5. SITE 252

The Shipboard Scientific Party[1]

SITE DATA

Locality: Northwest Crozet Basin

Position:
lat 37°02.44'S
long 59°14.33'E

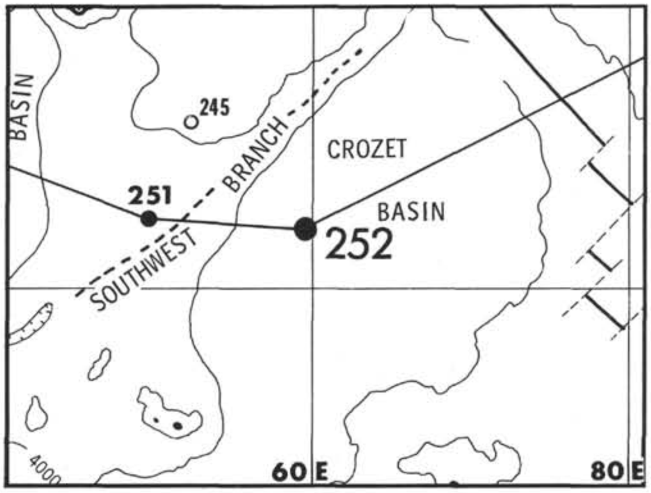
Dates Occupied: 23-24 September 1972

Water Depth: 5032 meters

Penetration: 247 meters

Number of Cores: 7

Oldest Datable Sediment Cored:
Depth (subbottom): 247 meters (Core 7)
Nature: Radiolarian silty clay
Age: Upper Miocene



Principal Results: Basement was not reached at this site since drilling was terminated by bad weather. The entire section drilled consists of gray radiolarian clay.

BACKGROUND AND OBJECTIVES

Site 252 is located in the northwest Crozet Basin in 5032 meters of water and just southeast of the Southwest Indian Ridge (Figure 1). The site is believed to be located over anomaly 24, and the age of the ocean crust at the site is estimated at between 60 and 60.5 m.y. (R. Schlich, personal communication, 1972). The ocean crust at Site 252 was generated by spreading on the ancient Southeast Branch (McKenzie and Sclater, 1971).

Because the crust here is older than the separation date of Australia and Antarctica the stratigraphy of this location was expected to show the influence of initiation of the Circumpolar Current after continental rifting. Further, Site 245 (Leg 25) is located on crust of a similar age just north of the Southwest Branch (Figure 1). Presumably, comparison of the stratigraphies of Sites 252 and 245 would show the effects of the initiation of the Circumpolar Current and whether uplift of the Southwest Branch separated two different sedimentary environments north and south of the ridge.

Seismic profiles at the site (Figure 2 and Chapter 12, this volume, fig. 4 and 6) show an unusually transparent sedimentary section about 0.5 sec DT thick above a very rough acoustic basement. Both the sediment surface and the acoustic basement have a hilly aspect with wavelengths of 2-3 km and 3-5 km, respectively. Relief on the sediment surface is around 0.05-0.10 sec DT, and relief on the acoustic basement is about 0.15-0.20 sec DT. No significant topographic features were seen near the site.

OPERATIONS

Glomar Challenger approached Site 252 from a westerly direction, passed over the site on a straight course, then turned onto a reciprocal course to drop the beacon underway. Unfortunately, as the site was approached and we reduced speed to drop the beacon, the airgun records became so noisy as to be almost unreadable. This proved subsequently to be the result of a broken lead in the hydrophone streamer. The beacon was dropped in 5032 meters of water at 0501, 23 September and by 0600 we had started down with the pipe. Core 1 was on deck at 1642 and consisted of only a few manganese nodules, suggesting we had just touched bottom. Table 1 gives the vital statistics regarding cores recovered at Site 252.

During the day the barometer had been falling steadily and the wind occasionally gusted up to 40 mph. By 2000 heavy rain squalls were moving in and wind speeds of 40 mph were common. Fortunately wind and swell were in the same direction so we had little problem with holding position. However, the barometer con-

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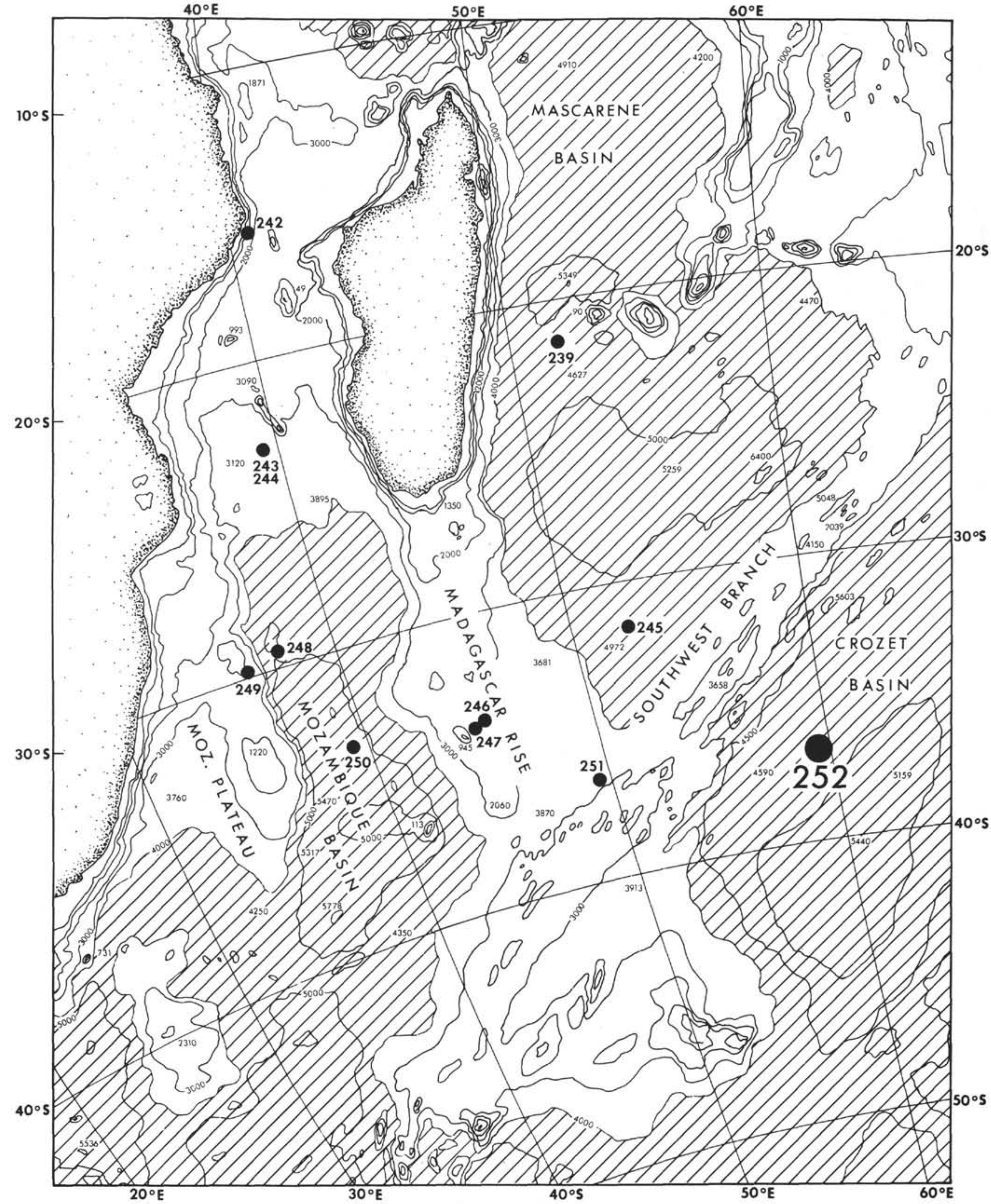

Figure 1. *Base chart and locality of Site 252. Other sites from DSDP Legs 24 and 25 are also shown. (Adapted from the Russian bathymetric chart of the Indian Ocean.)*

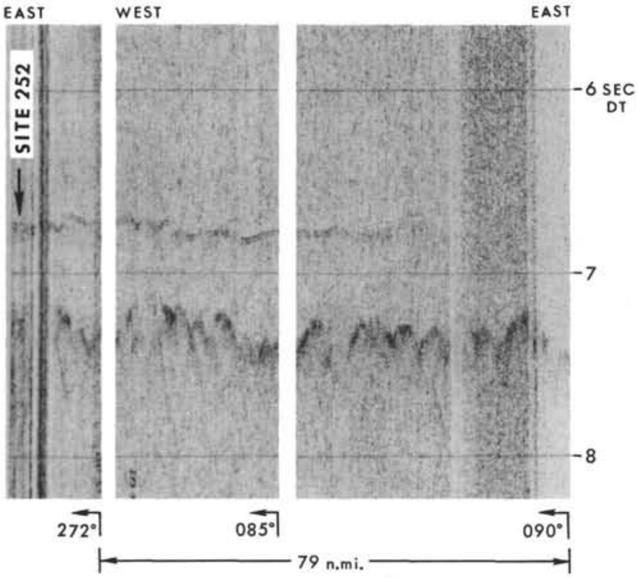

Figure 2. *Seismic reflection profile onto Site 252 taken from D/V* Glomar Challenger.

tinued to fall and at 0215, 24 September, after consultation with GMI, we abandoned Site 252 and began to withdraw from the hole. A few minutes after this decision was made the barometer ceased falling and the wind switched direction by 120°. This caused considerable difficulty with the positioning, since wind and swell were now at an angle to one another, and resulted in all four thrusters operating on maximum rpm for extended periods of time to try to hold the ship broadside to 35-mph winds until we could withdraw from the hole and take up a heading more directly into the wind.

By 0700 the barometer appeared to have stabilized and to be rising steadily, and it seemed that the wind speed would not increase further, so it was decided to stop pulling pipe and start going down again to spud Hole 252A. However, by 1030 the wind had increased in strength and was becoming variable in direction. With the wind across the swell a confused sea was developing, so we again suspended operations pending further information on the overall weather pattern. Soon after noon, in order to avoid working the pipe excessively at any one point, we commenced slowly pulling pipe.

Throughout the afternoon conditions deteriorated slightly, and the confused sea was causing considerable problems with positioning since the positioning system was regularly losing acoustic input.

At 1800, 24 September we decided to abandon Site 252 and move on to the next site. The factors which were considered in making this decision were as follows:

1) From the cores taken so far it was apparent that the primary interest of the site was going to lie in the radiolarian stratigraphy (see later sections of this report). To study this properly would require continuous coring, thus considerably extending the amount of time to be spent at the site. Even with continuous coring, however, the value of the site would be limited because the siliceous fossils, which were all mid-latitude forms, were the only ones present in the sediments, and thus correlation of this site with other locations would be difficult.

2) We were already running short of time so the prospect of even further delays was not a welcome one.

3) Finally, it was becoming apparent that the reasonably stable weather pattern which had accompanied us from Durban had broken up and that whereas conditions at the site might be expected to improve within 24 hr, there was little guarantee of any extensive period of fine weather to permit us to accomplish our objectives. The drill pipe was secured and we got underway for Site 253 at 1950, 24 September.

LITHOLOGY

Site 252 was discontinuously cored for 247 meters with a total core recovery of 41.5 meters of sediment. The sediments recovered are divided into two lithologic units on the basis of color differences (Table 2).

TABLE 1
Cores Cut at Site 252

Core	Date (Sept. 1972)	Time	Depth from Drill Floor (m)	Depth Below Sea Floor (m)	Length Cored (m)	Length Recovered (m)	Recovery (%)
1	23	1642	5042.0-5042.0	0-0	CC	CC	
2	23	1811	5042.0-5051.5	0-9.5	9.5	9.3	98
Drilled			5051.5-5087.5				
3	23	1935	5087.5-5097.0	45.5-55.0	9.5	8.2	86
Drilled			5097.0-5137.0				
4	23	2055	5137.0-5146.5	95.0-104.5	9.5	9.6	101
Drilled			5146.5-5187.5				
5	23	2220	5187.5-5197.0	145.5-155.0	9.5	4.5	47
Drilled			5197.0-5232.0				
6	24	0015	5232.0-5241.5	190.0-199.5	9.5	5.6	59
Drilled			5241.5-5279.5				
7	24	0210	5279.5-5289.0	237.5-247.0	9.5	4.3	45
Total					57.0	41.5	73

Note: Echo-sounding depth (to drill floor): 5042 meters.

TABLE 2
Lithologic Summary, Site 252

Unit	Core	Depth Below Sea Floor (m)	Thickness (m)	Description
1	2	0-4	4	Brown radiolarian silty clay, locally diatom rich, and locally pyrite rich
Transition Zone	2	4-5	1	Mixture of olive-gray and brown clay chunks showing drilling deformation
	2-7	5-247	247	Olive-gray diatom-bearing radiolarian silty clay suffused with finely disseminated pyrite

The only material recovered in Core 1 was a number of small rounded manganese nodules found in the core catcher. It is impossible to determine the exact relationship of these nodules to the mudline, for all sedimentary material was washed out of the core catcher before it came onboard.

X-ray diffraction studies show that most of the sediment recovered from Site 252 is amorphous (82%). The crystalline material is more than half quartz and feldspars, accompanied by montmorillonite and mica with traces of kaolinite and chlorite. The occurrence of augite may be erroneous, resulting from the limitations of the computer program used to identify the minerals (Zemmels and Cook, 1973), although Cook et al., (this colume, Chapter 24) claim to have observed this mineral in slides of the Site 252 material.

Unit 1

This surficial lithologic unit is a soft, brown radiolarian silty clay having local patches rich in diatoms or pyrite. A small percentage of the pyrite is present in the form of silt-sized framboids; radiolarians compose the bulk of the silt-size material, however. In common with Unit 2 underlying it, Unit 1 contains sporadic trace abundances of sponge spicules, quartz, mica, hornblende, hematite, glauconite, and siderite. Volcanic glass is common in trace amounts. Minor elements which are always present are diatoms and radiolarians. Shore-based analyses reveal that kaolinite comprises 3.0%-3.4% of this unit and is absent from the underlying unit.

The nature of the contact between Unit 1 and Unit 2 is obscured by brecciation due to drilling (Core 2, Section 3). Distinct chunks of the two differently colored lithologies are jumbled together in a transitional zone about 1 meter thick.

Unit 2

The main difference between this unit and the one described above is in coloration. Unit 2 is colored olive gray by a trace amount to a few percent of finely disseminated pyrite, which is slightly richer in faint greenish streaks. Local small black patches and layers contain enough pyrite for the black sediment to be termed pyrite radiolarian silty clay. Framboids constitute several percent of the pyrite. Radiolarians remain an important constituent throughout the unit, as do diatoms. Minor detrital and authigenic constituents are the same as in Unit 1.

Within the drilling breccia zone at the top of Core 7, a single indurated lump 2 × 3 × 11 cm in size was found within the mass of olive-gray clay. This piece, when examined in thin section, was determined to be a laminated combination of (1) fossiliferous micrite, consisting of an indurated fine-grained carbonate mud with a few whole diatoms and radiolarians; and (2) fossiliferous microsparite (or biomicrosparite), composed of fragmented radiolarian and diatom debris cemented together by microsparitic and micritic carbonate. Neither of the lithologies within the chunk show any terrigenous materials, and the opaline silica of the diatoms and radiolarian skeletons is largely replaced by carbonate.

This site was drilled in a water depth of 5032 meters, which lies well below the present-day carbonate compensation depth. The lack of any trace of carbonate microfossils throughout the cores indicates that sedimentation proceeded wholly below carbonate compensation depth at this site during the time represented by the cores recovered. Uniformity of detrital constituents indicates that provenance did not vary during this time period.

SHIPBOARD GEOCHEMICAL MEASUREMENTS

Routine analyses for salinity, *p*H, and alkalinity were conducted on interstitial water samples squeezed from six sediment samples taken at depths between 9.0 meters and 242 meters below the sea floor. In addition, *p*H was measured in the uppermost three samples of unsqueezed sediment before the recovered cores became too stiff for the punch-in electrodes. The sampling procedures and analytical techniques are described in the report on Site 250, and the results are summarized in Table 3 and presented in graphical form in Figure 3.

With the exception of the difference in punch-in and flow-through *p*H measurements, the analyzed interval appears too short to display significant trends. Salinity was uniformly 35.2‰ throughout, with the minor exception of the 34.9‰ value obtained from a depth of 194.5 meters below the sea floor. Alkalinity measured 3.08 meq/kg in the uppermost sample and decreased down the hole to 1.46 meq/kg in the lowermost sample, taken 242 meters below the sea floor.

TABLE 3
Summary of Shipboard Geochemical Measurements, Site 252

Sample (Interval in cm)	Depth Below Sea Floor (m)	Lab Temp (°C)	pH Punch-in/ Flow-through	Alkalinity (meq/kg)	Salinity °/oo
(Reference seawater)	–	–	/8.16	2.20	35.5
2-5, 144-150	8.94-9.00	21.0	7.41/7.95	3.08	35.2
3-5, 144-150	54.44-54.50	21.0	7.37/7.95	2.82	35.2
4-5, 144-150	103.94-104.00	21.0	7.46/8.06	2.38	35.2
5-2, 144-150	148.44-148.50	21.5	/8.14[a]	1.74	35.2
6-3, 144-150	194.44-194.50	21.5	/8.15[a]	1.52	34.9
7-3, 144-150	241.94-242.0	21.5	/8.36[a]	1.46	35.2

[a]Too stiff to measure punch-in.

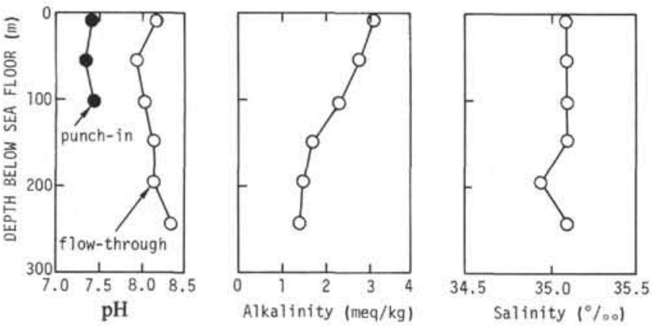

Figure 3. *Graphic summary of geochemical measurements taken at Site 252.*

As at Site 250, *p*H values obtained with the punch-in method were consistently lower than the flow-through measurements, by 0.58-0.78 *p*H unit. The sediment at Site 252 contains a large percentage of detrital clay; however, extraction of each interstitial water sample was easily accomplished in 2-4 min. No clear explanation for this difference in measurements is yet available.

The *p*H of the interstitial water from the uppermost sample was 8.19. A minimum value of 7.95 was measured in the sample taken at 54.5 meters. From that depth, *p*H increased down the hole to a maximum of 8.36 at 242 meters.

PHYSICAL PROPERTIES

Physical properties measured at Site 252 were bulk density, porosity, and acoustic velocity. The methods are described in the Explanatory Notes (Chapter 2). The results are shown in the hole summary diagram.

The bulk densities were very low, from 1.25 to 1.40 g/cc. There is a small but sudden increase in density at about 150 meters depth where there is a significant change in composition and consolidation of the sediments. The change is also marked by a decrease in water content and porosity.

The sonic velocities are very uniform at 1.49-1.52 km/sec. The low density is reflected in the low acoustic impedances, 1.90-2.05 (10^5 g/cm/sec), only about 20% higher than seawater. This small contrast explains the observed poor seismic reflection returns from the sediment surface. The small (5%) impedance increase at 150 meters could produce a very weak reflection.

CORRELATION OF SEISMIC REFLECTION PROFILE WITH DRILLING RESULTS

The acoustic sedimentary section at Site 252 is remarkably transparent; in some locations the sediment-water interface does not register at all on the seismic record. Evidently, the upper sediment section has acoustic properties similar to seawater, and this is borne out by the acoustic velocity measurements. Unfortunately, basement was not reached at this site, but based on measured sonic velocities and reflection times, it lies at 375 meters subbottom. No internal reflectors are evident in the section which is consistent with our observation of relatively uniform lithology down to the drilling depth of 247 meters.

PALEONTOLOGY

The core catchers of Site 252 are virtually devoid of calcareous nannoplankton and foraminifera, except for the top part of the hole. Marly patches on manganese nodules of Sample 1, CC contained a Quaternary nannoplankton assemblage consisting of etched *Gephyrocapsa oceanica, Coccolithus pelagicus, Pseudoemiliana lacunosa,* and *Ceratolithus cristatus.* In Sample 2, CC very few specimens of *Globorotalia inflata* and some benthonic foraminifera were found. In the rest of the core catchers all calcareous fossils have obviously been destroyed by dissolution.

On the other hand, the cores of this site contained substantial assemblages of radiolarians. In 5 samples examined from Core 252-2, radiolarians are abundant and well preserved, and in 19 samples from Cores 252-3 through 252-7 they are common and moderately to well preserved. The assemblage in 252-7, CC includes approximately equal numbers of rare *Ommatartus antepenultimus, O. avitus,* and *O. penultinus,* common *Stichocorys delmontensis,* very rare *S. peregrina,* and rare *Phormostichoartus corona,* and thus can be assigned tentatively to the *Ommatartus penultimus,* Zone (late late Miocene). Zonal boundaries are difficult to determine in the samples above this, but the top of Core 252-2 contains *Stichocorys peregrina* without *S. delmontensis* and also rare specimens of the form ancestral to *Pterocorys hertwigii,* with three or fewer longitudinal ribs, indicating a probable Pliocene age.

SEDIMENTATION RATE

Based on the preliminary dating by radiolarians, an average sedimentation rate between 23 and 45 m/m.y. since the Miocene can be estimated for this site.

SUMMARY AND CONCLUSIONS

Summary of Results

Site 252 is located in 5032 meters of water in the northwest Crozet Basin, off the southern flank of the Southwest Branch of the Indian Ocean Ridge. According to the prospectus for Leg 25, DSDP (this site was proposed as Site 6, Leg 25), this site is located over anomaly 24, and the age of the crust here should be between 60 and 60.5 m.y. This crust was presumably created by spreading from the ancient Southeast Branch. However, we have not seen the magnetometer data whereby anomaly 24 was identified at this site and *Glomar Challenger* data do not obviously verify this interpretation. Accordingly, we assume that the age of the crust here is in question. At this site 375 meters of sediment, estimated from seismic profiles and measured acoustic velocities, overlie undulating basement. Hole 252 was drilled to 247 meters before deteriorating weather conditions forced abandonment of the site. At this site, 57 meters were cored and 41.5 meters recovered. The oldest sediment, at 247 meters, is probably upper Miocene in age but may be as old as middle Miocene.

The recovered section is mainly radiolarian clay which can be divided into two units. Unit 1, of Quaternary age, is 4 meters of brown radiolarian clay. Unit 2, from 5 to 247 meters subbottom, is an olive-gray diatom-bearing radiolarian clay of Quaternary to upper or middle Miocene age. The coloration of this unit is due to a few percent of finely disseminated pyrite.

With the exception of Unit 1, calcareous microfossils are virtually absent in this section. Radiolaria are abundant in the entire section, however, and are well preserved. The value of this radiolarian section is diminished because the site was cored discontinuously and no calcareous fossils were present to correlate the Radiolaria with foraminiferal or nannofossil assemblage zones. Preliminary dating by Radiolaria gives an average sedimentation rate of 23-45 m/m.y. for this site.

Preliminary Conclusions

Unfortunately, this site failed to achieve two of the three stated goals: the age of the crust here was not determined and the sediments older than the breakup of Australia and Antarctica were not sampled. Consequently, the effects of this event on the Circumpolar Current could not be evaluated. However, a section that postdates the formation of the Southwest Branch (early to late Oligocene) was retrieved.

Site 245, DSDP Leg 25, lies northwest of Site 252 and the Southwest Branch along a line perpendicular to the ridge trend. Site 245, like Site 252, is also on crust of presumed Paleocene age. The Miocene through Recent section from the two sites can be compared. Site 245 has a very thin (20-50 m) middle Miocene section with no recognizable upper Miocene through Recent section or Oligocene through lower Miocene section. Site 252 has 247 meters of middle Miocene through Recent sediments which contain a uniform detrital component, indicating no significant changes in provenance or depositional rate. The missing Oligocene and lower Miocene section at Site 245 may be related to the pre mid Miocene flow of Antarctic Bottom Water (see Chapter 36, this volume). The thin and/or absent post-middle Miocene section is probably related to the initiation of a northerly bottom current which is reported to flow in this area (Heezen and Hollister, 1971). This current is topographically controlled by the Southwest Branch and may prohibit or inhibit deposition at Site 245. On the other hand, this current may have had little effect on deposition at Site 252, where the sedimentary column is typical for a pelagic regime below the carbonate compensation depth.

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McKenzie, D. and Sclater, J. G., 1971. Evolution of the Indian Ocean since the Late Cretaceous: Roy. Astron. Soc. Geophys. J., v. 25, p. 437-528.

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APPENDIX A
Grain-Size Determinations for Site 252

Core, Section, Top of Interval (cm)	Subbottom Depth (m)	Sand (%)	Silt (%)	Clay (%)	Classification
2-2, 140	2.9	0.2	34.7	65.1	Silty clay
2-4, 23	4.7	0.0	97.4	2.6	Silt
2-6, 91	8.4	0.1	29.4	70.5	Silty clay
3-1, 90	45.4	0.0	29.7	70.3	Silty clay
3-3, 90	49.4	0.1	35.2	64.8	Silty clay
3-6, 20	53.2	0.1	30.0	69.9	Silty clay
4-1, 90	95.9	0.1	27.1	72.8	Silty clay
4-3, 90	98.9	0.2	29.9	70.0	Silty clay
4-6, 90	103.4	0.1	28.4	71.5	Silty clay
5-1, 90	146.4	0.1	24.7	75.3	Clay
5-3, 90	149.4	0.2	40.0	59.8	Silty clay
6-2, 90	192.4	0.0	35.6	64.4	Silty clay
6-3, 90	193.9	0.1	41.9	58.0	Silty clay
7-2, 90	239.9	0.0	37.1	62.9	Silty clay

APPENDIX B
Carbon-Carbonate Determinations For Site 252

Core, Section, Top of Interval (cm)	Sub bottom Depth (m)	Total Carbon (%)	Organic Carbon (%)	$CaCO_3$ (%)
2-2, 138	2.88	0.4	0.2	2
2-6, 90	8.40	0.3	0.2	0
3-1, 88	46.38	0.3	0.2	0
3-3, 88	49.38	0.3	0.2	0
3-6, 18	53.18	0.3	0.2	0
4-1, 88	95.88	0.3	0.2	1
4-3, 88	98.88	0.3	0.2	0
4-6, 88	103.38	0.2	0.2	0
5-1, 88	146.38	0.2	0.2	0
5-3, 88	149.38	0.3	0.2	1
6-2, 88	192.38	0.4	0.2	1
6-3, 88	193.88	0.2	0.3	0
7-2, 89	239.89	0.2	0.2	0

APPENDIX C
X-Ray Analyses For Site 252

Core	Cored Interval Below Sea Floor (m)	Sample Depth Below Sea Floor (m)	Diff.	Amor.	Quar.	K-Fe.	Plag.	Kaol.	Mica	Chlo.	Mont.	Anal.	Hema.	Pyri.	Augi.
Bulk Samples															
2	0.0- 9.5	1.8	88.7	82.4	12.3	17.1	22.3	3.4	12.0	–	12.8	–	3.0	–	17.2
		3.7	88.8	82.5	13.7	12.2	20.4	3.0	9.8	–	14.6	–	–	1.7	24.5
4	95.0-104.5	103.7	90.4	84.9	13.4	13.7	18.1	–	16.7	–	17.4	1.1	–	0.9	18.5
6	190.0-199.5	194.2	89.3	83.2	11.2	4.0	21.5	–	8.6	–	12.3	2.2	–	3.6	36.7
7	237.5-247.0	240.4	88.2	81.5	13.2	5.1	19.9	–	8.6	–	20.5	1.8	–	2.5	28.4
2-20μ Fraction															
2	0.0- 9.5	1.8	81.8	71.6	17.3	20.4	24.1	–	5.6	–	–	0.9	2.8	–	29.0
		3.7	78.9	67.0	15.6	14.2	20.7	–	3.8	0.9	–	1.0	–	13.2	30.7
4	95.0-104.5	103.7	86.1	78.3	20.8	9.2	24.2	–	7.4	–	–	1.5	–	1.8	35.1
6	190.0-199.5	194.2	80.8	69.9	10.0	4.7	22.7	–	5.8	2.3	8.2	2.1	–	2.1	41.9
7	237.5-247.0	240.4	83.8	74.7	15.0	7.0	24.3	–	10.9	–	8.9	1.7	–	1.4	30.8
<2μ Fraction															
2	0.0- 9.5	1.8	91.5	86.6	11.8	7.0	16.7	3.7	15.0	–	40.0	–	–	–	5.8
		3.7	89.7	83.8	12.1	9.0	10.5	3.3	12.5	–	23.5	–	–	21.1	8.1
4	95.0-104.5	103.7	92.4	88.2	10.6	8.5	11.8	2.2	13.3	2.4	44.7	–	–	–	6.5
6	190.0-199.5	194.2	93.4	89.6	11.7	9.9	18.0	–	13.9	–	34.6	–	–	2.7	9.2
7	237.5-247.0	240.4	92.5	88.3	13.2	5.2	14.3	–	21.7	–	34.3	–	–	2.1	9.2

Site 252 Hole Core 1 Cored Interval: 0-0 m

AGE	FORAMS ZONE	NANNOS	FOSSIL CHARACTER: FORAMS	DISSOL. EFFECTS	NANNOS	SILICEOUS FOSS., ETC.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
		NN20-NN21					Core Catcher		Mn nodules			About 10 black manganese nodules, 1 x 2 x 2 cm.

Explanatory notes in chapter 2

Site 252 Hole Core 2 Cored Interval: 0.0-9.5 m

AGE	FORAMS ZONE	NANNOS	FOSSIL CHARACTER: FORAMS	DISSOL. EFFECTS	NANNOS	SILICEOUS FOSS., ETC.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
							1	0.5 1.0			* * HO XM	2 cm 10YR 3/2 patch 1 cm 10YR 3/2 patch 3 cm 10YR 3/2 patch
							2				CC GZ	
							3				* XM KE HO CC GZ	2 cm 5Y 4/1 patch 5Y 4/1 10YR 5/3 5Y 4/1 10YR 5/3 5Y 4/1 with N1 patch 10YR 5/3 and 5Y 4/1 with N1 flecks zone of N1 flecks
							4		VOID VOID		*	5Y 4/1 zone of N1 flecks diffuse 4 cm N1 zone
							5		GEOCHEM SPLE	V		2 cm layer of 5GY 3/2 stretched 0.5 cm 5GY 3/2 layer -do- 2 mm N1 band 5Y 4/1 with 1 cm N1 zones 3 cm 5GY 3/2 layer
							6				CC GZ KE	5Y 4/1 1 cm N1 layers
							Core Catcher				*	5Y 4/1

<u>Unit 1</u>: Brown RADIOLARIAN SILTY CLAY; with minor flecks and irregular patches of very dark grayish brown RADIOLARIAN SILTY CLAY, locally diatom-rich and locally rich in microscopic finely disseminated pyrite in which silt-sized framboids comprise as much as 3% of the pyrite.

TEXTURE: Sand 0.0-0.2%
Silt 35-97%
Clay 3-65%

TOTAL DETRITAL: 40-60%

Total Carbon: 0.4%
Organic Carbon: 0.2%
Calcium Carbonate: 2%

Unit 1 - Unit 2 transition, deformed by drilling; consisting of abrupt 20-cm alternations of BROWN CLAY and OLIVE GRAY RADIOLARIAN SILTY CLAY.

<u>Unit 2</u>: Olive gray DIATOM-BEARING RADIOLARIAN SILTY CLAY and minor RADIOLARIAN SILTY-CLAY, pyrite-bearing and locally diatom-bearing. All the sediment contains from traces up to 2% microscopic pyrite; in black flecks and small patches the pyrite is up to 12% and framboidal silt-sized pyrite is also found.

TEXTURE: Sand 0.1%
Silt 29%
Clay 70%

TOTAL DETRITAL: 40-65%

<u>MINOR CONSTITUENTS FOR BOTH UNITS 1 AND 2</u>:

<u>Ubiquitous</u> Diatoms (Trace-10%, ave. 6%)
Rads (Trace-52%, ave. 34%)
Sponge spicules (Trace-1%)
Quartz (Trace-2%)
Mica (Trace-1%)
Heavies (Trace-2%)
Feldspars

<u>Common</u> volcanic glass, trace amounts

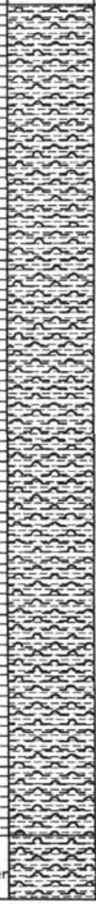
<u>Rare</u> hematite, glauconite

Total Carbon: 0.3%
Organic Carbon: 0.2%
Calcium Carbonate: 0%

CONSOLIDATION: Soft.

Explanatory notes in chapter 2

Site 252 Hole Core 3 Cored Interval: 45.5-55.0 m

AGE	FORAMS ZONE	NANNOS ZONE	FOSSIL CHARACTER: FORAMS	DISSOL. EFFECTS	NANNOS	SILICEOUS FOSS. ETC.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
							1	0.5, 1.0			CC GZ, *	5Y 4/1 throughout with N1 and 5G 3/2 zones, faint and widely scattered
							2				HO	2 1-cm N1 zones
							3				CC GZ	disturbed N1 bands
							4				*	streaked out 5Y 3/1 bands
							5					
							6				CC GZ, KE	4 cm N1 patches
							Core Catcher				*	5Y 4/1

DIATOM-BEARING RADIOLARIAN SILTY CLAY colored olive gray by ubiquitous 1% finely disseminated pyrite. Infrequent streaks, bands and patches of PYRITE RADIOLARIAN CLAY and PYRITE-RICH RADIOLARIAN CLAY, colored black and very dark gray, in which 1-2% of the pyrite is silt-sized framboids.

TEXTURE: Sand 0.0-0.1%
Silt 30-35%
Clay 65-70%

TOTAL DETRITAL COMPONENT: 50-70%, ave. 55%

BIOGENIC COMPONENTS:

Ubiquitous Rads, 28-40% (average 37%)
Diatoms Tr-10% (average 8%)
Sponge spicules, traces

Common ,collophanous fish debris traces

MINOR CONSTITUENTS:

Ubiquitous traces of quartz, rarely 1%
traces of mica
traces of heavies (hornblende)
traces of feldspars

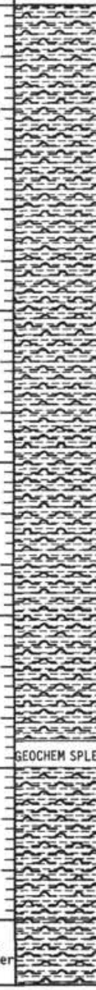
Common volcanic glass traces

Total Carbon: 0.3%
Organic Carbon: 0.2%
Calcium Carbonate: 0%

CONSOLIDATION: Soft.

Explanatory notes in chapter 2

Site 252 Hole Core 4 Cored Interval: 95.0-104.5 m

AGE	FORAMS ZONE	NANNOS ZONE	FOSSIL CHARACTER: FORAMS	DISSOL. EFFECTS	NANNOS	SILICEOUS FOSS. ETC.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
							1	0.5, 1.0			CC GZ *	5Y 4/1 throughout; 1 cm N1 band; 1 cm N1 band; 1 cm N1 band
							2				*	2 cm N1 band; 2 cm 5GY 3/2 band; -do-
							3				CC GZ, *, HO	1 cm N1 band; -do-; -do-; 4 cm N1 band; stretched 5 cm N1 band
							4				*	-do-; -do-
							5		GEOCHEM SPLE	VOID		5 cm N1 patches; -do-
							6				*, CC GZ, XM HO KE, *	N1 zone; faint 2 cm 5GY 3/2 band; 5 cm N1 band; 4 cm N1 band
							Core Catcher				*	5Y 4/1

DIATOM-BEARING RADIOLARIAN SILTY CLAY colored olive gray by ubiquitous trace to 3% amounts of finely disseminated pyrite. Black and less frequent greenish bands 1 to 4 cm wide are spaced irregularly 10 to 70 cm apart throughout the core.

TEXTURE: Sand 0.1-0.2%
Silt 27-30%
Clay 70-73%

TOTAL DETRITAL CONTENT: 45-60%, ave. 47%

BIOGENIC COMPONENTS:

Ubiquitous Rads, 37-45%, average 42%
Diatoms, 3-10%, average 7%

Common traces of sponge spicules

Rare collophanous fish debris

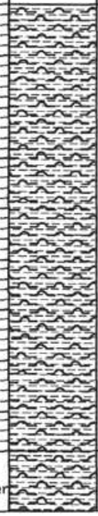
Total Carbon: 0.2-0.3%
Organic Carbon: 0.2%
Calcium Carbonate: 0-1%

CONSOLIDATION: Soft.

Explanatory notes in chapter 2

Site 252 Hole Core 5 Cored Interval: 145.5-155.0 m

AGE	FORAMS ZONE	NANNOS	FOSSIL CHARACTER: FORAMS	DISSOL. EFFECTS	NANNOS	SILICEOUS FOSS., ETC.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
							1	0.5, 1.0			CC GZ *	←2 cm N1 patch; 5Y 4/1; ←3 cm N1 patch; 5Y 5/1
							2				HO *	N4 with N1 patches; 5Y 5/1
							3				CC GZ KE *	tinge of N1 and 5GY 3/2
							Core Catcher					5Y 5/1



DIATOM-BEARING RADIOLARIAN SILTY CLAY, olive gray in the top 70 cm grading to light olive gray in the rest of the core, the coloring due to ubiquitous trace to 2% amounts of finely disseminated pyrite. Fewer 2-3 cm wide black patches of PYRITE RADIOLARIAN CLAY than in the previous core; one 30-cm layer of medium dark gray PYRITE-BEARING RADIOLARIAN CLAY in Section 2.

TEXTURE: Sand 0.1-0.2%
Silt 25-40%
Clay 60-75%

TOTAL DETRITAL: 45-72%, average 60%

BIOGENIC COMPONENTS:

Ubiquitous Rads, 28-45%, average 35%
Diatoms, 1-10%, average 4%

Common sponge spicules, traces

MINOR CONSTITUENTS:

Ubiquitous Traces of quartz, mica, hornblende, and feldspars.

Rare Traces of feldspar, volcanic glass, and authigenic carbonate.

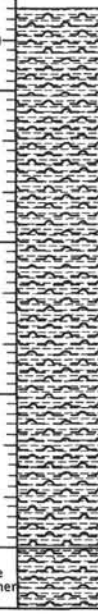
Total Carbon: 0.2-0.3%
Organic Carbon: 0.2%
Calcium Carbonate: 0-1%

CONSOLIDATION: Soft.

Explanatory notes in chapter 2

Site 252 Hole Core 6 Cored Interval: 190.0-199.5 m

AGE	FORAMS ZONE	NANNOS	FOSSIL CHARACTER: FORAMS	DISSOL. EFFECTS	NANNOS	SILICEOUS FOSS., ETC.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
							1	0.5, 1.0	VOID			5Y 4/1
							2				CC GZ * HO	
							3				* CC GZ XM KE *	←3 cm N1 patch; strung out N1 patch; -do-
							4					←4 cm N1 patch
							Core Catcher				*	5Y 4/1



Olive gray DIATOM BEARING RADIOLARIAN SILTY CLAY, colored by ubiquitous 2-4% amounts of finely disseminated pyrite, with few 3-4 cm patches of black PYRITE RADIOLARIAN CLAY with as much as 25% of the pyrite in silt-sized framboids.

TEXTURE: Sand 0.0-0.1%
Silt 36-42%
Clay 58-64%

TOTAL DETRITAL CONTENT: 45-55%, ave. 50%

BIOGENIC COMPONENTS:

Ubiquitous Rads, 40-43%, average 42%
Diatoms, 2-15%, average 7%

Rare Sponge spicules, in trace amounts.

MINOR CONSTITUENTS:

Ubiquitous Quartz and mica, trace to 1%

Ubiquitous Heavies (hornblende), traces to 2% and feldspars

Rare traces of hematite

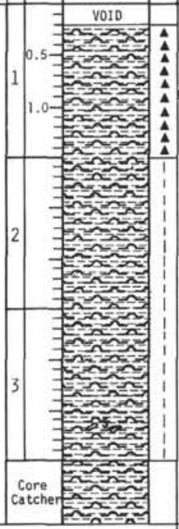
Total Carbon: 0.2-0.4%
Organic Carbon: 0.2-0.3%
Calcium Carbonate: 0-1%

CONSOLIDATION: Stiff where less disturbed by drilling

Explanatory notes in chapter 2

Site 252 Hole Core 7 Cored Interval: 237.5-247.0 m

AGE | ZONE: FORAMS, NANNOS | FOSSIL CHARACTER: FORAMS, DISSOL. EFFECTS, NANNOS, SILICEOUS FOSS., ETC. | SECTION | METERS | LITHOLOGY | DEFORMATION | LITHO. SAMPLE | LITHOLOGIC DESCRIPTION



KE*TS 5Y 4/1 throughout

5Y 5/1 limestone chunk, 2 x 3 x 10 cm

KE N1 layer

CC GZ minor N1 staining

XM 1 cm N1 band

5GY 3/2 3 mm bands

siderititized burrow chunks, 1 x 1.6 and 1.4 x 2.5 cm

5Y 4/1

Olive gray DIATOM-BEARING RADIOLARIAN SILTY CLAY, colored with ubiquitous 1-2% amounts of finely disseminated pyrite; two minor 1 and 10 cm layers of black PYRITE RADIOLARIAN CLAY; drilling breccia at top of core includes one 10-cm long chunk of indurated fossiliferous light olive gray MICRITE; sideritized burrows near base of core.

TEXTURE: Sand 0%
Silt 37%
Clay 63%

TOTAL DETRITAL CONTENT: 50-60%, avg. 54%

BIOGENOUS COMPONENT:

Ubiquitous Rads, 35-45%, average 38%
Diatoms 3-5%, average 4%

Common Sponge spicules

MINOR CONSTITUENTS:

Ubiquitous Quartz (tr-2%), hornblende tr-1%

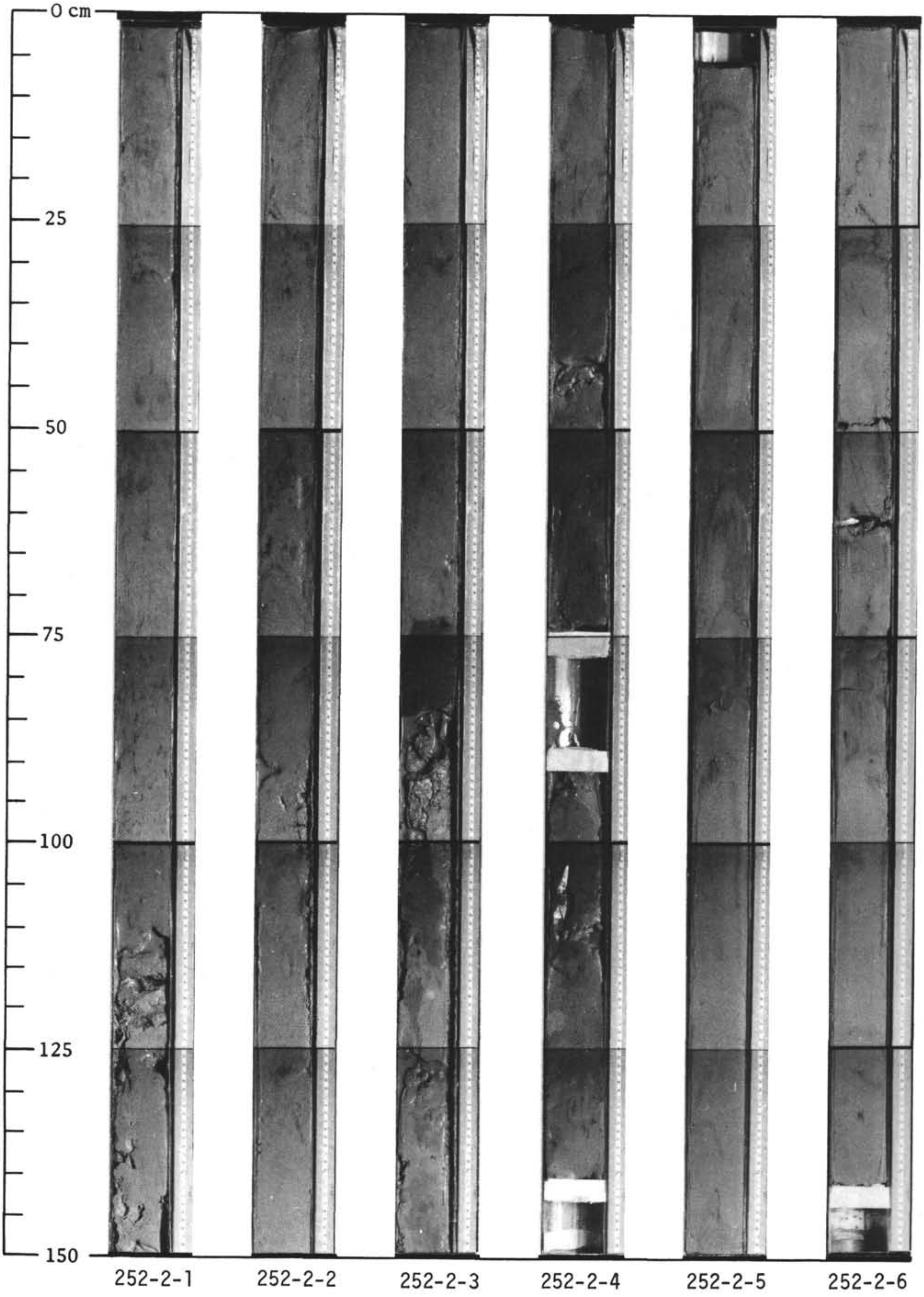
Common Mica, traces-1% feldspars

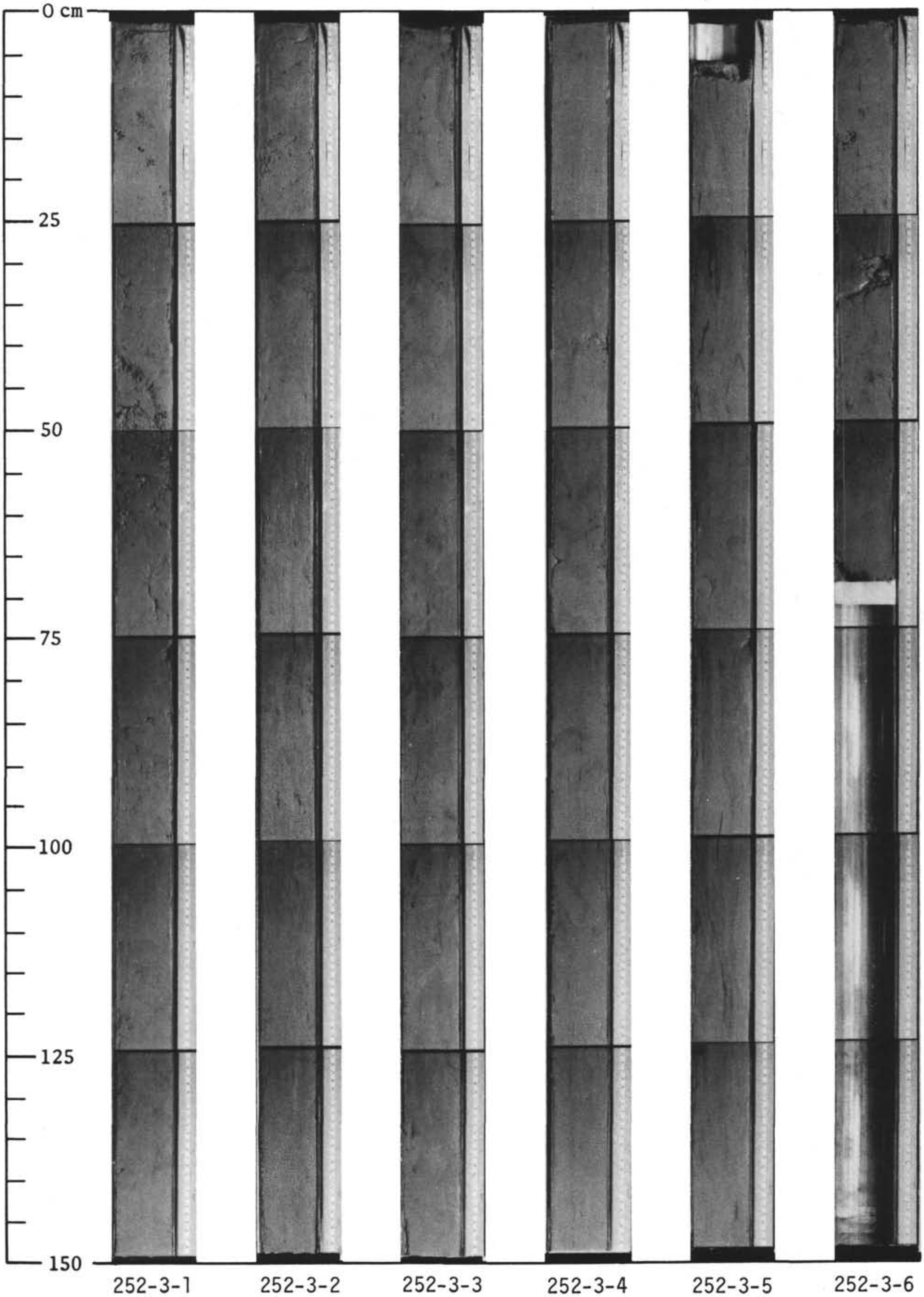
Rare Volcanic glass, hematite

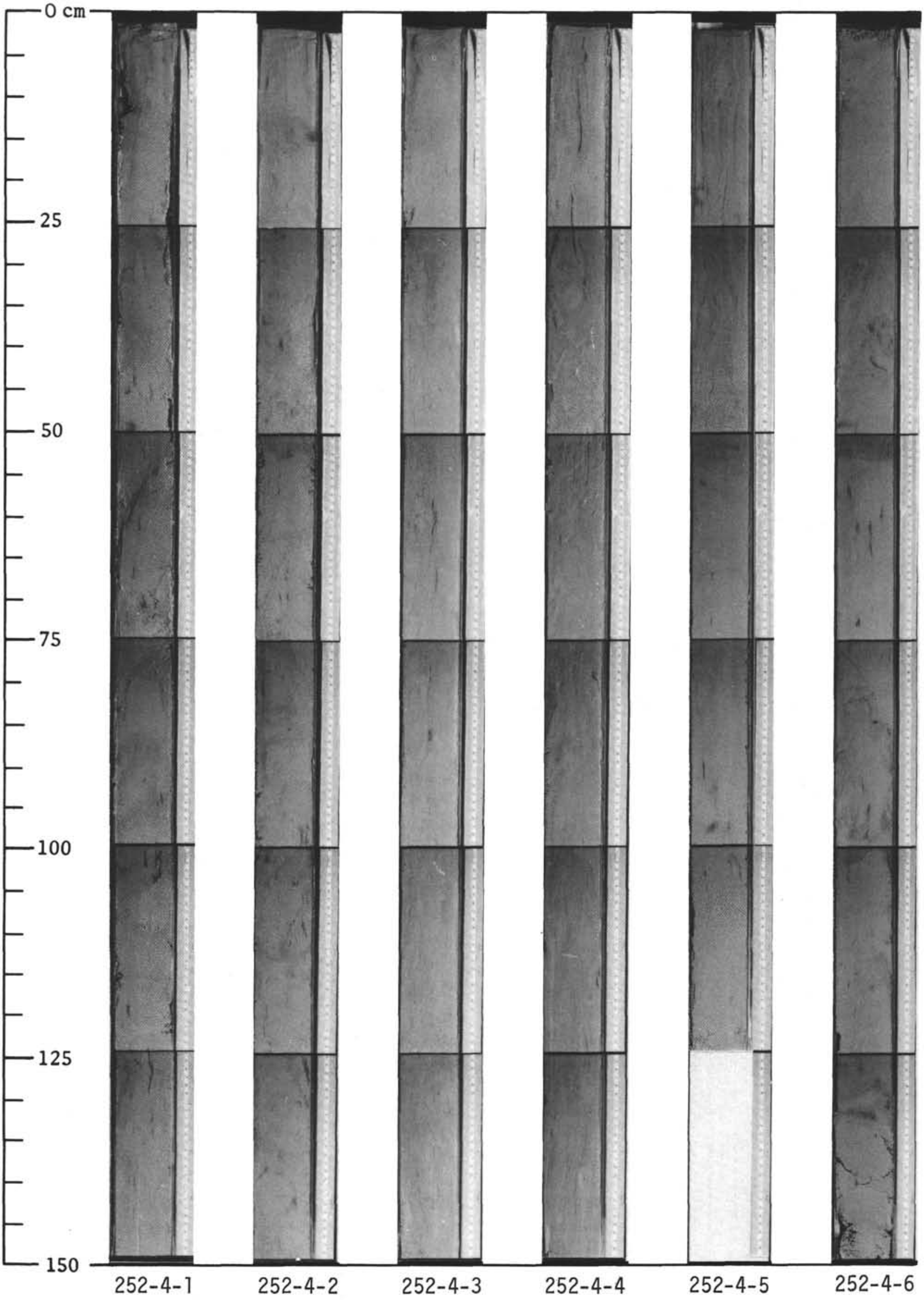
Total Carbon: 0.2%
Organic Carbon: 0.2%
Calcium Carbonate: 0%

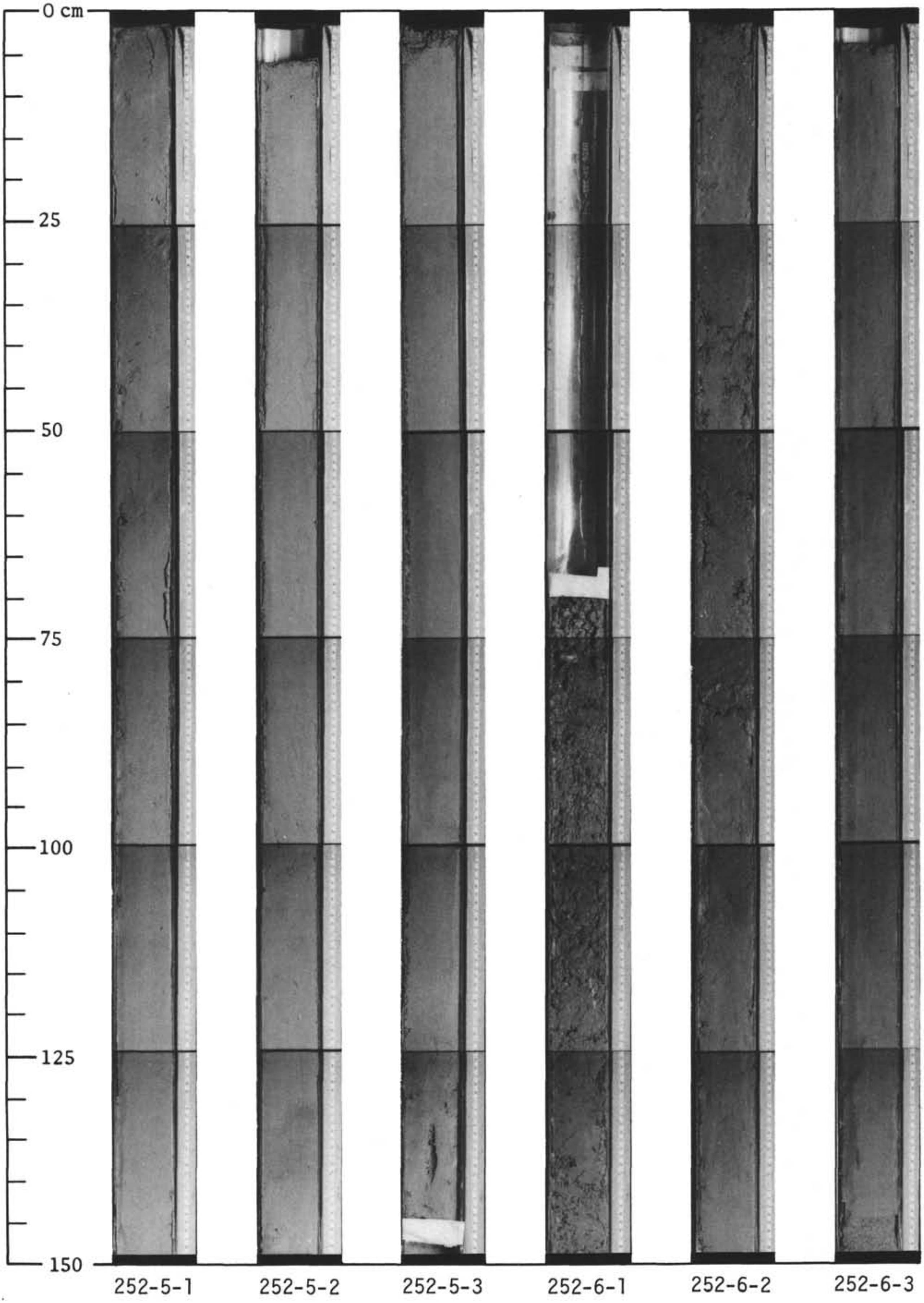
CONSOLIDATION: Stiff where undisturbed; also one chunk of lithified MICRITE in drilling breccia at top of unit.

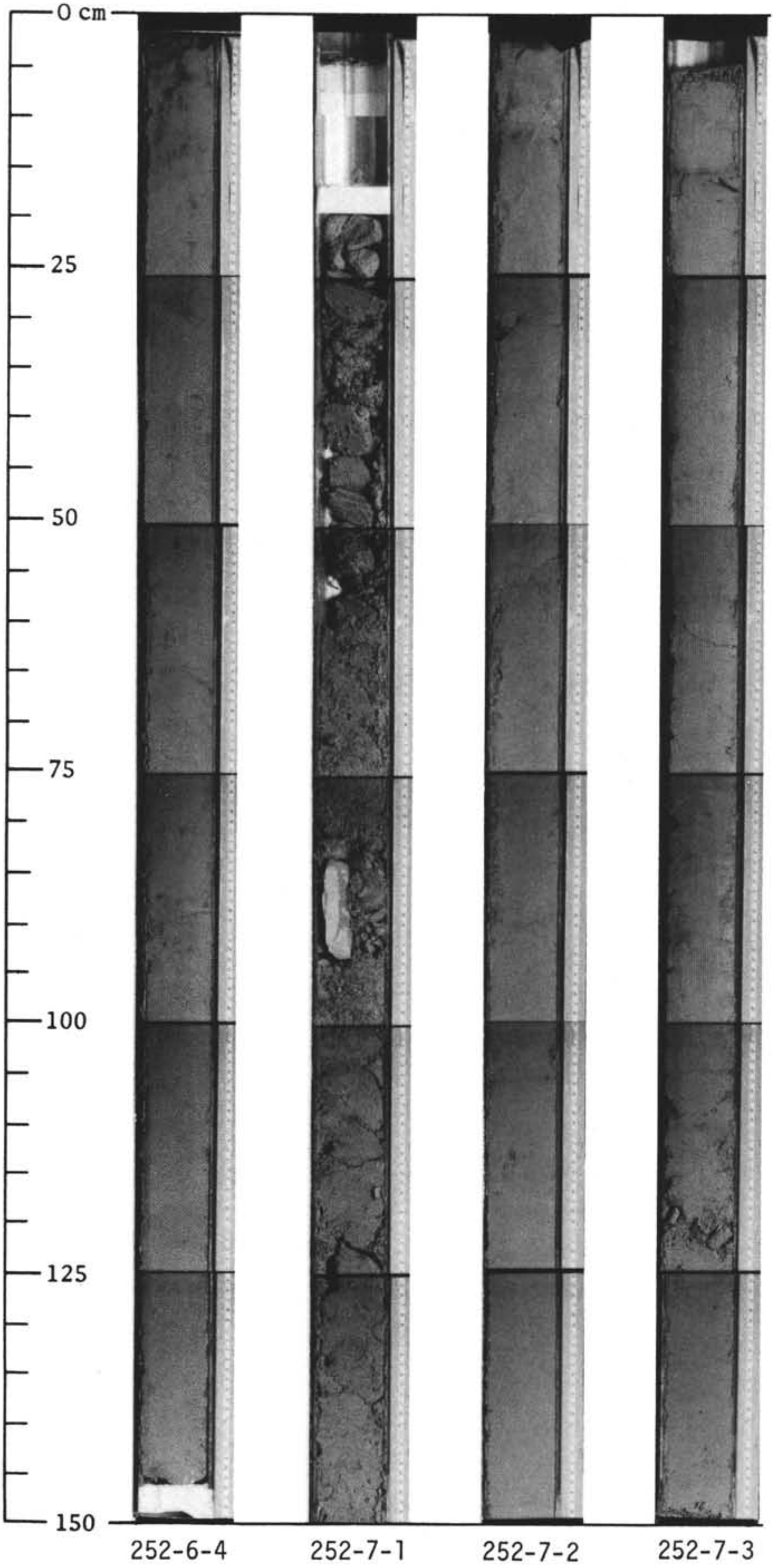
Explanatory notes in chapter 2


0 cm
25
50
75
100
125
150
252-2-1
252-2-2
252-2-3
252-2-4
252-2-5
252-2-6


0 cm
25
50
75
100
125
150
252-3-1
252-3-2
252-3-3
252-3-4
252-3-5
252-3-6


0 cm
25
50
75
100
125
150
252-4-1
252-4-2
252-4-3
252-4-4
252-4-5
252-4-6


0 cm
25
50
75
100
125
150
252-5-1
252-5-2
252-5-3
252-6-1
252-6-2
252-6-3


0 cm
25
50
75
100
125
150
252-6-4
252-7-1
252-7-2
252-7-3

SUMMARY OF DRILLING RESULTS: SITE 252/0 - 200 m

BIOSTRATIGRAPHY				AGE	CORES NO/DEPTH	LITHOLOGIC DESCRIPTION	◻ GRAPE × SYRINGE BULK DENSITY	ACOUST. VEL. KM/SEC
FORAMINIFERA	NANNOPLANKTON	RADIOLARIANS	MACRO-FOSSILS				1.00 2.50	1.0 6.0
Few planktonic foraminifera	NN 20			Quaternary	0 1, 2	Mn Brown RADIOLARIAN CLAY with minor brown RADIOLARIAN SILT-CLAY; Mn nodules on top		
						Olive gray DIATOM-BEARING RADIOLARIAN CLAY, suffused with finely disseminated pyrite		
Barren	Barren				50 3			
					100 4			
					150 5			
					6			

SUMMARY OF DRILLING RESULTS: SITE 252/200 - 400 m

BIOSTRATIGRAPHY				AGE	CORES NO/DEPTH	LITHOLOGIC DESCRIPTION	◻ GRAPE × SYRINGE BULK DENSITY (1.00 – 2.50)	ACOUST. VEL. KM/SEC (1.0 – 6.0)
FORAMINIFERA	NANNOPLANKTON	RADIOLARIANS	MACRO-FOSSILS					
					200			
Barren	Barren				7	[in drilling breccia near top of core, one chunk of light olive gray fossiliferous MICRITE AND MICROSPARITE. At bottom of core, sideritized burrow.]	× ◻	
					250			
					300			
					350			