3. SITE 333

The Shipboard Scientific Party[1]

SITE DATA

Date Occupied: 6-14 July 1974

Position: 36°50.45′N, 33°40.05′W

Water Depth (sea level): 1665.8 meters

Number of Holes: 2

Penetration:
Hole 333: 231 meters
Hole 333A: 529 meters

Number of Cores:
Hole 333: 9
Hole 333A: 11

Total Core Recovered:
Hole 333: 38.0 meters.
Hole 333A: 25.2 meters

Oldest Sediment Cored Above Basement:
Depth:
Hole 333: 219.0 meters
Hole 333A: 218.5 meters
Nature: Nannofossil ooze
Age: Near the late Pliocene-early Pliocene boundary

Acoustic Basement:
Depth Subbottom: 219.0 meters, 218.5 meters
Nature: Brecciated olivine-phyric basalt
Velocity: 5.95 km/sec at 0.5 kbar

SUMMARY

Two holes were drilled at Site 333 which is located near the base of a postulated fault scarp on the west side of Deep Drill Valley, approximately 1.8 km southwest of Site 332. About 220 meters of Recent to late Pliocene nanno-foram ooze overlie acoustic basement. Of 310.5 meters drilled into basement, 23.3 meters of heterogeneous, largely extrusive basalt with considerable rubbly material, sedimentary breccia, and soft sediment interbeds were recovered. Basalts appear to correlate best with the middle to lower basalt sequence in Hole 332B, but correlations are difficult because of the very low core recovery. One re-entry was accomplished in Hole 333A, but unstable hole conditions caused the bit to stick irretrievably at 529 meters below the mud line. Results at this site suggest that deeper material may be recovered by drilling at the base of a fault scarp, but that drilling is more difficult.

BACKGROUND AND OBJECTIVES

Site 333 is located on the western margin of Deep Drill Valley approximately 1.8 km southwest of Site 332 (Figure 1). This site was selected for a second deep penetration attempt after the failure of Hole 332B. The western wall of the valley was interpreted as a fault scarp, and it was thought that drilling near the base of the uplifted block might penetrate rocks stratigraphically lower than those encountered in Hole 332B. It was hoped that some geologic horizons at Site 333 could be correlated with those at Site 332, making it possible to construct a composite section through the upper part of layer 2.

During the *Glomar Challenger* site survey of 6/7 July 1974, a line was run from positive anomaly 2′ over Site 333, the beacon for the site being dropped while running the line (Figure 2). We noted that Site 333 apparently is related to the 3.32 m.y. crossover from negative to positive anomaly, as is Site 332, and it therefore was anticipated that the two sites would be similar in age, approximately 3.50 m.y. The survey line was not extended to anomaly 3 for fear of losing the beacon at Site 333. The main difference between the magnetic anomaly profiles for Sites 332 and 333 is the apparent absence of the inflection in the profile through Site 333.

OPERATIONS

Upon leaving Site 332, profiling runs were carried out over the site to tie in the subbottom topography, bottom bathymetry, and magnetics of the site with that of Site 333 (Figure 3). The latter site was chosen on the western side of Deep Drill Valley where the steep slope was postulated to be a fault scarp. By selecting the site with care, it was hoped to start drilling in a geological horizon equivalent to or below that at the bottom of Hole 332B. In fact, the site was located some distance from the fault scarp so our aim was not achieved.

A 16-kHz (series 254) beacon was dropped at Site 333 at 0130 hr 7 July, but profiling was continued 1 mile beyond the beacon's location to ensure an optimum location for deep penetration. Based on the extended profile, the drilling site was chosen 1000 ft west of the

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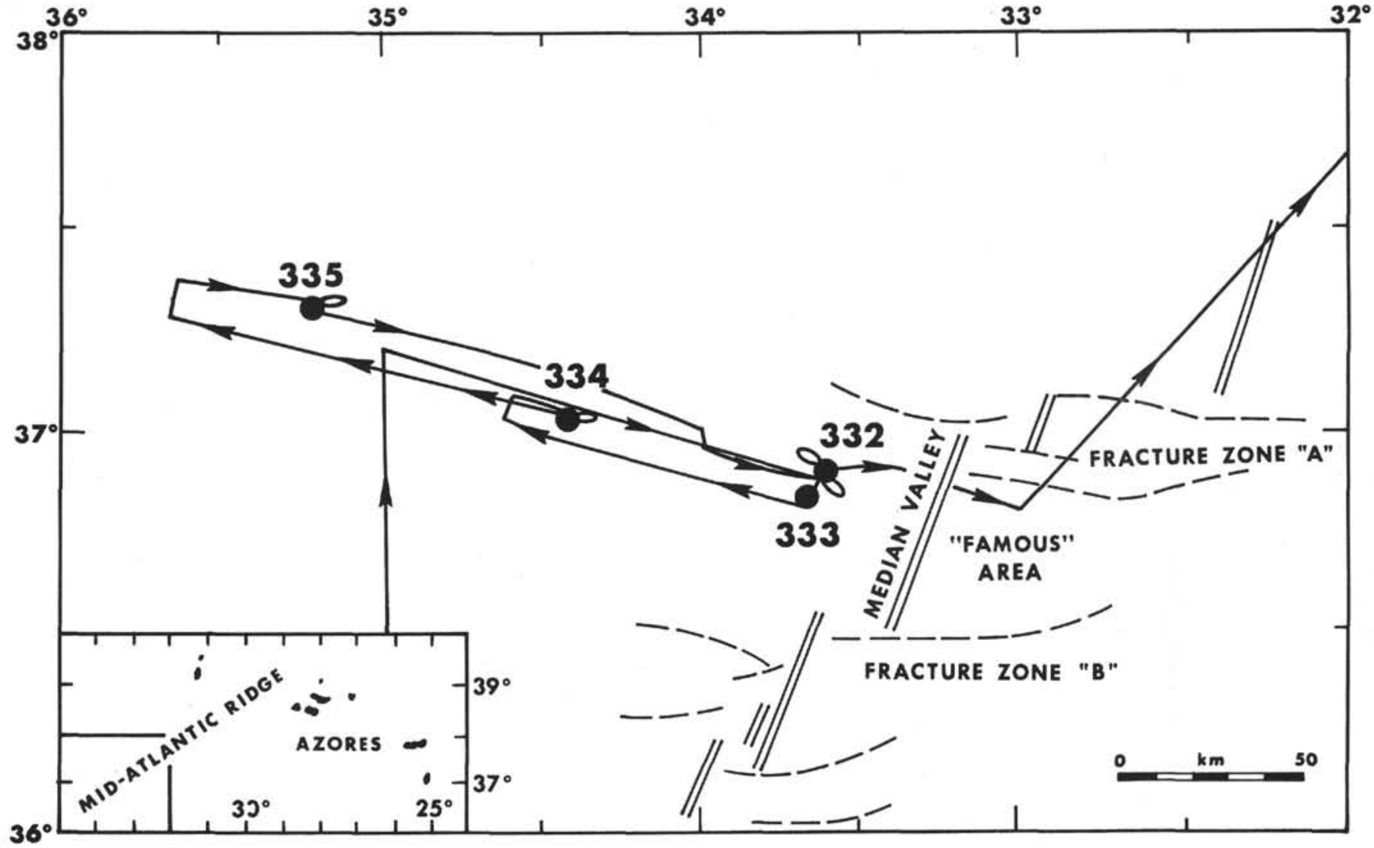

Figure 1. *Index map showing location of Site 333.*

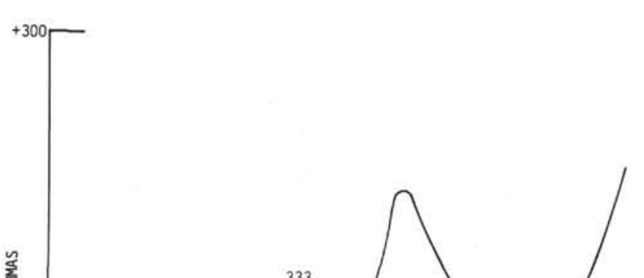

Figure 2. *Magnetic profile along* Glomar Challenger *survey track showing the location of Site 333 within the negative magnetic anomaly between positive anomalies 2' and 3.*

beacon. At 1050 hr the drill string was spudded in at 1682 meters, and nine cores were cut with a diamond bit. Drilling in basement rocks with the diamond bit was painfully slow, and when it was pulled the bit was found to have only 5% salvage value, all surface diamonds having been lost after only a few meters penetration into basement. The first hole (333) was drilled as a test hole to determine depth to basement prior to attempting deep penetration by re-entry.

At 1400 hr 8 July a re-entry cone was assembled; modifications over the one used at 332B included a 19-sq-ft increase in pad-bearing area to reduce the settling rate into sediment and an increase in the number of drainage slots. By 0915 hr 9 July the cone was keel-hauled, and by 1200 hr all the casing was in place. It took only a total of 31 hr for the Global Marine drilling crew to build and place the cone.

A 65-meter westward offset relative to Hole 333 was made to place Hole 333A closer to the fault scarp. Two hundred feet of casing were jetted to 1750 meters, with the top of the cone at 1674 meters, and the mud line at 1680 meters.

At 1962 meters the core barrel jammed, and the string had to be pulled out of the hole. The bit (F94CK) after 4.5 hr was in excellent condition (Ti, Bl, GO), but the core barrel was jammed solid by fine drill cuttings. Re-entry into the hole was completed by 0438 hr 10 July. The hole continued to show sticking problems, especially while pulling the core barrel. To alleviate this condition the core barrel was pulled only after each fourth joint of penetration, and the hole was repeatedly flushed with 75/75 mud.

The pipe stuck permanently at 2100 hr 12 July after 307.5 meters penetration into basement. Although the bit was stuck, all bumper subs were free. The pipe would not pull up, go down, rotate, or circulate water. The pipe was worked for 4 hr with pulls in excess of

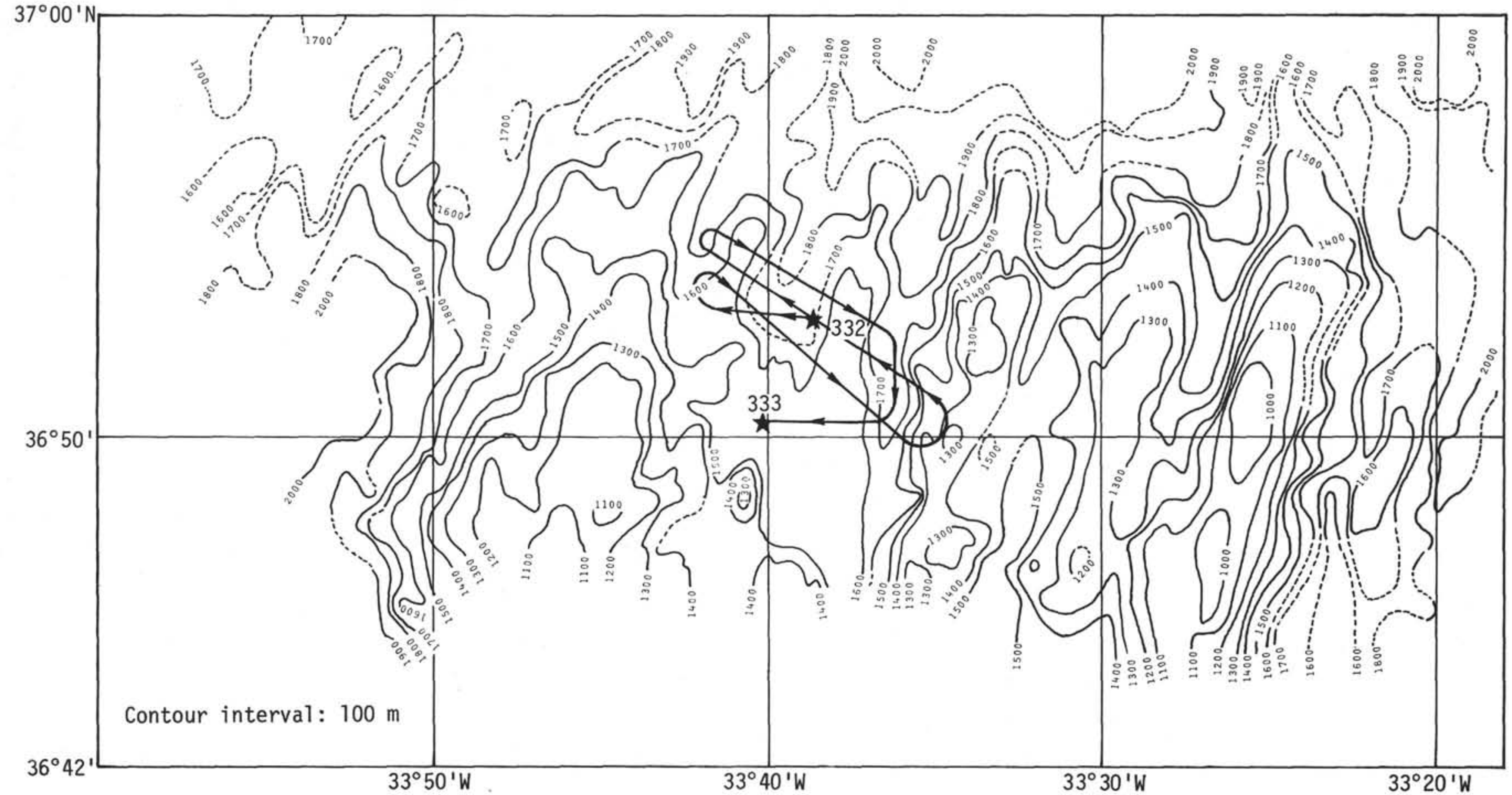

Figure 3. Glomar Challenger *track from Site 332 to Site 333.*

600,000 lb, to no avail. Finally after two string shot demolition charges were fired, the string was severed from the bit at the level of the lowermost bumper sub. The string was recovered without further mishaps. An *Alvin* submersible beacon was dropped to mark the site for eventual visual examination, and the site abandoned.

Table 1 provides a summary of cores recovered from Holes 333 and 333A.

LITHOLOGY

Introduction

Hole 333 was cored to 3 meters below mud line and then washed to 145.5 meters. Two cores were taken in the interval 145.5 to 183.5 meters, and then the hole was continuously cored to 231 meters. The first basalt (acoustic basement) was encountered at 219 meters. Hole 333A was located about 65 meters west of Hole 333. It was washed to 215.5 meters below mud line, then cored discontinuously to a depth of 529 meters. The first basalt (acoustic basement) in this hole was encountered at 218.5 meters.

The lithologies are described below and are summarized in Table 2. Sediment descriptions are taken from Hole 333, basalt descriptions from Hole 333A.

Sediments

The punch core from Hole 333 consists chiefly of stiff white to very pale brown (10YR 7/4) nannofossil ooze capped by 19 cm of light gray (10YR 7/2) nanno-rich foram ooze. Cores 2-9 consist almost entirely of watery to stiff, white (2.5Y 8/), foram-bearing nannofossil ooze composed of 96% nannofossils, 3% foraminifers, and trace amounts of sponge spicules, Radiolaria, diatoms, and pyrite.

Thin light green (2.5Y 7/2) to green (5G 7/1) layers of stiff ooze in places interrupt the otherwise homogeneous character of the sequence. These layers average 1 cm in thickness and number as many as 15 in one 1.5-meter section but rarely exceed three per meter. The dark green layers are thicker and fewer in number than the lighter layers. Subcircular green patches in Cores 3-6 may represent burrows. Similar light brownish-gray (2.5Y 6/2) patches occur occasionally throughout the sequence.

Slight to moderate purple spot mottling (close to 5P 4/2) occurs throughout the white ooze. A few 0.5-cm-thick layers with the same tint occur in some sections. The purple color is associated with a higher pyrite content (up to 2%). Pyrite may also be associated with the green ooze because slightly higher than normal amounts are found in those sediments. Pyrite nodules (0.7-1.2 cm) occur in Sections 2 and 5, Core 3; Section 1, Core 4; and Section 5, Core 5.

TABLE 1
Coring Summary, Site 333

Core	Date (July 1974)	Time	Depth From Drill Floor (m)	Depth Below Sea Floor (m)	Cored (m)	Recovered (m)	Recovery (%)
Hole 333							
1	7	1130	1682.0-1685.0	0.0- 3.0	3.0	2.1	70
2	7	1430	1827.5-1837.0	145.5-155.0	9.5	9.5	100
Heat Flow Measurement							
3	7	1630	1846.5-1856.0	164.5-174.0	9.5	9.4	99
4	7	1745	1865.5-1875.0	183.5-193.0	9.5	7.6	80
5	7	1840	1875.0-1884.5	193.0-202.5	9.5	4.8	50
6	7	2000	1884.5-1894.0	202.5-212.0	9.5	2.7	30
7	7	2125	1894.0-1903.5	212.0-221.5	9.5	1.9	20
8	8	0300	1903.5-1908.5	221.5-226.5	5.0	0.03	0
9	8	0730	1908.5-1913.0	226.5-231.0	4.5	0.0	0
Total					69.5	38.03	55
Hole 333A							
1	10	0120	1897.0-1905.0	217.0-225.0	8.0	2.82	35
2	10	0450	1905.0-1924.0	225.0-244.0	19.0	1.10	6
3	10	0925	1924.0-1943.0	244.0-263.0	19.0	1.30	7
4	10	1155	1943.0-1962.0	263.0-282.0	19.0	0.14	1
5	11	1244	1962.0-2000.0	282.0-320.0	38.0	1.40	4
6	11	1700	2000.0-2038.0	320.0-358.0	38.0	1.80	5
7	11	2245	2038.0-2076.0	358.0-396.0	38.0	1.80	5
8	12	0545	2076.0-2114.0	396.0-434.0	38.0	5.82	15
9	12	1140	2114.0-2161.5	434.0-481.5	47.5	4.80	10
10	12	1520	2161.5-2190.0	481.5-510.0	28.5	2.43	9
11	12	2020	2190.0-2209.0	510.0-529.0	19.0	1.80	9
Total					312.0	25.21	8

TABLE 2
Lithologic Summary of Basement Rocks from Hole 333A

Unit	Interval	Core Recovered (m)	Probable Maximum Thickness (m)	Lithology
1	1-3, 0 cm to 2-2, 50 cm	2.2	28.5	Sparsely to moderately phyric pillow basalt and basalt breccia; microphenocrysts and glomerophyric clots of fresh olivine in a quenched groundmass
2	3-1, 0 cm to 4-1, 20 cm	1.44	38.0	Sparsely to moderately phyric, medium-grained basalt with fresh olivine phenocrysts; plagioclase and olivine phyric types are interlayered with plagioclase, green augite, olivine phyric types.
3	5-1, 0 cm to 6-2, 120 cm	3.2	76.0	Heterogeneous sequence of moderately to sparsely phyric basalt and basalt breccia; phenocryst assemblages are plagioclase, plagioclase-olivine, and plagioclase-green augite-olivine
4	7-1, 0 cm to 8-3, 75 cm	4.98	42.0	Moderately plagioclase phyric basalt and basalt breccia with rare phenocrysts of olivine and green augite
5	8-3, 75 cm to 8-7, 95 cm	3.64	34.0	Moderately plagioclase phyric basalt and basalt breccia; rare augite phenocrysts
6	9-1, 0 cm to 9-5, 80 cm	5.30	40.0	Sparsely to moderately phyric basalt and basalt breccia; phenocrysts chiefly plagioclase with minor green augite and rare olivine; Groundmass intergranular to subophitic
7	10-1, 0 cm to 10-1, 75 cm	0.50	10.0	Aphyric basalt
8	10-1, 75 cm to 11-2, 150 cm	3.73	66.0	Moderately plagioclase phyric basalt with minor green augite and olivine phenocrysts; abundant pyrite on fracture surfaces

Many smear slides contain traces of volcanic glass, and pumice fragments (up to 2.0 cm) occur in Cores 1 and 2. Shards up to 3 mm long make up 2% of the sediment in a 26-cm-thick layer in Section 4, Core 5. Similar shards are present in Cores 6 and 7. Perhaps these were widely distributed by burrowing organisms following deposition.

Core 1 of Hole 333A has 1.5 meters of white, foram-bearing nannofossil ooze above the first basalt. Below the first basalt, Cores 1, 2, 5, 7, and 8 contain several pieces of fossiliferous breccia having clasts of volcanic glass (in various stages of palagonitization), basalt, and individual ferromagnesian minerals embedded in a chalk or limestone matrix. The angular clasts make up from 15% to 45% of the rock.

Basement

A total of 310.5 meters of basement consisting of basalt and basalt breccia was drilled in Hole 333A. The core recovered represents about 8% of the section drilled. Because most cores represent drilled intervals of 30 meters or more, we have only a poor idea of the distribution of recovered core. The relatively easy drilling of most of the section and the poor recovery suggest that a large part of the sequence consists of unconsolidated basaltic rubble and breccia, and perhaps some interbedded sediment. This is consistent with the frequent occurrence of basalt breccia, basalt-sediment breccia, and glassy material in the recovered core and with the high torques experienced at the drill bit.

Based on megascopic and microscopic examination of the cores, the basalts have been divided into eight major lithologic units (Table 2). Recognition of detailed subunits was not possible. The boundaries between units are poorly defined because of the length of the cored interval and the poor recovery. Many smaller units may have been missed entirely during coring. Major element analyses of basalts from Site 333 are given in Tables 3A and 3B and trace element analyses are presented in Tables 3C and 3D (at end of text).

Most of the recovered basalts are sparsely to moderately phyric with three principal phenocryst assemblages: (1) olivine alone, (2) plagioclase and olivine, and (3) plagioclase, green augite, and olivine. Olivine phenocrysts are commonly altered to smectite; fresh grains range from Fo_{85-90}. Plagioclase and clinopyroxene are normally fresh. The phenocrysts are set in variolitic to intergranular or subophitic groundmasses composed chiefly of plagioclase laths, clinopyroxene, and magnetite with minor olivine and glass.

Fresh glassy rinds are common in Unit 1, rare or absent in other units. Monomict breccias with clasts of lithologies 1-3 are found throughout the section associated with unbrecciated basalt of similar lithology. The matrix of the breccias consists of various amounts of carbonate, chlorite, and small broken mineral grains, glass, palagonite, and basalt fragments.

Alteration is slight to moderate throughout the section. Smectite is ubiquitous as vesicle fillings and as replacement of interstitial material (commonly devitrified glass). Carbonate is present in all units as a vein mineral and as vesicle fillings. Chlorite is developed in the matrix of breccias and occurs in places as vein or fracture coatings where it is commonly associated with sulfide (e.g., Units 6, 7, and 8 where sulfide is common). Olivine shows variable alteration to serpentine(?), smectite, and less commonly to iddingsite and/or carbonate. The alteration is greater in Units 6, 7, and 8 than higher in the section; here both phenocryst and groundmass olivine are completely replaced.

Fe-Ti oxide and both primary and secondary sulfide minerals are present in the basalts. Magnetite is often skeletal, and spinels form small euhedral crystals generally closely associated with olivine. Ilmenite is bladed, and uncommon. The primary sulfides form small round globules, up to about 20 μm in diameter, but most commonly around 2 μm or less. These globules contain pyrrhotite and chalcopyrite and are confined to glass, or former glassy areas. Sulfide globules may also occur within magnetite and silicate grains, or molded about corners of magnetite grains.

The secondary sulfide minerals differ from primary ones by (a) larger size, often up to 500 μm, (b) occurrence in veins, vesicles, and clay patches; and (c) different mineralogy—the principal secondary sulfide is pyrite.

The primary sulfide globules probably formed as immiscible sulfide droplets in a silicate liquid. Textural relations suggest that sulfide segregation occurred simultaneously with crystallization of both silicates and magnetite. This implies a relatively high temperature of sulfur saturation in the basaltic melt.

Secondary sulfide mineralization is clearly later than the clay which replaces interstitial glass and olivine. One crystal shows a radial growth pattern which indicates growth as a solid phase by the process of seeding and accretion.

Slickensided surfaces coated with smectite, chlorite(?), and pyrite are common in Cores 9 and 10. The orientation and sense of motion indicate formation in response to mainly horizontally developed tension relative to the top and bottom of the cores. Two sets of normal or gravity fault planes occur—a high angle, and a low angle set. Where time sequence can be established, the high angle set formed after the low angle set. Displacement on most of the slickensided surfaces is commonly a few millimeters. In a few cases, conjugate shears can be recognized.

PALEOMAGNETISM

The sediments recovered from Holes 333 and 333A yielded few reliable cleaned paleomagnetic inclinations; for the most part, the material is both weakly and unstably magnetized. There is a suggestion that axial dipole inclinations characterize the topmost few meters of the sediments and shallower inclinations the basal few tens of meters (Hall and Ryall, this volume).

Basalt cleaned paleomagnetic (NRM) inclinations are scattered but generally shallow (Table 4). Only one magnetic unit was identified in the basalts, consisting of the massive basalt at the bottom of Hole 333A. Here the average NRM inclination is $+02.3 \pm 2.0°$ (S.D. of the mean) (Hall and Ryall, this volume). The shallow basalt NRM inclinations are unexpected since the site is located within the negative magnetic anomaly located between positive anomalies 2′ and 3.

Alteration of the basalts by seawater at close to ocean bottom temperatures has strongly affected the magnetic properties. Alteration is at a minimum in the massive basalts at the bottom of Hole 333A. Here average NRM intensity at $78 \pm 11 \times 10^{-4}$ emu/cm^3 is the highest for any magnetic or lithologic unit sampled on Leg 37.

PHYSICAL PROPERTIES AND HEAT FLOW

Physical properties and seismic velocities of Hole 333A basalts are given in Table 5.

Bulk densities of the basalts range from 2.463 to 2.872 g/cm^3 with a mean of 2.754. The mean is significantly lower than for basalts from Site 332 reflecting the generally higher porosities in Hole 333A, particularly of the breccias. The porosity ranges from 5.5% to 24.5% with a mean of 11.1%.

Basalt compressional wave velocities are unexceptional for the Leg 37 sites, averaging 5.60 ± 0.13 km/sec (S.D. of the mean).

A heat flux value of 0.50 ± 0.08 (21 ± 3) hfu was obtained from a temperature measurement in the sediments at Hole 333. This low value is similar to the value obtained at Site 332.

BIOSTRATIGRAPHY

General

Planktonic foraminifera and calcareous nannoplankton are abundant and well preserved in the sediments recovered above basement in Hole 333.

TABLE 4
Magnetic Data for Basement Rocks from Hole 333A

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	Stable Dec	Micro Content	Data Size	Sample Depth (m)
1-3, 46-48(2)	0.64	263	0.321	217	0.233	6.1	57.8	5640	-4.4	162.7	3284	228.8	-4.3	162.9	0.40	2.60	220.46
1-3, 74-76(1)	0.57	238	0.385	309	0.277	2.6	20.5	2855	8.8	308.6	1457	194.3	7.5	310.6			220.74
2-1, 50-52(1)	0.55	234	0.440	169	0.132	2.1	34.6	2632	25.6	143.3	1725	263.4	18.3	152.6			225.50
2-1, 68-70(2)	0.64	261	0.418	183	0.151	3.0	43.7	3596	5.9	171.3	2123	229.3	3.3	170.0			225.68
2-2, 17-19(2)	0.62	258	0.378	139	0.127	2.4	42.0	2625	-18.1	160.5	1633	236.3	-15.8	158.5			226.67
3-1, 32-34(2)	0.64	261	0.566	285	0.174	1.0	12.2	1562	-6.9	353.6	1262	339.0	-13.3	348.2	0.90	4.70	244.32
3-1, 62-64(2)	0.41	197	0.860	786	0.315	1.0	6.9	2430	13.0	161.0	745	140.0	11.0	158.4			244.62
3-1, 129-131(2)	0.32	170	0.861	835	0.334	1.6	10.9	4080	11.0	17.0	1097	125.0	2.1	24.0	0.80	5.10	245.29
3-2, 9-11(2)	0.27	160	0.879	1094	0.429	2.3	11.7	5740	7.0	16.0	1337	140.0	4.2	14.3			245.59
5-1, 31-34(2)	0.60	251	0.348	170	0.168	1.8	24.1	1843	-1.3	340.8	1582	394.5	-3.2	341.1			282.31
5-1, 36-38(2)	0.60	250	0.314	169	0.186	3.3	39.1	2974	4.0	348.3	2024	285.1	-3.3	341.8	0.90	4.20	282.36
5-1, 113-115(2)	0.60	249	0.355	134	0.130	1.1	18.7	1127	34.5	24.1	794	269.6	25.5	26.1			283.13
5-2, 57-59(2)	0.57	239	0.329	128	0.134	1.7	28.8	1660	8.8	153.5	1309	311.9	6.6	154.0			284.07
6-1, 16-18(2)	0.25	155	0.879	615	0.241	3.7	34.3	9480	24.0	280.0	1721	105.0	23.4	281.3			320.16
6-2, 53-55(2)	0.73	295	0.484	248	0.177	2.2	27.8	3101	16.7	324.6	868	121.0	12.2	331.6			322.03
6-2, 59-61(3)	0.75	300	0.445	281	0.218	2.4	24.8	3137	20.9	331.3	1016	130.2	14.6	329.4	0.50	3.70	322.09
6-2, 92-94(2)		548	1.157	1282	0.382	1.2	7.2	4178	-10.2	79.4	1574	142.8	-6.7	66.8	0.20	1.70	322.42
7-1, 7-9(3)	0.73	295	0.575	208	0.125	2.2	39.9	3736	-26.8	355.8	2527	271.5	-36.0	356.7			358.07
8-1, 91-93(2)	0.71	290	0.569	300	0.182	1.7	21.2	2859	21.5	66.3	1562	223.1	19.7	66.6			396.91
8-3, 111-113(2)	0.71	283	0.294	65	0.076	1.1	32.7	957	3.0	172.0	633	245.0	-5.2	169.1			400.11
8-3, 139-141 (2)	0.67	272	0.466	293	0.217	2.3	24.0	3162	2.3	106.9	1113	158.3	1.5	106.5	0.40	2.90	400.39
8-4,44-46(2)	0.71	285	0.568	197	0.120	0.2	3.3	291	32.6	17.8	262	325.0	28.0	20.0			400.94
8-4, 66-68(2)	0.62	254	0.400	255	0.220	0.4	4.5	512	-52.7	62.4	275	208.5	-37.0	49.5			401.16
8-5, 118-120(2)	0.75	300	0.430	393	0.315	0.5	3.7	653	34.0	326.0	236	90.0	19.9	347.6			403.18
8-6, 58-60(3)	0.66	268	0.476	378	0.274	0.7	6.1	1030	40.0	300.0	221	70.0	31.2	318.5			404.08
8-6, 98-100(2)	0.91	368	0.260	255	0.338	1.7	11.2	1289	23.0	222.3	1057	312.4	20.1	222.4	0.20	2.00	404.48
8-6, 109-111(2)	0.91	366	0.230	187	0.280	1.6	12.7	1072	37.3	66.5	946	320.5	31.6	63.8			404.59
9-2, 55-57 (20)	0.87	349	0.253	248	0.338	0.8	5.4	606	10.0	195.3	513	294.8	4.5	196.2			436.05
9-4,23-25(1)	0.51	223	0.680	703	0.356	0.8	4.8	1530	-2.8	110.0	280	119.2	6.4	112.2			438.73
9-4, 98-100(2)	0.13	135	1.285	1469	0.394	0.5	2.6	1700	-59.0	93.0	252	80.0	-57.0	94.3			439.48
10-1, 31-34(2)	0.53	227	0.989	1211	0.422	3.4	17.8	9690	-21.0	75.0	646	60.0	-20.0	73.1	1.00	4.90	481.81
10-1, 125-126(2)	0.39	190	1.199	916	0.263	1.4	11.4	4700	-6.0	11.0	623	85.0	-1.9	14.1			482.75
10-2, 106-109(2)	0.28	164	1.236	1032	0.288	1.6	12.5	5800	3.0	351.0	970	90.0	6.9	357.4			484.06
10-2, 112-115(2)	0.30	165	1.082	1054	0.336	2.1	13.7	6480	3.0	352.0	1205	90.0	-2.9	356.1	0.90	4.60	484.12
10-3, 65-68(2)	0.27	160	0.585	997	0.588	5.0	19.1	8560	2.0	175.0	1231	80.0	9.0	175.1			485.15
11-2, 30-32(2)	0.33	175	0.677	855	0.435	4.8	24.3	9335	5.4	261.5	1932	83.3	2.5	254.8	0.70	4.00	511.80
11-2, 38-40(2)	0.30	165	0.730	959	0.453	5.6	27.7	11940	-14.0	279.0	1493	100.0	-.1	229.0			511.88

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, Chapter 16, this volume.

Sample (Interval in cm)	x	Q	J(0)	I(0)	MDF	J_{100}/NRM (or J_{max}/NRM)	In direction (°) at MDF
3-1, 74-77(a)	3000	1.4	1900	U	–	–	–
3-1, 74-76(b)	14800	0.25	1700	U	–	–	–
3-1, 75-76(a)	15300	0.22	1500	U	225	(1.07 at 50 oe)	8
3-1, 75-76(b)	5000	1.65	3700	U	150	.65	5*
10-2, 74-78	2900	1.69	5000	U	100	.44	36

Note: J(0), natural remanent magnetization intensity in units of 10^{-6} emu. cm^{-3} x, susceptibility in units of 10^{-6} emu^{-3}. oe^{-1} (average for sample where bracketed); Q, Königsberger ratio (NRM/0.54x); 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.

TABLE 5
Physical Properties and Seismic Velocities of Basement Rocks from Hole 333A

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)	Ham. Frame (km/sec)	P (0.5) (km/sec)	P (2.0) (km/sec)
1-3, 75	217.8	0.0	2.849	2.990	7.0	2.4	1190	5.74	5.40	5.55
2-1, 51	225.5	4.0	2.830	2.993	8.1	2.8	163	5.89		
3-1, 130	245.3	23.8	2.821	3.001	9.0	3.2	96.7	5.51	5.62	5.75
5-1, 37	282.4	60.9	2.809	2.994	9.2	3.2	223	5.84		
6-2, 60	322.1	100.6	2.872	2.981	5.5	1.9	1910	6.06	5.98	6.08
7-1, 8	358.1	136.6	2.463	2.943	24.5	9.8	6.33	4.40		
8-6, 59	404.1	182.6	2.769	2.969	10.1	3.6	30.5	5.47	5.67	5.79
9-2, 56	436.1	214.6	2.493	2.918	22.0	8.7	9.17	4.26		
9-4, 99	439.5	218.0	2.782	2.976	9.7	3.4	17.4	5.09		
9-4, 104	439.6	218.1	2.773	2.977	10.3	3.7		4.99		
10-2, 113	484.1	262.6	2.763	2.963	10.1	3.6	39.8	5.23	5.29	5.43
11-2, 39	511.9	290.4	2.821	2.980	8.1	2.9	189			
Mean			2.754	2.974	11.1	4.1	72.6	5.32	5.59	5.72

Radiolaria are common in Core 2, but are rare in the remaining cores.

Core 1 contains sediments of Pleistocene age. Cores 2 and 3, which were recovered approximately 140 to 170 meters below Core 1, are middle late Pliocene in age. Cores 4 through 7 contain fossils of early late Pliocene age.

Part of one core of sediment was recovered near the basalt-sediment contact in Hole 333A. Planktonic foraminifera and calcareous nannoplankton of early late Pliocene age are abundant in these sediments, while Radiolaria are common. Preservation is good in all three fossil groups.

Planktonic Foraminifers

An incomplete late Pliocene sequence was recovered in Cores 2 through 7 of Hole 333. Cores 2 and 3 contain rare *Globorotalia miocenica.* This species appears to be a reliable indicator of Zone N21 in Leg 37 sediments. These cores are assigned to Zone N21 based on the presence of this species, the absence of *Globorotalia truncatulinoides*, and the virtual absence of *Sphaeroidinella seminulina* and *S. subdehiscens.* Scattered rare specimens of the last two species co-occur with rare reworked specimens of *Globorotalia margaritae* in Cores 2 and 3. This situation also occurs in Zone N21 of Hole 332A. Minor amounts of lower Pliocene sediment have been reworked into the upper Pliocene in the area of Sites 332 and 333.

The Zone N20/N21 boundary is placed in the washed interval between Cores 3 and 4. *Sphaeroidinella seminulina* and *S. subdehiscens* are common in the top of Core 4, marking the first downhole recovery of Zone N20 sediments.

Cores 4 through 7 are assigned to Zone N20 based on the presence of common *Sphaeroidinella seminulina* and *S. subdehiscens* and on the absence of unmistakably in situ early Pliocene foraminifers. A total of 14 specimens of *Globorotalia margaritae* was found in samples from Cores 4 through 7. Most of these are abraded and/or discolored and are considered to be reworked contaminants.

The absolute age of the sediment-basement contact in Hole 333 is placed at 3.0 to 3.3 m.y.B.P.

Faunas in sediments recovered from near the sediment-basalt contact in Hole 333A closely resemble the faunas of Cores 4 through 7 in Hole 333. These faunas are assigned to Zone N20 due to the presence of rare specimens of *Sphaeroidinella seminulina* and *S. subdehiscens*, and on the absence of characteristic early Pliocene species.

Radiolaria

Radiolarian faunas in Holes 333 and 333A exhibit a higher latitude aspect and contain species which indicate a Pliocene to Pleistocene age. The faunas are not precisely age diagnostic, but the co-occurrence of *Stichocorys peregrina* and *Ommartartus tetrathalamus* in Core 1 of Hole 333A indicates a Pliocene age for these sediments.

Characteristic species at Site 333 include *Amphirhopalum ypsilon, Axoprunum angelinum, Bathropyramis woodringi, Cornutella profunda, Eucyrtidium acuminatum, Eucyrtidium calvertense, Stylocontarium aquilonium, Polysolenia* spp., and Carpocaniidae spp.

Nannofossils

Cores above acoustic basement contain well-preserved Pliocene and Pleistocene nannofossils. Sediments interlayered with the basalts have only poorly preserved nannofossils making age determinations difficult.

Core 1, Hole 333, has *Emiliania huxleyi* and *Gephyrocapsa oceanica* indicative of Zone NN21.

Zone NN16 is indicated in Core 2 by the presence of *Crenolithus doronicoides, Cyclococcolithina leptopora, Coccolithus pelagicus, Discoaster brouweri, D. pentaradiatus, D. surculus, Helicopontosphaera kamptneri, Pseudoemiliania lacunosa*, and several *Scyphosphaera* species. The rare occurrence of *Reticulofenestra pseudoumbilica* in Cores 3-5 possibly puts them in Zone NN15. The same flora is found in Cores 6 and 7 with a gradual increase in abundance of *R. pseudoumbilica* and *Sphenolithus abies*; therefore, these cores appear to belong in Zone NN15.

Since Core 1, Hole 333A, has a similar assemblage to Core 7, Hole 333, it is also placed in Zone NN15.

TABLE 3
Geochemical Data for Basalts in Hole 333A

TABLE 3A
Major Element Analyses of Basalt Glasses in Hole 333A

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
1- 3, 5-	220.05	ML	50.04	0.92	14.85	8.80	-	8.99	12.53	1.90	0.21	0.12	98.36
1- 3, 128-	221.28	ML	51.21	0.96	14.84	8.86	-	8.88	12.52	1.85	0.17	0.11	99.40
2- 1, 39-	225.39	ML	51.19	0.93	14.90	8.84	-	8.93	12.62	1.83	0.18	0.11	99.53
2- 1, 93-	225.93	ML	51.09	0.92	14.86	8.81	-	9.00	12.67	1.83	0.17	0.11	99.46
2- 2, 47-	226.97	ML	50.62	1.19	14.41	9.43	-	8.15	12.34	2.01	0.20	0.12	98.47
5- 1, 103-	283.03	ML	50.82	1.28	15.46	10.77	-	6.71	12.72	2.48	0.13	0.11	100.48
7- 1, 14-	358.14	ML	51.20	1.30	14.96	10.96	-	6.89	12.12	2.12	0.22	0.14	99.91
7- 1, 86-	358.86	AU	50.77	1.42	14.54	11.13	0.20	7.00	11.64	1.84	0.36	-	98.90
7- 1, 86-	358.86	AU	52.54	1.50	14.62	10.99	0.20	6.89	11.30	2.17	0.28	-	100.49
7- 1, 86-	358.86	AU	51.86	1.54	14.44	11.16	0.21	7.06	11.36	2.18	0.26	-	100.07
7- 2, 60-	360.10	ML	51.60	1.32	15.06	11.00	-	6.89	12.04	2.16	0.22	0.14	100.43
8- 1, 109-	397.09	ML	51.10	1.31	14.91	11.00	-	6.93	12.00	2.16	0.22	0.12	99.75
8- 2, 47-	397.97	AU	51.94	1.44	13.86	11.26	0.22	7.62	12.19	2.17	0.25	-	100.95
8- 2, 47-	397.97	AU	51.73	1.41	13.61	11.23	0.22	7.68	12.15	2.17	0.26	-	100.46
8- 2, 47-	397.97	AU	51.68	1.42	13.56	11.37	0.21	7.66	12.16	2.13	0.25	-	100.44
8- 2, 49-	397.99	ML	51.78	1.26	15.11	10.74	-	6.84	12.18	2.14	0.18	0.13	100.36
8- 2, 107-	398.57	ML	51.08	1.23	14.91	10.69	-	7.18	12.39	2.09	0.18	0.14	99.89
8- 3, 29-	399.29	ML	51.20	1.23	14.88	10.62	-	7.01	12.21	2.12	0.20	0.14	99.61
8- 4, 4-	400.54	ML	51.45	1.19	14.80	10.33	-	7.35	12.09	2.10	0.21	0.14	99.66
8- 4, 89-	401.39	ML	51.28	1.22	14.61	10.39	-	7.30	12.19	2.03	0.22	0.14	99.38
8- 6, 105-	404.55	ML	51.67	0.95	14.92	9.41	-	7.88	13.15	1.86	0.13	0.12	100.09
9- 3, 24-	437.24	AU	46.88	0.01	33.35	0.44	0.00	0.28	17.74	1.45	0.06	-	100.21
11- 1, 4-	510.04	ML	51.29	1.25	14.54	10.66	-	7.00	12.11	2.06	0.19	0.14	99.24
11- 1, 98-	510.98	ML	51.29	1.24	14.58	10.62	-	7.22	12.04	2.10	0.20	0.14	99.43

TABLE 3B
Major Element Analyses of Basalts in Hole 333A

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
1- 3,	46- 48	220.47	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0.0781
1- 3,	46- 48	220.47	BOG	XRF	4818	0.98	1443	927	-	834	0.14	975	1225	185	0.10	0.13	0.13	126	108	9955	228	-
1- 3,	52-	220.52	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0.0865
1- 3,	52-	220.52	MUN	AAS	49.40	0.90	14.20	2.07	6.57	8.43	0.15	10.15	12.39	1.81	0.14	0.09	-	-	-	97.87	2.05	-
1- 3,	61- 63	220.62	FW	XRFFP	49.89	0.94	14.36	2.23	5.80	7.81	0.16	9.86	12.02	1.92	0.13	0.09	0.29	1.45	1.55	100.69	2.64	-
1- 3,	66- 68	220.67	ZAK	WET	48.26	0.95	13.92	4.55	5.04	9.13	0.15	9.34	12.14	1.92	0.19	0.15	-	1.88	0.44	99.71	-	-
2- 1,	68- 70	225.69	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.08	-	-	0.08	-	-
2- 1,	68- 70	225.69	GUNN	XRF	50.08	0.91	14.49	2.42	6.38	8.56	0.15	10.25	12.41	1.83	0.25	0.12	-	0.83	0.75	100.87	-	-
2- 1,	86-	225.86	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.08	-	-	0.08	-	0.0265
2- 1,	86-	225.86	GUNN	XRF	49.99	0.92	14.53	2.76	6.31	8.79	0.15	9.93	12.48	1.88	0.23	0.12	-	0.78	1.02	101.10	-	-
2- 1,	86-	225.86	MUN	AAS	49.20	0.86	14.40	2.64	6.20	8.58	0.15	10.15	12.55	1.83	0.27	0.09	-	-	-	98.34	1.52	-
2- 2,	36- 38	226.87	FW	XRFFP	49.37	0.92	14.37	2.08	5.65	7.52	0.15	10.01	12.29	1.84	0.19	0.06	0.15	1.24	-	98.32	2.04	-
3- 1,	5- 8	244.07	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.61	-	-	0.61	-	0.0188
3- 1,	5- 8	244.07	GUNN	XRF	49.87	1.49	14.76	3.62	7.63	10.89	0.18	6.74	11.98	2.28	0.39	0.20	-	0.78	0.74	100.66	-	-
3- 1,	32- 34	244.33	AUF	AAS	48.99	0.88	14.76	4.14	5.68	9.41	0.16	7.77	12.43	2.35	0.25	0.07	0.03	1.51	0.74	99.76	-	-
3- 1,	32- 34	244.33	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	0.03	-	0.0000
3- 1,	32- 34	244.33	GUNN	XRF	50.91	0.87	14.65	10.51	-	9.46	0.16	7.69	12.56	2.31	0.26	0.08	-	-	-	100.00	-	-
3- 1,	44-	244.44	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.28	-	-	0.28	-	0.0000
3- 1,	44-	244.44	GUNN	XRF	49.96	0.81	15.57	4.84	5.16	9.51	0.18	7.12	13.16	2.25	0.30	0.08	-	1.05	1.01	101.49	-	-
3- 1,	44-	244.44	MUN	AAS	49.20	0.76	15.20	4.48	5.05	9.08	0.19	7.09	12.91	2.18	0.35	0.09	-	-	-	97.50	2.35	-
3- 1,	62- 64	244.63	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	-	0.10	-	0.0997
3- 1,	62- 64	244.63	AUF	AAS	49.17	0.78	16.99	1.62	6.82	8.28	0.14	7.20	12.80	2.16	0.06	0.05	0.13	1.75	0.27	99.94	-	-
3- 1,	62- 64	244.63	BOG	XRF	47.41	0.80	16.65	9.32	-	8.39	0.14	7.64	12.84	2.15	0.06	0.09	0.14	1.30	0.60	99.14	2.00	-
3- 1,	74- 77	244.76	TM	PROBE	50.32	0.81	16.21	1.67	7.29	8.79	0.13	7.61	12.64	2.13	0.12	-	0.27	0.63	0.41	100.24	1.42	-
3- 1,	74- 77	244.76	TM	PROBE	49.71	0.76	16.75	4.30	4.95	8.82	0.16	6.95	12.66	2.09	0.23	-	0.24	1.08	0.70	100.58	2.08	-
3- 1,	75- 76	244.76	TM	PROBE	-	-	-	-	-	-	-	-	-	-	-	-	0.31	0.54	0.41	1.26	-	-
3- 1,	75- 76	244.76	TM	PROBE	-	-	-	-	-	-	-	-	-	-	-	-	0.24	0.98	0.67	1.89	-	-
3- 2,	9- 11	245.60	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	-	0.11	-	0.1159
3- 2,	9- 11	245.60	GUNN	XRF	50.38	0.98	14.55	2.44	8.04	10.23	0.17	7.75	12.45	2.16	0.10	0.10	-	0.86	1.05	101.03	-	-
3- 2,	9- 11	245.60	GUNN	XRF	50.46	0.98	14.61	2.41	8.04	10.20	0.17	7.77	12.37	2.11	0.10	0.11	-	0.86	1.05	101.04	-	-
3- 2,	30- 31	245.81	FW	XRFFP	49.98	0.83	16.56	1.81	6.15	7.78	0.14	7.20	12.75	2.11	0.09	0.06	0.11	0.80	-	98.59	1.20	-
3- 2,	44- 48	245.96	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.12	-	-	0.12	-	0.0031
3- 2,	44- 48	245.96	GUNN	XRF	50.54	0.89	14.55	4.48	5.88	9.91	0.16	7.75	12.49	2.30	0.23	0.09	-	1.38	1.10	101.84	-	-
3- 2,	45- 47	245.96	FW	XRFFP	48.93	0.89	14.32	4.22	5.30	9.10	0.17	8.25	12.17	2.32	0.22	-	0.07	1.53	1.17	99.56	2.73	-
5- 1,	31- 34	282.33	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.12	-	-	0.12	-	0.0059
5- 1,	31- 34	282.33	GUNN	XRF	50.07	1.08	14.80	2.98	6.57	9.25	0.16	8.54	12.83	1.80	0.30	0.14	-	0.75	0.96	100.98	-	-
5- 1,	113-115	283.14	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0000
5- 1,	113-115	283.14	GUNN	XRF	49.45	1.39	15.34	11.92	-	10.73	0.17	6.93	11.98	2.35	0.28	0.18	-	-	-	99.99	-	-
5- 2,	57- 59	284.08	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.07	-	-	0.07	-	0.0000
5- 2,	57- 59	284.08	GUNN	XRF	49.76	1.29	14.95	4.60	6.51	10.64	0.17	7.43	11.94	2.17	0.29	0.16	-	1.25	1.06	101.58	-	-
5- 2,	68-	284.18	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	0.02	-	0.0094
5- 2,	68-	284.18	GUNN	XRF	49.23	1.27	15.26	4.24	6.81	10.63	0.16	7.60	12.02	2.15	0.33	0.16	-	1.25	1.27	101.75	-	-
5- 2,	68-	284.18	MUN	AAS	48.90	1.11	14.70	4.50	6.31	10.36	0.17	7.48	11.83	2.16	0.38	0.09	-	-	-	97.63	2.15	-
6- 1,	16- 18	320.17	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0984
6- 1,	16- 18	320.17	BOG	XRF	47.18	1.27	14.43	11.03	-	9.92	0.16	7.90	11.52	2.13	0.18	0.18	0.17	1.27	1.09	98.51	2.40	-
6- 1,	28-	320.28	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.05	-	-	0.05	-	0.0140
6- 1,	28-	320.28	GUNN	XRF	50.28	1.26	14.78	4.64	6.42	10.59	0.17	7.47	11.71	2.04	0.36	0.16	-	1.33	1.34	101.96	-	-
6- 1,	28-	320.28	MUN	AAS	48.90	1.12	14.30	4.60	6.25	10.39	0.17	7.42	11.52	2.09	0.41	0.09	-	-	-	96.87	2.40	-
6- 1,	70- 75	320.72	FW	XRFFP	49.80	0.93	14.98	2.41	5.90	8.07	0.17	8.75	12.93	1.92	0.17	0.09	0.82	1.34	0.66	100.87	1.93	-
6- 2,	21- 23	321.72	ZAK	WET	48.16	1.00	14.86	5.09	5.94	10.52	0.15	6.91	11.82	2.30	0.28	0.16	-	1.91	0.60	99.95	-	-
6- 2,	26- 33	321.80	TM	PROBE	-	-	-	-	-	-	-	-	-	-	-	-	0.19	0.57	0.16	0.92	-	-
6- 2,	26- 33	321.80	TM	PROBE	-	-	-	-	-	-	-	-	-	-	-	-	0.26	0.38	0.04	0.68	-	-

6- 2,	53- 55	322.04	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.16	-	-	0.16	-	0.0067
6- 2,	53- 55	322.04	BOG	XRF	47.53	0.79	16.06	8.88	-	7.99	0.16	8.74	13.62	1.67	0.14	0.09	0.24	0.80	0.88	99.60	1.80	-
6- 2,	92- 94	322.43	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	2.83	-	-	2.83	-	0.0081
6- 2,	92- 94	322.43	GUNN	XRF	48.09	0.87	14.55	3.81	5.12	8.55	0.27	8.75	15.94	1.64	0.27	0.12	-	0.75	1.34	101.52	-	-
7- 1,	59- 61	358.60	FW	XRFFP	49.63	1.32	15.27	2.67	6.90	9.30	0.19	7.68	12.18	2.11	0.28	0.13	-	0.68	1.12	100.16	1.46	-
7- 2,	66-	360.16	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0023
7- 2,	66- 68	360.17	BOG	XRF	47.76	1.22	15.12	11.12	-	10.01	0.18	7.09	12.42	2.16	0.23	0.16	0.23	0.50	0.79	98.98	2.27	-
8- 1,	30- 33	396.32	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	0.04	-	0.0043
8- 1,	30- 33	396.32	GUNN	XRF	49.28	1.30	14.96	4.55	6.61	10.71	0.18	7.58	12.01	2.31	0.31	0.17	-	0.70	1.19	101.15	-	-
8- 1,	72- 74	396.73	FW	XRFFP	49.14	1.37	14.74	3.12	6.50	9.31	0.12	8.01	11.77	2.26	0.24	0.16	0.11	1.03	0.77	99.34	1.75	-
8- 1,	81-	396.81	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.0034
8- 1,	81-	396.81	GUNN	XRF	49.59	1.28	15.11	3.85	6.97	10.44	0.19	7.70	11.93	2.18	0.26	0.17	-	0.76	0.99	100.98	-	-
8- 1,	81-	396.81	MUN	AAS	48.80	1.24	14.80	3.78	6.88	10.28	0.19	7.74	11.75	2.18	0.30	0.09	-	-	-	97.75	1.43	-
8- 1,	91- 93	396.92	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	0.02	-	0.0000
8- 1,	91- 93	396.92	BOG	XRF	48.80	1.28	14.98	11.41	-	10.27	0.19	7.39	12.17	2.25	0.30	0.17	-	1.08	0.35	100.37	-	-
8- 1,	91- 93	396.92	GUNN	XRF	49.71	1.26	15.21	3.99	6.70	10.29	0.18	7.51	12.04	2.21	0.29	0.16	-	0.97	0.97	101.20	-	-
8- 2,	92-	398.42	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0078
8- 2,	92- 94	398.43	BOG	XRF	46.87	1.18	15.04	11.39	-	10.25	0.18	7.71	12.15	2.15	0.15	0.14	0.10	1.24	1.01	99.31	2.78	-
8- 3,	100-103	400.02	FW	XRFFP	48.14	0.70	15.44	2.60	5.00	7.34	0.16	8.41	14.44	1.72	0.16	0.06	-	0.78	1.07	98.68	2.33	-
8- 3,	111-113	400.12	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	2.00	-	-	2.00	-	0.0000
8- 3,	111-113	400.12	BOG	XRF	46.72	0.65	15.39	7.79	-	7.01	0.16	7.60	14.26	2.09	0.57	0.09	-	1.66	3.37	100.35	-	-
8- 3,	111-113	400.12	GUNN	XRF	49.49	0.69	15.76	3.58	4.34	7.56	0.16	7.99	14.77	2.07	0.58	0.09	-	1.72	1.58	102.82	-	-
8- 3,	139-141	400.40	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	0.02	-	0.0296
8- 3,	139-141	400.40	GUNN	XRF	49.65	1.16	15.57	2.93	6.95	9.58	0.18	8.01	12.49	1.98	0.16	0.15	-	1.10	0.96	101.29	-	-
8- 4,	90-	401.40	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0000
8- 4,	90-	401.40	GUNN	XRF	49.96	1.13	15.04	11.51	-	10.36	0.16	7.92	11.21	2.32	0.62	0.14	-	-	-	100.01	-	-
8- 4,	90-	401.40	MUN	AAS	47.90	1.03	14.30	5.04	5.39	9.92	0.16	7.70	10.61	2.36	0.64	0.09	-	-	-	95.22	3.16	-
8- 5,	17- 19	402.18	FW	XRFFP	48.40	0.76	15.96	2.24	5.10	7.12	0.15	8.31	14.59	1.78	0.17	0.07	1.11	0.70	1.50	100.84	2.59	-
8- 5,	116-	403.16	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0118
8- 5,	118-120	403.19	BOG	XRF	45.01	0.68	15.04	8.27	-	7.44	0.13	8.18	15.62	1.95	0.21	0.09	2.70	1.15	0.99	100.02	5.05	-
8- 6,	33-	403.83	AUF	AAS	46.52	0.72	16.11	3.88	4.35	7.84	0.12	7.21	13.96	2.31	0.58	0.08	2.03	1.13	0.94	99.94	-	-
8- 6,	33-	403.83	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	2.05	-	-	2.05	-	0.0035
8- 6,	33-	403.83	CML	XRF	48.00	0.91	13.80	10.40	-	9.36	0.14	8.00	14.90	2.50	0.67	0.14	-	-	-	99.46	-	0.4300
8- 6,	33-	403.83	GUNN	XRF	48.72	0.76	16.06	9.10	-	8.19	0.13	7.51	14.79	2.21	0.62	0.10	-	-	-	100.00	-	-
8- 6,	33-	403.83	MUN	AAS	47.40	0.69	15.20	4.19	4.22	7.99	0.13	7.23	13.92	2.19	0.64	0.09	-	-	-	95.90	4.52	-
9- 3,	57-	437.57	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0105
9- 3,	57- 59	437.58	BOG	XRF	47.38	1.00	15.21	10.19	-	9.17	0.18	8.09	12.48	2.16	0.14	-	0.12	1.47	0.92	99.34	2.70	-
9- 3,	104-	438.04	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0215
9- 3,	104-	438.04	GUNN	XRF	50.18	0.98	15.16	10.32	-	9.29	0.28	8.23	12.46	2.00	0.29	0.12	-	-	-	100.02	-	-
9- 3,	104-	438.04	MUN	AAS	48.40	0.88	14.60	3.06	6.12	8.87	0.26	8.01	12.20	2.02	0.33	0.09	-	-	-	95.97	2.95	-
9- 4,	5- 6	438.56	FW	XRFFP	49.45	0.58	16.75	1.65	4.60	6.08	0.13	8.44	14.49	1.68	0.05	0.06	0.43	0.93	1.07	100.31	2.40	-
9- 4,	23- 25	438.74	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0612
9- 4,	23- 25	438.74	BOG	XRF	47.29	0.54	16.72	7.52	-	6.77	0.13	8.16	14.02	2.17	0.05	-	0.42	1.47	1.01	99.50	3.87	-
9- 4,	112-113	439.63	FW	XRFFP	50.41	0.99	16.08	2.39	5.40	7.55	0.13	8.66	12.12	2.04	0.13	0.09	0.10	1.06	1.74	101.34	1.90	-
9- 4,	122-125	439.74	ZAK	WET	47.59	1.10	15.31	2.51	6.48	8.74	0.15	7.79	11.82	2.66	0.19	0.14	-	2.33	0.54	99.74	-	-
9- 4,	135-	439.85	AUF	AAS	49.81	1.02	15.64	2.88	6.57	9.16	0.14	8.38	12.11	2.27	0.16	0.10	0.16	0.87	0.85	100.96	-	-
9- 4,	135-	439.85	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.16	-	-	0.16	-	0.0774
9- 4,	135-	439.85	GUNN	XRF	50.29	1.01	15.22	10.20	-	9.18	0.15	8.55	12.19	2.12	0.17	0.12	-	-	-	100.02	-	-
9- 4,	135-	439.85	MUN	AAS	48.70	1.00	14.90	3.08	6.27	9.04	0.16	8.44	12.16	2.13	0.22	0.09	-	-	-	97.15	1.98	-
9- 5,	77- 79	440.78	FW	XRFFP	50.06	1.51	15.17	4.39	4.60	8.55	0.14	6.88	10.49	2.44	0.25	0.17	-	2.82	0.98	99.90	3.51	-
10- 1,	31- 34	481.83	BOG	XRF	48.38	1.17	14.67	10.46	-	9.41	0.14	7.87	10.77	2.23	0.14	-	0.26	1.46	1.13	98.68	2.97	-
10- 1,	39-	481.89	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.09	-	-	0.09	-	0.1271
10- 1,	39-	481.89	GUNN	XRF	51.51	1.14	15.10	3.31	6.72	9.70	0.14	8.00	10.81	2.25	0.14	0.13	-	0.89	1.13	101.27	-	-
10- 1,	39-	481.89	MUN	AAS	50.30	1.01	14.70	3.17	6.51	9.36	0.14	8.01	10.61	2.25	0.24	0.09	-	-	-	97.03	1.98	-
10- 1,	70- 73	482.22	FW	XRFFP	50.25	1.13	14.72	3.38	5.70	8.74	0.15	7.80	10.67	2.30	0.14	0.11	-	1.72	1.28	99.35	2.39	-
10- 1,	106-109	482.58	FW	XRFFP	49.49	1.11	15.69	2.34	5.80	7.91	0.13	7.49	11.83	2.12	0.17	0.10	0.10	2.28	0.72	99.37	2.93	-
10- 1,	124-127	482.76	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0303
10- 1,	124-127	482.76	BOG	XRF	47.88	1.09	15.88	9.66	-	8.69	0.13	7.67	12.04	2.15	0.20	-	0.14	1.67	1.06	99.57	3.06	-

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
10- 1, 131-134	482.83	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	0.03	-	0.0482
10- 1, 131-134	482.83	GUNN	XRF	50.42	1.14	15.96	2.74	6.41	8.87	0.13	7.65	12.38	2.15	0.18	0.13	-	0.86	1.19	101.34	-	-
10- 1, 131-134	482.83	GUNN	XRF	50.46	1.13	16.10	2.79	6.41	8.92	0.13	7.61	12.22	2.13	0.18	0.13	-	0.86	1.19	101.34	-	-
10- 2, 74- 78	483.76	TM	PROBE	-	-	-	-	5.92	5.92	-	-	-	-	-	-	0.06	0.81	0.75	7.54	-	-
10- 2, 106-109	484.08	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.1246
10- 2, 106-109	484.08	BOG	XRF	49.54	1.08	15.86	9.59	-	8.63	0.13	7.25	12.24	2.05	0.23	0.13	-	1.41	0.68	100.19	-	-
10- 2, 106-109	484.08	GUNN	XRF	51.01	1.08	15.86	2.82	6.14	8.67	0.13	7.70	12.17	2.05	0.23	0.13	-	1.01	1.23	101.56	-	-
10- 3, 59- 62	485.11	AUF	AAS	50.36	1.11	15.73	2.77	6.31	8.80	0.12	7.76	11.64	2.09	0.20	0.12	0.02	0.68	1.21	100.12	-	-
10- 3, 59- 62	485.11	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.02	-	-	0.02	-	0.0195
10- 3, 59- 62	485.11	CML	XRF	51.20	1.25	14.20	10.00	-	9.00	0.13	9.10	11.40	2.10	0.22	0.16	-	-	-	99.76	-	0.3100
10- 3, 59- 62	485.11	GUNN	XRF	50.58	1.13	15.83	9.93	-	8.94	0.13	7.88	12.07	2.13	0.19	0.13	-	-	-	100.00	-	-
10- 3, 59- 62	485.11	MUN	AAS	49.50	1.08	15.10	3.16	5.99	8.83	0.13	7.59	12.16	2.07	0.23	0.09	-	-	-	97.10	1.63	-
10- 3, 65- 68	485.17	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0271
10- 3, 65- 68	485.17	GUNN	XRF	50.80	1.12	15.77	9.95	-	8.95	0.13	7.79	11.97	2.15	0.19	0.13	-	-	-	100.00	-	-
11- 1, 40-	510.40	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	-	0.0615
11- 1, 91- 92	510.92	FW	XRFFP	49.58	1.12	15.28	1.80	7.00	8.62	0.17	7.89	12.04	2.03	0.07	0.10	0.10	1.53	0.67	99.38	2.05	-
11- 1, 115-116	511.16	FW	XRFFP	49.49	1.12	15.17	2.22	7.00	9.00	0.16	7.55	11.85	2.04	0.13	0.10	-	1.04	1.06	98.93	1.69	-
11- 2, 30- 32	511.81	BOG	XRF	47.97	1.13	14.65	10.44	-	9.39	0.16	7.78	12.10	2.08	0.11	0.13	0.16	1.55	0.98	99.24	2.70	-
11- 2, 53-	512.03	AUM	TRACK	-	-	-	-	-	-	-	-	-	-	-	-	0.01	-	-	0.01	-	0.0570
11- 2, 53-	512.03	GUNN	XRF	50.12	1.12	15.35	2.56	7.25	9.56	0.16	8.03	12.33	2.06	0.08	0.14	-	0.85	1.11	101.16	-	-
11- 2, 53-	512.03	GUNN	XRF	50.06	1.13	15.38	2.61	7.25	9.60	0.16	8.01	12.26	2.11	0.08	0.13	-	0.85	1.11	101.14	-	-
11- 2, 59-	512.09	ZAK	WET	48.42	0.95	15.31	2.29	7.92	9.98	0.15	7.68	12.14	2.16	0.14	0.14	-	1.50	0.36	99.70	-	-

TABLE 3C
First Transition and Rare Earth Elements in Basalts in Hole 333A

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
1- 3, 46	220.46	BOG	-	6000	220	466	1080	64839	46	180	75	62	-	-	-	-	-	-	-	-	-	-	-
1- 3, 52	220.52	MUN	-	5395	-	794	1162	65652	-	176	72	69	-	-	-	-	-	-	-	-	-	-	-
1- 3, 61	220.61	FWPU	39	5635	-	671	1239	60774	-	-	72	-	7.380	10.00	59.000	3.320	0.930	-	0.590	-	-	2.64	0.300
2- 1, 68	225.68	GUNN	-	5455	-	-	1162	66620	-	240	-	-	-	-	-	-	-	-	-	-	-	-	-
2- 1, 86	225.86	GUNN	-	5515	-	-	1162	68437	-	236	-	-	-	-	-	-	-	-	-	-	-	-	-
2- 1, 86	225.86	MUN	-	5156	-	885	1162	66757	-	211	78	73	-	-	-	-	-	-	-	-	-	-	-
2- 2, 36	226.86	FW	-	5515	-	690	1162	58556	-	225	82	-	-	-	-	-	-	-	-	-	-	-	-
3- 1, 5	244.05	GUNN	-	8932	-	-	1394	84756	-	101	-	-	-	-	-	-	-	-	-	-	-	-	-
3- 1, 32	244.32	GUNN	-	5215	-	-	1239	73512	-	98	-	-	-	-	-	-	-	-	-	-	-	-	-
3- 1, 44	244.44	GUNN	-	4856	-	-	1394	74014	-	65	-	-	-	-	-	-	-	-	-	-	-	-	-
3- 1, 44	244.44	MUN	-	4556	-	138	1471	70670	-	66	86	63	-	-	-	-	-	-	-	-	-	-	-
3- 1, 62	244.62	BOG	-	4920	255	175	1080	65189	34	63	66	64	-	-	-	-	-	-	-	-	-	-	-
3- 1, 74	244.74	TM	47	4856	220	150	1007	68463	47	72	74	-	3.430	9.70	6.500	1.810	0.730	-	0.490	0.67	-	2.32	0.390
3- 1, 74	244.74	TM	44	4556	250	155	1239	68632	49	60	65	-	3.780	9.40	6.100	1.960	0.700	-	0.450	0.78	-	2.54	0.430
3- 1, 75	244.75	TM	-	-	200	150	-	-	49	60	60	-	-	-	-	-	-	-	-	-	-	-	-
3- 1, 75	244.75	TM	-	-	205	140	-	-	38	55	65	-	-	-	-	-	-	-	-	-	-	-	-
3- 2, 9	245.59	GUNN	-	5875	-	-	1317	79656	-	69	-	-	-	-	-	-	-	-	-	-	-	-	-
3- 2, 9	245.59	GUNN	-	5875	-	-	1317	79446	-	69	-	-	-	-	-	-	-	-	-	-	-	-	-
3- 2, 30	245.80	FWPU	42	4976	-	154	1084	60562	-	70	87	-	4.320	4.90	38.000	2.070	0.660	-	0.570	-	-	2.39	0.330
3- 2, 44	245.94	GUNN	-	5335	-	-	1239	77103	-	82	-	-	-	-	-	-	-	-	-	-	-	-	-
3- 2, 45	245.95	FWPU	47	5335	-	159	1317	70798	-	-	93	-	4.360	9.79	60.000	1.750	0.700	-	0.430	-	-	2.86	0.340
5- 1, 31	282.31	GUNN	-	6474	-	-	1239	72009	-	137	-	-	-	-	-	-	-	-	-	-	-	-	-
5- 1, 113	283.13	GUNN	-	8333	-	-	1317	83374	-	92	-	-	-	-	-	-	-	-	-	-	-	-	-
5- 2, 68	284.18	GUNN	-	7613	-	-	1239	82714	-	85	-	-	-	-	-	-	-	-	-	-	-	-	-
5- 2, 68	284.18	MUN	-	6654	-	203	1317	80624	-	83	60	85	-	-	-	-	-	-	-	-	-	-	-
6- 1, 16	320.16	BOG	-	7800	220	217	1240	77149	37	76	45	86	-	-	-	-	-	-	-	-	-	-	-
6- 1, 28	320.28	GUNN	-	7553	-	-	1317	82428	-	85	-	-	-	-	-	-	-	-	-	-	-	-	-
6- 1, 28	320.28	MUN	-	6714	-	208	1317	80856	-	84	67	83	-	-	-	-	-	-	-	-	-	-	-
6- 1, 70	320.70	FWPU	40	5575	-	411	1317	62812	-	109	77	-	6.770	12.00	51.000	2.400	0.700	-	0.670	-	-	2.42	0.290
6- 2, 26	321.76	TM	-	-	280	450	-	-	49	88	55	-	-	-	-	-	-	-	-	-	-	-	-
6- 2, 26	321.76	TM	-	-	270	520	-	-	48	100	45	-	-	-	-	-	-	-	-	-	-	-	-
6- 2, 53	322.03	BOG	-	4800	220	275	1240	62111	42	104	-	60	-	-	-	-	-	-	-	-	-	-	-
6- 2, 92	322.42	GUNN	-	5215	-	-	2091	66530	-	205	-	-	-	-	-	-	-	-	-	-	-	-	-
7- 1, 59	358.59	FW	-	7913	-	244	1471	72419	-	105	67	-	-	-	-	-	-	-	-	-	-	-	-
7- 2, 66	360.16	BOG	-	7440	255	205	1390	77779	51	81	71	83	-	-	-	-	-	-	-	-	-	-	-
8- 1, 30	396.30	GUNN	-	7793	-	-	1394	83340	-	83	-	-	-	-	-	-	-	-	-	-	-	-	-
8- 1, 72	396.72	FWPU	42	8213	-	-	929	72451	-	81	40	-	8.430	12.00	76.000	2.980	1.020	-	1.090	-	-	3.19	0.390
8- 1, 81	396.81	GUNN	-	7673	-	-	1471	81248	-	86	-	-	-	-	-	-	-	-	-	-	-	-	-
8- 1, 81	396.81	MUN	-	7434	-	214	1471	80027	-	85	60	87	-	-	-	-	-	-	-	-	-	-	-
8- 1, 91	396.91	GUNN	-	7553	-	-	1394	80124	-	96	-	-	-	-	-	-	-	-	-	-	-	-	-
8- 1, 91	396.91	BOG	-	7790	260	217	1470	79807	51	81	70	78	-	-	-	-	-	-	-	-	-	-	-
8- 2, 92	398.42	BOG	-	7260	-	220	1390	79667	44	70	50	84	-	-	-	-	-	-	-	-	-	-	-
8- 3, 100	400.00	FW	-	4196	-	499	1239	57131	-	120	40	-	-	-	-	-	-	-	-	-	-	-	-
8- 3, 111	400.11	GUNN	-	4136	-	-	1239	58823	-	118	-	-	-	-	-	-	-	-	-	-	-	-	-
8- 3, 111	400.11	BOG	-	4090	170	320	1240	54487	44	104	32	52	-	-	-	-	-	-	-	-	-	-	-
8- 3, 139	400.39	GUNN	-	6954	-	-	1394	74603	-	113	-	-	-	-	-	-	-	-	-	-	-	-	-
8- 4, 90	401.40	GUNN	-	6774	-	-	1239	80506	-	87	-	-	-	-	-	-	-	-	-	-	-	-	-
8- 4, 90	401.40	MUN	-	6175	-	180	1239	77235	-	82	33	76	-	-	-	-	-	-	-	-	-	-	-
8- 5, 17	402.17	FWPU	40	4556	-	351	1162	55392	-	102	39	-	4.020	6.33	39.000	2.180	0.920	-	0.580	-	-	2.52	0.260
8- 5, 118	403.18	BOG	-	4260	200	395	1000	57844	47	124	53	62	-	-	-	-	-	-	-	-	-	-	-
8- 6, 33	403.83	GUNN	-	4556	-	-	1007	63650	-	97	-	-	-	-	-	-	-	-	-	-	-	-	-
8- 6, 33	403.83	MUN	-	4136	-	318	1007	62176	-	93	43	57	-	-	-	-	-	-	-	-	-	-	-

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
8-6, 33	403.83	CML	-	5455	-	-	1084	72743	33	110	60	57	-	-	-	-	-	-	-	-	-	-	-
9-3, 57	437.57	BOG	-	6180	255	142	1390	71274	54	81	130	72	-	-	-	-	-	-	-	-	-	-	-
9-3, 104	438.04	GUNN	-	5875	-	-	2168	72183	-	85	-	-	-	-	-	-	-	-	-	-	-	-	-
9-3, 104	438.04	MUN	-	5275	-	127	2014	69072	-	83	0	36	-	-	-	-	-	-	-	-	-	-	-
9-4, 5	438.55	FWPU	44	3477	-	548	1007	47370	-	135	108	-	2.780	4.26	61.000	1.030	1.030	-	0.570	-	-	1.16	0.280
9-4, 23	438.73	BOG	-	3360	170	520	1000	52598	37	129	86	45	-	-	-	-	-	-	-	-	-	-	-
9-4, 112	439.62	FW	-	5935	-	130	1007	58777	-	83	105	-	-	-	-	-	-	-	-	-	-	-	-
9-4, 135	439.85	GUNN	-	6055	-	-	1162	71344	-	71	-	-	-	-	-	-	-	-	-	-	-	-	-
9-4, 135	439.85	MUN	-	5995	-	118	1239	70380	-	75	73	64	-	-	-	-	-	-	-	-	-	-	-
9-5, 77	440.77	FW	-	9052	-	317	1084	66535	-	95	61	-	-	-	-	-	-	-	-	-	-	-	-
10-1, 31	481.81	BOG	-	7200	255	175	1080	73162	37	62	59	71	-	-	-	-	-	-	-	-	-	-	-
10-1, 39	481.89	GUNN	-	6834	-	-	1084	75508	-	65	-	-	-	-	-	-	-	-	-	-	-	-	-
10-1, 39	481.89	MUN	-	6055	-	164	1084	72879	-	68	69	74	-	-	-	-	-	-	-	-	-	-	-
10-1, 70	482.20	FWPU	44	6774	-	156	1162	68039	-	-	66	-	6.800	6.10	58.000	2.710	2.590	-	0.910	-	-	3.69	0.390
10-1, 106	482.56	FW	-	6654	-	290	1007	61543	-	110	73	-	-	-	-	-	-	-	-	-	-	-	-
10-1, 124	482.74	BOG	-	6720	270	322	1000	67567	41	116	71	77	-	-	-	-	-	-	-	-	-	-	-
10-1, 131	482.81	GUNN	-	6834	-	-	1007	69068	-	122	-	-	-	-	-	-	-	-	-	-	-	-	-
10-1, 131	482.81	GUNN	-	6774	-	-	1007	69418	-	122	-	-	-	-	-	-	-	-	-	-	-	-	-
10-2, 74	483.74	TM	-	-	300	400	-	46111	55	105	63	-	-	-	-	-	-	-	-	-	-	-	-
10-2, 106	484.06	GUNN	-	6474	-	-	1007	67525	-	112	-	-	-	-	-	-	-	-	-	-	-	-	-
10-2, 106	484.06	BOG	-	6600	255	337	1000	67077	44	120	65	70	-	-	-	-	-	-	-	-	-	-	-
10-3, 59	485.09	GUNN	-	6774	-	-	1007	69455	-	108	-	-	-	-	-	-	-	-	-	-	-	-	-
10-3, 59	485.09	MUN	-	6474	-	341	1007	68759	-	102	70	72	-	-	-	-	-	-	-	-	-	-	-
10-3, 59	485.09	CML	-	7493	-	-	1007	69945	42	116	73	83	-	-	-	-	-	-	-	-	-	-	-
10-3, 65	485.15	GUNN	-	6714	-	-	1007	69595	-	112	-	-	-	-	-	-	-	-	-	-	-	-	-
11-1, 91	510.91	FW	42	6714	-	259	1317	67113	-	93	70	-	6.040	9.42	39.000	2.190	2.820	-	1.140	-	-	3.66	0.300
11-1, 115	511.15	FW	-	6714	-	280	1239	70051	-	-	71	-	-	-	-	-	-	-	-	-	-	-	-
11-2, 30	511.80	BOG	-	6960	265	292	1240	73022	40	89	55	77	-	-	-	-	-	-	-	-	-	-	-
11-2, 53	512.03	GUNN	-	6714	-	-	1239	74398	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-
11-2, 53	512.03	GUNN	-	6774	-	-	1239	74747	-	99	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 3D
Trace Elements in Basalts in Hole 333A

Sample[a]	Depth (m)	Inv.	B	Li	Rb	Sr	Cs	Ba	Tl	Th	U	Y
1- 3, 46- 48	220.47	AUM	-	-	-	-	-	-	-	-	0.320	-
1- 3, 52-	220.52	AUM	-	-	-	-	-	-	-	-	0.290	-
1- 3, 52-	220.52	MUN	-	-	4.00	117.0	-	203	-	-	-	-
1- 3, 61- 63	220.62	FW	-	-	1.80	127.0	3	79	-	1.07	1.130	20.5
1- 3, 66- 68	220.67	ZAK	-	18.5	3.90	-	-	-	-	-	-	-
2- 1, 68- 70	225.69	AUM	-	-	-	-	-	-	-	-	0.220	-
2- 1, 68- 70	225.69	GUNN	-	-	5.00	117.0	-	77	-	-	-	-
2- 1, 86-	225.86	AUM	-	-	-	-	-	-	-	-	0.180	-
2- 1, 86-	225.86	GUNN	-	-	4.00	118.0	-	75	-	-	-	-
2- 1, 86-	225.86	MUN	-	-	7.00	111.0	-	82	-	-	-	-
2- 2, 36- 38	226.87	FW	-	-	2.70	145.0	-	78	-	-	-	20.9
3- 1, 5- 8	244.07	AUM	-	-	-	-	-	-	-	-	0.560	-
3- 1, 5- 8	244.07	GUNN	-	-	7.00	120.0	-	83	-	-	-	-
3- 1, 32- 34	244.33	AUM	-	-	-	-	-	-	-	-	0.230	-
3- 1, 32- 34	244.33	GUNN	-	-	8.00	94.0	-	51	-	-	-	-
3- 1, 44-	244.44	AUM	-	-	-	-	-	-	-	-	0.240	-
3- 1, 44-	244.44	GUNN	-	-	7.00	104.0	-	82	-	-	-	-
3- 1, 44-	244.44	MUN	-	-	8.00	93.0	-	98	-	-	-	-
3- 1, 62- 64	244.63	AUM	-	-	-	-	-	-	-	-	0.180	-
3- 1, 74- 77	244.76	TM	<1	5.0	-	75.0	-	22	-	-	-	28.0
3- 1, 74- 77	244.76	TM	15	17.0	-	125.0	-	29	-	-	-	25.0
3- 1, 75- 76	244.76	TM	<1	6.0	-	80.0	-	18	-	-	-	22.0
3- 1, 75- 76	244.76	TM	30	17.0	-	88.0	-	16	-	-	-	24.0
3- 2, 9- 11	245.60	AUM	-	-	-	-	-	-	-	-	0.150	-
3- 2, 9- 11	245.60	GUNN	-	-	0.00	93.0	-	64	-	-	-	-
3- 2, 9- 11	245.60	GUNN	-	-	0.00	93.0	-	71	-	-	-	-
3- 2, 30- 31	245.81	FW	-	-	0.30	99.0	2	63	-	0.64	0.810	21.1
3- 2, 44- 48	245.96	GUNN	-	-	3.00	95.0	-	72	-	-	-	-
3- 2, 45- 47	245.96	FW	-	-	4.10	99.0	3	-	-	0.69	1.300	23.6
5- 1, 31- 34	282.33	AUM	-	-	-	-	-	-	-	-	0.890	-
5- 1, 31- 34	282.33	GUNN	-	-	6.00	110.0	-	77	-	-	-	-
5- 1, 113-115	283.14	AUM	-	-	-	-	-	-	-	-	0.410	-
5- 1, 113-115	283.14	GUNN	-	-	5.00	122.0	-	87	-	-	-	-
5- 2, 57- 59	284.08	AUM	-	-	-	-	-	-	-	-	0.650	-
5- 2, 57- 59	284.08	GUNN	-	-	5.00	118.0	-	73	-	-	-	-
5- 2, 68-	284.18	AUM	-	-	-	-	-	-	-	-	0.340	-
5- 2, 68-	284.18	GUNN	-	-	7.00	118.0	-	86	-	-	-	-
5- 2, 68-	284.18	MUN	-	-	7.00	105.0	-	116	-	-	-	-
6- 1, 16- 18	320.17	AUM	-	-	-	-	-	-	-	-	0.320	-
6- 1, 28-	320.28	AUM	-	-	-	-	-	-	-	-	0.300	-
6- 1, 28-	320.28	GUNN	-	-	7.00	117.0	-	87	-	-	-	-
6- 1, 28-	320.28	MUN	-	-	10.00	105.0	-	104	-	-	-	-
6- 1, 70- 75	320.72	FW	-	-	2.80	113.0	3	80	-	0.88	0.770	20.6
6- 2, 21- 23	321.72	ZAK	-	20.5	3.50	-	-	-	-	-	-	-
6- 2, 26- 33	321.80	TM	7	13.0	-	105.0	-	36	-	-	-	36.0
6- 2, 26- 33	321.80	TM	20	32.0	-	85.0	-	38	-	-	-	38.0
6- 2, 92- 94	322.43	AUM	-	-	-	-	-	-	-	-	0.800	-
6- 2, 92- 94	322.43	GUNN	-	-	7.00	119.0	-	66	-	-	-	-
7- 1, 59- 61	358.60	FW	-	-	5.10	119.0	-	98	-	-	-	24.7
7- 2, 66-	360.16	AUM	-	-	-	-	-	-	-	-	0.280	-
8- 1, 30- 33	396.32	GUNN	-	-	5.00	117.0	-	73	-	-	-	-

TABLE 3D – *Continued*

Zr	Hf	Nb	Ta	Pd	Ir	Pt	Au	Cd	Pb	Sb	F	P	Ga	Sn	Ag	Ge	Yb
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	2.22	-	0.66	-	-	-	-	47	-	0.50	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.03	0.15	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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53	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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41	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	0.67	-	0.89	-	-	-	-	42	-	0.65	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	1.43	-	0.67	-	-	-	-	47	-	0.71	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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61	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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64	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	1.73	-	0.84	-	-	-	-	42	-	0.73	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.022	0.16	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 3D – *Continued*

Sample[a]	Depth (m)	Inv.	B	Li	Rb	Sr	Cs	Ba	Tl	Th	U	Y
8- 1, 72- 74	396.73	FW	-	-	3.70	121.0	4	98	-	1.00	1.160	28.4
8- 1, 81-	396.81	AUM	-	-	-	-	-	-	-	-	0.220	-
8- 1, 81-	396.81	GUNN	-	-	3.00	116.0	-	67	-	-	-	-
8- 1, 81-	396.81	MUN	-	-	7.00	108.0	-	92	-	-	-	-
8- 1, 91- 93	396.92	AUM	-	-	-	-	-	-	-	-	0.240	-
8- 1, 91- 93	396.92	GUNN	-	-	5.00	117.0	-	73	-	-	-	-
8- 2, 92-	398.42	AUM	-	-	-	-	-	-	-	-	0.280	-
8- 3, 100-103	400.02	FW	-	-	1.70	114.0	-	59	-	-	-	17.6
8- 3, 111-113	400.12	AUM	-	-	-	-	-	-	-	-	0.160	-
8- 3, 111-113	400.12	GUNN	-	-	6.00	105.0	-	72	-	-	-	-
8- 3, 139-141	400.40	GUNN	-	-	2.00	119.0	-	67	-	-	-	-
8- 4, 90-	401.40	AUM	-	-	-	-	-	-	-	-	0.240	-
8- 4, 90-	401.40	GUNN	-	-	9.00	110.0	-	67	-	-	-	-
8- 4, 90-	401.40	MUN	-	-	7.00	89.0	-	78	-	-	-	-
8- 5, 17- 19	402.18	FW	-	-	3.80	115.0	3	59	-	0.96	1.250	18.9
8- 5, 116-	403.16	AUM	-	-	-	-	-	-	-	-	0.150	-
8- 6, 33-	403.83	AUM	-	-	-	-	-	-	-	-	0.340	-
8- 6, 33-	403.83	CML	-	-	7.00	121.0	-	83	-	-	-	19.0
8- 6, 33-	403.83	GUNN	-	-	6.00	113.0	-	84	-	-	-	-
8- 6, 33-	403.83	MUN	-	-	4.00	102.0	-	119	-	-	-	-
9- 3, 57-	437.57	AUM	-	-	-	-	-	-	-	-	0.100	-
9- 3, 104-	438.04	AUM	-	-	-	-	-	-	-	-	0.160	-
9- 3, 104-	438.04	GUNN	-	-	4.00	118.0	-	131	-	-	-	-
9- 3, 104-	438.04	MUN	-	-	9.00	107.0	-	194	-	-	-	-
9- 4, 5- 6	438.56	FW	-	-	1.70	212.0	3	54	-	1.03	1.330	17.5
9- 4, 23- 25	438.74	AUM	-	-	-	-	-	-	-	-	0.080	-
9- 4, 112-113	439.63	FW	-	-	2.60	133.0	-	90	-	-	-	21.2
9- 4, 122-125	439.74	ZAK	-	64.0	7.50	-	-	-	-	-	-	-
9- 4, 135-	439.85	AUM	-	-	-	-	-	-	-	-	0.220	-
9- 4, 135-	439.85	GUNN	-	-	3.00	128.0	-	97	-	-	-	-
9- 4, 135-	439.85	MUN	-	-	2.00	121.0	-	152	-	-	-	-
9- 5, 77- 79	440.78	FW	-	-	7.20	126.0	-	138	-	-	-	34.1
10- 1, 39-	481.89	AUM	-	-	-	-	-	-	-	-	0.280	-
10- 1, 39-	481.89	GUNN	-	-	3.00	113.0	-	98	-	-	-	-
10- 1, 39-	481.89	MUN	-	-	2.00	106.0	-	131	-	-	-	-
10- 1, 70- 73	482.22	FW	-	-	1.20	114.0	4	91	-	0.98	1.290	25.6
10- 1, 106-109	482.58	FW	-	-	3.50	120.0	-	82	-	-	-	24.4
10- 1, 124-127	482.76	AUM	-	-	-	-	-	-	-	-	0.210	-
10- 1, 131-134	482.83	AUM	-	-	-	-	-	-	-	-	0.270	-
10- 1, 131-134	482.83	GUNN	-	-	3.00	115.0	-	87	-	-	-	-
10- 1, 131-134	482.83	GUNN	-	-	3.00	115.0	-	83	-	-	-	-
10- 2, 74- 78	483.76	TM	<1	6.0	-	100.0	-	40	-	-	-	16.0
10- 2, 106-109	484.08	AUM	-	-	-	-	-	-	-	-	0.250	-
10- 2, 106-109	484.08	GUNN	-	-	5.00	114.0	-	82	-	-	-	-
10- 3, 59- 62	485.11	AUM	-	-	-	-	-	-	-	-	0.240	-
10- 3, 59- 62	485.11	CML	-	-	4.00	127.0	-	75	-	-	-	27.0
10- 3, 59- 62	485.11	GUNN	-	-	4.00	116.0	-	90	-	-	-	-
10- 3, 59- 62	485.11	MUN	-	-	1.00	105.0	-	126	-	-	-	-
10- 3, 65- 68	485.17	AUM	-	-	-	-	-	-	-	-	0.200	-
10- 3, 65- 68	485.17	GUNN	-	-	3.00	112.0	-	78	-	-	-	-
11- 1, 91- 92	510.92	FW	-	-	-	112.0	4	81	-	0.67	1.270	25.6

TABLE 3D – *Continued*

Zr	Hf	Nb	Ta	Pd	Ir	Pt	Au	Cd	Pb	Sb	F	P	Ga	Sn	Ag	Ge	Yb
80	1.05	-	0.89	-	-	-	-	47	-	0.63	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
68	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
56	1.43	-	0.93	-	-	-	-	45	-	0.52	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
51	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
57	1.03	-	1.31	-	-	-	-	47	-	0.54	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.006	0.14	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76	1.96	-	1.81	-	-	-	-	62	-	2.52	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
71	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
71	1.74	-	2.54	-	-	-	-	61	-	1.13	-	-	-	-	-	-	-

TABLE 3D – *Continued*

Sample[a]	Depth (m)	Inv.	B	Li	Rb	Sr	Cs	Ba	Tl	Th	U	Y
11- 1, 115-116	511.16	FW	-	-	1.20	112.0	-	80	-	-	-	24.9
11- 2, 53-	512.03	AUM	-	-	-	-	-	-	-	-	0.260	-
11- 2, 53-	512.03	GUNN	-	-	1.00	110.0	-	89	-	-	-	-
11- 2, 53-	512.03	GUNN	-	-	1.00	111.0	-	86	-	-	-	-
11- 2, 59-	512.09	ZAK	-	47.0	3.70	-	-	-	-	-	-	-

Note: The analysts codes are as follows; AU – F. Aumento, Dalhousie University (Chapter 57, this volume); AUM – F. Aumento and W. Mitchell, Dalhousie University; S by A. J. Naldrett, University of Toronto (Chapter 32, this volume); BOG – H. Bougault, Centre Oceanologique de Bretagne (Chapters 30 and 50, this volume); MUN – Memorial University of Newfoundland (see Chapter 56, this volume); FW – M. Flower, Ruhr-Universitat Bochum (Chapters 51 and 61, this volume); ZAK – G. Zakariadze, Georgian Academy of Science; GUNN – B. Gunn, University of Montreal (Chapter 58, this volume); AUF – F. Aumento and M. Fratta, Dalhousie University; TM – G. Thompson, Woods Hole Oceanographic Institution (Chapter 53, this volume); CML – R. Lambert, University of Alberta (Chapter 34, this volume); FWPU – M. Flow-

TABLE 3D – *Continued*

Zr	Hf	Nb	Ta	Pd	Ir	Pt	Au	Cd	Pb	Sb	F	P	Ga	Sn	Ag	Ge	Yb
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.0	0.14	-	-	-	-	-

er, Ruhr-Universitat Bochum (transition elements) and H. Puchelt, Universitat Karlsruhe (REE) (Chapters 51 and 37, respectively, this volume). The methods codes are as follows: TRACK – fission track; XRF – X-ray flourescence; AAS – atomic absorption; XRFAA – X-ray flourescence 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 flourescence and flame photometry; – - not detected.

Site 333 Hole Core 1 Cored Interval: 0.0-3.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	
					0					
PLEISTOCENE	N23 (F) / NN21				1	0.5	VOID			
						1.0			105	10YR 7/2 Pumice fragment 10YR 7/4
		F	A	G					130	
					2				22	2.5Y 7/2
										2.5Y 8/1
		F	A	G					132 143	Pumice frag. (1.4 x 1.0 cm)
		F N R	A A F	G G G	Core Catcher					2.5Y 8/1

LITHOLOGIC DESCRIPTION

Mostly soft to stiff, very pale brown to white nanno ooze. Faint 0.5-1.0 cm thick green layers below 2-103. Section 2 with slight purple spot mottling.

1. NANNO FORAM OOZE
   Smear slide 1-105

Forams	59%
Nannos	40%
Sponge Spicules	TR
Vol. Glass	TR

2. FORAM-RICH NANNO OOZE
   Avg. of smear slides 1-130, 2-22

Nannos	85%
Forams	14%
Sponge Spicules	TR
Rads	TR

3. FORAM-BEARING NANNO OOZE
   Avg. of smear slides 2-132, 2-143

Nannos	97%
Forams	2%
Sponge Spicules	TR
Vol. Glass	TR

X-ray (Bulk) 1-115
Amor 18.1, Calc 97.7, Arag 2.3

X-ray (2-20µm)

	1-115
Amor	N.D.
Quar	9.8
K-Fe	30.4
Plag	32.6
Mica	7.1
Augi	20.1
Cris	PRES

Explanatory Notes in Chapter 1

Site 333 Hole Core 2 Cored Interval: 145.5-155.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	
					0		VOID			Pumice 0.7 x 1.0 cm
LATE PLIOCENE	N21 / N20 (F)				1	0.5			75	2.5Y 8/1
						1.0				Pumice 0.7 x 1.0 cm; Pumice 1.0 x 1.0 cm
		F	A	G						
					2				54 75	2.5Y 8/1
		F	A	G			REMOVED			Pumice 0.5 cm; Pumice 2.0 cm
	NN16				3				75	2.5Y 8/1
		F	A	G			VOID			
					4					2.5Y 8/1
		F	A	G			VOID		90 109	
									25	2.5Y 8/1
		F	A	G	5		VOID		61	5G 7/1 layer
					6				27	2.5Y 8/1
		F	A	G					75	
	NN15?	F N R	A A C	G G G	Core Catcher					2.5Y 8/1

LITHOLOGIC DESCRIPTION

Chiefly stiff white (2.5Y 8/1) nanno ooze. Slight to moderate purple spot mottling throughout. Green (2.5Y 7/2) patches in Sections 1 and 2. Light brown gray (2.5Y 6/2) patches at 4-78, 4-142 and in Section 6. Black patch at 2-54 pyrite rich. Green layers in Sections 4-6.

FORAM BEARING NANNO OOZE
Avg. of smear slides 1-75, 2-75, 3-75, 4-90, 4-109, 5-25, 5-61, 6-27, 6-75

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

Grain Size

	1-80	2-80	3-90	4-80	6-80
sand	5.3	4.4	5.7	18.0	7.4
silt	23.6	20.2	19.3	31.5	25.5
clay	71.0	75.4	75.1	50.5	67.1

Carbon-Carbonate 3-72
11.4, 0.0, 95

X-ray (Bulk) 1-83
Amor 12.1, Calc 100.0

X-ray (2-20µm)

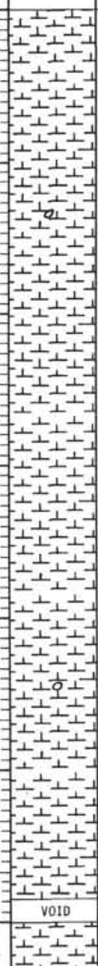
	1-83	2-83	3-93	4-83	6-83
Amor	N.D.	N.D.	N.D.	63.0	N.D.
Quar	7.7	7.5	7.0	18.7	8.1
K-Fe	22.0	44.9	14.1	14.0	27.1
Plag	25.0	28.3	27.0	11.9	20.3
Kaol	0.9	-	-	1.2	0.8
Mica	12.5	9.8	21.5	7.9	16.9
Chlo	0.5	-	-	1.8	0.5
Mont	27.0	-	23.4	26.3	22.5
Pyri	-	3.2	-	16.6	2.8
Augi	4.4	6.3	7.1	1.5	1.0
Cris	PRES	PRES	PRES	PRES	PRES

Explanatory Notes in Chapter 1

Site 333 Hole Core 3 Cored Interval:164.5-174.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHO. SAMPLE	
LATE PLIOCENE	NN15? / N20 (F)				0			
					1	0.5, 1.0	75	2.5Y 8/1
		F	A	G	2		62, 75	2.5Y 8/1
		F	A	G	3		75, 97, 102	2.5Y 8/1; 5G 7/1 layers; 2.5Y 8/1
		F	A	G	4		75	2.5Y 8/1
		F	A	G	5		75, 114	2.5Y 8/1; 5G 7/1 layers; 2.5Y 8/1; 5G 7/1 layers; 2.5Y 8/1; 5G 7/1 layers; 2.5Y 8/1
		F	A	G	6		75	2.5Y 8/1; 5G 7/1 layers; 2.5Y 8/1
		F / N / R	A / A / F	G / G / G	Core Catcher			2.5Y 8/1

LITHOLOGY



DEFORMATION

LITHOLOGIC DESCRIPTION

Stiff chiefly white (2.5Y 8/1) ooze with occasional green layers 0.5-1.0 cm thick. Slightly mottled throughout with purple spots. Light brown gray (2.5Y 6/2) patches (burrows?) in Sections 3-6. Greenish gray (2.5Y 7/2) patch at 2-96. Pyrite nodules at 2-48 and 5-68. Pyrite rich at 3-97.

FORAM-BEARING NANNO OOZE

Avg. of smear slides 1-75, 2-62, 2-75, 3-75, 3-102, 4-75, 5-75, 5-114, 6-75

Nannos	96%
Forams	2%
Sponge Spicules	1%
Rads	TR
Diatoms	TR
Vol. Glass	TR

Grain Size

	1-80	3-80	5-80
sand	6.6	6.9	5.5
silt	21.0	28.7	29.3
clay	72.5	64.4	65.2

Carbon-Carbonate 3-72
11.1, 0.1, 92

X-ray (Bulk) 1-83
Amor 10.3, calc 100.0

X-ray (2-20μm)

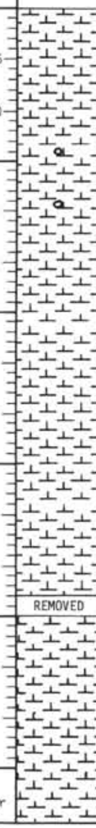
	1-83	2-83	3-83	4-66	5-83
Amor	N.D.	78.9	74.3	N.D.	80.5
Quar	8.3	11.1	20.0	6.3	8.3
K-Fe	25.7	9.2	14.2	17.2	9.7
Plag	31.2	23.3	13.7	21.6	26.4
Kaol	-	-	2.6	1.5	1.1
Mica	22.9	13.0	10.1	18.3	9.3
Chlo	-	1.5	1.2	0.5	1.2
Mont	-	29.7	34.5	23.4	27.2
Anal	-	-	-	1.1	0.8
Pyri	1.8	1.0	0.5	1.8	1.3
Amph	-	-	-	1.5	-
Augi	10.1	11.2	3.2	6.9	14.7
Cris	PRES	PRES	PRES	PRES	TR

Explanatory Notes in Chapter 1

Site 333 Hole Core 4 Cored Interval:183.5-193.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHO. SAMPLE	
LATE PLIOCENE	NN15 / N20 (F)				0			
		F	A	G	1	0.5, 1.0	63, 75	2.5Y 8/1
		F	A	G	2		75	2.5Y 8/1; 2.5Y 7/2 layers; 2.5Y 8/1
		F	A	G	3		75	2.5Y 8/1
		F	A	G	4		75	2.5Y 8/1; 5G 7/1 layer
		F	A	G	5		75	2.5Y 8/1
		F / N / R	A / A / R	G / G / G	Core Catcher			2.5Y 8/1

LITHOLOGY



DEFORMATION

LITHOLOGIC DESCRIPTION

Stiff chiefly white (2.5Y 8/1) ooze with occasional green layers 0.5-1.0 cm thick. Slightly mottled throughout with purple spots. Purple patch at 1-63. Pyrite nodules at 1-143 and 2-45. Occasional light brown gray (2.5Y 6/2) patches may be filled burrows.

FORAM-BEARING NANNO OOZE

Avg. of smear slides 1-75, 2-75, 3-75, 4-75, 5-75

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

Grain Size

	1-80	3-80	5-80
sand	10.5	5.7	4.2
silt	38.2	50.3	31.7
clay	51.2	44.0	64.1

Carbon-Carbonate 3-72
11.5, 0.1, 95

X-ray (Bulk) 1-83
Amor 8.4, Calc 100.0

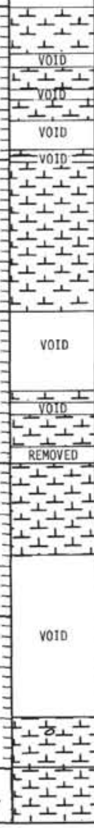
X-ray (2-20μm)

	1-83	2-83	3-83	4-83	5-83
Amor	N.D.	N.D.	N.D.	N.D.	N.D.
Quar	12.9	16.0	8.3	14.4	4.7
K-Fe	8.9	15.6	11.6	-	-
Plag	33.3	26.0	34.1	48.5	47.5
Kaol	-	-	-	2.7	-
Mica	23.4	12.0	37.4	14.3	11.1
Chlo	1.3	1.3	-	1.1	-
Phil	-	9.6	-	-	-
Pyri	2.2	0.4	1.5	-	1.6
Augi	18.1	18.9	7.1	19.0	35.2
Cris	TR	TR	TR	TR	-

Explanatory Notes in Chapter 1

Site 333 Hole Core 5 Cored Interval: 193.0-202.5 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	COLOR
					0					
LATE PLIOCENE	N20 (F)	F	A	G	1	0.5, 1.0	VOID, VOID, VOID, VOID		75	2.5Y 8/1; 2.5Y 8/1; 2.5Y 8/1; 2.5Y 8/1
?—?	?									
EARLY PLIOCENE	N19 (F), NN15	F	A	G	2				75	2.5Y 8/1
		F	A	G	3		VOID, VOID, REMOVED			2.5Y 8/1; 2.5Y 8/1
		F	A	G	4				70	2.5Y 8/1
		F	A	G	5		VOID		130	2.5Y 8/1
		F N R	A A F	G G G	Core Catcher					2.5Y 8/1



LITHOLOGIC DESCRIPTION

Watery to stiff chiefly white (2.5Y 8/1) ooze with occasional green layers 0.5-1.0 cm thick. Slight purple spot mottling throughout. Light green (2.5Y 7/2) patches in Section 1 may be burrows. Pyrite nodule at 5-106. Volcanic glass (up to 3 mm) in Sections 4 and 5. Glass especially common (~2%) in 54-80 cm zone in Section 4.

FORAM BEARING NANNO OOZE

Avg. of smear slides 1-75, 2-75, 4-70, 5-130

Nannos	97%
Forams	2%
Sponge Spicules	TR
Rads	TR
Vol. Glass	TR
Pyrite	TR

Grain Size

	2-80	4-80
sand	6.8	6.3
silt	28.3	34.3
clay	65.0	59.5

Carbon-Carbonate 2-72
10.5, 0.1, 87

X-ray (Bulk) 2-83
Amor 8.2, Calc 100.0

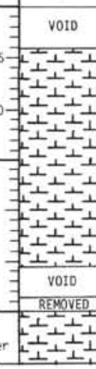
X-ray (2-20μm)

	2-83	4-83
Amor	N.D.	N.D.
Quar	5.5	5.1
K-Fe	8.5	-
Plag	20.0	50.0
Mica	61.7	11.0
Phil	-	5.5
Pyri	-	1.5
Augi	4.3	26.9
Cris	TR	TR

Explanatory Notes in Chapter 1

Site 333 Hole Core 6 Cored Interval: 202.5-212.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	COLOR
					0					
EARLY PLIOCENE	N19 (F), NN15	F	A	G	1	0.5, 1.0	VOID		122	2.5Y 8/1
		F	A	G	2		VOID, REMOVED		60	2.5Y 8/1
		F N R	A A -	G G -	Core Catcher					2.5Y 8/1



LITHOLOGIC DESCRIPTION

Stiff chiefly white (2.5Y 8/1) nanno ooze with slight purple spot mottling. Green (5G 7/1) patches at 1-72 and 1-117 and from 69-87 in Section 2. Black volcanic glass specks (up to 3 mm) above 1-102 make up 2% of sediment.

FORAM-BEARING NANNO OOZE

Avg. of smear slides 1-122, 2-60

Nannos	97%
Forams	2%
Sponge spicules	TR
Vol. Glass	TR
Pyrite	TR

Grain Size

	1-80	2-80
sand	6.0	3.9
silt	31.5	32.7
clay	62.5	63.4

Carbon-Carbonate 1-72
11.5, 0.1, 95

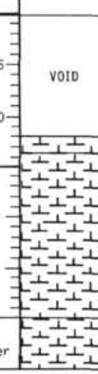
X-ray (Bulk) 1-83
Amor 6.9, Calc 100.0

X-ray (2-20μm)

	1-83	2-83
Amor	N.D.	N.D.
Quar	8.0	5.0
Plag	46.7	31.9
Mica	15.6	16.2
Mont	-	25.2
Phil	-	14.4
Pyri	-	1.3
Augi	29.7	6.0
Cris	PRES	-

Site 333 Hole Core 7 Cored Interval: 212.0-221.5 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	COLOR
					0					
EARLY PLIOCENE	N19 (F), NN15	F	A	G	1	0.5, 1.0	VOID		140	2.5Y 8/1; 10YR 8/1
		F	A	G	2				75	10YR 8/1 to 10YR 8/2
		F N R	A A -	G G -	Core Catcher					10YR 8/2



LITHOLOGIC DESCRIPTION

Watery to very stiff white (2.5Y 8/1 to 10YR 8/2) ooze with very slight purple spot mottling. Watery above contact at 1-133. Black specks of volcanic glass (up to 3 mm in size) in Section 1, 123-133, and Section 2, 51-64.

FORAM BEARING NANNO OOZE

Avg. of smear slides 1-140, 2-75

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

Grain Size

	2-1
sand	7.6
silt	33.1
clay	59.3

Carbon-Carbonate 2-72
11.1, 0.1, 92

X-ray (Bulk) 2-83
Amor 9.5, Calc 100.0

X-ray (2-20μm)

	2-83
Amor	49.1
Quar	3.0
Plag	17.8
Mica	3.4
Mont	19.2
Phil	35.7
Augi	20.9

Explanatory Notes in Chapter 1

Site 333 Hole Core 8 Cored Interval: 221.5-226.5 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	LITHOLOGIC DESCRIPTION
								0							Original recovery was 0.03 m; styrofoam spacers make the amount of basalt shown here greater than the amount recovered. SPARSELY PHYRIC BASALT

(CHEMICAL CHARACTER: Al_2O_3, Fe_2O_3, MgO, K_2O, H_2O+, CO_2)

Site 333 Hole Core 9 Cored Interval: 226.5-231.0 m

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION
					0					Recovery was 0.00 percent.

(FOSSIL CHARACTER: FOSSIL, ABUND., PRES.)

Site 333 Hole A Core 1 Cored Interval: 217.0-225.0 m Sheet 1 of 2, sediment recovery.

AGE	ZONE	FOSSIL	ABUND.	PRES.	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE		LITHOLOGIC DESCRIPTION
					0						Stiff chiefly white (2.5Y 8/1) ooze with moderate purple spot mottling. Approx. 15 light green layers in Section 1. Two thicker (2 cm) green layers in Section 2. Some light brown gray (2.5Y 6/2) patch mottling.
EARLY PLIOCENE	N19 (F) NN15	F N R	A A C	G G G	1	0.5 1.0	VOID		80 146 27 40	2.5Y 8/1 2.5Y 8/1	FORAM BEARING NANNO OOZE Avg. of smear slides 1-80, 1-146, 2-27, 2-40 Nannos 95% Forams 4% Sponge spicules TR Diatoms TR Vol. Glass TR Pyrite TR

(FOSSIL CHARACTER: FOSSIL, ABUND., PRES.)

Grain Size

	1-80
sand	7.2
silt	32.8
clay	60.0

Carbon-Carbonate 1-72
11.3, 0.1, 93

X-ray (Bulk) 1-83
Amor 6.4, Calc 100.0

Explanatory Notes in Chapter 1

Site 333 Hole A Core 1 Cored Interval: 217.0-225.0 m Sheet 2 of 2, hard rock recovery.

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	LITHOLOGIC DESCRIPTION
								0							Sediment - see Sheet 1
								1	0.5 1.0						Baked carbonate. Sparsely olivine-phyric basalt. Most phenocrysts ≤1 mm. Groundmass is rapidly quenched with skeletal plagioclase and fibrous pyroxene. Olivine in groundmass.
								2							Breccia: polymict with clasts of aph?ric and ol-plag phyric basalt as well as olivine phyric basalt. Carbonate with glass and palagonite clasts.
28.6 56.4	ShnSHN Shr SHR	14.8	9.5	10.0	0.10	1.08	0.13	3 Core Catcher			A B	2.849	5.40	7.0	Sparsely olivine-phyric.

(CHEMICAL CHARACTER: Al_2O_3, Fe_2O_3, MgO, K_2O, H_2O+, CO_2)

Site 333 Hole A Core 2 Cored Interval: 225.0-244.0 m

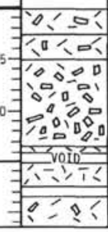
NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	METERS	LITHOLOGY	SAMPLES	D g/cc	V km/sec	POROSITY	LITHOLOGIC DESCRIPTION
								0							Original recovery was 1.10 m. Styrofoam spacers make the amount of basalt shown here greater than the amount recovered.
26.3	ShnSHN n SHN							1	0.5 1.0	VOID	B A	2.830	5.89	8.1	Breccia: carbonate and (glass)-palagonite. Sparsely olivine phyric basalt. Groundmass has abundant olivine and a quench texture (see Core 1).
26.3	ShrSHR										A				

(CHEMICAL CHARACTER: Al_2O_3, Fe_2O_3, MgO, K_2O, H_2O+, CO_2)

Explanatory Notes in Chapter 1

Site 333 Hole A Core 3 Cored Interval: 244.0-263.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	METERS	SAMPLES	D g/cc	V km/sec	POROSITY
								0					
57.4 40.8 24.3 15.6	Shn SHN — Shn SHN — Shn SHN — Shr SHR	17.0	9.51	7.8	.06	.60	.14	1	0.5, 1.0	TC, A, A, B, A	2.821	5.62	9.0



LITHOLOGIC DESCRIPTION

Original recovery was 1.30 m. Styrofoam spacers make the amount of basalt shown here less than the amount recovered.

Sparsely phyric (plagioclase>olivine>green augite).

Sparsely phyric (plagioclase). Olivine in groundmass.

Phyric (plagioclase>>olivine) basalt. Phenocryst content about 15%. Groundmass contains rare olivine and has a subophitic texture.

Aphyric basalt. Groundmass contains rare olivine and has a subophitic texture.

Plagioclase phyric basalt - see above.

Sparsely phyric (plagioclase) basalt.

Site 333 Hole A Core 4 Cored Interval: 263.0-282.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	METERS	SAMPLES	D g/cc	V km/sec	POROSITY
								0					

LITHOLOGIC DESCRIPTION

Original recovery was 0.14 m. Styrofoam spacers make the amount of basalt shown here greater than the amount recovered.

Sparsely to moderately phyric (plagioclase>>olivine).

Site 333 Hole A Core 5 Cored Interval: 282.0-320.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	METERS	SAMPLES	D g/cc	V km/sec	POROSITY
								0					
18.4 29.7	ShrSHR ShnSHR							1	0.5	A, B	2.809	5.84	9.2
11.3	nN								1.0	A			
16.6	ShnSHN									A			

LITHOLOGIC DESCRIPTION

Original recovery was 1.40 m. Styrofoam spacers make the amount of basalt shown here greater than the amount recovered.

Carbonate breccia: basalt clasts.

Sparsely olivine phyric basalt.

Sparsely phyric (plagioclase>green augite>olivine). Intergranular groundmass containing olivine.

Mixed sparsely phyric (plagioclase>olivine) basalt and breccia with clasts of similar lithology.

Phyric-10% (olivine>plagioclase>green augite).

Mixed sparsely phyric (plagioclase>olivine) basalt and breccia with clasts of similar lithology. Breccias have a white matrix (mainly carbonate) or a green matrix (smectite-chlorite).

Explanatory Notes in Chapter 1

Site 333 Hole A Core 6 Cored Interval: 320.0-358.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	METERS	SAMPLES	D g/cc	V km/sec	POROSITY
								0					
94.8	nN	14.8	11.32	8.1	0.18	1.09	0.17	1	0.5, 1.0	A			
41.8 31.0 31.4	Shr SHR Shr SHN nSHN	16.35	9.04	8.9	0.14	0.98	0.24	2		A, B, A	2.872	5.98	6.5

LITHOLOGIC DESCRIPTION

Original recovery was 1.80 m. Styrofoam spacers make the amount of basalt shown here greater than the amount recovered.

Sparsely phyric (plagioclase>>olivine). Intergranular to rapidly quenched groundmass with rare olivine.

Med. grained piece.

Aphyric basalt.

Breccia: carbonate-smectite matrix. Clasts of sparsely phyric (plagioclase>olivine) basalt.

Breccia: carbonate-smectite matrix. Clasts of green augite in addition to plagioclase.

Sparsely phyric (plagioclase>>olivine±green augite) basalt.

Breccia with red matrix. Tectonic?

Phyric (10%) basalt. Plagioclase>olivine≥green augite. Intergranular groundmass with olivine.

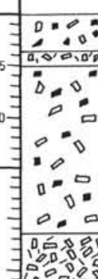
Sparsely plagioclase phyric.

Highly phyric (25%) basalt. Plagioclase≥green augite>olivine. Intergranular groundmass.

Phyric (8%) basalt. Plagioclase.

Site 333 Hole A Core 7 Cored Interval: 358.0-396.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	METERS	SAMPLES	D g/cc	V km/sec	POROSITY
								0					
3 .4	rR							1	0.5, 1.0	B	2.463	4.40	24.5
		15.35	11.29	7.2	0.23	0.79	0.23	2		TC			



LITHOLOGIC DESCRIPTION

Original recovery was 1.80 m. Styrofoam spacers make the amount of basalt shown here greater than the amount recovered.

Breccia: chlorite matrix. Clasts are plagioclase phyric basalt.

Phyric (10%) basalt. Plagioclase>>olivine≥green augite.

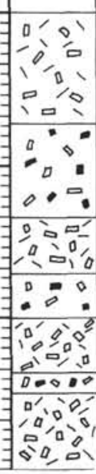
Breccia with clasts of moderately phyric basalt (plagioclase>olivine). Matrix was originally glass and palagonite, now largely to completely replaced by chlorite or smectite.

Phyric (10%) basalt (plagioclase>olivine) similar to clast in breccia above. Groundmass is rapidly quenched.

Explanatory Notes in Chapter 1

Site 333 Hole A Core 8 Cored Interval: 396.0-434.0 m Sheet 1 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						
28.6	nSHN							1	0.5, 1.0		TC, A			
		15.4	11.66	7.9	0.15	1.01	0.10	2			TC			
9.57, 31.6	ShrSHR, ShnSHN							3			A, A			



LITHOLOGIC DESCRIPTION

Original recovery was 5.82 m. Styrofoam spacers make the amount of basalt shown here greater than the amount recovered.

Mixed unit. Sparsely to moderately plagioclase phyric basalt. Rare olivine and green augite phenocrysts found in some pieces. Several pieces are highly vesicular. Olivine present in groundmass.

Breccia: matrix is glass-palagonite now mostly or completely replaced bychlorite(?)Clasts are sparsely to moderately phyric (plagioclase>> olivine) basalt.

Moderately (8%) plagioclase phyric basalt.

Augite and olivine in thin section.

Breccia: similar to above.

Moderately (9%) plagioclase phyric basalt.

Breccia: similar to above.

Contact seen in one piece (8-3 #9A)

Moderately (8-10%) phyric basalt (plagioclase ≥green augite>olivine). Intergranular groundmass containing olivine.

No augite or olivine.

Explanatory Notes in Chapter 1

Site 333 Hole A Core 8 Cored Interval: 396.0-434.0 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						
5.12, 2.91	rR, nN							1	0.5, 1.0	VOID	B			
6.53	nSHN	15.8	8.69	8.6	0.21	0.99	2.7	2			A			
10.3, 12.9	nN, nN							3		VOID	B	2.769	5.67	10.1
10.7	nN							4						

LITHOLOGIC DESCRIPTION

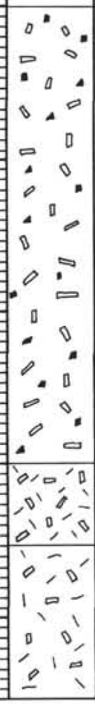
Breccia: matrix of relic glass-palagonite now mostly or completely replaced by chlorite(?). Clasts are sparsely plagioclase phyric basalt.

Moderately (10%) phyric basalt. Plagioclase ~green augite>olivine. Intergranular to subophitic groundmass containing olivine (mostly altered). Fine carbonate veins throughout section.

Breccia: matrix of fresh glass, palagonite, carbonate, and crustal fragments.

Explanatory Notes in Chapter 1

Site 333 **Hole** A **Core** 9 **Cored Interval:** 434.0-481.5 m



NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	LITHOLOGY	SAMPLES	D g/cc	V km/sec	POROSITY	LITHOLOGIC DESCRIPTION
6.06	Shn ShN	15.6	10.45	8.3	0.14	0.92	0.12	0, 1, 2, 3		B TC	2.493	4.26	22.0	Original recovery was 4.80 m. Styrofoam spacers make the amount of basalt shown here greater than the amount recovered. Breccia: matrix is relic glass-palagonite mostly *or completely replaced by chlorite(?)*. Clasts are sparsely to moderately plagioclase phyric basalt. Sulfide on fracture surfaces.
15.3	ShrSHN	17.2	7.75	8.4	0.05	1.01	0.42	4		A				Sparsely to moderately phyric basalt. Plagioclase >green augite. Rare olivine pseudomorphs seen in thin section. Subophitic groundmass contains olivine.
17.0	rR							4		A,B B	2.782 2.773	5.09 4.99	9.7 10.3	Sparsely phyric basalt. Plagioclase>>green augite. Groundmass is intergranular to subophitic and contains relic olivine.

Explanatory Notes in Chapter 1

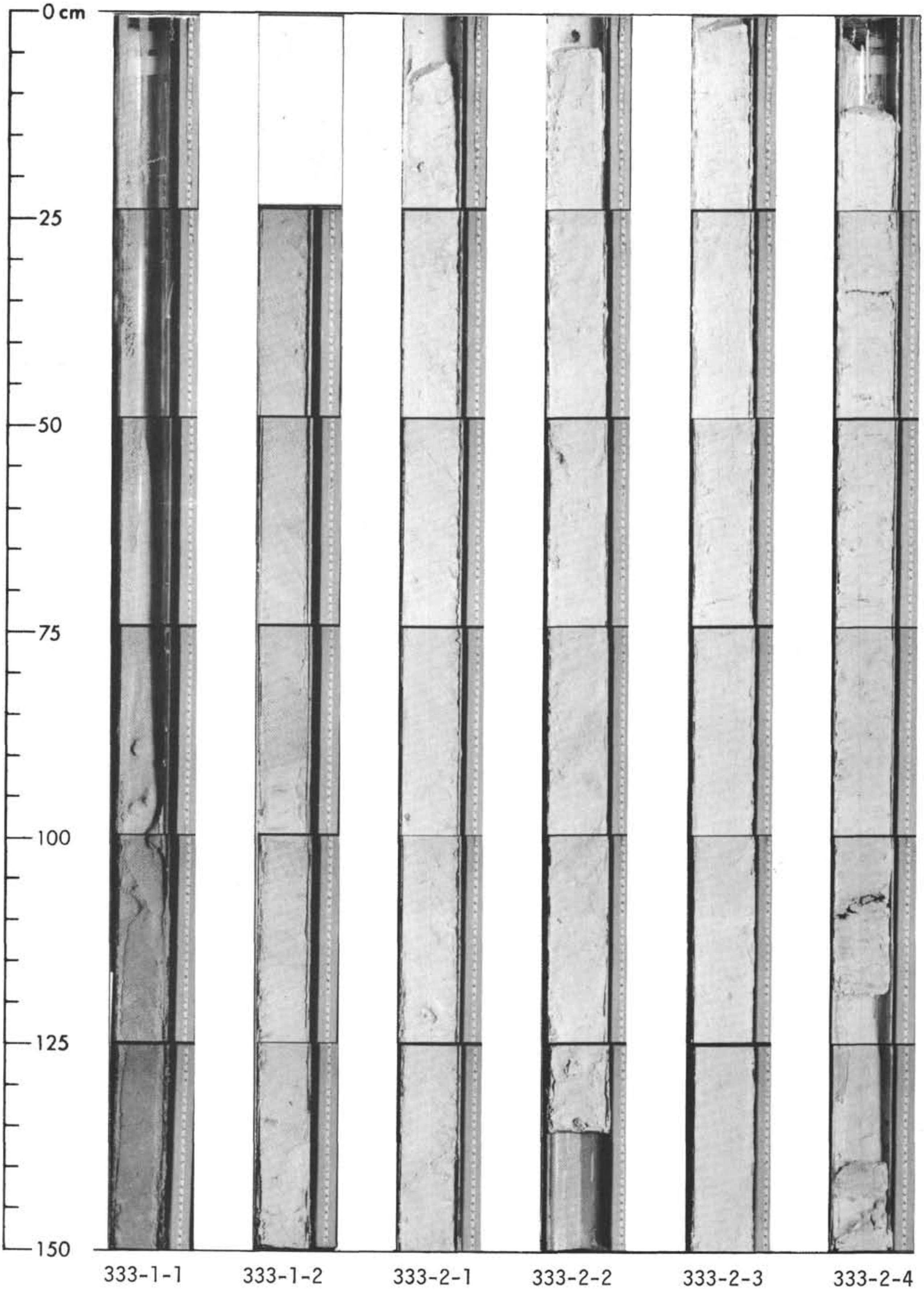
Site 333 **Hole** A **Core** 10 **Cored Interval:** 481.5-510.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	LITHOLOGY	SAMPLES	D g/cc	V km/sec	POROSITY	LITHOLOGIC DESCRIPTION
								0						Original recovery was 2.43 m. Styrofoam spacers make the amount of basalt shown here greater than the amount recovered.
9.69	rR	15.1	10.97	8.1	0.14	1.13	0.26	1		A				Aphyric basalt highly fractured with chlorite(?) + sulfide on fracture surfaces. Intergranular groundmass containing relic olivine.
47.0 58.0 64.8 85.6	ShrSHR ShrSHRShrSHN ShnSHN	4.35	9.95	7.9	0.20	1.06	0.14	1, 2, 3		A A B A	2.763	5.29	10.1	Moderately phyric basalt (10%) plagioclase> green augite>olivine. Groundmass is intergranular to subophitic and contains relic olivine. Olivine phenocrysts mostly replaced by serpentine-smectite. Sulfide is common in the groundmass and on fracture surfaces.

Site 333 **Hole** A **Core** 11 **Cored Interval:** 510.0-529.0 m

NRM INTENSITY	POLARITY	Al_2O_3	Fe_2O_3	MgO	K_2O	H_2O+	CO_2	SECTION	LITHOLOGY	SAMPLES	D g/cc	V km/sec	POROSITY	LITHOLOGIC DESCRIPTION
								0						Original recovery was 1.80 m. Styrofoam spacers make the amount of basalt shown here greater than the amount recovered.
								1						Breccia: matrix is glass-palagonite replaced by chlorite(?) Clasts=lithology below.
								1		TC				Sparsely phyric basalt. Plagioclase>green augite >olivine. Intersertal groundmass contains olivine (relic). Sulfides in groundmass and fractures.
93.4 119.4	ShrSHR ShnSHN	15.05	10.73	8.0	0.11	0.98	0.16	1, 2		A B	2.821		8.1	Moderately phyric basalt. Same lithology as above.

Explanatory Notes in Chapter 1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125
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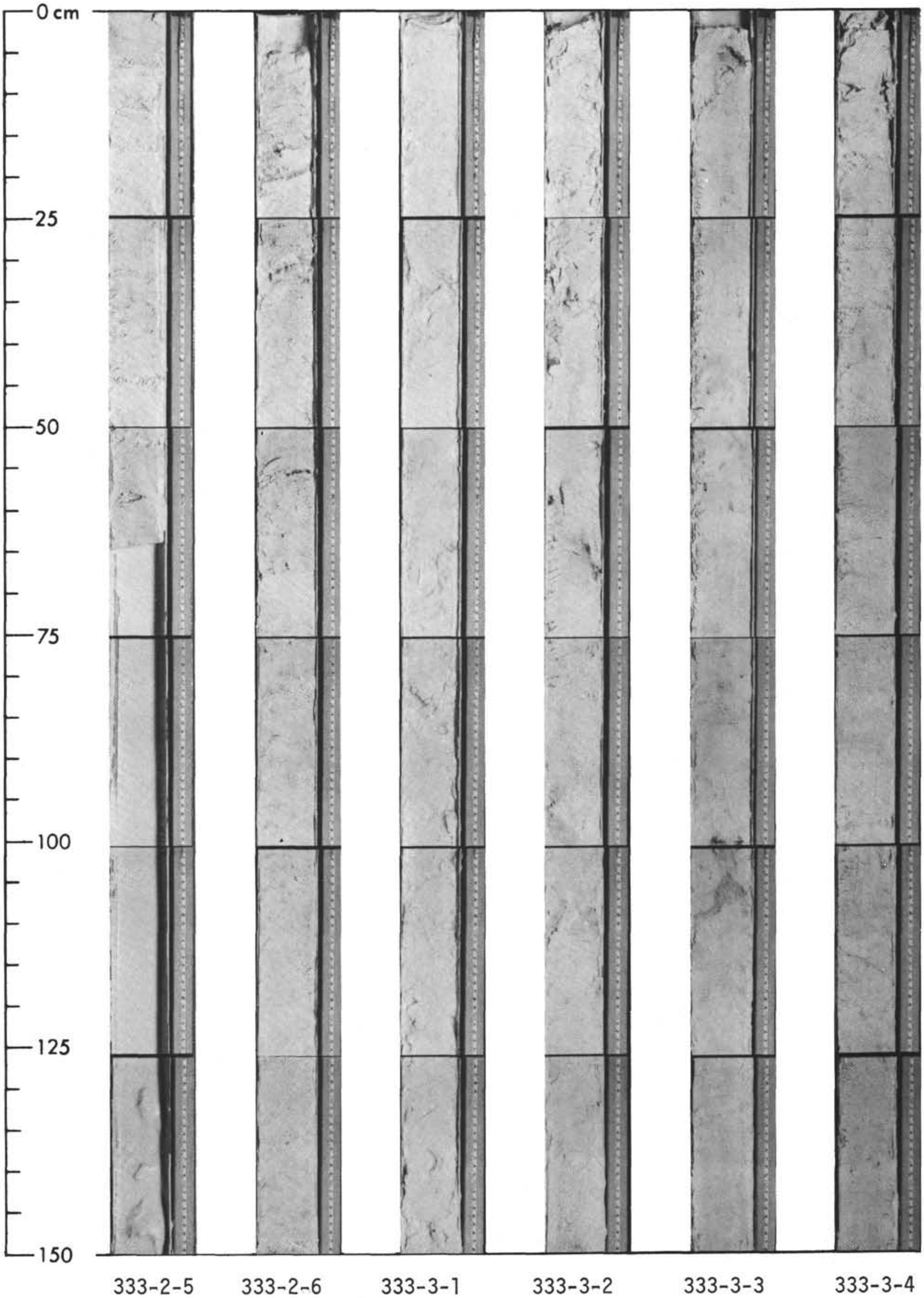
333-1-2
333-2-1
333-2-2
333-2-3
333-2-4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333-3-1
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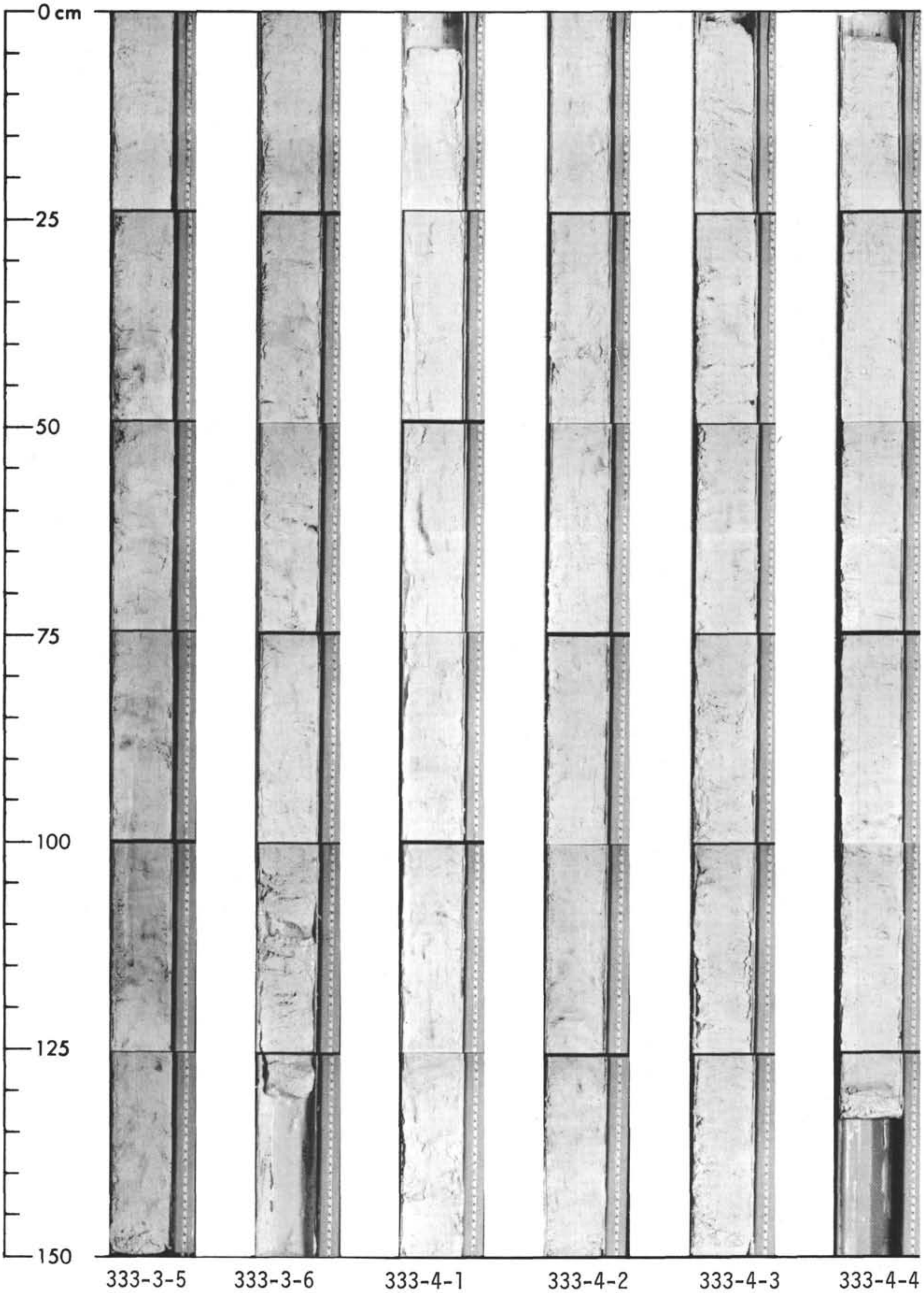
333-3-4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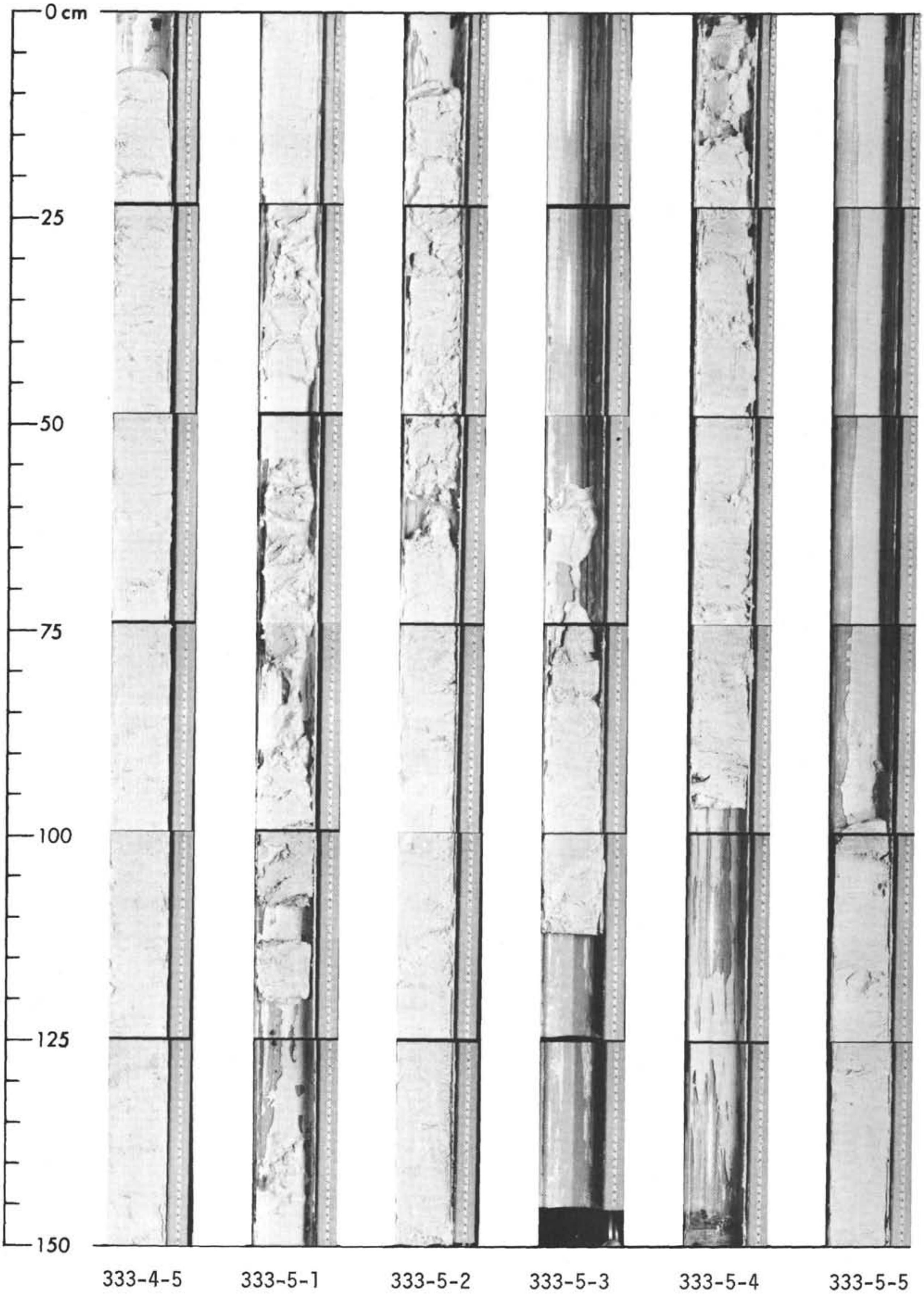
333-4-4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50
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100
125
150
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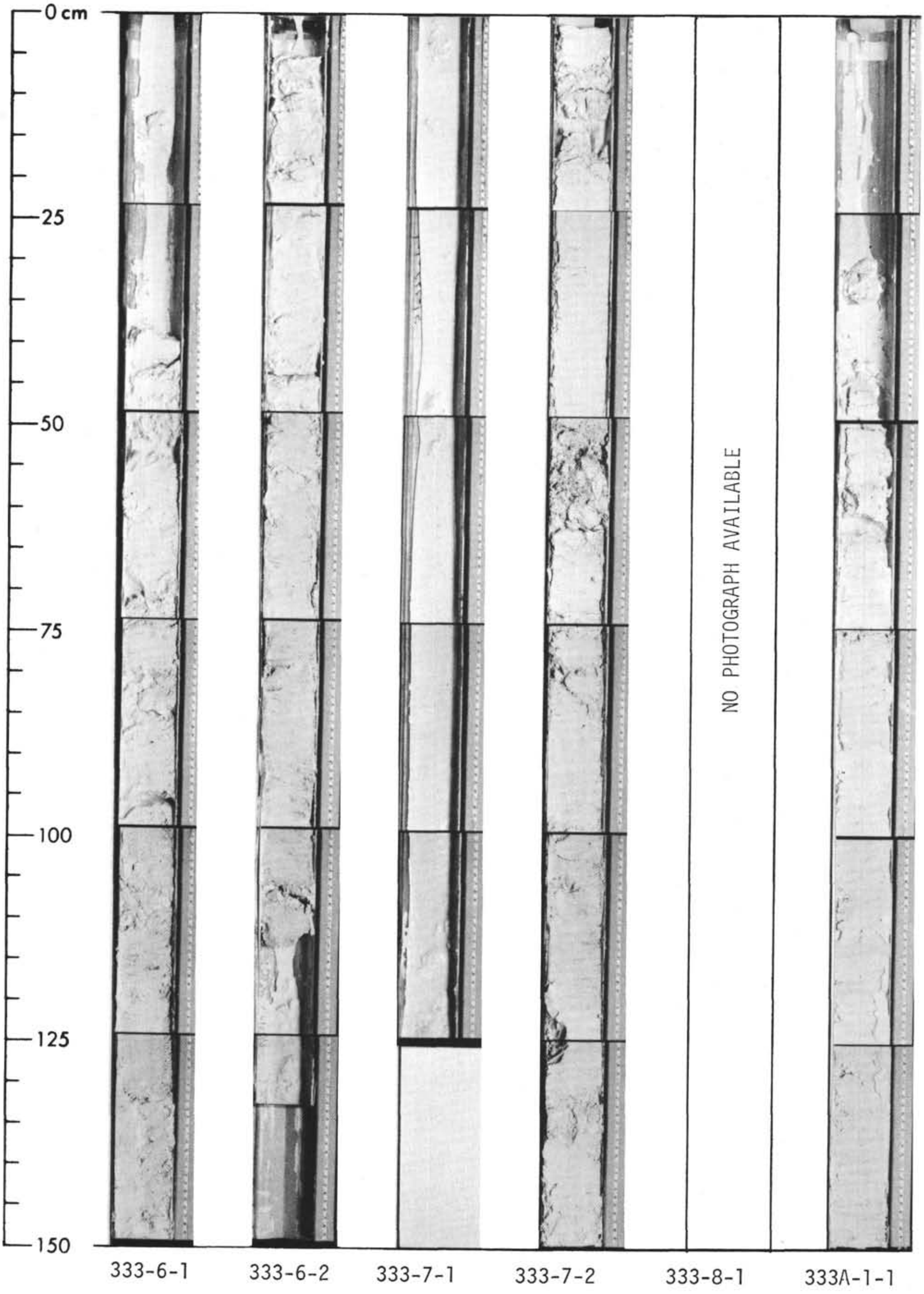
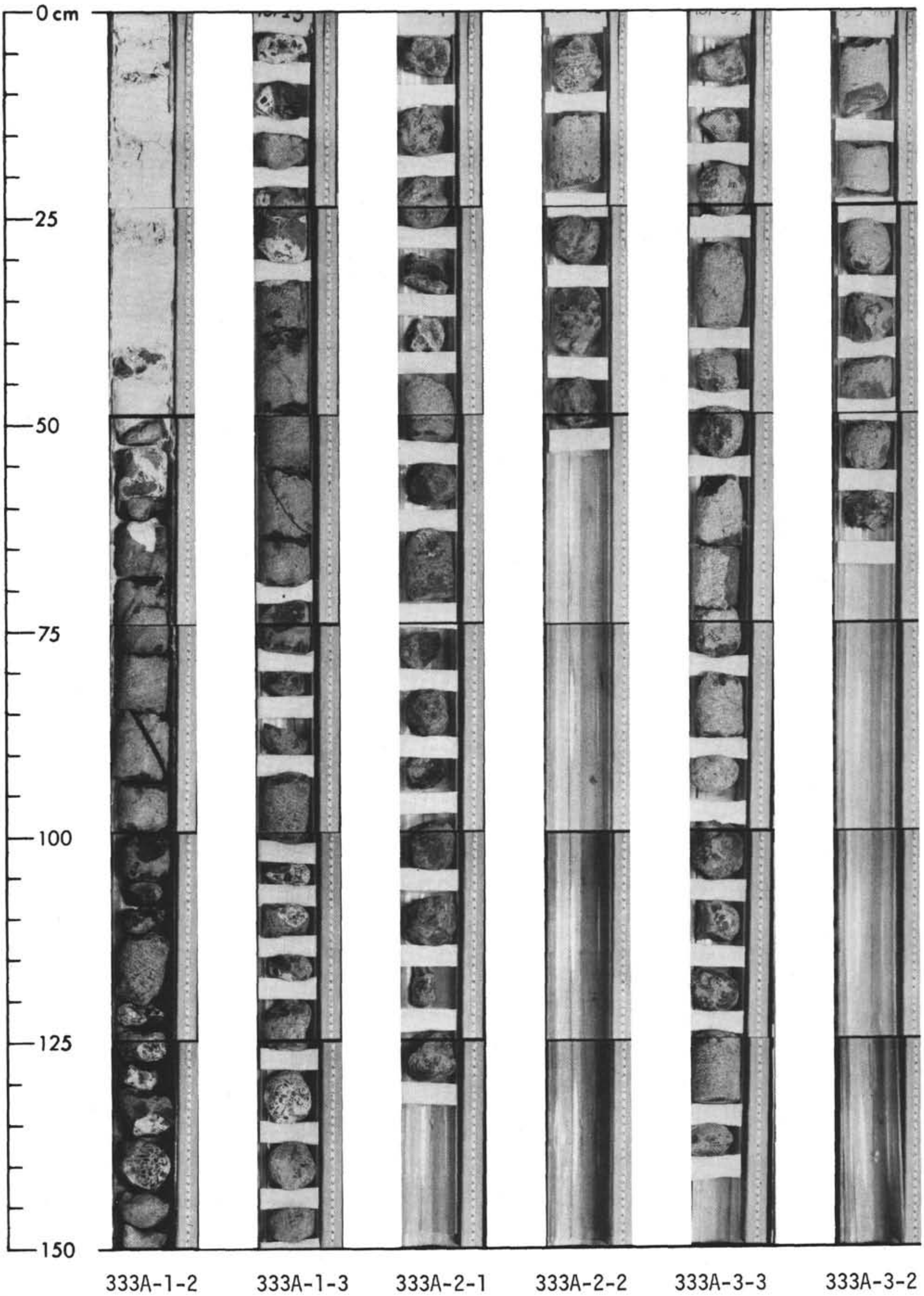
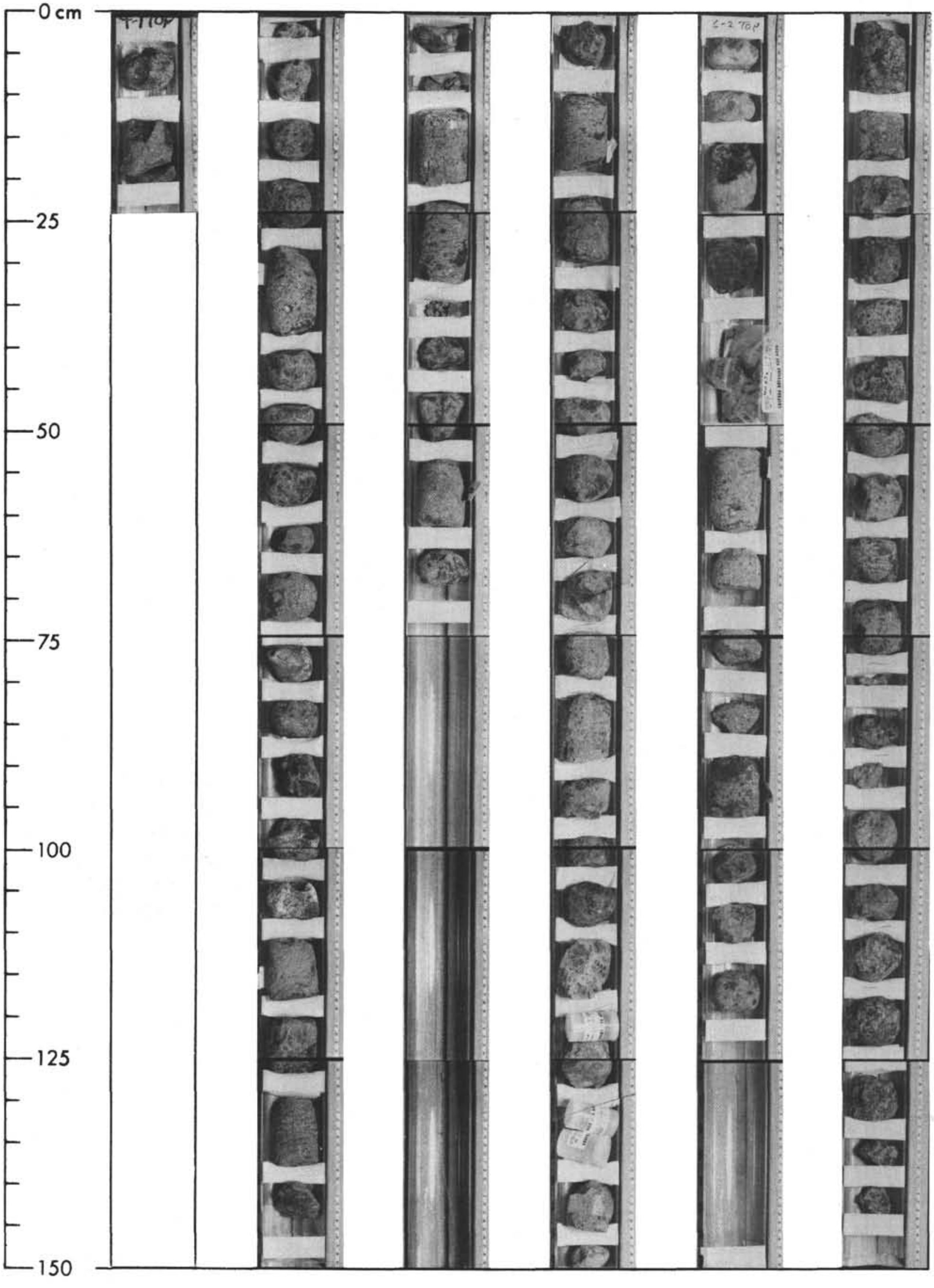
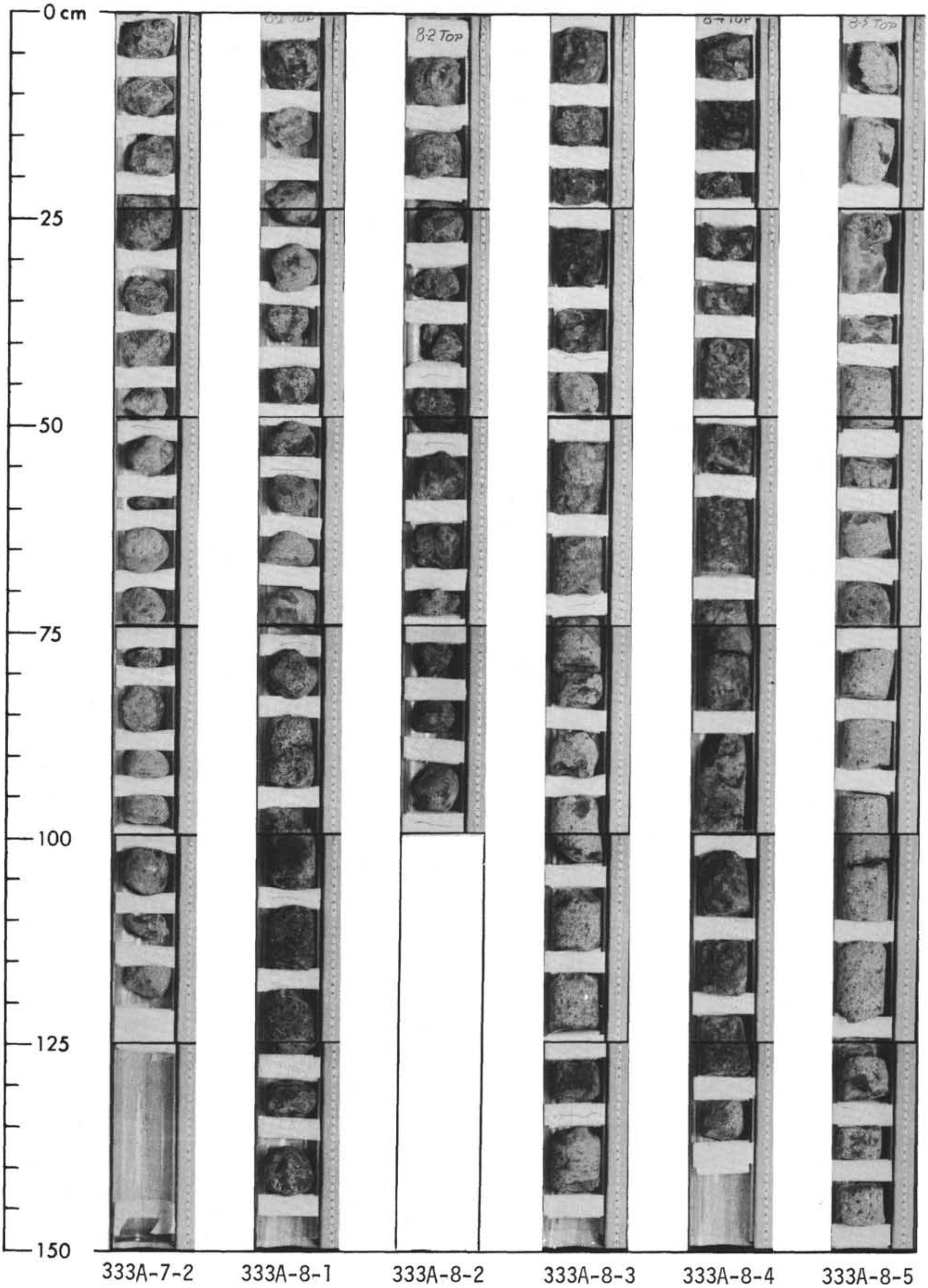
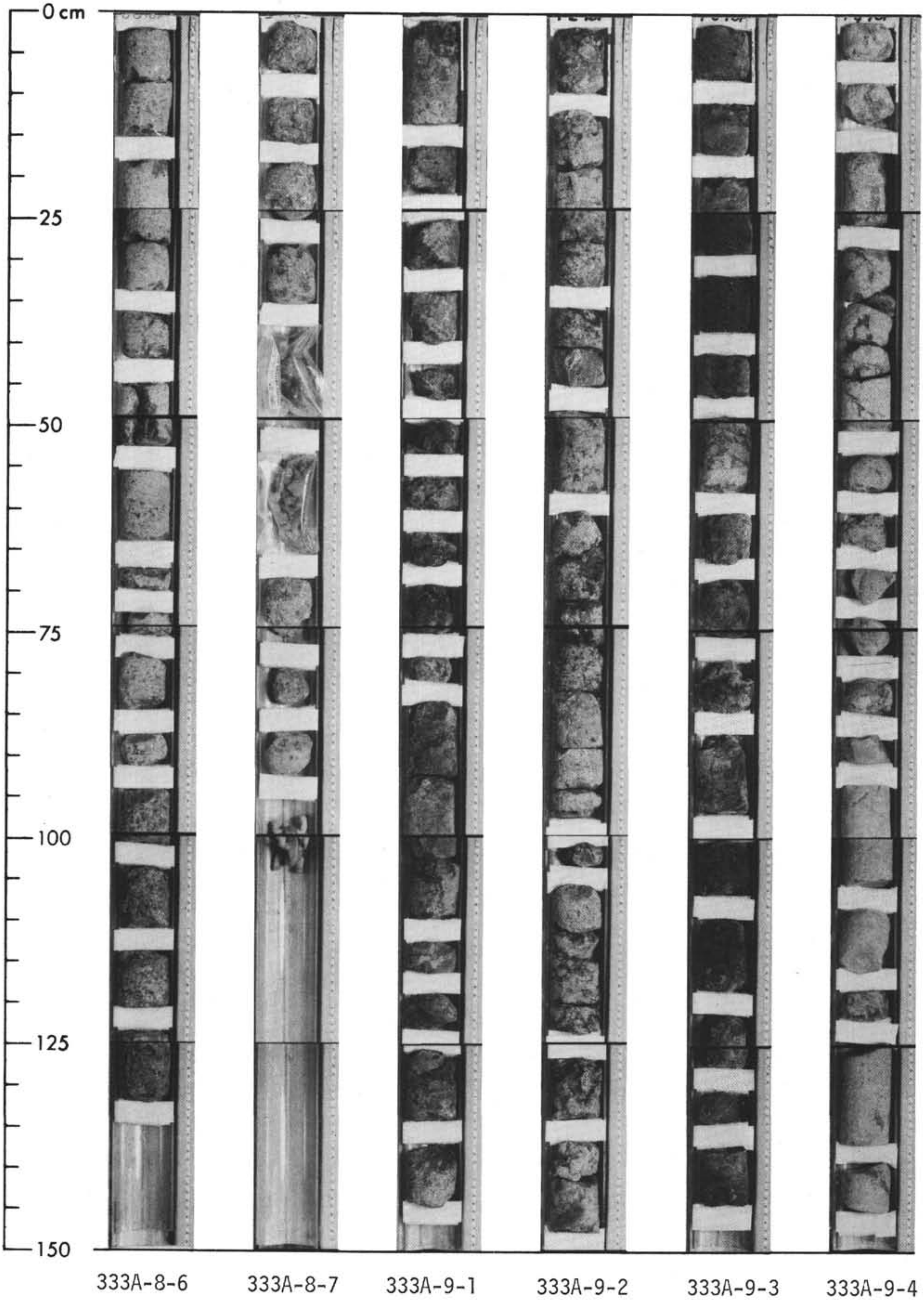
333-5-3
333-5-4
333-5-5

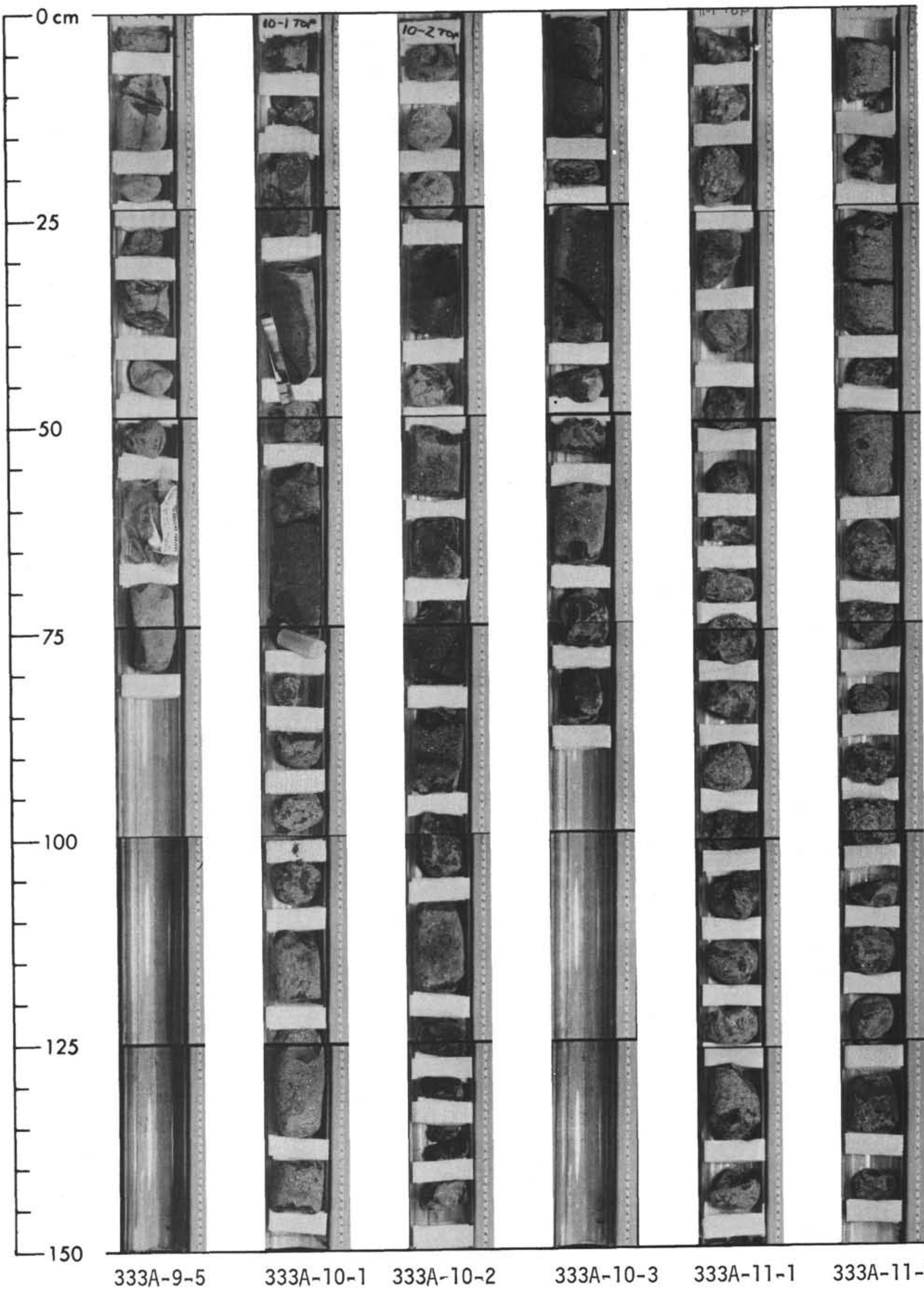

0 cm
25
50
75
100
125
150
NO PHOTOGRAPH AVAILABLE
333-6-1
333-6-2
333-7-1
333-7-2
333-8-1
333A-1-1


0 cm
25
50
75
100
125
150
333A-1-2
333A-1-3
333A-2-1
333A-2-2
333A-3-3
333A-3-2


0 cm
25
50
75
100
125
150
333A-4-1
333A-5-1
333A-5-2
333A-6-1
333A-6-2
333A-7-1


0 cm
25
50
75
100
125
150
8·2 Top
333A-7-2
333A-8-1
333A-8-2
333A-8-3
333A-8-4
333A-8-5


0 cm
25
50
75
100
125
150
333A-8-6
333A-8-7
333A-9-1
333A-9-2
333A-9-3
333A-9-4



333A-9-5 333A-10-1 333A-10-2 333A-10-3 333A-11-1 333A-11-2