SITE 784 HOLE A CORE 1R CORED INTERVAL 4900.8-4902.2 mbsl: 0.0-1.4 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
UPPER PLEISTOCENE	B	B	*P. doliolus*	F/M R/M	?	γ=65.9 P=1.53; γ=65.5 P=1.59	0.8 0.43; 1.9; wt.%CaCO3 wt.%TOC	1; CC	0.5		○ ○ ○ ○	◇ ◇ ◇	* * *

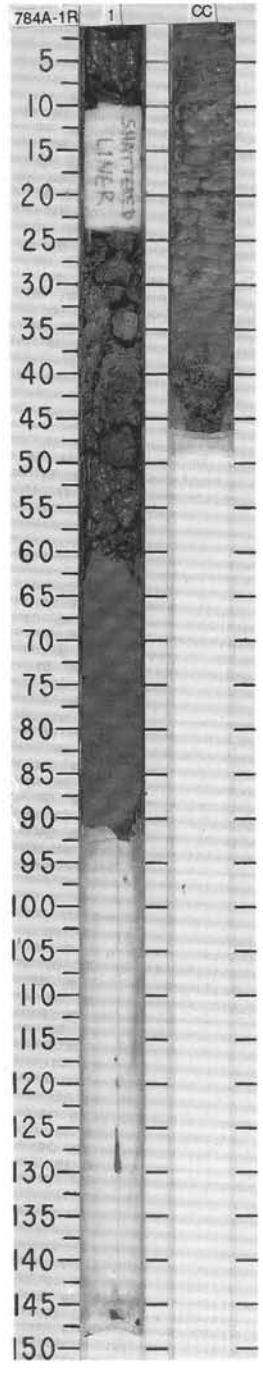
LITHOLOGIC DESCRIPTION

FELDSPAR- AND GLASS-RICH CLAYEY SILT

Major lithology: FELDSPAR- AND GLASS-RICH CLAYEY SILT, dark gray (10YR 4/1) mottled with dark yellowish brown (10YR 4/4) and very dark brown (10YR 2/2) and is very homogeneous. Brown (10YR 5/3), subangular to subrounded, 0.5 to 4 cm pumice fragments are present in the interval from 28 to 40 cm in Section 1.

SMEAR SLIDE SUMMARY (%):

	1, 36 D	1, 77 D	CC, 9 D
TEXTURE:			
Sand	10	3	8
Silt	30	60	62
Clay	60	37	30
COMPOSITION:			
Amphibole	—	—	2
Clay	40	32	30
Diatoms	7	8	Tr
Epidote	—	—	Tr
Feldspar	12	15	15
Glass	22	21	35
Micrite	—	—	7
Opaques	6	7	8
Radiolarians	8	9	3
Spicules	5	5	—



SITE 784 HOLE A CORE 2R CORED INTERVAL 4902.2-4911.7 mbsl; 1.4-10.9 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	R/P	P/B	CN14a	C/G *Nitzschia reinholdii*	?	● ϕ=68.5 ρ=1.51	● wt.%$CaCO_3$ 0.3 wt.%TOC 0.32	1					

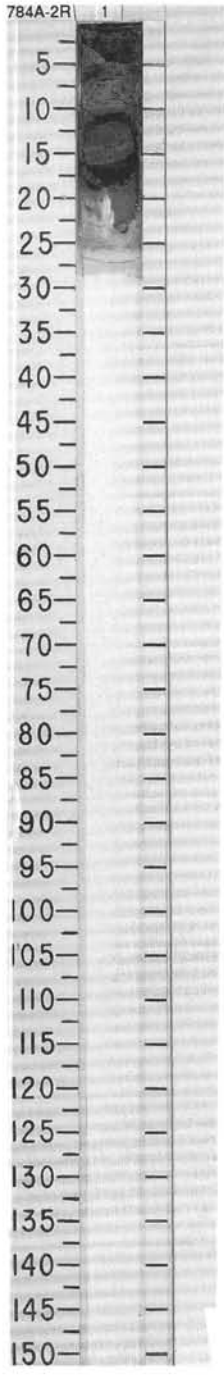
LITHOLOGIC DESCRIPTION

FELDSPAR-BEARING VITRIC ASH and VITRIC-BEARING BIOGENIC SILICA CLAY

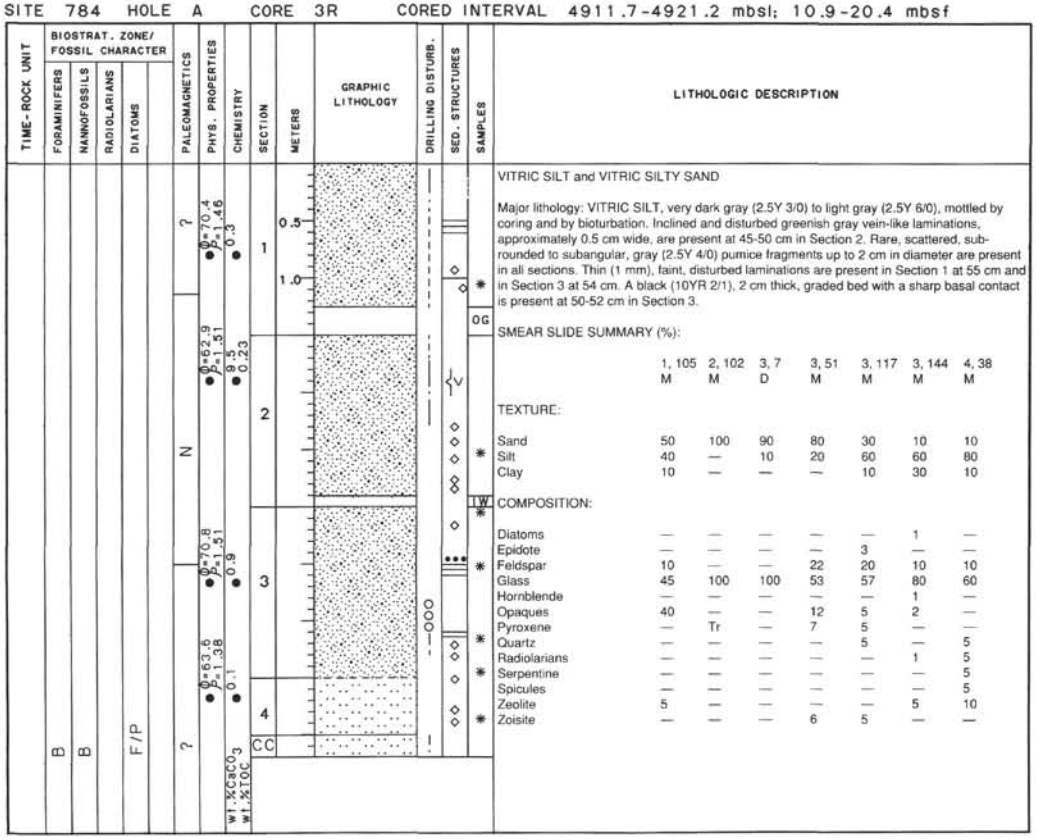
Major lithology: FELDSPAR-BEARING VITRIC ASH and pyroxene sand are present as black (10YR 2/1), 0.5 to 4 cm thick beds and as irregular blebs. VITRIC-BEARING BIOGENIC SILICA CLAY, grayish brown (2.5YR 5/2), is present in discontinuous laminae from 3 to 10 cm in Section 1.

SMEAR SLIDE SUMMARY (%):

	1, 2 D	1, 3 M	1, 8 D	1, 14 M
TEXTURE:				
Sand	—	90	—	30
Silt	80	10	20	70
Clay	20	—	80	—
COMPOSITION:				
Clay	—	—	25	—
Diatoms	Tr	—	10	—
Feldspar	20	10	—	10
Fish	—	—	Tr	—
Glass	78	25	15	84
Micrite	Tr	—	Tr	—
Opaques	—	20	10	5
Pyroxene	1	40	—	Tr
Quartz	—	3	—	—
Radiolarians	Tr	—	10	1
Rutile	—	2	—	—
Silicoflagellates	Tr	—	10	—
Spicules	Tr	—	20	—
Zeolite	—	—	Tr	—
Zoisite	1	—	—	—



SITE 784 HOLE A CORE 3R CORED INTERVAL 4911.7-4921.2 mbsl; 10.9-20.4 mbsf



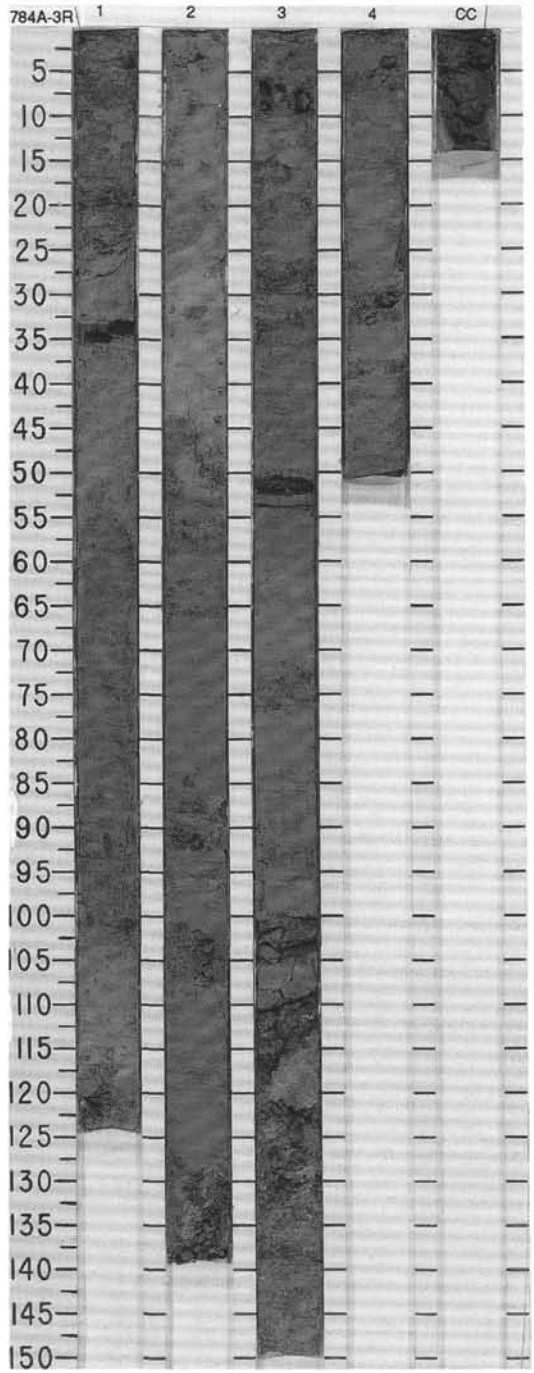
LITHOLOGIC DESCRIPTION

VITRIC SILT and VITRIC SILTY SAND

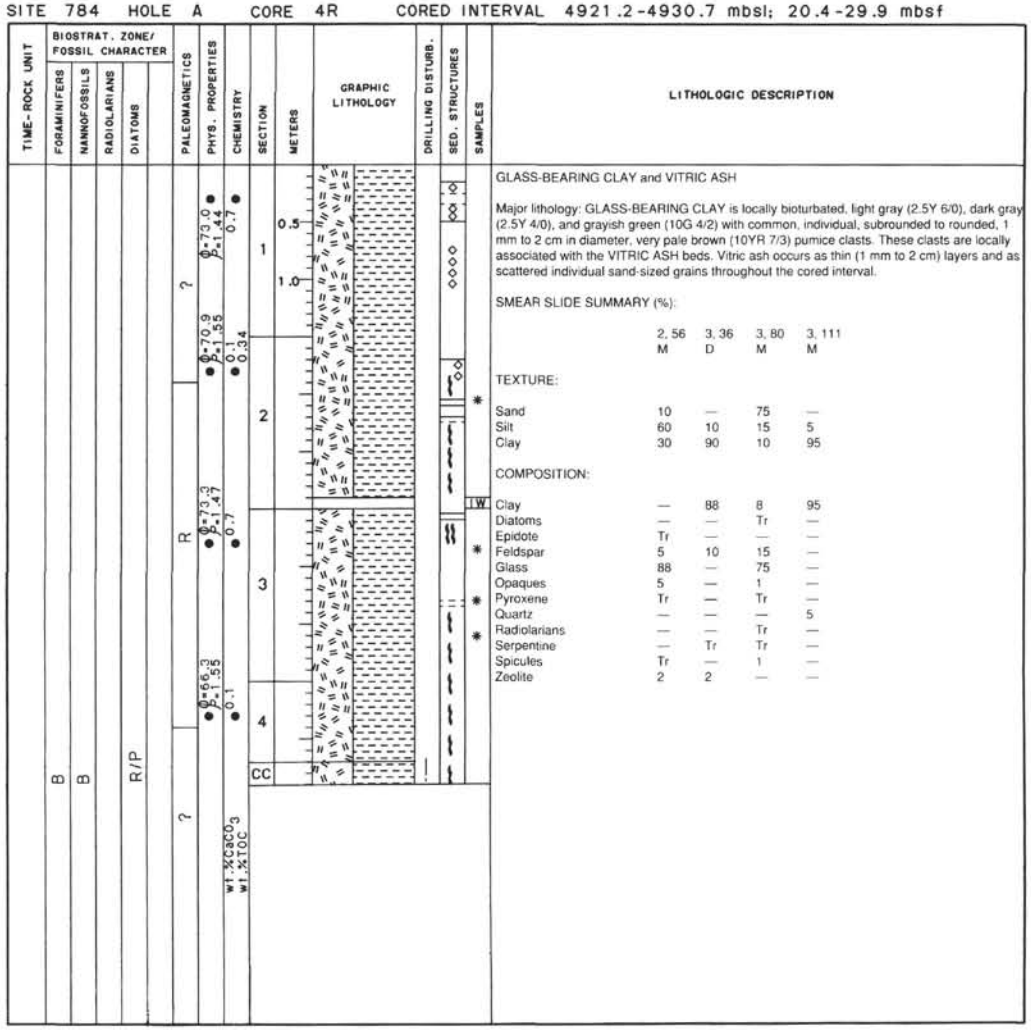
Major lithology: VITRIC SILT, very dark gray (2.5Y 3/0) to light gray (2.5Y 6/0), mottled by coring and by bioturbation. Inclined and disturbed greenish gray vein-like laminations, approximately 0.5 cm wide, are present at 45-50 cm in Section 2. Rare, scattered, sub-rounded to subangular, gray (2.5Y 4/0) pumice fragments up to 2 cm in diameter are present in all sections. Thin (1 mm), faint, disturbed laminations are present in Section 1 at 55 cm and in Section 3 at 54 cm. A black (10YR 2/1), 2 cm thick, graded bed with a sharp basal contact is present at 50-52 cm in Section 3.

SMEAR SLIDE SUMMARY (%):

	1, 105 M	2, 102 M	3, 7 D	3, 51 M	3, 117 M	3, 144 M	4, 38 M
TEXTURE:							
Sand	50	100	90	80	30	10	10
Silt	40	—	10	20	60	60	80
Clay	10	—	—	—	10	30	10
COMPOSITION:							
Diatoms	—	—	—	—	—	1	—
Epidote	—	—	—	—	3	—	—
Feldspar	10	—	—	22	20	10	10
Glass	45	100	100	53	57	80	60
Hornblende	—	—	—	—	—	1	—
Opaques	40	—	—	12	5	2	—
Pyroxene	—	Tr	—	7	5	—	—
Quartz	—	—	—	—	5	—	5
Radiolarians	—	—	—	—	—	1	5
Serpentine	—	—	—	—	—	—	5
Spicules	—	—	—	—	—	—	5
Zeolite	5	—	—	—	—	5	10
Zoisite	—	—	—	6	5	—	—



SITE 784 HOLE A CORE 4R CORED INTERVAL 4921.2-4930.7 mbsl; 20.4-29.9 mbsf



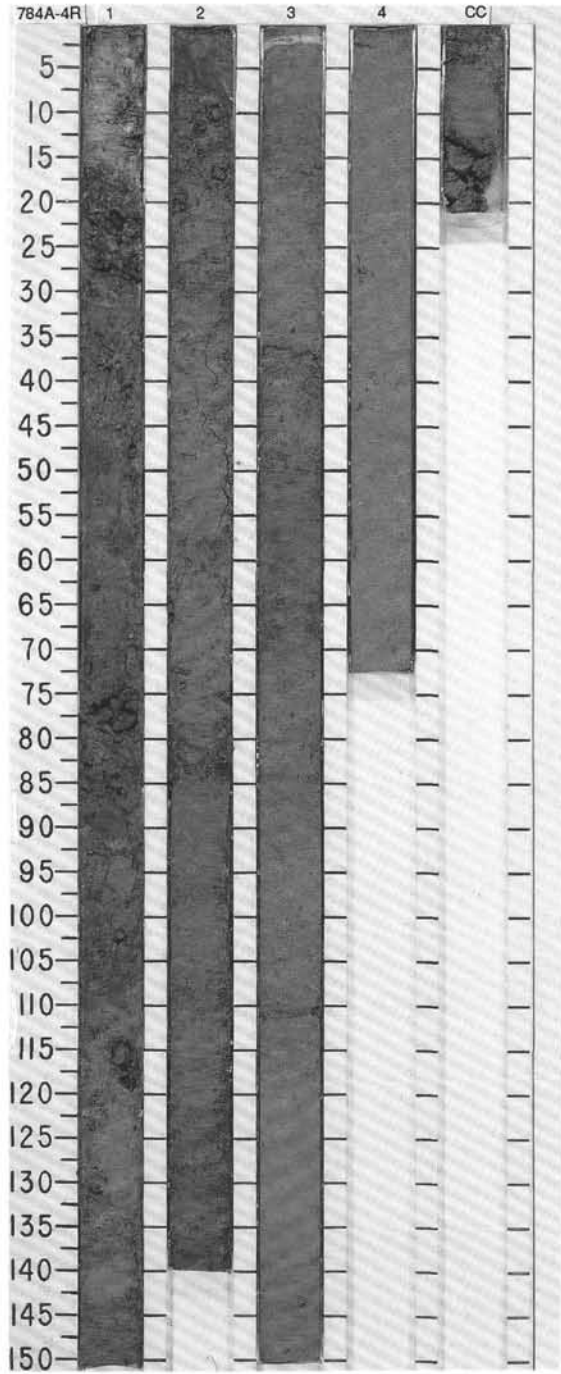
GLASS-BEARING CLAY and VITRIC ASH

Major lithology: GLASS-BEARING CLAY is locally bioturbated, light gray (2.5Y 6/0), dark gray (2.5Y 4/0), and grayish green (10G 4/2) with common, individual, subrounded to rounded, 1 mm to 2 cm in diameter, very pale brown (10YR 7/3) pumice clasts. These clasts are locally associated with the VITRIC ASH beds. Vitric ash occurs as thin (1 mm to 2 cm) layers and as scattered individual sand-sized grains throughout the cored interval.

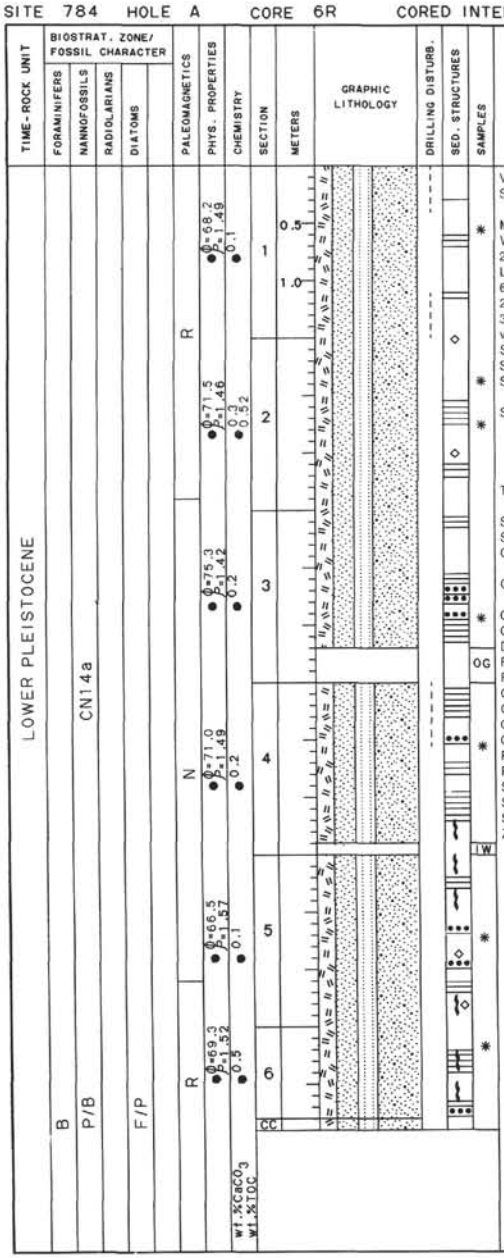
SMEAR SLIDE SUMMARY (%):

	2, 56 M	3, 36 D	3, 80 M	3, 111 M
TEXTURE:				
Sand	10	—	75	—
Silt	60	10	15	5
Clay	30	90	10	95
COMPOSITION:				
Clay	—	88	8	95
Diatoms	—	—	Tr	—
Epidote	Tr	—	—	—
Feldspar	5	10	15	—
Glass	88	—	75	—
Opaques	5	—	1	—
Pyroxene	Tr	—	Tr	—
Quartz	—	—	—	5
Radiolarians	—	—	Tr	—
Serpentine	—	Tr	Tr	—
Spicules	Tr	—	1	—
Zeolite	2	2	—	—

784 A 5R NO RECOVERY



SITE 784 HOLE A CORE 6R CORED INTERVAL 4940.3-4949.9 mbsl; 39.5-49.1 mbsf



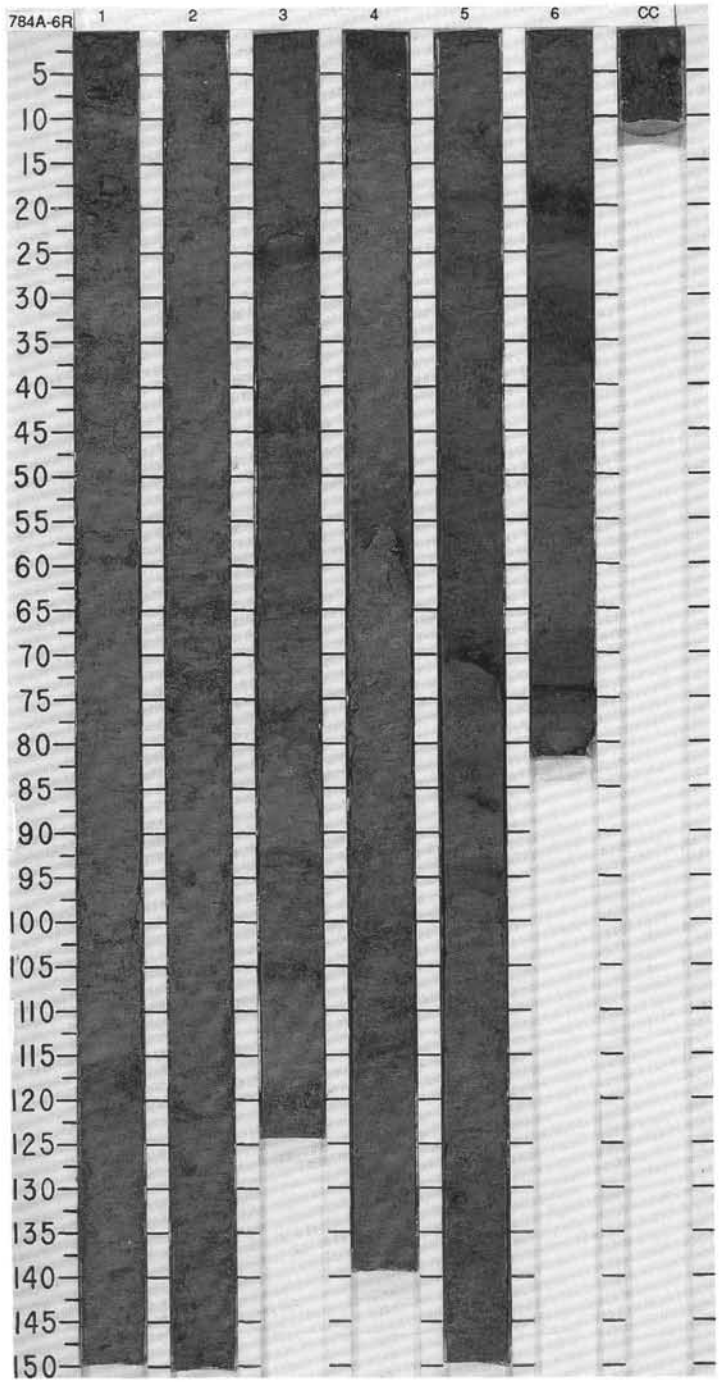
LITHOLOGIC DESCRIPTION

VITRIC SILTY SAND, VITRIC SAND, FELDSPAR- AND BIOGENIC-RICH VITRIC SILTY SAND, and VITRIC SANDY CLAY

Major lithology: VITRIC SILTY SAND, VITRIC SAND, FELDSPAR-AND BIOGENIC-RICH VITRIC SILTY SAND, and VITRIC SANDY CLAY, predominantly light brownish gray (2.5Y 6/2) to grayish brown (5Y 5/2) with laminae of gray (2.5Y 4/0) and dark gray (2.5Y 3/0). Laminae are usually faint and subhorizontal, they are present at 57-72 cm in Section 1, 60-62, 74, and 124-126 cm in Section 2, 3-5, 44-46, 92-97, and 120-123 cm in Section 3, 6-10, 24, 27, 70-76, 98-100, and 113-114 cm in Section 4, 18-20 and 123 cm in Section 5, 19-22, 35-39, and 70-76 cm in Section 6. Graded beds, commonly 1 to 2 cm thick and composed of vitric ash, are present at 70, 75, and 89 cm in Section 3, 56 cm in Section 4, 68 and 98 cm in Section 5, and 80 cm in Section 6. Clasts of dark gray (5Y 3/1) mud are present at 148 cm in Section 1, at 95 cm in Section 2, at 22 cm in Section 3, at 128 cm in Section 5, and at 7 cm in Section CC. Burrowing is present locally, but is not pervasive in any of the sections.

SMEAR SLIDE SUMMARY (%):

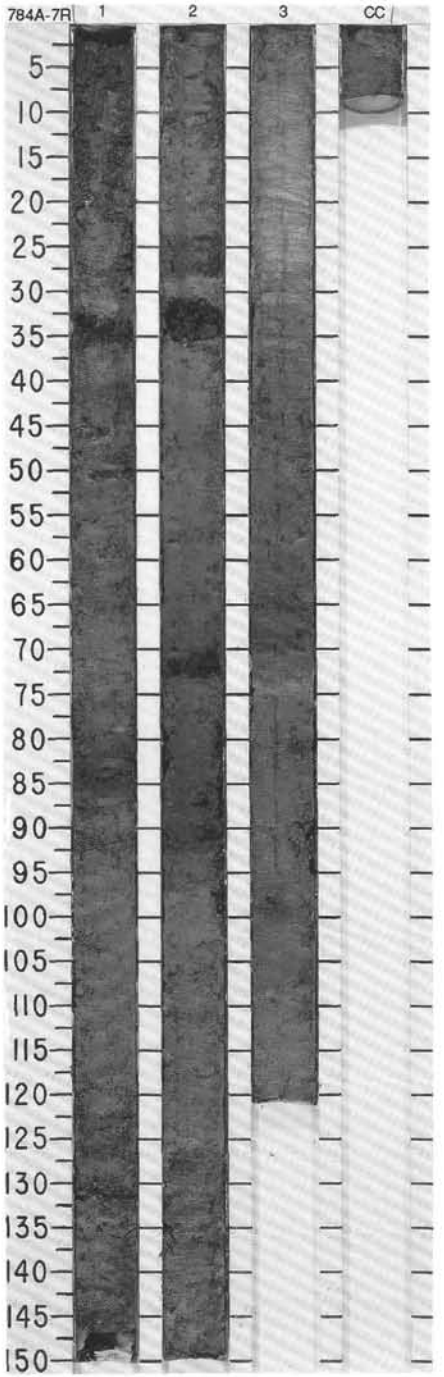
	1, 57 M	2, 38 D	2, 74 M	3, 93 M	4, 57 M	5, 71 M	6, 18 M
TEXTURE:							
Sand	35	40	60	60	80	85	25
Silt	55	25	35	20	20	5	15
Clay	10	35	5	20	—	10	60
COMPOSITION:							
Chlorite	—	—	—	—	Tr	—	—
Clay	—	32	—	12	—	10	40
Diatoms	—	5	—	1	—	—	1
Feldspar	8	5	15	15	10	5	15
Foraminifers	—	5	—	—	—	—	—
Garnet	3	—	—	—	—	—	—
Glass	74	32	73	65	65	64	27
Glauconite	—	—	—	—	—	—	Tr
Opaques	5	3	8	3	10	15	5
Pyroxene	—	—	2	—	10	2	—
Radiolarians	Tr	10	2	2	—	—	—
Serpentine	—	—	—	—	5	—	—
Silicoflagellates	—	3	—	—	—	—	—
Spicules	—	5	—	2	—	—	2
Zeolite	10	—	—	—	—	4	10



SITE 784 HOLE A CORE 7R CORED INTERVAL 4949.9-4959.6 mbsl; 49.1-58.8 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	B	B	A/G	*R. praebergonii*	R	γ=67.8, p=1.54; γ=72.3, p=1.49; γ=72.6, p=1.54	0.5; 0.29; 0.4	1; 2; 3; CC	0.5; 1.0				

wt.%$CaCO_3$
wt.%TOC



LITHOLOGIC DESCRIPTION

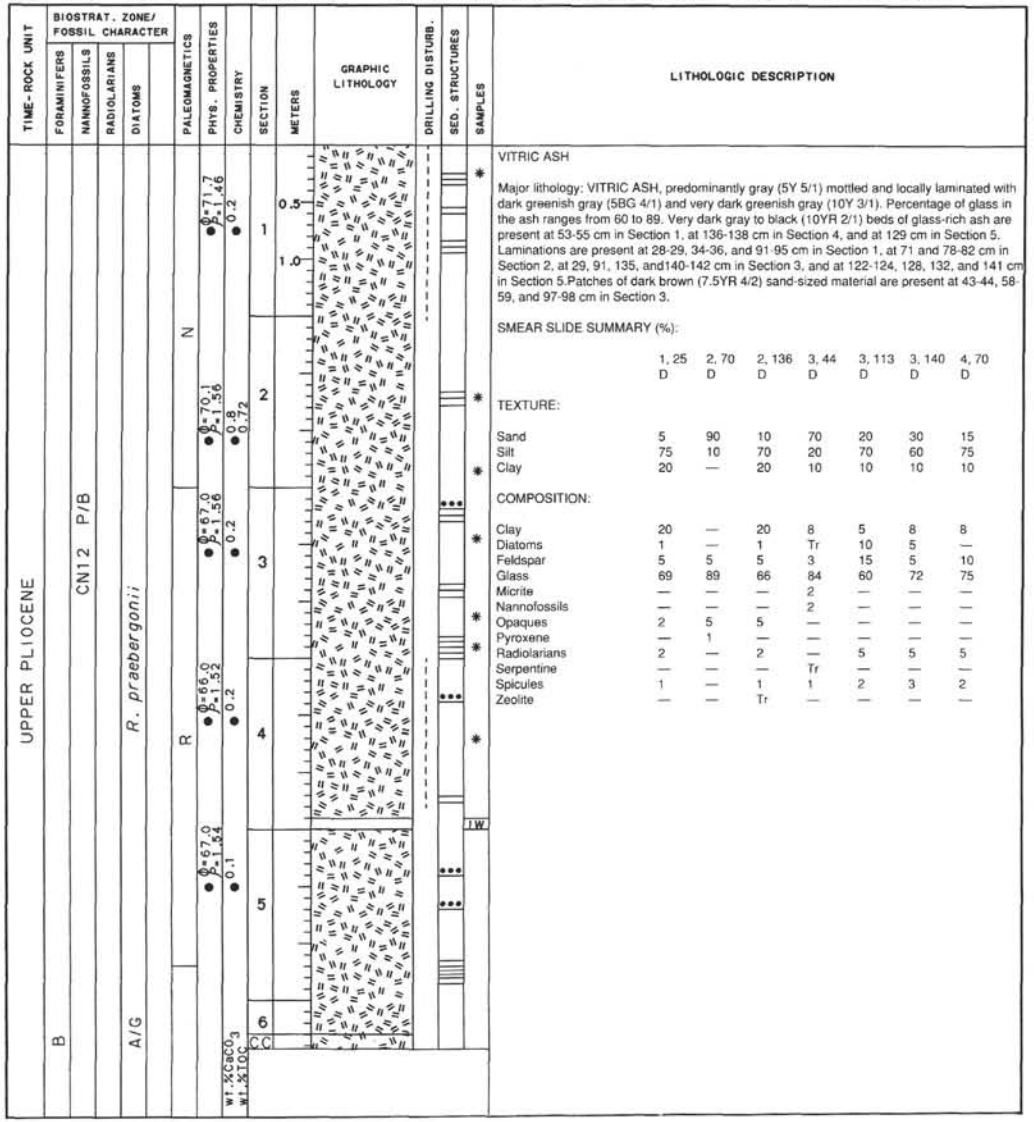
VITRIC ASH and VITRIC CLAYEY SILT

Major lithology: VITRIC ASH and VITRIC CLAYEY SILT, dark greenish gray (10YR 4/1) to very dark greenish gray (10YR 3/1) with very dark gray (5Y 3/1) laminations at 33, 78, and 82-84 cm in Section 1, 60-64 cm in Section 3, and at 0-1 cm in Section CC. One very dark gray (5Y 3/1) ash bed is present at 30-34 cm in Section 2.

SMEAR SLIDE SUMMARY (%):

	1, 33 D	1, 79 D	2, 71 M	3, 62 D
TEXTURE:				
Sand	60	10	88	40
Silt	30	60	10	30
Clay	10	30	2	30
COMPOSITION:				
Chlorite	Tr	—	—	—
Clay	4	20	2	15
Diatoms	1	8	—	5
Feldspar	10	8	3	3
Glass	80	42	90	64
Opaques	5	—	2	3
Pyroxene	—	—	Tr	—
Radiolarians	—	9	3	5
Silicoflagellates	—	5	—	—
Spicules	—	8	—	5
Zeolite	—	—	—	Tr

SITE 784 HOLE A CORE 8R CORED INTERVAL 4959.6-4969.3 mbsl; 58.8-68.5 mbsf



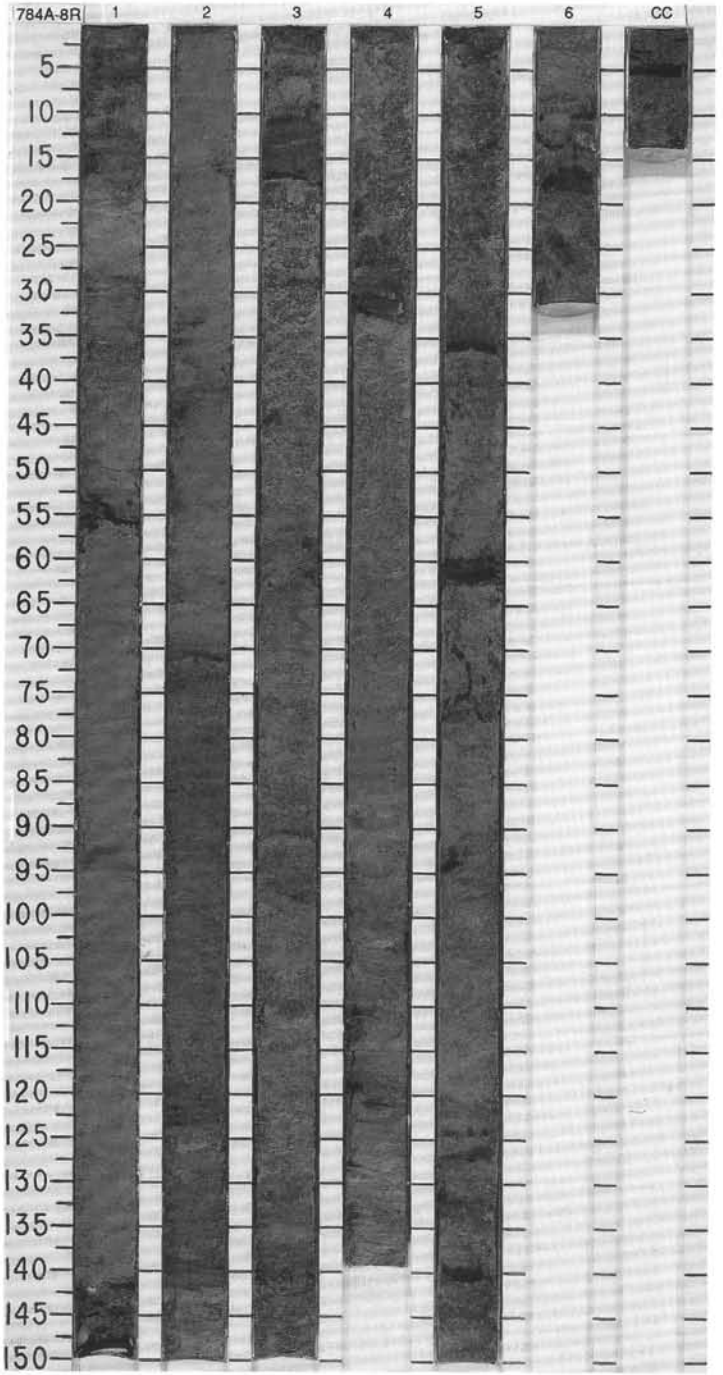
LITHOLOGIC DESCRIPTION

VITRIC ASH

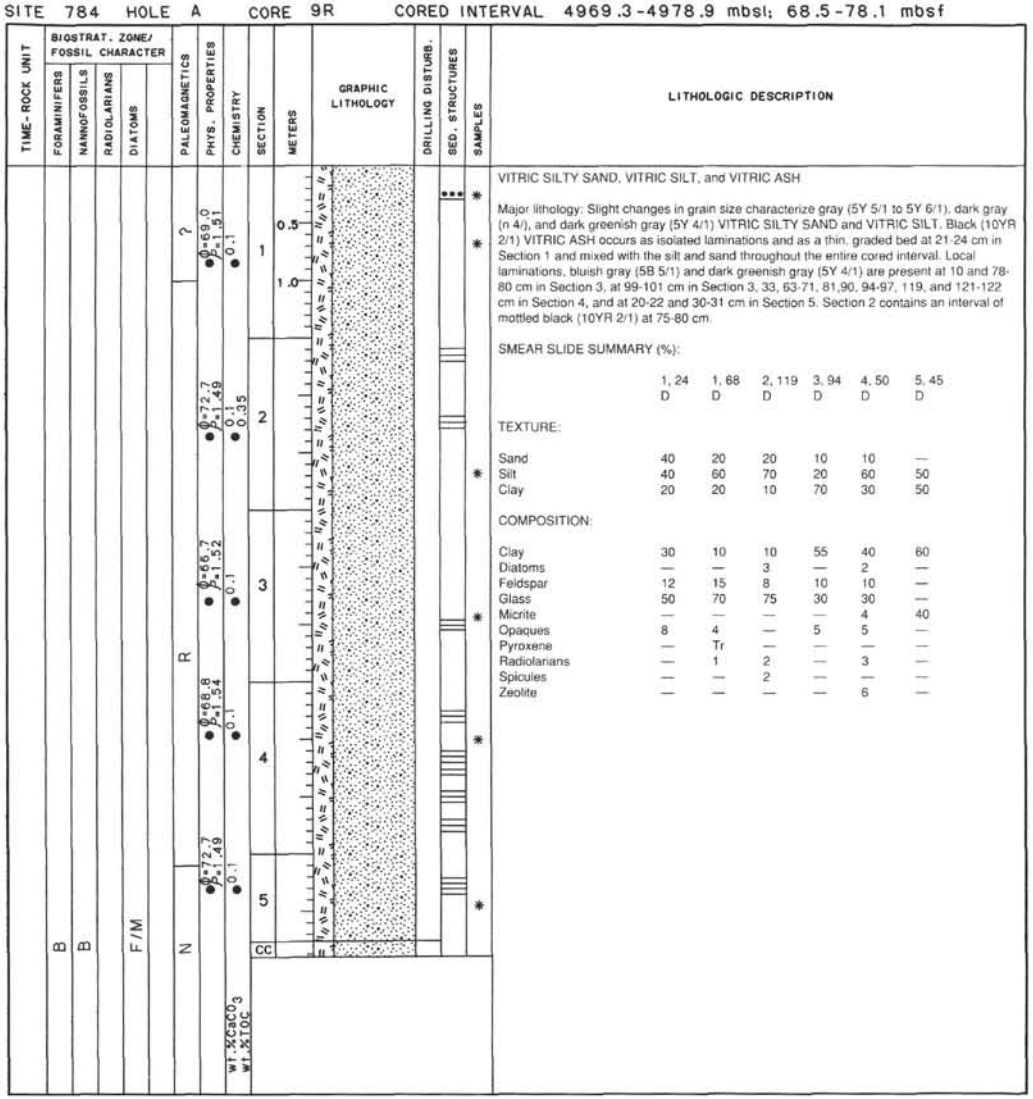
Major lithology: VITRIC ASH, predominantly gray (5Y 5/1) mottled and locally laminated with dark greenish gray (5BG 4/1) and very dark greenish gray (10Y 3/1). Percentage of glass in the ash ranges from 60 to 89. Very dark gray to black (10YR 2/1) beds of glass-rich ash are present at 53-55 cm in Section 1, at 136-138 cm in Section 4, and at 129 cm in Section 5. Laminations are present at 28-29, 34-36, and 91-95 cm in Section 1, at 71 and 78-82 cm in Section 2, at 29, 91, 135, and140-142 cm in Section 3, and at 122-124, 128, 132, and 141 cm in Section 5.Patches of dark brown (7.5YR 4/2) sand-sized material are present at 43-44, 58-59, and 97-98 cm in Section 3.

SMEAR SLIDE SUMMARY (%):

	1, 25 D	2, 70 D	2, 136 D	3, 44 D	3, 113 D	3, 140 D	4, 70 D
TEXTURE:							
Sand	5	90	10	70	20	30	15
Silt	75	10	70	20	70	60	75
Clay	20	—	20	10	10	10	10
COMPOSITION:							
Clay	20	—	20	8	5	8	8
Diatoms	1	—	1	Tr	10	5	—
Feldspar	5	5	5	3	15	5	10
Glass	69	89	66	84	60	72	75
Micrite	—	—	—	2	—	—	—
Nannofossils	—	—	—	2	—	—	—
Opaques	2	5	5	—	—	—	—
Pyroxene	—	1	—	—	—	—	—
Radiolarians	2	—	2	—	5	5	5
Serpentine	—	—	—	Tr	—	—	—
Spicules	1	—	1	1	2	3	2
Zeolite	—	—	Tr	—	—	—	—



SITE 784 HOLE A CORE 9R CORED INTERVAL 4969.3-4978.9 mbsl; 68.5-78.1 mbsf



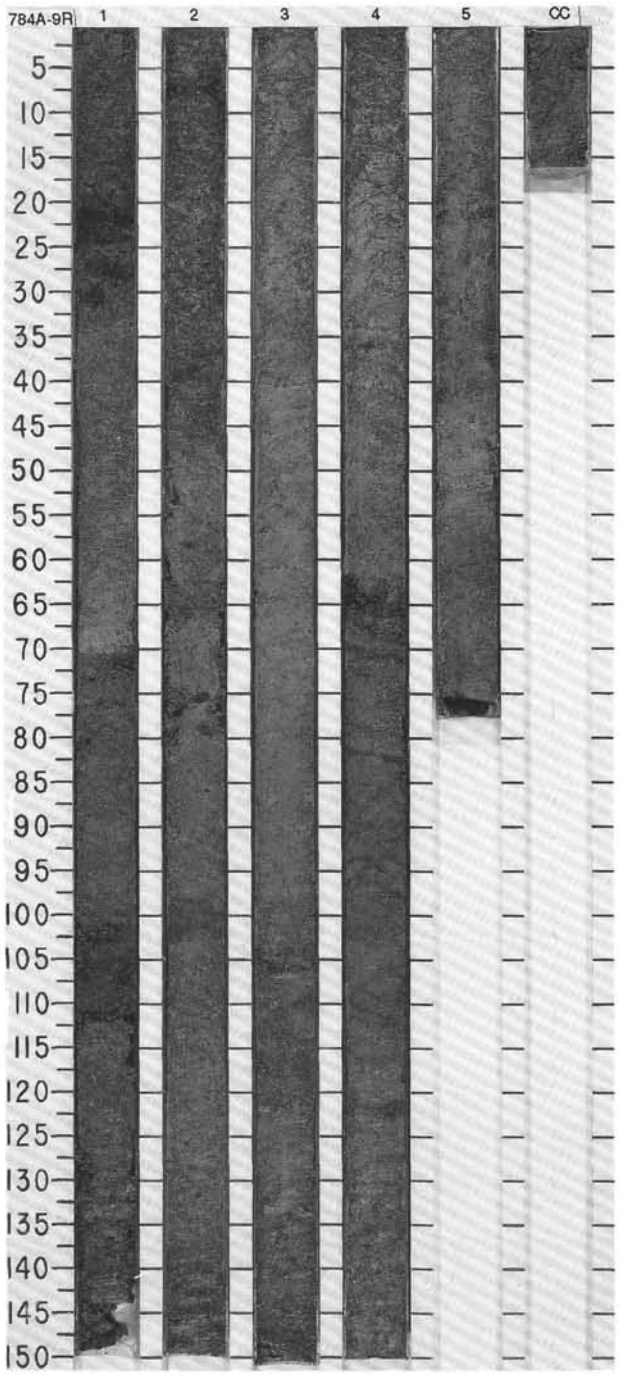
LITHOLOGIC DESCRIPTION

VITRIC SILTY SAND, VITRIC SILT, and VITRIC ASH

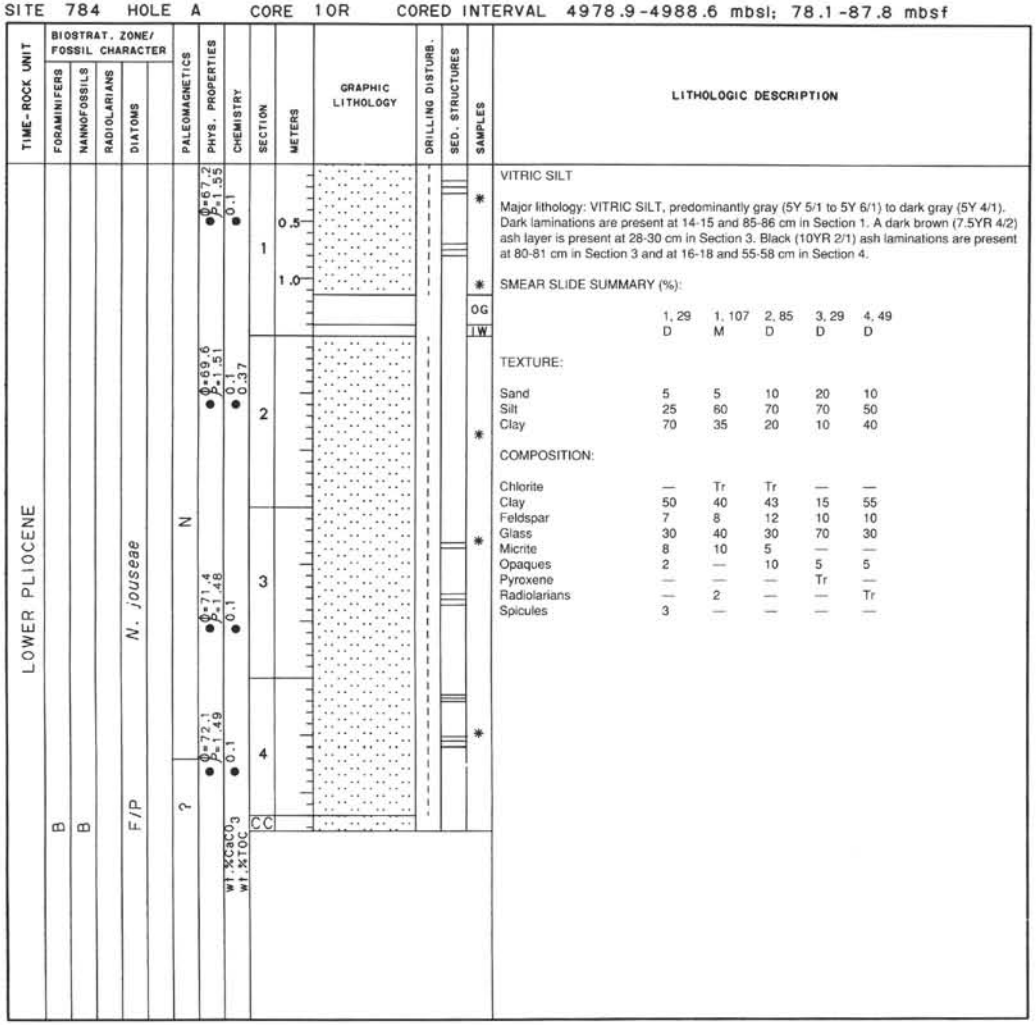
Major lithology: Slight changes in grain size characterize gray (5Y 5/1 to 5Y 6/1), dark gray (n 4/), and dark greenish gray (5Y 4/1) VITRIC SILTY SAND and VITRIC SILT. Black (10YR 2/1) VITRIC ASH occurs as isolated laminations and as a thin, graded bed at 21-24 cm in Section 1 and mixed with the silt and sand throughout the entire cored interval. Local laminations, bluish gray (5B 5/1) and dark greenish gray (5Y 4/1) are present at 10 and 78-80 cm in Section 3, at 99-101 cm in Section 3, 33, 63-71, 81,90, 94-97, 119, and 121-122 cm in Section 4, and at 20-22 and 30-31 cm in Section 5. Section 2 contains an interval of mottled black (10YR 2/1) at 75-80 cm.

SMEAR SLIDE SUMMARY (%):

	1, 24 D	1, 68 D	2, 119 D	3, 94 D	4, 50 D	5, 45 D
TEXTURE:						
Sand	40	20	20	10	10	—
Silt	40	60	70	20	60	50
Clay	20	20	10	70	30	50
COMPOSITION:						
Clay	30	10	10	55	40	60
Diatoms	—	—	3	—	2	—
Feldspar	12	15	8	10	10	—
Glass	50	70	75	30	30	—
Micrite	—	—	—	—	4	40
Opaques	8	4	—	5	5	—
Pyroxene	—	Tr	—	—	—	—
Radiolarians	—	1	2	—	3	—
Spicules	—	—	2	—	—	—
Zeolite	—	—	—	—	6	—



SITE 784 HOLE A CORE 10R CORED INTERVAL 4978.9-4988.6 mbsl; 78.1-87.8 mbsf



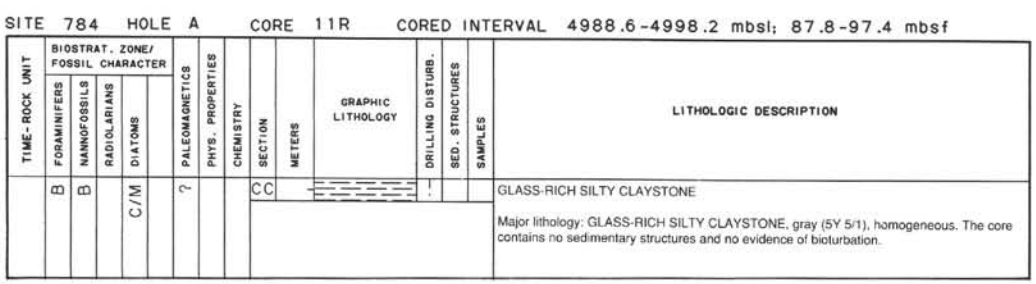
VITRIC SILT

Major lithology: VITRIC SILT, predominantly gray (5Y 5/1 to 5Y 6/1) to dark gray (5Y 4/1). Dark laminations are present at 14-15 and 85-86 cm in Section 1. A dark brown (7.5YR 4/2) ash layer is present at 28-30 cm in Section 3. Black (10YR 2/1) ash laminations are present at 80-81 cm in Section 3 and at 16-18 and 55-58 cm in Section 4.

SMEAR SLIDE SUMMARY (%):

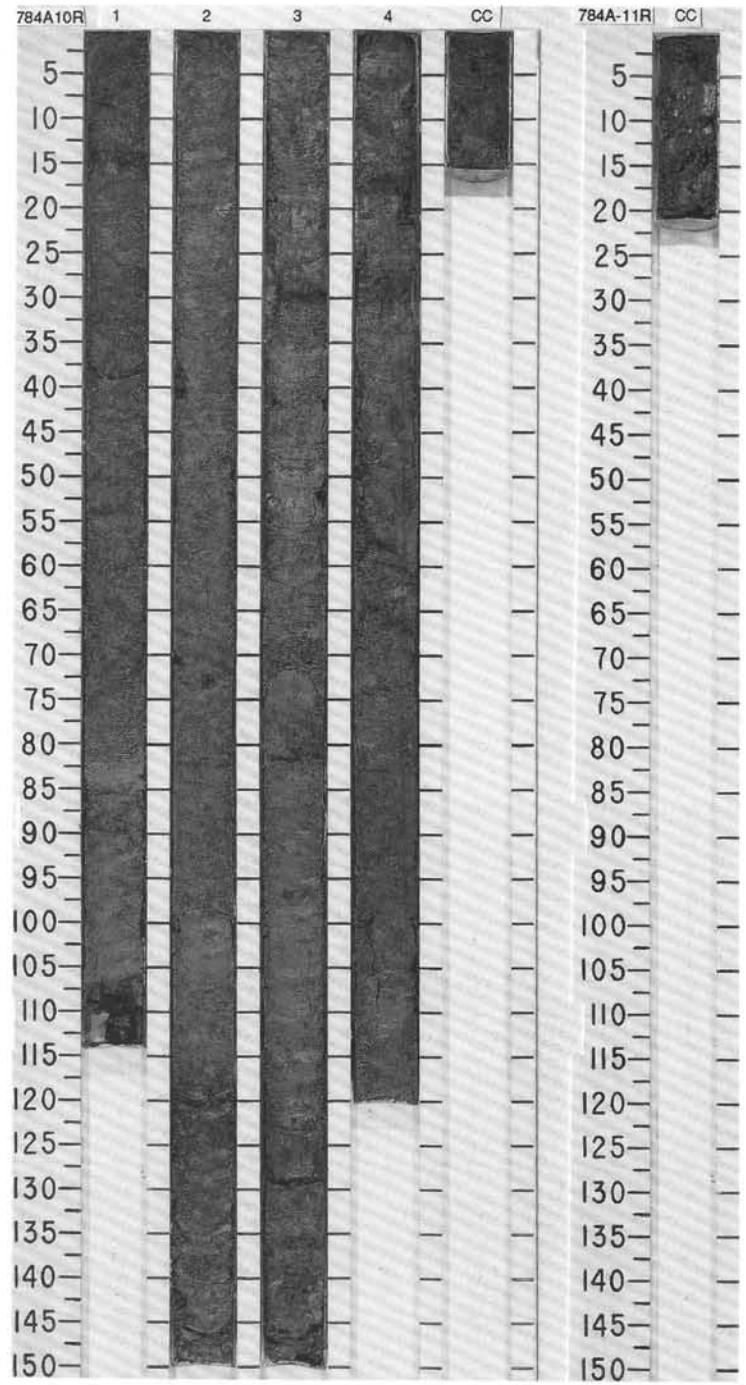
	1, 29	1, 107	2, 85	3, 29	4, 49
	D	M	D	D	D
TEXTURE:					
Sand	5	5	10	20	10
Silt	25	60	70	70	50
Clay	70	35	20	10	40
COMPOSITION:					
Chlorite	—	Tr	Tr	—	—
Clay	50	40	43	15	55
Feldspar	7	8	12	10	10
Glass	30	40	30	70	30
Micrite	8	10	5	—	—
Opaques	2	—	10	5	5
Pyroxene	—	—	—	Tr	—
Radiolarians	—	2	—	—	Tr
Spicules	3	—	—	—	—

SITE 784 HOLE A CORE 11R CORED INTERVAL 4988.6-4998.2 mbsl; 87.8-97.4 mbsf

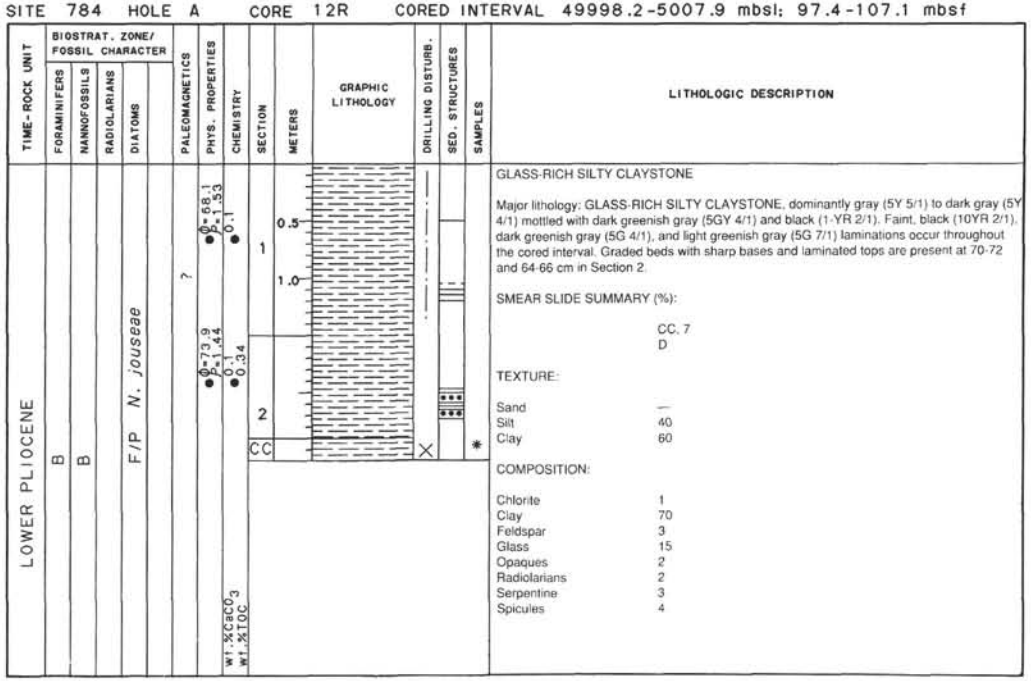


GLASS-RICH SILTY CLAYSTONE

Major lithology: GLASS-RICH SILTY CLAYSTONE, gray (5Y 5/1), homogeneous. The core contains no sedimentary structures and no evidence of bioturbation.



SITE 784 HOLE A CORE 12R CORED INTERVAL 49998.2-5007.9 mbsl; 97.4-107.1 mbsf



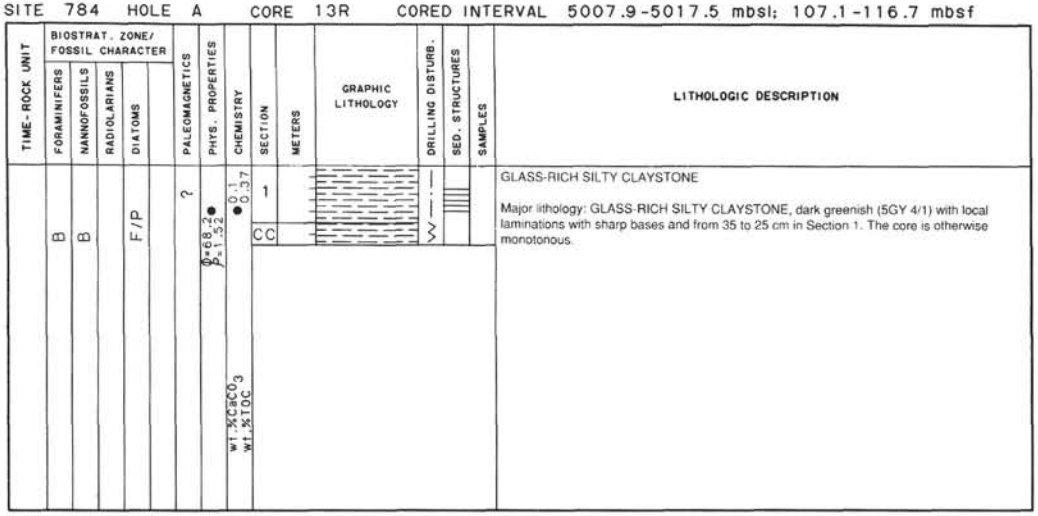
GLASS-RICH SILTY CLAYSTONE

Major lithology: GLASS-RICH SILTY CLAYSTONE, dominantly gray (5Y 5/1) to dark gray (5Y 4/1) mottled with dark greenish gray (5GY 4/1) and black (1-YR 2/1). Faint, black (10YR 2/1), dark greenish gray (5G 4/1), and light greenish gray (5G 7/1) laminations occur throughout the cored interval. Graded beds with sharp bases and laminated tops are present at 70-72 and 64-66 cm in Section 2.

SMEAR SLIDE SUMMARY (%):

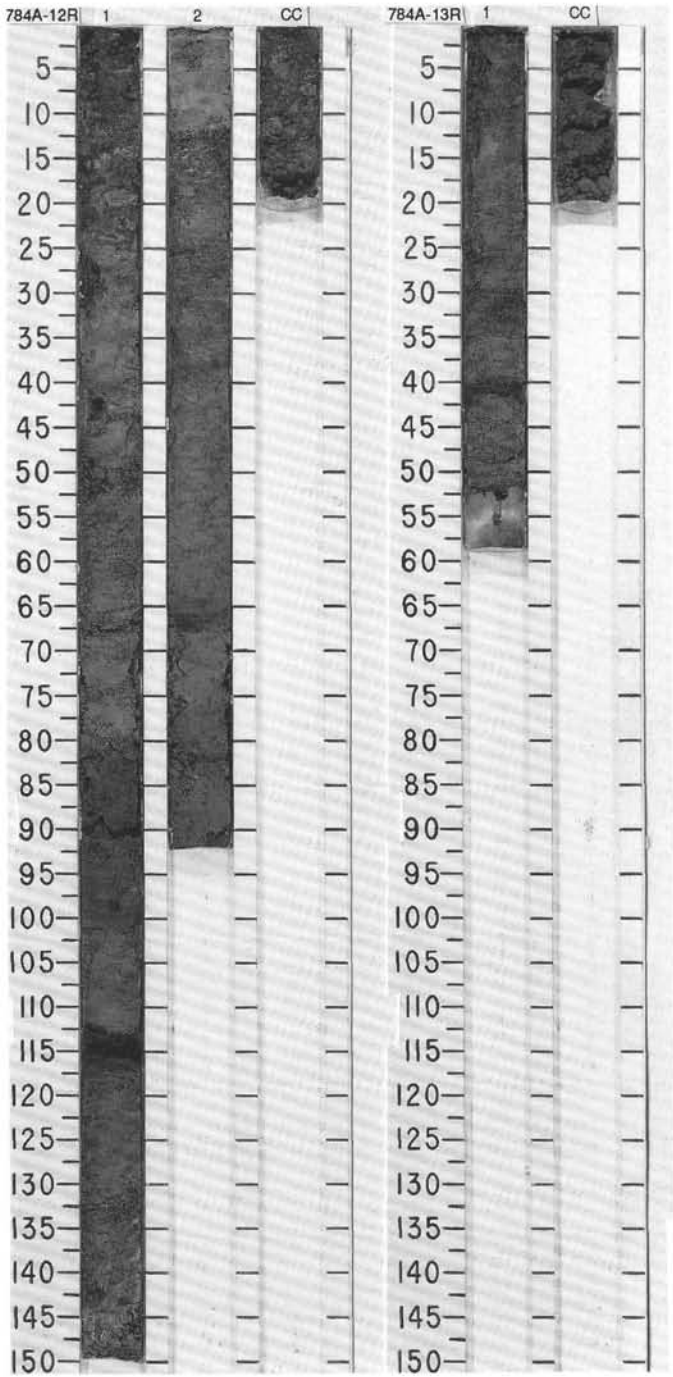
	CC, 7 D
TEXTURE:	
Sand	—
Silt	40
Clay	60
COMPOSITION:	
Chlorite	1
Clay	70
Feldspar	3
Glass	15
Opaques	2
Radiolarians	2
Serpentine	3
Spicules	4

SITE 784 HOLE A CORE 13R CORED INTERVAL 5007.9-5017.5 mbsl; 107.1-116.7 mbsf

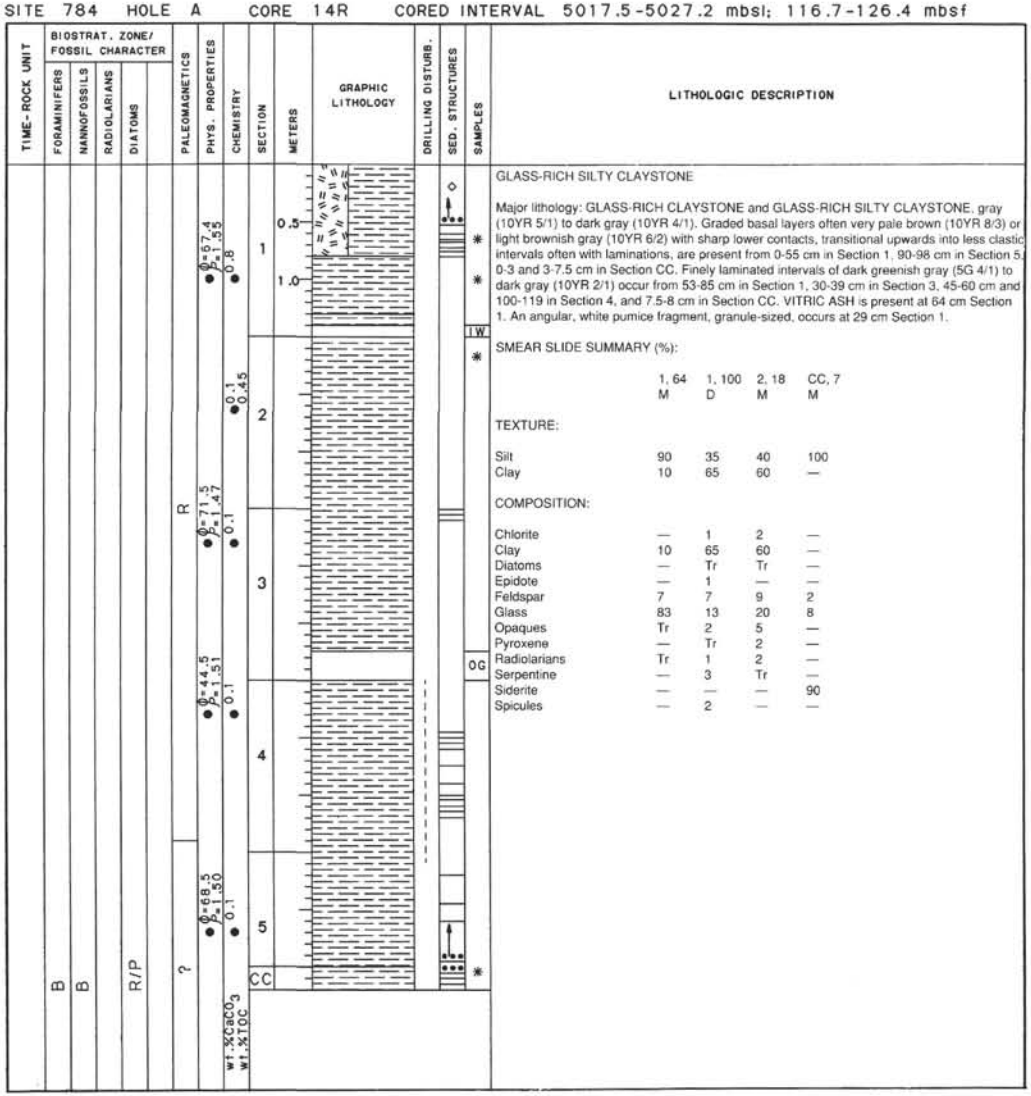


GLASS-RICH SILTY CLAYSTONE

Major lithology: GLASS-RICH SILTY CLAYSTONE, dark greenish (5GY 4/1) with local laminations with sharp bases and from 35 to 25 cm in Section 1. The core is otherwise monotonous.



SITE 784 HOLE A CORE 14R CORED INTERVAL 5017.5-5027.2 mbsl; 116.7-126.4 mbsf



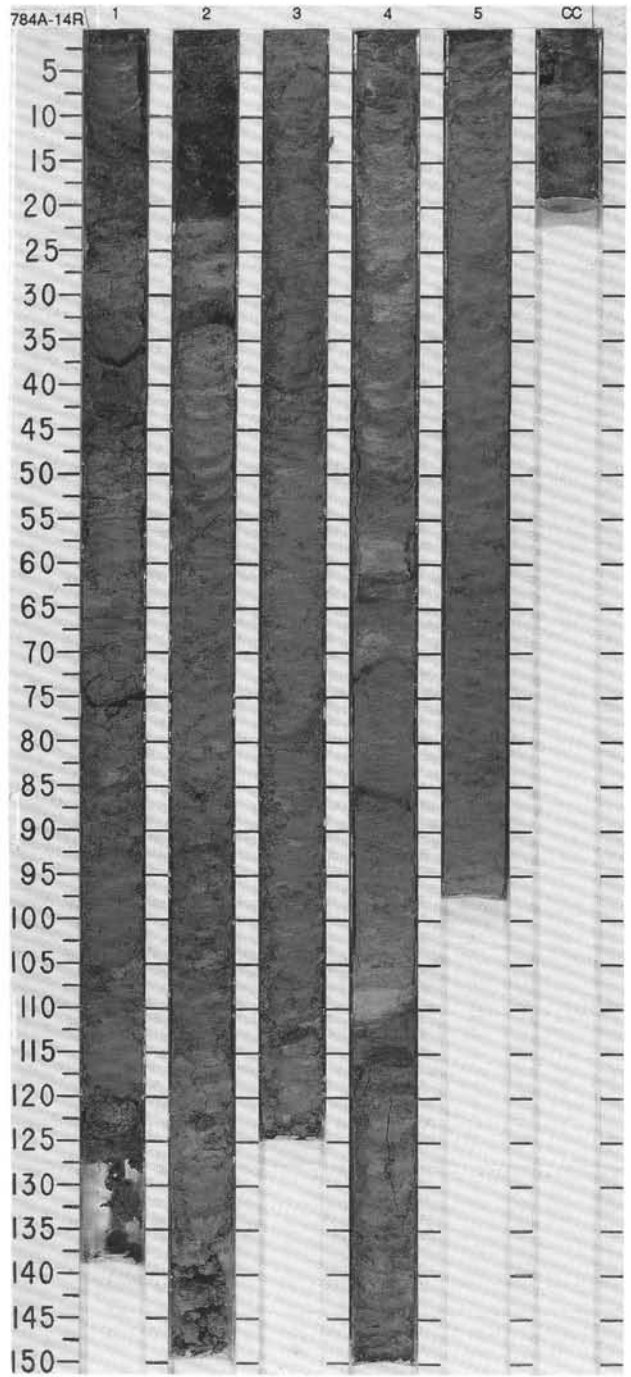
LITHOLOGIC DESCRIPTION

GLASS-RICH SILTY CLAYSTONE

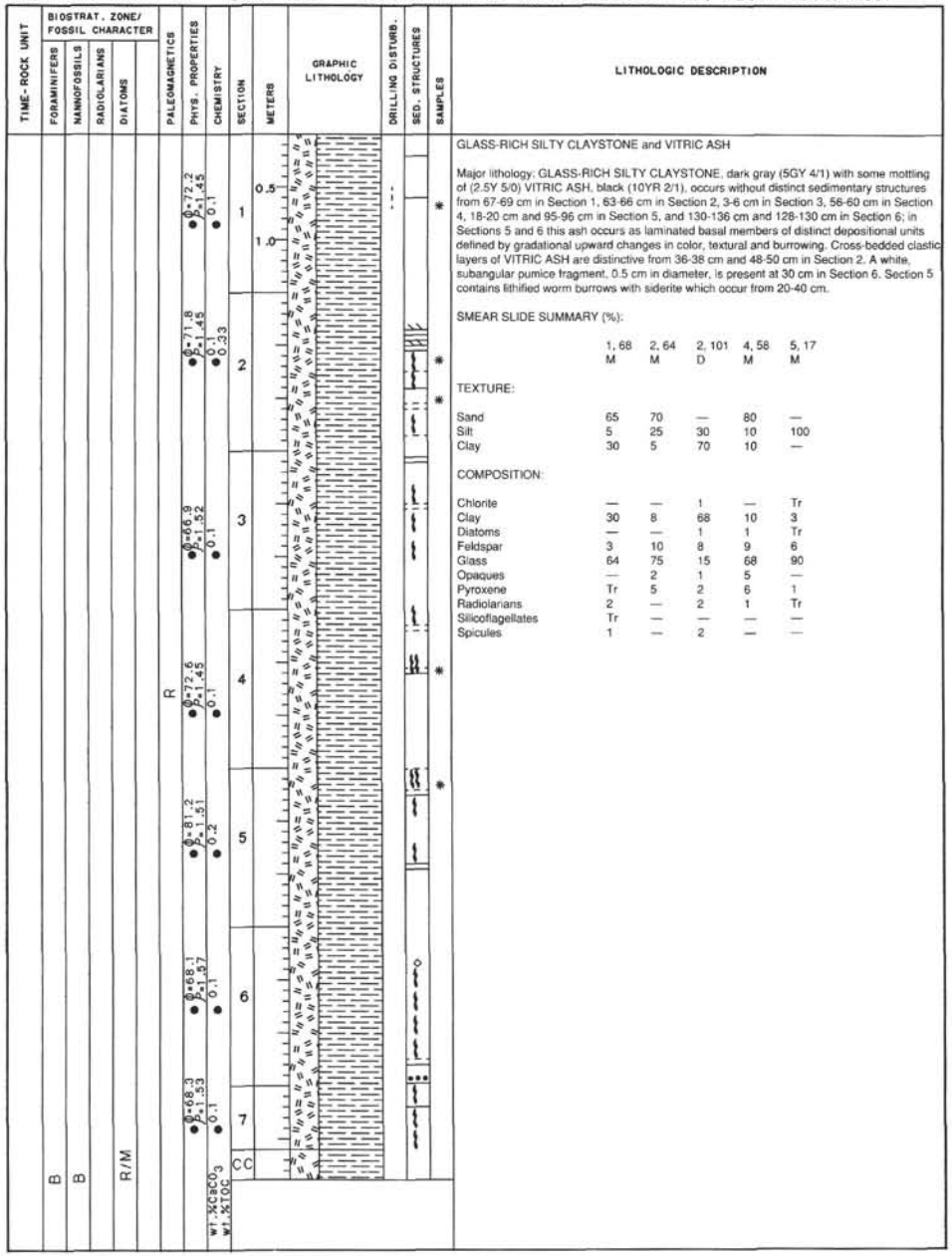
Major lithology: GLASS-RICH CLAYSTONE and GLASS-RICH SILTY CLAYSTONE, gray (10YR 5/1) to dark gray (10YR 4/1). Graded basal layers often very pale brown (10YR 8/3) or light brownish gray (10YR 6/2) with sharp lower contacts, transitional upwards into less clastic intervals often with laminations, are present from 0-55 cm in Section 1, 90-98 cm in Section 5, 0-3 and 3-7.5 cm in Section CC. Finely laminated intervals of dark greenish gray (5G 4/1) to dark gray (10YR 2/1) occur from 53-85 cm in Section 1, 30-39 cm in Section 3, 45-60 cm and 100-119 in Section 4, and 7.5-8 cm in Section CC. VITRIC ASH is present at 64 cm Section 1. An angular, white pumice fragment, granule-sized, occurs at 29 cm Section 1.

SMEAR SLIDE SUMMARY (%):

	1, 64 M	1, 100 D	2, 18 M	CC, 7 M
TEXTURE:				
Silt	90	35	40	100
Clay	10	65	60	—
COMPOSITION:				
Chlorite	—	1	2	—
Clay	10	65	60	—
Diatoms	—	Tr	Tr	—
Epidote	—	1	—	—
Feldspar	7	7	9	2
Glass	83	13	20	8
Opaques	Tr	2	5	—
Pyroxene	—	Tr	2	—
Radiolarians	Tr	1	2	—
Serpentine	—	3	Tr	—
Siderite	—	—	—	90
Spicules	—	2	—	—



SITE 784 HOLE A CORE 15R CORED INTERVAL 5027.2-5036.8 mbsl; 126.4-136.0 mbsf



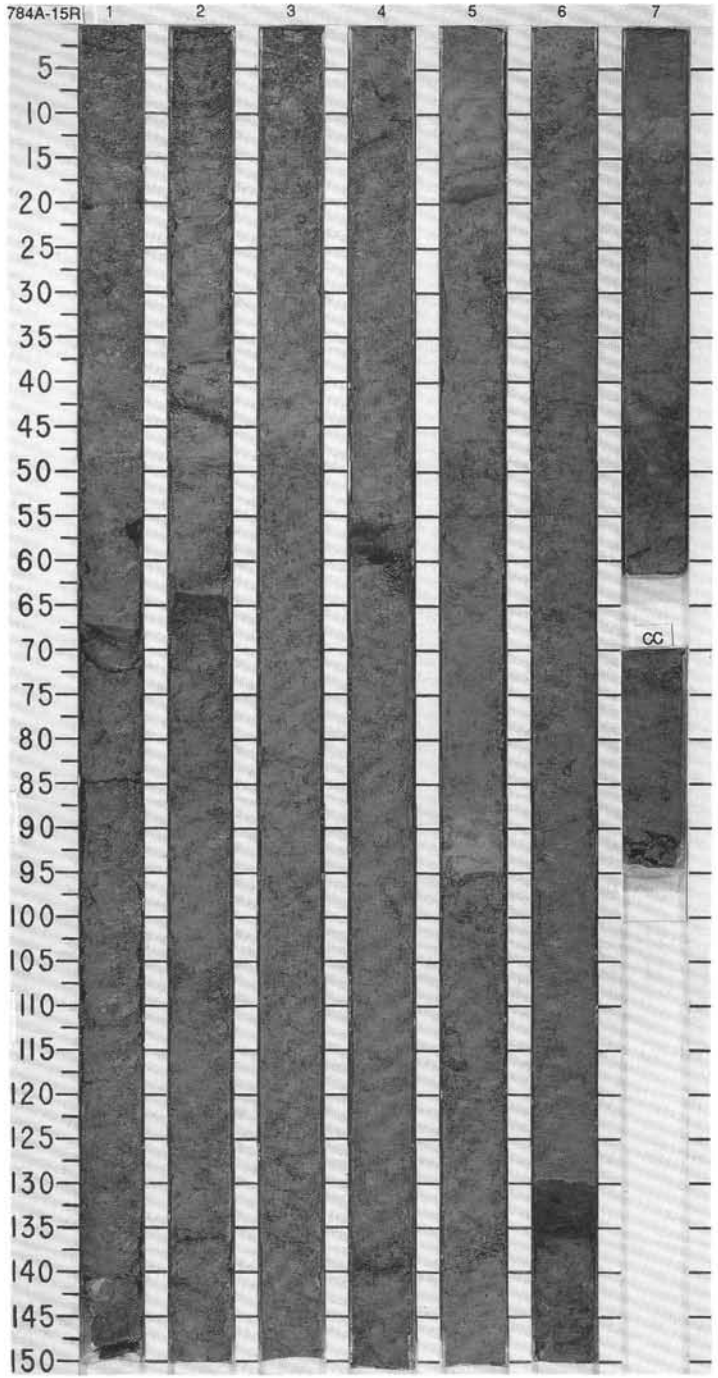
LITHOLOGIC DESCRIPTION

GLASS-RICH SILTY CLAYSTONE and VITRIC ASH

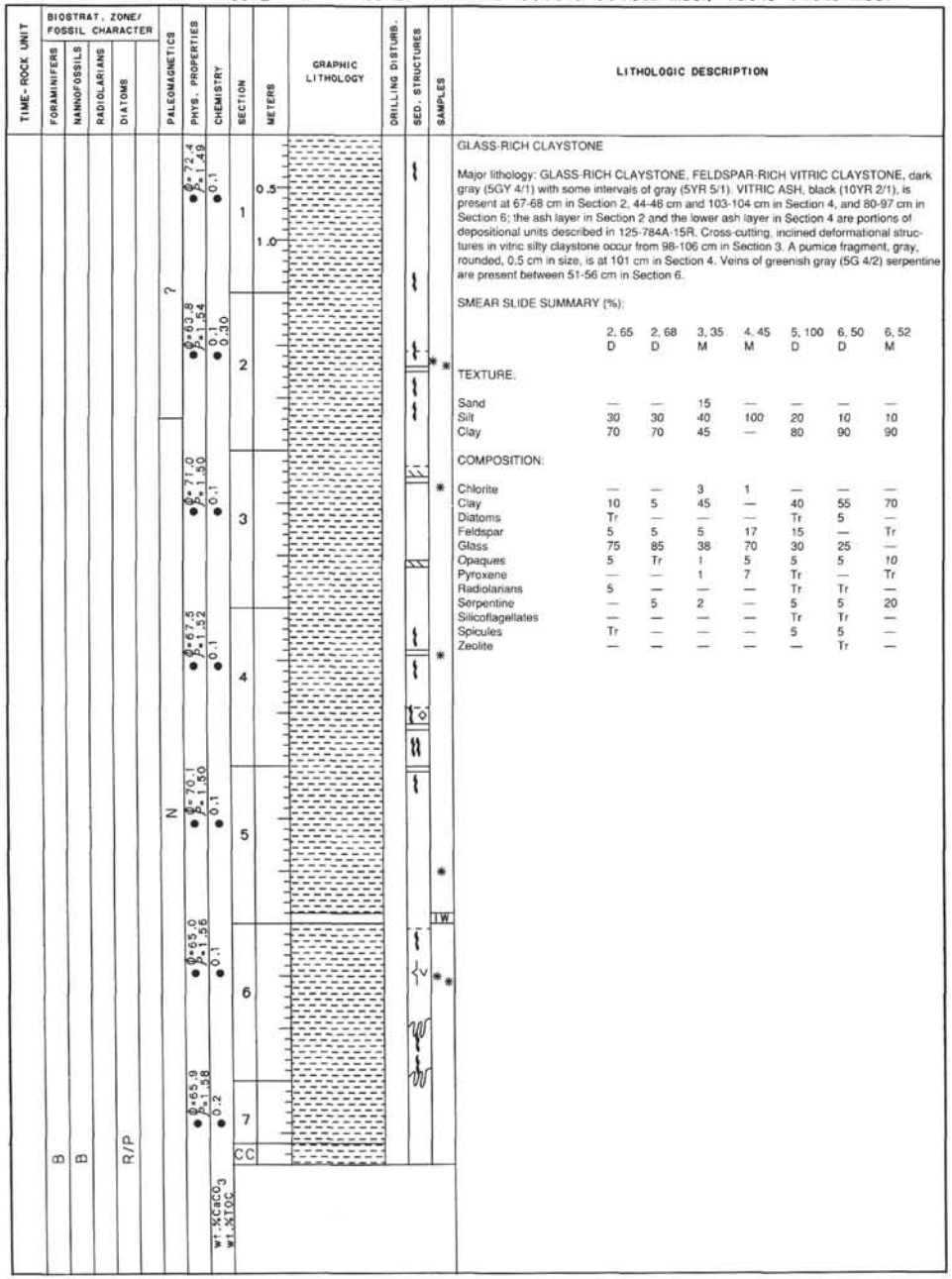
Major lithology: GLASS-RICH SILTY CLAYSTONE, dark gray (5GY 4/1) with some mottling of (2.5Y 5/0) VITRIC ASH, black (10YR 2/1), occurs without distinct sedimentary structures from 67-69 cm in Section 1, 63-66 cm in Section 2, 3-6 cm in Section 3, 56-60 cm in Section 4, 18-20 cm and 95-96 cm in Section 5, and 130-136 cm and 128-130 cm in Section 6; in Sections 5 and 6 this ash occurs as laminated basal members of distinct depositional units defined by gradational upward changes in color, textural and burrowing. Cross-bedded clastic layers of VITRIC ASH are distinctive from 36-38 cm and 48-50 cm in Section 2. A white, subangular pumice fragment, 0.5 cm in diameter, is present at 30 cm in Section 6. Section 5 contains lithified worm burrows with siderite which occur from 20-40 cm.

SMEAR SLIDE SUMMARY (%):

	1, 68 M	2, 64 M	2, 101 D	4, 58 M	5, 17 M
TEXTURE:					
Sand	65	70	—	80	—
Silt	5	25	30	10	100
Clay	30	5	70	10	—
COMPOSITION:					
Chlorite	—	—	1	—	Tr
Clay	30	8	68	10	3
Diatoms	—	—	1	1	Tr
Feldspar	3	10	8	9	6
Glass	64	75	15	68	90
Opaques	—	2	1	5	—
Pyroxene	Tr	5	2	6	1
Radiolarians	2	—	2	1	Tr
Silicoflagellates	Tr	—	—	—	—
Spicules	1	—	2	—	—



SITE 784 HOLE A CORE 16R CORED INTERVAL 5036.8-5046.4 mbsl; 136.0-145.6 mbsf



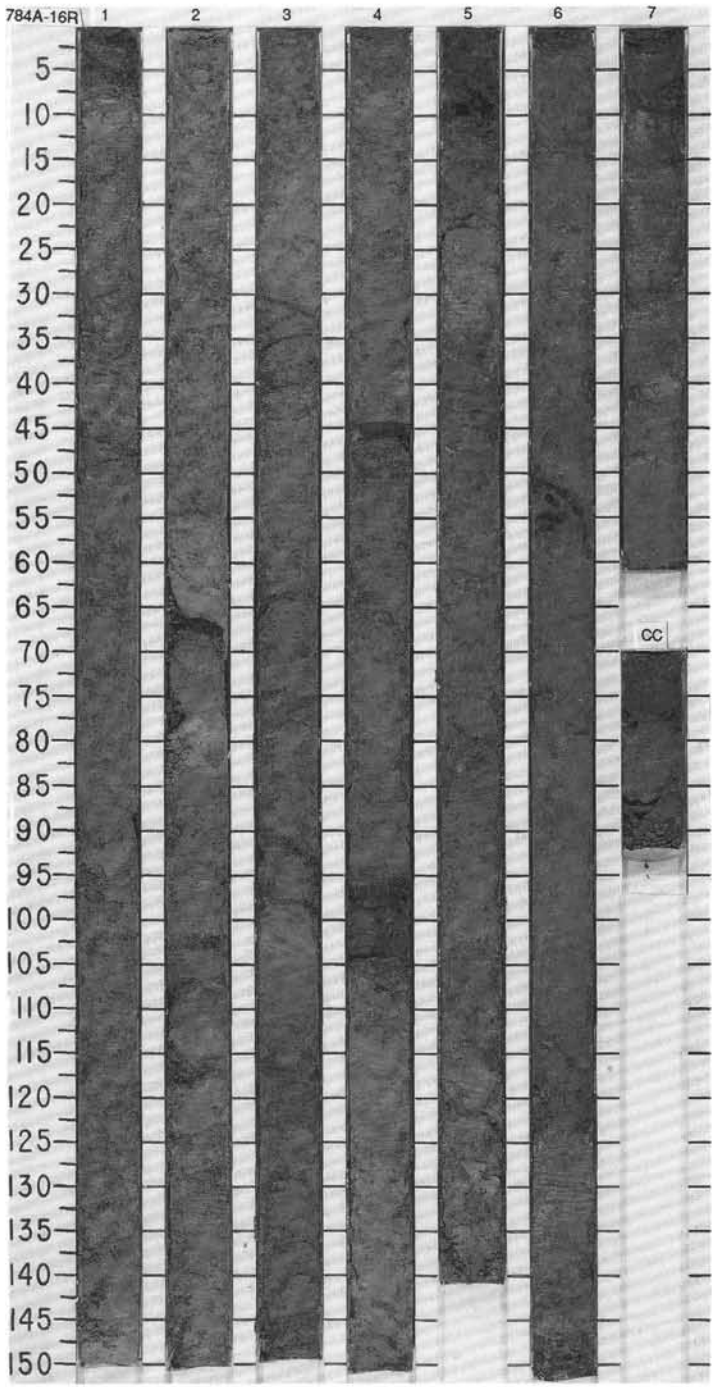
LITHOLOGIC DESCRIPTION

GLASS-RICH CLAYSTONE

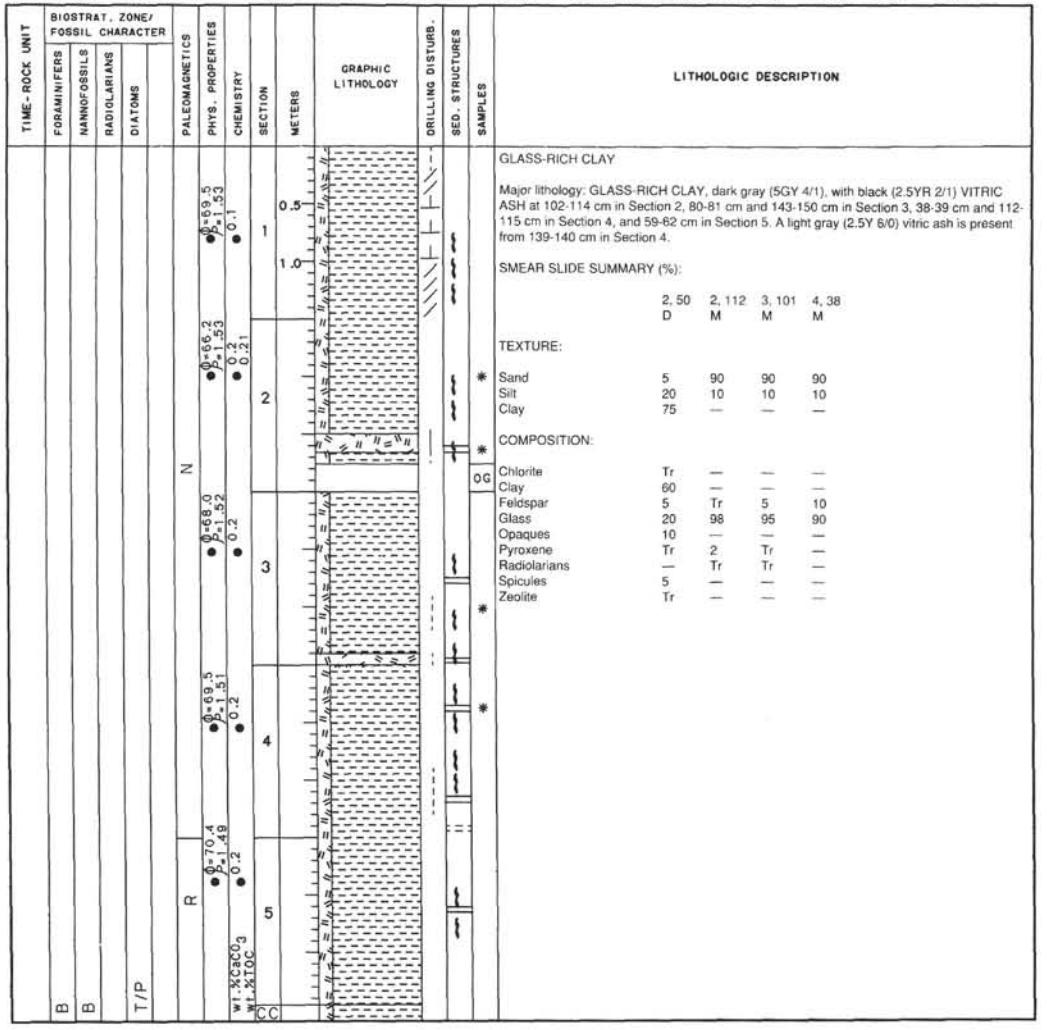
Major lithology: GLASS-RICH CLAYSTONE, FELDSPAR-RICH VITRIC CLAYSTONE, dark gray (5GY 4/1) with some intervals of gray (5YR 5/1). VITRIC ASH, black (10YR 2/1), is present at 67-68 cm in Section 2, 44-46 cm and 103-104 cm in Section 4, and 80-97 cm in Section 6; the ash layer in Section 2 and the lower ash layer in Section 4 are portions of depositional units described in 125-784A-15R. Cross-cutting, inclined deformational structures in vitric silty claystone occur from 98-106 cm in Section 3. A pumice fragment, gray, rounded, 0.5 cm in size, is at 101 cm in Section 4. Veins of greenish gray (5G 4/2) serpentine are present between 51-56 cm in Section 6.

SMEAR SLIDE SUMMARY (%):

	2, 65 D	2, 68 D	3, 35 M	4, 45 M	5, 100 D	6, 50 D	6, 52 M
TEXTURE:							
Sand	—	—	15	—	—	—	—
Silt	30	30	40	100	20	10	10
Clay	70	70	45	—	80	90	90
COMPOSITION:							
Chlorite	—	—	3	1	—	—	—
Clay	10	5	45	—	40	55	70
Diatoms	Tr	—	—	—	Tr	5	—
Feldspar	5	5	5	17	15	—	Tr
Glass	75	85	38	70	30	25	—
Opaques	5	Tr	1	5	5	5	10
Pyroxene	—	—	1	7	Tr	—	Tr
Radiolarians	5	—	—	—	Tr	Tr	—
Serpentine	—	5	2	—	5	5	20
Silicoflagellates	—	—	—	—	Tr	Tr	—
Spicules	Tr	—	—	—	5	5	—
Zeolite	—	—	—	—	—	Tr	—



SITE 784 HOLE A CORE 17R CORED INTERVAL 5046.4-5056.1 mbsl; 145.6-155.3 mbsf



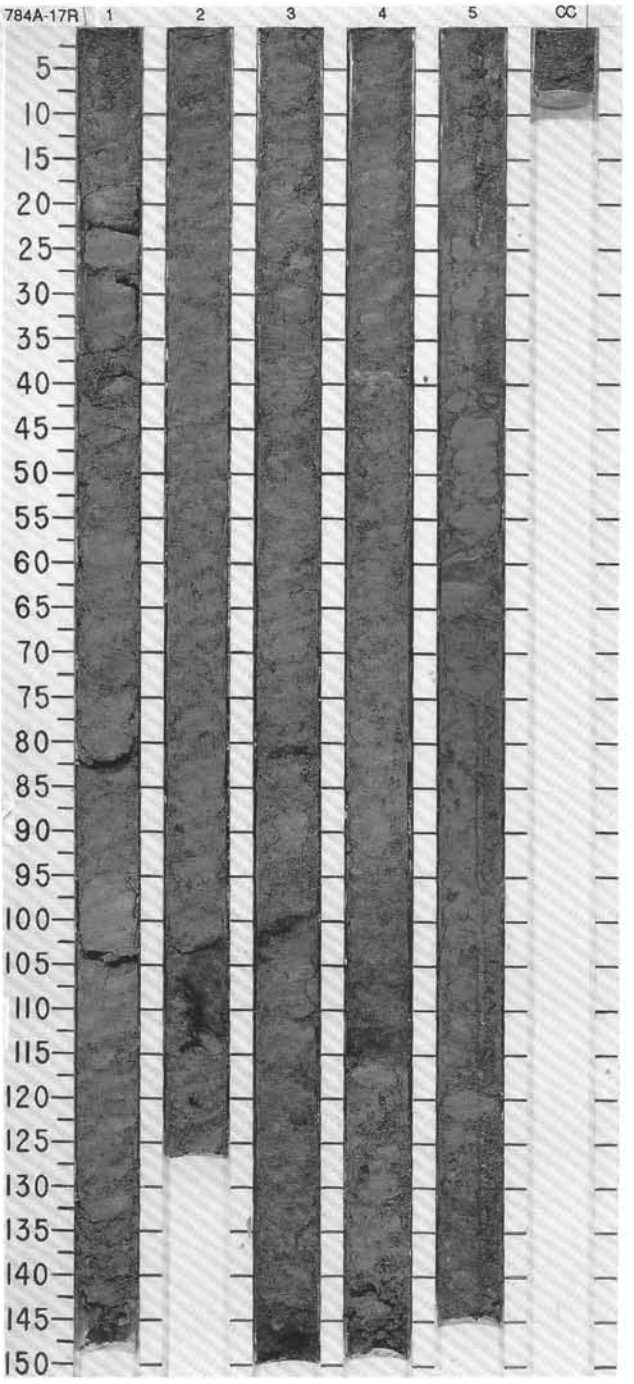
LITHOLOGIC DESCRIPTION

GLASS-RICH CLAY

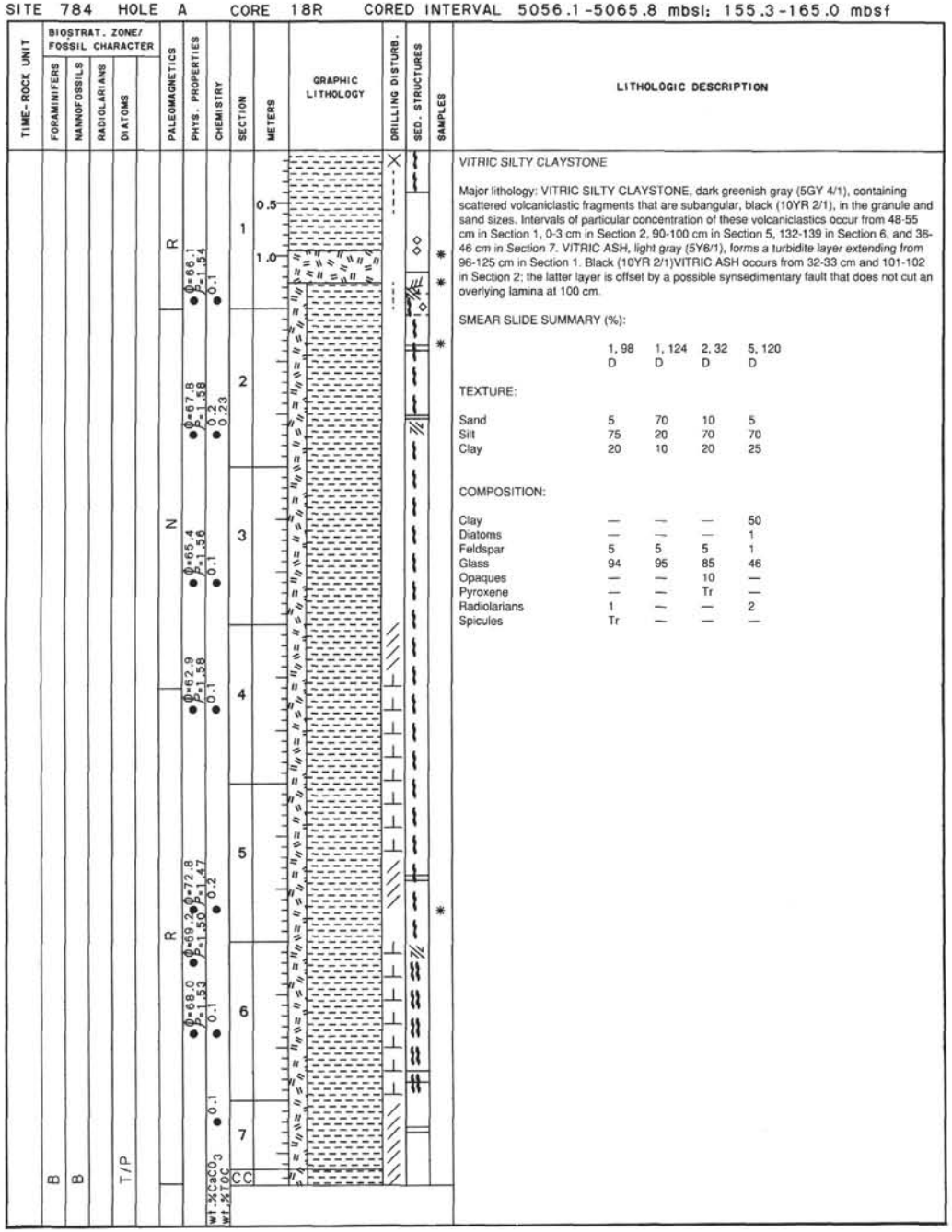
Major lithology: GLASS-RICH CLAY, dark gray (5GY 4/1), with black (2.5YR 2/1) VITRIC ASH at 102-114 cm in Section 2, 80-81 cm and 143-150 cm in Section 3, 38-39 cm and 112-115 cm in Section 4, and 59-62 cm in Section 5. A light gray (2.5Y 6/0) vitric ash is present from 139-140 cm in Section 4.

SMEAR SLIDE SUMMARY (%):

	2, 50 D	2, 112 M	3, 101 M	4, 38 M
TEXTURE:				
Sand	5	90	90	90
Silt	20	10	10	10
Clay	75	—	—	—
COMPOSITION:				
Chlorite	Tr	—	—	—
Clay	60	—	—	—
Feldspar	5	Tr	5	10
Glass	20	98	95	90
Opaques	10	—	—	—
Pyroxene	Tr	2	Tr	—
Radiolarians	—	Tr	Tr	—
Spicules	5	—	—	—
Zeolite	Tr	—	—	—



SITE 784 HOLE A CORE 18R CORED INTERVAL 5056.1-5065.8 mbsl; 155.3-165.0 mbsf



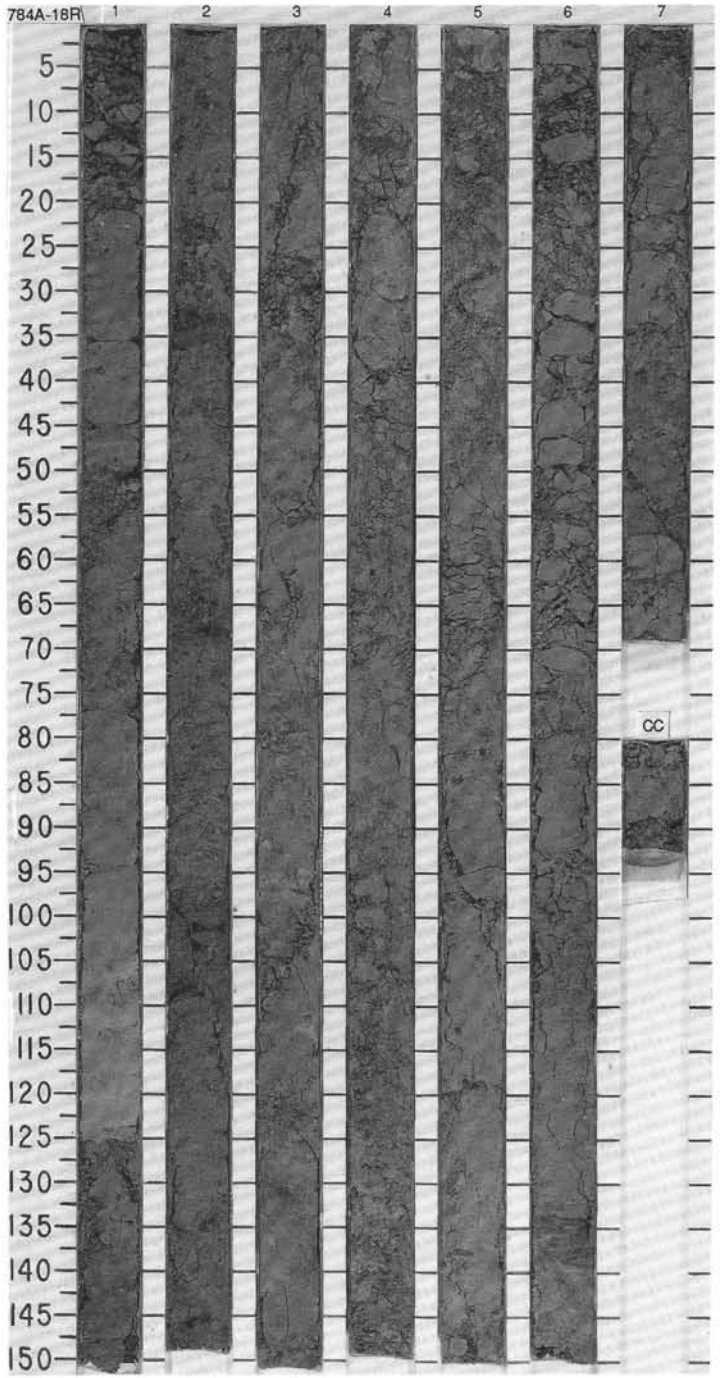
LITHOLOGIC DESCRIPTION

VITRIC SILTY CLAYSTONE

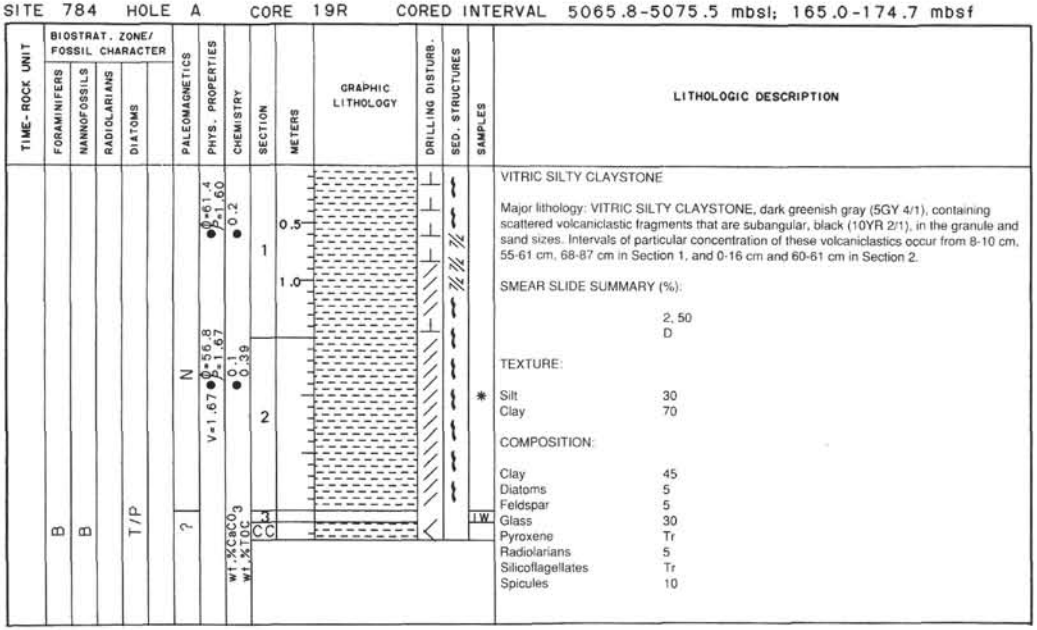
Major lithology: VITRIC SILTY CLAYSTONE, dark greenish gray (5GY 4/1), containing scattered volcaniclastic fragments that are subangular, black (10YR 2/1), in the granule and sand sizes. Intervals of particular concentration of these volcaniclastics occur from 48-55 cm in Section 1, 0-3 cm in Section 2, 90-100 cm in Section 5, 132-139 in Section 6, and 36-46 cm in Section 7. VITRIC ASH, light gray (5Y6/1), forms a turbidite layer extending from 96-125 cm in Section 1. Black (10YR 2/1)VITRIC ASH occurs from 32-33 cm and 101-102 in Section 2; the latter layer is offset by a possible synsedimentary fault that does not cut an overlying lamina at 100 cm.

SMEAR SLIDE SUMMARY (%):

	1, 98 D	1, 124 D	2, 32 D	5, 120 D
TEXTURE:				
Sand	5	70	10	5
Silt	75	20	70	70
Clay	20	10	20	25
COMPOSITION:				
Clay	—	—	—	50
Diatoms	—	—	—	1
Feldspar	5	5	5	1
Glass	94	95	85	46
Opaques	—	—	10	—
Pyroxene	—	—	Tr	—
Radiolarians	1	—	—	2
Spicules	Tr	—	—	—



SITE 784 HOLE A CORE 19R CORED INTERVAL 5065.8-5075.5 mbsl; 165.0-174.7 mbsf

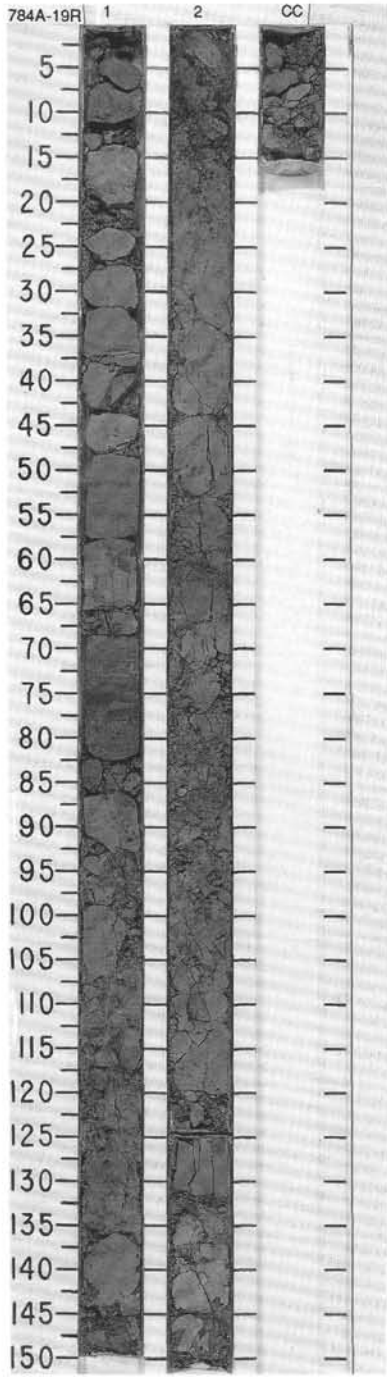


VITRIC SILTY CLAYSTONE

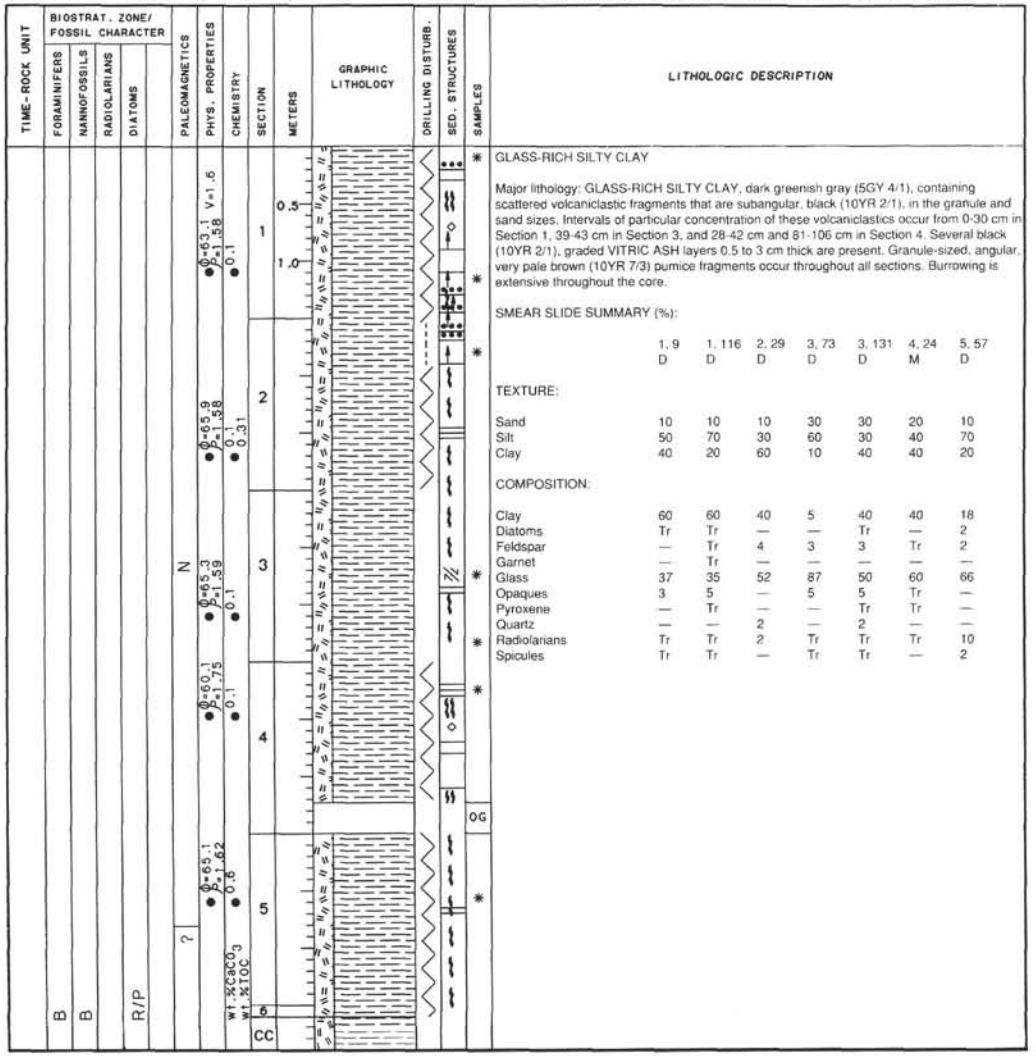
Major lithology: VITRIC SILTY CLAYSTONE, dark greenish gray (5GY 4/1), containing scattered volcaniclastic fragments that are subangular, black (10YR 2/1), in the granule and sand sizes. Intervals of particular concentration of these volcaniclastics occur from 8-10 cm, 55-61 cm, 68-87 cm in Section 1, and 0-16 cm and 60-61 cm in Section 2.

SMEAR SLIDE SUMMARY (%):

	2, 50
	D
TEXTURE:	
Silt	30
Clay	70
COMPOSITION:	
Clay	45
Diatoms	5
Feldspar	5
Glass	30
Pyroxene	Tr
Radiolarians	5
Silicoflagellates	Tr
Spicules	10



SITE 784 HOLE A CORE 20R CORED INTERVAL 5075.5-5085.2 mbsl; 174.7-184.4 mbsf



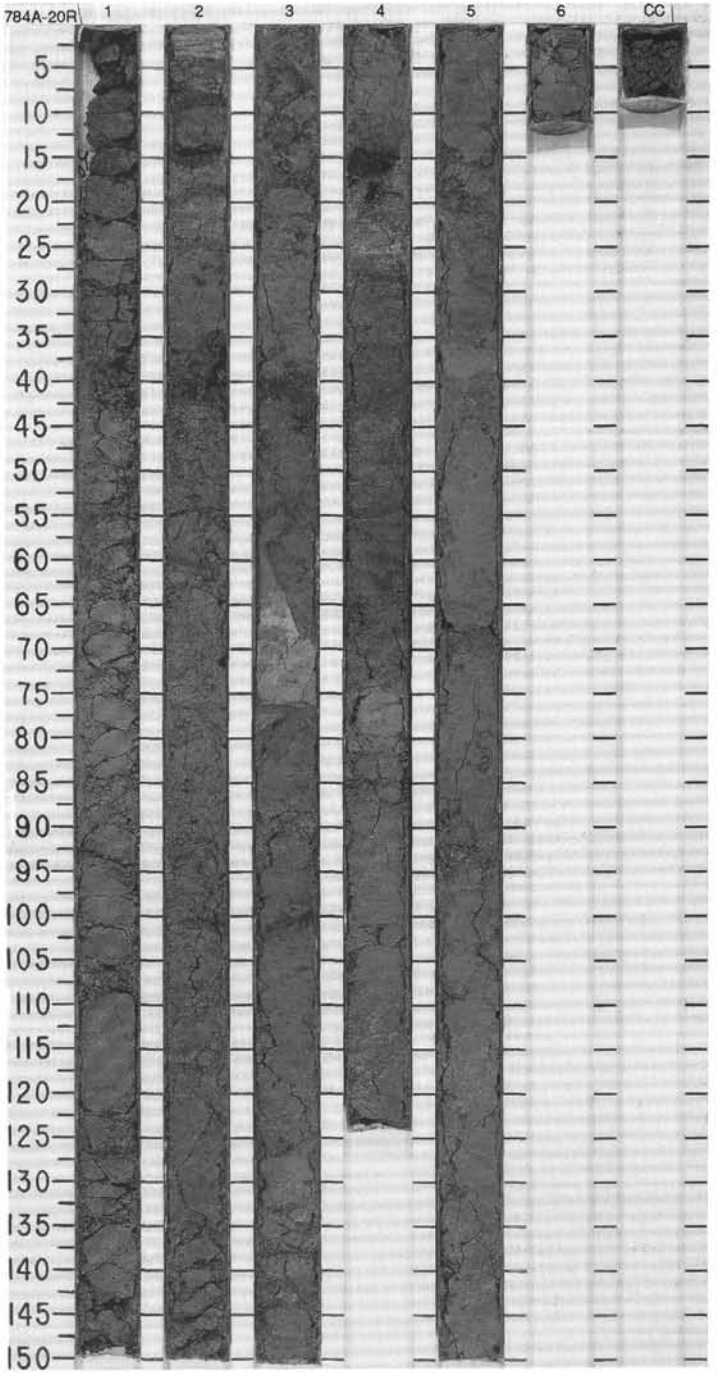
LITHOLOGIC DESCRIPTION

GLASS-RICH SILTY CLAY

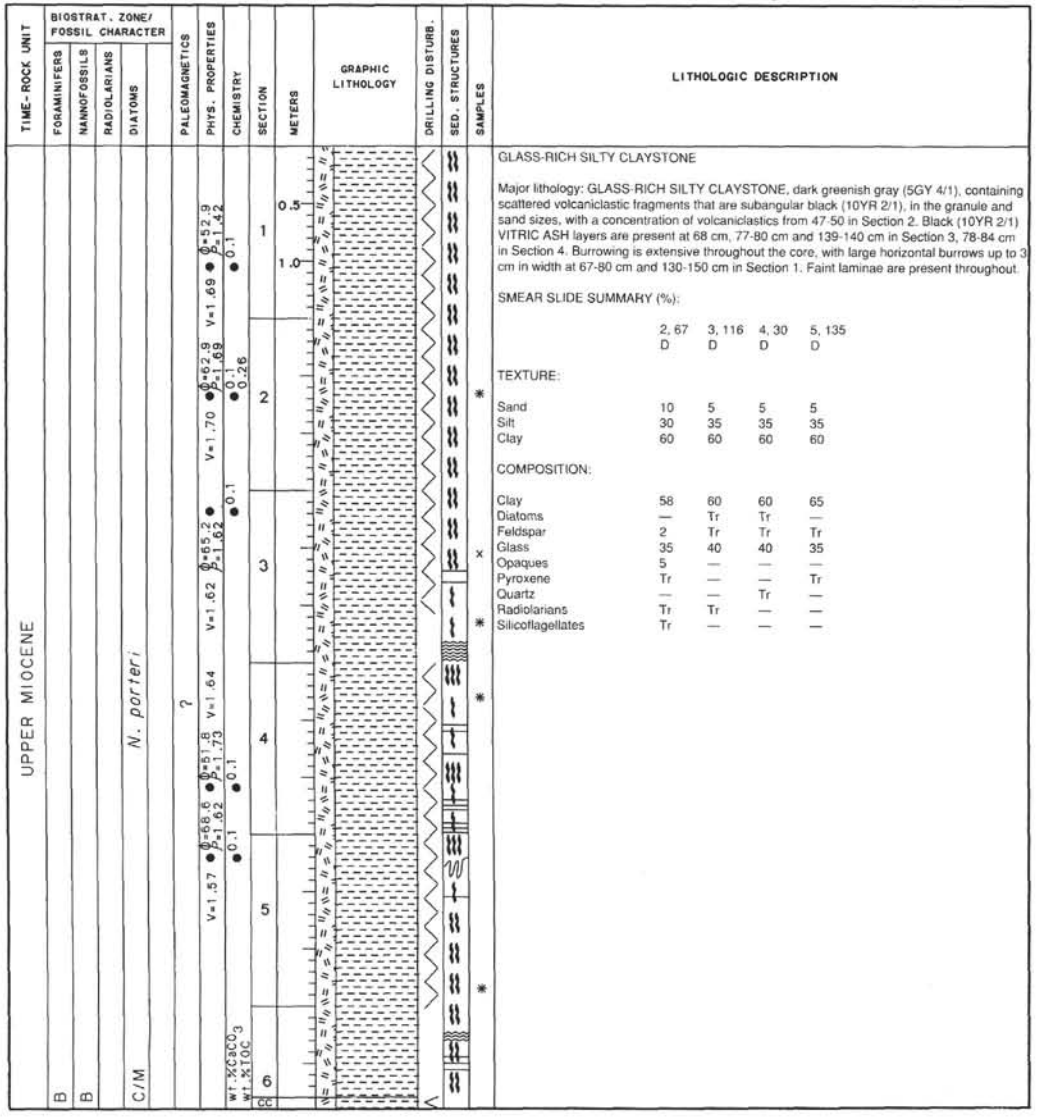
Major lithology: GLASS-RICH SILTY CLAY, dark greenish gray (5GY 4/1), containing scattered volcaniclastic fragments that are subangular, black (10YR 2/1), in the granule and sand sizes. Intervals of particular concentration of these volcaniclastics occur from 0-30 cm in Section 1, 39-43 cm in Section 3, and 28-42 cm and 81-106 cm in Section 4. Several black (10YR 2/1), graded VITRIC ASH layers 0.5 to 3 cm thick are present. Granule-sized, angular, very pale brown (10YR 7/3) pumice fragments occur throughout all sections. Burrowing is extensive throughout the core.

SMEAR SLIDE SUMMARY (%):

	1, 9 D	1, 116 D	2, 29 D	3, 73 D	3, 131 D	4, 24 M	5, 57 D
TEXTURE:							
Sand	10	10	10	30	30	20	10
Silt	50	70	30	60	30	40	70
Clay	40	20	60	10	40	40	20
COMPOSITION:							
Clay	60	60	40	5	40	40	18
Diatoms	Tr	Tr	—	—	Tr	—	2
Feldspar	—	Tr	4	3	3	Tr	2
Garnet	—	Tr	—	—	—	—	—
Glass	37	35	52	87	50	60	66
Opaques	3	5	—	5	5	Tr	—
Pyroxene	—	Tr	—	—	Tr	Tr	—
Quartz	—	—	2	—	2	—	—
Radiolarians	Tr	Tr	2	Tr	Tr	Tr	10
Spicules	Tr	Tr	—	Tr	Tr	—	2



SITE 784 HOLE A CORE 21R CORED INTERVAL 5085.2-5094.8 mbsl; 184.4-194.0 mbsf



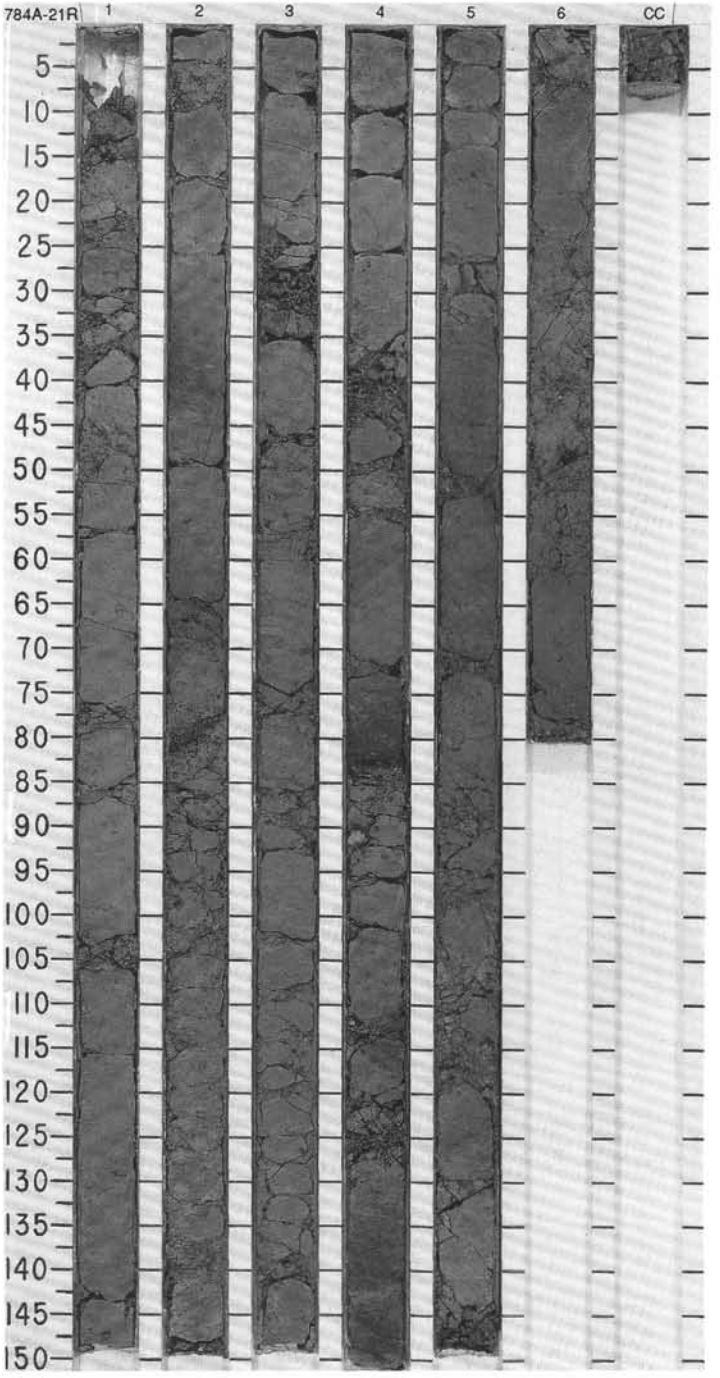
LITHOLOGIC DESCRIPTION

GLASS-RICH SILTY CLAYSTONE

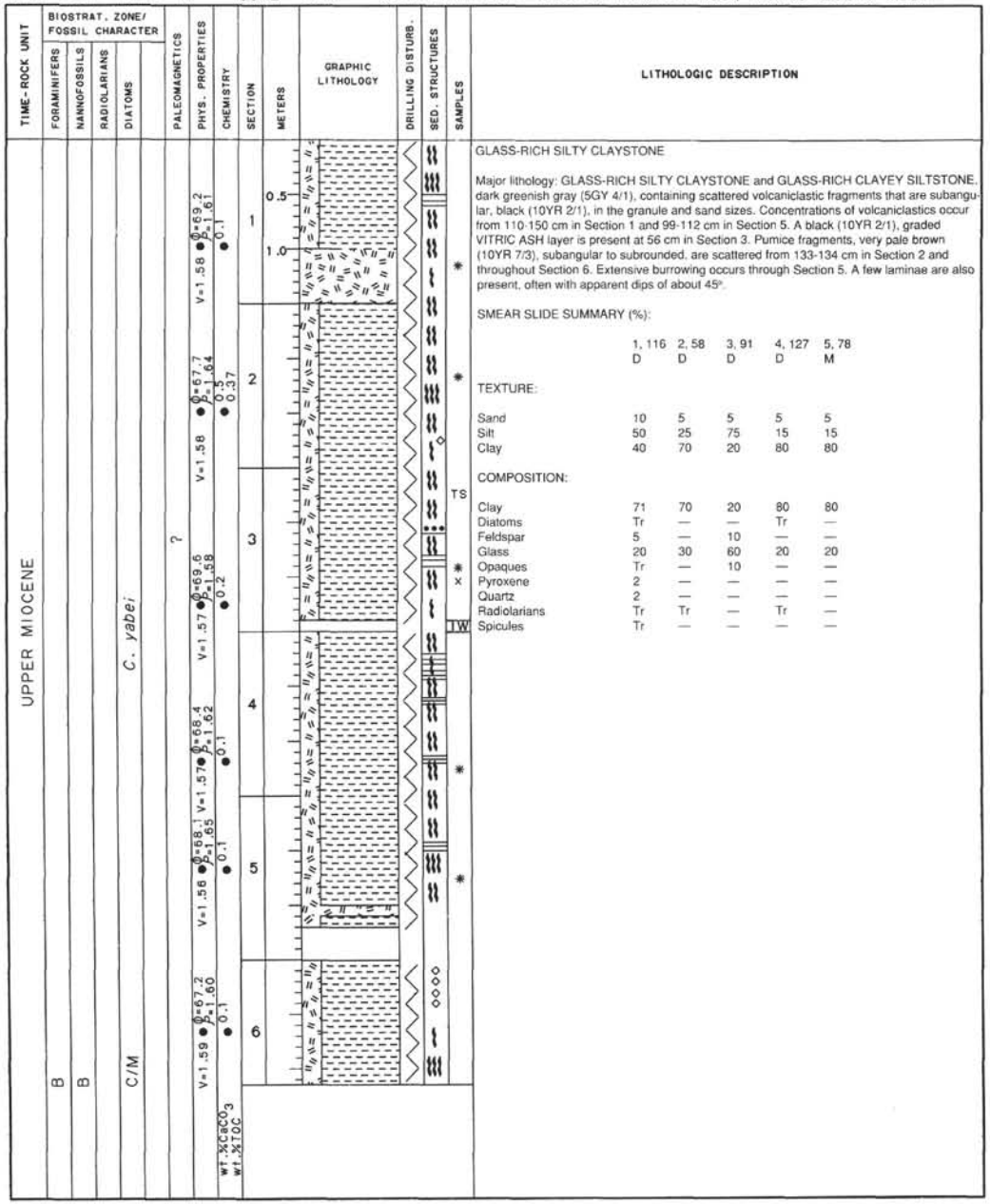
Major lithology: GLASS-RICH SILTY CLAYSTONE, dark greenish gray (5GY 4/1), containing scattered volcaniclastic fragments that are subangular black (10YR 2/1), in the granule and sand sizes, with a concentration of volcaniclastics from 47-50 in Section 2. Black (10YR 2/1) VITRIC ASH layers are present at 68 cm, 77-80 cm and 139-140 cm in Section 3, 78-84 cm in Section 4. Burrowing is extensive throughout the core, with large horizontal burrows up to 3 cm in width at 67-80 cm and 130-150 cm in Section 1. Faint laminae are present throughout.

SMEAR SLIDE SUMMARY (%):

	2, 67 D	3, 116 D	4, 30 D	5, 135 D
TEXTURE:				
Sand	10	5	5	5
Silt	30	35	35	35
Clay	60	60	60	60
COMPOSITION:				
Clay	58	60	60	65
Diatoms	—	Tr	Tr	—
Feldspar	2	Tr	Tr	Tr
Glass	35	40	40	35
Opaques	5	—	—	—
Pyroxene	Tr	—	—	Tr
Quartz	—	—	Tr	—
Radiolarians	Tr	Tr	—	—
Silicoflagellates	Tr	—	—	—



SITE 784 HOLE A CORE 22R CORED INTERVAL 5094.8-5104.4 mbsl; 194.0-203.6 mbsf



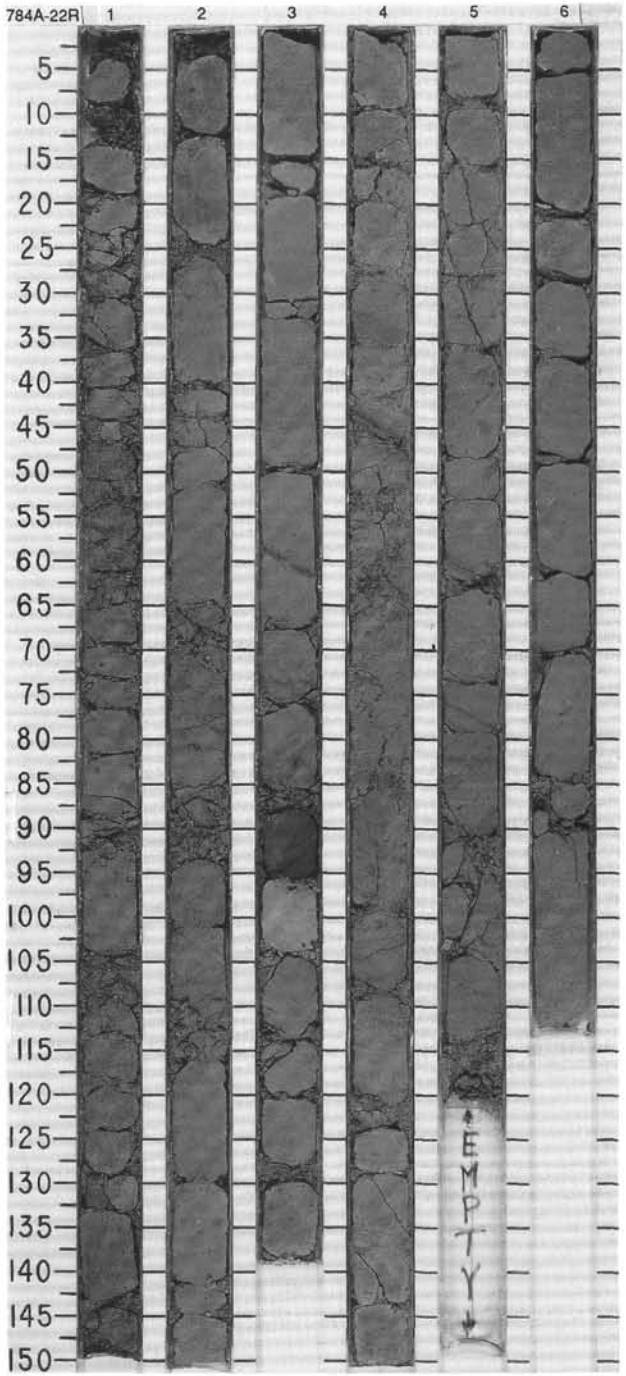
LITHOLOGIC DESCRIPTION

GLASS-RICH SILTY CLAYSTONE

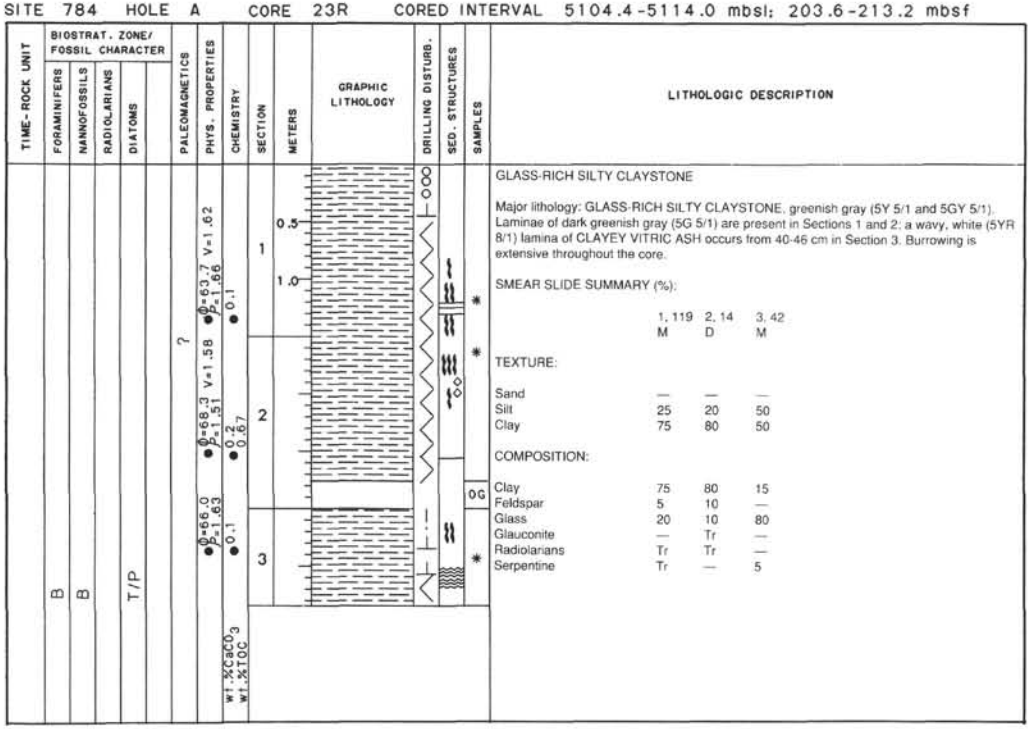
Major lithology: GLASS-RICH SILTY CLAYSTONE and GLASS-RICH CLAYEY SILTSTONE, dark greenish gray (5GY 4/1), containing scattered volcaniclastic fragments that are subangular, black (10YR 2/1), in the granule and sand sizes. Concentrations of volcaniclastics occur from 110-150 cm in Section 1 and 99-112 cm in Section 5. A black (10YR 2/1), graded VITRIC ASH layer is present at 56 cm in Section 3. Pumice fragments, very pale brown (10YR 7/3), subangular to subrounded, are scattered from 133-134 cm in Section 2 and throughout Section 6. Extensive burrowing occurs through Section 5. A few laminae are also present, often with apparent dips of about 45°.

SMEAR SLIDE SUMMARY (%):

	1, 116 D	2, 58 D	3, 91 D	4, 127 D	5, 78 M
TEXTURE:					
Sand	10	5	5	5	5
Silt	50	25	75	15	15
Clay	40	70	20	80	80
COMPOSITION:					
Clay	71	70	20	80	80
Diatoms	Tr	—	—	Tr	—
Feldspar	5	—	10	—	—
Glass	20	30	60	20	20
Opaques	Tr	—	10	—	—
Pyroxene	2	—	—	—	—
Quartz	2	—	—	—	—
Radiolarians	Tr	Tr	—	Tr	—
Spicules	Tr	—	—	—	—



SITE 784 HOLE A CORE 23R CORED INTERVAL 5104.4-5114.0 mbsl; 203.6-213.2 mbsf



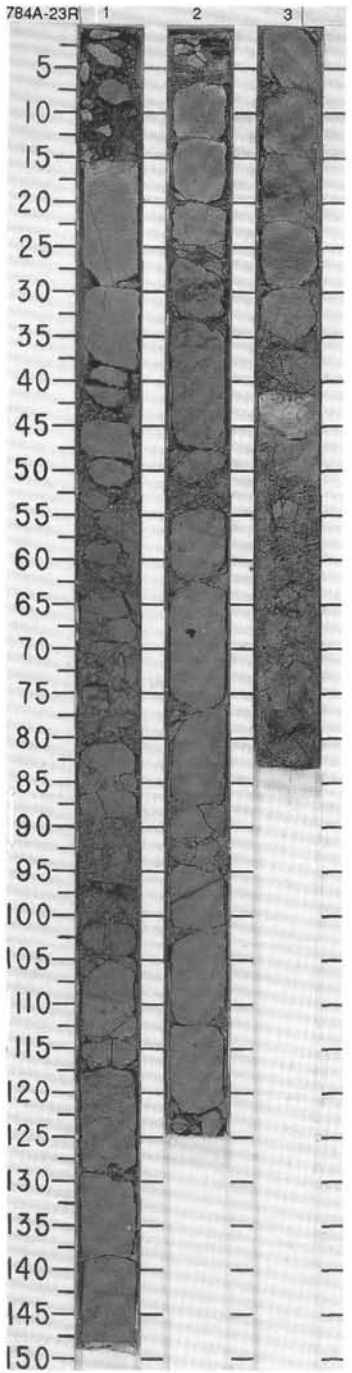
LITHOLOGIC DESCRIPTION

GLASS-RICH SILTY CLAYSTONE

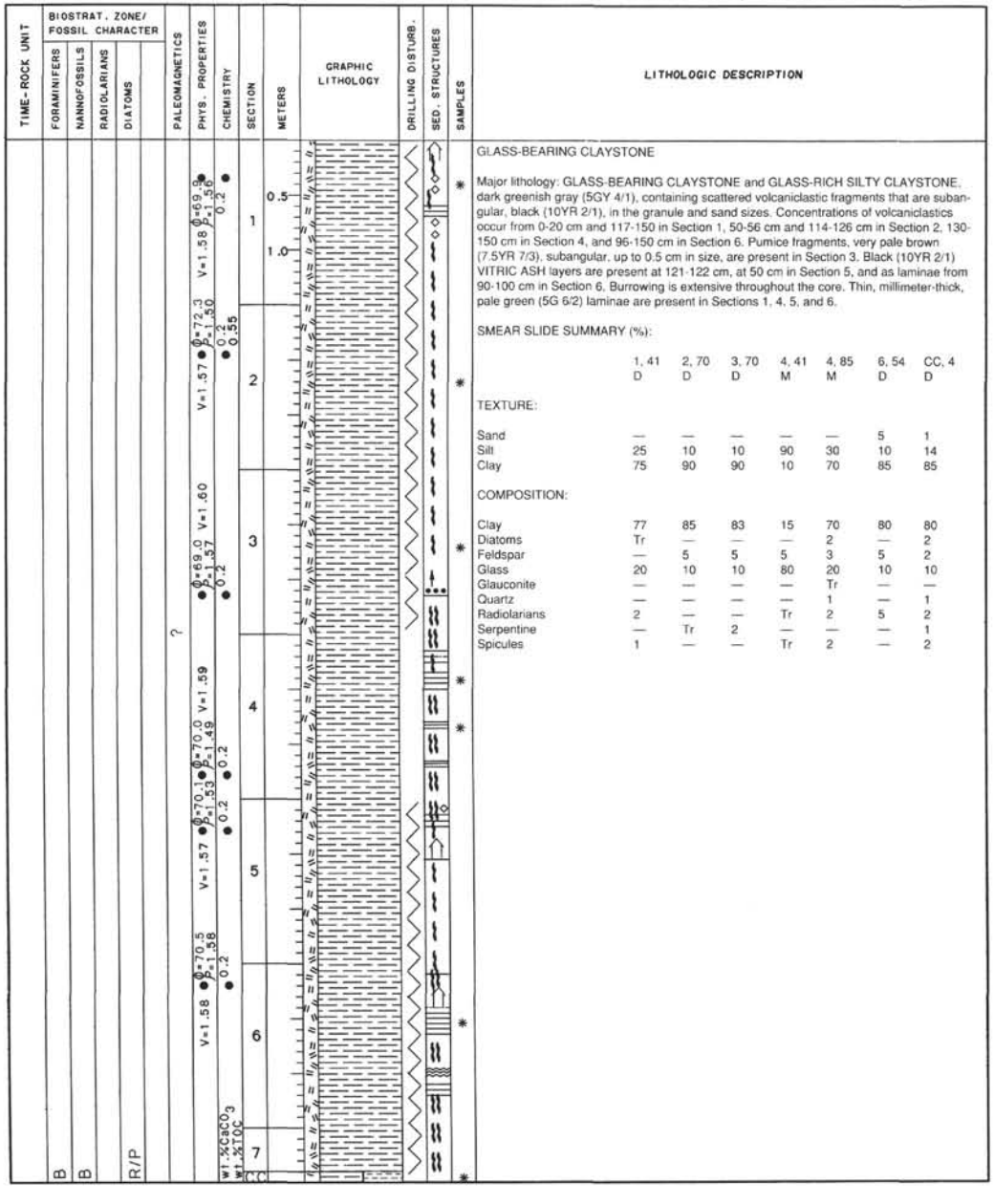
Major lithology: GLASS-RICH SILTY CLAYSTONE, greenish gray (5Y 5/1 and 5GY 5/1). Laminae of dark greenish gray (5G 5/1) are present in Sections 1 and 2; a wavy, white (5YR 8/1) lamina of CLAYEY VITRIC ASH occurs from 40-46 cm in Section 3. Burrowing is extensive throughout the core.

SMEAR SLIDE SUMMARY (%):

	1, 119 M	2, 14 D	3, 42 M
TEXTURE:			
Sand	—	—	—
Silt	25	20	50
Clay	75	80	50
COMPOSITION:			
Clay	75	80	15
Feldspar	5	10	—
Glass	20	10	80
Glauconite	—	Tr	—
Radiolarians	Tr	Tr	—
Serpentine	Tr	—	5



SITE 784 HOLE A CORE 24R CORED INTERVAL 5114.0-5123.7 mbsl; 213.2-222.9 mbsf



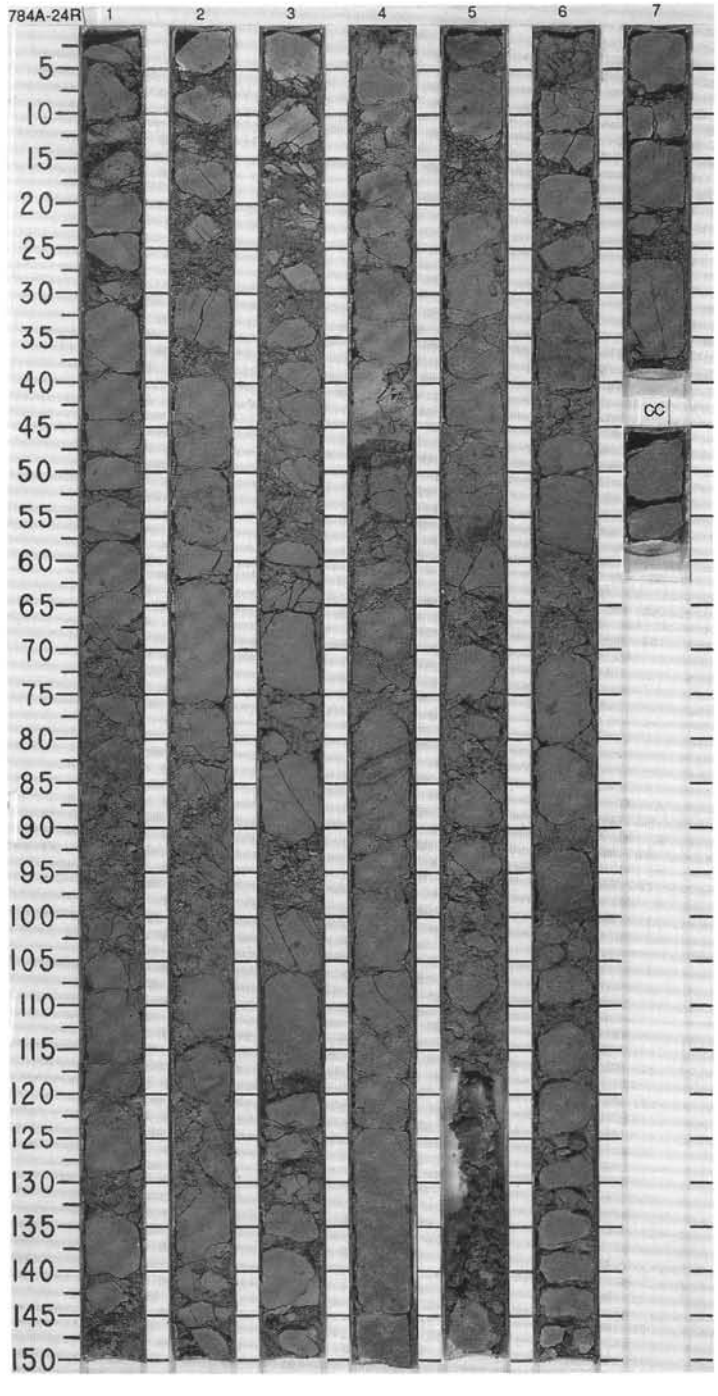
LITHOLOGIC DESCRIPTION

GLASS-BEARING CLAYSTONE

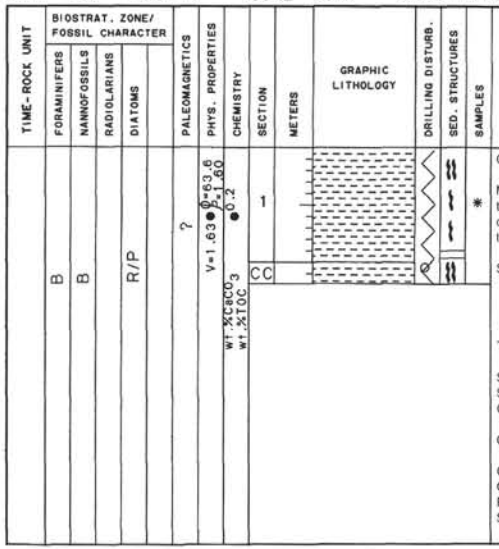
Major lithology: GLASS-BEARING CLAYSTONE and GLASS-RICH SILTY CLAYSTONE, dark greenish gray (5GY 4/1), containing scattered volcaniclastic fragments that are subangular, black (10YR 2/1), in the granule and sand sizes. Concentrations of volcaniclastics occur from 0-20 cm and 117-150 in Section 1, 50-56 cm and 114-126 cm in Section 2, 130-150 cm in Section 4, and 96-150 cm in Section 6. Pumice fragments, very pale brown (7.5YR 7/3), subangular, up to 0.5 cm in size, are present in Section 3. Black (10YR 2/1) VITRIC ASH layers are present at 121-122 cm, at 50 cm in Section 5, and as laminae from 90-100 cm in Section 6. Burrowing is extensive throughout the core. Thin, millimeter-thick, pale green (5G 6/2) laminae are present in Sections 1, 4, 5, and 6.

SMEAR SLIDE SUMMARY (%):

	1, 41 D	2, 70 D	3, 70 D	4, 41 M	4, 85 M	6, 54 D	CC, 4 D
TEXTURE:							
Sand	—	—	—	—	—	5	1
Silt	25	10	10	90	30	10	14
Clay	75	90	90	10	70	85	85
COMPOSITION:							
Clay	77	85	83	15	70	80	80
Diatoms	Tr	—	—	—	2	—	2
Feldspar	—	5	5	5	3	5	2
Glass	20	10	10	80	20	10	10
Glauconite	—	—	—	—	Tr	—	—
Quartz	—	—	—	—	1	—	1
Radiolarians	2	—	—	Tr	2	5	2
Serpentine	—	Tr	2	—	—	—	1
Spicules	1	—	—	Tr	2	—	2



SITE 784 HOLE A CORE 25R CORED INTERVAL 5123.7-5133.3 mbsl; 222.9-232.5 mbsf



LITHOLOGIC DESCRIPTION

GLASS-BEARING CLAYSTONE

Major lithology: GLASS-BEARING CLAYSTONE, greenish gray (5Y 5/1), containing scattered sand-sized volcaniclastic fragments that are subangular, black (10YR 2/1), with a concentration of volcaniclastics from 92-93 in Section 1. Burrowing is extensive throughout the core.

SMEAR SLIDE SUMMARY (%):

	1, 48
	D

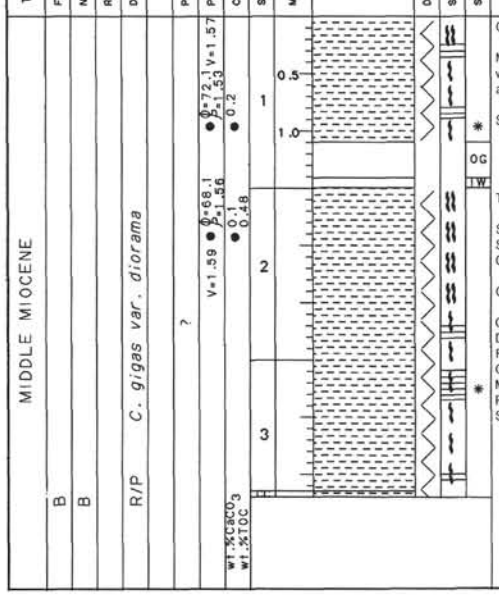
TEXTURE:

Sand	—
Silt	20
Clay	80

COMPOSITION:

Clay	82
Glass	10
Radiolarians	5
Spicules	3

SITE 784 HOLE A CORE 26R CORED INTERVAL 5133.3-5142.9 mbsl; 232.5-242.1 mbsf



LITHOLOGIC DESCRIPTION

GLASS-BEARING CLAYSTONE

Major lithology: GLASS-BEARING CLAYSTONE and CLAYSTONE, greenish gray (5Y 5/1), with volcaniclastic laminae at 30 cm and 80 cm in Section 1, 135 cm in Section 2, and 14 cm and 30 cm in Section 3. Burrowing is extensive throughout the core.

SMEAR SLIDE SUMMARY (%):

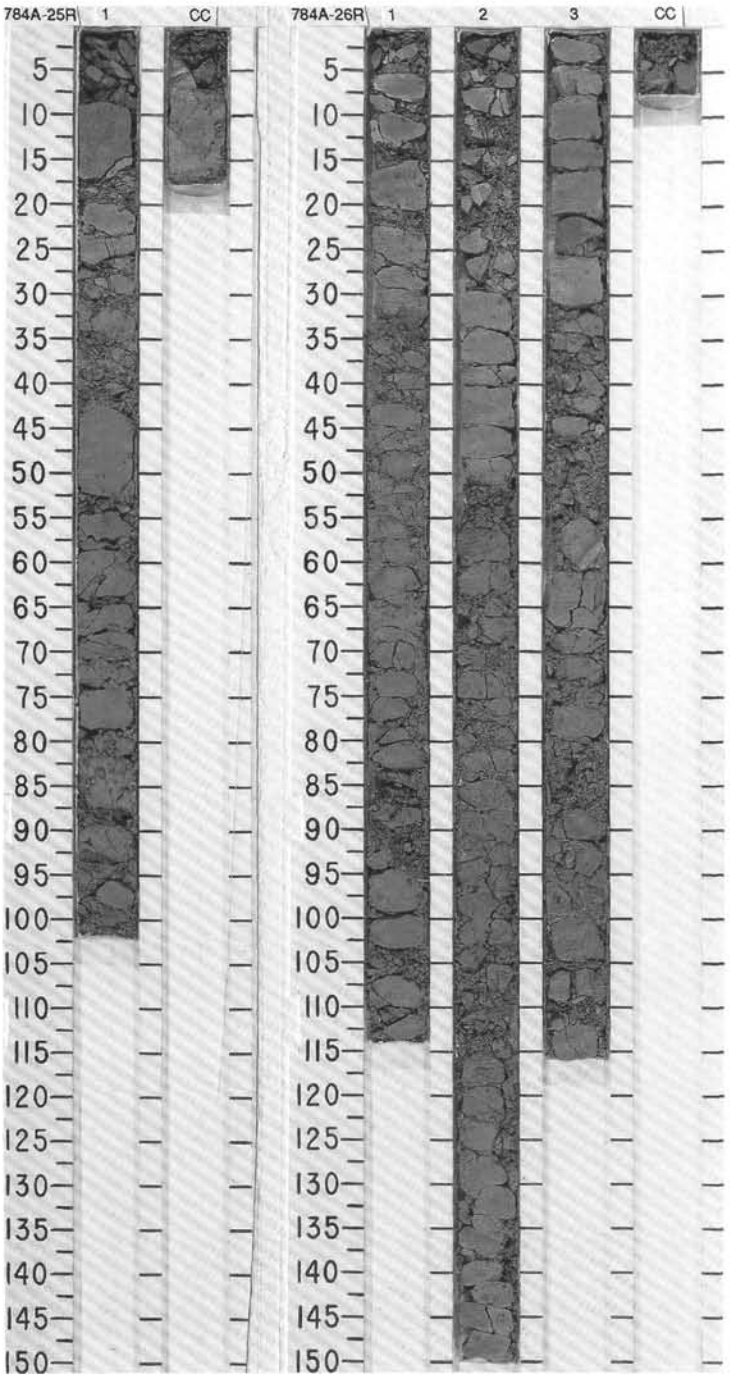
	1, 96	3, 27
	D	D

TEXTURE:

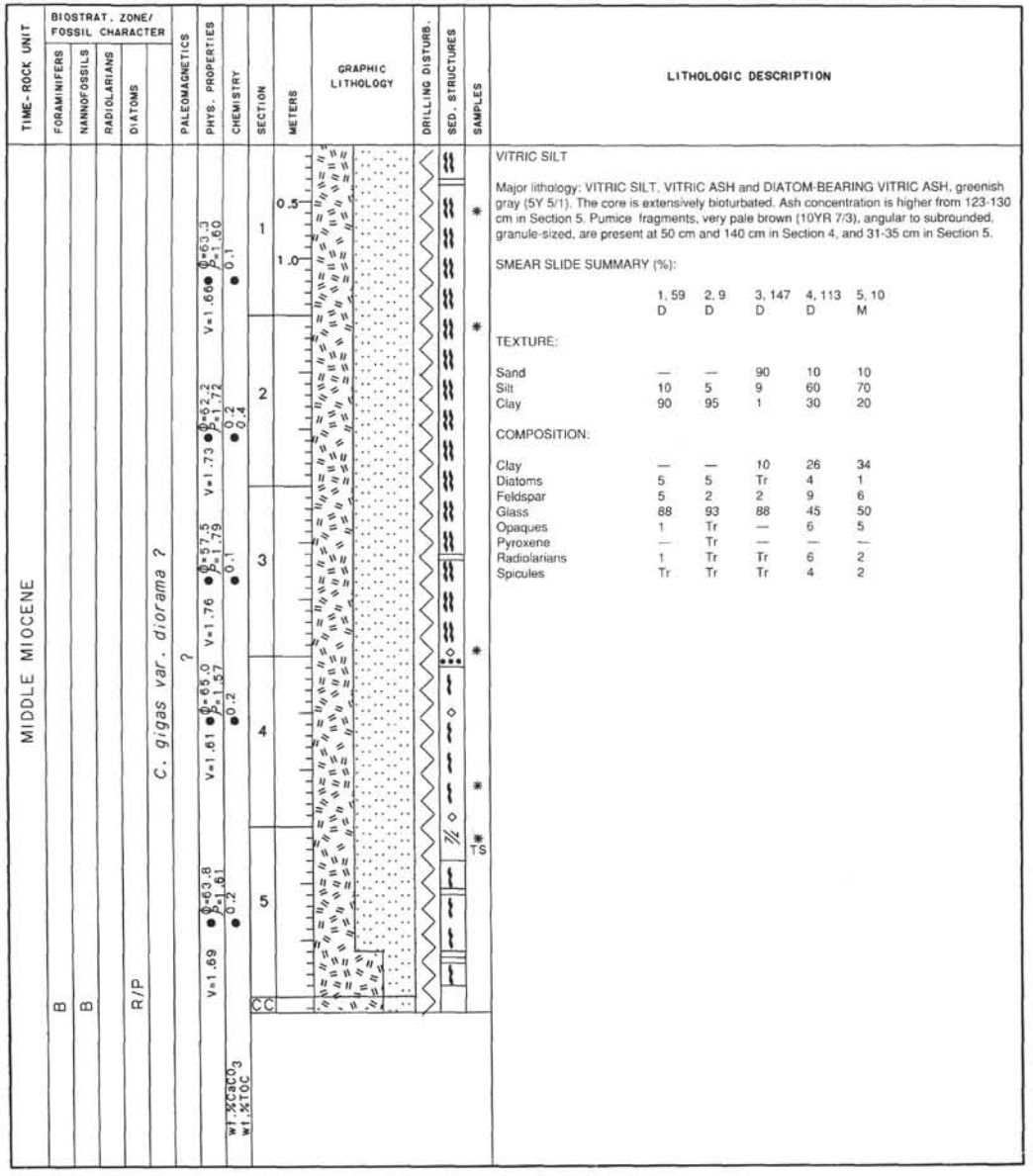
Sand	—	3
Silt	10	10
Clay	90	87

COMPOSITION:

Clay	70	34
Diatoms	—	1
Feldspar	5	3
Glass	15	—
Micrite	—	60
Radiolarians	5	2
Spicules	5	—



SITE 784 HOLE A CORE 27R CORED INTERVAL 5142.9-5152.6 mbsl; 242.1-251.8 mbsf



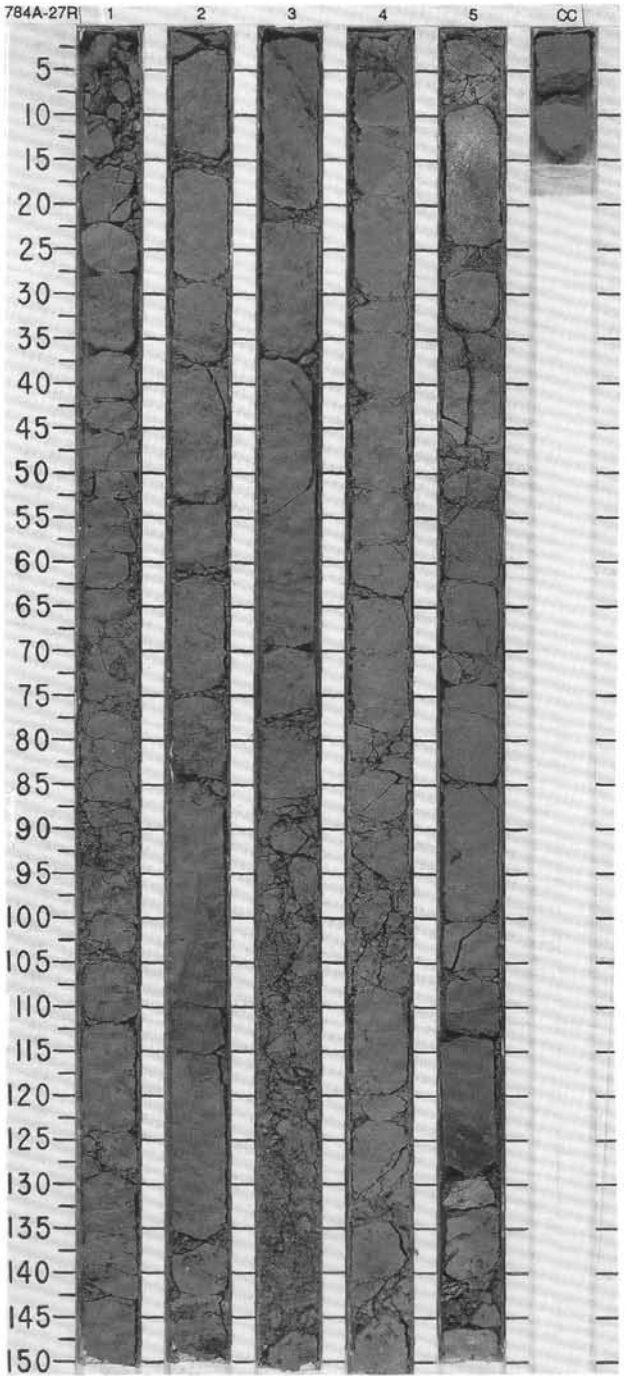
LITHOLOGIC DESCRIPTION

VITRIC SILT

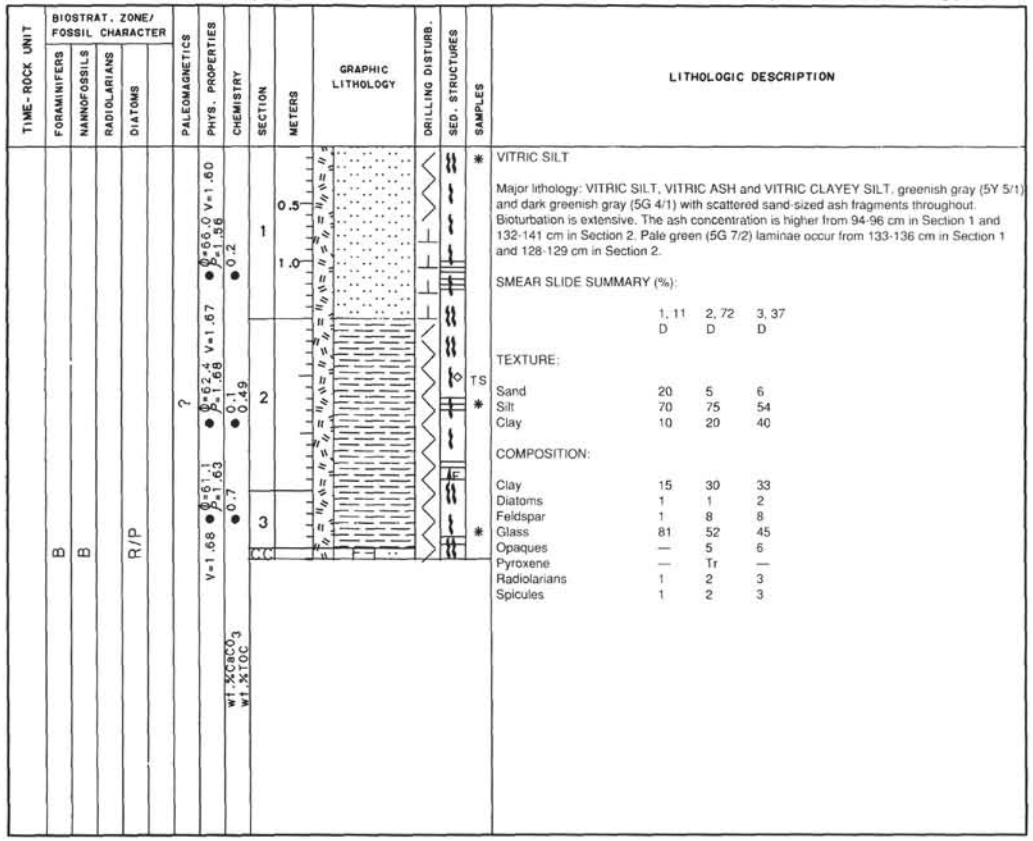
Major lithology: VITRIC SILT, VITRIC ASH and DIATOM-BEARING VITRIC ASH, greenish gray (5Y 5/1). The core is extensively bioturbated. Ash concentration is higher from 123-130 cm in Section 5. Pumice fragments, very pale brown (10YR 7/3), angular to subrounded, granule-sized, are present at 50 cm and 140 cm in Section 4, and 31-35 cm in Section 5.

SMEAR SLIDE SUMMARY (%):

	1, 59	2, 9	3, 147	4, 113	5, 10
	D	D	D	D	M
TEXTURE:					
Sand	—	—	90	10	10
Silt	10	5	9	60	70
Clay	90	95	1	30	20
COMPOSITION:					
Clay	—	—	10	26	34
Diatoms	5	5	Tr	4	1
Feldspar	5	2	2	9	6
Glass	88	93	88	45	50
Opaques	1	Tr	—	6	5
Pyroxene	—	Tr	—	—	—
Radiolarians	1	Tr	Tr	6	2
Spicules	Tr	Tr	Tr	4	2



SITE 784 HOLE A CORE 28R CORED INTERVAL 5152.6-5162.2 mbsl; 251.8-261.4 mbsf

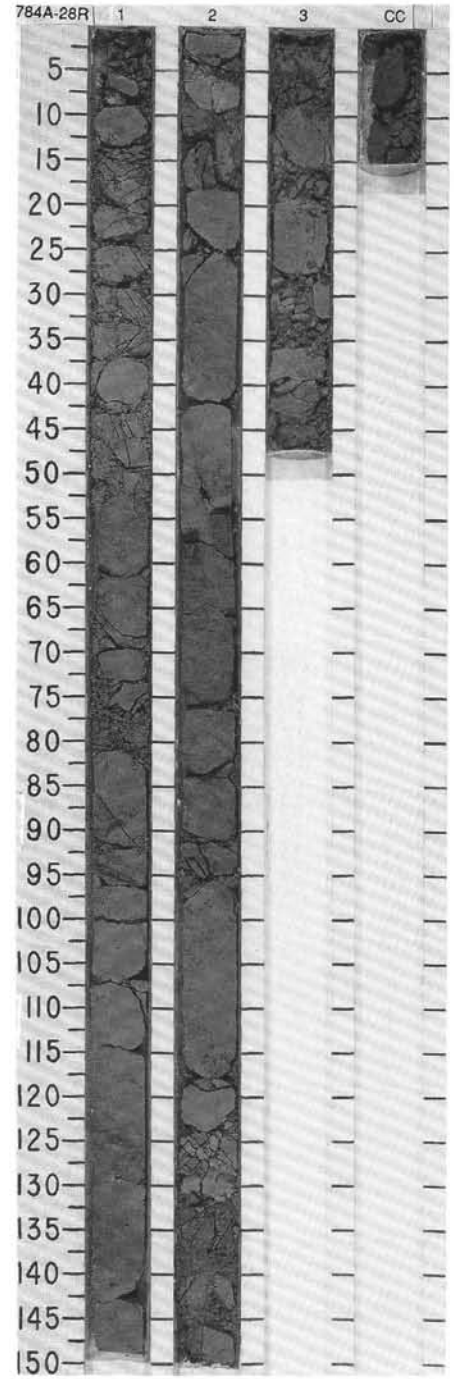


VITRIC SILT

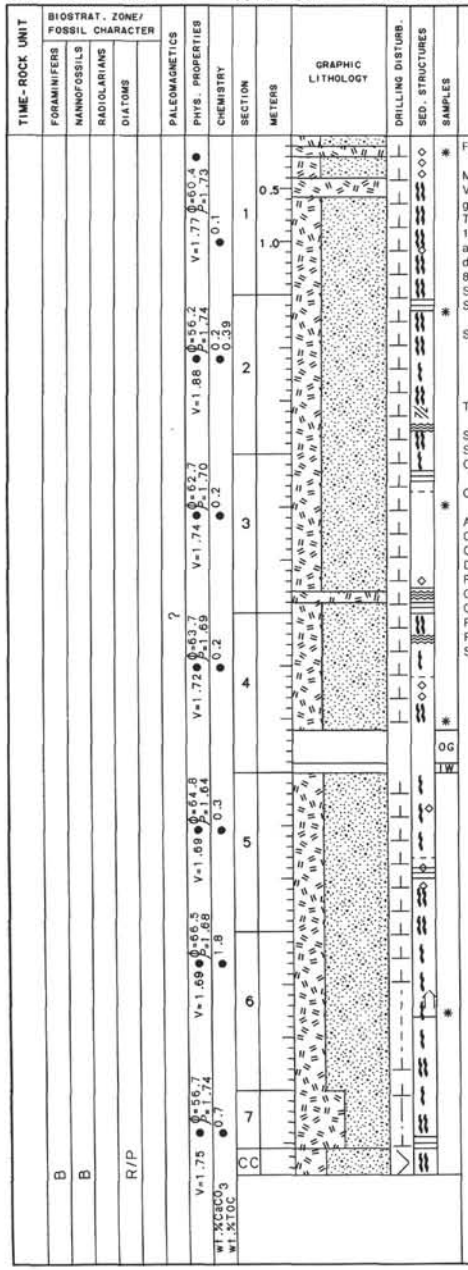
Major lithology: VITRIC SILT, VITRIC ASH and VITRIC CLAYEY SILT, greenish gray (5Y 5/1) and dark greenish gray (5G 4/1) with scattered sand-sized ash fragments throughout. Bioturbation is extensive. The ash concentration is higher from 94-96 cm in Section 1 and 132-141 cm in Section 2. Pale green (5G 7/2) laminae occur from 133-136 cm in Section 1 and 128-129 cm in Section 2.

SMEAR SLIDE SUMMARY (%):

	1, 11	2, 72	3, 37
	D	D	D
TEXTURE:			
Sand	20	5	6
Silt	70	75	54
Clay	10	20	40
COMPOSITION:			
Clay	15	30	33
Diatoms	1	1	2
Feldspar	1	8	8
Glass	81	52	45
Opaques	—	5	6
Pyroxene	—	Tr	—
Radiolarians	1	2	3
Spicules	1	2	3



SITE 784 HOLE A CORE 29R CORED INTERVAL 5162.2-5172.2 mbsl; 261.4-271.4 mbsf



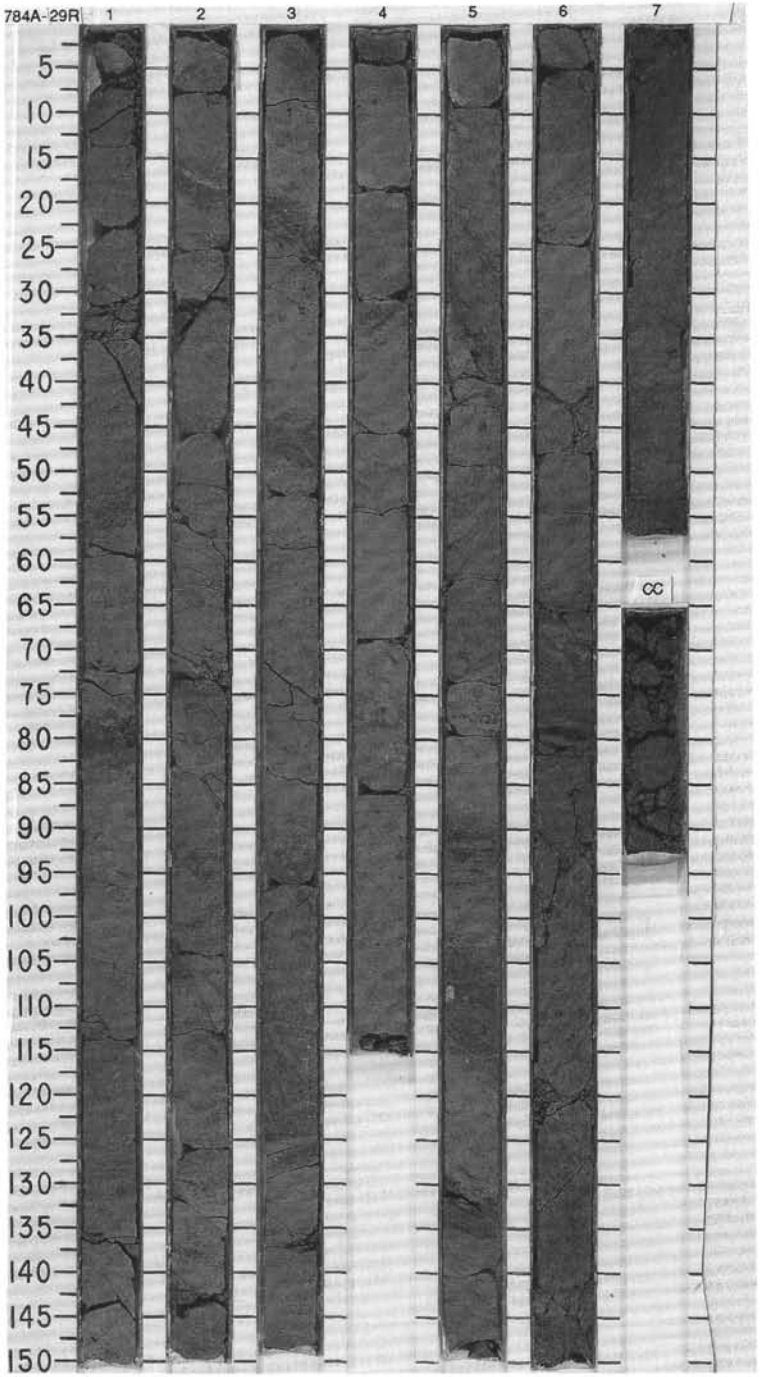
LITHOLOGIC DESCRIPTION

FELDSPAR AND GLASS-RICH SANDY SILTSTONE

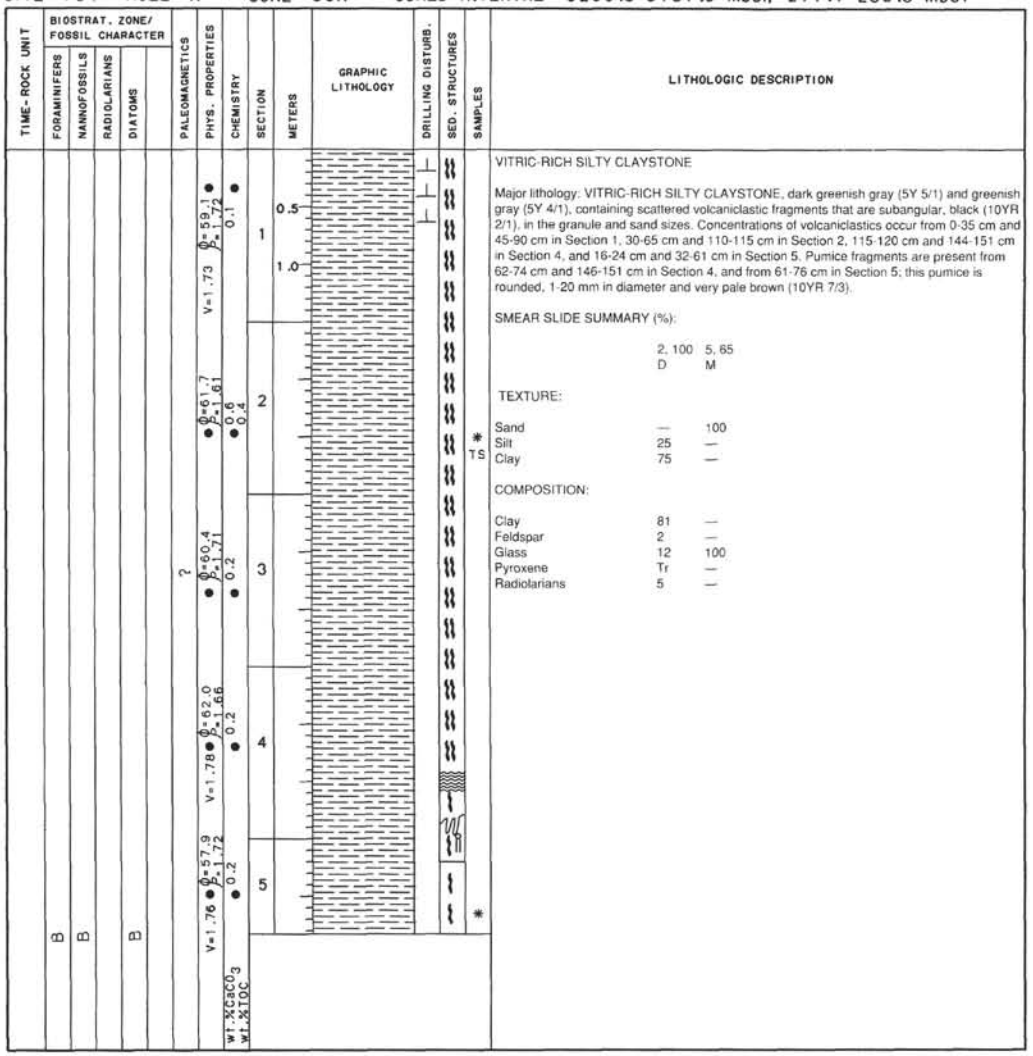
Major lithology: FELDSPAR and GLASS-RICH SANDY SILTSTONE, FELDSPAR-RICH VITRIC CLAYEY SILTSTONE and VITRIC SILT, greenish gray (5Y 5/1) and dark greenish gray (5G 4/1) with scattered sand-sized ash fragments throughout. Bioturbation is extensive. *The ash concentration is higher from 10-18 cm and 40-58 cm in Section 1, in laminae from* 125-137 cm in Section 3, and throughout Section 7. Pumice, very pale brown (10YR 7/3), angular to subrounded, is present from 28-30 cm and 117-119 cm in Section 1 as a 2 cm diameter particles, and as granule-sized fragments from 72-84 cm in Section 4, at 30 cm and 85-110 cm in Section 5. Pale green (5G7/2) laminae are present at 10 cm and 17-18 cm in Section 1, 15 cm and 125-135 cm in Section 3, 20-30 cm in Section 6, and throughout Section 7.

SMEAR SLIDE SUMMARY (%):

	1, 16	2, 17	3, 49	4, 102	6, 78
	D	M	D	D	D
TEXTURE:					
Sand	10	10	10	8	20
Silt	85	70	60	72	70
Clay	5	20	30	20	10
COMPOSITION:					
Amphibole	—	—	—	—	Tr
Chlorite	—	—	—	—	Tr
Clay	30	23	30	30	25
Diatoms	—	1	3	2	—
Feldspar	12	12	12	12	15
Glass	50	55	44	40	40
Opaques	8	6	4	10	15
Pyroxene	—	—	—	Tr	3
Radiolarians	—	1	3	3	Tr
Spicules	Tr	2	4	3	2



SITE 784 HOLE A CORE 30R CORED INTERVAL 5200.8-5181.6 mbsl; 271.4-280.8 mbsf

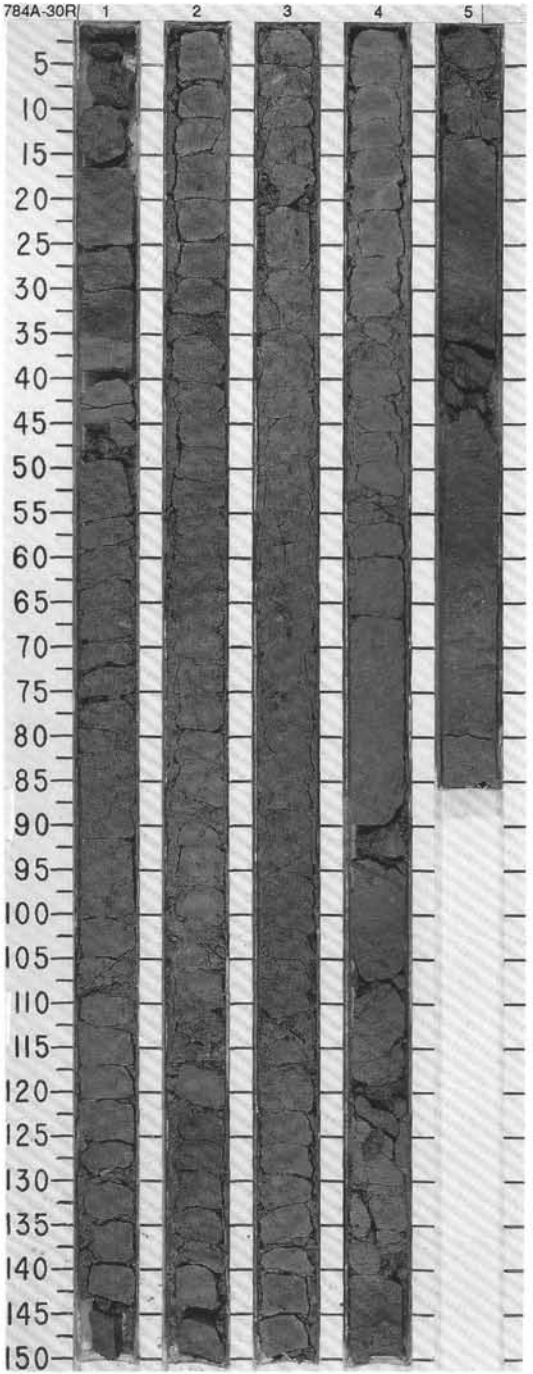


VITRIC-RICH SILTY CLAYSTONE

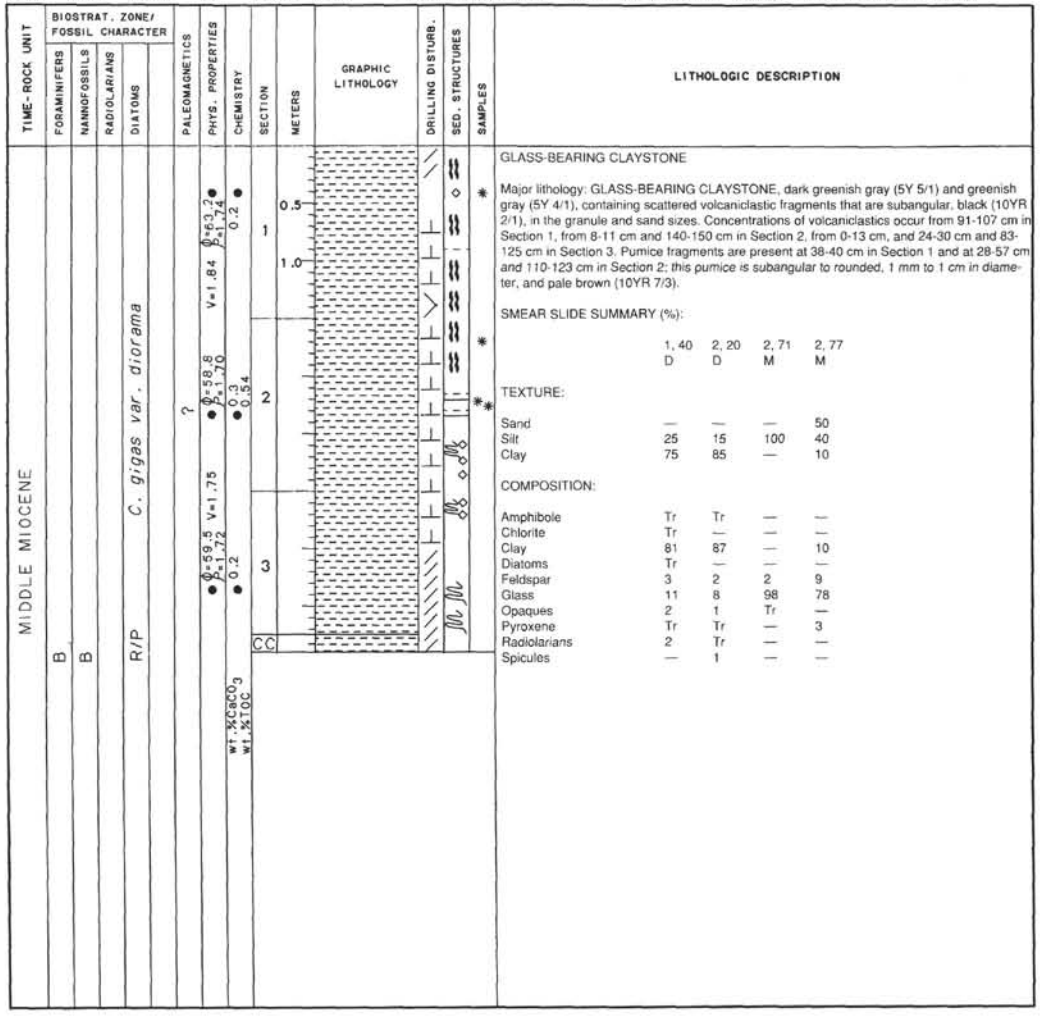
Major lithology: VITRIC-RICH SILTY CLAYSTONE, dark greenish gray (5Y 5/1) and greenish gray (5Y 4/1), containing scattered volcaniclastic fragments that are subangular, black (10YR 2/1), in the granule and sand sizes. Concentrations of volcaniclastics occur from 0-35 cm and 45-90 cm in Section 1, 30-65 cm and 110-115 cm in Section 2, 115-120 cm and 144-151 cm in Section 4, and 16-24 cm and 32-61 cm in Section 5. Pumice fragments are present from 62-74 cm and 146-151 cm in Section 4, and from 61-76 cm in Section 5; this pumice is rounded, 1-20 mm in diameter and very pale brown (10YR 7/3).

SMEAR SLIDE SUMMARY (%):

	2, 100 D	5, 65 M
TEXTURE:		
Sand	—	100
Silt	25	—
Clay	75	—
COMPOSITION:		
Clay	81	—
Feldspar	2	—
Glass	12	100
Pyroxene	Tr	—
Radiolarians	5	—



SITE 784 HOLE A CORE 31R CORED INTERVAL 5181.6-5191.2 mbsl; 280.8-290.4 mbsf



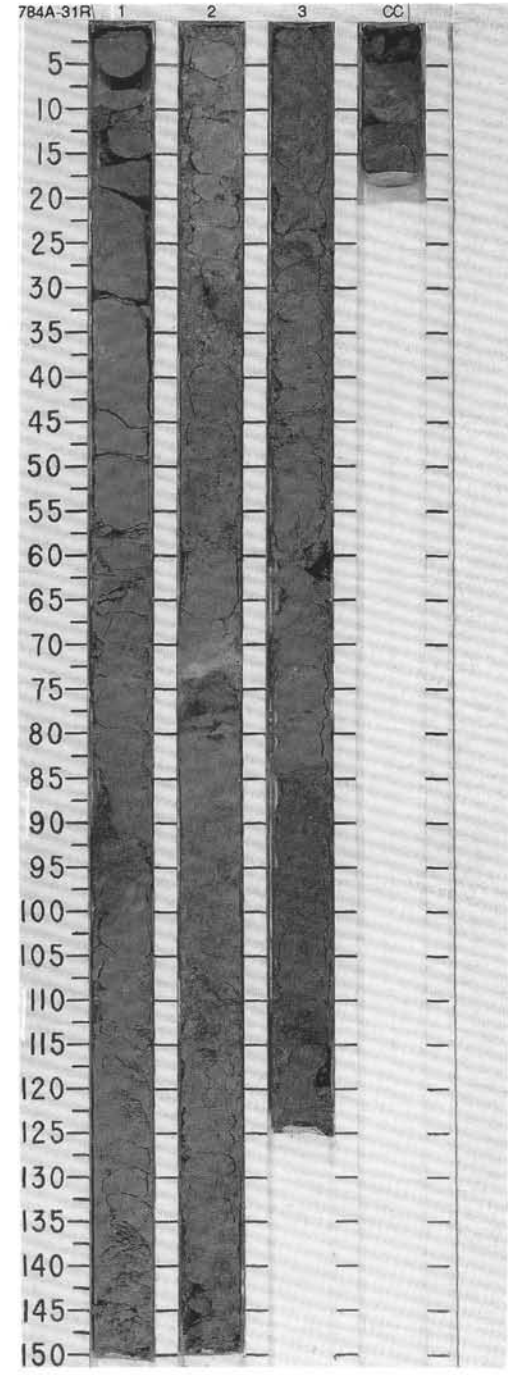
LITHOLOGIC DESCRIPTION

GLASS-BEARING CLAYSTONE

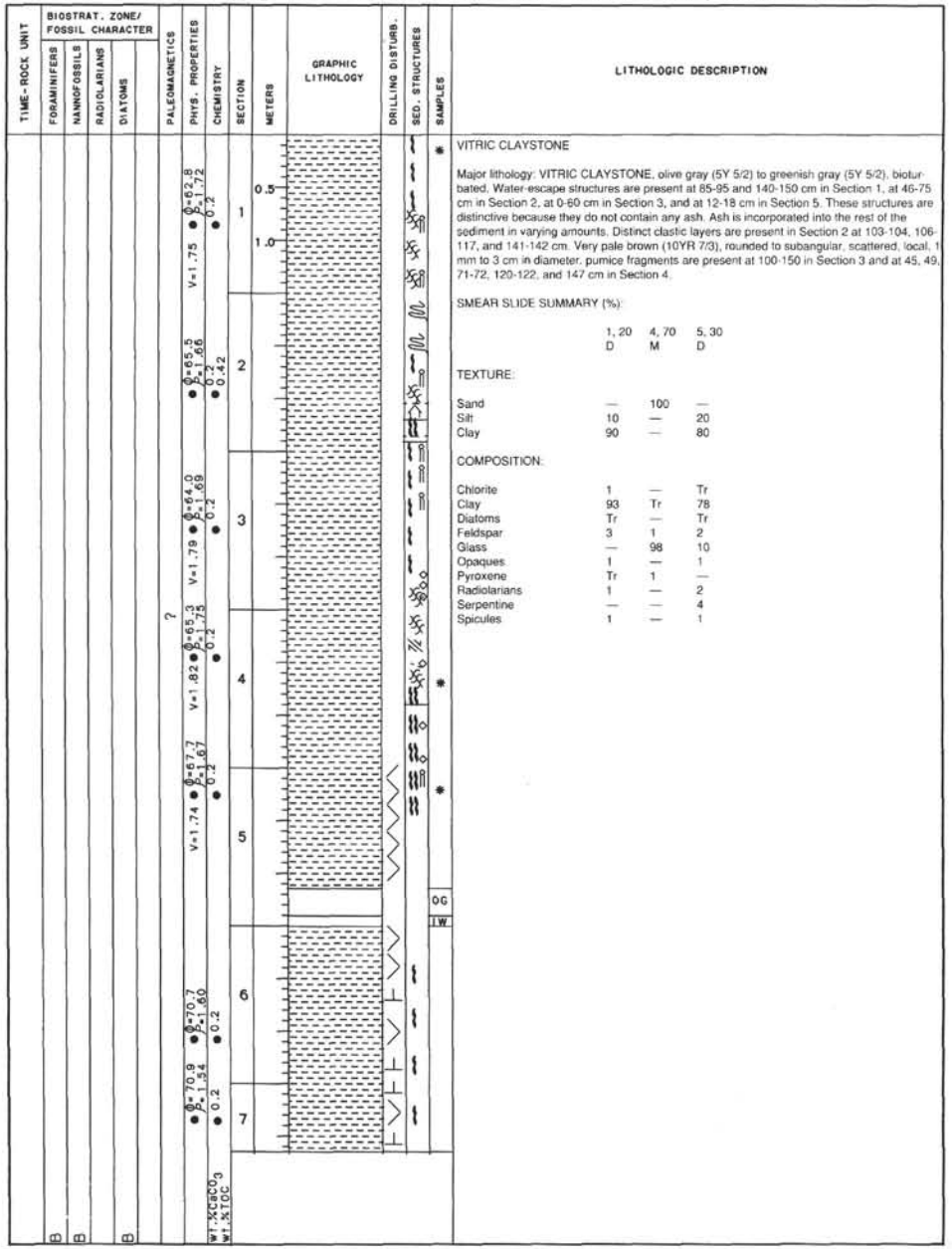
Major lithology: GLASS-BEARING CLAYSTONE, dark greenish gray (5Y 5/1) and greenish gray (5Y 4/1), containing scattered volcaniclastic fragments that are subangular, black (10YR 2/1), in the granule and sand sizes. Concentrations of volcaniclastics occur from 91-107 cm in Section 1, from 8-11 cm and 140-150 cm in Section 2, from 0-13 cm, and 24-30 cm and 83-125 cm in Section 3. Pumice fragments are present at 38-40 cm in Section 1 and at 28-57 cm and 110-123 cm in Section 2; this pumice is subangular to rounded, 1 mm to 1 cm in diameter, and pale brown (10YR 7/3).

SMEAR SLIDE SUMMARY (%):

	1, 40 D	2, 20 D	2, 71 M	2, 77 M
TEXTURE:				
Sand	—	—	—	50
Silt	25	15	100	40
Clay	75	85	—	10
COMPOSITION:				
Amphibole	Tr	Tr	—	—
Chlorite	Tr	—	—	—
Clay	81	87	—	10
Diatoms	Tr	—	—	—
Feldspar	3	2	2	9
Glass	11	8	98	78
Opaques	2	1	Tr	—
Pyroxene	Tr	Tr	—	3
Radiolarians	2	Tr	—	—
Spicules	—	1	—	—



SITE 784 HOLE A CORE 32R CORED INTERVAL 5191.2-5200.8 mbsl; 290.4-300.0 mbst



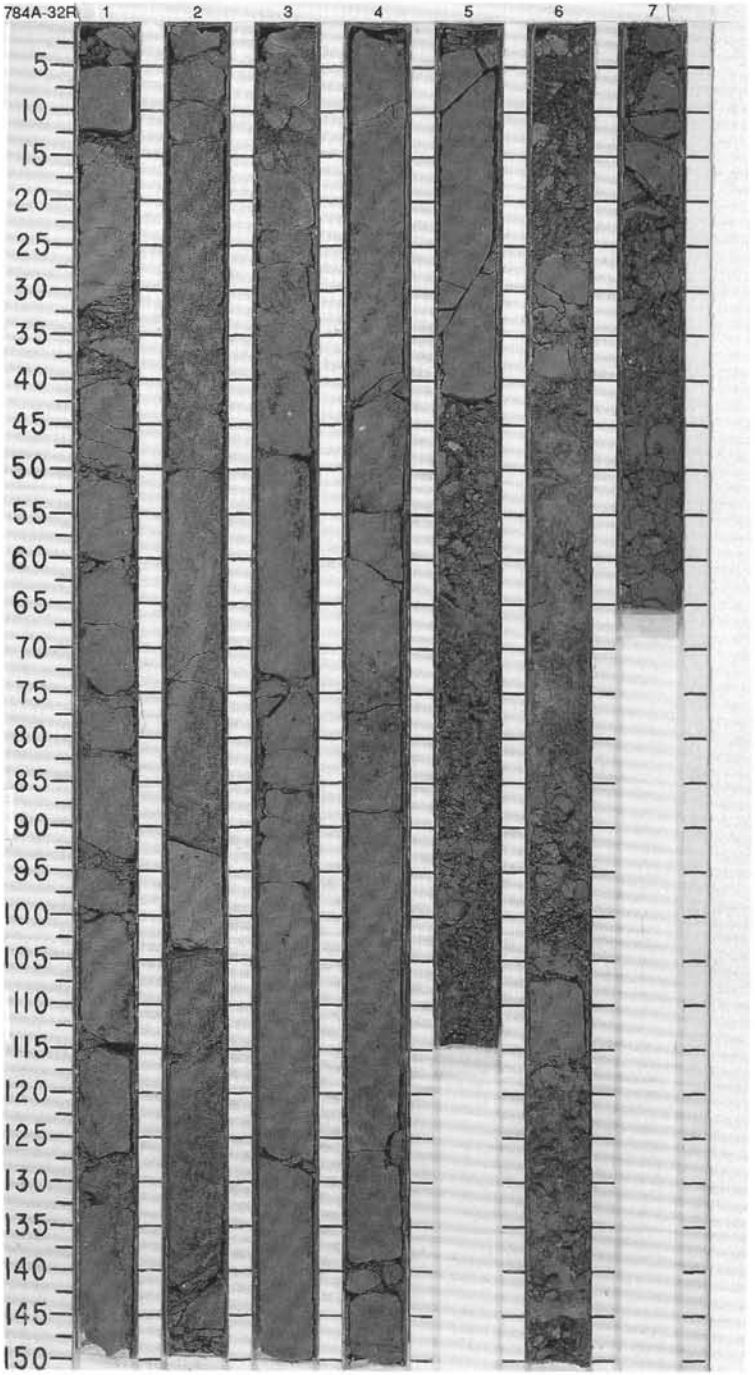
LITHOLOGIC DESCRIPTION

VITRIC CLAYSTONE

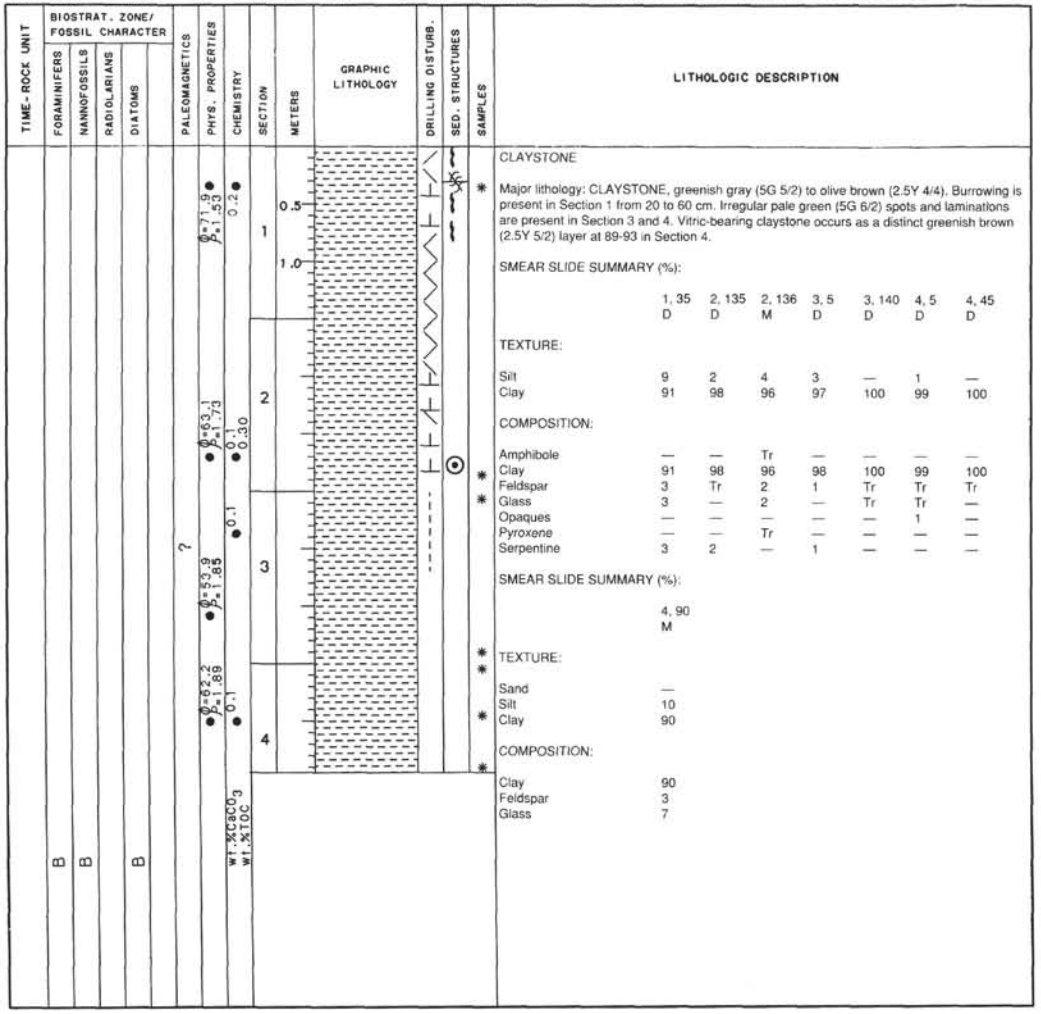
Major lithology: VITRIC CLAYSTONE, olive gray (5Y 5/2) to greenish gray (5Y 5/2), bioturbated. Water-escape structures are present at 85-95 and 140-150 cm in Section 1, at 46-75 cm in Section 2, at 0-60 cm in Section 3, and at 12-18 cm in Section 5. These structures are distinctive because they do not contain any ash. Ash is incorporated into the rest of the sediment in varying amounts. Distinct clastic layers are present in Section 2 at 103-104, 106-117, and 141-142 cm. Very pale brown (10YR 7/3), rounded to subangular, scattered, local, 1 mm to 3 cm in diameter, pumice fragments are present at 100-150 in Section 3 and at 45, 49, 71-72, 120-122, and 147 cm in Section 4.

SMEAR SLIDE SUMMARY (%):

	1, 20 D	4, 70 M	5, 30 D
TEXTURE:			
Sand	—	100	—
Silt	10	—	20
Clay	90	—	80
COMPOSITION:			
Chlorite	1	—	Tr
Clay	93	Tr	78
Diatoms	Tr	—	Tr
Feldspar	3	1	2
Glass	—	98	10
Opaques	1	—	1
Pyroxene	Tr	1	—
Radiolarians	1	—	2
Serpentine	—	—	4
Spicules	1	—	1



SITE 784 HOLE A CORE 33R CORED INTERVAL 5200.8-5210.5 mbsl; 300.0-309.7 mbsf



LITHOLOGIC DESCRIPTION

CLAYSTONE

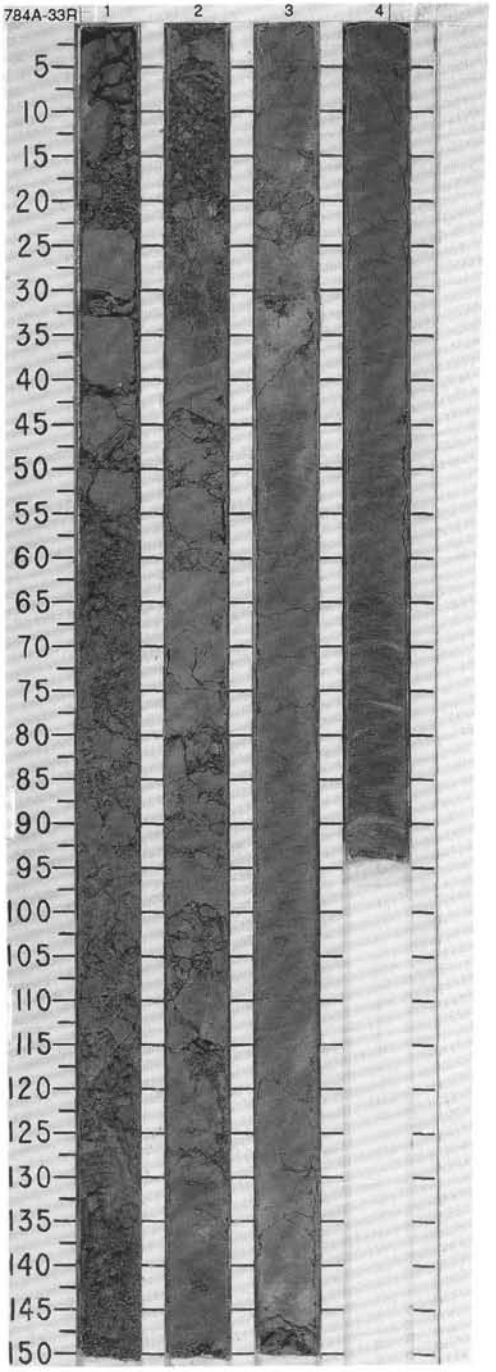
Major lithology: CLAYSTONE, greenish gray (5G 5/2) to olive brown (2.5Y 4/4). Burrowing is present in Section 1 from 20 to 60 cm. Irregular pale green (5G 6/2) spots and laminations are present in Section 3 and 4. Vitric-bearing claystone occurs as a distinct greenish brown (2.5Y 5/2) layer at 89-93 in Section 4.

SMEAR SLIDE SUMMARY (%):

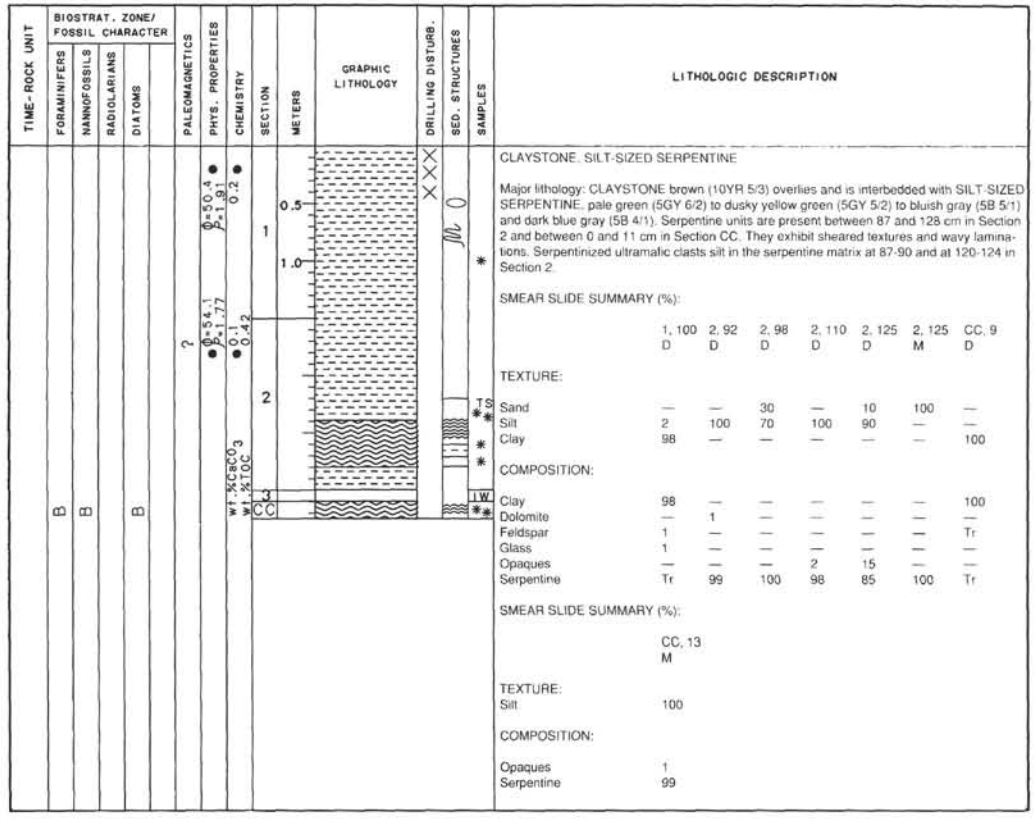
	1, 35 D	2, 135 D	2, 136 M	3, 5 D	3, 140 D	4, 5 D	4, 45 D
TEXTURE:							
Silt	9	2	4	3	—	1	—
Clay	91	98	96	97	100	99	100
COMPOSITION:							
Amphibole	—	—	Tr	—	—	—	—
Clay	91	98	96	98	100	99	100
Feldspar	3	Tr	2	1	Tr	Tr	Tr
Glass	3	—	2	—	Tr	Tr	—
Opaques	—	—	—	—	—	1	—
Pyroxene	—	—	Tr	—	—	—	—
Serpentine	3	2	—	1	—	—	—

SMEAR SLIDE SUMMARY (%):

	4, 90 M
TEXTURE:	
Sand	—
Silt	10
Clay	90
COMPOSITION:	
Clay	90
Feldspar	3
Glass	7



SITE 784 HOLE A CORE 34R CORED INTERVAL 5210.5-5220.1 mbsl; 309.7-319.3 mbsf



LITHOLOGIC DESCRIPTION

CLAYSTONE, SILT-SIZED SERPENTINE

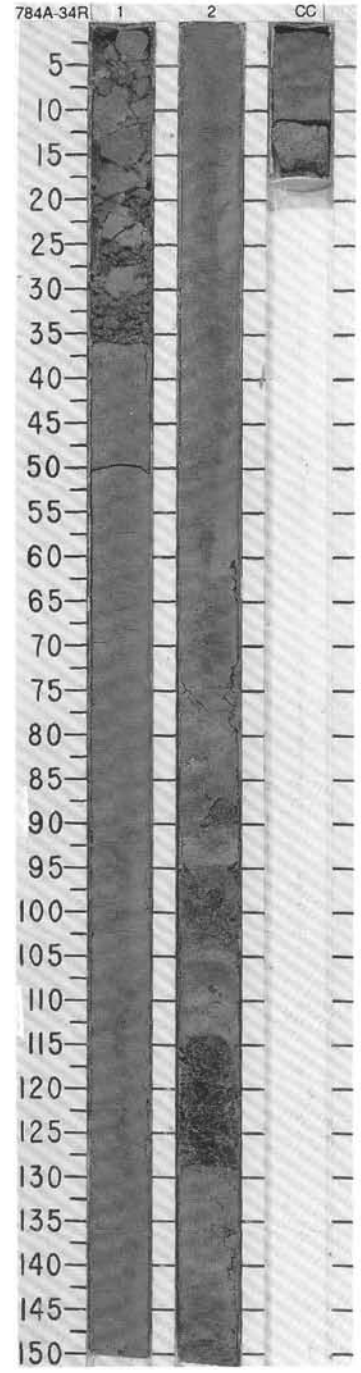
Major lithology: CLAYSTONE brown (10YR 5/3) overlies and is interbedded with SILT-SIZED SERPENTINE, pale green (5GY 6/2) to dusky yellow green (5GY 5/2) to bluish gray (5B 5/1) and dark blue gray (5B 4/1). Serpentine units are present between 87 and 128 cm in Section 2 and between 0 and 11 cm in Section CC. They exhibit sheared textures and wavy laminations. Serpentinized ultramafic clasts silt in the serpentine matrix at 87-90 and at 120-124 in Section 2.

SMEAR SLIDE SUMMARY (%):

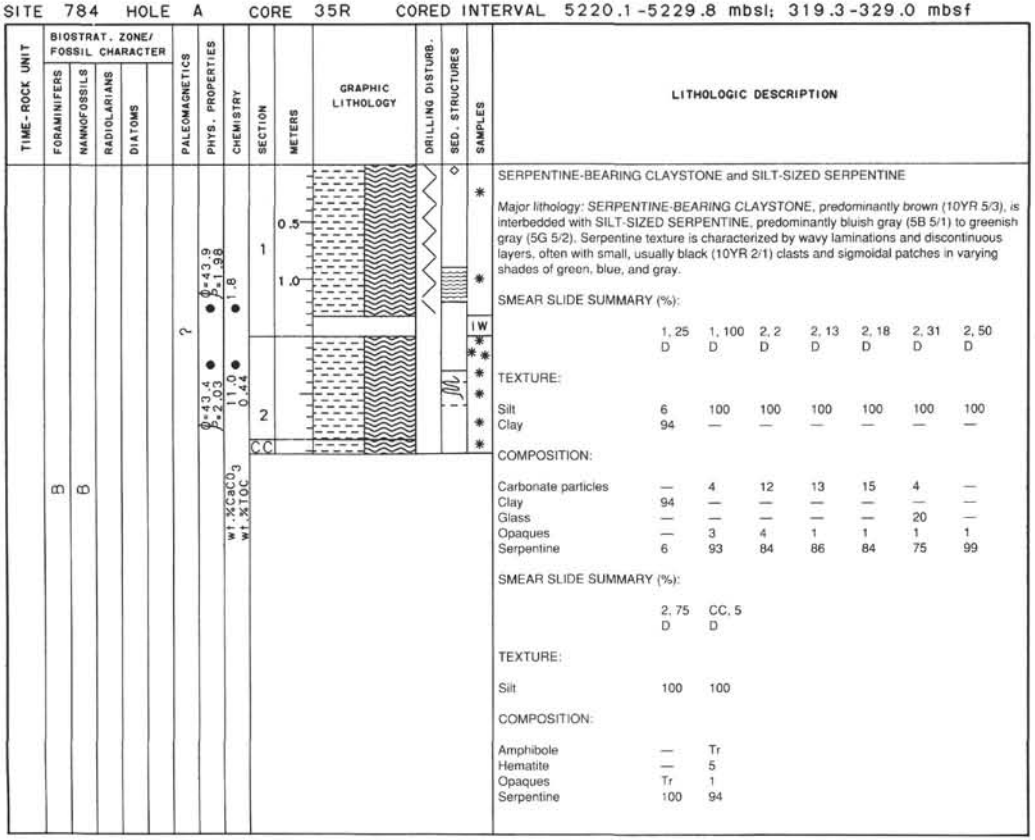
	1, 100 D	2, 92 D	2, 98 D	2, 110 D	2, 125 D	2, 125 M	CC, 9 D
TEXTURE:							
Sand	—	—	30	—	10	100	—
Silt	2	100	70	100	90	—	—
Clay	98	—	—	—	—	—	100
COMPOSITION:							
Clay	98	—	—	—	—	—	100
Dolomite	—	1	—	—	—	—	—
Feldspar	1	—	—	—	—	—	Tr
Glass	1	—	—	—	—	—	—
Opaques	—	—	—	2	15	—	—
Serpentine	Tr	99	100	98	85	100	Tr

SMEAR SLIDE SUMMARY (%):

	CC, 13 M
TEXTURE:	
Silt	100
COMPOSITION:	
Opaques	1
Serpentine	99



SITE 784 HOLE A CORE 35R CORED INTERVAL 5220.1-5229.8 mbsl; 319.3-329.0 mbsf



LITHOLOGIC DESCRIPTION

SERPENTINE-BEARING CLAYSTONE and SILT-SIZED SERPENTINE

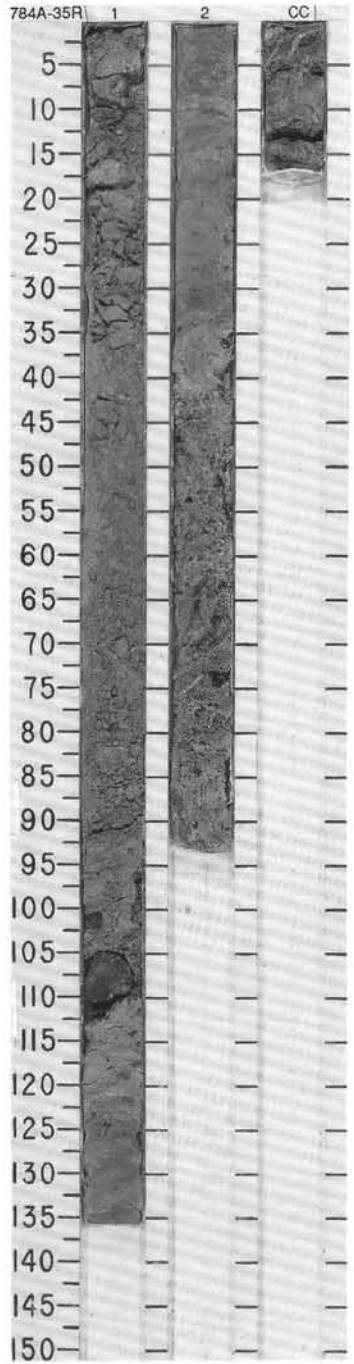
Major lithology: SERPENTINE-BEARING CLAYSTONE, predominantly brown (10YR 5/3), is interbedded with SILT-SIZED SERPENTINE, predominantly bluish gray (5B 5/1) to greenish gray (5G 5/2). Serpentine texture is characterized by wavy laminations and discontinuous layers, often with small, usually black (10YR 2/1) clasts and sigmoidal patches in varying shades of green, blue, and gray.

SMEAR SLIDE SUMMARY (%):

	1, 25 D	1, 100 D	2, 2 D	2, 13 D	2, 18 D	2, 31 D	2, 50 D
TEXTURE:							
Silt	6	100	100	100	100	100	100
Clay	94	—	—	—	—	—	—
COMPOSITION:							
Carbonate particles	—	4	12	13	15	4	—
Clay	94	—	—	—	—	—	—
Glass	—	—	—	—	—	20	—
Opaques	—	3	4	1	1	1	1
Serpentine	6	93	84	86	84	75	99

SMEAR SLIDE SUMMARY (%):

	2, 75 D	CC, 5 D
TEXTURE:		
Silt	100	100
COMPOSITION:		
Amphibole	—	Tr
Hematite	—	5
Opaques	Tr	1
Serpentine	100	94



SITE 784 HOLE A CORE 36R CORED INTERVAL 5229.8-5239.5 mbsl; 329.0-338.7 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
	B	B		B	?	ϕ=37.9 ρ=1.71 ; ϕ=11.4 ρ=2.39 ; V=3.45	0.4 ; wt.%$CaCO_3$; wt.%TOC	1 ; CC	0.5 ; 1.0	IM	X	◇ ◇	* TS ; * ; *

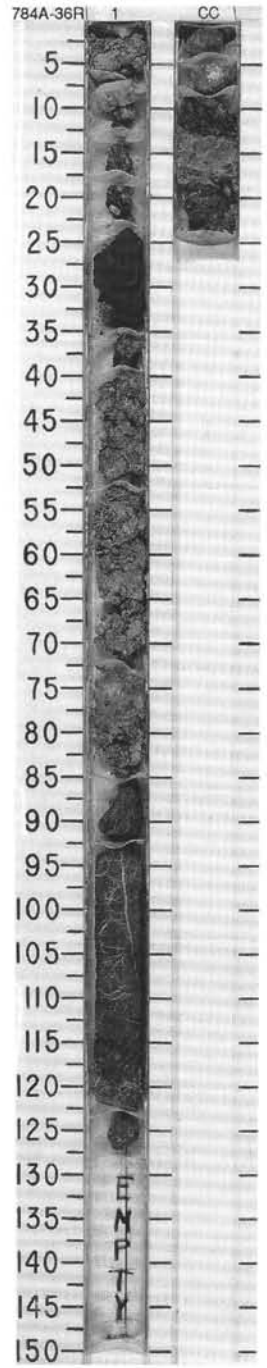
LITHOLOGIC DESCRIPTION

SHEARED PHACOIDAL SERPENTINE

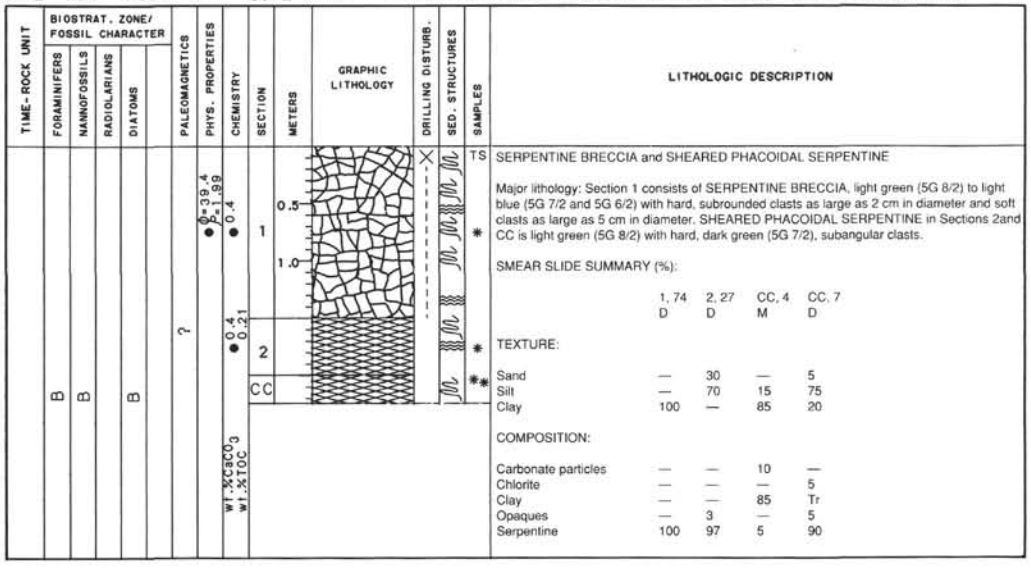
Major lithology: SHEARED PHACOIDAL SERPENTINE, very light green (5G 8/2), bluish gray (5B 5/1), and dark bluish gray (5BY 6/1), is extremely disturbed by drilling. Subangular to subrounded serpentinized harzburgite clasts up to 5 cm in diameter float in the sheared matrix at 7 to 24 cm in Section CC.

SMEAR SLIDE SUMMARY (%):

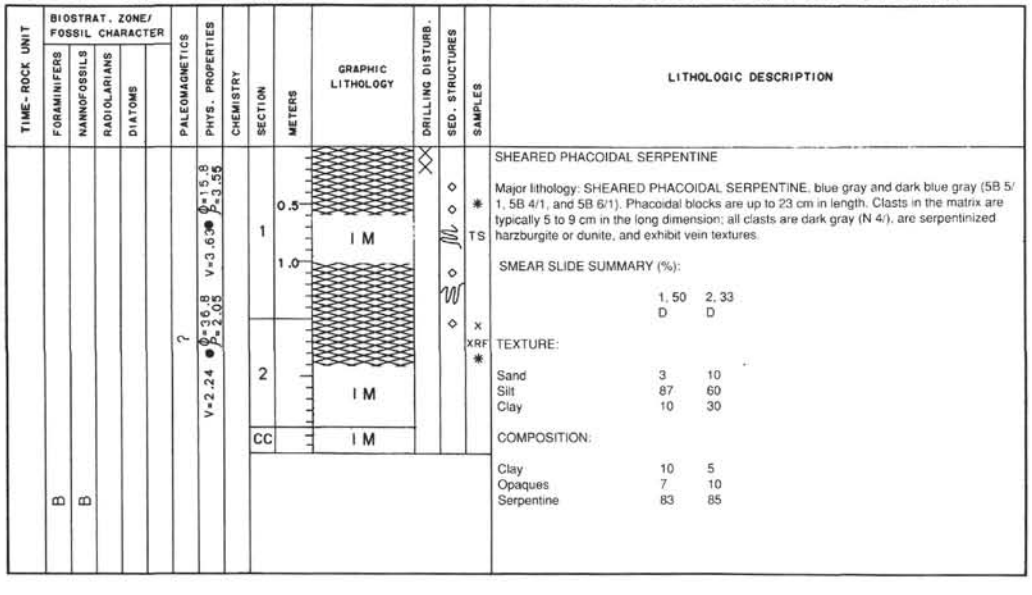
	1, 7 M	1, 7 D	1, 60 D	CC, 16 D
TEXTURE:				
Sand	—	—	20	20
Silt	100	100	70	75
Clay	—	—	10	5
COMPOSITION:				
Chlorite	—	—	2	5
Clay	40	—	30	10
Diatoms	—	Tr	—	—
Epidote	—	—	2	—
Feldspar	—	—	—	3
Glass	—	Tr	—	—
Micrite	60	—	—	—
Opaques	—	—	10	15
Pyroxene	—	—	—	3
Radiolarians	Tr	Tr	—	—
Serpentine	—	Tr	56	61
Siderite	—	100	—	—
Thulite	—	—	Tr	3

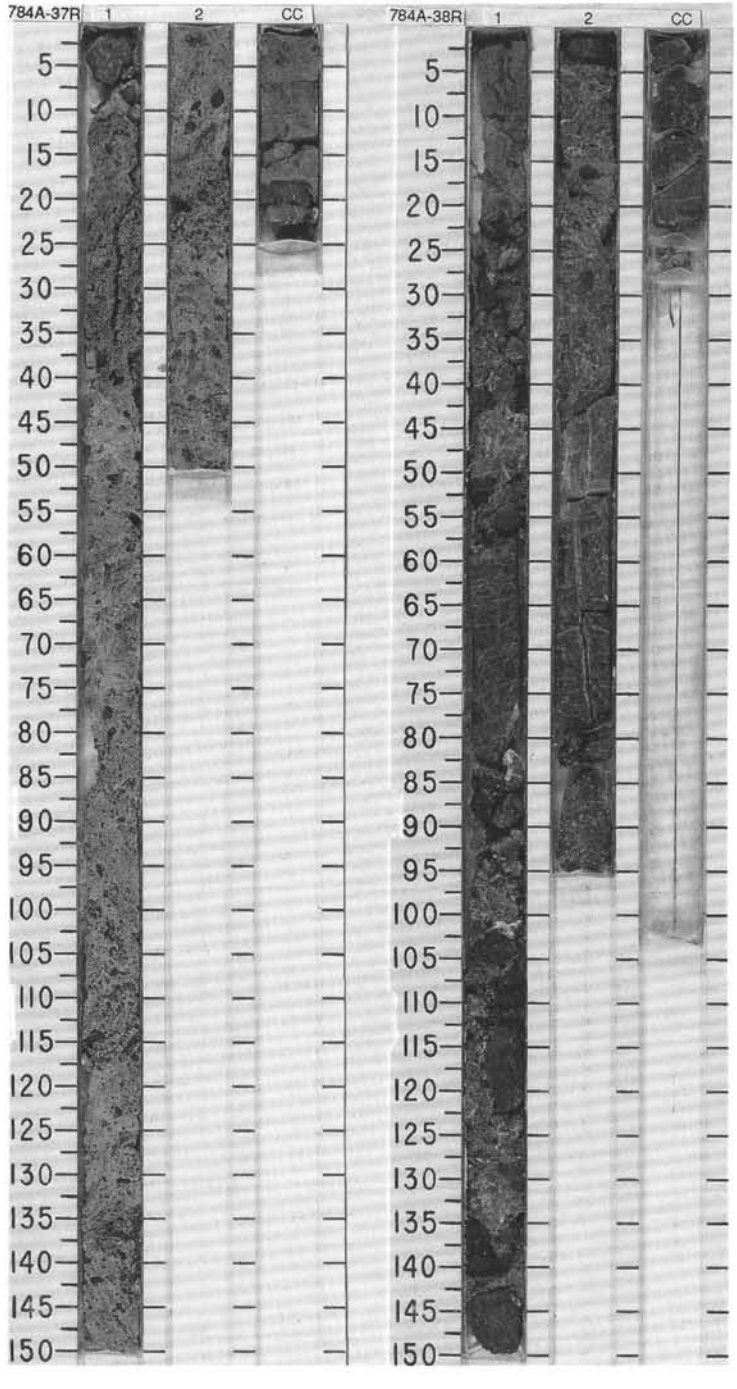


SITE 784 HOLE A CORE 37R CORED INTERVAL 5239.5-5249.1 mbsl; 338.7-348.3 mbsf

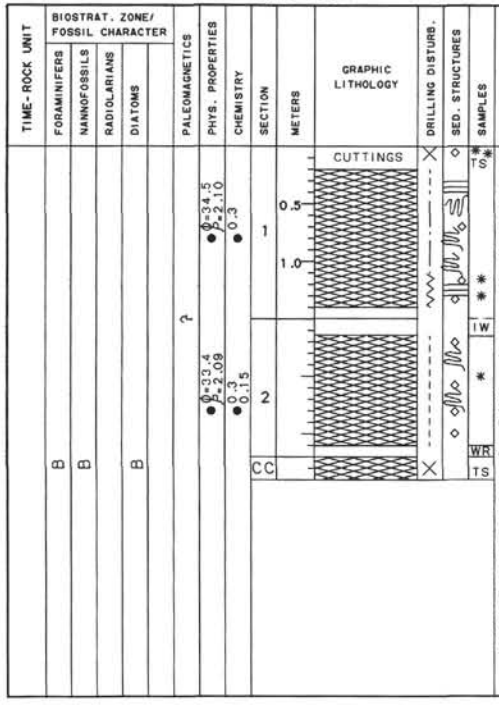


SITE 784 HOLE A CORE 38R CORED INTERVAL 5249.1-5258.7 mbsl; 348.3-357.9 mbsf





SITE 784 HOLE A CORE 39R CORED INTERVAL 5258.7-5268.3 mbsl; 357.9-367.5 mbsf



LITHOLOGIC DESCRIPTION

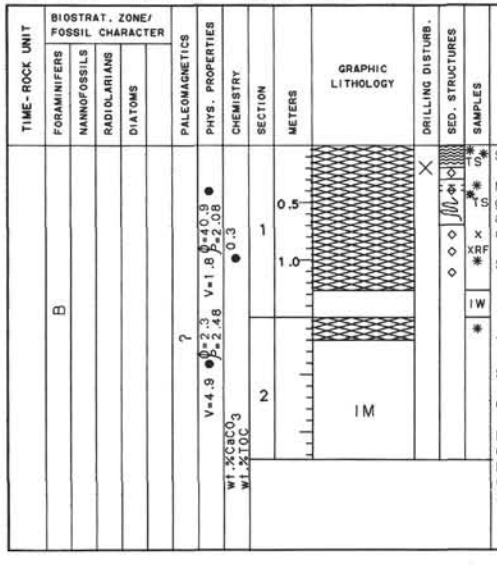
SHEARED PHACOIDAL SERPENTINE

Major lithology: SHEARED PHACOIDAL SERPENTINE in blue green colors of varying lightness (5B 6/1 alternating with N 7/ and 5G 6/2). Deformation pattern is outlined by alternations of these colors. Convolute laminations, both vertical and horizontal, are present throughout the core. Dark serpentinized ultramafic clasts, averaging 1 cm in size, float in the serpentine matrix.

SMEAR SLIDE SUMMARY (%):

	1, 3 M	1, 5 M	1, 115 M	1, 130 M	2, 50 D
TEXTURE:					
Sand	—	—	5	5	5
Silt	20	10	55	55	55
Clay	80	90	40	40	40
COMPOSITION:					
Carbonate particles	Tr	—	—	—	—
Chert	—	20	—	—	—
Chlorite	Tr	—	Tr	10	—
Clay	60	55	20	—	5
Diatoms	Tr	—	—	—	—
Feldspar	Tr	—	—	—	—
Glass	40	15	—	—	—
Opaques	—	10	10	Tr	5
Radiolarians	Tr	—	—	—	—
Serpentine	—	Tr	70	90	90
Spicules	Tr	—	—	—	—
Thulite	—	—	—	—	Tr

SITE 784 HOLE A CORE 40R CORED INTERVAL 5268.3-5278.1 mbsl; 367.5-377.3 mbsf



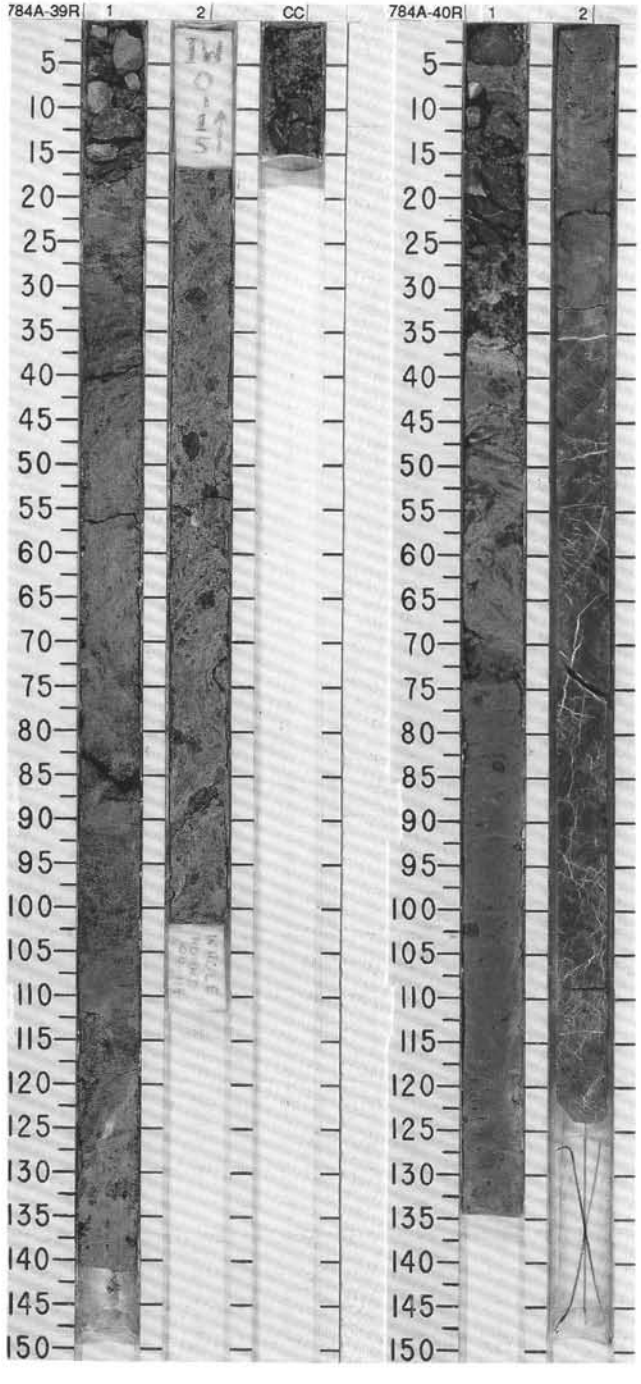
LITHOLOGIC DESCRIPTION

SHEARED PHACOIDAL SERPENTINE

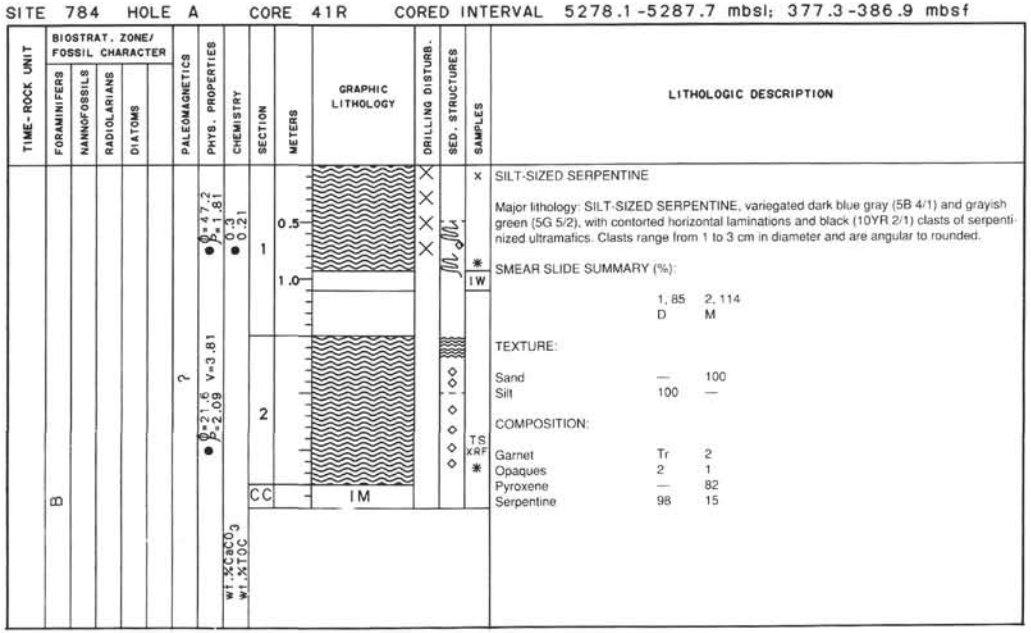
Major lithology: SHEARED PHACOIDAL SERPENTINE, dark blue gray (5B 4/1), grayish green (5B 5/2), bluish gray (5B 3/1), light greenish gray (5GY 7/1) and dark blue (5B 4/1) in alternating wavy and convolute laminations and bands. Broken and sheared black (10YR 2/1) rock fragments in the matrix are angular and up to 8 cm in their longest dimension.

SMEAR SLIDE SUMMARY (%):

	1, 6 D	1, 8 D	1, 37 D	1, 50 D	1, 100 D	2, 10 D
TEXTURE:						
Silt	100	100	100	100	100	100
COMPOSITION:						
Dolomite	—	Tr	—	—	Tr	—
Glass	Tr	—	—	—	—	—
Micrite	—	—	Tr	—	—	Tr
Opaques	Tr	7	—	5	2	Tr
Serpentine	100	93	100	95	98	100



SITE 784 HOLE A CORE 41R CORED INTERVAL 5278.1-5287.7 mbsl; 377.3-386.9 mbsf



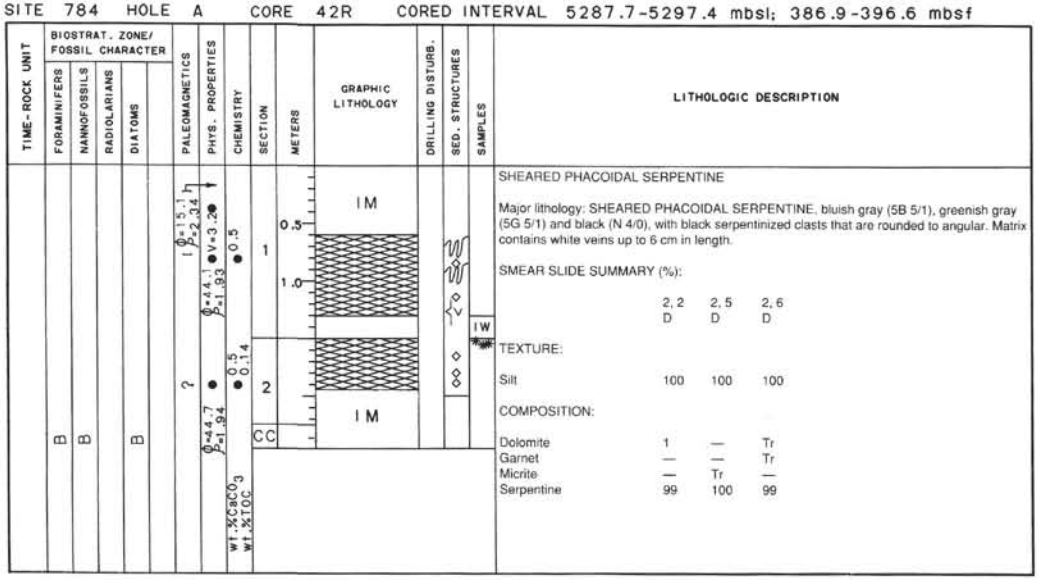
SILT-SIZED SERPENTINE

Major lithology: SILT-SIZED SERPENTINE, variegated dark blue gray (5B 4/1) and grayish green (5G 5/2), with contorted horizontal laminations and black (10YR 2/1) clasts of serpentinized ultramafics. Clasts range from 1 to 3 cm in diameter and are angular to rounded.

SMEAR SLIDE SUMMARY (%):

	1, 85 D	2, 114 M
TEXTURE:		
Sand	—	100
Silt	100	—
COMPOSITION:		
Garnet	Tr	2
Opaques	2	1
Pyroxene	—	82
Serpentine	98	15

SITE 784 HOLE A CORE 42R CORED INTERVAL 5287.7-5297.4 mbsl; 386.9-396.6 mbsf

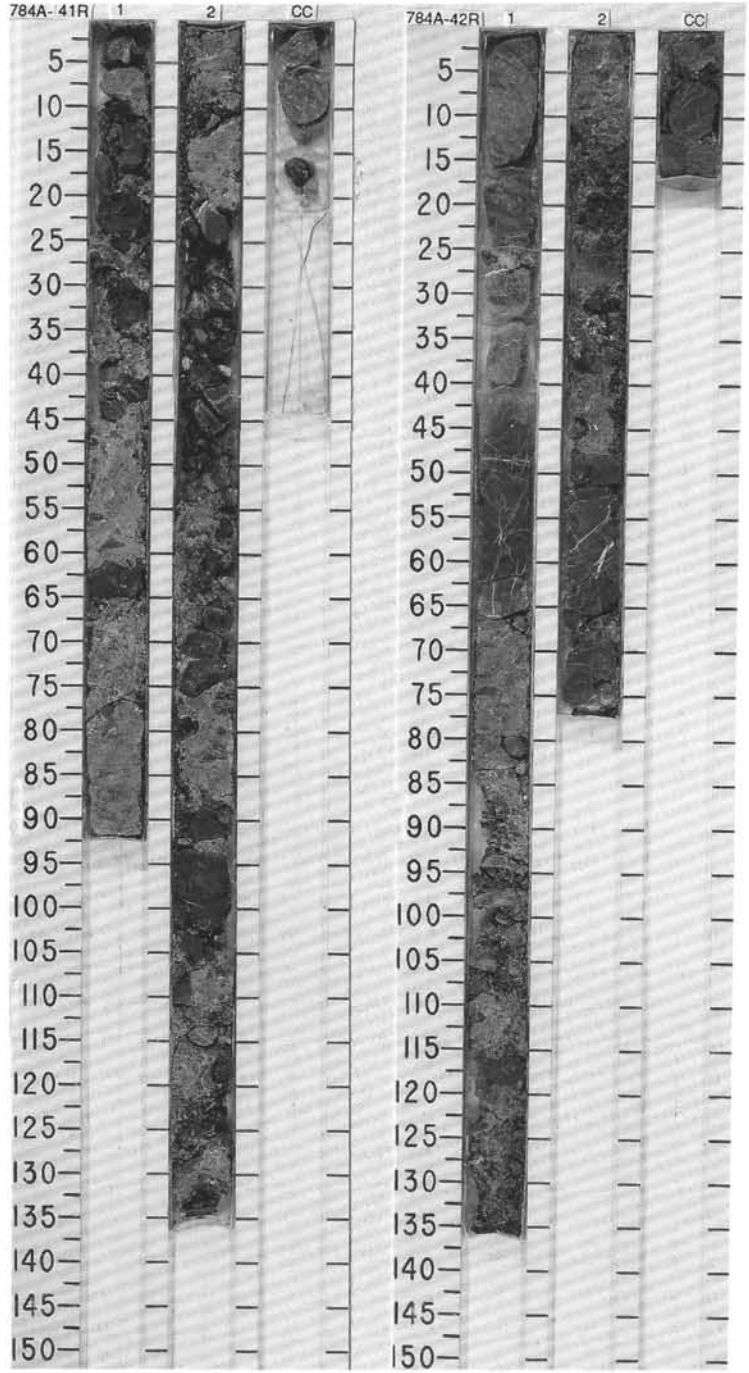


SHEARED PHACOIDAL SERPENTINE

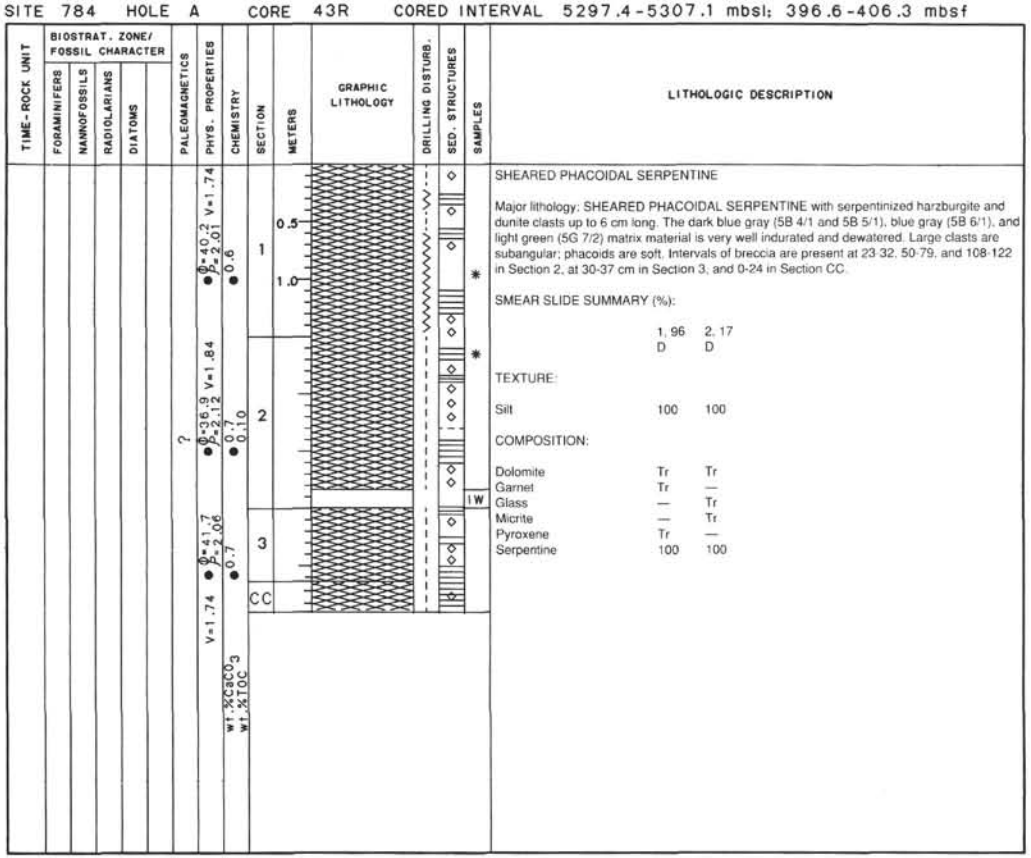
Major lithology: SHEARED PHACOIDAL SERPENTINE, bluish gray (5B 5/1), greenish gray (5G 5/1) and black (N 4/0), with black serpentinized clasts that are rounded to angular. Matrix contains white veins up to 6 cm in length.

SMEAR SLIDE SUMMARY (%):

	2, 2 D	2, 5 D	2, 6 D
TEXTURE:			
Silt	100	100	100
COMPOSITION:			
Dolomite	1	—	Tr
Garnet	—	—	Tr
Micrite	—	Tr	—
Serpentine	99	100	99



SITE 784 HOLE A CORE 43R CORED INTERVAL 5297.4-5307.1 mbsl; 396.6-406.3 mbsf

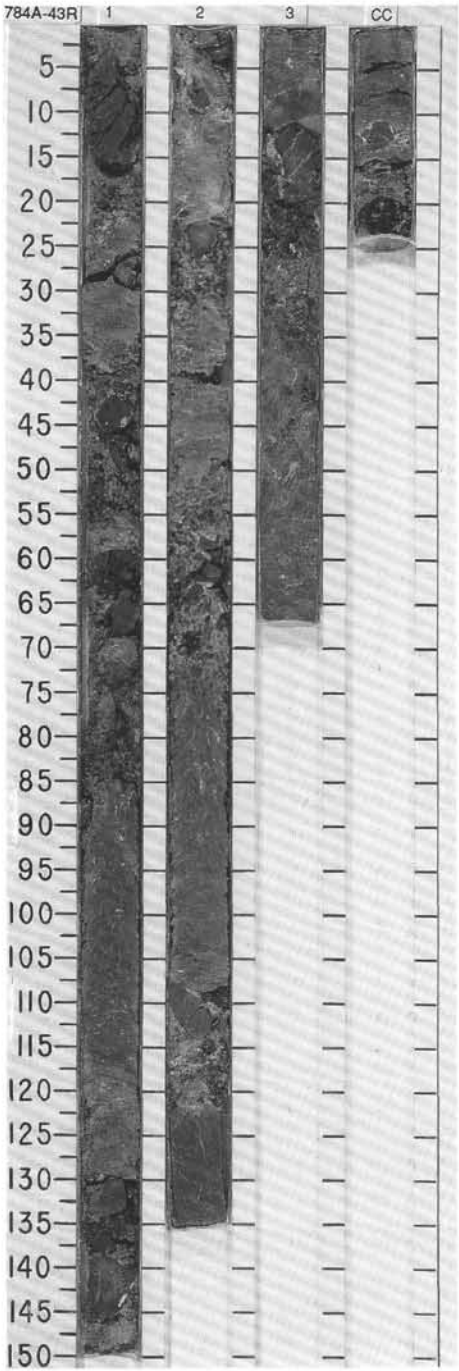


SHEARED PHACOIDAL SERPENTINE

Major lithology: SHEARED PHACOIDAL SERPENTINE with serpentinized harzburgite and dunite clasts up to 6 cm long. The dark blue gray (5B 4/1 and 5B 5/1), blue gray (5B 6/1), and light green (5G 7/2) matrix material is very well indurated and dewatered. Large clasts are subangular; phacoids are soft. Intervals of breccia are present at 23-32, 50-79, and 108-122 in Section 2, at 30-37 cm in Section 3, and 0-24 in Section CC.

SMEAR SLIDE SUMMARY (%):

	1, 96 D	2, 17 D
TEXTURE:		
Silt	100	100
COMPOSITION:		
Dolomite	Tr	Tr
Garnet	Tr	—
Glass	—	Tr
Micrite	—	Tr
Pyroxene	Tr	—
Serpentine	100	100



SITE 784 HOLE A CORE 44R CORED INTERVAL 5307.1-5316.4 mbsl; 406.3-415.6 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
					?			1 CC	0.5				*	

SHEARED PHACOIDAL SERPENTINE

Major lithology: SHEARED PHACOIDAL SERPENTINE, light green (5G 6/2) blue gray (5B 6/1) and dark blue gray (5B 4/1 and 5B 5/1). The core contains serpentinized clasts up to 5 cm in length. Up to 10 percent chlorite and aragonite are present in the matrix material.

SMEAR SLIDE SUMMARY (%):

	1, 46
	D
TEXTURE:	
Silt	100
COMPOSITION:	
Apatite	7
Dolomite	Tr
Glass	Tr
Micrite	Tr
Serpentine	93

SITE 784 HOLE A CORE 45R CORED INTERVAL 5316.4-5326.1 mbsl; 415.6-425.3 mbsf

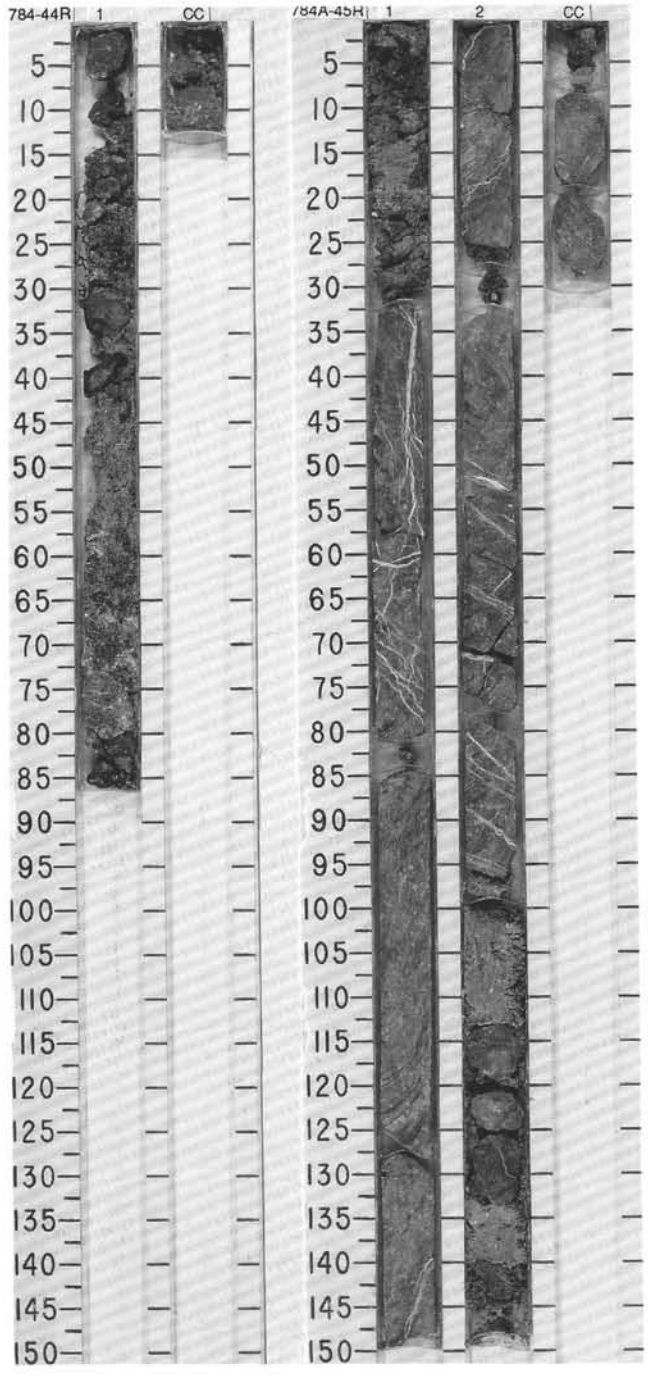
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
					?	V=5.66 φ=0.5 ρ=2.68 V=3.82 φ=11.0 ρ=2.35		1 2 CC	0.5 1.0	IM IM			TS *	

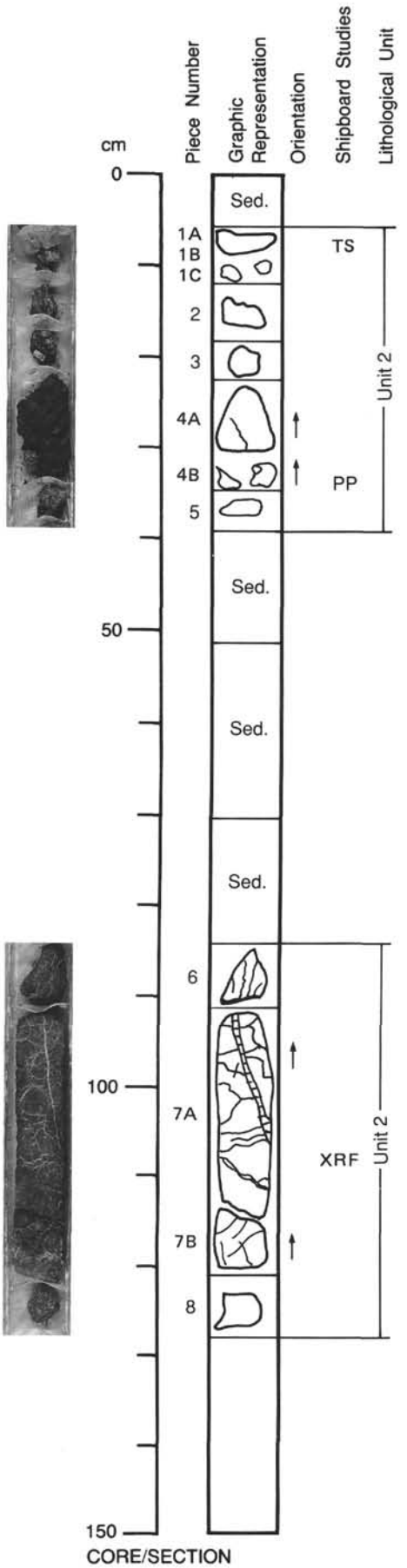
PHACOIDAL SHEARED SERPENTINE

Major lithology: PHACOIDAL SHEARED SERPENTINE, dark blue gray (5B 4/1 and 5B 5/1) and light green (5G 7/2) interbedded with serpentinized ultra mafic clasts.

SMEAR SLIDE SUMMARY (%):

	1, 17	2, 109	2, 138
	D	M	D
TEXTURE:			
Sand	—	30	—
Silt	100	70	100
COMPOSITION:			
Dolomite	Tr	Tr	Tr
Garnet	Tr	Tr	—
Micrite	Tr	Tr	—
Serpentine	100	100	95





125-784A-36R-1

UNIT 2: CALCAREOUS SILTSTONE

Pieces 1A; 1B; 1C

COLOR: Light brownish gray (10YR 6/2).
LAYERING: Piece 1A shows 5-mm-wide lamination consisting of dark gray (10YR 4/1) material.
DEFORMATION: None visible.
PRIMARY MINERALOGY: No primary mineralogy is visible.
SECONDARY MINERALOGY:
Calcite (<1 mm) 40-60%; quartz (?) (<1 mm) 40-60%; opaque minerals (<2 mm) <2%.
Total percent: 100%.
Texture: Grain-supported.
Vein material: None visible.
ADDITIONAL COMMENTS: This is a sedimentary rock whose mineralogy is difficult to see in hand sample. Piece 1A has lamination which probably represents bedding.

UNIT 2: SERPENTINIZED HARZBURGITE

Pieces 2, 3, 8

COLOR: Black (7.5YR 2/0).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:
Primary silicates are variably serpentinized.
Olivine - Mode: 70-75%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 20-25%.
Crystal size: 1-4 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: 50-70.

Clinopyroxene - Mode: 2-5%.
Crystal size: 1-2 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: 20-30.
Comments: Appears fresher than orthopyroxenes.

Spinel - Mode: Trace.
Crystal size: <1 mm.
Crystal shape: Ragged.
Crystal orientation: None visible.
Percent replacement: 0.
SECONDARY MINERALOGY:
Serpentine.
Total percent: 70-80%.
Texture: Bastite and mesh textures in areas.
Vein material: Piece 3 has <0.1-mm-wide white veins.

125-784A-36R-1 (continued)

UNIT 2: SERPENTINIZED HARZBURGITE

Pieces 4A; 4B; 6; 7A; 7B

COLOR: Dark greenish gray to dark gray (5BG 4/1 - N 4/).
LAYERING: None visible.
DEFORMATION: Abundant fracturing and veining throughout rock.
PRIMARY MINERALOGY:

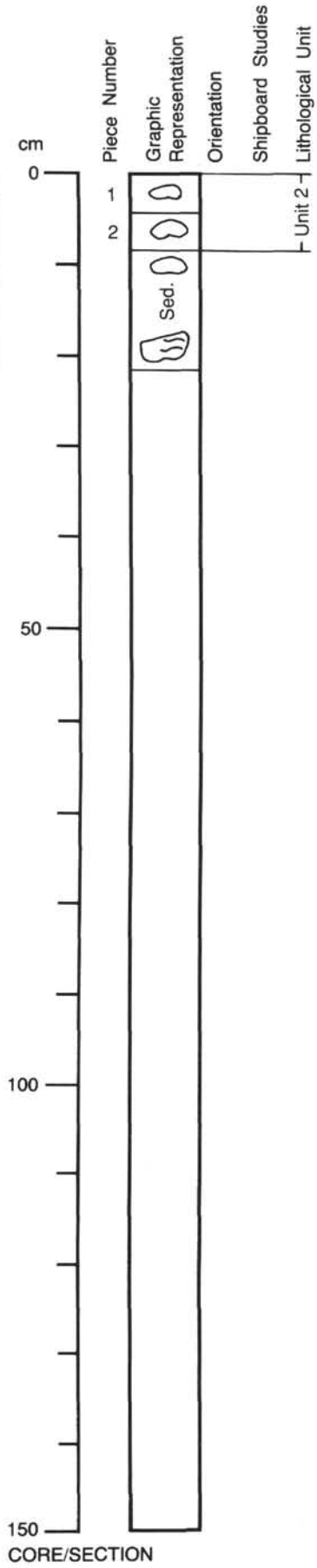
Primary silicates are variably serpentinized.
Olivine - Mode: 75-85%.
Crystal size: 1-2 mm.
Crystal shape: Anhedral.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 15-25%.
Crystal size: 1-4 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: 80-90.

Spinel - Mode: <1%.
Crystal size: <1 mm.
Crystal shape: Subhedral-ragged.
Crystal orientation: None visible.
Percent replacement: 0.

SECONDARY MINERALOGY:

Serpentine.
Total percent: 80-90%.
Texture: Mesh and bastite pseudomorphs after olivine and orthopyroxene.
Vein material: Abundant veins (0.5 mm-3 mm wide) throughout rocks. Piece 7A has large 3-m-wide chrysotile (?) vein oriented 30 degrees from core barrel. Smaller serpentine veins cross it at a large angle (70-90 degrees).



125-784A-36R-CC

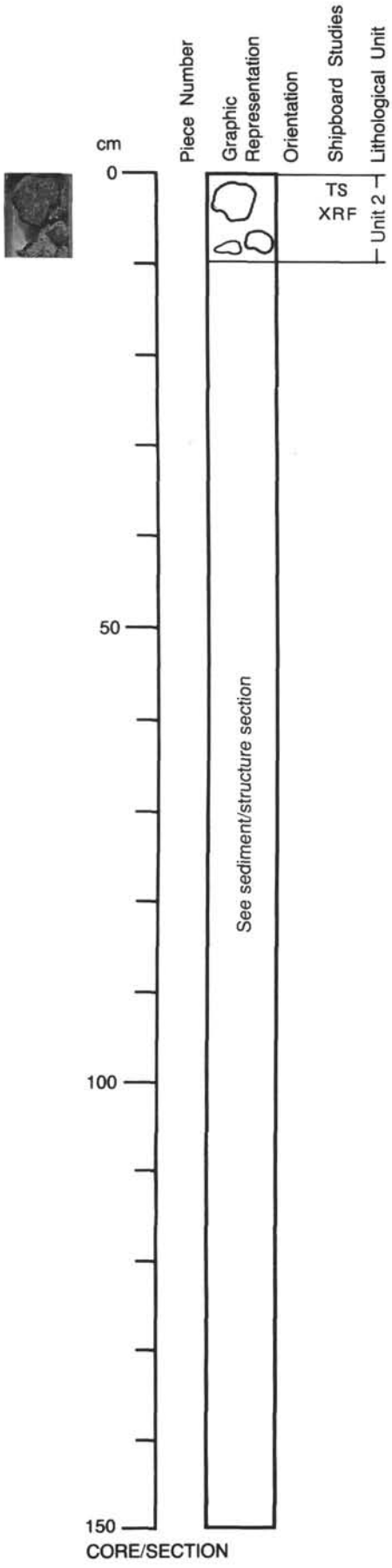
UNIT 2: SERPENTINIZED HARZBURGITE

Pieces 1 and 2

COLOR: Black (7.5YR 2/0).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:
Primary silicates are variably serpentinized.
Olivine - Mode: 70-75%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 25-30%.
Crystal size: 1-4 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: 50-70.

Spinel - Mode: Trace.
Crystal size: <1 mm.
Crystal shape: Ragged.
Crystal orientation: None visible.
Percent replacement: 0.
SECONDARY MINERALOGY:
Serpentine.
Total percent: 70-80%.
Texture: Mesh and bastite serpentine pseudomorphs after olivine and orthopyroxene.
Vein material: None visible.
ADDITIONAL COMMENTS: There are larger clasts (3-4 cm) of serpentinized harzburgites distributed in lower portion of core catcher within the phacodial serpentine.



125-784A-37R-1

UNIT 2: SERPENTINIZED HARZBURGITE

Pieces multiple fragments

COLOR: Black (7.5YR 2/0).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:

Primary silicates are variably serpentinized.
Olivine - Mode: 70-80%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

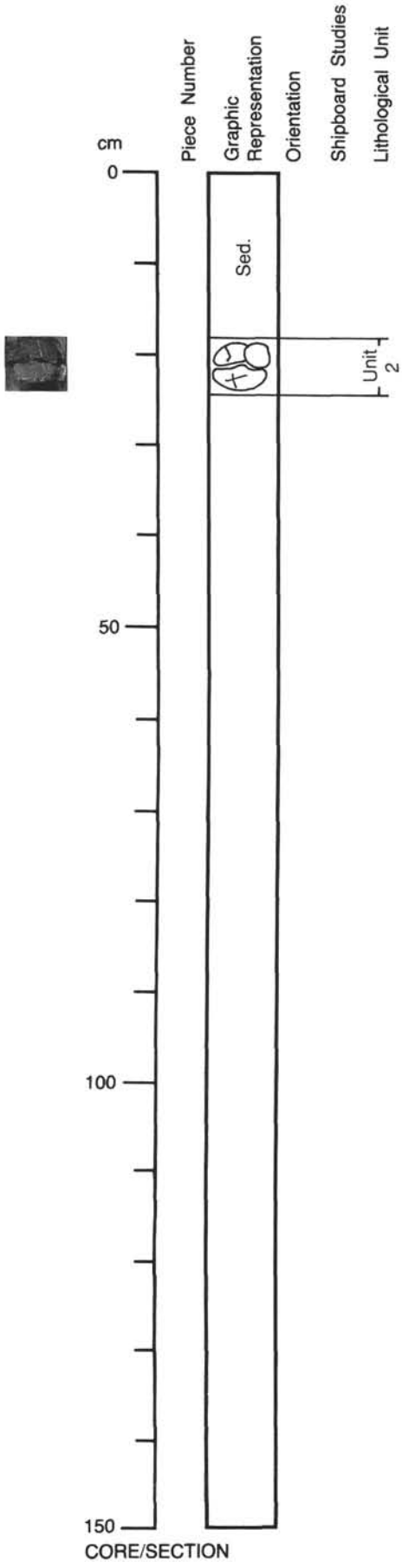
Orthopyroxene - Mode: 20-30%.
Crystal size: 1-4 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: 50-70.

Clinopyroxene - Mode: Trace.
Crystal size: 0.5-1 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: 40-50.

Spinel - Mode: Trace.
Crystal size: <2 mm.
Crystal shape: Ragged.
Crystal orientation: None visible.
Percent replacement: 0.

SECONDARY MINERALOGY:

Serpentine.
Total percent: 70-80%.
Texture: Mesh and bastite serpentine pseudomorphs after olivine and orthopyroxene.
Vein material: Small (<0.5-mm-wide) white-green veins cutting rock at no particular orientation.



125-784A-37R-CC

UNIT 2: SERPENTINIZED HARZBURGITE

Pieces large clast

COLOR: Dark greenish gray to dark gray (5BG 4/1 - N 4/).
LAYERING: None visible.
DEFORMATION: Clast is severely fractured.
PRIMARY MINERALOGY: Primary silicates are largely serpentinized.

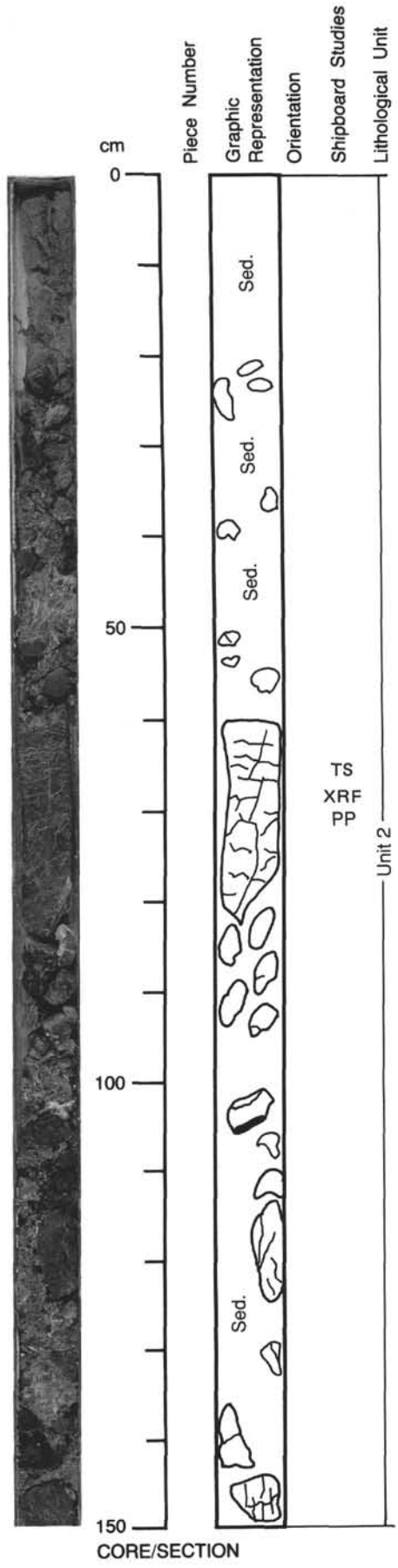
Olivine - Mode: 85-90%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 90-95.

Orthopyroxene - Mode: 10-15%.
Crystal size: 1-3 mm.
Crystal shape: Equant.
Crystal orientation: None visible.
Percent replacement: 80-90.

Spinel - Mode: Trace.
Crystal size: <1 mm.
Crystal shape: Ragged.
Crystal orientation: None visible.
Percent replacement: 0.

SECONDARY MINERALOGY:

Serpentine.
Total percent: 80-90%.
Texture: Patches of serpentine bastite pseudomorphs.
Vein material: Small white veins (<1 mm wide) are oriented approximately 90 degrees to each other.



125-784A-38R-1

UNIT 2: SERPENTINIZED HARZBURGITE

Pieces multiple pieces

COLOR: Dark greenish gray to dark gray (5BG 4/1 - N 4/).
LAYERING: None visible.
DEFORMATION: Some clasts show abundant fracturing and veining.
PRIMARY MINERALOGY:

Primary silicates are variably altered to serpentine.
Olivine - Mode: 80-90%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-95.

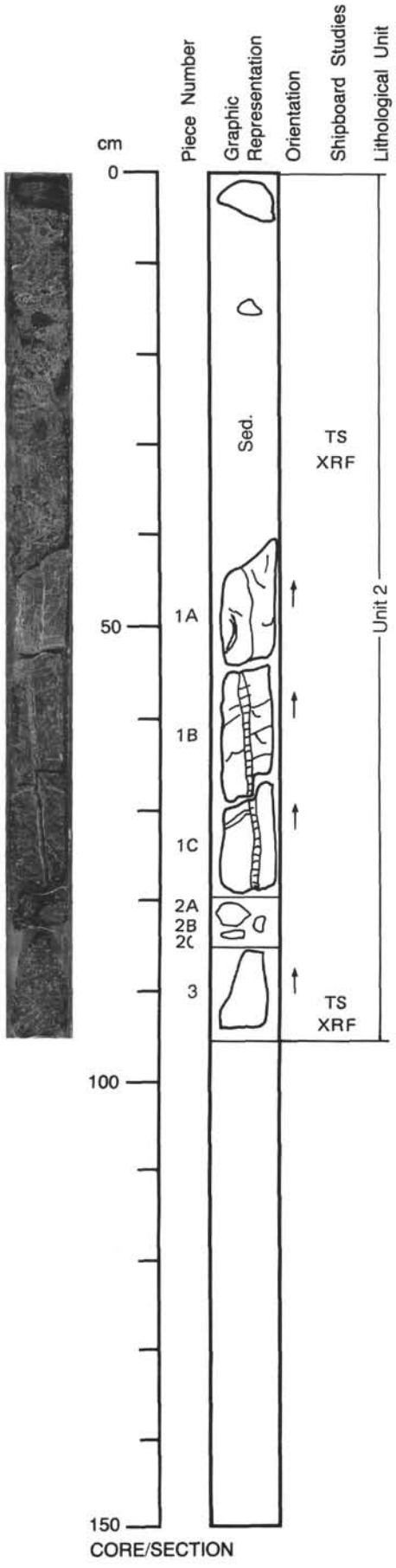
Orthopyroxene - Mode: 10-20%.
Crystal size: 1-4 mm.
Crystal shape: Equant to elongate.
Crystal orientation: None visible.
Percent replacement: 80-95.

Spinel - Mode: Trace.
Crystal size: <1 mm.
Crystal shape: Equant to ragged.
Crystal orientation: None visible.
Percent replacement: 0.

SECONDARY MINERALOGY:

Serpentine.
Total percent: 80-95%.
Texture: Patches of serpentine bastite pseudomorphs.
Vein material: Large fragment has 2-mm-wide black-green serpentine vein paralleling core barrel. This vein is crosscut perpendicularly by smaller white veins (<2 mm wide and 5 cm long). Other fragments also have small white veins (<2 mm wide) with random orientation.

ADDITIONAL COMMENTS: This section consists of multiple clasts of serpentinized harzburgite embedded in a phacoidal serpentine matrix.



125-784A-38R-2

UNIT 2: SERPENTINIZED HARZBURGITE

Pieces 1A, 1B, 1C, 2A, 2B, 2C

COLOR: Dark greenish gray to dark gray (5BG 4/1 - N 4/).
LAYERING: None visible.
DEFORMATION: Abundant fractures and veins.
PRIMARY MINERALOGY:
Primary silicates are variably serpentinized.
Olivine - Mode: 80%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 15-20%.
Crystal size: 1-4 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: 50-70.

Spinel - Mode: 1%.
Crystal size: <1 mm.
Crystal shape: Equant-ragged.
Crystal orientation: None visible.
Percent replacement: 0.
SECONDARY MINERALOGY:
Serpentine.
Total percent: 70-80%.
Texture: Serpentine bastite pseudomorphs after orthopyroxene.
Vein material: Abundant veins (0.5-3 mm wide) throughout pieces. Large 5-mm-wide chrysotile vein oriented almost parallel to core barrel. This vein is fractured along its length and crosscut perpendicularly by small (1-mm-wide and 6-mm-long) green-white serpentine veins.
ADDITIONAL COMMENTS: In upper portion of this section (0-2 cm) there is a serpentinized dunite clast (2 cm x 4 cm). This clast is >90% serpentinized and has no separate number on it.

UNIT 2: SERPENTINIZED HARZBURGITE

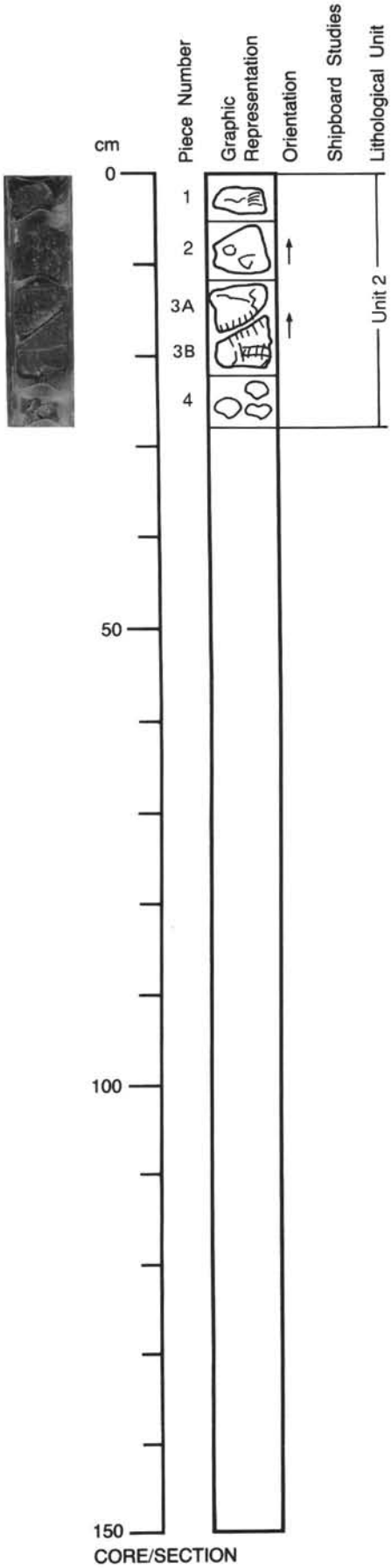
Piece 3

COLOR: Dark greenish gray to dark gray (5BG 4/1 - N 4/).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:
Primary silicates are variably serpentinized.
Olivine - Mode: 57-67%.
Crystal size: 1-3 mm.
Crystal shape: Anhedral.
Crystal orientation: None visible.
Percent replacement: 50-70.

Orthopyroxene - Mode: 30-40%.
Crystal size: 1-6 mm.
Crystal shape: Equant.
Crystal orientation: None visible.
Percent replacement: 50-70.

Clinopyroxene - Mode: <3%.
Crystal size: 1-2 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: 50-70.

Spinel - Mode: Trace.
Crystal size: <2 mm.
Crystal shape: Ragged.
Crystal orientation: None visible.
Percent replacement: 0.
SECONDARY MINERALOGY:
Serpentine.
Total percent: 50-70%.
Texture: Patches of serpentine bastite pseudomorphs.
Vein material: None visible.
ADDITIONAL COMMENTS: Sample is rich in pyroxene and fairly fresh.



125-784A-38R-CC

UNIT 2: SERPENTINIZED HARZBURGITE

Pieces 1, 2, 3A, 3B, 4

COLOR: Dark greenish gray to dark gray (5BG 4/1 - N 4/).
LAYERING: None visible.
DEFORMATION: Pieces 1, 3A and 3B show abundant fracturing and veining.
PRIMARY MINERALOGY: Primary silicates are variably altered to serpentine.

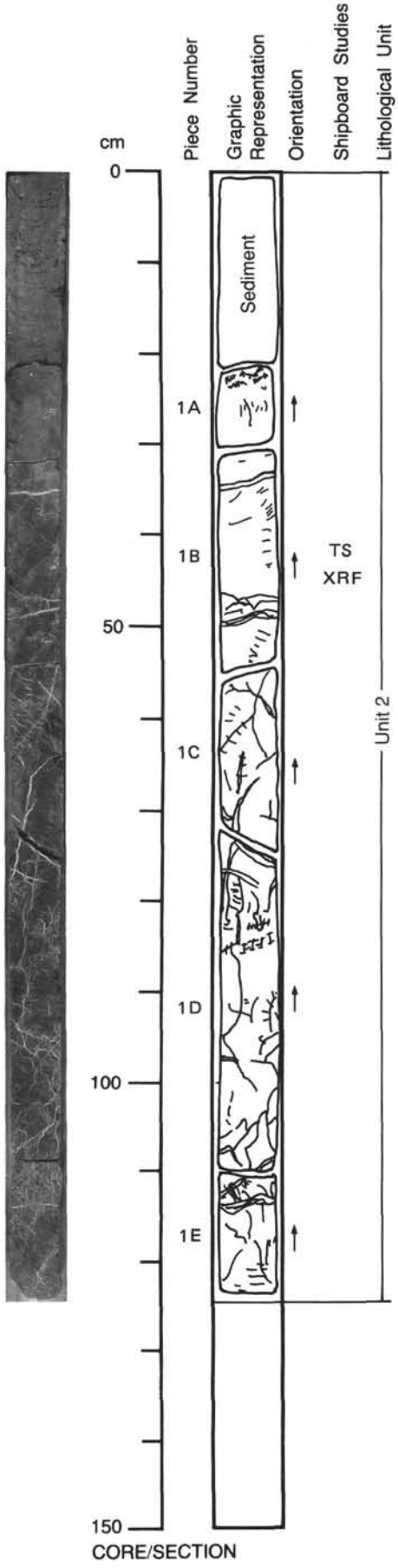
Olivine - Mode: 80-90%.
Crystal size: 1-2 mm.
Crystal shape: Anhedral.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 10-20%.
Crystal size: 1-6 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: 80-90.

Spinel - Mode: Trace.
Crystal size: <1 mm.
Crystal shape: Equant to ragged.
Crystal orientation: None visible.
Percent replacement: 0.

SECONDARY MINERALOGY:

Serpentine.
Total percent: 80-90%.
Texture: Serpentine bastite pseudomorphs after orthopyroxene.
Vein material: Piece 3 is fractured along a chrysotile "Frankenstein" vein. This vein is oriented 45 degrees to side of core barrel. It is perpendicularly cut by smaller (>2-mm-wide) veins along its length. Other pieces have small (>1-mm-wide) white-green veins.



125-784A-40R-2

UNIT 2: SERPENTINIZED DUNITE

Pieces 1A - 1E

COLOR: Black (N 4/).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:

Primary silicates are extensively and pervasively serpentinized.
Olivine - Mode: 95-97%.
Crystal size: None visible.
Crystal shape: None visible.
Crystal orientation: None visible.
Percent replacement: 95-100.

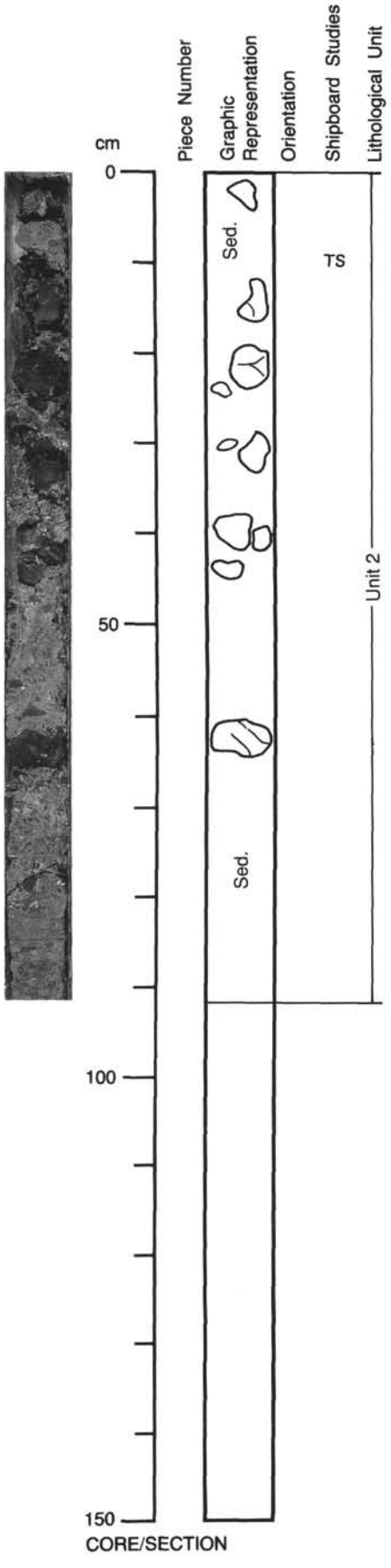
Orthopyroxene - Mode: 3-5%.
Crystal size: 1-3 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: Variable.

Cr-spinel - Mode: <1%.
Crystal size: 0.1-0.5 mm.
Crystal shape: Subhedral.
Crystal orientation: Disseminated.
Percent replacement: None visible.

SECONDARY MINERALOGY:

Massive textured serpentine.
Total percent: 99%.
Texture: Mesh texture present in 4 cm of top of piece; otherwise massive, but veined.
Vein material: White veins of chrysotile, mostly with shallow dip and often anastomosing; some crosscutting dark greenish-black serpentine veins.

ADDITIONAL COMMENTS: All sub-pieces are part of one continuous cored piece.



125-784A-41R-1

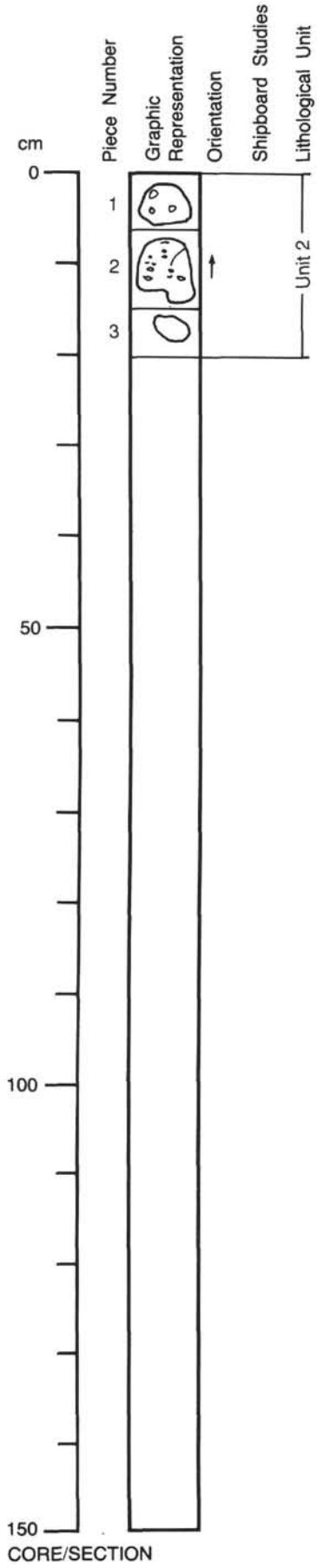
UNIT 2: SERPENTINIZED HARZBURGITE AND DUNITE

Pieces assorted clasts in a matrix

COLOR: Black (N 4/).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:
Extensively serpentinized rock.
Olivine - Mode: 95-99%.
Crystal size: None visible.
Crystal shape: None.
Crystal orientation: None visible.
Percent replacement: 95-100.

Orthopyroxene - Mode: 0-5%.
Crystal size: 0.5-3 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: Variable.

Cr-spinel - Mode: Trace.
Crystal size: 0.1-0.5 mm.
Crystal shape: Anhedral.
Crystal orientation: Disseminated.
Percent replacement: None visible.
SECONDARY MINERALOGY:
Massive serpentine.
Total percent: 98-10%.
Texture: Massive and bastite after orthopyroxene.
Vein material: <0.2 mm wide, white fill of chrysotile, orientated sub-horizontal.



125-784A-41R-CC

UNIT 2: SERPENTINIZED HARZBURGITE

Pieces 1 and 2

COLOR: Dark greenish gray to dark gray (5BG 4/1 - N 4/).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:
Primary silicates are variably serpentinized.
Olivine - Mode: 75-80%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 20-25%.
Crystal size: 1-4 mm.
Crystal shape: Subhedral-equant.
Crystal orientation: None visible.
Percent replacement: 60-70.

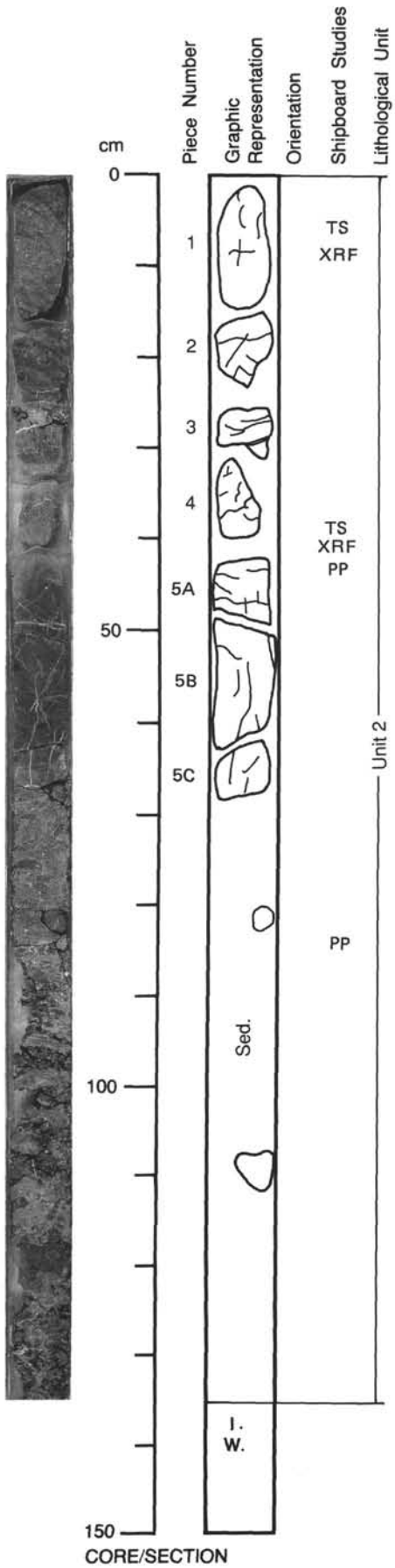
Spinel - Mode: Trace.
Crystal size: <1 mm.
Crystal shape: Equant.
Crystal orientation: None visible.
Percent replacement: 0.
SECONDARY MINERALOGY:
Serpentine.
Total percent: 70-80%.
Texture: Patches of serpentine bastite pseudomorphs after orthopyroxene.
Vein material: No veins are visible.

UNIT 2: SERPENTINIZED DUNITE

Piece 3

COLOR: Dark bluish gray (5B 4/1).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:
Olivine - Mode: 95-99%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Spinel - Mode: Trace.
Crystal size: <1 mm.
Crystal shape: Equant.
Crystal orientation: None visible.
Percent replacement: 0.
SECONDARY MINERALOGY:
Serpentine.
Total percent: 80%.
Texture: Serpentine mesh texture after olivine.
Vein material: <2-mm-wide white veins at no specific orientation.



125-784A-42R-1

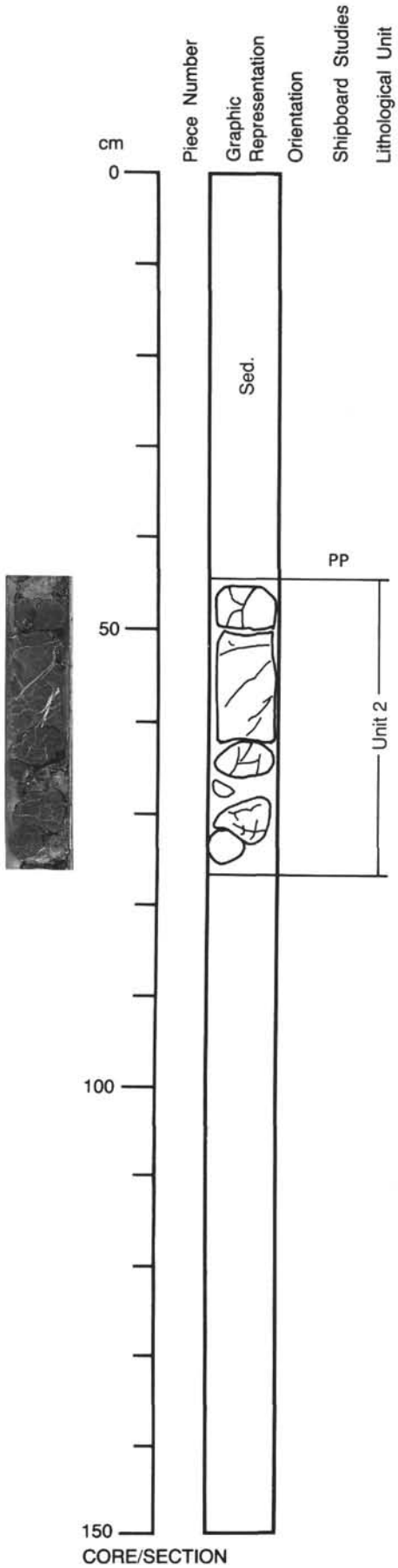
UNIT 2: SERPENTINIZED HARZBURGITE AND DUNITE

Pieces 1-5

COLOR: Dark greenish gray to dark gray (5BG 4/1 - N 4/).
LAYERING: There appears to be a contact within Piece 2 (18-22 cm) between harzburgitic and dunitic rocks.
DEFORMATION: Locally abundant deformation; fractures and veins.
PRIMARY MINERALOGY:
Primary silicates are variably serpentinized.
Olivine - Mode: 70-95%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 5-30%.
Crystal size: 1-4 mm.
Crystal shape: Equant.
Crystal orientation: None visible.
Percent replacement: 70-80.

Spinel - Mode: Trace.
Crystal size: <1 mm.
Crystal shape: Equant-ragged.
Crystal orientation: None visible.
Percent replacement: 0.
SECONDARY MINERALOGY:
Serpentine.
Total percent: 75-90%.
Texture: Patches of serpentine mesh and bastite textures.
Vein material: Abundant white and pale-green veins (0.5-3 mm wide) distributed throughout rocks at no specific orientation.
ADDITIONAL COMMENTS: There is a gradation between harzburgite and dunites within these fragments; fragments are clasts sitting in a serpentine matrix.



125-784A-42R-2

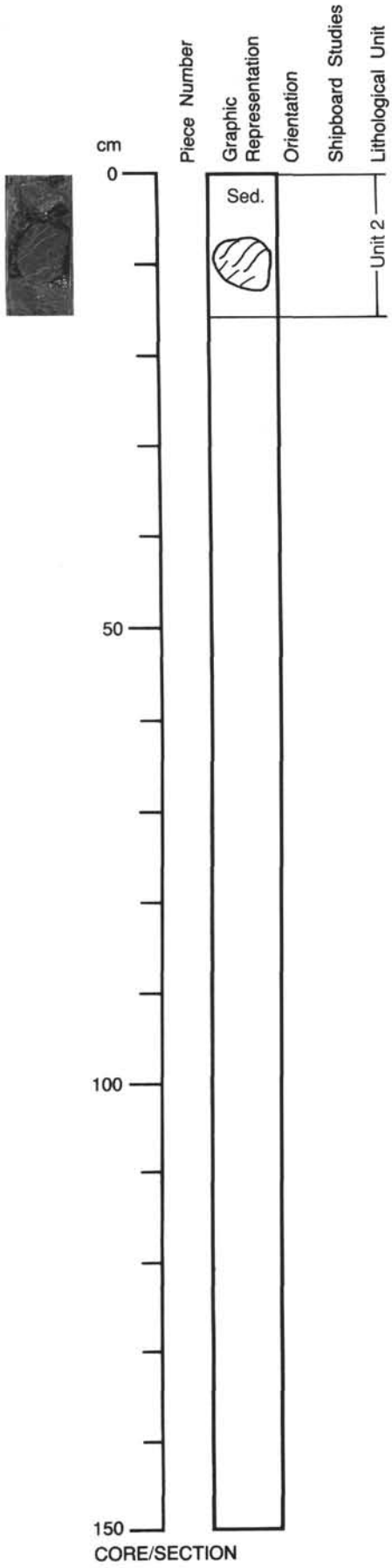
UNIT 2: SERPENTINIZED DUNITE

Pieces multiple fragments

COLOR: Black (N 4/).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:
Primary silicates are variably serpentinized.
Olivine - Mode: 95-99%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 1-2%.
Crystal size: 1-2 mm.
Crystal shape: Subhedral.
Crystal orientation: None visible.
Percent replacement: 70.

Spinel - Mode: Trace.
Crystal size: <1 mm.
Crystal shape: Ragged.
Crystal orientation: None visible.
Percent replacement: 0.
SECONDARY MINERALOGY:
Serpentine.
Total percent: 80-90%.
Texture: Minor serpentine bastite pseudomorphic texture in areas.
Vein material: White veins, (0.5-2 mm wide), and pale-green (serpentine?) veins in fragments at no specific orientation.



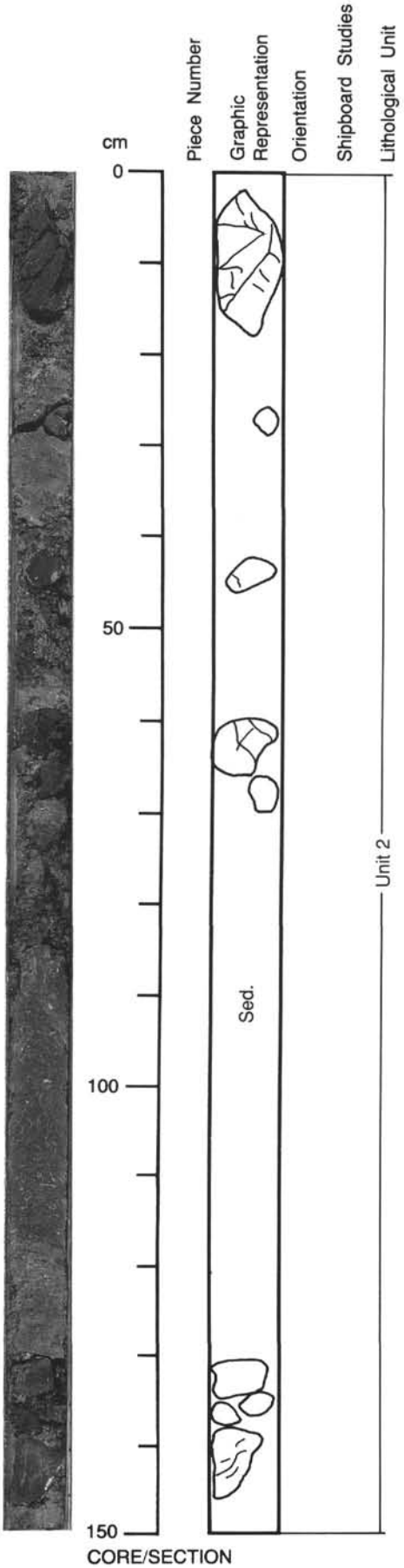
125-784A-42R-CC

UNIT 2: SERPENTINIZED DUNITE

Pieces one clast

COLOR: Black (N 4/).
LAYERING: None visible.
DEFORMATION: Abundant fractures and veining.
PRIMARY MINERALOGY:
Primary silicates are variably serpentinized.
Olivine - Mode: 90-99%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Spinel - Mode: Trace.
Crystal size: <1 mm.
Crystal shape: Equant-ragged.
Crystal orientation: None visible.
Percent replacement: 0.
SECONDARY MINERALOGY:
Serpentine.
Total percent: 80-90%.
Texture: Serpentine mesh after olivine (?).
Vein material: Pale-green serpentine veins (0.5-2 mm wide) oriented 45 degrees to core barrel.



125-784A-43R-1

UNIT 2: SERPENTINIZED HARZBURGITES AND DUNITES

Pieces multiple clasts in matrix

COLOR: Dark greenish gray to dark gray (5BG 4/1-N 4/).
LAYERING: None visible.
DEFORMATION: Abundant veining and fracturing.
PRIMARY MINERALOGY:

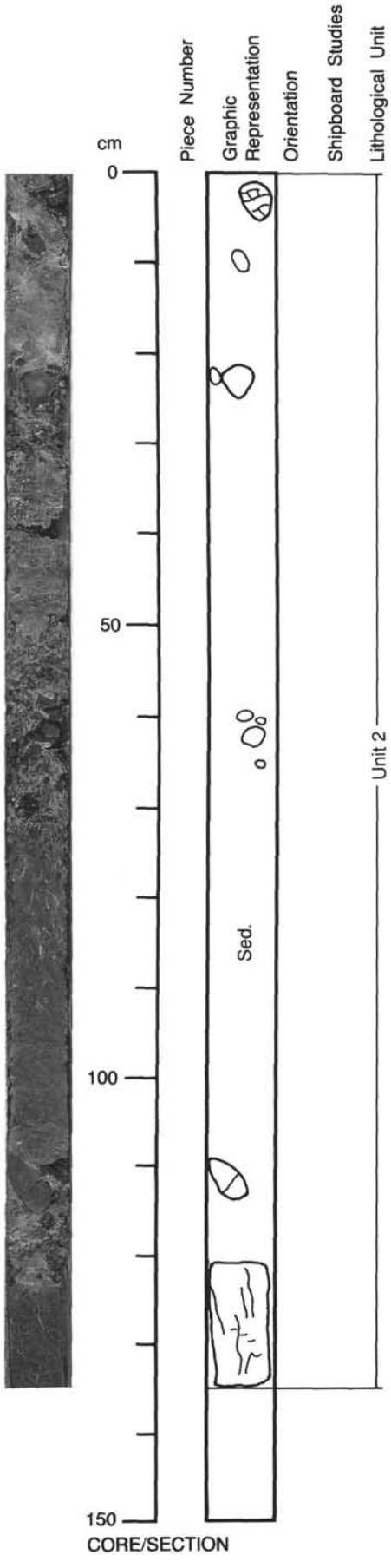
Primary silicates are variably serpentinized.
Olivine - Mode: 70-95%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 5-30%.
Crystal size: 1-3 mm.
Crystal shape: Equant.
Crystal orientation: None visible.
Percent replacement: 70-80.

Spinel - Mode: Tr-1%.
Crystal size: <1 mm.
Crystal shape: Equant-ragged.
Crystal orientation: None visible.
Percent replacement: 0.

SECONDARY MINERALOGY:

Serpentine.
Total percent: 70-90%.
Texture: Serpentine mesh and bastite pseudomorphs.
Vein material: Abundant veins (0.5-2 mm wide) of white and green (serpentine) minerals throughout rocks. The fractures in the clasts follow the general trend of the veins.



125-784A-43R-2

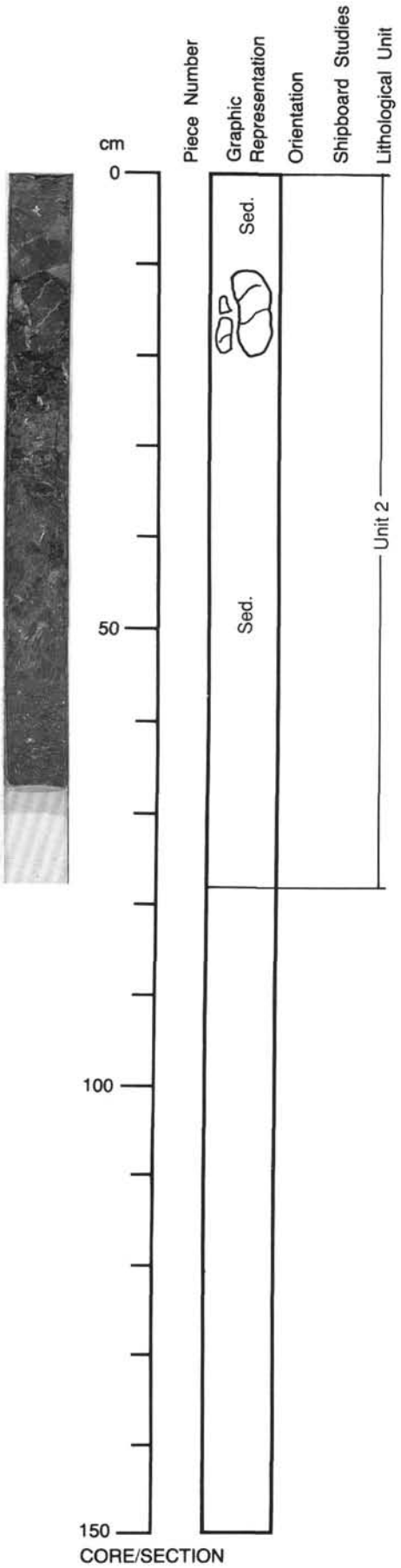
UNIT 2: SERPENTINIZED DUNITE AND HARZBURGITES

Pieces multiple clasts in matrix

COLOR: Dark greenish gray to dark gray (5BG 4/1-N 4/).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:
Olivine - Mode: 70-95%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 5-30%.
Crystal size: 1-2 mm.
Crystal shape: Equant.
Crystal orientation: None visible.
Percent replacement: 70.

Spinel - Mode: Tr-1%.
Crystal size: <1 mm.
Crystal shape: Ragged.
Crystal orientation: None visible.
Percent replacement: 0.
SECONDARY MINERALOGY:
Serpentine.
Total percent: 80-90%.
Texture: Patches of serpentine mesh and bastite pseudomorphs.
Vein material: Some clasts have white veins (0.5-1 mm wide) at no specific orientation.



125-784A-43R-3

UNIT 2: SERPENTINIZED HARZBURGITE

Pieces multiple clasts in matrix

COLOR: Dark gray (N 4/).
LAYERING: None visible.
DEFORMATION: None visible.
PRIMARY MINERALOGY:

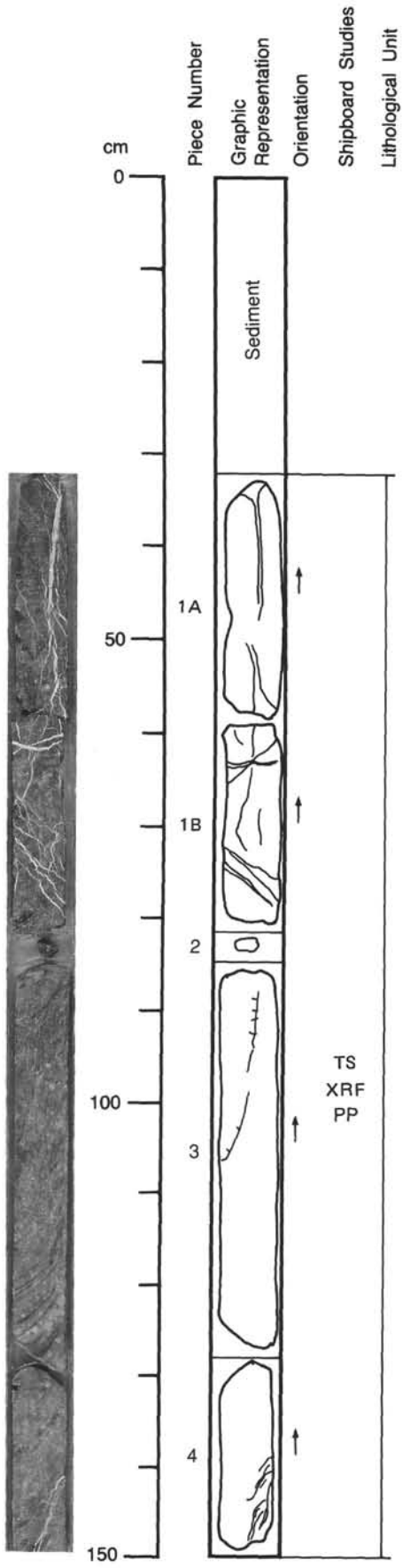
Primary silicates are variably serpentinized.
Olivine - Mode: 75-85%.
Crystal size: Not visible.
Crystal shape: Not visible.
Crystal orientation: None visible.
Percent replacement: 80-90.

Orthopyroxene - Mode: 15-25%.
Crystal size: 1-2 mm.
Crystal shape: Equant.
Crystal orientation: None visible.
Percent replacement: 70-80.

Spinel - Mode: Tr?
Crystal size: <1 mm.
Crystal shape: Ragged.
Crystal orientation: None visible.
Percent replacement: 0.

SECONDARY MINERALOGY:

Serpentine.
Total percent: 80-90%.
Texture: Patches of serpentine bastite pseudomorphs.
Vein material: Some clasts have white veins (1-2 mm wide) at no specific orientation.



125-784A-45R-1

UNIT 2: SERPENTINIZED TECTONIZED HARZBURGITE

Pieces 1A, 1B, 2, 3, 4

COLOR: Dark gray to gray (N5/ to N4/).
LAYERING: None visible.
DEFORMATION: Aligned spinels, curved cleavage planes on orthopyroxene crystals.
PRIMARY MINERALOGY:

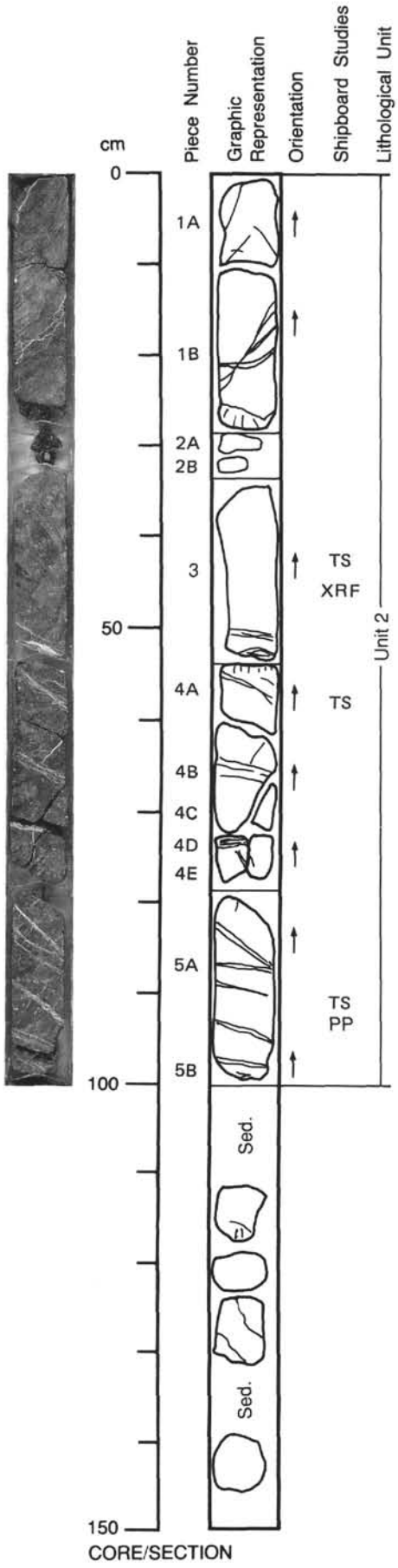
Primary silicates are variably serpentinized.
Olivine - Mode: 70-80%.
Crystal size: <8 mm.
Crystal shape: Not visible.
Crystal orientation: Not visible.
Percent replacement: Variable 50-100%.

Orthopyroxene - Mode: 20-30%.
Crystal size: <5 mm.
Crystal shape: Equant to elongate.
Crystal orientation: Not visible.
Percent replacement: Variable 50-80%.

Spinel - Mode: <1%.
Crystal size: <1 mm.
Crystal shape: Equant to elongate.
Crystal orientation: Short stringers at random orientations.
Percent replacement: Not visible.
Comments: Chlorite halos around crystals (<1 mm wide).

SECONDARY MINERALOGY:

Minor "Frankenstein" texture at bottom of heavily veined portion of the section.
Total percent: 80-99%.
Texture: Patches of serpentine bastite pseudomorphs.
Vein material: Piece 1 is highly veined. Three generations: first: subvertical, filled with amorphous green serpentine, <5 mm wide; second: also subvertical, follows tracks of first generation, white, probably chrysotile, 1-2 mm wide; third: subhorizontal to anastomosing, filled with chrysotile, <3 mm wide.



125-784A-45R-2

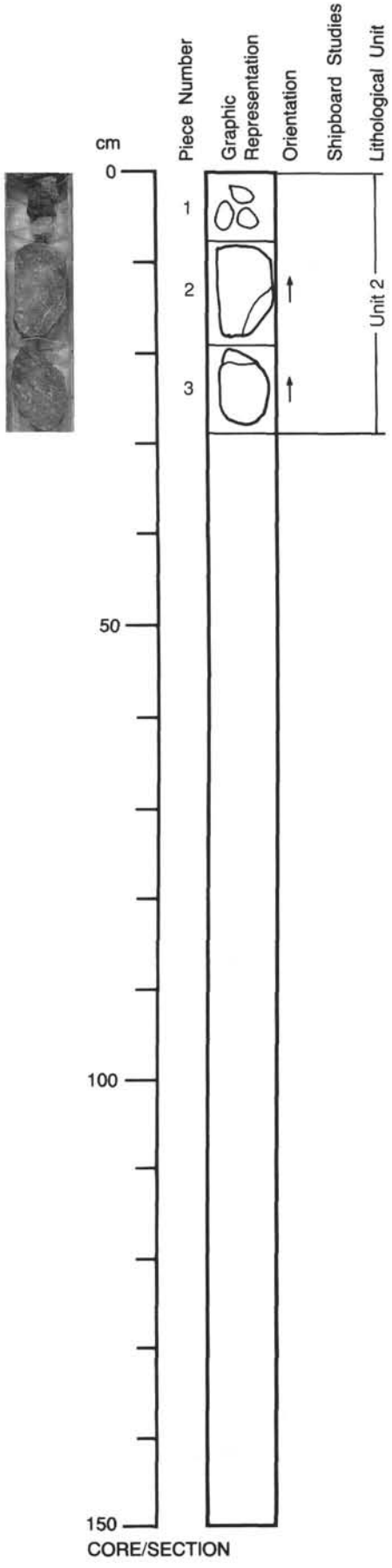
UNIT 2: SERPENTINIZED HARZBURGITE

Pieces 1A, B; 2A, B; 3; 4A-E; 5A, B;

COLOR: Dark gray-gray (N4/ N5/).
LAYERING: Some areas have alignment of orthopyroxene at 30 degrees to core axis.
DEFORMATION: Elongate spinels and trains of spinel; orthopyroxene cleavage has wavy extinction.
PRIMARY MINERALOGY:
Primary silicates are variably serpentinized 60-100%.
Olivine - Mode: 80-90%.
Crystal size: <6 mm.
Crystal shape: Not visible.
Crystal orientation: Not visible.
Percent replacement: 90-100.

Orthopyroxene - Mode: 10-20%.
Crystal size: <3-5 mm.
Crystal shape: Equant to elongate.
Crystal orientation: Some alignment.
Percent replacement: 40-60.

Spinel - Mode: <1%.
Crystal size: <1-1 mm.
Crystal shape: Equant to elongate.
Crystal orientation: Some stringers.
Percent replacement: None.
SECONDARY MINERALOGY:
The break between Pieces 3 and 4 appears to be along a major vein.
Total percent: 70-99%.
Texture: Serpentine mesh and bastite pseudomorphs.
Vein material: Two major generations. first: conjugate set, dipping at 45 degrees to core axis, dark to pale green and white chrysotile to dark amorphous serpentine, <4 mm wide, en echelon development especially in Piece 5; second: anastomosing, chrysotile filled, white, <2 mm wide.



125-784A-45R-CC

UNIT 2: SERPENTINIZED TECTONIZED HARZBURGITE

Pieces 1 (3 fragments), 2, 3

COLOR: Dark gray to gray (N4/ to N5/).
LAYERING: None visible.
DEFORMATION: Well-developed spinel stringers, wavy cleavage on orthopyroxene.
PRIMARY MINERALOGY:

Primary silicates are variable serpentinized.
Olivine - Mode: 80-90%.
Crystal size: <6 mm.
Crystal shape: Not visible.
Crystal orientation: Not visible.
Percent replacement: 90-100.

Orthopyroxene - Mode: 10-20%.
Crystal size: <3-5 mm.
Crystal shape: Equant to elongate.
Crystal orientation: None visible.
Percent replacement: 40-70.

Spinel - Mode: <1%.
Crystal size: <1-2 mm.
Crystal shape: Equant to elongate.
Crystal orientation: Stringers.
Percent replacement: None visible.

SECONDARY MINERALOGY:

Serpentine.
Total percent: 80-99%.
Texture: Patches of serpentine mesh and bastite pseudomorphs.
Vein material: Minor chrysotile vein, white, <2 mm wide, dips 50 degrees to core axis.

125-784A-34R-02 (87-89 cm) OBSERVER: TER WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized dunite

GRAIN SIZE: 0.1 - <2 mm

TEXTURE: Mesh

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	97	Not visible		Not visible	Altered to serpentine and without mesh texture.
Spinel	1	2	0.1-1.5		Subhedral-euhedral	Reddish brown Cr-spinel.
Orthopyroxene	0	1	<2		Subhedral	Altered to bastite.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	25	Serpentine	Dusty clay is scattered throughout the thin section.
Serpentine	65-70	Olivine, orthopyroxene	Chrysotile and/or lizardite replaced olivine.
Brucite			Antigorite and brucite exist after olivine.
Opaques	5	Spinel, serpentine	Magnetite(?) is partly replacing spinel and serpentine.

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

COMMENTS: Mesh texture after olivine is not common, because serpentinization in this rock is associated with antigorite and brucite. Fine-grained opaque minerals are scattered throughout the thin section. No piece number given.

125-784A-36R-01 (Piece 7,107-109 cm) OBSERVER: SAB WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 0.5-7 mm

TEXTURE: Mesh and bastite; tectonized

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	<1	78-83	1-3		Anhedral	95-100%, altered to serpentine mesh and magnetite.
Clinopyroxene	Trace	Trace	N/A		Subhedral	As exsolution lamellae in orthopyroxenes.
Spinel	1.5	2	0.5-2	Cr	Subhedral-anhedral	Red-brown, irregular shape, minor inclusions.
Orthopyroxene	2	15-20	2-7		Subhedral-anhedral	95-100% altered to serpentine bastite; minor clinopyroxene exsolution lamellae, wavy extinction in some grains.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	2	Serpentine	Dusty brown-black clay intermixed with serpentine and magnetite and distributed throughout slide.
Serpentine	79-84	Olivine, orthopyroxene	Serpentine forming mesh texture and bastite texture. Antigorite and lizardite may both be present, but it is difficult to tell because of amount of magnetite. Chrysotile forms 0.1- to 3-mm-wide veins throughout rock with no preferred orientation.
Magnetite	10-15	Olivine, spinel	Euhedral-subhedral crystals (0.05 to 0.3 mm) surrounded by mesh-textured serpentine. Magnetite is heavily concentrated in veins and in mesh centers and in mesh edges.

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

COMMENTS: 98-100% altered ultramafic. Spinels have minor anhedral inclusions of orthopyroxene(?). Relic orthopyroxenes show wavy clinopyroxene exsolution lamellae; curved outlines of mesh texture are present. Spinel crystals are rounded and appear to be out of equilibrium(?). This slide has abundant magnetite scattered throughout.

125-784A-34R-02 (87-89 cm) OBSERVER: TER WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized dunite

GRAIN SIZE: 0.1 - <2 mm

TEXTURE: Mesh

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	97	Not visible		Not visible	Altered to serpentine and without mesh texture.
Spinel	1	2	0.1-1.5		Subhedral-euhedral	Reddish brown Cr-spinel.
Orthopyroxene	0	1	<2		Subhedral	Altered to bastite.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	25	Serpentine	Dusty clay is scattered throughout the thin section.
Serpentine	65-70	Olivine, orthopyroxene	Chrysotile and/or lizardite replaced olivine.
Brucite			Antigorite and brucite exist after olivine.
Opaques	5	Spinel, serpentine	Magnetite(?) is partly replacing spinel and serpentine.

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

COMMENTS: Mesh texture after olivine is not common, because serpentinization in this rock is associated with antigorite and brucite. Fine-grained opaque minerals are scattered throughout the thin section. No piece number given.

125-784A-36R-01 (Piece 7,107-109 cm) OBSERVER: SAB WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 0.5-7 mm

TEXTURE: Mesh and bastite; tectonized

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	<1	78-83	1-3		Anhedral	95-100%, altered to serpentine mesh and magnetite.
Clinopyroxene	Trace	Trace	N/A		Subhedral	As exsolution lamellae in orthopyroxenes.
Spinel	1.5	2	0.5-2	Cr	Subhedral-anhedral	Red-brown, irregular shape, minor inclusions.
Orthopyroxene	2	15-20	2-7		Subhedral-anhedral	95-100% altered to serpentine bastite; minor clinopyroxene exsolution lamellae, wavy extinction in some grains.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	2	Serpentine	Dusty brown-black clay intermixed with serpentine and magnetite and distributed throughout slide.
Serpentine	79-84	Olivine, orthopyroxene	Serpentine forming mesh texture and bastite texture. Antigorite and lizardite may both be present, but it is difficult to tell because of amount of magnetite. Chrysotile forms 0.1- to 3-mm-wide veins throughout rock with no preferred orientation.
Magnetite	10-15	Olivine, spinel	Euhedral-subhedral crystals (0.05 to 0.3 mm) surrounded by mesh-textured serpentine. Magnetite is heavily concentrated in veins and in mesh centers and in mesh edges.

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

COMMENTS: 98-100% altered ultramafic. Spinels have minor anhedral inclusions of orthopyroxene(?). Relic orthopyroxenes show wavy clinopyroxene exsolution lamellae; curved outlines of mesh texture are present. Spinel crystals are rounded and appear to be out of equilibrium(?). This slide has abundant magnetite scattered throughout.

125-784A-37R-01 (6-9 cm) OBSERVER: SAB WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 0.05-5 mm

TEXTURE: Mesh and bastite

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	2	80	0.1-0.5		Anhedral	Altered to serpentine mesh; wavy extinction.
Clinopyroxene	2	3	0.05-1		Anhedral	As exsolution lamellae (100) and as individual grains.
Spinel	1	2	0.05-1	Cr	Euhedral-anhedral	Red-brown; altering to magnetite.
Orthopyroxene	5	15	0.1-5		Subhedral-anhedral	Altered to serpentine bastite; kink-banded, wavy extinction, bent exsolution lamellae.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	5	Serpentine	Dusty brown-black clay scattered throughout slide and intermixed with the serpentine.
Serpentine	69	Olivine, orthopyroxene	Mostly lizardite and/or chrysotile forming mesh and bastite textures.
Magnetite	15	Spinel, olivine, serpentine	Dusty 0.1-mm grains throughout slide and concentrated in veins (serpentine), mesh edges, and along cleavages.
Talc	1	Serpentine	Dusty, high birefringence; found associated with orthopyroxene and bastites in and along edges and cleavages.

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

COMMENTS: Relatively pyroxene-rich harzburgite. Spinels are fractured with silicates forming between fractures. Some spinels form ragged elongate trains. Orthopyroxene are wavy and kink-banded; have inclusions of clinopyroxene and spinels(?). One orthopyroxene grain is split by 1 to 1.5-mm-wide serpentine veins. This slide has abundant magnetite mesh edges and in serpentine veins (which are almost all parallel throughout slide). This rock was further altered after serpentinization. No piece number given.

125-784A-38R-01 (66-68 cm) OBSERVER: SAB WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 0.2-5 mm

TEXTURE: Mesh and bastite

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	85-90	1-4		Anhedral	Altered to serpentine mesh texture.
Spinel	Trace	Trace	0.2-0.3		Subhedral-anhedral	Partly altered to magnetite.
Orthopyroxene	0	10-15	1-5		Anhedral	Altered to serpentine bastite.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	5	Serpentine	Dusty brownish-blackish clay distributed throughout rock and intermixed with serpentine.
Serpentine	93	Olivine, orthopyroxene	Lizardite and/or chrysotile forming mesh and bastite textures. Chrysotile is also abundant in veins (see below).
Magnetite	2	Spinel	Dusty, 0.1-mm, fine-grained; scattered throughout slide and appears concentrated in serpentine veins and mesh centers.

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

COMMENTS: Veins of serpentine (0.05 to 1 mm); magnetite and clays are abundant throughout slide and parallel one another. These smaller veins are then cut perpendicularly by a 5-mm-wide chrysotile vein (almost like "Frankenstein" texture). This larger chrysotile vein is also rimmed by a high birefringence, length slow(?) mineral. No piece number given.

125-784A-38R-02 (Piece 3,92-95 cm) OBSERVER: SAB WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 0.2-5 mm

TEXTURE: Cumulate, mesh and bastite

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	3	79.5	1-3		Anhedral	Altering to serpentine mesh texture.
Clinopyroxene	2-4	2-4	0.5-2		Anhedral	As exsolution lamellae and as anhedral crystals.
Spinel	1.5	1.5	0.2-0.5		Anhedral	Reddish brown; fractured.
Orthopyroxene	17	25	2-5		N/A	Partly or fully altered to serpentine bastite texture, wavy extinction, kink-banded, exsolution lamellae.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	Trace	Orthopyroxene, serpentine	Pale-green in color; rarely visible in orthopyroxene bastite.
Serpentine	74-76	Olivine, orthopyroxene	Lizardite and/or chrysotile forms mesh and bastite textures. Chrysotile veins are present.
Magnetite	<1	Spinel	Dusty 0.1-mm grains; occurs along the grain boundaries among olivine, orthopyroxene and clinopyroxene.

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

COMMENTS: Spinels are fractured and have silicates forming within the fractures. Spinels are sometimes aligned in elongate trains. Orthopyroxenes are kink-banded, have wavy extinctions and have inclusions of clinopyroxene as well as serpentine pseudomorphic grains. Minor chrysotile veins (0.5 mm wide and 2 mm long) cross many orthopyroxene grains.

125-784A-39R-01 (5-6 cm) OBSERVER: HIR WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Meta-volcaniclastic rock

GRAIN SIZE: 0.1-2 mm

TEXTURE: Cataclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Plagioclase	Trace	5-10	<0.1		Euhedral	Occurs in volcanic fragments.
Clinopyroxene	Trace	2-5	<0.2		Anhedral	Occurs in volcanic fragments and in matrix.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	70	Plagioclase	Matrix is occupied by brown dusty clay.
Chlorite	20-30	Clinopyroxene, hornblende	Showing abnormal interference color.
Sphene	Trace		Showing high reflective index, high birefringence and euhedral to subhedral shape; abundant in amphibolite clasts.
Hornblende	Trace		Occurring in amphibolite clasts; pale-green to colorless.

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

COMMENTS: This rock contains subround to angular clasts of varying sizes (<2 mm) in a dusty clay matrix. Clasts consist of amphibolite and basalt. This rock underwent the low-grade metamorphism and associated cataclastic deformation. Amphiholite consists of pale-green hornblende, saussuritized plagioclase, chlorite and sphene. Basalt consists of chlorite, saussuritized plagioclase and relict clinopyroxene. No piece number given.

125-784A-39R-01 (5-6 cm) OBSERVER: JOH WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Metabasalt

GRAIN SIZE: Fine-grained

TEXTURE: Aphyric

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Glass	0	60-70	N/A		N/A	100% altered to clays + limonite.
Plagioclase	10-15	15-25	0.05-0.15		Laths	Quench morphology, altered to clays.
Clinopyroxene	7-12	15-20	0.1-0.2		Anhedral, elongate	Small occasional radiation clusters.
Magnetite	<1	<1	0.01-0.02		Equant, euhedral	Randomly distributed throughout.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	65-70	Glass, plagioclase	Brown amorphous clays disseminated throughout slide obscuring original textures.
Carbonate	2-3	Veins	Calcite (0.02 to 0.04 mm wide), throughout.
Chlorite	5-10	Veins	Pale-green chlorite is scattered throughout the rock.
Limonite	10-15	Glass, matrix	Occurs as veins and patches. Veins are anastomosing and appear to converge to form patches. Veins are 0.5 to 1 mm wide, patches are up to 3 mm.

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

COMMENTS: This sample is a small (1 cm diameter) altered clast of aphyric fine-grained basalt with limonite vein alteration. No piece number given.

125-784A-39R-01 (11-12 cm) OBSERVER: HIR WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 1-4 mm

TEXTURE: Mesh and bastite

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	2-3	83	1-4		Anhedral	Mostly altered to mesh textured serpentine.
Clinopyroxene	Trace	Trace	0.1-0.3		Anhedral	Forms exsolution lamellae in orthopyroxene and isolated anhedral crystal.
Spinel	2	2	0.5-1.5		Subhedral-anhedral	Dark red and translucent Cr-spinel is scattered throughout the rock.
Orthopyroxene	7-8	15	1-4		Anhedral	Partly altered to bastite-textured serpentine.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chrysotile/ lizardite	85-89	Olivine, orthopyroxene	Form mesh and bastite textures after olivine and orthopyroxene, respectively.
Magnetite	<1		Occurs in serpentine veins.

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

COMMENTS: Wavy extinction and kink-bands are common in orthopyroxene crystals. Mesh texture is well developed in most of slide and olivine, thus there appears to be very little post-serpentinization deformation. Hourglass serpentine texture is also well developed in a portion of the slide. Clinopyroxene grains are usually near orthopyroxene edges. No piece number given.

125-784A-39R-CC (12-13 cm) OBSERVER: HIR WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized dunite

GRAIN SIZE: 1-3 mm

TEXTURE: Mesh and bastite

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Olivine	0	91-94	1-3		Anhedral	Altered to mesh-textured serpentine.
Spinel	Trace	1	0.1-0.8		Anhedral	Altered to magnetite.
Orthopyroxene	0	5-8	0.5-1.5		Anhedral	Altered to bastite-textured serpentine.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	10	Serpentine	Dusty brown clay is scattered throughout the rock.
Chrysotile/ lizardite	88-89	Olivine, orthopyroxene	Form mesh and bastite textures.
Magnetite	1	Spinel	Fine-grained magnetite is scattered throughout the rock.

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

COMMENTS: Fragmentation and veining are prevailed throughout the rock. Veins vary in width from 0.5 mm to 2 mm, and consist of chrysotile, magnetite and clays. Veins appear to have no preferred orientation. Veins also have bright purple color which probably results from impregnation when making the thin section. No piece number given.

125-784A-40R-01 (10-12 cm) OBSERVER: HIR WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Meta-volcaniclastic rock

GRAIN SIZE: 0.5-1 mm

TEXTURE: Clastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Clinopyroxene	20	25-30	0.5-1		Anhedral	Tectonically distorted and actinolitized.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	10-20	Matrix	Dusty brownish clays are scattered throughout the rock.
Carbonate	<5	Vein fill	Forms veins.
Chlorite	50	Matrix	Pale-green chlorite fills in matrix throughout the rock.
Actinolite	<5	Clinopyroxene	Occurs as small acicular crystals along rim of clinopyroxene.
Prehnite	<2	Vein fill	Partly shows feather-like texture; colorless, high birefringence.

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

COMMENTS: This rock contains abundant clinopyroxene fragments in highly sheared chlorite and clay matrix. Clinopyroxene is distorted to varying degrees and is partly or fully actinolitized. Veins of calcite and chlorite (0.01 to 0.1 mm wide) run throughout the rock. No piece number given.

125-784A-40R-01 (12-15 cm) OBSERVER: HIR WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Metabasalt

GRAIN SIZE: 0.05-0.1 mm

TEXTURE: Primary intersertal, secondary cataclastic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Clinopyroxene	25-30	25-30	0.05-0.1		Anhedral	Mostly occurs as quench crystal.
Plagioclase	0	40-50	0.1		Euhedral-subhedral	Mostly occurs as quench crystal, replaced by chlorite.
Glass	0	25-30	N/A		N/A	Completely altered to clay and chlorite.
Opaques	<5	<5	0.05		Euhedral-anhedral	Scattered throughout the rock.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	<10	Glass, plagioclase	Brown dusty clay is locally visible, amorphous clays pervasive.
Carbonate	5		Occurs as vein minerals.
Chlorite	40-50	Glass	Pale-green in color, low refractive index; pervasive.
Actinolite	Trace		Pale-green in color.
Sphene	Trace		Fine-grained, high refractive index, distributed throughout the rock.

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

COMMENTS: Fine-grained (0.01-0.05 mm) pale-green actinolite to actinolitic hornblende partly replaces primary clinopyroxene. Cataclastic deformation has prevailed throughout the rock. Fractured and pulverized fragments are predominant in the slide. No piece number given.

125-784A-40R-01 (52-54 cm) OBSERVER: PHI WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Sand-sized serpentine

GRAIN SIZE: Fine-grained

TEXTURE: Foliated, anastomosing foliation

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	Most	N/A		N/A	Completely altered.
Orthopyroxene	0	Some?	N/A		N/A	Completely altered.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	20	Serpentine, olivine, orthopyroxene	
Serpentine	70	Olivine, orthopyroxene?	Fibrous: fibers radial in clasts bundled and anastomosing in matrix.
Opaques	10	Olivine, orthopyroxene?	Concentrated along edges of fiber bundles in matrix.

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

COMMENTS: Slide almost annihilated in polishing and grinding. Fine-grained fibrous serpentine anastomoses around serpentinite clasts. Probable serpentinite mud-flow. Original serpentine possibly foliated to yeild the abundant fibers. No piece number given.

125-784A-40R-02 (Piece 1B,41-43 cm) OBSERVER: TER WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized dunite

GRAIN SIZE: Not visible

TEXTURE: Mesh

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	99	Not visible		Not visible	Altered to mesh-textured serpentine.
Spinel	<1	1	0.2-0.5		Euhedral-subhedral	Dark brownish black Cr-spinel.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	5	Serpentine	Dusty brownish clay is scattered throughout the rock, especially in veins.
Serpentine	90-95	Olivine	Chrysotile and/or lizardite replaced olivine.
Opaques	2	Spinel, serpentine	Magnetite(?) is replacing partly spinel, and observed in vein.

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

COMMENTS: Mesh texture appears to define a crude foliation because mesh vein edges parallel one another to a great degree. Veins (0.1 to 0.5 mm wide) of serpentine and clays (after serpentine) run throughout the rock. Veins (0.01 to 0.02 mm wide) of opaque minerals also exist.

125-784A-41R-02 (98-100 cm) OBSERVER: HIR WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized dunite

GRAIN SIZE: 1-3 mm

TEXTURE: Mesh

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	99	1-3?		Anhedral	Completely altered to mesh-textured serpentine.
Spinel	<0.5	1	0.5-1.5		Euhedral to subhedral	Mostly altered to magnetite.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	10	Serpentine	Dusty brownish clay is scattered throughout the rock and intermixed with serpentine.
Chrysotile/ lizardite	85	Olivine	Form mesh texture which is well developed.
Magnetite	5	Spinel	Replaced spinel and filled in vein with serpentine; dusty 0.1-mm grains.

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

COMMENTS: This rock is highly altered, and contains abundant dusty brown clay fine-grained magnetite. Anastomosing veins of serpentine run throughout the rock. Some appear to form "Frankenstein-like" texture. Veins appear to be mostly chrysotile, clay and magnetite. No piece number given.

125-784A-42R-01 (Piece 1,5-8 cm) OBSERVER: HIR WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 1-5 mm

TEXTURE: Mesh and bastite

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	2-3	80-85	1-3		Anhedral	Mostly altered to mesh-textured serpentine.
Clinopyroxene	<1	<1	1-2		Anhedral	Forms exsolution lamellae in orthopyroxene and isolate anhedral crystal.
Spinel	<0.5	<0.5	<1	Cr	Euhedral-anhedral	Reddish brown spinel scattered throughout the rock.
Orthopyroxene	10-15	15-20	1-5		Anhedral	Mostly altered to bastite textured serpentine.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	Trace	Orthopyroxene	Pale-green chlorite occurs in pyroxene bastite.
Chrysotile/ lizardite	75-80	Olivine, orthopyroxene	Forms mesh and bastite textures after olivine and orthopyroxene, respectively.
Magnetite	Trace		Magnetite (0.01 to 0.02 mm) scattered throughout the rock.

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

COMMENTS: Wavy extinction is common in orthopyroxene crystals. Small serpentine veins (0.05 to 0.1 mm in width) are visible. Clinopyroxene are usually in or near orthopyroxene margins. Spinels sometimes form crudely elongated trains. Veins have no visible orientation.

125-784A-42R-01 (Piece 4,39-41 cm) OBSERVER: HIR WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized dunite

GRAIN SIZE:

TEXTURE: Mesh

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
Olivine	0	99	Not visible		Not visible	Altered to mesh-textured serpentine completely.
Spinel	Trace	1	0.2-0.6		Anhedral	Mostly altered to magnetite.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	5-10	Serpentine	Dusty brownish clay is scattered throughout the rock.
Chrysotile/ lizardite	88-93	Olivine	
Magnetite	>1	Spinel	Spinel is almost altered to magnetite.
Sulfides	1		Fine-grained sulfide minerals (pyrrhotite?) are scattered throughout the rock.

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

COMMENTS: Anastomosing veins of serpentine run throughout the rock. Spinels form crudely elongated trails; mesh texture appears to define a crude foliation because mesh vein edges parallel one another to a great degree.

125-784A-45R-01 (Piece 3,98-100 cm) OBSERVER: SAB WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 0.1-5 mm

TEXTURE: Mesh (minor bastite)

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	10	77	1-4		Anhedral	Altered to serpentine mesh texture, wavy extinction, kink-banded.
Clinopyroxene	2	2	0.1-0.5		Subhedral-anhedral	As exsolution lamellae and as individual crystals.
Spinel	0.5	1	0.01-0.5	Cr	Euhedral-subhedral	Dark brown to dark red brown, fractured.
Orthopyroxene	7	20	1-5		Anhedral	Altering to serpentine bastite texture, wavy extinction, (100) exsolution lamellae, kink-banded.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Serpentine	80	Olivine, orthopyroxene	Lizardite and/or chrysotile forming mesh and bastite texture from olivine and orthopyroxene, respectively.
Magnetite	0.5	Spinel	Dusty 0.01-mm grains disseminated throughout slide.

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

COMMENTS: Relatively pyroxene-rich serpentinized harzburgite. Orthopyroxene and olivine show wavy extinctions and are kink-banded. Olivine appears to have been more altered than orthopyroxene. Orthopyroxenes have anhedral inclusions of clinopyroxene and of serpentine pseudomorphs. Most clinopyroxene grains are concentrated near orthopyroxene margins.

125-784A-45R-02 (Piece 3,41-44 cm) OBSERVER: HIR WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 1-4 mm

TEXTURE: Mesh and bastite

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Olivine	5-10	62-68	1-4		Anhedral	Mostly altered to mesh serpentine.
Clinopyroxene	2-3	2-3	1-1.5		Anhedral	Occurs as anhedral crystal and as exsolution lamellae in orthopyroxene.
Spinel	Trace	Trace	<1		Euhedral-anhedral	Reddish brown in color.
Orthopyroxene	15-20	30-35	1-4		Anhedral	Partly altered to bastite textured serpentine wavy extinction, kink-banded.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chrysotile/ lizardit	60-70	Olivine, orthopyroxene	Forms mesh and bastite textures after olivine and orthopyroxene, respectively.
Magnetite	Trace	Serpentine, veins	Occurs in serpentine veins; very fine-grained, dusty grains.

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

COMMENTS: Serpentine veins (0.02 to 0.1 mm wide) run throughout the slide at no preferred orientation. Wavy extinction and kink-bands are visible in orthopyroxene crystals. Clinopyroxene-exsolution lamellae appear bent in some orthopyroxene crystals. Olivines are more altered than orthopyroxene.

125-784A-45R-02 (Piece 4,60-62 cm) OBSERVER: SAB WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 0.1-5 mm

TEXTURE: Mesh and bastite

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	3	70	1-2		Anhedral	Altered to serpentine mesh texture.
Clinopyroxene	1.5	2	0.1-2		Anhedral	As exsolution lamellae and as grains near orthopyroxene margins.
Spinel	2.5	3	0.1-2	Cr	Subhedral-anhedral	Red-brown, fractured.
Orthopyroxene	5	25	0.1-5		Anhedral	Altering to serpentine bastite, wavy extinctions, kink-banded, (100) clinopyroxene lamallae.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	7	Serpentine	Dusty brown clay distributed throughout slide and intermixed with serpentine.
Serpentine	80	Olivine, orthopyroxene	Lizardite and/or chrysotile forming mesh and bastite textures.
Magnetite	1	Spinel	Dusty grains concentrated along cleavages of orthopyroxene mostly.

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

COMMENTS: Relatively pyroxene-spinel-rich serpentinized harzburgite. Spinels are large and congregate in patches and crudely elongate trains. They are fractured and have inclusions of anhedral serpentine pseudomorphs. Orthopyroxene grains have inclusions of anhedral serpentine pseudomorphs after olivine inclusions (olivine still inside one pseudomorph).

125-784A-45R-02 (Piece 5,92-94 cm) OBSERVER: TER WHERE SAMPLED: Torishima Forearc Seamount, west flank

ROCK NAME: Serpentinized harzburgite

GRAIN SIZE: 0.1-4 mm

TEXTURE: Mesh and bastite

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	85-90	Not visible		Not visible	Altered to mesh-textured serpentine.
Clinopyroxene	0	2	0.1-2		Anhedral	Altered to bastite.
Spinel	Trace	Trace	0.1-0.3		Anhedral-subhedral	Reddish brown Cr-spinel.
Orthopyroxene	0	10-15	0.5-4		Anhedral	Altered to bastite.
GROUNDMASS						
N/A	N/A	N/A	N/A		N/A	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clays	10-15	Serpentine	Dusty brownish clay is scattered throughout the rock, especially in vein.
Serpentine	85-90	Olivine, orthopyroxene	Chrysotile and/or lizardite replaced olivine and orthopyroxene.
Opaques	1	Spinel, serpentine	Magnetite is partly replacing spinel and observed in vein.

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

COMMENTS: Mesh texture appears to define a crude foliation because mesh vein edges subparallel one another. Veins (0.1 to 4 mm wide) of serpentine and clays (after serpentine) run through the rock.