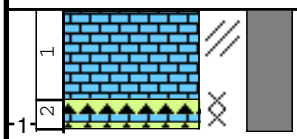
Core Photo

1186A-1W WASH CORE

Site 1186 Hole A Core 2R Cored 697.4-706.9 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
1	1, 2						XRD CAR THS	NANNOFOSSIL FORAMINIFER LIMESTONE

Age: late Eocene

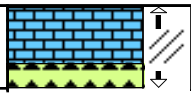
Major Lithology:

White (N9) NANNOFOSSIL FORAMINIFER LIMESTONE has moderate bioturbation dominated by Planolites type burrows. Some burrows are filled by black particles. Microfacies in thin section from Section 1 at 47-50 cm, is a foraminifer wackestone to packstone containing about 40% foraminifers.

Minor Lithology:
Section CC has CHERT, dark reddish gray (5YR 4/2), which contains white patches of LIMESTONE.

Core Photo

Site 1186 Hole A Core 3R Cored 706.9-716.5 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
	1						CAR XRD	FORAMINIFER NANNOFOSSIL LIMESTONE and CHERT

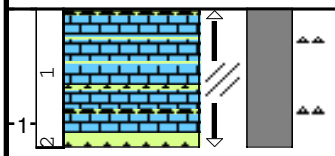
Age: middle to late Eocene

Major Lithologies:

White (N9) FORAMINIFER NANNOFOSSIL LIMESTONE has moderate bioturbation, but discrete burrows cannot be resolved. CHERT, dark reddish gray (5YR 4/2), contains white patches of LIMESTONE. Stylolitic and other diagenetic laminae are present within the limestone.

Core Photo

Site 1186 Hole A Core 4R Cored 716.5-726.1 mbsf



NANNOFOSSIL LIMESTONE WITH FORAMINIFERS and CHERT

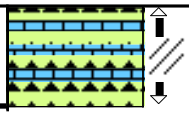
Age: middle Eocene

Major Lithologies:

White (N9) NANNOFOSSIL LIMESTONE WITH FORAMINIFERS is partially silicified and has light gray laminae. Some foraminifer chambers are filled by chert, and carbonate content is ~60%. The LIMESTONE has moderate bioturbation, but discrete burrows cannot be resolved. Microfacies in thin section from Section 1 at 75-79 cm is a sparse foraminifer wackestone containing about 10% foraminifers. Pieces of CHERT, gray (N5) are in Section 1 at 12-22 cm and 25-28 cm.

Core Photo

Site 1186 Hole A Core 5R Cored 726.1-735.7 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
	1 2						CAR XRD	LIMESTONE and CHERT

Age: early to middle Eocene

Major Lithologies:

White (N9) LIMESTONE is partially silicified. Carbonate content is ~65%. Stringers and irregular beds of CHERT, gray (N5) are abundant. Bioturbation is moderate. Several intervals have burrows filled with LIMESTONE within a gray silicified matrix, but CHERT appears to fill burrows within LIMESTONE in Section 1 at 50-55 cm.

Core Photo

Site 1186 Hole A Core 6R Cored 735.7-745.3 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
	1						CAR THS XRD	CHERT and SILICEOUS LIMESTONE

Age: early Eocene

Major Lithologies:

SILICEOUS LIMESTONE in Section CC at 0-8 cm is very light gray (N8) and has a carbonate content of 35%. The microfacies in thin section from Section CC at 2-5 cm is a wackestone-packstone with ~30% radiolarians and ~20% foraminifers and foraminifer ghosts. Most foraminifer chambers are filled by silica. CHERT in Section CC at 9-28 cm is pinkish white (10YR 8/2) to reddish brown (5YR 4/4) and contains some patches of LIMESTONE.

Core Photo

Site 1186 Hole A Core 7R Cored 745.3-755.0 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
	1						PAL	CHERT

Age: early Eocene

Major Lithologies:

A single piece of CHERT, gray (5YR 5/1), contains small patches of white LIMESTONE.

Core Photo

Site 1186 Hole A Core 8R Cored 755.0-764.6 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
	1						PAL	CHERT

Age: late Paleocene to early Eocene

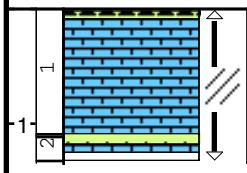
Major Lithologies:

Two fragments of CHERT, gray (5YR 5/1), contain rounded patches of white LIMESTONE.

Core Photo

Site 1186 Hole A Core 9R Cored 764.6-774.2 mbsf

METERS | SECTION | GRAPHIC LITH. | DISTURB. | BIOTURB. | STRUCTURE | ACCESSORIES | SAMPLE | DESCRIPTION



THS
XRD
PAL

FORAMINIFER NANNOFOSSIL CHALK and CHERT

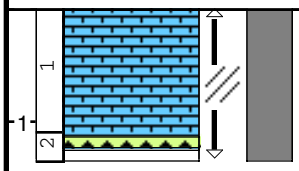
Age: late Paleocene

Major Lithologies:

FORAMINIFER NANNOFOSSIL CHALK, white (N9), is bioturbated but the uniform white color obscures individual burrows. Microfacies in thin section from Section 1 at 96-99 cm is a foraminifer wackestone. CHERT, olive brown (2.5YR 4/4), with patches and rinds of white CHALK, is in Section 1 at 10-13 cm and Section CC at 0-9 cm (which includes one rounded CHERT nodule in CHALK). Black specks of possible pyrite are rare within the limestone.

Core Photo

Site 1186 Hole A Core 10R Cored 774.2-783.9 mbsf



NANNOFOSSIL FORAMINIFER CHALK

Age: late Paleocene

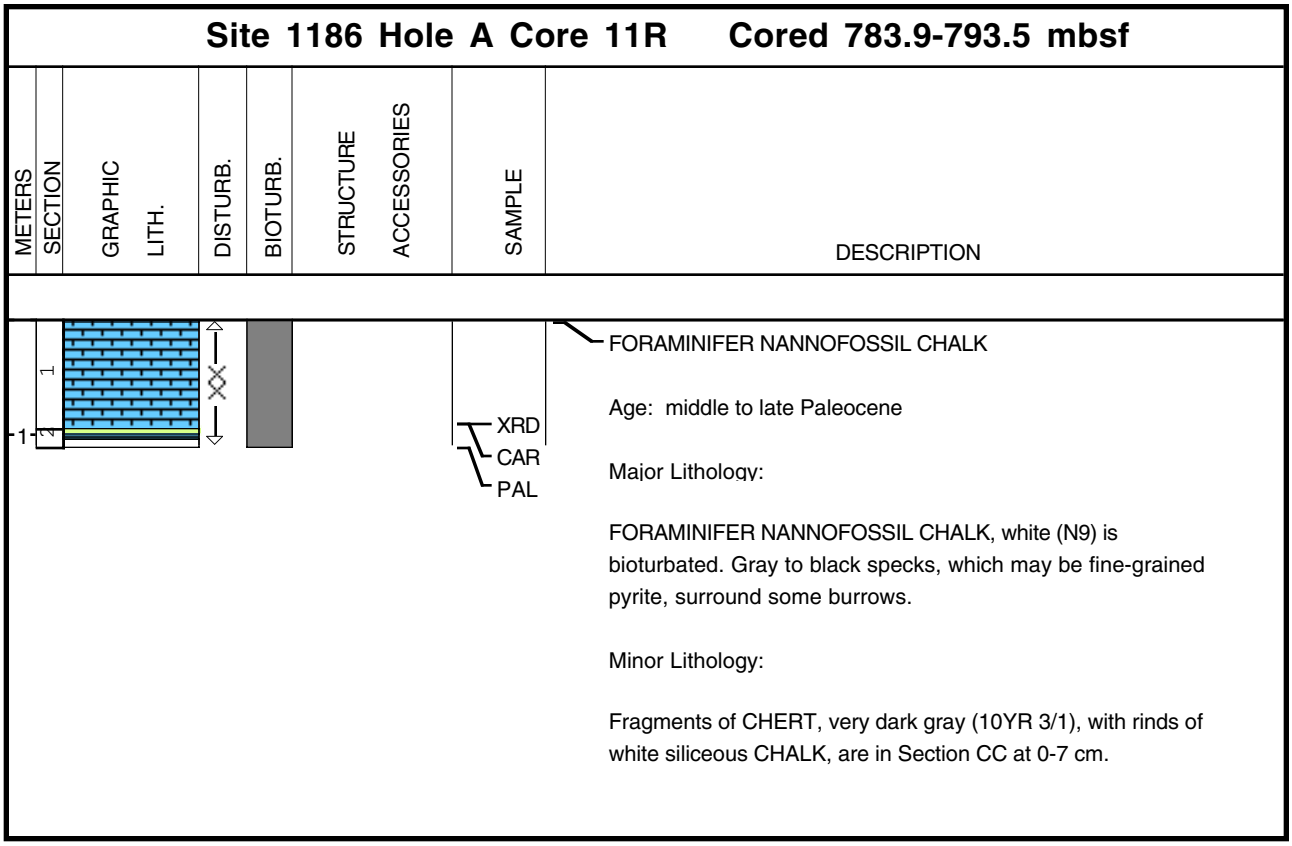
Major Lithology:

NANNOFOSSIL FORAMINIFER CHALK, white (N9) to very light gray (N8), is bioturbated with Planolites burrows. Carbonate content is ~95%, and microfacies in thin section from Section 1 at 72-75 cm is a foraminifer packstone with ~50% foraminifers. Rare stylolite and clay seams are in Section 1 at 95 cm.

Minor Lithology:

CHERT, olive brown (5YR 4/4), containing small patches of white LIMESTONE, is in Section CC at 6-15 cm.

Core Photo


Site 1186 Hole A Core 11R Cored 783.9-793.5 mbsf
METERS
SECTION
GRAPHIC LITH.
DISTURB.
BIOTURB.
STRUCTURE
ACCESSORIES
SAMPLE
DESCRIPTION
1
1
2
XRD
CAR
PAL
FORAMINIFER NANNOFOSSIL CHALK
Age: middle to late Paleocene
Major Lithology:
FORAMINIFER NANNOFOSSIL CHALK, white (N9) is bioturbated. Gray to black specks, which may be fine-grained pyrite, surround some burrows.
Minor Lithology:
Fragments of CHERT, very dark gray (10YR 3/1), with rinds of white siliceous CHALK, are in Section CC at 0-7 cm.

Core Photo

Site 1186 Hole A Core 12R Cored 793.5-803.1 mbsf

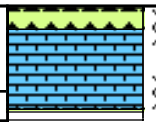
METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
	1						THS PAL	CHERT

Age: middle Paleocene

Fragments of CHERT, dark reddish brown (5YR 2/2), contain rinds and small patches of white CHALK.

Core Photo

Site 1186 Hole A Core 13R Cored 803.1-812.7 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
1	1 2						CAR XRD PAL	FORAMINIFER NANNOFOSSIL CHALK and ZEOLITIC CHALK Age: early to middle Paleocene Major Lithology: CHALK, very light gray (5Y 8/1) grades into ZEOLITIC CHALK, light gray (10YR 7/2) to dark gray (5Y 4/1). An olive gray (5Y 5/2) piece of ZEOLITIC CHALK is in Section CC at 8-13 cm. Bioturbation, especially Planolites type, is common and may include an abundance of vertical burrow types. The ZEOLITE CHALK intervals have microflaser texture, anastomosing seams, and small nodules or burrows filled by chalk. Minor Lithology: CHERT, dark reddish gray (5YR 4/2) to reddish brown (5YR 4/4) with patches of white LIMESTONE, in Section 1 at 0-20 cm and Section CC at 13-17 cm.

Core Photo

Site 1186 Hole A Core 14R Cored 812.7-822.3 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
	1						XRD CAR PAL	CHERT and FORAMINIFER NANNOFOSSIL CHALK Age: late Maastrichtian to early Paleocene Major Lithologies: CHERT, red (2.5R 4/8), contains rare patches of white FORAMINIFER NANNOFOSSIL CHALK. One piece of CHALK, white (N9), is in Section CC, 0-5 cm.

Core Photo

Site 1186 Hole A Core 15R Cored 822.3-832.0 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
	1						CAR XRD PAL	CHERT and FORAMINIFER NANNOFOSSIL CHALK

Age: late Maastrichtian

Major Lithologies:

CHERT, red (2.5R 4/8) with light gray (N8) and brownish red (5YR 4/4) lenses and bands.
FORAMINIFER NANNOFOSSIL CHALK, white (N9), in Section CC, 0-8 cm, has no distinctive sedimentary features.

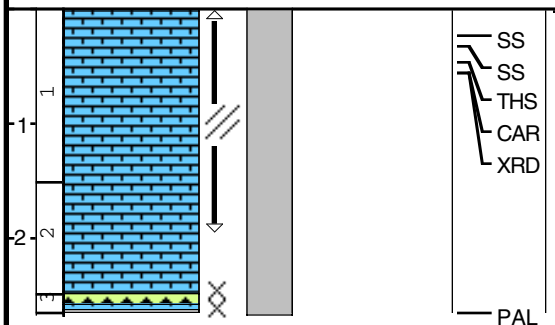
Core Photo

Site 1186 Hole A Core 16R Cored 832.0-841.7 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
1	1						CAR XRD SS PAL	FORAMINIFER NANNOFOSSIL CHALK Age: late Maastrichtian Major Lithology: FORAMINIFER NANNOFOSSIL CHALK is white (N9) with subtle bands of very light gray (N8.5). It is bioturbated and includes Planolites burrows, but most burrows are difficult to discern against the white background.

Core Photo

Site 1186 Hole A Core 17R Cored 841.7-851.0 mbsf



FORAMINIFER NANNOFOSSIL CHALK

Age: late Maastrichtian

Major Lithology:

FORAMINIFER NANNOFOSSIL CHALK is white (N9) with cm-scale bands of light greenish gray (5GY 8/1). There is no discernable difference between the light and dark color bands in thin sections and smear slides, but stylolites and anastomosing seams are only apparent in the darker bands. Carbonate content is 96%, and microfacies in thin section from Section 1 at 46-50 cm is a foraminifer wackestone with ~25% foraminifers. Bioturbation is not obvious, but may be obscured by later diagenesis.

Minor Lithology:

CHERT, red (2.5R 4/6), is in Section CC at 0-8 cm.

Core Photo

Site 1186 Hole A Core 18R Cored 851.0-860.6 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
	1							CHERT

Age: late Maastrichtian

Major Lithology:

Fragments of CHERT are red (10R 4/8) with rind of white porcellanite.

Core Photo

Site 1186 Hole A Core 19R Cored 860.6-870.2 mbsf

METERS	SECTION	GRAPHIC LITH.	DISTURB.	BIOTURB.	STRUCTURE	ACCESSORIES	SAMPLE	DESCRIPTION
	1						CAR XRD	FORAMINIFER NANNOFOSSIL CHALK

Age: early to late Maastrichtian

Major Lithology:

FORAMINIFER NANNOFOSSIL CHALK, white (N9), has subtle cm-scale bands of light greenish gray (10Y 8/1) in Section 1 at 3-20 cm. There is no visible bioturbation in the white chalk.

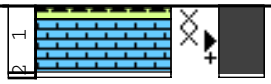
Minor Lithology:

CHERT, red (10R 4/8), in Section 1, 0-3 cm, may be a piece that was displaced down hole.

Core Photo

Site 1186 Hole A Core 20R Cored 870.2-879.9 mbsf

METERS | SECTION | GRAPHIC LITH. | DISTURB. | BIOTURB. | STRUCTURE | ACCESSORIES | SAMPLE | DESCRIPTION



XRD
CAR
PAL

NANNOFOSSIL CHALK

Age: late Campanian to early Maastrichtian

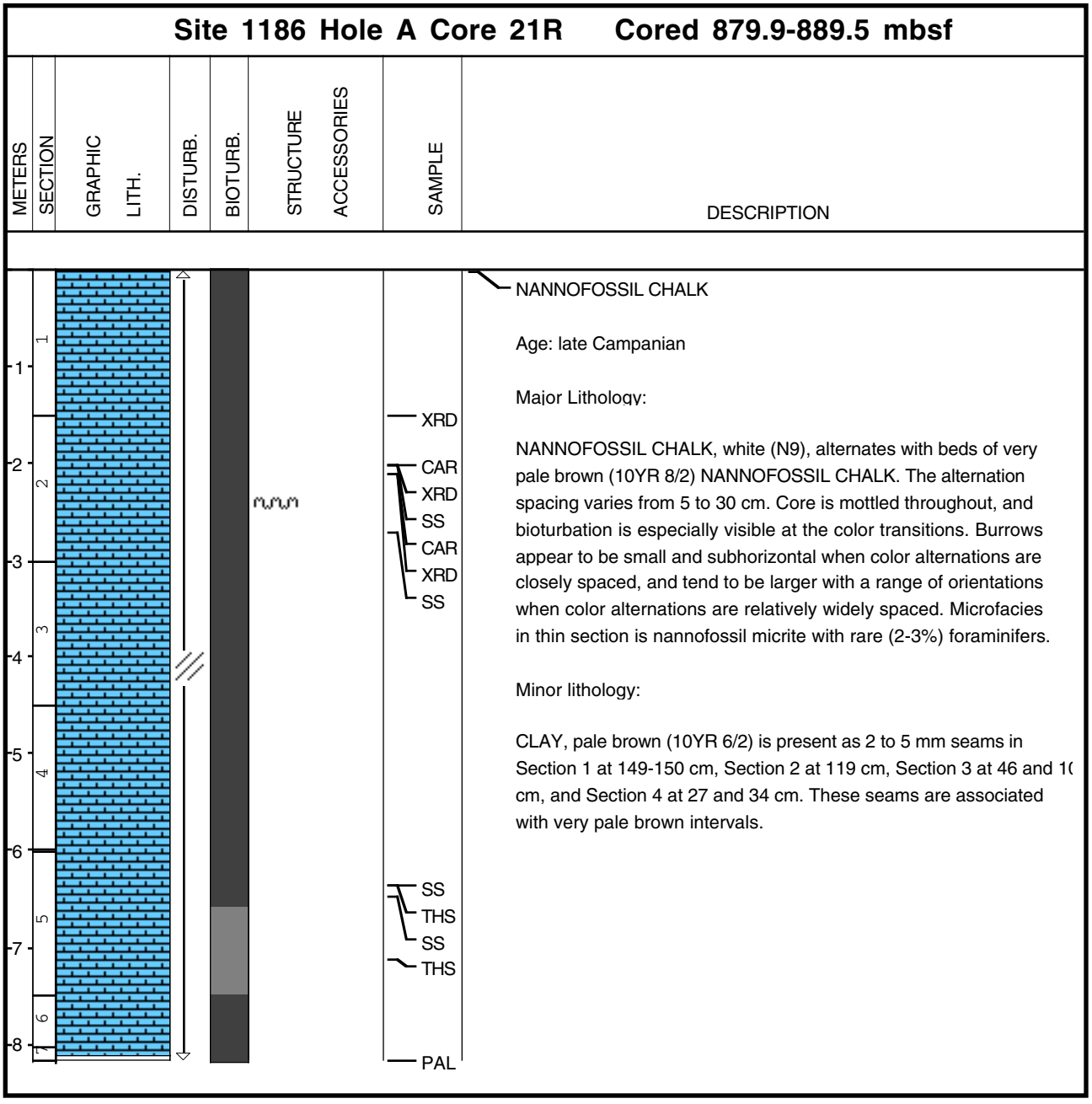
Major Lithology:

NANNOFOSSIL CHALK, white (N9), is bioturbated, but burrows are difficult to resolve due to homogenous white color.

Minor Lithology:

CHERT, red (10R 4/6), fragments at top of core in Section 1, 0-12 cm, may be material that was displaced down hole.

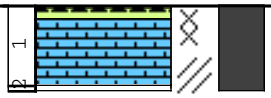
Core Photo


Site 1186 Hole A Core 21R Cored 879.9-889.5 mbsf
METERS
SECTION
GRAPHIC LITH.
DISTURB.
BIOTURB.
STRUCTURE
ACCESSORIES
SAMPLE
DESCRIPTION
XRD
CAR
XRD
SS
CAR
XRD
SS
SS
THS
SS
THS
PAL
NANNOFOSSIL CHALK
Age: late Campanian
Major Lithology:
NANNOFOSSIL CHALK, white (N9), alternates with beds of very pale brown (10YR 8/2) NANNOFOSSIL CHALK. The alternation spacing varies from 5 to 30 cm. Core is mottled throughout, and bioturbation is especially visible at the color transitions. Burrows appear to be small and subhorizontal when color alternations are closely spaced, and tend to be larger with a range of orientations when color alternations are relatively widely spaced. Microfacies in thin section is nannofossil micrite with rare (2-3%) foraminifers.
Minor lithology:
CLAY, pale brown (10YR 6/2) is present as 2 to 5 mm seams in Section 1 at 149-150 cm, Section 2 at 119 cm, Section 3 at 46 and 1(
cm, and Section 4 at 27 and 34 cm. These seams are associated with very pale brown intervals.

Core Photo

Site 1186 Hole A Core 22R Cored 889.5-899.1 mbsf

METERS | SECTION | GRAPHIC LITH. | DISTURB. | BIOTURB. | STRUCTURE | ACCESSORIES | SAMPLE | DESCRIPTION



XRD
CAR
THS
PAL

NANNOFOSSIL CHALK

Age: late Campanian

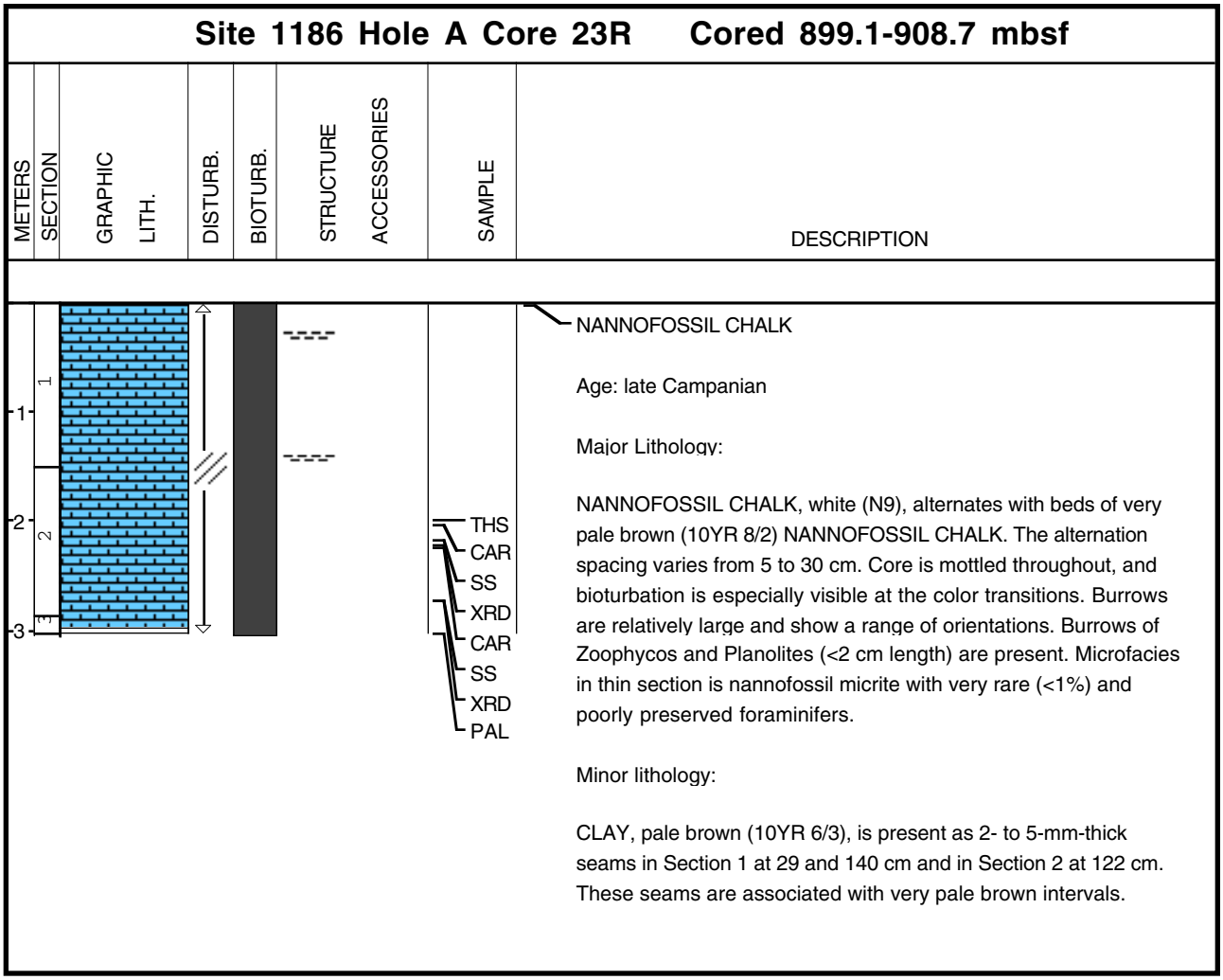
Major Lithology:

NANNOFOSSIL CHALK is mottled white to very pale brown (N9 to 10YR 8/2), and bioturbation is especially visible at the color transitions. Planolites burrows are present. Pale brown (10YR 6/2) clay seams are present in Section 1 at 54 and 60 cm. Microfacies in thin section is nannofossil micrite with very rare (<1%) foraminifers.

Minor Lithology:

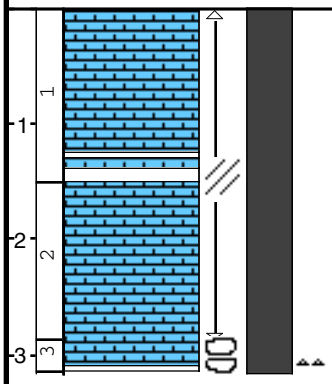
CHERT pieces, dusky red to dark red (10R 3/4 to 10R 3/6) and brown 10YR 4/3, at top of core in Section 1, 0-10 cm, may be may be material that was displaced down hole.

Core Photo


Site 1186 Hole A Core 23R Cored 899.1-908.7 mbsf
METERS
SECTION
GRAPHIC LITH.
DISTURB.
BIOTURB.
STRUCTURE
ACCESSORIES
SAMPLE
DESCRIPTION
1
2
3
THS
CAR
SS
XRD
CAR
SS
XRD
PAL
NANNOFOSSIL CHALK
Age: late Campanian
Major Lithology:
NANNOFOSSIL CHALK, white (N9), alternates with beds of very pale brown (10YR 8/2) NANNOFOSSIL CHALK. The alternation spacing varies from 5 to 30 cm. Core is mottled throughout, and bioturbation is especially visible at the color transitions. Burrows are relatively large and show a range of orientations. Burrows of Zoophycos and Planolites (<2 cm length) are present. Microfacies in thin section is nannofossil micrite with very rare (<1%) and poorly preserved foraminifers.
Minor lithology:
CLAY, pale brown (10YR 6/3), is present as 2- to 5-mm-thick seams in Section 1 at 29 and 140 cm and in Section 2 at 122 cm. These seams are associated with very pale brown intervals.

Core Photo

Site 1186 Hole A Core 24R Cored 908.7-918.3 mbsf



DESCRIPTION

NANNOFOSSIL CHALK

Age: late Campanian

Major Lithology:

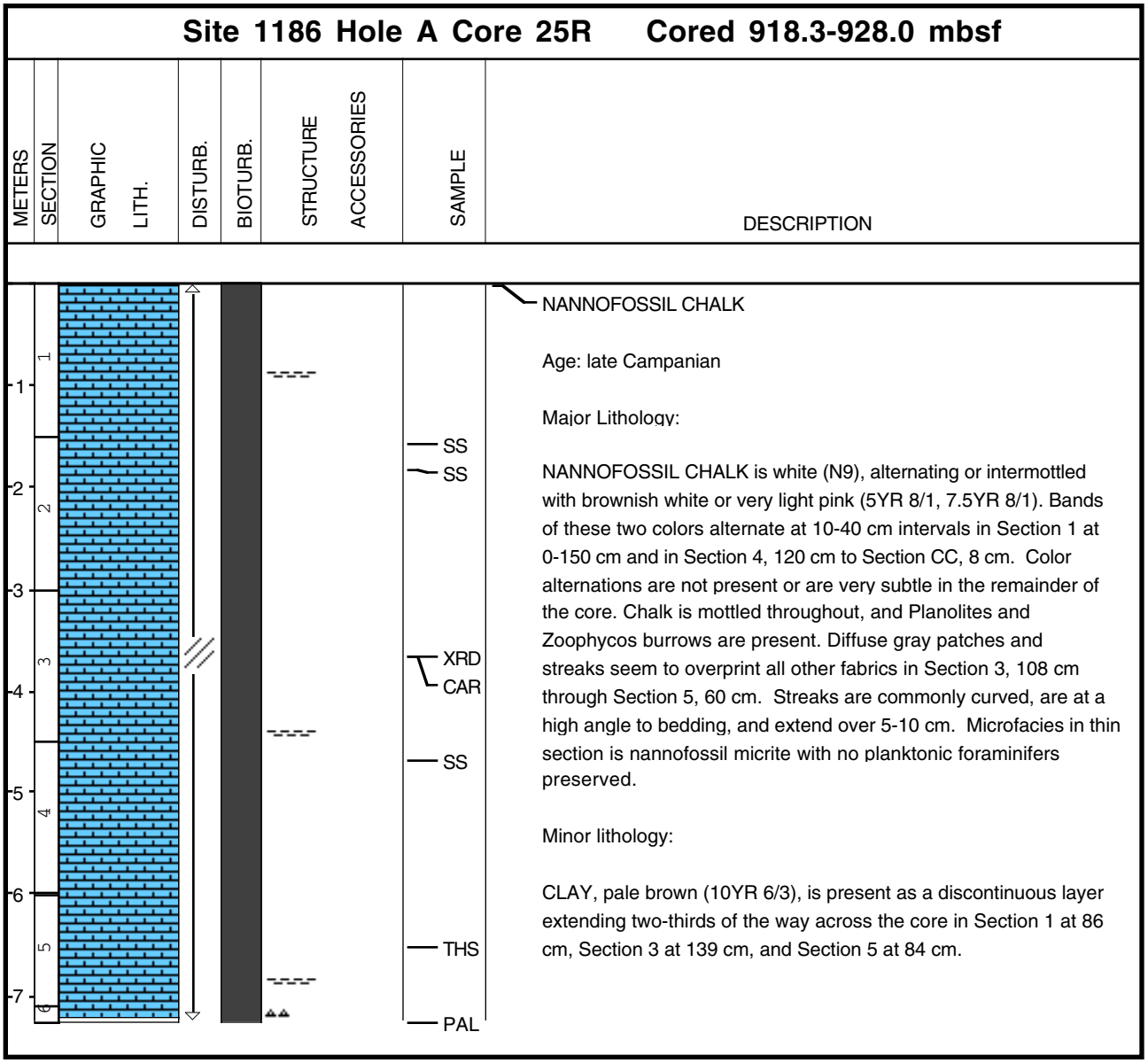
NANNOFOSSIL CHALK, white (N9), alternates with beds of very pale brown (10YR 8/2) NANNOFOSSIL CHALK. The alternation spacing varies from 5 to 20 cm. Core is mottled throughout, and bioturbation is especially visible at the color transitions. Burrows range from horizontal to vertical, and Planolites burrows are present. Microfacies in thin section is nannofossil micrite with very rare (<1%) and poorly preserved foraminifers.

Minor Lithologies:

CLAY, pale brown (10YR 6/3), is present as small pieces in Section 2, 5-10 cm, but no discrete seams were observed.

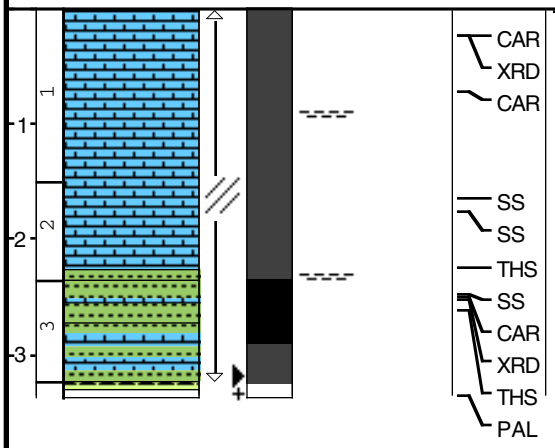
CHERT, black (N8), is present in Section CC at 18-23 cm.

Core Photo


Site 1186 Hole A Core 25R Cored 918.3-928.0 mbsf
METERS
SECTION
GRAPHIC LITH.
DISTURB.
BIOTURB.
STRUCTURE
ACCESSORIES
SAMPLE
DESCRIPTION
1
2
3
4
5
6
CC
SS
SS
XRD
CAR
SS
THS
PAL
NANNOFOSSIL CHALK
Age: late Campanian
Major Lithology:
NANNOFOSSIL CHALK is white (N9), alternating or intermottled with brownish white or very light pink (5YR 8/1, 7.5YR 8/1). Bands of these two colors alternate at 10-40 cm intervals in Section 1 at 0-150 cm and in Section 4, 120 cm to Section CC, 8 cm. Color alternations are not present or are very subtle in the remainder of the core. Chalk is mottled throughout, and Planolites and Zoophycos burrows are present. Diffuse gray patches and streaks seem to overprint all other fabrics in Section 3, 108 cm through Section 5, 60 cm. Streaks are commonly curved, are at a high angle to bedding, and extend over 5-10 cm. Microfacies in thin section is nannofossil micrite with no planktonic foraminifers preserved.
Minor lithology:
CLAY, pale brown (10YR 6/3), is present as a discontinuous layer extending two-thirds of the way across the core in Section 1 at 86 cm, Section 3 at 139 cm, and Section 5 at 84 cm.

Core Photo

Site 1186 Hole A Core 26R Cored 928.0-937.6 mbsf



NANNOFOSSIL CHALK and CLAYSTONE to CLAYEY LIMESTONE

Age: late Albian, late Coniacian, and Campanian

Major Lithology:

NANNOFOSSIL CHALK, white (N9 to 10YR 8/2) is present in Section 1, 2 cm to Section 2, 76 cm. The NANNOFOSSIL CHALK is mottled with very subtle light tan/white alternations. Microfacies in thin section is nannofossil micrite with no planktonic foraminifers preserved. Vertical burrows filled with finer material are present throughout the chalk. The burrows cut across all other fabrics and the burrow fillings tend to wash out to leave empty tubes. Gray material in host sediment surrounds these burrows. Disseminated gray regions also surround sharp contacts between 3- to 5-cm-diameter patches of white sediment with curved sharp boundaries and tan sediment in Section 1 at 111-117 cm and in Secti 2 at 19-25 cm. There is no apparent difference except color between chalk on either side of these contacts.

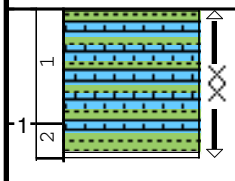
CLAYSTONE to CLAYEY NANNOFOSSIL LIMESTONE is present from Section 2, 77 cm, to Section 3, 86 cm. The CLAYSTONE and CLAYEY NANNOFOSSIL LIMESTONE have a complex fabric with anastomosing laminae and multiple crosscutting mottles or burrows. In general, the color grades downward from near white at Section 2, 77 cm, to dark brown and black at Section 3, 10-15 cm, and then to light gray at Section 3, 87 cm. A coarsely mottled pattern is produced by 1- to 3-cm-long patches of various shades of brown, white, gray, and black within these intervals. Carbonate content at Section 3, 12-13 cm, is ~20%. Thin section from Section 3 at 24-27 cm contains volcanic glass and opaque minerals in a nannofossil and clay matrix, and microfacies from Section 3 at 77-80 cm is a nannofossil micrite with no planktonic foraminifers preserved.
This CLAYSTONE to CLAYEY NANNOFOSSIL LIMESTONE coincides with the transition from the upper Albian to the Campanian and includes an interval of upper Coniacian.

Minor Lithology:

CHERT, black, brown and amber, is present as 3-5-cm-diameter pieces in Section 3 at 7-10 cm and in Section CC at 6-11 cm.

Core Photo

Site 1186 Hole A Core 27R Cored 937.6-947.2 mbsf



RADIOLARIAN NANNOFOSSIL LIMESTONE, NANNOFOSSIL LIMESTONE, and CHERT

Age: late Albian

Major Lithology:

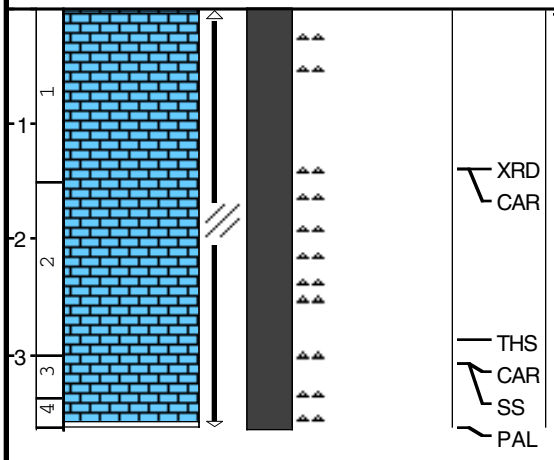
RADIOLARIAN NANNOFOSSIL LIMESTONE to NANNOFOSSIL LIMESTONE, light gray (10YR 7/2) to very dark brown (10YR 2/2), is present as broken pieces <15 cm long. Microflaser fabric is common. Microfacies in thin section from Section 1 at 37-39 cm is a radiolarian wackestone with a partially silicified matrix, and the carbonate content is ~30%. Limestone is silicified in Section CC at 5-20 cm.

Minor Lithology:

CHERT, black (N1) to dark reddish brown (5YR 3/4), is present as broken pieces <5 cm long at several intervals. A red (2.5R 4/8) CHERT piece at top of core in Section 1 at 0-10 cm may material that was displaced down hole. CHERT is dark through remainder of core.

Core Photo

Site 1186 Hole A Core 28R Cored 947.2-956.8 mbsf



NANNOFOSSIL LIMESTONE

Age: early to late Albian

Major Lithology:

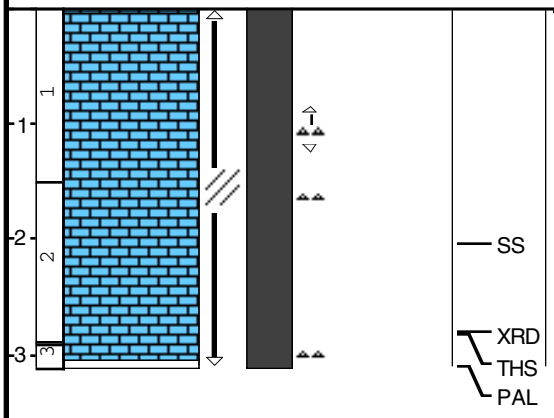
NANNOFOSSIL LIMESTONE is mainly light brownish gray (10YR 6/2) with mottles and patches of white (10YR 8/2), and bands of dark grayish brown (10YR 4/2). Burrows are dominated by Planolites type, and bioturbation is commonly distorted into subhorizontal elongate lenses by compaction. Some intervals have a microflaser texture. Partial silicification forms rare small (<1 cm) irregular nodules. Inclined bioturbation in Section 1 at 120-153 cm may indicate a synsedimentary slump. Carbonate content ranges from 75 to 90%. Microfacies in thin section from Section 2 at 136-139 cm is nannofossil limestone with no planktonic foraminifers preserved.

Minor Lithology:

CHERT, very dark brown (10YR 2/2), is present in several intervals. Each piece is about 5 cm thick.

Core Photo

Site 1186 Hole A Core 29R Cored 956.8-966.4 mbsf



NANNOFOSSIL LIMESTONE WITH FORAMINIFERS

Age: late Aptian

Major Lithology:

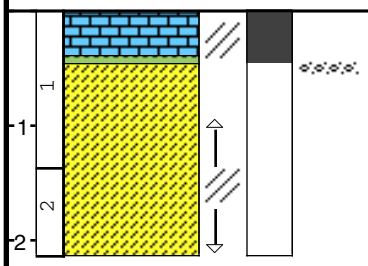
NANNOFOSSIL LIMESTONE WITH FORAMINIFERS is light brownish gray (10YR 6/2) to dark grayish brown (10YR 4/2) with mottles and bands of darker and lighter shades, including white (10YR 8/2). Bioturbation consists mainly of small subhorizontal burrows dominated by Planolites type. A "woody" texture is common, and may be produced by post-depositional compaction and diagenetic enhancement of the bioturbation.

Minor Lithology:

CHERT, very dark brown (10YR 2/2), is present at several intervals. Each piece is about 5 cm thick.

Core Photo

Site 1186 Hole A Core 30R Cored 966.4-970.0 mbsf



NANNOFOSSIL LIMESTONE WITH FORAMINIFERS and FERRUGINOUS CLAYSTONE

Age: early Aptian

Major Lithologies:

NANNOFOSSIL LIMESTONE WITH FORAMINIFERS is pinkish white (10YR 8/2) darkening downward to reddish yellow (10YR 7/6) then strong brown (10YR 5/6). Bioturbation is abundant, and Planolites burrows are common. Microfacies in thin section from Section 1 at 28-31 cm is a foraminifer wackestone with ~15% foraminifers and abundant brownish semi-opaque grains, which may be Fe-oxyhydroxides.

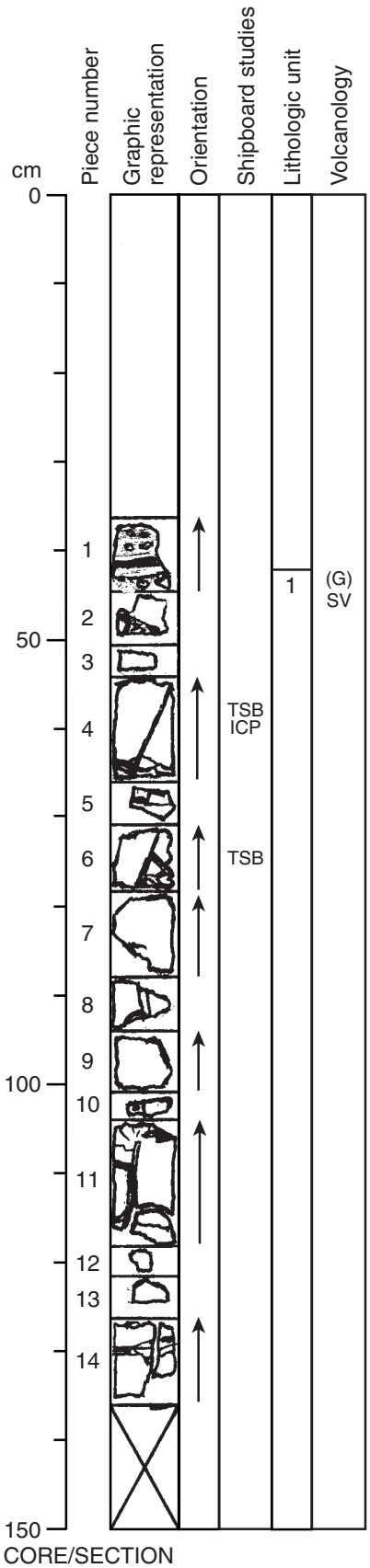
FERRUGINOUS CLAYSTONE in Section 1, 38-45 cm, is dark brown (10YR 3/3) and contains a 5-mm-thick band of pale blue green (5BG 6/2) clay. The FERRUGINOUS CLAYSTONE is mainly laminated and has rare bioturbation.

The FERRUGINOUS CLAYSTONE unconformably overlies a 1-cm-thick breccia layer containing angular basaltic glass fragments (~0.5 cm diameter) and rounded coarse-sand-sized grains. The base of this breccia or the sediment contact with the underlying basalt was not recovered.

Minor Sediment Lithology within Basalt:

Some fractures within the basalt are filled with light gray carbonate. Thin section from such a fracture at Section 1 at 73-76 cm (piece #5) indicates an intraclast limestone breccia of sand-sized clasts of foraminifer and radiolarian wackestone within a microspar matrix.

Core Photo



192-1186A-30R-1 **Section Top: 966.40 mbsf**

UNIT 1: SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 1–14

CONTACTS: The contact between brown claystone of lithologic Unit III and altered glass (clasts) of basement Unit 1 is located in Piece 1 at 44 cm.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max	Min	Avg.	Shape/Habit
Olivine:	1–2	0.4	0.1	0.3	Euhedral to subhedral; commonly in glomerocrysts

GROUNDMASS: Glassy (clasts in Piece 1); aphanitic (Pieces 2–4 and 12–14); fine grained (Pieces 5–10); aphanitic to fine grained (Piece 11).

VESICLES: Sparsely vesicular to nonvesicular. Piece 1 has ~5% vesicles; they are round to irregular and <0.2 to 2 mm in size. They are filled or partly filled with black and green clay and a soft white mineral.

COLOR: Medium light gray (N6) to light gray (N7); applies to the least altered parts of the section.

STRUCTURE: Massive.

ALTERATION: Slight; moderate near veins. Olivine is replaced by black clay and Fe oxyhydroxide, the latter being the prevalent replacement mineral in brown halos.

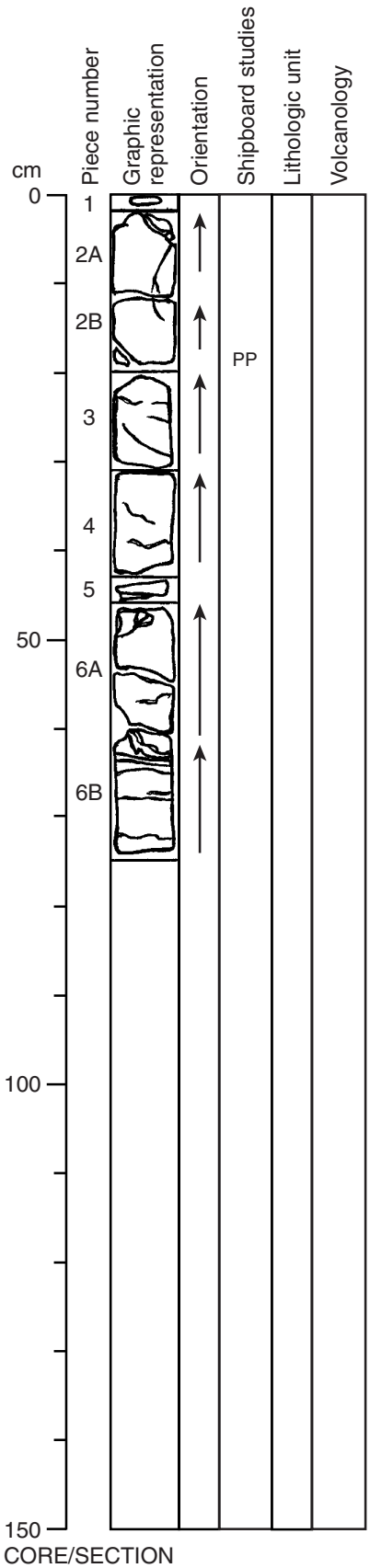
VEINS/FRACTURES: Moderately to highly veined. Veins are <1-8 mm wide and are filled with green-black clay, white crystalline carbonate, an unidentified white mineral (zeolite?), Fe oxyhydroxide, fine-grained pink carbonate, and/or brown and yellow clay. Olive and green-gray halos are present adjacent to some veins. Veins (7 mm wide) in Pieces 10 and 11 contain subangular clay clasts (<1–3 mm) in a brownish yellow matrix. A vein (8 mm wide) in Piece 8 is filled with fine-grained pink carbonate and contains an angular clast of altered glass.

COMMENTS: Irregular miarolitic cavities (0.2–2 mm) are filled with black, green, and white clay and their abundance decreases downsection. Piece 1 is breccia consisting of altered glass clasts (≤15 mm) and brown claystone clasts (<2 mm) in a very pale brown (10YR 8/2) clay matrix. Near one surface of Piece 2, small spherical objects composed of white clay are present; these may represent altered spherulites.

Description of thin section at 59-61 cm

Whole-rock ICP-AES data

Core Photo



192-1186A-30R-2 **Section Top: 967.76 mbsf**

UNIT 1: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT

Pieces: 1–6B

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	<1	2.0	0.6	0.8	Subhedral laths
Olivine:	~1–3	1.0	0.5	0.8	Subhedral to euhedral; rarely in glomerocrysts

GROUNDMASS: Aphanitic to fine grained. Fine-grained regions have variolitic texture.

VESICLES: Nonvesicular. Rare round vesicles (~0.5 mm) are filled with white carbonate.

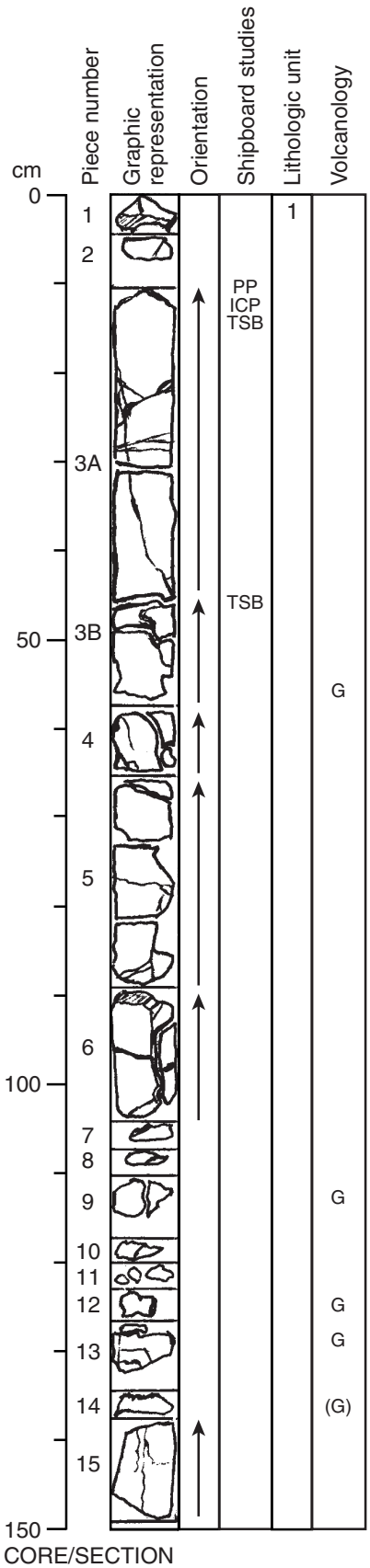
COLOR: Medium light gray (N6) in the least altered regions to light yellowish brown (2.5Y 6/3) adjacent to some of the veins.

STRUCTURE: Massive.

ALTERATION: Slight to high inside alteration halos adjacent to veins. Olivine inside the halos is replaced by Fe oxyhydroxide; outside the halos, olivine is replaced by green clay.

VEINS/FRACTURES: Moderately veined. Veins are <1-7 mm wide and are filled with green clay, celadonite, white carbonate, light brown carbonate, Fe oxyhydroxide, and sulfide.

Core Photo



192-1186A-31R-1 **Section Top: 970.00 mbsf**

UNIT 1: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 1–15

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	<1–2			<0.1	Euhedral laths
Olivine:	<1–3	0.6	0.2	0.4	Subhedral to euhedral; rarely in glomerocrysts

The phenocryst abundance varies throughout the section, e.g., the bottom of Piece 3B (the lower margin of a pillow) has a relatively high olivine abundance, and Piece 10 has a relatively high abundance of plagioclase phenocrysts.

GROUNDMASS: Glassy to aphanitic to fine grained. Fine-grained regions have variolitic texture. Piece 4 has ~0.2-mm spherulites at the top.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5) to light gray (N7); the glass is greenish black (5GY 2/1).

STRUCTURE: Pillowed. Glassy margins are present on Pieces 3B, 9 and 13. Piece 14 is a hyaloclastite composed of altered glass cemented by white carbonate.

ALTERATION: Slight; moderate near veins. Olivine is replaced by green clay and Fe oxyhydroxide.

VEINS/FRACTURES: Sparsely to moderately veined. Veins are <1-3 mm wide and are filled with dark green clay, carbonate, and Fe oxyhydroxide. Native copper is present in a vein in Piece 6. Pyrite is locally present in the groundmass.

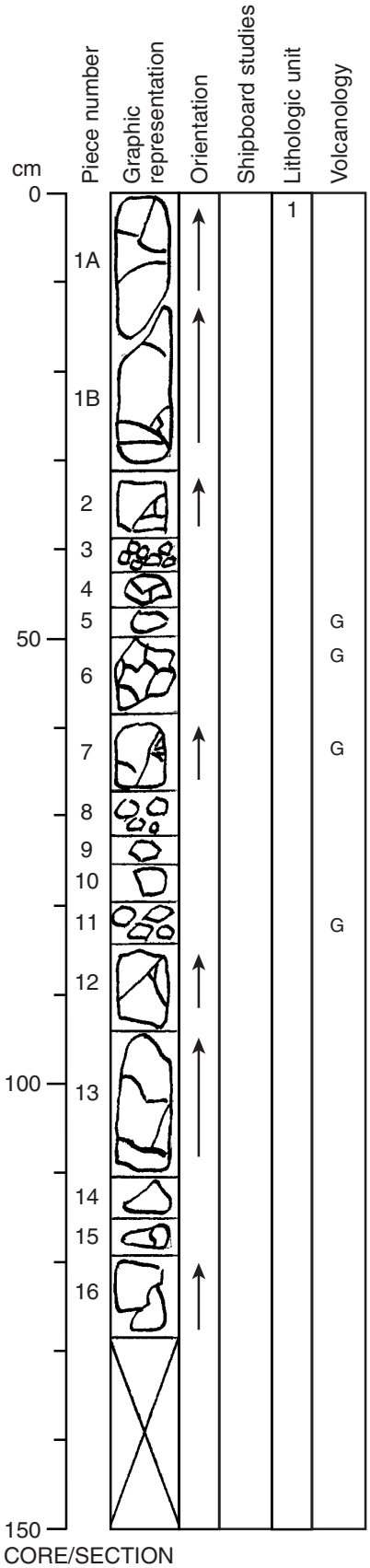
COMMENTS: Piece 1 has basalt in contact with fine-grained carbonate containing angular clasts of red carbonate; the basalt does not have a chilled margin, so the contact does not represent an original basalt-water or basalt-sediment interface and the carbonate is probably filling fractures. Two tabular euhedral plagioclase crystals (~1.5 and 1 mm) are present near the top of Piece 4. Sparse irregular miarolitic cavities (~1 mm) are filled with green clay; some are interconnected.

Description of thin section at 13-15 cm

Description of thin section at 44-48 cm

Whole-rock ICP-AES data

Core Photo



192-1186A-31R-2 **Section Top: 971.49 mbsf**

UNIT 1: SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 1A–16

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	2	1	<1	<1	Subhedral to euhedral

GROUNDMASS: Aphanitic to fine grained. Piece 1B contains fine-grained bands in aphanitic basalt.

VESICLES: Sparsely vesicular. Pieces 4 and 5 contain round vesicles (<1 mm); elongated vesicles (≤2 mm) are present in Piece 7; a 4 x 7-mm elongate vesicle is present in Piece 11. Vesicles are filled with dark green clay.

COLOR: Light bluish gray (5B 7/1) to medium light gray (N6).

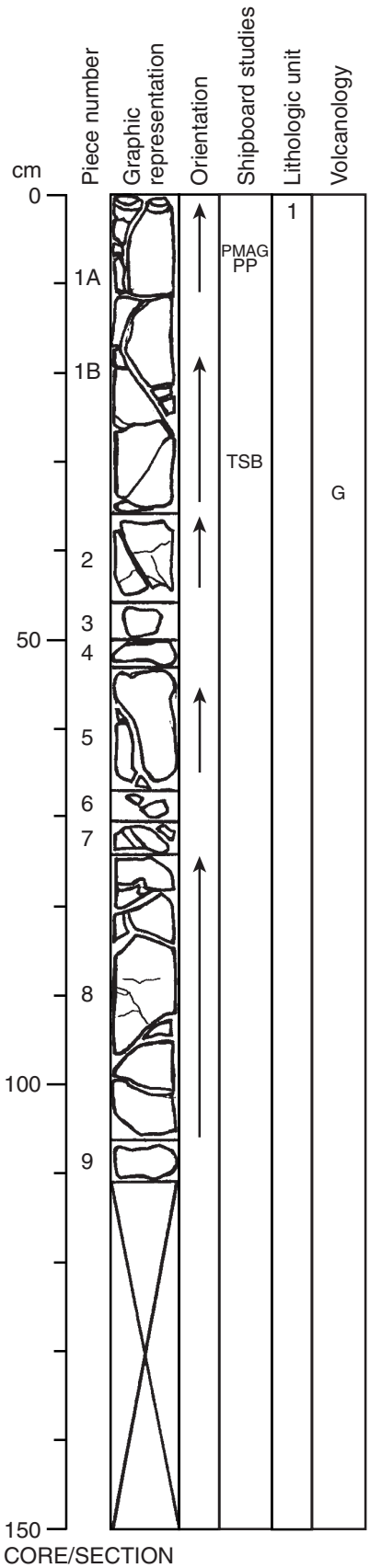
STRUCTURE: Pillowed. Glass is present in Pieces 5, 6, 7 and 11.

ALTERATION: Moderate. Olivine is replaced by dark green clay.

VEINS/FRACTURES: Moderately to highly veined. Veins are <1-4 mm wide and are filled with carbonate.

COMMENTS: In Piece 15, basalt is in contact with carbonate sandstone that is probably infilling a fracture. Abundant miarolitic cavities (1–3 mm) in Pieces 7 and 13 are filled with dark green clay.

Core Photo



192-1186A-31R-3 **Section Top: 972.76 mbsf**

UNIT 1: SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 1A–9

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	<<1	1.5	0.5		Subhedral laths
Olivine:	1–2	1	0.5	0.7	Subhedral to euhedral; rarely in glomerocrysts

GROUNDMASS: Aphanitic to fine grained. Fine-grained regions have variolitic texture.

VESICLES: Generally nonvesicular. Rare round vesicles (0.1-0.5 mm) are filled with green clay.

COLOR: Light gray (N7) to medium light gray (N6) in less altered regions to very pale brown (10YR 7/4) near veins.

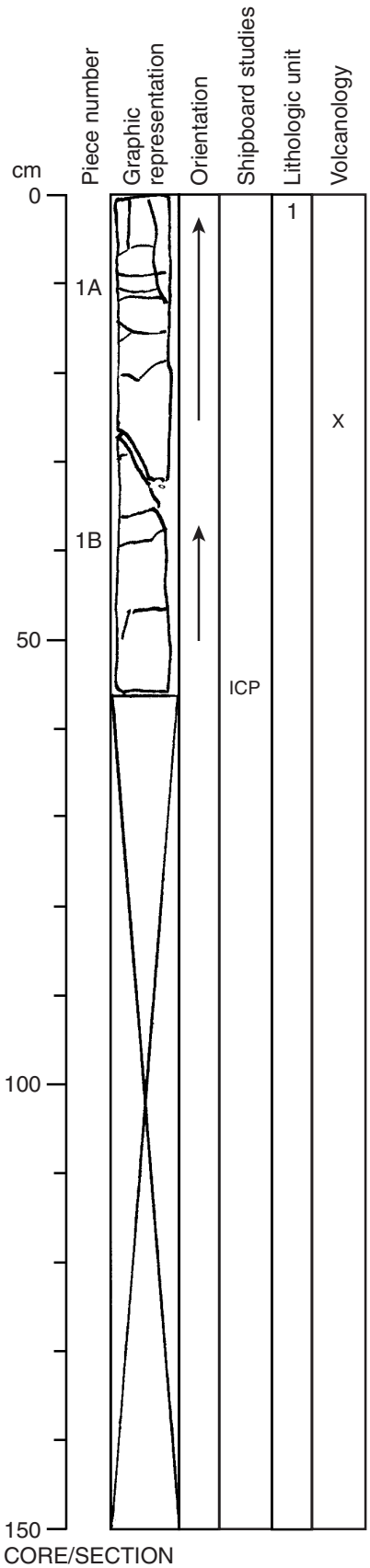
STRUCTURE: Pillowed. Pillow structures are inferred from glassy rims and variations in grain size.

ALTERATION: Slight; high near larger veins. Olivine is replaced by green clay and Fe oxyhydroxide.

VEINS/FRACTURES: Moderately veined. Veins are <1-5 mm wide and are filled with white carbonate, green clay, and Fe oxyhydroxide.

COMMENTS: Miarolitic cavities (<1 mm) in Piece 8 at 90 cm are filled with green clay and white carbonate.

Core Photo



192-1186A-31R-4 **Section Top: 973.86 mbsf**

UNIT 1: APHYRIC TO SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 1A–1B

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	<<1	1			Subhedral laths
Olivine:	0–2	1.2	0.5	~0.5	Subhedral to euhedral

GROUNDMASS: Aphanitic to fine grained. Fine-grained regions have variolitic texture.

VESICLES: Nonvesicular. Rare round vesicles (≤0.5 mm) are filled with green clay and white carbonate.

COLOR: Light gray (N7) to medium light gray (N6) in least altered regions to very pale brown (10YR 7/4) near veins.

STRUCTURE: Pillowed. Pillows are inferred based on the change in groundmass grain size from aphanitic at the top to fine grained at the bottom.

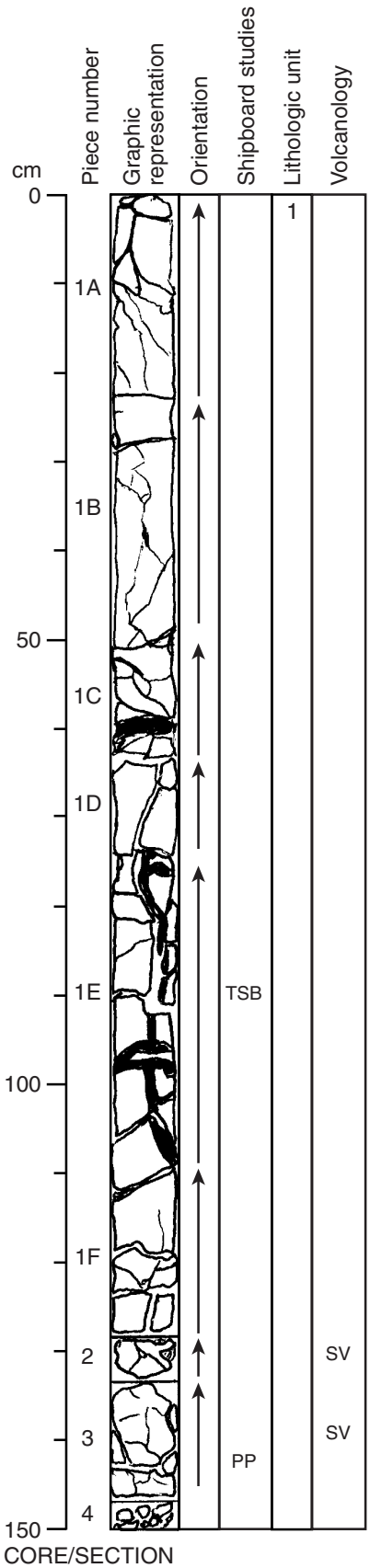
ALTERATION: Slight; high near veins. Olivine is replaced by green clay.

VEINS/FRACTURES: Moderately veined. Veins are <1-18 mm wide and are filled with white carbonate, brown and green clay, pyrite, and Fe oxyhydroxide.

COMMENTS: A plagioclase xenocryst (4 x 6 mm) is present at 25 cm.

Whole-rock ICP-AES data

Core Photo



192-1186A-32R-1 **Section Top: 976.20 mbsf**

UNIT 1: SPARSELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 1A–4

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	1	0.8	0.5	0.7	Euhedral
Olivine:	1	1.2	0.4	0.6	Euhedral

GROUNDMASS: Aphanitic to fine grained. Fine-grained regions have poorly developed variolitic texture.

VESICLES: Generally nonvesicular; sparsely vesicular in aphanitic regions close to pillow margins. Vesicles are <1-2 mm in diameter, irregular in shape, and are filled with carbonate and green clay.

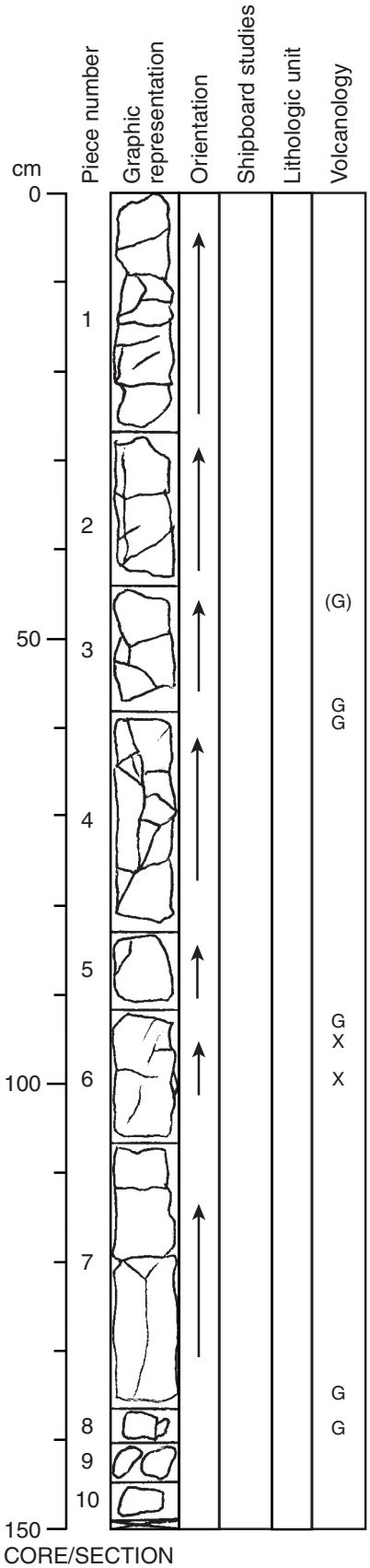
COLOR: Medium light gray (N6) to light gray (N7).

STRUCTURE: Pillowed. Pieces 1A to 1F represent a section through a large pillow from the fine grained interior to the aphanitic margin.

ALTERATION: Slight to moderate. Olive and brown alteration halos are present around veins. Olivine phenocrysts are replaced by green-black clay.

VEINS/FRACTURES: Moderately veined. A large vein is present at the base of Piece 1C and another is present (3–8 mm wide) continuously from Piece 1D to the base of Piece 1E. Both veins are filled with carbonate. Additional veins (<1-8 mm) in the section are filled with carbonate, green clay, and Fe oxyhydroxide.

Core Photo



192-1186A-32R-2 **Section Top: 977.67 mbsf**

UNIT 1: SPARSELY TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 1–10

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	~1	1	0.2	0.8	Euhedral
Olivine:	2–3	1.2	0.5	0.8	Euhedral to subhedral

GROUNDMASS: Aphanitic to fine grained. Fine grained regions have variolitic texture.

VESICLES: Generally nonvesicular. Rare round vesicles 1 mm in diameter are present in the aphanitic regions.

COLOR: Medium light gray (N6) to medium gray (N5).

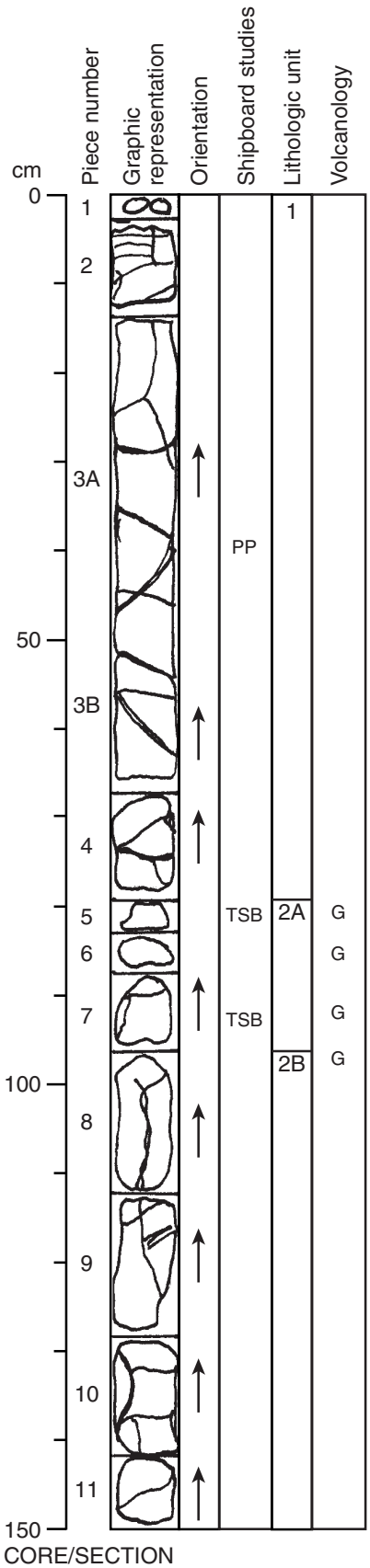
STRUCTURE: Pillowed. Glassy margins are present on Pieces 3–4 and 6–8.

ALTERATION: Slight to moderate. Olivine phenocrysts are replaced by green and black clay.

VEINS/FRACTURES: Moderately veined. Veins are <1-3 mm wide and are filled with zeolite, green clay, black clay, and Fe oxyhydroxide.

COMMENTS: Miarolitic cavities in the fine-grained regions are irregular to subround, ~2 mm in size, and filled with green clay. Two plagioclase-rich xenoliths are present in Piece 6 at 100 cm (2 x 3 mm) and 96 cm (2 x 2 mm exposed on the outer surface of core).

Core Photo



192-1186A-32R-3 **Section Top: 979.17 mbsf**

UNIT 1: SPARSELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 1–4

CONTACTS: The contact between Units 1 and 2A is inferred to be between Pieces 4 and 5.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	1	0.3	0.3	0.3	Euhedral to subhedral
Olivine:	1–2	1	0.3	0.5	Euhedral to subhedral

GROUNDMASS: Aphanitic to fine grained. Fine grained regions have variolitic texture.

VESICLES: Nonvesicular.

COLOR: Light bluish gray (5B 7/1).

STRUCTURE: Pillowed. Pillows are inferred on the basis of groundmass grain size variations.

ALTERATION: Slight to moderate. Olivine phenocrysts are partially (aphanitic regions) to completely (fine-grained regions) replaced by brown clay.

VEINS/FRACTURES: Slightly veined. Veins are <1-8 mm wide and are filled with green and brown clay and carbonate.

UNIT 2A: CONGLOMERATE

Pieces: 5–7

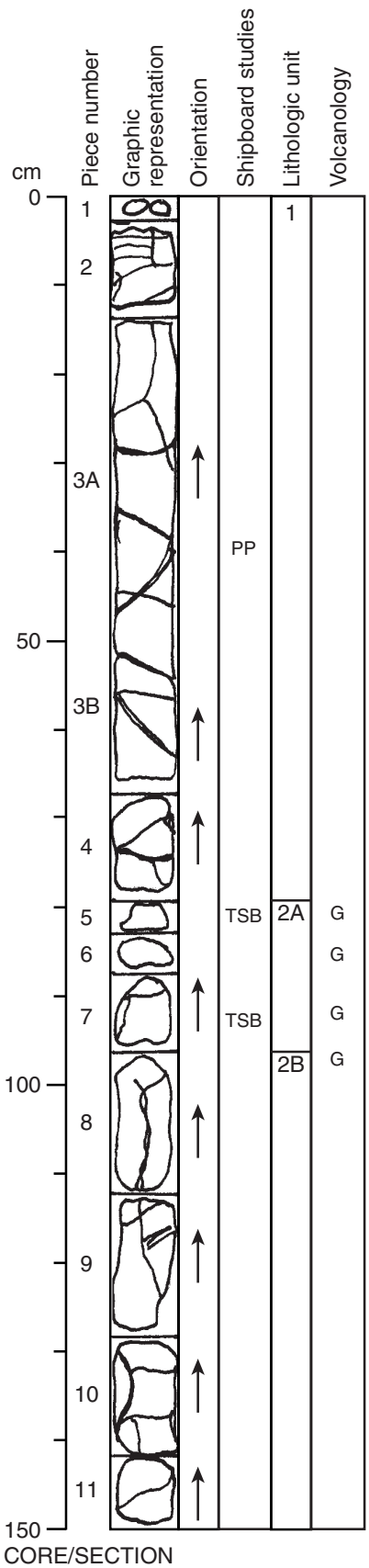
CONTACTS: Not recovered. The contact between Units 1 and 2A is inferred to be between Pieces 4 and 5. The contact between Units 2A and 2B is inferred to be between Pieces 7and 8.

COLOR: Pieces 5 and 6 are pale red (10R 6/2) to grayish red (10R 4/2); Piece 7 is white (N9), greenish black (5GY 2/1), pale green (5G /2), and brown (7.5YR 5/2).

STRUCTURE: Conglomeratic.

COMMENTS: Pieces 5 and 6 are conglomerate containing clasts of carbonate and rare glass in a white carbonate matrix. In Piece 7, 3-mm-wide euhedral (bi-pyramidal) calcite crystals are present within a green and brown clay matrix. The calcite crystals decrease in size with increasing distance above the contact with Unit 2B. The upper part of Piece 7 is a sandstone composed of carbonate grains. Above this is a thin layer of carbonate. Altered glass clasts are also present in Piece 7.

Core Photo



192-1186A-32R-3 **Section Top: 979.17 mbsf**

UNIT 2B: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 8–11

CONTACTS: Not recovered. The contact between Units 2A and 2B is inferred to be between Pieces 7 and 8.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	1–2	1	0.1	0.3	Euhedral to subhedral
Olivine:	2–3	2	0.3	0.8	Euhedral

GROUNDMASS: Aphanitic to fine grained. Fine-grained regions have variolitic texture.

VESICLES: Nonvesicular.

COLOR: Light medium gray (N6).

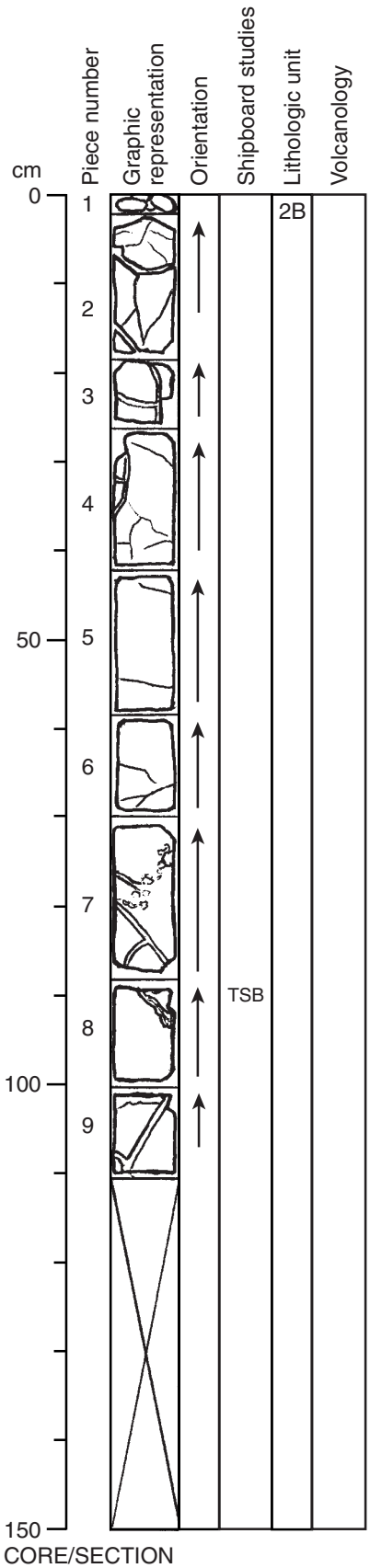
STRUCTURE: Pillowed. Pillows are inferred on the basis of grain size variations and the minor glass on the top of Piece 8.

ALTERATION: Slight to moderate. Olivine phenocrysts are replaced by brown clay.

VEINS/FRACTURES: Moderately veined. Veins are <1-4 mm wide and are filled with Fe oxyhydroxide and green clay.

COMMENTS: Rare miarolitic cavities are filled with carbonate and green clay.

Core Photo



192-1186A-32R-4 **Section Top: 980.66 mbsf**

UNIT 2B: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 1–9

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	1	0.5	0.3	0.4	Subhedral
Olivine:	1-4	1.0	0.3	0.5	Euhedral

Plagioclase phenocrysts are only visible in aphanitic regions.

GROUNDMASS: Aphanitic to fine grained.

VESICLES: Generally nonvesicular. Rare round vesicles (~1 mm) are present in Piece 4.

COLOR: Medium light gray (N6).

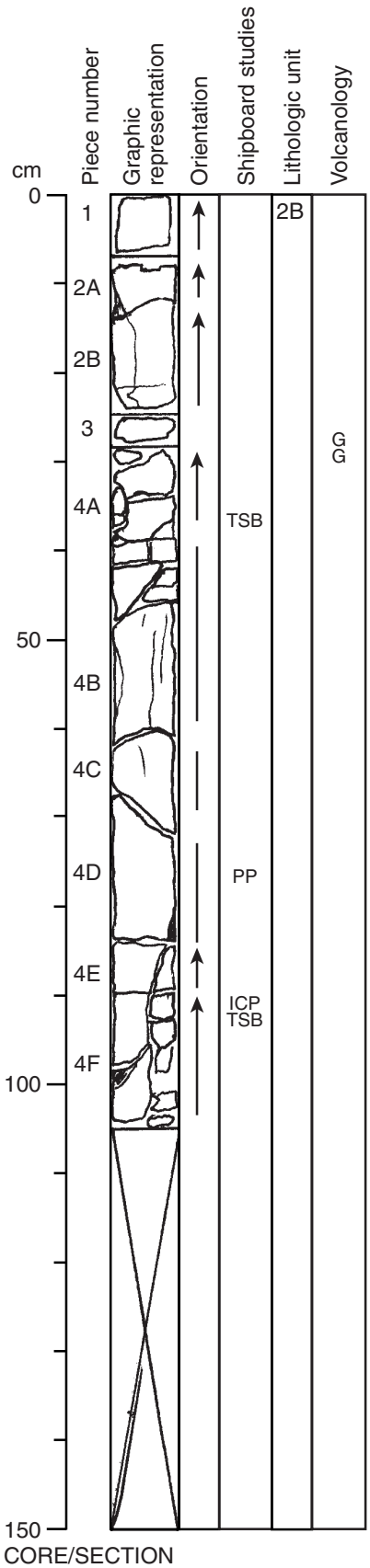
STRUCTURE: Pillowed. Pillows are inferred on the basis of groundmass grain size variations; no glassy margins are present. Altered glass is present in the fragments of Piece 1 (working half only).

ALTERATION: Slight to moderate. Alteration halos are present adjacent to veins. Olivine phenocrysts are replaced by green and brown clays.

VEINS/FRACTURES: Moderately veined. Veins are <1-4 mm wide and are filled with carbonate, Fe oxyhydroxide, green clay, zeolite, and copper.

COMMENTS: Irregular miarolitic cavities (<1-3 mm) in Piece 7 are filled with carbonate and black and green clay.

Core Photo



192-1186A-33R-1 **Section Top: 981.00 mbsf**

UNIT 2B: SPARSELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 1–4F

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	1	2	0.4	0.6	Euhedral
Olivine:	1–2	1.5	0.4	0.8	Euhedral

GROUNDMASS: Aphanitic to fine grained. Fine-grained regions have variolitic texture.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5) to light gray (N7).

STRUCTURE: Pillowed. Glassy margins are present in Piece 3 and Piece 4A (working half only).

ALTERATION: Slight. Olivine phenocrysts are replaced by green-black clay and, near veins, by Fe oxyhydroxide.

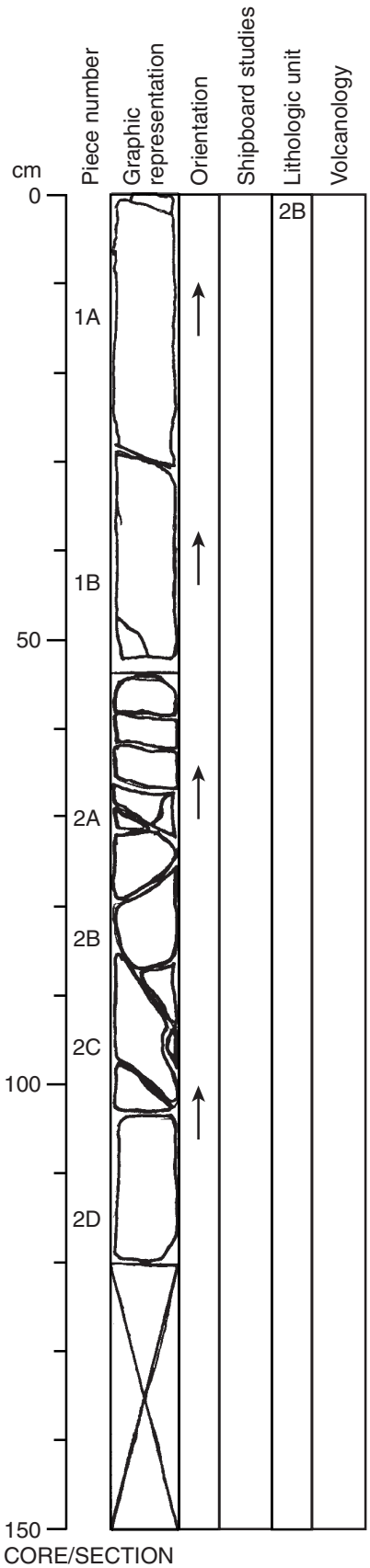
VEINS/FRACTURES: Sparsely to moderately veined. Veins are ≤1 mm wide and are filled with green-black clay and Fe oxyhydroxide.

Description of thin section at 35-38 cm

Description of thin section at 91-93 cm

Whole-rock ICP-AES data

Core Photo



192-1186A-33R-2 **Section Top: 982.05 mbsf**

UNIT 2B: MODERATELY OLIVINE-PHYRIC BASALT

Pieces: 1A–2D

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	2–3	2	0.3	0.8	Subhedral to euhedral

GROUNDMASS: Fine grained with variolitic texture.

VESICLES: Nonvesicular.

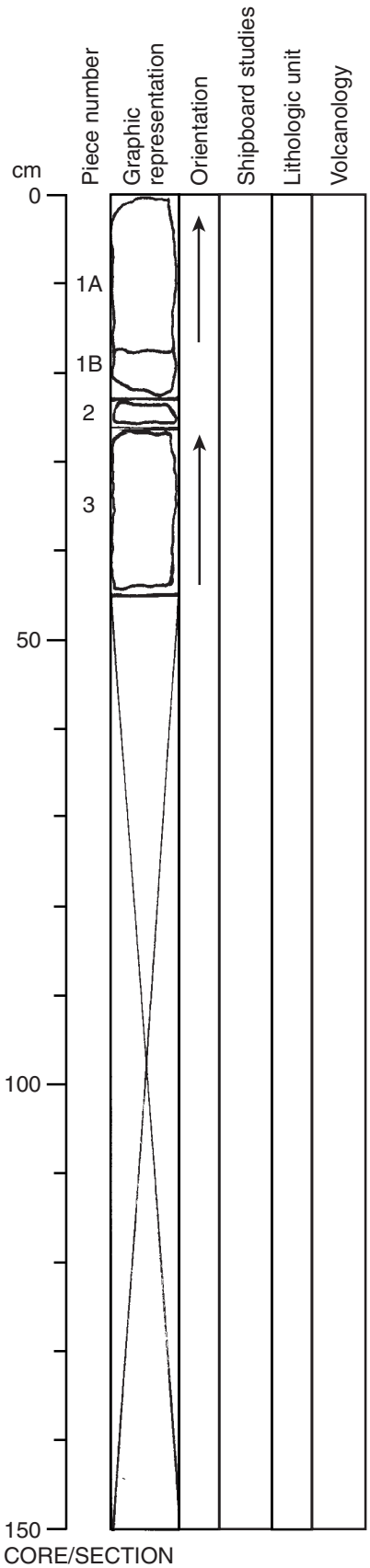
COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Olivine phenocrysts are replaced by green-black clay.

VEINS/FRACTURES: Sparsely veined. Veins are <1-2 mm wide and are filled with carbonate and green-black clay.

Core Photo



192-1186A-33R-3 **Section Top: 983.25 mbsf**

UNIT 2B: SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 1A–3

CONTACTS: None.

PHENOCRYSTS:

	%	Grain Size (mm):			
	Mode	Max	Min	Avg.	Shape/Habit
Olivine:	1	1.2	0.5	0.8	Euhedral

GROUNDMASS: Fine grained with variolitic texture.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5).

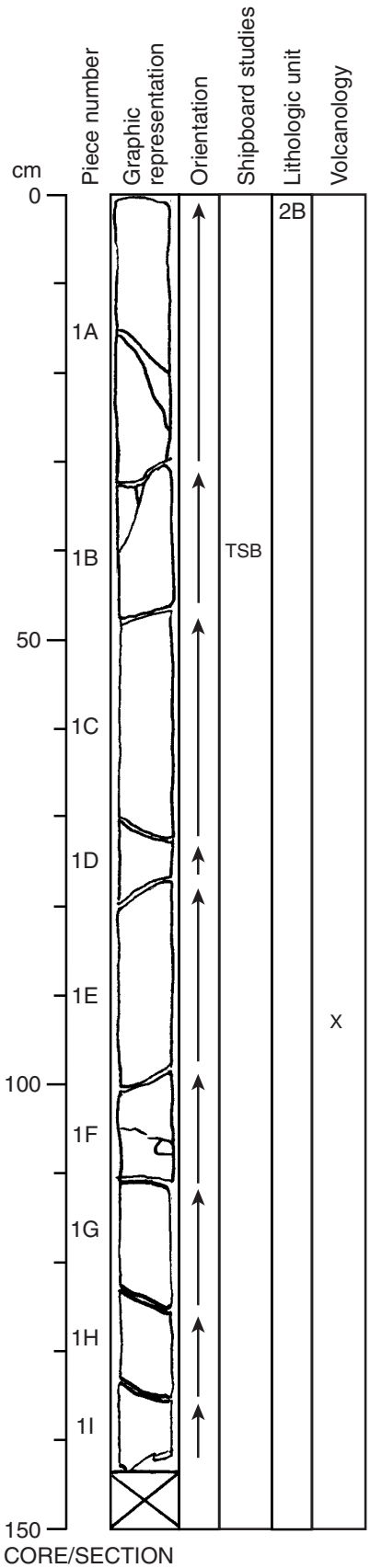
STRUCTURE: Massive.

ALTERATION: Slight. Olivine phenocrysts are replaced by black clay. Small (2 mm) alteration halos are present adjacent to veins.

VEINS/FRACTURES: Sparsely veined. Veins are <1-2 mm wide and are filled with black clay, zeolite, and pyrite.

COMMENTS: One plagioclase-rich xenolith (2 x 5 mm) is present on the outer surface of Piece 3.

Core Photo



192-1186A-34R-1 **Section Top: 985.80 mbsf**

UNIT 2B: SPARSELY TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 1A–1I

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	~1	1.5	1		Subhedral laths
Olivine:	1–3	1.5	1		Subhedral to euhedral

Olivine increases in abundance toward the bottom of the section.

GROUNDMASS: Fine grained with variolitic texture. Grain size generally decreases toward the bottom of the section, but is still fine grained.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5) to medium light gray (N6); halos near large veins are greenish black (5GY 2/1).

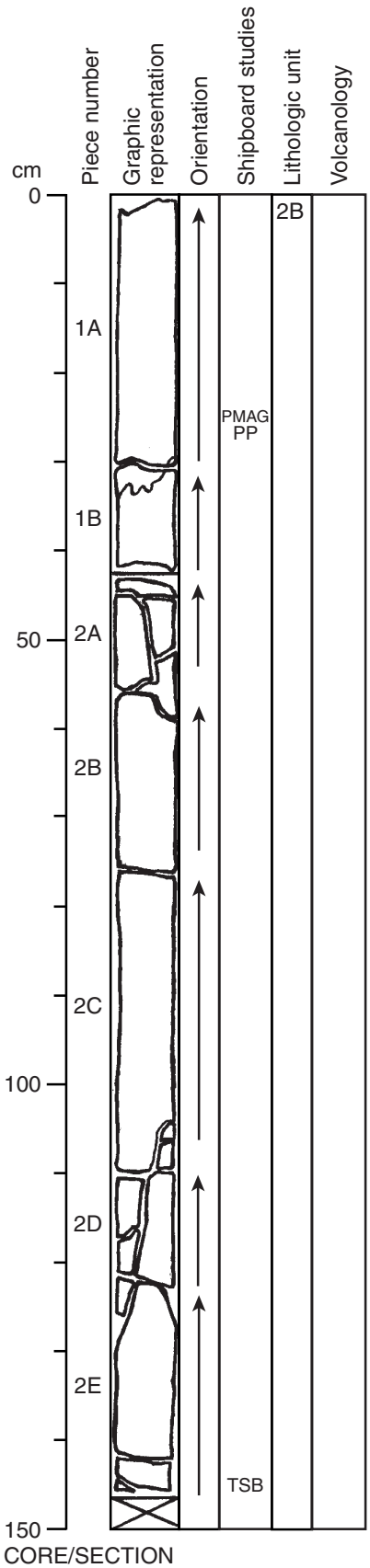
STRUCTURE: Massive.

ALTERATION: Slight; moderate near veins. Olivine is replaced by dark green clay and, rarely, pyrite.

VEINS/FRACTURES: Sparsely veined. Veins are <1-8 mm wide and are filled with dark green clay, white carbonate, and pyrite. The irregular appearance of the veins in Pieces 1B and 1F is a consequence of the split core surface being subparallel with the vein.

COMMENTS: A plagioclase xenocryst (3 x 2.5 mm) is present in Piece 1E at 93 cm.

Core Photo



192-1186A-34R-2 **Section Top: 987.23 mbsf**

UNIT 2B: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT

Pieces: 1A–2E

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	1–4	1	<0.1	0.2	Euhedral to subhedral; commonly in glomerocrysts.

GROUNDMASS: Fine grained with variolitic texture.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5) to medium light gray (N6).

STRUCTURE: Massive.

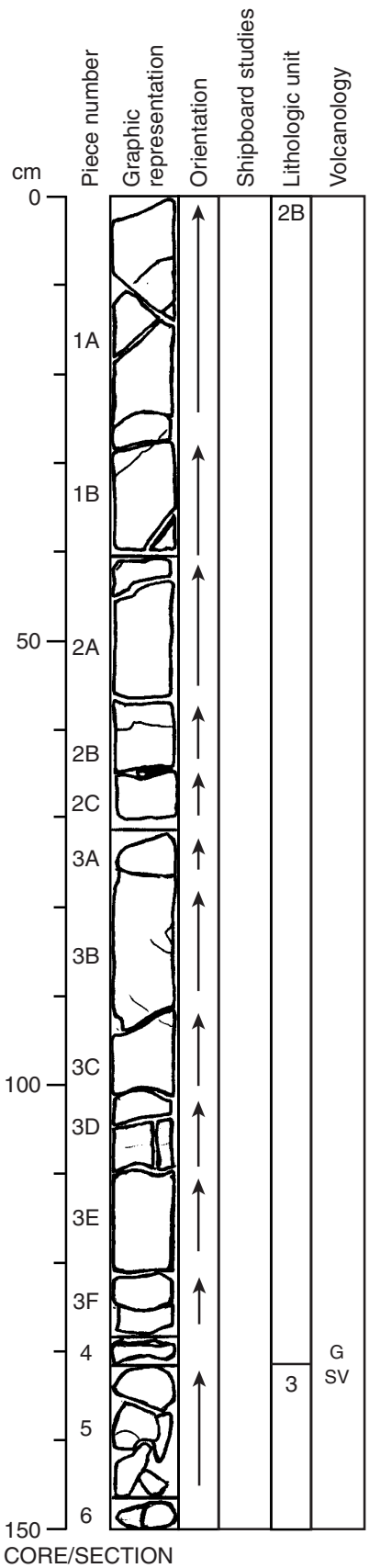
ALTERATION: Slight. Olivine is replaced by black clay, Fe oxyhydroxide, and white carbonate.

VEINS/FRACTURES: Sparsely veined. Veins are <1-2 mm wide and are filled with dark green clay and white carbonate.

COMMENTS: Rare plagioclase xenocrysts (<1 mm) are present (e.g., Piece 2E at 136 cm).

Description of thin section at 143-145 cm

Core Photo



192-1186A-34R-3 **Section Top: 988.69 mbsf**

UNIT 2B: APHYRIC TO SPARSELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 1A–4

CONTACTS: Not recovered. The contact between Units 2B and 3 is inferred to be between Pieces 4 and 5, and separates a massive cooling unit above from pillowed cooling units below.

PHENOCRYSTS:

	% Grain Size (mm): Mode	Max	Min	Avg.	Shape/Habit
Plagioclase:	<1	0.2	<0.1	~0.1	Euhedral laths
Olivine:	~1	0.5	0.1	0.3	Subhedral to euhedral

Plagioclase phenocrysts are only visible in aphanitic regions.

GROUNDMASS: Pieces 1 and 2 are fine grained; Pieces 3 grades from fine grained to aphanitic downsection; Piece 4 is aphanitic to glassy.

VESICLES: Nonvesicular.

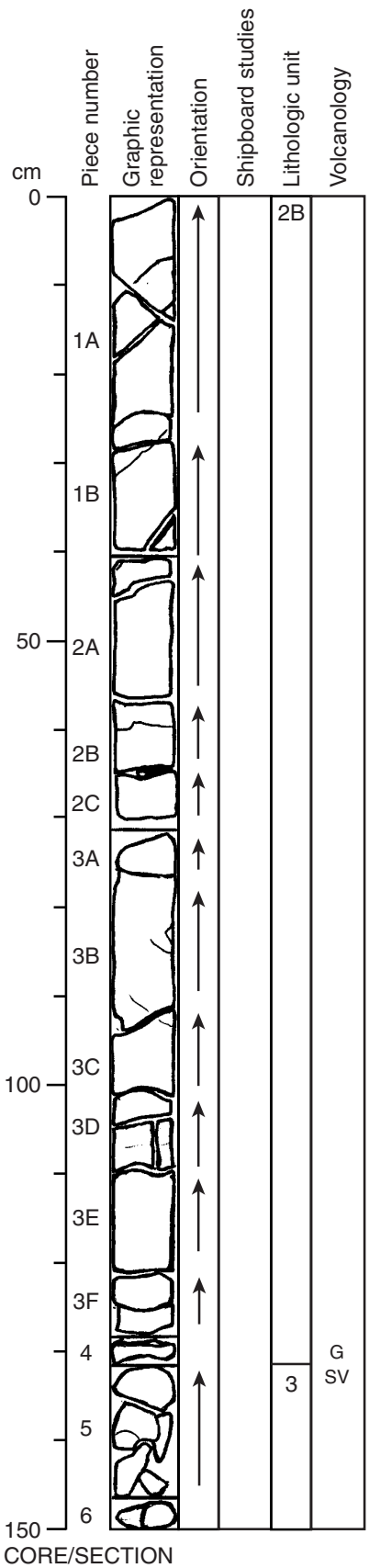
COLOR: Medium gray (N5) to medium light gray (N6).

STRUCTURE: Massive, with decrease in average grain size downsection indicating proximity to the lower margin of a cooling unit.

ALTERATION: Slight; moderate near veins. Olivine is replaced by Fe oxyhydroxide and dark green clay.

VEINS/FRACTURES: Sparsely veined. Veins are <1-2 mm wide and are filled with black and green clay, white carbonate, and Fe oxyhydroxide.

Core Photo



192-1186A-34R-3 **Section Top: 988.69 mbsf**

UNIT 2B: SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 5–6

CONTACTS: Not recovered. The contact between Units 2B and 3 is inferred to be between Pieces 4 and 5, and separates a massive cooling unit above from pillowed cooling units below.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	<<1	0.2	<0.1	~0.1	Euhedral laths
Olivine:	~1	0.5	0.1	0.3	Subhedral to euhedral

GROUNDMASS: Aphanitic

VESICLES: Generally nonvesicular. Rare round vesicles are present in Piece 5; they are <0.5 mm in diameter and are filled with green clay and white carbonate.

COLOR: Medium gray (N5) to medium light gray (N6).

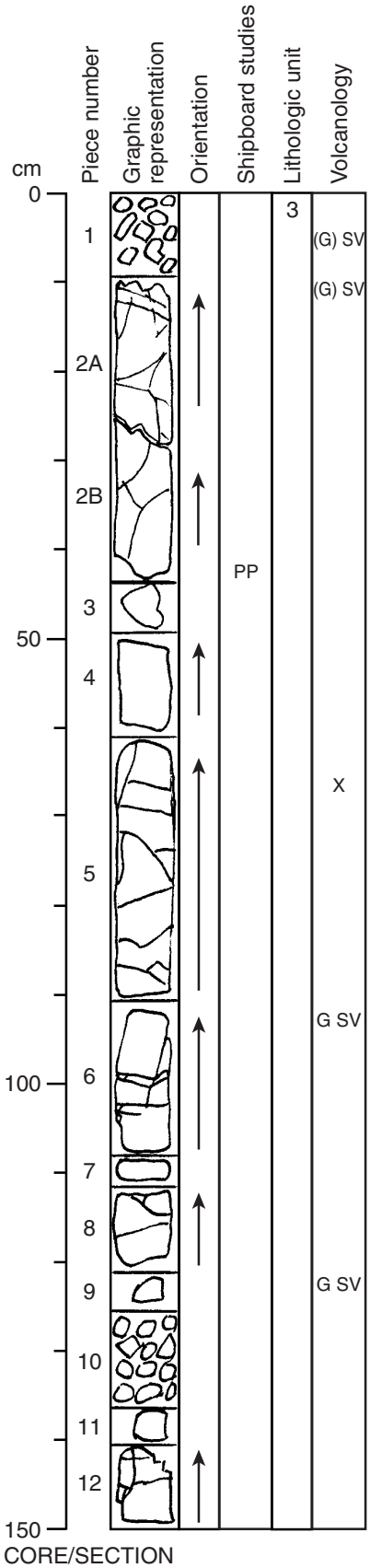
STRUCTURE: Massive.

ALTERATION: Slight; moderate near veins. Olivine is replaced by Fe oxyhydroxide and dark green clay.

VEINS/FRACTURES: Sparsely veined. Veins are <1-2 mm wide and are filled with black and green clay, white carbonate, and Fe oxyhydroxide.

COMMENTS: Two plagioclase-rich xenoliths (1 x 2 mm) are present in Piece 5 at 133 cm.

Core Photo



192-1186A-34R-4 **Section Top: 990.19 mbsf**

UNIT 3: SPARSELY TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 1–12

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	<1				
Olivine:	1– 3	0.8	<0.1	0.2	Euhedral to subhedral; rarely in glomerocrysts

GROUNDMASS: Aphanitic to fine grained. Fine-grained regions have variolitic texture.

VESICLES: Sparsely vesicular near glassy rims. Vesicles (≤1 mm) are round to irregular, and are filled with green and black clay, Fe oxyhydroxide, and white carbonate. Vesicles decrease in abundance away from aphanitic regions.

COLOR: Light gray (N7) to medium gray (N5) to bluish gray (5B 6/1); greenish gray (5BG 6/1) in alteration halos near veins.

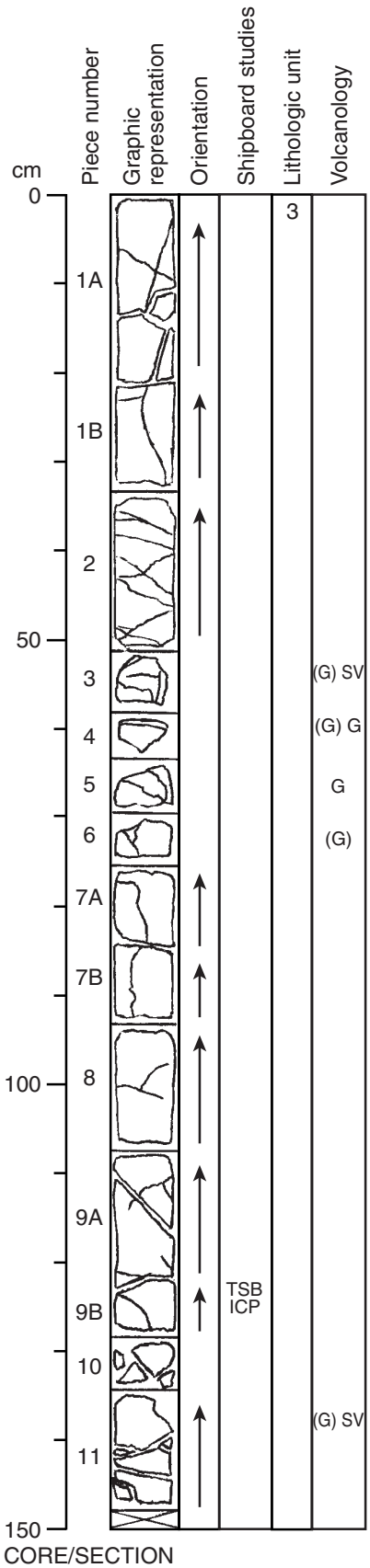
STRUCTURE: Pillowed. Glassy rims are present in Pieces 2A, 6 and 9. Aphanitic regions grade into fine-grained regions away from pillow rims (e.g., Piece 5).

ALTERATION: Slight; moderate near veins. Locally, celadonite(?) imparts a blue-green color to the basalt. Olivine is replaced by black and green clay, Fe oxyhydroxide, and celadonite.

VEINS/FRACTURES: Moderately veined. Veins are <1-9 mm wide and are filled with celadonite, Fe oxyhydroxide, white carbonate, black and green clay, and pyrite.

COMMENTS: Some spherulites (0.2–0.5 mm) are present adjacent to the glassy rims of Pieces 2A, 6 and 9.

Core Photo



192-1186A-34R-5 **Section Top: 991.69 mbsf**

UNIT 3: APHYRIC TO SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 1A–11

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	<<1	0.5			Subhedral laths
Olivine:	≤1	1.5	0.5		Subhedral to euhedral; rarely in glomerocrysts

GROUNDMASS: Glassy to aphanitic to fine grained. Aphanitic regions are locally spherulitic; fine-grained regions have variolitic texture.

VESICLES: Generally nonvesicular. Pieces 3 and 11 have subround to subangular vesicles (≤2.5 mm in diameter) and irregular miarolitic cavities (≤1 mm). Rare round vesicles (<1 mm) are present throughout the section. Vesicles are filled with dark green clay, Fe oxyhydroxide, and white carbonate.

COLOR: Light gray (N7) to medium gray (N5) in least altered areas; dark greenish gray (5G 4/1) near veins.

STRUCTURE: Pillowed. Glassy rims are present in Pieces 3–6 and grain size variations are consistent with a pillowed sequence.

ALTERATION: Slight to moderate near veins. Olivine is replaced by dark green clay, Fe oxyhydroxide, and pyrite. Glass is generally altered to dark green clay.

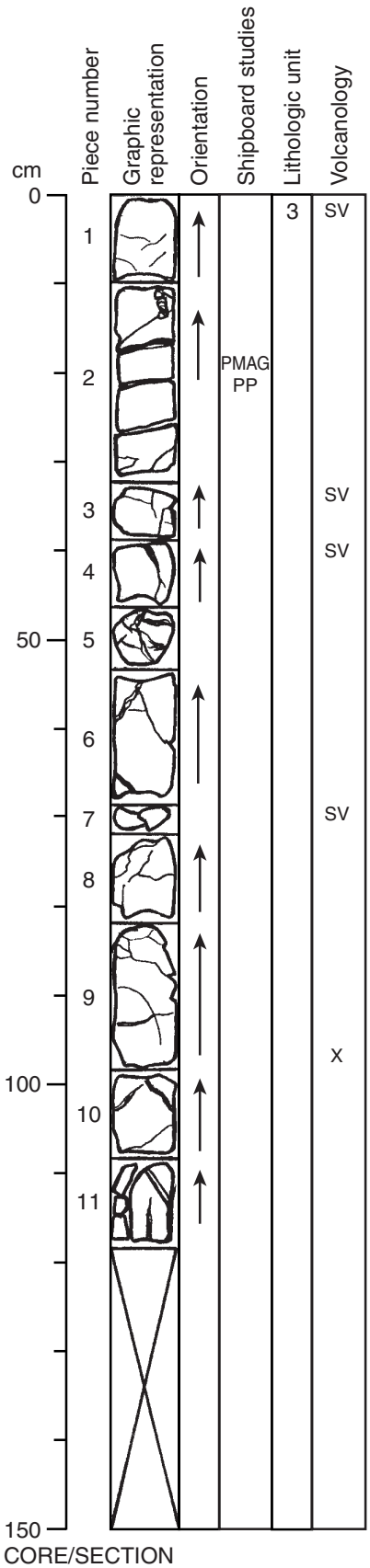
VEINS/FRACTURES: Moderately veined. Veins are most abundant in Piece 2. Veins are <1 mm wide and are filled with dark green clay, white carbonate, pyrite, and Fe oxyhydroxide.

COMMENTS: Some unaltered glass is present in Piece 4.

Description of thin section at 122-125 cm

Whole-rock ICP-AES data

Core Photo



192-1186A-34R-6 **Section Top: 993.17 mbsf**

UNIT 3: SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 1–11

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	1–2	1	<1	<1	Subhedral to euhedral; rarely in glomerocrysts

GROUNDMASS: Aphanitic to fine grained.

VESICLES: Generally nonvesicular. Sparsely vesicular in some aphanitic regions (e.g., Pieces 1, 3, 4 and 7), where round vesicles are filled with brown and green clay, Fe oxyhydroxide, celadonite, and white carbonate.

COLOR: Medium light gray (N6) to dark greenish gray (5G 4/1).

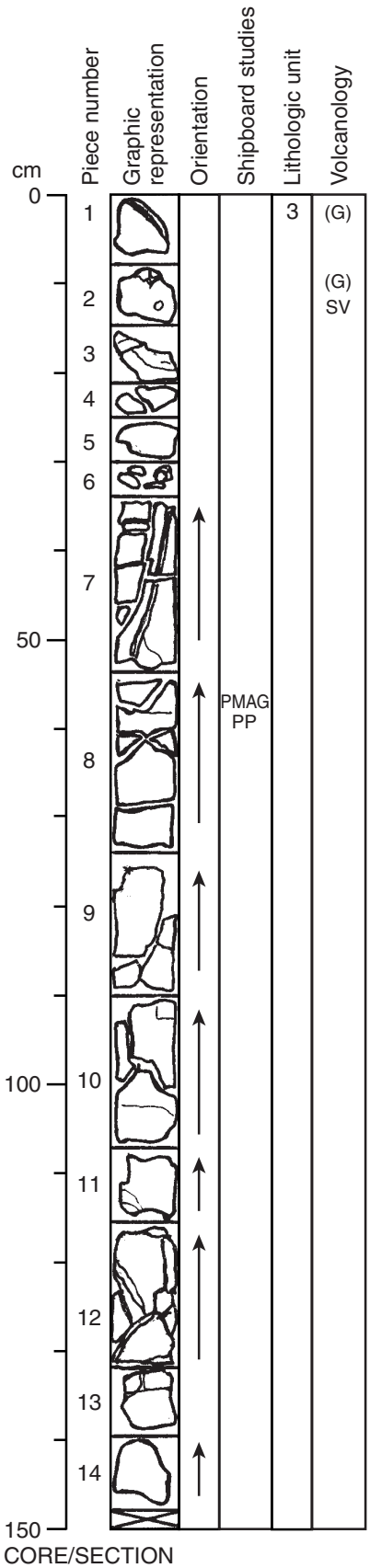
STRUCTURE: Pillowed. Pillow structures are inferred from grain size variation and the distribution of vesicles.

ALTERATION: Moderate. Olivine is replaced by brown and green clay, Fe oxyhydroxide, celadonite, and white carbonate.

VEINS/FRACTURES: Sparsely to moderately veined. Veins are filled with white carbonate, brown clay, black oxide(?), and Fe oxyhydroxide.

COMMENTS: A plagioclase xenolith is present in Piece 9 at 97.5 cm.

Core Photo



192-1186A-35R-1 **Section Top: 995.50 mbsf**

UNIT 3: MODERATELY OLIVINE-PHYRIC BASALT

Pieces: 1–14

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	3	0.8	0.3	0.5	Euhedral to subhedral

GROUNDMASS: Aphanitic to fine grained.

VESICLES: Generally nonvesicular, except for Piece 2, which is sparsely vesicular. Vesicles are 1 to 4 mm in diameter and are filled with carbonate.

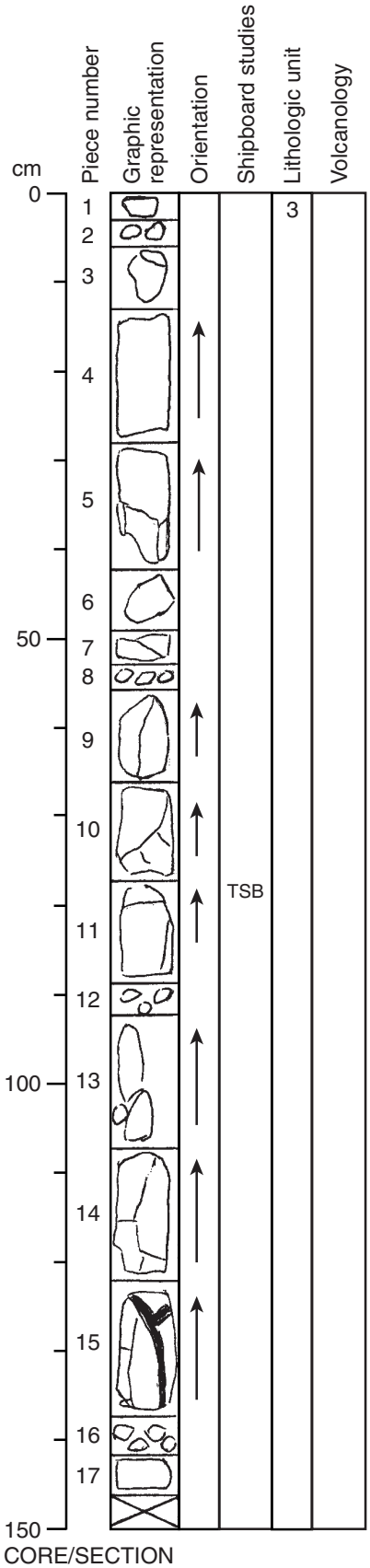
COLOR: Light gray (N7) to light bluish gray (5B 7/1).

STRUCTURE: Pillowed. Glassy margins are present in Pieces 1 and 2.

ALTERATION: Slight. Alteration halos are present adjacent to veins. Olivine phenocrysts are replaced by green and brown clay.

VEINS/FRACTURES: Sparsely veined. Veins are <1-8 mm wide and are filled with green clay, Fe oxyhydroxide, and carbonate.

Core Photo



192-1186A-35R-2 **Section Top: 996.99 mbsf**

UNIT 3: APHYRIC BASALT

Pieces: 1–17

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	<1	1	0.3	0.5	Subhedral

GROUNDMASS: Fine grained with variolitic texture (Pieces 1–15). Pieces 16 and 17 are aphanitic.

VESICLES: Nonvesicular.

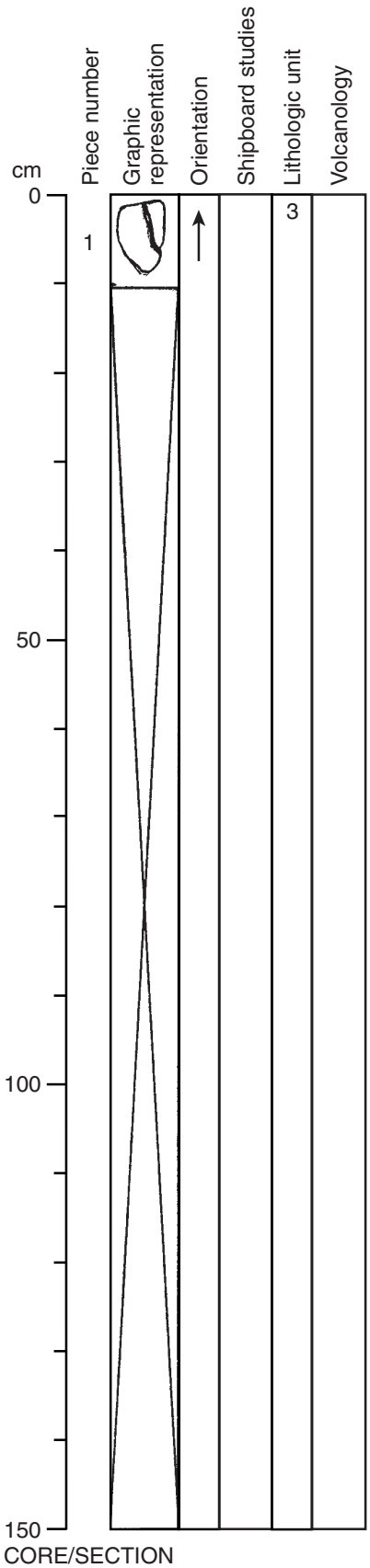
COLOR: Light bluish gray (5B 7/1) to olive yellow gray (2.5Y 6/6).

STRUCTURE: Massive.

ALTERATION: Moderate to complete. All veins have associated Fe-oxyhydroxide-rich alteration halos.

VEINS/FRACTURES: Highly veined. The veins are <1-10 mm wide and are filled with carbonate, green clay, and Fe oxyhydroxide.

Core Photo



192-1186A-35R-3 **Section Top: 998.45 mbsf**

UNIT 3: APHYRIC BASALT

Piece: 1

CONTACTS: None.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max	Min	Avg.	Shape/Habit
Olivine:	<1	1	0.3	0.5	Subhedral

GROUNDMASS: Fine grained with variolitic texture. Elongate plagioclase laths are present.

VESICLES: Nonvesicular.

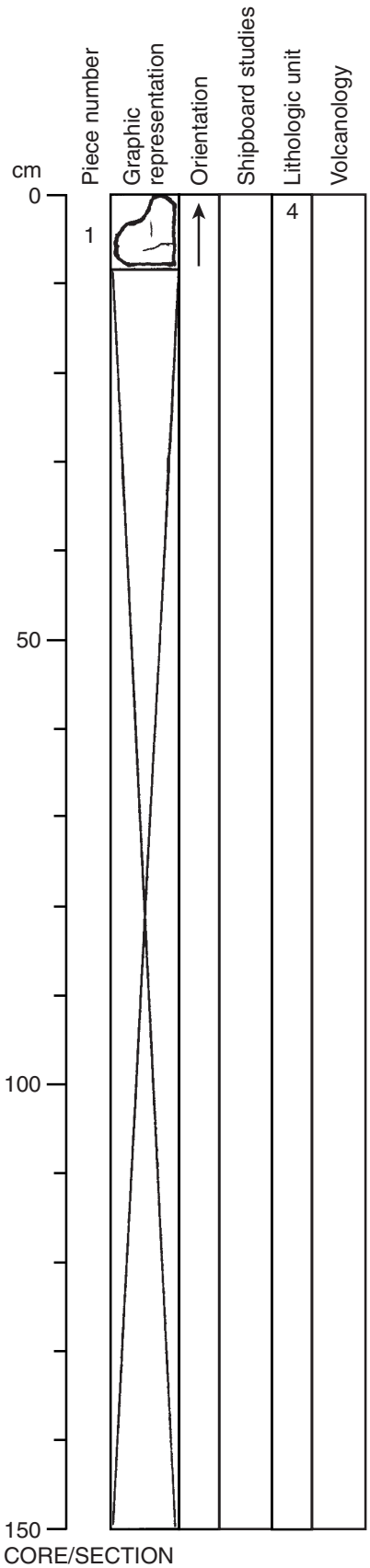
COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts are replaced by green-black clay.

VEINS/FRACTURES: Contains a single vein (3 mm wide) filled with carbonate and green clay.

Core Photo



192-1186A-36R-1 **Section Top: 1005.10 mbsf**

UNIT 4: SPARSELY OLIVINE-PHYRIC BASALT

Piece: 1

CONTACTS: Not recovered. The contact between Unit 3 and Unit 4 is inferred, based on downhole logging data, to be between Sections 192-1186A-35R-3 and 192-1186A-36R-1 (1004 mbsf).

PHENOCRYSTS:

	%	Grain Size (mm):			
	Mode	Max	Min	Avg.	Shape/Habit
Olivine:	2	0.7	0.3	0.5	Euhedral to subhedral

GROUNDMASS: Aphanitic.

VESICLES: Nonvesicular.

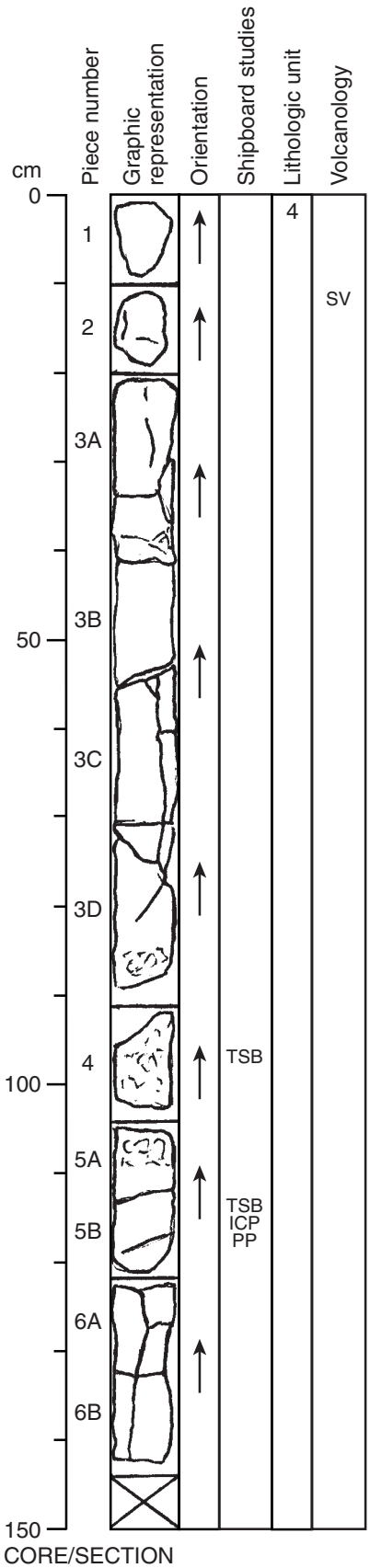
COLOR: Medium light gray (N6).

STRUCTURE: One aphanitic piece recovered. Downhole logging data suggests the piece may be from a pillowed sequence.

ALTERATION: Slight. Olivine phenocrysts are replaced by green clay.

VEINS/FRACTURES: Sparsely veined. The veins are <1 mm wide and are filled with black clay and Fe oxyhydroxide.

Core Photo



192-1186A-37R-1 **Section Top: 1014.80 mbsf**

UNIT 4: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT

Pieces: 1–6B

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	2–5	1.2	0.2	0.8	Euhedral to subhedral; commonly in glomerocrysts

The abundance of olivine varies within the section.

GROUNDMASS: Fine grained to aphanitic. Pieces 3A–6B have a patchy texture (on a scale of ~5 mm) with both aphanitic and fine-grained, variolitic regions.

VESICLES: Generally nonvesicular. Rare round vesicles (≤1 mm) are filled with carbonate.

COLOR: Medium light gray (N6) to medium gray (N5).

STRUCTURE: Massive.

ALTERATION: Slight. Olivine phenocrysts are replaced by black clay and pyrite.

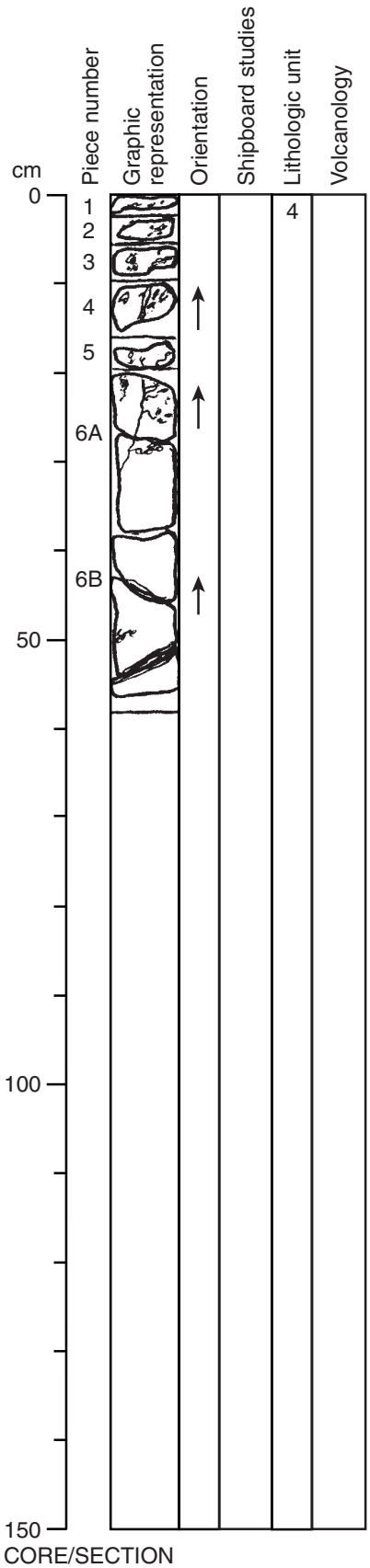
VEINS/FRACTURES: Sparsely veined. Veins are <1-3 mm wide and are filled with green-black clay, zeolite and pyrite.

COMMENTS: Irregular miarolitic cavities (<1-5 mm wide) are abundant at ~45 cm and 85–103 cm; they are filled with black and green clay, zeolite, and Fe oxyhydroxide.

Description of thin section at 114-118 cm

Whole-rock ICP-AES data

Core Photo



192-1186A-37R-2 **Section Top 1016.25 mbsf**

UNIT 4: MODERATELY OLIVINE-PHYRIC BASALT

Pieces: 1–6B

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	3–5	1	0.3	0.5	Euhedral

GROUNDMASS: Predominantly aphanitic; patchy texture (on a scale of ~5 mm) with both aphanitic and fine-grained regions.

VESICLES: Nonvesicular.

COLOR: Medium light gray (N6).

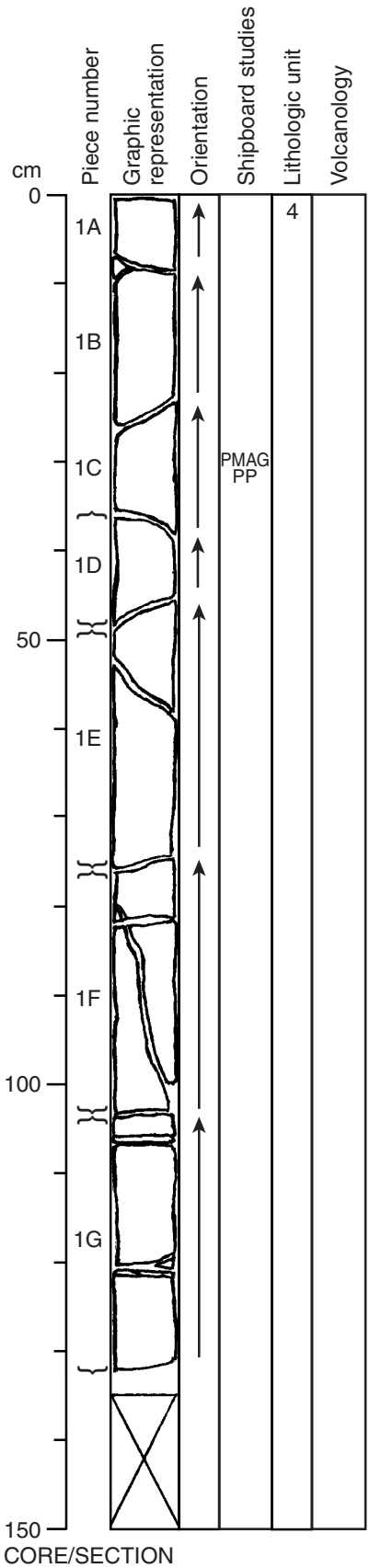
STRUCTURE: Massive.

ALTERATION: Moderate to high. Alteration is high adjacent to miarolitic cavities.

VEINS/FRACTURES: Highly veined. Veins are <1-3 mm wide and are filled with green clay, Fe oxyhydroxide, carbonate, and black clay.

COMMENTS: Irregular miarolitic cavities (<1-5 mm in diameter) are filled with green clay and carbonate; some are interconnected.

Core Photo



192-1186A-37R-3 **Section Top: 1016.83 mbsf**

UNIT 4: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT

Pieces: 1A–1G

CONTACTS: None.

PHENOCRYSTS:

	%	Grain Size (mm):			
	Mode	Max	Min	Avg.	Shape/Habit
Olivine:	1–5	1.0	0.3	0.8	Euhedral to subhedral

Olivine phenocrysts are unevenly distributed.

GROUNDMASS: Predominantly aphanitic at the top to fine grained at the bottom; patchy texture (on a scale of ~5 mm) with both aphanitic and fine-grained regions.

VESICLES: Nonvesicular.

COLOR: Medium light gray (N6).

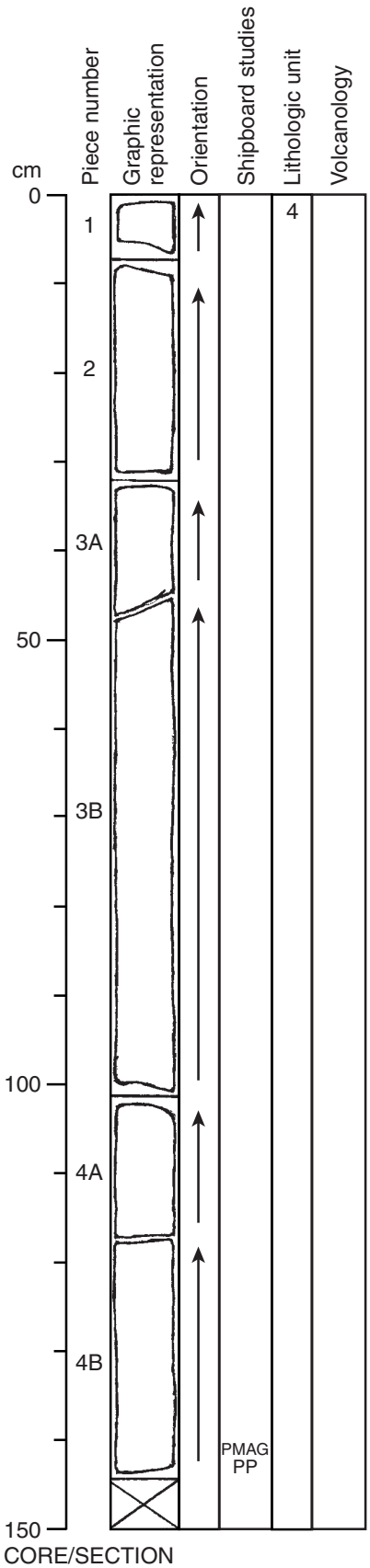
STRUCTURE: Massive.

ALTERATION: Slight. Olivine phenocrysts are replaced by green clay.

VEINS/FRACTURES: Sparsely veined. Veins are 1-3 mm wide and are filled with carbonate and green clay.

COMMENTS: Piece 1E contains a plagioclase-rich xenolith (3 x 5 mm).

Core Photo



192-1186A-38R-1 **Section Top: 1019.40 mbsf**

UNIT 4: APHYRIC TO SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 1–4B

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	<<1	1.5			Subhedral laths; seriate with groundmass
Olivine:	<1–2	1.1	0.8	~1	Subhedral to euhedral

GROUNDMASS: Fine grained with variolitic texture. Rare aphanitic patches (~1–3 mm) are present.

VESICLES: Generally nonvesicular. Rare round vesicles (≤0.5 mm in diameter) are filled with dark green clay.

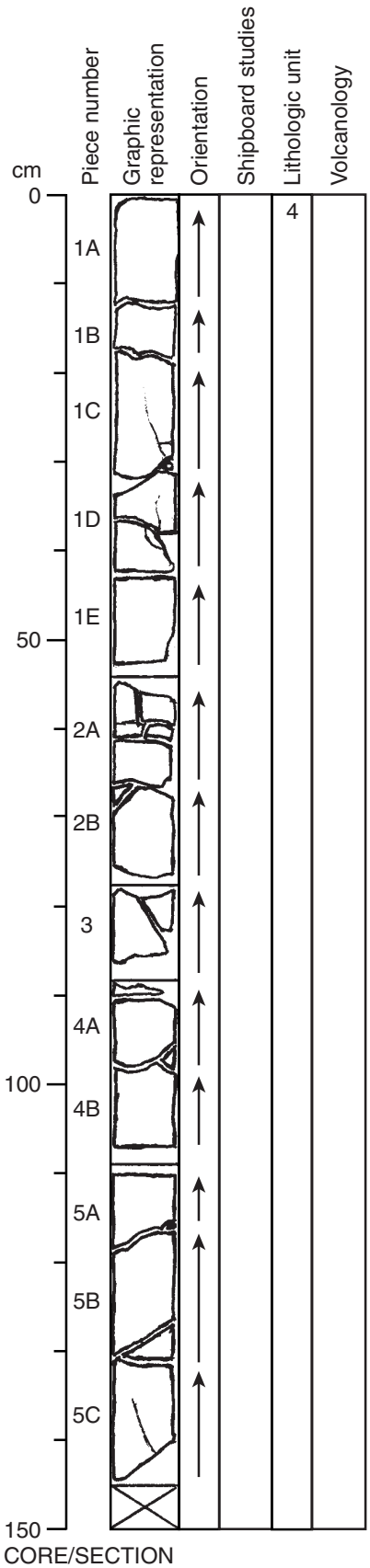
COLOR: Medium light gray (N6) to medium gray (N5).

STRUCTURE: Massive.

ALTERATION: Slight. Olivine phenocrysts are replaced by dark green clay.

VEINS/FRACTURES: Sparsely veined. Veins are <1 mm wide and are filled with dark green clay.

Core Photo



192-1186A-38R-2 **Section Top: 1020.85 mbsf**

UNIT 4: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT

Pieces: 1A–5C

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	1–5	1	0.1	0.3	Euhedral to subhedral; commonly in glomerocrysts

GROUNDMASS: Predominantly fine grained; patchy texture with both aphanitic and fine-grained, variolitic regions.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5) to light gray (N7).

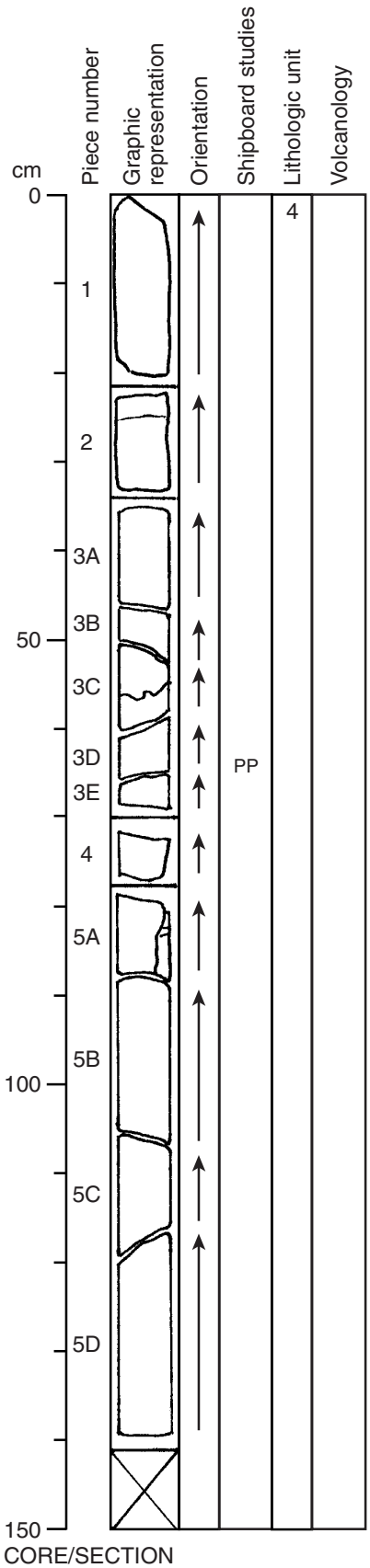
STRUCTURE: Massive.

ALTERATION: Slight. Filled miarolitic cavities make the rock appear more altered. Olivine phenocrysts are replaced by black clay and gray clay.

VEINS/FRACTURES: Sparsely veined. Veins are <1 mm wide and are filled with black, green, and yellow clay, Fe oxyhydroxide, calcite, zeolite, and pyrite.

COMMENTS: Sparsely to moderately abundant irregular miarolitic cavities are filled with black, green and yellow clay, celadonite, calcite, zeolite, Fe oxyhydroxide, and pyrite.

Core Photo



192-1186A-38R-3 **Section Top: 1022.30 mbsf**

UNIT 4: MODERATELY OLIVINE-PHYRIC BASALT

Pieces: 1–5D

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	2–3	1.0	<0.5	0.5	Euhedral to subhedral

GROUNDMASS: Predominantly fine grained; patchy texture with both aphanitic and fine-grained, variolitic regions. The relatively high proportion of fine-grained patches gives the basalt a coarser appearance than the basalt in Core 192-1186A-37R.

VESICLES: Nonvesicular.

COLOR: Medium light gray (N6).

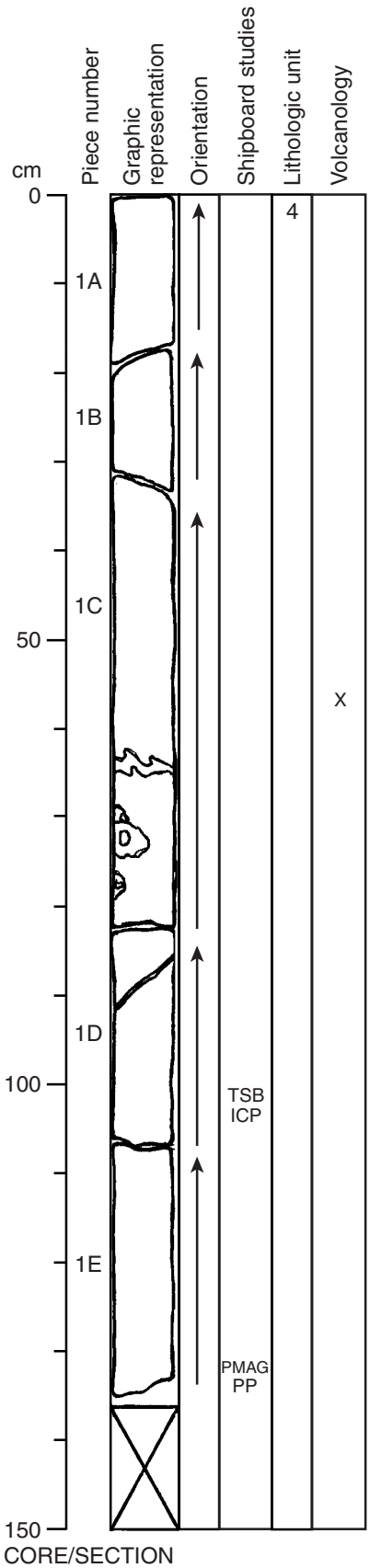
STRUCTURE: Massive.

ALTERATION: Slight. Olivine phenocrysts are replaced by dark green clay.

VEINS/FRACTURES: Sparsely veined. Veins are ≤1 mm wide and are filled with carbonate and black clay.

COMMENTS: Piece 5C contains a plagioclase-rich xenolith (5 x 5 mm) at 113.5 cm (working half). Abundant irregular miarolitic cavities (≤5 mm) in Pieces 5B and 5D are filled with dark green clay.

Core Photo



192-1186A-38R-4 **Section Top: 1023.72 mbsf**

UNIT 4: SPARSELY TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT

Pieces: 1A–1E

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Plagioclase:	1	2	1	1.5	Subhedral laths
Olivine:	1–3	1.5	0.8	~1	Subhedral to euhedral

GROUNDMASS: Predominantly fine grained; patchy texture with both aphanitic and fine-grained, variolitic regions. Aphanitic patches decrease in abundance toward the bottom of the section.

VESICLES: Nonvesicular.

COLOR: Medium light gray (N6) to medium gray (N5) in less altered regions to light olive gray (5Y 6/2) near veins.

STRUCTURE: Massive.

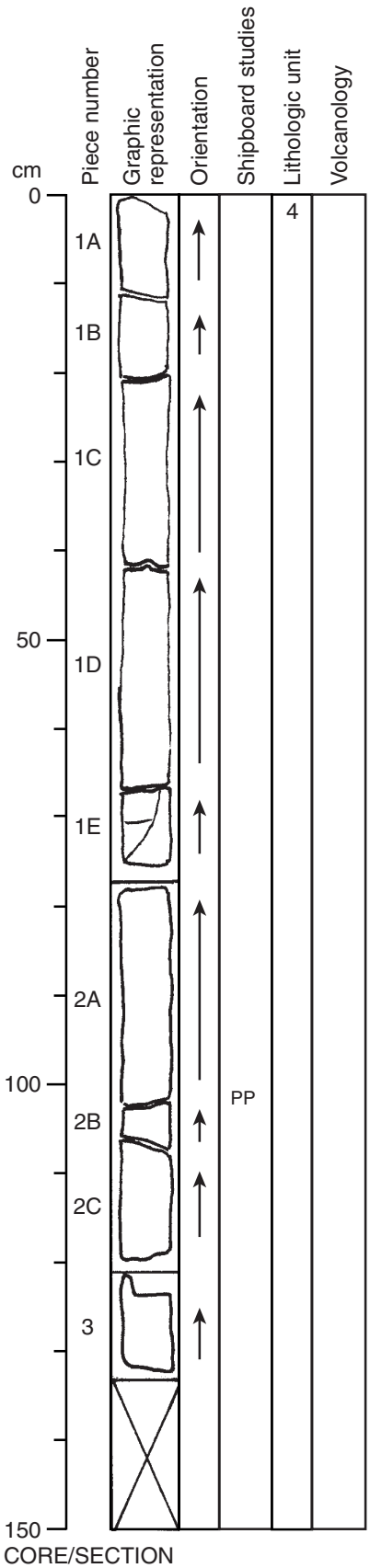
ALTERATION: Slight; moderate near veins. Olivine phenocrysts are replaced by dark green clay.

VEINS/FRACTURES: Sparsely veined. Two veins (~2 mm wide) in the middle part of Piece 1C are filled with white carbonate and dark green clay; their irregular appearance on the split face is due to the split surface being subparallel with the vein.

COMMENTS: A plagioclase-rich xenolith (3 x 4 mm) is present at 58 cm in the working half. Irregular miarolitic cavities (≤4 mm) are sparsely distributed in Pieces 1A–1C. They are filled with dark green clay and white carbonate; some are interconnected.

Whole-rock ICP-AES data

Core Photo



192-1186A-39R-1 **Section Top: 1024.40 mbsf**

UNIT 4: APHYRIC BASALT

Pieces: 1A–3

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	<1	<1	<0.5	0.5	Subhedral to euhedral

GROUNDMASS: Fine grained.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5) to medium dark gray (N4).

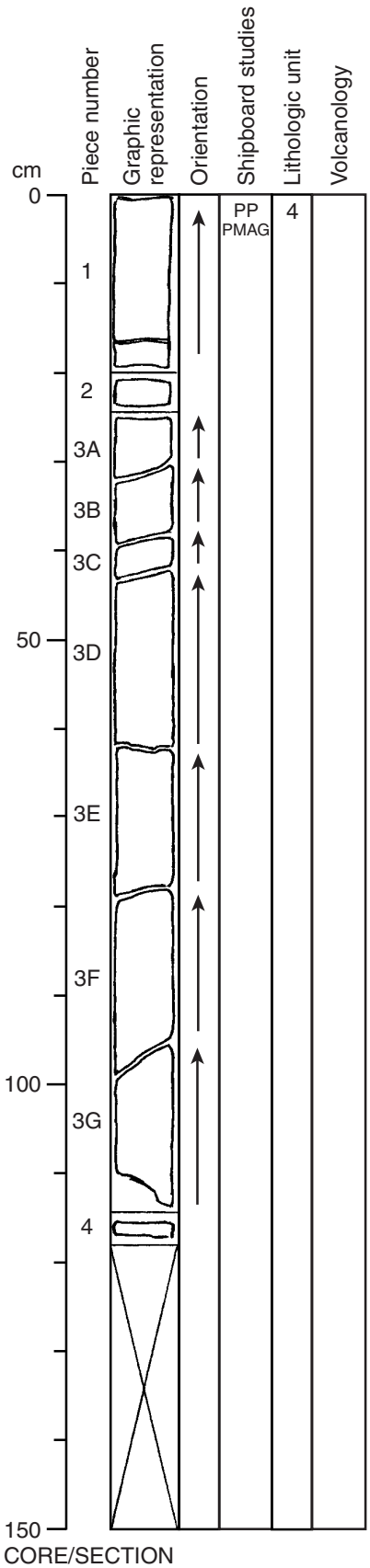
STRUCTURE: Massive.

ALTERATION: Slight. Olivine phenocrysts are replaced by dark green clay.

VEINS/FRACTURES: Sparsely veined. Veins are <1-4 mm wide and are filled with black clay and white carbonate.

COMMENTS: A plagioclase xenocryst (2 x 3 mm) is present in Piece 1D at 65 cm.

Core Photo



192-1186A-39R-2 **Section Top: 1025.72 mbsf**

UNIT 4: SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 1–4

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	1–2	1	<0.5	0.5	Subhedral to euhedral

GROUNDMASS: Fine grained.

VESICLES: Nonvesicular.

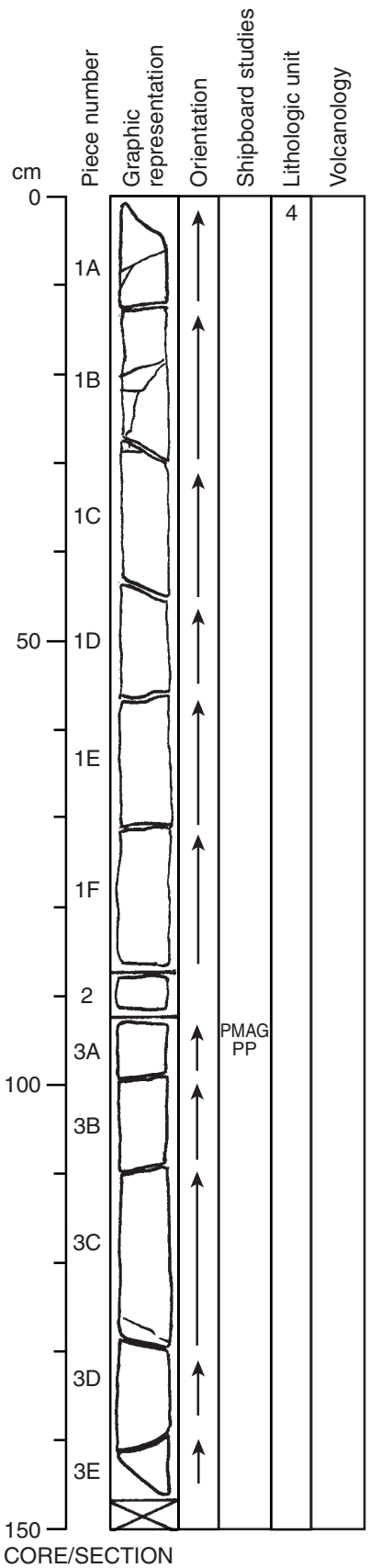
COLOR: Medium gray (N5) to medium dark gray (N4).

STRUCTURE: Massive.

ALTERATION: Slight. Olivine phenocrysts are replaced by dark green clay.

VEINS/FRACTURES: Sparsely veined. Veins are <1-4 mm wide and are filled with black and green clay and pyrite.

Core Photo



192-1186A-39R-3 **Section Top: 1026.89 mbsf**

UNIT 4: SPARSELY OLIVINE-PHYRIC BASALT

Pieces: 1A–3E

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	~1	1	<0.5	0.5	Subhedral to euhedral

GROUNDMASS: Fine grained.

VESICLES: Nonvesicular.

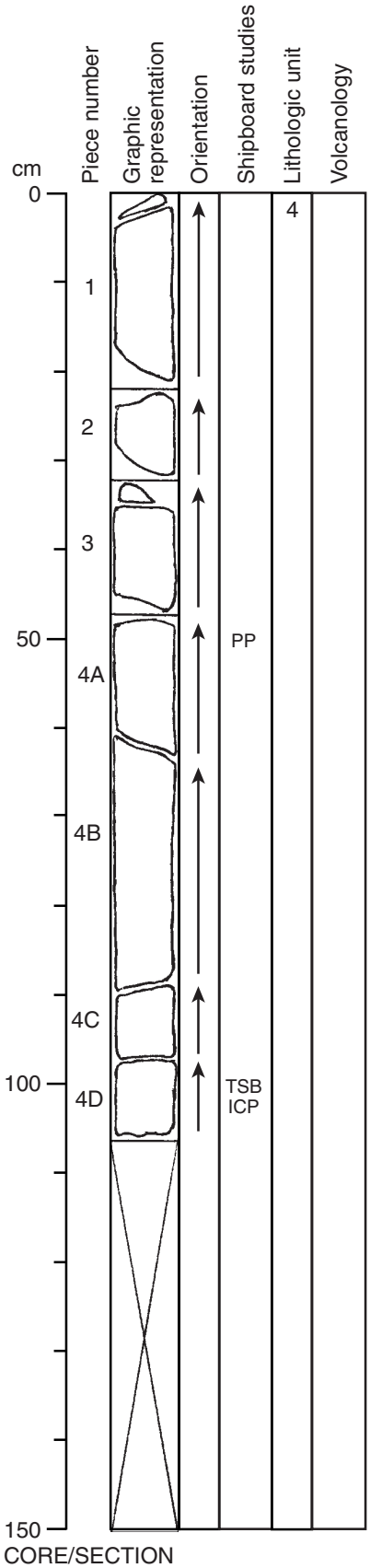
COLOR: Medium gray (N5) to medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Slight; moderate near veins. Olivine phenocrysts are replaced by dark green clay. A brown halo is present adjacent to the vein in Pieces 3A and 3B.

VEINS/FRACTURES: Sparsely veined. Piece 1B has the highest abundance of veins. Veins are <1-2 mm wide and are filled with black clay, green clay, Fe oxyhydroxide, and white carbonate.

Core Photo



192-1186A-39R-4 **Section Top: 1028.35 mbsf**

UNIT 4: APHYRIC BASALT

Pieces: 1A–4D

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	<1	0.5	0.1	0.2	Subhedral to euhedral

GROUNDMASS: Fine grained.

VESICLES: Nonvesicular.

COLOR: Medium light gray (N6).

STRUCTURE: Massive.

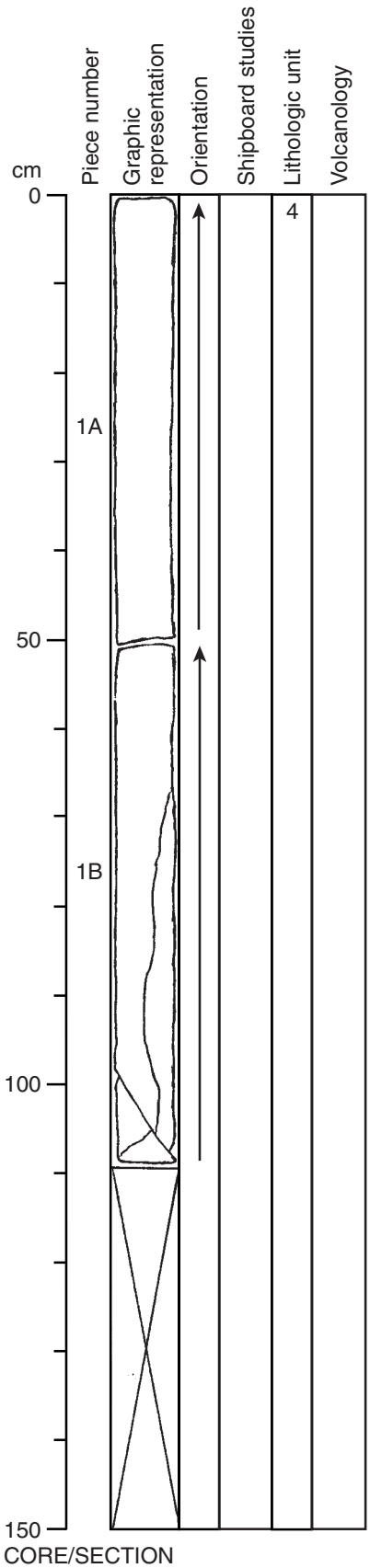
ALTERATION: Slight. Olivine is replaced by dark green clay.

VEINS/FRACTURES: Sparsely veined. Veins are <1-2 mm wide and are filled with black clay and pyrite.

Description of thin section at 101-104 cm

Whole-rock ICP-AES data

Core Photo



192-1186A-39R-5 **Section Top: 1029.41 mbsf**

UNIT 4: APHYRIC BASALT

Pieces: 1A–1B

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max	Min	Avg.	Shape/Habit
Olivine:	<1	0.6	0.1	0.3	Subhedral to euhedral

GROUNDMASS: Fine grained.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5) to light gray (N7).

STRUCTURE: Massive.

ALTERATION: Slight. Olivine is replaced by dark green clay.

VEINS/FRACTURES: Sparsely veined. Veins are <1-2 mm wide and are filled with black clay, green clay, and white carbonate. Piece 1A has no veins.

Site 1186 Smear Slides

Site	Hole	Core	Type	Section	Top (cm)	Depth (mbsf)	Lithology	T-Sand	T-Silt	T-Clay	M-Biotite	M-Calcite	M-Carbonate	M-Clay	M-Feldspar	M-Glauconite	M-Opaques	M-Plagioclase	M-Pyrite	M-Pyroxene	M-Quartz	M-Unspecified Minerals	M-Volcanic Glass	M-Zeolite	B-Diatoms	B-Ebridians	B-Foraminifers	B-Nannofossils	B-Radiolarians	B-Siliceous Sponge Spicules	B-Silicoflagellates	B-Sponge Spicules	B-Organic debris	R-Lithic Fragments	Comments
1186	A	16	R	1	90	832.9	D	10	10	80																	10	88	2						
1186	A	17	R	1	22	841.92	M	30	10	60																	35	65							Darker colored band
1186	A	17	R	1	30	842	D	10	10	80																	25	75							White-colored part
1186	A	19	R	1	16	860.76	D	10	19	71																	30	69	1						
1186	A	20	R	1	22	870.42	D	10	10	80																	20	80							
1186	A	21	R	2	50	881.9	D	3	17	80			2														3	95							
1186	A	21	R	2	120	882.6	M	0	10	90				50										20				30							
1186	A	21	R	5	37	886.27	D	2	15	83				5													2	93							
1186	A	21	R	5	46	886.36	D	5	15	80																	10	90							
1186	A	23	R	2	66	901.26	D	1	15	84												10					1	89							red semi opaques?
1186	A	23	R	2	122	901.82	M	0	10	90			60	20														20							zeolites?
1186	A	24	R	1	92	909.62	D	5	10	85																	5	95							
1186	A	25	R	2	6	919.86	M	0	10	90																		100							
1186	A	25	R	2	30	920.1	D	0	10	90																		100							
1186	A	25	R	4	17	922.97	M	0	10	90			15															85							
1186	A	26	R	3	11	930.48	D		2	98				45								5		30				20							
1186	A	26	R	3	82	931.19	D	0	10	90			15	15								10						60							
1186	A	26	R	2	22	929.72	M	0	10	90												2						98							
1186	A	26	R	2	19	929.69	D	0	10	90														5				95							
1186	A	28	R	3	3	950.23	M	0	10	90			45									10						45							brownish semi opaques are common.
1186	A	29	R	2	50	958.8	D	0	10	90			25											30				45							Zeolites?
1186	A	30	R	1	41	966.81	M	0	10	90												94						6							brownish semi-opaques

Site 1186 Sediment Thin Section Descriptions

Hole	Core	Sec	cm	Location	% Carb	Facies name	Preliminary description and notes	Figure number or Photomicrograph ID#	Microfossils and possible environmental interpretation
							NOTE: In the estimates of foraminifer abundance, we are ignoring what is filling or half-replacing the tests => actual "foraminifers" would only the be test walls, hence a rather small percent of the current rock. But, it is the foraminifer packing that indicates the original texture. Similarly, we generally lump "micrite" with nannofossils, assuming that the matrix was originally nannofossils (as indicated by smear slides, etc.).		
Subunit IIA -- Limestone and chert									
Upper Eocene									
1186A	2R	1	47-50	Typical chalk	2R-1, 7-8 cm = 96.0% 3R-1, 29-30 cm = 96.7%	Foraminifer nannofossil limestone	Abundant foraminifers (about 40%) in micritic (nannofossil) matrix. Foraminifers are well preserved.	See photomicrograph **1186AS-1**	
Middle Eocene									
1186A	4R	1	75-79	Typical chalk	4R-1, 69-71 cm = 57.4% 5R-1, 47-49 cm = 66.6%	Foraminifer sparse wackestone (Nannofossil chalk with foraminifers)	About 10% foraminifers in nannofossil micrite. Some foraminifer chambers are filled by chert, even though walls are microspar. Small spherical foraminifers(?) are visible at 20x.	See photomicrograph **1186AS-2**	A nannofossil/planktonic foraminifer wackestone, the interval is characterized by abundant planktonic foraminifera infilled with relatively coarsely crystalline silica. Rare radiolaria and volcaniclastic grains are also present, as well as frequent deep-water benthic foraminifera. The planktonic assemblage is dominated by *Acarinina* species and, especially, by the thick-walled taxon, *Globigerina senni*. Thus some primary dissolution is likely, although not nearly so great as was evident in the middle Eocene section of Site 1185. Secondary dissolution was considerable as well, concentrating extensively fragmented bioclasts in linear zones parallel to bedding. Index species include *Morozovella lehneri*, *M. aragonensis* and *Hastigerina bolivariana*, indicating Zone P11, lower middle Eocene.
Lower Eocene									
1186A	6R	CC	2-5	Siliceous Limestone	6R-CC, 1-2 cm = 35.5%	Foraminifer radiolarian wackestone-packstone (Nannofossil foraminifer limestone with radiolarians) with partial silicification	About 20% foraminifers (if including ghosts) and 30% radiolarians in nannofossil micrite. Most foraminifer chambers are filled by chert. Radiolarians are poorly preserved ovals of silica. Majority of matrix has an indistinct clotted appearance with suggestions of abundant radiolarian ghosts and fragments. Base of Eocene.	See photomicrographs **1186AS-3**, **1186AS-4**	The sample is a nannofossil/radiolarian/planktonic foraminifer wackestone, indicative of a highly bioturbated, autochthonous pelagic mud deposit. Radiolaria are dominant, but poorly preserved, with extensive recrystallization and minor calcification. Planktonic foraminifera are strongly dominated by Acarinina species and are commonly infilled with silica. The sample therefore differs sharply from the washed residue derived from Sample 6R-CC, 27-28 cm, in which radiolaria are much rarer and Morozovella species are abundant in the planktonic foraminifer assemblage. The latter sample is also very soft and exhibits very good preservation of foraminifera.
									The thin interval in Core 6R-CC may therefore record a period in which surface water plankton composition changed frequently and radically, resulting in layering of highly divergent pelagic sediments. Age diagnostic species include *Acarinina soldadoensis*, *A. broedermanni* and *Morozovella acuta*, indicating a basal Eocene age.
Upper Paleocene									
1186A	9R	1	96-99	Typical limestone		Foraminifer nannofossil limestone	Foraminifers are common in nannofossil micrite. Burrows accumulate foraminifer fragments.	See photomicrograph **1186AS-21**	A nannofossil/planktonic foraminifer wackestone, the sample contains abundant, recrystallized planktonic foraminifera and rare benthic species. Bioclast distribution is very uneven, with irregularly-shaped, poorly fossiliferous areas and frequent vertical and horizontal burrows with high concentrations of bioclasts (feeding traces). The original distribution of bioclasts in this autochthonous deposit was likely much more even, but then altered due to bioturbation. The presence of the benthic foraminifer Stensioina beccariiformis indicates deposition prior to the terminal Paleocene anoxic event. The biostratigraphic indices *Morozovella velascoensis*, *M. gracilis*, *M. marginodentata* and *Parasubbotina varianta* indicate a latest Paleocene (upper Zone P5) age.

Site 1186 Sediment Thin Section Descriptions

Hole	Core	Sec	cm	Location	% Carb	Facies name	Preliminary description and notes	Figure number or Photomicrograph ID#	Microfossils and possible environmental interpretation
							NOTE: In the estimates of foraminifer abundance, we are ignoring what is filling or half-replacing the tests => actual "foraminifers" would only the be test walls, hence a rather small percent of the current rock. But, it is the foraminifer packing that indicates the original texture. Similarly, we generally lump "micrite" with nannofossils, assuming that the matrix was originally nannofossils (as indicated by smear slides, etc.).		
1186A	10R	1	72-75	Typical limestone	10R-1, 69-70 cm =96.4% 11R-1, 86-87 cm = 95.8%	Nannofossil foraminifer limestone	Foraminifers are very abundant (more than 50%). Most of them are fragmented.	See **Chapter 6, Figure F9** (1186AS-22)	A planktonic foraminifer wackestone/packstone, the sample exhibits dense packing of bioclasts. Planktonic foraminifera are the only bioclast other than a single benthic specimen. The distribution is variable, however, from grain supported to muddy intervals, the irregular distribution probably reflecting bioturbation. Autochthonous deposition under highly productive surface water is indicated, as in Sample 12R-CC, 0-3 cm. Priniciple indices include *Morozovella apanthesma*, *M. subbotinae*, *Igorina albeari*, and *Acarinina soldadoensis*, indicating a late middle Thanetian age (Zone P4c).
Middle Paleocene									
1186A	12R	CC	0-3	Chert with rind		Chert	Completely silicified. In main part, no trace of original microfacies remains. Lower part seems to have been a foraminifer packstone, now silicified.	See photomicrographs **1186AS-23**, **1186AS-24**	The sample is a planktonic foraminifer packstone largely replaced by chert. Densely packed planktonic foraminifera are dominated by species of *Morozovella* and *Igorina*. The size range of the assemblage is broad and the distribution is chaotic. A slowly deposited, pelagic autochthonous unit indicative of very high surface water productivity is indicated. The sample is similar to the densely fossiliferous planktonic foraminifer wackestone and packstone noted from the Paleocene to middle Eocene section of Site 1183. A middle Selandian age is indicated by the index species *Morozovella acuta*, *M. angulata*, *M. conicotruncata* and *Igorina albeari*.
Lower Paleocene									
1186A	13R	1	21-24	Microflaser zeolite chalk	13R-1, 28-29 cm = 90.2%		Shipboard thin section was not prepared.		
Main Subunit IIIA -- White limestone Maastrichtian									
1186A	17R	1	46-50	Banded chalk	14R-CC, 1-2 cm =96.3% 15R-CC, 2-3 cm = 96.7% 16R-1, 61-62 cm = 97.6% 17R-1, 53-54 cm = 96.1%	Foraminifer nannofossil chalk	About 25% well-preserved foraminifers in nannofossil micrite. Most foraminifer chambers are void. Beautiful example of a microstylolite is present.	See **Chapter 6, Figure F15** (1186AS-5)	A planktonic foraminifer/nannofossil wackestone, the sample contains abundant planktonic foraminifera, which compose all of the bioclasts in the thin-section. Grading of bioclasts indicates turbidites. Two styolites merge into one large styolite near the top of the thin section, easily visible due to accumulation of non-soluble grains. Principle index species include *Gansserina gansseri*, *Globotruncanita conica* and *Globotruncana ventricosa*, indicating lower upper Maastrichtian.
Upper Campanian									
1186A	21R	5	37-39	Typical chalk (tan-colored facies)	19R-1, 48-49 cm = 96.8% 20R-1, 23-25 cm = 97.5% 21R-2, 49-50 cm = 97.0% 21R-2, 57-58 cm = 96.1%	Nannofossil chalk	Nannofossil micrite dominant. Foraminifers are rare (2%). Fragments of foraminifers(?) are common.	See photomicrograph **1186AS-6**	A nannofossil mudstone, the sample marks a return to autochthonous deposition below the lysocline. Bioclasts are very rare (<2%), although planktonic foraminifer size distribution is wider than is typical for autochthonous samples from this interval. This may indicate a closer proximity to the lysocline than the section below or there may be still some minor movement of sediment and foraminifera from above the lysocline. Radiolarians are absent and volcaniclastic grains are very rare.
									The sample marks the first appearance datums of the planktonic foraminifera *Globotruncana aegyptiaca*, *Rugoglobigerina hexacamerata* and *Pseudoguembelina excolata*, indicating the aegyptiaca planktonic foraminifer zone and a latest Campanian (formerly late early Maastrichtian) age.
1186A	21R	5	111-113	Typical chalk (White facies)		Nannofossil chalk	Nannofossil micrite dominant. Foraminifers are rare (3%). Most foraminifers are ghosts.	See photomicrograph **1186AS-7**	A nannofossil mudstone, the sample continues to be similar in bioclast composition to the above interval. However, the planktonic and benthic foraminifera and volcaniclastic grains show a strong preferred orientation, indicating deposition via mudflows and/or very muddy turbidity currents. Very rare radiolaria are also present, with a coarse recrystallization as in Sample 27R-1, 37-39 cm. Overall clast volume increases to about 5%.

Site 1186 Sediment Thin Section Descriptions

Hole	Core	Sec	cm	Location	% Carb	Facies name	Preliminary description and notes	Figure number or Photomicrograph ID#	Microfossils and possible environmental interpretation
							NOTE: In the estimates of foraminifer abundance, we are ignoring what is filling or half-replacing the tests => actual "foraminifers" would only the be test walls, hence a rather small percent of the current rock. But, it is the foraminifer packing that indicates the original texture. Similarly, we generally lump "micrite" with nannofossils, assuming that the matrix was originally nannofossils (as indicated by smear slides, etc.).		
1186A	22R	1	55-58	Typical chalk (light tan)	22R-1, 43-44 cm = 92.8%	Nannofossil chalk	Nannofossil micrite. Foraminifers are very rare, small and poorly preserved.	See **Chapter 6, Figure F17** (1186AS-8)	A nannofossil mudstone, the sample marks a return to section nearly barren of microfossils (<2% of sample) as in Sample 24-2, 72-75cm. This indicates no transport of sediment from above the lysocline. Very rare volcaniclastic grains are still present.
1186A	23R	2	44-47	Typical chalk	23R-2, 51-58 cm = 98.0% 23R-2, 72-73 cm = 97.1%	Nannofossil chalk	Mainly nannofossil micrite. Foraminifers are very rare, small and poorly preserved.	See photomicrograph **1186AS-9**	A nannofossil mudstone, the sample is very similar to the 26R-2, 73-76 cm sample. Planktonic foraminifera are slightly more common, making up about 5% of the sample. Planktonic species are also more diverse and show a slightly greater size distribution range. These differences reflect the continuing affects of allochthonous planktonic foraminifera (which are most common in the 23R-CC washed residue) transported from above the lysocline to Site 1186.
									Planktonic foraminifers constitute the only bioclast other than volcaniclastic grains and a single benthic foraminifer. The former are much rarer than in Samples 24R-2, 72-75 cm through 26R-2, 73-76 cm. The first stratigraphic occurrence of the planktonic foraminifer *Globotruncanella havanensis* indicates the base of the late Campanian (= former base Maastrichtian).
1186A	24R	2	72-75	Typical chalk	24R-1, 39-40 cm = 96.5%	Nannofossil chalk	Mainly nannofossil micrite. Foraminifers are very rare, small and poorly preserved.	See photomicrograph **1186AS-10**	A nannofossil mudstone, the sample is very similar to the 26R-2, 73-76 cm sample. However, foraminifera and volcaniclastic grains are even rarer, making up less than 2% of the sample, which represents continued deposition below the foraminifer lysocline. *Aragonia ouezzanensis* is again present.
1186A	25R	5	51-53	Typical chalk	25R-3, 65-66 cm = 97.4%	Nannofossil chalk	Mainly nannofossil micrite. Foraminifers are very rare, small and poorly preserved. A brownnish semi-opaque mineral is present.	See photomicrograph **1186AS-11**	A nannofossil mudstone, the sample is nearly identical to the 26R-2, 73-76 cm sample. Foraminifera and volcaniclastic grains make up less than 5% of the sample, which was deposited below the foraminifer lysocline. *Aragonia ouezzanensis* is again present.
Transition to Subunit IIIB Lower Campanian									
1186A	26R	2	73-76	Lowest chalk above condensed zone	26R-1, 22-23 cm = 96.6% 26R-1, 70-71 cm = 93.3%	Nannofossil limestone	Mainly nannofossil micrite. Foramnifers are very rare, small, and have very poor preservation. Foraminifer chambers are often filled by sparry calcite	See photomicrograph **1186AS-12**	A nannofossil mudstone, the sample is nearly barren of microfossils. Few planktonic and benthic foraminifera and rare volcaniclastic grains make up less than 5% of the sample. The interval was deposited below the foraminifer lysocline, but in a less corrosive environment than that represented by the 27R-1, 37-39 cm sample. The biofacies is similar to that of the foraminifer mudstone layers observed in the 26R-3, 24-27 cm sample. The benthic foraminifer *Aragonia ouezzanensis* indicates an age no older than Campanian.
Upper Coniacian?									
1186A	26R	3	24-27	Condensed zone (Alb/ Coniacian)	26R-3, 12-13 cm = 20.7%	Nannofossil limestone with foraminifers and volcanic glasses	Whitish burrows are filled by nannofossil micrite with rare foraminifers. Darker-colored burrows are filled by nannofossils and siliceous fragments, which are probably volcanic glasses. Opaques and clay minerals are common.	See **Chapter 6, Figure F19** (1186AS-14) See photomicrographs **1186AS-13**, **1186AS-15**, **1186AS-16**	The sample is a nannofossil/volcaniclastic/planktonic foraminifer wackestone/mudstone that has undergone extensive dissolution. The thin-section shows a complex interfingering of brown, clayey, volcaniclastic-rich layers that are nearly unfossiliferous, and, grey mudstone intervals with frequent, tiny planktonic foraminifera and much rarer volcaniclastic grains. The original depositional texture was likely a more orderly lamination between volcaniclastic-rich and mudstone layers. The former deposit is possibly allochthonous, indicative of remobilized ash layers that incorporated occasional foraminifers. The latter unit represents pelagic mud deposited below the foraminifer lysocline.
									A combination of bioturbation and extensive secondary dissolution then resulted in the current complex texture. Planktonic foraminifera are dominated by very small species of *Globigerinelloides*. One larger specimen is tentatively identified as *Hastigerinoides subdigitata*, which ranges from the upper Coniacian to middle Campanian.

Site 1186 Sediment Thin Section Descriptions

Hole	Core	Sec	cm	Location	% Carb	Facies name	Preliminary description and notes	Figure number or Photomicrograph ID#	Microfossils and possible environmental interpretation
							NOTE: In the estimates of foraminifer abundance, we are ignoring what is filling or half-replacing the tests => actual "foraminifers" would only the be test walls, hence a rather small percent of the current rock. But, it is the foraminifer packing that indicates the original texture. Similarly, we generally lump "micrite" with nannofossils, assuming that the matrix was originally nannofossils (as indicated by smear slides, etc.).		
Subunit IIIB -- Mottled pink and gray limestone									
Albian									
1186A	26R	3	77-80	Highest Albian marly lms; below condensed zone		Nannofossil limestone	Mainly nannofossil micrite. Foraminifers are very rare, small and have very poor preservation. Foraminifer chambers are often filled by sparry calcite.	See photomicrograph **1186AS-17**	A nannofossil mudstone, the sample is very similar to the sub-lysocline mudstone interval higher in Hole 1186A (i.e., Samples 26R-2, 73-76 cm, through 22R-1, 55-58 cm). Clasts larger than clay size make up less than 2% of the sample volume, mainly volcaniclastic grains, with much rarer bioclasts. The latter are mainly composed of very small (<80 microns) planktonic foraminifera and larger agglutinated and recrystallized hyaline benthic species. The interval represents pelagic deposition below the foraminifer lysocline. Minor burrowing is also present.
1186A	27R	1	37-39	Marly limestone	27R-1, 37-38 cm = 30.9% (apparently mainly silica)	Radiolarian nannofossil limestone	Radiolarians are abundant, but poorly preserved. Matrix is nannofossil micrite? Maybe partly silicified. Brownish semi-opaque grains are common.	See **Chapter 6, Figure F21** (1186AS-18)	A nannofossil/radiolarian wackestone, the sample shows graded laminae of radiolarian bioclasts. Planktonic foraminifers are absent and benthic species are limited to very rare agglutinated specimens. The laminae are macroscopically obvious due to concentration in some layers of darker material, likely a mixture of clay minerals and organic matter. The interval is indicative of fine-grained, low-volume turbidites deposited below the foraminifer lysocline.
									The radiolaria are poorly preserved, exhibiting a coarse recrystallization. Unlike Aptian to Albian radiolaria-rich intervals at Site 1183, this assemblage shows relatively high diversity, with numerous dictyometrid specimens in addition to spherical species. The reputed Cenomanian index *Pseudodictyometra pseudomacrocephala* is present.
1186A	28R	2	136-139	Typical marly limestone	28R-1, 135-136 cm = 88.4% 28R-3, 4-5 cm = 75.4%	Nannofossil limestone	Mainly nannofossil micrite. Fragments of foraminifers(?) are scattered. Foraminifer ghosts are included. They are filled by sparry calcite or silica.	See photomicrograph **1186AS-19**	The sample is a nannofossil/volcaniclastic wackestone. Fine-grained volcaniclastic grains compose the dominant clast, with bioclasts limited to few agglutinated and nodosariid benthic foraminifera and rare, sometimes very coarse-grained macrofossil debris. Nannofossils indicate an early Albian age for the sample, indicating that the lysocline rose above Site 1186 much earlier than at Site 1183.
									The mixing of nodosariid benthic foraminifera and rare, but coarse-grained macrofossil debris, with deep-water agglutinated foraminifera suggests an allochthonous unit deposited by debris flows. The agglutinated foraminifer assemblage shows affinities with that described from Albian slope facies of the extreme eastern Indian Ocean off Western Australia.
Aptian									
1186A	29R	2	131-134	Typical marly limestone		Nannofossil limestone with foraminifers	Foraminifers are common in nannofossil micrite. Microstylolites are present.		The sample is a nannofossil/planktonic foraminifer wackestone. Planktonic foraminifera make up almost all the bioclasts and compose about 30% of the sample by volume. The planktonic assemblage is strongly dominated by species of Blefuscuiana, without any *Globigerinelloides* specimen evident. This sharply contrasts with the underlying and overlying section as observed in washed residue (i.e., Samples 29R-CC, 17-22 cm, and 29R-2, 73-76 cm) in which large species of *Globigerinelloides* dominate (i.e., *G. barri*, *G. algerianus*, *G. ferreolensis* and *G. aptiensis*).
									In the upper Aptian, dominance of the *Globigerinelloides* assemblage indicates deep, open marine deposition, whereas *Blefuscuiana* dominance indicates shallow-water conditions as at Site 1183. It is therefore likely that this sample is indicative of an allochthonous deposit of shallow-water pealgic mud transported into a deeper water setting. This hypothesis is supported by the occurrence of coarse-grained macrofossil debris (mollusc and echinoid) as well as by a texture marked by alternation between very diffuse, discontinuous lenses of more concentrated bioclasts and less fossiliferous areas.

Site 1186 Sediment Thin Section Descriptions

Hole	Core	Sec	cm	Location	% Carb	Facies name	Preliminary description and notes	Figure number or Photomicrograph ID#	Microfossils and possible environmental interpretation
							NOTE: In the estimates of foraminifer abundance, we are ignoring what is filling or half-replacing the tests => actual "foraminifers" would only the be test walls, hence a rather small percent of the current rock. But, it is the foraminifer packing that indicates the original texture. Similarly, we generally lump "micrite" with nannofossils, assuming that the matrix was originally nannofossils (as indicated by smear slides, etc.).		
1186A	30R	1	28-31	Limestone (almost at basalt contact)		Nannofossil limestone with foraminifers	Foraminifers are common in nannofossil micrite. Brownish semi-opaque minerals are observed. Some of them show a mode of the occurrence like framboidal pyrite.	See **Chapter 6, Figure F22** (1186AS-20)	A nannofossil/planktonic foraminifer wackestone, the interval is rich in volcaniclastic grains and shows a diffuse lamination. The laminae are macroscopically visible due to varying concentration of volcaniclastic debris, much of it clay-size. Bioclasts are almost entirely composed of small planktonic foraminifera that show a subtle preferred orientation. The subtlety of the orientation is more likely due to the dominance of equidimensional globular species, rather than a reflection of the hydraulic conditions of deposition. Rare benthic foraminifera are almost entirely composed of shallow-water species, the sole exception being a single specimen of the slope species *Gaudryina dividens*.
									Coarse-grained mollusc debris is also present. Thus the biofacies is very similar to that of the shallow-water middle Aptian limestone noted above basalt basement at Site 1183. However, the laminated texture and clast orientation indicates the transportation of shallow-water mud. The depth of deposition that can be estimated as that indicated by the washed residues from the overlying white limestone section (i.e., Sample 30R-1, 11-15 cm – upper slope). The most common planktonic species present are *Blefuscuiana daminae*, *Praehedbergella ruka papillata* and *P. sigali*, indicating a level no higher than the *Leupoldina cabri* Zone, although the nominate taxon is not present.
Unit IV -- Limestone between basalt									
1186A	30R	1	73-76 (piece 5)	Limestone vein in basalt		Intraclast breccia with microspar matrix	White "vein" in basalt, that cuts older clay-filled veins. Microspar (recrystallized) matrix with (1) "ray" rounded micrite to wackestone clasts, which can include foraminifers and calcified radiolarians, (2) "brown" rounded micrite clasts, (3) angular reddish-black opaques (Fe oxyhydroxide minerals?), which can include a transparent greenish mineral (glauconite?), (4) large clasts of the transparent green mineral (glauconite?), which have a calcite spar halo, (5) foraminifer texts (oddly, not replaced by microspar), (6) other mineral grains (not identified).	See **Chapter 6, Figure F29** (1186AS-25)	The thin section is of fractured basalt, the fractures filled with iron oxide, spar and limestone breccia. The limestone is highly recrystallized, but common small to medium size planktonic foraminifera are still evident in much of the debris. The density of the surviving bioclasts is occasionally high, indicating that the original limestone was very fossiliferous. Tentatively identified specimens of *Blefuscuiana daminae* and *Praehedbergella ruka* are frequent. No radiolaria are evident. The facies is therefore similar to Sample 32R-4, 8, 89-92 cm and to the foraminifer wackestone facies in the breccia from Sample 32R-3, 5, 79-82 cm. No species resembling *P. pseudosigali* or *B. occulta* were observed.
							This is not a depositional facies, but probably is a disrupted and mixed assemblage of other previous sediment types. Maybe an injected Neptunian Dyke? I suspect that this was a forceful injection when the original source sediment was semi-lithified (hence the variable-sized wackestone clasts), perhaps during a late-stage fissure formation.		
1186A	32R	3	79-82 (piece 5)	Limestone breccia		Conglomerate of Ferruginous Radiolarian Wackestone.and other clasts	Weird lithology. Reddish brown granule-pebble conglomerate between basalt flows. In general, the larger rounded clasts are radiolarian wackestone to packstone.with variable amounts of small particles of presumed Fe-oxyhydroxides (hence the reddish colors) = ferruginous limestone. Other clasts include (1) foraminifer sparse wackestone (odd, because this lacks significant radiolarians, whereas the radiolarian wackestone lacks significant foraminifers), (2) large glass shards or hyaloclasts with green clay alteration rim, (3) concentrations of opaque minerals with calcite microspar, and (4) other types.	See **Chapter 6, Figure F28** (1186AS-26) See photomicrographs **1186AS-27**, **1186AS-28**	The sample is a breccia composed principally of pebble-size fragments of limestone clasts of two principal types: (1) a radiolarian wackestone with rare small planktonic foraminifera (<100 micron) similar to the facies in the cabri zone of Site 1183 and in interstial limestone in the upper basalt of Site 1185; and, (2) planktonic foraminifer wackestone, with very small (<80 micron) foraminifera, very similar to the facies in sample 1186A-32R-4, 8, 89-92 cm. Planktonic foraminifera cannot be definitely identified due to small size and recrystallization, but tentative species identification indicates that the two facies may be of different ages.

Site 1186 Sediment Thin Section Descriptions

Hole	Core	Sec	cm	Location	% Carb	Facies name	Preliminary description and notes	Figure number or Photomicrograph ID#	Microfossils and possible environmental interpretation
							NOTE: In the estimates of foraminifer abundance, we are ignoring what is filling or half-replacing the tests => actual "foraminifers" would only the be test walls, hence a rather small percent of the current rock. But, it is the foraminifer packing that indicates the original texture. Similarly, we generally lump "micrite" with nannofossils, assuming that the matrix was originally nannofossils (as indicated by smear slides, etc.).		
							How did this form? A mystery. There must have been two pre-existing types of semi-lithified chalk, each having signficant ferruginous components (similar to other facies near the basalts at other sites). Then, both tpes are disrupted, rolled and mixed, and emplaced on top of the basalt before the next flow encased it.		The radiolarian facies contains planktonic foraminifers dominated by *Blefuscuiana daminae*, with much rarer *Praehedbergella sigali*. This species composition indicates an affinity to the cabri zone, although *Leupoldina cabri* itself is not present in this sample. The planktonic foraminifer facies contains *Praehedbergella ruka* and *Blefuscuiana occulta*, suggesting a possible older early Aptian age. No *Praehedbergella pseudosigali* is evident
1186A	32R	4	89-92 (piece 8)	Limestone neptunian dyke within basalt			This "limestone dyke" has a sharp angular contact to basalt, implying a later fissure fill. The general facies is ferruginous microspar containing sand-sized angular clasts.	See photomicrograph **1186AS-29**	The sample is thermally altered limestone in contact with basalt. The limestone is heavily altered to spar and a dark orange-brown material assumed to be iron oxide. Rare, small planktonic foraminifera (<80 microns) are noted and small irregular zones of spar are frequent that may be the altered remains of larger microfossils. Overall, the original limestone texture has been obliterated and the paleoenvironment is indeterminate. The planktonic foraminifera resemble three species of *Praehedbergella*: *P. ruka*, *P. sigali* and *P. pseudosigali*, the last possibly indicative of a late Barremian age.

TS# 178 192-1186A-30R-1, 59-61 cm, Piece 4 — **Unit 1** — **OBSERVER:** **SPI, TS, CRN, LMC, MG, RVW, WJC**

ROCK NAME: **Sparsely olivine-phyric basalt.**
WHERE SAMPLED: **Vein with associated alteration halo, located in an aphanitic basalt.**
GRAIN SIZE: **Microcrystalline to hypocrystalline.**
TEXTURE: **Porphyritic, locally subtrachytic.**

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	APPROX. COMP.	MORPHOLOGY	COMMENTS
PHENOCRYSTS								
Olivine	0	1	0.2	0.4	0.2		Euhedral	A few unaltered relicts present.
Plagioclase	<1	<1	0.2	0.6	0.2		Euhedral laths	Partially resorbed.
GROUNDMASS								
Plagioclase	15	15	<0.01	0.05	0.03		Microlitic and skeletal	Some have swallow-tail terminations; some with sieve texture are also present.
Devitrified glass	74	80					Fibrous, microcrystalline	
Clinopyroxene	4	4	0.05	0.12	0.1		Subhedral to anhedral	
OPAQUE/ OXIDE MINERALS								
Titanomagnetite	<1	<1	<0.01	0.02	0.01		Subhedral to anhedral	Octahedral and skeletal/dendritic habits.
Sulfide	Trace	Trace			<0.01		Blebs	Inclusions in silicates.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Green smectite	7				Devitrified glass and olivine	Mainly nontronite.
Celadonite	Trace				Olivine	
Calcite	Trace				Olivine	
Fe oxyhydroxide	Trace				Olivine	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
None.							

VEINS	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
One large, horizontal		Center of slide			2.2	Calcite and traces of smectite	Associated alteration halo is present. Plagioclase stained by Fe oxyhydroxide in halo.

COMMENTS :

See **Chapter 6, Figure F32**; see photomicrograph **1186A-209**

TS# 179 192-1186A-31R-1, 13-15 cm, Piece 3A | **Unit 1** | **OBSERVER:** | **PRC, TS, LMC, CRN, RVW, MG, JH**

ROCK NAME: **Sparsely clinopyroxene-phyric basalt.**
WHERE SAMPLED: **Pillow interior; TS# 180 is aphanitic pillow margin.**
GRAIN SIZE: **Hypocrystalline; fine grained.**
TEXTURE: **Subophitic to intersertal; porhyritic and locally variolitic.**

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	APPROX. COMP.	MORPHOLOGY	COMMENTS
PHENOCRYSTS								
Plagioclase	<1	<1	0.15	0.5	0.2		Anhedral to subhedral and stubby	With ragged grain boundaries and some are oscillatory zoned.
Clinopyroxene	1	1	0.12	0.22	0.15		Anhedral	Some are isolated, intergranular crystals but others are subophitic with groundmass plagioclase.
Olivine	0	<1					Anhedral to subhedral	Presence of olivine is inferred from the anhedral and angular morphology of secondary calcite.
GROUNDMASS								
Plagioclase	37	38	0.02	0.13	0.06		Anhedral to subhedral and elongate	
Clinopyroxene	38	38	<0.01	0.1	0.06		Anhedral to subhedral and equant; a few are elongate	Seriate from feathery to equant grains.
Devitrified glass	0	20						
OPAQUE MINERALS								
Titanomagnetite	2	2	<0.01	<0.04	0.01		Skeletal and dendritic to anhedral	Interstitial.
Sulfide	Trace	Trace			<0.01			Interstitial.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Calcite	~1				Olivine	
Green and brown smectite	20				Devitrified glass, olivine and plagioclase	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
Rare						Smectite	Extremely small.

VEINS	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
None							

COMMENTS :

TS# 180 192-1186A-31R-1, 44-48 cm, Piece 3B **Unit 1** **OBSERVER:** **PRC, SPI, TS, LMC, RVW, MG, CRN, JH**

ROCK NAME: **Sparsely plagioclase-olivine-phyric basalt.**

WHERE SAMPLED: **Aphanitic pillow margin; TS# 179 is fine grained interior.**

GRAIN SIZE: **Hypocrystalline to crytocrystalline.**

TEXTURE: **Porphyritic with variolitic to intersertal groundmass; subtrachytic and locally glomerophyric.**

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	APPROX. COMP.	MORPHOLOGY	COMMENTS
PHENOCRYSTS								
Olivine	0	1	0.07	0.65	0.4		Subhedral to euhedral	
Plagioclase	1-2	1-2	0.1	0.25	0.15		Subhedral to euhedral	Occasionally glomerophyric and some have swallow-tail terminations.
Clinopyroxene	<<1	<<1	0.07	0.2	0.1		Anhedral to subhedral	Some are isolated but others are subophitically attached to groundmass plagioclase.
GROUNDMASS								
Plagioclase	10	10	0.02	0.08	0.04		Fibrous to skeletal to anhedral and elongate	
Clinopyroxene	~3	~3		<.05			Feathery to anhedral	
Devitrified glass	73	83					Fibrous	
OPAQUE MINERALS								
Titanomagnetite	2	2	<0.01	0.01	<0.01		Skeletal to subhedral	
Sulfide	Trace	Trace		0.01			Blebs	The largest ones are in the vein.

SECONDARY MINERALOGY	PERCENT		SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Calcite	~1	0				Olivine	
Celadonite	<<1	0				Olivine	
Smectite	9	0				Glass	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
Three	Trace		0.4	5		Calcite and celadonite	The largest one is an open cavity.

VEINS	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
Yes		Corner		<0.07		Pyrite and manganese?	Associated with the large vesicle.

COMMENTS :

See **Chapter 6, Figure F35**, **Figure 44**, **Figure F45**; see photomicrograph **1186A-221**

TS# 181 192-1186A-33R-1,35-38 Piece 4A **Unit:2B** **OBSERVER:** **TS, SPI, CRN, LMC, MG, RVW, PRC, JH**

ROCK NAME: **Sparsely plagioclase-olivine-phyric basalt**

WHERE SAMPLED: **Pillow rim; TS# 182 is fine-grained interior of same pillow.**

GRAIN SIZE: **Cryptocrystalline to microcrystalline; hypohyaline**

TEXTURE: **Locally gromerophyric (olivine, plagioclase and clinopyroxene) in spherulitic groundmass.**

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	APPROX. COMP.	MORPHOLOGY	COMMENTS
PHENOCRYSTS								
Plagioclase	2	2	0.02	0.12	0.1		Subhedral to euhedral lath	Some have oscillatory zoning.
Olivine	0	1	0.1	0.4	0.3		Euhedral	
Clinopyroxene	<1	<1	0.08	0.2	0.12		Anhedral to subhedral	
GROUNDMASS								
Plagioclase	15	15	<0.01	0.05	0.03		Subhedral, acicular	Some crystals have swallow-tail ends.
Clinopyroxene	15	15	<0.01	0.05	0.02		Anhedral	
Devitrified glass	60	66					Cryptocrystalline	
OPAQUE MINERALS								
Titanomagnetite	<1	<1	<0.01	0.02	0.01		Subhedral, skeletal and dendritic	

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Celadonite	5				Olivine and devitrified glass	
Sulfide	<1		<0.01		Bleb	
Pyrite	1				Adjacent to veins	
Fe oxyhydroxide	1				Olivine and devitrified glass	
Calcite	<1				Olivine	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
One	1	lower	1.8	2.8		Calcite	

VEINS	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
Yes			0.01	0.03	0.02	Celadonite	
Yes			<0.01	0.02	0.01	Celadonite, pyrite	

COMMENTS : Plagioclase and clinopyroxene phenocrysts have patchy distribution.
See photomicrograph **1186A-210**

TS# 182 192-1186A-33R-1, 91-93 cm, Piece 4F **Unit 2B** **OBSERVER: WJC, TS, SPI, LMC, CRN, MG, RVW, PRC, JH**

ROCK NAME: **Sparsely olivine-phyric basalt.**
WHERE SAMPLED: **Fine grained pillow interior; TS# 181 is aphanitic rim of same pillow.**
GRAIN SIZE: **Fine grained, hypocrystalline.**
TEXTURE: **Subophitic, variolitic, intersertal.**

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	APPROX. COMP.	MORPHOLOGY	COMMENTS
PHENOCRYSTS								
Olivine	0	2	0.1	0.6	0.2		Euhedral to subhedral	
GROUNDMASS								
Plagioclase	45	45	<0.01	0.34	0.1		Laths, euhedral to subhedral	
Clinopyroxene	44	44	0.02	0.3	0.1		Equant to elongate, subhedral to anhedral	
Glass	0	6						
OPAQUE MINERALS								
Titanomagnetite	3	3	<0.01	0.15	0.01		Skeletal, subhedral	
Pentlandite	<1	<1	<0.01	0.03	<0.01		Blebs	Inclusions in silicate minerals.

SECONDARY MINERALOGY	PERCENT		SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Brown smectite	8					Olivine, glass and vesicles	
Pyrite	trace	0	<0.01	0.02	<0.01	Blebs	Associated with glass.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
Vesicle	Trace					Brown smectite	

VEINS	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
None.							

COMMENTS : Rare vesicles are found within the thin section. No Cr spinel was noted. There may be evidence for primary sulfide (possibly pentlandite); several are mantled by titanomagnetite and enclosed by silicates. See **Chapter 6, Figure F37**, **Figure F38**, **Figure F39**; see photomicrographs **1186A-207**, **1186A-223**

TS# 190 192-1186A-34R-2, 143-146 cm, Piece 2E **Unit 2B** **OBSERVER:** **MG, WJC, TS, LMC, PRC, SPI, CRN, JH**

ROCK NAME: **Moderately olivine-phyric basalt.**

WHERE SAMPLED: **Massive base of Unit 2B.**

GRAIN SIZE: **Patchy; fine grained to microcrystalline.**

TEXTURE: **Heterogeneous: microcrystalline and variolitic; coarser-grained and subophitic.**

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	max.	av.	APPROX. COMP.	MORPHOLOGY	COMMENTS
PHENOCRYSTS								
Olivine	0	3					Euhedral to subhedral	
Plagioclase	<1	<1	0.3	0.4			Tabular, euhedral to subhedral	One shows oscillatory zoning.
GROUNDMASS - coarser-grained regions								
Plagioclase	28	28	0.04	0.1	0.08		Elongate, sometimes tabular; euhedral to subhedral	Oscillatory zoning in some crystals.
Clinopyroxene	23	23	0.2	0.8	0.6		Mainly equant, subhedral to anhedral	Subophitic with plagioclase; some crystals are sector zoned.
GROUNDMASS - finer-grained regions								
Plagioclase	15	15	0.04	0.1	0.08		Elongate, subhedral to anhedral	Variolitic texture with clinopyroxene.
Clinopyroxene	14	14	0.2	0.8	0.6		Elongate, anhedral	
Glass	0	15						
OPAQUE MINERALS								
Titanomagnetite	2	2	0.08	0.16	0.08			Associated with olivine pseudomorphs and altered glass.
Pentlandite	<1	<1	<0.01	0.01	<0.01			Inclusions in glass and silicates.

SECONDARY MINERALOGY	PERCENT		SIZE (mm) min.	max.	av.	REPLACING / FILLING	COMMENTS
Brown smectite	18	0				Olivine and glass	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	max.	av.	FILLING / MORPHOLOGY	COMMENTS
None							

VEINS	PERCENT	LOCATION	SIZE (mm) min.	max.	av.	FILLING / MORPHOLOGY	COMMENTS
None							

COMMENTS : Patchy texture with approximately 70% fine grained and 30% aphanitic regions. Finer-grained groundmass fills the interstitial spaces between the plagioclase and clinopyroxene in the coarser-grained regions. The patchy texture is better developed in TS # 192.

See **Chapter 6, Figure F36**; see photomicrograph **1186A-246**

TS# 191 192-1186A-34R-5, 122-125 cm, Piece 9B **Unit 3** **OBSERVER:** **MG, RVW, TS, LMC, SPI, CRN, MG**

ROCK NAME: **Sparsely olivine-phyric basalt.**
WHERE SAMPLED: **Fine grained (?) basalt of Unit 3.**
GRAIN SIZE: **Hypocrystalline to cryptocrystalline.**
TEXTURE: **Seriate to glomeroporphyritic; variolitic.**

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	APPROX. COMP.	MORPHOLOGY	COMMENTS
PHENOCRYSTS								
Plagioclase	<1	<1	0.16	0.24	0.2		Tabular	
Olivine	0	1	0.15	0.2	0.15		Subhedral	Plucked out. Some form glomerocrysts.
Clinopyroxene	<1	<1			0.2		Subhedral	
GROUNDMASS								
Devitrified glass	51	62						Quenched groundmass?
Plagioclase	15	15	0.01	0.05	0.02		Elongate	
Clinopyroxene	20	20	0.08	0.1	0.1		Anhedral	
OPAQUE MINERALS								
Titanomagnetite	~1	2	0.16	0.3	0.2		Skeletal, subhedral	Some are maghemitized.
Sulfide	<1	<1					Blebs	Often associated with titanomagnetite.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Brown clay	11				Glass	
Calcite	<1				Olivine	
Green clay	<<1				Olivine	
Maghemite	1				Titanomagnetite	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
None							

VEINS	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
None						Pyrite, celadonite	En echellon.

COMMENTS :

See photomicrograph **1186A-226**

TS# 192 192-1186A-37R-1,114-118 Piece 5B **Unit: 4** **OBSERVER:** **RVW, CRN, SPI, PRC, LMC, TS, JH**

ROCK NAME: **Sparsely olivine-phyric basalt.**

WHERE SAMPLED: **Massive base of Unit 4.**

GRAIN SIZE: **Patchy: fine grained and microcrystalline.**

TEXTURE: **Heterogeneous: variolitic in microcrystalline regions; subophitic in coarser-grained regions.**

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	APPROX. COMP.	MORPHOLOGY	COMMENTS
PHENOCRYSTS								
Olivine	0	1	0.1	0.6	0.3		Subhedral to euhedral	Only present in coarser-grained regions.
GROUNDMASS - coarser-grained regions								
Olivine	0	3	0.1	0.6	0.3		Subhedral to euhedral	
Plagioclase	32	32	0.03	0.2	0.05		Subhedral to euhedral laths	Oscillatory zoning in some crystals.
Clinopyroxene	25	25	0.1	1.2	0.6		Euhedral to anhedral	Subophitic with plagioclase.
GROUNDMASS - microcrystalline regions								
Plagioclase	5	5	<0.01	0.01	<0.01		Laths to fibrous crystallites	
Devitrified glass	28	28						
Clinopyroxene	5	5	<0.01	0.02	<0.01		Subhedral to fibrous crystallites	
OPAQUE MINERALS								
Titanomagnetite	1	1	<0.01	0.01	0.01		Euhedral to skeletal, octahedra	Only present in microcrystalline regions.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Calcite	4				Olivine	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
None							

VEINS	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
One		middle of slide			<0.1	Calcite, brown smectite and marcasite	

COMMENTS : Patchy texture with approximately 60% fine-grained regions and 40% aphanitic regions; varies on a scale of ~4 mm. Microcrystalline groundmass fills the interstitial spaces between the plagioclase and the subophitic clinopyroxene in the coarser-grained groundmass.
See **Chapter 6, Figure F34**; see photomicrograph **1186A-224**, **1186A-225**

TS# 195 192-1186A-39R-4, 101-104 cm, Piece 4D — **Unit 4** — **OBSERVER:** **PRC, CRN, LMC, TS, JH**

ROCK NAME: **Sparsely olivine-phyric basalt.**
WHERE SAMPLED: **Fine-grained, massive base of Unit 4?**
GRAIN SIZE: **Holocrystalline; fine grained.**
TEXTURE: **Intergranular to subophitic.**

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	APPROX. COMP.	MORPHOLOGY	COMMENTS
PHENOCRYSTS								
Plagioclase	<1	<1	0.3	0.6	0.4		Anhedral to subhedral	
Olivine	0	1	<.1	0.5	0.25		Subhedral	See comments below.
Clinopyroxene	<1	<1	0.3	0.4	0.35		Anhedral to subhedral	Mainly intergranular.
GROUNDMASS								
Plagioclase	42	42	<0.02	0.25	0.15		Anhedral to subhedral	
Clinopyroxene	42	44	<0.02	0.2	0.15		Anhedral to subhedral	Simple twins.
Glass	0	10						
OPAQUE MINERALS								
Titanomagnetite	~2	~2	~0.01	0.13	0.05		Skeletal and anhedral to subhedral	One elongate and skeletal one is ~0.12 x 1.2 mm!
Sulfide	<<1	<<1	<0.01	0.025	<0.01		Blebs to anhedral	Probably pentlandite; present as inclusions in silicate minerals and glass.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Smectite	13				Olivine, glass and rarely clinopyroxene	Mostly brown smectite. Some clinopyroxenes are partly replaced by green smectite.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
None							It is very hard to differentiate this from plucked-out spaces.

VEINS	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
None							

COMMENTS : There are plenty of plucked out patches in this section some of which are subhedral and could have been olivine, but others are anhedral and could have been glass.
See photomicrograph **1186A-232**