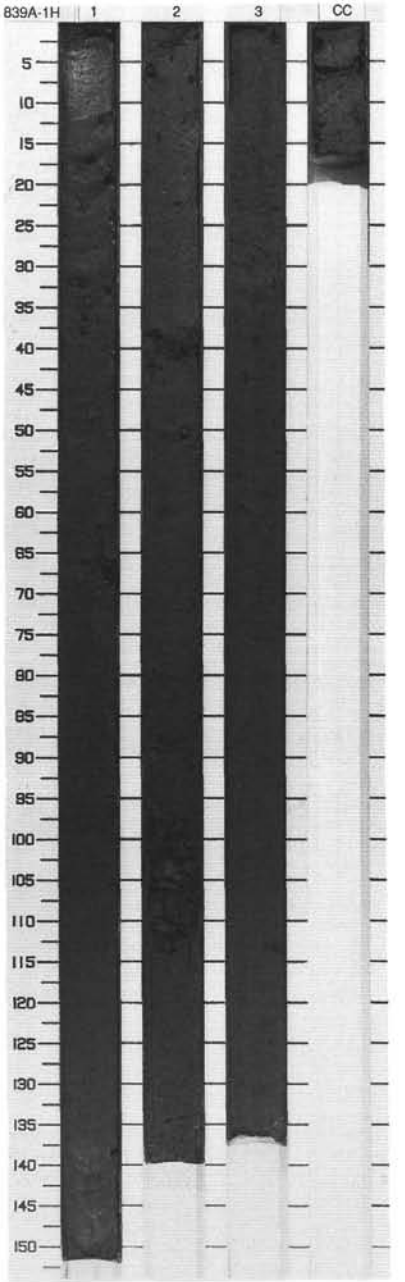
135-839A-1H
SMEAR SLIDE SUMMARY (%):

	1, 8 D	2, 10 D	3, 1 M	3, 32 M	CC, 8 D
TEXTURE:					
Sand	---	---	35	---	---
Silt	4	6	64	50	4
Clay	96	94	1	50	96
COMPOSITION:					
Accessory minerals	---	---	2	5	---
Clay	35	35	1	35	36
Diatoms	Tr	---	---	---	---
Dolomite	---	Tr	---	---	---
Feldspar	---	---	2	15	---
Foraminifers	4	6	15	15	4
Glass	---	Tr	80	15	Tr
Nannofossils	61	59	---	10	61
Radiolarians	---	Tr	---	---	---
Spicules	Tr	Tr	---	---	Tr

SITE 839 HOLE A CORE 1H CORED 0.0 - 4.5 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1 2 3 CC	Middle Pleistocene			S S I S S S	10YR 3/4	CLAYEY NANNOFOSSIL OOZE. Major lithology: CLAYEY NANNOFOSSIL OOZE, dark yellowish brown (10YR 3/4), homogenous soft sediment containing angular pumice clasts. Clasts are generally millimeter-sized but may be up to 5 cm in diameter. Variable but persistent dark mottling in Sections 1 and 3. Foraminifers are more abundant in Section 2, from 40 to 100 cm. Minor lithologies: COARSE VOLCANIC SAND, dark yellowish brown (10YR 3/4) occurs in Section 2, 0–5 cm, in Section 3, 0–1 cm, and as a dark wedge in Section 3, 113–115 cm. CLAYEY SILT WITH NANNOFOSSILS, VOLCANIC GLASS, FELDSPAR, AND FORAMS, occurs in Section 3, 29–33 cm.

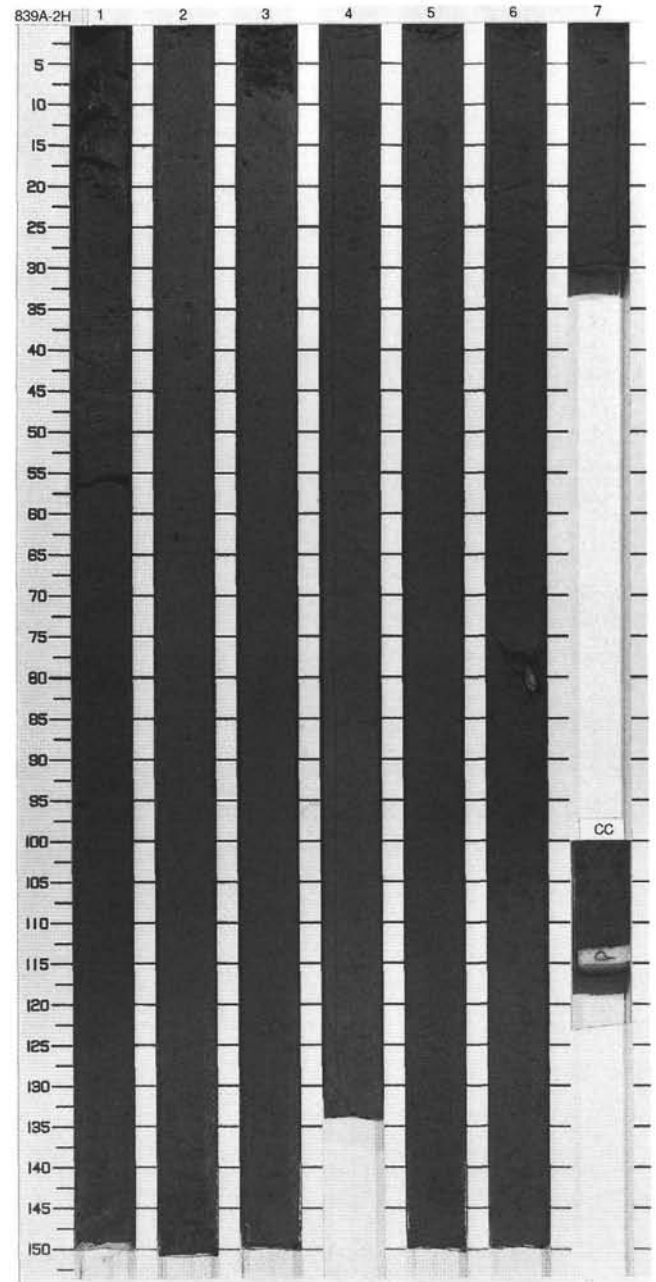


135-839A-2H
SMEAR SLIDE SUMMARY (%):

	1, 45 M	3, 7 M	6, 69 D
TEXTURE:			
Sand	70	20	5
Silt	15	45	3
Clay	15	35	92
COMPOSITION:			
Accessory minerals	---	Tr	—
Clay	15	35	30
Feldspar	2	5	—
Foraminifers	10	---	8
Glass	73	60	—
Nannofossils	---	---	62

SITE 839 HOLE A CORE 2H — CORED 4.5 - 14.0 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1 2 3 4 5 6 7 CC	Middle Pleistocene	F F F F	W	S S I P S	10YR 3/3 10YR 4/3 10YR 3/3 10YR 4/3 10YR 3/3 10YR 4/3	CLAYEY NANNOFOSSIL OOZE. Major lithology: CLAYEY NANNOFOSSIL OOZE, dark brown (10YR 3/3). Generally structureless, with occasional mottling and pumice clasts up to 2 cm in diameter. Minor lithologies: VOLCANIC SAND WITH FORAMS AND CLAY, grayish brown (2.5Y 5/2). Occurs as thin, fining-upward interbeds in Section 1, 37–46 cm and 55–57 cm, with gradational contacts with the overlying clayey nannofossil ooze. FINE VITRIC ASH, very dark grayish brown (10YR 3/2), occurs in Section 1, 91–95 cm, Section 2, 148 cm, and Section 3, 7 cm. Sharply defined basal contacts and gradational upper contacts with the overlying nannofossil ooze. Basal contact in Section 3 at 7 cm is disrupted by pumice clast and moderately bioturbated.

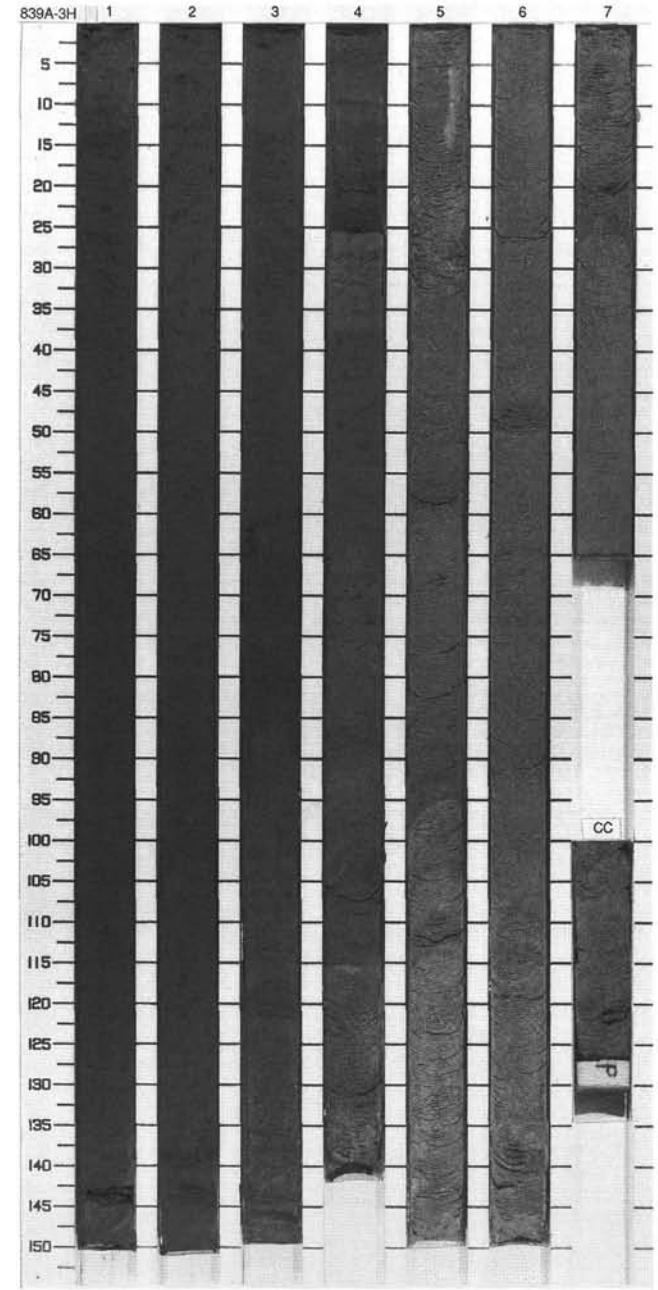


135-839A-3H
SMEAR SLIDE SUMMARY (%):

	2, 135 D	3, 130 D	4, 24 M	7, 23 M
TEXTURE:				
Sand	10	10	80	70
Silt	85	80	15	30
Clay	5	10	5	---
COMPOSITION:				
Accessory minerals	---	3	Tr	Tr
Clay	5	5	5	—
Feldspar	---	5	15	5
Foraminifors	Tr	2	10	5
Glass	95	75	70	90
Nannolossils	---	10	---	—

SITE 839 HOLE A CORE 3H CORED 14.0 - 23.5 mbsf

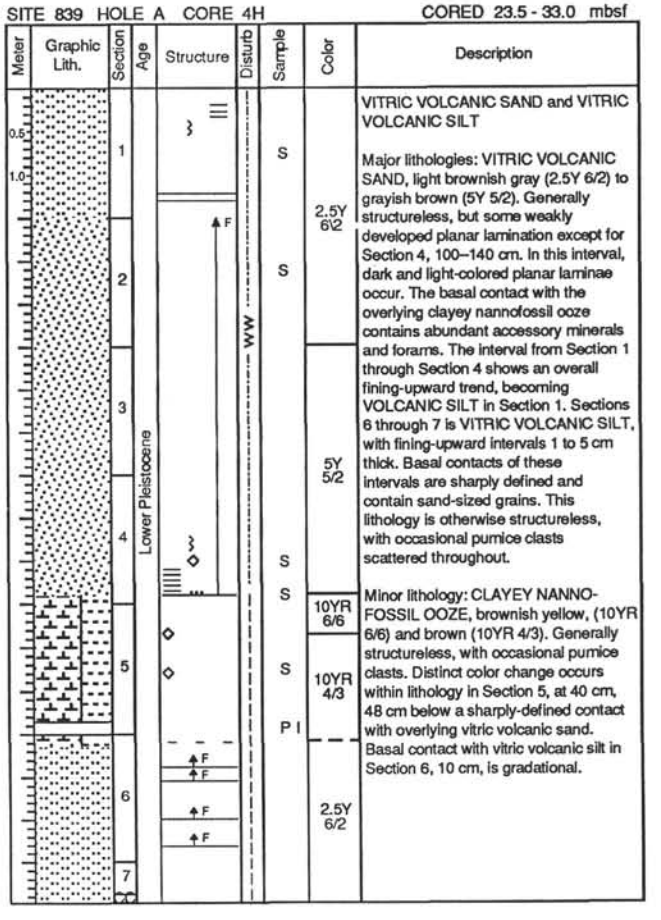
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1 2 3 4 5 6 7 CC	Middle Pleistocene	F		S S S I P	10YR 3/3 2.5Y 5/2 10YR 4/4 2.5Y 6/2 To 2.5Y 5/2 2.5Y 6/2	VITRIC VOLCANIC SILT , VITRIC VOLCANIC SAND and CLAYEY NANNOFOSSIL OOZE Major lithologies: VITRIC VOLCANIC SILT, VITRIC VOLCANIC SAND, light brownish gray (2.5Y 6/2) to grayish brown (2.5Y 5/2). Varies from structureless to graded, with parallel laminae and fining-upward sequences with sharply defined basal contacts. Within vitric volcanic silt, coarser, thin bands of sand-sized material occur in Section 4, 0–25 cm, and 105–115 cm, Section 6, 26–27 cm, 48–50 cm, 65–66 cm, 138–142 cm, and Section 7, 17–27 cm. Sandy beds generally contain a greater proportion of accessory minerals. A dispersed vitric volcanic silt bed occurs in Section 2, 132–138 cm. CLAYEY NANNOFOSSIL OOZE, dark brown (10YR 3/3), generally structureless with occasional mottling and pumice clasts. Within this lithology in Section 4, 25–64 cm, there is a sharply defined color change at 36 cm, from yellowish brown (10YR 5/6) to dark yellowish brown (10YR 4/4). This color change occurs 11 cm below the base of a vitric volcanic sand interval. Minor lithology: NONE.



135-839A-4H
SMEAR SLIDE SUMMARY (%):

	1, 75 D	2, 60 D	4, 100 M	4, 139 M	5, 75 D	6, 80 D
TEXTURE:						
Sand	30	70	75	85	---	10
Silt	60	20	20	10	20	85
Clay	10	10	5	5	80	5
COMPOSITION:						
Accessory minerals	3	Tr	10	30	5	---
Clay	---	5	5	---	25	5
Feldspar	5	2	7	10	---	Tr
Foraminifers	Tr	---	3	5	10	5
Glass	90	90	75	55	10	90
Nannofossils	2	2	---	Tr	50	---
Rock fragment	---	1	---	---	---	---

SITE 839 HOLE A CORE 4H — CORED 23.5 - 33.0 mbsf

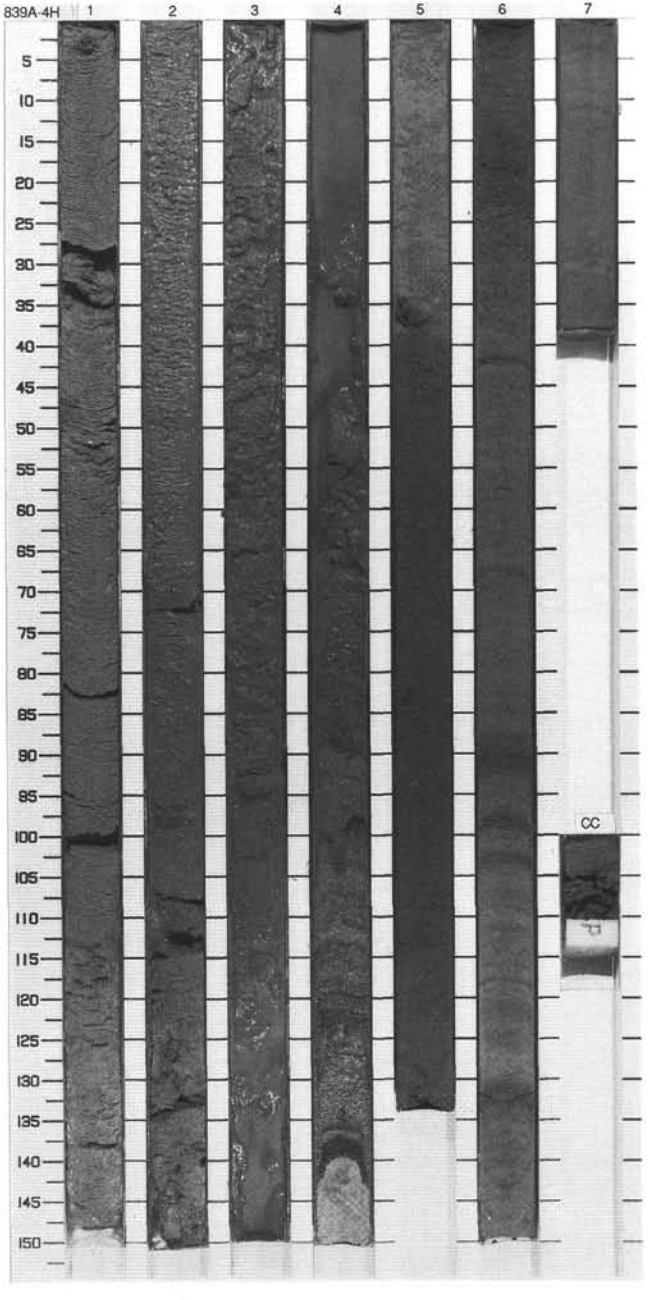


Description

VITRIC VOLCANIC SAND and VITRIC VOLCANIC SILT

Major lithologies: VITRIC VOLCANIC SAND, light brownish gray (2.5Y 6/2) to grayish brown (5Y 5/2). Generally structureless, but some weakly developed planar lamination except for Section 4, 100–140 cm. In this interval, dark and light-colored planar laminae occur. The basal contact with the overlying clayey nannofossil ooze contains abundant accessory minerals and forams. The interval from Section 1 through Section 4 shows an overall fining-upward trend, becoming VOLCANIC SILT in Section 1. Sections 6 through 7 is VITRIC VOLCANIC SILT, with fining-upward intervals 1 to 5 cm thick. Basal contacts of these intervals are sharply defined and contain sand-sized grains. This lithology is otherwise structureless, with occasional pumice clasts scattered throughout.

Minor lithology: CLAYEY NANNOFOSSIL OOZE, brownish yellow, (10YR 6/6) and brown (10YR 4/3). Generally structureless, with occasional pumice clasts. Distinct color change occurs within lithology in Section 5, at 40 cm, 48 cm below a sharply-defined contact with overlying vitric volcanic sand. Basal contact with vitric volcanic silt in Section 6, 10 cm, is gradational.

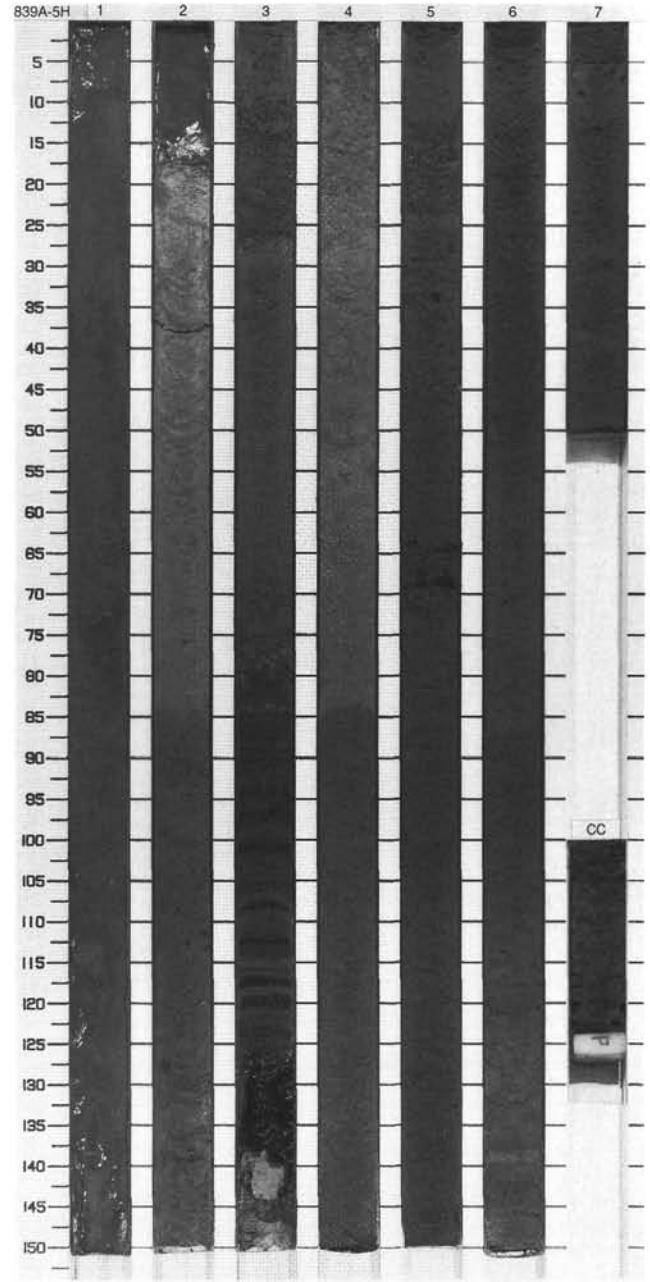


135-839A-5H
SMEAR SLIDE SUMMARY (%):

	1, 50 D	2, 40 M	3, 90 D	3, 136 M	5, 68 M	5, 114 D	7, 25 D
TEXTURE:							
Sand	90	5	10	85	60	10	10
Silt	10	10	80	10	30	15	20
Clay	---	85	10	5	10	75	70
COMPOSITION:							
Accessory minerals	Tr	---	5	10	10	5	Tr
Clay	---	25	5	---	---	35	35
Feldspar	5	Tr	3	---	2	---	---
Foraminifers	---	Tr	1	10	5	10	10
Glass	95	15	80	75	75	---	---
Intraclasts	---	---	---	2	---	10	15
Nannofossils	---	60	1	3	3	40	40
Rock fragment	---	---	---	---	5	---	---

SITE 839 HOLE A CORE 5H — CORED 33.0 - 42.5 mbsf

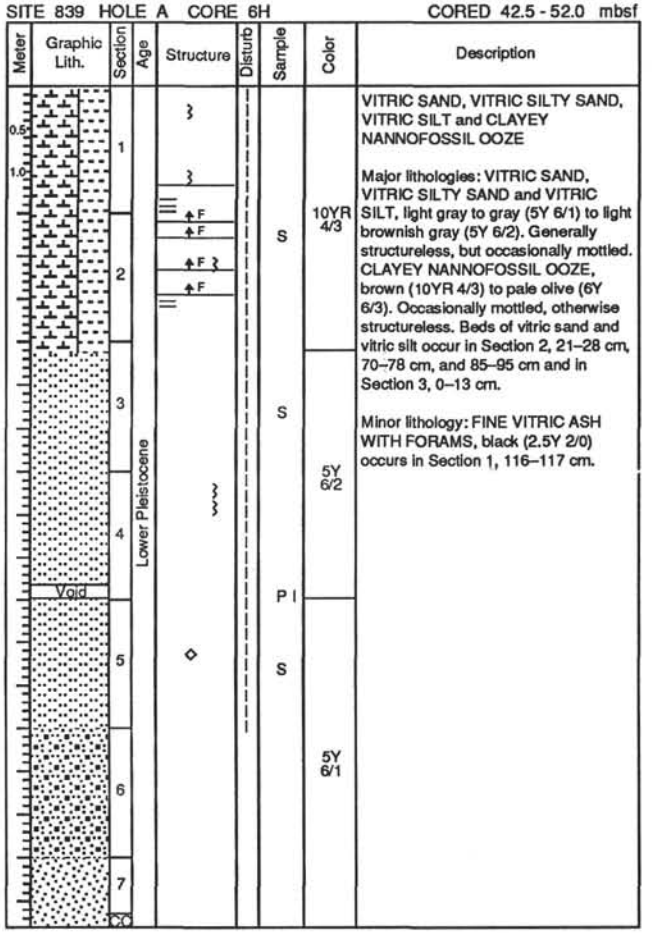
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5		1	Lower Pleistocene			S	5Y 5/1	CLAYEY NANNOFOSSIL OOZE, VITRIC VOLCANIC SAND and VITRIC VOLCANIC SILT. Major lithologies: CLAYEY NANNOFOSSIL OOZE, brown (10YR 4/3) to dark brown (10YR 3/3). Generally structureless with occasional mottling and pumice clasts. Shows sharp color change within the lithology below overlying vitric volcanic sand and silt layers at Section 2, 83 cm, and Section 4, 84 cm. VITRIC VOLCANIC SAND, gray (5Y 5/1), generally structureless. In Section 3, 75–125 cm, a repeated sequence of thin-bedded, fining-upward intervals occurs. In Section 7, 0–5 cm, VITRIC VOLCANIC SAND grades upward into planar-laminated VITRIC VOLCANIC SILT, light olive brown (2.5Y 5/4), in Section 6, 120–150 cm. Minor lithologies: FINE VITRIC ASH, dark grayish brown (10YR 4/2) to black (2.5Y 2/0), occurs in thin, bioturbated, diffuse beds in Section 5, 20–23 cm and 64–69 cm. CLAYEY NANNOFOSSIL OOZE WITH GLASS, pale olive (5Y 6/2), generally structureless. Occurs below volcanic sand in Section 2, 17 to 60 cm.
1.0							5Y 6/2	
		2		F		S	10YR 4/3	
		3		F F F F		S	5Y 4/1	
		4		F		S	5Y 6/3	
		5		F F		S	10YR 4/3 To 10YR 3/3	
		6				S		
		7				S	2.5Y 5/4	
		CC					10YR 4/3	



135-839A-6H
SMEAR SLIDE SUMMARY (%):

	2, 24 M	3, 80 D	5, 80 D
TEXTURE:			
Sand	65	20	25
Silt	30	70	65
Clay	5	10	10
COMPOSITION:			
Accessory minerals	Tr	8	10
Clay	5	--	--
Feldspar	10	2	--
Foraminifers	10	--	Tr
Glass	70	90	85
Nannofossils	--	Tr	5
Rock fragment	5	--	--

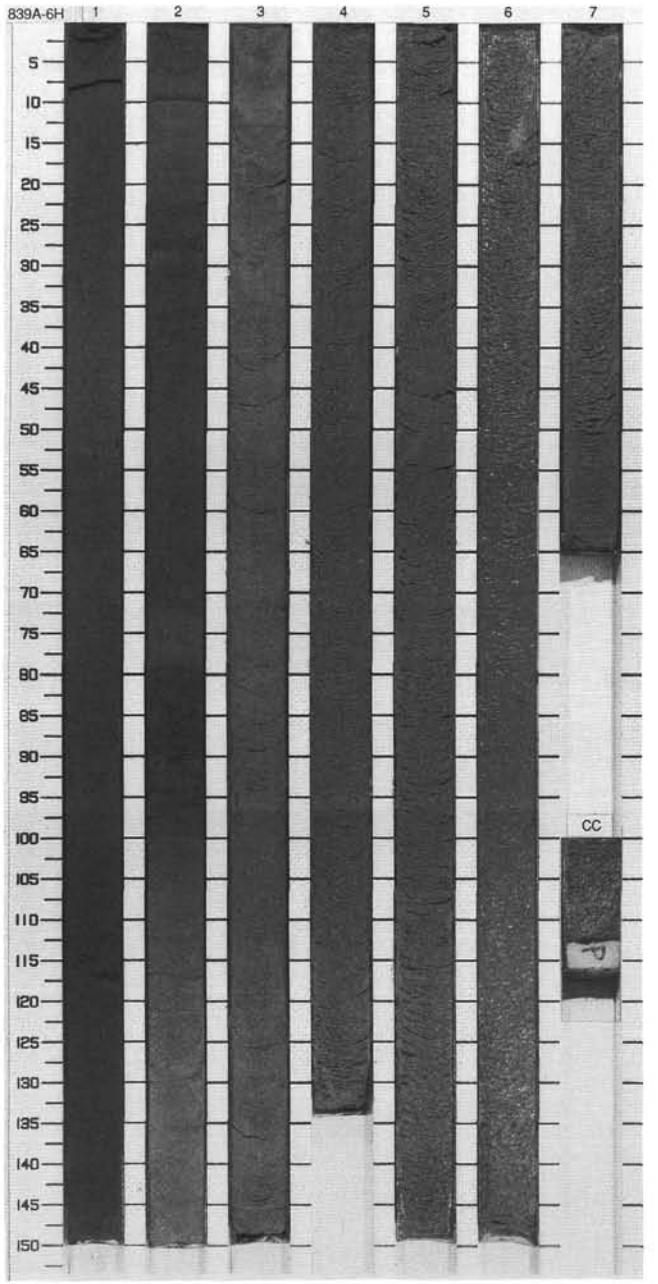
SITE 839 HOLE A CORE 6H CORED 42.5 - 52.0 mbsf



VITRIC SAND, VITRIC SILTY SAND, VITRIC SILT and CLAYEY NANNOFOSSIL OOZE

Major lithologies: VITRIC SAND, VITRIC SILTY SAND and VITRIC SILT, light gray to gray (5Y 6/1) to light brownish gray (5Y 6/2). Generally structureless, but occasionally mottled. CLAYEY NANNOFOSSIL OOZE, brown (10YR 4/3) to pale olive (6Y 6/3). Occasionally mottled, otherwise structureless. Beds of vitric sand and vitric silt occur in Section 2, 21–28 cm, 70–78 cm, and 85–95 cm and in Section 3, 0–13 cm.

Minor lithology: FINE VITRIC ASH WITH FORAMS, black (2.5Y 2/0) occurs in Section 1, 116–117 cm.

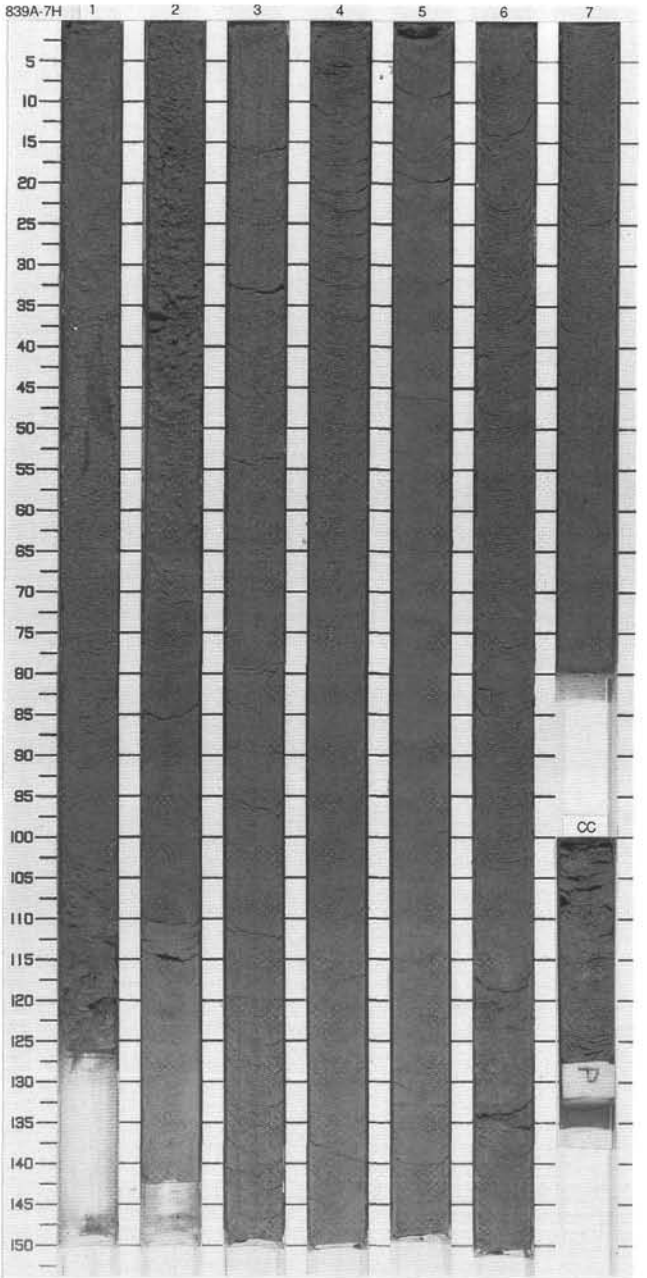


135-839A-7H
SMEAR SLIDE SUMMARY (%):

	1, 90 D	2, 110 D	4, 80 D	6, 80 D
TEXTURE:				
Sand	85	70	---	10
Silt	15	25	90	80
Clay	---	5	10	10
COMPOSITION:				
Accessory minerals	Tr	5	---	8
Clay	Tr	5	5	--
Feldspar	5	20	Tr	--
Foraminifers	2	Tr	---	--
Glass	93	70	90	92
Nannofossils	---	---	5	Tr

SITE 839 HOLE A CORE 7H CORED 52.0 - 61.5 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0	Void	1 2 3 4 5 6 7 CC	Upper Pliocene	F F F	W W	S S S S	5Y 6/1 5Y 5/1 5Y 6/1 5Y 5/1 5Y 6/1	VITRIC SILT and VITRIC SAND Major lithology: VITRIC SILT and VITRIC SAND, light gray (5Y 6/1) to gray (5Y 5/1). Generally structureless, but with slight mottling and water escape structures in Section 1, 40–60 cm. Sequence shows a general fining-upward trend from vitric sand to vitric silt. Minor lithologies: None.

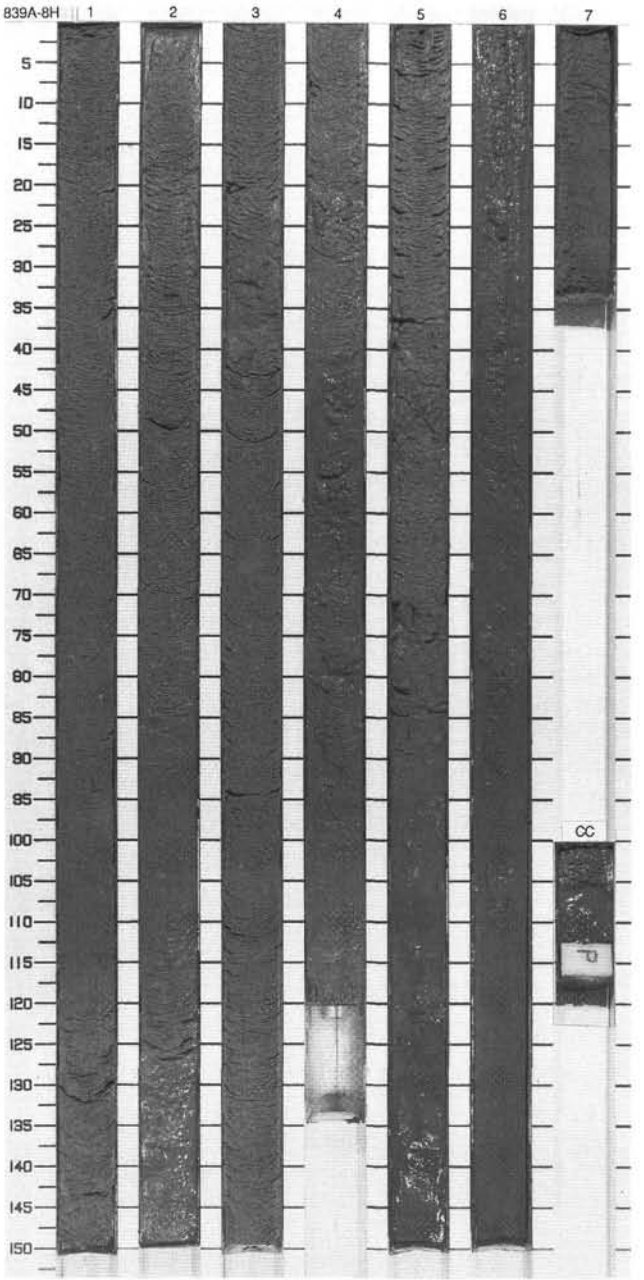


135-839A-8H
SMEAR SLIDE SUMMARY (%):

	1, 80 D	3, 80 D	5, 120 M	7, 25 D
TEXTURE:				
Sand	10	5	80	70
Silt	80	85	15	25
Clay	10	10	5	5
COMPOSITION:				
Accessory minerals	5	8	10	5
Foraminifers	2	---	Tr	3
Glass	90	90	90	90
Nannofossils	3	2	---	2

SITE 839 HOLE A CORE 8H — CORED 61.5 - 71.0 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5, 1.0		1, 2, 3, 4, 5, 6, 7, CC	Upper Pliocene	F, F		S, S, I P, S	5Y 6/1	*VITRIC SILT and VITRIC SAND* Major lithologies: VITRIC SILT, gray to light gray (5YR 6/1), structureless throughout, except for a fining-upward sequence in Section 1, 0–98 cm, overlying vitric sand. VITRIC SAND, gray to light gray (5YR 6/1), generally structureless. In Section 5, 105–150 cm, weak disrupted laminae are slightly darker due to concentrations of accessory minerals. The lower part of the core is strongly affected by drilling disturbance. This has destroyed most of the primary sedimentary structures from Sections 4 to 6. Minor lithologies: None.

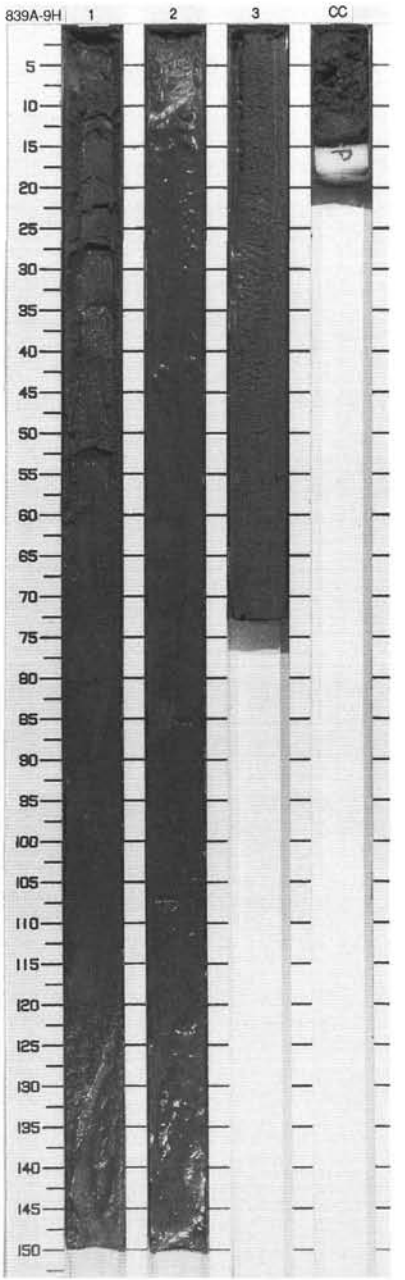


135-839A-9H
SMEAR SLIDE SUMMARY (%):

	1, 100 D	2, 100 D	3, 50 D
TEXTURE:			
Sand	60	55	60
Silt	38	44	38
Clay	2	1	2
COMPOSITION:			
Accessory minerals	1	1	2
Clay	2	1	2
Feldspar	2	2	3
Foraminifers	1	1	1
Glass	94	95	92

SITE 839 HOLE A CORE 9H CORED 71.0 - 80.5 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5, 1.0		1, 2, 3, CC	Upper Pliocene		W	S, S, S	5Y 5/1	VITRIC SILTY SAND Major lithology: VITRIC SILTY SAND, gray (5Y 5/1). Core badly affected by drilling disturbance which has destroyed any primary sedimentary structures. Minor lithologies: None.



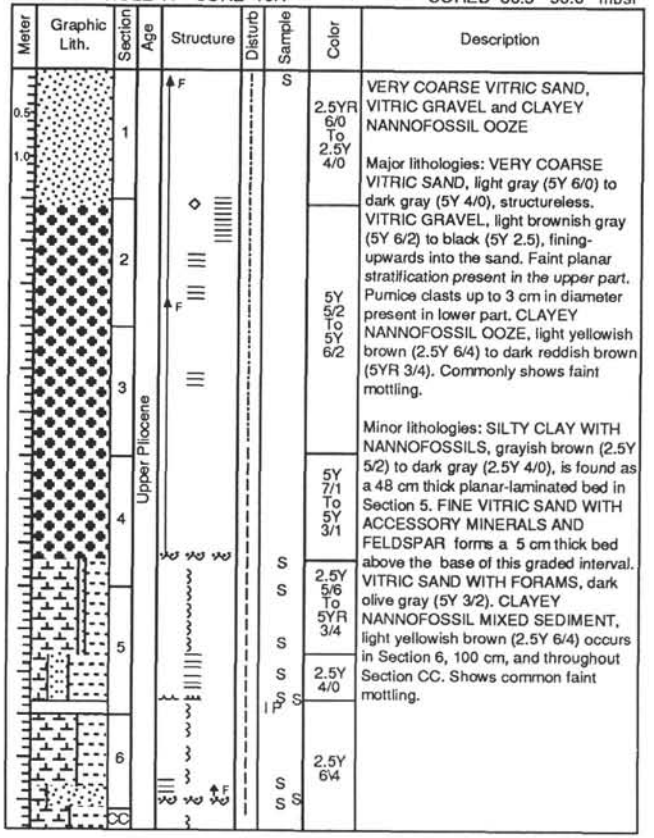
135-839A-10H
SMEAR SLIDE SUMMARY (%):

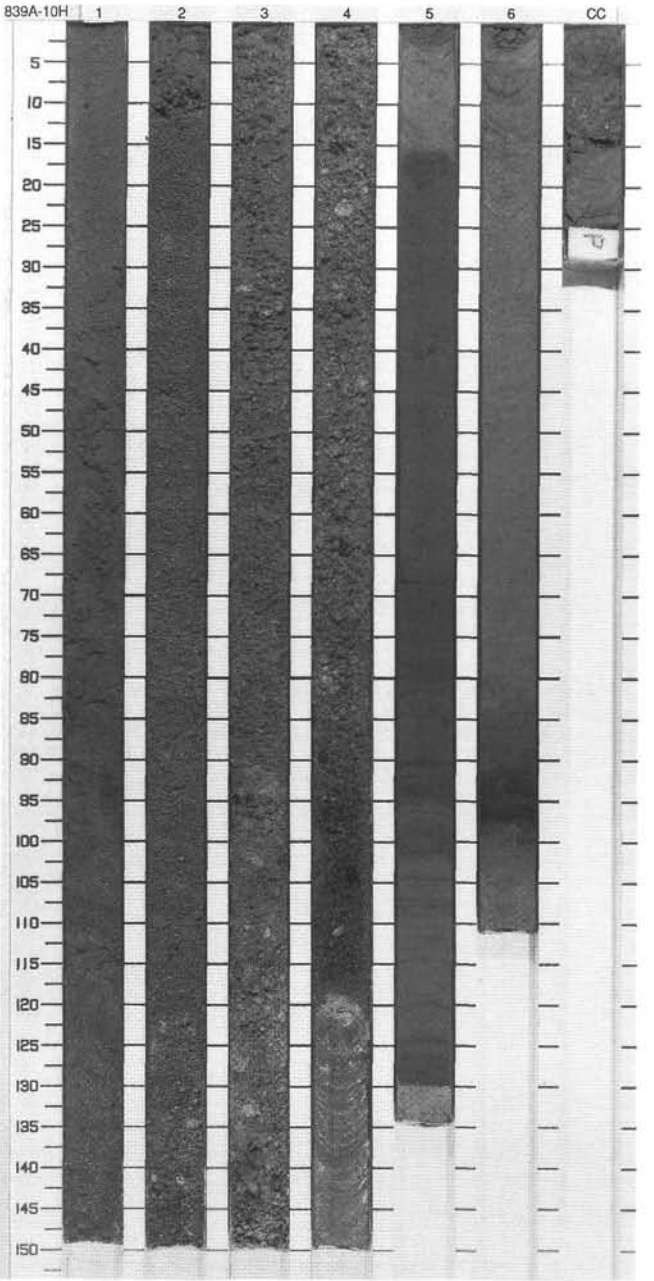
	1, 3 D	4, 120 D	5, 2 D	5, 65 D	5, 100 M	5, 130 M	5, 131 D
TEXTURE:							
Sand	85	---	---	---	---	50	---
Silt	15	3	3	3	1	40	5
Clay	---	97	97	97	99	10	95
COMPOSITION:							
Accessory minerals	1	Tr	Tr	---	Tr	10	---
Clay	1	40	40	40	40	5	40
Feldspar	1	Tr	Tr	---	1	15	Tr
Foraminifers	Tr	3	3	3	Tr	8	4
Glass	97	---	---	---	54	60	3
Nannofossils	---	57	57	57	5	2	53

SMEAR SLIDE SUMMARY (%):

	6, 78 D	6, 97 M	6, 102 D
TEXTURE:			
Sand	---	80	---
Silt	1	15	2
Clay	99	5	98
COMPOSITION:			
Accessory minerals	---	10	---
Clay	45	5	45
Feldspar	---	10	Tr
Foraminifers	1	20	2
Glass	---	55	---
Nannofossils	54	Tr	53

SITE 839 HOLE A CORE 10H — CORED 80.5 - 90.0 mbsf





135-839A-11H
SMEAR SLIDE SUMMARY (%):

	1, 52 D	1, 70 M	1, 87 D	2, 88 M	2, 95 D	3, 75 D	4, 13 D
TEXTURE:							
Sand	---	40	---	60	---	---	---
Silt	10	55	8	37	1	4	1
Clay	90	5	92	3	99	96	99
COMPOSITION:							
Accessory minerals	Tr	Tr	---	1	---	---	---
Clay	35	5	45	Tr	35	40	45
Feldspar	Tr	3	Tr	3	Tr	Tr	Tr
Foraminifers	5	67	8	8	1	4	1
Glass	5	25	Tr	85	Tr	Tr	---
Nannolossils	55	Tr	47	3	64	56	54

SMEAR SLIDE SUMMARY (%):

	4, 17 M	4, 42 D	4, 141 D	5, 6 D	5, 69 M	6, 5 M	6, 48 M
TEXTURE:							
Sand	70	50	70	---	10	55	85
Silt	25	42	27	13	85	42	14
Clay	5	8	3	87	5	3	1
COMPOSITION:							
Accessory minerals	Tr	1	5	Tr	1	Tr	1
Calcite	Tr	---	---	---	---	---	---
Clay	5	8	3	35	5	3	1
Feldspar	1	1	5	Tr	3	1	2
Foraminifers	3	4	5	3	1	8	8
Glass	91	86	82	10	90	88	85
Nannolossils	Tr	Tr	Tr	52	---	Tr	Tr

SMEAR SLIDE SUMMARY (%):

	6, 95 D	6, 103 M	6, 139 D	7, 30 D	7,37 D
TEXTURE:					
Sand	83	---	---	---	20
Silt	15	8	40	50	60
Clay	2	92	60	50	20
COMPOSITION:					
Accessory minerals	Tr	Tr	1	---	5
Clay	2	35	36	25	20
Feldspar	Tr	Tr	3	2	15
Foraminifers	8	8	Tr	5	3
Glass	90	Tr	35	45	57
Nannolossils	Tr	57	25	23	Tr

SITE 839 HOLE A CORE 11H CORED 90.0 - 99.5 mbsf

Meter | Graphic Lith. | Section | Age | Structure | Disturb | Sample | Color

Upper Pliocene

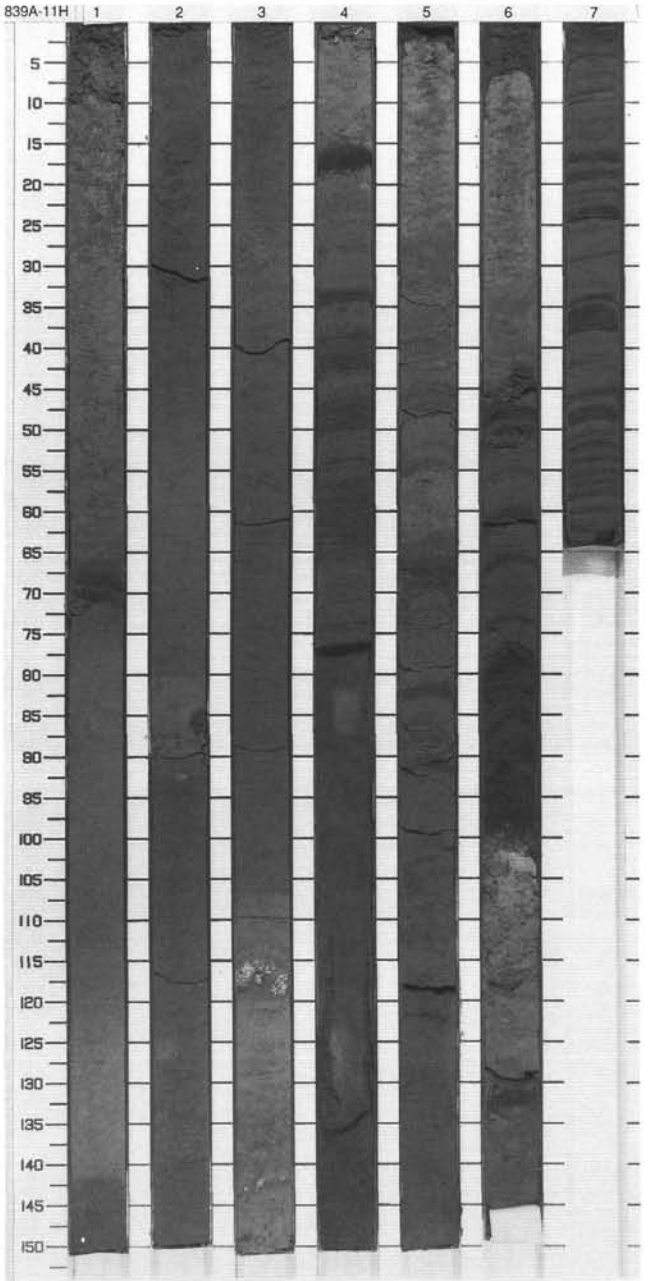
Color: 2.5Y 6/4; 2.5Y 6/6; 10YR 3/3; 10YR 5/3 To 10YR 4/4; 2.5Y 3/2 To 2.5Y 6/4; 2.5Y 2/0; 2.5Y 5/2 To 2.5Y 4/2; 5Y 3/1; 5Y 6/3 To 5Y 3/1; 5Y 4/1 To 5Y 3/1

Description

CLAYEY NANNOFOSSIL OOZE, CLAYEY NANNOFOSSIL MIXED SEDIMENT, and VITRIC SILTY SAND.

Major Lithologies: CLAYEY NANNOFOSSIL OOZE, dark brown (10YR 3/3) to yellowish brown (10YR 5/4) to brown (10YR 4/3). Mottled throughout. CLAYEY NANNOFOSSIL MIXED SEDIMENT, olive yellow (2.5Y 6/6), light yellowish brown (2.5Y 6/4) to grayish brown (2.5Y 5/2). Some local mottling, otherwise structureless. In Section 5 the sediment contains more than 10% volcanic glass. VITRIC SILTY SAND, grayish brown (2.5Y 5/2) to dark grayish brown (2.5Y 3/2) to black (2.5Y 2/0) . This lithology is present as a 8 cm thick, graded interval in Section 2 throughout Section 4 and the top 2 cm of Section 5. In Section 4, 0–77 cm, vitric silty sand is interbedded with thin nannofossil oozes, while between 77–150 cm, it occurs as a single graded unit.

Minor lithologies: VITRIC SILT and VITRIC SAND, grayish brown (2.5Y 5/2) to dark grayish brown (2.5Y 4/2) to very dark gray (5Y 3/1), occurring as a sequence of graded, planar laminated intervals in Sections 5, 6, and 7. FORAM OOZE WITH GLASS, thin, olive gray (5Y 4/2), graded interval with a sharp base in Section 1 (66–72 cm).



135-839A-12X
SMEAR SLIDE SUMMARY (%):

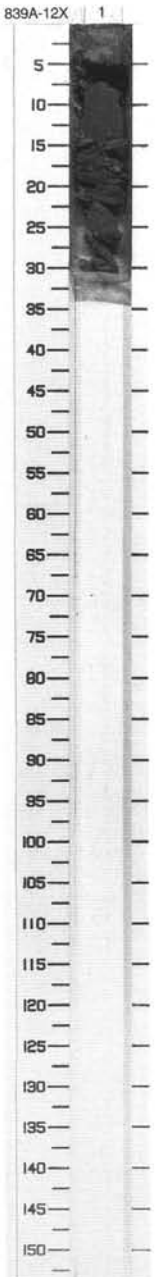
	1, 3 D	1, 18 D
TEXTURE:		
Sand	---	---
Silt	42	20
Clay	58	80
COMPOSITION:		
Accessory minerals	---	Tr
Clay	28	53
Feldspar	1	2
Foraminifers	1	---
Glass	40	5
Nannolossils	30	30
Zeolite	---	10

SITE 839 HOLE A CORE 12X CORED 99.5 - 109.2 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		1			W	S S	5Y 4/1	NANNOFOSSIL CLAY
								Major lithology: NANNOFOSSIL CLAY, dark gray (5Y 4/1) indurated. Highly disturbed by drilling. Minor Lithology: CLAYEY VITRIC ASH WITH NANNOFOSSILS.

839A 13X NO RECOVERY

839A 14X NO RECOVERY



135-839A-15X
SMEAR SLIDE SUMMARY (%):

	1, 52 D
TEXTURE:	
Sand	---
Silt	85
Clay	15
COMPOSITION:	
Clay	10
Feldspar	Tr
Foraminifers	2
Glass	83
Nannofossils	5

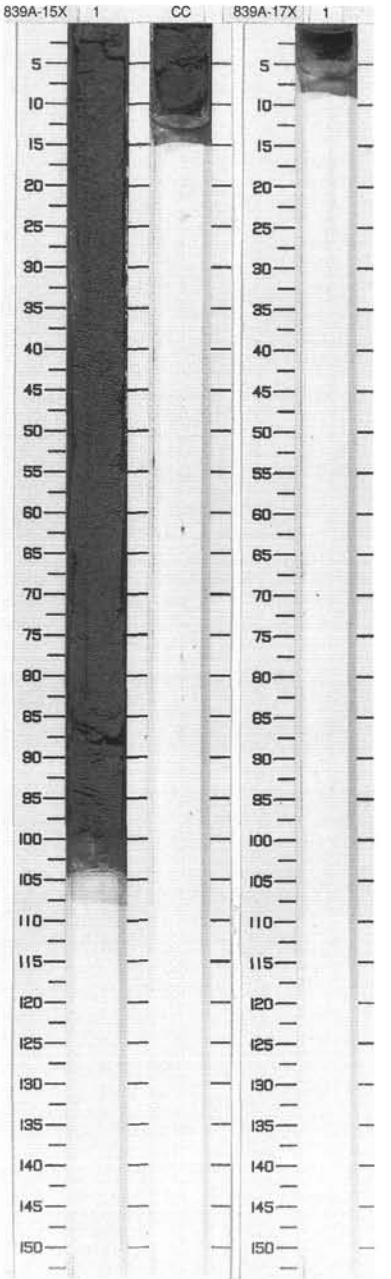
SITE 839 HOLE A CORE 15X CORED 128.5 - 138.2 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1 CC	uPlio		WWWWWW	S	5Y 5/2	VITRIC SILT WITH CLAY Major Lithology: VITRIC SILT WITH CLAY, olive gray (5Y 5/2), structureless, highly disturbed by drilling. Minor lithology: None.

839A 16X NO RECOVERY

SITE 839 HOLE A CORE 17X CORED 147.9 - 157.6 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
								VOLCANIC GRAVEL Major lithology: VOLCANIC GRAVEL, black (2.5Y 2/0) to light gray to gray (5Y 6/1). Rounded to subrounded grains, up to 2–5 mm in diameter. Clasts are mainly pumice. Minor lithology: None.



135-839A-18X
SMEAR SLIDE SUMMARY (%):

	CC, 19 D	CC, 33 D
TEXTURE:		
Sand	55	---
Silt	40	70
Clay	5	30
COMPOSITION:		
Accessory minerals	2	5
Clay	5	30
Feldspar	2	40
Foraminifers	1	---
Glass	90	25
Nannofossils	Tr	---

135-839A-20X
SMEAR SLIDE SUMMARY (%):

	CC, 10 M	CC, 28 D
TEXTURE:		
Sand	45	30
Silt	53	57
Clay	2	13
COMPOSITION:		
Accessory minerals	28	5
Clay	2	8
Feldspar	25	15
Foraminifers	---	1
Glass	45	66
Nannofossils	---	5

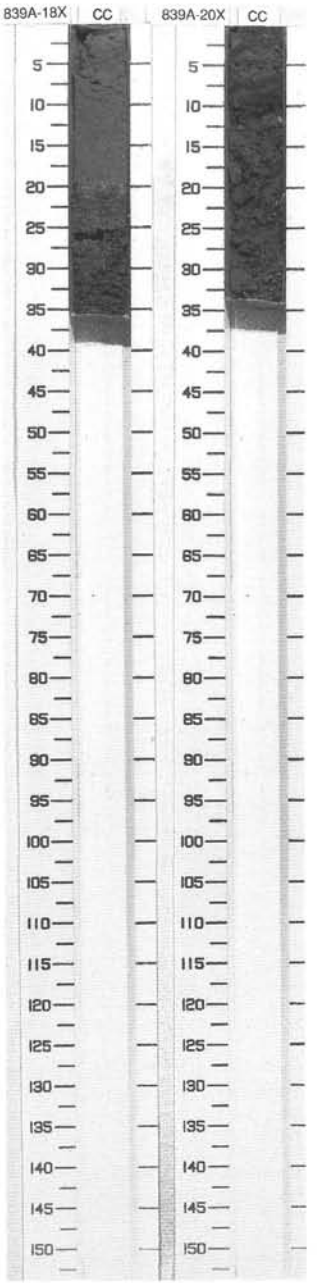
SITE 839 HOLE A CORE 18X CORED 157.6 - 167.3 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		CC			W	S	5Y 5/1	VITRIC SAND and CLAYEY FELDSPAR SILT WITH VOLCANIC GLASS. Major lithology: VITRIC SAND, gray (5Y 5/1), structureless, with scoured basal contact, overlying structureless, olive (5Y 5/3) CLAYEY FELDSPAR SILT WITH VOLCANIC GLASS. Minor lithology: None.

839A 19X NO RECOVERY

SITE 839 HOLE A CORE 20X CORED 175.5 - 186.2 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		CC			W	S	5Y 3/2	VITRIC SILT WITH FELDSPAR Major lithology: VITRIC SILT WITH FELDSPAR, olive gray (5Y 3/2) to dark olive (5Y 4/2), partly indurated with faint bedding and lamination. Minor lithology: None.



135-839A-21X
SMEAR SLIDE SUMMARY (%):

	CC, 6 D	CC, 15 D	CC, 26 M	CC, 34 D
TEXTURE:				
Sand	---	---	---	55
Silt	35	40	50	45
Clay	65	60	50	---
COMPOSITION:				
Accessory minerals	1	1	1	8
Clay	45	40	50	---
Feldspar	3	3	3	15
Foraminifers	1	1	1	1
Glass	30	35	45	76
Nannofossils	20	20	0	---

SITE 839 HOLE A CORE 21X — CORED 186.2 - 195.5 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		CC			W	S S S	5Y 4/2	VITRIC CLAY WITH NANNOFOSSILS and VITRIC CLAY. Major lithology: VITRIC CLAY WITH NANNOFOSSILS, olive gray (5Y 4/2), occurring as indurated clasts intermixed with VITRIC CLAY, light olive brown (2.5Y 5/4), slightly indurated. Very disturbed by drilling. Minor lithology: VITRIC SAND WITH FELDSPAR, very dark gray (2.5Y 3/0), structureless, but with a sharp scoured basal contact.

SITE 839 HOLE A CORE 22X — CORED 195.9 - 205.6 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
								CLAY Major lithology: CLAY, dark grayish green (10G 3/1), indurated.

135-839A-23X
SMEAR SLIDE SUMMARY (%):

	CC, 12 D
TEXTURE:	
Sand	---
Silt	70
Clay	30
COMPOSITION:	
Accessory minerals	Tr
Clay	10
Feldspar	10
Glass	65
Nannofossils	15

SITE 839 HOLE A CORE 23X — CORED 205.9 - 215.2 mbsf

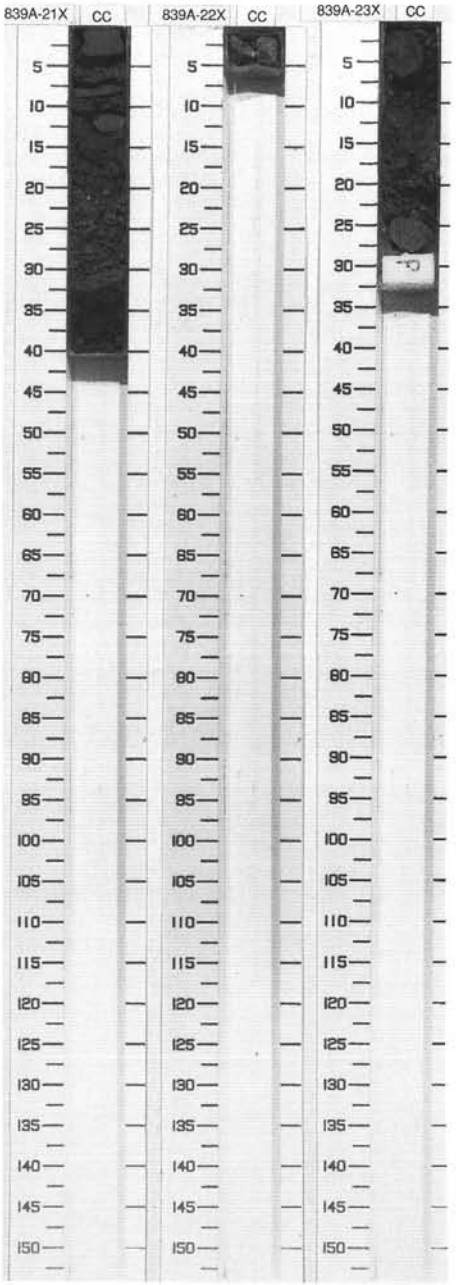
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		CC		F	W	S	2.5Y 3/2	VITRIC SILT WITH NANNOFOSSILS, CLAY AND FELDSPAR, and CLAYEY NANNOFOSSIL OOZE. Major lithology: VITRIC SILT WITH NANNOFOSSILS, CLAY AND FELDSPAR, very dark grayish brown (2.5Y 3/2), fines up into CLAYEY NANNOFOSSIL OOZE, dark brown to brown (10YR 4/3). Very disturbed by drilling. Minor lithology: VESICULAR BASALT, black (2.5Y 2/0).

839A 24X HARD ROCK

839A 25N HARD ROCK

839B 1W WASH CORE

839B 2W WASH CORE



135-839B-3R
SMEAR SLIDE SUMMARY (%):

	CC, 10 D
TEXTURE:	
Sand	30
Silt	19
Clay	51
COMPOSITION:	
Accessory minerals	Tr
Clay	30
Feldspar	1
Foraminifers	3
Glass	45
Nannofossils	21

SITE 839 HOLE B CORE 3R — CORED 110.0 - 119.7 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		CC			X	S	5Y 5/2	CLAYEY VITRIC SAND WITH NANNOFOSSILS Major lithology: CLAYEY VITRIC SAND WITH NANNOFOSSILS, olive gray (5Y 5/2). Some planar-lamination preserved but heavily bioturbated. Minor lithology: None.

SITE 839 HOLE B CORE 4R — CORED 119.7 - 129.4 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		CC				S	5Y 7/2	VITRIC SILT WITH NANNOFOSSILS AND CLAY, light gray (5Y 7/2). Structureless. Minor lithology: None.

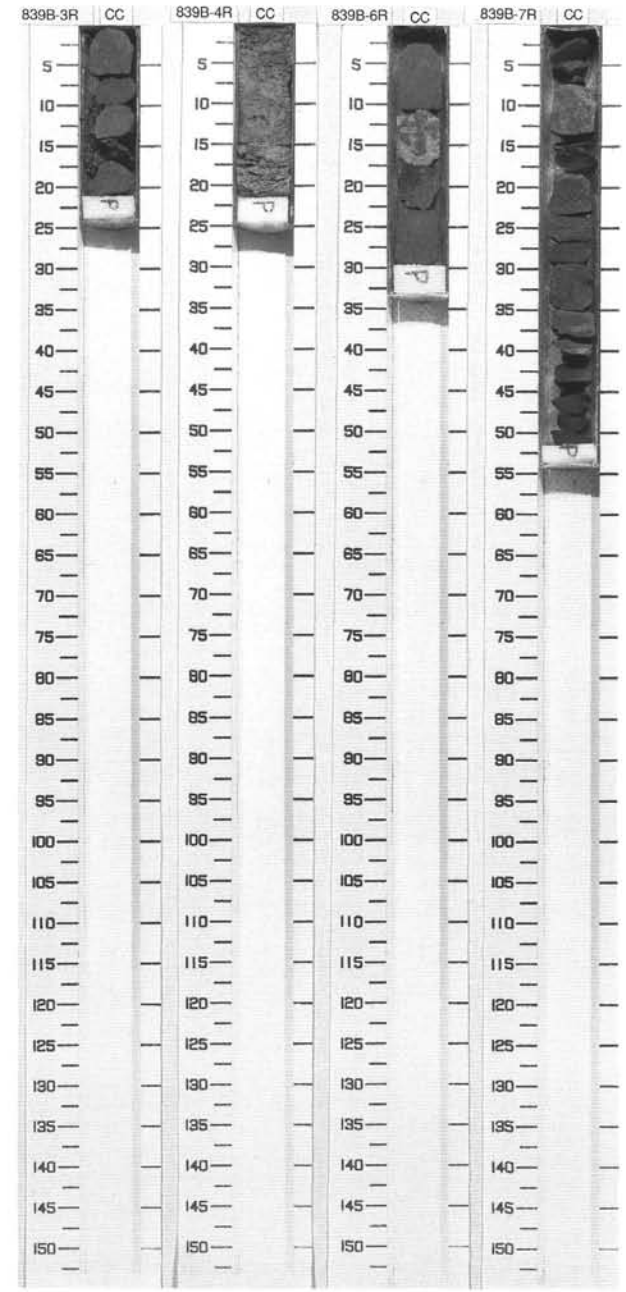
839B 5W WASH CORE

SITE 839 HOLE B CORE 6R — CORED 180.0 - 189.7 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		CC			X		2.5Y 4/2	VITRIC SILTSTONE Major lithologies: VITRIC SILTSTONE, dark grayish brown (2.5Y 4/2). Black dendritic structures and planar-lamination occur above basal contact. Minor lithology: VITRIC SANDSTONE, very dark grayish brown (2.5Y 3/2), occurs from 15 to 22 cm, bioturbated.

SITE 839 HOLE B CORE 7R — CORED 189.7 - 194.7 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		CC	uPli		X			VITRIC SILTSTONE Major lithology: VITRIC SILTSTONE, grayish brown (2.5Y 4/2) to dark grayish brown (2.5Y 4/2), showing parallel- and cross-lamination, frequently burrowed. Minor lithology: CALCAREOUS VITRIC SILTSTONE, light yellowish brown (2.5Y 6/4), 0-15 cm. This contains minor black (2.5Y 2/0) VITRIC SANDSTONE inclusions.



SITE 839 HOLE B CORE 8R CORED 194.7 - 199.3 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5		1	uPli				2.5Y 4/2	VITRIC SILTSTONE Major lithology: VITRIC SILTSTONE, dark grayish brown (2.5Y 4/2) to olive (5Y 4/4). Parallel- and cross-lamination occurs at 30 and 40 cm. Frequently bioturbated. Minor lithology: VITRIC SANDSTONE, black (2.5Y 2/0), occurs as inclusions within vitric siltstone, between 7 and 9 cm.

SITE 839 HOLE B CORE 9R CORED 199.3 - 204.3 mbsf

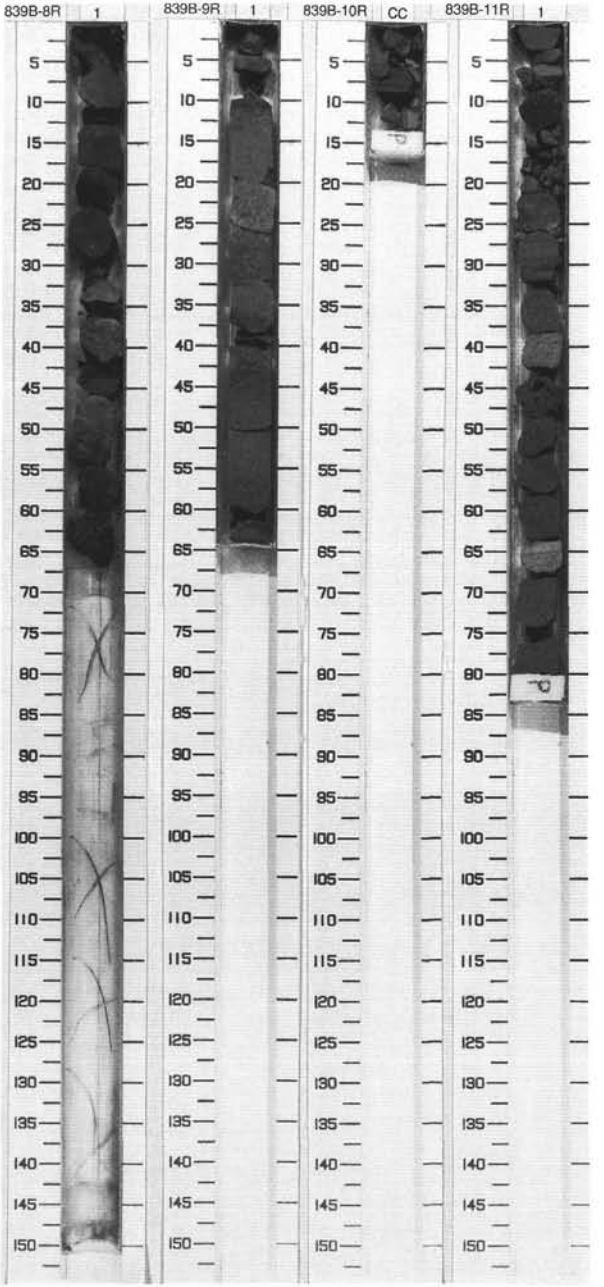
Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5		CC					2.5Y 4/2	VITRIC SILTSTONE Major Lithology: VITRIC SILTSTONE, light olive brown (2.5Y 5/4) to olive (5Y 4/4) . This core shows slumped parallel laminae at the base. Strongly bioturbated, with calcareous infilling of burrow structures. Minor lithology: None.

SITE 839 HOLE B CORE 10R CORED 204.3 - 208.5 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		CC						VITRIC SILTSTONE Major lithology: VITRIC SILTSTONE, dark grayish brown (10YR 4/2) and pale olive (5Y 6/3) occurring as pebbles. Some show planar-lamination. Minor Lithologies: None.

SITE 839 HOLE B CORE 11R CORED 208.5 - 213.5 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5		1	uPli				5G 5/1	VITRIC SANDSTONE Major lithology: VITRIC SANDSTONE, greenish gray (5G 5/1) to pale olive (5Y 4/4). Structureless. Minor lithologies: VOLCANIC BRECCIA, matrix-supported, crudely graded, polymict breccia containing angular clasts up to 22 mm in diameter. CALCAREOUS CLAYSTONE, reddish brown (5Y 4/4), occurs between 25 and 30 cm. VITRIC SILTSTONE, pale olive (5Y 6/4) occurs as pebbles of drilling breccia between 12 and 20 cm.



839B 12R THROUGH 16R HARD ROCKS

SITE 839 HOLE B CORE 17R CORED 256.7 - 266.4 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
		1	uPli				7.5YR 4/3	CLAYEY NANNOFOSSIL OOZE WITH FORAMS AND GLASS

Major lithology: CLAYEY NANNOFOSSIL OOZE WITH FORAMS AND GLASS, dark brown to brown (7.5YR 4/3). Strongly bioturbated, with bioturbation decreasing in intensity down section. Overlain directly by basalt.

Minor lithology: None.

839B 18R THROUGH 31R HARD ROCK

839B 32R NO RECOVERY

839B 33R NO RECOVERY

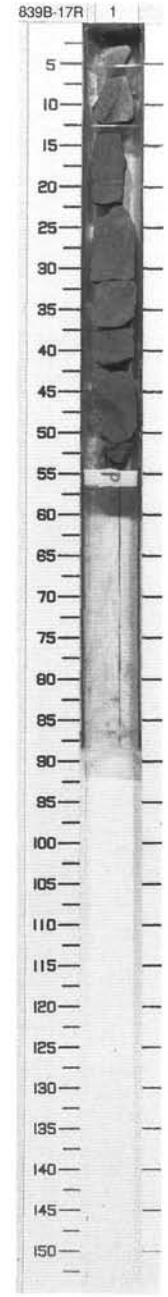
839B 34R THROUGH 39R HARD ROCKS

839B 40R NO RECOVERY

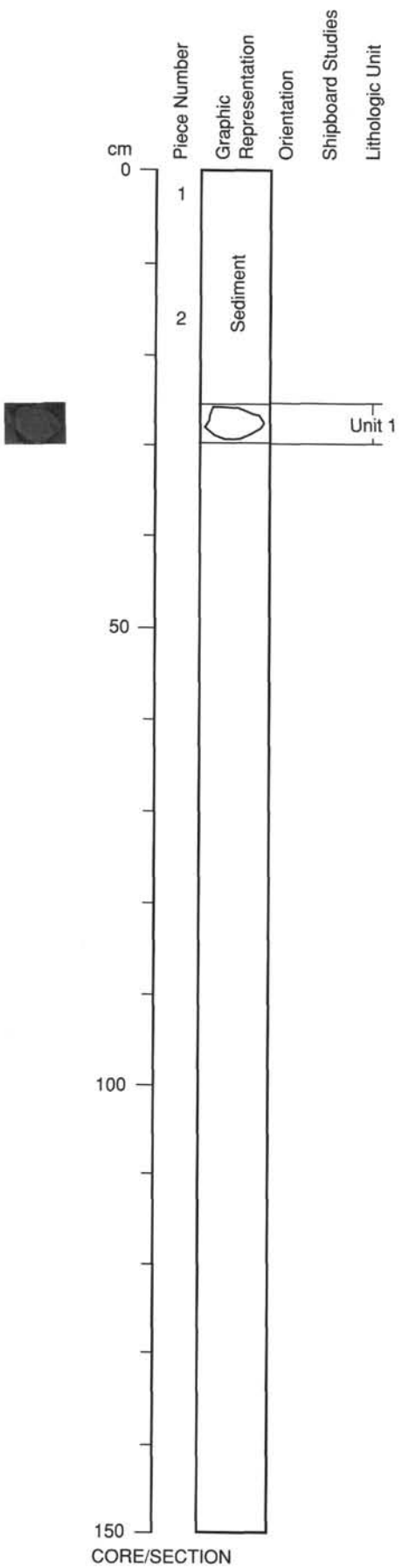
839B 41R HARD ROCK

839B 42R HARD ROCK

839B 43 THROUGH 45R NO RECOVERY



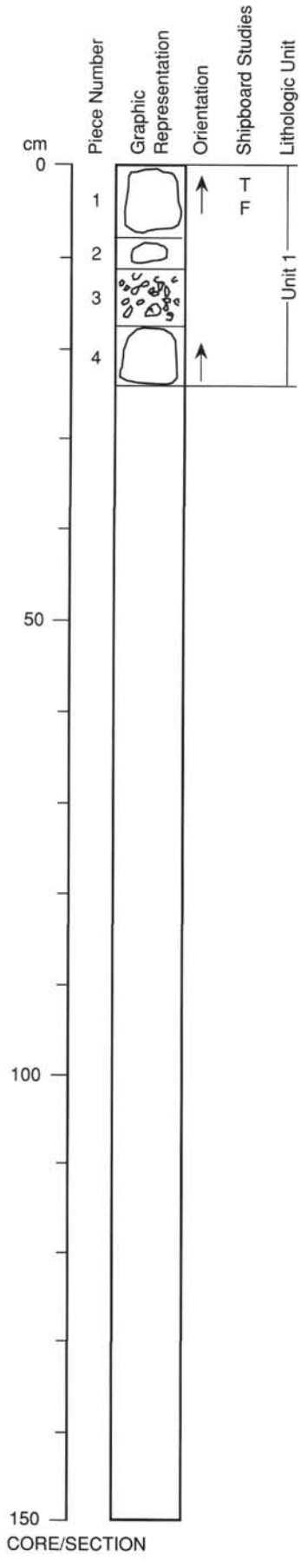
135-839A-23X-CC



UNIT 1: APHYRIC BASALT

Pieces 26–30 cm

CONTACTS: None.
PHENOCRYSTS: Rare olivine phenocrysts visible.
GROUNDMASS: Fine-grained; interlocking network of plagioclase and clinopyroxene; some possible anhedral olivine.
VESICLES: 40%; <1 mm; subrounded; distributed throughout; numerous large (1 cm) dark, highly vesicular quenched regions fill vesicles. Rock has a high porosity due to abundant extremely small vesicles.
Miaroles: Some vesicles are lined with globular and tabular zeolites. Small, dark octahedra are evident in some vesicles.
COLOR: 10YR 5/0, dark gray.
STRUCTURE: Massive.
ALTERATION: Slight.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: This is a single piece at the base of a sediment filled core catcher; the remaining cores of Hole A all contain basalt.



135-839A-24X-1

UNIT 1: APHYRIC BASALT

Pieces 1–4

CONTACTS: None.

PHENOCRYSTS: Very rare (<<1%) olivine grains to 1 mm across are found in this core. In one of these grains, a few Cr-spinel inclusions were observed.

GROUNDMASS: Fine-grained, composed of interlocking plagioclase, clinopyroxene, and cryptocrystalline material. Rare olivine as a fine groundmass component.

VESICLES: 40%; <3 mm; subrounded to rounded; distributed randomly; there is a bimodal distribution of vesicles. Large vesicles (>1 mm) are relatively rare, but small (<0.5 mm) vesicles are abundant and impart a high porosity to the rock. Refilled vesicles contain dark, quenched, very highly vesicular material.

Miaroles: Most vesicles only have minor infilling, globular and tabular zeolite line some vesicles. A few vesicles are completely infilled with light yellow material.

COLOR: 10YR 5/0.

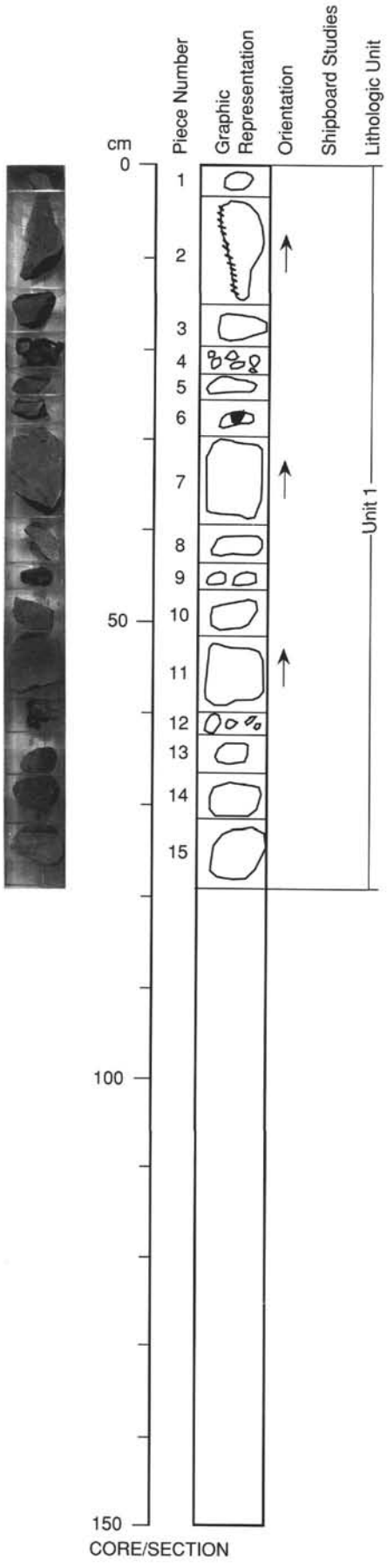
STRUCTURE: Massive.

ALTERATION: Slight

VEINS/FRACTURES: None.

ADDITIONAL COMMENTS: Piece 3 is rubble <1–5 mm in size.

135-839A-25N-1

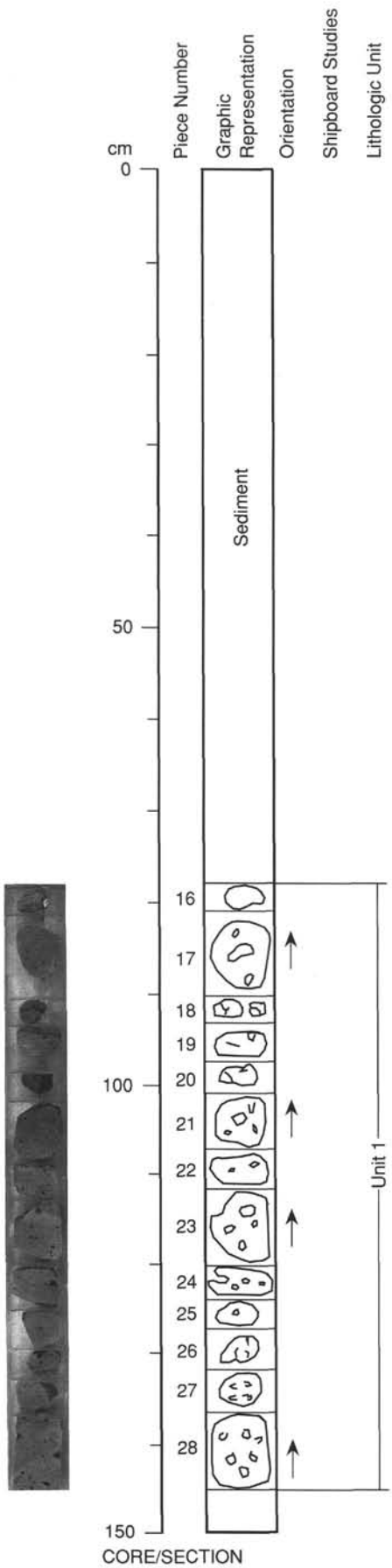


Yellowish fracture surface

UNIT 1: APHYRIC BASALT

Pieces 1–15

CONTACTS: None.
PHENOCRYSTS: Rare olivine grains (<1 mm) are observed.
GROUNDMASS: Fine-grained interlocking plagioclase and clinopyroxene with minor olivine.
VESICLES: 25%–40%; <3 mm; rounded to subrounded; distributed randomly; there is a bimodal vesicle distribution. Large (>1mm) vesicles are relatively rare; abundant small (<0.5 mm) vesicles impart a high porosity to the rock. Refilled vesicles (to 2 mm) contain dark, quenched highly vesicular material.
Miaroles: Vesicles are partially lined with globular to tabular zeolites; some vesicles are completely infilled with light yellow material.
COLOR: 10YR 5/0, very dark gray.
STRUCTURE: Massive.
ALTERATION: Slight.
VEINS/FRACTURES: One side of Piece 2 is coated with a light tan-yellow soft material which looks as if it was a filled fracture that broke during drilling.
ADDITIONAL COMMENTS: Piece 4 is composed of many pieces of rubble <5 mm in size



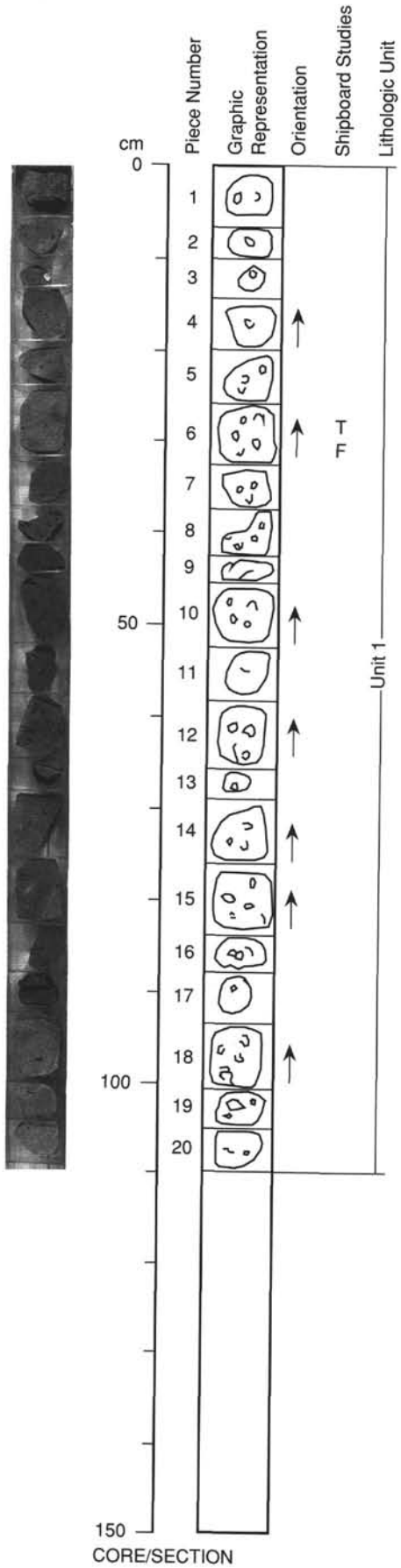
135-839B-12R-1

UNIT 1: APHYRIC BASALT

Pieces 16–28

CONTACTS: None.
PHENOCRYSTS: Rare olivine and clinopyroxene(?) phenocrysts up to 0.5 mm across.
GROUNDMASS: Fine-grained, microcrystalline intergrowth of plagioclase and clinopyroxene, with rare olivines.
VESICLES: 30%–40%; <0.5 and >1 mm; round to irregular; randomly distributed; small vesicles are distributed uniformly throughout the rock. The larger vesicles have a random distribution. Dark patches of very finely vesicular basalt occur in all pieces, either filling or lining the larger cavities.
Miaroles: Some large cavities (up to 1 cm across) have thin linings of brown to yellow finely crystalline zeolites and/or dark brown-black globular zeolites.
COLOR: 2.5Y 5/0, dark gray.
STRUCTURE: None.
ALTERATION: Despite its slightly yellowish tinge, the rock appears to be only slightly altered.
VEINS/FRACTURES: None.

Large vesicles - often with secondary infills



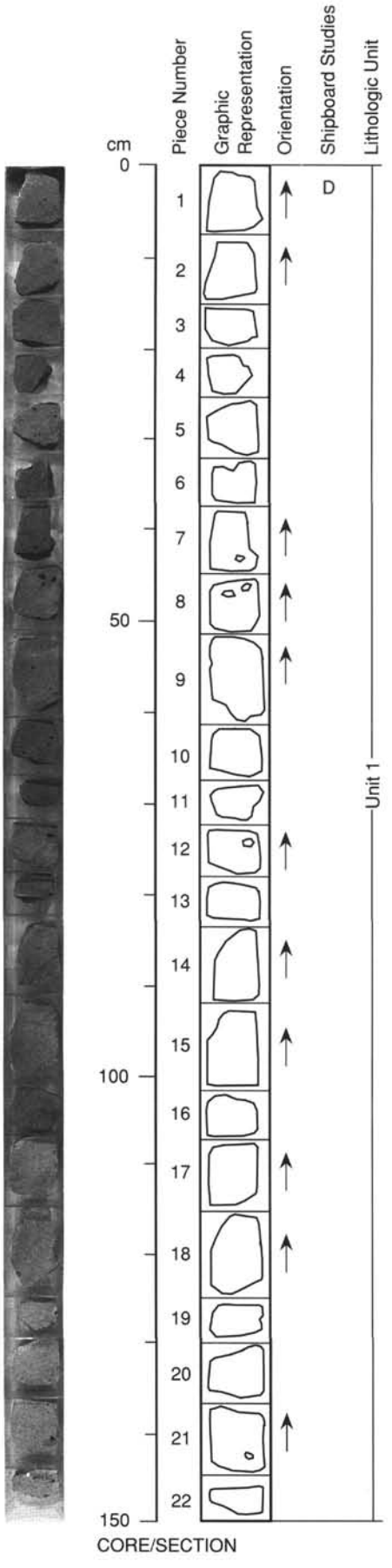
135-839B-12R-2

UNIT 1: SPARSELY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–20

CONTACTS: None.
PHENOCRYSTS: Rare, large (up to 1 mm across) subhedral olivine and.clinopyroxene grains.
GROUNDMASS: Fine-grained interlocking plagioclase and clinopyroxene with rare olivine.
VESICLES: 30%–40%; up to 1 cm; irregular; distributed throughout; bimodal size distribution of vesicles. Rare larger ones (>2 mm) comprise approximately 10% of the rock. Abundant vesicles (<0.5 mm) impart high porosity to the rock. Patches of dark highly vesicular material up to several centimeters across either fill or line some vesicles. Miaroles: Finely crystalline to globular zeolites lining most vesicles, some with distinct yellow-tan color.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Slightly altered.
VEINS/FRACTURES: None.


Large vesicles - often with secondary infills



135-839B-13R-1

UNIT 1: SPARSELY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–22

CONTACTS: None.

PHENOCRYSTS: Very few clearly defined phenocrysts visible; gradations of size to coarse groundmass minerals.
Olivine: 1%; up to 3 mm; subhedral crystals.
Clinopyroxene: <1%; up to 1.5 mm; subhedral crystals
Cr-spinel: Trace; up to 1 mm; glomeroporphyritic

GROUNDMASS: Holocrystalline, seriate texture. Plagioclase, clinopyroxene, a few magnetite octahedra, and olivine visible. Almost diabasic, although the grain size is less than 1 mm.

VESICLES: 20%–30%; 0.1 to 11 mm; rounded to subrounded, elongated; disseminated throughout the core; largest vesicles erratically distributed. Small vesicles present throughout all core samples.
Miaroles: Minor infillings in some vesicles by globular zeolites.

COLOR: 10YR 3/1, very dark gray

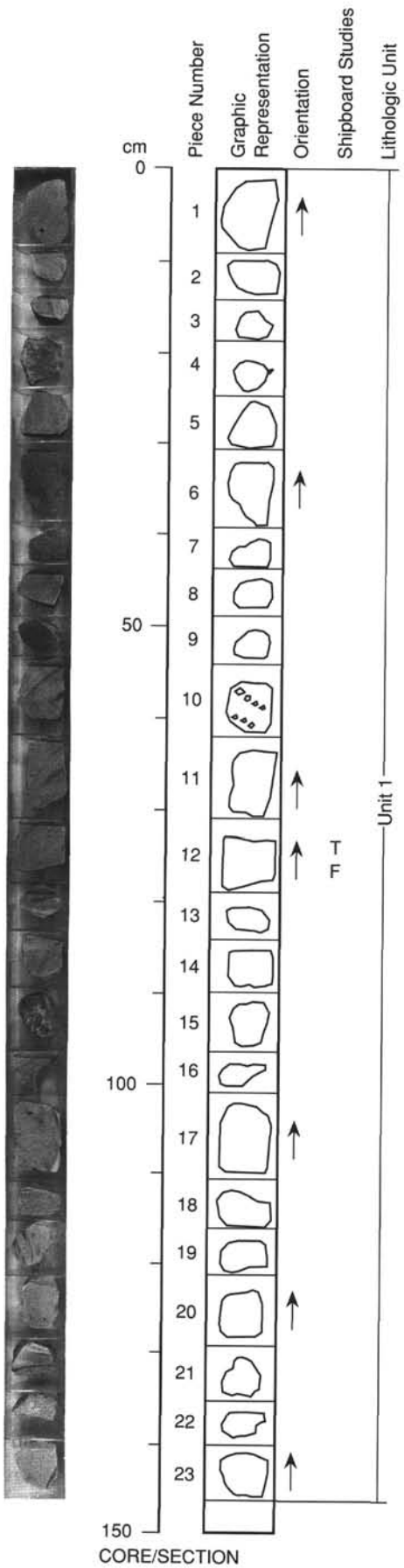
STRUCTURE: Massive.

ALTERATION: Slightly altered.

VEINS/FRACTURES: No veins within the samples. However, Pieces 1, 11, and 14 have broken along fracture surfaces, with development of globular white to greenish zeolites.

ADDITIONAL COMMENTS: Dark quenched and vesicular basaltic infillings occur up to 2 cm in size; these appear to be segregation vesicles.

Conspicuous vesicles

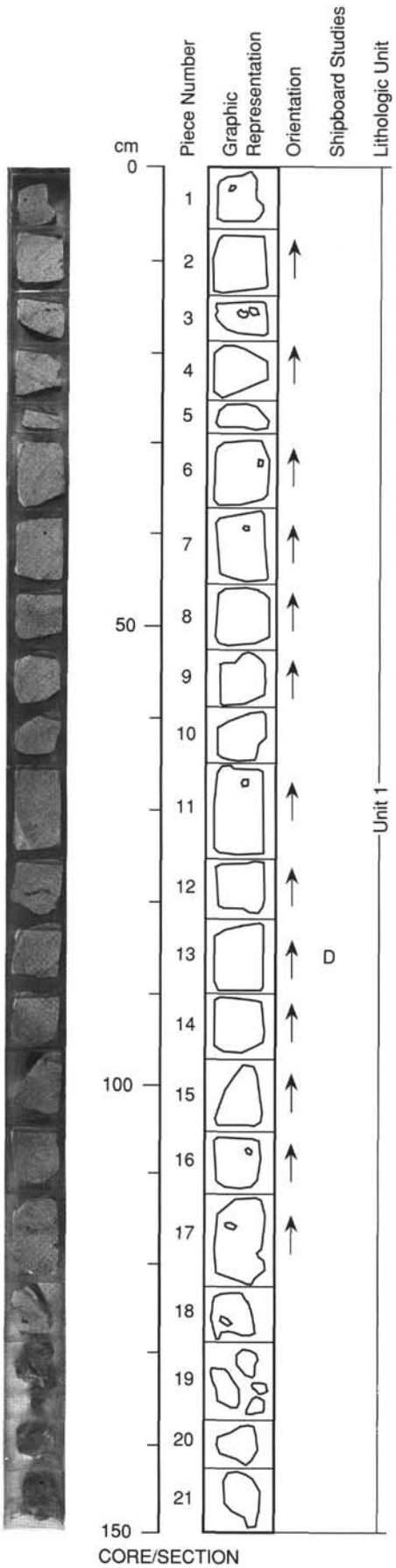


135-839B-13R-2

UNIT 1: SPARSELY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–23

CONTACTS: None.
PHENOCRYSTS:
Clinopyroxene: <1%; up to 1 mm.
Olivine: <1%; up to 2 mm.
GROUNDMASS: Holocrystalline, interlocking plagioclase and clinopyroxene with rare olivine
VESICLES: 20%–30%; <0.1–6 mm; rounded; disseminated throughout the core; two vesicle trails occur in Piece 10.
Miaroles: Many miaroles are lined or filled by tiny globular zeolites.
COLOR: 5Y 5/1, gray.
STRUCTURE: Massive.
ALTERATION: Slightly altered.
VEINS/FRACTURES: Fractured surfaces are lined by greenish zeolites.
ADDITIONAL COMMENTS: A few octahedral black crystals appear in vesicles and in the groundmass. These may be magnetites or spinel.



135-839B-13R-3

UNIT 1: SPARSELY TO MODERATELY PHYRIC OLIVINE CLINOPYROXENE BASALT

Pieces 1–21

CONTACTS: None.

PHENOCRYSTS: Distinction between phenocrysts and groundmass is difficult owing to the seriate texture.
Opaques: Trace; up to 1 mm; glomeroporphyritic; well developed octahedra.
Olivine: 2%–3%; up to 3.5 mm; euhedral-subhedral.
Clinopyroxene: <1%; up to 2 mm; subhedral, intergrown with plagioclase.

GROUNDMASS: Holocrystalline, seriate textured, almost diabasic (grain size < 1mm). Plagioclase, clinopyroxene, olivine, and sparse magnetite crystals visible.

VESICLES: 20%–30%; 0.1–11 mm; rounded to subrounded; disseminated throughout the core; some variation in the distribution of the more coarsely vesicular zones. Large vesicles erratically scattered through core.
Miaroles: Common infillings by white to gray or greenish globular and acicular zeolites.

COLOR: 7.5YR 4/0, dark gray.

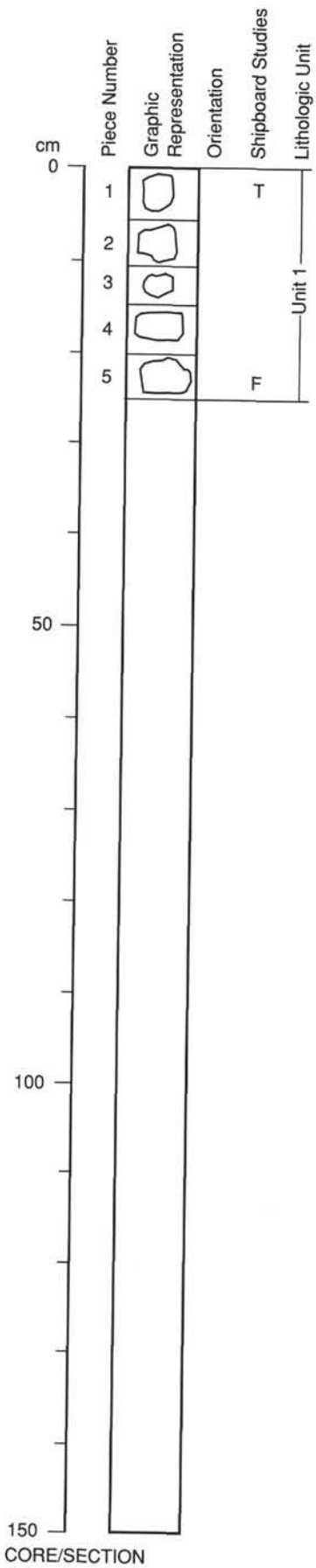
STRUCTURE: Massive.

ALTERATION: Slightly to moderately altered.

VEINS/FRACTURES: No clearly defined veins visible within pieces; although some pieces (e.g. Piece 3) have obviously broken along very fine scale fractures.

ADDITIONAL COMMENTS: Some darker colored quenched basaltic secondary vesicle infillings (segregation vesicles) sporadically present.

ᵖ Prominent vesicles



135-839B-13R-4

UNIT 1: SPARSELY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–5

CONTACTS: None

PHENOCRYSTS: The seriate texture makes distinction of phenocrysts difficult from the groundmass.
Opaques: <1%; up to 1 mm; small glomeroporphyritic aggregates; some well developed octahedra.
Olivine: <1%; up to 2 mm; subhedral crystals.
Clinopyroxene: <1%; up to 2 mm; euhedral to subhedral crystals, some tabular.

GROUNDMASS: Holocrystalline, seriate texture, almost diabasic (grain size < 1 mm). Plagioclase, clinopyroxene, olivine and sparse magnetite octahedra visible.

VESICLES: 20%–30%; 0.1–3 mm; rounded to subrounded, interconnecting; distributed throughout; variation in the distribution of some of the more coarsely vesicular zones - these tend to occur in distinct bands.
Miaroles: Common infillings by white to gray or greenish globular and acicular zeolites.

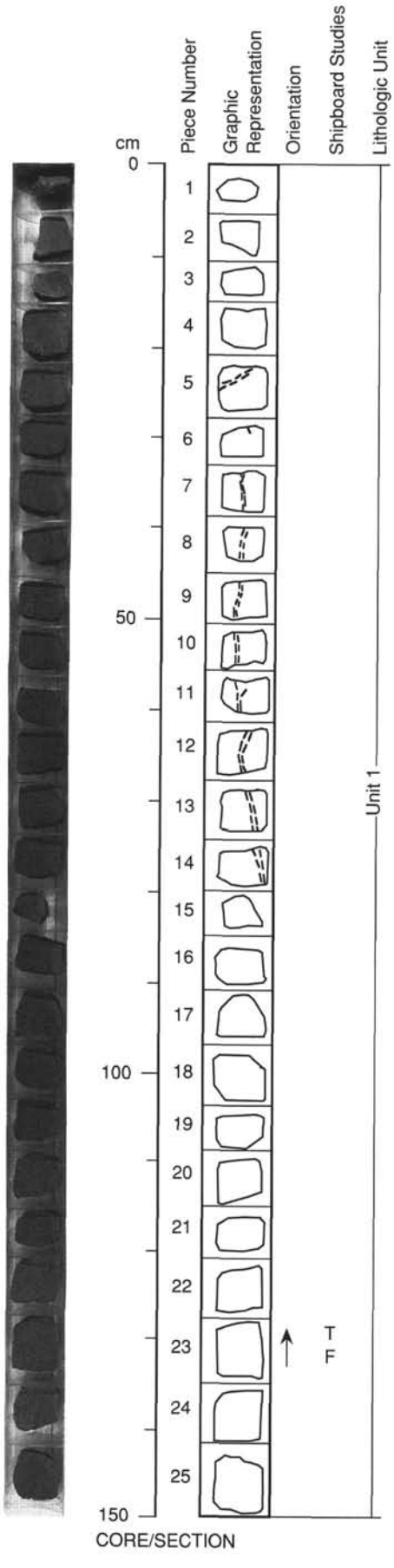
COLOR: 7.5YR 4/0, dark gray.

STRUCTURE: Massive.

ALTERATION: Slightly altered.

VEINS/FRACTURES: None.

ADDITIONAL COMMENTS: In Piece 2, indication of a darker band (1 cm wide) of fine quenched vesicular basalt (due to magma segregation?) crossing the sample.



135-839B-14R-1

UNIT 1: SPARSELY PHYRIC OLIVINE BASALT

Pieces 1–25

CONTACTS: None.

PHENOCRYSTS: Groundmass is somewhat seriate, in places could grade upwards to phenocrysts sizes as in previous cores of this unit.
Olivine: <1%; to 1.5 mm; euhedral, these look fractured and stained reddish orange.

GROUNDMASS: Microcrystalline, plagioclase and clinopyroxene up to 0.7 mm (0.5 mm average). The groundmass also has 3%–5% euhedral black octahedra up to 350 microns.

VESICLES: 15%–20%; <0.7 and >1 mm; irregular; distributed throughout; a prominent, near vertical vesicle train in Pieces 7–14 where coalesced vesicles have formed a planar cavity or fracture. A small vesicle train dips 20° left in Piece 5. Larger vesicles 1%–5% rarely to 4.5 mm; smaller vesicles occur throughout the rock, sometimes interconnected.
Miaroles: Zeolites with platy habit lining most vesicles, some vesicles with finely disseminated white needles of zeolite.

COLOR: 2.5YR 5/2, grayish brown.

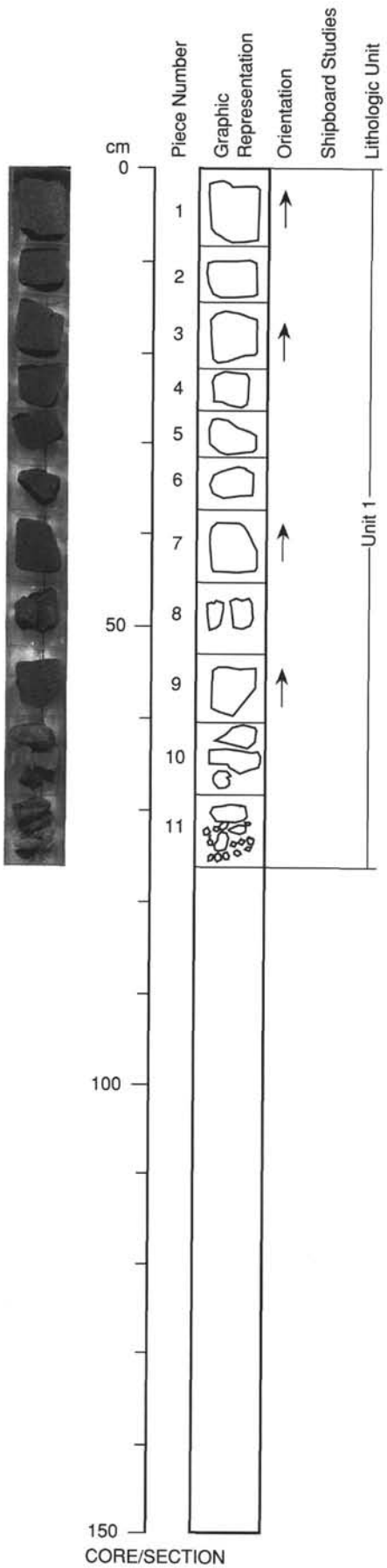
STRUCTURE: Massive.

ALTERATION: Slightly to moderately altered. The rock is a greenish brown color, with significant orange-brown staining on larger plagioclases. Translucent platy minerals filling vesicles are sometimes stained a yellowish orange.

VEINS/FRACTURES: The surface on Piece 2 is coated with yellow clay, spotted with Mn-oxide globules, and is coated on one end with globular orange-red clays or oxyhydroxides.

ADDITIONAL COMMENTS: The opaques are the most prominent feature of the core. The section is brown, somewhat coarser grained, and more altered than previous sections.

Vesicle bands-almost linear cavities



135-839B-14R-2

UNIT 1: SPARSELY PHYRIC OLIVINE BASALT

Pieces 1–11

CONTACTS: None.

PHENOCRYSTS: Rare subhedral olivine grains up to 1 mm across.

GROUNDMASS: Microcrystalline, prominent octahedra less than or equal to 350 microns. Plagioclase laths with interstitial pyroxene, magnetite, and minor mesostasis.

VESICLES: 15%–20%; <0.7 and >1 mm; irregular; distributed throughout; larger vesicles (3%–7%) are randomly distributed. Fine vesicles (10%–12%) give the groundmass a fine porosity. Cavities are rarely up to 6 mm across, and these larger vesicles may be slightly more rounded.

Miaroles: Vesicle linings and fillings of platy translucent zeolite, stained orangish in planes. Some disseminated white needles.

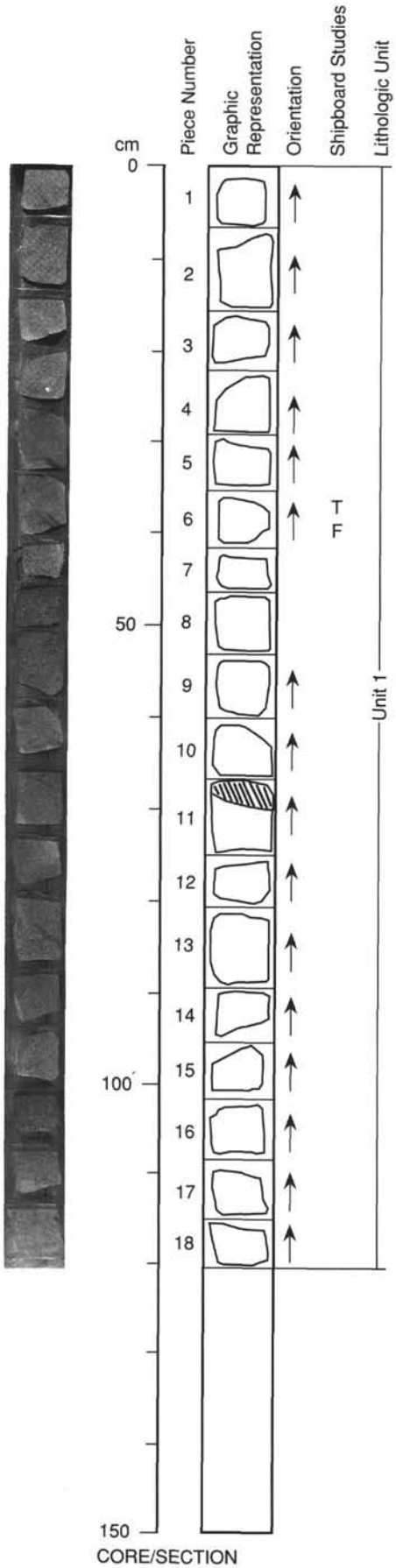
COLOR: 2.5YR 5/2, grayish brown.

STRUCTURE: Massive.

ALTERATION: Moderately to slightly altered. The rock has a green-brown hue, orange staining around larger plagioclases is common. Yellowish green clayey coating on the side of Piece 6.

VEINS/FRACTURES: None.

ADDITIONAL COMMENTS: Prominent groundmass magnetite octahedra are the most striking feature, and these may show up better here than in Cores 135-839B-12R and -13R. Because of the coarser grain size and great alteration ring in Core 135-834B-14R.



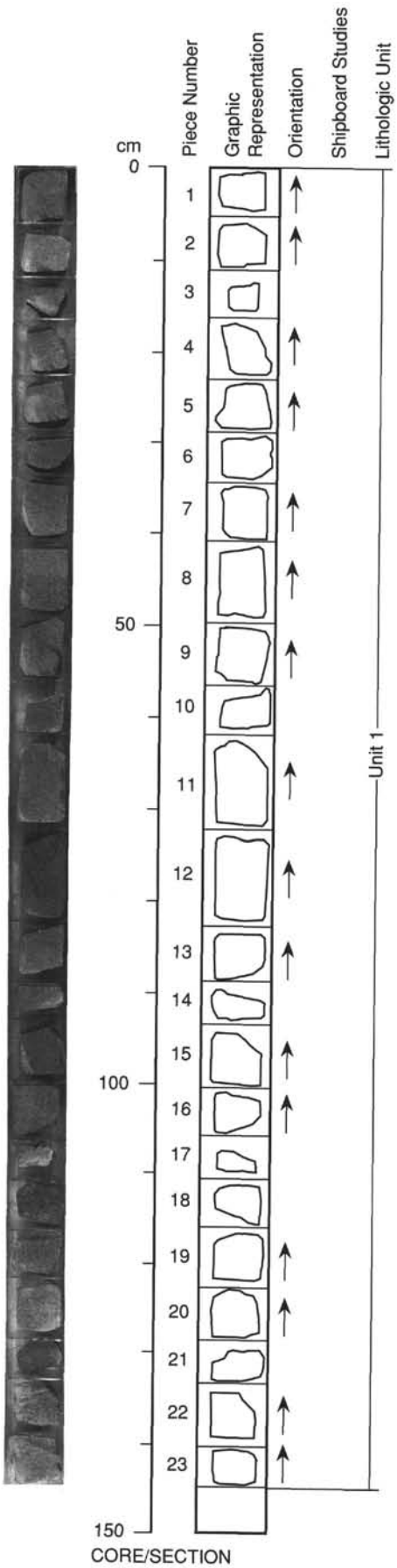
135-839B-15R-1

UNIT 1: SPARSELY TO MODERATELY PHYRIC OLIVINE BASALT

Pieces 1–18

CONTACTS: None.
PHENOCRYSTS:
Olivine: 2%–3%; up to 2.5 mm; euhedral.
GROUNDMASS: Fine-grained, holocrystalline interlocking plagioclase and clinopyroxene with rare olivine and prominent opaque octahedra.
VESICLES: 20%–30%; <0.1–5 mm; rounded; distributed throughout; vesicles rarely occur greater than 1 mm in diameter, and they are then lined by zeolites.
Miaroles: White acicular and/or yellow platy zeolites line some vesicles
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Slightly to moderately altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Piece 1 has patches of amorphous silica(?). An opaque rich zone occurs in Piece 11.

Darker horizon (magnetite impregnated?)



135-839B-15R-2

UNIT 1: SPARSELY PHYRIC OLIVINE BASALT

Pieces 1–23

CONTACTS: None.

PHENOCRYSTS: Phenocryst percentage may be higher depending on definition, the seriate texture makes it difficult to separate phenocrysts from the groundmass. Olivine: Trace–1%; up to 2 mm; euhedral, seriate into the groundmass, commonly with a brownish rust staining.

GROUNDMASS: Microcrystalline; plagioclase, interstitial clinopyroxene, euhedral magnetite are common. The average grain size is approximately 0.6 mm, and looks equigranular.

VESICLES: 3%–10%; <0.5–1.5 mm; irregular; distributed throughout; distinctly less vesicular than in higher cores; larger vesicles are rare, most <0.5 mm. Pieces 10, 11, and 13 are particularly low in vesicle abundance.
Miaroles: Some vesicle linings of dull translucent zeolite in platy and globular habits; other zeolites occur as white needles.

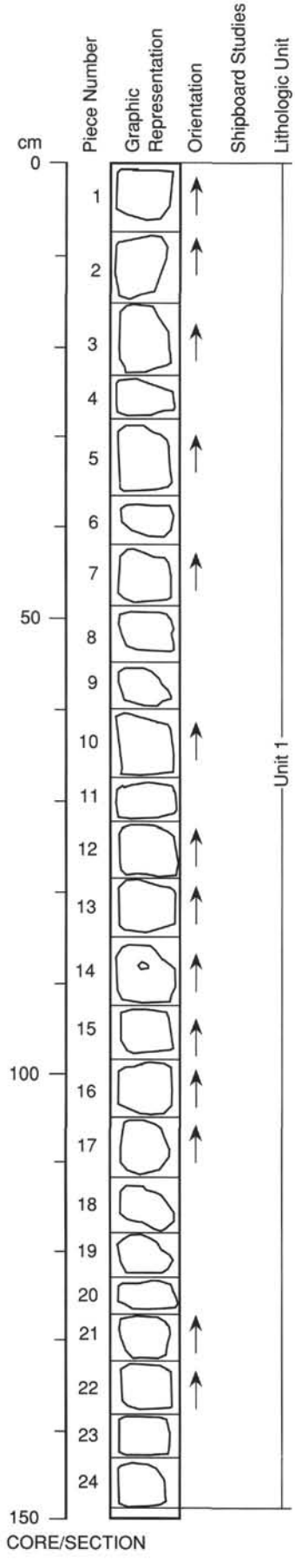
COLOR: 10YR 5/1, gray; somewhat browner gray where weathered.

STRUCTURE: Massive.

ALTERATION: Slightly to moderately altered. Slight alteration front in Piece 8. Orange-brown oxidative staining around olivine is common.

VEINS/FRACTURES: None.

ADDITIONAL COMMENTS: Despite the more massive, less vesicular nature of the rock of this section, the hand specimens contain the same abundant opaques as observed throughout Unit 1.



135-839B-15R-3

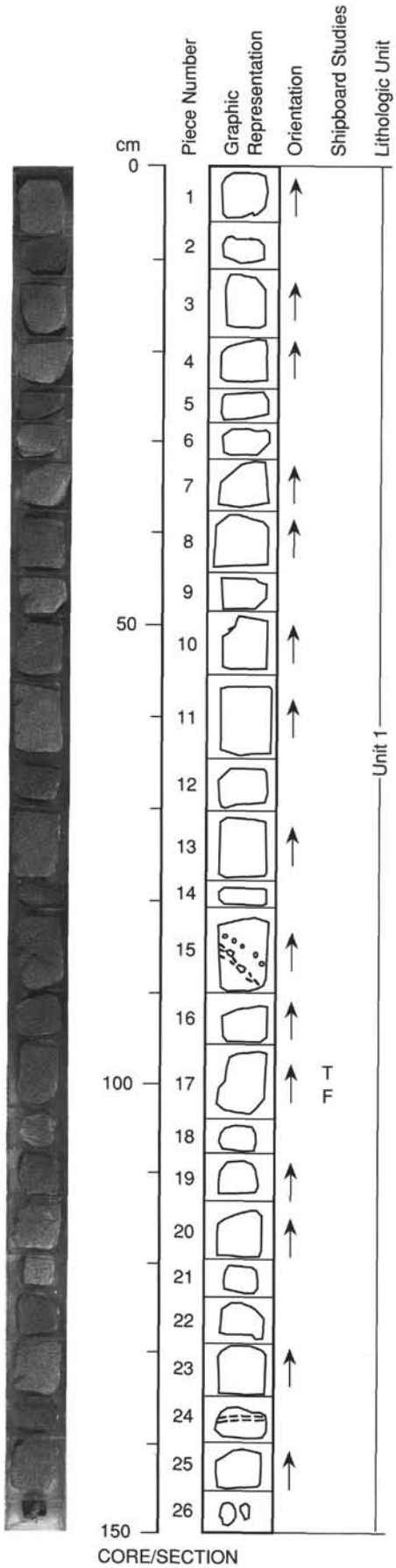
UNIT 1: SPARSELY PHYRIC OLIVINE BASALT

Pieces 1–24

CONTACTS: None.
PHENOCRYSTS: Seriate texture makes phenocryst distinction very arbitrary.
Olivine: 2%; up to 3.5 mm; euhedral to subhedral tabular crystals.
Cr-spinel: Trace; up to 1 mm; glomeroporphyritic aggregates, some may be magnetite(?).
GROUNDMASS: Holocrystalline, seriate, almost diabasic (grain size <1 mm).
Plagioclase, clinopyroxene, olivine and magnetite(?)/spinel(?) octahedra visible.
VESICLES: 10%–15%; 0.1–4 mm; rounded, elongated to interconnected; variously distributed; vesicles only rarely >1 mm in diameter.
Miaroles: Partial infilling by globular zeolites.
COLOR: 2.5Y 5/0, gray (fresh) to 2.5Y 5/2, grayish brown (more altered samples).
STRUCTURE: Massive.
ALTERATION: Slightly to moderately altered.
VEINS/FRACTURES: None.

o Larger vesicle

135-839B-15R-4



UNIT 1: SPARSELY PHYRIC OLIVINE BASALT

Pieces 1–26

CONTACTS: None.

PHENOCRYSTS: Seriate into the groundmass; most stained orangish (Fe-oxyhydroxides). Difficult to distinguish between phenocrysts and the groundmass owing to the seriate texture.
Olivine: Trace–2%; up to 1.5 mm; euhedral; Fe-oxidative staining common.
Spinel: Trace; up to 0.7 mm; quite large euhedra in 3–4 grain clump which grades into the groundmass.

GROUNDMASS: Microcrystalline; stubby plagioclase laths (approximately 1 mm), intergranular clinopyroxene (0.5 mm average), prominent magnetite euhedra.

VESICLES: 5%–15%; <0.6 and >1 mm; irregular shapes; distributed throughout; Cavities rarely up to 6 mm across. Two bands of such cavities dip to the right at 45° in Piece 15. Percentages show a range; 1%–2% larger vesicles compared with 5%–10% finer vesicles. Less vesicular pieces include 4, 7, 18, and 23.
Miaroles: Small linings and fillings of platy and barrel shaped translucent zeolites; rare white acicular zeolites.

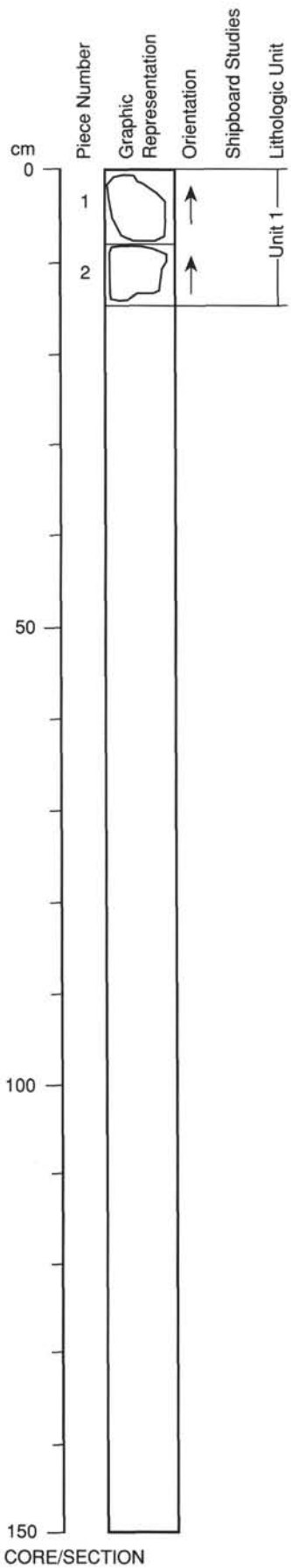
COLOR: 5YR 7/1, light gray to 5YR 5/1, gray.

STRUCTURE: Massive.

ALTERATION: Slight to moderate alteration, considerable Fe-oxidative staining, green brown hue to some pieces.

VEINS/FRACTURES: None.

=== Dark bands of frothy "quenched" material
°. Large vesicles and cavities

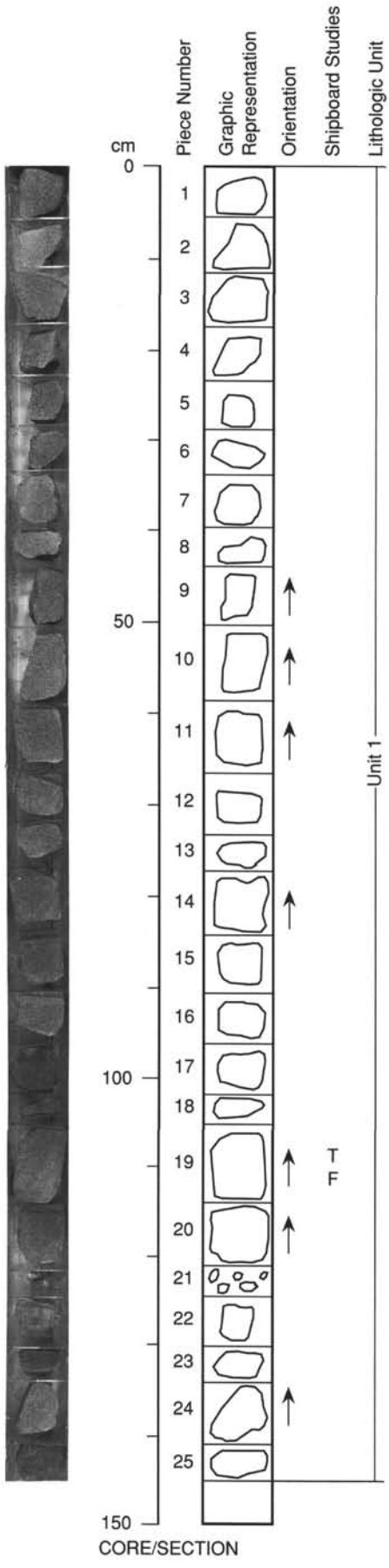


135-839B-15R-5

UNIT 1: SPARSELY PHYRIC OLIVINE BASALT

Pieces 1 and 2

CONTACTS: None.
PHENOCRYSTS: Seriate texture makes distinction of phenocrysts difficult.
Olivine: 1%–2%; up to 2 mm; euhdral to subhedral tabular crystals.
GROUNDMASS: Holocrystalline, seriate, tending towards diabasic texture (although grain size still <1 mm). Plagioclase, clinopyroxene, olivine and magnetite(?) visible.
VESICLES: 15%; 0.1–2 mm; rounded–subrounded and interpenetrating; distributed throughout.
Miaroles: Partial infilling by globular zeolites, varies within pieces.
COLOR: 10YR 4/2, dark grayish brown.
STRUCTURE: Massive.
ALTERATION: Slightly altered.
VEINS/FRACTURES: None.



135-839B-16R-1

UNIT 1: SPARSELY TO MODERATELY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–25

CONTACTS: None.

PHENOCRYSTS: Seriate porphyritic.
Clinopyroxene: 2%–3%; 0.5 mm; euhedral to subhedral.
Olivine: 2%–3%; 0.5–1 mm; euhedral.
Spinel: Trace; 1 mm; as irregularly shaped metallic looking patches which look like intergrowths of several smaller crystals.

GROUNDMASS: Fine-grained, holocrystalline; interlocking plagioclase and clinopyroxene with rare magnetite.

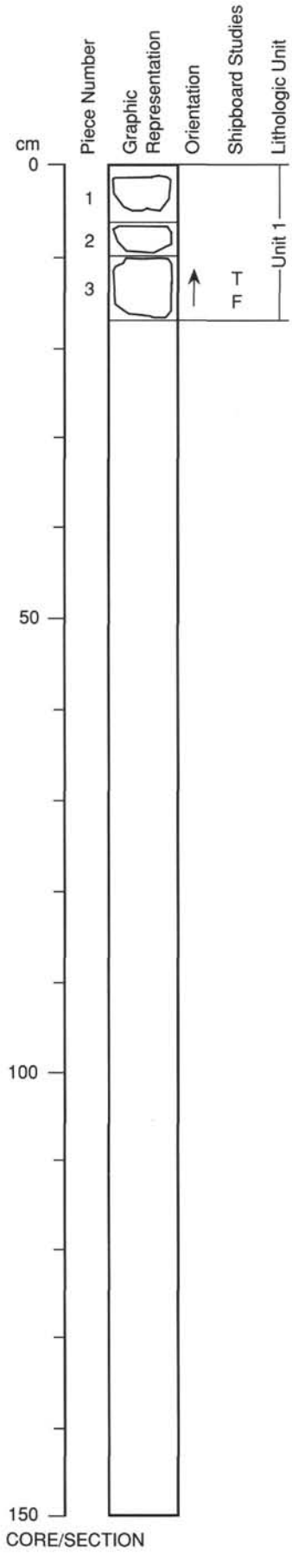
VESICLES: 15%–20%; up to 1.5 mm; round to subrounded; distributed throughout.
Miaroles: Rarely cavities are thinly lined with globular white and tan zeolites, and fine acicular white zeolites. Perfect octahedra occur in many cavities (magnetite(?)/spinel(?)).

COLOR: 2.5Y 5/2 grayish brown (altered) to 2.5Y 4/0, dark gray (fresh).

STRUCTURE: Massive.

ALTERATION: Slightly to moderately altered.

VEINS/FRACTURES: Piece 10 is broken along what appears to be a steeply dipping fracture. This is coated with yellow-white zeolites, clays, and Mn-oxides. Similar material is also observed on Piece 8.



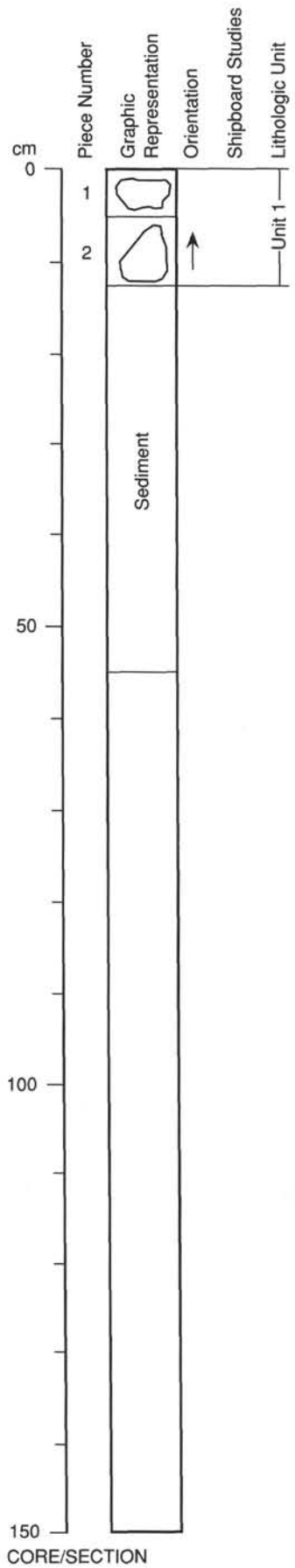
135-839B-16R-2

UNIT 1: SPARSELY TO MODERATELY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–3

CONTACTS: None.
PHENOCRYSTS: Seriate texture makes the distinction of phenocrysts difficult.
Spinel: Trace; up to 2 mm; euhedral to subhedral grains.
Olivine: 1%–2%; up to 2.5 mm; euhedral-subhedral crystals.
Clinopyroxene: 1%–2%; up to 2.5 mm; subhedral.
GROUNDMASS: Holocrystalline, seriate tending towards diabasic texture (grain size <1 mm), interlocking plagioclase and clinopyroxene.
VESICLES: 15%; 0.1–2 mm; subrounded and interconnecting; distributed throughout.
Miaroles: Patchy partial infilling by milky white globular zeolites 10YR 3/1, very dark gray.
STRUCTURE: Massive.
ALTERATION: Slightly to moderately altered.
VEINS/FRACTURES: None.

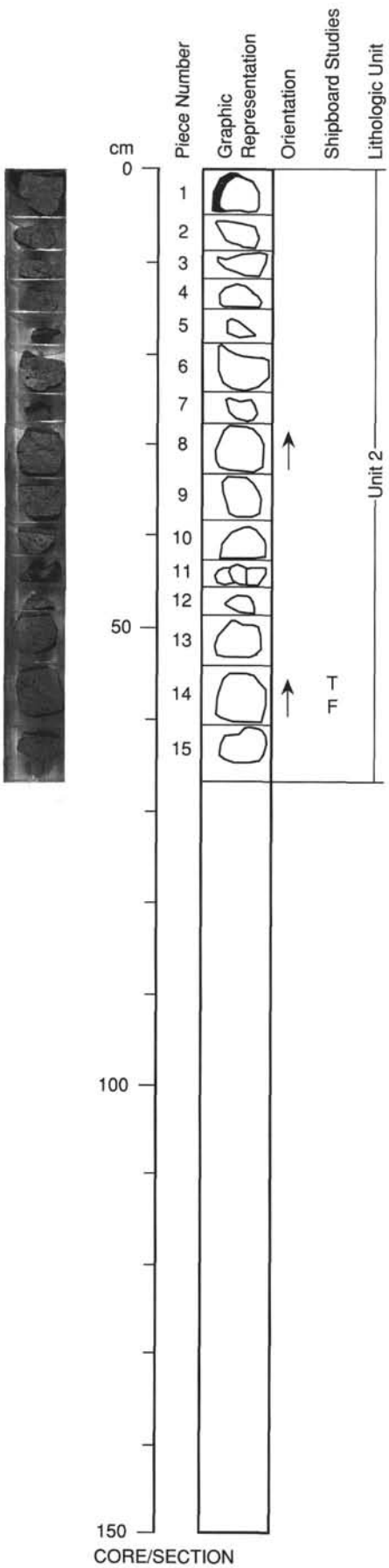
135-839B-17R-1



UNIT 1: SPARSELY TO MODERATELY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–2

CONTACTS: None.
PHENOCRYSTS:
Clinopyroxene: 2%; 1 mm; subhedral.
Olivine: 2%–3%; < 1mm; euhedral; some with brownish staining.
GROUNDMASS: Holocrystalline; plagioclase, olivine, and clinopyroxene visible as well as prominent octahedral opaques.
VESICLES: 15%; 0.2–0.5 mm; irregular; randomly distributed; the rock appears to have been largely crystalline before the vesicles formed.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Slightly to moderately altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: These pieces are underlain by indurated brown sediment; they comprise the base of Unit 1.

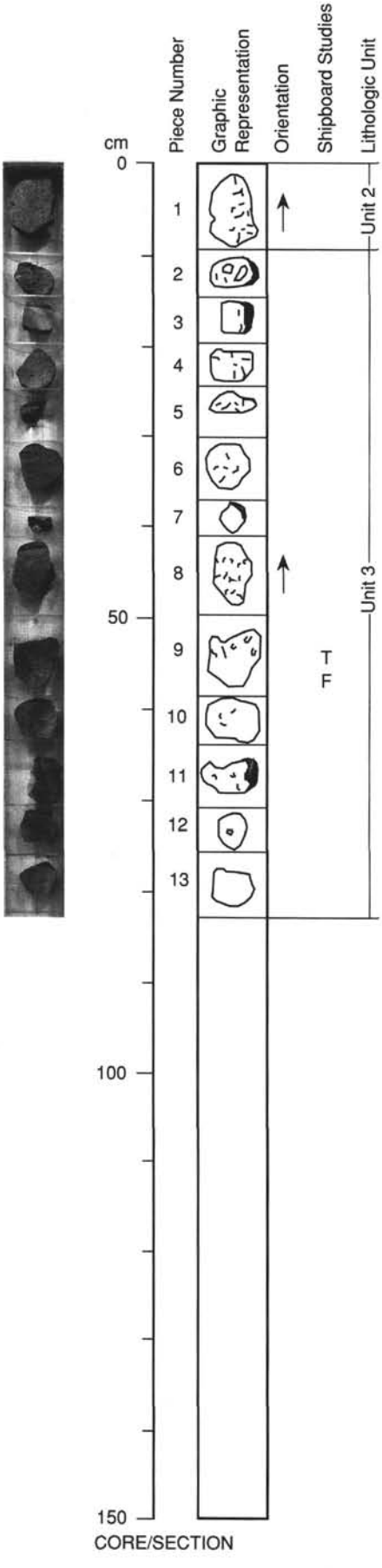


135-839B-18R-1

UNIT 2: MODERATELY PHYRIC PYROXENE-PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–15

CONTACTS: Glassy rinds occur on Pieces 1 and 2.
PHENOCRYSTS:
Plagioclase: 7%–10%; 1.5 mm; subhedral to anhedral.
Pyroxene: Trace; 1 mm; anhedral pale green crystals; includes both orthopyroxene and clinopyroxene.
GROUNDMASS: Fine-grained, microlitic.
VESICLES: 10%; 0.2–11 mm; round to irregular; variously distributed; immediately under the glass in Piece 1, the vesicles are more ovoid with the suggestion of some alignment subparallel to the contact. Darker patches of vesicular basalt fill or line some large vesicles (melt segregations).
Miaroles: Where some larger vesicles have coalesced to form small pipes (approximately 1 cm long), these are thinly lined with white-yellow-orange amorphous zeolites(?).
COLOR: 2.5Y 4/0, dark gray.
STRUCTURE: The glassy rims suggest pillows or thin flows.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: None.



135-839B-19R-1

UNIT 2: MODERATELY PHYRIC PYROXENE-PLAGIOCLASE BASALTIC ANDESITE

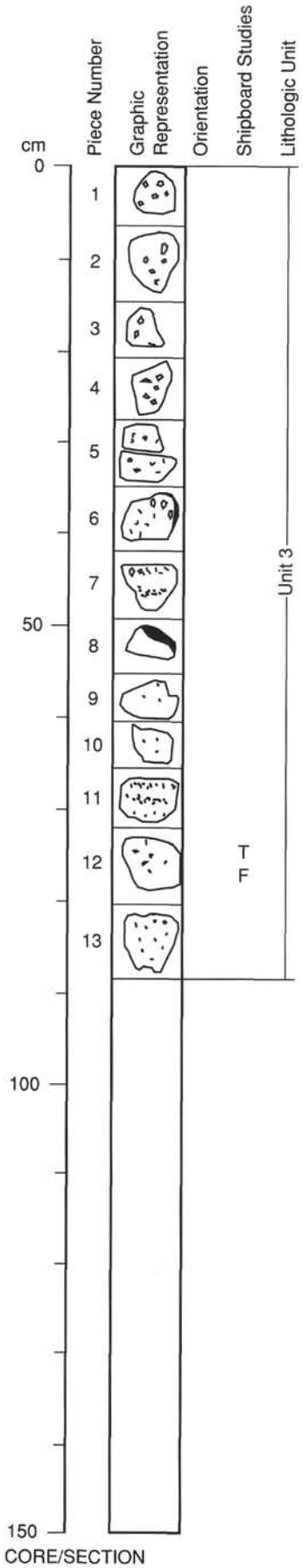
Piece 1

CONTACTS: Bottom of unit.
PHENOCRYSTS: Rare subhedral pyroxene to 0.5 mm; pale green; both orthopyroxene and clinopyroxene occur in thin section.
Plagioclase: 5%–10%; 0.5–1.5 mm; subhedral to euhedral.
GROUNDMASS: Fine-grained, holocrystalline. Plagioclase and clinopyroxene visible.
VESICLES: 15%–20%; 0.1–4 mm; rounded to irregular; randomly distributed throughout.
Miaroles: A few coalesced vesicles are thinly coated with whitish yellow amorphous zeolites.
COLOR: 2.5Y 4/0, dark gray.
STRUCTURE: Glassy rinds suggest thin flows or pillows.
ALTERATION: Fresh.
VEINS/FRACTURES: None.

UNIT 3: MODERATELY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 2–13

CONTACTS: Glassy margin on Pieces 3, 4, 7, and 12.
PHENOCRYSTS: Olivine abundance varies between pieces.
Olivine: 5%–7%; up to 3.5 mm; euhedral to subhedral.
Clinopyroxene: 1%–2%; up to 2 mm; euhedral to subhedral crystals; glomeroporphyritic.
Spinel: <1%; 0.5 mm; euhedral; intergrown with olivine.
GROUNDMASS: Fine-grained; plagioclase, clinopyroxene, and olivine visible.
VESICLES: 10%–15%; 0.1 to 12 mm; rounded to elongated; disseminated throughout sample.
Miaroles: Rare yellow-brown zeolite(?) coatings.
COLOR: 2.5Y 4/0, dark gray.
STRUCTURE: Massive, with some intraflow contacts.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: Piece 9 has broken along thin fracture surfaces; these have thin coating of yellow-brown zeolite(?).



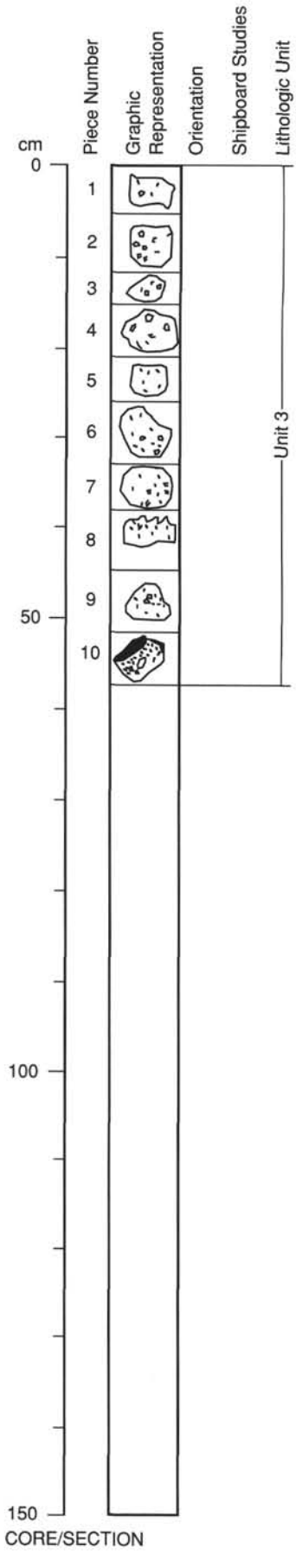
135-839B-20R-1

UNIT 3: MODERATELY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–13

CONTACTS: Glass rim on Piece 8.
PHENOCRYSTS:
Olivine: 5%–7%; 1–3 mm; subhedral to anhedral.
Clinopyroxene: 1%–2%; 1–2 mm; subhedral.
GROUNDMASS: Cryptocrystalline.
VESICLES: 20%–30%; 1–3 mm; round; distributed in bands; vesicles tend to be concentrated in planar zones; many have milky blue internal coating. Groundmass is *micro-vesicular*.
COLOR: 2.5Y 5/0, light gray.
STRUCTURE: Thinly bedded flows or pillows.
ALTERATION: Fresh to slightly altered. Brownish coatings occur on Pieces 1, 9, 10, and 13.
VEINS/FRACTURES: *None*.
ADDITIONAL COMMENTS: There appears to be a gradual increase in olivine content down section.

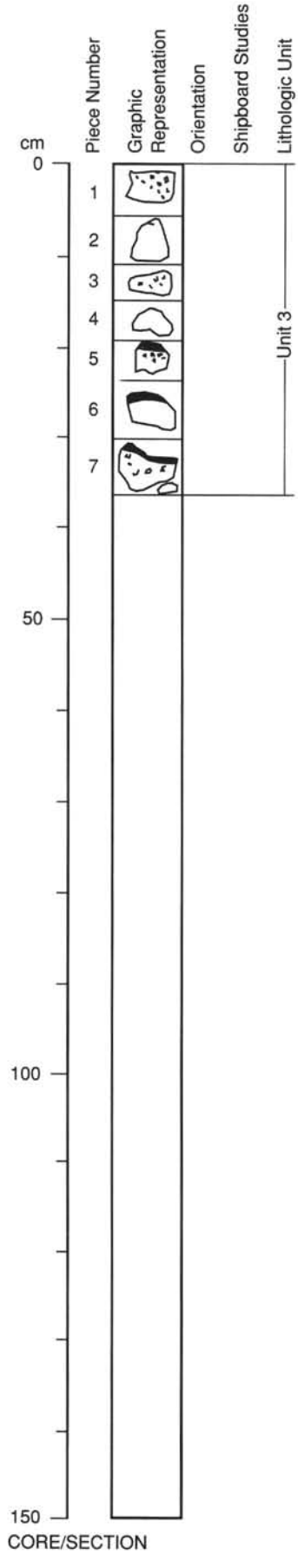
135-839B-21R-1



UNIT 3: MODERATELY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–10

CONTACTS: Glassy rims on Pieces 8, 9, and 10.
PHENOCRYSTS: The largest crystals occur in Pieces 7 and 10.
Olivine: 3%–5%; 1–3 mm; anhedral to subhedral.
Clinopyroxene: 1%–2%; <1 mm; subhedral.
GROUNDMASS: Olivine and clinopyroxene occur as microphenocrysts; mostly cryptocrystalline.
VESICLES: 20%–30%; 0.5–4 mm; rounded; randomly distributed; there is a bluish coating in some vesicles; uniformly microvesicular, locally coarsely vesicular.
COLOR: 2.5Y 5/0.
STRUCTURE: Thin flows or pillows.
ALTERATION: Fresh to slightly altered; brown staining occurs in vesicles in Piece 6.
VEINS/FRACTURES: None.



135-839B-22R-1

UNIT 3: MODERATELY TO HIGHLY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–7

CONTACTS: Glass rinds on Pieces 5, 6, 7.

PHENOCRYSTS: The most prominent feature of these rocks are the pale green glassy olivine phenocrysts associated with and/or including spinels.
Olivine: 5%–7%; up to 9 mm; large rectangular euhedral to subhedral pale green crystals.
Clinopyroxene: 1%–2%; up to 1 mm; subhedral.
Spinel: Trace; up to 1.75 mm; occur in small anhedral grains in olivines and as larger euhedral crystals.

GROUNDMASS: Microlitic, particularly towards the glassy margins.

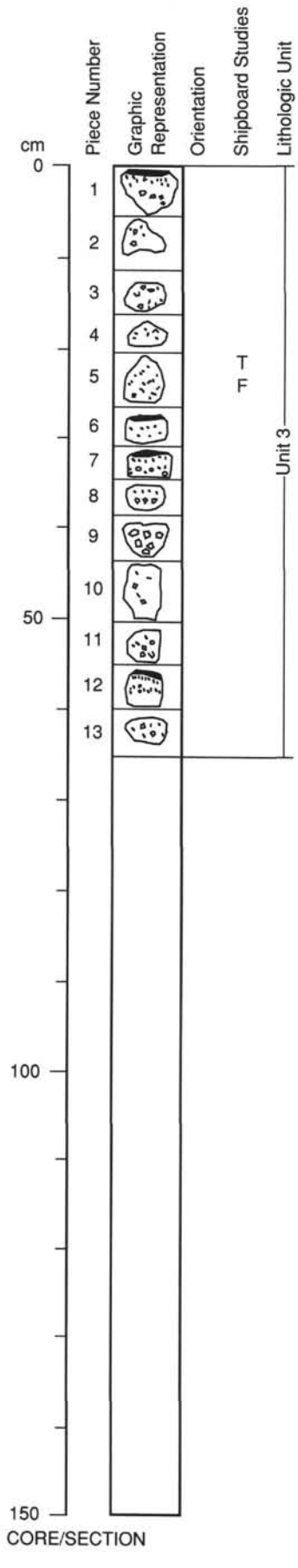
VESICLES: 30%–40%; <0.1–2.75 mm; round to irregular in shape; randomly distributed throughout; the size of the vesicles decreases towards the glassy rims in Pieces 5, 6, and 7, while the abundance increases.
Miaroles: Some of the larger cavities (formed when vesicles have coalesced) are thinly lined with white-yellow brownish zeolites.

COLOR: 2.5Y 5/0, gray.

STRUCTURE: Thin flows or pillows.

ALTERATION: Fresh to slightly altered.

VEINS/FRACTURES: None.

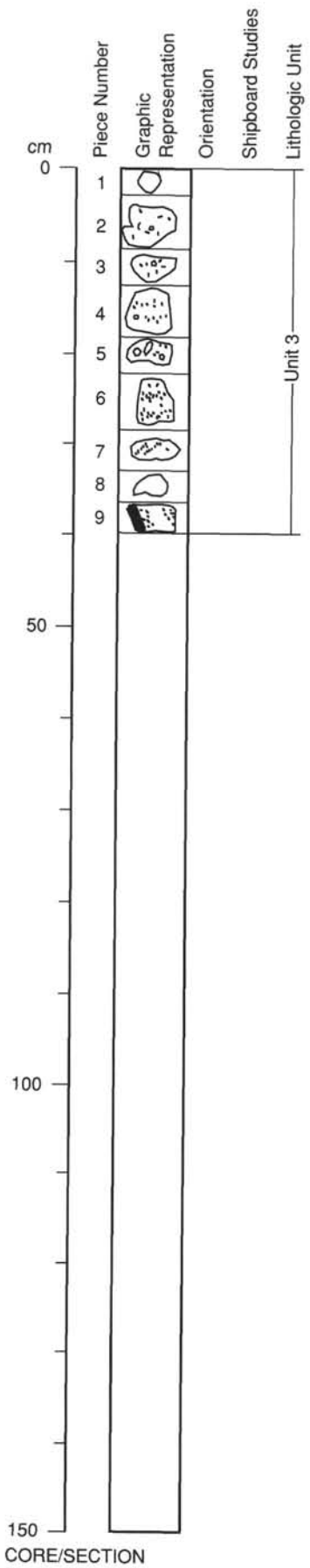


135-839B-23R-1

UNIT 3: MODERATELY TO HIGHLY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–13

CONTACTS: Glassy rinds on Pieces 1, 6, and 7.
PHENOCRYSTS: Largest crystals in Pieces 10 and 13.
Olivine: 4%–8%; 2–6 mm; elongated, euhedral to subhedral pale green crystals.
Clinopyroxene: 1%–2%; <1 mm; subhedral.
GROUNDMASS: Clinopyroxene and olivine microphenocrysts in cryptocrystalline interior; glassy fillings in some vesicles.
VESICLES: 15%–30%; 0.2–>5 mm; rounded; distributed throughout; tend to be concentrated in planar zones. Vesicle size decreases near glassy margins while abundance increases.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Thin flows or pillows.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Olivine increasing in size and abundance down this core as well as throughout the unit.

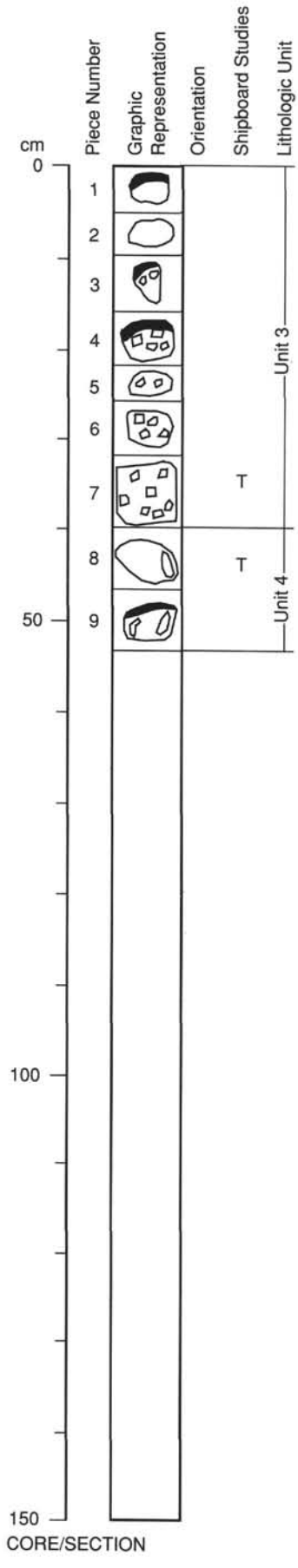


135-839B-24R-1

UNIT 3: MODERATELY TO HIGHLY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–9

CONTACTS: Glass rinds on Pieces 8 and 9.
PHENOCRYSTS: Olivine phenocrysts have numerous euhedral to subhedral spinel inclusions.
Olivine: 5%–12%; up to 7 mm; large euhedral to subhedral crystals.
Clinopyroxene: 1%–2%; up to 1 mm; subhedral.
GROUNDMASS: Microlitic to microcrystalline.
VESICLES: 30%–40%; <0.1–10 mm; rounded to irregular; randomly distributed.
Miaroles: Vesicles are generally clear, but some have whitish and orange-red crystalline zeolites thinly coating their walls.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Thin flows or pillows.
ALTERATION: Fresh.
VEINS/FRACTURES: None.



135-839B-25R-1

UNIT 3: MODERATELY TO HIGHLY PHYRIC CLINOPYROXENE OLIVINE BASALT

Pieces 1–7

CONTACTS: Glassy margins on Pieces 1, 3, and 4.
PHENOCRYSTS: Increase in olivine content from Pieces 1–7, reaches 10%–15% in Piece 7.
Olivine: 7%–15%; up to 7.5 mm; euhedral to subhedral crystals and glomeroporphyritic aggregates.
Opaques: <1%; up to 0.7 mm; euhedral crystals.
Clinopyroxene: 1%–2%; up to 0.7 mm; subhedral; often in glomeroporphyritic clusters.
GROUNDMASS: Fine-grained, holocrystalline to vitreous. Plagioclase, olivine and clinopyroxene visible.
VESICLES: 10%–15%; 0.1 mm to 1 cm; rounded to irregular and elongate; unevenly distributed; vary in distribution and sizes from piece to piece; with some of coarser vesicle occurrences in distinct bands.
Miaroles: Rare globular zeolite(?) linings.
COLOR: 2.5T 3/0 very dark gray.
STRUCTURE: Thin flows or pillows.
ALTERATION: Fresh.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Glassy selvages in Piece 1, 3, and 4. Darker colored segregation vesicles common

UNIT 4: SPARSELY PHYRIC OLIVINE CLINOPYROXENE BASALT

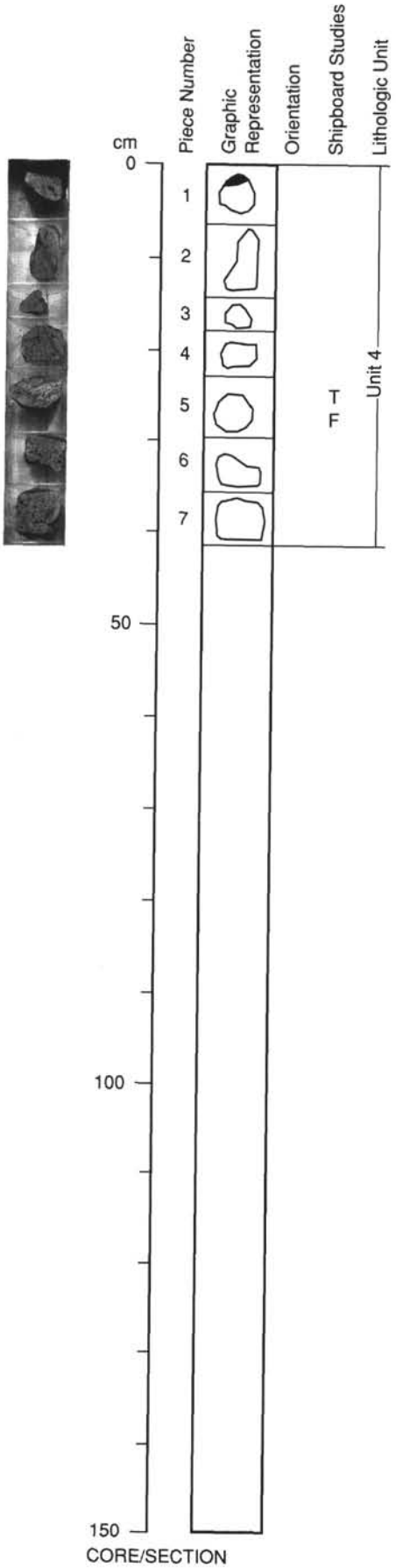
Pieces 8 and 9

CONTACTS: Units 3–4 boundary at top of Piece 8.
PHENOCRYSTS:
Clinopyroxene: 1%; up to 1 mm; euhedral tabular crystals.
Olivine: 1%; up to 1.3 mm; euhedral to subhedral.
GROUNDMASS: Holocrystalline to vitreous. Plagioclase, clinopyroxene and olivine visible.
VESICLES: 5%–15%; 0.2–10 mm; rounded to elongate; variously distributed; some pipe-like with frothy filling (segregation vesicles); one very large one in Piece 8.
Miaroles: Sporadic yellow-brown zeolite(?) linings.
COLOR: 2.5Y 6/0, gray.
STRUCTURE: Pillow or thin flow.
ALTERATION: Fresh; trace of yellow brownish coatings on some grains.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Very abrupt change from olivine phyric unit above. Piece 9 has a glassy margin. Dark segregation vesicles very common; largest is up to 2 cm in diameter.

Glassy margin

Olivine phenocrysts >4 mm across

Vesicles >1 cm



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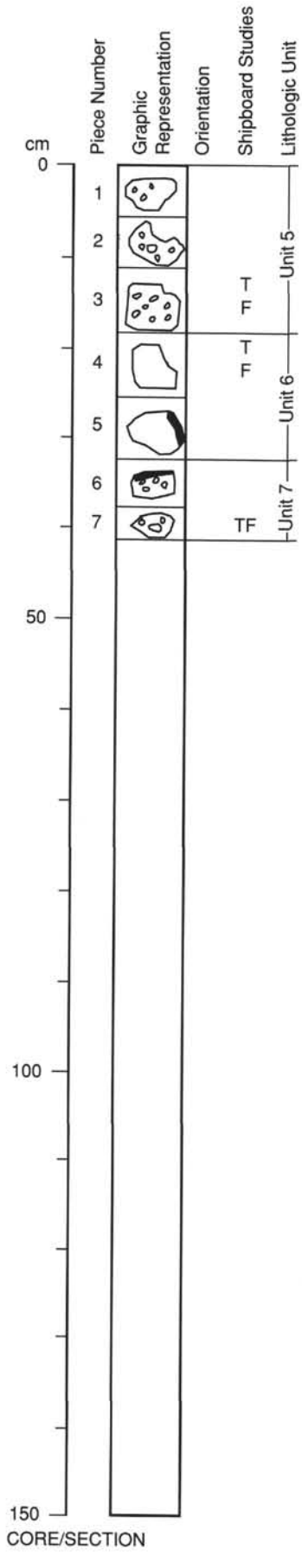
UNIT 4: SPARSELY PHYRIC OLIVINE CLINOPYROXENE BASALT

Pieces 1–7

CONTACTS: None visible.
PHENOCRYSTS:
Clinopyroxene: 1%; up to 1 mm; euhedral.
Olivine: 1%; up to 1.5 mm; euhedral to subhedral.
GROUNDMASS: Fine-grained, holocrystalline.
VESICLES: 30%; <0.1 to 4 mm; mainly rounded; disseminated throughout; one or two vesicles in this section reach a size of 1.5 cm in diameter.
COLOR: 2.5Y 4/0, dark gray.
STRUCTURE: Massive.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Patches of amorphous silica occur on Piece 1; rarely, fractures are lined by yellowish zeolites and vesicles show tiny globular zeolites of the same type with patches of Mn-oxide(?).



135-839B-27R-1

UNIT 5: MODERATELY PHYRIC PYROXENE-PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–3

CONTACTS: Top and bottom of Unit 5.
PHENOCRYSTS: Plagioclase-only glomerocrysts common but multi-mineral aggregates do occur.
Plagioclase: 5%–8%; 0.5–1.5 mm; euhedral to subhedral, seriate to groundmass; commonly in glomerocrysts.
Olivine(?)–Trace(?); 0.4–0.6 mm; not confirmed in thin section; could be rare xenocrysts or green pyroxene.
Pyroxene: Trace; 0.7–1.5 mm; darker green, good cleavage, with plagioclase in glomerocrysts; may be a mix of ortho- and clinopyroxene
Spinel: Trace; 0.2 mm; best seen in one mafic-plagioclase glomerocryst; not confirmed in thin section but could be xenocrystic.
GROUNDMASS: Glassy to aphanitic.
VESICLES: 8%–10%; 0.6–4 mm; ovoid to elongate; distributed throughout; rare 7 mm cavities; Pieces 1 and 3 show a slight alignment of vesicles; Piece 2 has the large cavity; Piece 3 has some fine scale porosity (<0.4 mm vesicles).
Miaroles: Yellow-white to gray-white zeolite(?) vesicle linings common; some orange to reddish Fe-oxyhydroxide linings.
COLOR: 7.5YR 4/0, dark gray.
STRUCTURE: Massive or thin flows.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: None.

UNIT 6: MODERATELY TO HIGHLY PHYRIC CLINOPYROXENE OLIVINE BASALT

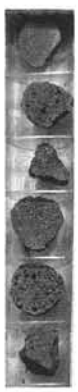
Pieces 4 and 5

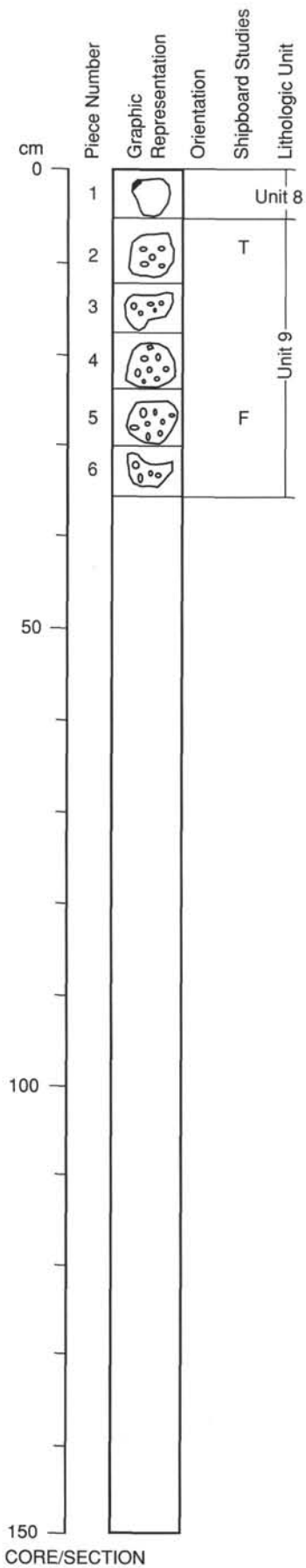
CONTACTS: Top and bottom of Unit 6, glass on Piece 5.
PHENOCRYSTS: Olivine phenocrysts are small but common.
Olivine: 5%–10%; up to 3.5 mm; single crystals; also intergrown with other grains.
Clinopyroxene: 1%–2%; < 1mm; seriate to groundmass.
Spinel: Trace–1%; <0.3; single grains and in clumps of 3–6 grains; distinct blood red edges.
GROUNDMASS: Glassy (especially around vesicles) to aphanitic.
VESICLES: 15%–20%; <0.4 and >0.5 mm; various shapes; distributed throughout; bimodal population; large vesicles are irregular to rounded, small vesicles form network of very fine irregular pores.
COLOR: 7.5YR 5/0 gray.
STRUCTURE: Thin flows.
ALTERATION: Slight, minor yellow to yellow-orange coatings.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Resembles Unit 3.

UNIT 7: MODERATELY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 6 and 7

CONTACTS: Glassy margin on Piece 6 is top of Unit 7; Piece 7 is the bottom.
PHENOCRYSTS:
Plagioclase: 4%–7%; 0.5–1.2 mm.; euhedral cores in single crystals; also in glomerocrysts with olivine and/or clinopyroxene.
Pyroxene: 1%; 0.5 mm.; euhedral, singly and with plagioclase; thin section shows both orthopyroxene and clinopyroxene.
GROUNDMASS: Aphanitic, glassy, especially around vesicle margins.
VESICLES: 10%–15%; 0.7–4 mm.; round; rarely ovoid to irregular; distributed throughout; Piece 7 has a 21x7 mm irregular cavity; vesicle percent excludes cavity.
Miaroles: green-white and yellow-green clay or zeolite as vesicle linings; brownish red minor Fe-oxide staining.
COLOR: 7.5YR 4/0 dark gray.
STRUCTURE: Thin flows.
ALTERATION: Slight, mainly as vesicle fillings; groundmass is very fresh.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Same lithology as Unit 5.





135-839B-28R-1

UNIT 8: MODERATELY TO HIGHLY PHYRIC CLINOPYROXENE OLIVINE BASALT

Piece 1

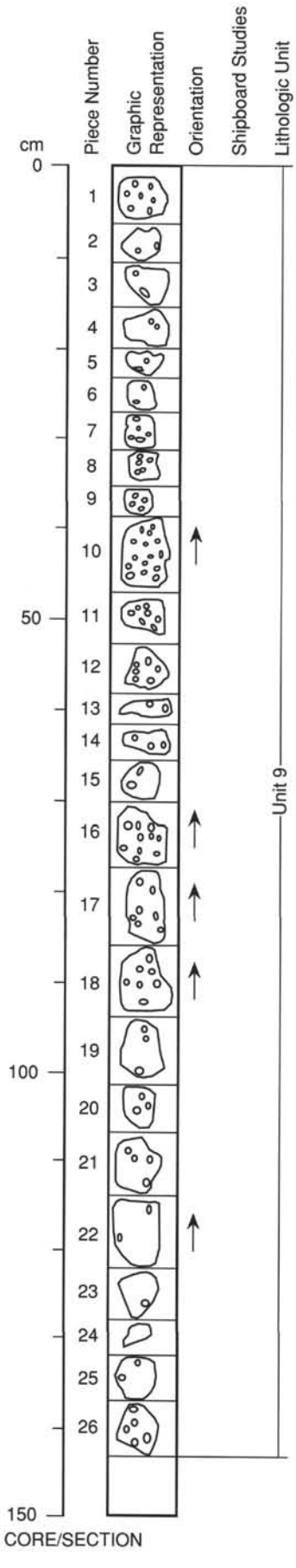
CONTACTS: None.
PHENOCRYSTS: Some small multicrystal aggregates.
Olivine: 7%–10%; up to 2.5 mm; occurs mostly as single crystals.
Clinopyroxene: 1%–2%; up to 1 mm; occurs mostly as single crystals.
Spinel: 1%; to 0.3 mm.; included in olivine, and in groups with olivine.
GROUNDMASS: Glassy to aphanitic.
VESICLES: 15%–20%; <0.4 and >.5 mm.; irregular; throughout; bimodal size distribution; about 1% are 0.5 to 2.0 mm.; the rest are very small and probably interconnected, producing a high groundmass porosity.
COLOR: 7.5YR 5/0, gray.
STRUCTURE: None.
ALTERATION: Fresh to slightly altered; Fe-oxyhydroxide coatings and some olivine alteration.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Similar to Unit 6.

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 2–6

CONTACTS: This is top of Unit 9.
PHENOCRYSTS: Plagioclase very seriate-porphyritic.
Plagioclase: 8%–10%; 0.5–2.2 mm.; euhedral single crystals and abundant plagioclase glomerocrysts.
Proxene: 1%-2%; 0.7-1 mm.; usually in clusters with plagioclase; thin section shows orthopyroxene and clinopyroxene
GROUNDMASS: Aphanitic, glassy around vesicles, intersertal.
VESICLES: 10%–15%; 0.5–6 mm; round to ovoid; throughout; Most common size is 1.5–5 mm. As discrete vesicles; frothy fillings common; fine scale pervasive porosity in Pieces 5 and 6 only.
Miaroles: Orange-brown Fe-oxyhydroxide, white-yellow, yellowish brown, and gray-white vesicle linings probably include clays and zeolites.
COLOR: 7.5YR, 4/0 dark gray.
STRUCTURE: None apparent.
ALTERATION: Fresh.
VEINS/FRACTURES: None.

° Large vesicles
/ Glass



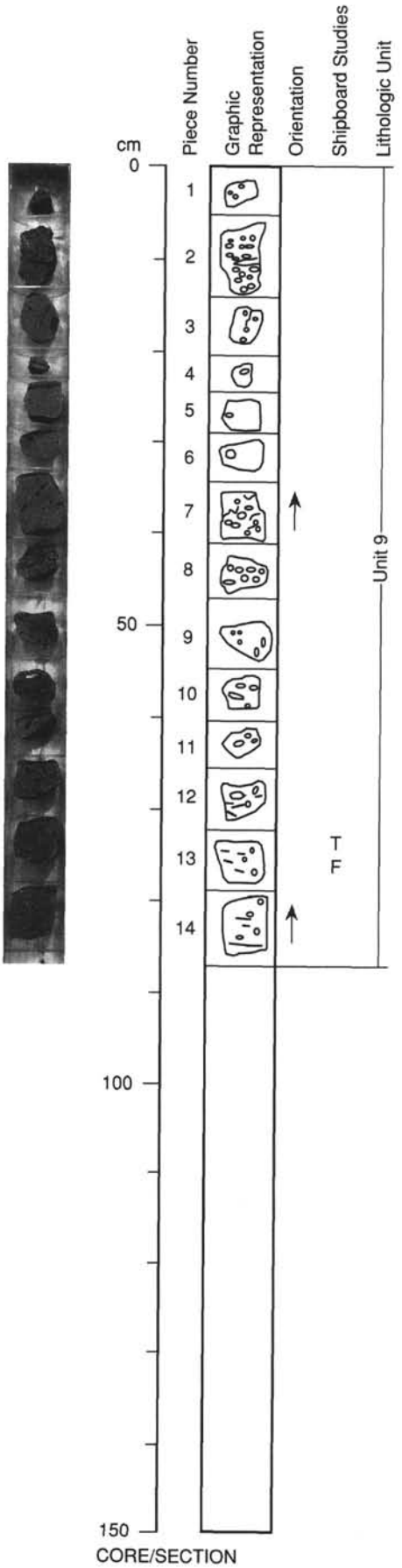
135-839B-29R-1

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–26

CONTACTS: None.
PHENOCRYSTS:
Plagioclase: 7%–10%; up to 3 mm; euhedral to subhedral, tabular to equant pyroxene 1%–2%; up to 3 mm; subhedral, some intergrown with plagioclase.
GROUNDMASS: Fine-grained, holocrystalline; plagioclase and pyroxene visible.
VESICLES: 20%; 0.1–8 mm; rounded to elongate and coalescing; distributed throughout; vesicles tend to be bimodal in size: (1) <0.3 mm and (2) >0.6–8 mm. Vesicle trains visible in Pieces 13, 16–20, and 26. Dark segregation vesicle infillings also present. Miaroles: Rare linings or coatings of yellowish to red-brown zeolites(?)
COLOR: 2.5Y 3/0, very dark gray.
STRUCTURE: Massive.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Pieces 1, 5, and 7–11 have finer grained groundmasses compared with other pieces, suggesting proximity to flow contacts.

° Course vesicles



135-839B-30R-1

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–14

CONTACTS: Pieces 1 and 2 are quite glassy which suggests possible flow boundaries.

PHENOCRYSTS: Plagioclase is most common in monomineralic clots.
Plagioclase: 7%–10%; 0.5–2.2 mm; single euhedral crystals, and as glomerocrysts.
Pyroxene: 1%–2%; 0.7–1 mm; single euhedral crystals, more commonly in glomerocrysts with plagioclase; some are pale green while others are brownish; thin section shows both orthopyroxene and clinopyroxene.

GROUNDMASS: Glassy groundmass in marginal pieces, particularly on vesicle walls. Pieces apparently more interior are aphanitic to intersertal/intergranular.

VESICLES: 10%–20%; <0.2 and 0.5–7 mm; round to ovoid or irregular; variously distributed; large vesicles (>0.5 mm) are concentrated (up to 10%) in the finer grained flow top pieces, while interior pieces have 1%–8% large vesicles and have begun to develop abundant small (<0.2 mm) irregular vesicles. Subhorizontal to gently dipping vesicle bands in several pieces.
Miaroles: Whitish gray to yellowish zeolite(?) in Piece 10. Yellow to orange-brown oxide coatings on Pieces 2, 4, and 8.

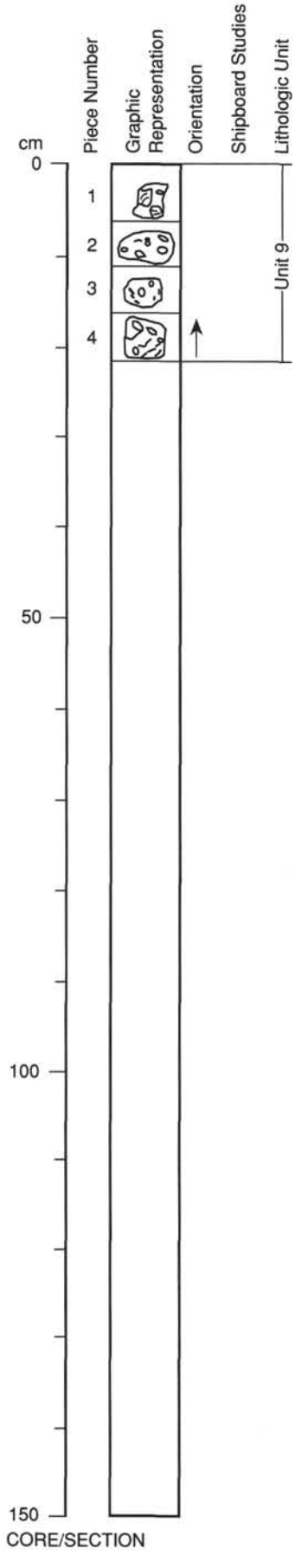
COLOR: 7.5YR 5/0, gray to 7.5YR 4/0, dark gray.

STRUCTURE: Thin flows.

ALTERATION: Fresh to slightly altered; for example, vesicle fillings show yellowish to orange-brown surface coatings in Pieces 4, 7, 9, and 14.

VEINS/FRACTURES: Outside surfaces of some pieces appear to be defined by fractures.

o Large vesicles
⁓ Vesicle bands

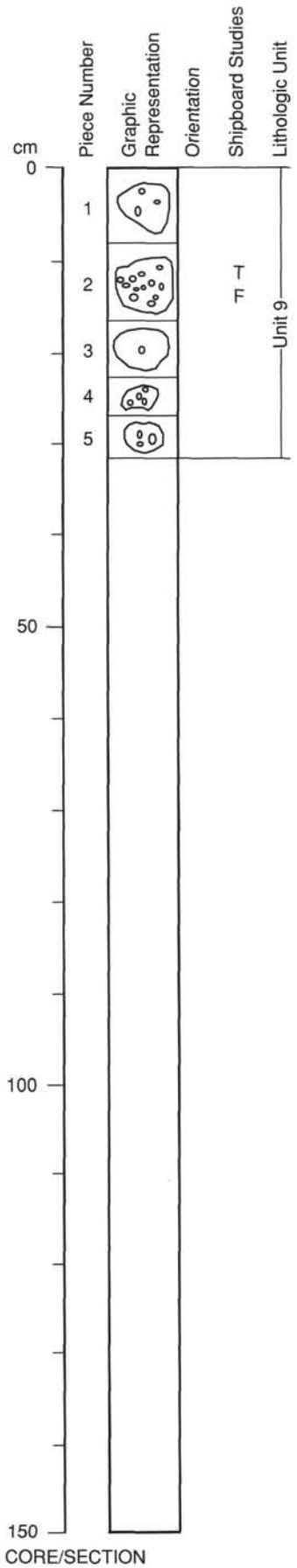


135-839B-31R-1

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–4

CONTACTS: None.
PHENOCRYSTS:
Plagioclase: 3%–5%; up to 2.5 mm; subhedral to euhedral; tend towards glomerocrystic.
Pyroxene: 1%–2%; up to 1 mm; isolated and in small clusters.
GROUNDMASS: Microlitic to finely crystalline.
VESICLES: 10%–20%; <<0.1 and >1 mm; round to irregular; variously distributed; the very fine vesicles are generally uniformly distributed, with the larger vesicles (up to 13 mm across) randomly distributed. Some of the finer vesicles occur in thin wispy strings (ie. Pieces 3 and 4). Darker, frothy melt segregations line some of the larger cavities in Pieces 1 and 2.
Miaroles: Barrel shaped black zeolites(?) and colorless globular zeolites thinly line the walls of the larger vesicles.
COLOR: 2.5Y 3/0, very dark gray.
STRUCTURE: Massive.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: None.



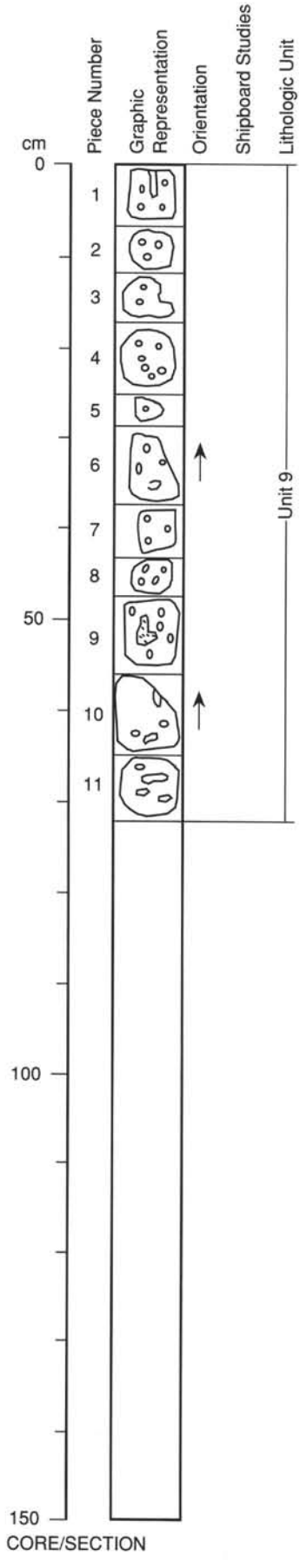
135-839B-34R-1

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–5

CONTACTS: None.
PHENOCRYSTS:
Plagioclase: 10%–12%; up to 3 mm; euhedral to subhedral, often in glomeroporphyritic clusters.
Pyroxene: 1%–2%; up to 3 mm; often in glomeroporphyritic clusters with plagioclase. Some isolated euhedral, tabular grains; very rare. Thin section shows both orthopyroxene and clinopyroxene.
GROUNDMASS: Microlitic to very finely crystalline. Occasional plagioclase microlites discernable, mostly indistinguishable groundmass.
VESICLES: 5%–15%; <6 mm; rounded to subrounded; randomly distributed; most are empty except for linings of very dark, highly vesicular quenched material. Piece 3 has very few vesicles, while Piece 2 is highly vesicular.
Miaroles: Very rare orangish oxidized linings in vesicles.
COLOR: 2.5Y 3/0, very dark gray.
STRUCTURE: Massive.
ALTERATION: Fresh.
VEINS/FRACTURES: None.

Large vesicles



135-839B-35R-1

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–11

CONTACTS: A very small glassy rim occurs on Piece 1.

PHENOCRYSTS:

Plagioclase: 7%–12%; up to 3 mm; as single euhedral crystals, tending to glomerocrystic.

Pyroxene: Tr%–1%; up to 2.5 mm; as single euhedral tabular crystals.

GROUNDMASS: Microlitic to microcrystalline.

VESICLES: 15%– 25%; <0.1 and >1 mm; rounded to irregular; variously distributed; some larger vesicles have Mn-oxide(?) staining.

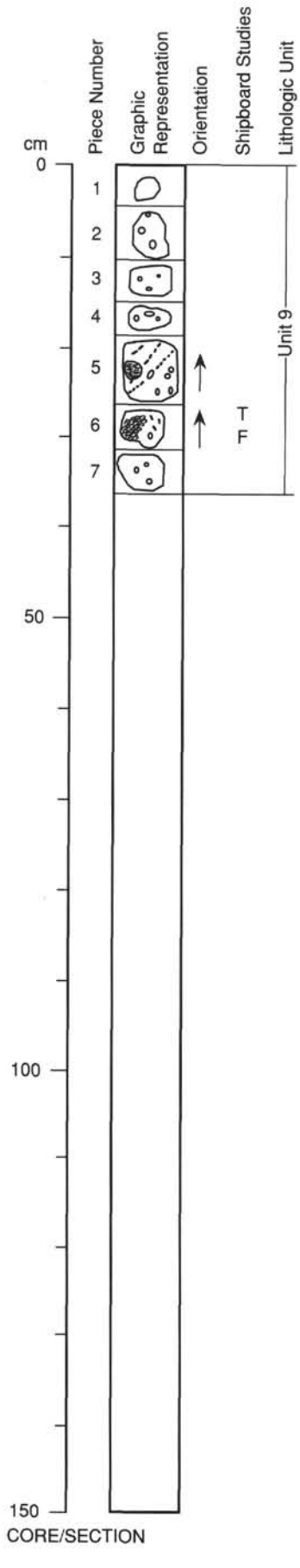
Microvesicles are relatively uniformly distributed. Slightly larger (ie. approximately 1 mm) wispy strings of vesicles occur in many pieces. Finally, the largest vesicles (2–20 mm across) are randomly distributed and either lined or filled with darker frothy melt segregations.

COLOR: 2.5Y 3/0, very dark gray.

STRUCTURE: Thin flows or pillows(?).

ALTERATION: Fresh.

VEINS/FRACTURES: The back of Piece 10 contains a planar, steeply dipping surface which appears to represent a fracture surface.



135-839B-36R-1

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–7

CONTACTS: None.

PHENOCRYSTS:

Plagioclase: 7%–12%; up to 3.5 mm; as single euhedral crystals or small glomerocrysts.

Pyroxene: Trace; up to 4.5 mm; rare euhedral tabular phenocrysts; thin section shows both orthopyroxene and clinopyroxene.

GROUNDMASS: Microlitic to microcrystalline.

VESICLES: 20%–25%; <0.1 and >1mm; round to irregular; variously distributed; microvesicles are uniformly distributed throughout the core. Slightly larger (ie. 1 mm) vesicles form thin, wispy trains through Piece 1, Pieces 4–6. The largest vesicles (3–7 mm across) are randomly distributed and are generally free from infilling. In most pieces, dark frothy melt segregation vesicles are observed. In Piece 6, a patch 2.5 cm across appears to be a large vesicle which was subsequently infilled with the same porphyritic melt as the host rock. A thin vesicle halo defines the patch.

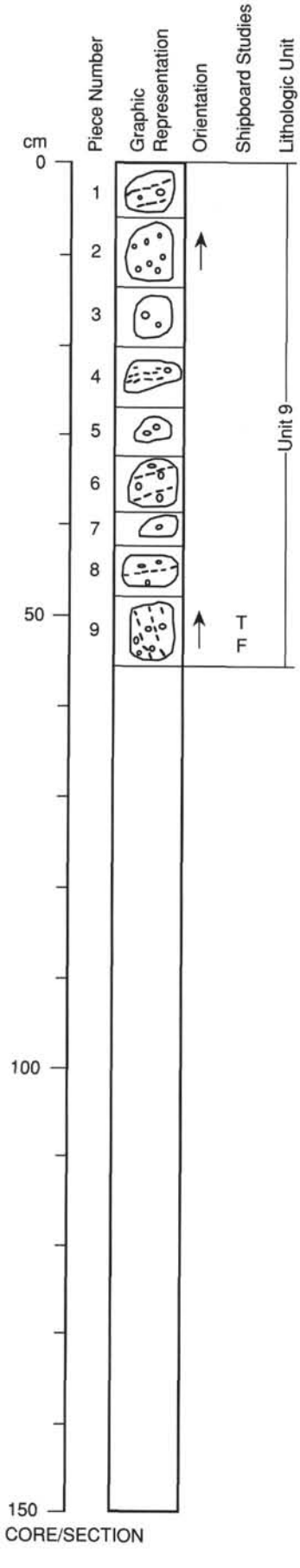
Miaroles: Some larger vesicles are thinly lined with yellow-orange-brown oxides.

COLOR: 2.5Y3/0, very dark gray.

STRUCTURE: Massive(?).

ALTERATION: Fresh.

VEINS/FRACTURES: One end of Piece 7 is coated with yellowish clays-zeolites(?) and would appear to represent an old fracture surface.



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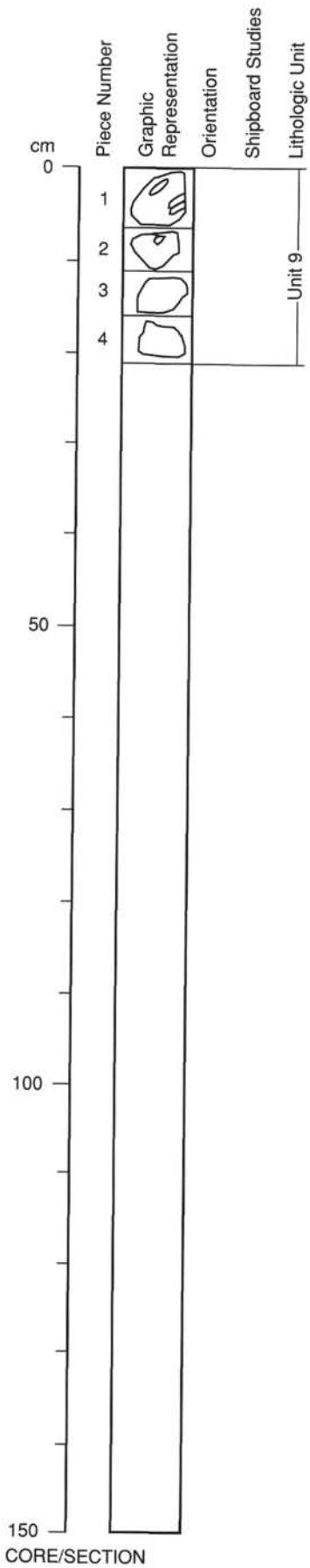
UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–9

CONTACTS: None.
PHENOCRYSTS: Same phenocryst assemblage may occur in frothy vesicle fillings. Plagioclase: 8%–10%; 1–2 mm; subhedral single crystals and glomerocrysts. Pyroxene: 1%–2%; 0.5–1 mm; dark green, subhedral to euhedral, locally in glomerocrysts with plagioclase; some are pale green; thin section shows both orthopyroxene and clinopyroxene.
GROUNDMASS: Aphanitic, microlites sometimes visible on walls of vesicles.
VESICLES: 15%–20%; <0.5 and 1–4 mm; spherical; distributed throughout; there appears to be three generations of vesicles: (1) large spherical vesicles, (2) microscale groundmass vesicles and (3) small vesicles along shear zones that offset large vesicles; these may be contemporaneous with frothy vesicle fillings.
COLOR: 2.5Y 4/0, dark gray.
STRUCTURE: Massive.
ALTERATION: Fresh; blue or yellow coatings and zeolites occur on some vesicle walls.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Good samples for a study of the vesicle development and multiple stages of vesicle filling.

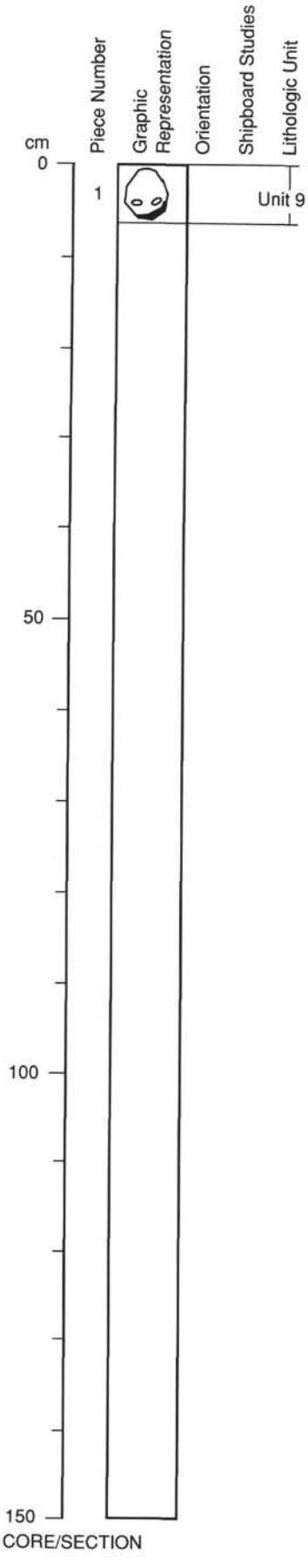


135-839B-38R-1

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–4

CONTACTS: None.
PHENOCRYSTS:
Plagioclase: 7%–10%; 0.8–2 mm; subhedral single crystals and glomerocrysts.
Pyroxene: 1%–2%; 0.2–0.5 mm; rarely in glomerocrysts with plagioclase.
GROUNDMASS: Cryptocrystalline, relatively compact (few vesicles).
VESICLES: 8%–15%; 0.5–1 mm; spherical; variously distributed; vesicles most common in Pieces 1 and 2; some thin vesicle bands in Pieces 3 and 4; pipe vesicles 5 mmx15 mm or more; frothy glass fill in pipe vesicles and small spherical vesicles.
Miaroles: Minor yellowish and gray-white vesicle linings in Piece 1.
COLOR: 2.5YR 5/0 gray.
STRUCTURE: Thin flows(?).
ALTERATION: Pieces 1 and 2 fresh; Pieces 3 and 4 slightly altered (pervasive oxidation); yellow-brown clay in pipe vesicles in Piece 1.
VEINS/FRACTURES: None.



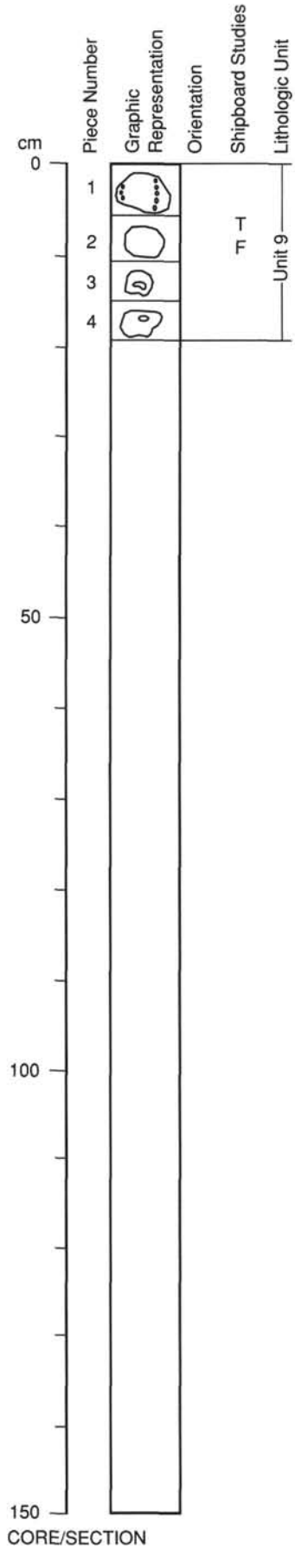
135-839B-39R-1

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Piece 1

CONTACTS: None.
PHENOCRYSTS:
Plagioclase: 7%–10%; 0.7–3.5 mm; euhedral to subhedral isolated crystals and glomerocrysts.
Pyroxene: 1%–2%; up to 2 mm; subhedral intergrown with plagioclase glomerocrysts.
GROUNDMASS: *Very fine-grained to glassy; plagioclase microlites visible.*
VESICLES: 30%–35%; 0.2–7.5 mm; rounded to irregular; disseminated throughout sample; Largest vesicles erratically distributed
Miaroles: Local very thin Mn-oxide(?) linings.
COLOR: 10YR 2/1, black.
STRUCTURE: Massive.
ALTERATION: None.
VEINS/FRACTURES: None.

Glassy margin



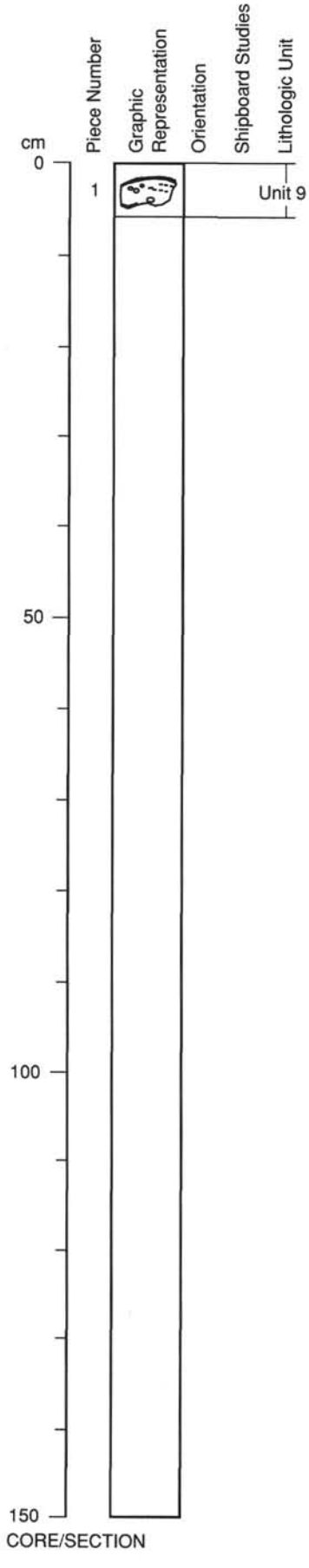
135-839B-41R-1

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Pieces 1–4

CONTACTS: None visible.
PHENOCRYSTS:
Plagioclase: 5%–7%; up to 2.5 mm; euhedral to subhedral.
Pyroxene: 2%–3%; up to 3 mm; euhedral; both light and dark green; thin section shows both orthopyroxene and clinopyroxene.
GROUNDMASS: Fine-grained, holocrystalline.
VESICLES: 2%–20%; up to 3.5 mm; rounded; disseminated throughout the sample; refilled segregation vesicles of up to 1.1 cm; two vesicle tails in Piece 1.
Miaroles: None.
COLOR: 2.5Y 4/0, dark gray.
STRUCTURE: Massive.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Vesicles have thin coating of globular zeolites; large olivine and clinopyroxene phenocrysts are in Piece 2.

o Large vesicles



135-839B-42R-1

UNIT 9: MODERATELY TO HIGHLY PHYRIC PYROXENE PLAGIOCLASE BASALTIC ANDESITE

Piece 1

CONTACTS: Glassy margin on Piece 1.
PHENOCRYSTS:
Plagioclase: 8%–10%; 0.5–2.2 mm; single euhedral crystals and plagioclase glomerocrysts common.
Pyroxene: 1%–2%; 0.8 mm; glomerocrysts with plagioclase and single crystals in the groundmass.
GROUNDMASS: Glassy to microlitic.
VESICLES: 3%–5%; 0.4 to 4 mm; rounded to irregular; variously distributed; largest vesicles near glass, become smaller inwards; a few chains of small vesicles occur parallel to the glassy margin.
Miaroles: Minor gray-white and yellowish vesicle linings.
COLOR: 2.5YR 4/0, gray.
STRUCTURE: None.
ALTERATION: Slight: vesicle linings and yellow-brown surface coating on one side.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Last piece recovered of Unit 9; may be a small amount of sulfide on one outside corner.

135-839A-10H-03 (116-135 cm) OBSERVER: EWE WHERE SAMPLED: Sedimentary Unit IIE

ROCK NAME: Rhyolitic pumice

GRAIN SIZE: Fine grained

TEXTURE: Pumiceous, porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	5-7	5-7	0.35-1.5	An60	Euhedral	isolated and in small glomerocrysts; oscillatory zoning towards more sodic compositions in outer parts of crystals
Hypersthene	2-3	2-3	0.5-1.0		Euhedral	prismatic crystals; isolated and in aggregates with clinopyroxene
Augite	1-2	1-2	0.2-0.5		Euhedral to subhedral	Isolated crystals and as intergrowths with plagioclase and orthopyroxene
Magnetite	<1	<1	0.07-0.3		Equant to skeletal	
GROUNDMASS						
Glass	10	10	n/a		pumiceous	fresh glass

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	80-85	disseminated	0.005-6	empty	

135-839A-24X-01 (Piece 1,0-4 cm) OBSERVER: KRI WHERE SAMPLED: Unit 1

ROCK NAME: Sparsely phryic olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Porphyritic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	2-3	3-5	.3-.7		subhedral	seriate texture makes phenocryst distinction difficult; most are fresh, but some show extensive breakdown; rare Cr-spinel inclusions
Cr-spinel	tr	tr	1.1		anhedral	large cluster of several grains, edges show resorption
Clinopyroxene	tr	tr	to 0.5	subhedral	subhedral	seriate to groundmass, sector zoning common
GROUNDMASS						
Plagioclase	25-30	25-30	<1mm		euhedral	randomly oriented laths form a network with interstitial clinopyroxene
Clinopyroxene	15-20	15-20	<0.5		euhedral to subhedral	some sector zoned; some have distinct narrow rims
Olivine	2-3	3-5	<0.3		subhedral to anhedral	most are fresh; some show extensive breakdown to iddingsite and clays
Magnetite	tr	tr	<0.05		skeletal to equant	minor component of groundmass
Orthopyroxene	2-3	2-3	0.2-0.4		euhedral to subhedral	prismatic crystals sometimes intergrown with plagioclase and clinopyroxene

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
green-brown clays	0-5	replacing mesostasis	
iddingsite	tr		forms along fractures in some olivines; as do some green-brown clays.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	25-30	throughout	<2 mm	empty	rounded to subrounded	difficult to estimate content due to plucking and refilling of some vesicles with grinding grit

COMMENTS: Most of this slide didn't make it through the thin section making process and much plucking has occurred; vesicle content may be overestimated. Rock is slightly altered. Mesostasis was originally 15-20% percent of rock and is now 10-15 due to replacement by fine grained clays.

135-839B-12R-02 (Piece 6, 29-32 cm) OBSERVER: KRI WHERE SAMPLED: Unit 1

ROCK NAME: Moderately phyric clinopyroxene olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Vesicular, seriate porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	1-2	2-3	0.2-1		subhedral to anhedral	many have numerous euhedral Cr-spinel inclusions, up to 0.02 mm; some show evidence of incipient breakdown
Clinopyroxene	1-2	1-2	0.4-0.7		subhedral	often twinned; some with undulatory extinction; occur as isolated crystals and in small clusters
Plagioclase	tr	tr	<0.6		subhedral	Rare large grains show resorbtion and strong zoning
GROUNDMASS						
Clinopyroxene	15-20	15-20	<0.4		anhedral to subhedral	mostly equant grains in between plagioclase microlites
Plagioclase	15-20	15-20	<0.6		euhedral to subhedral	randomly oriented elongate microlites
Opaques	1-2	1-2	<0.02		euhedral	looks like Cr-spinel with reddish color, but the amount of clinopyroxene in the slide suggests that some may be magnetite
Olivine	2-3	2-3	<0.2		anhedral	many are small phenocrysts
Orthopyroxene	tr	tr	<0.1		euhedral	rare prismatic crystals

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Orange-brown clays?	15-20	replacing mesostasis	locally replacement is complete
iddingsite	tr	replacement	along fractures in olivine

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-25	throughout	<1.5	none	irregular	microvesicles impart high porosity to the rock

COMMENTS: Mesostasis was originally 25-30 percent of the rock, but all except for 5-10 percent has been replaced by fine grained orange-brown clays. A one mm vein of dark, highly quenched, vesicular material cuts the sample. Similar material lines and fills some vesicles. Seriate texture makes distinction between groundmass and phenocrysts somewhat arbitrary. Rock is moderately altered. Grain size in groundmass is finer than in most other Unit 1 samples. 1143 point count: plagioclase groundmass 19.8%; clinopyroxene groundmass 16.5%; olivine groundmass 2.3%; olivine phenocrysts 0.7%; clinopyroxene phenocrysts 1.0%; mesostasis 35.9%; vesicles open 23.5%; vesicles filled 0.4%; vesicles total 23.9%

135-839B-13R-02 (Piece 12,77-78 cm) OBSERVER: KRI WHERE SAMPLED: Unit 1

ROCK NAME: Sparsely phyric olivine clinopyroxene basalt

GRAIN SIZE: Fine grained

TEXTURE: Holocrystalline, seriate, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	<1	<1	0.4-0.8		subhedral	Cr-spinel inclusions in many; some grains have minor iddingsite in fractures and along rims; mostly as isolated crystals and in small clusters
Clinopyroxene	1-2	1-2	0.3-1		euhedral to subhedral	slight zoning and undulose extinction in some; many twinned; occur as isolated crystals and small glomerocryts
GROUNDMASS						
Plagioclase	30-35	30-35	<1		euhedral	mostly interlocking elongate laths; quench textures common
Olivine	3-5	3-5	<0.4		subhedral to anhedral	mostly isolated grains, interstitial to plagioclase
Opaques	1-2	1-2	<0.05		equant	mostly equant and cruciform magnetite; some of the largest grains may be Cr-spinel
Clinopyroxene	15	15	<0.3		subhedral	acicular and equant; intergrown with plagioclase microlites and orthopyroxene
Orthopyroxene	2-3	2-3	<0.6		euhedral	intergrown with plagioclase and clinopyroxene

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING		COMMENTS
?clays	15-20	replacement	crpytocrystalline mesostasis	green brown clays replace the interstitial

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	15-20	throughout	<1.5	empty to minor	very irregular

COMMENTS: Mesostasis originally comprised 30-35 percent of this rock; 10-15 percent remains. It is interstitial, microcrystalline and variously replaced by cryptocrystalline green brown clays. Seriate texture makes the distinction between groundmass and phenocrysts arbitrary. Texture tends to near diabasic depending on the degree of crystallinity of the groundmass which varies across the slide. Rock is moderately altered.

135-839B-13R-04 (Piece 1,2-6 cm) OBSERVER: JAN WHERE SAMPLED: Unit 1

ROCK NAME: Sparsely phyric olivine clinopyroxene basalt

GRAIN SIZE: Fine grained

TEXTURE: Seriate porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Clinopyroxene	<1	<1	0.15-0.8 mm		subhedral to anhedral	mostly as single crystals
Olivine	1-2	1-2	0.2-0.5		subhedral to anhedral	occur as individual grains
Plagioclase	tr	tr	0.5 mm		anhedral	single tabular crystals
GROUNDMASS						
Plagioclase	20-25	20-25	<0.4 mm		euhedral laths	
Clinopyroxene	15-20	15-20	<0.1 mm		euhedral to subhedral	
Opaques	tr-1	tr-1	<0.1 mm		euhedral	square blocky crystals, sometimes irregular
Mesostasis	22-27	25-30	n/a		interstitial	brown glass and cryptocrystalline mesostasis with dusty opaques
Orthopyroxene	<1	<1	<0.1 mm		euhedral to subhedral	prismatic crystals; often intergrown with plagioclase and clinopyroxene

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	tr-3	replacement	alteration of mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-25	randomly distributed	0.08-2 mm	empty	round to irregular	sample is badly plucked and estimate is a maximum

COMMENTS: There is minor olivine (<3%) in the groundmass. This rock is slightly altered. 1123 point count: plagioclase groundmass 24.7%; clinopyroxene groundmass 19.3%; olivine groundmass 2.9%; opaques 0.9%; orthopyroxene groundmass 0.2%; olivine phenocrysts 0.8%; clinopyroxene phenocrysts 0.4%; mesostasis 27.8%; vesicles open 23.0%.

135-839B-14R-01 (Piece 23,132-135 cm) OBSERVER: EWE WHERE SAMPLED: Unit 1

ROCK NAME: Sparsely phyric olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Holocrystalline, seriate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	<1	1	0.8-0.9		euhedral	as isolated crystals and glomerocrysts; some partially enclosed by orthopyroxene
GROUNDMASS						
Plagioclase	30-35	30-35	up to 1.0	An 55-65	euhedral to subhedral elongated tabular crystals	interlocking crystals, normal zoning with distinct sodic rims
Olivine	3-5	3-5	0.08-0.8		subhedral to anhedral	separate grains, some interstitial to plagioclase, some included in orthopyroxene
Clinopyroxene	15	15	0.05-0.9		subhedral to anhedral	intergrown with plagioclase, often interstital, lamellar twinning, curved extinction
Orthopyroxene	3-5	3-5	0.2-0.8		subhedral prismatic crystals	intergrown with plagioclase and clinopyroxene; some crystals include olivine
Magnetite	2	2	0.02-0.25		euhedral to anhedral	octahedral to skeletal; mostly interstitial but also partially included in clinopyroxene and plagioclase

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Yellow-brown clays?	<1	replacement	very localized replacement of mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Cavities	15-20	disseminated	0.05-3 mm	none	irregular

COMMENTS: Mesostasis is 20% and is still quite fresh. It is interstitial, microcrystalline with radiating structures and is somewhat oxidized. The seriate texture makes the distinction between phenocrysts and groundmass very arbitrary. Texture near diabasic. Evidence for Fe-enrichment in the smallest interstitial clinopyroxenes (color change). Rock is fresh to slightly altered. 1005 point count: plagioclase groundmass: 39.4%; clinopyroxene groundmass: 15.8%; olivine groundmass: 1.4%; opaques 1.4%; orthopyroxene groundmass 3.0%; olivine phenocrysts 0.3%; mesostasis 21.9%; vesicles open: 16.8%; vesicles filled <0.1%.

135-839B-15R-01 (Piece 6,34-37 cm) OBSERVER: JAN WHERE SAMPLED: Unit 1

ROCK NAME: Sparsely phyric olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Porphyritic, microcrystalline

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	tr-1	tr-1	up to 1		subhedral	significantly resorbed; iddingsite developed along fractures; usually occur as isolated grains
Clinopyroxene	tr	tr	0.4-0.5		subhedral	gradational into groundmass
GROUNDMASS						
Plagioclase	30-35	30-35	0.06-0.5		anhedral to subhedral	laths
Clinopyroxene	20-25	20-25	0.06-0.4		subhedral to anhedral	as single grains and in clusters
Orthopyroxene	3-5	3-5	0.1-0.4		euhedral to subhedral	as single crystals
Opaques	1-2	1-2	up to 0.3		anhedral	Cr spinels occur included in olivines and possibly in the groundmass, but most of the groundmass opaques are magnetite
Olivine	2-3	2-3	<0.3		subhedral to anhedral	isolated crystals in groundmass; some resorption

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Yellow-orange clay?	12-14	replacement	alteration of the mesostasis to clays

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	10-15	throughout	0.1-2	none	round to irregular

COMMENTS: Mesostasis was originally 20% of the rock, now it is 6-8% due to replacement by fine grained clays. The rock is slightly altered. Seriate texture makes the distinction between phenocrysts and groundmass somewhat arbitrary. 1081 point count: plagioclase groundmass 32.6%; clinopyroxene groundmass 21.0%: olivine groundmass 2.7%; opaques 1.9%; orthopyroxene groundmass 2.0%; olivine phenocyrsts 0.8%; clinopyroxene phenocrysts <0.1%; mesostasis 25.4%; vesicles open 13.7%

135-839B-15R-04 (Piece 17,95-98 cm) OBSERVER: EWE WHERE SAMPLED: Unit 1

ROCK NAME: Sparsely phyric olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Holocrystalline, seriate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	1-2	1-2	1.0-2		subhedral	mostly isolated crystals, less common glomerocrysts; often skeletal due to partial resorption; Cr spinel inclusions in some grains
GROUNDMASS						
Plagioclase	20-25	20-25	up to 0.8		euhedral to subehedral elongate tabular crystals	interlocking, sometimes with radiative growths
Clinopyroxene	20	20	0.1-0.9		subhedral to anhedral	interlocking, partly intergrown with plagioclase and clinopyroxene, some interstitial
Orthopyroxene	5	5	0.2-1.0		subhedral,prismatic crystals	partially intergrown with plagioclase and clinopyroxene, some partially enclose olivine
Olivine	3-5	3-5	0.1-1.0		subhedral to anhedral	some crystals partially enclosed by orthopyroxene or clinopyroxene; also interstitial
Magnetite	2-3	2-3	0.04-0.26		euhedral to anhedral	octahedral to skeletal; mostly interstitial in mesostasis; some of the largest may be Cr-spinel

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Iddingsite	<1	replacement	minor alteration along cracks fo a few crystals
Yellow-brown clay?	5	replacement	localized replacement of mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	10-15	disseminated	0.05	none	subrounded to irregular and coalescive

COMMENTS: The mesostasis was originally 25-30%, now 20-25%. It is interstitial and microcrystalline, sometimes with radiating structures with very fine and delicate opaque globular grains. Quenched plagioclase microlites with swallowtail textures are present. The seriate texture makes distinction of phenocrysts from groundmass minerals arbitrary. Texture is near diabasic. Rock is slightly to moderately altered.1051 point count: plagioclase groundmass 28.7%; clinopyroxene groundmass 26.2%; olivine groundmass 4.8%; opaques 1.1% (Cr-spinel =0.1%); orthopyroxene groundmass 3.3%; olivine phenocrysts 0.6%; mesostasis 23.5%; vesicles open 11.7%; vesicles filled <0.1%

135-839B-16R-01 (Piece 19,106-108 cm) OBSERVER: KRI WHERE SAMPLED: Unit 1

ROCK NAME: Moderately phyric clinopyroxene-olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Vesicular, porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	1-2	2-4	0.4-1		subhedral to anhedral	somewhat broken down along fractures; replaced by iddingsite; Cr-spinel inclusions in many
Clinopyroxene	1-2	1-2	0.2-1		euhedral to subhedral	many are twinned and or sector zoned
Cr-spinel	tr	tr	1 mm		subhedral	3 dark brown grains with somewhat resorbed edges
GROUNDMASS						
Plagioclase	25-30	25-30	<1		euhedral	elongate microlites; some are strongly zoned
Clinopyroxene	15-20	15-20	<0.2		subhedral	elongate and equant grains
Magnetite	1-2	1-2	<0.1		equant	isolated equant grain ; some of the largest grains may be Cr-spinel
Olivine	1-2	3-4	<0.4		euhedral	some are highly altered; most are probably small phenocrysts
Orthopyroxene	1-2	1-2	<0.1		euhhedral	prismatic grains; often intergrown with each other or plagioclase

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Iddingsite			forms along fractures in olivines
?mixed clays	5	both	replaces mesostasis and fills vesicles with fine grained greenish-brown clays; locally reddish-orange patches as well

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-25	throughout	<2.5	partial	irregular	section has been badly plucked and vesicles may be overestimated

COMMENTS: Poor polish makes opaque identification difficult. Cr-spinels appear to be limited to large phenocrysts and inclusions in olivines, but some of the groundmass opaques may also be Cr-spinel. Most are magnetite. Rock is moderately altered but plagioclase and clinopyroxene grains are still fresh. Most alteration is in mesostasis and olivine grains. The rock was originally 20-25 percent mesostasis and is now 15-20 percent mesostasis due to replacement by fine grained clays. >1000 point count: plagioclase groundmass 31.2%; clinopyroxene groundmass 19.7%; olivine groundmass 2.4%; opaques 1.7% (Cr spinel = 0.5%); olivine phenocrysts 0.8%; clinopyroxene phenocrysts 0.9%; mesostasis 21.5%; vesicles open 21.1%; vesicles filled 0.2%; vesicles total 21.3%

135-839B-16R-02 (Piece 3,10-12 cm) OBSERVER: EWE WHERE SAMPLED: Unit 1

ROCK NAME: Moderately phyric clinopyroxene-olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Porphyritic, tending to seriate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	1-3	1-3	0.5-2		subhedral	separate crystals and glomerocrysts of olivine; largest crystals are skeletal
Clinopyroxene	1-2	1-3	0.3-0.6		euhedral	mostly glomerocrysts of clinopyroxene
GROUNDMASS						
Plagioclase	25-30	25-30	to 0.25	An 65	euhedral to subhedral	elongated, tabular crystals to microlites; larger crystals show some zoning
Clinopyroxene	20	20	0.03-0.3		subhedral to anhedral	partly intergrown with plagioclase; interstitial and granular to locally ophitic; some zoning visible
Olivine	5	5	0.08-0.5		subhedral to anhedral	some, but not all, grains enclosed by clinopyroxene; also interstitial to plagioclase
Orthopyroxene	1	1	0.2-0.4		subhedral, prismatic	some crystals discrete, some partially enclosing plagioclase
Magnetite	2-3	2-3	0.01-0.15		euhedral to anhedral	predominantly in mesostasis; some of the larger grains may be Cr-spinel

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Zeolite	1	filling	localized partial globular linings to vesicles forming acicular and microcrystalline growths
Yellow-brown clay?	5	replacement	localized replacement of mesostasis; minor replacement of olivine along fractures

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	15-20	disseminated	0.5-4	localized	irregular

COMMENTS: Mesostasis was originally 20%, 15% remains. This rock is finer grained and more clearly porphyritic (although still seriate) than specimens examined higher in the unit. The rock is slightly to moderately altered. >1000 point count: plagioclase groundmass 33.9%; clinopyroxene groundmass 21.8%; olivine groundmass 1.8%; opaques 1.6%; orthopyroxene 0.4%; olivine phenocrysts 1.4%; clinopyroxene phenocrysts 1.5%; mesostasis 20.3%; vesicles open 17.3%

135-839B-18R-01 (Piece 14,54-58 cm) OBSERVER: KRI WHERE SAMPLED: Unit 2

ROCK NAME: Moderately phyric orthopyroxne-clinopyroxene-plagioclase basaltic andesite

GRAIN SIZE: Fine grained

TEXTURE: Glomeroporphyritic, vesicular, seriate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	7-10	7-10	0.5-2		euhedral	tabular, zoned crystals; melt inclusions common; most in glomeroporphyritic clusters
Clinopyroxene	tr-1	tr-1	0.3-0.9		subhedral to anhedral	largely in glomerocrysts with plagioclase
Orthopyroxene	tr	tr	to 0.5?		subhedral to euhedral	
GROUNDMASS						
Plagioclase	10-15	10-15	<0.5		euhedral	randomly oriented microlites; quench textures common
Magnetite	1-2	1-2	<0.05		skeletal	cruciform morphology common
Mesostasis	40-50	40-50	n/a		interstitial	extremely fresh, glassy in places
Orthopyroxene	1-3	1-3	<0.5		subhedral	mostly elongate grains; equant ones may be fdifficult to distinguish from clinopyroxene
Clinopyroxene	10-15	10-15	<0.3		subhedral	elongate tabular and equant grains; feathery quench textures are only present in infilled vesicles

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15-20	throughout	<2	none	rounded	bimodal size distribution >1 mm and <0.5 mm

COMMENTS: Segregation vesicles are common. Some of these are extremely glassy. In those quenched areas clinopyroxene microlites are more common than in the rest of the groundmass. Magnetite grains commonly occur enclosed in groundmass orthopyroxene. Rock is fresh. 1055 point count: Clinopyroxene phenocrysts 0.1%; plagioclase phenocrysts 6.6%; orthopyroxene phenocrysts 0.3%; plagioclase groundmass 13.8%; clinopyroxene groundmass 13.7%; orthopyroxene groundmass 0.3%; opaques 2.9%; mesostasis 43.9%; vesicles open 17.8%; vesicles filled 0.5%; vesicles total 18.3%

135-839B-19R-01 (Piece 9,50-53 cm) OBSERVER: KRI WHERE SAMPLED: Unit 3

ROCK NAME: Moderately phyric clinopyroxene olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Seriate porphyritic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Clinopyroxene	1-3	1-3	0.3-1		euhedral to subhedral	occasionally intergrown; mostly isolated grains
Olivine	5-10	5-10	0.2-1		euhedral to subhedral	Cr-spinel inclusions to 0.01 mm common; very fresh grains, generally isolated
GROUNDMASS						
Clinopyroxene	5-10	5-10	<0.3		euhedral to subhedral	isolated equant and elongate grains; acicular crystallites often intergrown with quench plagioclase
Olivine	2-3	2-3	0.2		euhedral	isolated microphenocrysts
Mesostasis	30-40	30-40	n/a		interstitial	glassy to cryptocrystalline
Plagioclase	10-15	10-15	<0.3		euhedral	quench microlites intergrown with clinopyroxene crystallites
Opaques	tr-1	tr-1	<0.1		equant to skeletal	laths in groundmass are likely magnetite; some of the larger euhedral ones may be Cr-spinels

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
? mixed clays	2-5	replacement	localized replacement of mesostasis by fine grained clays

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-25	throughout to	4 mm	empty to partial	irregular to rounded	segregation vesicles common; bimodal size distribution, small vesicles (<0.2 mm) give rock a high porosity

COMMENTS: Seriate texture makes distinction between phenocrysts and groundmass arbitrary. 1158 point count gives: 7.1% olivine phenocrysts; 1.5% clinopyroxene phenocrysts; 15.9% groundmass plagioclase; 10.2% groundmass clinopyroxene; 3.0% groundmass olivine; 0.2% groundmass opaques; 0.2% Cr-spinel (included in olivine); 38.4% mesostasis; 23.2% open vesicles; 0.3% filled vesicles

135-839B-20R-01 (Piece 12,74-77 cm) OBSERVER: EWE WHERE SAMPLED: Unit 3

ROCK NAME: Moderately phyric clinopyroxene-olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	3-5	3-5	0.5-2.5		euhedral to subhedral	mostly isolated crystals; kink bands in largest grain
Cr-spinel	<1	<1	0.3-0.8		euhedral to subhedral	isolated crystals and glomerocrysts; also as <= 0.06 mm inclusionsin olivine and clinopyroxene phenocrysts
Clinopyroxene	3-5	3-5	0.5-1.8		euhedral to subhedral	mostly glomerocrysts
GROUNDMASS						
Olivine	5-8	5-8	0.08-0.5		euhedral to anhedral	discrete crystals to interstitial grains
Plagioclase	20	20	up to 0.4		euhedral to subhedral	long, tabular crystals to microlites
Clinopyroxene	15	15	0.05-0.5		subhedral to anhedral	microphenocrysts to anhedral interstitial grains
Magnetite	<1	<1	0.002-0.06		euhedral to subhedral	isolated grains in mesostasis
Mesostasis	30-35	30-35	n/a		interstitial	dark brown glass with local development of quenched acicular clinopyroxene plus or minus plagioclase intergrowths

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-25	disseminated	0.03-2.5	none	rounded to irregular	segregation vesicles present-see comments

COMMENTS: A gradation between phenocryst and microphenocryst sized crystals exists. A number of fine grained quenched basaltic segregation vesicles are present, up to 4 mm in diameter. Olivine phenocrysts 4.0%; clinopyroxene phen crysts 1.3%; plagioclase groundmass 18.7%; clinopyroxene groundmass 15.2%; olivine groundmass 6.5%; opaques 0.4% (Cr-spinel = 0.1%); mesostasis 33.1%; vesicles open 20.8%.

135-839B-23R-01 (Piece 5,24-26 cm) OBSERVER: KRI WHERE SAMPLED: Unit 3

ROCK NAME: Highly phyric clinopyroxene olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Vesicular, porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	10-15	10-15	0.5-3		euhedral to subhedral	mostly fresh, a few show minor alteration to iddingsite; Cr-spinels to 0.02 mm are common
Clinopyroxene	1-2	1-2	0.5-1.2		subhedral	rare, tabular and equant grains in small glomerocrysts; some sector zoning
GROUNDMASS						
Olivine	3-5	3-5	<0.5		subhedral	equant isolated grains
Clinopyroxene	10-15	10-15	<0.3		euhedral to sbuhedral	often intergrown elongate grains; also quench crystallites
Plagioclase	5-7	5-7	<0.7		euhedral	elongate, swallowtail terminations
Cr-spinel	tr	tr	0.4		subhedral	dark brown; much darker than those included in olivines somewhat resorbed
Mesostasis	60	60	n/a		interstitial	cryptocrystalline to glassy; includes some clinopyroxene crystallites

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-25	throughout	<1	none	irregular	several regions are more vesicular, more quenched and no phenocrysts; no sharp boundaries with host

COMMENTS: Section is badly plucked and modal estimates and vesicle estimates are difficult.

135-839B-25R-01 (Piece 7,35-38 cm) OBSERVER: KRI WHERE SAMPLED: Unit 3

ROCK NAME: Highly phryic clinopyroxene olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Seriate, porphyritic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	10-15	10-15	up to 5 mm		euhedral	extremely fresh; undulatory extinction in many grains; Cr-spinel inclusions common; rarely intergrown grains
Clinopyroxene	tr-1	tr-1	to 0.8 mm		subhedral	can be in groups with olivine
GROUNDMASS						
Cr-spinel	tr	tr	<0.2		euhedral to subhedral	dark red to opaque, fresh
Clinopyroxene	5-10	5-10	<0.5		euhedral to subhedral	equant and elongate groundmass components; some have curved outlines and wavelike extinction properties
Olivine	3-5	3-5	<0.2		euhedral to subhedral	arbitrary size cutoff between phenocrysts and groundmass but characteristics are similar between the two; some quench morphologies in the groundmass
Mesostasis	30-40	40-50	n/a		interstitial	dominantly fresh; some localized replacement by finegrained clays; rare glassy patches; clinopyroxene crystallites common components
Plagioclase	5-10	5-10	<0.6		euhedral	elongate microlites

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
?mixed clays	10-15	replacement	localized replacement of mesostasis by fine grained clays

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	10	throughout	<3	empty	irregular to rounded	segregation vesicles common, often with inward growing microlites

COMMENTS: Segregation vesicles common; either filling or lining vesicles with clinopyroxene and plagioclase microlites growing into the interiors. Seriate texture makes distinction between phenocrysts and groundmass arbitrary. 1070 point count gives: 14.1% olivine phenocrysts; 0.4% clinopyroxene phenocrysts; 8.7% groundmass plagioclase; 9.2% groundmass clinopyroxene; 4.5% groundmass olivine; 0.1% Cr-spinel; 52.0% mesostasis; 11.1% open vesicles.

135-839B-25R-01 (Piece 8,46-48 cm) OBSERVER: EWE WHERE SAMPLED: Unit 4

ROCK NAME: Aphyric to sparsely phyric olivine-clinopyroxene basalt

GRAIN SIZE: Fine grained

TEXTURE: Seriate, porphyritic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	<=1	<=1	0.5-0.7		euhedral	show some corrosion and cracking; fresh Cr-spinel inclusions
Clinopyroxene	<=1	<=1	0.7-0.8		euhedral	sieve textured cores; associated with olivine
GROUNDMASS						
Olivine	2-3	2-3	0.05-0.5		euhedral to subhedral	microphenocrysts; some skeletal; fresh
Clinopyroxene	15-20	15-20	0.02-0.7		euhedral to anhedral	microphenocrysts (>=0.15 mm) to anhedral interstitial groundmass; curved cleavages and shadowy extinction; isolated crystals, rarely intergrown with olivine
Plagioclase	10-15	10-15	up to 0.5	An65	euhedral to subhedral	microphenocrysts to microlites
Mesostasis	39-49	40-50	n/a		interstitial	dark brown glassy, with very fine Fe-oxide granules (about 0.005 mm) and localized incipient devitrification; small pyroxene crystals and crystallites in mesostasis

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Fe-oxides and clays?	1	filling and localized replacement	very localized alteration of mesostasis and infilling by yellow-brown isotropic to near isotropic mineraloids

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	15-20	disseminated	0.02-3.6	minor	subrounded to coalescive

COMMENTS: Large segregation veins, vesicles, and patches comprise about 25-30% of this section. The gradation between microphenocryst, phenocryst and groundmass is continuous. 1070 point count gives 0.1% olivine phenocrysts; 0.1% clinopyroxene phenocrysts; 13.8% groundmass plagioclase; 17.5% groundmass clinopyroxene (10.7% microphenocrysts 0.1-0.5 mm); 2.0% groundmass olivine (1.2% microphenocrysts); 50.6% mesostasis; 15.9% open vesicles.

135-839B-26R-01 (Piece 5,23-26 cm) OBSERVER: EWE WHERE SAMPLED: Unit 4

ROCK NAME: Aphyric to sparsely phyric olivine clinopyroxene basalt

GRAIN SIZE: Fine grained

TEXTURE: Porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Clinopyroxene	tr	tr	0.4-0.5		euhedral to subhedral	mainly in glomerocrysts; curved cleavages at extinction; some sector zoning; complete gradation to groundmass in size
Plagioclase	tr	tr	0.4		euhedral to subhedral	thick tabular isolated crystals
Olivine	<1	<1	0.4-0.5		subhedral	isoalted, often skeletal clusters
GROUNDMASS						
Plagioclase	5-10	5-10	<0.5	An 55	euhedral to subhedral	elongated tabular crystals to microlites
Clinopyroxene	15-20	15-20	0.03-0.3		euhedral to anhedral	microphenocrysts to anhedral interstitial grains; curved cleavages at extinction
Olivine	2-3	2-3	0.08-0.4		euhedral to anhedral	microphenocrysts to anhedral interstital grains
Magnetite	<1	<1	<0.01		anhedral	complex skeletal and rod-like granular aggregates in mesostasis
Mesostasis	55	55	n/a		interstitial	brown glass to microcrystalline quench acicular aggregates of clinopyroxene to cryptocrystalline

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Zeolites?	1	replacement	Yellow to yellow-brown fibrous coatings occur localized to a few vesicles and to rare patches in the mesostasis.
Fe-oxyhydroxides	tr	replacement	occur withthe zeolites in the alteration patches; may be producing the brownish colors

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15	disseminated	0.02 to 8	localized	rounded to coalescing	rare linings

COMMENTS: Gradation between phenocryst and microphenocryst sized crystals. Dark quenched basaltic segregation vesicles present. Rock is fresh. True phenocrysts (>0.5 mm) are rare but microphenocrysts (0.1-0.5 mm) account for most of the olivine and clinopyroxene. 1115 point count gives: 0.2% olivine phenocrysts; 6.4% groundmass plagioclase; 17.1% groundmass clinopyroxene (10.6% microphenocrysts); 2.7% groundmass olivine (1.3% microphenocrysts); ; 59.6% mesostasis; 14.0% open vesicles.

135-839B-27R-01 (Piece 3,15-17 cm) OBSERVER: KRI WHERE SAMPLED: Unit 5

ROCK NAME: Highly phyric clinopyroxene-orthopyroxene-plagioclase basaltic andesite

GRAIN SIZE: Fine grained

TEXTURE: Seriate glomeroporphyritic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	7-10	7-10	0.4-3		euhedral to subhedral	commonly in glomerocrysts; oscillatory zoning in most; sodic rims common
Orthopyroxene	1-2	1-2	0.2-1		euhedral to subhedral	occur singly and in small orthopyroxene clusters; occasionally in clusters with plagioclase
Clinopyroxene	<1	<1	0.5		subhedral to anhedral	rare occurences in glomerocrysts
GROUNDMASS						
Plagioclase	10-15	10-15	<0.8		euhedral	randomly oriented quench microlites; seriate with phenocrysts
Clinopyroxene	3-5	3-5	<0.5		euhedral to subhedral	mostly elongate groundmass grains; some equant microphenocrysts
Orthopyroxene	1-3	1-3	<0.5		euhedral to subhedral	isolated and in small star shaped clusters
Mesostasis	35-45	50-60	n/a		interstitial	moderate replacement by fine grained clays (some may be filled microvesicles); includes crystallites of pyroxene
Magnetite	tr-1	tr-1	<0.02		skeletal to equant	in microcrystalline mesostasis

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
?clays	15	replacement	localized replacement of mesostasis; patches of red orange clays

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	10-15	throughout	to 5 mm	empty	very irregular	some of the largest vesicles are clearly several smaller ones coalesced

COMMENTS: Poor polish makes opaque estimate difficult and also makes some plagioclase phenocrysts look somewhat altered. Segregation vesicles are common, up to 3 mm across. Most of the vesicles are rather large (>0.5 mm) and thus this rock is different from others in hole by its lack of microvesicles. Some altered mesostasis patches may in fact be filled microvesicles. Glomeroporphyritic clusters are up to 5 mm across. 1115 point count gives 0.2% clinopyroxene phenocrysts; 8.6% plagioclase phenocrysts; 0.2% orthopyroxene phenocrysts; 10.7% groundmass plagioclase; 3.8% groundmass clinopyroxene (includes all small pyroxene, hard to distinguish orthopyroxene from clinopyroxene); 0.7% groundmass orthopyroxene; 0.9% groundmass opaques; 60.0% mesostasis; 14.9% open vesicles.

135-839B-27R-01 (Piece 4,21-24 cm) OBSERVER: EWE WHERE SAMPLED: Unit 6

ROCK NAME: Highly phyric clinopyroxene-olivine basalt

GRAIN SIZE: Fine grained

TEXTURE: Porphyritic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	5-10	5-10	0.25-3.2		euhedral to subhedral	isolated crystals, often skeletal; Cr-spinel inclusions 0.005-0.01 mm in size
Cr-spinel	<1	<1	0.15-0.8		euhedral to subhedral	isolated crystals and glomerocrysts
Clinopyroxene	1-2	1-2	0.25-0.4		euhedral	isolated crystals
GROUNDMASS						
Olivine	3-5	3-5	0.05-0.25		euhedral to subhedral	microphenocrysts, isolated crystals and aggregates
Clinopyroxene	3-5	3-5	0.05-0.25		euhedral to subhedral	microphenocrysts, often in aggregates
Plagioclase	1-2	1-2	up to 0.2		euhedral to subhedral	scarce microlites in groundmass
Mesostasis	55-60	55-60	n/a		n/a	microcrystalline to cryptocrystalline; radiative acicular and feathery quench aggreages of clinopyroxene (?) and plagioclase, plus fine Fe-oxide grains; some yellow cryptocrystalline devitrified glassy patches

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	20-25	disseminated	0.03-7	none	rounded to coalescing

COMMENTS: Gradation between phenocryst and microphenocryst sized crystals. Rock is fresh. 1199 point count gives 5.6% olivine phenocrysts; 0.6% clinopyroxene phenocrysts; 0.4% groundmass plagioclase; 4.8% groundmass clinopyroxene; 3.3% groundmass olivine; 0.1% Cr-spinel; 61.1% mesostasis; 24.2% open vesicles.

135-839B-27R-01 (Piece 7,38-41 cm) OBSERVER: KRI WHERE SAMPLED: Unit 7

ROCK NAME: Highly phyric clinopyroxene orthopyroxene plagioclase basaltic andesite

GRAIN SIZE: Fine grained

TEXTURE: Glomeroporphyritic, vesicular, seriate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	5-10	5-10	0.4-1.5		euhedral to subhedral	isolated and in glomerocrysts to 4 mm across; oscillatory zoning with distinct sodic rims; melt inclusions common
Orthopyroxene	1-3	1-3	0.3-0.8		euhedral to subhedral	elongate prismatic crystals and in small dominantly pyroxene clusters
Clinopyroxene	tr-1	tr-1	0.5		subhedral to anhedral	isolated and in small dominantly pyroxene clusters
GROUNDMASS						
Plagioclase	7-10	7-10	<0.6		euhedral	randomly oriented quenched crystals; swallowtail terminations common
Clinopyroxene	3-5	3-5	<0.3		euhedral to subhedral	isolated equant crystals dominate; also some acicular crystals intergrown with plagioclase
Orthopyroxene	1-3	1-3	<0.5		euhedral	commonly in star shaped clusters
Mesostasis	45-50	60-65	n/a		interstitial	patchy breakdown to fine grained clays (some of the patches may be filled microvesicles); some glassy portions with crystallites
Magnetite	tr-1	tr-1	<0.02		skeletal	laths and crosses in cryptocrystalline groundmass

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
?clays	15-20	replacement	small localized patches of fine grained green brown clays replacing mesostasis; these may be filled microvesicles, but their irregular shape and the absence of filling in the larger vesicles suggests they are altered mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	10-15	throughout	0.4-2	empty	round to subrounded	some of the largest are extremely round; segregation vesicles common

COMMENTS: Abundant opaques in vesicles which are presumably grinding grit. Seriate texture makes the distinction between phenocrysts and groundmass rather arbitrary. Rock is moderately altered 1082 point count gives <0.1% clinopyroxene phenocrysts; 7.1% plagioclase phenocrysts; 0.5% orthopyroxene phenocrysts; 9.2% groundmass plagioclase; 3.9% groundmass clinopyroxene (includes all small pyroxene, as it is hard to distinguish ortho- from clino-); 0.5% groundmass orthopyroxene; 0.5% opaques; 66.1% mesostasis; 12.2% open vesicles.

135-839B-28R-01 (Piece 2, 8-10 cm) OBSERVER: KRI WHERE SAMPLED: Unit 9

ROCK NAME: Highly phyric clinopyroxene-orthopyroxene-plagioclase basaltic andesite

GRAIN SIZE: Fine grained

TEXTURE: Vesicular, glomeroporphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	10	10	0.4-1.5		euhedral to subhedral	tend to occur in glomerocrysts to 5 mm across; occasional melt inclusions
Clinopyroxene	tr-1	tr-1	0.5-1.5		euhedral to subhedral	commonly twinned
Orthopyroxene	tr-1	tr-1	0.3-1.2		subhedral	occurs singly and in small star-shaped clusters; one with a core of clinopyroxene
GROUNDMASS						
Plagioclase	10-15	10-15	<0.4		euhedral	elongate, randomly oriented microlites
Clinopyroxene	3-5	3-5	<0.3		subhedral	equant; elongate, often intergrown with plagioclase microlites
Orthopyroxene	3-5	3-5	<0.3		euhedral to subhedral	elongate, tabular grains often in star shaped clusters; faintly pleochroic
Magnetite	tr-1	tr-1	<0.01		skeletal	small skeletal grains occur in cryptocrystalline groundmass
Mesostasis	58	60	n/a		interstitial	glassy to microcrystalline; includes some pyroxene and plagioclase microlites; locally replaced by clays

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Yellow-brown clays	1-2	replaces mesostasis	rare and localized replacement of mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15	throughout	<3	none	subrounded	largest are result of smaller ones coalescing; bimodal size distribution

COMMENTS: The larger vesicles are commonly filled or lined with very dark, highly vesicular quenched material. The vesicles in these patches are often lined by glassy selvages. There is very little observable mineralogy in these highly quenched regions. The rock is fresh. Two point counts (2167 points total) give: 0.4% clinopyroxene phenocrysts; 9.4% plagioclase phenocrysts; 0.3% orthopyroxene phenocrysts; 10.3% groundmass plagioclase; 3.4% groundmass clinopyroxene (includes all small pyroxene, as it is hard to distinguish clino- and ortho-); 0.8% groundmass orthopyroxene; 1.6% groundmass opaques; 58.3% mesostasis; 14.8% open vesicles.

135-839B-30R-01 (Piece 13,74-76 cm) OBSERVER: KRI WHERE SAMPLED: Unit 9

ROCK NAME: Highly phyric clinopyroxene-orthopyroxene-plagioclase basaltic andesite

GRAIN SIZE: Fine grained

TEXTURE: Glomeroporphyritic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	7-10	7-10	0.5-1.5		euhedral to subhedral	occurs as isolated grain and in glomeroporphyritic clusters to 4 mm across; most grains show oscillatory zoning with distinct sodic rims; melt inclusions are common towards the cores.
Orthopyroxene	1-2	1-2	0.5-0.8		euhedral to subhedral	faint green-brown pleochroism; several small glomerocrysts, often star shaped clusters of dominantly orthopyroxene
Clinopyroxene	tr-1	tr-1	to 0.5		euhedral to subhedral	singly and in glomerocrysts with plagioclase
GROUNDMASS						
Plagioclase	10-15	10-15	<0.5		euhedral	randomly oriented microlites; swallowtail terminations are common
Orthopyroxene	3-5	3-5	<0.3		euhedral to subhedral	tend to occur in small clusters
Clinopyroxene	5-10	5-10	<0.3		euhedral to subhedral	mostly equant grains
Mesostasis	40-50	40-50	n/a		interstitial	extremely fresh; dominantly glassy
Magnetite	1	1	<0.05		equant to skeletal	occurs throughout groundmass; cruciform morphologies common

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Orange-brown clays	tr	replacement	extremely rare and localized replacement of mesostasis by amorphous yellow-brown clays

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	10-15	throughout	<1.5	empty	subrounded	Thin glassy selvages line some vesicles

COMMENTS: Sample is extremely fresh; mesostasis is glassy and mineral phases are fresh. Orthopyroxene/clinopyroxene distinction can be somewhat difficult in the groundmass and was largely based on straight versus inclined extinction. 1103 point count: clinopyroxene phenocrysts 0.1%; plagioclase phenocrysts 11.7%; orthopyroxene phenocrysts 0.7%; plagioclase groundmass 14.4%; clinopyroxene groundmass (may include some opx) 9.8%; orthopyroxene groundmass 2.1%; opaques 2.8%; mesostasis 43.8%; vesicles open 15.0%

135-839B-34R-01 (Piece 3,15-18 cm) OBSERVER: JAN WHERE SAMPLED: Unit 9

ROCK NAME: Highly phyric orthopyroxene-clinopyroxene-plagioclase basaltic andesite

GRAIN SIZE: Fine grained

TEXTURE: Porphyritic, microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	10-15	10-15	0.2-2.5 mm		euhedral to subhedral	oscillatory zoning common; generally as glomerocrysts, glass inclusions are common
Clinopyroxene	tr-1	tr-1	0.4-1.5 mm		euhedral to subhedral	occur in glomerocrysts with plagioclase
Orthopyroxene	tr-1	tr-1	0.15-0.5 mm		euhedral	as single crystals and as small star shaped glomerocrysts
GROUNDMASS						
Plagioclase	20-25	20-25	<0.15		euhedral	elongate laths; preferentially oriented around glomerocrysts or vesicles
Clinopyroxene	10-15	10-15	<0.15		subhedral to anhedral	
Orthopyroxene	1-3	1-3	<0.1		subhedral	cross-cutting elongate crystals forming star shaped clusters
Opaques	1-2	1-2	0.002-0.06		euhedral to anhedral	mainly as small grains dusting within the mesostasis; some larger crystals do occur
Mesostasis	40-45	40-45	n/a		interstitial	brown glass and cryptocrystalline mesostasis; includes pyroxene crystallites

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	5-10	randomly distributed	0.2-2 mm	none	round to irregular	most vesicles are randomly distributed, but some form a 'vein' described below. Large vesicles are partially filled with quenched magma as described previously. Plagioclase laths line up to define the original cavity wall
Vein	tr	vesicle train	0.5 mm	quenched vesicular margin	wispy	diffuse, ill defined, grading rapidly into the host groundmass

COMMENTS: This rock is extremely fresh. A 1013 point count gives 1.0% clinopyroxene phenocrysts; 11.9% plagioclase phenocrysts; 0.3% orthopyroxene phenocrysts; 20.6% groundmass plagioclase; 10.5% groundmass clinopyroxene (includes all small pyroxene as it is difficult to distinguish clino- from ortho-); 1.5% groundmass orthopyroxene; 1.2% groundmass opaques; 45.0% mesostasis; 7.4% open vesicles; 0.6% filled vesicles.

135-839B-36R-01 (Piece 6,25-28 cm) OBSERVER: KRI WHERE SAMPLED: Unit 9

ROCK NAME: Moderately phyric orthopyroxene-clinopyroxene-plagioclase basaltic andesite

GRAIN SIZE: Fine grained

TEXTURE: Glomeroporphyritic, vesicular, seriate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	7-10	7-10	0.4-2		euhedral to subhedral	oscillatory zonings with sodic rims; tend to glomeroporphyritic clusters; melt inclusions in cores
Orthopyroxene	tr	tr	< 0.5		euhedral	a few, isolated, elongate crystals
Clinopyroxene	1-2	1-2	0.4-1.2		subhedral to anhedral	tend to dominantly clinopyroxene clusters
GROUNDMASS						
Plagioclase	10-15	10-15	<0.4		euhedral	randomly oriented elongate laths, quench textures common
Orthopyroxene	1-3	1-3	<0.3		euhedral	elongate isolated grains
Clinopyroxene	5-10	5-10	<0.3		euhedral to subhedral	occur both as elongate grains and equant grains
Mesostasis	55-60	55-60	n/a		interstitial	cryptocrystalline to glassy
Magnetite	tr-1	tr-1	<0.02		equant to skeletal	occur in cryptocrystalline mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	10-15	throughout	<4	none	irregular to rounded	microvesicles (<0.3 mm) are more abundant than the large ones

COMMENTS: Sample is fresh. Several vesicles are either filled or lined with dark, highly vesicular quenched material. One 1.5 cm portion of this section is a filled vesicle. The section was taken because in hand sample this fillings was very similar in appearance to the host. In thin section this material is very highly vesicular (>60%), is dark due to the abundance of magnetite, the quench crystallites are dominantly clinopyroxene. A few plagioclase phenocrysts are present in this region but they are rare and somewhat resorbed. The mesostasis in this region is very glassy and glassy selvages line most of the vesicles. A 1100 point count gives 0.3% clinopyroxene phenocrysts; 7.5% plagioclase phenocrysts; 0.1% orthopyroxene phenocrysts; 16.2% groundmass plagioclase; 5.0% groundmass clinopyroxene (includes all small pyroxene as it is hard to distinguish clino- and ortho-); 0.4% groundmass orthopyroxene; 1.2% groundmass opaques; 56.5% mesostasis; 11.2% open vesicles; 2.8% filled vesicles.

135-839B-37R-01 (Piece 9,50-53 cm) OBSERVER: KRI WHERE SAMPLED: Unit 9

ROCK NAME: Moderately phyric orthopyroxene-clinopyroxene-plagioclase basaltic andesite

GRAIN SIZE: Fine grained

TEXTURE: Vesicular, glomeroporphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	7-10	7-10	0.2-2		euhedral to anhedral	dominantly in glomerocrystic clusters; oscillatory zoning with sodic rims
Clinopyroxene	1-2	1-2	0.4-1		subhedral	commonly twinned, tend to occur in small mafic clusters
Orthopyroxene	1-2	1-2	0.3-1		euhedral to subhedral	isolated and in small star-shaped clusters
GROUNDMASS						
Plagioclase	10-15	10-15	<0.2		euhedral	microlitic laths
Clinopyroxene	5-7	5-7	<0.2		subhedral	
Orthopyroxene	1-3	1-3	<0.3		euhedral to subhedral	quench textures common
Magnetite	tr-1	tr-1	<0.02		skeletal	small skeletal grains in cryptocrystalline mesostasis; some small crosses
Mesostasis	40-50	40-50	n/a		interstitial	cryptocrystalline to glassy; mostly still fresh, some clinopyroxene crystallites

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	tr	replacement	very rare and localized replacement of mesostasis to orangish clays

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15-20	throughout	up to 3 mm	empty	very round to irregular	bimodal size distribution; there is a 'vein' running through the sample made up of interconnected vesicles (<0.5 mm diameter each) and quenched material

COMMENTS: Several of the largest vesicles have quench boundaries with crystallites growing radially inward to the vesicle center. Two 1 mm thick vesicle veins cut through the sample. These are lined with highly vesicular, dark, quenched material. Still extremely glassy with more clinopyroxene microlites than the rest of the rock. This rock is extremely fresh. A 1042 point count gives 0.3% clinopyroxene phenocrysts; 7.6% plagioclase phenocrysts; 0.5% orthopyroxene phenocrysts; 12.1% groundmass plagioclase; 6.3% groundmass clinopyroxene (includes all small unidentified pyroxene as it is hard to distinguish ortho- from clino-); 1.0% groundmass orthopyroxene; 6.0% groundmass opaques; 47.4% mesostasis; 18.4% open vesicles.

135-839B-41R-01 (Piece 2,5-7 cm) OBSERVER: KRI WHERE SAMPLED: Unit 9

ROCK NAME: Moderately phyric orthopyroxene-plagioclase basaltic andesite

GRAIN SIZE: Fine grained

TEXTURE: Glomeroporphyritic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	3-5	3-5	0.4-1		euhedral to subhedral	tend to glomeroporphyritic clusters; oscillatory zoning with distinct sodic rims; melt inclusions common
Orthopyroxene	tr	tr	<1		euhedral	rare prismatic isolated crystals, occasionally in clusters with plagioclase
GROUNDMASS						
Plagioclase	15-20	15-20	<0.6		euhedral	randomly oriented quenched laths
Clinopyroxene	10-15	10-15	<0.6		euhedral to subhedral	isolated and intergrown with plagioclase; magnetite inclusions in some
Orthopyroxene	1-3	1-3	<0.5		euhedral to subhedral	isolated grains and star shaped clusters
Magnetite	tr-1	tr-1	<0.02		skeletal	skeletal laths in cryptocrystalline mesostasis
Mesostasis	38-43	40-45	n/a		interstitial	dominantly glassy; very localized replacement by fine grained clays; includes some clinopyroxene crystallites

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
?clays	tr-2	replacement	rare and localized replacement of mesostasis by fine grained green brown clays

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-25	throughout	<2 mm	empty to complete	irregular to subrounded	bimodal size distribution; large ones are rare, very small ones are abundant. Some are filled with fine grained green brown clays but much of the infilling may in fact be grinding grit

COMMENTS: Abundant opaques in vesicles, but this is probably grinding grit and has not been included in opaque estimates. About 30% of this slide is comprised of segregation vesicles and very irregularly shaped segregation regions. These are aphyric and the mesostasis is dominantly feathery clinopyroxene crystallites. They are much more irregularly shaped than in previous observations and grade much more gradually into the host. Mesostasis in these regions is extremely fresh. Rock as a whole is also fresh. 1346 point count yields: 3.5% plagioclase phenocrysts; 0.2% orthopyroxene phenocrysts; 17.2% groundmass plagioclase; 11.7% groundmass clinopyroxene (includes small unidentified pyroxene as it is hard to distinguish ortho- from clino-); 0.1% groundmass orthopyroxene; 0.4% groundmass opaques; 43.1% mesostasis; 23.8% open vesicles.