SITE 770 HOLE A CORE 1R CORED INTERVAL 0-1.40 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	B●	R/M●	F/M●	R/P●	W/C=85 Φ=69.3 (γ=2.54 P=1.35)	W/C=130 Φ=78.1 γ=2.54 P=1.42	W/C=114 Φ=76.3 (γ=2.52 P=1.47)	1 CC	0.5 1.0				* *

LITHOLOGIC DESCRIPTION

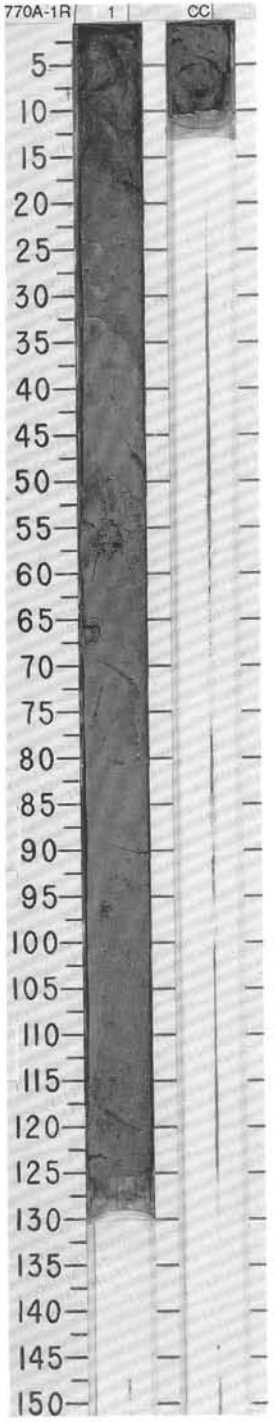
VOLCANIC SILTY CLAY with volcanic ash

Major lithology: VOLCANIC SILTY CLAY occurs throughout the whole core. In the upper 30 cm of Section 1 it is olive brown (2.5Y 4/4) in color, below it is dark greenish gray (10Y 4/2). The silty clay consists of clay, volcanic glass, feldspar, accessory minerals, radiolarians, and spicules.

Minor lithology: Crystal-vitric ash layers occur in the upper 52 cm of Section 1. They are very dark gray (10YR 3/1) in color. They consist of glass, feldspar, hornblende, rock fragments, and biotite. Drilling disturbance is severe in this core and no sedimentary structures can be seen.

SMEAR SLIDE SUMMARY (%):

	1, 27 D	1, 90 D
TEXTURE:		
Sand	10	10
Silt	40	30
Clay	50	60
COMPOSITION:		
Accessory minerals	—	5
Biotite	1	—
Carbonate particles	—	Tr
Clay	45	50
Dinoflagellate	—	Tr
Feldspar	15	5
Glass	15	20
Hornblende	1	5
Opaques	2	Tr
Plant	Tr	—
Radiolarians	5	5
Rock fragment	5	—
Spicules	10	10



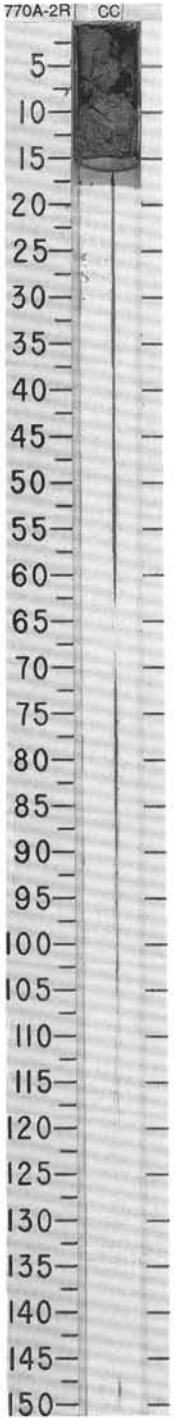
SITE 770 HOLE A CORE 2R CORED INTERVAL 1.4-10.9 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	BIOSTRAT. ZONE/ FOSSIL CHARACTER: NANNOFOSSILS	BIOSTRAT. ZONE/ FOSSIL CHARACTER: RADIOLARIANS	BIOSTRAT. ZONE/ FOSSIL CHARACTER: DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
	B●		B●	B●				CC	-		O		*	VOLCANIC SILTY CLAY

Major lithology: The 15 cm recovered in the core catcher consist of VOLCANIC SILTY CLAY. It is dark greenish gray (10Y 4/2) and olive brown (2.5Y 4/4) in color. It consists of clay, glass, feldspar, hornblende, spicules and radiolarians. Drilling disturbance is very severe.

SMEAR SLIDE SUMMARY (%):

	CC, 5 D
TEXTURE:	
Sand	5
Silt	45
Clay	50
COMPOSITION:	
Biotite	1
Clay	45
Diatoms	1
Feldspar	10
Glass	20
Hornblende	5
Opaques	1
Radiolarians	2
Rock fragment	5
Spicules	10



SITE 770 HOLE B CORE 1R CORED INTERVAL 0-9.7 mbsf

TIME-ROCK UNIT: PLEISTOCENE

BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS: B; NANNOFOSSILS: R/M; RADIOLARIANS: F/M; DIATOMS: R/P

PALEOMAGNETICS

PHYS. PROPERTIES: WC=79.5 Y=2.43 P=1.43; WC=124 Y=2.56 P=1.46; WC=78.6 P=1.46; WC=77.1 Y=2.55 P=1.48; WC=115 Y=2.58 P=1.48; WC=77.1 P=1.48; WC=114 Y=2.58 P=1.48; WC=133 Y=2.68

CHEMISTRY

SECTION: 1, 2, 3, 4, 5, 6, 7

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY: VOID

DRILLING DISTURB.

SED. STRUCTURES

SAMPLES

LITHOLOGIC DESCRIPTION

VOLCANIC SILTY CLAY with volcanic ash

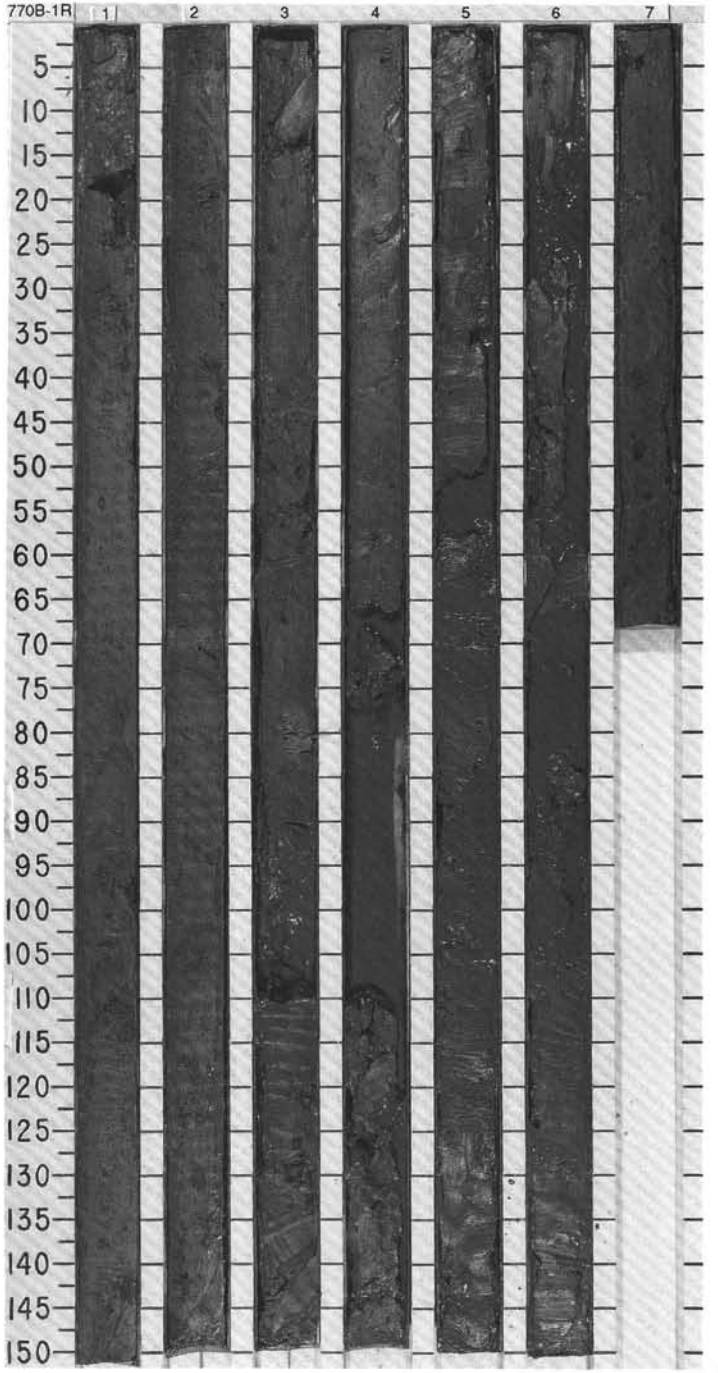
Major lithology: VOLCANIC SILTY CLAY is massive except for a few thin, greenish laminae. In the upper 30 cm of Section 1 it is olive grey (5Y 5/2) in color and becomes dark greenish gray (10Y 4/1) at Section 1, 75 cm. The silty clay consists of clay, volcanic glass, plagioclase, accessory minerals, radiolarians, and spicules. It is interpreted as hemipelagic in origin.

Minor lithology: Very thin to thin crystal-vitric ash beds occur in Section 1, 141-144 cm, and interbedded with silty clay between 77 and 150 cm in Section 3. They are grayish green (5G 4/2), greenish gray (5GY 5/1) and light greenish gray (10Y 6/1). They consist of glass, feldspar, amphiboles (including hornblende), and rock fragments.

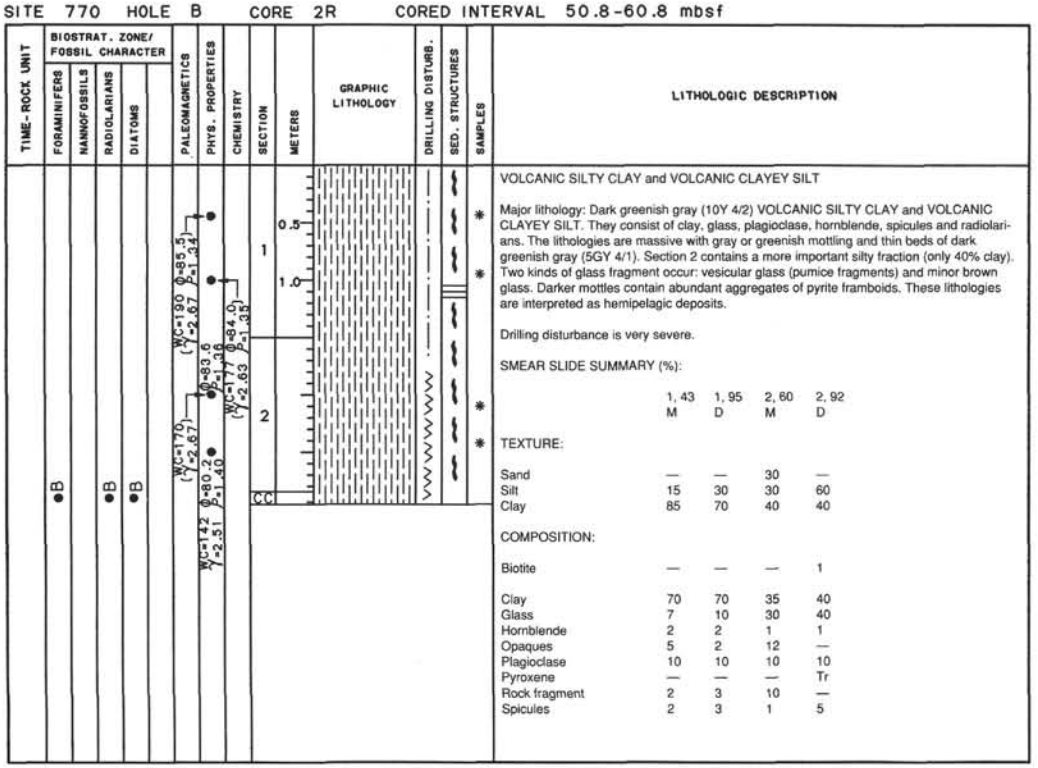
Drilling disturbance is severe in this core and the only sedimentary structures which can be seen are rare greenish layers and mottling due to bioturbation.

SMEAR SLIDE SUMMARY (%):

	1, 5 M	1, 110 D	2, 54 D	3, 80 M
TEXTURE:				
Sand	10	5	5	50
Silt	50	25	45	40
Clay	40	70	50	10
COMPOSITION:				
Amphibole	—	—	—	10
Biotite	—	1	—	—
Carbonate grains	—	5	—	—
Clay	30	40	50	10
Diatoms	2	1	—	—
Dinoflagellate	2	Tr	—	—
Foraminifers	—	3	—	—
Glass	15	15	35	23
Hornblende	10	7	5	15
Nannofossils	—	10	—	—
Opaques	3	—	1	5
Organic matter	—	3	—	Tr
Plagioclase	30	10	5	30
Radiolarians	—	—	—	1
Rock fragment	—	2	—	Tr
Spicules	7	3	1	—
Zircon	—	—	—	1



SITE 770 HOLE B CORE 2R CORED INTERVAL 50.8-60.8 mbsf



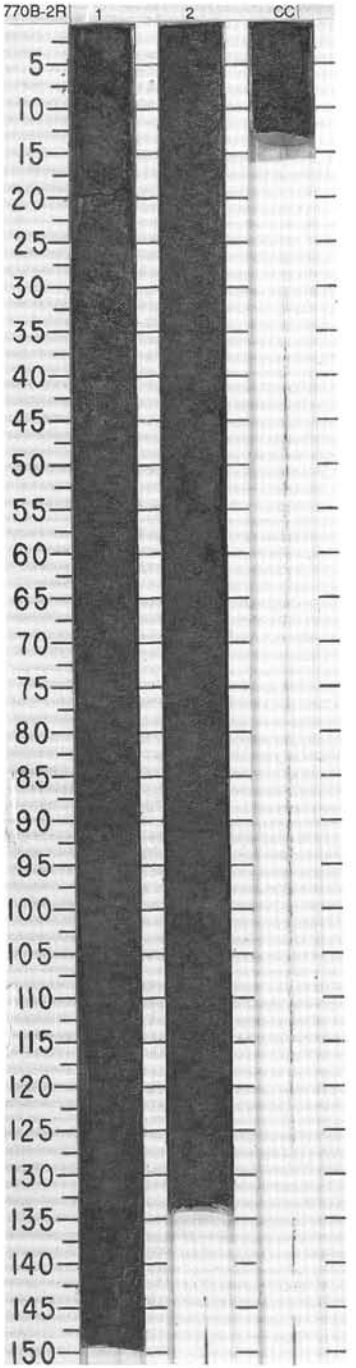
VOLCANIC SILTY CLAY and VOLCANIC CLAYEY SILT

Major lithology: Dark greenish gray (10Y 4/2) VOLCANIC SILTY CLAY and VOLCANIC CLAYEY SILT. They consist of clay, glass, plagioclase, hornblende, spicules and radiolarians. The lithologies are massive with gray or greenish mottling and thin beds of dark greenish gray (5GY 4/1). Section 2 contains a more important silty fraction (only 40% clay). Two kinds of glass fragment occur: vesicular glass (pumice fragments) and minor brown glass. Darker mottles contain abundant aggregates of pyrite framboids. These lithologies are interpreted as hemipelagic deposits.

Drilling disturbance is very severe.

SMEAR SLIDE SUMMARY (%):

	1, 43 M	1, 95 D	2, 60 M	2, 92 D
TEXTURE:				
Sand	—	—	30	—
Silt	15	30	30	60
Clay	85	70	40	40
COMPOSITION:				
Biotite	—	—	—	1
Clay	70	70	35	40
Glass	7	10	30	40
Hornblende	2	2	1	1
Opaques	5	2	12	—
Plagioclase	10	10	10	10
Pyroxene	—	—	—	Tr
Rock fragment	2	3	10	—
Spicules	2	3	1	5



SITE 770 HOLE B CORE 3R CORED INTERVAL 99.6-109.1 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
	B	B	B	B		WC-124 @ 0-78.5 WC-135 @ 0-1.41		1	0.5				*
						WC-124 @ 2-79.5 WC-135 @ 2-79.1		1	1.0				
								2					IW
								3					
								CC					

LITHOLOGIC DESCRIPTION

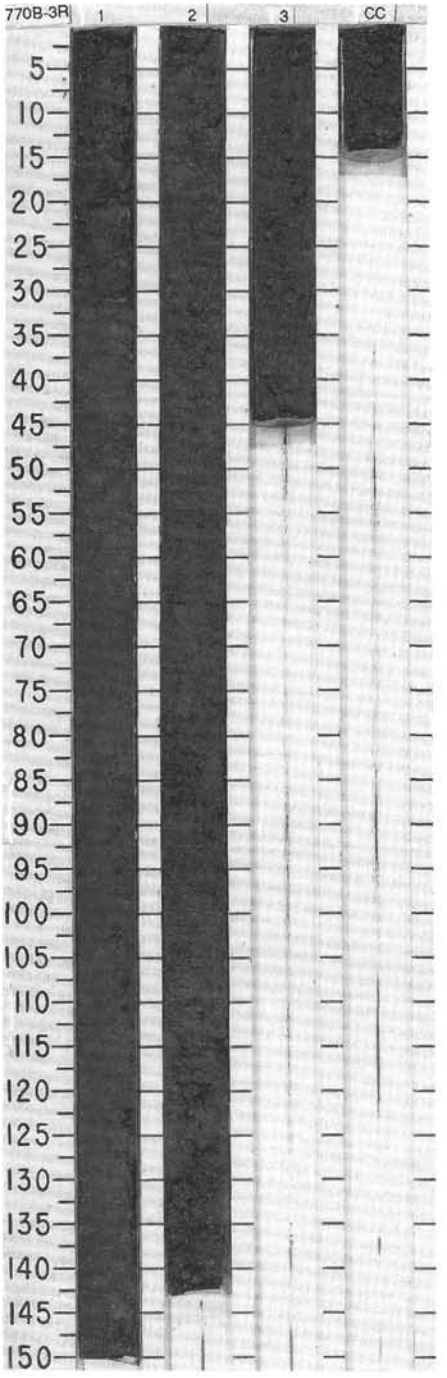
VOLCANIC SILTY CLAY

Major lithology: Dark greenish gray (10Y 4/1) VOLCANIC SILTY CLAY. It is massive, mottled and moderately bioturbated. No discrete ash layers occur, but the silty material is predominantly glass, with plagioclase, hornblende, and opaque minerals. Plantmaterial, sponge spicules and radiolarians occur. The volcanic silty clay is considered to be hemipelagic in origin.

Drilling disturbance is severe.

SMEAR SLIDE SUMMARY (%):

	1, 100 D
TEXTURE:	
Sand	10
Silt	40
Clay	50
COMPOSITION:	
Apatite	Tr
Clay	37
Glass	40
Hornblende	4
Opaques	5
Plagioclase	5
Plant	5
Radiolarians	Tr
Rock fragment	1
Spicules	1



SITE 770 HOLE B CORE 4R CORED INTERVAL 147.6-157.3 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
UPPER PLIOCENE	●C/M N19/20-N21	NN15	●R/P	●B		WC-88 ●@70.5 γ-2.54 ρ-1.54 WC-112 ●@75.9 γ-2.58 ρ-1.47 WC-106 ●@74.9 γ-2.61 ρ-1.49 WC-105 ●@76.4 γ-2.75 ρ-1.52 WC-99 ●@75.0 γ-2.69 ρ-1.55		1 2 3 4 5 CC	0.5 1.0				* * * * OG IW *

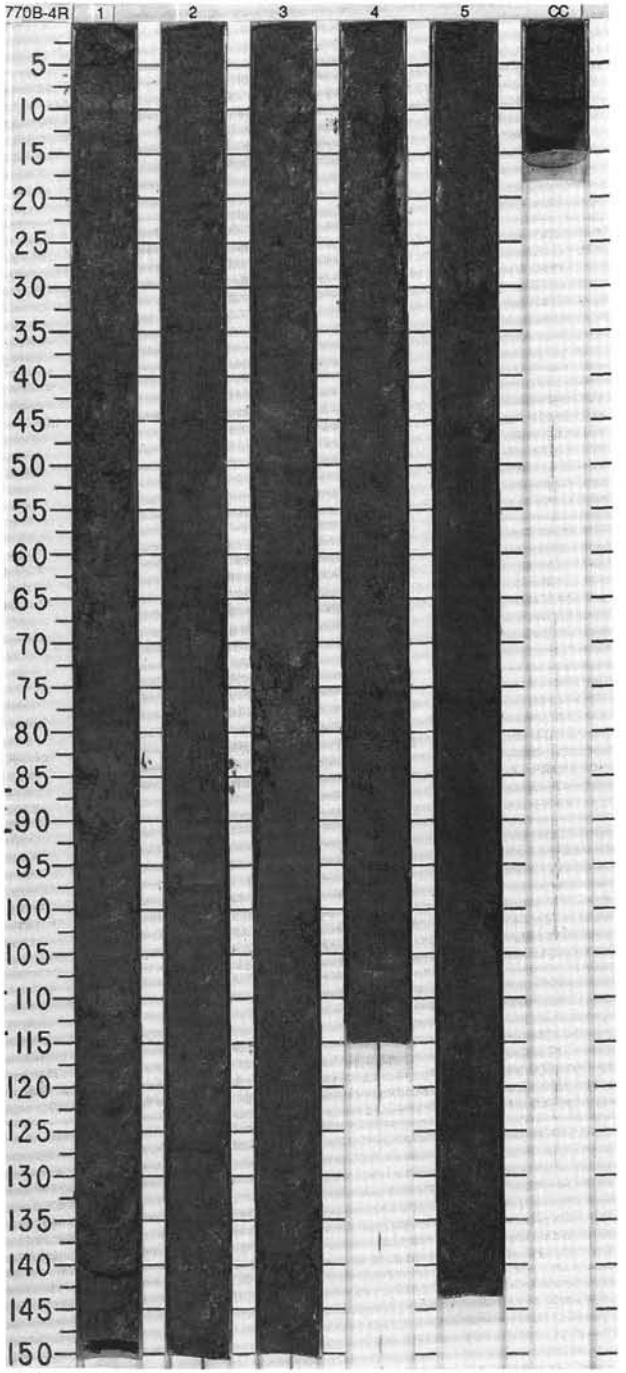
CLAY and marl

Major lithology: Dark greenish gray (10Y 4/1) CLAY. It is massive, slightly to moderately bioturbated and slightly mottled. Silt of feldspar, glass, hornblende, and opaques occurs as a minor component throughout and concentrated in very thin discrete but diffuse, layers in the clay. These very thin beds are grayish green (5G 4/2) and are interpreted as altered ash layers. The clay is interpreted as a hemipelagic deposit.

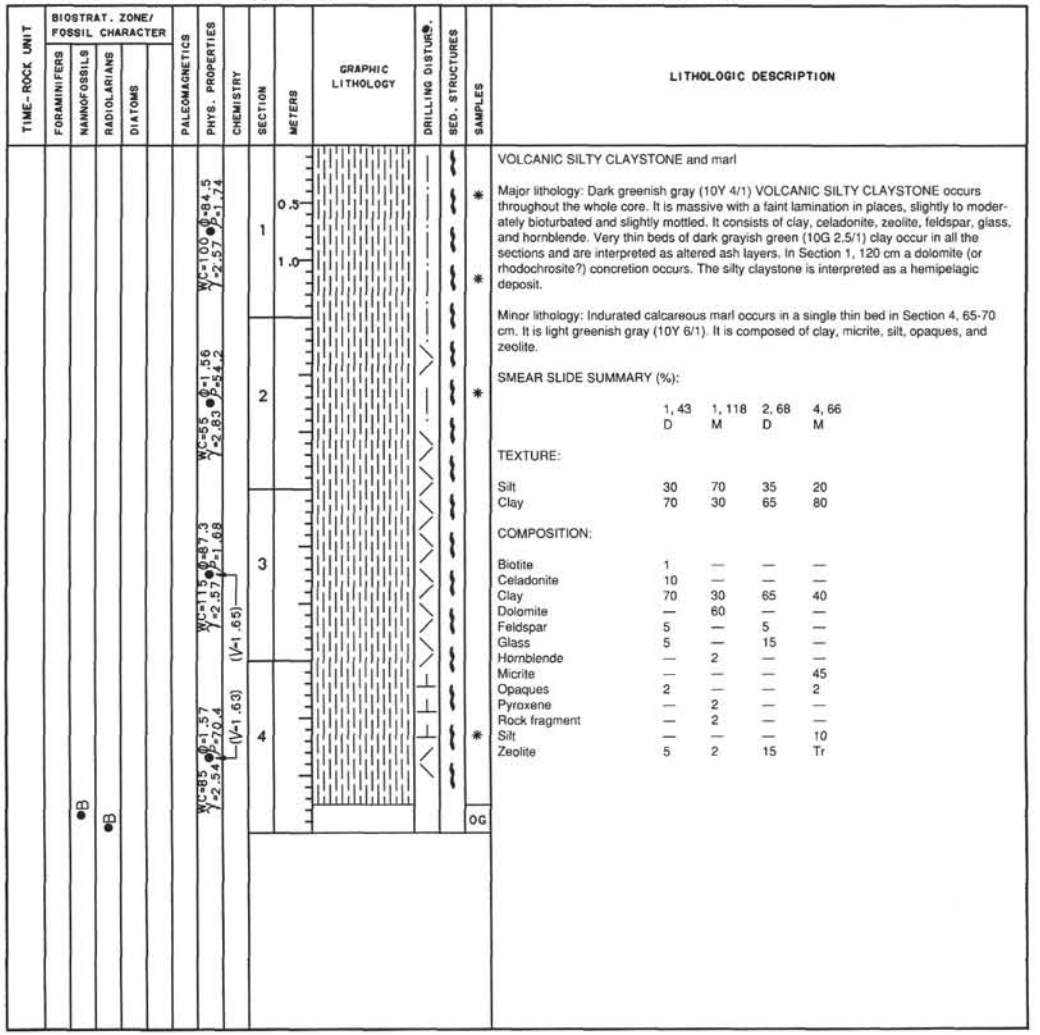
Minor lithology: Calcareous marl occurs in a single bed in Section 3, 70-81 cm. It is light greenish gray (10Y 6/1) with diffuse upper and lower boundaries. It is composed of clay and fine particles of calcite.

SMEAR SLIDE SUMMARY (%):

	1, 76 D	1, 101 M	3, 78 M	4, 74 M	5, 70 D
TEXTURE:					
Sand	—	5	—	—	—
Silt	20	10	50	10	15
Clay	80	80	50	85	85
COMPOSITION:					
Accessory minerals	Tr	—	—	—	Tr
Calcite	—	—	90	—	—
Clay	80	80	10	85	80
Feldspar	—	5	—	7	5
Glass	10	3	—	—	10
Hornblende	—	5	—	3	4
Opaques	Tr	3	—	3	—
Plagioclase	5	—	—	—	—
Plant	Tr	—	—	Tr	—
Pyrite	5	—	—	—	—



SITE 770 HOLE B CORE 5R CORED INTERVAL 195.8-205.5 mbsf



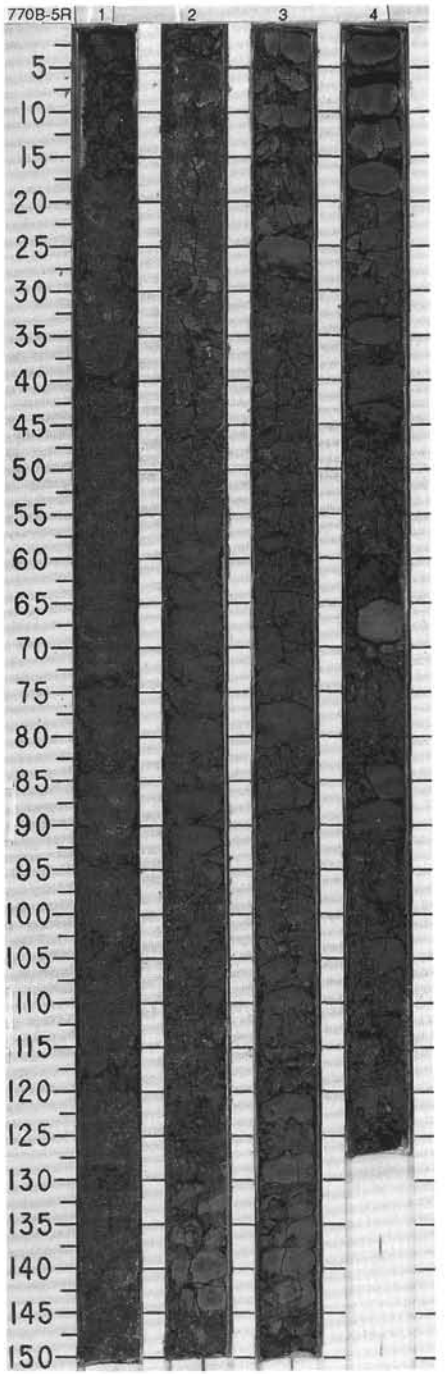
VOLCANIC SILTY CLAYSTONE and marl

Major lithology: Dark greenish gray (10Y 4/1) VOLCANIC SILTY CLAYSTONE occurs throughout the whole core. It is massive with a faint lamination in places, slightly to moderately bioturbated and slightly mottled. It consists of clay, celadonite, zeolite, feldspar, glass, and hornblende. Very thin beds of dark grayish green (10G 2.5/1) clay occur in all the sections and are interpreted as altered ash layers. In Section 1, 120 cm a dolomite (or rhodochrosite?) concretion occurs. The silty claystone is interpreted as a hemipelagic deposit.

Minor lithology: Indurated calcareous marl occurs in a single thin bed in Section 4, 65-70 cm. It is light greenish gray (10Y 6/1). It is composed of clay, micrite, silt, opaques, and zeolite.

SMEAR SLIDE SUMMARY (%):

	1, 43 D	1, 118 M	2, 68 D	4, 66 M
TEXTURE:				
Silt	30	70	35	20
Clay	70	30	65	80
COMPOSITION:				
Biotite	1	—	—	—
Celadonite	10	—	—	—
Clay	70	30	65	40
Dolomite	—	60	—	—
Feldspar	5	—	5	—
Glass	5	—	15	—
Hornblende	—	2	—	—
Micrite	—	—	—	45
Opaques	2	—	—	2
Pyroxene	—	2	—	—
Rock fragment	—	2	—	—
Silt	—	—	—	10
Zeolite	5	2	15	Tr



SITE 770 HOLE B CORE 6R CORED INTERVAL 244.1-253.7 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
MIOCENE	B●	B●	C/G●	R/P●	WC=145.0-84.2 V=2.78 P=1.46	WC=141.0-60.9 V=1.57 P=2.64 P=1.42	V=1.57 P=2.64 P=1.42	1	0.5 1.0		/ X X / /	≀ ≀ ≀	*
			C/G●					2			X X	≀ ≀	W
								CC			X		

(D. penultima)

LITHOLOGIC DESCRIPTION

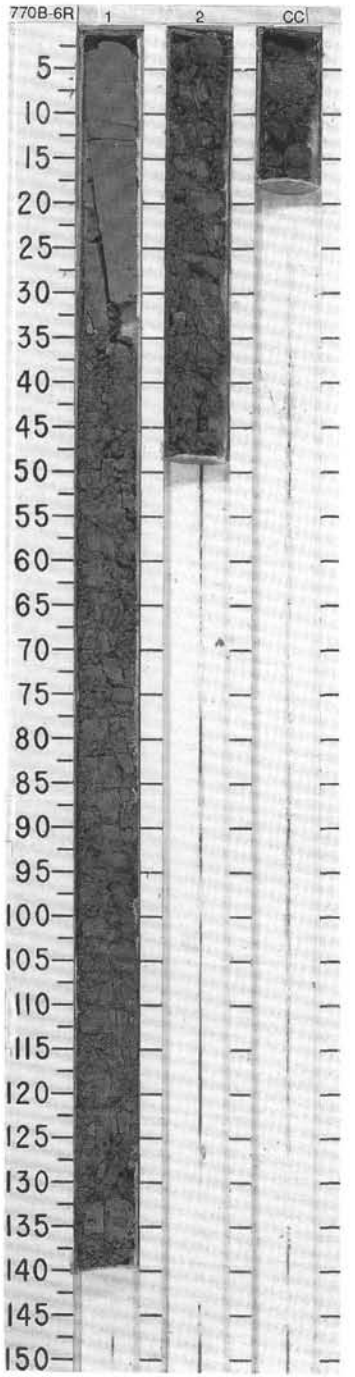
CLAYSTONE

Major lithology: Dark greenish gray (10Y 4/1) CLAYSTONE. It is moderately to heavily bioturbated with some sub-horizontal burrows filled with very dark greenish gray (10Y 3/1) clay. Irregular laminae of grayish green (5G 4/1) appear to be reaction rims around burrows in places. It is composed of clay minerals with common sponge spicules, some radiolarians, feldspar, opaques and accessory minerals. The claystone is considered to be hemipelagic in origin.

Drilling disturbance is severe in all except the top 30 cm of Section 1.

SMEAR SLIDE SUMMARY (%):

	1, 6 D	1, 10 D
TEXTURE:		
Silt	15	15
Clay	85	85
COMPOSITION:		
Accessory minerals	1	1
Clay	85	80
Feldspar	—	3
Opaques	2	2
Radiolarians	1	2
Rock fragment	—	1
Spicules	10	10



SITE 770 HOLE B CORE 7R CORED INTERVAL 292.4-302.1 mbsf

TIME-ROCK UNIT | BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | PALEOMAGNETICS | PHYS. PROPERTIES | CHEMISTRY | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURB. | SED. STRUCTURES | SAMPLES

PHYS. PROPERTIES: WC=67 ϕ=66.0 ρ=2.69/ρ=1.68; WC=52 ϕ=61.0 ρ=2.76/ρ=1.83; WC=39 ϕ=53.1 ρ=2.74/ρ=1.75; WC=77 ϕ=82.7 ρ=1.95/ρ=2.77; ●V=1.61

SAMPLES: TW

LITHOLOGIC DESCRIPTION

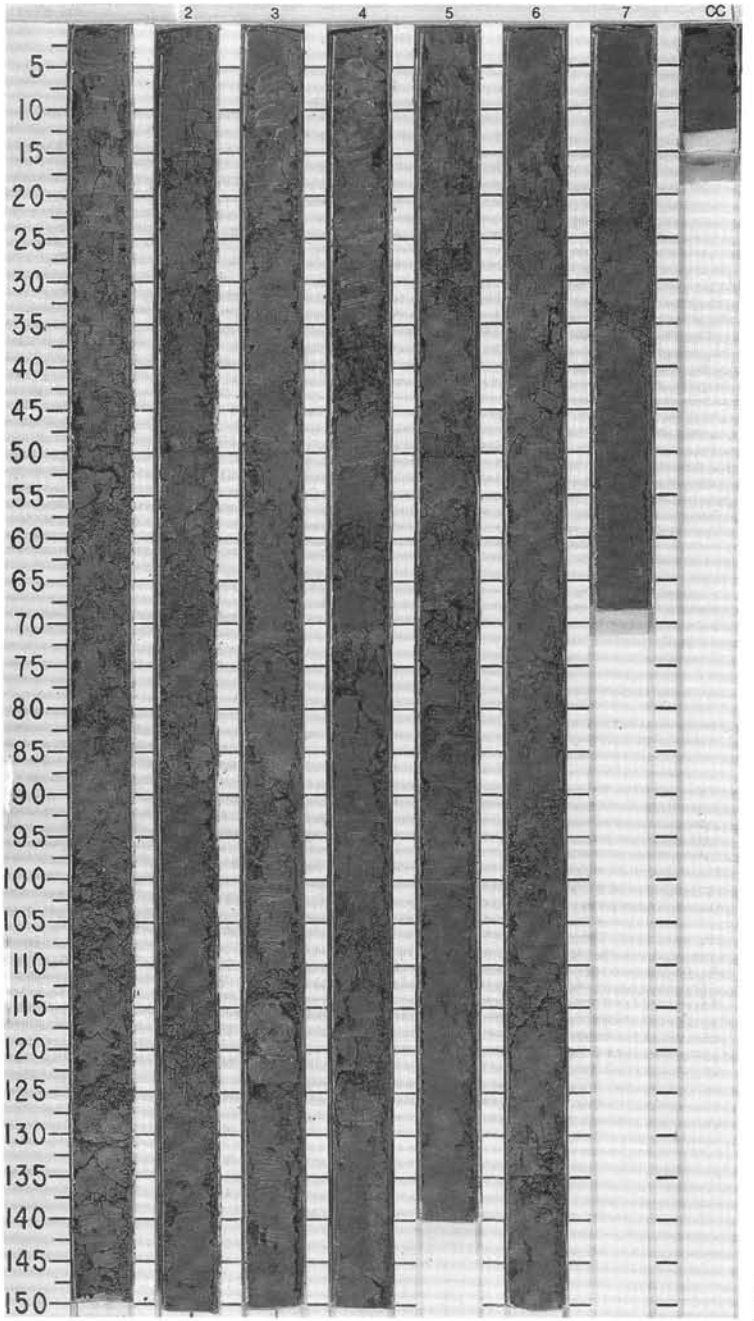
CLAYSTONE and silty claystone

Major lithology: CLAYSTONE makes up most of this core. It is olive gray (5Y 4/2) grading downward in Section 3 to grayish brown (2.5Y 5/2).It is massive and bioturbated, with color mottling. The claystone consists of clay with up to. 10% silt, including feldspar, zeolites, and opaque minerals. It is interpreted as a pelagic or hemipelagic deposit.

Minor lithology: Silty claystone occurs as thin to very thin interbeds in the claystone. It is *very dark gray (5Y 3/1) to greenish gray (5GY 5/1) and highly bioturbated, with numerous* large round burrows. The boundaries of these beds are sharp to diffuse. The silt component consists of feldspar rock fragments, and zeolites. These layers may be highly altered ash beds.

SMEAR SLIDE SUMMARY (%):

	1, 73 D	1, 131 M	2, 76 M	5, 66 M
TEXTURE:				
Silt	—	5	10	40
Clay	100	90	90	60
COMPOSITION:				
Apatite	—	Tr	Tr	Tr
Clay	100	90	90	60
Epidote	—	—	Tr	—
Feldspar	—	5	—	10
Glass	—	—	—	10
Opaques	—	Tr	3	4
Plagioclase	—	—	5	—
Rock fragment	—	Tr	—	15
Zeolite	Tr	Tr	—	—



SITE 770 HOLE B CORE 8R CORED INTERVAL 340.6-349.6 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
	B	B	B			WC=48 Φ=62.1 ρ=2.81 ρ=1.96		1	0.5 1.0				* *
						WC=44 Φ=57.8 ρ=2.78 ρ=1.95		2					*
					V=1.65	Φ=59.7 WC=48 ρ=1.89 ρ=2.68		3					*
								CC					

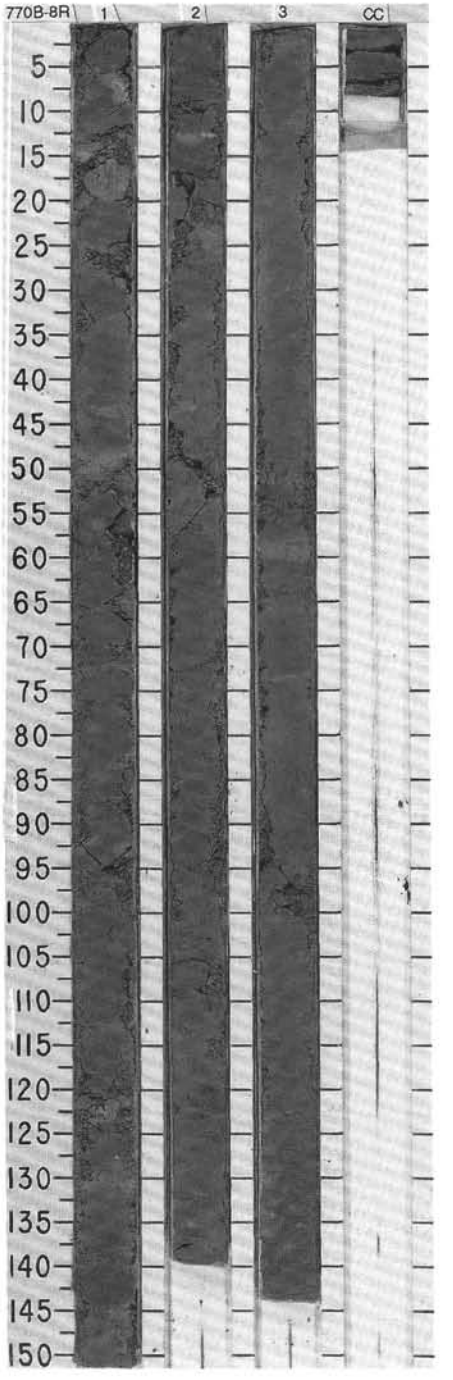
LITHOLOGIC DESCRIPTION

CLAYSTONE

Major lithology: CLAYSTONE which is brown (10YR 5/3) and massive, with faint color mottling indicating at least slight bioturbation. The claystone consists of clay minerals with very minor zeolites, feldspar, and opaque minerals. Isolated small ovoid patches and thin layers of light olive gray (5Y 6/2) to light greenish gray (10Y 6/1) claystone have diffuse boundaries and appear to have a diagenetic origin; they contain up to 10% disseminated diagenetic carbonate grains (dolomite or rhodochrosite). The claystone is interpreted as pelagic in origin.

SMEAR SLIDE SUMMARY (%):

	1, 48 M	1, 78 D	2, 77 D	3, 58 M
TEXTURE:				
Sand	—	—	2	—
Silt	5	5	7	15
Clay	95	95	90	85
COMPOSITION:				
Accessory minerals	—	—	1	—
Carbonate	10	—	—	—
Clay	85	95	90	85
Feldspar	—	—	2	5
Fish	Tr	Tr	—	—
Opaques	Tr	Tr	3	1
Rock fragment	—	—	1	2
Zeolite	2	Tr	2	3



SITE 770 HOLE B CORE 9R CORED INTERVAL 349.6-359.3 mbsf

TIME-ROCK UNIT | BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS | PALEOMAGNETICS | PHYS. PROPERTIES | CHEMISTRY | SECTION | METERS | GRAPHIC LITHOLOGY | DRILLING DISTURB. | SED. STRUCTURES | SAMPLES

FORAMINIFERS: B
NANNOFOSSILS: B
RADIOLARIANS: B

PHYS. PROPERTIES: ρ=63.6 WC=54.4 V=1.64 ρ=1.83 V=2.81; ρ=65.4 WC=62 V=2.74 ρ=1.75; ρ=76.7 WC=87 V=2.42 ρ=1.69

SECTION: 1, 2, 3, 4, CC

METERS: 0.5, 1.0

SAMPLES: *, *, *, *

LITHOLOGIC DESCRIPTION

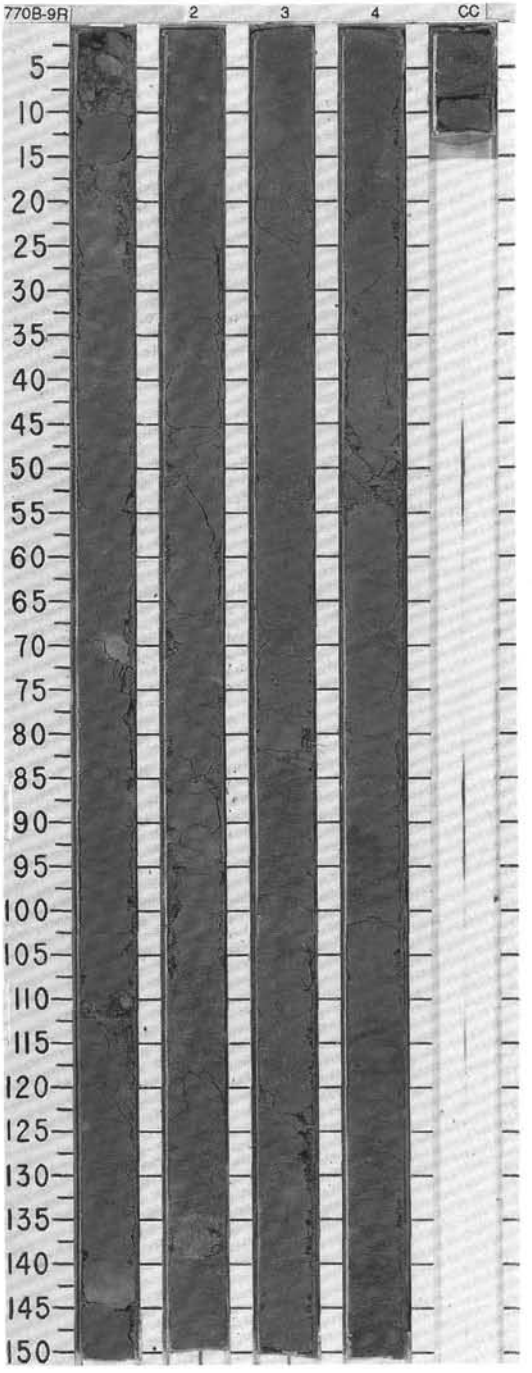
CLAYSTONE and claystone with silt

Major lithology: CLAYSTONE which is brown (10YR 5/3), massive, and slightly to moderately bioturbated. It consists of clay minerals with very minor feldspar, rock fragments, and opaque minerals. The claystone is interpreted to be a pelagic deposit.

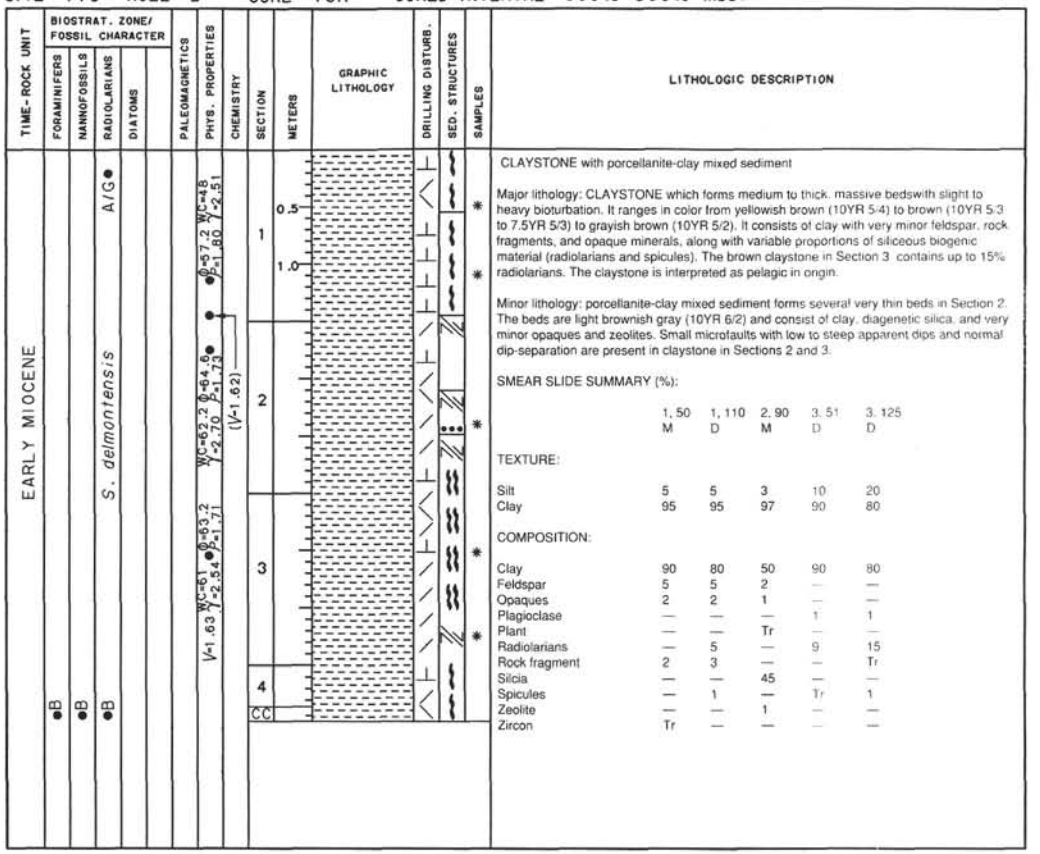
Minor lithology: Claystone with silt occurs as sparse thin to very thin interbeds which contain 10-15% silt. These beds are pinkish gray (7.5YR 7/2). The silt is chiefly a mixture of feldspar, zeolites, opaque minerals, and rock fragments, and may represent altered ash. In one gray (5Y 5/1) bed (Section 2, 135-140 cm) the silt consists entirely of fresh euhedral to broken plagioclase crystals, commonly with glass inclusions. The contacts of this bed are obscured by drilling disturbance, but it represents a mixture of ash and pelagic clay.

SMEAR SLIDE SUMMARY (%):

	1, 110 M	1, 144 M	2, 138 M	3, 80 D
TEXTURE:				
Sand	—	5	1	—
Silt	10	15	15	1
Clay	90	80	84	99
COMPOSITION:				
Carbonate grains	—	3	—	—
Clay	85	80	84	90
Feldspar	5	7	—	—
Opaques	3	1	—	3
Plagioclase	—	—	16	5
Rock fragment	2	3	Tr	2
Zeolite	2	3	—	—
Zircon	—	2	—	—



SITE 770 HOLE B CORE 10R CORED INTERVAL 359.3-368.9 mbsf



LITHOLOGIC DESCRIPTION

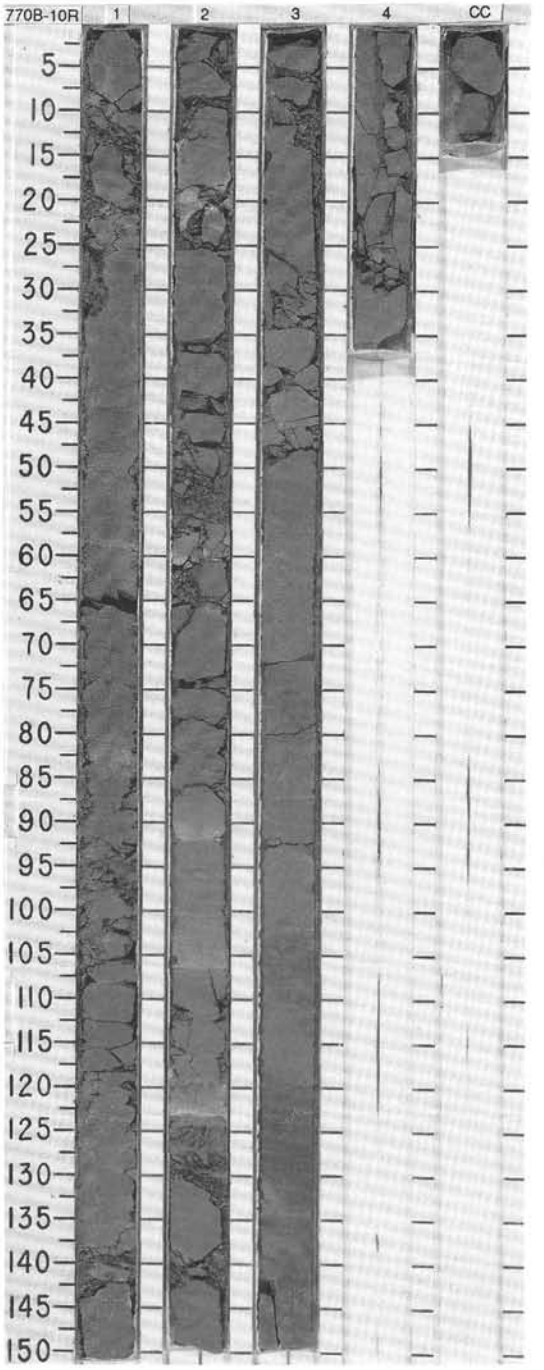
CLAYSTONE with porcellanite-clay mixed sediment

Major lithology: CLAYSTONE which forms medium to thick, massive bedswith slight to heavy bioturbation. It ranges in color from yellowish brown (10YR 5/4) to brown (10YR 5/3 to 7.5YR 5/3) to grayish brown (10YR 5/2). It consists of clay with very minor feldspar, rock fragments, and opaque minerals, along with variable proportions of siliceous biogenic material (radiolarians and spicules). The brown claystone in Section 3 contains up to 15% radiolarians. The claystone is interpreted as pelagic in origin.

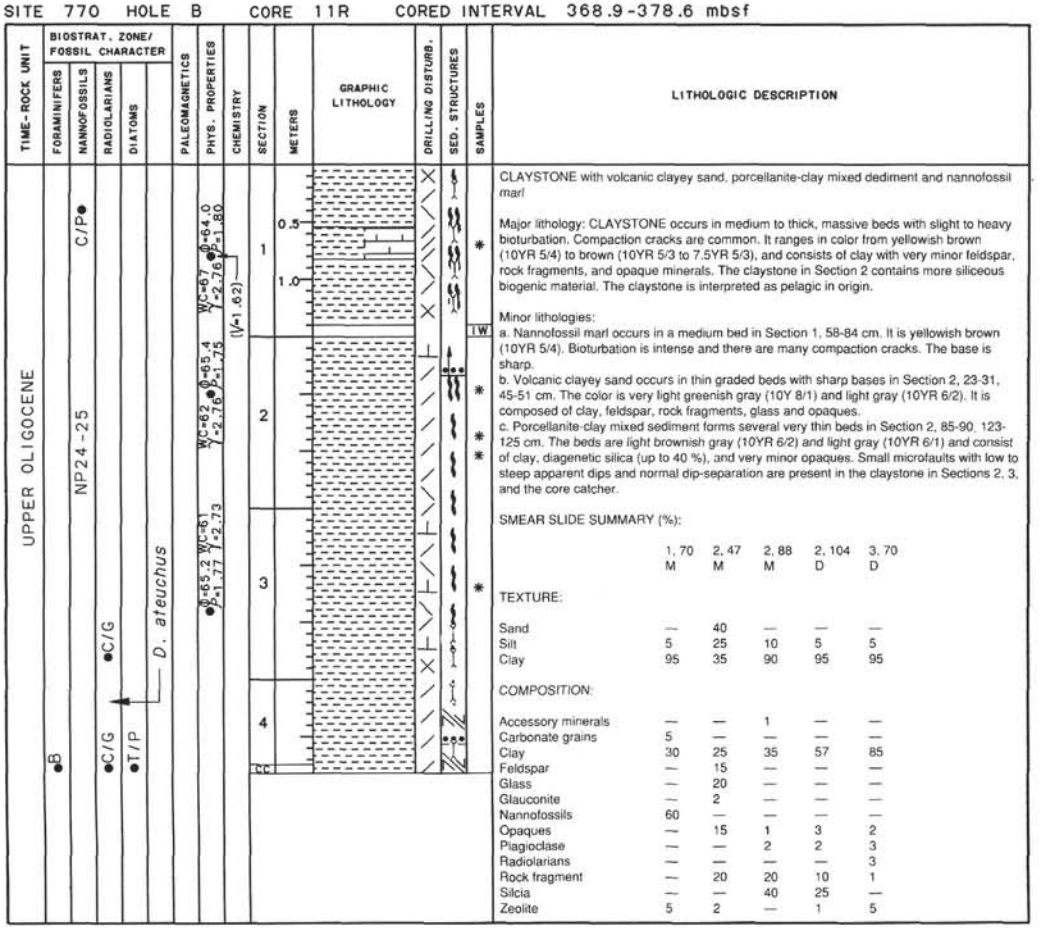
Minor lithology: porcellanite-clay mixed sediment forms several very thin beds in Section 2. The beds are light brownish gray (10YR 6/2) and consist of clay, diagenetic silica, and very minor opaques and zeolites. Small microfaults with low to steep apparent dips and normal dip-separation are present in claystone in Sections 2 and 3.

SMEAR SLIDE SUMMARY (%):

	1, 50 M	1, 110 D	2, 90 M	3, 51 D	3, 125 D
TEXTURE:					
Silt	5	5	3	10	20
Clay	95	95	97	90	80
COMPOSITION:					
Clay	90	80	50	90	80
Feldspar	5	5	2	—	—
Opaques	2	2	1	—	—
Plagioclase	—	—	—	1	1
Plant	—	—	Tr	—	—
Radiolarians	—	5	—	9	15
Rock fragment	2	3	—	—	Tr
Silcia	—	—	45	—	—
Spicules	—	1	—	Tr	1
Zeolite	—	—	1	—	—
Zircon	Tr	—	—	—	—



SITE 770 HOLE B CORE 11R CORED INTERVAL 368.9-378.6 mbsf



LITHOLOGIC DESCRIPTION

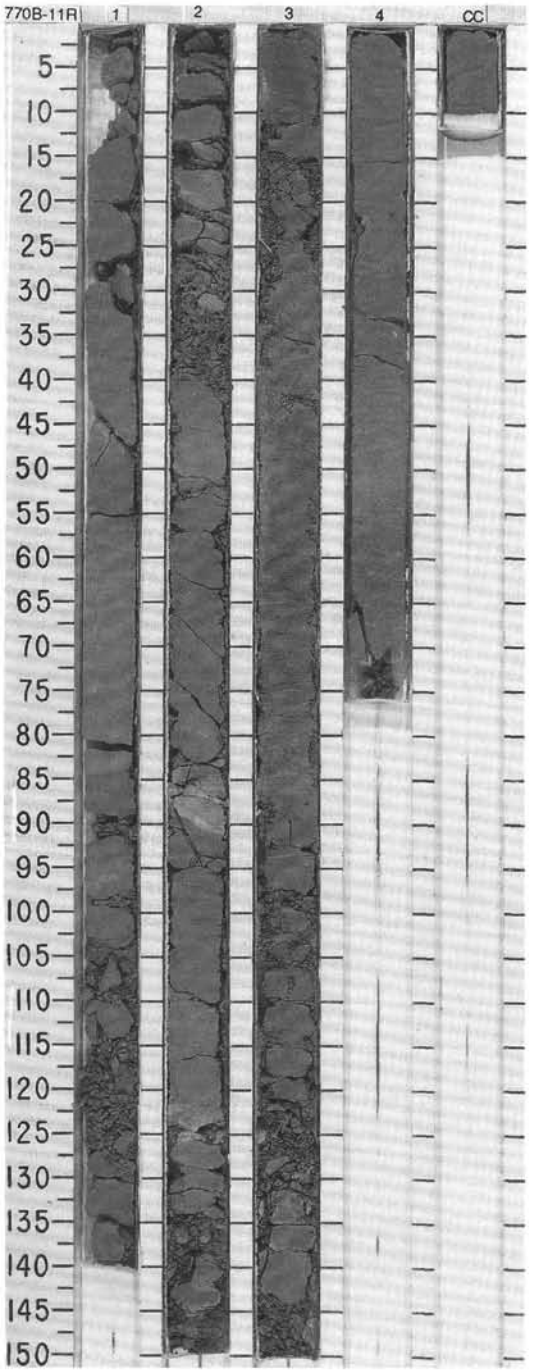
CLAYSTONE with volcanic clayey sand, porcellanite-clay mixed dediment and nannofossil *marl*

Major lithology: CLAYSTONE occurs in medium to thick, massive beds with slight to heavy bioturbation. Compaction cracks are common. It ranges in color from yellowish brown (10YR 5/4) to brown (10YR 5/3 to 7.5YR 5/3), and consists of clay with very minor feldspar, rock fragments, and opaque minerals. The claystone in Section 2 contains more siliceous biogenic material. The claystone is interpreted as pelagic in origin.

Minor lithologies:
a. Nannofossil marl occurs in a medium bed in Section 1, 58-84 cm. It is yellowish brown (10YR 5/4). Bioturbation is intense and there are many compaction cracks. The base is sharp.
b. Volcanic clayey sand occurs in thin graded beds with sharp bases in Section 2, 23-31, 45-51 cm. The color is very light greenish gray (10Y 8/1) and light gray (10YR 6/2). It is composed of clay, feldspar, rock fragments, glass and opaques.
c. Porcellanite-clay mixed sediment forms several very thin beds in Section 2, 85-90, 123-125 cm. The beds are light brownish gray (10YR 6/2) and light gray (10YR 6/1) and consist of clay, diagenetic silica (up to 40 %), and very minor opaques. Small microfaults with low to steep apparent dips and normal dip-separation are present in the claystone in Sections 2, 3, and the core catcher.

SMEAR SLIDE SUMMARY (%):

	1, 70 M	2, 47 M	2, 88 M	2, 104 D	3, 70 D
TEXTURE:					
Sand	—	40	—	—	—
Silt	5	25	10	5	5
Clay	95	35	90	95	95
COMPOSITION:					
Accessory minerals	—	—	1	—	—
Carbonate grains	5	—	—	—	—
Clay	30	25	35	57	85
Feldspar	—	15	—	—	—
Glass	—	20	—	—	—
Glauconite	—	2	—	—	—
Nannofossils	60	—	—	—	—
Opaques	—	15	1	3	2
Plagioclase	—	—	2	2	3
Radiolarians	—	—	—	—	3
Rock fragment	—	20	20	10	1
Silcia	—	—	40	25	—
Zeolite	5	2	—	1	5



SITE 770 HOLE B CORE 12R CORED INTERVAL 378.6-388.2 mbsf

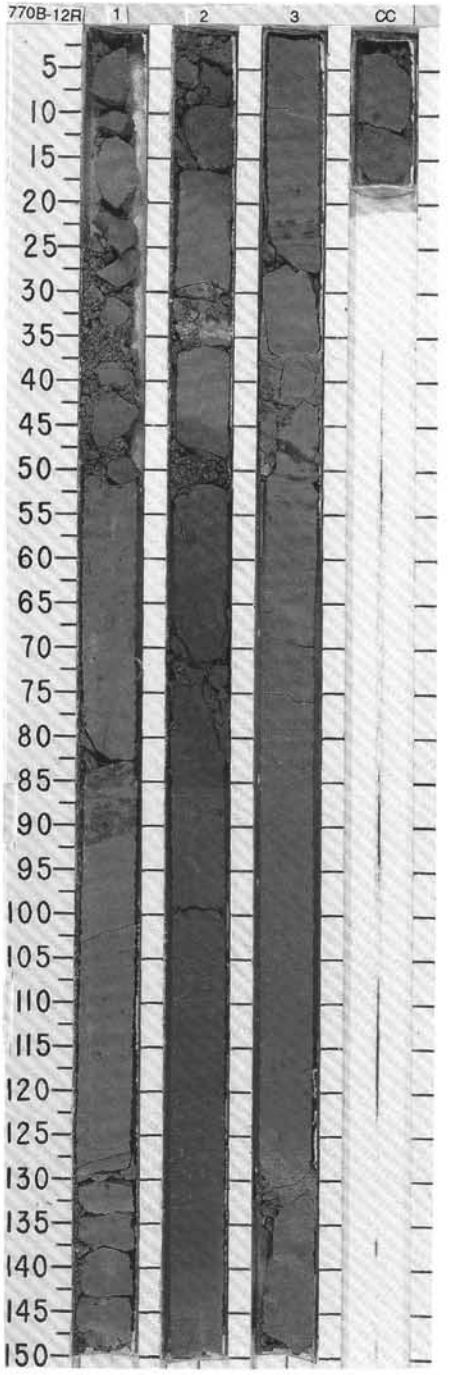
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
	B	B	C/G		V=1.64 WC=92 ρ=2.62 P=1.86 ρ=72.6	V=1.6 WC=100 ρ=2.41 P=1.50 ρ=73.1	V=1.61 WC=96 ρ=2.58 P=1.54 ρ=73.7	1	0.5				*
			D. ateuchus/T. tuberosa						1.0				
								2					*
								3					
								CC					

CLAYSTONE

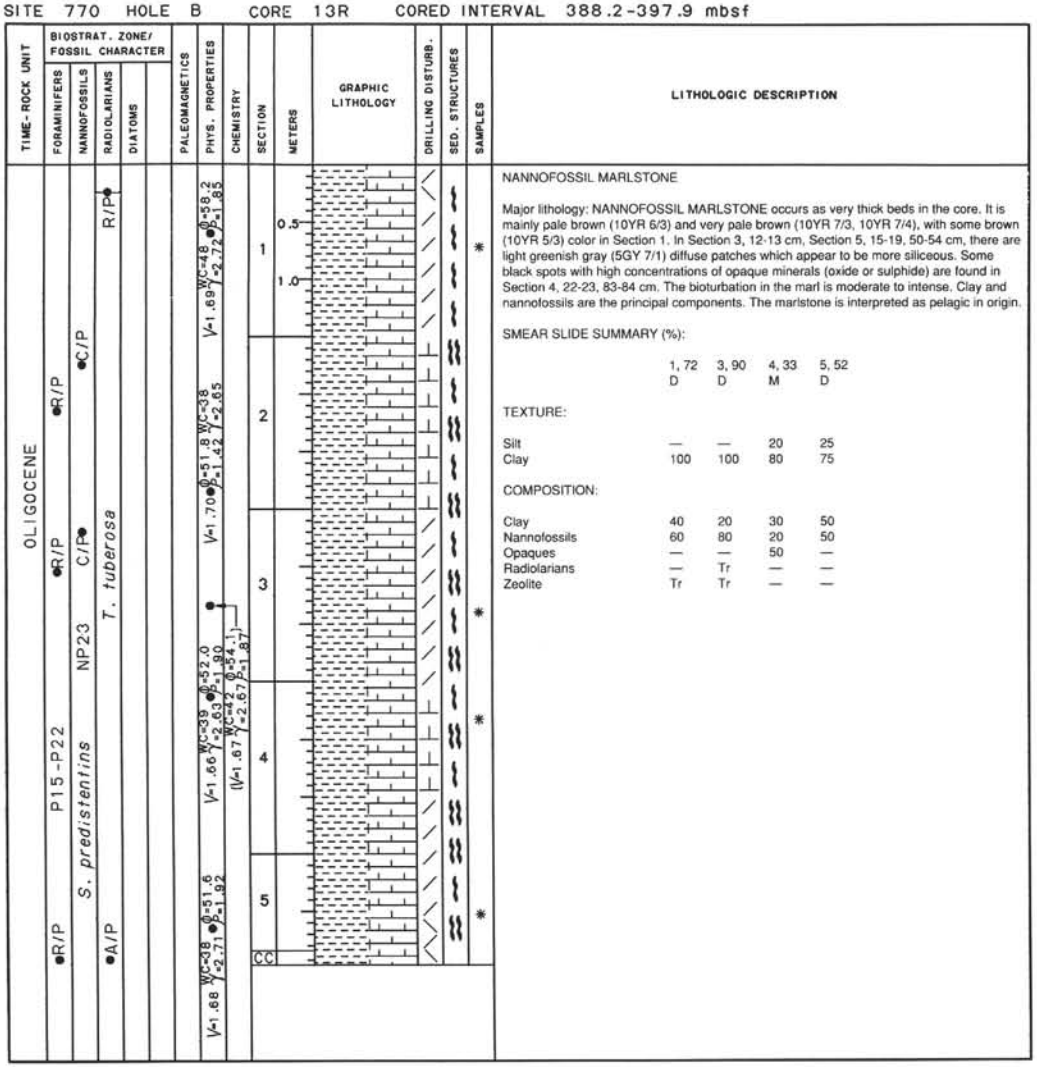
Major lithology: CLAYSTONE occurs in medium to thick, massive beds with slight to heavy bioturbation and some compaction cracks. Thin laminations are present in places. It ranges in color from yellowish brown (10YR 5/4) to brown (10YR 5.3 to 7.5YR 5.4, 4/3) to pale brown (10YR 6/3). One dark grayish brown (10YR 4.2) clay bed in Section 1 has sharp base and is normally-graded in the bottom 1 cm. The claystone consists mainly of clay with minor radiolarians and spicules. In Section 2 there is a higher concentration of siliceous biogenic material. The claystone is interpreted as pelagic in origin. Bedding defined by thin laminations shows a consistent dip of between 15 and 20° throughout the core. Small microfaults with low to steep apparent dips and normal dip-separation are present in claystone in Section 3.

SMEAR SLIDE SUMMARY (%):

	1, 75 D	2, 42 M
TEXTURE:		
Silt	10	5
Clay	90	95
COMPOSITION:		
Clay	90	95
Feldspar	Tr	Tr
Glass	Tr	—
Opaques	—	Tr
Radiolarians	4	Tr
Spicules	6	5
Zeolite	Tr	Tr



SITE 770 HOLE B CORE 13R CORED INTERVAL 388.2-397.9 mbsf



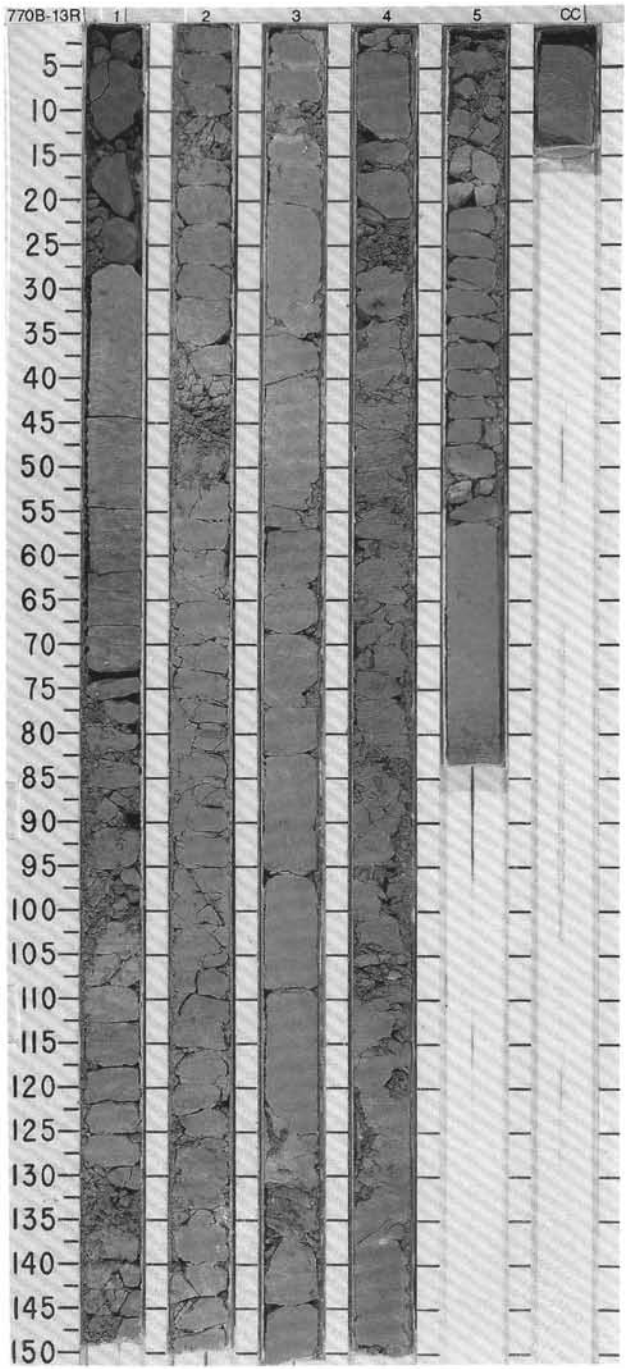
LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARLSTONE

Major lithology: NANNOFOSSIL MARLSTONE occurs as very thick beds in the core. It is mainly pale brown (10YR 6/3) and very pale brown (10YR 7/3, 10YR 7/4), with some brown (10YR 5/3) color in Section 1. In Section 3, 12-13 cm, Section 5, 15-19, 50-54 cm, there are light greenish gray (5GY 7/1) diffuse patches which appear to be more siliceous. Some black spots with high concentrations of opaque minerals (oxide or sulphide) are found in Section 4, 22-23, 83-84 cm. The bioturbation in the marl is moderate to intense. Clay and nannofossils are the principal components. The marlstone is interpreted as pelagic in origin.

SMEAR SLIDE SUMMARY (%):

	1, 72 D	3, 90 D	4, 33 M	5, 52 D
TEXTURE:				
Silt	—	—	20	25
Clay	100	100	80	75
COMPOSITION:				
Clay	40	20	30	50
Nannofossils	60	80	20	50
Opaques	—	—	50	—
Radiolarians	—	Tr	—	—
Zeolite	Tr	Tr	—	—



SITE 770 HOLE B CORE 14R CORED INTERVAL 397.9-407.6 mbsf

TIME-ROCK UNIT: OLIGOCENE

BIOSTRAT. ZONE/FOSSIL CHARACTER
- FORAMINIFERS: B● P15-P22 ●R/P; E. subdistricha NP21 ●C/P; C/VP●
- NANNOFOSSILS: ●R/P C/P● NP22 ?
- RADIOLARIANS: (H. reticulata)
- DIATOMS

PALEOMAGNETICS

PHYS. PROPERTIES: V=1.68 WC=40 Φ=52.5 P=1.59 ρ=2.68; V=1.68 WC=36 Φ=50.3 P=1.95 ρ=2.72; V=1.69 WC=36 Φ=53.5 P=1.91 ρ=2.72; V=1.68 WC=40 Φ=52.5 P=1.59 ρ=2.68

CHEMISTRY

SECTION: 1, 2, 3, 4, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURB.

SED. STRUCTURES

SAMPLES: TW

LITHOLOGIC DESCRIPTION

NANNOFOSSIL MARLSTONE and CLAYSTONE

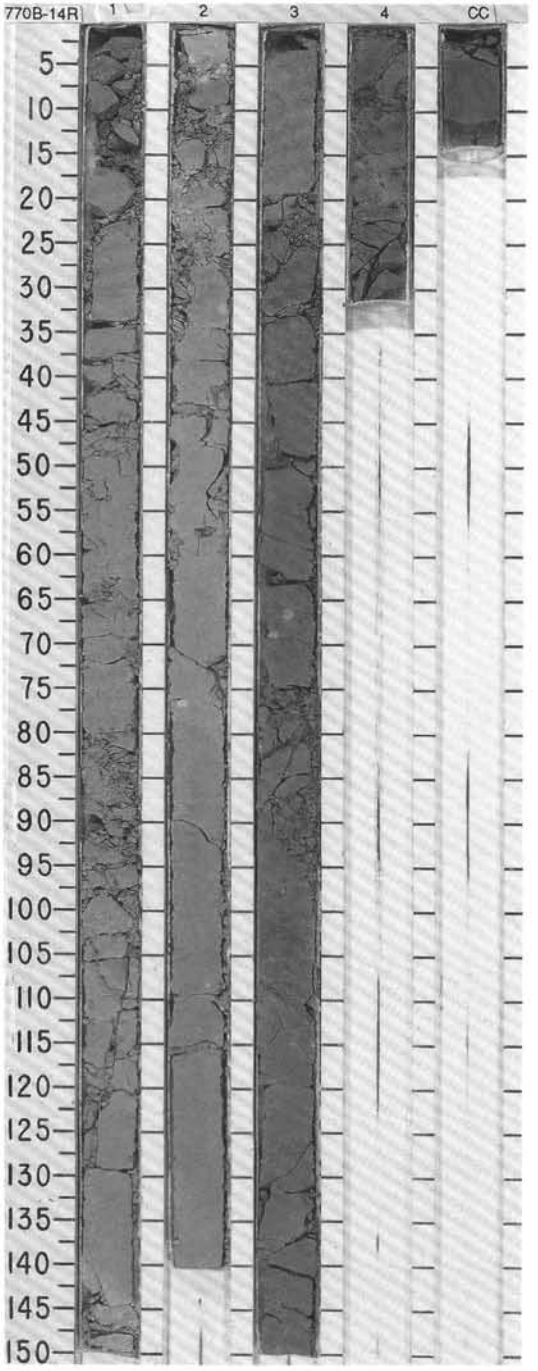
Major lithologies:

a. NANNOFOSSIL MARLSTONE occurs down to Section 3, 25 cm. It is pale brown (10YR 6/3) and is moderately bioturbated throughout. The principal components are nannofossils (coccoliths and Discoaster) and clay minerals. Diffuse layers and patches of light gray (5Y 7/1) marlstone occur at the base of Section 1 and through Section 2. There is no apparent difference in composition between the gray and the brown material.

b. CLAYSTONE occurs below Section 3, 25 cm. It is brown (7.5YR 5/4) and massive throughout except for intense bioturbation at the top of the unit and slight bioturbation below. There are occasional light gray (5Y 7/1) diffuse alteration patches in Section 3. Very small (<1 mm) manganese micronodules occur in the core catcher. Both lithologies are considered to be pelagic in origin.

SMEAR SLIDE SUMMARY (%):

	1, 60 D	2, 2 M	4, 21 D
TEXTURE:			
Silt	20	20	5
Clay	80	80	95
COMPOSITION:			
Clay	40	60	95
Feldspar	—	—	1
Nannofossils	60	40	—
Opaques	—	—	2
Quartz	—	—	2



SITE 770 HOLE B CORE 15R CORED INTERVAL 407.6-417.3 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
EOCENE ?	P15-P22 ●R/P	NP18 - 20 ? ●C/P						1	0.5				*
MIDDLE EOCENE	R/P● P14 ●R/P	D. saipanensis NP17 ●C/P	R/VP ●			●0=48.6 WC=33 P=2.02 V=1.65 ●0=48.8 WC=34 P=2.03 V=1.67 ●0=48.8 WC=33 P=2.02 V=1.72	●0=47.5 WC=33 P=2.71 V=1.69 P=1.98	2	1.0				*
								3					*
								4					
								5					
								CC					

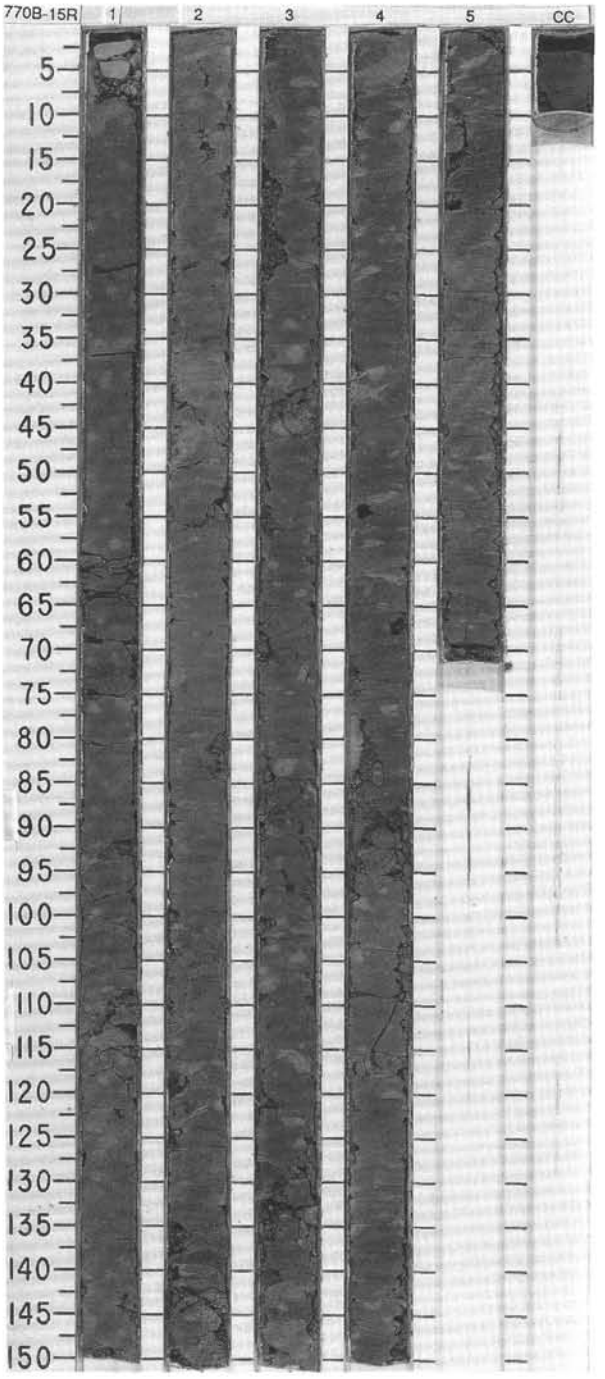
LITHOLOGIC DESCRIPTION

NANNOFOSSIL CLAYSTONE

Major lithology: NANNOFOSSIL CLAYSTONE. It is moderately bioturbated throughout but with no other sedimentary structures. It is mainly brown (10YR 4/3) with very dark gray (10YR 3/1) mottling associated with the bioturbation and larger patches of yellowish brown (10YR 5/5) throughout the core. These paler patches are diagenetic in origin, and may be related to the occurrence of white agglutinated foraminifers which occur in these patches. The principal components are clay minerals, nannofossils (coccoliths and Discoaster) and a minor component of opaque minerals which are more common in the darkest clay. The claystone is interpreted as pelagic in origin.

SMEAR SLIDE SUMMARY (%):

	1, 43 D	2, 35 D	3, 82 D
TEXTURE:			
Silt	25	30	30
Clay	75	70	70
COMPOSITION:			
Accessory minerals	—	5	—
Clay	70	60	60
Nannofossils	25	20	35
Opaques	5	10	2



SITE 770 HOLE B CORE 16R CORED INTERVAL 417.3-425.8 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
MIDDLE EOCENE	B● P13/P14	NP17 ? ●C/M	A/M●●F/P ●B ●F/P (P. chalara)			WC-2 Φ-5.8 γ-2.82 P-2.80 ● WC-0.6 Φ-1.7 γ-2.85 P-2.86 ● (V-5.72) (V-5.26) ● Φ-67.7 WC-69 γ-1.69 γ-2.76 V-1.63 ● V-1.67 WC-39 Φ-53.1 γ-2.77 P-1.93 ●		1 2 3	0.5 1.0	VOID			* * *

LITHOLOGIC DESCRIPTION

NANNOFOSSIL CLAYSTONE, SANDY CLAY and SILTY CLAYSTONE overlying IGNEOUS BASEMENT

The sedimentary section of the core, recovered in Section 1 through Section 3, 60 cm, consists of the following major lithologies:

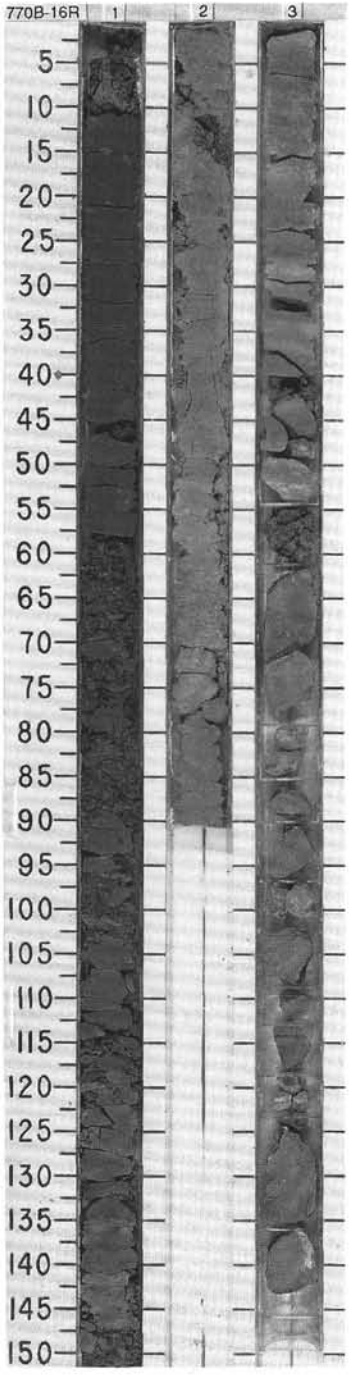
a. NANNOFOSSIL CLAYSTONE occurs in Section 1. It is dark grayish brown to brown (10YR 4/2, 5/3) with diagenetic patches of pale brown (10YR 6/3) and intensely bioturbated throughout. The lithology is composed of clay, nannofossils and a minor component of opaque minerals. It is interpreted as pelagic in origin.

b. SANDY CLAY occurs in Section 2 and Section 3, 52-60 cm. It is highly variable in color from yellowish brown (10YR 5/4) to pale yellow (5Y 7/3) and olive yellow (5Y 6/6). It is thickly laminated in places and shows fining-upwards sequences in Section 2. The sandy component is a pale green aggregate of clay minerals, in a matrix of clay. These beds are soft in Section 2, and the grains are rounded. In Section 3, 47-60 cm, the material is harder, and very angular grains are clear. This material is considered likely to be altered volcanic glass.

c. SILTY CLAYSTONE occurs in Section 3, 0-47 cm. It is laminated in places and bioturbated throughout. Some of the burrows are infilled with coarser, greener material. The main color is light brown (7.5YR 6/4) with brown (7.5YR 4/4) layers. The main component is clay, with feldspar, zeolite, rock fragments and rare nannofossils. Igneous basement rocks occur below Section 3, 60 cm.

SMEAR SLIDE SUMMARY (%):

	1, 41 D	2, 38 D	2, 68 D	3, 26 D	3, 45 M
TEXTURE:					
Sand	—	30	30	—	40
Silt	30	20	20	10	20
Clay	70	50	50	90	40
COMPOSITION:					
Accessory minerals	2	—	Tr	Tr	—
Amphibole	—	—	—	—	2
Clay	60	65	60	90	30
Feldspar	—	—	—	2	2
Glass	—	—	—	—	4
Nannofossils	30	—	—	Tr	—
Opaques	5	—	Tr	Tr	3
Oxide	—	—	—	—	1
Radiolarians	—	—	—	—	40
Rock fragment	—	35	40	3	1
Silcia	—	—	—	—	12
Zeolite	—	—	—	5	2



SITE 770 HOLE C CORE 1R CORED INTERVAL 383.8-393.3 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
MIDDLE OLIGOCENE	R/P	P15-P22	B	B		ϕ=48.4 WC=33 P=2.02 ?=2.71 V=1.72		6					*
	A/M	NP23				ϕ=56.2 WC=44 P=1.90 ?=2.77 V=1.69		3					*
	R/P		B	B		ϕ=57.7 WC=48 P=1.83 ?=2.69 V=1.67		1	0.5				*
	R/P		T. tuberosa(?)	C/G				1	1.0				*
	B							7					
								CC					

LITHOLOGIC DESCRIPTION

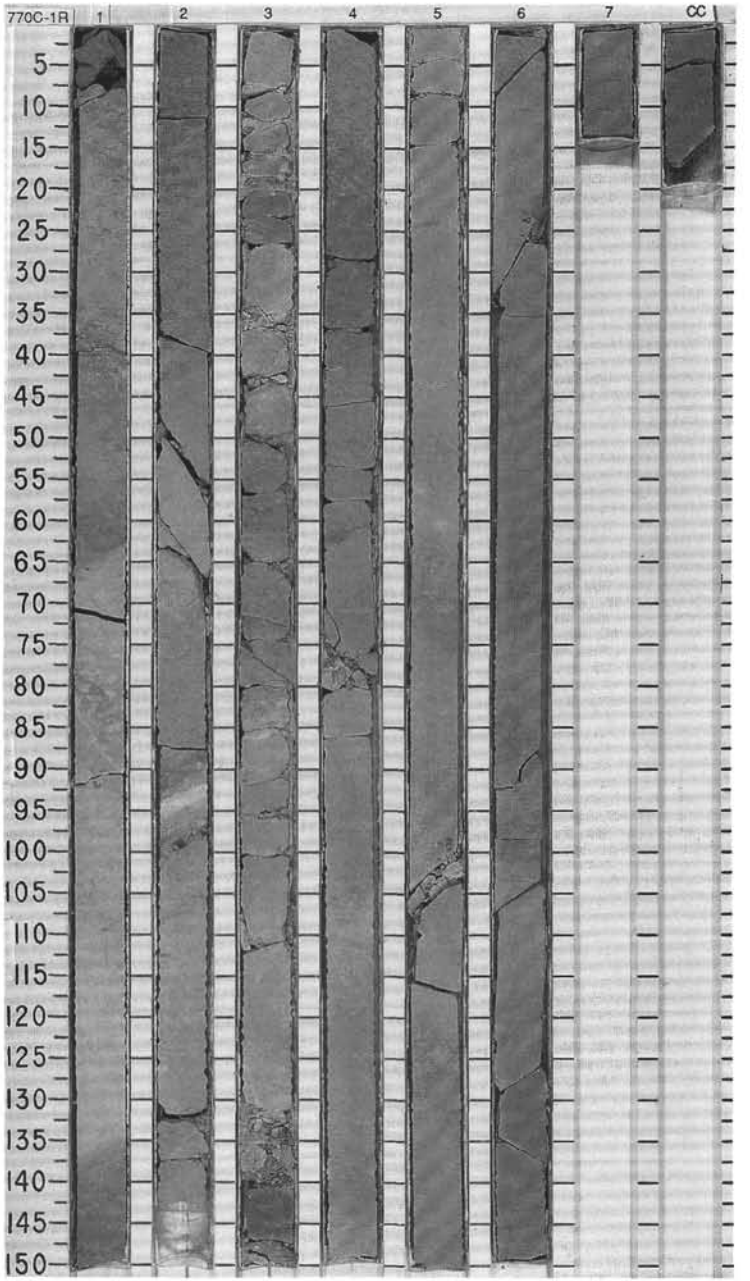
NANNOFOSSIL MARLSTONE with claystone and nannofossil chalk

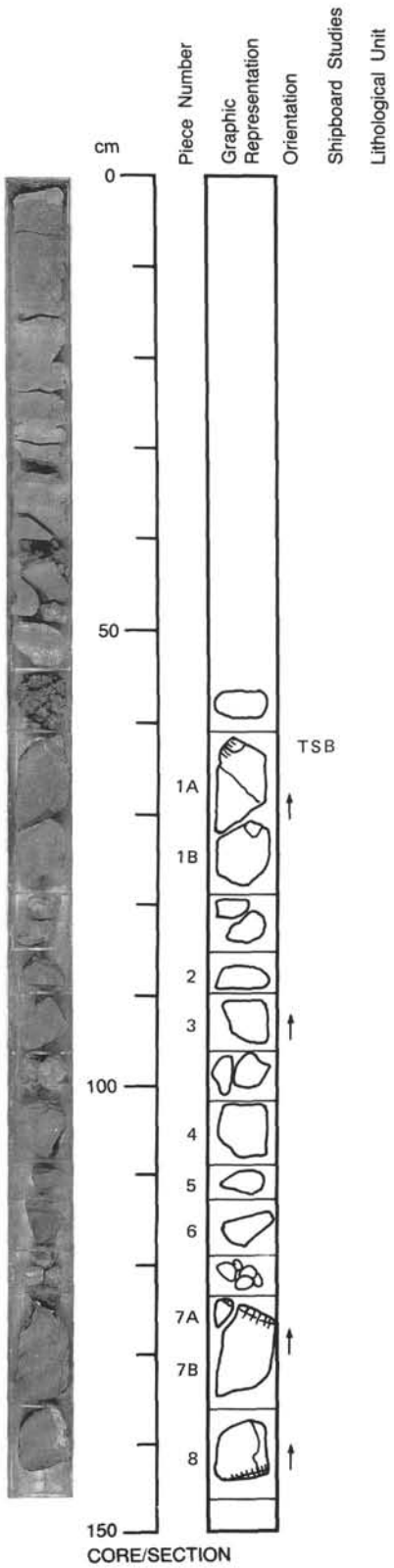
Major lithology: NANNOFOSSIL MARLSTONE occurs in thick units of varying color in this core. It is very pale brown to light gray (10YR 7/3, 7/2) in Section 1, light brownish gray to light gray (10YR 6/1, 6/2, 7/1) in Sections 2 and 3, becoming pale brown (10YR 7/3) in Sections 4 and 5; Section 6 is mainly light yellowish brown (10YR 6/4) with a change to yellowish brown (10YR 5/4) in the lowest 50 cm of this core. These color changes appear to be due to variations in nannofossil content: they are dominant in the paler colors and are less abundant in the brown marlstones at the bottom of the core, where clay is more abundant. Bioturbation is intense throughout. These are interpreted as pelagic deposits.

Minor lithologies:
a. CLAYSTONE occurs in thin beds in Section 3, 20-26, 131-150 cm. They are brown (7.5YR 5/2), dark reddish gray (5YR 4/2) or altered to greenish gray (5GY 6/1). These beds are not bioturbated and show some slightly wavy lamination.
b. Nannofossil chalk occurs in a single very thin bed in Section 2, 94-96 cm. It is light greenish gray (5G 7/1), massive and has sharp top and bottom contacts. Where bedding can be seen it is inclined 20-30 throughout this core. Microfaults occur in Section 1, 35 cm.

SMEAR SLIDE SUMMARY (%):

	2, 36 D	2, 93 M	3, 146 M	6, 44 D
TEXTURE:				
Clay	100	100	100	100
COMPOSITION:				
Clay	30	10	95	30
Nannofossils	70	70	5	70





124-770B-16R-3

UNIT 1: MODERATELY PLAGIOCLASE-OLIVINE PHYRIC BASALT

Pieces 1-8

CONTACTS: None with overlying sediments; chilled margins in Piece 1A (upper side, azimuth 55 degrees), Piece 7 (upper part, azimuth 130 degrees) and Piece 8 (lower part, azimuth 90 degrees).

PHENOCRYSTS: Variable concentration; either individual crystals or in glomerophyritic aggregates of plagioclase and clinopyroxene, sometimes with olivine.
Plagioclase - 2-3%; 1-2 mm; Lath shaped, fresh.
Olivine - 2-3%; < 1mm; Euhedral prismatic form. Rarely fresh, mostly altered to green or orange phyllosilicates.

GROUNDMASS: Very fine-grained to glassy with microvarioles (chilled rims), mostly consisting of radiating aggregates of plagioclase, pyroxene, and mesostasis.

VESICLES: Relatively scarce and irregularly distributed, generally not exceeding 5%, about 0.5 mm in size, filled with clays(dark green, yellow, orange, forming varicolored concentric layers parallel to the wall).

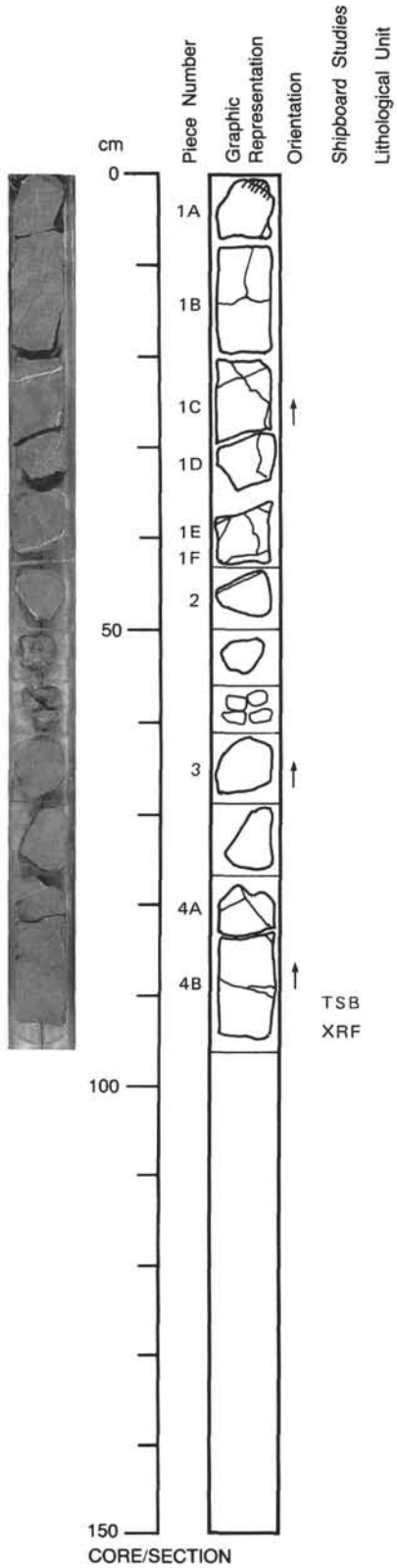
COLOR: Dark gray, brownish gray.

STRUCTURE: Pillowed.

ALTERATION: Slight to moderate.

VEINS/FRACTURES: Sparse irregular fractures, partly filled with clays, less than 0.5 mm wide. Thick irregular veins (5-6 mm wide in Piece 8) are filled with a microbreccia consisting of shards of altered glass (replaced by green or brown clays), some crystals of plagioclase and clinopyroxene and of calcite-silica cement.

ADDITIONAL COMMENTS: Structure suggests a pillow lava flow, probably with small pillows and minor interpillow material. Rock texture gives evidence of rapid chilling. Particularly platy olivine crystals in the groundmass give evidence of quenching. Microbreccia in Piece 8 contains altered green glass shards similar to those from the interval 50-55 cm in the sedimentary sequence overlying basement.

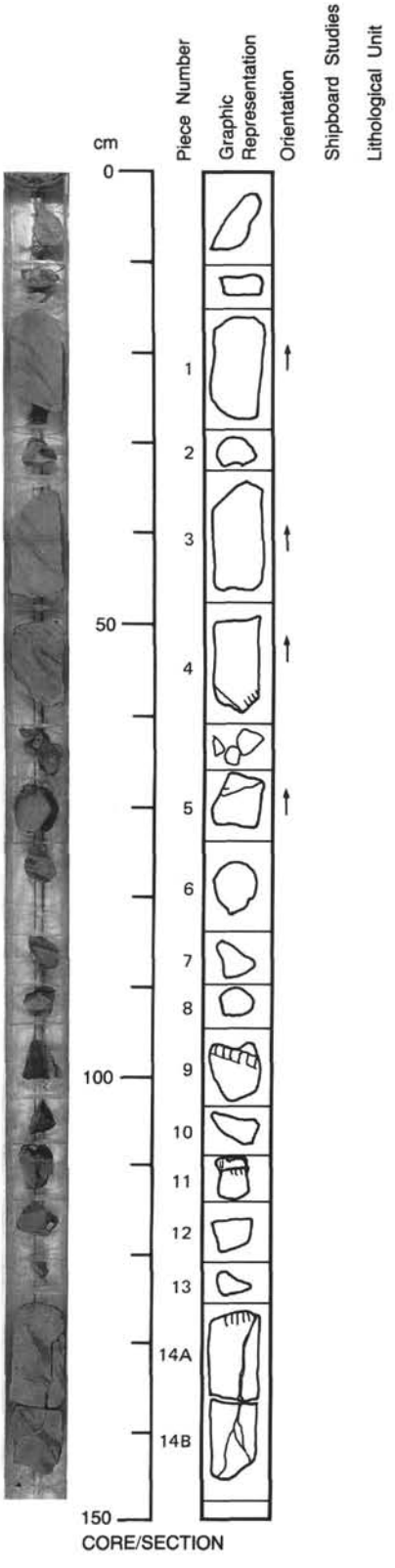


124-770B-16R-4

UNIT 1: CONTINUED

Pieces 1-4

CONTACTS: Chilled margin in Piece 1A (azimuth 120 degrees).
PHENOCRYSTS: Except at the top of Piece 1A, from the variolitic margin 1-2 cm downward, distributed uniformly as individual crystals of olivine or glomerophyric aggregates of plagioclase. Piece 2 contains an inclusion 4 x 5 mm in size consisting of plagioclase-olivine aggregate.
Plagioclase - ~3%; 0.5-2.0 mm; Laths, fresh.
Olivine - ~3%; 0.5-1.0 mm; Euhedral prisms, fresh (Pieces 1B, 4B) with spinel inclus ons, or altered to green and orange clays.
GROUNDMASS: Very fine-grained, intersertal divergent texture. Chilled margin of Piece 1A shows glassy, partially devitrified texture. Glass is fresh.
VESICLES: Irregularly distributed, relatively abundant in Pieces 1A, 1B, 2 (about 8%) filled mostly with green clays.
COLOR: Dark gray.
STRUCTURE: Massive, probably pillowed.
ALTERATION: Slight.
VEINS/FRACTURES: Irregular features, <1 mm wide, partially filled with clays; 1-3 mm veins filled with calcite and some green clay.

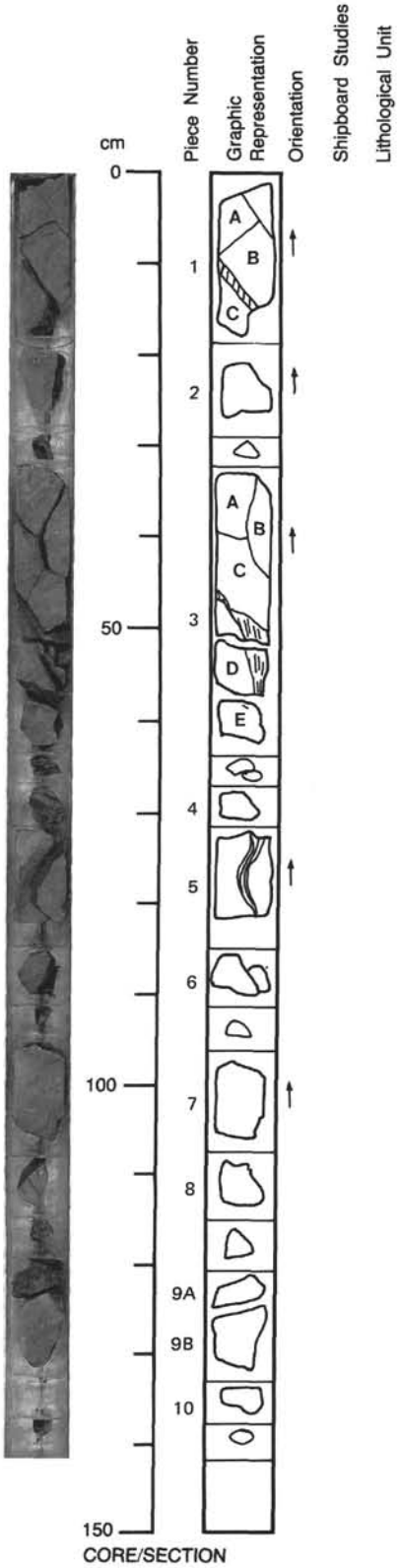


124-770B-17R-1

UNIT 1: CONTINUED

Pieces 1-14

CONTACTS: Chilled margins with fresh vesicular glass in Piece 14A (azimuth 95 degrees) or with microvariolitic texture on Piece 4A (azimuth 45 degrees) and Pieces 9 and 11 (unoriented).
PHENOCRYSTS: Rather irregularly distributed. Mostly as glomerophyritic aggregates with glassy mesostasis.
Plagioclase - ~10%; 0.3-2 mm; Euhedral or subhedral laths, fresh.
Olivine - ~3-5%; 0.3-0.5 mm; Prismatic euhedral, mostly fresh, emerald green in color, or yellow, transformed to orange clay if altered.
GROUNDMASS: Very fine-grained, mostly with radiating intersertal texture, locally with platy olivine crystals (Pieces 1 and 3); microvariolitic or glassy in chilled margins.
VESICLES: Few, filled with green clays.
COLOR: Dark gray, brownish gray.
STRUCTURE: ?Pillowed.
ALTERATION: Slight to variable.
VEINS/FRACTURES: Irregular veins 2-4 mm, filled with green clays and calcite; larger veins (> 1 cm) in Interval 54-70 cm filled with hyaloclastite breccia.

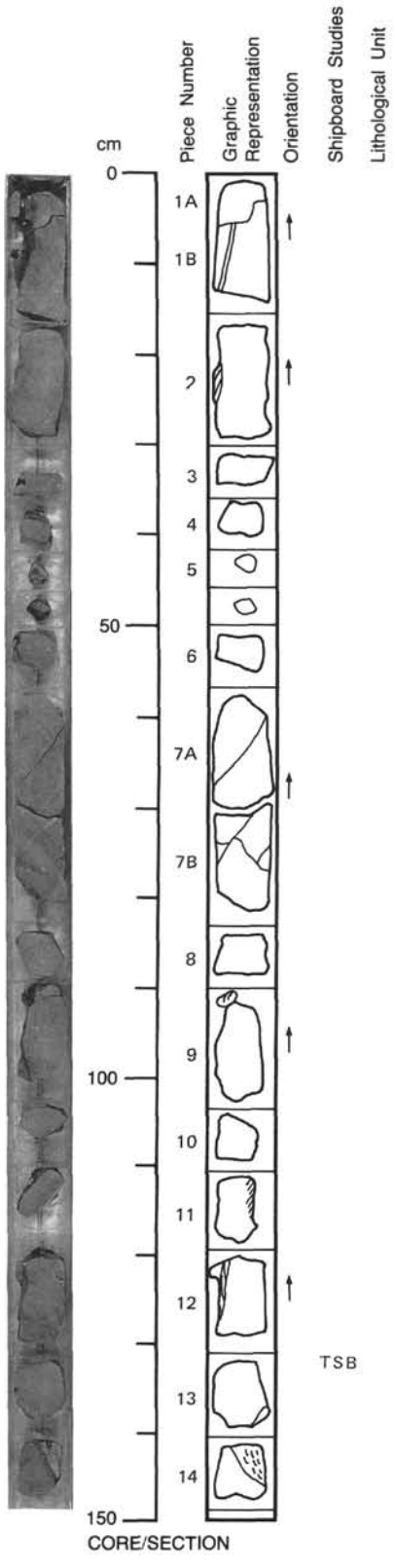


124-770B-17R-2

UNIT 1: CONTINUED

Pieces 1-10

CONTACTS: Chilled margin, black glass in Piece 9A, unoriented. Piece 10 comprises hyaloclastic fragments and variolitic zone ?pillow margin. Piece 3E also has glassy margin and variolites.
PHENOCRYSTS: Irregularly distributed individual crystals of olivine and plagioclase and glomeroporphyritic aggregates of plagioclase.
Plagioclase - 5%; 0.5-2 *mm*; Euhedral-subhedral.
Olivine - 3-5%; < 1.0 mm; Euhedral-subhedral.
GROUNDMASS: Microcrystalline to very fine-grained, intersertal aggregates of plagioclase laths and clinopyroxene and glass. Glass and variolitic texture at chilled margins.
VESICLES: <1%; Filled with dark green minerals generally calcite fills very small proportion.
COLOR: Dark gray.
STRUCTURE: Massive, with possible pillow margin remnants.
ALTERATION: Slight to moderate, much of the olivine altered to clay and limonite, fractures; veins of green and brown clay as shown in graphic representation, often limonite and carbonate border on thinner veins.
VEINS/FRACTURES: N/A



124-770B-17R-3

UNIT 1: CONTINUED

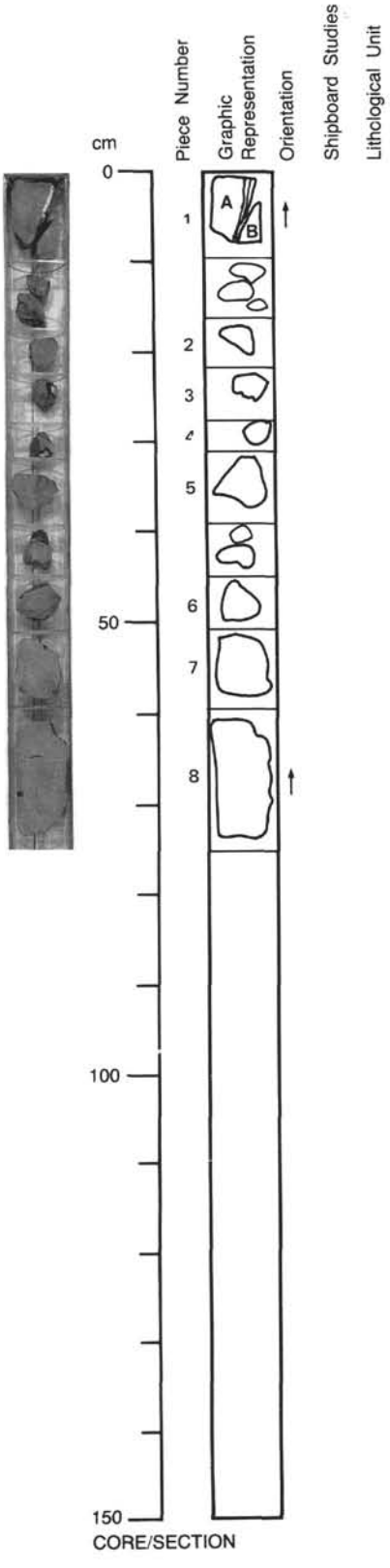
Pieces 1-10

CONTACTS: Piece 1, chilled glass, variolitic, very fine grained margins 5 mm wide.
PHENOCRYSTS: Irregularly distributed olivine and plagioclase phenocrysts. Olivine occurs clustered together. Plagioclase as individual crystals.
Plagioclase - 3-5%; 1-2 mm; Euhedral.
Olivine - 5-10%; 0.5 mm; Euhedral-subhedral.
GROUNDMASS: Fine-grained, intersertal aggregate of plagioclase, clinopyroxene, glass and platy olivine. Banded and fragmental glass and variolites in chilled margins.
VESICLES: ?; 1-2 mm; spherical; heterogeneously; particularly abundant in Pieces 1 and 2 (5%). Filled with dark and light green clay.
COLOR: Dark gray with limonite standing along fractures and altered olivine.
STRUCTURE: Massive with relic chilled margins.
ALTERATION: Slight to moderate, limonite stains along fracture margins and altered olivine crystals (limonite and clay).
VEINS/FRACTURES: Filled with clay, limonite and carbonate.

UNIT 1: CONTINUED

Pieces 11-14

CONTACTS: Pieces 11, 13 and 14, chilled glassy, fragmental and banded, variolitic very fine-grained 0.5-2 cm wide.
PHENOCRYSTS: Irregularly distributed single olivine crystals in clusters and glomerophyric aggregates of plagioclase.
Plagioclase - ~3%; 1-3 mm; Euhedral to subhedral.
Olivine - 3%; ~0.5 mm; Euhedral to subhedral.
GROUNDMASS: Cryptocrystalline to microcrystalline, no identifiable minerals. Banded and fragmental glassy and variolitic chilled margins.
VESICLES: 2-3%; Spherical and irregular; N/A; Filled with layers of lighter and darker green clays.
COLOR: Brownish gray.
STRUCTURE: Massive with some remnants of pillow margins indicating pillows 40-100 cm.
ALTERATION: Slight to moderate; mainly oxidation along fractures and of clay replacing olivine.
VEINS/FRACTURES: Few thin and irregular, filled with limonite and carbonate with green and brown clays in center.

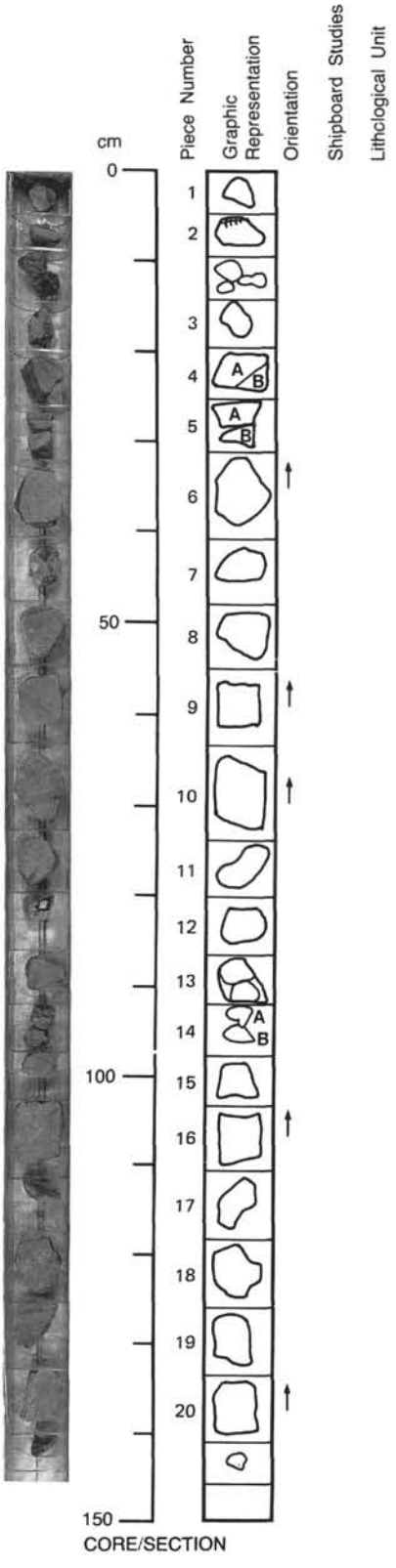


124-770B-17R-4

UNIT 1: CONTINUED

Pieces 1-8

CONTACTS: Piece 1A has 5 mm variolitic margin with very minor glass clast.
PHENOCRYSTS: Irregularly distributed individual crystals of olivine and plagioclase and glomerophyric aggregates of plagioclase and clinopyroxene.
Plagioclase - 3%; 1-2 mm; Euhedral and subhedral.
Clinopyroxene - <1%; < 0.5 mm; Aggregated with plagioclase.
Olivine - 3%; 0.5 mm; Euhedral, subhedral.
GROUNDMASS: Cryptocrystalline to microcrystalline groundmass. Pieces 5 and 6 are coarser-grained than average and have an intersertal texture composed of plagioclase, clinopyroxene and glass.
VESICLES: 2-3%; up to 1 mm; filled with layers of green clays and limonite, scattered.
COLOR: Brownish gray.
STRUCTURE: Massive, chilled margin remnants.
ALTERATION: Slight to moderate, groundmass stained with limonite near fractures.
VEINS/FRACTURES: N/A

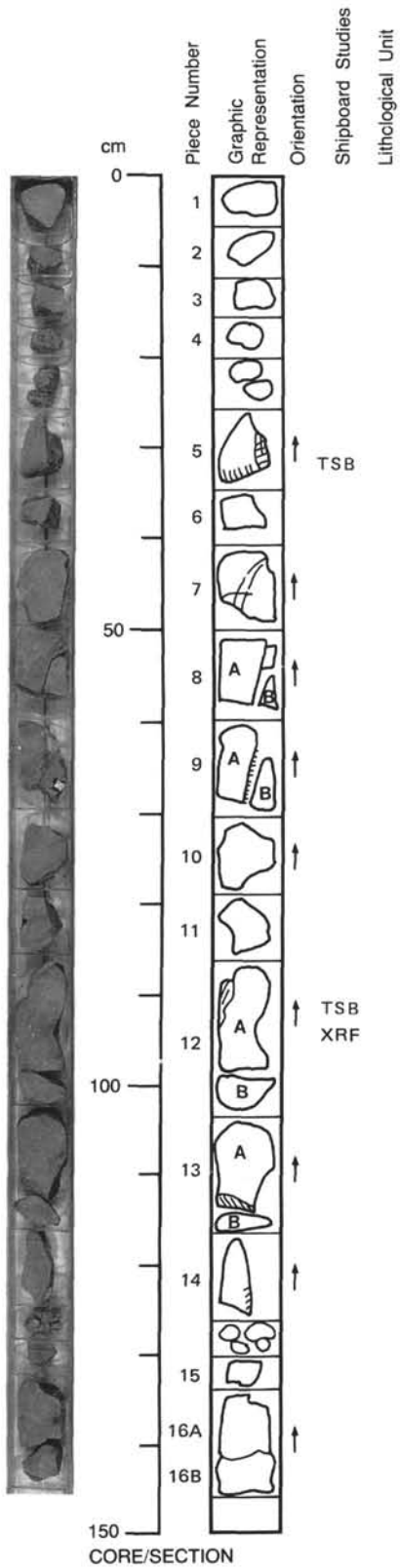


124-770B-18R-1

UNIT 1: CONTINUED

Pieces 1-20

CONTACTS: Piece 2 and the fragments below have relics of chilled margins, fragments of glass and variolites.
PHENOCRYSTS: Irregularly distributed single crystals of plagioclase and olivine and glomerophyric aggregates.
Plagioclase - 5-10%; 1-2 mm; Euhedral, subhedral.
Olivine - 5-10%; 0.5-1 mm; Euhedral, subhedral.
GROUNDMASS: Texture varies, but is dominantly cryptocrystalline to microcrystalline increasing in grain size to intersertal aggregates of plagioclase, clinopyroxene and minor glass. Pieces 1-6 and 13-17 microcryptocrystalline; 8-11 and 18-19 intersertal.
VESICLES: Few, ~1% in micro- and cryptocrystalline matrix; 1 mm, <0.5% in intersertal matrix. Spherical and irregular, filled with dark and light green clays.
COLOR: Brownish gray.
STRUCTURE: Massive with minor remnants of chilled margins.
ALTERATION: Slight to moderate, oxidation around veins and fractures, olivines altered to clay and limonite.
VEINS/FRACTURES: Few veinlets filled with Fe-oxide and silica.
ADDITIONAL COMMENTS: This is probably a pillow lava unit made up of large pillows with intersertal texture and smaller pillows with microcrystalline texture, all have similar phenocryst assemblage.

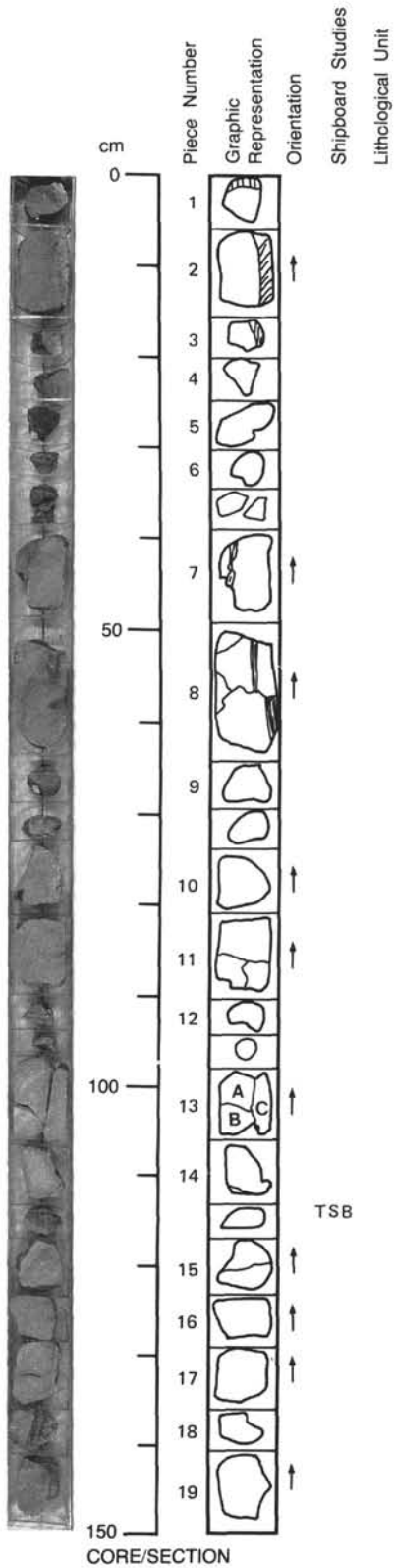


124-770B-18R-2

UNIT 1: CONTINUED

Pieces 1-16

CONTACTS: ~5 mm wide, fresh black glass and variolite rim on the bottom of Piece 6.
PHENOCRYSTS: Heterogeneously distributed crystals of plagioclase and olivine with glomerophyric aggregates of plagioclase, clinopyroxene and glass.
Plagioclase - 2-5%; 1-2 mm; Euhedral to subhedral.
Olivine - 2-5%; < 1mm; Euhedral, subhedral.
GROUNDMASS: Microcrystalline to very fine-grained intersertal, made up of plagioclase, clinopyroxene and glass.
VESICLES: Heterogeneously distributed, abundant small (<0.5 mm) irregular vesicles near chilled margins, larger (1 mm) scattered, spherical vesicles filled with green clay.
COLOR: Gray with oxidized zones and areas.
STRUCTURE: Massive with very minor remnants of chilled margins.
ALTERATION: Slight to moderate alteration, oxidation adjacent to veins and fractures, olivine altered partly to clay and limonite.
VEINS/FRACTURES: Several green clay filled fractures up to 1 cm wide, crystals and glass fragments suspended in the fine green matrix. Carbonate and limonite margins and separate veins.



124-770B-18R-3

UNIT 1: CONTINUED

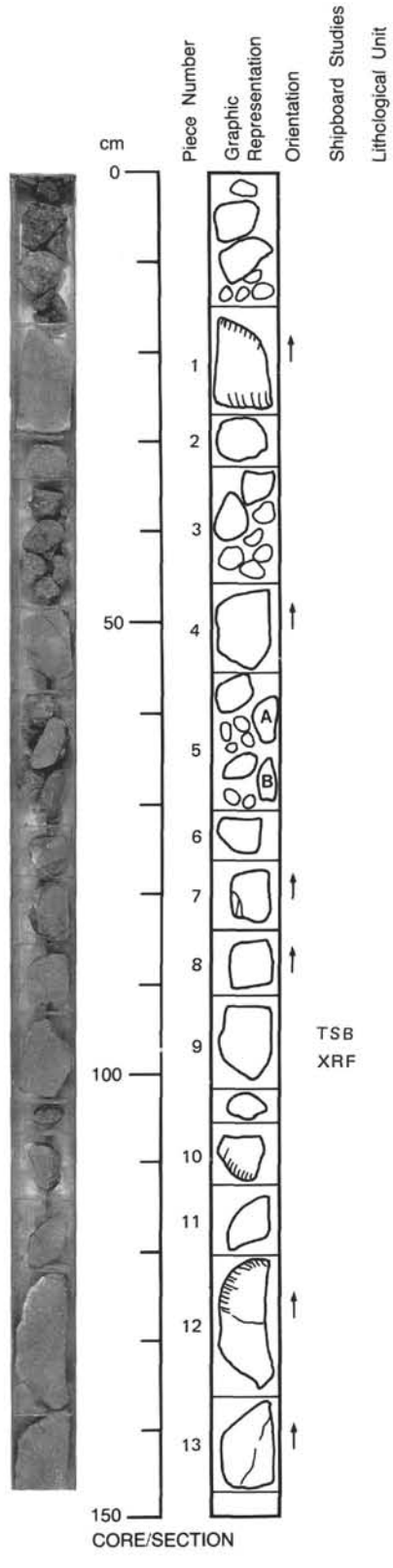
Pieces 1-9

CONTACTS: Fresh glassy, fragmental and variolitic chilled margins on Pieces 1, 2 and 3.
PHENOCRYSTS: Heterogeneously distributed plagioclase, olivine crystals and glomerphyric aggregates.
Plagioclase - <10%; 1-3 mm; Euhedral to subhedral.
Olivine - <10%; 0.5-1.0 mm; Euhedral to subhedral.
GROUNDMASS: Microcrystalline to cryptocrystalline with glassy patches.
VESICLES: <5%; up to 1 mm; Round and irregular; Heterogeneously distributed; Filled or partially filled with green clay.
COLOR: Gray to brownish gray.
STRUCTURE: Massive, minor remnants of chilled margins.
ALTERATION: Sparse to moderate, oxidation along veins and fractures, olivine partly altered to clay and limonite.
VEINS/FRACTURES: Up to 1 cm in width, filled with green clay with glassy clasts, calcite along some margins, limonite in fine fractures.

UNIT 2: HIGHLY PLAGIOCLASE-OLIVINE PHYRIC BASALT

Pieces 10-19

CONTACTS: None.
PHENOCRYSTS: Uniformly distributed plagioclase and olivine.
Plagioclase - ~15%; up to 5 mm; Euhedral.
Olivine - 5-10%; 0.5-1 mm; Euhedral to subhedral.
GROUNDMASS: Microcrystalline intersertal intergrowth of plagioclase and pyroxene and glass.
VESICLES: Few, rounded vesicles <0.5 mm, filled with green clay.
COLOR: Light gray.
STRUCTURE: Massive.
ALTERATION: Slight; olivines altered to clay and limonite, some limonite staining in zones around thin fractures.
VEINS/FRACTURES: Limonite stained irregular fractures and few < 5 mm veins filled with green clay with carbonate margins.

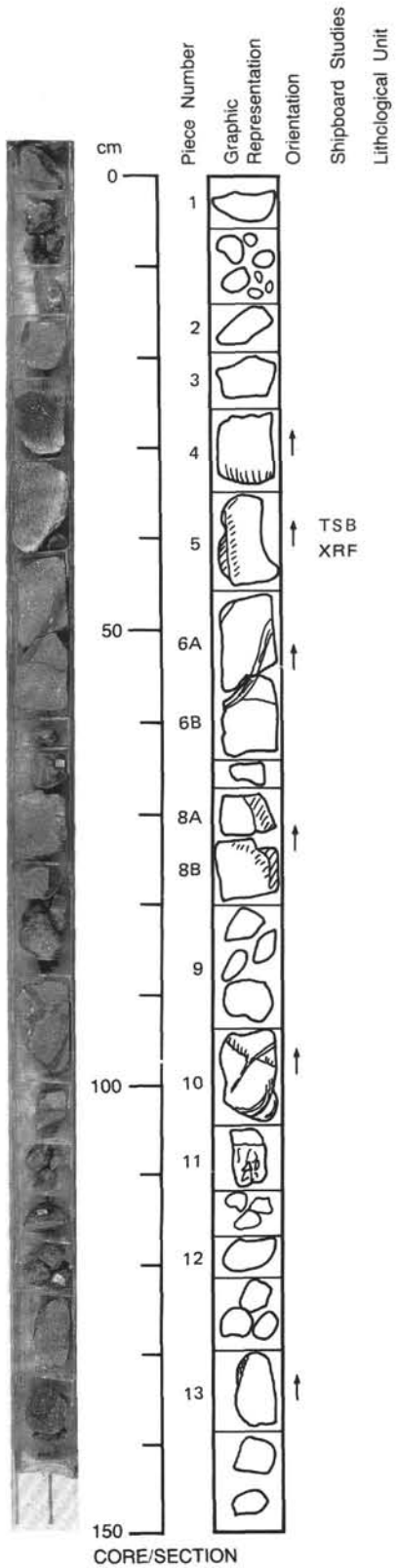


124-770B-19R-1

UNIT 2: CONTINUED

Pieces 1-13

CONTACTS: Glassy and variolitic chilled margins in pieces 1, 6, 10, 12, and hyaloclastic breccia occurs in Piece 3 and associated fragments, some of the fragments associated with Pieces 5A and 5B.
PHENOCRYSTS: Abundant and uniformly distributed plagioclase and olivine.
Plagioclase - ~15%; 1-3 mm; Euhedral.
Olivine - 5-10%; 0.5-2 mm; Euhedral to subhedral.
GROUNDMASS: Microcrystalline, intersertal aggregates of radiating plagioclase laths and ? olivine plates and glass with clinopyroxene prisms.
VESICLES: 2%; <0.5 mm; Spherical; Heterogeneously distributed; Often only lined with dark green minerals.
COLOR: Light gray with oxidized zones along fractures and patches where olivine is abundant.
STRUCTURE: The common chilled margins and hyaloclastic breccia suggest a pillow lava.
ALTERATION: Slight, some limonite staining adjacent to fractures and olivine altered in part to green clay and limonite .
VEINS/FRACTURES: Very fine fractures in Pieces 12 and 13, with limonite.

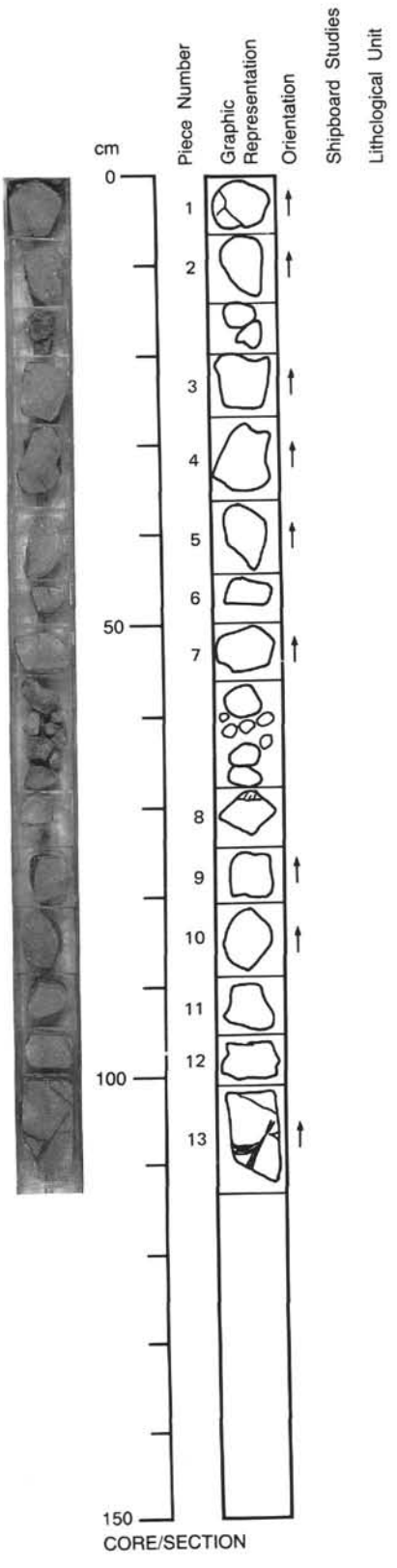


124-770B-19R-2

UNIT 2: CONTINUED

Pieces 1-13

CONTACTS: Pieces 4, 5, 8B, show chilled variolitic margins.
PHENOCRYSTS: Uniformly distributed phenocrysts and glomerophyric aggregates.
Plagioclase - 10-15%; 1-3 mm; Euhedral to subhedral.
Olivine - 5-10%; 0.5-1.5; Euhedral to subhedral. Sometimes aggregated with plagioclase.
GROUNDMASS: Microcrystalline to very fine-grained intersertal texture made up of plagioclase laths, clinopyroxene and glass.
VESICLES: 0-2%.
COLOR: Light gray, stained with lominite in part.
STRUCTURE: Massive, with some curved chilled margins and veins and patches of hyaloclastite breccia.
ALTERATION: Slight, limonite staining in zones adjacent to veins, and clay and limonite partially replace olivine.
VEINS/FRACTURES: There are fractures up to 1 cm wide in networks which are filled with green clay containing angular glassy and lithic fragments-hyaloclastite.
ADDITIONAL COMMENTS: In Piece 5 the olivine phenocrysts occur concentrated in a zone parallel to the chilled margin.

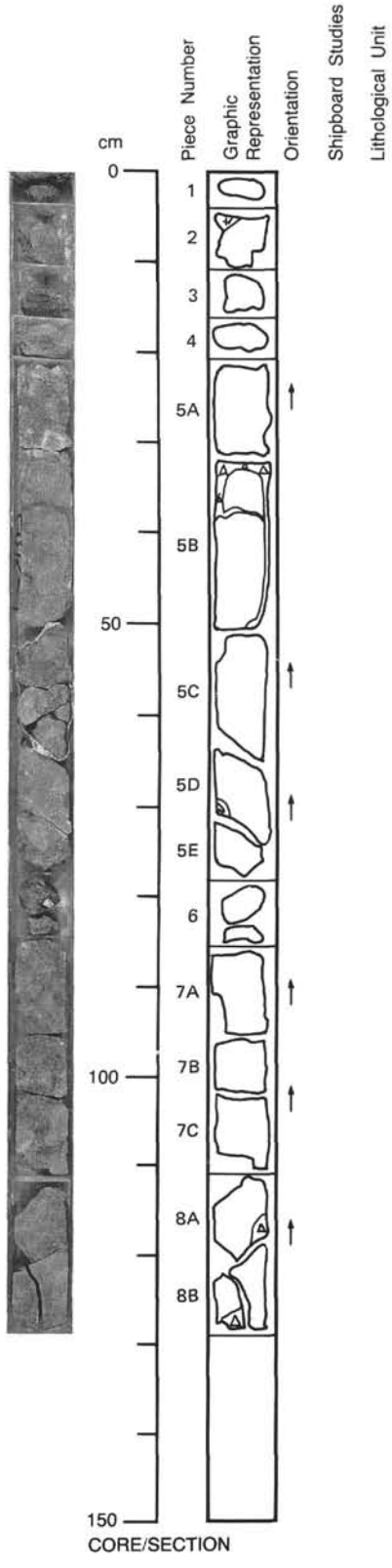


124-770B-19R-3

UNIT 2: CONTINUED

Pieces 1-13

CONTACTS: None.
PHENOCRYSTS: Uniformly distributed plagioclase and olivine, single crystals and glomerophyric aggregates.
Plagioclase - 10-15%; 1-3 mm; Euhedral to subhedral.
Olivine - 5-10%; 0.5-1.5 mm; Euhedral to subhedral.
GROUNDMASS: Microcrystalline to very fine-grained intersertal, plagioclase, clinopyroxene and glass, possibly with olivine plates.
VESICLES: None.
COLOR: Light gray, zones and patches limonite stained.
STRUCTURE: Massive, fractured.
ALTERATION: Slightly altered in zones 2 cm wide along fractures and olivine altered in part to clay and limonite.
VEINS/FRACTURES: Pieces 1, 8 and 13 have green clay filled veins up to 1 cm wide. These veins contain olivine crystals, glassy fragments and lithic clasts.



124-770B-20R-1

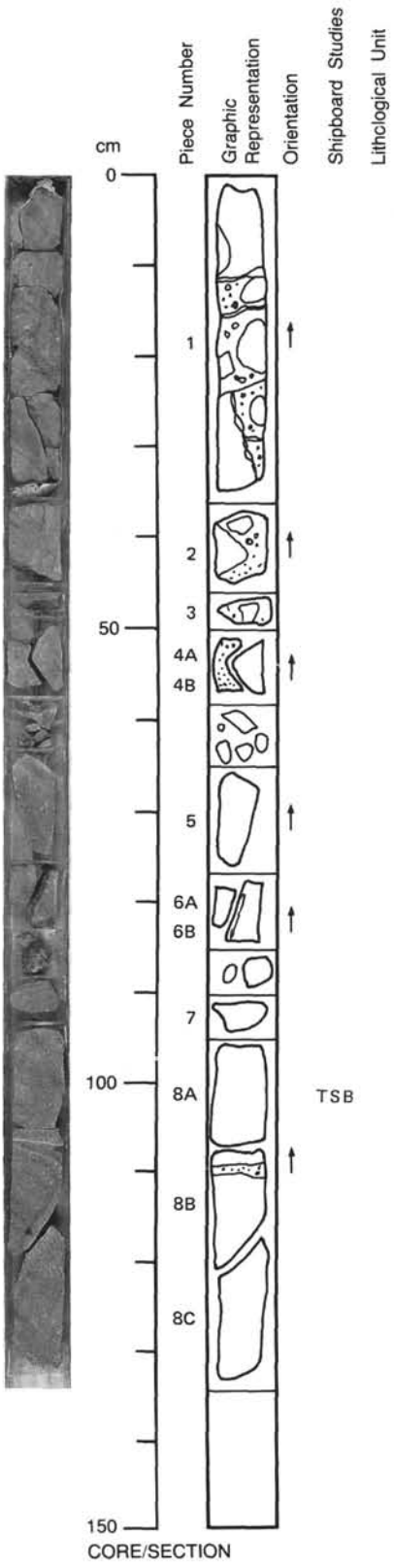
UNIT 3: BASALTIC PILLOW BRECCIA

Pieces 1-8

CONTACTS: None.
PHENOCRYSTS: see comments
GROUNDMASS: see comments
VESICLES: see comments
COLOR: see comments
STRUCTURE: see comments
ALTERATION: see comments
VEINS/FRACTURES: see comments
ADDITIONAL COMMENTS: This unit is a volcanic breccia generally angular fragments in which the largest clasts are fragments of porphyritic lava and are 5-10 cm in Pieces 5B and 8. Similar smaller clasts are found in all pieces along with dark and light green glassy clasts. The larger clasts are surrounded by a fine grained matrix with lithic and glassy fragments 1-10 mm, which are themselves surrounded by a pale green clay matrix perhaps formed from volcanic ash. The small fragments show all the textures associated with chilled margins, banded and fragmental glass, and variolitic textured fragments. The largest clast in Piece 5B is penetrated by a green clay vein 5 mm in diameter which contains glass clasts, lithic clasts just like the large one, individual crystals.
SEE OVERFLOW

Pieces 1-8

Several of the larger lithic clasts (5 cm) in Pieces 5A and 7C have the buff colored chilled margin preserved. The majority of the larger clasts are of the more porphyritic variety of lava (Unit 2) with ~15% plagioclase phenocrysts and 5-10% olivine set in a microcrystalline to intersertal matrix. In some clasts, platy olivine occurs. These quenched olivine crystals are prominent in Pieces 7A and 7C and plagioclase phenocrysts are less obvious.



124-770B-20R-2

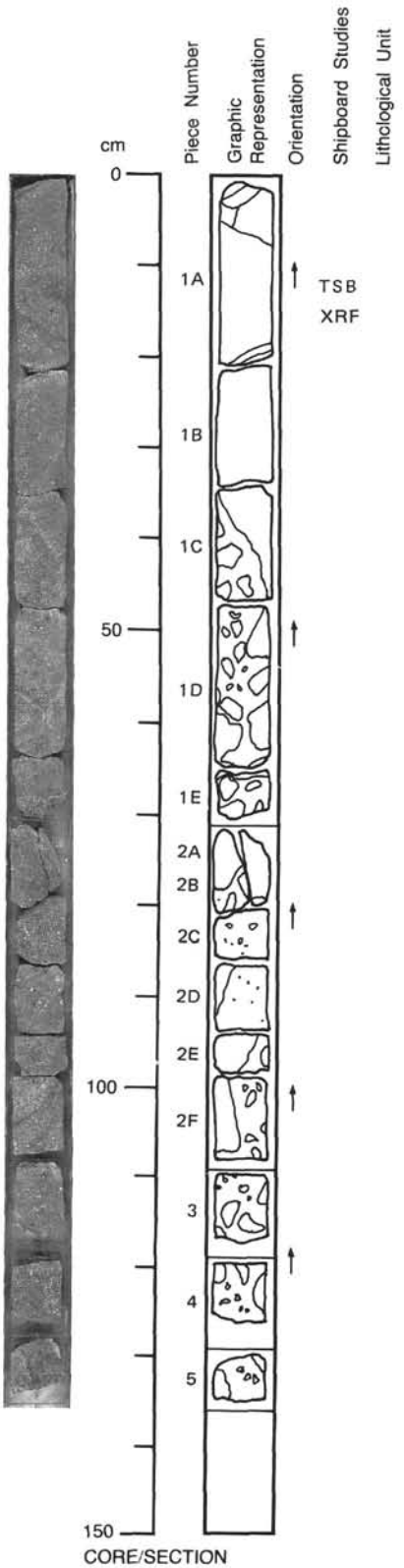
UNIT 3: CONTINUED

Pieces 1-8

CONTACTS: None.
PHENOCRYSTS: see comments
GROUNDMASS: see comments
VESICLES: see comments
COLOR: Dark gray, brownish gray, dark green.
STRUCTURE: see comments
ALTERATION: Variable, mostly slight (large clasts) to moderate (fine glassy clasts).
VEINS/FRACTURES: see comments
ADDITIONAL COMMENTS: Homogeneous breccia consisting of angular fragments of porphyritic lava, highly variable in size ranging from > 20 cm (Pieces 8B and 8C) to about 0.5 cm. Pieces 5, 8A and 8B p.p are decimeter-sized fragments; Pieces 1 and 2 show a well recovered interval of breccia with clasts 1-10 cm in size set in a finely brecciated matrix consisting of fragments of porphyritic lava < 1 cm to some mm in size. Highly variable in texture (glassy, microvariolitic, subvariolitic, hyaloporphyritic with prisms or platy olivine microphenocrysts). Cement consists of silica, clay and some carbonate. Structure and petrography of the clasts suggest an origin by fragmentation of pillow lava. SEE OVERFLOW

Pieces 1-8

Larger clasts consist of porphyritic basalt containing 10-15% volume plagioclase (1-3 mm) and 5-10% volume olivine (1-0.5 mm) within a fine-grained groundmass of plagioclase, clinopyroxene,olivine with intergranular to intersertal texture. Vesicles are 1-2% in volume, filled with green clays.



124-770B-20R-3

UNIT 3: CONTINUED

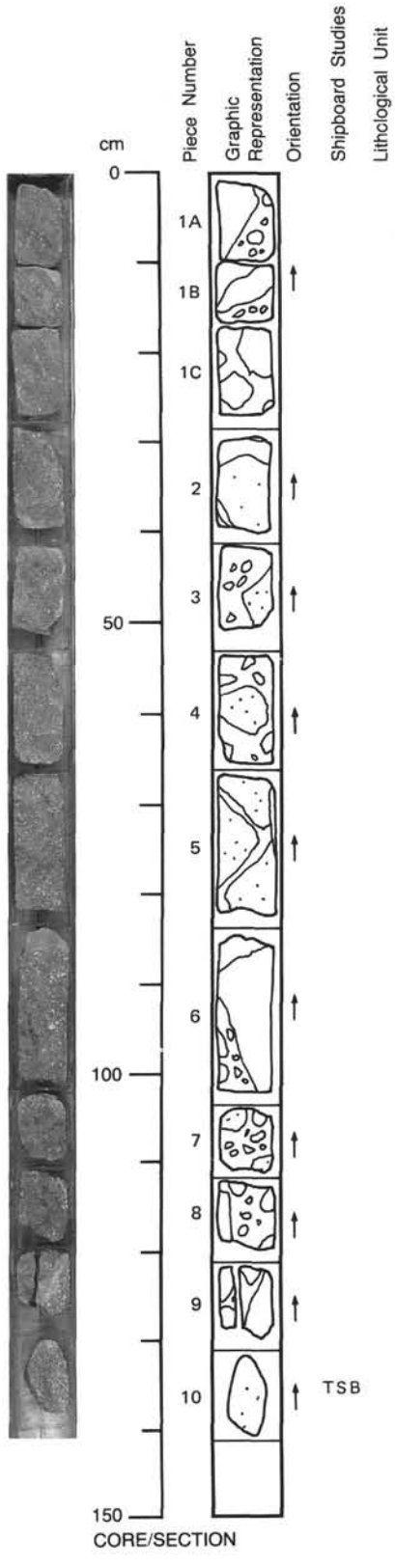
Pieces 1-2B

CONTACTS: see comments
PHENOCRYSTS: see comments
GROUNDMASS: see comments
VESICLES: see comments
COLOR: see comments
STRUCTURE: see comments
ALTERATION: see comments
VEINS/FRACTURES: see comments
ADDITIONAL COMMENTS: The basaltic breccia consists in the interval of 1-40 cm of highly porphyritic plagioclase-olivine dolerite (Pieces 1A, 1B, 1C p.p) constituting a single fragment bounded, on top of Piece 1A, by a vein of fine volcanic clasts cemented by silica and clay. In the interval 40-80 cm, breccia consists of fragments of porphyritic dolerite, similar to the overlying larger one, 0.5-6 cm in size, lithologically uniform, subangular in shape, cemented by carbonate and silica mixed with clays. Color is gray, brownish gray.

UNIT 4: AMYGDALOIDAL HIGHLY PLAGIOCLASE-OLIVINE-PHYRIC BASALT

Pieces 2C-5

CONTACTS: Sharp, separated by a vein of finely brecciated volcanics from Subunit 3A.
PHENOCRYSTS:
Plagioclase - 5%; 2-0.5 mm; Isolated lath shaped crystals or aggregates of few crystals.
Olivine - 5-10%; 0.5-1.5 mm; Euhedral, partly altered to orange clays and calcite or ?silica.
GROUNDMASS: Fine-grained microcrystalline consisting of plagioclase, clinopyroxene, olivine, Fe-Ti oxides, occasionally with scarce glassy mesostasis, intergranular to intersertal in texture.
VESICLES: 3-20%; 0.5-3.0 mm; N/A; Rather irregularly distributed; Mostly spherical filled with calcite and smectite.
COLOR: Gray, brownish gray, brown (veins).
STRUCTURE: Brecciated with uniformly textured clasts, suggesting an origin by fragmentation of massive lava and subsequent cementation (detrital and chemical).
ALTERATION: Locally slight, affecting olivine and incipiently plagioclase.
VEINS/FRACTURES: N/A
ADDITIONAL COMMENTS: Monogenic breccia consisting of lithologically uniform fragments of highly porphyritic amygdaloidal basalt, 1 mm to 8 cm in size, with a silica-carbonate-clay cement.

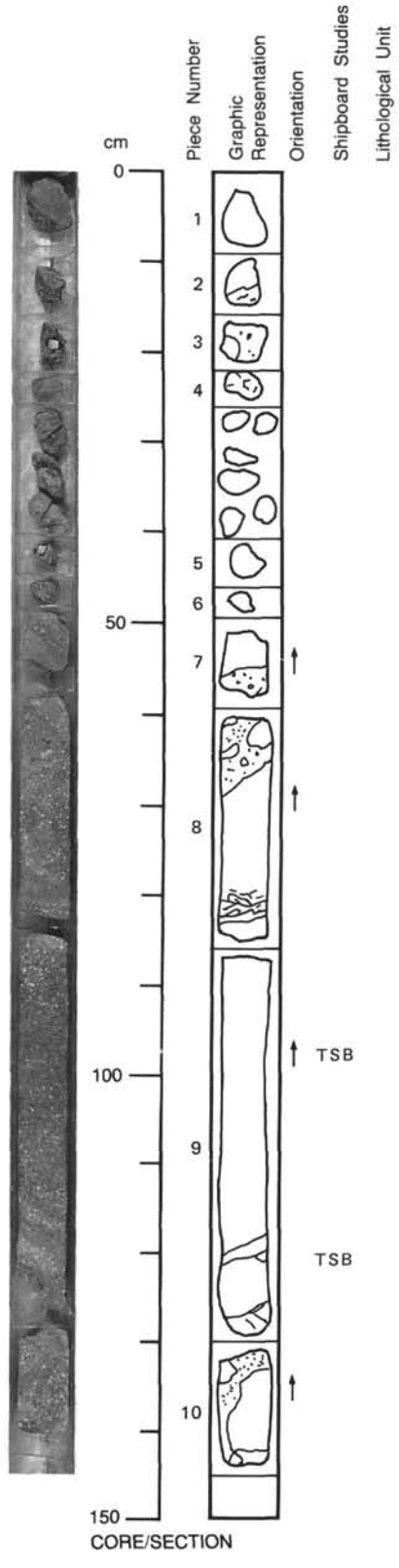


124-770B-20R-4

UNIT 4: CONTINUED

Pieces 1-10

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - ~5%; 0.5-10 mm; Euhedral, lath shape.
Olivine - ~10%; 0.5-1.5 mm; Euhedral, occasionally altered to calcite, occasionally glomerocrysts, rimmed with orange oxidation stains.
GROUNDMASS: Composed of plagioclase, pyroxene and olivine in intersertal and intergranular relationship. Pyroxene can have sub-ophitic to ophitic inclusions of plagioclase. The groundmass is fine- and medium-grained. Pyroxene seems to be the more abundant component in certain portions. The grain size is coarser than the earlier basalts. Gives the rock a doleritic appearance. Olivine in the groundmass appears fresher than those in the phyric phase. Plagioclase is slightly to moderately altered (to clay ?).
VESICLES: 5-20%; 0.5-9.0 mm; Highly vesicular/amygdaloidal; dominantly filled with calcite, minor amygdules are green (chloritic/smectitic) clay and are finer (>0.5 mm).
COLOR: The rock is gray, the interclast filling material is light brown (rust color) to orange.
STRUCTURE: Brecciated, fractured.
ALTERATION: Brown oxide stains occur as halos rimming fractures and veins. Groundmass if fresh, except for the occasional turbid appearance of the plagioclase; may indicate some clay (possibly kaolinite/illite) alteration.
VEINS/FRACTURES: The open fractures as a result of brecciation is filled with carbonate bearing brown siliceous clay material, which can contain centimeter size clasts of the host rock.
ADDITIONAL COMMENTS: The rock, being brecciated, is more probably a flow than an intrusive, in spite of its relatively coarser character (than earlier units), which make it doleritic. ODP classification, however, restricts the name dolerite to intrusive rocks. Thus, this unit is classified as basalt.



124-770B-21R-1

UNIT 5: AMYGDALOIDAL MODERATELY TO HIGHLY PLAGIOCLASE-OLIVINE PHYRIC BASALT

Pieces 1-10

CONTACTS: No sharp contact. Some fine-grained poorly vesicular zones are observed in Pieces 8 and 9.

PHENOCRYSTS:
Plagioclase - 5-10%; 0.5-3 mm; Isolated laths or aggregates of few lath crystals.
Olivine - 1-3%; 1.0-0.5 mm; Euhedral, partly altered to clays and calcite or silica.

GROUNDMASS: Fine-grained, consisting of plagioclase, clinopyroxene, olivine, Fe-Ti oxide, with intergranular texture.

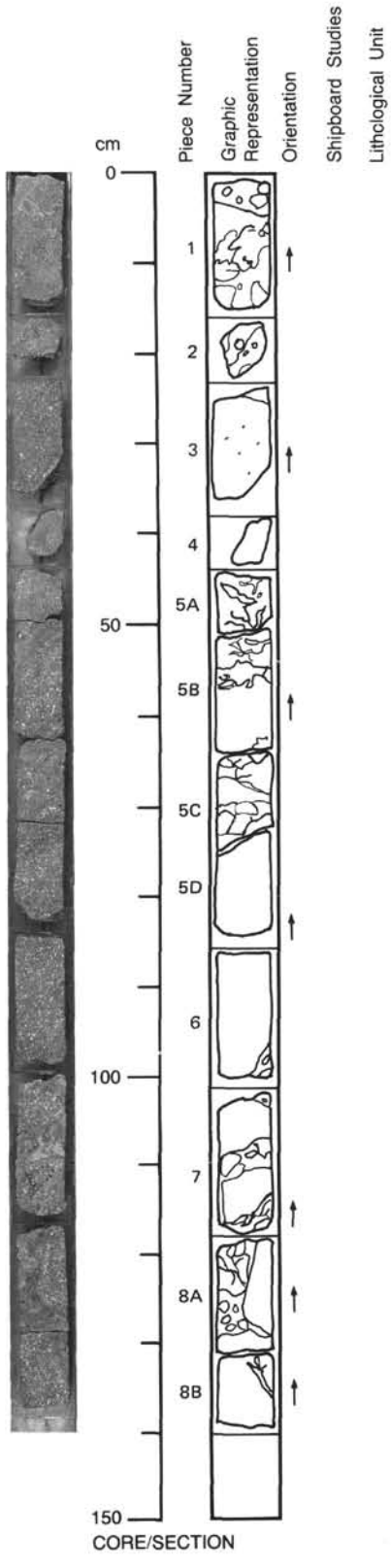
VESICLES: Mostly abundant, 10-25%, some coarse, spherical lobate and ovoidal shaped 1-3 mm in size, fine vesicles less than 1 mm are also diffused. Larger vesicles are completely or partly filled, finer ones are filled. Filling consists of silica, green clays and calcite.

COLOR: Dark gray, brownish gray and pinkish gray (brecciated zones).

STRUCTURE: Brecciated, irregular veins consisting of finely brecciated lava fragments, similar to the massive one, but often finer-grained and poor in vesicles, cemented by calcite, silica and clays, are present in Pieces 2-4, 7, 8 and 10. They are up to 4 cm wide.

ALTERATION: N/A

VEINS/FRACTURES: N/A

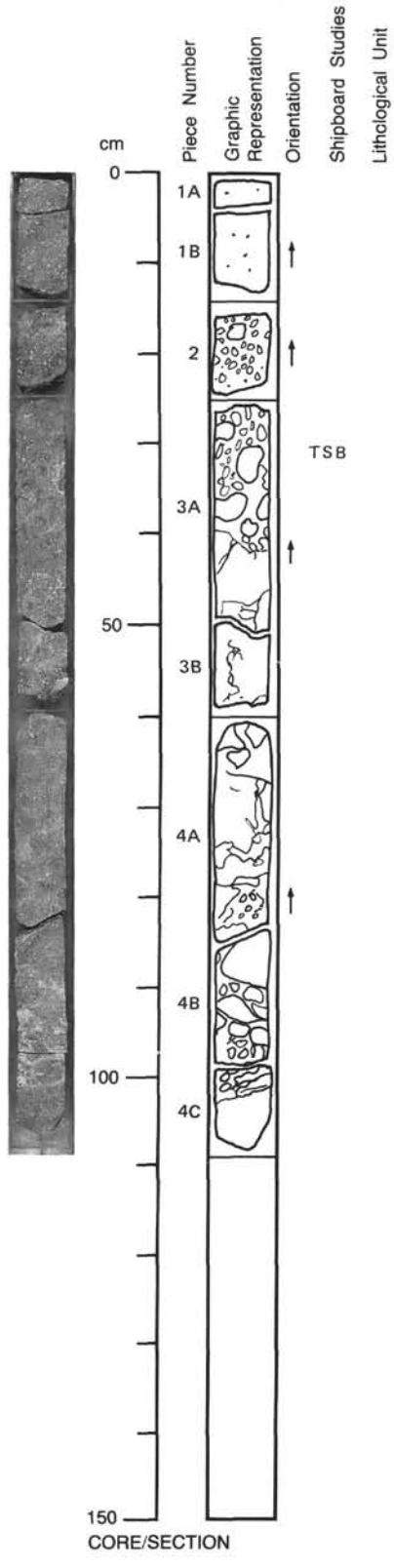


124-770B-21R-2

UNIT 5: CONTINUED

Pieces 1-8

CONTACTS: see comments
PHENOCRYSTS: see comments
GROUNDMASS: see comments
VESICLES: see comments
COLOR: see comments
STRUCTURE: see comments
ALTERATION: see comments
VEINS/FRACTURES: see comments
ADDITIONAL COMMENTS: Similar in lithology to Section 124-770B-21R-1, but more homogeneous in the distribution of phenocrysts and of vesicles. The latter are about 20% in volume. Veins of finely brecciated lava, highly irregular, are present in Pieces 1, 2 and 5A. They are cemented by silica, clays and carbonate. Pieces 4, 5C, 7 and 8A show brecciated texture with subrounded fragments 1-10 cm in size. Veins cemented mostly by secondary minerals with rare fine lava clasts. Some coarse fragments in Piece 7 and 8 have lobate outlines and show the development of a relatively fine-grained non-vesicular marginal zone 3-8 mm in thickness. These features give evidence of chilling at margins of clasts and later vesiculation in their interior, that could indicate autoclastic type of brecciation.



124-770B-21R-3

UNIT 5: CONTINUED

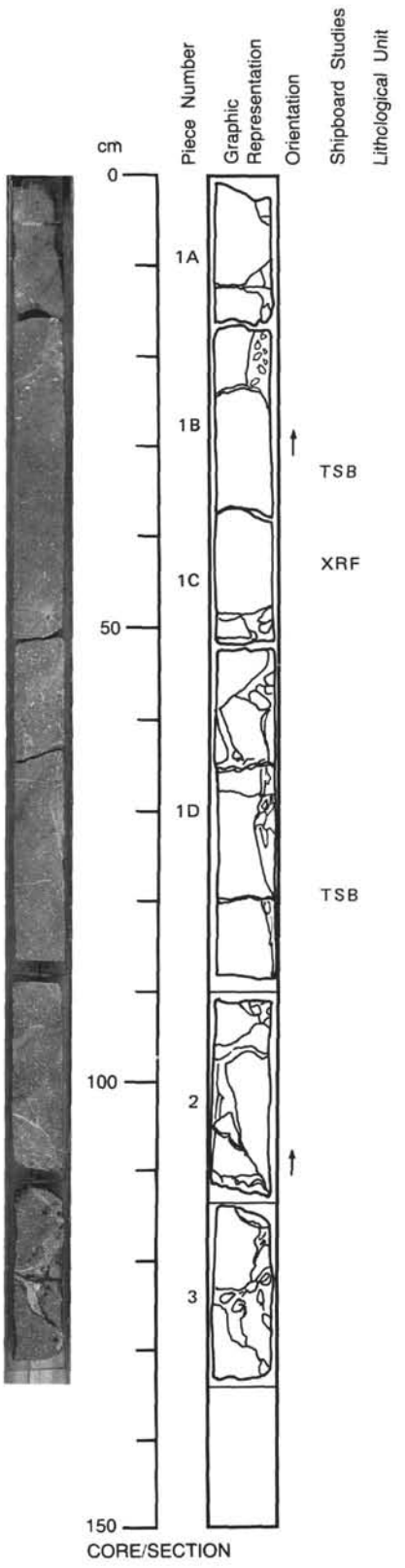
Pieces 1A-1B

CONTACTS: see comments
PHENOCRYSTS: see comments
GROUNDMASS: see comments
VESICLES: see comments
COLOR: see comments
STRUCTURE: see comments
ALTERATION: see comments
VEINS/FRACTURES: see comments
ADDITIONAL COMMENTS: Similar in texture and composition to Section 124-770B-21R-2. Not brecciated. Phenocrysts slightly more abundant reaching 10% of both olivine and plagioclase in different parts of the section.

UNIT 6: BRECCIATED MODERATELY TO HIGHLY PLAGIOCLASE-OLIVINE PHYRIC BASALT

Pieces 1B-3

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5-10%; 0.5-4 mm; Isolated laths or aggregates of few laths.
Olivine - 5-15%; 0.5-3 mm; Euhedral, partly altered to clays and calcite.
GROUNDMASS: Microcrystalline, intergranular to subophitic intergrown of plagioclase, clinopyroxene, olivine and Fe-Ti oxide. In the microbreccia on top of the unit (Pieces 1B, 2, 3), the lava clasts have glassy or hyaloporphyritic texture. Glass is altered to clays or devetrified.
VESICLES: 5-20%; Irregularly distributed.
COLOR: Gray, brownish gray.
STRUCTURE: Finely to coarsely brecciated. Pieces 1B (1 cm at bottom), 2 and 3A (upper 7 cm) consist of microbreccia made of fragments of glass, hypohyaline and hyaloporphyritic (olivine and plagioclase phyric) lava, 2-10 mm in size, or fragments of microcrystalline lava, more scarce and smaller (0.5-2 mm), and of a matrix of fine glass clasts cemented by silica and clay with some calcite. REST SEE COMMENTS
ALTERATION: Slight to moderate.
VEINS/FRACTURES: N/A
ADDITIONAL COMMENTS: STRUCTURE CONTINUED: Piece 3A (lower 20 cm) consists of breccia with rounded clasts 2-5 cm in size of porphyritic vesicular lava grading to non-vesicular and finer-grained in the outer zone, cemented by veins of clay, silica and calcite including mm-sized fragments of glassy lava. These two types of breccia could represent the autoclastically brecciated top of a lava flow.

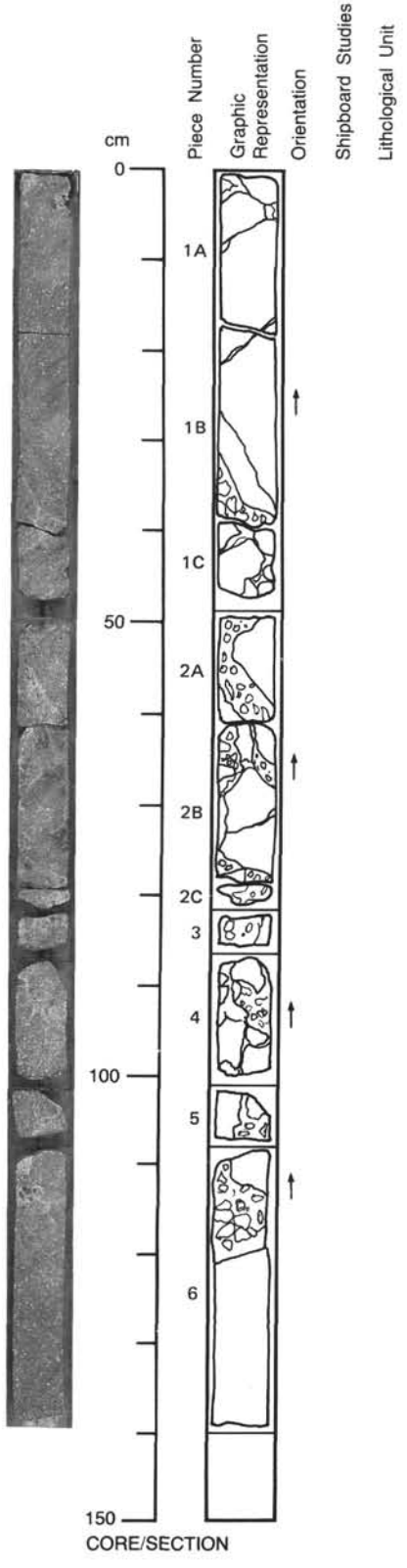


124-770B-21R-4

UNIT 6: CONTINUED

Pieces 1-3

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 3-10%; 0.5-4 mm; Euhedral, lath-like.
Olivine - 8-10%; 0.5-3 mm; Euhedral.
GROUNDMASS: Texture intersertal and intergranular, subophitic. Consisting of 40% plagioclase, ~40% pyroxene and ~20% olivine. Subhedral pyroxene is intergranular with plagioclase, and are occasionally in subophitic relation to the latter. Olivine is more or less evenly distributed and may occur within interstices of other crystals. They are easily altered to Fe-oxide and calcite or silica.
VESICLES: Interval 0-45 cm is slightly vesicular (5%), from 45-134 cm, is moderately to highly vesicular (8-15%). Vesicle fillings are calcite and brown oxides. Size range is 0.5-6 mm, round to lobate.
COLOR: Gray to brownish in stained portions. Veins are white to light brown, to red.
STRUCTURE: Brecciated. There can be two types of brecciation present. One is autoclastic, in which the clasts are finer grained along the border, where they are in contact with the filling vein material. The interior is coarser grained and highly vesicular. Another type of brecciation is post-depositional and can be related to tectonic movements. The clasts in this type are angular and are broken in jig-saw fashion, where each individual fragment fits with another.
ALTERATION: Fe-oxide halos can be observed along veins and fractures. Otherwise, the rock is relatively fresh. The slightly turbid appearance of plagioclase phenocrysts indicates weak clay alteration. Olivine phenocrysts can be replaced by calcite and silica. Those in the groundmass phase are rimmed by iron oxide and may be completely replaced where oxidation is prominent.
VEINS/FRACTURES: Stringers and veinlets traverse the core along fractures and brecciation zones. Size is from 1-20 mm. Filling material is light brown to white and red calcite bearing, siliceous clay and silica. Along the veinlets may be included millimeter to centimeter size clasts of rock fragments.
ADDITIONAL COMMENTS: This is the interior of the lava flow. It is coarser grained than basalts at top of the basement.

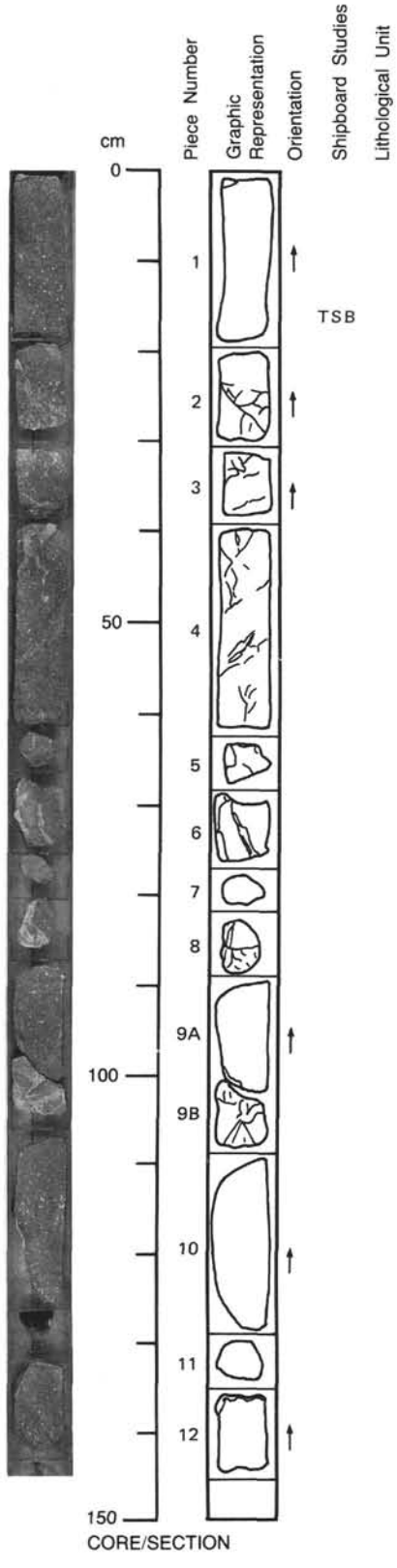


124-770B-21R-5

UNIT 6: CONTINUED

Pieces 1-6

CONTACTS: None
PHENOCRYSTS:
Plagioclase - 5-10%; 0.5-3 mm; Lath shaped.
Olivine - 0-8%; 0.5-2.0 mm; Euhedral prisms.
GROUNDMASS: Fine-grained, consisting of intergranular to intersertal intergrowths of plagioclase, clinopyroxene, olivine and Fe-Ti oxide.
VESICLES: Rather uniformly distributed except along thin chilled margins, 10-15%, 0.5-5 mm, filled with silica, clays and calcite.
COLOR: Gray, brownish gray, reddish gray.
STRUCTURE: Coarsely brecciated clasts 1 to >35 cm with fine-grained non-vesicular rims and rounded or lobate outline are cemented with veins of clay, silica and calcite containing finely brecciated clasts of microlitic and glassy lava. This suggests that brecciation was most caused by interaction with sea water.
ALTERATION: Slight.
VEINS/FRACTURES: N/A

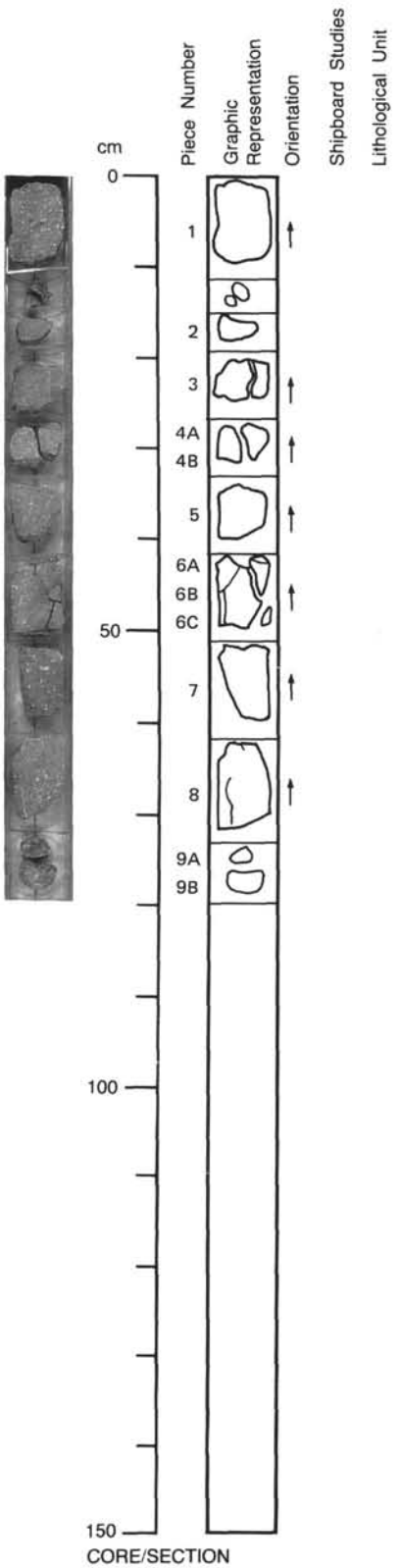


124-770B-21R-6

UNIT 6: CONTINUED

Pieces 1-12

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 6-8%; 0.5-5 mm; Euhedral laths.
Olivine - ~6%; 0.5-2 mm; Euhedral.
GROUNDMASS: Fine to medium grained, consisting of 45% plagioclase, 35% pyroxene and 15-20% olivine. Texture is intersertal to intergranular.
VESICLES: Moderately (8%) to highly vesicular (15%). Mostly filled with calcite and to a lesser amount, green clay.
COLOR: Dark gray to brownish gray; veins white to light brown and light yellow.
STRUCTURE: Except for Piece 1, the others show evidence of brecciation and/or fracturing/veining. On Piece 6, a chilled margin is observed with a thickness of 1-2 cm. This portion is abutted by a vein. The appearance of the chill is mottled due to fine glassy portions and some irregular patches of coarser material. Open fractures are also present, with geode crystals of calcite and accompanying light green clay.
ALTERATION: Slight, oxidation halos along veins.
VEINS/FRACTURES: Anastomosing veins (1-10 mm wide) embaying rock fragments that are statically fragmented.

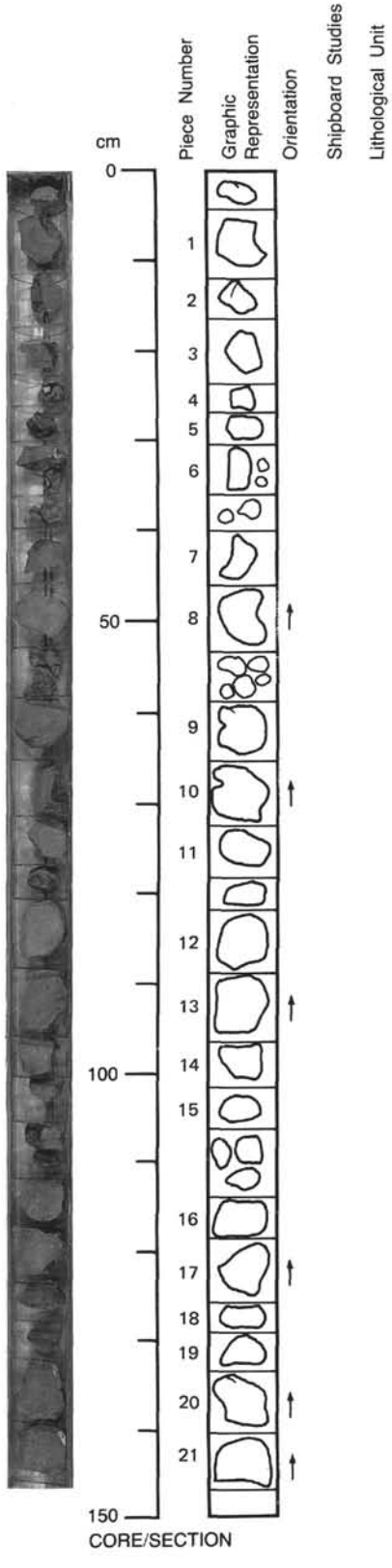


124-770B-21R-7

UNIT 6: CONTINUED

Pieces 1-6

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 8-10%; 0.5-3 mm; Lath shaped, incipiently altered.
Pyroxene - N/A; N/A; Occasionally occurs as glomerophyric intergrowths with plagioclase.
Olivine - 5-8%; 0.5-2 mm; Euhedral prisms, altered to clays and calcite.
GROUNDMASS: Fine-grained, consists of plagioclase, olivine, clinopyroxene and Fe-Ti oxides with intergranular texture.
VESICLES: Irregularly scattered coarse vesicles, 1-4 mm, and fine vesicles ranging from 25% (Piece 1) to 10% (Piece 3). They are filled with calcite, silica, clays and iron hydroxides.
COLOR: Dark gray, brownish and yellowish gray.
STRUCTURE: Massive.
ALTERATION: Slight to moderate.
VEINS/FRACTURES: Few veins filled with calcite, clay and stained with iron hydroxides, 2-3 mm wide and veinlets filled with calcite.

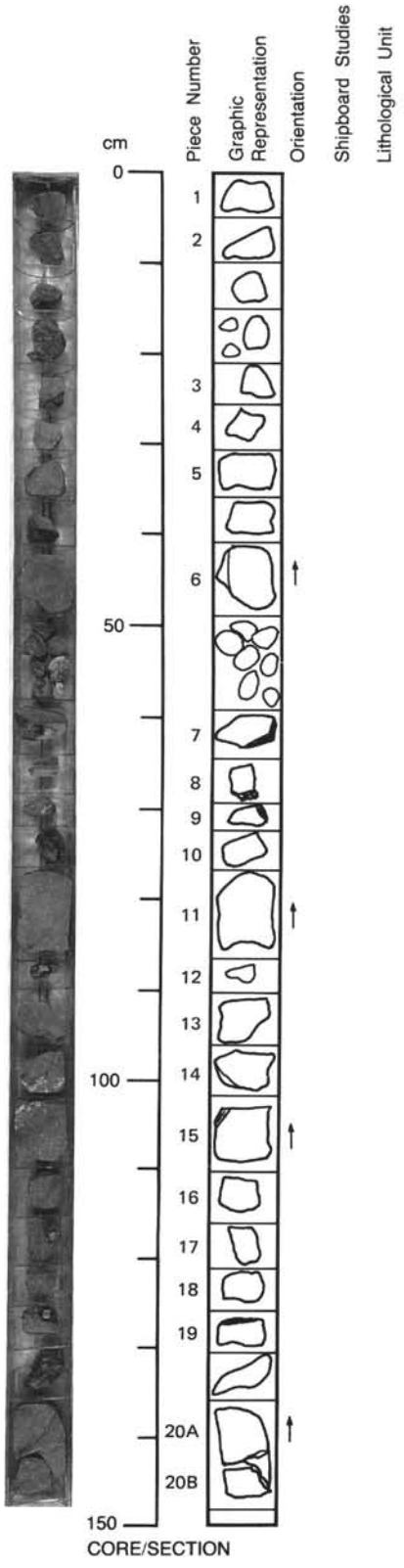


124-770C-2R-1

UNIT 1: MODERATELY PLAGIOCLASE-CLINOPYROXENE-OLIVINE PHYRIC BASALT

Pieces 1-21

CONTACTS: None; red mud above Piece 1 but not in contact.
PHENOCRYSTS:
Plagioclase - 1-3%; 1-3 mm; Euhedral.
Olivine - 3%; 0.5 mm; euhedral-subhedral.
GROUNDMASS: Fine-grained, intersertal, aggregates of plagioclase, clinopyroxene, olivine and mesostasis. Some cryptocrystalline areas.
VESICLES: <<1%; up to 1 mm; filled with light green clay.
COLOR: Gray with limonite staining.
STRUCTURE: Massive.
ALTERATION: Slight to moderate, olivine altered to clay and limonite, some oxidation around fractures.
VEINS/FRACTURES: Few, Pieces 9, 10, 12 irregular fractures <<0.5 mm wide filled with limonite, Pieces 1,2,3, 6B, 17, 20, 21 have 1 mm veins filled with white calcite and silica (?).
ADDITIONAL COMMENTS: Petrographically, these rocks are very similar to those in 770B-16R-3.

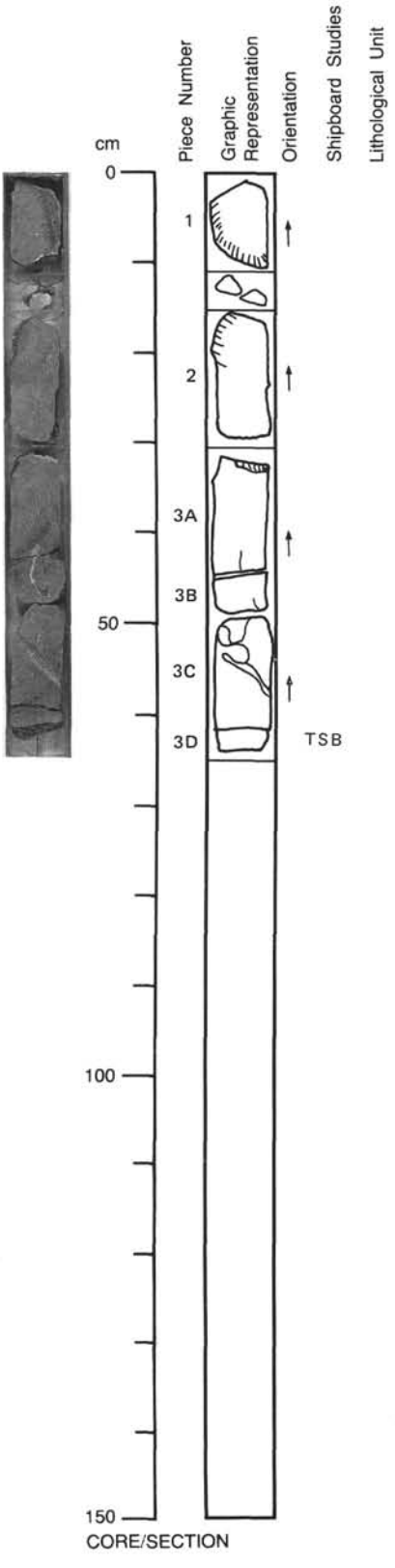


124-770C-2R-2

UNIT 1: CONTINUED

Pieces 1-20

CONTACTS: Small amount of black glass from chilled margin in unnumbered piece between 5 and 6.
PHENOCRYSTS:
Plagioclase - <5%; 1-3 mm; Euhedral, subhedral in aggregates.
Olivine - <5%; 0.5 mm; Euhedral-subhedral.
GROUNDMASS: microcrystalline to very fine-grained and cryptocrystalline intersertal aggregates of plagioclase and clinopyroxene and mesostasis.
VESICLES: <<1%; < 1mm; Scattered, filled with green clays and carbonate/silica.
COLOR: Brownish gray.
STRUCTURE: Pillowed.
ALTERATION: Moderate, olivine altered to clay and limonite, and groundmass stained with limonite.
VEINS/FRACTURES: 1-2 mm white carbonate veins more or less horizontal.

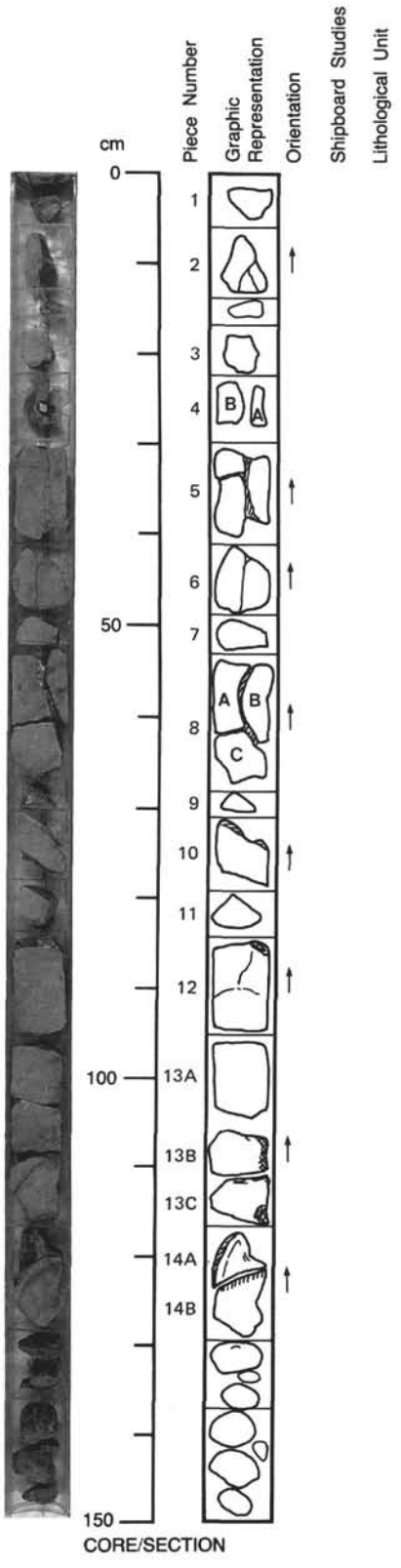


124-770C-2R-3

UNIT 1: CONTINUED

Pieces 1-3

CONTACTS: Excellent pillow margins in Pieces 1 and 2, with well preserved black glass.
PHENOCRYSTS:
Plagioclase - 2%; 1-3 mm; Euhedral-subhedral.
Olivine - 1%; ~0.5 mm; Euhedral-subhedral occurs as aggregates.
GROUNDMASS: Well-developed, microcrystalline intersertal texture, plagioclase and clinopyroxene with mesostasis.
VESICLES: 1-2%; up to 1 mm; N/A; N/A; Filled with green and white minerals, often banded.
COLOR: Brownish gray.
STRUCTURE: Pillowed.
ALTERATION: Moderate, much of the groundmass is stained by limonite; olivine altered to clay and limonite.
VEINS/FRACTURES: Some prominent veins of green clay containing fragments of glass, often with white carbonate/silica margins and limonite in center or margins and as individual very thin (<0.5 mm) irregular veins.

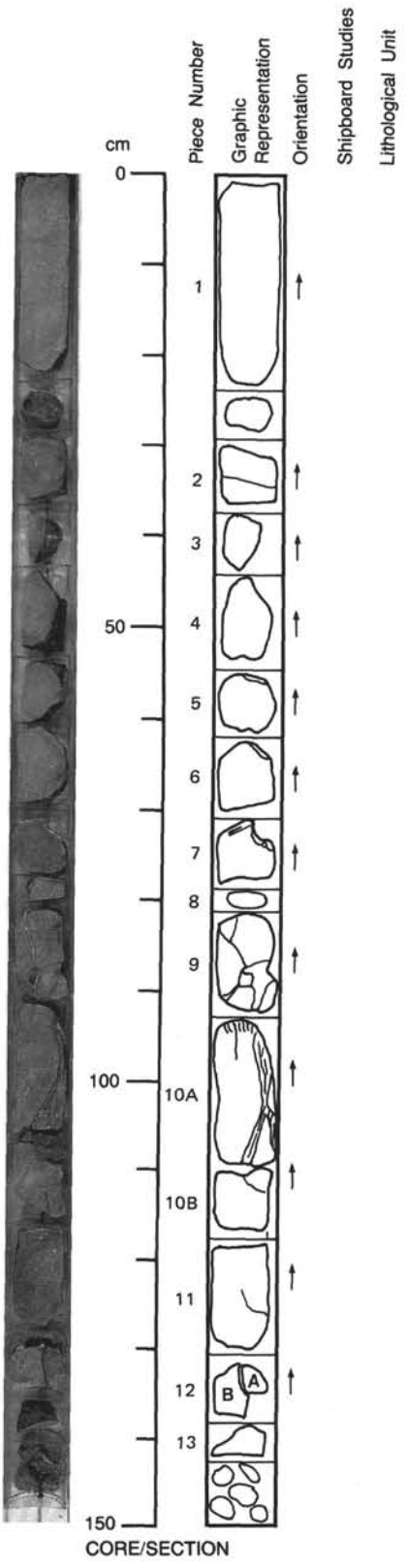


124-770C-3R-1

UNIT 1: CONTINUED

Pieces 1-14

CONTACTS: Well preserved pillow margin in Pieces 13, 13B and 14B, and inter-pillow *hyaloclastite in Piece* 14A.
PHENOCRYSTS:
Plagioclase - <5%; 1-5 mm; Euhedral to subhedral.
Olivine - <5%; 0.5 mm; Euhedral-subhedral.
GROUNDMASS: Very fine grained, microcrystalline to cryptocrystalline and intersertal in patches, radiating plagioclase laths, clinopyroxene, olivine, and mesostasis.
VESICLES: <1%; <1 mm; Scattered; Filled or partly filled with dark green layers of clay.
COLOR: Gray, with some limonite staining.
STRUCTURE: Pillowed.
ALTERATION: Slight, some olivine altered to clays and limonite, staining in zones on vein margins.
VEINS/FRACTURES: Fairly common green clay filled veins 5-10 mm, contain clasts which are glassy banded, variolite, lithic and crystals and often run along pillow margins.



124-770C-3R-2

UNIT 1: CONTINUED

Pieces 1-13

CONTACTS: Glassy and variolitic chilled pillow margin on top of Piece 10A. Inter-pillow hyaloclastite in Pieces 10B and 10C.

PHENOCRYSTS:
Plagioclase - 3-5%; 1-3 mm; Laths, euhedral.
Olivine - 3-5%; 0.5-1.0 mm; Euhedral to subhedral.

GROUNDMASS: Very fine grained, microcrystalline and cryptocrystalline in patches, *intersertal aggregates of plagioclase, clinopyroxene, olivine and mesostasis.*

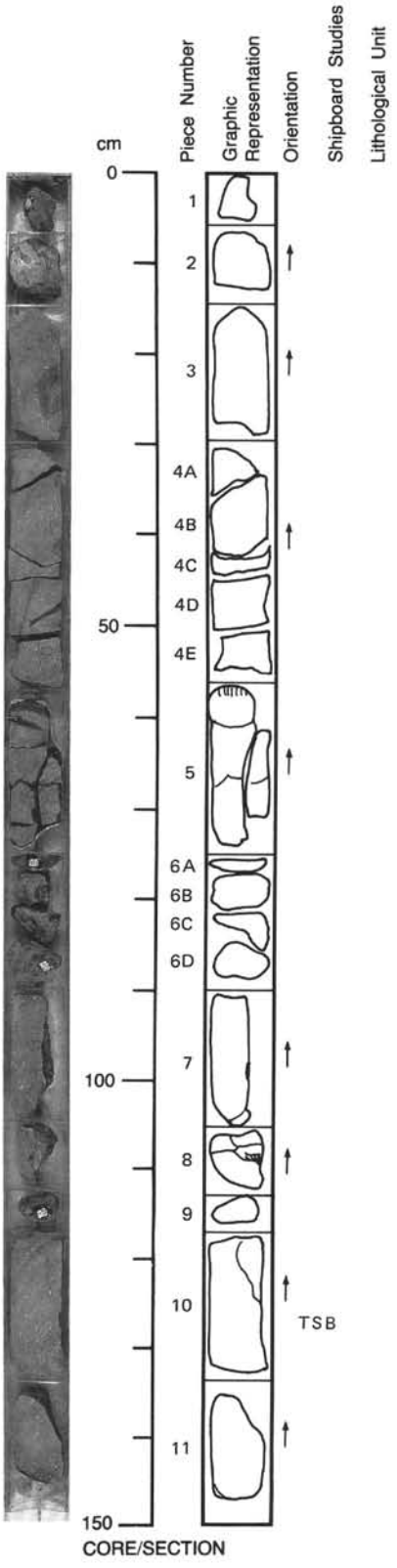
VESICLES: <<1%; Very scattered; Filled and partly filled with clay.

COLOR: Gray with lominite staining.

STRUCTURE: Pillowed.

ALTERATION: Slight, some olivine altered to clay and limonite, rock is limonite stained along veins.

VEINS/FRACTURES: Few clay and carbonate and limonite filled veins 5-10 mm, some leading to interpillow fill.

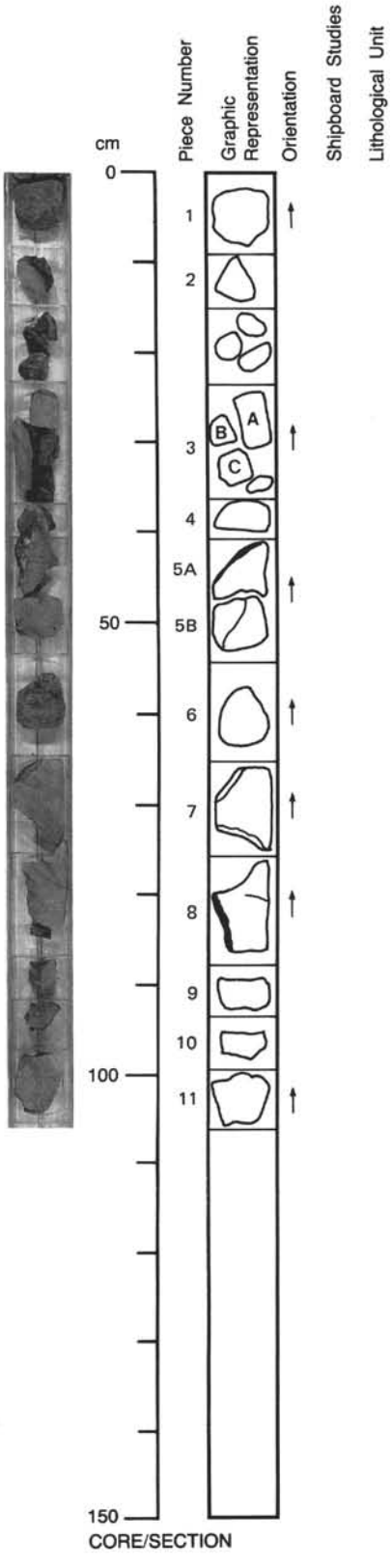


124-770C-3R-3

UNIT 1: CONTINUED

Pieces 1-11

CONTACTS: Chilled margin of pillow at top of Piece 5 and bottom of Piece 4E.
PHENOCRYSTS:
Plagioclase - <5%; 1-3 mm; Euhedral to subhedral.
Olivine - ~5%; 0.5-1.0 mm; Euhedral, occurs as groups concentrated in certain areas.
GROUNDMASS: Very fine-grained, microcrystalline to cryptocrystalline, intersertal aggregates of plagioclase, clinopyroxene, olivine(?) and mesostasis.
VESICLES: None.
COLOR: Gray.
STRUCTURE: Pillowed and fractured.
ALTERATION: Fresh, minor alteration of olivine to clay and limonite.
VEINS/FRACTURES: Very few limonite filled irregular fractures, 1.5 mm wide clay filled veins in Piece 5, and minor network of clay in Piece 8.

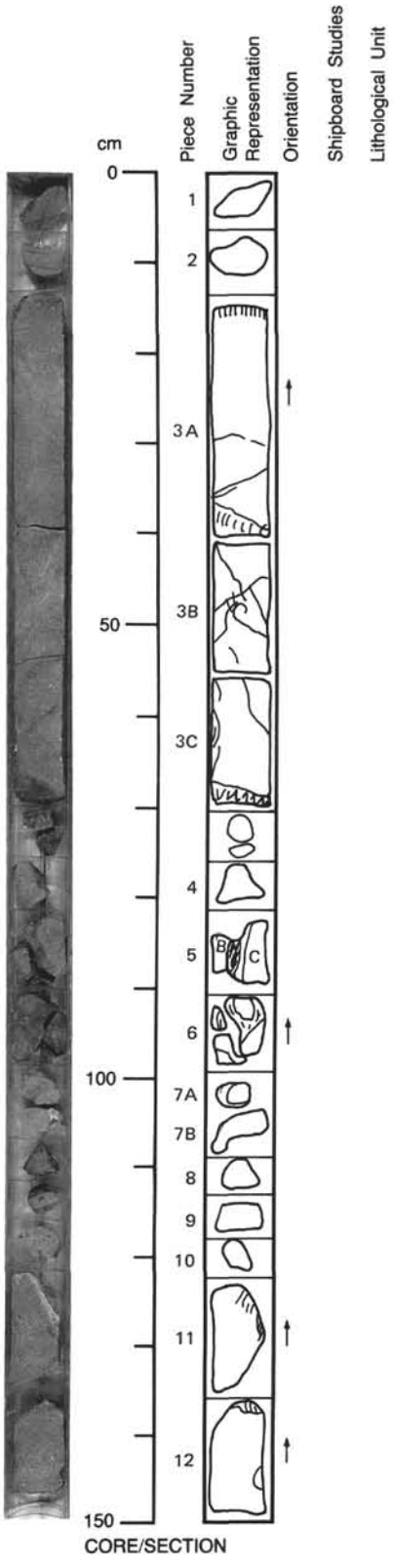


124-770C-3R-4

UNIT 1: CONTINUED

Pieces 1-11

CONTACTS: None; unnumbered pieces between Pieces 2 and 3 are hyaloclastite.
PHENOCRYSTS: Even fewer in this part of the unit than in the pillow lava above.
Plagioclase - 1-3%; 1-2 mm; Euhedral-subhedral.
Olivine - 1-3%; 0.5 mm; Euhedral-subhedral.
GROUNDMASS: The majority is very fine-grained intersertal texture made up of plagioclase laths, clinopyroxene and mesostasis. Some microcrystalline to cryptocrystalline areas.
VESICLES: Very few in bulk of Pieces but about 2% in Piece 11, 1-2 mm spherical, filled with layer of various green clays and some with clay and mainly calcite, perhaps with silica.
COLOR: Gray.
STRUCTURE: Fractured.
ALTERATION: Fresh to slight, olivines altered to clays and limonite, slight limonite staining of matrix.
VEINS/FRACTURES: Few fine (0.2 mm) irregular fractures filled with limonite and some thin green clay, carbonate veins in Pieces 3, 5, 7 and 8.



124-770C-4R-1

UNIT 1: CONTINUED

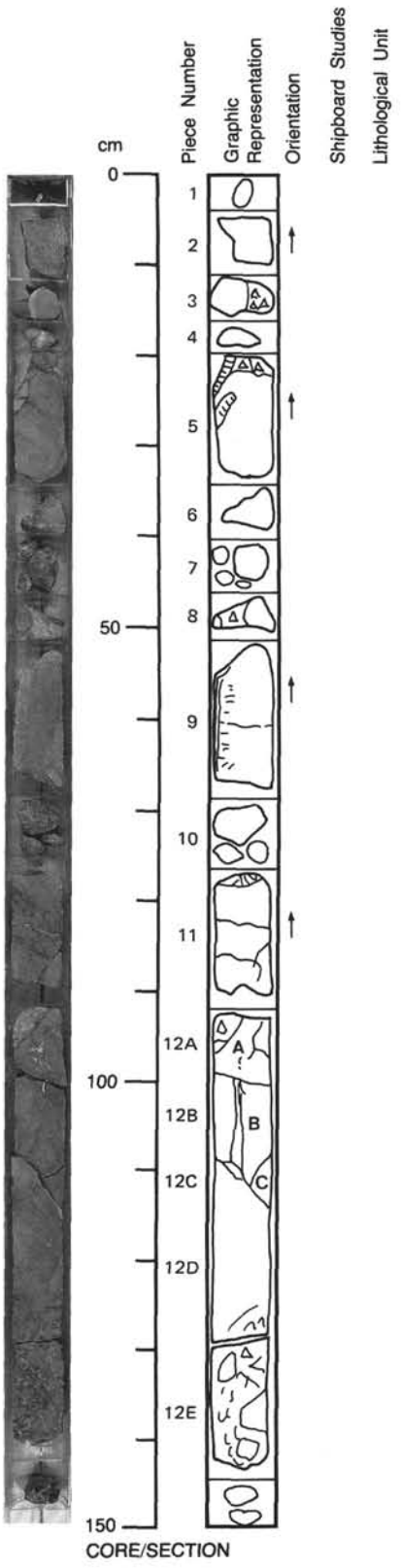
Pieces 1-2

CONTACTS: see comments
PHENOCRYSTS: see comments
GROUNDMASS: see comments
VESICLES: see comments
COLOR: see comments
STRUCTURE: see comments
ALTERATION: see comments
VEINS/FRACTURES: see comments
ADDITIONAL COMMENTS: Same as Section 124-770C-3R-4.

UNIT 2: HIGHLY PLAGIOCLASE OLIVINE PHYRIC BASALT, PILLOW BASALT AND PILLOW BRECCIA

Pieces 3-12

CONTACTS: Chilled margin at top of Piece 1A, 3 mm, clay at base. Chilled margin variolitic on Piece 11 and top of Piece 12.
PHENOCRYSTS:
Plagioclase - ~15%; 1-3 mm; Euhedral-subhedral.
Olivine - 3%; 0.5-2 mm; Euhedral, subhedral.
GROUNDMASS: Microcrystalline to cryptocrystalline, sometimes intersertal, plagioclase, clinopyroxene and mesostasis.
VESICLES: Very few, some in Piece 11 near chilled margin largely lined with calcite, some filled with green clay.
COLOR: Light gray, limonite in zones around veins, and clay and limonite replace olivine.
STRUCTURE: Pillow lava/pillow breccia, green clay surround lobate clasts with chilled margins in Pieces 5 and 6-micropillows.
ALTERATION: Slight, limonite staining and clay and limonite after olivine.
VEINS/FRACTURES: Limonite and carbonate in irregular, 1 mm wide fractures. Clay in veins up to 2 cm, filled with glass, lithic and crystal clasts; inter-pillow filling in Pieces 7 and 9.



124-770C-4R-2

UNIT 2: CONTINUED

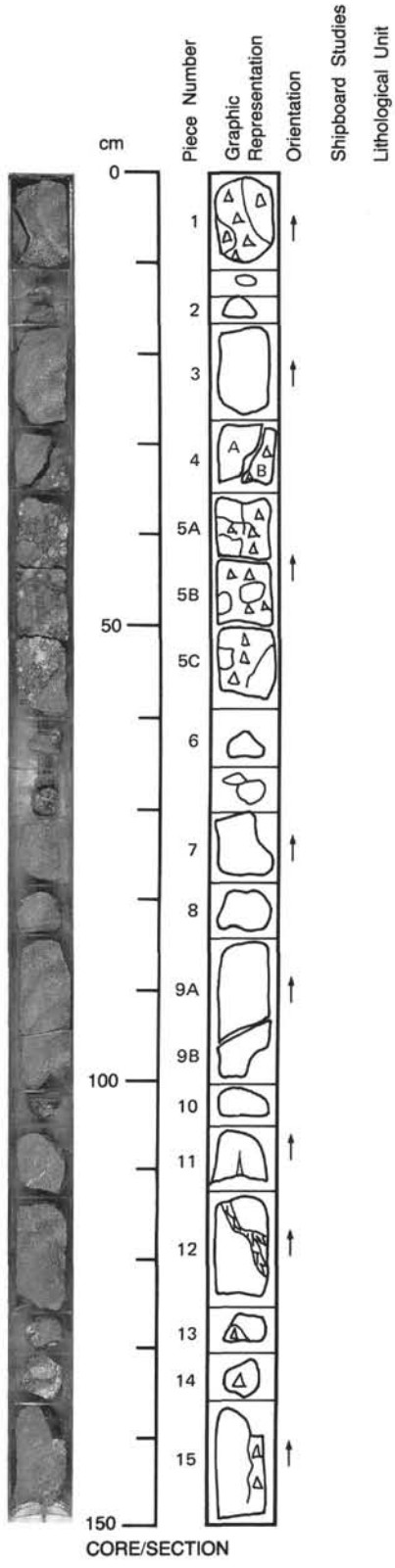
Pieces 1-2

CONTACTS: see comments
PHENOCRYSTS: see comments
GROUNDMASS: see comments
VESICLES: see comments
COLOR: see comments
STRUCTURE: see comments
ALTERATION: see comments
VEINS/FRACTURES: see comments
ADDITIONAL COMMENTS: Same as Section 124-770C-4R-1.

UNIT 2: CONTINUED

Pieces 3-12

CONTACTS: Pillow margins in Pieces 3, 4 and 9, abundant hyaloclastite in Pieces 3-11, 12A, 12D, and 12E. There may be minipillows with chilled lobate margins against the green hyaloclastite clay in Pieces 6, 8 and 12E.
PHENOCRYSTS:
Plagioclase - 10-15%; 1-2 mm; Euhedral, subhedral.
Olivine - < 5%; 0.5-2 mm; Patchy, clumpy distribution.
GROUNDMASS: Microcrystalline to cryptocrystalline intersertal aggregates of plagioclase clinopyroxene and mesostasis.
VESICLES: Very few.
COLOR: Brownish gray.
STRUCTURE: Brecciated pillow lava.
ALTERATION: Olivine altered in part to clays and limonite. Matrix also altered in part to limonite.
VEINS/FRACTURES: Calcite and green clay filled fractures up to 5 mm.
ADDITIONAL COMMENTS: This unit becomes dominantly brecciated from this level.



124-770C-4R-3

UNIT 2: CONTINUED

Pieces 1-15

CONTACTS: Good chilled pillow margin in Piece 1 and hyaloclastite interpillow breccia in Pieces 1, 4B, 5A, 5B, 5C, 6, 13, 14, 15. This breccia comes after only 1.5 m of the highly phyric lava (15.4 m in Hole 770B). The clasts are highly phyric lava and thus the breccia should be regarded as part of a heterogeneous Unit 2.

PHENOCRYSTS:
Plagioclase - 10%; 1-3 mm; Euhedral, subhedral; 15% in Pieces 7-12.
Olivine - ~5%; 0.5-15 mm; Euhedral-subhedral (~10% in Pieces 7-12).

GROUNDMASS: Microcrystalline to very fine-grained intersertal, clinopyroxene, olivine, mesostasis. Quench olivine plates in pillow and micropillow margins.

VESICLES: Very few.

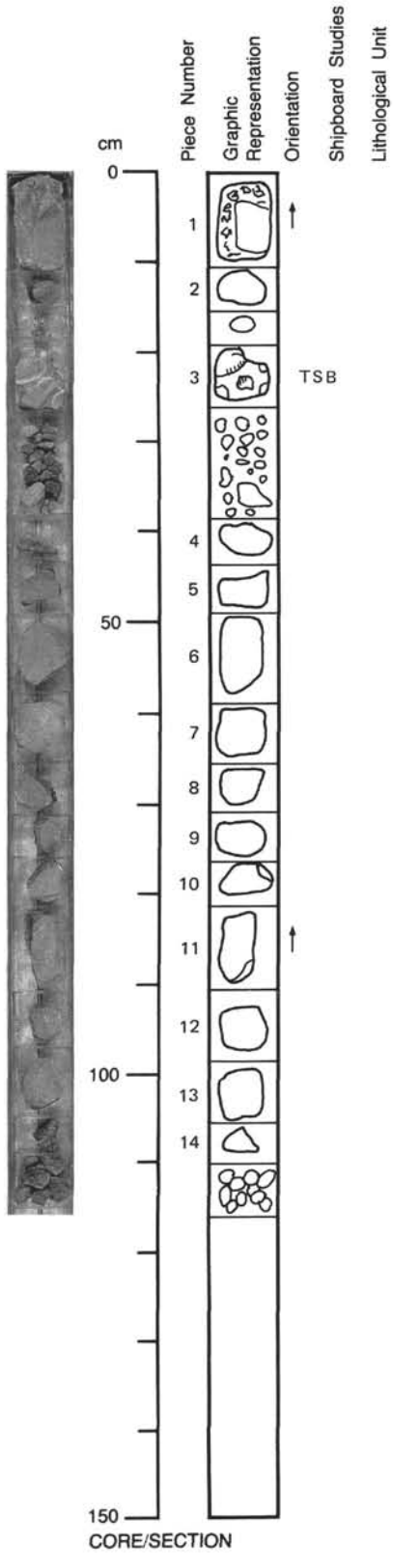
COLOR: Brownish gray.

STRUCTURE: Brecciated pillow lava.

ALTERATION: Olivine altered to clay and limonite areas of groundmass limonite stained.

VEINS/FRACTURES: A few carbonate limonite veins in Pieces 9, 11, 13, 14. Brown clay vein 1 cm in diameter in Piece 12 with green glass clast, hematite and carbonate margins. Narrow green clay vein in the same piece.

ADDITIONAL COMMENTS: Almost all show some brecciation except Pieces 7-12, which is regarded as a section through a large unfractured pillow.

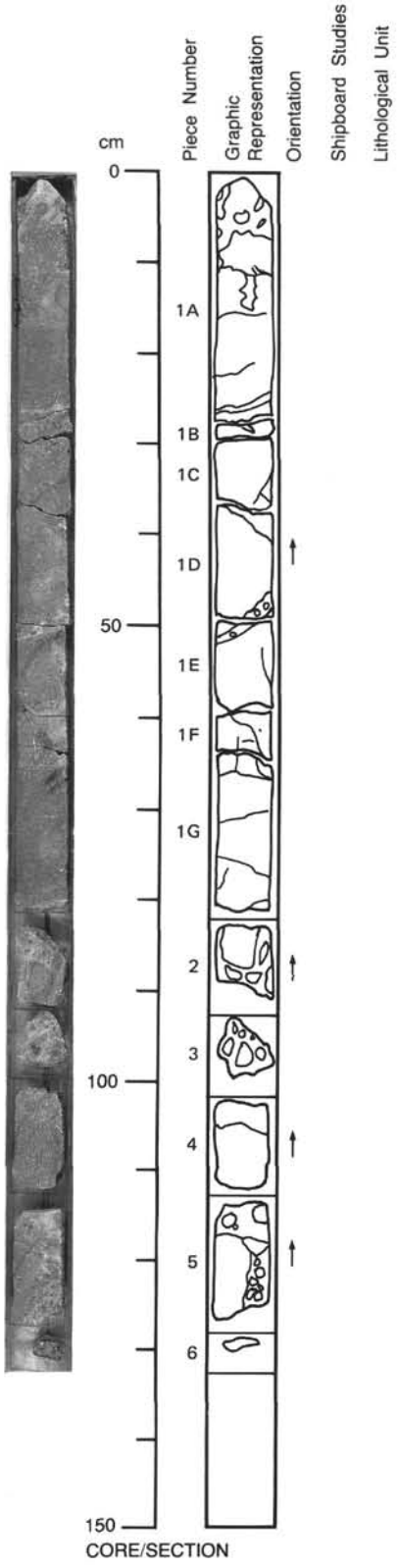


124-770C-4R-4

UNIT 2: CONTINUED

Pieces 1-14

CONTACTS: Glassy and variolitic chilled margins in Pieces 1 and 2 around lava clasts included in hyaloclastite breccia. No contacts on Pieces 4-14, fairly homogeneous.
PHENOCRYSTS:
Plagioclase - 8-10%; 1-3 mm; Euhedral, fresh.
Olivine - 3-5%; 0.5-1 mm; Euhedral, altered to calcite clay and iron hydroxide.
GROUNDMASS: Intergranular to intersertal in texture, consists of plagioclase, clinopyroxene, olivine, Fe-Ti oxides and mesostasis. Glassy or hypocrystalline in clasts from hyaloclastite breccia.
VESICLES: 3-5%; Filled with clay and calcite.
COLOR: Brownish gray.
STRUCTURE: Brecciated with pillow remnants in Piece 3.
ALTERATION: Slight, except for olivine and glass that are largely replaced by calcite, clays, and Fe-oxides.
VEINS/FRACTURES: Few, calcite veinlets in Pieces 10 and 11.

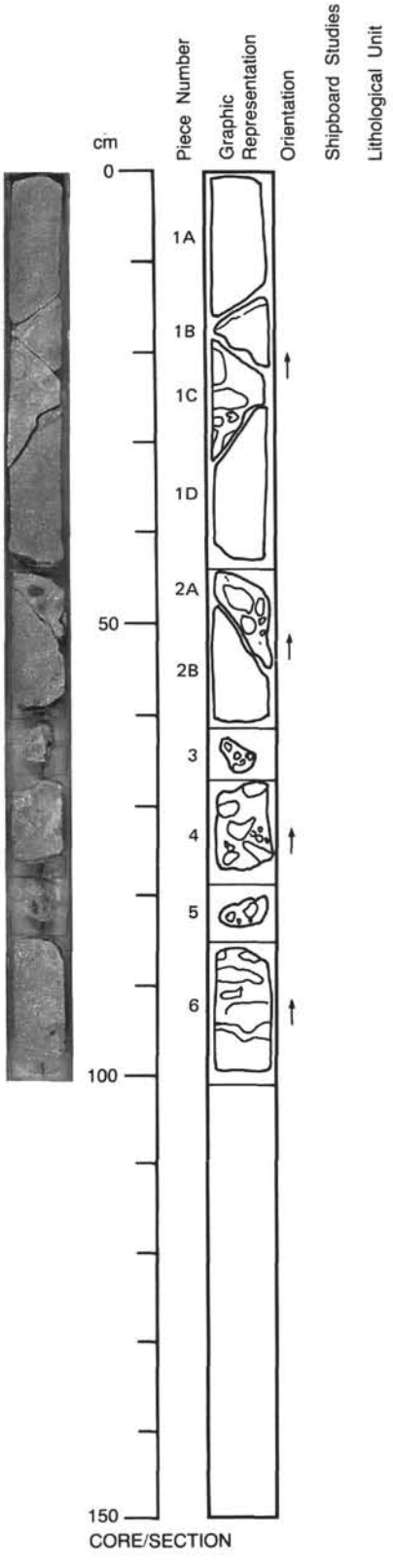


124-770C-5R-1

UNIT 3: MODERATELY TO HIGHLY PLAGIOCLASE-OLIVINE PHYRIC BASALT

Pieces 1-6

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 8-15%; 0.5-3 mm; Euhedral laths.
Olivine - ~5-8%; 0.5-1 mm; Euhedral, altered to clays, calcite, Fe-hydroxides.
GROUNDMASS: Microcrystalline, consisting of plagioclase, clinopyroxene, olivine, Fe-Ti oxides, locally with mesostasis, intergranular to intersertal in texture.
VESICLES: 5-10%; 0.5-2 mm; N/A; Fine, scattered; Filled with clays, calcite and Fe-hydroxides.
COLOR: Gray, brownish gray, yellowish gray, yellow pink (veins).
STRUCTURE: Coarsely brecciated, breccia of clasts of lava, similar texturally to the coarse fragments, 3 mm to 4 cm, surrounded, cemented by calcite and clays, stained by Fe-hydroxides, are present in Pieces 1A (5 cm top), 2, 3 and 5.
ALTERATION: Slight, diffuse staining by Fe-hydroxide, large replacement of olivine by clay, calcite and Fe-oxides.
VEINS/FRACTURES: Besides wide irregular veins in brecciated portions, calcite veinlets </= 1 mm wide (Pieces 1A, 1G, 4).

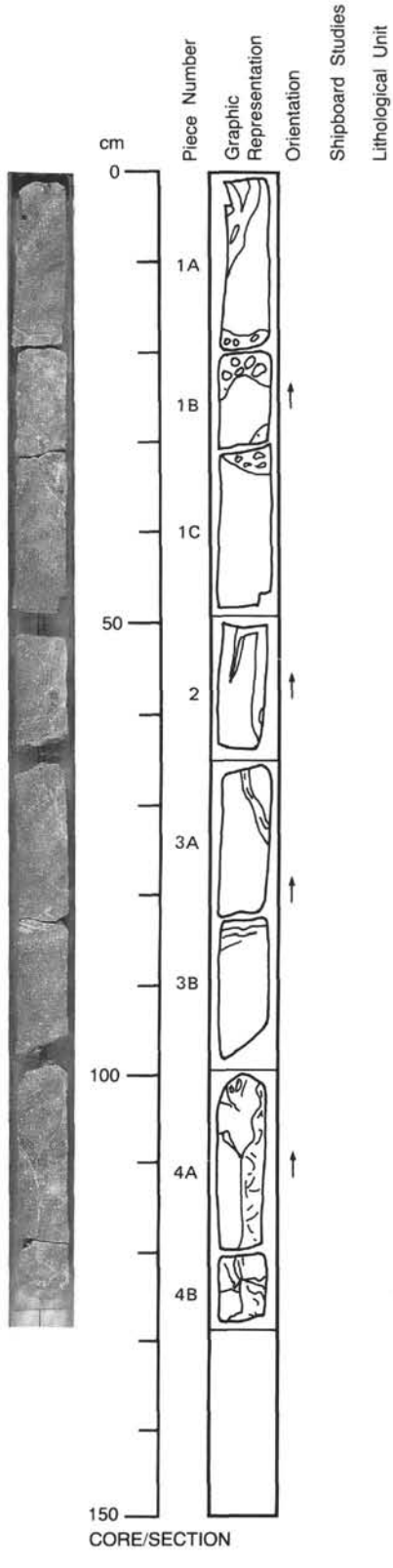


124-770C-5R-2

UNIT 3: CONTINUED

Pieces 1-6

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5-15%; 0.5-6 mm; Euhedral laths, glomerophyric.
Olivine - 3-8%; 0.5-2 mm; Euhedral prisms.
GROUNDMASS: Microcrystalline, intersertal to divergent, consists of 50% plagioclase, 30-35% pyroxene and 15-20% olivine. Some pyroxene crystals relatively larger than plagioclase, olivine appears to be between plagioclase laths.
VESICLES: 5-15%, clasts of Pieces 5 and 6 are more vesicular than upper section (Pieces 1-4), 0.2-3 mm in Pieces 1-4, 0.2-4.5 mm in Pieces 5 and 6. Round shape in Piece 1-4, round and irregular in Pieces 5 and 6. Fillings are calcite and yellow and green clay.
COLOR: Gray to brownish gray, light brown to red orange brown veins.
STRUCTURE: Brecciated, carbonates and clay invade fractures, small clasts included in the fractures are more porphyritic and vesicular than the big blocks hosting the veins.
ALTERATION: Moderate, plagioclase phenocrysts occasionally turbid (clay?) olivine may be fresh or altered by Fe-oxide or clay. Groundmass relatively fresh with some Fe-oxide stains.
VEINS/FRACTURES: Fractures filled with carbonatic clay, veins with brown to reddish brown.
ADDITIONAL COMMENTS: In Piece 6, two fragments appear to have been separated by extension, one piece being an exact fit to the other, suggesting a static fragmentation.

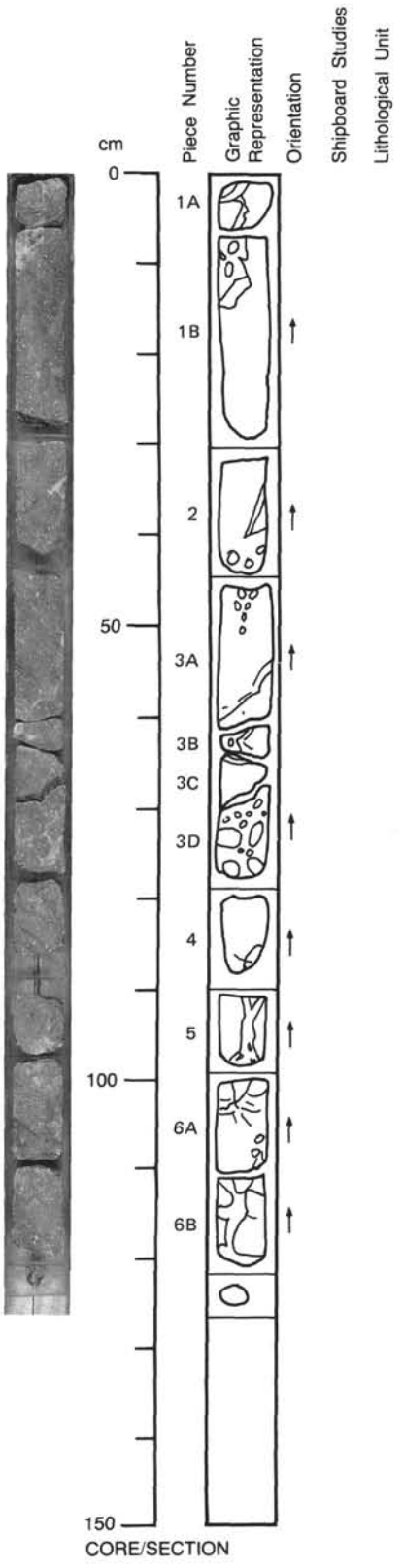


124-770C-5R-3

UNIT 3: CONTINUED

Pieces 1-4

CONTACTS: N/A
PHENOCRYSTS:
Plagioclase - 10-15%; 1-5 mm; Euhedral.
Olivine - 5-7%; 0.5-1 mm; Euhedral, altered.
GROUNDMASS: Plagioclase, clinopyroxene, olivine, Fe-Ti oxides, mesostasis, intergranular to intersertal divergent.
VESICLES: ~10%, small (0.5-1 mm) vesicles filled with clays and larger (1-3 mm) vesicles filled with calcite and lined with clays and Fe-oxides.
COLOR: Gray, brownish gray, yellowish gray.
STRUCTURE: Brecciated. The lava is subdivided into 3-30 cm fragments, either surrounded by fine breccia consisting cf lava clasts cemented by calcite stained with Fe-oxides (Piece 1) or cemented with veins of calcite containing clay (Piece 2), clasts of ? altered volcanic glass (Pieces 1A, 2, 3A, 4). Lava clasts mostly subrounded.
ALTERATION: Slight, affecting olivine and incipiently plagioclase and mesostasis, more altered in fine clasts.
VEINS/FRACTURES: Mostly calcite; veins with few lava clasts are near vertical, and show two-stage filling by calcite.

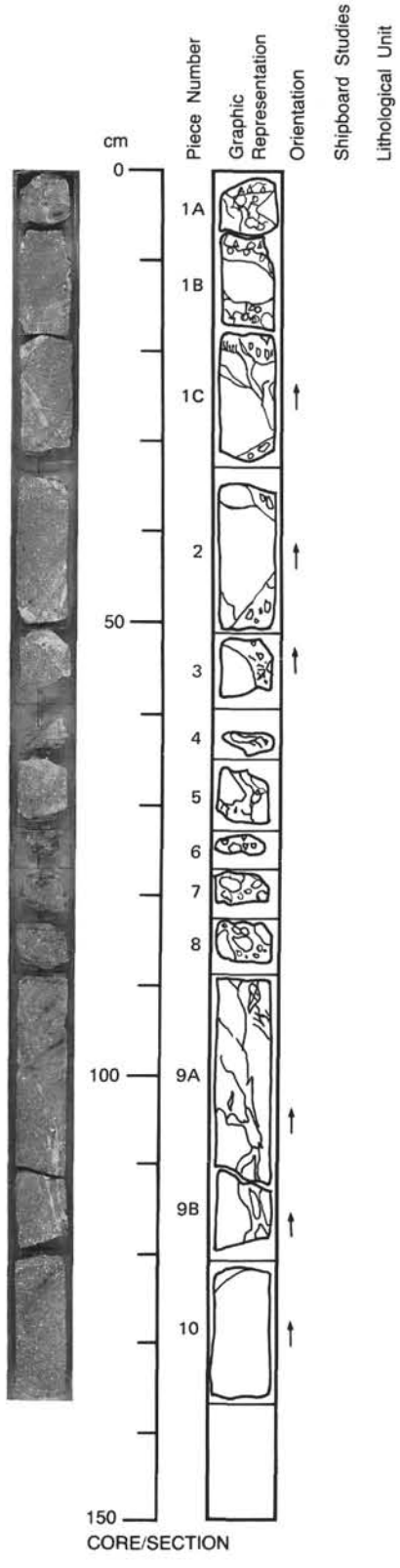


124-770C-5R-4

UNIT 3: CONTINUED

Pieces 1-6

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10-15%; 1-5 mm; Euhedral laths.
Olivine - 3-5%; 0.5-1 mm; Euhedral, altered to green clays, calcite and Fe-hydroxides.
GROUNDMASS: Plagioclase, clinopyroxene, olivine, Fe-Ti oxides, fine-grained, intersertal texture with variable grain size. Various microlitic to glassy textures, mostly porphyritic (plagioclase-phyric), but also aphyric in microbreccia clasts.
VESICLES: 5-10%; Mainly very fine(<1 mm), also 1-2 mm; N/A; N/A; Filled with calcite, clays and Fe-hydroxides.
COLOR: Gray, brownish gray.
STRUCTURE: Coarsely to finely brecciated. Clasts of porphyritic basalt are 1-2 mm to 30 cm. They are mostly cemented by calcite stained with Fe-hydroxides. Probably precipitated in two phases. Pieces 1A and 1B (top) and 5 contain veins filled pink calcite including clasts of pale yellow pink calcite, that could represent older brecciated veins. Fine breccia occurs in Pieces 2 (bottom), 3A (top and bottom), 3B,3D (top) and 6A (bottom). REST SEE COMMENTS
ALTERATION: N/A
VEINS/FRACTURES: N/A
ADDITIONAL COMMENTS: STRUCTURE CONTINUED: It consists of glassy or hypohyaline subangular, 1-10 mm rock fragments, highly altered and stained with brownish yellow Fe-hydroxides. Subordinately, clasts of fresh basalts, with rounded forms are associated (Pieces 3D and 6A), as well as clasts of pale pinkish calcite, 1-12 mm. The fine breccia is cemented by pink calcite. Structure and vein filling suggest that brecciation resulted by magmatic (autoclastic) processes of interaction with water (formation of glassy and hypocrystalline fragments, probably accumulated within open fractures), and by later tectonic processes, responsible for the fragmentation of the fresh lava cementation with calcite occurred in two phases, following the two brecciation phases.

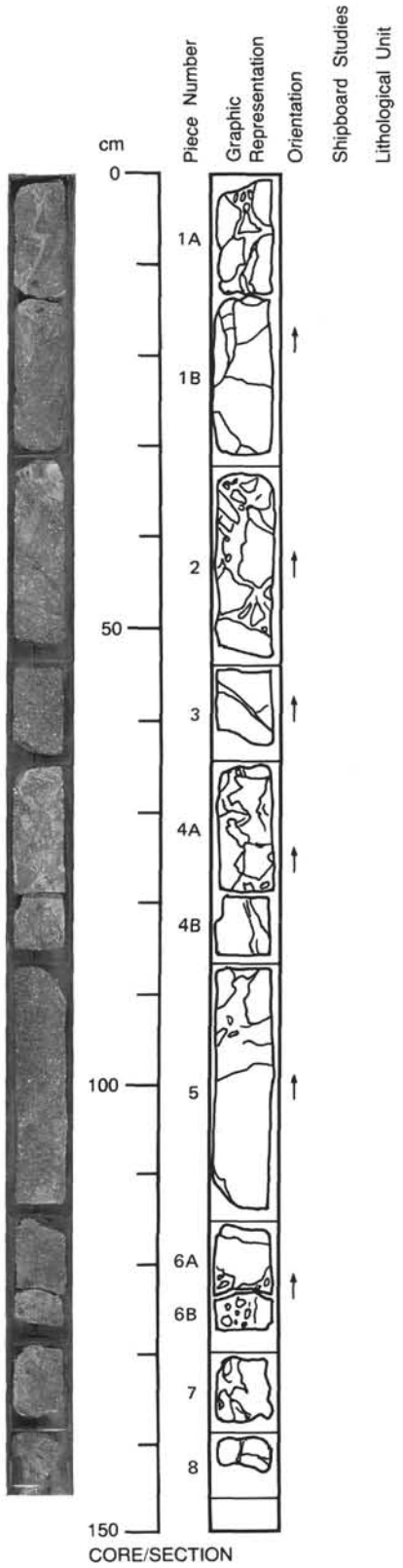


124-770C-5R-5

UNIT 3: CONTINUED

Pieces 1-10

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10-15%; 0.75-2.5 mm; Euhedral laths.
Olivine - 2-5%; 0.5-3.5 mm; Euhedral prisms.
GROUNDMASS: 40% plagioclase, 20% pyroxene, 20% olivine, 20% mesostasis, intersertal, subophitic, ophitic.
VESICLES: 8-12%; 0.25-4.0 mm; Round to lobate; Filled by calcite and green clays and Fe-oxides.
COLOR: Gray to brownish gray, vein 1 is peach colored, vein 2 is maroonish brown.
STRUCTURE: Brecciated.
ALTERATION: Slight to moderate. Fe-oxide halos where fractures are present. Some plagioclase phenocrysts are turbid (clay alteration?), and olivine can be replaced by calcite and Fe-oxides, especially those in the groundmass.
VEINS/FRACTURES: Fractures filled with cementing material of at least three types, all carbonatic: 1)a yellow greenish fine material with crystal rock fragments included. The size of the "vein" is 2-25 mm. The material seems to be volcanic, and, thus, can be interpreted as finely fragmented rock material replaced cemented by calcite. 2)pink to peach colored calcite vein along margins of open fractures and subsequently transversed by a young vein.
REST SEE COMMENTS
ADDITIONAL COMMENTS: VEINS/FRACTURES: 3) reddish/maroonish brown carbonate vein. Within this vein are glass and rock fragments, and also angular clasts of the pinkish vein. Veins tend to be vertical or with a high inclination. Nature of brecciation suggests shattering.

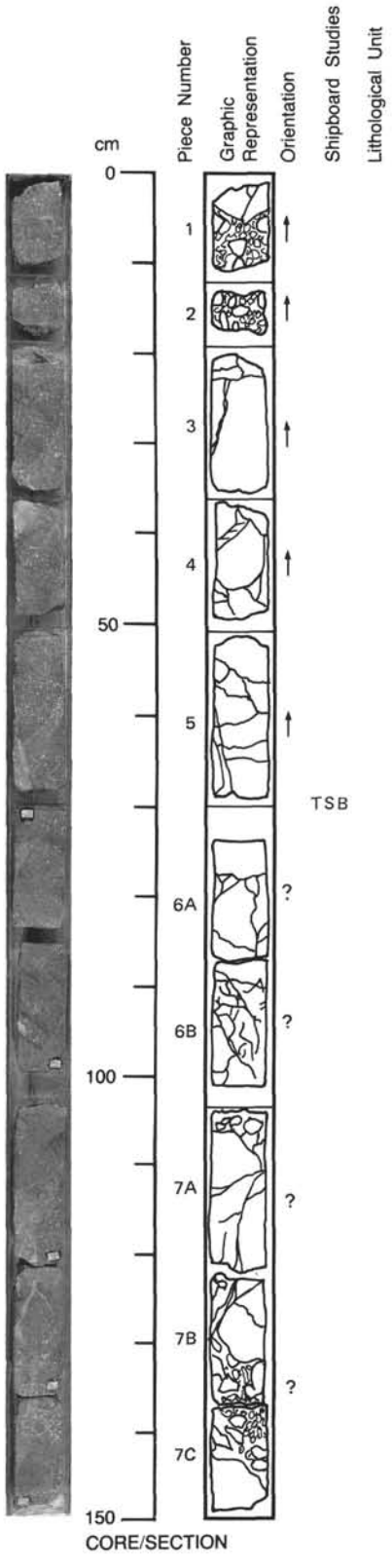


124-770C-5R-6

UNIT 3: CONTINUED

Pieces 1-8

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10-15%; 1-4 mm; Isolated or glomerophyric laths.
Olivine - 5-10%; ~0.5 mm; Altered to clay, calcite and Fe-hydroxides.
GROUNDMASS: Mostly *microcrystalline composed of plagioclase, clinopyroxene, olivine* and Fe-Ti oxides, intergranular texture.
VESICLES: 7-10%; smaller ones <1mm; larger ones 1-3 mm; N/A; N/A; Smaller vesicles filled with green clays and calcite; larger ones filled mainly with calcite.
COLOR: Gray, brownish gray, pink (calcite veins)
STRUCTURE: Coarsely to finely brecciated. The lava is disrupted into fragments decimeter and cm-sized, cemented mostly with calcite. Microbreccia of lava clasts locally highly altered (Piece 5B). In Pieces 2 (top), 4A, 6 and 7, there is evidence of two phase brecciation, an early one (?autoclastic) responsible for coarse fragmentation, and a later one (tectonic) giving way to disrupted clasts with angular outlines. Both phases followed by cementation with calcite.
ALTERATION: Slight, affecting mostly olivine. More altered in finely brecciated portions, where groundmass and plagioclase p.p. are altered, in addition to olivine, to green clays.
VEINS/FRACTURES: N/A
ADDITIONAL COMMENTS: Veins have variable orientation. Older ones are mostly close to vertical and are cut and displaced by later fractures, filled with calcite veinlets (particularly evident in Piece 1).



124-770C-5R-7

UNIT 3: CONTINUED

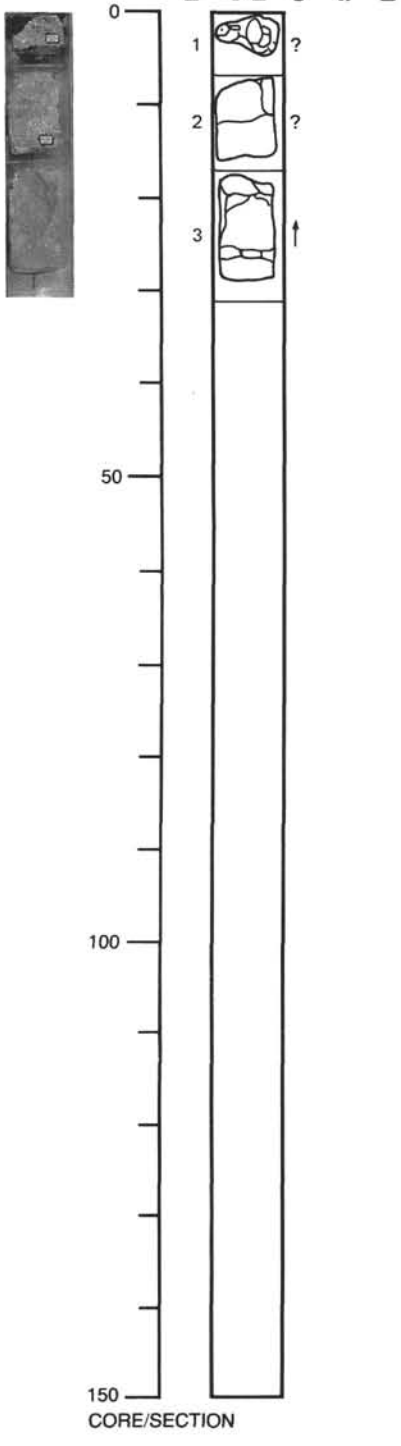
Pieces 1-5

CONTACTS: see comments
PHENOCRYSTS: see comments
GROUNDMASS: see comments
VESICLES: see comments
COLOR: see comments
STRUCTURE: see comments
ALTERATION: see comments
VEINS/FRACTURES: see comments
ADDITIONAL COMMENTS: Similar in lithology and structure to Section 124-770-5R-6. Piece 1 is a breccia with clasts 1 mm to 4-5 cm, cemented by calcite. Piece 3, 4 and 5 are large clasts, fractured and cemented with pink calcite veins 0.5-2 cm wide, mainly vertical. A network of horizontal or inclined calcite veinlets present. Phenocrysts in this section are much lower in proportion than much of the remainder of the unit, plagioclase 3%, olivine 2%.

UNIT 4: MODERATELY PLAGIOCLASE OLIVINE PHYRIC BASALT

Pieces 6-7

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 3-5%; 0.5-1 mm; Laths.
Olivine - 3-5%; ~0.5 mm; Euhedral, altered to clay, calcite and Fe-hydroxide.
GROUNDMASS: Fine-grained intergrowth of plagioclase, olivine, clinopyroxene, Fe-Ti oxides, with altered mesostasis, intersertal texture.
VESICLES: 5-8%; ~0.5 to 1-2 mm; Filled with clays, calcite and Fe-hydroxide.
COLOR: Dark gray, brownish gray, pink (calcite veins).
STRUCTURE: Massive to brecciated, Piece 7 shows near vertical calcite veins, 2-3 mm wide (Piece 7A) merging downward into a finely brecciated zone with 2-10 mm lava clasts, cemented by calcite (Pieces 7B, 7C).
ALTERATION: N/A
VEINS/FRACTURES: N/A

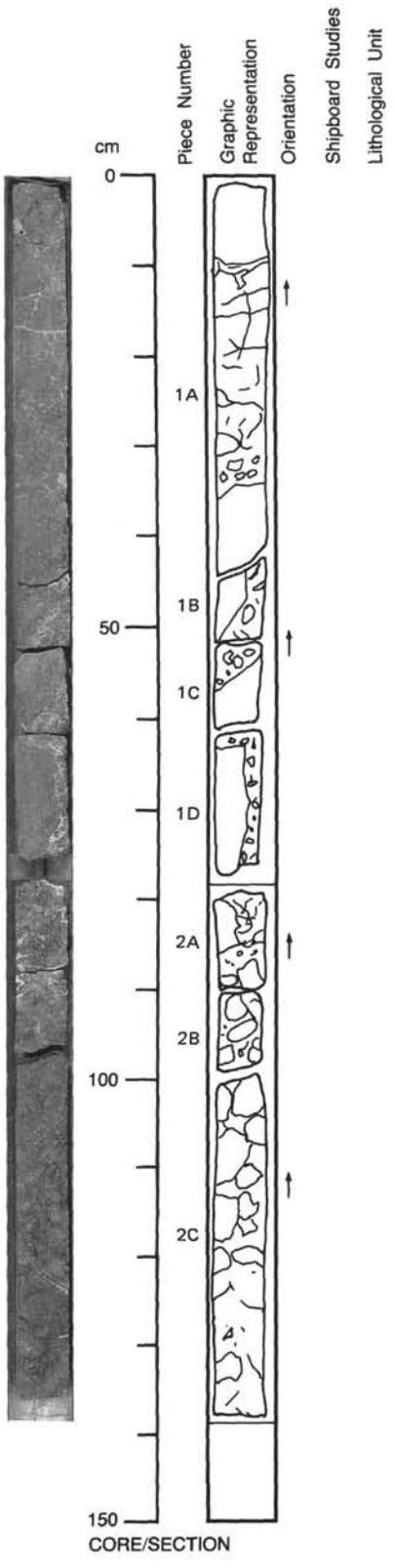


124-770C-5R-8

UNIT 4: CONTINUED

Pieces 1-3

CONTACTS: see comments
PHENOCRYSTS: see comments
GROUNDMASS: see comments
VESICLES: see comments
COLOR: see comments
STRUCTURE: see comments
ALTERATION: see comments
VEINS/FRACTURES: see comments
ADDITIONAL COMMENTS: Piece 3 is similar in composition and texture to the basalt in Unit 4, Section 124-770C-5R-7. It shows a vertical pink calcite vein > 3mm wide, and thin fractures across. Pieces 1-2 are lithologically distinct, consisting of highly plagioclase-olivine phyric basalt with microcrystalline groundmass, with brecciated texture and carbonate veins. They are similar to basalt from Unit 3.

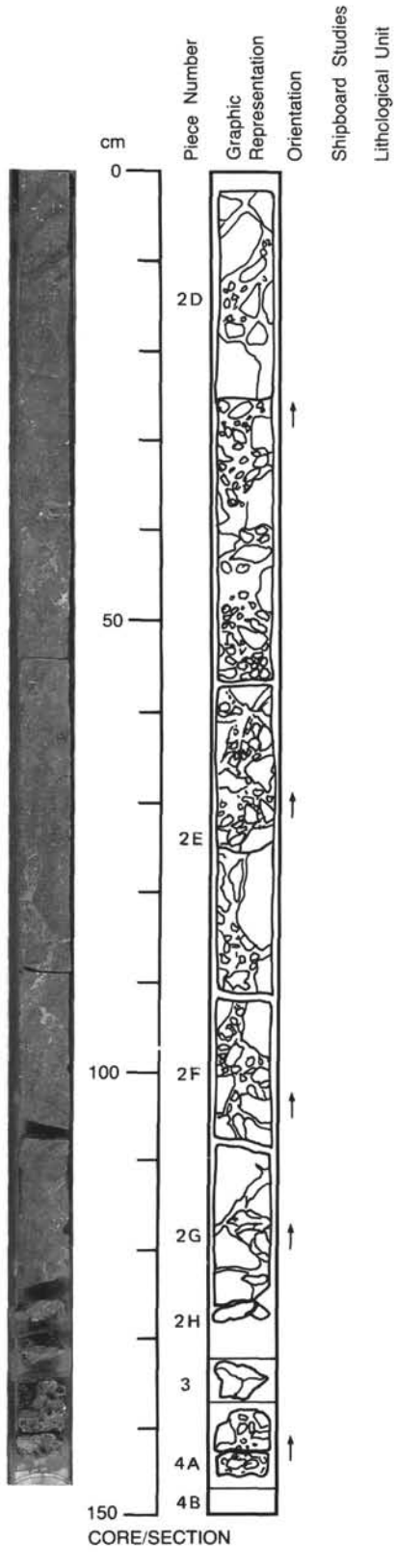


124-770C-6R-1

UNIT 4: CONTINUED

Pieces 1-2

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 2-5%; 0.5-2 mm; Euhedral laths.
Olivine - 0-5%; ~0.5 mm; Euhedral, altered to clay, calcite and Fe-hydroxide.
GROUNDMASS: Fine-grained intergrowth of plagioclase, clinopyroxene, olivine, Fe-Ti oxides, mesostasis with intersertal texture.
VESICLES: ~10%, mostly fine, filled with clays and calcite, few 1-2 mm vesicles, incompletely filled as the finer ones.
COLOR: Gray, brownish gray, pink (carbonate veins).
STRUCTURE: Finely to coarsely brecciated. Piece 2 shows an incipient fragmentation into clasts 5-50 mm, subrounded, separated by thin calcite vein or by patches with more advanced alteration. Pieces 1A and 2B show similar but more intense fragmentation with clasts of 3-20 mm separated and cemented with pink carbonate. Finely brecciated zones with veins and sharp contacts occur in Piece 1B to 1C, and 1D.
REST SEE COMMENTS
ALTERATION: Mostly slight, moderate, locally (microbreccia clasts and intraclast zones in Piece 2C).
VEINS/FRACTURES: In addition to the main veins of brecciated lava, there are later veinlets filled with colorless calcite.
ADDITIONAL COMMENTS: STRUCTURE CONTINUED: They are 2-3 cm wide and consist of microbreccia cemented by pink carbonate, and are vertical (Piece 1D) or inclined (azimuth 50 degrees) in Pieces 1B and 1C.

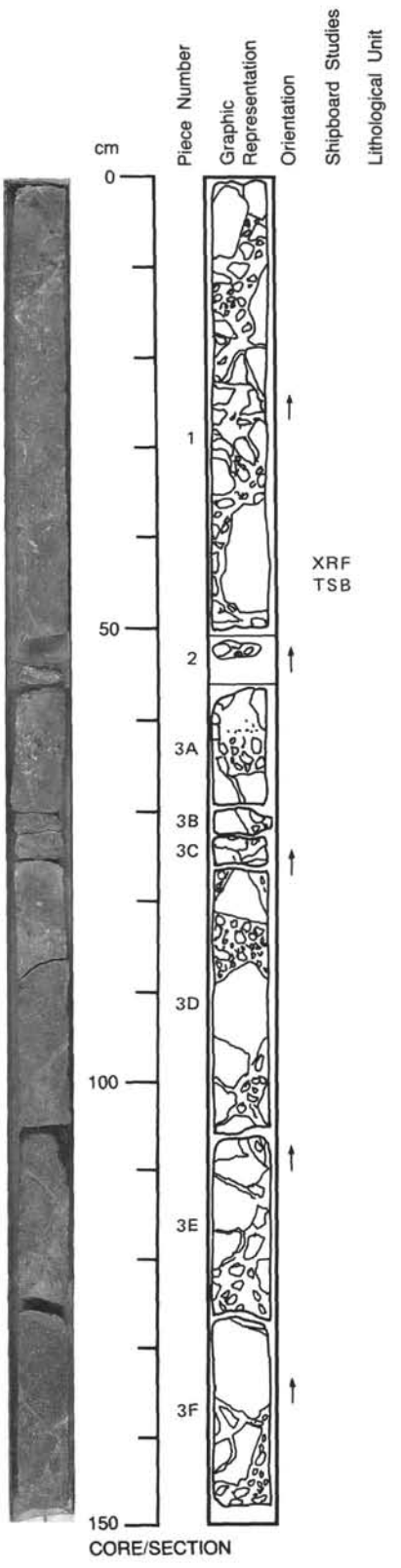


124-770C-6R-2

UNIT 4: CONTINUED

Pieces 1-4

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 1-5%; 0.5-1.25 mm; Euhedral.
Olivine - 1-3%; 0.5-1.5 mm; Euhedral prisms.
GROUNDMASS: 20-30% plagioclase, 15-20% mesostasis, 15-20% pyroxene, 10-15% olivine, 20-25% mesostasis, intersertal texture, hyalocrystalline. Fine-grained plagioclase and pyroxene.
VESICLES: 5-15%; 0.3-7 mm; Round to lobate; Filled with calcite, Fe-oxide and green clay.
COLOR: Brownish gray, red orange, pink and orange (cement).
STRUCTURE: Brecciated. Fractures range 1-30 mm. Open fractures are filled with calcite clay. Within the veining of the clay are fragments of rock, exhibiting a shattered appearance (Piece 2A). The rock is wholly fragmented, cemented subsequently by calcitic clay and silica. A fracture in Pieces 2B and 2C is with a general vertical direction, though arcuate in shape and with shattered rock cemented by pink calcitic clay. Certain planar fractures are planes of short movements by the angular blocks and fragments.
ALTERATION: Oxidation halos following fractures. Olivine is replaced by calcite and Fe-oxides.
VEINS/FRACTURES: SEE STRUCTURE.

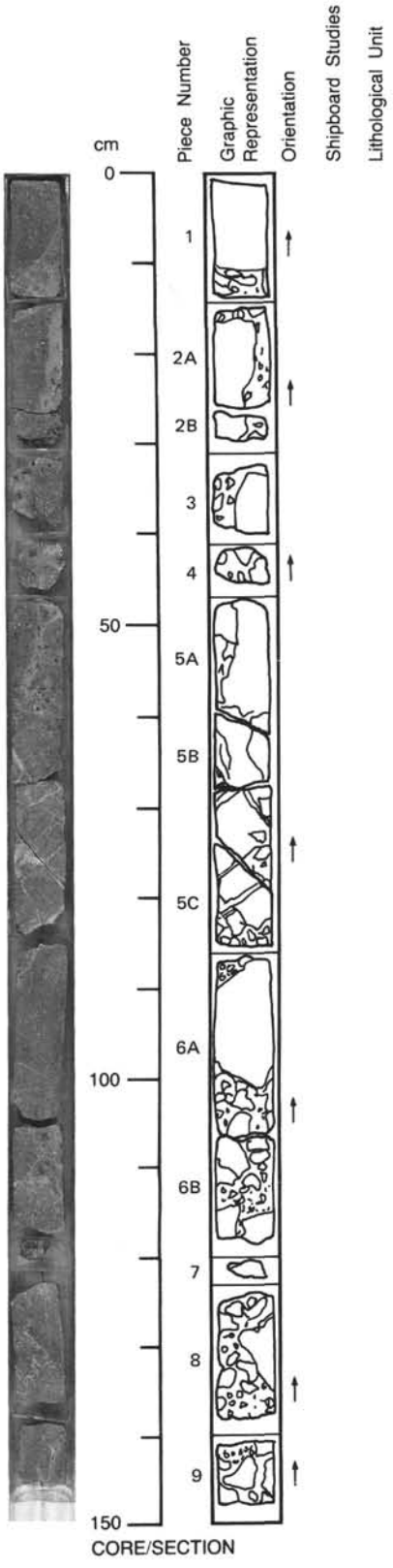


124-770C-6R-3

UNIT 4: CONTINUED

Pieces 1-3

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 2-5%; 0.5-2 mm; Euhedral laths.
Olivine - 1-3%; 0.5 mm; Euhedral prisms.
GROUNDMASS: Plagioclase, clinopyroxene, olivine, Fe-Ti oxides, intergrown with intersertal texture.
VESICLES: 5-10%; <1-2 mm; Filled with green clays, calcite and Fe-hydroxides.
COLOR: Dark gray, brownish gray, pink (carbonate clay veins).
STRUCTURE: Brecciated. The rock is divided into fragments 2-12 cm, with subrounded or subangular forms. Zones with finer brecciation occur throughout, and are particularly developed in Pieces 3A, 3D and 3F. The fine breccia is cemented by pink calcite-clay mixture, stained with Fe-hydroxides, forming irregular veins, among the large clasts. Pure carbonate-clay vein cements the larger clasts. They are cross-cutting, related to at least two fracture systems, and often form large patches at their intsection.
ALTERATION: N/A
VEINS/FRACTURES: N/A

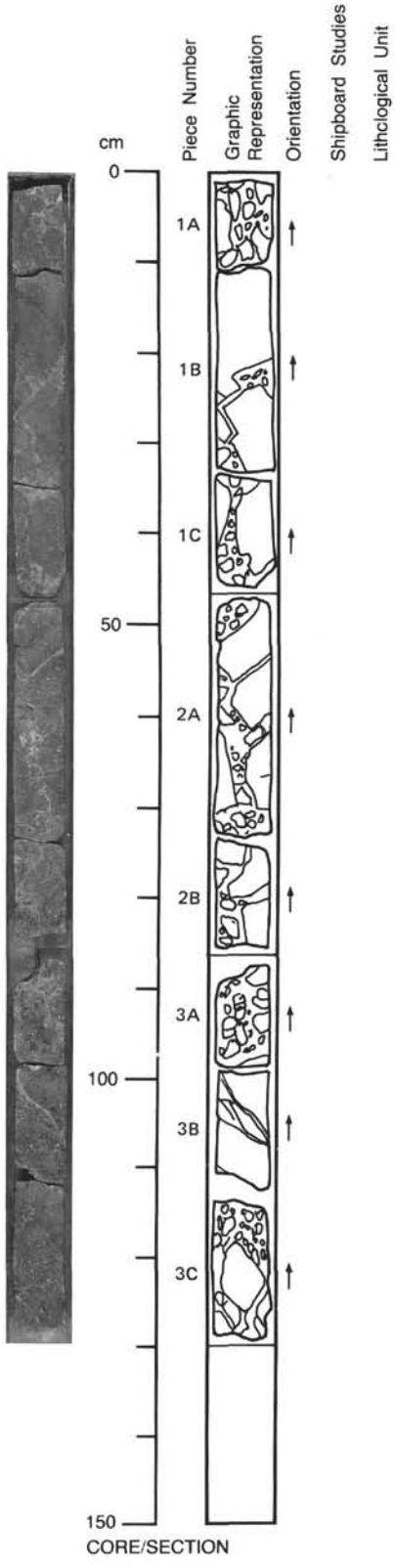


124-770C-6R-4

UNIT 4: CONTINUED

Pieces 1-9

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 2-5%; 1-3.5 mm; Euhedral laths.
Olivine - 1-2%; 0.5-1.25 mm; Euhedral, as glomerocrysts.
GROUNDMASS: 20% plagioclase, 50% pyroxene, 12% olivine, 15% mesostasis, intersertal texture, some platey olivine.
VESICLES: 8-15%; 0.2-2.75 mm; Mostly round; Filled with calcite and green clay.
COLOR: Gray, brownish gray, vein is pink.
STRUCTURE: Brecciated. Blocks and fragments cemented by pink calcitic clay. Wide (1-2 cm) vertical veins. Conjugate fractures are inclined and maybe perpendicular to each other. The rock has a shattered appearance. Small scale displacements could have occurred along the thin (1-5 mm) later fractures.
ALTERATION: Oxide stains as halos emanating from fractures.
VEINS/FRACTURES: The veins cement the shattered pieces. SEE STRUCTURE.

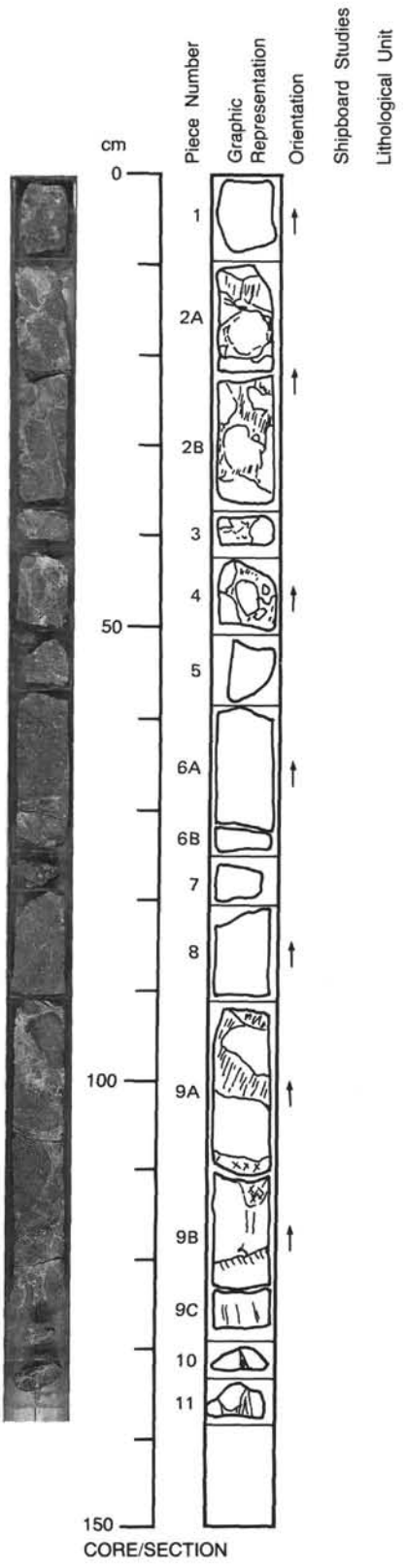


124-770C-6R-5

UNIT 4: CONTINUED

Pieces 1-3

CONTACTS: N/A
PHENOCRYSTS:
Plagioclase - 3-5%; 0.5-2 mm; Euhedral laths.
Olivine - 2-3%; ~0.5 mm; Euhedral laths.
GROUNDMASS: Plagioclase, clinopyroxene, olivine, Fe-Ti oxides, fine-grained aggregates with intersertal texture.
VESICLES: 5-12%; < 1-2 mm; N/A; N/A; Filled with green clays, calcite and Fe-hydroxides.
COLOR: Dark gray, brownish gray.
STRUCTURE: Brecciated, irregular veins of lava clasts (1-20 mm) cemented by calcite-clay-Fe hydroxides interposed among coarse (up to 15 cm) clasts of lava, also pure carbonate veins cements the coarse clasts.
ALTERATION: Slight, variable, affecting olivine, limited zones in lava clasts, and small lava clasts.
VEINS/FRACTURES: N/A



124-770C-7R-1

UNIT 4: CONTINUED

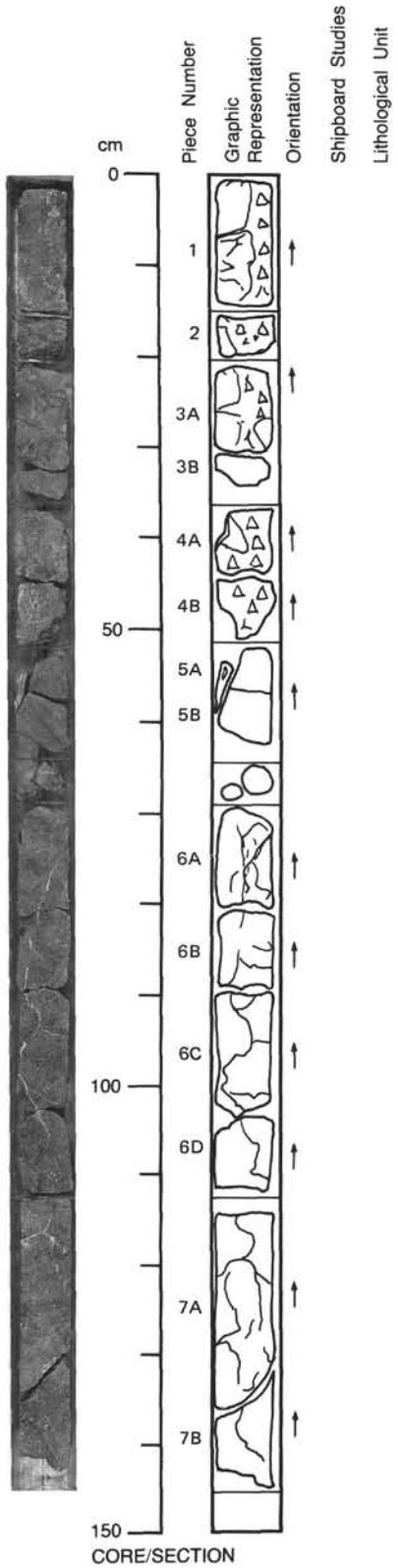
Pieces 1-7

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - ~2-3%; 1-3 mm; Euhedral.
Olivine - ~1%; 0.5 mm; Subhedral.
GROUNDMASS: Very fine-grained intersertal, radiating aggregates of plagioclase laths and mesostasis.
VESICLES: ~10%; Lined or filled with clay. They have calcite.
COLOR: Brownish-yellow gray.
STRUCTURE: The lavas are penetrated by a vein network of mainly pink calcite veins up to a maximum of 2 cm wide separating the rock into a breccia made up of clasts from 1 mm to 15 cm in diameter. Many of the smaller clasts are surrounded by calcite and hence enclosed in the vein system.
ALTERATION: Slight to moderate oxidation of the matrix and alteration of the olivine to clay and limonite.
VEINS/FRACTURES: SEE STRUCTURE.

UNIT 5: MODERATELY TO HIGHLY PLAGIOCLASE OLIVINE-PHYRIC BASALT, PILLOW BRECCIA

Pieces 8-11

CONTACTS: Pillow margin preserved at top of Piece 8 and bottom of Piece 9B, and through 9C, 10, 11, radial fractures.
PHENOCRYSTS:
Plagioclase - 5-10%; 1-2 mm; Euhedral. Up to 10% plagioclase in patches.
Olivine - 2-5%; <1.0 mm; Euhedral.
GROUNDMASS: Very fine grained, microcrystalline, intersertal, radiating plagioclase lathes and mesostasis, some cryptocrystalline patches.
VESICLES: 5-10%; 1-1.5 mm; N/A; N/A; Lined with dark green clay and filled with either lighter green or silica.
COLOR: Brownish-yellow gray.
STRUCTURE: Veined pillow breccia.
ALTERATION: Slight, matrix oxidized, olivine replaced by clay and limonite.
VEINS/FRACTURES: Some large pink carbonate veins including clasts through Pieces 9A and 9B; Piece 8 contains irregular transparent carbonate veins as does Pieces 9C, 10 and 11.
ADDITIONAL COMMENTS: This unit still has some pink calcite vein network but is separated from the Unit 4 because it has pillow margins (Piece 8) and hyaloclastite breccia showing it to be a pillow lava not a massive unit. Pieces 6B and 7 have some glassy material, maybe derived from pillow margins.



124-770C-7R-2

UNIT 5: CONTINUED

Pieces 1-7

CONTACTS: None, but hyaloclastic breccia well represented. In Pieces 1, 2, 3A, 4A, 4B abundant evidence of glassy and variolitic pillow margins and quenched textures in the fragments. Pieces 5-7 may present one homogeneous pillow (fractured).

PHENOCRYSTS:
Plagioclase - ~5%; 1-2 mm; Euhedral.
Olivine - <1%; 0.5 mm; N/A.

GROUNDMASS: Microcrystalline to cryptocrystalline and intersertal aggregates of plagioclase and mesostasis.

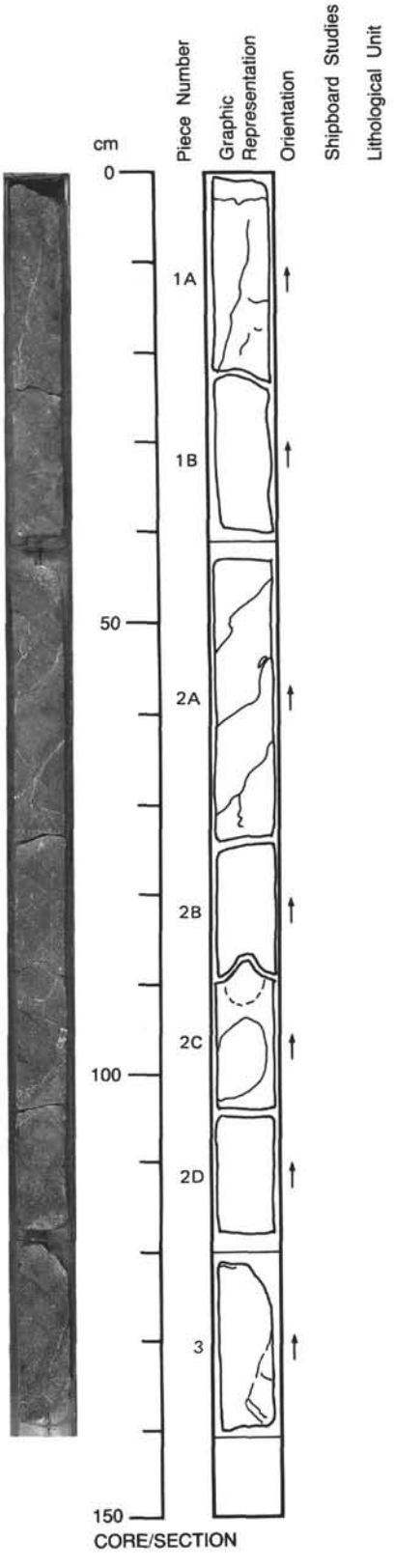
VESICLES: (Up to 10%); 1-3 mm in diameter; Spherical; Filled and lined with green clay and carbonate and silica.

COLOR: Gray to brownish gray.

STRUCTURE: Pillow breccia, brecciation may be very prominent with green glassy fragments and matrix or much less obvious with very little matrix.

ALTERATION: Slight oxidation along veins and fractures and in glassy and cryptocrystalline parts of matrix.

VEINS/FRACTURES: Prominent irregular networks of white carbonate veins in Pieces 6-7.



124-770C-7R-3

UNIT 5: CONTINUED

Pieces 1-3

CONTACTS: None, but whole rock is brecciated in larger fragments (maximum 15 cm, commonly < 10 cm). Separated by narrow zones and patches of breccia with clay or carbonate matrix. The rounded clasts in Piece 2C have well developed radiate structure including quench olivine along their borders. They are chilled margins without glass on micropillows.

PHENOCRYSTS:

Plagioclase - ~5%; 1-2 mm; Euhedral-subhedral.

Olivine - <1%; <0.5 mm; N/A.

GROUNDMASS: Very fine-grained to microcrystalline with poorly developed intersertal texture made up of plagioclase laths and mesostasis.

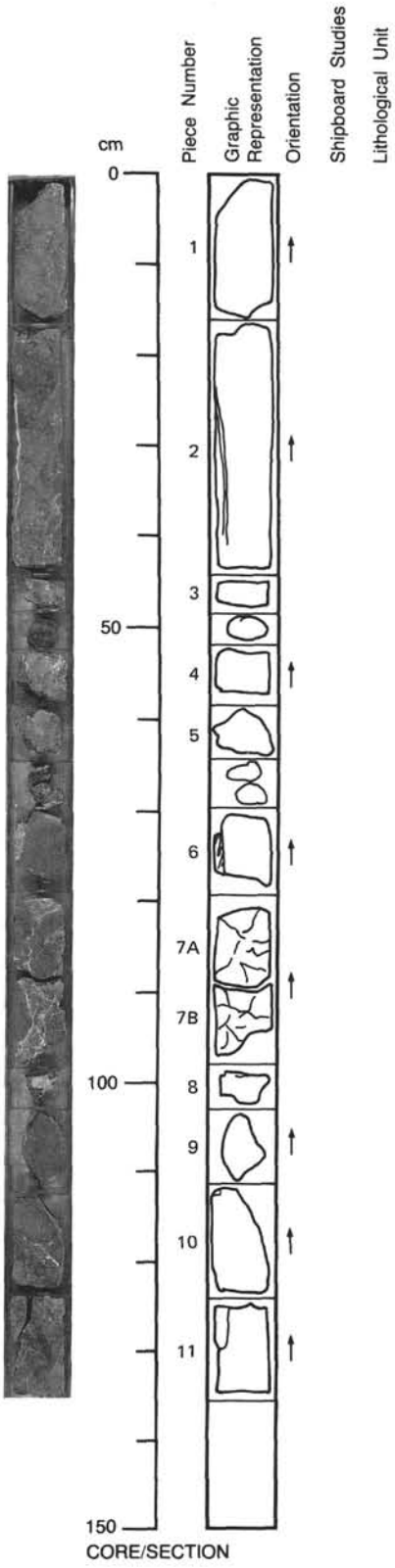
VESICLES: 5%; Up to 2 mm; Unevenly distributed; Lined and filled with green clays or with carbonate and silica.

COLOR: Gray and brownish gray.

STRUCTURE: Brecciated, perhaps with micropillows with chilled margins.

ALTERATION: Limonite alteration around fragments margins and along some of the fractures.

VEINS/FRACTURES: Veins are filled with carbonate or mixtures of carbonate and clay.

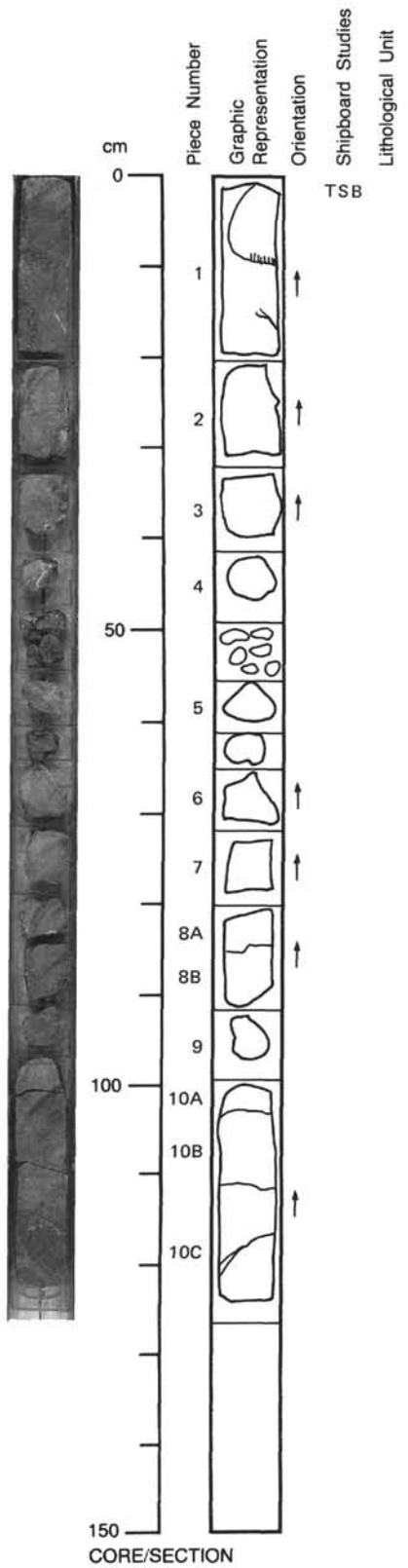


124-770C-7R-4

UNIT 5: CONTINUED

Pieces 1-11

CONTACTS: None, rock extensively brecciated with carbonate or clay matrix.
PHENOCRYSTS:
Plagioclase - <5%; 1-2 mm; Euhedral, subhedral.
Olivine - ~5%; 0.5-1.0 mm; Euhedral-subhedral.
GROUNDMASS: Fine-grained intersertal to intergranular with plagioclase and matrix.
VESICLES: Common in Piece 1 and the upper part of Piece 2 (also in last 2 pieces of previous section), 1-3 mm, lined with clay and filled with clay and carbonate.
COLOR: Gray to brownish gray.
STRUCTURE: All pieces except Piece 9 show brecciation to greater or lesser extent.
ALTERATION: Slight oxidation of matrix to limonite, olivine altered to clay and limonite.
VEINS/FRACTURES: Fractures commonly vertical and linear and vein networks filled with carbonate and clay, partically in Pieces 7A and 7B.

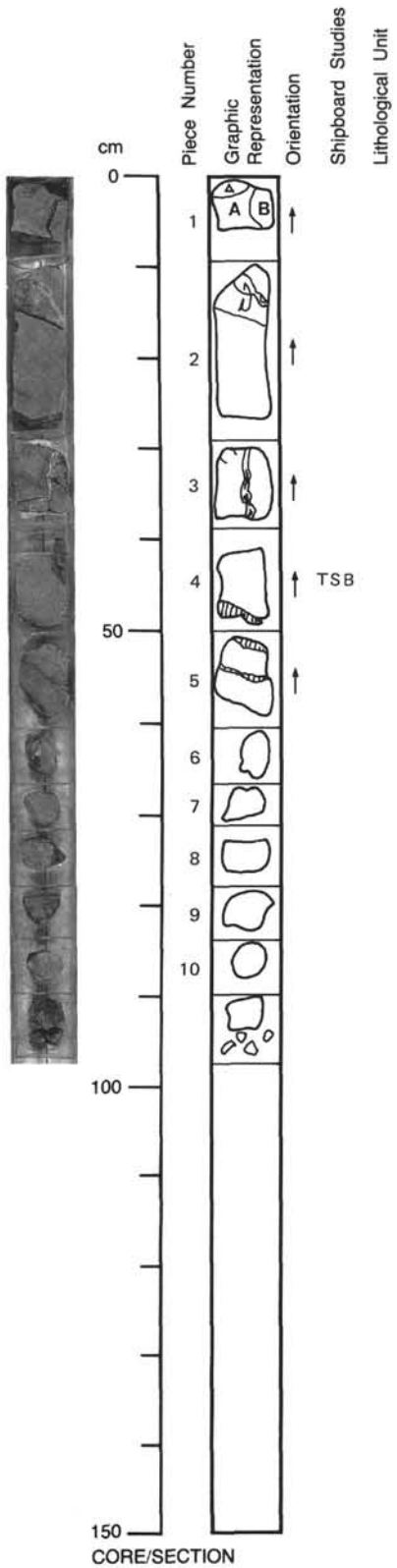


124-770C-7R-5

UNIT 5: CONTINUED

Pieces 1-10

CONTACTS: Fine-grained and glassy margins on micropillow <10 cm in Pieces 1 and 10C. Brecciation common in the core, often with glassy white fragments.
PHENOCRYSTS:
Plagioclase - 5-15%; 1-2 mm; Subhedral, heterogeneously distributed.
Olivine - 4-10%; 1.0-2.0 mm; Euhedral-subhedral.
GROUNDMASS: Cryptocrystalline, microcrystalline to very fine-grained, intersertal plagioclase and mesostasis.
VESICLES: 5%; 1-2 mm; Uneven distributed; Most commonly filled with carbonate and perhaps silica.
COLOR: Gray to brownish gray.
STRUCTURE: Brecciated pillow lava.
ALTERATION: Slight to moderate, limonite stains in matrix, clay and limonite replaces olivine.
VEINS/FRACTURES: Several thin irregular, carbonate filled fractures with limonite margin, often near horizontal.

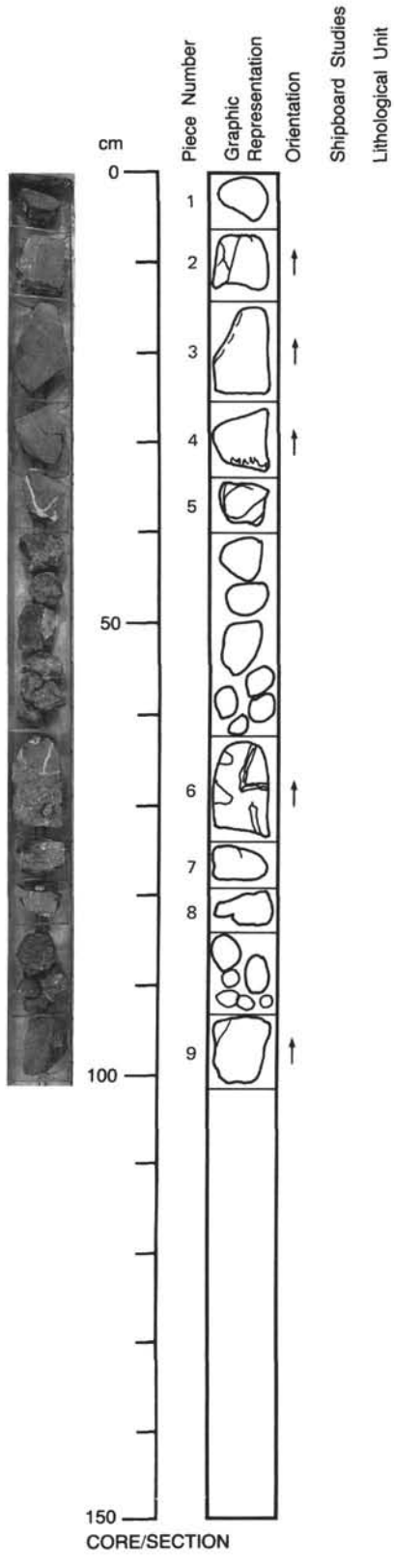


124-770C-7R-6

UNIT 5: CONTINUED

Pieces 1-10

CONTACTS: Glassy pillow margins and variolitic zones in Pieces 1, 4 and 5, brecciation in Pieces 2A, 3 and 8.
PHENOCRYSTS:
Plagioclase - 5-10%; 1-3 mm; Euhedral, subhedral.
Olivine - 3-5%; <1mm; Euhedral, subhedral.
GROUNDMASS: Cryptocrystalline, variolitic, microcrystalline, very fine grained, intersertal plagioclase and mesostasis.
VESICLES: 1-3%; N/A; N/A; N/A; Filled with green clay and carbonate.
COLOR: Gray and brownish gray.
STRUCTURE: Pillow lava, with some brecciation.
ALTERATION: Slight, limonite staining of matrix, olivine altered to clay and limonite.
VEINS/FRACTURES: Carbonate, clay and clast, veins up to 8 mm in Pieces 2 and 3.
ADDITIONAL COMMENTS: Pieces 4 and 5 have chilled margins, on 2 sides in Piece 5, and represent cryptocrystalline dikes penetrating the pillow breccias.

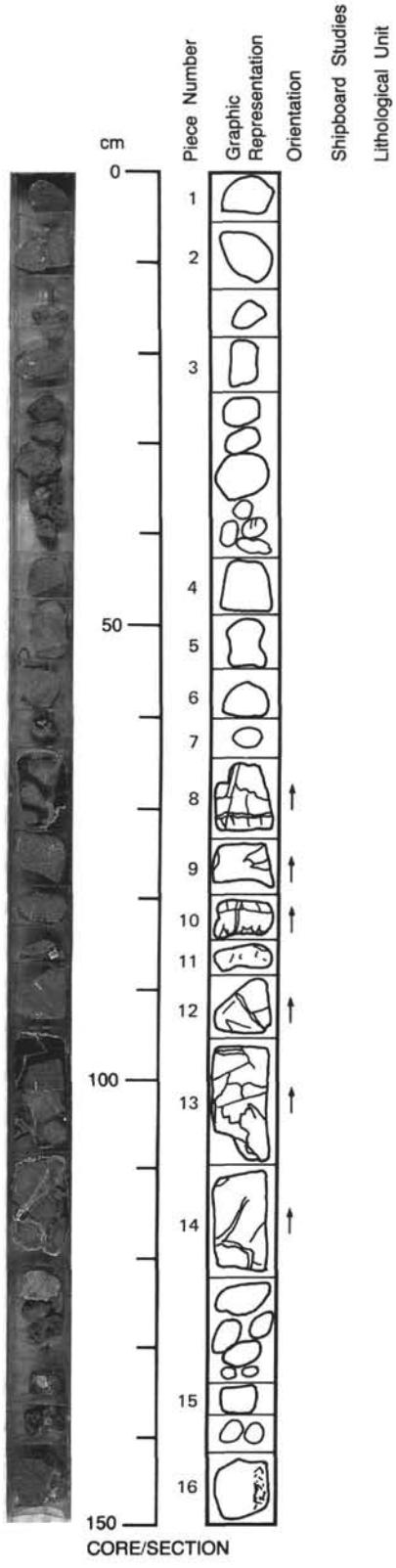


124-770C-8R-1

UNIT 5: CONTINUED

Pieces 1-9

CONTACTS: None, but rock is brecciated in Pieces 6, 7 and 8.
PHENOCRYSTS:
Plagioclase - 10%; 1-3 mm; Euhedral-subhedral.
Olivine - 1%; 0.5 mm; N/A.
GROUNDMASS: Microcrystalline to very fine-grained intersertal plagioclase and mesostasis.
VESICLES: 2%; generally < 1 mm; Filled with brown oxidized green clay, carbonate and silica.
COLOR: Brownish gray and brown (smaller fragments).
STRUCTURE: Brecciated basalt, Pieces 6 and 7 have spalled off fragments of chilled margins.
ALTERATION: Moderate, in majority of the section limonite staining of the matrix and olivine altered to clay and limonite. Fragments in Pieces 6, 7 and 8 are strongly oxidized representing spalled material from pillow margins.
VEINS/FRACTURES: Occur in Pieces 2, 3, 5, 6, 7 and 8, carbonate and clay mixtures up to 5 mm wide filling matrix of breccia as well as irregular fractures.



124-770C-9R-1

UNIT 6: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces 1-16

CONTACTS: Very well preserved glass, variolite, oxidized fine-grained margins preserved in Pieces 8, 10, 11, 13 and 14.

PHENOCRYSTS: In Pieces 15 and 16 olivine and plagioclase are more abundant and larger and matrix is coarse-grained.
Plagioclase - <2%; 1-2 mm; Euhedral, subhedral.
Olivine - <10%; 1 mm; Euhedral, subhedral.

GROUNDMASS: This unit is characterized by a coarser grained texture in groundmass as well as very well developed chilled margins on Pieces 8, 10, 13 and 14. Texture is fine-grained, intersertal to intergranular plagioclase, olivine, clinopyroxene intergrowth. Pieces 15 and 17 relatively coarse-grained (~ 1mm) intergranular intergrowth of plagioclase, olivine, clinopyroxene and glass.

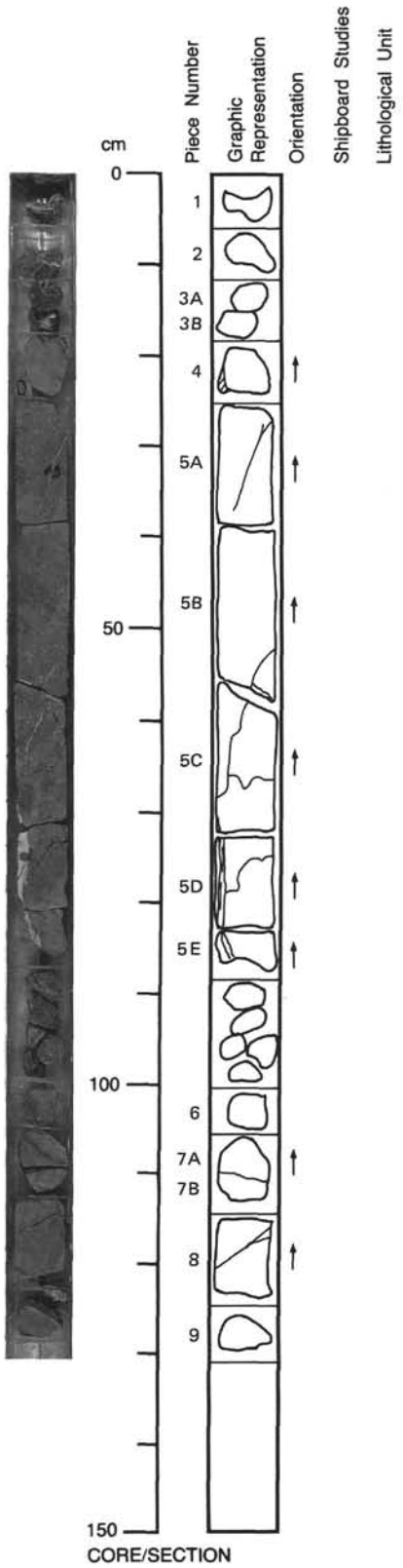
VESICLES: Heterogeneously distributed, most abundant in Pieces 1, 2, and 3, 1-3 mm, spherical; generally lined with green clay and when filled it is calcite.

COLOR: Gray to brownish gray.

STRUCTURE: Chilled margins well developed and planar, may be dike.

ALTERATION: Slight matrix, particularly finer grained limonite stained, olivine altered to clay and limonite.

VEINS/FRACTURES: Green clay filled fractures 2-7 mm in Pieces 8-14, with some carbonate veins and margins. Piece 16 has carbonate net veins.



124-770C-9R-2

UNIT 6: CONTINUED

Pieces 1-9

CONTACTS: Good chilled margin glass and very fine-grained oxidized groundmass in Piece 4, fine-grained also in Piece 5E. Pieces 1-3B look like Pieces 15-16 from Section 124-770C-9R-1.

PHENOCRYSTS:
Plagioclase - <5%; 1-2 mm; Euhedral.
Olivine - <10%; 1-2 mm; Euhedral, subhedral.

GROUNDMASS: Very fine-grained in chilled margins to fine-grained intersertal to intergranular texture plagioclase, olivine, clinopyroxene.

VESICLES: Very few, <1%, restricted to chilled material, 1 mm, filled with darker and lighter green clays.

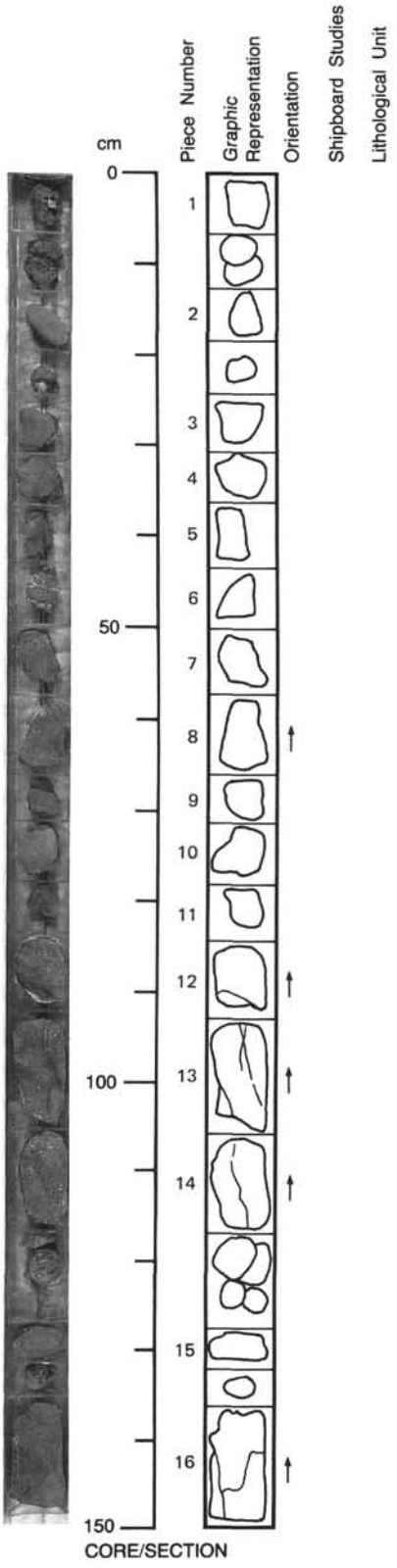
COLOR: Gray to brownish gray.

STRUCTURE: Massive with finer layers could be big pillows (60 cm) or thin sheet flows or dikes.

ALTERATION: Moderate, groundmass oxidized to lominite, olivine mostly altered to clay and limonite.

VEINS/FRACTURES: Steep to vertical, not very abundant, 1-2 mm thick, filled with carbonate, 3-5 mm thick with carbonate and clay having limonite margins.

ADDITIONAL COMMENTS: The distribution of chilled margins and very fine-grained to cryptocrystalline rocks indicates Pieces 4, 5, 6 and 7 represent a dike >30 cm thick, Piece 10 contains the whole of a 3 cm dike. Pieces 13 and 14 are parts of a dike >20 cm wide. All have very sharp, planar glassy margins which appear horizontal in the core. The host rocks have vesicular upper contacts and a fine-grained aphyric texture grading down to coarser grained olivine phyric rocks.



124-770C-10R-1

UNIT 6: CONTINUED

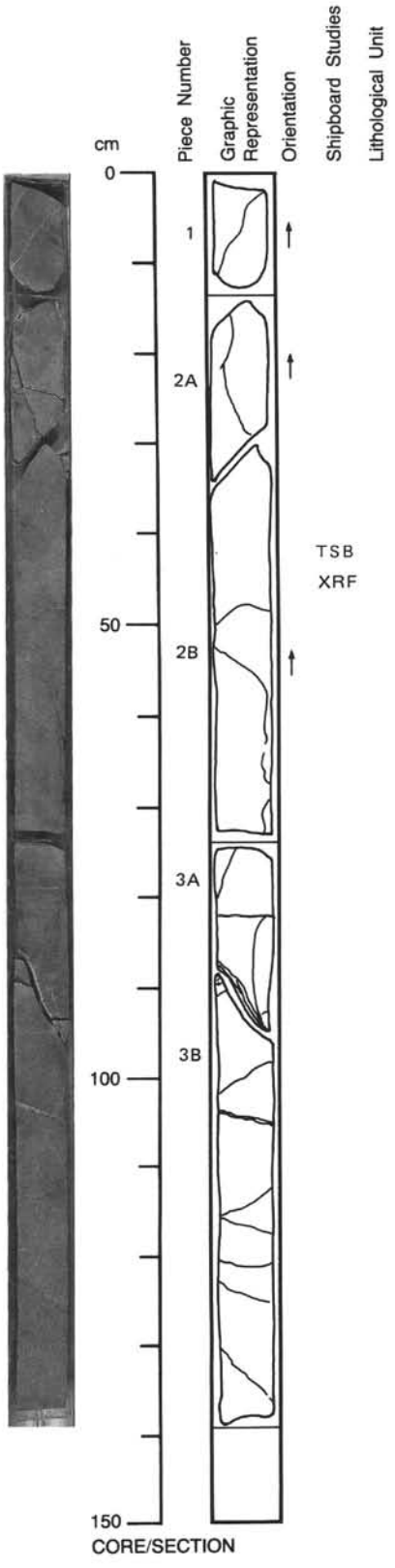
Pieces 1-11

CONTACTS: None, glass in unnumbered fragment between Pieces 2 and 3. Pieces 2, 3 10 and 11 are very fine-grained to cryptocrystalline-chilled margin.
PHENOCRYSTS:
Plagioclase - 2%; 1-2 mm; Euhedral-subhedral.
Olivine - 5%; 1 mm; Euhedral, subhedral.
GROUNDMASS: Cryptocrystalline to fine-grained, intersertal plagioclase, clinopyroxene, olivine, mesostasis.
VESICLES: Relatively few, 3% in Piece 2 maximum, filled with green clay.
COLOR: Gray to grayish brown.
STRUCTURE: Massive.
ALTERATION: Slight, groundmass stained by limonite, olivine altered to green clay and limonite.
VEINS/FRACTURES: 1-2 mm thick carbonate and limonite in Pieces 1, 3, 6 and 8.

UNIT 7: SPARSELY PLAGIOCLASE PHYRIC TO APHYRIC DOLERITE

Pieces 12-16

CONTACTS: None, but Pieces 12, 13, 14 and 15 contain numerous vesicles, becoming fewer downward. Interpreted as the top of a lava.
PHENOCRYSTS: Very few phenocrysts, <2 % aphyric
Plagioclase - <2%; 1-2 mm; Euhedral-subhedral.
GROUNDMASS: Fine-grained intergrowth of plagioclase, clinopyroxene, perhaps intergranular but may be glassy patches.
VESICLES: Numerous in Pieces 12-15, 1-3 mm, most commonly filled with calcite, often together with green clay and Fe oxide.
COLOR: Gray and brownish gray.
STRUCTURE: Massive.
ALTERATION: Slight to moderate, matrix oxidized to limonite along fractures.
VEINS/FRACTURES: Few thin irregular fractures filled with calcite.

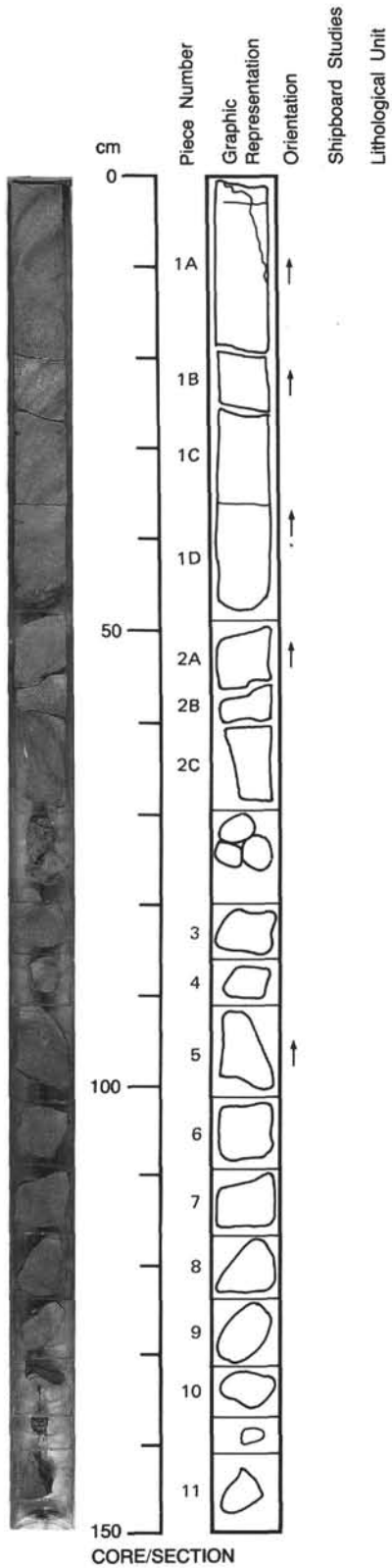


124-770C-10R-2

UNIT 7: CONTINUED

Pieces 1-3

CONTACTS: None.
PHENOCRYSTS: Plagioclase - <1%; 1-2 mm; Euhedral-subhedral.
GROUNDMASS: Fine-grained intergranular texture, plagioclase, clinopyroxene, and may be a little glass.
VESICLES: None.
COLOR: Gray, brownish gray.
STRUCTURE: Massive lava.
ALTERATION: Slight, groundmass oxidized and stained with limonite particularly along vein margins.
VEINS/FRACTURES: Generally steeply dipping but some horizontal and near horizontal. There are thin (1-2 mm) carbonate veins, and brown clay veins 1-2 mm, and thicker composite carbonate pale-green and brown clay veins, and even two very thin (1 mm) dark green clay veins.

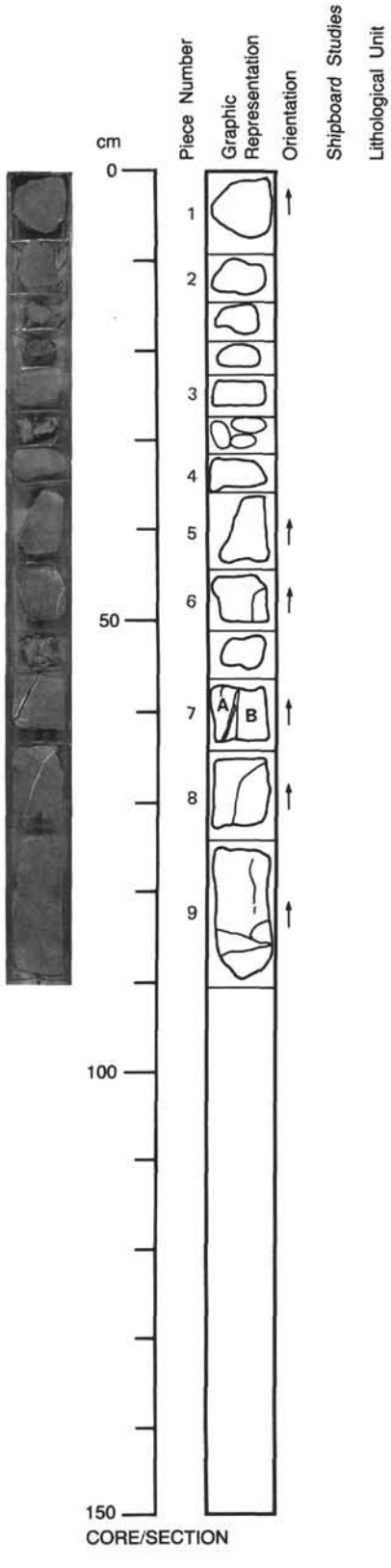


124-770C-10R-3

UNIT 7: CONTINUED

Pieces 1-11

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - <2%; 1-2 mm; Euhedral.
Olivine - < 1%; 0.5 mm; N/A.
GROUNDMASS: Fine-grained intergranular, intersertal, plagioclase, clinopyroxene, olivine, glass.
VESICLES: None.
COLOR: Gray to brownish gray.
STRUCTURE: Massive.
ALTERATION: Slight, groundmass oxidized to limonite, especially along fractures.
VEINS/FRACTURES: Thin (1mm) veins, filled generally with brown clay, two have calcite. Some fractures.

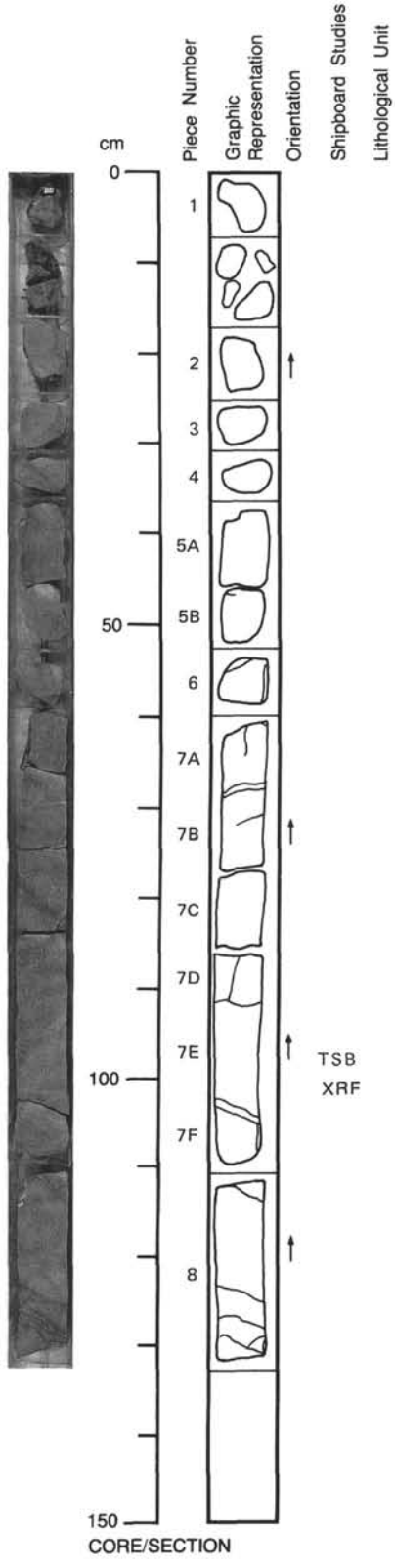


124-770C-10R-4

UNIT 7: CONTINUED

Pieces 1-9

CONTACTS: None.
PHENOCRYSTS: Plagioclase - <1%; 1-2 mm; Euhedral.
GROUNDMASS: Fine-grained, intergranular to intersertal, plagioclase, clinopyroxene, olivine, glass.
VESICLES: <1%; <1 mm; Spherical; Scattered, filled with green clay and/or calcite.
COLOR: Gray to brownish gray.
STRUCTURE: Massive.
ALTERATION: Slight, groundmass oxidized and stained with limonite, olivine altered partly to clay and limonite.
VEINS/FRACTURES: Occur in Pieces 5-8, mainly light brown clay and carbonate mixtures 1-3 mm wide. Thin (1 mm) brown clay veins in Piece 9.

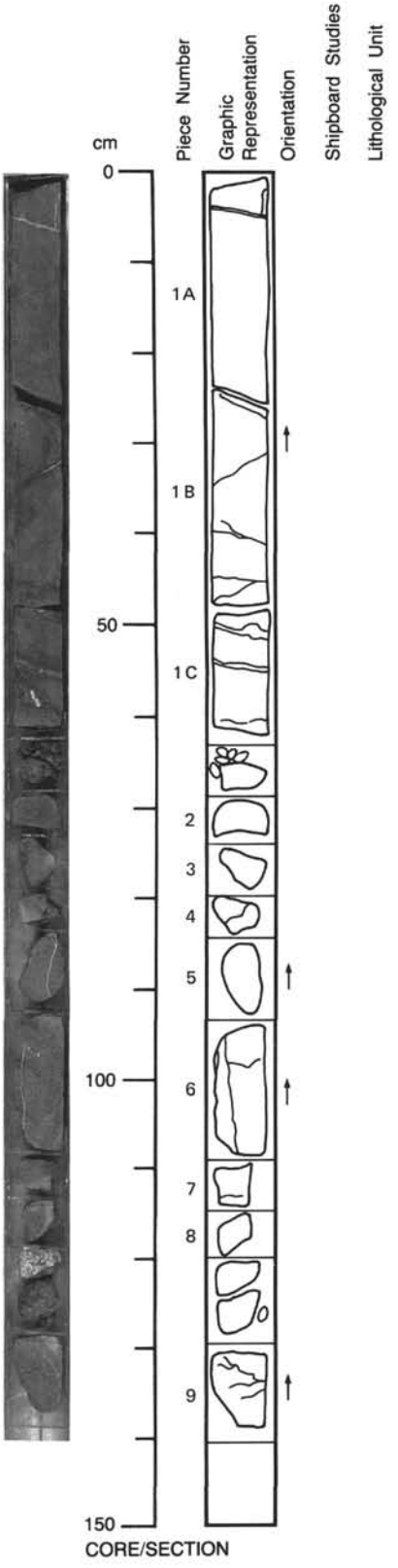


124-770C-11R-1

UNIT 7: CONTINUED

Pieces 1-8

CONTACTS: None.
PHENOCRYSTS: Plagioclase - 3%; 1-2 mm; Isolated euhedral laths.
GROUNDMASS: Intergrowth of plagioclase, clinopyroxene, olivine, Fe-Ti oxide, with altered mesostasis, fine-grained, phaneritic, intersertal texture.
VESICLES: <1%;Filled with green clays.
COLOR: Dark gray, brownish gray.
STRUCTURE: Massive.
ALTERATION: Slight, mostly affecting olivine. Oxidation and staining by Fe-hydroxide diffuse in the upper 50 cm (Pieces 1-5), limited propagation from fractures in Pieces 6-8.
VEINS/FRACTURES: Veins 1-10 mm wide, oblique (azimuth 90-120 degrees), filled with green clays, Fe hydroxide and calcite occur in Pieces 7D, 7E, 7F and 8. Calcite veinlets in Pieces 7A and 7B.
ADDITIONAL COMMENTS: Massive texture and relatively coarse and uniform grain size suggest a interior lava flow or a sill.



124-770C-11R-2

UNIT 7: CONTINUED

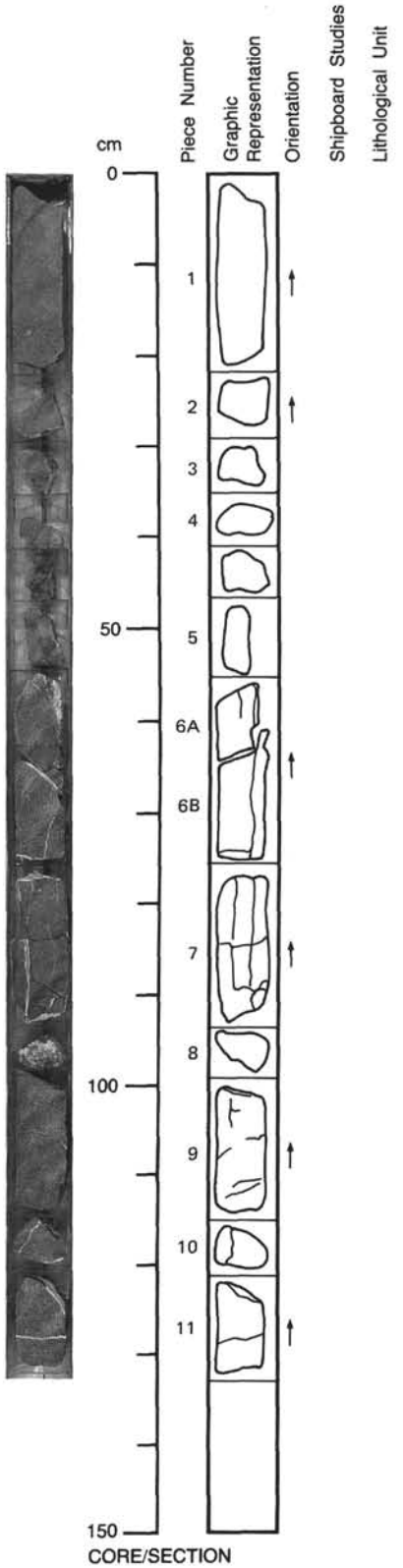
Pieces 1-2

CONTACTS: None.
PHENOCRYSTS: Plagioclase - 0-1%; 1-2 mm; Euhedral lath.
GROUNDMASS: Intersertal to intergranular, composed of plagioclase, pyroxene, olivine and mesostasis.
VESICLES: None.
COLOR: Dark gray when fresh, stained with brown oxide where oxidized; white, yellow, orange and green vein.
STRUCTURE: Massive.
ALTERATION: Very slight brown stains as halos emanating from fracture planes.
VEINS/FRACTURES: Fractures at slight to moderate, angle of dip traverse the core, subsequently filled with calcite forming colloform bands along the fracture spaces and mottled calcitic yellow and green clay. Vein is 1-20 mm. Thickening of vein observed in Piece 1C. Two directions of dip: dominant one has azimuth > 90 degrees, the other has <90 degrees.

UNIT 8: SPARSELY TO HIGHLY PLAGIOCLASE OLIVINE PHYRIC DOLERITE

Pieces 3-9

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 1-2%; 1-2 mm; Euhedral laths.
Olivine - 1-2%; 0.5-2 mm; euhedral prisms.
GROUNDMASS: Intergranular plagioclase, pyroxene and olivine. Olivine may occur as granules or as skeletal elongated crystals.
VESICLES: None.
COLOR: Gray when fresh with orange stains and yellow green specks.
STRUCTURE: Massive.
ALTERATION: Fe oxide stains where fractures occur. Slight plagioclase alteration, evidenced by turbid appearance. Olivine altered to Fe-oxide and green clay.
VEINS/FRACTURES: A 2 mm stringer of calcite cuts vertically through Pieces 5 and 6, sparse dendritic calcite stringers (~ 1mm) on Piece 9, close fracturing with Fe-oxide filling.

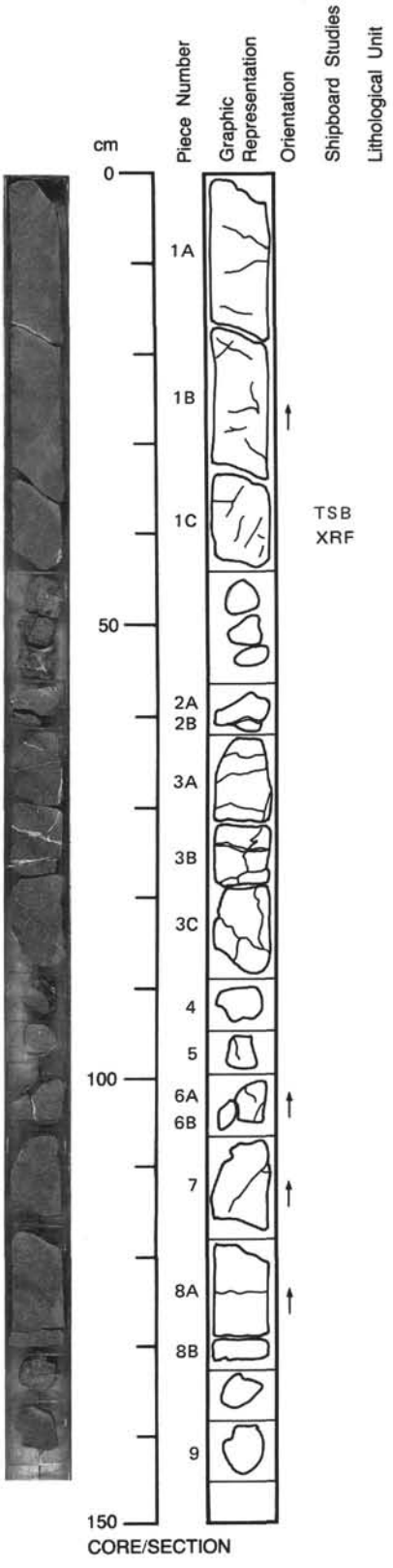


124-770C-12R-1

UNIT 8: CONTINUED

Pieces 1-11

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 0-2%; 1-2 mm; Laths.
Olivine - 8-10%; 0.5-2 mm; Euhedral prisms, mostly altered.
GROUNDMASS: Phaneritic aggregate of plagioclase, clinopyroxene, olivine, Fe-Ti oxide intergranular to subophitic texture.
VESICLES: None.
COLOR: Brownish gray, dark gray.
STRUCTURE: Massive.
ALTERATION: Slight, affecting olivine, largely replaced by clays, carbonate and Fe-hydroxide.
VEINS/FRACTURES: Frequent veins 1-5 mm wide, mainly vertical and nearly horizontal, filled with green clays and calcite, often lined with Fe-hydroxide.

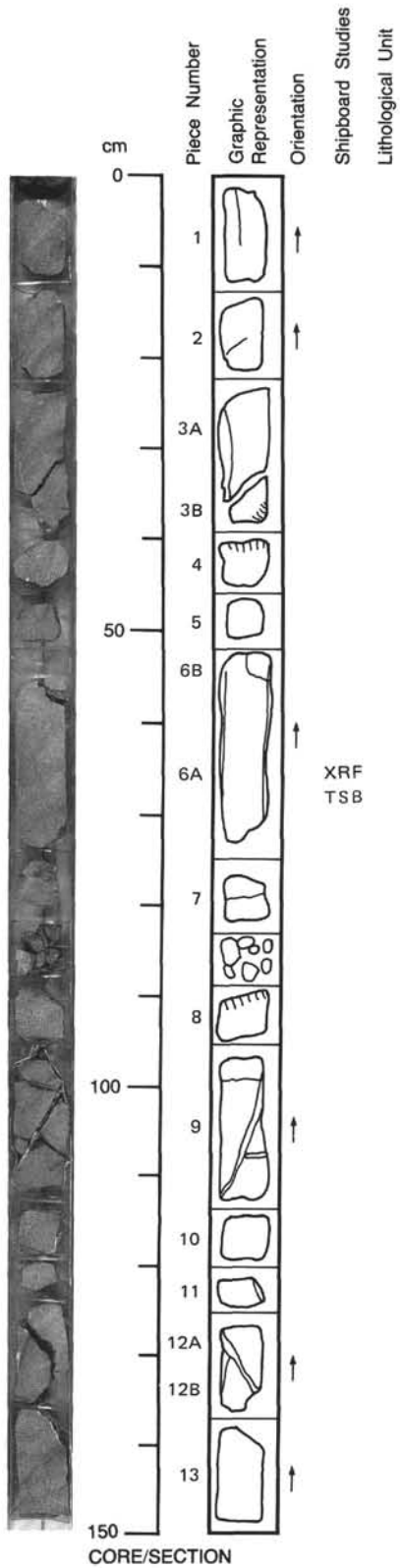


124-770C-12R-2

UNIT 8: CONTINUED

Pieces 1-9

CONTACTS: None
PHENOCRYSTS:
Plagioclase - <15%; 3-5 mm; Euhedral, rounded laths.
Olivine - 5-10%; 0.5-2.0 mm; Euhedral prisms.
GROUNDMASS: Intergranular plagioclase, pyroxene and olivine.
VESICLES: None.
COLOR: Gray when fresh, white veinlets.
STRUCTURE: Massive, slightly fractured.
ALTERATION: Slight, olivine is altered to clay and Fe-oxide and calcite.
VEINS/FRACTURES: Veinlets <1-4 mm wide, filled with calcite. Major veining is vertical to low angled. One vertical vein on Piece 6, filled with calcite.



124-770C-12R-3

UNIT 8: CONTINUED

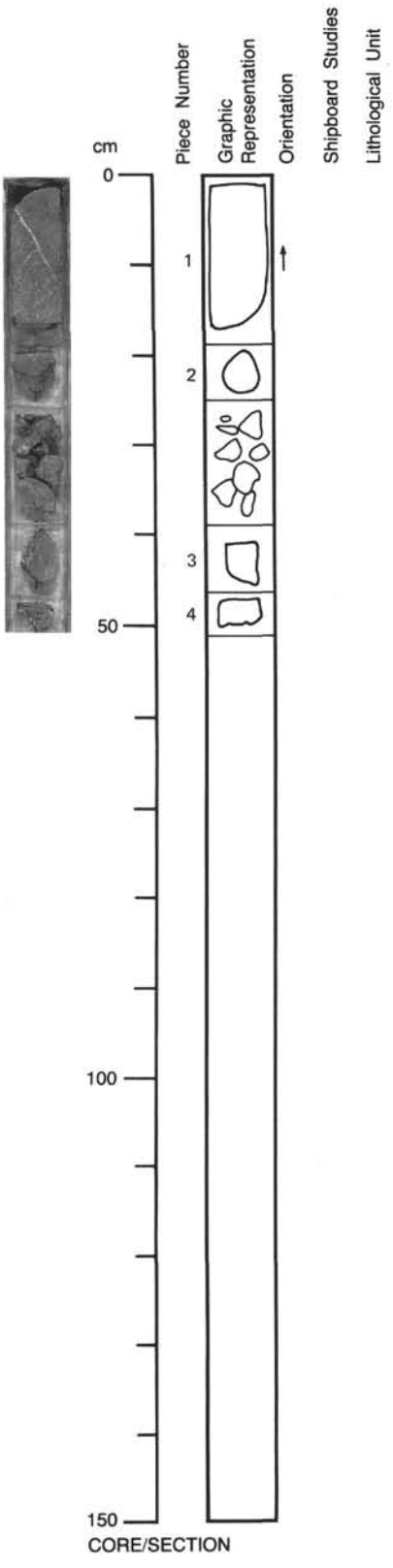
Pieces 1-2

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 1-2%; 1-2 mm; Euhedral laths.
Olivine - 8-10%; 0.5-2 mm; Euhedral prisms, altered to clays, calcite, Fe hydroxides.
GROUNDMASS: Fine-grained phaneritic aggregate of plagioclase, clinopyroxene, olivine and Fe-Ti oxide.
VESICLES: Few scattered in Piece 1, 1-2 mm, filled with calcite and clays.
COLOR: Brownish gray.
STRUCTURE: Massive.
ALTERATION: Slight, diffuse staining with Fe-hydroxide, and nearly complete alteration of olivine to clays, calcite and Fe-hydroxide.
VEINS/FRACTURES: Veinlets filled with clays and calcite.
ADDITIONAL COMMENTS: The rock is similar to Section 124-770C-12R-2, rather highly altered.

UNIT 9: MODERATELY TO HIGHLY OLIVINE-PLAGIOCLASE PHYRIC BASALT

Pieces 3-13

CONTACTS: Chilled margins glassy or microvariolitic in Pieces 3B (bottom), 4 and 8 (top).
PHENOCRYSTS:
Plagioclase - <12%; 0.5-3 mm; Euhedral laths.
Olivine - 3-5%; 0.5-2 mm; Euhedral prisms, highly altered.
GROUNDMASS: Fine-grained intergrowth of plagioclase, clinopyroxene, olivine, Fe-Ti oxide, altered mesostasis, intersertal texture. In chilled zones, hypohyaline, glassy, microvariolitic textures are developed.
VESICLES: 5-8%; 0.4-1 mm; Irregularly distributed; filled with green clays, calcite and Fe-hydroxide.
COLOR: Brownish gray, gray.
STRUCTURE: Occurrence of thin curved chilled margins suggest pillow structure.
ALTERATION: Slight, olivine and glass are altered, and oxidation diffuse, shown by staining or halos flanking veins where Fe-hydroxides occur.
VEINS/FRACTURES: Veins filled with green or brown clays and calcite, are present in Pieces 3 (one vertical vein), 7, 9 (one vein 3-5 mm wide, azimuth 30 degrees + veinlets), 10, 12 and 13.
ADDITIONAL COMMENTS: Pieces 4 and 5 are part of a cryptocrystalline to very fine-grained dike with glassy margin on the top of Piece 4. Piece 8 has chilled margin on top and is very fine-grained grading down to coarser grained and more porphyritic in Piece 9. Most of this section may comprise dikes penetrating each other. Pieces 4, 5, 6 and 7 dike >40 cm; Pieces 8, 9 10 and 11 dike > 35 cm. Most rock represented by Pieces 1, 2, 3, 12 and 13.



124-770C-12R-4

UNIT 9: CONTINUED

Pieces 1-4

CONTACTS: Evidence of chilling on Pieces 2 and 3.
PHENOCRYSTS:
Plagioclase - 3-8%; 1-3 mm; Euhedral laths.
Olivine - 1-4%; 0.5-2.5 mm; Euhedral prisms.
GROUNDMASS: Composed of plagioclase, pyroxene, olivine and glass mesostasis; intersertal to intergranular texture. Olivine is altered. At chilled portions, microvariolitic texture is observed.
VESICLES: Moderately vesicular (5-8%), rounded vesicles filled with calcite, Fe-oxide and green clay, 0.5-2 mm.
COLOR: Gray when fresh, grayish/brownish gray at oxidized/altered portions, white stringers of calcite.
STRUCTURE: Pillowed.
ALTERATION: Slight to moderate, iron stain halos emanating from fractures. Olivine phenocrysts and groundmass are largely altered, though some phenocrysts are fresh. Plagioclase is slightly altered, as evidenced by turbid appearance.
VEINS/FRACTURES: 1-4 mm calcite/clay veins with some colloform bands of clay. Piece 1 has 1 mm vein, azimuth 150 degrees.

124–770B–16R–03 (Piece 1, 64–65 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Basalt, olivine–plagioclase, phyric

GRAIN SIZE: Fine grained

TEXTURE: Hyalopilitic hypohyaline

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	2–3	0.2–1.0		Euhedral–subhedral	Totally altered to clay and calcite.
Plagioclase	3	3	0.3–2.0	An50–70	Euhedral–subhedral	Some normal zoning, angular glass inclusions.
GROUNDMASS						
Plagioclase	20	30	0.15–1.0	An50–70	Laths	Hollow swallow tail, laths 1mm. Some laths altered to clay.
Mesostasis	65	65	N/A		N/A	All mesostasis is devitrified and oxidized.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	10		Replacing olivine and plagioclase microliths.
Carbonate	2		Replacing olivine.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	2	Uneven	0.01–1.00	Clay	Spherical, lobate	Large vesicles have green clay lining brown clay core, smaller vesicles only green clay.

COMMENTS: Groundmass texture is that of radiating aggregates of microlitic plagioclase 0.15 mm in a cryptocrystalline to glassy matrix. Matrix is turbid, brown, from devitrification. In addition there are hollow plagioclase laths 1 mm. Olivine phenocrysts occur in small groups. (NO UNIT NUMBER GIVEN).

124–770B–16R–04 (Piece 4B, 95–96 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Olivine–plagioclase phyric basalt

GRAIN SIZE: Fine–grained

TEXTURE: Hypocrystalline

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	2	3	0.5		Euhedral	
Plagioclase	3	3	1–3		Euhedral–subhedral	Angular glass inclusions, complex zoning, normal glomerophyric and single crystals.
GROUNDMASS						
Plagioclase	15	15	0.1–1.0		Laths	Skeletal and microliths.
Mesostasis	79	79	N/A		N/A	Devitrified glass?? and full of tiny glass of Fe–Ti oxides.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	1	Olivine	Bright blue green may be celadonite.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	0				

COMMENTS: (NO UNIT NUMBER GIVEN).

124-770B-17R-03 (Piece 13, 134-137 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase-olivine phyric basalt

GRAIN SIZE: Fine-grained

TEXTURE: Hypocrystalline, hyalo???

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	2	0.1-0.6		Euhedral	Occurs in aggregates of small crystals.
Plagioclase	3	3	1.0-4.0	~An70	Euhedral-subhedral	Single crystals and glomerophyric aggregates sometimes with ?? show compositional zoning oscillatory.
GROUNDMASS						
Plagioclase	30	60	0.5-1.0		Laths	Skeletal presence and microliths . Many microliths appear turbid as a result of clay alteration and oxidization.
Mesostasis	34	34	N/A		N/A	Turbid through ?? and tiny grains Fe-Ti oxide.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	32		Altering plagioclase and olivine.
Clays	1	Vesicles	Bright green celadonite altering olivine.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	1	Irregular	<0.05	Green clay	Irregular

COMMENTS: (NO UNIT NUMBER GIVEN).

124-770B-18R-02 (Piece 5, 42-45 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Medium-fine grained

TEXTURE: Hypohyalline, intersertal

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	2	0.2-0.6		Euhedral-subhedral	Totally altered to green calcite and brown clay.
Plagioclase	2	2	1-3		Euhedral	Individual crystals and glomerophyric.
GROUNDMASS						
Plagioclase	30	30	.25-2.0		Laths	Radiating aggregates, many hollow skeletal tendency to flow allignment in part.
Clinopyroxene	25	25	N/A		Anhedral grains	Skeletal prisms intergrown with glass and Fe-oxide.
Mesostasis	41	4	N/A		N/A	Turbid glass due to oxidation and tiny Fe-Ti oxide crystals.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	1	Olivine	Brown and gray replacing olivine.
Carbonate	1	Olivine	Replacing olivine.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	0				

COMMENTS: Olivine occurs as aggregates of phenocrysts. (NO UNIT NUMBER GIVEN).

124-770B-18R-03 (Piece 14, 144-145 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Hypocrystalline, hyalopilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	10	0.3-1.2		Euhedral-subhedral	Totally altered.
Plagioclase	13	15	1-5		Euhedral-subhedral	Single crystals, glomerophyric includes complete olivines with plagioclase. Angular areas of glass replaced in part by clay.
GROUNDMASS						
Plagioclase	15	15	0.1-0.5		Laths	Very narrow <0.7 mm with numerous incipient crystallites, skeletal hollow swallow tail.
Mesostasis	58	58	N/A		N/A	Turbid, rust stained devitrified glass radiates.
Clinopyroxene	2	2	0.1		N/A	Skeletal poorly developed.
Ilmenite	Trace	Trace	N/A		N/A	Small grain and plates.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	10	Olivine	Brown clay.
Clays	2	Plagioclase	Brown clay.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	<1	Uneven	<1	Clay	Spherical	Brown clay in layer.

COMMENTS: (NO UNIT NUMBER GIVEN).

124-770B-19R-01 (Piece 9, 98-99 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Fine grained, intersertal

TEXTURE: Hypocrystalline, hyalopilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	6	0.3-3.0		Euhedral-subhedral	Partly enclosed in plagioclase. Altered 100%.
Plagioclase	20	20	1-5		Euhedral-subhedral anhedral	Angular patches and glass included.
GROUNDMASS						
Plagioclase	25	25	0.3-1.0		Laths	Hollow, skeletal, swallow tail.
Mesostasis	48	48	N/A		N/A	Made up of incipient unidentifiably radiate laths and turbid glass. Possible incipient clinopyroxene.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	6	Olivine	Brown clay aggregate
Clays	1	Vesicles	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	1	Uneven	0.02	Clay	Spherical	Green clay

COMMENTS: Cut by this angular vein (0.01 mm) of brown glass. Some of the plagioclase phenocrysts may be fractured. (NO UNIT NUMBER GIVEN).

124-770B-19R-02 (Piece 4, 42-45 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Hypohyalline, hyalopilitic cryptocrystalline

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	4	0.5-3.0		Subhedral-euhedral	100% altered.
Plagioclase	20	20	1-4	An70	Euhedral-subhedral	Angular inclusions of glass.
GROUNDMASS						
Plagioclase	10	10	N/A		Laths	Swallow tail, hollow skeletal
Mesostasis	66	66	N/A		N/A	Turbid brown, no optical properties. Some vertical small plagioclase laths and unidentifiable minerals start to appear.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING		COMMENTS
Clays	4	Olivine	Brown clay.	
Clays	2	Vesicles		

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	1-2	Uneven	.1-.3	Clay	Spherical	Brown clay filling.

COMMENTS: Brown clay fills intergrow fracture. (NO UNIT NUMBER GIVEN).

124-770B-20R-02 (Piece 8, 101-102 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Fine-medium grained

TEXTURE: Intergranular, intersertal-sub-ophitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	10	0.2-2.0		Euhedral	100% altered to clay.
Plagioclase	20	20	1-5		Anhedral, euhedral	Glassy inclusions, compositional zoning. Single crystals and glomerophyric aggregates sometimes with olivine.
GROUNDMASS						
Plagioclase	32	32	0.25- .00	An50-70	Laths	Euhedral, subhedral size grades to phenocrysts.
Clinopyroxene	30	30	N/A		N/A	
Glass	0	5	N/A		N/A	Altered to clays, intergranular
Ilmenite	1	1	N/A		N/A	Angular patches.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING		COMMENTS
Clays	10	Olivine	Brown clays	
Clays	5	Glass	Brown and fibrous	
Vesicles	2		Clay	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	2.3	Scattered	2		Spherical

COMMENTS: Texture is patchy, varying from intergranular, with radiating clinopyroxene plagioclase intergrowths in intergranular areas. Smallest olivines are also intergranular, some clinopyroxene plagioclase is ultrafasciculate. (NO UNIT NUMBER GIVEN).

124–770B–20R–03 (Piece 1, 12–14 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Fine–medium grained

TEXTURE: Intergranular, intersertal

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	5	0.5–1.0		Euhedral	100% altered, included in plagioclase.
Plagioclase	10	10	1–5	An60–70	Euhedral–subhedral	Glassy inclusions. Some cores replaced by ???? material.
GROUNDMASS						
Plagioclase	39	39	0.5–1.0	An60	Broad laths	
Clinopyroxene	30	30	0.3–1.0		Prisms, anhedral grains	Occurs as grains and intergrowths.
Ilmenite	1	1	0.1–0.2		N/A	Skeletal, dendritic, platey.
Glass	12	12	N/A		N/A	Angular intersertal areas – altered to clay.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING		COMMENTS
Clays	5	Olivine	Brown clay	
Clays	3	Vesicles	Clay and calcite	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	3	Scattered	4	Clay, calcite	Spherical

COMMENTS: Many of the intergranular areas between plagioclase are occupied by intergrowths, parallel and radial of clinopyroxene. (NO UNIT AND PIECE NUMBER GIVEN).

124–770B–20R–04 (Piece 10, 135–140 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Fine–medium grained

TEXTURE: Intergranular, sub–ophitic, intersertal

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	10	.5–1		Subhedral–euhedral	100% altered.
Plagioclase	5	5	1–5		Euhedral	Zones altered to clay and calcite.
GROUNDMASS						
Plagioclase	51	51	1–2	~An50	N/A	
Clinopyroxene	13	13	1–2		N/A	
Ilmenite	1	1	1		N/A	Large skeletal plates.
Glass	0	5	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING		COMMENTS
Clays	10	Olivine	Brown clay and calcite.	
Clays	5	Glass	Sericite and calcite	
Calcite	15	Vesicles	Calcite and clay.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	15	Uneven	0.5– .0	Calcite, clay	Spherical, lobate

COMMENTS: Coarse plagioclase in groundmass so ???. (NO UNIT NUMBER GIVEN).

124–770B–21R–01 (Piece 9, 99–100 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Fine–medium grained

TEXTURE: Intergranular, intersertal, intra–fasciculate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	5	0.5–1.0		Subhedral–euhedral	100% altered to clay.
Plagioclase	3	3	1–3	~An65	Euhedral–subhedral	Includes patches of altered glass compositional zoning normal.
GROUNDMASS						
Plagioclase	37	37	0.5–1.5	~An65	Laths	
Clinopyroxene	34	34	0.5–1.5		Prisms	Well developed radial prisms and parallel aggregates with plagioclase.
Glass	0	5	N/A		N/A	
Ilmenite	1	1	.1–.5 mm		N/A	Skeletal plates.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	5	Olivine	Clay.
Clays	5	Glass	Clay
Vesicles	15		Calcite and clay.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15	Through out	.5–5	Clay, calcite	Spherical, lobate	Lined and filled with clays, or lined with clays and filled with calcite.

COMMENTS: (NO UNIT NUMBER GIVEN).

124–770B–21R–01 (Piece 9, 123–126 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Fine–medium grained

TEXTURE: Intersertal, intrafasciculate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	8	1.0–1.5		Euhedral	100% replaced
Plagioclase	1	1	2		Euhedral–subhedral	
GROUNDMASS						
Plagioclase	45	45	0.3–1.5		Laths	
Clinopyroxene	25	25	0.2–1.5		N/A	Intrafasciculate radial and parallel, intergrowth, and vermicular with plagioclase.
Ilmenite/Mt.	1	1	N/A		N/A	Plates and grains skeletal crystals.
Glass	0	10	N/A		N/A	Angular ?? area

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	8	Olivine	Brown clays
Clays	10	Glass	Green and brown clays
Vesicles	10	?	Clay, calcite

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	10	Uniform	0.5–3.0	Clay,calcite	Spherical, lobate	Lined and filled with green and brown clay and filled with calcite.

COMMENTS: Slide of junction of core and carbonate vein. Lithic fragments in the vein have same general texture and grain size as the host rock. Carbonate is the host material (in vein) to angular fragments and broken individual crystals. (NO UNIT NUMBER GIVEN).

124-770B-21R-03 (Piece 3, 34-35 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Vein breccia, plagioclase olivine phyric basalt host

GRAIN SIZE: Fine-medium grained

TEXTURE: Intergranular, intrafasciculate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	5	1.0		Euhedral subhedral	100% altered.
Plagioclase	10	10	2		Euhedral, subhedral	More sodic narrow rim.
GROUNDMASS						
Plagioclase	38	38	1-2		Laths	Glassy core replaced by clay.
Clinopyroxene	37	37	1-2		Prismatic grains	Radial and parallel intergrowth and intergranular with plagioclase.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	5	Olivine	Pale brown clay.
Clays	5	Vesicles	Clay.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	5	Uneven	2	Clay, sericite	Spherical	Clay lining and feldspar filling.

COMMENTS: The description is of the clasts of basalts which are set in a fine grained vesicular carbonate and clay together with devitrified glassy clasts. Three glass clasts are vesicular angular and vary in size from 3 mm to < 0.1 mm. The lithic clasts have a similar size range but in the smaller sizes the clasts are individual crystals. (NO UNIT NUMBER GIVEN).

124-770B-21R-04 (Piece 1, 34-35 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE:

TEXTURE: Intergranular, intrafasciculate, intersertal

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	10	0.4-0.6		Euhedral-subhedral	100% altered.
Plagioclase	6	6	2-5		Euhedral-subhedral	Zones and cores of olivine altered lenses of glass normal compositional zoning.
GROUNDMASS						
Plagioclase	35	35	0.2-1.5	An65	N/A	
Clinopyroxene	28	28	0.4-2.0		N/A	
Glass	?	5	N/A		N/A	
Ilmenite	1	1	0.2		N/A	Plates and grains.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	10	Olivine	Brown clay, fibrous.
Clays	5	Glass	Clay.
Clay/calcite	15	Vesicles	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15	Throughout	0.5-4.0		Spherical, irregular	Normally piled with a mixture of clay and calcite with clay rims.

COMMENTS: Texture is patchy, particular with respect to the distribution of olivine and there are fine grained areas which have some altered glass-intersertal. (NO UNIT AND PIECE NUMBER GIVEN).

124–770B–21R–04 (Piece 1, 77–78 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase, olivine phyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Intergranular, intersertal, intra–fasciculate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	5	0.5		Euhedral–subhedral	100% altered
Plagioclase	5	5	2	An55	Euhedral–subhedral	Altered zones and patches of glass, normal compositional zoning
GROUNDMASS						
Plagioclase	39	38	0.1–1.0	An50	Laths	Hollow, cores altered glass.
Clinopyroxene	27	27	0.1–0.5		Grains, prisms	Intergrowths with plagioclase and vermicular magnetite with ilmenite.
Glass	?	20	?		N/A	Devitrified angular patches.
Ilmenite	1	1	0.1		Plates	Intergrown with devitrified glass ???

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING		COMMENTS
Clays	5	Olivine	Clay brownish	
Clays	20	Glass	Clays	
Clay/calcite	3	Vesicles	?	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	3	Uneven	1–3	Clay, calcite	Spherical, irregular

COMMENTS: Structures very like vesicles in this rock– spheres of fine grained glassy material with microliths of plagioclase intergrown with abundant clinopyroxene and ilmenite angular vesicles– center of core either cognate xenoliths or crystallized immiscible liquid. (NO UNIT AND PIECE NUMBER GIVEN).

124–770B–21R–06 (Piece 1, 19–20 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: *Fine–grained*

TEXTURE: Intergranular, intrafisciculate, intersertal

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	5	0.5–1.0		Euhedral–subhedral	100% altered to clay, occur in groups.
Plagioclase	15	15	1–3	An60–70	Euhedral–subhedral	Zones and angular patches of devitrified glass. Normal compositional zoning, glomerophyric and single crystals.
GROUNDMASS						
Plagioclase	24	24	0.5–1.0	An65	Laths	Compositional zoning, cores.
Clinopyroxene	34	34	0.3–1.5		Blades and grains	Radial and parallel aggregate with plagioclase
Ilmenite	2	2	N/A		N/A	Plates and euhedral grains.
Glass	0	5	N/A		N/A	Devitrified to clay.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	5	Olivine	
Clays	5	Glass	
Clay/calcite	15	Vesicles	Intermate mixture cannot be separated.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15	Through out	1–4	Clay, calcite	Spherical, ovoid	Many lined with clays, some with clay calcite filled centers.

COMMENTS: (NO UNIT AND PIECE NUMBER GIVEN).

124-770C-2R-03 (Piece 3, 61-62 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: ?

GRAIN SIZE: Medium to fine grained

TEXTURE: Hypocrystalline, hyalophitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	1	0.2-0.5		Euhedral	Totally altered to brown clays.
Plagioclase	2	2	1-2		Euhedral	Some angular glass inclusions.
GROUNDMASS						
Plagioclase	25	50	0.2-1.0	An50-70	Laths	Skeletal, hollow, swallow tail.
Clinopyroxene	5	5	0.1		N/A	Intergranular, skeletal
Mesostasis	27	27	N/A		N/A	Incipient crystals of plagioclase, Fe oxides plus clinopyroxene.
Glass	0	15	N/A		Angular	Fills spaces between crystals.
GI	Trace	N/A	N/A		Angular	Altered to brown clay.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	1	Olivine	Brown and green mixture.
Clays	15	Glass	Brown clay ?? glass.
Clay	25	Plagioclase, laths.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	0				

COMMENTS: (NO UNIT NUMBER GIVEN).

124-770C-3R-03 (Piece 10, 128-129 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Medium to fine grained

TEXTURE: Hypocrystalline, intersertal, intergranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	2	0.3-0.5		Euhedral-subhedral	Totally altered to clays.
Plagioclase	2	2	1-3	An50-70	Euhedral-subhedral	Includes angular patches of glass, sometimes trapped between glomerophyric aggregates. Olivine occurs as groups of grains and maybe associated with plagioclase.
GROUNDMASS						
Plagioclase	33	33	.5-1		Laths	Hollow, skeletal swallow tail.
Clinopyroxene	56	56	< 0.3		Grows	Skeletal prisms intergrown with iron oxide and very small plagioclase in intercrystal spaces, sometimes radiating.
Glass	0	5	N/A		N/A	
Ilmenite	1	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	2	Olivine	Brown fibrous aggregates.
Clays	5	Glass	Brown clays.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	0				

COMMENTS: ????? on plagioclase phenocrysts in narrow zones with irregular contacts with groundmass. Iron oxide is platey, skeletal intergrown with clinopyroxene largely. Texture is ???. Sometimes, very few plagioclase laths sometimes numerous laths. (NO UNIT NUMBER GIVEN).

124-770C-4R-11 (Piece 3, 26-27 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE:

TEXTURE:

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	3	0.5-2.0	An60	Euhedral	100% altered.
Plagioclase	15	15	1-3		Subhedral-euhedral	Angular glass patches included.
GROUNDMASS						
Plagioclase	10	10	N/A	An50-70	Laths	Skeletal, hollow, swallow tail.
Fe oxide	2	2	.01		Granules	
Mesostasis	70	70	N/A		N/A	Turbid devitrified glass in ?? incipient skeletal arborescent clinopyroxene and plag laths occur.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING		COMMENTS
Clays	3	Olivine	Brown clay.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	0				

COMMENTS: Thin irregular calcite vein. (NO UNIT NUMBER GIVEN).

124-770C-5R-07 (Piece 5, 70-71 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase, olivine phyric basalt

GRAIN SIZE: Fine-grained

TEXTURE: Intergranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	3	0.5-1.0		Euhedral-subhedral	100% altered ???? ???? clays and calcite.
Plagioclase	2	2	2	An70	N/A	Altered glass patches and zones, compositional zoning.
GROUNDMASS						
Plagioclase	14	14	0.3-0.6	An50	Hollow laths	With turbid dark glass and altered glass.
Clinopyroxene	33	33	.3-.6		Prisms and subhedral grains	Intergrown with plagioclase- occasional prism 1.0 mm.
Ilmenite	<1	<1	0.2		N/A	Skeletal crystals and plates often in glass.
Glass	15	15	N/A		N/A	Very dark turbid angular patches.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING		COMMENTS
Clays/calcite	3	Olivine	Clays	
Clays	2	Vesicles	Clays iron oxide and calcite.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	2	Uneven	0.2-3.0	Clay, calcite, ????	Spherical, irregular	??? iron oxide, clay, clay + calcite ???.

COMMENTS: Opaque equidimensional grains are few but may represent an earlier phase of magnetite with ilmenite formed largely from interstitial glass. (NO UNIT NUMBER GIVEN).

124-770C-6R-03 (Piece 1, 44-45 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Fine-grained

TEXTURE: Intergranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	1	0.5		N/A	
Plagioclase	4	4	1-3		N/A	Glass inclusions.
GROUNDMASS						
Plagioclase	50	50	0.5-1.5	~An60	Laths	
Clinopyroxene	34	34	0.2-2.0		Grains prisms	Grains and parallel and radial prisms intergrown with plagioclase.
Glass	2	2	N/A		N/A	
Ilmenite	1(2)	1(2)	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	1	Olivine	Brown clays.
Clays	8	Vesicles	Limonite clays + calcite mixed.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	8	Uneven	0.5-3	Layered	Spherical	Limonite and iron oxide with clays + calcites.

COMMENTS: Various degrees of crystallinity represented by difficult textural domains. (NO UNIT AND PIECE NUMBER GIVEN).

124-770C-7R-05 (Piece 1, 3-6 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Cryptocrystalline

TEXTURE: Hyalophitic, hypocrystalline, intersertal

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	4	0.5		Euhedral	Clays
Plagioclase	15	15	1-3	An70	Euhedral	Quench plagioclase laths grow out from phenocryst. Phenocrysts have patches of devitrified glass included. ???? complex zoning. Glomerophyric aggregates with/without olivine.
GROUNDMASS						
Plagioclase	5	5	N/A		N/A	
Glass	74	74	N/A		N/A	Devitrified cryptocrystalline radial unidentifiable aggregates. Turbid and stained with iron oxide.
Ilmenite	1	1	N/A		N/A	Filled with minute Fe oxide granules.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	1	Vesicles	
Clays	4	Olivine	Clays.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	1	Scattered	0.5	Clay	Spherical

COMMENTS: (NO UNIT AND PIECE NUMBER GIVEN).

124-770C-7R-06 (Piece 4, 43-44 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Cryptocrystalline

TEXTURE: Hypohyaline, hyalopilitic, intersertal

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	3	0.5		Euhedral-subhedral	100% altered to clay and calcite.
Plagioclase	8	8	1-3	An75	Euhedral	??, minor compositional zoning, quench laths grow on the phenocrysts. Some small regular ?? glass. Glomerophyric?
GROUNDMASS						
Plagioclase	10	10	0.25-1.00		Laths	Hollow, swallow tail.
Glass	75	75	?		?	Devitrified into arborescent laths of unidentifiable minerals.
Fe oxide	1	1	N/A		?	Occurs as tiny granulars in glass matrix.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	3	Vesicles	Iron oxide, green and brown clays, calcite.
Clays	3	Olivine	Mixed with calcite.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	3	Scattered	0.1-3.0	Clay, calcite, ????	Spherical	Iron oxide ??, clay calcite ??. Some small vesicles filled with green smectite.

COMMENTS: Olivine occurs as groups of grains in limited area, and as single crystals. (NO UNIT NUMBER GIVEN).

124-770C-10R-02 (Piece 2, 42-43 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Basalt, aphyric

GRAIN SIZE: Fine-grained

TEXTURE: Intergranular, subophitic, intersertal

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	1	1	1.5		Euhedral	Glass inclusions, minor compositional zoning.
GROUNDMASS						
Plagioclase	31	31	0.5-0.8	An60	Laths	Devitrified glass core.
Clinopyroxene	42	42	0.5-1.0		Subprisms and grains	Enclosed between and intergrown with plagioclase.
Glass	0	20	N/A		N/A	Angular green clay/ilmenite intergrowth.
Olivine	0	4	N/A		Rounded grains.	Occupies intergranular position.
Ilmenite	2	2	N/A		Plates	Occurs in devitrified glass + euhedral pyroxene.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	4	Olivine	Replaced by greenish clay aggregates.
Clays	20	Glass	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	0				

COMMENTS: (NO UNIT NUMBER GIVEN).

124-770C-11R-01 (Piece 7, 96-98 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase phyric basalt

GRAIN SIZE: Fine-grained

TEXTURE: Intergranular, subophitic,??

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	3	3	1-2		Euhedral	Glass zones altered to clay between core and more sodic rim. In some crystals devitrified glass patches throughout.
GROUNDMASS						
Plagioclase	38	38	0.3-0.8	An60	Laths	Some with devitrified glass cores. Intergrown, intergranular.
Clinopyroxene	38	38	0.5-1.0		Prisms and subhedral grains	
Olivine	0	1	N/A		N/A	Altered to greenish clay.
Glass	0	20	N/A		N/A	
Ilmenite	1	1	N/A		Plates and subhedral grains	In clay and intergrowths.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	1	Olivine	Clay
Clays	20	Glass	Greenish clay with intergrown ilmenite.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	0				

COMMENTS: (NO UNIT NUMBER GIVEN).

124-771A-11R-03 (Piece 1, 13-16 cm) OBSERVER: SPA WHERE SAMPLED:

ROCK NAME: Moderately clinopyroxene-phyric basalt

GRAIN SIZE: Fine-grained

TEXTURE: Phyric, hypocrystalline

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Clinopyroxene	4	4	1.2-0.3	Augite	Prism	Glomerophyric zoned/zoned.
GROUNDMASS						
Plagioclase	42	44	0.4-0.05	Labradorite bytownite	Lath	Incipient alteration to clays.
Clinopyroxene	23	23	0.4-0.01	Augite	Subhedral - Prismatic	Pale brownish, green.
Glass	0	25	N/A		N/A	Altered to clays.
Magnetite	4	4	1.1-0.02		Euhedral-granular	
Ilmenite	trace	trace	0.03-0.01		Needles	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	27	Glass, plagioclase	Mostly yellow green, radiate aggregates.
Clays	trace	Vesicles	Yellow-green (outer zone) to brown red (inner zone).

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	2	Irregular	5.0-0.03	Clay	Spherical, pipe	Lined with clay festoons.

COMMENTS: (NO PIECE OR UNIT NUMBER GIVEN).

124-770C-12R-02 (Piece 1, 38-41 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: Plagioclase olivine phyric basalt

GRAIN SIZE: Fine-grained

TEXTURE: Intergranular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	15	0.5-3.0		Euhedral-rounded	Totally altered.
Plagioclase	5	5	1-3	An75	Euhedral-subhedral	Pebbles of devitrified glass, ?? normal compositional zoning, may be ???? by glassy patches.
GROUNDMASS						
Plagioclase	36	35	N/A	An70	Laths	Some with devitrified glass cores.
Clinopyroxene	33	33	N/A		N/A	Intergrowth with plagioclase and intergranular.
Glass	0	10	?		?	Replaced by bright green clay and ??.
GI	1	?	.1-.5		Plates + grains	Intergrown with uniform olivine, pyroxene.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	15	Olivine	Clay, Limonite could be a mixture of iddingsite and bowlingite.
Clays	10	Glass	Clays ?? from ?? glass.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	0				

COMMENTS: Whole rock is fractured and penetrated by very thin veins of clay. (NO UNIT AND PIECE NUMBER GIVEN).

124-770C-12R-03 (Piece 1, 66-67 cm) OBSERVER: TES WHERE SAMPLED:

ROCK NAME: ?

GRAIN SIZE: Fine

TEXTURE: Intergranular and intersertal

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	3	0.2-1.0		Euhedral-subhedral	Altered to clays
Plagioclase	12	12	1-4	An80	Subhedral	Sometimes broken, patches of devitrified glass, minor compositional zoning.
GROUNDMASS						
Plagioclase	26	26	0.2-0.8	An60-70	Laths	Some hollow, devitrified glass cores.
Clinopyroxene	32	32	0.1-0.5		Grains and prisms	Clusters of small grains are intergrowths between plag. Prisms are intergrown with plag.
Glass	0	20	N/A		N/A	Devitrified angular patches between plagioclase.
Ilmenite	1	N/A	N/A		Grains, plates, and skeletal dendrites	With devitrified glass.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	3	Olivine	Clays
Clays	20	Glass	Greenish clays intergrown with ilmenite.
Clay/calcite	6	Vesicles	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	6	Uneven	0.5-3.0	Clay, calcite	Spherical	Filled with dark to light brown clay and cores of calcite with some clay.

COMMENTS: Ilmenite also intergrown with and included in px. Much of the clay and the olivine is limonite stained. (NO UNIT AND PIECE NUMBER GIVEN).