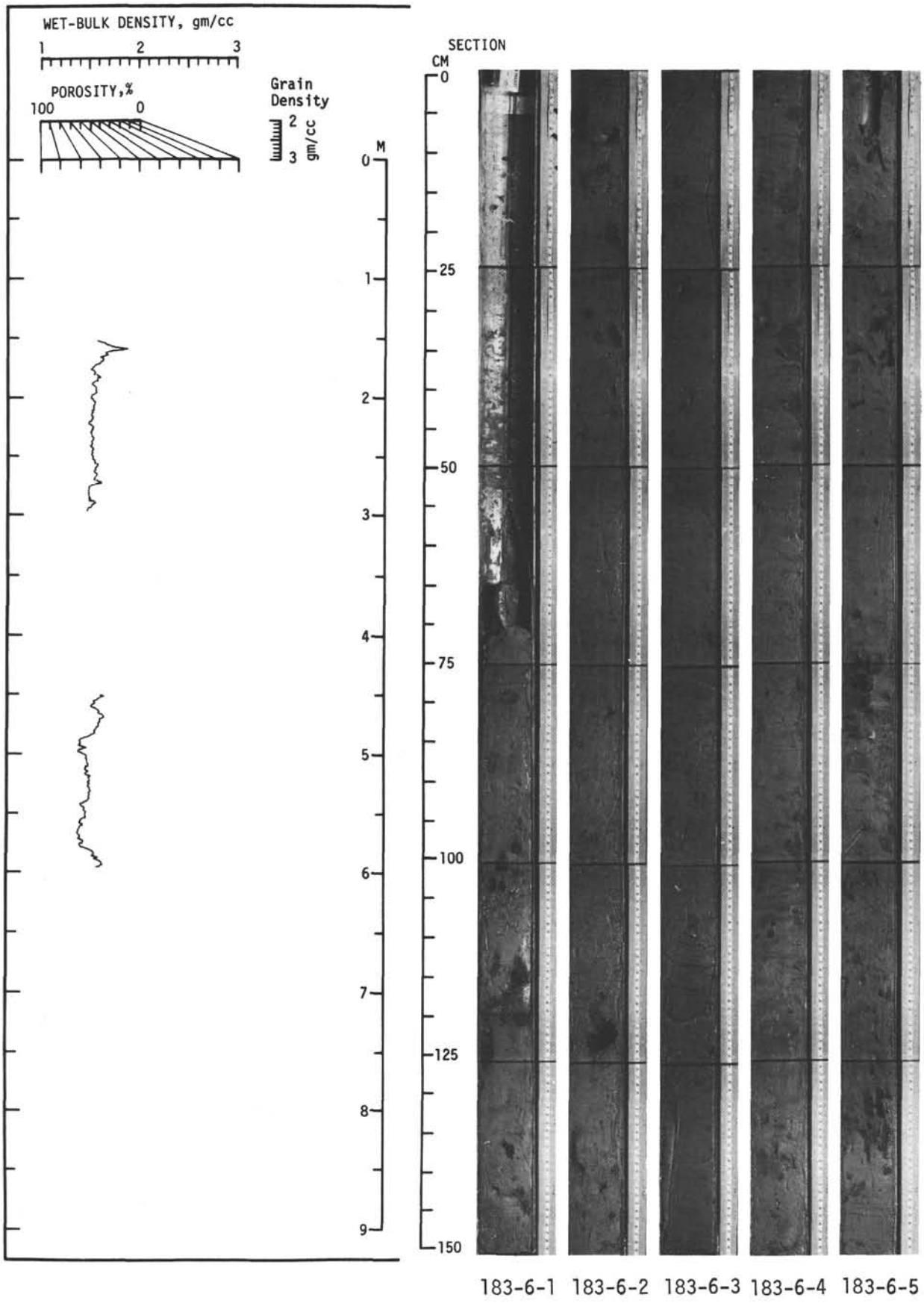
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SECTION
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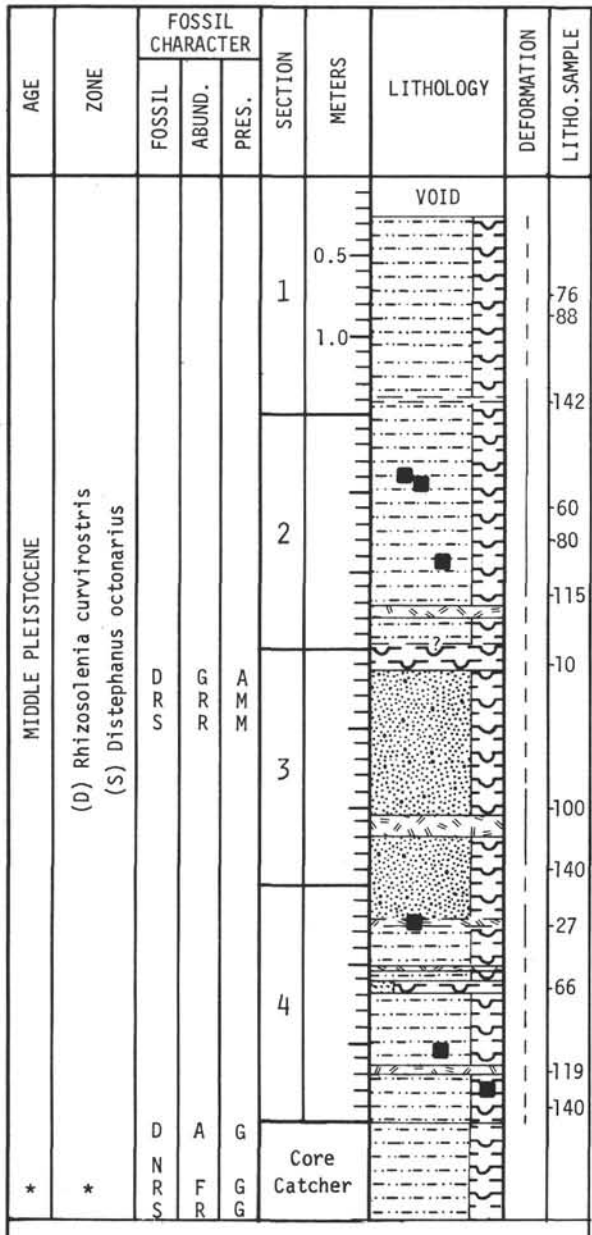
183-6-5

Site 183 Hole Core 7 Cored Interval: 49-59



DIATOM RICH CLAYEY SILT
medium dark gray (N4) to olive gray (5Y 3/2)

ASH dark olive gray (5Y 3/2)

Basic lithology
DIATOM RICH SILTY CLAY
olive gray (5Y 3/2)
Scattered rafted pebbles and streaks and pods of DIATOM OOZE, light olive gray-brown (5Y 5/2 - 5/6)

ASH grayish brown, iron oxide stained
GLASS BEARING DIATOM OOZE

Basic lithology locally contains sand sized glass and mineral grains

DIATOM RICH SANDY SILT
olive gray (5Y 3/2)

ASH dusky yellowish brown (10YR 2/2)

ASH brown (10YR 2/2)
SAND and SILT BEARING DIATOM OOZE

ASH dusky brown (5YR 2/2)

Slides

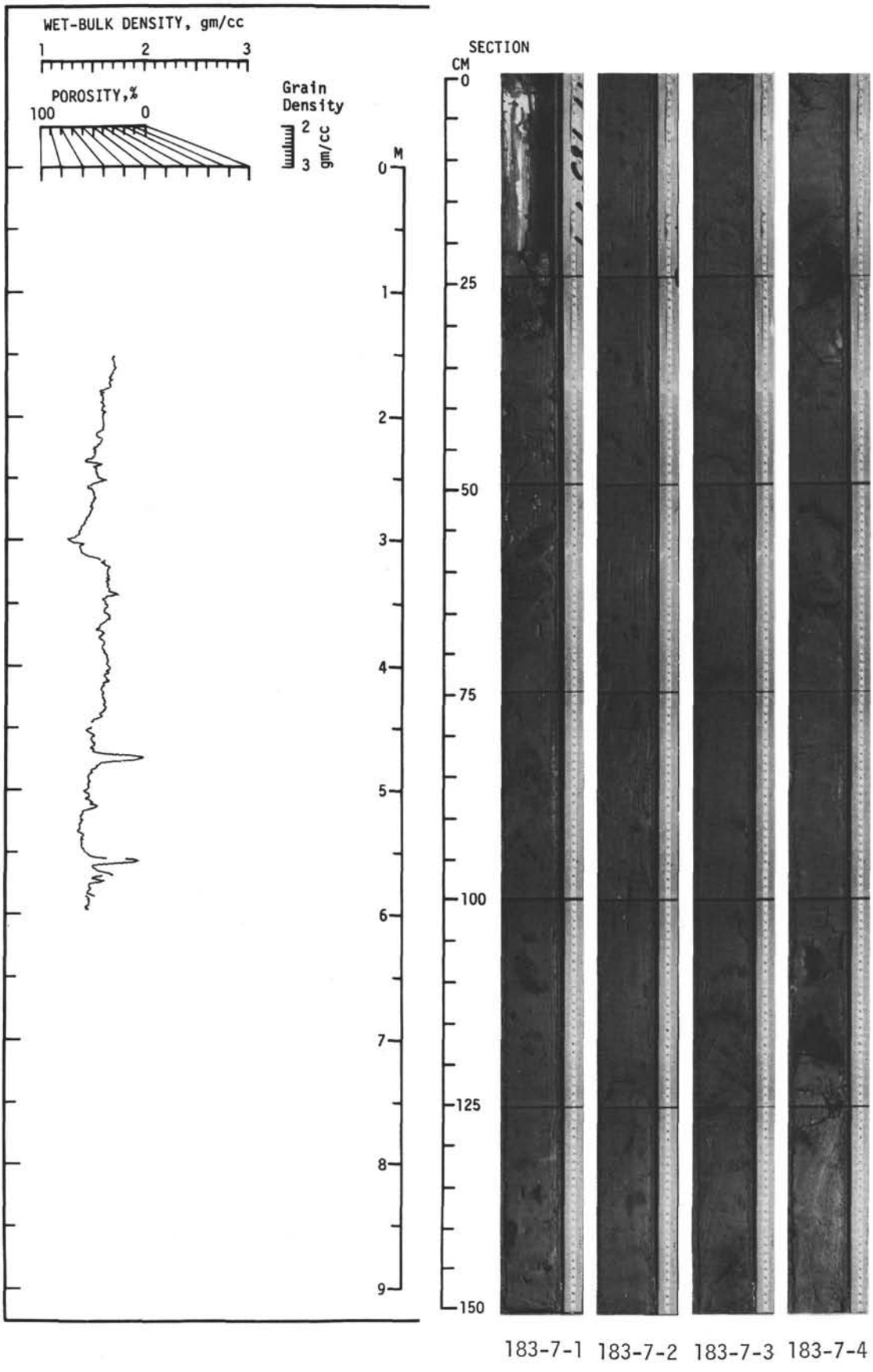
1-76	1-88
40% diatoms	45% diatoms
30% clay	25% glass, iron oxide coated
10% glass	20% clay
15% quartz, feldspar	10% quartz, feldspar, etc.
5% other	

1-142	2-60
85% glass shards	50% clay
10% clay	25% diatoms
5% quartz, feldspar	25% quartz, feldspar pyroxene, etc.

2-115
60% clay
20% diatoms
15% quartz, feldspar
5% other

Explanatory notes in Chapter 1

* LOWER PLEISTOCENE
*(D) Actinocyclus oculatus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SECTION
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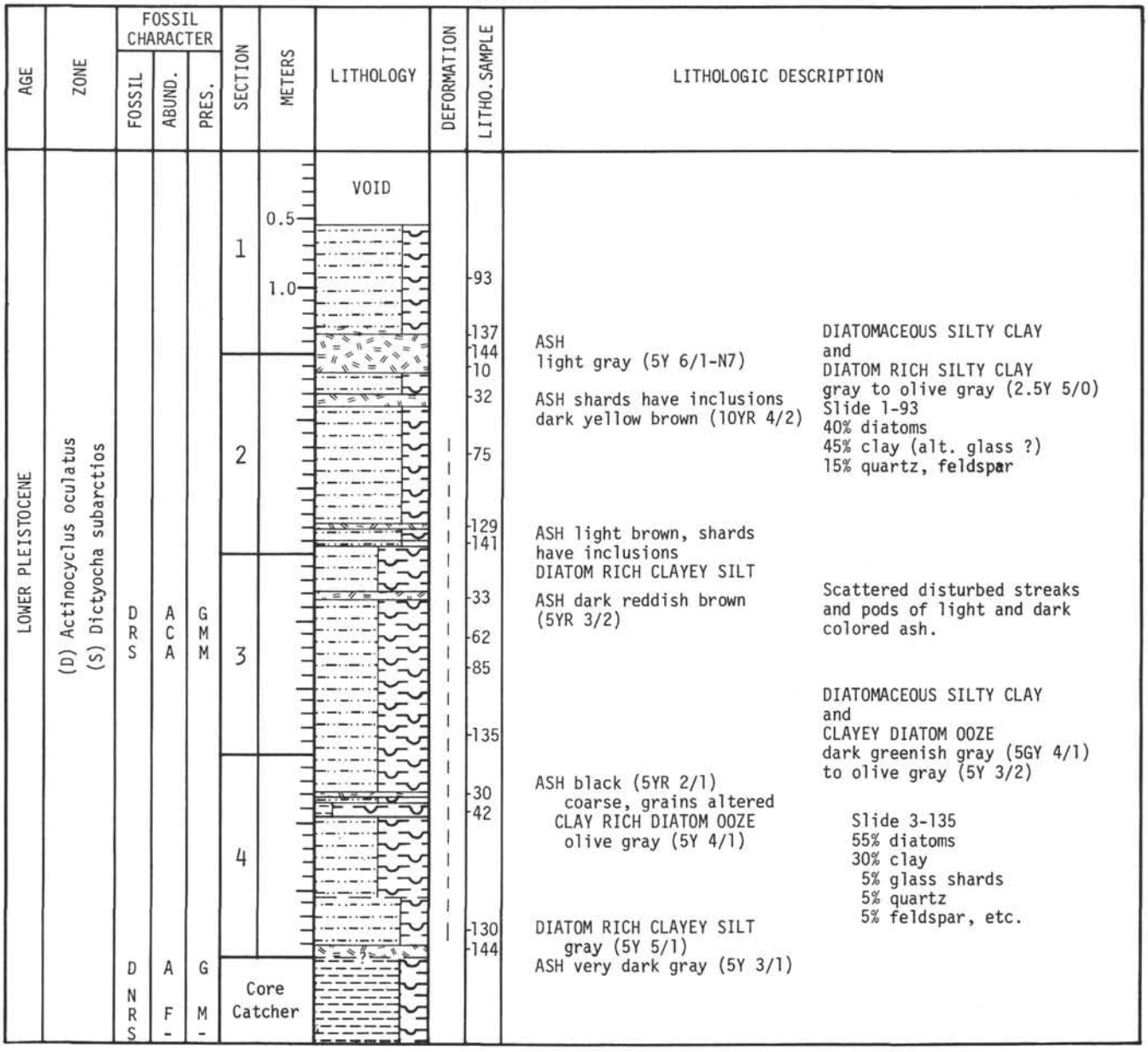
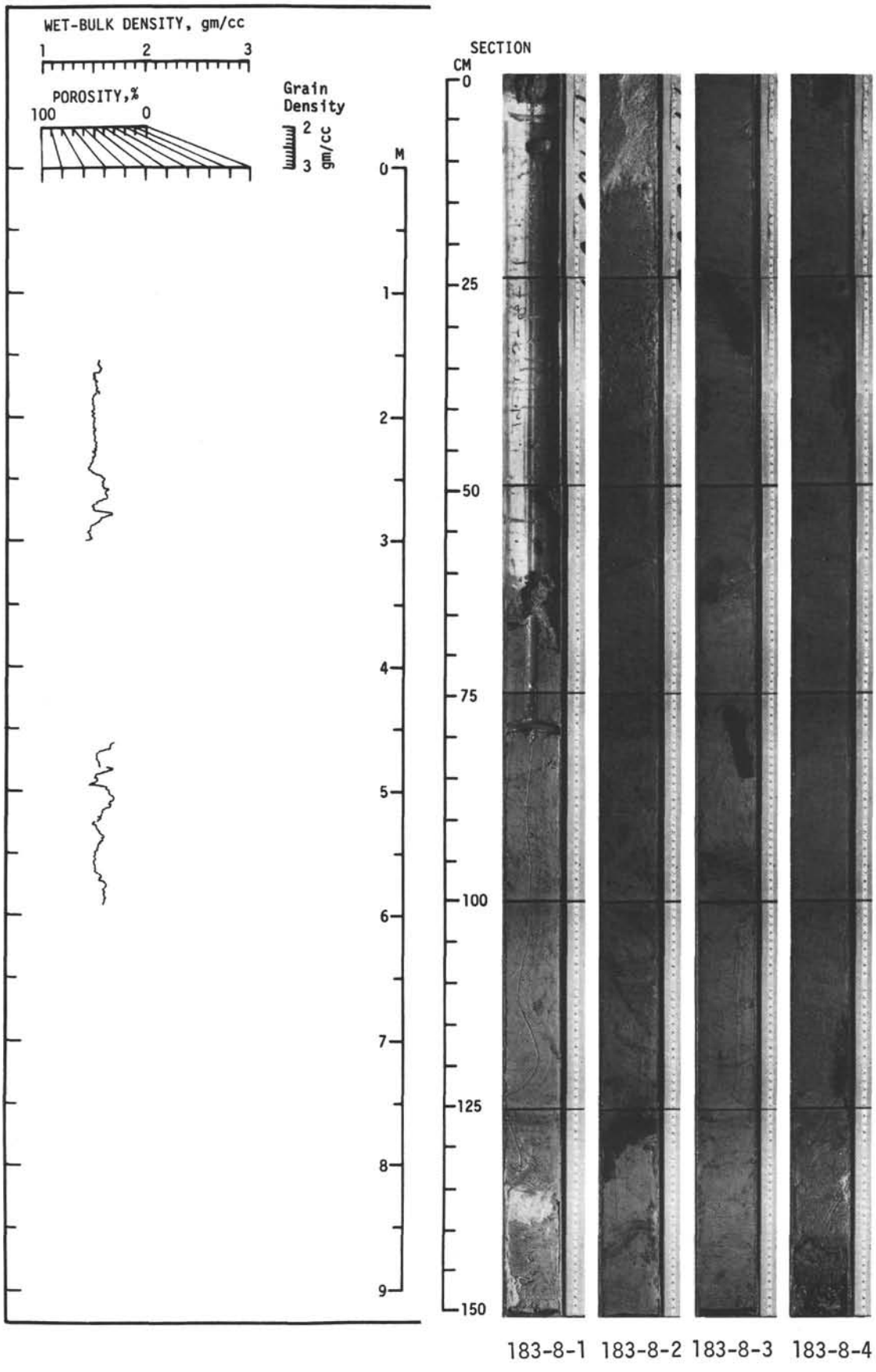
183-7-4

Site 183 Hole Core 8 Cored Interval: 59-68



Explanatory notes in Chapter 1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SECTION
CM
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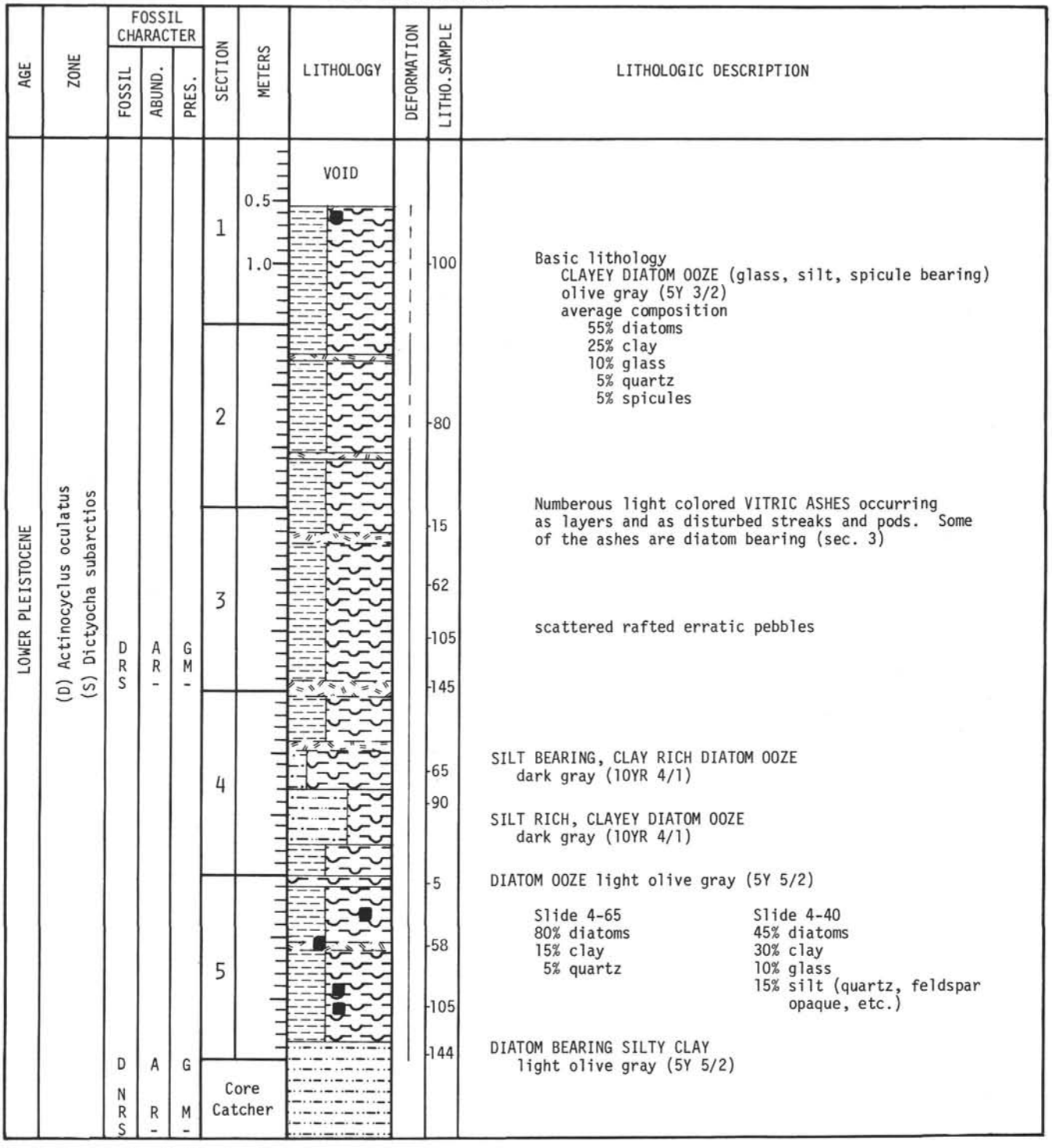
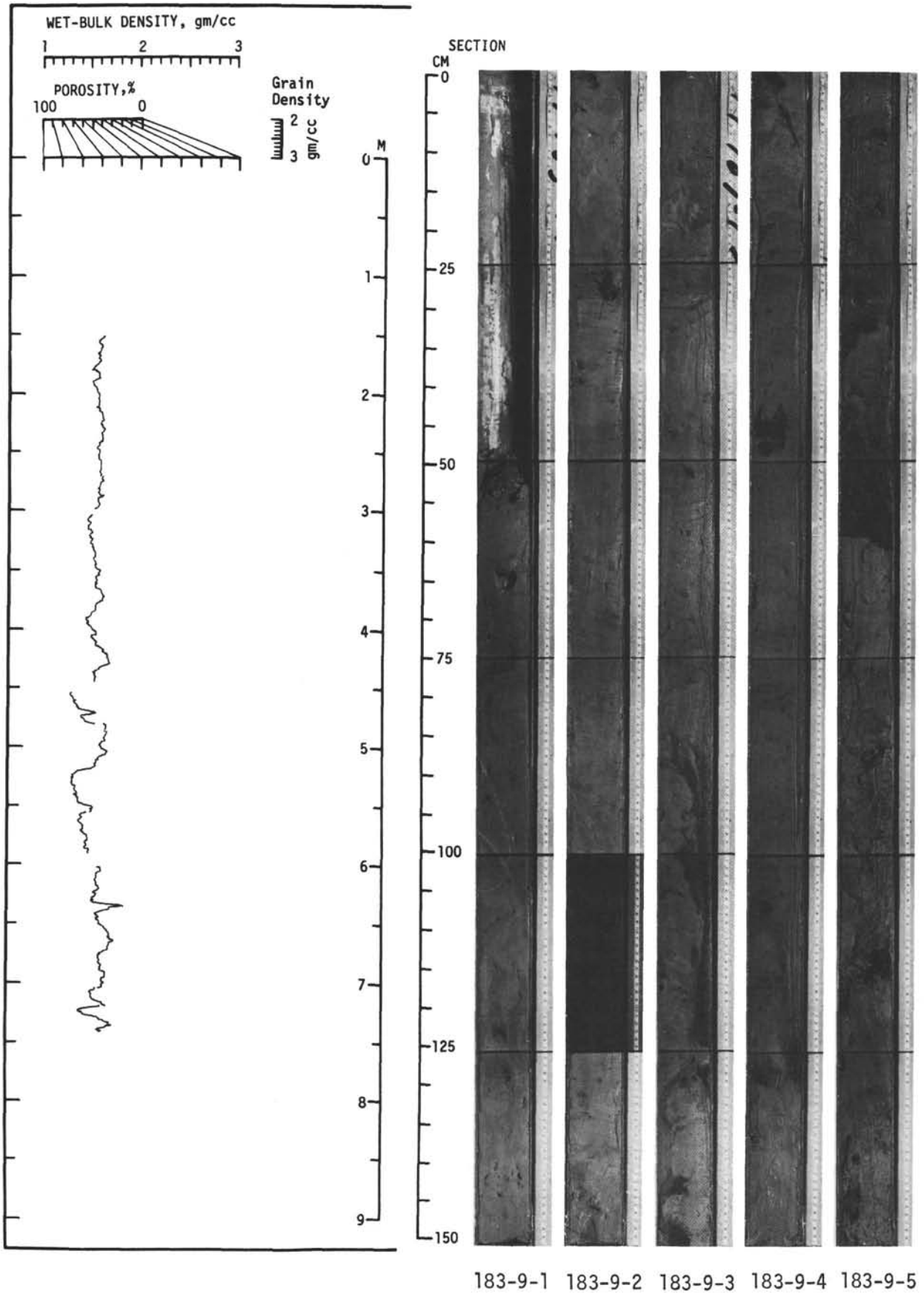
183-8-4

Site 183 Hole Core 9 Cored Interval: 68-78



Explanatory notes in Chapter 1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SECTION
CM
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25
50
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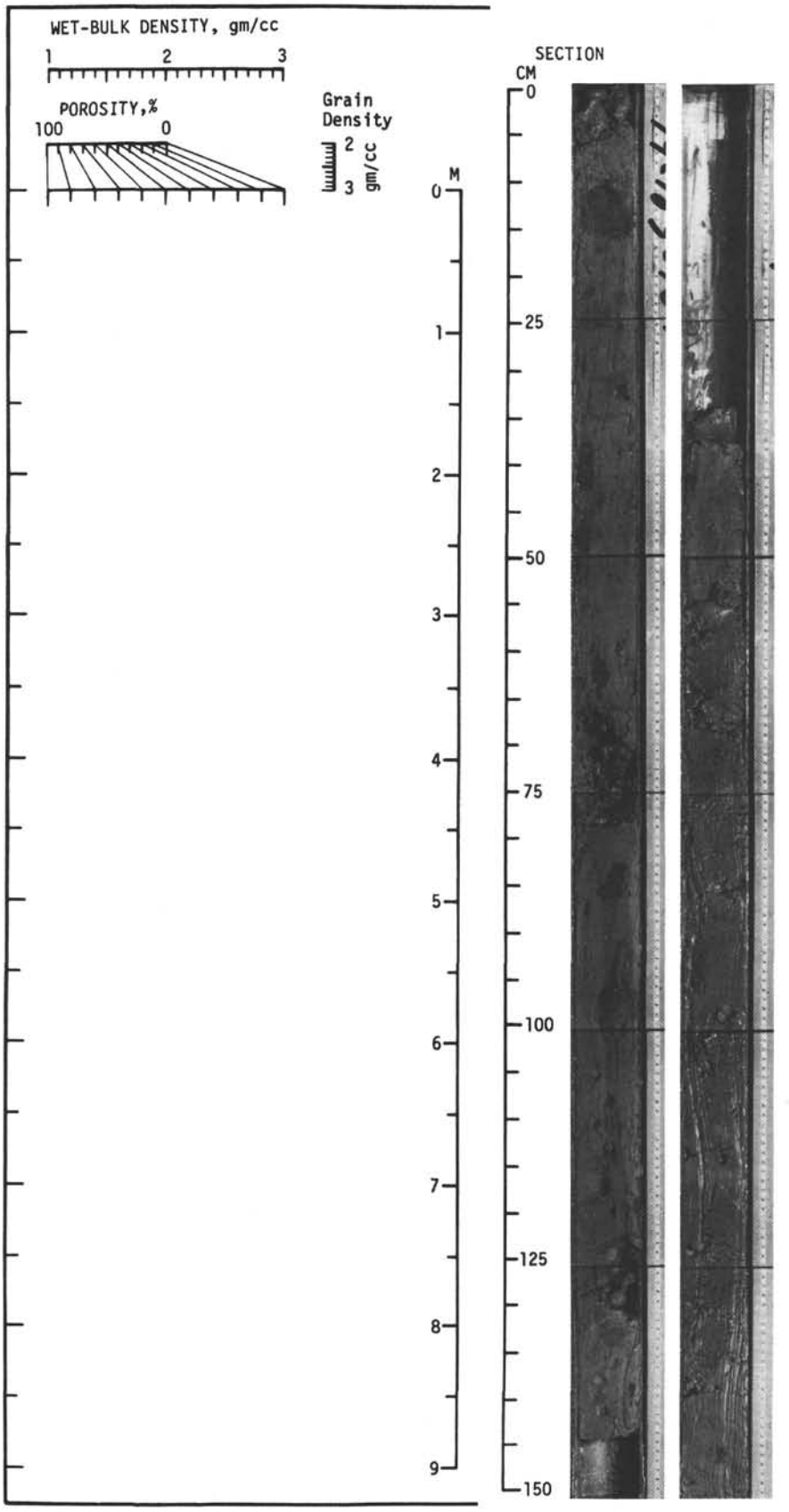
150
183-9-1
183-9-2
183-9-3
183-9-4
183-9-5

Site 183 Hole Core 10 Cored Interval: 78-87

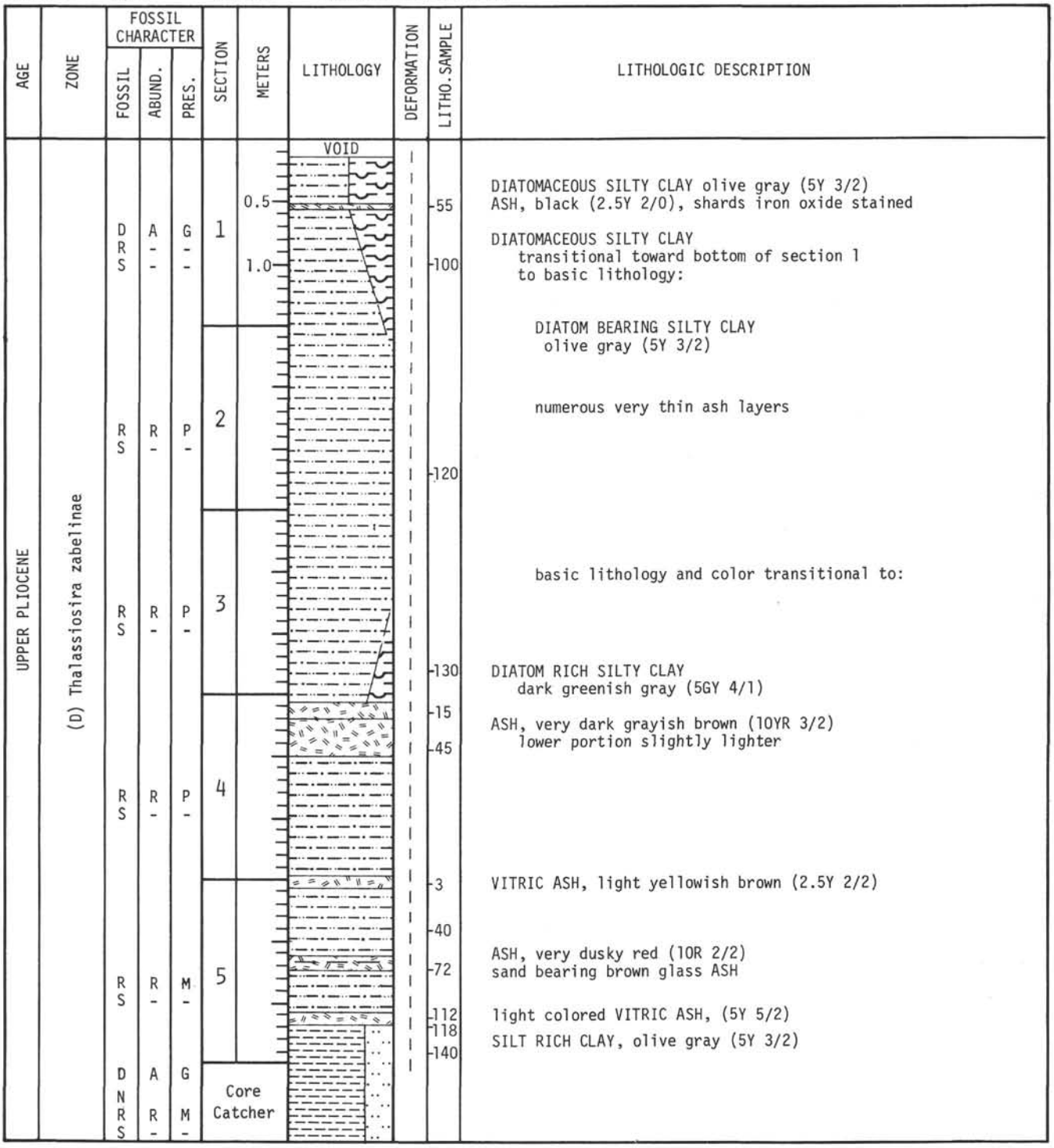
AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LOWER PLEISTOCENE	(D) Actinocyclus oculatus (S) Dictyocha subarctios	PF BF D R S	- - A R A	G M M	1	0.5 1.0			-42 -90	ASH, black (7.5YR 2/0) Basic lithology CLAYEY DIATOM OOZE olive gray (5Y 3/2) sec. 1 contains pods of ASH, very dark gray (10YR 5/2), some devitrification 60% glass, 20% clay, 15% feldspar-quartz, 3% pyroxene
					2		VOID			
		R S	R R	M M					-79	CLAY BEARING DIATOM OOZE light olive gray (5Y 5/2)
		D N R S	A F F	G M M	Core Catcher					

Explanatory notes in Chapter 1

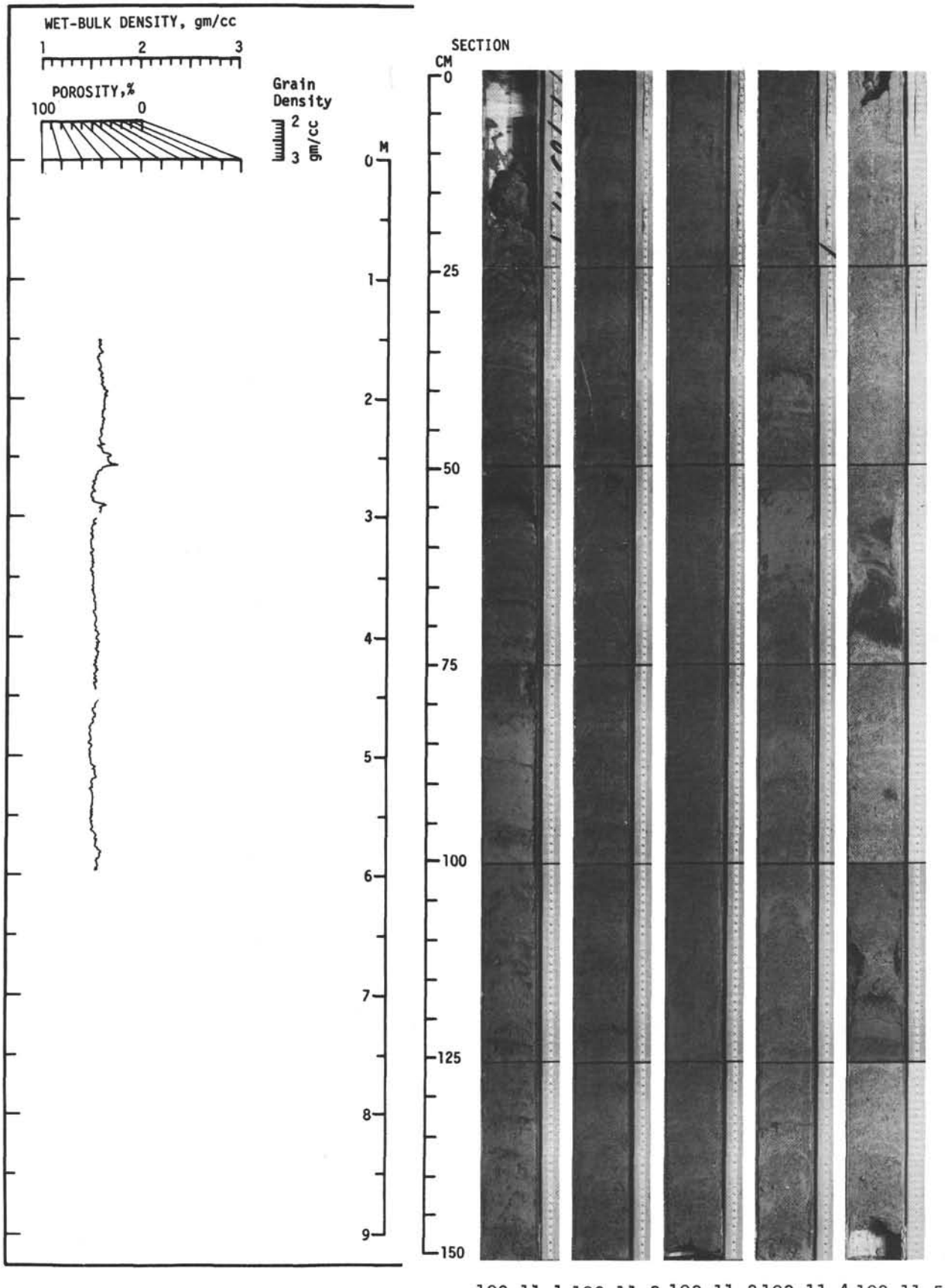


183-10-1 183-10-2

Site 183 Hole Core 11 Cored Interval: 99-108



Explanatory notes in Chapter 1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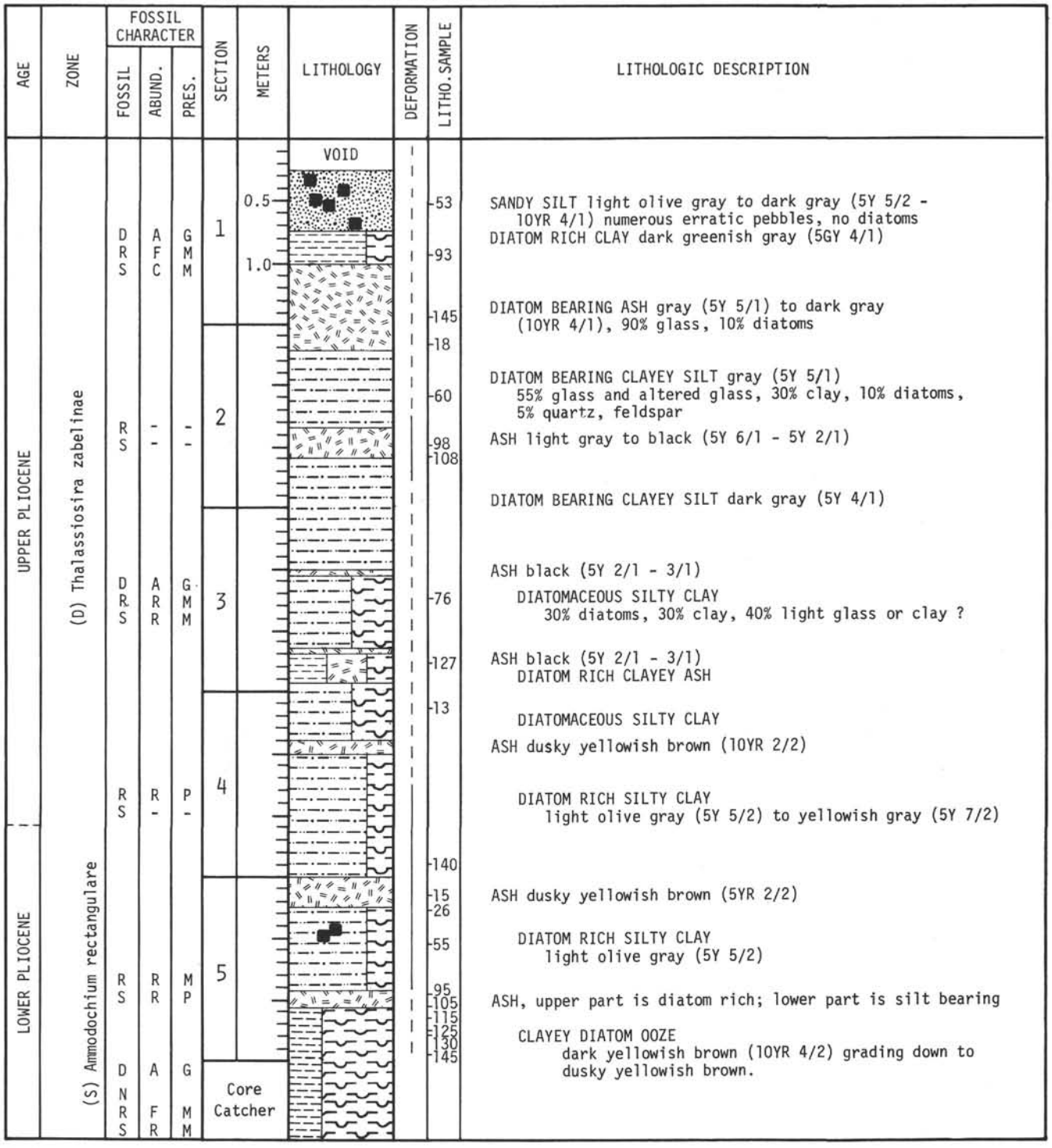
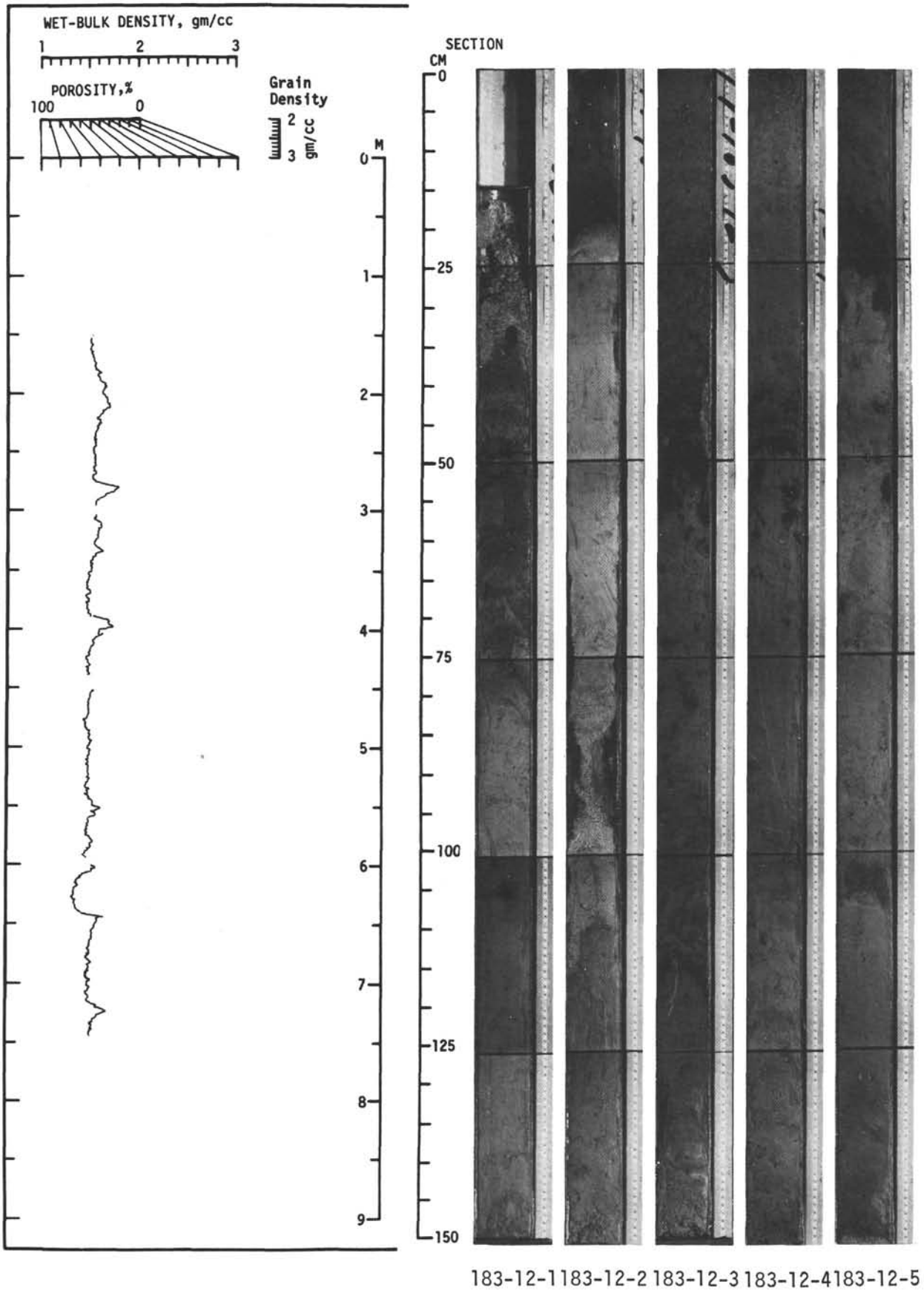
183-11-5

Site 183 Hole Core 12 Cored Interval: 118-127



Explanatory notes in Chapter 1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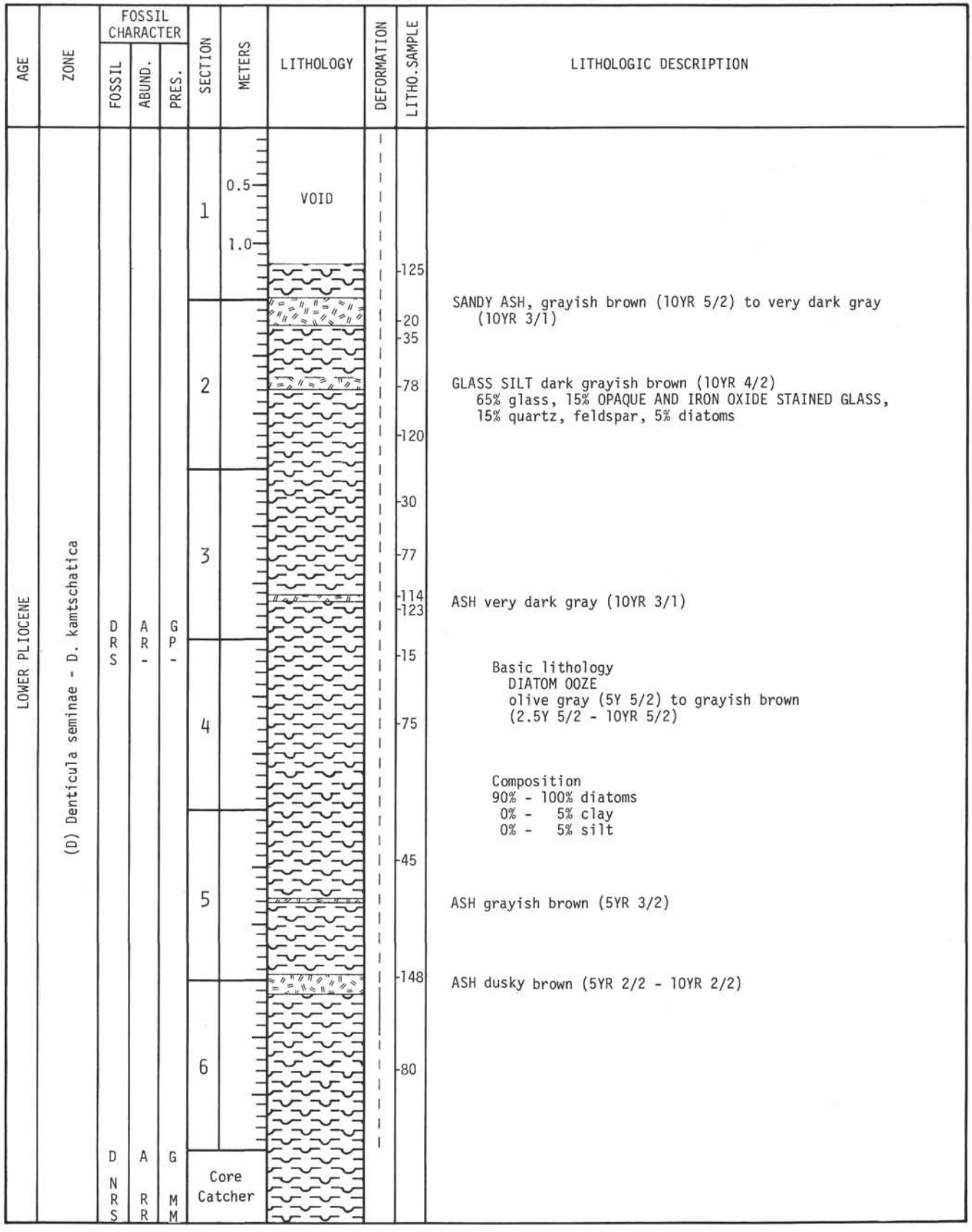
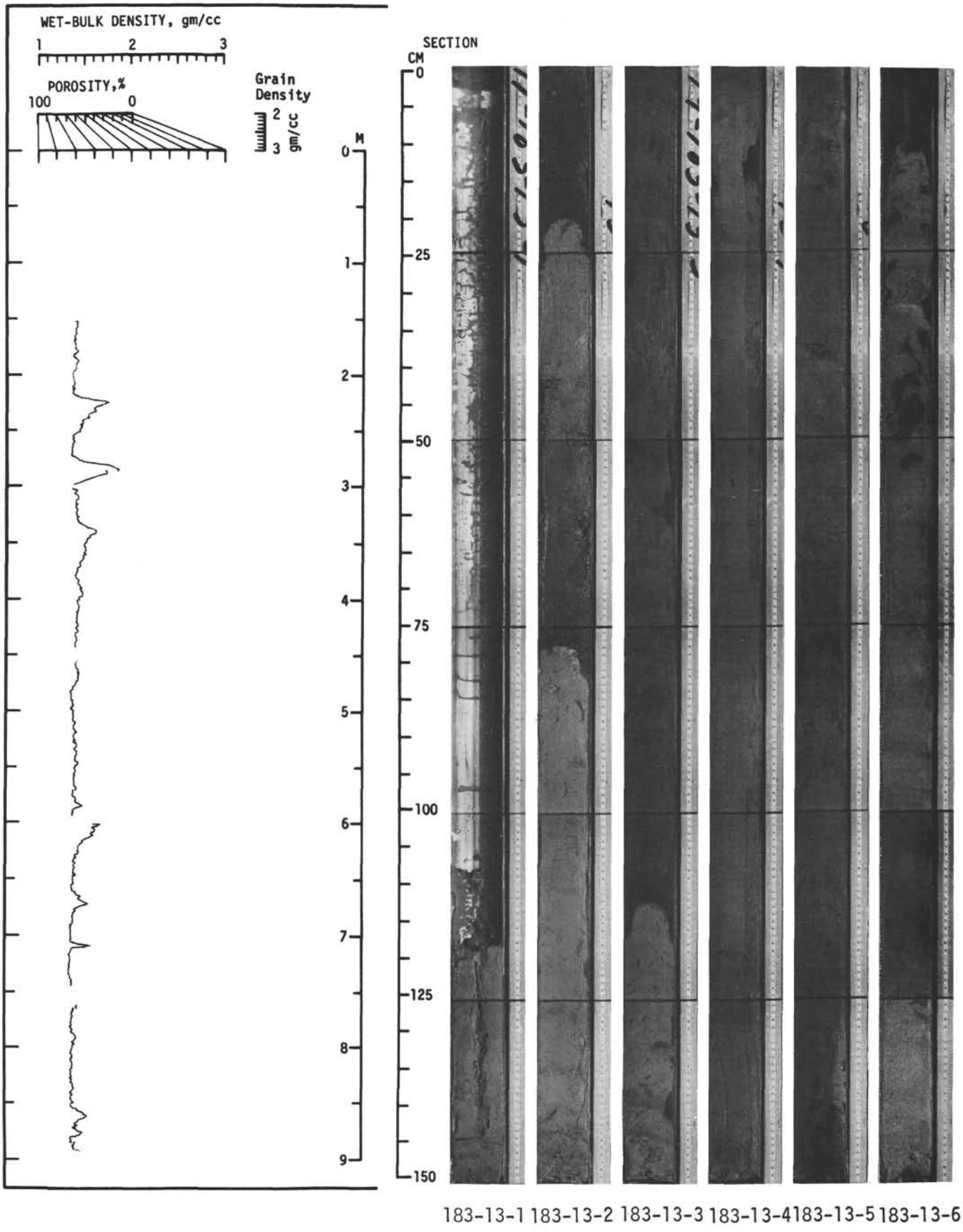
Site 183 Hole Core 13 Cored Interval: 127-136



Explanatory notes in Chapter 1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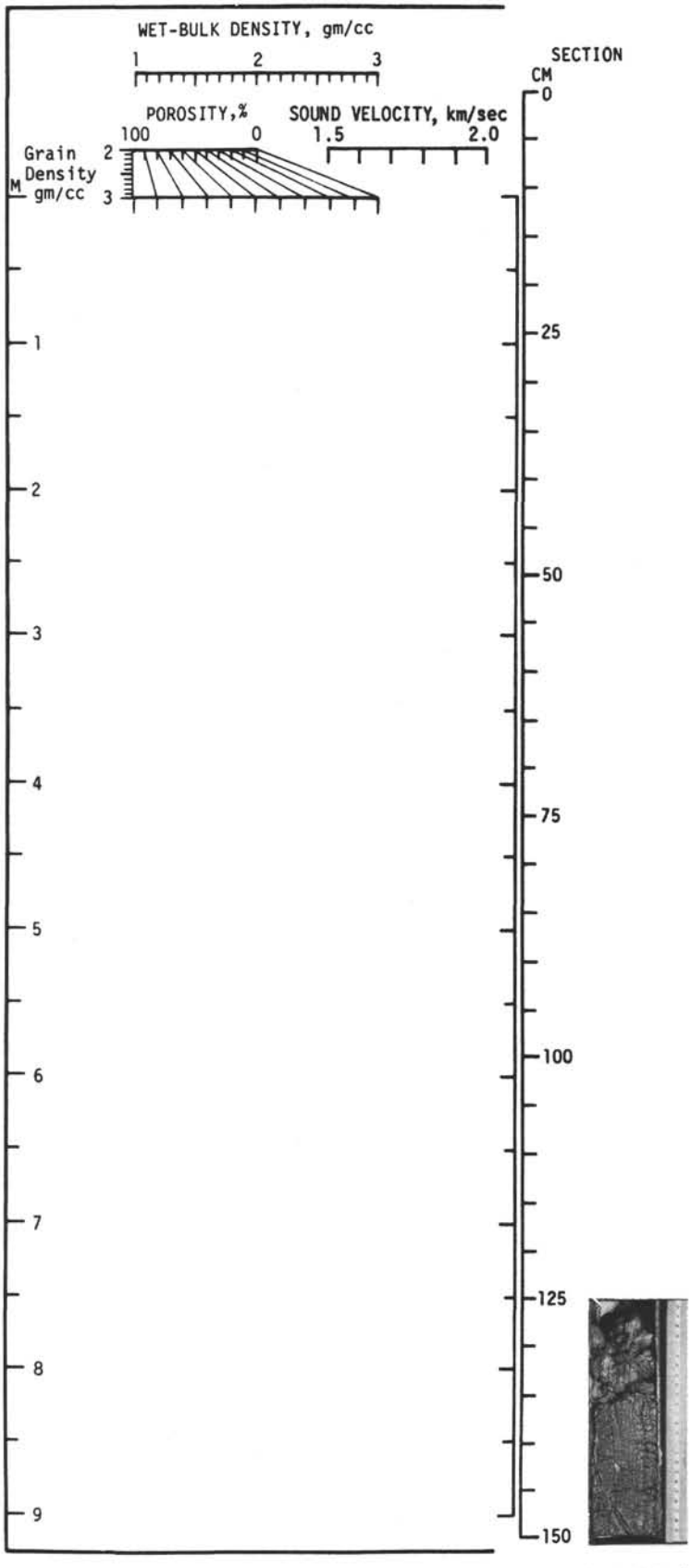
183-13-6

Site 183 Hole Core 14 Cored Interval: 136-146

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LOWER PLIOCENE	*	D N R S	A R F	G M G	1	0.5 1.0		---	143	DIATOM OOZE grayish brown (2.5Y 5/2) 99% diatoms 1% glass, quartz, feldspar, pyroxene
					Core Catcher					

Explanatory notes in Chapter 1

*(D) Denticulina seminae - D. kamtschatica
(S) Cannopilus hemisphaericus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2
3
SECTION
CM
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POROSITY,%
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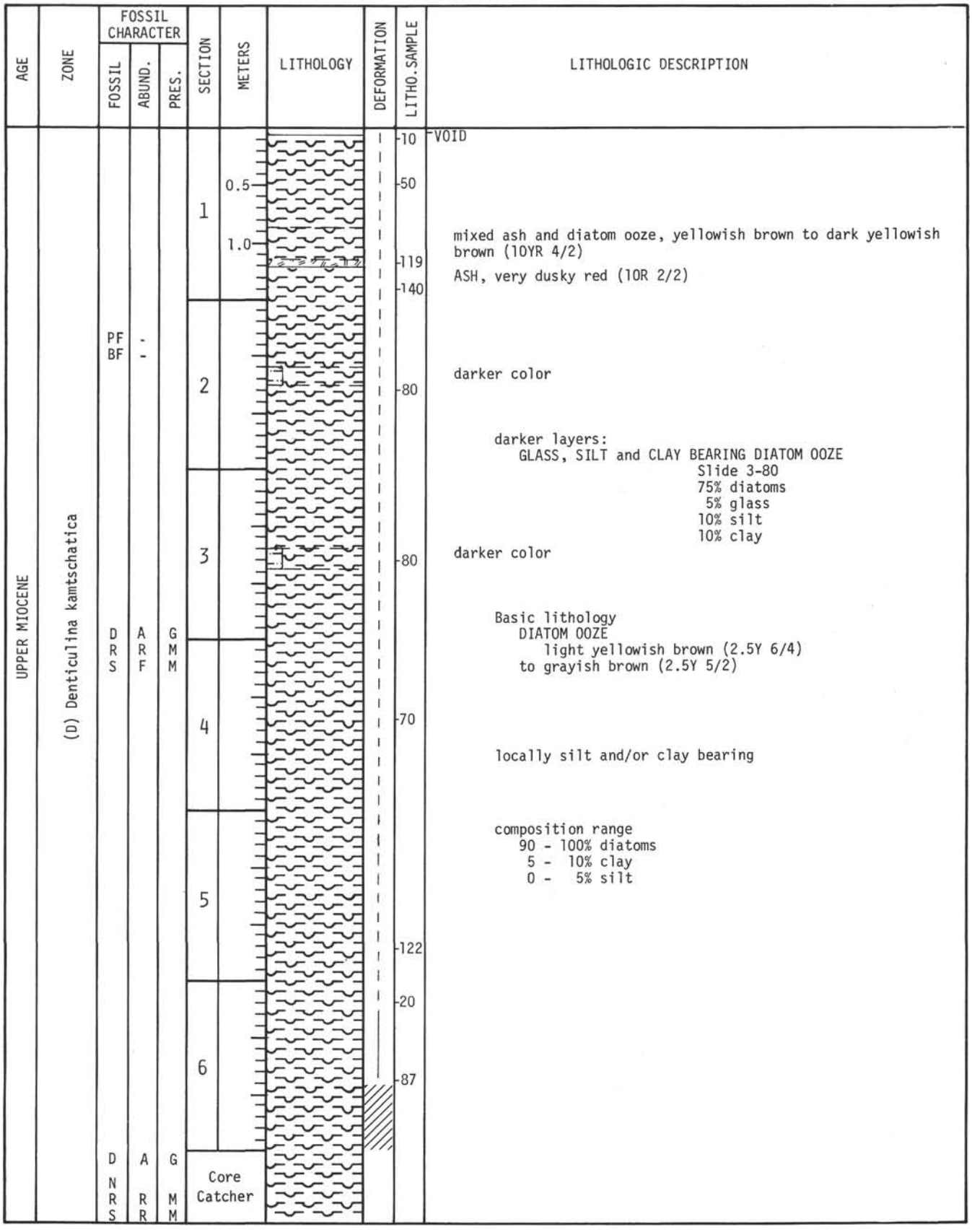
SOUND VELOCITY, km/sec
1.5
2.0
Grain
Density
gm/cc
2
3
M
1
2
3
4
5
6
7
8
9
25
50
75
100
125
150

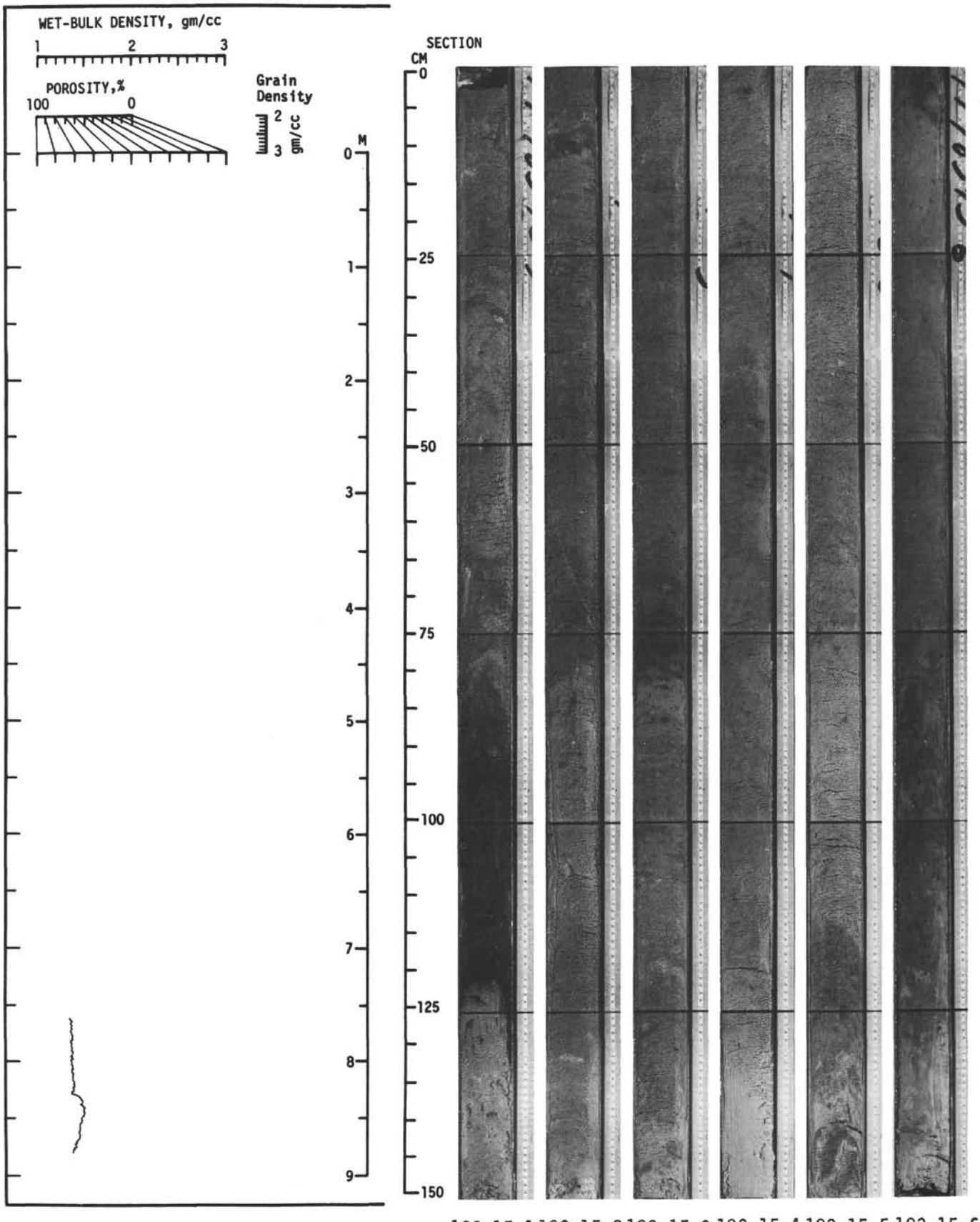
183-14-1

Site 183 Hole Core 15 Cored Interval: 146-155



Explanatory notes in Chapter 1

Site 183, Core 16; no recovery. Cored Interval: 155-164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3
POROSITY,%
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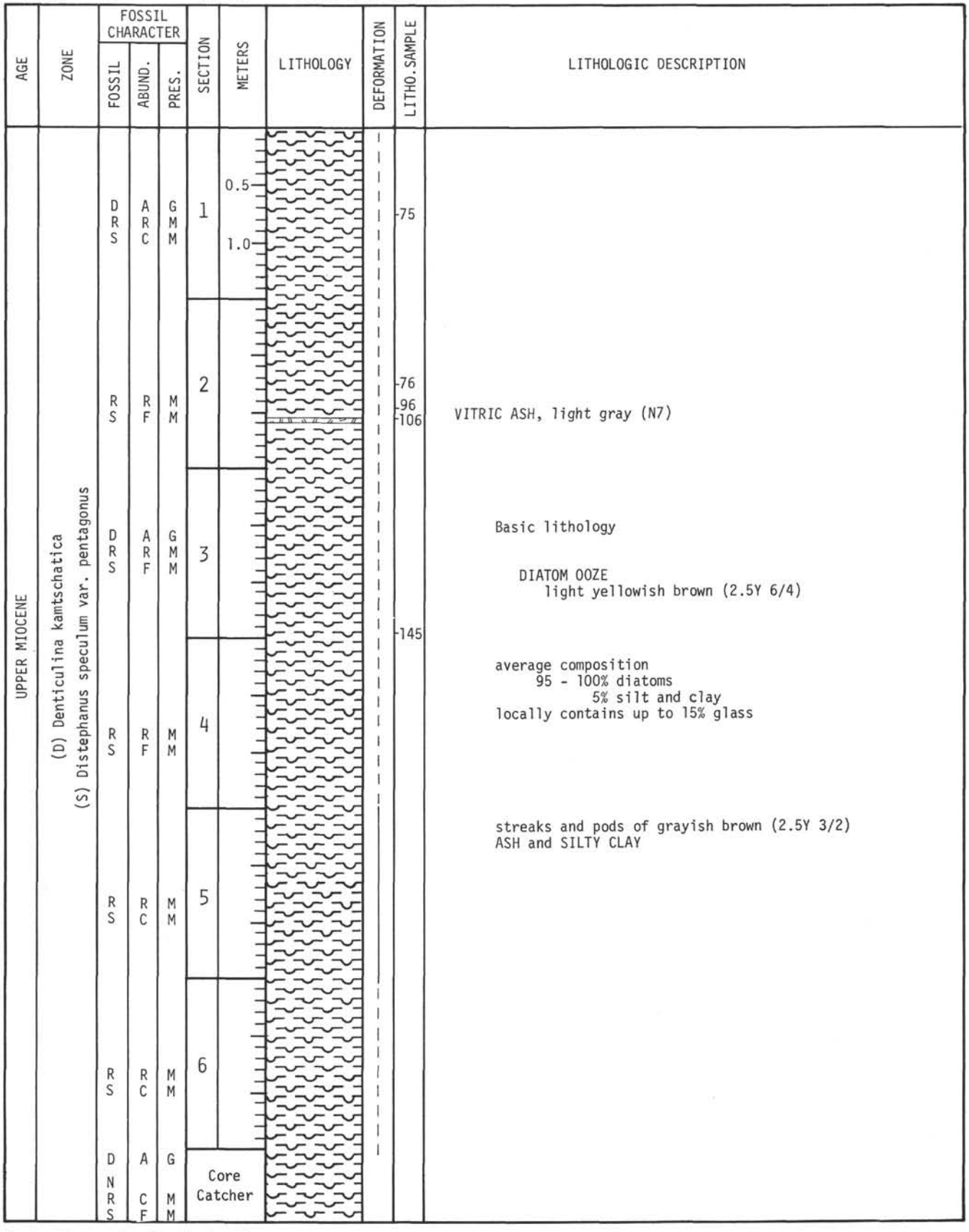
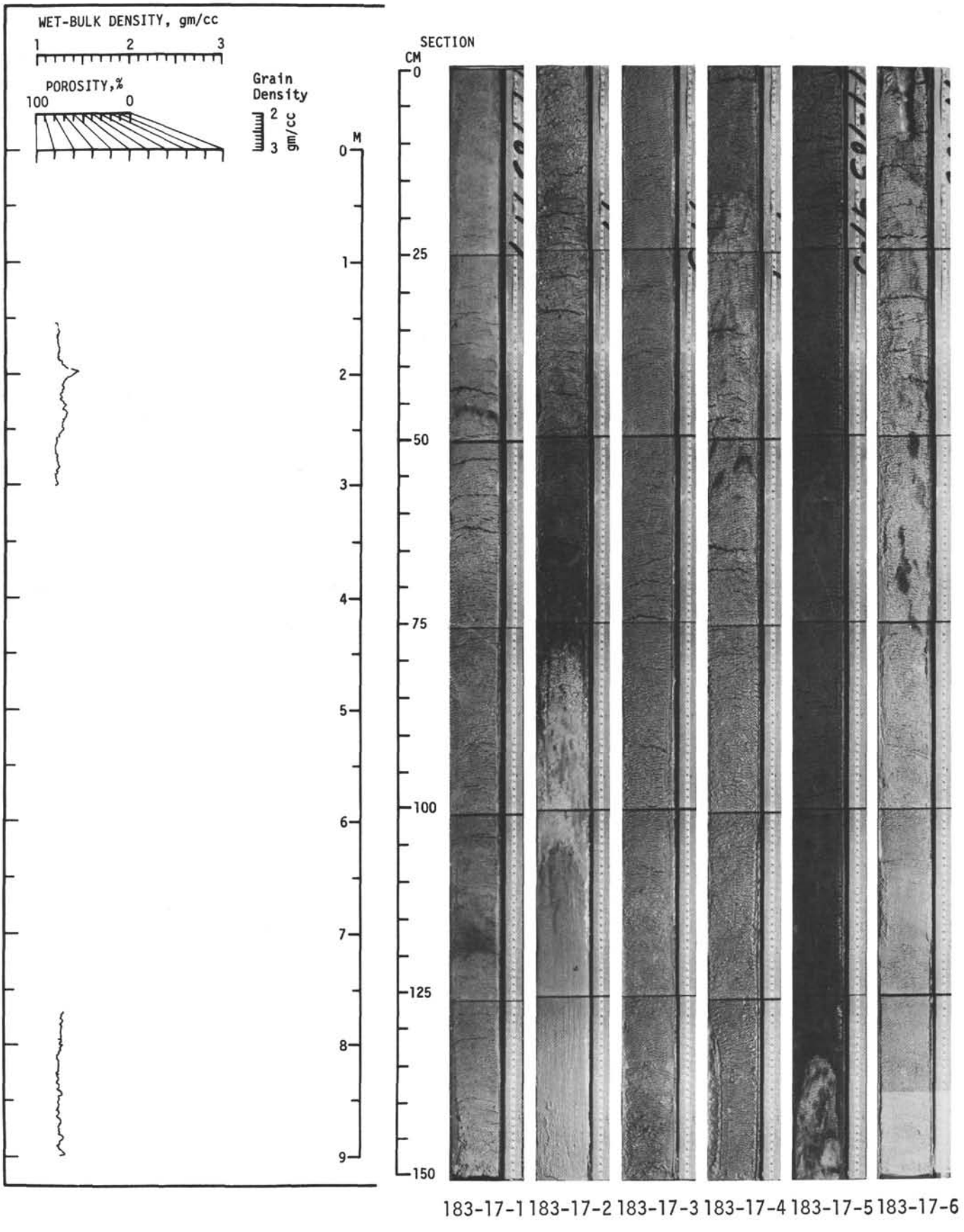
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-15-1
183-15-2
183-15-3
183-15-4
183-15-5
183-15-6

Site 183 Hole Core 17 Cored Interval: 164-173



Explanatory notes in Chapter 1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2
3
POROSITY,%
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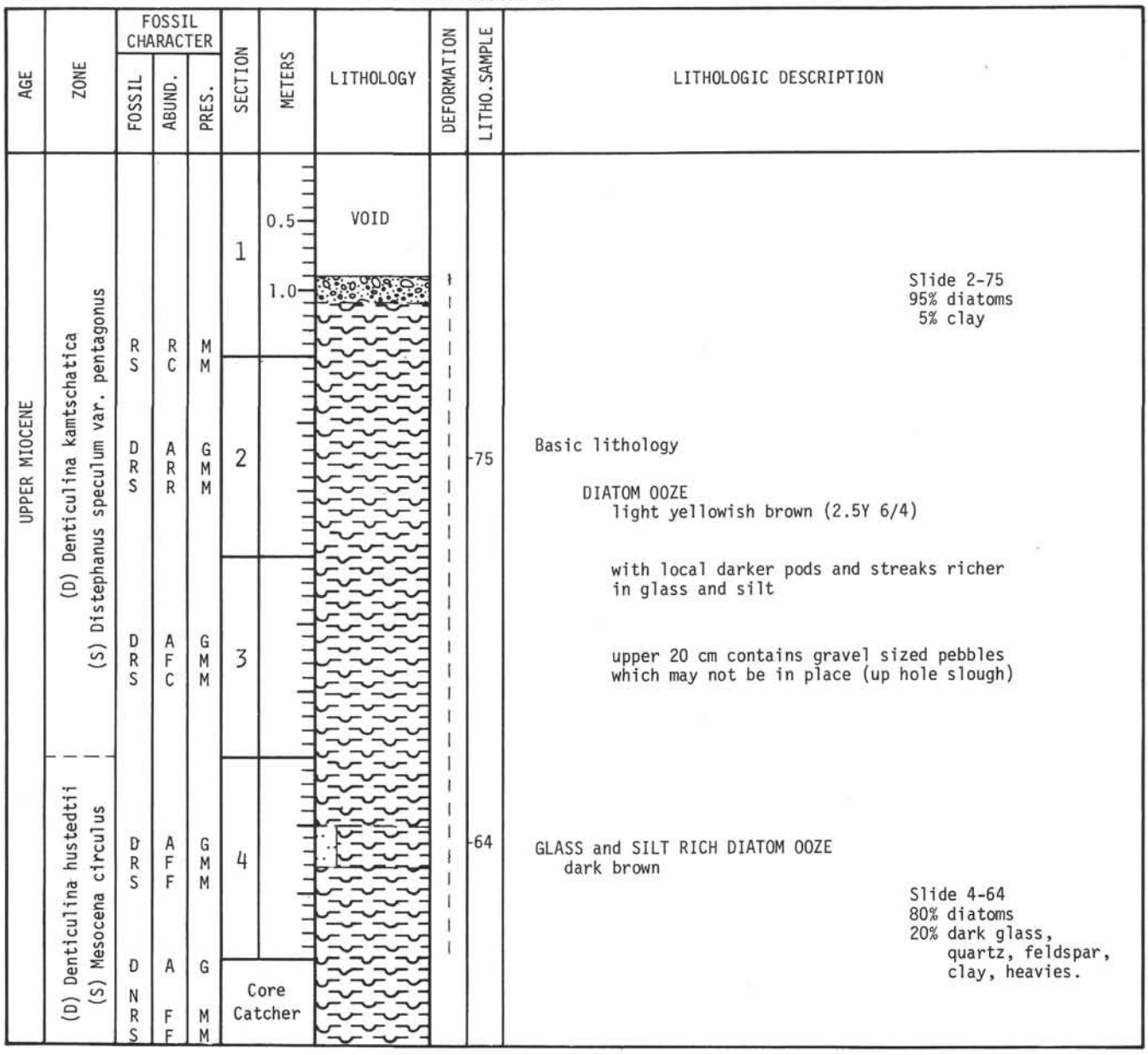
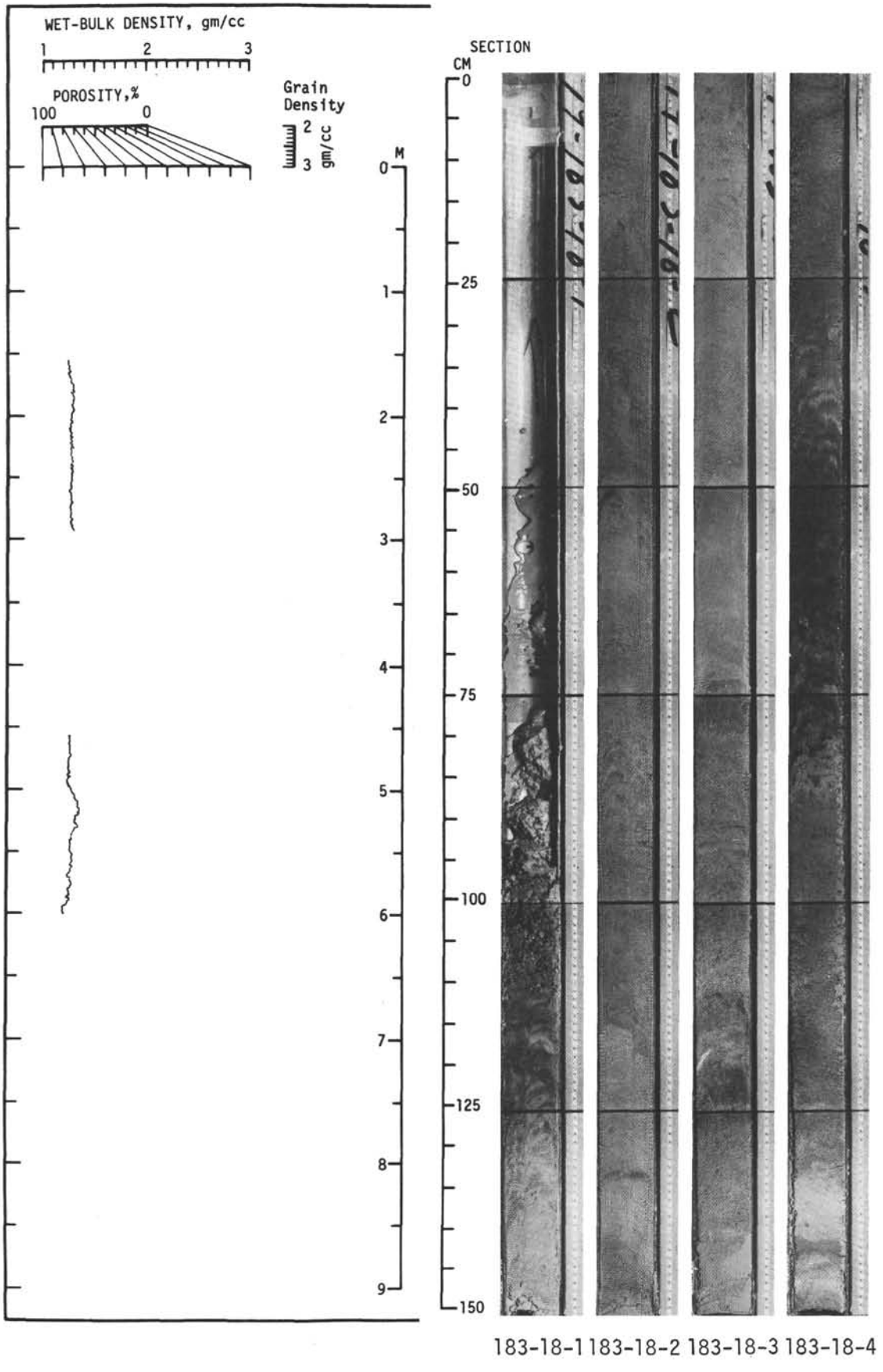
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-17-1
183-17-2
183-17-3
183-17-4
183-17-5
183-17-6

Site 183 Hole Core 18 Cored Interval: 173-183



Explanatory notes in Chapter 1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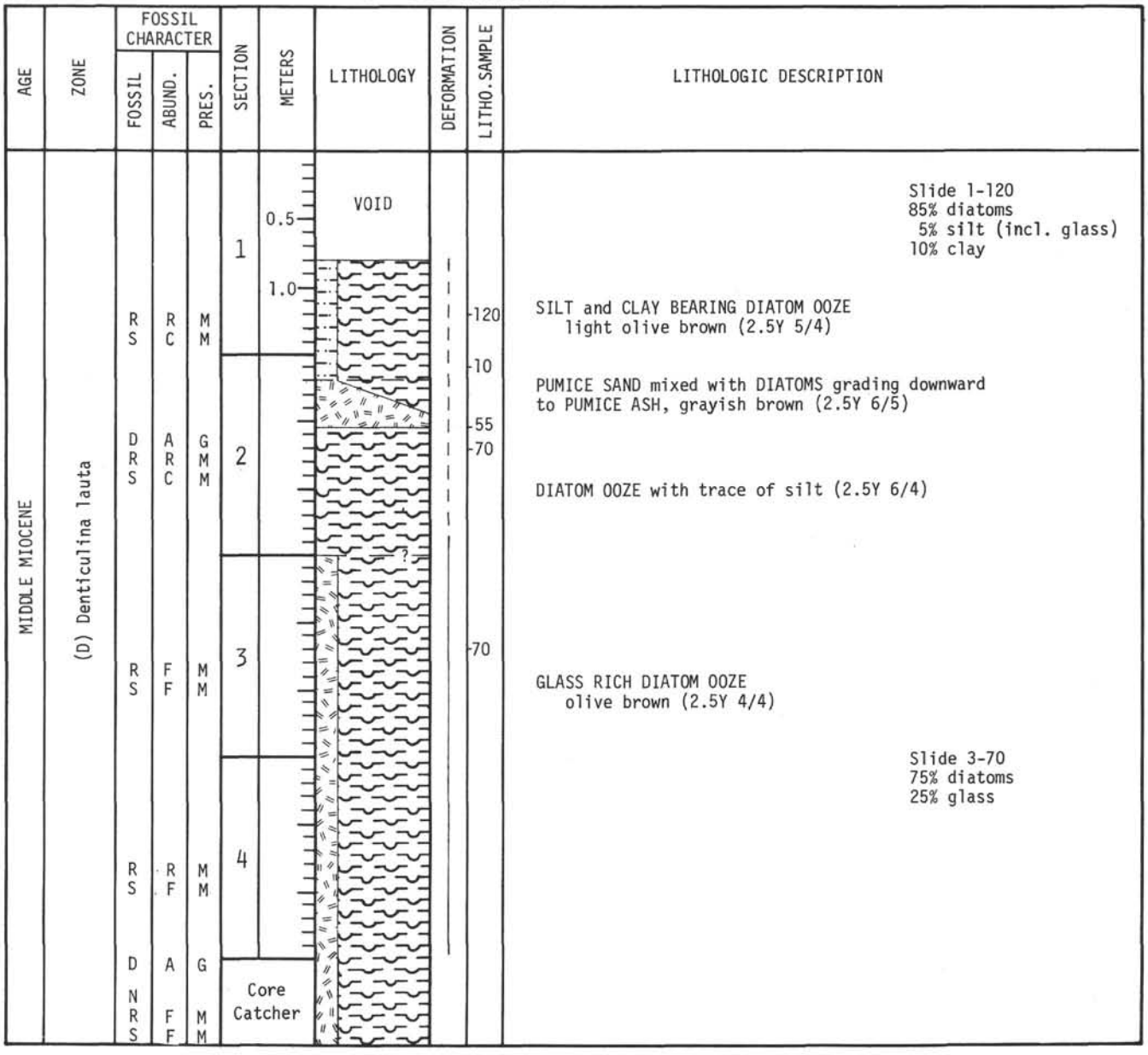
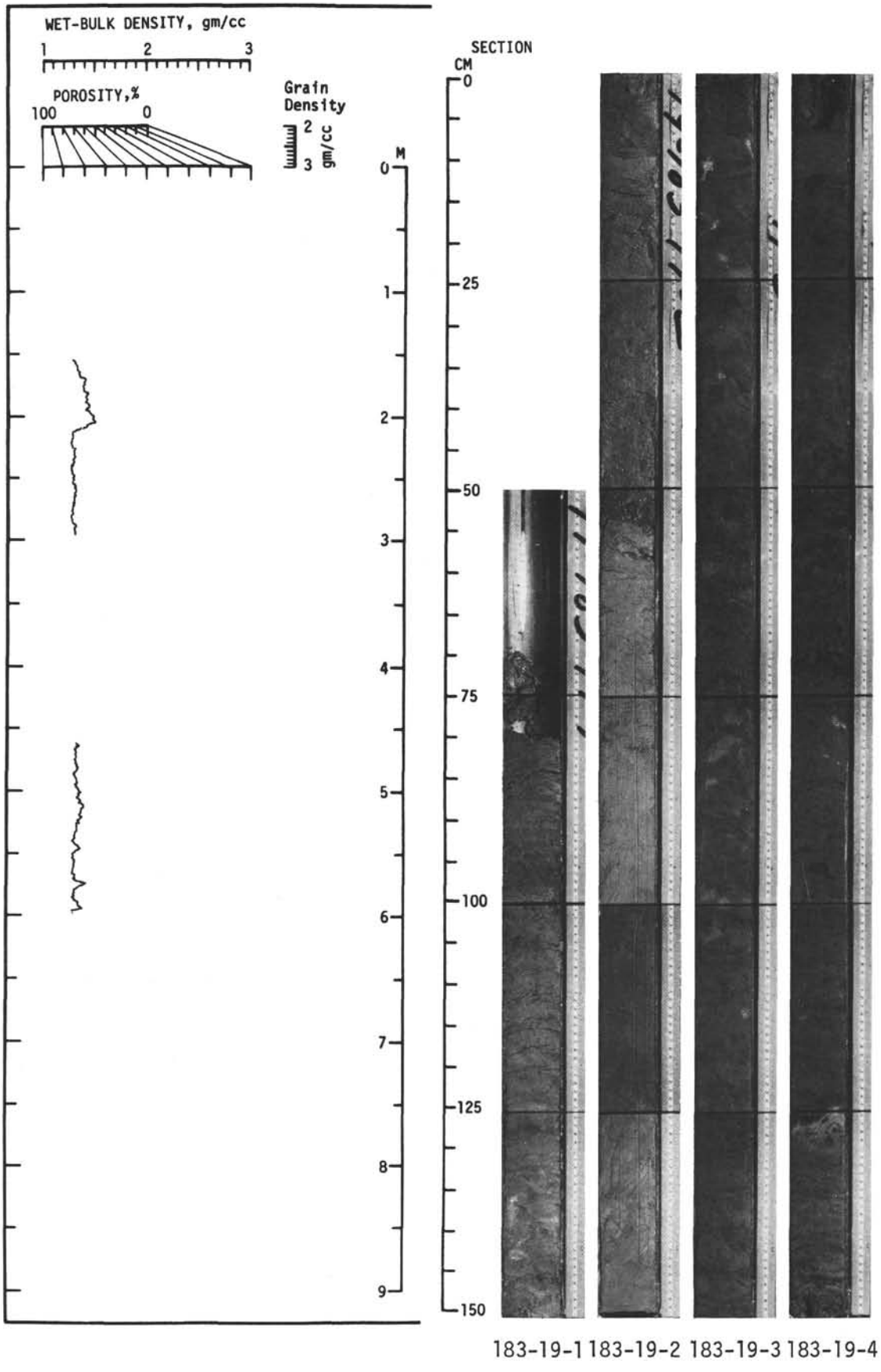
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-18-1
183-18-2
183-18-3
183-18-4

Site 183 Hole Core 19 Cored Interval: 183-192



Explanatory notes in Chapter 1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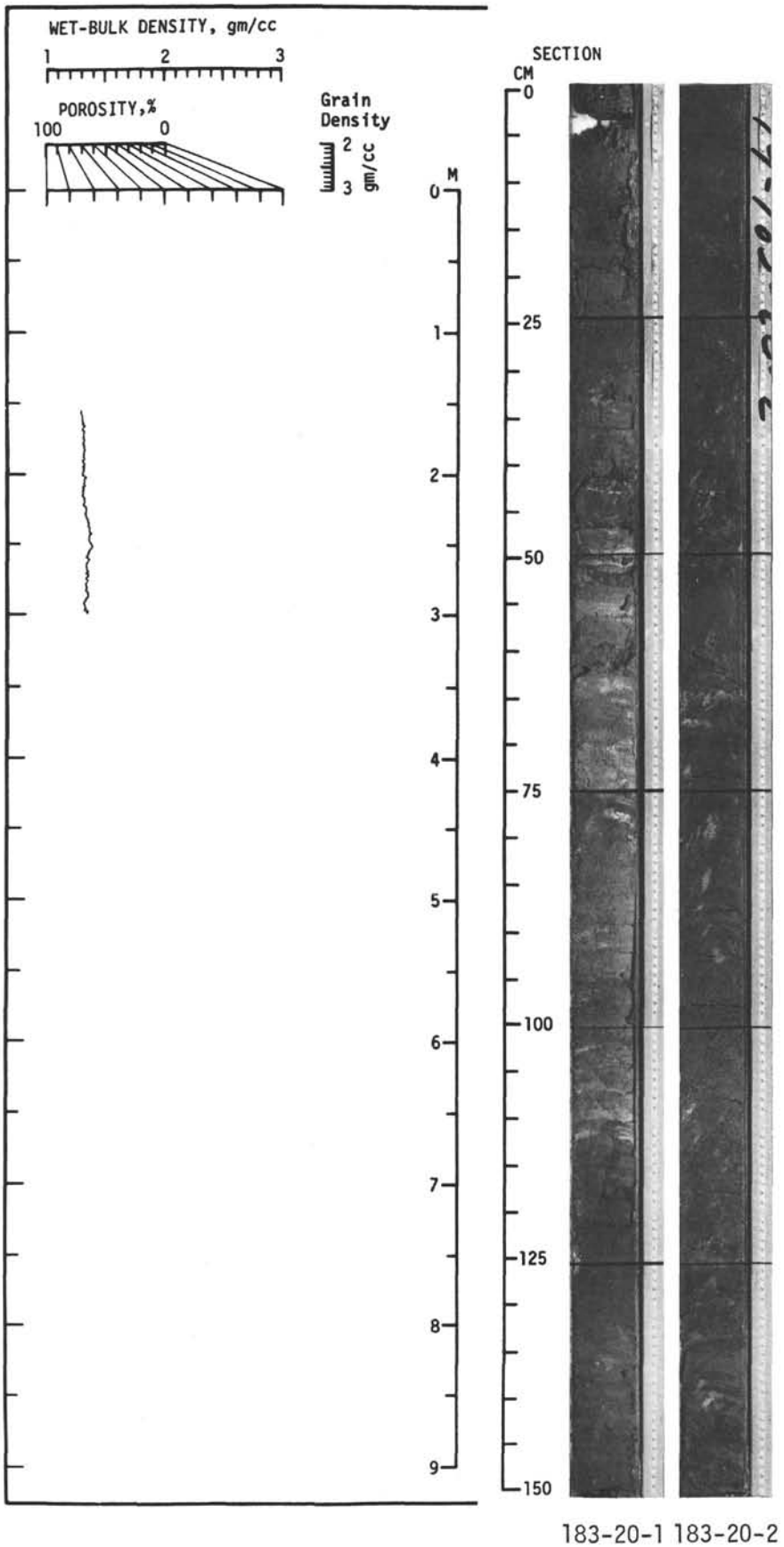
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-19-1
183-19-2
183-19-3
183-19-4

Site 183 Hole Core 20 Cored Interval: 192-201

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
MIDDLE MIOCENE	(D) Denticula lauta (S) Distephanus schauinslandii	R S D R S D N R S	C C A C F A F R	M M G M M G M M	1 2 Core Catcher	0.5 1.0			20 79 135 100	DIATOM OOZE dark grayish brown (2.5Y 4/2) to very dark grayish brown (2.5Y 3/2) in gradationally interbedded layers upper 10 cm contains pebbles (up hole slough ?)

Explanatory notes in Chapter 1


WET-BULK DENSITY, gm/cc
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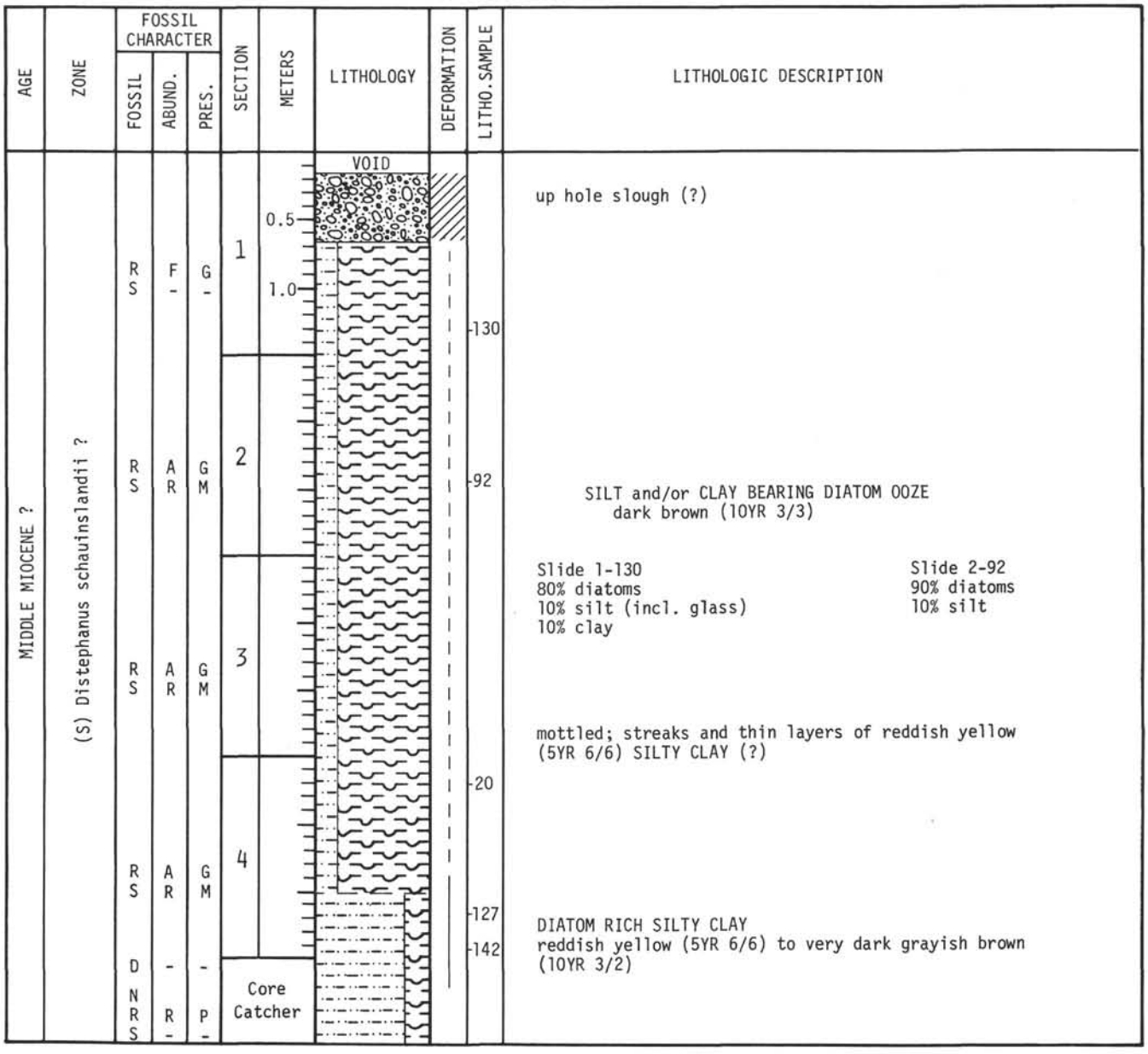
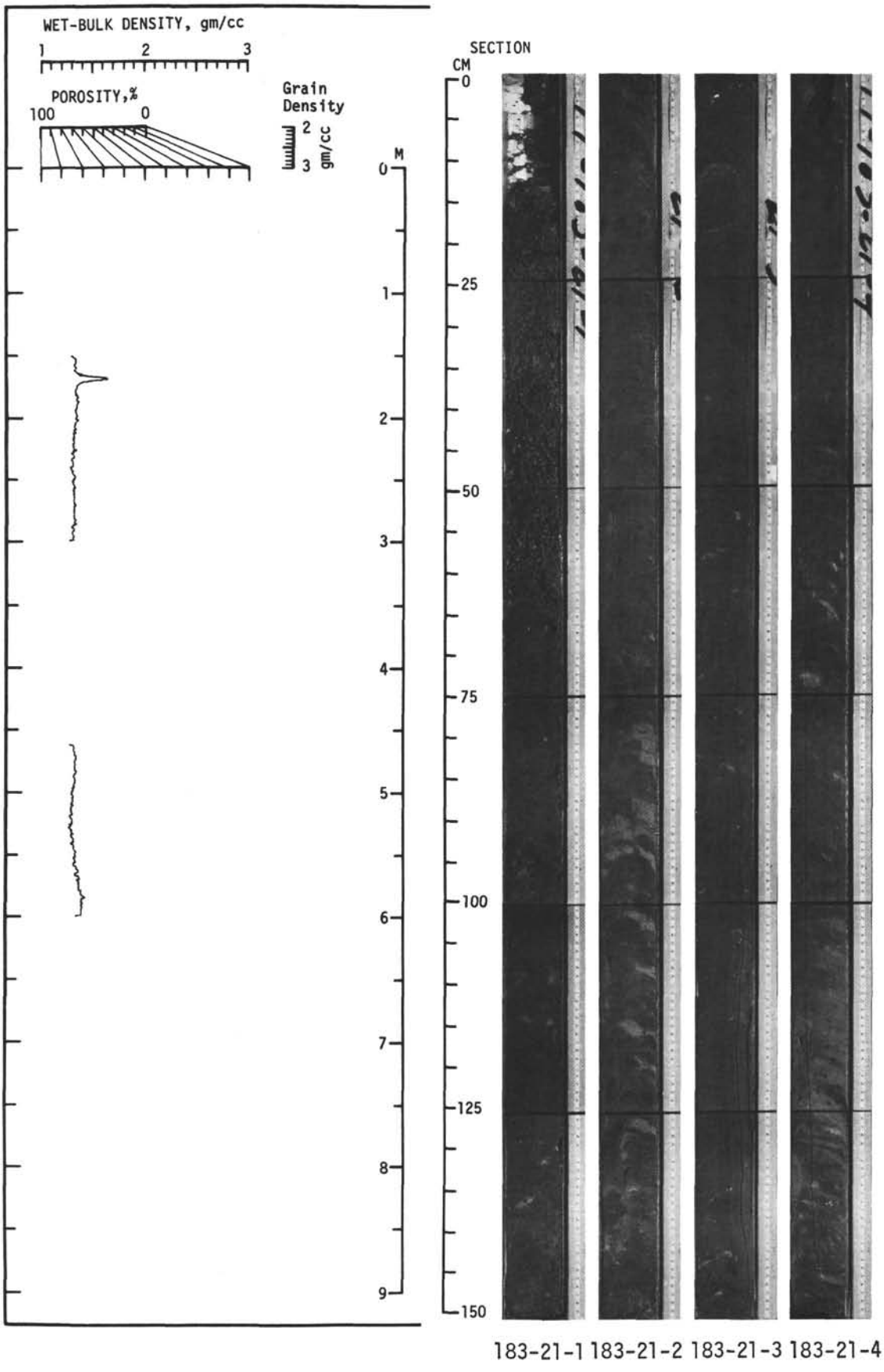
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-20-1
183-20-2

Site 183 Hole Core 21 Cored Interval: 201-210



Explanatory notes in Chapter 1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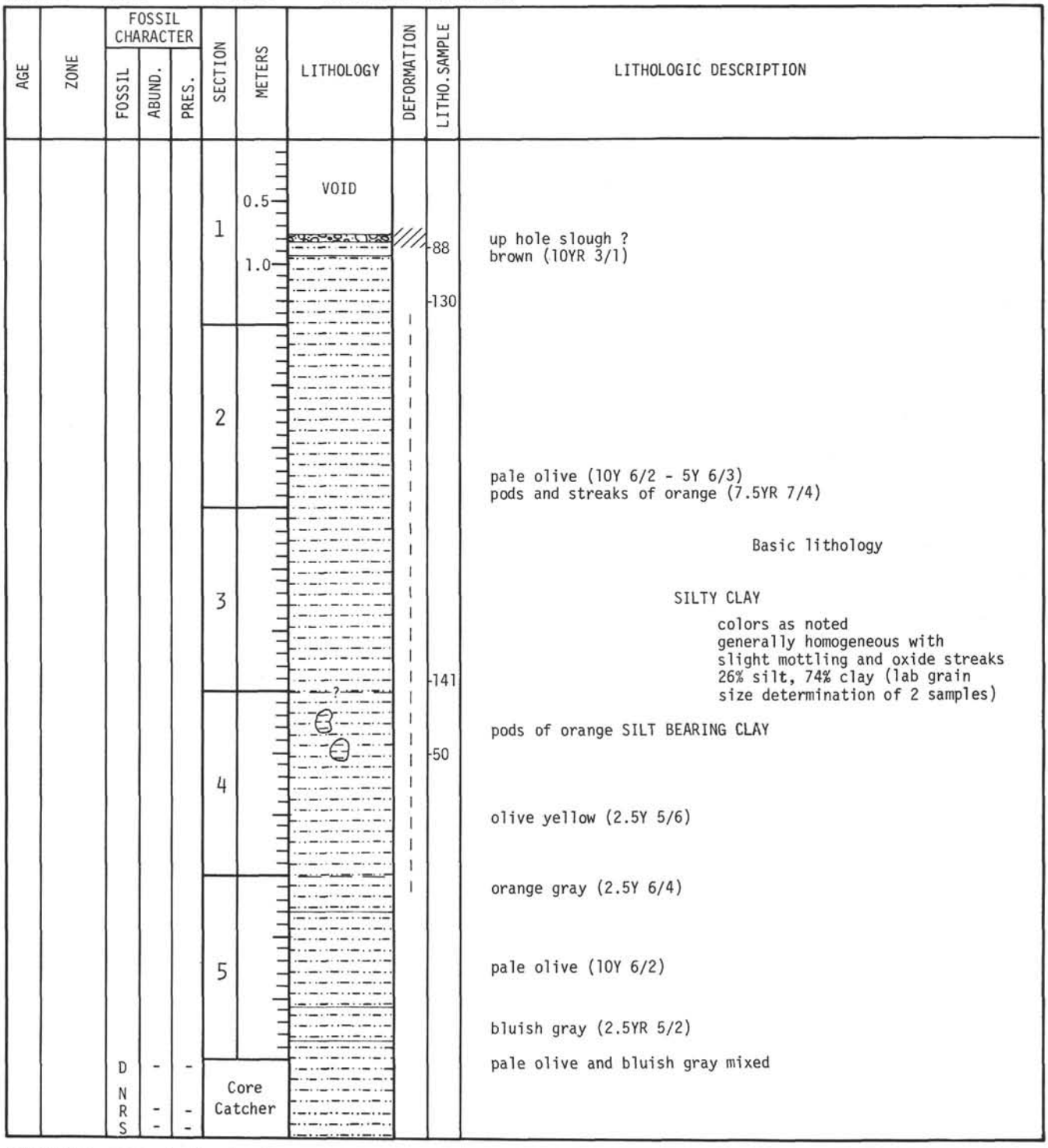
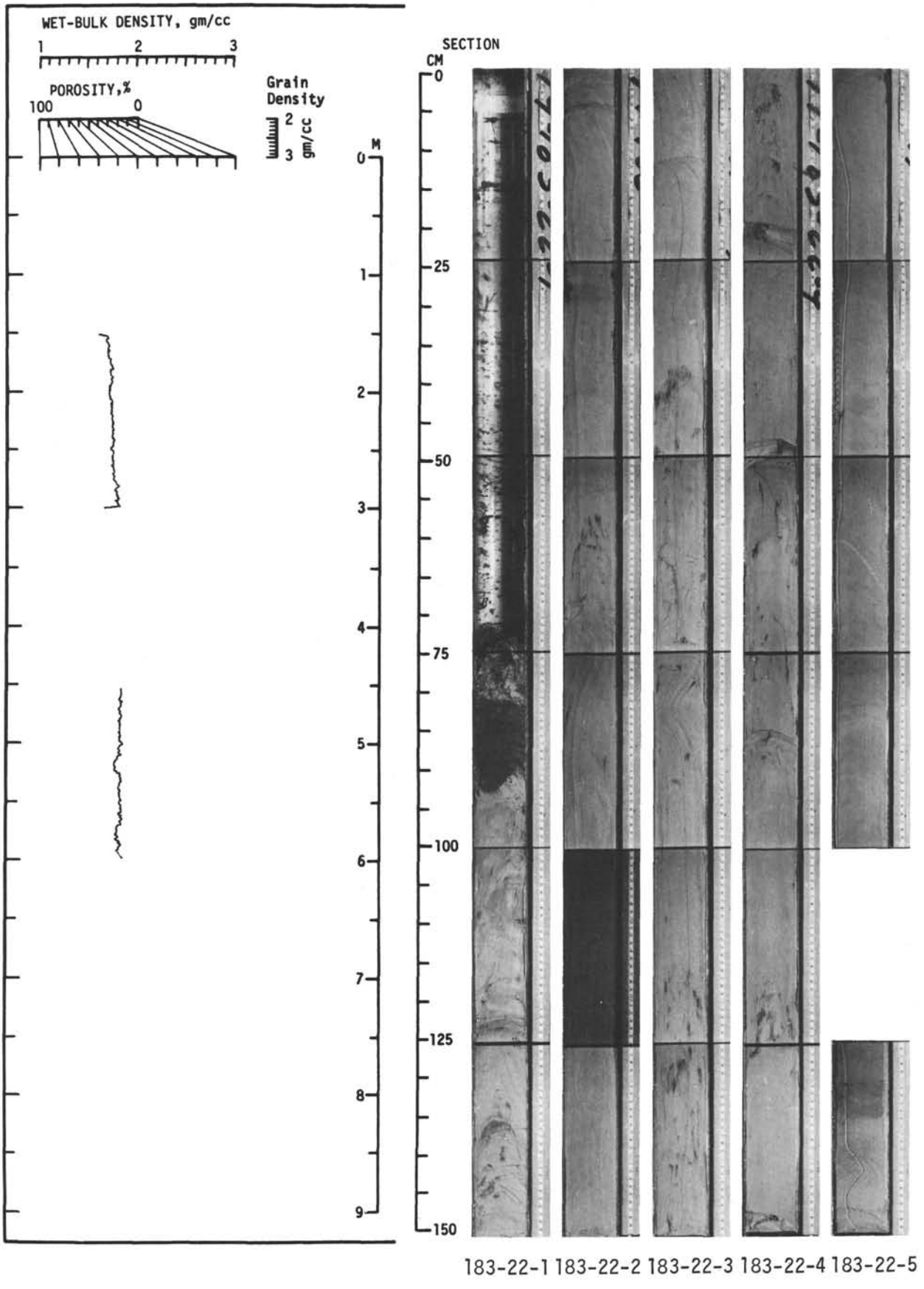
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-21-1
183-21-2
183-21-3
183-21-4

Site 183 Hole Core 22 Cored Interval: 210-220



Explanatory notes in Chapter 1


WET-BULK DENSITY, gm/cc
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2
3
POROSITY,%
100
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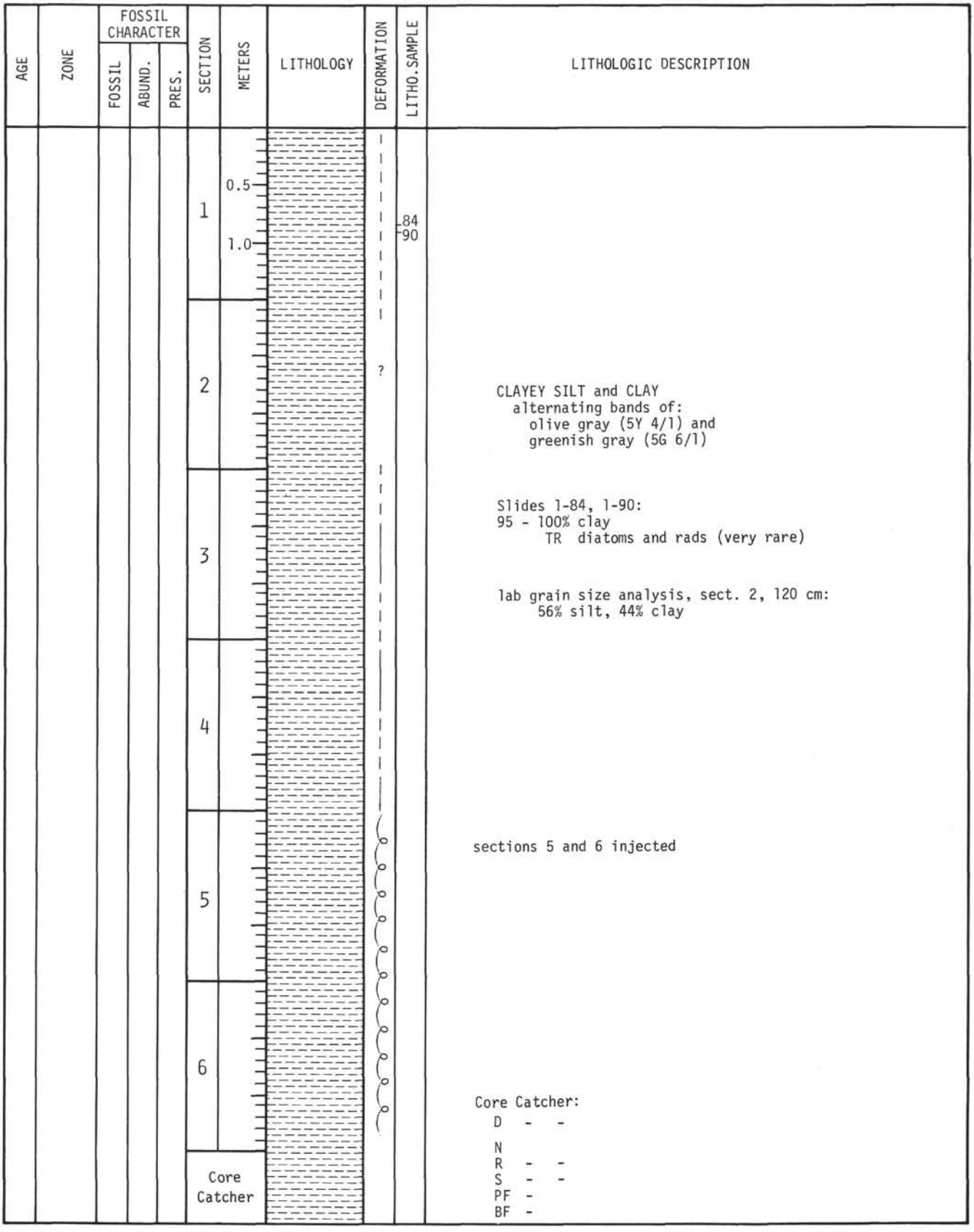
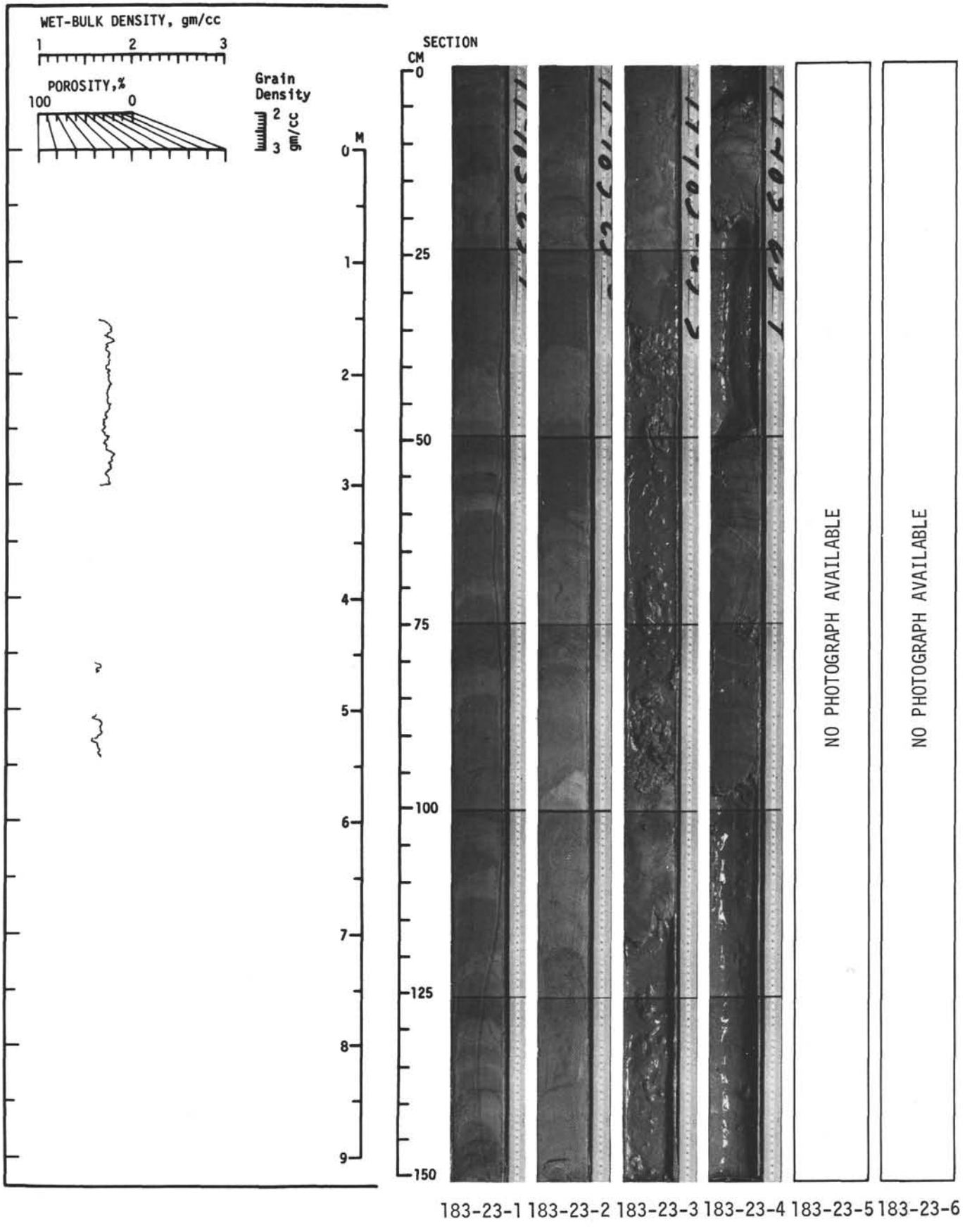
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-22-1
183-22-2
183-22-3
183-22-4
183-22-5

Site 183 Hole Core 23 Cored Interval: 220-229



Explanatory notes in Chapter 1


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
NO PHOTOGRAPH AVAILABLE
NO PHOTOGRAPH AVAILABLE
183-23-1
183-23-2
183-23-3
183-23-4
183-23-5
183-23-6

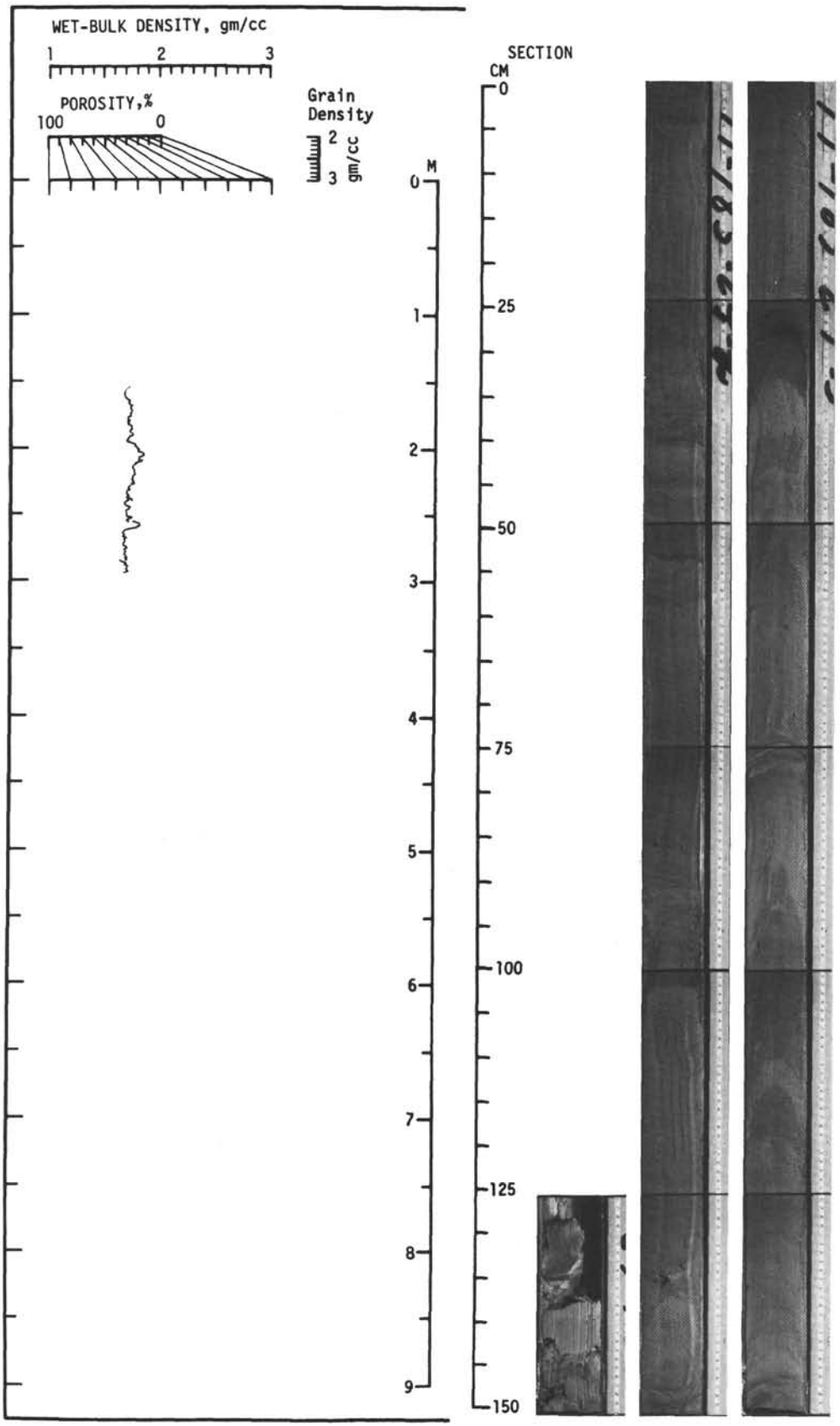
Site 183 Hole Core 24 Cored Interval: 229-239

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					1	0.5 1.0	VOID			
					2					CLAY greenish gray (5GY 6/1), olive gray (5Y 4/1), dark gray (2.5Y 4/0)
					3					CLAY banded (1/2 - 40 cm thickness) dark gray (10YR 4/1) to gray (7.5YR 5/0)
					Core Catcher					Core Catcher: D - - N R - - S - - PF - BF -

Site 183 Hole Core 25 Cored Interval: 239-248

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
OLIG.					Core Catcher		?		CC1 CC2	core catcher recovery only SILT RICH CLAY gray (5Y 5/1) Slide cc1 80% clay 20% silt SILT BEARING CLAY RICH NANNOFOSSIL OOZE light gray (5Y 7/1) semi-indurated Slide cc2 80% nannos 5% silt 15% clay Core Catcher: N C G N A M D - - R - - S - - PF - BF -

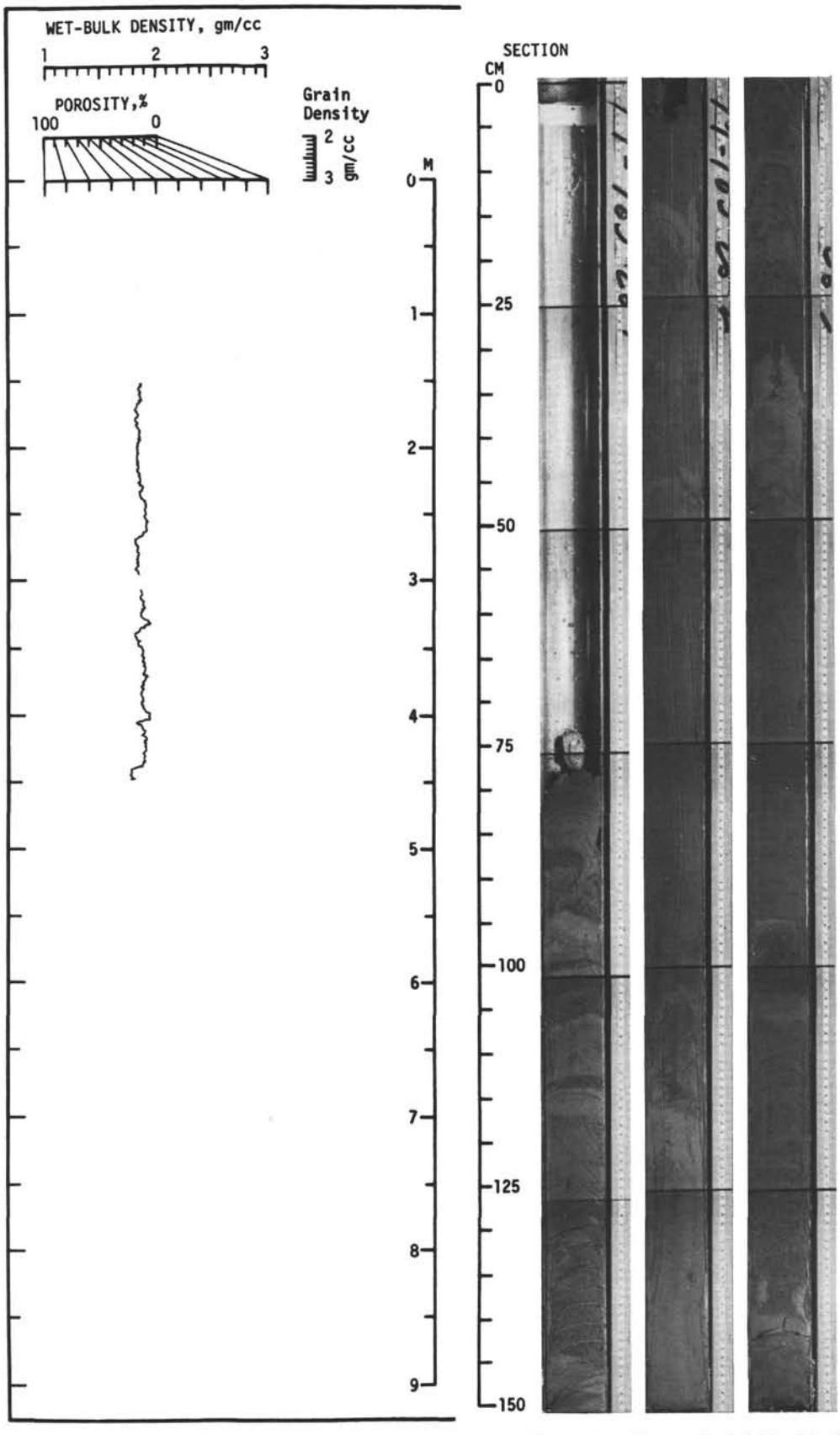
Explanatory notes in Chapter 1


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-24-1
183-24-2
183-24-3

Site 183 Hole Core 26 Cored Interval: 248-257

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LOWER OLIGOCENE	No diagnostic fossils	N	R	M	1	0.5	VOID			
		N	R	M		1.0			110	
					2					SILTY CLAY. CLAYEY SILT, CLAY RICH SILT dark gray (10YR 4/1) to gray (7.5YR 5/0), layered (see core 24)
					3					14 - 57% clay 43 - 86% silt (5 lab grain size determinations)
					Core Catcher					Core Catcher: N R M D - - R - - S - - PF - BF -

Explanatory notes in Chapter 1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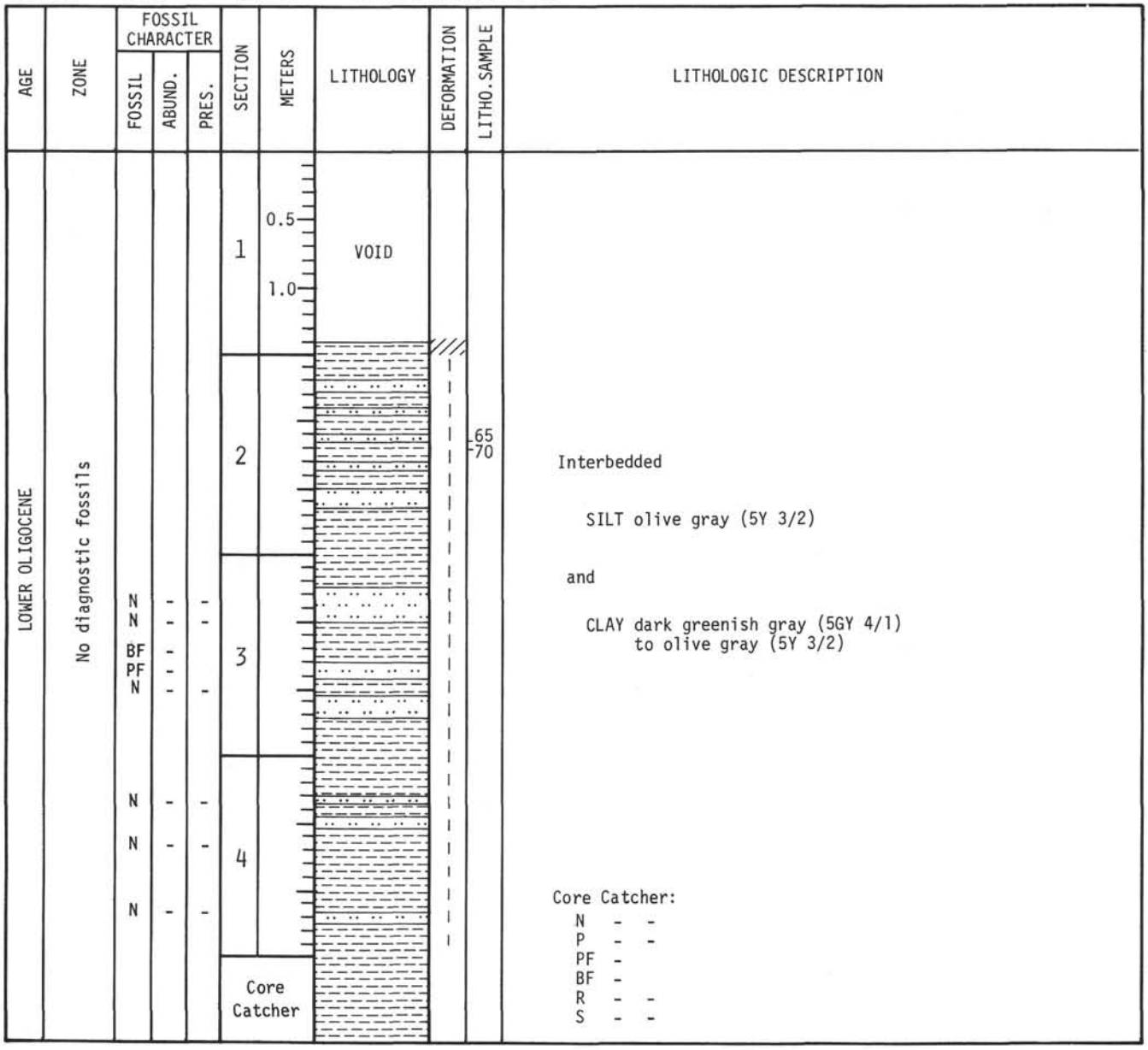
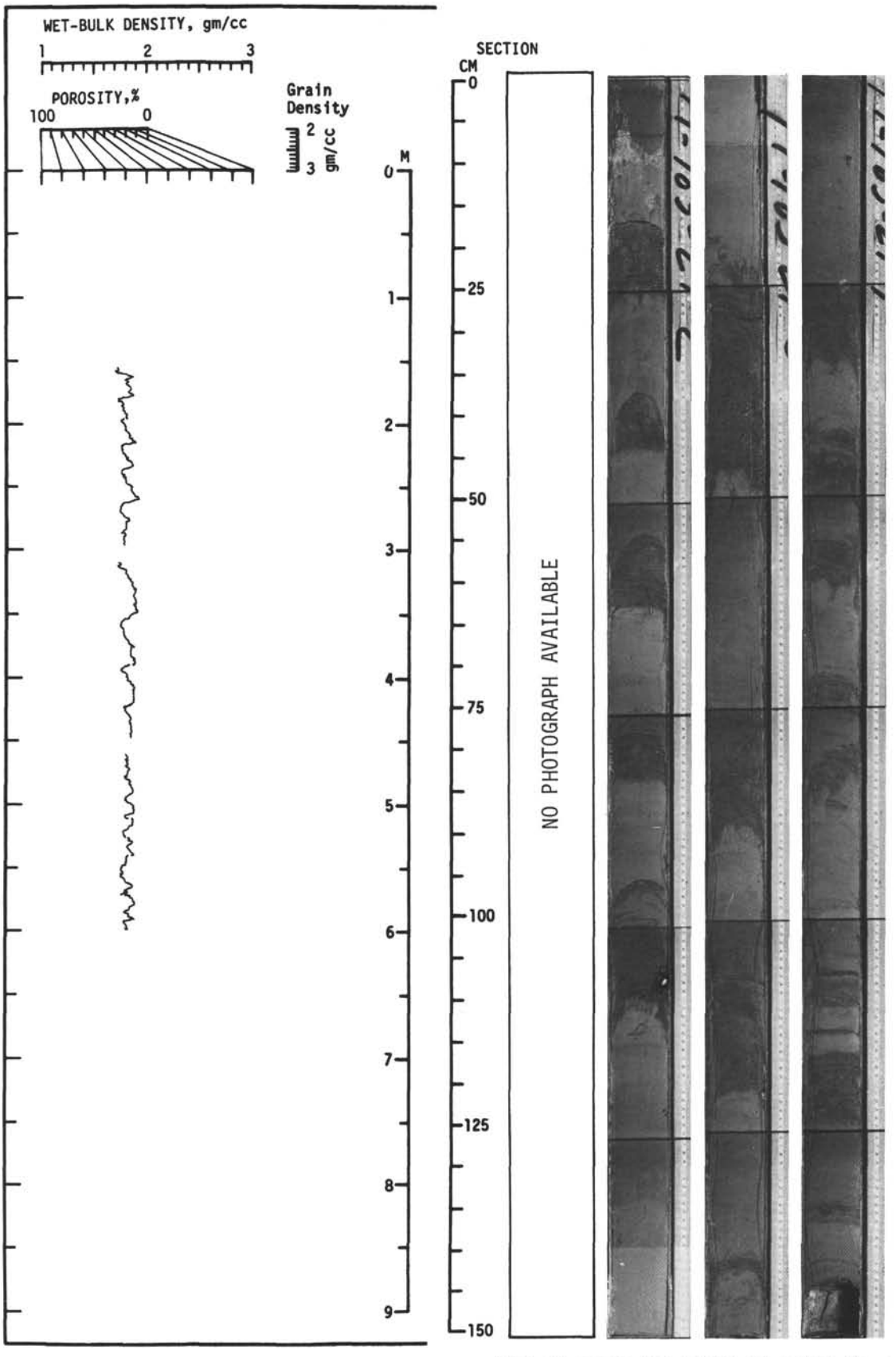
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-26-1
183-26-2
183-26-3

Site 183 Hole Core 27 Cored Interval: 257-267



Explanatory notes in Chapter 1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Grain Density
2
3
gm/cc
M
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1
2
3
4
5
6
7
8
9
SECTION
CM
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25
50
75
100
125
150
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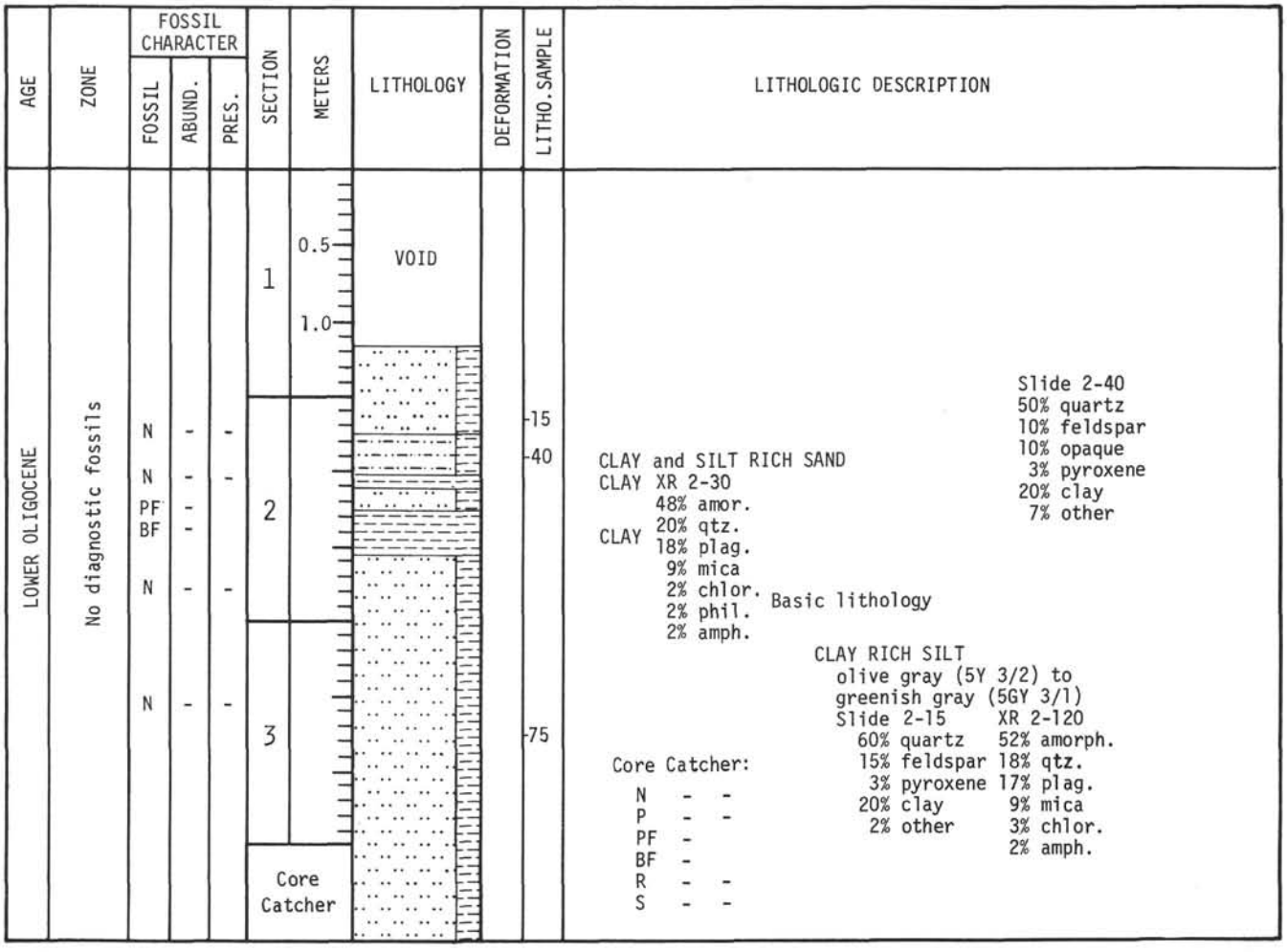
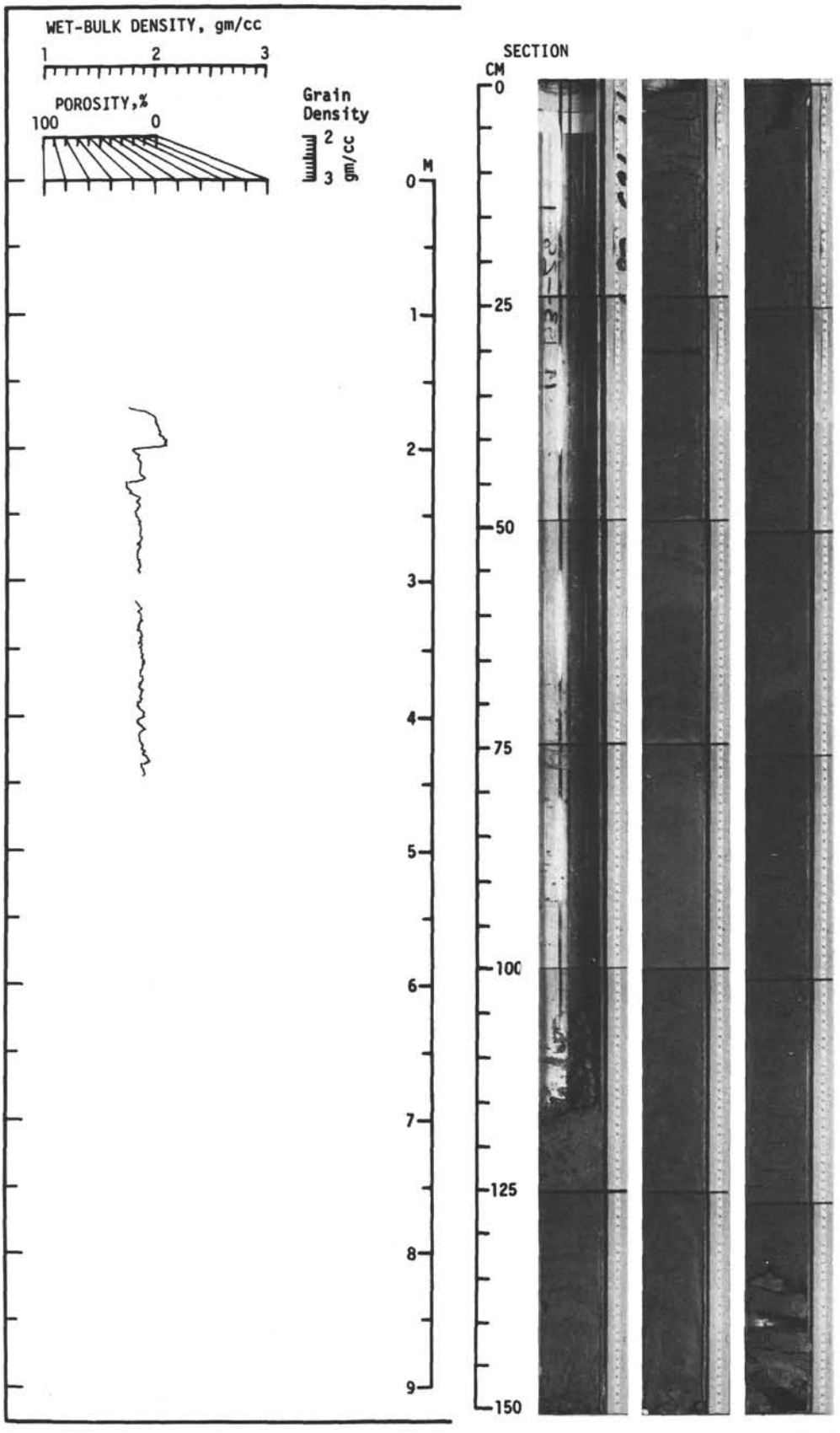
183-27-1
183-27-2
183-27-3
183-27-4

Site 183 Hole Core 28 Cored Interval: 267-276



Explanatory notes in Chapter 1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3
POROSITY,%
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Grain
Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-28-1
183-28-2
183-28-3

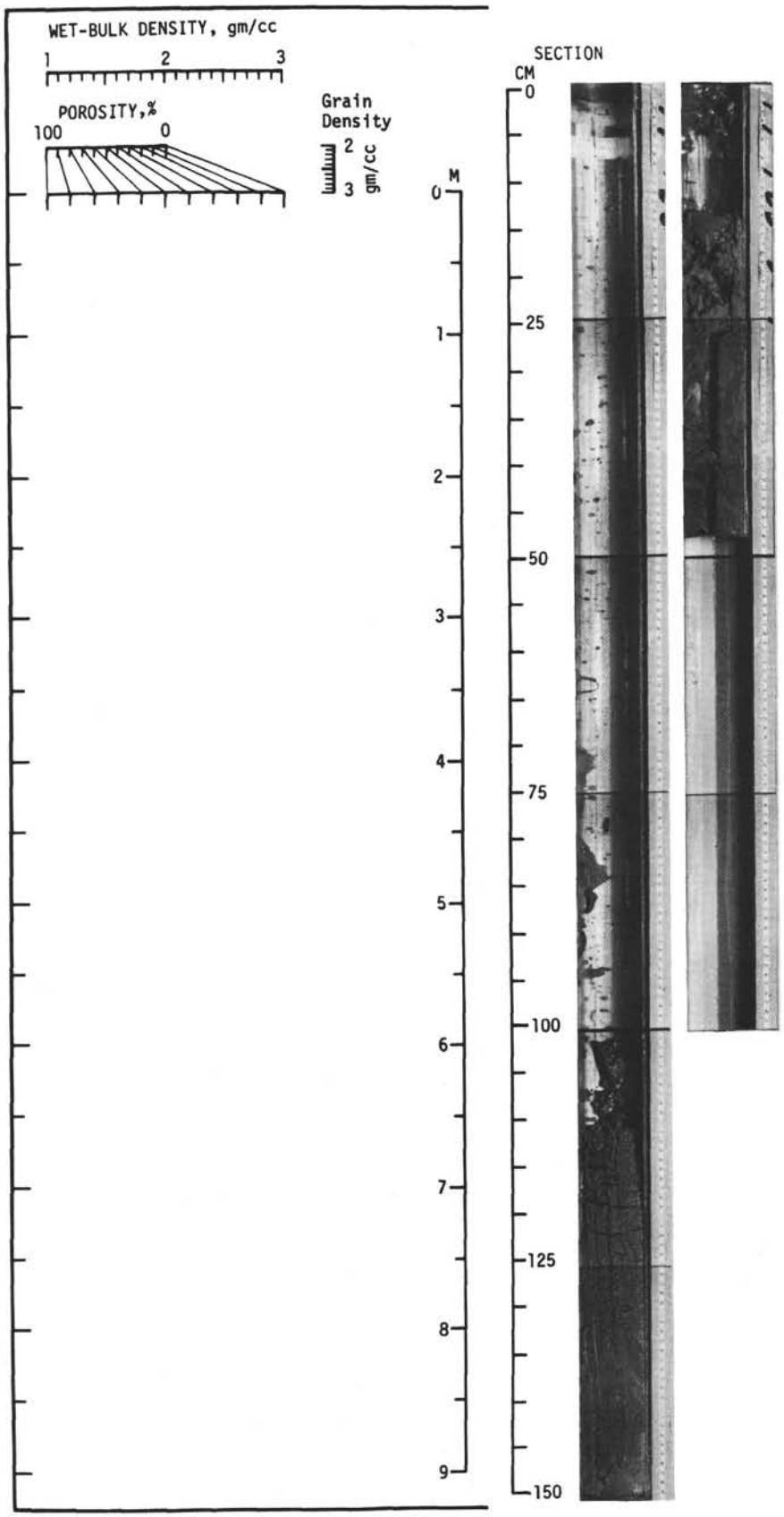
Site 183 Hole Core 29 Cored Interval: 276-285

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LOWER OLIG.	No diag. fossils	N N	- C	- M	1 Core Catcher	0.5 1.0	VOID		136	CLAY BEARING SILTY SAND black (5Y 2/2) fine to very fine sand Core Catcher: N - - D - - PF - BF - R - - S - - Slide 1-136 60% quartz 25% feldspar 5% clay 3% lithic fragments 7% other sand 64% silt 30% (2 lab grain size determinations) clay 6%

Site 183 Hole Core 30 Cored Interval: 285-295

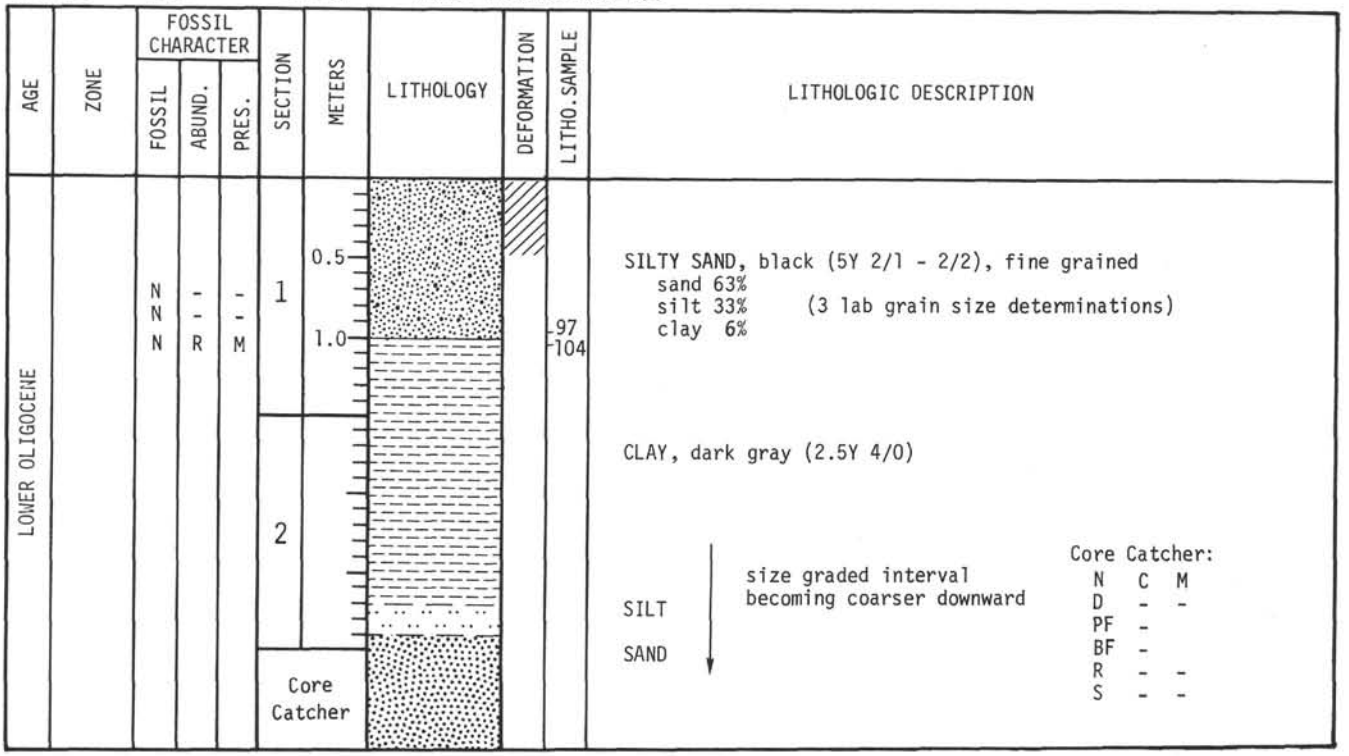
AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LOWER OLIGOCENE	Barren of fossils	N N	- -	- -	1 Core Catcher	0.5 1.0	VOID		140	SANDY SILT gray (5Y 5/1) Core Catcher: N - - N - - D - - PF - BF - R - - S - -

Explanatory notes in Chapter 1

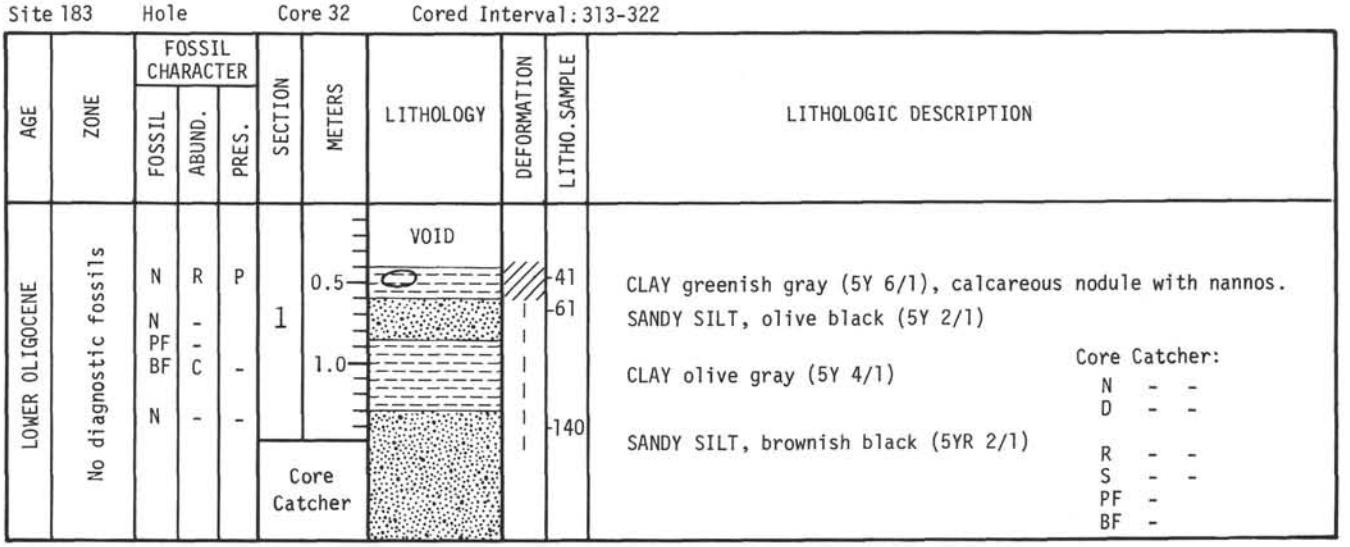


183-29-1 183-30-1

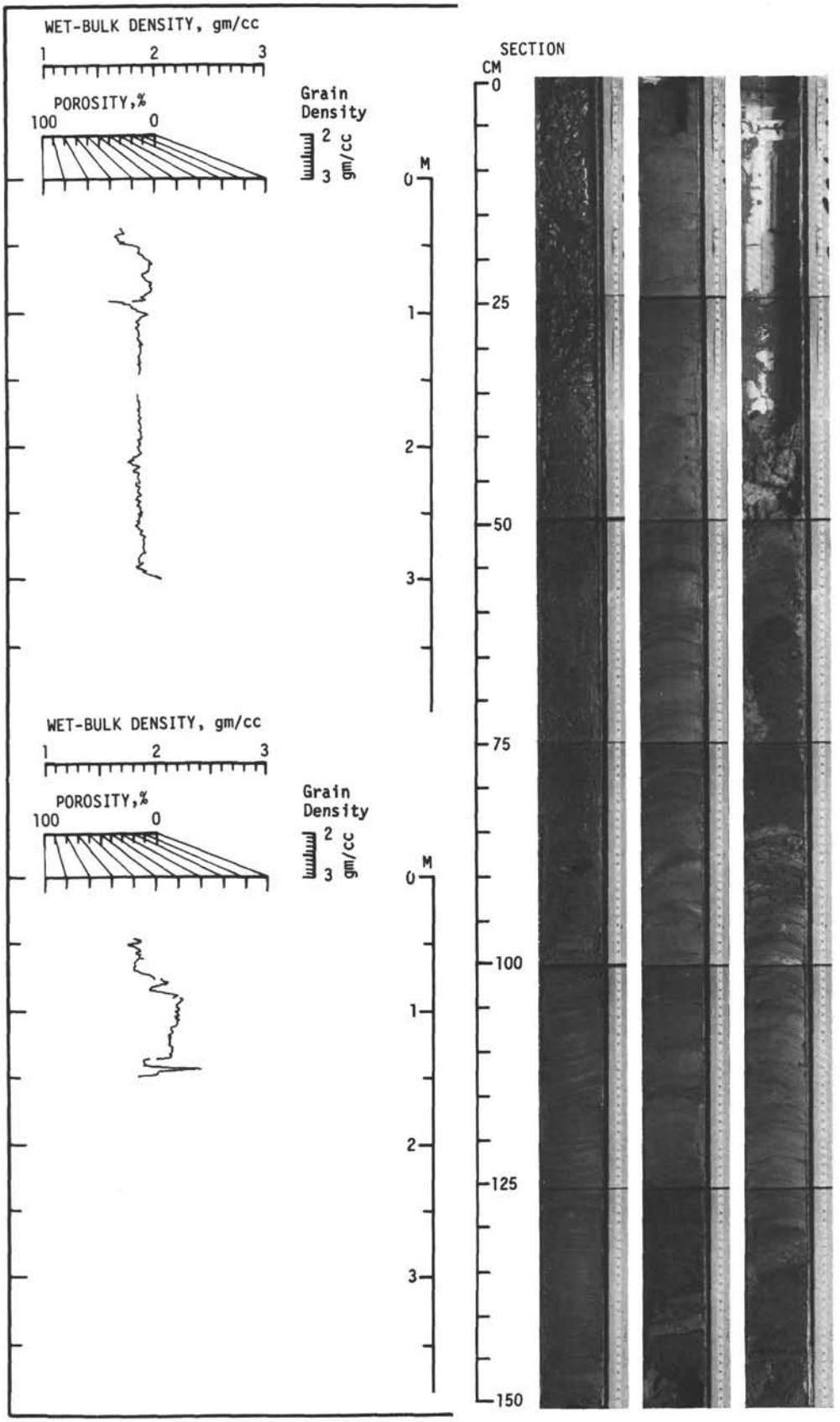
Site 183 Hole Core 31 Cored Interval: 295-304



Site 183 Hole Core 32 Cored Interval: 313-322



Explanatory notes in Chapter 1


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3

SECTION
CM
0
25
50
75
100
125
150
183-31-1
183-31-2
183-32-1

Site 183 Hole Core 33 Cored Interval: 341-350

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
L. OLIG.	No diag. fossils				Core Catcher				CC	core catcher recovery only thinly laminated CLAYEY SILTSTONE olive gray (5Y 3/2) laminae 1-3 mm thick Slide cc 40% quartz 10% opaque 5% feldspar 2% pyroxene 3% other 40% clay Core Catcher: N R M D - - R - - S - - PF - BF -

Site 183 Hole Core 34 Cored Interval: 360-369

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
L. OLIG.	No diag. fossils				Core Catcher				CC	core catcher only SANDY CLAYEY SILT olive gray (5Y 3/2) Slide cc sand 25% silt 50% clay 25% 50% quartz 20% feldspar 3% pyroxene 2% other 25% clay Core Catcher: N C M D - - R - - S - - PF - BF -

Explanatory notes in Chapter 1

Site 183 Hole Core 35 Cored Interval: 388-397

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LOWER OLIG. ?	No diagnostic fossils	N N N N N	- - R - R	- - M - M	1 Core Catcher	0.5 1.0	VOID		104	calcite cemented SILTSTONE and SANDSTONE thinly interbedded SILTSTONE AND SANDSTONE calcite cemented Basic lithology. SILT BEARING CLAY dark greenish gray (5GY 4/1) Slide 1-104 10% silt 90% clay

Core Catcher:

	R	M
D	-	-
R	-	-
S	-	-
PF	-	
BF	-	

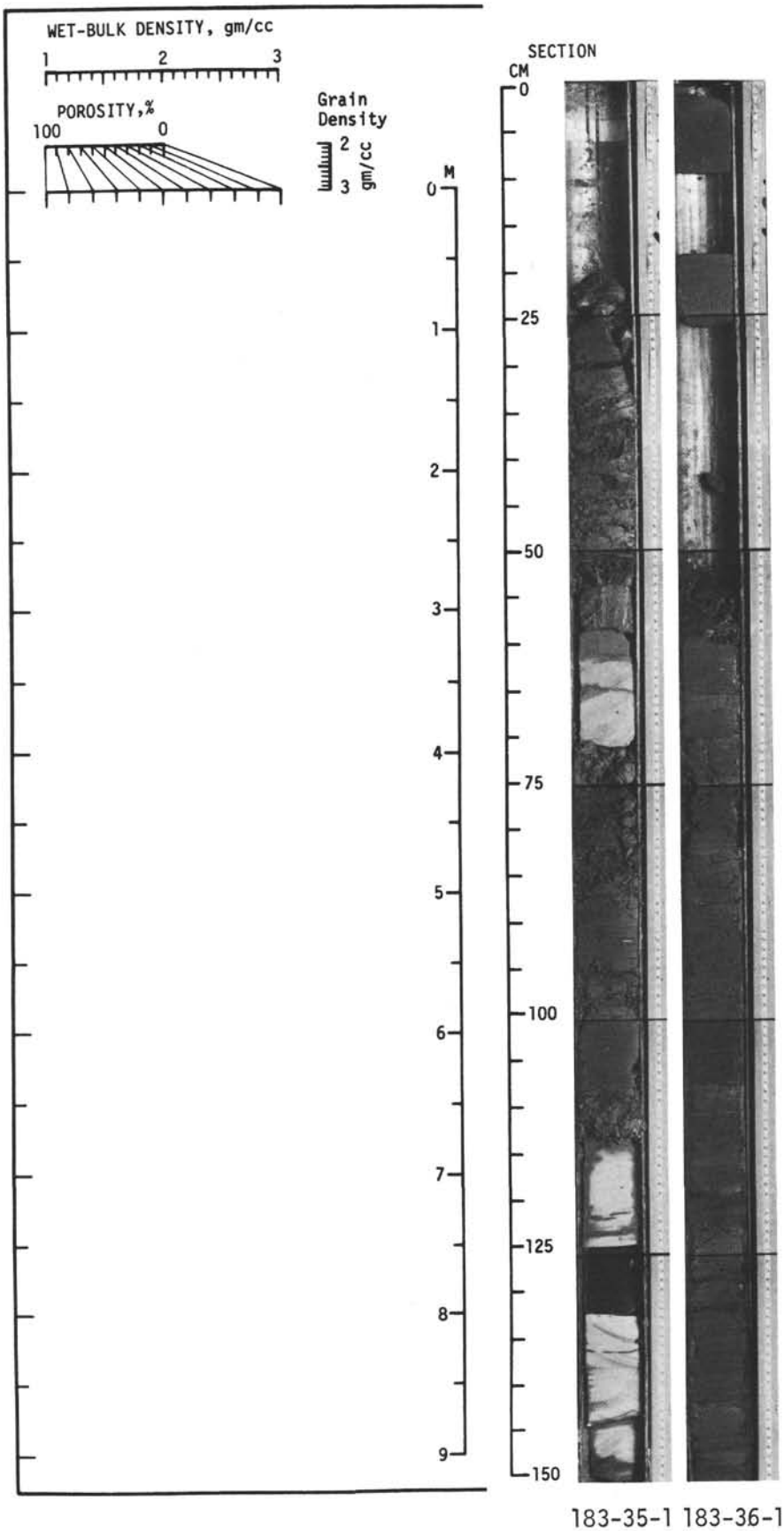
Site 183 Hole Core 36 Cored Interval: 416-425

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
L. OLIG. ?	No diagnostic fossils	N PF BF N D	- - - R -	- M -	1 Core Catcher	0.5 1.0	VOID			CLAY dark gray (5Y 4/1), firm graded beds: CLAY (top) to SILTY SAND, olive gray (5Y 4/2) CLAY as above, firm

Core Catcher:

	R	S
R	-	-
S	-	-
PF	-	
BF	-	

Explanatory notes in Chapter 1


WET-BULK DENSITY, gm/cc
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2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-35-1
183-36-1

Site 183 Hole Core 37 Cored Interval: 444-453

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
L. OLIG.-U. EOC.	No diag. foss.	N	R	M	1	0.5 1.0	VOID		-130	Semi-indurated ORGANIC MATERIAL BEARING CLYSTONE dark gray (5Y 4/1) 5 - 10% wood, plant fragments
					Core Catcher					

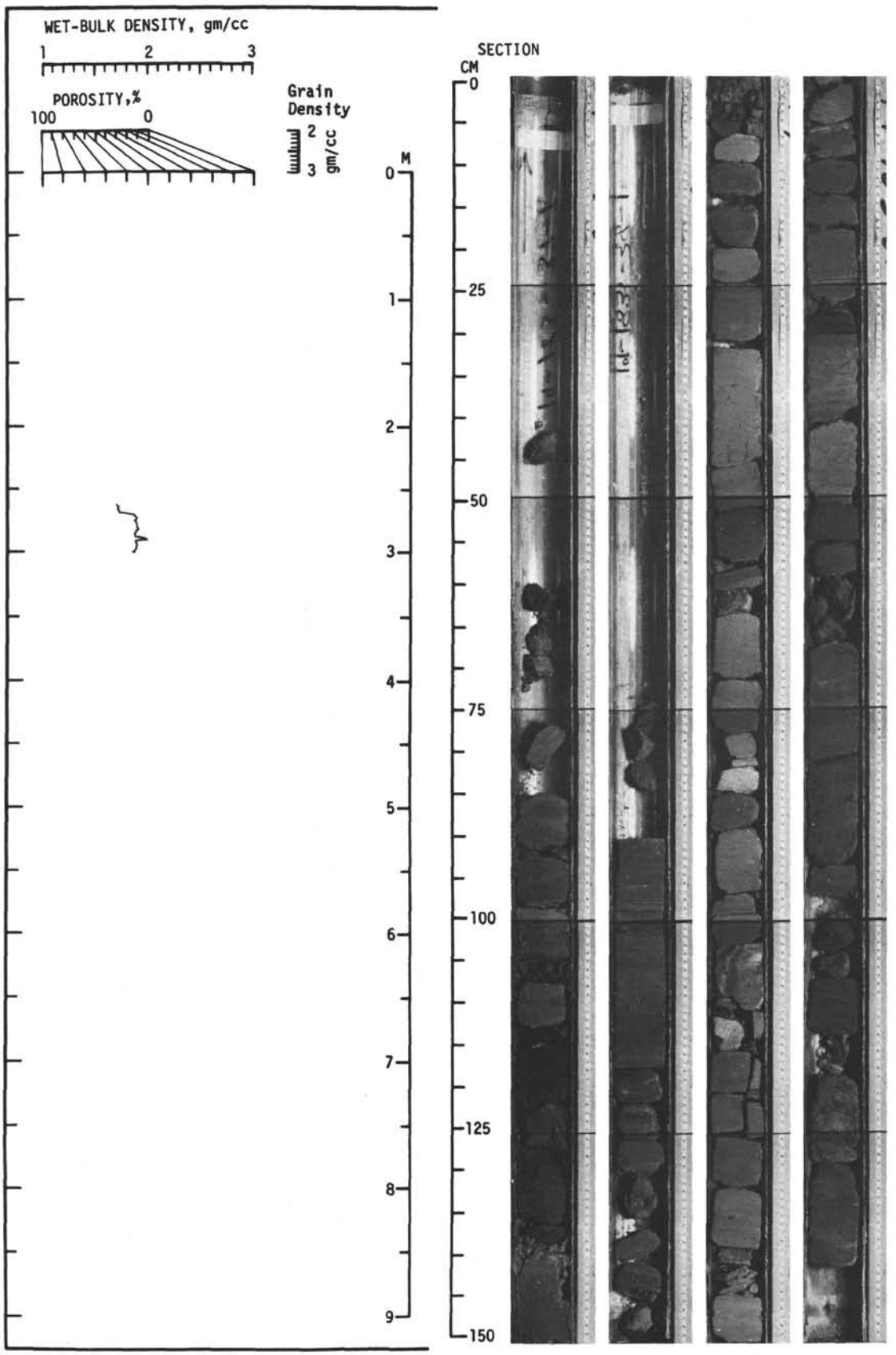
Core Catcher:

N	R	M
D	-	-
R	-	-
S	-	-
PF	-	
BF	R	

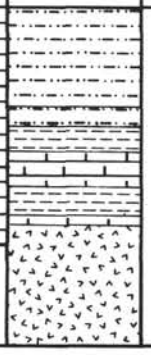
Site 183 Hole Core 38 Cored Interval: 472-481

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
MIDDLE EOCENE ?	Few useful fossils	PF BF N	- - R	M	1	0.5 1.0	VOID		-114	Basic lithology CLAY olive gray (5Y 3/2) to dark greenish gray (5GY 4/1) fine layering and mottling XR 2-120 65% amor. 12% qtz. 9% plag. 10% mica 5% chlor. Slide 1-114 100% clay
					2					
		PF BF	- -		3				-95	SILTY SAND, olive gray (5Y 3/2), with CLAY interbeds up to 3 cm thick
		N D F R S	- - -	- - -	Core Catcher					SILTY SAND (as above)

Explanatory notes in Chapter 1


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150
183-37-1
183-38-1
183-38-2
183-38-3

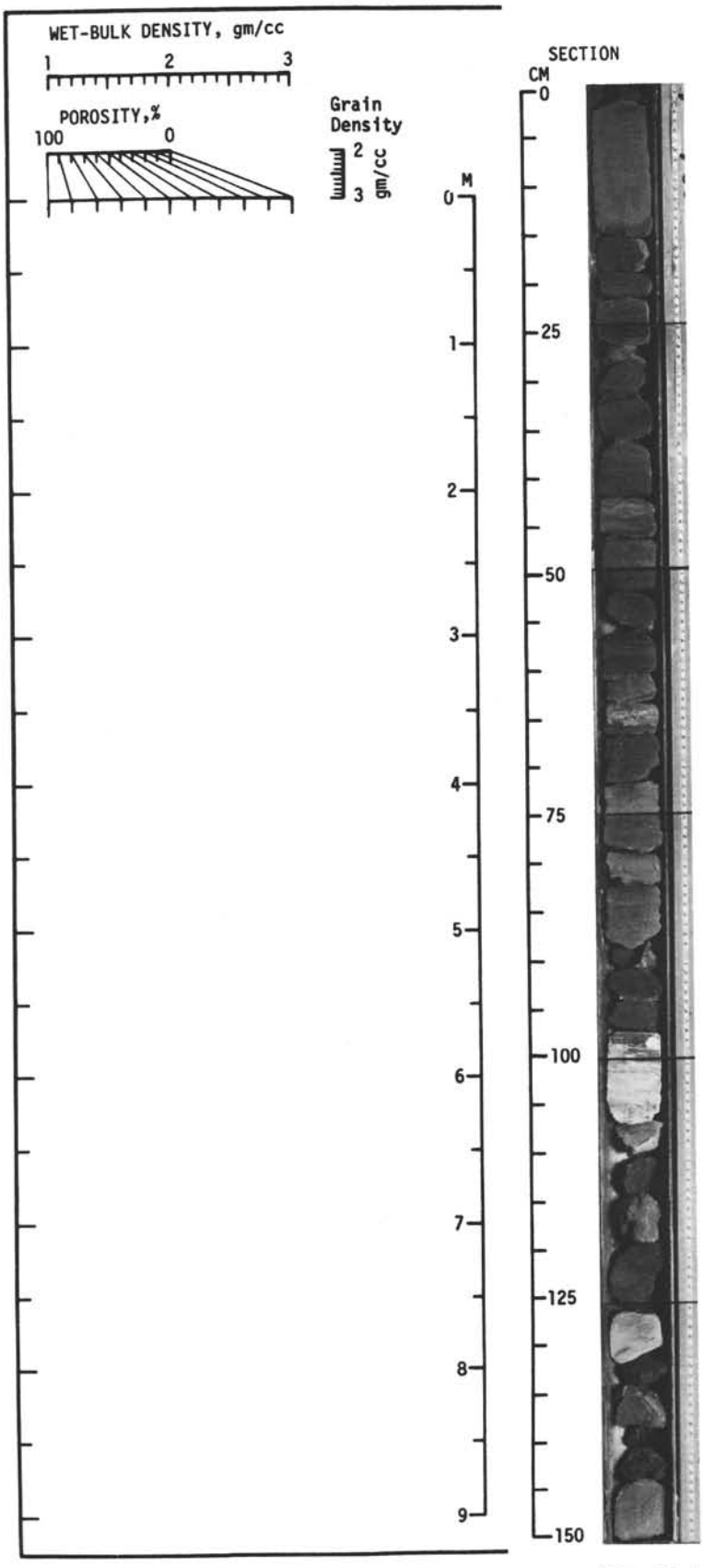
Site 183 Hole Core 39 Cored Interval: 500-505

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
LOWER EOC.	N - Marthasterites tribrachiatus	N N N N N D R S	- R R A A R - - -	- M M P P P M - -	1	0.5 1.0			37 78 88 106 125	SILTY CLAY dark gray (5Y 4/1 - 3/1) SILTY CLAY light olive gray (5Y 6/2) CLAY dusky yellowish green (5GY 5/2) NANNO LIMESTONE bluish white (5B 9/1) CALCAREOUS FERRUGINOUS CLAY dark yellowish brown (10YR 4/6) NANNO LIMESTONE dark greenish gray (5G 4/1) OLIVINE BASALT XR 1-80: 81% amor., 5% quartz, 4% plag., 6% mica, 2% chlor., 2% mont. XR 1-120: 83% amor., 1% quartz, 5% K-feld., 1% mica, 9% mont.
					Core Catcher					

Site 183 Hole Core 40 Cored Interval: 505-516

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					Core Catcher					core catcher only several rounded BASALT pebbles and basalt cuttings

Explanatory notes in Chapter 1


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain
Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
SECTION
CM
0
25
50
75
100
125
150

183-39-1