4. SITE 334

The Shipboard Scientific Party[1]

SITE DATA

Date Occupied: 14-17 July 1974

Position: 37°02.13'N, 34°24.87'W

Water Depth (sea level): 2619 meters

Number of Holes: 1

Penetration: 376.5 meters

Number of Cores: 27

Total Core Recovered: 99.6 meters

Oldest Sediment Cored Above Basement:
Depth: 254 meters
Nature: Foram-bearing nannofossil ooze
Age: Early late Miocene, near late Miocene-middle Miocene boundary

Acoustic Basement:
Depth Subbottom: 259.5 meters
Nature: Basalt overlying a gabbro-peridotite sequence
Velocity: 5.94 to 7.29 km/sec at 0.5 kbar

SUMMARY

Site 334 was drilled on a steep east-facing slope in a small, deep basin near the middle of magnetic anomaly 5. Acoustic basement lies beneath 259.5 meters of Recent to early late Miocene foram-bearing nannofossil ooze and was drilled 123.5 meters with 20% recovery. Basement consists of an upper 50-meter-thick section of largely aphyric basalt and a lower 67-meter-thick section of fresh, coarse-grained gabbro, serpentinized olivine gabbro, serpentinized peridotite, and breccia. Such a shallow occurrence of a plutonic assemblage was not expected at this site.

Breccias with gabbro and peridotite clasts in a nannofossil-foram ooze matrix are interlayered with the plutonic rocks and may reflect exposure of a mélange in or near the Median Valley of the Mid-Atlantic Ridge prior to burial by later basaltic extrusions. It is probable that uplift along the east-facing slope also assisted in bringing the gabbro-peridotite complex to shallow depths.

The plutonic rocks show mainly primary igneous textures suggestive of a cumulative origin for the peridotites and some of the gabbros.

BACKGROUND AND OBJECTIVES

Sites 332 and 333 provided an excellent insight into the nature of layer 2 of late Pliocene age. Unanswered questions remaining after drilling at these sites concerned the representativeness of the sections drilled, the existence of possible secular variations in basalt sequences, and the nature of materials occurring at levels deeper than those drilled at Sites 332 and 333. With these questions in mind, Site 334 was selected along a sea-floor spreading flow line connecting Sites 332 and 333 with the FAMOUS area at the ridge crest (Figure 1). The line was chosen to avoid fracture zones and to sample material that originated from the same spreading zone as the rocks at Sites 332 and 333.

Site 334 is located in a small sediment pond near the center of magnetic anomaly 5 in crust about 9.0 to 9.5 m.y. in age. Four tracks link the area of Sites 332 and 333 with the area of Site 334. These are the *Hudson* track of Jan/Feb 1974 (Cruise 74-003) and *Glomar Challenger* tracks of 17 June, 14 July, and 21/22 July, 1974 (Iuliucci and Aumento, this volume). Magnetic records are presently available only for the three *Glomar Challenger* tracks, and the magnetic anomaly profiles for these tracks are plotted in Figure 2. Regional gradients have been removed from original total field profiles by fitting linear gradients by eye. In the vicinity of Site 334 the profiles are separated by close to 9 km. However, as the result of a maneuver to avoid traffic, Profile 1 crosses Profile 2 and runs about 2 km to the south of it in the vicinity of Sites 332 and 333. Correction has been made for the major deviation from a line during this maneuver.

There is a strong coherence between the three profiles, indicating that a well-defined linear anomaly pattern exists in the area of the survey tracks. Phase agreement holds well throughout from the points in the vicinity of Sites 332 and 333 to the broad positive anomaly identified as anomaly 5. If this identification is correct, spreading has been very uniform over the area of the survey at a rate close to the 1.17 cm/yr previously determined for this area.

Although Site 334 was selected during the survey of 14 July (Profile 3) the position of the site is projected with the smallest offset onto the 17 June profile (Profile 2). The site lies on the young side of positive anomaly 5, but at a significant distance from the next youngest

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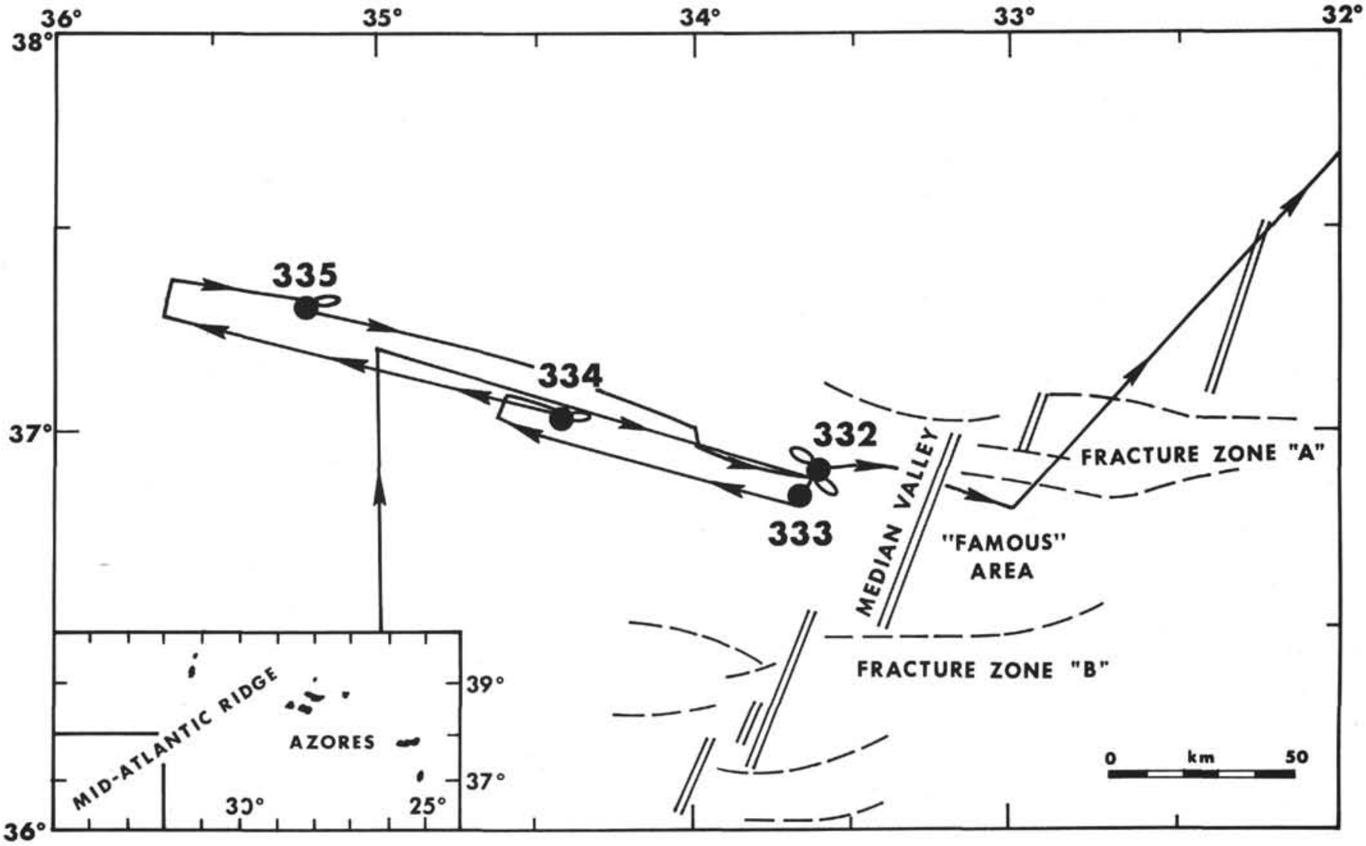

Figure 1. *Index map showing location of Leg 37 drill sites.*

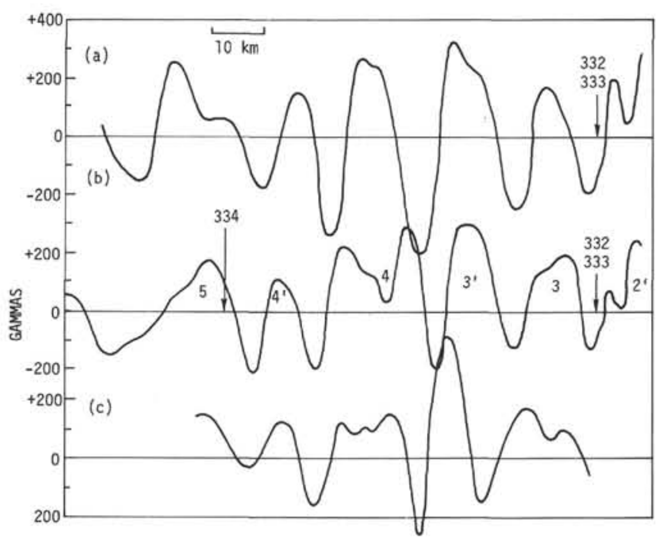

Figure 2. *Magnetic anomaly profiles along three* Glomar Challenger *tracks linking the vicinities of Sites 332, 333 and 334.*

negative anomaly. Talwani et al. (1971) give the age of anomaly 5 as from 8.71 to 9.94 m.y. If it is assumed that spreading was uniform within this interval, linear interpolation within anomaly 5 on Profile 2 gives an age for the magnetic source at Site 334 of 8.9 m.y.

Although the identification of the broad positive anomaly at this site as anomaly 5 seems well based, there is a clear conflict between the magnetic and paleontological estimates for the age of basement. Howe and Miles (this volume) find a basement age of 10-11 m.y. which is significantly older than the age from magnetic anomaly identification. This discrepancy has not yet been resolved.

The drill string was spudded in at Site 334 near the base of a steep, west-facing slope on the hypothesis that the slope was a fault scarp, and that faulting had exposed material from sections deeper in the crust.

The principal objectives for this site were to obtain an older basement sequence for comparison with Sites 332 and 333 in regard to macroscopic features, petrography, chemical composition, magnetic stratigraphy, and sonic velocities. The site was chosen at the base of a suspected fault scarp in an attempt to reach deeper into the crust than had been possible at Sites 332 and 333.

OPERATIONS

At 0230 hr 14 July *Glomar Challenger* left Site 333 and profiled 38 miles west-northwest to Site 334, where at 0930 hr 14 July a 16-kHz beacon serial 252 was dropped on the second pass over the site (Figure 1). After arriving on station a sonobuoy record was made.

A sediment thickness of 195 meters was estimated from the sonobuoy record, but the actual thickness found by drilling was 259.5 meters. This discrepancy could not be explained by errors in our estimates of sediment velocities nor by errors in measurements of travel times on the records. At this site, as later at Site 335, a likely explanation appears to be the presence of side reflections which were mistaken for acoustic basement.

The drill string was spudded in at 1930 hr in 2632 meters of water, and a 6-meter surface core was retrieved. The string was then washed to 129.5 meters subbottom where continuous coring was commenced. Heat-flow measurements were made at 139 and 177 meters subbottom.

Basalt basement was encountered at 259.5 meters subbottom. The basalt was hard to drill, the penetration rate being only 4.5 m/hr, slower than for any previous hole on Leg 37. In contrast, hole sloughing and high bit torque experienced at other sites were not encountered here. The lower penetration rates and severe bit bouncing reduced the expected life of the bit by 50% in spite of the continuous use of the heave compensator.

The bit was pulled after a total subbottom penetration of 376.5 meters. Two cones were missing from the bit.

A summary of cores taken at Site 334 is given in Table 1.

Glomar Challenger departed the site at 1400 hr 17 July.

LITHOLOGY

A single hole was drilled at Site 334; it was cored from 0 to 6 meters, washed from 6 to 129.5 meters, and then continuously cored to the bottom of the hole at 376.5 meters below the sea floor. The lithologic section consists of 259.5 meters of sediment overlying acoustic basement, approximately 50 meters of basalt with some interlayered sediment, and below the basalt, approximately 67 meters of gabbro, olivine gabbro, and peridotite.

Sediments

The punch core from 0 to 6 meters consists of firm, very pale brown (10YR 7/4) to white (10YR 8/2), foram-bearing nannofossil ooze capped by 45 cm of watery, very pale brown (10YR 7/3) nanno-foram ooze.

Cores 2-4 consist almost entirely of very stiff, white (N9) to light gray (N8), foram-bearing nannofossil ooze composed of 96% nannofossils, 3% forams, and trace amounts of sponge spicules, pyrite, and volcanic glass. A few thin (0.5 cm thick) green (10GY 5/2) and greenish-gray (5G 8/1) layers interrupt the otherwise homogeneous character of the sediments. A black patch in Section 4, Core 2 is rich in glauconite and hematite(?).

TABLE 1
Coring Summary, Site 334

Core	Date (July 1974)	Time	Depth From Drill Floor (m)	Depth Below Sea Floor (m)	Cored (m)	Recovered (m)	Recovery (%)
1	14	2000	2632.0-2638.0	0.0- 6.0	6.0	3.0	50
2	14	2250	2761.5-2771.0	129.5-139.0	9.5	9.5	100
Heat Flow							
3	15	0130	2771.0-2780.5	139.0-148.5	9.5	2.9	31
4	15	0230	2780.5-2790.0	148.5-158.0	9.5	1.8	19
5	15	0335	2790.0-2799.5	158.0-167.5	9.5	5.0	53
6	15	0445	2799.5-2809.0	167.5-177.0	9.5	3.2	34
Heat Flow							
7	15	0705	2809.0-2818.5	177.0-186.5	9.5	9.5	100
8	15	0940	2818.5-2828.0	186.5-196.0	9.5	3.2	34
9	15	1100	2828.0-2837.5	196.0-205.5	9.5	6.2	65
10	15	1210	2837.5-2847.0	205.5-215.0	9.5	8.5	89
11	15	1320	2847.0-2856.5	215.0-224.5	9.5	6.2	65
12	15	1440	2856.5-2866.0	224.5-234.0	9.5	5.5	58
13	15	1600	2866.0-2875.5	234.0-243.5	9.5	9.5	100
14	15	1715	2875.5-2885.0	243.5-253.0	9.5	1.4	15
15	15	1830	2885.0-2894.5	253.0-262.5	9.5	0.5	5
16	15	2150	2894.5-2904.0	262.5-272.0	9.5	4.55	48
17	16	0130	2904.0-2913.5	272.0-281.5	9.5	2.5	26
18	16	0355	2913.5-2923.0	281.5-291.0	9.5	1.6	17
19	16	0750	2923.0-2932.5	291.0-300.5	9.5	2.4	25
20	16	0915	2932.5-2942.0	300.5-310.0	9.5	2.2	23
21	16	1110	2942.0-2951.5	310.0-319.5	9.5	0.8	8
22	16	1255	2951.5-2961.0	319.5-329.0	9.5	1.6	17
23	16	1500	2961.0-2970.5	329.0-338.5	9.5	1.5	16
24	16	1825	2970.5-2980.0	338.5-348.0	9.5	3.8	40
Heat Flow							
25	17	0115	2980.0-2989.5	348.0-357.5	9.5	1.0	11
26	17	0400	2989.5-2999.0	357.5-367.0	9.5	1.4	15
27	17	0700	2999.0-3008.5	367.0-376.5	9.5	0.3	3
				Total	253.0	99.55	39

Cores 5-9 are composed chiefly of watery to very stiff, light gray (N7), greenish-gray (5GY 6/1), or olive-gray (5Y 6/1) nannofossil ooze composed of 85% nannofossils, 3% forams, 8% volcanic glass, 3% Radiolaria, and trace amounts of sponge spicules and pyrite. Either nearly continuous volcanic activity took place during the deposition of these sediments to explain the uniform occurrence of glass or perhaps the shards were once in discrete layers and were later redistributed by burrowing organisms. In comparison to younger and older cores, the radiolarian content of Cores 5-9 is significantly higher. Pumice fragments are prevalent in Cores 7 and 9.

Cores 10-13 are quite similar to Cores 2-4. They consist of watery to stiff, light gray (N7 to N8), foram-bearing nannofossil ooze composed of 97% nannofossils, 2% forams, and a trace of pyrite.

Below acoustic basement, Cores 16, 17, and 20 have interlayered sediment. Rare limestone, probably at one time nanno ooze, is interbedded with basalt in Cores 16 and 17. Core 20 has 40 cm of well-indurated calcareous sediment, two pieces of which are pale yellow (2.5Y 8/4) nannofossil ooze. A third piece is pale yellow to light yellow-brown sediment showing intense burrowing. The basal sand of this layer is composed of 85% nannofossil-chalk clasts, 10% basalt glass, 2% forams, 2% zeolite, and trace amounts of pyroxene and plagioclase. A few manganese dendrites discolor the surface of the core.

Basement

Acoustic basement was encountered at 259.5 meters and drilled to a bottom hole depth of 376.5 meters. A total of 25.2 meters of core was recovered. Three major lithologic units have been recognized; an upper sequence of sparsely phyric basalt, a lower sequence of aphyric basalt, and a basal sequence of mafic and ultramafic plutonic rocks (Table 2). In the two basalt units 14 cooling breaks can be recognized on the presence of glass rinds and interlayered sediments. The plutonic unit is a sequence of interlayered gabbro, olivine gabbro, and peridotite with several distinct breccia zones. Major element compositions of the basement rocks are given in Tables 3A and 3B and trace element compositions in Tables 3C and 3D (at end of text).

Unit 1 consists of light gray, medium-grained, sparsely phyric basalt. Glass rinds are locally present but no interlayered sediment was observed. Phenocrysts make up from 5% to 10% of typical specimens and consist of plagioclase with small amounts of augite and olivine. The plagioclase occurs in subhedral, often corroded, crystals from 1 to 5 mm in length; most crystals are at least An_{65-70} and are only weakly zoned, although a few have narrow sodic rims. The plagioclase crystals occur either singly or in small glomerophyric clots associated with augite ($2V_z$ = 45°) and olivine microphenocrysts. All of the olivine has a composition of Fo_{85-90} based on a $2V$ of approximately 90°, and most crystals show some rounding and corrosion.

All of the basalts from Unit 1 have a fine-grained quenched groundmass with prominent skeletal plagioclase laths up to 0.5 mm in length. Small skeletal crystals of olivine average about 5% and augite is present in variable amounts. These crystals are in a glassy to microcrystalline matrix showing incipient crystallization to clinopyroxene and iron oxide.

Olivine crystals are fresh or show only slight alteration to iddingsite. Yellow smectite replaces some glass and lines sparse vesicles near fractures, but most of the groundmass is unaltered.

Unit 2 is a sequence of medium gray, aphyric basalt containing numerous glass rinds and interlayered sediments. Except for the absence of phenocrysts, these basalts are mineralogically and texturally similar to those of Unit 1. All are fine-grained rocks showing quench textures and all contain about 5% of groundmass olivine. Most specimens have a few plagioclase microphenocrysts but these never exceed 1%.

These basalts are notably more altered than those of Unit 1. The olivine is completely replaced by brown smectite and minor carbonate, and in many specimens the interstitial material is largely replaced by smectite. Smectite and carbonate are also common vesicle fillings.

A complex interlayered sequence of gabbro, olivine gabbro or troctolite, and serpentinized peridotite comprises Unit 3. The bulk of this unit consists of light brown very coarse-grained, two-pyroxene gabbro. Most of these rocks have a hypidiomorphic granular texture; some are slightly deformed with marginal granulation of crystals. Prismatic crystals of orthopyroxene ($2V_x$ = 80°), up to 1.5 cm long, average about 20% and pale green augite ($2V_z$ = 50°) averages 30%. Both pyroxenes are characterized by abundant exsolution lamellae and the augite crystals have prominent (100) parting. Many of these crystals are marginally uralitized to pale green amphibole. Plagioclase crystals generally range from 2 to 5 mm in diameter, are anhedral to subhedral, and often contain small inclusions of pyroxene. Most have a composition of An_{85-90}. Some of the gabbros contain small quantities (up to 10%) of olivine (Fo_{85-88}), which is usually partly to completely serpentinized. Primary iron oxides are rare to absent. Except for serpentinization of the olivine, the gabbros are generally fresh. Some specimens, particularly those that have granulated crystal margins, contain some interstitial chlorite and talc(?).

The peridotites are very distinctive, dark gray to greenish-gray lherzolites with abundant ovoids of serpentinized olivine up to 1.5 cm across. Fresh olivine crystals (Fo_{90}) are commonly twinned and contain abundant inclusions of red-brown picotite. The serpentine pseudomorphs contain trains of magnetite dust and are cut by narrow veinlets of carbonate. Large prismatic crystals of orthopyroxene make up 10% to 40%. Exsolution lamellae are not common in these crystals but picotite inclusions are typically rimmed with augite. Augite crystals generally make up less than 10% and plagioclase usually less than 5%.

The olivine gabbros or troctolites are intermediate in composition and consist of serpentinized olivine, clinopyroxene and orthopyroxene, and plagioclase. These rocks are texturally similar to the associated gabbros. They grade into either gabbro or lherzolite with

TABLE 2
Lithologic Units in Acoustic Basement at Site 334

Unit	Interval	Core Recovered (m)	Probable Maximum Thickness (m)	Lithology
1	15-1, 150 cm to 16-3, 90 cm	2.5	12	Light gray, medium-grained, sparsely phyric basalt with phenocrysts of plagioclase, augite, and olivine
2	16-3, 90 cm to 21-1, 15 cm	10.8	45	Light gray, medium-grained aphyric basalt with numerous glass rinds and sedimentary interbeds
3	21-1, 15 cm to 27-1, 50 cm	10.3	65.5	Interlayered gabbro, olivine gabbro, and serpentinized peridotite with numerous breccias containing plutonic clasts in a nannofossil chalk matrix

decreasing or increasing percentages of olivine. The degree of serpentinization in the troctolites is directly related to the modal percent of olivine.

Both the gabbros and peridotites have numerous breccia zones. These consist of angular fragments of gabbro and peridotite together with broken crystals of feldspar and pyroxene. Some breccias have a matrix of finely comminuted material of the same composition, but in others the matrix consists of light brown nannofossil chalk. No basalt fragments occur in the breccias, and no such breccias have been found in the overlying basalts themselves. These breccias are tentatively interpreted as indicating cold extrusion or tectonic uplift of the coarse-grained rocks onto the ocean floor in the median valley prior to eruption of the overlying basalts.

Sulfide and oxide minerals in the basalts of Site 334 are similar to those in other basalts recovered on Leg 37. Magnetite is by far the most abundant oxide and is generally skeletal in shape. Ilmenite occurs in residual glass and spinel is closely associated with olivine.

The sulfides are almost entirely in the form of small globules, hence are presumably primary. There are hematite patches in several thin sections which may have been derived from earlier secondary sulfides. In Core 20, Section 2, there are abundant thin, botryoidal pyrite crusts growing on smectite. These crusts are almost certainly secondary, but their derivation is not clear.

The gabbros and peridotites are devoid of primary magnetite. They have some chromite and much secondary magnetite and sulfide. The secondary opaques occur in serpentine, in brecciated areas, and in altered exsolution lamellae within some of the pyroxenes.

The sulfides in the plutonic rocks are far more complex than those in the basalts. Grains with three and four distinct phases are often present. Bornite, pyrrhotite, chalcopyrite, and pyrite have been tentatively identified and there are at least two additional unidentified phases. It appears that these rocks have the highest copper and sulfur contents of all rocks examined on Leg 37.

PHYSICAL PROPERTIES AND HEAT FLOW

The paleomagnetic results from this site fall into three groups: sediments, basalts, and the gabbro-peridotite complex. The sediments yield a clear picture of part of the worldwide geomagnetic reversal sequence. Since only the lowest half of the 259-meter-thick sediment section was cored continuously, the paleomagnetic record cannot be correlated unambiguously with the worldwide sequence. Howe and Miles (this volume) find that a convincing fit can be made if it is assumed that normal polarity epoch 9, which is seen in linear anomaly patterns as anomaly 5, extends from 148 to 187 meters subbottom in the sediment sequence. If this identification is correct the basement age must be greater than is implied by the location of the site within what is apparently anomaly 5. This difference in apparent ages for basement has not been resolved.

The 50-meter-thick sequence of pillow basalts underlying the sediment column consists of two lithological units with well-defined statistically identical cleaned natural remanence (NRM) inclinations (Table 4). The mean cleaned inclination is $+53.1 \pm 3.1°$ (S.D. of mean) for shipboard samples. This inclination is indistinguishable from the expected dipole inclination for the site of $+56°$, and the polarity of the lava sequence is consistent with the location of the site within a positive magnetic anomaly (Hall and Ryall, this volume). The small scatter of cleaned NRM inclinations suggests that eruption of the sequence took place over an interval of not more than 100 yr. Generally well developed alteration by seawater at close to ocean bottom temperatures has strongly influenced the magnetic properties of the pillow basalts, with Curie point, Q ratio, and mean demagnetizing field now relatively high, and remanence intensity, initial susceptibility, and saturation magnetization now relatively low.

Paleomagnetic inclinations in the gabbro-peridotite complex are scattered, probably because of the mélange nature of the complex. The poorly defined average direction is inclined upwards, in contrast to the uni-

TABLE 4
Magnetic Measurements for Basement Rocks from Site 334

Sample (Interval in cm)	Cation Deficiency Z	Curie Temp	Rock Magnetic Data JSAT	SUS	SUS/ JSAT	NRM/ JSAT	Q (F=0.45)	Paleomagnetic Data J (0)	I (0)	D (0)	J (200)	MDF	Stable Inc	Dec	Micro Content	Data Size	Sample Depth (m)
16-1, 22-25 (2)	0.78	310	0.440	182	0.143	8.6	133.7	10947	58.4	33.3	7322	252.9	58.3	32.7	0 50	2.30	262.72
16-1, 110-113 (2)	0.76	307	0.436	221	0.175	2.1	27.0	2682	36.9	21.7	2679	362.9	39.2	23.5			263.60
16-2, 109-112 (2)	0.44	206	1.037	659	0.219	2.3	22.9	6788	49.7	14.3	2252	134.2	52.5	14.1			265.09
16-3, 16-19 (2)	0.32	170	1.085	1587	0.504	2.5	11.0	7850	47.0	196.0	1914	105.0	50.2	198.1			265.66
16-4, 7-10 (2)	0.78	310	0.417	182	0.151	2.6	38.0	3113	58.2	214.8	2502	286.7	54.7	216.5			267.07
16-4, 110-113 (2)	0.71	287	0.397	248	0.215	2.9	29.6	3308	57.9	164.7	1632	189.3	60.7	160.3	0.30	2.70	268.10
16-5, 19-21 (2)	0.91	366	0.483	256	0.183	0.8	9.7	1116	39.1	189.2	538	196.6	38.4	191.9			268.69
17-1, 77-80 (2)	0.82	329	0.304	244	0.277	2.1	17.0	1864	41.6	199.3	1384	263.8	42.2	201.2			272.77
17-2, 140-143 (2)	0.76	307	0.298	182	0.211	5.7	60.0	4918	59.2	70.1	4503	333.9	59.1	69.0			274.90
17-3, 3-6 (2)	0.69	284	0.377	201	0.184	3.0	36.5	3302	57.9	251.8	2080	246.3	59.3	254.7	0.40	2.90	275.03
17-3, 95-98 (2)	0.73	297	0.343	232	0.233	1.6	15.3	1600	64.9	336.9	815	208.3	63.6	335.5			275.95
18-1, 20-23 (2)	0.87	350	0.342	159	0.160	5.2	72.0	5149	71.1	276.8	4164	313.5	71.2	274.8			281.70
19-1, 6-9 (2)	0.89	358	0.366	208	0.196	6.2	70.7	6616	60.0	123.6	5777	332.9	60.0	121.1			291.06
19-2, 47-49 (2)	0.87	350	0.374	269	0.248	1.5	13.1	1580	46.8	114.1	1376	288.5	47.4	110.6			292.97
19-3, 93-95 (2)	0.85	339	0.356	271	0.262	3.0	25.7	3133	47.7	64.1	2438	303.0	48.2	65.3	0.30	2.10	294.93
20-1, 98-100 (2)	0.71	289	0.492	360	0.252	0.6	5.6	909	40.0	98.0	365	90.0	54.3	84.9			301.48
20-2, 16-18 (2)	0.53	230	0.814	698	0.296	1.1	8.0	2510	60.0	325.0	700	100.0	62.6	329.3			302.16
20-2, 38-40 (2)	0.76	307	0.464	291	0.216	0.6	6.1	800	49.8	327.2	413	194.3	64.1	328.3			302.38
21-1, 47-49 (2)				75			2.3	78	-26.7	331.4	56	358.0	-24.3	332.1	0.10	2.90	310.47
22-2, 61-63 (2)		577	1.170	4679	1.379	1.5	2.4	5154	-60.9	205.7	288	107.2	-55.6	207.1	1.20	3.70	321.61
23-1, 127-129 (2)		527	0.147	137	0.321	0.6	4.1	253	4.4	287.3	201	467.4	9.3	289.7			330.27
24-1, 92-94 (1)								3									339.42
24-1, 93-94 (2)								22									339.43
24-3, 112-114 (2)				62			0.2	6	-30.0	37.0	3		1.8	187.0			342.62
24-4, 95-97 (2)		572	0.187	681	1.256	1.5	2.7	821	-19.0	269.0	123	125.0	-6.8	275.3	0.20	2.60	343.95
26-1, 20-22 (2)		578	0.311	1680	1.863	2.4	2.8	2140	-77.0	72.0	368	120.0	-68.3	48.7	1.20	4.10	357.70

Note: *J*(0) and *J*(200), intensity of natural remanent magnetism and NRM intensity after AF demagnetization in 200-oe field; respectively; JSAT, saturation intensity; SUS, magnetic susceptibility; *Q*, Königsberger ratio; *I*(0), inclination; *D*(0), declination; MDF, median destructive field. From Hall and Ryall, this volume.

Sample (Interval in cm)	χ	Q	$J(0)$	$I(0)$	MDF	J_{100}/NRM (or J_{max}/NRM)	△ Direction (deg) at MDF
16-3, 29-31	6500	1.3	3900	U	200	0.89	8
19-2, 17-19(a)	14200	0.4	2500	U	250	0.93	4*
19-2, 17-19(m)	9900	1.7	7700	U	300	(1.08 at 50 oe)	2
19-2, 17-19(i)	14900	0.6	3700	U	200	1.0	3
21-1, 36-47(a)	8500	0.15	6800	U	425	0.90	1
21-1, 36-47(b)	7700	0.19	6500	U	275	0.98	4
22-2, 34-35(a)			33000	-65	–	–	–
22-2, 34-35(b)	32300	0.20	33000	-63	>400	0.95	2
22-2, 34-35(c)			20000	-64	175	0.81	2
27-1, 38-50(a)			–	U	–	–	–
27-1, 38-50(b)	16800	0.10	8400	U	150	(1.03 at 50 oe)	3
27-1, 38-50(c)			6300	U	–	–	–

Note: $J(0)$, natural remanent magnetization intensity in units of 10^{-6}emu. cm^{-3} (average for sample where bracketed χ, susceptibility in units of 10^{-6} emu. cm^{-3}, oe^{-1}(average for sample where bracketed); Q, Königsberger ratio (NRM 10.45χ) $I(0)°$, inclination of NRM; J_{100}/NRM, residual NRM fraction after 100 oe AF cleaning; J_{max}, maximum intensity reached during AF demagnetization; MDF, mean destructive field; U, unoriented sample. All others were partially (vertically) oriented; *Denotes angular shift with respect to 50-oe demag step instead of NRM. From Brecher et al., this volume.

Sample (Interval in cm)	$J(0)$	$I(0)$	$D(0)$	$J(200)$	MDF	Stable I	Stable D	TRM	SRM	SRM(h)
20-1, 114-116	1090	+25	137	644	230	Indet.	Indet.	8690	349	520
22-2, 52-55	5770	-57	210	627	130	-64	216	38500	1230	1490
24-3, 55-58	36	-29	152	–		–	–	–	–	–

Note: $J(0)$, intensity of magnetization in emu/cc, for natural remanent magnetization; $J(100)$, intensity following 100-oe demagnetization; $I(0)$, inclination of NRM; $D(0)$, declination in degrees; MDF, median destructive field; TRM, laboratory thermoremanence acquired in 0.5 oe from an unspecified temperature; SRM, saturation remanence in natural state; SRM(h), saturation remanence after laboratory thermoremanence acquisition. From Carmichael, this volume.

Sample (Interval in cm)	D	I	$Jn \times 10^3$ (Gauss)	$k \times 10^3$ (Gauss/oe)	Q_n
20-1, 114-116	294	+28	1.54	0.307	11
26-2, 4-7	162	-44	2.94	4.22	1.5

D, declination, degrees; I, inclination, degrees, positive downward; J_n, intensity of magnetization; k, initial susceptibility measured in 0.31 peak oe; Q_n, Königsberger ratio $Q_n = J_n/kH$, where H = 0.45 oe. is the present in situ field. From Deutsch et al., this volume.

TABLE 4 – *Continued*

Sample (Interval in cm)	$J_{nrm} \times 10^{-4}$	D_{nrm}	I_{nrm}	$J_{100} \times 10^{-4}$	D_{100}	I_{100}	$J_{200} \times 10^{-4}$	D_{200}	I_{200}	J_{100}/J_{nrm}	J_{200}/J_{nrm}
19-2, 6	19.11	346.5	-65.6	14.63	354.4	-70.1	3.32	352.9	-71.8	0.77	0.17
22-1, 57	3.85	0.4	48.6	3.82	359.5	49.9	3.62	0.1	50.6	0.99	0.94
22-2, 52	41.45	108.4	-70.7	15.05	114.6	-67.1	0.87	60.2	-64.6	0.36	0.02
22-2, 85	34.19	49.2	-67.4	11.38	44.3	-62.2	1.30	29.3	-63.3	0.33	0.04

Note: J_{nrm}, J_{100}, and J_{200}, intensity of magnetization in emu/cc, for natural remanent magnetization, and following 100 oe and 200 oe, demagnetization treatment, respectively; corresponding directions given by D and I where D, declination in degrees east of an arbitrary zero azimuth; I, inclination in degrees with respect to the horizontal, negative above the horizontal. $J100/J$nrm and $J200/J$nrm are simple magnetic stability indices. The present mean inclination of the geomagnetic field at Sites 332B, 334, and 335 = +59°; axial dipole inclination = +56.5°. From Ellwood and Watkins this volume.

Sample (Interval in cm)	Depth(m)[a]	Intensity (10^{-4} G) NRM	Intensity (10^{-4} G) 100 oe	Direction NRM Dec.	Direction NRM Inc.	Direction Stable Dec.	Direction Stable Inc.	H_b	k^c (10^{-4} G/oe)	Qn^c	MDF[e] (oe)
19-2, 70	40	26.2	26.3	156	65	140	69	400	2.53	10.3	302
26-1, 140	106	17.8	9.3	275	-23	284	-27	200	39.5	0.44	105

[a]Approximate subbasement depth in meters.

[b]H is the AF demagnetizing field for each stable direction.

[c]k = initial susceptibility.

[d]Qn = NRM intensity/susceptibility.

[e]MDF = median destructive field of NRM. From Kent and Lowrie, this volume.

formly downwards magnetization of the overlying pillow basalts. Magnetization intensity varies by three orders of magnitude, with serpentinized peridotite as magnetic as the overlying basalts and fresh gabbro effectively nonmagnetic.

Pillow basalt compressional wave velocities at this site average 6.32 ±0.12 km/sec (S.D. of mean) (Table 5). Fresh gabbros of the plutonic complex have a mean velocity of 7.21 km/sec (Hyndman, this volume), which is appropriate for the upper part of crustal layer 3 (i.e., 3a) rather than layer 2 if a small amount of fracturing or low velocity material is present. If the peridotites were little serpentinized before being brought to near the surface of layer 2, such a complex at the base of the crust would explain the basal layer (3b) that has sometimes been observed by refraction measurements with velocities between those of oceanic layer 3 and the mantle. When compared with the basalts recovered from all Leg 37 sites the gabbros are denser, less porous, less conducting electrically, but better conducting thermally. In contrast, the serpentinized peridotites are *less* dense than the basalts, while in other physical properties they show differences in the same sense as shown by the gabbros.

Other physical properties of basement rocks are given in Table 6.

Several temperature measurements were made at Site 334 and a best estimate of conductive heat flux is 1.16 ±0.8 HFU.

BIOSTRATIGRAPHY

General

Cores 1 through 14 contain abundant and well-preserved planktonic foraminifers and calcareous nannoplankton. Core-catcher samples from Site 334 were examined for Radiolaria. The radiolarians are common and well preserved, but are absent from core-catcher samples in Cores 2, 3, 12, 13, and 14. Core 1 sediments are Pleistocene in age, while those of Cores 2 through 14 are late Miocene in age.

Minor amounts of sediment occur as indurated veins, interbeds, and components of breccias in the basalt and ultramafic rocks of the basement sequence. Sediments in Cores 16, 17, 20, 22, and 26 were examined for calcareous nannoplankton. All samples are barren except those from Core 20, Section 2, and from Core 22, Section 2. Samples from Section 2 of Core 20 yielded abundant and well-preserved calcareous nannoplankton as well as foraminifers. The foraminifers indicate an age of early late Miocene. A breccia interbed which bears a small amount of indurated calcareous sediment is present in ultramafic rocks in Core 22, Section 2. This material contains a few moderately preserved nannofossils.

Planktonic Foraminifers

Sediments in Core 1 are late Pleistocene in age and are assigned to Zone N23. The uppermost part of the core may be Holocene, but this could not be determined with certainty. The faunas of this core are dominated by temperate species, although some species indicative of warmer water are present.

Sediments in Cores 2 through 14 are assigned to the upper Miocene, but the subdivision of these sediments is difficult because of the absence of some important zone species.

Cores 2 through 6 are placed in Zone N17. Included within this interval is the predominantly Miocene species, *Globigerinoides mitra.* The Zone N16/N17 boundary could not be distinguished by the use of planktonic foraminifers, but it was roughly established by using Radiolaria from core-catcher samples. It is placed between Cores 6 and 7 based on the first downhole occurrence of *Ommartartus hughesi* in Sample 334-7, CC.

Faunas in Cores 7 through 12 and Sample 334-13-1, 106-108 cm are assigned to Zone N16. *Globoquadrina advena* first appears in Core 13, Section 2, marking the approximate top of Zone N15. Sediments in the interval between Sample 334-13-2, 51-53 cm and basement are assigned to this zone. Faunas in the chalk interbed in Section 2 of Core 20 are also referable to Zone N15.

The absolute age of the sediment-basement contact in Hole 334 is approximately 10.5 to 11.0 m.y.B.P.

Radiolaria

Core-catcher samples from Cores 1 through 14 and lithified sediments from Core 20 were examined for Radiolaria. Sample 334-1, CC and Samples 334-4, CC through 334-11, CC contain Radiolaria which are common and well preserved. The remaining samples are barren.

Core 1 contains radiolarians of Pleistocene age. Cores 4 and 5 contain nearly uniform assemblages which include *Stichocorys delmontensis* and *Stichocorys peregrina.* The co-occurrence of these species indicates an age of late Miocene. Core 6 faunas are similar, but do not include *S. peregrina.* Faunas in Cores 7 through 11 also resemble those of Cores 4 and 5, but are characterized by the presence of *Ommartartus hughesi* and the absence of *S. peregrina.* In addition, rare specimens of *Ommartartus penultimus* and *O. antepenultimus* are present in some samples within this interval. Cores 7 through 11 are assigned to the *Ommartartus antepenultimus* Zone of the upper Miocene, based on the presence of *O. hughesi.*

Nannofossils

Cores above acoustic basement are dominated by well-preserved late Miocene nannofossils. Cores taken below have only poorly preserved nannofossils, making age determinations difficult. Ages determined are based almost entirely on core-catcher samples.

The upper portion of Core 1 has *Emiliania huxleyi* and *Gephyrocapsa oceanica* indicative of Zone NN21.

Cores 2-10 are placed in Zone NN11 on the occurrence of *Coccolithus pelagicus, Cyclococcolithina leptopora, Discoaster berggrenii, D. brouweri, D. challengeri, D. pentaradiatus, D. surculus, D. variabilis, Helicopontosphaera kamptneri, Reticulofenestra pseudoumbilica, Sphenolithus abies,* and the rare occurrence of *Discoaster quinqueramus. Ceratolithus*

TABLE 5
Seismic Velocities of Basalts (B), Gabbros (G), and Peridotities (P) from Site 334

Sample (Interval in cm)	Density (g/cm^3)	Ham. Frame (km/sec)	P (0.5) (km/sec)	S (0.5) (km/sec)	P/S (0.5)	P (2.0) (km/sec)	S (2.0) (km/sec)	P/S (2.0)
16-2, 89 (B)	2.820	5.80	5.94	3.30	1.80	6.00	3.32	1.81
16-4, 105 (B)	2.928	6.20	6.44	3.62	1.78	6.47	3.63	1.78
18-1, 85 (B)	2.945	6.25	6.40	3.60	1.78	6.44	3.62	1.78
18-2, 13 (B)	2.893	6.23	6.40	3.60	1.78	6.42	3.62	1.77
2-1, 40 (G)	3.002	7.17	7.29	3.98	1.83	7.34	4.01	1.83
21-1, 79 (G)	2.969	7.61	7.17	4.08	1.76	7.29	4.11	1.73
22-1, 70 (G)	3.013	6.82	6.96	3.93	1.77	7.02	3.99	1.76
22-2, 44 (P)	2.836	6.16	6.75	3.33	2.03	6.97	3.33	2.09
23-1, 77 (G)	3.034	7.13	7.23	4.02	1.80	7.28	4.04	1.80
24-1, 64 (G)	2.871	7.11	7.29	3.93	1.85	7.42	3.95	1.88
24-4, 87 (G)	2.851	6.39	6.85	3.84	1.78	6.92	3.87	1.79
26-1, 19 (G)	2.640	5.68						
26-2, 20 (P)	2.666	5.45						
Mean of basalts	2.882	6.46	6.79	3.75	1.81	6.87	3.77	1.82
Mean of gabbros	2.957	7.04	7.13	3.96	1.80	7.21	4.00	1.80

TABLE 6
Physical Properties of Basalts (B), Gabbros (G), and Peridotites (P) from Site 334

Sample (Interval in cm)	Depth Below Bottom (m)	Depth Below Top Basalt (m)	Bulk Density (g/cm^3)	Grain Density (g/cm^3)	Porosity (vol %)	Water Content (Wt %)	Resistivity (ohm-m)	Velocity (P) 0.5 kbar (km/sec)
16-2-89 (B)	264.9	5.4	2.820	2.963	7.3	2.6	114	5.94
16-4-105 (B)	277.6	18.1	2.928	2.995	3.3	1.1	939	6.44
18-1-85 (B)	282.4	22.9	2.945	3.009	3.1	1.0	959	6.40
18-2-13 (B)	283.1	23.6	2.893	3.000	5.3	1.8	721	6.40
21-1-40 (G)	310.4	50.9	3.002	3.017	0.8	0.3	3300	7.29
21-1-79 (G)	310.8	51.3	2.969	3.002	1.7	0.6	1850	7.17
22-1-70 (G)	320.2	60.7	3.013	3.028	0.8	0.3	1150	6.96
22-2-44 (P)	321.4	61.9	2.836	2.868	1.7	0.6	7160	6.75
23-1-77 (G)	329.8	70.3	3.034	3.049	0.8	0.3	1480	7.23
24-1-64 (G)	339.1	79.6	2.871				3540	7.29
24-4-87 (G)	343.9	84.4	2.851				687	6.85
26-1-19 (G)	357.7	98.2	2.666					(5.65)[a]
26-2-20 (P)	359.2	99.7	2.640					(5.88)[a]
Mean of basalts			2.896	2.992	4.7	1.6	683	6.30
Mean of gabbros			2.915	3.024	1.0	0.4	2001	6.92

[a]Hamilton frame at 1 atm + 0.2 km/sec for 0.5 kbar estimate.

amplificus, *C. dentatus*, and *C. primus* also occur rarely in Core 2.

Cores 11-15 commonly have *Coccolithus pelagicus*, *Cyclococcolithina leptopora*, *Discoaster brouweri*, *D. challengeri*, *D. prepentaradiatus*, *D. variabilis*, *Helicopontosphaera kamptneri*, *Reticulofenestra pseudoumbilica*, and *Sphenolithus abies*. Additional occasional occurrences of *Discoaster bollii*, and *D.* cf. *D. neohamatus* likely place these cores in Zone NN10.

REFERENCE

Talwani, M., Windisch, C.C., and Langseth, M.G., 1971. Reykjanes Ridge Crest, A detailed geophysical study: J. Geophys. Res., v. 76, p. 473-517.

TABLE 3
Geochemical Data for Igneous Rocks at Site 334

TABLE 3A
Major Element Analyses of Basalt Glasses at Site 334

Sample[a]		Depth (m)	Inv.	SiO_2	TiO_2	Al_2O_3	Total Iron	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Total
5- 2,	3-	159.53	ML	50.51	1.12	15.60	9.37	-	8.19	11.77	2.42	0.19	0.12	99.29
5- 2,	108-	160.58	ML	50.65	1.15	15.65	9.33	-	8.24	11.68	2.41	0.17	0.13	99.41
5- 3,	39-	161.39	ML	50.45	1.16	15.78	9.52	-	8.03	12.10	2.41	0.18	0.11	99.74
6- 1,	44-	167.94	ML	50.58	1.16	15.46	9.58	-	8.01	12.04	2.43	0.17	0.10	99.53
6- 3,	89-	171.39	ML	50.51	1.17	15.60	9.54	-	8.26	12.05	2.43	0.17	0.10	99.83
6- 4,	46-	172.46	ML	50.99	1.16	15.61	9.52	-	8.21	12.05	2.39	0.16	0.10	100.19
6-CC,	28-	170.60	ML	50.33	1.14	15.77	9.53	-	7.99	11.95	2.41	0.17	0.10	99.39
6-CC,	60-	170.60	ML	50.72	1.13	15.57	9.56	-	8.21	11.95	2.41	0.16	0.09	99.80
7- 1,	15-	177.50	ML	50.49	1.17	15.43	9.50	-	7.93	11.99	2.44	0.17	0.10	99.22
7- 2,	4-	178.89	ML	50.58	1.14	15.82	9.61	-	8.15	12.10	2.35	0.17	0.10	100.02
7- 2,	18-	179.03	ML	50.92	1.13	15.63	9.59	-	8.11	12.15	2.32	0.18	0.09	100.12
7- 3,	86-	181.21	ML	50.66	1.19	15.63	9.56	-	7.79	12.15	2.50	0.18	0.10	99.76
8- 4,	46-	191.46	ML	50.67	1.16	15.80	9.51	-	8.34	11.75	2.31	0.18	0.12	99.84
9- 1,	38-	196.38	ML	50.29	1.18	15.70	9.40	-	8.06	11.84	2.42	0.18	0.11	99.18
9- 5,	92-	202.92	ML	50.62	1.15	15.84	9.35	-	7.75	12.11	2.35	0.17	0.11	99.45
10- 2,	89-	207.89	ML	51.02	1.15	15.95	9.37	-	7.90	12.18	2.29	0.15	0.11	100.12
11- 1,	22-	215.22	ML	50.73	1.14	15.53	9.24	-	7.58	12.18	2.35	0.16	0.12	99.03
16- 1,	30-	262.80	ML	52.14	0.95	14.65	10.01	-	7.28	11.97	2.06	0.22	0.13	99.41
16- 1,	104-	263.54	ML	51.82	0.95	14.87	9.87	-	7.53	12.23	2.03	0.19	0.10	99.59
16- 5,	72-	269.22	ML	52.20	0.85	14.44	9.91	-	7.99	12.70	1.80	0.08	0.07	100.04
17- 1,	4-	272.04	ML	52.07	0.83	14.45	9.97	-	8.06	12.69	1.83	0.09	0.07	100.06
18- 1,	46-	281.96	ML	51.66	0.85	14.62	10.03	-	7.76	12.66	1.79	0.09	0.08	99.54
19- 2,	17-	292.67	ML	52.17	0.78	14.62	9.52	-	7.82	12.82	1.80	0.08	0.06	99.67

TABLE 3B
Major Analyses of Igneous Rocks at Site 334

Sample[a]	Depth (m)	Inv.	Method	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	Total Iron	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	CO_2	H_2O^-	H_2O^+	Total	LOI	S
15- 2, 14- 17	254.66	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0244
15- 2, 14- 17	254.66	GUNN	XRF	50.78	0.89	15.66	2.90	6.84	9.45	0.16	7.32	12.32	1.92	0.34	0.11	-	0.46	0.43	100.13	-	-
15- 2, 30-	254.80	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0320
15- 2, 30- 32	254.81	BOG	XRF	49.49	0.85	15.54	10.25	-	9.22	0.16	7.52	12.52	1.89	0.31	-	0.24	0.20	0.57	99.54	2.16	-
16- 1, 22- 25	262.74	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	0.03	-	0.0243
16- 1, 22- 25	262.74	BOG	XRF	50.37	0.88	15.67	10.19	-	9.17	0.16	7.44	12.49	1.93	0.37	0.11	-	0.56	0.28	100.45	-	-
16- 1, 22- 25	262.74	GUNN	XRF	50.99	0.87	15.47	2.54	6.95	9.23	0.16	7.47	12.36	1.96	0.36	0.10	-	0.52	0.40	100.15	-	-
16- 1, 40- 42	262.91	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0000
16- 1, 40- 42	262.91	GUNN	XRF	51.41	0.92	15.13	2.53	6.87	9.14	0.17	7.49	12.25	2.05	0.32	0.11	-	0.55	0.51	100.31	-	-
16- 1, 110-113	263.62	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.07	-	-	0.07	-	0.0000
16- 1, 110-113	263.62	GUNN	XRF	51.35	0.90	15.00	2.71	6.88	9.32	0.18	7.62	12.11	2.06	0.30	0.11	-	0.54	0.26	100.02	-	-
16- 2, 109-112	265.11	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	0.0987
16- 2, 109-112	265.11	BOG	XRF	49.90	0.86	15.43	9.64	-	8.67	0.16	7.64	12.47	2.03	0.25	0.10	-	0.92	0.47	99.87	-	-
16- 2, 109-112	265.11	GUNN	XRF	51.23	0.86	15.59	1.82	7.16	8.80	0.16	7.81	12.31	1.93	0.23	0.10	-	0.54	0.59	100.33	-	-
16- 2, 109-112	265.11	GUNN	XRF	51.24	0.86	15.58	1.81	7.16	8.79	0.16	7.75	12.31	2.00	0.23	0.10	-	0.54	0.59	100.33	-	-
16- 3, 16- 19	265.68	AUF	AAS	49.89	0.84	15.79	1.50	7.66	9.01	0.15	7.60	11.95	2.07	0.19	0.06	0.07	1.36	0.41	99.54	-	-
16- 3, 16- 19	265.68	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	0.03	-	0.0956
16- 3, 16- 19	265.68	BOG	XRF	49.05	0.84	15.46	10.22	-	9.20	0.15	8.00	12.27	2.13	0.19	0.08	0.04	0.80	0.67	99.90	1.57	-
16- 3, 24- 31	265.78	TM	PROBE	51.12	0.85	15.55	1.91	7.08	8.80	0.15	8.21	12.16	1.96	0.21	-	0.12	0.42	0.32	100.06	0.93	-
16- 3, 29- 31	265.80	FW	XRFFP	50.80	0.87	15.53	1.27	7.40	8.54	0.16	7.91	12.08	2.01	0.21	0.08	0.07	0.69	1.01	100.09	1.21	-
16- 3, 29- 31	265.80	ISH	XRF	49.70	1.09	14.80	-	-	9.48	0.18	7.23	12.20	1.69	0.28	0.20	-	-	-	96.68	2.88	-
16- 4, 7- 10	267.09	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0142
16- 4, 7- 10	267.09	BOG	XRF	48.94	0.73	14.63	9.98	-	8.98	0.16	8.50	13.28	1.68	0.17	0.07	0.22	0.50	0.42	99.28	1.07	-
16- 4, 110-113	268.12	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	0.0038
16- 4, 110-113	268.12	BOG	XRF	49.91	0.73	14.88	10.12	-	9.11	0.16	8.28	13.13	1.80	0.23	0.08	-	0.58	0.20	100.10	-	-
16- 4, 110-113	268.12	GUNN	XRF	51.04	0.73	14.85	2.85	6.56	9.12	0.16	8.21	12.79	1.78	0.22	0.08	-	0.64	0.47	100.38	-	-
16- 5, 19- 21	268.70	AUF	AAS	-	-	-	3.01	6.28	8.99	-	-	-	-	-	-	-	0.56	0.61	10.46	-	-
16- 5, 19- 21	268.70	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0000
16- 5, 19- 21	268.70	GUNN	XRF	49.61	0.73	15.78	9.94	-	8.94	0.17	7.91	13.80	1.79	0.19	0.08	-	-	-	100.00	-	-
17- 1, 77- 80	272.79	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.0053
17- 1, 77- 80	272.79	GUNN	XRF	51.52	0.75	15.10	1.77	6.60	8.19	0.16	8.32	13.06	1.78	0.13	0.08	-	0.57	0.44	100.28	-	-
17- 1, 77- 80	272.79	GUNN	XRF	51.55	0.75	15.10	1.76	6.60	8.18	0.16	8.35	13.04	1.76	0.13	0.08	-	0.57	0.44	100.29	-	-
17- 2, 140-143	274.92	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.15	-	-	0.15	-	0.0258
17- 2, 140-143	274.92	GUNN	XRF	50.92	0.75	14.90	2.18	6.95	8.91	0.17	8.32	13.10	1.72	0.15	0.08	-	0.50	0.09	99.83	-	-
17- 3, 3- 6	275.05	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.0169
17- 3, 3- 6	275.05	BOG	XRF	49.75	0.74	14.67	10.01	-	9.01	0.17	8.51	12.93	1.72	0.18	0.08	-	0.43	0.07	99.26	-	-
17- 3, 3- 6	275.05	GUNN	XRF	51.12	0.74	14.81	2.07	7.07	8.94	0.17	8.48	12.83	1.68	0.16	0.08	-	0.47	0.53	100.21	-	-
17- 3, 57- 59	275.58	FW	XRFFP	50.22	0.76	14.92	5.03	3.40	7.93	0.16	8.76	13.08	1.82	0.17	0.06	0.10	0.33	0.77	99.58	0.76	-
17- 3, 57- 59	275.58	ISH	XRF	49.80	1.13	14.00	-	-	10.80	0.21	7.45	13.10	2.07	0.29	-	-	-	1.02	98.95	-	-
17- 3, 95- 98	275.97	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.08	-	-	0.08	-	-
17- 3, 95- 98	275.97	GUNN	XRF	51.44	0.74	14.95	2.41	6.18	8.35	0.16	8.56	12.89	1.77	0.13	0.08	-	0.65	0.49	100.45	-	-
17- 3, 95- 98	275.97	GUNN	XRF	51.06	0.76	15.17	2.47	6.18	8.40	0.16	8.53	13.05	1.72	0.13	0.08	-	0.65	0.49	100.45	-	-
18- 1, 20- 23	281.72	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.0131
18- 1, 20- 23	281.72	GUNN	XRF	51.16	0.73	14.97	9.80	-	8.82	0.16	8.24	13.02	1.69	0.16	0.07	-	-	-	100.00	-	-
18- 2, 31- 33	283.32	FW	XRFFP	51.15	0.76	15.10	1.72	6.50	8.05	0.17	8.71	12.98	1.85	0.13	0.06	0.14	0.46	0.74	100.47	0.80	-
19- 1, 6- 9	291.08	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.0319
19- 1, 6- 9	291.08	GUNN	XRF	50.88	0.75	14.85	2.11	7.20	9.10	0.17	8.44	12.87	1.68	0.16	0.08	-	0.42	0.49	100.10	-	-
19- 2, 6- 8	292.57	SGS	NAA	-	-	-	-	8.80	8.80	-	-	-	2.10	-	-	-	-	-	10.90	-	-
19- 2, 17- 19	292.68	TM	PROBE	-	-	-	-	-	-	-	-	-	-	-	-	0.54	0.27	0.31	1.12	-	-
19- 2, 47- 49	292.98	AUF	AAS	51.01	0.76	15.15	2.08	6.73	8.60	0.16	8.32	12.80	1.77	0.15	0.06	0.01	0.65	0.84	100.49	-	-
19- 2, 47- 49	292.98	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.0131
19- 2, 47- 49	292.98	GUNN	XRF	51.01	0.76	15.26	9.52	-	8.57	0.17	8.26	13.03	1.75	0.15	0.08	-	-	-	99.99	-	-

19- 2,	95-101	293.48	ISH	XRF	50.80	0.99	14.30	-	-	10.20	0.07	7.70	13.40	1.64	0.08	0.06	-	-	-	99.24	0.58	-
19- 2,	102-111	293.57	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	-
19- 3,	19- 29	294.24	ISH	XRF	-	-	-	-	-	-	-	-	-	-	-	-	-	0.20	0.82	1.02	-	-
19- 3,	93- 95	294.94	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.0204
19- 3,	93- 95	294.94	GUNN	XRF	51.24	0.75	14.80	1.84	7.16	8.82	0.17	8.56	12.82	1.66	0.13	0.08	-	0.46	0.37	100.04	-	-
19- 3,	99-105	295.02	CML	XRF	50.20	0.87	13.10	11.50	-	10.35	0.18	8.80	13.10	1.80	0.20	0.09	-	-	-	99.84	-	0.1100
19- 3,	99-105	295.02	GUNN	XRF	50.21	0.76	15.05	10.40	-	9.36	0.18	8.48	12.95	1.72	0.17	0.09	-	-	-	100.01	-	-
19- 3,	99-105	295.02	MUN	AAS	49.00	0.82	15.20	2.52	7.30	9.57	0.18	8.52	12.95	1.77	0.20	0.12	-	-	-	98.58	0.90	-
20- 1,	20- 22	300.71	AUF	AAS	-	-	-	3.67	4.45	7.75	-	-	-	-	-	-	-	1.02	9.20	18.34	-	-
20- 1,	98-100	301.49	AUF	AAS	49.97	0.75	15.20	3.21	5.68	8.57	0.15	8.27	12.42	2.07	0.18	0.06	0.05	1.29	0.93	100.23	-	-
20- 1,	98-100	301.49	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	0.0000
20- 1,	98-100	301.49	GUNN	XRF	51.11	0.75	14.92	9.66	-	8.69	0.15	8.68	12.58	1.89	0.18	0.07	-	-	-	99.99	-	-
20- 1,	121-123	301.72	ISH	XRF	49.20	0.89	14.70	-	-	9.55	0.15	8.20	12.80	2.10	0.30	-	-	0.61	1.04	99.50	-	-
20- 2,	16- 18	302.17	AUF	AAS	50.42	0.77	15.12	0.97	7.82	8.69	0.16	8.51	12.62	1.88	0.09	0.04	0.01	1.08	0.43	99.92	-	-
20- 2,	16- 18	302.17	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.0845
20- 2,	16- 18	302.17	BOG	XRF	49.08	0.74	14.61	9.85	-	8.86	0.16	8.99	13.00	1.88	0.10	0.07	0.07	0.60	0.58	99.73	1.20	-
20- 2,	23- 25	302.24	FW	XRFFP	50.29	0.76	14.70	1.18	6.80	7.86	0.16	8.88	12.61	1.80	0.06	0.06	-	1.02	0.68	99.00	1.44	-
20- 2,	26- 28	302.27	CML	XRF	51.40	0.91	14.60	9.80	-	8.82	0.14	8.40	12.30	2.10	0.17	0.12	-	-	-	99.94	-	0.0900
20- 2,	26- 28	302.27	MUN	AAS	49.30	0.84	14.90	3.69	5.20	8.52	0.16	8.57	12.60	1.84	0.16	0.09	-	-	-	97.35	1.49	-
20- 2,	32- 34	302.33	ISH	XRF	48.30	0.81	14.20	-	-	10.40	0.17	8.20	13.10	2.23	0.37	-	-	0.69	0.64	99.11	-	-
20- 2,	38- 40	302.39	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.08	-	-	0.08	-	0.0000
20- 2,	38- 40	302.39	GUNN	XRF	50.16	0.75	14.70	3.92	6.39	9.92	0.19	8.25	12.78	1.82	0.24	0.08	-	0.67	0.60	100.55	-	-
20- 2,	38- 40	302.39	GUNN	XRF	49.95	0.75	14.79	3.99	6.39	9.98	0.19	8.27	12.75	1.89	0.24	0.08	-	0.67	0.60	100.56	-	-
21- 1,	0- 10	310.05			39.00	0.06	3.30	-	-	7.25	0.09	34.40	0.62	0.18	0.02	-	-	-	-	81.92	14.80	-
21- 1,	36- 47	310.42	TM	PROBE	50.88	1.09	14.48	6.16	4.36	9.90	0.17	7.42	11.95	2.16	0.30	-	0.22	0.17	0.44	99.80	0.78	-
21- 1,	36- 47	310.42	TM	PROBE	-	-	-	-	-	-	-	-	-	-	-	-	0.18	0.11	0.19	0.48	-	-
21- 1,	47- 49	310.48	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0395
21- 1,	47- 49	310.48	BOG	XRF	49.52	0.11	18.00	5.66	-	5.09	0.11	10.14	15.01	-	0.01	-	0.03	0.20	0.33	99.12	-	-
22- 1,	26- 33	319.80	ISH	XRF	45.00	0.30	15.20	-	-	10.10	0.31	13.30	8.70	2.24	0.16	-	-	0.95	2.57	99.51	-	-
22- 1,	52- 57	320.05	ISH	XRF	48.30	0.24	13.50	-	-	8.10	0.16	15.70	11.40	1.46	0.08	-	-	0.27	0.23	99.44	-	-
22- 2,	14- 21	321.18	FW	XRFFP	40.66	0.05	5.53	2.13	5.00	6.92	0.14	31.77	4.27	0.18	0.01	-	0.10	0.30	10.00	100.14	9.34	-
22- 2,	14- 21	321.18	LEB	WET	40.65	0.05	5.40	3.63	5.20	8.47	0.13	30.55	4.22	0.10	0.02	-	-	-	-	89.95	8.60	-
22- 2,	34- 35	321.35	TM	PROBE	45.84	0.76	13.78	4.51	4.24	8.30	0.13	7.10	10.82	1.76	0.17	-	0.14	0.33	11.08	100.66	10.67	-
22- 2,	61- 63	321.62	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0536
22- 2,	61- 63	321.62	BOG	XRF	40.99	0.05	4.13	10.02	-	9.02	0.14	34.58	2.14	0.10	0.02	0.01	0.11	0.50	6.44	99.23	6.70	-
22- 2,	70- 75	321.72	FW	XRFFP	39.38	0.06	4.22	4.80	4.30	8.62	0.13	32.52	3.36	0.09	-	-	0.16	0.32	10.28	99.62	10.06	-
22- 2,	77- 79	321.78	ISH	XRF	39.90	0.04	3.45	-	-	7.40	0.07	32.50	1.55	0.01	0.01	-	-	-	-	87.37	11.48	-
22- 2,	77- 79	321.78	LEB	WET	38.44	0.04	4.10	3.82	4.67	8.11	0.11	34.10	1.48	0.08	0.02	-	-	-	-	96.87	11.30	-
22- 2,	80- 82	321.81	GUNN	XRF	44.85	0.07	4.79	10.78	-	9.70	0.15	36.53	2.69	0.11	0.02	0.01	-	-	-	100.00	-	-
22- 2,	80- 82	321.81	MUN	AAS	39.70	0.01	3.89	4.14	4.09	7.82	0.13	34.45	1.20	0.06	0.06	0.09	-	-	-	87.82	11.21	-
22- 2,	110-120	322.15	ISH	XRF	47.00	0.89	17.20	-	-	9.55	0.15	12.20	12.80	1.65	0.30	-	-	-	-	97.98	1.65	-
23- 1,	8- 22	329.15	ISH	XRF	47.20	0.27	14.40	-	-	6.45	0.16	14.30	13.00	1.69	0.07	-	-	-	-	97.54	0.79	-
23- 1,	30- 35	329.33	ISH	XRF	41.80	0.03	3.57	-	-	7.67	0.03	32.90	2.49	0.07	0.02	-	-	-	-	88.55	10.70	-
23- 1,	30- 35	329.33	LEB	WET	39.90	0.05	3.86	4.44	3.59	7.59	0.11	32.59	3.20	0.10	0.02	-	-	-	-	87.96	10.70	-
23- 1,	83- 85	329.84	ISH	XRF	45.90	0.05	14.90	-	-	3.47	0.05	11.10	12.40	0.40	0.06	-	-	-	-	91.93	8.60	-
23- 1,	127-129	330.28	AUF	AAS	49.77	0.17	16.60	0.94	6.49	7.34	0.17	10.11	13.93	1.27	0.02	0.01	0.09	0.16	0.08	99.81	-	-
23- 1,	127-129	330.28	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.09	-	-	0.09	-	0.0503
23- 1,	127-129	330.28	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0363
23- 1,	127-129	330.28	BOG	XRF	49.16	0.15	16.09	7.99	-	7.19	0.16	10.33	13.90	1.27	0.02	0.01	0.07	0.20	0.42	99.77	0.50	-
23- 1,	127-129	330.28	GUNN	XRF	50.92	0.15	15.25	8.34	-	7.50	0.17	10.41	13.59	1.13	0.02	0.03	-	-	-	100.01	-	-
23- 1,	127-129	330.28	GUNN	XRF	50.74	0.14	15.68	8.13	-	7.32	0.17	10.13	13.84	1.14	0.02	0.01	-	-	-	100.00	-	-
23- 1,	127-129	330.28	GUNN	XRF	50.48	0.15	15.81	8.07	-	7.26	0.17	10.25	13.77	1.27	0.02	0.02	-	-	-	100.01	-	-
23- 1,	134-143	330.39	FW	XRFFP	50.02	0.15	15.62	3.89	6.10	9.60	0.19	10.30	12.21	1.27	0.02	-	-	0.18	1.02	100.97	0.53	-
23- 1,	139-143	330.41	ISH	XRF	43.70	0.04	3.72	-	-	6.67	0.08	32.10	1.35	0.01	0.01	-	-	-	-	87.73	11.48	-
23- 2,	52- 62	331.07	ISH	XRF	41.80	0.28	4.89	-	-	6.46	0.11	30.20	5.54	0.04	-	-	-	-	-	89.42	9.57	-
23- 2,	78- 82	331.30	CML	XRF	43.90	0.07	5.30	9.20	-	8.28	0.11	39.20	1.30	0.32	0.10	0.04	-	-	-	99.54	-	0.4000
23- 2,	78- 82	331.30	GUNN	XRF	44.03	0.04	3.99	10.72	-	9.65	0.12	39.63	1.26	0.14	0.03	0.03	-	-	-	99.99	-	-
23- 2,	78- 82	331.30	MUN	AAS	38.30	0.01	3.15	6.55	1.74	7.63	0.10	36.70	0.56	0.08	0.06	0.09	-	-	-	873.41	2.44	-

TABLE 3B – *Continued*

Sample[a]	Depth (m)	Inv.	Method	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	Total Iron	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	CO_2	H_2O^-	H_2O^+	Total	LOI	S
24- 1, 40- 44	338.92	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	0.02	-	-
24- 1, 110-117	339.64	ISH	XRF	43.20	0.12	11.80	-	-	5.72	0.43	23.50	5.75	2.02	0.28	-	-	-	-	91.85	8.25	-
24- 3, 72- 79	342.26	ISH	XRF	47.80	0.09	13.00	-	-	5.45	0.08	15.90	8.50	2.45	0.83	-	-	-	-	94.10	5.25	-
24- 3, 112-114	342.63	AUF	AAS	49.75	0.12	12.54	0.53	4.50	4.98	0.12	18.60	12.02	0.51	0.01	0.01	0.06	0.30	1.25	100.32	-	-
24- 3, 112-114	342.63	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.06	-	-	0.06	-	0.0540
24- 3, 112-114	342.63	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0852
24- 3, 112-114	342.63	BOG	XRF	49.50	0.09	12.20	5.42	-	4.88	0.12	17.52	12.37	0.49	0.01	0.03	0.06	0.20	1.34	99.35	1.70	-
24- 3, 112-114	342.63	GUNN	XRF	51.07	0.09	12.69	5.64	-	5.07	0.12	17.78	12.08	0.50	0.01	0.02	-	-	-	100.00	-	-
24- 3, 112-114	342.63	GUNN	XRF	50.67	0.08	12.15	5.76	-	5.18	0.12	18.25	12.45	0.48	0.01	0.02	-	-	-	99.99	-	-
24- 3, 112-114	342.63	GUNN	XRF	50.81	0.09	12.11	5.79	-	5.21	0.12	18.11	12.42	0.52	0.02	0.01	-	-	-	100.00	-	-
24- 3, 136-140	342.88	CML	XRF	46.10	0.08	6.90	7.80	-	7.02	0.15	28.60	9.10	0.30	0.02	0.03	-	-	-	99.08	-	0.4500
24- 4, 81- 83	343.82	ISH	XRF	42.80	0.05	6.47	-	-	5.90	0.04	30.00	7.80	0	0.09	-	-	-	-	93.15	5.74	-
24- 4, 81- 83	343.82	LEB	WET	45.00	0.08	7.20	3.22	4.31	7.21	0.13	23.88	9.13	0.20	0.06	-	-	-	-	93.11	5.74	-
24- 4, 95- 97	343.96	AUF	AAS	45.58	0.10	11.67	1.08	4.66	5.63	0.11	20.40	11.85	0.36	0.04	0.01	0.05	0.57	3.34	99.82	-	-
24- 4, 95- 97	343.96	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.05	-	-	0.05	-	0.0828
24- 4, 95- 97	343.96	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0481
24- 4, 95- 97	343.96	BOG	XRF	45.50	0.07	11.30	6.33	-	5.70	0.11	19.73	11.80	0.29	0.03	0.02	0.11	0.30	3.81	99.40	3.90	-
24- 4, 95- 97	343.96	GUNN	XRF	48.46	0.07	11.57	6.68	-	6.01	0.12	20.35	12.33	0.35	0.04	0.02	-	-	-	99.99	-	-
24- 4, 95- 97	343.96	GUNN	XRF	48.40	0.07	12.16	6.45	-	5.80	0.12	19.80	12.66	0.28	0.04	0.02	-	-	-	100.00	-	-
24- 4, 111-113	344.12	FW	XRFFP	49.80	0.10	18.05	0.02	3.60	3.62	0.10	11.42	16.09	0.87	0.02	-	-	0.12	0.68	100.87	0.69	-
25- 1, 52- 58	348.55	ISH	XRF	40.80	0.08	3.06	-	-	7.60	0	36.00	0.92	0.01	0.01	-	-	-	-	88.18	11.82	-
25- 1, 52- 58	348.55	LEB	WET	37.60	0.04	3.86	4.79	4.13	8.44	0.11	34.88	1.16	0.07	0.02	-	-	-	-	86.66	11.82	-
26- 1, 20- 22	357.71	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.31	-	-	0.31	-	0.0352
26- 1, 20- 22	357.71	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0371
26- 1, 20- 22	357.71	BOG	XRF	39.24	0.05	4.72	8.99	-	8.09	0.12	34.27	3.12	0.13	-	0.01	0.31	0.60	7.20	98.76	8.10	-
26- 1, 20- 22	357.71	GUNN	XRF	44.75	0.05	5.46	9.63	-	8.67	0.16	35.04	4.79	0.11	0.01	0.01	-	-	-	100.01	-	-
26- 1, 118-125	358.72	ISH	XRF	43.90	0.09	6.95	-	-	7.88	0.26	25.90	5.80	0.75	0.01	-	-	-	-	91.54	8.00	-
26- 2, 5- 10	359.08	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.06	-	-	0.06	-	-
26- 2, 59- 64	359.62	GUNN	XRF	48.35	0.07	10.42	6.89	-	6.20	0.16	22.07	11.70	0.26	0.06	0.02	-	-	-	100.00	-	-
26- 2, 59- 64	359.62	GUNN	XRF	48.33	0.07	10.39	6.91	-	6.22	0.16	22.08	11.70	0.28	0.06	0.02	-	-	-	100.00	-	-
26- 2, 64- 67	359.66	ISH	XRF	47.50	0.10	8.70	-	-	5.94	0.15	22.40	8.70	0.34	0.17	-	-	-	-	94.00	5.20	-
26- 2, 64- 67	359.66	LEB	WET	44.62	0.10	10.28	0.94	5.57	6.42	0.13	21.10	10.77	0.26	0.06	-	-	-	-	94.83	5.20	-
26- 2, 93-103	359.98	ISH	XRF	43.50	0.05	9.95	-	-	7.70	0.12	25.80	8.42	0.06	0.04	-	-	-	-	95.78	3.97	-
26- 2, 93-103	359.98	LEB	WET	45.20	0.06	11.30	1.82	4.85	6.49	0	21.55	10.19	0	0.08	-	-	-	-	95.00	3.97	-
27- 1, 3- 12	367.08	ISH	XRF	40.80	0.06	3.15	-	-	7.38	0.09	33.90	1.12	0.06	0.08	-	-	-	-	86.64	12.12	-
27- 1, 3- 12	367.08	LEB	WET	38.60	0.05	3.90	3.72	3.95	7.30	0.12	34.98	0.84	0.11	0.03	-	-	-	-	86.29	12.12	-
27- 1, 38- 50	367.44	ISH	XRF	45.70	0.13	9.35	-	-	8.95	0.13	18.50	12.50	0.22	0.10	-	-	-	-	94.58	4.00	-
27- 1, 38- 50	367.44	LEB	WET	45.90	0.07	10.25	1.92	4.85	6.58	0.12	21.30	10.56	0.34	0.04	-	-	-	-	95.32	4.00	-
27- 1, 38- 50	367.44	TM	PROBE	49.09	0.81	14.56	3.43	5.43	8.52	0.12	7.96	11.54	1.75	0.20	-	0.24	0.33	6.28	101.74	5.12	-

TABLE 3C
First Transition and Rare Earth Elements in Igneous Rocks at Site 334

Sample[a]	Depth (m)	Inv.	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	La	Ce	Nd	Sm	Eu	Gd	Tb	Ho	Tm	Yb	Lu
15-2, 14	254.64	GUNN	-	5335	-	-	1239	73552	-	110	-	-	-	-	-	-	-	-	-	-	-	-	-
15-2, 14	254.64	MUY	-	-	-	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-2, 30	254.80	BOG	-	5160	235	275	1240	71693	41	118	75	71	-	-	-	-	-	-	-	-	-	-	-
15-2, 30	254.80	DOS	36	-	-	220	-	-	44	-	-	-	4.450	10.70	-	1.950	0.680	-	0.550	-	-	2.38	0.360
16-1, 22	262.72	BOG	-	5280	255	262	1240	71274	44	110	74	78	-	-	-	-	-	-	-	-	-	-	-
16-1, 22	262.72	GUNN	-	5215	-	-	1239	71875	-	116	-	-	-	-	-	-	-	-	-	-	-	-	-
16-1, 40	262.90	GUNN	-	5515	-	-	1317	71174	-	141	-	-	-	-	-	-	-	-	-	-	-	-	-
16-1, 40	262.90	MUY	-	-	-	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-1, 110	263.60	GUNN	-	5395	-	-	1394	72573	-	118	-	-	-	-	-	-	-	-	-	-	-	-	-
16-2, 109	265.09	BOG	-	5160	245	265	1240	67427	44	124	71	71	-	-	-	-	-	-	-	-	-	-	-
16-2, 109	265.09	GUNN	-	5156	-	-	1239	68521	-	170	-	-	-	-	-	-	-	-	-	-	-	-	-
16-2, 109	265.09	GUNN	-	5156	-	-	1239	68451	-	170	-	-	-	-	-	-	-	-	-	-	-	-	-
16-3, 16	265.66	BOG	-	5100	260	270	1160	71484	43	113	67	75	-	-	-	-	-	-	-	-	-	-	-
16-3, 24	265.74	TM	40	5096	270	295	1162	68506	49	135	67	-	4.600	7.90	4.700	1.860	0.640	-	0.420	0.74	-	2.45	0.370
16-3, 29	265.79	FWPU	37	5215	-	249	1239	66522	-	114	64	-	5.680	9.72	55.000	1.670	0.690	-	2.640	-	-	3.35	0.350
16-3, 31	265.81	BAS	-	-	-	-	-	-	50	110	74	120	-	-	-	-	-	-	-	-	-	-	-
16-3, 31	265.81	CHE	-	-	380	400	-	-	47	150	430	-	-	-	-	-	-	-	-	-	-	-	-
16-4, 7	267.07	BOG	-	4440	245	200	1240	69805	47	142	87	72	-	-	-	-	-	-	-	-	-	-	-
16-4, 7	267.07	DOS	38	-	-	148	-	-	51	-	-	-	3.880	9.25	-	1.730	0.620	-	0.470	-	-	2.04	0.330
16-4, 110	268.10	BOG	-	4380	245	200	1240	70784	47	86	86	67	-	-	-	-	-	-	-	-	-	-	-
16-4, 110	268.10	GUNN	-	4376	-	-	1239	71029	-	93	-	-	-	-	-	-	-	-	-	-	-	-	-
16-5, 19	268.69	GUNN	-	4376	-	-	1317	69525	-	106	-	-	-	-	-	-	-	-	-	-	-	-	-
17-1, 77	272.77	GUNN	-	4496	-	-	1239	63756	-	273	-	-	-	-	-	-	-	-	-	-	-	-	-
17-1, 77	272.77	GUNN	-	4496	-	-	1239	63686	-	270	-	-	-	-	-	-	-	-	-	-	-	-	-
17-2, 140	274.90	GUNN	-	4496	-	-	1317	69357	-	115	-	-	-	-	-	-	-	-	-	-	-	-	-
17-3, 3	275.03	BOG	-	4440	220	192	1320	70015	47	78	90	66	-	-	-	-	-	-	-	-	-	-	-
17-3, 3	275.03	GUNN	-	4436	-	-	1317	69569	-	103	-	-	-	-	-	-	-	-	-	-	-	-	-
17-3, 57	275.57	FW	-	4556	-	180	1239	61665	-	102	94	-	-	-	-	-	-	-	-	-	-	-	-
17-3, 59	275.59	BAS	-	-	-	-	-	-	70	100	80	100	-	-	-	-	-	-	-	-	-	-	-
17-3, 59	275.59	CHE	-	-	320	225	-	-	32	120	130	-	-	-	-	-	-	-	-	-	-	-	-
17-3, 95	275.95	GUNN	-	4436	-	-	1239	65008	-	226	-	-	-	-	-	-	-	-	-	-	-	-	-
17-3, 95	275.95	GUNN	-	4556	-	-	1239	65428	-	222	-	-	-	-	-	-	-	-	-	-	-	-	-
18-1, 20	281.70	GUNN	-	4376	-	-	1239	68546	-	103	-	-	-	-	-	-	-	-	-	-	-	-	-
18-2, 31	283.31	FW	-	4556	-	-	1317	62659	-	102	104	-	-	-	-	-	-	-	-	-	-	-	-
19-1, 6	291.06	GUNN	-	4496	-	-	1317	70830	-	99	-	-	-	-	-	-	-	-	-	-	-	-	-
19-2, 6	292.56	SGS	42	-	-	155	-	68543	46	-	-	-	5.100	11.00	6.800	3.000	0.710	-	0.540	-	0.48	2.40	0.340
19-2, 17	292.67	TM	-	-	250	180	-	-	55	100	90	-	-	-	-	-	-	-	-	-	-	-	-
19-2, 47	292.97	GUNN	-	4556	-	-	1317	66587	-	115	-	-	-	-	-	-	-	-	-	-	-	-	-
19-2, 101	293.51	BAS	-	-	-	-	-	-	70	170	80	75	-	-	-	-	-	-	-	-	-	-	-
19-2, 101	293.51	CHE	-	-	330	220	-	-	32	125	250	-	-	-	-	-	-	-	-	-	-	-	-
19-2, 102	293.52	DOS	39	-	-	142	-	-	52	-	-	-	3.760	8.85	-	1.840	0.650	-	0.470	-	-	2.15	0.350
19-3, 29	294.29	BAS	-	-	-	-	-	-	70	150	84	75	-	-	-	-	-	-	-	-	-	-	-
19-3, 29	294.29	CHE	-	-	320	175	-	-	32	100	140	-	-	-	-	-	-	-	-	-	-	-	-
19-3, 99	294.99	CML	-	5215	-	-	1394	80436	56	105	75	88	-	-	-	-	-	-	-	-	-	-	-
19-3, 99	294.99	GUNN	-	4556	-	-	1394	72743	-	92	-	-	-	-	-	-	-	-	-	-	-	-	-
19-3, 99	294.99	MUN	-	4916	-	198	1394	74486	-	90	71	73	-	-	-	-	-	-	-	-	-	-	-
19-3, 99	294.99	MUY	-	-	-	210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-1, 98	301.48	GUNN	-	4496	-	-	1162	67567	-	94	-	-	-	-	-	-	-	-	-	-	-	-	-
20-1, 123	301.73	BAS	-	-	-	-	-	-	70	170	84	90	-	-	-	-	-	-	-	-	-	-	-
20-1, 123	301.73	CHE	-	-	330	195	-	-	32	120	140	-	-	-	-	-	-	-	-	-	-	-	-
20-2, 16	302.16	BOG	-	4500	245	180	1240	68896	46	89	87	76	-	-	-	-	-	-	-	-	-	-	-
20-2, 16	302.16	DOS	39	-	-	136	-	-	46	-	-	-	3.410	8.69	-	1.640	0.600	-	0.465	-	-	1.92	0.300

TABLE 3C – *Continued*

Sample[a]	Depth (m)	Inv.	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	La	Ce	Nd	Sm	Eu	Gd	Tb	Ho	Tm	Yb	Lu
20- 2, 23	302.23	FW	-	4556	-	155	1239	61219	-	97	89	-	-	-	-	-	-	-	-	-	-	-	-
20- 2, 26	302.26	CML	-	5455	-	-	1084	68546	49	137	98	77	-	-	-	-	-	-	-	-	-	-	-
20- 2, 26	302.26	MUN	-	5036	-	166	1239	66312	-	114	93	68	-	-	-	-	-	-	-	-	-	-	-
20- 2, 26	302.26	MUY	-	-	-	220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20- 2, 34	302.34	BAS	-	-	-	-	-	-	50	100	84	100	-	-	-	-	-	-	-	-	-	-	-
20- 2, 34	302.34	CHE	-	-	320	185	-	-	-	93	140	-	-	-	-	-	-	-	-	-	-	-	-
20- 2, 38	302.38	GUNN	-	4496	-	-	1471	77182	-	88	-	-	-	-	-	-	-	-	-	-	-	-	-
20- 2, 140	303.40	DOS	39	-	-	409	-	-	46	-	-	-	2.250	6.69	-	1.540	0.540	-	0.470	-	-	2.29	0.360
21- 1, 10	310.10	BAS	-	-	-	-	-	-	50	100	80	75	-	-	-	-	-	-	-	-	-	-	-
21- 1, 36	310.36	TM	36	6534	100	570	1317	77046	45	230	73	-	-	<1.00	<1.000	0.170	0.170	-	0.060	0.22	-	0.57	0.110
21- 1, 36	310.36	TM	-	-	100	600	-	-	65	210	80	-	-	-	-	-	-	-	-	-	-	-	-
21- 1, 47	310.47	BOG	-	660	135	700	852	39589	38	202	83	34	-	-	-	-	-	-	-	-	-	-	-
21- 1, 47	310.47	DOS	31	-	-	542	-	-	39	-	-	-	0.180	-	0.470	0.190	0.135	0.370	0.080	-	-	0.52	0.083
22- 1, 33	319.83	BAS	-	-	-	-	-	-	70	220	130	75	-	-	-	-	-	-	-	-	-	-	-
22- 1, 33	319.83	CHE	-	-	250	300	-	-	-	150	80	-	-	-	-	-	-	-	-	-	-	-	-
22- 1, 57	320.07	BAS	-	-	-	-	-	-	55	240	90	70	-	-	-	-	-	-	-	-	-	-	-
22- 1, 57	320.07	CHE	-	-	250	1000	-	-	-	250	160	-	-	-	-	-	-	-	-	-	-	-	-
22- 2, 14	321.14	FWPU	10	300	-	5701	1084	53843	-	2061	33	-	0.047	1.87	13.000	0.032	0.028	-	0.059	-	-	1.01	0.018
22- 2, 21	321.21	BAS	-	-	-	-	-	-	80	1400	77	50	-	-	-	-	-	-	-	-	-	-	-
22- 2, 21	321.21	CHE	-	-	130	1000	-	-	-	1000	140	-	-	-	-	-	-	-	-	-	-	-	-
22- 2, 34	321.34	TM	16	4556	<1	2500	1007	64570	135	2000	35	-	0.070	<1.00	<1.000	0.050	0.050	-	<1.000	0.07	-	0.30	-
22- 2, 61	321.61	BOG	-	300	35	4474	1085	70085	80	1340	46	36	-	-	-	-	-	-	-	-	-	-	-
22- 2, 61	321.61	DOS	14	-	-	4360	-	0	106	-	-	-	0.058	-	-	0.029	0.024	0.073	0.015	-	-	0.15	0.026
22- 2, 70	321.70	FWPU	10	360	-	5252	1007	67066	-	2279	34	-	0.170	4.15	25.000	0.023	0.039	-	0.039	-	-	1.01	0.037
22- 2, 79	321.79	BAS	-	-	-	-	-	-	100	1770	78	60	-	-	-	-	-	-	-	-	-	-	-
22- 2, 79	321.79	CHE	-	-	140	1000	-	-	-	1000	90	-	-	-	-	-	-	-	-	-	-	-	-
22- 2, 80	321.80	GUNN	-	420	-	-	1162	75400	-	1992	-	-	-	-	-	-	-	-	-	-	-	-	-
22- 2, 80	321.80	MUN	-	60	-	3759	1007	60814	-	1704	48	61	-	-	-	-	-	-	-	-	-	-	-
22- 2, 120	322.20	BAS	-	-	-	-	-	-	85	120	74	90	-	-	-	-	-	-	-	-	-	-	-
22- 2, 120	322.20	CHE	-	-	245	860	-	-	-	200	240	-	-	-	-	-	-	-	-	-	-	-	-
23- 1, 22	329.22	BAS	-	-	-	-	-	-	90	220	50	70	-	-	-	-	-	-	-	-	-	-	-
23- 1, 22	329.22	CHE	-	-	245	480	-	-	-	290	70	-	-	-	-	-	-	-	-	-	-	-	-
23- 1, 35	329.35	BAS	-	-	-	-	-	-	100	1720	30	50	-	-	-	-	-	-	-	-	-	-	-
23- 1, 35	329.35	CHE	-	-	135	1000	-	-	-	1000	34	-	-	-	-	-	-	-	-	-	-	-	-
23- 1, 85	329.85	BAS	-	-	-	-	-	-	35	210	80	20	-	-	-	-	-	-	-	-	-	-	-
23- 1, 85	329.85	CHE	-	-	220	1000	-	-	-	210	105	-	-	-	-	-	-	-	-	-	-	-	-
23- 1, 127	330.27	BOG	-	900	160	415	1240	55886	40	158	40	47	-	-	-	-	-	-	-	-	-	-	-
23- 1, 127	330.27	DOS	33	-	-	309	-	-	45	-	-	-	0.230	-	0.600	0.230	0.170	0.450	0.100	-	-	0.68	0.100
23- 1, 127	330.27	GUNN	-	839	-	-	1317	56865	-	156	-	-	-	-	-	-	-	-	-	-	-	-	-
23- 1, 134	330.34	FW	-	899	-	299	1471	74721	-	173	100	-	-	-	-	-	-	-	-	-	-	-	-
23- 1, 143	330.43	BAS	-	-	-	-	-	-	100	260	110	50	-	-	-	-	-	-	-	-	-	-	-
23- 1, 143	330.43	CHE	-	-	240	760	-	-	-	200	250	-	-	-	-	-	-	-	-	-	-	-	-
23- 2, 62	331.12	BAS	-	-	-	-	-	-	130	1670	40	50	-	-	-	-	-	-	-	-	-	-	-
23- 2, 62	331.12	CHE	-	-	150	1000	-	-	-	1000	50	-	-	-	-	-	-	-	-	-	-	-	-
23- 2, 78	331.28	CML	-	420	-	-	852	64349	117	2080	17	54	-	-	-	-	-	-	-	-	-	-	-
23- 2, 78	331.28	GUNN	-	240	-	-	929	74981	-	1649	-	-	-	-	-	-	-	-	-	-	-	-	-
23- 2, 78	331.28	MUN	-	60	-	3446	774	59367	-	1426	21	59	-	-	-	-	-	-	-	-	-	-	-
24- 1, 40	338.90	DOS	-	-	-	-	-	-	-	-	-	-	0.160	0.41	0.450	0.180	0.120	0.310	0.067	-	-	0.43	0.068
24- 1, 117	339.67	BAS	-	-	-	-	-	-	60	360	110	150	-	-	-	-	-	-	-	-	-	-	-
24- 1, 117	339.67	CHE	-	-	150	1000	-	-	-	370	165	-	-	-	-	-	-	-	-	-	-	-	-
24- 3, 79	342.29	BAS	-	-	-	-	-	-	50	400	120	40	-	-	-	-	-	-	-	-	-	-	-
24- 3, 79	342.29	CHE	-	-	150	1000	-	-	-	370	210	-	-	-	-	-	-	-	-	-	-	-	-
24- 3, 112	342.62	BOG	-	540	110	1800	930	37910	38	475	79	26	-	-	-	-	-	-	-	-	-	-	-
24- 3, 112	342.62	DOS	29	-	-	1560	-	-	49	-	-	-	0.095	0.25	0.280	0.110	0.068	0.230	0.052	-	-	0.34	0.053
24- 3, 112	342.62	GUNN	-	540	-	-	929	39449	-	447	-	-	-	-	-	-	-	-	-	-	-	-	-

24- 3, 112	342.62	GUNN	-	480	-	-	929	40288	-	465	-	-	-	-	-	-	-	-	-	-	-	-	-
24- 3, 136	342.86	CML	-	480	-	-	1162	54557	-	1260	43	43	-	-	-	-	-	-	-	-	-	-	-
24- 4, 83	343.83	BAS	-	-	-	-	-	-	80	900	77	60	-	-	-	-	-	-	-	-	-	-	-
24- 4, 83	343.83	CHE	-	-	150	1000	-	-	-	620	90	-	-	-	-	-	-	-	-	-	-	-	-
24- 4, 95	343.95	BOG	-	420	80	1900	852	44275	49	755	102	28	-	-	-	-	-	-	-	-	-	-	-
24- 4, 95	343.95	DOS	-	-	-	-	-	-	-	-	-	-	0.038	0.12	0.170	0.099	0.070	0.200	0.045	-	-	0.30	0.048
24- 4, 95	343.95	GUNN	-	420	-	-	929	45114	-	627	-	-	-	-	-	-	-	-	-	-	-	-	-
24- 4, 111	344.11	FW	-	599	-	1164	774	28180	-	277	80	-	-	-	-	-	-	-	-	-	-	-	-
25- 1, 58	348.58	BAS	-	-	-	-	-	-	100	2100	50	50	-	-	-	-	-	-	-	-	-	-	-
25- 1, 58	348.58	CHE	-	-	120	1000	-	-	-	1000	50	-	-	-	-	-	-	-	-	-	-	-	-
26- 1, 20	357.70	BOG	-	300	35	6170	930	62880	58	1856	16	32	-	-	-	-	-	-	-	-	-	-	-
26- 1, 20	357.70	DOS	-	-	-	-	-	-	-	-	-	-	0.030	-	0.097	0.040	0.021	0.060	0.015	-	-	0.13	0.023
26- 1, 20	357.70	GUNN	-	300	-	-	1239	67357	-	1829	-	-	-	-	-	-	-	-	-	-	-	-	-
26- 1, 125	358.75	BAS	-	-	-	-	-	-	100	870	170	40	-	-	-	-	-	-	-	-	-	-	-
26- 1, 125	358.75	CHE	-	-	165	1000	-	-	-	760	270	-	-	-	-	-	-	-	-	-	-	-	-
26- 2, 5	359.05	DOS	-	-	-	-	-	-	-	-	-	-	0.087	0.30	0.280	0.110	0.084	0.190	0.041	-	-	0.28	0.047
26- 2, 59	359.59	GUNN	-	420	-	-	1239	48192	-	779	-	-	-	-	-	-	-	-	-	-	-	-	-
26- 2, 59	359.59	GUNN	-	420	-	-	1239	48332	-	782	-	-	-	-	-	-	-	-	-	-	-	-	-
26- 2, 67	359.67	BAS	-	-	-	-	-	-	60	740	130	50	-	-	-	-	-	-	-	-	-	-	-
26- 2, 67	359.67	CHE	-	-	140	1000	-	-	-	600	210	-	-	-	-	-	-	-	-	-	-	-	-
26- 2, 103	360.03	BAS	-	-	-	-	-	-	65	680	120	40	-	-	-	-	-	-	-	-	-	-	-
26- 2, 103	360.03	CHE	-	-	135	1000	-	-	-	600	230	-	-	-	-	-	-	-	-	-	-	-	-
27- 1, 12	367.12	BAS	-	-	-	-	-	-	100	1860	70	50	-	-	-	-	-	-	-	-	-	-	-
27- 1, 12	367.12	CHE	-	-	125	1000	-	-	-	1000	12	-	-	-	-	-	-	-	-	-	-	-	-
27- 1, 38	367.38	TM	28	4856	40	1600	929	66285	108	1400	200	-	-	-	-	0.090	0.047	-	-	-	0.07	0.23	0.050
27- 1, 50	367.50	BAS	-	-	-	-	-	-	85	900	210	40	-	-	-	-	-	-	-	-	-	-	-
27- 1, 50	367.50	CHE	-	-	135	1000	-	-	-	840	320	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 3D
Trace Elements in Igneous Rocks at Site 334

Sample[a]	Depth (m)	Inv.	B	Li	Rb	Sr	Cs	Ba	Tl	Th	U	Y
15- 2, 14- 17	254.66	GUNN	-	-	6.00	86.0	-	89	-	-	-	-
15- 2, 14- 17	254.66	MUY	-	6.5	8.20	85.0	-	110	0 035	-	-	-
15- 2, 30- 32	254.81	DOS	-	-	-	-	-	-	-	0.46	-	-
16- 1, 22- 25	262.74	AUM	-	-	-	-	-	-	-	-	0.110	-
16- 1, 22- 25	262.74	GUNN	-	-	7.00	80.0	-	80	-	-	-	-
16- 1, 40- 42	262.91	GUNN	-	-	6.00	86.0	-	89	-	-	-	-
16- 1, 40- 42	262.91	MUY	-	7.0	2.70	93.0	-	45	< 001	-	-	-
16- 1, 110-113	263.62	AUM	-	-	-	-	-	-	-	-	0.140	-
16- 1, 110-113	263.62	GUNN	-	-	6.00	81.0	-	85	-	-	-	-
16- 2, 109-112	265.11	AUM	-	-	-	-	-	-	-	-	0.140	-
16- 2, 109-112	265.11	GUNN	-	-	4.00	89.0	-	95	-	-	-	-
16- 2, 109-112	265.11	GUNN	-	-	4.00	88.0	-	93	-	-	-	-
16- 3, 24- 31	265.78	TM	<1	5.0	-	60.0	-	40	-	-	-	23.0
16- 3, 29- 31	265.80	AN	-	-	-	-	-	-	-	-	-	-
16- 3, 29- 31	265.80	BAS	-	5.0	4.00	-	-	-	-	-	-	-
16- 3, 29- 31	265.80	CHE	-	-	-	5.0	-	90	-	-	-	-
16- 3, 29- 31	265.80	FWPU	-	-	2.70	87.0	3	84	-	0.96	1.040	22.7
16- 3, 29- 31	265.80	SAV	-	-	-	-	-	-	-	-	-	-
16- 4, 7- 10	267.09	DOS	-	-	-	-	-	-	-	0.42	-	-
16- 4, 110-113	268.12	AUM	-	-	-	-	-	-	-	-	0.160	-
16- 4, 110-113	268.12	GUNN	-	-	4.00	67.0	-	64	-	-	-	-
16- 5, 19- 21	268.70	AUM	-	-	-	-	-	-	-	-	0.280	-
16- 5, 19- 21	268.70	GUNN	-	-	3.00	75.0	-	-	-	-	-	-
17- 1, 77- 80	272.79	AUM	-	-	-	-	-	-	-	-	0.500	-
17- 1, 77- 80	272.79	GUNN	-	-	2.00	74.0	-	69	-	-	-	-
17- 1, 77- 80	272.79	GUNN	-	-	2.00	74.0	-	64	-	-	-	-
17- 2, 140-143	274.92	AUM	-	-	-	-	-	-	-	-	0.130	-
17- 2, 140-143	274.92	GUNN	-	-	3.00	67.0	-	54	-	-	-	-
17- 3, 3- 6	275.05	GUNN	-	-	3.00	67.0	-	61	-	-	-	-
17- 3, 57- 59	275.58	AN	-	-	-	-	-	-	-	-	-	-
17- 3, 57- 59	275.58	BAS	-	6.0	3.00	-	-	-	-	-	-	-
17- 3, 57- 59	275.58	CHE	-	-	-	88.0	-	120	-	-	-	-
17- 3, 57- 59	275.58	FW	-	-	2.70	77.0	-	69	-	-	-	20.6
17- 3, 57- 59	275.58	SAV	-	-	-	-	-	-	-	-	-	-
17- 3, 95- 98	275.97	AUM	-	-	-	-	-	-	-	-	0.160	-
17- 3, 95- 98	275.97	GUNN	-	-	2.00	76.0	-	66	-	-	-	-
17- 3, 95- 98	275.97	GUNN	-	-	2.00	75.0	-	75	-	-	-	-
18- 1, 20- 23	281.72	AUM	-	-	-	-	-	-	-	-	0.140	-
18- 1, 20- 23	281.72	GUNN	-	-	3.00	65.0	-	-	-	-	-	-
18- 2, 31- 33	283.32	FW	-	-	2.10	73.0	-	49	-	-	-	20.8
19- 1, 6- 9	291.08	AUM	-	-	-	-	-	-	-	-	0.120	-
19- 1, 6- 9	291.08	GUNN	-	-	3.00	69.0	-	69	-	-	-	-
19- 2, 17- 19	292.68	TM	<1	6.0	-	50.0	-	16	-	-	-	21.0
19- 2, 47- 49	292.98	AUM	-	-	-	-	-	-	-	-	0.190	-
19- 2, 47- 49	292.98	GUNN	-	-	3.00	72.0	-	-	-	-	-	-
19- 2, 95-101	293.48	AN	-	-	-	-	-	-	-	-	-	-
19- 2, 95-101	293.48	BAS	-	7.0	4.00	-	-	-	-	-	-	-
19- 2, 95-101	293.48	CHE	-	-	-	88.0	-	60	-	-	-	-
19- 2, 95-101	293.48	SAV	-	-	-	-	-	-	-	-	-	-
19- 2, 102-111	293.57	DOS	-	-	-	-	-	-	-	0.43	-	-
19- 3, 19- 29	294.24	AN	-	-	-	-	-	-	-	-	-	-

TABLE 3D – *Continued*

Zr	Hf	Nb	Ta	Pd	Ir	Pt	Au	Cd	Pb	Sb	F	P	Ga	Sn	Ag	Ge	Yb
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	1.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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49	1.70	-	0.64	-	-	-	-	43	-	0.64	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.029	0.05	-	-	-	-	-
-	0.99	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	1.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	3.37	-	-	-	-	-	-	-	-	-	-

TABLE 3D – *Continued*

Sample[a]		Depth (m)	Inv.	B	Li	Rb	Sr	Cs	Ba	Tl	Th	U	Y
19- 3,	19- 29	294.24	BAS	-	10.0	4.00	-	-	-	-	-	-	-
19- 3,	19- 29	294.24	CHE	-	-	-	80.0	-	60	-	-	-	-
19- 3,	19- 29	294.24	SAV	-	-	-	-	-	-	-	-	-	-
19- 3,	93- 95	294.94	AUM	-	-	-	-	-	-	-	-	0.130	-
19- 3,	99-105	295.02	CML	-	-	3.00	77.0	-	60	-	-	-	23.0
19- 3,	99-105	295.02	GUNN	-	-	4.00	70.0	-	82	-	-	-	-
19- 3,	99-105	295.02	MUCA	-	5.6	6.40	85.0	-	99	0 044	-	0.170	-
19- 3,	99-105	295.02	MUN	-	-	6.00	69.0	-	112	-	-	-	-
20- 1,	98-100	301.49	GUNN	-	-	4.00	69.0	-	80	-	-	-	-
20- 1,	121-123	301.72	AN	-	-	-	-	-	-	-	-	-	-
20- 1,	121-123	301.72	BAS	-	15.0	8.00	-	-	-	-	-	-	-
20- 1,	121-123	301.72	CHE	-	-	-	84.0	-	57	-	-	-	-
20- 1,	121-123	301.72	SAV	-	-	-	-	-	-	-	-	-	-
20- 2,	16- 18	302.17	DOS	-	-	-	-	-	-	-	0.41	-	-
20- 2,	23- 25	302.24	FW	-	-	-	76.0	-	59	-	-	-	19.8
20- 2,	26- 28	302.27	CML	-	-	4.00	83.0	-	43	-	-	-	23.0
20- 2,	26- 28	302.27	MUCA	-	14.0	5.50	85.0	-	72	0 017	-	0.190	-
20- 2,	26- 28	302.27	MUN	-	-	2.00	72.0	-	89	-	-	-	-
20- 2,	32- 34	302.33	AN	-	-	-	-	-	-	-	-	-	-
20- 2,	32- 34	302.33	BAS	-	11.0	12.70	-	-	-	-	-	-	-
20- 2,	32- 34	302.33	CHE	-	-	-	88.0	-	60	-	-	-	-
20- 2,	32- 34	302.33	SAV	-	-	-	-	-	-	-	-	-	-
20- 2,	38- 40	302.39	GUNN	-	-	5.00	72.0	-	64	-	-	-	-
20- 2,	140-145	303.43	DOS	-	-	-	-	-	-	-	0.24	-	-
21- 1,	0- 10	310.05	AN	-	-	-	-	-	-	-	-	-	-
21- 1,	0- 10	310.05	BAS	-	13.0	3.80	-	-	-	-	-	-	-
21- 1,	0- 10	310.05	CHE	-	-	-	5.0	-	20	-	-	-	-
21- 1,	0- 10	310.05	SAV	-	-	-	-	-	-	-	-	-	-
21- 1,	36- 47	310.42	TM	70	70.0	-	26.0	-	<1	-	-	-	<1.0
21- 1,	36- 47	310.42	TM	<1	4.0	-	30.0	-	<1	-	-	-	11.0
21- 1,	47- 49	310.48	DOS	-	-	-	-	-	-	-	<1.00	-	-
22- 1,	26- 33	319.80	AN	-	-	-	-	-	-	-	-	-	-
22- 1,	26- 33	319.80	BAS	-	-	4.00	-	-	-	-	-	-	-
22- 1,	26- 33	319.80	CHE	-	-	-	60.0	-	34	-	-	-	-
22- 1,	26- 33	319.80	SAV	-	-	-	-	-	-	-	-	-	-
22- 1,	52- 57	320.05	AN	-	-	-	-	-	-	-	-	-	-
22- 1,	52- 57	320.05	BAS	-	6.0	3.00	-	-	-	-	-	-	-
22- 1,	52- 57	320.05	CHE	-	-	-	26.0	-	30	-	-	-	-
22- 1,	52- 57	320.05	SAV	-	-	-	-	-	-	-	-	-	-
22- 2,	14- 21	321.18	AN	-	-	-	-	-	-	-	-	-	-
22- 2,	14- 21	321.18	BAS	-	6.0	3.00	-	-	-	-	-	-	-
22- 2,	14- 21	321.18	CHE	-	-	-	5.0	-	20	-	-	-	-
22- 2,	14- 21	321.18	FWPU	-	-	1.40	2.7	0	6	-	0.19	0.230	1.4
22- 2,	14- 21	321.18	SAV	-	-	-	-	-	-	-	-	-	-
22- 2,	34- 35	321.35	TM	28	7.0	-	<1.0	-	<1	-	-	-	15.0
22- 2,	61- 63	321.62	DOS	-	-	-	-	-	-	-	<1.00	-	-
22- 2,	70- 75	321.72	FWPU	-	-	-	2.7	0	-	-	0.12	0.210	3.8
22- 2,	77- 79	321.78	AN	-	-	-	-	-	-	-	-	-	-
22- 2,	77- 79	321.78	BAS	-	5.5	2.00	-	-	-	-	-	-	-
22- 2,	77- 79	321.78	CHE	-	-	-	5.0	-	20	-	-	-	-
22- 2,	77- 79	321.78	SAV	-	-	-	-	-	-	-	-	-	-

TABLE 3D – *Continued*

Zr	Hf	Nb	Ta	Pd	Ir	Pt	Au	Cd	Pb	Sb	F	P	Ga	Sn	Ag	Ge	Yb
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.020	0.020	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	<.001	0.02	<1	2.20	-	-	-	-	-	-	-	-	-	-
39	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	9	2.40	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.022	0.025	-	-	-	-	-
-	0.98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	<.001	0.03	<1	0.92	-	-	-	-	-	-	-	-	-	-
37	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	8	2.59	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.026	0.049	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	0.88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	3.30	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.01	0.012	-	-	-	-	-
<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	<1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	8	2.10	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	.0046	0.01	-	-	-	-	-
-	-	-	-	-	-	8	5.40	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	.0046	0.01	-	-	-	-	-
-	-	-	-	-	-	8	9.60	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	0.16	-	-	-	-	101	-	0.16	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.01	0.01	-	-	-	-	-
<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	<1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	0.19	-	-	-	-	89	-	0.11	-	-	-	-	-	-	-
-	-	-	-	-	-	8	6.20	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.01	0.01	-	-	-	-	-

TABLE 3D – *Continued*

Sample[a]	Depth (m)	Inv.	B	Li	Rb	Sr	Cs	Ba	Tl	Th	U	Y
22- 2, 80- 82	321.81	AUMC	-	-	-	-	-	-	-	-	0.130	-
22- 2, 80- 82	321.81	GUNN	-	-	1.00	2.0	-	33	-	-	-	-
22- 2, 80- 82	321.81	MUN	-	-	5.00	14.0	-	8	-	-	-	-
22- 2, 110-120	322.15	AN	-	-	-	-	-	-	-	-	-	-
22- 2, 110-120	322.15	BAS	-	6.0	4.00	-	-	-	-	-	-	-
22- 2, 110-120	322.15	CHE	-	-	-	34.0	-	21	-	-	-	-
22- 2, 110-120	322.15	SAV	-	-	-	-	-	-	-	-	-	-
23- 1, 8- 22	329.15	AN	-	-	-	-	-	-	-	-	-	-
23- 1, 8- 22	329.15	BAS	-	3.0	4.00	-	-	-	-	-	-	-
23- 1, 8- 22	329.15	CHE	-	-	-	32.0	-	26	-	-	-	-
23- 1, 8- 22	329.15	SAV	-	-	-	-	-	-	-	-	-	-
23- 1, 30- 35	329.33	AN	-	-	-	-	-	-	-	-	-	-
23- 1, 30- 35	329.33	BAS	-	6.0	2.00	-	-	-	-	-	-	-
23- 1, 30- 35	329.33	CHE	-	-	-	5.0	-	16	-	-	-	-
23- 1, 30- 35	329.33	SAV	-	-	-	-	-	-	-	-	-	-
23- 1, 78- 82	329.80	AUM	-	-	-	-	-	-	-	-	0.120	-
23- 1, 83- 85	329.84	AN	-	-	-	-	-	-	-	-	-	-
23- 1, 83- 85	329.84	BAS	-	5.0	2.00	-	-	-	-	-	-	-
23- 1, 83- 85	329.84	CHE	-	-	-	14.0	-	22	-	-	-	-
23- 1, 83- 85	329.84	SAV	-	-	-	-	-	-	-	-	-	-
23- 1, 127-129	330.28	AUM	-	-	-	-	-	-	-	-	0.015	-
23- 1, 127-129	330.28	AUM	-	-	-	-	-	-	-	-	0.015	-
23- 1, 127-129	330.28	DOS	-	-	-	-	-	-	-	<1.00	-	-
23- 1, 127-129	330.28	GUNN	-	-	1.00	30.0	-	43	-	-	-	-
23- 1, 127-129	330.28	GUNN	-	-	2.00	30.0	-	47	-	-	-	-
23- 1, 134-143	330.39	FW	-	-	0.30	36.0	-	16	-	-	-	6.0
23- 1, 139-143	330.41	SAV	-	-	-	-	-	-	-	-	-	-
23- 2, 52- 62	331.07	AN	-	-	-	-	-	-	-	-	-	-
23- 2, 52- 62	331.07	BAS	-	11.0	7.00	-	-	-	-	-	-	-
23- 2, 52- 62	331.07	CHE	-	-	-	5.0	-	17	-	-	-	-
23- 2, 52- 62	331.07	SAV	-	-	-	-	-	-	-	-	-	-
23- 2, 78- 82	331.30	AUMC	-	-	-	-	-	-	0 022	-	-	-
23- 2, 78- 82	331.30	CML	-	-	3.00	6.0	-	35	-	-	-	2.0
23- 2, 78- 82	331.30	GUNN	-	-	1.00	5.0	-	79	-	-	-	-
23- 2, 78- 82	331.30	MUN	-	-	3.00	15.0	-	69	-	-	-	-
24- 1, 110-117	339.64	AN	-	-	-	-	-	-	-	-	-	-
24- 1, 110-117	339.64	BAS	-	24.0	3.00	-	-	-	-	-	-	-
24- 1, 110-117	339.64	CHE	-	-	-	6.0	-	17	-	-	-	-
24- 1, 110-117	339.64	SAV	-	-	-	-	-	-	-	-	-	-
24- 3, 72- 79	342.26	AN	-	-	-	-	-	-	-	-	-	-
24- 3, 72- 79	342.26	BAS	-	19.0	3.60	-	-	-	-	-	-	-
24- 3, 72- 79	342.26	CHE	-	-	-	10.0	-	17	-	-	-	-
24- 3, 112-114	342.63	AUM	-	-	-	-	-	-	-	-	0.004	-
24- 3, 112-114	342.63	AUM	-	-	-	-	-	-	-	-	0.012	-
24- 3, 112-114	342.63	DOS	-	-	-	-	-	-	-	<1.00	-	-
24- 3, 112-114	342.63	GUNN	-	-	0.00	13.0	-	63	-	-	-	-
24- 3, 112-114	342.63	GUNN	-	-	1.00	10.0	-	44	-	-	-	-
24- 4, 81- 83	343.82	AN	-	-	-	-	-	-	-	-	-	-
24- 4, 81- 83	343.82	BAS	-	6.0	3.00	-	-	-	-	-	-	-
24- 4, 81- 83	343.82	BAS	-	-	-	5.0	-	26	-	-	-	-
24- 4, 81- 83	343.82	SAV	-	-	-	-	-	-	-	-	-	-

TABLE 3D – *Continued*

Zr	Hf	Nb	Ta	Pd	Ir	Pt	Au	Cd	Pb	Sb	F	P	Ga	Sn	Ag	Ge	Yb
-	-	-	-	62.000	0.553	9	10.00	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	8	3.70	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	.0046	0.01	-	-	-	-	-
-	-	-	-	-	-	-	3.90	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	.0060	0.01	-	-	-	-	-
-	-	-	-	-	-	8	6.00	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.01	0.01	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	8	4.70	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	.0046	0.01	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	<1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	.0046	0.01	-	-	-	-	-
-	-	-	-	-	-	8	7.10	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	.0086	0.01	-	-	-	-	-
-	-	-	-	19.000	0.723	1	4.40	-	-	-	-	-	-	-	-	-	-
1	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	8	3.80	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.01[illegible]	0.01	-	-	-	-	-
-	-	-	-	-	-	8	9.10	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-9	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	<1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	[illegible]	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	15	8.40	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	.0046	0.01	-	-	-	-	-

TABLE 3D – *Continued*

Sample[a]	Depth (m)	Inv.	B	Li	Rb	Sr	Cs	Ba	Tl	Th	U	Y
24-4, 95-97	343.96	AUM	-	-	-	-	-	-	-	-	0.022	-
24-4, 95-97	343.96	GUNN	-	-	1.00	14.0	-	-	-	-	-	-
24-4, 111-113	344.12	FW	-	-	-	23.0	-	19	-	-	-	4.6
25-1, 52-58	348.55	AN	-	-	-	-	-	-	-	-	-	-
25-1, 52-58	348.55	BAS	-	4.0	2.00	-	-	-	-	-	-	-
25-1, 52-58	348.55	CHE	-	-	-	5.0	-	15	-	-	-	-
25-1, 52-58	348.55	SAV	-	-	-	-	-	-	-	-	-	-
26-1, 20-22	357.71	AUM	-	-	-	-	-	-	-	-	0.074	-
26-1, 20-22	357.71	GUNN	-	-	1.00	4.0	-	47	-	-	-	-
26-1, 118-125	358.72	AN	-	-	-	-	-	-	-	-	-	-
26-1, 118-125	358.72	BAS	-	9.0	4.00	-	-	-	-	-	-	-
26-1, 118-125	358.72	CHE	-	-	-	7.0	-	18	-	-	-	-
26-1, 118-125	358.72	SAV	-	-	-	-	-	-	-	-	-	-
26-2, 59-64	359.62	AUMC	-	-	-	-	-	-	-	-	0.031	-
26-2, 59-64	359.62	GUNN	-	-	1.00	13.0	-	58	-	-	-	-
26-2, 59-64	359.62	GUNN	-	-	1.00	13.0	-	60	-	-	-	-
26-2, 64-67	359.66	AN	-	-	-	-	-	-	-	-	-	-
26-2, 64-67	359.66	BAS	-	11.0	3.00	-	-	-	-	-	-	-
26-2, 64-67	359.66	CHE	-	-	-	9.0	-	21	-	-	-	-
26-2, 64-67	359.66	SAV	-	-	-	-	-	-	-	-	-	-
26-2, 93-103	359.98	AN	-	-	-	-	-	-	-	-	-	-
26-2, 93-103	359.98	BAS	-	5.0	2.20	-	-	-	-	-	-	-
26-2, 93-103	359.98	CHE	-	-	-	8.0	-	22	-	-	-	-
26-2, 93-103	359.98	SAV	-	-	-	-	-	-	-	-	-	-
27-1, 3-12	367.08	AN	-	-	-	-	-	-	-	-	-	-
27-1, 3-12	367.08	BAS	-	4.0	2.00	-	-	-	-	-	-	-
27-1, 3-12	367.08	CHE	-	-	-	5.0	-	17	-	-	-	-
27-1, 3-12	367.08	SAV	-	-	-	-	-	-	-	-	-	-
27-1, 38-50	367.44	AN	-	-	-	-	-	-	-	-	-	-
27-1, 38-50	367.44	BAS	-	6.0	2.30	-	-	-	-	-	-	-
27-1, 38-50	367.44	CHE	-	-	-	6.0	-	22	-	-	-	-
27-1, 38-50	367.44	SAV	-	-	-	-	-	-	-	-	-	-
27-1, 38-50	367.44	TM	27	8.0	-	6.0	-	<1	-	-	-	13.0

Note: The analysts codes are as follows: AUM – F. Aumento and W. Mitchell, Dalhousie University; S by A. J. Naldrett, University of Toronto (Chapter 32, this volume); GUNN – B. Gunn, University of Montreal (Chapter 58, this volume); BOG – H. Bougault, Centre Oceanologique de Bretagne (Chapters 30 and 50, this volume); AUF – F. Aumento and M. Fratta, Dalhousie University; TM – G. Thompson, Woods Hole Oceanographic Institution (Chapter 53, this volume); FW – M. Flower, Ruhr-Universitat Bochum (Chapters 51 and 61, this volume); ISH – I. Shevaleevsky, U.S.S.R. Academy of Sciences; SGS – J. Schilling, University of Rhode Island (Chapters 38 and 71, this volume); MUN – Memorial University, Newfoundland (see Chapter 56, this volume); CML – R. Lambert, University of Alberta (Chapter 34, this volume); LEB – A. Lebedkova, U.S.S.R. Academy of Sciences; MUY – J. Muysson, McMaster University (Chapter 33, this volume); DOS – J. Dostal, Dalhousie University (Chapter 35, this volume); FWPU – M. Flower, Ruhr-Universitat Bochum (first transition elements) and H. Puchelt, Universitat Karlsruhe (REE) (Chapters 51 and 37, respectively); BAS – L. Bannich, and N. Sushevskaya, U.S.S.R. Academy of Sciences;

TABLE 3D – *Continued*

Zr	Hf	Nb	Ta	Pd	Ir	Pt	Au	Cd	Pb	Sb	F	P	Ga	Sn	Ag	Ge	Yb
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	8	6.30	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	.0046	0.01	-	-	-	-	-
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-	-	-	-	-	-	8	2.10	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	.0046	0.01	-	-	-	-	-
-	-	-	-	-	-	8	2.40	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	.0046	0.01	-	-	-	-	-
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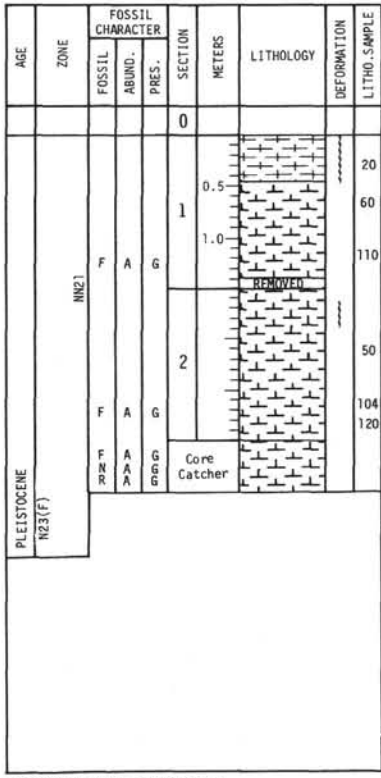
<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CHE – S. Chernogorova, U.S.S.R. Academy of Sciences; MUCA – J. Muysson, McMaster University (Chapter 33, this volume); J. Crocket, McMaster University (Chapter 36, this volume), F. Aumento and W. Mitchell, Dalhousie University (Chapter 31, this volume); AUMC – F. Aumento and W. Mitchell, Dalhousie University (Chapter 31, this volume) and J. Crocket, McMaster University (Chapter 36, this volume); AN – G. Anoshin, U.S.S.R. Academy of Sciences; SAV – E. Savinova, N. Kosilina and T. Andreeva, U.S.S.R. Academy of Sciences. The methods codes are as follows: TRACK – fission track; XRF – X-ray fluorescence; AAS – atomic absorption; XRFAA – X-ray fluorescence and atomic absorption; WET – classical wet chemical techniques; NCL – neoclassical techniques; PROBE – electron microprobe; MISC – miscellaneous techniques; NAA – neutron activation analysis; CLASS – classical wet chemical techniques; XRFFP – X-ray fluorescence and flame photometry; – - not detected.

Site 334 Hole Core 1 Cored Interval: 0.0-6.0 m



LITHOLOGIC DESCRIPTION

10YR 7/3	
10YR 7/4 to 10YR 8/2	
10YR 7/4 to 10YR 8/2	
10YR 8/2	

Watery to firm very pale brown to white calcareous ooze. White ooze very slightly mottled with very pale brown patches (filled burrows?). Pumice fragment at 1-129.

1. NANNO-FORAM OOZE
   Smear slide 1-20

Forams	55%
Nannos	45%
Sponge Spicules	TR
Diatoms	TR
Vol. Glass	TR

2. FORAM-BEARING NANNO OOZE
   Avg. of smear slides 1-60, 1-110, 2-50, 2-104, 2-120, CC

Nannos	94%
Forams	5%
Sponge Spicules	TR
Diatoms	TR
Vol. Glass	TR

Grain Size

	2-80
sand	51.5
silt	14.4
clay	34.1

Carbon-Carbonate 2-72
10.9, 0.1, 90

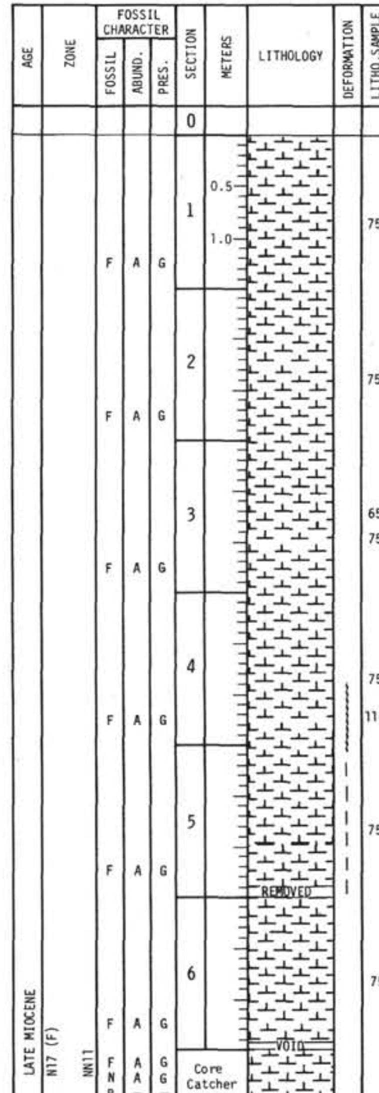
X-ray (Bulk) 2-83
Amor 20.2, Calc 97.4, Quar 1.8, Mica 0.8

X-ray (2-20μm)

	2-83
Amor	N.D.
Quar	35.7
K-Fe	18.9
Plag	18.2
Kaol	1.1
Mica	24.8
Chlo	1.4
Cris	TR

Explanatory Notes in Chapter 1

Site 334 Hole Core 2 Cored Interval: 129.5-139.0 m



LITHOLOGIC DESCRIPTION

Very stiff white (N9) to light gray (N8) ooze. White ooze mottled with gray areas and vice versa. Deformed green (10GY 5/2) layers 0.5 cm thick below 106 cm in Section 4. Greenish-gray (5G 7/1) layer at 5-8. Yellowish-gray (5Y 8/1) layer in Section 6 with 4 cm thickness. Hematite- and glauconite-rich at 4-114.

FORAM-BEARING NANNO OOZE
   Avg. of smear slides 1-75, 2-75, 3-65, 3-75, 4-75, 5-75, 6-75

Nannos	97%
Forams	2%
Pyrite	TR

Grain Size

	1-80	3-80	5-80
sand	18.2	7.1	9.6
silt	26.8	29.5	29.0
clay	55.0	63.4	61.4

Carbon-Carbonate 3-72
11.2, 0.1, 93

X-ray (Bulk) 1-83
Amor 4.8, Calc 100.0

X-ray (2-20μm)

	1-83	2-83	3-83
Amor	N.D.	N.D.	60.4
Quar	7.3	5.0	2.8
Plag	16.7	62.2	29.6
Mica	12.3	3.5	4.4
Mont	24.6	-	28.4
Paly	-	-	3.3
Phil	31.7	27.7	28.4
Anal	-	1.6	0.8
Augi	7.3	-	2.1

	4-83	5-83	6-83
Amor	58.4	67.6	N.D.
Quar	2.0	4.7	5.6
Plag	42.1	32.5	28.6
Mica	2.2	5.6	7.5
Mont	26.9	26.3	29.9
Paly	-	-	1.3
Phil	22.4	30.1	21.3
Anal	1.0	0.9	1.0
Augi	3.3	-	4.8

Colors (top to bottom): N9 to N8; N8 to N9; mixed N8 and N9; N8; N8 with 10GY 5/2 layers; N8; 5G 7/1 layer; N8; N9 to N8; 5Y 8/1 layer; N8; N8

Explanatory Notes in Chapter 1

Site 334 Hole Core 3 Cored Interval: 139.0-148.5 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE
LATE MIOCENE	N17 (F) NN11	F	A	G	0, 1	0.5, 1.0	VOID	△△△△△△△	96, 121
		F	A	G	2		REMOVED		48, 54, 135
		F N R	A A —	G G /	Core Catcher				

LITHOLOGIC DESCRIPTION

Very stiff chiefly white to light gray (N8) ooze with green (10GY 5/2) and greenish gray (5G 8/1) layers between 1-120 and 2-89. Darkest layers are stiffest.

N8

10GY 5/2 layer 5G 8/1

mixed 10GY 5/2 and 5G 8/1 layers

mixed N8 and N9 layers

N8

FORAM-BEARING NANNO OOZE
Avg. of smear slides 1-96, 1-121, 2-48, 2-54, 2-135

Nannos	95%
Forams	3%
Pyrite	1%
Vol. Glass	TR

Grain Size

	2-80
sand	6.4
silt	28.7
clay	64.9

Carbon-Carbonate 2-72
11.0, 0.1, 91

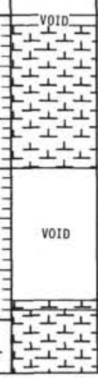
X-ray (Bulk) 2-83
Amor 6.9, Calc 100.0

X-ray (2-20μm)

	2-83
Amor	45.5
Quar	2.0
Plag	25.1
Mica	16.7
Mont	12.7
Phil	38.1
Anal	1.5
Augi	3.9

Site 334 Hole Core 4 Cored Interval: 148.5-158.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE
LATE MIOCENE	N17 (F) NN11	F	A	G	0, 1	0.5, 1.0	VOID		40, 100
					2		VOID		140
		F N R	A A C	G G M	Core Catcher				



LITHOLOGIC DESCRIPTION

This core was accidentally dropped on the deck. Therefore parts of Section 1 are not necessarily in order and their top-bottom orientation may be incorrect.

N7

N8

N7

N7

5GY 6/1

Very stiff light gray (N7 to N8) ooze with a few faint light green layers.

FORAM-BEARING NANNO OOZE
Avg. of smear slides 1-40, 1-100, 2-140

Nannos	95%
Forams	4%
Sponge Spicules	TR
Pyrite	TR
Vol. Glass	TR

Grain Size

	1-80
sand	4.1
silt	30.6
clay	65.3

Carbon-Carbonate 1-72
10.7, 0.1, 89

X-ray (Bulk) 1-83
Amor 4.8, Calc 100.0

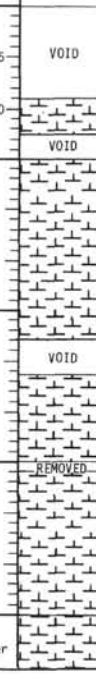
X-ray (2-20μm)

	1-83
Amor	N.D.
Quar	3.6
Plag	38.1
Mica	21.5
Augi	36.8

Explanatory Notes in Chapter 1

Site 334 Hole Core 5 Cored Interval: 158.0-167.5 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE
LATE MIOCENE	N17 (F) NN11	F	A	G	0, 1	0.5, 1.0	VOID, VOID	△△	110
		F	A	G	2				75
		F	A	G	3		VOID		130
		F	A	G	4		REMOVED		40, 80, 113
		F N R	A A C	G G M	Core Catcher				



LITHOLOGIC DESCRIPTION

Watery to very stiff gray to greenish-gray (5GY 6/1) ooze. Black patch pyrite at 1-110. Subcircular greenish-gray (5GY 4/1) patch at 4-113 may be filled burrow.

N7

N7

N7

N7

N7 to N8 gradational contact 5GY 6/1

5Y 4/1

VOLCANIC GLASS, FORAM BEARING NANNO OOZE
Avg. of smear slides 2-75, 3-130, 4-40, 4-80, 4-113

Nannos	85%
Forams	6%
Vol. Glass	6%
Pyrite	TR
Rads	2%
Sponge Spicules	TR

Grain Size

	3-80	4-80
sand	14.0	21.5
silt	38.1	42.9
clay	47.9	35.6

Carbon-Carbonate 3-72
9.4, 0.1, 78

X-ray (Bulk) 2-116
Amor 46.1, Calc 93.0, Quar 0.6, Plag 6.4

X-ray (2-20μm)

	2-116	3-83	4-83
Amor	79.8	85.9	78.3
Quar	2.8	4.9	2.4
Plag	37.3	31.9	25.9
Mica	8.3	22.3	7.5
Mont	-	-	26.2
Anal	2.2	2.5	3.0
Augi	49.5	38.4	34.9
Cris	TR	PRES	-

Explanatory Notes in Chapter 1

Site 334 Hole Core 6 Cored Interval: 167.5-177.0 m

AGE	ZONE			FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
							0					
LATE MIOCENE	N17 (F)	NN11		F	A	G	1	0.5, 1.0	VOID, REMOVED		20, 120	5Y 6/1 to 5GY 6/1
				F	A	G	2		VOID		54, 75	5GY 6/1; 5GY 6/1; 5G 3/2 layer; 5GY 6/1; 5GY 4/1 layer; 5GY 6/1
				F N R	A A C	G G M	Core Catcher					5Y 6/1

Very stiff olive gray (5Y 6/1) to greenish-gray (5GY 6/1) ooze. Possible filled burrow at 1-95. Marked 0.5 cm thick dusky green (5G 3/2) layer at 2-54. Dark greenish-gray (5GY 4/1) layer at 2-131.

VOLCANIC GLASS-FORAM-BEARING NANNO OOZE
Avg. of smear slides 1-20, 1-120, 2-54, 2-95

Nannos	87%
Forams	5%
Vol. Glass	5%
Pyrite	TR
Rads	2%
Sponge Spicules	TR

Grain Size

	1-80	2-80
sand	14.3	13.9
silt	42.9	43.9
clay	42.8	42.2

Carbon-Carbonate 2-72
8.4, 0.1, 69

X-ray (Bulk) 1-83
Amor 40.8, Calc 97.7, Plag 2.3

X-ray (2-20μm)

	1-83	2-83
Amor	90.2	N.D.
Quar	2.0	3.9
Plag	28.1	37.3
Mica	7.7	14.4
Mont	24.8	-
Anal	4.2	-
Augi	33.1	44.4
Cris	TR	TR

Explanatory Notes in Chapter 1

Site 334 Hole Core 7 Cored Interval: 177.0-186.5 m

AGE	ZONE			FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	LITHOLOGIC DESCRIPTION
							0					
LATE MIOCENE	N16 (F)	NN11	Ommartartus antepenultimus (R)	F	A	G	1	0.5, 1.0			63, 75	N7 to 5GY 6/1
				F	A	G	2				75, 144	N7
				F	A	G	3				75	N7 to 5GY 6/1
				F	A	G	4				19, 75	N7 to 5GY 6/1
				F	A	G	5		REMOVED		75, 135	5GY 6/1; 10GY 5/2 layer; 5GY 6/1; N6
				F	A	G	6				31, 44, 75	5GY 6/1; 5P 4/2 layer; 5GY 6/1; 5GY 4/1 layer
				F N R	A A A	G G G	Core Catcher					5GY 4/1

Mostly very stiff light gray (N7) to greenish-gray (5GY 6/1) to dark green gray (5GY 4/1) ooze with slight purple spot mottling in upper half. Black pyrite-rich patch at 4-19. 3 mm thick green (10GY 5/2) layer at 5-55. 0.5 cm purple (5P 4/2) layer at 6-31. Slight olive gray (5Y 6/1) mottling in Section 6. Pumice fragments at 1-91, 1-116, 4-106, 4-134, 5-61, 5-76, 5-85, and 6-44. Purple pyrite-rich streak at 2-144.

VOLCANIC GLASS-FORAM-BEARING NANNO OOZE
Avg. of smear slides 1-63, 1-75, 2-75, 3-75, 4-75, 5-75, 5-135, 6-31, 6-44, 6-75

Nannos	86%
Forams	3%
Vol. Glass	8%
Rads	4%
Sponge Spicules	TR
Pyrite	TR

Grain Size

	1-80	3-80	5-80
sand	8.1	10.3	7.5
silt	41.2	39.9	38.7
clay	50.7	49.7	53.9

Carbon-Carbonate 3-60
9.0, 0.1, 74

X-ray (Bulk) 1-83
Amor 32.7, Calc 100.0

X-ray (2-20μm)

	1-83	2-88	3-83
Amor	90.1	89.7	88.6
Quar	2.8	3.4	5.0
Plag	15.2	18.0	15.1
Mica	10.2	4.8	8.5
Mont	37.0	34.8	37.9
Paly	-	-	-
Phil	11.1	7.7	7.6
Anal	3.8	4.9	2.6
Pyri	2.4	1.8	2.1
Augi	17.4	24.7	21.2
Cris	TR	PRES	-

	4-83	5-83	6-83
Amor	91.0	87.8	85.6
Quar	1.7	2.9	1.9
Plag	14.4	18.3	19.7
Mica	8.1	4.5	7.1
Mont	46.7	43.3	34.6
Paly	3.3	-	-
Phil	3.6	3.6	-
Anal	4.1	3.7	6.5
Pyri	-	1.0	0.6
Augi	18.2	22.7	29.6
Cris	PRES	-	-

Explanatory Notes in Chapter 1

Site 334 Hole Core 8 Cored Interval: 186.5-196.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
LATE MIOCENE	N16 (F) NN11 *Ommartartus antepenultimus* (R)				0				
					1	0.5, 1.0	REMOVED		60, 106
		F	A	G					
					2				60
		F	A	G					
		F N R	A A C	G G M	Core Catcher				

LITHOLOGIC DESCRIPTION

5GY 6/1
5GY 6/1
5Y 4/1

Watery to stiff greenish-gray (5GY 6/1) to olive gray (5Y 4/1) ooze. Black spots of pyrite micronodules in 100-125 interval in Section 1. Greenish gray (5G 6/1) spot at 1-60.

RAD-FORAM-VOLCANIC GLASS-BEARING NANNO OOZE

Avg. of smear slides 1-60, 2-60

Nannos	82%
Vol. Glass	9%
Forams	3%
Rads	5%
Sponge Spicules	TR
Pyrite	TR
Glauconite	TR

Grain Size

	1-60	2-88
sand	17.4	18.1
silt	43.7	40.8
clay	38.9	41.1

Carbon-Carbonate 2-82
7.1, 0.1, 58

X-ray (Bulk) 1-54
Amor 47.6, Calc 100.0

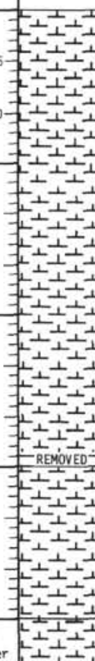
X-ray (2-20μm)

	1-54	2-91
Amor	89.5	88.6
Quar	1.7	2.2
Plag	17.6	19.1
Mica	6.3	6.0
Mont	41.8	44.3
Anal	4.8	2.3
Pyri	1.9	1.6
Augi	25.8	24.5

Explanatory Notes in Chapter 1

Site 334 Hole Core 9 Cored Interval: 196.0-205.5 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE
LATE MIOCENE	N16 (F) NN11 *Ommartartus antepenultimus* (R)				0				
					1	0.5, 1.0			10, 135
					2				75
		F	A	G					
					3		REMOVED		75
		F	A	G					
					4				75
		F	A	G					
		F N R	A A C	G G M	Core Catcher				



LITHOLOGIC DESCRIPTION

N7
N7
N7
N7
5P 4/2 layer
N7
5GY 6/1 layer
N7
5Y 6/1

Watery to stiff light gray (N7) to light olive gray (5Y 6/1) ooze. White (N9) patches at 1-6, 1-10, 1-16 and 2-83. Dark greenish-gray (5GY 4/1) patch at 1-135. Purple (5P 4/2) layer 3 mm thick at 4-90. Diffuse greenish-gray (5GY 6/1) layer at 4-97. Pumice fragments at 3-44 and 4-96.

RAD-VOLCANIC GLASS-FORAM-BEARING NANNO OOZE

Avg. of smear slides 1-10, 1-135, 2-75, 3-75, 4-75

Nannos	86%
Forams	3%
Vol. Glass	7%
Rads	3%
Sponge Spicules	TR
Pyrite	TR

Grain Size

	2-91	3-80	4-82
sand	2.1	9.7	10.1
silt	89.9	40.0	37.2
clay	8.0	50.2	52.7

Carbon-Carbonate 4-72
9.8, 0.1, 81

X-ray (Bulk) 2-94
Amor 25.8, Calc 96.3, Mica 3.7

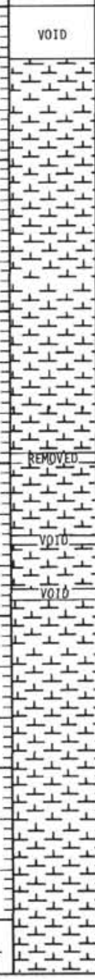
X-Ray (2-20μm)

	2-94	3-83	4-85
Amor	90.6	85.5	88.6
Quar	4.0	5.0	3.9
Plag	13.8	19.1	16.9
Mica	11.0	5.6	5.7
Mont	48.3	41.3	50.5
Phil	4.4	-	-
Anal	4.0	3.4	2.6
Pyri	-	1.0	-
Augi	14.6	24.6	20.4
Cris	PRES	-	TR

Explanatory Notes in Chapter 1

Site 334 Hole Core 10 Cored Interval: 205.5-215.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE
					0				
LATE MIOCENE	N16 (F) NN10? Ommartartus antepenultimus (R)				1	0.5 1.0	VOID		90
		F	A	G	2				110
		F	A	G	3		REMOVED		75
		F	A	G	4		VOID VOID		60
					5				75
					6				75
		F N R	A A A	G G G	Core Catcher				



LITHOLOGIC DESCRIPTION

N7 · N7 · N8 · N8 · 5G 8/1 layer · N8 · N8 · N8 · N8

Watery to stiff light gray (N7 to N8) ooze mottled with white (N9) patches at 1-124, 1-143, 2-43, and 2-68. Yellowish-gray (5Y 8/1) patches at 1-96, 1-113, 2-61, 2-110, 3-46, 3-76, and 3-83. Greenish-gray (5G 8/1) layer at 4-124. Greenish-gray patch (5GY 8/1) at 6-102.

FORAM-BEARING NANNO OOZE
Avg. of smear slides 1-90, 2-110, 3-75, 4-60, 5-75, 6-75

Nannos	93%
Forams	5%
Vol. Glass	1%
Rads	TR
Sponge Spicules	TR
Pyrite	TR

Trace of fish remains at 4-60.

Grain Size

	4-90
sand	7.6
silt	20.9
clay	71.5

Carbon-Carbonate 4-69
11.0, 0.1, 91

X-ray (Bulk) 4-94
Amor 11.1, Calc 100.0

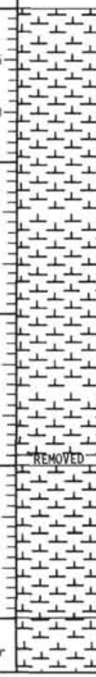
X-ray (2-20μm)

	4-96
Amor	N.D.
Quar	14.7
Plag	60.0
Mica	9.0
Anal	3.1
Augi	13.3
Cris	TR

Explanatory Notes in Chapter 1

Site 334 Hole Core 11 Cored Interval: 215.0-224.5 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE
					0				
LATE MIOCENE	N16 (F) NN10 Ommartartus antepenultimus (R)	F	A	G	1	0.5 1.0			35 75
		F	A	G	2				125
		F	A	G	3		REMOVED		75
		F	A	G	4				120 135
		F N R	A A A	G G G	Core Catcher				



LITHOLOGIC DESCRIPTION

N8 · N8 · N7 layer · N8 · N8 · N8 · 5Y 8/1 interval · 5GY 6/1 layers · N8 · N8

Watery to stiff chiefly light gray (N8) ooze. Greenish gray (5G 6/1) patches at 1-51, 1-67, and 1-77. Two black specks at 1-35. 3 mm thick gray (N7) layer at 2-125. Purple (5P 4/2) patches in Section 3. Yellowish gray (5Y 8/1) from 108-130 in Section 4.

FORAM-BEARING NANNO OOZE
Avg. of smear slides 1-35, 1-75, 2-125, 3-75, 4-120, 4-185

Nannos	96%
Forams	3%
Rads	TR
Sponge Spicules	TR
Vol. Glass	TR
Pyrite	TR

Grain Size

	2-80	3-80	4-80
sand	11.6	9.3	9.6
silt	23.2	17.0	17.6
clay	65.2	73.6	72.8

Carbon-Carbonate 3-72
11.0, 0.1, 91

X-ray (Bulk) 2-83
Amor 11.6, Calc 100.0

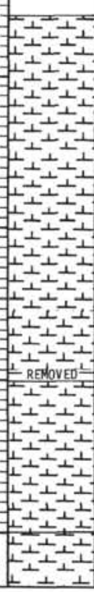
X-ray (2-20μm)

	2-83	3-83	4-83
Amor	N.D.	87.9	N.D.
Quar	7.4	6.5	5.8
Plag	22.1	15.6	19.4
Mica	4.3	19.3	17.5
Mont	34.7	35.1	35.1
Phil	10.4	10.5	11.7
Anal	2.0	1.6	-
Augi	19.1	11.3	10.6
Cris	PRES	PRES	PRES

Explanatory Notes in Chapter 1

Site 334 Hole Core 12 Cored Interval: 224.5-234.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	
LATE MIOCENE	N16 (F) / NN10				0					
					1	0.5, 1.0	VOID		120	N8
		F	A	G						
		F	A	G	2				37	N8
		F	A	G	3		REMOVED		75	N8
		F	A	G	4				90	N7 to 5GY 6/1
		F N R	A A —	G G —	Core Catcher					5Y 6/1



LITHOLOGIC DESCRIPTION

Watery to very stiff chiefly light gray (N8) ooze becoming greenish gray (5GY 6/1) in Section 4. Bluish gray (5B 7/1) patches in Sections 1 and 2. Gray mottling in Sections 3 and 4.

FORAM-BEARING NANNO OOZE

Avg. of smear slides 1-120, 2-37, 3-75, 4-90

Nannos	94%
Forams	5%
Rads	TR
Sponge Spicules	TR
Vol. Glass	TR
Pyrite	TR

Grain Size

	2-80	3-80	4-81
sand	9.6	10.4	12.3
silt	23.8	23.3	23.5
clay	66.6	66.3	64.1

Carbon-Carbonate 3-72
10.7, 0.1, 88

X-ray (Bulk) 2-83
Amor 13.7, Calc 100.0

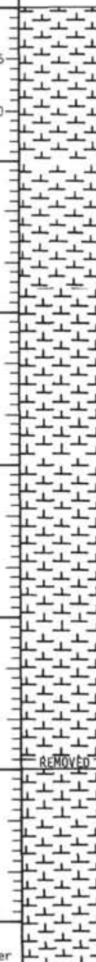
X-ray (2-20μm)

	2-83	3-83	4-83
Amor	N.D.	N.D.	76.7
Quar	6.5	5.8	3.4
Plag	29.9	26.3	22.1
Mica	9.6	7.3	4.2
Mont	26.9	23.2	36.4
Phil	-	5.8	-
Anal	3.5	2.0	5.8
Pyri	-	3.2	1.8
Augi	23.6	26.4	26.4
Cris	TR	TR	PRES

Explanatory Notes in Chapter 1

Site 334 Hole Core 13 Cored Interval: 234.0-243.5 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE	
LATE MIOCENE	N15(F) / NN10				0					
		F	A	G	1	0.5, 1.0			75	N7
		F	A	G	2				30 116	N7 to N8
		F	A	G	3					N8
		F	A	G	4				75	N8
		F	A	G	5		REMOVED		75	N8
		F	A	G	6				75 145	N7 to N8 10YR 8/3
		F N R	A A	G G	Core Catcher					10YR 8/3



LITHOLOGIC DESCRIPTION

Watery to stiff light gray (N7 to N8) nanno ooze. Stiff very pale brown (10YR 8/3) below 6-143. White (N9) patches at 1-31 and 1-63. Olive gray (5Y 4/1) patches at 2-84, 2-116, and 3-101. Black pyritic patch at 2-30.

FORAM-BEARING NANNO OOZE

Avg. of smear slides 1-75, 2-116, 4-75, 5-75, 6-75, 6-145

Nannos	94%
Forams	5%
Rads	TR
Sponge Spicules	TR
Vol. Glass	TR
Pyrite	TR

Grain Size

	2-83	4-90	5-80	6-80
sand	14.0	13.8	12.6	11.8
silt	22.7	23.6	21.2	22.4
clay	63.3	62.6	66.2	65.7

Carbon-Carbonate 4-104
11.0, 0.1, 91

X-ray (Bulk) 2-86
Amor 13.9, Calc 100.0

X-ray (2-20μm)

	2-86	4-93	5-83	6-83
Amor	N.D.	74.2	72.1	N.D.
Quar	5.5	7.8	8.0	4.3
Plag	25.3	18.4	19.3	32.8
Mica	12.0	26.5	14.2	5.4
Mont	30.9	19.6	34.9	17.3
Paly	-	-	-	1.3
Phil	-	8.4	-	26.0
Anal	2.7	3.2	4.0	2.5
Pyri	2.6	-	0.8	1.2
Augi	21.0	16.1	18.8	9.0
Cris	PRES	PRES	TR	-

Explanatory Notes in Chapter 1

Site 334 Hole Core 14 Cored Interval: 243.5-253.0 m

AGE	ZONE		FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE
						0				
LATE MIOCENE	N15(F)	NN10	F	A	G	1	0.5, 1.0		Δ Δ Δ Δ Δ Δ	110
			F N R	A A —	G G —	Core Catcher				

LITHOLOGIC DESCRIPTION

Watery mixture of light gray (N8) and very pale brown (10YR 8/3) ooze above 1-76. Stiff very pale brown below.

mixture of N8 and 10YR 8/3 — FORAM-BEARING NANNO OOZE

Smear slide 1-110

Nannos	97%
Forams	2%
Pyrite	TR

10YR 8/3

Grain Size

	1-82
sand	6.6
silt	23.4
clay	70.1

10YR 8/3

Carbon-Carbonate 1-72
11.1, 0.1, 92

X-ray (Bulk) 1-91
Amor 17.6, Calc 100.0

X-ray (2-20μm)

	1-91
Amor	N.D.
Quar	7.1
Plag	22.2
Mica	7.2
Mont	32.1
Anal	3.7
Pyri	3.0
Augi	24.7
Cris	TR

Site 334 Hole Core 15 Cored Interval: 253.0-262.5 m Sheet 1 of 2

AGE	ZONE	FOSSIL CHARACTER: FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO.SAMPLE
					0				
LATE MIOCENE	NN10				1	0.5	VOID / VOID		31, 70

LITHOLOGIC DESCRIPTION

10YR 7/4 — Blocks of very stiff grayish orange (10YR 7/4) nanno ooze. Very pale orange (10YR 8/2) patch at 1-31 with yellowish brown (10YR 5/6) spot having 66% volcanic glass content.

10YR 7/4 — FORAM-BEARING NANNO OOZE

Smear slide 1-70

Nannos	98%
Forams	2%

Site 334 Hole Core 15 Cored Interval: 253.0-262.5 m Sheet 2 of 2

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	METERS	LITHOLOGY	SAMPLES	D g/cc	V km/sec	POROSITY
								0						
		15.7	10.4	7.6	0.31	0.57	0.24	1	0.5, 1.0		T,C			

LITHOLOGIC DESCRIPTION

Original basalt recovery was 0.20 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

SPARSELY PHYRIC BASALT
T. S. 2-30
5% of phenocrysts, chiefly plagioclase with lesser augite and olivine. Quenched groundmass of skeletal plagioclase, olivine and some augite crystal in glassy to poorly crystallized material. Slight replacement of glass by smectite. Sparse vesicles contain some calcite.

Explanatory Notes in Chapter 1

Site 334 Hole Core 16 Cored Interval: 262.5-272.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	METERS	LITHOLOGY	SAMPLES	D g/cc	V km/sec	POROSITY
								0						
109.5	nN							1	0.5		A			
26.8	nN								1.0	VOID	A A			
67.9	nN							2			B A	2.820	5.94	7.3
78.5	nN	15.7	10.4	8.1	0.19	0.67	0.04	3			A			
31.3	nN	14.8	10.1	8.6	0.17	0.42	0.22				A			
33.1	nN							4			B A	2.928	6.44	3.3
11.2	nN							5			A			

LITHOLOGIC DESCRIPTION

Original basalt recovery was 4.55 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

1. SPARSELY PHYRIC BASALT
   T. S. 1-110, 2-109, 3-16
   5-10% of plagioclase, augite and olivine phenocrysts up to 5 mm long in poorly crystallized groundmass of skeletal plagioclase laths, small olivine crystals and sheaf-like masses of clinopyroxene. Minor interstitial glass and iron-oxides. Glass and olivine partly replaced by smectite. Sparse vesicles and veinlets contain some smectite and carbonate and rare zeolites.

2. APHYRIC BASALT
   T. S. 4-7, 4-110, 5-19
   Poorly crystallized basalt similar to sparsely phyric unit above except these rocks contain only traces of plagioclase microphenocrysts. Some sedimentary interlayers with some glassy breccia. Olivine typically replaced by brown smectite.

Explanatory Notes in Chapter 1

Site 334 Hole Core 17 Cored Interval: 272.0-281.5 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	SAMPLES	D g/cc	V km/sec	POROSITY
								0				
18.6	nN							1	A			
								2				
49.2	nN								A			
33.0	nN								A			
16.0	nN							3	A			

LITHOLOGIC DESCRIPTION

Original basalt recovery was 2.5 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

APHYRIC BASALT
T. S. 1-77, 2-140, 3-3, 3-95
Poorly crystallized, slightly variolitic basalt composed of skeletal plagioclase laths, small olivine crystals and small augite grains in mats of sheaf-like clinopyroxene with minor interstitial glass and iron-oxides. Some specimens very glassy. Olivine and some glass altered to smectite. Sparse vesicles rimmed with some smectite - some filled with glass. Glassy zones common; some interlayered sediment and some carbonate veins.

Site 334 Hole Core 18 Cored Interval: 281.5-291.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	SAMPLES	D g/cc	V km/sec	POROSITY
								0				
51.5	N							1	A			
									B	2.945	6.40	3.1
									A			
								2	B	2.893	6.40	5.3

LITHOLOGIC DESCRIPTION

Original basalt recovery was 1.6 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

APHYRIC BASALT
T. S. 1-20
Poorly crystallized basalt with skeletal plagioclase laths and minor olivine crystals with some crystallized augite in glassy, variolitic matrix incipiently crystallized to clinopyroxene. Olivine and some glass replaced by smectite. 1% vesicles lined with smectite and partly filled with carbonate.

Explanatory Notes in Chapter 1

Site 334 Hole Core 19 Cored Interval: 291.0-300.5 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	SAMPLES	D g/cc	V km/sec	POROSITY
								0				
66.2	nN							1	A			
15.8	nN							2	A			
31.3	nN							3	A			

LITHOLOGIC DESCRIPTION

Original basalt recovery was 2.4 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

APHYRIC BASALT
T. S. 1-6, 2-47, 3-93
Poorly crystallized, variolitic basalt with skeletal plagioclase laths, minor skeletal olivine and some augite in incipiently crystallized matrix. 2-3 percent vesicles with very minor smectite. Matrix and olivine fresh.

Site 334 Hole Core 20 Cored Interval: 300.5-310.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	SAMPLES	D g/cc	V km/sec	POROSITY
								0				
9.09	nN							1	A			
25.1	nN	14.8	9.97	9.1	0.10	0.58	0.07		A			
									A			
8.00	nN							2				

LITHOLOGIC DESCRIPTION

Original basalt recovery was 2.2 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

APHYRIC BASALT
T. S. 1-98, 2-16, 2-38
Medium-grained, intergranular to subophitic, slightly variolitic. Consists of plagioclase, augite 3-5% olivine and minor iron-oxides associated with interstitial glass. 3-5% vesicles partly filled with brown smectite. Smectite replaces all olivine and some interstitial glass. Chalk at 2-107 correlated with zones N16 and NN10.

Explanatory Notes in Chapter 1

Site 334 Hole Core 21 Cored Interval: 310.0-319.5 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	SAMPLES	D g/cc	V km/sec	POROSITY
0.78	rR	18.1	5.69	10.2	0.01	0.33	0.03	1	B, A	3.002	7.29	0.8
									B, T,C	2.969	7.17	1.7

LITHOLOGIC DESCRIPTION

Original recovery was 0.8 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

1. TWO PYROXENE GABBRO
   T. S. 1-47, 1-98
   Coarse-grained, hypidmorphic granular; composed of augite, orthopyroxene and plagioclase. Minor uralite and chlorite on pyroxene crystal margins.

2. APHYRIC BASALT

Site 334 Hole Core 22 Cored Interval: 319.5-329.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	SAMPLES	D g/cc	V km/sec	POROSITY
								1	A, B	3.013	6.96	0.8
51.5	rR	4.44	10.8	37.2	0.02	6.44	0.11	2	B, A	2.836	6.75	

LITHOLOGIC DESCRIPTION

Original recovery was 1.6 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

1. PERIDOTITE
   T. S. 2-61
   Coarse grained serpentinized peridotite. Serpentine psuedomorphs after olivine form ovoids 1.5 cm across. Interstitial material consists of augite surrounded by minor green amphibole and chlorite. Minor plagioclase. Fairly abundant sulfides.

2. GABBRO
   T. S. 1-40
   Augite and orthopyroxene gabbro.

3. BRECCIA
   Gabbro and peridotite fragments and broken plagioclase and pyroxene crystals in matrix of nanno chalk.

Site 334 Hole Core 23 Cored Interval: 329.0-338.5 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	SAMPLES	D g/cc	V km/sec	POROSITY
2.53	nSHN	16.2	8.05	10.4				1	B	3.034	7.23	
									A			
								2				

LITHOLOGIC DESCRIPTION

Original recovery was 1.5 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

1. GABBRO
   T. S. 1-127
   Coarse-grained, hypidiomorphic granular; crystals slightly deformed. Composed of plagioclase, augite, and orthopyroxene. Pyroxene crystal margins slightly granulated and altered to green amphibole.

2. PERIDOTITE
   Dark greenish-gray, serpentinized plagioclase-bearing peridotite.

3. BRECCIA
   Angular clasts of gabbro and peridotite and crystal fragments of plagioclase and pyroxene in white to light brown matrix of nanno-bearing chalk.

Explanatory Notes in Chapter 1

Site 334 Hole Core 24 Cored Interval: 338.5-348.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	SAMPLES	D g/cc	V km/sec	POROSITY
								1	B	2.871	7.29	
								2				
0.0644	rSHN	12.4	5.51	17.8	0.01	1.34	0.06	3	A			
8.21	ShrSHR	11.8	6.61	20.6	0.03	3.81	0.11	4	B, A	2.851	6.85	

LITHOLOGIC DESCRIPTION

Original recovery was 3.8 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

1. GABBRO
   T. S. 3-112, 4-95
   Coarse-grained, hypidiomorphic granular; composed of plagioclase, augite and orthopyroxene with minor olivine replaced by serpentine. Some green amphibole around margins of pyroxene crystals. Some secondary amphibole and sulfide minerals in veins.

2. BRECCIA
   Brecciated gabbro; broken fragments of feldspar and partly uralitized pyroxene in light colored matrix (nonsediment, noncarbonate) with some chlorite and talc(?).

Site 334 Hole Core 25 Cored Interval: 348.0-357.5 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	SAMPLES	D g/cc	V km/sec	POROSITY
								1				

LITHOLOGIC DESCRIPTION

Original recovery was 1.0 m. Styrofoam spacers make the amount shown here greater than the amount recovered.

1. GABBRO
   Coarse-grained, light colored; composed of clinopyroxene, orthopyroxene and plagioclase. Some olivine in lower part.

2. PERIDOTITE
   Dark greenish gray, coarse-grained; large black ovoids of magnetite-dusted serpentine after olivine; interstitial plagioclase and pyroxene, somewhat uralitized. Some spinel inclusions in olivine psuedomorphs.

   In upper 45 cm gabbro and peridotite are intimately interlayered and appear to grade into one another.

Explanatory Notes in Chapter 1

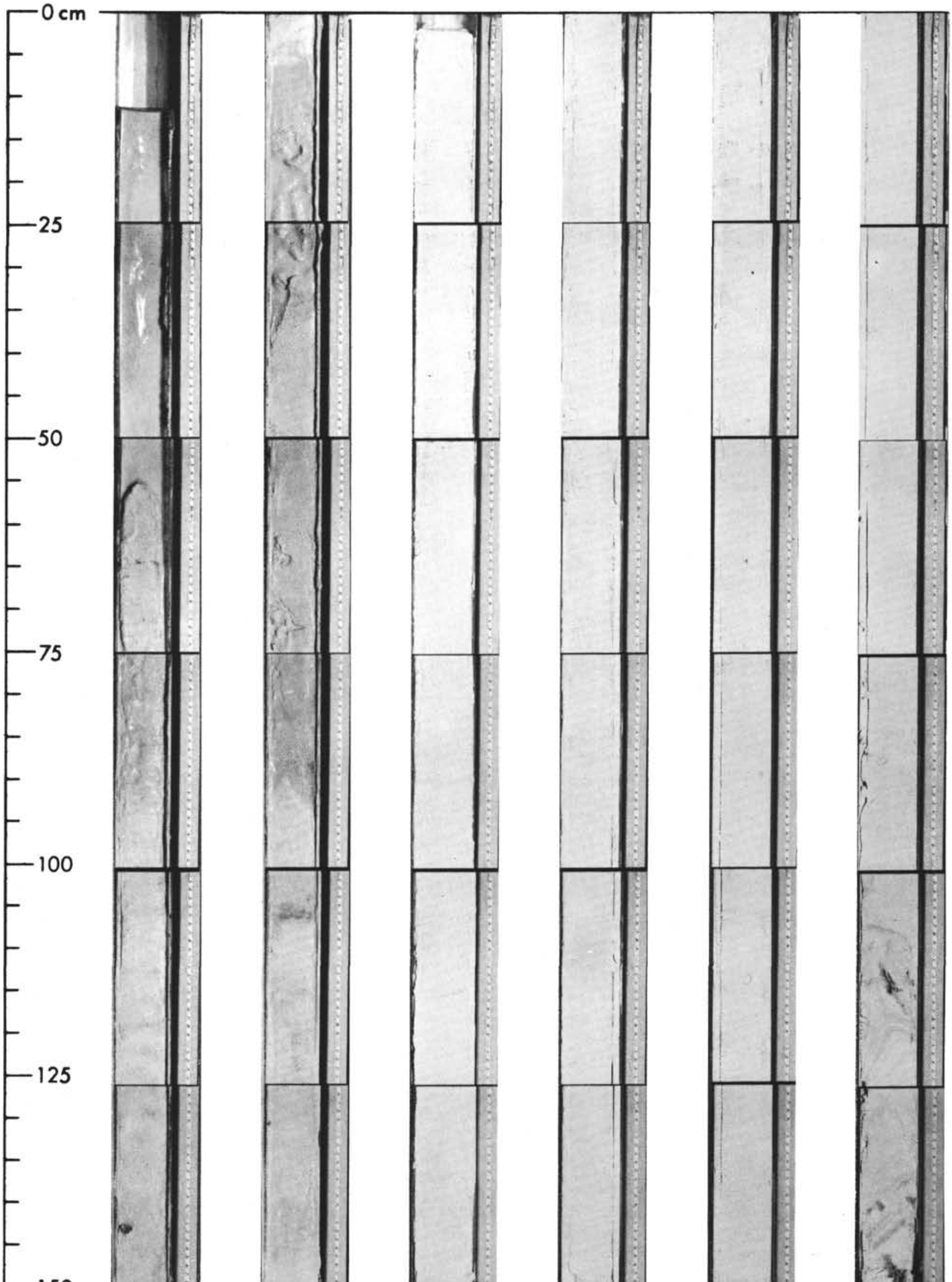
Site 334 Hole Core 26 Cored Interval: 357.5-367.0 m

NRM INTENSITY	POLARITY	CHEMICAL CHARACTER Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	METERS	LITHOLOGY	SAMPLES	D g/cc	V km/sec	POROSITY	LITHOLOGIC DESCRIPTION
								0							Original recovery was 1.4 m. Styrofoam spacers make the amount shown here greater than the amount recovered.
21.4	rR	5.14	9.78	37.3	0.00	7.2	0.31	1	0.5 1.0		A B	2.666	5.65		GABBRO T. S. 1-20 Light brown, coarse-grained, allotriomorphic granular; composed of clinopyroxene, augite and plagioclase with minor olivine and picotite. Some olivine serpentinized. From 0-100 cm gabbro and peridotite are inter-layered and associated with some breccia.
								2			B	2.640	5.88		PERIDOTITE Dark gray-green serpentinized rock composed of pyroxene and ovoids of serpentinized olivine. Minor spinel and plagioclase.

Site 334 Hole Core 27 Cored Interval: 367.0-376.5 m

NRM INTENSITY	POLARITY	CHEMICAL CHARACTER Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	METERS	LITHOLOGY	SAMPLES	D g/cc	V km/sec	POROSITY	LITHOLOGIC DESCRIPTION
								0							Original recovery was 0.3 m. Styrofoam spacers make the amount shown here greater than the amount recovered.
									0.5						GABBRO T.S. Light brown, coarse-grained, composed of orthopyroxene, clinopyroxene, plagioclase, minor olivine and spinel. Olivine serpentinized and pyroxene somewhat uralitized.

Explanatory Notes in Chapter 1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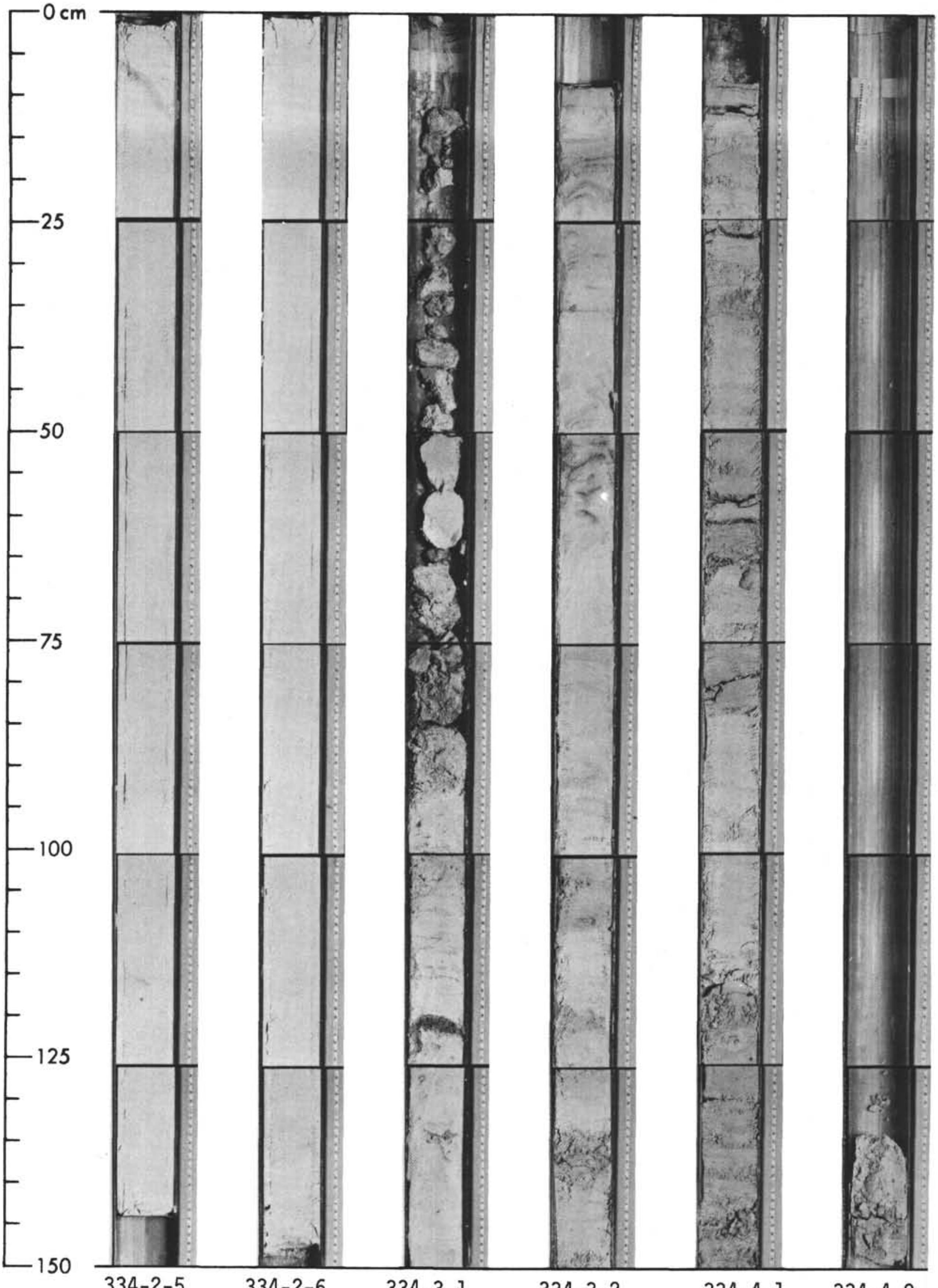
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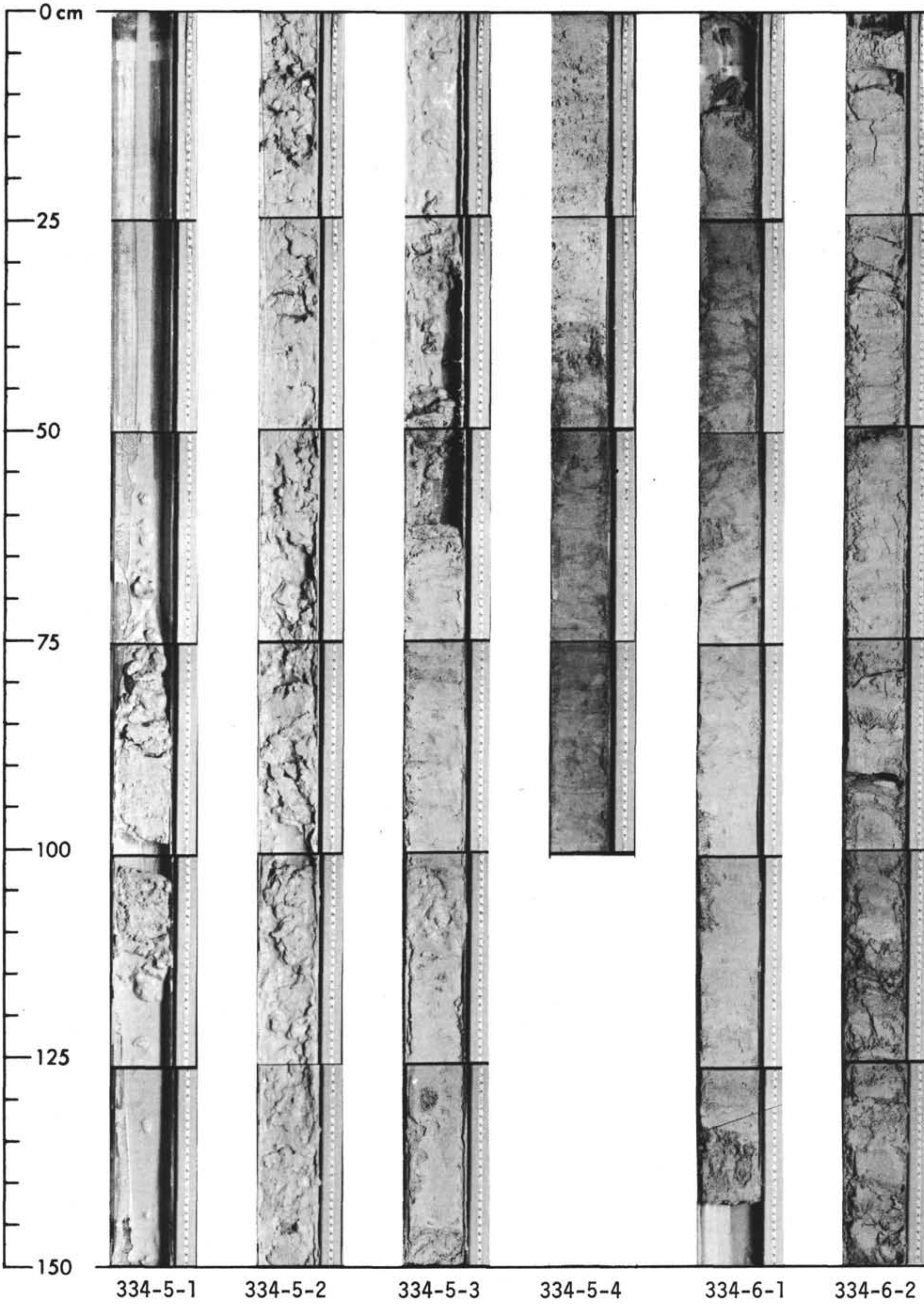
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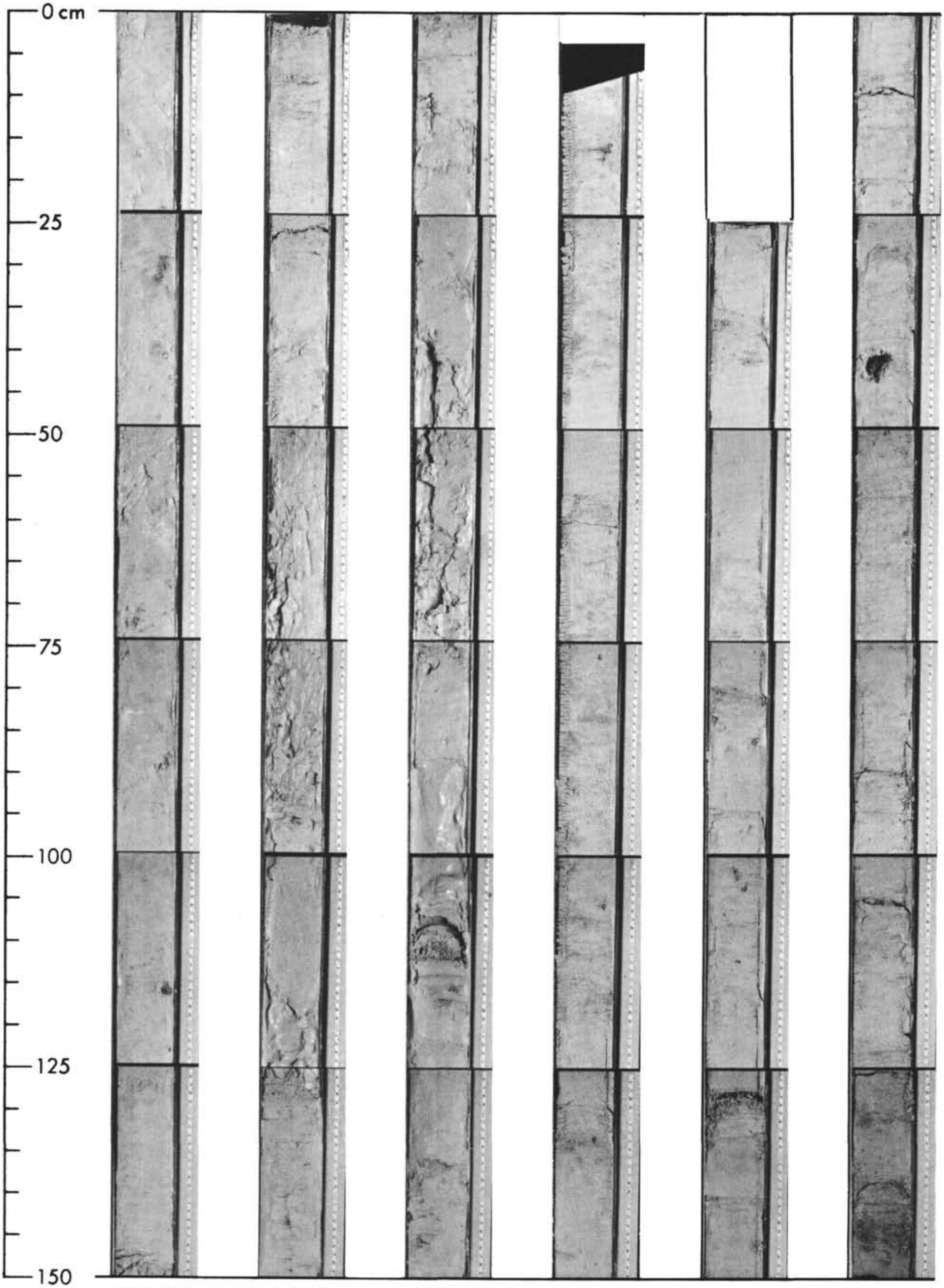
50
75
100
125
150
334-5-1
334-5-2
334-5-3
334-5-4
334-6-1
334-6-2



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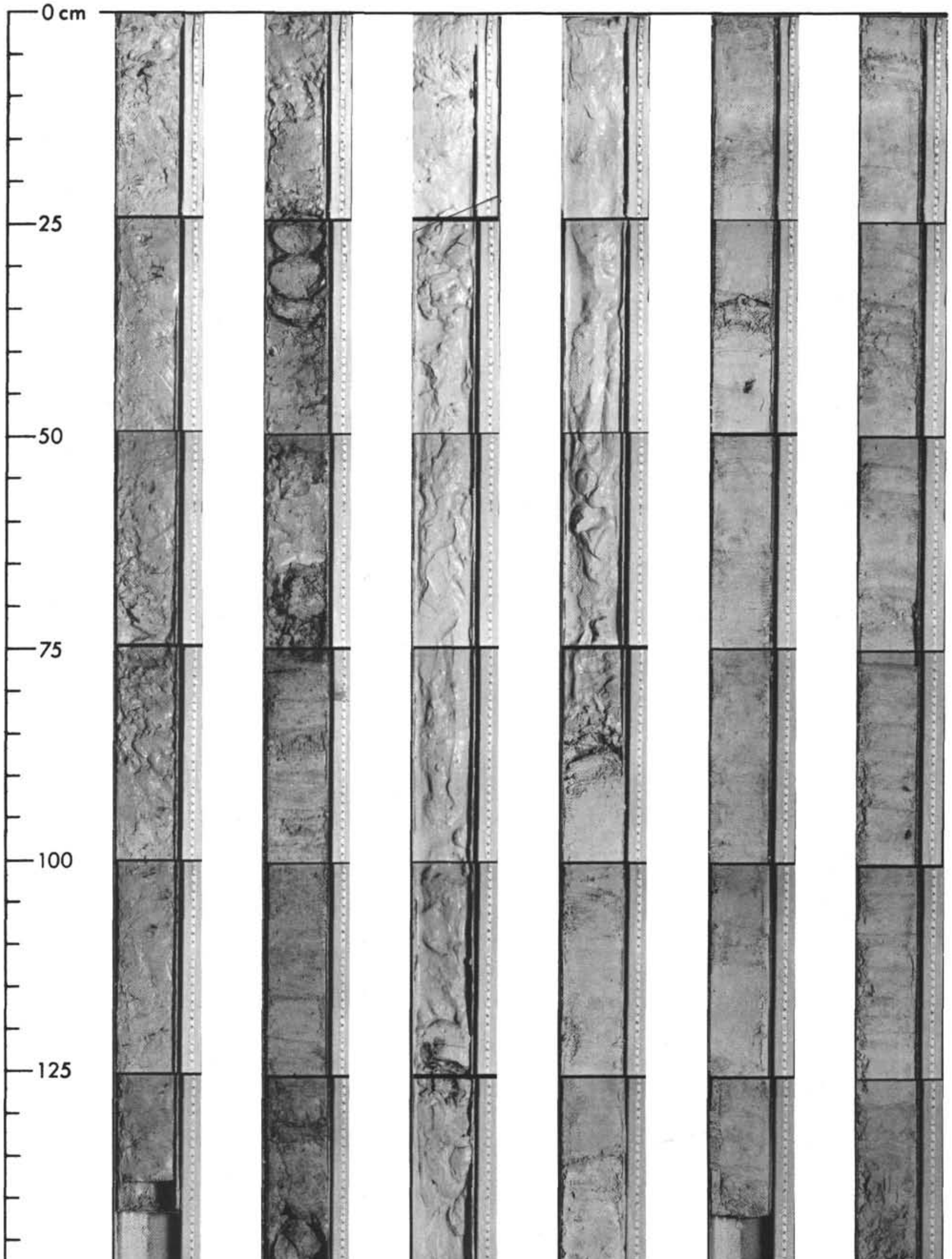
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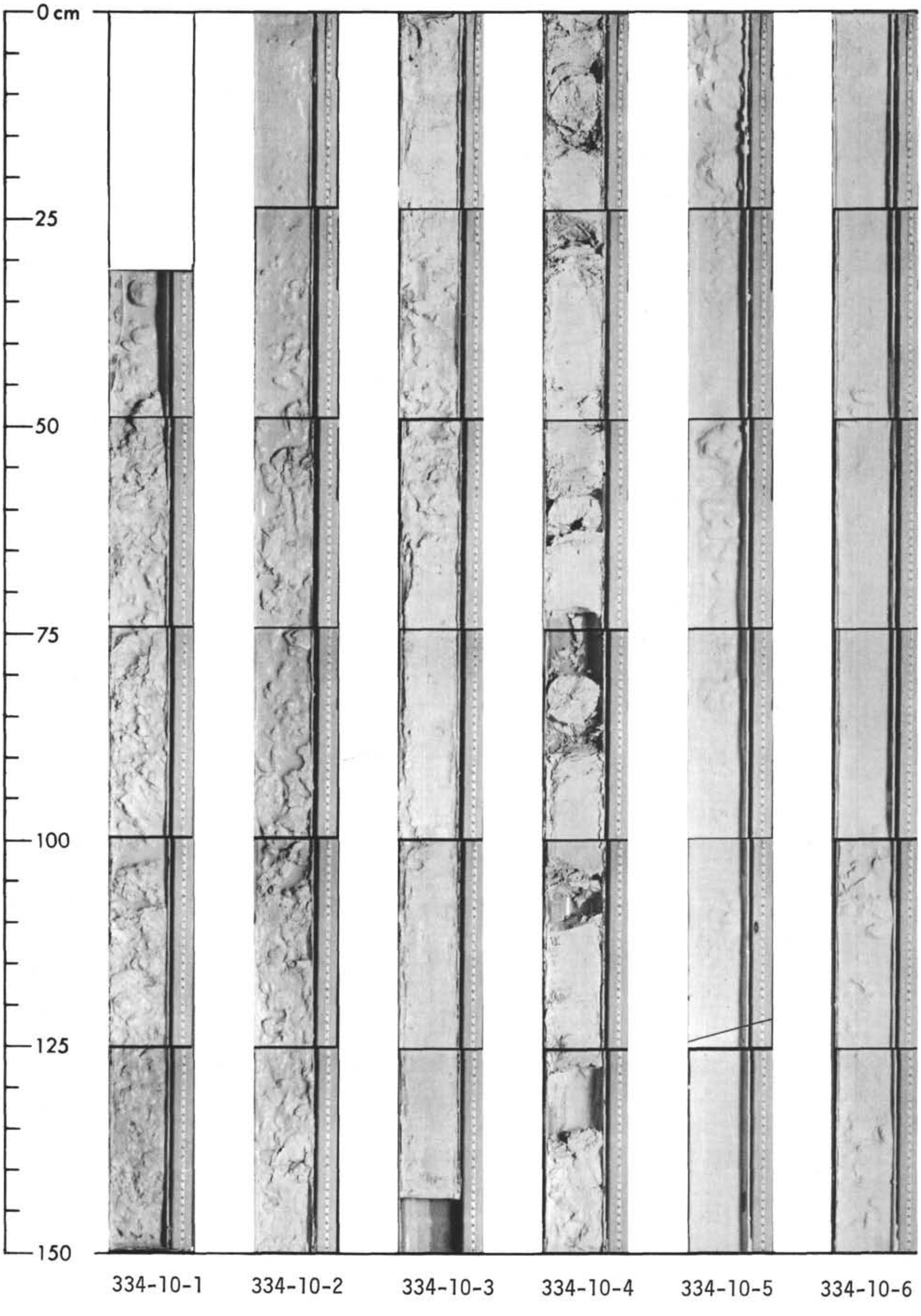

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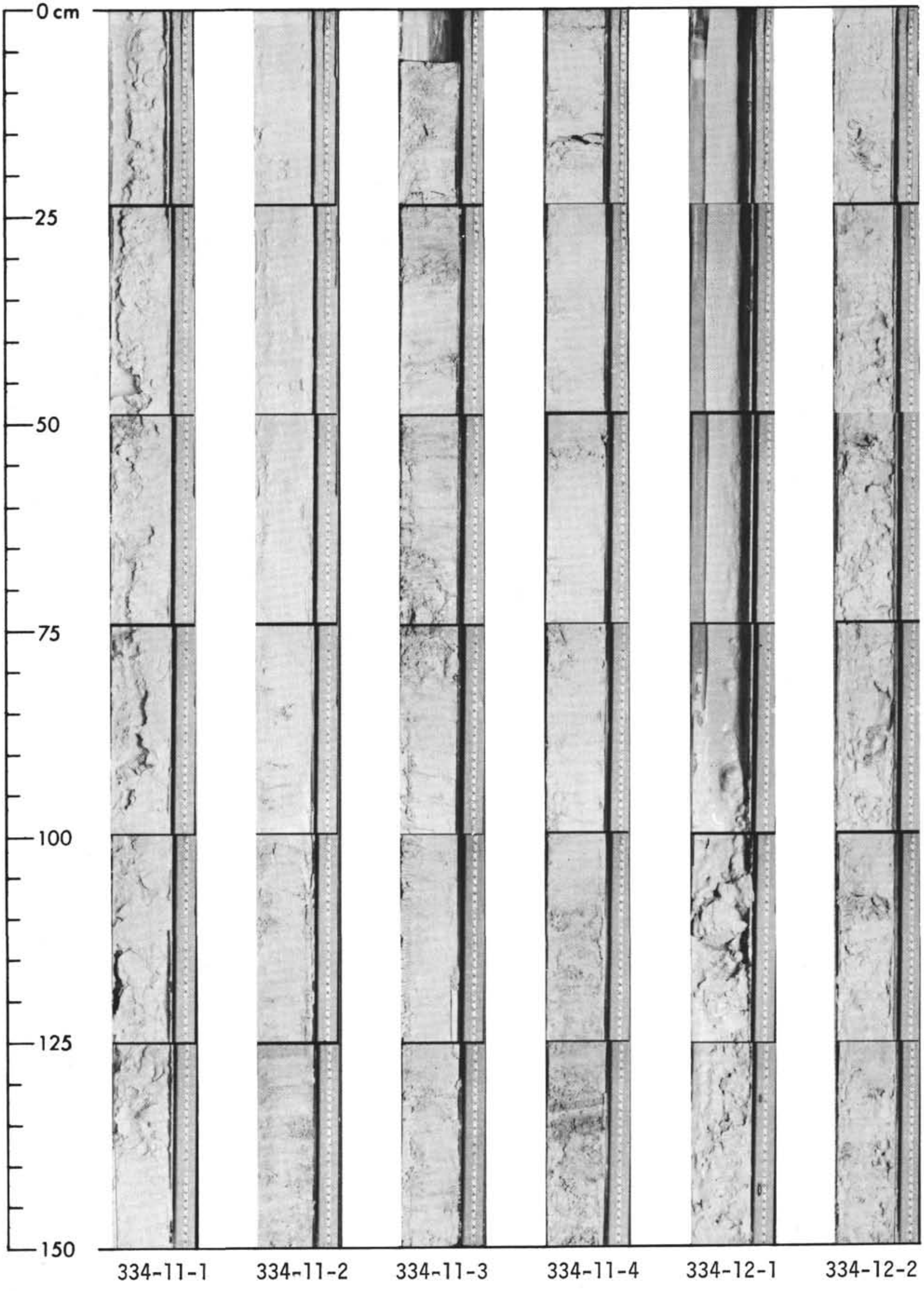
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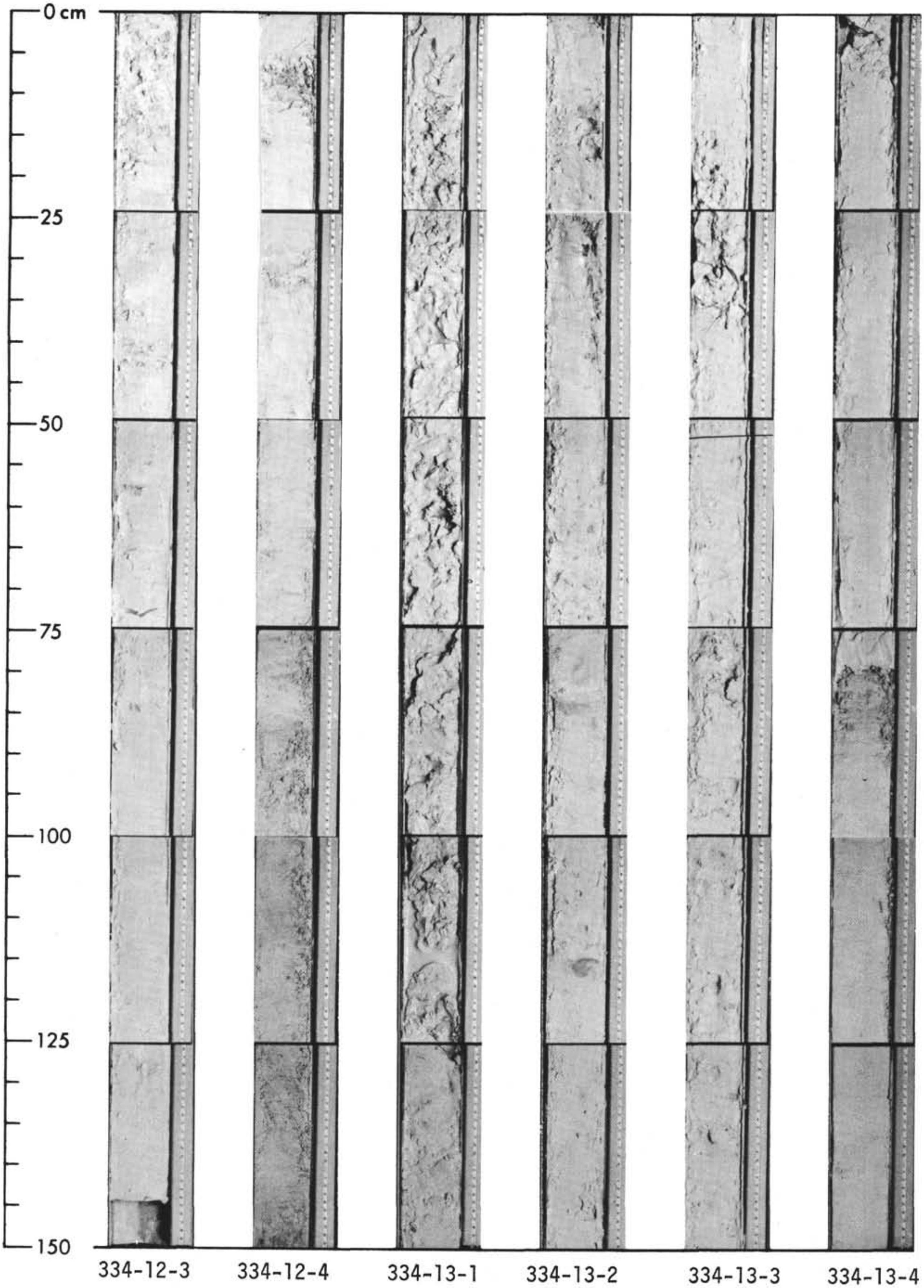
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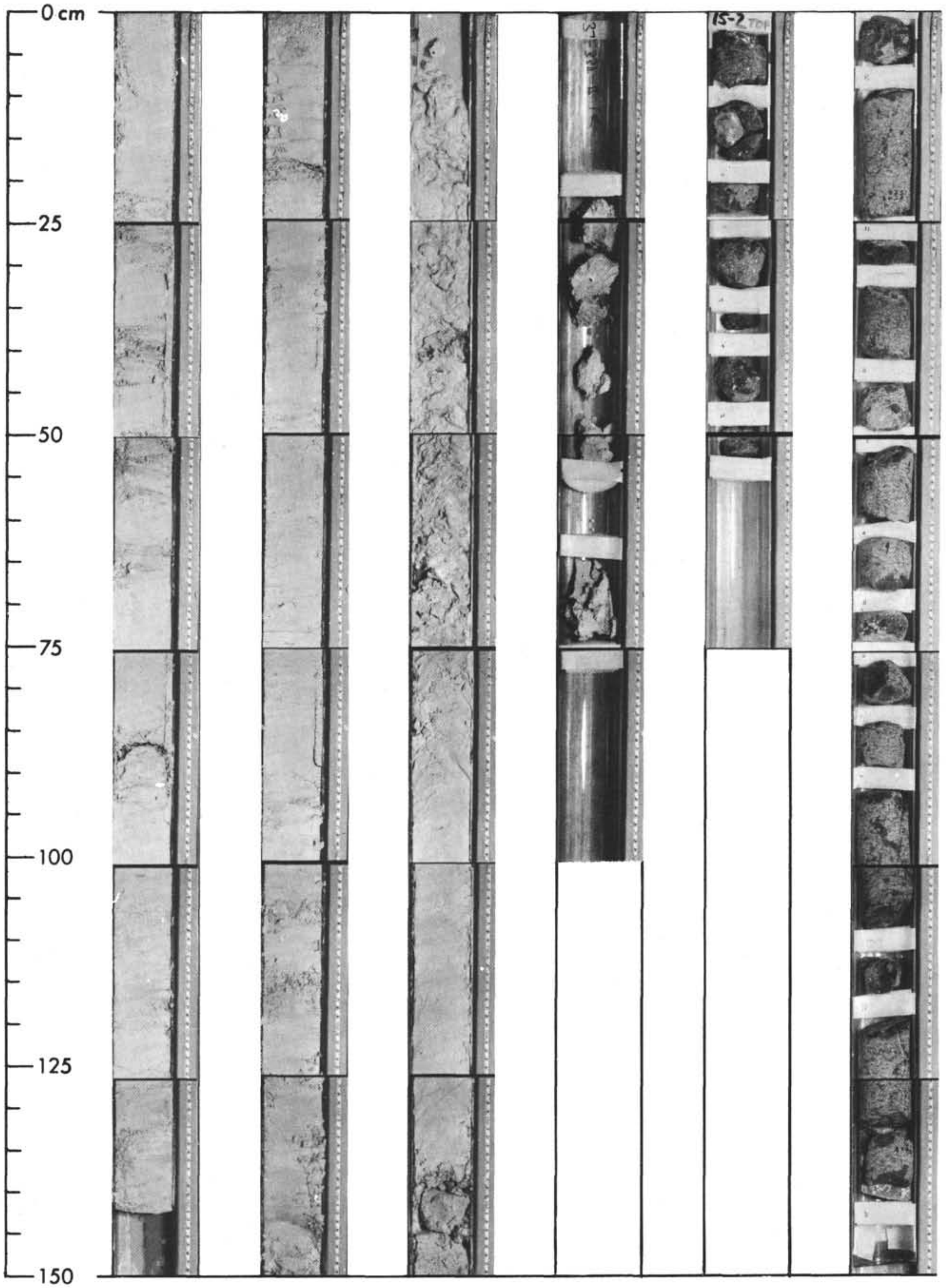
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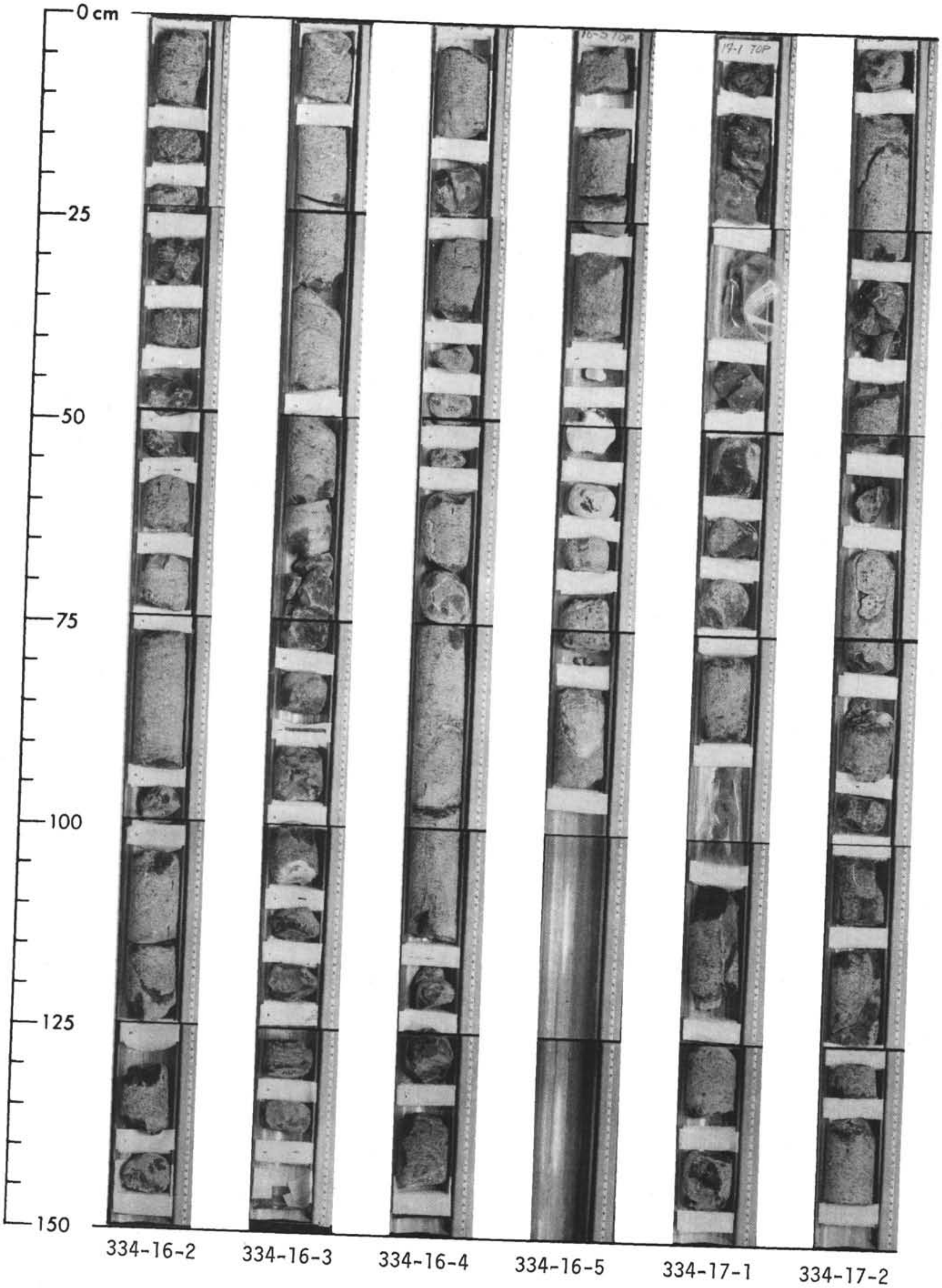
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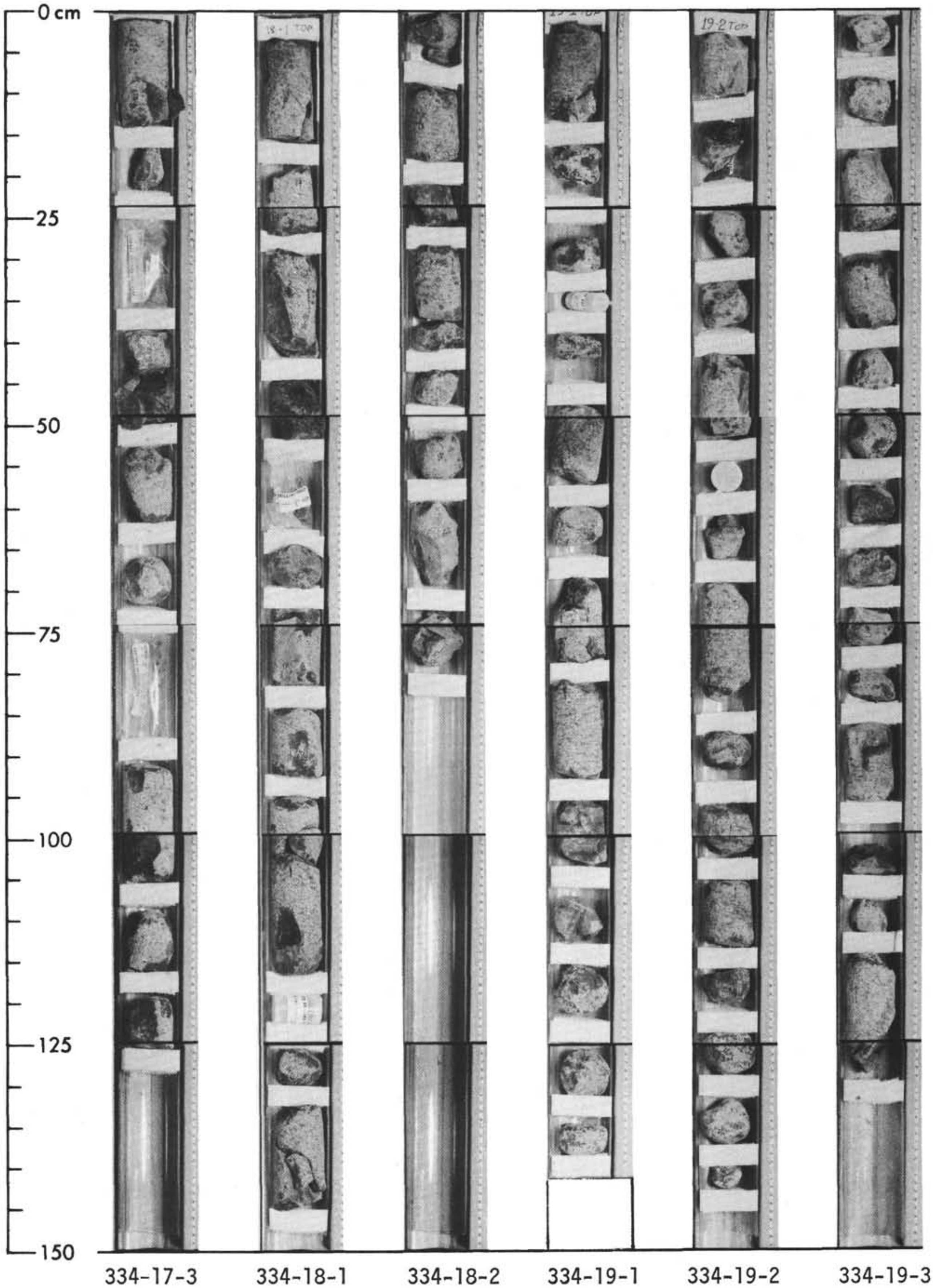
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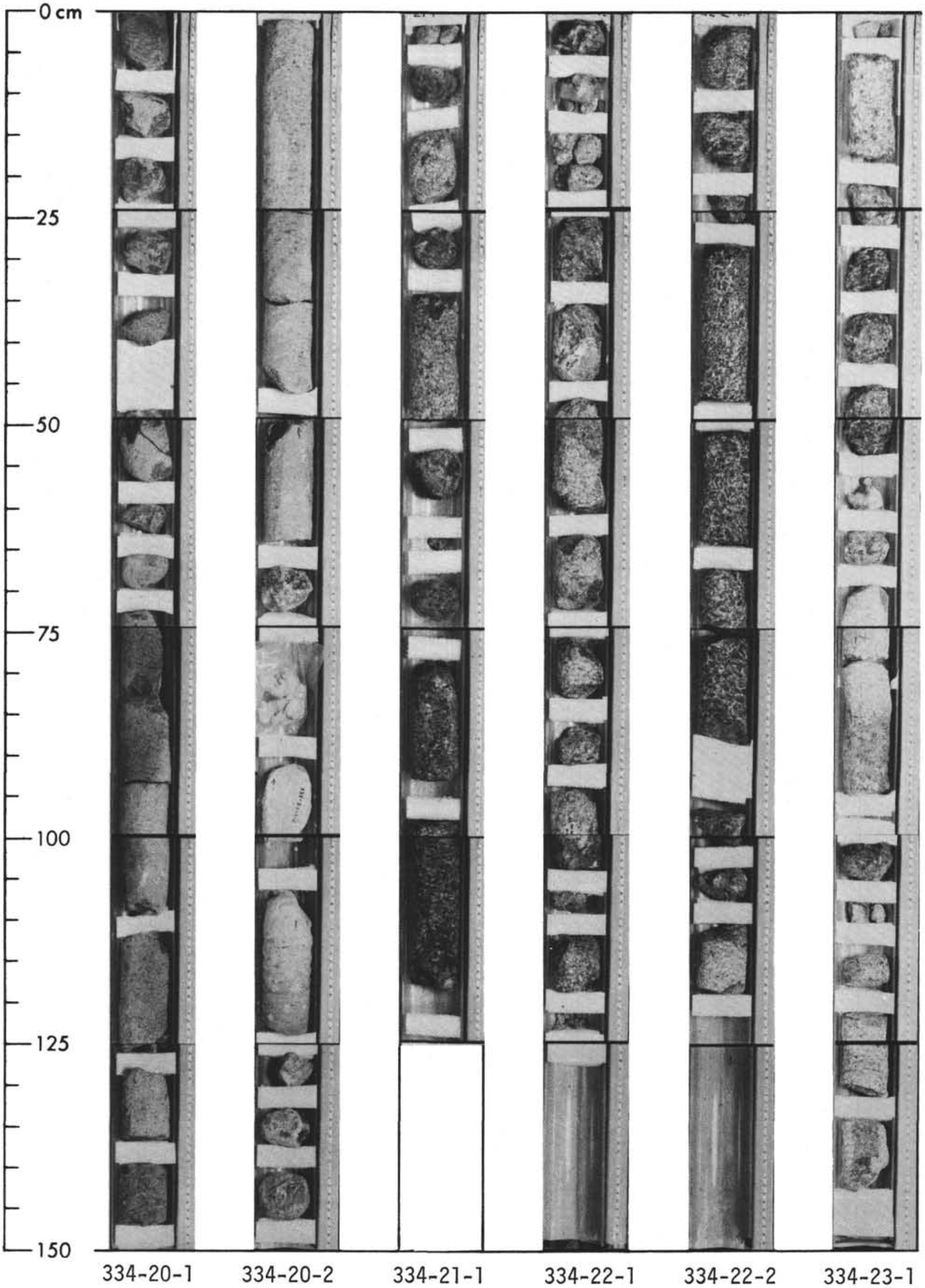
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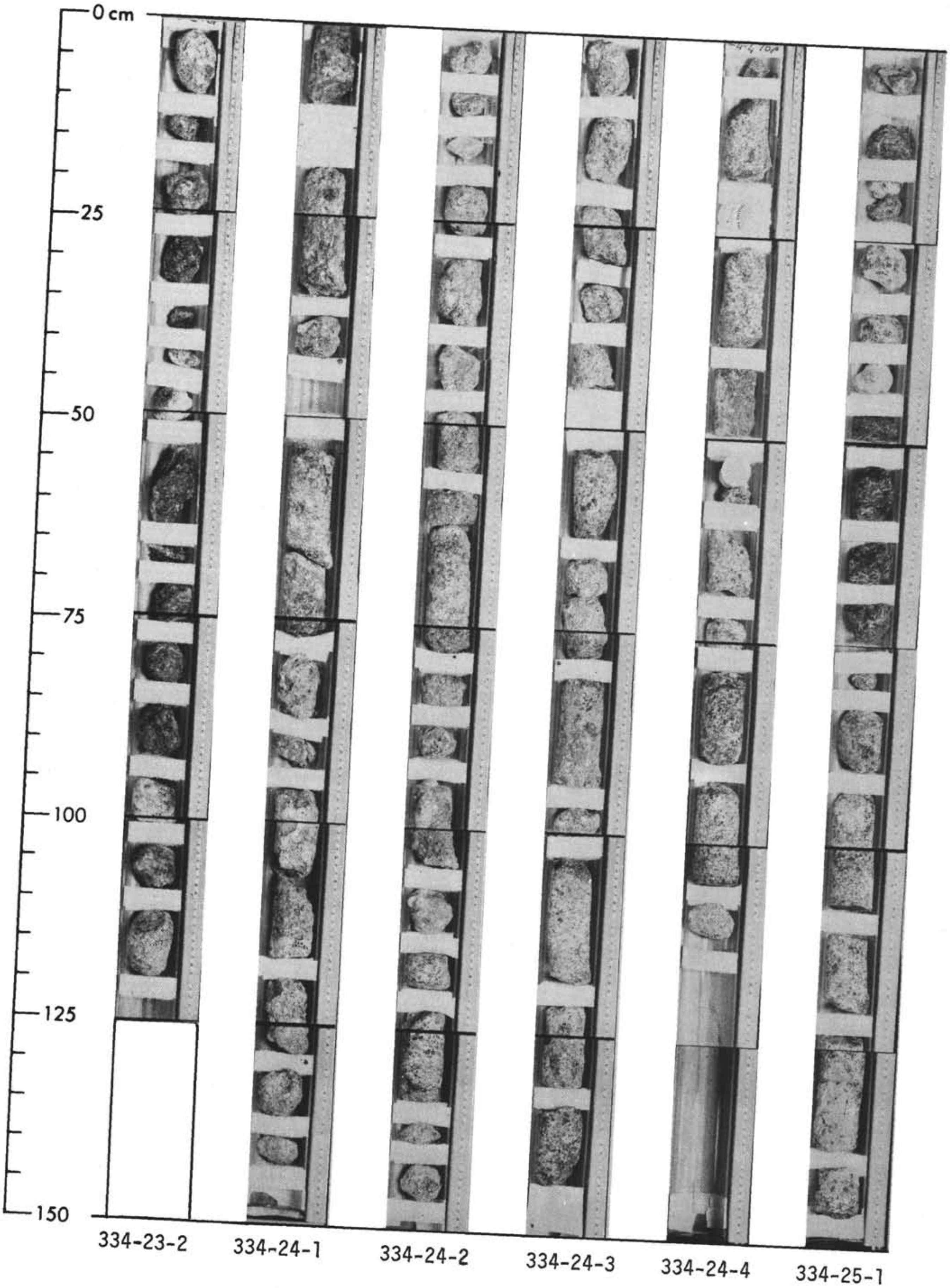
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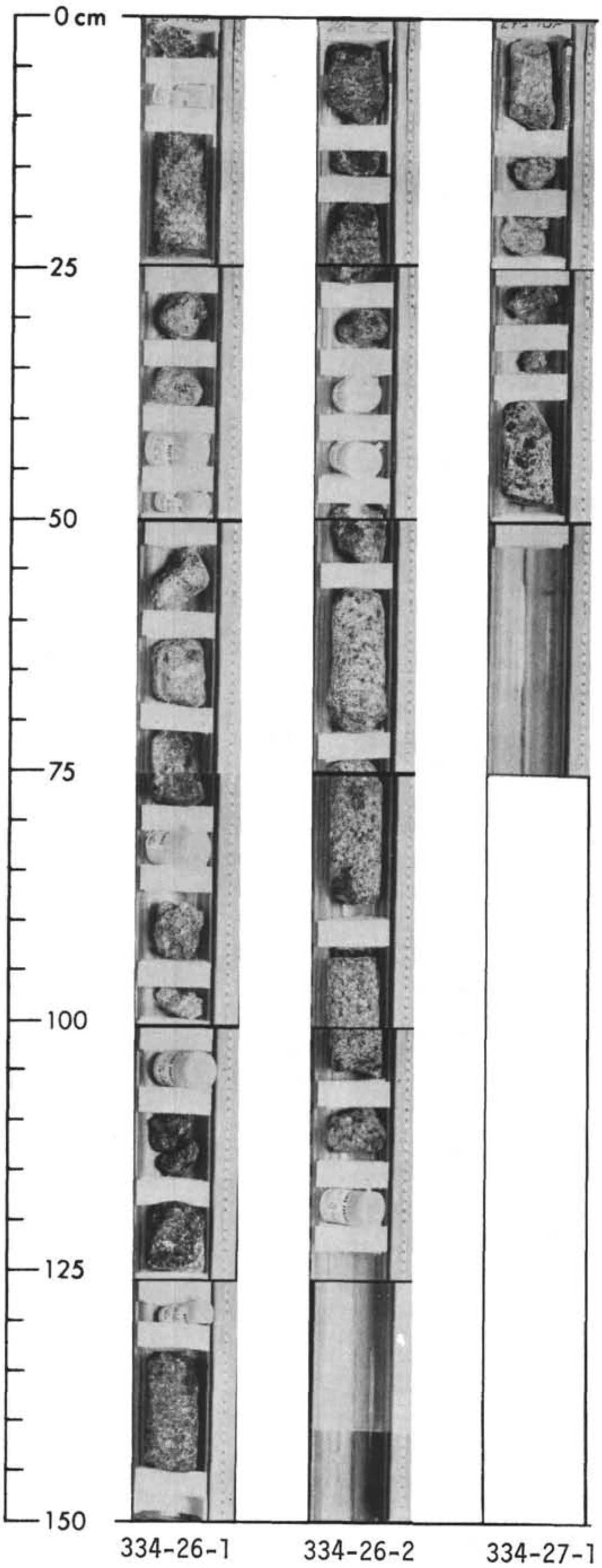
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