6. SITE 187

The Shipboard Scientific Party[1]

SITE DATA

Date Occupied: 12-13 Aug 71.

Position:
51°06.6′N
173°57.2′W

Water Depth: 4577 meters.

Penetration: 370 meters.

Number of Holes: One.

Number of Cores: Four.

Total Core Recovered: 6.8 meters.

Acoustic Basement:
Depth: 160 meters
Nature: Deformed sediments
Velocity: Approximately same as Site 186, 2.0 km/sec.

Age of Oldest Sediment: Early late Miocene.

Basement: Miocene deformed sediments.

SUMMARY

The sediment sequence at Site 187, located 2.3 miles southeast of Site 186 (Figure 1), consists of diatomaceous silty clay that is older but otherwise virtually identical to that recovered at Site 186. Only four cores were attempted to a total depth of 370 meters; they contained sediment of Pleistocene, lower Pliocene, and late Miocene age. Limestone fragments (one of which contains fecal pellets), silty mud, and an ice-rafted (?), rounded graywacke pebble were recovered from the core catcher of Core 1 at 164 meters. The two limestone fragments contain a lower Pleistocene flora and probably caved from higher in the hole, as the associated silt is of early Pliocene age. Upper Miocene disturbed (probably by coring operations) and indurated silty clay (claystone) with associated diatomaceous sediment was recovered between 175 and 370 meters.

Site 187 is located above the "acoustic basement" underlying the outer ridge of Atka Basin, Aleutian Terrace. This ridge is also the summit of the steeply sloping inner wall of the Aleutian Trench. Drilling at this site shows that at least part of the acoustic basement is deformed sedimentary rock as old as late Miocene. These deposits presumably accumulated in Atka Basin. Near Site 186, beneath this basin, stratigraphically equivalent beds lie deeper than 926 meters. The structural displacement of late Miocene beds between Sites 186 and 187 must be at least 750 meters. The source area for the allochthonous block of middle Miocene silty clay cored at Site 186 in beds of early Pliocene age is presumably the ridge drilled at Site 187 (see Grow, this volume).

BACKGROUND AND OBJECTIVES

Description

Site 187 is located over the inner part of the outer "bedrock" ridge of Atka Basin, Aleutian Terrace (4577 m, corrected). The site is just 2.3 miles southeast (132°T) of previous Site 186. The reference profile (Figure 2) revealed about 100 to 150 meters of pelagic debris overlying an acoustically unresolvable "basement," which could either be deformed sedimentary debris or possibly vesicular volcanic rocks. Gravity data imply that the outer ridge is not underlain by exceptionally dense material, hence deformed sedimentary deposits were expected.

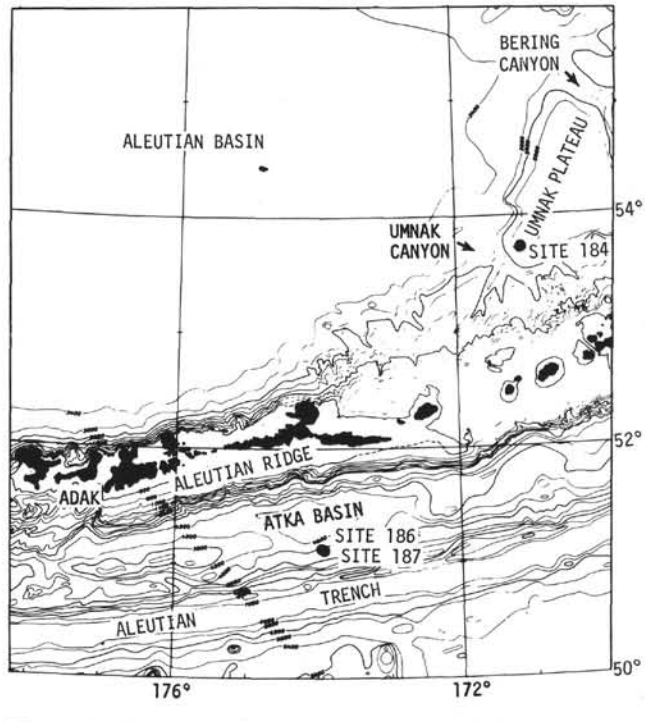

Figure 1. *Base map showing the location of Site 187.*

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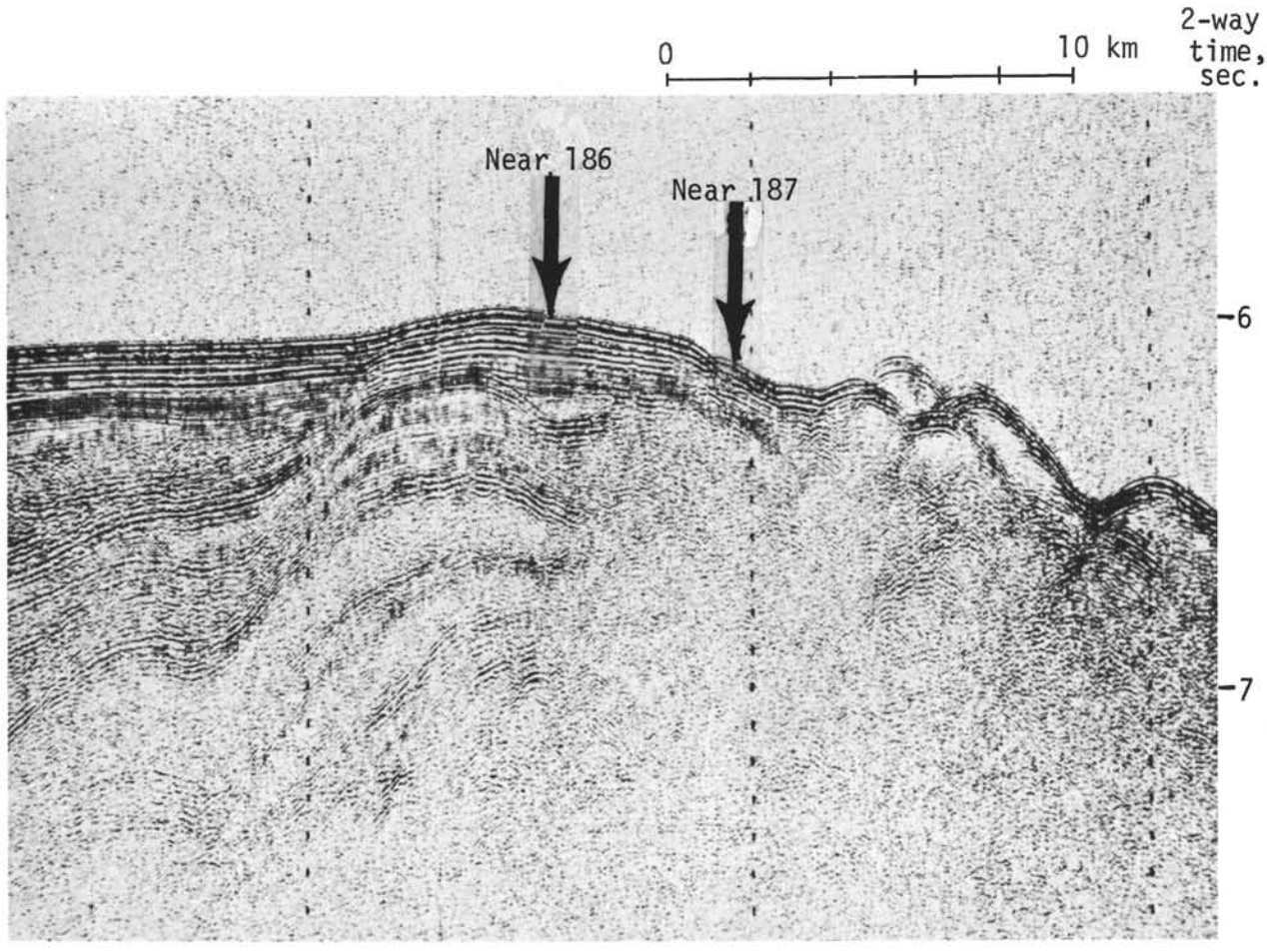


Figure 2. *Reference seismic reflection profile, obtained by E. L. Hamilton, 2 Aug 70.*

Objectives

A considerable body of circumstantial evidence exists that implies that the outer ridge, which is also the upper part of the inner wall of the adjacent Aleutian Trench, may be underlain by oceanic offscrapings. The principal objective of Site 187 was to (1) determine the nature of the rocks underlying the ridge, (2) establish their relation to the sedimentary section drilled at Site 186, and (3) assess the possibility that oceanic offscrapings may be present.

OPERATIONS

Pre- and Post-drilling Survey

Site 187 is located 2.3 miles southeast (132°T) of Site 186 along the track of the reference profile collected by E. L. Hamilton on 2 Aug 70. The ship was moved to this site with the drill string suspended below the ship, therefore no seismic equipment was streamed. A new beacon was dropped at 1210 hrs on 12 Aug 71. The finally accepted position is: 51°06.62′N; 173°57.23′W. The reference seismic profile is shown in Figure 2. No air-gun profile was made coming onto the site, but a post-drilling survey was made which passed through Sites 186 and 187 (Figure 3). A map showing the surveys and track and site locations is shown in Figure 4.

Drilling Program

Site 187 was occupied from 1215 hrs 12 Aug 71 (beacon away) until 1200 hrs 13 Aug 71 with alternate coring and washing from the sea floor to a subbottom depth of 370 meters. At this depth a diatomaceous clayey silt, of early late Miocene age, lithologically similar to that encountered at Site 186 was cored. Coring speed, which was slow, and the necessity to disembark personnel at Adak on 14 Aug 71 required that the hole be abandoned.

Using Matthews Tables and information from the U.S. Navy Undersea Research and Development Center, the sonic depth of 2342 fms was corrected to 4538 meters giving a water depth of 4544 meters and a drill-floor depth of 4554 meters. Considering the past errors in this calculation, the bottom below drill floor was estimated at 4587 meters. This estimate then, gives an estimated depth below sea level of 4577 meters. This is the accepted depth, inasmuch as, in order to save time, the bottom was not cored. No difficulties were encountered in drilling this hole. A coring summary is given in Table 1.

LITHOSTRATIGRAPHY

The deposits recovered from Site 187 are dark brownish gray and olive gray diatomaceous silty clay, identical to those recovered at Site 186. An ice-rafted(?), rounded

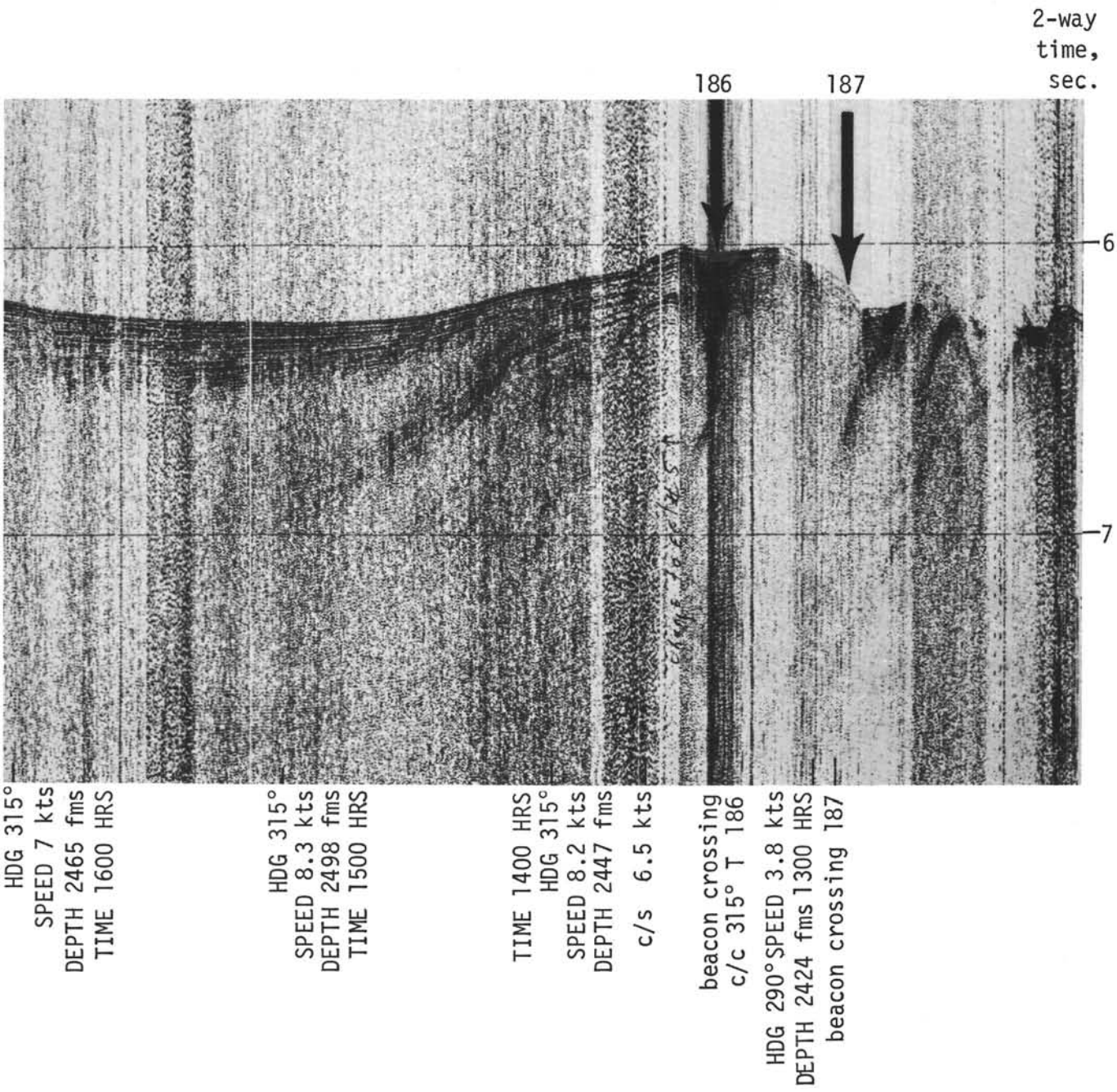


Figure 3. *Reflection profile obtained by* Glomar Challenger *upon departure from Site 187.*

pebble of graywacke was recovered from the core catcher in the Interval 164 to 173 meters along with mud of early Pliocene age and two angular pieces of lower Pleistocene limestone (one of which included fecal pellets) probably derived from higher levels. In Core 2 a light gray vitric ash was recovered (174 m) in beds of late Miocene age. The final core recovered from 361 to 370 meters contains highly disturbed layers of brittle claystone in an otherwise soft section of diatomaceous silty clay.

PHYSICAL PROPERTIES

A limited number of GRAPE measurements and shore laboratory density determinations were made on the sediment from Site 187. These are presented on the site summary sheet. No trends are apparent over the range tested.

PALEONTOLOGY

The four cores taken at Site 187 consist of diatomaceous silty clay; the core catcher of Core 1 contained two limestone pieces, one of which included fecal pellets. Only siliceous fossils have been found. The limestone fragment of Core 1 is Pleistocene in age and is thus not indigenous to the silty clay, early Pliocene, within which it is enclosed. This fragment presumably fell down the hole from a higher stratigraphic level. Silty clay of the remaining cores are of late Miocene age.

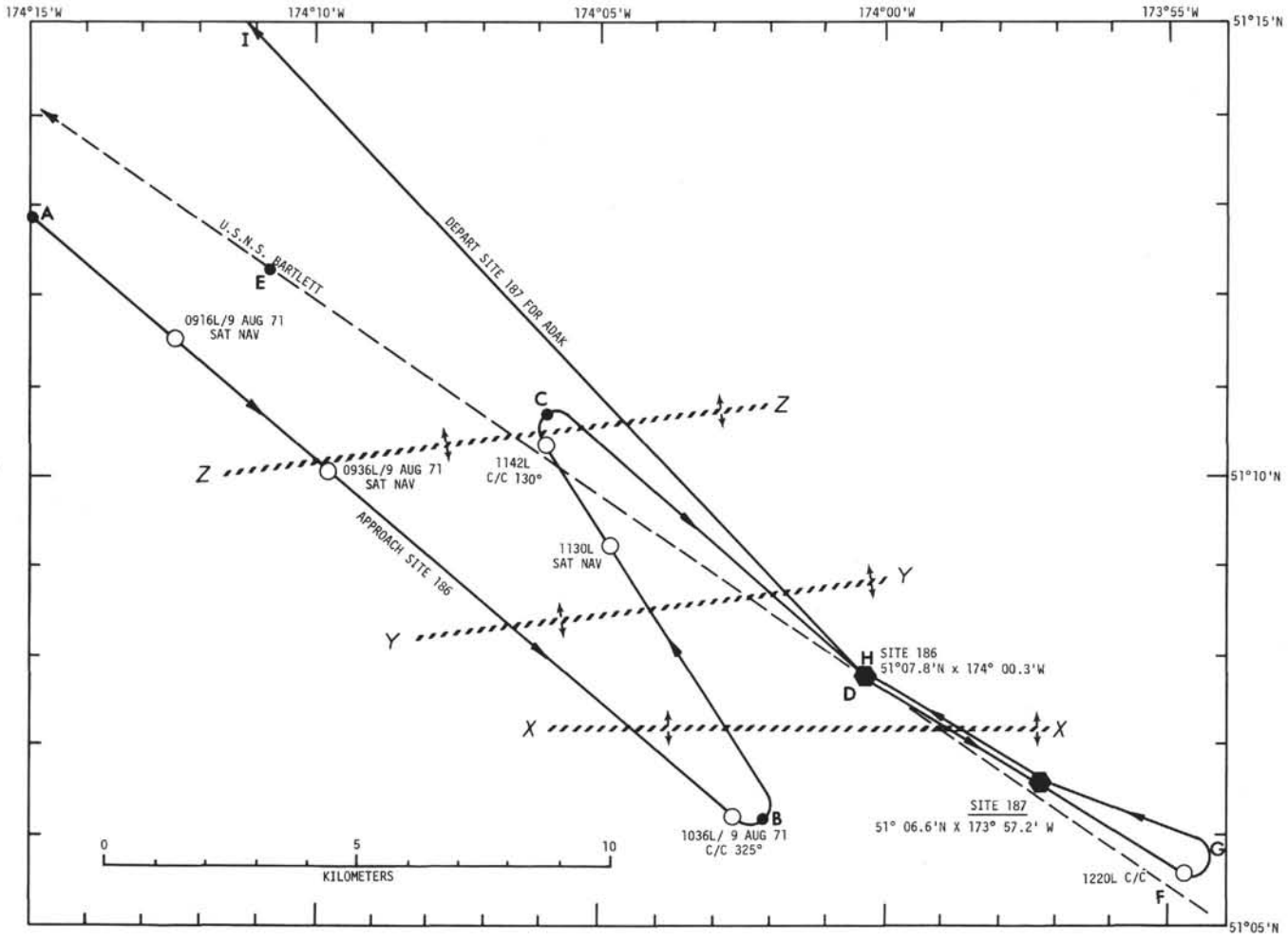


Figure 4. *Track of the* Glomar Challenger *in the vicinity of Sites 186 and 187.*

Calcareous Nannoflora

Although some of the cores at this site contain limestone bands, the site is apparently barren of nannofossils.

Radiolaria and Silicoflagellates

Occurrences of radiolarians and silicoflagellates from Site 187 are shown in Table 6, Chapters 27 and 28. In Cores 1 and 3 limestone and clay contain different microfossil assemblages and, in the case of Core 1, the assemblages are even of different ages. A few radiolarians were found from other samples at this site, but without any index taxa.

As for silicoflagellates, the limestone of Core 1 yields varieties of *Distephanus speculum* and *Dictyocha subarctios,* apparently indicating Pleistocene age.

Diatoms

The limestone of Core 1 contains many diatoms of Pleistocene age. Diatom assemblages of associated silty clay indicate an early Pliocene age. The flora of Core 4 is dominated by *Coscinodiscus marginatus* forma and *Denticula kamtschatica,* and it seems to be older than Core 28 of Site 186.

CORRELATION BETWEEN REFLECTION PROFILE AND STRATIGRAPHIC COLUMN

See Correlation Between Reflection Profile and Stratigraphic Column report for Site 186.

TABLE 1
Coring Summary – Site 187

Core	Cored Interval Below Bottom (m)	Cored (m)	Recovered (m)	Recovered (%)
Wash 1	164-173	9	3 pebbles in catcher	0.0
2	173-182	9	3.0	33.3
Wash 3	267-276	9	1.5	16.7
Wash 4	361-370	9	2.3	25.6
		36	6.8	18.9

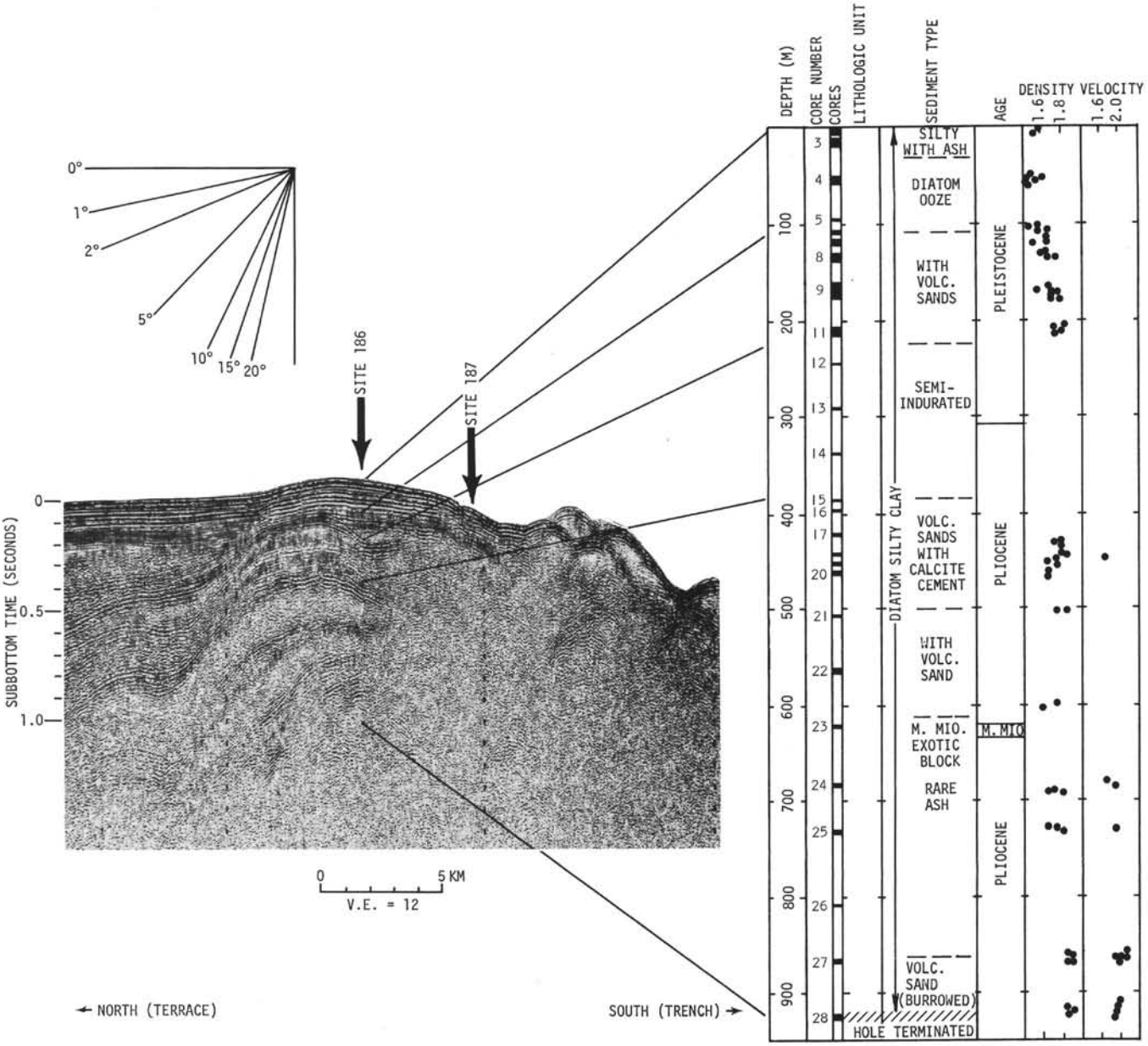
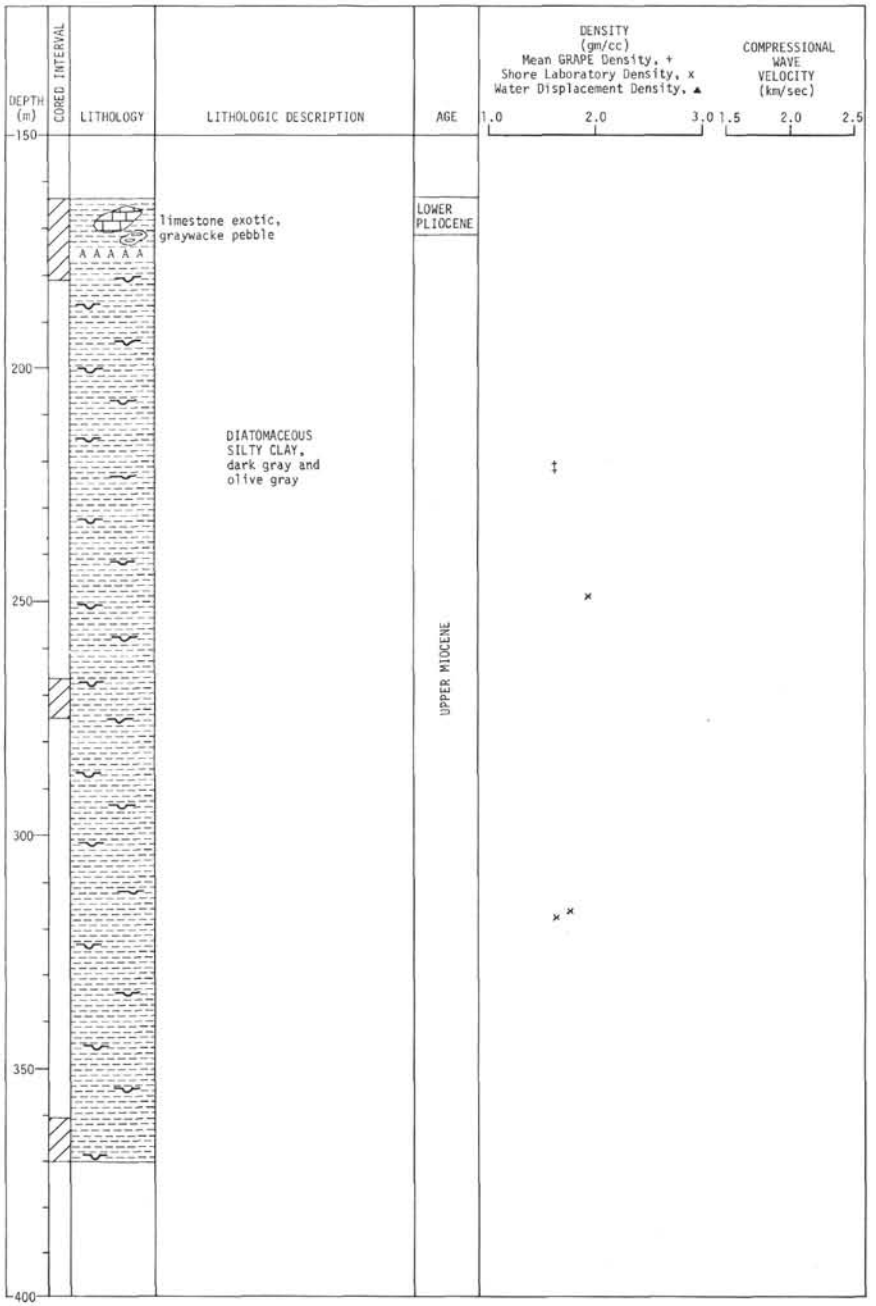


Figure 5. *Correlation of the seismic reflection profile with physical properties and the lithologic column, Sites 186 and 187.*

SITE 187


DEPTH (m)
CORED INTERVAL
LITHOLOGY
LITHOLOGIC DESCRIPTION
AGE
DENSITY (gm/cc)
Mean GRAPE Density, +
Shore Laboratory Density, x
Water Displacement Density, ▲
COMPRESSIONAL WAVE VELOCITY (km/sec)
1.0
2.0
3.0
1.5
2.0
2.5
150
200
250
300
350
400
limestone exotic, graywacke pebble
DIATOMACEOUS SILTY CLAY, dark gray and olive gray
LOWER PLIOCENE
UPPER MIOCENE

Site 187 Hole Core 1 Cored Interval: 164-173

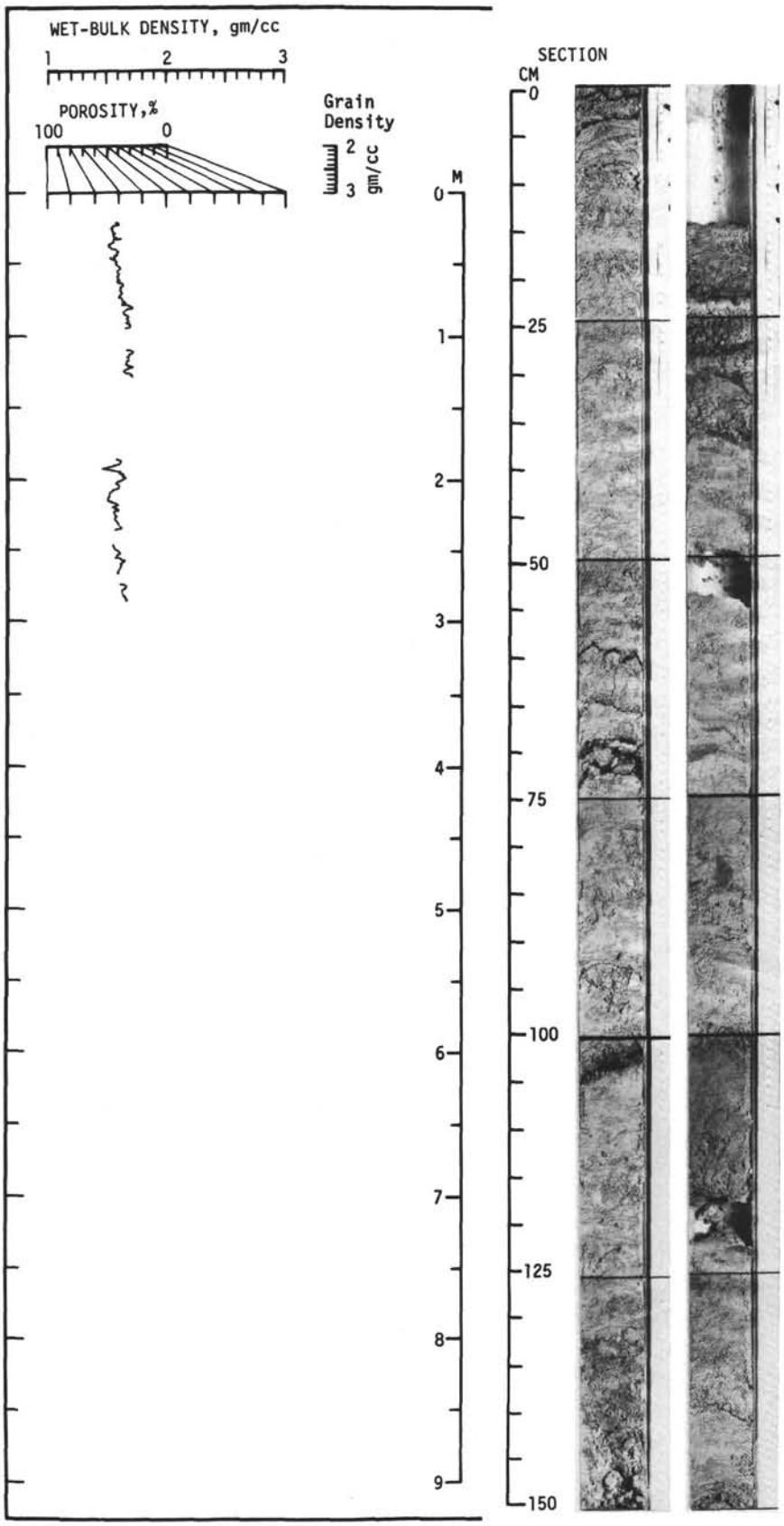
AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
PLEISTOCENE - LOWER PLIOCENE	(D) Denticula seminae ? (S) - D. kamtschatica	D PF BF N R S	A - - - R R	G - M M	Core Catcher					core catcher sample only: 1) angular pieces of LIMESTONE (5-10 cm) dusky yellow (5Y 6/4) and med. light gray (N6) 2) rounded GRAYWACKE pebble (5-10 cm) dark gray (N4) 3) small amount of diatomaceous silty clay

Explanatory notes in Chapter 1

Site 187 Hole Core 2 Cored Interval: 173-182

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	FOSSIL CHARACTER: ABUND.	FOSSIL CHARACTER: PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
UPPER MIOCENE	(D) Denticula kamtschatica				1	0.5 1.0			-105 -147	VITRIC ASH, light bluish gray
					2		VOID		-112	Core Catcher: Basic lithology: D A G PF - BF - N - - R R M S R M DIATOM BEARING SILTY CLAY dark greenish gray (5GY 4/1) with thin (1-2 cm) layers of SAND, greenish black (5G 2/1) and diatom rich zones, olive gray (5Y 4/1)
					Core Catcher					

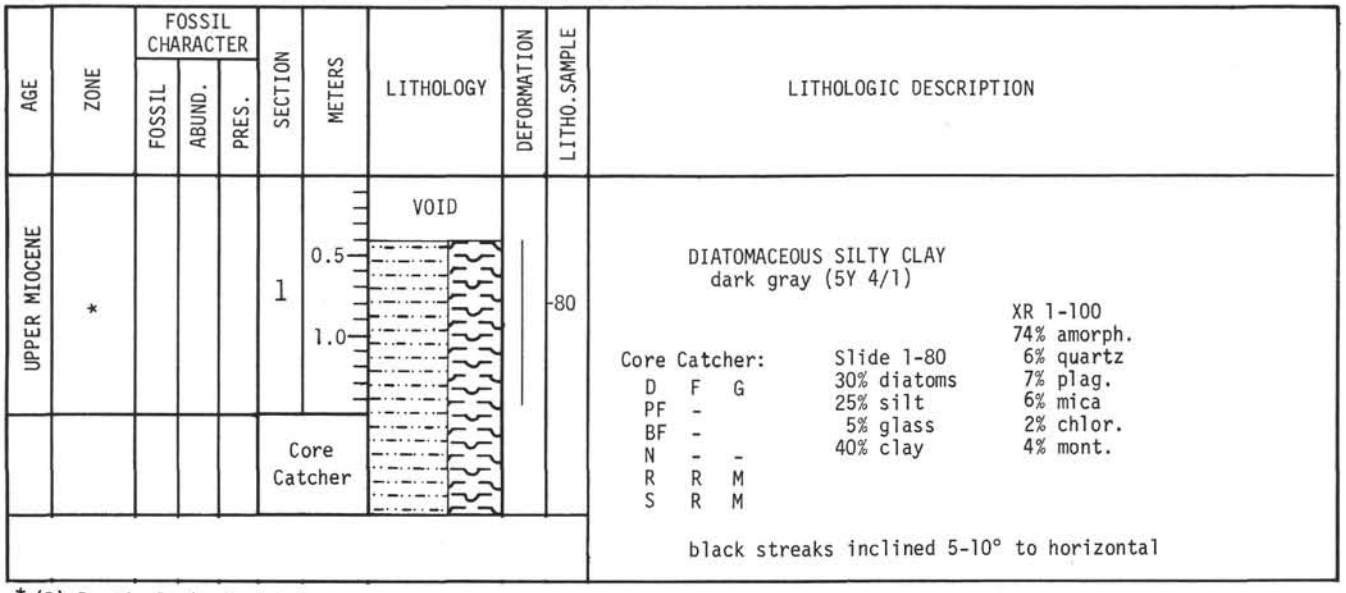
Explanatory notes in Chapter 1


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

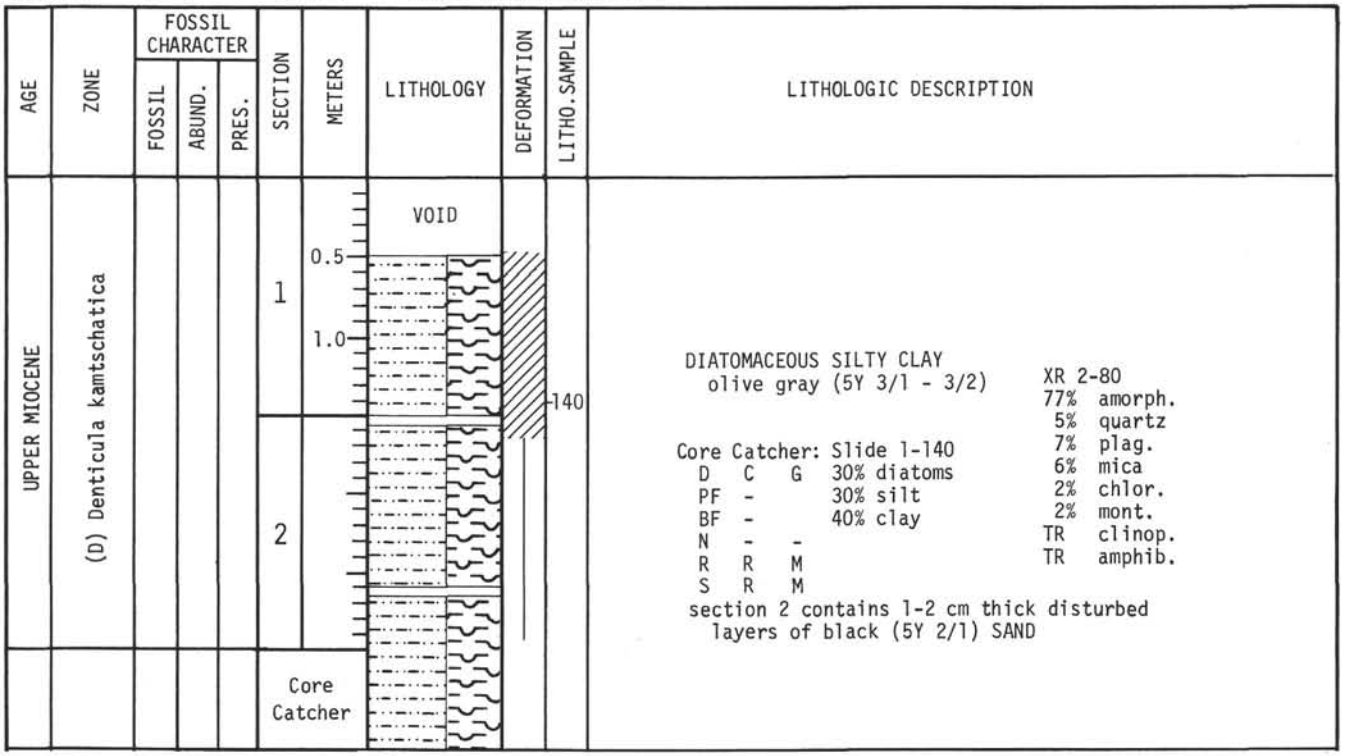
187-2-1 187-2-2

Site 187 Hole Core 3 Cored Interval: 267-276

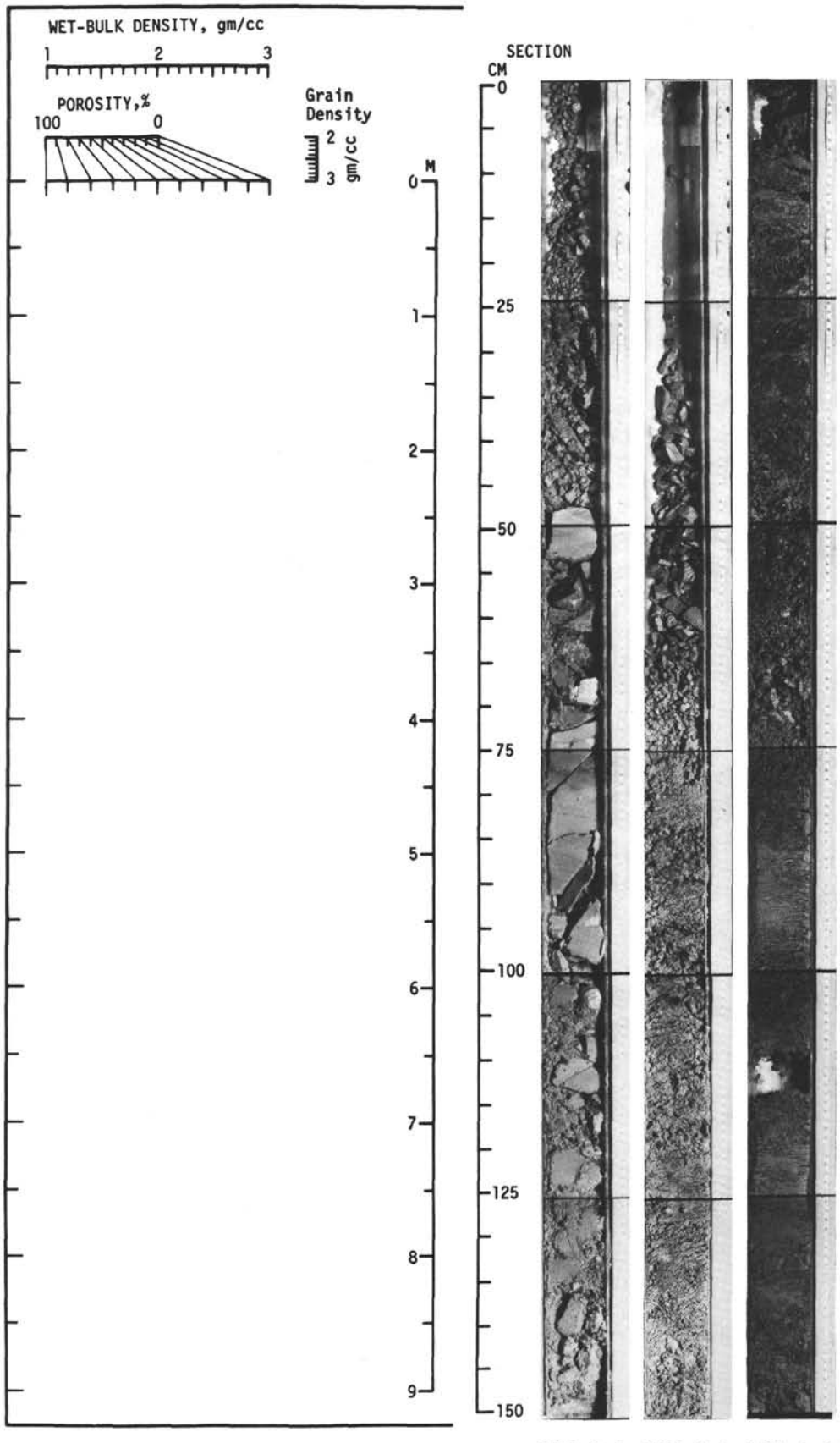


* (D) Denticula kamtschatica

Site 187 Hole Core 4 Cored Interval: 361-370



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
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SECTION
CM
0
25
50
75
100
125
150
187-3-1
187-4-1
187-4-2