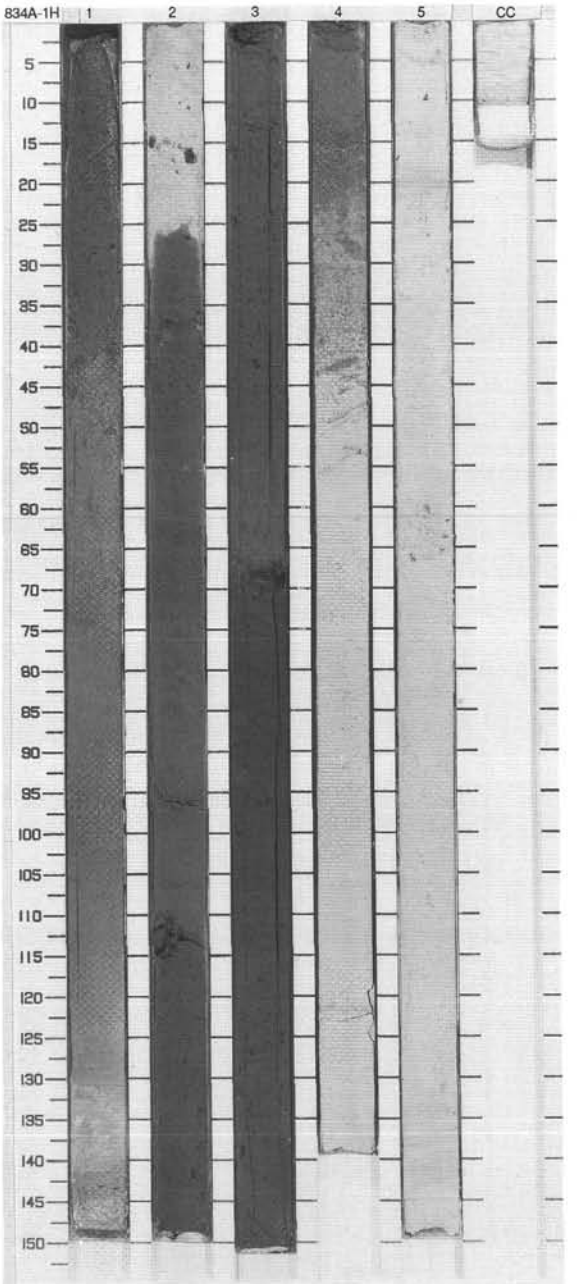
135-834A-1H
SMEAR SLIDE SUMMARY (%):

	1, 1* D	2, 10 D	2, 100 D	3, 1 D	3, 100 D	3, 149 D	4, 48 M
TEXTURE:							
Sand	---	---	---	---	Tr	---	---
Silt	15	---	10	15	10	---	---
Clay	85	---	90	85	90	---	---
COMPOSITION:							
Accessory minerals	---	10	---	---	---	---	Tr
Aragonite	Tr	---	---	Tr	Tr	---	---
Clay	30	10	15	30	30	30	25
Dolomite	Tr	---	---	Tr	Tr	---	---
Feldspar	---	5	---	---	---	---	---
Foraminifers	15	45	10	15	10	5	5
Glass	---	5	15	---	---	---	---
Intraclasts	---	15	---	---	---	---	15
Nannolossils	55	10	55	55	60	65	55
Opaques	---	---	---	---	Tr	---	---

*Smear - slide summary (%)
Section, depth (cm)
M = minor lithology
D = dominant lithology

SITE 834 HOLE A CORE 1H CORED 0.0 - 7.6 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1	Pleistocene	F		S	10YR 4/3 To 10YR 6/3	CLAYEY NANNOFOSSIL OOZE WITH FORAMS. Major lithology: CLAYEY NANNOFOSSIL OOZE WITH FORAMS, dark yellowish brown to very pale brown (10YR 3/4 to 7/4), with scattered pumice fragments and intervals of graded bedding. Minor lithology: FORAM OOZE WITH NANNOFOSSILS, CLAY, ACCESSORY MINERALS AND INTRACLASTS, very pale brown (10YR 7/4). Minor amounts of volcanic glass and larger volcanic fragments up to 2 cm in diameter occur. A thin, light gray (2.5 Y 7/0), FINE ASH layer occurs in Section 5, 15–22 cm.
		2				S	10YR 3/4 To 10YR 4/4	
		3				S		
		4				S	10YR 3/4 To 10YR 7/4	
		5				S		
		CC				I	10YR 7/1	



Information on Core Description Forms, for ALL sites, represents field notes taken aboard ship. Some of this information has been refined in accord with post-cruise findings, but production schedules prohibit definitive correlation of these forms with subsequent findings. Thus, the reader should be alerted to the occasional ambiguity or discrepancy.

135-834A-2H
SMEAR SLIDE SUMMARY (%):

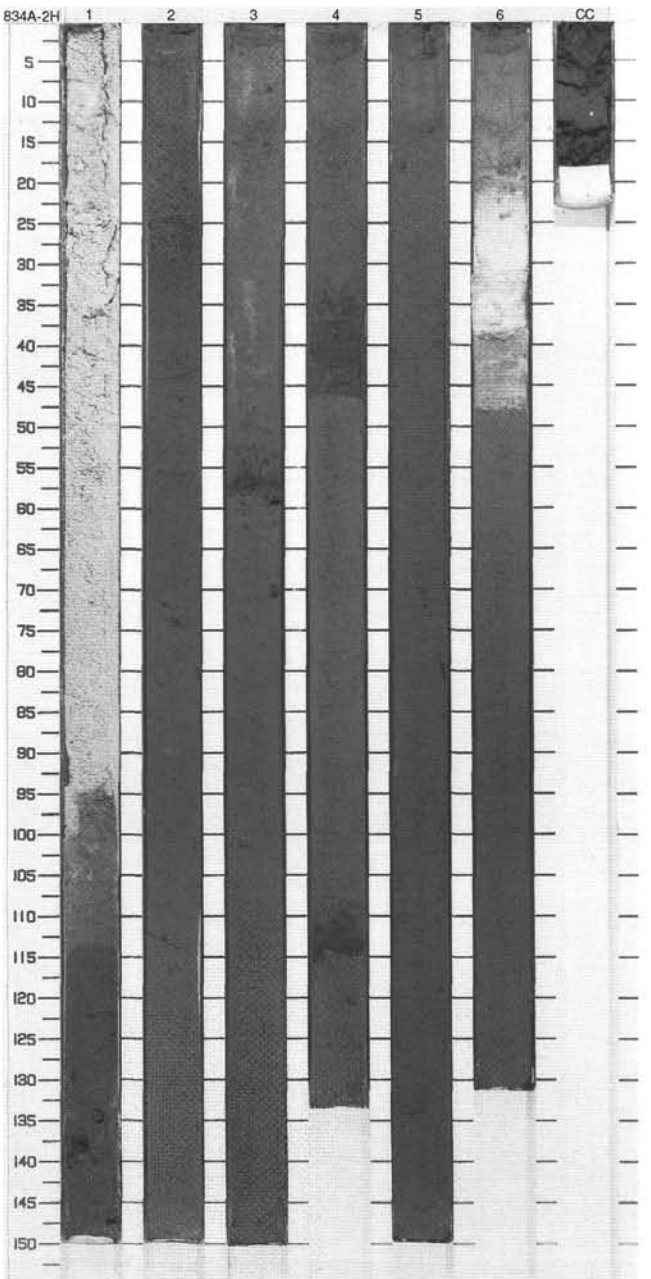
	1, 30 D	1, 100 D	1, 142 D	3, 50 D	3, 70 D	4, 40 M	4, 61 D
TEXTURE:							
Sand	25	---	---	---	Tr	---	---
Silt	40	15	5	15	6	---	---
Clay	35	85	95	85	94	---	---
COMPOSITION:							
Accessory minerals	---	---	---	Tr	1	---	Tr
Aragonite	---	---	---	Tr	---	---	---
Bioclast	5	---	---	---	---	---	---
Clay	10	30	30	30	28	20	30
Dolomite	---	Tr	---	Tr	Tr	---	---
Feldspar	---	Tr	---	---	Tr	15	---
Foraminifers	40	15	5	15	5	---	10
Glass	15	---	---	---	2	65	---
Intraclasts	20	---	---	---	---	---	---
Nannofossils	10	55	65	55	64	---	60
Opaques	---	---	---	Tr	---	---	---
Silicoflagellates	---	---	---	---	Tr	---	---

SMEAR SLIDE SUMMARY (%):

	4, 129 D	5, 110 D	6, 16 D
TEXTURE:			
Sand	---	---	---
Silt	---	---	---
Clay	---	---	---
COMPOSITION:			
Clay	30	30	30
Foraminifers	3	10	5
Nannofossils	67	60	65

SITE 834 HOLE A CORE 2H CORED 7.6 - 17.1 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5		1	Pleistocene	F		S	10YR 7/1	CLAYEY NANNOFOSSIL OOZE Major lithology: CLAYEY NANNOFOSSIL OOZE, yellowish brown to dark yellowish brown (10YR 5/6 to 3/4), with an abrupt color change in Section 1 at 115 cm. Scattered volcanic fragments and occasional mottling occur. Minor lithologies: INTRACLAST FORAM OOZE, light gray (10 YR 7/1) with minor amounts of volcanic glass and larger volcanic lithic fragments. Very dark grayish brown (2.5 Y 3/2) FINE ASH layers occur in Section 3, 53–60 cm, and Section 4, 32–47 cm and 106–111 cm.
1.0						S	10YR 5/6 To 10YR 3/4	
		2				S		
		3				S	10YR 3/4	
		4				S		
						S		
		5				S	10YR 3/3 To 10YR 3/4	
		6				S		
		CC						



135-834A-3H
SMEAR SLIDE SUMMARY (%):

	1, 30 D	1, 70 D	1, 112 D	2, 50 D	2, 85 D	2, 88 D	2, 101 M
TEXTURE:							
Sand	---	---	---	---	---	---	---
Silt	---	20	---	---	---	---	---
Clay	---	80	---	---	---	---	---
COMPOSITION:							
Accessory minerals	Tr	---	Tr	Tr	Tr	Tr	---
Bioclast	---	---	---	Tr	---	---	2
Clay	30	30	30	33	30	30	10
Dolomite	Tr	---	Tr	Tr	---	---	---
Foraminifers	10	20	5	2	3	4	20
Glass	---	Tr	---	---	---	---	---
Intraclasts	---	---	---	---	---	---	3
Nannolossils	60	50	65	65	67	65	65

SMEAR SLIDE SUMMARY (%):

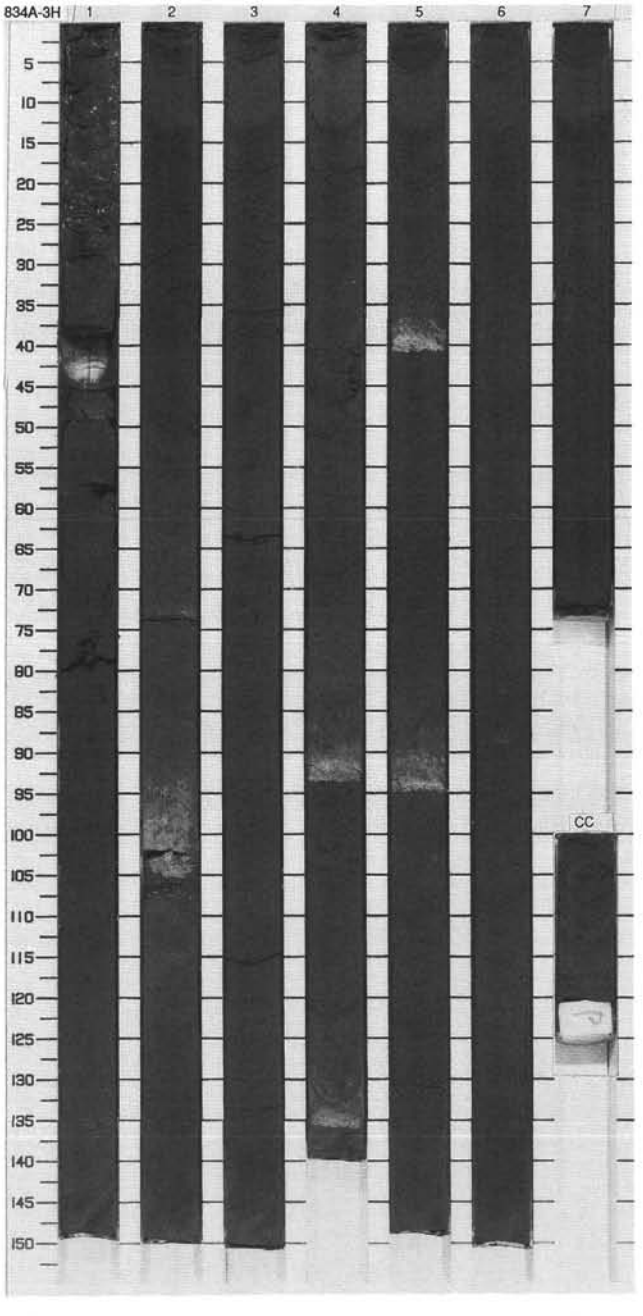
	2, 107 D	3, 50 D	3, 130 D	4, 60 D	4, 127 D	4, 133 D	5, 32 D
TEXTURE:							
Sand	---	---	---	---	---	---	---
Silt	---	---	---	---	---	---	---
Clay	---	---	---	---	---	---	---
COMPOSITION:							
Accessory minerals	---	Tr	Tr	Tr	---	---	Tr
Bioclast	---	Tr	---	Tr	---	---	---
Calcite	---	Tr	---	Tr	---	---	---
Clay	32	30	30	30	30	30	30
Feldspar	---	---	---	---	---	Tr	---
Foraminifers	3	10	5	10	5	3	5
Nannolossils	65	60	65	60	65	67	65

SMEAR SLIDE SUMMARY (%):

	5, 81 D	5, 96 D	6, 44 D	6, 124 D
TEXTURE:				
Sand	---	---	---	---
Silt	---	---	---	---
Clay	---	---	---	---
COMPOSITION:				
Accessory minerals	2	Tr	Tr	Tr
Clay	28	32	30	32
Dolomite	Tr	---	---	---
Foraminifers	5	3	8	3
Nannolossils	65	65	62	65

SITE 834 HOLE A CORE 3H CORED 17.1 - 26.6 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5	Void	1	Pleistocene			S	10YR 4/3 To 10YR 4/4	CLAYEY NANNOFOSSIL OOZE WITH FORAMS Major lithology: CLAYEY NANNOFOSSIL OOZE WITH FORAMS, dark brown to dark yellowish brown (10YR 4/3 to 10YR 4/4), with scattered pumice fragments. Minor lithology: NANNOFOSSIL FORAM OOZE, very pale brown (10YR 7/3). These beds are graded with sharp lower contacts and gradational upper contacts. The beds occur in Section 2 at 75 and 108 cm, Section 4 at 92 and 135 cm, and in Section 5 at 38 and 94 cm.
1.0						S		
						S		
		2				S		
				F		S		
						S	10YR 4/4	
		3				S		
						S		
		4				S		
						S		
						S		
		5				S		
						S	10YR 3/4	
		6				S		
						S		
		7						
		CC						



135-834A-4H
SMEAR SLIDE SUMMARY (%):

	1, 100 D	2, 8 D	2, 38 M	2, 40 M	2, 45 D	2, 50 D	2, 51 D
TEXTURE:							
Sand	---	---	20	---	---	0	---
Silt	25	---	50	---	5	70	50
Clay	75	100	30	---	95	30	50
COMPOSITION:							
Accessory minerals	---	---	---	---	Tr	Tr	Tr
Bioclast	---	---	20	10	---	---	---
Clay	30	20	---	---	45	---	35
Dolomite	---	Tr	---	---	---	---	Tr
Foraminifers	25	---	50	80	5	70	50
Glass	Tr	---	---	---	---	---	---
Nannolossils	45	80	30	10	50	30	15

SMEAR SLIDE SUMMARY (%):

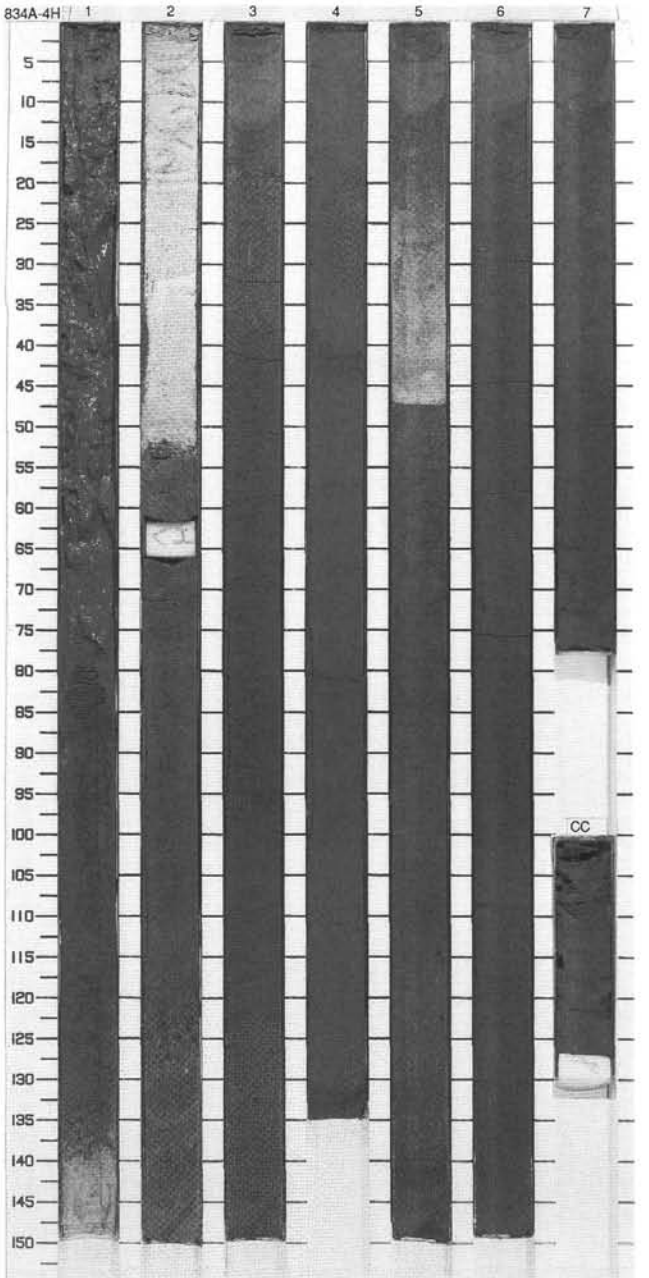
	2, 120 D	3, 120 D	4, 40 D	4, 100 D	5, 22 D	5, 45 M	5, 48 D
TEXTURE:							
Sand	---	Tr	---	---	---	---	---
Silt	15	15	10	5	5	---	2
Clay	85	85	90	95	95	---	98
COMPOSITION:							
Accessory minerals	---	Tr	---	---	---	---	---
Calcite	---	---	---	---	Tr	---	---
Clay	30	30	30	30	30	---	38
Dolomite	Tr	Tr	Tr	Tr	Tr	---	---
Feldspar	---	Tr	Tr	---	---	---	---
Foraminifers	15	15	10	5	5	75	2
Glass	---	---	---	---	---	10	---
Nannolossils	55	55	60	65	65	15	60
Quartz	---	---	---	---	---	Tr	---

SMEAR SLIDE SUMMARY (%):

	6, 28 D
TEXTURE:	
Sand	---
Silt	10
Clay	90
COMPOSITION:	
Clay	30
Foraminifers	10
Nannolossils	60

SITE 834 HOLE A CORE 4H CORED 26.6 - 36.1 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0	Void	1 2 3 4 5 6 7 CC	Pleistocene	F F	OOOO	S S S S S S S S S I S S	10YR 4/4 10YR 7/4 10YR 5/4 10YR 4/4 10YR 7/4 10YR 4/4	CLAYEY NANNOFOSSIL OOZE Major lithology: CLAYEY NANNOFOSSIL OOZE, yellowish brown to dark yellowish brown (10YR 4/4 to 10YR 5/4), with mottled intervals and scattered pumice fragments. Minor lithology: NANNOFOSSIL FORAM OOZE and FORAM OOZE, very pale brown to white (10YR 7/4 to 10YR 8/2). Sharp lower contacts and gradational upper contacts with the major lithology. Graded bedding evident.



135-834A-5H
SMEAR SLIDE SUMMARY (%):

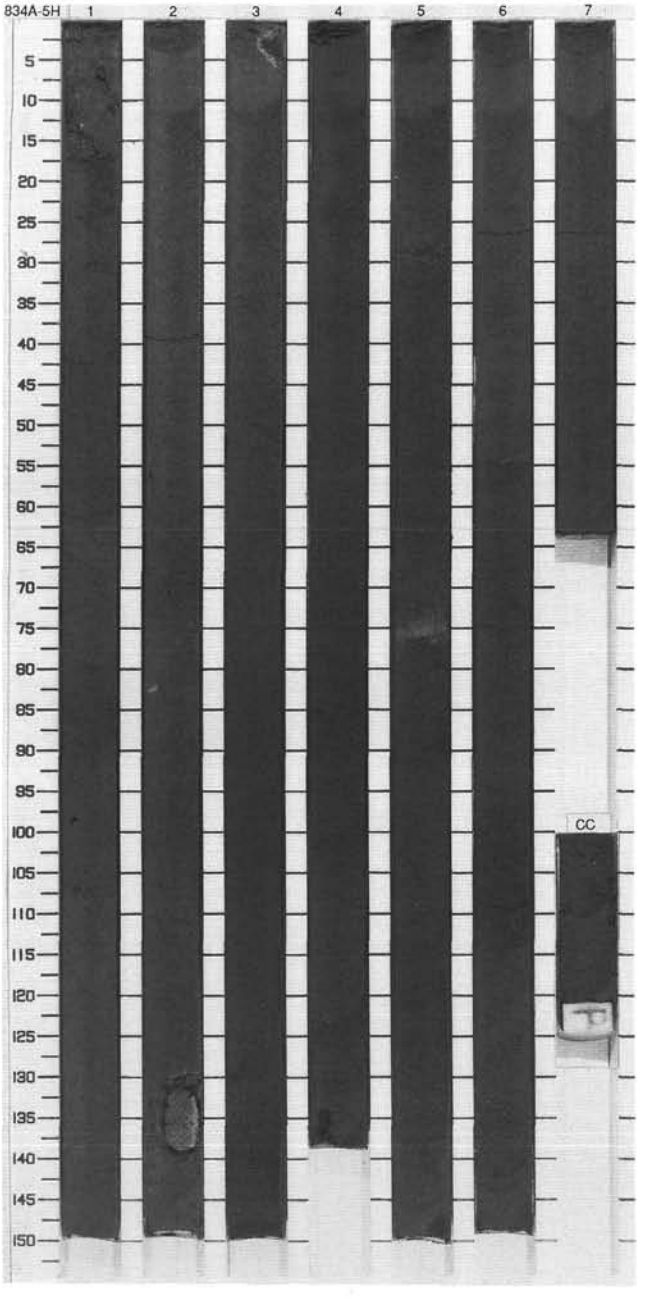
	1, 140 D	2, 120 D	4, 70 D	5, 17 D	5, 40 D	5, 76 M	5, 90 D
TEXTURE:							
Sand	---	---	---	---	---	---	---
Silt	10	10	---	10	5	30	2
Clay	90	90	---	90	95	70	98
COMPOSITION:							
Accessory minerals	---	---	---	Tr	---	10	Tr
Clay	30	30	---	30	30	---	30
Dolomite	Tr	Tr	---	---	Tr	---	Tr
Feldspar	---	Tr	---	---	---	20	Tr
Foraminifers	10	10	10	10	5	---	2
Glass	---	---	5	Tr	---	70	---
Nannofossils	60	60	80	60	65	---	68
Quartz	---	---	5	---	---	---	---

SMEAR SLIDE SUMMARY (%):

	5, 130 D	6, 53 D
TEXTURE:		
Sand	---	---
Silt	10	3
Clay	90	97
COMPOSITION:		
Accessory minerals	---	Tr
Clay	30	34
Foraminifers	10	3
Glass	---	Tr
Nannofossils	60	63

SITE 834 HOLE A CORE 5H CORED 36.1 - 45.6 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5		1	Upper Pleistocene			S	10YR 4/4	CLAYEY NANNOFOSSIL OOZE WITH FORAMS. Major lithology: CLAYEY NANNOFOSSIL OOZE WITH FORAMS, very dark brown to dark yellowish brown (10YR 2/2 to 10YR 4/4). Mottling and scattered volcanic fragments occur. Minor lithology: FINE ASH WITH FELDSPAR in Section 5 at 76 cm.
1.0		2				S		
		3						
		4				S	10YR 2/2	
		5				I S S S S S		
		6				S	10YR 2/2 To 10YR 3/2	
		7						
		CC						



135-834A-6H

SMEAR SLIDE SUMMARY (%):

	1, 30 D	1, 50 M	1, 75 D	1, 103 D	1, 132 M	2, 35 M	2, 90 D
TEXTURE:							
Sand	---	---	---	---	---	80	10
Silt	4	5	1	1	---	20	10
Clay	96	95	99	99	---	---	80
COMPOSITION:							
Clay	30	30	30	30	---	---	10
Foraminifers	4	5	1	1	1	---	2
Glass	1	---	4	4	90	99	20
Nannofossils	65	65	65	65	9	---	68

SMEAR SLIDE SUMMARY (%):

	2, 149 M	3, 30 D	3, 51 M	3, 80 D	3, 140 D	4, 25 D	4, 59 M
TEXTURE:							
Sand	5	---	80	---	5	5	5
Silt	5	---	15	32	90	90	90
Clay	90	---	5	68	5	5	5
COMPOSITION:							
Accessory minerals	---	---	---	---	---	---	5
Clay	30	---	---	30	---	---	---
Foraminifers	1	10	---	1	---	1	---
Glass	3	40	95	1	75	80	95
Nannofossils	66	50	5	68	25	19	---

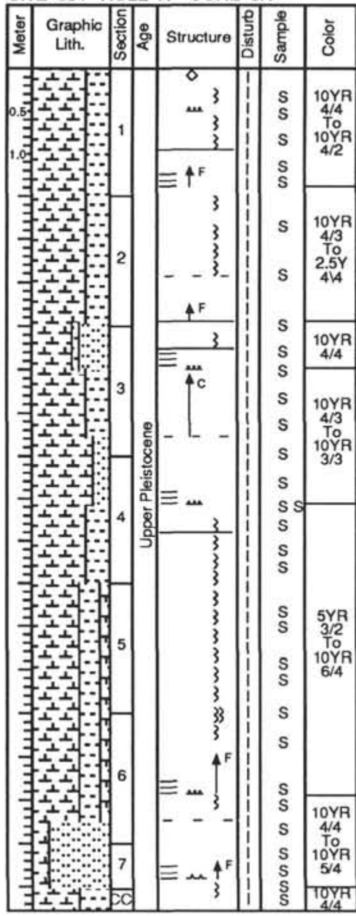
SMEAR SLIDE SUMMARY (%):

	4, 80 D	4, 120 D	5, 30 D	5, 100 D	6, 40 D	6, 92 M	6, 100 D
TEXTURE:							
Sand	---	---	---	---	---	---	---
Silt	6	---	10	15	15	25	15
Clay	94	100	90	85	85	75	85
COMPOSITION:							
Accessory minerals	---	---	---	Tr	Tr	5	Tr
Clay	25	34	30	30	30	30	30
Dolomite	---	---	---	---	---	Tr	Tr
Foraminifers	1	---	1	10	10	20	10
Glass	5	---	4	5	5	Tr	5
Nannofossils	69	66	65	55	55	45	55
Oxide	---	---	---	---	Tr	---	---

SMEAR SLIDE SUMMARY (%):

	6, 140 D	7, 10 D	7, 35 D	7, 45 D	CC, 10 D
TEXTURE:					
Sand	---	---	---	---	---
Silt	85	85	---	10	5
Clay	15	15	---	90	95
COMPOSITION:					
Accessory minerals	---	---	---	Tr	---
Clay	---	---	---	30	30
Dolomite	---	---	---	Tr	---
Feldspar	---	---	---	Tr	---
Glass	85	85	85	10	5
Nannofossils	15	15	15	60	65

SITE 834 HOLE A CORE 6H CORED 45.6 - 55.1 mbsf

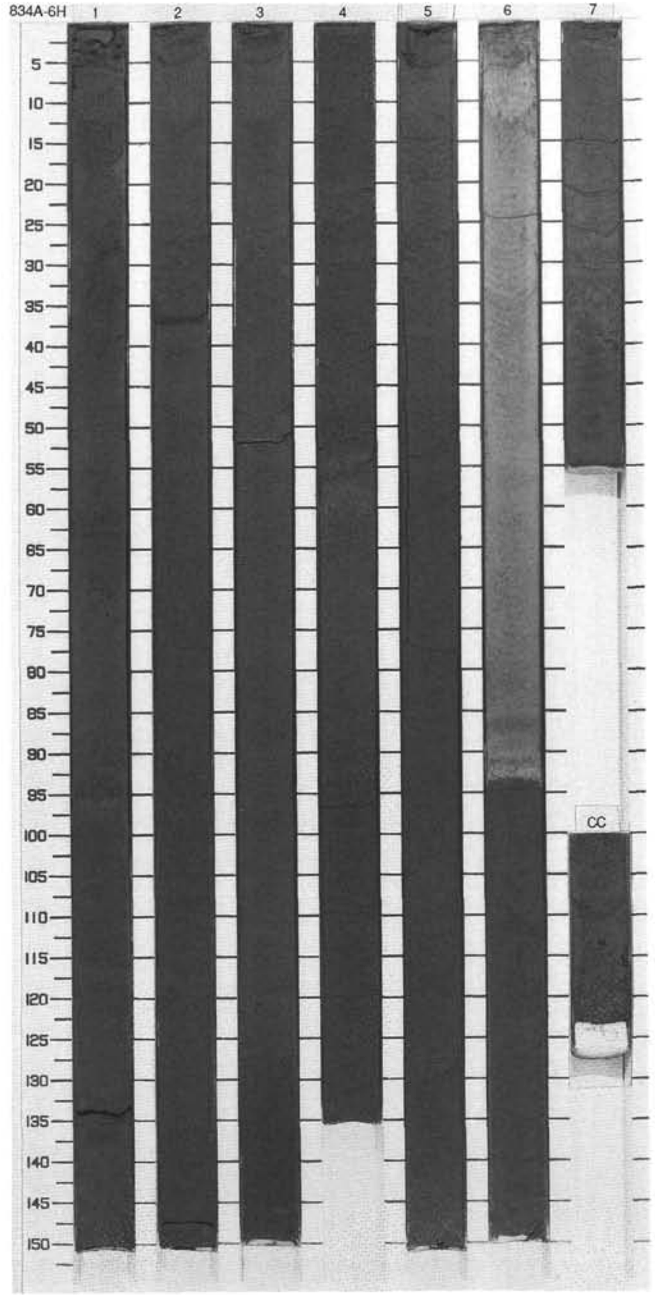


Description

CLAYEY NANNOFOSSIL OOZE

Major lithology: CLAYEY NANNOFOSSIL OOZE, dark yellowish brown to pale brown (10YR 3/4 to 10YR 6/4). Occasional mottling of both colors.

Minor lithologies: VOLCANIC SILT WITH NANNOFOSSILS, dark yellowish brown to pale brown (10YR 4/4 to 10YR 6/3). NANNOFOSSIL OOZE WITH FORAMS, dark yellowish brown to dark reddish brown (10YR 4/4 to 5YR 3/2). VOLCANIC SILT layers (1–2 cm thick), dark grayish brown (2.5Y 4/2), showing normal grading, sharp bases, and gradational upper contacts, occur in Section 1, 133–135 cm, Section 3, 50–52 cm, and Section 4, 57–59 cm. FINE ASH, thin pyroclastic sediment in Section 2, 35–37 cm.



135-834A-7H
SMEAR SLIDE SUMMARY (%):

	1, 10 D	1, 24 D	1, 100 D	2, 8 D	2, 100 D	3, 40 D	3, 81 M
TEXTURE:							
Sand	---	---	---	---	---	---	---
Silt	20	90	10	5	5	5	10
Clay	80	10	90	95	95	95	90
COMPOSITION:							
Accessory minerals	Tr	Tr	Tr	Tr	Tr	Tr	Tr
Clay	30	Tr	30	35	30	40	20
Dolomite	Tr	---	---	Tr	---	Tr	---
Feldspar	Tr	Tr	Tr	Tr	Tr	---	Tr
Foraminifers	10	Tr	5	5	5	5	5
Glass	10	90	5	Tr	---	---	30
Nannofossils	50	10	60	60	65	55	45

SMEAR SLIDE SUMMARY (%):

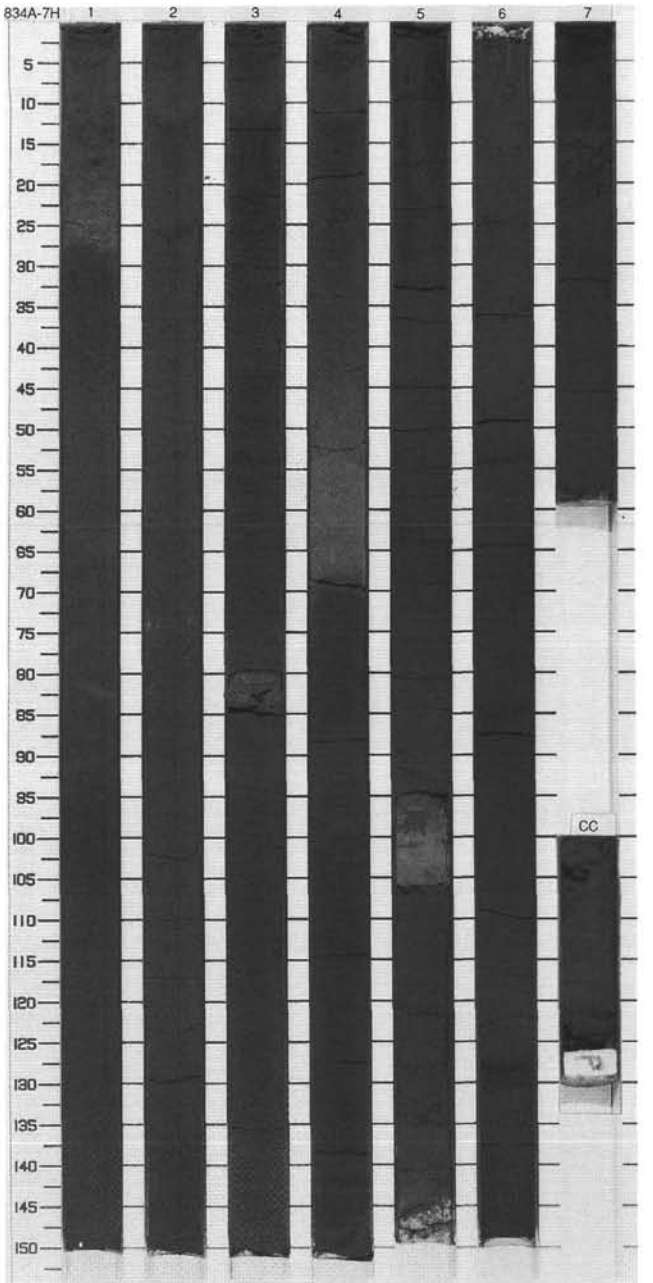
	3, 112 D	4, 60 D	4, 120 D	5, 52 D	5, 103 M	5, 125 M	5, 148 M
TEXTURE:							
Sand	---	---	---	---	---	---	---
Silt	5	---	5	5	100	5	100
Clay	95	---	95	95	---	95	---
COMPOSITION:							
Accessory minerals	Tr	Tr	Tr	Tr	Tr	Tr	Tr
Clay	40	10	40	40	Tr	40	Tr
Dolomite	---	---	Tr	---	---	---	---
Feldspar	---	Tr	---	Tr	Tr	---	Tr
Foraminifers	5	---	5	5	---	5	---
Glass	Tr	75	---	Tr	100	---	100
Mica	---	---	---	---	Tr	---	---
Nannofossils	55	15	55	55	---	55	---

SMEAR SLIDE SUMMARY (%):

	6, 40 D	6, 80 M	6, 145 D	7, 50 D
TEXTURE:				
Sand	---	---	---	---
Silt	5	5	5	5
Clay	95	95	95	95
COMPOSITION:				
Accessory minerals	Tr	Tr	Tr	Tr
Clay	40	40	40	35
Dolomite	Tr	Tr	Tr	Tr
Foraminifers	5	5	5	5
Nannofossils	55	55	55	60

SITE 834 HOLE A CORE 7H CORED 55.1 - 64.6 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1 2 3 4 5 6 7 CC	Lower Pleistocene	F F		S S S S S S S S S S S S S S	10YR 3/2 To 10YR 3/3 10YR 2/2 10YR 3/3 10YR 2/2 10YR 3/2 10YR 3/3 To 10YR 2/2 10YR 2/2	CLAYEY NANNOFOSSIL OOZE. Major lithology: CLAYEY NANNOFOSSIL OOZE, mottled, brown to very dark brown (10YR 3/3 to 10YR 2/2). In Section 1, 0–19 cm, the clayey nannofossil ooze contains forams and ash. Minor lithologies: FINE ASH in Section 5, 95–105 cm, and in Section 5, 145 cm, to Section 6, 2 cm. The vitric ash layers are white to reddish brown (10YR 8/1 to 2.5YR 5/4) with sharp basal contacts and fine upwards. VOLCANIC SILT WITH CLAY AND NANNOFOSSILS, light olive brown to dark greenish gray (2.5Y 5/4 to 10Y 5/4) occur in Section 4, 45–70 cm, and VOLCANIC SILT WITH NANNOFOSSILS, yellowish brown (10YR 5/4) occurs in Section 1, 19–27 cm.



135-834A-8H
SMEAR SLIDE SUMMARY (%):

	1, 3 D	1, 70 D	2, 71 D	3, 3 D	3, 66 D	3, 91 D	3, 99 D
TEXTURE:							
Sand	---	---	---	---	---	---	---
Silt	90	5	---	95	---	---	---
Clay	10	95	100	5	---	100	100
COMPOSITION:							
Accessory minerals	Tr	Tr	Tr	Tr	Tr	Tr	Tr
Clay	5	35	35	5	61	58	56
Dolomite	---	Tr	---	Tr	---	---	---
Fe oxide	---	Tr	---	Tr	---	---	---
Feldspar	Tr	---	---	Tr	---	Tr	Tr
Foraminifers	---	5	Tr	Tr	---	1	---
Glass	90	---	---	95	---	1	Tr
Nannolossils	5	60	65	Tr	39	40	44

SMEAR SLIDE SUMMARY (%):

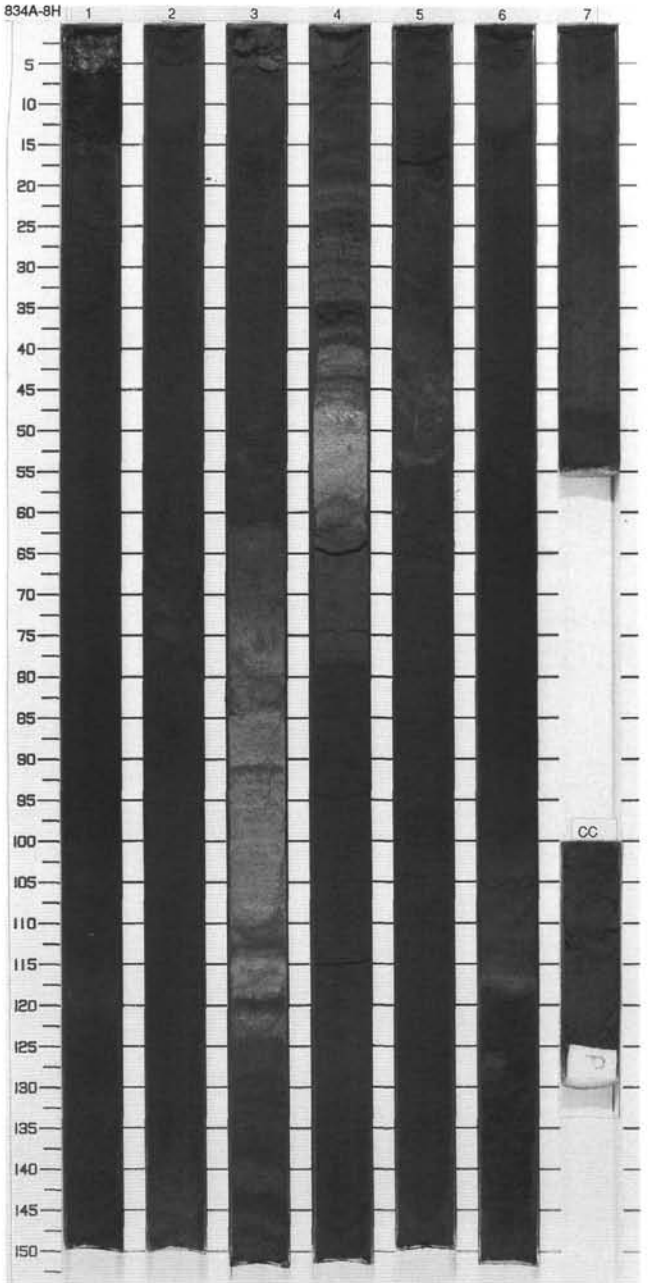
	3, 141 M	4, 37 M	4, 40 M	4, 53 D	4, 71 D	4, 140 D	5, 50 D
TEXTURE:							
Sand	70	90	98	---	---	---	---
Silt	30	10	2	5	---	---	---
Clay	---	---	---	95	100	100	100
COMPOSITION:							
Accessory minerals	3	---	17	Tr	2	Tr	1
Clay	---	---	---	55	52	55	43
Clinopyroxene	---	40	---	---	---	---	---
Dolomite	---	---	---	Tr	---	Tr	---
Fe oxide	---	---	---	---	Tr	Tr	---
Feldspar	2	---	---	Tr	1	---	1
Foraminifers	50	60	65	5	---	Tr	---
Glass	45	---	---	---	---	---	---
Nannolossils	---	---	---	40	45	45	55
Rock fragment	---	---	17	---	---	---	---

SMEAR SLIDE SUMMARY (%):

	5, 120 D	7, 27 D
TEXTURE:		
Sand	---	---
Silt	---	---
Clay	100	---
COMPOSITION:		
Accessory minerals	Tr	Tr
Clay	51	85
Feldspar	Tr	---
Foraminifers	---	5
Nannolossils	49	10

SITE 834 HOLE A CORE 8H CORED 64.6 - 74.1 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5		1	Lower Pliocene			S	10YR 2/1 To 10YR 2/2	CLAYEY NANNOFOSSIL MIXED SEDIMENT. Major lithology: CLAYEY NANNOFOSSIL MIXED SEDIMENT, dark brown (10YR 2/1) and mottled. Minor lithologies: Alternating thin layers of black to light olive gray (5Y 2.5/2 to 5Y 6/2) CRYSTAL-RICH LITHIC TUFF, light olive gray (5Y 6/2) NANNOFOSSIL OOZE, FORAM FINE ASH, and FORAM SAND WITH MINERAL AND ROCK FRAGMENTS in Section 3, 123 cm, to Section 4, 47 cm. Reddish gray (5YR 5/2) VITRIC ASH occurs in Section 1, 0–6 cm, and Section 3, 0–4 cm.
1.0						S		
		2				S	10YR 2/2 To 10YR 2/1	
		3		F		S	5Y 4/2 To 5Y 2.5/2	
		4				S	10YR 2/2 To 10YR 2/1	
		5				S	10YR 3/2 To 10YR 2/1	
		6				S	10YR 2/1 To 10YR 4/4	
		7				S	10YR 3/3	
		CC						



135-834A-9H
SMEAR SLIDE SUMMARY (%):

	1, 80 D	2, 60 D	3, 93 D	3, 101 D	3, 105 M	4, 40 D	4, 95 D
TEXTURE:							
Sand	---	---	Tr	---	60	---	---
Silt	---	---	---	---	30	---	---
Clay	100	---	100	---	10	100	---
COMPOSITION:							
Accessory minerals	Tr	Tr	1	---	2	Tr	Tr
Clay	55	47	51	13	---	55	5
Feldspar	Tr	---	---	---	---	Tr	Tr
Foraminifers	Tr	3	---	5	5	---	Tr
Glass	---	---	2	80	90	1	85
Nannofossils	45	50	45	2	---	44	10
Rock fragment	---	---	---	---	2	---	---
Spicules	---	---	---	---	---	---	Tr

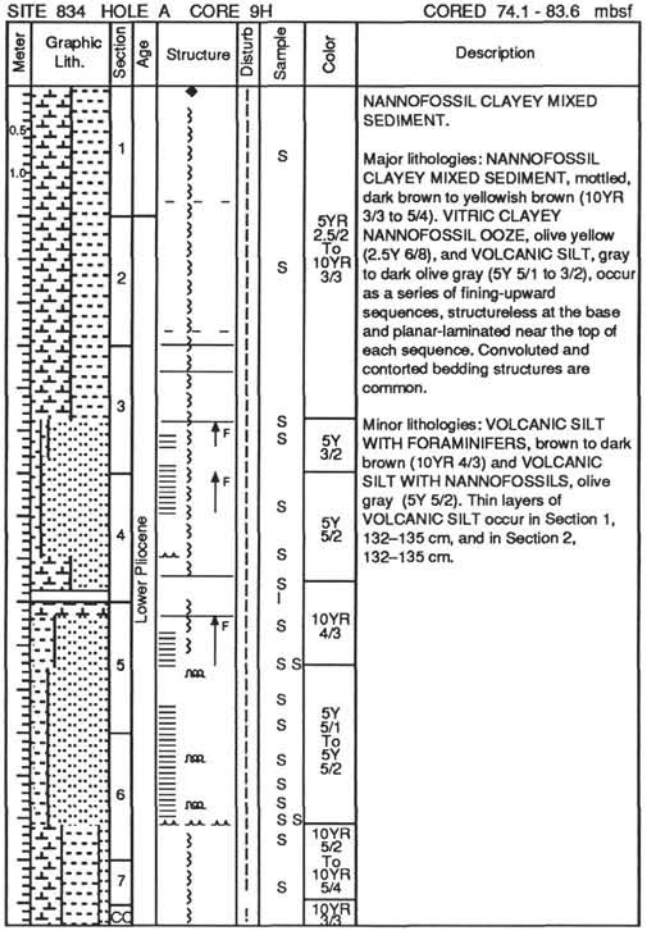
SMEAR SLIDE SUMMARY (%):

	4, 120 D	5, 27 D	5, 71 M	5, 71 D	5, 110 D	5, 142 D	6, 31 D
TEXTURE:							
Sand	10	---	70	---	0	---	5
Silt	80	---	25	---	70	---	90
Clay	10	---	5	---	30	---	5
COMPOSITION:							
Accessory minerals	5	Tr	2	---	Tr	---	Tr
Clay	---	30	---	15	20	20	---
Feldspar	5	Tr	2	Tr	Tr	---	Tr
Foraminifers	---	---	10	20	Tr	Tr	---
Glass	40	65	80	60	70	75	80
Nannofossils	50	5	5	5	10	5	20
Oxide	---	---	---	---	Tr	---	---

SMEAR SLIDE SUMMARY (%):

	6, 66 D	6, 71 M	6, 104 D	6, 108 D	6, 128 D	7, 26 D
TEXTURE:						
Sand	0	---	5	---	---	---
Silt	90	85	85	---	---	5
Clay	10	15	10	---	100	95
COMPOSITION:						
Accessory minerals	Tr	Tr	Tr	---	---	2
Clay	5	10	10	30	56	23
Feldspar	Tr	Tr	Tr	---	---	Tr
Foraminifers	Tr	Tr	2	5	---	5
Glass	90	85	83	60	---	35
Nannofossils	5	5	5	5	44	35
Oxide	---	---	---	---	Tr	---

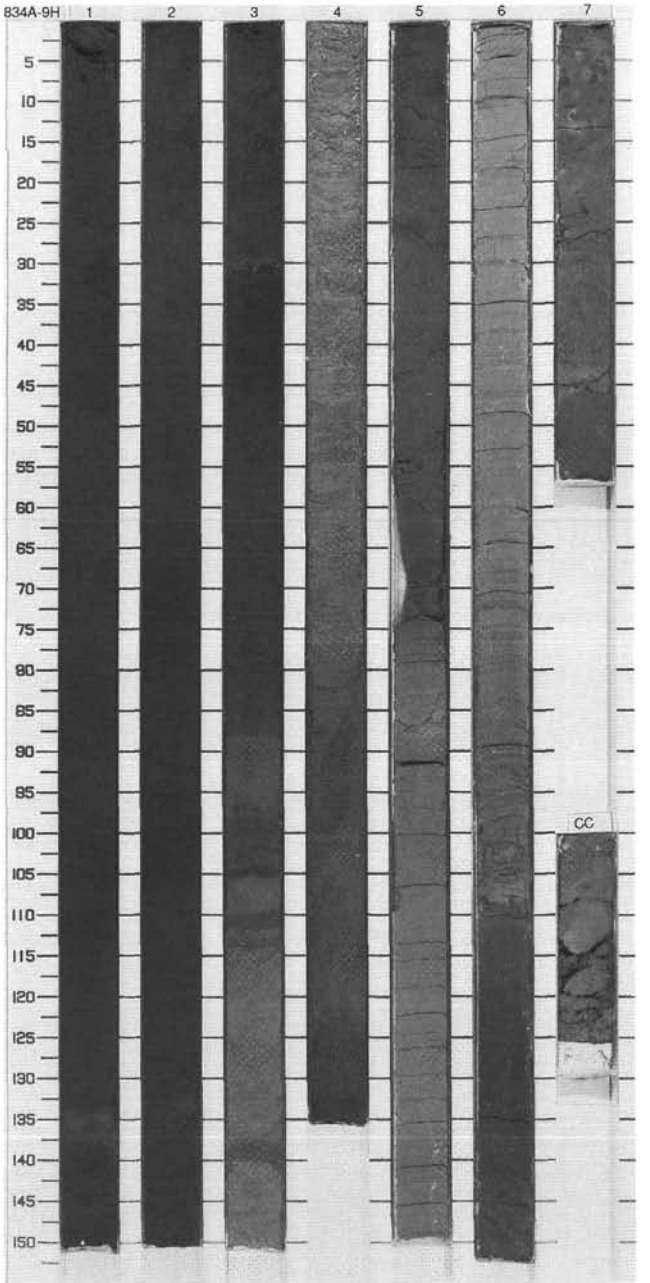
SITE 834 HOLE A CORE 9H CORED 74.1 - 83.6 mbsf



NANNOFOSSIL CLAYEY MIXED SEDIMENT.

Major lithologies: NANNOFOSSIL CLAYEY MIXED SEDIMENT, mottled, dark brown to yellowish brown (10YR 3/3 to 5/4). VITRIC CLAYEY NANNOFOSSIL OOZE, olive yellow (2.5Y 6/8), and VOLCANIC SILT, gray to dark olive gray (5Y 5/1 to 3/2), occur as a series of fining-upward sequences, structureless at the base and planar-laminated near the top of each sequence. Convoluted and contorted bedding structures are common.

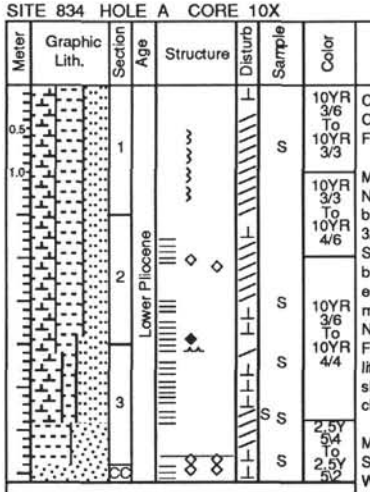
Minor lithologies: VOLCANIC SILT WITH FORAMINIFERS, brown to dark brown (10YR 4/3) and VOLCANIC SILT WITH NANNOFOSSILS, olive gray (5Y 5/2). Thin layers of VOLCANIC SILT occur in Section 1, 132–135 cm, and in Section 2, 132–135 cm.



135-834A-10X
SMEAR SLIDE SUMMARY (%):

	1, 73 D	2, 95 D	3, 21 M	3, 79 M	3, 86 D	3, 121 M
TEXTURE:						
Sand	Tr	---	20	-	---	-
Silt	5	---	75	80	---	85
Clay	95	100	5	20	100	15
COMPOSITION:						
Accessory minerals	---	---	---	---	2	--
Clay	38	35	15	10	32	10
Feldspar	---	---	---	---	1	--
Foraminifors	2	---	20	---	---	--
Glass	---	55	20	80	60	85
Nannofossils	60	10	45	10	5	5
Oxide	Tr	---	---	---	---	--

SITE 834 HOLE A CORE 10X — CORED 83.6 - 93.2 mbsf

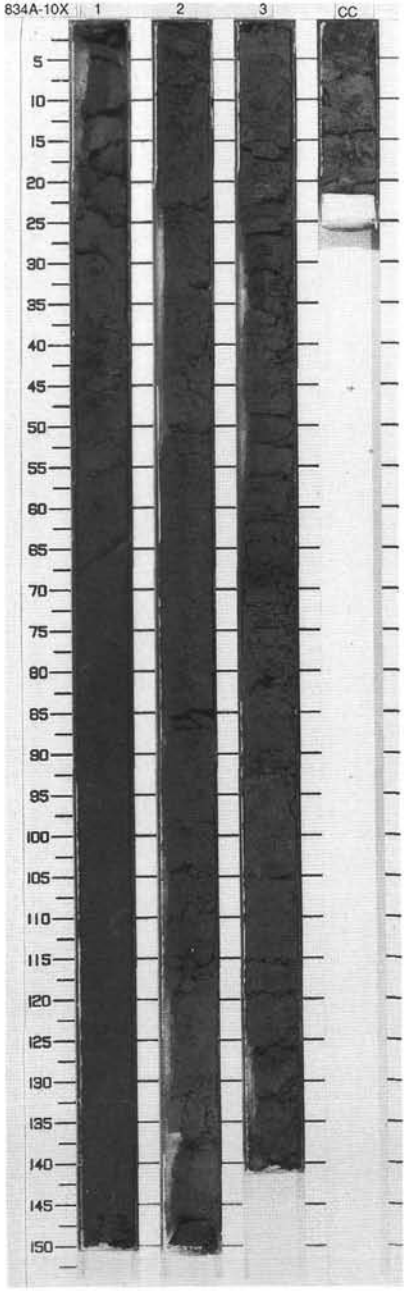


Description

CLAYEY NANNOFOSSIL OOZE and CLAYEY NANNOFOSSIL OOZE WITH FORAMS AND VOLCANIC SILT.

Major lithologies: CLAYEY NANNOFOSSIL OOZE, mottled, dark brown to dark yellowish brown (10YR 3/3 to 10YR 4/4) towards the base of Section 1, and uniformly dark yellowish brown (10YR 3/6 to 10YR 3/4) elsewhere. The sediment contains minor graded ash layers. CLAYEY NANNOFOSSIL OOZE WITH FORAMS AND VOLCANIC SILT. This lithology grades between the sharp-based vitric ash layers and the clayey nannofossil ooze.

Minor lithologies: VOLCANIC SILT/SAND and VOLCANIC SILT WITH NANNOFOSSILS AND CLAY. These light olive brown (2.5Y 5/4) units occur as graded units within the clayey nannofossil ooze. The lower parts of these units are parallel laminated. Units have sharp bases and contain almost 100% volcanic glass towards their bases. Units grade upwards into clayey nannofossil ooze. In the Section CC at 5 cm there is a layer of volcanic lapilli.



135-834A-11X
SMEAR SLIDE SUMMARY (%):

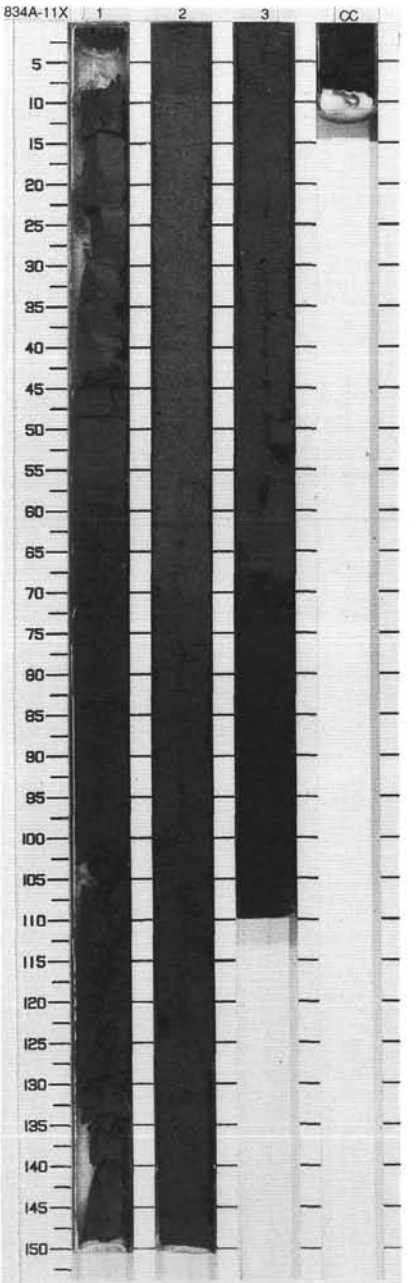
	1, 36 M	1, 42 D	1, 49 D	1, 96 M	1, 142 D	2, 50 D	2, 120 D
TEXTURE:							
Sand	-	---	---	Tr	---	-	---
Silt	90	---	---	10	---	95	---
Clay	10	100	100	90	---	5	100
COMPOSITION:							
Accessory minerals	Tr	---	---	Tr	---	Tr	1
Clay	5	15	20	15	15	5	15
Feldspar	Tr	---	---	---	---	Tr	4
Glass	90	80	70	5	80	85	75
Nannolossils	5	5	10	80	5	5	5
Oxide	---	---	---	Tr	---	---	---

SMEAR SLIDE SUMMARY (%):

	3, 33 D	3, 88 M	3, 96 D
TEXTURE:			
Sand	---	Tr	---
Silt	---	5	3
Clay	100	95	97
COMPOSITION:			
Accessory minerals	Tr	---	---
Clay	25	20	50
Feldspar	1	---	---
Foraminifers	---	Tr	3
Glass	70	Tr	---
Nannolossils	4	80	47
Oxide	---	Tr	---

SITE 834 HOLE A CORE 11X CORED 93.2 - 102.9 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1 2 3	Lower Pliocene	F	WWWWWWWW	S S S S S S S S	2.5Y 5\2 10YR 4/4 2.5Y 5\4 2.5Y 4\2 7.5YR 3/4	VOLCANIC SAND/SILT Major lithology: VOLCANIC SAND/SILT, olive gray to dark grayish brown (5Y 4/2 to 2.5Y 4/2). Each interval shows a scoured basal contact and a gradational upper transition into nannofossil ooze with clay. The volcanic sand is often structureless, but sometimes shows parallel cross-lamination and, more rarely, wavy laminae. Minor lithology: NANNOFOSSIL OOZE WITH CLAY. Dark brown (10YR 4/4), showing rare sedimentary structures, although mottling (3–6 mm across) sometimes occurs. Also contains rare volcanic glass fragments. Towards the base of the sequence, the sediment is a darker shade of brown.



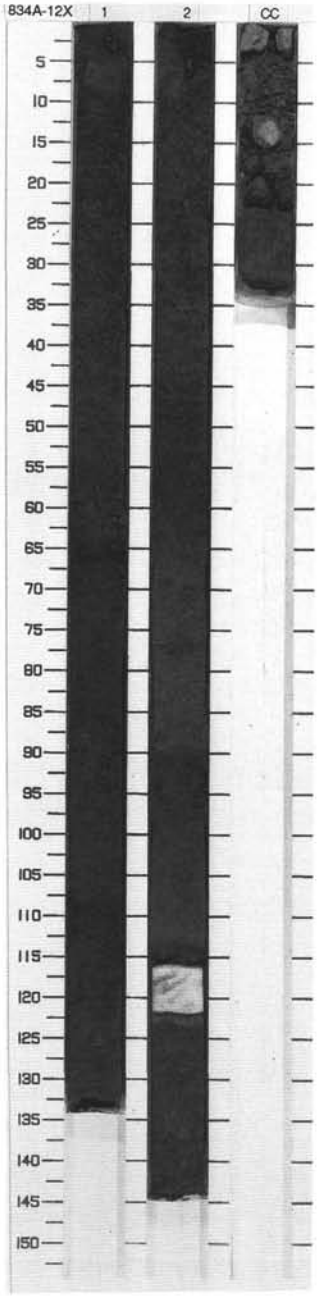
135-834A-12X
SMEAR SLIDE SUMMARY (%):

	1, 65 M	2, 22 D	2, 75 D	2, 90 M
TEXTURE:				
Sand	65	Tr	---	60
Silt	30	Tr	---	35
Clay	5	100	100	5
COMPOSITION:				
Accessory minerals	5	---	Tr	Tr
Clay	---	50	25	---
Feldspar	10	Tr	Tr	5
Glass	80	5	70	95
Nannolossils	5	45	5	Tr

SITE 834 HOLE A CORE 12X CORED 102.9 - 112.5 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1 2 CC	Lower Pliocene		M	S I S S	10YR 3/6 To 10YR 4/4 10YR 3/6	NANNOFOSSIL CLAYEY MIXED SEDIMENT Major lithology: NANNOFOSSIL CLAYEY MIXED SEDIMENT, dark yellowish brown (10YR 3/6) with no obvious sedimentary structures. Thin interbeds of dark gray (10YR 2/1) volcanic silt in Section 1 at 67 and 116 cm. In Section CC, subrounded pebbles of vesicular basalt occur within nannofossil clayey mixed sediment. Minor lithology: VOLCANIC SILT. In addition to thin beds within nannofossil clayey mixed sediment, thicker, dark yellowish brown (10YR 4/4) volcanic silt grades into the major lithology. Transition zones are mottled and burrowed.

834A 13X THROUGH 15X HARD ROCK



135-834A-16X

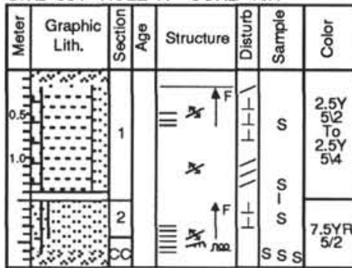
SMEAR SLIDE SUMMARY (%):

	1, 64 D	1, 128 D	2, 22 M	CC, 17 M	CC, 17 D	CC, 19 M	CC, 20 D
TEXTURE:							
Sand	---	---	10	---	---	0	---
Silt	82	---	80	5	5	---	90
Clay	18	100	10	95	95	100	10
COMPOSITION:							
Accessory minerals	2	Tr	Tr	1	3	Tr	Tr
Bioclast	---	---	---	---	---	0	---
Clay	18	85	10	---	30	20	10
Dolomite	---	Tr	---	---	Tr	0	---
Feldspar	---	Tr	---	1	2	Tr	Tr
Foraminifers	---	---	---	---	---	0	---
Glass	70	---	---	90	65	65	90
Lithic fragments	---	---	10	---	---	---	---
Magnetite	---	---	---	8	---	---	---
Nannofossils	10	15	---	---	---	0	---
Palagonite	---	---	---	---	---	15	Tr
Silt	---	---	80	---	---	---	---

SMEAR SLIDE SUMMARY (%):

	CC, 21 D
TEXTURE:	
Sand	---
Silt	90
Clay	10
COMPOSITION:	
Accessory minerals	2
Clay	10
Feldspar	1
Glass	87
Mica	Tr
Palagonite	Tr
Spicules	Tr

SITE 834 HOLE A CORE 16X CORED 131.9 - 136.3 mbsf



Description

CLAYSTONE

Major lithology: CLAYSTONE containing thin volcanic silt layers. Claystone is grayish brown (2.5Y 5/2) grading into (2.5Y 5/4) downcore. The upper 4 cm of is baked by overlying basalt sill. Claystone shows black dendritic growth structures along hairline fractures, and shows an abrupt color change to gray (7.5YR 6/0) near its base which appears to represent a reduction front.

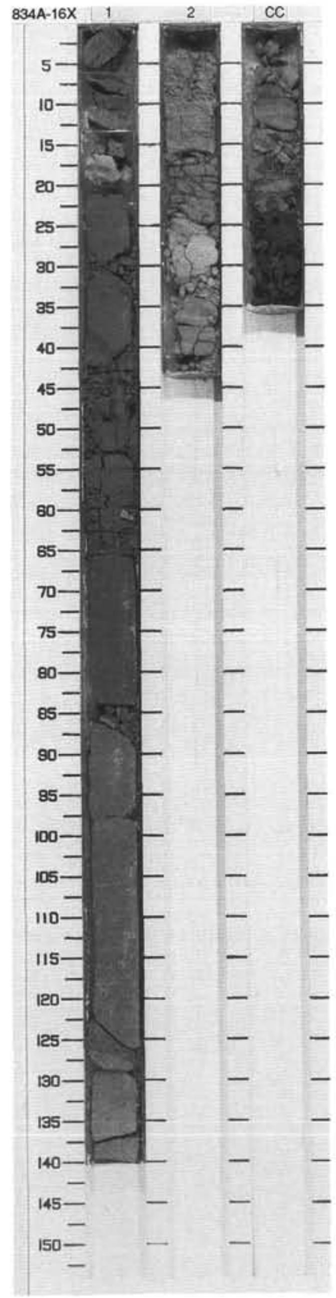
Minor lithology: VOLCANIC SILT AND SAND, light gray (7.5YR 5/2), shows normal grading and lamination. Contains small basalt pebbles at base derived from underlying basalt.

834A 17X HARD ROCK

834A 18X HARD ROCK

834A 19N NO RECOVERY

834A 20X HARD ROCK



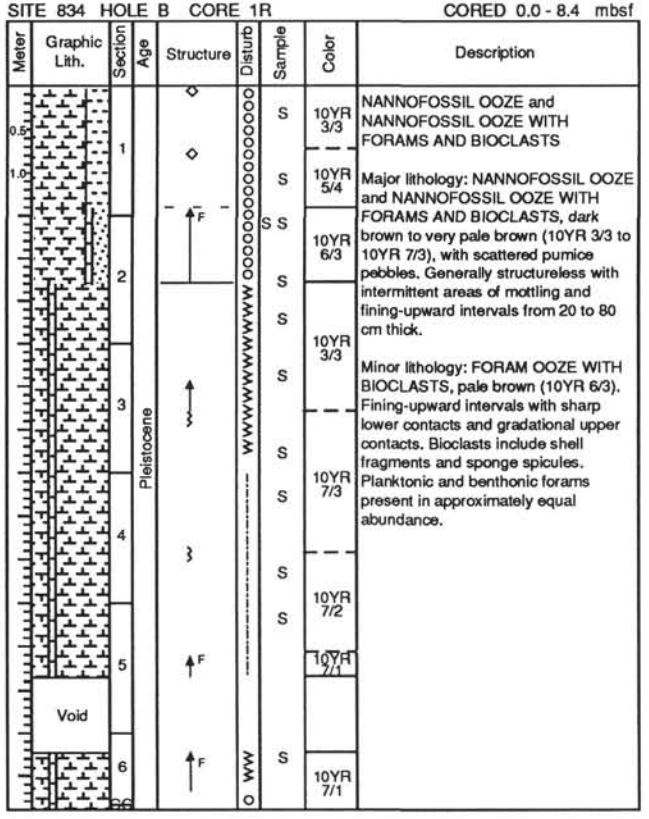
135-834B-1R
SMEAR SLIDE SUMMARY (%):

	1, 33 D	1, 108 D	2, 8 D	2, 8 D	2, 75 M	2, 123 D	3, 35 D
TEXTURE:							
Sand	---	---	75	75	80	20	20
Silt	15	20	20	20	20	5	10
Clay	85	80	5	5	-	75	70
COMPOSITION:							
Accessory minerals	---	---	Tr	Tr	---	---	---
Bioclast	---	---	15	15	20	5	10
Clay	20	20	---	---	---	---	---
Foraminifers	5	3	60	60	80	20	25
Glass	---	Tr	10	10	Tr	5	Tr
Intraclasts	---	---	10	10	---	---	---
Nannofossils	70	70	5	5	---	70	65
Oxide	5	5	---	---	---	---	---
Spicules	---	---	---	---	Tr	---	---

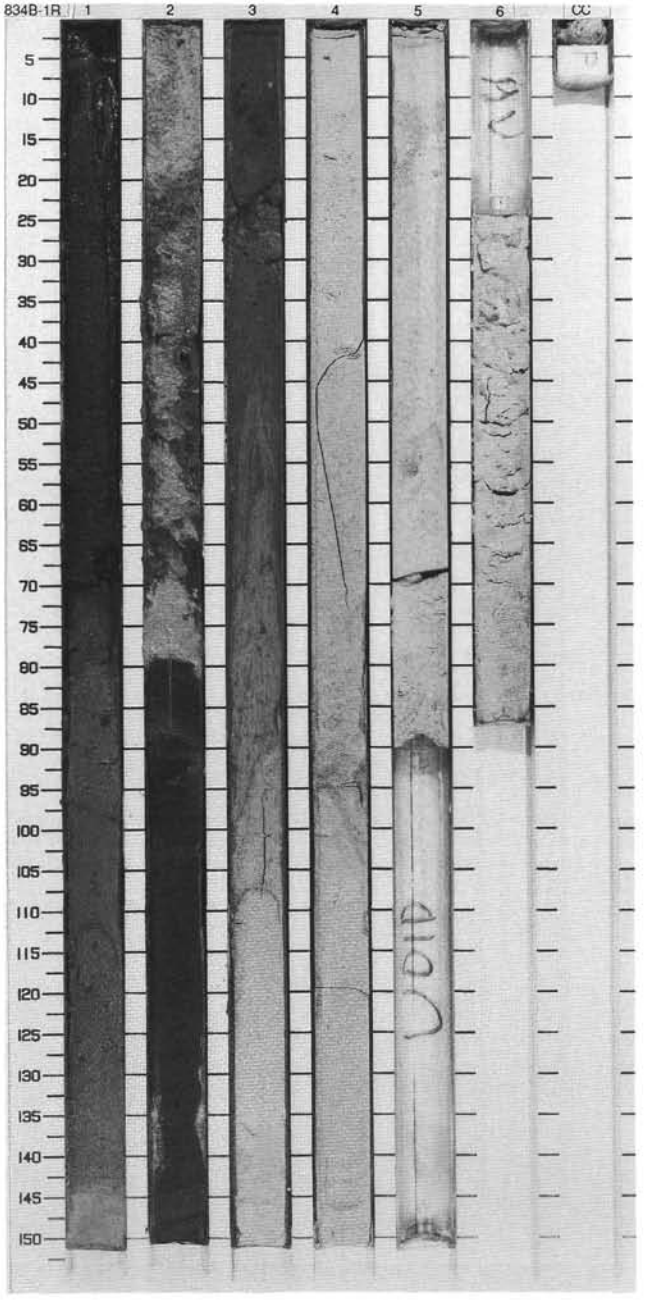
SMEAR SLIDE SUMMARY (%):

	3, 126 D	4, 33 D	4, 118 D	5, 19 D	6, 25 D
TEXTURE:					
Sand	5	10	20	10	5
Silt	15	10	5	10	30
Clay	80	80	75	80	65
COMPOSITION:					
Accessory minerals	Tr	---	---	Tr	---
Bioclast	5	Tr	5	---	20
Feldspar	---	---	Tr	5	Tr
Foraminifers	5	5	10	5	5
Glass	5	10	5	10	10
Nannofossils	80	80	75	80	65

SITE 834 HOLE B CORE 1R CORED 0.0 - 8.4 mbsf



WASHED 8.4–68.2 mbsf

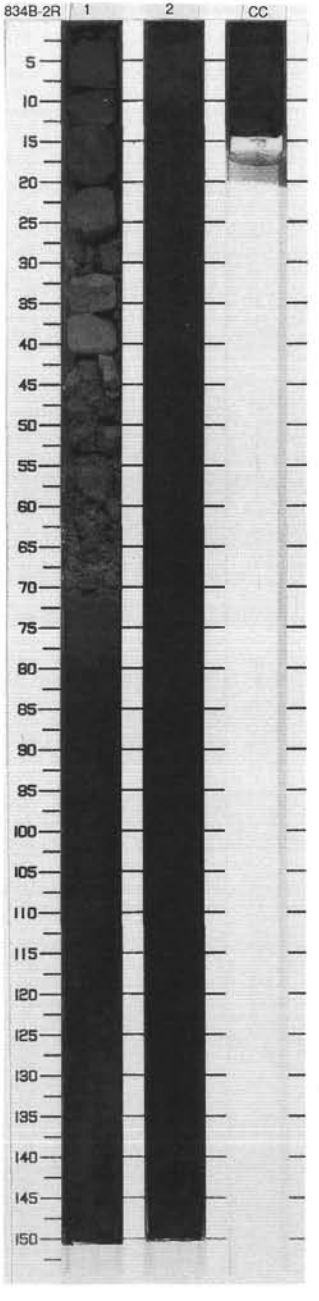


135-834B-2R
SMEAR SLIDE SUMMARY (%):

	1, 34 D	1, 65 D	2, 100 D	2, 140 D
TEXTURE:				
Sand	---	---	---	---
Silt	5	5	---	---
Clay	95	95	---	100
COMPOSITION:				
Accessory minerals	Tr	Tr	Tr	Tr
Clay	10	5	10	20
Dolomite	Tr	---	Tr	Tr
Feldspar	Tr	Tr	---	Tr
Foraminifers	5	5	10	---
Nannofossils	85	90	80	80
Opaques	---	---	---	Tr

SITE 834 HOLE B CORE 2R CORED 68.2 - 77.8 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5		1	Upper Pliocene		WWW	S	5YR 3/2	CLAYEY NANNOFOSSIL OOZE and CLAYEY NANNOFOSSIL OOZE AND FORAMS.
1.0						S	5YR 2/2	Major lithology: CLAYEY NANNOFOSSIL OOZE and CLAYEY NANNOFOSSIL OOZE AND FORAMS, very dark grayish brown to very dark brown (10YR 3/2 to 10YR 2/2), generally structureless. Slight mottling occurs in Section 2, 0–45 cm.
		2				S	10YR 2/2	
		CC				S	10YR 3/2	Minor lithology: SANDY TO CLAYEY NANNOFOSSIL OOZE WITH INTRACLASTS, dark reddish brown (5YR 3/2) to light brownish gray (2.5Y 3/2). Alternating thin-bedded to very thin-bedded, partly indurated, layers of medium sand and clay. Abundant intraclasts are found isolated in a sandy to silty matrix. Intraclasts are <4cm in diameter.

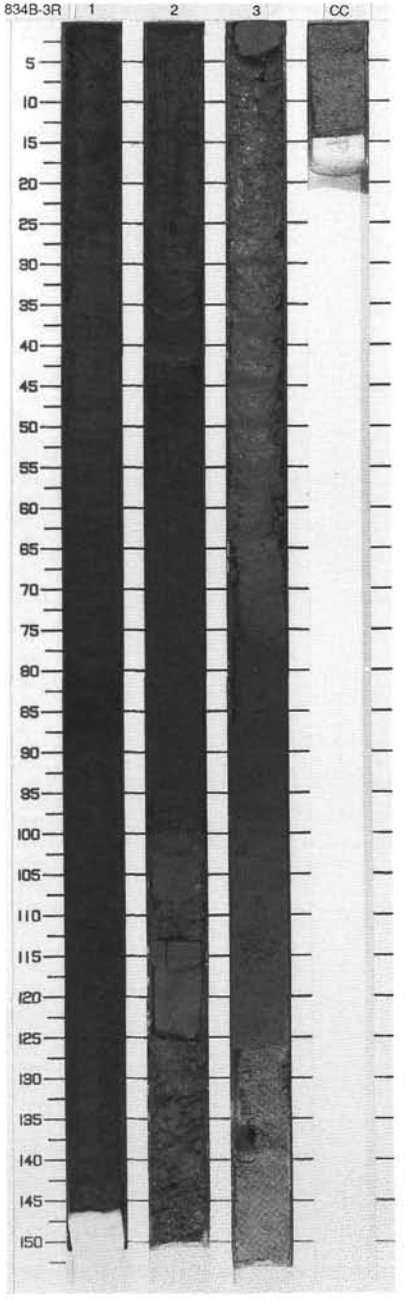


135-834B-3R
SMEAR SLIDE SUMMARY (%):

	1, 130 D	2, 42 M	2, 90 D	2, 120 D	3, 30 D	3, 100 D	3, 140 D
TEXTURE:							
Sand	---	---	---	---	---	---	---
Silt	5	---	5	85	90	80	75
Clay	95	100	95	15	10	20	25
COMPOSITION:							
Accessory minerals	Tr	Tr	Tr	Tr	Tr	Tr	Tr
Clay	10	10	10	10	5	10	15
Dolomite	Tr	---	---	---	---	---	---
Feldspar	Tr	---	Tr	Tr	---	Tr	Tr
Foraminifers	5	---	5	---	---	---	---
Glass	---	85	---	85	90	80	75
Nannofossils	85	5	85	5	5	10	10
Palagonite	---	---	---	Tr	Tr	---	---

SITE 834 HOLE B CORE 3R CORED 77.8 - 87.4 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1 2 3 CC	Lower Pliocene	F F F		S S S S S S S	10YR 3/2 2.5Y 6/2 To 10YR 6/4	CLAYEY NANNOFOSSIL MIXED SEDIMENT and VOLCANIC SILT WITH NANNOFOSSILS AND CLAY. Major lithology: CLAYEY NANNOFOSSIL MIXED SEDIMENT, very dark grayish brown (10YR 3/2), with intervals of black (10YR 2/1). VOLCANIC SILT WITH NANNOFOSSILS AND CLAY, light yellowish brown (10YR 6/4). This forms the main lithology in the lower part of the core. Minor lithology: WELL-SORTED VOLCANIC SILT in Section 2, 41–42 cm, yellowish brown (10YR 5/8).



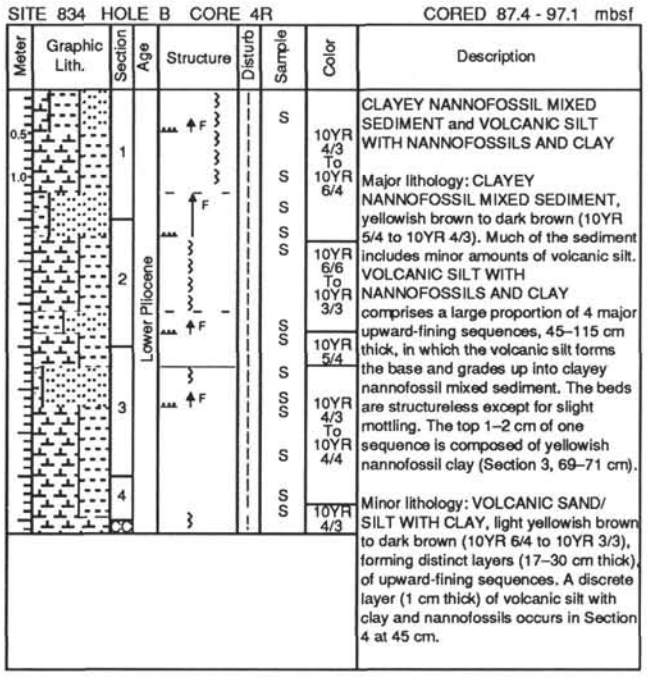
135-834B-4R
SMEAR SLIDE SUMMARY (%):

	1, 30 D	1, 100 D	1, 145 D	2, 20 D	2, 40 D	2, 132 D	2, 146 D
TEXTURE:							
Sand	---	---	---	---	---	---	---
Silt	20	3	80	100	5	60	3
Clay	80	97	20	---	95	40	97
COMPOSITION:							
Accessory minerals	Tr	Tr	Tr	15	---	Tr	Tr
Clay	35	20	15	10	5	10	10
Dolomite	Tr	---	---	---	Tr	---	Tr
Feldspar	Tr	Tr	Tr	15	Tr	---	Tr
Foraminifers	3	3	3	5	5	---	3
Glass	40	Tr	77	45	---	85	---
Mica	---	---	---	---	---	0	---
Nannofossils	22	77	5	Tr	90	5	87
Opaques	Tr	Tr	Tr	10	---	Tr	---
Palagonite	---	---	Tr	---	---	0	---

SMEAR SLIDE SUMMARY (%):

	3, 30 M	3, 62 D	3, 72 M	3, 121 D	4, 20 D	4, 45 M
TEXTURE:						
Sand	---	---	---	---	---	---
Silt	---	---	---	---	---	---
Clay	100	---	100	100	100	---
COMPOSITION:						
Accessory minerals	Tr	Tr	Tr	Tr	Tr	Tr
Clay	60	10	60	20	20	15
Dolomite	---	---	Tr	---	---	---
Feldspar	Tr	Tr	Tr	Tr	Tr	Tr
Foraminifers	---	---	Tr	Tr	Tr	Tr
Glass	25	85	---	---	---	70
Nannofossils	15	5	40	80	80	15
Opaques	Tr	Tr	---	---	---	Tr

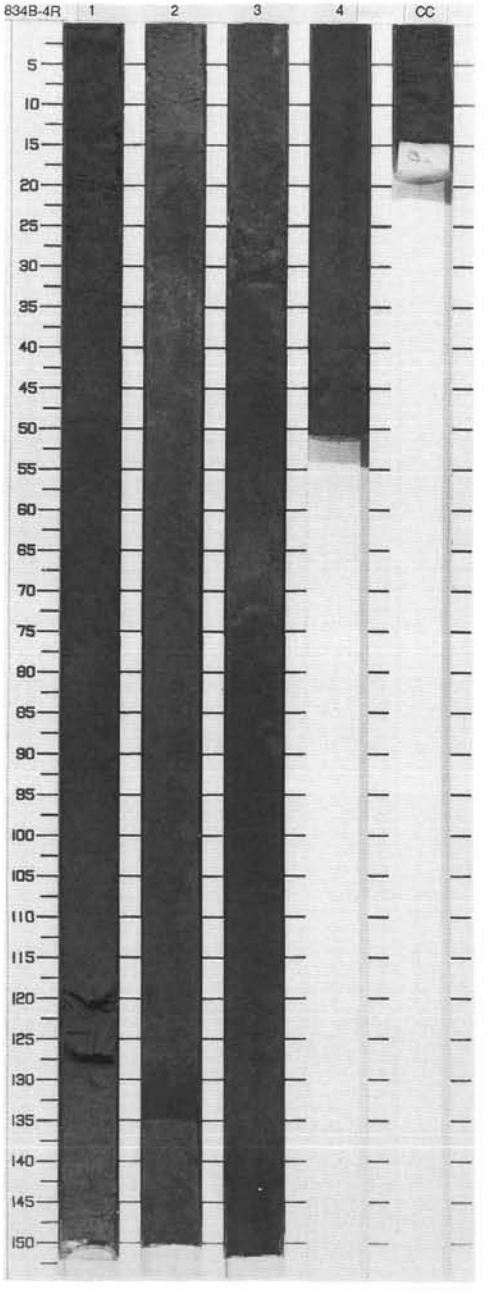
SITE 834 HOLE B CORE 4R CORED 87.4 - 97.1 mbsf



CLAYEY NANNOFOSSIL MIXED SEDIMENT and VOLCANIC SILT WITH NANNOFOSSILS AND CLAY

Major lithology: CLAYEY NANNOFOSSIL MIXED SEDIMENT, yellowish brown to dark brown (10YR 5/4 to 10YR 4/3). Much of the sediment includes minor amounts of volcanic silt. VOLCANIC SILT WITH NANNOFOSSILS AND CLAY comprises a large proportion of 4 major upward-fining sequences, 45–115 cm thick, in which the volcanic silt forms the base and grades up into clayey nannofossil mixed sediment. The beds are structureless except for slight mottling. The top 1–2 cm of one sequence is composed of yellowish nannofossil clay (Section 3, 69–71 cm).

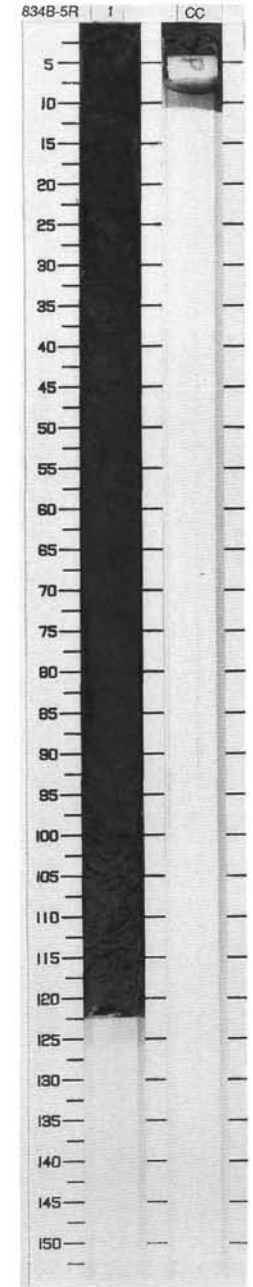
Minor lithology: VOLCANIC SAND/SILT WITH CLAY, light yellowish brown to dark brown (10YR 6/4 to 10YR 3/3), forming distinct layers (17–30 cm thick), of upward-fining sequences. A discrete layer (1 cm thick) of volcanic silt with clay and nannofossils occurs in Section 4 at 45 cm.



SITE 834 HOLE B CORE 5R CORED 97.1 - 101.8 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1 CC			WW	S S	10YR 4/3	NANNOFOSSIL CLAY WITH VOLCANIC SILT. Major lithology: NANNOFOSSIL CLAY WITH VOLCANIC SILT, brown to dark brown (10YR 4/3). Minor lithology: VOLCANIC SAND, pale brown (10YR 6/3).

WASHED 101.8–106.8 mbsf



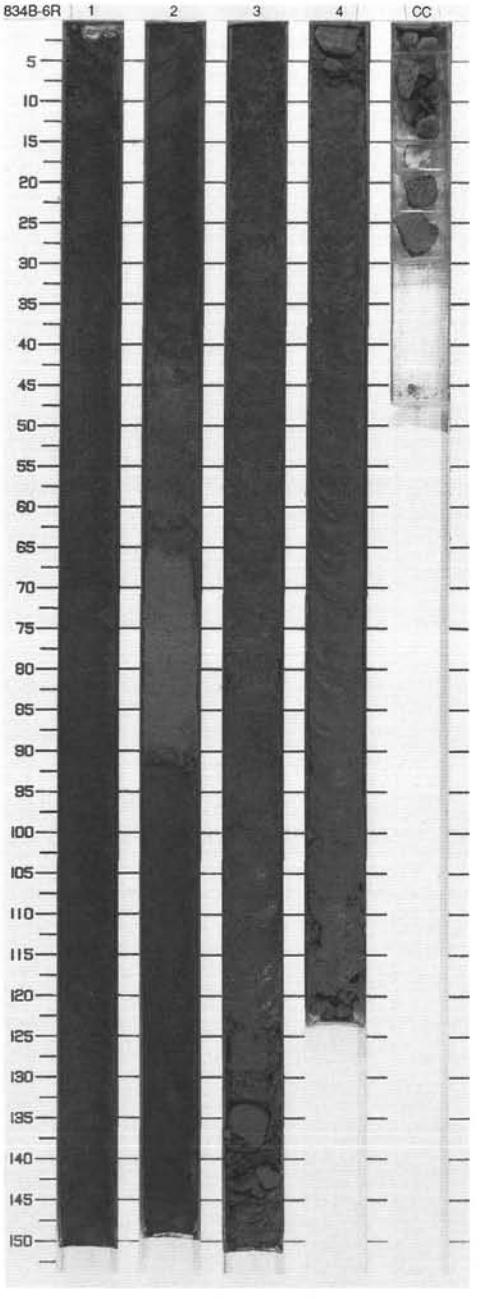
135-834B-6R
SMEAR SLIDE SUMMARY (%):

	1, 1 M	1, 80 D	2, 80 D	2, 91 M	3, 109 D	4, 72 D
TEXTURE:						
Sand	---	---	---	---	---	---
Silt	---	3	70	5	70	---
Clay	100	97	30	95	30	100
COMPOSITION:						
Accessory minerals	Tr	Tr	Tr	Tr	Tr	Tr
Clay	90	25	20	85	30	10
Dolomite	---	Tr	---	---	---	---
Feldspar	---	---	Tr	Tr	Tr	Tr
Foraminifers	---	3	---	---	---	---
Glass	---	Tr	70	5	---	---
Nannofossils	10	72	10	10	70	90

SITE 834 HOLE B CORE 6R CORED 106.8 - 116.4 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1	Lower Pliocene			S	10YR 3/3	CLAYEY NANNOFOSSIL MIXED SEDIMENT Major lithology: CLAYEY NANNOFOSSIL MIXED SEDIMENT, dark brown (10YR 3/3). Minor lithologies: VOLCANIC SAND WITH NANNOFOSSILS AND CLAY, light yellowish brown (10YR 6/4). An interlayered sequence of VOLCANIC SAND WITH NANNOFOSSILS AND CLAY, and CLAYEY NANNOFOSSIL MIXED SEDIMENT occurs in Section 2, 42–66 cm. CLAY WITH NANNOFOSSILS occurs in Section 1, 0–5 cm, white (10YR 8/2), and in Section 2, 91–93 cm, yellowish brown (10YR 5/8).
						S		
		2		F F		SS	10YR 6/4	
							10YR 3/3	
		3				S	10YR 3/3 To 10YR 6/6	
		4				S	10YR 3/3	
		CC						

834B 7R THROUGH 12R HARD ROCK



135-834B-13R
SMEAR SLIDE SUMMARY (%):

	2, 80 M	2, 86 D	2, 103 M
TEXTURE:			
Sand	---	5	2
Silt	10	5	18
Clay	90	90	80
COMPOSITION:			
Accessory minerals	2	1	1
Clay	52	90	---
Feldspar	1	4	1
Foraminifers	---	---	Tr
Glass	---	Tr	Tr
Nannofossils	40	---	75
Opaques	Tr	---	---
Oxide	5	5	20
Palagonite	Tr	Tr	Tr
	---	---	Tr

SITE 834 HOLE B CORE 13R CORED 161.0 - 165.7 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0		1 2	Lower Pliocene		V V	S S	10YR 4/3	CLAY Major lithology: CLAY, brown to dark brown (10YR 4/3), indurated. Minor lithologies: NANNOFOSSIL CLAY, very dark grayish brown (5YR 3/2), thickly laminated to thinly laminated in Section 2, 75–84 cm. NANNOFOSSIL CHALK, very dark, grayish brown (5YR 3/2) in Section 2, 100–105 cm. Chalk contains minor quantities of iron oxyhydroxide minerals, as well as trace magnetite, palagonite and sideromelane. Basaltic rubble occurs in Section 2, 72–75 cm, immediately beneath the basalt.

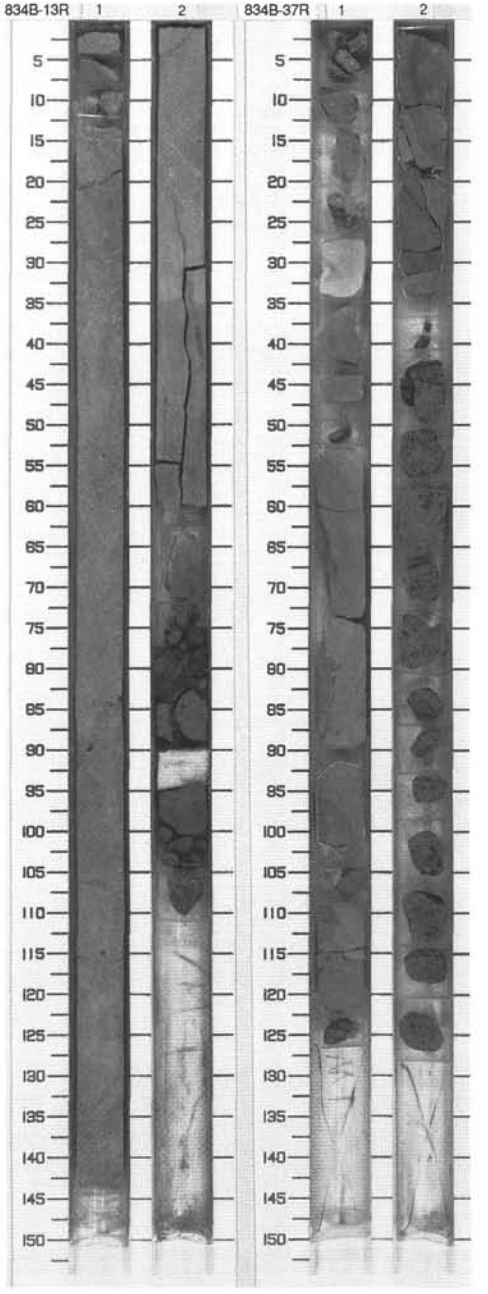
834B 14R THROUGH 36R HARD ROCK

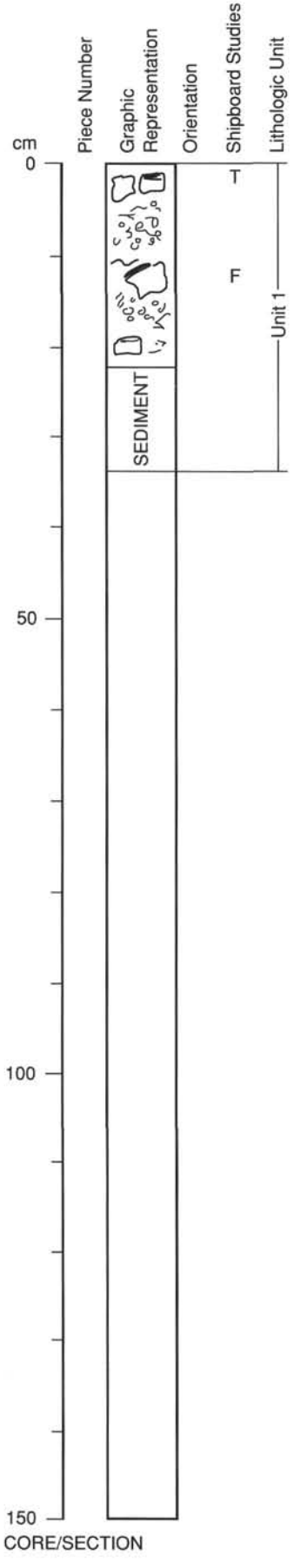
135-834B-37R
SMEAR SLIDE SUMMARY (%):

	1, 30 M	1, 30 M	1, 61 M	2, 31 M	2, 34 M
TEXTURE:					
Sand	---	---	30	---	---
Silt	---	---	20	20	---
Clay	---	---	50	80	---
COMPOSITION:					
Cement	---	---	---	---	Tr
Clay	---	---	21	37	56
Feldspar	---	---	2	---	---
Foraminifers	15	15	16	---	3
Glass	---	---	---	10	---
Goethite	---	10	---	8	25
Nannofossils	65	65	31	20	10
Oxide	10	---	6	---	---
Palagonite	10	10	21	10	---
Plagioclase	---	---	---	Tr	1
Pore space	---	---	---	15	5
Pyroxene	---	---	Tr	Tr	Tr

SITE 834 HOLE B CORE 37R CORED 299.5 - 309.1 mbsf

Meter	Graphic Lith.	Section	Age	Structure	Disturb	Sample	Color	Description
0.5 1.0	Void	1 2				S S S S	10YR 7/8 To 10YR 4/3 To 10YR 3/1	CALCAREOUS SANDSTONE AND CALCAREOUS MUDSTONE Major lithologies: CALCAREOUS SANDSTONE, white (10YR 8/1) to yellow (10YR 7/8). Generally fine-grained and parallel-laminated towards base. The sandstone also contains small mudclasts. Deformed CALCAREOUS MUDSTONE, brown (10YR 4/3) to very dark grey (10YR 3/1) containing deformed thin lenticular sandy layers. Minor lithologies: SILTSTONE, brown (10YR 4/3) to very dark grey (10YR 3/1), occurs as a deformed layer within the sandstone.



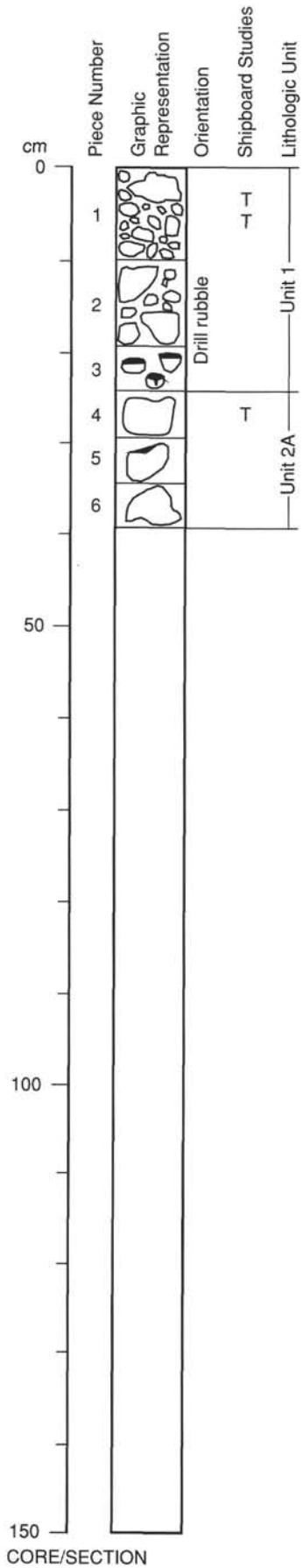


135-834A-12X-CC

UNIT 1: OLIVINE AND PLAGIOCLASE BEARING BASALT

Pieces 1–22 cm

CONTACTS: None, only loose pieces, though several have very thin glassy rims.
PHENOCRYSTS: Rare.
Plagioclase: <1%; to 2 mm; euhedral, single grains to small glomerocrysts.
Olivine: <1%; 0.5 mm; single grains.
GROUNDMASS: Aphanitic.
VESICLES: 10%–20%; 0.2–0.8 mm; irregular; uniform; very fine-grained and abundant; groundmass is very porous; some margin-parallel lines of vesicles.
Miaroles: None.
COLOR: 7.5YR 6/0, gray.
STRUCTURE: None.
ALTERATION: Slightly; brown to brown-gray patches and bands in groundmass.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: All occur as clasts and pebbles in red-brown nannofossil ooze; the olivine phenocrysts distinguish them from all of the lower units.



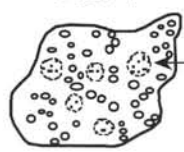
135-834A-13X-1

UNIT 1: APHYRIC BASALT

Pieces 1–3

CONTACTS: None.
PHENOCRYSTS: None visible.
GROUNDMASS: Uniformly microcrystalline.
VESICLES: None.
Miaroles: None.
COLOR: 10YR 4/1, dark gray.
STRUCTURE: Massive.
ALTERATION: Pervasive, slight–moderate alteration, glassy rims with palagonite on some surfaces.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: These pieces were recovered as drilling rubble and were arbitrarily sorted into (1) angular fragments coated in sediment (2) fragments with yellow-brown coatings on exterior surfaces, and (3) fragments with glassy rinds. Glassy rinds are from 1–5 mm thick.

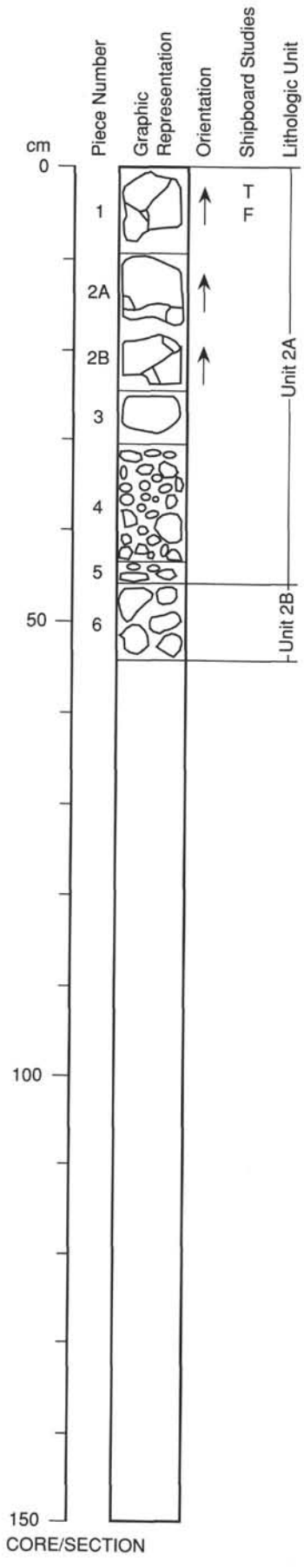
Piece 4



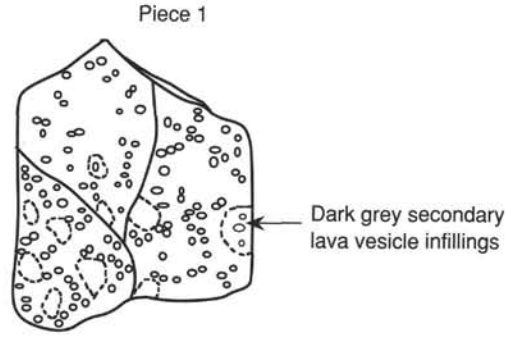
UNIT 2A: APHYRIC BASALT

Pieces 4–6

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Uniformly microcrystalline.
VESICLES: 10%–20%; <1 to 5 mm; round; various; more concentrated in Piece 5. Round (to 7 mm) concentrations of fine vesicles (up to 50%) are patchily distributed through samples.
Miaroles: None.
COLOR: 10YR 4/1, dark gray.
STRUCTURE: None.
ALTERATION: Slightly altered; Piece 6 has a thin (about 0.1 mm) carbonate coating on one surface.
VEINS/FRACTURES: None.



135-834A-14X-1



UNIT 2A: APHYRIC BASALT

Pieces 1–4

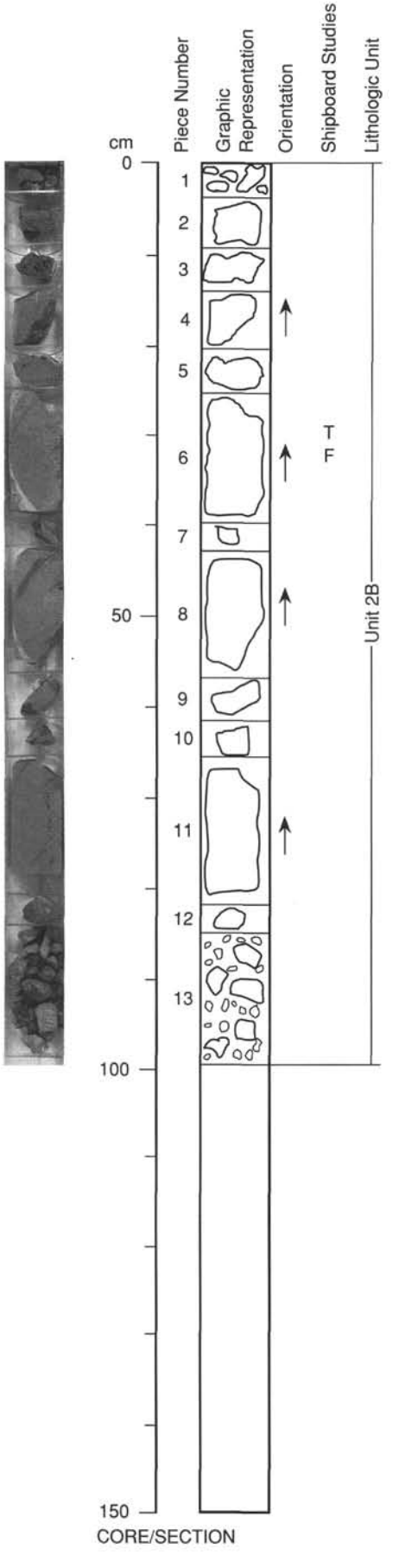
CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Uniformly very fine-grained.
VESICLES: 20%; 0.5 to 3.5 mm; round; patchy; two scales to vesicles: (1) relatively coarse, patchy distribution (as above) (2) very fine scale vesicles through groundmass, <= 0.2 mm, rounded to subrounded, forming about 30% of groundmass. Some (10%) coarse (3–12 mm) dark gray, secondary lava infillings of preexisting vesicles.
Miaroles: Very rare calcite linings to vesicles.
COLOR: 7.5YR 4/0, dark gray.
STRUCTURE: Massive, vesicular.
ALTERATION: Restricted to fractures and fracture infillings.
VEINS/FRACTURES: <5%; 1 to 3.5 mm width; random orientation; infillings finely crystalline calcite with minor "limonite" staining.
ADDITIONAL COMMENTS: The material in this part of the section is essentially identical to Unit 2B, the two being separated by a baked sediment zone.

Piece 5 is baked calcareous sediment (ooze).

UNIT 2B: APHYRIC BASALT

Piece 6

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Uniformly very fine-grained.
VESICLES: 30%; 1–4 mm; subrounded; patchy distribution; two size distributions: (1) large, patchy distribution, (2) very fine (<.15 mm) vesicles in groundmass comprising 40%–50% of groundmass.
Miaroles: Rare phillipsite and Mg-oxide infillings.
COLOR: 7.5YR 3/0, very dark gray.
STRUCTURE: Massive.
ALTERATION: Fresh–slightly altered.
VEINS/FRACTURES: None.



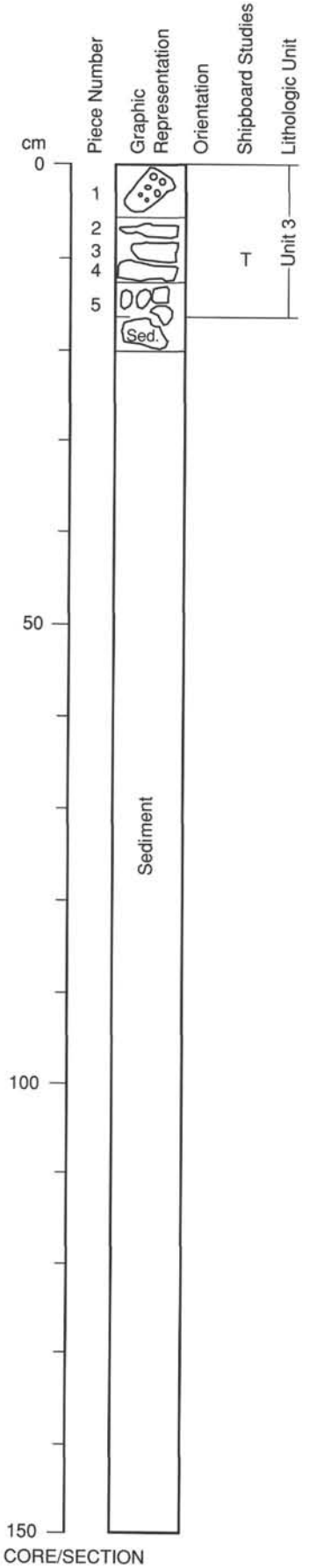
135-834A-15X-1

UNIT 2B: APHYRIC BASALT

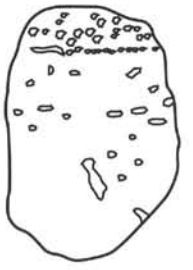
Pieces 1–13

CONTACTS: None visible.
PHENOCRYSTS: None.
GROUNDMASS: Uniformly very fine-grained to vitreous (latter especially noticeable around vesicles); plagioclase and pyroxene visible.
VESICLES: 30%; 1 to 6.5 mm; round to pipe-like; regular; two size distributions: (1) as above, (2) very fine (<0.15 mm) vesicles in groundmass comprising 40%–50% of groundmass. Pipe-like vesicular structures (vertical) developed clearly in Pieces 6, 8, and 11. Miaroles: Zeolites infilling some vesicles in lower portion of the section.
COLOR: 7.5YR 3/0, very dark gray.
STRUCTURE: Massive.
ALTERATION: Slight–moderate.
VEINS/FRACTURES: <1%; 0.2 mm width; random; fine-grained calcite (plus Fe-oxide staining) aggregates present along margins of some fragments - could be veins or baked calcareous ooze?.
ADDITIONAL COMMENTS: Pieces numbered 13 represent drilling rubble.

135-834A-16X-1



Piece 1



UNIT 3: SPARSELY TO MODERATELY PHYRIC PLAGIOCLASE BASALT

Pieces 1–5

CONTACTS: Loose fragments at 16 cm are adjacent to light tan baked(?) clay; these pieces are slightly more vesicular than Pieces 2–4 and are darker gray.

PHENOCRYSTS:
Plagioclase: 1%–3%; 1 to 2 mm; euhedral, rarely to 3 mm, minor glomerocrysts.

GROUNDMASS: Uniformly microcrystalline; groundmass has a fine porous texture (up to 30% very fine vesicles?).

VESICLES: 5%–10%; 0.5 to 4 mm; ovoid; patchy; concentrated in Pieces 1 and 5 (up to 5% to 10%); very patchy in Pieces 2 to 4 (<1% to 20% locally); see drawing.
Miaroles: Minor elongate cavities (to 3 by 10 mm); minor yellow, yellow-orange, blue-gray vesicle and cavity linings.

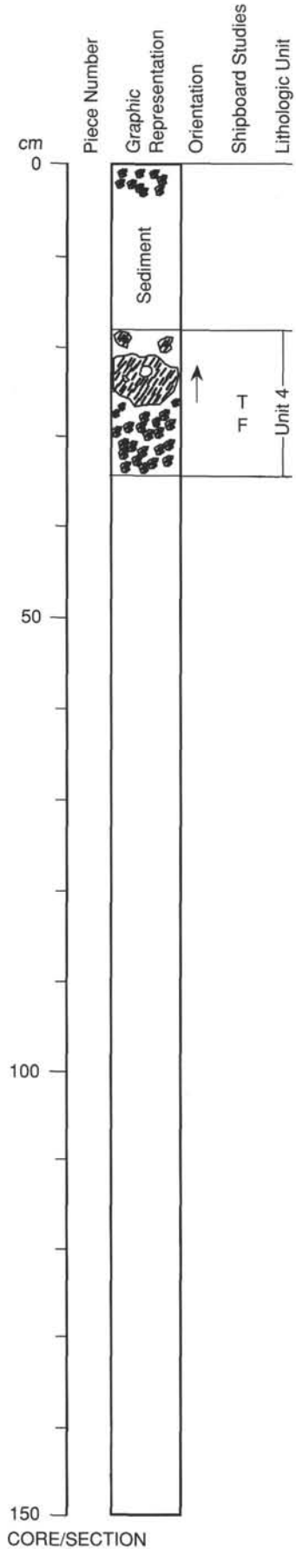
COLOR: 10YR 6/1 light gray.

STRUCTURE: Massive.

ALTERATION: Slight (see miaroles entry).

VEINS/FRACTURES: None.

ADDITIONAL COMMENTS: Contact at base is to clayey tuffaceous sediment with sharp transition from brown to gray-green color lower in the core. Sediment piece at contact is lighter tan and seems more indurated than the sediment below it.

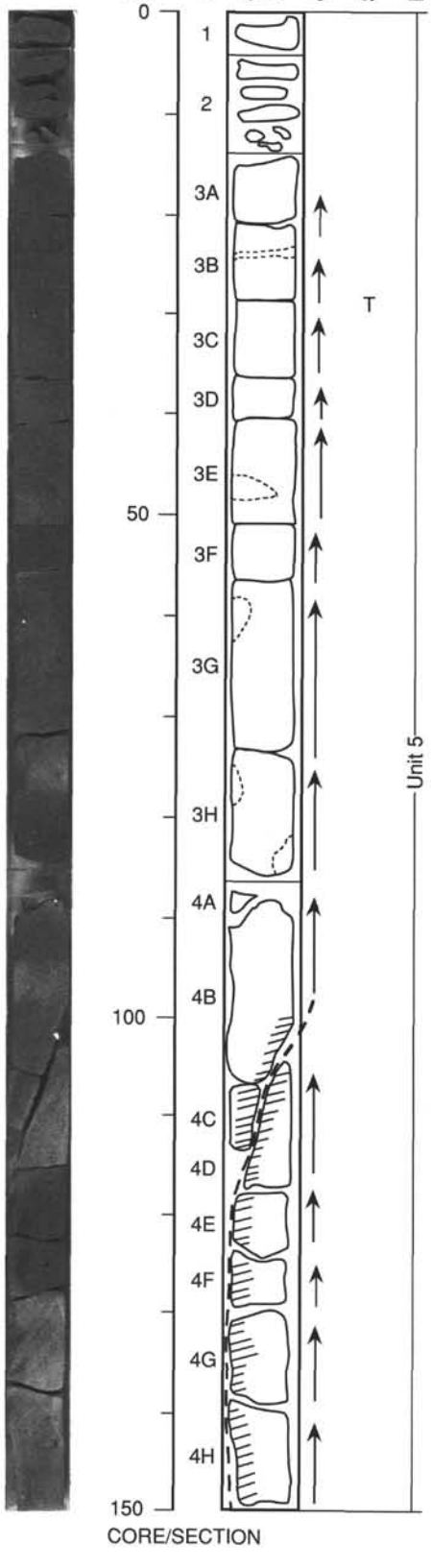


135-834A-16X-CC

UNIT 4: APHYRIC BASALT

Pieces 20–35 cm

CONTACTS: The contact at 20 cm has basalt fragments with glassy rims (<1mm) overlain by gray silty sediment.
PHENOCRYSTS: None.
GROUNDMASS: Aphanitic, fine porous vesicularity.
VESICLES: 10%; 2 mm; round; various; vesicles are most abundant in the large piece at 23 to 26 cm; they appear to decrease in abundance in the rubble. Rarely, cavities up to 12 mm in diameter occur.
Miaroles: None.
COLOR: 10YR 2.5/1, black.
STRUCTURE: Samples are brecciated (flow top?); pebble-sized except for one large piece at 23 to 26 cm.
ALTERATION: Fresh; minor gray-green sediment filling vesicles and surface cavities.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Section 16–20 is all sediment; the sediment contact on the basalt is judged to be depositional based on the abundance of volcanic fragments in the sediment. Pebbles at 0–5 cm fell on deck from core catcher, were retrieved by Hawkins and arbitrarily stored in top of CC. Rocks were not given piece numbers.



135-834A-17X-1

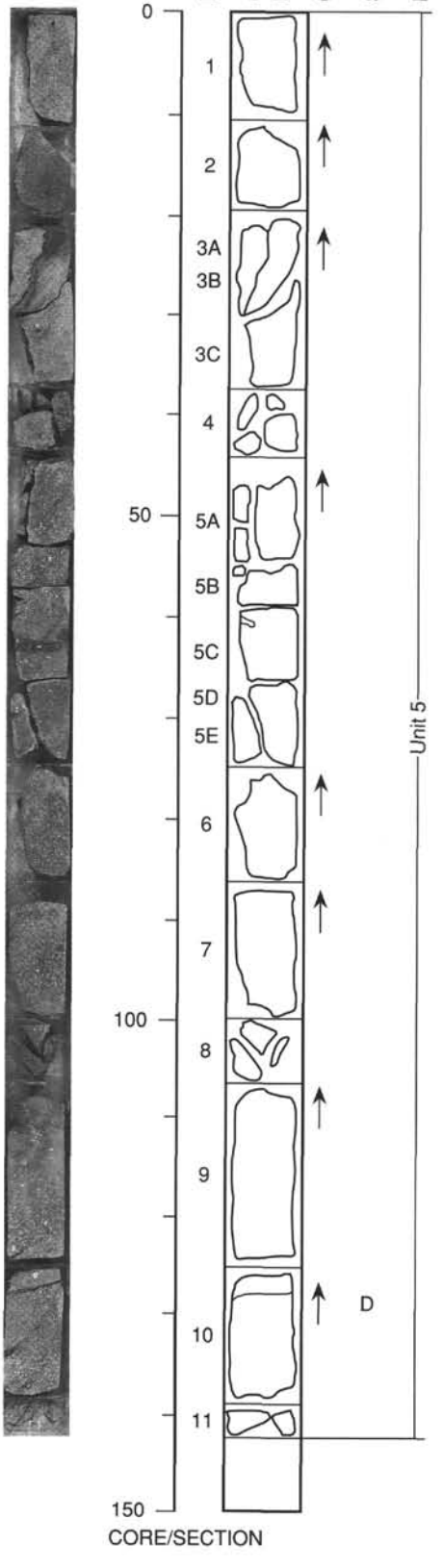
UNIT 5: APHYRIC BASALT

Pieces 1–4

CONTACTS: None visible.
PHENOCRYSTS: None visible.
GROUNDMASS: Fine-grained, holocrystalline. Extensive secondary mineral development comprising zeolites and smectite/chlorite(?) mixtures.
VESICLES: 1%; rarely to 6 mm; irregular; scattered; only large vesicles counted; groundmass has a pervasive porosity (up to 20%?) which is in part vesicles, in part grain boundary porosity.
Miaroles: All vesicles have partial infillings of(?) zeolites.
COLOR: 5Y 6/1, gray.
STRUCTURE: Massive.
ALTERATION: High to very high.
VEINS/FRACTURES: <1%; about 1 mm; steeply dipping to vertical; prominent steep fracture cutting unit between 100 and 150 cm. Distinct alteration zone along fracture with Fe oxide staining and rare pyrite visible.
ADDITIONAL COMMENTS: Alteration decreases from high to moderate downcore. Darker vesicular zones, relatively free of infillings are conspicuous at several positions in core.

Key

— — fracture
attraction zone adjacent to fracture
darker vesicular zones, relatively free of infillings

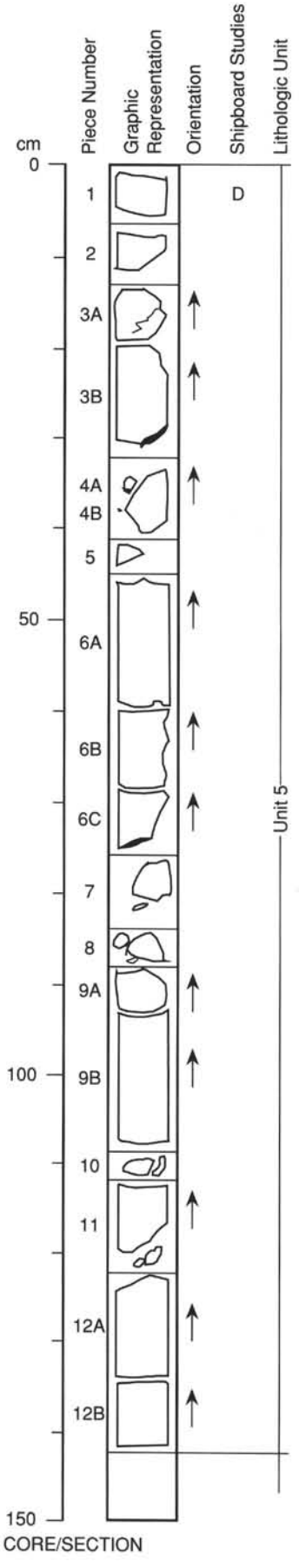


135-834A-17X-2

UNIT 5: APHYRIC BASALT

Pieces 1–11

CONTACTS: None visible.
PHENOCRYSTS: None visible.
GROUNDMASS: Fine-grained, holocrystalline. Extensive secondary mineral development, *comprising zeolites and green clays.*
VESICLES: 0%–15%; 1–7 mm; rounded to subrounded; variable; well-developed filiform zeolitic cavity infillings. Only large vesicles counted. Groundmass has a pervasive porosity which appears partly vesicular and partly a grain boundary porosity. Miaroles: Extensive zeolite infillings.
COLOR: 5Y 5/1, gray.
STRUCTURE: Massive.
ALTERATION: High to moderate.
VEINS/FRACTURES: Local; <2 mm width; subvertical; vein infillings variable; some calcite, some chlorite/clay, some zeolitic.
ADDITIONAL COMMENTS: Prominent infilled vesicular zones between 45–60 cm, 84–90 cm, 94–106 cm, 117–130 cm, and 135–150 cm.



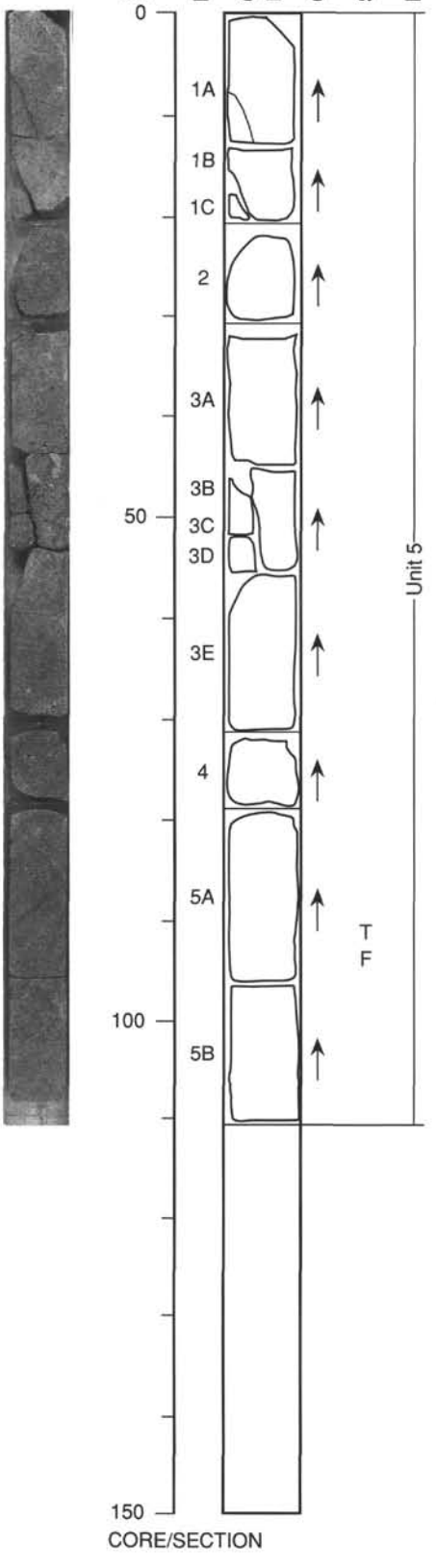
135-834A-17X-3

UNIT 5: APHYRIC BASALT

Pieces 1–12B

CONTACTS: None visible.
PHENOCRYSTS: None visible.
GROUNDMASS: Fine-grained, holocrystalline. Extensive secondary mineral development.
VESICLES: <20%; 1–9 mm; rounded to subrounded; variable; percentage quoted refers to the larger vesicles. Overall rock shows fine-scale porosity which may partly represent fine vesicularity.
Miaroles: Extensive zeolite infillings (dominantly white).
COLOR: 7.5YR N4/0, gray.
STRUCTURE: Massive.
ALTERATION: High to moderate.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Prominent vesicle infilling between 1–12 cm and 26–96 cm (gradational).

135-834A-17X-4

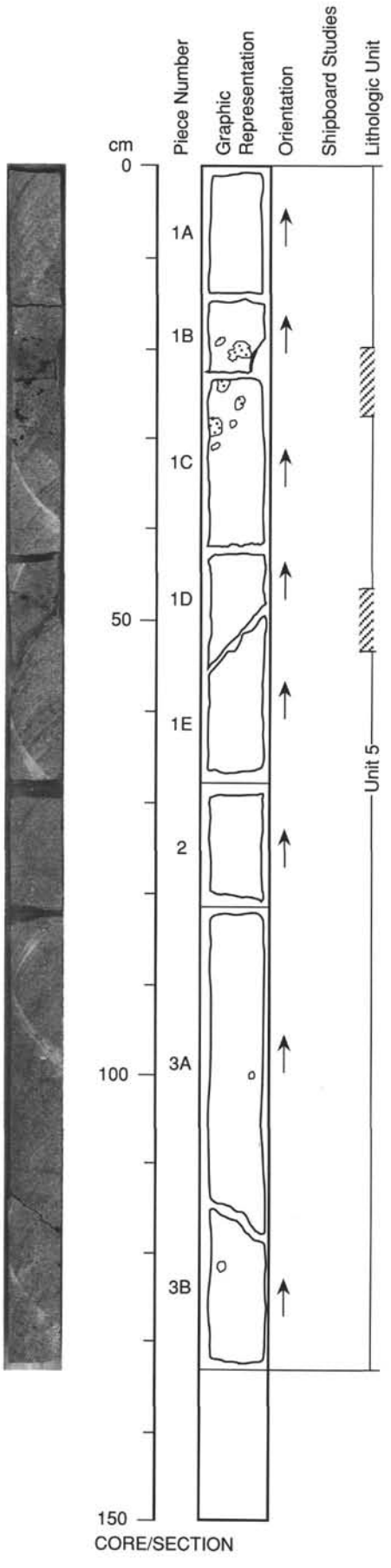


← Calcite vein < 0.1 mm in width with dark halo

UNIT 5: APHYRIC BASALT

Pieces 1A–5B

CONTACTS: None visible.
PHENOCRYSTS: None visible.
GROUNDMASS: Holocrystalline, fine-grained. Extensive secondary mineral development (zeolites/chlorite/smectite?)
VESICLES: 30%; <6 mm; rounded to elongated; throughout; larger vesicles show zeolite minerals and calcite growing from the wall.
Miaroles: Most vesicles infilled with platy and/or acicular minerals (zeolites?)
COLOR: 7.5N 4/0, dark gray.
STRUCTURE: Massive.
ALTERATION: High to moderate.
VEINS/FRACTURES: <1%; <1mm; subvertical; very thin white vein between 7–13 cm.
ADDITIONAL COMMENTS: Vesicle infilling not as extensive as in previous sections.



135-834A-18X-1

UNIT 5: APHYRIC BASALT

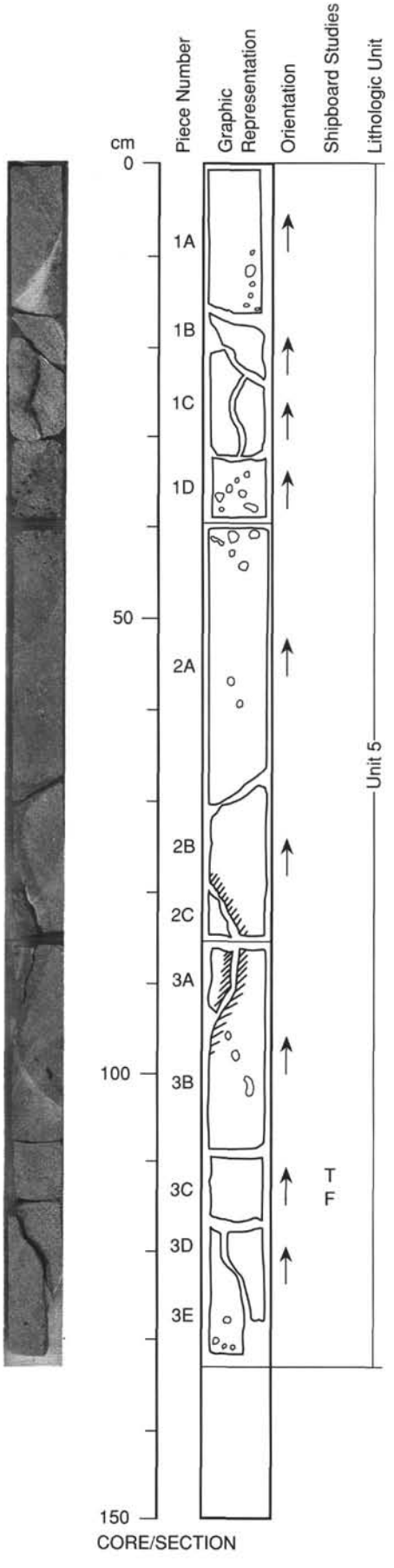
Pieces 1A–3B

CONTACTS: None.
PHENOCRYSTS: None visible
GROUNDMASS: Fine-grained , holocrystalline. Extensive secondary mineralization.
VESICLES: <1%–10%; 1–5 mm; rounded to subrounded; variable; large vesicles concentrated around Pieces 1B and 1C close to the large vug.
Miaroles: Tabular and/or acicular zeolite(?)-lined vugs and vesicles.
COLOR: 2.5Y N5/0 gray.
STRUCTURE: Massive.
ALTERATION: Highly to moderately altered. When Pieces 1A–1C are reconstructed, a semicircular alteration halo (3.5 or more cm wide) occurs around a large (1.5 cm across) vug. This vug is lined with orange-brown and green acicular zeolites(?)
VEINS/FRACTURES: <1%; 8 cm long; steeply dipping; reddish brown alteration along the fracture which now separates Pieces1D and 1E.

Key

zone of large cavities

orange fracture or cavity coating

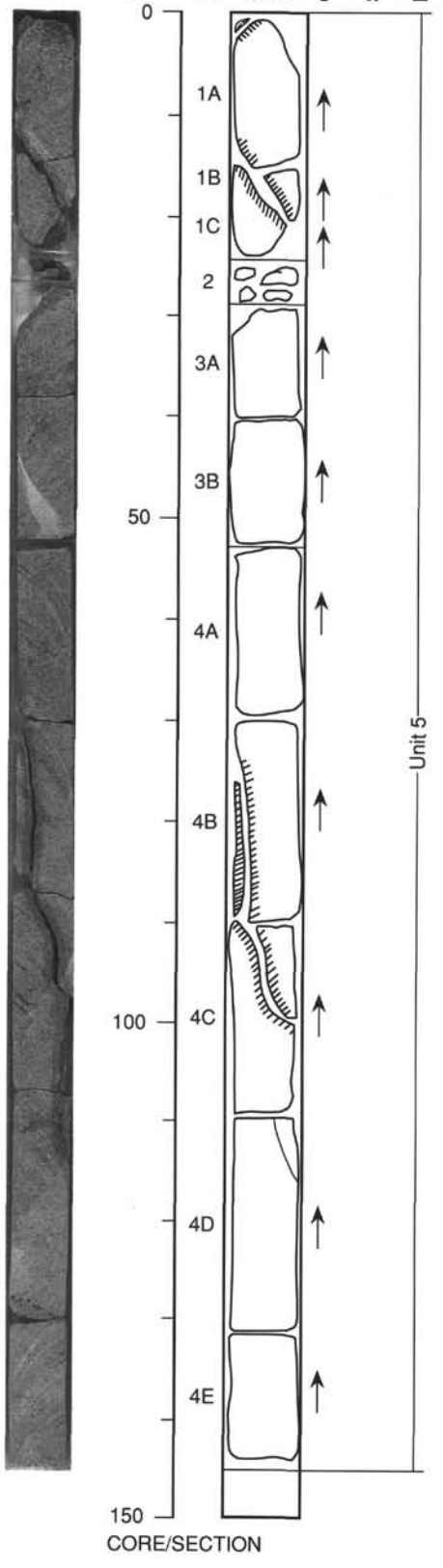


135-834A-18X-2

UNIT 5: APHYRIC BASALT

Pieces 1A–3E

CONTACTS: None.
PHENOCRYSTS: None visible.
GROUNDMASS: Fine- to medium-grained, holocrystalline. Extensive secondary mineralization.
VESICLES: 1%–10%; <1 mm–10 mm; irregular; variable; variable distribution, greatest concentration between 34 cm and 40 cm (ie. near Piece 1D). In Piece 1D zeolites(?) include green and yellow varieties (in addition to the typical white varieties observed). Miaroles: Tabular and/or acicular zeolite(?) lined vugs and vesicles.
COLOR: 2.5Y N5 gray.
STRUCTURE: Massive.
ALTERATION: Moderate–highly altered.
VEINS/FRACTURES: 1%; 12 cm long and 2 mm wide; subvertical; high carbonate content in vein fillings. On either side of the fracture there is an alteration halo 1.5 cm wide. Reddish brown alteration along the fracture, and on piece boundaries.



135-834A-20X-1

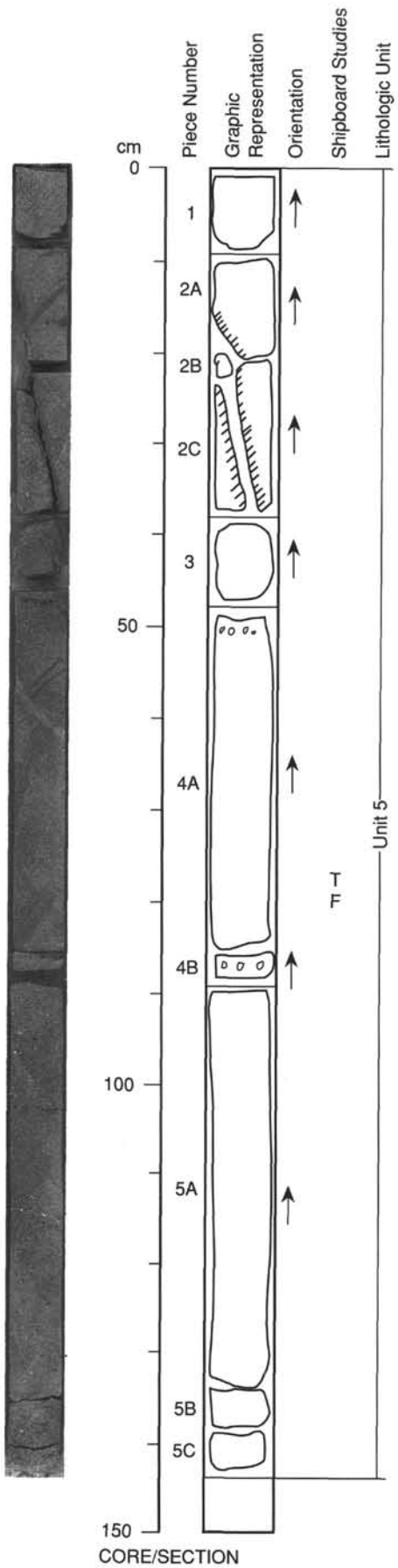
UNIT 5: APHYRIC BASALT

Pieces 1A–4E

CONTACTS: None visible.
PHENOCRYSTS: None visible.
GROUNDMASS: Fine- to medium-grained, holocrystalline. Widespread secondary mineralization.
VESICLES: 0%–15%; <1–5 mm; rounded to irregular; variable; vesicles appear more abundant in Pieces 1 and 2 although development is patchy and infilling is more intense towards the bottom of this section.
Miaroles: White zeolites(?) varying from thin coatings to tabular and/or globular.
COLOR: 2.5Y N5, gray.
STRUCTURE: Massive.
ALTERATION: Moderately to highly altered.
VEINS/FRACTURES: 2%; 10–46 cm long, 2 mm wide; steeply dipping to subvertical; fractures infilled with coatings and acicular crystals of zeolite(?) up to 2 mm wide. Alteration halo extends 7 mm either side of the fracture surface.

Key

//// Fe-Mn and/or calcite in fractures

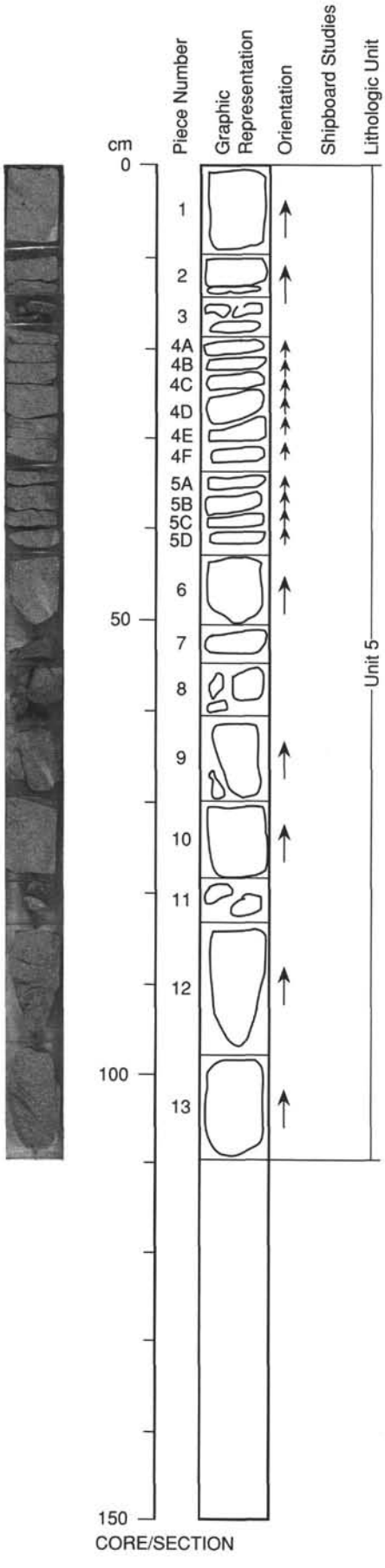


135-834A-20X-2

UNIT 5: APHYRIC BASALT

Pieces 1–5C

CONTACTS: None visible.
PHENOCRYSTS: None visible.
GROUNDMASS: Fine- to medium-grained, holocrystalline. Extensive secondary mineral development.
VESICLES: 0%–5%; <1–6 mm; rounded to elongate; variable; vesicle content is irregular and patchy but this is due largely to infilling by secondary minerals obscuring the original vesicle distribution.
Miaroles: Most vesicles filled with white tabular to globular zeolites.
COLOR: 2.5Y N5, gray.
STRUCTURE: Massive.
ALTERATION: Moderately to highly altered.
VEINS/FRACTURES: 1%; 20 cm long; 1 mm wide; subvertical; fracture surfaces coated with Fe-Mn oxide with high carbonate content; 1 cm alteration halo on either side.

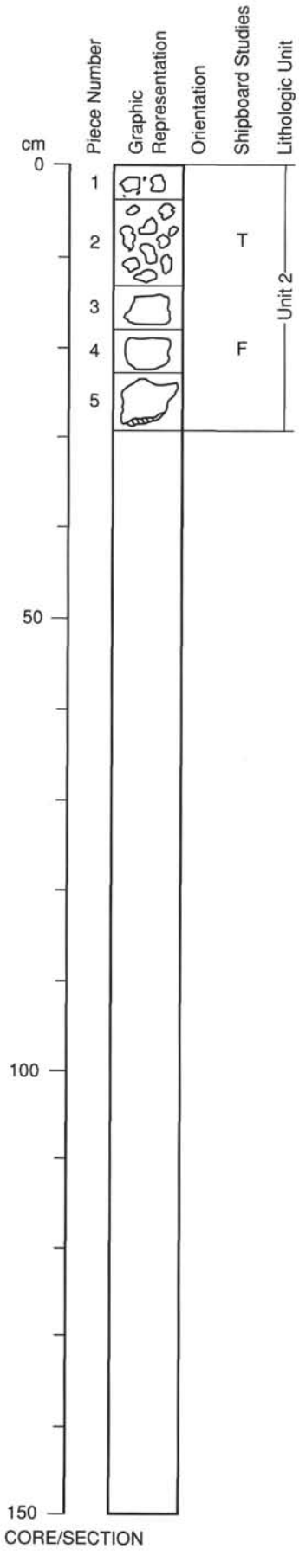


135-834A-20X-3

UNIT 5: APHYRIC BASALT

Pieces 1–13

CONTACTS: None visible.
PHENOCRYSTS: None.
GROUNDMASS: Fine- to medium-grained, holocrystalline. Extensive secondary mineral development.
VESICLES: 0%–10%; <1–5 mm; rounded to subrounded; variable; vesicle abundance is somewhat obscured by degree of infilling with secondary minerals.
Miaroles: White zeolites(?) generally tabular to globular.
COLOR: 2.5Y N/5, gray.
STRUCTURE: Massive.
ALTERATION: Moderately to highly altered.
VEINS/FRACTURES: None.



135-834B-6R-CC

UNIT 2: APHYRIC BASALT

Pieces 2, 4, and 5

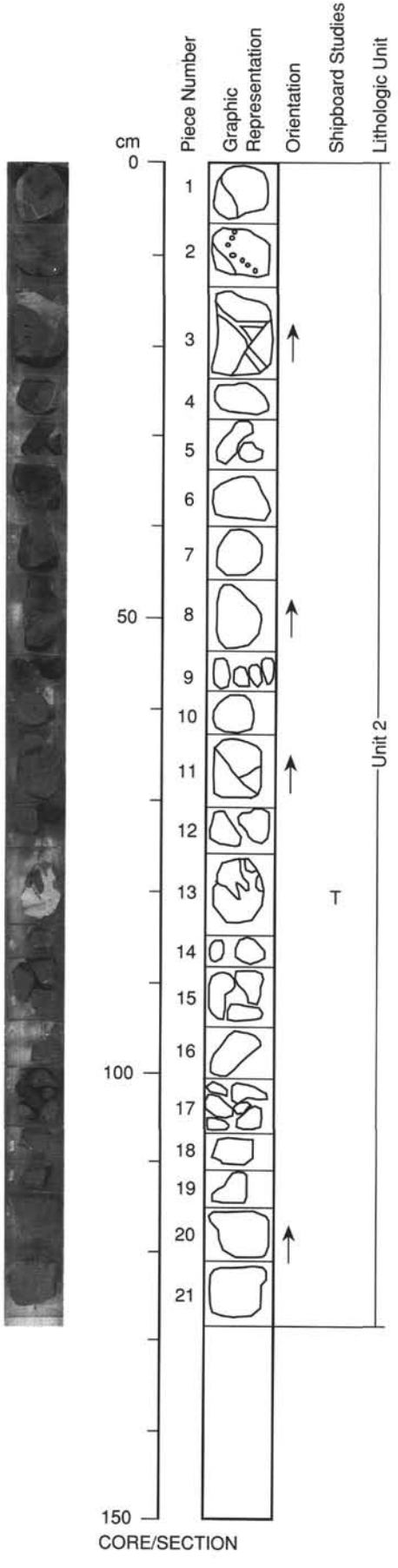
CONTACTS: Glassy basalt fragments are attached to metamorphosed limestone clasts in Pieces 1 and 3.
PHENOCRYSTS: None.
GROUNDMASS: Uniformly microcrystalline (<0.4 mm). Pieces 2 and 4 are slightly finer grained; groundmass texture has plagioclase microlite with intergranular clinopyroxene.
VESICLES: 30%; <1 to 45 mm; ovoid to round; patchy to uniform; two vesicle populations: one has large, ovoid vesicles >1 mm to 4.5 mm; these are most abundant in Pieces 2 and 4 (4% to 8%) and comprise only 1% of Piece 4. The second group has round, <1 mm (typically 0.5 mm) vesicles comprising up to 30% of groundmass volume in most pieces.
Miaroles: Thin orange-red and brown-red coatings in some vesicles.
COLOR: 10YR 6/1, gray; Pieces 2 and 4 are slightly browner.
STRUCTURE: None.
ALTERATION: Slight to moderate in Piece 5; vesicle fillings as noted above; <1 mm calcite coatings on some outside surfaces; brown-orange intergranular coatings and fillings are common in Piece 5.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: At least one pebble of Piece 2 is a 7 mm angular limestone clast; two small fragments in Piece 2 have thin glassy margins.

UNIT 2: LIMESTONE

Pieces 1 and 3

CONTACTS: Metamorphosed adjacent to basalt; all pieces have small, glassy, basaltic fragments attached.
PHENOCRYSTS: N/A.
GROUNDMASS: Fine-grained with some small dark gray patches (siliceous infillings?)
VESICLES: N/A.
Miaroles: N/A.
COLOR: 10YR 8/1, white to 10YR 5/3, brown.
STRUCTURE: None.
ALTERATION: High-probably a metamorphosed ooze; glassy fragments have yellow-orange palagonite(?)/clay(?) rims.
VEINS/FRACTURES: <1%; <0.2 mm; N/A; filled with recrystallized carbonate?
ADDITIONAL COMMENTS: Thin coatings of recrystallized calcite on some outside surfaces.

Pieces may have been mixed in core catcher and sorted on cutting table. No stratigraphic significance.

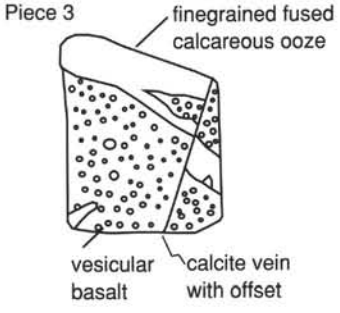


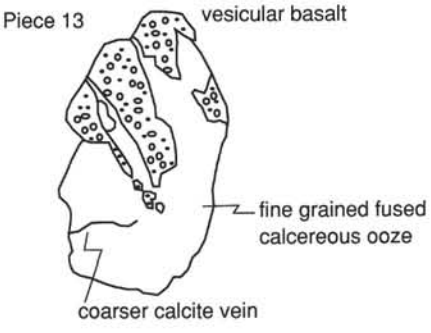
135-834B-7R-1

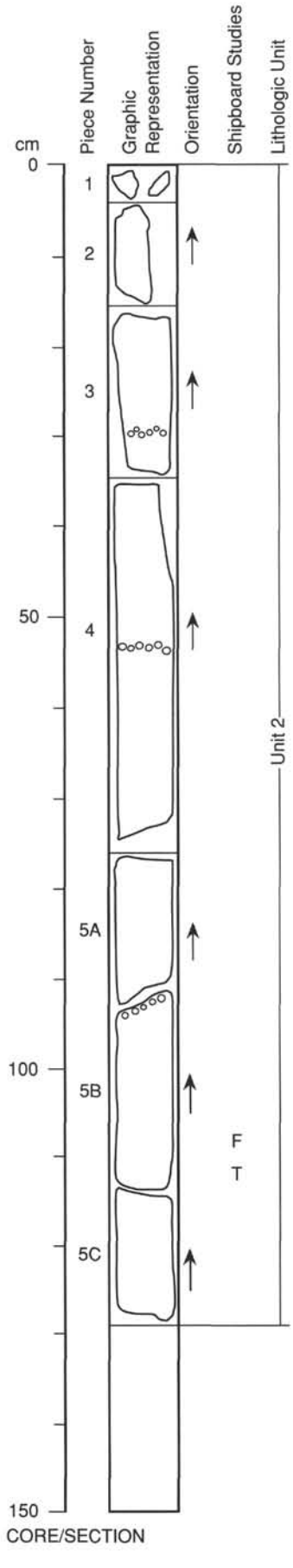
UNIT 2: APHYRIC BASALT

Pieces 1–21

CONTACTS: None seen.
PHENOCRYSTS: Plagioclase: <0.1%; 1 by 4 mm; single phenocryst in Piece 4.
GROUNDMASS: Fine-grained, holocrystalline. Plagioclase laths visible. Rare, small deep brown to reddish brown patches may represent altered olivine and/or pyroxene. More common small paler brown patches of uncertain origin.
VESICLES: 15%–20%; 0.1 to 3 mm; rounded to interlocking; even; there tends to be a bimodal distribution of vesicles. The smaller vesicles interlock extensively, giving the rock a high porosity.
Miaroles: Partial infillings of calcite, (?)zeolite, Mn-oxides variously occur.
COLOR: 10YR 5/1, gray.
STRUCTURE: Massive.
ALTERATION: Fresh to highly altered.
VEINS/FRACTURES: <1%; <=1mm width; various; small irregular veins contain calcite. Drill fragments frequently have broken along such veins yielding the patchy calcite coatings on some fragments.
ADDITIONAL COMMENTS: Pieces 3 and 13 exhibit complex reaction features between calcareous ooze and lava. The calcareous material is recrystallized. Piece 14 is recrystallized calcareous ooze.







135-834B-8R-1

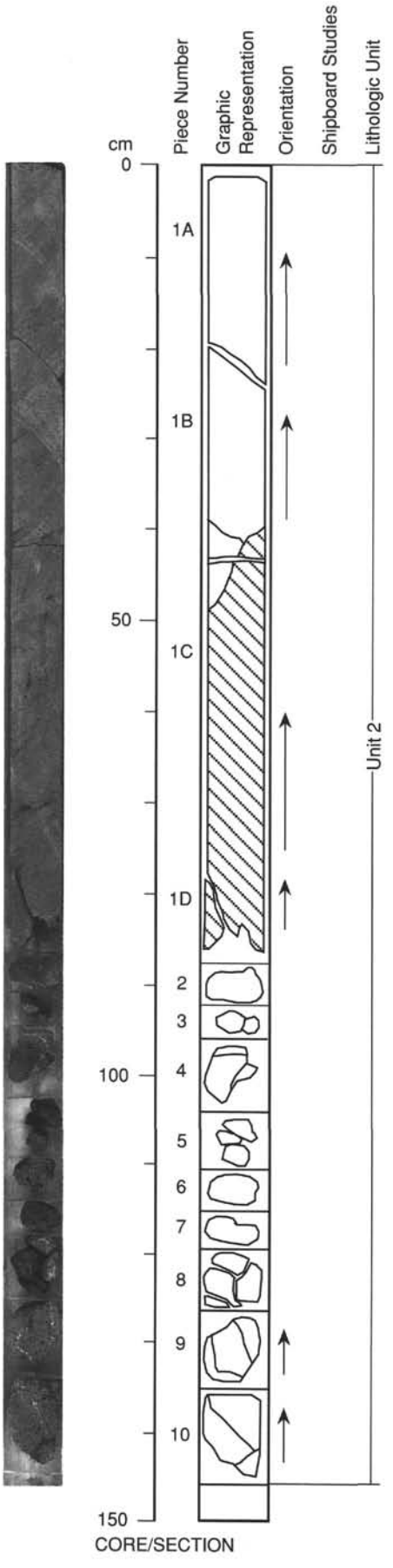
UNIT 2: APHYRIC BASALT

Pieces 1–5C

CONTACTS: None visible.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained, holocrystalline. Plagioclase laths visible, plus fine pyroxene (interstitial).
VESICLES: 10%–20%; 0.1 to 3 mm; rounded to subangular, interconnected; large vesicles patchily distributed; interconnected producing quite high porosity. Three subhorizontal zones of largest vesicle concentrations at 29–31 cm, 54–55 cm, and 92–95 cm. Miaroles: Minor zeolite(?) infilling.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Slight.
VEINS/FRACTURES: <<1%; <= 1 mm width; subvertical; infillings and coatings of Mn *oxides*, *zeolite(?)*, *and calcite*.

ooooo Subhorizontal coarser vesicle zones

135-834B-8R-2

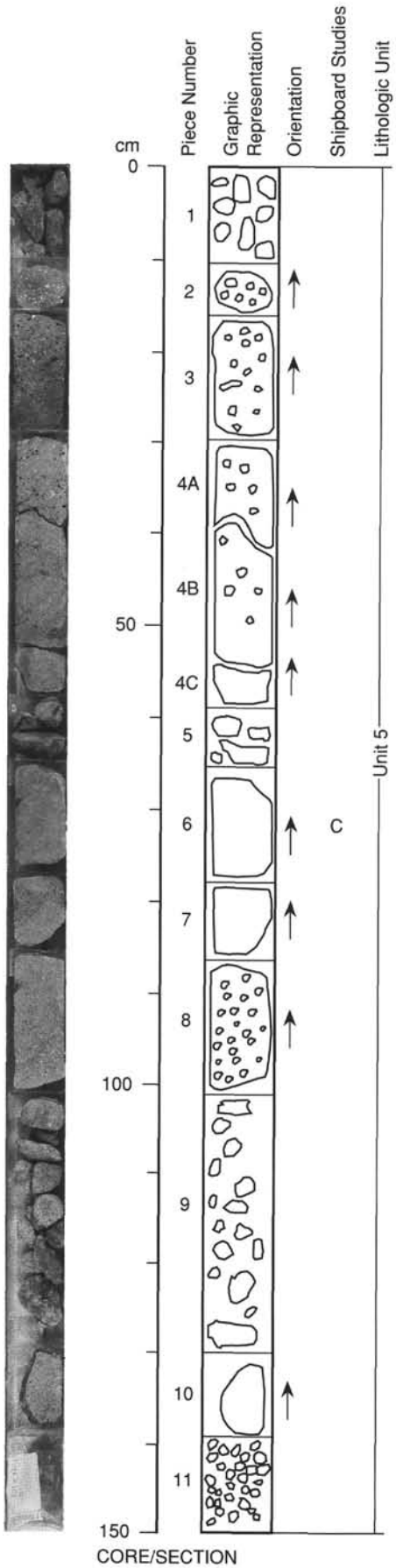


UNIT 2: APHYRIC BASALT

Pieces 1A–10

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained.
VESICLES: 3%–20%; 5 mm; rounded; patchy; two populations: one set occasional, subrounded to 5 mm sometimes aligned in strings, others <2 mm, irregular. Miaroles: Smaller vesicles have coatings of light green zeolites.
COLOR: Fresher rock is gray (2.5Y 5/0); altered is light brownish gray (2.5Y 6/2).
STRUCTURE: None.
ALTERATION: Moderate; note alteration front in Piece 1C.
VEINS/FRACTURES: <1%; <1 mm; various; brown to orange-brown clay fillings. Fracture surfaces are well exposed in Piece 4, can see two generations of carbonate infilling. The outer is medium brown, the inner is white with sharp boundary between the two. Also some yellow orange ochreous material.

Oxidized, altered portion of piece

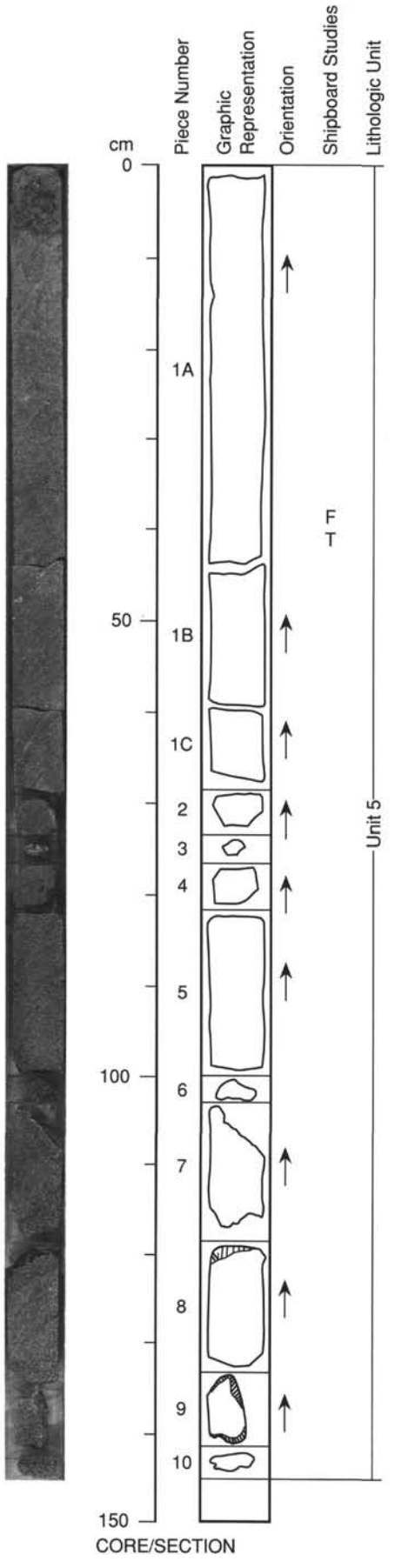


135-834B-9R-1

UNIT 5: APHYRIC BASALT

Pieces 1–11

CONTACTS: None visible.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained, pervasive alteration.
VESICLES: 1%–30%; <1–6 mm; irregular-rounded; variable; largest vesicles in Pieces 2, 3, and 4; smaller in the other pieces.
Miaroles: Zeolite and carbonate infilling in Pieces 2 and 8, none in the others.
COLOR: 7.5R 3/0.
STRUCTURE: Massive.
ALTERATION: Highly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Piece 11 is rubble from Core Catcher.

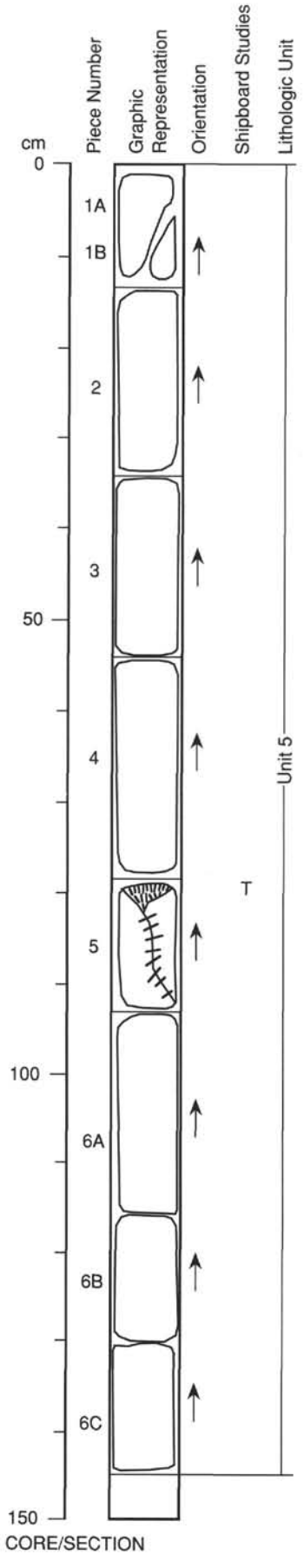


135-834B-10R-1

UNIT 5: APHYRIC BASALT

Pieces 1A–10

CONTACTS: None visible.
PHENOCRYSTS:
Plagioclase: Trace; <1.
GROUNDMASS: Microcrystalline to very fine-grained (to 1 mm); plagioclase laths with intergranular pyroxene.
VESICLES: 10%; 1–5 mm; subrounded; uniform; vesicle distribution even throughout the section.
Miaroles: Slight secondary mineral development on the walls.
COLOR: 2.5YR 5/0 gray.
STRUCTURE: Massive.
ALTERATION: Moderate.
VEINS/FRACTURES: None.



135-834B-10R-2

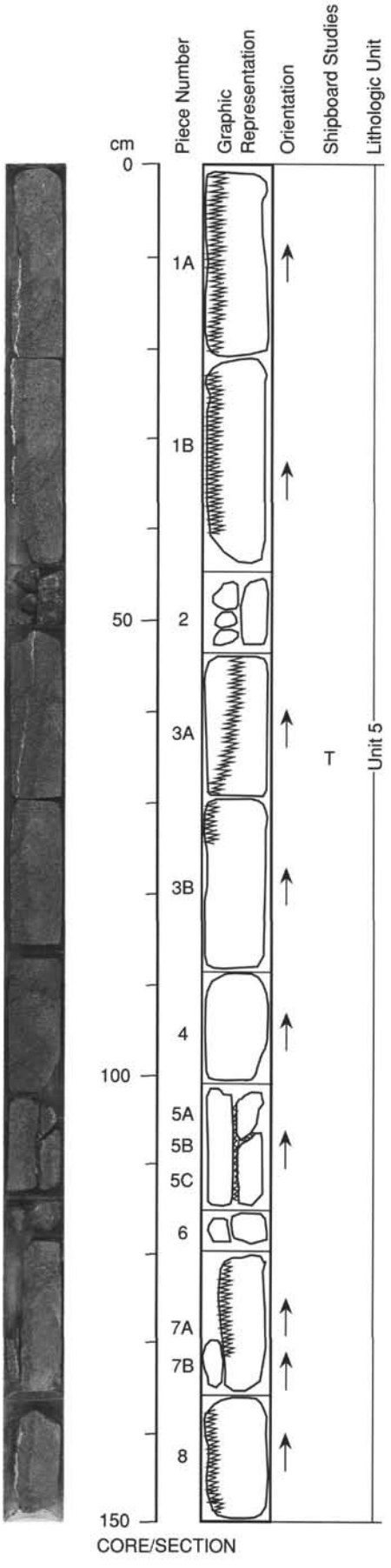
UNIT 5: APHYRIC BASALT

Pieces 1A–6C

CONTACTS: None visible.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained groundmass of pyroxenes and plagioclase laths.
VESICLES: 10%–20%; <1–7 mm; subrounded to irregular; relatively uniform; vesicles lined with white-green globular carbonate(?) and acicular zeolites.
Miaroles: None.
COLOR: 2.5YR 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderately altered.
VEINS/FRACTURES: <1%; 14 cm long; 1–2 mm wide; subvertical; acicular zeolites(?) and/or carbonate. Colorless to pale yellow-brown material infilling fracture.

/// = fibrous or acicular zeolites

135-834B-10R-3

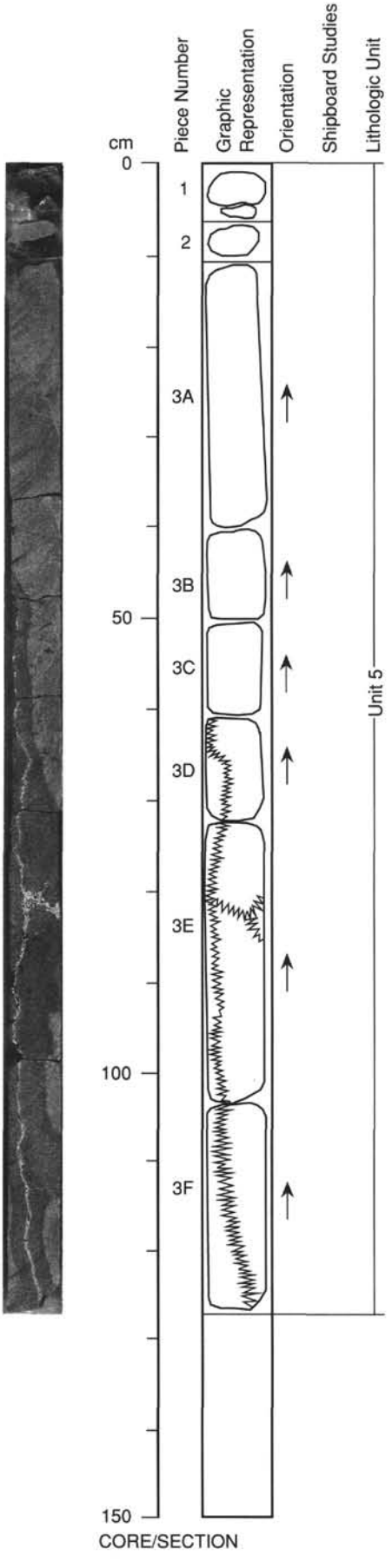


UNIT 5: APHYRIC BASALT

Pieces 1A–8

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained; plagioclase laths with intergranular pyroxene.
VESICLES: <1%–10%; <1–4 mm; subrounded to irregular; uniform; vesicles lined with white to pale green globular zeolites(?) and/or carbonate. Distribution appears patchy, however this results from variation in infilling, particularly in the vicinity of the vein filled fracture.
Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderate–highly altered.
VEINS/FRACTURES: 5%; 10 to >45 cm long; subvertical; Pieces 1–3, 5, 7, and 8 all show evidence of wide (up to 2 cm) alteration halos either side of the vein filled fractures. The fractures are irregular rather than flat–planar surfaces. Immediately adjacent to the rock surface the alteration is a Fe-oxide brown. The vein-fill material itself is a white carbonate(?) and/or zeolite which varies from massive to clusters of acicular and tabular crystals.

^^^ = veins with acicular mineral growtrh (zeolite?)



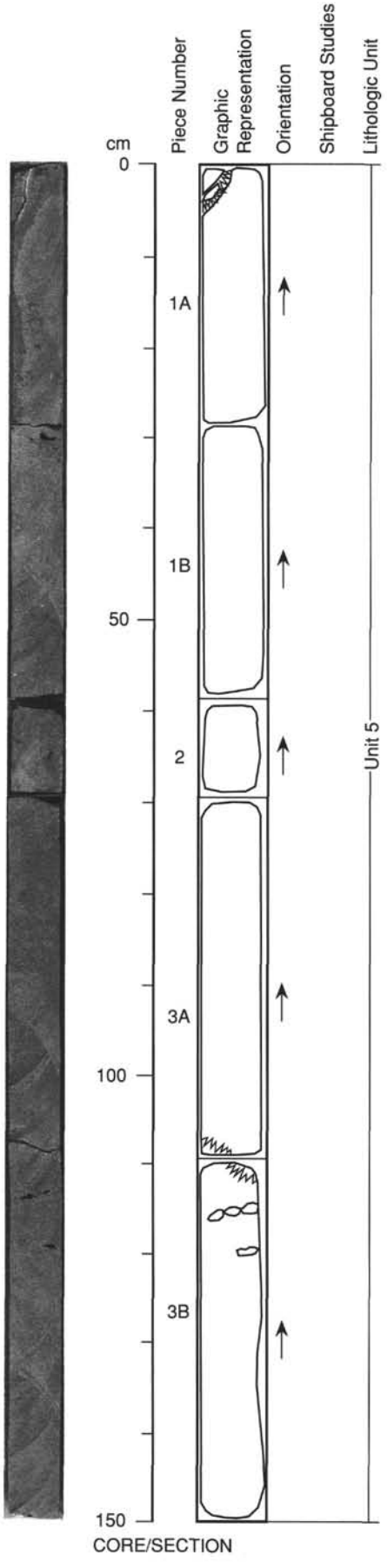
135-834B-11R-1

UNIT 5: APHYRIC BASALT

Pieces 1–3F

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained.
VESICLES: 5%–10%; <1–4 mm; subrounded; uniform; infilled with white globular to tabular zeolites (?) and/or carbonate.
Miaroles: None.
COLOR: 2.5Y 5/0, gray to 2.5Y 5/2.
STRUCTURE: Massive.
ALTERATION: Moderate to very high.
VEINS/FRACTURES: 5%; 80 cm long; 2–4 mm wide; subvertical; Pieces 3B and 3F contain an irregular vein-filled fracture which branches out in sample 3E. Alteration halos are up to 4 cm wide either side of the fracture. The vein infilling the fracture passes from Fe-oxide staining at the rock interface to whitish zeolites and/or carbonates at the interior. Greenish clays are also present.

= filled veins (zeolites, carbonates,green clays, Fe-oxide and hydroxide)

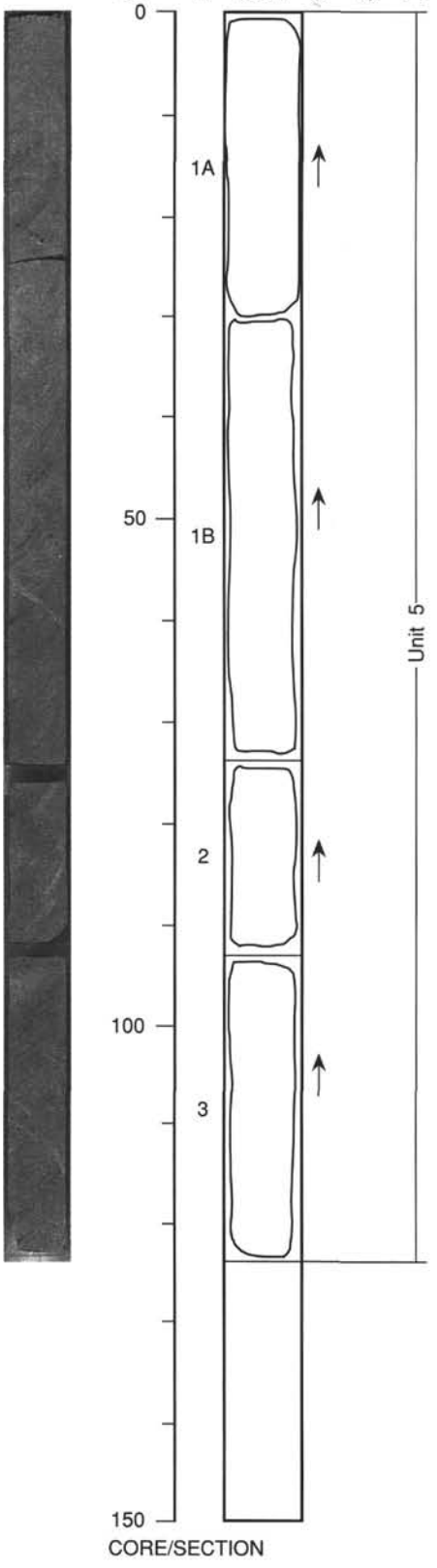


135-834B-11R-2

UNIT 5: APHYRIC BASALT

Pieces 1A–3B

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained .
VESICLES: 5%–10%; 1–5 mm; 2 cm; subrounded; uniform; large (1–2 cm) vesicles at 30 cm, 112 cm, 120 cm. These are generally empty with minor secondary mineral development on the walls. Smaller vesicles are generally filled with white to pale green globular zeolites(?) and/or carbonates.
Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderate.
VEINS/FRACTURES: 1%; 1 mm wide; subhorizontal; the vein from 1–10 cm is a continuation of the long vein in Section 1. The alteration halo extends for 1 cm on either side. The vein is filled with zeolite, carbonate and green clays. At 110 cm is a small white vein without an alteration halo.



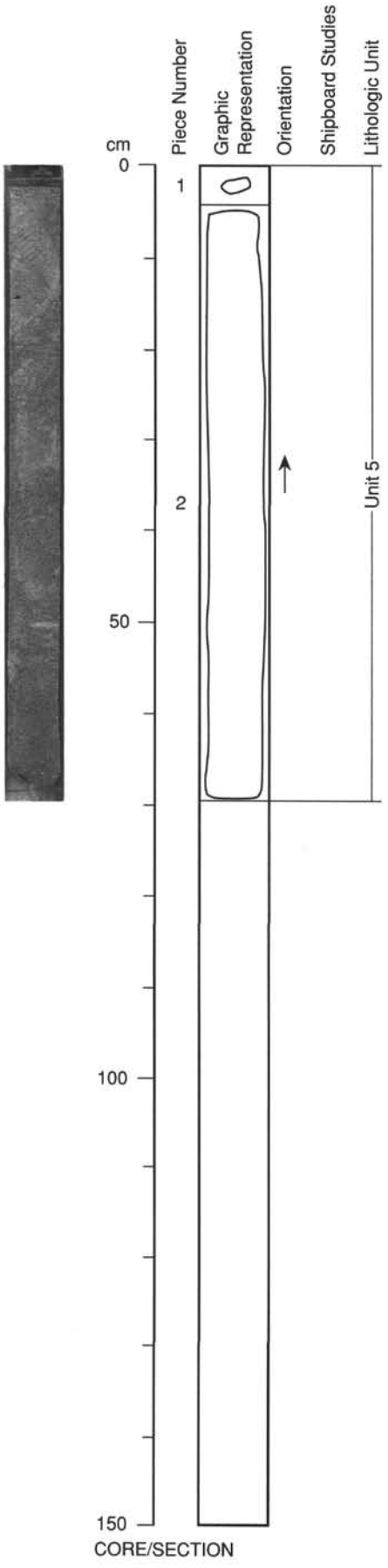
135-834B-11R-3

UNIT 5: APHYRIC BASALT

Pieces 1A–3

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained .
VESICLES: 5%–10%; <1–6 mm; subrounded; uniform; globular infillings vary from colorless/whitish to greenish. Vesicle size averages approximately 1 mm. Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderate–high.
VEINS/FRACTURES: None.

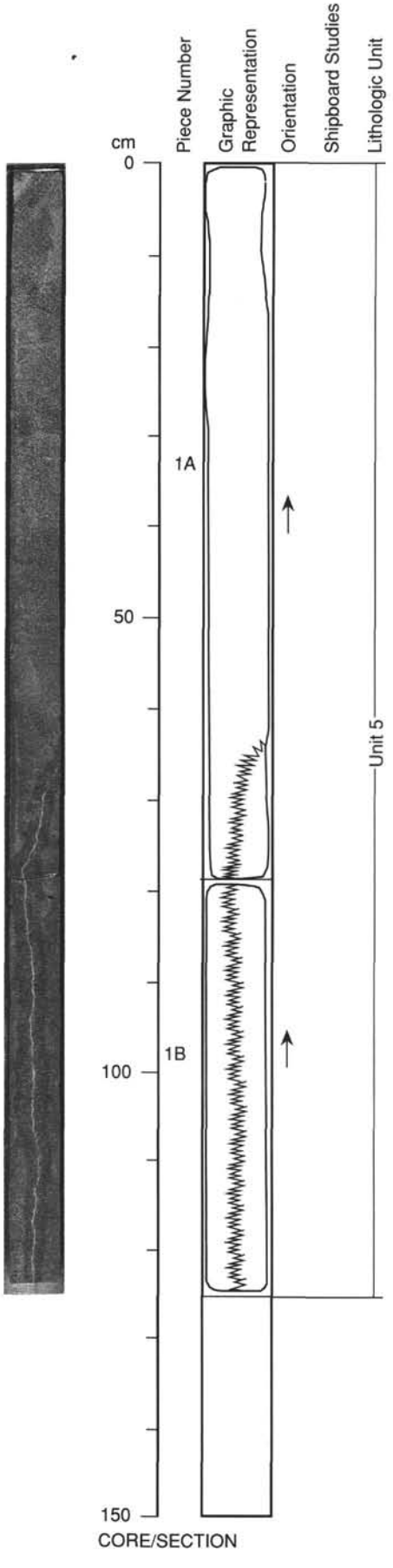
135-834B-12R-1



UNIT 5: APHYRIC BASALT

Pieces 1–2

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained .
VESICLES: 5%–10%; <1–6 mm; subrounded; uniform; vesicles are generally up to 1 mm diameter with rare examples up to 6 mm across. Zeolites and carbonates(?) infill vesicles.
Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderate.
VEINS/FRACTURES: None.



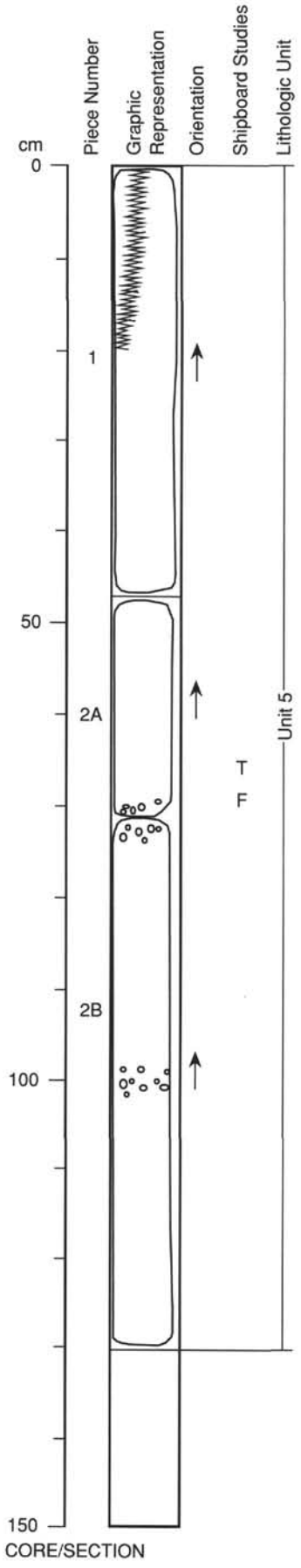
135-834B-12R-2

UNIT 5: APHYRIC BASALT

Pieces 1A–1B

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained .
VESICLES: 5%–10%; <1–3 mm; subrounded to irregular; uniform; vesicles infilled with tabular and globular white to greenish zeolites(?) and carbonates.
Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderate to high.
VEINS/FRACTURES: 1%; 2 mm wide; subvertical; the vein-basalt interface is coated with Fe-oxide staining. The vein infill is composed of both massive and acicular colorless to white and yellowish material.

= inflilled veins, zeolites, green clays, carbonates



135-834B-12R-3

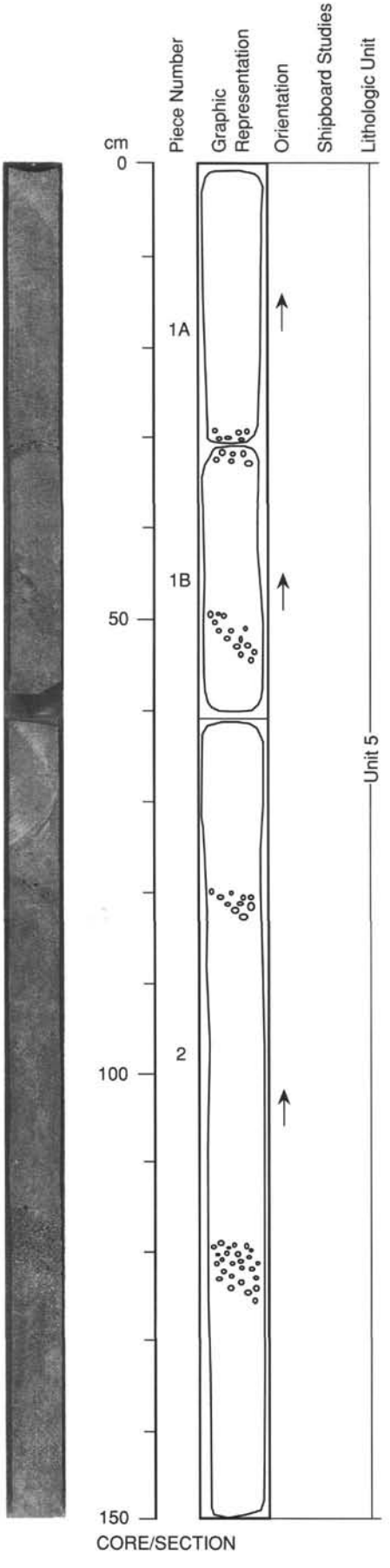
UNIT 5: APHYRIC BASALT

Pieces 1–2B

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained .
VESICLES: 5%–10%; <1–5 mm; subrounded to irregular; variable; vesicles generally 1 mm in diameter or less with rare examples up to 5 mm. Linings and infillings of white to greenish zeolites and/or carbonates are pervasive.
Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderate-high.
VEINS/FRACTURES: <1%; >17 cm long; steeply dipping; Piece 1 contains the continuation of the fracture described for Piece 1 of Section 135-834B-12R-2. The description is identical.
ADDITIONAL COMMENTS: Piece 1 is continuous with Piece 1B in section above.

= veins filled with zeolites, green clays, or carbonates

= concentration of open vesicles



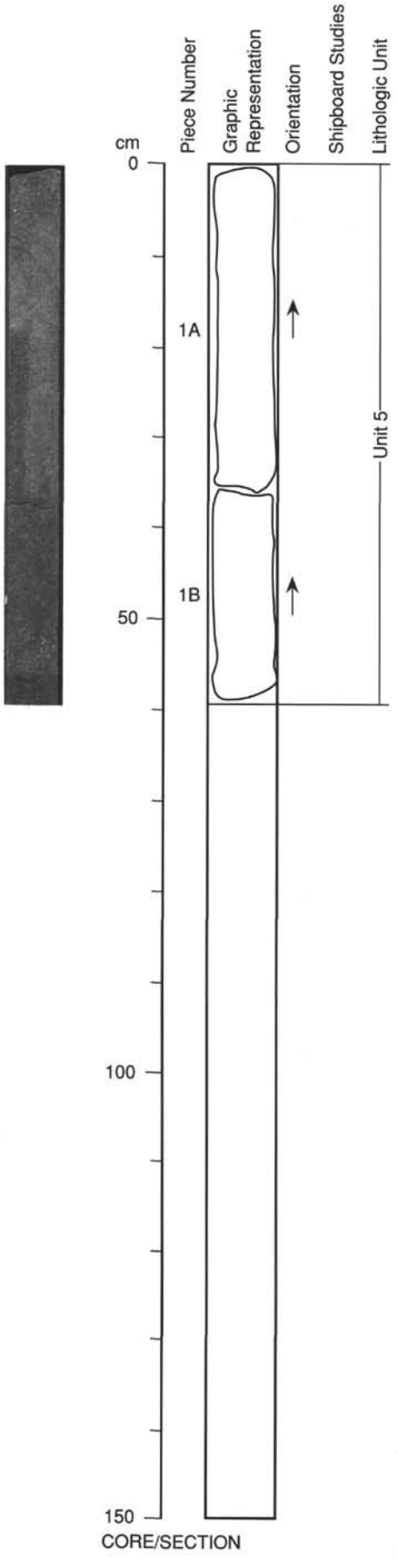
135-834B-12R-4

UNIT 5: APHYRIC BASALT

Pieces 1A–2

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained .
VESICLES: 5%–15%; <1–4 mm; subrounded to irregular; variable; vesicles generally 1 mm diameter or less. In a few locations in both pieces there is an apparent concentration of vesicles. It is within these areas that the diameter increases to 5 mm. Widespread infilling of vesicles by white to greenish zeolites and/or carbonates is also reduced in these patches of vesicles.
Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderate.
VEINS/FRACTURES: None.

= concentration of open vesicles

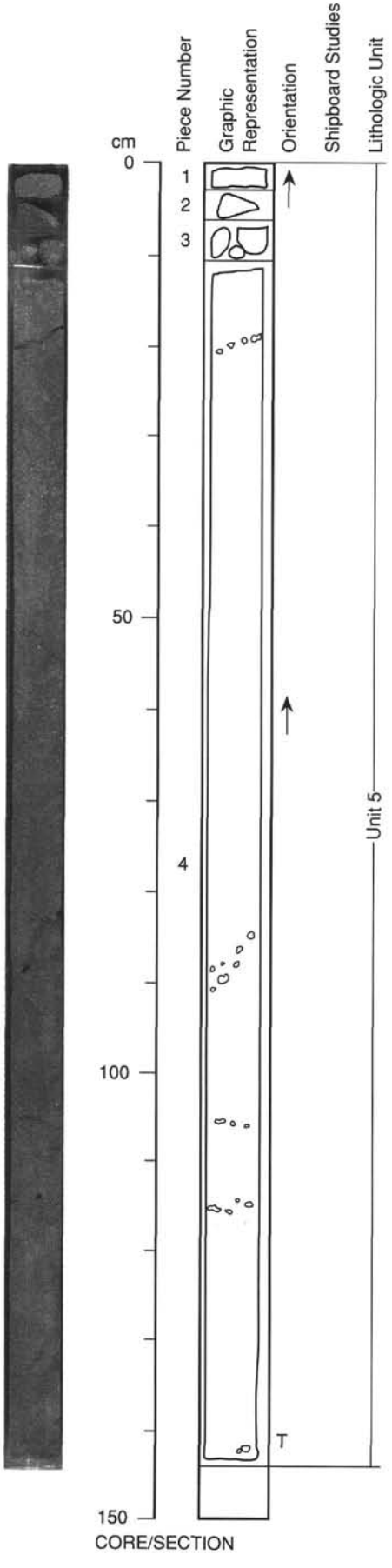


135-834B-12R-5

UNIT 5: APHYRIC BASALT

Pieces 1A–1B

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained .
VESICLES: 5%–10%; 0.1–1 mm; subrounded to irregular; uniform; vesicles typically lined or infilled with white to greenish zeolites and/or carbonates.
Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderate.
VEINS/FRACTURES: None.



135-834B-13R-1

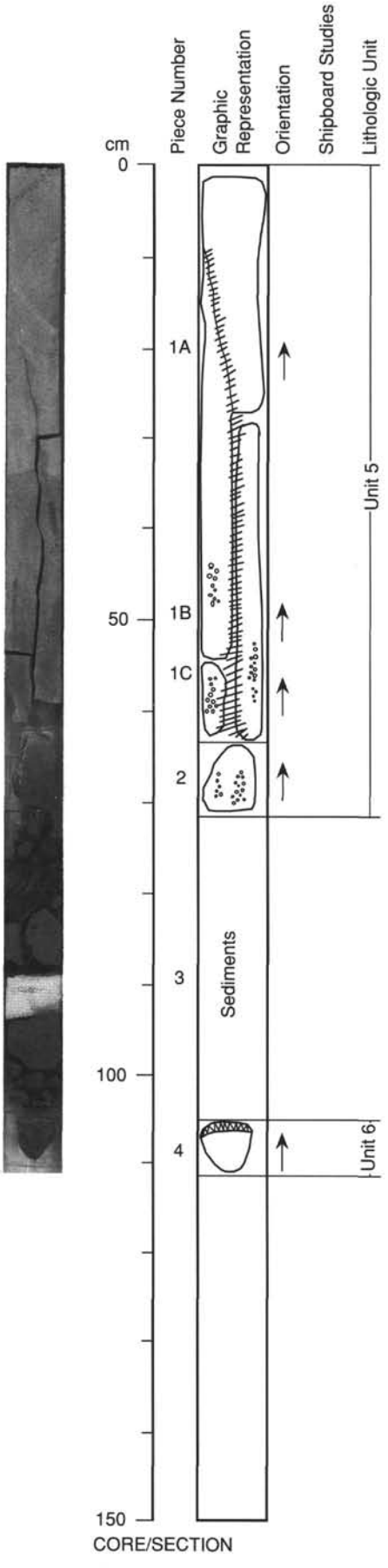
UNIT 5: APHYRIC BASALT

Pieces 1–4

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine- to medium-grained.
VESICLES: 5%–10%; <1–10 mm; rounded to elongate; mostly uniform; most vesicles are filled with a white greenish mixture of zeolites and/or carbonates. One band of open vesicles at 20 cm have a brownish Fe-oxide coating.
Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderate.
VEINS/FRACTURES: None.

= concentration of open vesicles

135-834B-13R-2



UNIT 5: APHYRIC BASALT

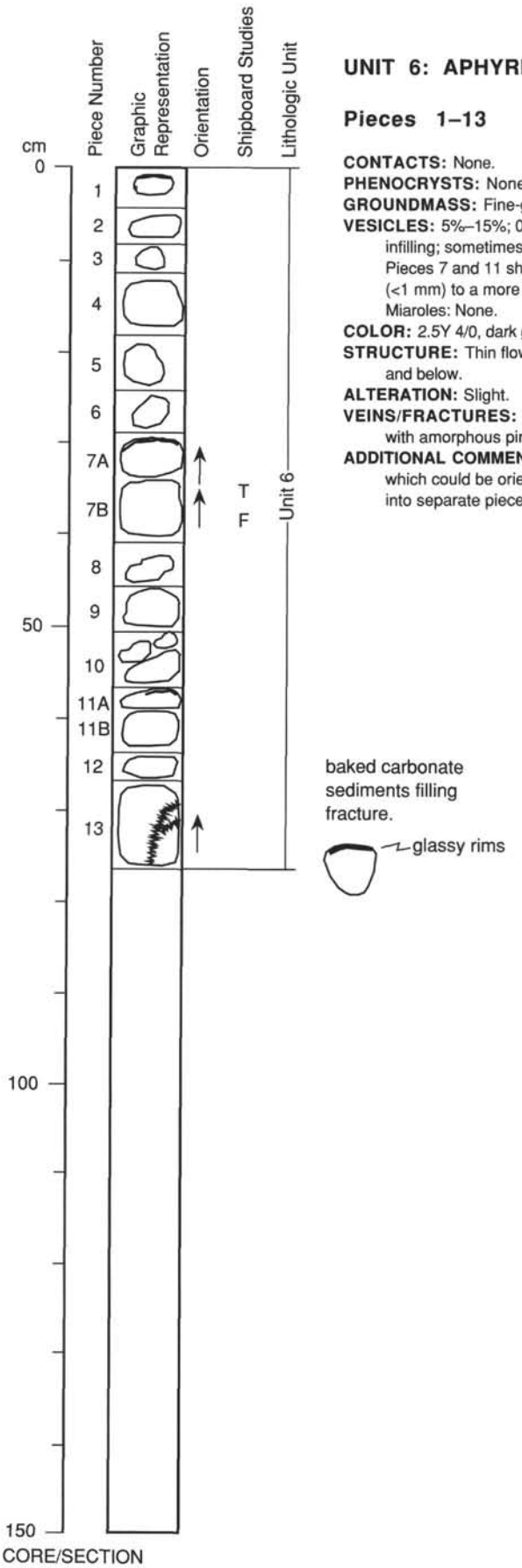
Pieces 1A–2

CONTACTS: Lower contact with sedimentary section; a few basalt pebbles with small ropy-like surface just above sediment.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained .
VESICLES: 5%–10%; <0.1–2 mm; subrounded; various; in the least altered zone vesicle infills are colorless to white globular and tabular zeolites plus or minus carbonates; in the more heavily altered zone these are stained an orange brown from Fe-oxide. Pipe vesicles indicated in the sketch contain frothy, finely vesicular interiors.
Miaroles: None.
COLOR: 2.5Y 5/0, gray to 2.5Y 5/2, grayish brown.
STRUCTURE: Massive.
ALTERATION: Moderately to very highly altered.
VEINS/FRACTURES: 1%; 40 cm long; subvertical; irregular fracture lined with Fe-oxide.
ADDITIONAL COMMENTS: Approximately halfway down Piece 1 there is a color change from gray to orange-gray. This corresponds to the change from a moderate degree of alteration to a very highly altered state.

UNIT 6: APHYRIC BASALT

Piece 4

CONTACTS: Upper contact is with sedimentary section; sediment is adhering to the glass surface and there are glass grains in the sediment, contact appears depositional.
PHENOCRYSTS: None.
GROUNDMASS: Aphanitic.
VESICLES: 10%–15%; 0.8–2.5 mm; subrounded; irregular; some of vesicles have a frothy. texture along their walls; others are clean and empty.
Miaroles: None.
COLOR: 2.5Y 3/0, dark gray.
STRUCTURE: Massive with quenched glassy rim.
ALTERATION: Slight.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Glassy rim 2–3 mm thick.



baked carbonate sediments filling fracture.

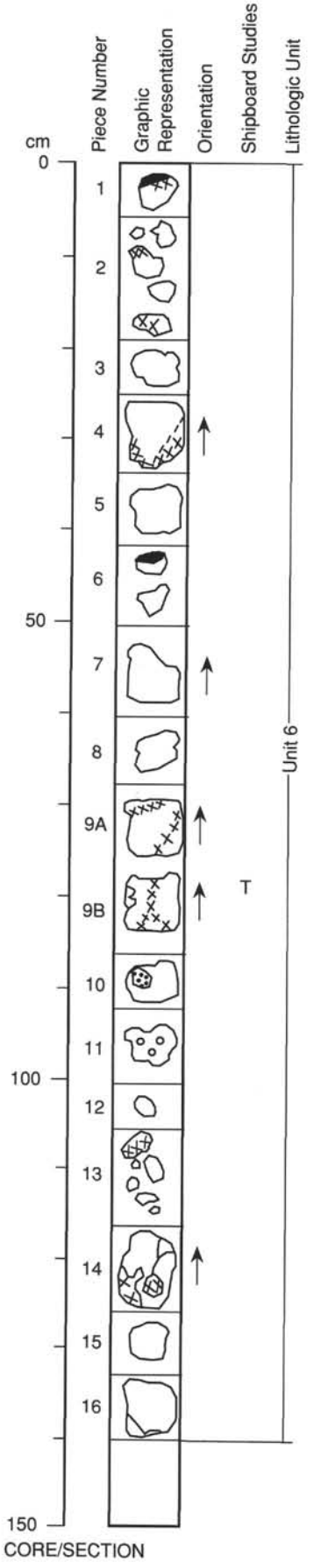
glassy rims

135-834B-14R-1

UNIT 6: APHYRIC BASALT

Pieces 1–13

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained to glassy.
VESICLES: 5%–15%; 0.1 to 4 mm; subrounded; various; vesicles generally clear from infilling; sometimes Fe-oxide staining is observed and minor zeolites(?) are present. Pieces 7 and 11 show transitions from glassy, more massive rims with small vesicles (<1 mm) to a more coarsely (>2 mm) vesicular interior.
Miaroles: None.
COLOR: 2.5Y 4/0, dark gray.
STRUCTURE: Thin flows or pillows judging from glassy margins here and in cores above and below.
ALTERATION: Slight.
VEINS/FRACTURES: <1%; 3 mm by 5 cm long; steeply dipping to subhorizontal; infilled with amorphous pinkish brown material (carbonate?) in Piece 13.
ADDITIONAL COMMENTS: This section contains drill rubble as well as larger pieces which could be oriented. The rubble at the top of this section has been arbitrarily sorted into separate piece numbers for curatorial handling.



135-834B-15R-1

UNIT 6: APHYRIC BASALT

Pieces 1–16

CONTACTS: Carbonate clasts (fused?) in Pieces 1 and 14; glassy margins in Pieces 1, 3, and 6.

PHENOCRYSTS: None.

GROUNDMASS: Aphanitic to microcrystalline near glass margins (Pieces 1, 3, 6); typically rock is microcrystalline to fine-grained (<1 to 1.1 mm) plagioclase laths with interstitial clinopyroxene (minor) and mesostasis.

VESICLES: 20%; <1 to 2 mm; round to irregular; uniform; most common in interiors are fine vesicles (<1 mm population comprising 15%–20% of rock); a second population (1–2 mm) makes up 2–3 volume % and is most common in Pieces 4 and 7. Rims are generally less vesicular in both populations.
Miaroles: Most unfilled.

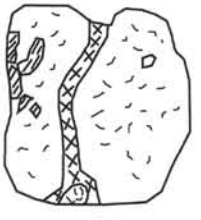
COLOR: 10YR 6/1, gray.

STRUCTURE: Thin flows or pillows judging from repetition of glass.

ALTERATION: Slight to moderate in Pieces 12, 14, and 9 near carbonate veins.

VEINS/FRACTURES: 2%; 1–13 mm wide; subvertical to 45°; most filled with recrystallized? carbonate; occurs as thick pods as well as veins. Pieces 9 and 14 have fracture wall linings of orange Fe-oxy-hydroxides (<0.5 mm); Piece 4 has fracture linings of < 1 mm of a later white material which runs along the carbonate vein and then cuts across it. The large carbonate vein in Piece 4 has a 10 mm spindle-shaped glass inclusion with an orangish palagonitic alteration zone around it.

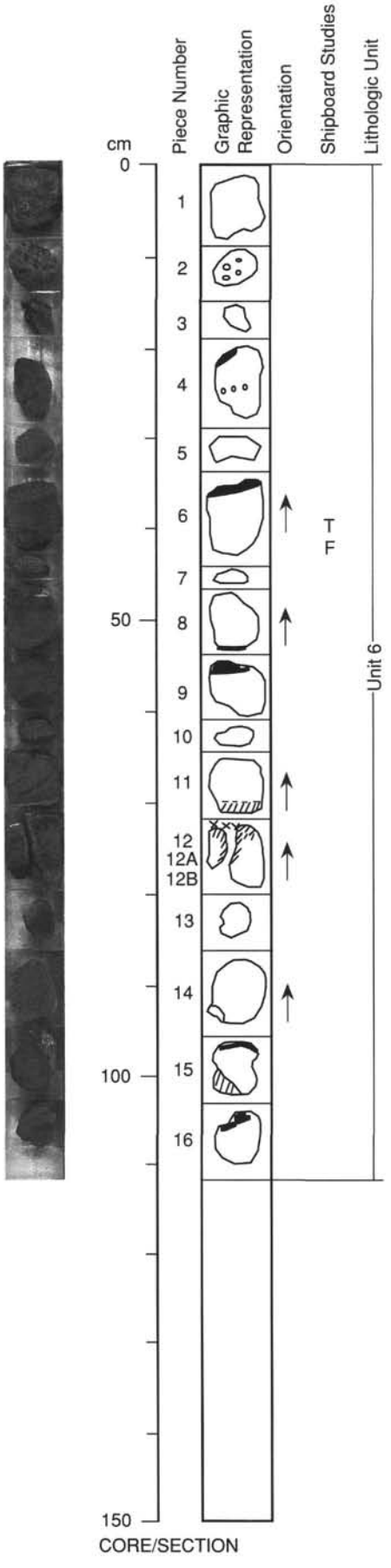
Piece 9B



x calcite

massive "clasts"

thin oxidative coatings on fracture walls.



135-834B-15R-2

UNIT 6: APHYRIC BASALT

Pieces 1–16

CONTACTS: Glassy rims on Pieces 4, 6, 8(bottom), 9, 15, and 16.

PHENOCRYSTS: None; small microphenocrysts (same size as crystalline interiors) of plagioclase and olivine in glass.

GROUNDMASS: Adjacent to glassy margins microlitic to aphanitic; interiors (1–3, 5, 7, 10–14) microcrystalline with plagioclase laths, minor olivine, minor intergranular clinopyroxene, and altered mesostasis.

VESICLES: 1%–30%; <1–1.5 mm; round; uniform to patchy; two populations: large vesicles (1–1.5 mm) only 1%–3%, common near rims and randomly in interiors; gas cavities to 9 mm occur in Piece 2. Second population is < 1 mm and comprises up to 30% of groundmass; less abundant and smaller near margins but fully developed within 20 cm of the rim.

Miaroles: No infilling.

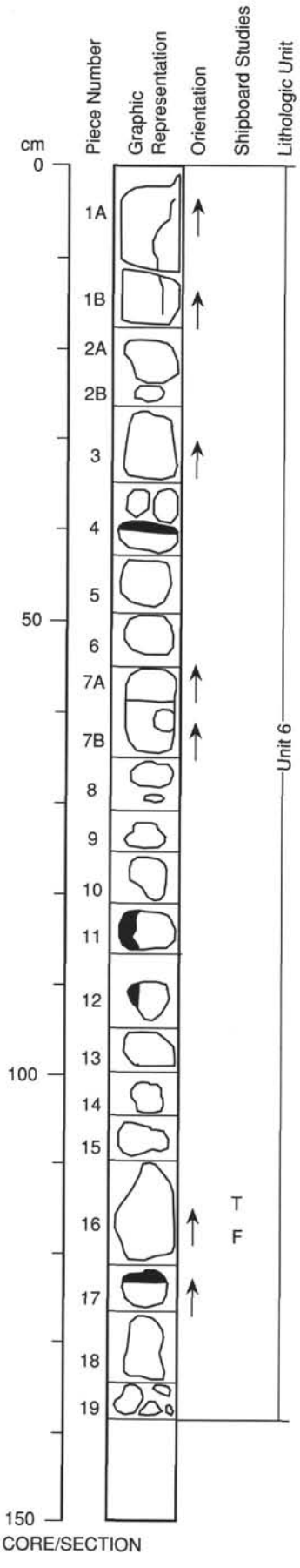
COLOR: 7.5YR 5/10, gray near rims to 10YR 5/1, brownish gray in interiors.

STRUCTURE: Thin flows or pillows based on glass rims.

ALTERATION: Coarser interiors distinctly browner and more altered; surface coatings of orange Fe-oxy-hydroxides on Piece 1. Overall: slightly to moderately altered.

VEINS/FRACTURES: Trace; <1 to 2 mm wide; subvertical and subhorizontal; cooling fracture in Piece 4; horizontal calcite filled vein between 11 and 12, mostly on 12 with vertical fracture in 12 coming off it; a 10 mm alteration zone (brown) occurs around the fractures; calcitic fracture coating on Piece 15, below the calcite is a patch of dull green-tan fill of small barrel-shaped crystals (barite?) with rare small surface sulfide(?) grains (blue iridescence).

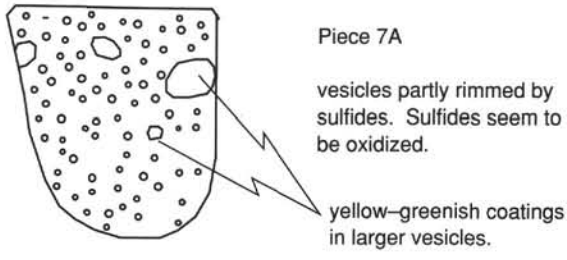
135-834B-16R-1



UNIT 6: APHYRIC BASALT

Pieces 1A–19

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained , holocrystalline.
VESICLES: 30%; 0–1 cm; rounded, rarely elongate; various; larger vesicles in Pieces 5 to 19; in Pieces 7A and 7B vesicles are partly rimmed by sulfides. Sulfides seem to be oxidized leaving yellow greenish to dark green coatings.
Miaroles: Observed in Pieces 1 to 4.
COLOR: 10YR 4/1 to 3/1, dark gray to very dark gray.
STRUCTURE: Massive (glass rims may suggest small pillows or flows).
ALTERATION: Slightly to moderately altered.
VEINS/FRACTURES: <1%; < 0.2 mm wide; subvertical; calcite vein in Pieces 1A and 1B with light halo up to 1 cm on each side.
ADDITIONAL COMMENTS: Pieces 15 and 16 show patches of dark, secondary infillings of magma in former vesicles. Glass rim on Pieces 4 and 17, each covered by barite(?). Sharp change in vesicle size (see above) between Pieces 4 and 5.



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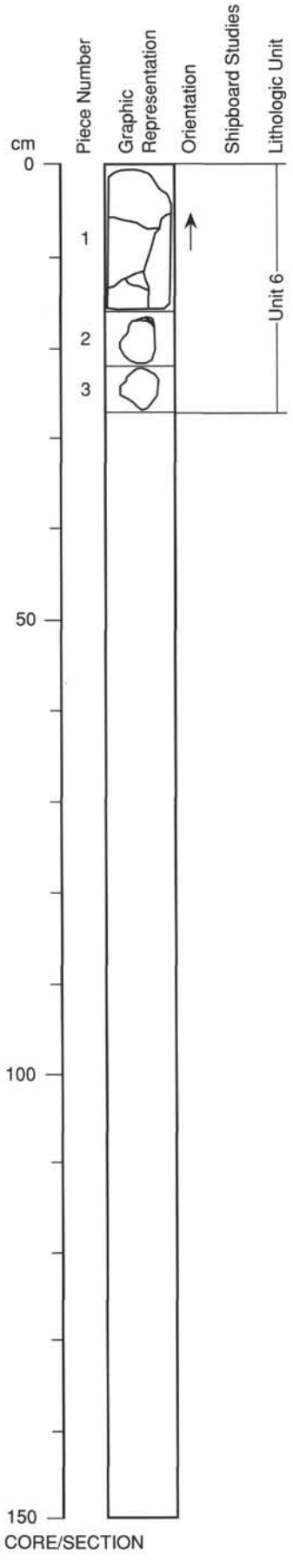
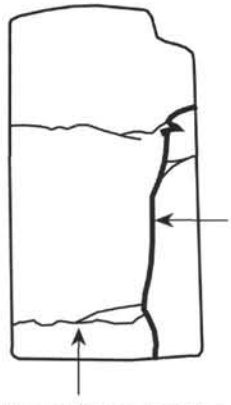


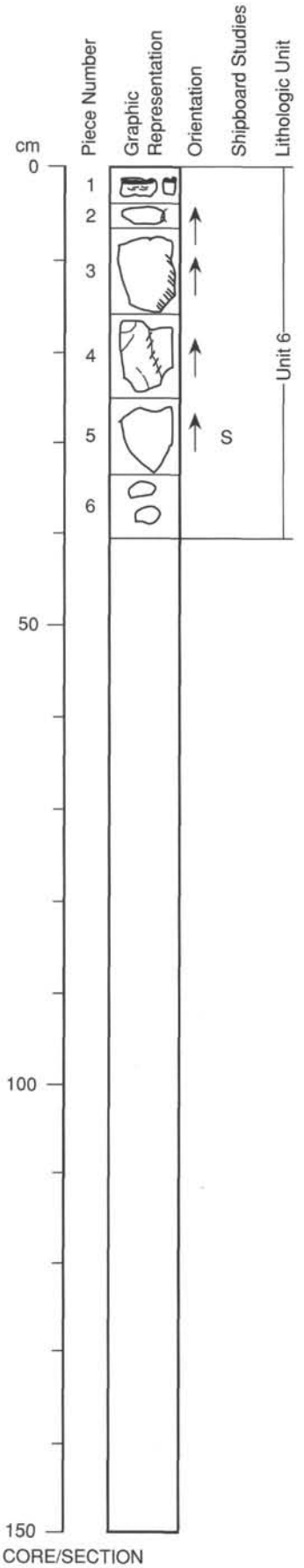
Vein structures in Piece 1



UNIT 6: APHYRIC BASALT

Pieces 1–3

CONTACTS: None seen.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained, holocrystalline; plagioclase laths visible.
VESICLES: 10%; 0.5 to 4 mm; rounded to elongate, some interconnected; larger ones in patches; two size distributions: (1) as above; (2) <0.2 mm, distributed throughout groundmass comprising an additional 10%–15% of volume of rock; these are interconnected.
Miaroles: Thin vesicle linings of rare calcite and unidentified deep red-brown to steel gray mineral; not all vesicles lined.
COLOR: 10YR 4/1, dark gray.
STRUCTURE: Massive.
ALTERATION: Slight.
VEINS/FRACTURES: 1%; 0.2–2 mm; subvertical and sub-horizontal; two vein sets in Piece 1 (to which the above numbers refer) both calcite infilled. A coarser (2 mm) pink, finely crystallized set (subvertical) cut by finer, white calcite veinlets (< 0.5 mm width). Thin calcite coating on part of surface of Piece 3.
ADDITIONAL COMMENTS: Piece 2 contains a 5 mm thick glassy rind at one end of sample which appears free of crystals. This is in sharp contact with aphyric, finely vesicular holocrystalline basalt. Coarse vesicles (> 1 mm) occur 2.5–3 mm inwards from glass contacts.

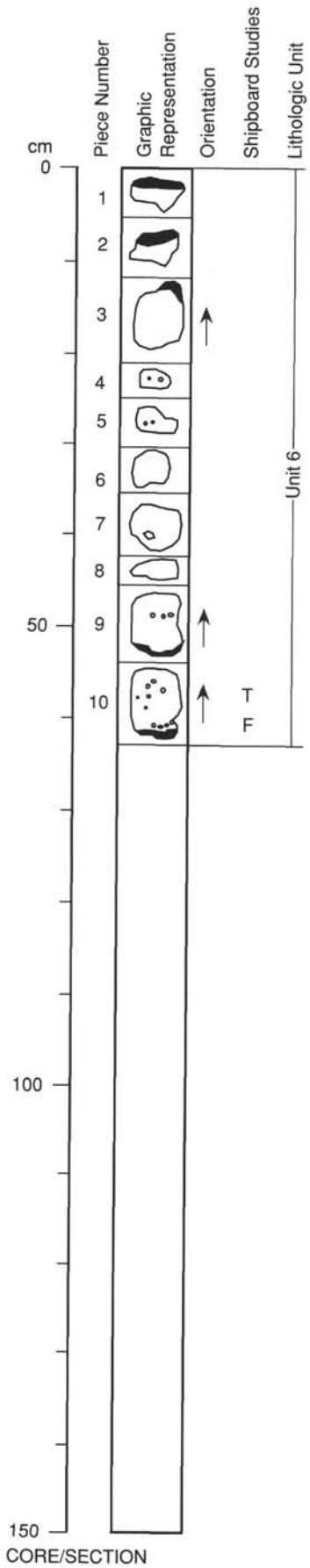


135-834B-17R-1

UNIT 6: APHYRIC BASALT

Pieces 1–6

CONTACTS: Glassy margin on Piece 1.
PHENOCRYSTS: None.
GROUNDMASS: Aphanitic (Piece 1) microcrystalline (2–6) plagioclase laths (<1 mm) with intergranular clinopyroxene and altered mesostasis.
VESICLES: 30%; <0.5 mm; irregular; uniform; a minor larger population also: <1% in Pieces 2–6, up to 2.5 mm, rounded; 2%, 3–4 mm by 1 mm cavities elongate parallel to the margins in Piece 1; small vesicle population is less common in Piece 1.
Miaroles: Minor; thin coatings on vesicle walls, orange, yellow-orange, yellow-green coatings.
COLOR: 10YR 5/1 interior to 7.5YR 5/0 margin.
STRUCTURE: Flow or pillow?, judging from cores above and below.
ALTERATION: Common yellow and orange-brown grain coatings in microcrystalline interiors; brownish alteration along veins and edges. Slight to moderate alteration overall.
VEINS/FRACTURES: Trace; <1 to 1.5 mm; various; fracture coating or fill include carbonate (Piece 4 with brownish alteration zone around vein), zeolites (botroidal, 1 mm, in Piece 2); soft orange to yellow-brown coatings on Pieces 1 and 2; dull red maroon coating on Piece 2.
ADDITIONAL COMMENTS: Gray vesicle fill in some Piece 1 vesicles probably drill mud. Smear slide is listed for Piece 5 but no notation was made of what was sampled. Probably a vein or coating.



135-834B-18R-1

UNIT 6: APHYRIC BASALT

Pieces 1–10

CONTACTS: Glassy margins on Pieces 1 (5 mm thick), 2 (7 mm), 3 (1 mm), 9 and 10 (1 mm).

PHENOCRYSTS: A single 2 mm plagioclase in Piece 7, one 2.5 mm glomerocryst in Piece 8 (very pale olivine or stained plagioclase).

GROUNDMASS: Glassy to microlitic at margins, interior pieces microcrystalline to aphanitic (Pieces 5 to 8), plagioclase and intergranular clinopyroxene microlites with mesostasis.

VESICLES: </=35%; < 1 mm; irregular; uniform; most common is population of small vesicles, so dense Pieces 4 to 8 are almost spongy; glassy rims are massive grading to 10%, 0.3 mm vesicles, grading to spongy texture; larger vesicle population (0.5 to 4 mm) occurs in scattered spots (1% to 4%); most common in Pieces 6 and 10. Miaroles: Minor thin yellow-orange coatings on inside vesicle walls.

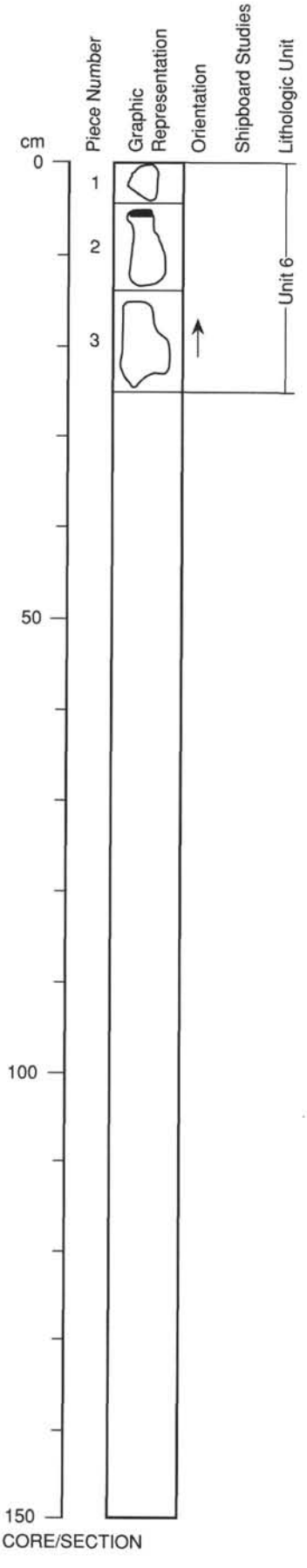
COLOR: 7.5YR 5/0, gray, margins to 10YR 6/1.

STRUCTURE: Thin flows or pillows.

ALTERATION: Brownish hue to interior pieces, slight to moderate orange and yellow-orange grain boundary coatings and vesicle fill. Overall, the rock is fresh to moderately altered.

VEINS/FRACTURES: Yellow to orange Fe-oxy-hydroxide coatings on glass surfaces (Pieces 1, 2, 3, 10); greenish brown surface coating on one side of Piece 2, 6 mm, bright yellow orange patch on Piece 6.

ADDITIONAL COMMENTS: Orientation of Pieces 9 and 10 may be suspect: glass and microlitic zones point down relative to orientation arrows.

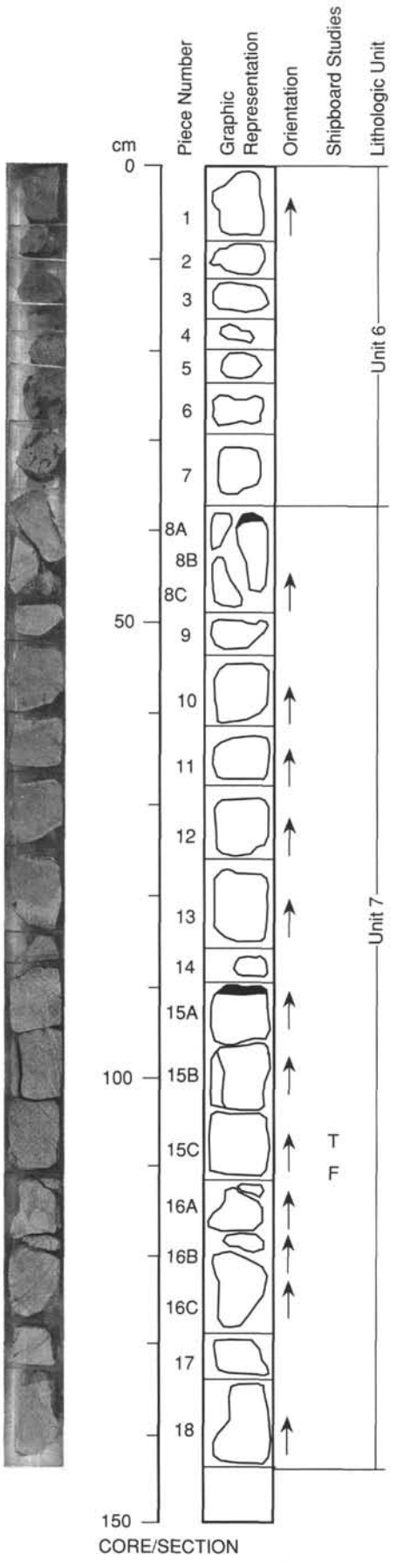


135-834B-19R-1

UNIT 6: APHYRIC BASALT

Pieces 1–3

CONTACTS: None visible.
PHENOCRYSTS: Plagioclase: <=1%; 2.5 by 1 to 1x1 mm.
GROUNDMASS: Fine-grained , holocrystalline (with glass rind in Piece 2). Plagioclase laths visible. Darker colored "lava-infilled" vesicles present in Piece 2.
VESICLES: 10%–20%; 0.1 to 3.5 mm; rounded to pipe-like to irregular; irregular; larger vesicles concentrated in clusters; vesicles interconnecting sometimes pipe-like giving the holocrystalline groundmass a high porosity.
Miaroles: Local Fe-oxide coatings and local zeolites?
COLOR: 10YR 3/1, very dark gray.
STRUCTURE: Massive.
ALTERATION: Slight.
VEINS/FRACTURES: No veins visible; thin sporadic calcite coatings on Piece 3.
ADDITIONAL COMMENTS: Piece 2 contains 1.5 cm black glassy rim in which no crystals are visible. This piece has larger vesicles (>1 mm) extending across sample into glassy zone. Smaller vesicles not present in glass.



135-834B-20R-1

UNIT 6: APHYRIC BASALT

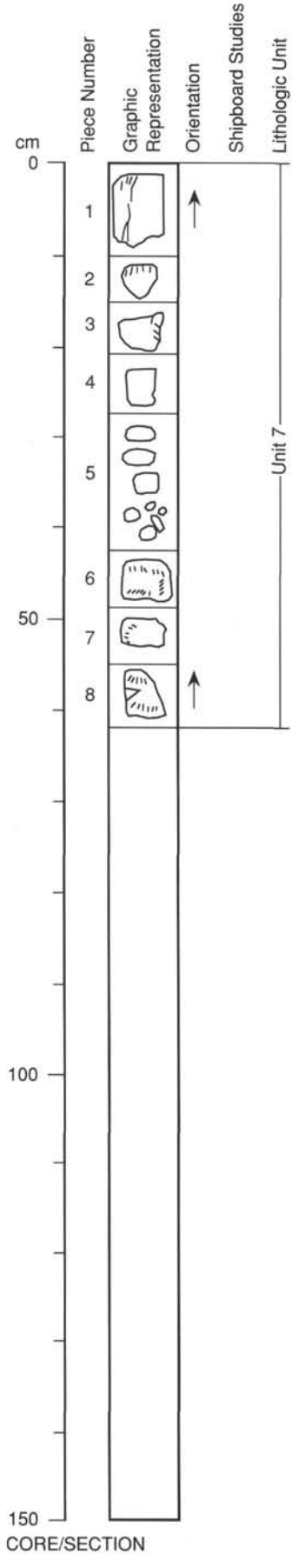
Pieces 1–7

CONTACTS: None.
PHENOCRYSTS: Plagioclase phenocrysts tend towards microphenocrystal size, but are persistent in each piece.
Plagioclase: </=1%; 0.4x2.7 to 0.25 x 0.7 mm; laths.
GROUNDMASS: Fine-grained , holocrystalline.
VESICLES: 10%–15%; up to 5; rounded to elongated; random; size increasing from Pieces 1 to 7.
Miaroles: None.
COLOR: 10YR 3/1, very dark gray.
STRUCTURE: Massive.
ALTERATION: Slightly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: End of Unit 6.

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 8A–18

CONTACTS: None.
PHENOCRYSTS: Uniformly distributed. Prominent plagioclase microphenocrysts up to 1.5 mm in length scattered through the groundmass.
Plagioclase: 10%–15%; 1x2 to 2x3.5 mm; single grains and glomerophyric.
GROUNDMASS: Fine-grained , holocrystalline.
VESICLES: 1%; 1 mm; rounded; variable; concentrated near to glass rims.
COLOR: 7.5YR 6/0, gray to 10YR 6/2, light brownish gray.
STRUCTURE: Massive.
ALTERATION: Brown to red-brown alteration rinds.
VEINS/FRACTURES: <1%; 0.5 mm wide; various; calcite filled veins in Pieces 15A and 15B.
ADDITIONAL COMMENTS: Light brownish gray (10YR 6/2) color appears prominently beneath glass rims and along cracks and veins.

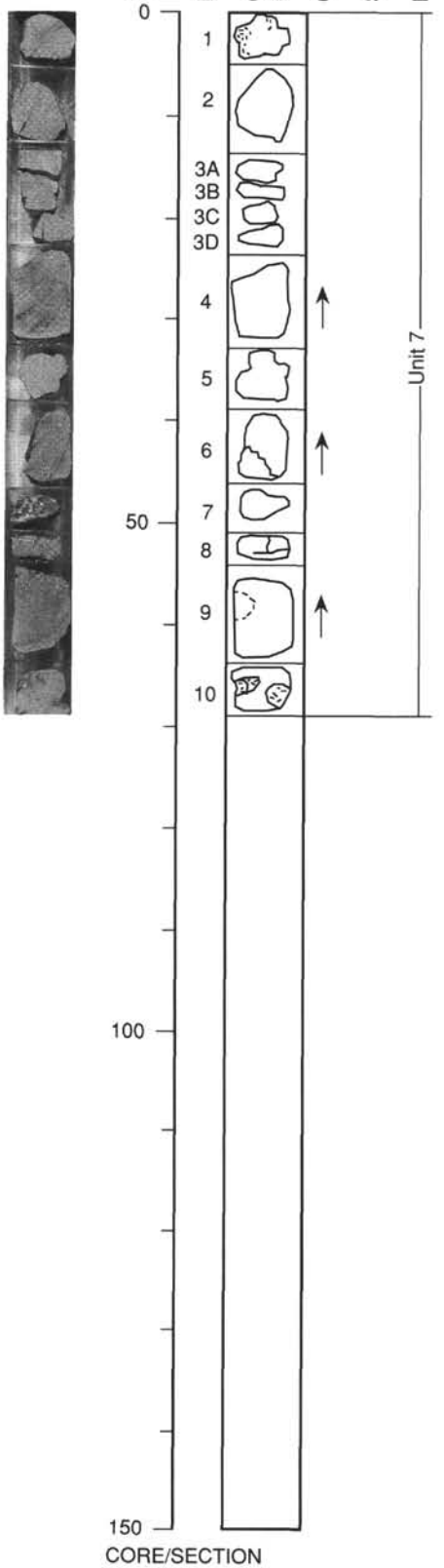


135-834B-20R-2

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–8

CONTACTS: None.
PHENOCRYSTS: Uniformly distributed.
Plagioclase: 10%–15%; 1–4 mm; small single grains and larger glomerocrysts.
GROUNDMASS: Microcrystalline plagioclase laths with intersertal mesostasis and minor intergranular clinopyroxene(?)
VESICLES: Trace; 1 mm; various; random.
Miaroles: Very rare (e.g. 1 in Piece 1) white calcite filled vesicles.
COLOR: 7.5YR 6/0, gray to 10YR 6/1, brownish gray.
STRUCTURE: Massive.
ALTERATION: Surface patches and coatings of calcite and Mn-oxide, orange oxy-hydroxide staining on grain boundaries is common. Rare fresh gray cores (Piece 8) brownish to red-brown alteration rinds are common. Overall, the rock is moderately altered.
VEINS/FRACTURES: <1%; 0.1–0.5 mm wide; various; calcite, Fe-oxy-hydroxide filled, all pieces appear partially bounded by fracture surfaces.



135-834B-21R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–10

CONTACTS: None (some slightly finer grained piece, e.g. Pieces 3D, 5).

PHENOCRYSTS: In most altered pieces,the larger plagioclase and glomerocrysts have a greenish to brown tinge, and are stained and altered.
Plagioclase: 5%–10%; 1–2 mm; single grain and 2–5 mm grain glomerocrysts

GROUNDMASS: Microcrystalline to very fine-grained . Plagioclase microlites with intergranular pyroxene to intersertal mesostasis.

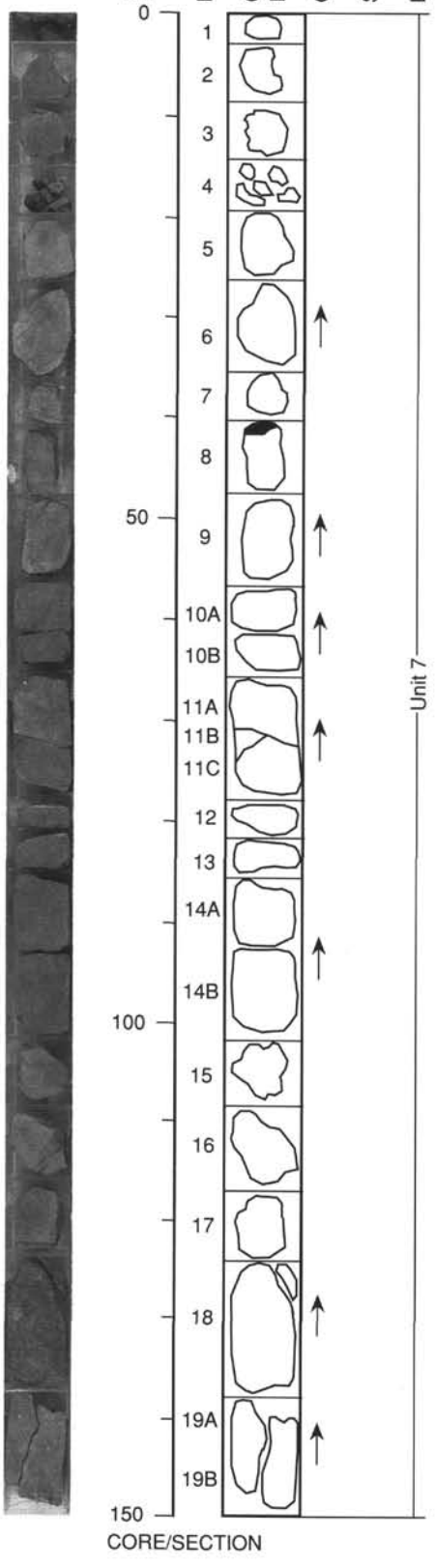
VESICLES: <1%; 0.6–1 mm; round; random.
Miaroles: 3–4 large gas cavities in Piece 10 (10–22 mm) lined and filled with calcite, phillipsite, and a brown bladed (short and flat rhombs) mineral.

COLOR: 2.5YR 5/0, gray in the fresh cores (e.g. Piece 9) to 2.5Y 6/2, light brownish gray where highly altered.

STRUCTURE: Massive.

ALTERATION: Moderate to very high alteration with brownish alteration rinds. Pieces 1 and 2 with particularly heavy weathering, probably clay development; some yellow brown clayey and Mn-oxide surface coatings.

VEINS/FRACTURES: <1%; <1–1 mm; various; some outside fracture surfaces coated with calcite; small fractures (e.g. Piece 2) coated with slight Fe-oxy-hydroxides. Thin veins in Pieces 6 and 8 of calcite and zeolite.



135-834B-22R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–19B

CONTACTS: None.

PHENOCRYSTS: Thin plagioclase microphenocryst laths, randomly oriented, sparsely scattered in groundmass, up to 1 mm length.
Plagioclase: 10%–15%; 0.3x0.8 to 2x6 mm; evenly distributed, many in glomeroporphyritic aggregates.

GROUNDMASS: Fine-grained , holocrystalline.

VESICLES: <1%–3%; 0.5–2 mm; rounded to strongly elongated; evenly distributed; infilling is insignificant in Pieces 1–5. Pieces 6, 9, 10, 13–15, 17, and 19 contain concentrically zoned soft clay-like infillings.

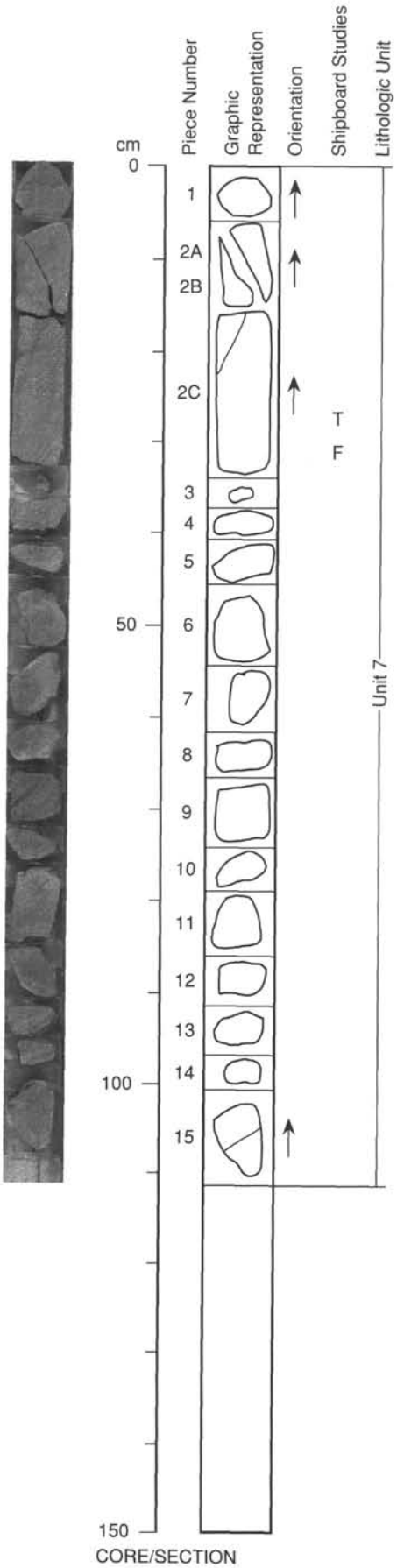
COLOR: 2.5YR 5/0, gray to 2.5Y 5/2, grayish brown.

STRUCTURE: Massive.

ALTERATION: Slightly to very highly altered.

VEINS/FRACTURES: <<1%; 0.5 mm wide; irregular, subhorizontal.; veins sporadic, in part calcite infilled.

ADDITIONAL COMMENTS: Piece 7 contains a 3 mm glassy salvage with variolitic texture, passing sharply inwards into a microlitic zone (0.5 mm wide). This zone passes inwards into the more typical finely crystalline groundmass texture of Pieces 2–5 and 7–19. Piece 15 is microlytic at one end. Piece 1 appears anomalous, and may represent a fragment of Unit 3 (very sparsely phyric plagioclase basalt).



135-834B-22R-2

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–15

CONTACTS: None.

PHENOCRYSTS: Fresh plagioclase microphenocrysts randomly oriented and evenly distributed.
Plagioclase: 10%–15%; 1–4 *mm*; *single grains and small glomerocrysts.*

GROUNDMASS: Microcrystalline, mostly plagioclase microlites and intergranular clinopyroxene.

VESICLES: 0%–5%; 1 mm; round; in concentric bands; vesicles concentrated in concentric bands near the margins of some samples.

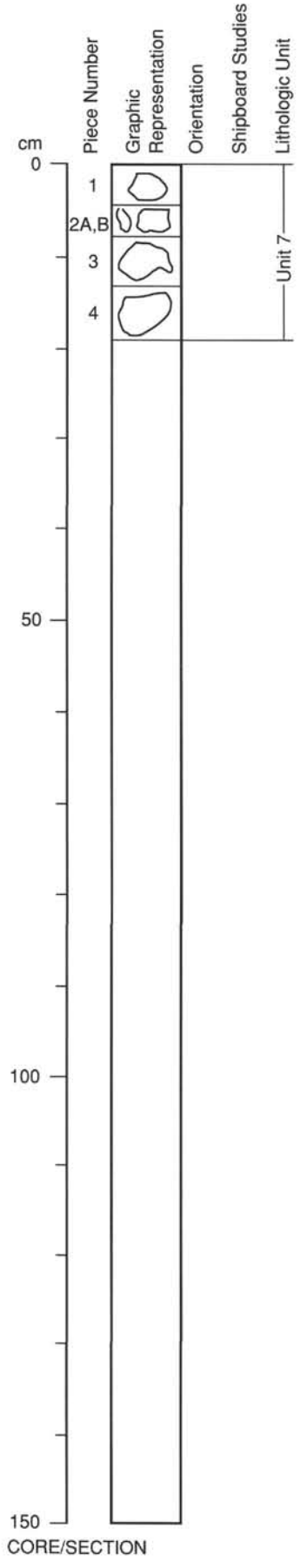
COLOR: 2.5YR 4/0, gray (least altered) to 10YR 6/2, light brownish gray (in the most altered material).

STRUCTURE Massive.

ALTERATION: *Slight to moderate in the interiors of pieces, to very high at some margins.*

VEINS/FRACTURES: <1%; <1 mm wide; random; very thin veins, filled with carbonate or open with Fe-staining on margins. Alteration halos 2–7 mm on either side of veins.

ADDITIONAL COMMENTS: Many pieces look like remnant, altered pillows with extensive alteration at the margins (especially Piece 1) although there is no glass present. Alteration very high in some places.

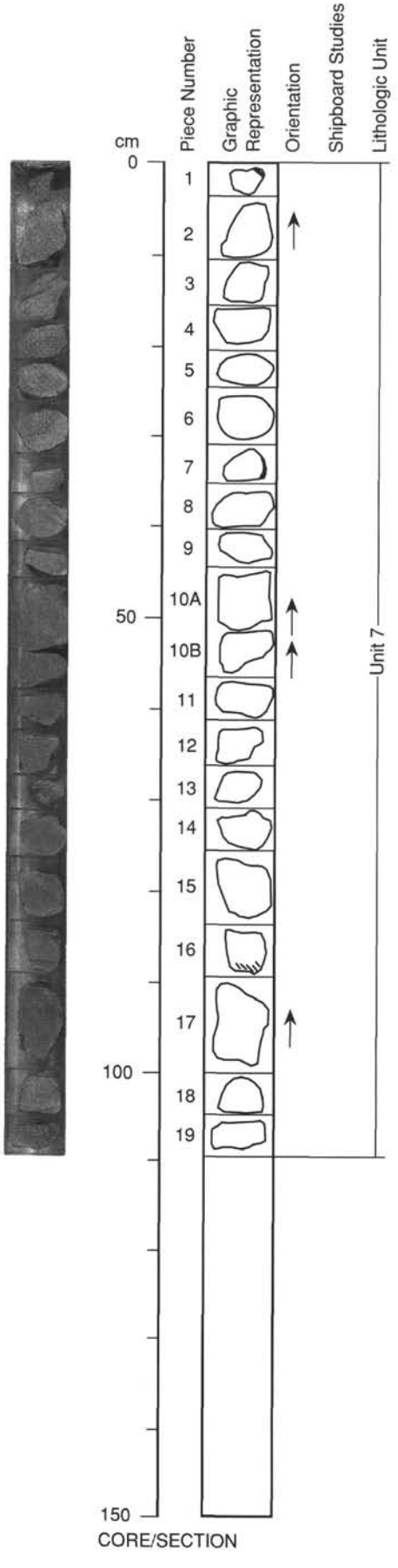


135-834B-23R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–4

CONTACTS: None.
PHENOCRYSTS: Randomly distributed.
Plagioclase: 10%–15%; up to 5 mm; single grains and small glomerocrysts
GROUNDMASS: Fine-grained , holocrystalline.
VESICLES: <1%; <1; rounded; variable; generally clear of infillings.
COLOR: 7.5YR 4/0, gray to 10YR 6/2, light brownish gray
STRUCTURE: Massive.
ALTERATION: Slightly to highly altered.
VEINS/FRACTURES: None.



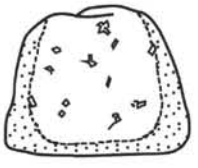
135-834B-24R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

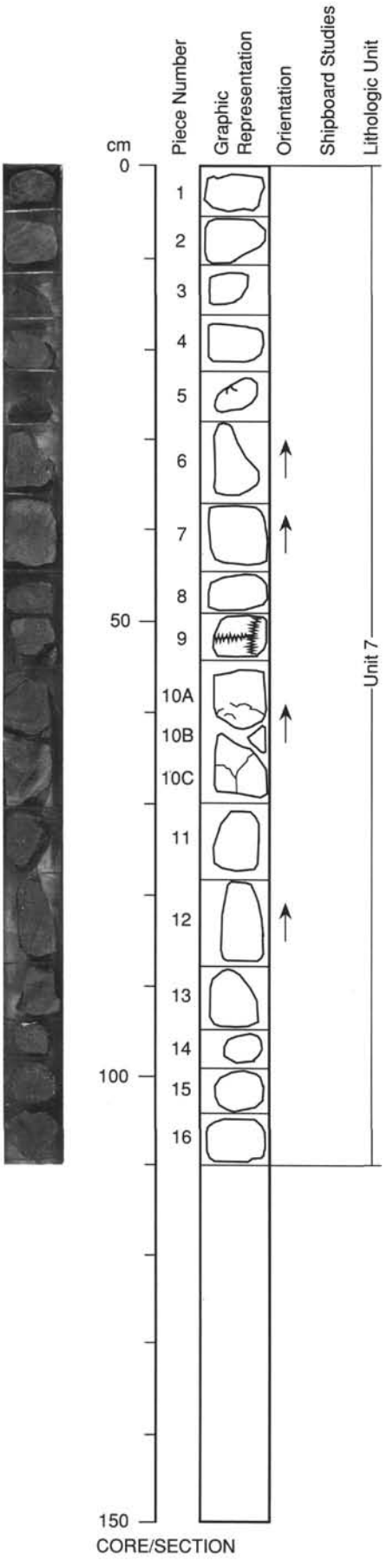
Pieces 1–19

CONTACTS: None.
PHENOCRYSTS:
Plagioclase: 10%–15%; 2–3 mm; occurs as single crystals and as glomerocrysts.
GROUNDMASS: Aphanitic.
VESICLES: 3%–10%; 0.02–1; rounded to irregular; variable; concentrated in patches or irregular zones.
Miaroles: None.
COLOR: 2.5YR 5/0 fresh, gray to 2.5Y 6/2 altered, yellow gray.
STRUCTURE: Massive.
ALTERATION: Marginal alteration zone 0.5–1 cm is common. Moderately altered to highly altered in some areas.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: No veins or fractures are present.

Heavy alteration



Piece 18
Showing typical outer alteration



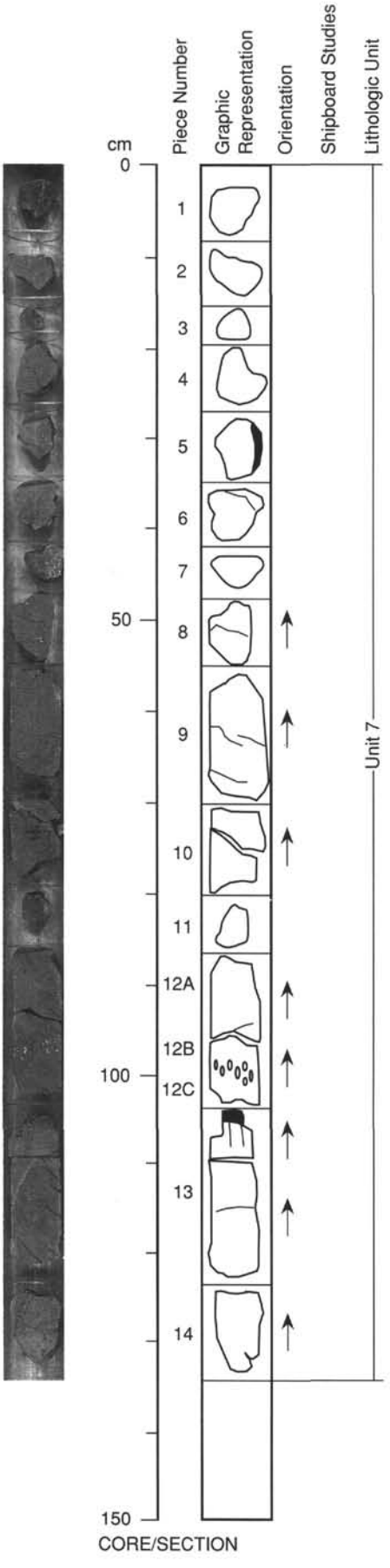
135-834B-25R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–16

CONTACTS: None.
PHENOCRYSTS: Pieces 14 and 15 contain glomerocrysts up to 6 mm and plagioclase content approaching 10%. Most plagioclase is fresh, however some do show greenish alteration.
Plagioclase: 10%–15%; 1–4 mm; single laths and glomerophyric aggregates.
GROUNDMASS: Microcrystalline with some plagioclase microlites visible.
VESICLES: 1%–3%; <2 mm; rounded; irregular; most vesicles are filled with white globular zeolites.
COLOR: 2.5YR 5/0 fresh, gray to 2.5Y 6/2 altered, light brownish gray.
STRUCTURE: Massive.
ALTERATION: Slight to very high.
VEINS/FRACTURES: 1%; 2 mm wide; random; Piece 9 with filled (carbonate) veins, Piece 10 with open fractures with Fe-staining on walls.
ADDITIONAL COMMENTS: Alteration halos extend to 1.5 cm in from exterior edges.

Vein filled with carbonate
Open veins



135-834B-26R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–14

CONTACTS: None.

PHENOCRYSTS: Randomly distributed and oriented plagioclases vary from laths to subhedral blocky crystals. Fe-stained orange brown in the more altered areas. Plagioclase: 10%–15%; 1.5–7 mm; single crystals and glomerocrysts.

GROUNDMASS: Microcrystalline with plagioclase microlites

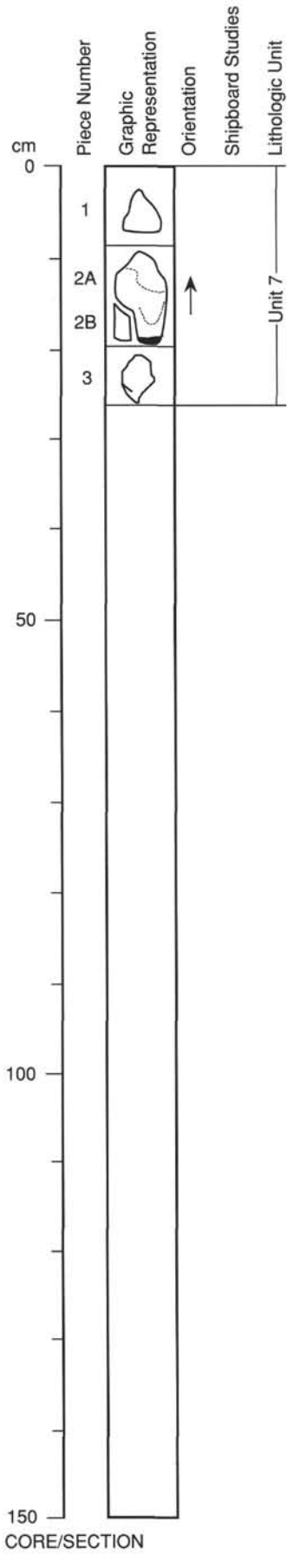
VESICLES: 0%–2%; <<.1–4 mm; round to irregular; patchy; clear, unfilled vesicles are very small (typically <0.1 mm) and form in concentrated patches parallel to piece margins. Miaroies: In Piece 12B, a subhorizontal band of large vesicles occurs across the core and are lined and/or filled with white, globular zeolites(?) and/or carbonate.

COLOR: 2.5YR 5/0, gray to 2.5Y 6/2, light brownish gray.

STRUCTURE: Massive.

ALTERATION: Slightly to moderately altered.

VEINS/FRACTURES: <1%; <1 mm wide; various; very fine irregular fractures are occasionally lined with Fe-oxy-hydroxides.

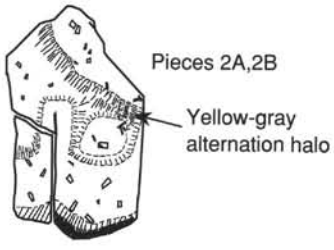


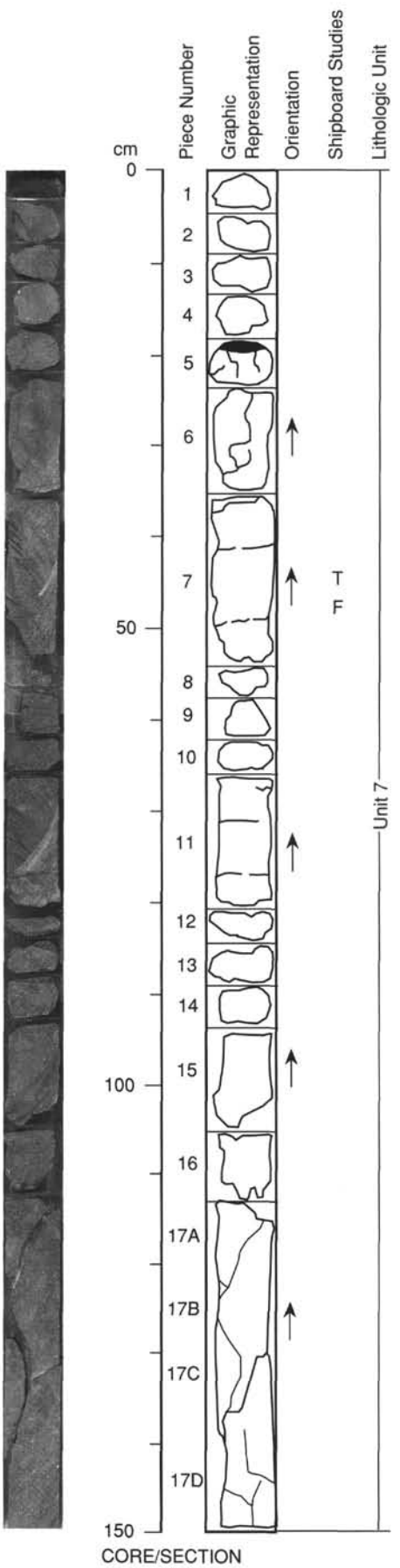
135-834B-27R-1

UNIT 7: HIGH PHYRIC PLAGIOCLASE BASALT

Pieces 1–3

CONTACTS: None.
PHENOCRYSTS: Randomly distributed and oriented plagioclase grains and Fe-stained orange brown in the more altered areas.
Plagioclase: 10%–15%; 2–4 mm; single crystals and glomerocrysts.
GROUNDMASS: Microcrystalline displaying plagioclase microlites
VESICLES: 0%–5%; <<0.1–1; round to irregular; patchy; generally clear from infillings and concentrated parallel to outer margins of some pieces.
Miaroles: None.
COLOR: 2.5YR 5/0, gray to 2.5Y 6/2, light brownish gray.
STRUCTURE: Massive.
ALTERATION: Slight to moderate.
VEINS/FRACTURES: None.



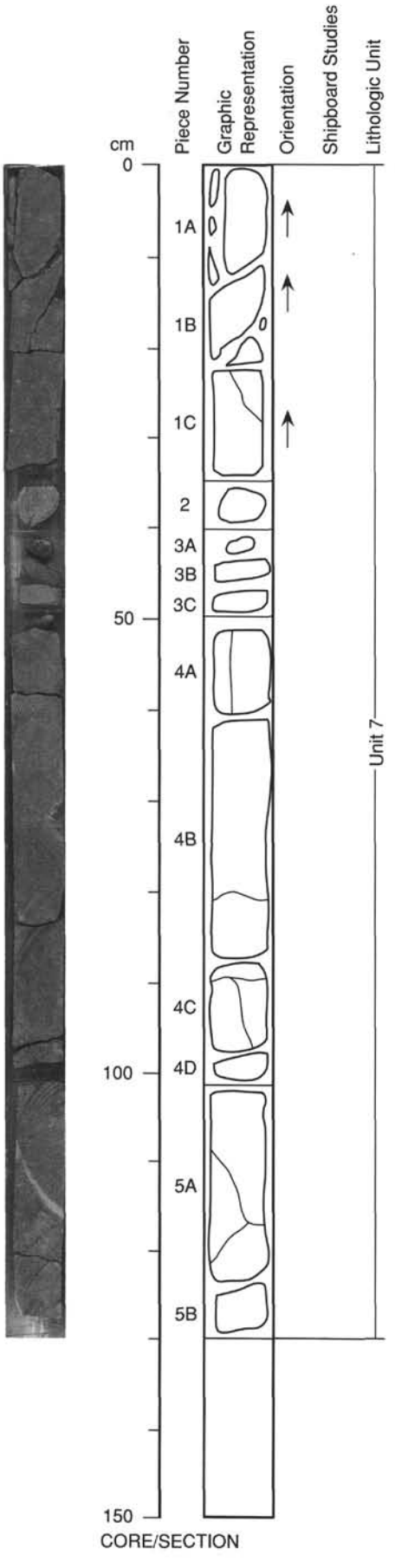


135-834B-28R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–17D

CONTACTS: None.
PHENOCRYSTS: Euhedral crystals up to 4.5 mm long. Fe-staining coats the crystals in the more altered areas.
Plagioclase: 10%–15%; 1–4.5 mm; single rectangular laths and glomerocrysts.
GROUNDMASS: Microcrystalline with plagioclase microlites.
VESICLES: Vesicles are rare and very widely scattered (eg. there are 3 in Piece 14).
Miaroles: A few large cavities are lined with white and brown (Fe-stained?) tabular and globular zeolites(?) and/or carbonates.
COLOR: 2.5YR 5/0, gray to 2.5Y 6/2, light brownish gray.
STRUCTURE: Massive.
ALTERATION: Slight to moderate.
VEINS/FRACTURES: 1%; <2 mm; various; very fine-scale irregular cracks are generally clear from infilling. Wider fractures are infilled with white and Fe-stained carbonate(?) as in Piece 17.
ADDITIONAL COMMENTS: Dark remnants of a glassy rim occur on Piece 5.



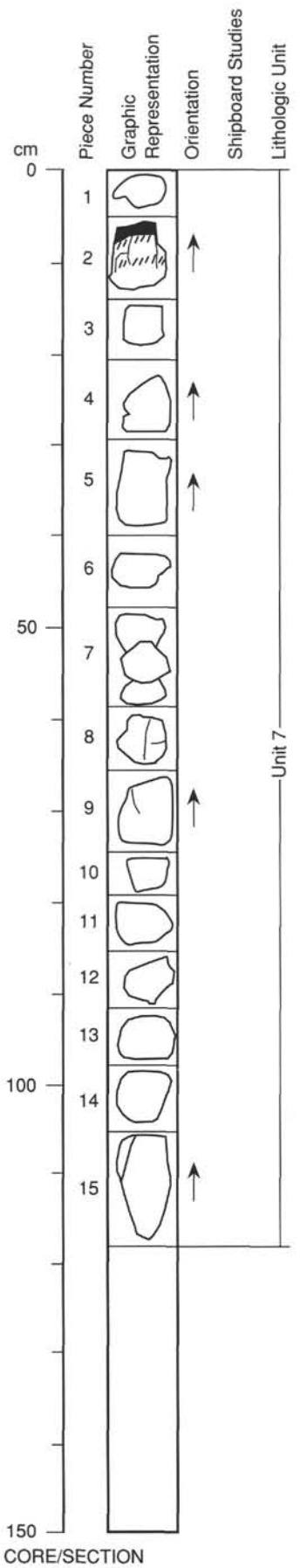
135-834B-28R-2

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1A–5B

CONTACTS: None.
PHENOCRYSTS: Random distribution and orientation. Fresh, colorless to white plagioclases stain yellow-brown in the more altered areas.
Plagioclase: 10%–15%; 1.5–4 mm; single crystals and glomerophyric intergrowths.
GROUNDMASS: Microcrystalline.
VESICLES: 0%–5%; <<0.1–1 mm; round to irregular; patchy; small areas of finely vesicular basalt occur in the altered margins parallel to the edges in some pieces.
Miaroles: Rare cavities up to 6 mm diameter (eg. Piece 4C) are lined with white to pale green globular zeolites(?) and/or carbonates.
COLOR: 2.5YR 5/0, gray to 2.5Y 6/2, light brownish gray.
STRUCTURE: Massive.
ALTERATION: Slight to moderate.
VEINS/FRACTURES: 2%; 1 mm wide; various; rock surfaces show Fe-oxy-hydroxide staining and coatings of greenish white carbonate(?).

~~~ = fractures generally open
~~~



135-834B-29R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–15

CONTACTS: None.

PHENOCRYSTS: Random distribution and orientation of euhedral to subhedral crystals and crystal intergrowths. Fresh white phenocrysts stain yellow brown in the more altered areas.
Plagioclase: 10%–15%; 1.5–4 mm; single crystals and glomerocrysts.

GROUNDMASS: Microcrystalline with plagioclase microlites.

VESICLES: 0%–2%; <<0.1–1; rounded to irregular; patchy; rare and fine vesiculation confined to patches parallel to piece edges (eg. Piece 2).
Miaroles: None.

COLOR: 2.5YR 5/0, gray to 2.5Y 6/2, light brownish gray

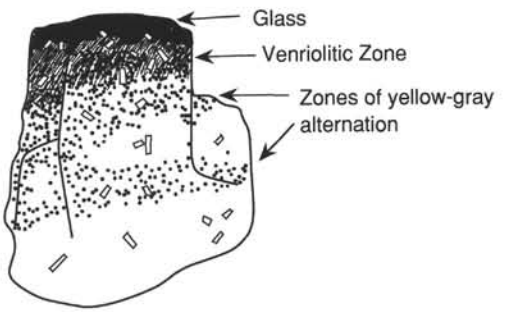
STRUCTURE: Massive.

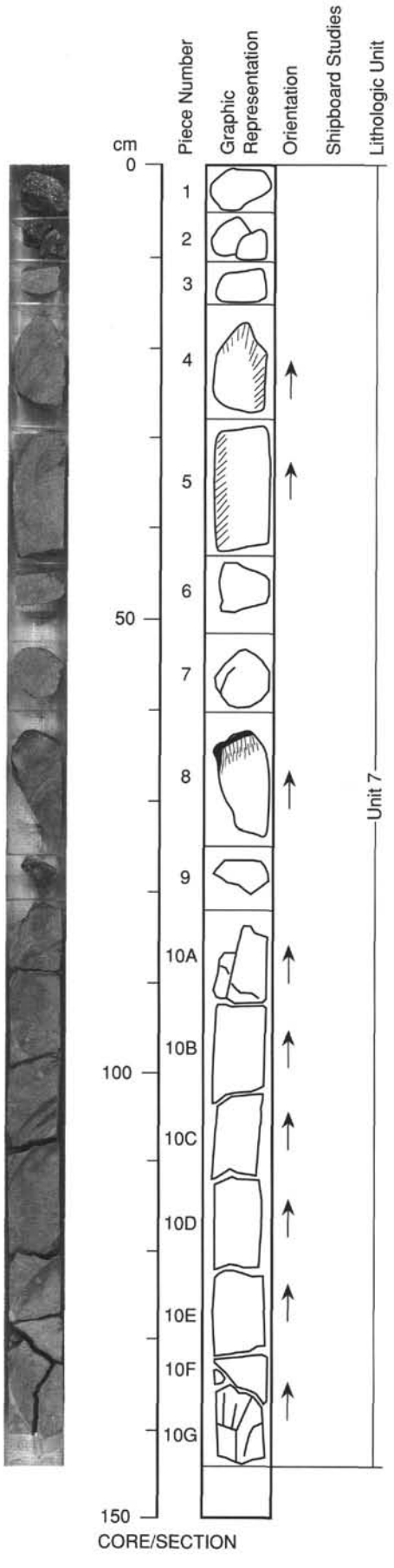
ALTERATION: Slight to moderate.

VEINS/FRACTURES: <1%; <1 mm wide; various; fine cracks lined with Fe-stained carbonate.

ADDITIONAL COMMENTS: Piece 2 has a plagioclase phyric glass rind which grades rapidly into the more typical microcrystalline basalt.

Piece 2



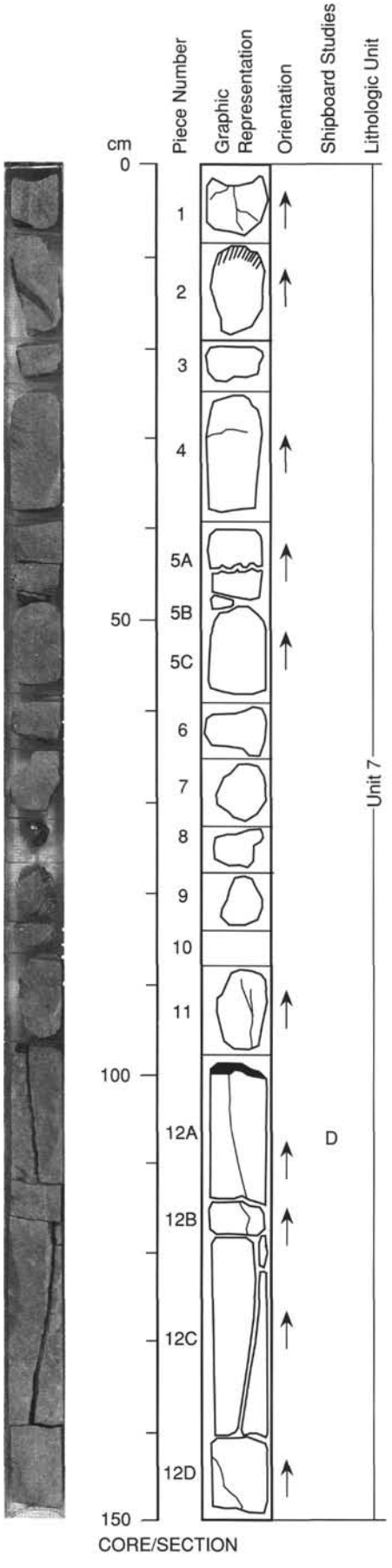


135-834B-30R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–10G

CONTACTS: None.
PHENOCRYSTS: Random distribution and orientation of colorless to white plagioclase phenocrysts. Fe-stained to yellow-brown in the more altered areas.
Plagioclase: 10%–15%; 1.5–5 mm; single crystals and glomerocrysts.
GROUNDMASS: Microcrystalline with plagioclase microlites.
VESICLES: None.
COLOR: 2.5YR 5/0, gray to 2.5Y 6/2, light brownish gray
STRUCTURE: Massive.
ALTERATION: Slight to high.
VEINS/FRACTURES: 2%; up to 1 mm wide; various; fractures lined with Fe-oxy-hydroxides and sometimes greenish carbonate(?).
ADDITIONAL COMMENTS: Piece 8 has a rind of plagioclase phyric glass up to 4 mm wide which grades rapidly into the more typical basalt of Unit 4. Vesicles are almost entirely absent in this section except for a very small patch beneath this glassy rind.

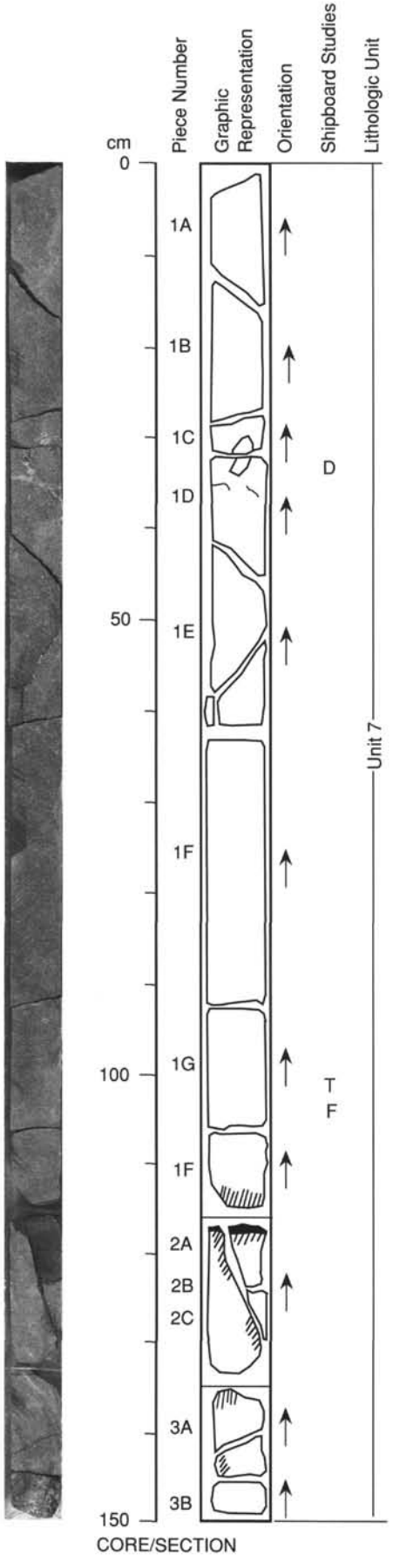


135-834B-30R-2

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–12D

CONTACTS: None.
PHENOCRYSTS: Random distribution and orientation. Fe-stained yellow-brown in the more altered areas.
Plagioclase:10%–15%; 1.5–5 mm; single crystals and glomerocrysts.
GROUNDMASS: Microcrystalline with plagioclase microlites.
VESICLES: None.
Miaroles: Rare cavities (e.g. Piece 5A) up to 5 mm in diameter are lined with clays and carbonates(?).
COLOR: 2.5YR 5/0, gray to 2.5Y 6/2, light brownish gray
STRUCTURE: Massive.
ALTERATION: Slight to moderate.
VEINS/FRACTURES: 1%; up to 1 mm wide; various; fractures lined with Fe-oxy-hydroxides and greenish to white clay.
ADDITIONAL COMMENTS: The rind of plagioclase phyric glass at the top of Piece 12 is underlain by a few fine vesicles.



135-834B-30R-3

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1A–3B

CONTACTS: Glassy margin (1.5 mm) in Piece 2A.

PHENOCRYSTS: Glomerocrysts to 1 cm.
Plagioclase: 10%–15%; 1–2 mm long; euhedral to subhedral.

GROUNDMASS: Microcrystalline with 0.5 mm plagioclase and smaller with intergranular clinopyroxene and interstitial mesostasis; finer grained in Piece 1H above glass margin; glassy to microlitic in Piece 2A.

VESICLES: Tr; 1–2 mm; irregular; see comments; vesicles occur near glassy margin in Piece 2A; a large (6 by 45 mm) gas cavity occurs in Pieces 1C and 1D; 2 similar subvertical cavities on back of 1D.
Miaroles: Cavities in Piece 1D filled with small botryoidal and globular crystals (very like barite in form), translucent columnar and spire-like crystals, and bipyramidal sulfides.

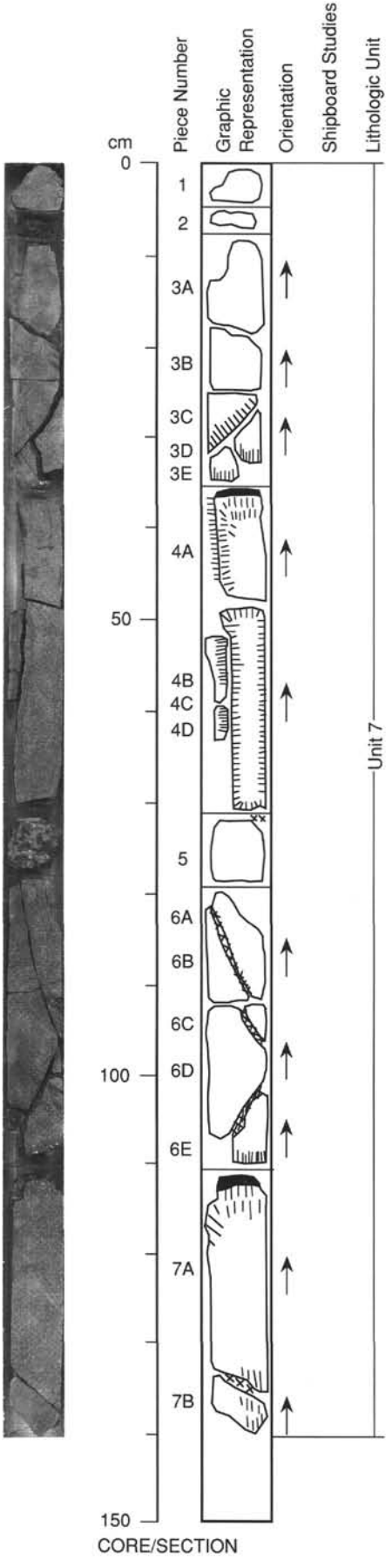
COLOR: 2.5YR 6/0, gray to 10YR 7/3, very pale brown where altered.

STRUCTURE: Thick flows (1–2 m) judging from glass rim here and in cores above and below.

ALTERATION: Fresh to moderate around glassy rim; both base of top flow and rim of lower flow near glass are slightly to moderately altered.

VEINS/FRACTURES: 1%; <0.4 mm wide; 0°, 30°, 85°; fractures separate most of the pieces; coatings on fractures include calcite, a soft light gray-green talc-like mineral in Piece 1E, Mn-oxides (particularly in Pieces 2 and 3) and a few grains of a brownish translucent mineral on the back of Piece 3A.

ADDITIONAL COMMENTS: A nice example of a basalt chill zone in the finer grain sizes above the glass margin; also a good example of preferential alteration around the contacts between two flows.

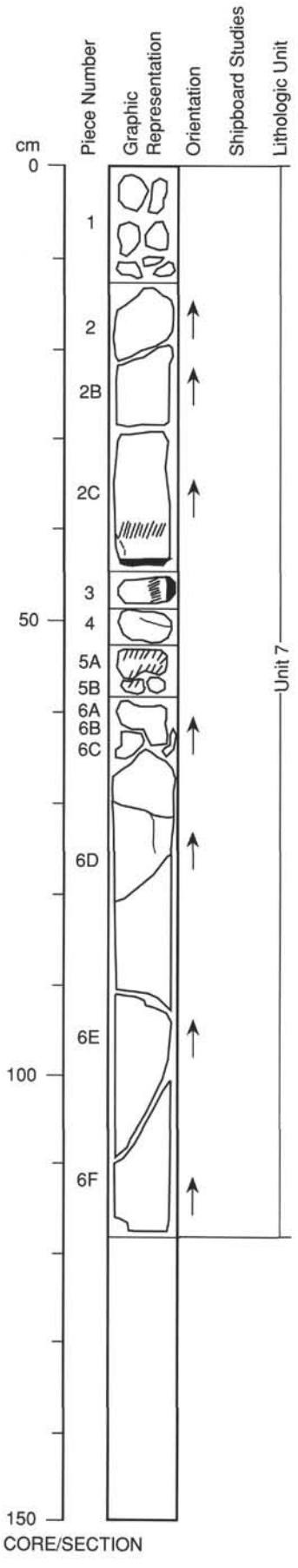


135-834B-31R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–7B

CONTACTS: Between Pieces 6 and 7, and Pieces 3 and 4 (glass on each piece).
PHENOCRYSTS: Glomerocrysts.
Plagioclase: 10%–15%; </= 5 mm; euhedral to subhedral
GROUNDMASS: Fine-grained , holocrystalline.
VESICLES: <1%; <1 mm; rounded; close to glass rims; vesicles mainly occur about 1 cm below glass rims.
COLOR: 7.5YR 6/0, gray to 10YR 6/2, light brownish gray.
STRUCTURE: Massive.
ALTERATION: Brownish gray alteration rinds below glass rims and along cracks. Cracks filled by calcite (white), sometimes brown or green colored. Slight to moderately altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: White to yellowish coatings on glass; probably altered.

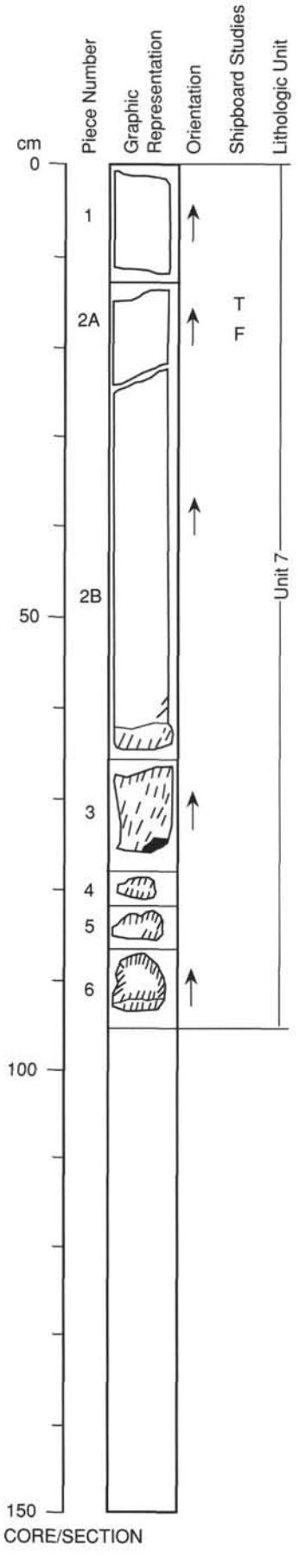


135-834B-31R-2

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–6F

CONTACTS: Glassy margins (0.5–1.2 mm) on the bottom of Pieces 2 and 3.
PHENOCRYSTS: Glomerocrysts to 4 mm; individual crystals rarely to 4 mm. Plagioclase: 10%–15%; 1–2 mm; euhedral to subhedral.
GROUNDMASS: Microcrystalline, plagioclase laths with intergranular clinopyroxene and mesostasis, finer grained (microlitic) next to glassy zones.
VESICLES: Trace; <1 mm; irregular; near glass rims; occur only near glassy rims. Miaroles: None.
COLOR: 2.5Y 7/4, pale yellow (altered); 2.5Y 7/0, light gray (fresh); 2.5Y 4/0, dark gray (near glassy rims).
STRUCTURE: Thick flows or pillows?
ALTERATION: Extensive near glassy rims, to light brown oxidized zone (brown from

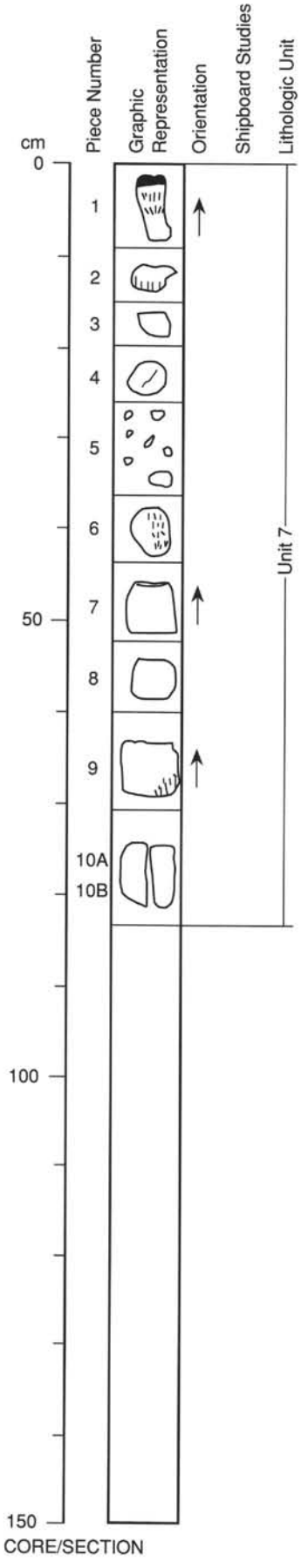


135-834B-31R-3

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–6

CONTACTS: Altered glassy margin in lower right corner of Piece 4.
PHENOCRYSTS: Glomerocrysts to 5 mm.
Plagioclase: 10%–15%; 1–3 mm; euhedral to subhedral.
GROUNDMASS: Microcrystalline to very fine-grained ; plagioclase laths with intergranular clinopyroxene and mesostasis; altered microlitic to glassy rim in Piece 3 with finer grained zones in Pieces 3 and 4.
VESICLES: None.
Miaroles: None.
COLOR: 2.5YR 6/0 (gray, fresh) to 2.5YR 7/2 (light gray) where altered.
STRUCTURE: Thickly bedded flows or pillows judging from contact zones
ALTERATION: Brownish, oxidized zones around fine-grained margins in Piece 3, extends into Pieces 2 to 6. The rock is slightly to moderately altered.
VEINS/FRACTURES: 1%; 0.3 mm wide; 0°, 30° left, 10° down; boundaries between pieces are usually fractures; one large fracture strikes perpendicular to the core and dips about 10°–down; subhorizontal fractures are most common; fracture coatings include calcite (Piece 2), soft gray to blue-white talc-coating (Pieces 1, 2), Mn-oxide (Pieces 3, 4), palagonite alteration or remnants with Mn-oxide spots (Piece 4), Fe-oxy-hydroxides (Pieces 4, 5).
ADDITIONAL COMMENTS: Altered glassy rim in Piece 3.

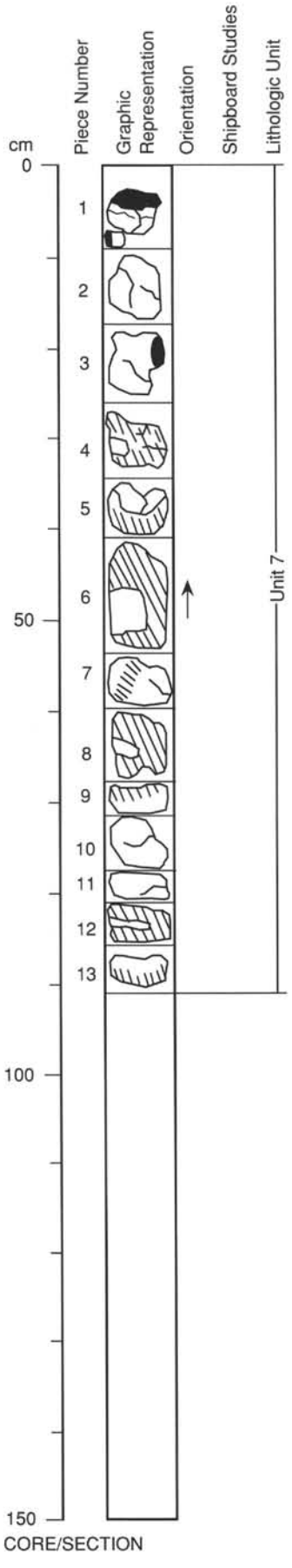


135-834B-32R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–10B

CONTACTS: Glass rim on the top of the section.
PHENOCRYSTS: Randomly distributed and oriented.
Plagioclase: 10%–15%; </=5 mm; glomerocrysts as well as single phenocrysts.
GROUNDMASS: Fine-grained , holocrystalline.
VESICLES: <1%; <1; rounded; see comments; underneath glass rim.
Miaroles: None.
COLOR: 2.5YR 5/0, gray to 2.5Y 6/2, light brownish gray.
STRUCTURE: Massive.
ALTERATION: Slightly to moderately altered. Brownish gray alteration front below glass rim.
VEINS/FRACTURES: None.



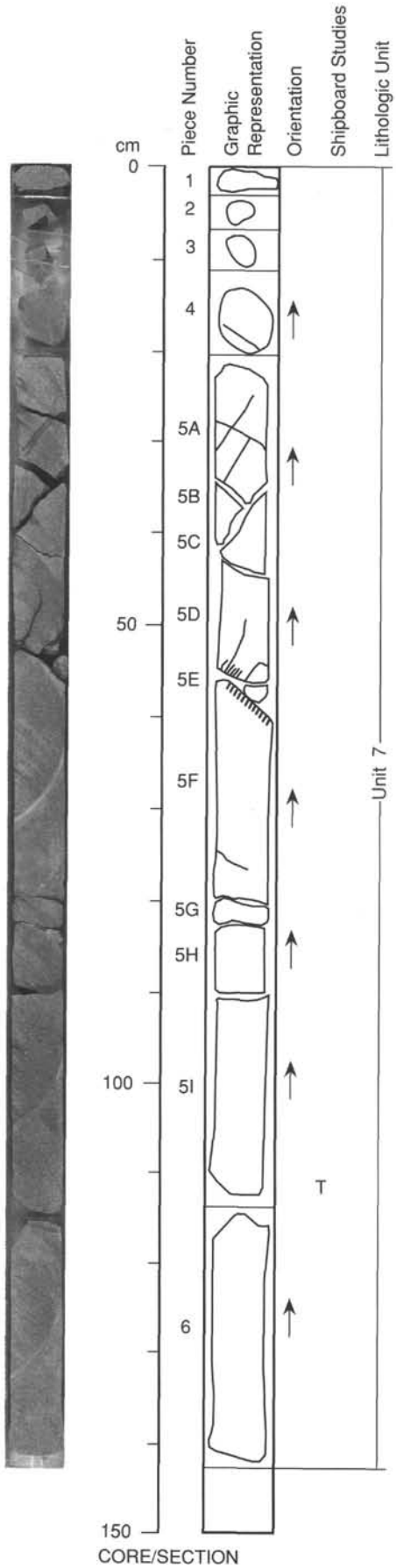
135-834B-33R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–13

CONTACTS: None.
PHENOCRYSTS: Randomly oriented and distributed. Stained yellowish in the more altered areas, but generally fresh.
Plagioclase:10%–15%; 1.5–4 mm; single crystals and glomerocrysts.
GROUNDMASS: Fine-grained , holocrystalline.
VESICLES: None.
COLOR: 2.5YR 5/0, gray to 2.5Y 6/2, light brownish gray.
STRUCTURE: Massive.
ALTERATION: Slight to moderate alteration.
VEINS/FRACTURES: <1%; <1 mm; various; fine, irregular fractures are coated with clays and Fe-oxy-hydroxides.
ADDITIONAL COMMENTS: Plagioclase phyric glass rinds occur on both sides of Piece 1 vesicular chilled basalt (approximately 2 cm wide, see sketch).

135-834B-33R-2

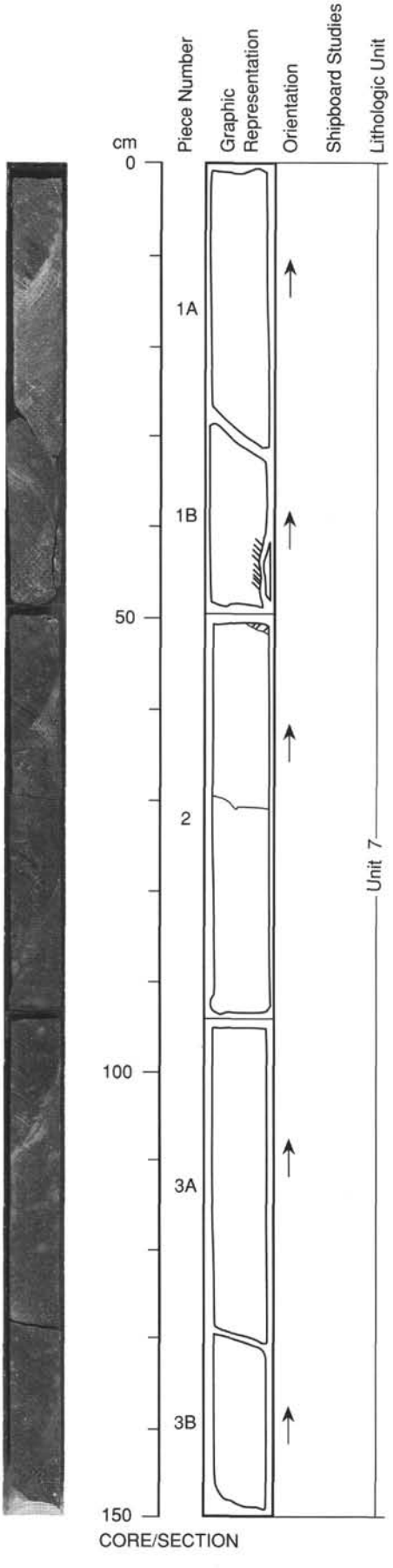


UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–6

CONTACTS: None.
PHENOCRYSTS: Randomly oriented and distributed. Fresh. Black glassy patches occur in the groundmass up to 1 mm diameter (e.g. Piece 5A).
Plagioclase: 15%–20%; 1.5–5 mm; single crystals and glomerocrysts.
GROUNDMASS: Fine-grained, holocrystalline.
VESICLES: None.
COLOR: 2.5YR 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Fresh to slight.
VEINS/FRACTURES: 2%; <1 mm; various; fine, irregular fractures coated thinly by greenish clays and rarely Fe-oxy-hydroxide (e.g. Piece 5).

mmmm Moderate alteration

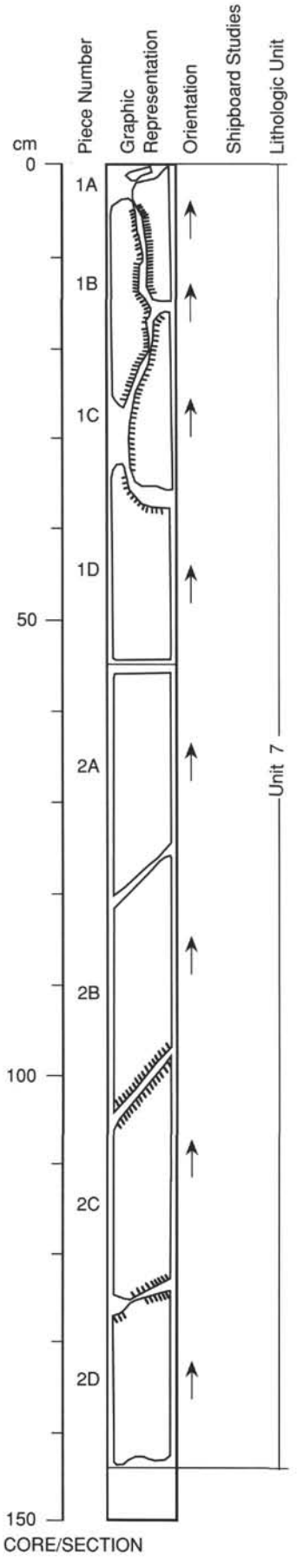


135-834B-33R-3

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1A–3B

CONTACTS: None.
PHENOCRYSTS: Randomly distributed and oriented.
Plagioclase: 10%–20%; 2–8 mm; glomerocrysts present in addition to single euhedral and subhedral crystals (up to 8 mm long).
GROUNDMASS: Fine-grained, holocrystalline intergrowth of pyroxene and plagioclase.
VESICLES: None.
Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: <1%; <1 mm; various; chalky white and greenish clays thinly coat these fractures (e.g. Piece 1B)



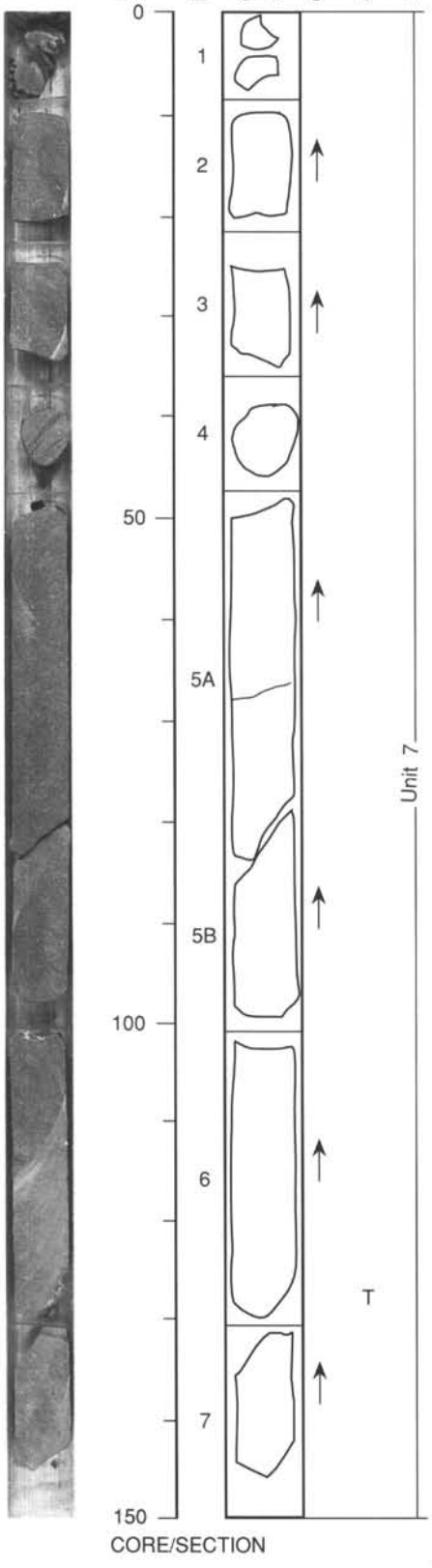
135-834B-33R-4

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1A–2D

CONTACTS: None.
PHENOCRYSTS: Randomly distributed and oriented.
Plagioclase: 10%–20%; 2–6 mm; single euhedral to subhedral crystals as well as glomerocrysts.
GROUNDMASS: Fine-grained holocrystalline intergrowth of plagioclase and pyroxene
VESICLES: None.
Miaroles: None.
COLOR: 2.5Y 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Fresh slightly altered.
VEINS/FRACTURES: 2%; < 1mm wide; subvertical to 45°; fractures lined with a mottled coating of white and greenish clays.

Alteration along fractures

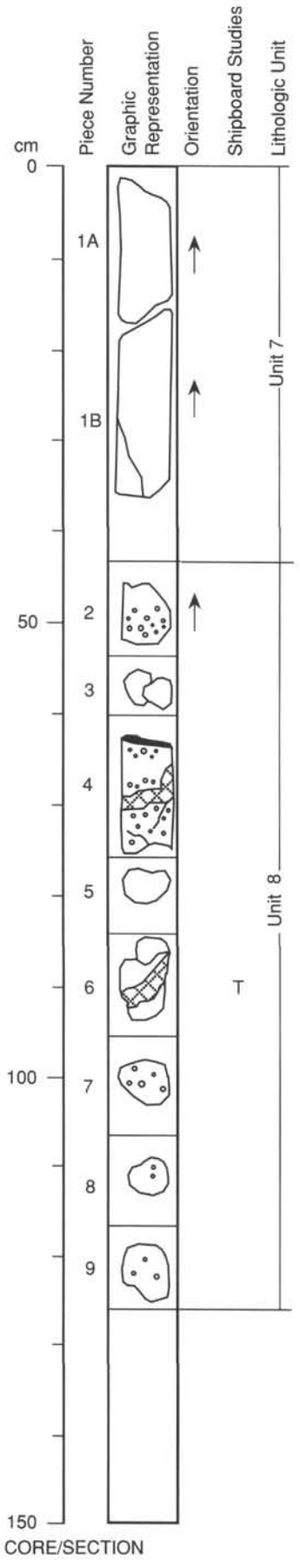


135-834B-34R-1

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

Pieces 1–7

CONTACTS: None.
PHENOCRYSTS: Randomly distributed and oriented.
Plagioclase: 10%–15%; 2–6 mm; single euhedral to subhedral crystals as well as glomerocrysts.
GROUNDMASS: Fine-grained , holocrystalline. Rare pale yellow green olivine crystals observed (<1%).
VESICLES: None.
COLOR: 2.5 YR 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: <1%; <1 mm; various; fractured edges commonly have coatings of white or greenish clay and/or Mn-oxide.

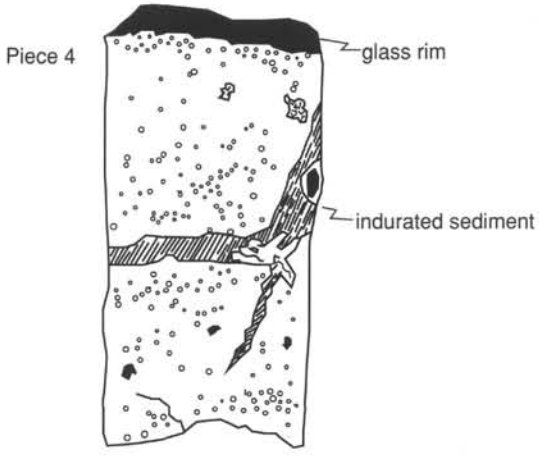


135-834B-34R-2

UNIT 7: HIGHLY PHYRIC PLAGIOCLASE BASALT

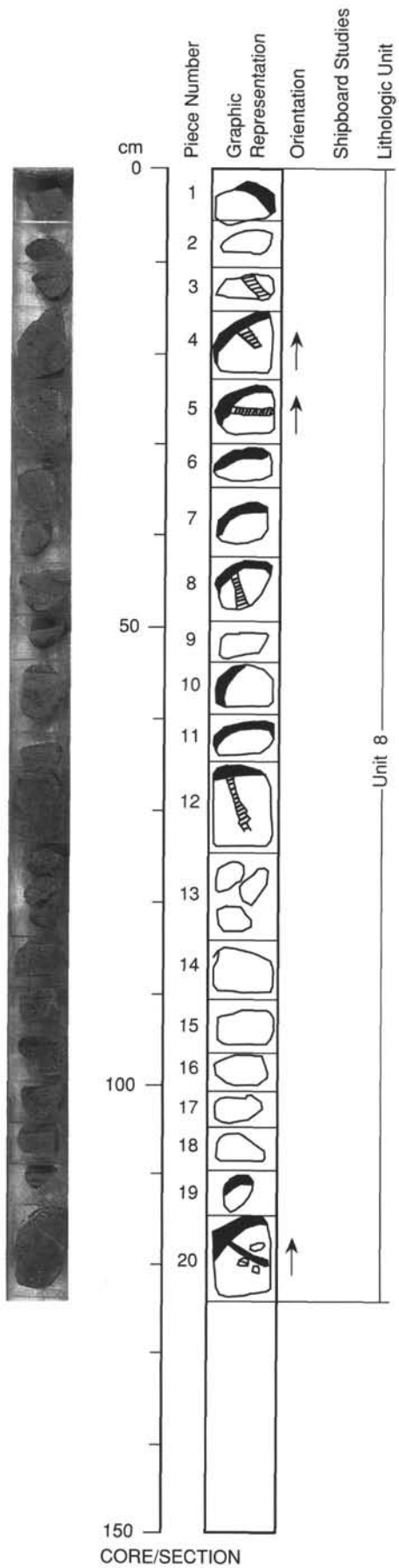
Pieces 1A–1B

CONTACTS: None.
PHENOCRYSTS: See description.
Plagioclase: 10%–15%; 3–5 mm; euhedral to subhedral, isolated crystals and glomerocrysts.
Olivine: <1%; 0.5–1 mm; very rare isolated crystals and integer own with plagioclase.
GROUNDMASS: Randomly oriented plagioclase enclosed by augite.
VESICLES: None.
Miaroles: None.
COLOR: 2.5YR 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: <1%; < 1 mm side; 20°–80°; widely separated; may be slickensided.



Pieces 2–9

CONTACTS: Indurated and/or baked sediment near top of interval and in fractures.
PHENOCRYSTS: These are microphenocrysts, visible only under microscope.
Plagioclase: 5%–8%; 0.3–0.6 mm; platy laths.
Olivine: 1%–2%; 0.2–0.8; yellow.
GROUNDMASS: Frothy gray glass; locally pale tan patches.
VESICLES: 5%–10%; 1–2 mm; round; variable; microvesicular groundmass; 70%–80% void space.
Miaroles: Both macro- and micro-vesicles may have lining of highly refractive clear crystals.
COLOR: 5Y 4/1, gray.
STRUCTURE: Massive.
ALTERATION: Slightly altered.
VEINS/FRACTURES: 2%; 1–20 mm wide; variable; fractures may be filled by indurated sediment.



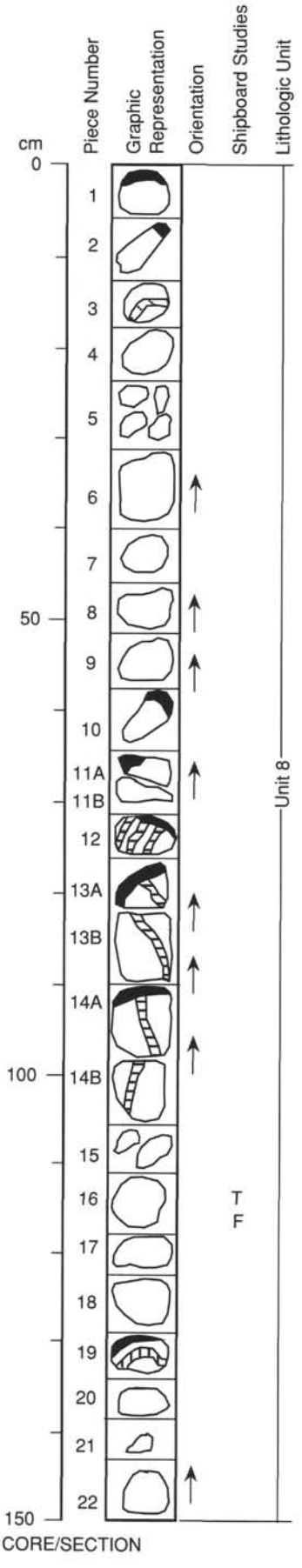
135-834B-35R-1

UNIT 8: APHYRIC BASALT

Pieces 1–20

CONTACTS: None.
PHENOCRYSTS: Randomly distributed.
Olivine: 1%; up to ' .5 mm; single greenish yellow glassy crystals; subhedral to euhedral.
GROUNDMASS: Very fine-grained , laths of plagioclase clearly identified.
Microlitic close to glass rinds
VESICLES: 5%–15%; <1–3 mm; round to subrounded; patchy; vesicles are frequently frothy or irregular on the interior rather than smooth cavities.
Miaroles: Some vesicles lined with euhedral phillipsite crystals
COLOR: 2.5YR 4/0, dark gray.
STRUCTURE: Massive.
ALTERATION: Generally slightly altered, but moderately highly altered near fractures and veining.
VEINS/FRACTURES: 1%; 1–2.5 mm wide; various; veins of indurated/baked(?) sediment are present in Pieces 3, 4, 5, 8, 12, and 20.
ADDITIONAL COMMENTS: Lighter brownish patches of more frothy basalt occur within the more typical vesicular basalt. Glass rinds are present on Pieces 1, 3, 4, 5, 6, 7, 8, 11, 12, 19, 20.

Glassy pillow margins
Indurated sediment in veins or clasts

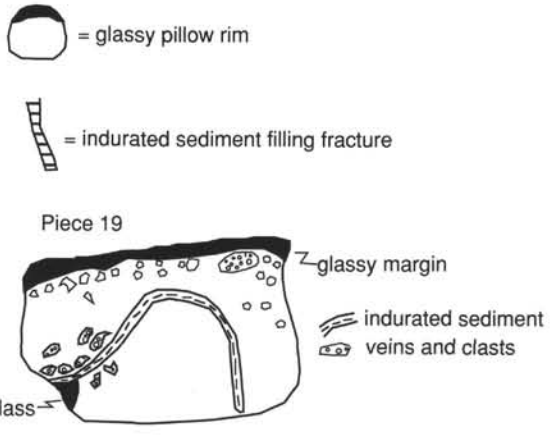


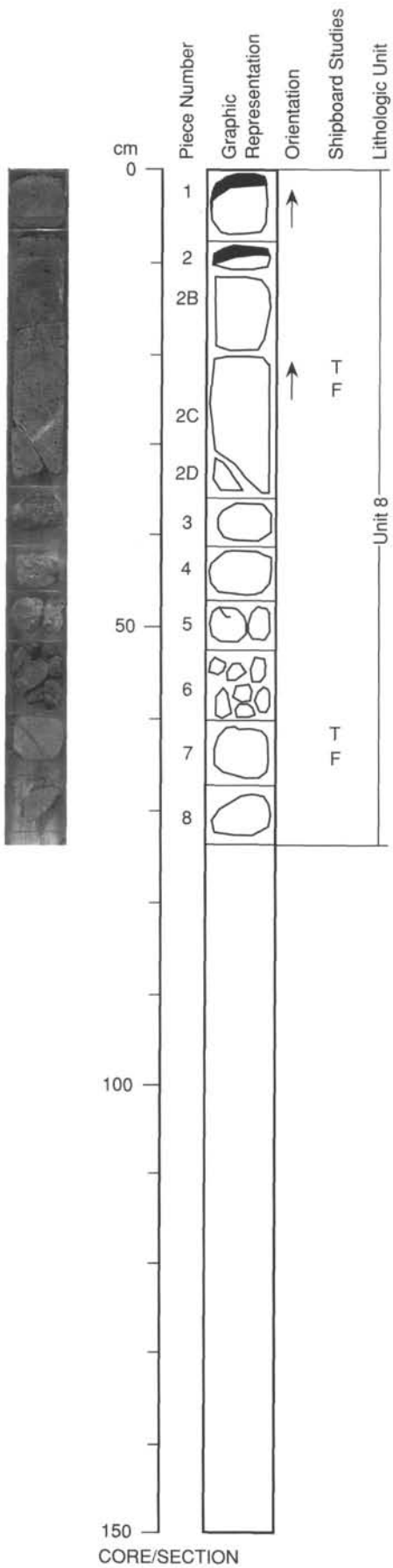
135-834B-35R-2

UNIT 8: APHYRIC BASALT

Pieces 1–22

CONTACTS: None.
PHENOCRYSTS: Randomly distributed.
Olivine: Trace; up to 3 mm; subhedral to euhedral pale greenish-yellow crystals.
GROUNDMASS: *Very fine-grained , includes plagioclase laths < 1mm long.*
Microlitic adjacent to glass rinds.
VESICLES: 5%–15%; <1–3 mm; round to subrounded; patchy; smaller vesicles have irregular "frothy" linings of basalt.
Miaroles: Rarely, vesicles are lined with zeolites (phillipsite).
COLOR: 2.5YR 4/0, dark gray.
STRUCTURE: Massive.
ALTERATION: Slightly altered (generally) to moderately or highly altered close to fractures or veins.
VEINS/FRACTURES: 1%; 1–5 mm wide; various; indurated/baked sediment veins in Pieces 3, 12, 13, and 18. Fe-oxy-hydroxide alteration products within 0.5 cm either side of these features.
ADDITIONAL COMMENTS: Glass rinds on Pieces 1, 2, 10, 11, 12, 13A, 13C, and 18.





135-834B-36R-1

UNIT 8: APHYRIC BASALT

Pieces 1–8

CONTACTS: None.

PHENOCRYSTS:

Olivine: Trace; < 1 mm; greenish yellow glassy crystals; subhedral to euhedral.
Clinopyroxene: Trace; 1.5 mm; euhedral, fresh green.

GROUNDMASS: Very fine-grained ; plagioclase laths are easily identified; microlitic near glassy rims.

VESICLES: 5%–35%; up to 2 mm; rounded to subrounded; throughout; vesicle content varies greatly and appears to decrease downcore.

Miaroles: Some vesicles lined with euhedral zeolites.

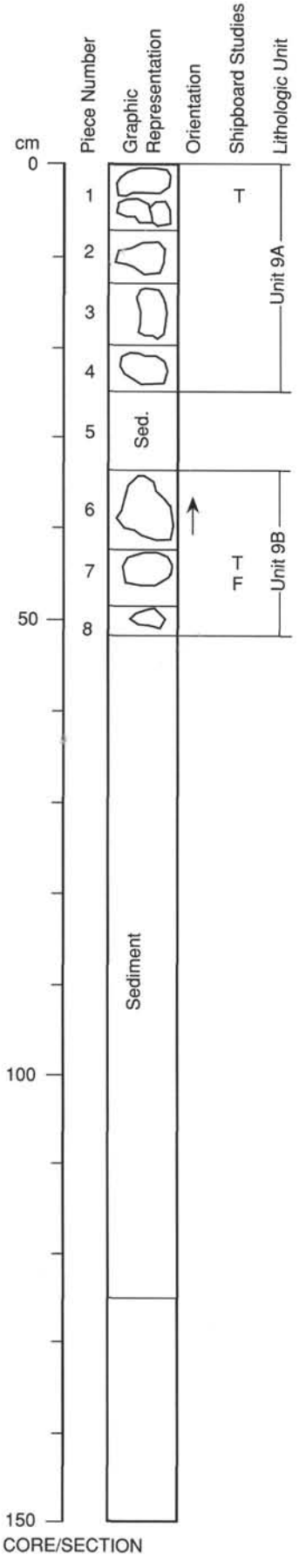
COLOR: 2.5YR 4/0, gray.

STRUCTURE: Massive.

ALTERATION: Fresh to slightly altered.

VEINS/FRACTURES: Trace; < 2mm wide; surfaces with calcite and globular colorless zeolites?. No alteration halo in host rock.

ADDITIONAL COMMENTS: Vesicle content appears to be decreasing downcore. Spongy texture is not as prominent in this section. Olivine content is somewhat higher in this section. Regions of spongy small vesicles are still common in the vesicular host and appear as dull gray patches. The pebbles at the top of core 37–1 are somewhat similar to these.



135-834B-37R-1

UNIT 9A: MODERATELY PHYRIC OLIVINE PLAGIOCLASE BASALT

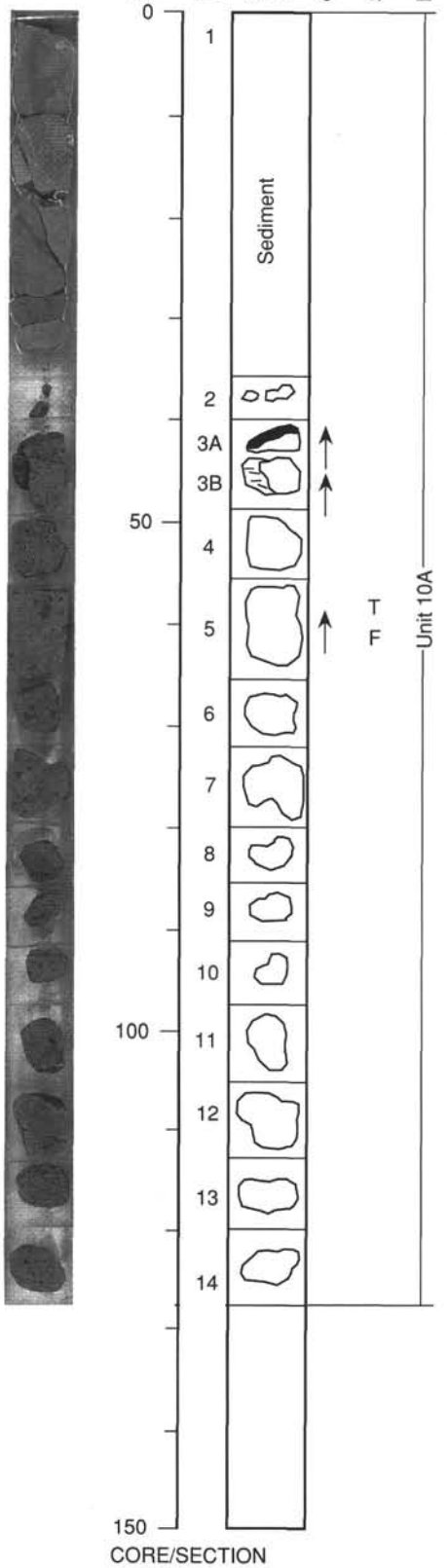
Pieces 1–4

CONTACTS: Piece 4 is underlain by a fine sand-sized sediment.
PHENOCRYSTS: Plagioclase becomes abundant in Piece 2 to Piece 4.
Plagioclase: Tr-2%; 1–1.5 mm; euhedral as single crystals and in glomerocrysts; most common and largest in Pieces 2 and 4.
Olivine: 2%-4%; <0.7 mm; euhedral, single grains; rarely to 3 mm in Pieces 2 and 3.
GROUNDMASS: Microcrystalline; plagioclase laths < 0.6 mm with intergranular clinopyroxene(?) and interstitial mesostasis.
VESICLES: 5%–10%; <0.5– 1.1 mm; round to irregular; scattered; rare cavities to 4 mm; the vesicles are bimodal: 1% are >1mm, 3% to 5% are small, < 0.5mm
Miaroles: Minor reddish and blue-gray linings.
COLOR: 7.5YR 5/0, gray.
STRUCTURE: None.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: Trace; piece sides are bounded in part by fractures; coatings include Mn-oxides, Fe-oxy-hydroxides
ADDITIONAL COMMENTS: Piece 1 is generally quite olivine phyric with little plagioclase and is much like a denser variety of the material in upper parts of Unit 8. Pieces 2 to 4 are much more plagioclase phyric than most of Unit 8 and are more similar to the pieces of Unit 9.

UNIT 9B: MODERATELY PHYRIC OLIVINE PLAGIOCLASE BASALT

Pieces 6–8

CONTACTS: Overlain by fine sand-sized sediment (Piece 5); underlain by coarse sandstone. Piece 7 has a thin glass margin with adhering sediment like that in Piece 5 and clearly belongs at the top of this unit.
PHENOCRYSTS: Glomerocrysts of plagioclase, olivine (2–3 grains) and plagioclase plus olivine (to 3 mm)
Plagioclase: 2%; 1–3 mm; euhedral, single crystals.
Olivine: 1%–2%; 0.5–1 mm; single, euhedral most common.
GROUNDMASS: Microlitic (Piece 8) to microcrystalline (Pieces 6, 7).
VESICLES: 5%–10%; >0.8 or <0.4 mm; round; various; Bimodal: 1%–2%, 0.9– 1 mm, most common in Piece 8 (to 10%) which also has cavities up to 4 by 8 mm; smaller population is 5%–6% throughout groundmass.
Miaroles: Minor blue-white (zeolite?) and greenish (clay?) linings.
COLOR: 7.5YR 5/0, gray.
STRUCTURE: Thin flow?
ALTERATION: Slight to moderate; surface coatings of orange Fe-oxy-hydroxide stained clays (Piece 6); Mn-oxides (Piece 6, 7), yellow-tan clays or sediments (Pieces 7, 8).
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Piece 6 looks like a cobble; it has a weathered, not cored, surface. This unit is very similar to Pieces 2, 3 and 4 - they may two thin flows of a similar lithology; the sediment between them is white-tan and well-lithified, partly baked(?).



135-834B-37R-2

UNIT 10A: APHYRIC BASALT

Pieces 2–14

CONTACTS: Overlain by sediment; a fine-grained margin in Piece 3; Piece 14 is finer grained.

PHENOCRYSTS: Very sparse.
Plagioclase: Trace; 1–1.5 mm; euhedral.

GROUNDMASS: Aphanitic to intersertal with groundmass plagioclase and abundant olivine. or clinopyroxene; Piece 14 is finer grained with very few crystals-very glassy.

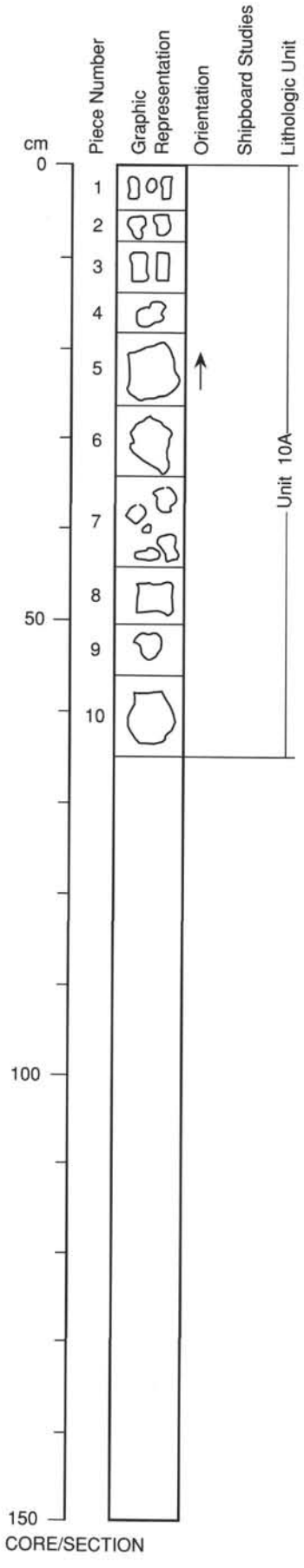
VESICLES: 10%–30%; 1– 6 mm or <0.5 mm; round to irregular; various; Bimodal; round to large cavities, sometimes elongate; smaller population composes 20%– 30% giving groundmass a high porosity.
Miaroles: Large cavities often filled with darker, frothy basalt; yellow-orange and yellow-green coatings in many large cavities, particularly Pieces 3 and 11.

COLOR: 7.5YR 5/0, gray.

STRUCTURE: Thick flow?

ALTERATION: Slight.

VEINS/FRACTURES: Minor, yellow-brown surface and vesicle coatings.

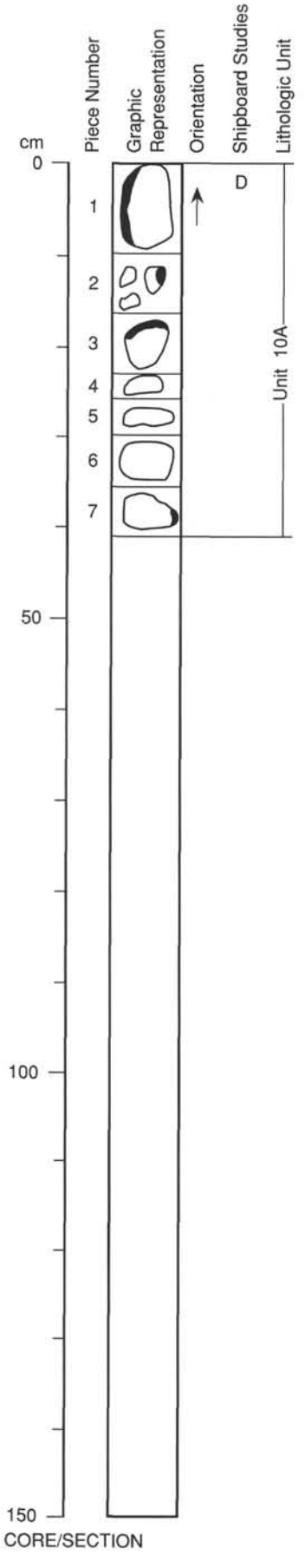


135-834B-38R-1

UNIT 10A: APHYRIC BASALT

Pieces 1–10

CONTACTS: None.
PHENOCRYSTS: Very rare plagioclase.
GROUNDMASS: Microcrystalline to intersertal; groundmass plagioclase and clinopyroxene (or olivine?) with interstitial glass.
VESICLES: 10%–30%; <0.4 to 5 mm; round to irregular; various; Bimodal; large ones (1– 5 mm) variously distributed <2 –4% in Pieces 1, 2, 3, 4, 5, 7, 5%–10% in Pieces 6, 8–10; small population (<0.4 mm) occurs throughout up to 2%–5% giving groundmass a high porosity.
Miaroles: Minor vesicle linings.
COLOR: 7.5YR 5/0, gray to 10YR 6/0, light gray.
STRUCTURE: None.
ALTERATION: Slight: surface and vesicle coatings including translucent, drusy coating (zeolite(?), Pieces 3, 8); yellow orange Fe-oxy-hydroxide (Pieces 6, 10); tan clay (?, Piece 5).
VEINS/FRACTURES: None prominent.

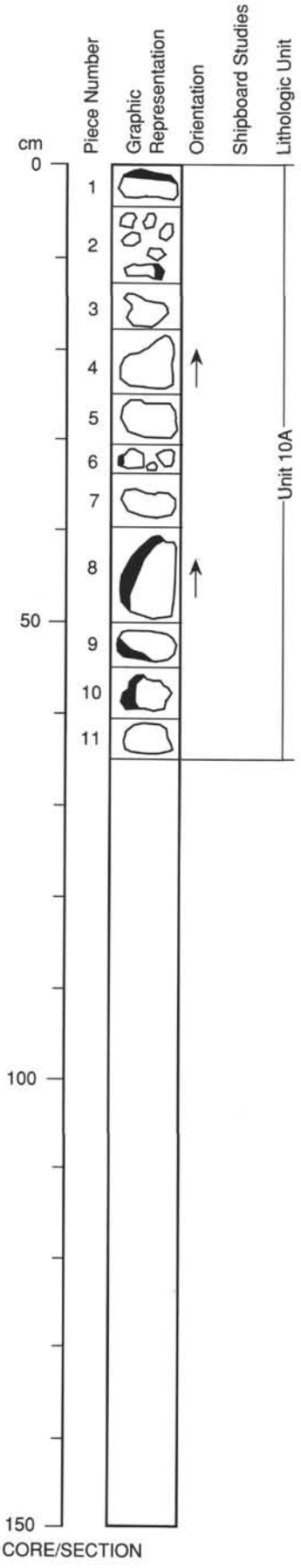


135-834B-39R-1

UNIT 10A: APHYRIC BASALT

Pieces 1–7

CONTACTS: None.
PHENOCRYSTS: No phenocryst visible.
GROUNDMASS: Holocrystalline, very fine-grained .
VESICLES: 30%–40%; <=3 mm; rounded; throughout; very rarely vesicles contain zeolites and sulfide blebs. Latter limited to Piece 6.
Miaroles: None.
COLOR: 2.5YR 4/0, (dark gray).
STRUCTURE: Massive.
ALTERATION: Slight.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Glass rims show yellowish brown to dark brown coarse-grained alteration product (probably palagonite).

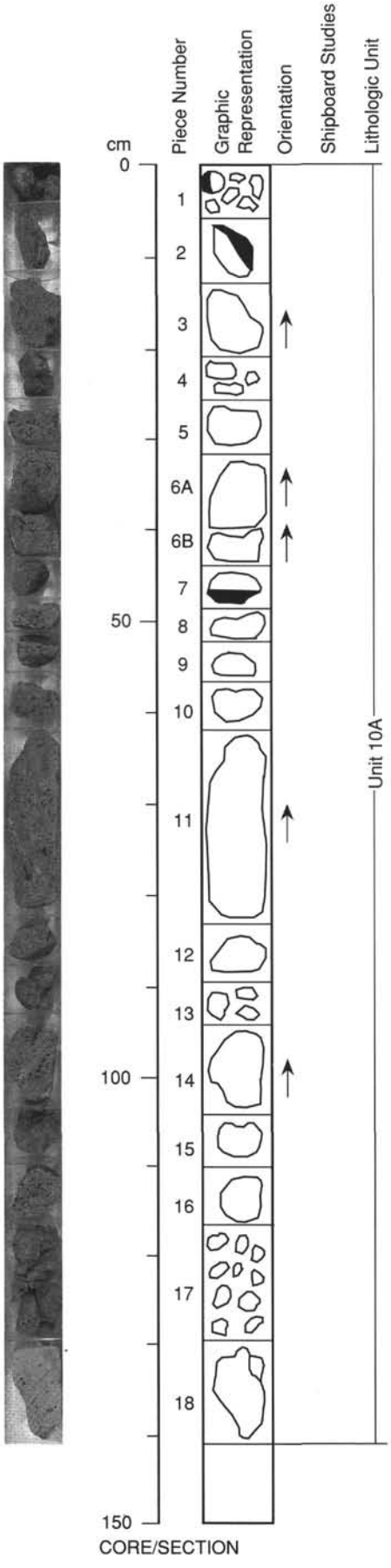


135-834B-40R-1

UNIT 10A: APHYRIC BASALT

Pieces 1 –11

CONTACTS: None.
PHENOCRYSTS: Not visible.
GROUNDMASS: Very fine-grained , holocrystalline.
VESICLES: 30%; <=5 mm; rounded; throughout; magma infilling in huge vesicles suggested.
COLOR: 2.5YR 4/0 dark gray.
STRUCTURE: Massive.
ALTERATION: Fresh/slight.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: A few vesicles are lined with a light blue unidentified mineral in Piece 5. Glass rims altered on top to coarse-grained yellowish brown material (palagonite?) covered by zeolites. Piece 8 (oriented) appears to be a pillow margin.

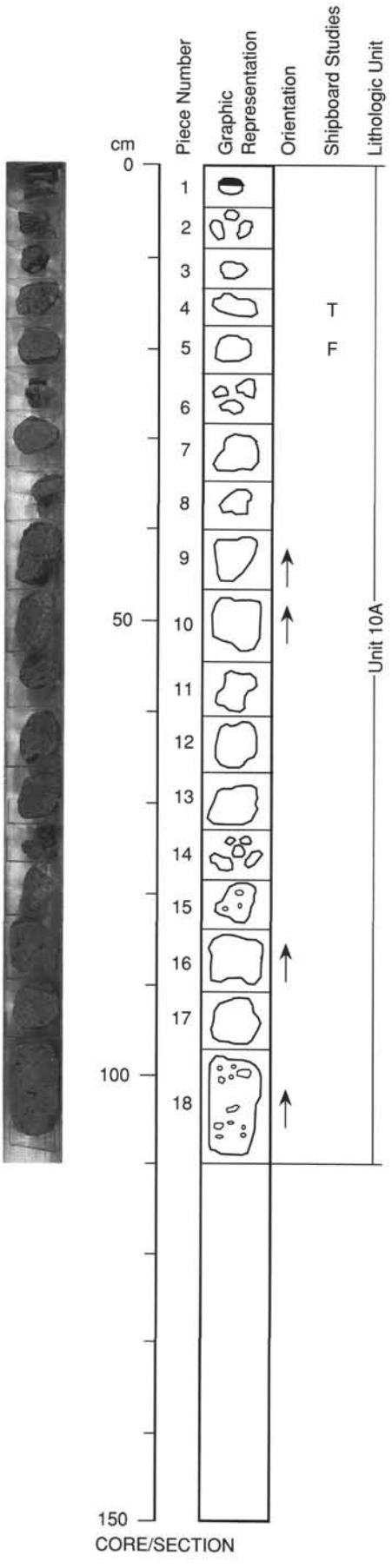


135-834B-41R-1

UNIT 10A: APHYRIC BASALT

Pieces 1-18

CONTACTS: None.
PHENOCRYSTS: Not present.
GROUNDMASS: Holocrystalline, very fine-grained .
VESICLES: 20%–30%; up to 6 mm; mainly rounded; throughout; pieces with smaller and larger vesicles can be distinguished.
COLOR: 2.5YR 4/0 (dark gray).
STRUCTURE: Massive.
ALTERATION: Fresh to slight.
VEINS/FRACTURES: <0.1%; <0.1 mm; a single fracture occurs in Piece 18 (Fe-staining)
ADDITIONAL COMMENTS: Piece 18 has a lower amount of vesicles and is slightly different in color (5/2 on chart 2.5Y). Infillings of a light blue and green colored material (obviously the same mineral) in vesicles occur throughout the core.

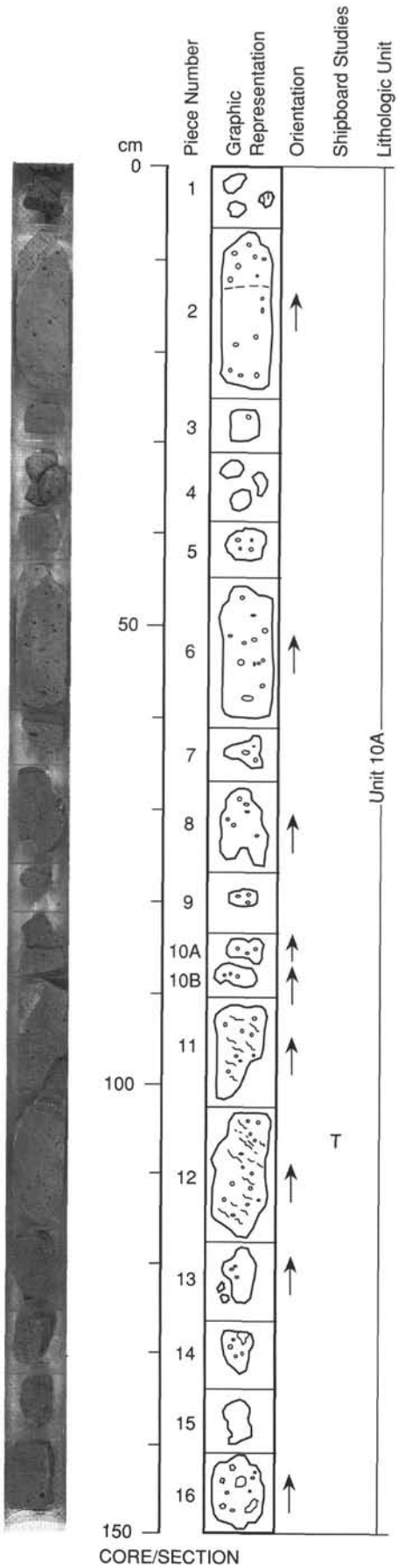


135-834B-42R-1

UNIT 10A: APHYRIC BASALT

Pieces 1–18

CONTACTS: Glass on Piece 1.
PHENOCRYSTS: Rare plagioclase - 1 mm, euhedral.
GROUNDMASS: Aphanitic to microcrystalline; plagioclase and clinopyroxene (or olivine?) crystals in a glassy to aphanitic matrix.
VESICLES: 20%–30%; <0.5–7 mm; round to irregular; various; two populations: one small (10%–30% throughout) and one large (>1 to 7 mm round to ellipsoidal, 5 %–10% in Pieces 1–6, 9–3, 15–18 and 1%–2% in Pieces 7, 8, 14, and 15.
Miaroles: Various thin vesicle fillings including blue gray zeolites(?), Fe-oxy-hydroxides; a 1 by 6 mm cavity in Piece 18 filled with green-white, drusy deposit.
COLOR: 10YR 6/1, light gray.
STRUCTURE: None.
ALTERATION: Slight to moderate where abundant fill occurs; some pieces have a brownish green cast though the groundmass which looks clean under the binocular microscope.
VEINS/FRACTURES: Trace; 0.7 mm; subvertical; in Piece 9, filled with white calcite; surface coatings include yellowish clays(?), calcite, Fe-oxy-hydroxides or Fe-stained clays.
ADDITIONAL COMMENTS: Vesicle coatings more abundant than they were through core 40.

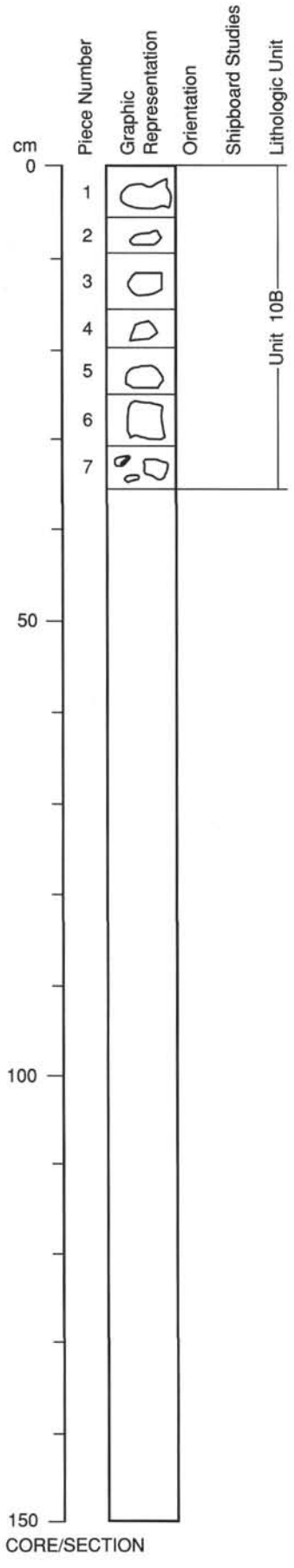


135-834B-43R-1

UNIT 10A: APHYRIC BASALT

Pieces 1–16

CONTACTS: Glass fragments in Piece 1; may be an altered margin in Piece 14.
PHENOCRYSTS: Rare plagioclase; euhedral, rarely to 5 mm, more typically about 1 mm.
GROUNDMASS: Microcrystalline random plagioclase laths (< 0.5 mm), intergranular clinopyroxene (or olivine?), mesostasis.
VESICLES: 15 %–25%; <0.6 mm or > 1.5 mm; round to irregular; various; bimodal: larges (>1.5 mm) round to ellipsoidal, cavities to 10 mm make up 1%– 5% (except in Piece 1 where they are 1%–5%); small, distribution overall is patchy; small vesicles (<0.7 mm, compose 15 %–30% of groundmass, probably interconnected.
Miaroles: Thin coatings common; greenish clay(?); blue black, light green, whitish, blue-white zeolites or clays; Fe-oxy-hydroxides or Fe-stained clays; Piece 16 has a variety of these.
COLOR: 10YR 6/1 to 6/2 altered, 2.5YR 6/0 in some fresher margins and bands
STRUCTURE: None (possibly thick flows?).
ALTERATION: Moderate, based on color a light greenish brown cast in interiors with grayer margins or bands (Pieces 2, 8) suggests some groundmass alteration.
VEINS/FRACTURES: Tr; <0.4 mm; subhorizontal; some Fe-oxy-hydroxides or Fe-stained clays along some fractures; also Mn-oxides, yellowish clays on some outside surfaces.
ADDITIONAL COMMENTS: Bands of fine vesicles in Piece 11 (dipping 15° right) and Piece 12 (dipping 45° right) define a flow banding; large vesicles seem less common than in previous 3 or 4 mm cores; not all vesicles are filled.



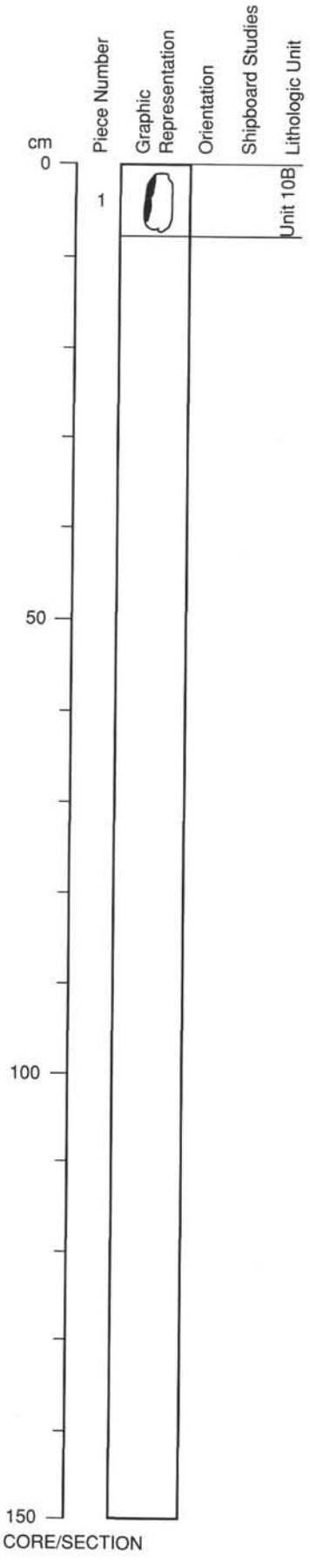
135-834B-44R-1

UNIT 10B: APHYRIC BASALT

Pieces 2–7

CONTACTS: Sediment Piece occurs as Piece 1.
PHENOCRYSTS: None.
GROUNDMASS: Very fine-grained , holocrystalline
VESICLES: 5%; <= 2 mm; rounded; throughout
Miaroles: Some vesicles are filled by clear, colorless zeolite (xx).
COLOR: 2.5YR 4/0.
STRUCTURE: Massive.
ALTERATION: Fresh to slight.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Sediment is clayey non-carbonate with glass and palagonite grains. Could be an altered basalt rim rather than a sediment; there is some glass on one of the fragments of Piece 7.

Hard sediment with glass clasts

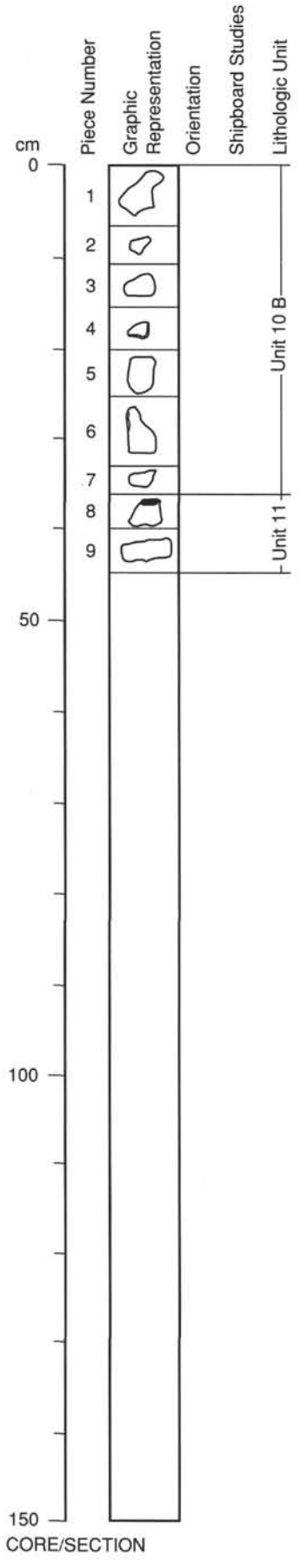


135-834B-45R-1

UNIT 10B: APHYRIC BASALT

Piece 1

CONTACTS: None, but does have a nice glass rind.
PHENOCRYSTS: None.
GROUNDMASS: *Holocrystalline, very fine-grained .*
VESICLES: 15%; < 2 mm; rounded; various; very few vesicles rimmed by glass, then palagonite (?), then a thin layer of light blue zeolite(?).
COLOR: 2.5YR 4/0.
STRUCTURE: Massive.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: This piece is nearly totally surrounded by a thin layer of colorless, clear zeolite which is grown on palagonitized glass.



135-834B-46R-1

UNIT 10B: APHYRIC BASALT

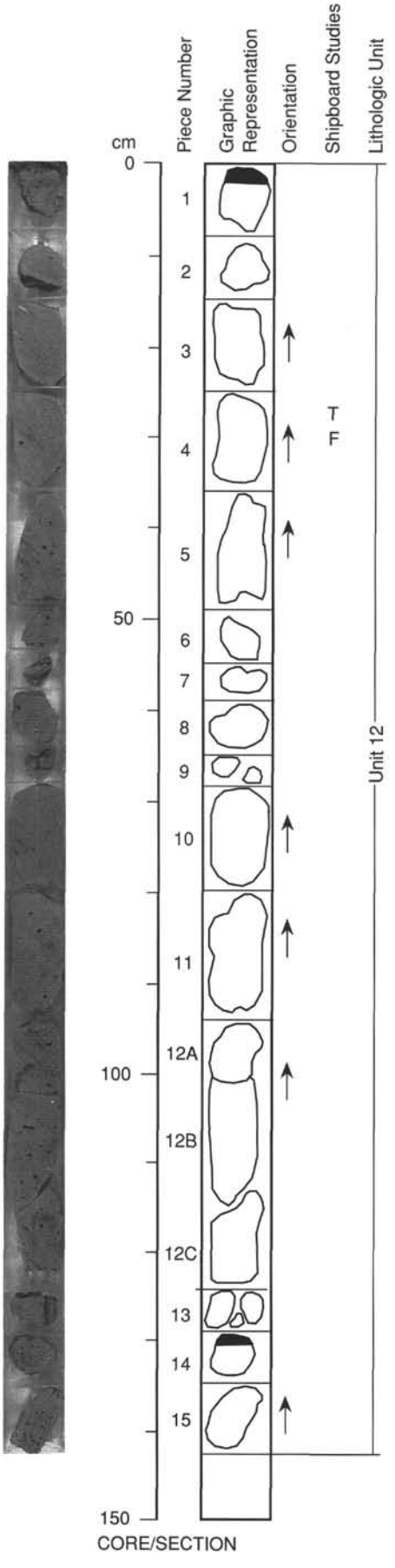
Pieces 1–7

CONTACTS: Piece 7 is the bottom of Unit 7.
PHENOCRYSTS: Very rare plagioclase to 0.9 mm.
GROUNDMASS: Microcrystalline to aphanitic: small plagioclase laths (<0.3 mm) with intergranular clinopyroxene (and olivine?), interstitial glassy mesostasis.
VESICLES: 15%–30%; <0.6 mm or >1mm; round to irregular; various; Bimodal: a large population (>1 mm), round to ovoid, <1% (Pieces 6, 7), 3%– 7% (Pieces 1 –5); small population (<0.6 mm), 15%–30%, irregular, occur throughout groundmass.
Miaroles: Minor, thin vesicle coatings; Fe-oxy-hydroxides, green-brown clays or zeolites.
COLOR: 10YR 6/1, gray.
STRUCTURE: None.
ALTERATION: Slight to moderate; color has a slight brownish hue; some vesicle coatings occur.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Surface coatings include Fe-oxy-hydroxides, yellowish to reddish clays(?), white translucent zeolite (Piece 6).

UNIT 11: SPARSELY PHYRIC OLIVINE PLAGIOCLASE BASALT

Pieces 8–9

CONTACTS: Top of Unit 8; glass on Piece 8.
PHENOCRYSTS: Most commonly as single crystals.
Plagioclase: 3%; 0.8–1.5 mm; euhedral, seriate.
Olivine: 1%; 1.4–1.6 mm; euhedral single crystals.
GROUNDMASS: Glassy to microlitic (Piece 8); aphanitic to microcrystalline (Piece 9).
VESICLES: 30%; <0.6 mm; irregular; throughout; rim is massive, but within 1 cm away from the rim, the sample has become highly porous; minor larger, irregular cavities (0.9–1.6 mm).
Miaroles: None.
COLOR: 7.5YR 5/0, gray.
STRUCTURE: None.
ALTERATION: Slight.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Only two pieces of Unit 11; surface coatings include palagonite and a white translucent zeolite (Piece 8).



135-834B-47R-1

UNIT 12: APHYRIC BASALT

Pieces 1–15

CONTACTS: None visible.

PHENOCRYSTS:

Plagioclase: <0.1%; 0.8x5 mm to 0.5 by 0.5 mm; euhedral, very sparse.
Clinopyroxene: <0.1%; 1.5x2 to 4x7 mm; euhedral, very sparse.

GROUNDMASS: Holocrystalline, fine-grained. Prominent plagioclase microlites and also clinopyroxene visible. Seriate texture.

VESICLES: 15%; 0.4 to 16 mm; rounded to elongated, some coalescing; variable; pale green smectite/chlorite-like linings on vesicles. Also, pale blue encrustation on vesicle walls, possibly a zeolite(?) Vesicles tend to occur bimodally: (1) >1.0 mm and (2) <0.5 mm. The coarser vesicles are variable in abundance being more abundant in Pieces 1, 5, and 12–15. Fine vesicle trails in Pieces 5, 11, and 12 (weak).
Miaroles: Smectite/chlorite and zeolite(?) linings.

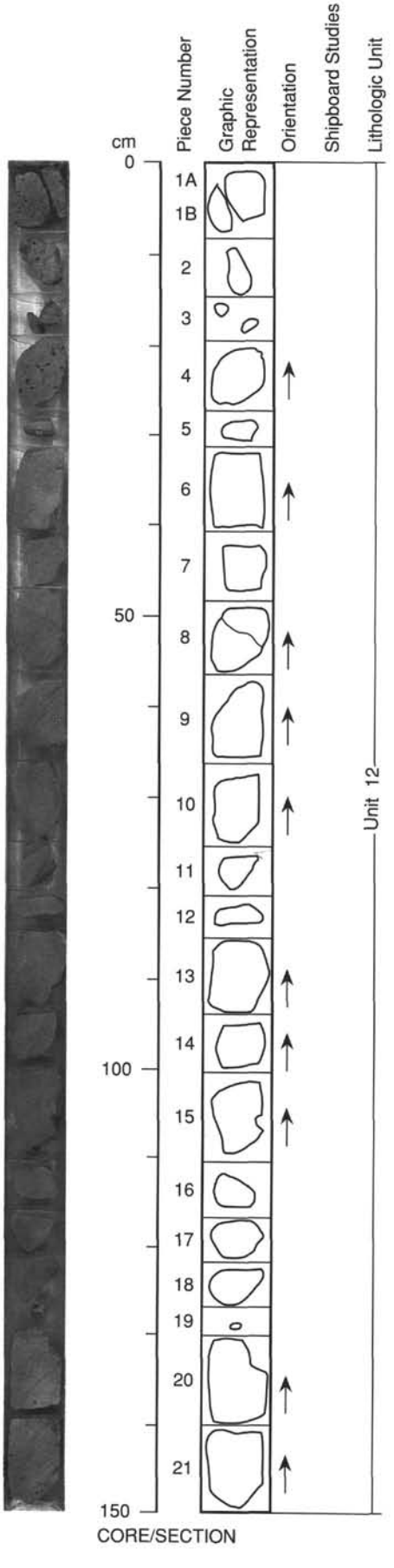
COLOR: 2.5Y 4/0, dark gray.

STRUCTURE: Massive.

ALTERATION: Moderate to high.

VEINS/FRACTURES: No veins visible.

ADDITIONAL COMMENTS: Thin glassy rinds, 3 and 5 mm thick, respectively, on one side each of Pieces 1 and 14. Piece 3 (working half) contained a single large clinopyroxene phenocryst (about 3x5 mm). Pieces 1, 13, and 15 are finer grained, suggesting they are near flow contacts. Darker gray, vesicular blebs (3–6 mm) at secondary vesicle infillings are noticeable in Pieces 11 and 12.

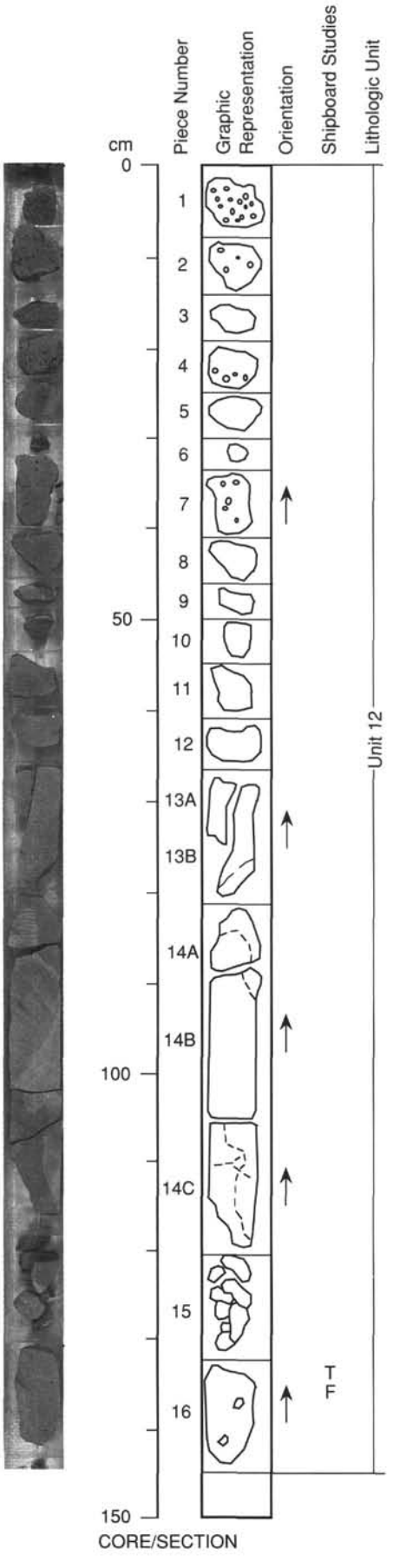


135-834B-48R-1

UNIT 12: APHYRIC BASALT

Pieces 1–21

CONTACTS: None.
PHENOCRYSTS: Very rare clinopyroxene and plagioclase phenocrysts (e.g. 1 clinopyroxene 1 mm long in Piece 1).
GROUNDMASS: Fine-grained , holocrystalline, microcytic plagioclase with subhedral clinopyroxene.
VESICLES: 5%–50%; <0.5-6 mm; round to irregular; variable; relatively uniform distribution of fine vesicles, with patchy areas containing much greater-sized vesicles. Miaroles: Coalesced vesicles sometimes lined with yellow-orange-red material.
COLOR: 10YR 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Moderately altered.
VEINS/FRACTURES: <<1%; 0.5 to 1 mm wide; unknown; only one fracture (Piece 8). The rock surfaces appear to be coated with Fe-oxy-hydroxides which grade into the white fracture-infill material. An alteration halo extends for 2–3 mm either side of the fracture.



135-834B-49R-1

UNIT 12: APHYRIC BASALT

Pieces 1–16

CONTACTS: None.

PHENOCRYSTS: Very rare phenocrysts. One clinopyroxene (Piece 14) and one each of pyroxene and plagioclase (Piece 16); all about 1 mm across.

GROUNDMASS: Fine-grained , holocrystalline. Plagioclase microlites with subhedral clinopyroxene. Seriate texture.

VESICLES: 5%–40%; <0.5–10 mm; round to irregular; variable; bimodal size variation from a relatively uniform distribution of small vesicles (<0.5 mm) to patches of larger vesicles (e.g. Piece 1). Some larger vesicles are filled with frothy basaltic material (e.g. Piece 2). Miaroles: Larger cavities sometimes lined with orange-red oxides and metallic lustre. In Piece 16 the vesicles are lined with deep blue-gray globular material, some with white prismatic crystals (zeolites?).

COLOR: 10YR 5/0, gray, to very blue-gray within Pieces 15 and 16.

STRUCTURE: Massive.

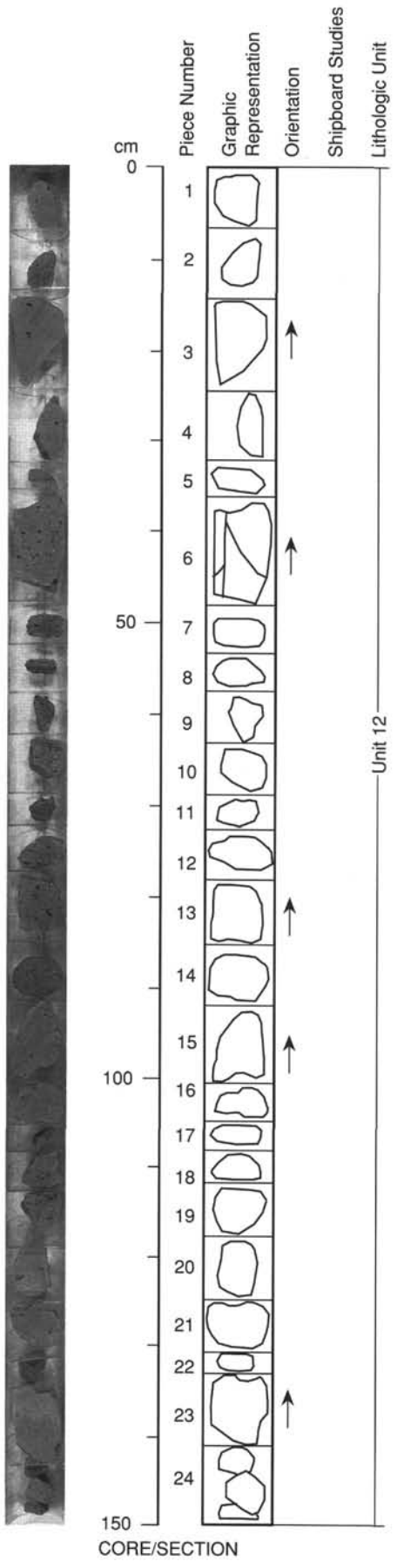
ALTERATION: Slight (e.g. Piece 16) to generally moderately altered. Multiple alteration halos overprint each other in Piece 14, not always clearly associated with the fractures observed.

VEINS/FRACTURES: 1%; up to 2 mm wide; various; irregular fractures filled with orange brown oxy-hydroxides and black Mn-oxides. Alteration halos extend up to 4 mm either side of the fractures.

ADDITIONAL COMMENTS: Below Piece 14 there is a sharp transition to a very blue-gray phase of this same basalt. Alteration products on the edge of Piece 16 are blue-green clays. This blue basalt continues into Core 135-834B-50R where it is associated with sulfides (see notes for Section 135-834B-50R-1).

= alteration zone boundary

135-834B-50R-1



UNIT 12: APHYRIC BASALT

Pieces 1–24

CONTACTS: None.

PHENOCRYSTS: Rare phenocrysts of plagioclase and clinopyroxene (e.g. Piece 16 has a 7 mm long needle of plagioclase with euhedral to subhedral clinopyroxene crystals (about 1 mm across) at either end. Smaller clinopyroxenes also occur within the plagioclase.

GROUNDMASS: Fine-grained , holocrystalline with plagioclase microlites intergrown with blocky clinopyroxenes. Seriate texture.

VESICLES: 5%–40%; <0.5–10 mm; round to irregular; variable; bimodal distribution of vesicles. Uniform distribution of fine-scale vesicles (<0.5 mm diameter) with random and patchy occurrence of larger vesicles (rarely in the form of tubes). In Pieces 1–6, the vesicles are lined with small globular blue-gray material some with acicular white crystals growing into the void space. Elsewhere, the larger vesicles also have frothy basaltic infills.

Miaroles: A cavity in the working half of the core (Piece 3) is lined with octahedral pale yellow-silver sulphides (pyrite?). Others have infills of yellow-orange oxides and blue-white globular coatings.

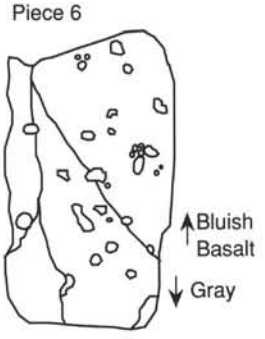
COLOR: 10YR 5/0, gray to very blue-gray in Pieces 1– 6.

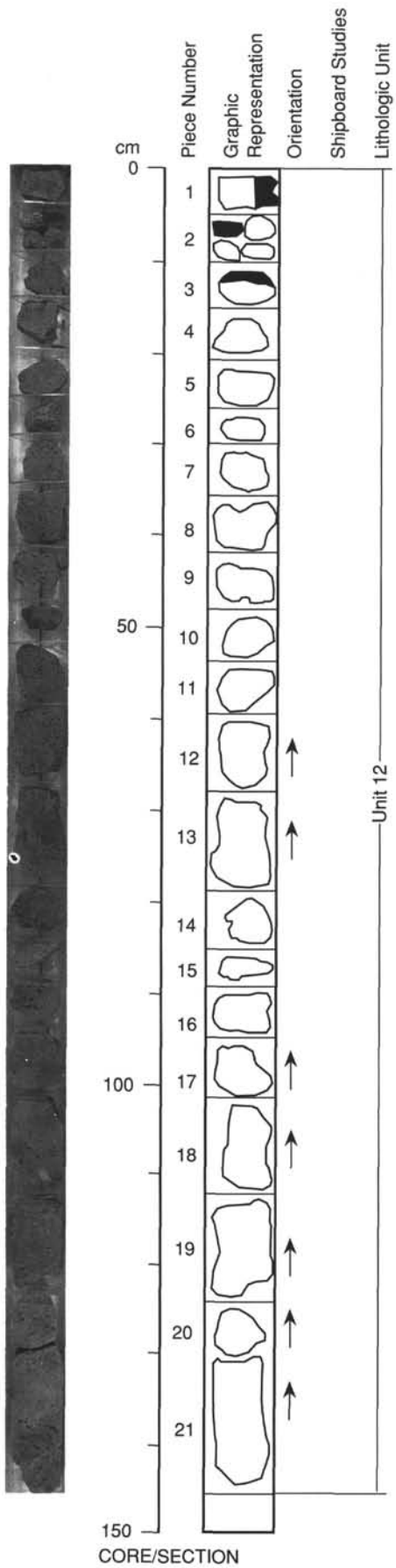
STRUCTURE: Massive.

ALTERATION: Slightly to moderately altered.

VEINS/FRACTURES: 1%; 1 mm wide; various; the planar fractured end of Piece 3 has a patchy film of yellow-silver sulfide (pyrite?). The blue coloration in this zone may be linked to the presence of these sulfides. Elsewhere (e.g. Piece 6), the alteration is oxidizing so that the fracture in Piece 6 is lined with orange-brown clays.

ADDITIONAL COMMENTS: The transition from the more typical coloration of Unit 12 into the bluish phase (ie. Core 135-834B-49R and back again, ie. Piece 6) is remarkably sharp. It is noted however, that in Piece 6 a few vesicles in the fractured more oxidized side share the same blue lining material that pervades the overlying basalt. Seriate texture results in hand sample descriptions being aphyric and thin section descriptions being sparsely to moderately phyric.



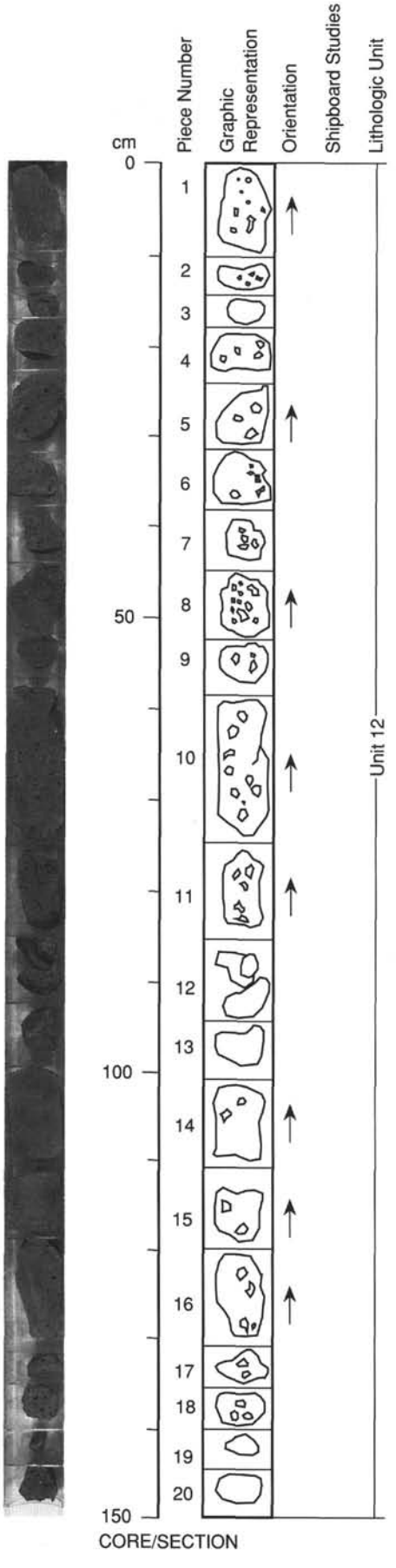


135-834B-51R-1

UNIT 12: APHYRIC BASALT

Pieces 1–21

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Very rare plagioclase and clinopyroxene phenocrysts (e.g. 1 plagioclase 1.5 mm long and 1 clinopyroxene 1 mm long occur in Piece 20B). Seriate texture.
VESICLES: 15%–50%; <0.5–11 mm; round to irregular; variable; bimodal distribution. Evenly distributed fine vesicles (<0.5 mm) with patchy areas of larger vesicles (particularly in the top half of the section).
Miaroles: Cavities lined with a range of clays and zeolites(?). Colors vary from blue-white to orange-red and green.
COLOR: 10YR 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Slight alteration in the glass, to more moderately altered elsewhere.
VEINS/FRACTURES: <1%; <1 mm; unknown; fracture surface on the edge of Piece 19 is coated with orange-brown Fe-oxy-hydroxides.
ADDITIONAL COMMENTS: Glass rinds on Pieces 1 and 2.

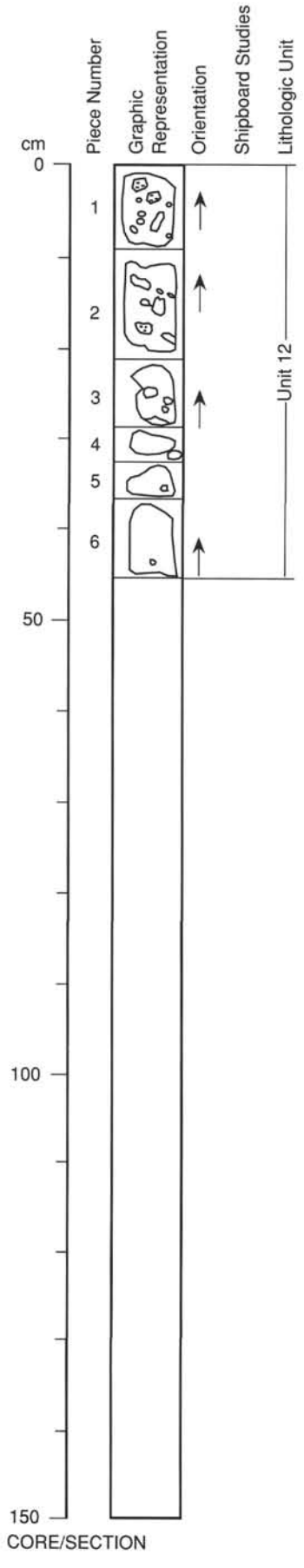


135-834B-52R-1

UNIT 12: APHYRIC BASALT

Pieces 1–20

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained , holocrystalline, plagioclase microlites most clearly visible in the fresher rocks. Seriate texture.
VESICLES: 1%-40%; <0.5–7 mm; rounded to irregular; variable; bimodal size range. Small vesicles (<0.5 mm) are relatively evenly distributed throughout, while the larger vesicles occur in patches.
Miaroles: Some cavities are lined with orange-brown crystals, others show blue-white coatings of globular material which may become pinkish in patches.
COLOR: 10YR 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Slightly altered (e.g. Piece 1) to moderately altered sometimes in zones as though the rocks were part of a large alteration halo.
VEINS/FRACTURES: One small crack (Piece 10) has a film of orange brown Fe-oxy-hydroxide coating it.
ADDITIONAL COMMENTS: Glass rinds on Pieces 8 and 20 are up to 5 mm wide. The seriate texture means that hand-sample descriptions of the Unit are commonly aphyric while thin section descriptions are sparsely to moderately phyric.

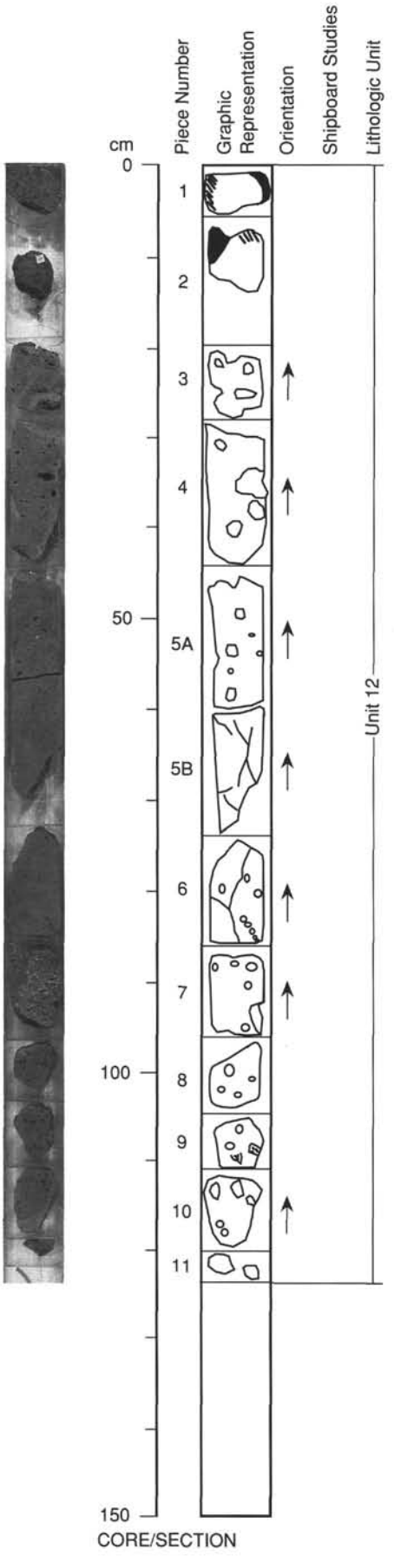


135-834B-52R-2

UNIT 12: APHYRIC BASALT

Pieces 1–6

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained , holocrystalline with plagioclase microlites intergrown with clinopyroxene. Seriate texture.
VESICLES: 15%–40%; <0.5–7.5 mm; round-ovoid to irregular; variable; bimodal size distribution with some of the larger vesicles filled with more finely vesicular basalt (e.g. Piece 2). The larger vesicles are more concentrated in the top half of the section. Small vesicles are evenly distributed.
Miaroles: Larger vesicles are sometimes lined with yellow-orange material, while others are coated with blue-white and pink globular material.
COLOR: 10YR 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Slight to moderate degree of alteration.
VEINS/FRACTURES: One crack (Piece 3) is coated with yellow-orange chalky material.

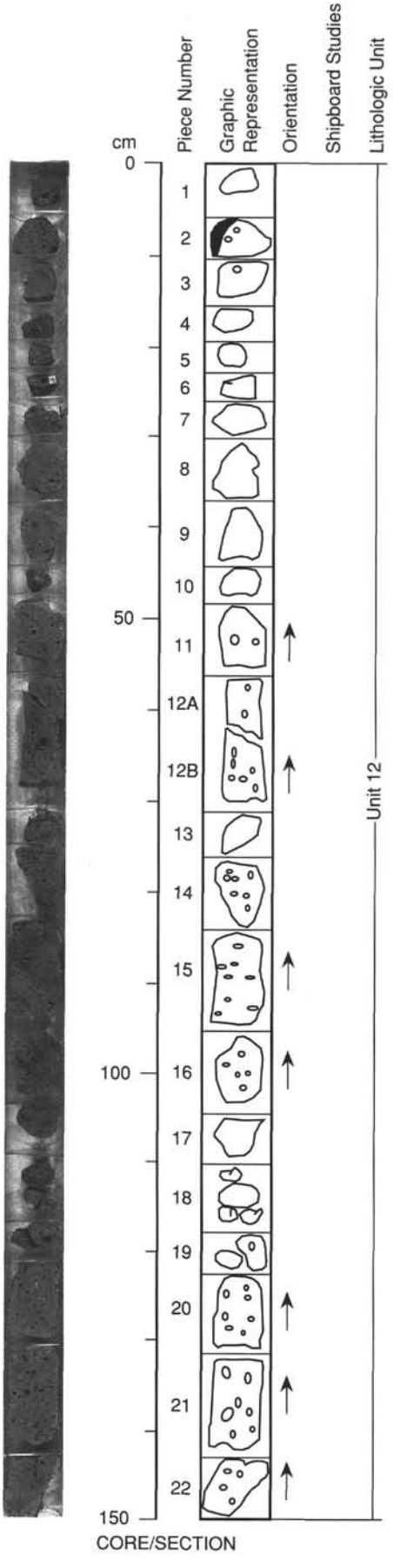


135-834B-53R-1

UNIT 12: APHYRIC BASALT

Pieces 1–11

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained , holocrystalline; plagioclase microlites. Seriate texture.
VESICLES: 15%; <0.5–20 mm; rounded to ovoid to irregular; variable; Small vesicles (<0.5 mm diameter) appear to be uniformly distributed throughout the section. Larger vesicles have a more patchy distribution and occur particularly concentrated in Pieces 1–2.
Miaroles: Some vesicles lined with globular coatings of material which vary in color from white, to blue white, pink and yellow.
COLOR: 10YR 5/0, gray.
STRUCTURE: Massive.
ALTERATION: Slightly-moderately altered.
VEINS/FRACTURES: 2%; about 1 mm wide; various; fractures are coated with yellow-orange clays and patches of Mn-oxides.
ADDITIONAL COMMENTS: Glass rinds on Pieces 1 to 2.



135-834B-54R-1

UNIT 12: APHYRIC BASALT

Pieces 1–22

CONTACTS: None seen.

PHENOCRYSTS:

Plagioclase: Trace; 0.25x0.5; euhedral.
Clinopyroxene: Trace; 1.5x2.0 mm; euhedral.

GROUNDMASS: Fine-grained , holocrystalline. Prominent plagioclase microlites visible, plus clinopyroxene. Seriate textured.

VESICLES: 20%; 0.2 to 15 mm; rounded to irregular and coalescing; even; partial infilling by yellow-brown 'palagonite' (Piece 1); small reddish crystals coating vesicle in Piece 2; Fe-oxide coatings common; globular linings of unidentified mineral (yellow-brown) sporadically occur. Greenish brown chlorite/smectite(?) coating; pale bluish to blue-gray zeolite(?) linings. Vesicle linings are highly diverse. Vesicle size tends to be bimodal; (1) greater than about 0.8 mm, and (2) <0.5 mm. Vesicular darker gray 'secondary' vesicle infillings present, up to 11 mm wide.

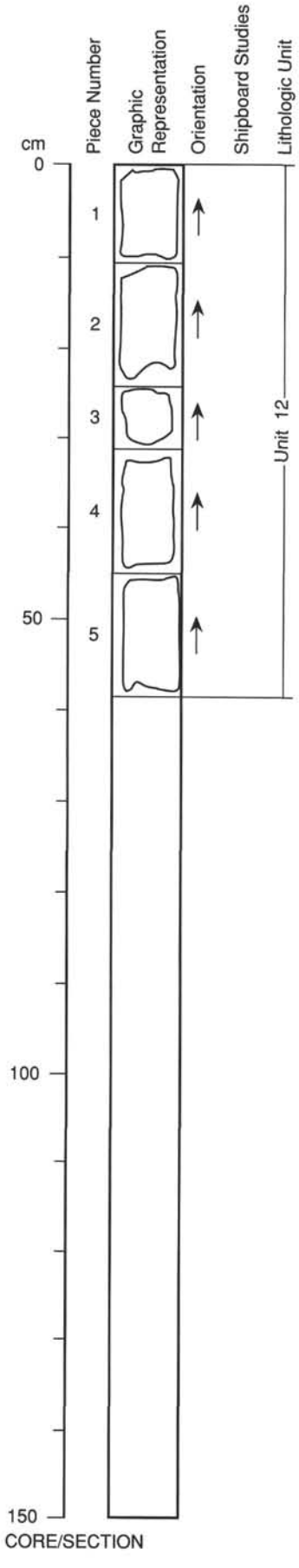
COLOR: 2.5Y 4/0 dark gray.

STRUCTURE Massive.

ALTERATION: Slight.

VEINS/FRACTURES: <<1%; <=1 mm width; subvertical and subhorizontal; veins only in Pieces 20 and 21. Infillings smectite/chlorite(?) clays.

ADDITIONAL COMMENTS: Glass rind, 5 mm thick, on one end of Piece 2. Pieces 1 to 5 finer grained than other core pieces.



135-834B-54R-2

UNIT 12: APHYRIC BASALT

Pieces 1–5

CONTACTS: None seen.

PHENOCRYSTS:

Plagioclase: Trace; 1.0x1.3 mm; euhedral.

GROUNDMASS: Fine-grained , holocrystalline. Seriate textured. Plagioclase microlites conspicuous; clinopyroxene visible.

VESICLES: 15%; 0.2 to 13 mm; rounded to elongated and coalescing; even; only completely filled adjacent to small fractures. Vesicle sizes bimodal; (1) >1.3 mm, and (2) <0.6 mm,the latter distributed throughout groundmass.

Miaroles: Linings variable - include yellow-brown 'palagonite'; bluish gray zeolites(?); unidentified minute pale yellow to brown globular crystals.

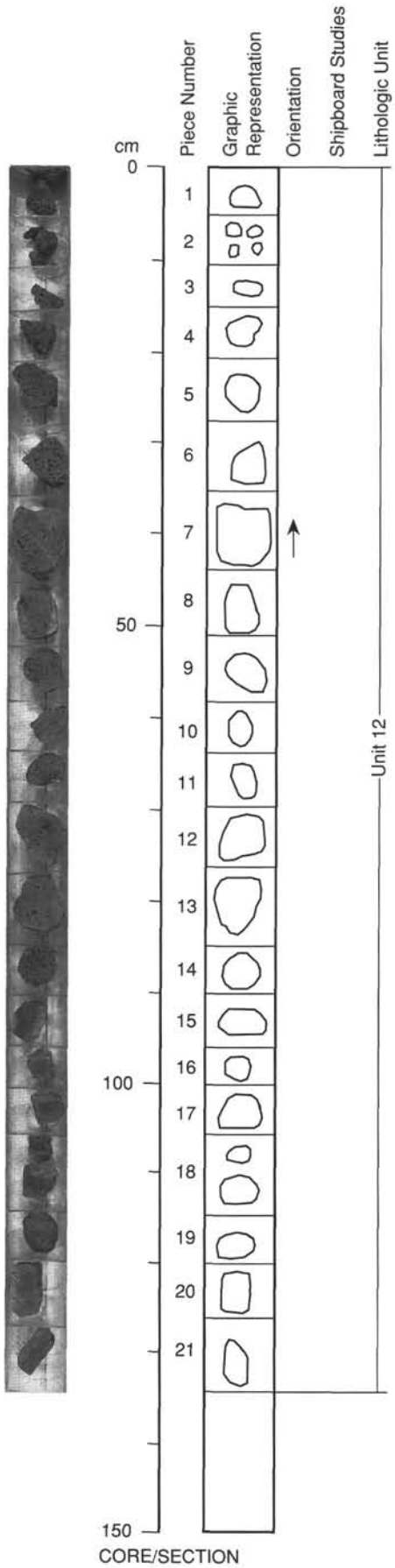
COLOR: 2.5Y 4/0 dark gray.

STRUCTURE: Massive.

ALTERATION: Slight.

VEINS/FRACTURES: <1%; <=0.5 mm width; variable, but dominantly subvertical; infilling by smectite/chlorite clays(?).

ADDITIONAL COMMENTS: Darker gray globular and elongated patches of vesicular lava present in core, up to 5 mm diameter. The seriate texture results in hand sample descriptions of aphyric and thin section descriptions of sparsely to moderately phyric.

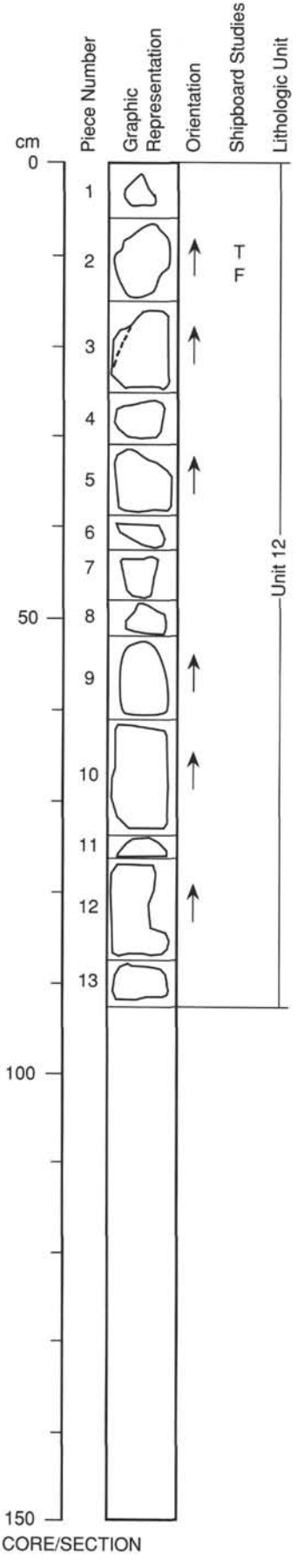


135-834B-55R-1

UNIT 12: APHYRIC BASALT

Pieces 1–21

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: *Fine-grained , holocrystalline with plagioclase microlites. Seriate texture.*
VESICLES: 1%–30%; <=5 mm; rounded; various; the amount of vesicles changes dramatically from piece to piece.
Miaroles: Often filled with a yellow-brown acicular to elongate prismatic zeolite(?). Also occurring in vesicles.
COLOR: 10YR 5/1. Yellow greenish chlorite/smectite tite coatings in some vesicles. Yellow vesicle infilling of an unknown mineral in Pieces 1, 5, 6, and 11, also white in Piece 5.



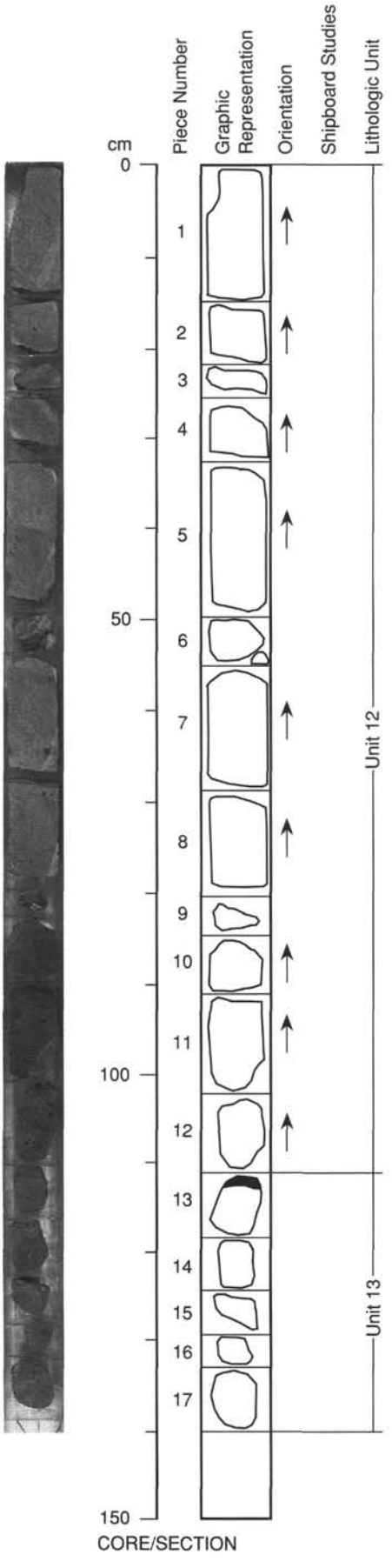
135-834B-56R-1

UNIT 12: APHYRIC BASALT

Pieces 1–13

CONTACTS: None seen.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained , holocrystalline. Conspicuous plagioclase microlites and clinopyroxene visible. Seriate texture.
VESICLES: 10%; up to 7 mm; rounded to elongated and coalescing; Even (smaller, variable (larger ones); black to deep red-brown glassy linings in some vesicles in Piece 2. Marked reduction in the percentage of large vesicles (>2 mm) from Pieces 1 and 2, through to Piece 3 (remaining pieces similar to 3). General vesicle sizes bimodal, either (i) >=1.5 mm, and (ii) <=1 mm. Smaller vesicle common throughout core. Larger vesicles <2% in Pieces 3 to 13.
Miaroles: Phillipsite aggregates lining vesicles in Piece 1 and 3; blue-gray globular zeolitic linings common; rare acicular zeolite linings.
COLOR: 10YR 5/1 gray.
STRUCTURE: Massive.
ALTERATION: Fresh to slightly altered.
VEINS/FRACTURES: <<1%; <=0.5 mm width; subvertical; only vein seen in Piece 3 - localized alteration of lava associated with vein along edge of fragment. Infilling of vein by clays(?) + zeolite (phillipsite) infilling in associated cavities.
ADDITIONAL COMMENTS: Pieces 1 and 2 slightly finer grained (and darker gray and vesicular) than other fragments in core suggesting near contact to flow. In Piece 9, a subvertical zone (about 7 mm wide) is present which shows markedly reduced vesiculation (internal flow contact?). Seriate texture results in hand sample descriptions which are aphyric and thin section descriptions which are sparsely phyric.

Vein and associated alteration



135-834B-56R-2

UNIT 12: APHYRIC BASALT

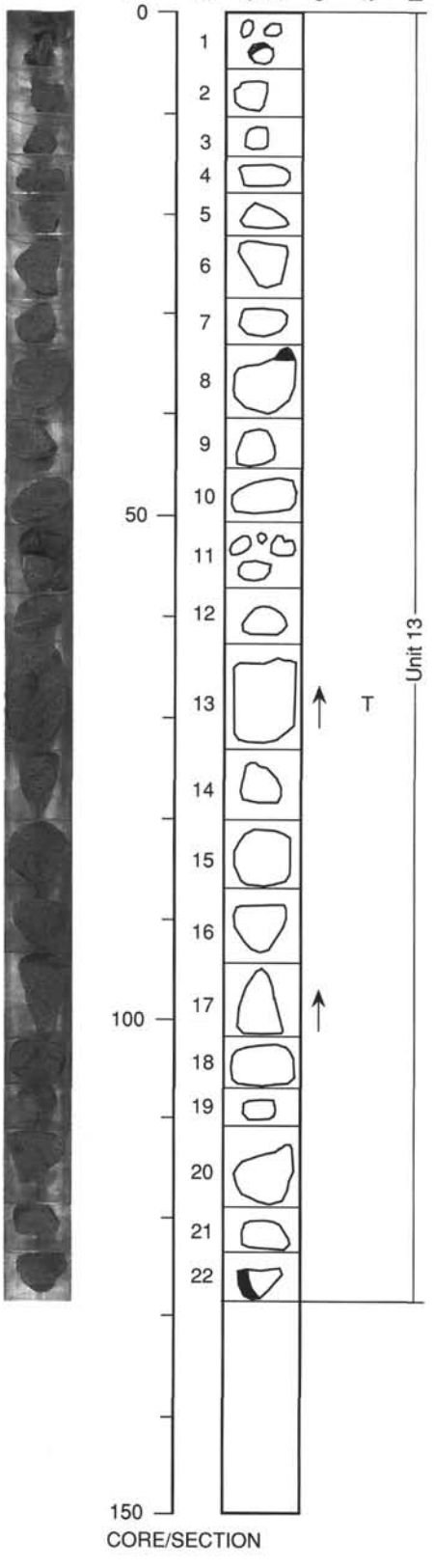
Pieces 1–12

CONTACTS: None seen.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained , holocrystalline. Conspicuous plagioclase microlites, and clinopyroxene visible.
VESICLES: 10%; 0.2 to 7 mm; rounded to coalescing; variable; vesicle sizes bimodal: (i) >=1.5 mm (ii) <=1 mm. Larger vesicles vary in abundance-low abundance (<3%) in Pieces 1 to 8, increasing to >=10% in fragments 10 to 12.
Miaroles: Linings of blue-gray globular zeolites(?); acicular crystals (sporadic); pale green to brownish globular microcrystalline growths.
COLOR: 10YR 4/2 dark grayish brown (10YR 3/1, very dark gray for fragment 12).
STRUCTURE: Massive.
ALTERATION: Slight.
VEINS/FRACTURES: No veins visible.

UNIT 13: MODERATELY PHYRIC PLAGIOCLASE OLIVINE BASALT

Pieces 13–17

CONTACTS: None seen.
PHENOCRYSTS:
Plagioclase: 2%; 0.7x1 to 1x1.7 mm; euhedral.
Olivine: 3%; 0.5x0.7 to 1.9x2.1 mm; euhedral.
GROUNDMASS: Fine-grained , holocrystalline. Plagioclase microlites visible.
VESICLES: 30%; 0.1 to 2.0 mm; round to elongated and coalescing; even
Miaroles: Phillipsite linings to vesicle and vesicle trains-locally only. Most vesicles appear to have no infillings.
COLOR: 10YR 3/1, very dark gray).
STRUCTURE: Massive, vesicular.
ALTERATION: Slight.
VEINS/FRACTURES: <<1%; 1 mm (width); variable; only visible in Piece 17 - zeolite infilled. Latter also visible on one margin of Piece 14.
ADDITIONAL COMMENTS: Glassy rind, 7 mm thick, on one edge of Piece 13 - this piece shows gradation through variolitic and microlitic zones to coarser zones. Small clayey-silty sediment clast (or alteration rind fragment?) in Piece 15.

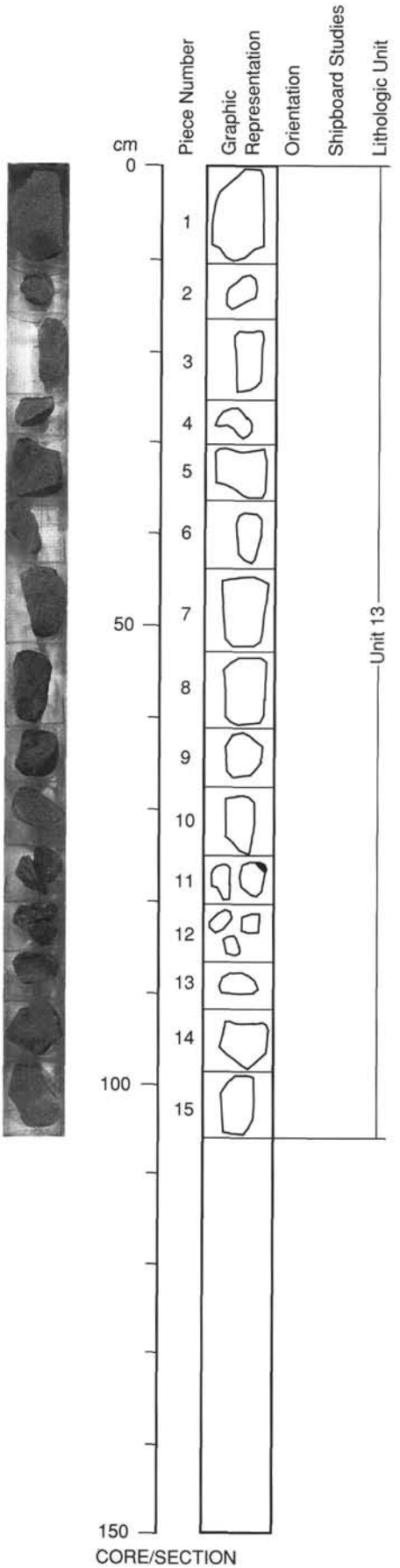


135-834B-57R-1

UNIT 13: MODERATELY PHYRIC CLINOPYROXENE OLIVINE PLAGIOCLASE BASALT

Pieces 1–22

CONTACTS: None visible.
PHENOCRYSTS:
Plagioclase: 3%–5%; to 1 mm.
Olivine: 2%–3%; to 0.6 mm.
Clinopyroxene; 1%–2% to 0.6 mm.
GROUNDMASS: Fine-grained , holocrystalline. Plagioclase microlites below glass rim of Pieces 8 and 22.
VESICLES: 1%–5%; up to 3 mm; rounded; variable; Pieces 4, 10, 13, and 14 have distinct higher amounts of vesicles.
COLOR: 2.5YR 4/0, dark gray.
STRUCTURE: Massive yellowish vesicle infillings in Piece 4. Single yellow (going into white) colored zeolite infilling in Piece 10.



135-834B-58R-1

UNIT 13: MODERATELY PHYRIC OLIVINE PLAGIOCLASE BASALT

Pieces 1–15

CONTACTS: None.

PHENOCRYSTS: Seriate, particularly plagioclase, grading into groundmass; phenocrysts are not so distinct in more crystalline interiors, but are clear in finer grained outer margins.

Plagioclase: 1%–2%; 0.7–1.2 mm; euhedral, sometimes in glomerocrysts

Olivine: 1%; <0.7 mm; euhedral.

GROUNDMASS: Aphanitic to microcrystalline; plagioclase and olivine grains with intersertal, relatively fresh mesostasis.

VESICLES: 20%–40%; <0.5 or >1; round to irregular; throughout; bimodal: large >1mm, 1%– 3%, *common in Pieces 5, 7– 10; small < 0.5 mm throughout, irregular,* interconnected.

Miaroles: Very minor yellow-clays(?), blue-gray botryoidal zeolite, and red brown zeolite(?) linings.

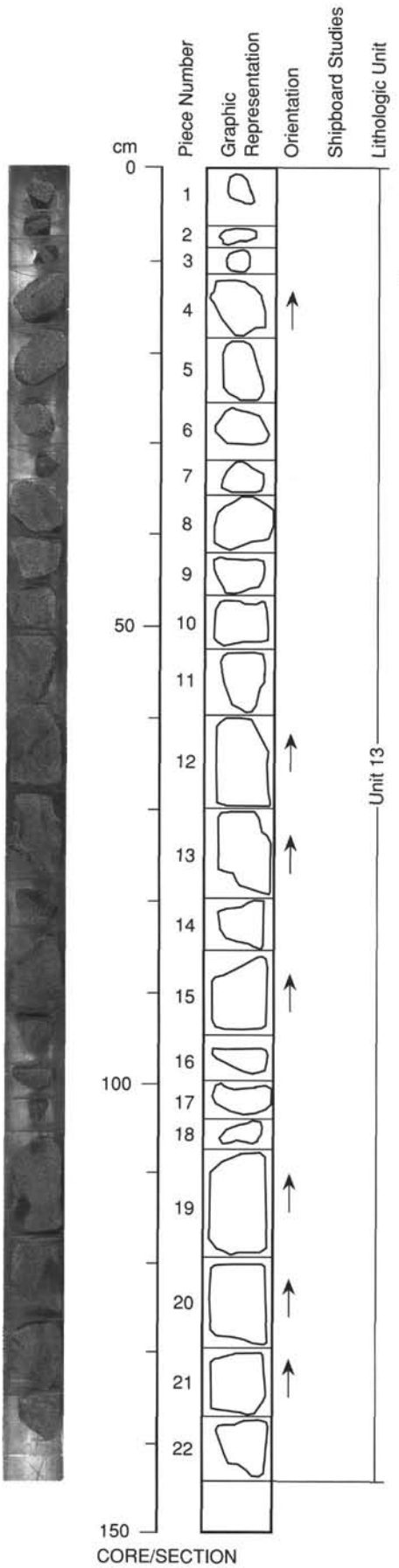
COLOR: 2.5YR 3/0, very dark gray to 10 YR 6/1, gray.

STRUCTURE: None.

ALTERATION: Slightly altered; olivine partially replaced by reddish aggregates in Pieces 1 and 15.

VEINS/FRACTURES: Tr; <0.5 mm wide; subvertical; surface and fracture coatings covered with yellow to orange-brown Fe-stained clays and/or Fe-oxy-hydroxides (Pieces 2, 3, 5, 7, 8, 9, and 11); whitish translucent globular zeolite (Pieces 6, 9, and 11); Mn-oxides (Pieces 12, 14, and 15).

ADDITIONAL COMMENTS: Core fell out onto the catwalk. No order or orientation despite arrows and labels!



135-834B-59R-1

UNIT 13: MODERATELY PHYRIC OLIVINE CLINOPYROXENE PLAGIOCLASE BASALT

Pieces 1–22

CONTACTS: None visible.

PHENOCRYSTS:

Plagioclase: 2%; 0.5x0.8 mm; euhedral-size grades to groundmass grains.
Olivine: 1.5%; 0.3x0.5 mm to 1.5x1.5 mm; euhedral size grades into groundmass grains.
Clinopyroxene: 1.5%; <1 mm; subhedral.

GROUNDMASS: Fine-grained , holocrystalline. Plagioclase, olivine, and clinopyroxene visible.

VESICLES: 30%; 0.2 to 4 mm; rounded to elongated and coalescing; larger vesicles show variable distributing; vesicle sizes seem to show continuous size range from smaller to larger sizes. Smaller vesicle evenly distributed throughout.
Miaroles: Colorless phillipsite plus yellow brown to white finely globular zeolite; small black Mn-oxide(?) aggregates; linings in some vesicles of yellow to reddish brown clay(?) material.

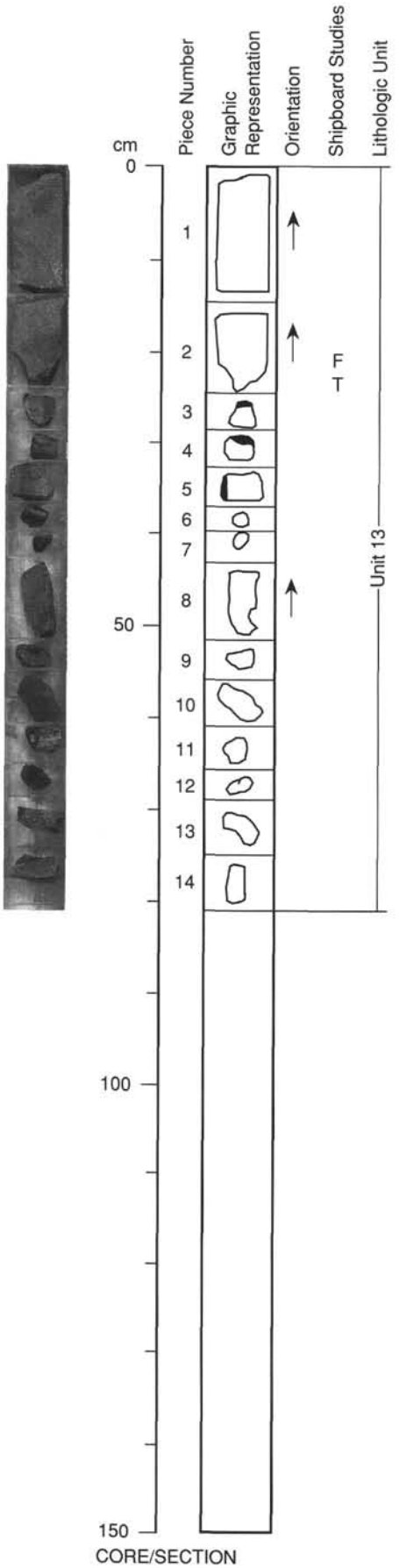
COLOR: 10YR 3/1, very dark gray.

STRUCTURE: Massive, vesicular.

ALTERATION: Slight.

VEINS/FRACTURES: No veins clearly visible in pieces. However, zeolite linings on margin of some pieces (eq. 8) suggests these have broken along small veins.

ADDITIONAL COMMENTS: Plagioclase phenocrysts appear to decrease slightly in abundance towards lower part of core. Continued from Vesicle Comments: very minor acicular zeolite in a small number of vesicles; Fe oxide coatings locally present.



135-834B-59R-2

UNIT 13: MODERATELY PHYRIC OLIVINE CLINOPYROXENE PLAGIOCLASE BASALT

Pieces 1–14

CONTACTS: Glassy fragments in Pieces 3–5 and possibly on Piece 9.
PHENOCRYSTS: Plagioclase most obvious in rims, gradational into groundmass in interiors.
Plagioclase: 1%– 3%; 1–1.5 mm; euhedral.
Olivine: 1%; 0.5 –1; euhedral.
Clinopyroxene: 1%; <1 mm; subhedral.
GROUNDMASS: Aphanitic at margins to intersertal. Plagioclase and olivine microlites (and clinopyroxene?) with interstitial relatively fresh mesostasis.
VESICLES: 20%–30%; <0.5 or >0.8 mm; round to irregular; throughout; rare cavities to 10 mm; bimodal large >1 mm 1%– 2% only in Pieces 3–5 (near margins), 10–15; small <0.5 mm 20%– 30% except near glassy rims.
Miaroles: Orange and yellow-brown linings in some (e.g. Piece 9, 11–14).
COLOR: 2.5YR 3/0, dark gray to 10YR 6/1, gray.
STRUCTURE: Thin flows or pillows?
ALTERATION: Slight alteration; olivine to reddish brown pseudomorphs in Piece 15.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Surfaces coated variously with yellowish to orange clays (Pieces 1, 8, 9, 11, 13, 14), Mn-oxide (Pieces1, 11) orange-yellow palagonitic alteration (Pieces 3– 5).

135-834A-12X-CC (1-4 cm) OBSERVER: EWE WHERE SAMPLED: Unit 1

ROCK NAME: Sparsely phyric olivine-plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Sparsely seriate porphyritic, microlitic, sparsely vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	1	1	0.3-0.7	An70	euhedral	tend to glomerophyric; oscillatory zoning with An range of about 10%; narrow sodic rims of An60; cores are not most calcic compositions
Olivine	0.1	0.1	0.07-0.7		euhedral	fresh-no alteration
GROUNDMASS						
Plagioclase	20	20	0.06-0.3	An55	Euhedral	microlites randomly oriented
Olivine	3	3	0.02-0.1		mostly euhedral	fresh; mostly equant and rarely subhedral
Clinopyroxene	39	40	0.05-0.15		aggregates	occurs as fine acicular quench aggregates or sheaths, some radiating, which have nucleated on plagioclase microlites; also as fine (0.002 mm) granular crystals; also occur intergrown with plagioclase
Magnetite	2	2	0.002-0.004		interstitial	euhedral to skeletal
Mesostasis	30	30	n/a		cryptocrystalline	brown-green interstitial material

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite/smectite	1.5	partial infilling	composes 30% of vesicles; yellow-green to reddish brown; radial structures-less commonly complete infilling (with cryptocrystalline aggregates of same? mineral); form linings to some vesicles, occurence through sections varies

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	5-10		0.04-4	partial	rounded to elongated and coalescive	tend to be localized in zones and patches

COMMENTS: Vesicle infilling occurs in distinct zones which may be fracture controlled; appear to be trace equant spinels (<0.05mm) and sulfide globules (<0.004mm) in the groundmass; Rock is fresh; 1181 point count: plagioclase phenocrysts 0.8%; olivine phenocrysts 0.2%; olivine in groundmass 3.6%; plagioclase laths in groundmass 16.9%; clinopyroxene in groundmass 40.5; opaques 2.3; interstitial groundmass 23.8%; open vesicles 10.9; infilled vesicles 1.1

135-834A-13X-01 (Piece 1,0-10 cm) OBSERVER: KRI WHERE SAMPLED: Unit 1-(subsample a)

ROCK NAME: Sparsely phyric plagioclase basalt

GRAIN SIZE: Fine grained, vesicular

TEXTURE: Porphyritic, microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	2	2	0.3-0.7		euhedral	blocky, rectangular crystals; fresh, commonly zoned, tend to glomerocrysts
GROUNDMASS						
Plagioclase	40	40	<0.6		microlites	long, thin laths; randomly oriented laths, often intergrown
Olivine	4	4	0.05-0.1		euhedral	
Clinopyroxene	30	30	< 0.05		anhedral	fine-grained feathery aggregates
Spinel	tr	tr	0.04		equant	adjacent to plagioclase phenocrysts
Magnetite	tr	tr	< 0.01		subhedral to	in felty groundmass
Mesostasis	0	15			anhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Brown clays	15		replacing cryptocrystalline groundmass

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15	throughout	<1	most empty	irregular	most empty-some with rims of brown-green clays

COMMENTS: Moderately altered, with most of the felty cryptocrystalline groundmass (15%) altered to brown clays.

135-834A-13X-01 (Piece 1,0-10 cm) OBSERVER: KRI WHERE SAMPLED: Unit 1 (subsample b)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Variolitic; microporphyritic; vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	<1	<1	<.3		euhedral	glomeroporphyritic clusters; commonly zoned
GROUNDMASS						
Plagioclase	20	20	<.2	An 50	elongate	microlitic laths
Clinopyroxene	15	15	< 0.05		quench	in fine-grained feathery aggregates
Olivine	5	5	< 0.1		equant	euhedral; some quench textures
Opaques	tr	tr	<0.06		equant	magnetite present as a dusting in the groundmass; spinels enclosed in plagioclase phenocrysts.
Mesostasis	40	45	n/a		interstitial	some is altered to fine-grained clays

SECONDARY MINERALOGY	PERCENT	REPLACING\ FILING
Clays	5	Mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	10-15	throughout	<0.6		rounded to irregular	most are empty, some have fine grained clays lining their rims

COMMENTS: A vein with Fe-oxide staining cuts the sample and produces a yellow-brown filling of the vesicles. One edge of the section shows a variolitic texture. 2 point counts were done on this sample yielding: plagioclase phenocrysts 0.2-.96%; groundmass (includes some microcrystalline mineral phases) 80.9-82.7%; opaques 1-1.2%; vesicles 12-16.2%; other (clays) 5.6%. Rock is slightly altered.

135-834A-13X-01 (Piece 1,5-7 cm) OBSERVER: JAN WHERE SAMPLED: Unit 1

ROCK NAME: Aphyric basalt

GRAIN SIZE: Glassy to microcrystallineglassy to microcrystalline

TEXTURE: spherulitic, microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	tr	tr	0.5-2.5		euhedral	generally as glomerocrysts, rarely zoned
GROUNDMASS						
Plagioclase	30-40	30-35	<0.5		euhedral to anhedral	skeletal quenched laths, some with forked terminations and included in spherulites
Clinopyroxene	10-30	10-15	<0.1		anhedral	small granular crystals, to delicate feathery fans
Olivine	tr	tr	<0.1		subhedral to anhedral	
Opaques	1-5	1-5	0.002-1.5		blocky to needle-like	
Mesostasis	0-8	10-40	n/a		fibrous to cryptocrystalline	mostly replaced by secondary clays

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	2-30	replacement of mesostasis	yellow, orange and brown clays are particularly common throughout one half of this section.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	10-15	throughout	0.06-0.3	clear	rounded to irregular

COMMENTS: There are two distinct zones in this section which relate to two different features. The first is the alteration front which is clearly visible in plane polarized light (40% unaltered mesostasis). The more altered area however is also more notable in its quench textures. This more spherulitic and altered zone grades rapidly into a more grainy microlitic and fresher basalt (10% mesostasis, nearly completely altered). The interface between the two zones is highlighted by the concentration of yellow, orange and brown clays. The rock is slightly to moderately altered.

135-834A-13X-01 (Piece 4,24-29 cm) OBSERVER: EWE WHERE SAMPLED: Unit 2A

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine-grained

TEXTURE: Rarely porphyritic; microcrystalline; vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	<=0.1	<=0.1	0.2-0.8	An75	euhedral	tend to glomeroporphyritic; narrow, more sodic rims (An60)
Clinopyroxene	<=0.1	<=0.1	0.2-1.4		subhedral	single glomeroporphyritic aggregates, pale coloured
GROUNDMASS						
Plagioclase	20-25	20-25	0.1-0.25	An70	tabular to microlitic	zoned to sodic rims of An35
Clinopyroxene	30	30	0.02-0.1		euhedral to subhedral	equant, tabular, and granular crystals
Magnetite	3	3	<=0.01		anhedral to skeletal	interstitial
Mesostasis	10-15	10-15	up to .005		interstitial	broken down to extremely fine grained brownish clays

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite/smectite	4	partial to complete filling	yellow-green, radiating massive to crytocrystalline aggregates in centers of filled vesicles; variously developed along cracks
Calcite	<0.1	rare infilling	(or small inclusions/xenoliths?)

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-30	throughout	0.1-2.5	partial to complete locally	rounded to irregular	certain clusters of vesicles show quenching of enclosing groundmass (e.g. quench pyroxene); vesicles are commonly coalescing; most vesicle are unfilled

COMMENTS: The areas of quenching around vesicles may be due to re-intrusion of small lava pockets into previously developed vesicles. Contacts with enclosing rocks are gradational. 1026 point count yields: plagioclase phenocrysts 0.3 %; clinopyroxene phenocrysts <0.1 %; plagioclase groundmass microlites 20.7 %; clinopyroxene groundmass 29.9 %; opaques 4.9%: interstitial groundmass 15.5 %; olivine groundmass 0.3%; open vesicles 25.8%; vesicle infill material 2.6%; total vesicles 28.4%. Rock is slightly altered.

135-834A-14X-01 (Piece 1,6-7 cm) OBSERVER: EWE WHERE SAMPLED: Unit 2A

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Rarely porphyritic; microlitic; vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	0.1	0.1	0.2-0.5	An70-75	Euhedral	tend to glomerocrysts; show narrow more sodic rims (An50)
GROUNDMASS						
Plagioclase	20-25	20-25	0.05-0.25	An70	Microlitic	
Clinopyroxene	30	30	0.02-0.2		subhedral to anhedral	tabular to equant
Magnetite	3	3	<=0.01		anhedral to skeletal	
Mesostasis	13-18	15-20	<=0.06		n/a	brown cryptocrystalline, interstitial

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite/smectite	2	lining to completely infilling vesicles	very localized
amorphous Fe-oxide	<<1%	localized and rare	partial to complete infilling

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	25-30		0.05-2.0	locally filled along cracks only	round to irregular, often coalescive	bimodal size distribution

COMMENTS: 5 cm coarsely vesicular patches in slide are associated with zones of abundant quench pyroxenes; these quench areas grade into more crystalline groundmass. These patches may represent lava "oozing" into larger, earlier formed vesicles. Point count result for 891 points: plagioclase phenocrysts: 0.2%; plagioclase in groundmass 23.6%; clinopyroxene in groundmass 29%; opaques in groundmass 2.4; interstitial groundmass 16.4%; open vesicles 28.1%; vesicle filling material 0.4 Rock is fresh to slightly altered.

135-834A-15X-01 (Piece 6,26-40 cm) OBSERVER: KRI WHERE SAMPLED: Unit 2B

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Microcrystalline, rarely porphyritic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	<1	<1	0.2-0.5	An75	euhedral	zoned, some edges raggedy and resorbed
GROUNDMASS						
Plagioclase	35	37	0.02-0.4		microlitic	
Clinopyroxene	20	20	0.02-0.2		subhedral-anhedral	
Magnetite	5	5	0.02		skeletal	cruciform, some oxidized
Mesostasis	0	15	n/a		n/a	interstitial, cryptocrystalline; altered to clays

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	2	lining cavities	Yellowish green; often quite localized; cryptocrystalline to radiating bundles; smaller vesicles (<0.5 mm) are generally completely filled
Amorphous Fe-oxide	2	localized, near cracks	
Clays	15	mesostasis	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	25	throughout	to 2 mm	rims filled with clays	irregular	often coalescing; bimodal size distribution; smaller ones are completely filled

COMMENTS: It is difficult to tell filled, small vesicles from altered groundmass patches. I think most of the clay areas are filled vesicles. Clinopyroxenes are very fresh, some plagioclase show minor alteration (< 2%). 1115 point count yields: plagioclase phenocrysts <0.1%; plagioclase groundmass 34.8%; clinopyroxene groundmass 22.1%; opaques 3.1%; interstitial groundmass 17.3%; open vesicles 14.9%; filled vesicles 7.8%; vesicles total 22.7% Rock is slightly to moderately altered.

135-834A-16X-01 (Piece 4,11-13 cm) OBSERVER: EWE WHERE SAMPLED: Unit 3

ROCK NAME: Moderately phyric plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Porphyritic, microcrystalline to ophitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	3-5	3-5	0.4-0.28	80-90	euhedral	occurs as isolated crystals and glomeroporphyritic clusters. Narrow sodic rims. Larges crystals have prominent cryptocrystalline dark inclusions aligned along c axis.
GROUNDMASS						
Plagioclase	20-25	20-25	<0.7	An60	euhedral to subhedral	elongated lath-shaped, grading to microlites
Clinopyroxene	20-25	20-25	<0.5		subhedral to anhedral	varies from granular and interstitial to ophitic. Some coarser crystals tending to be acicular.
Cr-spinel	tr	tr	<0.05		euhedral	occur in plagioclase phenocrysts and possibly in mesostasis
Magnetite	1	1	<0.001		euhedral to anhedral	isolated euhedral grains to granular skelet l, acicular, and cruciform aggregates, mainly in mesostasis.
Mesostasis	5-10	15-20	n/a		interstitial	cryptocrystalline brown material when unaltered

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
?Clays/silica	15	both	possible clays and cryptocrystalline siliceous material occur as partial fillings of vesicles and replacement of mesostasis. pale brownish-green fibrous clays? and ? cryptocrystalline silica present as linings to vesicles.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	30-35	disseminated	<3.0	linings only	subrounded to irregular	most vesicles between 0.1-0.5 mm size coalescing of vesicles

COMMENTS: 1117 point count by EWE: plagioclase phenocrysts 2.7%; plagioclase groundmass 20.2%; clinopyroxene groundmass 27.9%; opaques 1.1%; mesostasis 17.9%; open vesicles 23.0%; infilled vesicles 7.2%; vesicles total 30.2% Rock is moderately altered.

135-834A-16X-CC (Piece 1,28-30 cm) OBSERVER: KRI WHERE SAMPLED: Unit 4

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	<1	<1	0.4-1.3		euhedral	two isolated grains with scalloped edges and resorbing interiors
GROUNDMASS						
Plagioclase	20-25	20-25	<.3		microlitic	elongate microlites, randomly oriented
Clinopyroxene	20-25	20-25	<.4		euhedral	elongate often fan-like aggregates finely intergrown with plagioclase microlites; very fresh
Magnetite	1-2	1-2	<.05		euhedral	equant crystals in microcrystalline groundmass
Mesostasis	5-10	20-25	n/a		interstitial	cryptocrystalline material, much of it is altered to very fine grained green-brown clays

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	25-30	throughout	0.1-3.5	most are clean and empty	irregular	often coalesced to large irregular shapes; bimodal size distribution

COMMENTS: Rock is very fresh except for clay development in mesostasis. There is a bimodal size distribution of the vesicles. The very large ones are well formed and tend to be aggregates of more moderately sized voids. There is also a very fine scale porosity to the rock with abundant vesicles of <.1 mm. 1048 point count by EWE: plagioclase phenocrysts 0.1%; plagioclase groundmass 20.7%; clinopyroxene groundmass 26.1%; magnetite 1.2%; mesostasis (includes altered mesostasis) 23.4%; vesicles 28.6%

135-834A-17X-01 (Piece 3C,28-32 cm) OBSERVER: KRI WHERE SAMPLED: Unit 5

ROCK NAME: Sparsely phyric plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Seriate, poikilitic, microcrystalline, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	1-2	1-2	<1.5		euhedral	very raggedy-scalloped edges; resorbed regions; strongly zoned
GROUNDMASS						
Plagioclase	33	35	<0.5	An60-70	euhedral microlites	zoned
Clinopyroxene	20	20	< 1		poikilitic	fresh
Magnetite	2-3	2-3	<0.1		equant, cruciform	ilmenite lamellae
Sulfides	tr-1	tr-1	< 0.1		globules	
Ilmenite	tr	tr	<0.05		blades	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20	patchy	to 5	calcite/ clays	irregular and interconnected	connected almost into veins oriented across the section

COMMENTS: Cryptocrystalline groundmass (20%) is highly altered to clays. Trace spinel occurs as small, raggedy crystals next to plagioclase. Calcite occurs filling some vesicles and in other patches throughout the section. Clays occur rimming some vesicles. Plagioclases enclosed in clinopyroxene tend to be fresher than those that are not enclosed. Not only does this sample show groundmass alteration, but there are several regions of more pervasive alteration, with extensive calcite infilling of vesicles and breakdown of groundmass minerals. Rock is moderately altered. JA adds: Ragged brown stilpnomelane? to 0.2 mm in groundmass irregularly intergrown/laminated with chrome green chlorite (totals <1% of rock).

135-834A-17X-04 (Piece 5A,92-93 cm) OBSERVER: KRI WHERE SAMPLED: Unit 5

ROCK NAME: Sparsely phyric plagioclase basalt

GRAIN SIZE: Fine to medium grained

TEXTURE: Seriate poikilitic, microcrystalline, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	2	2	0.5-1.5	An75	euhedral	some strongly zoned (especially at rims)
GROUNDMASS						
Plagioclase	30	35	<0.5	An70	euhedral	zoned
Clinopyroxene	20	20	0.5-3		poikilitic	zoned and twinned with plagioclase chadacrysts
Magnetite	5	5	0.05-0.3		equant, cruciform	commonly with fine il enite lamellae
Ilmenite	1	1	<0.2		skeletal	isolated in groundmass
Mesostasis	0	20	n/a		n/a	cryptocrystalline; completely altered to clays

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Carbonate and clays	8	infilling	very fine grained
Clays	20	mesostasis	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20	throughout	0.23	all partially to completely filled	irregular	often coalescing

COMMENTS: Mesostasis is completely altered to clays. Clay minerals also fill or partially fill the vesicles so alteration is difficult to quantify, as is original vesicle content. Plagioclases enclosed in clinopyroxene are extremely fresh, others show just a few % clays. Rock is moderately altered.

135-834A-18X-02 (Piece 3C,113-114 cm) OBSERVER: EWE WHERE SAMPLED: Unit 5

ROCK NAME: Aphyric to sparsely phyric plagioclase basalt

GRAIN SIZE: Fine to medium grained

TEXTURE: Seriate poikilitic, microcrystalline

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	<1-2	<1-2	0.6-2.0	An75-80	euhedral	Narrow sodic rims (to An40); tend to glomeroporphyritic
GROUNDMASS						
Plagioclase	39	40	0.08-0.6	An70	euhedral	zoned to sodic rims (An55); tabular to microlitic
Clinopyroxene	20	20	0.07-4.0		ophitic-poikilitic	dominated by large poikilitic crystals
Magnetite	2.0	2.0	0.03-0.1		equant to euhedral	oxidized and unmixed
Ilmenite	<=1.0	<=1.0	0.1		tabular euhedral to equant to skeletal	
Mesostasis	0	15-20	n/a		n/a	microcrystalline, interstitial

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Calcite	7.5	infilling	microcrystalline to radiating; calcite, zeolites, chlorite
Clay	15-20	mesostasis, vesicles	and clays fill 50% of vesicles

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	15	even	0.2-1.5	all partially to completely filled	rounded to subrounded and coalescing

COMMENTS: 1605 point count yields: plagioclase phenocrysts 0.7%; plagioclase groundmass 41%; clinopyroxene groundmass 21.5%; opaques groundmass 3.4%; interstitial groundmass 19.3%; filled vesicle material 9.7%; open vesicle space 4.4. Rock is moderately altered.

135-834A-20X-02 (Piece 4A,81-82 cm) OBSERVER: KRI WHERE SAMPLED: Unit 5

ROCK NAME: Aphyric to sparsely phyric plagioclase basalt

GRAIN SIZE: Fine to medium grained

TEXTURE: Seriate poikilitic, microcrystalline, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	<1-2	<1-2	0.5-1.5	An70-75	euhedral	some strongly zoned
GROUNDMASS						
Plagioclase	38	40	<0.5	An70	euhedral	zoned with sodic rims
Clinopyroxene	20	20	0.5-3		poikilitic	with plagioclase chadacrysts; zoned and twinned
Magnetite	3	3	0.05-0.4		skeletal, cruciform	
Ilmenite	tr	tr	0.1		skeletal	
Mesostasis	0	15	n/a		n/a	microcrystalline; completely altered to clays

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Calcite	3-4	infilling	microcrystalline at vesicle edges to radiating calcite in center of completely filled vesicles; secondary mineral assemblage (calcite + zeolites + clay) makes up 60% of vesicle volume
Clays	15	Mesostasis	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20	throughout	0.4-3	all partially to completely filled	rounded to subrounded	coalescing; difficult to estimate vesicle content of rock due to subsequent infilling

COMMENTS: Mesostasis is completely altered. Altered groundmass material is difficult to distinguish from filled vesicles. Plagioclases enclosed in clinopyroxene oikocrysts are generally fresher than other groundmass plagioclases which can show a few percent secondary minerals. Rock is moderately altered.

135-834B-6R-CC (Piece 2,8-11 cm) OBSERVER: KRI WHERE SAMPLED: Unit 2

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Microlitic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	tr	tr	to 0.4		euhedral	no true phenocrysts are present, but there are a few "slightly larger" plagioclases (up to 0.4 mm).
GROUNDMASS						
Plagioclase	30	30	< 0.4		microlites	some strongly zoned with narrow sodic rims
Clinopyroxene	15	15	0.04-0.1		euhedral	acicular quench crystals
Olivine	tr-1	tr-1	< 0.05		euhedral	
Mesostasis	5	25	n/a		interstitial	somewhat altered to extremely fine grained clays
Opaques	tr	tr	0.01-0.03		equant	there is a very fine grained dusting of magnetite in the groundmass.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	35	random	0.1-1	partially filled with brown-green clays	round	vesicles are bimodally distributed: aside from the relatively large ones there is a fine scale porosity due to the abundance of extremely small vesicles (<0.1mm)

COMMENTS: Cryptocrystalline groundmass is now composed largely of fine-grained clays. Patchy distributions of Fe-oxyhydroxides have stained some portions and given some vesicles a yellow-brown coloration. The largest vesicles are rimmed or partially filled with brownish clays. Rock is moderately altered.

135-834B-7R-01 (Piece 13,80-81 cm) OBSERVER: KRI WHERE SAMPLED: Unit 2

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Microlitic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	<1	<1	0.5		euhedral laths	some show resorbtion along the edges
Clinopyroxene	<1	<1	0.4		subhedral	
GROUNDMASS						
Plagioclase	30	30	0.05-0.5		microlites	some have a resorbed/spongy appearance
Clinopyroxene	15	15	0.02-0.1		subhedral	
Olivine	tr-1	tr-1	0.05-0.1mm		equant	
Opaques	3-4	3-4	0.05		equant	most are magnetite; many cruciform
Mesostasis	5-10	5-10	n/a		fine grained	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	35	random	0.05-1	most are partially filled	rounded to irregular	wide size variation with all intermediate sizes represented

COMMENTS: A fine grained calcite vein runs through one side of this section. This represents a vein of indurated sediment. The calcite crystals are larger (up to 0.05 mm) at the margins of the vein. There are also a few calcite "clasts" occuring about 2 mm into the interior of the rock. The rock and vesicles show Fe-oxyhydroxide staining at the edges of the calcite vein. Rock is fresh.

135-834B-8R-01 (Piece 5B,110-113 cm) OBSERVER: KRI WHERE SAMPLED: Unit 2

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Vesicular, microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	tr	tr	<1.0		euhedral	corroded interiors
GROUNDMASS						
Plagioclase	35-40	35-40	<0.5		euhedral	randomly oriented microlites
Clinopyroxene	10-15	10-15	<0.2		euhedral-subhedral	acicular quench crystals
Magnetite	2-3	2-3	<0.6		euhedral	equant, interstitial grains
Mesostasis	5	25	n/a		interstitial	largely replaced by fine grained green-brown clays

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING
Clays	20	Mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-25	throughout	<2.5	minor	irregular	bimodal size distribution; aside from large ones there is a fine scale porosity due to the abundance of extremely small vesicles (<0.1 mm).

COMMENTS: Cryptocrystalline groundmass is now composed largely of fine grained clays. Mineral phases are extremely fresh. Rock is slightly-moderately altered.

135-834B-10R-01 (Piece 1,36-37 cm) OBSERVER: KRI WHERE SAMPLED: Unit 5

ROCK NAME: Sparsely phyric plagioclase basalt

GRAIN SIZE: Fine to medium grained

TEXTURE: Seriate poikilitic, microcrystalline, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	1	1	0.5-1	An75	euhedral	zoned
GROUNDMASS						
Plagioclase	38	40	<0.5	An70	euhedral	strongly zoned to sodic rims
Clinopyroxene	20	20	0.6-3		poikilitic	sector zoned and twinned
Magnetite	3	3	0.3		euhedral, cruciform	ilmenite lamellae common
Ilmenite	tr	tr	0.2		skeletal	
Mesostasis	0	15	n/a		n/a	groundmass is completely altered to fine grained clays

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Carbonates/clays	8	infilling vesicles	very fine grained
Clays	15	mesostasis	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20	throughout	0.1-3	most partially filled	irregular	bimodal size distribution; small ones are round

COMMENTS: One patch appears to have altered plagioclase clusters, but they look very similar to some of the filled vesicles, except for their relict shape. Plagioclases enclosed in clinopyroxene are extremely fresh in contrast to those in the groundmass which show a few percent alteration. Rock is moderately altered.

135-834B-10R-02 (Piece 5,76-80 cm) OBSERVER: KRI WHERE SAMPLED: Unit 5

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine to medium grained

TEXTURE: Seriate poikilitic, microcrystalline, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	40	40	0.1-2	An70-80	euhedral	strongly zoned
Clinopyroxene	30-35	30-35	0.4-3		euhedral-poikilitic	zoned and twinned
Magnetite	1-2	1-2	0.1-0.8		skeletal to cruciform	no ilmenite lamellae, unlike magnetite in other sections of unit
Mesostasis	7-10	7-10	n/a		n/a	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Calcite	n/a	fillings and veins	radiating habit; fills up to 40% of vesicle volume
Clays/calcite	n/a	vesicle borders	extremely fine-grained; fills up to 20% of vesicle volume
Fe-oxyhydroxide	tr	staining in some vesicles or cracks	amorphous; secondary mineralization much more extensive at one end-especially the large calcite infillings nearing a calcite filled vein

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15	throughout	0.2-4	most partially filled with clays	irregular	vesicle distribution varies greatly across the slide; up to 60 volume percent in places

COMMENTS: A region of this sample grades into a much coarser grained equivalent. In the coarser portion of the slide there is a higher percentage of clinopyroxene and clinopyroxene and plagioclase are nearly the same size. The coarse grained region is about 5 mm in diameter. Rock is slightly altered.

135-834B-10R-03 (Piece 3A,68-69 cm) OBSERVER: KRI WHERE SAMPLED: Unit 5

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine to medium grained, vesicular

TEXTURE: Seriate poikilitic, microcrystalline, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	33-34	35	0.1-0.5		euhedral microlites	strongly zoned to sodic rims, slightly altered to fine grained clays
Clinopyroxene	25	25	< 2		poikilitic	
Magnetite	2-3	2-3	<0.2		skeletal to cruciform	ilmenite lamellae common
Ilmenite	<1	<1	<0.1		elongate	
Mesostasis	0	25	n/a		n/a	completely altered to clays

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	7-10	throughout	1-6	calcite	irregular	up to 50% filled completely filled with anhedral calcite crystals; Fe-stained at margins
Vein	<1	cutting entire slide	1.5 wide	calcite		

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING
Clays	25	Mesostasis

COMMENTS: Calcite fills veins and vesicles. Green clays fill vesicles, mostly rimming edges; fine grained clays partially replace the groundmass. Plagioclases enclosed in clinopyroxenes are somewhat fresher than those surrounded by cryptocrystalline groundmass. The rock is moderately to highly altered.

135-834B-12R-03 (Piece 5,65-66 cm) OBSERVER: SHE WHERE SAMPLED: Unit 5

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine to medium grained

TEXTURE: Seriate poikilitic, microcrystalline, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	<1	<1	2		subhedral	zoned, usually more sodic rims
GROUNDMASS						
Plagioclase	38	40	0.1-0.8	An65	equant to lathlike	
Clinopyroxene	20	20	1-3		sieve-like	oikocrysts
Magnetite	1	1	0.01-0.15		equant, skeletal	
Mesostasis	0	24	n/a	n/a	interstitial	replaced by clays

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	2	plagioclase	fine spots throughout plagioclase
Clays	24	groundmass	green brown in color

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15	throughout	0.2-2	clays on edges	irregular	bimodal size distribution (<0.4 mm, > 1 mm), smaller population is most abundant

COMMENTS: The rock is moderately altered.

135-834B-13R-01 (Piece 4,138-140 cm) OBSERVER: KRI WHERE SAMPLED: Unit 5

ROCK NAME: Aphyric basalt

GRAIN SIZE: fine to medium grained

TEXTURE: Seriate, poikilitic, microcrystalline, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	1-2	2-3	<2.0 mm		euhedral	zoned crystals with corroded interiors
GROUNDMASS						
Plagioclase	38	40	<0.5		euhedral	elongate laths with fine spots throughout interiors
Clinopyroxene	15-20	15-20	<2.0		sieve-like	oikocrysts with enclosed plagioclase
Mesostasis	0	25	n/a		interstitial	replaced by fine grained clays
Magnetite	1	1	<0.5		euhedral	equant, skeletal

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
calcite	<1		large calcite grains (about 1 mm across) fill region about 4 mm across. This is not an obvious vesicle nor a vein. It is the only calcite in the slide
Clays	25	mesostasis	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15-20	throughout	0.2-2	minor	irregular	bimodal size distribution; edges lined with fine grained clays

COMMENTS: The rock is moderately altered. The plagioclase grains enclosed in the clinopyroxene oikocrysts are significantly less altered than those outside.

135-834B-14R-01 (Piece 7B,32-33 cm) OBSERVER: KRI WHERE SAMPLED: Unit 6

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Microcrystalline to microlitic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	<1-1	<1-1		An80	euhedral	tend to glomerocrysts
GROUNDMASS						
Plagioclase	5	5	<1 long	An60-80	microlites	
Clinopyroxene	3-4	3-4	<0.5		euhedral	quench textures
Olivine	1-2	1-2	<0.3		euhedral	quench textures
Magnetite	1	1	<0.02		anhedral	
Spinel	tr	tr	to 0.04		euhedral	in plagioclase and groundmass

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-30	random	<1.2	most empty	subrounded to irregular	most are clean and empty; clay lining on some; some are coated with Fe-oxyhydroxides near a vein filled with same

COMMENTS: Cryptocrystalline mesostasis (50-60%) is variolitic to microcrystalline with feathery textured crystallites. Sample is generally fresh, with some alteration in variolitic zone to fine grained clays. Some vesicles have clay lining the edges; one has a calcite filling. There is a dusting of magnetite in the groundmass. Vesicle size distribution is bimodal. The rock has about 5-10% large (1 mm) vesicles yet also has a very fine scale porosity (to 60% locally) with very small (<0.1 mm) vesicles. 1181 point count yields: olivine phenocrysts (0.2%), clinopyroxene phenocrysts (0.3%), plagioclase phenocrysts (1.0), plagioclase in groundmass (5.3), olivine in groundmass (0.8), clinopyroxene in groundmass (1.5), opaques (0.8), groundmass (53.8), dark groundmass spots (9.1), vesicles (25.8), filled vesicles (0.7), clays in groundmass (0.7). The rock is fresh. This count used a size discrimant for phenocrysts; another count just going by shape gave 4.5% PLAG, 2.6% CPX, 0.5% OL phenocrysts

135-834B-15R-01 (Piece 9B, 78-81 cm) OBSERVER: SHE WHERE SAMPLED: Unit 6

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Vesicular, microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	tr	tr	1.2		euhedral	grade into groundmass crystals
GROUNDMASS						
Plagioclase	15	15	0.2-1	An65	euhedral; boxcar and hopper shapes	intergrown with clinopyroxene
Clinopyroxene	7	7	0.1-0.6		euhedral, subhedral	commonly intergrown with plagioclase
Olivine	3	3	0.2-0.4		euhedral	
Magnetite	0.5	0.5	0.01-0.02		anhedral	scattered in groundmass
Mesostasis	40	45	n/a		n/a	quench pyroxene crystallites; generally very dark brown to black

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	2	filling vesicles near a vein	
Iddingsite	3	olivines, near vein	probably a mix of clays and Fe-oxyhydroxides
Calcite	2	vein fill	fills the 6 mm vein
Clays	5	groundmass	brown colored; most common in mesostasis near vein and some vesicles

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	30	throughout	0.1-1	clays near vein	irregular	there are areas 1-4 mm long of darker, more vesicular groundmass; these may be fillings of earlier cavities by later magma; they are black becuase of increased amounts of fine magnetite.
Vein	10	one end of slide	6mm	calcite		completely filled with fine-grained calcite

COMMENTS: The rock is moderately altered.

135-834B-15R-02 (Piece 6,37-38 cm) OBSERVER: SHE WHERE SAMPLED: Unit 6

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Variolitic, microlitic, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	12	12	0.1-0.6	An68	euhedral - subhedral	commonly in glomerocrysts, some swallowtail morphologies
Clinopyroxene	3	3	0.1-0.2		euhedral - subhedral	undulose extinction and bent lamellae in some; rarely to 0.8 mm; twinning and sector zoning common
Magnetite	1	1	0.002		anhedral	scattered in groundmass
Olivine	1	1	0.2		euhedral	single grains
Mesostasis	60	65	n/a		n/a	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays-green	1	filling vesicles	
Clays-reddish	tr	replacing olivine	"iddingsite"
Clays-brown	5?	groundmass replacement	hard to tell what % of groundmass is altered; alteration may be concentrated in larger brown-black groundmass clots

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20	throughout	0.02-0.2	minor greenish and reddish clays	irregular	rarely to 0.6 mm

COMMENTS: 2-3 mm dark spots in groundmass are dominated by variolitic texture; looks like these clots are filling older vesicles or cavities; they are distinctly browner in transmitted light, perhaps indicating a higher clay content. The rock is slightly altered.

135-834B-16R-01 (Piece 16,119-123 cm) OBSERVER: SHE WHERE SAMPLED: Unit 6

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Microcrystalline, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	40	40	0.1-0.6	An65	euhedral laths	radiating bundles intergrown with clinopyroxene; composition and percentages are not well determined
Clinopyroxene	10	10	0.1-0.4		anhedral - subophitic	intergrown with plagioclase
Olivine	1	1	0.2		euhedral	
Magnetite	2	2	0.01-0.1		subhedral - anhedral	disseminated in groundmass
Mesostasis	18	22	n/a		n/a	percentages may be higher if plagioclase estimate is lower

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	4	groundmass, lining some vesicles	greenish brown
Red clays, hematite	1	vesicle fill	also replacing olivine and groundmass

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	25	through out	0.1-0.6	minor green clay	round to irregular	large vesicles (1-3 mm) comprise 4% of rock; rest of vesicularlity is in small vesicles (< 0.6 mm)

COMMENTS: Variolitic, less crystalline zones occur rimming vesicles and in a 5 mm wide dark band cutting across the sample; no mineralogic change across the band, just a textural change. The rock is slightly altered.

135-834B-18R-01 (Piece 10,33-39 cm) OBSERVER: EWE WHERE SAMPLED: Unit 6

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Variolitic to microcrystalline, microporphyritic, vesicular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	0.3	0.3	0.1-0.7	An75	euhedral	tend to glomerophyric; narrow sodic rims (An50-55)
Olivine	0.3	0.3	0.07-0.6		euhedral	some skeletal, completely fresh
GROUNDMASS						
Plagioclase	6.5	6.5	0.05-0.6	An40-45	euhedral	Thin, elongated laths, often skeletal,with extended growth from crystal terminations (quenching); radial to subradial aggregates
Olivine	0.4	0.4	0.03-0.05		euhedral	microphenocrystic
Magnetite	tr	tr	<0.005		anhedral to skeletal	
Clinopyroxene	0.4	0.4	<0.003		skeletal	some intergrown skeletal aggregates
Mesostasis	67.7	67.7	n/a		n/a	variolitic, vesicular to microcrystalline; variolitic areas are distinctly feathery and spherulitic with complex quench intergrowths of clinopyroxene and plagioclase

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Amorphous silica?	minor	linings to vesicles	isotropic, low index of refraction coating to all vesicles

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	24.4	throughout	0.04-1.5	amorphous silica? as coatings	rounded to elongated and branching

COMMENTS: Percentages based on counting 1001 points. Some of the variolitic areas are rounded and appear to represent "refilling" of earlier large vesicles with later lava, followed by quenching. The rock is fresh.

135-834B-20R-01 (Piece 15C,104-108 cm) OBSERVER: KRI WHERE SAMPLED: Unit 7

ROCK NAME: Highly phyric plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Seriate porphyritic, microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	9-15	10-16	2	An70	euhedral	large compositional range; strongly zoned with sodic rims; some very spongy with altered interiors
Olivine	<1	<1	0.5	Fo88	euhedral	glomerocrystic clusters
GROUNDMASS						
Plagioclase	25-30	25-30	<0.5	An65-70	microlitic - euhedral	laths with random orientation
Olivine	1-2	1-2	0.1		euhedral	
Clinopyroxene	25-30	25-30	0.05-0.4		acicular	
Magnetite	1-2	1-2	<0.01		anhedral to equant	
Spinels	tr	tr	0.1 to 0.3		euhedral to equant	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING
Clays	7-10	Mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	1	random	1	minor	rounded to irregular	rimmed with greenish-brown clays; one filled with radiating calcite

COMMENTS: Microcrystalline groundmass makes up 7-10%. The groundmass is now largely altered to orangish clays. One edge has an Fe-oxyhydroxide coating and alteration; alteration halo near rim gives yellow orange brown hue to everything. A 972 point count gives: plagioclase phenocrysts 11.1%, olivine phenocrysts 0.3%, plagioclase in groundmass 27.0%, clinopyroxene in groundmass 38.6%, olivine in groundmass 0.2%, opaques in groundmass 0.2%, other (clays, interstitial mesostasis) 17.7%, vesicles 0.5%, filled vesicles 0.6%. The rock is moderately altered.

135-834B-22R-02 (Piece 2C,28-29 cm) OBSERVER: JAN WHERE SAMPLED: Unit 7

ROCK NAME: Highly phyric plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Seriate porphyritic, microlitic to microcrystalline

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	11	11	0.4-5.0	An75	euhedral	generally glomeroporphyritic; distinctly more sodic rims (An55)
Cr-spinel	tr	tr	0.07-0.22		euhedral	microphenocrystal
GROUNDMASS						
Plagioclase	35	35	0.1-0.9		euhedral	laths in random orientation
Clinopyroxene	30	30	0.05-11.0		granular to acicular	sometimes in radiating acicular aggregates
Opaques	2	2	0.02-0.05		euhedral-subhedral	dominantly magnetite in granular aggregates or skeletal grains. Trace amounts of Cr-spinel were observed
Olivine	2	2	0.05-0.1		euhedral to subhedral	fresh, equant crystals
Mesostasis	0	20	n/a		interstitial	radiating microcrystalline aggregates; alteration to pale greenish-brown clays.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Green-brown clays	20	interstitial mesostasis replacement	seems to be an "internal" replacement rather than a pervasive alteration of the rock

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
None	0				

COMMENTS: The rock is moderately altered.

135-834B-28R-01 (Piece 7,42-43 cm) OBSERVER: JA WHERE SAMPLED: Unit 7

ROCK NAME: Highly phyric plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Glomeroporphyritic, seriate porphyritic, microcrystalline

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	10-15	10-15	range to 3		euhedral-subhedral, blocky	as glomerophenocrysts, some with numerous large melt inclusions(to 0.25 mm), not aligned with crystallographic axes
Olivine	tr	tr	0.3-0.5		euhedral-subhedral	edges look scalloped on some- being dissolved? Lots in groundmass or attached to plagioclase phenocrysts.
GROUNDMASS						
Plagioclase	40-45	40-45	to 1		lathlike	often intergrown with one another
Olivine	<1	<1	<0.3		euhedral-anhedral	see phenocryst comments
Clinopyroxene	35-40	35-40	<0.2		anhedral	thin, elongate grains between plagioclase to feathery, plumose
Spinel	tr	tr	0.08-0.16		euhedral blocky	equant crystals as inclusions or adjacent to plagioclase phenocrysts- not loose in groundmass
Magnetite	3	3	<0.05		euhedral-skeletal	disseminated in groundmass

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	<<1	disseminated	0.8	fibrous to granular green-brown clays	rounded	Two groups of clays? Outer radial fibrous and inner, granular clays in most vesicles

COMMENTS: Also a few % fine-grained mesostasis. Trace of irregular sulfide globules (to 0.02 mm) in groundmass. Rock is slightly altered, as about 5% of the mesostasis is altered to fine-grained brownish clays.

135-834B-30R-03 (Piece 1G,105-107 cm) OBSERVER: JA WHERE SAMPLED: Unit 7

ROCK NAME: Highly phyric plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Glomeroporphyritic, microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	15.7	15.7	to 3		euhedral to subhedral	commonly in glomeroporrphyritic clusters; some have melt inclusions elongated and aligned parallel to the 010 axis
Olivine	0.9	0.9	to 1.8		euhedral to skeletal	
GROUNDMASS						
Plagioclase	45.0	45.0	to 1		elongate to skeletal laths	sometimes sheaf-like
Clinopyroxene	30.0	30.0	< 0.03		granules, anhedral grains, sheafs	
Magnetite	3.2	3.2	< 0.01		euhedral to skeletal	
Olivine	2.3	2.3	to 0.25		euhedral to skeletal	
Cr-spinel	tr	tr	0.05-0.2		euhedral to blocky	inclusions in plagioclase and olivine, and as loose grains in groundmass; relatively abundant

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	0.2	disseminated	<0.2	greenish-brown clays	round	filled with greenish-brown granular clays

COMMENTS: Groundmass also includes 2.7% fine-grained mesostasis. Traces of round, irregular sulfide globules (1 to 40 microns in size) are also found as inclusions in plagioclase phenocrysts or as groundmass grains. Rock is very fresh. Percentages based on point count by KRI (1019 counts).

135-834B-31R-03 (Piece 2A,16-19 cm) OBSERVER: KRI WHERE SAMPLED: Unit 7

ROCK NAME: Highly phyric plagioclase basalt

GRAIN SIZE: Fine to medium grained

TEXTURE: Porphyritic, microcrystalline

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	10-20	10-20	<2.5		euhedral	sodic rims
Olivine	1	1	0.5		euhedral	often in clusters
GROUNDMASS						
Plagioclase	40	40	0.201.0		euhedral	microlites form network with interstitial clinopyroxene
Clinopyroxene	25	25	to 4		anhedral - subhedral	radiating acicular crystals
Olivine	3	6	0.1-0.2		euhedral	scattered
Magnetite	5	5	up to 2		equant, cruciform	also skeletal
Spinels	tr	tr	< 0.05		equant	adjacent to plagioclase, hollow centers.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING
Clays	10	Mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Veins	<1		0.05 wide	filled with fine-grained clays	

COMMENTS: Interstitial mesostasis (10%) is altered to clays (smectites?) but the rest of the rock is generally fresh. Plagioclase crystals show some resorbed regions (often cores) and some are quite "fuzzy". A few olivines show significant breakdown. Clinopyroxene in groundmass forms beautiful fans of acicular grains with some blades several mm in length. A 1062 point count yields: plagioclase phenocrysts 10.5%, olivine phenocrysts 0.3%, plagioclase in groundmass 39.8%, clinopyroxene in groundmass 29.1%, olivine in groundmass 2.2%, opaques 4.9%, mesostasis 13.3%, veins/vesicles 0%. Rock is slightly to moderately altered.

135-834B-33R-02 (Piece 5I,115-116 cm) OBSERVER: KRI WHERE SAMPLED: Unit 7

ROCK NAME: Highly phyric plagioclase basalt

GRAIN SIZE: Fine to medium grained

TEXTURE: Seriate porphyritic, microcrystalline to microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	25	25	< 2	An75	euhedral	zoned, beginning to show some alteration
Olivine	1	1	1		irregular	some alteration, scalloped edges
GROUNDMASS						
Plagioclase	30	30	1.5	An40-70	elongate, euhedral to subhedral	strongly zoned to more sodic cores
Clinopyroxene	15	15	0.8		interstital	some acicular crystals
Olivine	1-2	1-2	< 0.1		subhedral	partially altered
Magnetite	1-2	1-2	<0.1		equant to skeletal	
Ilmenite	tr	tr	0.05		blades	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING
Clays	20	Mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
None	0				

COMMENTS: 0.08 mm sulfide globules occur in plagioclases. Alteration of cryptocrystalline groundmass (25% of rock) to fine grained clays gives the rock an overall degree of alteration of about 20%. Olivines are breaking down and are rimmed by iddingsite; however there is very little in the way of identifiable alteration or secondary minerals. The rock is fresh.

135-834B-34R-01 (Piece 6,127-136 cm) OBSERVER: JAN WHERE SAMPLED: Unit 7

ROCK NAME: Highly phyric plagioclase basalt

GRAIN SIZE: Fine to medium grained

TEXTURE: seriate porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	10	10	1.5-4		euhedral	fresh, often zoned, tend to gomerocrystic
Olivine	tr	tr	<1.0		euhedral	broken crystals, invaded by plagioclase and clays
GROUNDMASS						
Plagioclase	55-60	55-60	0.2-3		euhedral,ragged	may form long laths
Clinopyroxene	25-30	25-30	0.06-2.0		anhedral	ophitic-oikocrystic
Olivine	1	1	0.05-0.2		subhedral	
Opaques	1	1	0.01-0.2		blocky, very irregular	most are probably magnetite, but a few are quite brown in plane light
Mesostasis	1	3-5	n/a		granular to fibrous	brownish alteration

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING
Clay	2-4	mesostasis

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	tr	randomly scattered	0.5-2mm	empty	subrounded

COMMENTS: Slightly altered (the interstitial mesostasis is up to 80% altered to clays). Small veinlet (0.1 mm across) is filled with clay fanlets.

135-834B-34R-01 (Piece 6,127-130 cm) OBSERVER: JAN WHERE SAMPLED: Unit 7

ROCK NAME: Highly phyric plagioclase basalt

GRAIN SIZE: Fine to medium grained

TEXTURE: Seriate porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	10	10	1.5-4		euhedral	fresh, often zoned, tend to glomerocrystic
Olivine	tr	tr	<1		euhedral	broken crystals, invaded by plagioclase and clays.
GROUNDMASS						
Plagioclase	60-65	60-65	0.2-3		euhedral-ragged	many form long laths
Clinopyroxene	25-30	25-30	0.06-2		anhedral	ophitic-oikocrystic
Olivine	1	1	0.05-0.2		subhedral	
Opaques	1	1	0.01-0.2		blocky to irregular	a few very brown in plane polarised light
Mesostasis	1	3-5	n/a		granular to fibrous	brownish alteration

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	tr	randomly scattered	0.5-2	clear	subrounded

COMMENTS: Slightly altered, (ie. the intersitial mesostasis is up to 80% clays). Small veinlet (0.1 mm wide) is filled with clay fanlets.

135-834B-35R-02 (Piece 16,111-112 cm) OBSERVER: KRI WHERE SAMPLED: Unit 8

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: aphyric, vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	tr	tr	0.3-0.6		euhedral	tend to glomeroporhyritic clusters, many with well defined sodic rims
Olivine	tr	tr	0.2-0.8		anhedral-subhedral	a relict grain about 1.5 mm across is suggested by the optical continuity of all the fragments in the glomerocryst, yet all of the fragments are extremely fresh looking.
GROUNDMASS						
Plagioclase	20-25	20-25	<0.5		euhedral	skeletal microlites, randomly oriented
Clinopyroxene	15-20	15-20	<0.4		subhedral -euhedral	intergrown with plagioclase microlites; elongate laths often form fanlike aggregates
Olivine	1-3	1-3	<0.3		euhedral	equant, quench textures common
Mesostasis	5	40	n/a		interstitial	nearly completely broken down into finegrained brown clays
Magnetite	tr	tr	0.002-0.01		euhedral	skeletal grains form a fine dusting in the cryptocrystalline groundmass

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Fe-oxyhydroxides	<1		one 0.2 mm vein with strong Fe staining and filling of
Clays	35	Mesostasis	vesicles with brownish-yellow material

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20	throughout	0.05-1.5	minor	subrounded -irregular	some of the larger vesicles ar accumulations of several smaller vesicles

COMMENTS: All phenocrysts are found in one glomeroporphyritic cluster composed of well developed microphenocrysts and a very few euhedral minerals. Many of the original vesicles appear to have been infilled with very highly vesicular quench material with quench plagioclase, clinopyroxene and 60-80% void. The boundary with the host is gradational within a very narrow zone. A 1000 point count gives 0.5% plagioclase phenocrysts; 0.3 % clinopyroxene phenocrysts; 0.1% olivine phenocrysts (all > 200 microns); 20.2% groundmass plagioclase; 18.3% groundmass clinopyroxene; 0.1% olivine; 0.8% opaques; 38% mesostasis; 20.8% open vesicles; 0.9% filled vesicles. Rock is moderately altered.

135-834B-36R-01 (Piece 2C,20-21 cm) OBSERVER: JAN WHERE SAMPLED: Unit 8

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: microlitic, sparsely spherulitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	tr	tr	up to 1		euhedral	
Clinopyroxene	tr	tr	1		euhedral	
GROUNDMASS						
Plagioclase	10-15	10-15	0.1-0.5		euhedral	occasionally rectangular, typically laths.
Clinopyroxene	10-20	10-20	0.05-0.25		anhedral	
Opaques	1-5	1-5	0.02-0.08		euhedral to irregular	the larger crystals are needle-like.
Mesostasis	20-30	20-30	n/a		glassy to cryptocrystalline	
Olivine	tr	tr	0.01		anhedral	equant, textures common

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	tr	replacement	various colors, from yellow-green, to orange and brown.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	40-45	throughout	0.04-6	quenched vesicular melt	rounded to irregular	vesicular infills contain skeletal plagioclases and cryptocrystalline material

COMMENTS: Fresh brown glass occurs as a lining to some vesicles. Within the glass are blocky and needle-like opaques. Sometimes these needles are oriented perpendicular to the edge of the vesicle. A 1026 point count yields: 0.1% plagioclase phenocrysts; 0.3% clinopyroxene phenocrysts; 12.77% clinopyroxene in groundmass; 11.3% plagioclase in groundmass; 27.39% mesostasis; 32.8% open vesicles; 13.4% vesicle fill. Rock is fresh.

135-834B-36R-01 (Piece 7,64-65 cm) OBSERVER: KRI WHERE SAMPLED: Unit 8

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	35-40	35-40	<0.6		euhedral	elongate microlites, randomly oriented
Clinopyroxene	25-30	25-30	<0.3		subhedral -euhedral	often intergrown with plagioclase, fanlike cluster common
Magnetite	1-2	1-2	<0.02		skeletal	in interstitial material
Mesostasis	5	15	n/a		interstitial	cryptocrystalline interstitial material

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Fe-oxyhydroxides	<3	filling	one side of the section (about 2 mm) is Fe stained and the vesicles are filled with brownish-orange.
Green clays	<1	rimming vesicles	associated with Fe-oxide staining
Calcite	<1	filling	minor infilling of one portion of one vesicle
Clays	10	mesostasis	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15-20	throughout	0.1-2.0	minor	irregular	larger ones are often coalescing smaller vesicles

COMMENTS: Many of the vesicles are filled with what appears to be highly vesicular quench material. Quench plagioclase and clinopyroxene are evident in a 60-80% vesicular groundmass. The rock is reasonably fresh except for breakdown of mesostasis to fine grained clays and the alteration along one side.

135-834B-37R-01 (Piece 1,3-5 cm) OBSERVER: KRI WHERE SAMPLED: Unit 8

ROCK NAME: Moderately phyric olivine plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: porphyritic, microcrystalline

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	3-5	3-5	0.4-4.0	An75	euhedral	tend to glomeroporphyritic; narrow sodic rims sharply defined
Olivine	<1	<1	<0.25		euhedral - subhedral	occur in glomeroporph ritic aggregates with plagioclase, fresh
GROUNDMASS						
Plagioclase	15-20	15-20	<0.6		euhedral	elongate and tabular grains, microlitic, randomly oriented
Clinopyroxene	25-35	25-35	<0.25		euhedral	often aggregates of acicular quench crystal , with some more equant, generally intergrown with plagioclase
Olivine	2-3	2-3	<0.15		euhedral-subhedral	fresh
Magnetite	2-3	2-3	<0.05		skeletal	
Mesostasis	15-20	15-20	n/a		cryptocrystalline	brownish-green interstitial material

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
brown-green clays	<2	partial infilling, lines vesicles	comprises about 10% of vesicles, extremely fine grained
Fe-oxyhydroxides	2	replacement and infills vesicles near ve	vein at edge of section has strong yellow-brown staining and filled vesicles

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	10-15	throughout	0.02-0.8	partial-complete	rounded-irregular	smaller vesicles are more well rounded, often coalescing

COMMENTS: Possibly some extremely resorbed spinels in the groundmass. Very common round-irregular dark patches which grade into the groundmass. These patches (up to 1 cm across) are very highly vesicular (up to 75%) with subrounded vesicles. The infilling is quenched basalt with quench plagioclase and clinopyroxene in a quenched groundmass. 1169 point count by EWE: plagioclase phenocrysts 7.0%; olivine phenocrysts 0.6%; plagioclase groundmass 19.4%; olivine groundmass 2.1%; clinopyroxene groundmass 35.2%; opaques 2.5%; mesostasis 19.3%; open vesicles 10.9%; infilled vesicles 3.1%; total vesicles 14.0%. Rock is fresh.

135-834B-37R-01 (Piece 7,46-47 cm) OBSERVER: KRI WHERE SAMPLED: Unit 9B

ROCK NAME: Moderately phyric olivine plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Seriate porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	7-10	7-10	0.5-1.5		euhedral	tend to glomeroporphyritic clusters; narrow sodic rims sharply defined, generally zoned crystals with melt inclusions common
Olivine	1-3	1-3	<1.0		euhedral-subhedral	glomerocrysts and intergrowths with plagioclase, very fresh
GROUNDMASS						
Plagioclase	20-25	20-25	<0.6		euhedral	microlitic, elongate crystals
Clinopyroxene	20-25	20-25	<0.5		euhedral	mostly equant, blocky crystals; a few bladed quench crystals
Olivine	1-2	1-2	<0.2		subhedral	equant
Magnetite	1-2	1-2	<0.005-.02		skeletal	mostly present as a fine dusting in the cryptocrystalline groundmass
Mesostasis	0-5	25-30	n/a		interstitial	very fine grained brownish clays

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
brown-green clays	5	filling of vesicles	most vesicles are slightly to partially filled
Clays	20-25	mesostasis	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
7-10cles	7-10	throughout	0.02-1.0	partially filled	rounded-irregular	often coalescing to form very irregular shapes

COMMENTS: One glomerocrystic cluster (plagioclase + minor olivine) is 4 mm across. Vesicles filled with highly vesicular plus quench material are common, up to 2 mm across. A 1000 point count yields: 8% plagioclase phenocrysts (defined as > 200 microns), 1.8 % olivine phenocrysts; 21% groundmass plagioclase; 24.1% groundmass clinopyroxene; 1.3% groundmass olivine; 2.9% groundmass opaques; 29.5 % mesostasis; 9.7% open vesicles; 1.7% filled vesicles.Rock is moderately altered.

135-834B-37R-02 (Piece 5,61-62 cm) OBSERVER: EWE WHERE SAMPLED: Unit 10A

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Microcrystalline, tending to microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	10-15	10-15	<0.5	An70	euhedral - anhedral	elongated lathes, grading to microlites. Larger crystals show narrow sodic rims.
Clinopyroxene	5-7	5-7	<0.3		subhedral to anhedral	tend to be elongated, sometimes interstitial, some intergrown with plagioclase. Larger crystals show shadowy extinction. Some rad ating aggregates are present. Minute acicular aggretates locally in mesostasis.
Olivine	1-3	1-3	<0.3		euhedral-skeletal	prismatic crystals, the larger ones are elongated (often hollowed), and the smaller ones are more equant.
Magnetite	2	2	<0.01		subhedral to anhedral	large range isolated granules
Mesostasis	38-42	40-45	n/a		interstitial	brown cryptocrystalline, almost verging on glassy locally. Patch alteration.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Mixed clay	2-3%	lines vesicle walls, both	local lining to vesicles, and local replacement of mesostasis. Yellow to yellow-brown fibrous to microspherulitic. These sporadically oxidise to reddish brown. Fe oxyhydroxide, becoming near isotropic.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	30	disseminated	<0.3	localized	subrounded to irregular	description excludes the quenched blebs included in lava, see comments below.

COMMENTS: Rounded basaltic quenched "blebs", up to 4 mm diameter, occur throughout slide. These blebs are almost free of clearly defined groundmass crystals, consisting of cryptocrystalline to microcrystalline quenched aggregates. These blebs grade very rapidly into the groundmass of the host lava, and can contain large vesicles (up to 3 mm), taking up most of the volume of the blebs. A 957 point count yields: 13.3% groundmass plagioclase; 3.6% groundmass clinopyroxene; 0.9% groundmass olivine; 0.8% groundmass opaques; 42.5% mesostasis; 26% open vesicles; 4.8% filled vesicles; 8.1% dark patches. Rock is slightly altered.

135-834B-42R-01 (Piece 4,14-17 cm) OBSERVER: JAN WHERE SAMPLED: Unit 10A

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Microcrystalline to microlytic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	30-35	30-35	up to 0.6	An60-70	euhedral - subhedral	elongated tabular tending to microlites
Clinopyroxene	10	5-10	up to 0.3		subhedral to anhedral	coarser crystals short and prismatic with shadowy extinction. Smaller grains tend to be interstitial and some are partially intergrown with plagioclase
Olivine	3-5	3-5	up to 0.5		euhedral - subhedral	generally as short, prismatic crystals, rarely elongated. Shows varying iddingsitation
Magnetite	1	1	up to 0.01		variable	minute anhedral equant grains, needle-like aggregated, and skeletal grains confined to mesostasis
Mesostasis	30-35	30-35	up to 0.2		intersiti l	brown cryptocrytslline to microcrystalline when unaltered

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays and oxides	2-3	replacement and infill	yellow-brown to reddish-brown clays and iron oxides. Yellow material weakly fibrous to spherulitic. Reddish brown material is isotropic. Localised partial vesicle infill and replacement of mesostasis.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20	disseminated	up to 0.4	localised	subrounded to irregular	description excludes vesicular quench inclusions (see comments below)

COMMENTS: Contains common rounded to amoeboid dark colored, well defined areas, which grade very rapidly at their margins into the rock groundmass. These are strongly vesicular (>50%), with rounded to irregular vesicles up to 6 mm diameter. These areas consist of quenched basalt (quenched groundmass and plagioclase microlite textures). In size, they range from 1 mm to >1 cm. Rock is slightly altered.

135-834B-43R-01 (Piece 12,107-110 cm) OBSERVER: EWE WHERE SAMPLED: Unit 10A

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Microcrystalline tending to microlitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	10-20	10-20	up to 0.6	An 50	euhedral	elongated, tabular, grading to microlites and mesh < 0.2 mm; randomly oriented; larger crystals show normal zoning
Clinopyroxene	7-10	7-10	up to 0.15		subhedral to anhedral	partially intergrown with plagioclase, the smaller grains tending to be interstitial to plagioclase
Magnetite	3-7	3-7	up to 0.08		euhedral - anhedral	larger grains are euhedral, equant; smaller grains anhedral and lath-like
Mesostasis	10	45-50	up to 0.1		interstitial	yellowish to yellowish-brown microcrystalline to cryptocrystalline
Olivine	tr	tr	0.1		subhedral	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	35-40	mesostasis	yellow to brown

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20-25	disseminated	up to 2.5	rare partial infilling	round to irregular	tend to be bimodal in size: smaller ones in range 0.05-0.3 mm and are subrounded to irregular; larger vesicles are rounded

COMMENTS: Yellow to brown clay occurs locally replacing mesostasis and as rare partial vesicle fill. Where replacement is high, the sample develops an intense yellow-brown coloration with poorly developed fibrous structure. Possibly very rare clay replacement of plagioclase. A 1108 point count yields 51.4% mesostasis; 14.1% groundmass plagioclase; 4.69% groundmass clinopyroxene; 2.44% opaques; 21.8% open vesicles; 5.5% filled vesicles. Rock is moderately altered.

135-834B-47R-01 (Piece 4,27-30 cm) OBSERVER: EWE WHERE SAMPLED: Unit 12

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained

TEXTURE: Coarsely microlitic, seriate, vesicular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Magnetite	tr	tr	0.05-0.15		see comments	microphenocrysts of euhedral to subhedral (a few skeletal) magnetite occur throughout the rock, ranging from 0.05-0.15 mm; they, occur in groups or clusters of microphenocrysts (not glomerocrystic),within mesostasis, plagioclase, and clinopyroxene.
GROUNDMASS						
Plagioclase	20-30	20-30	up to 1.1	An 45-70	euhedral - subhedral	elongated tabular habit; normal zoning in larger crystals
Augite	10-15	10-15	up to 0.5		subhedral	equant, smaller grains tending to granular and interstitial, occurring in mesostasis.
Magnetite	1-2	1-2	up to 0.02		see comments	larger grains equant forms a variety of grain shapes from granular to rod-like.
Mesostasis	10	40-45	n/a		interstitial	cryptocrystalline, brown with minute magnetite granules when fresh

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Mixed clays	35	vesicles, mesostasis	Partial infilling of vesicles; yellow to reddish brown with variable Fe-oxide staining; fibrous to globular vesicle linings; yellow-brown cryptocrystalline in partial replacement of matrix

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	10	disseminated	up to 1	fibrous to globular linings	rounded to irregular and elongated

COMMENTS: Globular areas, up to 3.5 mm diameter, occur. These show quenching textures (e.g. skeletal plagioclase microlites, microcrystalline feathery and skeletal groundmass, and skeletal and feathery Fe-oxide growths) and vesicles up to 2 mm diameter (i.e. bigger than in main part of rock). Their contacts grade rapidly into enclosing rock matrix. It is not clear whether these represent early vesicle infillings or some form of inclusion. These correspond to the darker gray globular patches seen in hand speciman. A 1054 point count yields: 5.3% plagioclase phenocrysts (defined as > 200 microns) 0.7% clinopyroxene phenocrysts;2.3% magnetite microphenocrysts, 22.4% groundmass plagioclase; 12.7% groundmass clinopyroxene; 0.1% groundmass olivine; 0.6% groundmass opaques; 43.6% mesostasis; 5.9% filled vesicles; 6.3% open vesicles. There is a complete gradation from the larger (typically up to 1 mm) plagioclase down to the smallest. The rock is moderately to highly (?) altered.

135-834B-49R-01 (Piece 16,135-136 cm) OBSERVER: EWE WHERE SAMPLED: Unit 12

ROCK NAME: Moderately to highly phyric clinopyroxene plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Seriate to weakly porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	5-10	5-10	0.7-2.2	An 70	euhedral, elongated, tabular	show normal zoning (about 10 An) across crystals
Clinopyroxene	3-5	3-5	0.2-0.35		subhedral, equant	many crystals show shadowy extinction and bent cleavage
Magnetite	tr	tr	0.05-0.2		euhedral-subhedral	some magnetite is skeletal. Growth is generally in clusters (not glomerocrysts) and are included in the mesostasis, plagioclase and clinopyroxene.
GROUNDMASS						
Plagioclase	35	35	up to 0.7	An 50	euhedral - subhedral	elongated laths, normally zoned
Clinopyroxene	10	10	up to 0.2		subhedral to anhedral	interstitial to plagioclase; rarely to partially ophitic
Magnetite	3	3	up to 0.02		anhedral- granular	often strongly elongated to rod-like aggregates; some grains show trellis structure
Mesostasis	0	30	n/a		interstitial	green-brown mixed clays: fibrous and radiative; may represent alteration of original volcanic glass

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Mixed clays	30	mesostasis/vesicles	vesicles have linings of clays rather than complete fillings; same material composes altered groundmass

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	10	disseminated	to 0.5	radiating fiborus to spherulitic	rounded to elongated

COMMENTS: Gradation between phenocrystal and groundmass sized crystals, making distinction somewhat arbitrary. Similarly, the distinction between partially filled vesicles and mesostasis is blurred. The rock is moderately altered.

135-834B-56R-01 (Piece 2,7-9 cm) OBSERVER: EWE WHERE SAMPLED: Unit 12

ROCK NAME: Sparsely phyric olivine clinopyroxene plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Porphyritic, seriate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagiocalse	0.7	0.7	0.5-1.0	An70	euhedral-subhedral	randomly oriented, mostly discrete elongated, tabular crystals; zoning is not strongly defined optically except on rims (more sodic)
Clinopyroxene	0.7	0.7	0.2-0.4		subhedral	isolated crystals and also some with partly included plagioclase laths
Olivine	0.6	0.6	0.2-0.9		euhedral to subhedral	some crystals skeletal; altered partially to iddingsite; partially included plagioclase laths.
Magnetite	0.7	0.7	0.05-0.2		euhedral	localized concentrations of microphenocryts, enclosed by mesostasis, plagioclase, and clinopyroxene crystals
GROUNDMASS						
Plagioclases	19.9	19.9	<0.5	An70	euhedral-subhedral	elongated laths to small microlites; some of latter show swallowtail form
Clinopyroxene	3.0	3.9	<0.2		subhedral-anhedral	mostly intergrown with plagioclase; smaller grains interstitial.
Olivine	1.8	1.8	<0.2		subhedral-anhedral	interstitial
Magnetite	2.0	2.0	<0.02		subhedral-anhedral	granular to rod-like and trellis aggregates in mesostasis
Mesostasis	52.1	52.1	n/a		interstitial	dark brown cryptocrystalline to microcrystalline. Some very fine poyroxene-plagioclase acicular intergrowths

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
?mixed clays	0.8	localized linings	yellow brown to reddish brown fibrous growths. Associated with microfractures. Oxidizes to reddish Fe-oxyhydroxides.
Iddingsite			partial alteration of olivine

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	17.8	disseminated	0.05-0.3	rare lining	subrounded to coalescing	excluding vesicles in globular blebs

COMMENTS: Presence of globular vesicular patches in up to 3 mm vesicles. These are almost devoid of well-defined groundmass crystal phases; just finely quenched matrix. Diameter of 'globules' up to 4 mm. Phenocryst sized crystals grade down into microphenocryst and groundmass sized crystals. The distinction between phenocrysts and groundmass is thus in part arbitrary. 1051 point count by EWE: plagioclase phenocrysts 0.7%; clinopyroxene phenocrysts 0.7%; olivine phenocrysts 0.6%; Cr-spinel 0.7%; plagioclase groundmass 19.9%; clinopyroxene groundmass 3.0%; olivine groundmass 1.8%; magnetite 2.0%; mesostasis 52.1%; vesicles -open 17.8%; vesicles -filled 0.8%; vesicles total 18.6%; Rock is fresh.

135-834B-57R-01 (Piece 13,64-65 cm) OBSERVER: EWE WHERE SAMPLED: Unit 13

ROCK NAME: Moderately phyric olivine clinopyroxene plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Seriate, porphyritic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	3-5	3-5	0.5-1.0	An75	euhedral-subhedral	tend to occur as glomerocrysts with clinopyroxene and olivine, but also isolated crystals; zoning appears slight.
Olivine	2-3	2-3	0.2-0.6		euhedral- subhedral	equant crystals; isolated crystals and in glomeroporphyritic aggregates; rare incipient iddingsitation
Clinopyroxene	1-2	1-2	0.2-0.6		euhedral-anhedral	rare skeletal crystals; most occur in glomeoporphyritic aggregates with plagioclase in sobophitic form
Magnetite	tr	tr	0.15		euhedral	rare, isolated grains
GROUNDMASS						
Plagioclase	15	15	<0.5	An75	euhedral-subhedral	elongated laths grading to fine grained microlites
Olivine	1-2	1-2	<0.2		anhedral-subhedral	equant, fresh; commonly as isolated grains
Clinopyroxene	5	5	<0.2		subhedral-anhedral	equant, commonly associated with plagioclase
Magnetite	1	1	<0.01-0.05		subhedral-anhedral	restricted to mesostasis; more or less equant granules; most are <0.01 mm
Mesostasis	40	40	n/a		interstitial	dark brown, cryptocrytalline to microcrystalline; complex plagioclase-clinopyroxene intergrowths, typically acicular and feathery aggregates; unaltered

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
?mixed clays	<1	rare fill	rare partial linings; localized along small fractures; radiating and microspherulitic; become deep reddish-brown and near isotropic Fe-oxyhydroxides when oxidized

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	30	disseminated	<1.4	rare	irregular to coalescing	rare partial infillings

COMMENTS: Gradation in crystal sizes from phenocystal through microphenocrystal to coarse groundmass phases. The distinction between phenocrysts and groundmass phases is thus somewhat arbitrary.1076 point count by EWE: plagioclase phenocrysts 2.3%; clinopyroxene phenocrysts 1.3%; olivine phenocrysts 0.9%; plagioclase groundmass 15.4%; clinopyroxene groundmass 5.2%; olivine groundmass 1.4%; magnetite 1.7%; mesostasis 46.4%; vesicles -open 24.2%; vesicles -filled 1.2%; vesicles -total 25.4%. Rock is fresh

135-834B-59R-02 (Piece 2,22-24 cm) OBSERVER: EWE WHERE SAMPLED: Unit 13

ROCK NAME: Moderately phyric olivine clinopyroxene plagioclase basalt

GRAIN SIZE: Fine grained

TEXTURE: Porphyritic, seriate

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	2-3	2-3	0.5-1.2	An65-70	euhedral-subhedral	elongated tabular, common in glomeroporphyritic intergrowths with clinopyroxene
Olivine	0.2	0.2	0.2-0.3		euhedral-subhedral	equant, isolated and also intergrown with clinopyroxene and plagioclase in glomerporphyritic aggregates
Clinopyroxene	1-2	1-2	0.2-0.5		subhedral-anhedral	intergrown with plagioclase in glomeroporphyritic aggregates; optically zoned
GROUNDMASS						
Plagioclase	20-25	20-25	<0.5	An60	euhdral-subhedral	elongate laths grading to fine microlites
Clinopyroxene	10-15	10-15	<0.2		subhedral-anhedral	varies from equant to anhedral and interstitial, somtimes in subophitic intergrowths with plagioclase; rare fine grained acicular aggregates.
Olivine	1	1	<0.2		subhedral-anhedral	fine grained, often interstitial grains; trace Cr-spinel to 0.02 mm included in some grains
Magnetite	1-2	1-2	<0.02		anhedral to subhedral	vary from equant to acicular and rod-like aggregates, confined to mesostasis
Mesostasis	20-25	20-25	n/a		interstitial	cryptocrystalline to microcrystalline, brown to yellow brown

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Calcite	<1	fill	localized vesicle infilling, very sporadic occurrence
?mixed clays	<1	fill	very localized vesicle lining; yellow brown, microcrystalline, fibrous to microspherulitic

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	30-35	disseminated	<2mm	rare	subrounded to irregular

COMMENTS: Gradation of crystal sizes from phenocrystal through to microphenocrystal to coarse groundmass phases. The distinction between phenocrysts and groundmass phases is thus arbitrary. 1124 point count by EWE: plagioclase phenocrysts 2.3%; clinopyroxene phenocrysts 2.1%; olivine phenocrysts 0.2%; plagioclase groundmass 23.6%; clinopyroxene groundmass 11.7%; olivine groundmass 1.5%; magnetite 2.7%; mesostasis 24.1%; vesicles -open: 31.4%; vesicles -filled 0.4%; vesicles -total 31.8%. Rock is fresh.