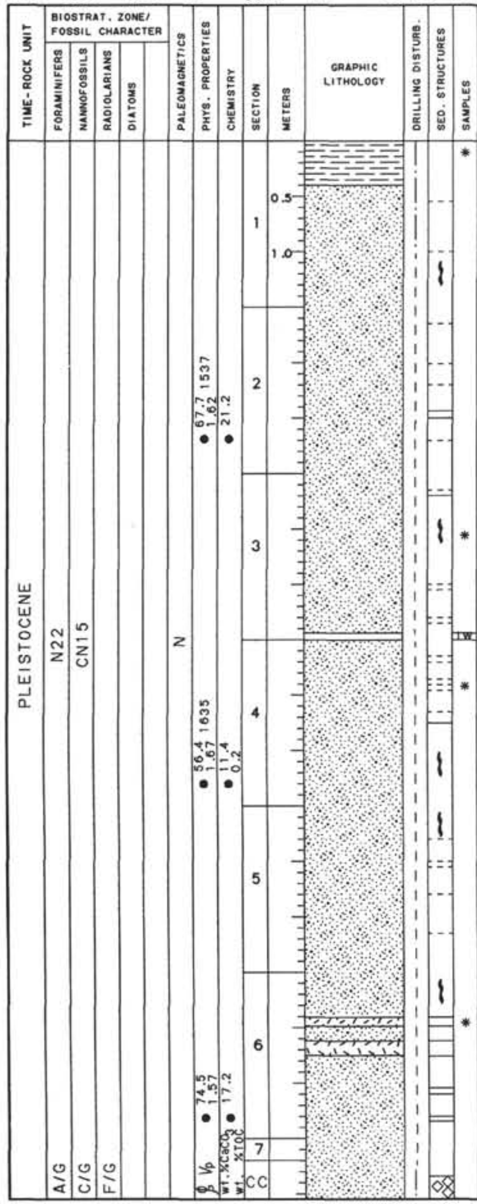
SITE 833 HOLE A CORE 1H CORED INTERVAL 0.0-9.5 mbsf



LITHOLOGIC DESCRIPTION

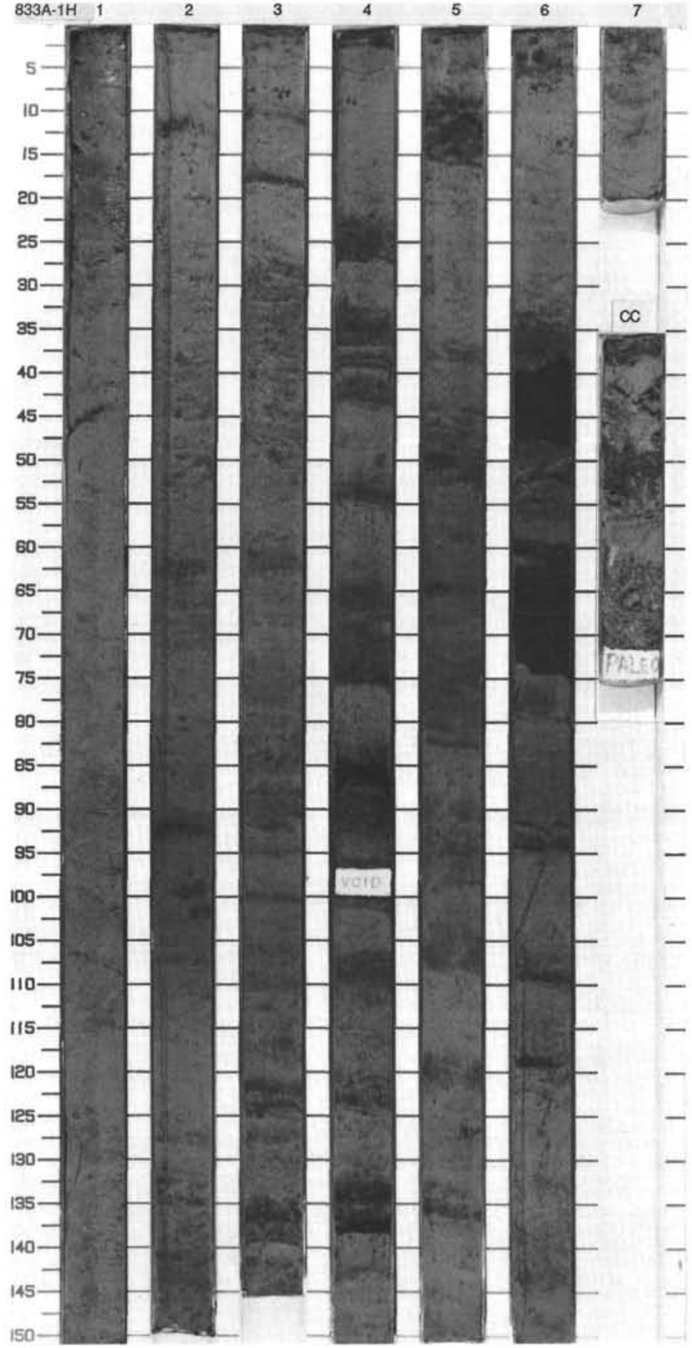
SANDY VOLCANIC SILT

Major lithology: Most of this core is unlithified, dark greenish gray (10Y 4/1) SANDY VOLCANIC SILT with clay, foraminifers, glass, nannofossils, and calcareous grains.

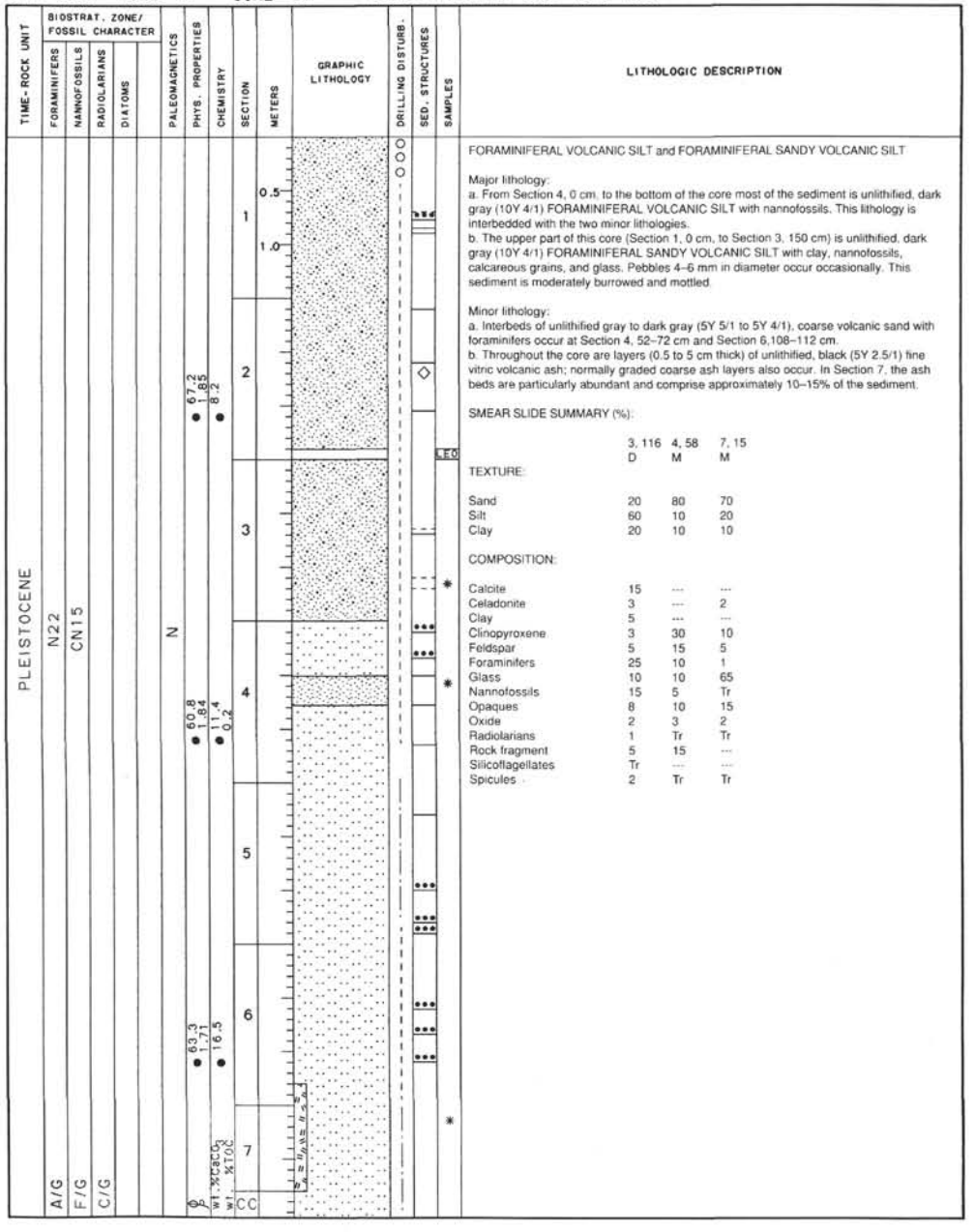
Minor lithology:
a. Section 1, 0-40 cm, is unlithified clayey volcanic silt with sand, foraminifers, and calcareous grains. It is brown (10YR 4/3) at the surface and grades down to dark greenish gray (10Y 4/1).
b. Interbedded throughout the core are silt to coarse sand-sized layers of black (5Y 2.5/1) vitric volcanic ash. Some layers have up to 10% calcareous grains. These ash beds range from 0.5 to 12 cm in thickness (e.g. Section 6, 62–74 cm) and may contain foraminifers. Some layers are dark greenish gray (5GY 4/1) and up to 2 cm in thickness. These were not specifically identified as ash layers.

SMEAR SLIDE SUMMARY (%):

	1, 10	3, 57	4, 41	6, 45
	D	D	M	M
TEXTURE:				
Sand	20	30	30	95
Silt	50	50	50	4
Clay	30	20	20	1
COMPOSITION:				
Calcite	20	10	10	---
Celadonite	---	---	---	5
Chlorite	---	---	2	---
Clay	25	10	15	1
Clinopyroxene	---	3	Tr	5
Diatoms	---	2	---	---
Feldspar	8	5	15	10
Foraminifers	20	20	1	1
Glass	2	15	30	50
Nannofossils	2	10	5	---
Olivine	2	Tr	---	---
Opaques	8	15	10	20
Orthopyroxene	---	---	5	---
Oxide	2	2	2	5
Radiolarians	5	2	Tr	---
Silicoflagellates	Tr	---	---	---
Spicules	2	2	1	---



SITE 833 HOLE A CORE 2H CORED INTERVAL 9.5-19.0 mbsf



LITHOLOGIC DESCRIPTION

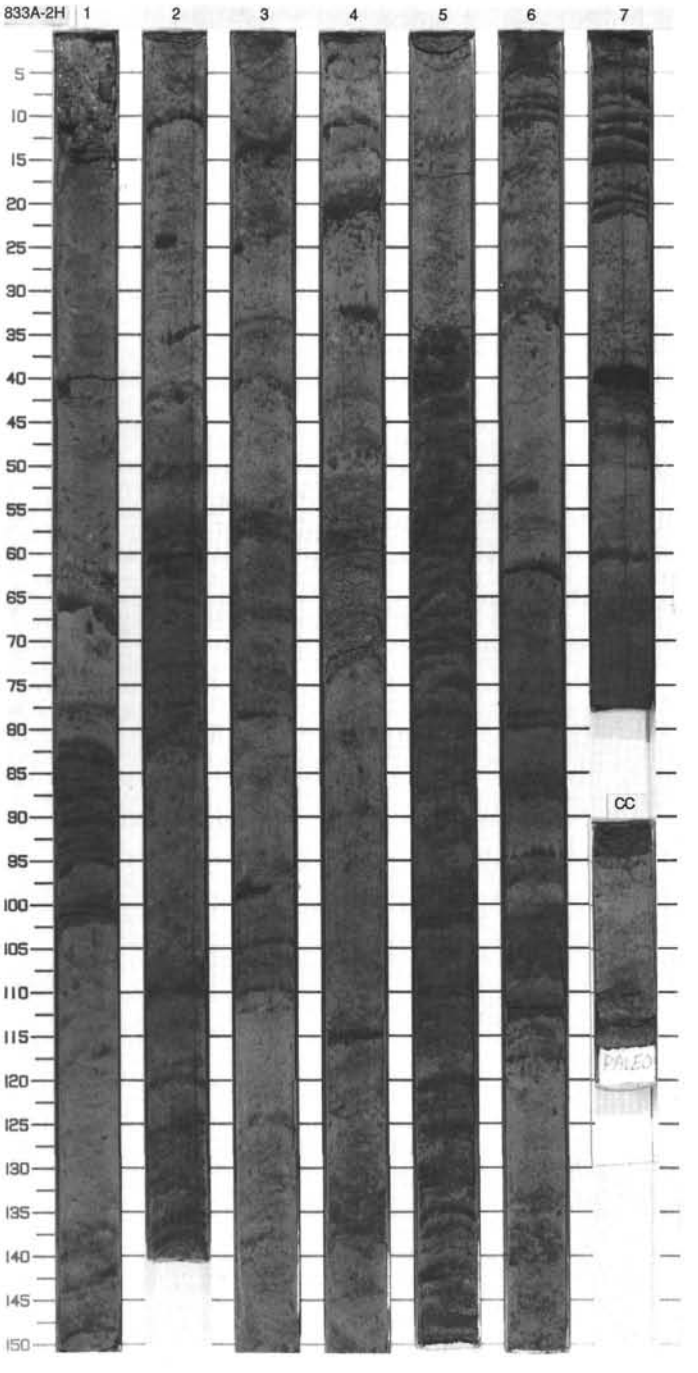
FORAMINIFERAL VOLCANIC SILT and FORAMINIFERAL SANDY VOLCANIC SILT

Major lithology:
a. From Section 4, 0 cm, to the bottom of the core most of the sediment is unlithified, dark gray (10Y 4/1) FORAMINIFERAL VOLCANIC SILT with nannofossils. This lithology is interbedded with the two minor lithologies.
b. The upper part of this core (Section 1, 0 cm, to Section 3, 150 cm) is unlithified, dark gray (10Y 4/1) FORAMINIFERAL SANDY VOLCANIC SILT with clay, nannofossils, calcareous grains, and glass. Pebbles 4–6 mm in diameter occur occasionally. This sediment is moderately burrowed and mottled.

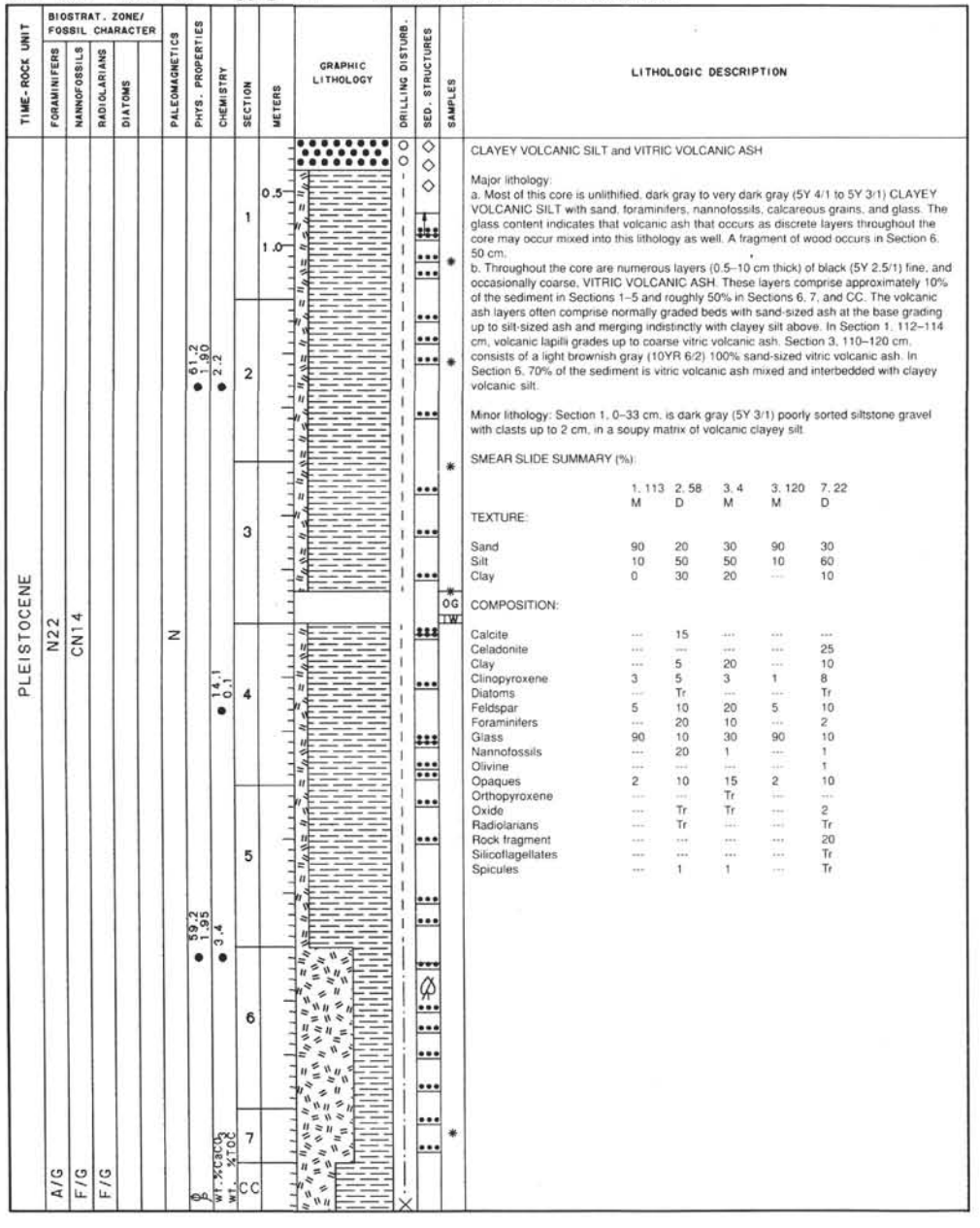
Minor lithology:
a. Interbeds of unlithified gray to dark gray (5Y 5/1 to 5Y 4/1), coarse volcanic sand with foraminifers occur at Section 4, 52–72 cm and Section 6,108–112 cm.
b. Throughout the core are layers (0.5 to 5 cm thick) of unlithified, black (5Y 2.5/1) fine vitric volcanic ash; normally graded coarse ash layers also occur. In Section 7, the ash beds are particularly abundant and comprise approximately 10–15% of the sediment.

SMEAR SLIDE SUMMARY (%):

	3, 116 D	4, 58 M	7, 15 M
TEXTURE:			
Sand	20	80	70
Silt	60	10	20
Clay	20	10	10
COMPOSITION:			
Calcite	15	---	---
Celadonite	3	---	2
Clay	5	---	---
Clinopyroxene	3	30	10
Feldspar	5	15	5
Foraminifers	25	10	1
Glass	10	10	65
Nannofossils	15	5	Tr
Opaques	8	10	15
Oxide	2	3	2
Radiolarians	1	Tr	Tr
Rock fragment	5	15	---
Silicoflagellates	Tr	---	---
Spicules	2	Tr	Tr



SITE 833 HOLE A CORE 3H CORED INTERVAL 19.0-28.5 mbsf



LITHOLOGIC DESCRIPTION

CLAYEY VOLCANIC SILT and VITRIC VOLCANIC ASH

Major lithology:

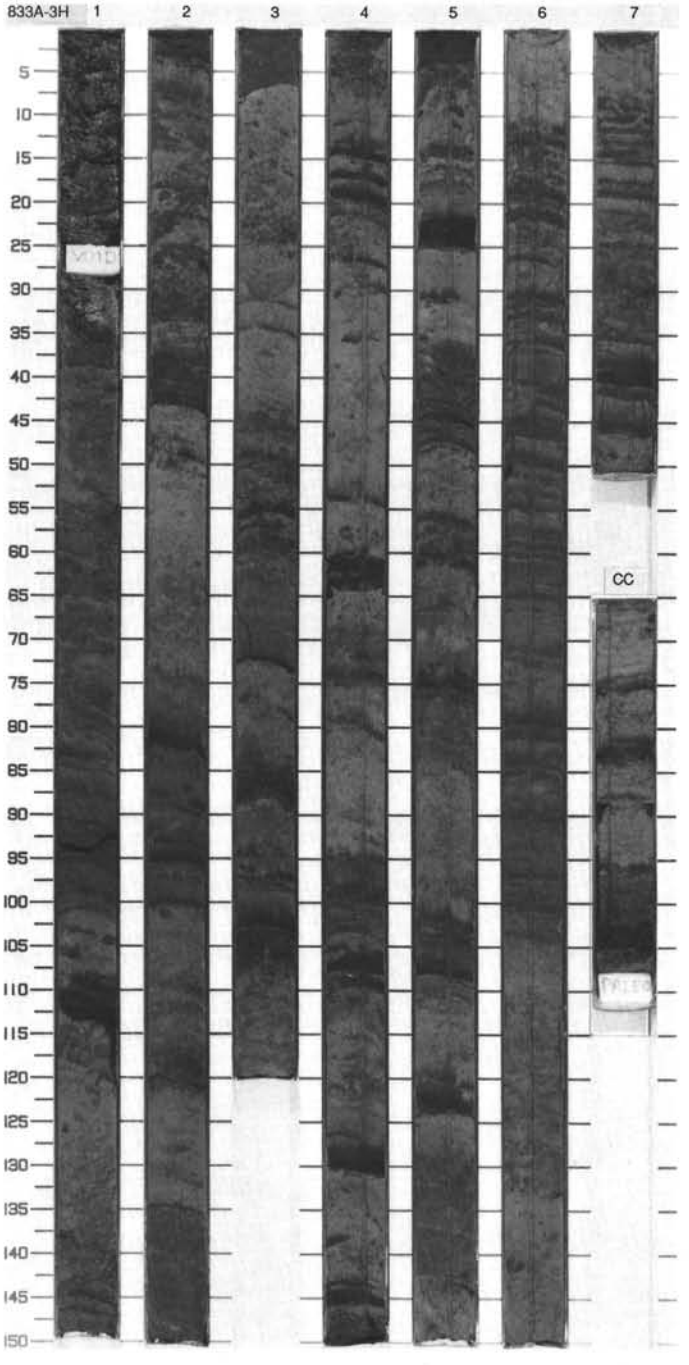
a. Most of this core is unlithified, dark gray to very dark gray (5Y 4/1 to 5Y 3/1) CLAYEY VOLCANIC SILT with sand, foraminifers, nannofossils, calcareous grains, and glass. The glass content indicates that volcanic ash that occurs as discrete layers throughout the core may occur mixed into this lithology as well. A fragment of wood occurs in Section 6, 50 cm.

b. Throughout the core are numerous layers (0.5–10 cm thick) of black (5Y 2.5/1) fine, and occasionally coarse, VITRIC VOLCANIC ASH. These layers comprise approximately 10% of the sediment in Sections 1–5 and roughly 50% in Sections 6, 7, and CC. The volcanic ash layers often comprise normally graded beds with sand-sized ash at the base grading up to silt-sized ash and merging indistinctly with clayey silt above. In Section 1, 112–114 cm, volcanic lapilli grades up to coarse vitric volcanic ash. Section 3, 110–120 cm, consists of a light brownish gray (10YR 6/2) 100% sand-sized vitric volcanic ash. In Section 6, 70% of the sediment is vitric volcanic ash mixed and interbedded with clayey volcanic silt.

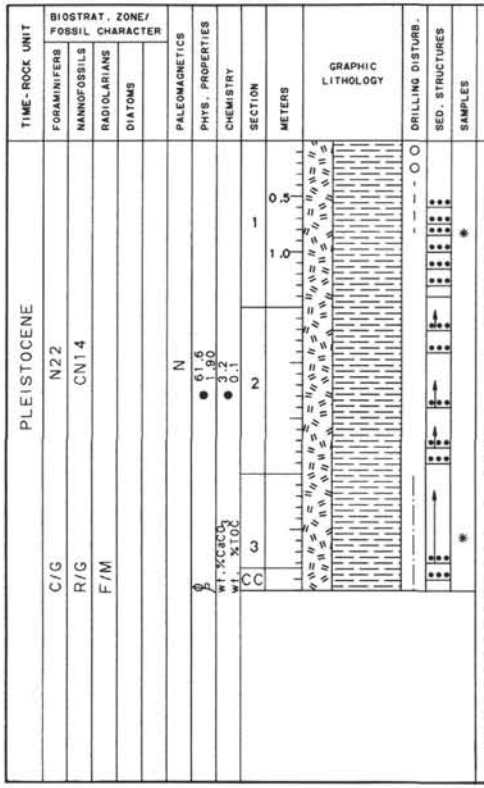
Minor lithology: Section 1, 0–33 cm, is dark gray (5Y 3/1) poorly sorted siltstone gravel with clasts up to 2 cm, in a soupy matrix of volcanic clayey silt.

SMEAR SLIDE SUMMARY (%):

	1, 113 M	2, 58 D	3, 4 M	3, 120 M	7, 22 D
TEXTURE:					
Sand	90	20	30	90	30
Silt	10	50	50	10	60
Clay	0	30	20	---	10
COMPOSITION:					
Calcite	---	15	---	---	---
Celadonite	---	---	---	---	25
Clay	---	5	20	---	10
Clinopyroxene	3	5	3	1	8
Diatoms	---	Tr	---	---	Tr
Feldspar	5	10	20	5	10
Foraminifers	---	20	10	---	2
Glass	90	10	30	90	10
Nannofossils	---	20	1	---	1
Olivine	---	---	---	---	1
Opaques	2	10	15	2	10
Orthopyroxene	---	---	Tr	---	---
Oxide	---	Tr	Tr	---	2
Radiolarians	---	Tr	---	---	Tr
Rock fragment	---	---	---	---	20
Silicoflagellates	---	---	---	---	Tr
Spicules	---	1	1	---	Tr



SITE 833 HOLE A CORE 4H CORED INTERVAL 28.5-32.6 mbsf



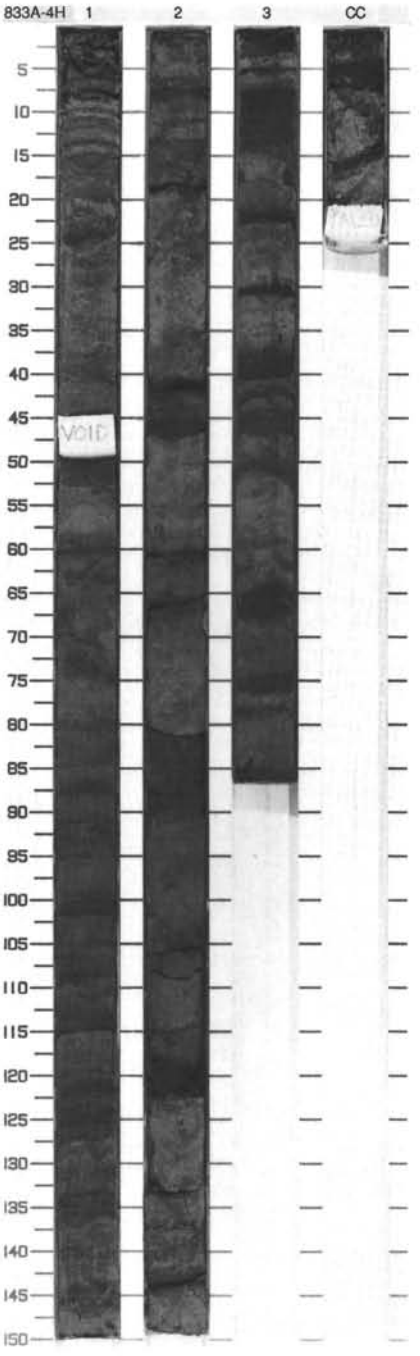
LITHOLOGIC DESCRIPTION

CLAYEY VOLCANIC SILT and VITRIC VOLCANIC ASH

Major lithology:
a. About 75% of this core is unlithified, dark gray to very dark gray (5Y 4/1 to 5Y 3/1) and dark greenish gray (10Y 4/1), CLAYEY VOLCANIC SILT with sand, foraminifers, nannofossils, and glass. The glass in this lithology suggests that the volcanic ash that occurs as discrete layers throughout the core may occur mixed into this lithology as well.
b. Throughout the core are numerous layers (0.5 to 11 cm thick) of black (5Y 2.5/1) fine, and occasionally coarse, VITRIC VOLCANIC ASH. These layers comprise approximately 25% of the core. The volcanic ash layers often comprise normally graded beds with sand-sized ash at the base grading up to silt-sized ash and merging indistinctly with the main lithology above.

SMEAR SLIDE SUMMARY (%):

	1, 82 M	3, 58 D
TEXTURE:		
Sand	30	20
Silt	50	60
Clay	20	20
COMPOSITION:		
Clay	---	15
Clinopyroxene	5	Tr
Diatoms	Tr	---
Feldspar	8	20
Foraminifers	---	15
Glass	80	15
Nannofossils	---	15
Olivine	---	5
Opaques	5	10
Orthopyroxene	---	Tr
Oxide	2	2
Radiolarians	Tr	---
Rock fragment	---	---
Silicoflagellates	Tr	---
Spicules	Tr	Tr



SITE 833 HOLE A CORE 5H CORED INTERVAL 32.6-39.2 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	C/G N22	F/G CN14	B		N	1549 ● 55.8 1.98 0.2 1540 62.0 1.84 8.3 ●	● 1.00 wt. %CaCO3 wt. %TOC	1 2 3 4 5	0.5 1.0				

LITHOLOGIC DESCRIPTION

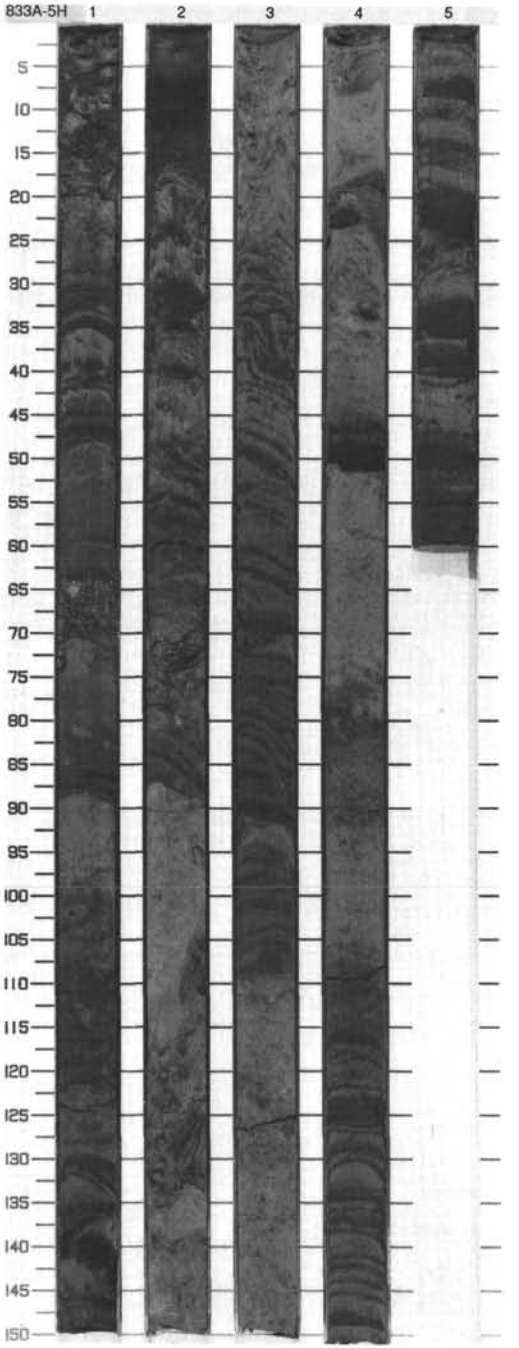
CLAYEY VOLCANIC SILT

Major lithology: Most of the core consists of dark to very dark gray (5Y 4/1 to 5Y 3/1) CLAYEY VOLCANIC SILT. Some silt beds up to ~50 cm thick are structureless and bioturbated, but most silt beds are 2–10 cm thick, with numerous normally graded interbeds of fine-grained vitric ash, 0.2–5 cm thick. Scattered gravel-sized clasts of siltstone occur throughout the core.

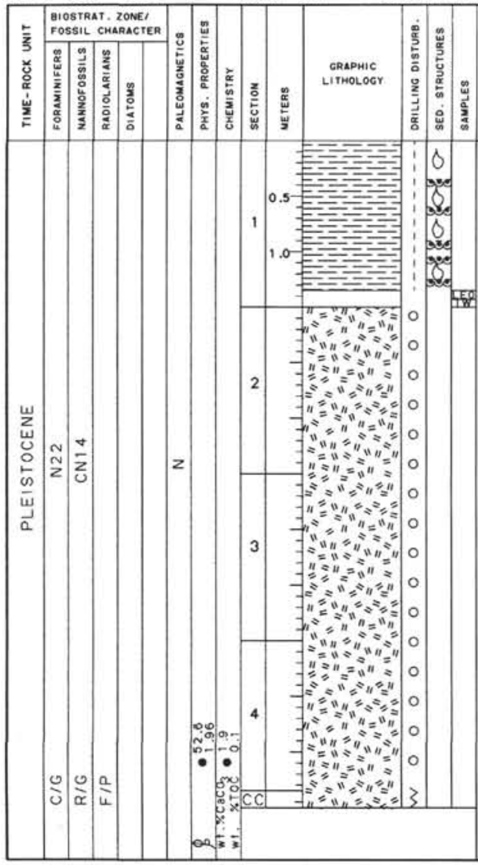
Minor lithology: Section 2, 0–16 cm contains black (5Y 2.5/1) vitric volcanic ash. The ash from 0–6 cm is fine-grained; from 6–16 cm the ash is coarse. In Section 2, the interval from 64–78 cm is rich in foraminifers, and contains gravel-sized clasts of siltstone.

SMEAR SLIDE SUMMARY (%):

	2, 80 D	4, 50 M
TEXTURE:		
Sand	5	60
Silt	60	30
Clay	35	10
COMPOSITION:		
Calcite	1	2
Chlorite	5	2
Clay	35	3
Clinopyroxene	4	6
Feldspar	15	10
Foraminifers	1	1
Glass	5	34
Nannofossils	5	7
Opaques	8	15
Oxide	10	5
Quartz	1	---
Rock fragment	10	15
Spicules	---	Tr



SITE 833 HOLE A CORE 6H CORED INTERVAL 39.2-45.2 mbsf



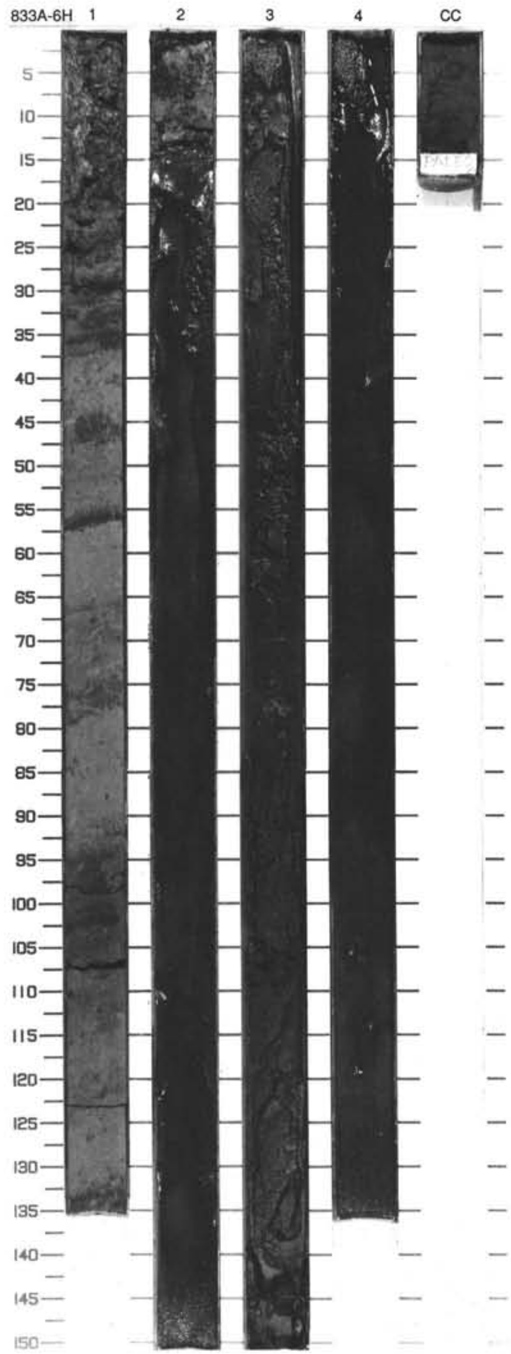
LITHOLOGIC DESCRIPTION

FINE VITRIC VOLCANIC ASH and CLAYEY VOLCANIC SILT

Major lithology:

a. Most of the core consists of black (5Y 2.5/1), soupy, sandy FINE VITRIC VOLCANIC ASH with foraminifers. About 30–40% of the ash grains are sand sized.

b. Section 1 consists of dark gray (5Y 4/1) CLAYEY VOLCANIC SILT with interbeds of volcanic ash. Ash beds are thin (<2 cm), many have scoured bases, and most are normally graded.



SITE 833 HOLE A CORE 7H CORED INTERVAL 45.2-54.0 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	F/G N22	F/G CN14				● 66.1 1532 1.93 ● 9.6 ● 59.7 1565 1.90 ● 60.4 1528 1.82	ϕ Vp ρ wt.%CaCO3	1 2 3 4 5 6 CC	0.5 1.0				*

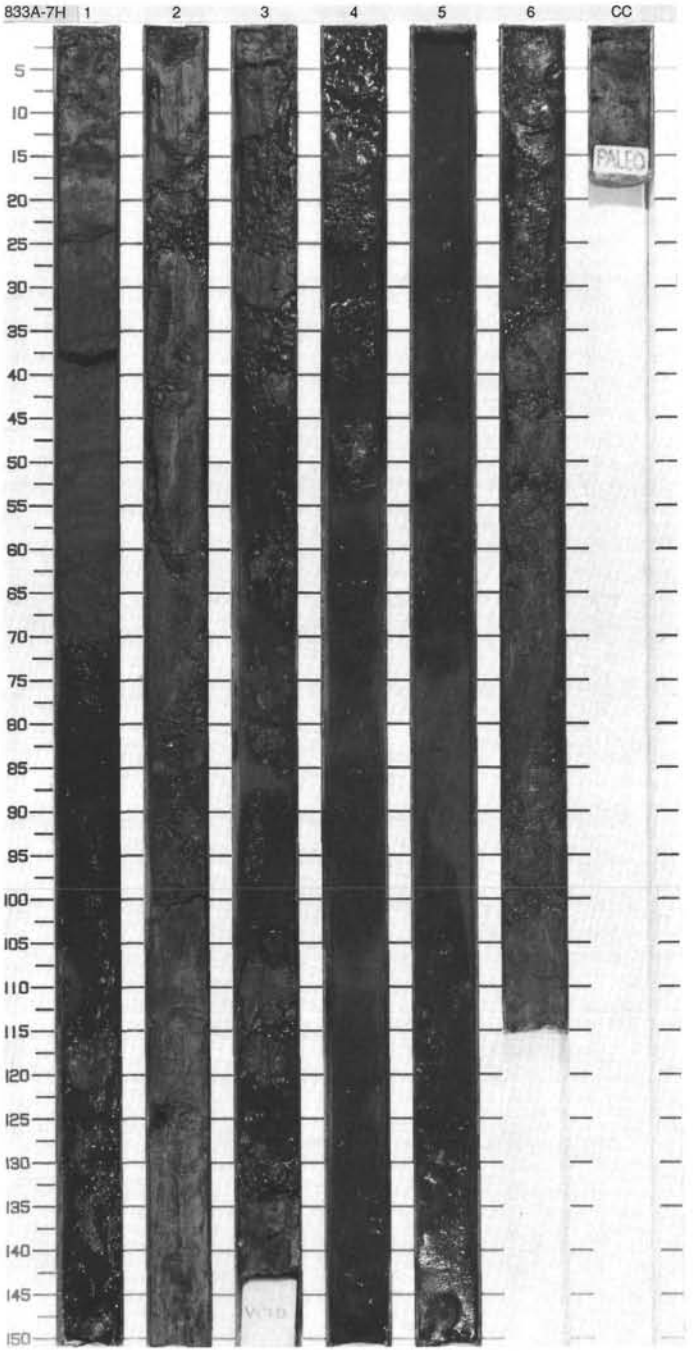
LITHOLOGIC DESCRIPTION

FINE VITRIC VOLCANIC ASH, SILTY VOLCANIC CLAY and CLAYEY VOLCANIC SILT

Major lithology:
a. A little more than half of the core consists of black (5Y 2.5/1), soupy, sandy FINE VITRIC VOLCANIC ASH, often with scattered clasts, <1 cm diameter, of clayey volcanic silt. About 40% of the ash grains are sand sized.
b. Section 1, 117–150 cm, Section 2, and Section 6, consist of thin interbeds of fine vitric volcanic ash in bioturbated and mottled, gray (5Y 5/1) SILTY VOLCANIC CLAY.
c. Dark gray (5Y 4/1) CLAYEY VOLCANIC SILT with interbeds of volcanic ash occurs in Section 1, 0–72 cm, and Section CC. Ash beds are thin (<2 cm), many have scoured bases, and most are normally graded. In Section 3, pods of unlithified (but not soupy), dark gray (5Y 4/1) CLAYEY VOLCANIC SILT occur in intervals 2–8 cm thick.

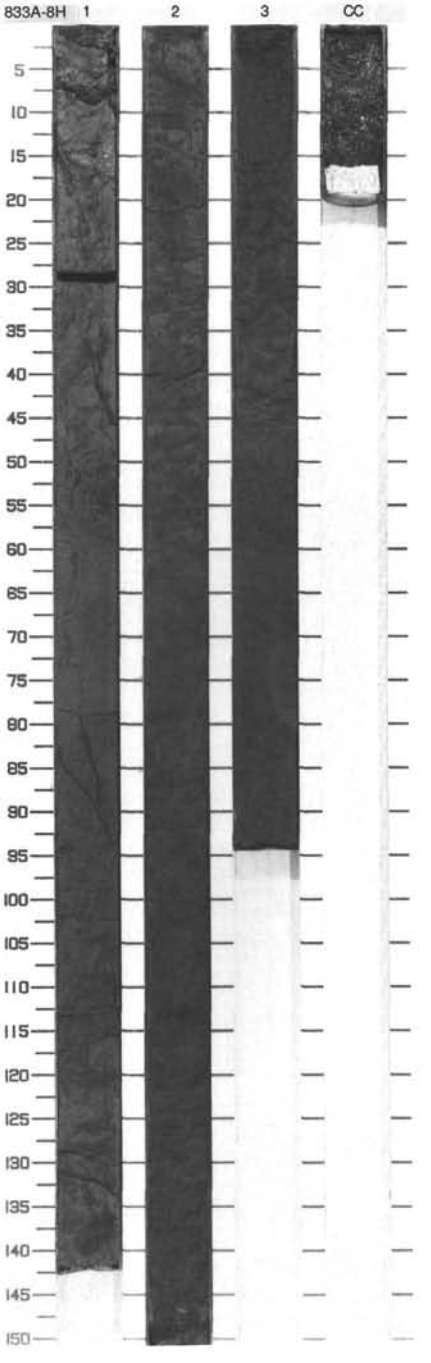
SMEAR SLIDE SUMMARY (%):

	2, 125 M
TEXTURE:	
Sand	40
Silt	50
Clay	10
COMPOSITION:	
Calcite	3
Chlorite	2
Feldspar	12
Foraminifers	2
Glass	41
Nannofossils	10
Olivine	Tr
Opaques	15
Oxide	5
Rock fragment	10



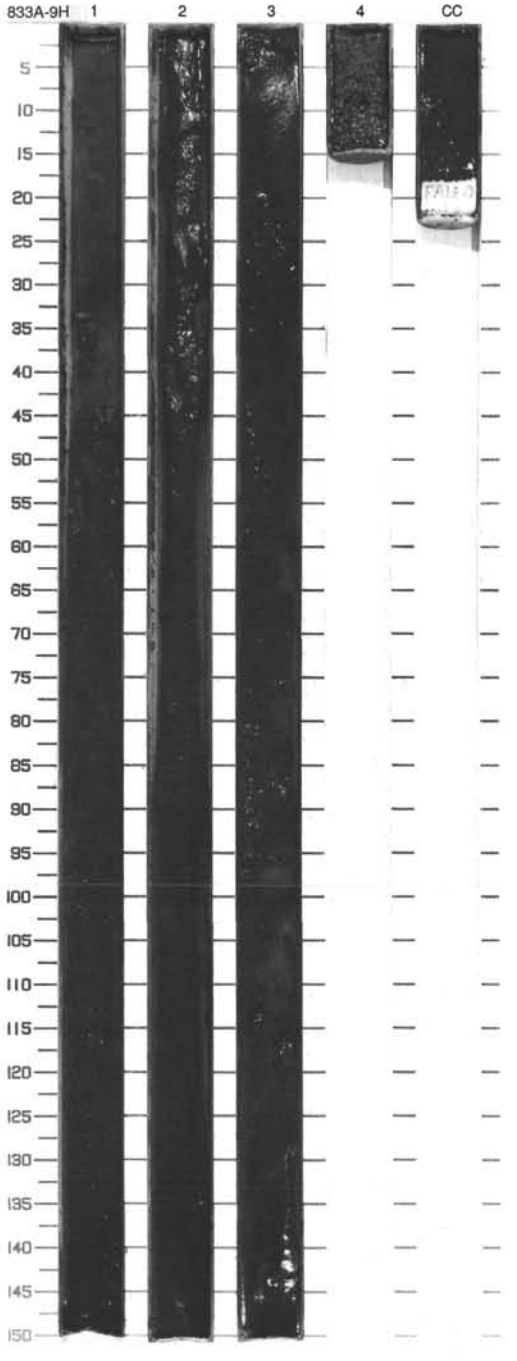
SITE 833 HOLE A CORE 8H CORED INTERVAL 54.0-58.1 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLEISTOCENE	R/G	R/G	B		N	● 58.5 1571 1.85 ● 58.4 1639 1.85	● 4.8 ● 2.8 0.1	1 2 3 CC	0.5 1.0				TW	CLAYEY VOLCANIC SILT and VOLCANIC SILT Major lithology: a. Section 1 and 2 consist of structureless, very dark gray (5Y 3/1), CLAYEY VOLCANIC SILT. Section 1 contains thin (1–2 mm), sub-vertical, sand-filled fractures up to 10 cm long. b. Section 3 and Section CC consist of dark gray (5Y 4/1) VOLCANIC SILT. In Section 3, the silt is slightly sandy.

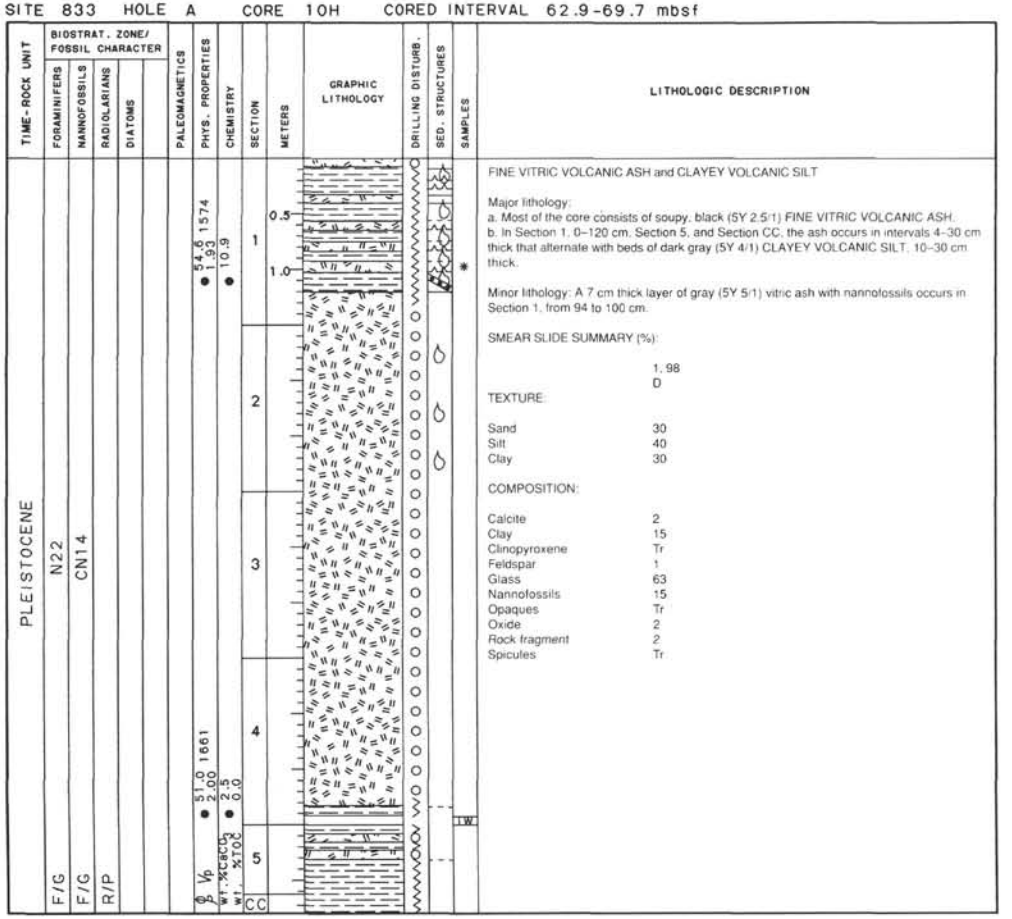


SITE 833 HOLE A CORE 9H CORED INTERVAL 58.1-62.9 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLEISTOCENE	C/G N22	R/G CN14	B			ϕ 54.6 1574 ρ ● 1.93	wt.%CaCO3 ● 2.0	1 2 3 4 CC	0.5 1.0			◇ ◇ ◆ ◆ ◆	*	FINE VITRIC VOLCANIC ASH Major lithology: The core consists of soupy, black (5Y 2.5/1), sandy FINE VITRIC VOLCANIC ASH, with occasional foraminifers. Section 1, 0–40 cm, features 1 cm diameter pumice fragments. Section 1, 60–120 cm, features occasional clasts of gray siltstone. SMEAR SLIDE SUMMARY (%): 2, 17 D TEXTURE: Sand 30 Silt 65 Clay 5 COMPOSITION: Clinopyroxene 6 Feldspar 16 Foraminifers 2 Glass 45 Opaques 18 Oxide 3 Rock fragment 10 Spicules Tr



SITE 833 HOLE A CORE 10H CORED INTERVAL 62.9-69.7 mbsf



LITHOLOGIC DESCRIPTION

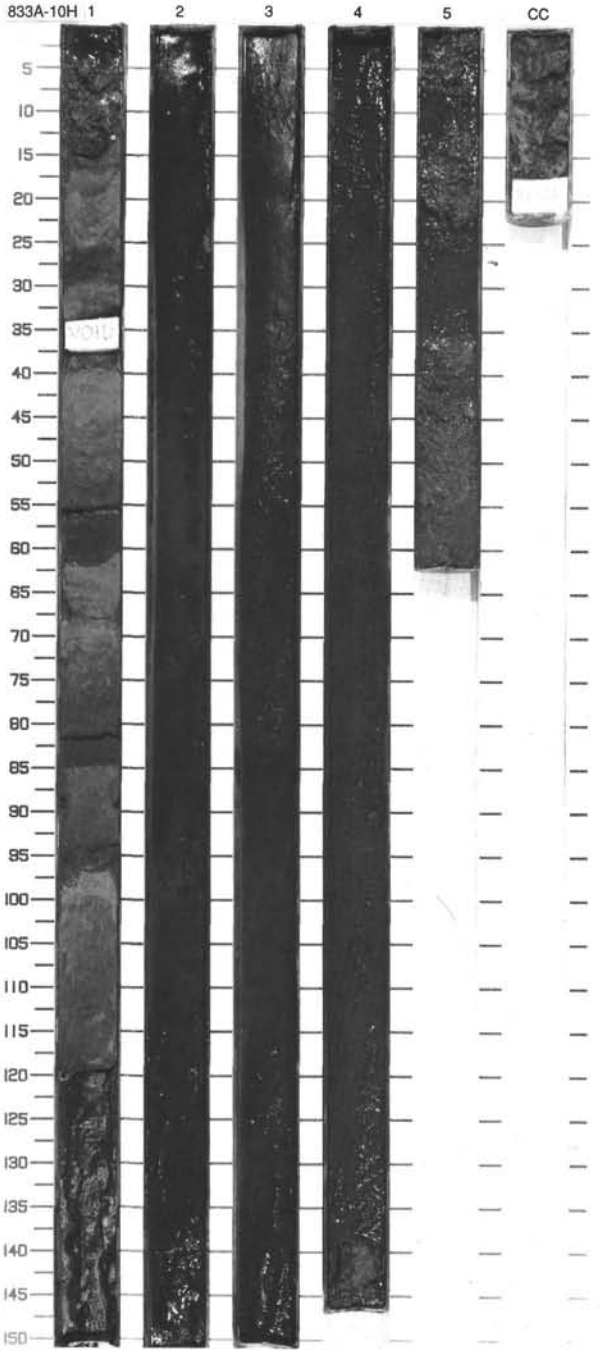
FINE VITRIC VOLCANIC ASH and CLAYEY VOLCANIC SILT

Major lithology:
a. Most of the core consists of soupy, black (5Y 2.5/1) FINE VITRIC VOLCANIC ASH.
b. In Section 1, 0–120 cm, Section 5, and Section CC, the ash occurs in intervals 4–30 cm thick that alternate with beds of dark gray (5Y 4/1) CLAYEY VOLCANIC SILT, 10–30 cm thick.

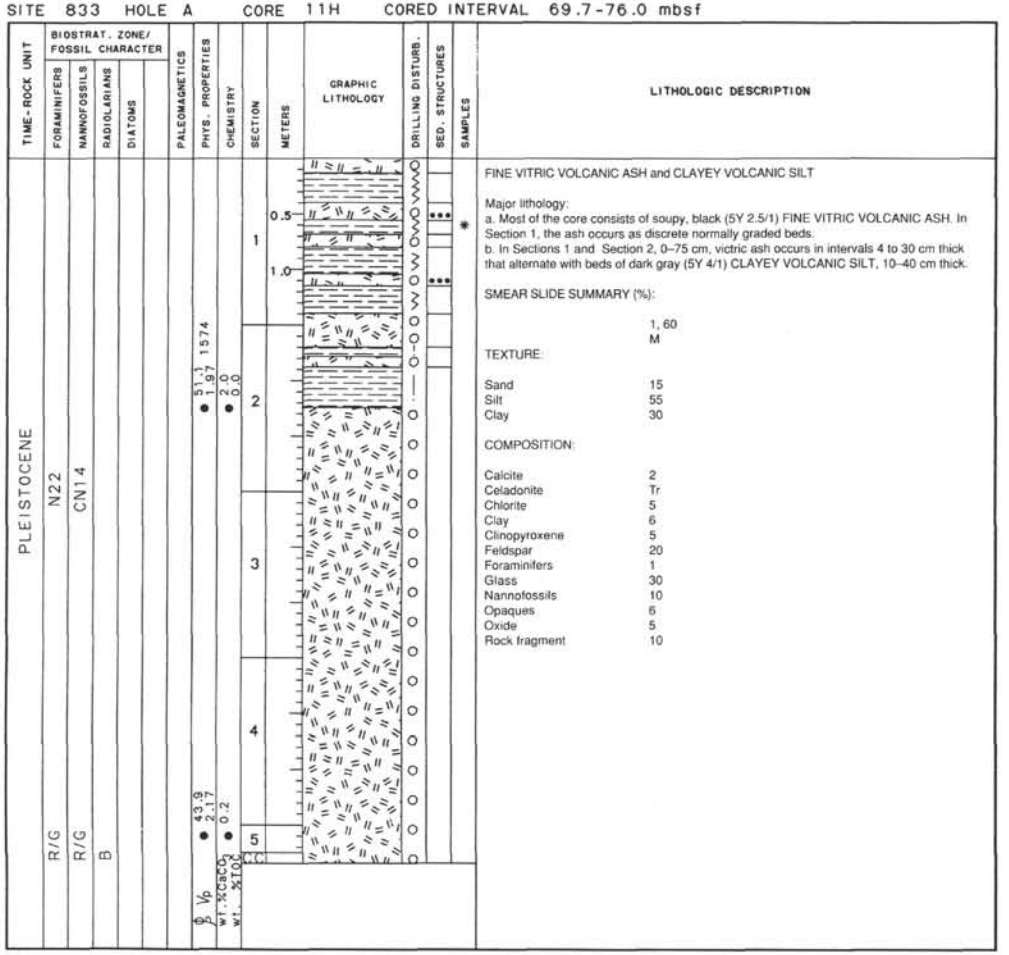
Minor lithology: A 7 cm thick layer of gray (5Y 5/1) vitric ash with nannofossils occurs in Section 1, from 94 to 100 cm.

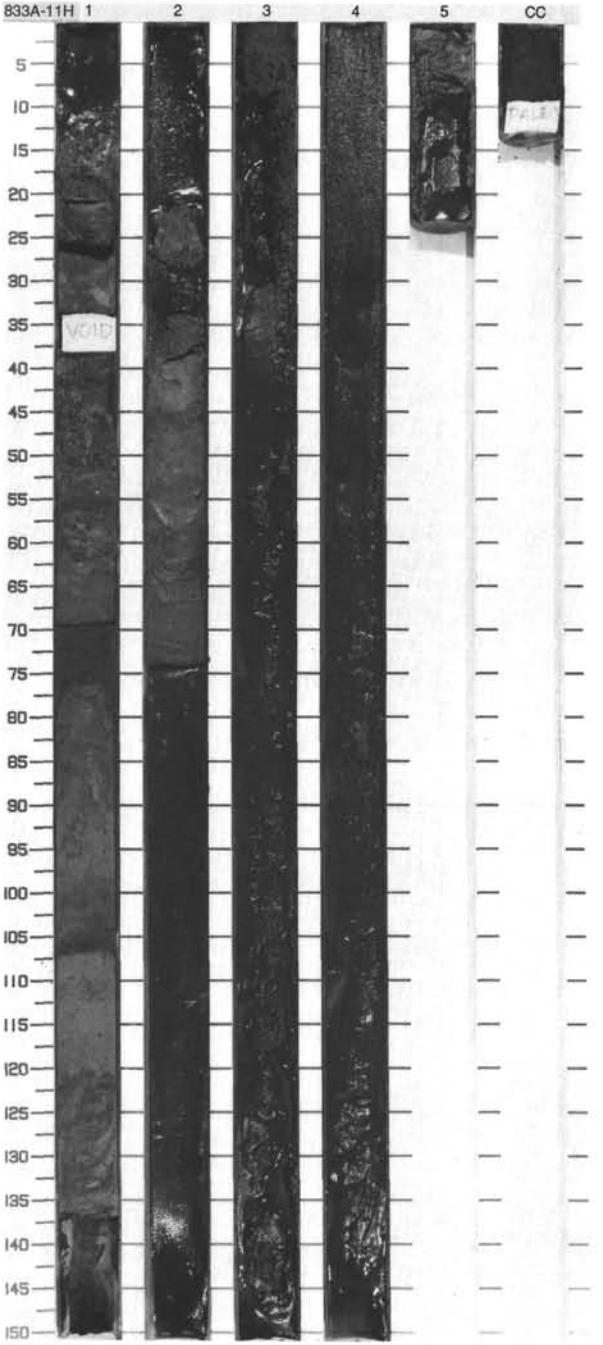
SMEAR SLIDE SUMMARY (%):

	1, 98 D
TEXTURE:	
Sand	30
Silt	40
Clay	30
COMPOSITION:	
Calcite	2
Clay	15
Clinopyroxene	Tr
Feldspar	1
Glass	63
Nannofossils	15
Opaques	Tr
Oxide	2
Rock fragment	*2*
Spicules	Tr



SITE 833 HOLE A CORE 11H CORED INTERVAL 69.7-76.0 mbsf





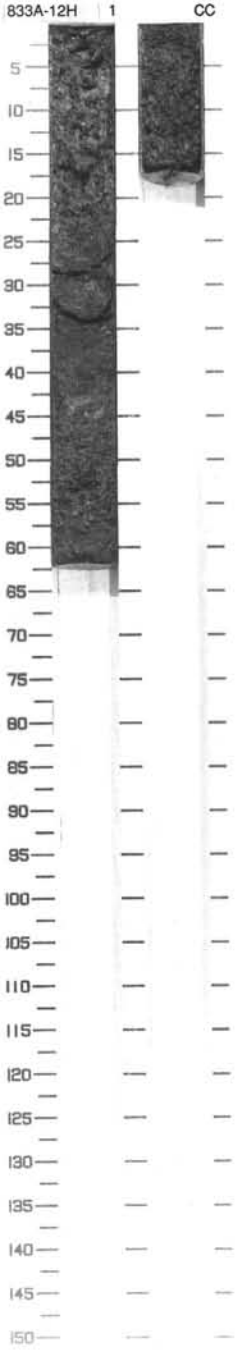
SITE 833 HOLE A CORE 12H CORED INTERVAL 76.0-78.0 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLEISTOCENE	F/G	R/G	B			● 60.9 1.75 ● 3.1 0.2	Wt. %CaCO3 Wt. %TOC	1	0.5					CLAYEY VOLCANIC SILT and FINE VITRIC VOLCANIC ASH

Major lithology:
a. Most of the 82 cm of recovery consists of dark gray (5Y 4/1) CLAYEY VOLCANIC SILT, with a lumpy texture due to the presence of partially lithified, gravel-sized clasts of clayey siltstone.
b. Section 1, 22–40 cm, consists of dark gray (5Y 4/1) FINE VITRIC VOLCANIC ASH.

SMEAR SLIDE SUMMARY (%):

	1, 52 D
TEXTURE:	
Sand	10
Silt	60
Clay	30
COMPOSITION:	
Calcite	2
Chlorite	10
Clay	20
Clinopyroxene	5
Feldspar	18
Glass	7
Nannofossils	10
Opaques	5
Rock fragment	23
Spicules	Tr



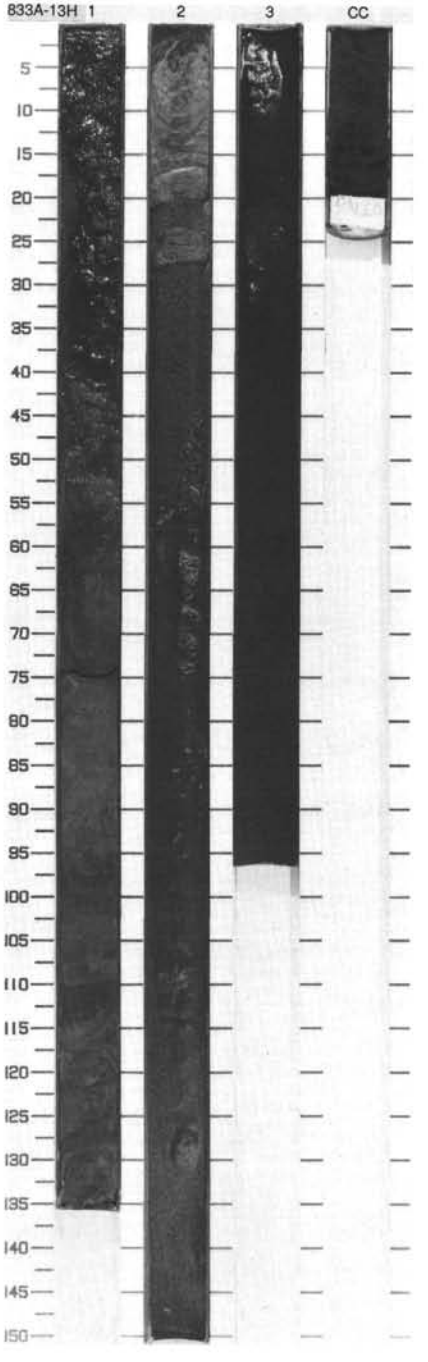
SITE 833 HOLE A CORE 13H CORED INTERVAL 78.0-81.1 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLEISTOCENE	R/G	CN14	B			● 53.6 1571 ● 1.99 ● 1.1		1	0.5 1.0					FINE VITRIC VOLCANIC ASH and CLAYEY VOLCANIC SILT
	N22	R/G						2						Major lithology: a. Most of the core consists of soupy, black (5Y 2.5/1) FINE VITRIC VOLCANIC ASH. b. In Section 1, 50–135 cm, and Section 2, 0–22 cm, the ash occurs in 4 cm thick intervals that alternate with beds of dark gray (5Y 4/1) CLAYEY VOLCANIC SILT, 10–30 cm thick. Section 1, 0–50 cm, is a highly disturbed mixture of FINE VITRIC VOLCANIC ASH and CLAYEY VOLCANIC SILT, with no visible layers.
								3						SMEAR SLIDE SUMMARY (%):
								CC						2, 39 M TEXTURE: Sand 60 Silt 35 Clay 5 COMPOSITION: Clay 5 Clinopyroxene 18 Feldspar 15 Glass 10 Olivine 4 Opaques 20 Orthopyroxene 2 Rock fragment 26

Φ Vp ρ wt. %CaCO3 wt. %TOC
● 47.3 2.15 ● 0.2 0.0

SITE 833 HOLE A CORE 14X CORED INTERVAL 81.1-84.0 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLEISTOCENE	C/G	R/G						1	0.5 1.0					Only 3 cm of sediment were recovered, and all was taken to the Paleontology Laboratory.
	N22	CN14												



SITE 833 HOLE A CORE 15X CORED INTERVAL 84.0-93.7 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	B	R/G CN14				● 54.7 ● 1.87 1621 (φ ρ Vp)	● 3.4 0.2 (wt.%CaCO3 wt.%TOC)	CC					

LITHOLOGIC DESCRIPTION

CLAYEY VOLCANIC SILT

Major lithology: The 19 cm of recovered sediment consists of very dark gray (5Y 3/1) CLAYEY VOLCANIC SILT.

SITE 833 HOLE A CORE 16X CORED INTERVAL 93.7-103.3 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	N22	CN14				● 65.1 1.78 1656	● 23.2 0.4	1	0.5 1.0				
						● 62.7 1.84	● 10.1	2					*
	R/G	F/G	B					3					IW
						(φ ρ Vp)	(wt.%CaCO3 wt.%TOC)	CC					

LITHOLOGIC DESCRIPTION

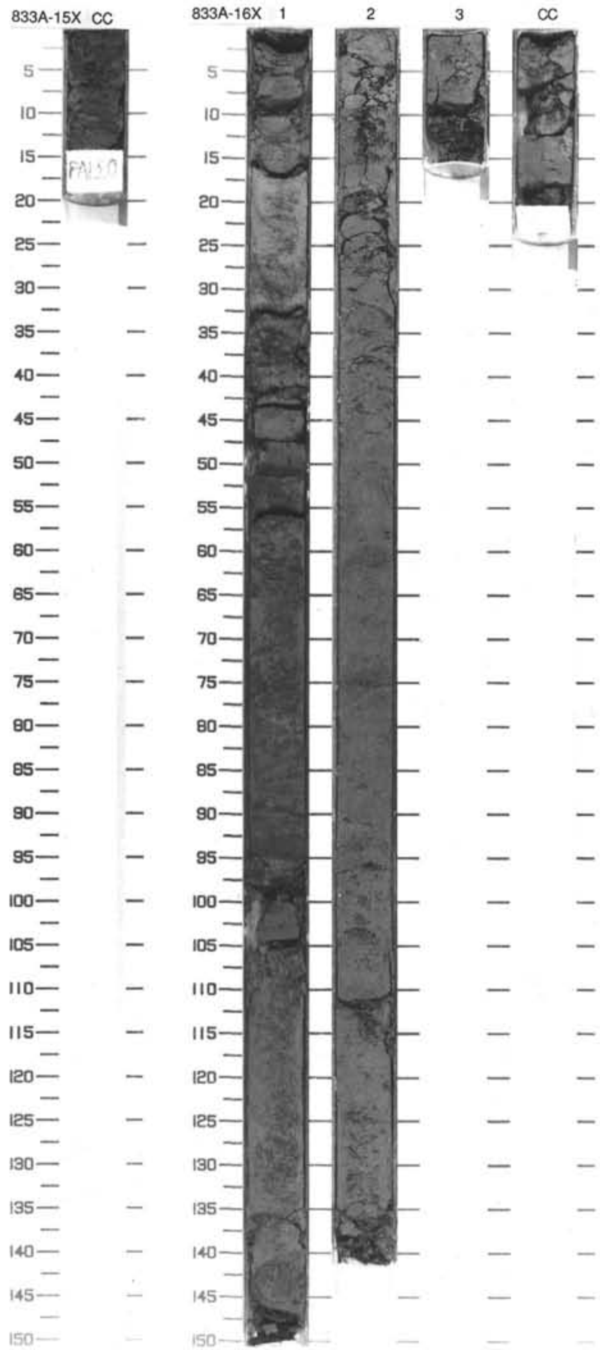
SILTY VOLCANIC CLAY and CLAYEY NANNOFOSSIL MIXED SEDIMENTARY ROCK

Major lithology:
a. Section 1 consists of dark gray to very dark gray (5Y 4/1 to 5Y 3/1) SILTY VOLCANIC CLAY with 6 scattered fragments of CLAYEY NANNOFOSSIL MIXED SEDIMENTARY ROCK, 2–3 cm thick, that appear to be from the other major lithology in this core.
b. Section 2 and Section CC consist of partially lithified, gray (5Y 4/1), CLAYEY NANNOFOSSIL MIXED SEDIMENTARY ROCK with some laminae.

Minor lithology: Black (5Y 2.5/1) interbeds of fine volcanic ash occur in Section 1 at 33–38 cm and 92–95 cm.

SMEAR SLIDE SUMMARY (%):

	2, 54 D
TEXTURE:	
Sand	2
Silt	20
Clay	78
COMPOSITION:	
Calcite	10
Chlorite	5
Clay	20
Clinopyroxene	5
Feldspar	8
Glass	5
Nannofossils	30
Opaques	7
Oxide	10



SITE 833 HOLE A CORE 17X CORED INTERVAL 103.3-113.0 mbsf

Time-rock unit	Foraminifers	Nannofossils	Radiolarians	Diatoms	Paleomagnetics	Phys. properties	Chemistry	Section	Meters	Drilling disturb.	Sed. structures	Samples
PLEISTOCENE	N22, F/G	CN14, F/G						CC				*

LITHOLOGIC DESCRIPTION

CLAYEY NANNOFOSSIL MIXED SEDIMENTARY ROCK

Major lithology: The core consists of dark gray (5Y 4/1) CLAYEY NANNOFOSSIL MIXED SEDIMENTARY ROCK. Contorted bedding occurs from 20 to 23 cm, and the interval from16 to 43 cm contains very thin-bedded laminae. Cross bedding occurs at 40 cm.

SMEAR SLIDE SUMMARY (%):

	CC, 21
	D
TEXTURE:	
Sand	5
Silt	15
Clay	80
COMPOSITION:	
Calcite	5
Chlorite	5
Clay	20
Clinopyroxene	2
Feldspar	8
Glass	3
Nannofossils	47
Opaques	5
Oxide	5

SITE 833 HOLE A CORE 18X CORED INTERVAL 113.0-122.6 mbsf

Time-rock unit	Foraminifers	Nannofossils	Radiolarians	Diatoms	Paleomagnetics	Phys. properties	Chemistry	Section	Meters	Drilling disturb.	Sed. structures	Samples
PLEISTOCENE	N22, R/G	CN14, F/G				Φ 60.8, ρ 1.82, Vp 1755	wt.% $CaCO_3$ 11.3, wt.% TOC 0.2	CC				*

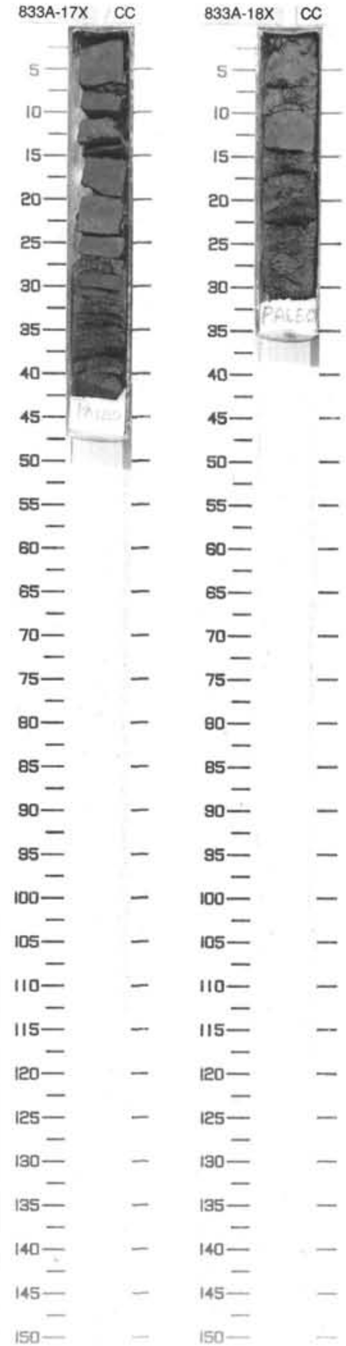
LITHOLOGIC DESCRIPTION

CLAYEY NANNOFOSSIL MIXED SEDIMENTARY ROCK

Major lithology: The core consists of dark gray (5Y 4/1), fissile CLAYEY NANNOFOSSIL MIXED SEDIMENTARY ROCK. The interval from 16–33 cm displays very thin-bedded laminae. Trace fossils (worm burrows and fecal pellets) are ubiquitous.

SMEAR SLIDE SUMMARY (%):

	CC, 11
	D
TEXTURE:	
Sand	10
Silt	35
Clay	55
COMPOSITION:	
Celadonite	Tr
Clay	17
Clinopyroxene	7
Feldspar	17
Foraminifers	Tr
Glass	4
Nannofossils	30
Opaques	5
Oxide	5
Rock fragment	15
Spicules	Tr



833A 19X NO RECOVERY

833A 20X NO RECOVERY

SITE 833 HOLE A CORE 21X CORED INTERVAL 142.0-151.7 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	F/G	N22	CN14	B		1842 61.5 1.88 55.8 1667 1.90	6.1 0.2 9.0	1 2 3 CC	0.5 1.0				

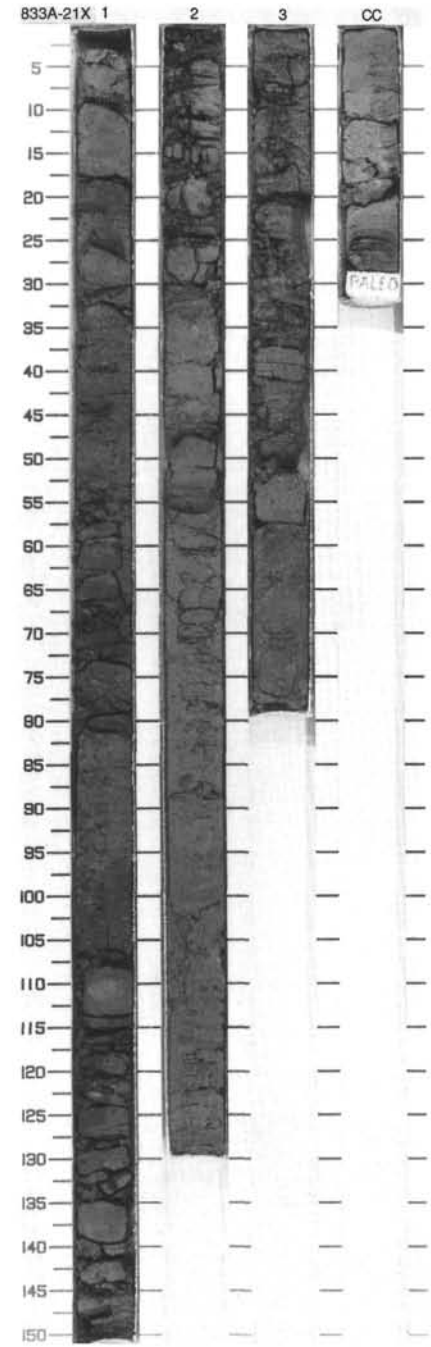
LITHOLOGIC DESCRIPTION

CLAYEY NANNOFOSSIL MIXED SEDIMENTARY ROCK and FINE VOLCANIC TUFF

Major lithology:
a. Most of this core is partially lithified, bioturbated, light gray to gray (5Y 7/1 to 5Y 5/1) CLAYEY NANNOFOSSIL MIXED SEDIMENTARY ROCK. Coring has fragmented much of the sediment. Partially lithified and lithified fragments decrease in size and number downcore in Section 2. In Section 3, the mixed sediment is cross bedded and partially lithified, but in Section CC it is thinly laminated.
b. Most of Section 1 is partially lithified, bioturbated, very dark gray (5Y 3/1) FINE VOLCANIC TUFF.

SMEAR SLIDE SUMMARY (%):

	1, 66 D	2, 91 D
TEXTURE:		
Sand	30	15
Silt	50	30
Clay	20	55
COMPOSITION:		
Calcite	---	8
Chlorite	---	10
Clay	11	15
Clinopyroxene	15	4
Feldspar	30	8
Foraminifers	1	2
Glass	8	10
Nannofossils	---	30
Opaques	10	5
Oxide	5	8
Rock fragment	20	---
Spicules	Tr	Tr



SITE 833 HOLE A CORE 22X CORED INTERVAL 151.7-161.3 mbsf

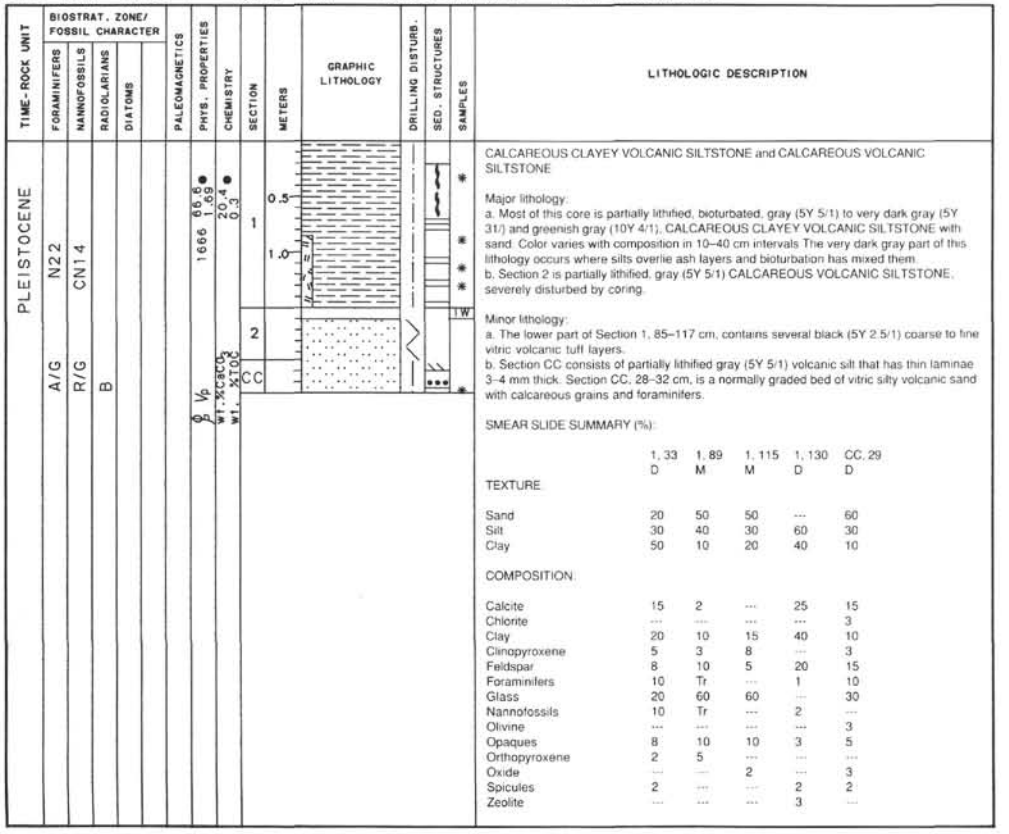
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	BIOSTRAT. ZONE/ FOSSIL CHARACTER: NANNOFOSSILS	BIOSTRAT. ZONE/ FOSSIL CHARACTER: RADIOLARIANS	BIOSTRAT. ZONE/ FOSSIL CHARACTER: DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLEISTOCENE	F/G	R/G				ϕ V_p 1696 57,3 1,91 ●		CC			X X		*	VITRIC SANDY VOLCANIC SILTSTONE

Major lithology: The 47 cm of recovered sediment is partially lithified, very dark gray VITRIC SANDY VOLCANIC SILTSTONE with clay.

SMEAR SLIDE SUMMARY (%):

	CC, 13 D
TEXTURE:	
Sand	30
Silt	50
Clay	20
COMPOSITION:	
Calcite	5
Clay	15
Clinopyroxene	8
Feldspar	15
Foraminifers	2
Glass	30
Nannofossils	1
Olivine	5
Opaques	10
Orthopyroxene	7
Oxide	2
Spicules	Tr

SITE 833 HOLE A CORE 23X CORED INTERVAL 161.3-170.9 mbsf



LITHOLOGIC DESCRIPTION

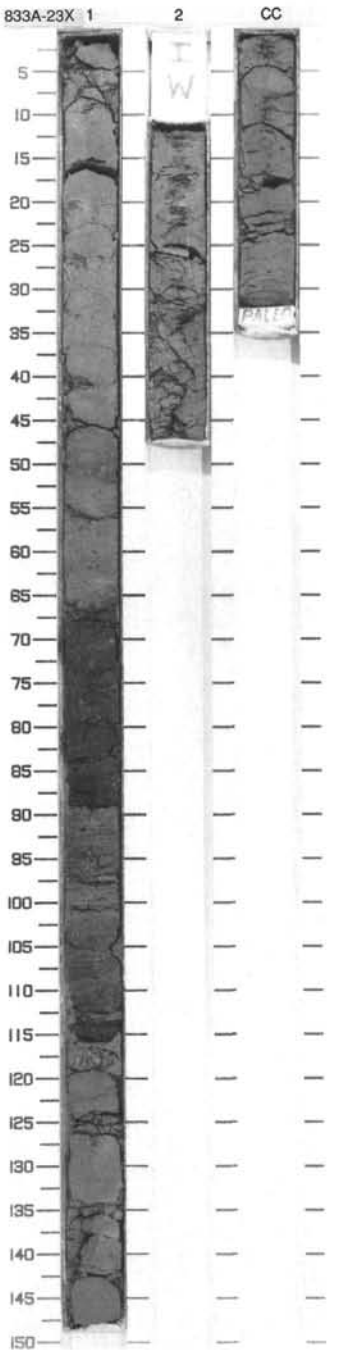
CALCAREOUS CLAYEY VOLCANIC SILTSTONE and CALCAREOUS VOLCANIC SILTSTONE

Major lithology:
a. Most of this core is partially lithified, bioturbated, gray (5Y 5/1) to very dark gray (5Y 3/1) and greenish gray (10Y 4/1), CALCAREOUS CLAYEY VOLCANIC SILTSTONE with sand. Color varies with composition in 10–40 cm intervals. The very dark gray part of this lithology occurs where silts overlie ash layers and bioturbation has mixed them.
b. Section 2 is partially lithified, gray (5Y 5/1) CALCAREOUS VOLCANIC SILTSTONE, severely disturbed by coring.

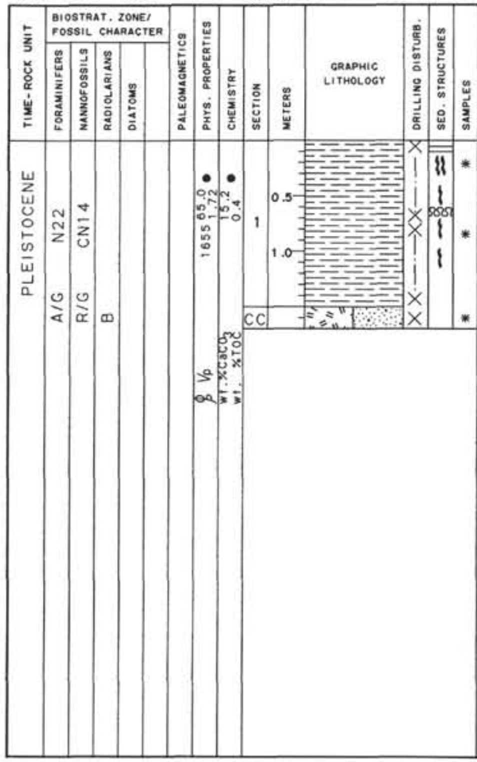
Minor lithology:
a. The lower part of Section 1, 85–117 cm, contains several black (5Y 2.5/1) coarse to fine vitric volcanic tuff layers.
b. Section CC consists of partially lithified gray (5Y 5/1) volcanic silt that has thin laminae 3–4 mm thick. Section CC, 28–32 cm, is a normally graded bed of vitric silty volcanic sand with calcareous grains and foraminifers.

SMEAR SLIDE SUMMARY (%):

	1, 33 D	1, 89 M	1, 115 M	1, 130 D	CC, 29 D
TEXTURE:					
Sand	20	50	50	---	60
Silt	30	40	30	60	30
Clay	50	10	20	40	10
COMPOSITION:					
Calcite	15	2	---	25	15
Chlorite	---	---	---	---	3
Clay	20	10	15	40	10
Clinopyroxene	5	3	8	---	3
Feldspar	8	10	5	20	15
Foraminifers	10	Tr	---	1	10
Glass	20	60	60	---	30
Nannofossils	10	Tr	---	2	---
Olivine	---	---	---	---	3
Opaques	8	10	10	3	5
Orthopyroxene	2	5	---	---	---
Oxide	---	---	2	---	3
Spicules	2	---	---	2	2
Zeolite	---	---	---	3	---



SITE 833 HOLE A CORE 24X CORED INTERVAL 170.9-180.6 mbsf



LITHOLOGIC DESCRIPTION

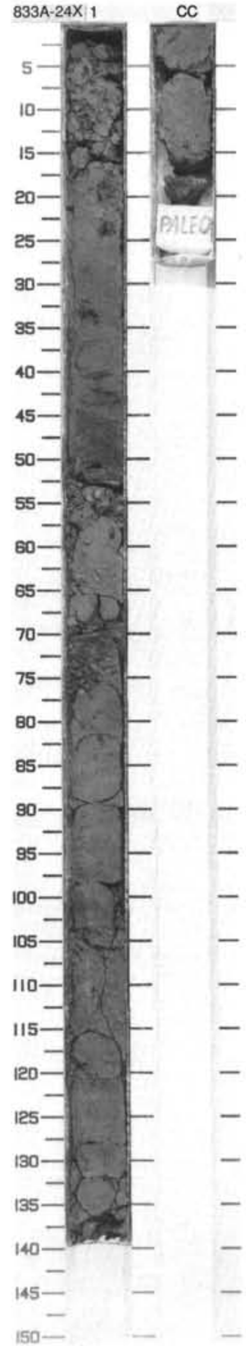
CALCAREOUS CLAYEY VOLCANIC SILTSTONE

Major lithology: Most of this core is partially lithified, bioturbated, gray (5Y 5/1) to greenish gray (10Y 4/1) CALCAREOUS CLAYEY VOLCANIC SILTSTONE with foraminifers and nannofossils. The greenish gray interval occurs in Section 1, 0–45 cm, and consists of clayey volcanic silt with calcareous grains and very few microfossils.

Minor lithology:
a. Interbedded in the siltstone (Section 1, 46–53 cm) and in Section CC is dark gray to very dark gray (5Y 4/1 to 5Y 3/1) volcanic tuff with devitrified glass and calcareous grains. In Section 1 a smear slide shows that the tuff has a sandy clayey silt texture.
b. Half of Section CC consists of dark gray (5Y 4/1) sandy volcanic silt, interbedded with tuff.

SMEAR SLIDE SUMMARY (%):

	1, 21 D	1, 85 D	CC, 10 D
TEXTURE:			
Sand	10	20	25
Silt	60	50	50
Clay	30	30	25
COMPOSITION:			
Calcite	15	30	15
Celadonite	25	---	---
Chlorite	10	---	Tr
Clay	30	20	10
Clinopyroxene	---	3	---
Feldspar	5	8	10
Foraminifers	2	20	20
Glass	---	---	15
Nannofossils	Tr	10	15
Olivine	---	---	2
Opaques	5	5	8
Oxide	---	---	2
Radiolarians	---	---	Tr
Spicules	5	2	2



SITE 833 HOLE A CORE 25X CORED INTERVAL 180.6-190.3 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	C/G	R/G	B			826 55.9 ● 1.87 Vp	23.0 ● wt. %CaCO3 0.4 wt. %TOC	CC	0.5				*

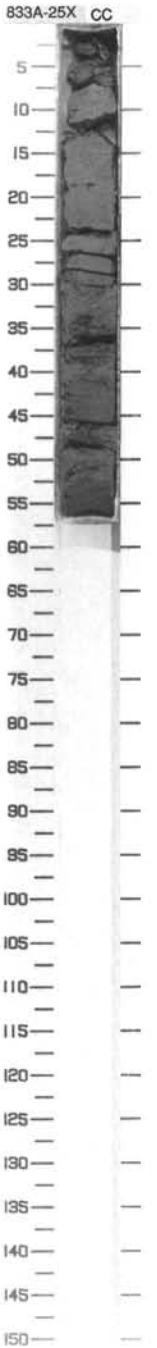
LITHOLOGIC DESCRIPTION

SANDY VOLCANIC SILTSTONE and VOLCANIC TUFF

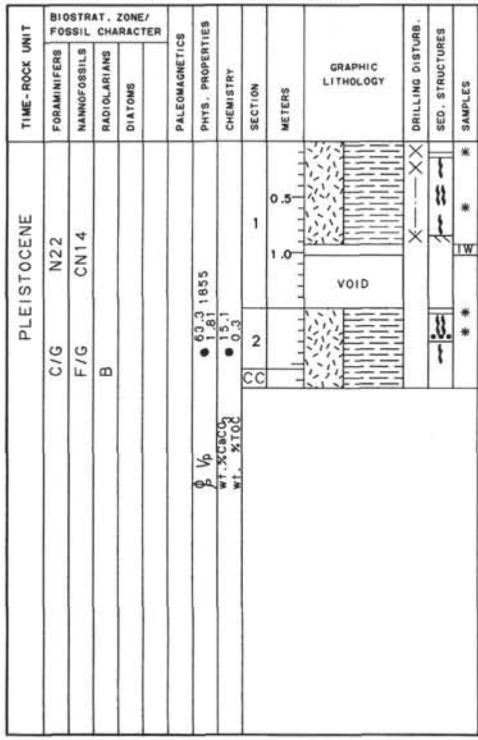
Major lithology:
a. About 70% of the core is partially lithified, greenish gray (10Y 5/1) SANDY VOLCANIC SILTSTONE with clay, calcareous grains, foraminifers, nannofossils, and glass. Much of this lithology is finely laminated or bioturbated.
b. Interbedded with the siltstone are layers of very dark gray (5Y 3/1) VOLCANIC TUFF.

SMEAR SLIDE SUMMARY (%):

	CC, 14 D	CC, 55 M
TEXTURE:		
Sand	30	80
Silt	50	20
Clay	20	---
COMPOSITION:		
Calcite	20	10
Chlorite	---	5
Clay	10	---
Clinopyroxene	8	5
Feldspar	15	20
Foraminifers	15	15
Glass	10	15
Nannofossils	10	Tr
Olivine	2	3
Opaques	5	20
Oxide	2	5
Spicules	2	2



SITE 833 HOLE A CORE 26X CORED INTERVAL 190.3-199.5 mbsf



LITHOLOGIC DESCRIPTION

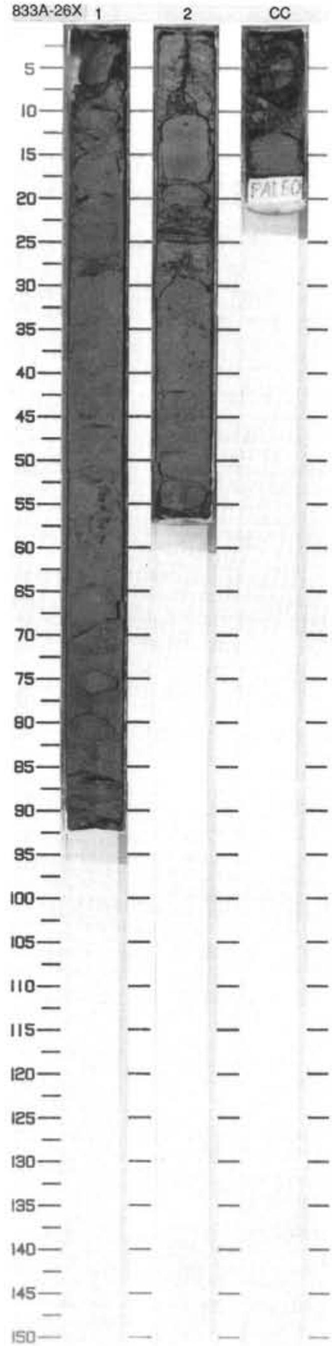
CLAYEY VOLCANIC SILTSTONE

Major lithology: About 60% of this core is partially lithified, bioturbated, gray to dark gray (5Y 5/1 to 5Y 4/1) CLAYEY VOLCANIC SILTSTONE with calcareous grains, glass, coarse sand, and foraminifers. In Section 1, 15–17 cm, and Section 2, 8–21 cm, the siltstone is dark greenish gray (5G 4/1). Some intervals are thinly laminated or cross bedded.

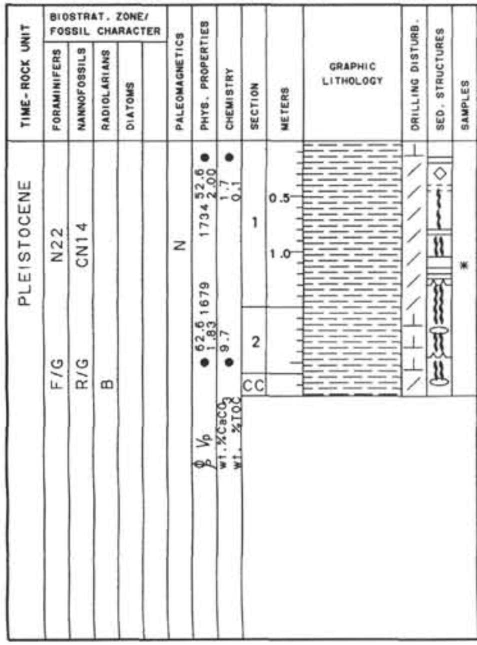
Minor lithology: Interbedded with the siltstone are layers of black (5Y 2.5/1) fine- to coarse-grained vitric volcanic tuff comprising about 40% of the core in Section 2. A layer of dark greenish gray (10Y 3/1) vitric volcanic tuff with foraminifers occurs in Section 2, at 21–25 cm.

SMEAR SLIDE SUMMARY (%):

	1, 10 M	1, 60 D	2, 4 M	2, 21 M
TEXTURE:				
Sand	60	10	5	90
Silt	20	60	45	10
Clay	20	30	50	---
COMPOSITION:				
Calcite	---	20	---	3
Chlorite	Tr	---	2	5
Clay	20	25	20	---
Clinopyroxene	10	---	---	5
Feldspar	10	10	5	10
Foraminifers	20	10	5	10
Glass	10	15	60	50
Nannofossils	5	5	---	5
Olivine	2	---	---	2
Opaques	8	8	5	5
Orthopyroxene	---	---	---	1
Oxide	2	2	---	2
Rock fragment	10	---	---	---
Spicules	2	3	Tr	1



SITE 833 HOLE B CORE 1R CORED INTERVAL 77.4-86.9 mbsf



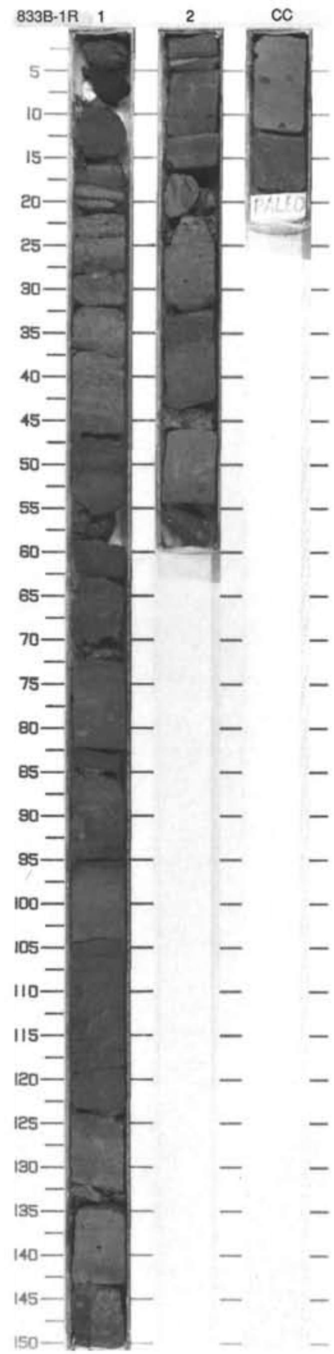
LITHOLOGIC DESCRIPTION

CLAYEY VOLCANIC SILTSTONE

Major lithology: The core consists of drilling biscuits of very dark gray (5Y 3/1), highly bioturbated CLAYEY VOLCANIC SILTSTONE. Trace fossils are abundant in most of the core, except for a few finely laminated layers as in Section 1, 15-20 cm, and 105-125 cm.

SMEAR SLIDE SUMMARY (%):

	1, 111
	D
TEXTURE:	
Sand	6
Silt	50
Clay	44
COMPOSITION:	
Chlorite	7
Clay	36
Clinopyroxene	4
Feldspar	17
Foraminifers	Tr
Glass	8
Nannofossils	8
Opaques	5
Oxide	5
Rock fragment	10
Spicules	Tr



SITE 833 HOLE B CORE 2R CORED INTERVAL 86.9-96.6 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	A/G	N22	C/G	CN1 4	B	N	1862 59.5 ● 1.86 ● 61.0 1665 1.74 ρ Vp	● 2.3 wt.%CaCO3	1	0.5 1.0	2	3		*

LITHOLOGIC DESCRIPTION

CLAYEY VOLCANIC SILTSTONE

Major lithology: Section 1 and Section 2, 0–140 cm, consist of gray to dark gray (5Y 6/1 to 5Y 4/1), highly bioturbated CLAYEY VOLCANIC SILTSTONE. Trace fossils are abundant in most of the core.

Minor lithology: Section 2, 140–150 cm, and Section CC consist of highly bioturbated, greenish gray (5GY 5/1) calcareous silty mixed sedimentary rock.

SMEAR SLIDE SUMMARY (%):

	3, 25 D
TEXTURE:	
Sand	20
Silt	50
Clay	30
COMPOSITION:	
Calcite	8
Clay	10
Clinopyroxene	5
Feldspar	7
Foraminifers	12
Glass	8
Nannofossils	20
Opaques	4
Orthopyroxene	1
Oxide	10
Rock fragment	15
Spicules	Tr

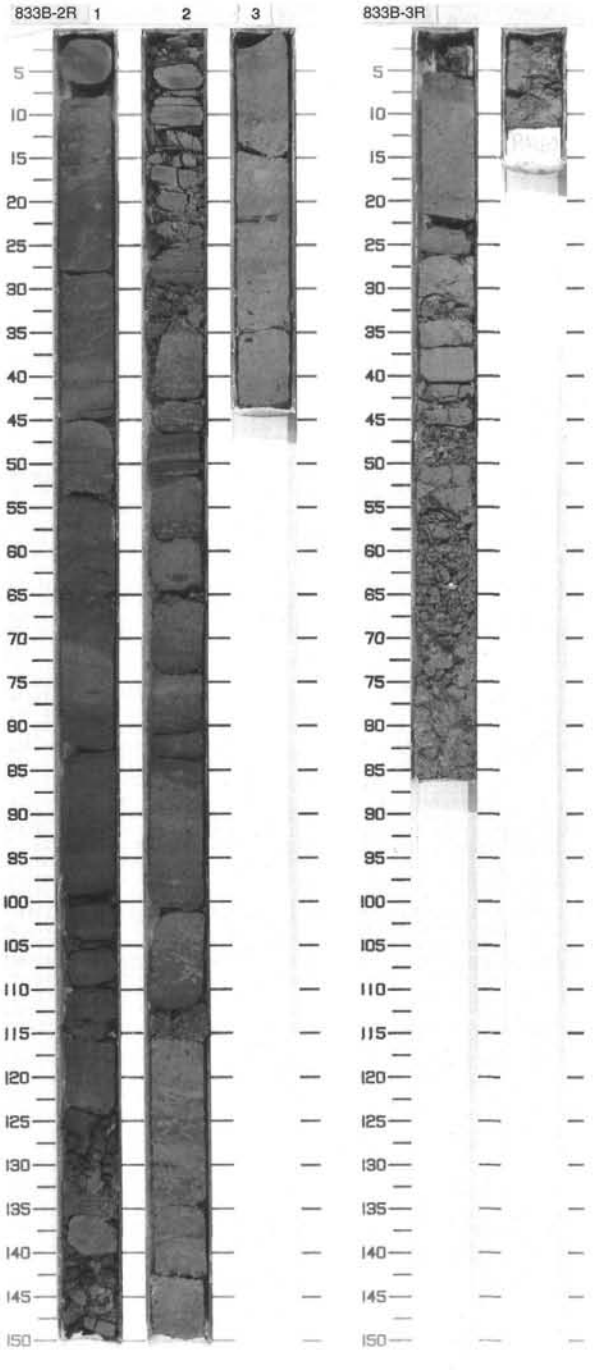
SITE 833 HOLE B CORE 3R CORED INTERVAL 96.6-106.2 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	C/G	N22	C/G	CN14	B	N	1701 64.3 ● 1.83 ρ Vp	10.2 ● wt.%CaCO3	1	0.5	CC			

LITHOLOGIC DESCRIPTION

CALCAREOUS SILTY MIXED SEDIMENTARY ROCK and CALCAREOUS CLAY

Major lithology:
a. Section 1, 0–40 cm, consists of highly bioturbated, greenish gray (5GY 5/1) CALCAREOUS SILTY MIXED SEDIMENTARY ROCK.
b. Section 1, 40–87 cm, and Section CC consist of gray (5Y 5/1) CALCAREOUS CLAY. The clay appears auto-brecciated in places, breaking into mm-scale angular fragments.



SITE 833 HOLE B CORE 4R CORED INTERVAL 106.2-115.8 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	N22 C/G	CN14 C/G	B		N	1813 49.9 2.03 ● ; 50.4 2005 2.02 ● ; φ Vp ρ		1, 2, CC	0.5, 1.0				*

LITHOLOGIC DESCRIPTION

CALCAREOUS SILTY VOLCANIC CLAYSTONE and CALCAREOUS CLAYSTONE

Major lithology:
a. Most of the core consists of heavily bioturbated, gray to greenish gray (5Y 4/1 to 5GY 4/1) CALCAREOUS SILTY VOLCANIC CLAYSTONE. A few sand-filled clastic dikes occur in Section 2, 115–130 cm.
b. Section 2, 25–80 cm, consists of dark gray (5Y 4/1), unlithified, finely laminated CALCAREOUS CLAYSTONE.

SMEAR SLIDE SUMMARY (%):

	2, 91
	D
TEXTURE:	
Sand	5
Silt	40
Clay	55
COMPOSITION:	
Calcite	30
Chlorite	Tr
Clay	40
Clinopyroxene	3
Feldspar	12
Foraminifers	4
Glass	4
Opaques	6
Spicules	1

SITE 833 HOLE B CORE 5R CORED INTERVAL 115.8-125.5 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	N22 F/G	CN14 C/G	B		N	1634 70.9 1.65 ● ; 71.6 1622 1.66 ● ; φ Vp ρ	4.0 ● ; 17.7 0.2 ● ; WT. %CaCO3 WT. %TOC	1, 2, 3, CC	0.5, 1.0	VOID			*, IW

LITHOLOGIC DESCRIPTION

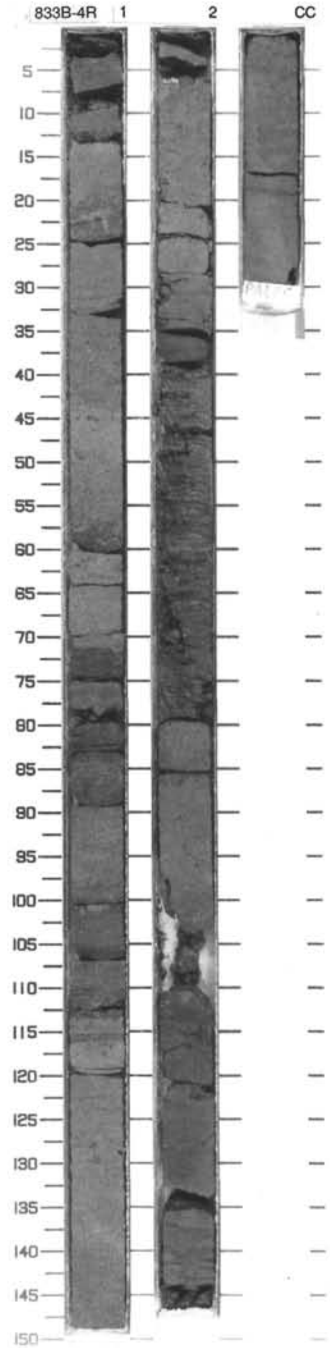
CALCAREOUS CLAYSTONE

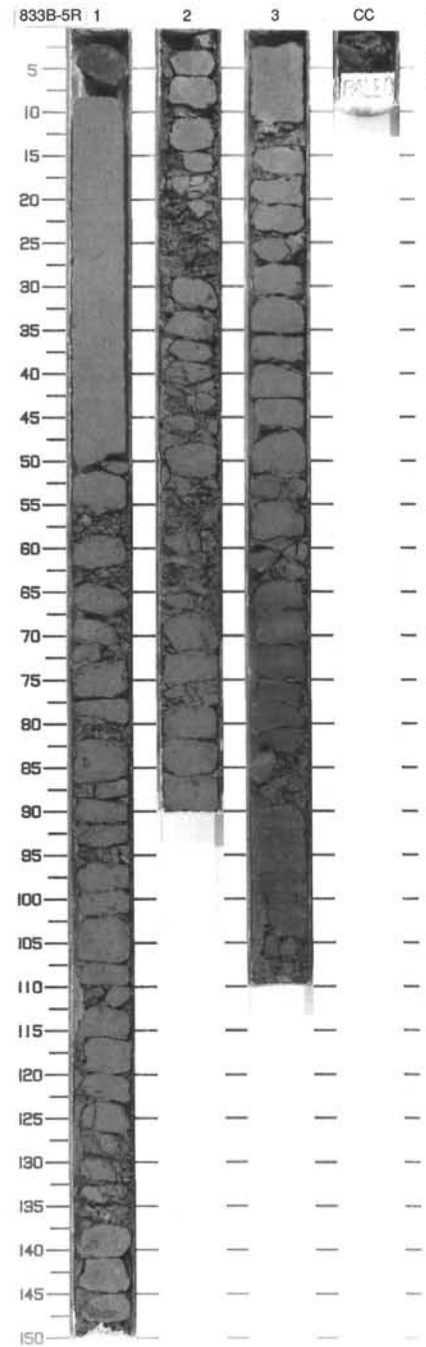
Major lithology: The core consists of gray (5Y 5/1), bioturbated CALCAREOUS CLAYSTONE with silt. Most of the recovery is in the form of drilling biscuits.

Minor lithology: Section 1, 0–7 cm, contains one cobble of dark gray (5Y 4/1) calcareous silty claystone, rich in trace fossils.

SMEAR SLIDE SUMMARY (%):

	1, 49
	D
TEXTURE:	
Silt	15
Clay	85
COMPOSITION:	
Calcite	25
Clay	59
Clinopyroxene	Tr
Feldspar	7
Foraminifers	3
Glass	2
Opaques	3
Spicules	1



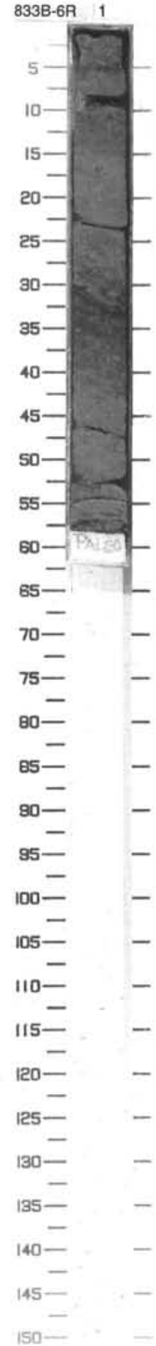


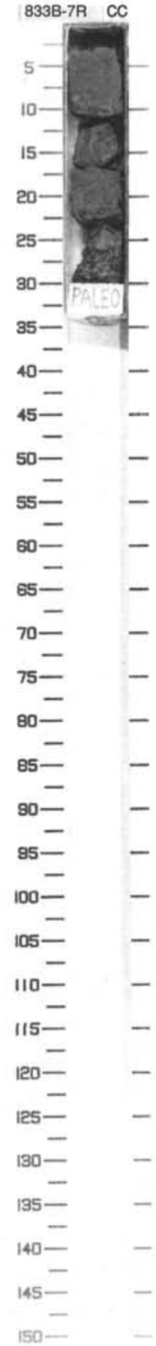
SITE 833 HOLE B CORE 6R CORED INTERVAL 125.5-135.2 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLEISTOCENE	N22 C/G	CN14 R/G	B			φ 61.6 ● ρ 1.82 Vp 2024	wt.%$CaCO_3$ 8.4 ● wt.%TOC 0.2	1	0.5					CALCAREOUS SILTY CLAYSTONE Major lithology: The core consists of heavily bioturbated, gray to greenish gray (5Y 4/1 to 5GY 4/1) CALCAREOUS SILTY CLAYSTONE with sand.

SITE 833 HOLE B CORE 7R CORED INTERVAL 135.2-144.8 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
	C/G N22	F/G CN14	B			φ 75.4 ● ρ 1.95 Vp 2067	wt.%$CaCO_3$ 9.4 ● wt.%TOC 0.2	CC						CALCAREOUS CLAYEY SILTSTONE Major lithology: The core consists of dark gray (5Y 4/1) CALCAREOUS CLAYEY SILTSTONE with sand and abundant trace fossils.





SITE 833 HOLE B CORE 8R CORED INTERVAL 144.8-154.5 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	F/G N22	R/G CN14	B		N	● 2127 Vp wt. %CaCO3 ● 14.2 wt. %TOC 0.2		1	0.5 1.0				* *

LITHOLOGIC DESCRIPTION

CALCAREOUS CLAYEY VOLCANIC SILTSTONE and SANDY VOLCANIC SILTSTONE

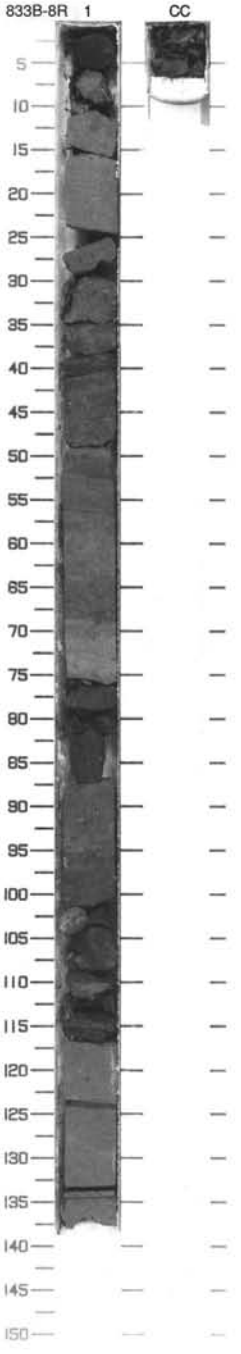
Major lithology:

a. Most of the core is partially lithified, bioturbated, gray (5Y 5/1) CALCAREOUS CLAYEY VOLCANIC SILTSTONE. Burrows about 0.5 cm in diameter and 1 mm long fecal pellets are common. Possible *Zoophycos* trace fossils occur in Section 1 at 43, 58 and 60 cm.

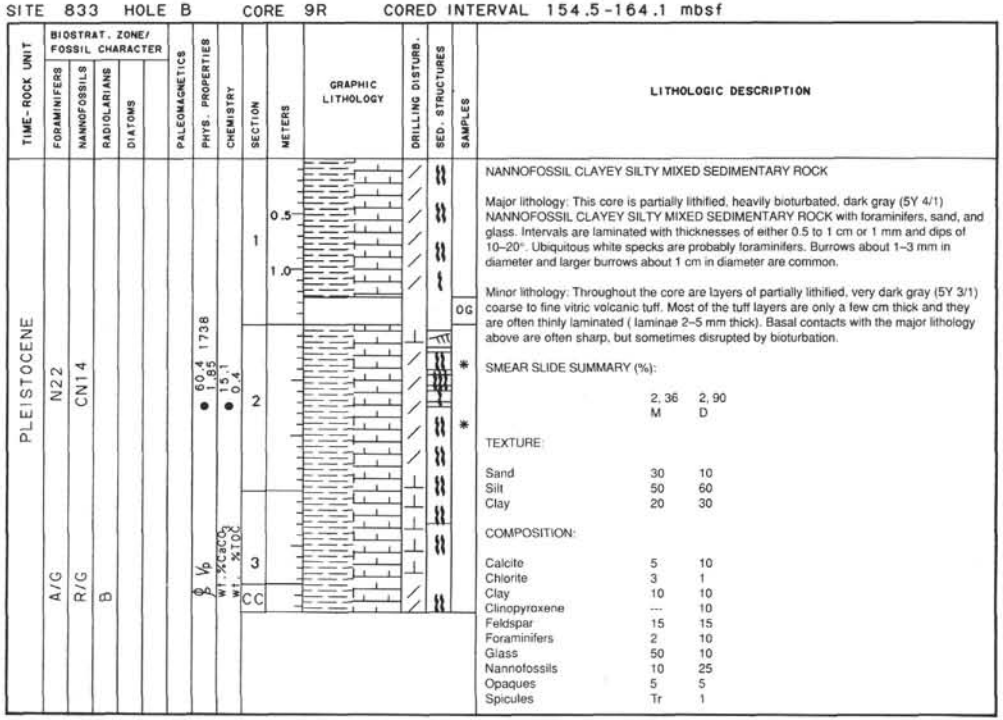
b. The remainder of the core is partially lithified, black (5Y 2.5/1) SANDY VOLCANIC SILTSTONE. This and the clayey siltstone are interbedded, with gradational boundaries. These gradational intervals are very dark gray (5Y 3/1), intermediate in shade between the two major lithologies.

SMEAR SLIDE SUMMARY (%):

	1, 36 D	1, 76 D
TEXTURE:		
Sand	30	15
Silt	50	55
Clay	20	30
COMPOSITION:		
Calcite	5	25
Celadonite	5	---
Chlorite	2	1
Clay	15	35
Clinopyroxene	5	5
Feldspar	30	25
Foraminifers	3	1
Glass	15	2
Nannofossils	5	1
Olivine	2	---
Opaques	8	---
Oxide	2	---
Spicules	Tr	3



SITE 833 HOLE B CORE 9R CORED INTERVAL 154.5-164.1 mbsf



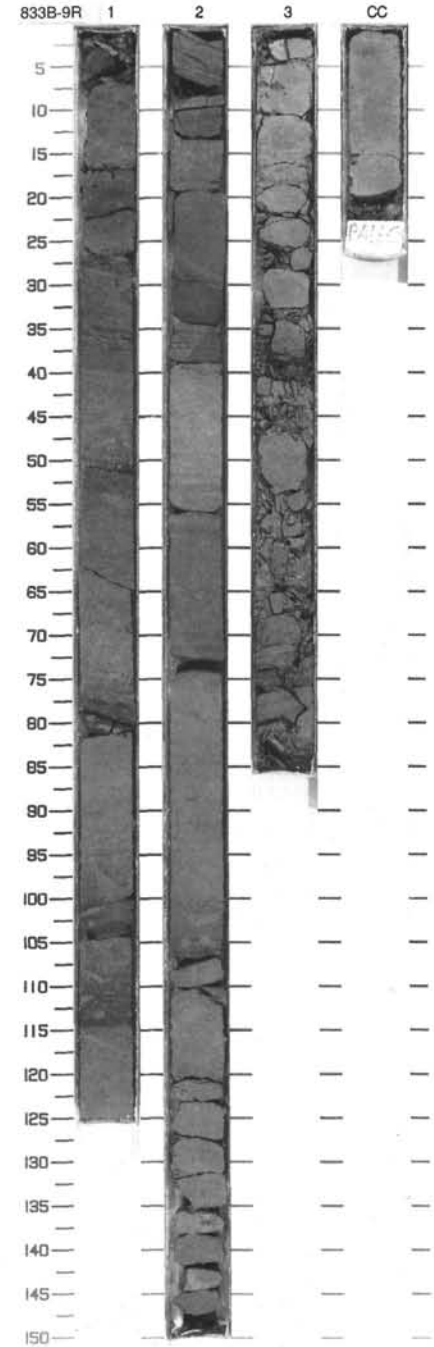
NANNOFOSSIL CLAYEY SILTY MIXED SEDIMENTARY ROCK

Major lithology: This core is partially lithified, heavily bioturbated, dark gray (5Y 4/1) NANNOFOSSIL CLAYEY SILTY MIXED SEDIMENTARY ROCK with foraminifers, sand, and glass. Intervals are laminated with thicknesses of either 0.5 to 1 cm or 1 mm and dips of 10–20°. Ubiquitous white specks are probably foraminifers. Burrows about 1–3 mm in diameter and larger burrows about 1 cm in diameter are common.

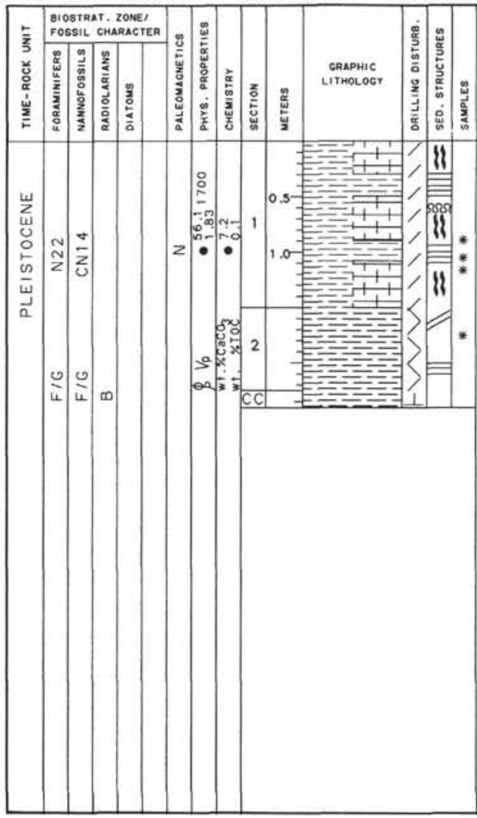
Minor lithology: Throughout the core are layers of partially lithified, very dark gray (5Y 3/1) coarse to fine vitric volcanic tuff. Most of the tuff layers are only a few cm thick and they are often thinly laminated (laminae 2–5 mm thick). Basal contacts with the major lithology above are often sharp, but sometimes disrupted by bioturbation.

SMEAR SLIDE SUMMARY (%):

	2, 36 M	2, 90 D
TEXTURE:		
Sand	30	10
Silt	50	60
Clay	20	30
COMPOSITION:		
Calcite	5	10
Chlorite	3	1
Clay	10	10
Clinopyroxene	---	10
Feldspar	15	15
Foraminifers	2	10
Glass	50	10
Nannofossils	10	25
Opaques	5	5
Spicules	Tr	1



SITE 833 HOLE B CORE 10R CORED INTERVAL 164.1-173.8 mbsf



LITHOLOGIC DESCRIPTION

FORAMINIFERAL NANNOFOSSIL CLAYEY SILTY MIXED SEDIMENTARY ROCK and CLAYEY CALCAREOUS VOLCANIC SILTSTONE

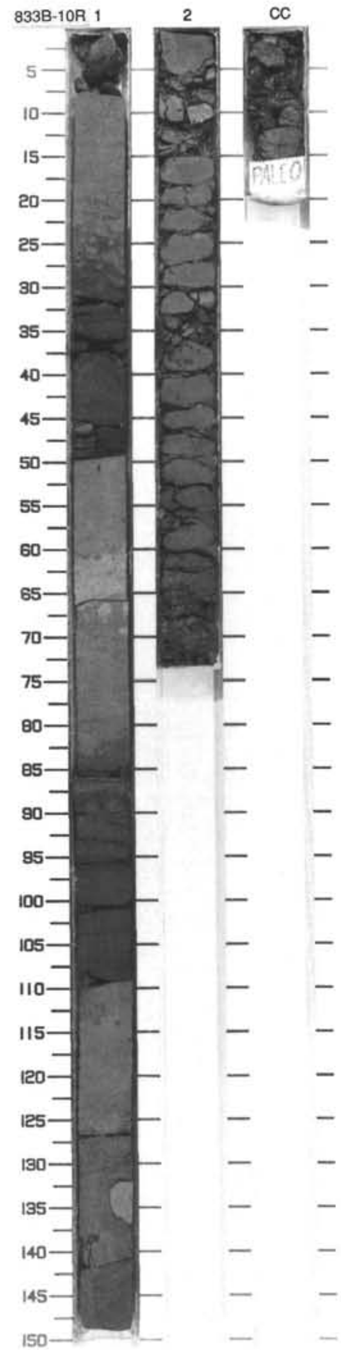
Major lithology:
a. Approximately 60% of this core is partially lithified, heavily bioturbated, gray to very dark gray (5Y 5/1 to 5Y 3/1) FORAMINIFERAL NANNOFOSSIL CLAYEY SILTY MIXED SEDIMENTARY ROCK with calcareous grains.
b. About 30% of this core is partially lithified, heavily bioturbated, gray (5Y 5/1) CLAYEY CALCAREOUS VOLCANIC SILTSTONE with volcanic glass.

Both the major lithologies are heavily bioturbated and partially mixed with adjacent layers of the vitric volcanic tuff.

Minor lithology: Section 1 includes about 5 layers of partially lithified, thinly laminated, black (5Y 2.5/1), fine to coarse vitric volcanic tuff. The darker intervals of the first major lithology (a) described above are largely a product of mixing of this vitric volcanic ash into overlying sediments by bioturbation.

SMEAR SLIDE SUMMARY (%):

	1, 90 M	1, 105 M	1, 118 D	2, 25 D
TEXTURE:				
Sand	70	5	20	---
Silt	30	75	40	70
Clay	---	20	40	30
COMPOSITION:				
Calcite	---	5	15	25
Celadonite	---	---	1	---
Chlorite	---	1	1	5
Clay	---	15	20	30
Clinopyroxene	3	2	3	3
Feldspar	10	15	10	15
Foraminifers	5	2	20	1
Glass	70	40	5	10
Nannofossils	Tr	10	20	Tr
Opaques	10	5	5	5
Oxide	1	---	---	---
Spicules	Tr	Tr	---	1



SITE 833 HOLE B CORE 11R CORED INTERVAL 173.8-183.5 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	F/G	F/G	B		N	ϕ Vp β 63.6 1807 1.78	wt.%CaCO3 8.5 wt.%TOC 0.1	1 2 CC	0.5 1.0				* * *

LITHOLOGIC DESCRIPTION

CLAYEY VITRIC VOLCANIC SILTSTONE and CLAYEY VOLCANIC SILTSTONE

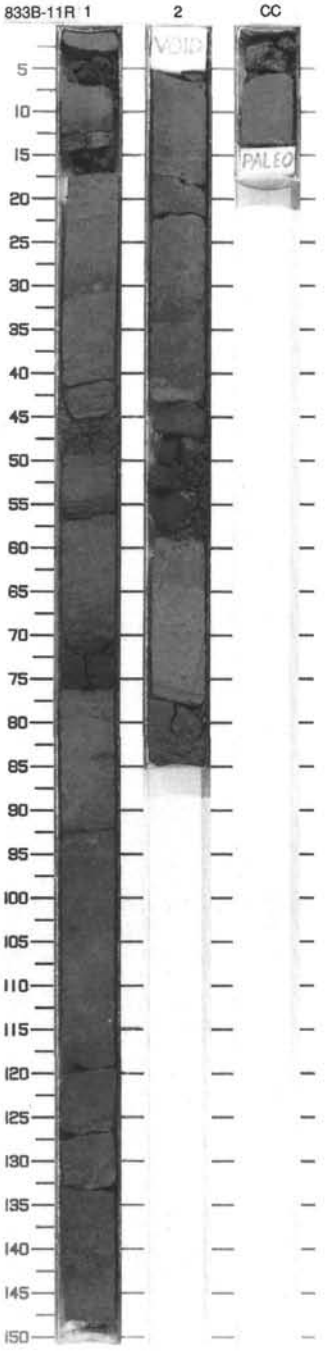
Major lithology:
a. About 50% of this core is partially lithified, bioturbated, dark gray (5Y 4/1) CLAYEY VITRIC VOLCANIC SILTSTONE.
b. Approximately 40% of the core is partially lithified, bioturbated, dark greenish gray (10Y 4/1) CLAYEY VOLCANIC SILTSTONE with calcareous grains that is interbedded with the vitric siltstone in 5–40 cm thick layers.

Minor lithology: Interbedded with both the major lithologies are partially lithified, thinly laminated, fine vitric volcanic tuff layers 1–5 cm thick. Smear-slide observations indicate that the glass is largely devitrified.

The high glass content of the vitric siltstone indicates that some ash fall material has been mixed with the dominant lithology, probably by bioturbation. Except for the vitric volcanic tuff layers, the entire core is heavily bioturbated,and burrows 3–5 mm in diameter occur throughout.

SMEAR SLIDE SUMMARY (%):

	1, 22 D	1, 114 D	2, 50 D
TEXTURE:			
Sand	10	10	20
Silt	60	60	65
Clay	30	30	15
COMPOSITION:			
Calcite	5	15	5
Chlorite	2	5	---
Clay	25	30	---
Clinopyroxene	---	5	3
Feldspar	10	25	20
Foraminifers	5	5	1
Glass	35	5	55
Nannofossils	10	5	5
Opaques	5	5	10
Spicules	Tr	Tr	Tr



SITE 833 HOLE B CORE 12R CORED INTERVAL 183.5-193.1 mbsf

TIME-ROCK UNIT: PLEISTOCENE

BIOSTRAT. ZONE/FOSSIL CHARACTER
- FORAMINIFERS: A/G; N22
- NANNOFOSSILS: F/G; CN14
- RADIOLARIANS: B
- DIATOMS:
- PALEOMAGNETICS: N
- PHYS. PROPERTIES: ● 58.1 1.90 1807
- CHEMISTRY: ● 18.2 0.2
- SECTION: 1, 2, 3, CC
- METERS: 0.5, 1.0
- GRAPHIC LITHOLOGY
- DRILLING DISTURB.
- SED. STRUCTURES
- SAMPLES

Φ Vp
β
wt. %CaCO3
wt. %TOC

LITHOLOGIC DESCRIPTION

SANDY VITRIC VOLCANIC SILTSTONE and CLAYEY VITRIC VOLCANIC SILTSTONE

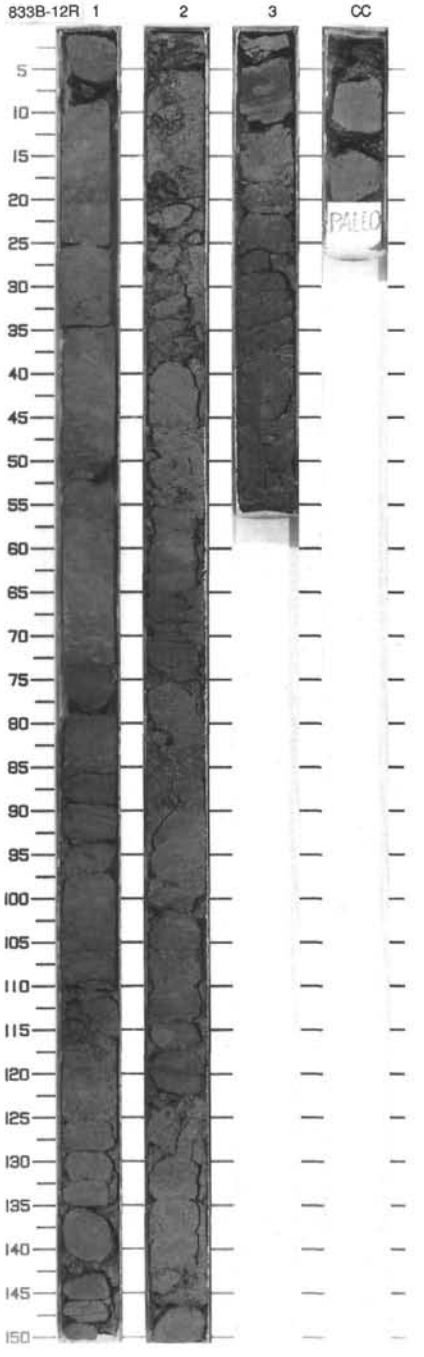
Major lithology:
a. About 70% of this core is partially lithified, bioturbated, dark gray (5Y 4/1) SANDY VITRIC VOLCANIC SILTSTONE with clay and foraminifers.
b. Partially lithified, bioturbated, dark greenish gray (10Y 4/1) to very dark gray (5Y 3/1) VITRIC CLAYEY VOLCANIC SILTSTONE with calcareous grains is interbedded with the sandy siltstone in layers 5 to 40 cm thick.

Minor lithology: Interbedded with the above major lithologies are very dark gray to black (5Y 3/1 to 5Y 2.5/1), laminated fine vitric volcanic tuff layers up to 10 cm in thickness.

The high glass content (35–40%) of both major lithologies suggests that bioturbation has mixed vitric volcanic tuff layers into the major lithologies or that minor vitric volcanic ash falls have occurred without forming discrete layers. Bioturbation is particularly heavy in the sandy siltstone (a). Burrowing is common, including at least one possible example of the trace fossil *Zoophycos* in Section 1 at 86 cm. Convoluted bedding occurs in Section 1 at 77 cm.

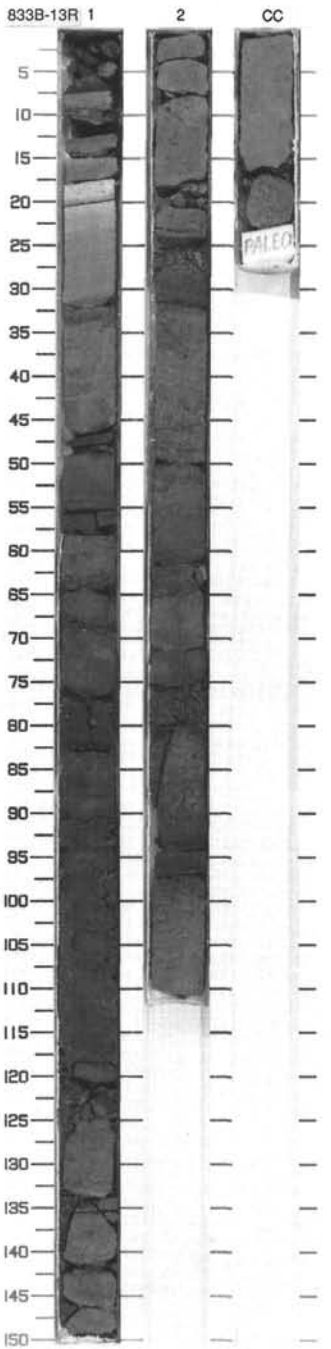
SMEAR SLIDE SUMMARY (%):

	1, 25 D	1, 108 M	3, 12 M	3, 44 D
TEXTURE:				
Sand	40	10	60	---
Silt	50	60	30	60
Clay	10	30	10	40
COMPOSITION:				
Calcite	---	15	---	3
Chlorite	3	2	---	---
Clay	10	25	10	30
Clinopyroxene	5	---	30	2
Feldspar	10	10	15	15
Foraminifers	10	1	5	3
Glass	40	35	10	35
Nannofossils	5	5	2	5
Opaques	10	1	10	3
Oxide	2	---	2	---
Rock fragment	---	---	15	---
Spicules	2	3	1	3



SITE 833 HOLE B CORE 13R CORED INTERVAL 193.1-202.8 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLEISTOCENE	A/G N22	F/G CN14	B		N	● 1863 Vp	● 15.8 0.2 wt. %CaCO3 wt. %TOC	1 2 CC	0.5 1.0					CLAYEY VITRIC VOLCANIC SILTSTONE and SANDY VITRIC VOLCANIC SILTSTONE Major lithology: a. About 50% of the core is partially lithified, dark gray (5Y 4/1) CLAYEY VITRIC VOLCANIC SILTSTONE interbedded with the second major lithology (b) described below in layers 10–35 cm thick. In Section 2, 22–38 cm, this sediment is dark greenish gray to very dark gray (10Y 4/1 to 5Y 4/1). Much of this sediment is thinly laminated and generally much less bioturbated than the sandy siltstone (b). b. The other 50% of the core is partially lithified, heavily bioturbated, dark gray (5Y 4/1) SANDY VITRIC VOLCANIC SILTSTONE. Minor lithology: a. Section 1, 0–8 cm, consists of partially lithified, black (5Y 2.5/1) fine volcanic tuff. In Section 2, 80–83 cm, is a black sand layer that is also likely to be volcanic tuff. The high glass content of the major lithologies suggests that volcanic ash falls may have occurred without forming discrete layers or were thin and became mixed into the major lithologies. b. Section 1, 18–32 cm, is thinly laminated (layers 1.5 to 3 mm thick) of gray to light gray (5Y 5/1 to 5Y 7/1), clayey calcareous chalk.



SITE 833 HOLE B CORE 14R CORED INTERVAL 202.8-212.4 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
PLEISTOCENE	?	CN14			N	● 71.8 1658 1.81	● 14.7	1	0.5 1.0				*
	B	F/G	B					2					
								3					OG IW
						● 65.7 1.71	● 11.7 0.3	4					
								CC					

Φ Vp wt. %CaCO3 wt. %TOC

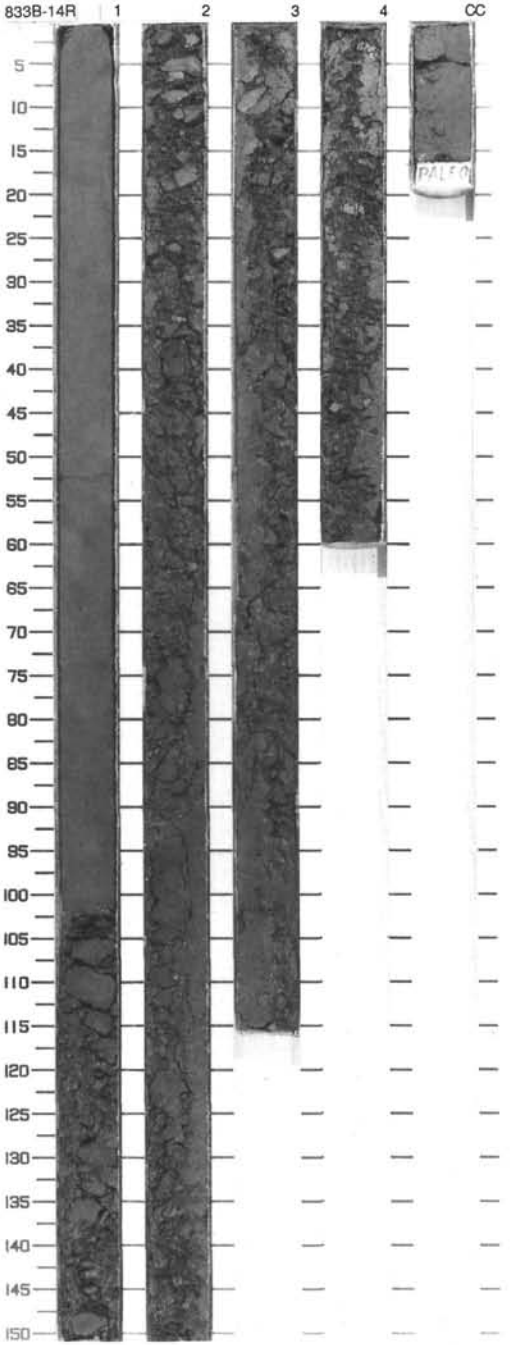
LITHOLOGIC DESCRIPTION

SILTY VOLCANIC CLAYSTONE

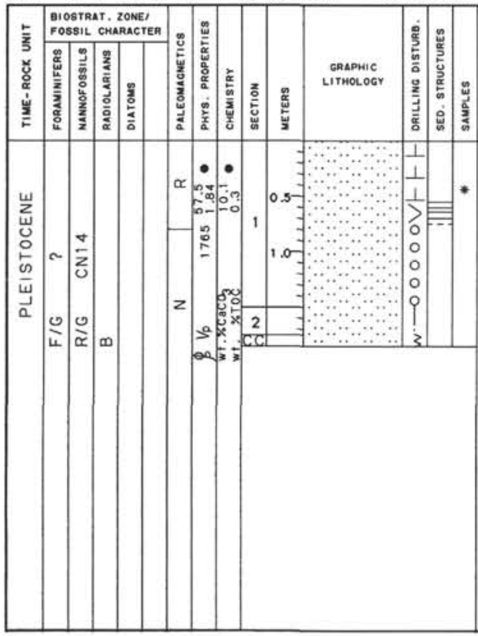
Major lithology: This entire core is partially lithified, nearly structureless, dark gray (5Y 4/1) SILTY VOLCANIC CLAYSTONE with calcareous grains and volcanic glass. Vague laminations about 1 mm in thickness occur in Section 1, 0–100 cm, and wavy laminations are present in Section 1, 87–90 cm.

SMEAR SLIDE SUMMARY (%):

	1, 54 D
TEXTURE:	
Sand	---
Silt	50
Clay	50
COMPOSITION:	
Calcite	20
Chlorite	2
Clay	40
Feldspar	10
Glass	20
Nannofossils	1
Spicules	3



SITE 833 HOLE B CORE 15R CORED INTERVAL 212.4-222.1 mbsf



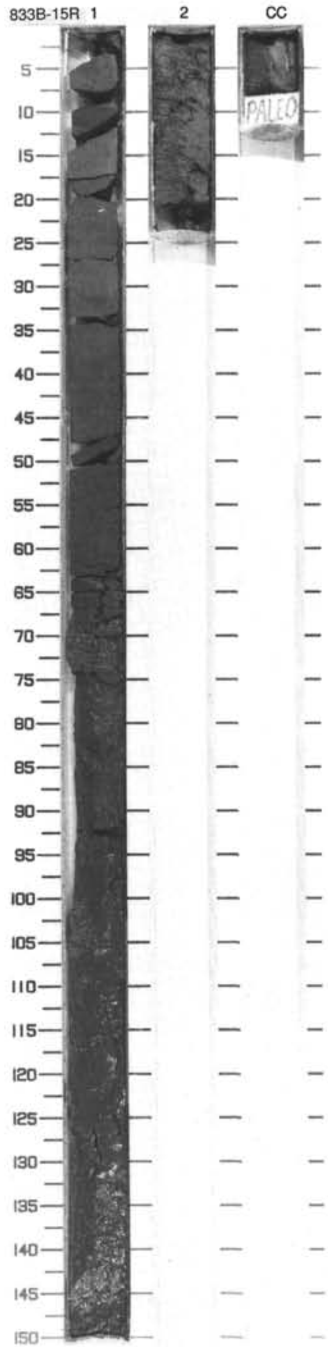
LITHOLOGIC DESCRIPTION

VOLCANIC SILT

Major lithology: The core consists of slightly lithified to soupy, dark gray (5Y 4/1), VOLCANIC SILT with calcareous grains, clay, zeolite and glass.

SMEAR SLIDE SUMMARY (%):

	1, 43
	D
TEXTURE:	
Silt	80
Clay	20
COMPOSITION:	
Amphibole	Tr
Calcite	15
Celadonite	Tr
Chlorite	5
Clay	9
Clinopyroxene	3
Feldspar	10
Foraminifers	5
Glass	15
Opaques	5
Oxide	8
Rock fragment	10
Spicules	Tr
Zeolite	15



SITE 833 HOLE B CORE 16R CORED INTERVAL 222.1-231.7 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS
PLEISTOCENE	N22 C/G	CN14 R/G	B		R	● 55.7 1773 1.86 ● 55.0 1878 1.92 φ Vp ρ	● 8.1 ● 10.7 0.1 wt.%CaCO₃ wt.%TOC	1 2 3 CC	0.5 1.0

LITHOLOGIC DESCRIPTION

SILTY CALCAREOUS CLAYSTONE

Major lithology: The core consists almost entirely of dark gray to dark greenish gray (5Y 4/1 to 5GY 4/1) SILTY CALCAREOUS CLAYSTONE. Trace fossils are abundant, though a few laminated beds survived bioturbation.

Minor lithology: A thinly laminated 5 cm thick bed of gray (5Y 5/1) clayey siltstone with calcareous grains occurs in Section 1, 26–31 cm.

SMEAR SLIDE SUMMARY (%):

	2, 61 D
TEXTURE:	
Silt	20
Clay	80
COMPOSITION:	
Amphibole	Tr
Calcite	30
Chlorite	Tr
Clay	51
Clinopyroxene	2
Feldspar	6
Foraminifers	3
Glass	3
Opaques	4
Spicules	1

SITE 833 HOLE B CORE 17R CORED INTERVAL 231.7-240.9 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS
PLEISTOCENE	N22 A/G	CN14 R/G	B		R	● 54.5 1852 1.87 ● 51.9 1988 1.81 φ Vp ρ	● 13.6 ● 2.9 0.0 wt.%CaCO₃ wt.%TOC	1 2 CC	0.5 1.0

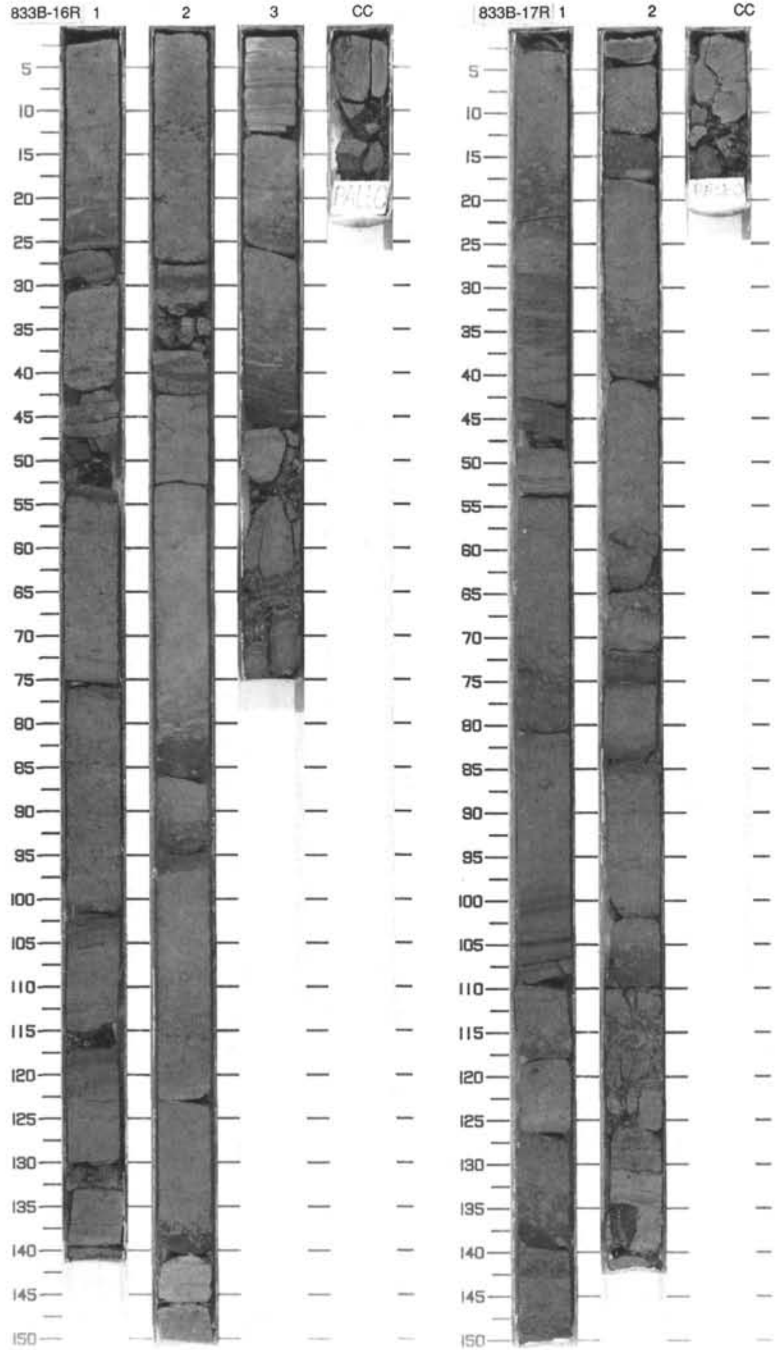
LITHOLOGIC DESCRIPTION

SILTY CALCAREOUS CLAYSTONE

Major lithology: The core consists of dark gray to dark greenish gray (5Y 4/1 to 5GY 4/1) SILTY CALCAREOUS CLAYSTONE. Trace fossils are abundant, though a few laminated beds survived.

SMEAR SLIDE SUMMARY (%):

	1, 93 D
TEXTURE:	
Sand	75
Silt	25
COMPOSITION:	
Calcite	27
Chlorite	Tr
Clay	57
Clinopyroxene	1
Feldspar	6
Foraminifers	2
Glass	3
Nannofossils	Tr
Opaques	3
Spicules	1



SITE 833 HOLE B CORE 18R CORED INTERVAL 240.9-250.5 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
	F/G N22	R/G CN14/CN13	B		R	1975 55.0 ● 1.81	3.6 ●	1	0.5 1.0				TW
					N	1733 ● 62.2 1.82	● 40.0 0.5	2					

Φ Vp wt. %CaCO3 wt. %TOC

LITHOLOGIC DESCRIPTION

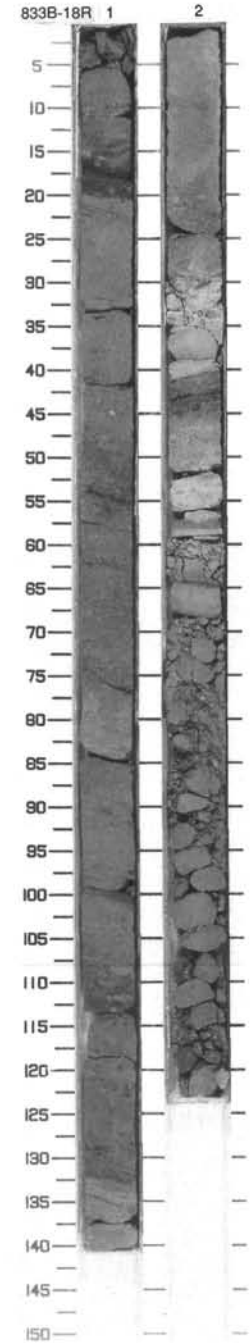
SILTY CALCAREOUS VOLCANIC CLAYSTONE and CALCAREOUS VOLCANIC SILT

Major lithology:
a. Most of the core consists of dark gray to dark greenish gray (5Y 4/1 to 5GY 4/1) SILTY CALCAREOUS VOLCANIC CLAYSTONE. Trace fossils are abundant, though a few laminated beds survived bioturbation.
b. Section 2, 69–124 cm, consists of gray (5Y 5/1) CALCAREOUS VOLCANIC SILT with clay. A few dendritic water-escape structures (vein structures) occur at 103 cm.

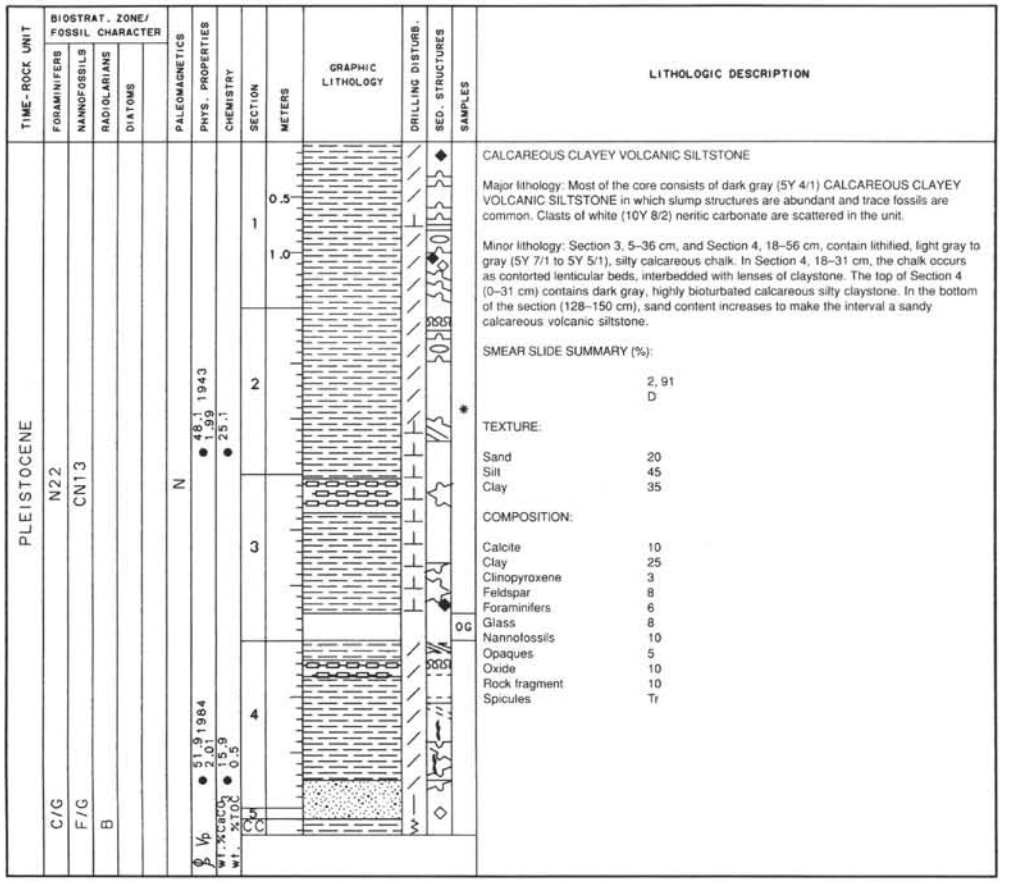
Minor lithology:
Light gray (5Y 6/1), bioturbated layers of silty calcareous mixed sediment are found in Section 2, at 30–42 and 52–69 cm.

SMEAR SLIDE SUMMARY (%):

	1, 16 M	2, 54 M
TEXTURE:		
Sand	35	15
Silt	55	30
Clay	10	55
COMPOSITION:		
Calcite	---	60
Clay	10	15
Clinopyroxene	10	---
Feldspar	35	2
Foraminifers	---	10
Glass	12	---
Nannofossils	---	2
Opaques	10	1
Oxide	8	10
Rock fragment	15	---
Spicules	---	Tr



SITE 833 HOLE B CORE 19R CORED INTERVAL 250.5-260.0 mbsf



LITHOLOGIC DESCRIPTION

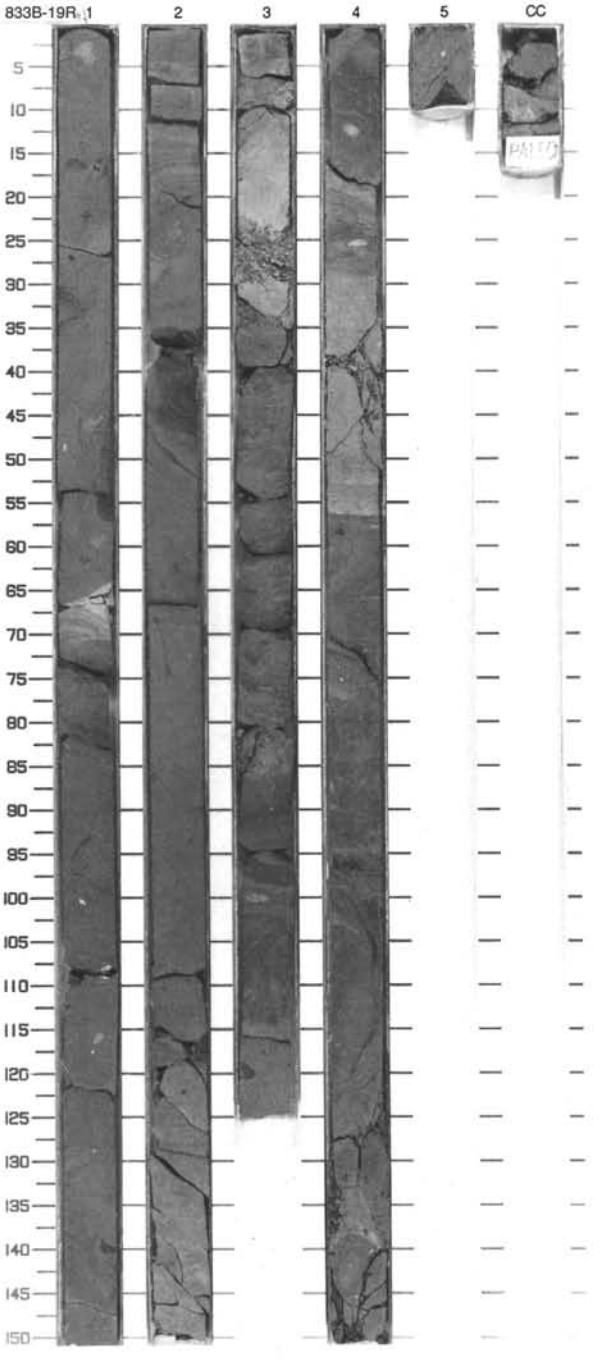
CALCAREOUS CLAYEY VOLCANIC SILTSTONE

Major lithology: Most of the core consists of dark gray (5Y 4/1) CALCAREOUS CLAYEY VOLCANIC SILTSTONE in which slump structures are abundant and trace fossils are common. Clasts of white (10Y 8/2) neritic carbonate are scattered in the unit.

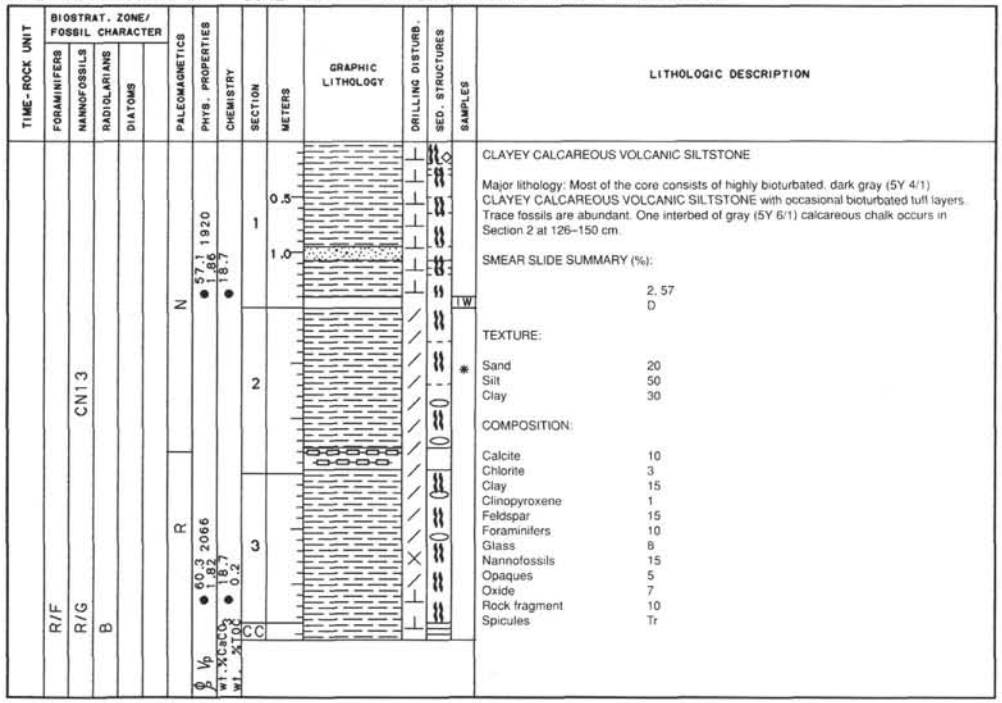
Minor lithology: Section 3, 5–36 cm, and Section 4, 18–56 cm, contain lithified, light gray to gray (5Y 7/1 to 5Y 5/1), silty calcareous chalk. In Section 4, 18–31 cm, the chalk occurs as contorted lenticular beds, interbedded with lenses of claystone. The top of Section 4 (0–31 cm) contains dark gray, highly bioturbated calcareous silty claystone. In the bottom of the section (128–150 cm), sand content increases to make the interval a sandy calcareous volcanic siltstone.

SMEAR SLIDE SUMMARY (%):

	2, 91 D
TEXTURE:	
Sand	20
Silt	45
Clay	35
COMPOSITION:	
Calcite	10
Clay	25
Clinopyroxene	3
Feldspar	8
Foraminifers	6
Glass	8
Nannofossils	10
Opaques	5
Oxide	10
Rock fragment	10
Spicules	Tr



SITE 833 HOLE B CORE 20R CORED INTERVAL 260.0-269.7 mbsf

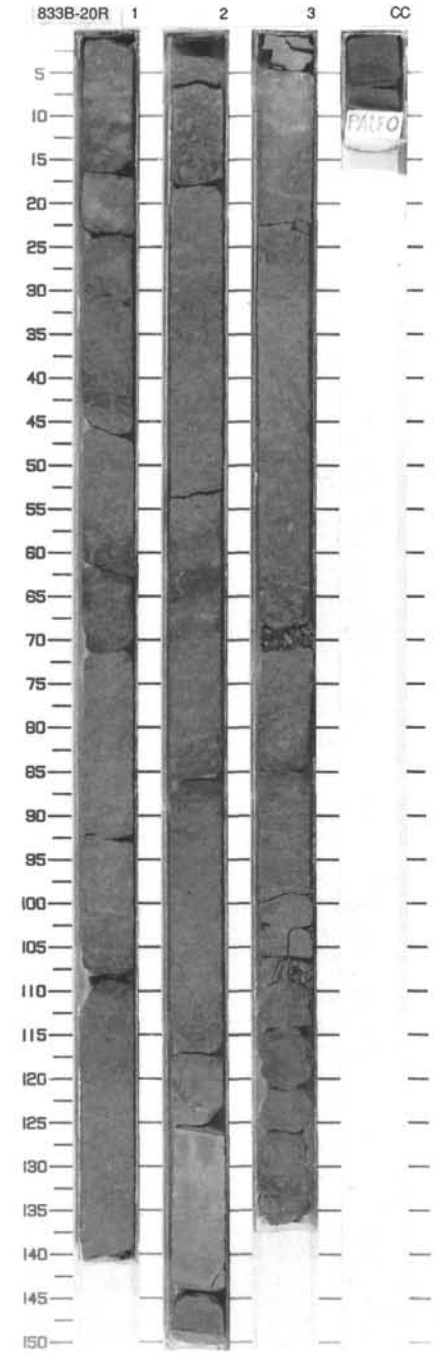


CLAYEY CALCAREOUS VOLCANIC SILTSTONE

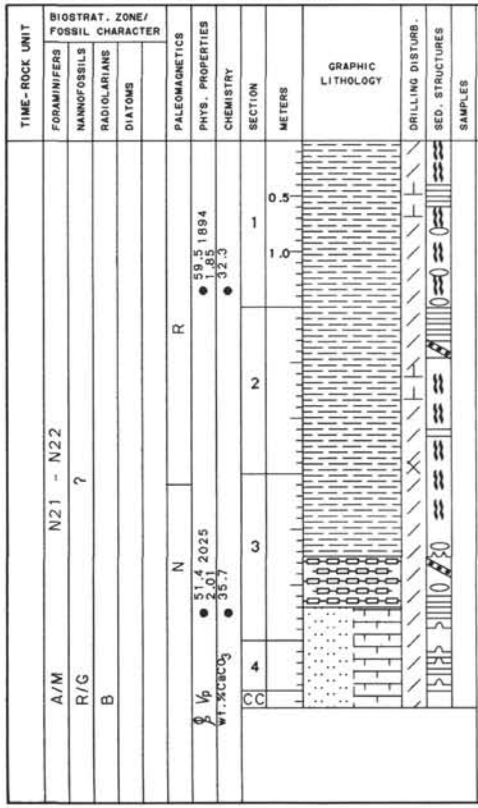
Major lithology: Most of the core consists of highly bioturbated, dark gray (5Y 4/1) CLAYEY CALCAREOUS VOLCANIC SILTSTONE with occasional bioturbated tuff layers. Trace fossils are abundant. One interbed of gray (5Y 6/1) calcareous chalk occurs in Section 2 at 126–150 cm.

SMEAR SLIDE SUMMARY (%):

	2, 57 D
TEXTURE:	
Sand	20
Silt	50
Clay	30
COMPOSITION:	
Calcite	10
Chlorite	3
Clay	15
Clinopyroxene	1
Feldspar	15
Foraminifers	10
Glass	8
Nannofossils	15
Opaques	5
Oxide	7
Rock fragment	10
Spicules	Tr



SITE 833 HOLE B CORE 21R CORED INTERVAL 269.7-279.3 mbsf



LITHOLOGIC DESCRIPTION

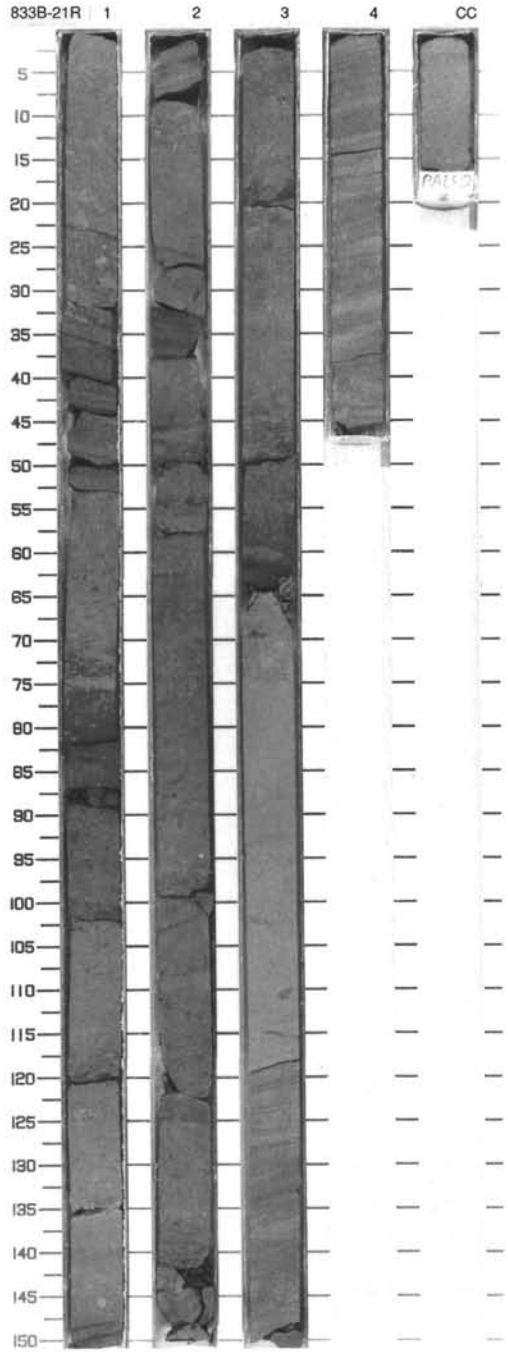
CALCAREOUS CLAYEY VOLCANIC SILTSTONE and SILTY FORAMINIFERAL MIXED SEDIMENTARY ROCK

Major lithology:
a. Most of the top of the core, through Section 3, 75 cm, consists of dark gray (5Y 4/1), highly bioturbated, CALCAREOUS CLAYEY VOLCANIC SILTSTONE. Trace fossils are abundant, but a few laminated intervals survive, including a cross-bedded sandy layer near the top of Section 2.
b. Below Section 3, 119 cm, the core consists of thinly laminated, black and greenish gray (5Y 2.5/1 and 10Y 5/1) SILTY FORAMINIFERAL MIXED SEDIMENTARY ROCK. These beds are often contorted. In Section CC, there are no laminations and the rock is gray (5Y 5/1).

Minor lithology:
a. Section 1, 33–54 cm, consists of very dark gray (5Y 3/1) calcareous silty volcanic claystone.
b. Section 3, 75–119 cm, consists of lithified, gray (5Y 5/1), clayey calcareous chalk with numerous fractures filled with sandy silt (clastic dikes).

SMEAR SLIDE SUMMARY (%):

	4, 30
	M
TEXTURE:	
Sand	35
Silt	55
Clay	10
COMPOSITION:	
Calcite	10
Celadonite	Tr
Chlorite	5
Clay	7
Clinopyroxene	4
Feldspar	7
Foraminifers	35
Glass	5
Nannofossils	3
Opaques	14
Oxide	10



SITE 833 HOLE B CORE 22R CORED INTERVAL 279.3-288.9 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
F/P	N21 - N22	CN13/CN12	B		N	● 57.7 1879 1.83 ● 54.9 2043 1.96 ● 48.1 ● 33.5		1 2 3 4 CC	0.5 1.0				IW * * *

LITHOLOGIC DESCRIPTION

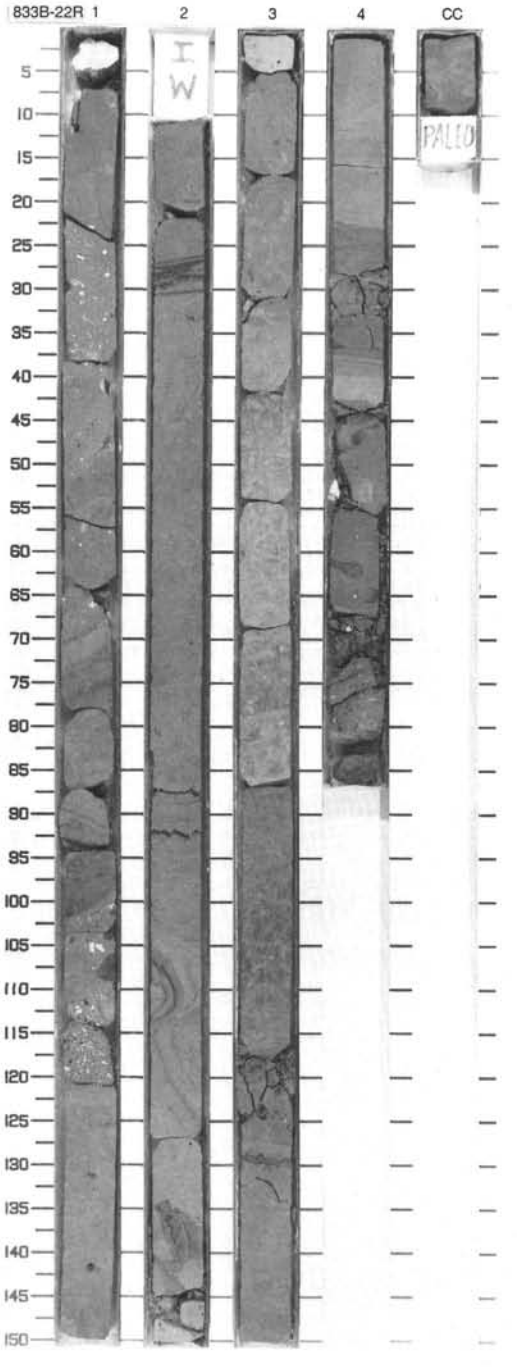
FORAMINIFERAL CHALK and SILTY FORAMINIFERAL MIXED SEDIMENTARY ROCK

Major lithology:
a. Most of the core consists of light greenish gray to greenish gray (5GY 5/1 to 5GY 3/1), partially lithified FORAMINIFERAL CHALK with silt. In Section 2, the chalk contains abundant slump structures, featuring chloritic (?) green beds which were displaced into a sequence of microfaults in the process of folding.
b. About one-third of the core consists of beds, 15–45 cm thick, of gray (5Y 4/1) SILTY FORAMINIFERAL MIXED SEDIMENTARY ROCK. In Section 4, the unit contains several neritic carbonate clasts.

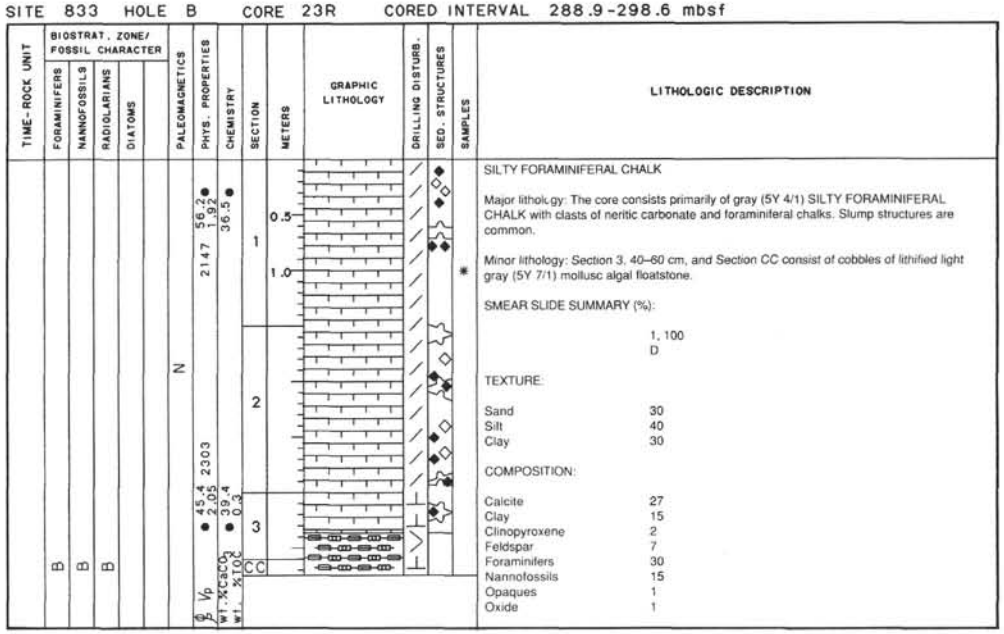
Minor lithology: Section 1, 22–70 cm, and 99–122 cm, contains greenish gray (5GY 5/1) calcareous breccia in a silty foraminiferal mixed sediment matrix. Clasts are neritic carbonate grains, > 1 cm in diameter. Section 1, 0–5 cm, consists of a single cobble of white (10Y 6/2), lithified, laminated wackestone with minor amounts of carbonate cement.

SMEAR SLIDE SUMMARY (%):

	2, 133 D	3, 98 D	3, 130 M
TEXTURE:			
Sand	28	35	5
Silt	52	37	75
Clay	20	28	20
COMPOSITION:			
Calcite	32	23	---
Chlorite	1	---	---
Clay	---	8	---
Clinopyroxene	Tr	2	2
Feldspar	5	5	10
Foraminifers	40	30	---
Nannofossils	15	20	---
Opaques	2	4	73
Oxide	5	8	---
Zeolite	---	---	15



SITE 833 HOLE B CORE 23R CORED INTERVAL 288.9-298.6 mbsf



LITHOLOGIC DESCRIPTION

SILTY FORAMINIFERAL CHALK

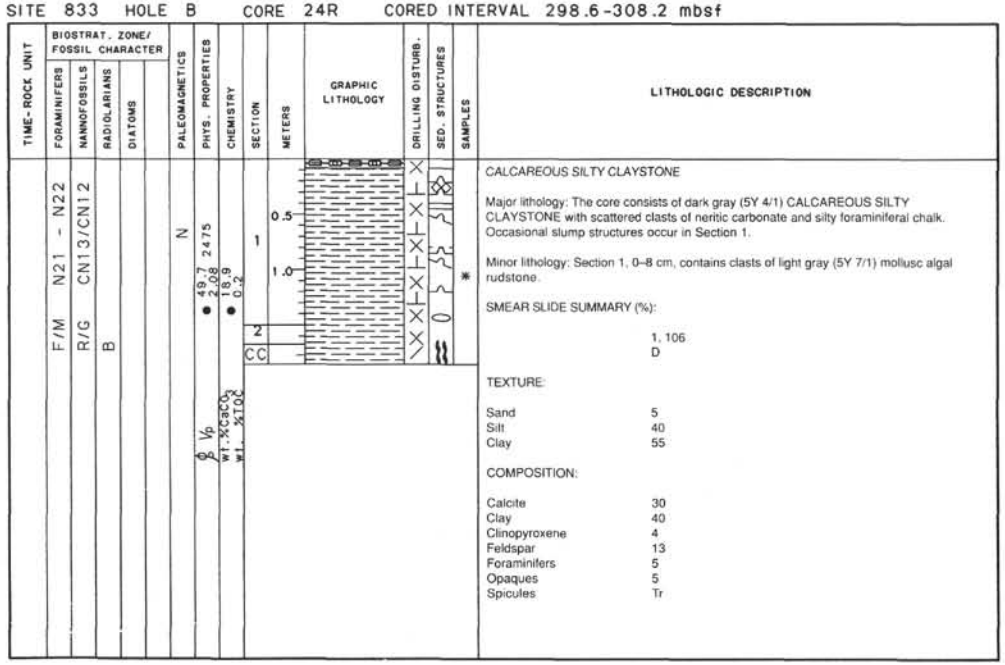
Major lithology: The core consists primarily of gray (5Y 4/1) SILTY FORAMINIFERAL CHALK with clasts of neritic carbonate and foraminiferal chalks. Slump structures are common.

Minor lithology: Section 3, 40–60 cm, and Section CC consist of cobbles of lithified light gray (5Y 7/1) mollusc algal floatstone.

SMEAR SLIDE SUMMARY (%):

	1, 100 D
TEXTURE:	
Sand	30
Silt	40
Clay	30
COMPOSITION:	
Calcite	27
Clay	15
Clinopyroxene	2
Feldspar	7
Foraminifers	30
Nannofossils	15
Opaques	1
Oxide	1

SITE 833 HOLE B CORE 24R CORED INTERVAL 298.6-308.2 mbsf



LITHOLOGIC DESCRIPTION

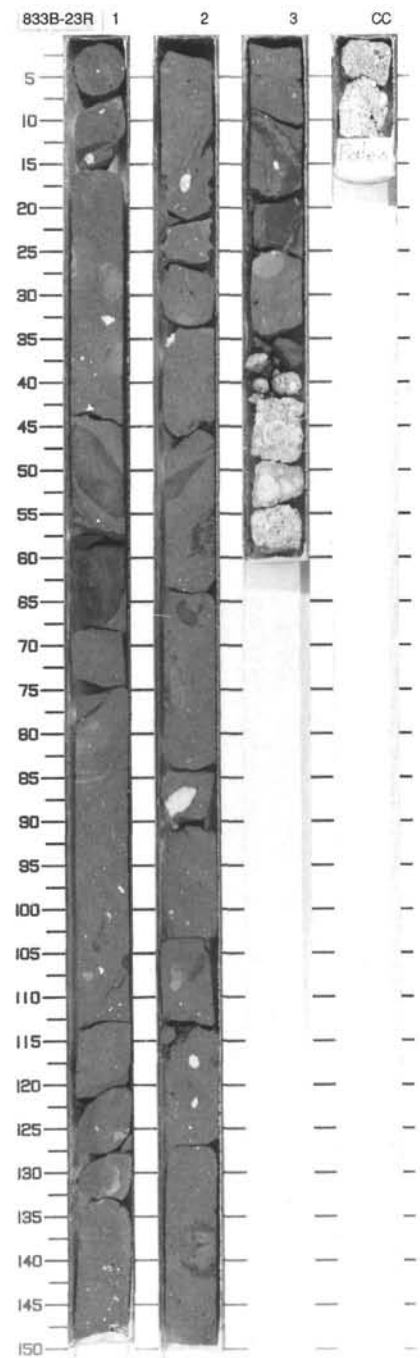
CALCAREOUS SILTY CLAYSTONE

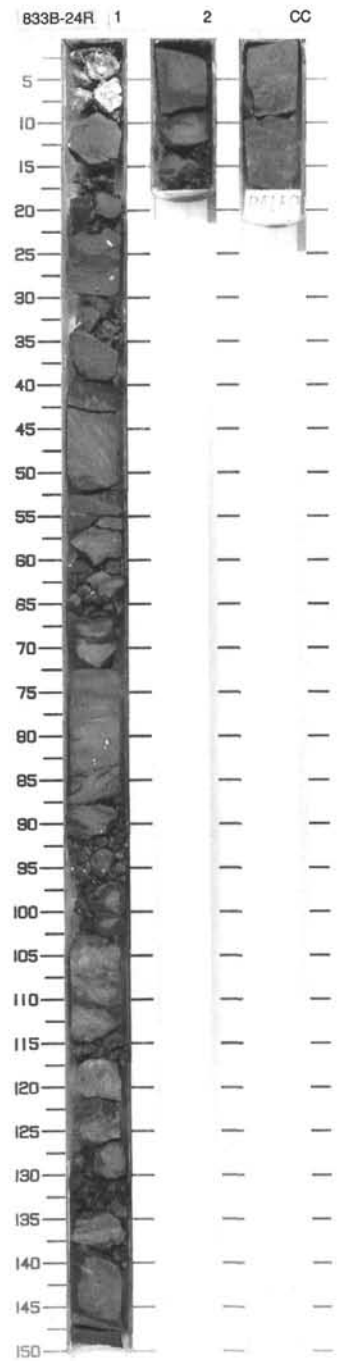
Major lithology: The core consists of dark gray (5Y 4/1) CALCAREOUS SILTY CLAYSTONE with scattered clasts of neritic carbonate and silty foraminiferal chalk. Occasional slump structures occur in Section 1.

Minor lithology: Section 1, 0–8 cm, contains clasts of light gray (5Y 7/1) mollusc algal rudstone.

SMEAR SLIDE SUMMARY (%):

	1, 106 D
TEXTURE:	
Sand	5
Silt	40
Clay	55
COMPOSITION:	
Calcite	30
Clay	40
Clinopyroxene	4
Feldspar	13
Foraminifers	5
Opaques	5
Spicules	Tr





SITE 833 HOLE B CORE 25R CORED INTERVAL 308.2-317.9 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
F/M	N21 - N22	CN13/CN12	B		N	2871 40.7 2.28	1.0	1	0.5 1.0				TW
R/M					R	53.1 2356 1.97	27.7 0.3	2					
					N			3					
								CC					

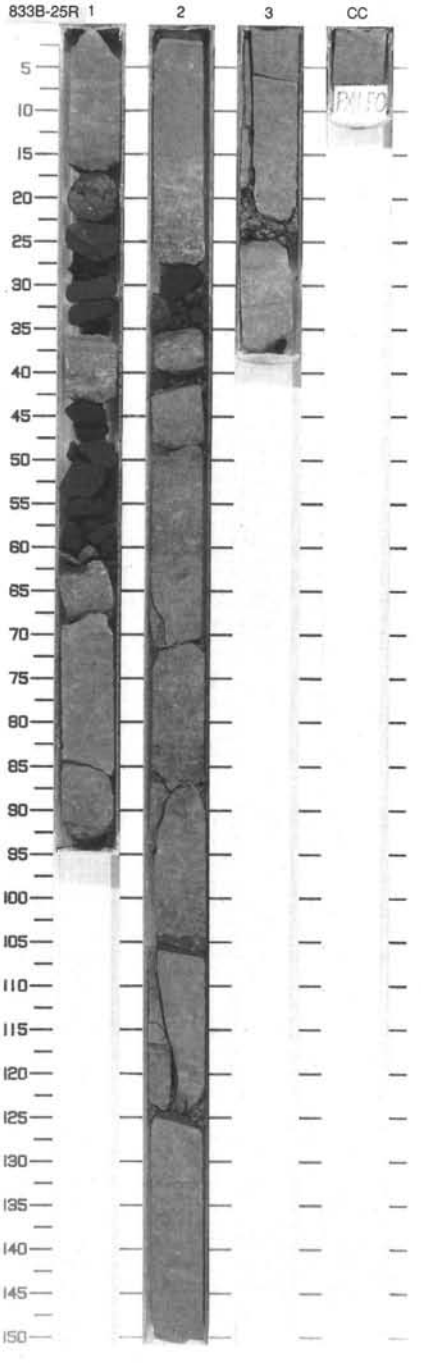
wt. %CaCO3
wt. %TOC

CALCAREOUS SILTY CLAYSTONE and FINE VOLCANIC TUFF

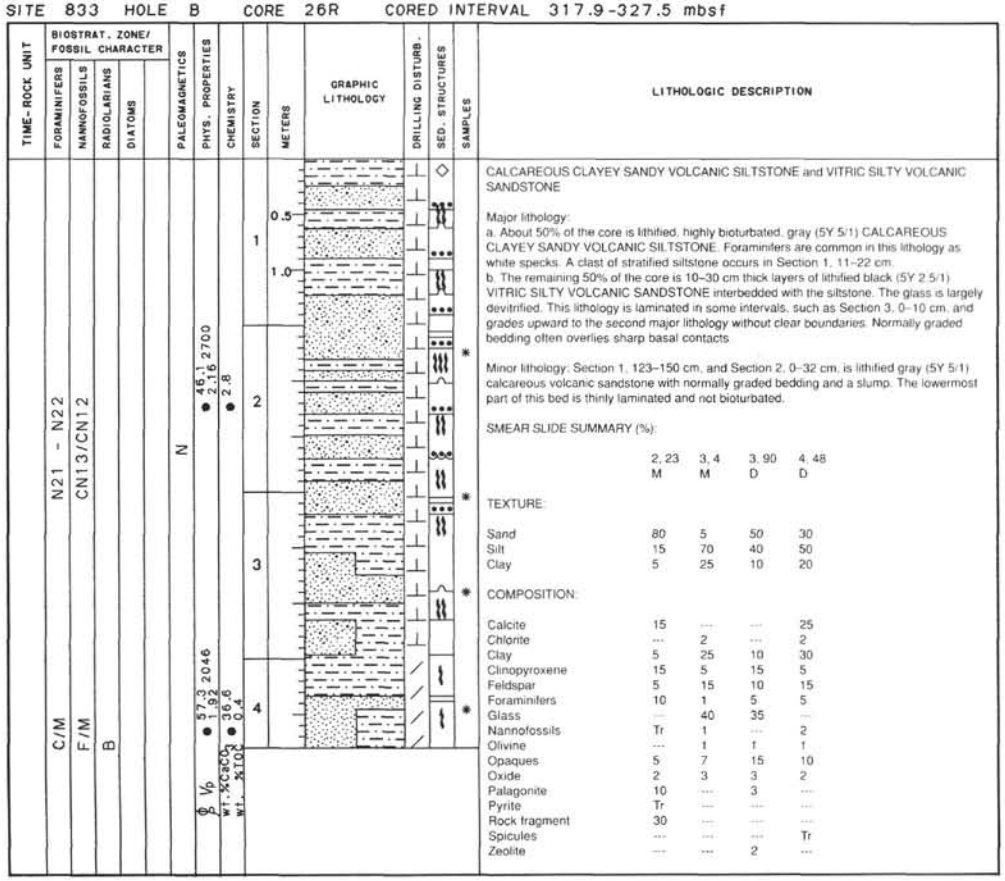
Major lithology:
a. Most of the core consists of highly bioturbated dark gray (5Y 4/1) CALCAREOUS SILTY CLAYSTONE with foraminifers, in beds about 5–50 cm thick.
b. The claystone is interbedded with black (5Y 2.5/1) FINE VOLCANIC TUFF, in beds about 2–15 cm thick. Tuff layers become more sparse and thinner below Section 1.

SMEAR SLIDE SUMMARY (%):

	1, 29 M
TEXTURE:	
Sand	70
Silt	30
COMPOSITION:	
Clinopyroxene	20
Feldspar	20
Glass	10
Opaques	30
Orthopyroxene	1
Oxide	2
Rock fragment	17
Spicules	Tr



SITE 833 HOLE B CORE 26R CORED INTERVAL 317.9-327.5 mbsf



LITHOLOGIC DESCRIPTION

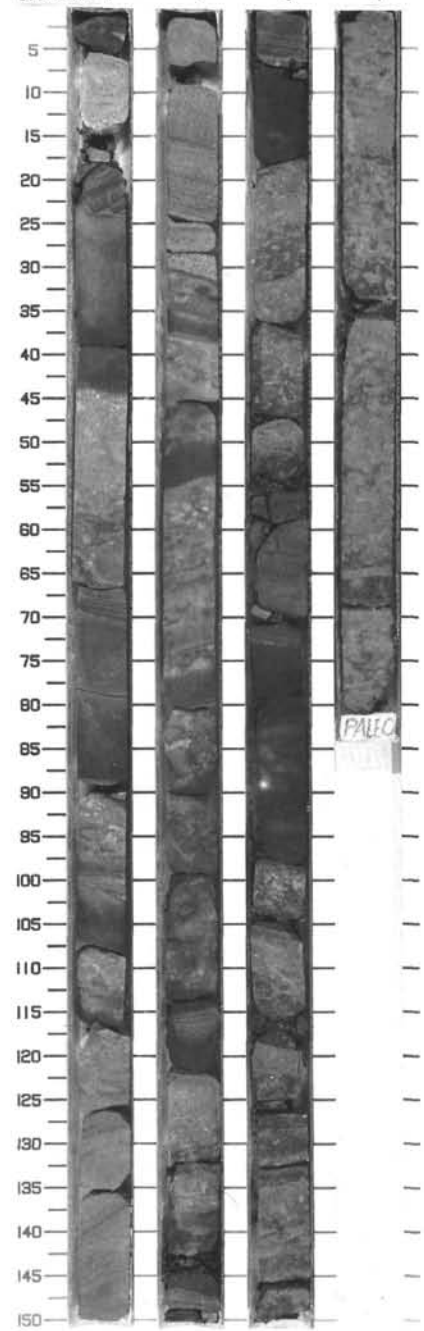
CALCAREOUS CLAYEY SANDY VOLCANIC SILTSTONE and VITRIC SILTY VOLCANIC SANDSTONE

Major lithology:
a. About 50% of the core is lithified, highly bioturbated, gray (5Y 5/1) CALCAREOUS CLAYEY SANDY VOLCANIC SILTSTONE. Foraminifers are common in this lithology as white specks. A clast of stratified siltstone occurs in Section 1, 11–22 cm.
b. The remaining 50% of the core is 10–30 cm thick layers of lithified black (5Y 2.5/1) VITRIC SILTY VOLCANIC SANDSTONE interbedded with the siltstone. The glass is largely devitrified. This lithology is laminated in some intervals, such as Section 3, 0–10 cm, and grades upward to the second major lithology without clear boundaries. Normally graded bedding often overlies sharp basal contacts.

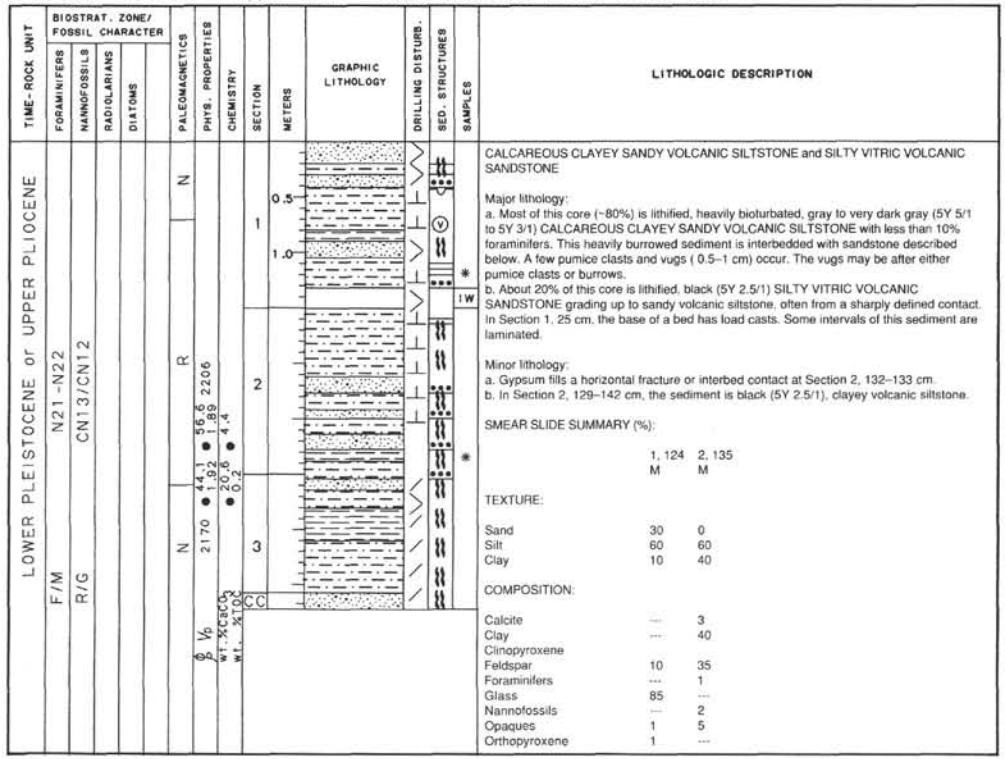
Minor lithology: Section 1, 123–150 cm, and Section 2, 0–32 cm, is lithified gray (5Y 5/1) calcareous volcanic sandstone with normally graded bedding and a slump. The lowermost part of this bed is thinly laminated and not bioturbated.

SMEAR SLIDE SUMMARY (%):

	2, 23 M	3, 4 M	3, 90 D	4, 48 D
TEXTURE:				
Sand	80	5	50	30
Silt	15	70	40	50
Clay	5	25	10	20
COMPOSITION:				
Calcite	15	---	---	25
Chlorite	---	2	---	2
Clay	5	25	10	30
Clinopyroxene	15	5	15	5
Feldspar	5	15	10	15
Foraminifers	10	1	5	5
Glass	---	40	35	---
Nannofossils	Tr	1	---	2
Olivine	---	1	1	1
Opaques	5	7	15	10
Oxide	2	3	3	2
Palagonite	10	---	3	---
Pyrite	Tr	---	---	---
Rock fragment	30	---	---	---
Spicules	---	---	---	Tr
Zeolite	---	---	2	---



SITE 833 HOLE B CORE 27R CORED INTERVAL 327.5-337.2 mbsf



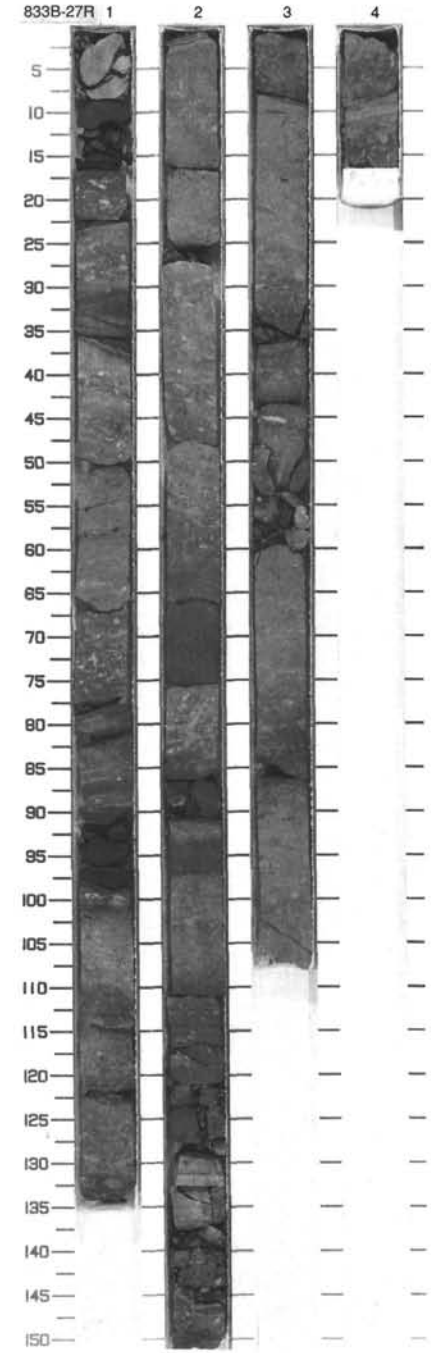
CALCAREOUS CLAYEY SANDY VOLCANIC SILTSTONE and SILTY VITRIC VOLCANIC SANDSTONE

Major lithology:
a. Most of this core (~80%) is lithified, heavily bioturbated, gray to very dark gray (5Y 5/1 to 5Y 3/1) CALCAREOUS CLAYEY SANDY VOLCANIC SILTSTONE with less than 10% foraminifers. This heavily burrowed sediment is interbedded with sandstone described below. A few pumice clasts and vugs (0.5–1 cm) occur. The vugs may be after either pumice clasts or burrows.
b. About 20% of this core is lithified, black (5Y 2.5/1) SILTY VITRIC VOLCANIC SANDSTONE grading up to sandy volcanic siltstone, often from a sharply defined contact. In Section 1, 25 cm, the base of a bed has load casts. Some intervals of this sediment are laminated.

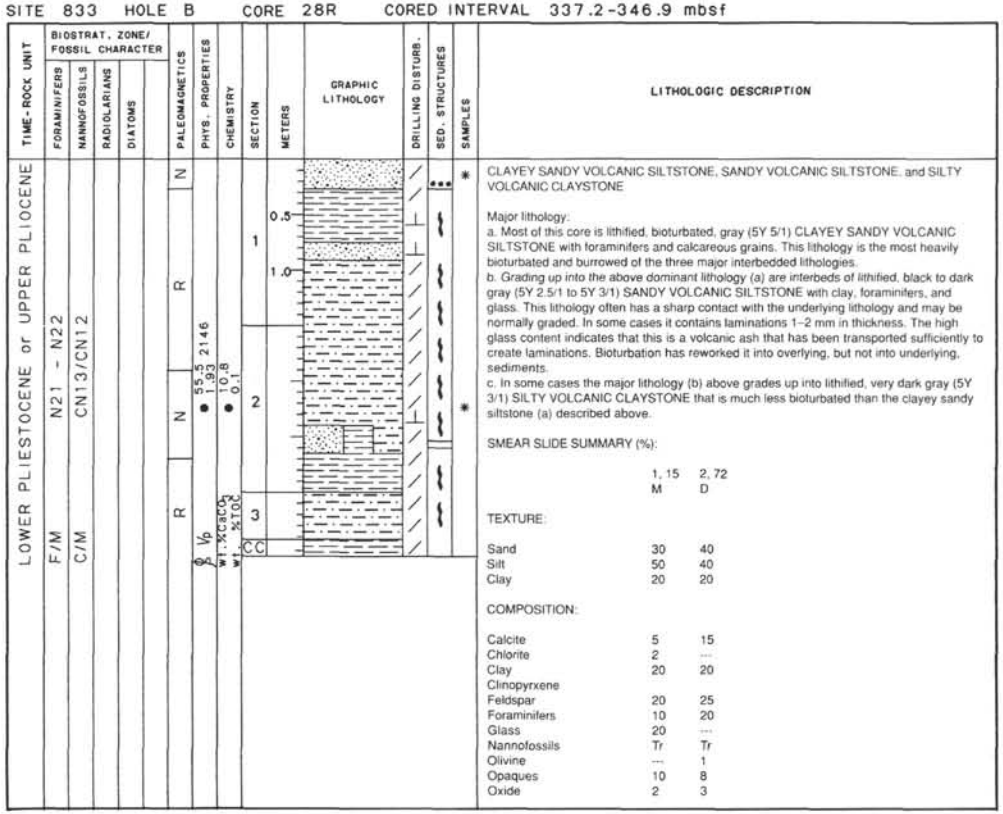
Minor lithology:
a. Gypsum fills a horizontal fracture or interbed contact at Section 2, 132–133 cm.
b. In Section 2, 129–142 cm, the sediment is black (5Y 2.5/1), clayey volcanic siltstone.

SMEAR SLIDE SUMMARY (%):

	1, 124 M	2, 135 M
TEXTURE:		
Sand	30	0
Silt	60	60
Clay	10	40
COMPOSITION:		
Calcite	---	3
Clay	---	40
Clinopyroxene		
Feldspar	10	35
Foraminifers	---	1
Glass	85	---
Nannofossils	---	2
Opaques	1	5
Orthopyroxene	1	---



SITE 833 HOLE B CORE 28R CORED INTERVAL 337.2-346.9 mbsf



LITHOLOGIC DESCRIPTION

CLAYEY SANDY VOLCANIC SILTSTONE, SANDY VOLCANIC SILTSTONE, and SILTY VOLCANIC CLAYSTONE

Major lithology:

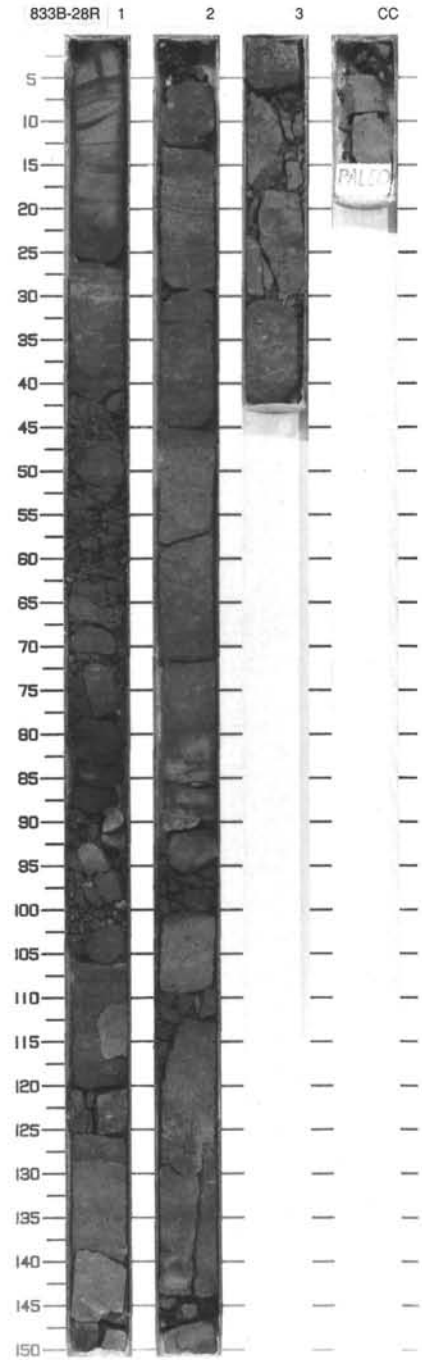
a. Most of this core is lithified, bioturbated, gray (5Y 5/1) CLAYEY SANDY VOLCANIC SILTSTONE with foraminifers and calcareous grains. This lithology is the most heavily bioturbated and burrowed of the three major interbedded lithologies.

b. Grading up into the above dominant lithology (a) are interbeds of lithified, black to dark gray (5Y 2.5/1 to 5Y 3/1) SANDY VOLCANIC SILTSTONE with clay, foraminifers, and glass. This lithology often has a sharp contact with the underlying lithology and may be normally graded. In some cases it contains laminations 1–2 mm in thickness. The high glass content indicates that this is a volcanic ash that has been transported sufficiently to create laminations. Bioturbation has reworked it into overlying, but not into underlying, sediments.

c. In some cases the major lithology (b) above grades up into lithified, very dark gray (5Y 3/1) SILTY VOLCANIC CLAYSTONE that is much less bioturbated than the clayey sandy siltstone (a) described above.

SMEAR SLIDE SUMMARY (%):

	1, 15 M	2, 72 D
TEXTURE:		
Sand	30	40
Silt	50	40
Clay	20	20
COMPOSITION:		
Calcite	5	15
Chlorite	2	---
Clay	20	20
Clinopyrxene		
Feldspar	20	25
Foraminifers	10	20
Glass	20	---
Nannofossils	Tr	Tr
Olivine	---	1
Opaques	10	8
Oxide	2	3



SITE 833 HOLE B CORE 29R CORED INTERVAL 346.9-356.5 mbsf

Column	Entries
TIME-ROCK UNIT	LOWER PLEISTOCENE or UPPER PLIOCENE
BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	N21 - N22; F/M
NANNOFOSSILS	CN13/CN12; F/P
RADIOLARIANS	B
DIATOMS	
PALEOMAGNETICS	R; N; R; N
PHYS. PROPERTIES	● 55.0 2157 1.94; ϕ V_p β
CHEMISTRY	● 12.1 0.2; wt. %CaCO$_3$ wt. %TOC
SECTION	1; 2; 3; CC
METERS	0.5; 1.0
GRAPHIC LITHOLOGY	VOID
SAMPLES	IW; *

LITHOLOGIC DESCRIPTION

FORAMINIFERAL SANDY VOLCANIC SILTSTONE

Major lithology: Most of the core is bioturbated, dark gray to gray (5Y 4/1 to 5Y 3/1). FORAMINIFERAL SANDY VOLCANIC SILTSTONE with clay. Some beds are black (5Y 2.5/1) and 0.5 cm or less in thickness. Bioturbation is limited to layers less rich in volcanic grains. Burrows about 5 mm in diameter in Section 2, 5–12 cm, may be *Zoophycos*. In Section 2, 15 cm, is a fracture filled with a layer of gypsum about 5 mm in thickness.

Minor lithology: In Section 2, 120–140 cm, is an interval of very dark gray to black (5Y 3/1 to 5Y 2.5/1) clayey volcanic siltstone. The black portion of this interval is not bioturbated.

SMEAR SLIDE SUMMARY (%):

	2, 64
	D
TEXTURE:	
Sand	40
Silt	50
Clay	10
COMPOSITION:	
Chlorite	1
Clay	10
Clinopyroxene	5
Feldspar	20
Foraminifers	40
Glass	5
Inorganic calcite	5
Nannofossils	1
Opaques	8
Oxide	2
Spicules	Tr

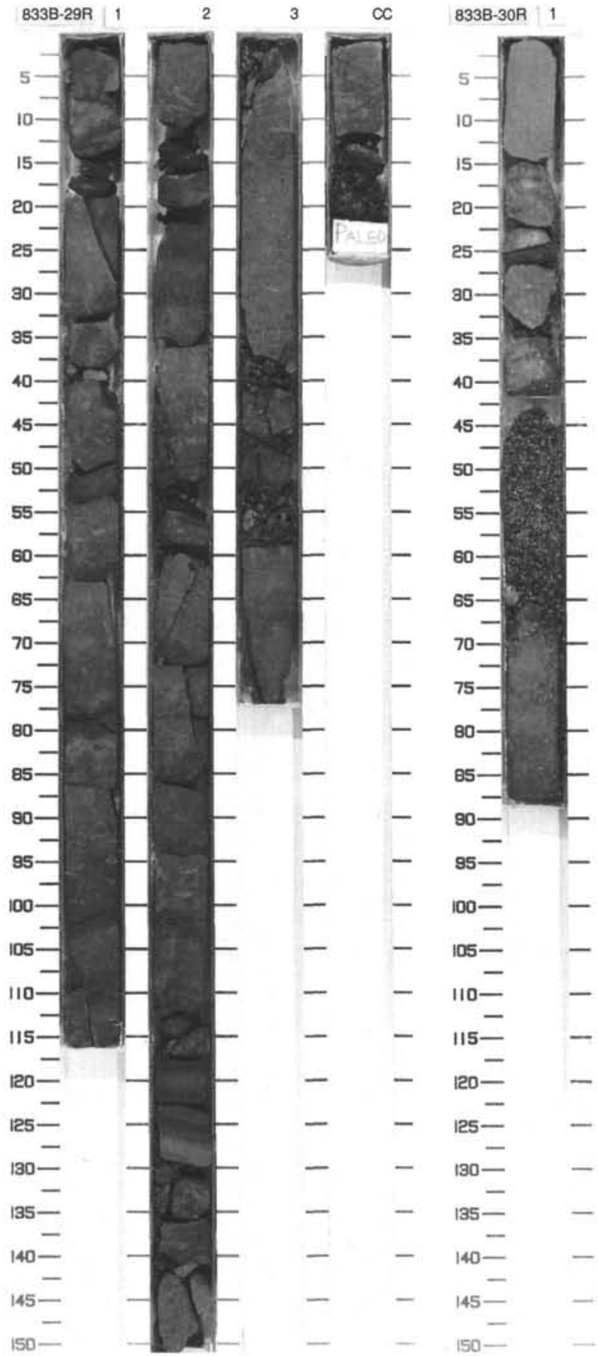
SITE 833 HOLE B CORE 30R CORED INTERVAL 356.5-366.2 mbsf

Column	Entries
TIME-ROCK UNIT	LOWER PLEISTOCENE or UPPER PLIOCENE
BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	N21 - N22; F/M
NANNOFOSSILS	CN13/CN12; R/G
RADIOLARIANS	B
DIATOMS	
PALEOMAGNETICS	N; R
PHYS. PROPERTIES	● 53.7 2621 1.89; ϕ V_p β
CHEMISTRY	● 6.4 0.1; wt. %CaCO$_3$ wt. %TOC
SECTION	1
METERS	0.5

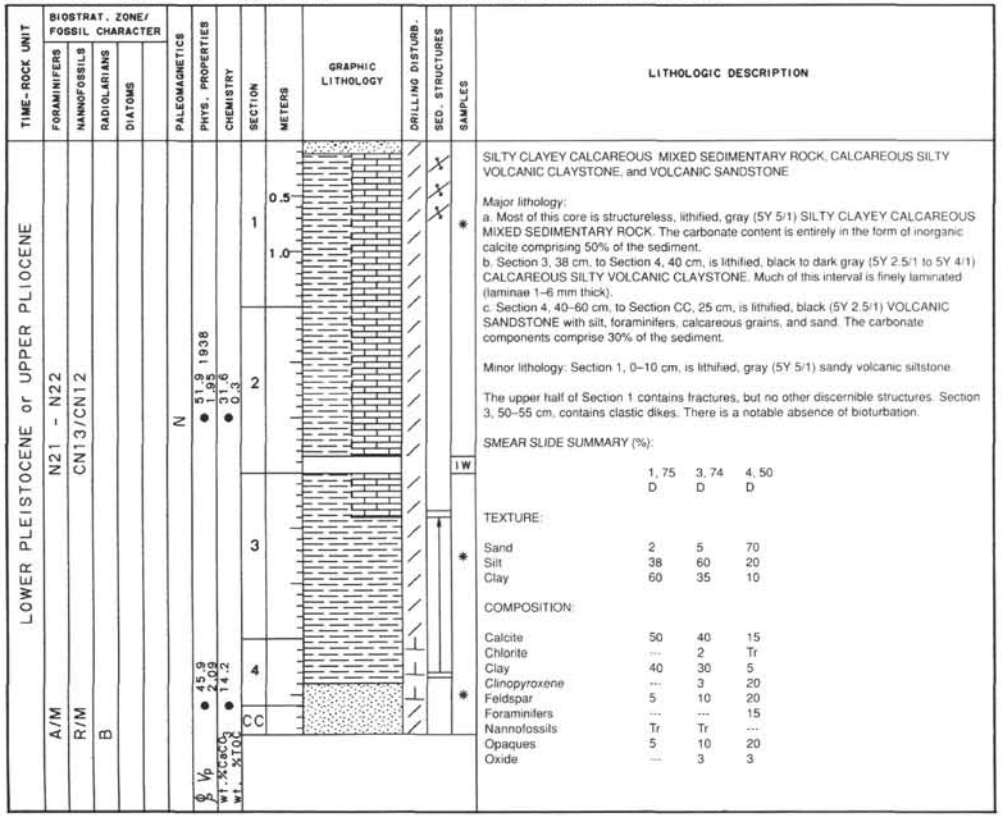
LITHOLOGIC DESCRIPTION

CLAYEY VOLCANIC SILTSTONE and BIOCLASTIC SED-LITHIC GRAVEL

Major lithology:
a. Most of this core is lithified gray to dark gray (5Y 5/1 to 5Y 4/1) CLAYEY VOLCANIC SILTSTONE. The uppermost interval, 0–14 cm, is claystone and the lowermost interval, Section 1, 67–88 cm, is clayey sandy volcanic siltstone.
b. The middle of the recovered interval, Section 1, 40–67 cm, is BIOCLASTIC SED-LITHIC GRAVEL. About 40% of the clasts are molluscs and range in size from 1 to 4 mm. The remainder are black volcanic siltstone ranging in size from 1 to 6 mm.



SITE 833 HOLE B CORE 31R CORED INTERVAL 366.2-375.8 mbsf



SILTY CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK, CALCAREOUS SILTY VOLCANIC CLAYSTONE, and VOLCANIC SANDSTONE

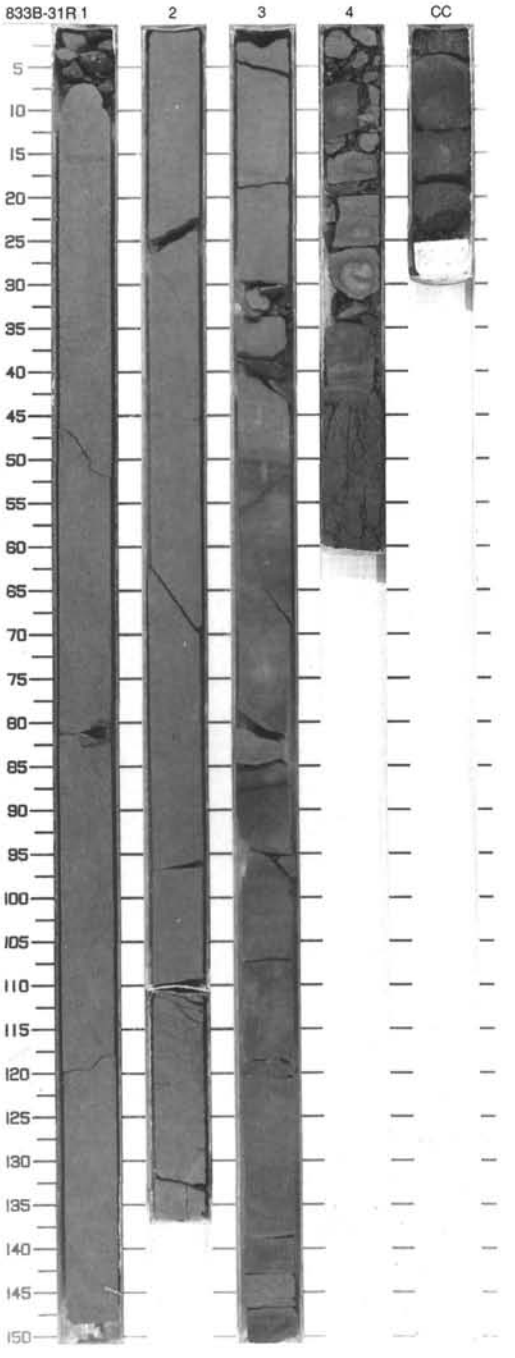
Major lithology:
a. Most of this core is structureless, lithified, gray (5Y 5/1) SILTY CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK. The carbonate content is entirely in the form of inorganic calcite comprising 50% of the sediment.
b. Section 3, 38 cm, to Section 4, 40 cm, is lithified, black to dark gray (5Y 2.5/1 to 5Y 4/1) CALCAREOUS SILTY VOLCANIC CLAYSTONE. Much of this interval is finely laminated (laminae 1–6 mm thick).
c. Section 4, 40–60 cm, to Section CC, 25 cm, is lithified, black (5Y 2.5/1) VOLCANIC SANDSTONE with silt, foraminifers, calcareous grains, and sand. The carbonate components comprise 30% of the sediment.

Minor lithology: Section 1, 0–10 cm, is lithified, gray (5Y 5/1) sandy volcanic siltstone.

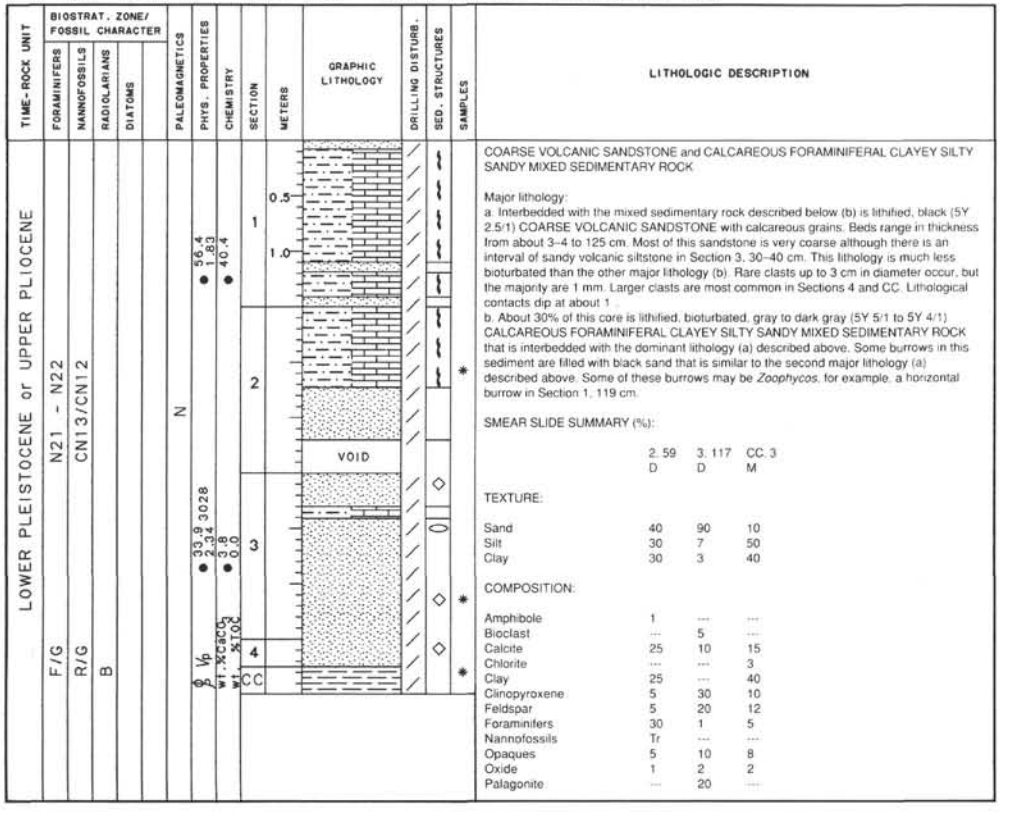
The upper half of Section 1 contains fractures, but no other discernible structures. Section 3, 50–55 cm, contains clastic dikes. There is a notable absence of bioturbation.

SMEAR SLIDE SUMMARY (%):

	1, 75 D	3, 74 D	4, 50 D
TEXTURE:			
Sand	2	5	70
Silt	38	60	20
Clay	60	35	10
COMPOSITION:			
Calcite	50	40	15
Chlorite	---	2	Tr
Clay	40	30	5
Clinopyroxene	---	3	20
Feldspar	5	10	20
Foraminifers	---	---	15
Nannofossils	Tr	Tr	---
Opaques	5	10	20
Oxide	---	3	3



SITE 833 HOLE B CORE 32R CORED INTERVAL 375.8-385.5 mbsf



LITHOLOGIC DESCRIPTION

COARSE VOLCANIC SANDSTONE and CALCAREOUS FORAMINIFERAL CLAYEY SILTY SANDY MIXED SEDIMENTARY ROCK

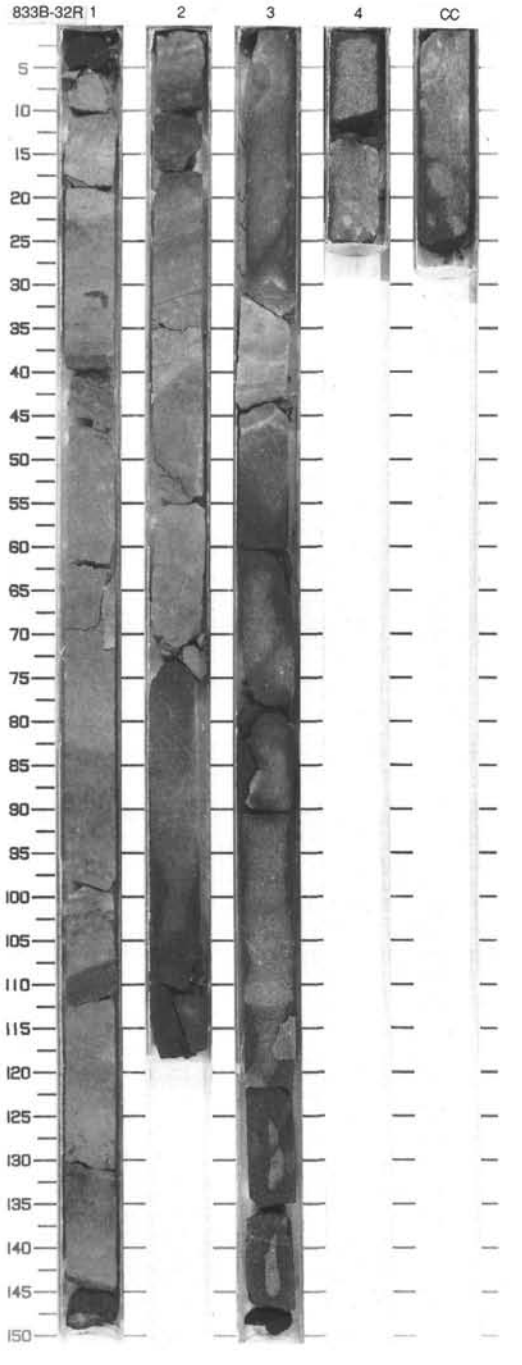
Major lithology:

a. Interbedded with the mixed sedimentary rock described below (b) is lithified, black (5Y 2.5/1) COARSE VOLCANIC SANDSTONE with calcareous grains. Beds range in thickness from about 3–4 to 125 cm. Most of this sandstone is very coarse although there is an interval of sandy volcanic siltstone in Section 3, 30–40 cm. This lithology is much less bioturbated than the other major lithology (b). Rare clasts up to 3 cm in diameter occur, but the majority are 1 mm. Larger clasts are most common in Sections 4 and CC. Lithological contacts dip at about 1 .

b. About 30% of this core is lithified, bioturbated, gray to dark gray (5Y 5/1 to 5Y 4/1) CALCAREOUS FORAMINIFERAL CLAYEY SILTY SANDY MIXED SEDIMENTARY ROCK that is interbedded with the dominant lithology (a) described above. Some burrows in this sediment are filled with black sand that is similar to the second major lithology (a) described above. Some of these burrows may be *Zoophycos*, for example, a horizontal burrow in Section 1, 119 cm.

SMEAR SLIDE SUMMARY (%):

	2, 59 D	3, 117 D	CC, 3 M
TEXTURE:			
Sand	40	90	10
Silt	30	7	50
Clay	30	3	40
COMPOSITION:			
Amphibole	1	---	---
Bioclast	---	5	---
Calcite	25	10	15
Chlorite	---	---	3
Clay	25	---	40
Clinopyroxene	5	30	10
Feldspar	5	20	12
Foraminifers	30	1	5
Nannofossils	Tr	---	---
Opaques	5	10	8
Oxide	1	2	2
Palagonite	---	20	---



SITE 833 HOLE B CORE 33R CORED INTERVAL 385.5-395.2 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
LOWER PLEISTOCENE or UPPER PLIOCENE	F/G N21 - N22	R/G CN13/CN12			N	ϕ Vp ρ wt. %CaCO3 wt. %TOC: 37.2 2595 2.05 4.6 0.1		1, 2, CC	0.5, 1.0	VOID			TW

LITHOLOGIC DESCRIPTION

VOLCANIC SANDSTONE

Major lithology: Most of the core consists of black (5Y 2.5/1) VOLCANIC SANDSTONE, which varies in texture from coarse grained in Section 1, to medium grained at the top of Section 2, to fine grained at the bottom of Section 2. Sand grains are often white or dark gray.

Minor lithology: Section 1, 99–112 cm, and Section 2, 50–69 cm, consist of very dark gray (5Y 3/1) silty volcanic claystone, and Section CC, 0–7 cm, contains black (5Y 2.5/1) sandy volcanic siltstone with basaltic grains.

SMEAR SLIDE SUMMARY (%):

	1, 63 D
TEXTURE:	
Sand	80
Silt	20
Clay	...
COMPOSITION:	
Calcite	2
Celadonite	Tr
Clinopyroxene	18
Feldspar	30
Glass	10
Nannofossils	2
Opaques	5
Oxide	10
Quartz	2
Rock fragment	21

SITE 833 HOLE B CORE 34R CORED INTERVAL 395.2-404.9 mbsf

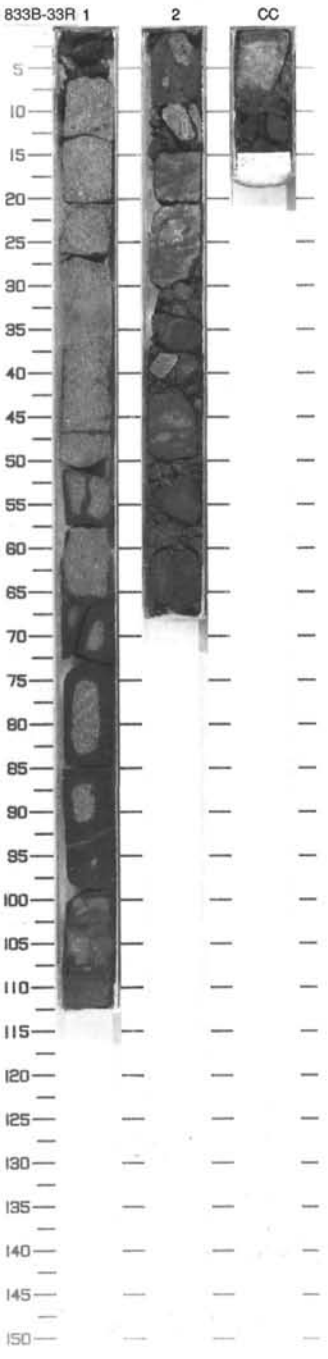
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
LOWER PLEISTOCENE or UPPER PLIOCENE	F/G N21 - N22	B ?	B		N	ϕ Vp ρ wt. %CaCO3 wt. %TOC: 7.6 3.16 5905 28.3 2.39 4026	0.3 0.0 1.1	1, 2, CC	0.5, 1.0				

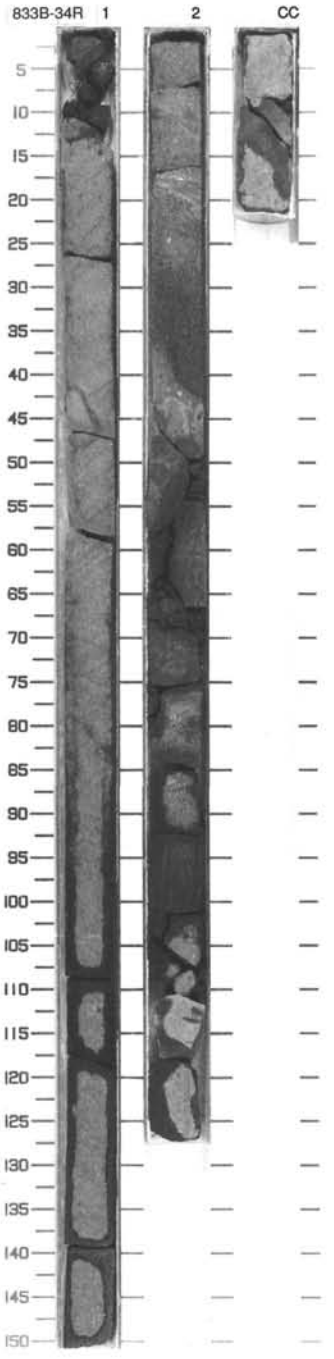
LITHOLOGIC DESCRIPTION

VOLCANIC SANDSTONE and SILTY CLAYSTONE

Major lithology:
a. Most of the core consists of black (5Y 2.5/1) fine- to medium-grained VOLCANIC SANDSTONE. Grains are dark gray, and a large (6 x 2 cm) clast of silty chalk occurs in Section 1.
b. Section 2, 35–81 cm, contains very dark gray (5Y 3/1) SILTY CLAYSTONE with slump structures at the upper and lower boundaries of the unit.

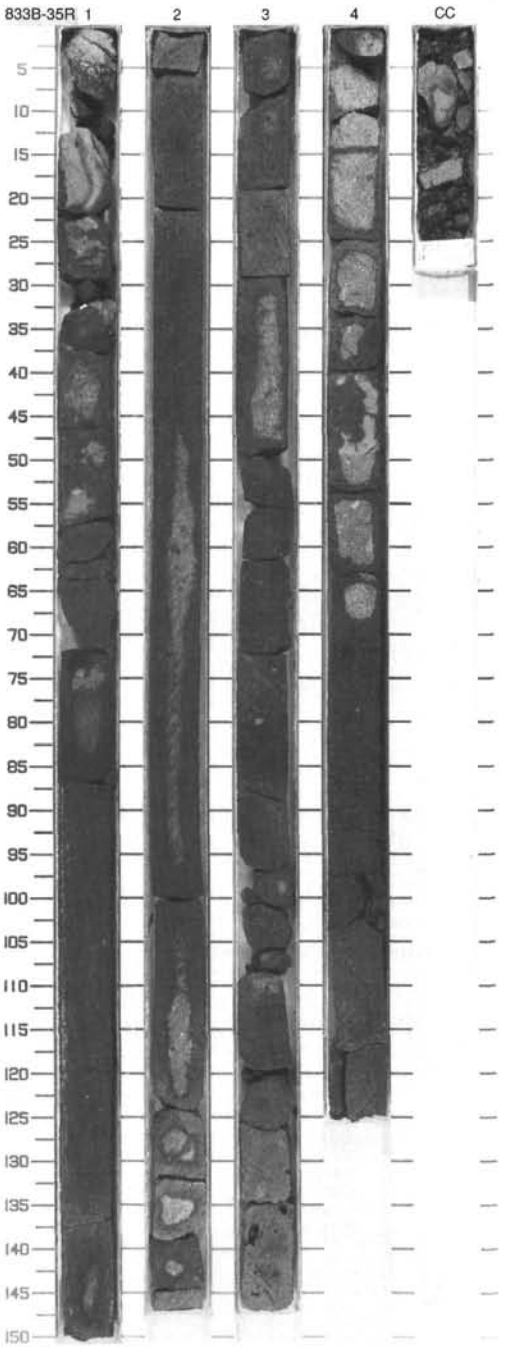
Minor lithology: Section CC contains black (5Y 2.5/1) basaltic breccia with clinopyroxene phenocrysts in the basalt clasts. The matrix is volcanic sandstone.



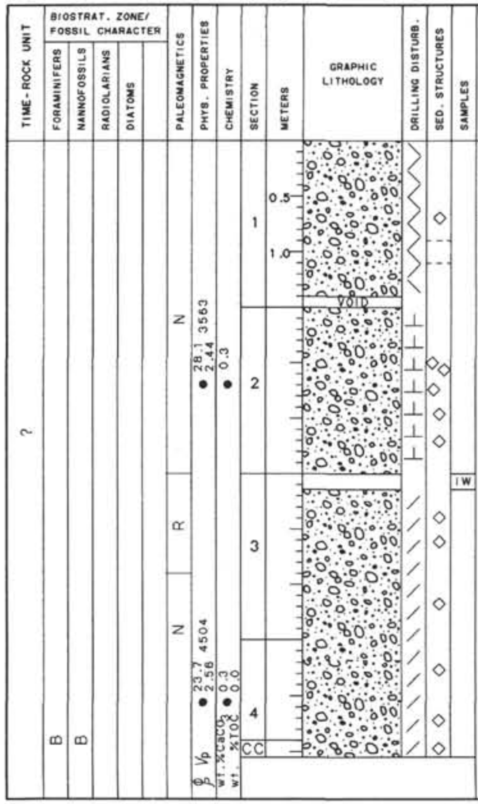


SITE 833 HOLE B CORE 35R CORED INTERVAL 404.9-414.5 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER PLEISTOCENE or UPPER PLIOCENE	F/G N21 - N22	B			N	● 20.9 3967 2.57 ● 29.3 36.0 2.45	● 0.8 ● 0.5 0.0	1 2 3 4 CC	0.5 1.0	Volc Volc				BASALTIC BRECCIA and VOLCANIC SANDSTONE Major lithology: a. About half the core consists of black (5Y 2.5/1) BASALTIC BRECCIA with occasional sed-lithic clasts up to 2 cm diameter. Basalt clasts are vesicular, with clinopyroxene phenocrysts, and range up to 17 cm diameter. Zeolites fill several vesicles, and cobbles at the top of the core display surficial zeolite coats up to 1 cm in diameter. The matrix is volcanic sandstone. b. The rest of the core is poorly sorted, black (5Y 2.5/1) VOLCANIC SANDSTONE with scattered sand-sized neritic carbonate grains.



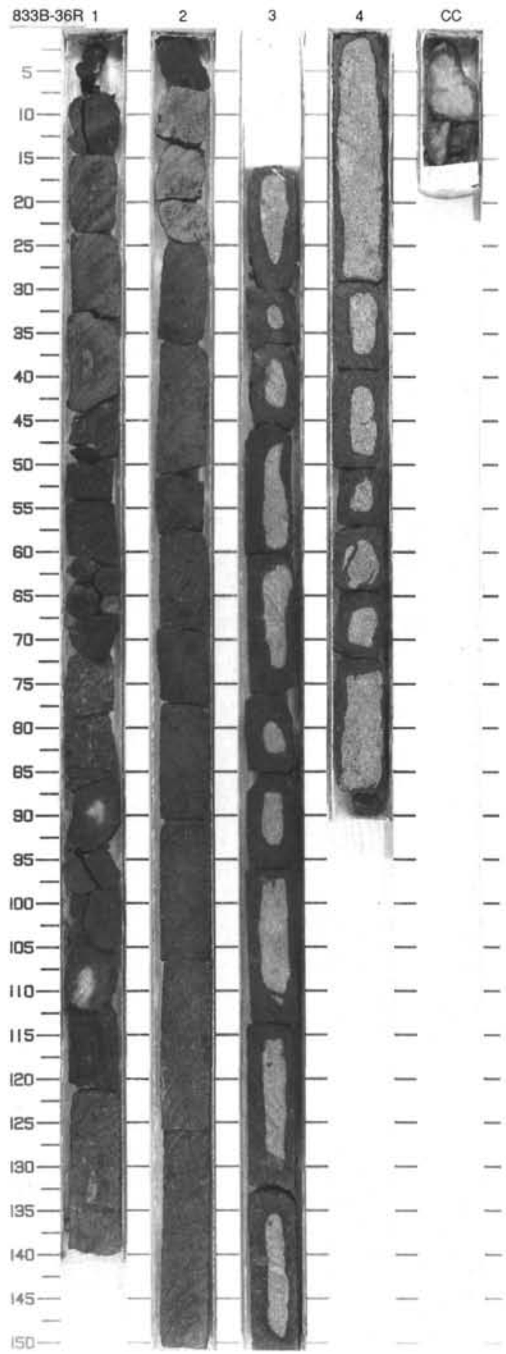
SITE 833 HOLE B CORE 36R CORED INTERVAL 414.5-424.2 mbsf



LITHOLOGIC DESCRIPTION

BASALTIC BRECCIA

Major lithology: Most of this core is lithified, black to very dark gray (5Y 3/1 to 5Y 2.5/1) and olive gray (5Y 3/2) BASALTIC BRECCIA with a fine- to coarse-grained volcanic sandstone matrix. Clasts range up to 6 cm in diameter.



SITE 833 HOLE B CORE 37R CORED INTERVAL 424.2-433.8 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
UPPER PLIOCENE	N21	?			N	ϕ Vp 33.8 3256 β ● 2.20 wt. %CaCO3 ● 3.8 wt. %TOC ● 0.0		1	0.5 1.0			◇	*
								2					

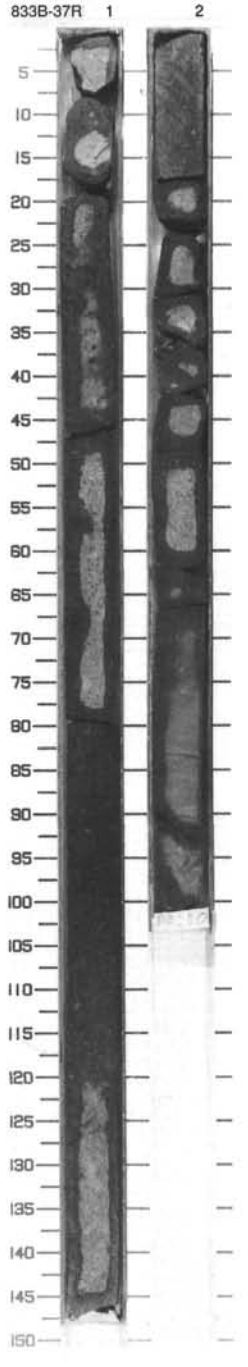
LITHOLOGIC DESCRIPTION

BASALTIC BRECCIA and CALCAREOUS SILTY VOLCANIC CLAYSTONE

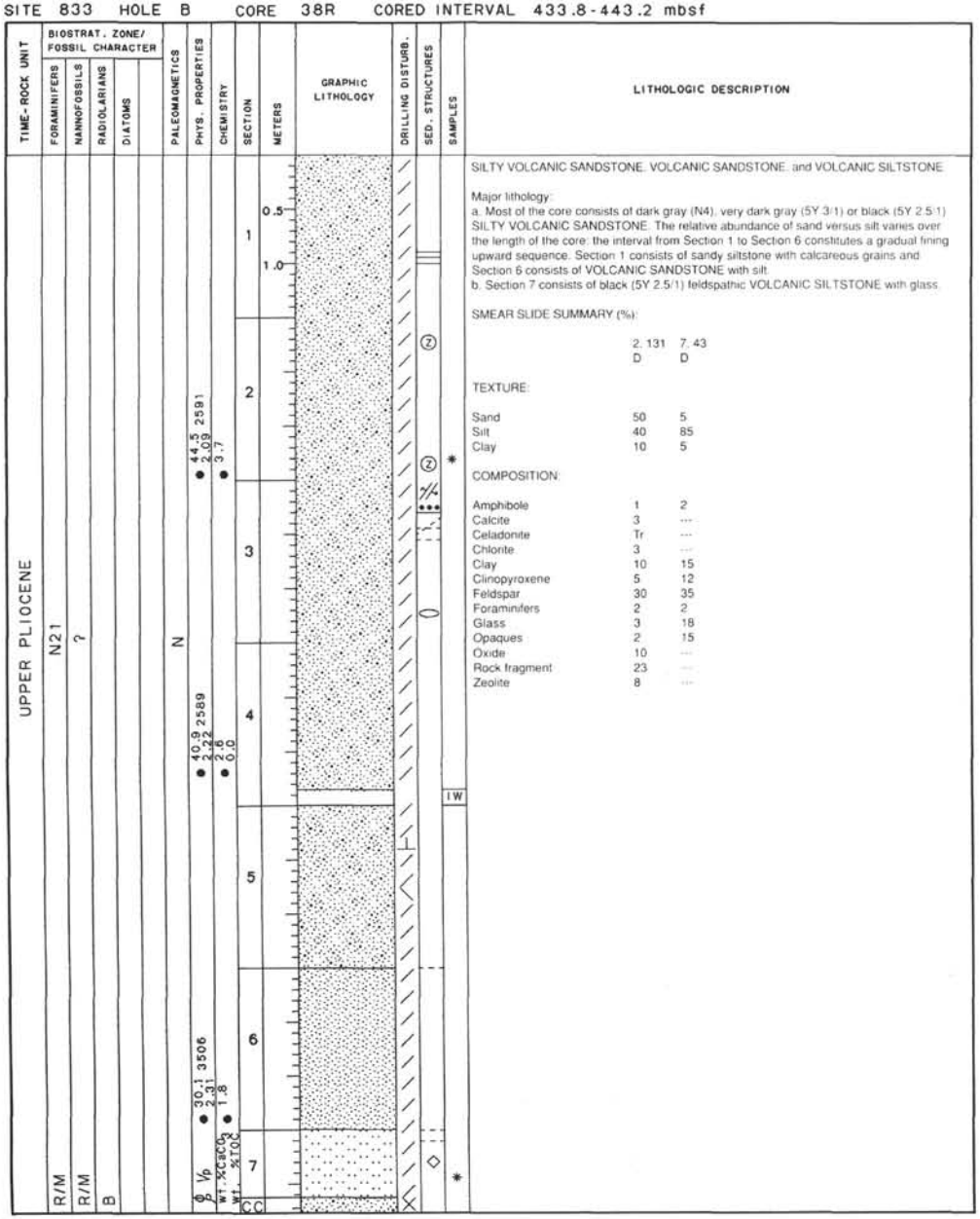
Major lithology:
a. Section 1 and Section 2, 0–60 cm, consist of black to dark olive gray (5Y 2.5/1 to 5Y 3/2) BASALTIC BRECCIA in a matrix of coarse-grained volcanic siltstone. Basalt clasts range up to 7 cm in diameter.
b. Section 2, 60–101 cm, consists of laminated, very dark gray (5Y 3/1) CALCAREOUS SILTY VOLCANIC CLAYSTONE interbedded with fine-grained volcanic sandstone.

SMEAR SLIDE SUMMARY (%):

	1, 131 D
TEXTURE:	
Sand	70
Silt	20
Clay	10
COMPOSITION:	
Chlorite	5
Clay	10
Clinopyroxene	15
Feldspar	30
Glass	8
Opaques	10
Oxide	10
Rock fragment	12
Spicules	Tr



SITE 833 HOLE B CORE 38R CORED INTERVAL 433.8-443.2 mbsf

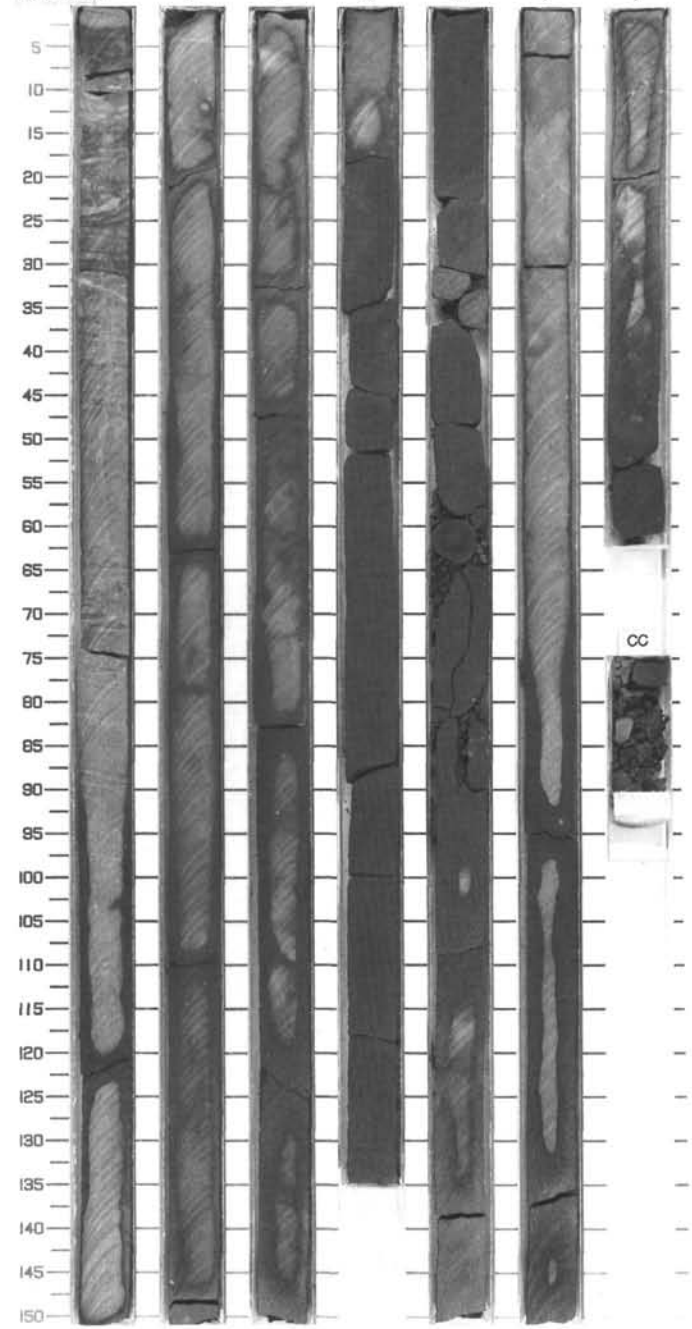


SILTY VOLCANIC SANDSTONE, VOLCANIC SANDSTONE, and VOLCANIC SILTSTONE

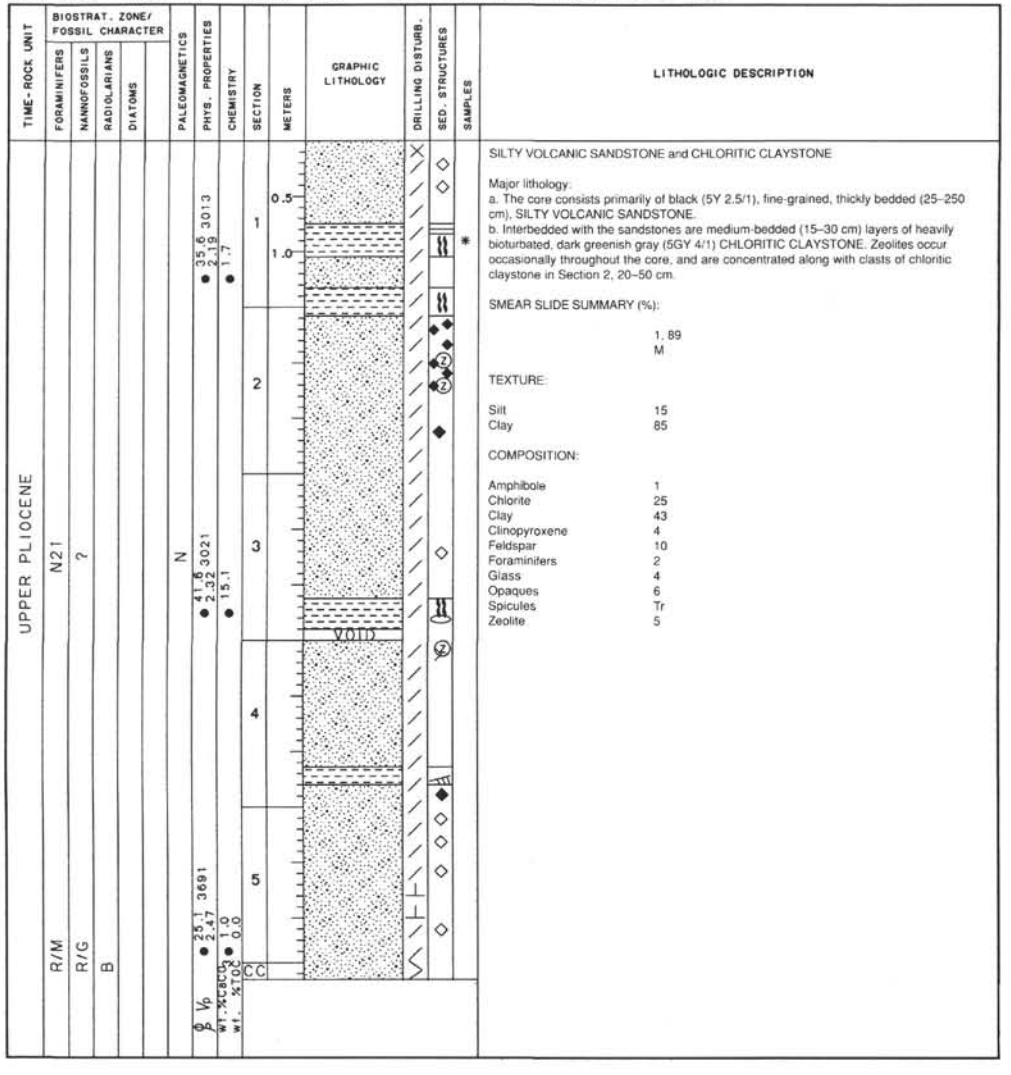
Major lithology:
a. Most of the core consists of dark gray (N4), very dark gray (5Y 3/1) or black (5Y 2.5/1) SILTY VOLCANIC SANDSTONE. The relative abundance of sand versus silt varies over the length of the core; the interval from Section 1 to Section 6 constitutes a gradual fining upward sequence. Section 1 consists of sandy siltstone with calcareous grains and Section 6 consists of VOLCANIC SANDSTONE with silt.
b. Section 7 consists of black (5Y 2.5/1) feldspathic VOLCANIC SILTSTONE with glass.

SMEAR SLIDE SUMMARY (%):

	2, 131 D	7, 43 D
TEXTURE:		
Sand	50	5
Silt	40	85
Clay	10	5
COMPOSITION:		
Amphibole	1	2
Calcite	3	---
Celadonite	Tr	---
Chlorite	3	---
Clay	10	15
Clinopyroxene	5	12
Feldspar	30	35
Foraminifers	2	2
Glass	3	18
Opaques	2	15
Oxide	10	---
Rock fragment	23	---
Zeolite	8	---



SITE 833 HOLE B CORE 39R CORED INTERVAL 443.2-452.5 mbsf

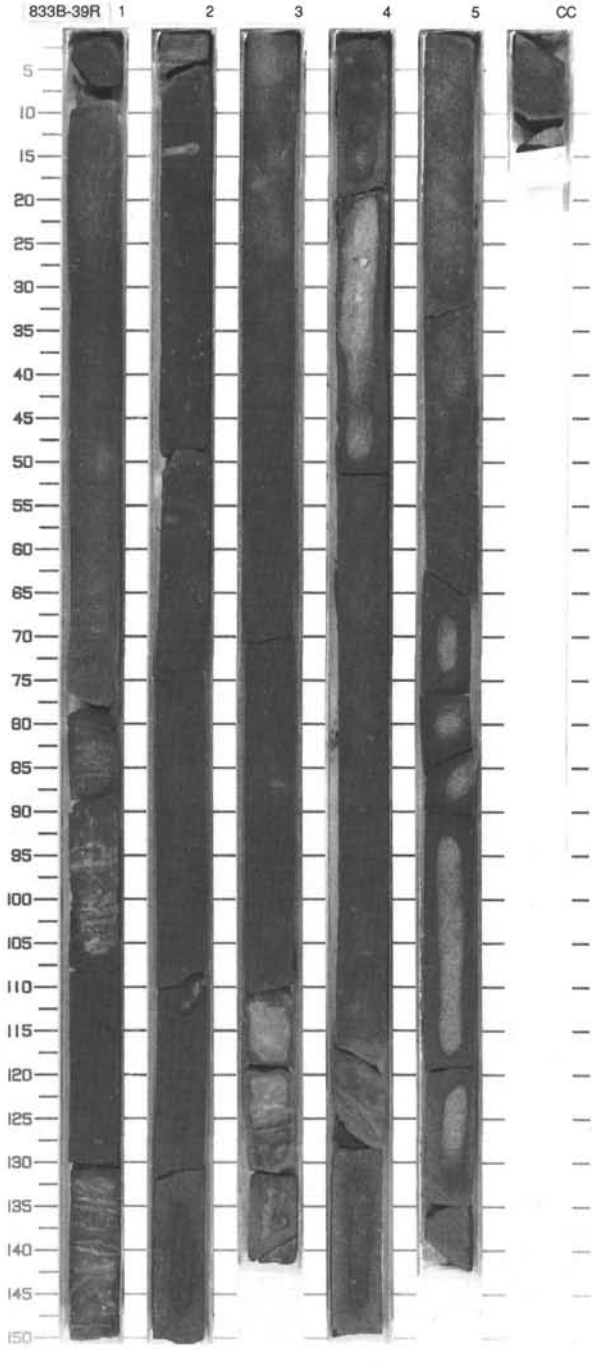


SILTY VOLCANIC SANDSTONE and CHLORITIC CLAYSTONE

Major lithology:
a. The core consists primarily of black (5Y 2.5/1), fine-grained, thickly bedded (25–250 cm), SILTY VOLCANIC SANDSTONE.
b. Interbedded with the sandstones are medium-bedded (15–30 cm) layers of heavily bioturbated, dark greenish gray (5GY 4/1) CHLORITIC CLAYSTONE. Zeolites occur occasionally throughout the core, and are concentrated along with clasts of chloritic claystone in Section 2, 20–50 cm.

SMEAR SLIDE SUMMARY (%):

	1, 89 M
TEXTURE:	
Silt	15
Clay	85
COMPOSITION:	
Amphibole	1
Chlorite	25
Clay	43
Clinopyroxene	4
Feldspar	10
Foraminifers	2
Glass	4
Opaques	6
Spicules	Tr
Zeolite	5



833B 40X NO RECOVERY

833B 41X NO RECOVERY

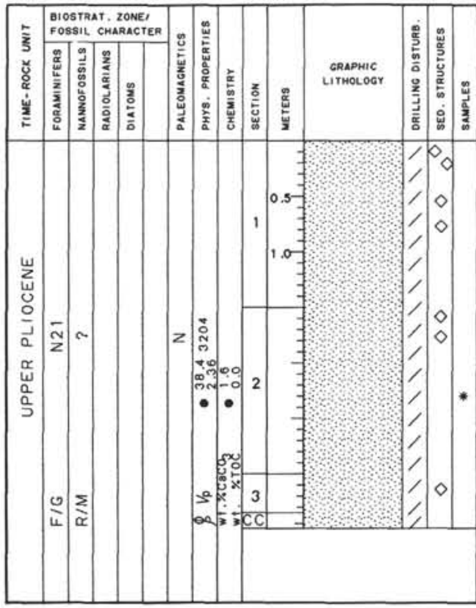
833B 42X NO RECOVERY

833B 43X NO RECOVERY

SITE 833 HOLE B CORE 44R CORED INTERVAL 471.5-481.1 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	BIOSTRAT. ZONE/ FOSSIL CHARACTER: NANNOFOSSILS	BIOSTRAT. ZONE/ FOSSIL CHARACTER: RADIOLARIANS	BIOSTRAT. ZONE/ FOSSIL CHARACTER: DIATOMS	BIOSTRAT. ZONE/ FOSSIL CHARACTER:	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	R/M													Only 2 cm of core was recovered, and all of it went to the Paleontology Laboratory.

SITE 833 HOLE B CORE 45R CORED INTERVAL 481.1-490.3 mbsf



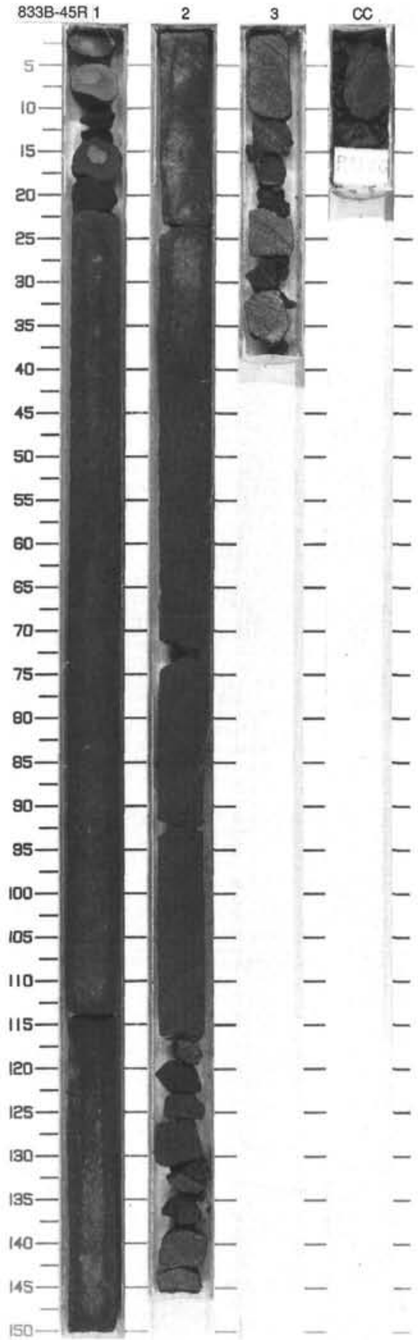
LITHOLOGIC DESCRIPTION

VOLCANIC SANDSTONE

Major lithology: All of this core is lithified, black (5Y 2.5/1) very coarse VOLCANIC SANDSTONE. Rounded, isolated clasts up to 1.5 cm in diameter are scattered sparsely throughout the core and consist of gray to very dark gray (5Y 5/1 to 5Y 3/1) volcanic siltstone. Hematitic grains up to 3 mm in diameter are common. In Section 3, 20–25 cm, is an isolated clast of basalt with pyroxene phenocrysts.

SMEAR SLIDE SUMMARY (%):

	2, 80 D
TEXTURE:	
Sand	70
Silt	20
Clay	10
COMPOSITION:	
Amphibole	5
Chlorite	1
Clay	10
Clinopyroxene	15
Feldspar	10
Opaques	10
Oxide	5
Palagonite	30
Zeolite	10



SITE 833 HOLE B CORE 46R CORED INTERVAL 490.3-500.0 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
UPPER PLIOCENE	C/G	R/M	B		N	● 31.0 3286 2.29 ● 37.6 2668 1.8 ● 16.7 0.1 ● 36.7 2987 2.26 ● 0.7 Ø Vp wt. %CaCO3 wt. %TOC		1 2 3 4 5 CC	0.5 1.0	Void Void Void		*	1W

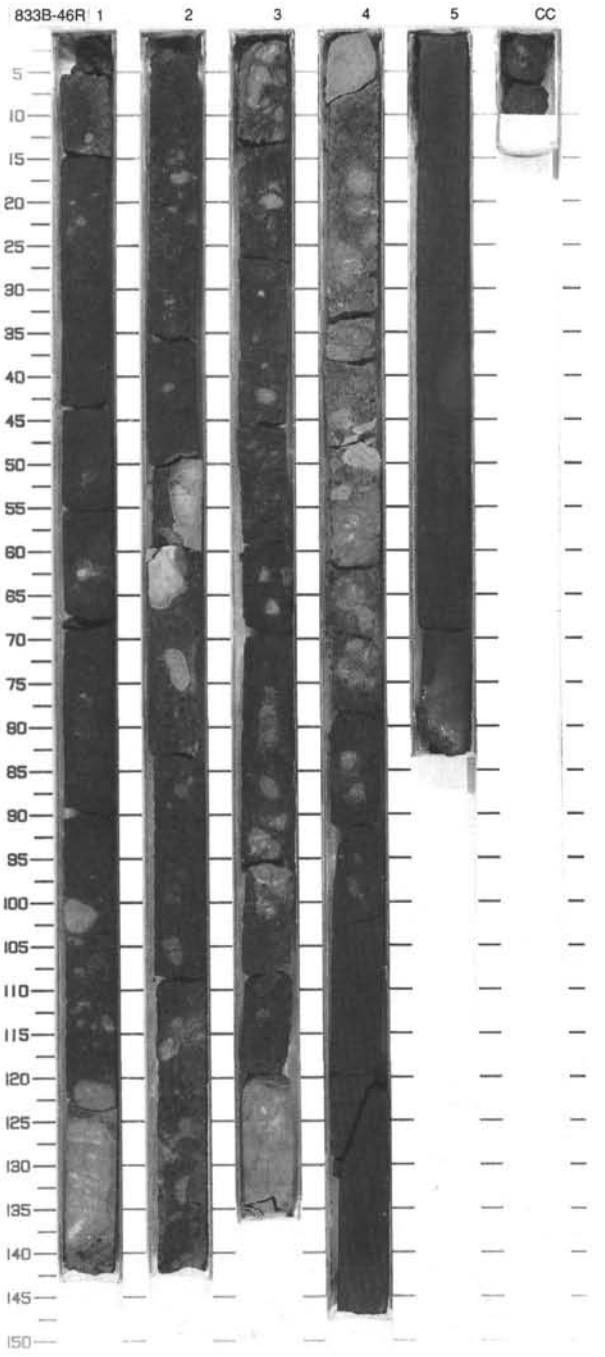
LITHOLOGIC DESCRIPTION

SED-LITHIC BASALTIC BRECCIA and SILTY VOLCANIC SANDSTONE

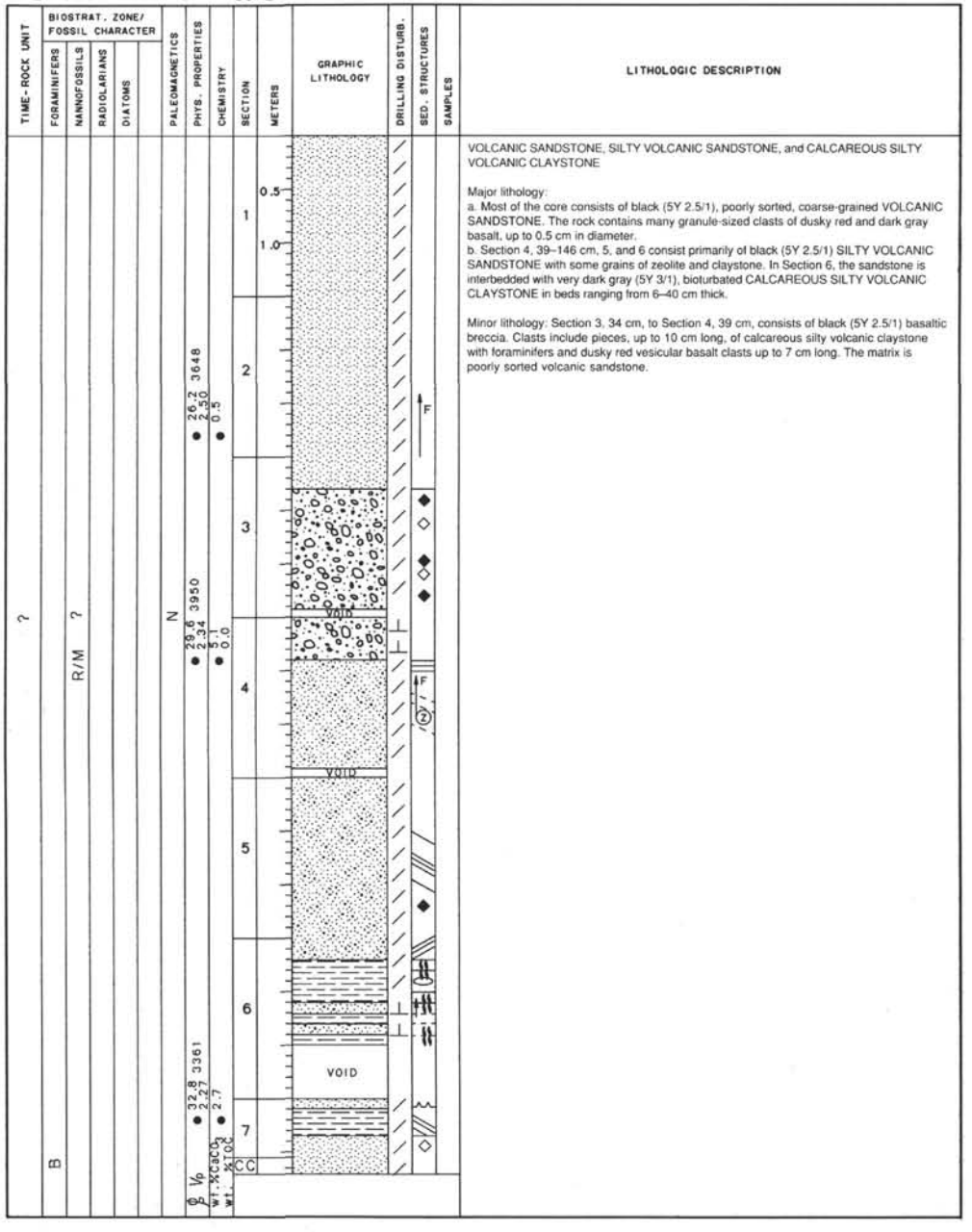
Major lithology:
a. Most of the core consists of black (5Y 2.5/1) or dark gray (5Y 4/1) SED-LITHIC BASALTIC BRECCIA. Clasts include 2–11 cm pieces of calcareous silty volcanic claystone with foraminifers, as well as black, gray, and dusky red vesicular basalt with pyroxene phenocrysts. The matrix is poorly sorted volcanic sandstone.
b. Section 4, 100–150 cm, and Section 5 consist of black (5Y 2.5/1) SILTY VOLCANIC SANDSTONE.

SMEAR SLIDE SUMMARY (%):

	2, 55 M
TEXTURE:	
Sand	10
Silt	30
Clay	60
COMPOSITION:	
Amphibole	3
Calcite	20
Chlorite	Tr
Clay	56
Clinopyroxene	2
Feldspar	4
Foraminifers	15
Glass	Tr
Mica	Tr



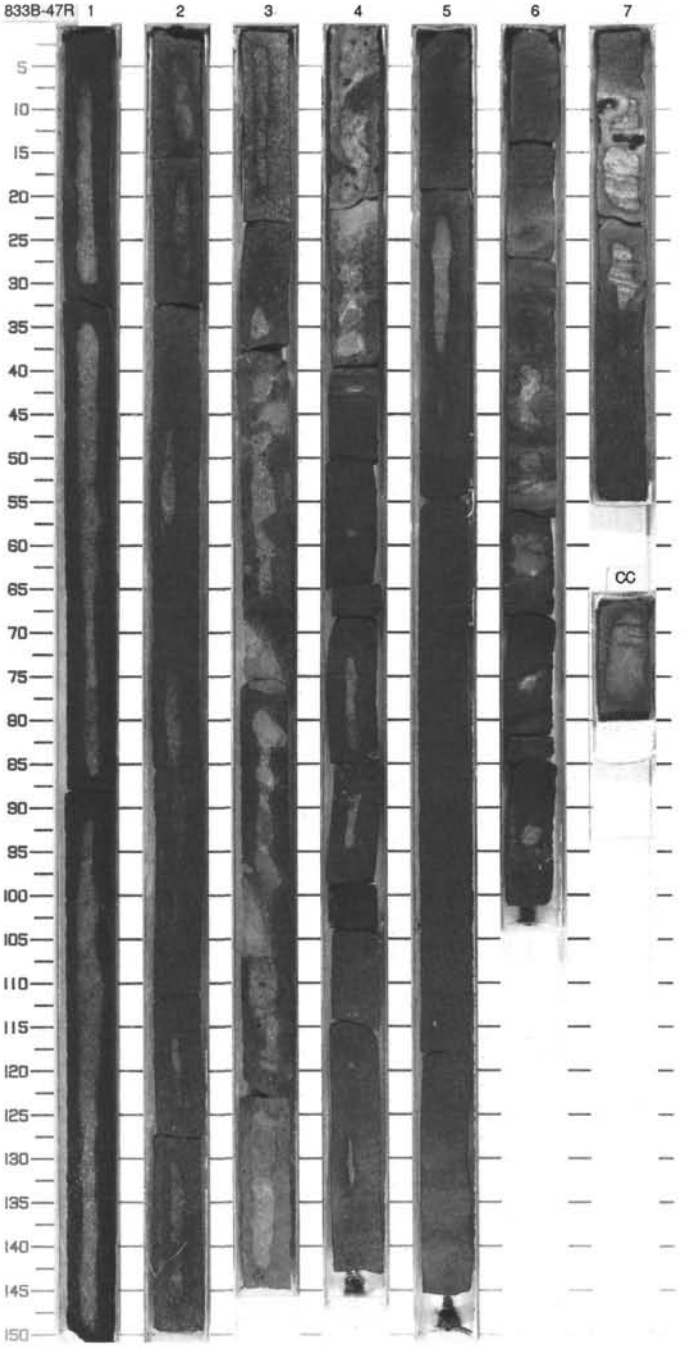
SITE 833 HOLE B CORE 47R CORED INTERVAL 500.0-509.6 mbsf



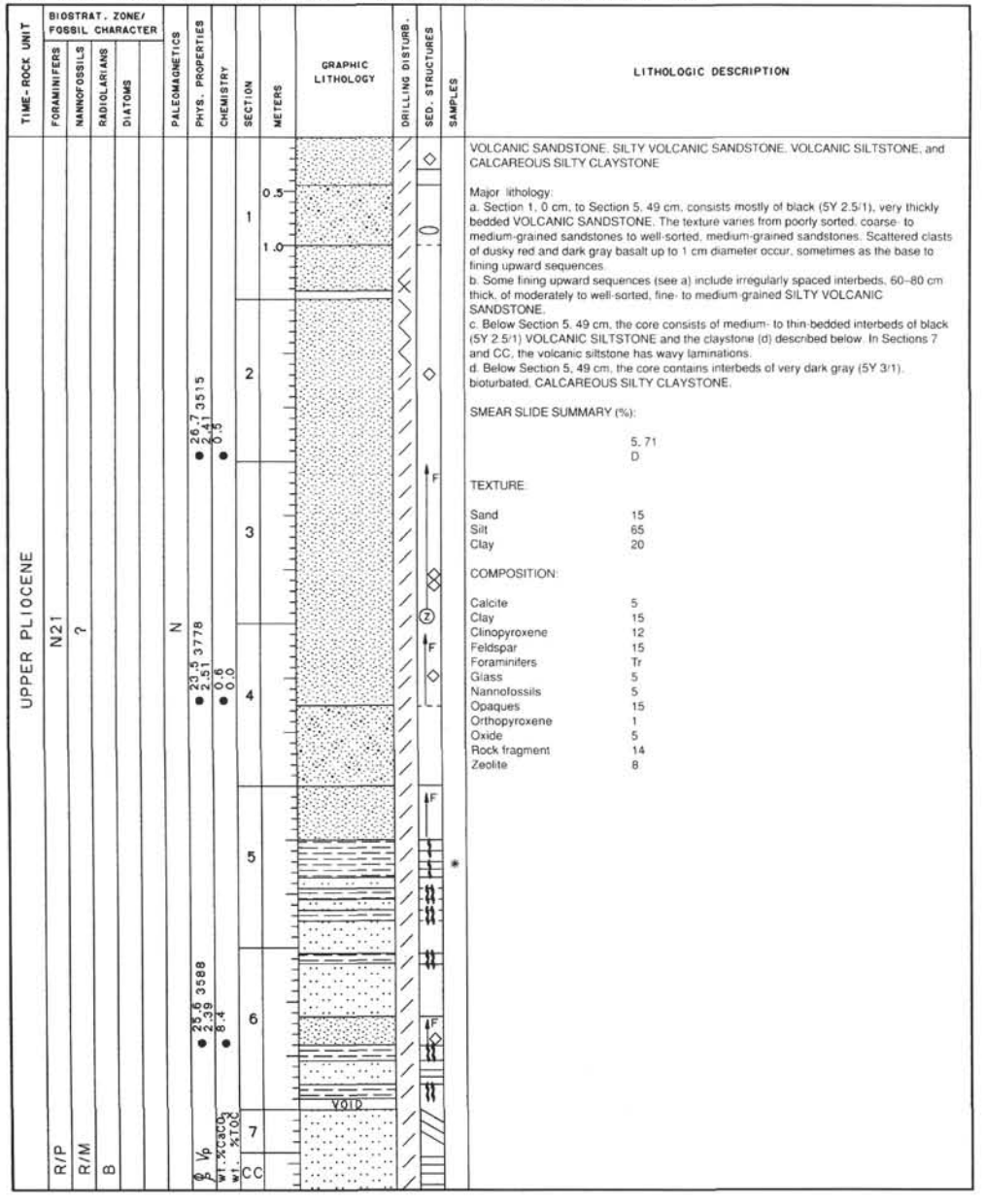
VOLCANIC SANDSTONE, SILTY VOLCANIC SANDSTONE, and CALCAREOUS SILTY VOLCANIC CLAYSTONE

Major lithology:
a. Most of the core consists of black (5Y 2.5/1), poorly sorted, coarse-grained VOLCANIC SANDSTONE. The rock contains many granule-sized clasts of dusky red and dark gray basalt, up to 0.5 cm in diameter.
b. Section 4, 39–146 cm, 5, and 6 consist primarily of black (5Y 2.5/1) SILTY VOLCANIC SANDSTONE with some grains of zeolite and claystone. In Section 6, the sandstone is interbedded with very dark gray (5Y 3/1), bioturbated CALCAREOUS SILTY VOLCANIC CLAYSTONE in beds ranging from 6–40 cm thick.

Minor lithology: Section 3, 34 cm, to Section 4, 39 cm, consists of black (5Y 2.5/1) basaltic breccia. Clasts include pieces, up to 10 cm long, of calcareous silty volcanic claystone with foraminifers and dusky red vesicular basalt clasts up to 7 cm long. The matrix is poorly sorted volcanic sandstone.



SITE 833 HOLE B CORE 48R CORED INTERVAL 509.6-519.3 mbsf



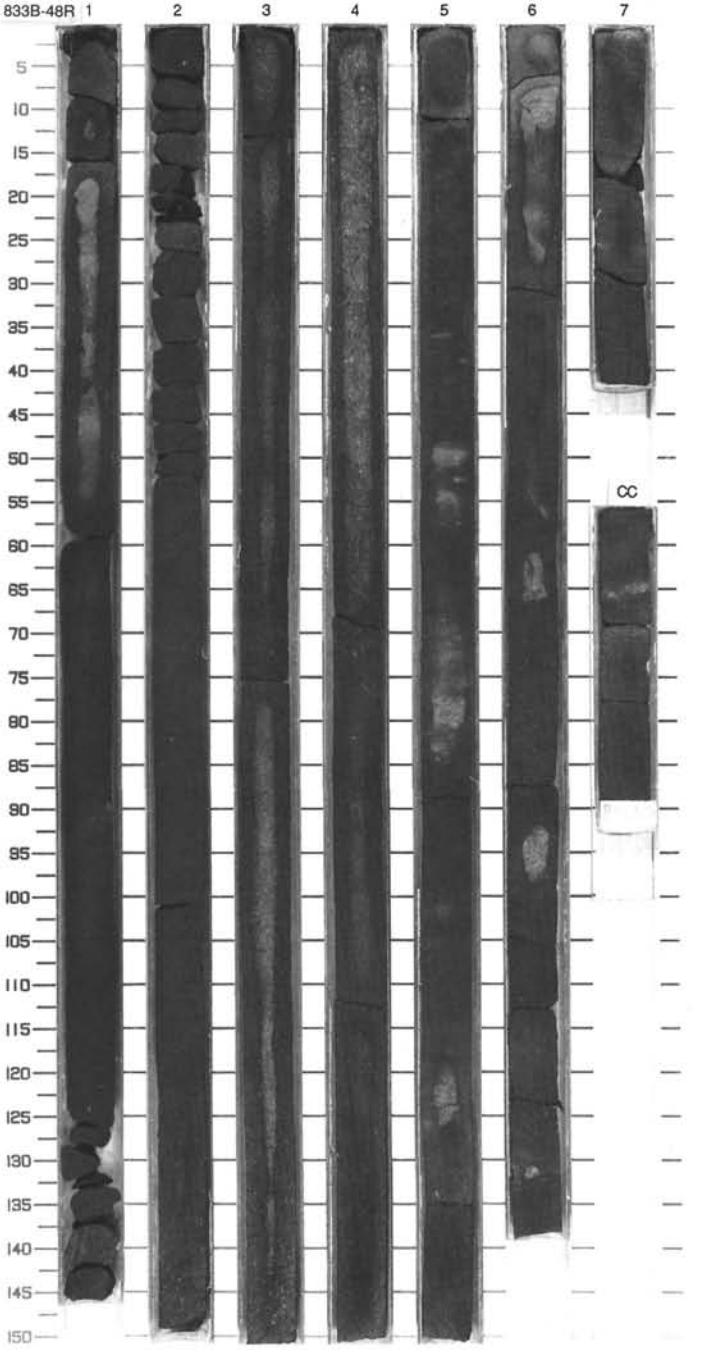
LITHOLOGIC DESCRIPTION

VOLCANIC SANDSTONE, SILTY VOLCANIC SANDSTONE, VOLCANIC SILTSTONE, and CALCAREOUS SILTY CLAYSTONE

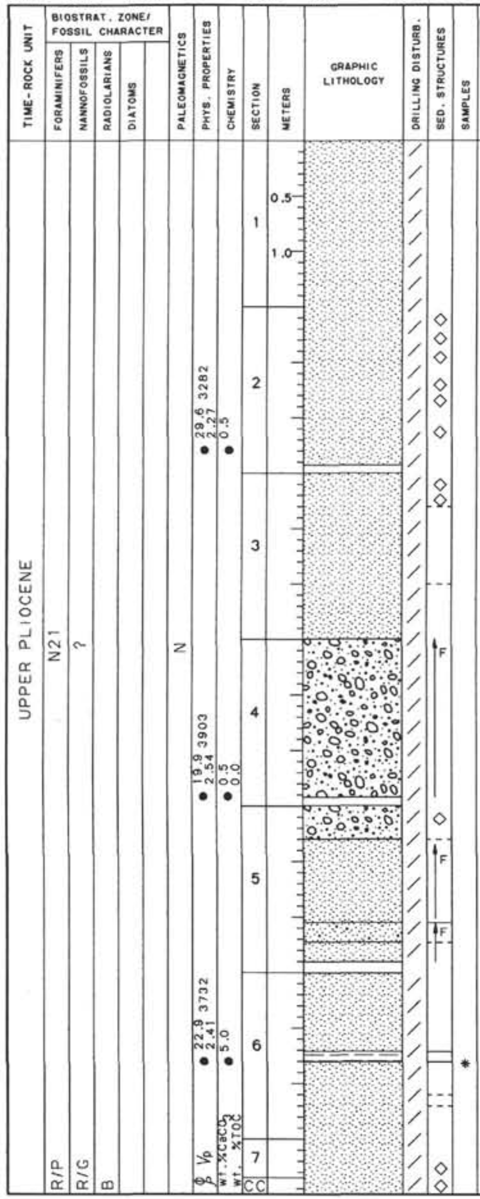
Major lithology:
a. Section 1, 0 cm, to Section 5, 49 cm, consists mostly of black (5Y 2.5/1), very thickly bedded VOLCANIC SANDSTONE. The texture varies from poorly sorted, coarse- to medium-grained sandstones to well-sorted, medium-grained sandstones. Scattered clasts of dusky red and dark gray basalt up to 1 cm diameter occur, sometimes as the base to fining upward sequences.
b. Some fining upward sequences (see a) include irregularly spaced interbeds, 60–80 cm thick, of moderately to well-sorted, fine- to medium-grained SILTY VOLCANIC SANDSTONE.
c. Below Section 5, 49 cm, the core consists of medium- to thin-bedded interbeds of black (5Y 2.5/1) VOLCANIC SILTSTONE and the claystone (d) described below. In Sections 7 and CC, the volcanic siltstone has wavy laminations.
d. Below Section 5, 49 cm, the core contains interbeds of very dark gray (5Y 3/1), bioturbated, CALCAREOUS SILTY CLAYSTONE.

SMEAR SLIDE SUMMARY (%):

	5, 71 D
TEXTURE:	
Sand	15
Silt	65
Clay	20
COMPOSITION:	
Calcite	5
Clay	15
Clinopyroxene	12
Feldspar	15
Foraminifers	Tr
Glass	5
Nannofossils	5
Opaques	15
Orthopyroxene	1
Oxide	5
Rock fragment	14
Zeolite	8



SITE 833 HOLE B CORE 49R CORED INTERVAL 519.3-528.9 mbsf



LITHOLOGIC DESCRIPTION

VOLCANIC SANDSTONE and BASALTIC BRECCIA

Major lithology:

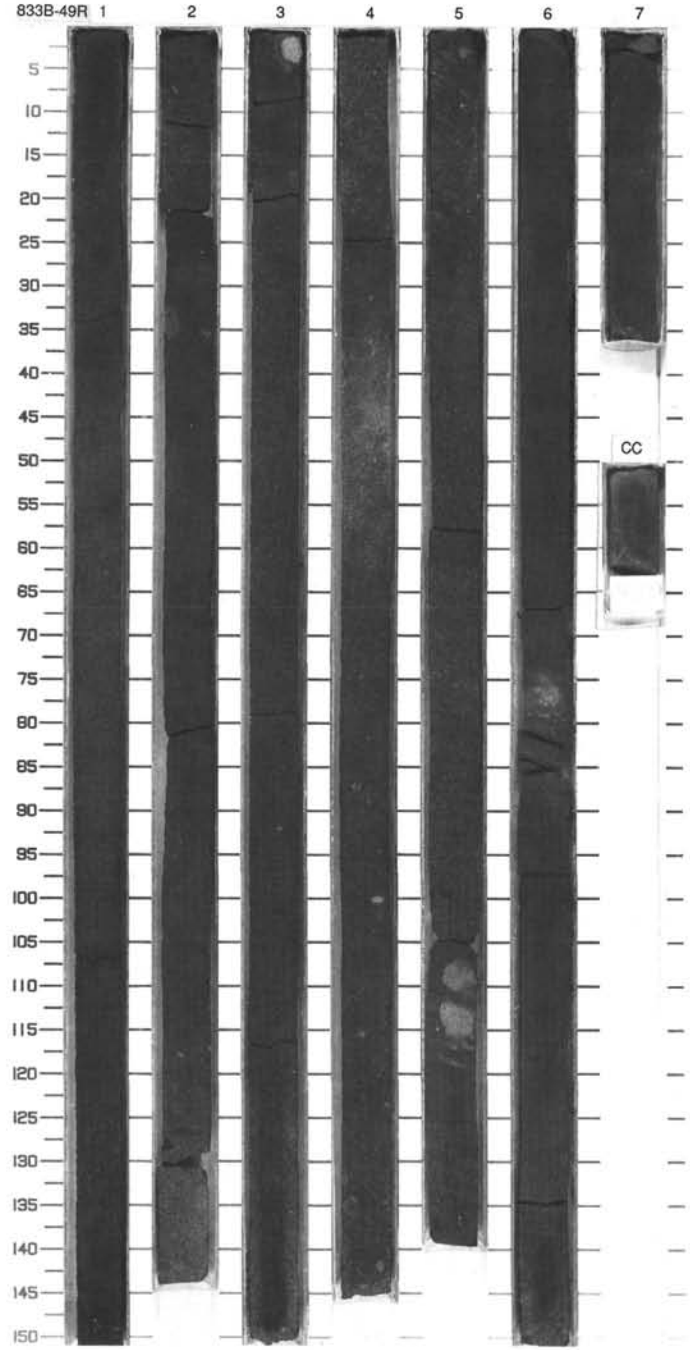
a. Most of the core consists of black (5Y 2.5/1), medium- to coarse-grained VOLCANIC SANDSTONE with abundant white zeolitic and dusky red oxidized sand grains. Scattered clasts, up to 3 cm in diameter, of vesicular basalt (some dusky red) and volcanic siltstone occur in the sandstone in Sections 2, 3, 7, and CC. In Section 5, silty volcanic sandstone occurs at the top of a fining upward sequence that extends from 105 to 140 cm and includes a basal sandstone from about 125 to 140 cm.

b. Section 4, 0 cm, to Section 5, 30 cm, consists of black (5Y 2.5/1), matrix-supported BASALTIC BRECCIA. Maximum clast size decreases upward in Section 4, from ~2 cm in the interval from 100-146 cm to ~1 cm at 0–100 cm.

Minor Lithology: Section 6, 71–88 cm, contains a sharply bounded bed of dark grayish brown (10 YR 4/2) clayey volcanic siltstone 10 cm thick, overlain by a 6 cm thick bed of gray (5Y 4/1) silty volcanic sandstone.

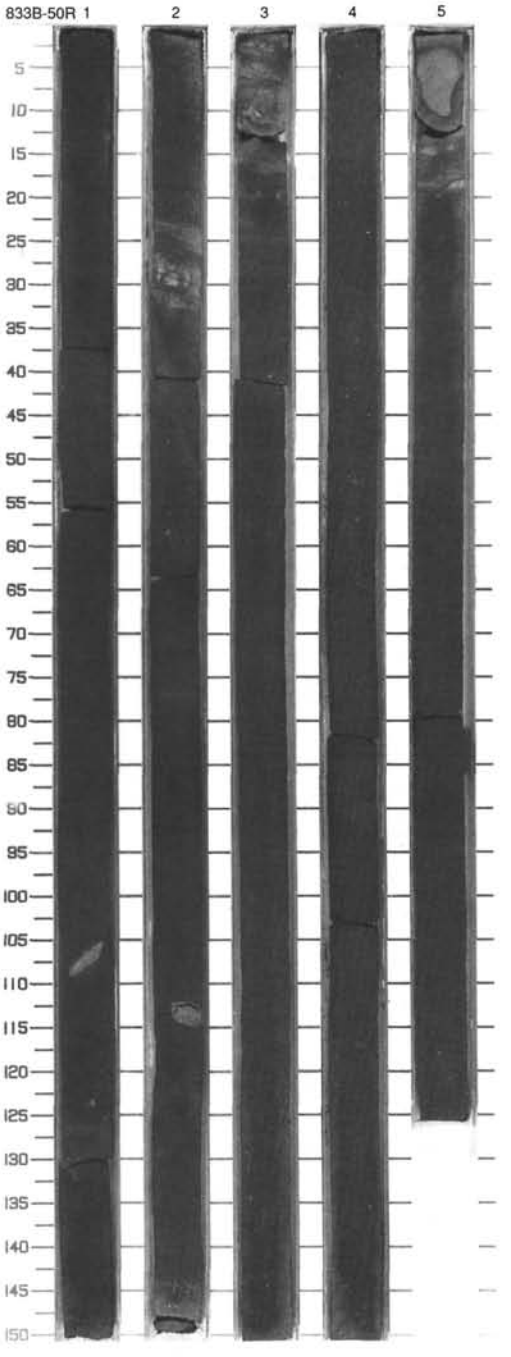
SMEAR SLIDE SUMMARY (%):

	6, 81
	M
TEXTURE:	
Sand	10
Silt	60
Clay	30
COMPOSITION:	
Clay	30
Clinopyroxene	5
Feldspar	15
Glass	5
Opaques	10
Oxide	10
Rock fragment	20
Zeolite	5

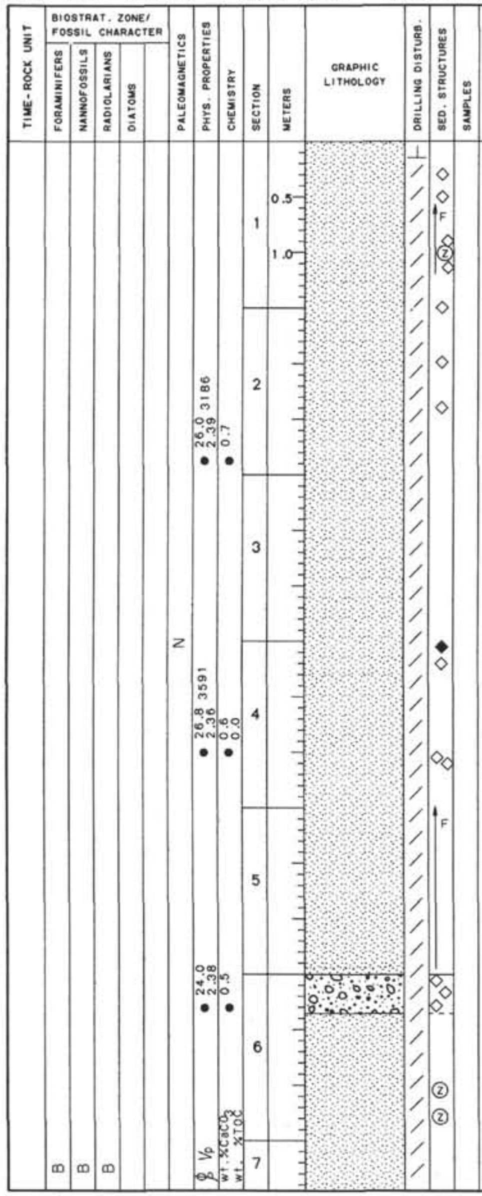


SITE 833 HOLE B CORE 50R CORED INTERVAL 528.9-538.6 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?		B	B		N	● 32.1 2.27 3186 ● 36.0 2.38 3591 Φ Vp β wt. %CaCO3 wt. %TOC	● 0.6 0.0	1 2 3 4 5	0.5 1.0			↑ (2) (2) (2)		VOLCANIC SANDSTONE Major lithology: Most of the core consists of black (5Y 2.5/1), medium- to fine grained, moderately to well-sorted VOLCANIC SANDSTONE. Some intervals contain white zeolite grains and dusky red oxidized grains. Scattered gravel-sized basalt clasts occur, often zeolitized. Section 2, 24–78, contains wavy laminations with a 10° dip. At Section 2, 118 cm, there is a dark greenish gray, kiwi-fruit-like clast 2 cm in diameter that is composed of plagioclase and clinopyroxene cemented by zeolite. Minor lithology: In Sections 2 and 3, interbeds of very dark gray (5Y 3/1), laminated, clayey volcanic siltstone occur.



SITE 833 HOLE B CORE 51R CORED INTERVAL 538.6-548.2 mbsf

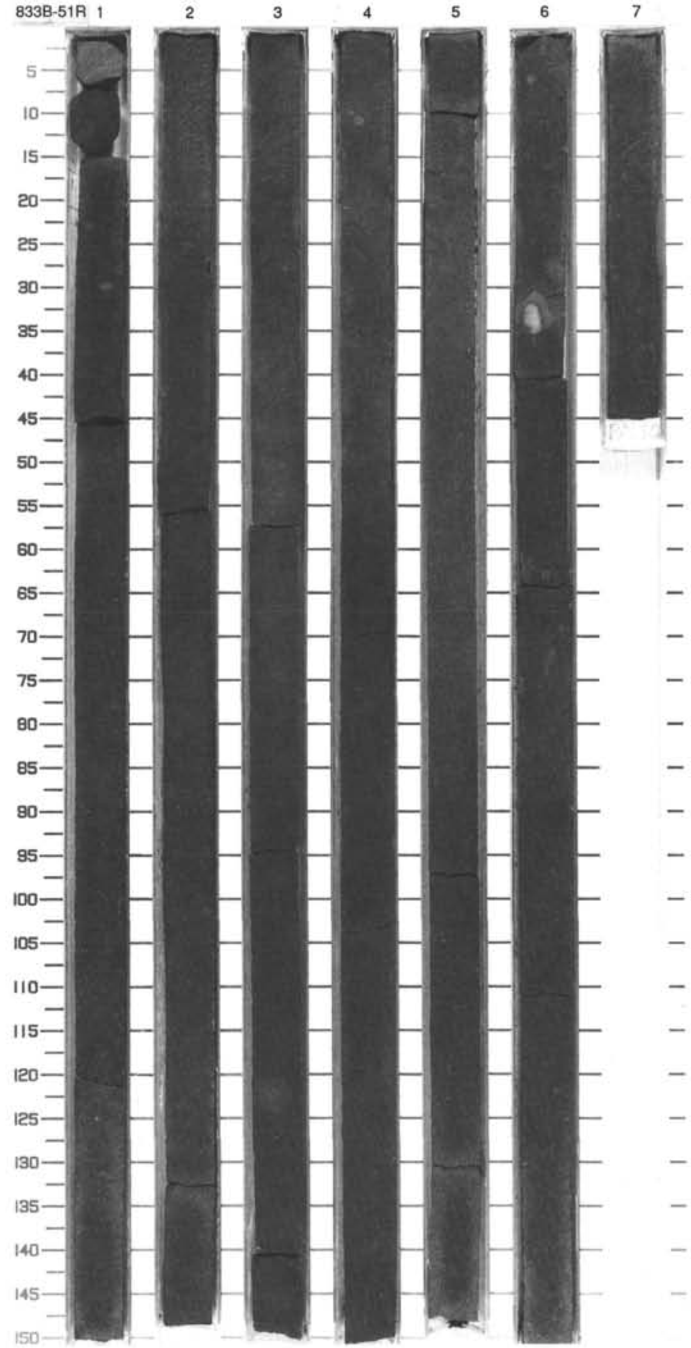


LITHOLOGIC DESCRIPTION

VOLCANIC SANDSTONE

Major lithology: Most of the core consists of black (5Y 2.5/1), medium- to coarse-grained, poorly sorted VOLCANIC SANDSTONE. Scattered pebble-sized clasts of basalt occur throughout the core, many with zeolite minerals filling vesicles. Many grains are oxidized a dusky red. Thick (70–150 cm) fining upward sequences occur in Section 1 and Section 5. An unusual alteration halo occurs around a 3 mm pyroxene pebble in Section 3 at 120 cm. The halo is much larger than the pebble and has a radius of 2 cm.

Minor lithology: Section 6, 0–35 cm, consists of black (5Y 2.5/1), matrix-supported basaltic breccia in a matrix of volcanic sandstone. Clasts of basalt are up to 4 cm in diameter.



SITE 833 HOLE B CORE 52R CORED INTERVAL 548.2-557.9 mbsf

TIME-ROCK UNIT: UPPER PLIOCENE

BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS R/M; N21; NANNOFOSSILS R/M; ?; RADIOLARIANS B; DIATOMS

PALEOMAGNETICS: N

PHYS. PROPERTIES: Vp; wt. %CaCO3; wt. %TOC

CHEMISTRY

SECTION: 1 2 3 4 5 6 7 CC

METERS: 0.5 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURB.

SED. STRUCTURES

SAMPLES: JW

LITHOLOGIC DESCRIPTION

VOLCANIC SANDSTONE and BASALTIC BRECCIA

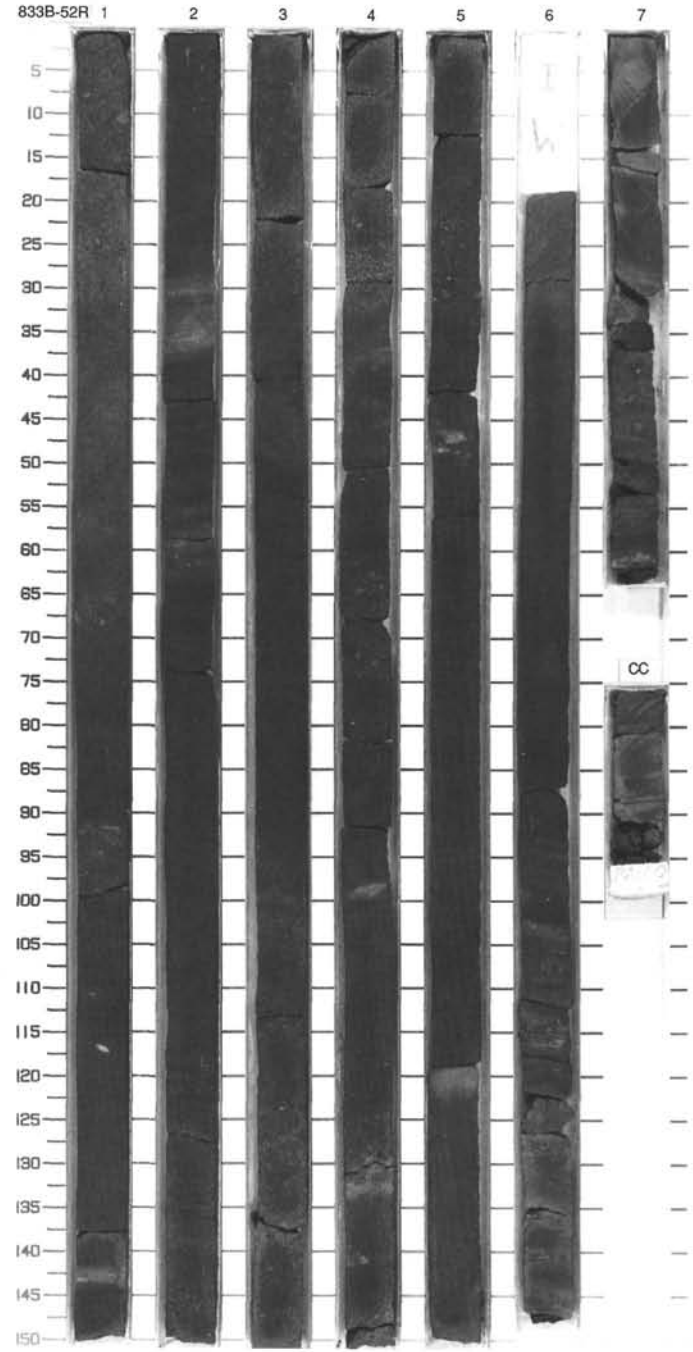
Major lithology:
a. Most of this core is lithified, black (5Y 2.5/1) medium- to coarse-grained VOLCANIC SANDSTONE comprised predominantly of basalt grains. Within this lithology are intervals up to 10 cm thick of very dark gray to black (5Y 3/1 to 5Y 2.5/1), very fine volcanic sandstone or siltstone that are finely laminated with rare cross laminations. The laminae are typically about 2 mm thick. In Section 3, 30–65 cm, Section 4, 85–125 cm, and Section 6, 17 cm, to Section CC, 20 cm, the fine- to coarse-grained volcanic sandstone is laminated (laminae 1–5 mm thick). A few stray basalt clasts occur in Section 3, 0–10 cm.
b. Gradational with the sandstones are layers of black (5Y 2.5/1) fine-grained BASALTIC BRECCIA with clasts of dusky red (10R 3/4) and altered dark gray (5Y 4/1) basalt. Some of the basaltic breccia has white grains in the matrix that appear to be zeolite mineral grains. The basalt breccia in Section 1, 0–32 cm, exhibits reverse grading.

Minor lithology: A few thin layers of very dark gray (5Y 3/1), laminated volcanic siltstone occur, as in Section 1, 140–144 cm.

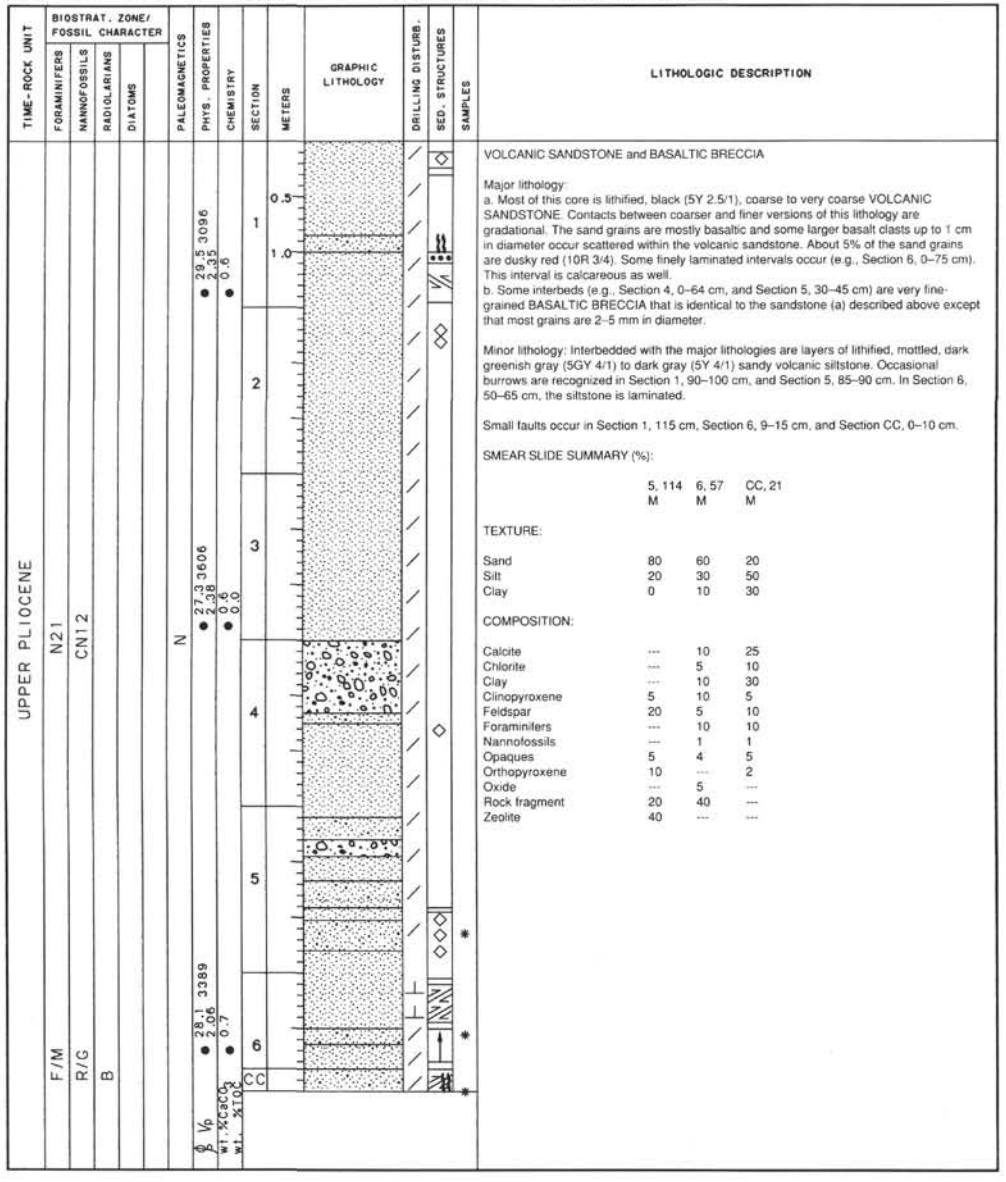
Slump folds occur at Section 1, 97 cm, and at Section 6, 135–145 cm. The latter interval contains a minor associated fracture.

SMEAR SLIDE SUMMARY (%):

	1, 67 D	6, 117 M
TEXTURE:		
Sand	70	50
Silt	30	40
Clay	---	10
COMPOSITION:		
Chlorite	10	25
Clay	---	10
Clinopyroxene	25	15
Feldspar	15	25
Foraminifers	---	Tr
Opaques	5	4
Orthopyroxene	Tr	---
Oxide	5	1
Rock fragment	35	20



SITE 833 HOLE B CORE 53R CORED INTERVAL 557.9-567.8 mbsf



LITHOLOGIC DESCRIPTION

VOLCANIC SANDSTONE and BASALTIC BRECCIA

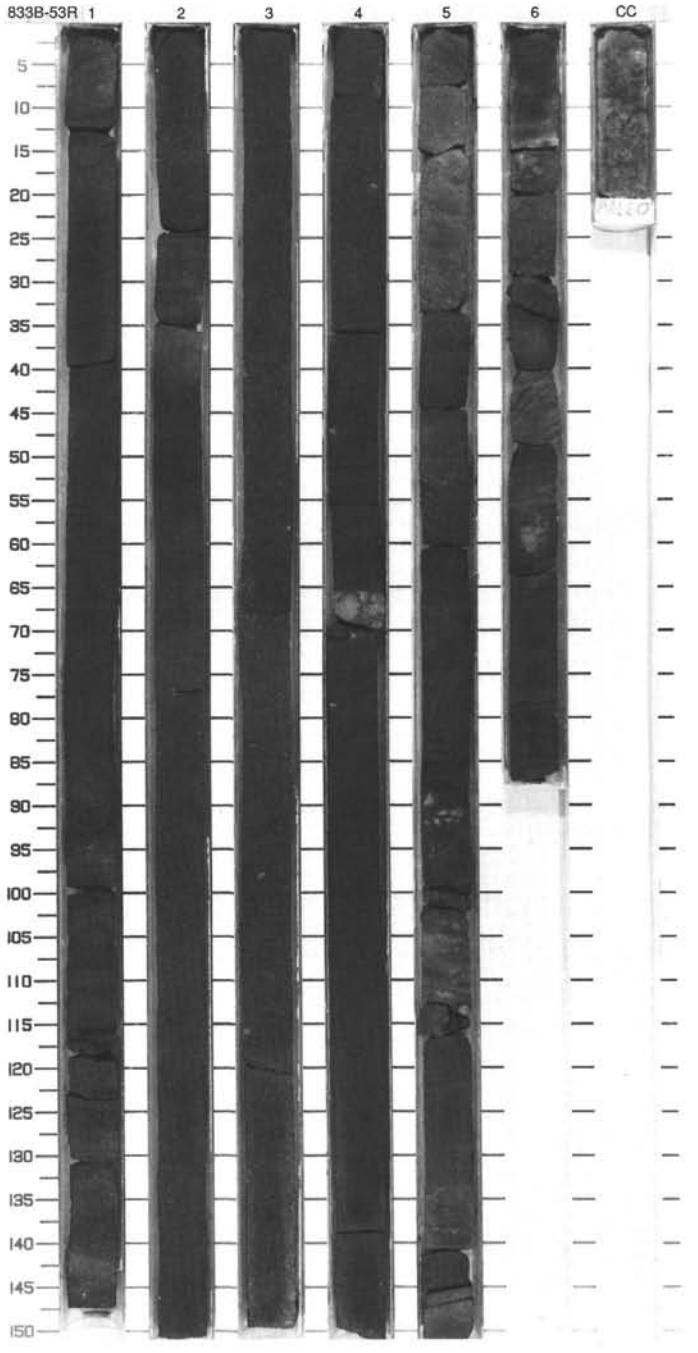
Major lithology:
a. Most of this core is lithified, black (5Y 2.5/1), coarse to very coarse VOLCANIC SANDSTONE. Contacts between coarser and finer versions of this lithology are gradational. The sand grains are mostly basaltic and some larger basalt clasts up to 1 cm in diameter occur scattered within the volcanic sandstone. About 5% of the sand grains are dusky red (10R 3/4). Some finely laminated intervals occur (e.g., Section 6, 0–75 cm). This interval is calcareous as well.
b. Some interbeds (e.g., Section 4, 0–64 cm, and Section 5, 30–45 cm) are very fine-grained BASALTIC BRECCIA that is identical to the sandstone (a) described above except that most grains are 2–5 mm in diameter.

Minor lithology: Interbedded with the major lithologies are layers of lithified, mottled, dark greenish gray (5GY 4/1) to dark gray (5Y 4/1) sandy volcanic siltstone. Occasional burrows are recognized in Section 1, 90–100 cm, and Section 5, 85–90 cm. In Section 6, 50–65 cm, the siltstone is laminated.

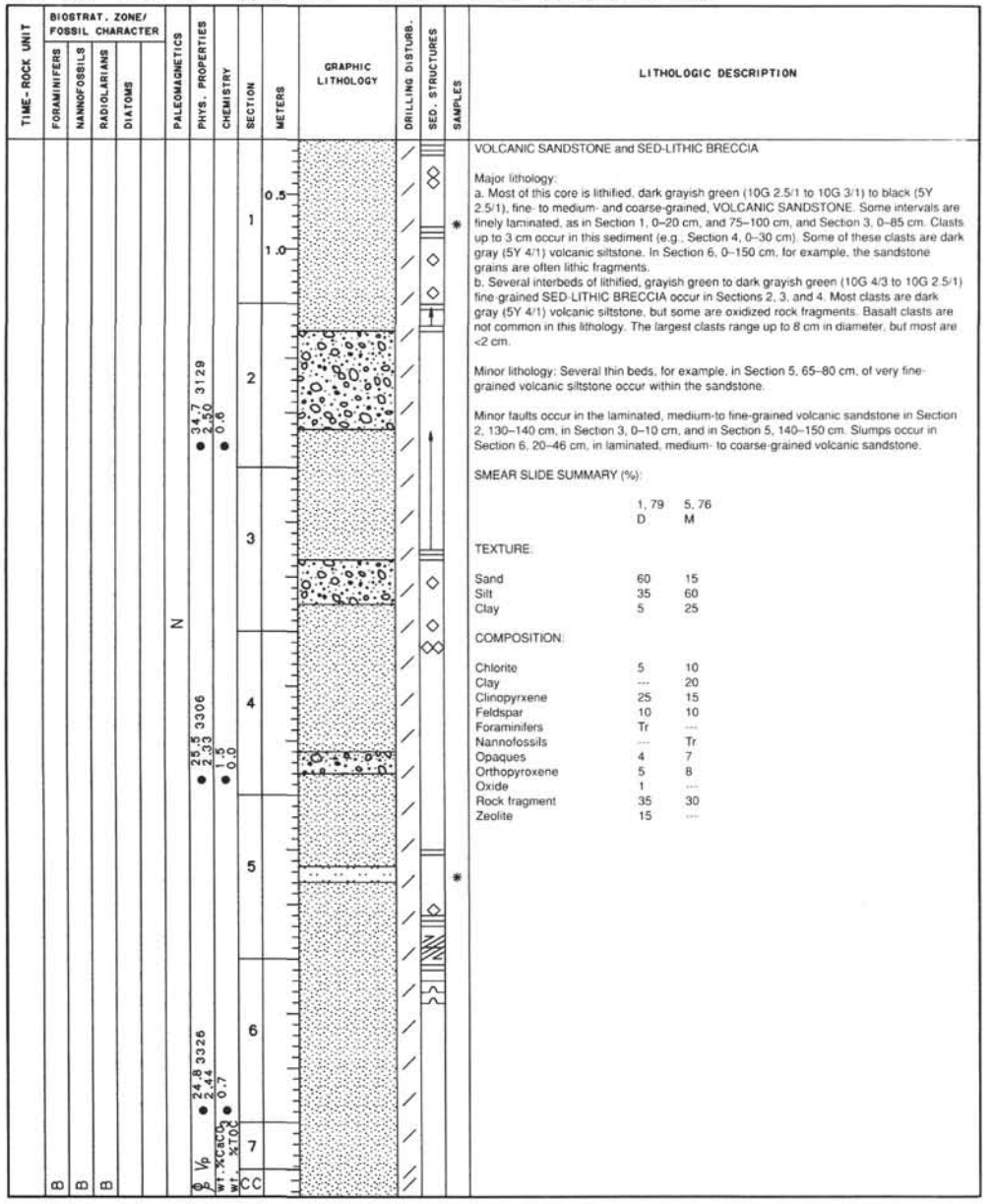
Small faults occur in Section 1, 115 cm, Section 6, 9–15 cm, and Section CC, 0–10 cm.

SMEAR SLIDE SUMMARY (%):

	5, 114 M	6, 57 M	CC, 21 M
TEXTURE:			
Sand	80	60	20
Silt	20	30	50
Clay	0	10	30
COMPOSITION:			
Calcite	---	10	25
Chlorite	---	5	10
Clay	---	10	30
Clinopyroxene	5	10	5
Feldspar	20	5	10
Foraminifers	---	10	10
Nannofossils	---	1	1
Opaques	5	4	5
Orthopyroxene	10	---	2
Oxide	---	5	---
Rock fragment	20	40	---
Zeolite	40	---	---



SITE 833 HOLE B CORE 54R CORED INTERVAL 567.8-577.7 mbsf



VOLCANIC SANDSTONE and SED-LITHIC BRECCIA

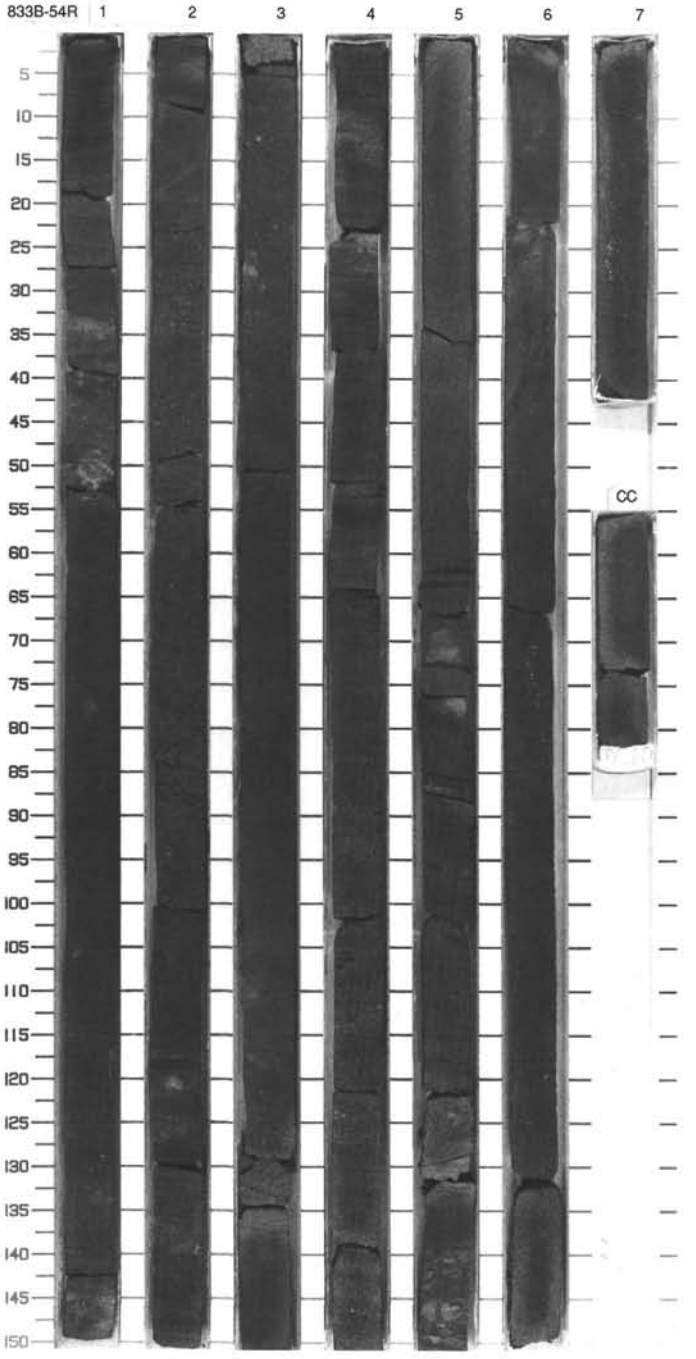
Major lithology:
a. Most of this core is lithified, dark grayish green (10G 2.5/1 to 10G 3/1) to black (5Y 2.5/1), fine- to medium- and coarse-grained, VOLCANIC SANDSTONE. Some intervals are finely laminated, as in Section 1, 0–20 cm, and 75–100 cm, and Section 3, 0–85 cm. Clasts up to 3 cm occur in this sediment (e.g., Section 4, 0–30 cm). Some of these clasts are dark gray (5Y 4/1) volcanic siltstone. In Section 6, 0–150 cm, for example, the sandstone grains are often lithic fragments.
b. Several interbeds of lithified, grayish green to dark grayish green (10G 4/3 to 10G 2.5/1) fine-grained SED-LITHIC BRECCIA occur in Sections 2, 3, and 4. Most clasts are dark gray (5Y 4/1) volcanic siltstone, but some are oxidized rock fragments. Basalt clasts are not common in this lithology. The largest clasts range up to 8 cm in diameter, but most are <2 cm.

Minor lithology: Several thin beds, for example, in Section 5, 65–80 cm, of very fine-grained volcanic siltstone occur within the sandstone.

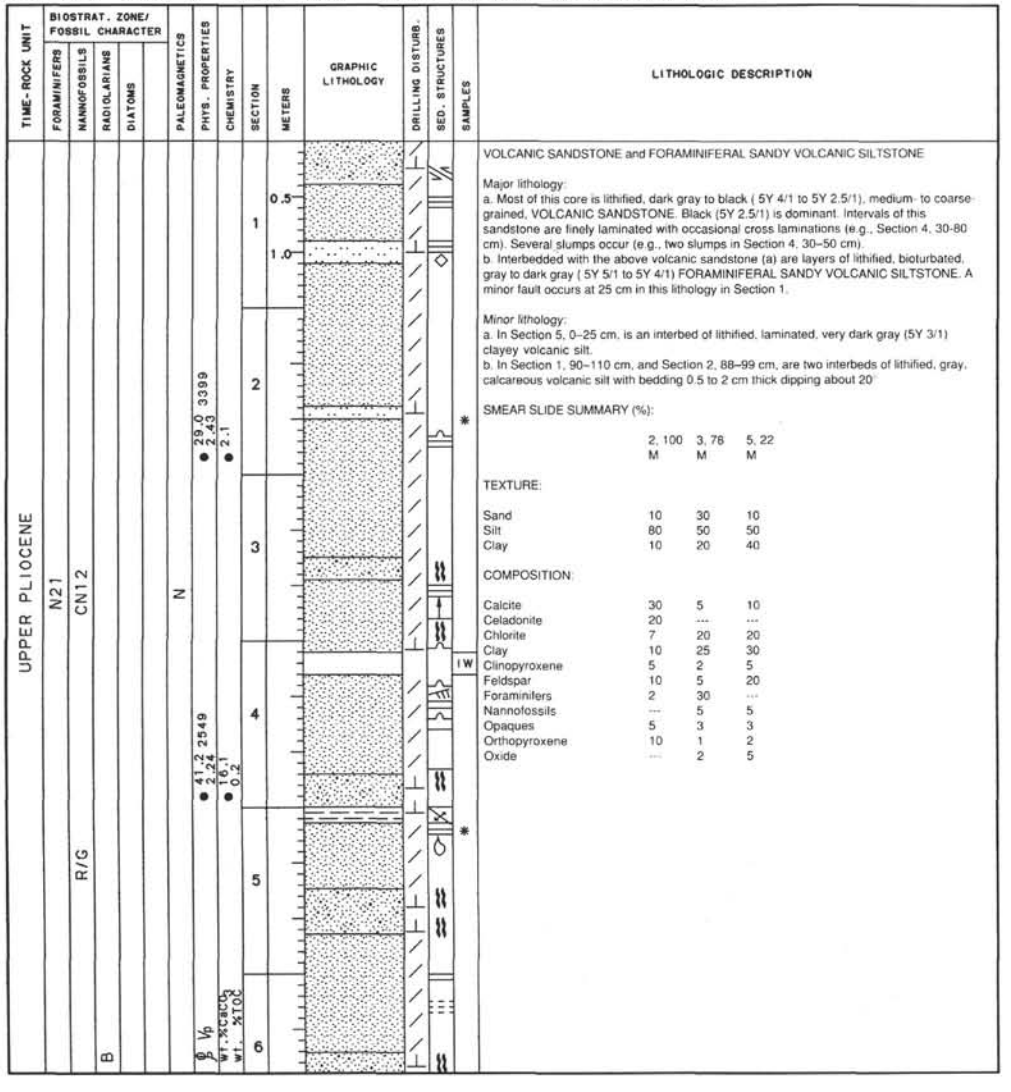
Minor faults occur in the laminated, medium-to fine-grained volcanic sandstone in Section 2, 130–140 cm, in Section 3, 0–10 cm, and in Section 5, 140–150 cm. Slumps occur in Section 6, 20–46 cm, in laminated, medium- to coarse-grained volcanic sandstone.

SMEAR SLIDE SUMMARY (%):

	1, 79 D	5, 76 M
TEXTURE:		
Sand	60	15
Silt	35	60
Clay	5	25
COMPOSITION:		
Chlorite	5	10
Clay	---	20
Clinopyrxene	25	15
Feldspar	10	10
Foraminifers	Tr	---
Nannofossils	---	Tr
Opaques	4	7
Orthopyroxene	5	8
Oxide	1	---
Rock fragment	35	30
Zeolite	15	---



SITE 833 HOLE B CORE 55R CORED INTERVAL 577.7-587.4 mbsf



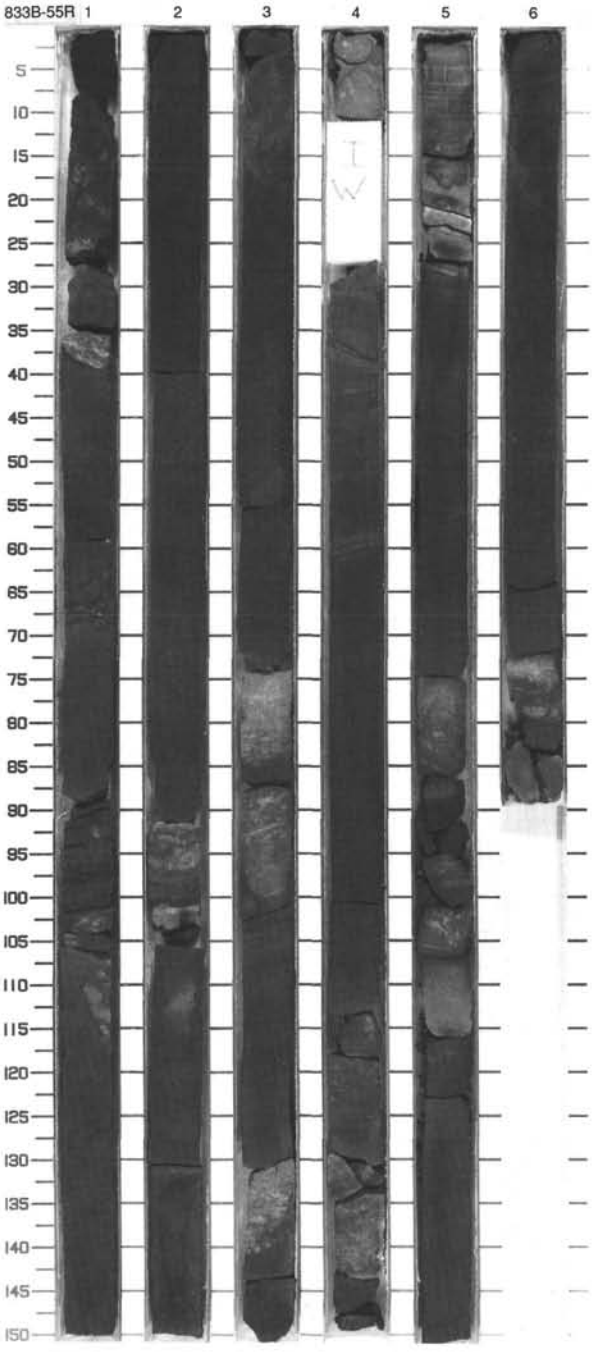
VOLCANIC SANDSTONE and FORAMINIFERAL SANDY VOLCANIC SILTSTONE

Major lithology:
a. Most of this core is lithified, dark gray to black (5Y 4/1 to 5Y 2.5/1), medium- to coarse-grained, VOLCANIC SANDSTONE. Black (5Y 2.5/1) is dominant. Intervals of this sandstone are finely laminated with occasional cross laminations (e.g., Section 4, 30-80 cm). Several slumps occur (e.g., two slumps in Section 4, 30–50 cm).
b. Interbedded with the above volcanic sandstone (a) are layers of lithified, bioturbated, gray to dark gray (5Y 5/1 to 5Y 4/1) FORAMINIFERAL SANDY VOLCANIC SILTSTONE. A minor fault occurs at 25 cm in this lithology in Section 1.

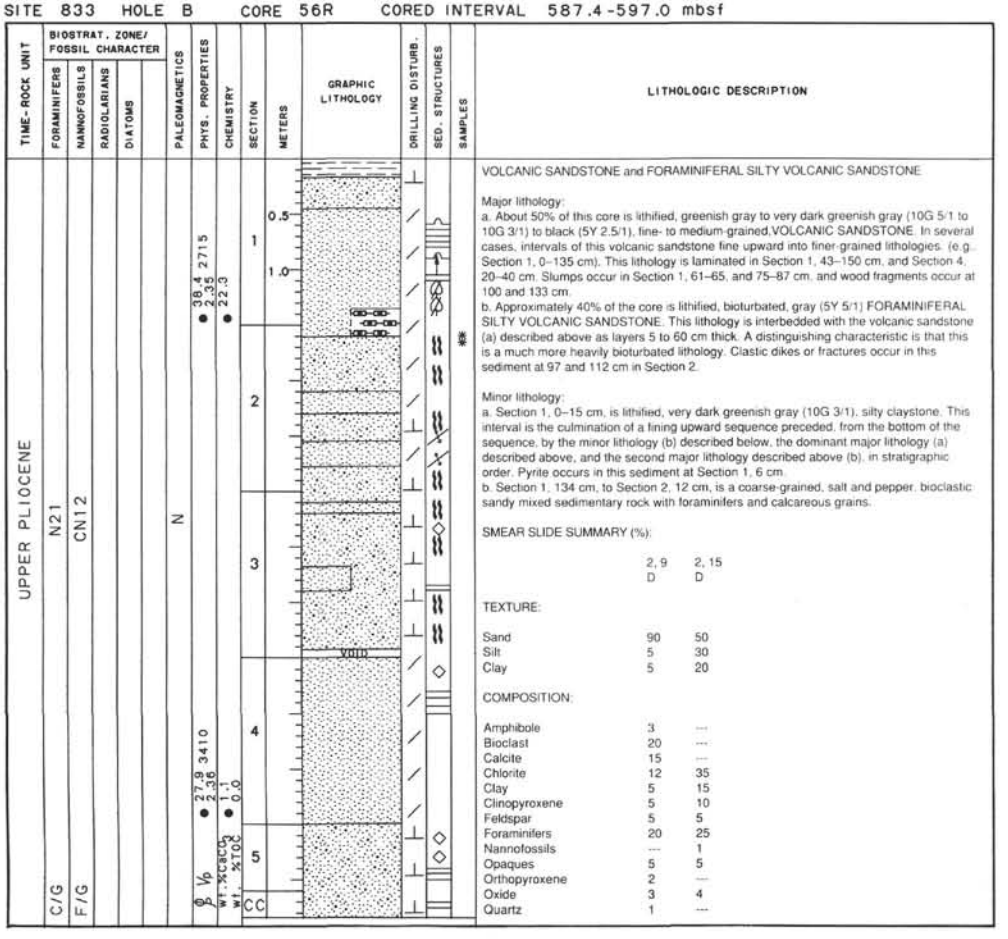
Minor lithology:
a. In Section 5, 0–25 cm, is an interbed of lithified, laminated, very dark gray (5Y 3/1) clayey volcanic silt.
b. In Section 1, 90–110 cm, and Section 2, 88–99 cm, are two interbeds of lithified, gray, calcareous volcanic silt with bedding 0.5 to 2 cm thick dipping about 20°

SMEAR SLIDE SUMMARY (%):

	2, 100 M	3, 78 M	5, 22 M
TEXTURE:			
Sand	10	30	10
Silt	80	50	50
Clay	10	20	40
COMPOSITION:			
Calcite	30	5	10
Celadonite	20	---	---
Chlorite	7	20	20
Clay	10	25	30
Clinopyroxene	5	2	5
Feldspar	10	5	20
Foraminifers	2	30	---
Nannofossils	---	5	5
Opaques	5	3	3
Orthopyroxene	10	1	2
Oxide	---	2	5



SITE 833 HOLE B CORE 56R CORED INTERVAL 587.4-597.0 mbsf



LITHOLOGIC DESCRIPTION

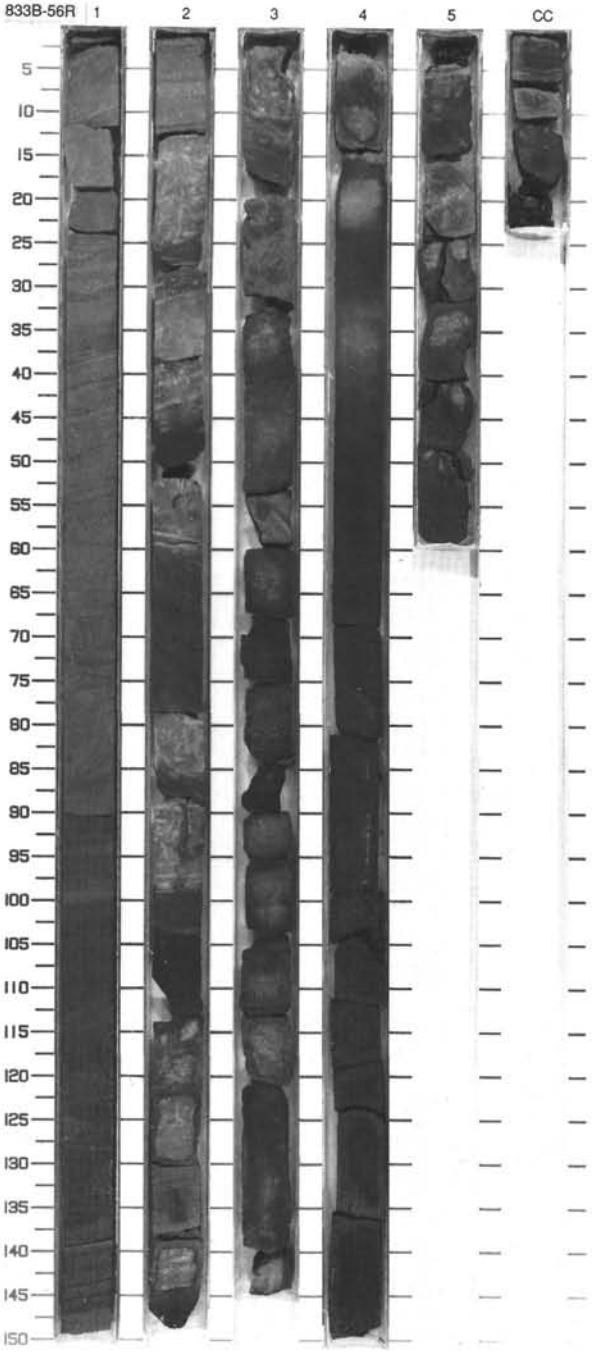
VOLCANIC SANDSTONE and FORAMINIFERAL SILTY VOLCANIC SANDSTONE

Major lithology:
a. About 50% of this core is lithified, greenish gray to very dark greenish gray (10G 5/1 to 10G 3/1) to black (5Y 2.5/1), fine- to medium-grained,VOLCANIC SANDSTONE. In several cases, intervals of this volcanic sandstone fine upward into finer-grained lithologies. (e.g., Section 1, 0–135 cm). This lithology is laminated in Section 1, 43–150 cm, and Section 4, 20–40 cm. Slumps occur in Section 1, 61–65, and 75–87 cm, and wood fragments occur at 100 and 133 cm.
b. Approximately 40% of the core is lithified, bioturbated, gray (5Y 5/1) FORAMINIFERAL SILTY VOLCANIC SANDSTONE. This lithology is interbedded with the volcanic sandstone (a) described above as layers 5 to 60 cm thick. A distinguishing characteristic is that this is a much more heavily bioturbated lithology. Clastic dikes or fractures occur in this sediment at 97 and 112 cm in Section 2.

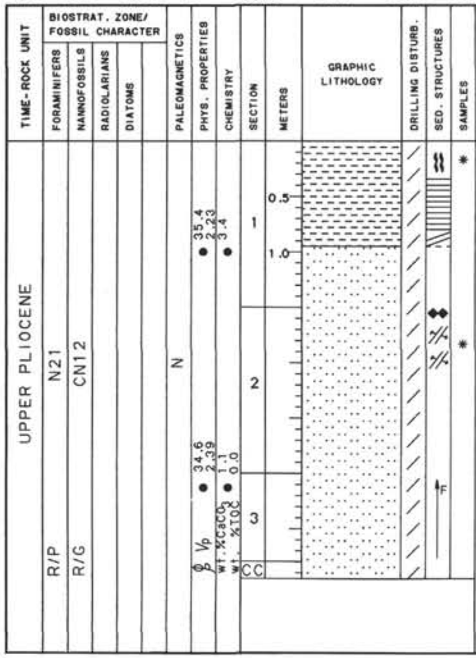
Minor lithology:
a. Section 1, 0–15 cm, is lithified, very dark greenish gray (10G 3/1), silty claystone. This interval is the culmination of a fining upward sequence preceded, from the bottom of the sequence, by the minor lithology (b) described below, the dominant major lithology (a) described above, and the second major lithology described above (b), in stratigraphic order. Pyrite occurs in this sediment at Section 1, 6 cm.
b. Section 1, 134 cm, to Section 2, 12 cm, is a coarse-grained, salt and pepper, bioclastic sandy mixed sedimentary rock with foraminifers and calcareous grains.

SMEAR SLIDE SUMMARY (%):

	2, 9 D	2, 15 D
TEXTURE:		
Sand	90	50
Silt	5	30
Clay	5	20
COMPOSITION:		
Amphibole	3	---
Bioclast	20	---
Calcite	15	---
Chlorite	12	35
Clay	5	15
Clinopyroxene	5	10
Feldspar	5	5
Foraminifers	20	25
Nannofossils	---	1
Opaques	5	5
Orthopyroxene	2	---
Oxide	3	4
Quartz	1	---



SITE 833 HOLE B CORE 57R CORED INTERVAL 597.0-606.7 mbsf



LITHOLOGIC DESCRIPTION

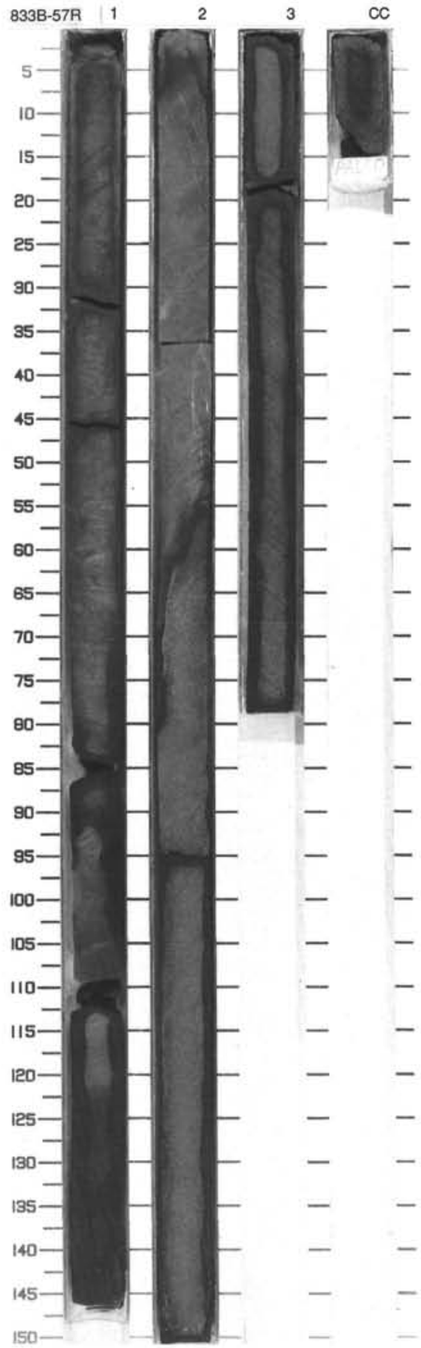
VOLCANIC SILTSTONE

Major lithology: Most of the core consists of black (5Y 2.5/1), fine- to medium-grained, well-sorted VOLCANIC SILTSTONE. In Sections 3 and CC, the silt coarsens somewhat and the sand component rises, so that the sediment is classified as VOLCANIC SILTSTONE with sand.

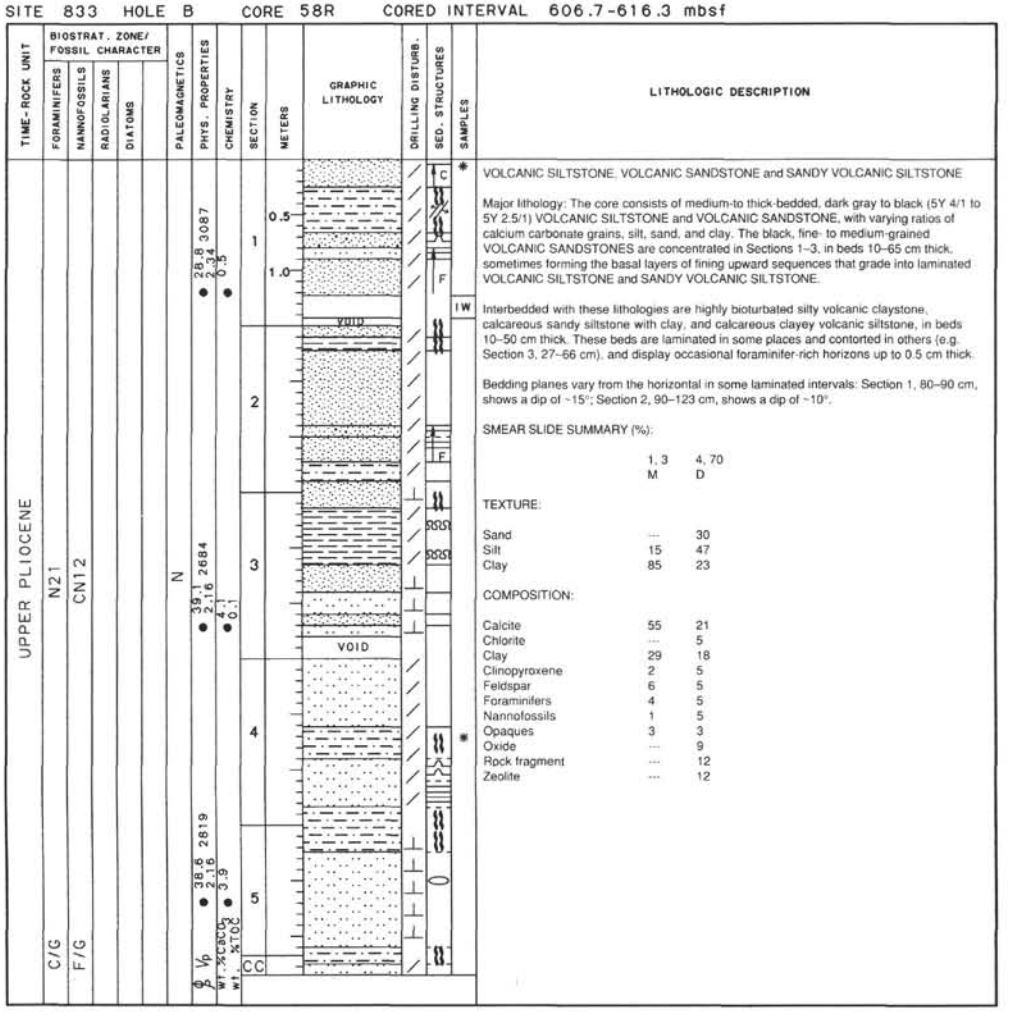
Minor lithology: Section 1, 0–96 cm, consists of very dark gray (5Y 3/1), laminated, claystone with silt.

SMEAR SLIDE SUMMARY (%):

	1, 18 D	2, 32 D
TEXTURE:		
Sand	5	15
Silt	20	75
Clay	75	10
COMPOSITION:		
Calcite	10	---
Clay	67	15
Clinopyroxene	3	15
Feldspar	9	35
Foraminifers	4	---
Glass	2	---
Nannofossils	1	---
Opaques	4	5
Rock fragment	---	25
Zeolite	---	5



SITE 833 HOLE B CORE 58R CORED INTERVAL 606.7-616.3 mbsf



LITHOLOGIC DESCRIPTION

VOLCANIC SILTSTONE, VOLCANIC SANDSTONE and SANDY VOLCANIC SILTSTONE

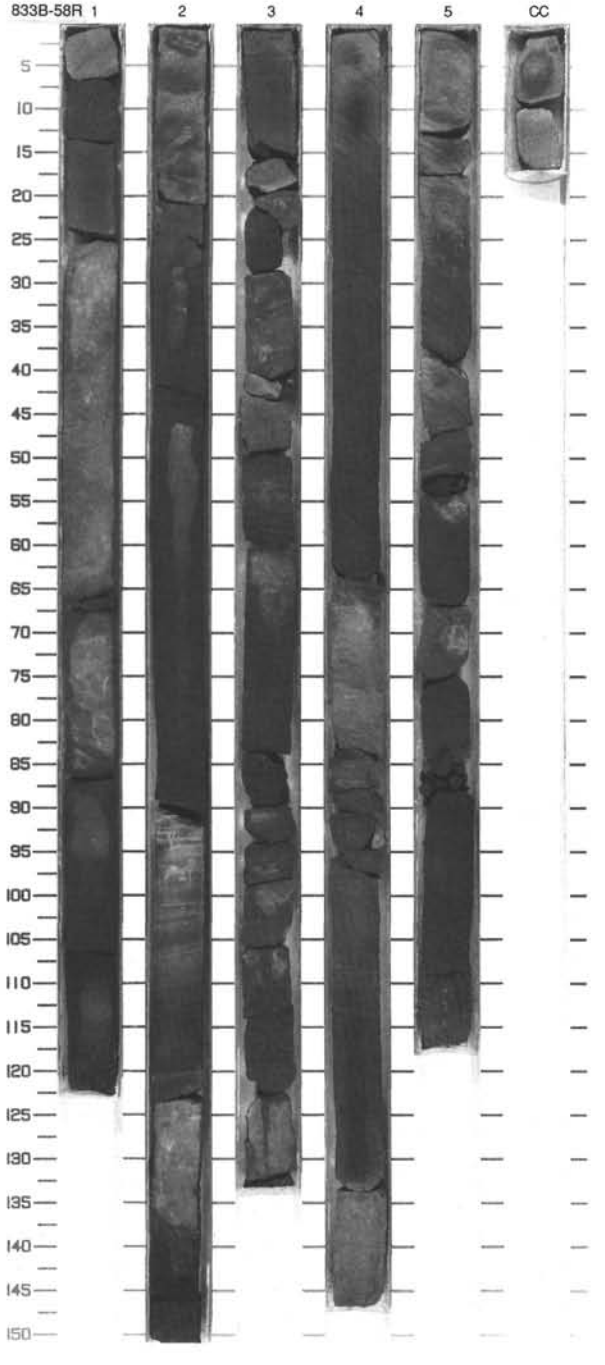
Major lithology: The core consists of medium-to thick-bedded, dark gray to black (5Y 4/1 to 5Y 2.5/1) VOLCANIC SILTSTONE and VOLCANIC SANDSTONE, with varying ratios of calcium carbonate grains, silt, sand, and clay. The black, fine- to medium-grained VOLCANIC SANDSTONES are concentrated in Sections 1–3, in beds 10–65 cm thick, sometimes forming the basal layers of fining upward sequences that grade into laminated VOLCANIC SILTSTONE and SANDY VOLCANIC SILTSTONE.

Interbedded with these lithologies are highly bioturbated silty volcanic claystone, calcareous sandy siltstone with clay, and calcareous clayey volcanic siltstone, in beds 10–50 cm thick. These beds are laminated in some places and contorted in others (e.g. Section 3, 27–66 cm), and display occasional foraminifer-rich horizons up to 0.5 cm thick.

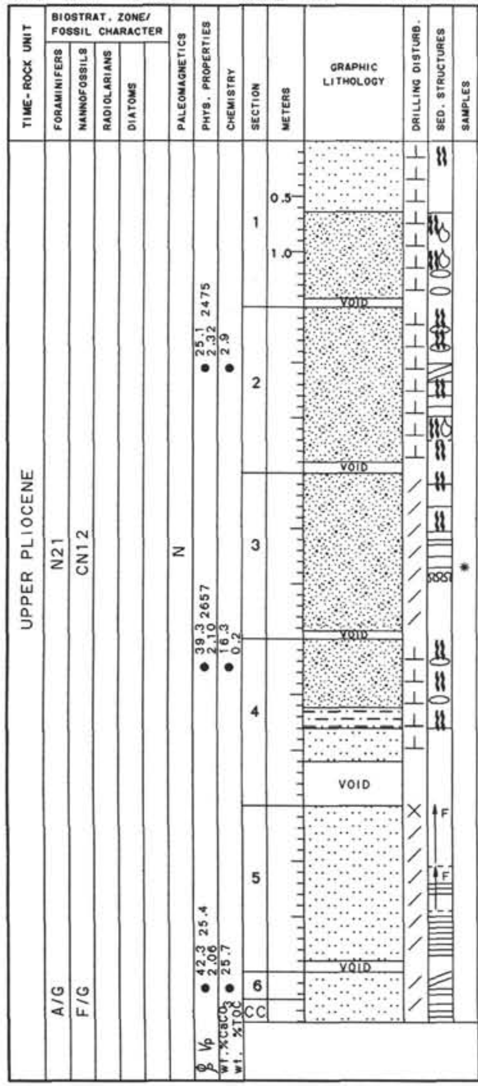
Bedding planes vary from the horizontal in some laminated intervals: Section 1, 80–90 cm, shows a dip of ~15°; Section 2, 90–123 cm, shows a dip of ~10°.

SMEAR SLIDE SUMMARY (%):

	1, 3 M	4, 70 D
TEXTURE:		
Sand	---	30
Silt	15	47
Clay	85	23
COMPOSITION:		
Calcite	55	21
Chlorite	---	5
Clay	29	18
Clinopyroxene	2	5
Feldspar	6	5
Foraminifers	4	5
Nannofossils	1	5
Opaques	3	3
Oxide	---	9
Rock fragment	---	12
Zeolite	---	12



SITE 833 HOLE B CORE 59R CORED INTERVAL 616.3-625.9 mbsf



LITHOLOGIC DESCRIPTION

SANDY VOLCANIC SILTSTONE, SANDY CALCAREOUS VOLCANIC SILTSTONE, CALCAREOUS VOLCANIC SILTSTONE, and VOLCANIC SILTSTONE

Major lithology: The core consists of volcanic siltstone in thin- to thick-bedded intervals with varying proportions of sand, clay, and calcareous grains. The varieties are described below.

a. From Section 1, 62 cm, to Section 4, 111 cm, the core consists of interbeds of medium- to thick-bedded, laminated, black (5Y 2.5/1) SANDY VOLCANIC SILTSTONE and thin- to thick-bedded, highly bioturbated, dark to very dark gray (5Y 4/1 to 5Y 3/1) SANDY CALCAREOUS VOLCANIC SILTSTONE with clay. In the interval from Section 2, 50 cm, to Section 3, 150 cm, the calcareous siltstone occurs as interbeds, 3–10 cm in thickness, in the sandy siltstone; higher and lower in the core, it occurs as beds up to 80 cm thick.

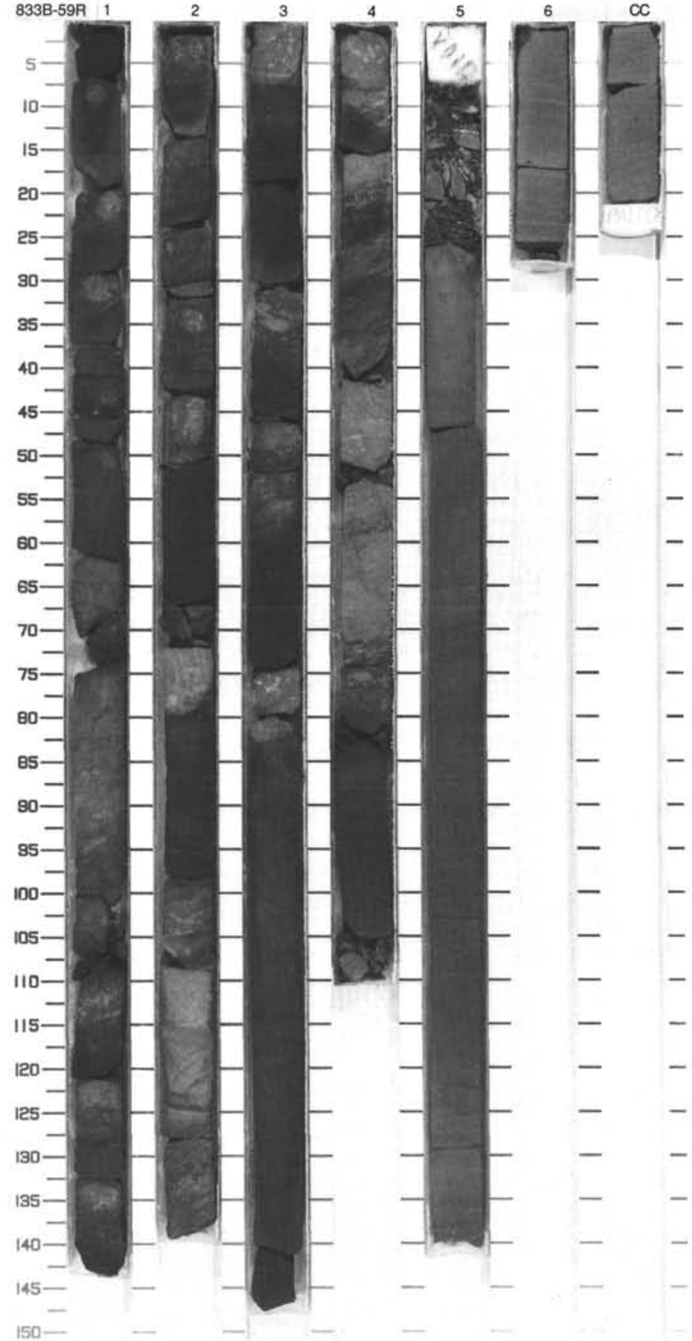
b. Section 5, 0–96 cm, consists of two fining upward sequences of dark gray (5Y 4/1) CALCAREOUS VOLCANIC SILTSTONE with clay.

c. Below Section 5, 96 cm, the core consists of dark gray to gray (5Y 4/1 to 5Y 5/1), finely laminated, CALCAREOUS VOLCANIC SILTSTONE.

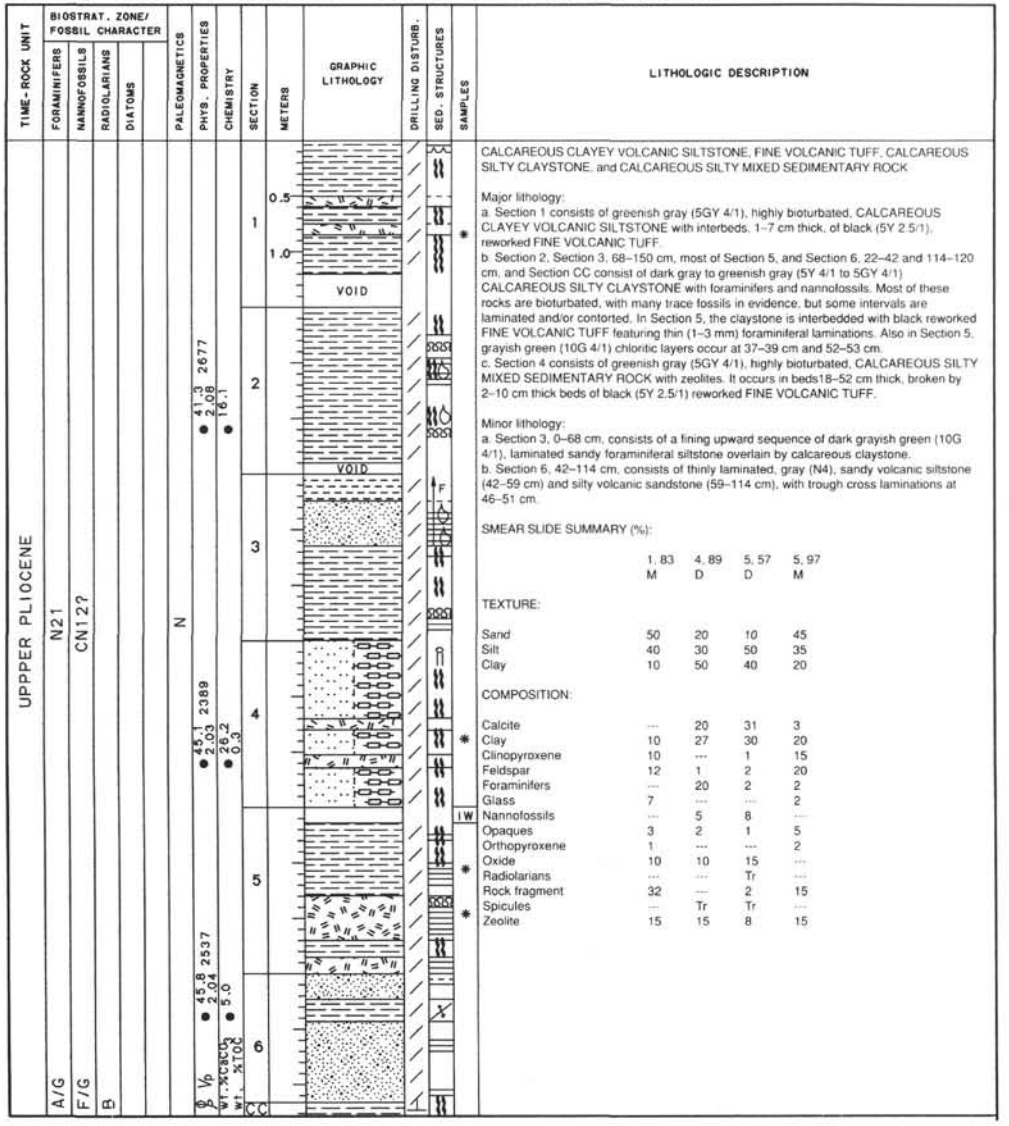
d. Section 1, 0–60 cm, consists of very dark gray (5Y 3/1) VOLCANIC SILTSTONE.

SMEAR SLIDE SUMMARY (%):

	3, 83 M	5, 30 D
TEXTURE:		
Sand	40	10
Silt	50	60
Clay	10	30
COMPOSITION:		
Calcite	10	22
Chlorite	5	2
Clay	---	20
Clinopyrox	4	2
Feldspar	7	2
Foraminifers	35	10
Nannofossils	---	10
Opaques	4	5
Oxide	5	10
Rock fragment	20	12
Spicules	---	Tr
Zeolite	10	5



SITE 833 HOLE B CORE 60R CORED INTERVAL 625.9-635.6 mbsf



LITHOLOGIC DESCRIPTION

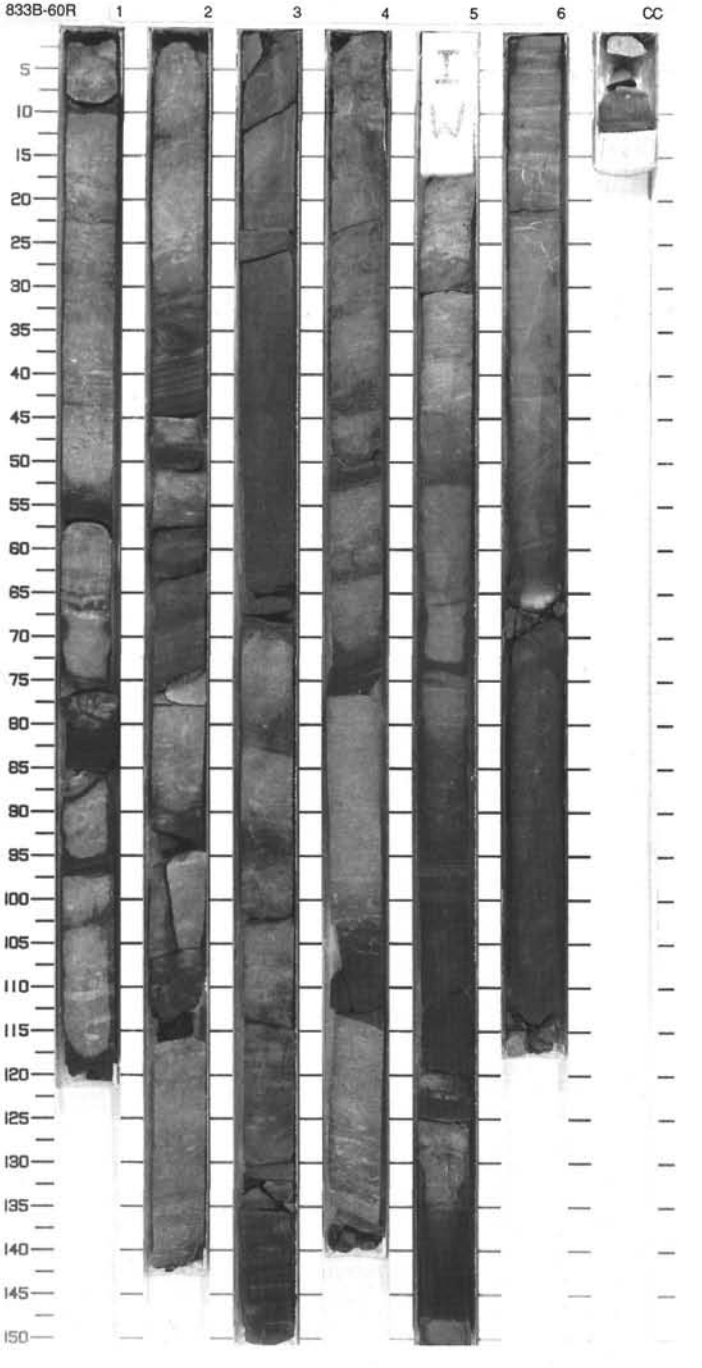
CALCAREOUS CLAYEY VOLCANIC SILTSTONE, FINE VOLCANIC TUFF, CALCAREOUS SILTY CLAYSTONE, and CALCAREOUS SILTY MIXED SEDIMENTARY ROCK

Major lithology:
a. Section 1 consists of greenish gray (5GY 4/1), highly bioturbated, CALCAREOUS CLAYEY VOLCANIC SILTSTONE with interbeds, 1–7 cm thick, of black (5Y 2.5/1), reworked FINE VOLCANIC TUFF.
b. Section 2, Section 3, 68–150 cm, most of Section 5, and Section 6, 22–42 and 114–120 cm, and Section CC consist of dark gray to greenish gray (5Y 4/1 to 5GY 4/1) CALCAREOUS SILTY CLAYSTONE with foraminifers and nannofossils. Most of these rocks are bioturbated, with many trace fossils in evidence, but some intervals are laminated and/or contorted. In Section 5, the claystone is interbedded with black reworked FINE VOLCANIC TUFF featuring thin (1–3 mm) foraminiferal laminations. Also in Section 5, grayish green (10G 4/1) chloritic layers occur at 37–39 cm and 52–53 cm.
c. Section 4 consists of greenish gray (5GY 4/1), highly bioturbated, CALCAREOUS SILTY MIXED SEDIMENTARY ROCK with zeolites. It occurs in beds18–52 cm thick, broken by 2–10 cm thick beds of black (5Y 2.5/1) reworked FINE VOLCANIC TUFF.

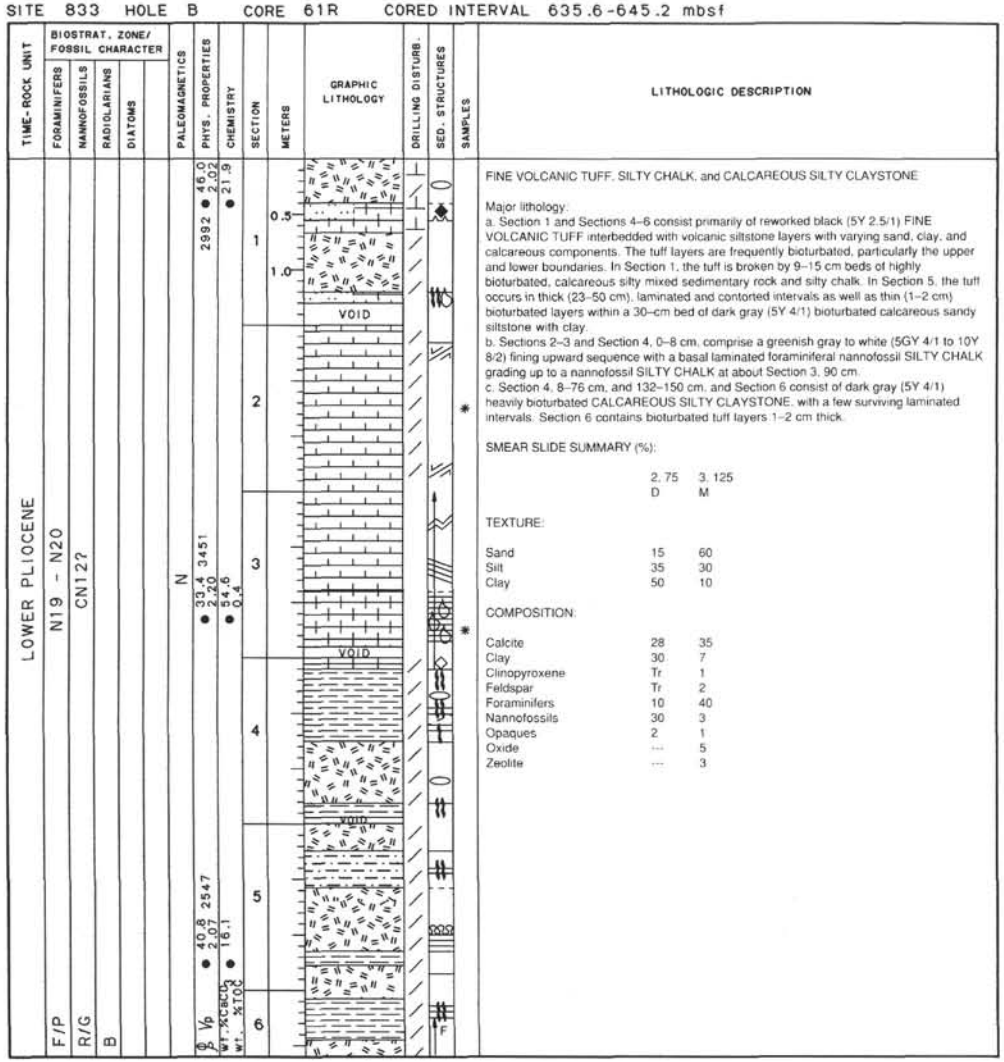
Minor lithology:
a. Section 3, 0–68 cm, consists of a fining upward sequence of dark grayish green (10G 4/1), laminated sandy foraminiferal siltstone overlain by calcareous claystone.
b. Section 6, 42–114 cm, consists of thinly laminated, gray (N4), sandy volcanic siltstone (42–59 cm) and silty volcanic sandstone (59–114 cm), with trough cross laminations at 46–51 cm.

SMEAR SLIDE SUMMARY (%):

	1, 83 M	4, 89 D	5, 57 D	5, 97 M
TEXTURE:				
Sand	50	20	10	45
Silt	40	30	50	35
Clay	10	50	40	20
COMPOSITION:				
Calcite	---	20	31	3
Clay	10	27	30	20
Clinopyroxene	10	---	1	15
Feldspar	12	1	2	20
Foraminifers	---	20	2	2
Glass	7	---	---	2
Nannofossils	---	5	8	---
Opaques	3	2	1	5
Orthopyroxene	1	---	---	2
Oxide	10	10	15	---
Radiolarians	---	---	Tr	---
Rock fragment	32	---	2	15
Spicules	---	Tr	Tr	---
Zeolite	15	15	8	15



SITE 833 HOLE B CORE 61R CORED INTERVAL 635.6-645.2 mbsf



FINE VOLCANIC TUFF, SILTY CHALK, and CALCAREOUS SILTY CLAYSTONE

Major lithology:

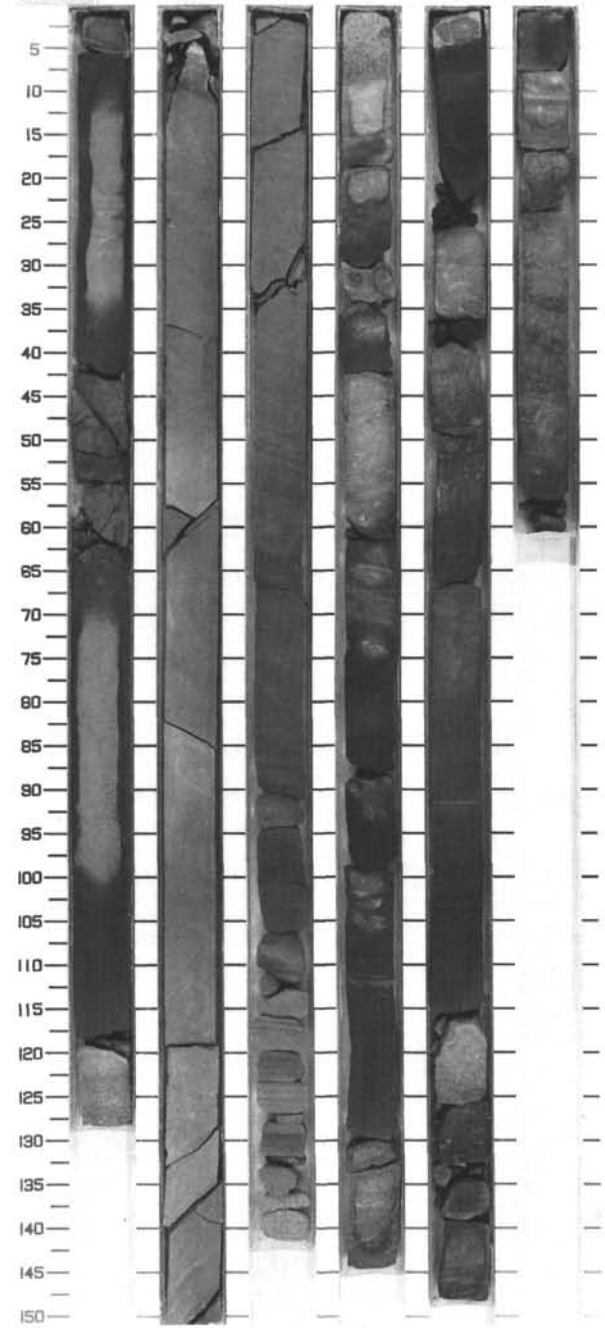
a. Section 1 and Sections 4–6 consist primarily of reworked black (5Y 2.5/1) FINE VOLCANIC TUFF interbedded with volcanic siltstone layers with varying sand, clay, and calcareous components. The tuff layers are frequently bioturbated, particularly the upper and lower boundaries. In Section 1, the tuff is broken by 9–15 cm beds of highly bioturbated, calcareous silty mixed sedimentary rock and silty chalk. In Section 5, the tuff occurs in thick (23–50 cm), laminated and contorted intervals as well as thin (1–2 cm) bioturbated layers within a 30–cm bed of dark gray (5Y 4/1) bioturbated calcareous sandy siltstone with clay.

b. Sections 2–3 and Section 4, 0–8 cm, comprise a greenish gray to white (5GY 4/1 to 10Y 8/2) fining upward sequence with a basal laminated foraminiferal nannofossil SILTY CHALK grading up to a nannofossil SILTY CHALK at about Section 3, 90 cm.

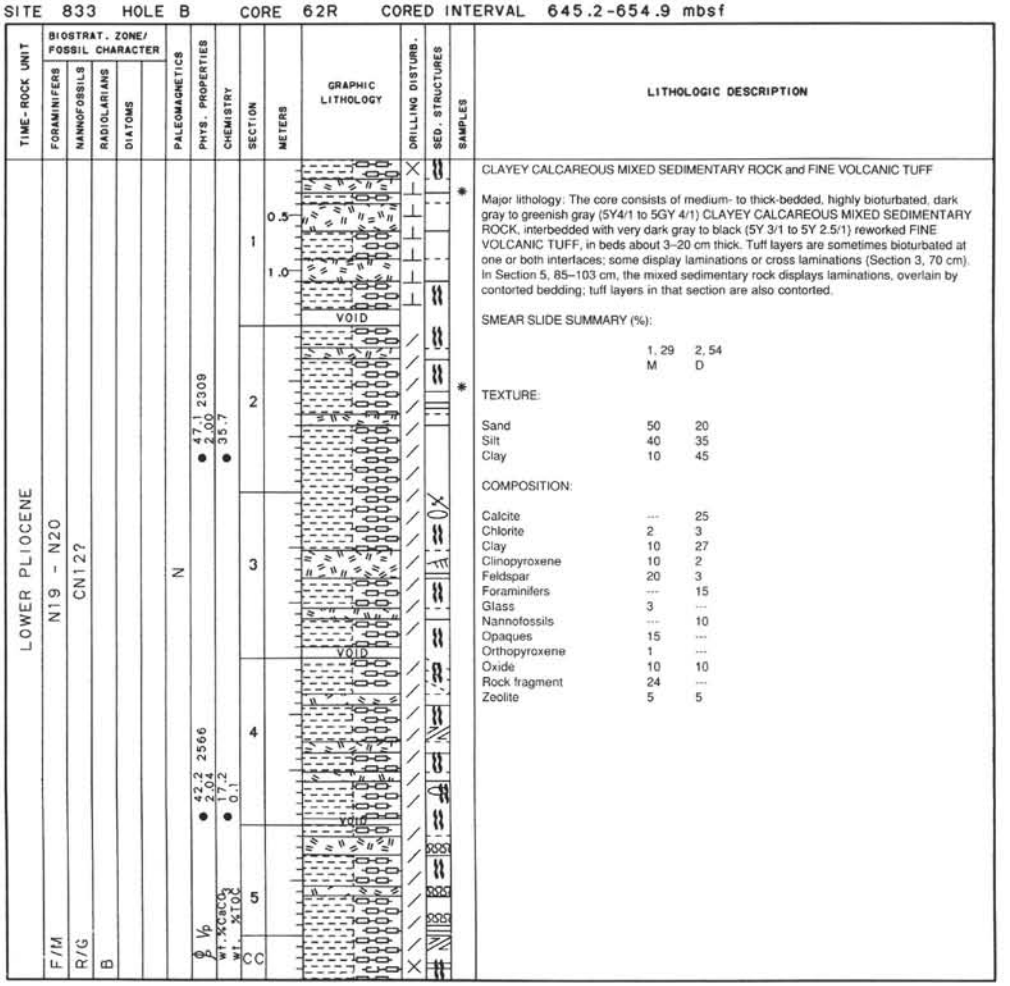
c. Section 4, 8–76 cm, and 132–150 cm, and Section 6 consist of dark gray (5Y 4/1) heavily bioturbated CALCAREOUS SILTY CLAYSTONE, with a few surviving laminated intervals. Section 6 contains bioturbated tuff layers 1–2 cm thick.

SMEAR SLIDE SUMMARY (%):

	2, 75 D	3, 125 M
TEXTURE:		
Sand	15	60
Silt	35	30
Clay	50	10
COMPOSITION:		
Calcite	28	35
Clay	30	7
Clinopyroxene	Tr	1
Feldspar	Tr	2
Foraminifers	10	40
Nannofossils	30	3
Opaques	2	1
Oxide	---	5
Zeolite	---	3



SITE 833 HOLE B CORE 62R CORED INTERVAL 645.2-654.9 mbsf

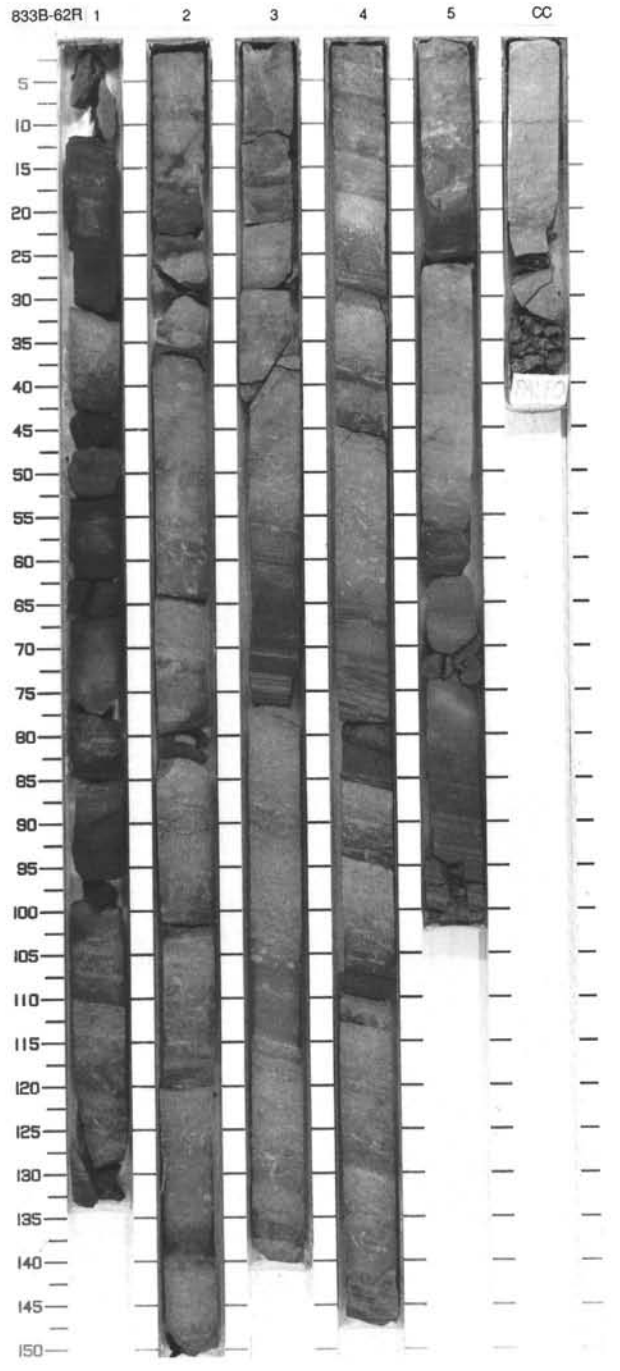


CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK and FINE VOLCANIC TUFF

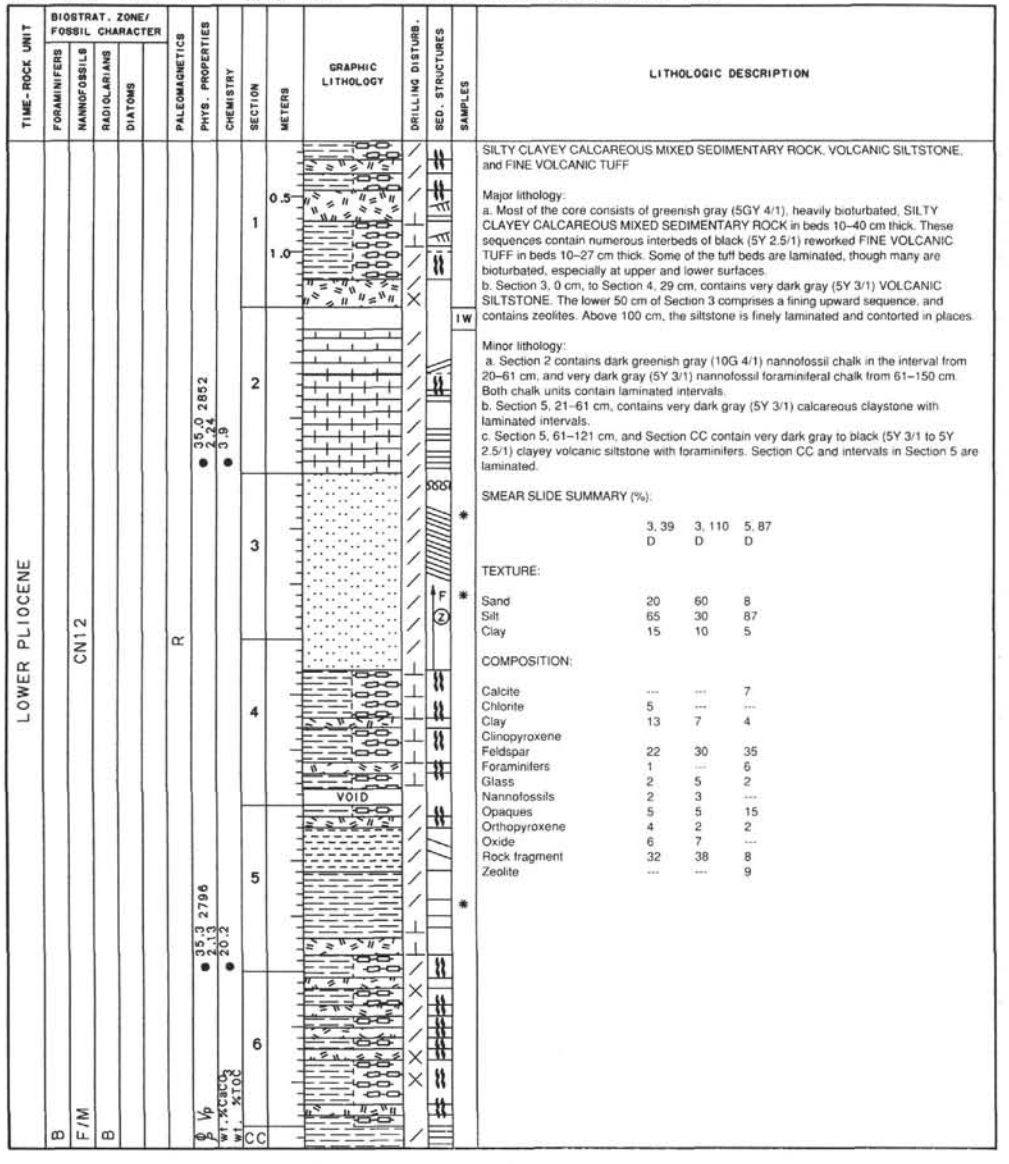
Major lithology: The core consists of medium- to thick-bedded, highly bioturbated, dark gray to greenish gray (5Y4/1 to 5GY 4/1) CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK, interbedded with very dark gray to black (5Y 3/1 to 5Y 2.5/1) reworked FINE VOLCANIC TUFF, in beds about 3–20 cm thick. Tuff layers are sometimes bioturbated at one or both interfaces; some display laminations or cross laminations (Section 3, 70 cm). In Section 5, 85–103 cm, the mixed sedimentary rock displays laminations, overlain by contorted bedding; tuff layers in that section are also contorted.

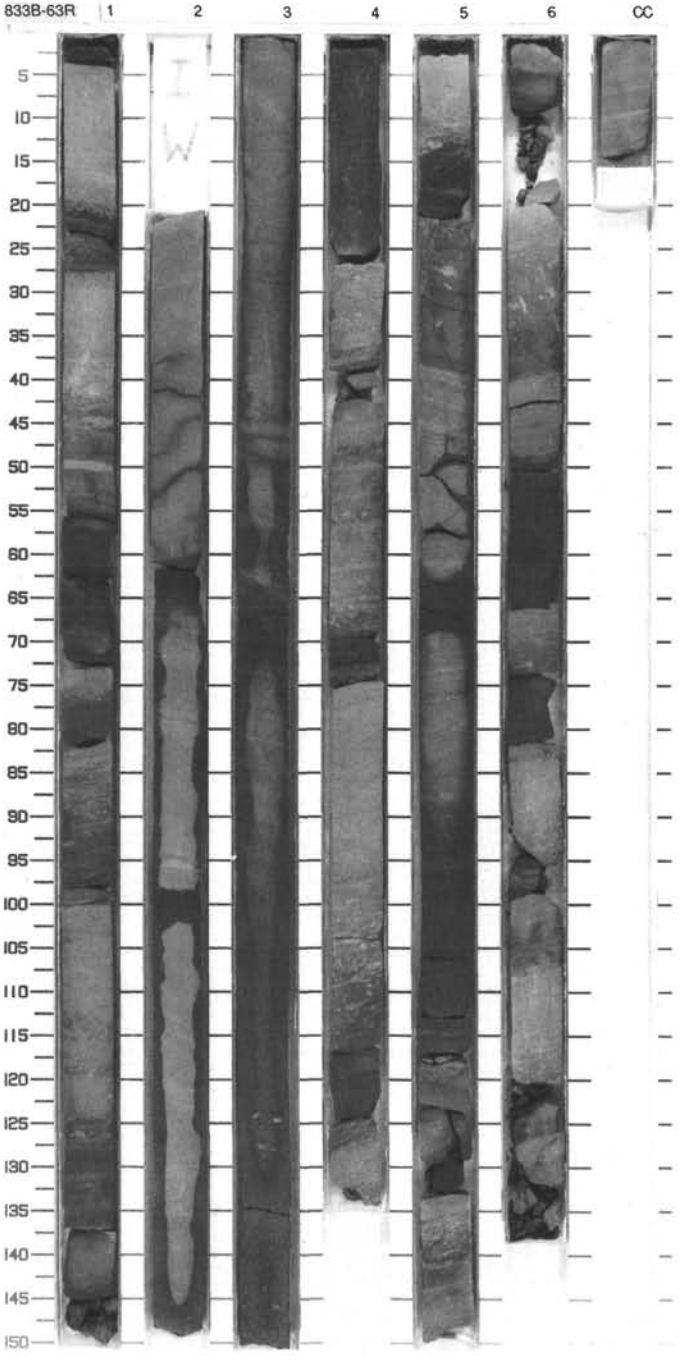
SMEAR SLIDE SUMMARY (%):

	1, 29 M	2, 54 D
TEXTURE:		
Sand	50	20
Silt	40	35
Clay	10	45
COMPOSITION:		
Calcite	---	25
Chlorite	2	3
Clay	10	27
Clinopyroxene	10	2
Feldspar	20	3
Foraminifers	---	15
Glass	3	---
Nannofossils	---	10
Opaques	15	---
Orthopyroxene	1	---
Oxide	10	10
Rock fragment	24	---
Zeolite	5	5

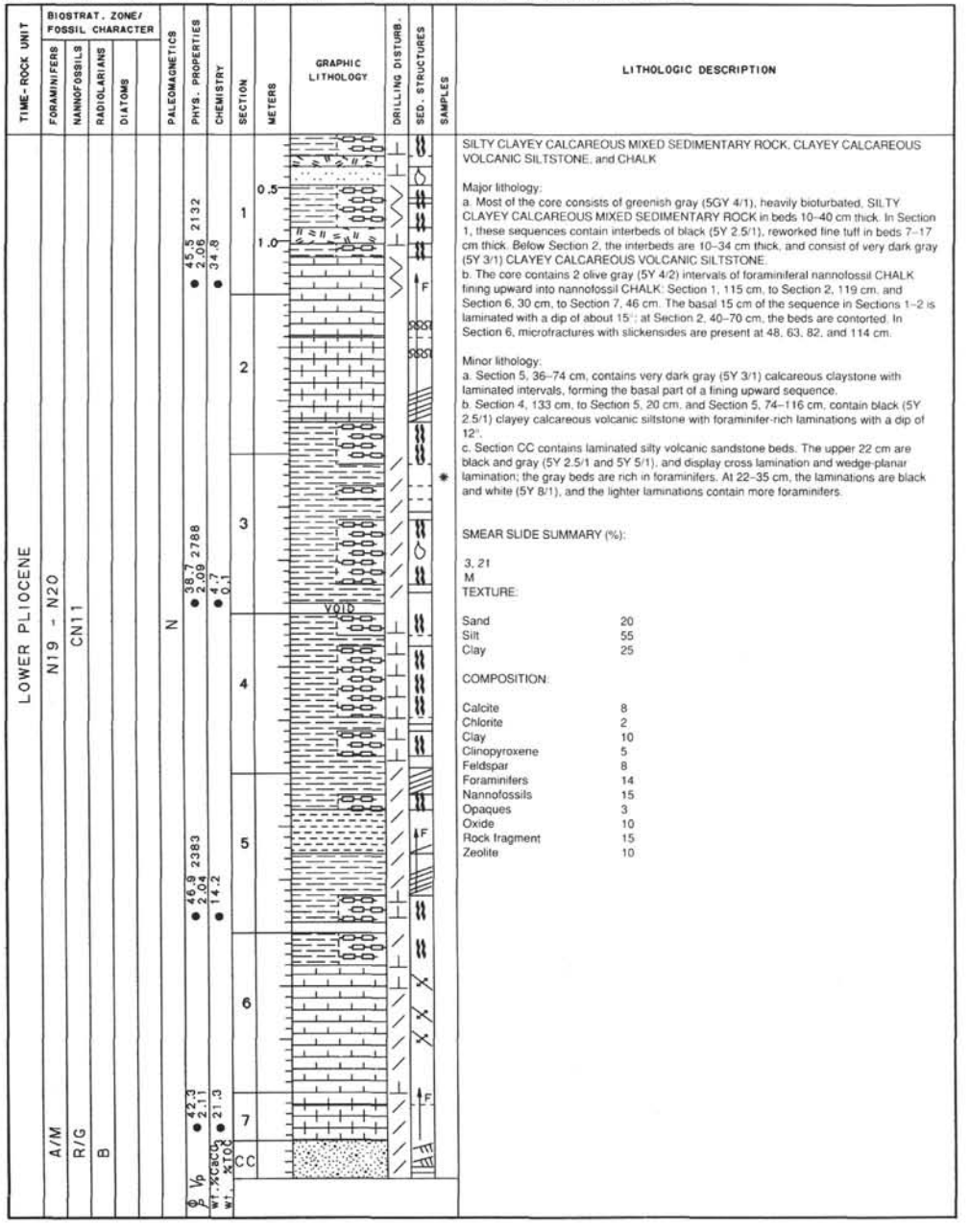


SITE 833 HOLE B CORE 63R CORED INTERVAL 654.9-664.9 mbsf





SITE 833 HOLE B CORE 64R CORED INTERVAL 664.9-674.2 mbsf



LITHOLOGIC DESCRIPTION

SILTY CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK, CLAYEY CALCAREOUS VOLCANIC SILTSTONE, and CHALK

Major lithology:
a. Most of the core consists of greenish gray (5GY 4/1), heavily bioturbated, SILTY CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK in beds 10–40 cm thick. In Section 1, these sequences contain interbeds of black (5Y 2.5/1), reworked fine tuff in beds 7–17 cm thick. Below Section 2, the interbeds are 10–34 cm thick, and consist of very dark gray (5Y 3/1) CLAYEY CALCAREOUS VOLCANIC SILTSTONE.
b. The core contains 2 olive gray (5Y 4/2) intervals of foraminiferal nannofossil CHALK fining upward into nannofossil CHALK: Section 1, 115 cm, to Section 2, 119 cm, and Section 6, 30 cm, to Section 7, 46 cm. The basal 15 cm of the sequence in Sections 1–2 is laminated with a dip of about 15°; at Section 2, 40–70 cm, the beds are contorted. In Section 6, microfractures with slickensides are present at 48, 63, 82, and 114 cm.

Minor lithology:
a. Section 5, 36–74 cm, contains very dark gray (5Y 3/1) calcareous claystone with laminated intervals, forming the basal part of a fining upward sequence.
b. Section 4, 133 cm, to Section 5, 20 cm, and Section 5, 74–116 cm, contain black (5Y 2.5/1) clayey calcareous volcanic siltstone with foraminifer-rich laminations with a dip of 12°.
c. Section CC contains laminated silty volcanic sandstone beds. The upper 22 cm are black and gray (5Y 2.5/1 and 5Y 5/1), and display cross lamination and wedge-planar lamination; the gray beds are rich in foraminifers. At 22–35 cm, the laminations are black and white (5Y 8/1), and the lighter laminations contain more foraminifers.

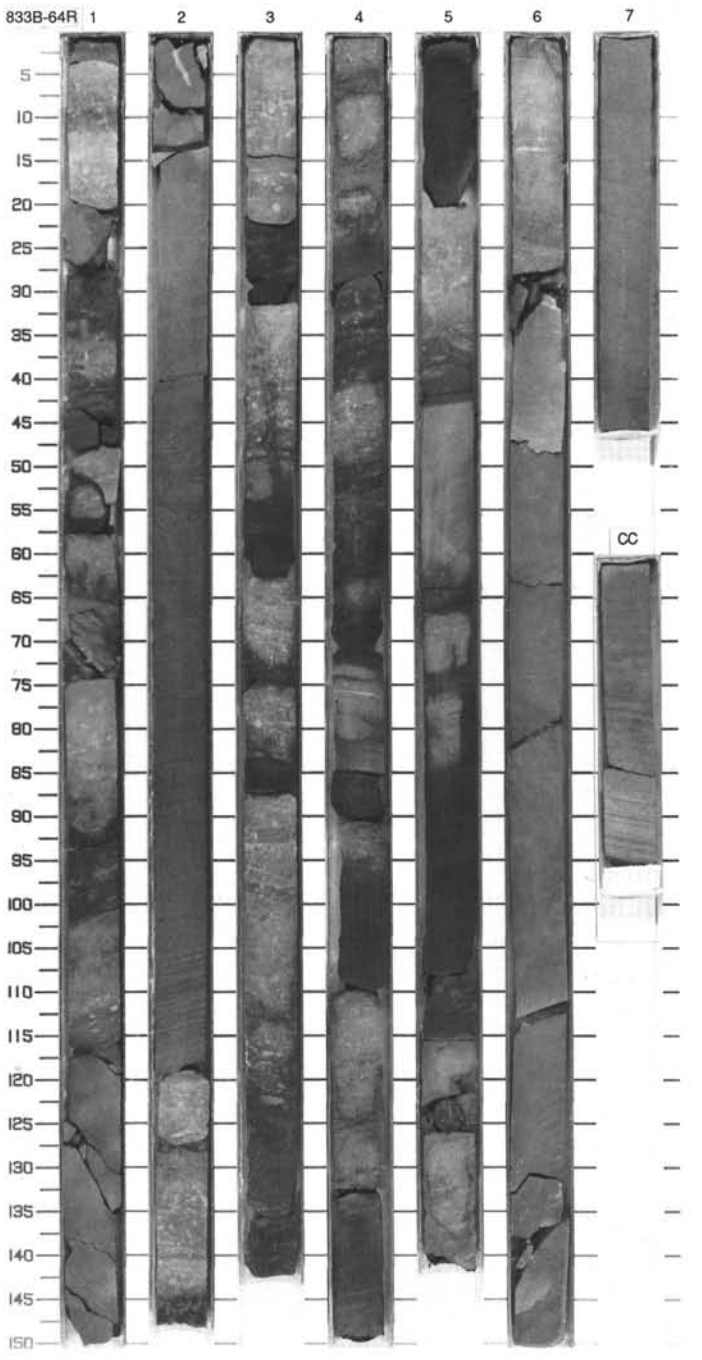
SMEAR SLIDE SUMMARY (%):

3, 21
M
TEXTURE:

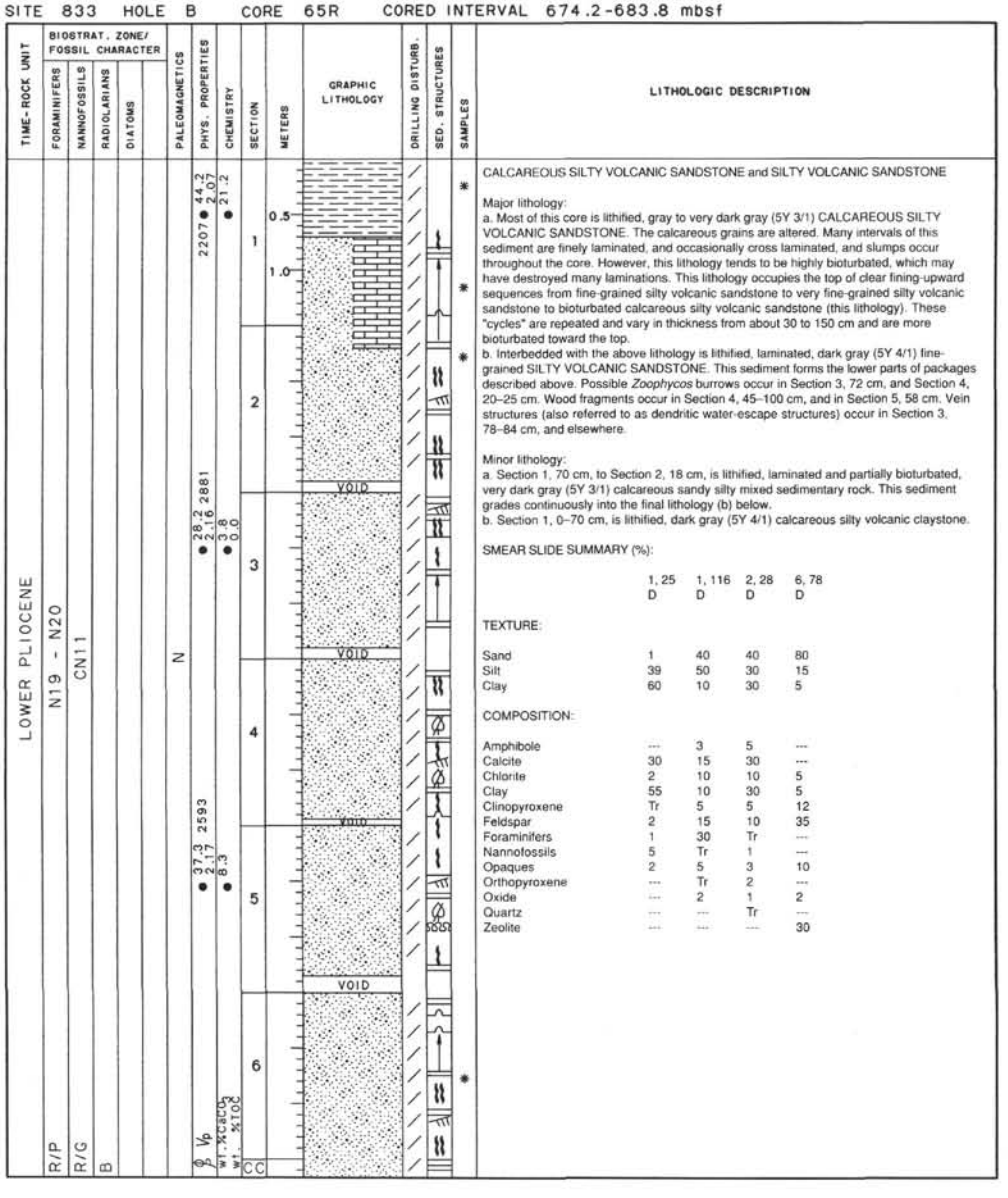
Sand	20
Silt	55
Clay	25

COMPOSITION:

Calcite	8
Chlorite	2
Clay	10
Clinopyroxene	5
Feldspar	8
Foraminifers	14
Nannofossils	15
Opaques	3
Oxide	10
Rock fragment	15
Zeolite	10



SITE 833 HOLE B CORE 65R CORED INTERVAL 674.2-683.8 mbsf



LITHOLOGIC DESCRIPTION

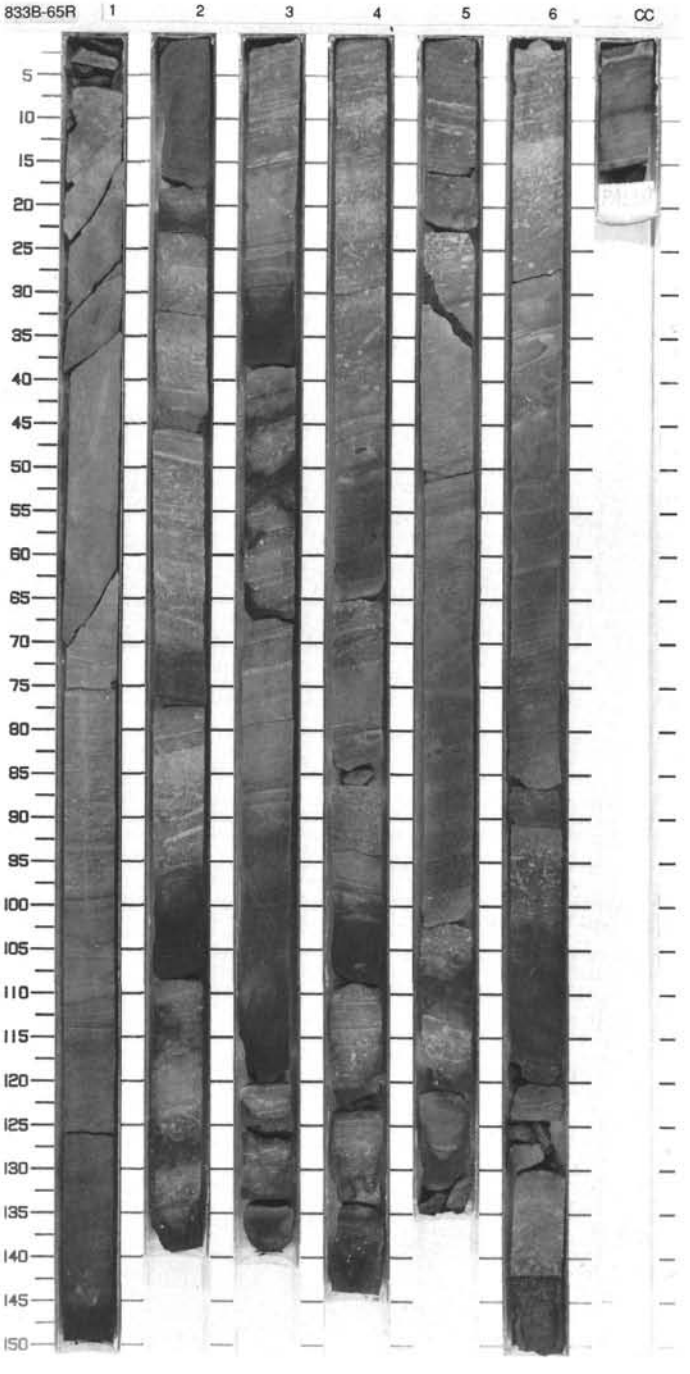
CALCAREOUS SILTY VOLCANIC SANDSTONE and SILTY VOLCANIC SANDSTONE

Major lithology:
a. Most of this core is lithified, gray to very dark gray (5Y 3/1) CALCAREOUS SILTY VOLCANIC SANDSTONE. The calcareous grains are altered. Many intervals of this sediment are finely laminated, and occasionally cross laminated, and slumps occur throughout the core. However, this lithology tends to be highly bioturbated, which may have destroyed many laminations. This lithology occupies the top of clear fining-upward sequences from fine-grained silty volcanic sandstone to very fine-grained silty volcanic sandstone to bioturbated calcareous silty volcanic sandstone (this lithology). These "cycles" are repeated and vary in thickness from about 30 to 150 cm and are more bioturbated toward the top.
b. Interbedded with the above lithology is lithified, laminated, dark gray (5Y 4/1) fine-grained SILTY VOLCANIC SANDSTONE. This sediment forms the lower parts of packages described above. Possible *Zoophycos* burrows occur in Section 3, 72 cm, and Section 4, 20–25 cm. Wood fragments occur in Section 4, 45–100 cm, and in Section 5, 58 cm. Vein structures (also referred to as dendritic water-escape structures) occur in Section 3, 78–84 cm, and elsewhere.

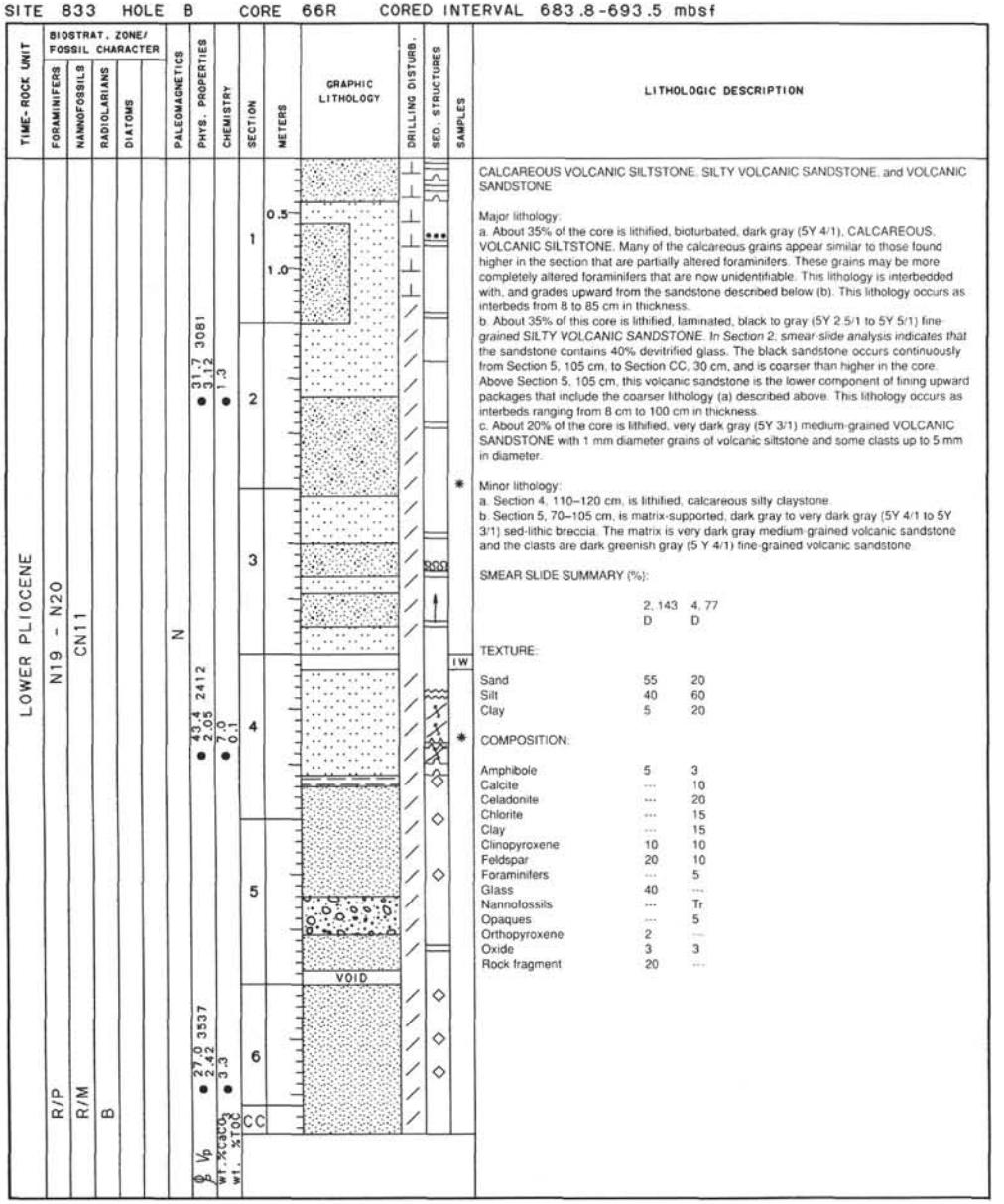
Minor lithology:
a. Section 1, 70 cm, to Section 2, 18 cm, is lithified, laminated and partially bioturbated, very dark gray (5Y 3/1) calcareous sandy silty mixed sedimentary rock. This sediment grades continuously into the final lithology (b) below.
b. Section 1, 0–70 cm, is lithified, dark gray (5Y 4/1) calcareous silty volcanic claystone.

SMEAR SLIDE SUMMARY (%):

	1, 25 D	1, 116 D	2, 28 D	6, 78 D
TEXTURE:				
Sand	1	40	40	80
Silt	39	50	30	15
Clay	60	10	30	5
COMPOSITION:				
Amphibole	---	3	5	---
Calcite	30	15	30	---
Chlorite	2	10	10	5
Clay	55	10	30	5
Clinopyroxene	Tr	5	5	12
Feldspar	2	15	10	35
Foraminifers	1	30	Tr	---
Nannofossils	5	Tr	1	---
Opaques	2	5	3	10
Orthopyroxene	---	Tr	2	---
Oxide	---	2	1	2
Quartz	---	---	Tr	---
Zeolite	---	---	---	30



SITE 833 HOLE B CORE 66R CORED INTERVAL 683.8-693.5 mbsf



LITHOLOGIC DESCRIPTION

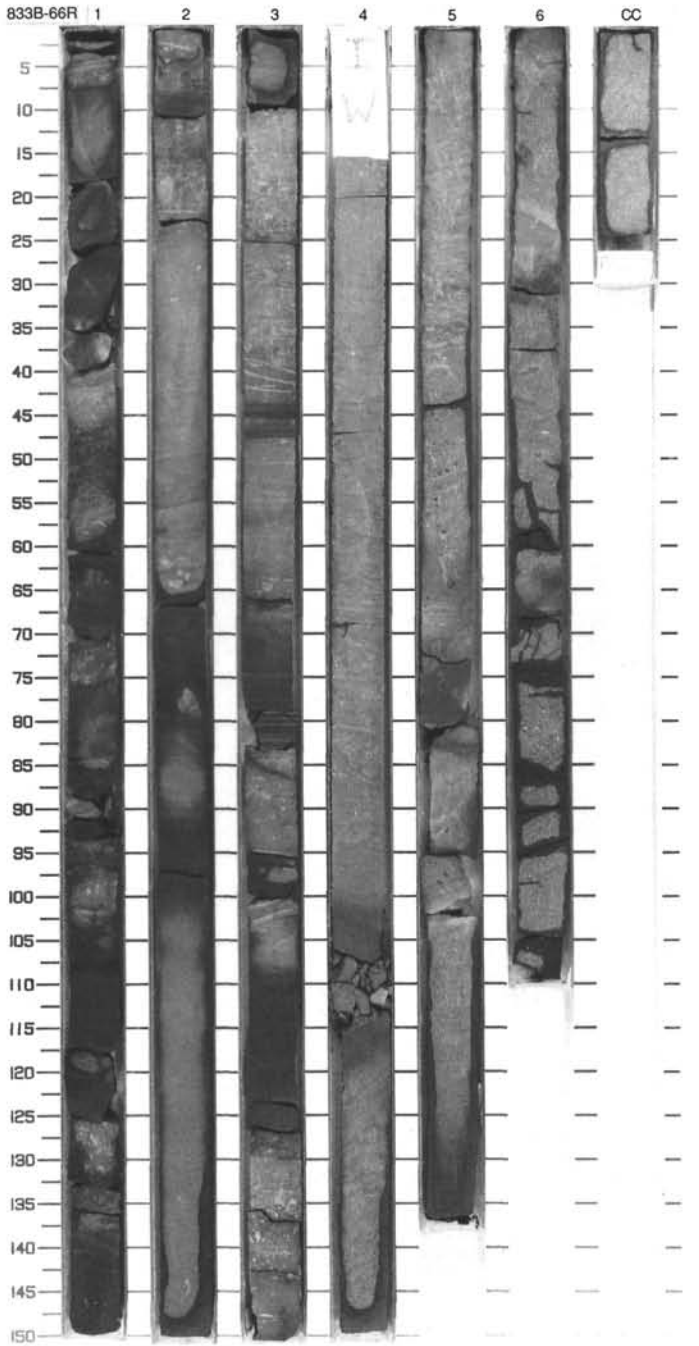
CALCAREOUS VOLCANIC SILTSTONE, SILTY VOLCANIC SANDSTONE, and VOLCANIC SANDSTONE

Major lithology:
a. About 35% of the core is lithified, bioturbated, dark gray (5Y 4/1), CALCAREOUS, VOLCANIC SILTSTONE. Many of the calcareous grains appear similar to those found higher in the section that are partially altered foraminifers. These grains may be more completely altered foraminifers that are now unidentifiable. This lithology is interbedded with, and grades upward from the sandstone described below (b). This lithology occurs as interbeds from 8 to 85 cm in thickness.
b. About 35% of this core is lithified, laminated, black to gray (5Y 2.5/1 to 5Y 5/1) fine-grained *SILTY VOLCANIC SANDSTONE. In Section 2, smear-slide analysis indicates that* the sandstone contains 40% devitrified glass. The black sandstone occurs continuously from Section 5, 105 cm, to Section CC, 30 cm, and is coarser than higher in the core. Above Section 5, 105 cm, this volcanic sandstone is the lower component of fining upward packages that include the coarser lithology (a) described above. This lithology occurs as interbeds ranging from 8 cm to 100 cm in thickness.
c. About 20% of the core is lithified, very dark gray (5Y 3/1) medium-grained VOLCANIC SANDSTONE with 1 mm diameter grains of volcanic siltstone and some clasts up to 5 mm in diameter.

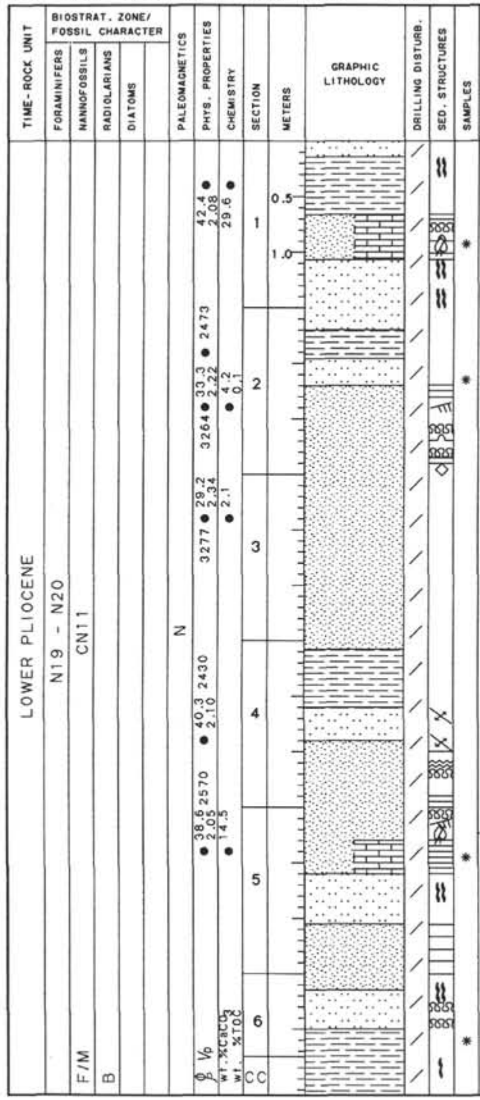
Minor lithology:
a. Section 4, 110–120 cm, is lithified, calcareous silty claystone.
b. Section 5, 70–105 cm, is matrix-supported, dark gray to very dark gray (5Y 4/1 to 5Y 3/1) sed-lithic breccia. The matrix is very dark gray medium-grained volcanic sandstone and the clasts are dark greenish gray (5 Y 4/1) fine-grained volcanic sandstone.

SMEAR SLIDE SUMMARY (%):

	2, 143 D	4, 77 D
TEXTURE:		
Sand	55	20
Silt	40	60
Clay	5	20
COMPOSITION:		
Amphibole	5	3
Calcite	---	10
Celadonite	---	20
Chlorite	---	15
Clay	---	15
Clinopyroxene	10	10
Feldspar	20	10
Foraminifers	---	5
Glass	40	---
Nannofossils	---	Tr
Opaques	---	5
Orthopyroxene	2	---
Oxide	3	3
Rock fragment	20	---



SITE 833 HOLE B CORE 67R CORED INTERVAL 693.5-703.1 mbsf



LITHOLOGIC DESCRIPTION

VOLCANIC SANDSTONE, CALCAREOUS VOLCANIC SILTSTONE, and CALCAREOUS SILTY CLAYSTONE

Major lithology:

a. About 40% of this core is lithified, dark gray to black (5Y 4/1 to 5Y 2.5/1), fine- to medium-grained VOLCANIC SANDSTONE. This sandstone often grades in a fining-upward sequence into the siltstone described below.

b. Approximately 25% of this core is lithified, bioturbated dark gray (5Y 4/1) CALCAREOUS VOLCANIC SILTSTONE. In Section, 2, 65–66 cm, this lithology is clayey volcanic silt with sand and calcareous grains.

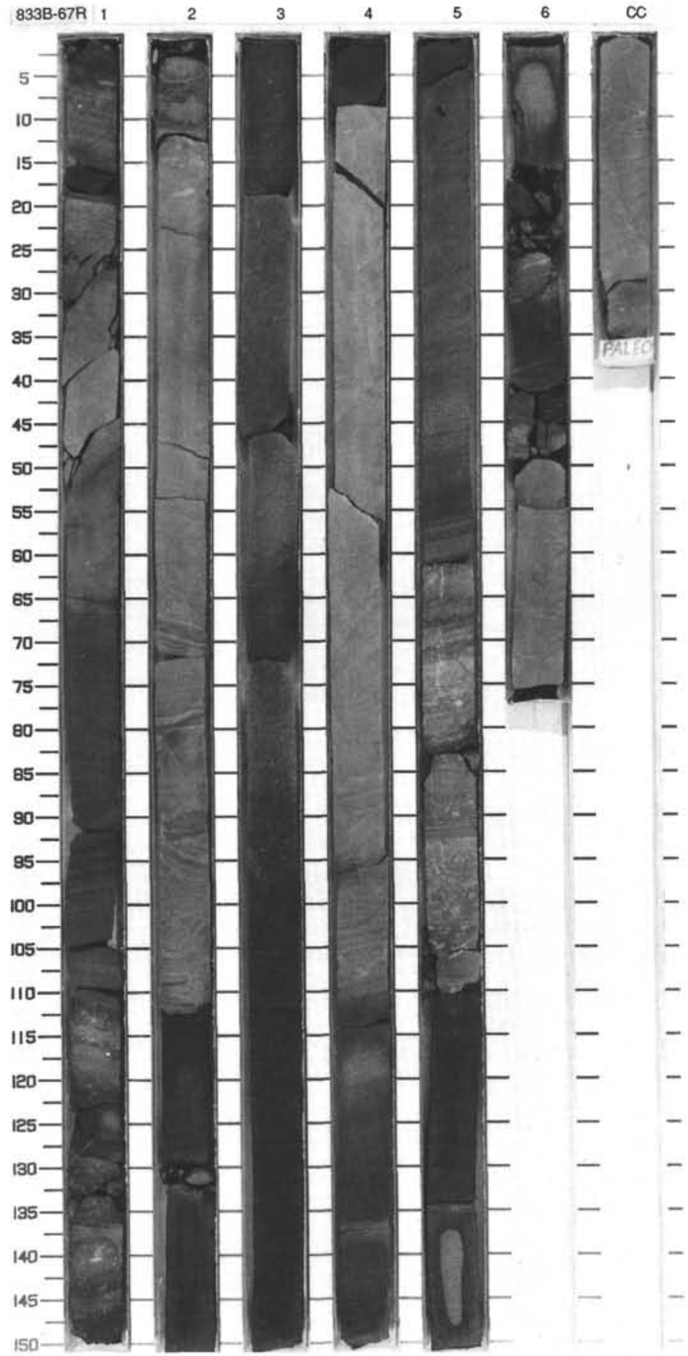
c. About 20% of this core is lithified, gray to dark gray (5Y 5/1 to 5Y 4/1) CALCAREOUS SILTY CLAYSTONE.

Minor lithology: Section 1, 65–107 cm, and Section 5, 30–58 cm, consist of very dark gray to dark gray (5Y 4/1 to 5Y 3/1), calcareous foraminiferal sandy mixed sedimentary rock. In Section 1, this lithology contains wood fragments and slumps and in Section 5 it is laminated.

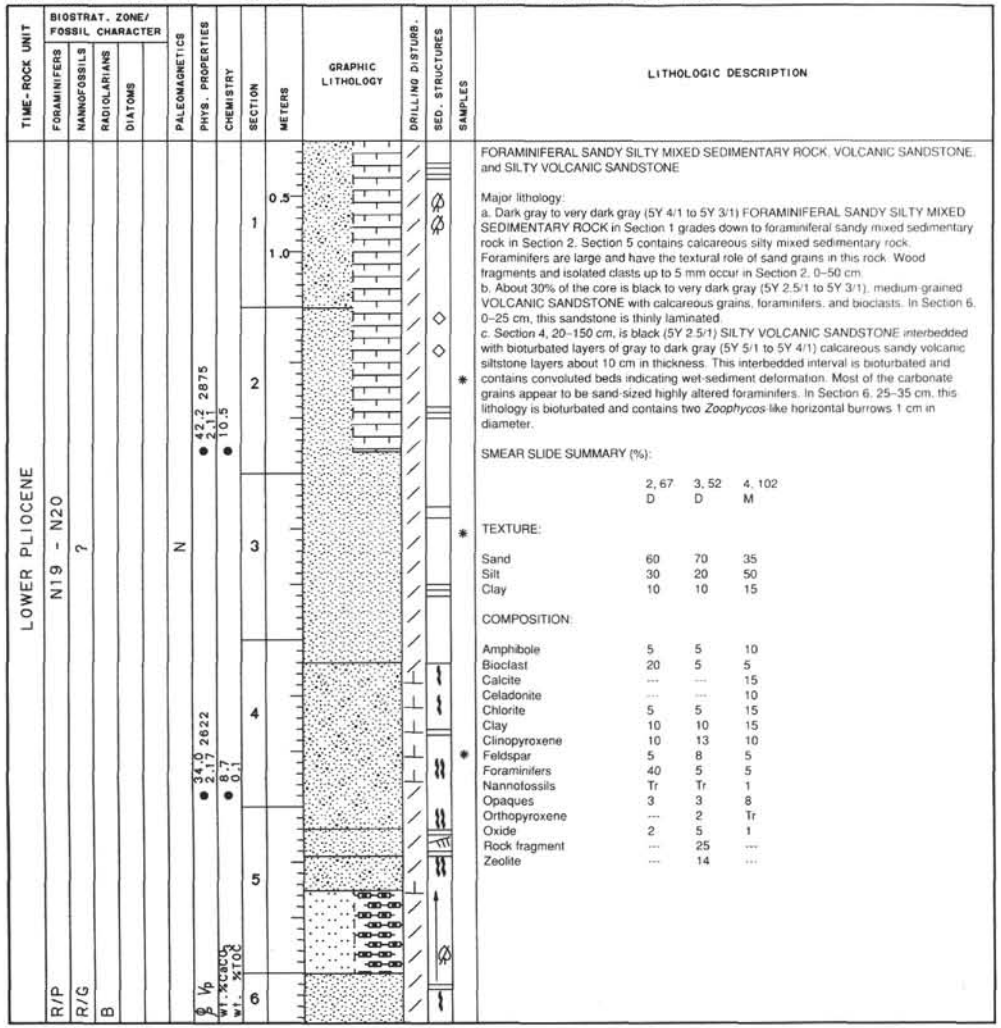
These lithologies compose fining-upward sequences. For example, Section 5, 59 cm, to Section 4, 7 cm, fines upward in the following sequence of the lithologies described above: the minor lithology, and major lithologies a, b, and c.

SMEAR SLIDE SUMMARY (%):

	1, 92 M	2, 65 D	5, 44 D	6, 61 D
TEXTURE:				
Sand	60	10	60	5
Silt	30	50	25	45
Clay	10	40	15	50
COMPOSITION:				
Amphibole	---	3	---	---
Bioclast	---	---	5	---
Calcite	25	10	25	30
Celadonite	---	15	---	---
Chlorite	10	15	8	4
Clay	10	30	10	50
Clinopyroxene	3	10	5	3
Feldspar	5	10	10	5
Foraminifers	25	---	25	---
Nannofossils	Tr	---	Tr	Tr
Opaques	10	5	5	4
Orthopyroxene	1	Tr	---	---
Oxide	Tr	2	2	3
Plant	10	---	---	---
Quartz	1	---	1	---



SITE 833 HOLE B CORE 68R CORED INTERVAL 703.1-712.8 mbsf



LITHOLOGIC DESCRIPTION

FORAMINIFERAL SANDY SILTY MIXED SEDIMENTARY ROCK, VOLCANIC SANDSTONE, and SILTY VOLCANIC SANDSTONE

Major lithology:

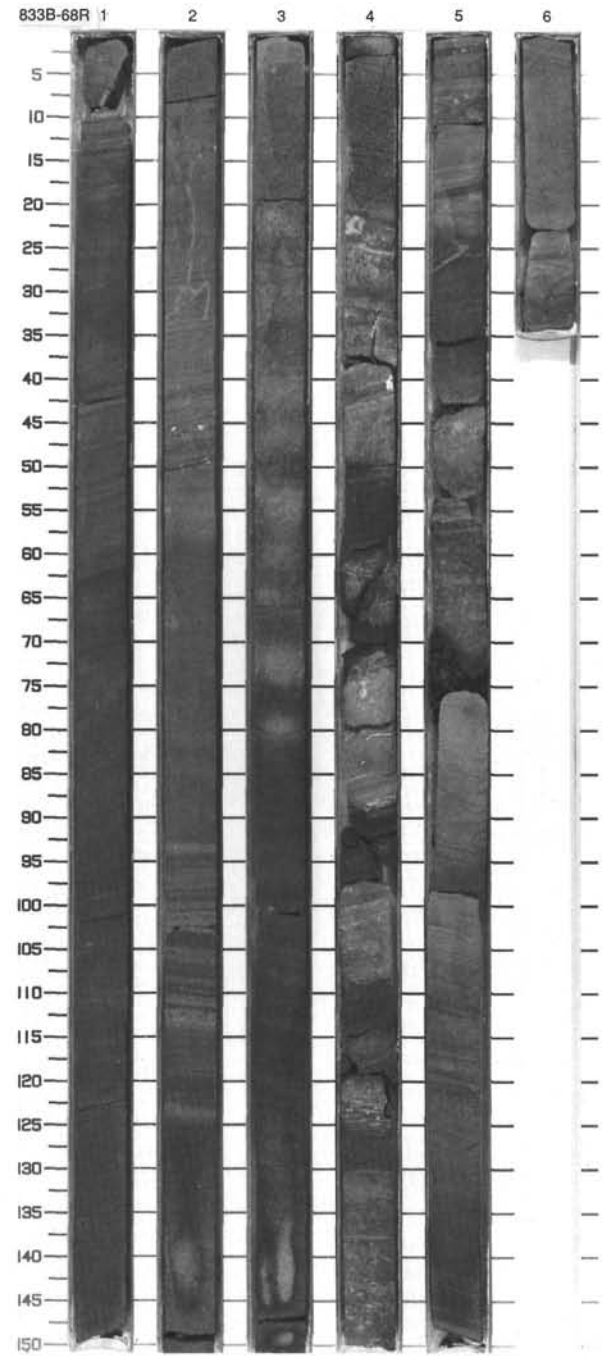
a. Dark gray to very dark gray (5Y 4/1 to 5Y 3/1) FORAMINIFERAL SANDY SILTY MIXED SEDIMENTARY ROCK in Section 1 grades down to foraminiferal sandy mixed sedimentary rock in Section 2. Section 5 contains calcareous silty mixed sedimentary rock. Foraminifers are large and have the textural role of sand grains in this rock. Wood fragments and isolated clasts up to 5 mm occur in Section 2, 0–50 cm.

b. About 30% of the core is black to very dark gray (5Y 2.5/1 to 5Y 3/1), medium-grained VOLCANIC SANDSTONE with calcareous grains, foraminifers, and bioclasts. In Section 6, 0–25 cm, this sandstone is thinly laminated.

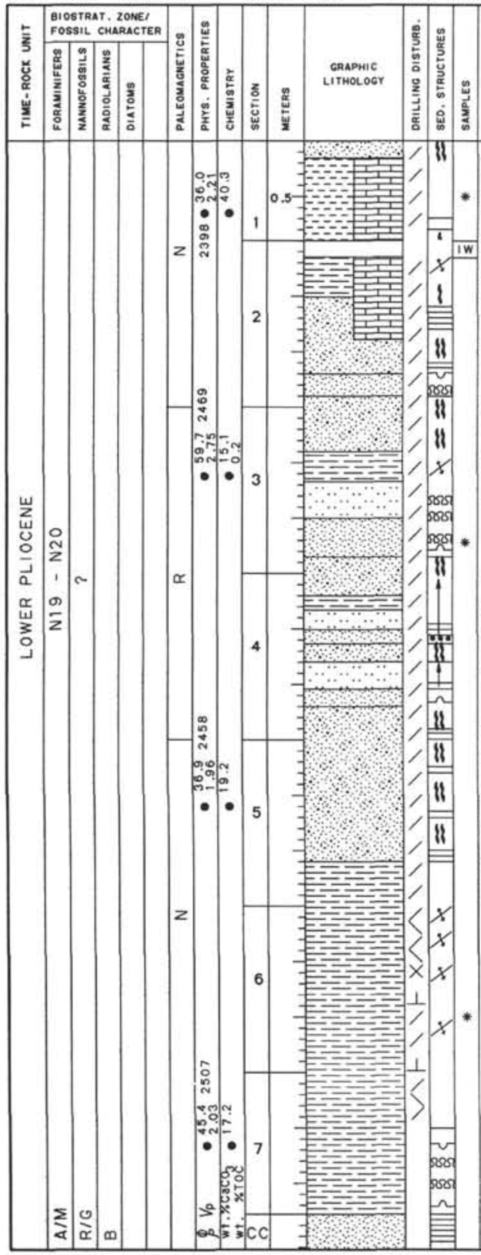
c. Section 4, 20–150 cm, is black (5Y 2.5/1) SILTY VOLCANIC SANDSTONE interbedded with bioturbated layers of gray to dark gray (5Y 5/1 to 5Y 4/1) calcareous sandy volcanic siltstone layers about 10 cm in thickness. This interbedded interval is bioturbated and contains convoluted beds indicating wet-sediment deformation. Most of the carbonate grains appear to be sand-sized highly altered foraminifers. In Section 6, 25–35 cm, this lithology is bioturbated and contains two *Zoophycos*-like horizontal burrows 1 cm in diameter.

SMEAR SLIDE SUMMARY (%):

	2, 67 D	3, 52 D	4, 102 M
TEXTURE:			
Sand	60	70	35
Silt	30	20	50
Clay	10	10	15
COMPOSITION:			
Amphibole	5	5	10
Bioclast	20	5	5
Calcite	---	---	15
Celadonite	---	---	10
Chlorite	5	5	15
Clay	10	10	15
Clinopyroxene	10	13	10
Feldspar	5	8	5
Foraminifers	40	5	5
Nannofossils	Tr	Tr	1
Opaques	3	3	8
Orthopyroxene	---	2	Tr
Oxide	2	5	1
Rock fragment	---	25	---
Zeolite	---	14	---



SITE 833 HOLE B CORE 69R CORED INTERVAL 712.8-722.5 mbsf



LITHOLOGIC DESCRIPTION

CALCAREOUS SILTY CLAYSTONE, CALCAREOUS SANDY VOLCANIC SILTSTONE, and CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK

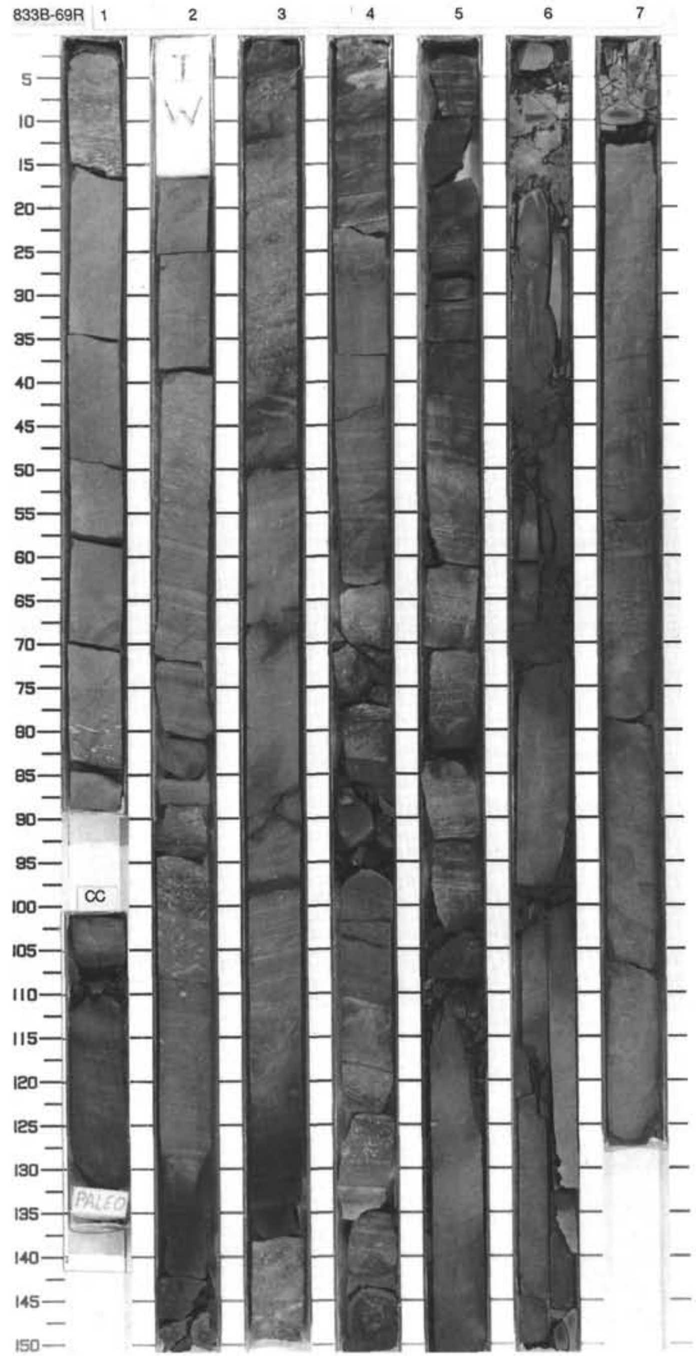
Major lithology:
a. The dominant lithology is dark gray (5Y 4/1) CALCAREOUS SILTY CLAYSTONE. It is the only lithology in Sections 6 and 7, and is interbedded with other lithologies in Sections 2, 3, and 4.
b. Interbeds of bioturbated gray to very dark gray (5Y 5/1 to 5Y 3/1) CALCAREOUS SANDY VOLCANIC SILTSTONE occur throughout the core.
c. Section 1, 16 cm, to Section 2, 85 cm, consists of gray (5Y 5/1) CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK grading through calcareous silty clayey mixed sedimentary rock to calcareous sandy silty mixed sedimentary rock at the base of the sequence. Parts of this lithology that are not bioturbated are usually laminated. Disseminated pyrite occurs in Section 2, 20–30 cm.

Minor lithology:
a. Interbeds of dark gray (5Y 4/1) silty volcanic sandstone are common above Section 5.
b. Interbeds of dark gray (5Y 4/1) volcanic sandstone are as common as the silty volcanic sandstone.

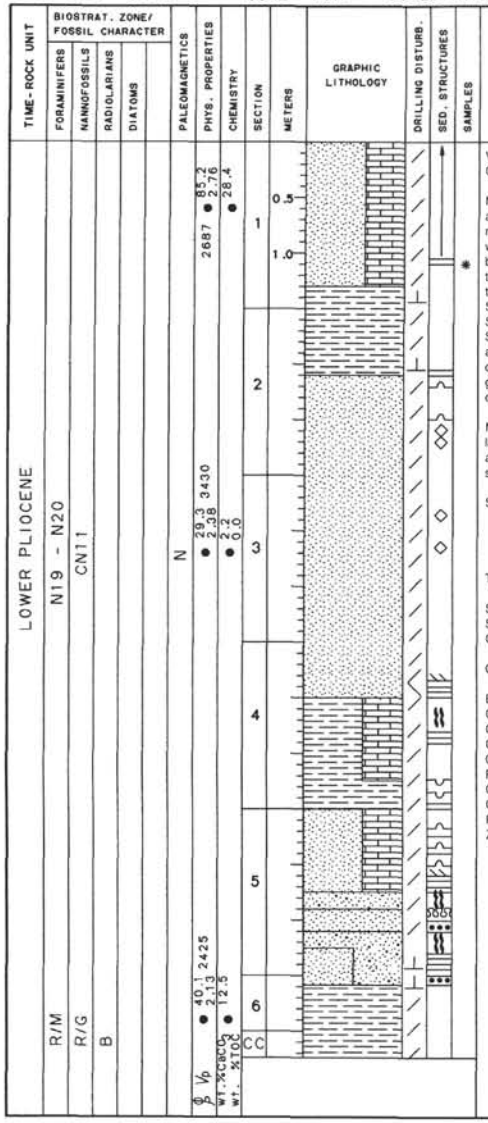
Slumps are common within the volcanic sandstones and siltstones and load structures occur at the base of some beds.

SMEAR SLIDE SUMMARY (%):

	1, 50 D	3, 121 D	6, 100 D
TEXTURE:			
Sand	5	70	2
Silt	15	25	38
Clay	80	5	60
COMPOSITION:			
Amphibole	---	---	Tr
Calcite	40	---	25
Chlorite	---	Tr	10
Clay	50	5	45
Clinopyroxene	---	10	8
Feldspar	1	10	3
Foraminifers	---	8	Tr
Nannofossils	5	---	2
Opaques	1	8	3
Orthopyroxene	---	5	---
Oxide	---	1	2
Quartz	---	---	2
Rock fragment	---	20	---
Zeolite	---	30	---



SITE 833 HOLE B CORE 70R CORED INTERVAL 722.5-732.2 mbsf



LITHOLOGIC DESCRIPTION

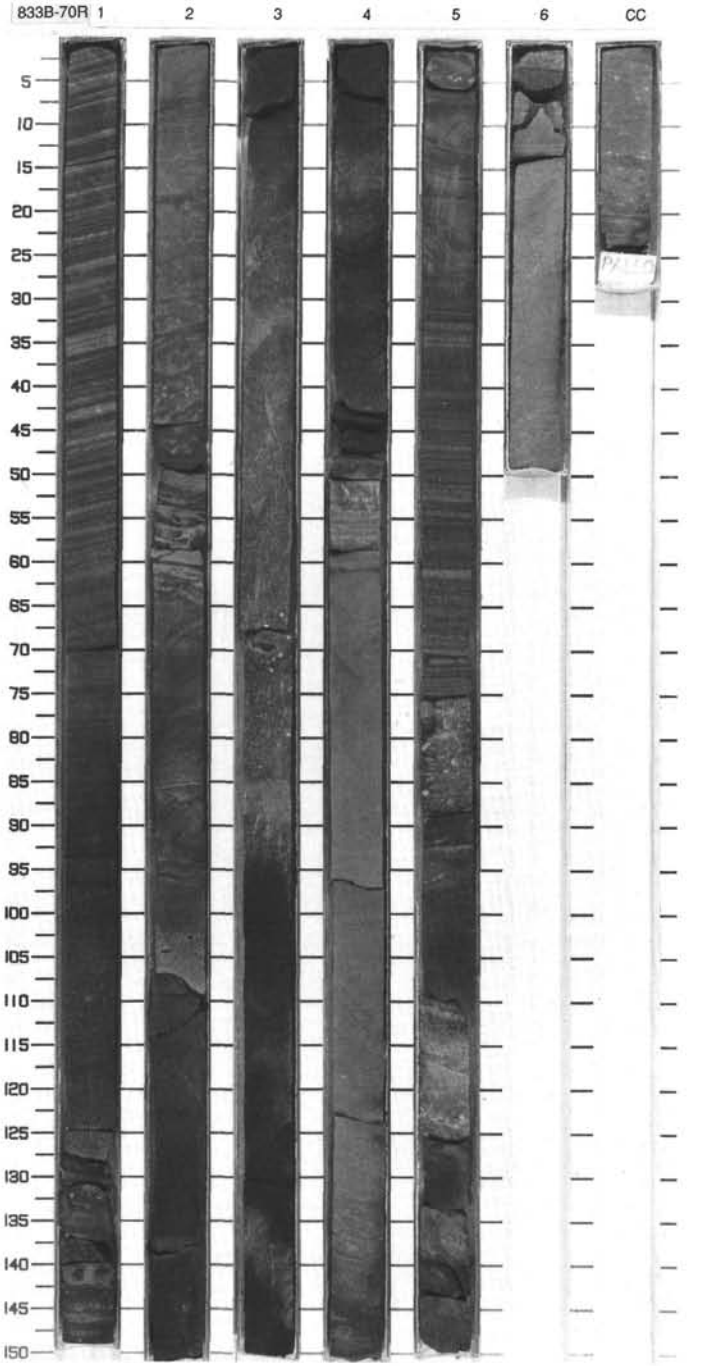
VOLCANIC SANDSTONE, CALCAREOUS SANDY MIXED SEDIMENTARY ROCK, and CALCAREOUS CLAYEY VOLCANIC SILTSTONE

Major lithology:
a. The dominant lithology in this core is dark gray to black (5Y 4/1 to 5Y 2.5/1), fine-to medium-grained VOLCANIC SANDSTONE. This sediment contains a few slumps and a wood fragment occurs at Section 2, 85 cm.
b. Most of Section 1, 0–128 cm, and parts of Sections 4 and Section 5 consist of dark gray to very dark gray (5Y 4/1 to 5Y 3/1) CALCAREOUS SANDY MIXED SEDIMENTARY ROCK that is composed of 60% of the sandstone described above and 40% carbonate grains. In Section 4, this lithology is finer-grained calcareous silty clayey mixed sedimentary rock. In *Section1, this lithology is laminated with thickness of layers decreasing upward. In* Section 5, this lithology contains several slumps and is laminated with alternation of black and white layers with the white layers rich in foraminifers and bioclasts.
c. Interbedded with the lithologies (a and b) described above are several layers of dark gray (5Y 4/1) CALCAREOUS CLAYEY VOLCANIC SILTSTONE with vague laminations disturbed by minor bioturbation and microfolding and slumping.

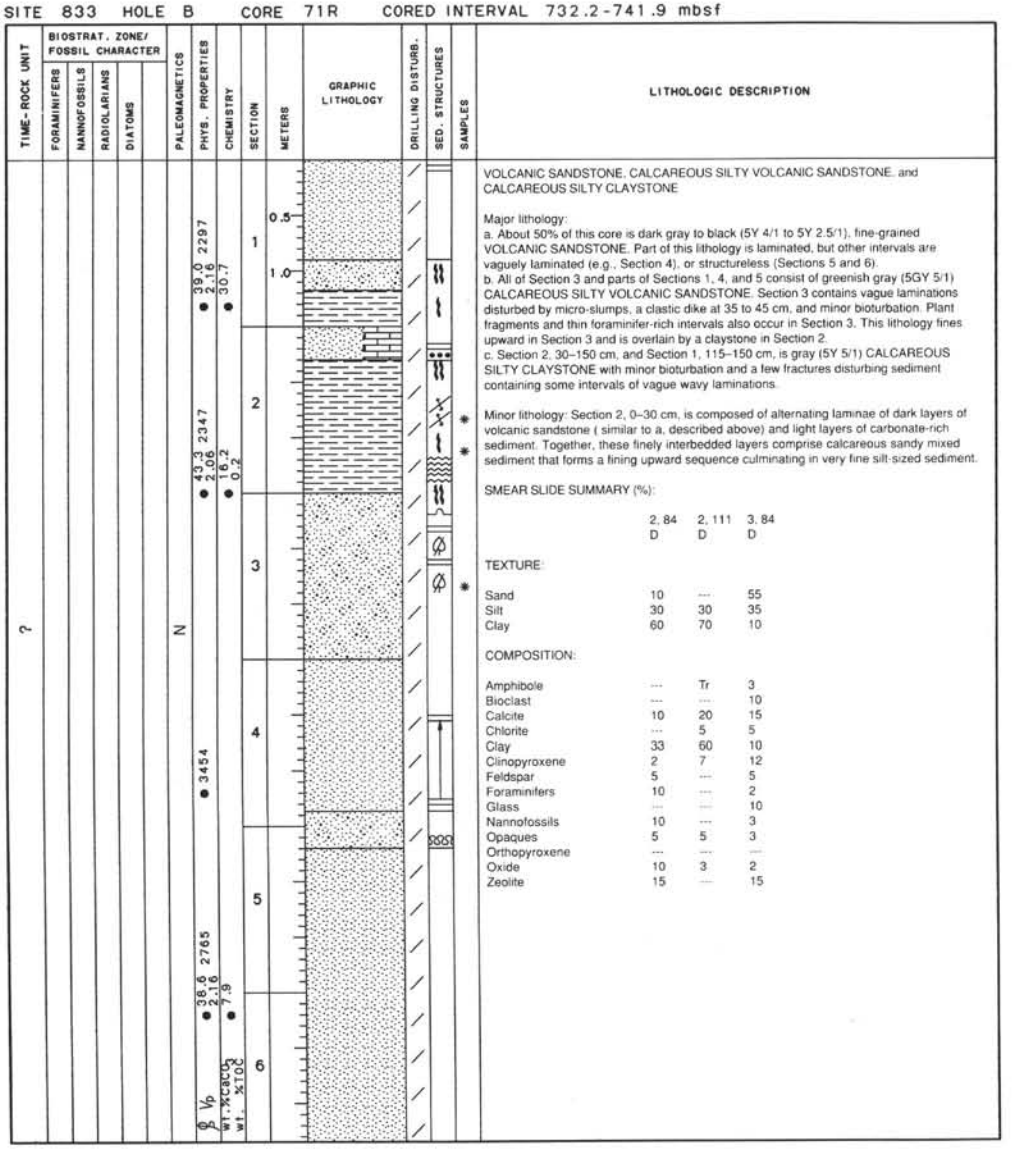
Minor lithology: Alternating with lithologies described above are relatively thin (5–15 cm) layers of highly bioturbated calcareous sandy volcanic siltstone. In Section 5, 75–150 cm, are fining upward sequences, starting with laminated graded beds of the volcanic sandstone (a) described above, grading up into this finer grained lithology.

SMEAR SLIDE SUMMARY (%):

	1, 110 D
TEXTURE:	
Sand	50
Silt	30
Clay	20
COMPOSITION:	
Bioclast	20
Calcite	10
Chlorite	15
Clay	15
Clinopyroxene	12
Foraminifers	10
Opaques	3
Orthopyroxene	3
Pyrite	Tr
Zeolite	12



SITE 833 HOLE B CORE 71R CORED INTERVAL 732.2-741.9 mbsf



LITHOLOGIC DESCRIPTION

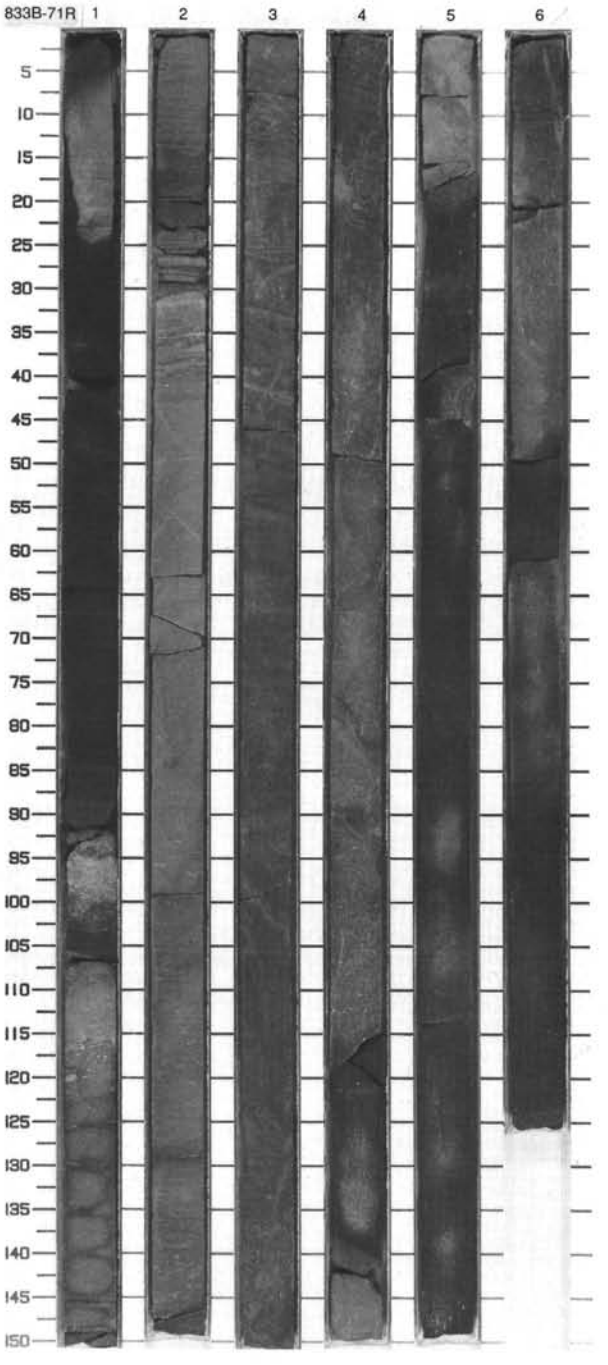
VOLCANIC SANDSTONE, CALCAREOUS SILTY VOLCANIC SANDSTONE, and CALCAREOUS SILTY CLAYSTONE

Major lithology:
a. About 50% of this core is dark gray to black (5Y 4/1 to 5Y 2.5/1), fine-grained VOLCANIC SANDSTONE. Part of this lithology is laminated, but other intervals are vaguely laminated (e.g., Section 4), or structureless (Sections 5 and 6).
b. All of Section 3 and parts of Sections 1, 4, and 5 consist of greenish gray (5GY 5/1) CALCAREOUS SILTY VOLCANIC SANDSTONE. Section 3 contains vague laminations disturbed by micro-slumps, a clastic dike at 35 to 45 cm, and minor bioturbation. Plant fragments and thin foraminifer-rich intervals also occur in Section 3. This lithology fines upward in Section 3 and is overlain by a claystone in Section 2.
c. Section 2, 30–150 cm, and Section 1, 115–150 cm, is gray (5Y 5/1) CALCAREOUS SILTY CLAYSTONE with minor bioturbation and a few fractures disturbing sediment containing some intervals of vague wavy laminations.

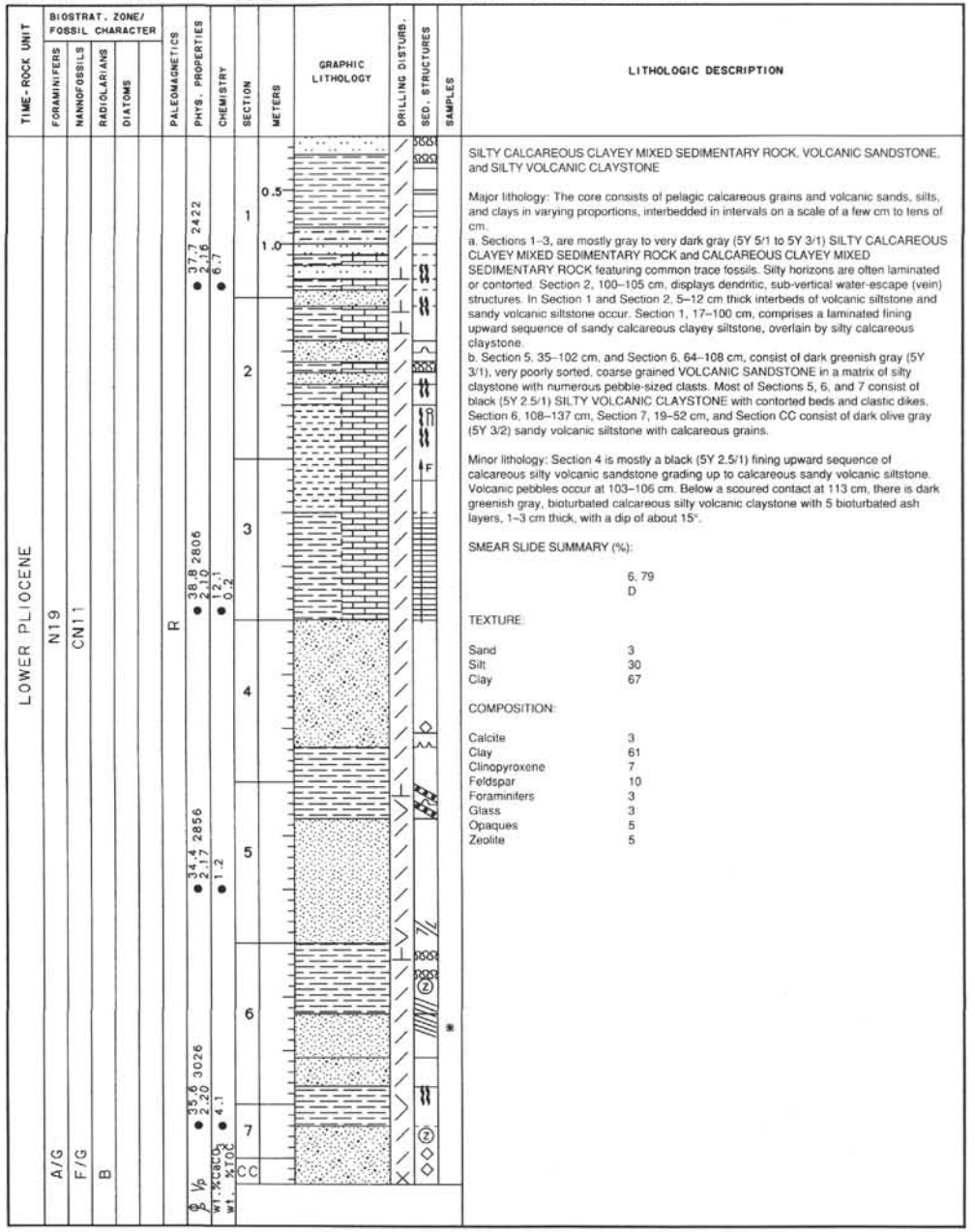
Minor lithology: Section 2, 0–30 cm, is composed of alternating laminae of dark layers of volcanic sandstone (similar to a, described above) and light layers of carbonate-rich sediment. Together, these finely interbedded layers comprise calcareous sandy mixed sediment that forms a fining upward sequence culminating in very fine silt-sized sediment.

SMEAR SLIDE SUMMARY (%):

	2, 84 D	2, 111 D	3, 84 D
TEXTURE:			
Sand	10	---	55
Silt	30	30	35
Clay	60	70	10
COMPOSITION:			
Amphibole	---	Tr	3
Bioclast	---	---	10
Calcite	10	20	15
Chlorite	---	5	5
Clay	33	60	10
Clinopyroxene	2	7	12
Feldspar	5	---	5
Foraminifers	10	---	2
Glass	---	---	10
Nannofossils	10	---	3
Opaques	5	5	3
Orthopyroxene	---	---	---
Oxide	10	3	2
Zeolite	15	---	15



SITE 833 HOLE B CORE 72R CORED INTERVAL 741.9–751.5 mbsf



SILTY CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK, VOLCANIC SANDSTONE, and SILTY VOLCANIC CLAYSTONE

Major lithology: The core consists of pelagic calcareous grains and volcanic sands, silts, and clays in varying proportions, interbedded in intervals on a scale of a few cm to tens of cm.

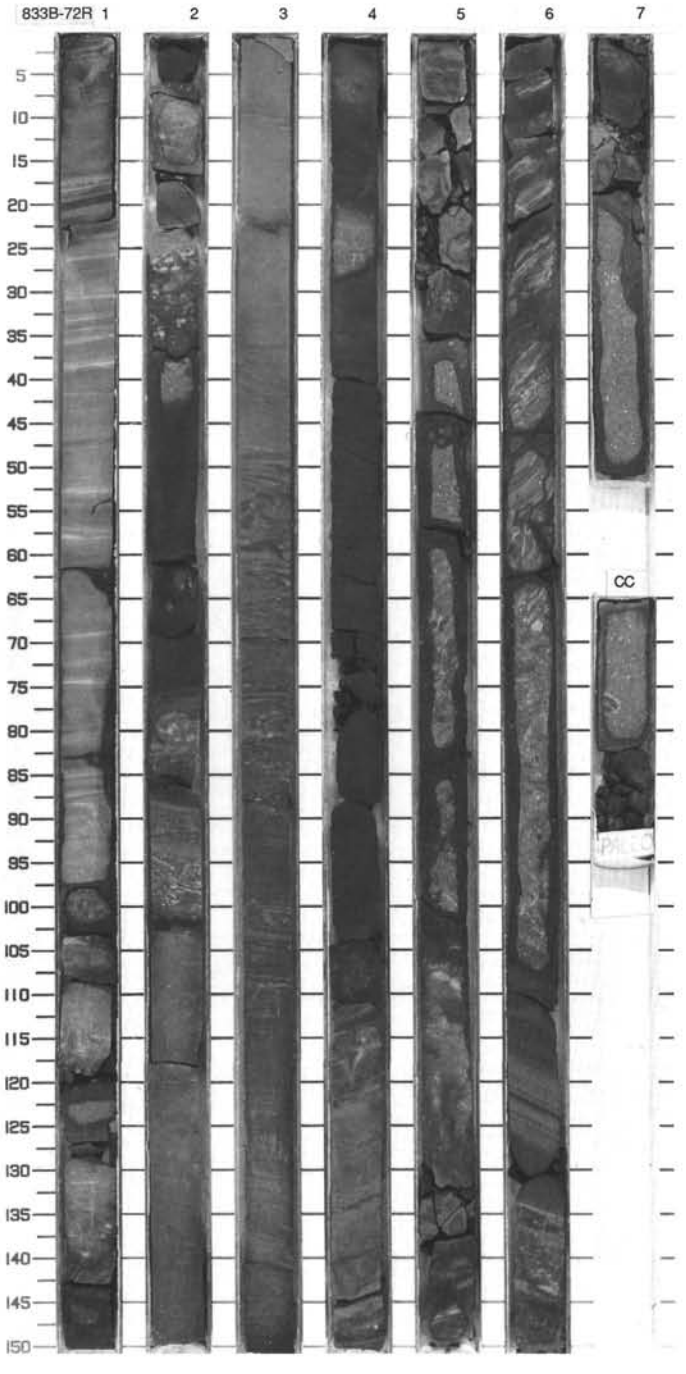
a. Sections 1–3, are mostly gray to very dark gray (5Y 5/1 to 5Y 3/1) SILTY CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK and CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK featuring common trace fossils. Silty horizons are often laminated or contorted. Section 2, 100–105 cm, displays dendritic, sub-vertical water-escape (vein) structures. In Section 1 and Section 2, 5–12 cm thick interbeds of volcanic siltstone and sandy volcanic siltstone occur. Section 1, 17–100 cm, comprises a laminated fining upward sequence of sandy calcareous clayey siltstone, overlain by silty calcareous claystone.

b. Section 5, 35–102 cm, and Section 6, 64–108 cm, consist of dark greenish gray (5Y 3/1), very poorly sorted, coarse grained VOLCANIC SANDSTONE in a matrix of silty claystone with numerous pebble-sized clasts. Most of Sections 5, 6, and 7 consist of black (5Y 2.5/1) SILTY VOLCANIC CLAYSTONE with contorted beds and clastic dikes. Section 6, 108–137 cm, Section 7, 19–52 cm, and Section CC consist of dark olive gray (5Y 3/2) sandy volcanic siltstone with calcareous grains.

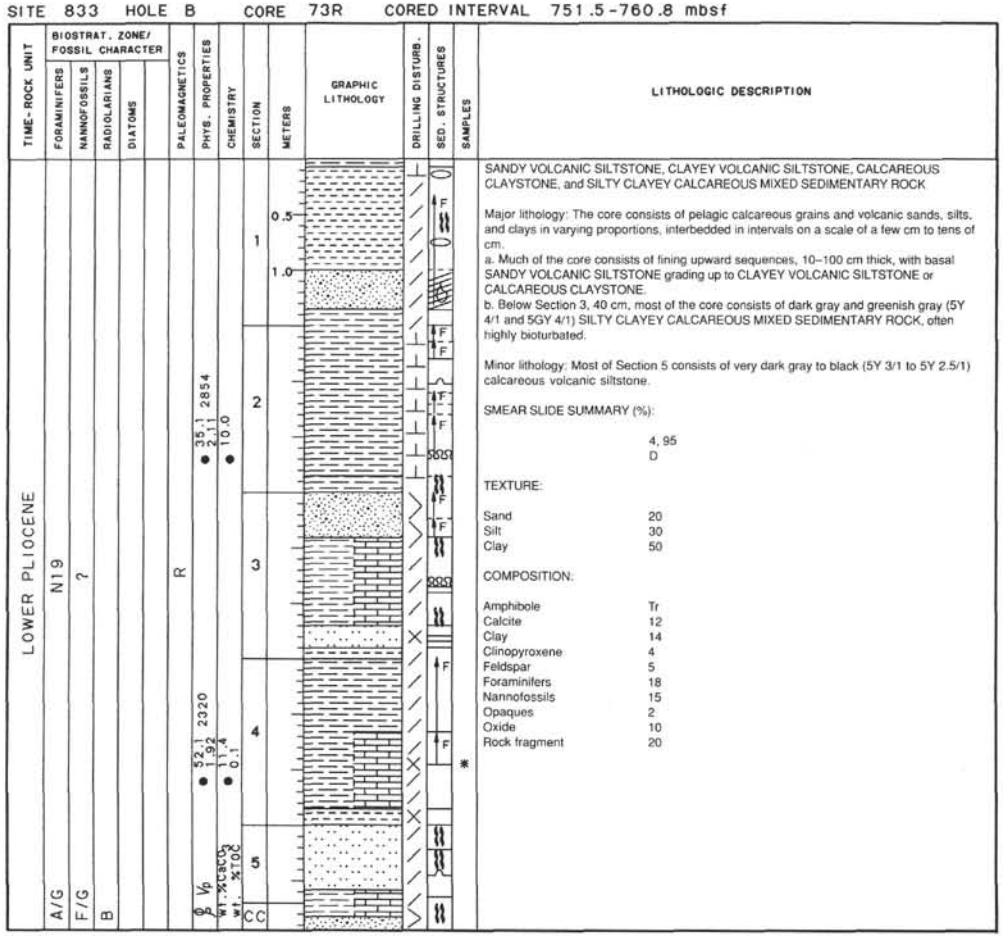
Minor lithology: Section 4 is mostly a black (5Y 2.5/1) fining upward sequence of calcareous silty volcanic sandstone grading up to calcareous sandy volcanic siltstone. Volcanic pebbles occur at 103–106 cm. Below a scoured contact at 113 cm, there is dark greenish gray, bioturbated calcareous silty volcanic claystone with 5 bioturbated ash layers, 1–3 cm thick, with a dip of about 15°.

SMEAR SLIDE SUMMARY (%):

	6, 79 D
TEXTURE:	
Sand	3
Silt	30
Clay	67
COMPOSITION:	
Calcite	3
Clay	61
Clinopyroxene	7
Feldspar	10
Foraminifers	3
Glass	3
Opaques	5
Zeolite	5



SITE 833 HOLE B CORE 73R CORED INTERVAL 751.5-760.8 mbsf



LITHOLOGIC DESCRIPTION

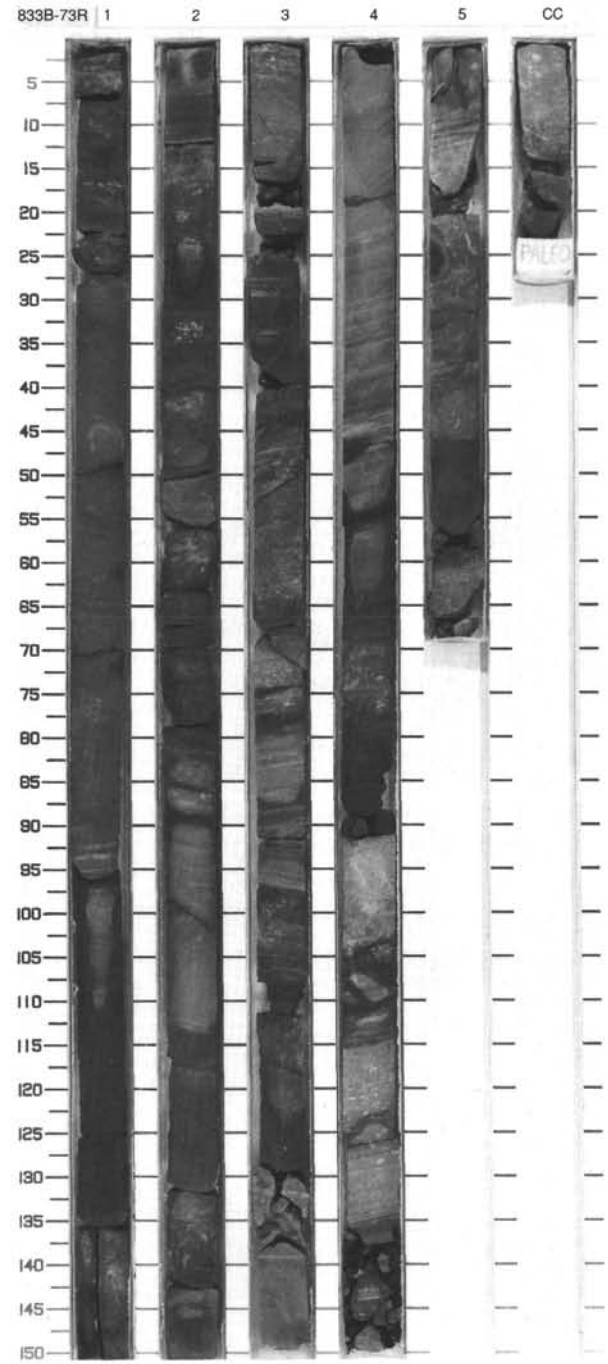
SANDY VOLCANIC SILTSTONE, CLAYEY VOLCANIC SILTSTONE, CALCAREOUS CLAYSTONE, and SILTY CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK

Major lithology: The core consists of pelagic calcareous grains and volcanic sands, silts, and clays in varying proportions, interbedded in intervals on a scale of a few cm to tens of cm.
a. Much of the core consists of fining upward sequences, 10–100 cm thick, with basal SANDY VOLCANIC SILTSTONE grading up to CLAYEY VOLCANIC SILTSTONE or CALCAREOUS CLAYSTONE.
b. Below Section 3, 40 cm, most of the core consists of dark gray and greenish gray (5Y 4/1 and 5GY 4/1) SILTY CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK, often highly bioturbated.

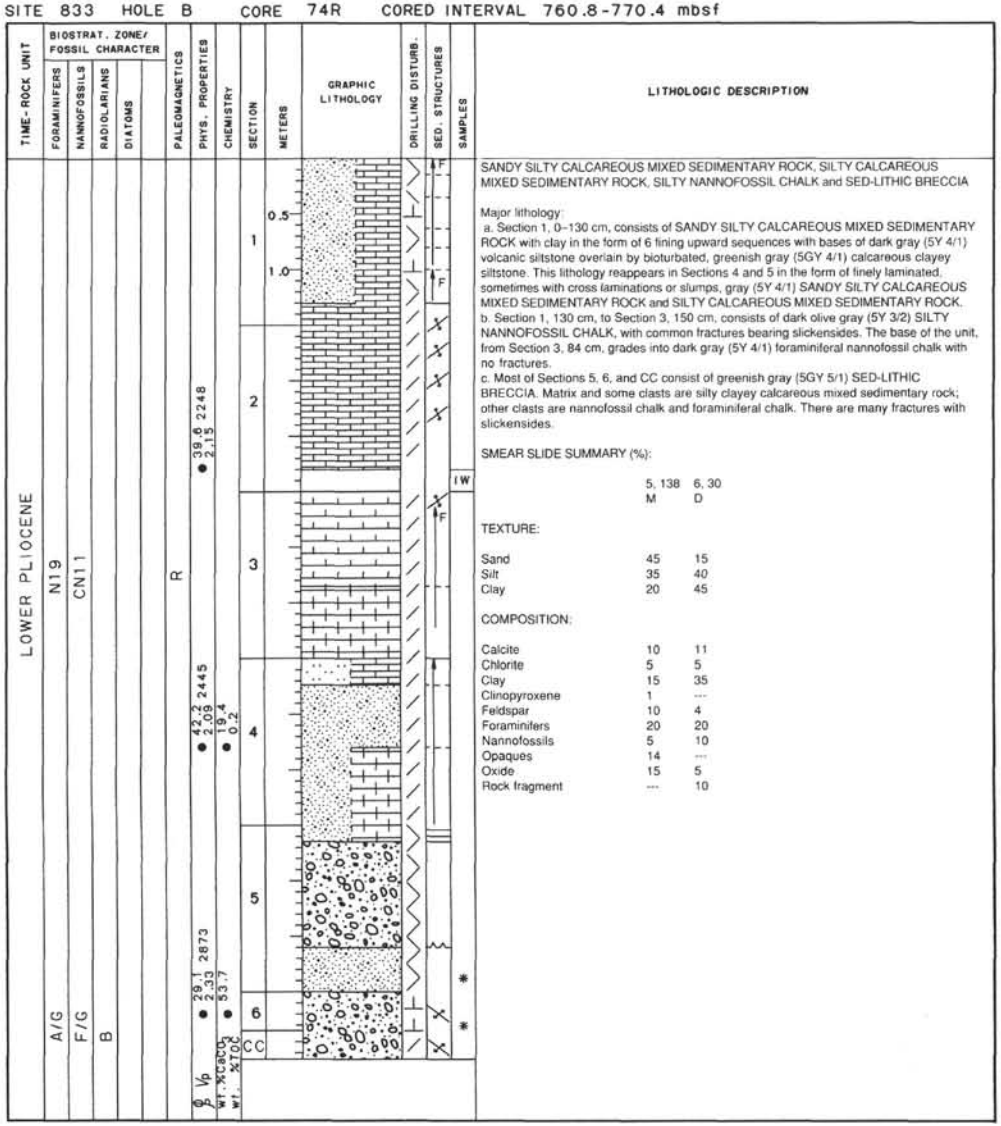
Minor lithology: Most of Section 5 consists of very dark gray to black (5Y 3/1 to 5Y 2.5/1) calcareous volcanic siltstone.

SMEAR SLIDE SUMMARY (%):

	4, 95 D
TEXTURE:	
Sand	20
Silt	30
Clay	50
COMPOSITION:	
Amphibole	Tr
Calcite	12
Clay	14
Clinopyroxene	4
Feldspar	5
Foraminifers	18
Nannofossils	15
Opaques	2
Oxide	10
Rock fragment	20



SITE 833 HOLE B CORE 74R CORED INTERVAL 760.8-770.4 mbsf



SANDY SILTY CALCAREOUS MIXED SEDIMENTARY ROCK, SILTY CALCAREOUS MIXED SEDIMENTARY ROCK, SILTY NANNOFOSSIL CHALK and SED-LITHIC BRECCIA

Major lithology:

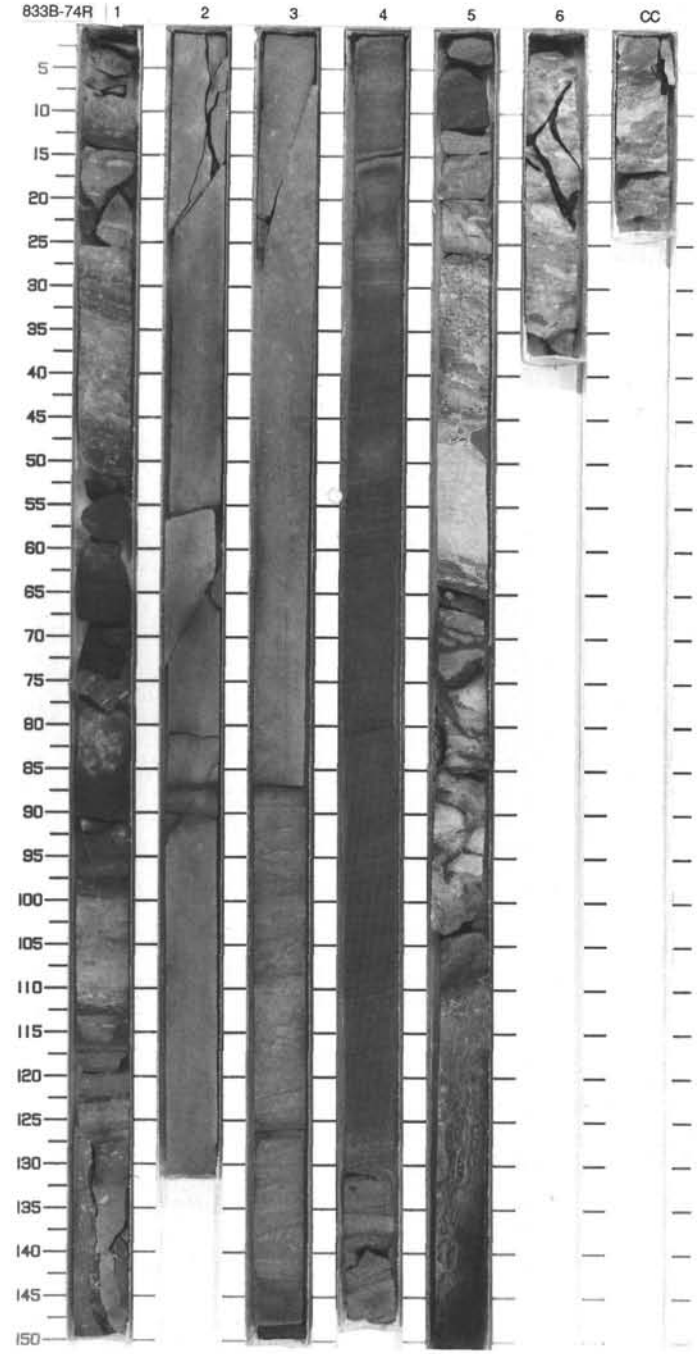
a. Section 1, 0–130 cm, consists of SANDY SILTY CALCAREOUS MIXED SEDIMENTARY ROCK with clay in the form of 6 fining upward sequences with bases of dark gray (5Y 4/1) volcanic siltstone overlain by bioturbated, greenish gray (5GY 4/1) calcareous clayey siltstone. This lithology reappears in Sections 4 and 5 in the form of finely laminated, sometimes with cross laminations or slumps, gray (5Y 4/1) SANDY SILTY CALCAREOUS MIXED SEDIMENTARY ROCK and SILTY CALCAREOUS MIXED SEDIMENTARY ROCK.

b. Section 1, 130 cm, to Section 3, 150 cm, consists of dark olive gray (5Y 3/2) SILTY NANNOFOSSIL CHALK, with common fractures bearing slickensides. The base of the unit, from Section 3, 84 cm, grades into dark gray (5Y 4/1) foraminiferal nannofossil chalk with no fractures.

c. Most of Sections 5, 6, and CC consist of greenish gray (5GY 5/1) SED-LITHIC BRECCIA. Matrix and some clasts are silty clayey calcareous mixed sedimentary rock; other clasts are nannofossil chalk and foraminiferal chalk. There are many fractures with slickensides.

SMEAR SLIDE SUMMARY (%):

	5, 138 M	6, 30 D
TEXTURE:		
Sand	45	15
Silt	35	40
Clay	20	45
COMPOSITION:		
Calcite	10	11
Chlorite	5	5
Clay	15	35
Clinopyroxene	1	---
Feldspar	10	4
Foraminifers	20	20
Nannofossils	5	10
Opaques	14	---
Oxide	15	5
Rock fragment	---	10



SITE 833 HOLE B CORE 75R CORED INTERVAL 770.4-779.7 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
LOWER PLIOCENE	N19	?			R	2624 ● 29.3 2.34		1	0.5 1.0				
						● 38.6 2387 2.05	● 16.7 0.0	2		void			
						● 38.0 2415 2.23	● 29.9	3		void			
	R/M	R/G						4					*
								5					
								6					

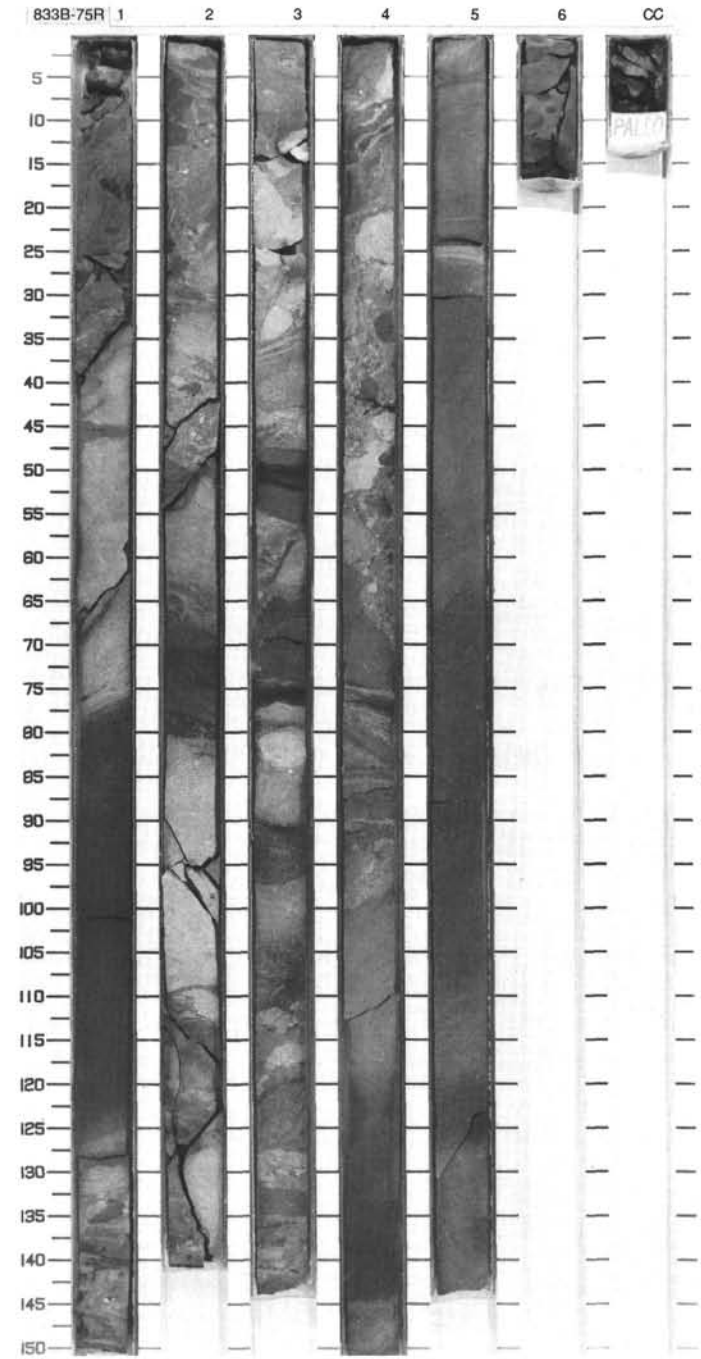
LITHOLOGIC DESCRIPTION

SED-LITHIC BRECCIA, SILTY CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK, and CALCAREOUS VOLCANIC SILTSTONE

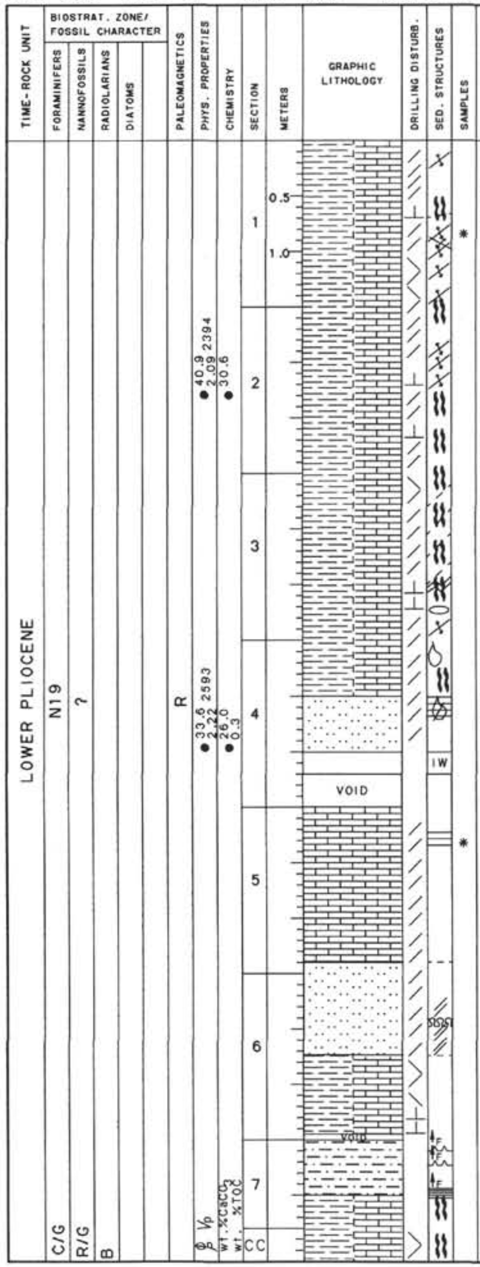
Major lithology:
a. Most of Sections 1–4 consists of dark gray and greenish gray (5Y 4/1 and 5GY 5/1) SED-LITHIC BRECCIA. Matrix and some clasts are silty clayey calcareous mixed sedimentary rock; other clasts are calcareous volcanic siltstone. There are many fractures with slickensides. The breccia is interbedded with beds 20–40 cm thick of dark gray and greenish gray, heavily bioturbated SILTY CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK. Plastic deformation textures are common around clasts.
b. Section 1, 80–130 cm, and the core below Section 4 at 100 cm, consists of dark greenish gray (5GY 5/1) CALCAREOUS VOLCANIC SILTSTONE. Slump structures are common in the lower interval, as are fractures featuring slickensides.

SMEAR SLIDE SUMMARY (%):

	5, 70 D
TEXTURE:	
Sand	20
Silt	60
Clay	20
COMPOSITION:	
Calcite	20
Celadonite	1
Clinopyroxene	2
Feldspar	7
Foraminifers	15
Glass	5
Mica	12
Nannofossils	3
Opaques	5
Rock fragment	30



SITE 833 HOLE B CORE 76R CORED INTERVAL 779.7 - 789.3 mbsf



LITHOLOGIC DESCRIPTION

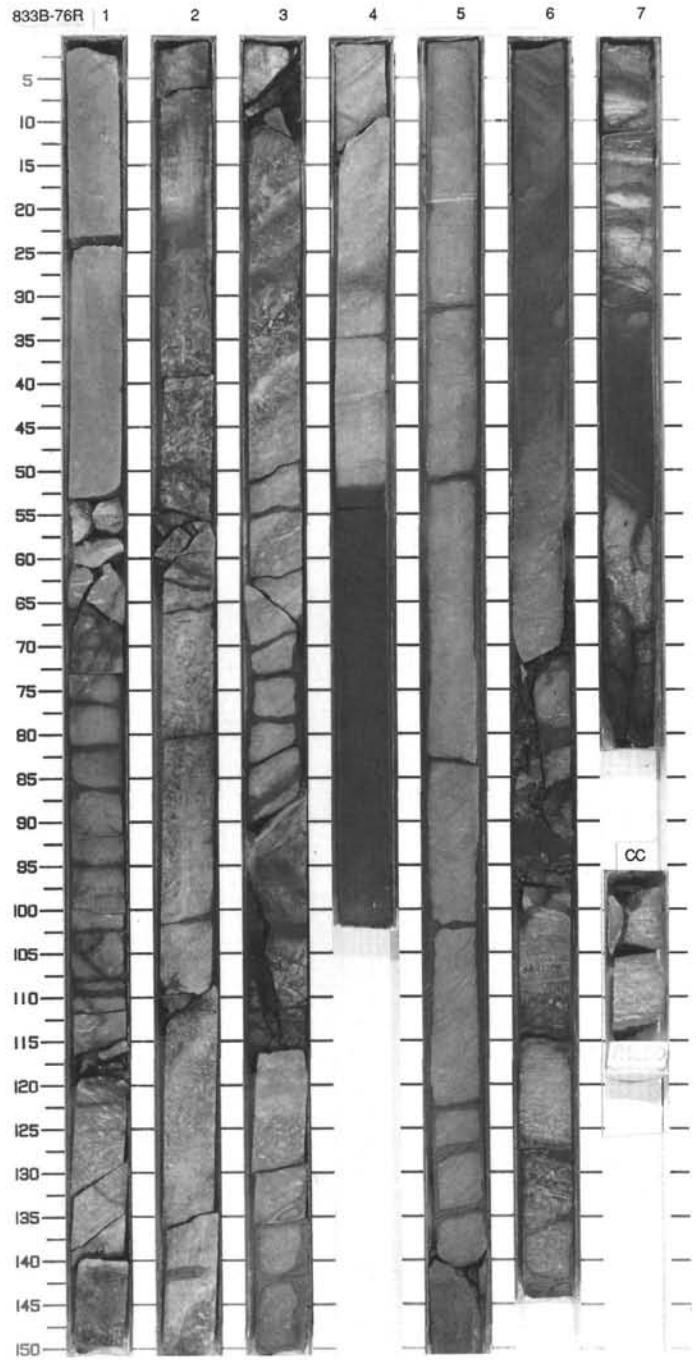
SILTY CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK and SILTY LIMESTONE

Major lithology:
a. Most of the core consists of dark greenish gray (5GY 4/1), heavily bioturbated SILTY CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK. The unit is moderately fractured, about 40º from horizontal, and most fracture surfaces show slickensides.
b. Section 5, 0–140 cm, consists of dark greenish gray (5GY 4/1) SILTY LIMESTONE.

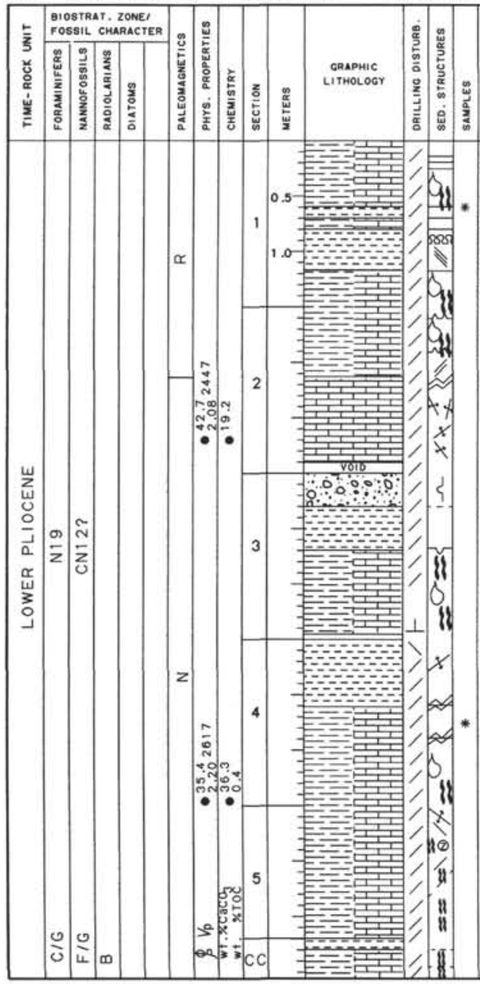
Minor lithology: In Sections 4 and 6, there are 50 and 80 cm thick beds of dark gray (5Y 4/1) calcareous volcanic siltstone with parallel and convoluted laminae. In Section 6, the laminae dip at 30°.

SMEAR SLIDE SUMMARY (%):

	1, 84	5, 32
	D	D
TEXTURE:		
Sand	10	5
Silt	30	65
Clay	60	30
COMPOSITION:		
Amphibole	---	1
Calcite	15	67
Celadonite	Tr	1
Chlorite	---	---
Clay	30	10
Clinopyroxene	---	4
Feldspar	Tr	5
Foraminifers	20	5
Glass	---	3
Nannofossils	10	---
Opaques	---	4
Oxide	15	---
Quartz	---	---
Rock fragment	10	---



SITE 833 HOLE B CORE 77R CORED INTERVAL 789.3 - 799.0 mbsf



LITHOLOGIC DESCRIPTION

SILTY CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK, CALCAREOUS CLAYSTONE, and SILTY LIMESTONE

Major lithology:

a. Most of the core consists of dark gray and dark greenish gray (5Y 4/1 and 5GY 4/1), heavily bioturbated SILTY CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK. The unit is moderately fractured, with many fractures dipping at about 40º from horizontal. Most fracture surfaces show slickensides.

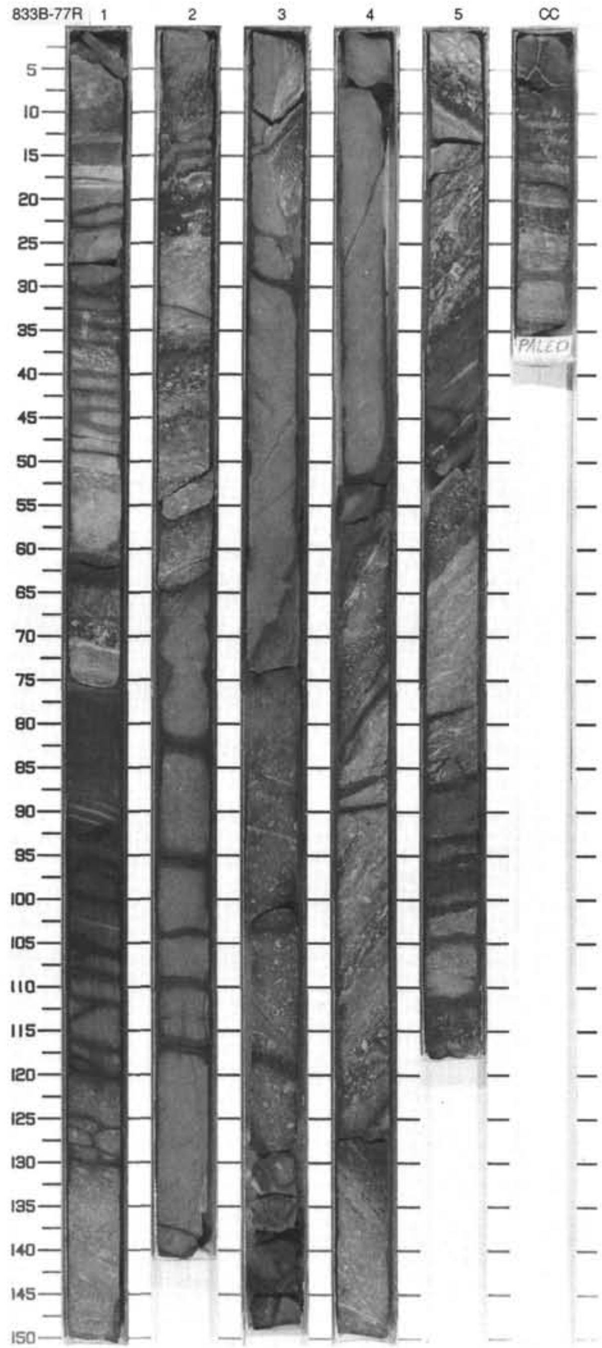
b. Section 1, 76–118 cm, Section 3, 30–72 cm, and Section 4, 0–60 cm, consist of dark olive gray (5Y 3/2) CALCAREOUS CLAYSTONE.

c. Section 2, 65–142 cm, consists of dark olive gray (5Y 4/2) SILTY LIMESTONE.

Minor lithology: At Section 4, 60 cm, a contorted bed inclined at ~60 is altered volcanic ash, with a large zeolite component.

SMEAR SLIDE SUMMARY (%):

	1, 65 D	4, 78 M
TEXTURE:		
Sand	5	15
Silt	15	70
Clay	80	15
COMPOSITION:		
Amphibole	2	---
Calcite	10	---
Celadonite	Tr	---
Chlorite	---	10
Clay	41	15
Clinopyroxene	1	1
Feldspar	---	5
Glass	5	10
Opaques	1	15
Rock fragment	25	20
Zeolite	10	22



SITE 833 HOLE B CORE 78R CORED INTERVAL 799.0 - 808.7 mbsf

TIME-ROCK UNIT: LOWER PLIOCENE

BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS N19 F/G; NANNOFOSSILS ? R/G; RADIOLARIANS B; DIATOMS

PALEOMAGNETICS: N

PHYS. PROPERTIES: ϕ Vp β; 32.2 2.19 2966; 39.9 2.10 2365

CHEMISTRY: wt. %CaCO3 48.9; wt. %TOC 19.6 0.2

SECTION: 1, 2, 3, 4, CC

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURB.

SED. STRUCTURES

SAMPLES

LITHOLOGIC DESCRIPTION

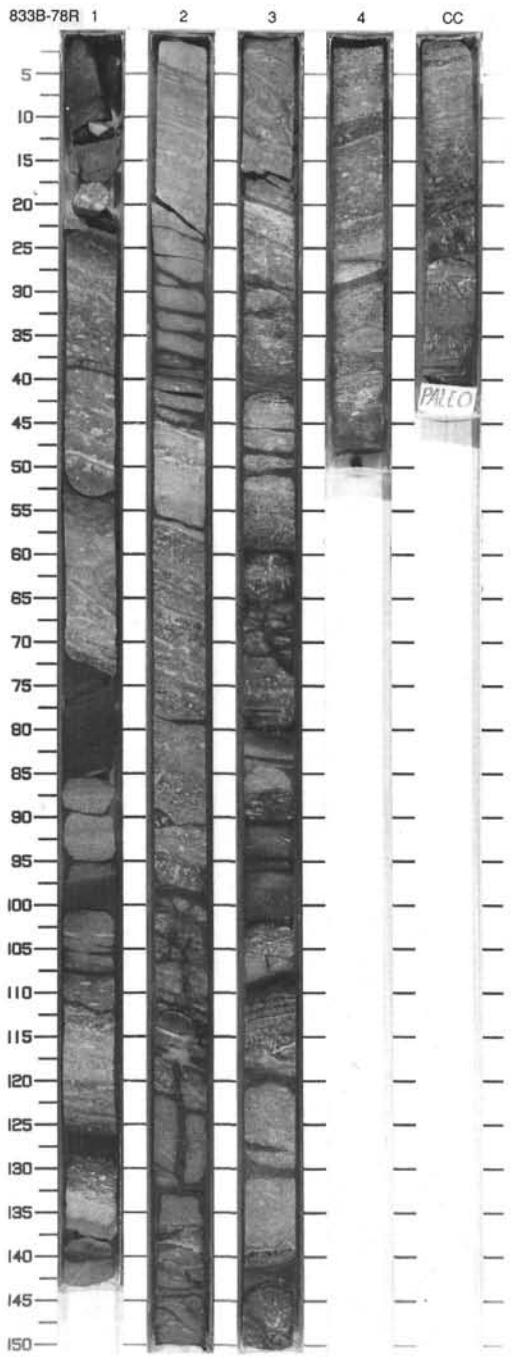
SILTY CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK

Major lithology: Most of the core consists of dark gray and dark greenish gray (5Y 4/1 and 5GY 4/1), heavily bioturbated SILTY CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK. Some finely laminated intervals survive.

Minor lithology: The core is peppered with interbeds of clayey volcanic siltstone, calcareous volcanic siltstone, calcareous silty claystone, and calcareous claystone. The interbeds range in thickness from 1–40 cm.

SMEAR SLIDE SUMMARY (%):

	1, 7 M	1, 135 M
TEXTURE:		
Sand	5	---
Silt	25	25
Clay	70	75
COMPOSITION:		
Calcite	28	68
Celadonite	---	Tr
Clay	39	10
Clinopyroxene	Tr	1
Feldspar	3	3
Foraminifers	5	15
Glass	3	---
Opaques	---	3
Oxide	12	---
Zeolite	10	---



SITE 833 HOLE B CORE 79R CORED INTERVAL 808.7 - 818.3 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
LOWER PLIOCENE	F/M	N19	R/M	CN11?	B	● 41.9 2.05 2702 ● 22.3 2.49 3073 ● 63.5 ϕ Vp wt. %CaCO3 wt. %TOC	● 34.8 2.25 2628 ● 41.2 0.4 ● 41.3 2.12 2437 ● 22.2	1 2 3 4 5 6 7 8 CC					

LITHOLOGIC DESCRIPTION

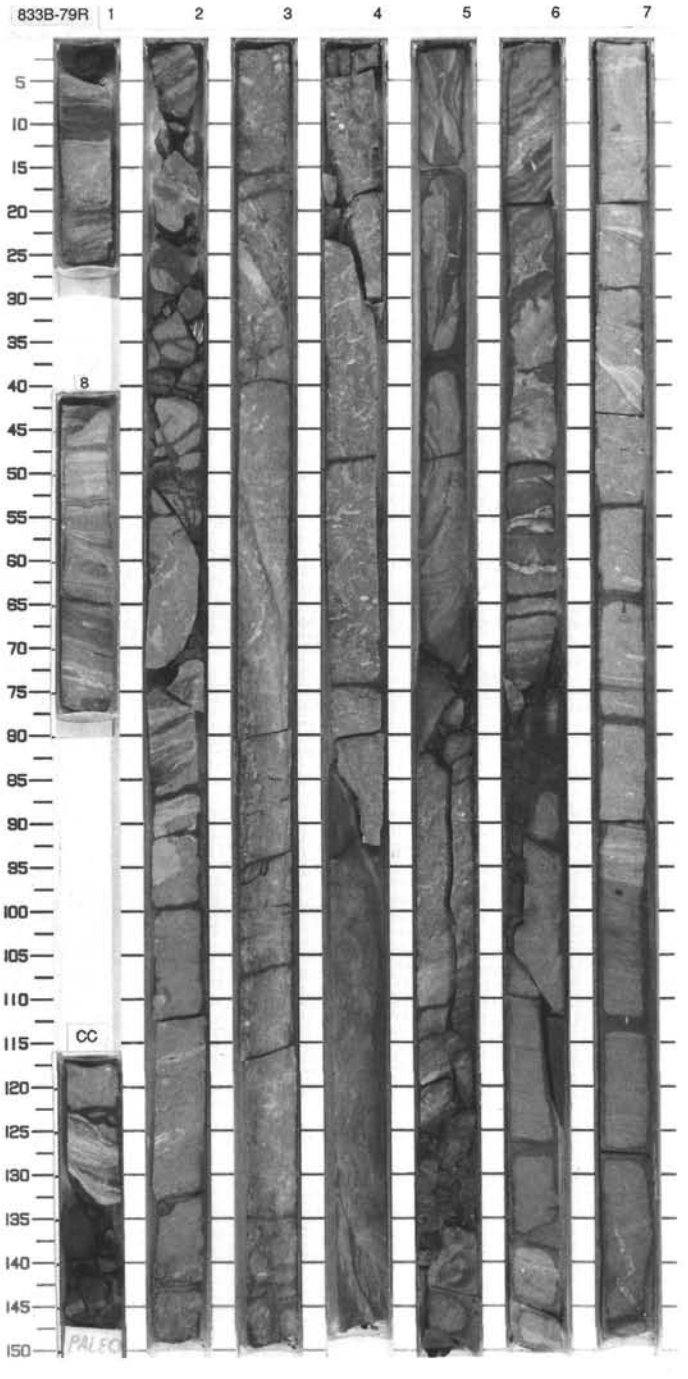
SILTY CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK and SILTY LIMESTONE

Major lithology:
a. Much of Sections 1–5 consists of dark greenish gray (5GY 4/1), heavily bioturbated SILTY CALCAREOUS CLAYEY MIXED SEDIMENTARY ROCK, with thin clayey limestone interbeds. A few wood fragments occur in Section 3, at 35 cm, and 2 neritic clasts, 2 mm and 5 mm in diameter, occur at Section 4, 10 cm. Some contorted beds are present. Bedding planes range from sub-horizontal in Section 2 to ~60–65° in Sections 3, 4, and 5. b. Section 6, 138–150 cm, and Sections 7, 8 and CC consist of dark greenish gray (5GY 4/1) SILTY LIMESTONE. Several white (10Y 8/2) neritic carbonate clasts occur, all <0.5 cm in diameter. Some intervals are laminated.

Minor lithology: Much of Sections 4, 5, and 6 consists of dark gray or dark greenish gray (5Y 4/1 or 5GY 4/1) calcareous volcanic siltstone and very dark gray (5Y 3/1) calcareous claystone. In Section 4, the siltstone bed is rich in foraminifers and zeolites, and displays ubiquitous contorted bedding. The siltstone in Section 6 is laminated. All the claystone displays slump structures.

SMEAR SLIDE SUMMARY (%):

	4, 123 D	7, 29 D
TEXTURE:		
Sand	20	3
Silt	65	82
Clay	15	15
COMPOSITION:		
Calcite	15	76
Celadonite	---	1
Chlorite	---	2
Clay	5	5
Clinopyroxene	Tr	1
Feldspar	10	4
Foraminifers	20	8
Glass	5	---
Nannofossils	---	2
Opaques	3	2
Rock fragment	20	---
Zeolite	20	---



SITE 833 HOLE B CORE 80R CORED INTERVAL 818.3 - 828.0 mbsf

TIME-ROCK UNIT: LOWER PLIOCENE

BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS A/G; N19; NANNOFOSSILS R/M; R/G; RADIOLARIANS B; R/G ?; DIATOMS

PALEOMAGNETICS: N

PHYS. PROPERTIES: ● 22.9 2601 2.29; ● 43.2; ● 28.5 2572 2.39; ● 47.9; ● 39.2 2721 2.14; ● 12.5

CHEMISTRY: Vp; wt. %CaCO3; wt. %TOC

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

METERS: 0.5, 1.0

GRAPHIC LITHOLOGY: VOID; VOID

DRILLING DISTURB.

SED. STRUCTURES

SAMPLES

LITHOLOGIC DESCRIPTION

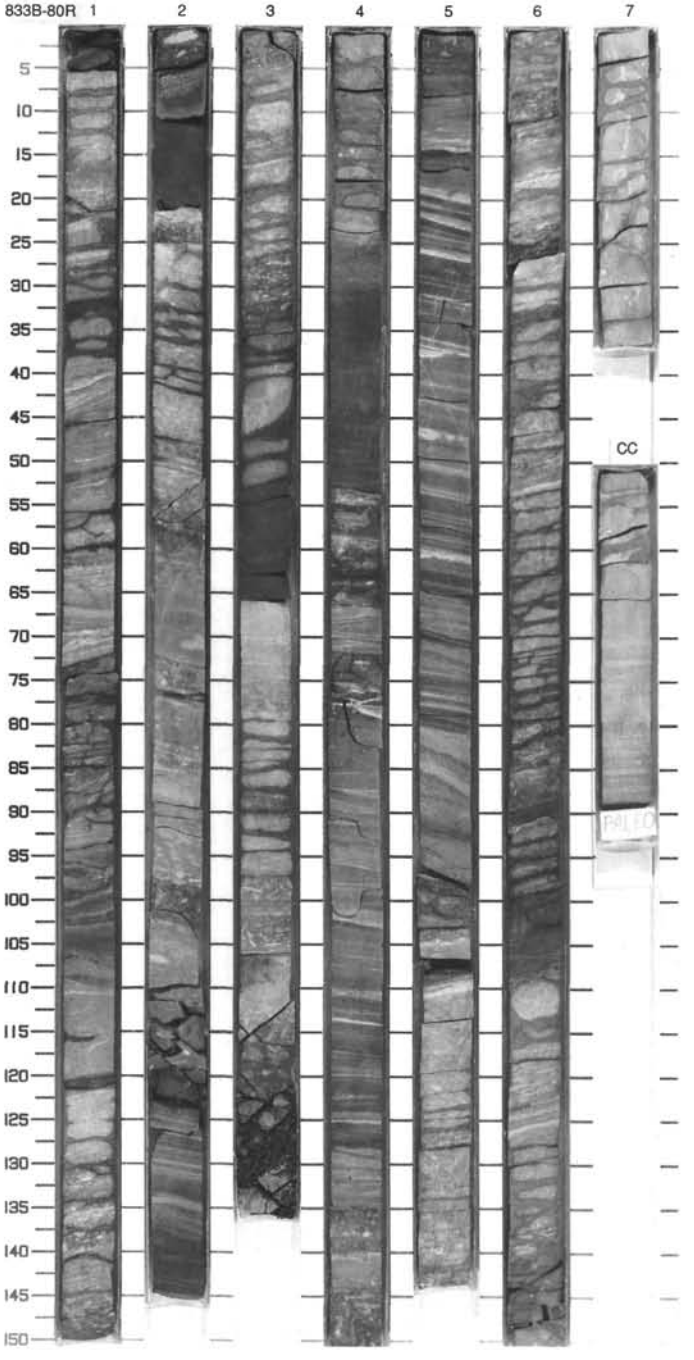
CALCAREOUS SANDY CLAYEY SILTY MIXED SEDIMENTARY ROCK, CLAYEY VOLCANIC SILTSTONE, and CALCAREOUS SILTY VOLCANIC SANDSTONE

Major lithology:
a. Most of this core is dark greenish gray to very dark gray (10Y 4/1 to 5Y 3/1), laminated CALCAREOUS SANDY CLAYEY SILTY MIXED SEDIMENTARY ROCK. This lithology is usually laminated except where heavily bioturbated. This lithology is interbedded with the other lithologies described below as layers 12 to 100 cm in thickness.
b. Interbedded with the other lithologies described above and below is lithified, dark greenish gray (10Y 4/1) CLAYEY VOLCANIC SILTSTONE. Layers of this sediment range from 15 to 100 cm in thickness.
c. Interbedded with the lithologies (a and b) described above is lithified, laminated, very dark gray (5Y 3/1) CALCAREOUS SILTY VOLCANIC SANDSTONE. Interbeds of this lithology range from 12 to 35 cm in thickness. Laminations within this lithology are typically 1–3 mm in thickness. In Section 4, 20–53 cm, for example, this sandstone has very fine-scale cross laminations. Fining upward trends are sometimes discernible within this lithology, which is often overlain by the finer-grained lithology (b) described above.

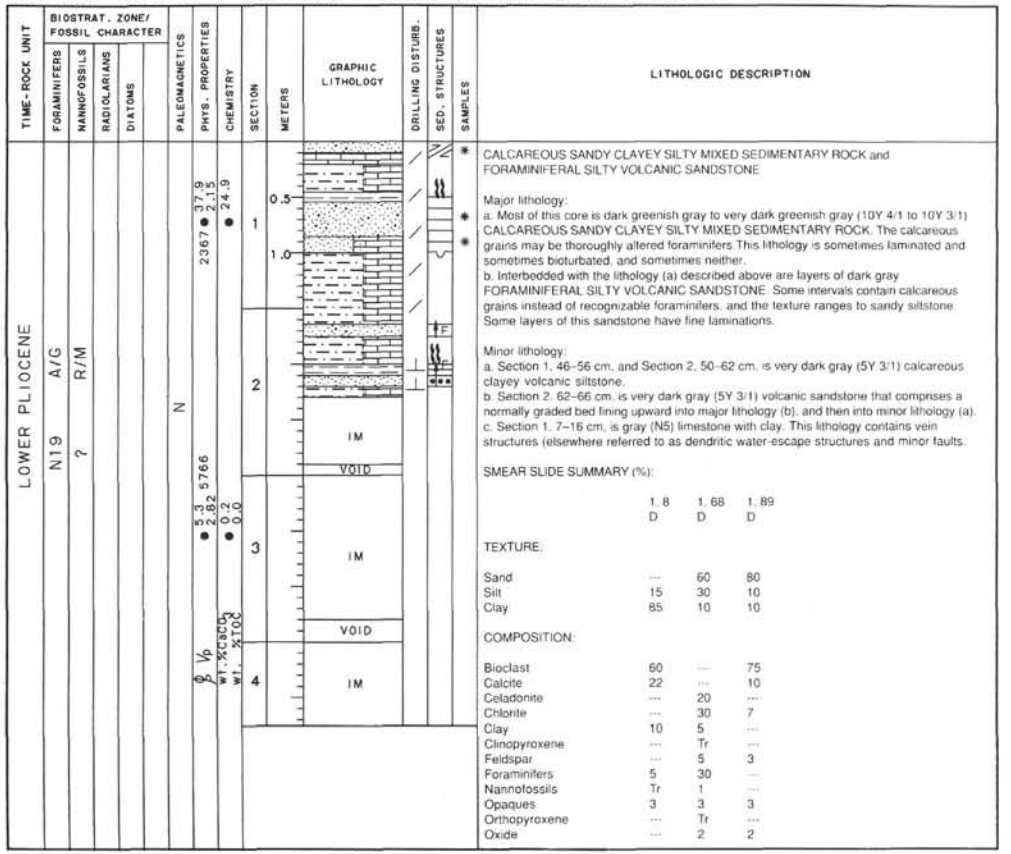
Minor lithology: A thin bed of dark gray (5Y 4/1) very fine volcanic sand occurs in Section 4, 67–72 cm.

SMEAR SLIDE SUMMARY (%):

	1, 101 M	4, 37 D	5, 54 D	5, 121 D	6, 25 D	CC, 27 D
TEXTURE:						
Sand	20	50	10	20	---	5
Silt	50	40	60	40	40	40
Clay	30	10	30	40	60	55
COMPOSITION:						
Bioclast	---	---	---	15	---	---
Calcite	10	30	10	30	40	40
Celadonite	---	20	30	---	---	---
Chlorite	7	15	---	---	---	5
Clay	25	10	25	40	55	40
Clinopyroxene	2	2	3	Tr	---	---
Feldspar	7	10	10	2	---	8
Foraminifers	10	2	1	5	---	Tr
Glass	5	---	10	---	---	---
Nannofossils	5	Tr	1	1	---	---
Opaques	4	8	5	3	3	2
Oxide	10	Tr	1	---	---	---
Quartz	---	2	---	2	---	---
Rock fragment	10	---	---	---	---	---
Zeolite	5	---	---	---	---	---



SITE 833 HOLE B CORE 81R CORED INTERVAL 828.0-834.0 mbsf



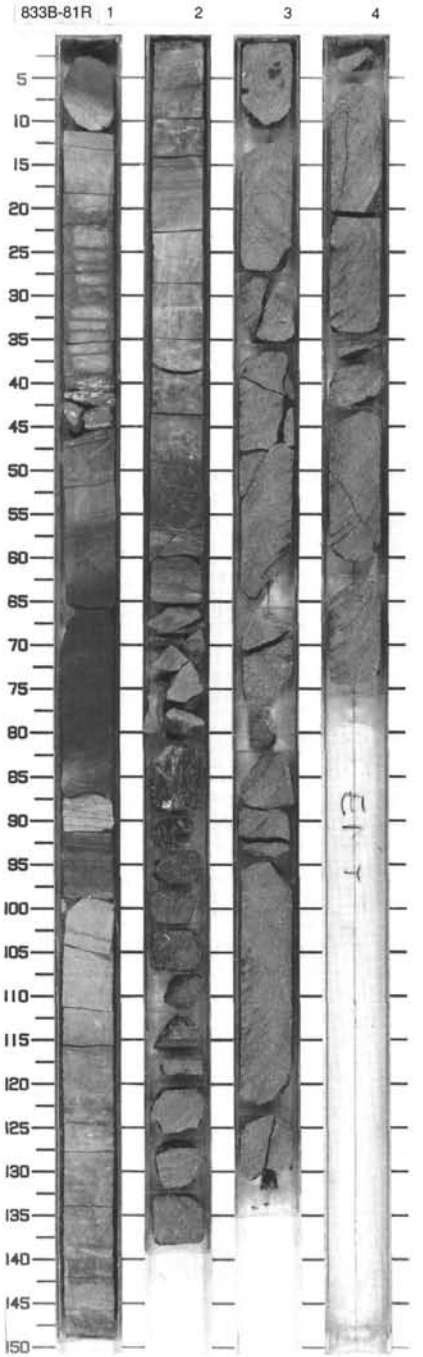
CALCAREOUS SANDY CLAYEY SILTY MIXED SEDIMENTARY ROCK and FORAMINIFERAL SILTY VOLCANIC SANDSTONE

Major lithology:
a. Most of this core is dark greenish gray to very dark greenish gray (10Y 4/1 to 10Y 3/1) CALCAREOUS SANDY CLAYEY SILTY MIXED SEDIMENTARY ROCK. The calcareous grains may be thoroughly altered foraminifers. This lithology is sometimes laminated and sometimes bioturbated, and sometimes neither.
b. Interbedded with the lithology (a) described above are layers of dark gray FORAMINIFERAL SILTY VOLCANIC SANDSTONE. Some intervals contain calcareous grains instead of recognizable foraminifers, and the texture ranges to sandy siltstone. Some layers of this sandstone have fine laminations.

Minor lithology:
a. Section 1, 46–56 cm, and Section 2, 50–62 cm, is very dark gray (5Y 3/1) calcareous clayey volcanic siltstone.
b. Section 2, 62–66 cm, is very dark gray (5Y 3/1) volcanic sandstone that comprises a normally graded bed fining upward into major lithology (b), and then into minor lithology (a).
c. Section 1, 7–16 cm, is gray (N5) limestone with clay. This lithology contains vein structures (elsewhere referred to as dendritic water-escape structures and minor faults.

SMEAR SLIDE SUMMARY (%):

	1, 8 D	1, 68 D	1, 89 D
TEXTURE:			
Sand	---	60	80
Silt	15	30	10
Clay	85	10	10
COMPOSITION:			
Bioclast	60	---	75
Calcite	22	---	10
Celadonite	---	20	---
Chlorite	---	30	7
Clay	10	5	---
Clinopyroxene	---	Tr	---
Feldspar	---	5	3
Foraminifers	5	30	---
Nannofossils	Tr	1	---
Opaques	3	3	3
Orthopyroxene	---	Tr	---
Oxide	---	2	2

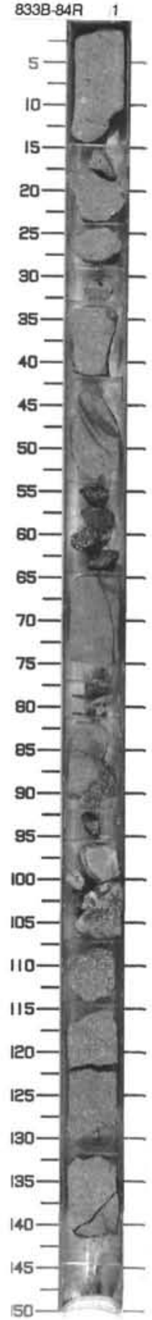


833B 82R HARD ROCK

833B 83R HARD ROCK

SITE 833 HOLE B CORE 84R CORED INTERVAL 851.2-856.2 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?		B			?	● ϕ 33.7, V_p 3410, ρ 2.32	● wt.% $CaCO_3$ 4.4, wt.% TOC 0.1	1	0.5, 1.0	IM / IM				CLAYEY CALCAREOUS VOLCANIC SILTSTONE Major lithology: A sedimentary interval occurs within the volcanic rocks at Section 1, 65–107 cm. The rocks are primarily greenish gray (10G 5/1) CLAYEY CALCAREOUS VOLCANIC SILTSTONE, with mineral-filled fractures, apparently originating from the volcanic rocks. The baked contacts between volcanic and sedimentary rock are visible at 86-91 cm and in the fragment at 93–96 cm. The rest of the rocks in this interval consist of fragments of black (5Y 2.5/1) serpentine, sometimes in contact with siltstones or basalt fragments. The serpentine surfaces show slickensides.



833B 85R HARD ROCK

833B 86R HARD ROCK

833B 87R HARD ROCK

SITE 833 HOLE B CORE 88R CORED INTERVAL 885.2-894.8 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
LOWER PLIOCENE	N19 F/P	CN11? C/M	B		?	15470 6.2 2.79; 2780 38.2 2.13; 3039	0.3; 16.1; 7.9 0.1	1, 2, CC	0.5, 1.0	IM	X		*

Legend: Φ ρ Vp (PHYS. PROPERTIES); wt. %CaCO3, wt. %TOC (CHEMISTRY)

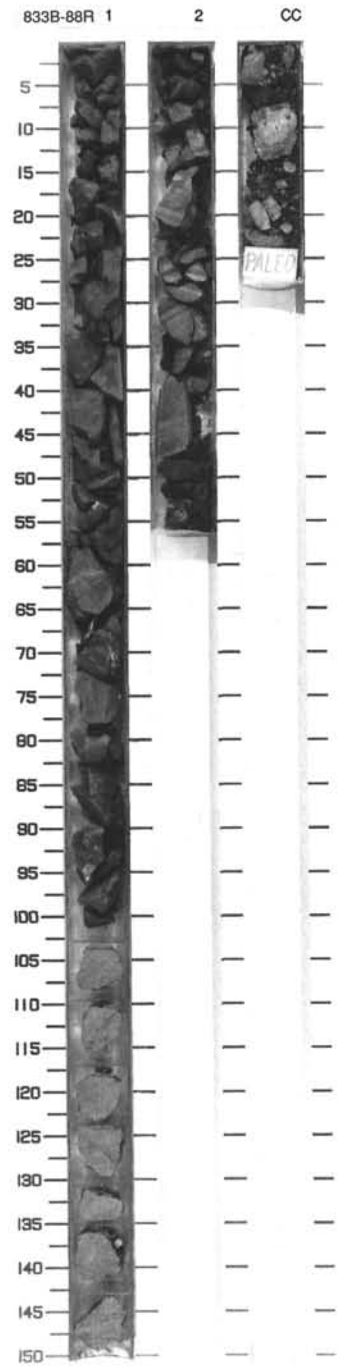
LITHOLOGIC DESCRIPTION

CALCAREOUS VOLCANIC SILTSTONE

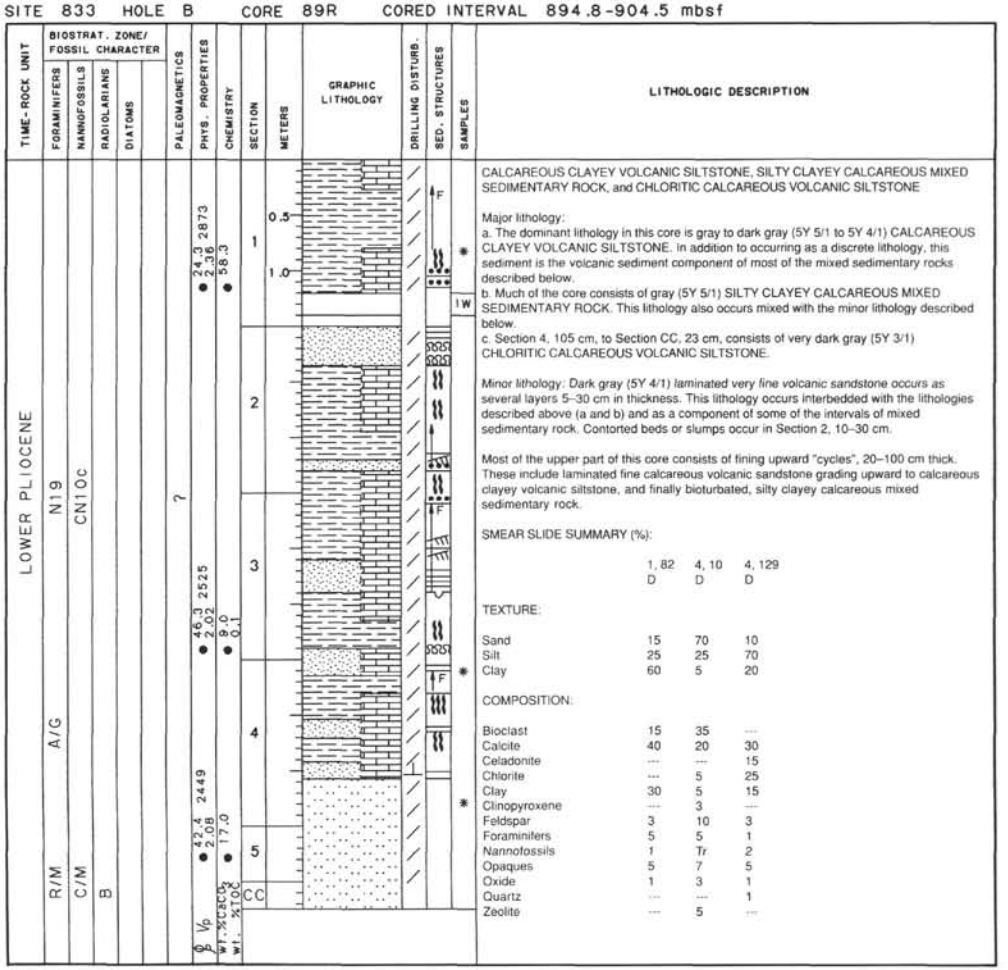
Major lithology: Sedimentary rocks in Sections 1, 2, and CC consist of grayish black (N2) to dark greenish gray (5G 4/1) CALCAREOUS VOLCANIC SILTSTONE, with calcite-filled veins and a pseudo-conchoidal fractured appearance.

SMEAR SLIDE SUMMARY (%):

	1, 89
	D
TEXTURE:	
Sand	10
Silt	70
Clay	20
COMPOSITION:	
Calcite	10
Celadonite	Tr
Chlorite	3
Clay	10
Feldspar	4
Foraminifers	15
Glass	5
Nannofossils	10
Opaques	4
Oxide	15
Rock fragment	14
Zeolite	10



SITE 833 HOLE B CORE 89R CORED INTERVAL 894.8-904.5 mbsf



LITHOLOGIC DESCRIPTION

CALCAREOUS CLAYEY VOLCANIC SILTSTONE, SILTY CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK, and CHLORITIC CALCAREOUS VOLCANIC SILTSTONE

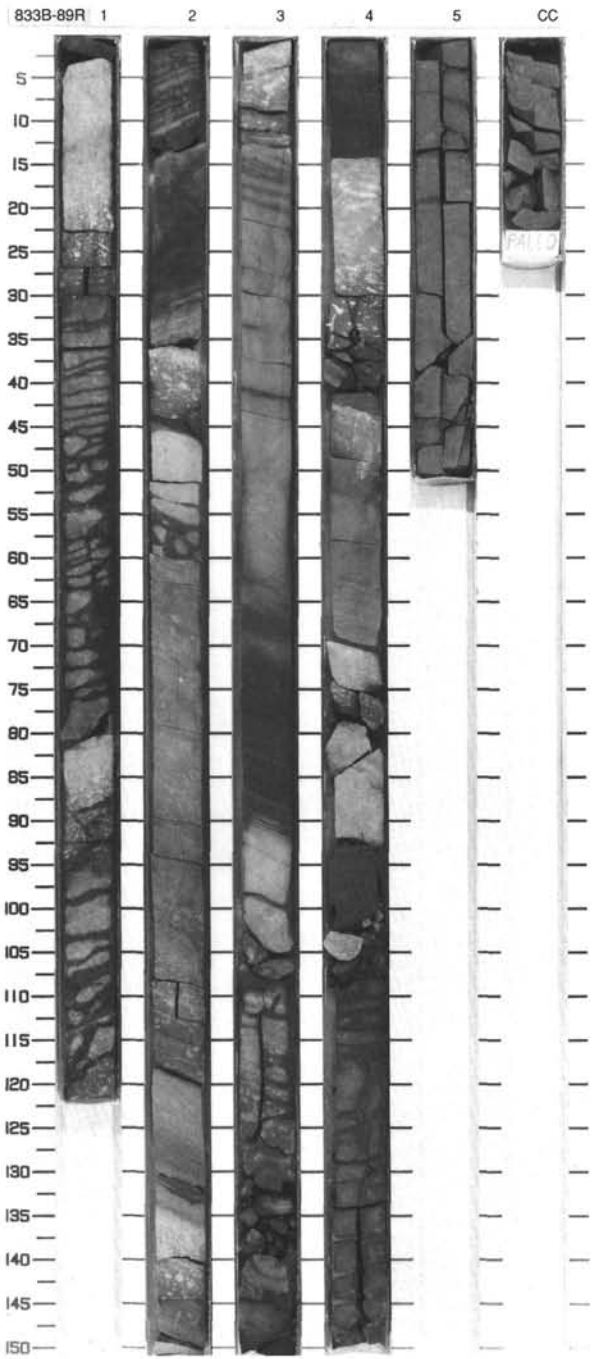
Major lithology:
a. The dominant lithology in this core is gray to dark gray (5Y 5/1 to 5Y 4/1) CALCAREOUS CLAYEY VOLCANIC SILTSTONE. In addition to occurring as a discrete lithology, this sediment is the volcanic sediment component of most of the mixed sedimentary rocks described below.
b. Much of the core consists of gray (5Y 5/1) SILTY CLAYEY CALCAREOUS MIXED SEDIMENTARY ROCK. This lithology also occurs mixed with the minor lithology described below.
c. Section 4, 105 cm, to Section CC, 23 cm, consists of very dark gray (5Y 3/1) CHLORITIC CALCAREOUS VOLCANIC SILTSTONE.

Minor lithology: Dark gray (5Y 4/1) laminated very fine volcanic sandstone occurs as several layers 5–30 cm in thickness. This lithology occurs interbedded with the lithologies described above (a and b) and as a component of some of the intervals of mixed sedimentary rock. Contorted beds or slumps occur in Section 2, 10–30 cm.

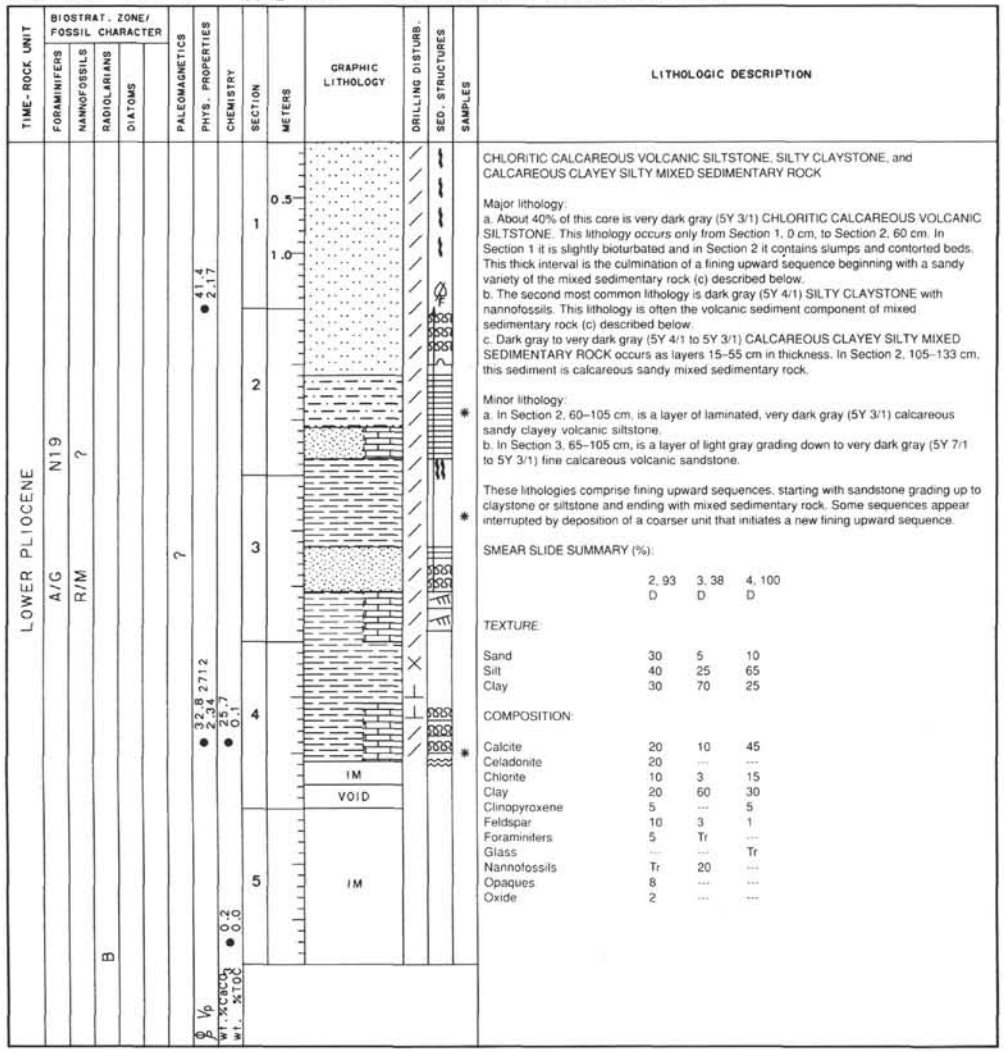
Most of the upper part of this core consists of fining upward "cycles", 20–100 cm thick. These include laminated fine calcareous volcanic sandstone grading upward to calcareous clayey volcanic siltstone, and finally bioturbated, silty clayey calcareous mixed sedimentary rock.

SMEAR SLIDE SUMMARY (%):

	1, 82 D	4, 10 D	4, 129 D
TEXTURE:			
Sand	15	70	10
Silt	25	25	70
Clay	60	5	20
COMPOSITION:			
Bioclast	15	35	---
Calcite	40	20	30
Celadonite	---	---	15
Chlorite	---	5	25
Clay	30	5	15
Clinopyroxene	---	3	---
Feldspar	3	10	3
Foraminifers	5	5	1
Nannofossils	1	Tr	2
Opaques	5	7	5
Oxide	1	3	1
Quartz	---	---	1
Zeolite	---	5	---



SITE 833 HOLE B CORE 90R CORED INTERVAL 904.5-914.2 mbsf



CHLORITIC CALCAREOUS VOLCANIC SILTSTONE, SILTY CLAYSTONE, and CALCAREOUS CLAYEY SILTY MIXED SEDIMENTARY ROCK

Major lithology:
a. About 40% of this core is very dark gray (5Y 3/1) CHLORITIC CALCAREOUS VOLCANIC SILTSTONE. This lithology occurs only from Section 1, 0 cm, to Section 2, 60 cm. In Section 1 it is slightly bioturbated and in Section 2 it contains slumps and contorted beds. This thick interval is the culmination of a fining upward sequence beginning with a sandy variety of the mixed sedimentary rock (c) described below.
b. The second most common lithology is dark gray (5Y 4/1) SILTY CLAYSTONE with nannofossils. This lithology is often the volcanic sediment component of mixed sedimentary rock (c) described below.
c. Dark gray to very dark gray (5Y 4/1 to 5Y 3/1) CALCAREOUS CLAYEY SILTY MIXED SEDIMENTARY ROCK occurs as layers 15–55 cm in thickness. In Section 2, 105–133 cm, this sediment is calcareous sandy mixed sedimentary rock.

Minor lithology:
a. In Section 2, 60–105 cm, is a layer of laminated, very dark gray (5Y 3/1) calcareous sandy clayey volcanic siltstone.
b. In Section 3, 65–105 cm, is a layer of light gray grading down to very dark gray (5Y 7/1 to 5Y 3/1) fine calcareous volcanic sandstone.

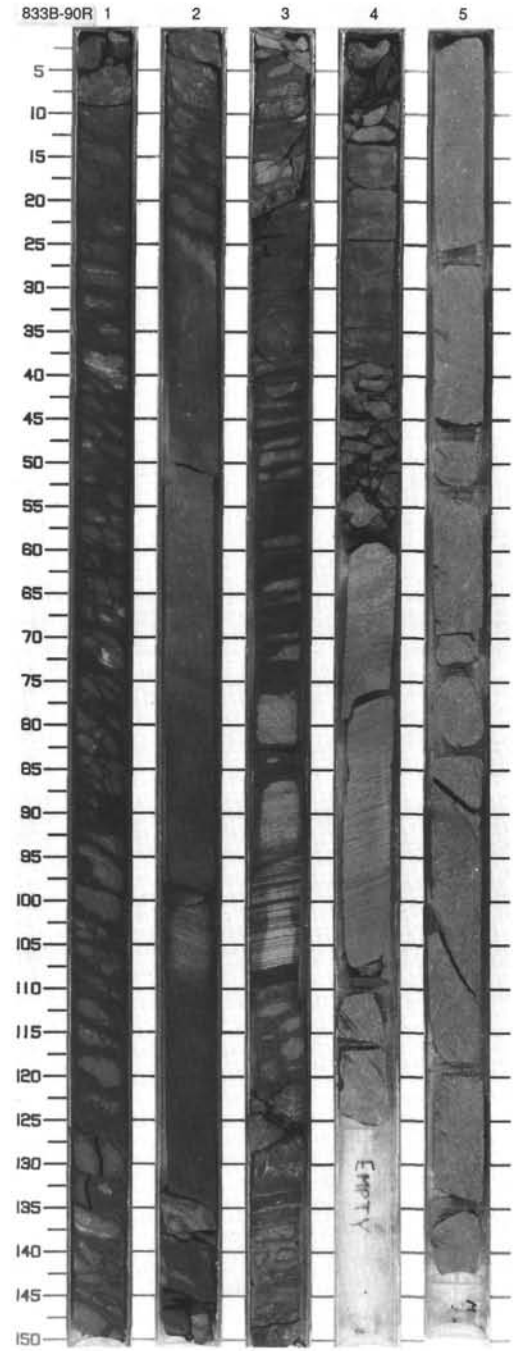
These lithologies comprise fining upward sequences, starting with sandstone grading up to claystone or siltstone and ending with mixed sedimentary rock. Some sequences appear interrupted by deposition of a coarser unit that initiates a new fining upward sequence.

SMEAR SLIDE SUMMARY (%):

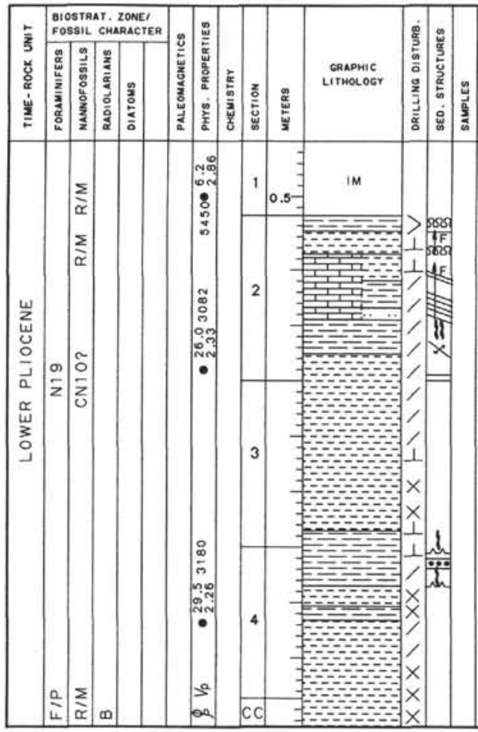
	2, 93 D	3, 38 D	4, 100 D
TEXTURE:			
Sand	30	5	10
Silt	40	25	65
Clay	30	70	25
COMPOSITION:			
Calcite	20	10	45
Celadonite	20	---	---
Chlorite	10	3	15
Clay	20	60	30
Clinopyroxene	5	---	5
Feldspar	10	3	1
Foraminifers	5	Tr	---
Glass	---	---	Tr
Nannofossils	Tr	20	---
Opaques	8	---	---
Oxide	2	---	---

833B 91R HARD ROCK

833B 92R HARD ROCK



SITE 833 HOLE B CORE 93R CORED INTERVAL 933.6-943.3 mbsf



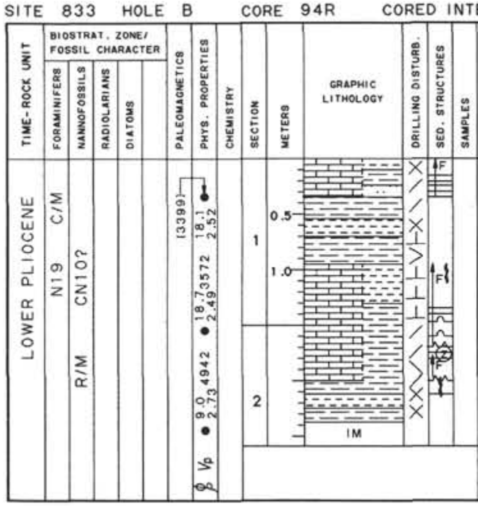
LITHOLOGIC DESCRIPTION

CALCAREOUS CLAYSTONE, CLAYEY SILTY CALCAREOUS MIXED SEDIMENTARY ROCK, and CLAYEY CALCAREOUS VOLCANIC SILTSTONE

Major lithology:
a. Section 2, 124–150 cm, Section 2, 0–134 cm, Section 4, 8–10, 33–50, and 66–137 cm, and Section CC consist of black (5Y 2.5/1) CALCAREOUS CLAYSTONE with silt.
b. Section 2, 32–96 cm, consists of a fining upward sequence of CLAYEY SILTY CALCAREOUS MIXED SEDIMENTARY ROCK, at least 60% calcareous. The basal 36 cm is laminated and cross-laminated. The non-calcareous component of the rocks grades upward from silt at 96 cm, to clayey silt at about 60 cm, to clay from 32–62 cm. A foraminifer-rich layer occurs at 82 cm.
c. Section 3, 134–150, Section 4, 0–33 and 54–65 cm, consists of greenish gray (5GY 4/1) CLAYEY CALCAREOUS VOLCANIC SILTSTONE with foraminifers. The beds contain sandy and clayey interbeds, 1–3 cm thick, and horizons rich in trace fossils.

Minor lithology:
a. Section 2, 0–32 cm, consists of dark greenish gray (5G 4/1), laminated and contorted, silty claystone (0–16 cm) and dusky yellow green (5GY 5/1) to greenish gray (5G 5/1) claystone. The lower bed fines upward gradually, and has contorted bedding in the basal few cm.
b. Section 2, 96–124 cm, consists of dark greenish gray (10Y 4/1) silty calcareous claystone with foraminifers, bioturbated with numerous trace fossils in the top 10 cm. A fracture with slickensides occurs at 115 cm.

SITE 833 HOLE B CORE 94R CORED INTERVAL 943.3-952.9 mbsf

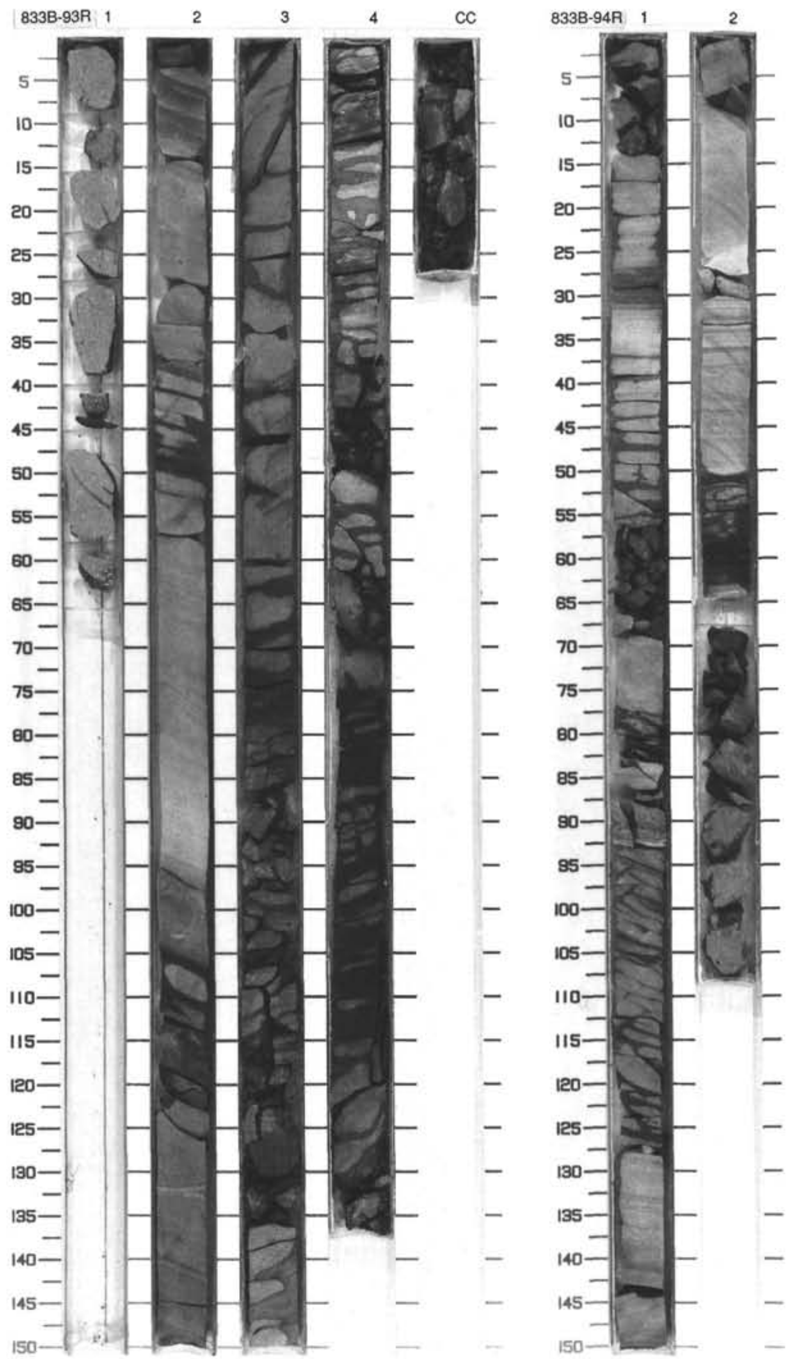


LITHOLOGIC DESCRIPTION

CLAYEY SILTY CALCAREOUS MIXED SEDIMENTARY ROCK and SILTY CALCAREOUS CLAYSTONE

Major lithology:
a. Most of the core consists of fining upward sequences of gray to dark gray (N5 to N4) CLAYEY SILTY CALCAREOUS MIXED SEDIMENTARY ROCK. The non-calcareous component of the sequences grades from silt at the base, up to clayey silt and clay. Basal layers are laminated, and contorted in some places. At the top of one of the sequences (Section 2, 25–28 cm), there is a 3 cm bed of bioturbated, light gray limestone containing a 5 mm lens with zeolite, pyrite, and calcite crystals.
b. About 25% of the core consists of dark greenish gray (5GY 3/1), bioturbated, SILTY CALCAREOUS CLAYSTONE with foraminifers.

Minor lithology: Section 1, 56–69 cm, and Section 2, 68–76 cm, consist of fragments of black (5Y 2.5/1) calcareous claystone, with scattered dendritic veins of calcite. Section 2, 76–89 cm, is black fragments of clayey calcareous siltstone.

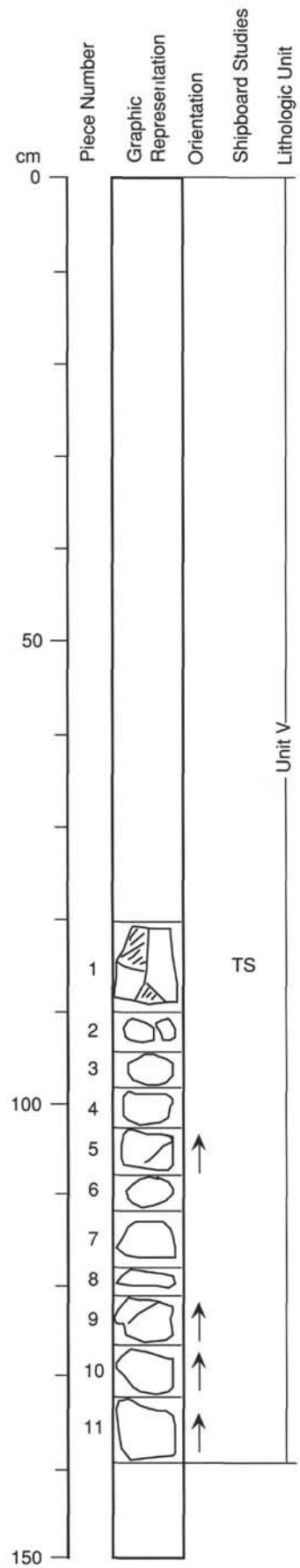


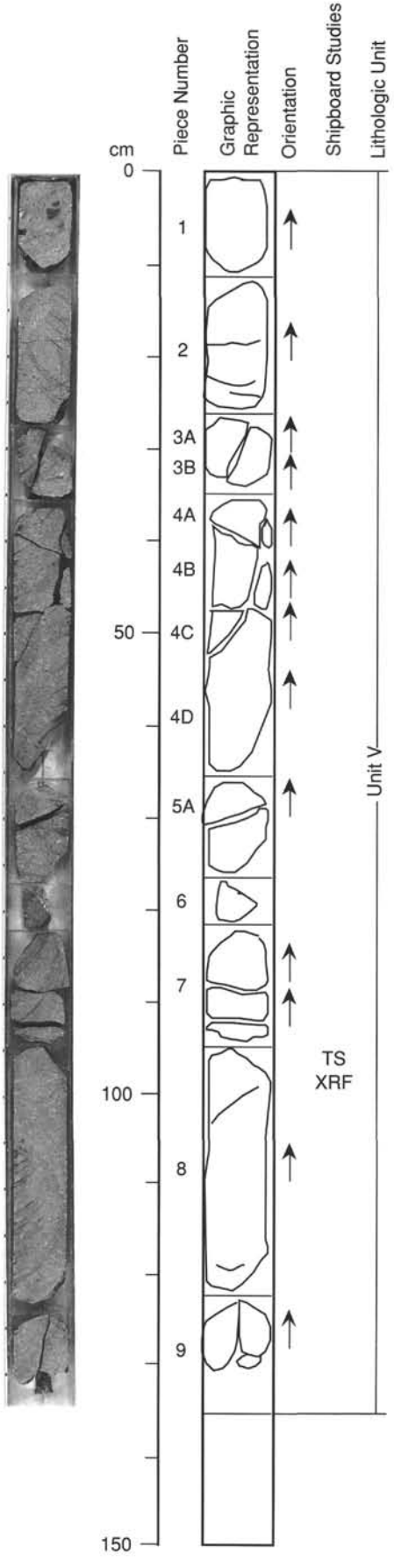
134-833B-81R-2

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–11

CONTACTS: With foraminiferal siltstone (in Piece 1). Gradation from intact silstone to massive basalt is as follows. 2–10 mm baked sediment; <1 mm crack-filling zeolite veins; <5 mm sub-parallels plagioclase concentration zone; <5 mm chilled margin (non-vesicular); >30 mm: vesicula basalt (Pieces 1 and 2).
PHENOCRYSTS: Plagioclase - 25–30%, 1–10 mm, euhedral to subhedral, no alteration. Clinopyroxene - 3–7%, 1–3 mm, subhedral, no alteration. Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: Glassy for Pieces 1 and 2, microcrystalline for Pieces 3–11.
VESICLES: 10%, <0.3 mm, rounded for Pieces 1 and 2. No vesicles are found in Pieces 3–11.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, diagonal, occasional fractures. Sometimes filled with zeolite.



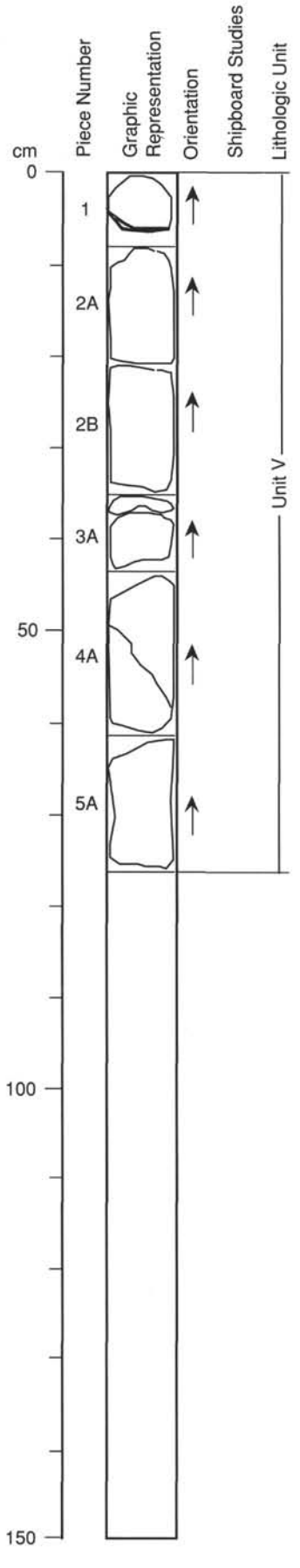


134-833B-81R-3

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–9

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 25–35%, 1–10 mm, euhedral to subhedral, no alteration.Clinopyroxene - 3–7%, 1–3 mm, subhedral, no alteration.Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, diagonal or horizontal, occasional fractures. Sometime filled with zeolite.

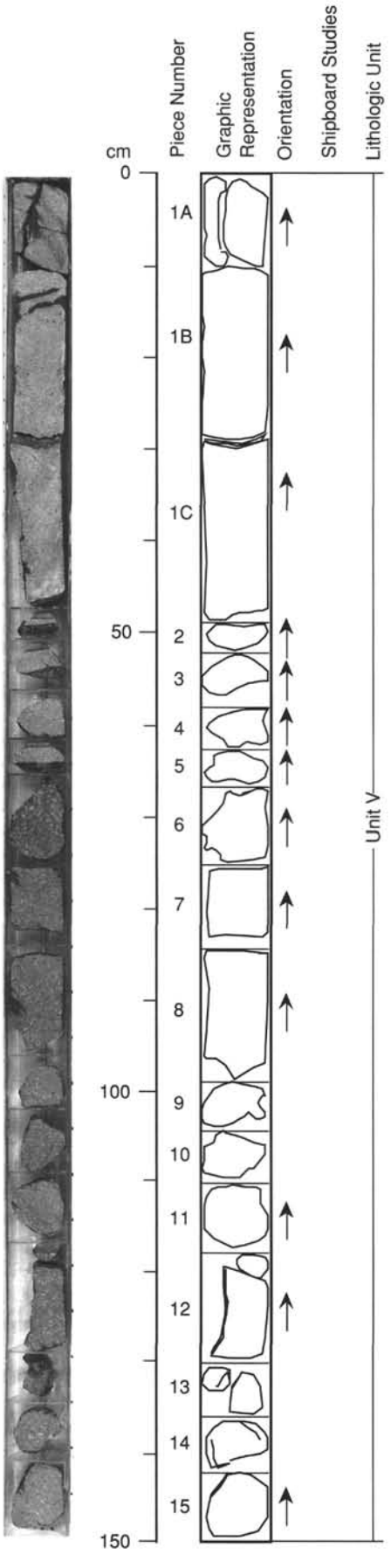


134-833B-81R-4

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–5A

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 25–35%, 1–10 mm, euhedral to subhedral, no alteration.
Clinopyroxene - 3–7%, 1–3 mm, subhedral, no alteration.
Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, diagonal or horizontal, occasional fractures. Sometimes filled with zeolite.

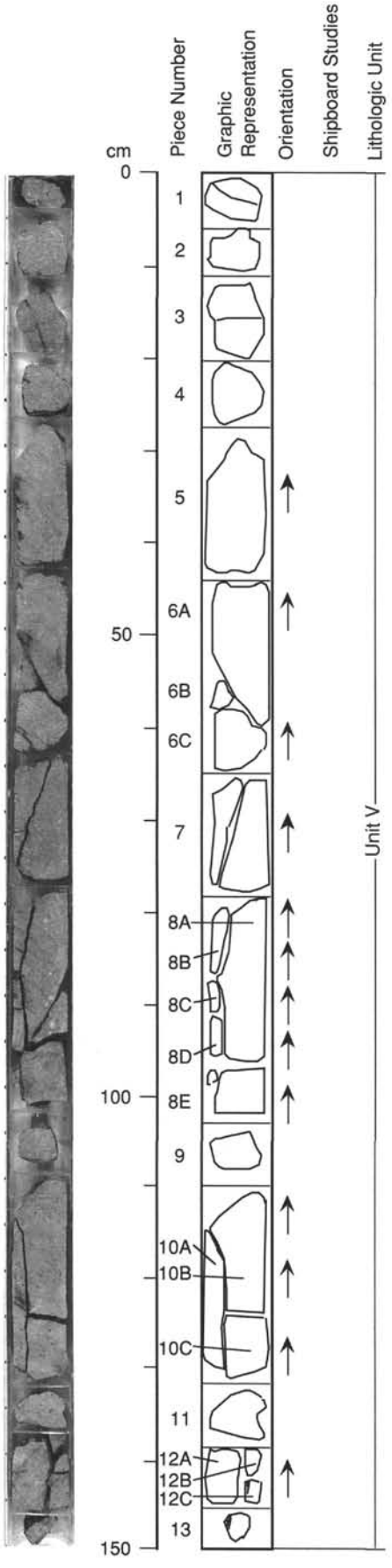


134-833B-82R-1

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–15

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 25–35%, 1–10 mm, euhedral to subhedral, no alteration.
Clinopyroxene - 3–7%, 1–3 mm, subhedral, no alteration.
Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, diagonal or horizontal, occasional fractures.Sometimes filled with zeolite.

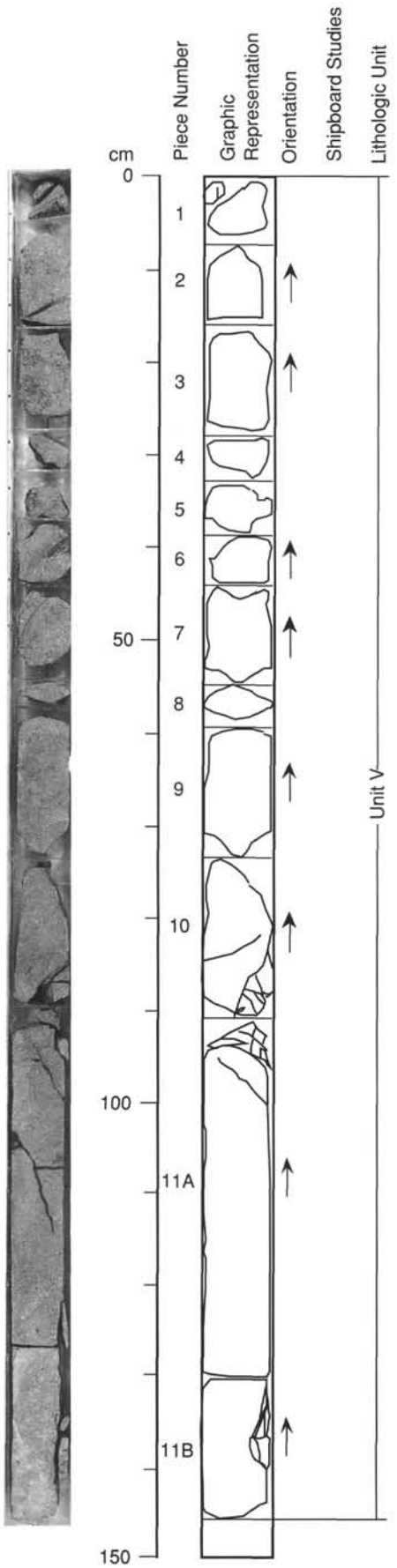


134-833B-82R-2

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–13

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 25–35%, 1–10 mm, euhedral to subhedral, no alteration.
linopyroxene - 3–7%, 1–3 mm, subhedral, no alteration.
Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, vertical and diagonal, occasional fractures. No fillings.

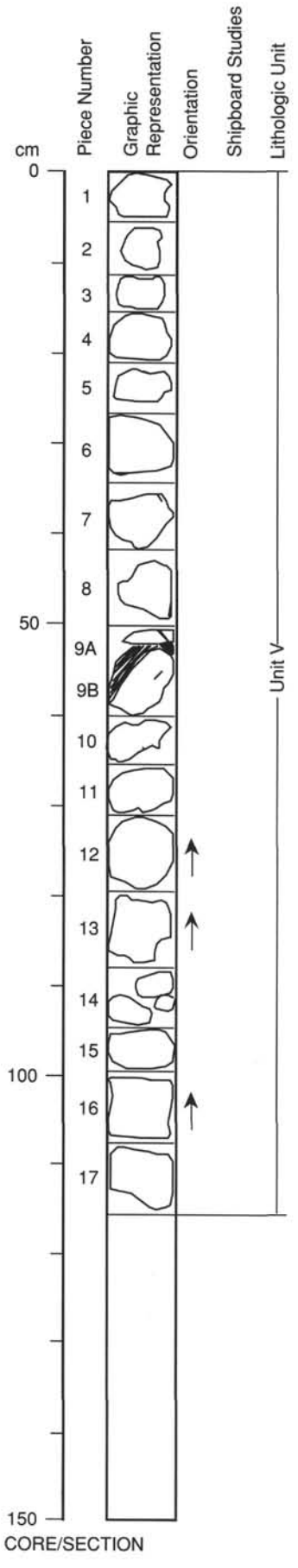


134-833B-82R-3

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–11B

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 25–35%, 1–10 mm, euhedral to subhedral, no alteration.
Clinopyroxene - 3–7%, 1–3 mm, subhedral, no alteration.
Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: *Microcrystalline.*
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: <5%,1–11 mm, irregular shape. Cavities are filled with dark green and pale green alteration minerals. Dark greenish gray minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, diagonal or horizontal, occasional fractures. Sometimes filled with zeolite.

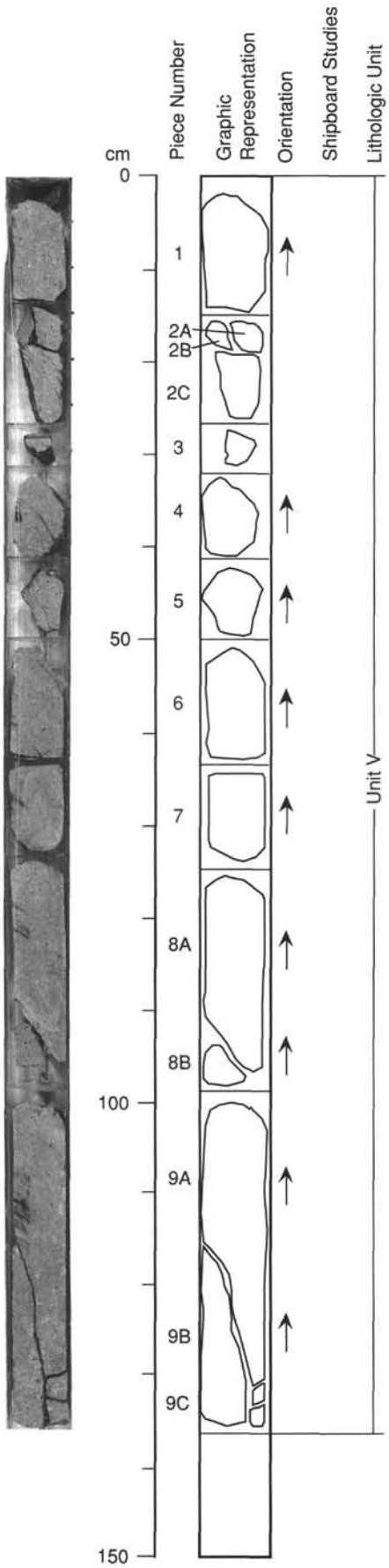


134-833B-82R-4

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–17

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 25–35%, 1–10 mm, euhedral to subhedral, no alteration.
Clinopyroxene - 3–7%, 1–3 mm, subhedral, no alteration.
Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, diagonal or horizontal, occasional fractures. Sometimes filled with zeolite.

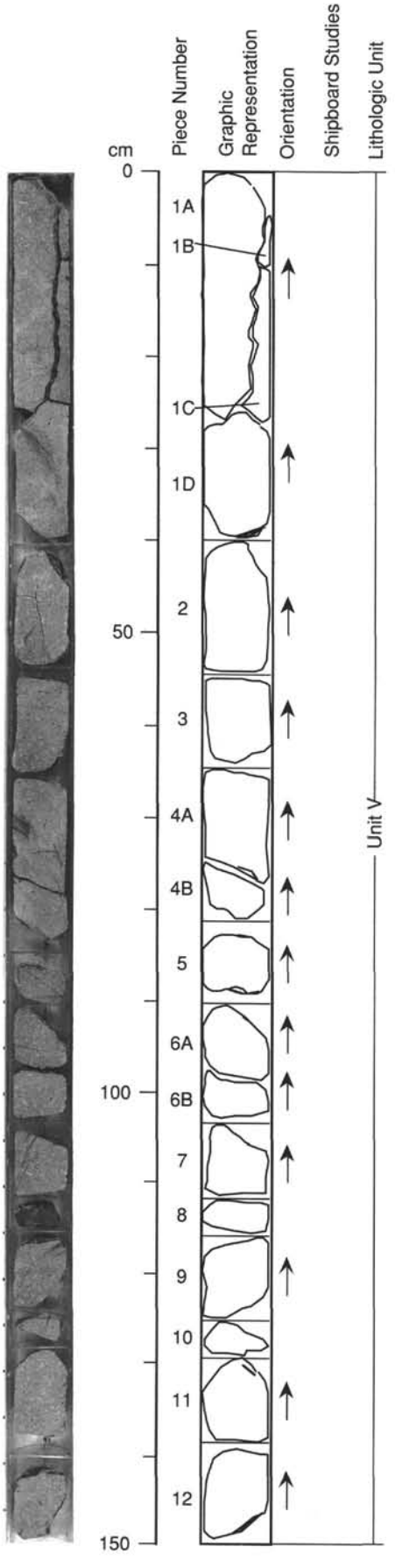


134-833B-83R-1

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–9C

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 25–35%, 1–10 mm, euhedral to subhedral, no alteration.
Clinopyroxene - 3–7%, 1–3 mm, subhedral, no alteration.
Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, nearly vertical fractures in Pieces 8 and 9. Development of chlorite and zeolites along fractures.

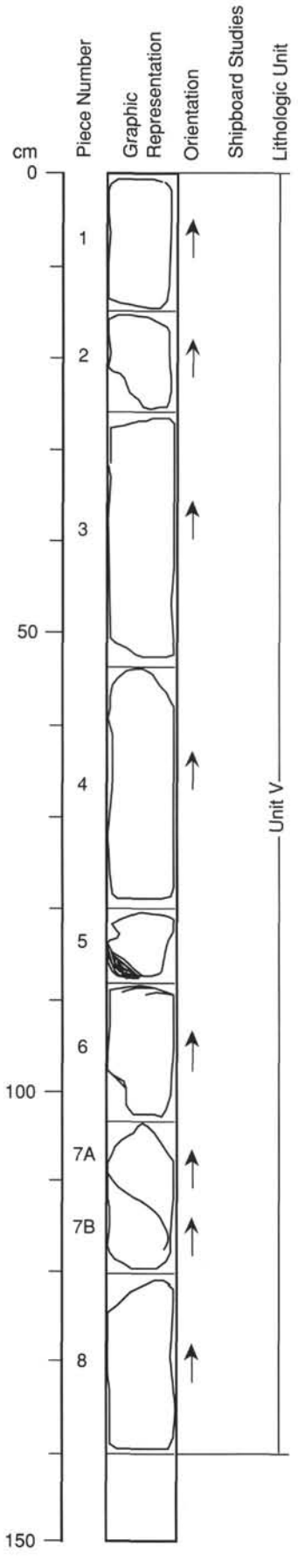


134-833B-83R-2

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–12

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 25–35%, 1–10 mm, euhedral to subhedral, no alteration.
Clinopyroxene - 3–7%, 1–3 mm, subhedral, no alteration.
Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, nearly vertical and diagonal fractures. Development of chlorite, zeolite and calcite along fractures.

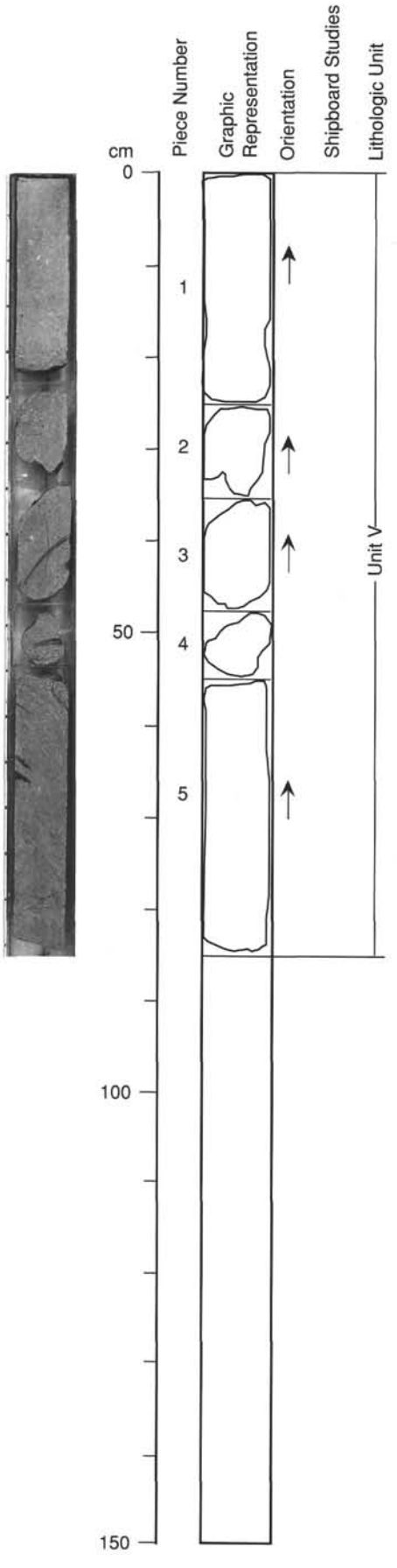


134-833B-83R-3

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–8

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 25–35%, 1–10 mm, euhedral to subhedral, no alteration.
Clinopyroxene - 3–7%, 1–3 mm, subhedral, no alteration.
Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, diagonal fracture between Pieces 7A and 7B. Development of chlorite and calcite along fractures.

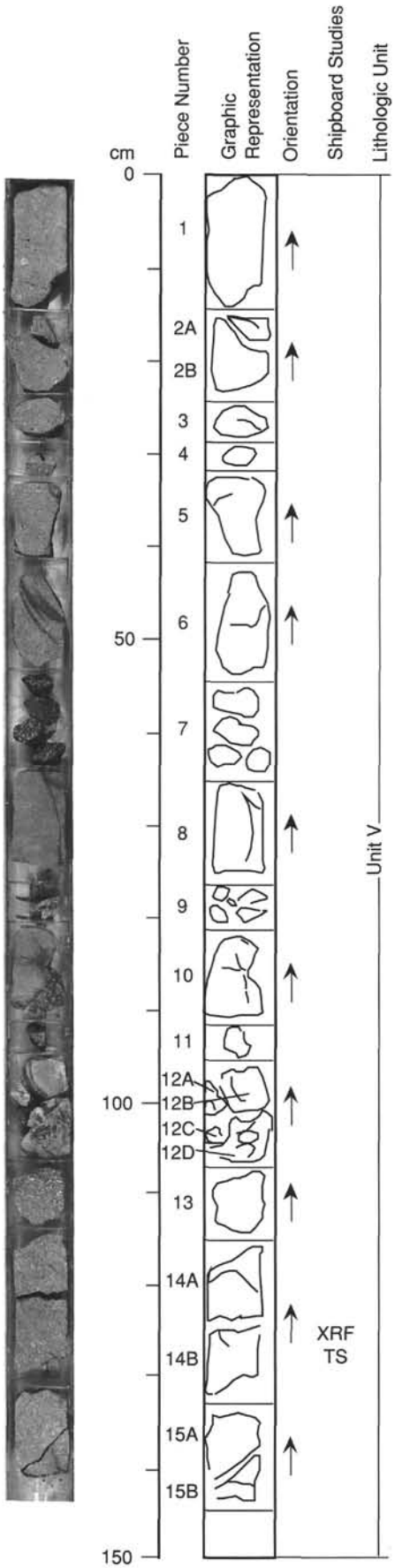


134-833B-83R-4

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–5

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 25–35%, 1–10 mm, euhedral to subhedral, no alteration.
Clinopyroxene - 3–7%, 1–3 mm, subhedral, no alteration.
Olivine - 1–2%, 0.5–2 mm, subhedral, completely altered to dark greenish gray minerals.
GROUNDMASS: Microcrystalline.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray minerals replacing olivine.
VEINS/FRACTURES: <1%, <1 mm, diagonal or horizontal, occasional fractures. Sometimes filled with zeolites.

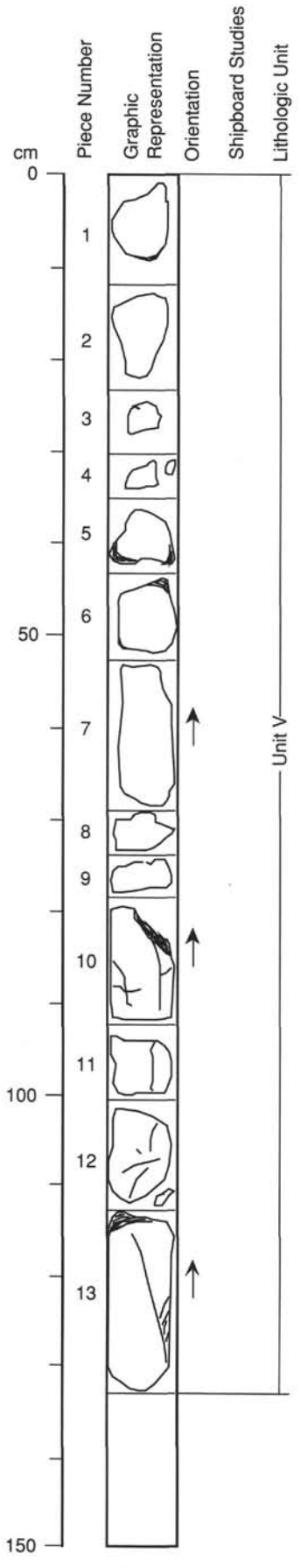


134-833B-84R-1

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–7 and 13–15

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–5 mm, euhedral and slightly altered.
Clinopyroxene - 7–8%, 1–3 mm, subhedral to anhedral.
Olivine - 1–2%, 0.5–2 mm, totally pseudomorphed.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, < 0.3 mm, irregular, random.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Serpentine/chlorite alteration of olivine(?). Greenish gray (5G 6/1).
VEINS/FRACTURES: Occasional fractures (0.5 mm).
ADDITIONAL COMMENTS: The very irregular contact in Piece 12 shows disruption of lower part into what was probably wet and unconsolidated sediment.Sedimentary rock is a silty limestone (Pieces 8 and 9 and parts of 10, 11 and 12).

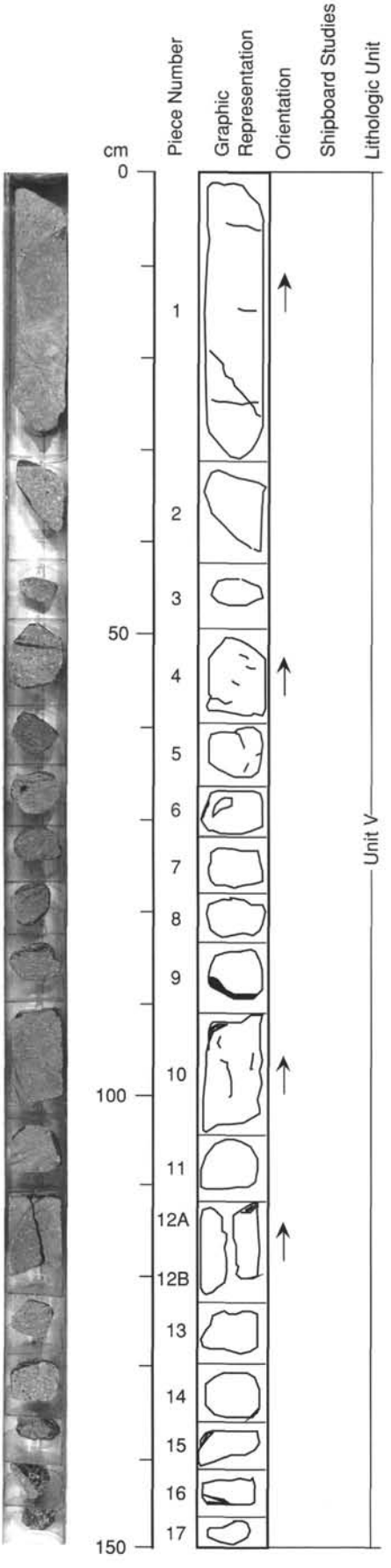


134-833B-85R-1

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–13

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–5 mm, euhedral and slightly altered.
Clinopyroxene - 7–8%, 1–3 mm, subhedral to anhedral.
Olivine - 1–2%, 0.5–2 mm, totally pseudomorphed.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, < 0.3 mm, irregular, random.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Serpentine/chlorite alteration of olivine(?). Greenish gray (5G 6/1).
VEINS/FRACTURES: Occasional fractures (0.5 mm).

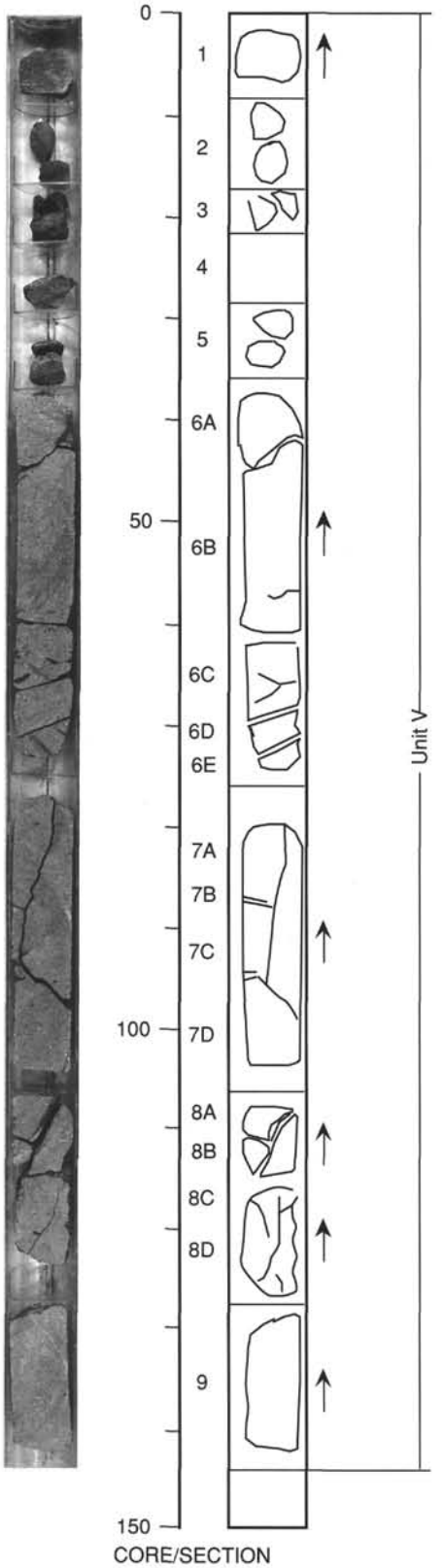


134-833B-85R-2

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–17

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–5 mm, euhedral and slightly altered.
Clinopyroxene - 7–8%, 1–3 mm, subhedral to anhedral.
Olivine - 1–2%, 0.5–2 mm, totally pseudomorphed.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, < 0.3 mm, irregular, random.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Serpentine/chlorite alteration of olivine(?). Greenish gray (5G 6/1).
VEINS/FRACTURES: Occasional fractures (0.5 mm).

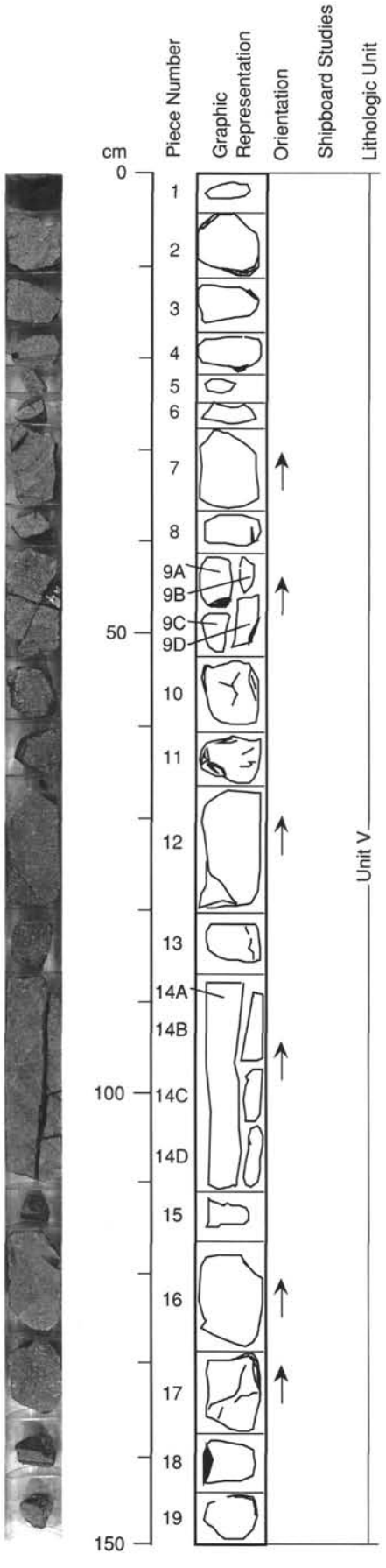


134-833B-85R-3

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1 and 4–9

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–5 mm, euhedral and slightly altered.
Clinopyroxene - 7–8%, 1–3 mm, subhedral to anhedral.
Olivine - 1–2%, 0.5–2 mm, totally pseudomorphed.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, < 0.3 mm, irregular, random.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Serpentine/chlorite alteration of olivine(?). Greenish gray (5G 6/1).
VEINS/FRACTURES: Occasional fractures (0.5 mm).
ADDITIONAL COMMENTS: Pieces 2 and 3 are calcareous volcanic siltstone.



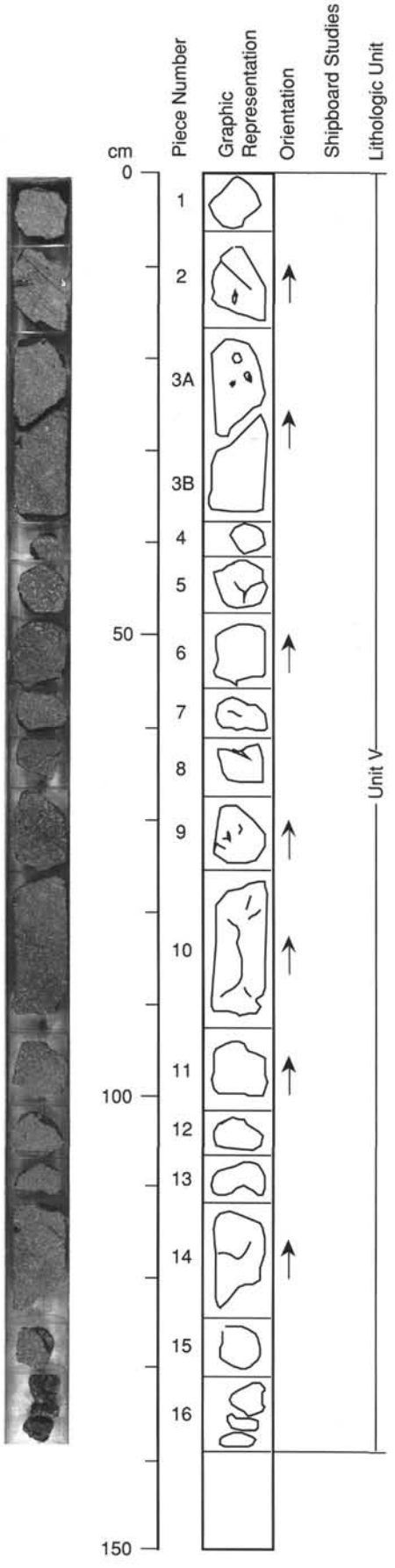
134-833B-86R-1

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1: Calcareous volcanic silt

Pieces 2–19

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–5 mm, euhedral and slightly altered.
Clinopyroxene - 7–8%, 1–3 mm, subhedral to anhedral.
Olivine - 1–2%, 0.5–2 mm, totally pseudomorphed.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, < 0.3 mm, irregular, random.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Serpentine/chlorite alteration of olivine(?). Greenish gray (5G 6/1).
VEINS/FRACTURES: Occasional fractures (0.5 mm).
ADDITIONAL COMMENTS: Pieces 9, 12 and 14 are fractured and fractures are coated with zeolites. Pieces 10 and 11 have a border of calcareous volcanic silt. Pieces 16 and 17 include rounded vesicles,1–4 mm in size filled with light bluish gray (5B 7/1) minerals (probably zeolites).

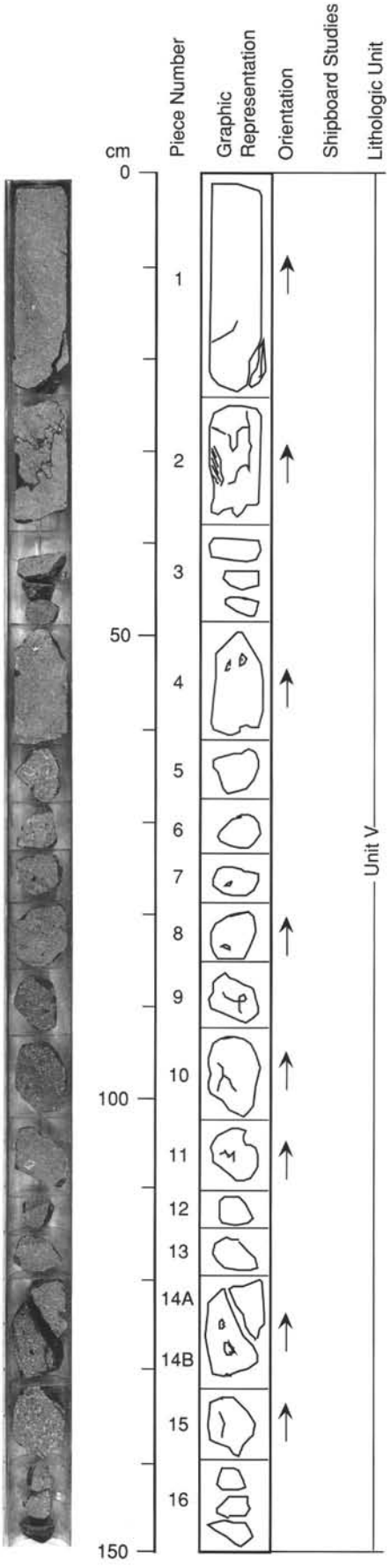


134-833B-86R-2

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–16

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–5 mm, euhedral and slightly altered.
Clinopyroxene - 7–8%, 1–3 mm, subhedral to anhedral.
Olivine - 1–2%, 0.5–2 mm, totally pseudomorphed.
ROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, < 0.3 mm, irregular, random.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Serpentine/chlorite alteration of olivine(?). Greenish gray (5G 6/1).
VEINS/FRACTURES: Occasional fractures (0.5 mm).
ADDITIONAL COMMENTS: Sparse but conspicuous spheroidal vesicles in Pieces 3 and 10.

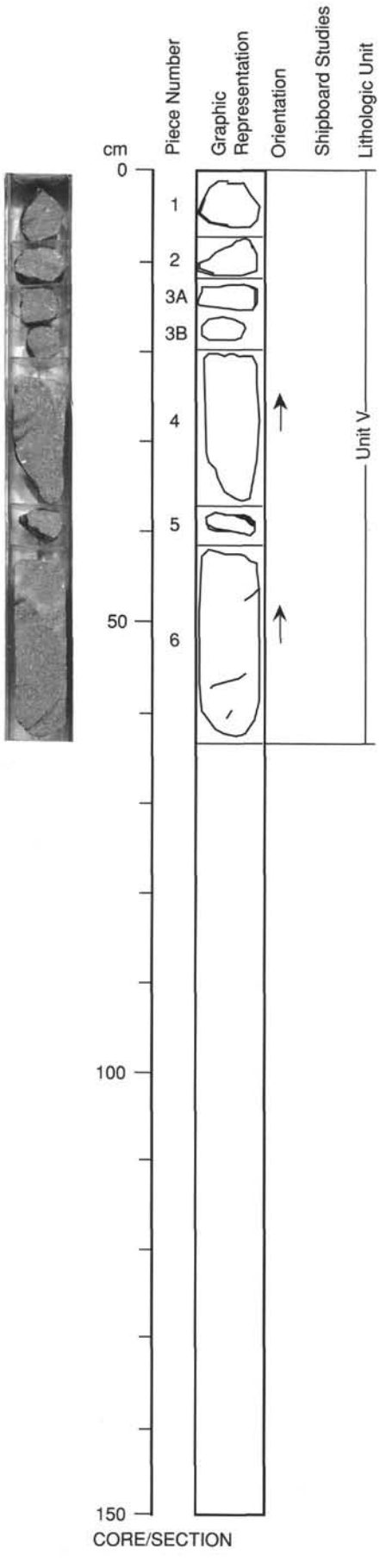


134-833B-86R-3

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–16

CONTACTS: None.
Plagioclase - 15–20%, 1–5 mm, euhedral and slightly altered.
Clinopyroxene - 7–8%, 1–3 mm, subhedral to anhedral.
Olivine - 1–2%, 0.5–2 mm, totally pseudomorphed.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, < 0.3 mm, irregular, random.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Serpentine/chlorite alteration of olivine(?). Greenish gray (5G 6/1).
VEINS/FRACTURES: Occasional fractures (0.5 mm).
ADDITIONAL COMMENTS: Sparse but relatively large (2–6 mm across) vesicles sometimes partially filled with light bluish gray (5B 7/1) zeolites.

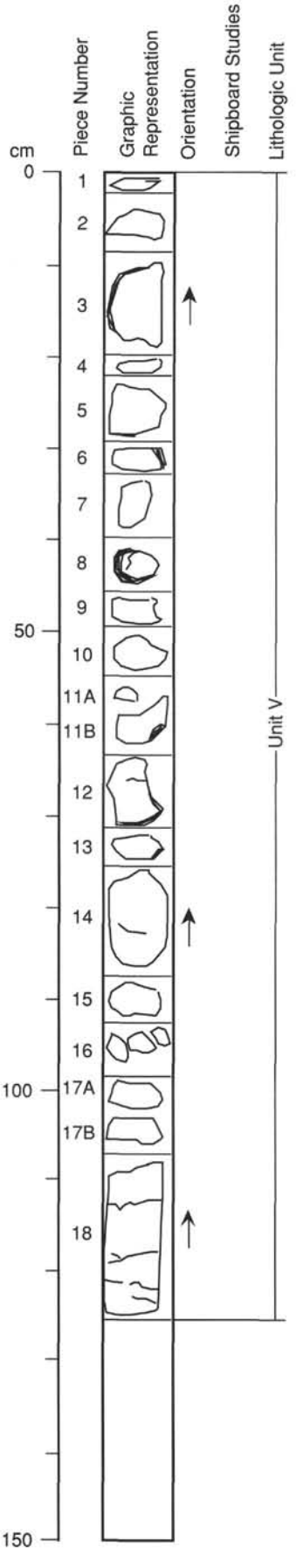


134-833B-86R-4

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–6

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–5 mm, euhedral and slightly altered.
Clinopyroxene - 7–8%, 1–3 mm, subhedral to anhedral.
Olivine - 1–2%, 0.5–2 mm, totally pseudomorphed.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, < 0.3 mm, irregular, random.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Serpentine/chlorite alteration of olivine(?). Greenish gray (5G 6/1).
VEINS/FRACTURES: Occasional fractures (0.5 mm).
ADDITIONAL COMMENTS: Piece 6 has few rounded vesicles, 1–4 mm in size, filled with very light gray (N8) zeolites.

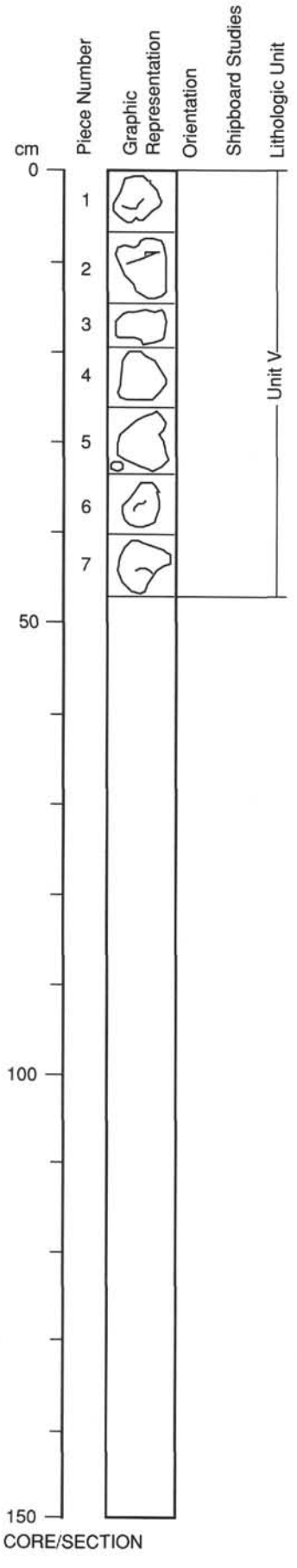


134-833B-87R-1

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–18

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–5 mm, euhedral and slightly altered.
Clinopyroxene - 7–8%, 1–3 mm, subhedral to anhedral.
Olivine - 1–2%, 0.5–2 mm, totally pseudomorphed.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, < 0.3 mm, irregular, random.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Serpentine/chlorite alteration of olivine(?). Greenish gray (5G 6/1).
VEINS/FRACTURES: Occasional fractures (0.5 mm).

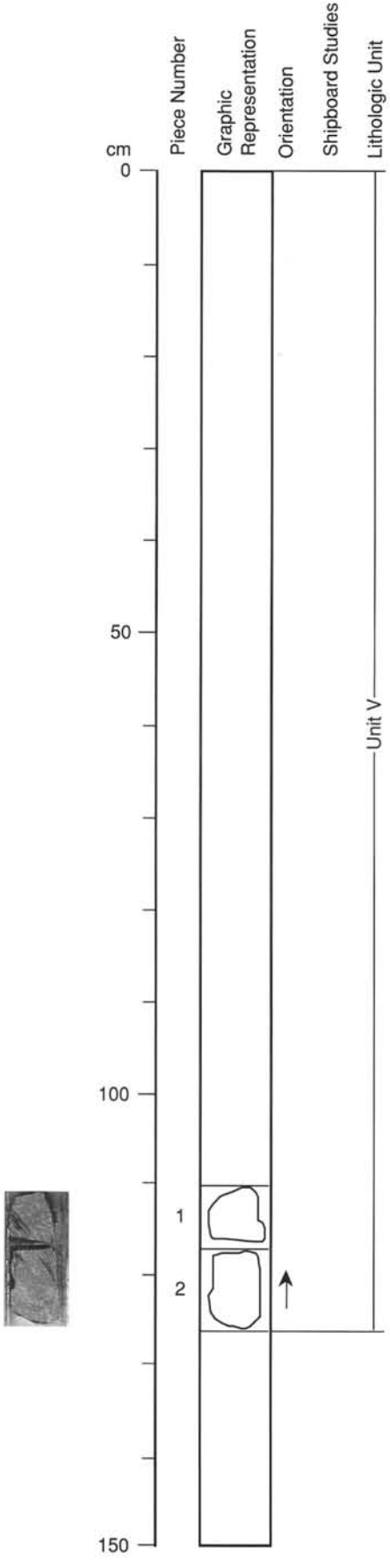


134-833B-88R-1

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–7

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–5 mm, euhedral and slightly altered.
Clinopyroxene - 7–8%, 1–3 mm, subhedral to anhedral.
Olivine - 1–2%, 0.5–2 mm, totally pseudomorphed.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, < 0.3 mm, irregular, random.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Serpentine/chlorite alteration of olivine(?). Greenish gray (5G 6/1).
VEINS/FRACTURES: Occasional fractures (0.5 mm).

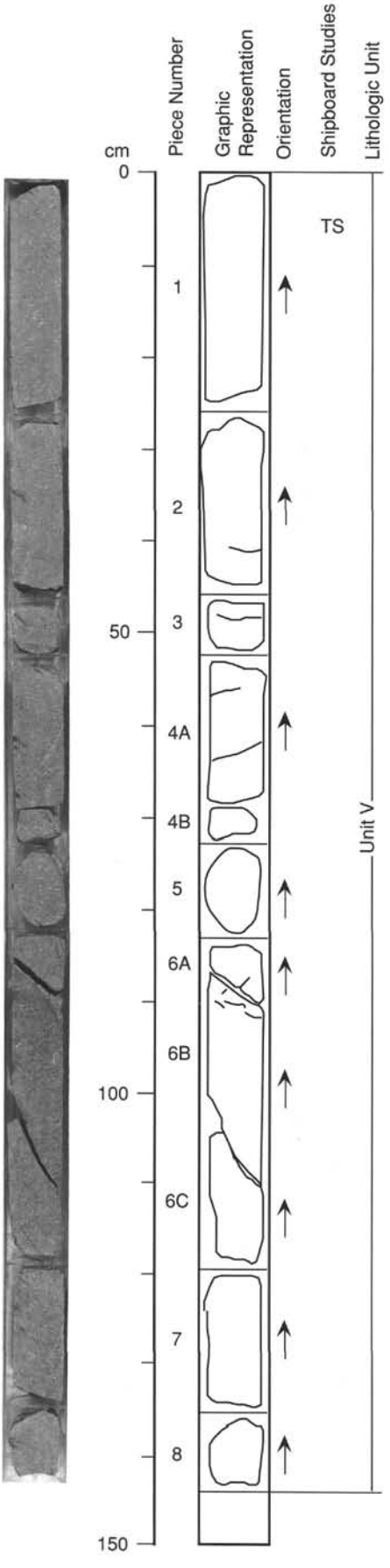


134-833B-90R-4

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT.

Pieces 1–2

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–8 mm, euhedral and elongate laths. Slightly oriented in the horizontal plane.
Clinopyroxene - 7–9%, 1–3 mm, subhedral.
Olivine - 2–3%, 0.5–2.0 mm, anhedral, completely altered.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G 4/1) minerals completely replacing olivine (?).
VEINS/FRACTURES: 1%, <0.5 mm, horizontal and diagonal, occasional fractures. No fillings.
ADDITIONAL COMMENTS: Top of this unit (Piece 1) is more fine-grained to glassy material.

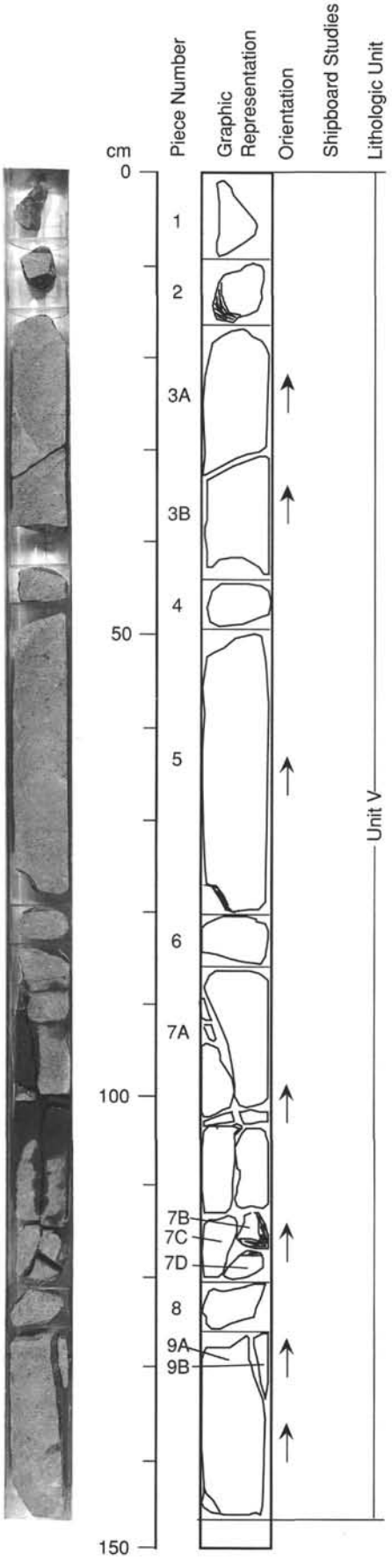


134-833B-90R-5

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT.

Pieces 1–8

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 15–20%, 1–8mm, euhedral and elongate laths. Slightly oriented in the direction of horizontal plane.
Olivine - 2–3%, 0.5–2 mm, anhedral. Completely altered.
Clinopyroxene - 7–9%, 1–3 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?).
VEINS/FRACTURES: <1%, <0.5 mm, horizontal and diagonal, occasional fractures. No fillings.



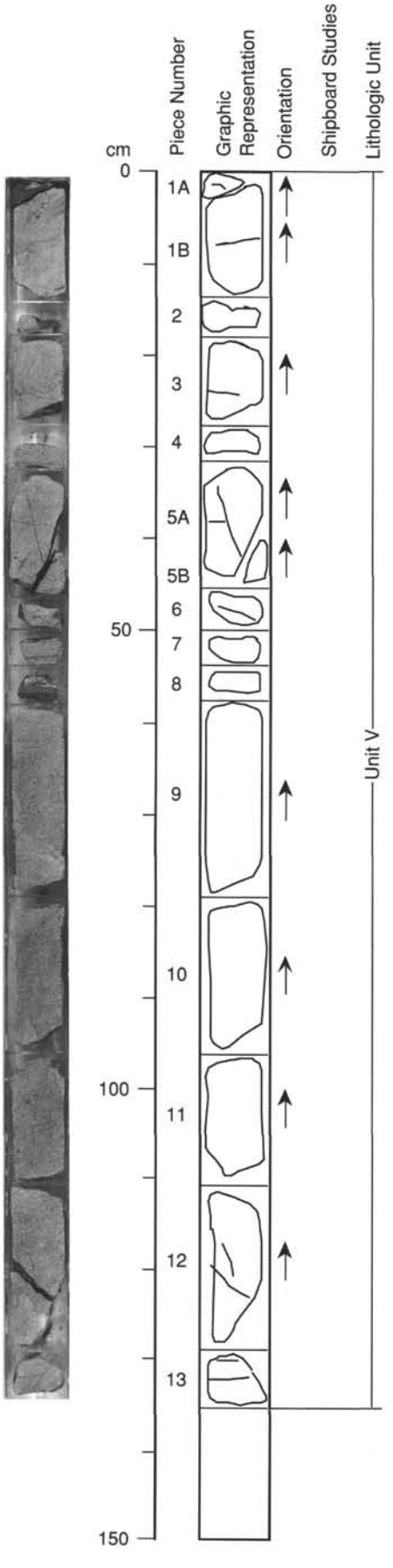
134-833B-91R-1

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–9A and 9B

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, general, occasional fractures. Sometimes filled with chlorite.
ADDITIONAL COMMENTS: Piece 1 is a gray (N6) calcareous volcanic clayey siltstone with foraminifers. No contacts are visible between siltstone and basalt. Compared to the basalt from previous cores of this unit (134-833B-81R to -90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered.

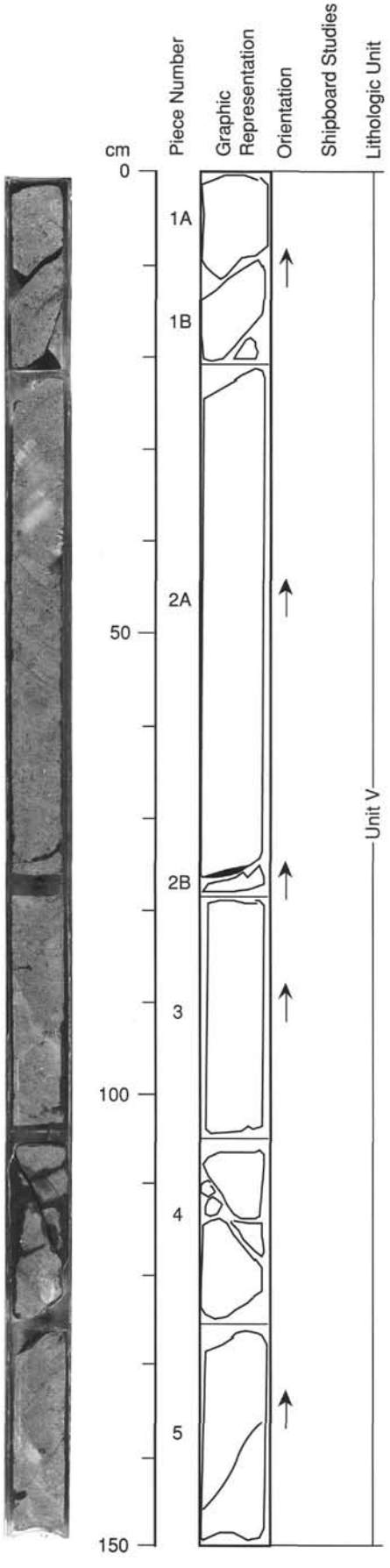
134-833B-91R-2



UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–13

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, general, occasional fractures. Sometimes filled with chlorite.
ADDITIONAL COMMENTS: Compared to the basalt from previous cores of this unit (134-833B-81R to-90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered.

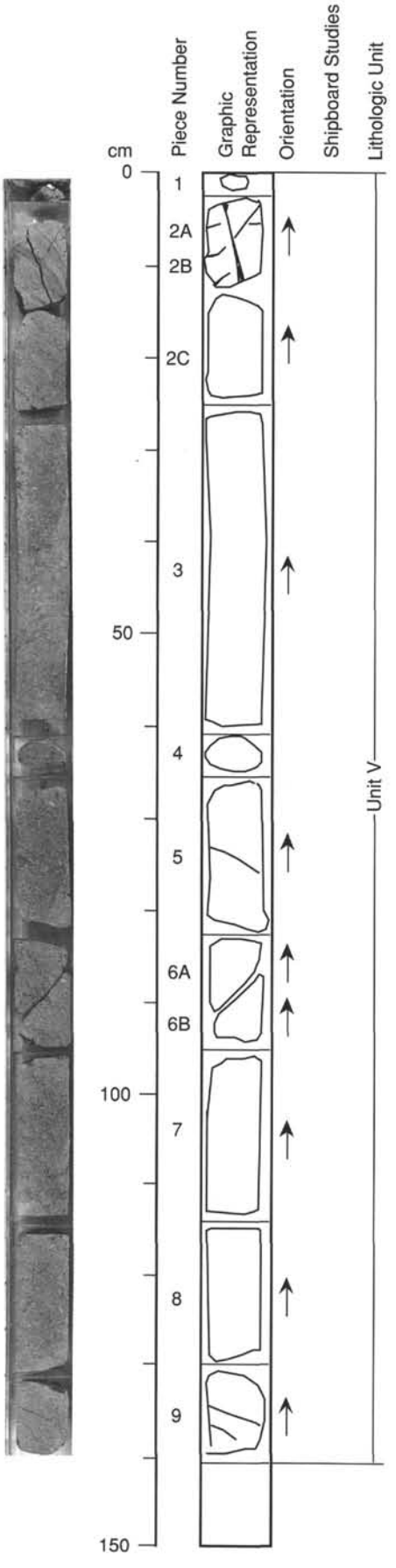


134-833B-91R-3

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1– 5

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0)
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, occasional fractures. Sometimes filled with chlorite.
ADDITIONAL COMMENTS: Compared to the basalt from previous cores of this unit (134-833B-81R to -90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered. Fractures in Piece 4 has no filling.

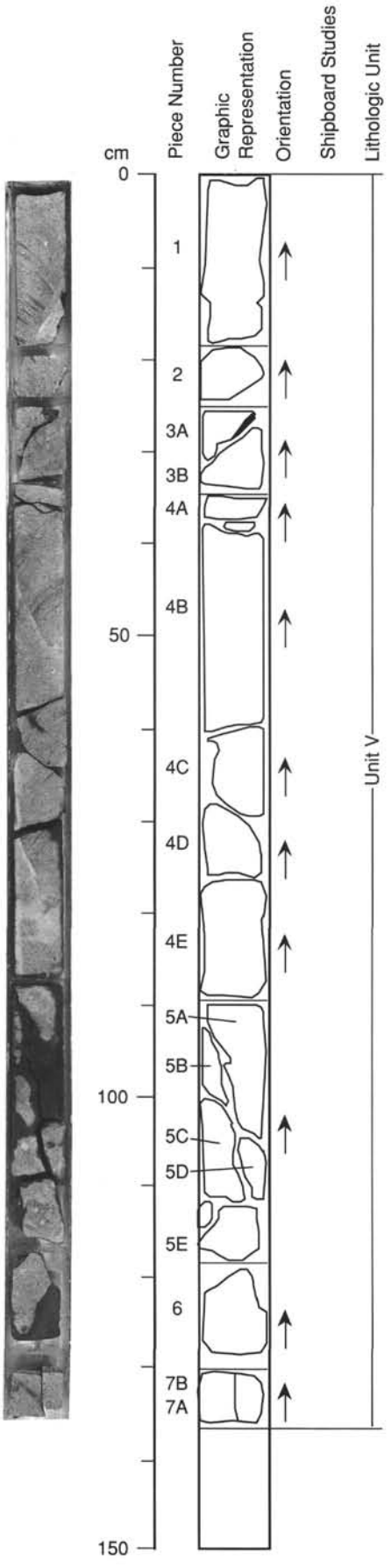


134-833B-91R-4

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–9

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, occasional fractures. Sometimes filled with chlorite.
ADDITIONAL COMMENTS: Compared to the basalt from previous cores of this unit (134-833B-81R to -90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered.



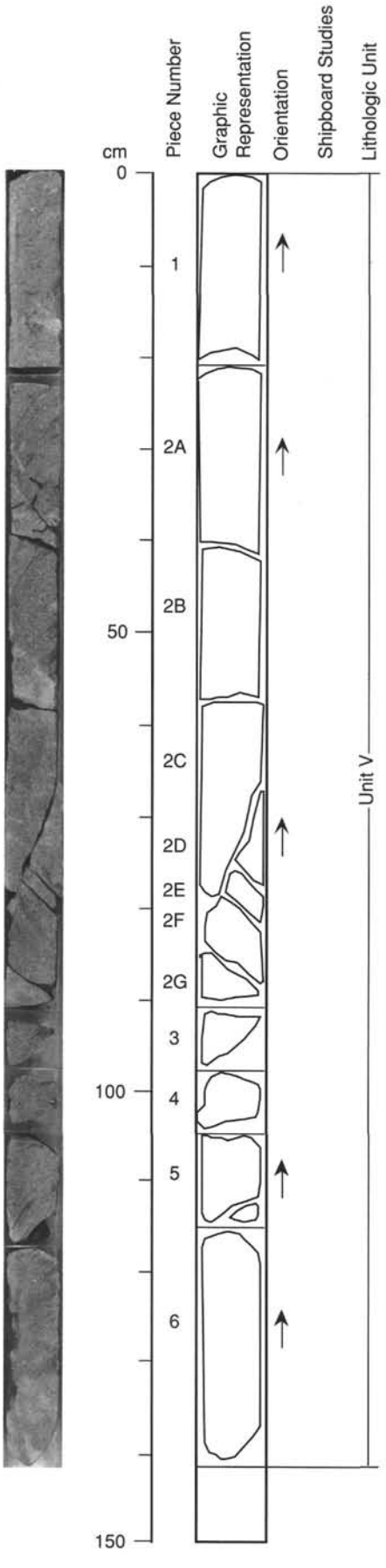
134-833B-91R-5

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–7

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, occasional fractures. Sometimes filled with chlorite.
ADDITIONAL COMMENTS: Compared to the basalt from previous cores of this unit (134-833B-81R to -90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered. Fractures in Piece 5A-5E are not filled.

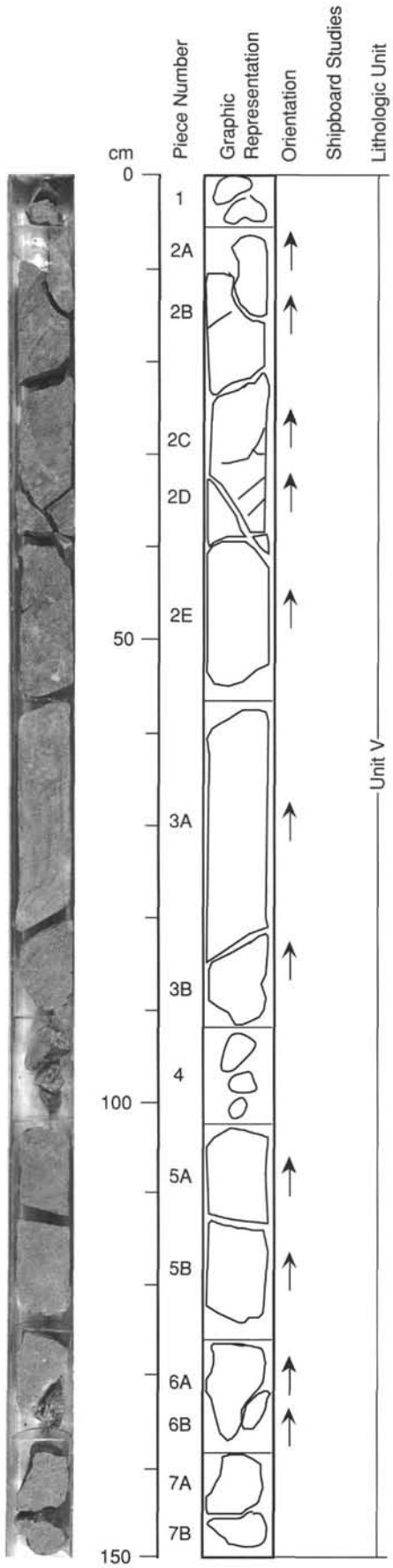
134-833B-91R-6



UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–6

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, occasional fractures. Sometime filled with chlorite.
ADDITIONAL COMMENTS: Compared to the basalt from previous cores of this unit (134-833B-81R to -90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered.

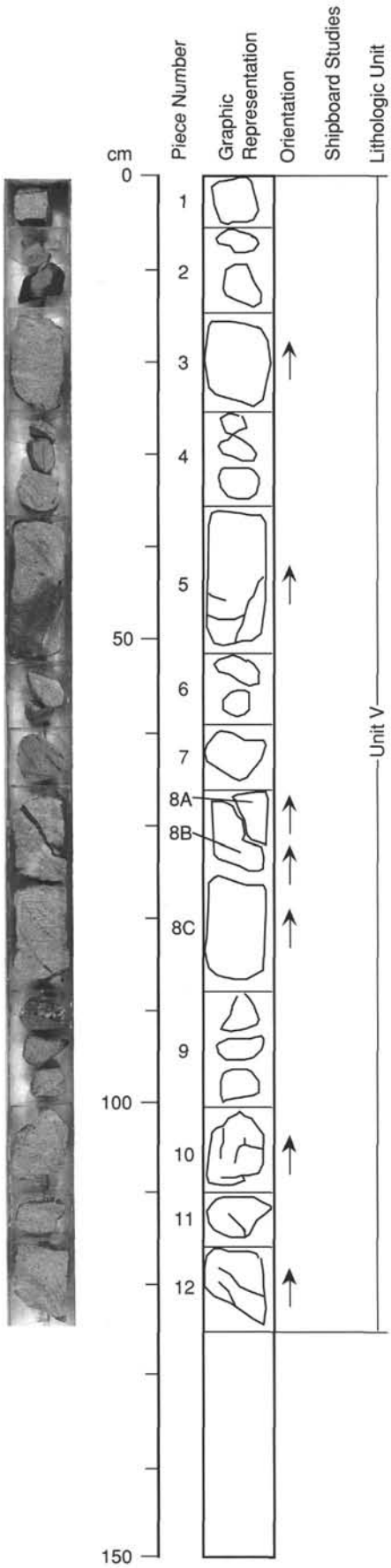


134-833B-92R-1

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–7B

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, occasional fractures. Sometimes filled with chlorite.
ADDITIONAL COMMENTS: Compared to the basalt from previous cores of this unit (134-833B-81R to -90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered.

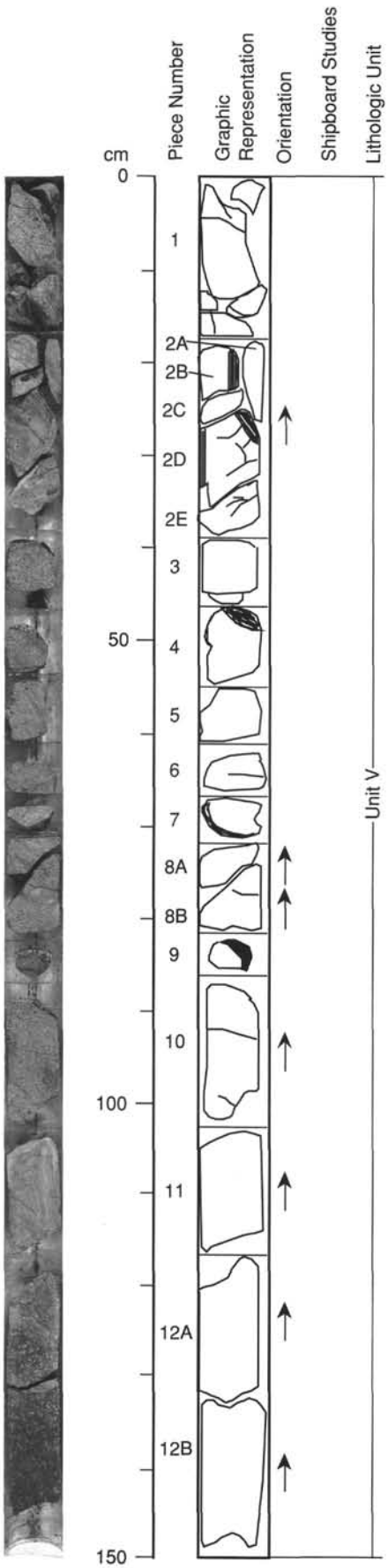


134-833B-92R-2

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–12

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, occasional fractures. Sometimes filled with chlorite.
ADDITIONAL COMMENTS: Compared to the basalt from previous cores of this unit (134-833B-81R to -90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered.



134-833B-92R-3

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–11

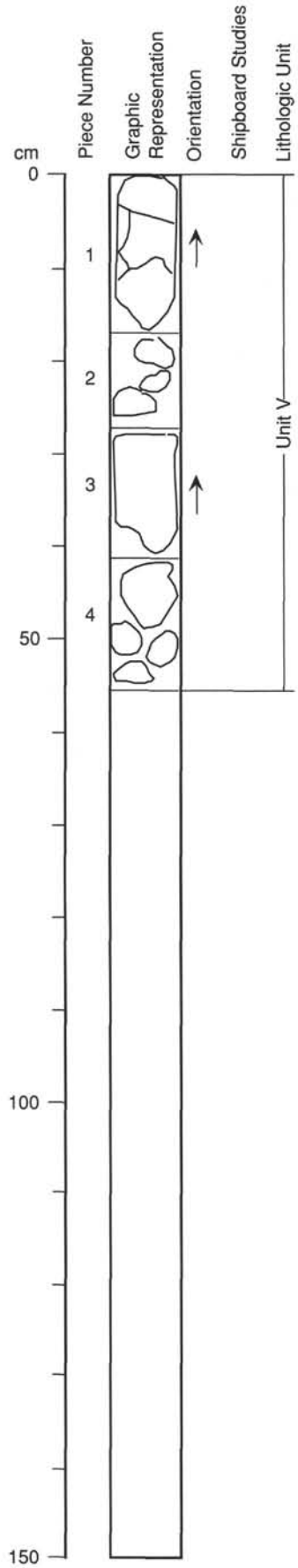
CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, general, occasional fractures. Sometimes filled with chlorite.
ADDITIONAL COMMENTS: Piece 1 is a gray (N6) calcareous volcanic clayey siltstone with foraminifers. No contacts are visible between siltstone and basalt. Compared to the basalt from previous cores of this unit (134-833B-81R to -90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered.

UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 12A and 12B

CONTACTS: None
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Clinopyroxene - 10–12%, 1–3 mm, subhedral.
Olivine - 3–5%, 0.5–2.0 mm, anhedral, completely altered.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Dark greenish gray (5G 4/1).
STRUCTURE: Sheared and faulted.
ALTERATION: Highly altered. Dark greenish gray (5G 4/1) minerals, completely replacing olivine (?) and part of the groundmass.
VEINS/FRACTURES: <5%, <3 mm, diagonal conjugate fault fractures. Filled with dark greenish gray (5G 4/1) minerals. Zeolites form along fractures.
ADDITIONAL COMMENTS: These two pieces appear to have the same lithology as the basalts above and below but they are fractured and highly altered probably as the result of shear stress. Plagioclase phenocrysts show foliation in the direction of one of the conjugate fractures. The edge of aligned plagioclase shows development of secondary plagioclase.

134-833B-92R-4

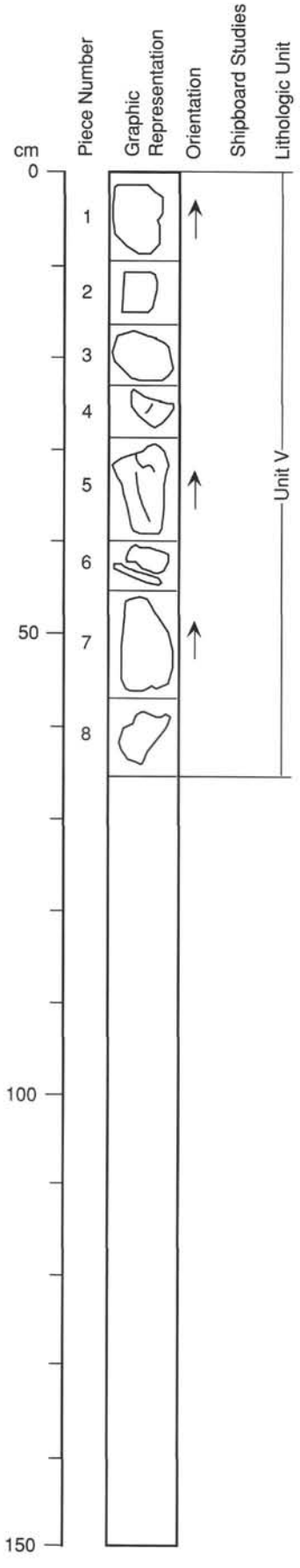


UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–4

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, occasional fractures. Sometimes filled with chlorite.
ADDITIONAL COMMENTS: Compared to the basalt from previous cores of this unit (134-833B-81R to -90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered.

134-833B-93R-1

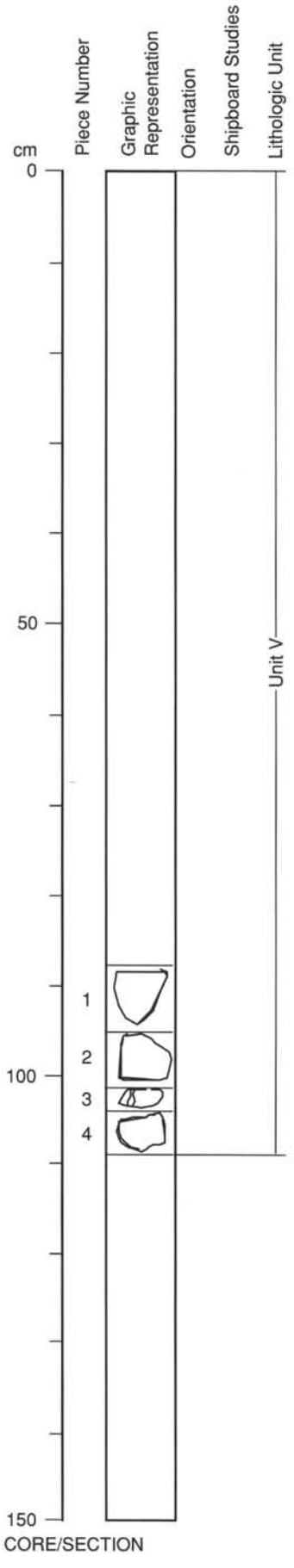


UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces 1–8

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1–8 mm, euhedral and elongate laths.
Olivine - 3–5%, 0.5–2 mm, anhedral, completely altered.
Clinopyroxene - 3–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: None.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: Dark greenish gray (5G4/1) minerals completely replacing olivine (?) and part of groundmass.
VEINS/FRACTURES: <1%, <1.5 mm, occasional fractures. Sometimes filled with chlorite.
ADDITIONAL COMMENTS: Compared to the basalt from previous cores of this unit (134-833B-81R to -90R), the proportion of plagioclase is smaller and that of mafic minerals is greater, and the rocks are slightly more altered. Piece 8: Darkening of matrix in part of specimen is suggestive of chill. No contact visible, but sediment in next section recovered below this piece.

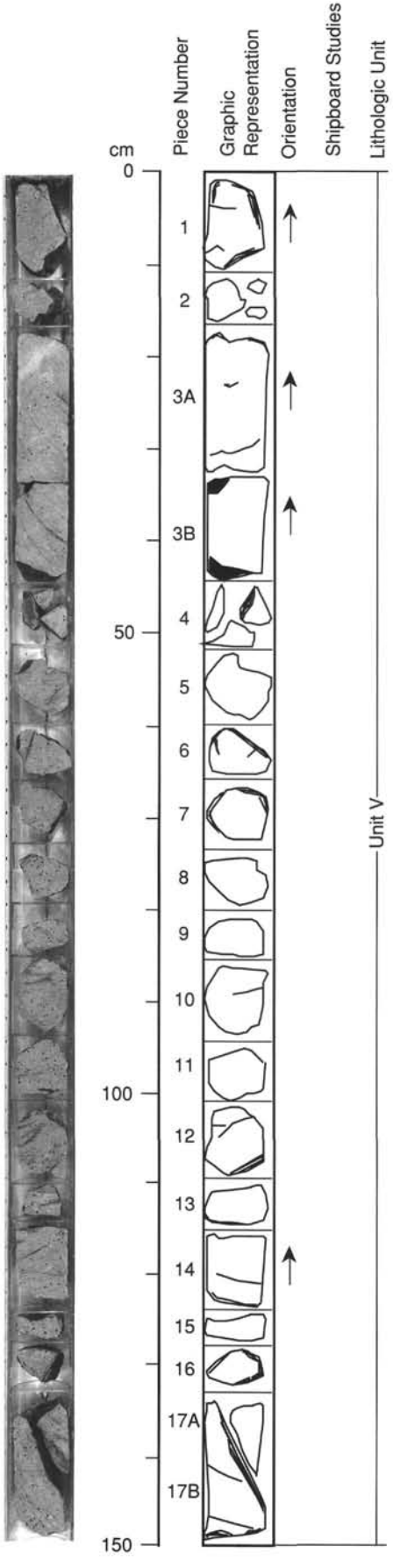
134-833B-94R-2



UNIT V: HIGHLY PLAGIOCLASE-PHYRIC BASALT.

Pieces 1–4

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 10–15%, 1.0–6.0 mm, euhedral.
Clinopyroxene - 5–7%, 1.0–3.0 mm, subhedral.
GROUNDMASS: Microcrystalline, plagioclase and pyroxene.
VESICLES: 5%, 0.5–1.0 mm, rounded, random. Some are filled with light bluish gray (5B 7/1) minerals (zeolites), but most of them are unfilled. One cavity, irregularly shaped, is up to 6 mm in size.
COLOR: Gray (N 5/0).
STRUCTURE: None.
ALTERATION: None visible.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Piece 3, more glassy than other pieces, has a border and one vein (1–2 mm) of baked calcareous volcanic siltstone.

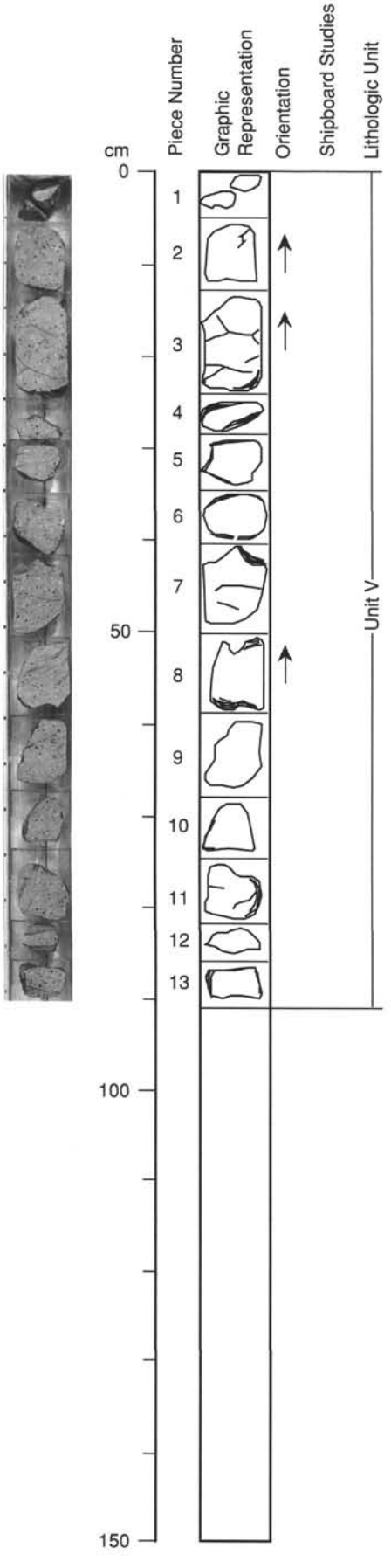


134-833B-95R-1

UNIT V: MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces 1–17B

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 6–10%, 2–6 mm, euhedral.
GROUNDMASS: Microcrystalline, mainly plagioclase and clinopyroxene.
VESICLES: 8–10%, 1–2 mm, rounded, random. Some are filled with medium bluish gray (5B 5/1) minerals (zeolites), but the majority are unfilled.
COLOR: Gray (N 5/0-N 6/0) to light gray (N 7/0).
STRUCTURE: None.
ALTERATION: None visible.
VEINS/FRACTURES: Occasional fractures, < 0.5 mm, unfilled. Piece 17 has two subparallel small fractures.
ADDITIONAL COMMENTS: These rocks appear to be less porphyritic and more vesicular than those in the previous core.

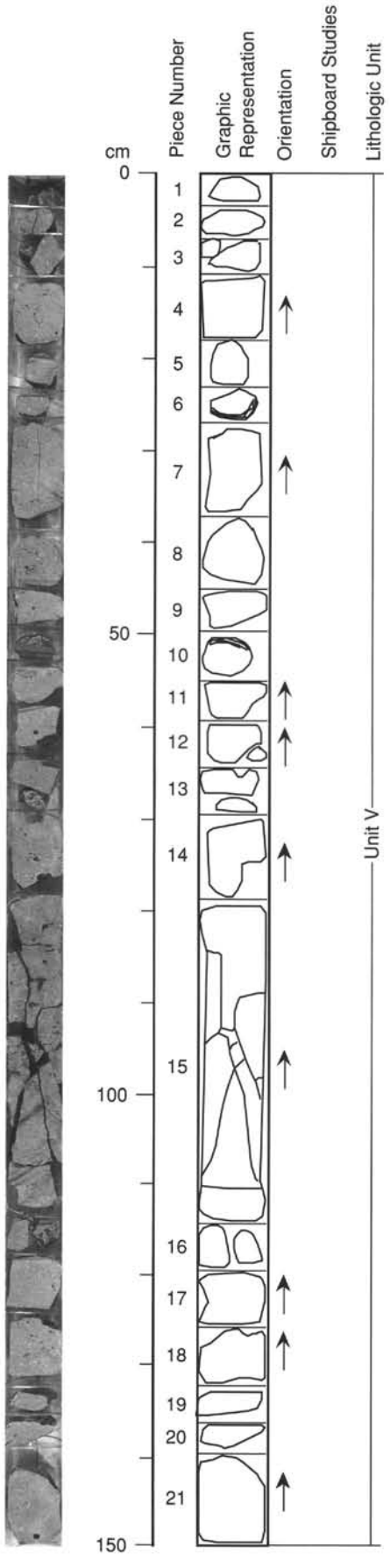


134-833B-95R-2

UNIT V: MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces 1–13

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 6–10%, 2–6 mm, euhedral.
GROUNDMASS: Microcrystalline, mainly plagioclase and clinopyroxene.
VESICLES: 8–10%, 1–2 mm, rounded, random. Some are filled with medium bluish gray (5B 5/1) minerals (zeolites), but the majority are unfilled.
COLOR: Gray (N 5/0-N 6/0) to light gray (N 7/0).
STRUCTURE: None.
ALTERATION: None visible.
VEINS/FRACTURES: Occasional fractures, < 0.5 mm, unfilled.
ADDITIONAL COMMENTS: These rocks appear to be less porphyritic and more vesicular than those in the previous core.



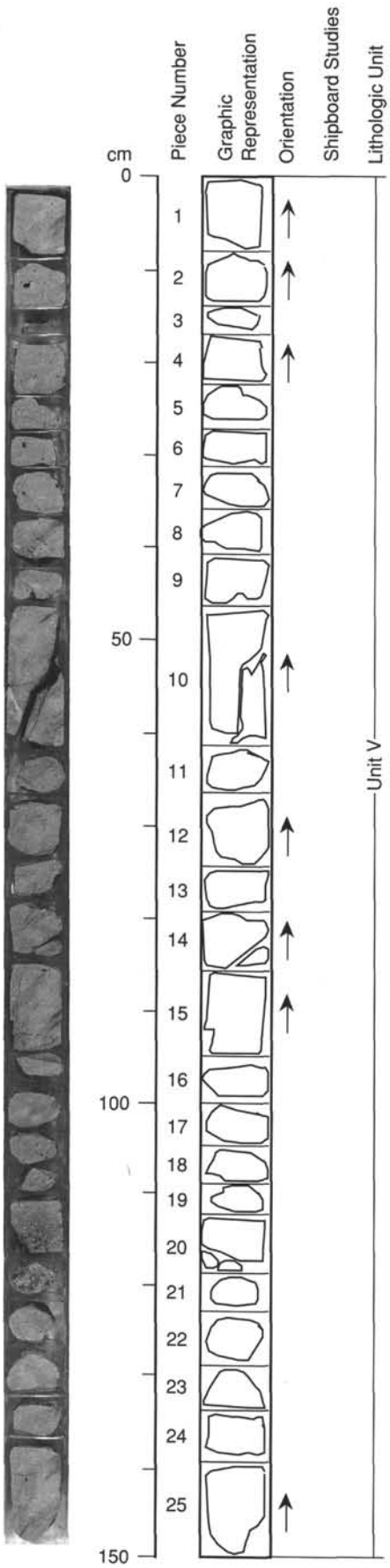
134-833B-96R-1

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE- PHYRIC BASALT

Pieces 1–21

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–10%, 1–8 mm, euhedral.
Clinopyroxene - 3–5%, 1–3 mm, euhedral to subhedral.
Magnetite - <1%, up to 1 mm, euhedral to subhedral.
GROUNDMASS: Microcrystalline with plagioclase, clinopyroxene and, magnetite.
VESICLES: 5%, 1–8 mm, rounded, random. Some cavities are filled with medium greenish gray (5B 5/1) minerals (zeolite or chlorite).
COLOR: Gray (N 6/0) to light gray (N 7/0).
STRUCTURE: None.
ALTERATION: Alteration minerals filling cavities show collomorph pattern and structures.
VEINS/FRACTURES: 5%, up to 10 cm long, subvertical, unfilled. Piece 15 is broken by drilling along preexisting, steeply dipping, unfilled, conjugate fractures. Striation on one of the planes indicates fault motion.

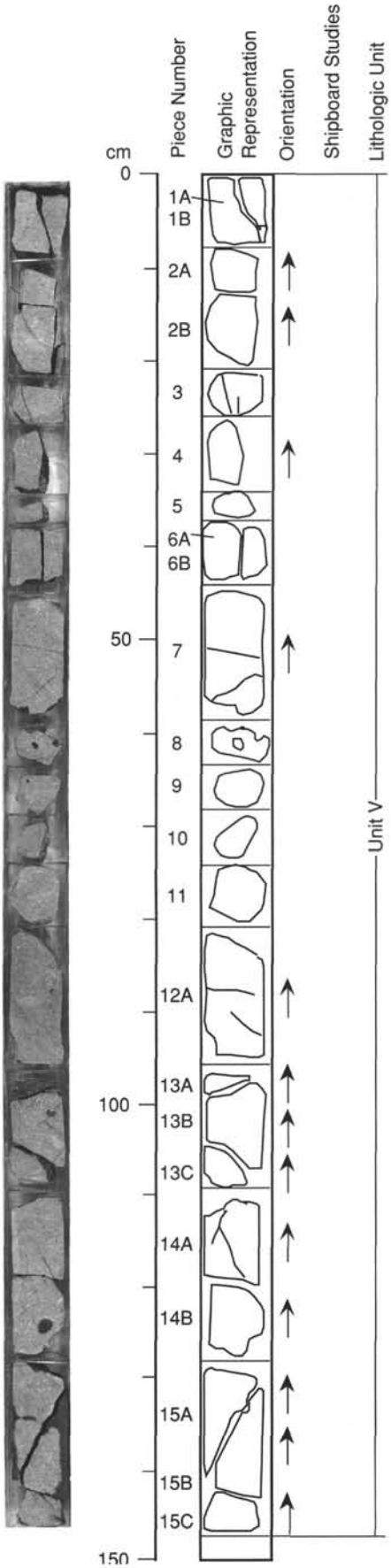
134-833B-96R-2



UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE- PHYRIC BASALT

Pieces 1–25

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–10%, 1–8 mm, euhedral.
Clinopyroxene - 3–5%, 1–3 mm, euhedral to subhedral.
Magnetite - <1%, up to1 mm, euhedral to subhedral.
GROUNDMASS: Microcrystalline with plagioclase, clinopyroxene and, magnetite.
VESICLES: 5%, 1–8 mm, rounded, random. Some cavities are filled with medium greenish gray (5B 5/1) minerals (zeolite or chlorite).
COLOR: Gray (N 6/0) to light gray (N 7/0).
STRUCTURE: None.
ALTERATION: Alteration minerals filling cavities show collomorph pattern and structures.
VEINS/FRACTURES: 5%, up to 10 cm long, subvertical, unfilled. Fractures in Piece 20 filled with hematite.



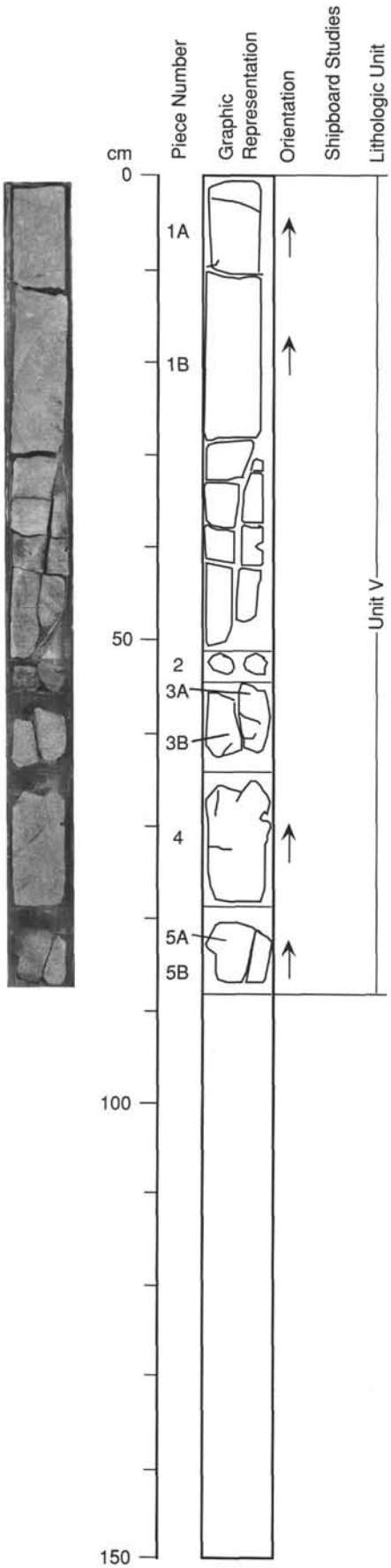
134-833B-96R-3

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE- PHYRIC BASALT

Pieces 1–15C

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–10%, 1–8 mm, euhedral.
Clinopyroxene - 3–5%, 1–3 mm, euhedral to subhedral.
Magnetite - <1%, up to1 mm, euhedral to subhedral.
GROUNDMASS: Microcrystalline with plagioclase, clinopyroxene and, magnetite.
VESICLES: 5%, 1–8 mm, rounded, random. Some cavities are filled with medium greenish gray (5B 5/1) minerals (zeolite or chlorite).
COLOR: Gray (N 6/0) to light gray (N 7/0).
STRUCTURE: None.
ALTERATION: Alteration minerals filling cavities show collomorph pattern and structures.
VEINS/FRACTURES: *Occasional fractures <0.5 mm, unfilled.*

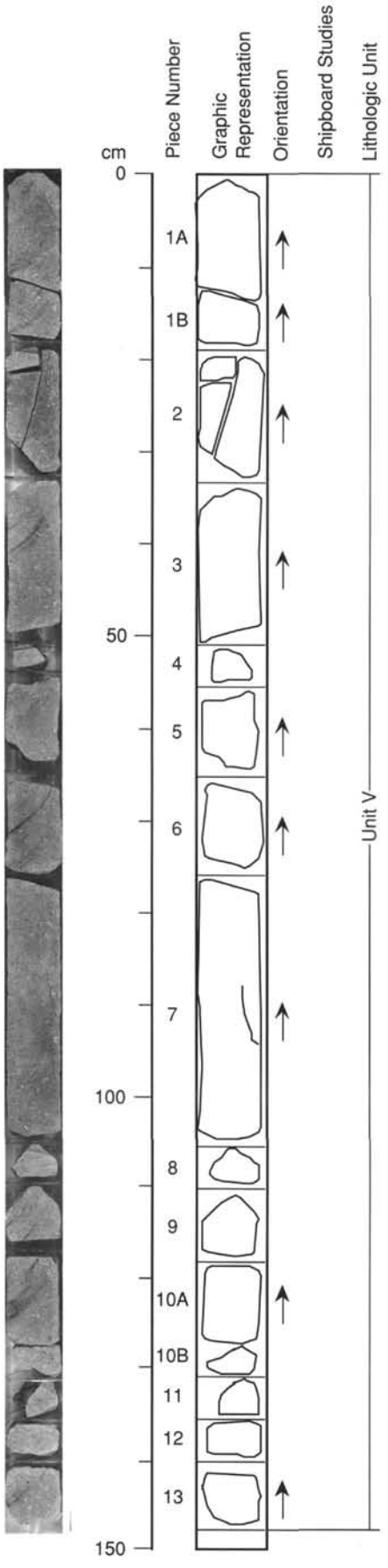
134-833B-96R-4



UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-PHYRIC BASALT

Pieces 1–5B

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–10%, 1–8 mm, euhedral.
Clinopyroxene - 3–5%, 1–3 mm, euhedral to subhedral.
Magnetite - <1%, up to 1 mm, euhedral to subhedral.
GROUNDMASS: Microcrystalline with plagioclase, clinopyroxene and, magnetite.
VESICLES: 5%, 1–8 mm, rounded, random. Some cavities are filled with medium greenish gray (5B 5/1) minerals (zeolite or chlorite).
COLOR: Gray (N 6/0) to light gray (N 7/0).
STRUCTURE: None.
ALTERATION: Alteration minerals filling cavities show collomorph pattern and structures.
VEINS/FRACTURES: 5%, up to 10 cm long, subvertical, unfilled.

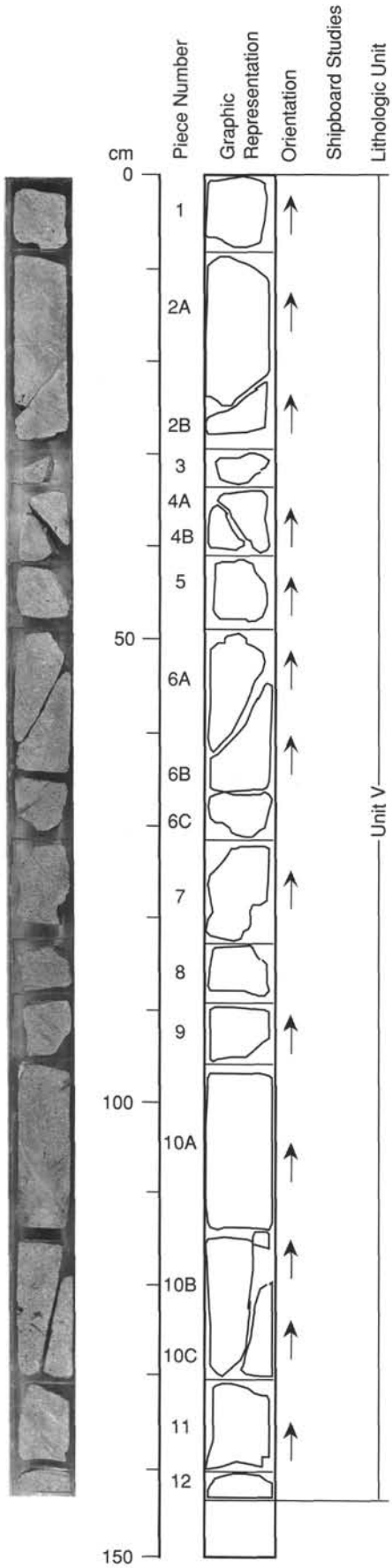


134-833B-97R-1

UNIT V: MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces 1A to 13

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–10%, 1–8 mm, euhedral
GROUNDMASS: Microcrystalline to fine grained.
VESICLES: 1–3%, 1–2mm, rounded to irregular, filled by dark minerals.
COLOR: Light gray (N 7/0).
STRUCTURE: None.
ALTERATION: Moderately altered (chloritized).
VEINS/FRACTURES: 1%, up to 8 cm, random, unfilled.

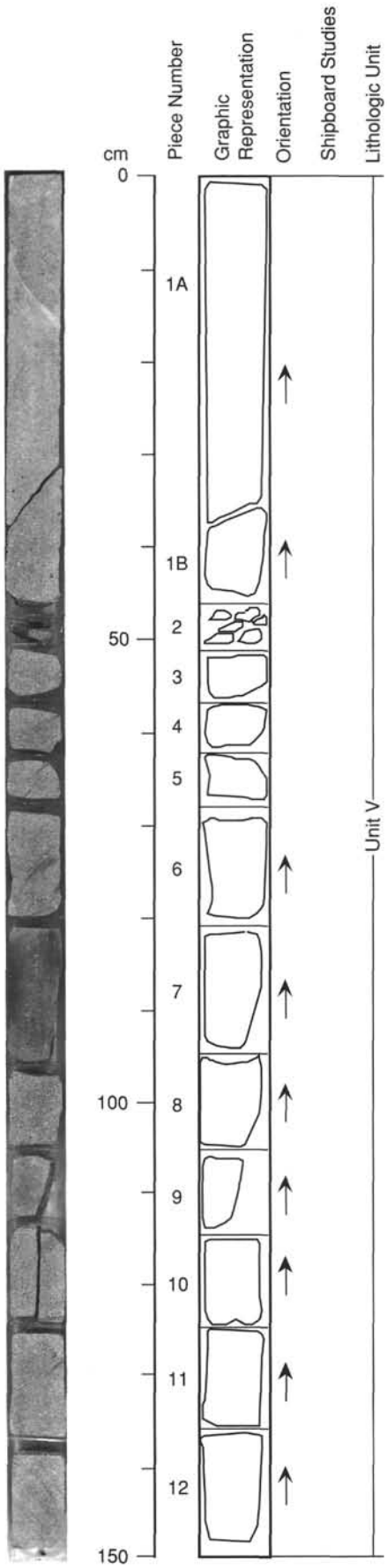


134-833B-97R-2

UNIT V: MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces 1–12

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 8%, 1–8 mm, euhedral.
GROUNDMASS: Fine-grained.
VESICLES: 1–3%, up to 3 mm, rounded, irregular. Filled by dark minerals. Some cavities show colloform patterns.
COLOR: Light gray (N 7/0).
STRUCTURE: None.
ALTERATION: Moderately altered (chloritized).
VEINS/FRACTURES: 1%, subvertical, unfilled.



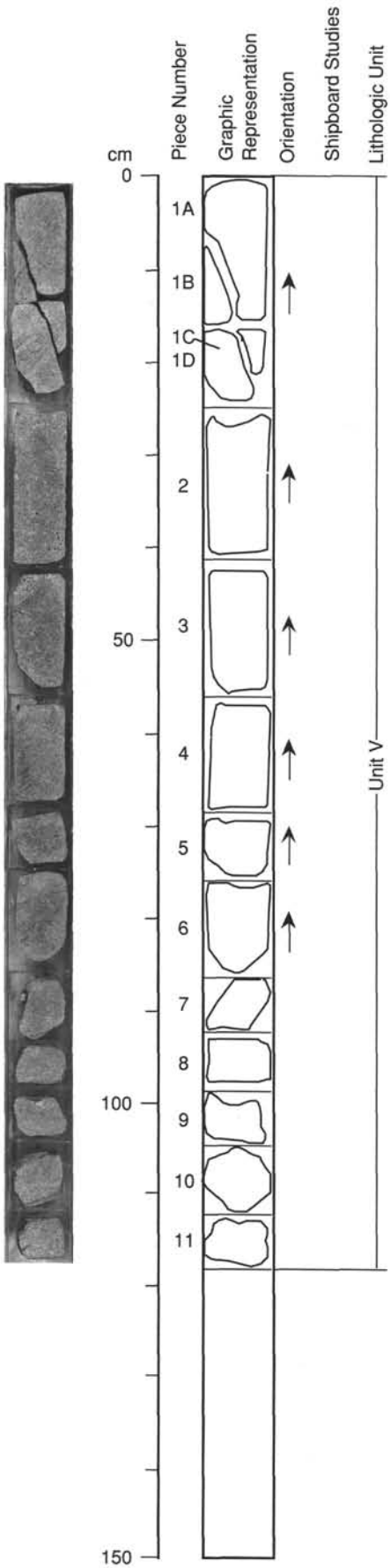
134-833B-97R-3

UNIT V: MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces 1–12

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 8%, 1–8 mm, euhedral.
GROUNDMASS: Uniformly fine-grained.
VESICLES: 1–3%, up to 3 mm, rounded, irregular. Filled by dark minerals. Some cavities show colloform patterns.
COLOR: Light gray (N 7/0).
STRUCTURE: None.
ALTERATION: Moderately altered (chloritized).
VEINS/FRACTURES: 1%, subvertical, unfilled.

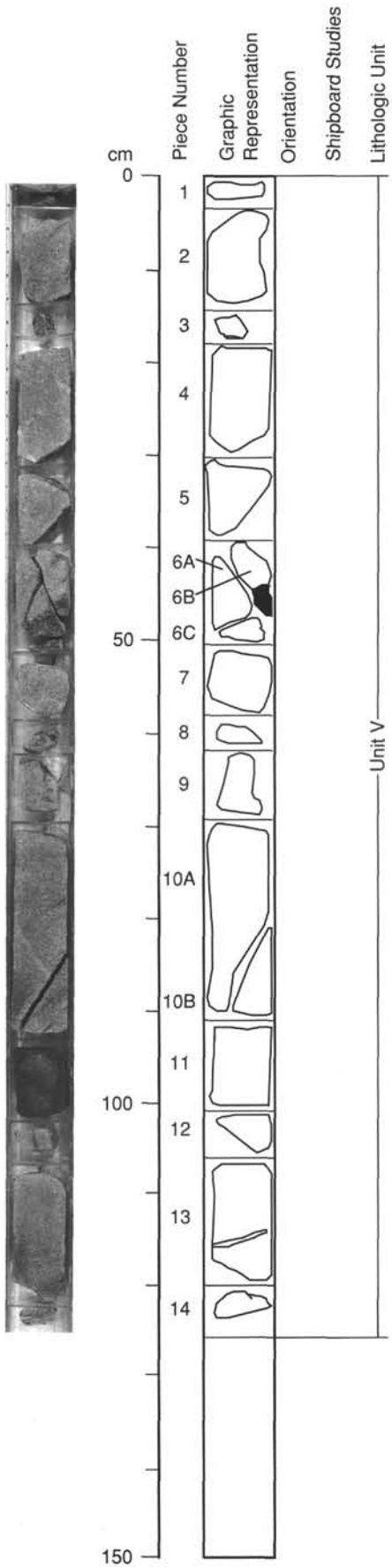
134-833B-97R-4



UNIT V: MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces 1–11

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 8%, 1–8 mm, euhedral.
GROUNDMASS: Fine-grained.
VESICLES: 1–3%, up to 3 mm, rounded, irregular. Filled by dark minerals. Some cavities show colloform patterns.
COLOR: Light gray (N 7/0).
STRUCTURE: None.
ALTERATION: Moderately altered (chloritized).
VEINS/FRACTURES: 1%, subvertical, unfilled.



134-833B-98R-1

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE- PHYRIC BASALT

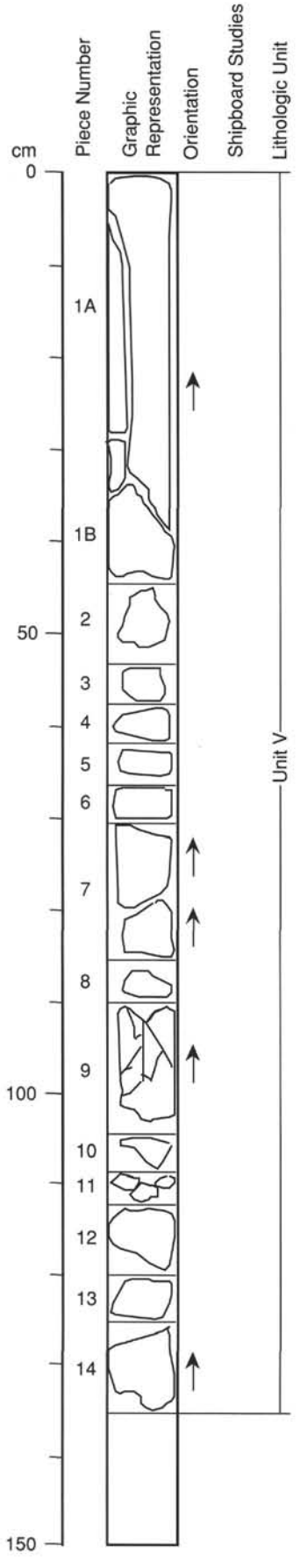
Pieces 1–10

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Clinopyroxene - 1–3%, 0.3–3.0 mm, subhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, part of clinopyroxene and glass.
VEINS/FRACTURES: <1%, <0.5 mm, oblique but near vertical. Occasional fractures.
ADDITIONAL COMMENTS: Piece 1 is a dark greenish gray calcareous siltstone.

UNIT V: DIABASE

Pieces 11–14

CONTACTS: Gradual (bottom of Piece 11)
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained (<0.5 mm). Subophitic texture with plagioclase, clinopyroxene, olivine and opaque minerals.
VESICLES: 1%, <1 mm, rounded.
COLOR: Medium dark gray (N4).
STRUCTURE: None.
ALTERATION: Highly altered. Medium greenish gray (5B 5/1) and grayish black (N2). Alteration products are pervasive, replacing olivine, part of clinopyroxene, plagioclase, and groundmass.
VEINS/FRACTURES: A vein in Piece 13, 1–2%, 2–3 mm, subhorizontal, filled with aggregates of opaque and white microcrystalline minerals .



134-833B-98R-2

UNIT V: DIABASE

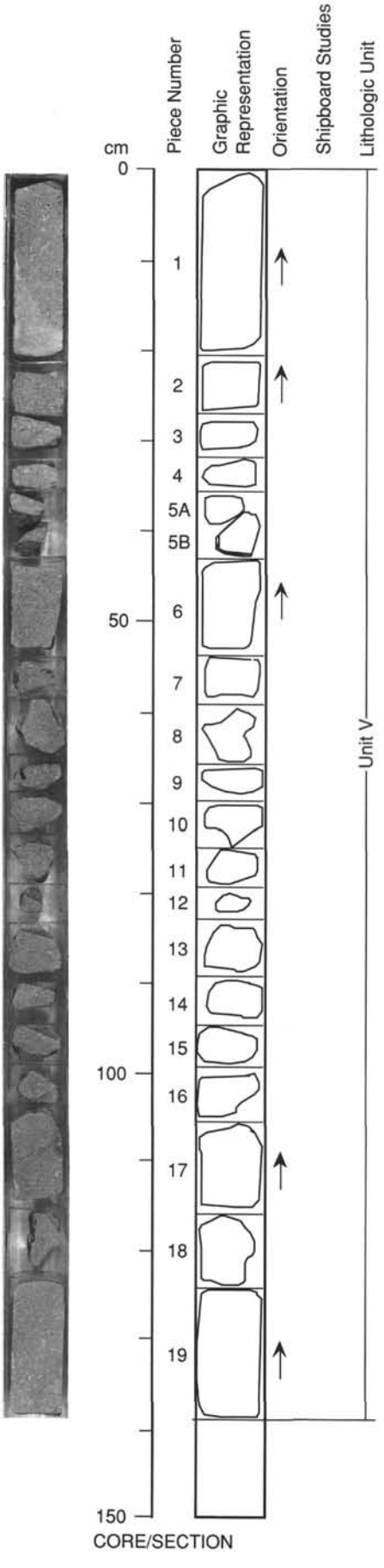
Piece 1A (top half)

CONTACTS: None.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained (<0.5 mm). Subophitic texture with plagioclase, clinopyroxene, olivine and opaque minerals.
VESICLES: 1%, <1 mm, rounded.
COLOR: Medium dark gray (N4).
STRUCTURE: None.
ALTERATION: Highly altered. Medium greenish gray (5B 5/1) and grayish black (N2). Alteration products are pervasive, replacing olivine, part of clinopyroxene, plagioclase, and groundmass.
VEINS/FRACTURES: 1–2%, 2–3 mm, subhorizontal. Veins, 1 cm wide, runs 11–12 cm from the top of the piece. Filled by aggregates of opaque and white microcrystalline minerals.

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces 1A (bottom half), 1B–14

CONTACTS: Gradual (in Piece 1A).
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Clinopyroxene - 1–3%, 0.3–3.0 mm, suibhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, partof clinopyroxene and glass.



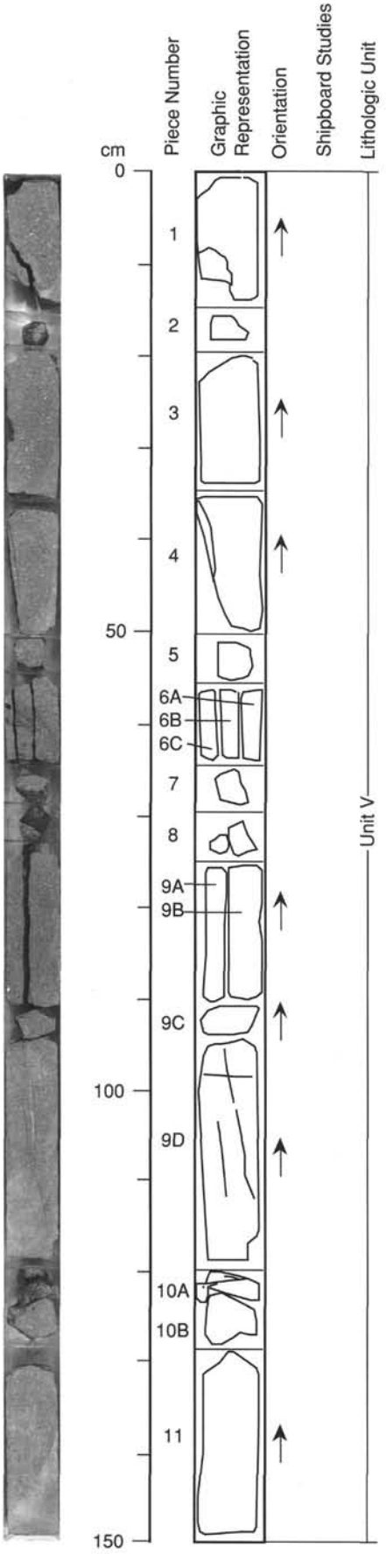
134-833B-98R-3

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces 1–19

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
Clinopyroxene - 1–3%, 0.3–3.0 mm, subhedral.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, part of clinopyroxene and glass.
VEINS/FRACTURES: <1%, <0.5 mm, oblique but near vertical. Occasional fractures.

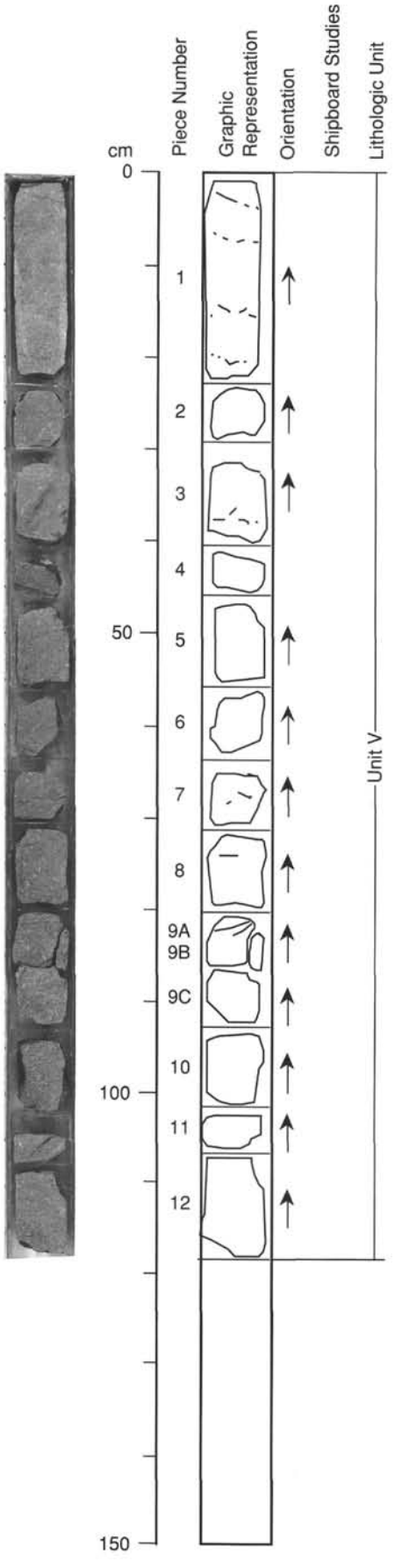
134-833B-98R-4



UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces 1–11

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Clinopyroxene - 1–3%, 0.3–3.0 mm, subhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, part of clinopyroxene and glass.
VEINS/FRACTURES: <1%, <0.5 mm, oblique but near vertical. Occasional fractures.
ADDITIONAL COMMENTS: Subvertical fracture affects Pieces 4, 6, 9A and 9C. Veins in Pieces 1, 2, 6, 9A, 9C and 11 are <1%, <0.5 mm, subvertical and filled with dark greenish minerals.

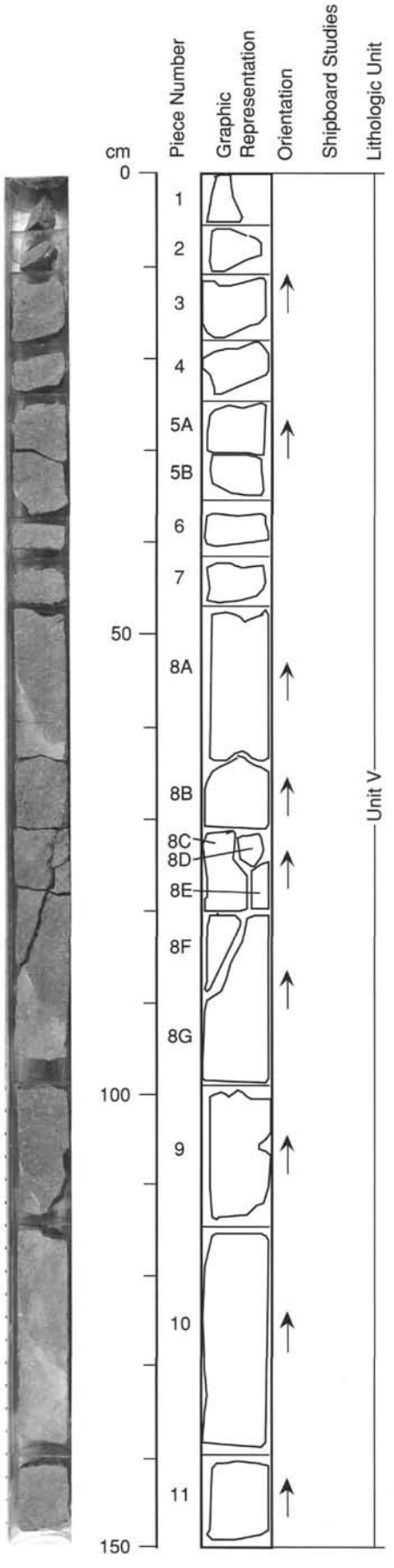


134-833B-98R-5

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces 1–12

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Clinopyroxene - 1–3%, 0.3–3.0 mm, subhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, part of clinopyroxene and glass.
VEINS/FRACTURES: <1%, <0.5 mm, oblique but near vertical. Occasional fractures.
ADDITIONAL COMMENTS: Subvertical fracture affects Piece 9A. Subhorizontal veins filled with dark greenish secondary mineral cut Pieces 1, 3, 7, 8 and 9A.

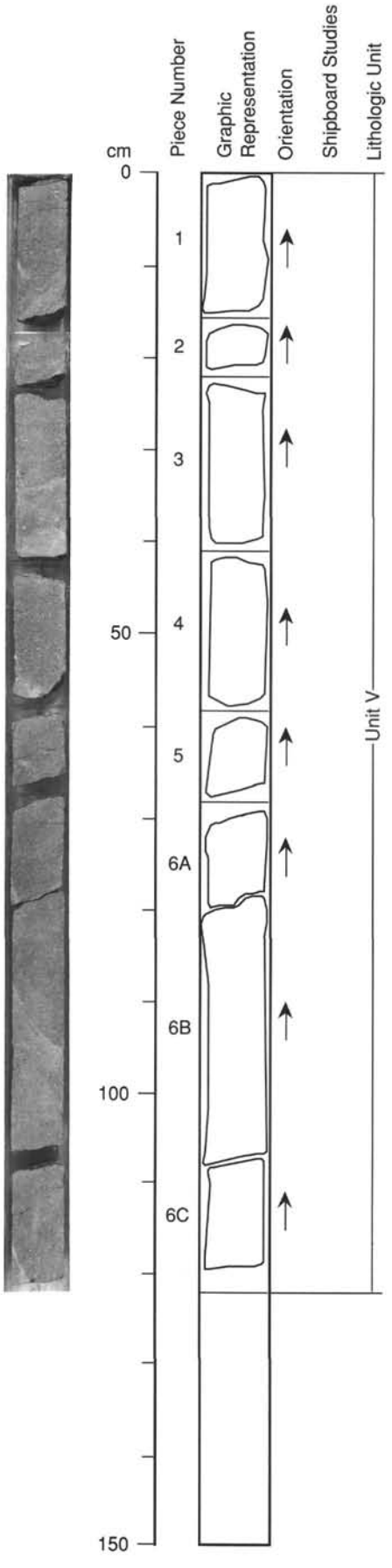


134-833B-99R-1

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces 1–11

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Clinopyroxene - 1–3%, 0.3–3.0 mm, subhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, part of clinopyroxene and glass.
VEINS/FRACTURES: <1%, <0.5 mm, oblique but near vertical. Occasional fractures.

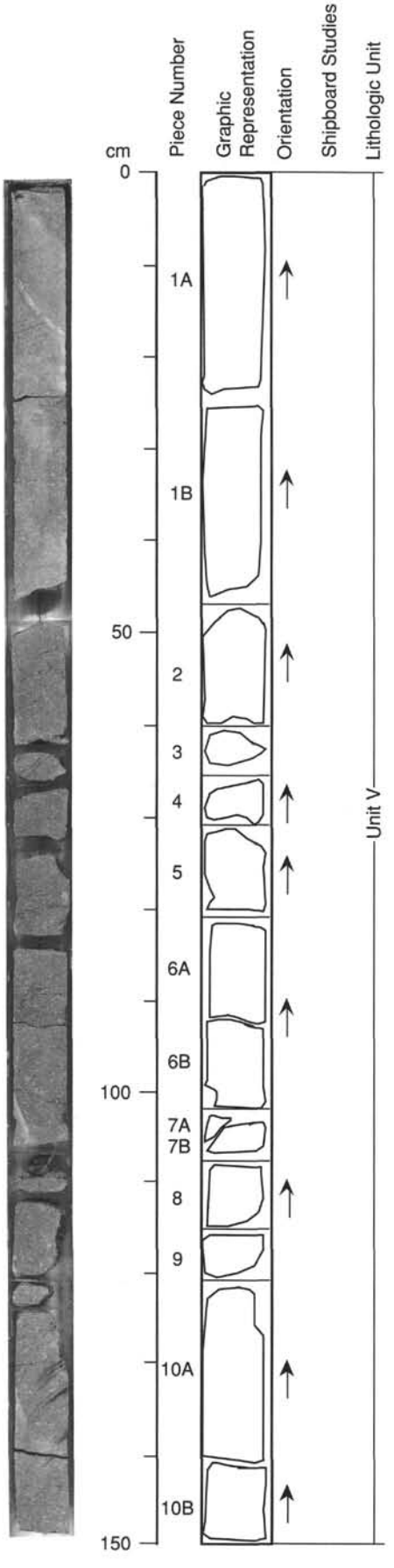


134-833B-99R-2

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces 1–6C

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Clinopyroxene - 1–3%, 0.3–3.0 mm, subhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, part of clinopyroxene and groundmass glass.
VEINS/FRACTURES: <1%, <0.5 mm, oblique but near vertical. Occasional fractures.

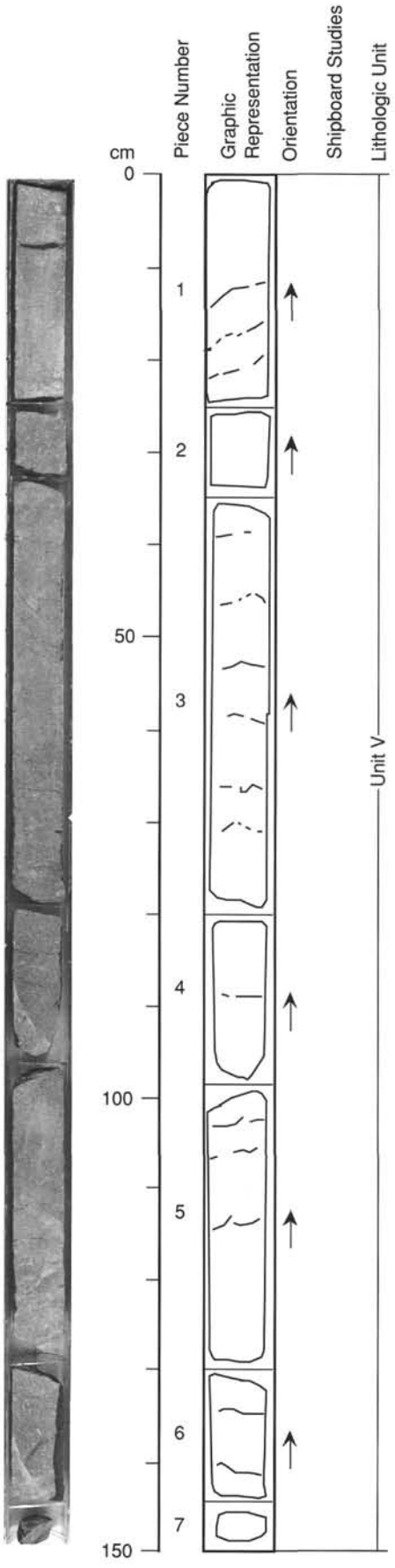


134-833B-99R-3

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces 1–10B

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Clinopyroxene - 1–3%, 0.3–3.0 mm, subhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, part of clinopyroxene and glass.
VEINS/FRACTURES: <1%, <0.5 mm, oblique but near vertical. Occasional fractures.



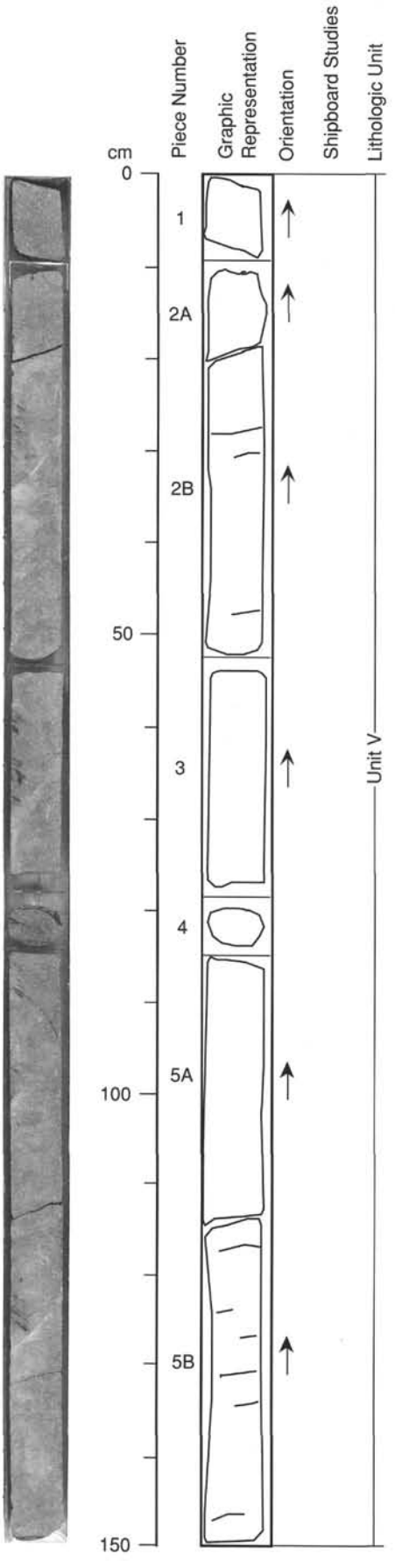
134-833B-99R-4

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces 1–7

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Clinopyroxene - 1–3%, 0.3–3.0 mm, subhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, part of clinopyroxene and glass.
VEINS/FRACTURES: <1%, <0.5 mm, oblique but near vertical. Occasional fractures.

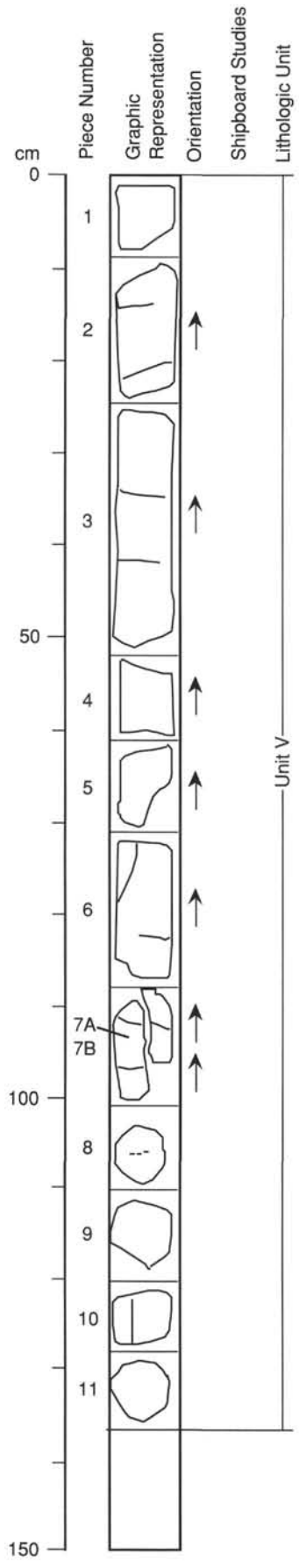
134-833B-99R-5



UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces 1–5B

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Clinopyroxene - 1–3%, 0.3–3.0 mm, subhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, part of clinopyroxene and glass.
VEINS/FRACTURES: <1%, <0.5 mm, oblique but near vertical. Occasional fractures.



134-833B-99R-6

UNIT V: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces 1–11

CONTACTS: None.
PHENOCRYSTS:
Plagioclase - 5–7%, 1–10 mm, euhedral.
Clinopyroxene - 1–3%, 0.3–3.0 mm, subhedral.
Olivine - 1%, 0.3–2 mm, subhedral, completely altered.
GROUNDMASS: Fine-grained with plagioclase, clinopyroxene, and opaque minerals. Glass is altered to medium greenish gray (5B 5/1) minerals.
VESICLES: 1%, 0.5–1.0 mm, rounded.
COLOR: Medium dark gray (N3).
STRUCTURE: None.
ALTERATION: Moderately altered. Medium greenish gray (5B 5/1) and grayish black (N2) alteration products are pervasive, replacing olivine, part of clinopyroxene and groundmass glass.
VEINS/FRACTURES: <1%, <0.5 mm, oblique but near vertical. Occasional fractures.

134-833B-33R-02 (Piece 1, 111-113 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Plagioclase-pyroxene phyric basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	-	2	0.1-2.0		Subhedral.	
Plagioclase	35	35	0.2-2.0	An_{68}	Subhedral.	
Clinopyroxene	6	6	1.0-3.0	Augite	Subhedral.	
GROUNDMASS						
Plagioclase	20	20	<0.1		Laths.	
Clinopyroxene	22	22	<0.1		Grains.	
Opaque minerals	10	10	<0.05		Grains.	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Serpentine	2	Olivine.	
Chlorite	5	Patchy distribution in matrix.	

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

134-833B-37R-01 (Piece 1, 42-43 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Picritic basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	9	13	0.1-1.0		Subhedral.	
Plagioclase	30	30	0.1-1.5		Subhedral.	
Clinopyroxene	13	13	0.1-2.0	Augite.	Subhedral.	
GROUNDMASS						
Clinopyroxene	9	9	<0.02		Anhedral.	
Plagioclase	4	4	<0.05		Anhedral.	
Opaque minerals	4	4	< 0.02		Anhedral.	
Glass	-	13	N/A.		N/A.	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clay minerals	13	Glass.	
Serpentine	4	Olivine.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	14		0.1-0.3	Chlorite.	Rounded.

COMMENTS: This is a clast in a volcanic breccia. The matrix is crystals, clay minerals, chlorite and small rock fragments.

134-833B-81R-02 (Piece 1, 84-86 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Highly plagioclase phyric basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Vitrophyric.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	<1	2	0.2-0.5		Subhedral.	Mostly altered to serpentine.
Plagioclase	30	30	1-8	An_{60}	Euhedral.	
Clinopyroxene	5	5	0.5-2.0	Augite.	Subhedral.	
Opaque minerals	1	1	0.1-1.0		Subhedral.	
GROUNDMASS						
Plagioclase	1	1	<0.1		Laths.	
Clinopyroxene	3	3	<0.1		Grains.	
Opaque minerals	3	3	<0.1		Anhedral.	
Glass	45	55	N/A.		N/A.	Color very pale brown (10YR 8/4) to light greenish gray (5GY 8/1).

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	9	Replacing glass and filling fractures.	
Zeolites	2	Filling fractures.	
Serpentine	1	Replacing olivine.	

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

COMMENTS: Glass is fresh and has perlitic structure: it becomes greenish gray towards the contact with the baked sediment.

134-833B-81R-03 (Piece 8, 96-98 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Highly plagioclase phyric basalt.

GRAIN SIZE: Fine grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	-	3	0.4-1.0		Subhedral.	Totally pseudomorphed.
Plagioclase	30	30	0.5-8.0	An_{55-65}	Euhedral.	Inclusions of opaque minerals. Oscillatory zoning.
Clinopyroxene	4	4	0.4-2.0	Augite.	Subhedral.	
Opaque minerals	1	1	0.1-0.3		Subhedral.	
GROUNDMASS						
Plagioclase	25	25	<0.2		Laths.	
Clinopyroxene	19	21	<0.5		Subhedral to anhedral.	
Opaque minerals	16	16	<0.6		Acicular to granular.	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	2	Clinopyroxene.	
Iddingsite	3	Olivine.	

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

COMMENTS: Some elongate quenched crystals of opaque minerals and clinopyroxenes in matrix.

134-833B-84R-01 (Piece 14B, 123-125 cm) OBSERVER: HAS WHERE SAMPLED:

ROCK NAME: Highly plagioclase phyric basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	-	1	0.2-0.8		Subhedral to anhedral,	Completely altered.
Plagioclase	40	40	0.3-7.0		Euhedral to subhedral.	Slightly oriented. Glass inclusions aligned along cleavage planes.
Clinopyroxene	5	5	0.3-1.3		Subhedral.	Inclusions of opaque minerals.
Opaque minerals	<1	<1	0.1-0.4		Anhedral.	
GROUNDMASS						
Plagioclase	13	13	0.05-0.15		Laths.	
Clinopyroxene	12	12	0.02-0.15		Elongate laths and grains.	Two groups. Granular-type, probably represents microphenocryst stage.
Opaque minerals	5	5	0.02-0.15		Acicular and granular.	Two groups. Granular-type, probably represents microphenocryst stage.
Glass	10	24	N/A.		N/A.	Yellowish brown (10YR 5/6), partly devitrified and altered.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	14	Glass.	
Iddingsite	0.5	Olivine	
Calcite	0.5	Olivine core.	

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

134-833B-90R-05 (Piece 1, 5-6 cm) OBSERVER: HAS WHERE SAMPLED:

ROCK NAME: Highly plagioclase phyric basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	-	2	0.2-1.0		Subhedral.	Completely altered.
Plagioclase	20	20	0.4-10.0		Euhedral to subhedral.	
Clinopyroxene	7	7	0.2-1.8		Subhedral.	Inclusion of opaque minerals.
Opaque minerals	1	1	0.2-0.4		Anhedral.	Microphenocryst size.
GROUNDMASS						
Plagioclase	20	20	0.03-0.3		Laths.	
Clinopyroxene	12	12	0.05-0.15		Grains.	
Opaque minerals	8	8	0.02-0.1		Anhedral.	
Olivine	-	2	0.1-0.2		Grains.	Completely altered.
Glass	-	28	N/A.		N/A.	Devitrified or altered.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	15	Olivine and Glass.	
Plagioclase	10	Devitrified from glass.	
Clay minerals	7	Glass.	

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