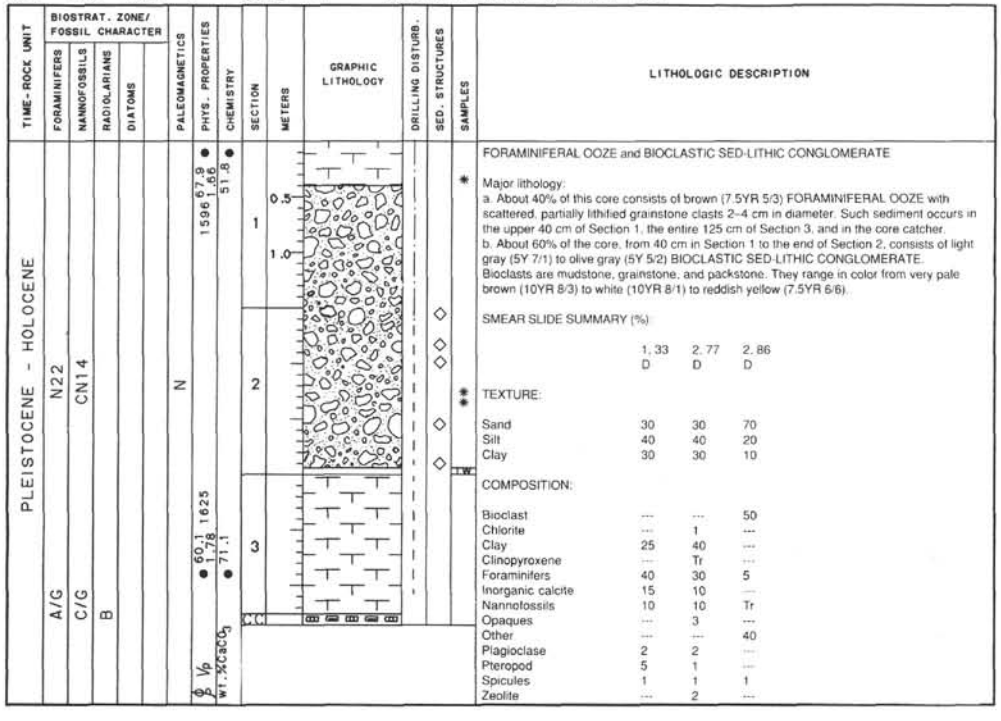
SITE 831 HOLE A CORE 1H CORED INTERVAL 0.0-4.4 mbsf



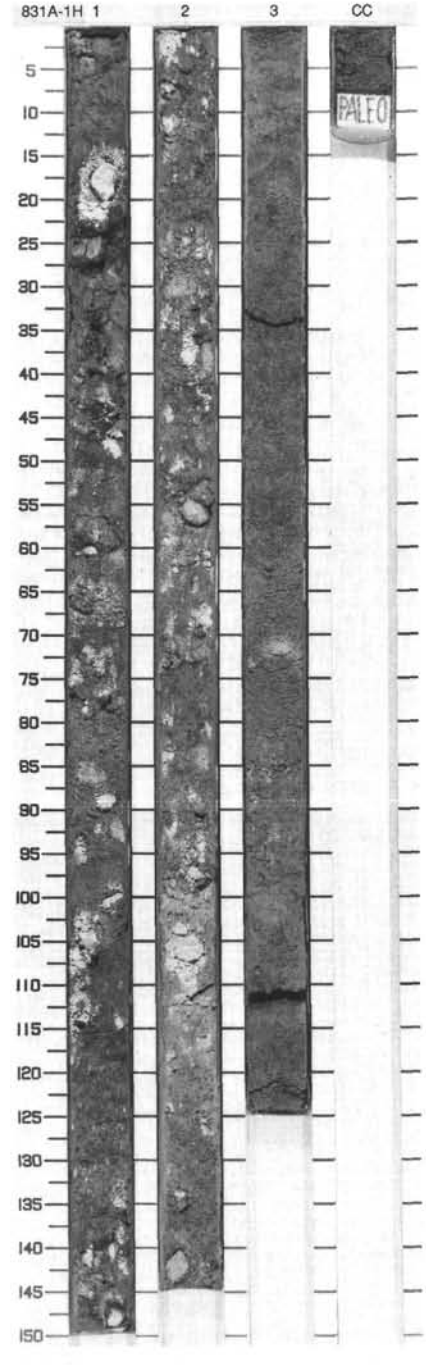
LITHOLOGIC DESCRIPTION

FORAMINIFERAL OOZE and BIOCLASTIC SED-LITHIC CONGLOMERATE

Major lithology:
a. About 40% of this core consists of brown (7.5YR 5/3) FORAMINIFERAL OOZE with scattered, partially lithified grainstone clasts 2–4 cm in diameter. Such sediment occurs in the upper 40 cm of Section 1, the entire 125 cm of Section 3, and in the core catcher.
b. About 60% of the core, from 40 cm in Section 1 to the end of Section 2, consists of light gray (5Y 7/1) to olive gray (5Y 5/2) BIOCLASTIC SED-LITHIC CONGLOMERATE. Bioclasts are mudstone, grainstone, and packstone. They range in color from very pale brown (10YR 8/3) to white (10YR 8/1) to reddish yellow (7.5YR 6/6).

SMEAR SLIDE SUMMARY (%)

	1, 33 D	2, 77 D	2, 86 D
TEXTURE:			
Sand	30	30	70
Silt	40	40	20
Clay	30	30	10
COMPOSITION:			
Bioclast	---	---	50
Chlorite	---	1	---
Clay	25	40	---
Clinopyroxene	---	Tr	---
Foraminifers	40	30	5
Inorganic calcite	15	10	---
Nannotossils	10	10	Tr
Opaques	---	3	---
Other	---	---	40
Plagioclase	2	2	---
Pteropod	5	1	---
Spicules	1	1	1
Zeolite	---	2	---



SITE 831 HOLE A CORE 2H CORED INTERVAL 4.4-6.4 mbsf

TIME-ROCK UNIT: PLEISTOCENE - HOLOCENE

BIOSTRAT. ZONE/FOSSIL CHARACTER
- FORAMINIFERS: A/G; N22
- NANNOFOSSILS: C/G; CN14
- RADIOLARIANS: B
- DIATOMS

PALEOMAGNETICS: N

PHYS. PROPERTIES: ● 65.8 1.664 | ● 69.8 1.65 | ● 68.3 1.66 | ● 66.8 1.73 | ● 64.7 1.72 | ● 65.0 1.81

CHEMISTRY: ● 80.8 | ● 78.9 | ● 81.3 | ● 82.3 | ● 80.1 | ● 85.1

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

METERS: 0.5 | 1.0

GRAPHIC LITHOLOGY

DRILLING DISTURB.

SED. STRUCTURES

SAMPLES

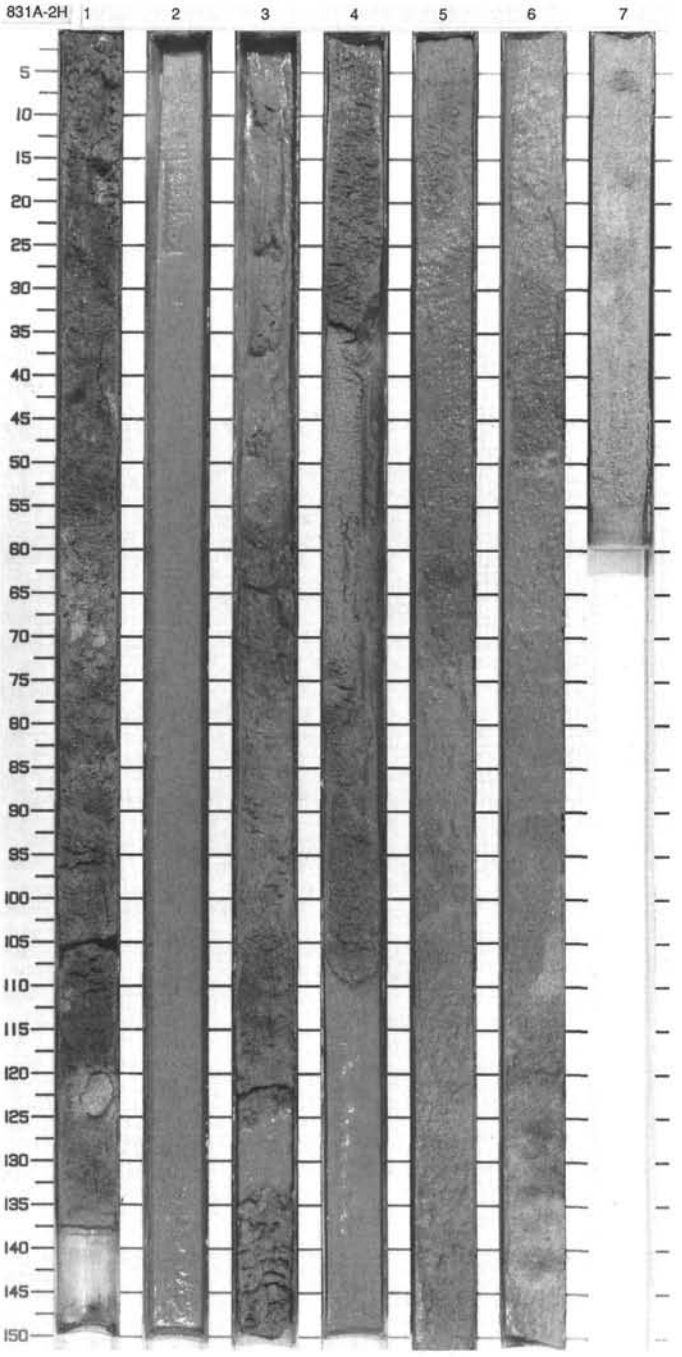
LITHOLOGIC DESCRIPTION

BIOCLASTIC FORAMINIFERAL OOZE

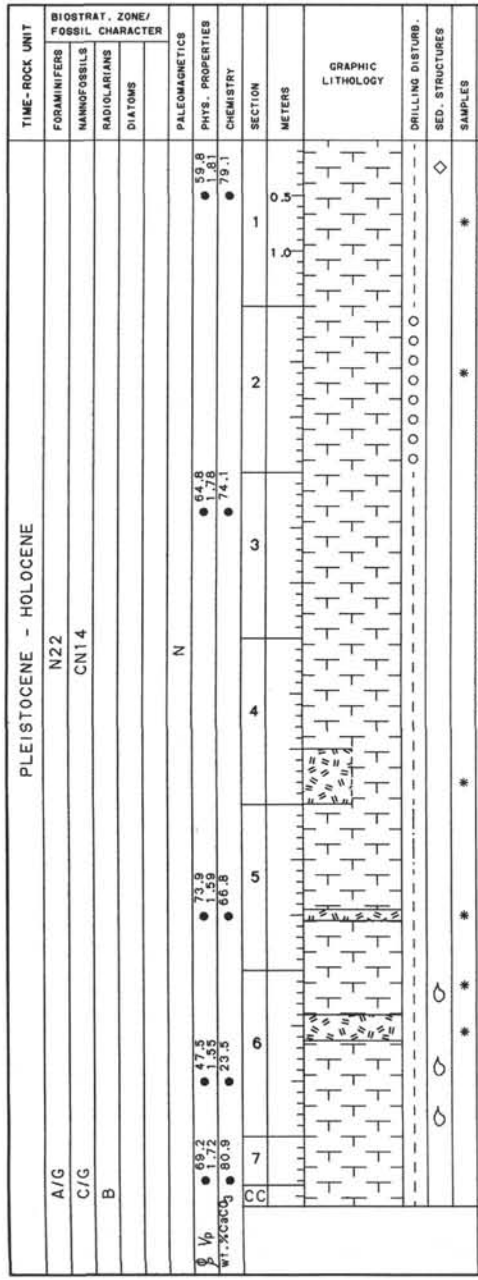
Major lithology: The entire core consists of greenish gray (5GY 5/1) to light yellowish brown (10YR 6/4) BIOCLASTIC FORAMINIFERAL OOZE. Bioclasts include a variety of small bivalves, gastropod fragments, occasional solitary corals, echinoid fragments and pteropods. Sections 2, 3, part of 4, and 5 are soupy.

SMEAR SLIDE SUMMARY (%):

	2, 34 D	2, 84 D	4, 18 D	6, 33 D	7, 35 D
TEXTURE:					
Sand	80	20	80	70	70
Silt	10	35	10	15	10
Clay	10	45	10	15	20
COMPOSITION:					
Bioclast	30	---	30	35	30
Calcite	---	43	---	---	---
Celadonite	---	Tr	---	---	---
Chlorite	---	Tr	---	---	---
Clay	15	20	15	10	---
Clinopyroxene	---	Tr	1	1	---
Feldspar	---	2	2	---	---
Foraminifers	50	25	45	50	40
Glass	---	2	Tr	Tr	---
Inorganic calcite	---	---	---	---	20
Nannofossils	---	8	1	---	Tr
Opaques	1	---	1	1	---
Other	---	---	---	---	5
Plagioclase	2	---	---	1	---
Pteropod	---	Tr	2	---	---
Spicules	---	---	Tr	Tr	---



SITE 831 HOLE A CORE 3H CORED INTERVAL 6.4-15.9 mbsf



LITHOLOGIC DESCRIPTION

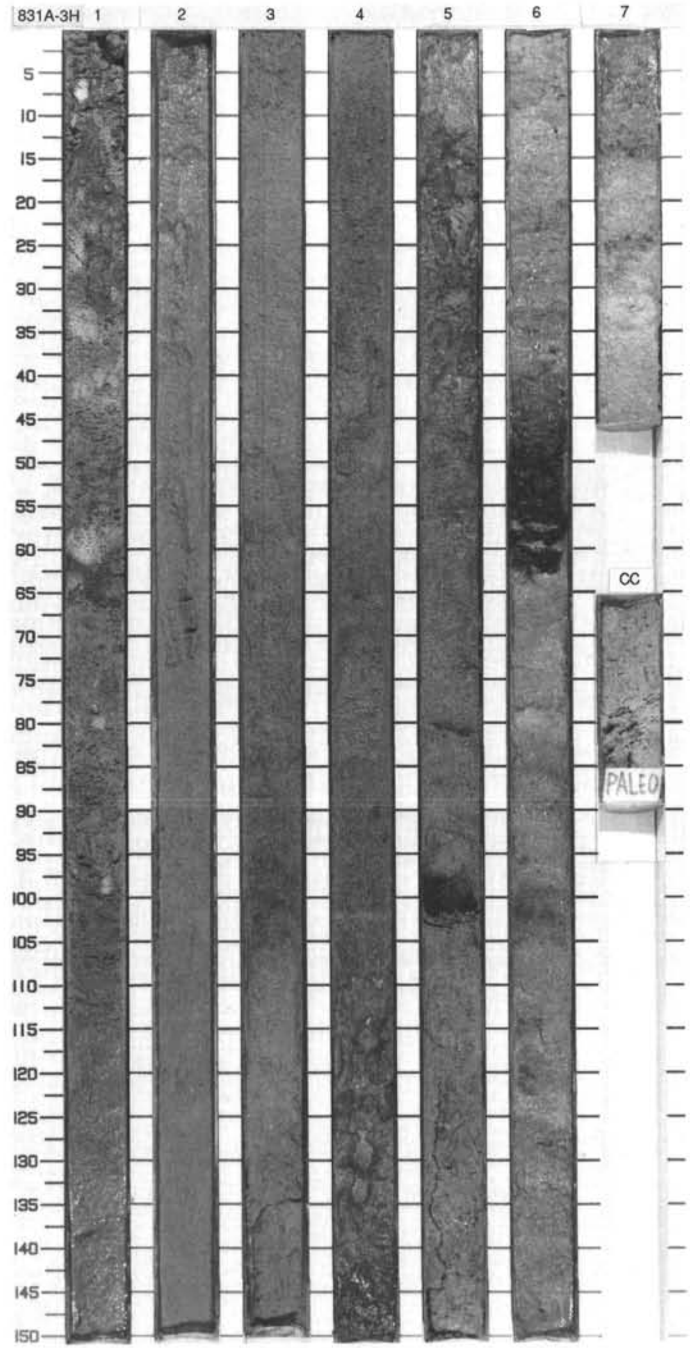
BIOCLASTIC FORAMINIFERAL OOZE

Major lithology: The entire core consists of gray (2.5Y 6/0) to light brownish gray (10YR 6/2) BIOCLASTIC FORAMINIFERAL OOZE. Pteropods are especially abundant in Sections 4 and CC. In portions of Section 6, the sediment consists almost entirely of pteropods.

Minor lithology:
a. Several black (10YR 2/1) ash layers, up to 22 cm thick, occur in Sections 5 and 6.
b. The lower 50 cm of Section 4 consists of light gray (10YR 6/1) ashy foraminiferal mixed sediment with pteropods.

SMEAR SLIDE SUMMARY (%):

	1, 73 D	2, 60 D	4, 130 D	5, 100 M	6, 12 D	6, 56 M
TEXTURE:						
Sand	60	80	80	70	60	23
Silt	20	10	15	30	20	67
Clay	20	10	5	---	20	10
COMPOSITION:						
Bioclast	30	35	5	---	20	---
Clay	10	---	---	---	10	5
Clinopyroxene	---	---	---	3	---	1
Feldspar	---	---	---	10	---	6
Foraminifers	40	45	35	---	30	Tr
Glass	---	---	35	67	---	53
Inorganic calcite	---	---	---	---	10	Tr
Nannofossils	10	5	2	---	10	---
Opaques	---	---	---	---	---	25
Other	5	10	---	---	---	---
Oxide	---	---	---	---	---	10
Pteropod	2	---	10	---	15	---
Rock fragment	---	---	---	20	---	---
Spicules	---	Tr	Tr	---	---	Tr



831A 4X NO RECOVERY

SITE 831 HOLE A CORE 5X CORED INTERVAL 16.9-20.0 mbsf

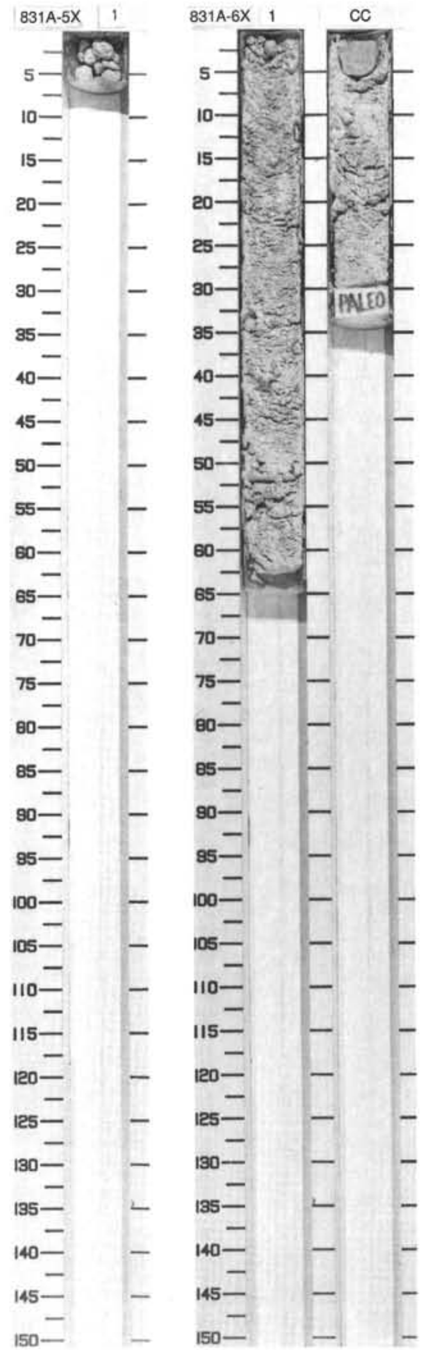
TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLEISTOCENE	N22 C/M	B	B					1						BIOCLASTIC GRAINSTONE Major lithology: Five cm of pale yellow (2.5Y 8/4) BIOCLASTIC GRAINSTONE was recovered as rounded to angular fragments, 0.5 to 2 cm in diameter.

(BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS)

SITE 831 HOLE A CORE 6X CORED INTERVAL 20.0-29.6 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLIOCENE - PLEISTOCENE	Tg/h C/P	B				● 2577 44.4 2.07 V_p ϕ ρ	● 97.0 wt.%$CaCO_3$	1 CC	0.5					PACKSTONE Major lithology: Sixty-two cm of unlithified, white (10YR 8/2) PACKSTONE was recovered in this core. Well-rounded, pebble-sized clasts of carbonate grains sporadically occur in the PACKSTONE. A well-preserved, 4 cm wide coral fragment (*Acropora*) with minor amounts of marine cement was recovered in the core catcher.

(BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS, NANNOFOSSILS, RADIOLARIANS, DIATOMS)



SITE 831 HOLE A CORE 7X CORED INTERVAL 29.6-39.1 mbsf

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

Major lithology: Two small (< 3 cm) carbonate cobbles of BIOCLASTIC PACKSTONE were recovered in this core. One was a bored (algal ?) coral fragment with well-preserved discrete corallites. The other was a < 2 cm mollusc shell fragment (tridacnid).

Petrographic analysis revealed a coral fragment, 2 cm in size, in a packstone matrix. Coral pores are largely filled with sediment, but some are open and fringed with acicular crystals, 60–120 microns in length. The matrix is poorly sorted, with grains ranging from 30 to 200 microns. Bioclasts include common mollusc fragments, a few foraminifers, echinoids and rare coralline algae. Calcite spheres, about 60 microns in size and with radial extinction, are abundant; they are of unknown origin.

SMEAR SLIDE SUMMARY (%):

	CC, 1 D
TEXTURE:	
Sand	75
Silt	20
Clay	5
COMPOSITION:	
Bioclast	20
Coral	60
Micrite	5
Pore space	5
Shell debris	10

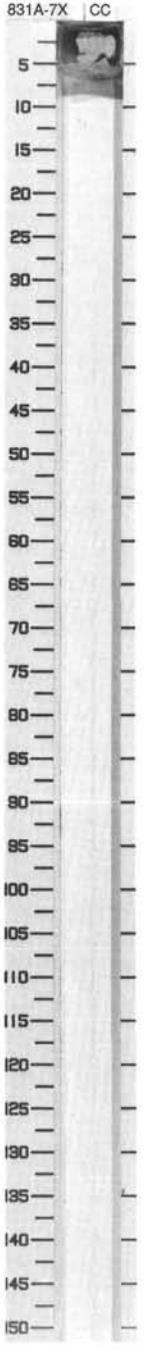
SITE 831 HOLE A CORE 8X CORED INTERVAL 39.1-48.6 mbsf

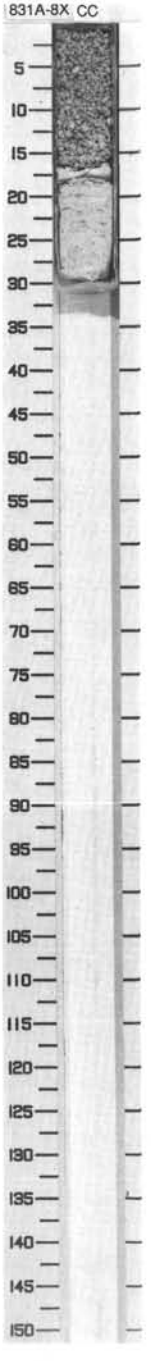
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLIOCENE - PLEISTOCENE	F/P	B	B			32.6 ● 2.33 1885 ϕ V_p	96.9 ● wt.%$CaCO_3$	CC					*	BIOCLASTIC GRAINSTONE and FORAMINIFERAL WACKESTONE

Major lithology: The upper 19 cm of this core consists of an unlithified, white (10YR 8/2) shell hash that includes fragments (< 2 cm) of echinoid spines, coral fragments, foraminifers, and molluscs. With no mud, this portion of the core is classified as a BIOCLASTIC GRAINSTONE. However, the lack of mud may be an artifact of drilling. The lower 11 cm of this core consists of a partially lithified, white (10YR 8/2) FORAMINIFERAL WACKESTONE.

SMEAR SLIDE SUMMARY (%):

	CC, 23 D
TEXTURE:	
Sand	15
Silt	30
Clay	55
COMPOSITION:	
Foraminifers	15
Inorganic calcite	85





831A 9X NO RECOVERY

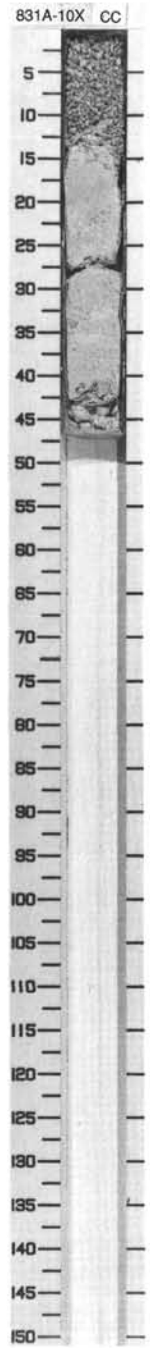
SITE 831 HOLE A CORE 10X CORED INTERVAL 58.0-67.7 mbsf

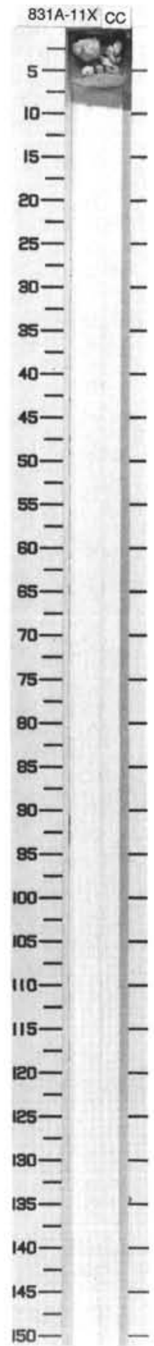
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER					PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS											
?	B	B	B				● 28.1 2.42 1953 φ ρ V_p	● 97.5 wt.% $CaCO_3$	CC						BIOCLASTIC GRAINSTONE and FORAMINIFERAL WACKESTONE Major lithology: The upper 12 cm of this core consists of an unlithified, white (10YR 8/2) shell hash that includes fragments (< 2 cm) of echinoid spines, corals, foraminifers, and molluscs. With no mud, this portion of the core is classified as a BIOCLASTIC GRAINSTONE. However, the lack of mud may be an artifact of drilling. The lower 36 cm of this core consists of a partially lithified, white (10YR 8/2) FORAMINIFERAL WACKESTONE

SITE 831 HOLE A CORE 11X CORED INTERVAL 67.7-77.3 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER					PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS											
?	B	B	B						CC						CORAL GRAINSTONE Major lithology: Rounded to angular fragments of white (10YR 8/2), partially calcitized CORAL GRAINSTONE, 0.5 to 2 cm in diameter, were recovered.

831A 12N NO RECOVERY





SITE 831 HOLE A CORE 13N CORED INTERVAL 88.0-100.0 mbsf

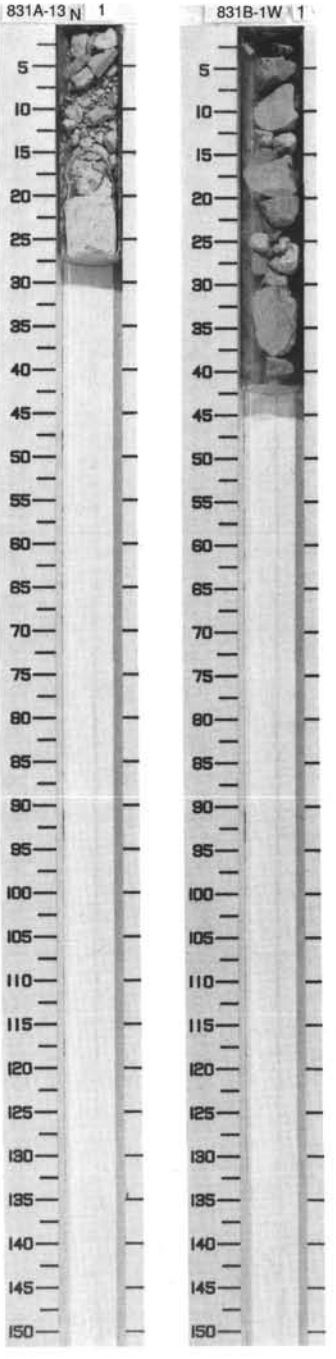
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B			7961 28.0 2.39 ϕ Vp wt.%$CaCO_3$ 96.9		1						CORAL GRAINSTONE and FORAMINIFERAL WACKESTONE Major lithology: The upper 15 cm of this core consists of a partially lithified, white (10YR 8/2) CORAL GRAINSTONE with minor amounts of marine cement. This facies was recovered as rounded to angular fragments, 0.5 to 2 cm in diameter. The lower 13 cm of this core consists of a partially lithified, white (10YR 8/2) FORAMINIFERAL WACKESTONE.

831A 14X NO RECOVERY

831A 15X NO RECOVERY

SITE 831 HOLE B CORE 1W CORED INTERVAL 0.0-102.4 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	LITHOLOGIC DESCRIPTION
MIDDLE PLEISTOCENE	B	F/G CN14	B					1						CORAL RUDSTONE Major lithology: The core consists of pieces of white (10YR 8/2) hermatypic coral, including *Porites* and *Acropora*, and undetermined head corals. The corals are dense, with pores filled with cement. The core is classified as CORAL RUDSTONE because no matrix was recovered, but these fragments may represent coral pieces in lagoonal sediment that was not recovered.



SITE 831 HOLE B CORE 2R CORED INTERVAL 102.4-111.9 mbsf

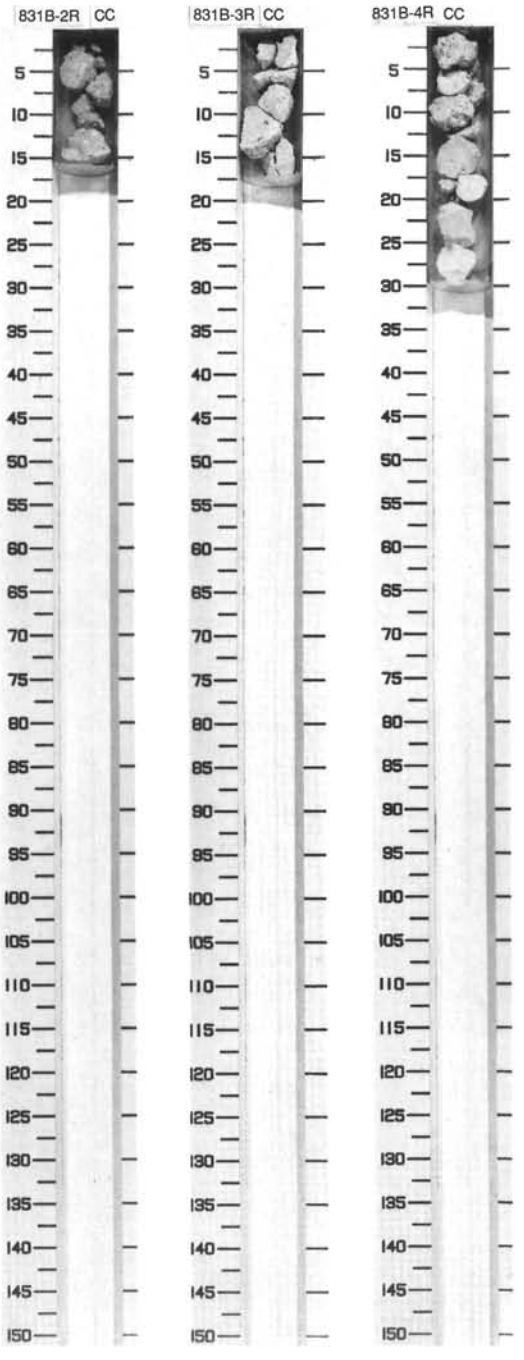
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
MIDDLE PLEISTOCENE (?)	B	CN14 (?) R/P	B			Vp=2856 ●		CC	1			◇		BIOCLASTIC WACKESTONE and CORALGAL RUDSTONE Major lithology: The core consists of pieces of lithified, light gray (10YR 7/2) BIOCLASTIC WACKESTONE with grains of coralline algae, coral, and gastropod fragments. There is also a piece of CORALGAL RUDSTONE and 1 piece of coral, 4–5 cm in diameter (possibly *Porites*), featuring a boring filled with sediment.

SITE 831 HOLE B CORE 3R CORED INTERVAL 11.9-121.3 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
MIDDLE PLEISTOCENE	B	CN14 F/G	B					CC	1			◇		CORAL RUDSTONE Major lithology: The core consists of pieces of white (10YR 8/2) coral, including *Porites* and *Acropora*. The corals are dense, with pores and borings filled with cement and mud. The core is classified as CORAL RUDSTONE because no matrix was recovered, but these fragments may represent coral pieces in lagoonal sediment that was not recovered.

SITE 831 HOLE B CORE 4R CORED INTERVAL 121.3-130.9 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC	1			◇		CORALGAL WACKESTONE and CORALGAL RUDSTONE Major lithology: The core consists of pieces of white (10YR 8/2) CORALGAL WACKESTONE and pieces of coral, including *Porites*. The corals are dense, with pores and borings filled with cement and mud. The corals are classified as CORAL RUDSTONE because no matrix was recovered, but these fragments may represent coral pieces in lagoonal sediment that was not recovered.

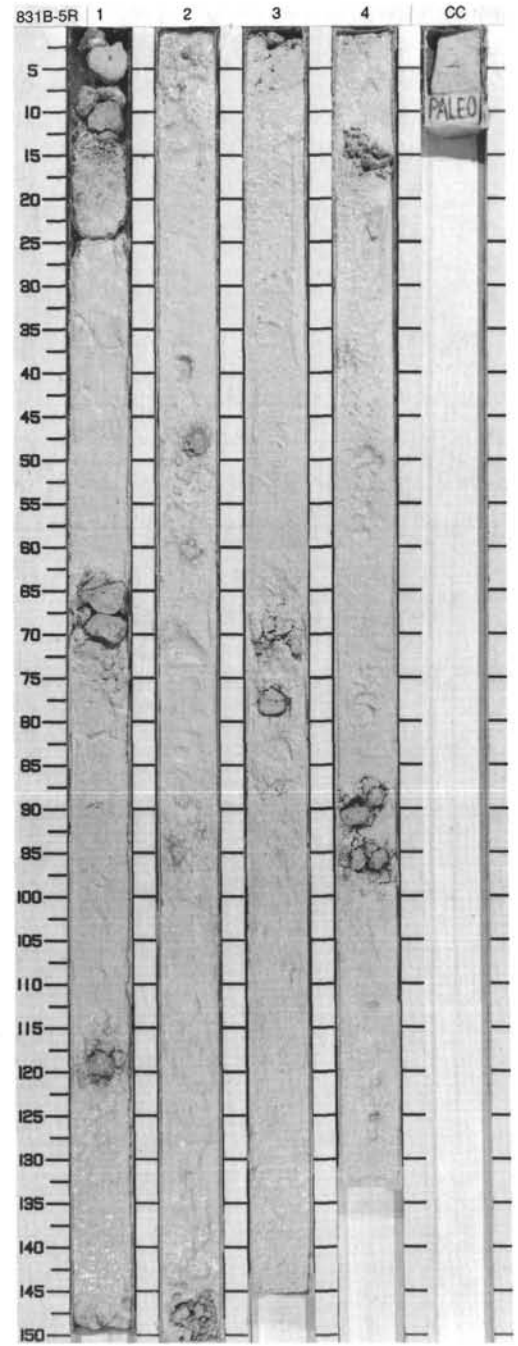


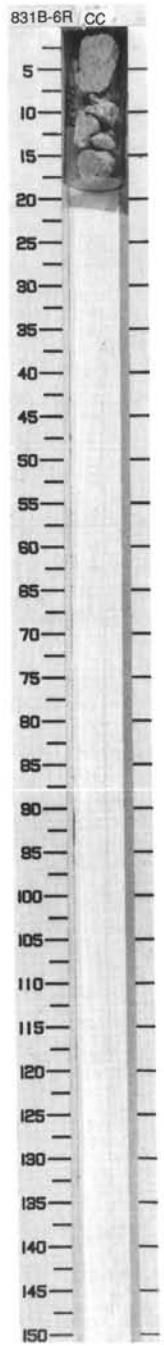
SITE 831 HOLE B CORE 5R CORED INTERVAL 130.9-133.9 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B			● 45.1 2.04 ● 97.2		1	0.5 1.0					BIOCLASTIC PACKSTONE Major lithology: The core mainly consists of white (10YR 8/2), soupy BIOCLASTIC PACKSTONE with abundant granule- to pebble-sized pieces of partially lithified BIOCLASTIC PACKSTONE. The soupy consistency may be a product of drilling. The packstone contains abundant pelecypod fragments and minor coral and possible bryozoan fragments. There are also pebble-sized clasts of lithified packstone with shell fragments, many of which are dissolved, creating moldic porosity. Minor lithology: Some grainstone fragments and pebble-sized pieces of partially lithified and lithified mollusc floatstone in a packstone matrix were recovered.
								2						
						● 45.7 2.08 ● 97.4		3						
								4					TW	
							wt.%CaCO$_3$	CC						

SITE 831 HOLE B CORE 6R CORED INTERVAL 133.9-140.5 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B			● 24.5 2.62 ● 97.4		CC						MOLLUSC FLOATSTONE Major lithology: The core consists of pieces of white (10YR 8/2) FLOATSTONE with a packstone matrix. The FLOATSTONE is mainly composed of small mollusc fragments. *Halimeda* is abundant in one piece of floatstone and another piece has a 1 cm fragment of *Acropora*. A single piece of head coral, 6 cm in size, was also recovered. Marine borings are common in all pieces and moldic porosity is present.
							wt.%CaCO$_3$							





SITE 831 HOLE B CORE 7R CORED INTERVAL 140.5-150.1 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					1					#	MOLLUSC FLOATSTONE and CORAL RUDSTONE

Major lithology: Five cobbles of carbonate were recovered. Three of the them are white (10YR 8/2), partially lithified MOLLUSC FLOATSTONE with abundant primary porosity and minor amounts of carbonate cement. The other 2 pieces are white (10YR 8/2), partially lithified CORAL RUDSTONE (*Acropora*) with marine clam borings (*Lithophaga*?).

Petrographic analysis indicates that the sediment is a poorly sorted mixture of sand- and silt-sized grains and micrite. Grains range from 4 mm to 20 microns in size, but most are 100 to 300 microns. Bioclasts include fragments of *Halimeda* , bryozoan, mollusc, echinoid and coralline algae. Calcite spheres, 30–50 microns in size and with radial extinction, are abundant; the origin of these spheres is unknown.

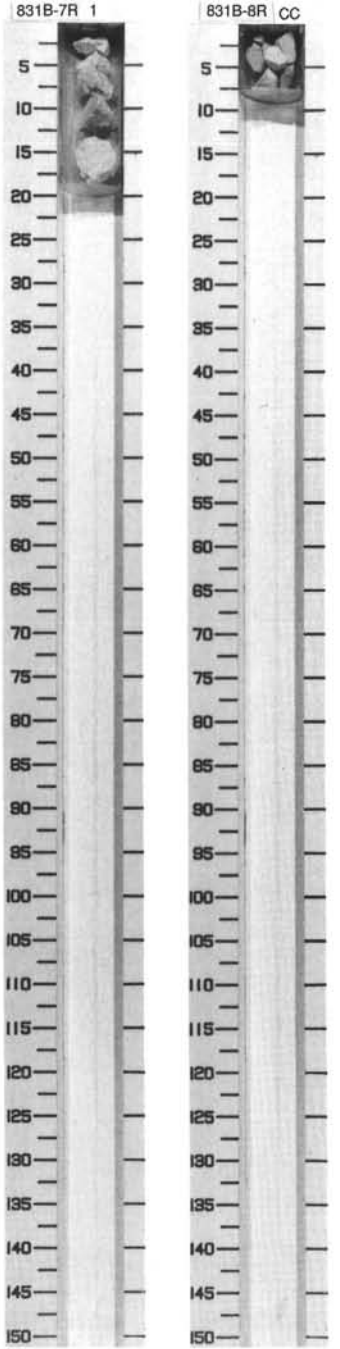
THIN SECTION SUMMARY (%):

	1, 8 D
TEXTURE:	
Sand	60
Silt	25
Clay	15
COMPOSITION:	
Bioclast	25
Coral	10
Foraminifers	5
Halimeda	20
Micrite	15
Pore space	10
Shell debris	15

SITE 831 HOLE B CORE 8R CORED INTERVAL 150.1-159.8 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						CORAL RUDSTONE

Major lithology: The core consists of 8, angular to subrounded, white (10YR 8/2), cobbles of CORAL RUDSTONE, < 3 cm wide. The corals are well-preserved specimens with minor amounts of marine cement and marine clam borings (*Lithophaga*?).



831B 9R NO RECOVERY

SITE 831 HOLE B CORE 10R CORED INTERVAL 161.4-169.4 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	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC FLOATSTONE Major lithology: The core consists of 2 angular to subrounded, cobbles of MOLLUSC FLOATSTONE with echinoid spines and algal (*Halimeda*?) fragments.

SITE 831 HOLE B CORE 11R CORED INTERVAL 169.4-179.1 mbsf

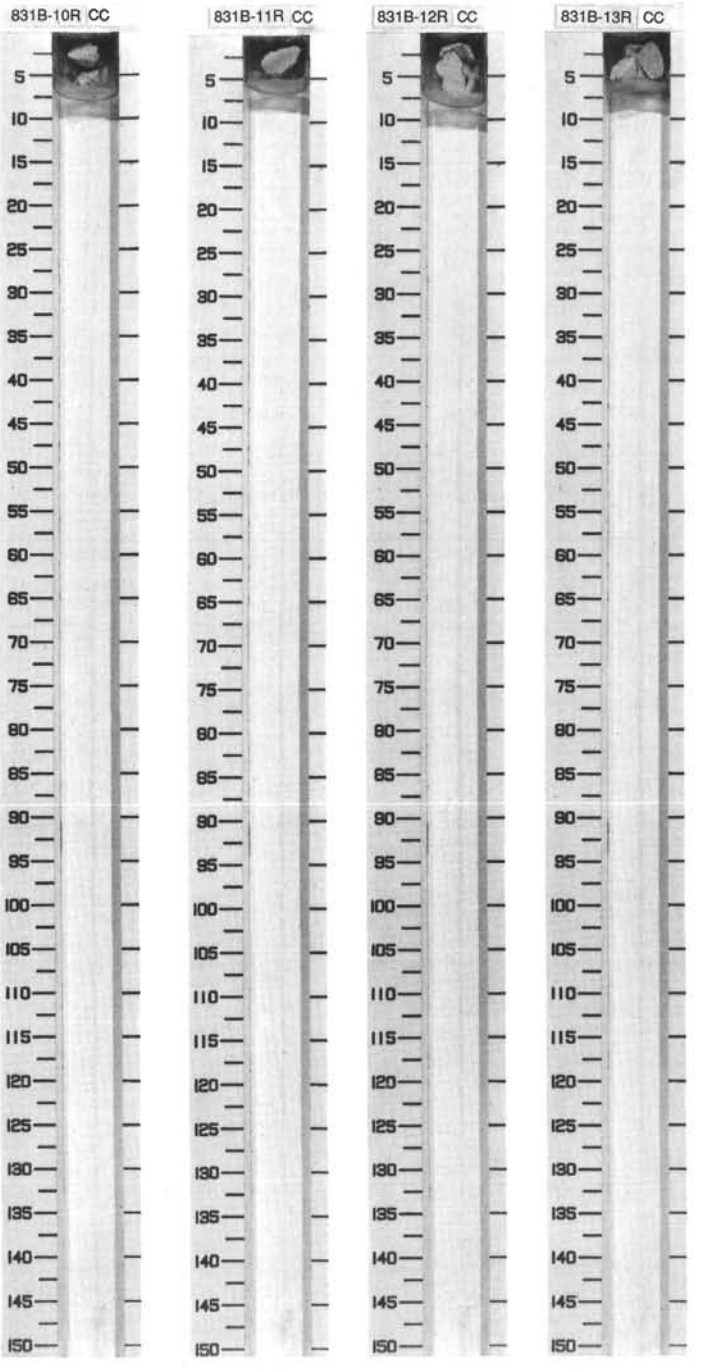
TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						CORAL RUDSTONE Major lithology: The core consists of 1 cobble, 3 x 5 cm, of partially calcitized, angular to subrounded, white (10YR 8/2) CORAL RUDSTONE.

SITE 831 HOLE B CORE 12R CORED INTERVAL 179.1-188.8 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC RUDSTONE and MOLLUSC FLOATSTONE Major lithology: The core consists of 4 cobbles of carbonate. Two of them are a MOLLUSC RUDSTONE consisting of fragments of a thick-shelled mollusc, most likely a tridacnid. The other two pieces are white (10YR 8/2), partially lithified, porous MOLLUSC FLOATSTONE.

SITE 831 HOLE B CORE 13R CORED INTERVAL 188.8-198.5 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						CORAL RUDSTONE Major lithology: The core consists of 4 pieces of subrounded, white to light gray (10YR 8/2 to 2.5Y 7/2), partially lithified fragments of coral. The recovered pieces form a CORAL RUDSTONE, but the absence of matrix may be the result of drilling.



SITE 831 HOLE B CORE 14R CORED INTERVAL 198.5-208.2 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC FLOATSTONE and CORAL RUDSTONE

Major lithology: The core consists of 6 fragments of carbonate. Five of the carbonate fragments are white (10YR 8/2), partially lithified MOLLUSC FLOATSTONE. The remaining carbonate fragment is CORAL RUDSTONE, a head coral, with minor amounts of marine cement infilling small pores.

SITE 831 HOLE B CORE 15R CORED INTERVAL 208.2-217.8 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC RUDSTONE

Major lithology: The recovered fragment is classified as a MOLLUSC RUDSTONE: it is a single 7 cm long fragment of a thick-shelled mollusc, possibly a conch (*Strombus*?). The internal chambers of the mollusc have marine borings and are lined with three generations of carbonate cement ranging in color from white (10YR 8/2) to grayish brown (10YR 5/2) to pale whitish yellow (2.5Y 8/3).

SITE 831 HOLE B CORE 16R CORED INTERVAL 217.8-227.5 mbsf

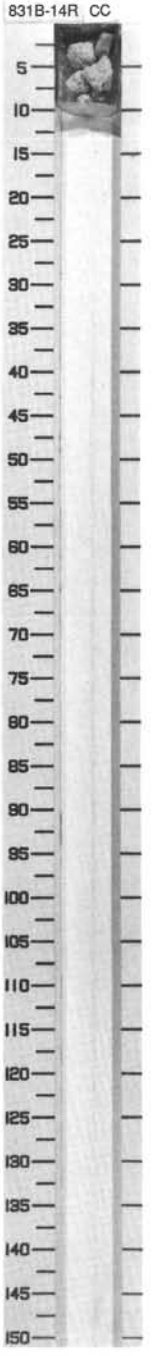
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B			Vp=4973 ●		CC					#	CORAL RUDSTONE and BIOCLASTIC FLOATSTONE

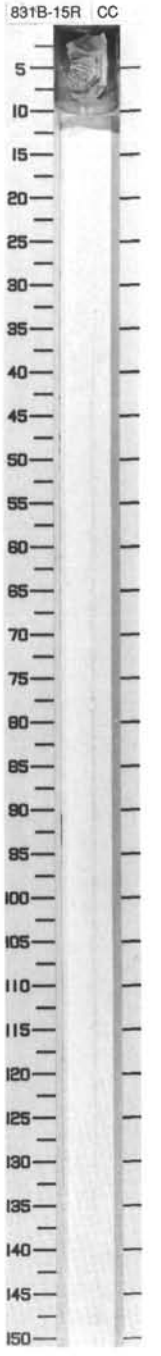
Major lithology: The core consists of 8 carbonate fragments. Five of these fragments are white (10YR 8/2), rounded to subrounded cobbles of CORAL RUDSTONE. Two of these fragments are 6 cm long, well-preserved pieces of coral (*Acropora*). The last carbonate fragment is a partially lithified BIOCLASTIC FLOATSTONE.

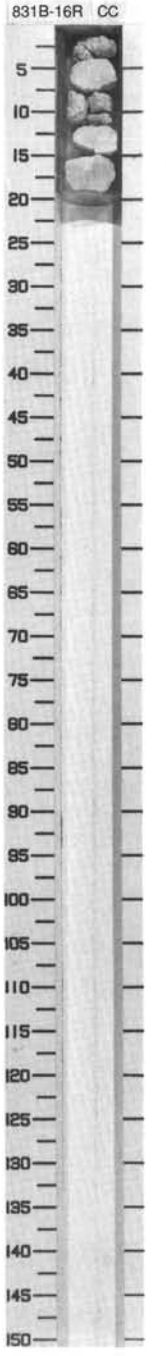
Petrographic analysis indicates the occurrence of two coral fragments in a fine-grained matrix. One piece of coral is encrusted with coralline algae, that is itself encrusted by a foraminifer with open chambers fringed with acicular crystals, about 60 microns in length. Sediment surrounding the corals includes fine sand- to silt-sized grains and micrite. Calcite spheres, 40–60 microns in size, with radial extinction are abundant in the sediment but are of unknown origin. In places, micritic sediment has a clotted peloidal texture suggestive of micritic cement.

THIN SECTION SUMMARY (%):

	CC, 11 D
TEXTURE:	
Sand	80
Silt	10
Clay	10
COMPOSITION:	
Bioclast	10
Coral	60
Micrite	10
Red algae	10
Shell debris	10







SITE 831 HOLE B CORE 17R CORED INTERVAL 227.5-237.2 mbsf

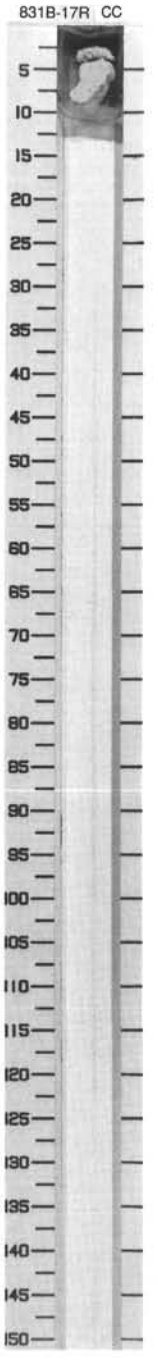
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						PELOIDAL PACKSTONE Major lithology: The core consists of 2 partially lithified, white (10YR 8/2) fragments of PELOIDAL PACKSTONE with rounded mud grains, which may be fecal pellets.

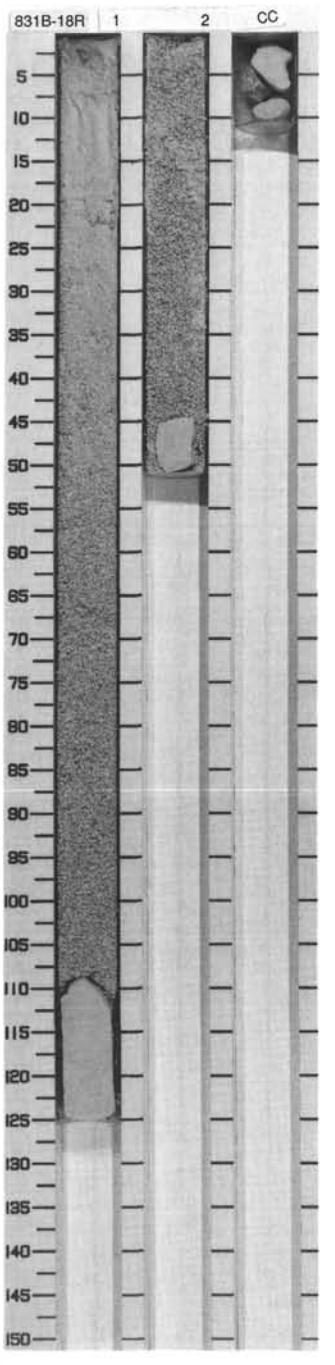
SITE 831 HOLE B CORE 18R CORED INTERVAL 237.2-246.4 mbsf

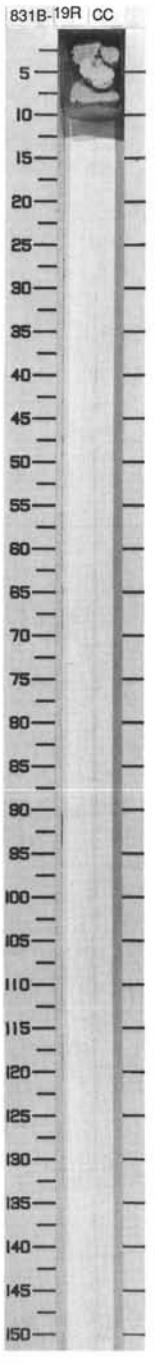
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
PLIOCENE - PLEISTOCENE	C/M	B	B			● Vp- 3854		1 2 CC	0.5 1.0	VOID			*	CORAL RUDSTONE, CORAL PACKSTONE, MUDSTONE, BIOCLASTIC RUDSTONE and BIOCLASTIC PACKSTONE Major lithology: The core consists of pale yellow (10YR 8/3), unlithified carbonate sediment that grades upward from CORAL RUDSTONE (Section 1, 65 cm, to Section 2, 50 cm; grains 2–6 mm in size) to CORAL PACKSTONE (Section 1, 5–65 cm), with 5 cm of light gray (10YR 7/1) MUDSTONE at the top of the core. The BIOCLASTIC RUDSTONE and PACKSTONE consist of very angular fragments of coral and mollusc with less abundant foraminifers and rare echinoid spines. Pieces of well-preserved *Porites* coral (head variety) occur at the bottom of Sections 1 and 2 and in Section CC. SMEAR SLIDE SUMMARY (%): 1, 2 M TEXTURE: Sand 30 Silt 50 Clay 20 COMPOSITION: Bioclast 75 Inorganic calcite 20

SITE 831 HOLE B CORE 19R CORED INTERVAL 246.4-256.0 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						CORAL RUDSTONE and CORAL FLOATSTONE Major lithology: The recovered sediment is classified as a CORAL RUDSTONE as the core consists of several pieces of head coral, including *Porites* and *Acropora*, and a single piece of CORAL FLOATSTONE with a translucently altered coral (probably *Lobophyllia*) in a wackestone matrix.







SITE 831 HOLE B CORE 20R CORED INTERVAL 256.0-265.5 mbsf

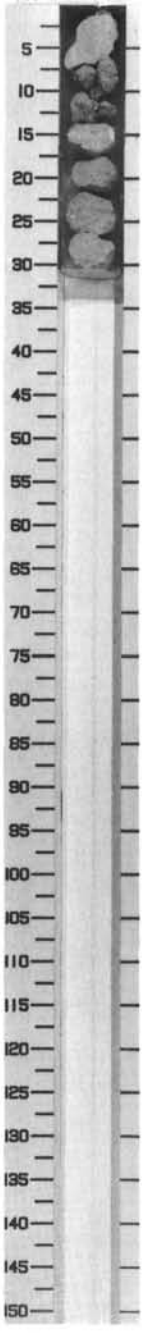
TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						INTRACLAST MOLLUSC FLOATSTONE Major lithology: The core consists of several pieces of light gray (10YR 7/2) INTRACLAST MOLLUSC FLOATSTONE with moldic porosity and 2 pieces of very pale brown (10YR 8/4) massive *Acropora*.

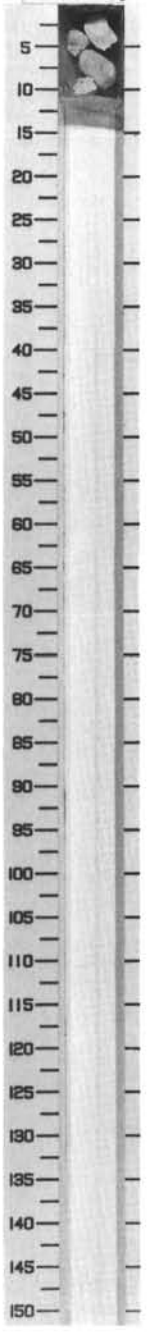
SITE 831 HOLE B CORE 21R CORED INTERVAL 265.5-275.2 mbsf

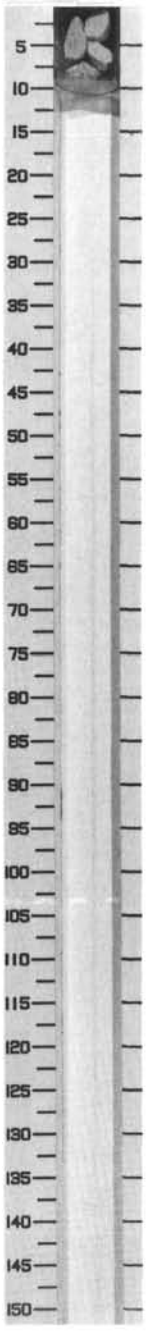
TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						INTRACLAST CORAL MOLLUSC RUDSTONE Major lithology: The core contains an INTRACLAST CORAL MOLLUSC RUDSTONE of four pieces: (1) a piece of white (10YR 8/2) *Porites* (3 x 5 cm head coral that is all or nearly all aragonite with largely unfilled pore space, (2) a piece of white (10YR 8/2) tridacnid clam shell (3 x 5 cm) that is very well preserved, and which comes from a clam estimated to be at least 25 cm in length, (3, 4) pieces of white (10YR 8/2) coral mollusc floatstone with moldic porosity produced by dissolution of mollusc shells.

SITE 831 HOLE B CORE 22R CORED INTERVAL 275.2-284.8 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B			V_p 4556 ●		CC						CORAL RUDSTONE Major lithology: The core consists of four pieces of CORAL RUDSTONE. Pieces 1 and 2 are white (2.5 Y 8/2) head coral with round corallites in which porosity is nearly occluded by cement. Piece 3 is a *Porites* head coral that retains much of its primary porosity. Piece 4 is a third species of head coral. Most of the coral material is still aragonitic.







SITE 831 HOLE B CORE 23R CORED INTERVAL 284.8-294.4 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	LITHOLOGIC DESCRIPTION
?	B	B	B					CC					#	MOLLUSC FLOATSTONE

Major lithology: The core consists of 12 pieces of light gray (10YR 7/2) MOLLUSC FLOATSTONE (gastropods and pelecypods) with a wackestone matrix. Moldic porosity is present as a result of the dissolution of mollusc shells.

Petrographic analysis indicates that the sediment consists of poorly sorted bioclasts, 50 microns to 3 mm in size, in a fine-grained matrix. Grains include fragments of coral, mollusc, bryozoans, echinoids, *Halimeda*, and coralline algae, and small benthic foraminifers and rare rotaliids. Calcite spheres, about 50 microns in size, with radial extinction are abundant; they are of unknown origin. Vuggy and moldic porosity forms about 10% of the rock.

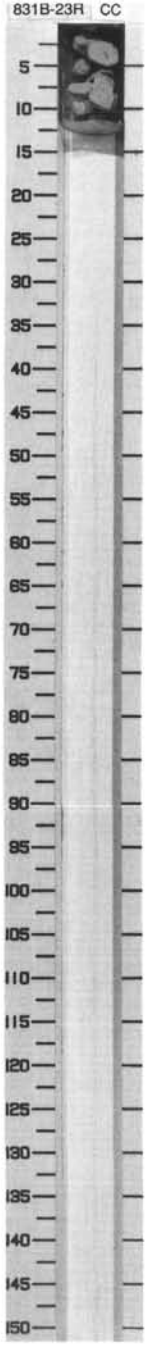
THIN SECTION SUMMARY (%):

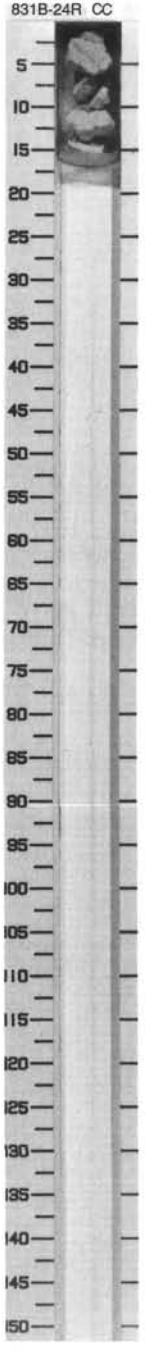
	CC, 3 M
TEXTURE:	
Sand	75
Silt	20
Clay	5
COMPOSITION:	
Bioclast	50
Bryozoa	2
Coral	2
Foraminifers	5
Micrite	5
Pore space	10
Red algae	5
Shell debris	15

SITE 831 HOLE B CORE 24R CORED INTERVAL 294.4-304.1 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						CORAL RUDSTONE, MOLLUSC FLOATSTONE and SPICULE GRAINSTONE

Major lithology: The core contained 7 pieces. There are 3 pieces of coral comprising a CORAL RUDSTONE, including 2 cobbles of well-preserved, white (10YR 8/2) *Porites* head coral. The other cobbles include 2 pieces of light gray (2.5Y 7/2) MOLLUSC FLOATSTONE with a packstone matrix and 2 pieces of SPICULE GRAINSTONE, composed of coarse sand-sized calcareous spicules.





SITE 831 HOLE B CORE 25R CORED INTERVAL 304.1-313.7 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	LITHOLOGIC DESCRIPTION
?	B	B	B					CC					#	MOLLUSC PACKSTONE, CORAL RUDSTONE, and ALGAL RUDSTONE

Major lithology: The core consists of 12 cobbles, 2–4 cm in size. Seven are MOLLUSC PACKSTONE with moldic porosity. Four are CORAL RUDSTONE, including Porites head coral and massive *Acropora*. One is an ALGAL RUDSTONE, composed of grain-supported plates of *Halimeda*, 0.5 cm in size.

Petrographic analysis indicates that the sediment consists of poorly sorted bioclasts, up to 4 mm in size, in a fine-grained matrix. *Halimeda* is abundant; other grains include fragments of coral, molluscs, bryozoans and echinoids, as well as smaller benthic foraminifers and rotaliids (*Operculina* and *Cyclopeus*). Vuggy and moldic porosity forms about 15% of the rock.

THIN SECTION SUMMARY (%):

	CC, 2 D
TEXTURE:	
Sand	80
Silt	15
Clay	5
COMPOSITION:	
Bioclast	25
Bryozoa	5
Coral	15
Foraminifers	5
Halimeda	15
Micrite	5
Pore space	15
Shell debris	10

SITE 831 HOLE B CORE 26R CORED INTERVAL 313.7-323.4 mbsf

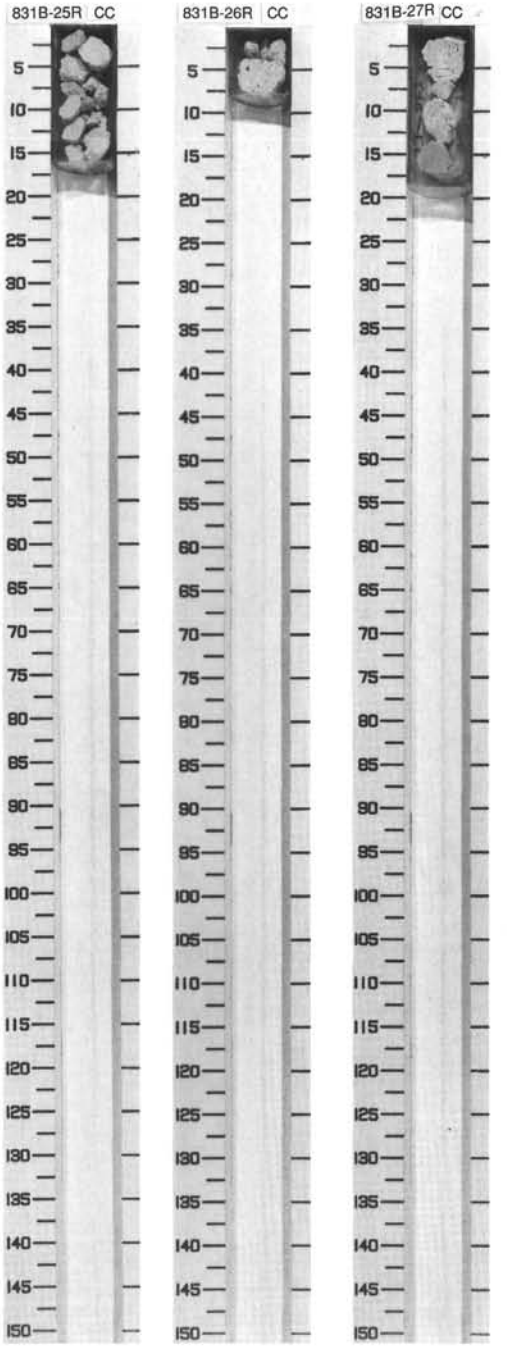
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC FLOATSTONE

Major lithology: The core consists of four pieces of lithified white (10YR 8/2) MOLLUSC FLOATSTONE with a wackestone matrix. Moldic porosity is present.

SITE 831 HOLE B CORE 27R CORED INTERVAL 323.4-333.0 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B			Vp= 4515		CC						MOLLUSC WACKESTONE and CORAL RUDSTONE

Major lithology: The core consists of 4 cobbles of carbonate. Three of the cobbles are white (10YR 8/2), partially lithified MOLLUSC WACKESTONE that has minor moldic porosity and minor amounts of carbonate cement infilling small pores. The remaining cobble is white (10YR 8/2) subrounded to rounded, well-preserved CORAL RUDSTONE.



SITE 831 HOLE B CORE 28R CORED INTERVAL 330.0-342.7 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	LITHOLOGIC DESCRIPTION
?	B	B	B					CC			>			CORALGAL PACKSTONE Major lithology: The core consists of 7 cobbles of CORALGAL PACKSTONE which are white (10YR 8/2) and partially lithified. Several of the cobbles have minor amounts of carbonate cement and moldic porosity, especially well developed in pencil or stick corals.

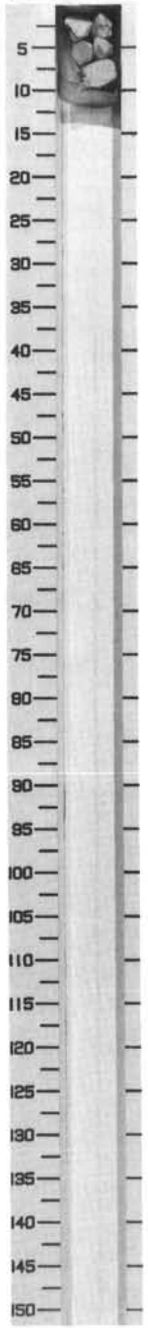
SITE 831 HOLE B CORE 29R CORED INTERVAL 342.7-352.3 mbsf

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
?	B	B	B					CC			>			MOLLUSC FLOATSTONE and CORAL RUDSTONE Major lithology: The core consists of 6 cobbles of MOLLUSC FLOATSTONE and 1 cobble of CORAL RUDSTONE. Moldic porosity and minor amounts of carbonate cement occur in the wackestone cobbles. All cobbles are white (10YR 8/2).

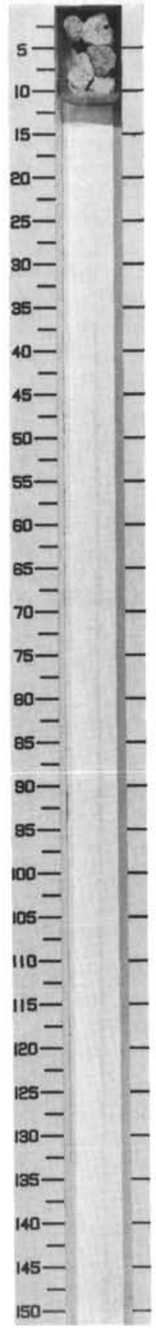
SITE 831 HOLE B CORE 30R CORED INTERVAL 352.3-362.0 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B			● 4503 22.6 2.66 (V_p ϕ ρ)	● 97.4 0.0 (wt.% $CaCO_3$, wt.% TOC)	CC			>			BIOCLASTIC FLOATSTONE Major lithology: The core consists of 7 cobbles of white to very pale brown (10YR 8/2 to 10YR 8/3) BIOCLASTIC FLOATSTONE with commonly developed moldic porosity. Carbonate cements occur in some of the larger molds.

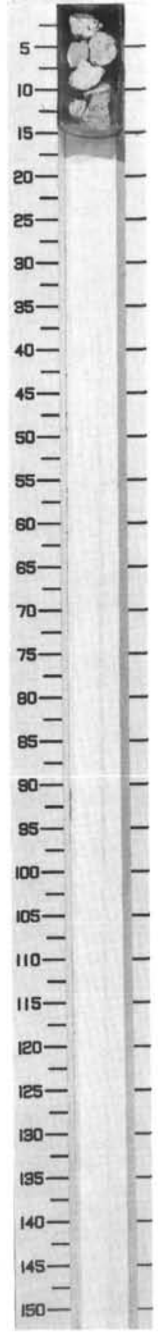
831B-28R CC



831B-29R CC



831B-30R CC



SITE 831 HOLE B CORE 31R CORED INTERVAL 362.0-371.6 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
?	B	B	B					CC					#

LITHOLOGIC DESCRIPTION

MOLLUSC FLOATSTONE and PELECYPOD RUDSTONE

Major lithology: The core consists of 2 cobbles of MOLLUSC FLOATSTONE and 2 cobbles of PELECYPOD RUDSTONE. The rudstone cobbles are fragments of a thick-shelled pelecypod, most likely a tridacnid. The floatstone is lithified, but remains friable. Cobbles are white to very pale brown (N9 to 10YR 8/3).

Petrographic analysis shows that the sediment consists of abundant sand-sized (2 mm–60 microns) grains in mosaic cement. Micritic grains and molds of grains represented only by micrite rims are abundant; coral, echinoid, and mollusc fragments are also present. Inter- and intragranular spaces are typically filled with sparry mosaic crystals 20–30 microns in size. Moldic and vuggy porosity accounts for about 15% of the rock; open pores are often fringed with bladed spar cement.

SMEAR SLIDE SUMMARY (%):

	CC, 8 D
TEXTURE:	
Sand	50
Silt	50
COMPOSITION:	
Bioclast	15
Coral	10
Foraminifers	1
Micrite	30
Peloids	10
Pore space	20
Shell debris	10

SITE 831 HOLE B CORE 32R CORED INTERVAL 371.6-381.3 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
?	B	B	B					CC					

LITHOLOGIC DESCRIPTION

BIOCLASTIC FLOATSTONE

Major lithology: The core consists of 6 cobbles of BIOCLASTIC FLOATSTONE which are white (N9), subrounded to subangular, well-lithified and have abundant cements. Minor amounts of skeletal material occur in the floatstone including molluscan debris, algal fragments, and pellets.

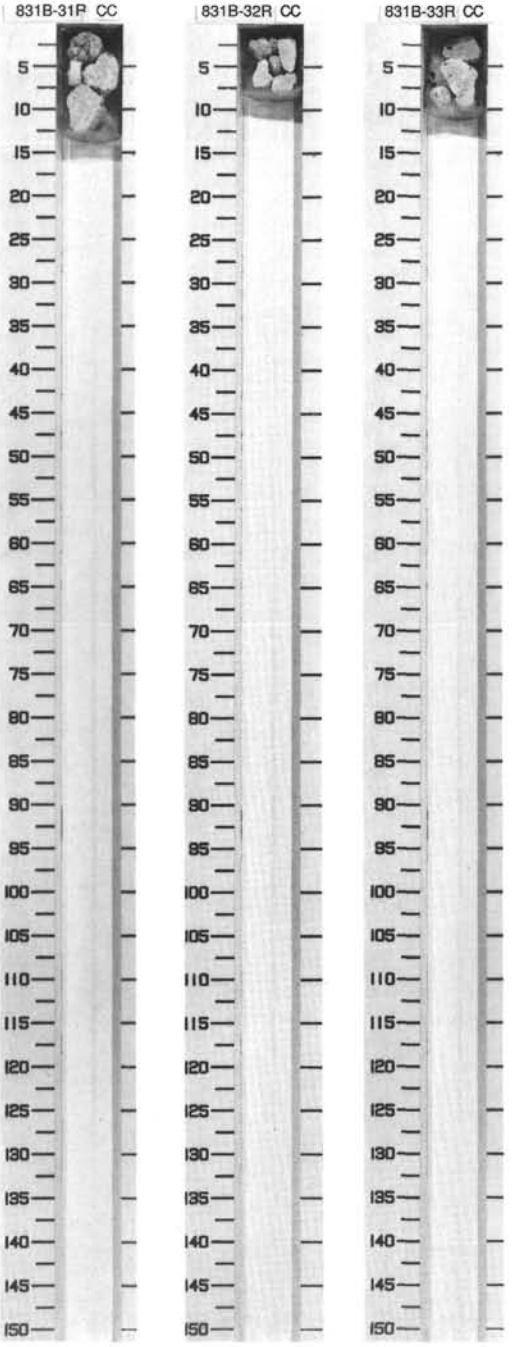
SITE 831 HOLE B CORE 33R CORED INTERVAL 381.3-391.0 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES
?	B	B	B			Vp=4986		CC					

LITHOLOGIC DESCRIPTION

CORAL RUDSTONE, ALGAL MUDSTONE, and CORALGAL FLOATSTONE

Major lithology: The core consists of 1 cobble each of CORAL RUDSTONE, ALGAL MUDSTONE, and CORALGAL FLOATSTONE. The CORAL RUDSTONE is pervasively calcitized and much of the internal skeletal structures of the coral have been obliterated. The ALGAL MUDSTONE has minor amounts of moldic porosity, a well-rounded open pore, and a void-filling rind of carbonate cement. Moreover, the majority of this cobble is very pale brown (10YR 7/4) and has wavy parallel laminations across its upper surface. Lastly, the CORALGAL FLOATSTONE is white to very pale brown, pervasively calcitized, and exhibits minor moldic porosity.



SITE 831 HOLE B CORE 34R CORED INTERVAL 391.0-400.6 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						WACKESTONE, CORALGAL PACKSTONE, BIOCLASTIC WACKESTONE, CORAL RUDSTONE, CORALGAL WACKESTONE and FORAMINIFERAL PACKSTONE

Major lithology: The core consists of 8 cobbles of carbonate. Three of the cobbles are white (10YR 8/2), subangular, pervasively calcitized WACKESTONE with a few mollusc fragments and several open pores. One of the cobbles is a CORALGAL PACKSTONE which has two generations of calcite cement filling void space. Another of the cobbles is a very pale brown (10YR 8/3) BIOCLASTIC WACKESTONE with algal and mollusc fragments. The last three cobbles are pervasively calcitized pieces of CORAL RUDSTONE, CORALGAL WACKESTONE and FORAMINIFERAL PACKSTONE.

SITE 831 HOLE B CORE 35R CORED INTERVAL 400.6-410.3 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
?	B	B	B					CC						BIOCLASTIC FLOATSTONE

Major lithology: The core consists of white to very pale brown (10YR 8/2 to 10YR 7/3) BIOCLASTIC FLOATSTONE. Overall the rock is well-lithified, but remains friable and porous.

SITE 831 HOLE B CORE 36R CORED INTERVAL 410.3-420.0 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B			V_p 4792 ●		CC					#	FORAMINIFERAL GRAINSTONE

Major lithology: The core consists of very pale brown (10YR 7/3) FORAMINIFERAL GRAINSTONE with veins of white (10YR 8/2) pore-filling marine cement.

Petrographic analysis shows that the sediment consists of sand-sized grains in mosaic spar cement. Grains include coral and coralline algae fragments, miliolids and other benthic foraminifers. Many grains have been dissolved and are preserved only as micritic rims; moldic porosity forms about 30% of the rock. Intergranular pore space is typically filled with mosaic spar, 20–70 microns in size.

THIN SECTION SUMMARY (%):

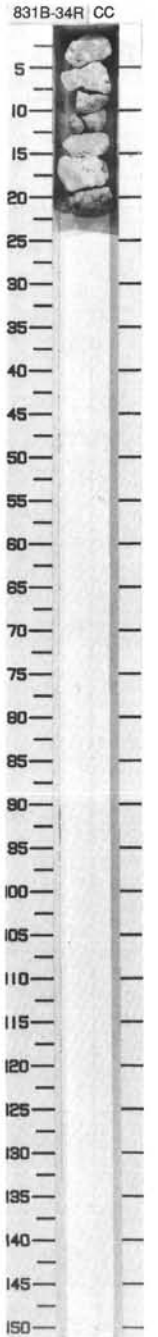
CC, 7
D

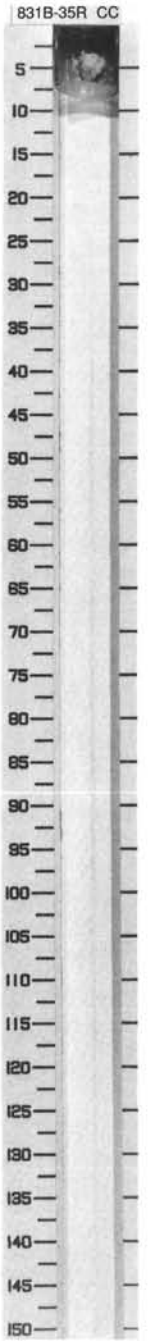
TEXTURE:

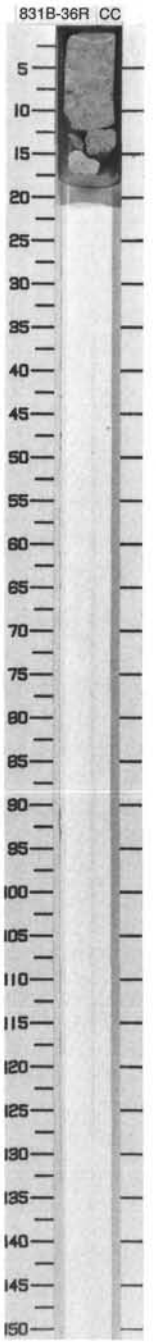
Sand	100

COMPOSITION:

Bioclast	10
Foraminifers	5
Intraclasts	35
Pore space	20
Red algae	15
Spar cement	15







SITE 831 HOLE B CORE 37R CORED INTERVAL 420.0-429.6 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC FLOATSTONE Major lithology: The core consists of 1 well-rounded piece of very pale brown (10YR 8/3) MOLLUSC FLOATSTONE with a packstone matrix.

SITE 831 HOLE B CORE 38R CORED INTERVAL 429.6-439.3 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
?	B	B	B					CC						MOLLUSC FLOATSTONE Major lithology: The core consists of 3 pieces of white (10YR 8/1) MOLLUSC FLOATSTONE with a packstone matrix; some moldic porosity is present.

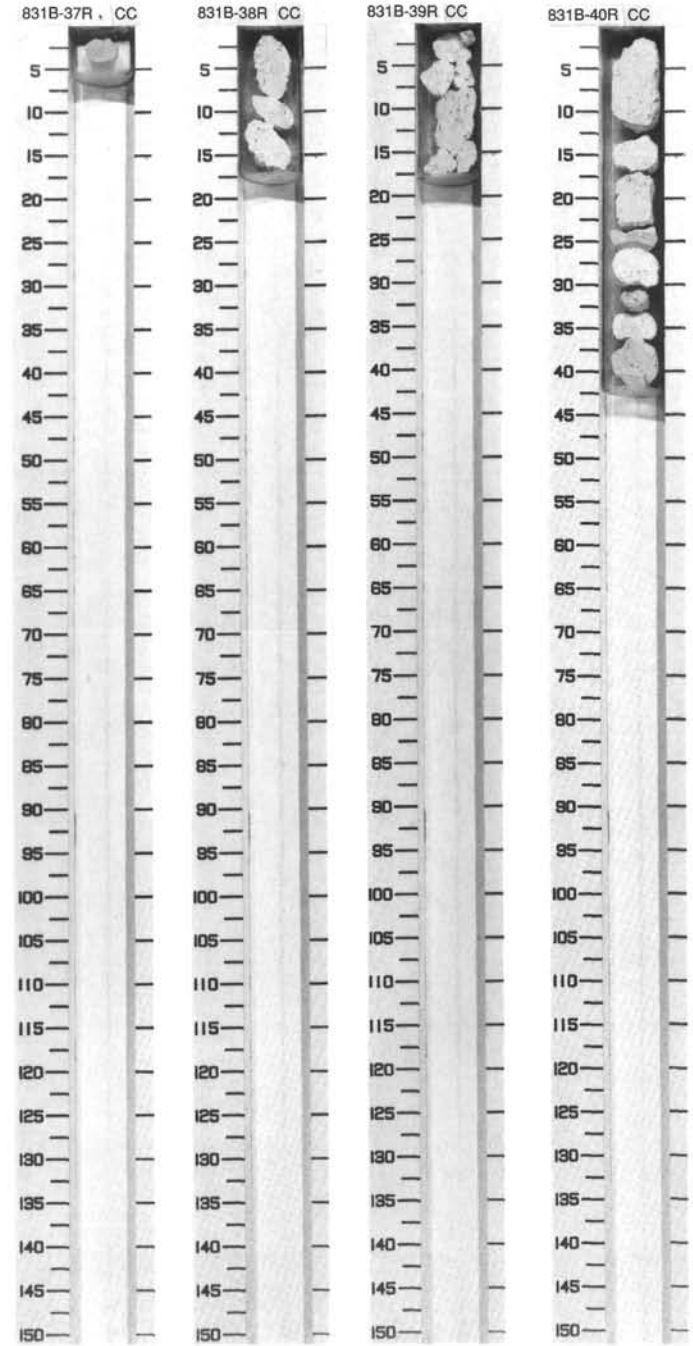
SITE 831 HOLE B CORE 39R CORED INTERVAL 439.3-448.9 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC FLOATSTONE Major lithology: The core consists of 7 pieces of white (10YR 8/1) MOLLUSC FLOATSTONE with a packstone matrix; some mollusc molds are present.

SITE 831 HOLE B CORE 40R CORED INTERVAL 448.9-458.6 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B			4107 8.1 2.69	99.5 0.0	CC						MOLLUSC FLOATSTONE Major lithology: The core consists of 8 pieces of white (10YR 8/1) MOLLUSC FLOATSTONE with a packstone matrix; some mollusc molds are present.

PHYS. PROPERTIES: ϕ V_p ρ wt. %$CaCO_3$ wt. %TOC



SITE 831 HOLE B CORE 41R CORED INTERVAL 458.6-468.3 mbsf

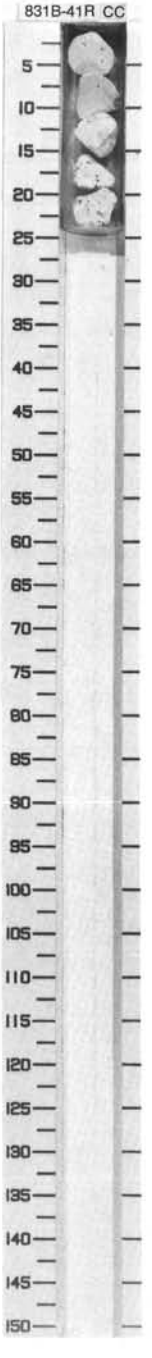
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC FLOATSTONE Major lithology: The core consists of 5 pieces of white (10YR 8/1) MOLLUSC FLOATSTONE with a packstone matrix; some mollusc molds are present. Gastropods, up to 0.5 cm in diameter, occur in Piece 1; whereas in Piece 2 they are up to 1 cm in diameter. One piece has a pelecypod mold that is 2 cm in diameter.

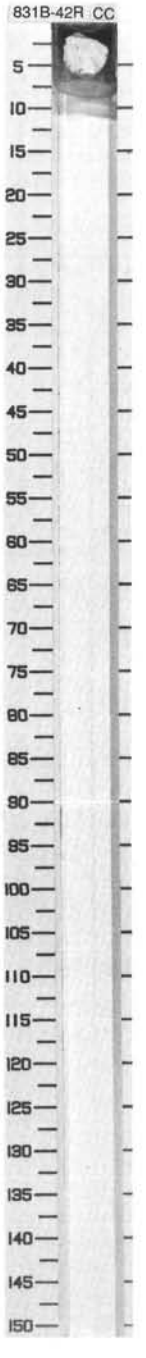
SITE 831 HOLE B CORE 42R CORED INTERVAL 468.3-477.9 mbsf

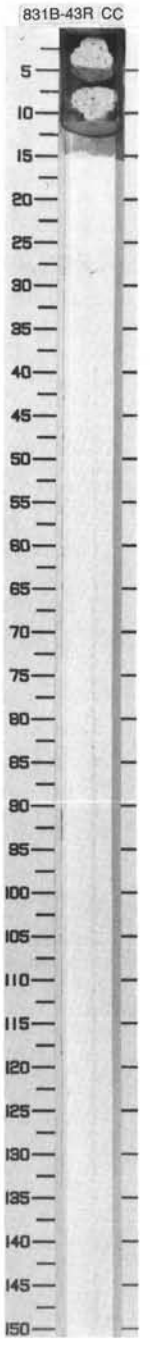
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC FLOATSTONE Major lithology: The core consists of 1 piece, 6x4 cm, of white (10YR 8/1), well-lithified MOLLUSC FLOATSTONE in a packstone matrix. Moldic porosity is present.

SITE 831 HOLE B CORE 43R CORED INTERVAL 477.9-487.2 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC					#	BIOCLASTIC FLOATSTONE Major lithology: The core consists of 2 pieces, 5x5 cm, of well-lithified BIOCLASTIC FLOATSTONE with a packstone matrix. Bryozoans and gastropods have been dissolved producing moldic porosity. The sediment is mottled, varying in color from very pale brown (10YR 7/3) to white (10YR 8/1). Petrographic analysis shows that the rock consists of areas of packstone to wackestone and patches of grainstone. Grains range in size from 50 to 400 microns. Micritic grains are abundant and outlines of shell fragments (preserved as micritic rims) are common; foraminifers (miliolids, peneropolids, other rotaliids, biserial forms and a few planktonic forms) and echinoid fragments are also present. In the grainstone, intergranular spaces are generally filled with microspar, 10–30 microns in size. Mosaic microspar also fills many of the shell molds and foraminifer chambers. Moldic porosity accounts for about 15% of the rock. THIN SECTION SUMMARY (%): CC, 3 D TEXTURE: Sand 50 Clay 50 COMPOSITION: Bioclast 10 Foraminifers 2 Peloids 70 Pore space 15







SITE 831 HOLE B CORE 44R CORED INTERVAL 487.2-496.4 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	LITHOLOGIC DESCRIPTION
?	B	B	B			Vp=4882 ●		CC					#	MOLLUSC FLOATSTONE and BIOCLASTIC GRAINSTONE

Major lithology: The core consists of 5 cobbles of white (10YR 8/2) carbonate rocks. Three of the cobbles are well-lithified MOLLUSC FLOATSTONE with packstone matrix and moldic porosity. Two of the cobbles are BIOCLASTIC GRAINSTONE with friable white micritic cement infilling small vugs.

Petrographic analysis show that the matrix of the mollusc floatstone is packstone consisting of grains 50–800 microns in size. Micritic grains are abundant and outlines of grains preserved only as micritic rims are common. Benthic foraminifers, coralline algae, and molluscs are also present. Intergranular space is filled with microspar (10–30 microns) and micrite. Moldic porosity after molluscs accounts for about 10% of the rock.

THIN SECTION SUMMARY (%):

	CC, 3 D
TEXTURE:	
Sand	60
Clay	40
COMPOSITION:	
Bioclast	10
Foraminifers	2
Micrite	10
Peloids	50
Pore space	10
Red algae	3
Shell debris	10

SITE 831 HOLE B CORE 45R CORED INTERVAL 496.4-506.0 mbsf

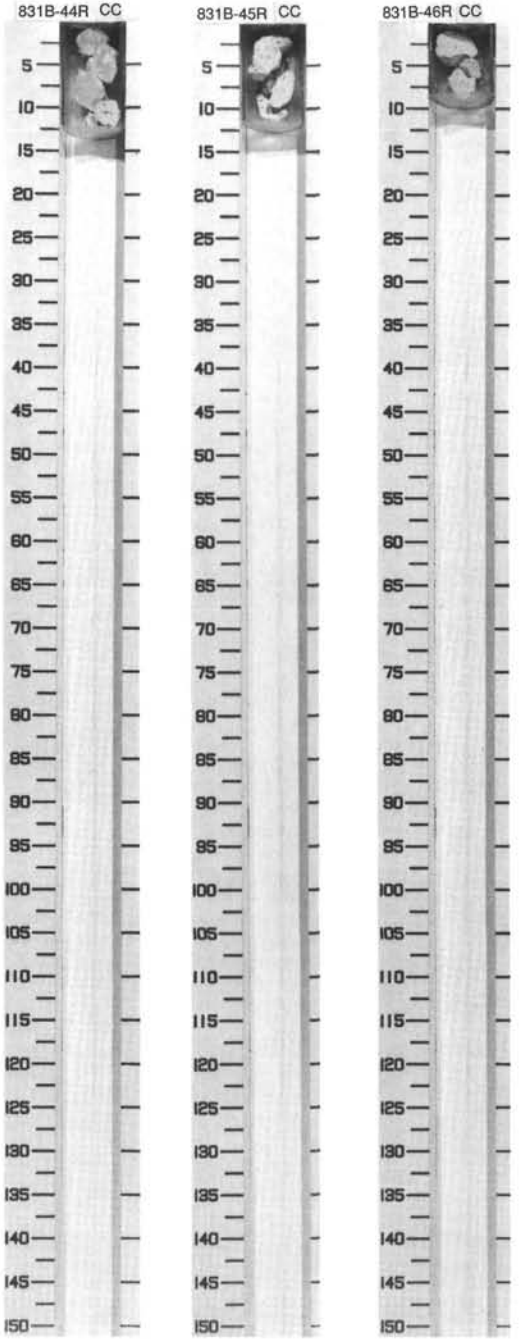
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC FLOATSTONE

Major lithology: The core consists of 4 cobbles of well-lithified, white (10YR 8/2) MOLLUSC FLOATSTONE with packstone matrix. The cobbles have numerous molds of gastropods and pelecypods, some up to 2 cm long.

SITE 831 HOLE B CORE 46R CORED INTERVAL 506.0-515.7 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	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC FLOATSTONE

Major lithology: The core consists of 3 cobbles of well-lithified, white (10YR 8/2) MOLLUSC FLOATSTONE with packstone matrix. Thin-shelled pelecypods have been dissolved producing moldic porosity.



SITE 831 HOLE B CORE 47R CORED INTERVAL 515.7-525.4 mbsf

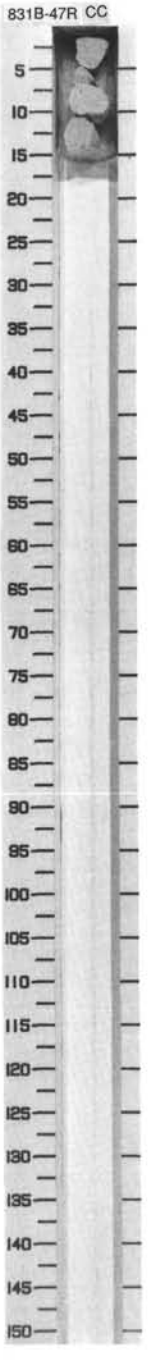
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B			Vp= 4017		CC						MOLLUSC FLOATSTONE and MOLLUSC MUDSTONE Major lithology: The core consists of 4 cobbles of carbonate rock. Three of the pieces are white (10YR 8/2), well-lithified MOLLUSC FLOATSTONE with packstone matrix. These rocks feature abundant gastropod molds. The fourth piece is white (10YR 8/2) MUDSTONE.

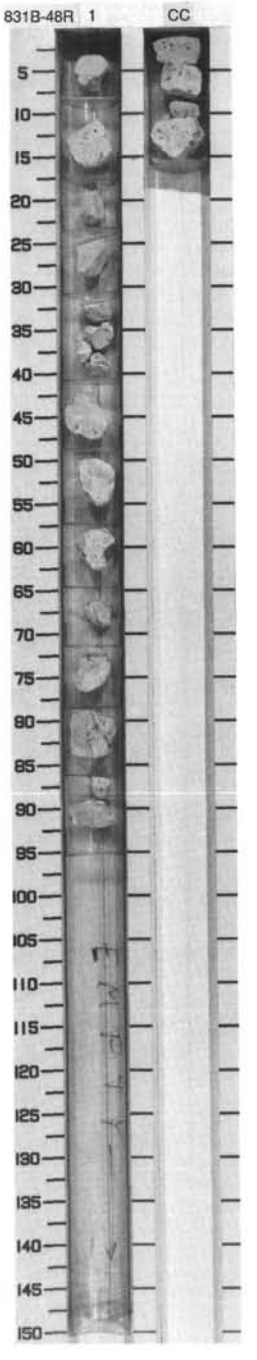
SITE 831 HOLE B CORE 48R CORED INTERVAL 525.4-534.6 mbsf

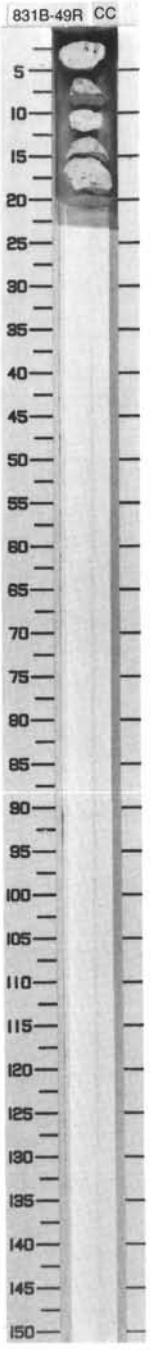
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					1 CC	0.5 1.0					BIOCLASTIC FLOATSTONE and MOLLUSC FLOATSTONE Major lithology: The core consists of 21 cobbles of white (10YR 8/2) BIOCLASTIC FLOATSTONE and MOLLUSC FLOATSTONE with a packstone matrix. The rocks feature abundant shell fragments and gastropod molds as much as 1–2 cm long. Many of the molds contain rim cements, and in one rock gastropods have been replaced by coarse-grained calcite cement. The rocks also show other minor to pervasive calcite cements, and some have zones of light brownish gray (10YR 6/2) depositional or diagenetic mottling.

SITE 831 HOLE B CORE 49R CORED INTERVAL 534.6-544.3 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
?	B	B	B			5.9 4164 3.07 0.1	99.5	CC						BIOCLASTIC FLOATSTONE and MUDSTONE Major lithology: The core consists of 5 pieces of white (10YR 8/2) carbonate rock. Three pieces are well-lithified BIOCLASTIC FLOATSTONE with a packstone matrix. Moldic porosity, often with rim cement or calcite infilling, is present after gastropods, and a 1.1 cm steinkernen occurs in one piece. The other 2 cobbles are well-lithified MUDSTONE with rare gastropod molds. Regions of very pale brown (10YR 7/3) alternate with white (10YR 8/1) in the carbonate cobbles, a feature that may represent fossil algae, bioturbation, or diagenetic mottling.







SITE 831 HOLE B CORE 50R CORED INTERVAL 544.3-553.9 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC					#	WACKESTONE

Major lithology: The core consists of 2 pieces of white (10YR 8/2), well-lithified WACKESTONE with a few gastropod molds and fragments 0.1–1.0 cm long.

Petrographic analysis indicates that the fine-grained dense carbonate consists of micritic grains, 40–80 microns in size, in a mosaic of microspar with a crystal size of 10–20 microns. Sparry fragments and pieces of molluscs and echinoids are also present.

THIN SECTION SUMMARY (%):

	CC, 3 D
TEXTURE:	
Sand	40
Silt	40
Clay	20
COMPOSITION:	
Bioclast	10
Cement	20
Peloids	70

SITE 831 HOLE B CORE 51R CORED INTERVAL 553.9-563.6 mbsf

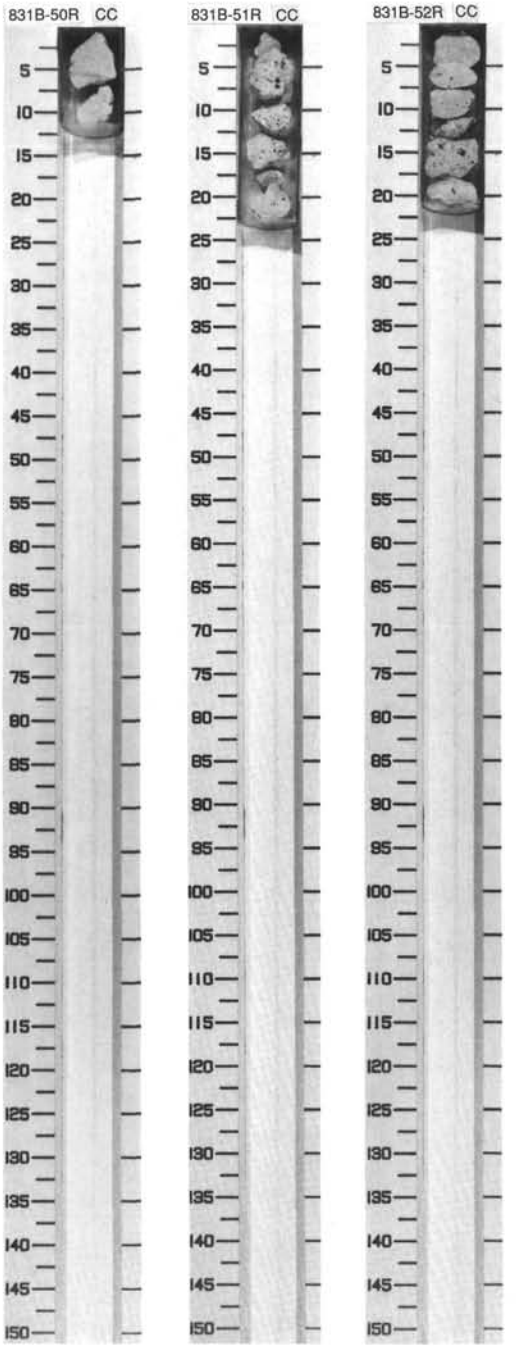
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
?	B	B	B					CC						MOLLUSC FLOATSTONE and MUDSTONE

Major lithology: The core consists of 6 pieces of white (10YR 8/2), well-lithified carbonate rock. Three pieces are MOLLUSC FLOATSTONE with abundant moldic porosity and highly dissolved and altered allochems. The other three cobbles are MUDSTONE with minor moldic porosity.

SITE 831 HOLE B CORE 52R CORED INTERVAL 563.6-573.3 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
LOWER MIOCENE	C/M	B	B					CC						MOLLUSC FLOATSTONE and MUDSTONE
	Te5													

Major lithology: The core consists of 6 pieces of well-lithified carbonate rock. Four pieces are white (10YR 8/2) MOLLUSC FLOATSTONE in a packstone matrix with abundant moldic porosity developed after gastropods = 1 cm long, and in one cobble, after 0.7 cm long coral fragments. One of the other two cobbles is very pale brown (10YR 8/3) MUDSTONE with brown to dark yellowish brown (10YR 5/3 to 10YR 3/4) calcite cement. The last piece is white (N2) lithified calcite with a coating of MOLLUSC FLOATSTONE with dissolved gastropods.



SITE 831 HOLE B CORE 53R CORED INTERVAL 573.3-582.9 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER MIOCENE	A/M	B	B			Vp-4154 ●		CC					#	MOLLUSC FLOATSTONE and FORAMINIFERAL GRAINSTONE

Te5

Major lithology: The core consists of 8 cobbles of carbonate rock. Six pieces are white to light brownish gray (10YR 8/2 to 10YR 6/2) MOLLUSCAN FLOATSTONE in a packstone matrix. Bivalves, corals, and gastropods have dissolved leaving abundant moldic porosity. Gastropod steinkerns and calcite cement are observed in several pieces. The other 2 cobbles are white (10YR 8/2), friable FORAMINIFERAL GRAINSTONE with moldic porosity after pencil corals. These cobbles are highly bored and have a dissolved texture.

Petrographic analysis shows that the foraminiferal packstone is a poorly sorted mixture of grains ranging in size from 80 microns to 2 mm. The foraminifers are mainly smaller rotaliids, with less common miliolids. Micritic grains are common; intraclasts, coralline algae, echinoid spines and molluscs are also present. Intergranular space is filled with micrite and spar, having a crystal size of 10–30 microns.

THIN SECTION SUMMARY (%):

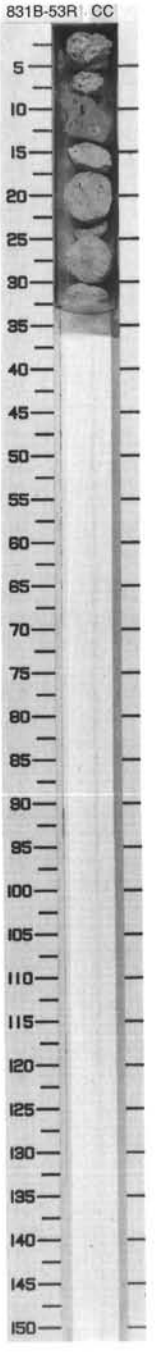
	CC, 20 D
TEXTURE:	
Sand	70
Silt	20
Clay	10
COMPOSITION:	
Cement	15
Echinoderm	5
Foraminifers	40
Intraclasts	5
Micrite	15
Peloids	20

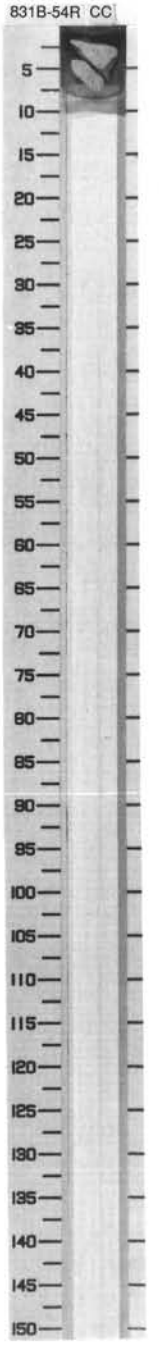
SITE 831 HOLE B CORE 54R CORED INTERVAL 582.9-592.6 mbsf

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
LOWER MIOCENE	A/M	B	B					CC						MOLLUSC FLOATSTONE

Te5

Major lithology: The core consists of 2 pieces of white (10YR 8/2), well-lithified MOLLUSC FLOATSTONE with minor moldic porosity and minor cement. One piece contains 2 pisolites.



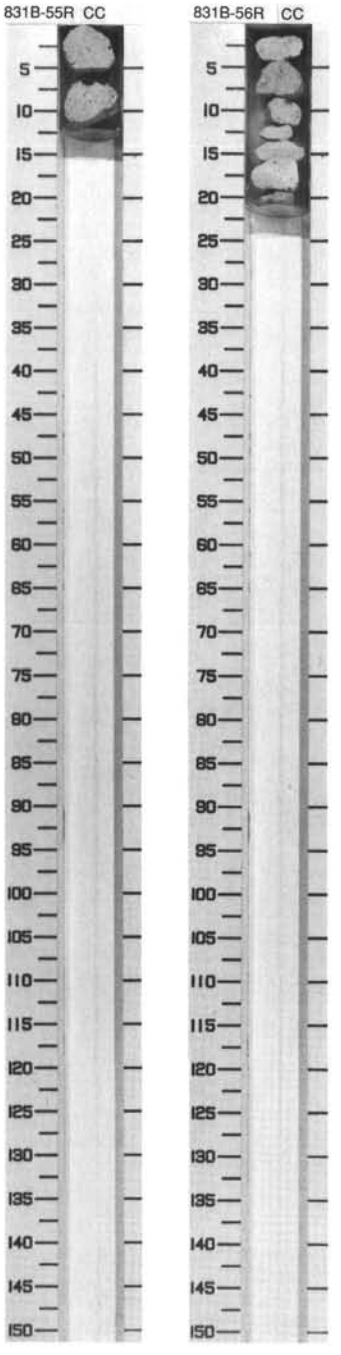


SITE 831 HOLE B CORE 55R CORED INTERVAL 592.6-602.3 mbsf

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
LOWER MIOCENE	Te5 A/M	B	B					CC						BIOCLASTIC FLOATSTONE Major lithology: The core consists of 3 pieces of white (10YR 8/2), well-lithified BIOCLASTIC FLOATSTONE with numerous molds of thin-shelled molluscs, some of which are filled with cement. Other molds identified include corals and gastropods.

SITE 831 HOLE B CORE 56R CORED INTERVAL 602.3-612.0 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER MIOCENE	A/M	B	B			Vp-4224 ●		CC					#	FORAMINIFERAL GRAINSTONE and MOLLUSC FORAMINIFERAL PACKSTONE Major lithology: The core consists of 7 pieces of white (10YR 8/2), well-lithified carbonate rock. Five pieces are FORAMINIFERAL GRAINSTONES to packstones, with miliolids especially abundant. Thin-shelled molluscs and corals have dissolved producing minor moldic porosity. Two pieces are MOLLUSC FORAMINIFERAL PACKSTONE with minor moldic porosity. Petrographic analysis indicates that the grainstone is composed mainly of foraminifers and micritic grains, 400 to 600 microns in size. Foraminifers include *Austrotrillina striata*, *Flosculinella sorites*, miliolids, and biserial and smaller rotaliids. Many of the micritic grains are recrystallized fragments of coralline algae. Intergranular spaces are filled with sparry mosaic cement, with a crystal size of 50–150 microns in size, and peloidal micritic cement. THIN SECTION SUMMARY (%): CC, 14 D TEXTURE: Sand 90 Silt 10 COMPOSITION: Bioclast 10 Cement 20 Foraminifers 40 Pore space 15 Red algae 15



SITE 831 HOLE B CORE 57R CORED INTERVAL 612.0-621.6 mbsf

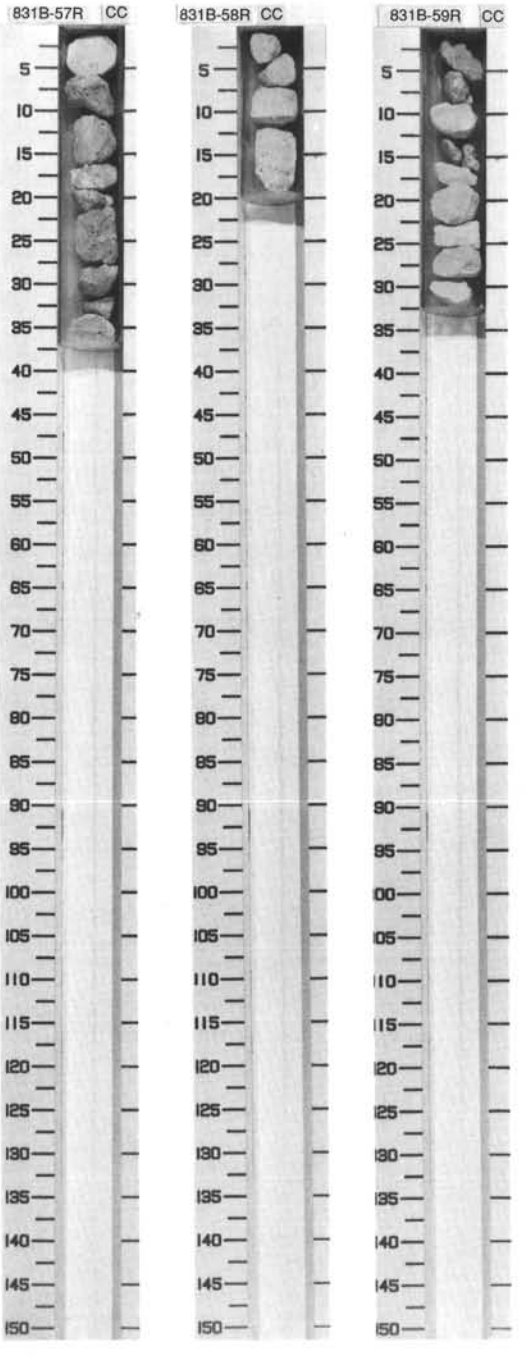
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
LOWER MIOCENE	Te5 A/M	B	B					CC						MOLLUSC FLOATSTONE Major lithology: The core consists of 10 pieces of lithified very pale brown (10YR 8/3) MOLLUSC FLOATSTONE with packstone matrix. Some molluscs have dissolved producing moldic porosity. Darker mottled areas that are very pale brown (10YR 7/3) may be due to burrowing. Some mollusc molds are partially filled with sparry calcite cement. Piece 2 is a coral mollusc floatstone.

SITE 831 HOLE B CORE 58R CORED INTERVAL 621.6-631.3 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
UPPER OLIGOCENE	UPPER Te1-4 A/M	B	B					CC					#	FORAMINIFERAL GRAINSTONE Major lithology: The core consists of 4 pieces of white (10YR 8/2) FORAMINIFERAL GRAINSTONE with minor moldic porosity. Petrographic analysis indicates that the grainstone is composed of about 70% grains, 20% sparry calcite cement, and 10% moldic porosity. Grains are 400 microns to 2 mm in size. Foraminifers are abundant and include *Nummulites fichteli, Spiroclypeus, Borelis, Austrotrillina striata*; miliolids, and biserial rotaliids. Many of the foraminifers are completely micritized and are recognized only by their shape. Other micritic grains are also present, but were not identifiable. Most of the intergranular pore space is filled with sparry mosaic cement, with crystal size 20-100 microns; a few open intergranular pores are lined with dentate crystals, 50-70 microns in size.

SITE 831 HOLE B CORE 59R CORED INTERVAL 631.3-641.0 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER OLIGOCENE	UPPER Te1-4 A/M	B	B			4603 ● 99.5 ● 0.2	wt. %CaCO3 wt. %TOC	CC						FORAMINIFERAL GRAINSTONE and CORAL MOLLUSC FLOATSTONE Major lithology: a. Most of the core consists of six pieces of white (10YR 8/2) and one piece of very pale brown (10YR 7/1) BIOCLASTIC FORAMINIFERAL GRAINSTONE with minor moldic porosity. b. Three pieces consist of white (10YR 8/2) CORAL MOLLUSC FLOATSTONE with wackestone matrix. Mollusc and small coral stems have dissolved producing moldic porosity.

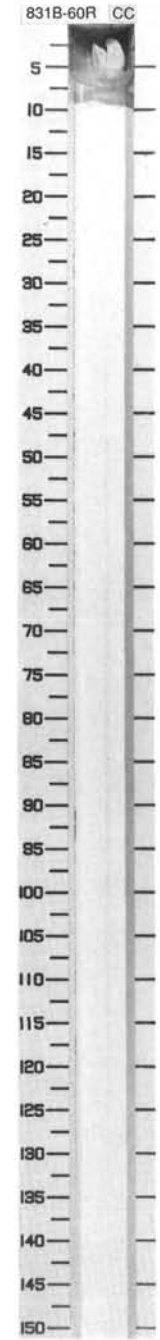


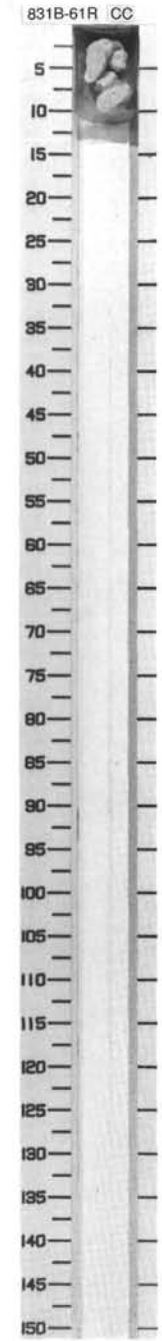
SITE 831 HOLE B CORE 60R CORED INTERVAL 641.0-650.3 mbsf

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
UPPER OLIGOCENE	C/M	B	B					CC						BIOCLASTIC FORAMINIFERAL GRAINSTONE Major lithology: This core consists of two small pieces of white (10YR 8/1) BIOCLASTIC FORAMINIFERAL GRAINSTONE
UPPER Te1-4														

SITE 831 HOLE B CORE 61R CORED INTERVAL 650.3-659.6 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
UPPER OLIGOCENE	C/M	B	B					CC					#	BIOCLASTIC GRAINSTONE Major lithology: This core consists of 5 small pieces of white (10YR 8/2) BIOCLASTIC GRAINSTONE with rare molds of mollusc shells. Petrographic analysis shows that the grainstone consists of abundant foraminifers and micritic grains, many of which are fragments of recrystallized coralline algae. Foraminifers include abundant miliolids and less common rotaliids. Intergranular spaces are generally filled with sparry mosaic cement, with a crystal size of 20–60 microns; some open pores are lined with dentate crystals, 30–50 microns long. Many grains, including numerous mollusc fragments, are preserved only as micritic rims that have not been infilled with cement; this moldic porosity accounts for about 20% of the rock. THIN SECTION SUMMARY (%): CC, 8 D TEXTURE: Sand 100 COMPOSITION: Bioclast 10 Foraminifers 40 Pore space 20 Red algae 30
UPPER Te1-4														





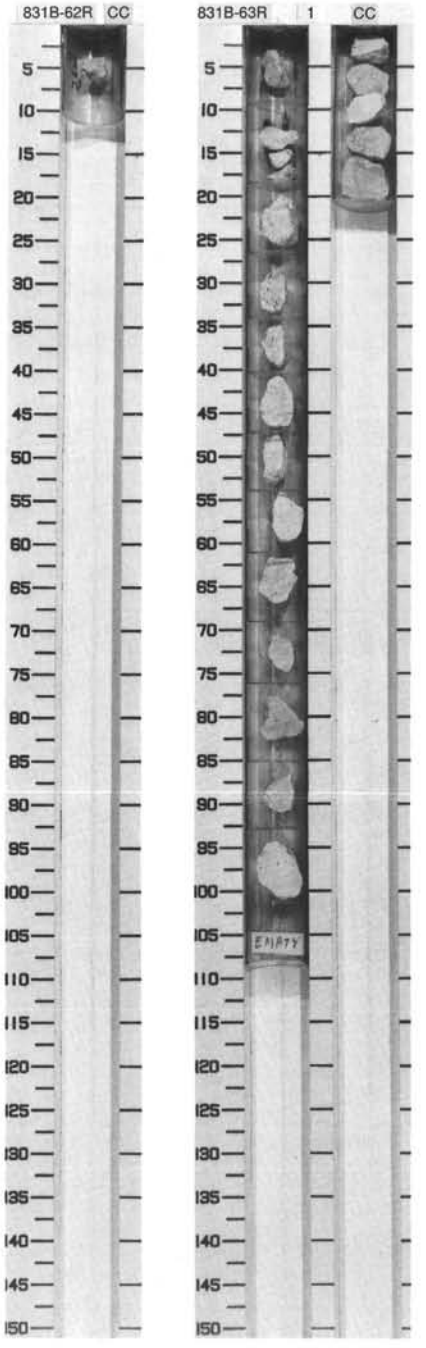
SITE 831 HOLE B CORE 62R CORED INTERVAL 659.6-669.2 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER OLIGOCENE	UPPER Te1-4 C/M	B	B					CC						BIOCLASTIC RUDSTONE Major lithology: This core consists of 1 small piece of very pale brown (10YR 7/3) BIOCLASTIC RUDSTONE with coral and mollusc.

SITE 831 HOLE B CORE 63R CORED INTERVAL 669.2-678.5 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER OLIGOCENE	UPPER Te1-4 C/M	B	B			ϕ Vp ● 5765	wt. %CaCO3 ● 99.7 wt. %IOC 0.0	1 CC	0.5 1.0				#	BIOCLASTIC PACKSTONE and FLOATSTONE Major lithology: This core consists of small pieces of white (10YR 8/2) BIOCLASTIC PACKSTONE and FLOATSTONE with a packstone matrix. Some of the pieces show pale brown (10YR 7/3) mottling; distinct burrows are present in one sample. Occasional pelecypod molds occur in some pieces. Pieces in the core catcher are very dense, with only a hint of granular structure. Petrographic analysis shows a patchy distribution of foraminiferal grainstone and packstone within the sample. Foraminifers include *Austrotrillina* (ancestral form), miliolids, and smaller benthic rotaliids (both uniserial and trochospiral forms); some of the foraminifers are completely infilled with micrite. Fecal pellets and fragments of branching coralline algae, molluscs and echinoid spines are also present. Grains range in size from about 60 to 800 microns. Intergranular space is filled with sparry mosaic cement (50–150 microns) and micrite. THIN SECTION SUMMARY (%):

	1, 40 D	1, 43 D
TEXTURE:		
Sand	70	80
Silt	10	20
Clay	20	---
COMPOSITION:		
Bioclast	25	10
Cement	15	20
Foraminifers	40	40
Pellets	---	10
Pore space	2	---
Red algae	10	---
Shell debris	5	20



SITE 831 HOLE B CORE 64R CORED INTERVAL 678.5-688.1 mbsf

TIME-ROCK UNIT: UPPER OLIGOCENE

BIOSTRAT. ZONE/FOSSIL CHARACTER: UPPER Te1-4; FORAMINIFERS: C/M; NANNOFOSSILS: B; RADIOLARIANS: B

SECTION: 1, 2, CC; METERS: 0.5, 1.0

GRAPHIC LITHOLOGY: VOID

SAMPLES: #

LITHOLOGIC DESCRIPTION

CORAL RUDSTONE and ALGAL PACKSTONE

Major lithology: Two small cobbles of well-preserved CORAL RUDSTONE occur in the upper 15 cm of this core. The occurrence of this facies only at the top of this core may indicate that these cobbles are stratigraphically out of place; perhaps they have fallen into the hole from above. The majority of the remaining 23 carbonate cobbles are dense, light gray (10YR 7/2) laminated ALGAL PACKSTONE with marine cement and occasional foraminifers (*Nummulites*?). Most of the primary porosity has been occluded by marine cement.

Petrographic analysis shows that at least some of the rock is algal packstone, consisting of about 40% coralline algae, including both encrusting and branching forms. Foraminifers (mainly rotaliids), echinoids, molluscs, and micritic grains are also present; some grains are preserved only as micritic rims infilled with microspar (10–20 microns). Intergranular space is filled with microspar (10–20 microns) and micrite. Moldic and vuggy porosity accounts for about 15% of the rock.

THIN SECTION SUMMARY (%):

	1, 90 D
TEXTURE:	
Sand	80
Silt	10
Clay	10
COMPOSITION:	
Bioclast	10
	5
Foraminifers	10
Peloids	15
Pore space	15
Red algae	40
Shell debris	5

SITE 831 HOLE B CORE 65R CORED INTERVAL 688.1-697.8 mbsf

TIME-ROCK UNIT: UPPER OLIGOCENE

BIOSTRAT. ZONE/FOSSIL CHARACTER: UPPER Te1-4; FORAMINIFERS: A/M; NANNOFOSSILS: B; RADIOLARIANS: B

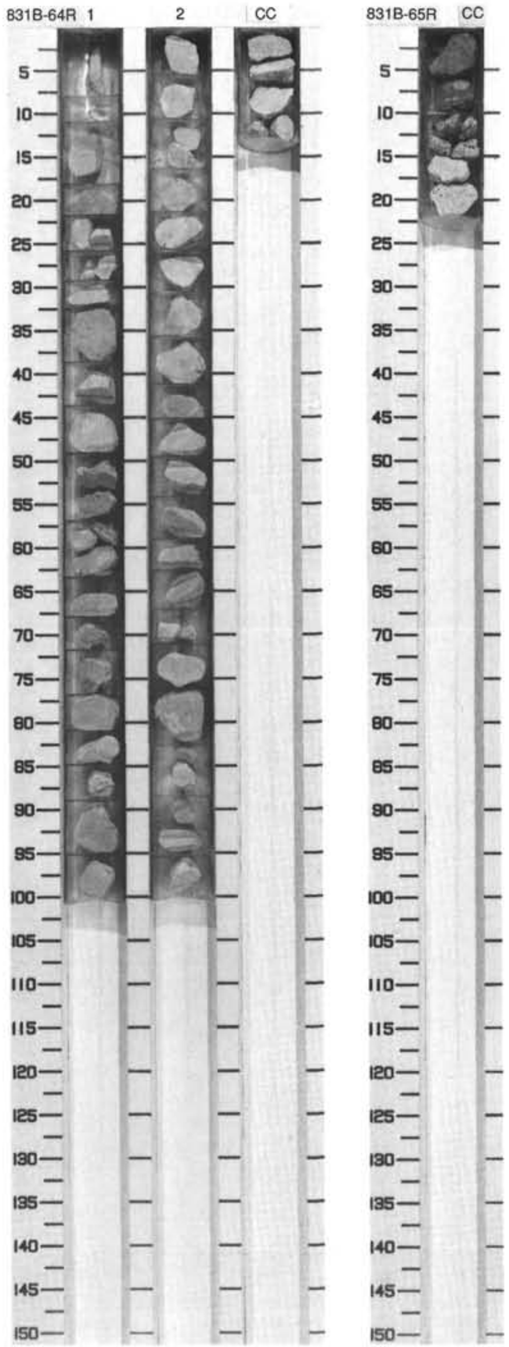
PHYS. PROPERTIES: ● 4622 57.7 1.90 (V_p, ϕ, β); CHEMISTRY: ● 1.8 (wt.% $CaCO_3$)

SECTION: CC

LITHOLOGIC DESCRIPTION

SILTY CLAY, FORAMINIFERAL GRAINSTONE, WACKESTONE, INTRACLAST FLOATSTONE

Major lithology: The upper 10 cm of this core consists of a reddish brown (2.5YR 5/4) SILTY CLAY, which clearly is a soil horizon (*sensu stricto* Terra Rosa). Beneath the SILTY CLAY layer is a cobble of light brown (7.5YR 6/4) FORAMINIFERAL GRAINSTONE. The two remaining carbonate cobbles are a dense, laminated (algal ?) WACKESTONE and an INTRACLAST FLOATSTONE. The latter has abundant marine and secondary carbonate cement



SITE 831 HOLE B CORE 66R CORED INTERVAL 697.8-707.5 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER OLIGOCENE	UPPER Te1-4 A/M	B	B			0.0 2.77 4825 φ Vp		1, CC	0.5, 1.0				#	

CORAL RUDSTONE, FORAMINIFERAL GRAINSTONE, BIOCLASTIC PACKSTONE, WACKESTONE with CHLORITE

Major lithology: A small cobble of pervasively calcitized CORAL RUDSTONE occurs in the upper 10 cm of this core. The occurrence of this cobble only at the top of this core may indicate that it is stratigraphically out of place; perhaps it has fallen into the hole from above. Several cobbles of FORAMINIFERAL GRAINSTONE and BIOCLASTIC PACKSTONE occur between 10 and 25 cm. Cobbles in the remaining 70 cm of the core are dominantly laminated (algal ?) WACKESTONE with CHLORITE. These cobbles have minor moldic porosity after pencil corals and minor amounts of pore-filling carbonate cement. Many of these cobbles have abundant veins of chlorite. In one case the chlorite veins diverge around a carbonate clast.

Petrographic analysis shows that the bioclastic packstone consists of foraminifers (*Austrotrillina striata, Borelis, miliolids*), coralline algae, intraclasts, micritic grains and mollusc fragments. Grain size ranges from 100 microns to 1 mm. Intergranular space is filled with microspar (crystals 10–20 microns in size) and micrite.

THIN SECTION SUMMARY (%):

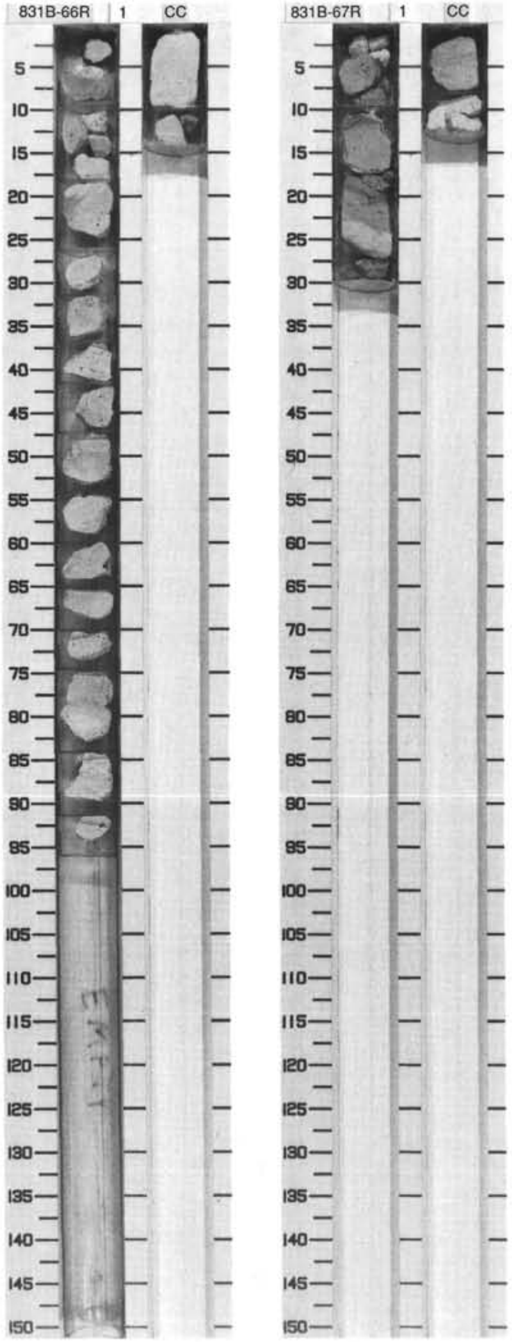
	1, 19 D
TEXTURE:	
Sand	80
Silt	20
COMPOSITION:	
Bioclast	10
Cement	10
Foraminifers	15
Intraclasts	5
Micrite	10
Peloids	15
Pore space	5
Red algae	20
Shell debris	5

SITE 831 HOLE B CORE 67R CORED INTERVAL 707.5-717.1 mbsf

TIME-ROCK UNIT	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER OLIGOCENE	UPPER Te1-4 A/M	B	B			25.5 2.46 φ	87.9 Wt.%CaCO3	1, CC						

CORAL RUDSTONE, FORAMINIFERAL WACKESTONE with CLAY, and BIOCLASTIC FLOATSTONE

Major lithology: The upper 5 cm consists of 3 cobbles of partially calcitized CORAL RUDSTONE. The occurrence of this facies only at the top of this core may indicate that these cobbles are stratigraphically out of place; perhaps they have fallen into the hole from above. A well-lithified, pinkish white (7.5YR 8/2) streaked with light red (2.5YR 6/6), CORAL RUDSTONE with interstitial mudstone occurs below the first three cobbles. The largest piece of carbonate occurs from 19 to 27 cm. This piece is a very pale brown (10YR 8/3 to 10YR 7/4) with streaks of red (10R 5/6) and light yellowish brown (10YR 6/4) FORAMINIFERAL WACKESTONE with CLAY. The core catcher consists of 4 carbonate cobbles. Three of the cobbles are BIOCLASTIC FLOATSTONE in a wackestone matrix. Mollusc and coral fragments have dissolved producing moldic porosity. Carbonate cement occurs along the edge of several pores.

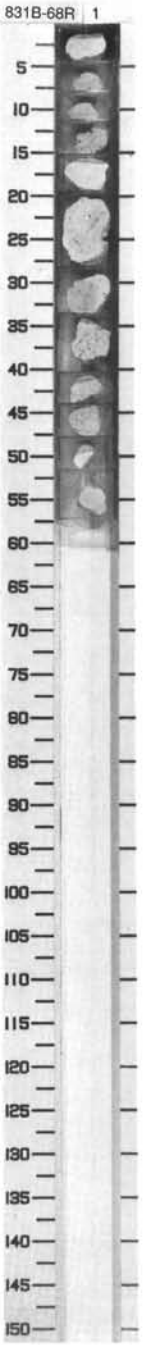


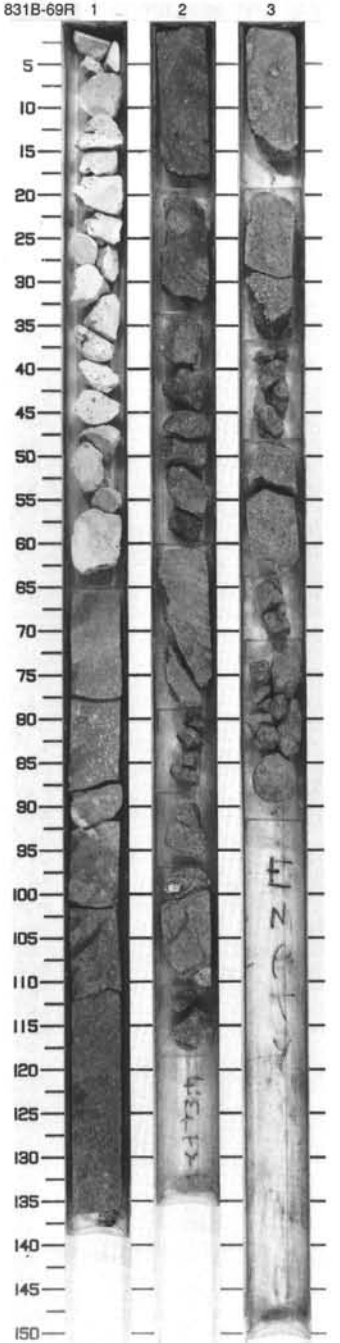
SITE 831 HOLE B CORE 68R CORED INTERVAL 717.1-726.8 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER: FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS	PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB.	SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION
UPPER OLIGOCENE	UPPER Te1-4 A/M	B	B					1	0.5					ALGAL RUDSTONE and BIOCLASTIC FLOATSTONE Major lithology: The core consists of 12 cobbles of carbonate. Four of the cobbles are classified as ALGAL RUDSTONE, some have chlorite veins throughout them. Two of the cobbles have such well-developed algal laminations they look like stromatolites. Seven of the carbonate cobbles are classified as BIOCLASTIC FLOATSTONE. Stick corals and thin-shelled molluscs have dissolved producing moldic porosity. Foraminifers sporadically occur in these cobbles.

SITE 831 HOLE B CORE 69R CORED INTERVAL 726.8-736.4 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	LITHOLOGIC DESCRIPTION
UPPER OLIGOCENE	UPPER Te1-4 A/M	B	B			● 21.1 3965 2.47 ● 14.0 4408 2.69 ● 20.7 3062 2.43		1 2 3	0.5 1.0	IM			#	CORAL RUDSTONE, BIOCLASTIC PACKSTONE and FORAMINIFERAL GRAINSTONE Major lithology: This core consists of 20 pieces of well-lithified carbonate rock that range in color from white (10YR 8/2) to very pale brown (10YR 7/3). Four of the pieces are, or contain, CORAL RUDSTONE, including 1) one piece of *Porites* with little to no cement, 2) another coral that is densely cemented, and 3) a coral that is coated with multiple layers of cement. Other pieces in the core are BIOCLASTIC PACKSTONE and FORAMINIFERAL GRAINSTONE: the packstone has borings, 0.5 to 2 mm in diameter. Petrographic analysis shows that the grainstone consists of well-sorted grains 0.5 to 1 mm in size. The grains are mainly miliolids (including *Austrotrillina howchini*) and rotaliid foraminifers and fragments of coralline algae, with minor mollusc and echinoid fragments. Many of the foraminifers are micritized and the molluscs are preserved only as micritic rims infilled with spar. Intergranular spaces are filled with sparry mosaic cement, with crystal size ranging from 10–50 microns. THIN SECTION SUMMARY (%): 1, 24 D TEXTURE: Sand 100 COMPOSITION: Bioclast 10 Foraminifers 40 Pore space 5 Red algae 30 Spar cement 15





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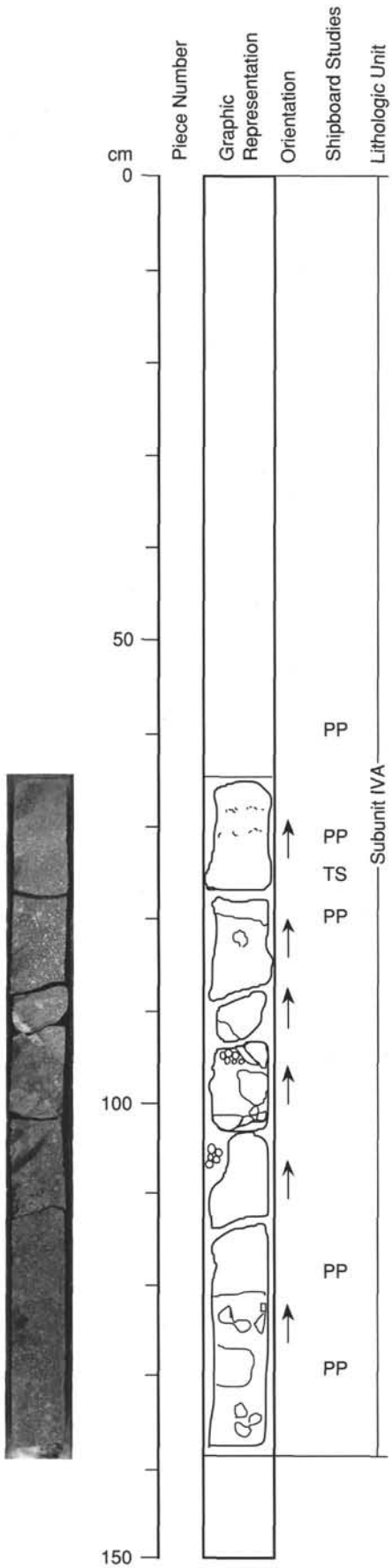
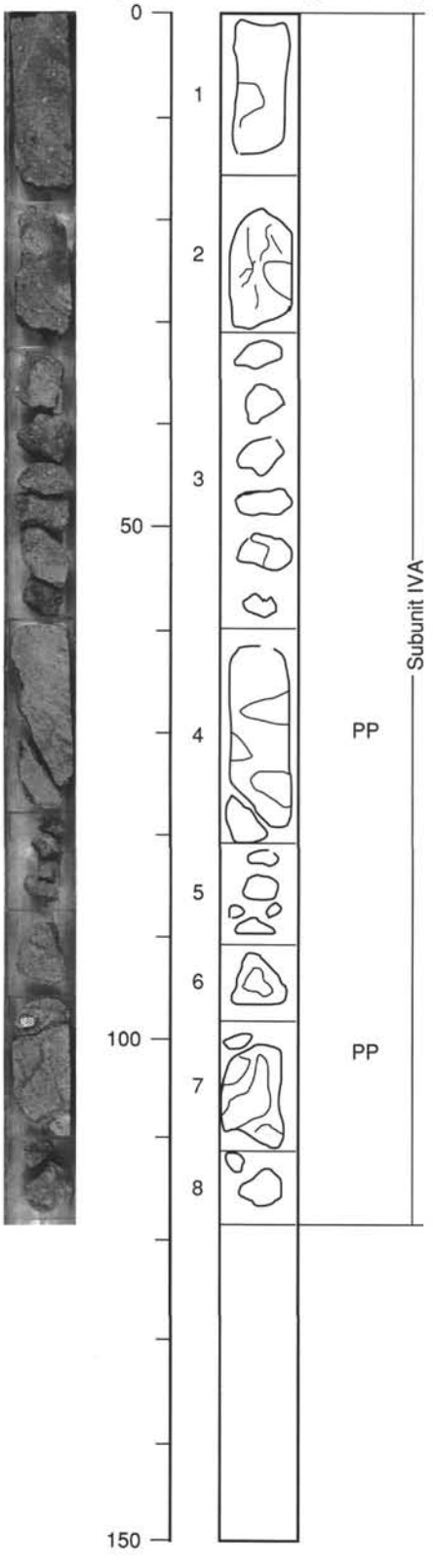


UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVA: Variegated andesitic breccia with some reworking

Pieces 1A–1F

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 1–5 mm, euhedral and subhedral. No orientation. 10-40% replacement.
Clinopyroxene - 2–4%, 0.5–3.0 mm, subhedral, dark green, 20-50% replacement.
Orthopyroxene: - 1–2%, 0.5–3.0 mm, subhedral, yellow-brown, 20-50%.
Opaque minerals - 1–2%, <1 mm, irregular shape. No orientation. No replacement.
GROUNDMASS: In clast: Microcrystalline to glassy; only plagioclase laths (0.1 mm) are visible.
VESICLES: In clasts: 5–10%, 0.5–2 mm, subrounded, randomly distributed.
COLOR: Orange-brown (7.5YR 6/8) at top, grades into light brown (2.5YR 6/6) at 6 cm from the top, then into brownish gray (2.5YR 5/2) where it becomes more or less homogeneous.
STRUCTURE: N/A.
ALTERATION: Clasts altered and oxidized to brownish gray matrix-like product.
VEINS/FRACTURES: <1%, <1 mm, random. Inside clasts vein filling is white, non-carbonate (zeolite(?)).
ADDITIONAL COMMENTS: Void filled with transparent and white, non-carbonate mineral (chalcedony and/or zeolite(?)).



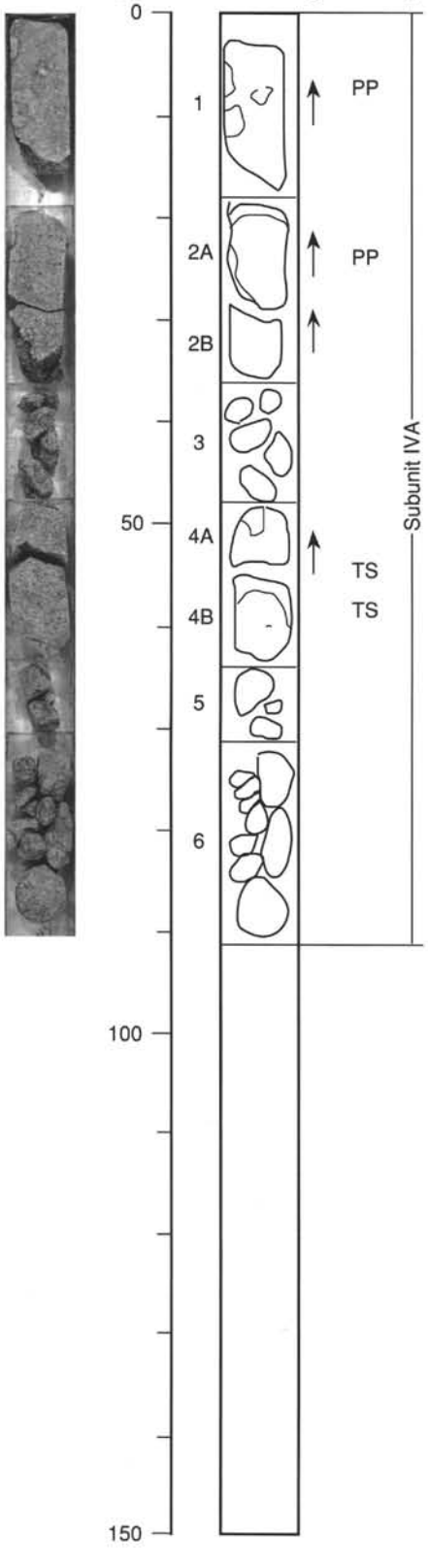
134-831B-69R-2

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVA: Variegated andesitic breccia with some reworking

Pieces 1–8

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 1–5 mm, euhedral.
Clinopyroxene - 5–10%, 1–3 mm, subhedral.
Orthopyroxene - 1–5%, 1–2 mm, subhedral, altered.
Magnetite - 1%, 0.5 mm.
GROUNDMASS: Fine-grained to microcrystalline.
VESICLES: None.
COLOR:
Pieces 1, 2, 3 and 4: reddish brown (5YR 4/3).
Pieces 5, 6, 7, and 8: olive gray (5Y 4/3).
STRUCTURE: N/A.
ALTERATION: Clasts altered to red and green products.
VEINS/FRACTURES: 5%, 0.5–2 mm, random.

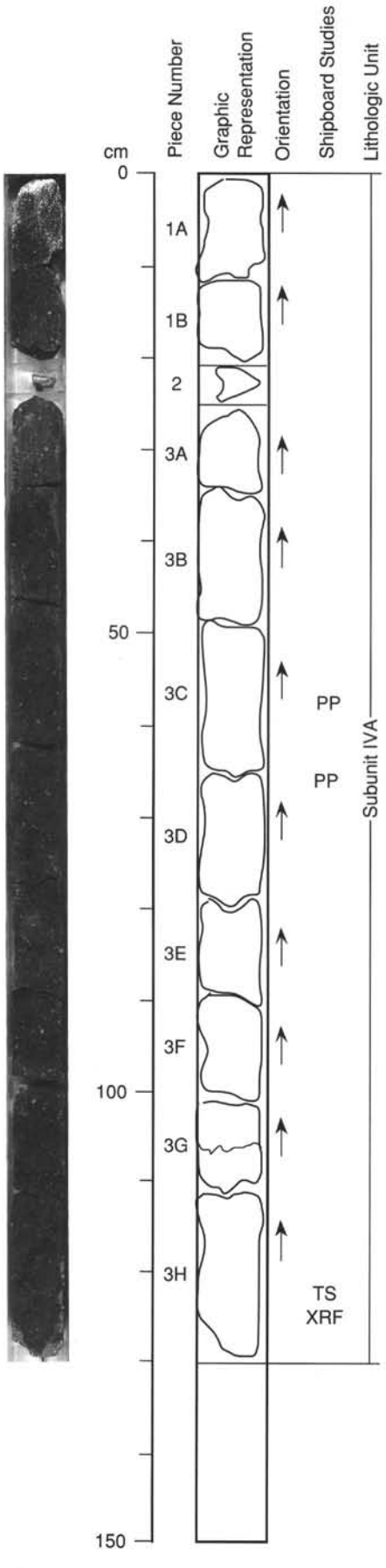


134-831B-69R-3

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVA: Variegated andesitic breccia with some reworking

Pieces 1–6

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 1–5 mm, euhedral, moderately altered.
Clinopyroxene - 8%, 1–5 mm, subhedral.
Orthopyroxene - 5%, 1–2 mm, euhedral to subhedral.
Magnetite - 1%, 0.5 mm, anhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1%, <0.5 mm, irregular, random. Filled with green minerals (zeolites).
COLOR: Matrix light olive gray (5Y6/2) to olive gray (5Y4/2), clasts light gray (10YR 7/1).
STRUCTURE: N/A.
ALTERATION: Matrix is highly altered to green minerals (chlorite or epidote (?)).
VEINS/FRACTURES: <1%, <0.5 mm, random, filled with the same minerals as vesicles.
ADDITIONAL COMMENTS: Clast size ranges between 1 and 8 cm.

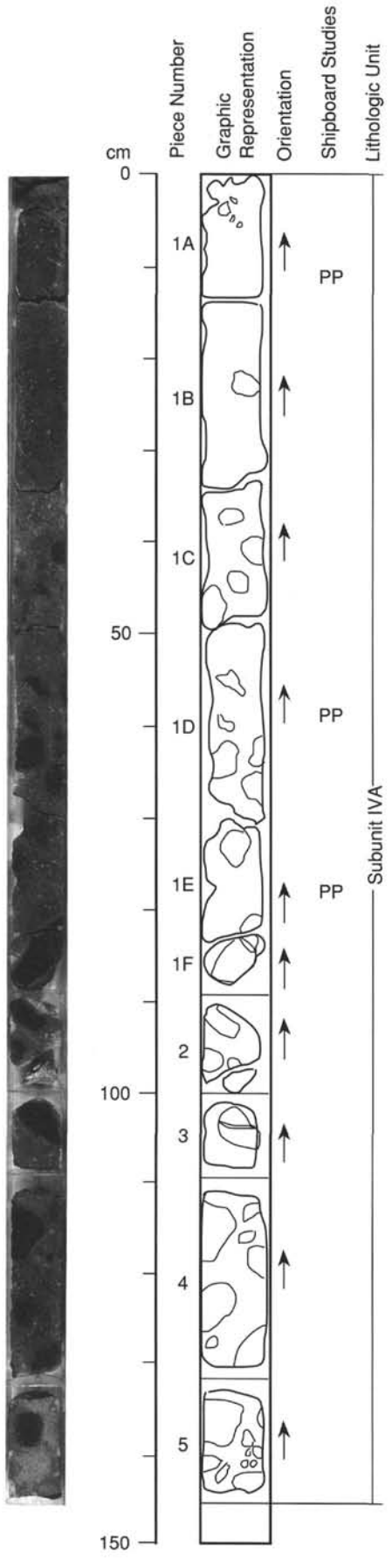


134-831B-70R-1

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVA: Variegated andesitic breccia with some reworking

Pieces 1–3H

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 1–5 mm, euhedral, altered.
Clinopyroxene - 2–5%, 1–3 mm, subhedral, dark green.
Orthopyroxene - 1–3%, 1–2 mm, subhedral, yellow brown.
Magnetite - 1%, 0.2–0.5 mm, anhedral.
GROUNDMASS: Microcrystalline to glassy. Plagioclase laths are visible. Glass (60%), fresh to moderately altered and devitrified.
VESICLES: 1–5%, 0.5–2 mm, irregular, random. Filled with white non-carbonate minerals.
COLOR:
Pieces 1 to 3A: olive gray (5Y 4/2).
Pieces 3 to 3E: dark grayish brown (2.5YR 4/2).
Pieces 3F to 3H: dark gray (5Y 4/1).
STRUCTURE: N/A.
ALTERATION: Highly altered and oxidized (chlorite and hematite).
VEINS/FRACTURES: 5%, 0.1–0.3 mm, irregular. Piece 3G filled with sulfide?

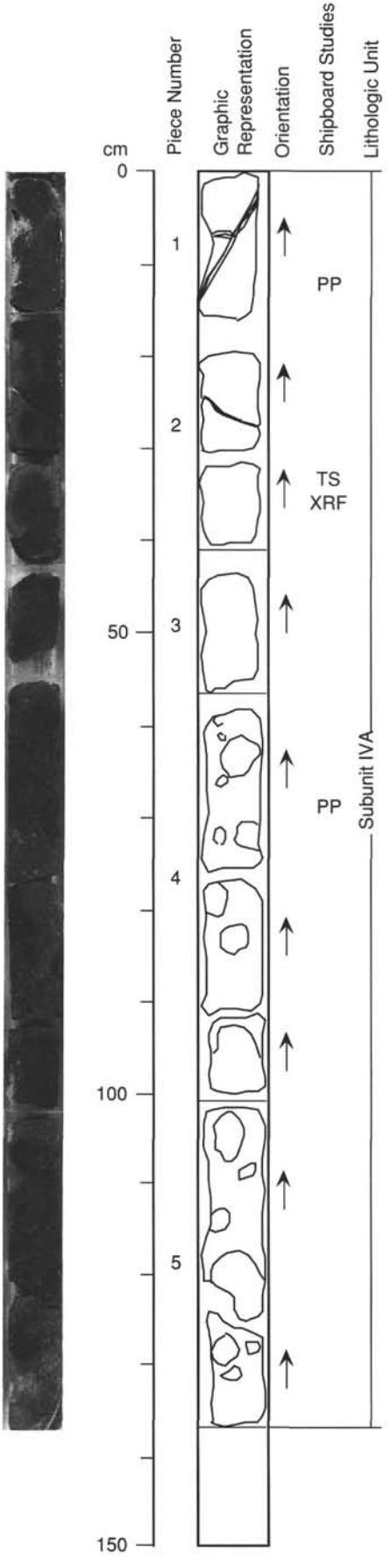


134-831B-70R-2

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVA: Variegated andesitic breccia with some reworking

Pieces 1A–1F, 2–5

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20–25%, 0.5–5 mm, euhedral.
Clinopyroxene - 1–2%, 0.5–1 mm, subhedral.
Orthopyroxene - 2–4%, 0.5–1 mm, subhedral.
GROUNDMASS: In clasts: microcrystalline to glassy, only plagioclase laths (<1 mm) are visible.
VESICLES: None.
COLOR: Matrix yellow/green/gray (10Y 7/2), clasts gray (10RY 4/1).
STRUCTURE: N/A.
ALTERATION: Clasts are relatively fresh. Matrix includes yellowish grains and reddish gray grains which may indicate the existence of chlorite, epidote, oxides and hydroxides. All the clasts have light gray glassy rims(zeolite and chlorite(?)).
VEINS/FRACTURES: 5%, 0.3–2 mm, irregular. Clasts in Pieces 1F, 2 and 3.
ADDITIONAL COMMENTS: The ratio of clast to matrix is low in this section (ca. 20%). Matrix is composed of 1–5 mm grains of minerals (plagioclase and pyroxenes), altered or oxidized lava fragments and yellowish alteration products filling the intervening spaces.



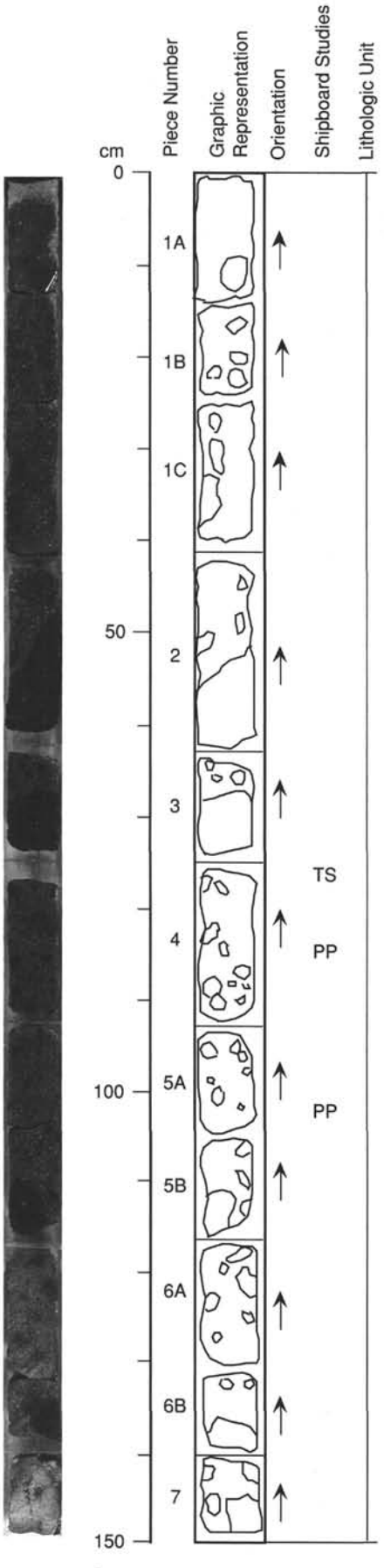
134-831B-70R-3

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVA: Variegated andesitic breccia with some reworking

Pieces 1–5

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 1–5 mm, euhedral, altered.
Clinopyroxene - 5–10%, 0.5–1mm, subhedral.
Orthopyroxene - 2–5%, 0.5–1mm, euhedral.
Magnetite - <1%, 0.5–1 mm, anhedral.
GROUNDMASS: Microcrystalline to glassy. Glass (60%) fresh to moderately devitrified.
VESICLES: None.
COLOR: Gray (7.5YR 5/1).
STRUCTURE: N/A.
ALTERATION: Clasts appear slightly altered.
VEINS/FRACTURES: In clasts: 5%, 0.1–2 mm, random. Filled with chlorite.
ADDITIONAL COMMENTS: Pieces 1, 2 and 3 are probably the same pebble (50 cm in diameter) of porphyritic andesite.

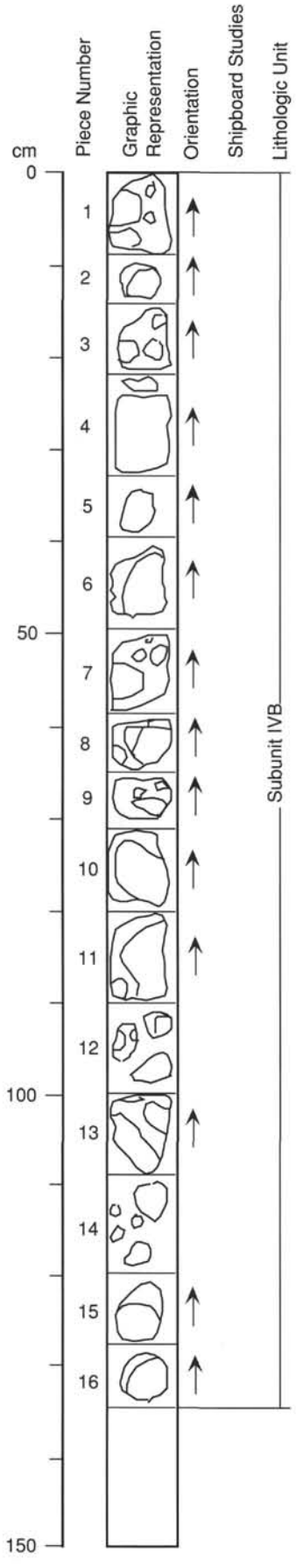


134-831B-70R-4

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–7

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 1–4 mm, euhedral to subhedral.
Clinopyroxene - 2–5%, 0.5–3 mm, subhedral.
Orthopyroxene - 2%, 0.5–3 mm, subhedral.
GROUNDMASS: Plagioclase laths in glassy groundmass extensively altered.
VESICLES: None.
COLOR: Matrix dark greenish gray (5G 4/1), clasts very dark gray (10Y 3/1).
STRUCTURE: N/A.
ALTERATION: Matrix intensively altered to green mineral (chlorite). White glassy rim (1 mm) around the clasts.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Clasts subangular to angular from 2 mm to 10 cm in size.

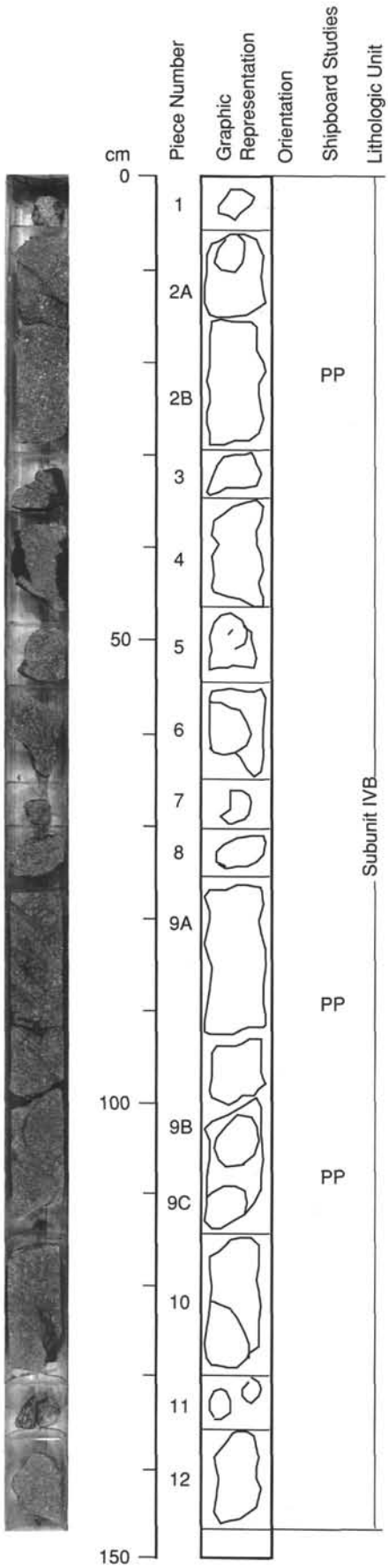


134-831B-70R-5

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–16

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 1–4 mm, euhedral to subhedral.
Clinopyroxene - 2–5%, 0.5–3 mm, subhedral.
Orthopyroxene - 2%, 0.5–3 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy, plagioclase laths are visible.
VESICLES: None.
COLOR: Matrix dark greenish gray (5G 4/1), clasts very dark gray (10Y 3/1).
STRUCTURE: N/A.
ALTERATION: Groundmass altered to chlorite. White rims around clasts.
VEINS/FRACTURES: None.

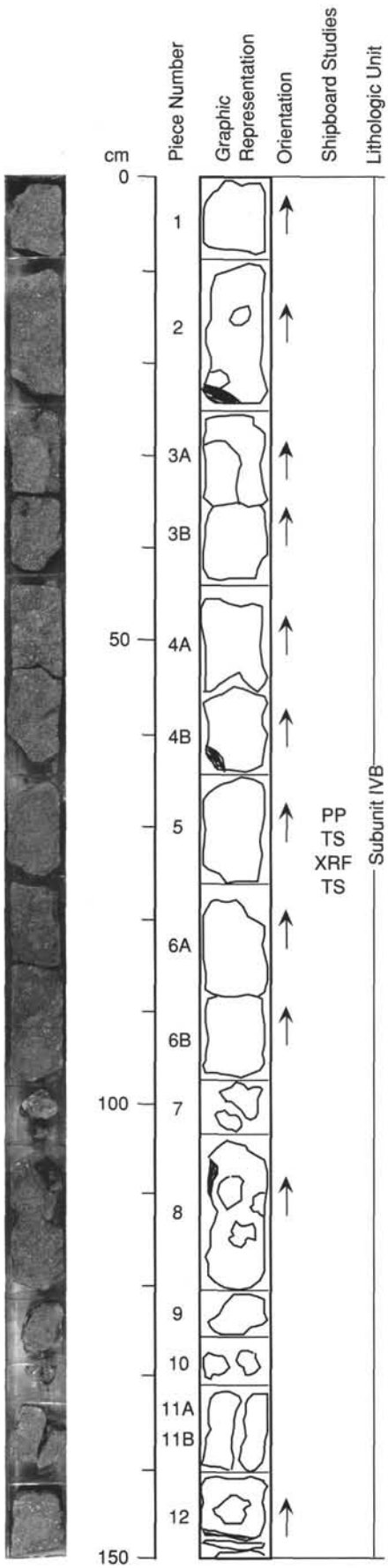


134-831B-71R-1

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–12

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 1–3 mm, euhedral.
Clinopyroxene - 5–10%, 0.5–2 mm, euhedral to subhedral.
Orthopyroxene - 1–2%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy, partially altered to greenish material.
VESICLES: 5–10%, 0.5–1 mm, irregular, random.
COLOR: Matrix greenish gray (5BG 4/1), clasts dark gray (10Y 3/1).
STRUCTURE: N/A.
ALTERATION: Part of the glass in clasts and matrix is moderately chloritized. Cavities are coated with zeolites.
VEINS/FRACTURES: Void space around clasts in Pieces 6 and 9A.
ADDITIONAL COMMENTS: Clasts make up about 25% of the whole section. Matrix is made of 1-5 mm size grains of crystals, rock fragments and alteration products filling the space between these grains. Plagioclase makes up 20–25% of the matrix.



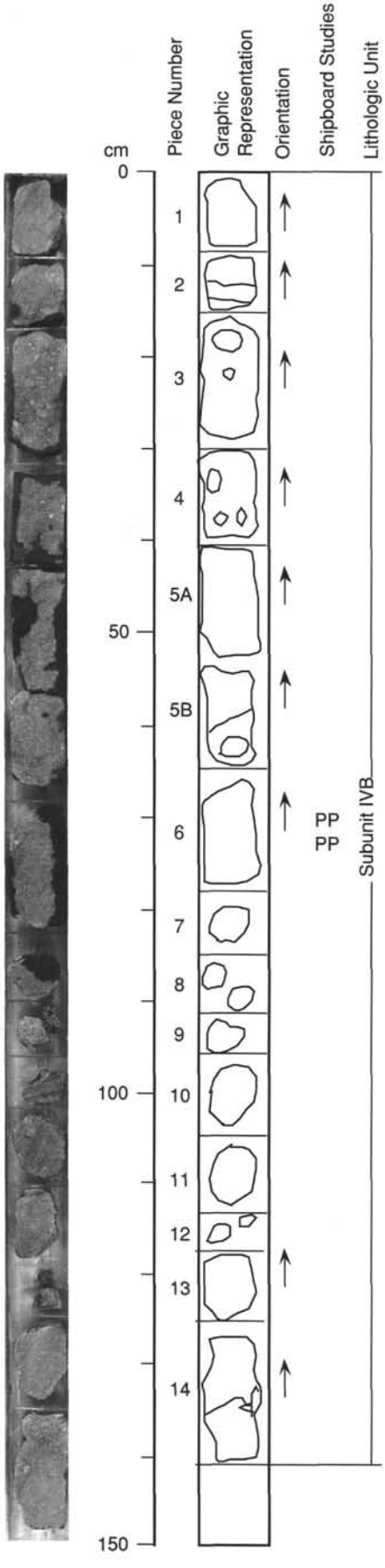
134-831B-71R-2

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–12

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 1–5 mm, euhedral, altered.
Clinopyroxene - 5–7%, 1–3 mm, euhedral to subhedral.
Orthopyroxene - 2–5%, 1 mm, euhedral to subhedral.
Magnetite - 1%, 0.5–1 mm, anhedral.
GROUNDMASS: Laths of plagioclase in a glassy, now devitrified, groundmass.
VESICLES: <1%, 1–2 mm, irregular, random. Filled with white non-calcareous minerals.
COLOR: Matrix dark greenish gray (5G 4/1), clasts black (5Y 2.5/1).
STRUCTURE: N/A.
ALTERATION: Matrix highly altered to green minerals.
VEINS/FRACTURES: 5%, 0.5–1 mm, irregular.
ADDITIONAL COMMENTS: Clast size ranges between 0.5 and 8 cm.

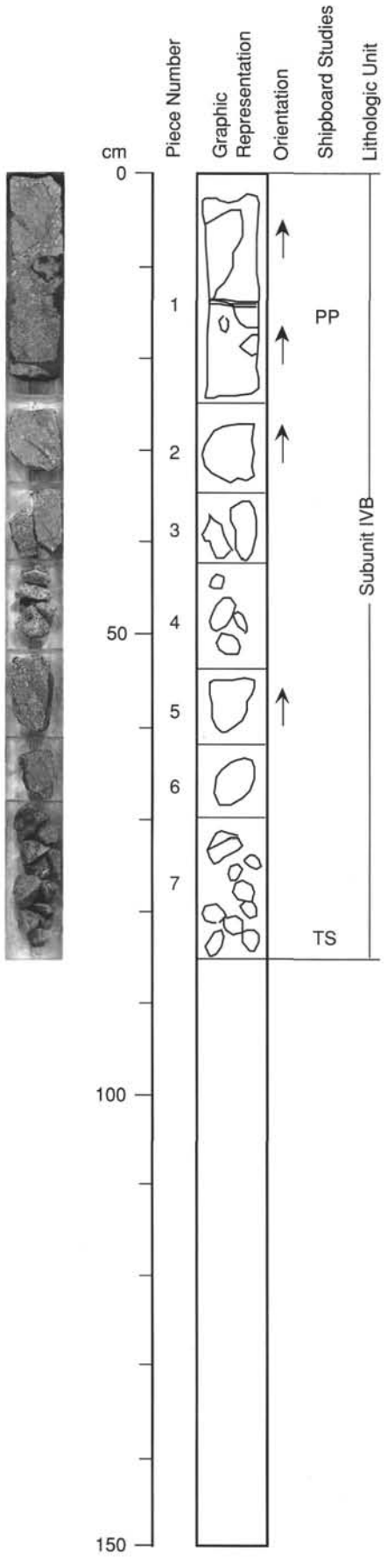
134-831B-71R-3



UNIT 1: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–14

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 1–5 mm, euhedral, altered.
Clinopyroxene - 5–8%, 1–2 mm, subhedral.
Orthopyroxene - 3–5%, 1 mm, subhedral.
Magnetite - <1%, 0.5–1 mm, anhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1%, 0.5–2 mm, irregular, random. Filled with zeolites(?).
COLOR: Matrix dark greenish gray (5G 4/1), clasts: dark gray (10Y 3/1).
STRUCTURE: N/A.
ALTERATION: Matrix altered to light green minerals.
VEINS/FRACTURES: <1%, <0.5 mm, random.

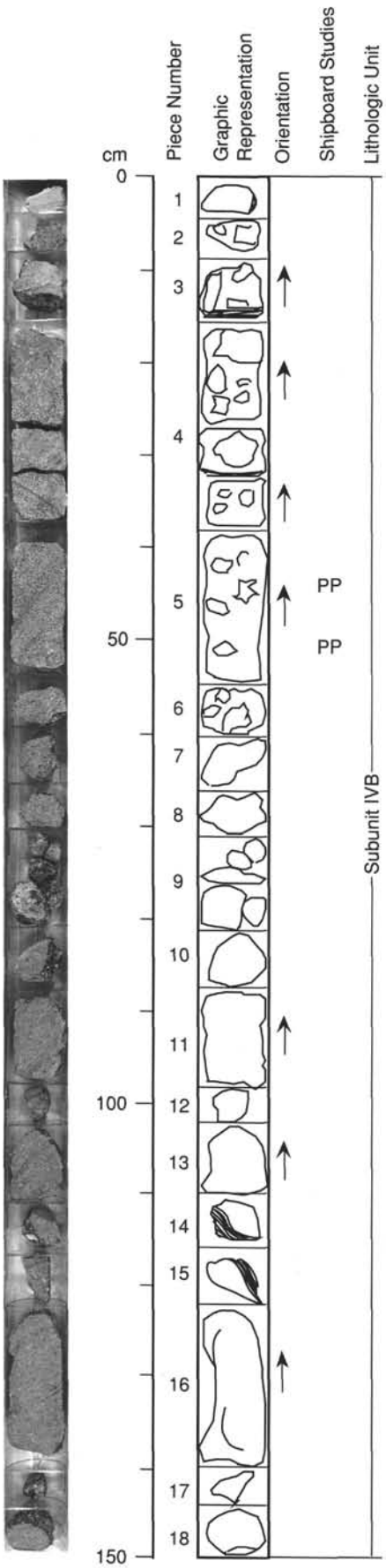


134-831B-71R-4

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–7

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 1–5 mm, euhedral to subhedral.
Clinopyroxene - 2–5%, 0.5–3 mm, euhedral.
Orthopyroxene - 2–5%, 0.5–3 mm, euhedral.
GROUNDMASS: Laths of plagioclase in a glassy matrix.
VESICLES: None.
COLOR: Matrix dark greenish gray (5G 4/1), clasts black (5Y 2.5/1).
STRUCTURE: N/A.
ALTERATION: Some clasts show a rim of 3–5 mm. This rim is composed of two layers: the inner side 1-2 mm thick, creamy colored and the outer side black.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Clast size ranges from 1 mm to 8 cm.



134-831B-72R-1

UNIT IV: CARBONATE

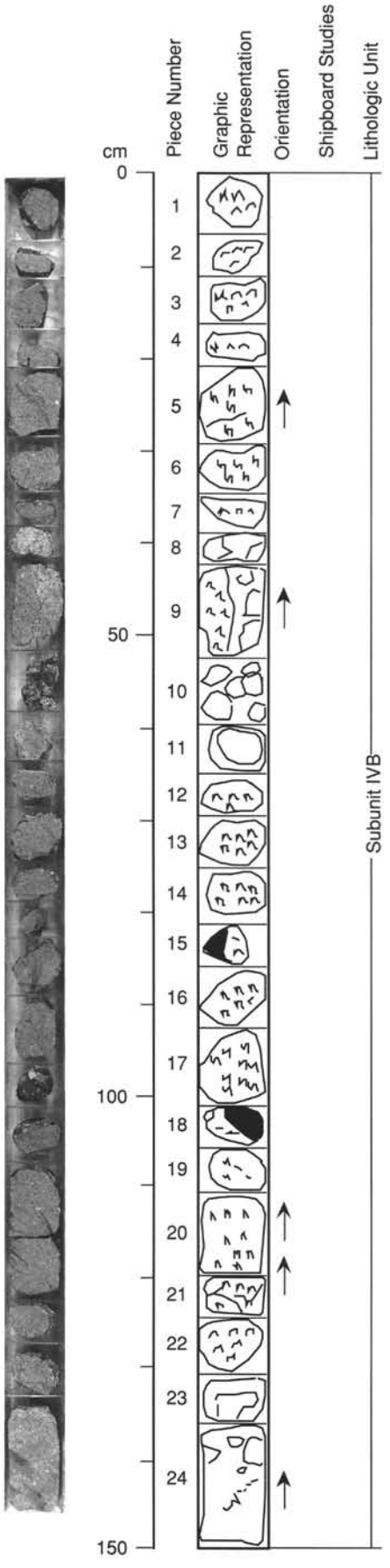
Piece 1

COLOR: White (2.5Y8/2).
ADDITIONAL COMMENTS: A carbonate piece possibly fallen into the bottom of the hole during drilling.

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 2–18

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 1–5 mm, euhedral, moderately altered.
Clinopyroxene - 5%, 1–3 mm, subhedral.
Orthopyroxene - 5%, 1–2 mm, subhedral, brown.
Magnetite - 1%, 0.5 mm, anhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: None.
COLOR: Matrix dark greenish gray (5G 4/1), clasts gray (7.5YR 5/1) to black (5Y 2.5/1).
STRUCTURE: N/A.
ALTERATION: Matrix is altered to green minerals (chlorite or epidote(?)). In clast, plagio-clases are stabilitized.
VEINS/FRACTURES: <1%, 1 mm, random, filled with green minerals.
ADDITIONAL COMMENTS: Matrix supported breccia. Clast size ranges between 0.1 and 8 cm.



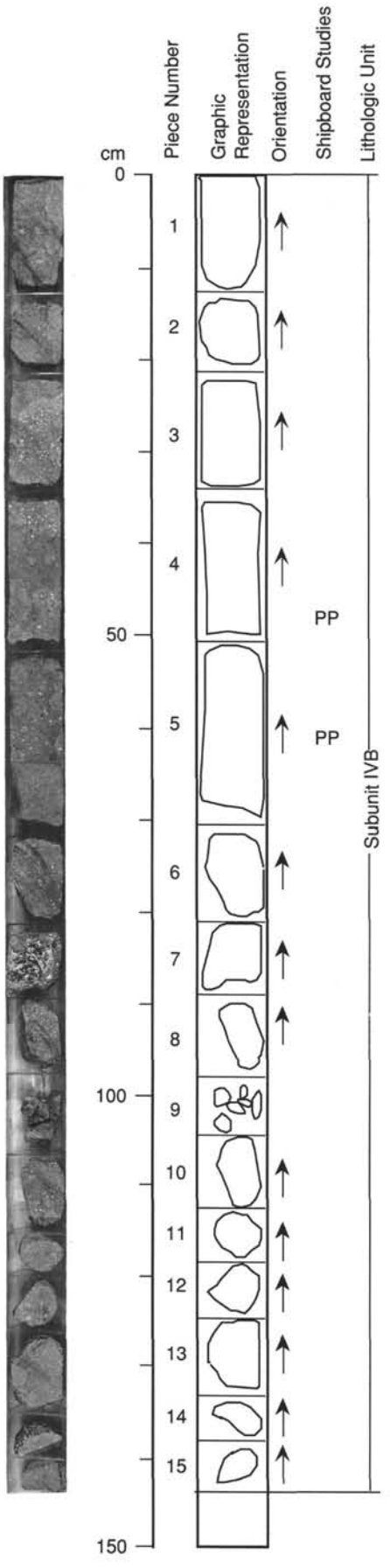
134-831B-72R-2

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–24

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–5 mm, euhedral, altered (sericite).
Clinopyroxene - 5%, 1–3 mm, subhedral, dark green.
Orthopyroxene - 5%, 1–2 mm, subhedral, brown.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: None.
COLOR: Very dark gray (10Y 3/1).
STRUCTURE: N/A.
ALTERATION: Matrix is highly altered to chlorite and green minerals?
VEINS/FRACTURES: <1%, <1 mm, random, filled with green minerals (zeolite(?)).
ADDITIONAL COMMENTS: Pieces 1–9 are andesitic lavas. Pieces 8–11 are matrix supported breccia. Clast size ranges between 1 and 5 mm.

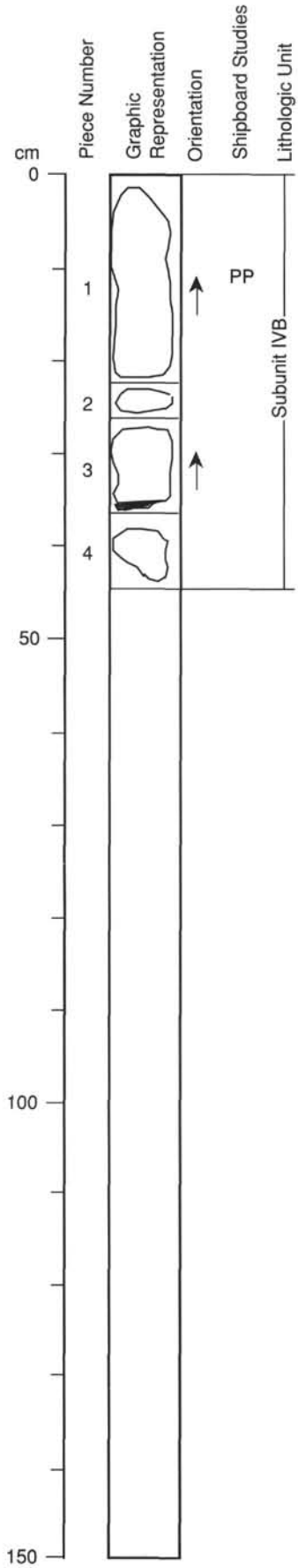


134-831B-72R-3

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–15

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 10–15%, 1–5 mm, euhedral.
Clinopyroxene - 5–10%, 0.5–2 mm, euhedral.
Orthopyroxene - 2–3%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: None.
COLOR: Matrix greenish gray (10G 4/2). Clast dark gray (10G 3/1).
STRUCTURE: N/A.
ALTERATION: Matrix and glass in clasts are moderately chloritized. Cavities are coated with zeolite.
VEINS/FRACTURES: <1%, 0.5–2 mm, random.
ADDITIONAL COMMENTS: Some clasts have 1–5 mm wide light colored corona. Percentage of clasts is around 40%.

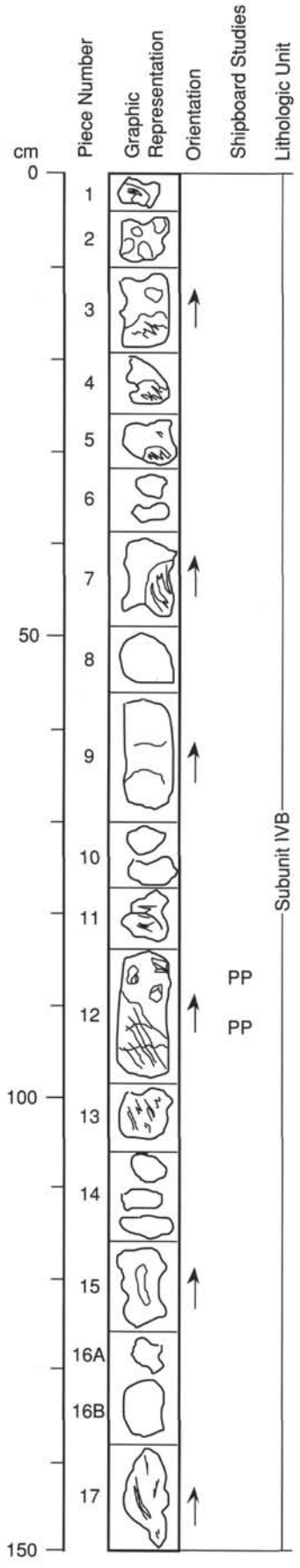


134-831B-72R-4

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–4

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 0.5–5 mm, euhedral to subhedral.
Orthopyroxene - 3–5%, 0.5–2 *mm, euhedral to subhedral.*
Clinopyroxene - 3–5%, 0.5–2 mm, euhedral to subhedral.
GROUNDMASS: Plagioclase laths in a glassy matrix.
VESICLES: <1%, 0.5–2 mm, irregular, random.
COLOR: Very dark gray (10Y 3/1).
STRUCTURE: N/A.
ALTERATION: None.
VEINS/FRACTURES: 1%, 0.5 mm, irregular.
ADDITIONAL COMMENTS: Only andesitic clasts occur in this section.



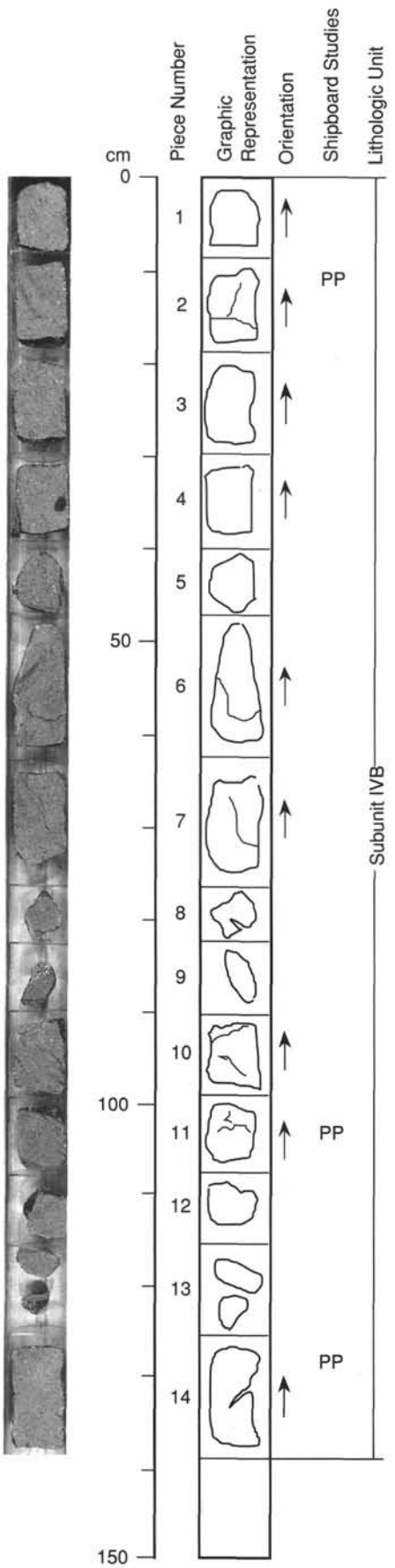
134-831B-73R-1

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–17

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 35%, <6 mm, euhedral, often glomeroporphyritic.
Clinopyroxene - 4%, 0.5–4 mm, subhedral to euhedral, dark green.
Orthopyroxene - 5%, 1–2 mm, subhedral, brown.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1-7%, <3 mm, elongate, round or irregular. Usually lined with very pale green (10G 7/2) material.
COLOR: Matrix light gray (5YR 7/1). Clasts bluish gray (5B 5/1).
STRUCTURE: Patchy, some flow banding.
ALTERATION: Relatively fresh but may be some alteration of plagioclase to sericite.
VEINS/FRACTURES: 2%, <1 mm, irregular, filled with white material, possibly zeolites.
ADDITIONAL COMMENTS: These are andesite or basaltic andesite clasts forming part of a breccia. Extensive coating of very pale green to pale green (10G 7/2) secondary mineral, probably zeolite. The breccia matrix is composed of very fine-grained subangular to subrounded fragments. The larger pieces (2–8 mm) have slightly coarser grain sizes and are white in color. The white fragments are enclosed in a greenish matrix which is probably composed of alteration products of the glass and of the rims of the clasts.

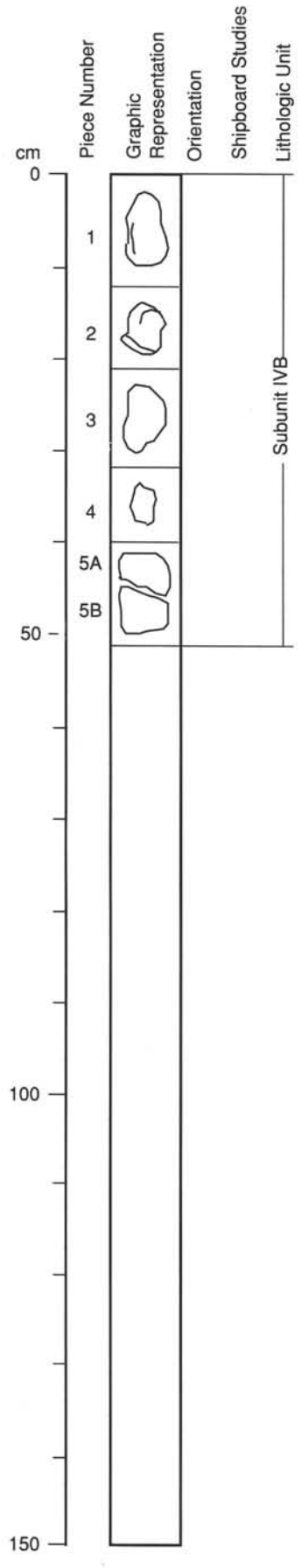


134-831B-73R-2

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–14

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30–35%, <6 mm, euhedral, often glomeroporphyritic.
Orthopyroxene - 5%, 1–2 mm, subhedral, brown.
Clinopyroxene - 4%, 0.5–4 mm, subhedral, dark green.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, <3 mm, elongate to rounded or irregular. Usually lined with very pale green (10G 7/2) material.
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy, some flow banding.
ALTERATION: Relatively fresh but there may be some alteration of plagioclase to sericite and pyroxenes to chlorite.
VEINS/FRACTURES: 2–3%, <1 mm, irregular, filled with white material, possibly zeolite. Some fracturing.
ADDITIONAL COMMENTS: The above refers to the more homogeneous andesite clasts forming part of a breccia. The clasts are commonly coated by a very pale green to pale green (10G 7/2) secondary mineral, which is probably a zeolite. The breccia matrix is composed of very fine-grained subangular to subrounded fragments. The white fragments are enclosed in a greenish matrix which is probably composed of alteration products of the glass and of the rims of the clasts.

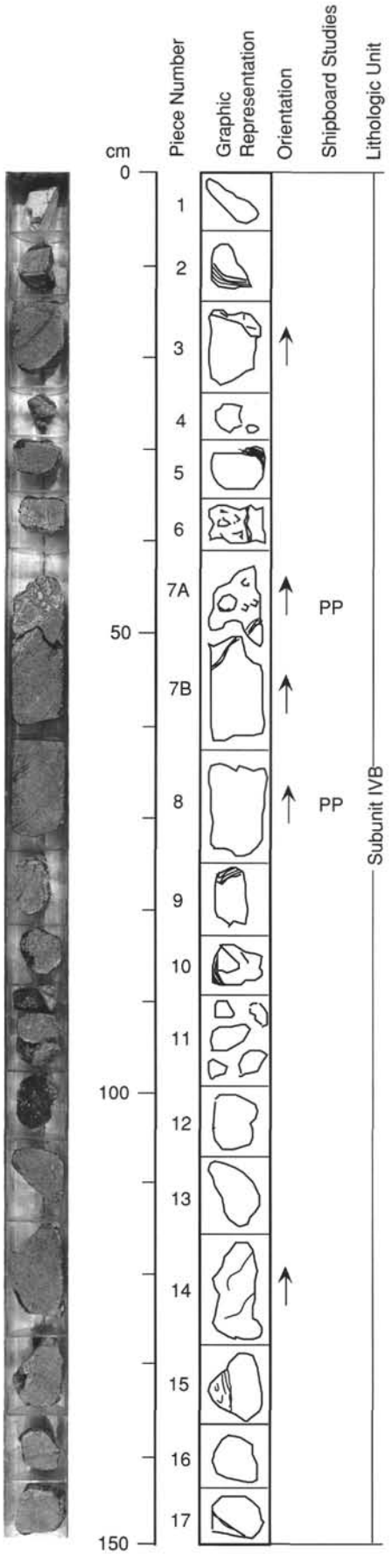


134-831B-73R-3

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–5

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 35%, <6 mm, euhedral, often glomeroporphyritic.
Orthopyroxene - 5%, 1–2 mm, subhedral, brown.
Clinopyroxene - 4%, 0.5–4 mm, subhedral, dark gray.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, <3 mm, elongate to rounded or irregular. Usually lined with pale green (10G 7/2) material.
COLOR: Matrix light gray (YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy; some flow banding.
ALTERATION: Relatively fresh but there may be some alteration of plagioclase to sericite and pyroxene to chlorite.
VEINS/FRACTURES: 2–3%, <1 mm, irregular, filled with white material, possibly zeolite. Some fracturing.
ADDITIONAL COMMENTS: The above refers to the more homogeneous andesite clasts forming part of a breccia. The clasts are commonly coated with a very pale green to pale green (10G 7/2) secondary mineral which is probably a zeolite. The breccia matrix is composed of very fine-grained subangular to subrounded fragments. The larger pieces (2–8 mm), which are white in color, have slightly coarser grain sizes. The white fragments are enclosed in a greenish matrix which is probably composed of alteration products of the glass and of the rim of the clasts.

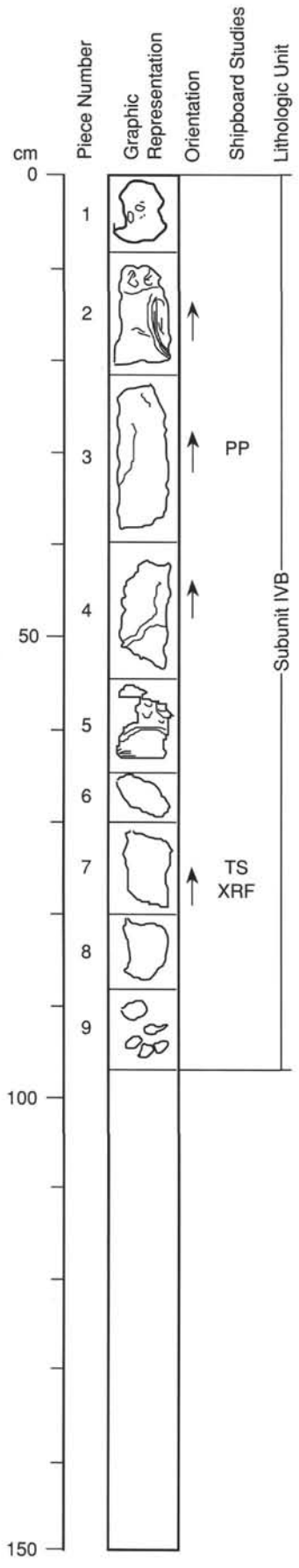


134-831B-74R-1

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 2–17

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 35%, <6 mm, euhedral, often glomeroporphyritic.
Orthopyroxene - 5%, 1–2 mm, subhedral, brown.
Clinopyroxene - 4%, 0.5–4 mm, subhedral, dark green.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, <3 mm, elongate to rounded or irregular. Usually lined with very pale green (10G 7/2) material.
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy; some flow banding.
ALTERATION: Relatively fresh but there may be some alteration of plagioclase to sericite and pyroxenes to chlorite.
VEINS/FRACTURES: 2–3%, <1 mm, irregular, filled with white material, possibly zeolite. Some fracturing.
ADDITIONAL COMMENTS: The above refers to the more homogeneous andesite clasts, forming part of a breccia. The clasts are commonly coated with a very pale to pale green (10G 7/2) secondary mineral, which is probably a zeolite. The breccia matrix is composed of very fine-grained subangular to subrounded fragments. The larger pieces (2–8 mm), which are white in color, have slightly coarser grain sizes. The white fragments are enclosed in a greenish matrix which is probably composed of alteration products of the glass and of the rims of the clasts.

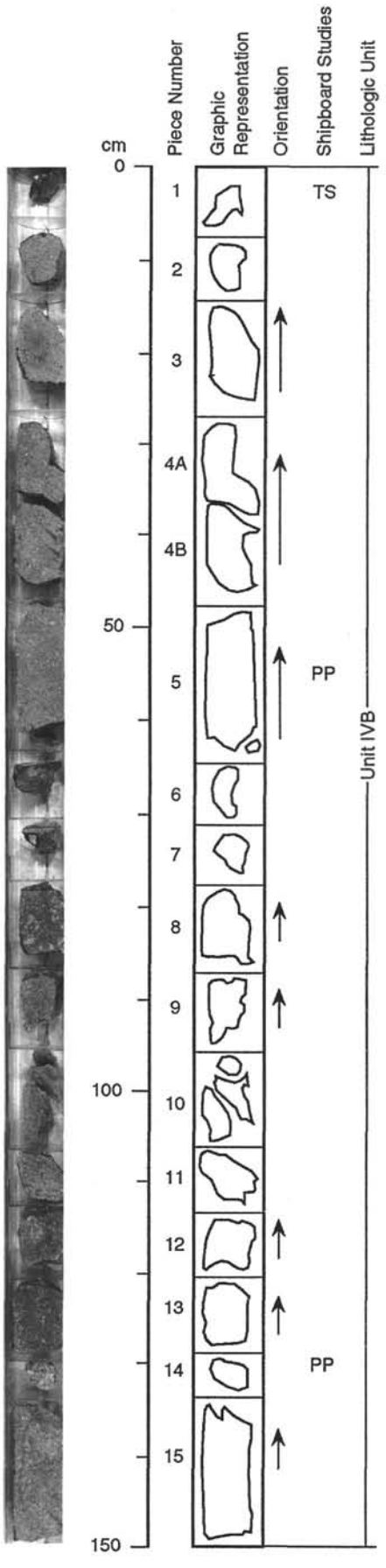


134-831B-74R-2

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–9

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 35%, <6 mm, euhedral, often glomeroporphyritic.
Orthopyroxene - 5%, 1–2 mm, subhedral, brown.
Clinopyroxene - 4%, 0.5–4 mm, subhedral, dark green.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, 3 mm, elongate to rounded or irregular. Usually lined with very pale green material (10G 7/2).
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy, some flow banding.
ALTERATION: Relatively fresh but there may be some alteration of plagioclase to sericite and pyroxenes to chlorite.
VEINS/FRACTURES: 2–3%, <1 mm, irregular, filled with white material, possibly zeolite. Some fracturing.
ADDITIONAL COMMENTS: The above refers to the more homogeneous andesite clasts, forming part of a breccia. The clasts are commonly coated with a very pale to pale green (10G 7/2) secondary mineral, which is probably zeolite. The breccia matrix is composed of very fine-grained subangular to subrounded fragments. The larger pieces (2–8 mm), which are white in color, have slightly coarser grain size. The white fragments are enclosed in a greenish matrix which is probably composed of alteration products of the glass and of the rims of the clasts.

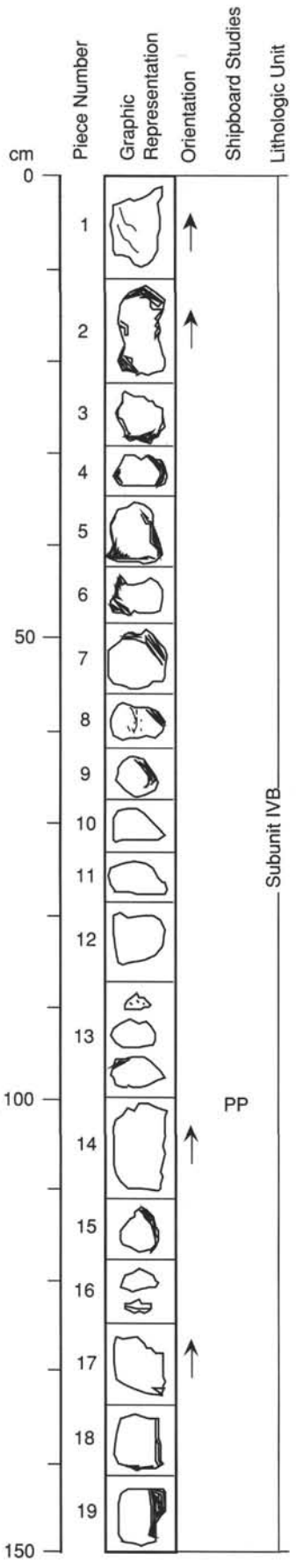


134-831B-75R-1

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–15

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30%, <5 mm, euhedral, sometimes glomeroporphyritic.
Orthopyroxene - 5%, 1–2 mm, subhedral, brown.
Clinopyroxene - <3%, 0.5–3 mm, subhedral, dark green.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–7%, <3 mm, elongate to irregular, random. Lined with a pale green (10G 7/2) secondary minerals.
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Some pieces (e.g., 8, 9, and 12) are rather patchy or mottled.
ALTERATION: Probably some alteration of plagioclase to sericite and of pyroxenes to chlorite. Hematite patches in Piece 8.
VEINS/FRACTURES: 2–4%, <1 mm, irregular, filled with white minerals, probably zeolite.
ADDITIONAL COMMENTS: Although there are no obvious signs of matrix in this section the pieces have a close resemblance to those in Cores 134-831B-73R and -74R. They may still be clasts or possibly represent a thin flow within the brecciated sequence.

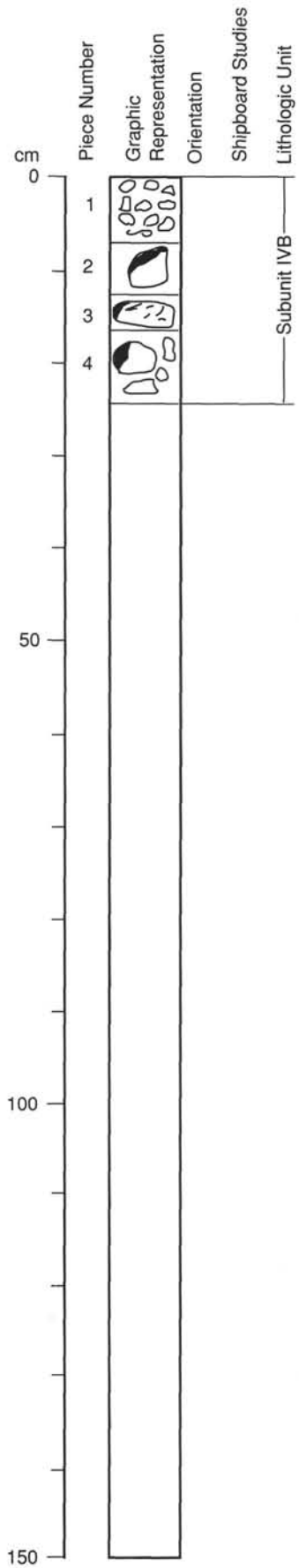


134-831B-75R-2

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–19

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30%, <5 mm, euhedral, sometimes glomeroporphyritic.
Orthopyroxene - 5%, 1–2 mm, subhedral, brown.
Clinopyroxene - 3%, 0.5–3 mm, subhedral, dark green.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–7%, <3 mm, elongate to irregular, random. Lined with a pale green (10G 7/2) secondary mineral.
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy or mottled.
ALTERATION: Probably some alteration of plagioclase to sericite and of pyroxenes to chlorite.
VEINS/FRACTURES: 3-5%, <1 mm, irregular, filled with white mineral, probably zeolite.
ADDITIONAL COMMENTS: Although there are no obvious signs of matrix in this section the pieces have a close resemblance to those in Cores 134-831B-73R and -74R. They may still be clasts or possibly represent a thin flow within the brecciated sequence.



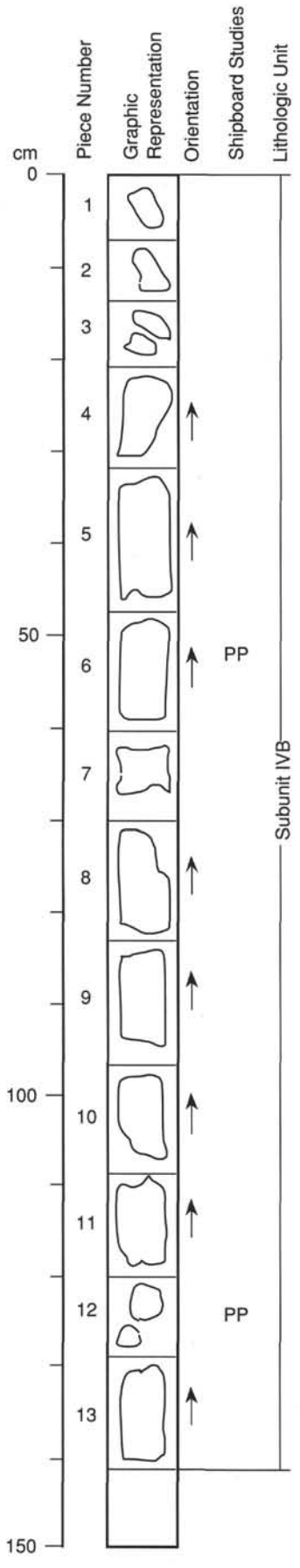
134-831B-75R-3

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–4

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30%, <5 mm, euhedral, sometimes glomeroporphyritic.
Orthopyroxene - 5%, 1–2 mm, subhedral, brown.
Clinopyroxene - 3%, 0.5–3 mm, subhedral, dark green.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, <3 mm, elongate to irregular, random. Lined with a pale green (10G 7/2) secondary mineral.
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy or mottled.
ALTERATION: Probably some alteration of plagioclase to sericite and of pyroxenes to chlorite.
VEINS/FRACTURES: 3–4%, <1 mm, irregular, filled with white mineral, probably zeolite.
ADDITIONAL COMMENTS: Although there are no obvious signs of matrix in this section the pieces have a close resemblance to those in Core 134-831B-73R and -74R. They may still be clasts or possibly represent a thin flow within the brecciated sequence.

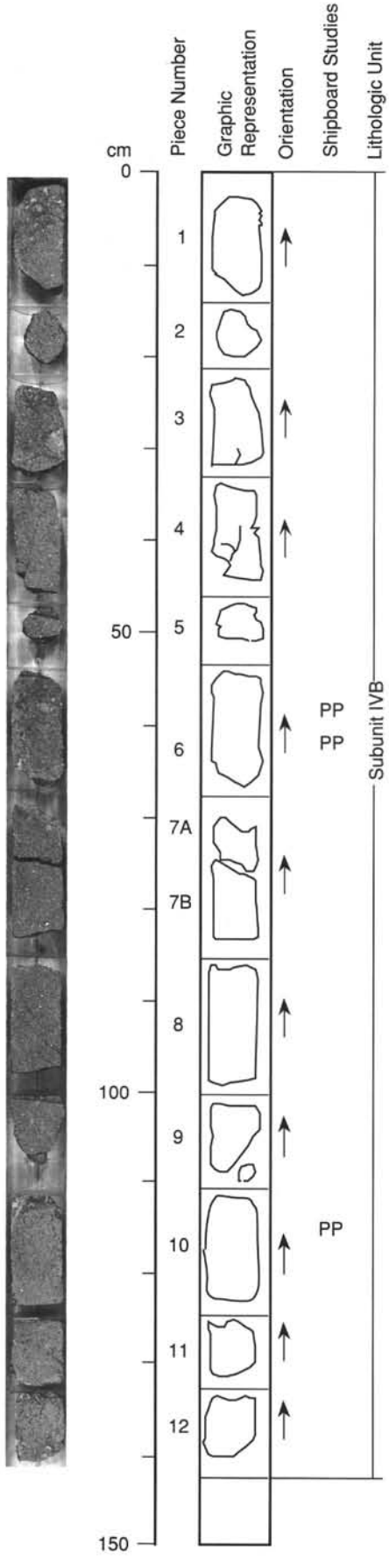


134-831B-76R-1

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–13

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30%, <7 mm, euhedral, sometimes glomeroporphyritic.
Orthopyroxene - 3%, 1–2 mm, subhedral, brown.
Clinopyroxene - 2%, 0.5–3 mm, subhedral, dark gray.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, <3 mm, elongate to irregular, random. Lined with a pale green (10G 7/2) secondary mineral.
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy and mottled, sometimes streaked.
ALTERATION: Plagioclase altered to sericite and pyroxenes to chlorite.
VEINS/FRACTURES: 3–4%, <1 mm, irregular, filled with white mineral, probably zeolite.
ADDITIONAL COMMENTS: The above description applies to the rounded and wispy andesitic clasts which make up about 40% of this section. The breccia matrix is highly altered and consists of crystal fragments from the clasts together with devitrified glass, chlorite, clay minerals and hematite, and is intensely zeolitized. Note that the matrix is more patchy and altered than in Cores 134-831B-73R and -74R.

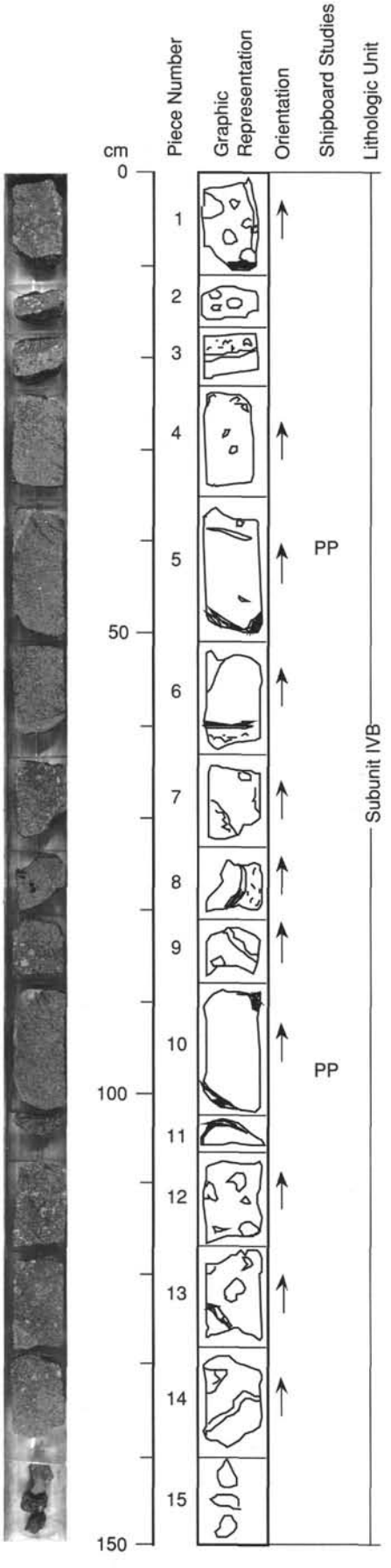


134-831B-76R-2

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–12

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30%, <7 mm, euhedral, sometimes glomeroporphyritic.
Orthopyroxene - 3%, 1–2 mm, subhedral, brown.
Clinopyroxene - 2%, 0.5–3 mm, subhedral, dark green.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, <3 mm, elongate to irregular, random. Lined with a pale green (10G 7/2) secondary mineral.
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy and mottled, sometime streaked.
ALTERATION: Plagioclase altered to sericite and pyroxenes to chlorite.
VEINS/FRACTURES: 1–2%, <1 mm, irregular, filled with white mineral, probably zeolite.
ADDITIONAL COMMENTS: The above description applies to andesitic clasts, some of which are rounded and wispy. They make up about 70% of the material in this section. The breccia matrix is highly altered and consists of crystal fragments from the clasts together with the devitrified glass, chlorite, clay minerals and hematite, and is intensely zeolitized. Note that the matrix is more patchy and altered than in Cores 134-831B-73R and -74R.

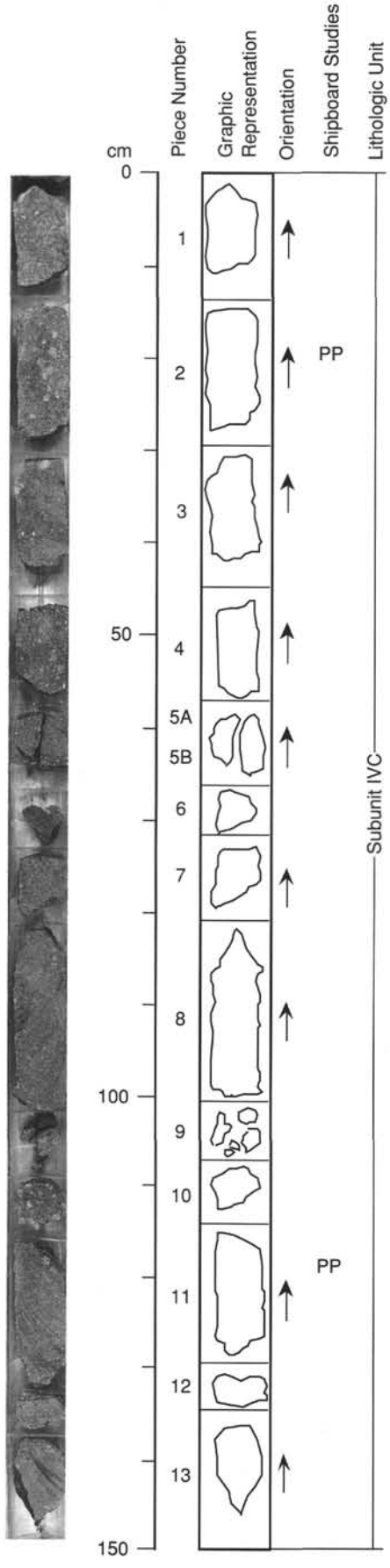


134-831B-76R-3

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVB: Andesitic hyalo-breccia with green matrix

Pieces 1–15

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30%, <7 mm, euhedral, sometimes glomeroporphyritic.
Orthopyroxene - 3%, 1–2 mm, subhedral, brown.
Clinopyroxene - 2%, 0.5–3 mm, subhedral, dark green.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, <3 mm, elongate to irregular, random. Lined with pale green (10G 7/2) secondary mineral.
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy to mottled, sometimes streaked.
ALTERATION: Plagioclase altered to sericite and pyroxenes altered to chlorite.
VEINS/FRACTURES: 2–3%, <1 mm, irregular, filled with white material, probably zeolite.
ADDITIONAL COMMENTS: The above description applies to the andesitic clasts, some of which are rounded and wispy. They make up about 50% of this section. The breccia matrix is highly altered and consists of crystal fragments from the clasts together with devitrified glass, chlorite, clay minerals and hematite, and is intensely zeolitized.



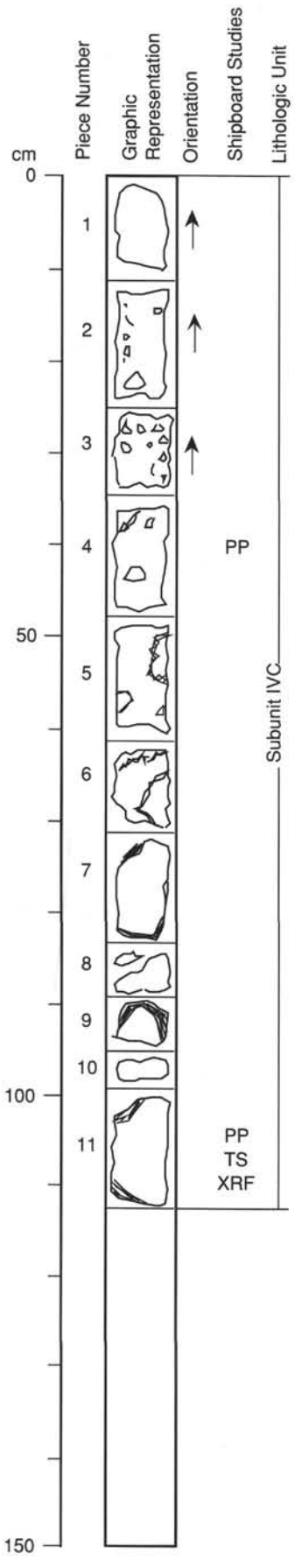
134-831B-76R-4

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–13

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30%, <7 mm, euhedral, sometimes glomeroporphyritic.
Orthopyroxene - 3%, 1–2 mm, subhedral, brown.
Clinopyroxene - 2%, 0.5–3 mm, subhedral, dark green.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, <3 mm, elongate to irregular, random. Lined with a pale green (10G 7/2) secondary mineral.
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy and mottled, sometimes streaked.
ALTERATION: Plagioclase altered to sericite and pyroxenes to chlorite.
VEINS/FRACTURES: 2–3%, <1 mm, irregular, filled with white mineral, probably zeolite.
ADDITIONAL COMMENTS: The above description applies to the rounded and wispy andesitic clasts which make up about 60% of this section. The breccia matrix is highly altered and consists of crystal fragments from the clasts together with devitrified glass, chlorite, clay minerals and hematite, and is intensely zeolitized.

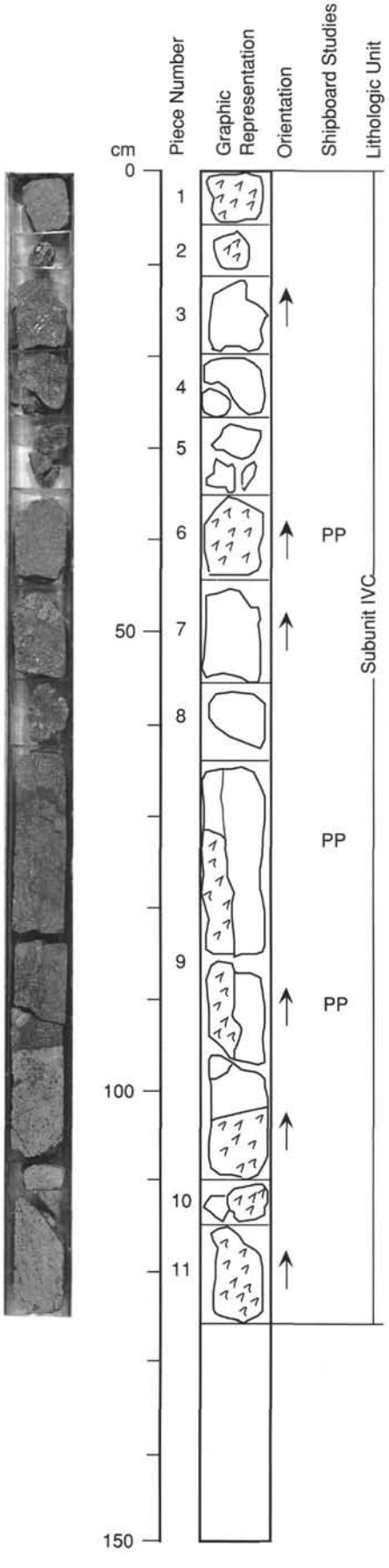


134-831B-76R-5

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–11

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30%, <7 mm, euhedral, sometimes glomeroporphyritic.
Orthopyroxene - 3%, 1–2 mm, subhedral, brown.
Clinopyroxene - 2%, 0.5–3 mm, subhedral, dark green.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, <3 mm, elongate to irregular, random. Lined with pale green (10G 7/2) secondary mineral.
COLOR: Matrix light gray (5YR 7/1), clasts bluish gray (5B 5/1).
STRUCTURE: Patchy and mottled, sometimes streaked.
ALTERATION: Plagioclase altered to sericite and pyroxenes to chlorite.
VEINS/FRACTURES: 1–2%, <1 mm, irregular, filled with white mineral, probably zeolite.
ADDITIONAL COMMENTS: The above description applies to the rounded and wispy andesitic clasts, which make up about 65% of the total in this section. Pieces 1–5 are almost exclusively matrix material. The matrix is coarse-sand to silt-sized. It is composed of crystal fragments from the clasts, pieces of clast groundmass, fragments of glass, hematite, zeolites and alteration products such as chlorite and clay minerals.



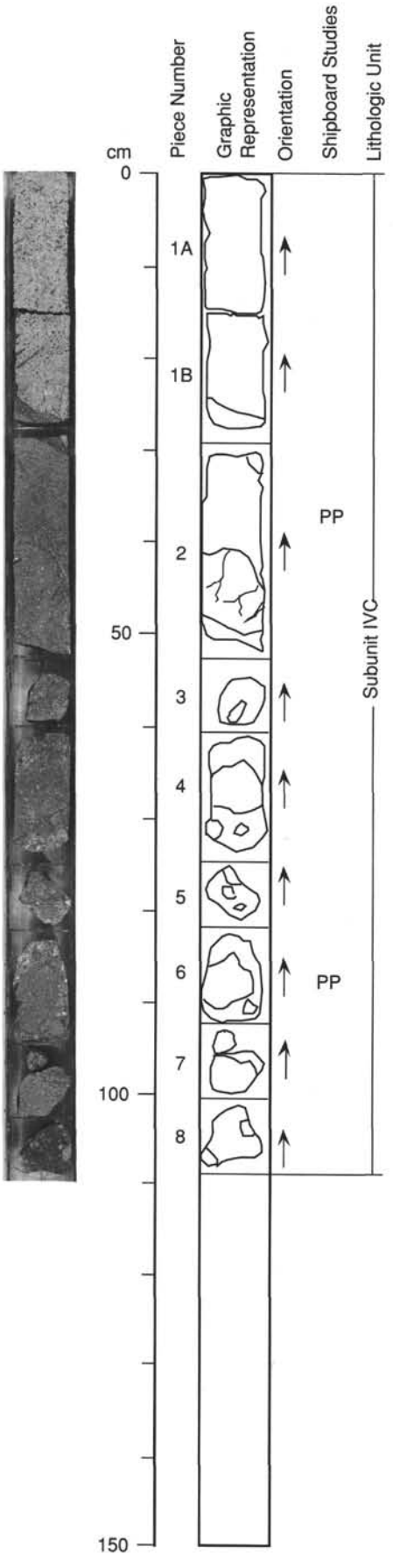
134-831B-77R-1

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–11

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–5 mm, euhedral, slightly altered.
Clinopyroxene - 5%, 1–3 mm, subhedral, dark greenish.
Orthopyroxene - 5%, 1–2 mm, euhedral to subhedral, brown.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1%, 1–3 mm, irregular, abundant in clasts in Pieces 10 and 11.
COLOR: Matrix dark greenish gray (5G 4/1), clasts dark gray (10Y 3/1) .
STRUCTURE: N/A.
ALTERATION: Matrix is highly altered to chlorite, greenish clay minerals and hematite.
VEINS/FRACTURES: <1%, <1 mm, random, filled with white mineral (zeolite(?)).
ADDITIONAL COMMENTS: Breccia composed of very fine-grained, subrounded fragments and sand. Some grains are oxidized (hematite(?)).

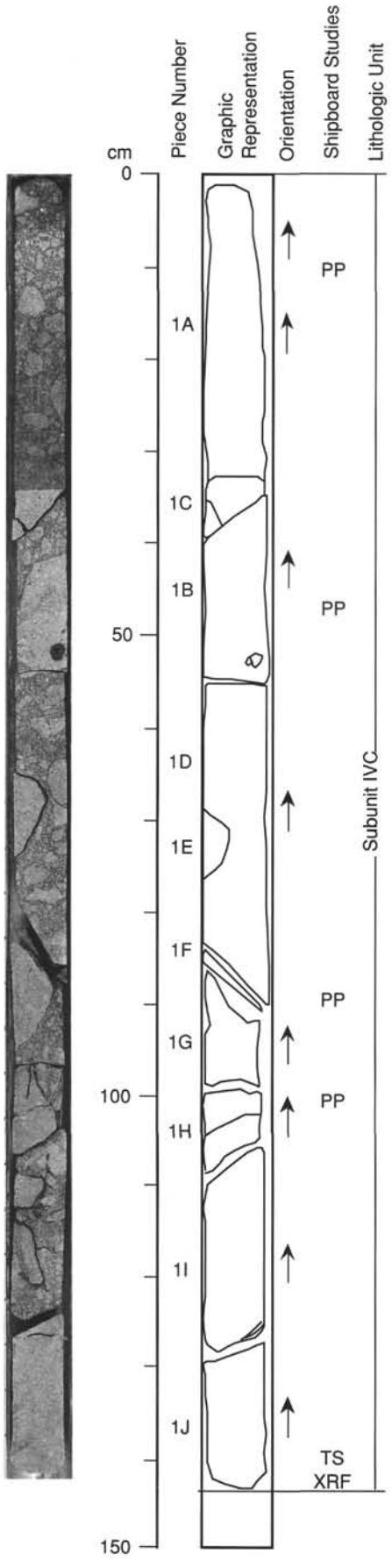


134-831B-77R-2

UNIT IV: ANDESITIC BRECCIA.
SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–8

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 10–15%, 1–5 mm, euhedral.
Clinopyroxene - 7–10%, 0.5–4 mm, subhedral.
Orthopyroxene - 2–5%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: Rare, irregular, 10% vesicles, partly filled with chlorite-like greenish material.
COLOR: Matrix light gray (10G6/1), greenish gray (5GY 4/1) for clasts in Pieces 1A and 1B, dark greenish gray (5G 4/1) in Pieces 2, 4, 6 and 7.
STRUCTURE: N/A.
ALTERATION: Moderate for clasts in Pieces 1A and 1B, slight in other clasts. Pyroxenes are partly altered to chlorite and plagioclase to sericite. Groundmass consists of light greenish gray alteration products. Hematite and zeolite are found in matrix.
VEINS/FRACTURES: <1%, veins in Piece 2, <1mm, irregular, filled with white material (inner part-zeolites?) and greenish material (outer part-chlorite?).
ADDITIONAL COMMENTS: Clasts make up 60% of this section. Matrix is made up of 1–4 mm subangular fragments of crystals and lithics. Spaces are filled with light gray and greenish alteration products, possibly zeolite and chlorite. Fragments include plagioclase, clinopyroxene, orthopyroxene, greenish gray glass, oxidized reddish rock fragments and hematite. Some crystals are altered, others are completely fresh.



134-831B-77R-3

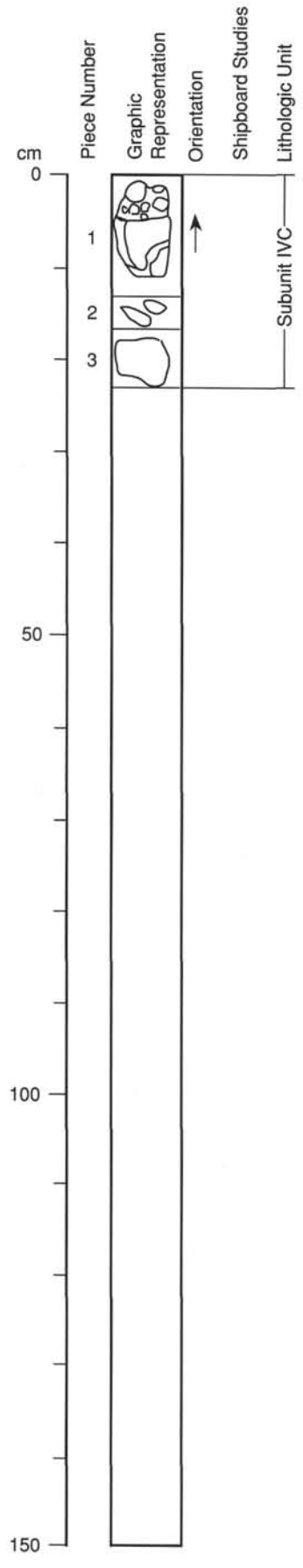
UNIT IV: ANDESITIC BRECCIA.

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1A–1J

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20–25%, 0.3– 3 mm, euhedral, altered to sericite.
Clinopyroxene - 5%, 0.3 –3 mm, subhedral.
Magnetite - 1%, ≤0.3 mm, anhedral.
GROUNDMASS: Microcrystalline with plagioclase laths and altered minerals.
VESICLES: 1%, <2 mm, irregular, abundant in the large clasts in Piece 1B (10%). They are filled with white and green minerals.
COLOR:
Piece 1A, 1D to 1J dark greenish gray (5G4/1).
Piece 1B, greenish gray (5BG 4/1).
STRUCTURE: N/A.
ALTERATION: Clasts and matrix are highly altered.
VEINS/FRACTURES: <1%, <1 mm, random, filled with green alteration minerals.
ADDITIONAL COMMENTS:
Piece 1A: clasts from 0.5 to 3 cm in size.
Pieces 1B to 1J: clasts from 1 cm to 10 cm in size.

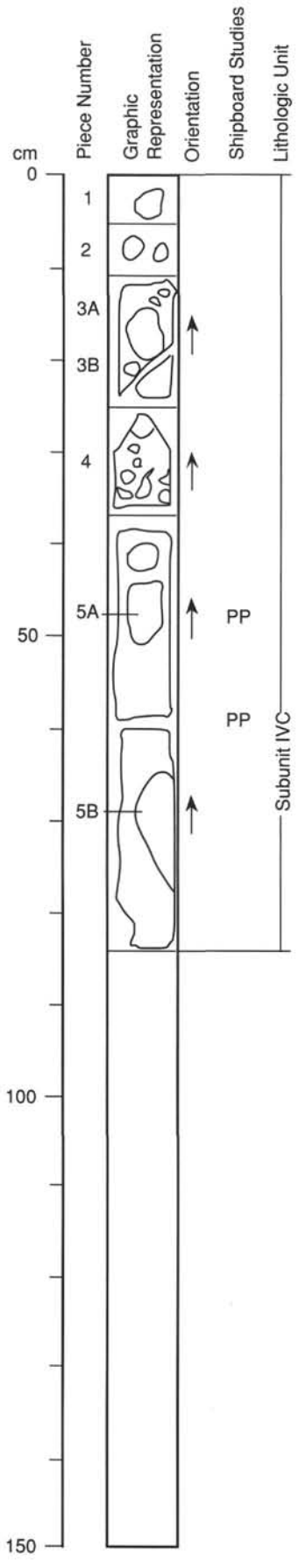
134-831B-77R-4



UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–3

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20-25%, 0.3– 3 mm, euhedral, altered to sericite.
Clinopyroxene - 5%, 0.3–3 mm, subhedral.
Magnetite - 1%, ≤0.3 mm, anhedral.
GROUNDMASS: Mostly microcrystalline with plagioclase laths and altered minerals.
COLOR: Greenish gray (5BG 4/1) to dark greenish gray (5G4/1).
STRUCTURE: N/A.
ALTERATION: None.
VEINS/FRACTURES: <1%, 1 mm, random. Veins in the clasts of Piece 3, 1 mm width, transparent, possibly either zeolite or silica mineral. Fractures in Piece 1.
ADDITIONAL COMMENTS: Matrix supported breccia.



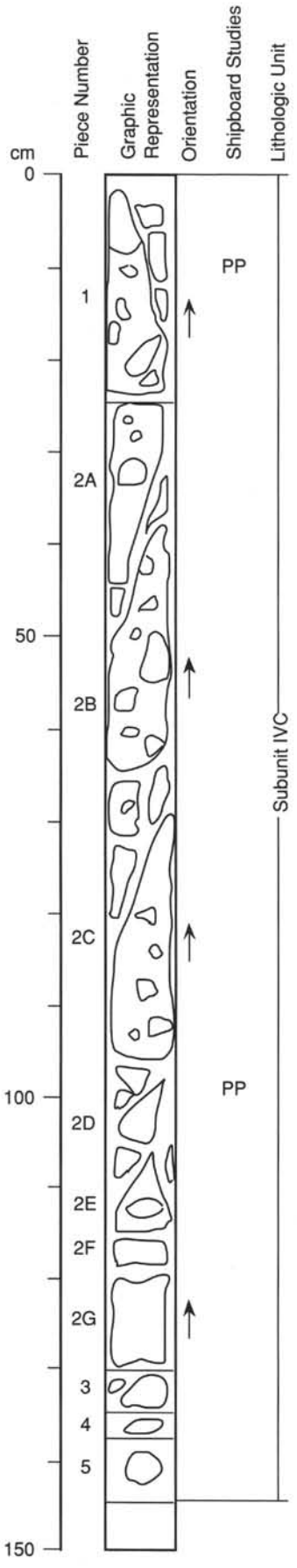
134-831B-78R-1

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–5

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–5 mm, euhedral, altered to sericite.
Clinopyroxene - 5%, 1–3 mm, subhedral, partly altered to chlorite.
Magnetite - 1%, 0.1–0.3 mm, anhedral.
GROUNDMASS: Mostly microcrystalline. Plagioclase laths altered to sericite.
VESICLES: None.
COLOR: Greenish gray (5G5/1).
STRUCTURE: N/A.
ALTERATION: Clasts and matrix are highly altered.
VEINS/FRACTURES: <1%, <1 mm, irregular.
ADDITIONAL COMMENTS: In the clasts orthopyroxene is absent and magnetite is more abundant. Clasts size range between 0.1 and 10 cm.

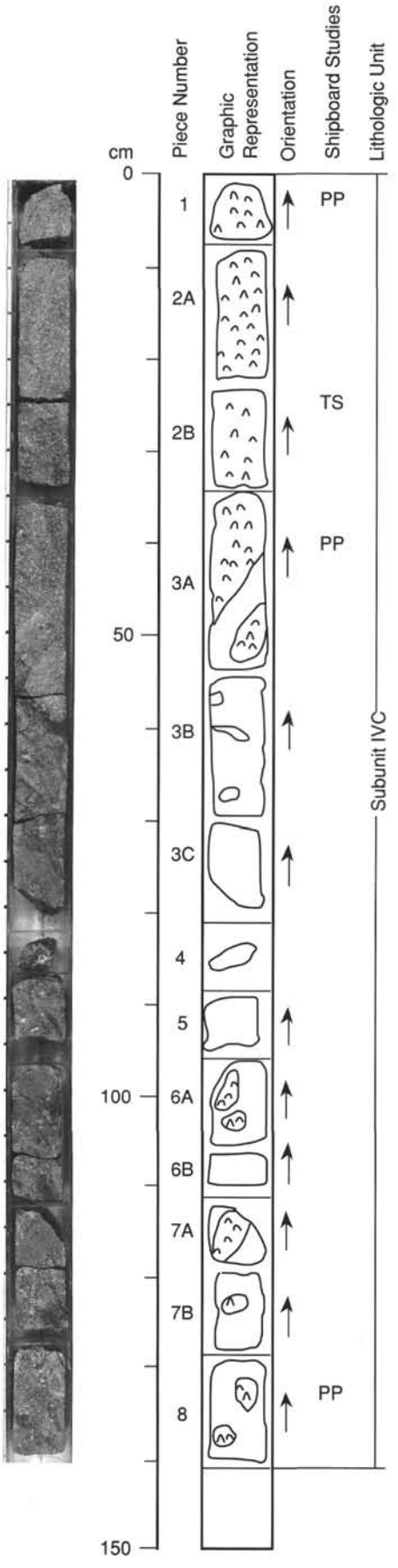


134-831B-79R-1

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–5

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 0.5–4 mm, euhedral to subhedral, altered to sericite.
Clinopyroxene - 3%, 0.5–2 mm, subhedral.
Magnetite - 1%, 0.3 mm, anhedral.
GROUNDMASS: Microcrystalline with plagioclase, clinopyroxene and magnetite.
VESICLES: 1%, 0.3 mm, irregular. Piece 3 shows 3% of vesicles filled by calcite. In other pieces, calcite is less abundant .
COLOR: Matrix dark greenish gray (5G 4/1), clasts greenish gray (5BG 4/1) to bluish gray (5B 5/1).
STRUCTURE: N/A.
ALTERATION: Groundmass and phenocrysts in clasts as well as matrix are highly altered to chlorite, sericite and calcite.
VEINS/FRACTURES: None.



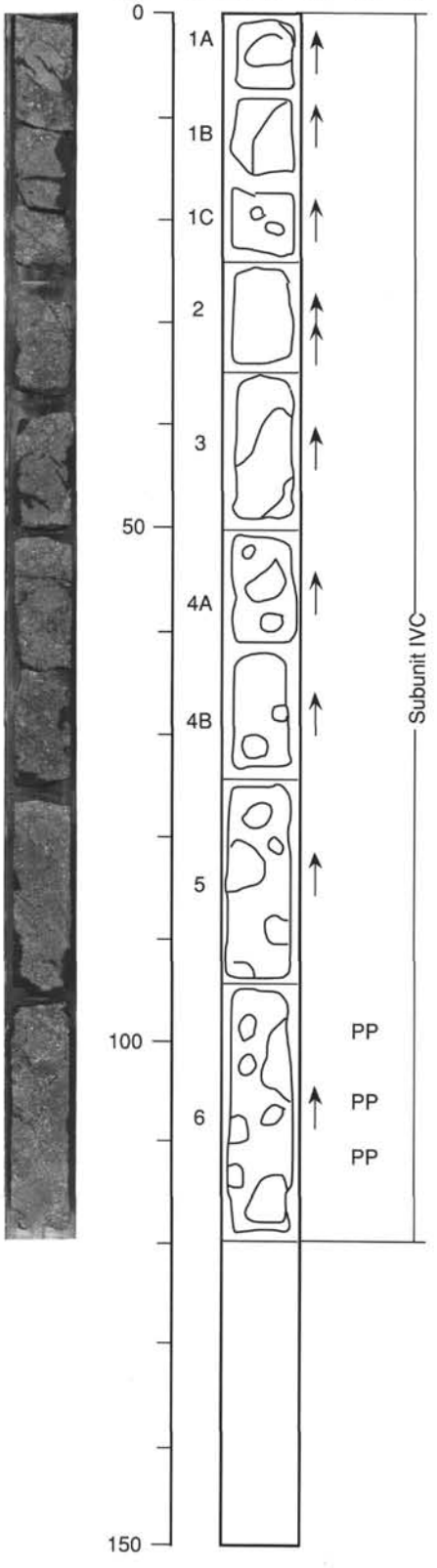
134-831B-79R-2

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–8

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30%, 0.5–5 mm, euhedral to subhedral, highly altered.
Clinopyroxene - 5%, 0.5–3 mm, subhedral.
Magnetite - <1%, maximum 0.3 mm, anhedral, partly oxidized.
GROUNDMASS: Microcrystalline to glassy. Plagioclase laths and strongly oxidized dusky red (10R 3/3) hematite are visible.
VESICLES: 1%, 0.2–0.5 mm, irregular, filled by silica minerals and calcite.
COLOR: Grayish red (10R 4/2).
STRUCTURE: N/A.
ALTERATION: Groundmass strongly oxidized and plagioclase altered to sericite.
VEINS/FRACTURES: <1%, <0.5 mm, filled by green minerals.
ADDITIONAL COMMENTS: Pieces 1, 2A and 2B and part of 3A are different fragments of the same decimeter size clast of porphyritic andesite.

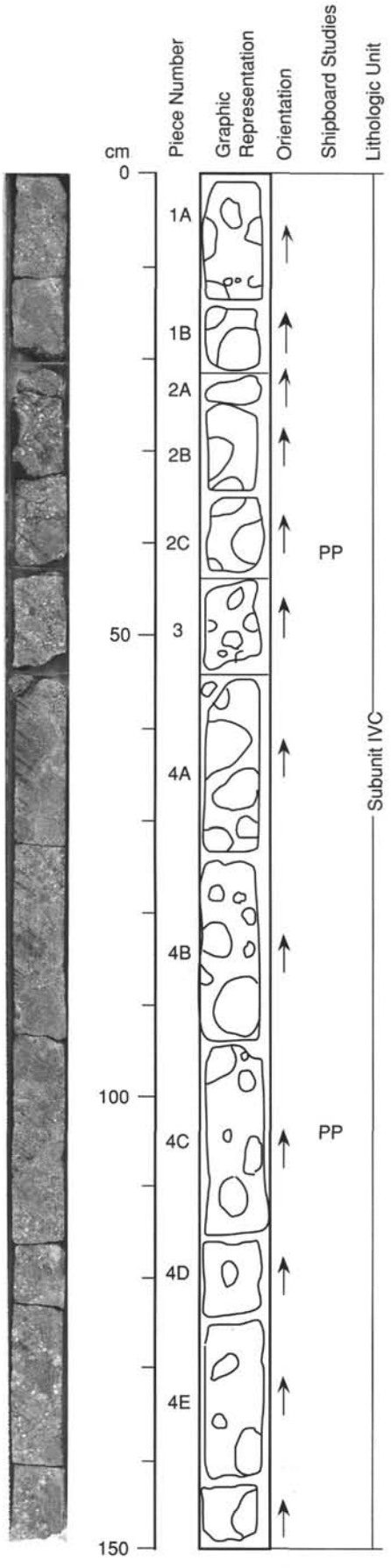


134-831B-79R-3

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–6

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 0.5–3 mm, euhedral and subhedral, altered to sericite and clay minerals.
Clinopyroxene - 5%, 0.5–2 mm, subhedral, greenish.
Orthopyroxene - 5%, 0.5–2 mm, euhedral, brownish.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: Rare, <1%, irregular, random. Cavities 1% in clasts, 5–10% in matrix partly filled wwith white non-carbonate material, possibly zeolite.
COLOR: Matrix greenish gray (10G 4/2), clasts dark gray (10Y 3/1).
STRUCTURE: N/A.
ALTERATION: Some plagioclase altered to sericite and clay minerals. Homogeneous microcrystalline to glassy grains in matrix (probably representing groundmass of rock fragments) shows various stages of alteration from gray fresh rock to reddish (hematite rich(?)), reddish gray, greenish white, white. These colors possibly indicate the existence of hematite, chlorite and zeolite.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Clasts make up 40% of this section. Most clasts have light gray corona (0.5 mm). Matrix is made of 1–15 mm, subrounded to subangular rock fragments, minerals contained in clasts and greenish to light gray alteration products filling the space between them.



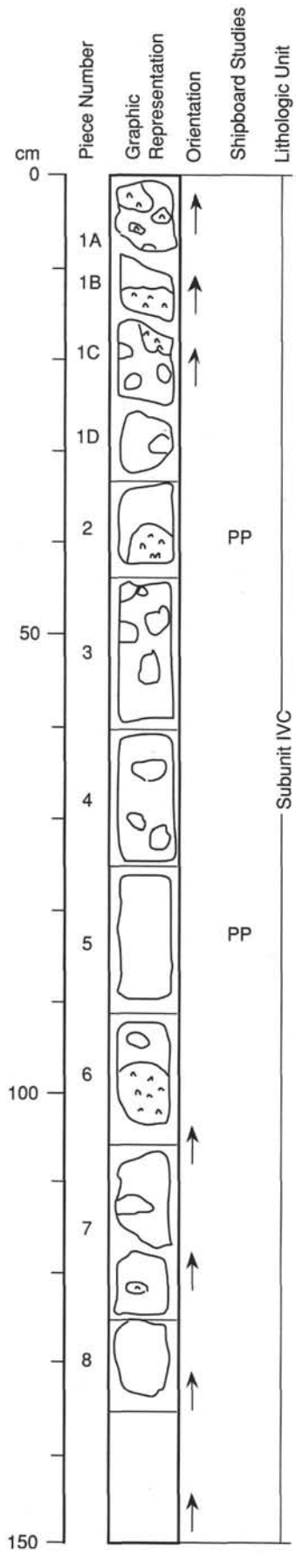
134-831B-80R-1

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–4

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 1–5 mm, subhedral, altered to sericite and clay minerals.
Clinopyroxene - 3–5%, 0.5–1.5 mm, subhedral, greenish.
Orthopyroxene - 3–5%, 0.5–1.5 mm, euhedral to subhedral, brownish .
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 2–10%, 1–3 mm, irregular. Inside, the vesicles are coated by or filled with greenish white, non-carbonate, materials.
COLOR: Matrix dark greenish gray (5GY 4/1), clasts dark gray (10Y 3/1).
STRUCTURE: N/A.
ALTERATION: Matrix and clasts are highly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Clast proportion is 40% of the total in this section. Clast size varies from 0.5-10 cm. Most clasts have light gray corona (<0.5 mm). Matrix is made of 1–5 mm, subrounded tosubangular rock fragments with varying degrees of alteration. Greenish light gray alteration products fill the intervening spaces. Oxidized fragments are less abundant than in the previous core (134-831B-79R-3).

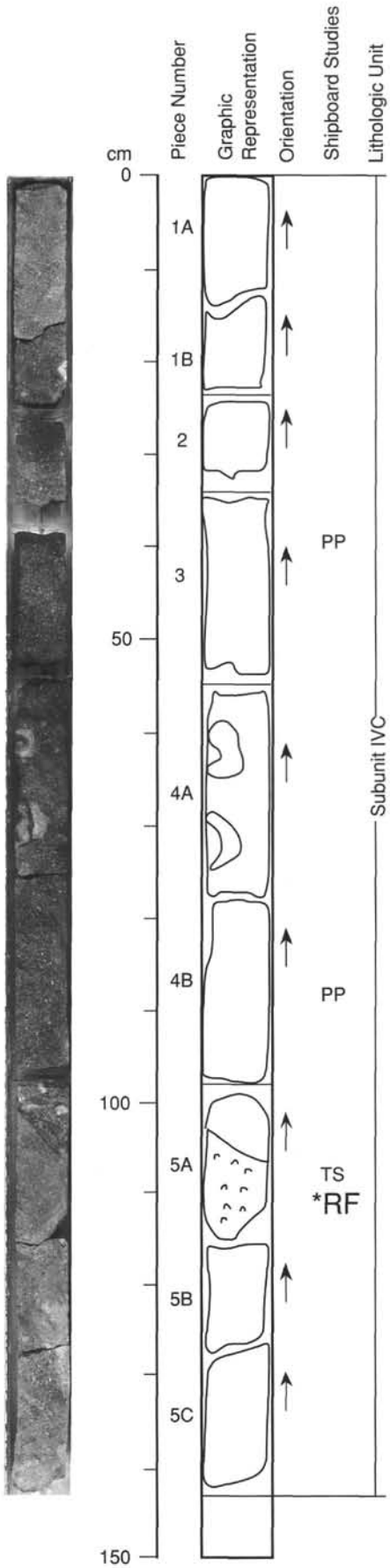


134-831B-80R-2

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–8

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 1–3 mm, euhedral to subhedral, altered to sericite and clay minerals..
Clinopyroxene - 5%, 1–2 mm, subhedral.
Orthopyroxene - 2%, 1–2 mm, euhedral to subhedral.
GROUNDMASS: Microphyric.
VESICLES: 1%, <1 mm, irregular, random, partly filled with greenish minerals (chlorite or zeolite).
COLOR: Dark greenish gray (5G 4/1).
STRUCTURE: N/A.
ALTERATION: Matrix and clasts are highly altered to white green and red secondary minerals.
VEINS/FRACTURES: <1%, <0.5 mm, irregular.
ADDITIONAL COMMENTS: Matrix supported breccia. Clast size ranges between 0.1 and 8 cm. The matrix consist of sandy material and rock fragments. Several clasts are strongly oxidized, with hematite showing a dusky red color (10R 3/3).



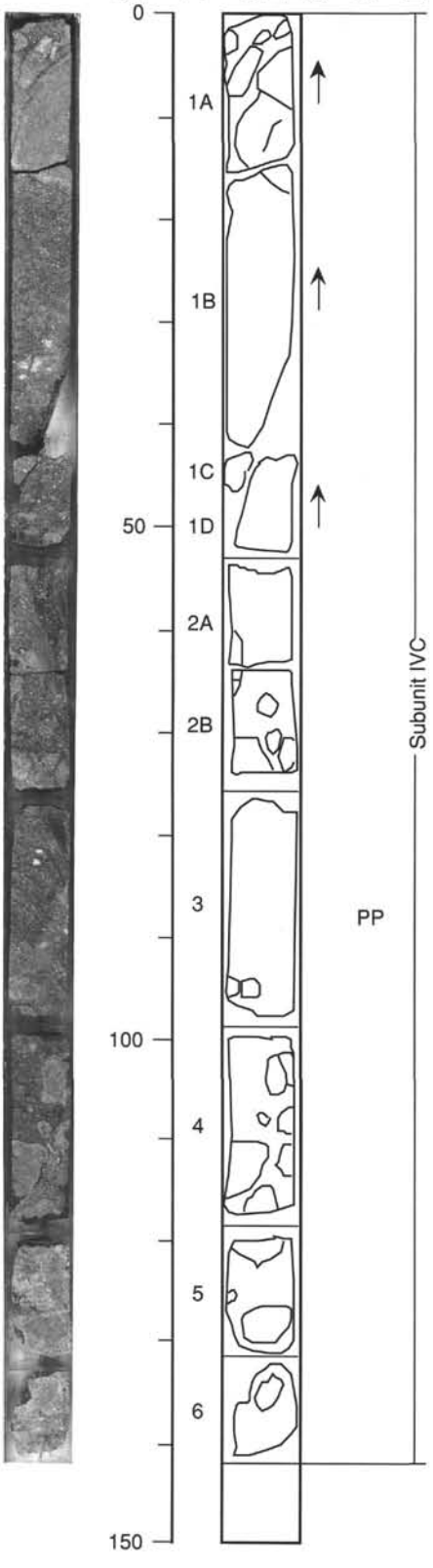
134-831B-80R-3

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–5

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–3 mm, euhedral, altered.
Clinopyroxene - 5%, 2 mm, subhedral.
Orthopyroxene - 2%, 1 mm, euhedral to subhedral.
Magnetite - 1%, 0.3 mm., anhedral, partly oxidized.
GROUNDMASS: Microphyric with devitrified glass.
VESICLES: 1%, <1 mm, irregular, cavities partly filled with greenish, semi-translucent minerals (zeolite or chlorite).
COLOR: Dark greenish gray (5G 4/1) to black (5Y 2.5/1).
STRUCTURE: N/A.
ALTERATION: All phenocrysts are highly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Matrix supported breccia. In this section, a part of Piece 5 is a fragment of the black glassy porphyritic andesite. In Piece 4A, the rim around the clast is about 1 cm in radius and has several concentric rings. The color of the rings changes progressively from light greenish to white.



134-831B-80R-4

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–6

CONTACTS: None visible.

PHENOCRYSTS: For clasts only.
Plagioclase - 15–20%, 1–3 mm, subhedral, moderate to highly altered to greenish white minerals (sericite and clay minerals).
Clinopyroxene - 3–5%, 0.5–1.5 mm, subhedral, greenish.
Orthopyroxene - 3–5%, 0.5–1.5 mm, euhedral to subhedral, brownish.

GROUNDMASS: Microcrystalline to glassy.

VESICLES: 5–10%, 1–3 mm, rounded and irregular. Coated by or filled with white to greenish non-carbonate minerals.

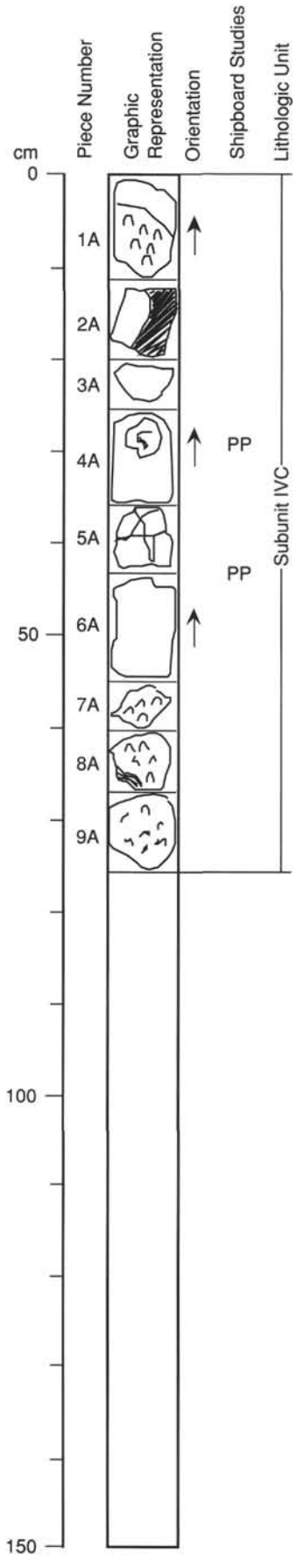
COLOR: Matrix dark greenish gray (5GY 4/1), clasts dark gray (10Y 3/1).

STRUCTURE: N/A.

ALTERATION: Some plagioclase altered to sericite and clay minerals.Homogeneous microcrystalline to glassy grains in matrix (probably representing groundmass of rock fragments) shows various stages of alteration, related to changes in color between reddish gray and greenish white. These colors possibly indicate the presence of hematite, chlorite and zeolite minerals.

VEINS/FRACTURES: <1%, <1 mm, oblique, clast in Piece 1A.

ADDITIONAL COMMENTS: Clast proportion is 20% of the total in this section. Most clasts range from 3 to 13 cm in size. They have 1 mm brownish gray inner corona and 2–3 mm light gray outer corona. The fractures in Piece 1A also have these inner and outer rims. Matrix is made of 1–10 mm, subangular to subrounded rock fragments, most of them being oxidized. Greenish gray alteration products fill the spaces between them.



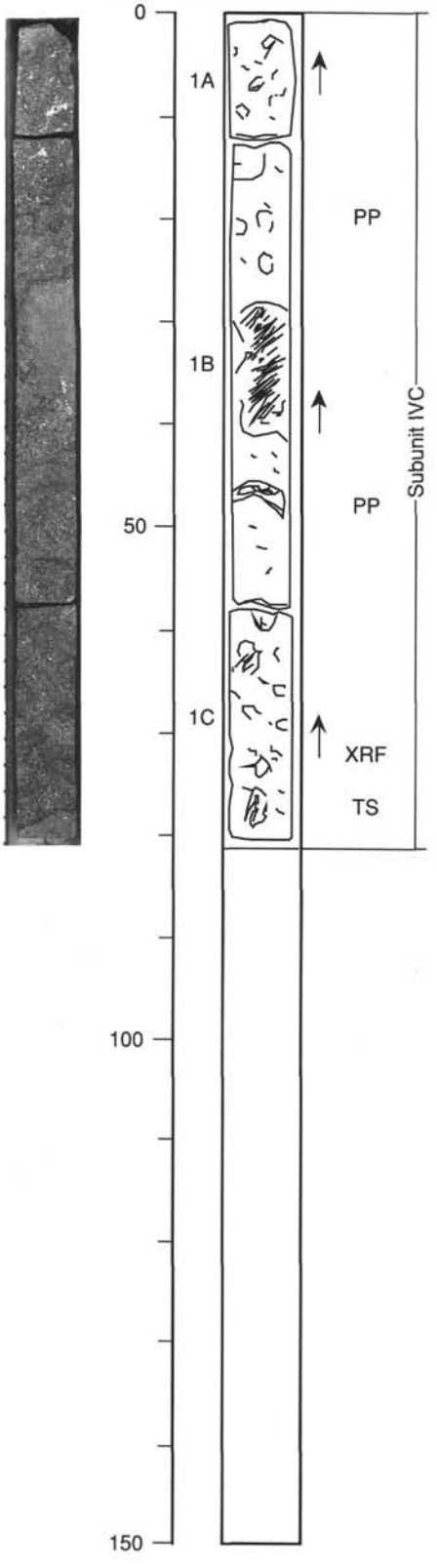
134-831B-80R-5

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–9

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 30%, 0.5–3 mm, euhedral to subhedral.
Clinopyroxene - 5%, 0.5–2 mm, subhedral.
Orthopyroxene - 3%, 0.5–2 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–2%, about 1 mm, irregular, filled with light bluish gray (5B 7/1) minerals.
COLOR: Matrix dark greenish gray (5G 4/1), clasts dark gray (5Y 3/1).
STRUCTURE: N/A.
ALTERATION: Some clasts are coated by light bluish gray minerals. Matrix is highly altered.
VEINS/FRACTURES: None.
ADDITIONAL COMMENTS: Clasts are subrounded to subangular with a size range between granule and pebble.

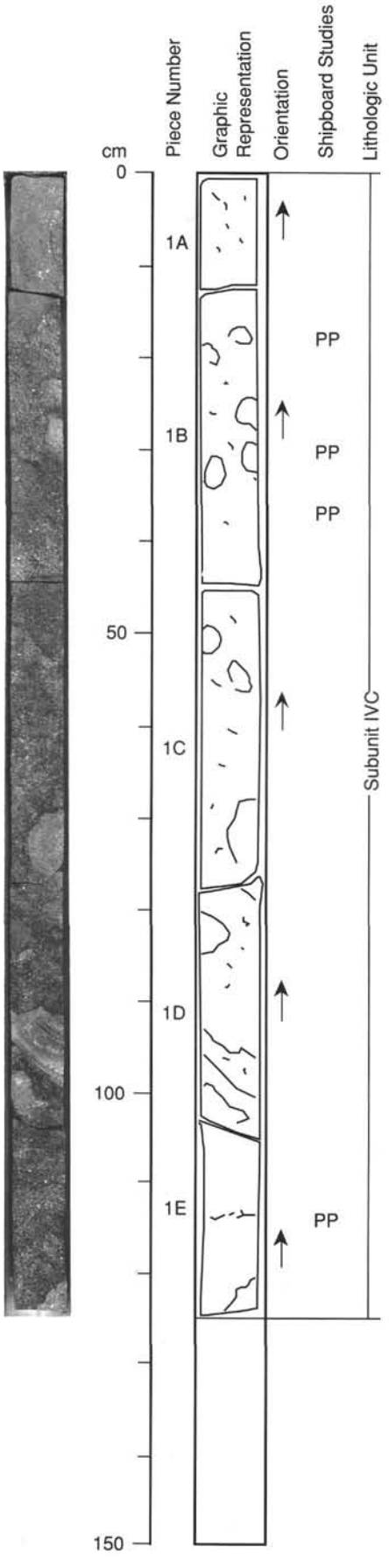


134-831B-81R-1

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1A–1C

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–3 mm, euhedral and sometimes glomeroporphyritic in association with orthopyroxene.
Clinopyroxene - 8%, 0.5–1 mm, euhedral to subhedral.
Orthopyroxene - 5%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 5–10%, 1–2 mm, subrounded to irregular, random, filled with bluish material, probably zeolite.
COLOR: Variable from light gray (5Y 7/1) to pale reddish brown (10R 5/4).
STRUCTURE: N/A.
ALTERATION: Clasts mainly unaltered, but some smaller ones are oxidized.
VEINS/FRACTURES: 1-2%, <1 mm, irregular.
ADDITIONAL COMMENTS: Much of the breccia matrix is red (oxidized). There are more crystals and fewer lithic fragments than higher in the sequence (e.g., Core 134-831B-73R): the main crystal components are plagioclase and clinopyroxene. The color of the breccia matrix is variegated, ranging between weak red (2.5YR 5/2) and gray (2.5Y 5/0). There are abundant vesicles (25–30%, 3–4 mm) filled with yellowish material.The proportion of andesitic clasts is about 25%.



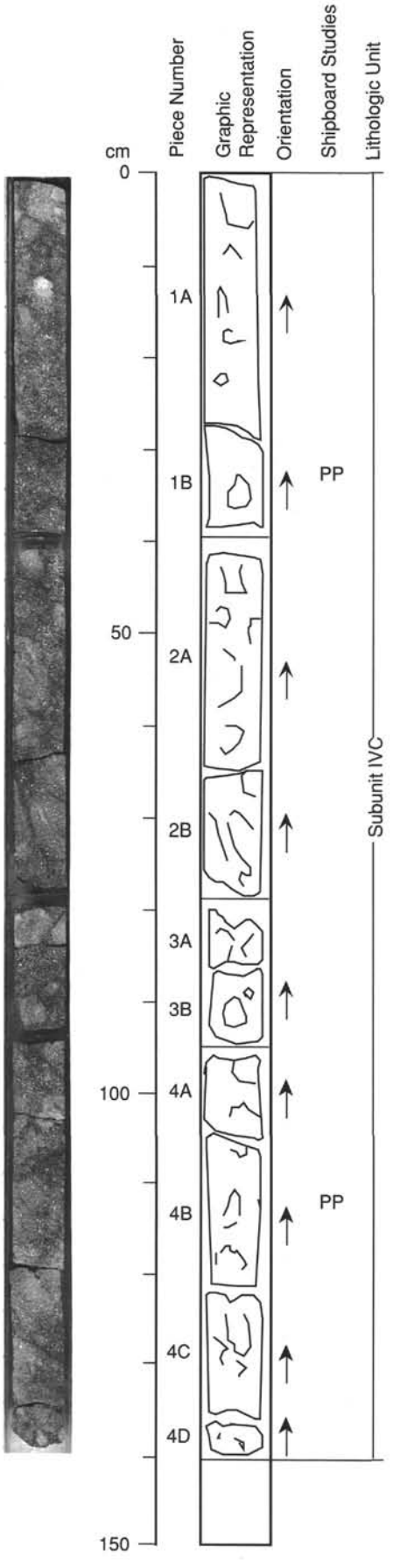
134-831B-81R-2

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1A–1E

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–3 mm, euhedral and sometimes glomeroporphyritic in association with orthopyroxene.
Clinopyroxene - 8%, 0.5–1 mm, euhedral to subhedral.
Orthopyroxene - 5%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 5–10%, 1–2 mm, subrounded to irregular, filled with bluish material, probably zeolite.
COLOR: Variable from light gray (5Y 7/1) to pale reddish brown (10R 5/4).
STRUCTURE: N/A.
ALTERATION: Clasts mainly unaltered, but some smaller ones are oxidized.
VEINS/FRACTURES: 2–3%, <1 mm, irregular.
ADDITIONAL COMMENTS: Much of the breccia matrix is red (oxidized). There are more crystals and fewer lithic fragments than higher in the sequence (e.g., Core 134-831B-73R): the main crystal components are plagioclase and clinopyroxene. The color of the breccia matrix is variegated, ranging between weak red (2.5YR 5/2) and gray (2.5Y 5/0). There are abundant vesicles (25–30%, 3–4 mm) filled with yellowish material. The proportion of large andesitic clasts is 25–30%.

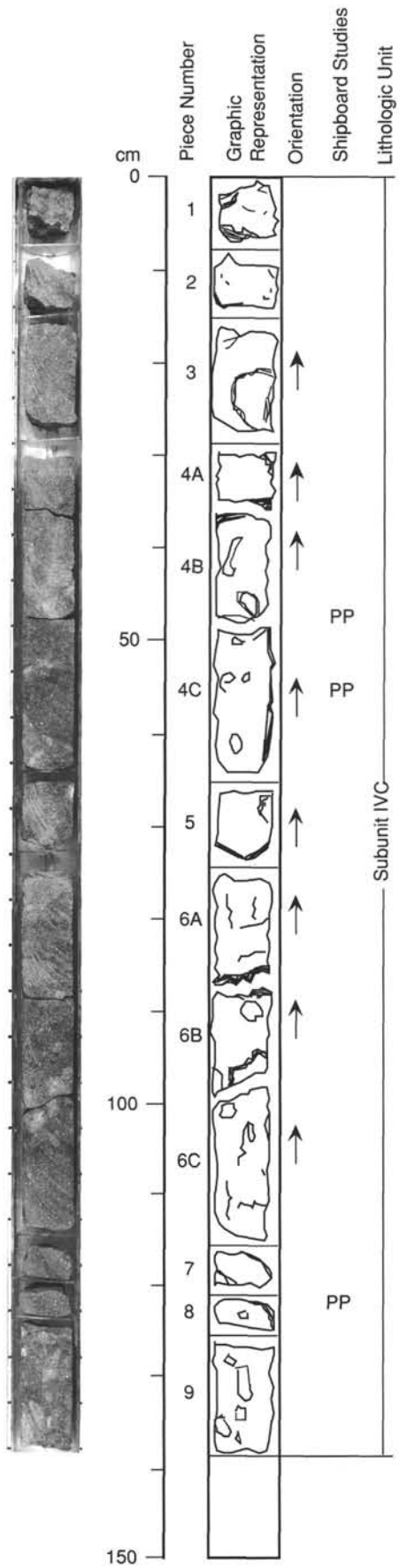


134-831B-81R-3

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1A–4D

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–3 mm, euhedral and sometimes glomeroporphyritic in association with orthopyroxene.
Clinopyroxene - 8%, 0.5–1 mm, euhedral to subhedral.
Orthopyroxene - 5%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 5–10%, 1–2 mm, subrounded to irregular, random, filled with bluish material, probably zeolite.
COLOR: Variable from light gray (5Y 7/1) to pale reddish brown (10R 5/4).
STRUCTURE: N/A.
ALTERATION: Clasts mainly unaltered, but some smaller ones are oxidized.
VEINS/FRACTURES: 3–4%, <1 mm, irregular.
ADDITIONAL COMMENTS: Much of the breccia matrix is red (oxidized). There are more crystals and fewer lithic fragments than higher in the sequence (e.g., Core 134-831B-73R): the main crystal components are plagioclase and clinopyroxene. The color of the breccia matrix is variegated, ranging between weak red (2.5YR 5/2) and gray (2.5Y 5/0). There are abundant vesicles (25–30%, 3–4 mm) filled with yellowish material. The proportion of larger andesitic clasts is 30–35%.



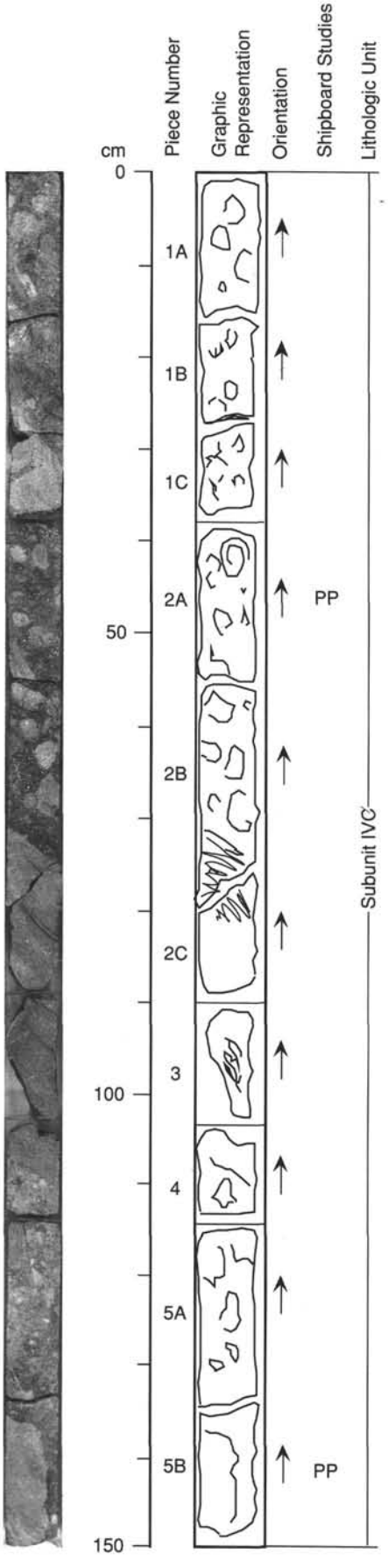
134-831B-81R-4

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–9

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–3 mm, euhedral and sometimes glomeroporphyritic in association with orthopyroxene.
Clinopyroxene - 8%, 0.5–1 mm, euhedral to subhedral.
Orthopyroxene - 5%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 5–10%, 1–2 mm, subrounded to irregular, random, filled with bluish material, probably zeolite.
COLOR: Variable from light gray (5Y 7/1) to pale reddish brown (10R 5/4).
STRUCTURE: N/A.
ALTERATION: Clasts mainly unaltered, but some smaller ones are oxidized.
VEINS/FRACTURES: 3–4%, <1 mm, irregular.
ADDITIONAL COMMENTS: Much of the breccia matrix is red (oxidized). There are more crystals and fewer lithic fragments than higher in the sequence (e.g., Core 134-831B-73R): the main crystal components are plagioclase and clinopyroxene. The color of the breccia matrix is variegated, ranging between weak red (2.5YR 5/2) and gray (2.5Y 5/0). There are abundant vesicles (25–30%, 3–4 mm) filled with yellowish material. The proportion of larger andesitic clasts is 30–35%.

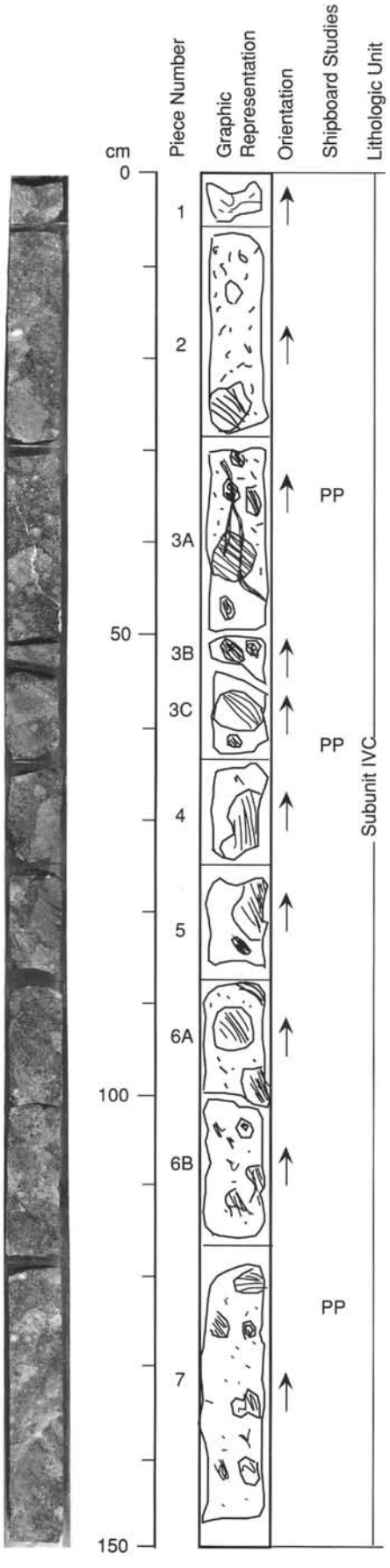


134-831B-81R-5

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–5B

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–3 mm, euhedral and sometimes glomeroporphyritic in association with orthopyroxene.
Clinopyroxene - 8%, 0.5–1 mm, euhedral to subhedral.
Orthopyroxene - 5%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 5–10%, 1–2 mm, subrounded to irregular, random, filled with bluish material, probably zeolite.
COLOR: Variable from light gray (5Y 7/1) to pale reddish brown (10R 5/4).
STRUCTURE: N/A.
ALTERATION: Clasts mainly unaltered, but some smaller ones are oxidized.
VEINS/FRACTURES: 3-4%, <1 mm, irregular.
ADDITIONAL COMMENTS: Much of the breccia matrix is red (oxidized). The main crystal components are plagioclase and clinopyroxene. The color of the breccia matrix is variegated, ranging between weak red (2.5YR 5/2) and gray (2.5Y 5/0). There are abundant vesicles (25–30%, 3–4 mm) filled with yellowish material. The proportion of large andesitic clasts is about 45%. Some of the smaller clasts have very conspicuous rims.



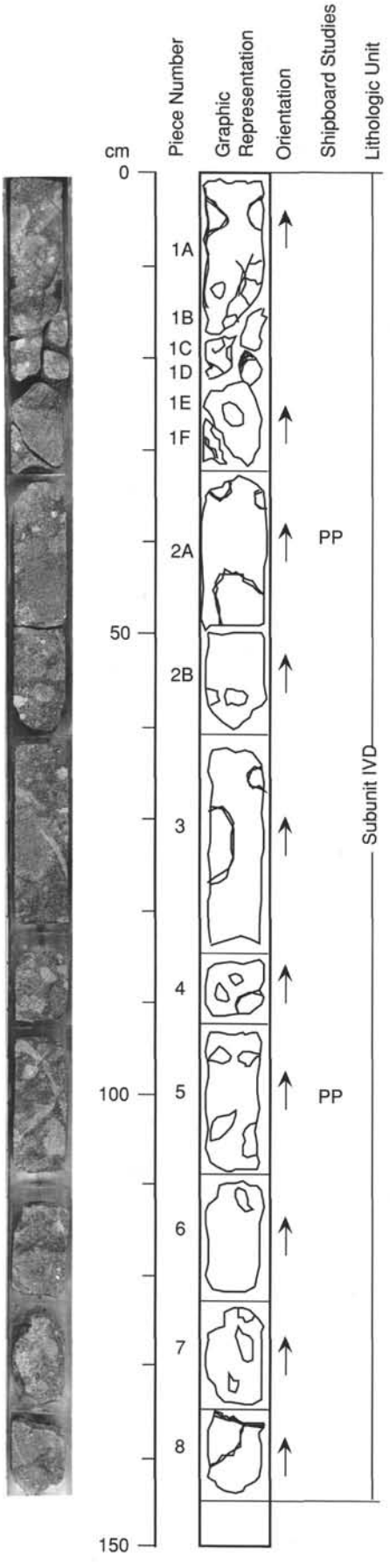
134-831B-81R-6

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVC: Variegated andesitic breccia with some reworking

Pieces 1–7

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–3 mm, euhedral and sometimes glomeroporphyritic in association with orthopyroxene.
Clinopyroxene - 8%, 0.5–1 mm, euhedral to subhedral.
Orthopyroxene - 5%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 5–10%, 1–2 mm, subrounded to irregular, random, filled with bluish material, probably zeolite.
COLOR: Variable from light gray (5Y 7/1) to pale reddish brown (10R 5/4).
STRUCTURE: N/A.
ALTERATION: Clasts mainly unaltered, but some smaller ones are oxidized.
VEINS/FRACTURES: 3–4%, <1 mm, irregular.
ADDITIONAL COMMENTS: Much of the breccia matrix is red (oxidized). The main crystal components are plagioclase and clinopyroxene. The color of the breccia matrix is variegated, ranging between weak red (2.5YR 5/2) and gray (2.5Y 5/0). There are abundant vesicles (25–30%, 3–4 mm) filled with yellowish material. Piece 3A contains a conspicuous calcite/zeolite vein (<2 mm). The proportion of larger andesitic clasts is 20-25%.

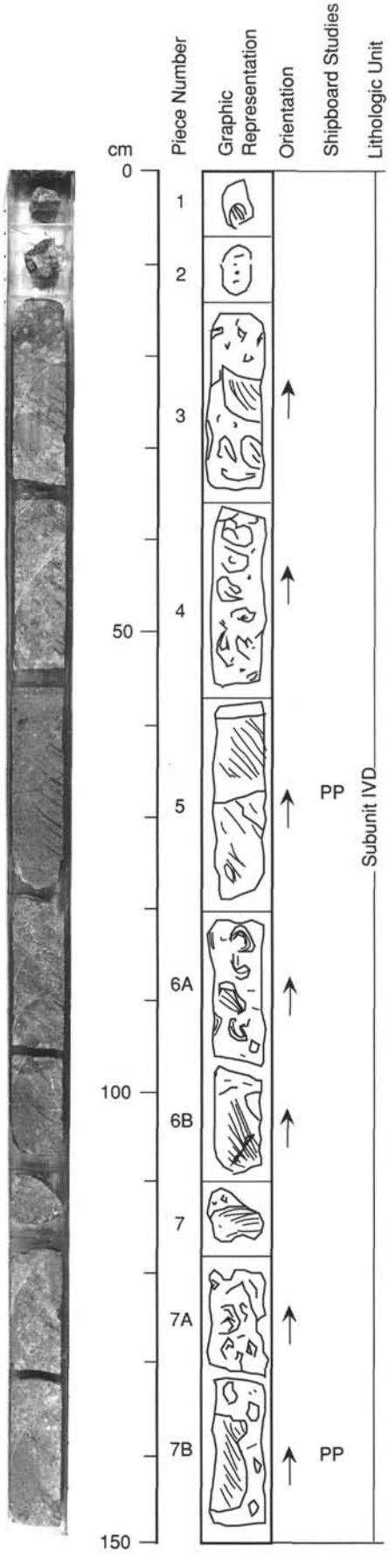


134-831B-81R-7

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–8

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–3 mm, euhedral and sometimes glomeroporphyritic in association with orthopyroxene.
Clinopyroxene - 8%, 0.5–1 mm, euhedral to subhedral.
Orthopyroxene - 5%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 5–10%, 1–2 mm, subrounded to irregular, random, filled with bluish material, probably zeolite.
COLOR: Variable from light gray (5Y 7/1) to pale reddish brown (10R 5/4).
STRUCTURE: N/A.
ALTERATION: Clasts mainly unaltered, but some smaller ones are oxidized.
VEINS/FRACTURES: 2–3%, <1 mm, irregular.
ADDITIONAL COMMENTS: Much of the breccia matrix is red (oxidized). The main crystal components are plagioclase and clinopyroxene. The color of the breccia matrix is variegated, ranging between weak red (2.5YR 5/2) and gray (2.5Y 5/0). There are abundant vesicles (25–30%, 3–4 mm) filled with yellowish material. The proportion of large andesitic clasts is about 25%.

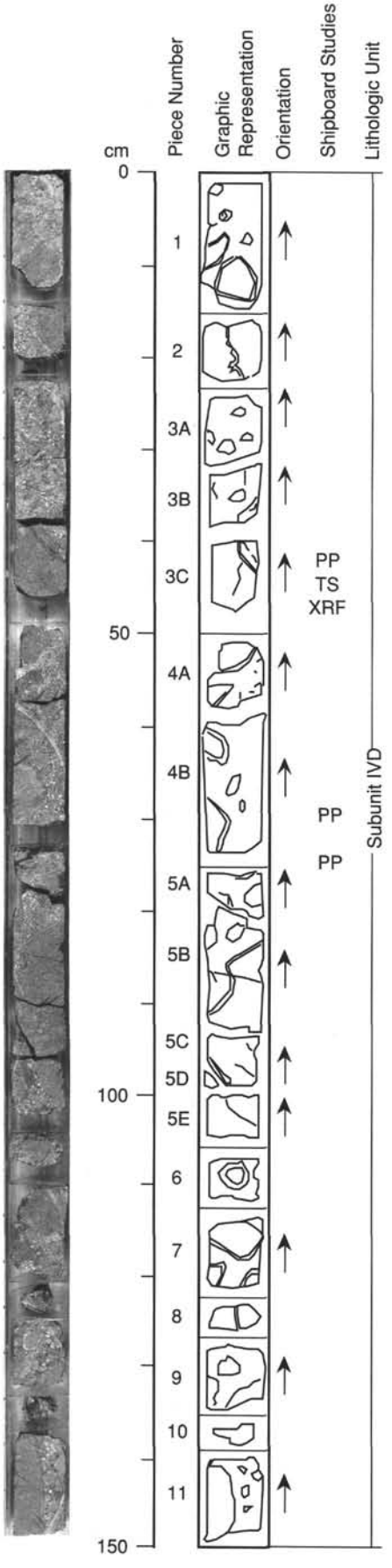


134-831B-82R-1

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–7B

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 1–4 mm, euhedral to subhedral.
Clinopyroxene - 5%, 0.5–3 mm, euhedral to subhedral.
Orthopyroxene - 3%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1-5%, 1 mm, rounded to subrounded, random, filled with white mineral, probably zeolite.
COLOR: Gray (2.5Y 5/0).
STRUCTURE: N/A.
ALTERATION: None evident.
VEINS/FRACTURES: Occasional small fractures (<1 mm).
ADDITIONAL COMMENTS: The shape of the clasts varies from flattened and elongate to subrounded to subangular; their edges are all smoothed rather than sharp. Almost invariably the clasts have a series of coronas or reaction rims which from the interior outward are brown (0.3 mm), white (0.6–0.8 mm) and pale gray (<2 mm). The matrix consists of small lithic fragments like the large clasts, white fragments from the border of the andesitic clasts and crystals of plagioclase and clinopyroxene. These components are set in a bluish gray (5B 6/1) to pale green (10G 6/2) glassy matrix. The greenish color may be due to dispersed celadonite. The clasts comprise about 50% of the whole rock.

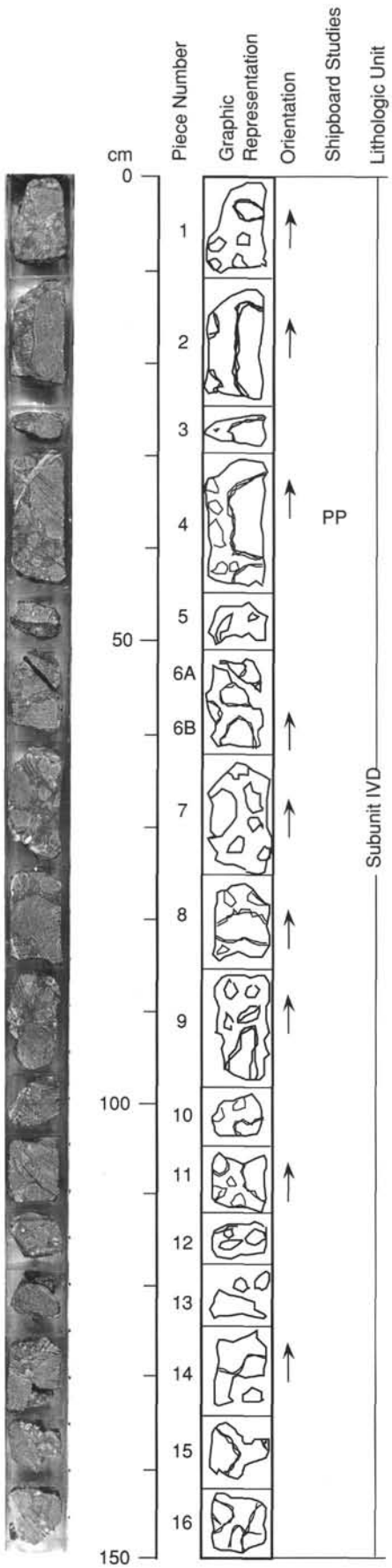


134-831B-82R-2

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–11

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 1–4 mm, euhedral to subhedral.
Clinopyroxene - 5%, 0.5–3 mm, euhedral to subhedral.
Orthopyroxene - 3%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, 1 mm, rounded to subrounded, random, filled with white mineral, probably zeolite.
COLOR: Gray (2.5Y 5/0).
STRUCTURE: N/A.
ALTERATION: None evident.
VEINS/FRACTURES: Occasional small fractures (<1 mm).
ADDITIONAL COMMENTS: The shape of the clasts varies from flattened and elongate to subrounded to subangular; their edges are all smoothed rather than sharp. Almost invariably the clasts have a series of coronas or reaction rims which from the interior outward are brown (0.3 mm), white (0.6–0.8 mm) and pale gray (<2 mm). The matrix consists of small lithic fragments like the large clasts, white fragments from the border of the andesitic clasts and crystals of plagioclase and clinopyroxene. These components are set in a bluish gray (5B 6/1) to pale green (10G 6/2) glassy matrix. The greenish color may be due to dispersed celadonite. The clasts comprise about 50% of the whole rock.

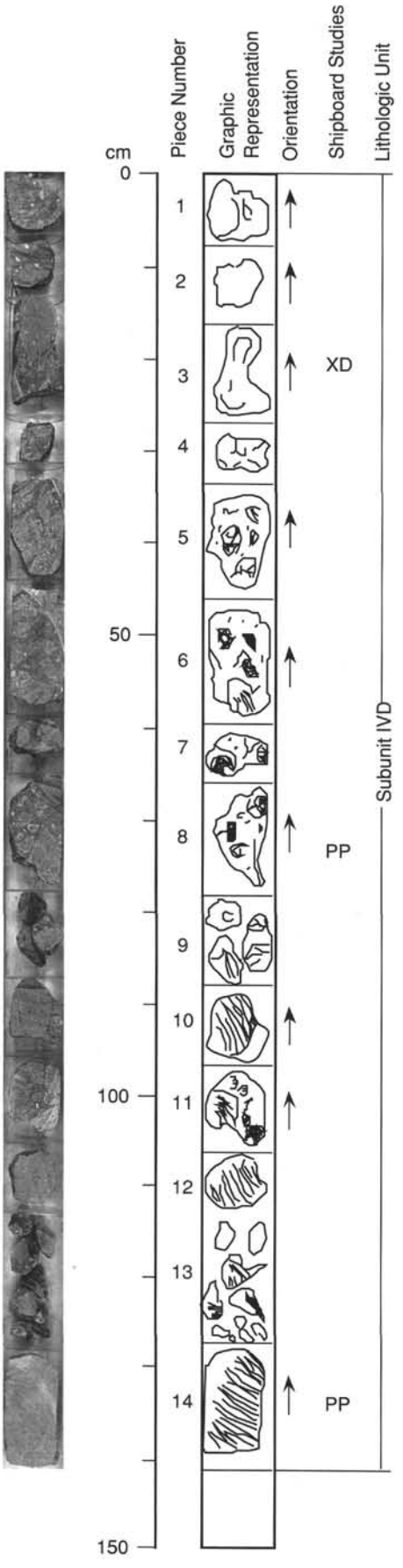


134-831B-82R-3

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–16

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 1–4 mm, euhedral to subhedral.
Clinopyroxene - 5%, 0.5–3 mm, euhedral to subhedral.
Orthopyroxene - 3%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, 1 mm, rounded to subrounded, random, filled with white mineral, probably zeolite.
COLOR: Gray (2.5Y 5/0).
STRUCTURE: N/A.
ALTERATION: None evident.
VEINS/FRACTURES: Occasional small fractures (<1 mm).
ADDITIONAL COMMENTS: The shape of the clasts varies from flattened and elongate to subrounded to subangular; their edges are all smoothed rather than sharp. Almost invariably the clasts have a series of coronas or reaction rims which from the interior outward are brown (0.3 mm), white (0.6–0.8 mm) and pale gray (<2 mm). The matrix consists of small lithic fragments like the large clasts, white fragments from the border of the andesitic clasts and crystals of plagioclase and clinopyroxene. These components are set in a bluish gray (5B 6/1) to pale green (10G 6/2) glassy matrix. The greenish color may be due to dispersed celadonite.The clasts comprise about 50% of the whole rock.

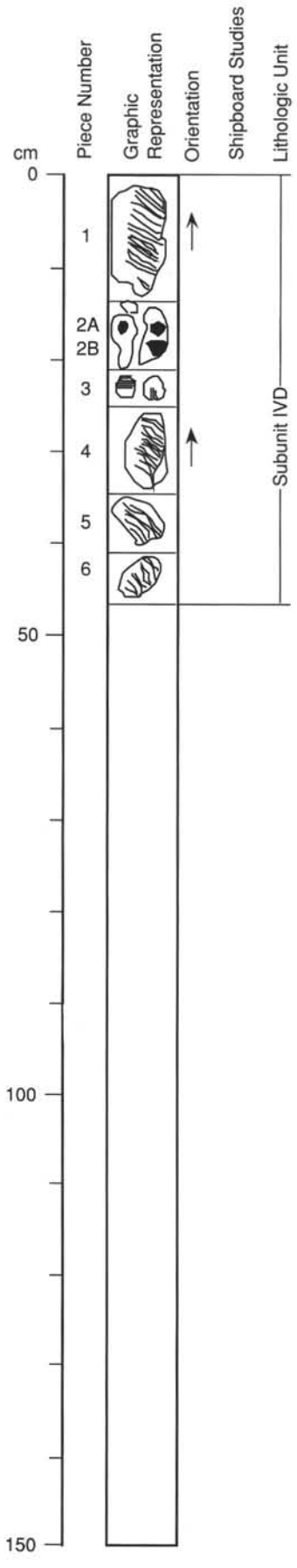


134-831B-82R-4

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–14

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 1–4 mm, euhedral to subhedral.
Clinopyroxene - 5%, 0.5–3 mm, euhedral to subhedral.
Orthopyroxene - 3%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, 1 mm, rounded to subrounded, random, filled with white mineral, probably zeolite.
COLOR: Gray (2.5Y 5/0).
STRUCTURE: N/A.
ALTERATION: None evident.
VEINS/FRACTURES: Occasional small fractures (<1 mm).
ADDITIONAL COMMENTS: The shape of the clasts varies from flattened and elongate to subrounded to subangular; their edges are all smoothed rather than sharp. Almost invariably the clasts have a series of coronas or reaction rims which from the interior outward are brown (0.3 mm), white (0.6–0.8 mm) and pale gray (<2 mm). The matrix consists of small lithic fragments like the large clasts, white fragments from the border of the andesitic clasts and crystals of plagioclase and clinopyroxene. These components are set in a bluish gray (5B 6/1) to pale green (10G 6/2) glassy matrix. The greenish color may be due to dispersed celadonite. The clasts comprise about 50% of the whole rock.



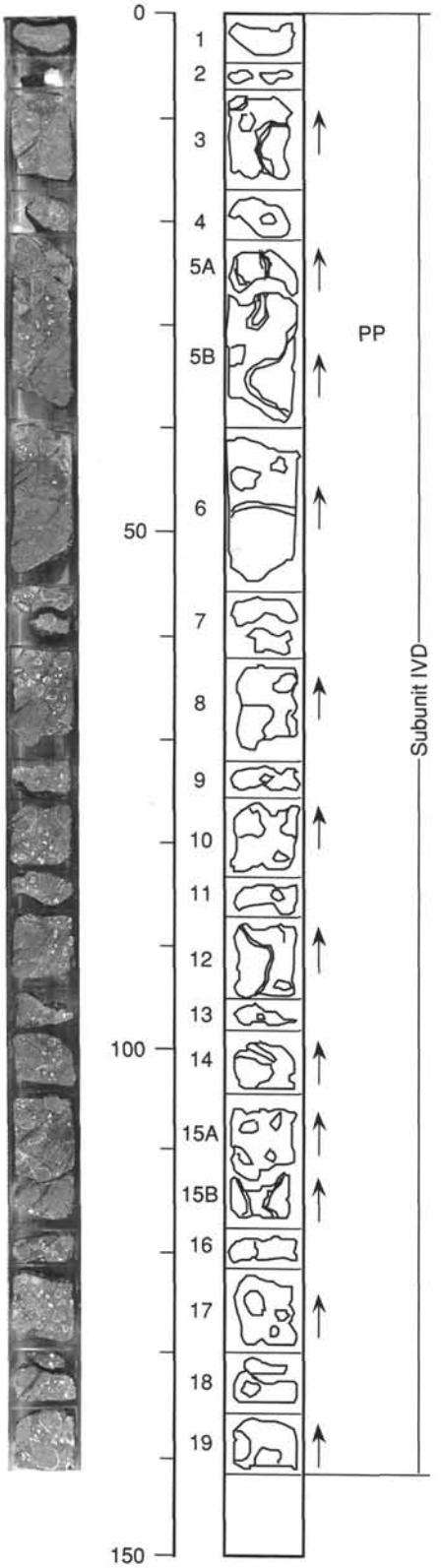
134-831B-82R-5

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–6

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20%, 1–4 mm, euhedral to subhedral.
Clinopyroxene - 5%, 0.5–3 mm, euhedral to subhedral.
Orthopyroxene - 3%, 0.2–0.6 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, 1 mm, rounded to subrounded, random, filled with white mineral, probably zeolite.
COLOR: Gray (2.5Y 5/0).
STRUCTURE: N/A.
ALTERATION: None evident.
VEINS/FRACTURES: Occasional small fractures (<1 mm).
ADDITIONAL COMMENTS: The shape of the clasts varies from flattened and elongate to subrounded to subangular; their edges are all smoothed rather than sharp. Almost invariably the clasts have a series of coronas or reaction rims which from the interior outward are brown (0.3 mm), white (0.6–0.8 mm) and pale gray (<2 mm). The matrix consists of small lithic fragments like the large clasts, white fragments from the border of the andesitic clasts and crystals of plagioclase and clinopyroxene. These components are set in a bluish gray (5B 6/1) to pale green (10G 6/2) glassy matrix. The greenish color may be due to dispersed celadonite. The clasts comprise about 50% of the whole rock.

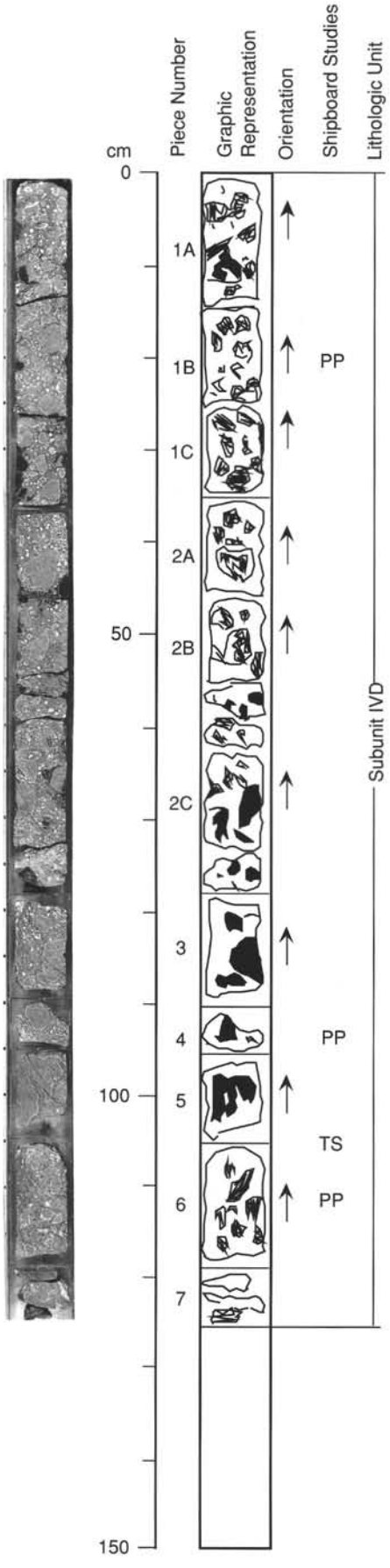


134-831B-83R-1

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–19

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–2 mm, euhedral, slightly oriented.
Clinopyroxene - 5%, 1 mm, subhedral.
Orthopyroxene - 5%, 0.2–0.7 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1-5%, 1 mm, rounded, random, filled with bluish white mineral, probably zeolite.
COLOR: Gray (2.5Y 5/0)
STRUCTURE: N/A.
ALTERATION: None evident.
VEINS/FRACTURES: Occasional small fractures (0.5 mm).
ADDITIONAL COMMENTS: The shape of the clasts varies from flattened and elongate to subrounded to subangular. Edges are smooth rather than sharp. All of the clasts have coronas or reaction rims, the most conspicuous being a thin white rim (1–1.5 mm). Outside the distinct white rim is a greenish gray zone (1.5 mm). The matrix contains white fragments similar to the border of the andesitic clasts. Crystal of plagioclase and clinopyroxene are very sparse. These components are set in a grayish green (5G 5/2) glassy matrix. The greenish color, possibly due to celadonite, is more uniform and more intense than in the previous cores. The clasts comprise about 45% of the whole rock volume.



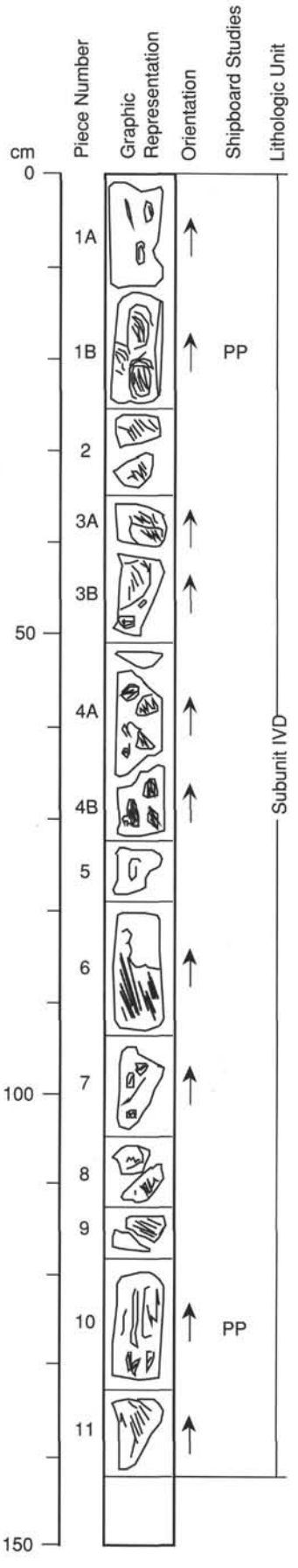
134-831B-83R-2

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–7

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–2 mm, euhedral, slightly oriented.
Clinopyroxene - 5%, 1 mm, subhedral.
Orthopyroxene - 5%, 0.2–0.7 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, 1 mm, rounded, random, filled with bluish-white mineral, probably zeolite.
COLOR: Gray (2.5Y 5/0)
STRUCTURE: N/A.
ALTERATION: None evident.
VEINS/FRACTURES: Occasional small fractures (0.5 mm).
ADDITIONAL COMMENTS: The shape of the clasts varies from flattened and elongate to subrounded to subangular. Edges are smooth rather than sharp. All of the clasts have coronas or reaction rims, the most conspicuous being a thin white rim (1–1.5 mm). Outside the distinct white rim is a greenish gray zone (1.5 mm). The matrix contains white fragments similar to the border of the andesitic clasts. Crystal of plagioclase and clinopyroxene are very sparse. These components are set in a grayish green (5G 5/2) glassy matrix. The greenish color, possibly due to celadonite, is more uniform and more intense than in the previous cores. The clasts comprise about 45% of the whole rock volume.

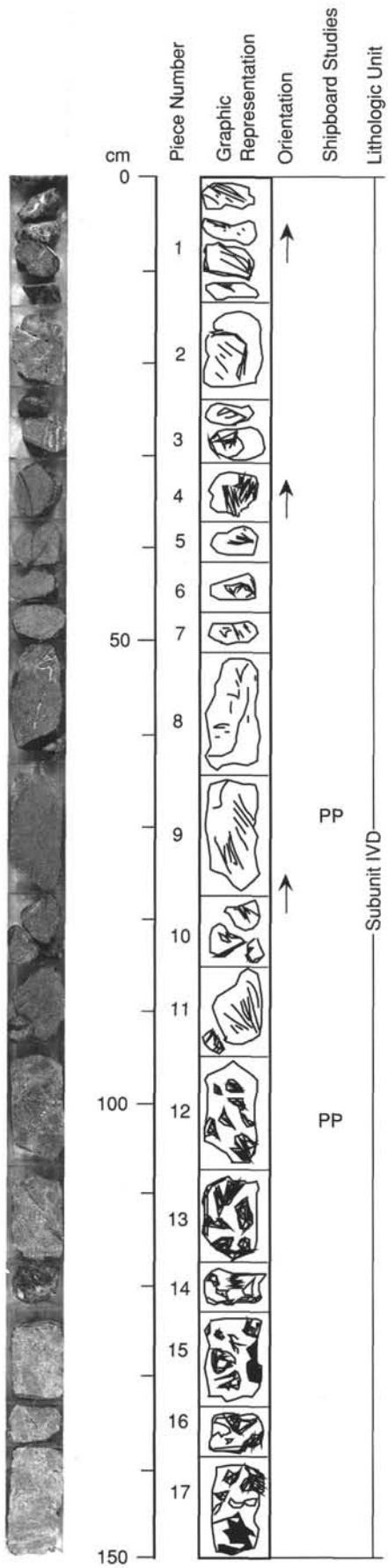


134-831B-83R-3

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–11

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–2 mm, euhedral, slightly oriented.
Clinopyroxene - 5%, 1 mm, subhedral.
Orthopyroxene - 5%, 0.2–0.7 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, 1–2 mm, rounded, random, filled with bluish-white mineral, probably zeolite.
COLOR: Gray (2.5Y 5/0).
STRUCTURE: N/A.
ALTERATION: None evident.
VEINS/FRACTURES: Occasional small fractures (0.5 mm).
ADDITIONAL COMMENTS: The shape of the clasts varies from flattened and elongate to subrounded, subangular and wispy. All of the clasts have conspicuous coronas or reaction rims which are whitish and <3 mm wide. The matrix is gray (5Y 5/1) with flecks of grayish-green (5G 5/2). It is composed of small lithic fragments similar to the andesitic clasts, glass, plagioclase and clinopyroxene, with alteration products that include clay minerals and zeolites.The clasts comprise about 50% of the whole rock volume.

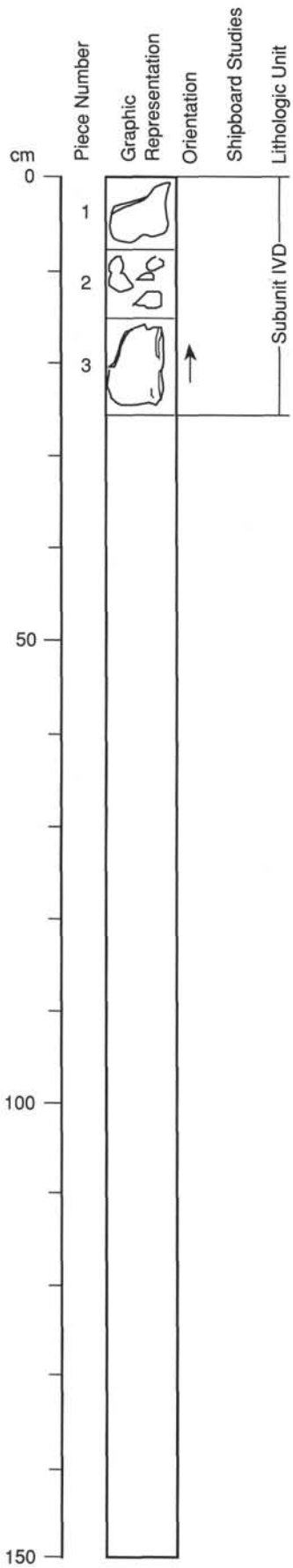


134-831B-83R-4

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–17

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–2 mm, euhedral, slightly oriented.
Clinopyroxene - 5%, 1 mm, subhedral.
Orthopyroxene - 5%, 0.2–0.7 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, 1–2 mm, rounded, random, filled with bluish white mineral, probably zeolite.
COLOR: Gray (2.5Y 5/0).
STRUCTURE: N/A.
ALTERATION: None evident.
VEINS/FRACTURES: Occasional small fractures (0.5 mm), filled with bluish white mineral, probably zeolite.
ADDITIONAL COMMENTS: The shape of the clasts varies from flattened and elongate to subrounded and subangular. Pieces 4–11 are almost exclusively clast material. The clasts embedded in the matrix show coronas or reaction rims: this takes the form of a thin (1 mm) white line enclosed by an outer greenish gray zone (1.5 mm). The matrix contains white fragments similar to the border of the andesitic clasts. Crystals of plagioclase and clinopyroxene are sparse. The color of the matrix varies from grayish green (5G 5/2) to gray (5Y 5/1). The greenish color is more intense at the bottom of the section (Pieces 12–17). The clasts comprise about 50% of the whole rock volume.



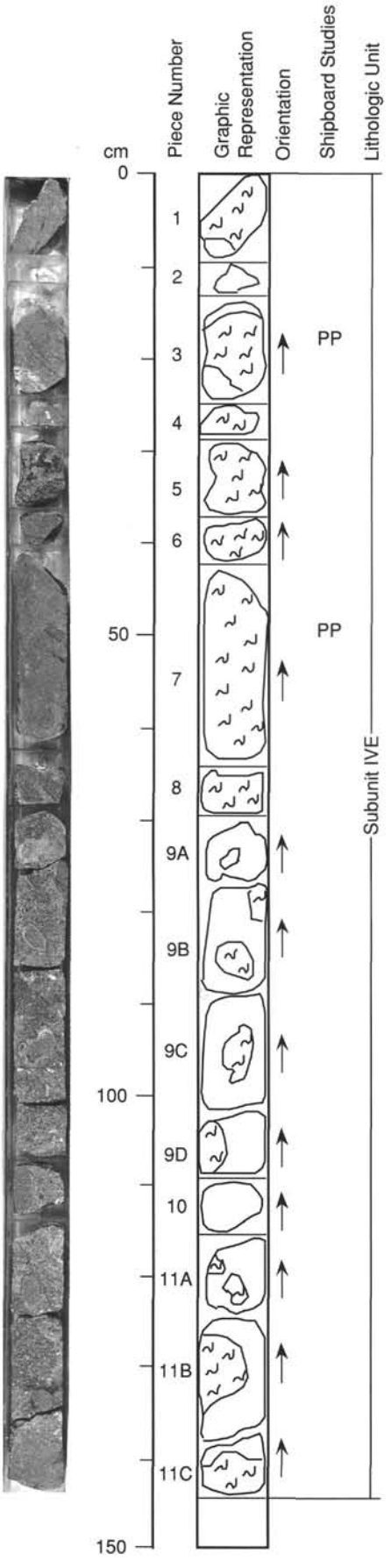
134-831B-83R-5

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVD: Andesitic hyalo-breccia with green matrix

Pieces 1–3

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 25%, 1–2 mm, euhedral, slightly oriented.
Clinopyroxene - 5%, 1 mm, subhedral.
Orthopyroxene - 5%, 0.2–0.7 mm, subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: 1–5%, 1–2 mm, rounded, random, filled with bluish white mineral, probably zeolite.
COLOR: Gray (2.5Y 5/0).
STRUCTURE: N/A.
ALTERATION: None evident.
VEINS/FRACTURES: Occasional small fractures (0.5 mm).
ADDITIONAL COMMENTS: Only clasts occur in this section.



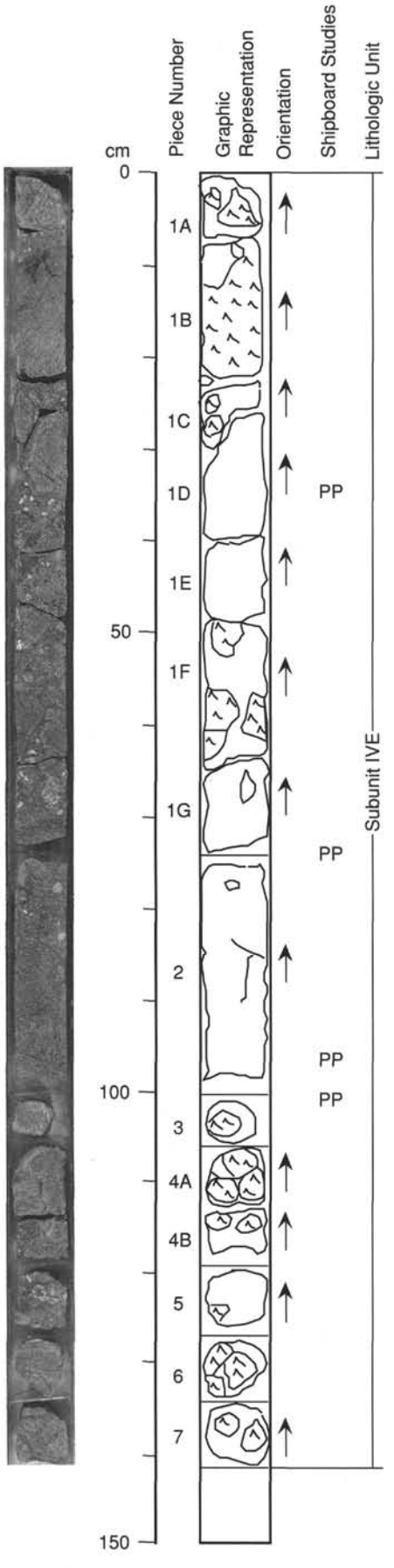
134-831B-84R-1

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVE: Variegated andesitic breccia with some reworking

Pieces 1–11

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20–25%, 1–4 mm, euhedral to subhedral.
Clinopyroxene - 5–8%, 0.5–3 mm., subhedral.
Orthopyroxene - 3–5%, 0.5–2 mm, euhedral to subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: None.
COLOR: Matrix greenish gray (5G 6/1), clasts dark gray (2.5YR 4/0).
STRUCTURE: N/A..
ALTERATION: Some plagioclases are altered to white or light greenish gray minerals.
VEINS/FRACTURES: <1%, 0.1–0.5 mm, irregular. In Piece 1, filled by white non-carbonate minerals.
ADDITIONAL COMMENTS: Clast size ranges between 1 and 20 cm, rounded to sub-rounded. Most clasts have reaction rims; the inner rim being a thin (0.5–2 mm) white line, and the outer a gray one, 2–4 mm wide. Some lack inner rims or both inner and outer rims. The clasts comprise 60% of the whole rock volume. Matrix is made of fragments of andesite (1–10 mm), with varying degrees of oxidation, crystals (<2 mm), and light greenish gray altered glass.



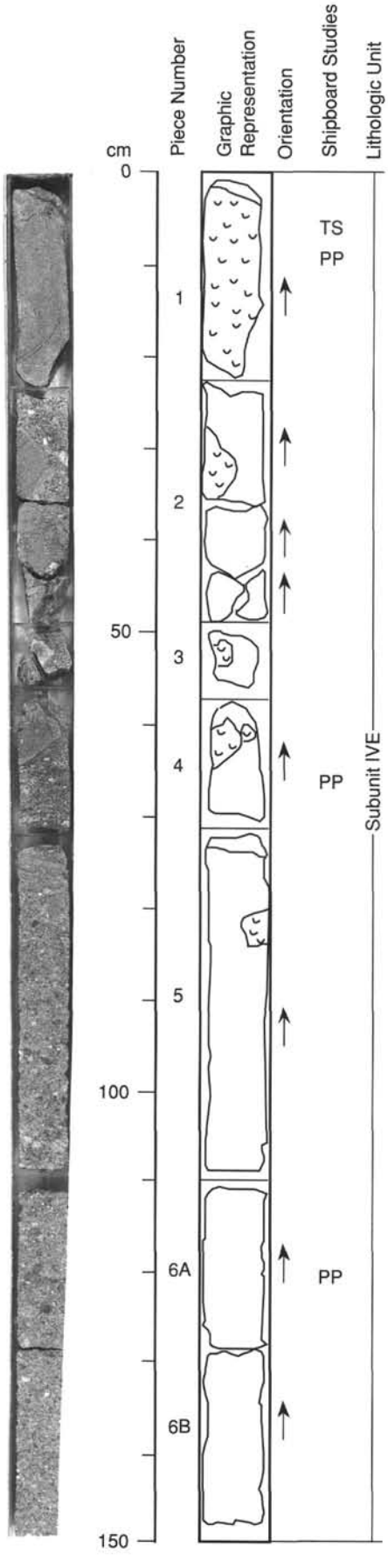
134-831B-84R-2

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVE: Variegated andesitic breccia with some reworking

Pieces 1–7

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20–25%, 1–4 mm, euhedral.
Clinopyroxene - 5–8%, 1–3 mm, subhedral.
Orthopyroxene - 3–5%, 1–2 mm, euhedral to subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: None.
COLOR: Matrix greenish gray (5G 6/1), clasts dark gray (2.5YR 4/0).
STRUCTURE: N/A.
ALTERATION: Plagioclase shows white or light greenish gray alteration rim.
VEINS/FRACTURES: <1%, 1 mm wide, fracture within clast in Piece 1B, and Piece 4 (top).
ADDITIONAL COMMENTS: The clasts are subrounded to subangular in shape, 1–15 cm in size. Most clasts have reaction rims; inner rim being thin white line, 0.5–2 mm wide and outer gray rim, 2–4 mm wide. This reaction zone extends into the interior of the clasts, probably along microfractures, in Pieces 1A, 1D, 1G, 3, 5 and 7, and occupies more than half the clast. The clasts comprise about 50% of the whole rock volume. Carbonates (5–10 mm) also occur.



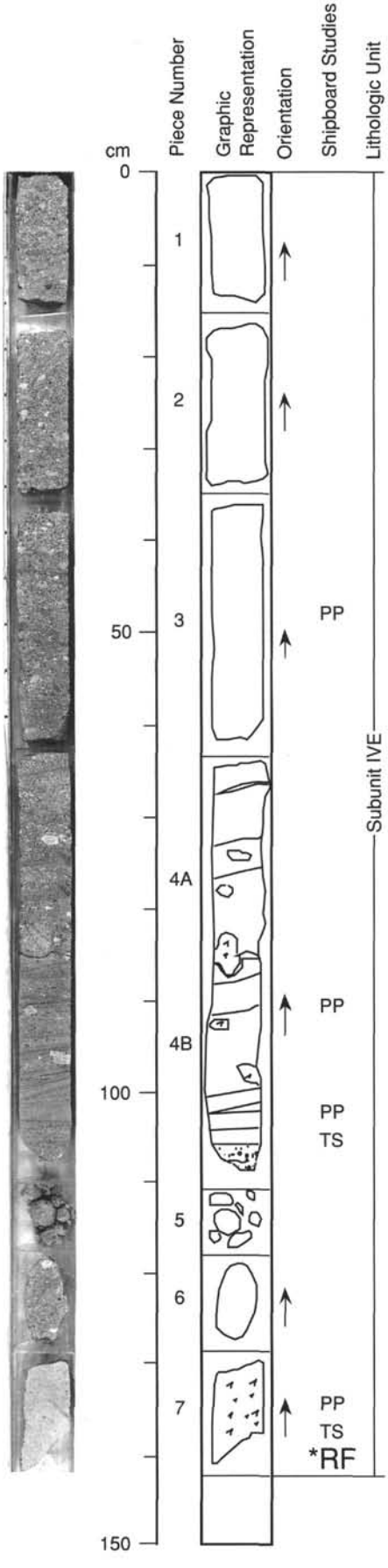
134-831B-84R-3

UNIT IV: ANDESITIC BRECCIA

SUBUNIT IVE: Variegated andesitic breccia with some reworking

Pieces 1–6

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20–25%, 1–4 mm, euhedral to subhedral.
Clinopyroxene - 5–8%, 0.5–3 mm, subhedral.
Orthopyroxene - 3–5%, 0.5–2 mm, euhedral to subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: N/A.
COLOR: Matrix greenish gray (5G 6/1), and weak red (10R 4/3 to 10R 4/2). Clasts dark gray (2.5YR 4/0).
STRUCTURE: N/A.
ALTERATION: Plagioclase shows white or light greenish gray alteration rim.
VEINS/FRACTURES: At the top of Piece 1, filled by green secondary mineral and calcite
ADDITIONAL COMMENTS: Clasts are subrounded to subangular in shape, 1–20 cm in size. Most clasts have reaction rims; the inner rim being light gray, 0.5–2 cm wide and the outer a gray rim 3–15 mm wide. Several subparallel layers of this reaction rim extend into the interior of clast in Piece 1. The proportion of clasts in this section is 60%. Matrix is made of fragments of lava, 1-10 mm in size, with varying degrees of oxidation, and light greenish gray altered glass. Also included are 5–10 mm calcite at 26–30 cm.



134-831B-84R-4

UNIT IV: ANDESITIC BRECCIA
SUBUNIT IVE: Variegated andesitic breccia with some reworking

Pieces 1–7

CONTACTS: None visible.
PHENOCRYSTS: For clasts only.
Plagioclase - 20–25%, 1–4 mm, euhedral to subhedral.
Clinopyroxene - 5–8%, 0.5–3 mm, subhedral.
Orthopyroxene - 3–5%, 0.5–2 mm, euhedral to subhedral.
GROUNDMASS: Microcrystalline to glassy.
VESICLES: N/A.
COLOR: Matrix dark greenish gray (5G 4/1) to dusky red (10R 3/3), clasts greenish gray (5G 5/1) or greenish black (5GY 2/1).
STRUCTURE: N/A.
ALTERATION: Plagioclase shows white or light greenish gray alteration rim.
VEINS/FRACTURES: Occasional small fractures (<1 mm).
ADDITIONAL COMMENTS: Pieces 1, 2, 3, 4A and 6 are relatively fine-grained volcanic conglomerate. Clasts are pebble size, mostly 0.5–1 cm in diameter and are made of altered andesitic rocks with different colors. Matrix is composed of rock fragments and of several minerals (plagioclase, clinopyroxene, orthopyroxene, magnetite, chlorite, etc.). Pieces 4A and 4B are medium to coarse-grained volcanic sandstone with few pebbles of volcanic rocks. Bedding is visible. Color of sandstone is dark gray (N4). One graded bed and cross bedding at 105–110 cm. This sandstone passes upward into conglomerate and contains isolated clasts of light greenish gray (5G 7/1) volcanics (probably andesite).

134-831B-69R-01 (Piece 1, 75-78 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	20	44	0.5-5		Euhedral to subhedral.	Severely altered.
Opaque minerals	1	1	0.1-0.2		Subhedral.	
GROUNDMASS						
Plagioclase	15	15	0.05-0.1		Laths.	
Opaque minerals	15	15	0.05-0.1		Grains.	
Pyroxene	-	15	0.05-0.1		Subhedral.	
Glass	-	10	N/A.		N/A.	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clay minerals	30	Plagioclase/glass.	
Hematite	19	Pyroxenes.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	2	Dispersed.	1-2	Clay minerals.	Irregular.

COMMENTS: A highly oxidized lava from near the top of the volcanic sequence.

134-831B-69R-03 (Piece 4, 54-58 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	12	15	0.2-0.5		Subhedral.	Some alteration, fractured.
Clinopyroxene	1	1	0.3-1.5		Subhedral.	
Opaque minerals	1	1	0.05-0.4		Subhedral.	
GROUNDMASS						
Plagioclase	20	30	0.05-0.1		Laths.	
Opaque minerals	10	10	0.01-0.05		Grains.	
Clinopyroxene	5	5	0.05-0.1		Grains.	
Glass	-	36	N/A.		N/A.	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clay minerals	36	Feldspar and glass.	
Palagonite	15	Glass.	Concentrated in patches and veins.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	5	Dispersed.	0.1-0.5	Clay minerals.	Irregular.

134-831B-69R-03 (Piece 4B, 58-61 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	22	22	0.3-4.0		Euhedral to subhedral.	Severely altered.
Clinopyroxene	5	5	0.2-2.0		Subhedral.	
Orthopyroxene	2	2	0.2-1.0		Subhedral.	
Opaque minerals	1	1	0.1-0.2		Subhedral.	
GROUNDMASS						
Plagioclase	30	30	0.03-0.1		Laths.	
Clinopyroxene	3	3	0.01-0.05		Laths and granular.	
Orthopyroxene	4	4	0.01-0.05		Laths.	
Opaque minerals	3	3	0.002-0.04		Rounded.	Minute grains show reddish color.
Glass	30	30	N/A.		N/A.	Light brown color.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	tr.	Orthopyroxene.	

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

134-831B-70R-01 (Piece 3, 123-125 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	22	22	0.3-4.0		Euhedral.	Fractured but very fresh, oscillatory zoning, small crystalline inclusions.
Clinopyroxene	3	3	0.1-2.0		Subhedral.	
GROUNDMASS						
Plagioclase	10	10	0.05-0.1		Laths.	
Opaque minerals	7	7	0.05-0.1		Grains.	
Glass	8	33	N/A.		N/A.	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clay minerals	50	Vesicles/glass.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	25		0.05-0.06	Clay minerals.	Irregular.	Lined or filled by yellow to brown clay or oxide.

134-831B-70R-03 (Piece 2, 34-36 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	30	30	0.3-6.0		Euhedral.	Oscillatory zoning, inclusions.
Clinopyroxene	4	4	0.1-2.0	Augite.	Subhedral.	
Orthopyroxene	2	2	0.2-2.0	Hypersthene.	Subhedral.	Pleochroic pale pink to green, glomeroporphyritic with clinopyroxene.
Opaque minerals	4	4	0.05-0.3			Subhedral.
GROUNDMASS						
Plagioclase	35	35	0.05-0.1		Laths.	
Pyroxene	5	5	0.05-0.1		Grains.	
Glass	20	20	0.05-0.1		N/A.	Patches of sideromelane associated with glomeroporphyritic clusters.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	1	Dispersed.	0.05-4.0	Clay minerals.	Subrounded.

134-831B-70R-04 (Piece 4, 77-80 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	28	28	0.2-4.0		Subhedral.	
Clinopyroxene	3	3	0.15-2.0	Augite.	Subhedral.	
Orthopyroxene	2	2	0.2-1.5		Subhedral.	
Opaque minerals	1	1	0.1-0.4		Subhedral.	
GROUNDMASS						
Plagioclase	23	23	0.05-0.1		Laths.	
Pyroxenes	15	15	0.05-0.1		Grains.	
Opaque minerals	3	3	0.05-0.1		Grains.	
Glass	22	22	0.1-0.2		N/A.	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	3		<0.4	Clay minerals.	Irregular.

COMMENTS: Clast enclosed in matrix of yellow/brown glass altering to palagonite. Enclosed in this glass are lithic and crystal fragments of same type as in andesite clasts. The most conspicuous crystal components are the fractured and slivered pieces of plagioclase.

134-831B-71R-02 (Piece 5, 69-70 cm) OBSERVER: HAS WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	24	24	0.3-3.5		Euhedral to subhedral.	Sometimes glomeroporphyritic.
Clinopyroxene	5	5	0.2-2.5		Subhedral.	
Orthopyroxene	2	2	0.25-1.7		Euhedral to subhedral.	
Opaque minerals	1	1	0.1-0.8		Rounded.	
GROUNDMASS						
Plagioclase	20	20	0.02-0.2		Laths.	
Clinopyroxene	5	5	0.04-0.1		Tabular or grains.	
Orthopyroxene	5	5	0.02-0.01		Laths.	
Opaque minerals	3	3	0.007-0.01		Granular.	
Glass	20	34	N/A.		N/A.	Brown color.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Silica minerals	7	Glass.	
Alkali feldspar	7	Glass.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	<1		0.5-1.0	Palagonite.	Irregular.

COMMENTS: Matrix of yellow/brown palagonite groundmass with fractured and slivered pieces of plagioclase and serpentine altered from pyroxenes is attached on the edge of the clast described above.

134-831B-71R-02 (Piece 6A, 76-78 cm) OBSERVER: HAS WHERE SAMPLED:

ROCK NAME: Palagonite matrix.

GRAIN SIZE:

TEXTURE:

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	24	24	0.1-2.5		Subhedral.	Some are fractured and slivered.
Clinopyroxene	2	7	0.15-1.0		Subhedral.	
Orthopyroxene	tr.	3	0.15-1.0		Subhedral.	
Opaque minerals	1	1	0.1-0.3		Rounded.	
GROUNDMASS						
Plagioclase	25	25	0.02-0.1		Euhedral.	
Opaque minerals	2	2	0.004-0.02		Granular.	
Clinopyroxene	5	5	0.02		Granular.	
Orthopyroxene	5	5	0.02		Laths.	
Glass	-	27	N/A.		N/A.	Altered to palagonite.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Palagonite	27	Glass.	
Chlorite	6	Pyroxenes.	
Serpentine	2	Pyroxene.	
Clay minerals	1	Vesicles.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	1		0.1-0.5	Clay minerals.	Irregular.

COMMENTS: An andesite clast is included at the edge of thin section. Clast enclosed in matrix of yellow/brown glass altering to palagonite. Subrounded clasts of andesite, 0.5-3.0 mm in size are found (5% of total). They are rich in acicular oxides.

134-831B-71R-04 (Piece 7, 145-150 cm) OBSERVER: HAS WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	25	25	0.3-5.0		Euhedral to subhedral.	
Clinopyroxene	5	5	0.2-3.0		Subhedral.	Some crystals grow after plagioclase.
Orthopyroxene	3	3	0.2-2.5		Euhedral to subhedral.	Clinopyroxene parallel growth on the rim along c-axis.
Opaque minerals	1	1	0.1-0.3		Rounded.	Microphenocryst size.
GROUNDMASS						
Plagioclase	30	30	0.01-0.1		Laths.	
Clinopyroxene	2	2	0.03-0.1		Rounded.	
Orthopyroxene	4	4	0.03-0.1		Elongate laths.	Clinopyroxene parallel growth.
Opaque minerals	3	3	0.002-0.5		Cubic or rounded.	
Glass	25	25	N/A.		N/A.	Brownish color.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	2	Groundmass.	0.05-0.2	Brownish crypto-crystalline material.	Irregular.	Nearly isotropic.

134-831B-75R-01 (Piece 1, 1-3 cm) OBSERVER: HAS WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	25	25	0.2-4.5		Euhedral to subhedral.	Glomeroporphyritic with the rest of phenocryst phases. Inclusions of glass and/or clinopyroxene.
Clinopyroxene	8	8	0.15-2.0		Subhedral.	
Orthopyroxene	3	3	0.15-1.2		Euhedral to subhedral.	
Opaque minerals	1	1	0.1-1.2		Rounded.	
GROUNDMASS						
Plagioclase	30	30	0.02-0.1		Laths.	Moderate orientation of groundmass and microphenocryst plagioclase.
Clinopyroxene	4	4	0.01-0.1		Granular.	
Orthopyroxene	4	4	0.02-0.1		Laths.	
Opaque minerals	5	5	0.002-0.05		Granular.	
Glass	18	20	N/A.		N/A.	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Plagioclase	2	Glass.	

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

134-831B-76R-05 (Piece 11, 109-110 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	30	30	0.2-6.0		Euhedral.	Strong oscillatory zoning.
Clinopyroxene	6	6	0.05-0.2		Subhedral.	
Orthopyroxene	1	1	0.1-1.0		Subhedral.	
Opaque minerals	1	1	0.1-1.0		Subhedral.	
GROUNDMASS						
Plagioclase	26	26	0.05-0.1		Laths.	Subparallel orientation.
Pyroxenes	21	21	0.05-0.1		Grains.	
Opaque minerals	15	15	0.05-0.1		Grains.	

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

134-831B-77R-03 (Piece 12, 139-141 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic, intergranular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	27	27	0.3-3.5		Euhedral to subhedral.	
Clinopyroxene	1	6	0.4-2.0		Subhedral.	Altered to chlorite and calcite.
Orthopyroxene	tr	4	0.4-2.0		Subhedral.	Altered to chlorite and calcite.
GROUNDMASS						
Plagioclase	40	40	0.05-0.3		Tabular.	
Clinopyroxene	5	8	0.03-0.2		Granular.	
Orthopyroxene	tr	5	0.03-0.2		Granular.	Altered to chlorite and actinolite.
Opaque minerals	-	2	0.04-0.15		Cubic, subrounded.	
Glass	0	8	N/A.		N/A.	Altered to chlorite and clay minerals.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	15	Glass and pyroxenes.	
Celadonite	8	Glass, pyroxenes.	
Calcite	2	Pyroxenes.	
Actinolite	tr	Pyroxenes.	

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

COMMENTS: Groundmass minerals are more coarse-grained and hyghly crystalline than other andesites recovered from the same hole. Attached at the bottom is a more altered, finer-grained andesite. No reactions rim nor chilled margin at the contact.

134-831B-79R-02 (Piece 3, 31-33 cm) OBSERVER: HAS WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	18	18	0.4-3.0		Subhedral.	Some show melting texture and glass inclusions.
Clinopyroxene	2	2	0.2-1.2		Subhedral.	
Orthopyroxene	3	5	1.2		Subhedral.	Altered to chlorite, oxidized rim.
Opaque minerals	1	1	0.1-0.4		Rounded.	
GROUNDMASS						
Plagioclase	20	20	0.02-0.15		Laths.	
Clinopyroxene	2	4	0.01-0.1		Granular.	Partly oxidized.
Orthopyroxene	1	4	0.01-0.1		Laths.	Partly oxidized.
Opaque minerals	1	6	0.005-0.05		Small granular and acicular.	
Glass	15	26	N/A.		N/A.	Partly altered to chlorite and celadonite.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Chlorite	7	Glass.	
Hematite	7	Pyroxene.	
Celadonite	5	Glass.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	
Vesicles	20		0.5-1.5	None.	Irregular, stretched and connected.	A few are filled by calcite.

134-831B-80R-03 (Piece 5A, 108-109 cm) OBSERVER: HAS WHERE SAMPLED: Clast in andesite breccia.

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	20	20	0.2-4.3		Euhedral to subhedral.	Including a few dusty plagioclase.
Clinopyroxene	5	5	0.15-1.8		Subhedral.	
Orthopyroxene	3	3	0.15-1.0		Subhedral.	
Opaque minerals	1	1	0.1-0.4		Rounded.	
GROUNDMASS						
Plagioclase	25	25	0.02-0.5		Laths.	Showing moderate flow structure.
Clinopyroxene	3	3	0.002-0.05		Laths and grains.	Microcrystalline.
Orthopyroxene	3	3	0.02-0.05		Laths and grains.	Microcrystalline.
Glass	0	30	N/A.		N/A.	Palagonitized, mostly reddish brown; partly light brown.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Palagonite	28	Glass.	
Chlorite	2	Glass.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	10		0.3-2.0	Palagonite 0.05 mm thick from the wall.	Irregular and connected.

COMMENTS: Including a xenolth, 3 mm in size, consisting of plagioclase, clinopyroxene, orthopyroxene, and interstitial palagonitized glass. Size of crystals are 0.3-1.0 mm, all are subhedral. This is probably a cumulate.

134-831B-81R-01 (Piece 1, 76-79 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	20	23	0.3-2.0		Subhedral.	Oscillatory zoning and zones of inclusions.
Clinopyroxene	2	4	0.1-0.2		Subhedral.	
Orthopyroxene	-	2	0.1-1.0		Subhedral.	Intensively altered to chlorite and celadonite.
Opaque minerals	1	1	0.1-0.2		Anhedral.	
GROUNDMASS						
Plagioclase	5	5	0.01-0.03		Laths.	
Opaque minerals	15	15	0.01-0.05		Grains.	
Glass	15	35	N/A.		N/A.	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Zeolites	20	Glass.	Also filling vesicles and fractures.
Clay minerals	10	Glass.	
Palagonite	10	Glass.	
Celadonite	1	Orthopyroxene.	
Chlorite	1	Orthopyroxene.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	15	General.	0.1-0.5	Zeolites.	Irregular.

COMMENTS: A dark, scorioceous and heavily oxidized rock which probably originated as an andesitic palagonite breccia.

134-831B-82R-02 (Piece 3, 41-43 cm) OBSERVER: COL WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained to microcrystalline.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	25	25	0.5-2.5	An_{45}	Euhedral.	Some crystals are very rich in crystal and glass inclusions. Sometimes glomeroporphyritic in association with orthopyroxene.
Orthopyroxene	6	6	0.5-1.5		Euhedral to subhedral.	
Clinopyroxene	5	5	0.5-1.5		Euhedral to subhedral.	
Opaque minerals	1	1	0.4-0.8		Anhedral.	
GROUNDMASS						
Plagioclase	20	20	0.01-0.02		Laths.	Very small crystallites.
Glass	43	43	N/A.		N/A.	Slightly oxidized.

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

COMMENTS: Some fractures at the edge of the larger clasts are filled with chlorite (0.1-0.3 mm in size). The description refers to the larger clasts (1-2 cm). The matrix is composed of smaller andesitic fragments (1-2 mm), plagioclase and pyroxenes crystals.

134-831B-83R-02 (Piece 6, 106-109 cm) OBSERVER: BAK WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	25	25	0.4-2.0		Euhedral.	Oscillatory zoning, crystal and glass inclusions.
Clinopyroxene	4	4	0.2-1.0		Subhedral.	
Orthopyroxene	1	1	0.2-0.5		Subhedral.	
Opaque minerals	1	1	0.05-0.1		Subhedral.	
GROUNDMASS						
Plagioclase	12	12	0.05-0.1		Laths.	
Pyroxene	12	12	0.05-0.1		Grains.	
Glass	45	45	N/A.		N/A.	Clear, very pale brown with crystallites.

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

134-831B-84R-03 (Piece 1, 8-9 cm) OBSERVER: COL WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Glassy.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESEN	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	15	15	0.4-1.5	An_{54}	Euhedral.	
Clinopyroxene	7	7	0.5-1.0		Euhedral to subhedral.	
Orthopyroxene	5	5	0.2-1.0		Euhedral to subhedral.	
Opaque minerals	1	1	0.1-0.2		Subhedral to anhedral.	
GROUNDMASS						
Plagioclase	6	6	0.02- 0.1		Laths.	
Pyroxenes	1	1	0.02-0.2		Grains.	
Glass	55	55	N/A.		N/A.	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	10		<1	Palagonite.	Irregular.	

COMMENTS: Groundmass slightly oxidized.

134-831B-84R-04 (Piece 7, 137-141 cm) OBSERVER: COL WHERE SAMPLED:

ROCK NAME: Andesite.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPO-SITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	20	27	1-5		Euhedral.	Some crystals are highly altered to clay minerals.
Clinopyroxene	10	18	0.5-1.0		Subhedral.	
Opaque minerals	1	1	0.5-0.7		Subhedral.	
GROUNDMASS						
Plagioclase	20	20	0.05-0.1		Laths	
Pyroxenes	15	15	0.5-0.8		Grains.	
Opaque minerals	8	10	0.02-0.05		Grains.	Altered to hydroxides.
Glass	9	9	N/A.		N/A.	

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clay minerals	7	Plagioclase.	
Chlorite	6	Clinopyroxene.	
Hydroxides	4	Clinopyroxene/opaque minerals.	

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