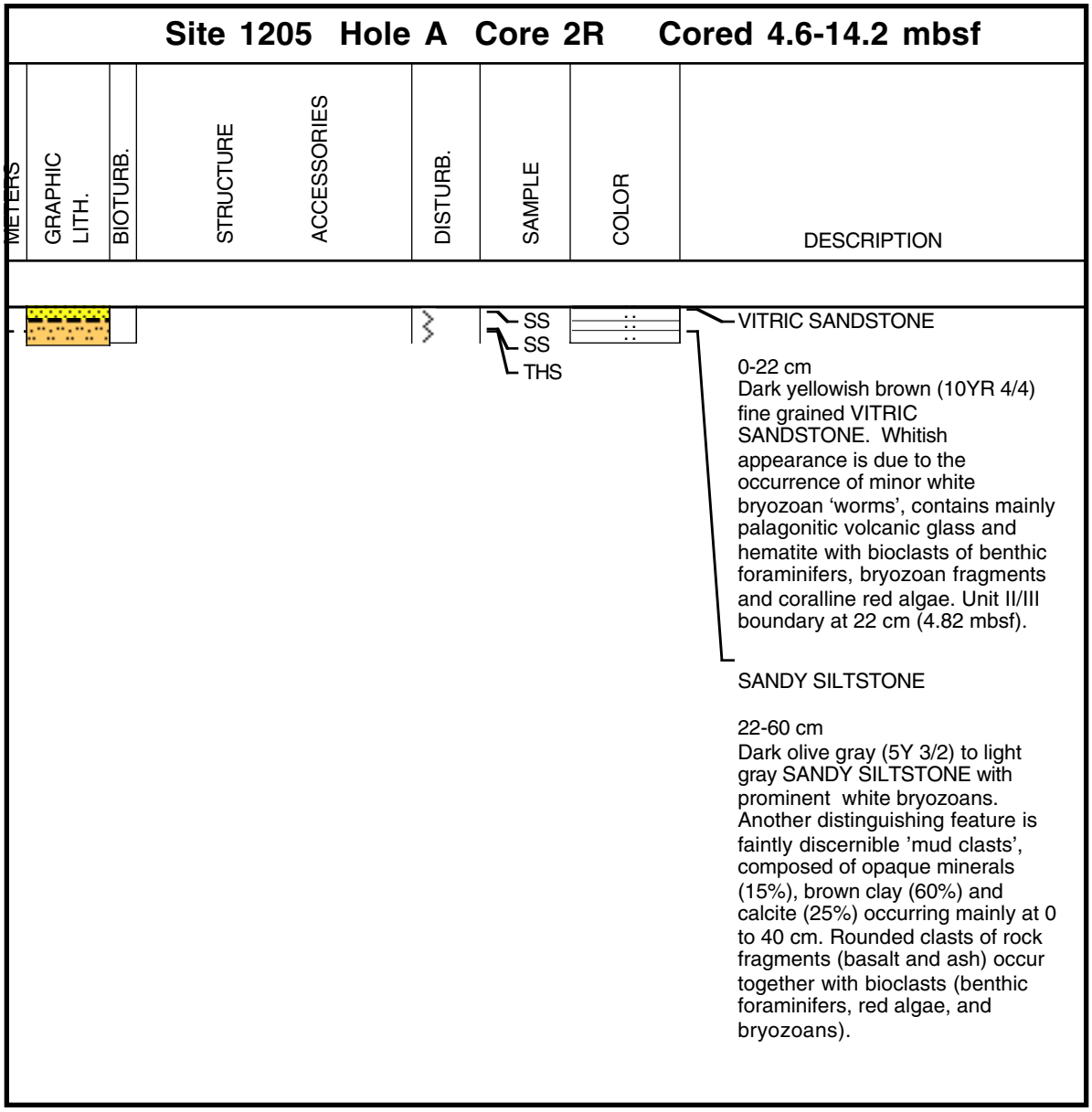
Core Photo

Site 1205 Hole A Core 1R Cored 0.0-4.6 mbsf

METERS	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	COLOR	DESCRIPTION
						SS SS THS SS		SILTY SANDSTONE 0-4 cm Olive gray (5Y 5/3) SILTY SANDSTONE cemented by calcite with containing rock fragments (well rounded to subrounded), bioclasts, volcanic ash, and minor clay. The bioclasts are benthic foraminifers, bryozoan fragments and coralline red algae. Conspicuous are the inferred, but not easily recognizable, bryozoan fragments, and the rounded pebbles of basalt and basaltic minerals (olivine, clinopyroxene and plagiclase). 4-9 cm Dark gray (5Y 4/1) fine grained SILTY SANDSTONE cemented by calcite. Mainly bioclasts (benthic foraminifers, bryozoan fragments and coralline red algae) and a minor component of rounded rock fragments of basalt and its minerals. A notable component is silt size grains of hematite and other Fe- oxides. Unit I/II boundary at 9 cm (0.09 mbsf). VITRIC SANDSTONE 9-15 cm Dark yellowish brown (10 YR 4/4) fine grained VITRIC SANDSTONE contains palagonItic volcanic glass and hematite with bioclasts of benthic foraminifers, bryozoan fragments, and coralline red algae in a calcite cement. Glass fragments in different stages of palagonitization dominate. Frequent opaque grains of hematite.

Core Photo


Site 1205 Hole A Core 2R Cored 4.6-14.2 mbsf
METERS
GRAPHIC LITH.
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SAMPLE
COLOR
DESCRIPTION
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SS
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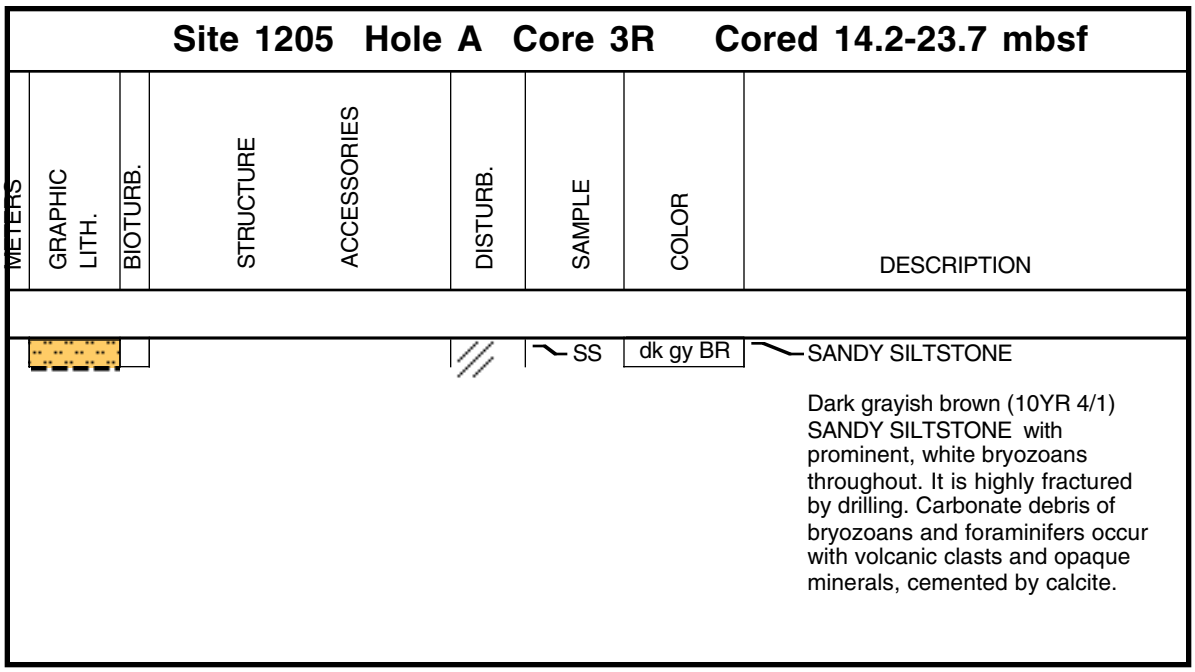
VITRIC SANDSTONE
0-22 cm
Dark yellowish brown (10YR 4/4) fine grained VITRIC SANDSTONE. Whitish appearance is due to the occurrence of minor white bryozoan 'worms', contains mainly palagonitic volcanic glass and hematite with bioclasts of benthic foraminifers, bryozoan fragments and coralline red algae. Unit II/III boundary at 22 cm (4.82 mbsf).
SANDY SILTSTONE
22-60 cm
Dark olive gray (5Y 3/2) to light gray SANDY SILTSTONE with prominent white bryozoans. Another distinguishing feature is faintly discernible 'mud clasts', composed of opaque minerals (15%), brown clay (60%) and calcite (25%) occurring mainly at 0 to 40 cm. Rounded clasts of rock fragments (basalt and ash) occur together with bioclasts (benthic foraminifers, red algae, and bryozoans).

Core Photo


Site 1205 Hole A Core 3R Cored 14.2-23.7 mbsf
METERS
GRAPHIC LITH.
BIOTURB.
STRUCTURE
ACCESSORIES
DISTURB.
SAMPLE
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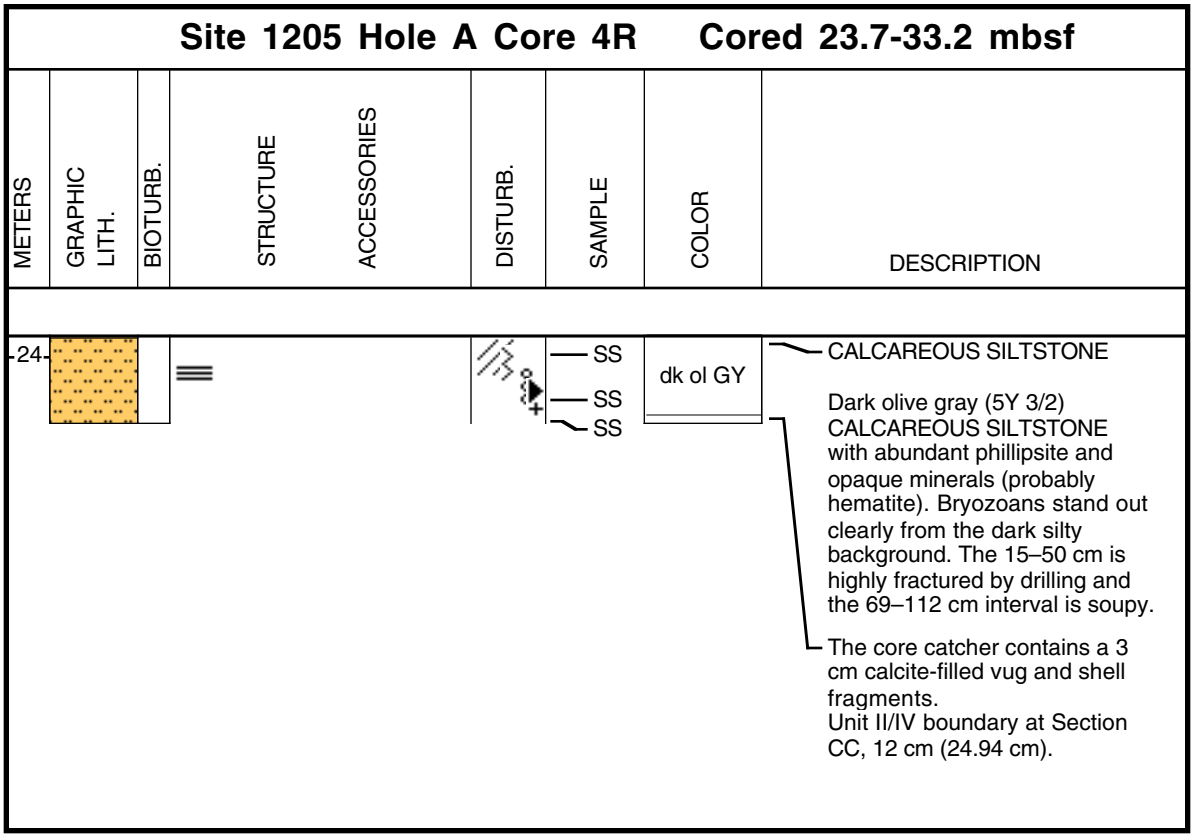
SANDY SILTSTONE
Dark grayish brown (10YR 4/1) SANDY SILTSTONE with prominent, white bryozoans throughout. It is highly fractured by drilling. Carbonate debris of bryozoans and foraminifers occur with volcanic clasts and opaque minerals, cemented by calcite.

Core Photo


Site 1205 Hole A Core 4R Cored 23.7-33.2 mbsf
METERS
GRAPHIC LITH.
BIOTURB.
STRUCTURE
ACCESSORIES
DISTURB.
SAMPLE
COLOR
DESCRIPTION
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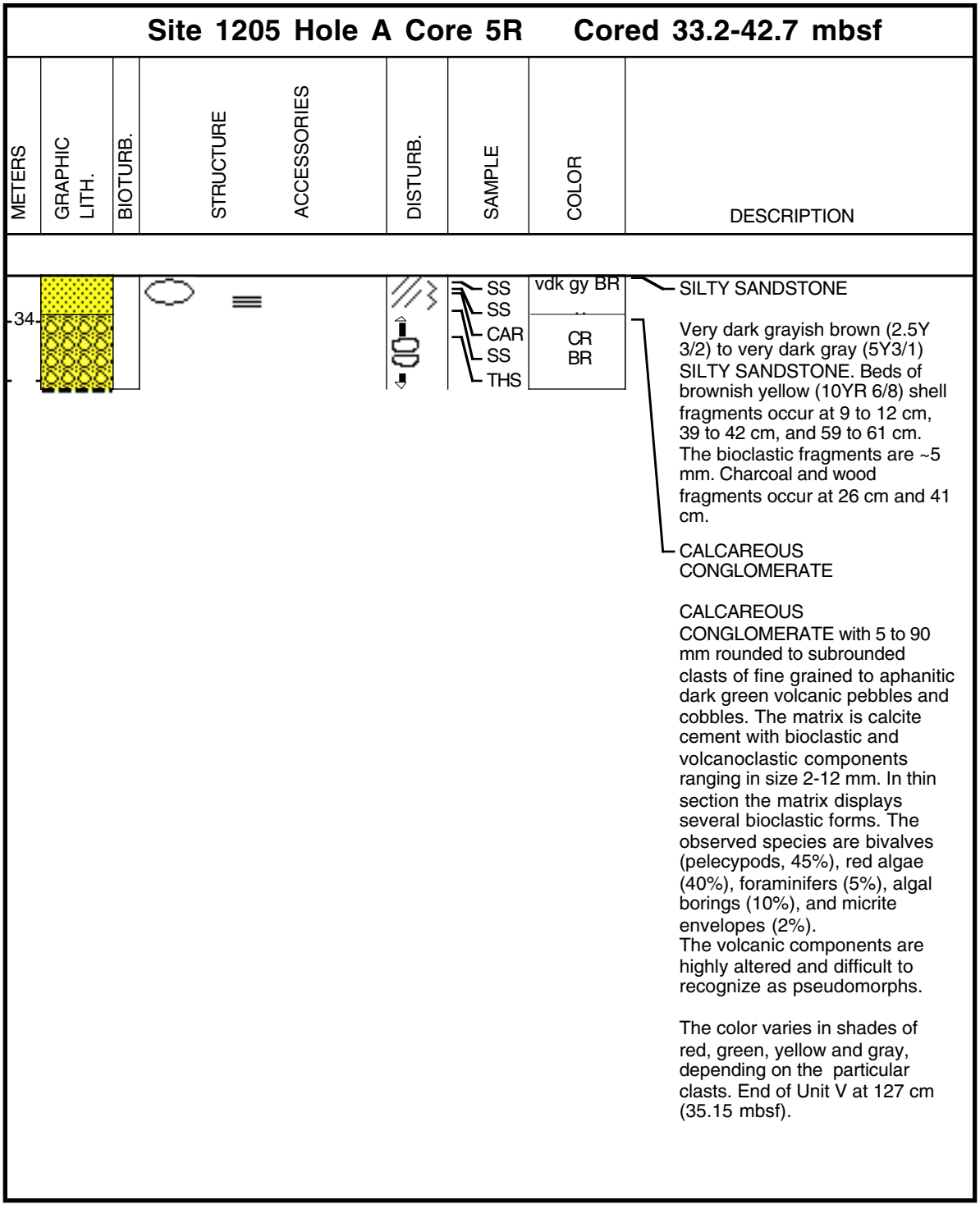
CALCAREOUS SILTSTONE
Dark olive gray (5Y 3/2) CALCAREOUS SILTSTONE with abundant phillipsite and opaque minerals (probably hematite). Bryozoans stand out clearly from the dark silty background. The 15–50 cm is highly fractured by drilling and the 69–112 cm interval is soupy.
The core catcher contains a 3 cm calcite-filled vug and shell fragments.
Unit II/IV boundary at Section CC, 12 cm (24.94 cm).

Core Photo


Site 1205 Hole A Core 5R Cored 33.2-42.7 mbsf
METERS
GRAPHIC LITH.
BIOTURB.
STRUCTURE
ACCESSORIES
DISTURB.
SAMPLE
COLOR
DESCRIPTION
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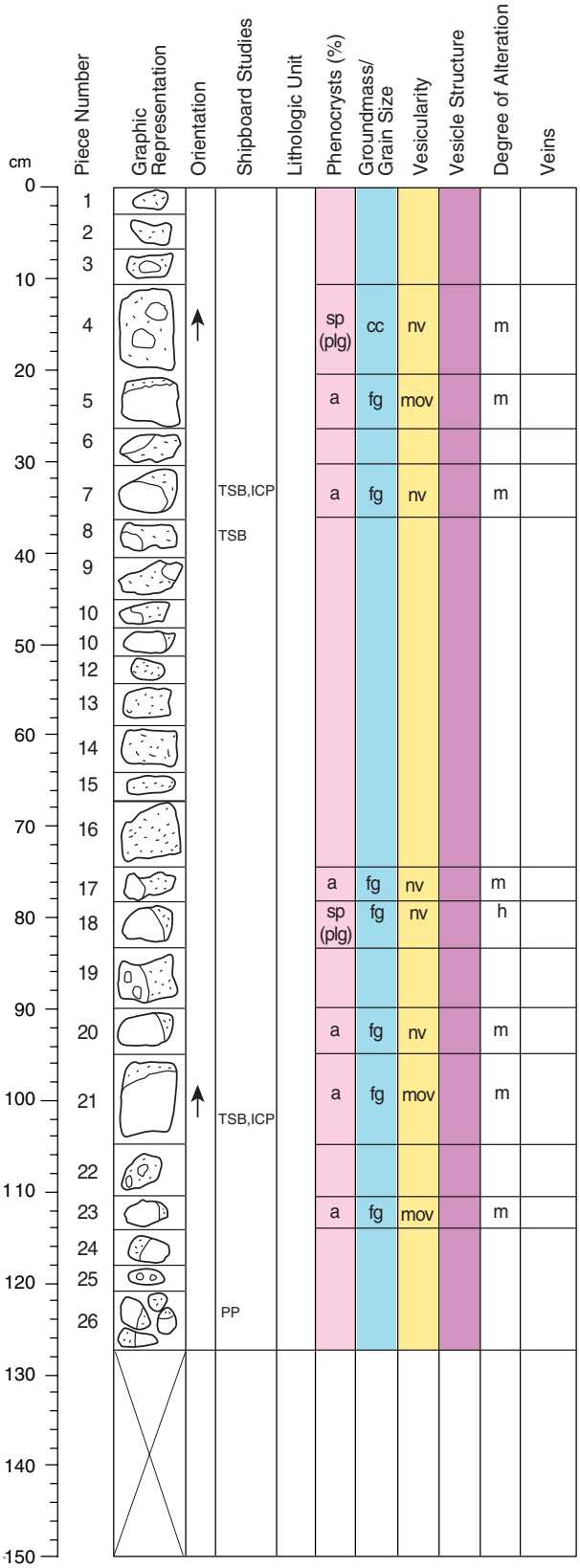
SILTY SANDSTONE
Very dark grayish brown (2.5Y 3/2) to very dark gray (5Y3/1) SILTY SANDSTONE. Beds of brownish yellow (10YR 6/8) shell fragments occur at 9 to 12 cm, 39 to 42 cm, and 59 to 61 cm. The bioclastic fragments are ~5 mm. Charcoal and wood fragments occur at 26 cm and 41 cm.
CALCAREOUS CONGLOMERATE
CALCAREOUS CONGLOMERATE with 5 to 90 mm rounded to subrounded clasts of fine grained to aphanitic dark green volcanic pebbles and cobbles. The matrix is calcite cement with bioclastic and volcanoclastic components ranging in size 2-12 mm. In thin section the matrix displays several bioclastic forms. The observed species are bivalves (pelecypods, 45%), red algae (40%), foraminifers (5%), algal borings (10%), and micrite envelopes (2%).
The volcanic components are highly altered and difficult to recognize as pseudomorphs.
The color varies in shades of red, green, yellow and gray, depending on the particular clasts. End of Unit V at 127 cm (35.15 mbsf).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-5R-2 (Section top: 33.88 mbsf)

UNIT V: CONGLOMERATE.

Pieces: 1–26

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase*:	3-5	4	1	3	Euhedral

GROUNDMASS: Fine grained to aphanitic. Most pieces contain groundmass consisting of clinopyroxene and plagioclase laths arranged in a subtrachytic texture.

VESICLES:	% Mode	Size (mm): Average	Shape
	0-5	2	Irregular

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

STRUCTURE: Clasts in conglomerate (Sedimentary Unit V).

ALTERATION: Moderate to high.

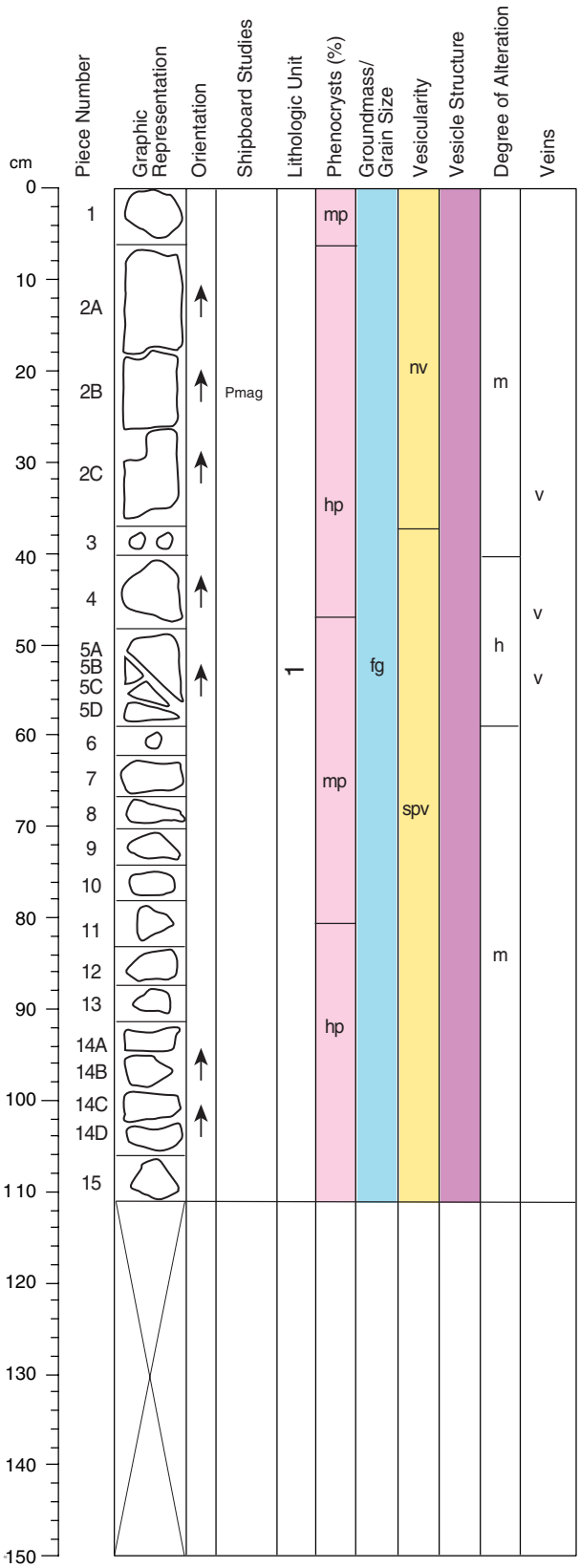
VEINS/FRACTURES: None.

COMMENTS: * Plagioclase phenocrysts present only in clasts from Pieces 4 and 18.

Largest clasts (enough for chemical analysis) are in Pieces 2, 5, 7, 8, 11, 17, 18, 20, 21, 23, and 24.

This barrel sheet describes the igneous lithology of the larger lava clasts within the conglomerate immediately overlying basement at Hole 1205A

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-6R-1 (Section top: 42.7 mbsf)

UNIT 1: MODERATELY TO HIGHLY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-15

CONTACTS: None.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3-10	20	1	5	Subhedral

GROUNDMASS: Fine grained. Consists of clinopyroxene, olivine (altered to Fe oxyhydroxide), titanomagnetite, altered glassy mesostasis (altered to greenish grey clay), and 1-3 mm plagioclase laths displaying a trachytic texture.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
Sparsely vesicular	1-3	0.5	Irregular to spherical

COLOR: Medium gray (N5) with reddish brown staining within 1 cm of veins.

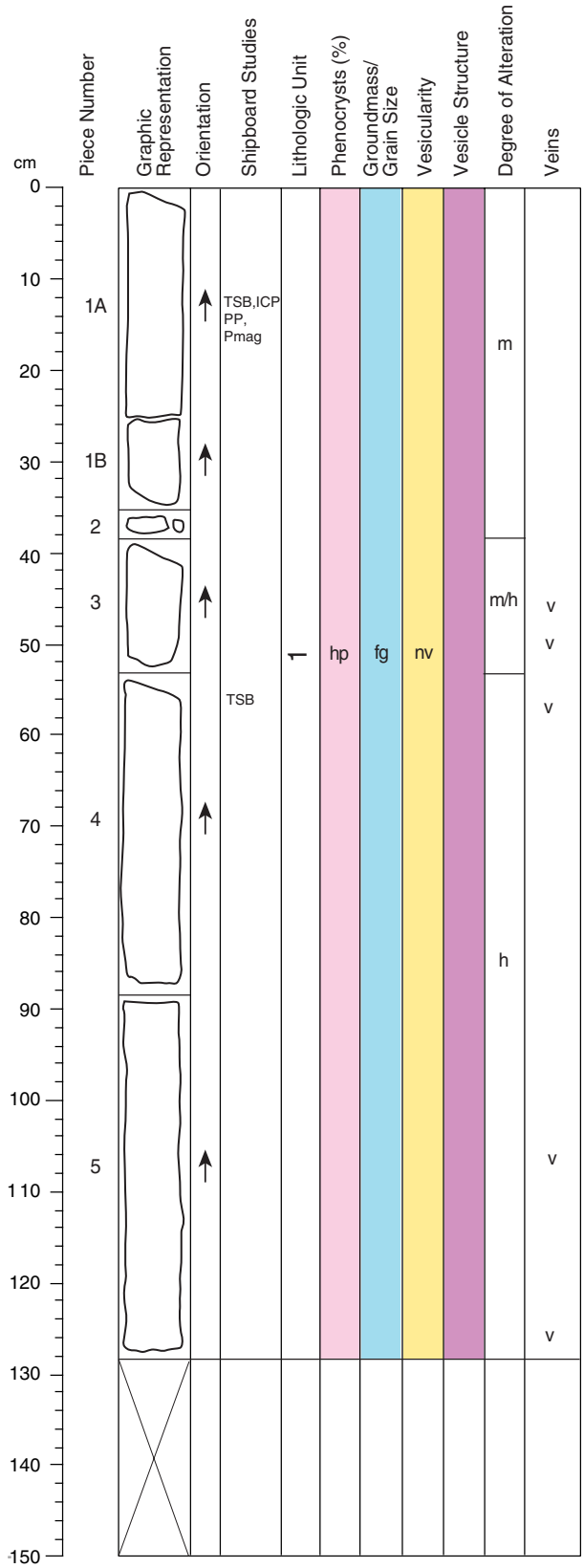
STRUCTURE: Massive.

ALTERATION: Moderate to high. Olivine(?) and glassy mesostasis are completely altered to Fe oxyhydroxide and greenish gray clay, respectively. Most of the plagioclase phenocrysts are moderately to highly altered (sericite? albite?), but are only slightly altered away from veins on the larger pieces. Macroscopic vesicles are lined with Fe oxyhydroxide, while microscopic vesicles are lined with greenish white clay. The megavesicle at 95 cm is lined with several unidentified minerals.

VEINS/FRACTURES: Sparsely veined, although many of the small pieces may be the result of moderately veined massive material being broken up during drilling. Veins are <2 mm wide and filled with carbonate.

COMMENTS: There appears to be two size populations of vesicles, a subround to irregular set (~8 mm), and a second, smaller (<0.5 mm) set, which have highly irregular shapes (dictitaxitic voids).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-6R-2 (Section top: 43.8 mbsf)

UNIT 1: MODERATELY TO HIGHLY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-5

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	8-15	12	3	8	Subhedral, prismatic

GROUNDMASS: Fine grained. The groundmass contains glassy mesostasis, plagioclase, clinopyroxene, olivine and black oxides with a trachytic texture in places.

VESICLES:	% Mode	Size (mm): Average	Shape
	0-2	1	Irregular

COLOR: Gray (N5 to N6).

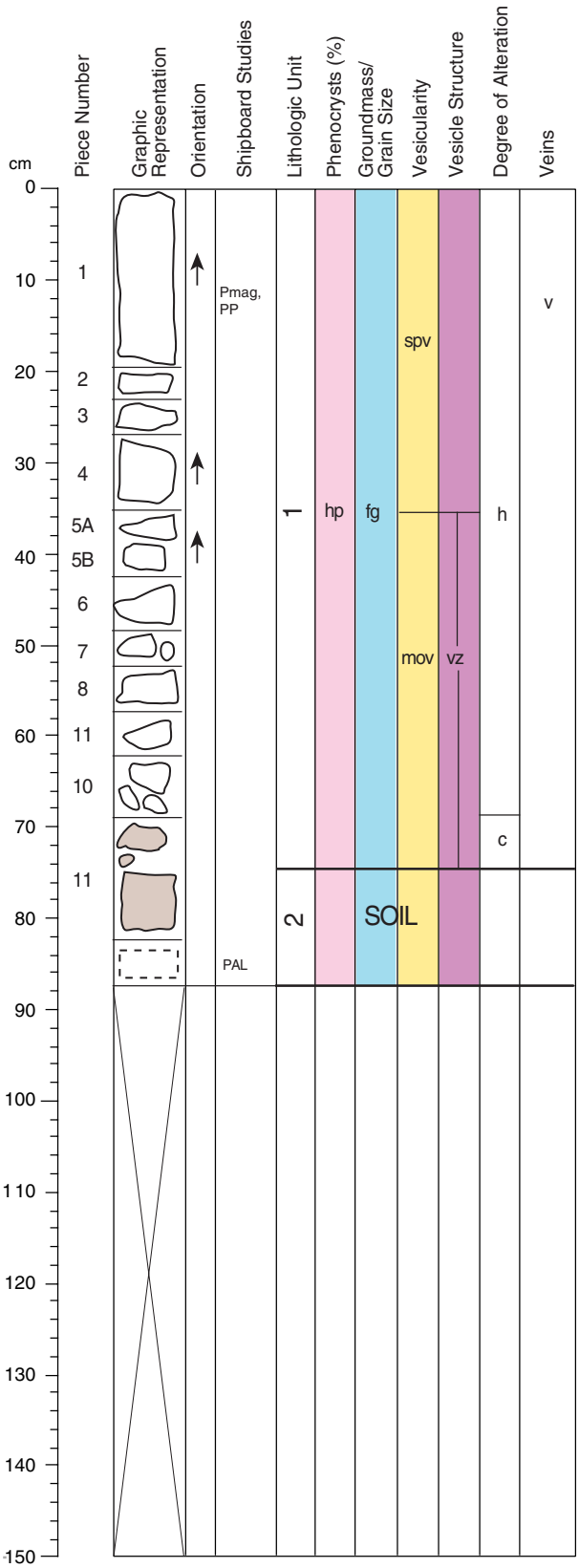
STRUCTURE: Massive.

ALTERATION: Moderate. Most highly altered close to veins. Olivine in groundmass is completely altered to carbonate and Fe oxyhydroxide. There is secondary sulfide in the groundmass. Plagioclase is partially sericitized close to veins. Small vesicles are filled with carbonate and clay.

VEINS/FRACTURES: Sparsely veined. Randomly oriented, 0.2-2 mm wide veins occur in Pieces 3 to 5, and are filled with carbonate and Fe oxyhydroxide.

COMMENTS: Section 6R-2 is much less altered than Sections 6R-1 and 6R-3.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-6R-3 (Section top: 45.08 mbsf)

UNIT 1: MODERATELY TO HIGHLY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-11

CONTACTS: A horizontal contact between Unit 1 and the underlying Unit 2 is present at 74 cm in Piece 11.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Plagioclase:	9-12	12	2	8	Subhedral, prismatic

GROUNDMASS: Fine grained. The groundmass consists of glassy mesostasis, plagioclase, clinopyroxene, olivine, and black oxides. The groundmass plagioclase display a trachytic texture.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
	2-10	3	Irregular

COLOR: Dark brown (5YR 4/2).

STRUCTURE: Massive.

ALTERATION: High. Very highly altered close to contact with the underlying soil. Olivine in groundmass is completely altered to carbonate and Fe oxyhydroxide. Plagioclase phenocrysts are partially to highly sericitized close to veins. Small vesicles are lined with Fe oxyhydroxide, and are occasionally filled with carbonate.

VEINS/FRACTURES: Sparsely veined. Randomly oriented, 0.5-1 mm wide veins occur in Piece 1, and are filled with carbonate and Fe oxyhydroxide.

COMMENTS: In the basal part of the lobe (35-75 cm) there is a vesicular zone with vesicularity increasing downwards.

UNIT 2: RED-BROWN SOIL.

Pieces: 11

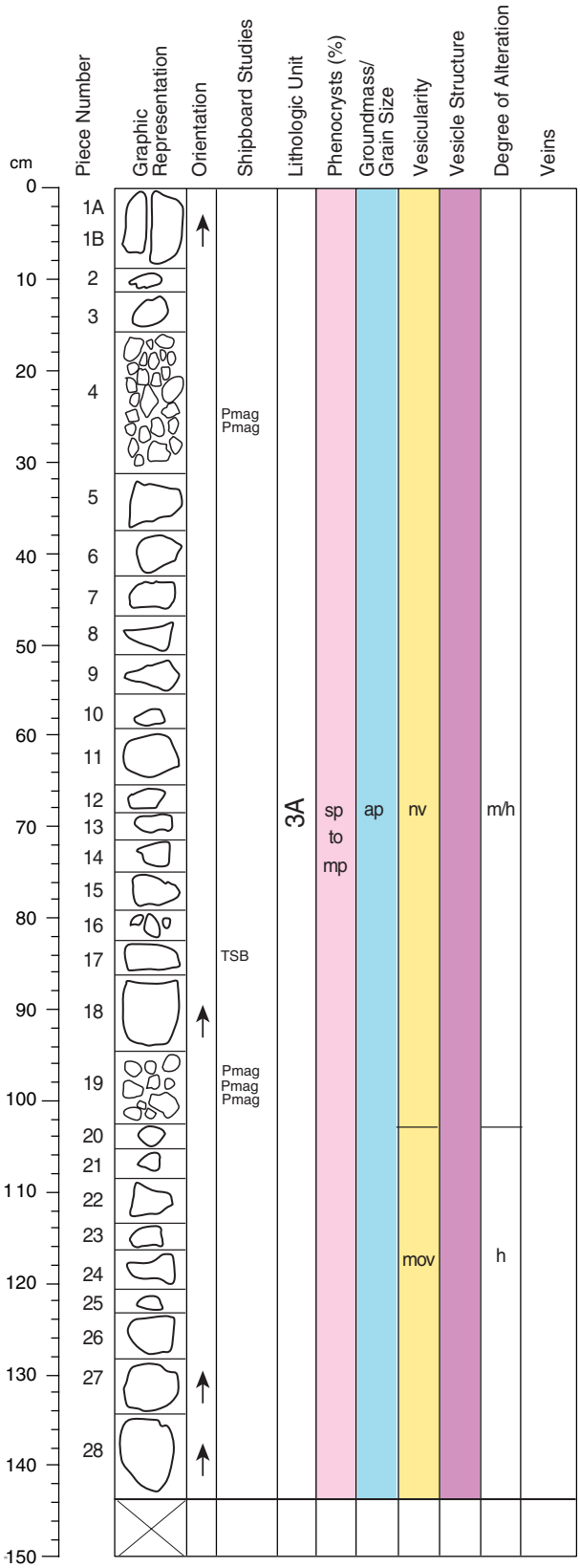
CONTACTS: The transition from Unit 1 and Unit 2 is a sharp horizontal and conformable contact at 74 cm in Section 63R-3 (45.82 mbsf). The contact between Units 2 and 3 was not recovered and is inferred to be at top of Section 7R-1 (52.20 mbsf).

GENERAL DESCRIPTION: Piece 11 (79 to 81 cm) is a layered (sub-cm to cm structures) soil horizon. The reddish clay is also finely laminated (mm-sized lamination) and contains isolated silty clay brown lamina (at 77 cm) with very thin contacts (i.e., at 74, 77, and 80 cm). The major components are opaque minerals, Fe oxides, volcanic glass (mostly palagonite) at various stages of alteration. The relative abundance of feldspar and clay can vary by layer (e.g., at 80 and 72.5 cm).

COLOR: Dark reddish brown (2.5YR 3/4) to yellowish brown (10YR 5/4 and 5/4).

COMMENTS: During drilling a sharp increase in penetration rate occurred at ~5 m into Core 6R.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-7R-1 (Section top: 52.2 mbsf)

UNIT 3a: OLIVINE-PLAGIOCLASE-PHYRIC BASALT BRECCIA.

Pieces: 1-28

CONTACTS: None observed. The contact between Units 2 and 3a is inferred to be at the base of Section 6R-3.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	3	0.5	1	Subhedral, prismatic
Olivine:	2	2	0.5	1	Subhedral; equant

GROUNDMASS: Aphanitic. Groundmass mineralogy uncertain because of extremely fine grain size and high degree of alteration.

VESICLES:	% Mode	Size (mm): Average	Shape
	0-6	0.5	Irregular

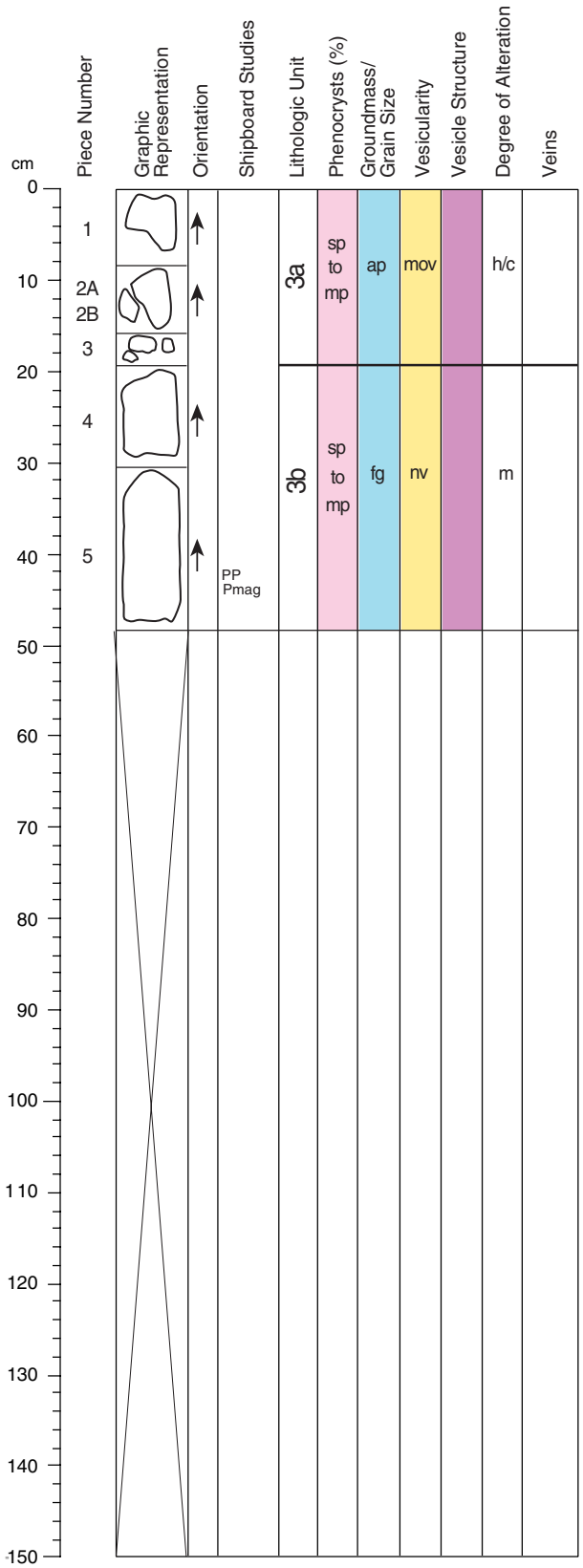
COLOR: Grayish brown (5YR 3/2).

ALTERATION: Moderate to high. Sparse olivine and plagioclase phenocrysts are completely replaced by Fe oxyhydroxide and clay minerals. The groundmass is soft, and contains a large amount of Fe oxyhydroxide. Some large vesicles and vugs are filled with carbonate.

VEINS/FRACTURES: None.

COMMENTS: This section has the same phenocryst assemblage as the underlying massive olivine-plagioclase phyric basalt, and is most likely the agglutinated to welded flow top rubble of this a'a flow.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-7R-2 (Section top: 53.62 mbsf)

UNIT 3a: OLIVINE-PLAGIOCLASE-PHYRIC BASALT BRECCIA.

Pieces: 1-3

CONTACTS: None observed. The boundary between Units 3a and 3b is inferred to be at 19 cm between Pieces 3 and 4.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1-2	3	0.5	1	Subhedral, prismatic
Olivine:	1-2	2	0.5	1	Subhedral; equant

GROUNDMASS: Aphanitic. Groundmass mineralogy uncertain because of extremely fine grain size and high degree of alteration.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	7	1	Irregular

COLOR: Grayish brown (5YR 3/2).

ALTERATION: Moderate to high. Sparse olivine and plagioclase phenocrysts are completely replaced by Fe oxyhydroxide and clay minerals. The groundmass is soft, and contains a large amount of Fe oxyhydroxide. Some large vesicles and vugs are filled with carbonate.

VEINS/FRACTURES: None.

COMMENTS: This section has the same phenocryst assemblage as the underlying massive olivine-plagioclase phyric basalt, and is most likely the agglutinated to welded flow top rubble of this a'a flow.

UNIT 3B: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 4-5

CONTACTS: None observed. The boundary between units 3a and 3b is inferred to be at 19 cm, between Pieces 3 and 4.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	3	1	2	Subhedral, equant
Olivine:	2	3	2	2	Euhedral, prismatic

GROUNDMASS: Aphyric. Consists of plagioclase, clinopyroxene, olivine, and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<1	1	Irregular

COLOR: Gray (N5).

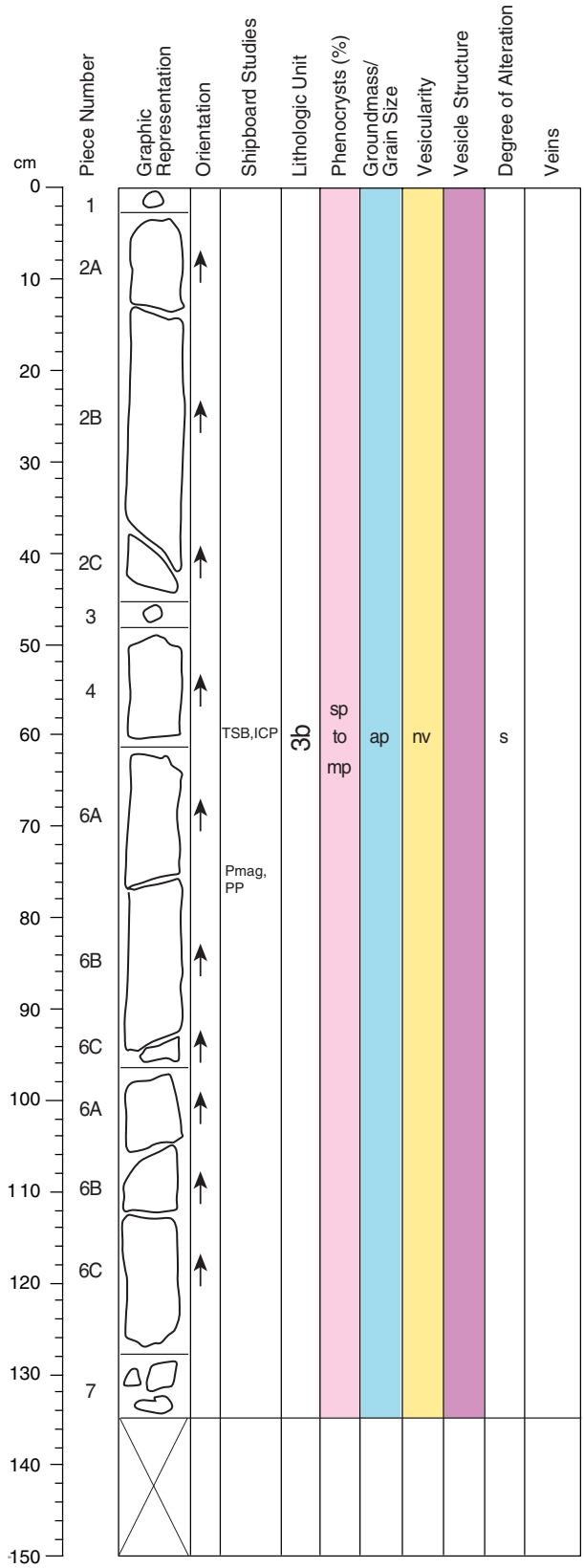
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Olivine phenocrysts are partially to completely replaced by green clay minerals, or Fe oxyhydroxide and carbonate. Vesicles are filled with Fe oxyhydroxide. Plagioclase phenocrysts are partially sericitized.

VEINS/FRACTURES: None.

COMMENTS: Unaltered olivine phenocrysts are present in Piece 5.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-8R-1 (Section top: 56.9 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-7

CONTACTS: None.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1-2	10	0.75	1	Subhedral, elongate
Olivine:	1-2	2	1	1.5	Euhedral, prismatic

GROUNDMASS: Fine grained to aphanitic. Consists of plagioclase, clinopyroxene and black oxides. Olivine may be present, but groundmass is too fine grained to ascertain.

VESICLES: Nonvesicular.

COLOR: Gray (N5).

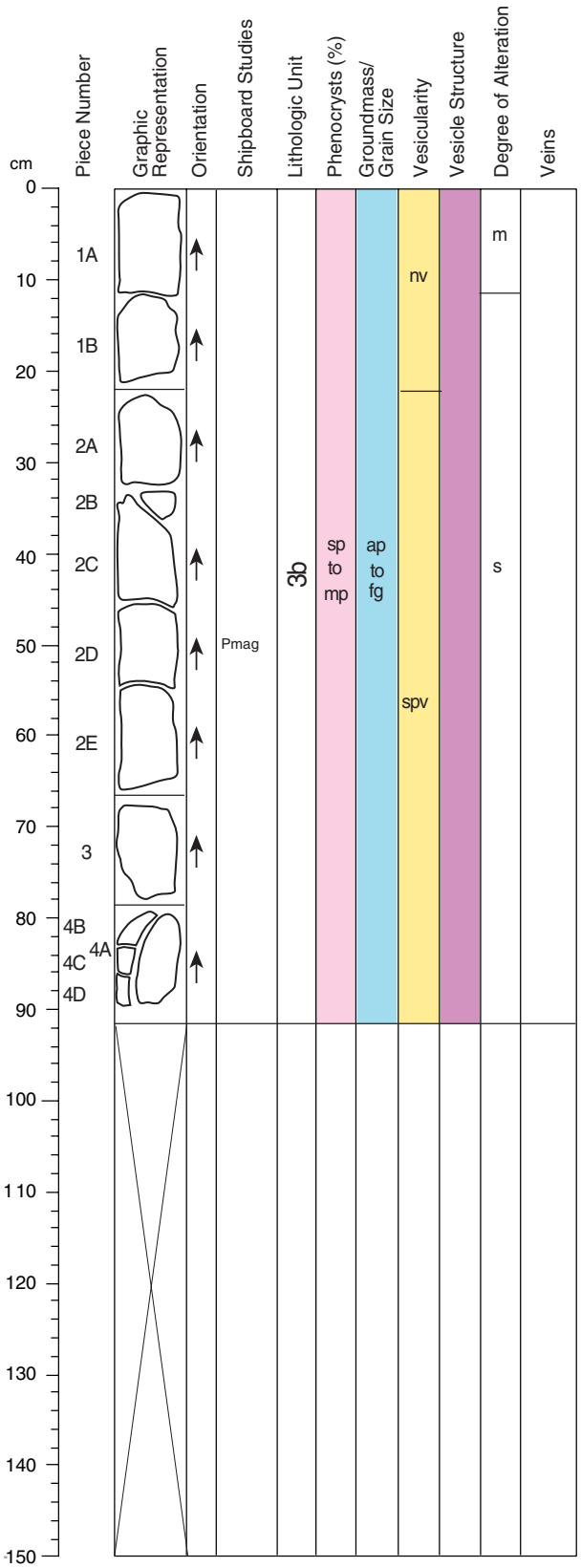
STRUCTURE: Massive.

ALTERATION: Slight. Olivine phenocrysts are completely replaced by green clay minerals or serpentine.

VEINS/FRACTURES: None.

COMMENTS: One equant plagioclase megacryst 10 mm in size is present in Piece 4 (52-53 cm). Piece 1 has a similar lithology to Unit 3a, and may have fallen from higher in the hole.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-8R-2 (Section top: 58.24 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-4D

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1-2	5.5	1	1.5	Subhedral; elongate
Olivine:	1-2	2	1	1.5	Euhedral; prismatic

GROUNDMASS: Fine grained to aphanitic. Consists of plagioclase, clinopyroxene and black oxides. Olivine may be present, but groundmass is too fine to ascertain.

VESICLES: Nonvesicular.

COLOR: Gray (N5).

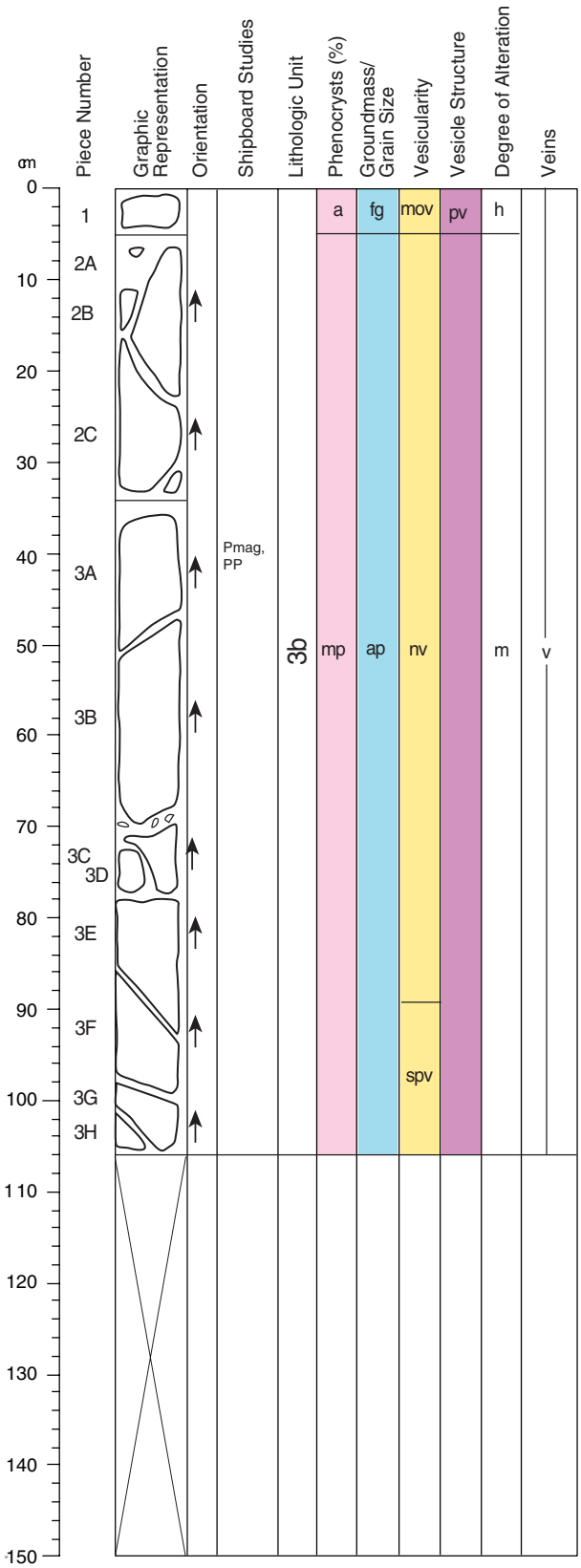
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Piece 1A contains moderate Fe-oxyhydroxide alteration around small fractures.

VEINS/FRACTURES: <1 mm unfilled fractures are distributed randomly throughout.

COMMENTS: Olivine phenocrysts are variably altered. Some are unaltered, whereas others are altered to Fe oxyhydroxide along fractures or are totally replaced by green clay.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-9R-1 (Section top: 58.9 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	8	1	2	Subhedral; elongate
Olivine:	1	1.5	1	1	Euhedral; prismatic

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, and black oxides. Olivine may be present, but groundmass is too fine to ascertain.

VESICLES:	% Mode	Size (mm): Average	Shape
	0-2	1	Irregular

COLOR: Medium gray (N5). Grayish orange (10 YR 7/4) adjacent to veins. Piece 1 is very dusky red (10R 2/2).

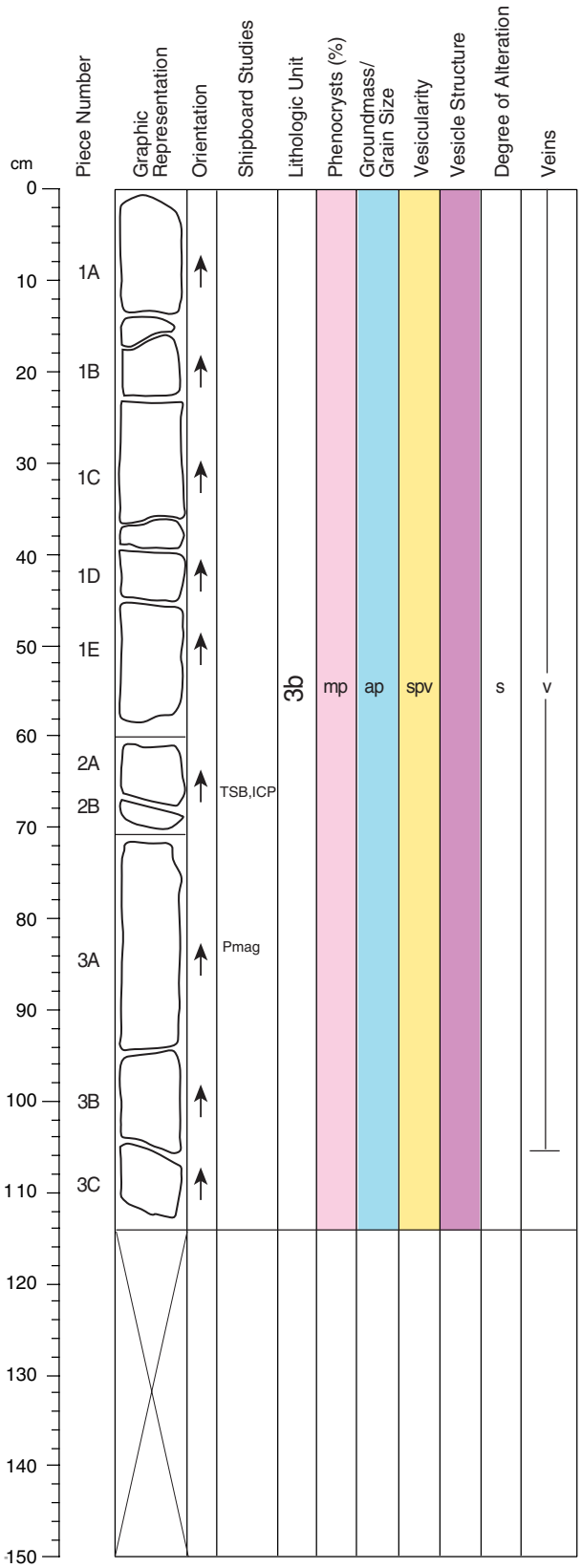
STRUCTURE: Massive.

ALTERATION: Moderate to high. Fe oxyhydroxide is found near fractures and veins throughout the section. A 1.5 mm Fe oxyhydroxide stained band runs horizontally across Piece 3A. White carbonate fills fractures along the margins of Piece 2. Olivine phenocrysts have been altered with Fe oxyhydroxide and clay.

VEINS/FRACTURES: <1 mm veins and fractures are distributed throughout the section.

COMMENTS: Olivine phenocrysts are altered to Fe oxyhydroxide. Piece 1 is highly altered and has similar lithology and appearance to samples in Unit 3a. It appears to be out of place and fallen from higher in the hole.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-9R-2 (Section top: 59.96 mbsf)

UNIT 3B: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	10	1	1.5	Subhedral; elongate
Olivine:	1	2	1	1	Euhedral; prismatic

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1	1	Irregular

COLOR: Medium gray (N5). Grayish orange (10 YR 7/4) adjacent to veins.

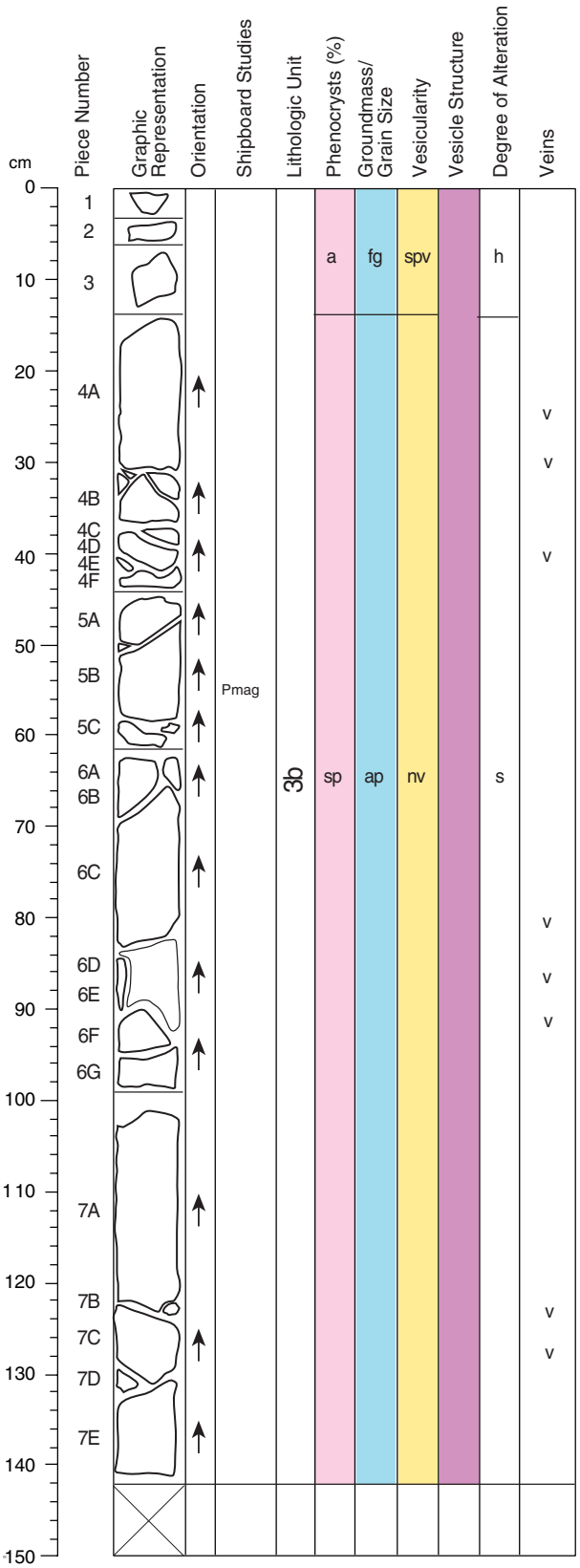
STRUCTURE: Massive.

ALTERATION: Slight. Moderate to high Fe oxyhydroxide alteration adjacent to veins and small fractures.

VEINS/FRACTURES: <1 mm veins and fractures are distributed throughout the whole section. Most are horizontally to subhorizontally oriented. Veins are filled with white carbonate, pale green clay and Fe oxyhydroxide.

COMMENTS: Olivine phenocrysts are altered to Fe oxyhydroxide. One equant plagioclase megacryst ~10 mm in size is present in Piece 3A (91-92 cm), containing carbonate filled veins. Flow banding is present through the section.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-10R-1 (Section top: 61.7 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-7

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	8	1	1.5	Subhedral; elongate
Olivine:	2	1.5	<1	1	Euhedral

GROUNDMASS: Aphanitic. Contains clinopyroxene, plagioclase, olivine and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
	<1-2	1	Irregular

COLOR: Pieces 1 to 3 range from very dusky red (10R 2/2) to dark reddish brown (10R 3/4). Pieces 4 to 7 are gray (N5).

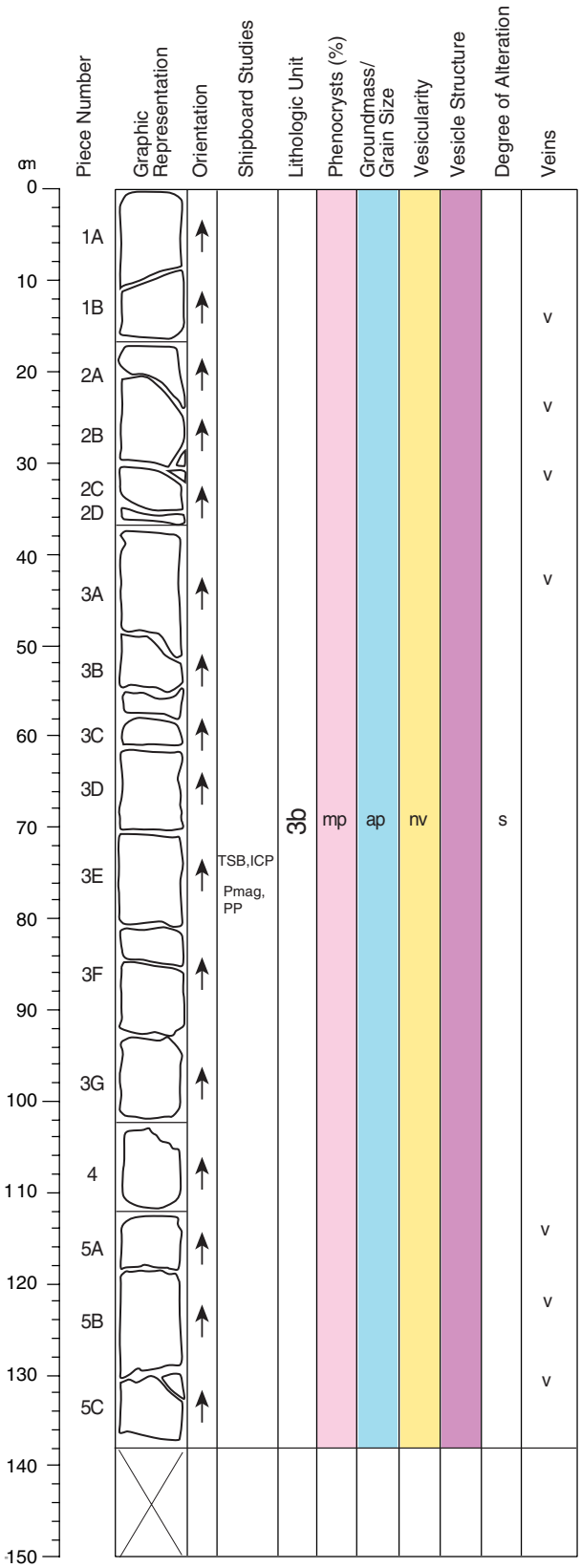
STRUCTURE: Massive.

ALTERATION: Slight to high. Fe oxyhydroxide is found adjacent to veins and near flow banding. Veins and fractures are filled with green clay and white carbonate. Vesicles are filled with Fe oxyhydroxide and clay. Many of the olivine phenocrysts have been altered, rimmed by Fe oxyhydroxide or replaced with a black clay mineral.

VEINS/FRACTURES: Many pieces are fractured along veins (<1.5 mm). Veins are present in Pieces 4, 6, and 7.

COMMENTS: Pieces 1 to 3 are similar in appearance to Unit 3a. These are likely to have dropped from higher in the hole. They are strongly oxidized, with a groundmass containing glomerocrystic plagioclase, clinopyroxene and highly Fe oxyhydroxide altered olivine. These pieces also contain <1% olivine phenocrysts, and are sparsely vesicular.
Some flow banding is present in Piece 3. In Piece 7C there is a plagioclase megaphenocryst that contains a <0.1 mm pyrite bleb.
Plagioclase-rich xenoliths ~1 mm in size contain small amounts of clinopyroxene and comprise <1% of the rock.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-10R-2 (Section top: 63.12 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-5

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1.5	6	1	3	Subhedral/elongate
Olivine:	1.5	1	1	1	Euhedral/prismatic

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5). Dark yellowish orange (10 YR 6/6) adjacent to veins.

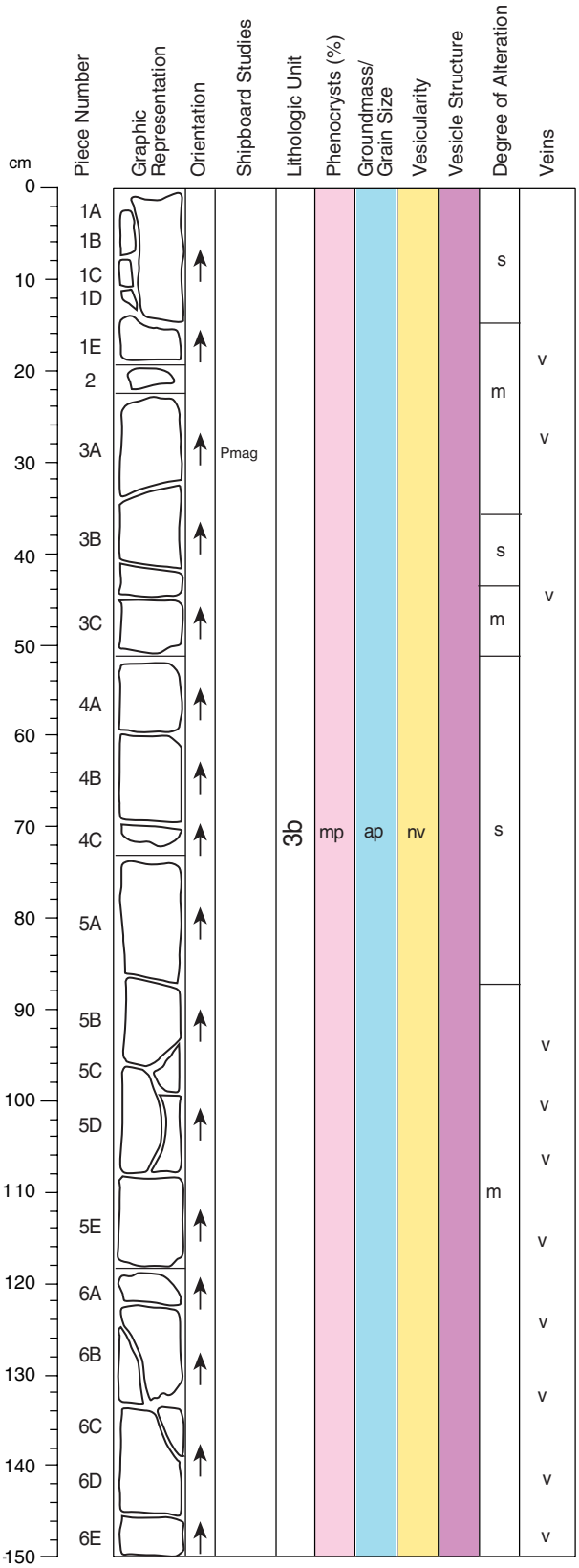
STRUCTURE: Massive.

ALTERATION: Slight. Moderate Fe oxyhydroxide alteration adjacent to veins and small fractures.

VEINS/FRACTURES: <1 mm veins and fractures are distributed in Pieces 1B-3A and 5. Veins are filled with Fe oxyhydroxide.

COMMENTS: Flow banding is present throughout the section. Some plagioclase phenocrysts contain inclusions of black opaque minerals(?), e.g., Piece 1A at 2 cm, Piece 4 at 103 cm.
A gabbroic xenolith with a rounded outline consisting of plagioclase, olivine and clinopyroxene, is present in Piece 2B at 26 cm. Olivine in this xenolith is unaltered.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-10R-3 (Section top: 64.5 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-6

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	4	1	2	Subhedral to euhedral
Olivine:	3	2	1	1	Euhedral

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides in an intergranular texture.

VESICLES: Nonvesicular.

COLOR: Medium gray (N6). Light brown (5 YR 5/6) alteration halo adjacent to veins.

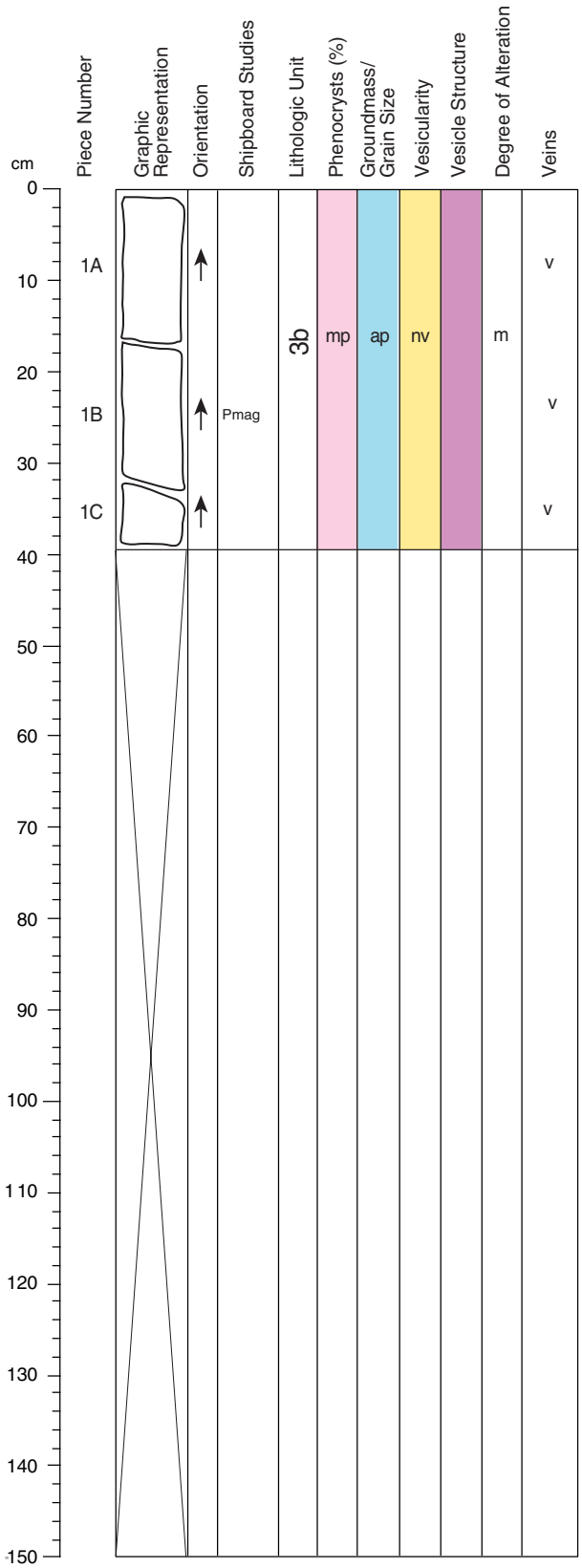
STRUCTURE: Massive.

ALTERATION: Slight in pieces without veins. Moderate Fe oxyhydroxide alteration adjacent to veins and fractures.

VEINS/FRACTURES: Sparsely veined. <1 mm veins and fractures are present in several pieces.

COMMENTS: Flow banding is present in Pieces 1 to 3A and 5B to 6E. Olivine is typically altered to black material but rarely yellow green cores are surrounded by the black alteration products. Rare vesicles are filled with calcite and clay. There are several 2-5 mm microgabbroic xenoliths of intergrown plagioclase and clinopyroxene; e.g., in Piece 8B.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-10R-4 (Section top: 66.0 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	4	1	2	Subhedral to euhedral
Olivine:	3	2	1	1	Euhedral

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides in an intergranular texture.

VESICLES: Nonvesicular.

COLOR: Medium gray (N6). Light brown (5 YR 5/6) alteration halo adjacent to veins.

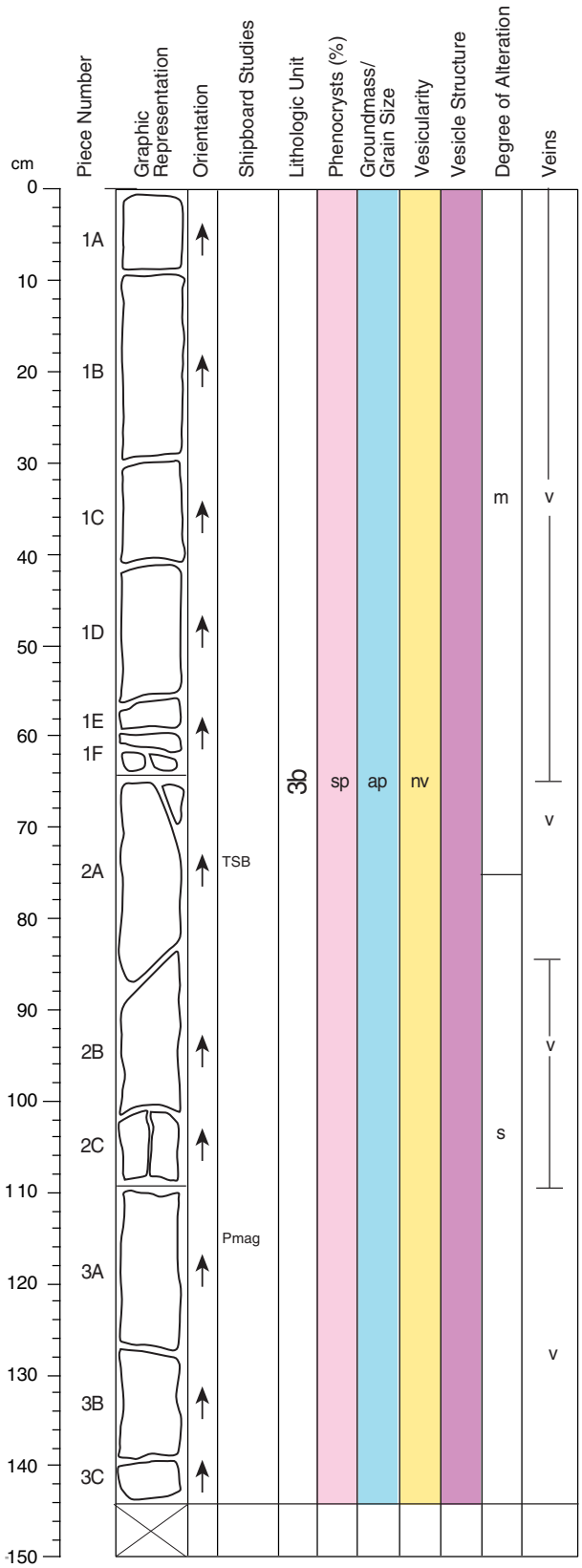
STRUCTURE: Massive.

ALTERATION: Moderate Fe oxyhydroxide alteration adjacent to veins and fractures. Rare vesicles are filled with calcite and clay.

VEINS/FRACTURES: Sparsely veined. There are several <1 mm veins and fractures.

COMMENTS: The piece has a streaky/mottled appearance caused by irregular distribution of dark gray to medium gray bands, probably as a result of flow banding. Olivine is typically altered to black material, but rarely yellow-green cores are surrounded by black alteration products; in Piece 1A olivine is altered to red-brown material and there are groundmass sulfides. Several 2-5 mm microgabbroic xenoliths of intergrown plagioclase and clinopyroxene are present; e.g., in Piece 1A.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-11R-1 (Section top: 66.2 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	11	3	5	Subhedral to euhedral; blocky
Olivine:	2	2	0.6	0.8	Euhedral to subhedral; equant

GROUNDMASS: Aphanitic. Clinopyroxene, plagioclase and glass in a spherulitic or variolitic texture. Clinopyroxene is just starting to crystallize. The rock has a "spotty" texture when wet.

VESICLES: Nonvesicular.

COLOR: Medium light gray (N6) at the base of the section grading upward to greenish gray (5G 6/1) at the top. Moderate yellowish brown (10YR 5/4) in alteration halos adjacent to veins.

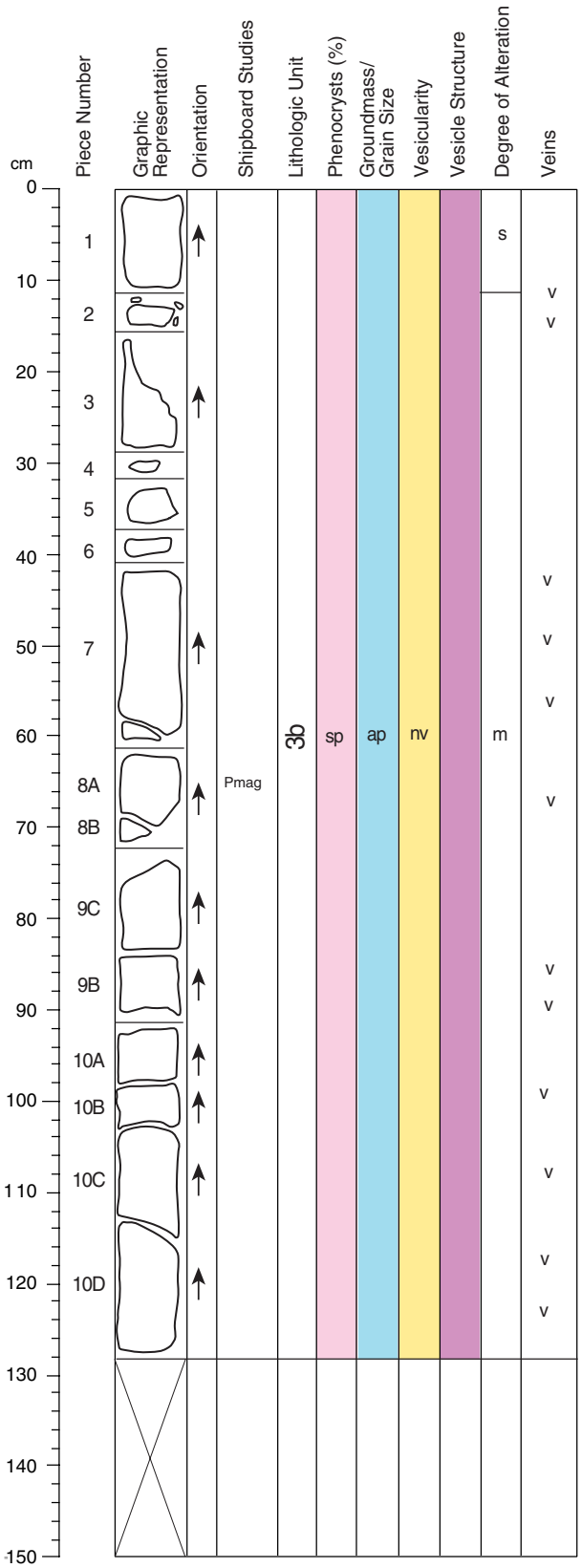
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Moderately altered at the top of the section to slightly altered at the base. Dark green clay is pervasive. Fe oxyhydroxide alteration fronts are also present. Olivine is completely altered to dark green clay and Fe oxyhydroxide adjacent to veins; away from veins it is mantled by a rim of dark green clay. Glass is altered to dark green clay.

VEINS/FRACTURES: Sparsely veined. The rock has fractured along veins. Fe oxyhydroxide halos up to 1 cm are present adjacent to veins. The veins are <0.1-1 mm wide and are filled with dark green clay, Fe oxyhydroxide, and rarely pyrite. They are mostly horizontal to subhorizontal.

COMMENTS: Overall the rock is nonvesicular. A few round to elongate vesicles are present (up to 5 mm) throughout the section and are filled with green clay and white carbonate. Large plagioclase crystals are present at 26 cm, 75 cm, and throughout 83-92 cm. Olivine phenocrysts with unaltered centers are present towards the base of the core (e.g., Pieces 3A to 3C). Olivine may be present in the groundmass.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-11R-2 (Section top: 67.65 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-10

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	11	3	5	Subhedral to euhedral; blocky
Olivine :	2	2	0.6	0.8	Euhedral to subhedral; equant Occasional glomerocrysts

GROUNDMASS: Aphanitic. Clinopyroxene, plagioclase and glass in a spherulitic to variolitic texture. Clinopyroxene is just starting to crystallize. The rock has a “spotty” texture when wet.

VESICLES: Nonvesicular.

COLOR: Medium light gray (N6) at the base of the section grading upward to greenish gray (5G 6/1) at the top. Moderate yellowish brown (10YR 5/4) in alteration halos adjacent to veins.

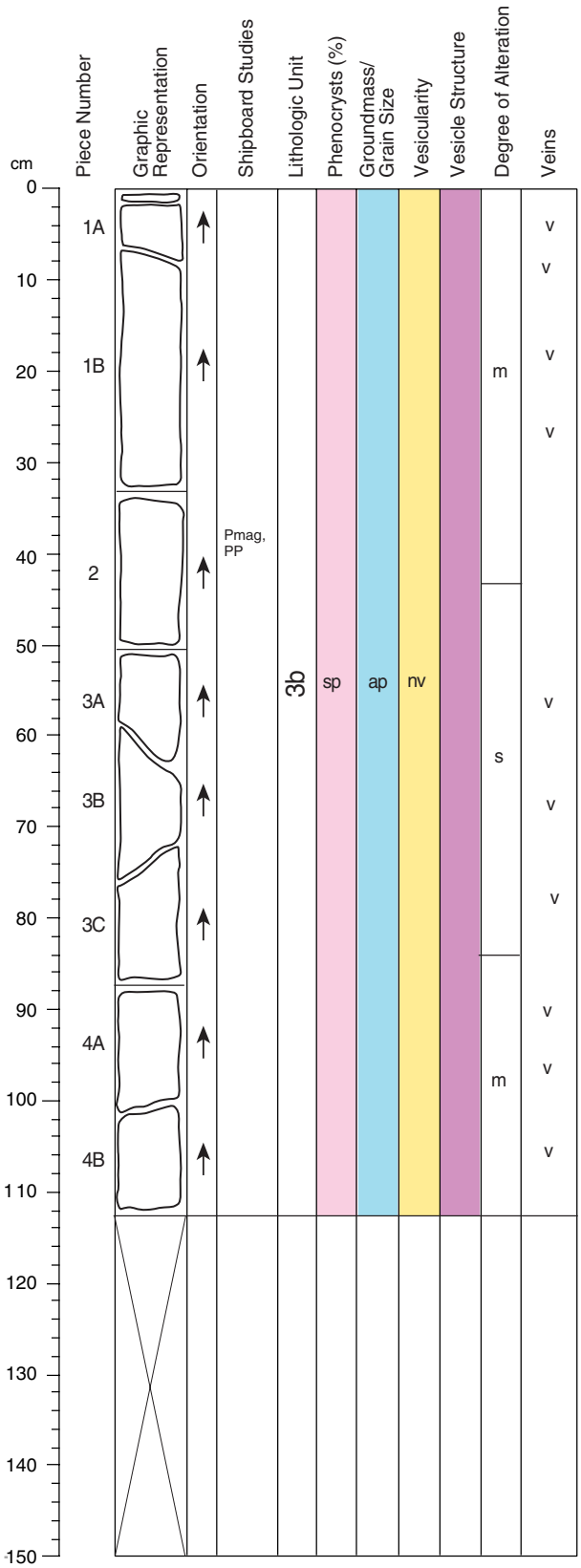
STRUCTURE: Massive.

ALTERATION: Slight (Piece 1) to moderate. Dark green clay is pervasive. Fe oxyhydroxide alteration fronts are also present. Olivine is completely altered to dark green clay and Fe oxyhydroxide. Glass is altered to light green clay in Pieces 2 to 5 and to dark green clay elsewhere. Clinopyroxene is altered to Fe oxyhydroxide adjacent to veins.

VEINS/FRACTURES: Sparsely veined. The rock has fractured along veins. Fe oxyhydroxide halos are present adjacent to veins. The veins are <0.1-3 mm wide and are filled with dark green clay and Fe oxyhydroxide. They are mostly horizontal to subhorizontal.

COMMENTS: Overall the rock is nonvesicular. A few round to elongate vesicles are present (up to 4 mm) throughout the section and are filled with green clay and white carbonate. Large plagioclase crystals are present in Pieces 1, 2, 9A, 9B, and 10A to 10D. Rare unaltered centers of olivine phenocrysts are present away from veins. Olivine may be present in the groundmass.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-11R-3 (Section top: 68.93 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	6	3	5	Subhedral; blocky
Olivine :	1-2	2.5	0.5	0.8	Subhedral; equant Occasional glomerocrysts

GROUNDMASS: Aphanitic. Clinopyroxene, plagioclase, and glass in a spherulitic to variolitic texture. The rock has a “spotty” texture when wet.

VESICLES: Nonvesicular.

COLOR: Medium light gray (N6) to dark greenish gray (5G 4/1) at the top. Moderate yellowish brown (10YR 5/4) in alteration halos adjacent to veins.

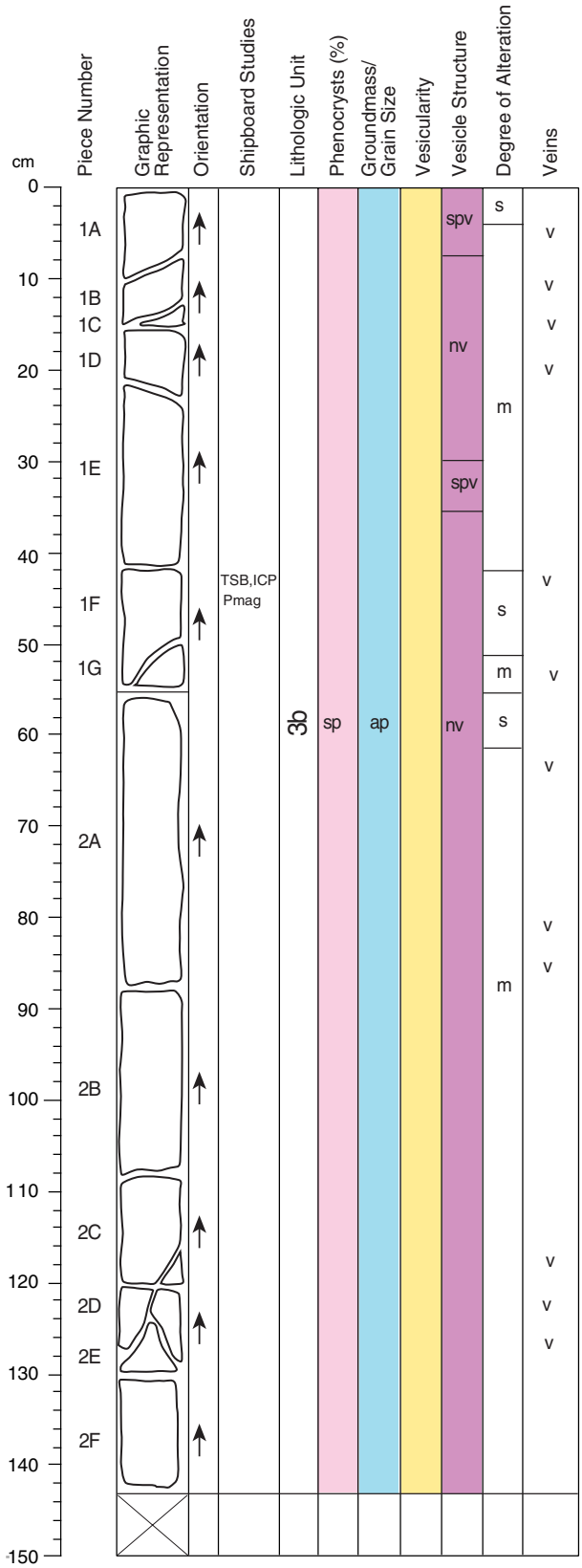
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Dark green clay is pervasive. Fe oxyhydroxide alteration fronts are also present. Olivine is completely altered to dark green clay and Fe oxyhydroxide. Glass is altered to dark green clay. Clinopyroxene is altered to Fe oxyhydroxide adjacent to veins. Sulfide is present in the groundmass of Piece 3A.

VEINS/FRACTURES: Sparsely veined. The rock has fractured along veins. Fe oxyhydroxide halos are present adjacent to veins. The veins are <0.1-3 mm wide and are filled with dark green clay and Fe oxyhydroxide. They are mostly horizontal to subhorizontal.

COMMENTS: Overall the rock is nonvesicular. A few round to elongate vesicles are present (up to 5 mm) throughout the section and are filled with green clay and white carbonate. Olivine phenocrysts with unaltered centers and mantled by a rim of dark green clay are present away from veins (e.g., Piece 3A). Olivine may be present in the groundmass.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-11R-4 (Section top: 70.05 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	10	2	4	Subhedral; blocky
Olivine :	1-2	2	0.2	0.8	Subhedral; equant

GROUNDMASS: Aphanitic. Clinopyroxene, plagioclase, and glass in a spherulitic to variolitic texture. The rock has a “spotty” texture when wet.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5), medium light gray (N6) to dark greenish gray (5G 4/1) at the top. Moderate yellowish brown (10YR 5/4) in alteration halos adjacent to veins.

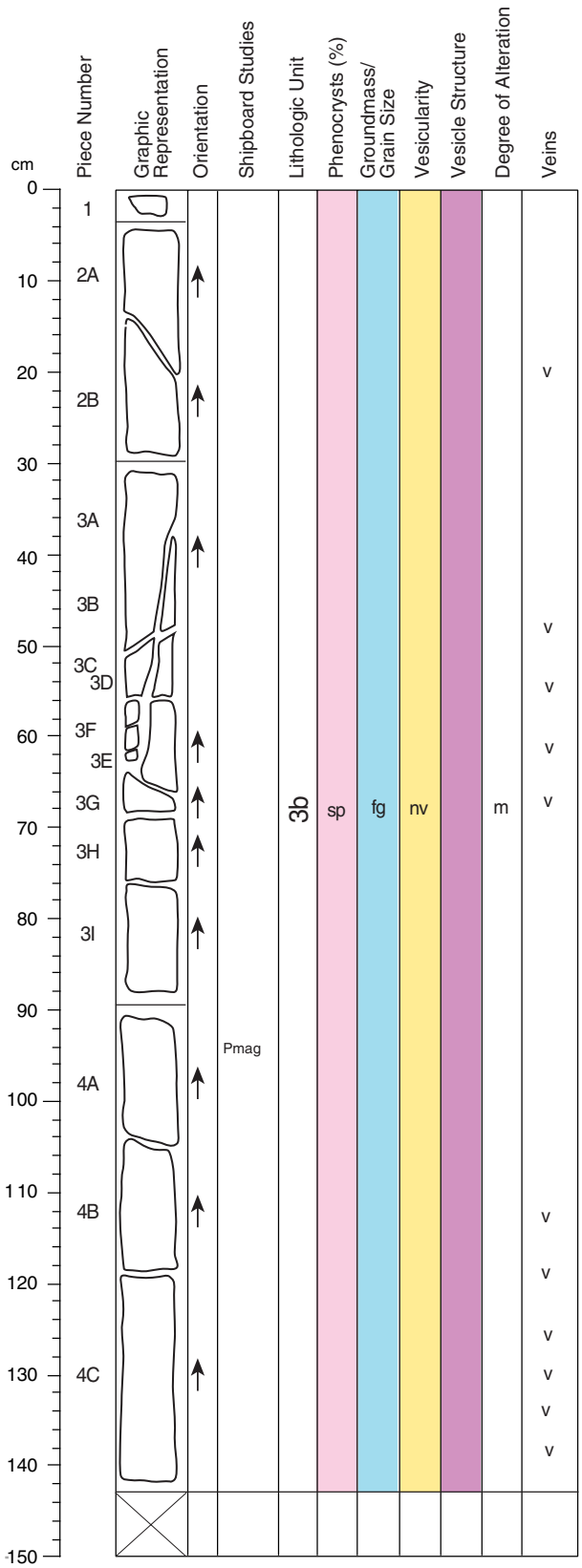
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Dark green clay is pervasive. Fe oxyhydroxide alteration fronts are also present. Olivine is completely altered to dark green clay and Fe oxyhydroxide around veins. Glass is altered to dark green clay. Clinopyroxene is altered to Fe oxyhydroxide adjacent to veins.

VEINS/FRACTURES: Sparsely to moderately veined. The rock has fractured along veins. Fe oxyhydroxide halos are present adjacent to veins. The veins are <0.1-3 mm wide and are filled with dark green clay and Fe oxyhydroxide. They are mostly horizontal to subhorizontal. The interval 75-91 cm contains a series of sub-mm veins that form a crossing network in a zone 6-8 mm wide and have brecciated the basalt.

COMMENTS: Overall the rock is nonvesicular. Two sparsely vesicular zones are present; one in Piece 1A (7-9 cm) and one in Piece 1E (26-32 cm). Round to elongate vesicles are present (up to 5 mm) and filled with green clay and white carbonate. Olivine phenocrysts with or without rims of dark green clay are present away from veins. Olivine may be present in the groundmass. A small amount of native copper was recognized in the bottom piece of the working half.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-12R-1 (Section top: 71.3 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	5	2	3	Euhedral; prismatic
Olivine :	2	2	0.5	1	Euhedral; equant

GROUNDMASS: Aphanitic, consists of plagioclase, olivine, clinopyroxene, black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-3	1.5	Round

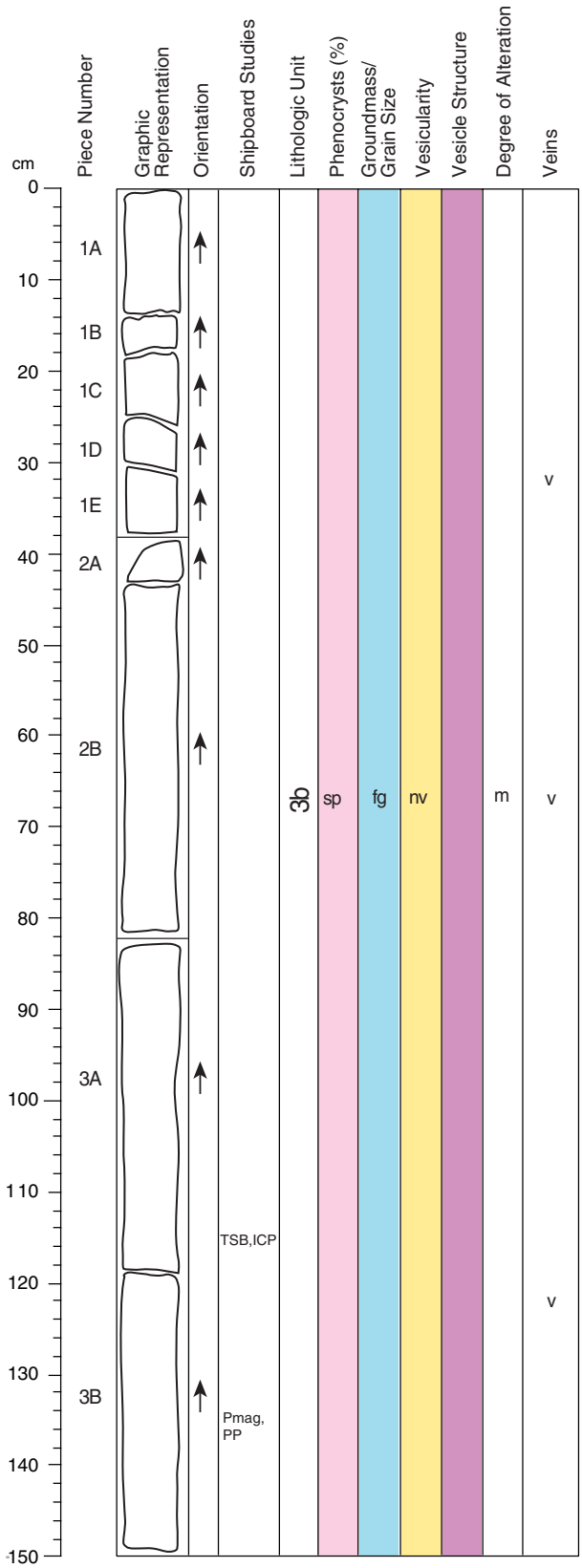
COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Moderate. In the upper part of the section, olivine phenocrysts are completely replaced by Fe oxyhydroxide. In Piece 4, a few remnant centers survive. Groundmass olivine is also altered. Vesicles are filled with grey-green clay or carbonate.

VEINS/FRACTURES: Sparsely veined. Veins occur throughout the section, are 0.5-2 mm wide, and filled with Fe oxyhydroxide and carbonate.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-12R-2 (Section top: 72.74 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	8	1	3	Euhedral; prismatic
Olivine :	2	2	0.5	1	Euhedral; equant

GROUNDMASS:Aphanitic. Consists of plagioclase, olivine, clinopyroxene, black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-2	1	Round

COLOR: Medium light gray (N6).

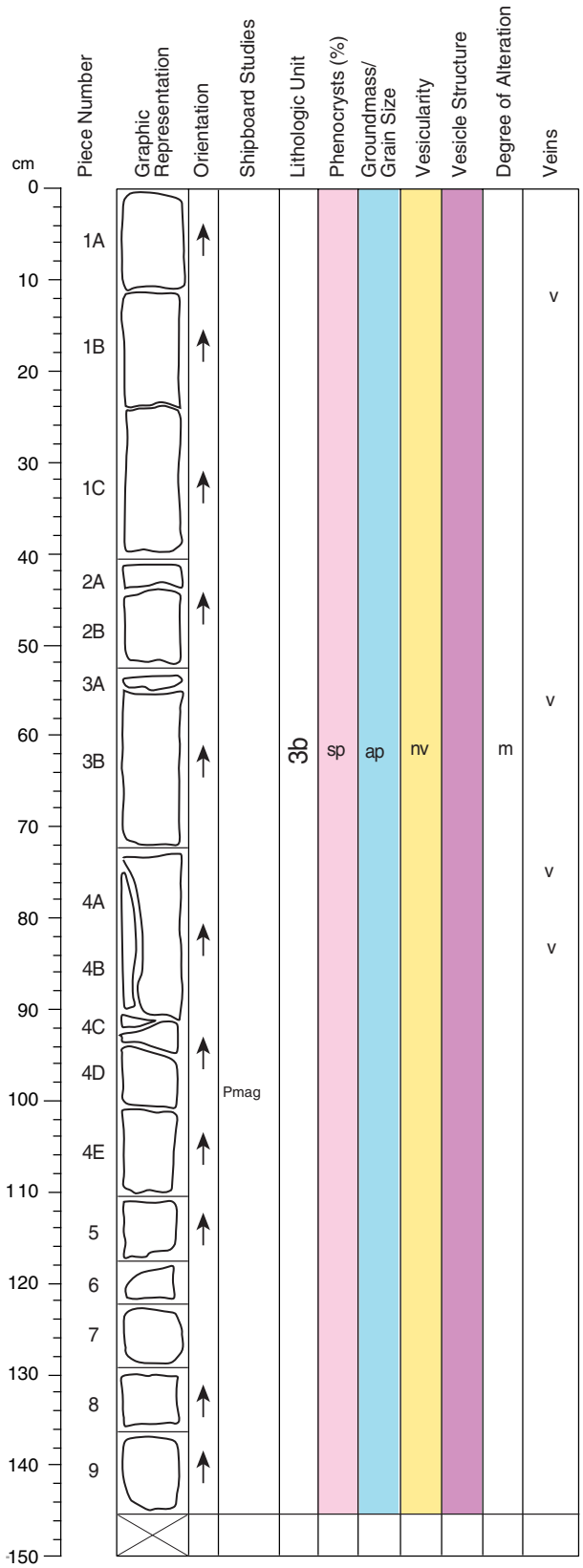
STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts are partially altered to grey-green clay and Fe oxyhydroxide. Vesicles are filled with grey-green clay and Fe oxyhydroxide.

VEINS/FRACTURES: Sparsely veined. Veins occur in Pieces 1 and 2, they are 0.5-2 mm wide, and filled with Fe oxyhydroxide.

COMMENTS: Unaltered olivine phenocrysts are present throughout this section.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-12R-3 (Section top: 74.24 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-9

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	6	1	2	Subhedral to euhedral; blocky
Olivine :	1	5	1	2	Euhedral to subhedral; equant

GROUNDMASS: Aphanitic. Clinopyroxene, plagioclase, and altered glass in a spherulitic to variolitic texture. Clinopyroxene is just starting to crystallize. The rock has a “spotty” texture when wet.

VESICLES: Nonvesicular.

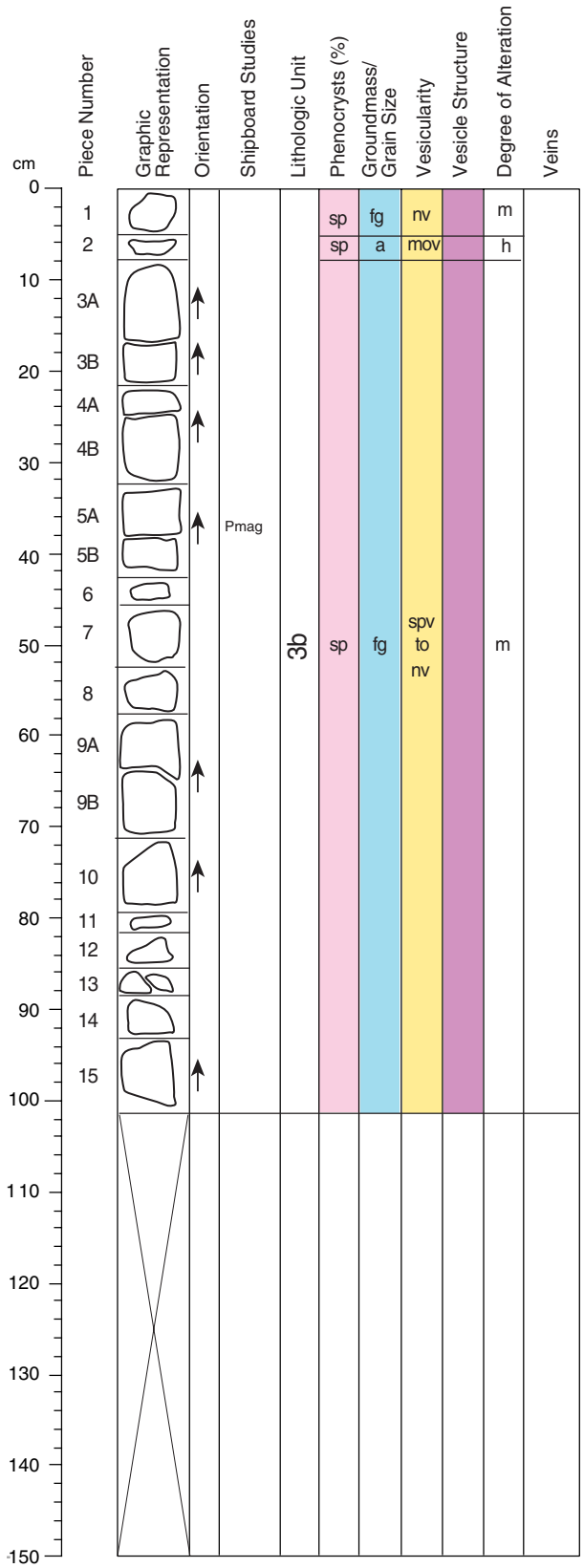
COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts are slightly altered. Groundmass is moderately altered to greenish gray clay. There are a few spots of light gray clay that may be replacing olivine phenocrysts or filling vesicles. At 111 cm, one of the larger spots (10 mm) has an olivine-like fracture pattern, fizzes mildly in HCl, and contains a few sulfide grains.

VEINS/FRACTURES: Moderately veined. The veins are <1 mm wide and are filled with gray carbonate and greenish gray clay.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-13R-1 (Section top: 76.1 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-15

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	6	1	4	Euhedral; prismatic
Olivine :	2	2	1	1	Subhedral; equant

GROUNDMASS: Aphanitic. Consists of plagioclase, olivine, clinopyroxene and black oxide.

VESICLES:

% Mode	Size (mm): Average	Shape
<1-3	1	Round

COLOR: Medium light gray (N6).

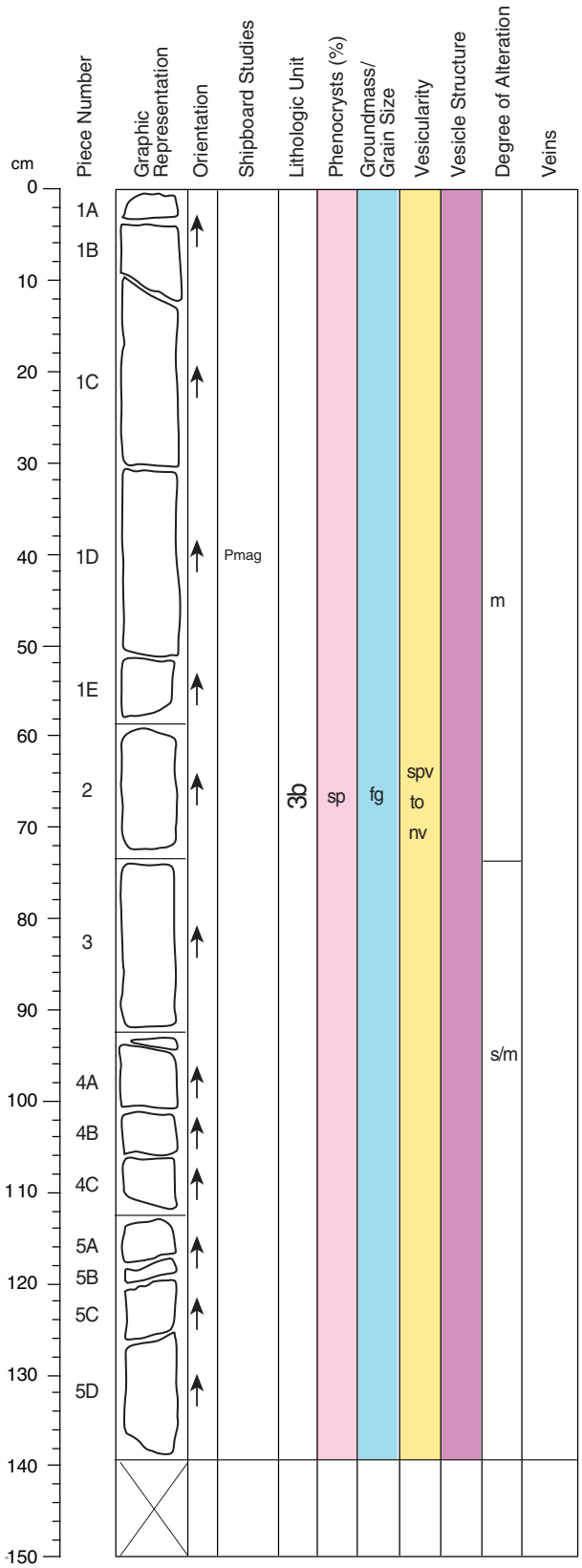
STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts are partially altered to grey-green clay. Vesicles are filled with grey-green clay and carbonate.

VEINS/FRACTURES: Sparse fractures, <0.5 mm wide, are filled with carbonate and dark green clay.

COMMENTS: Piece 2 is brown, vesicular, sparsely plagioclase-phyric basalt, and may have fallen from further up the hole.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-13R-2 (Section top: 77.12 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-5

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	10	3	6	Subhedral; prismatic
Olivine :	2	2	1	1.5	Subhedral; equant

GROUNDMASS: Aphanitic. Consists of plagioclase, olivine, clinopyroxene and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
	<1-3	1.5	Round

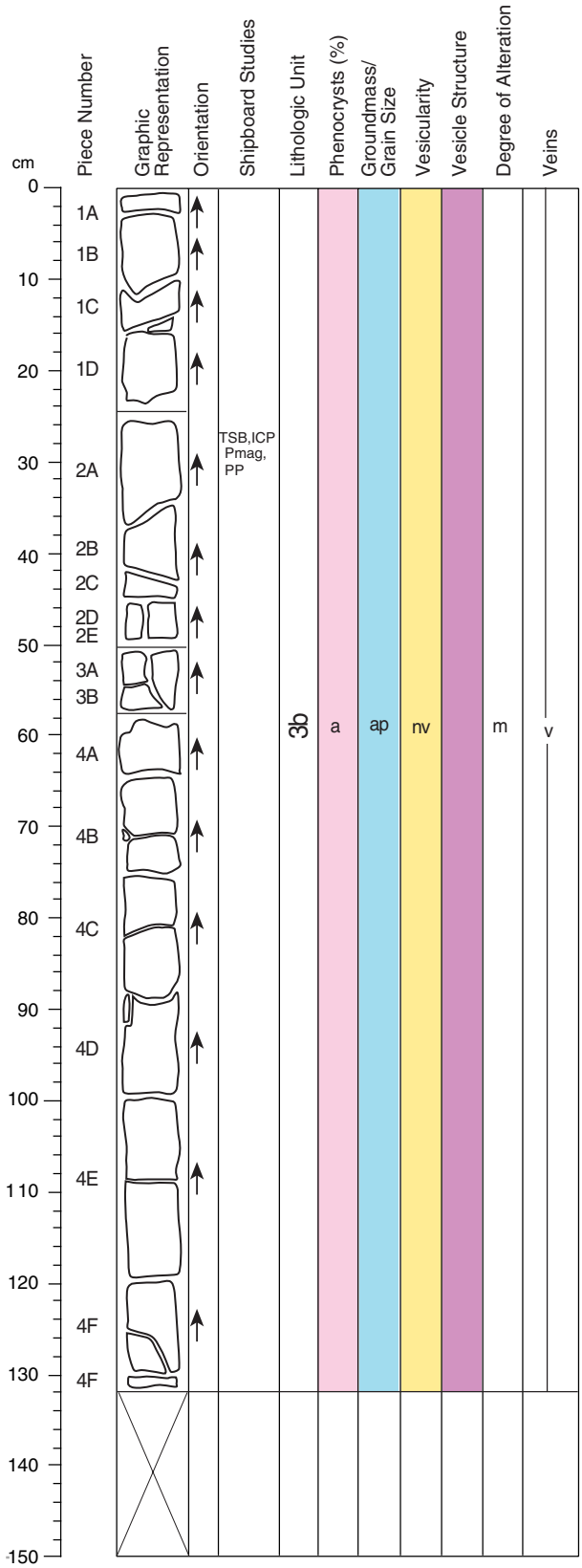
COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Olivine phenocrysts are partially altered to grey-green clay. Vesicles are filled with grey-green clay and occasionally carbonate.

VEINS/FRACTURES: Sparse fractures, <0.5 mm wide, are filled with carbonate, Fe oxyhydroxide and dark green clay.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-13R-3 (Section top: 78.52 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT*.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<<1	4	1	2	Euhedral; prismatic
Olivine :	<1	3	1	2	Euhedral; equant

GROUNDMASS: Aphanitic. Consists of plagioclase, altered olivine, clinopyroxene, and black oxide.

VESICLES: Nonvesicular.

COLOR: Medium light gray (N6), except moderate brown (5YR 4/4) near veins.

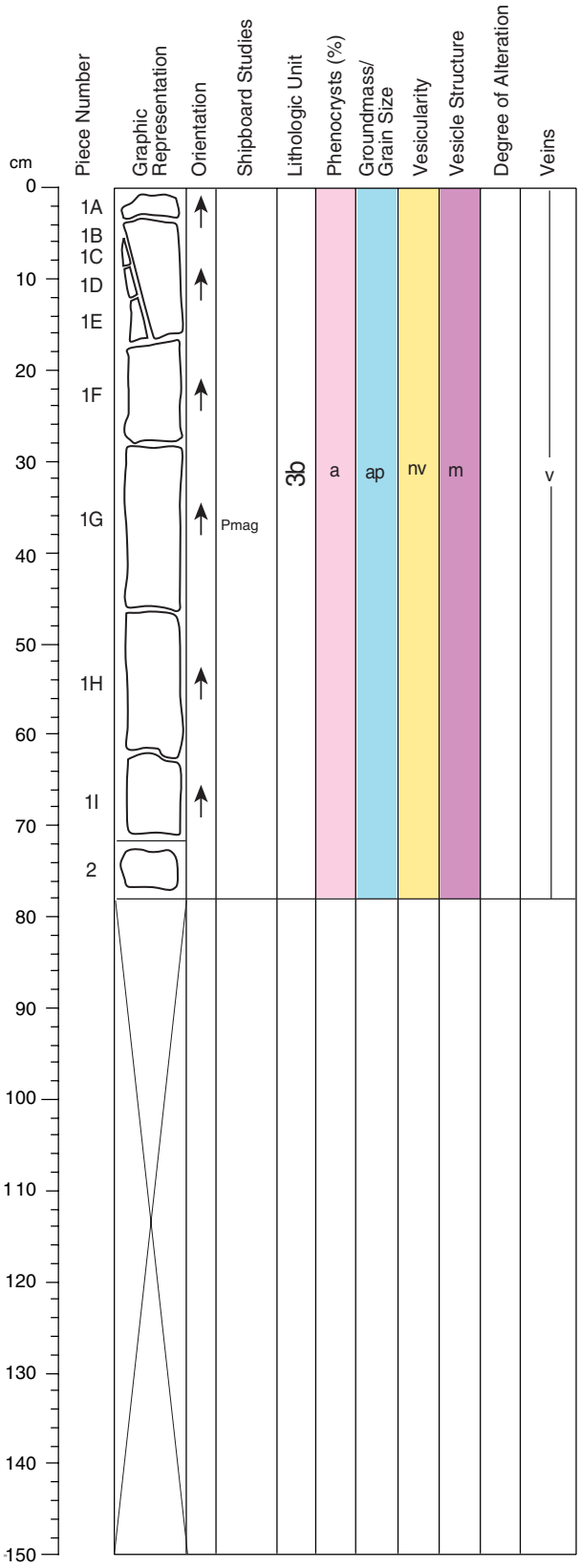
STRUCTURE: Massive.

ALTERATION: Moderate. Olivine is slightly to completely altered to Fe oxyhydroxides and greenish white clay. Plagioclase is slightly to completely altered to greenish white clay. Groundmass mesostasis is moderately to highly altered to dark bluish gray clay. Rare vesicles 2-8 mm wide are filled with Fe oxyhydroxide and greenish white clay. Fe oxyhydroxide alteration halos are present adjacent to veins and are ~10 mm wide.

VEINS/FRACTURES: Moderately veined. Veins are randomly oriented, <1 mm wide, and filled with Fe oxyhydroxide, dark grayish green clay, and greenish white carbonate. Most veins have iron oxidation halos ~10 mm wide and 0-20 mm away.

COMMENTS: *There is no obvious break between Sections 13R-2 and 13R-3. This is still part of Unit 3b, but there is a decrease in phenocryst abundance.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-13R-4 (Section top: 79.85 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT*.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<<1	4	1	2	Euhedral; prismatic
Olivine :	<1	3	1	2	Euhedral; equant

GROUNDMASS: Aphanitic. Consists of plagioclase, altered olivine, clinopyroxene, and black oxide.

VESICLES: Nonvesicular.

COLOR: Medium light gray (N6), except moderate brown (5YR 4/4) adjacent to veins.

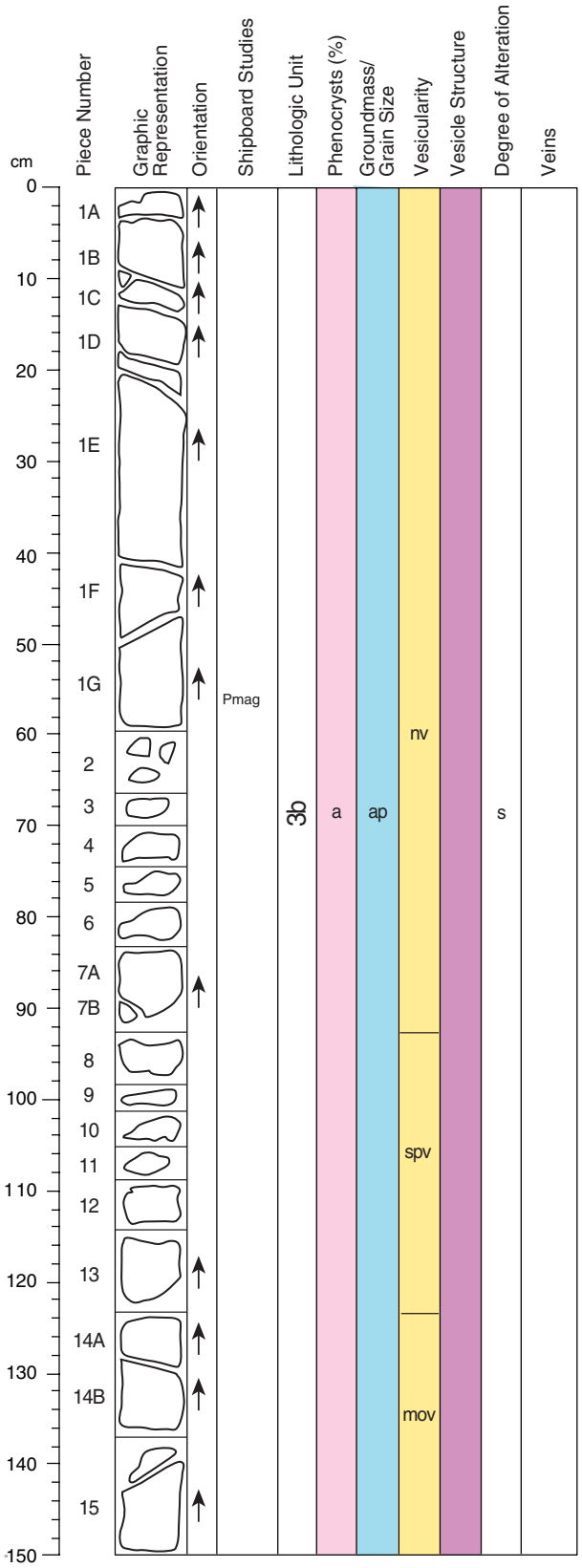
STRUCTURE: Massive.

ALTERATION: Moderate to high. Olivine is slightly to completely altered to Fe oxyhydroxide and greenish white clay. Plagioclase is slightly to completely altered to greenish white clay. Groundmass mesostasis is moderately to highly altered to dark bluish gray clay. Rare vesicles 2-8 mm wide are filled with Fe oxyhydroxide and greenish white clay. Fe oxyhydroxide staining is present in bands ~10 mm wide and 0-20 mm away from veins.

VEINS/FRACTURES: Moderately veined. Veins are randomly oriented, <1 mm wide, and filled with Fe oxyhydroxide, dark grayish green clay, and greenish white carbonate. Most veins have iron oxidation halos ~10 mm wide and 0-20 mm away.

COMMENTS: *There is no obvious break between Sections 13R-2 and 13R-3. This is still part of Unit 3b, but there is a decrease in phenocryst abundance.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-14R-1 (Section top: 81.0 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-15

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<<1	4	1	2	Euhedral; prismatic
Olivine :	<1	3	1	2	Euhedral; equant

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxides and some green material that may represent altered olivine or mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
0-90 cm	0-2	1	Round to slightly elongate
91-124 cm	4-5	<1	Round to slightly elongate
124-150 cm	7-8	<1	Round to slightly elongate

COLOR: Medium light gray (N6).

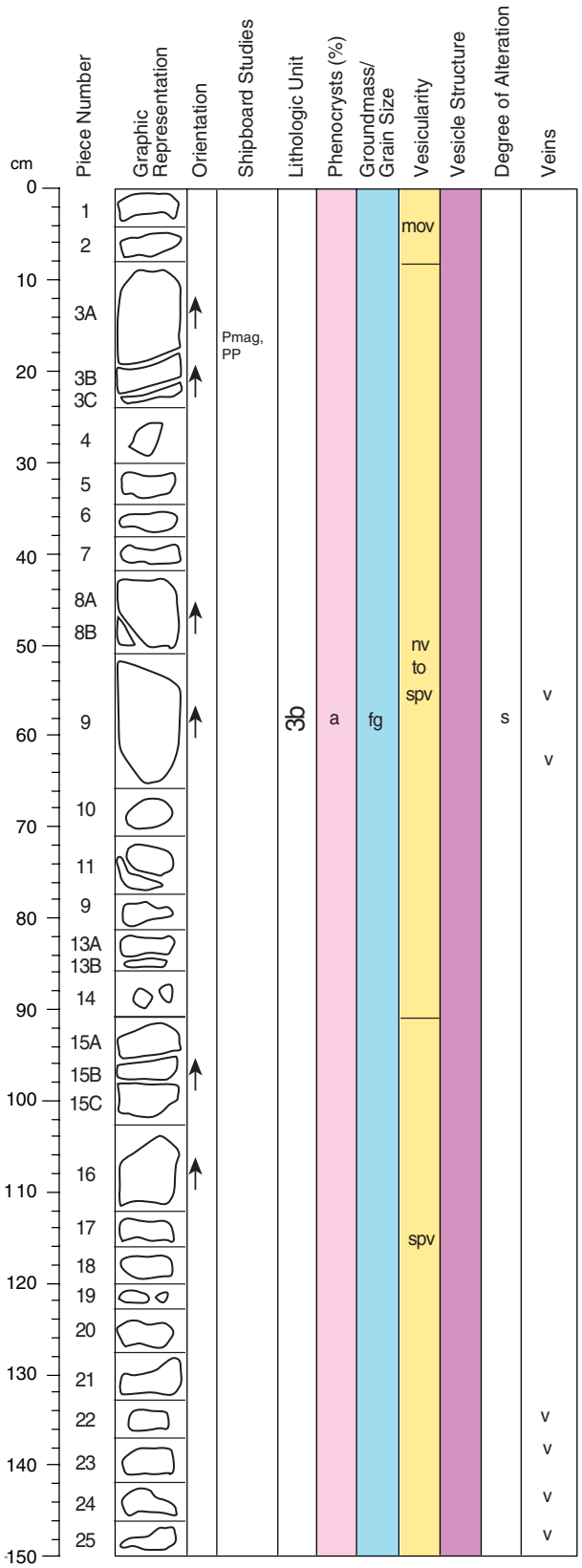
STRUCTURE: Massive.

ALTERATION: Slight. Small areas of green clay in the groundmass may be altered olivine or mesostasis. Vesicles <1-10 mm wide are lined with green clay and filled with greenish white carbonate.

VEINS/FRACTURES: None present.

COMMENTS: Vesicles <1-10 mm in size are sparsely present from 1-90 cm. A microvesicular zone is present from 91-150 cm, which increases in abundance downwards.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-14R-2 (Section top: 82.5 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-25

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	4	1	2	Euhedral; prismatic
Olivine :	1	1	1	1	Euhedral; equant

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
	1-6	1	Round to slightly elongate

COLOR: Medium gray (N5). Dark yellowish orange (10 YR 6/6) adjacent to veins.

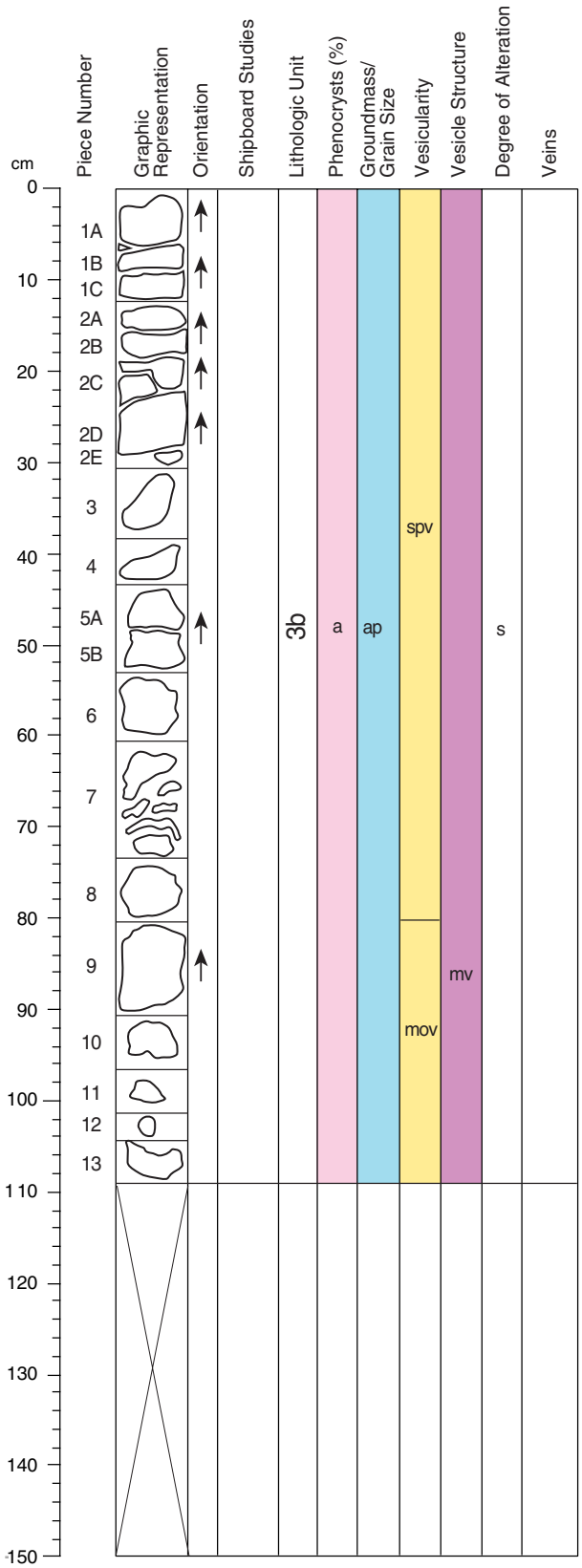
STRUCTURE: Massive.

ALTERATION: Slight. Moderate Fe oxyhydroxide alteration adjacent to veins and small fractures. Vesicles are filled with carbonate, pale green clay, Fe oxyhydroxide and zeolite.

VEINS/FRACTURES: Sparsely veined. <1 mm wide veins and fractures are present in Pieces 9 and 22-25. Veins are filled with Fe oxyhydroxide and pale green clay.

COMMENTS: A medium grained xenolith, containing ~5% olivine and ~1% plagioclase phenocrysts, is present in Piece 9 from 53-62 cm. Most olivine phenocrysts are altered to dark yellowish orange (10 YR 6/6) Fe oxyhydroxide. Flow structures are present around the xenolith. Flow banding is present in Pieces 3, 7-9 and 15-25. Most vesicles are elongated along the direction of flow banding.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-14R-3 (Section top: 84.0 mbsf)

UNIT 3b: APHYRIC TO MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-13

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	<1	1	1	1	Euhedral; equant

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxides and some green and orange material that may represent altered olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
0-30 cm	3	2	Round to slightly elongate
30-80 cm	2	4	Elongate
80-109 cm	10-13	<1	Round

COLOR: Medium gray (N5). Dark yellowish orange (10 YR 6/6) adjacent to veins.

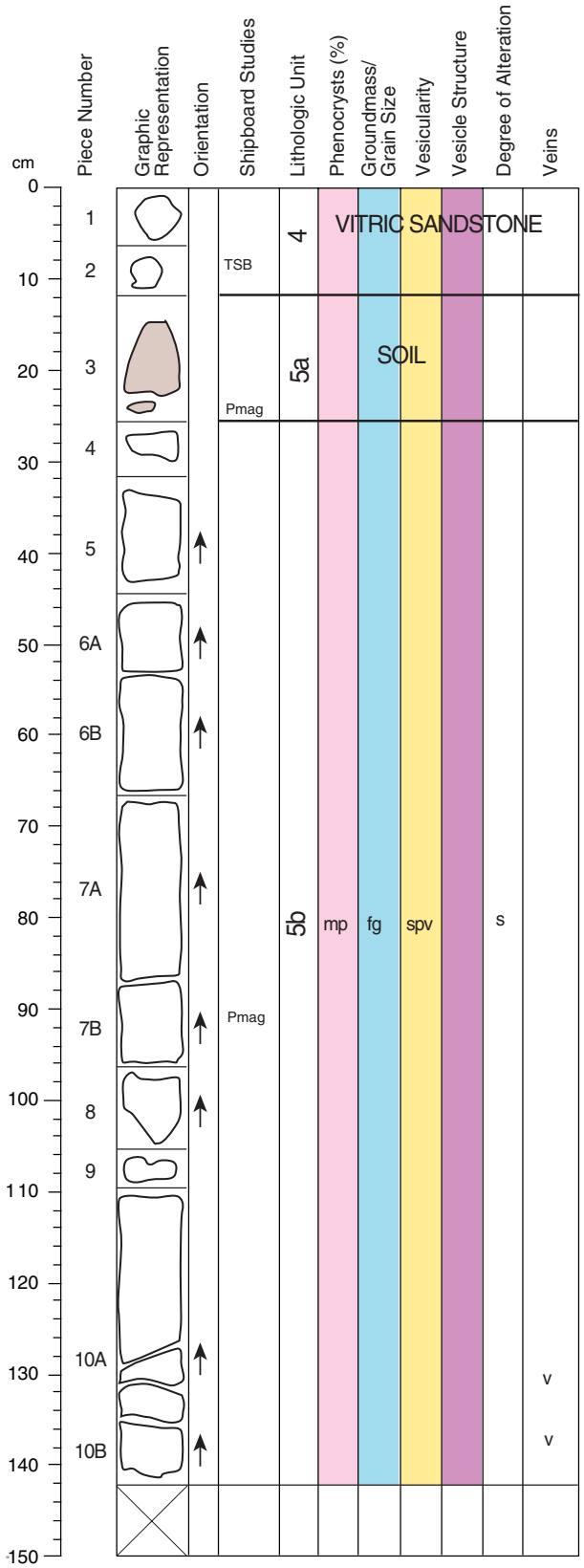
STRUCTURE: Massive.

ALTERATION: Slight. Moderate Fe oxyhydroxide alteration is present adjacent to veins and small fractures. Vesicles are filled with carbonate, pale green clay, (possibly chlorite?) and Fe oxyhydroxide. The vesicles in Piece 8 contain a small amount of metallic gold-colored acicular crystals (pyrite?). A large 45 mm, elongated vesicle in Piece 9 is filled with a light purple mineral, and lined with green clay.

VEINS/FRACTURES: Slightly veined. Many pieces are fractured along veins which contain Fe oxyhydroxide along with white carbonate.

COMMENTS: Many of the vesicles are elongated which suggests shear deformation during lava flow. In the working half of this core, soil material was obtained from the exterior of Piece 13. Piece 13 in the archive half has a 2-3 mm thick patch of glassy selvage at its base, representing the quenched base of the lava.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-15R-1 (Section top: 90.7 mbsf)

UNIT 4: DARK RED-BROWN SANDSTONE.

Pieces: 1–2

CONTACTS: None observed. The top of Unit 4 is inferred to be at the top of this core section. The boundary between Units 4 and 5a is inferred to be between Pieces 2 and 3 at 11 cm.

Piece 1
Very fine grained, laminated vitric dusky red sandstone.
Lamination show up as bands of different colors of red and brown (2.5 YR 3/1 to 3/2).

Piece 2
Identical to Piece 1 and consists of reddish brown very fine sandstone. Piece 2 is broken up into several small pieces surrounded by clay, but is identical to Piece 1.

The sandstone consists chiefly of ghosts of glass fragments (i.e. sideromelane tephra clasts) altered to palagonite and smectite. The original clast morphology is easily identifiable and shows vesicular, angular to subrounded clasts (see Microphotograph 1) in a clay cement. The clasts have irregular outlines highlighted by a rim of clay. Clay rims also highlight the spherical vesicles, contained within the clasts. Clast vesicularity is about 20%-50%.

About 8%-10% of the glass is in various stages of palagonitization. Some grains are yellow gel palagonite (isotropic; Fisher and Schmincke, 1984). Other grains are dark yellow brown with clouded interiors and have a gray colored appearance under crossed polars. Grain shape ranges from rounded to subrounded to angular.

The original composition of the sandstone is estimated to be 90%-95% glass and 5%-10% opaque minerals. Bright red grains are iddingsite and could be altered glass or olivine. The original grain size is around 80 to 120 mm and sorting is good. A few lithic fragments are present and contain plagioclase, clinopyroxene, and opaque minerals.

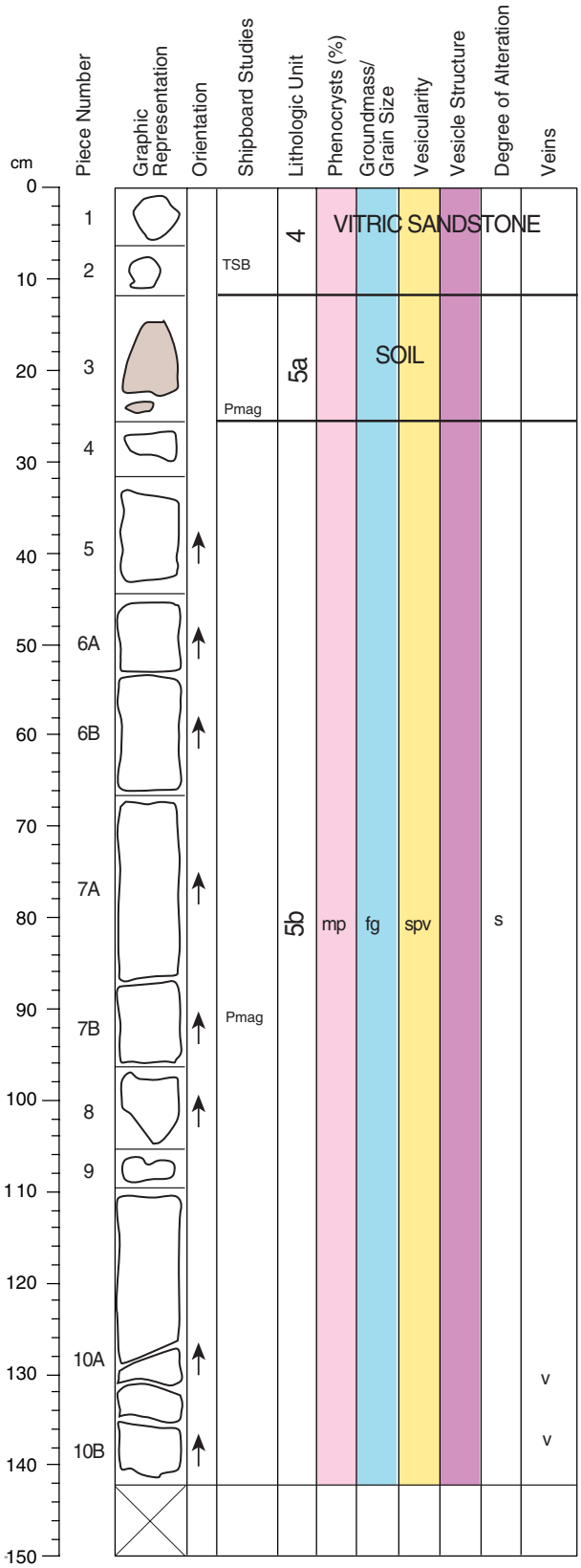
The bulk of the clast populations have been altered to smectite, but original clast outlines and structures are well preserved.

Due to alteration, the present mineral composition is:
72% clay (smectite mainly)
11% Fe oxide
6% Opaque (hematite)
2% Fresh volcanic glass
9% Palagonite

Reference: Fisher, R.V., and Schmincke, H.-U., 1984. Pyroclastic Rocks: New York (Springer Verlag).

(Continued on next page)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-15R-1 (Continued)

UNIT 5a: RED-BROWN SOIL.

Pieces: 3

CONTACTS: None observed. The boundary between Units 4 and 5a is inferred to be between Pieces 2 and 3 at 11 cm. The boundary between Units 5a and 5b is inferred to be between Pieces 4 and 5 at 25 cm.

GENERAL DESCRIPTION: This soil horizon consists of two cm-thick intervals.
A red-brown horizon (at 11-18 cm) consists of finely laminated clay interbedded (gradational contacts) with Fe oxide-rich clay containing pyrite, hematite, palagonite, and brown clay. The red color is due to the Fe oxides.

A dusky red interval of clay (at 18-21 cm) with dark gray, strongly altered basalt. Lithics or glass fragments cemented by reddish colored (iron-rich?) clayey matrix.

COLOR: Dusky red (2.5YR 3/2) to reddish brown (2.5YR 4/4) and dark reddish brown (10YR 4/1). Yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4).

COMMENTS: The moderately convoluted laminae are likely due to drilling disturbance.

UNIT 5B: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 4-10

CONTACTS: The unit boundary between Unit 5a and Unit 5b is inferred to be in between Piece 4 and Piece 5 at 25 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	6	1	2	Euhedral; prismatic
Olivine:	3	3	1	1	Euhedral; equant

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1	2	Round to slightly elongate

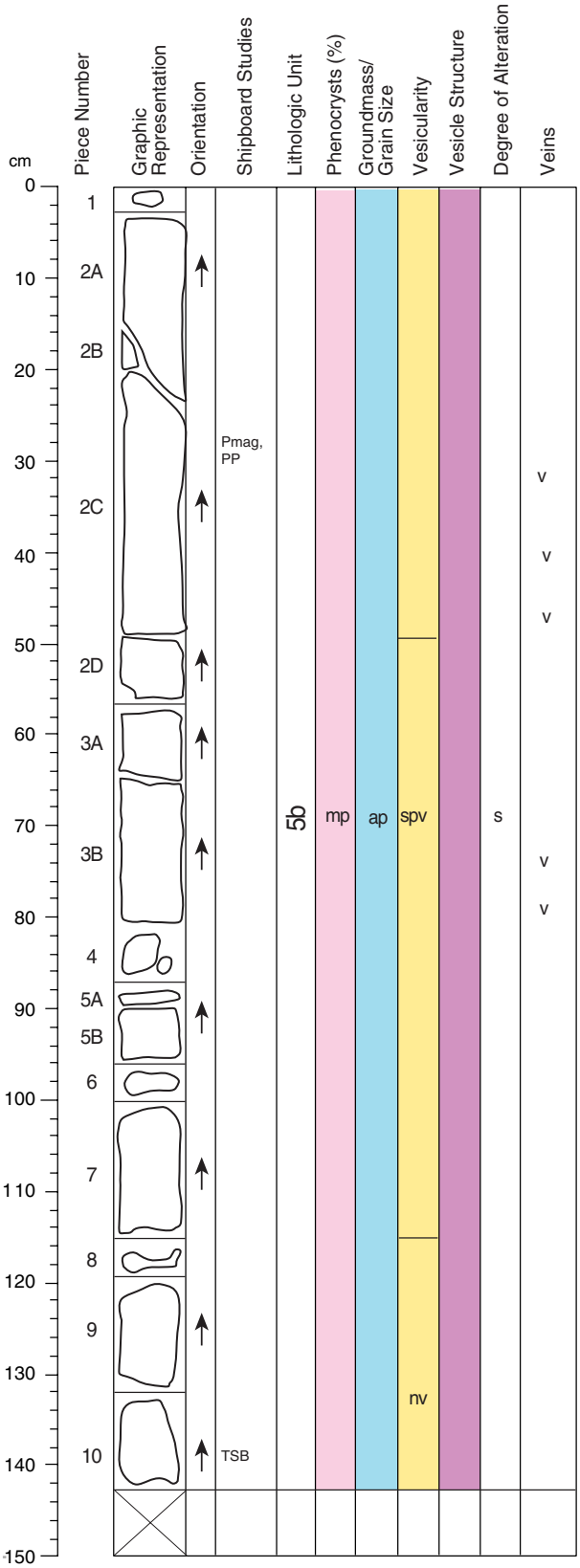
COLOR: Medium gray (N5). Dark yellowish orange (10 YR 6/6) adjacent to veins.

STRUCTURE: Massive.

ALTERATION: Slight. Moderate Fe oxyhydroxide alteration adjacent to veins and small fractures. Vesicles are filled with carbonate, pale green clay and Fe oxyhydroxide. Most olivine is altered to dark yellowish orange (10 YR 6/6) Fe oxyhydroxide, but unaltered olivine is also present, for example in Piece 8.

VEINS/FRACTURES: Sparsely veined. <1 mm wide veins are present in Pieces 10. Veins are filled with Fe oxyhydroxide and pale green clay.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-15R-2 (Section top: 92.12 mbsf)

UNIT 5b: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-10

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	4	12	2	3	Euhedral; prismatic
Olivine:	2	3	1	1	Euhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
	0-2	2	Round to slightly elongate

COLOR: Medium gray (N5). Dark yellowish orange (10 YR 6/6) adjacent to veins.

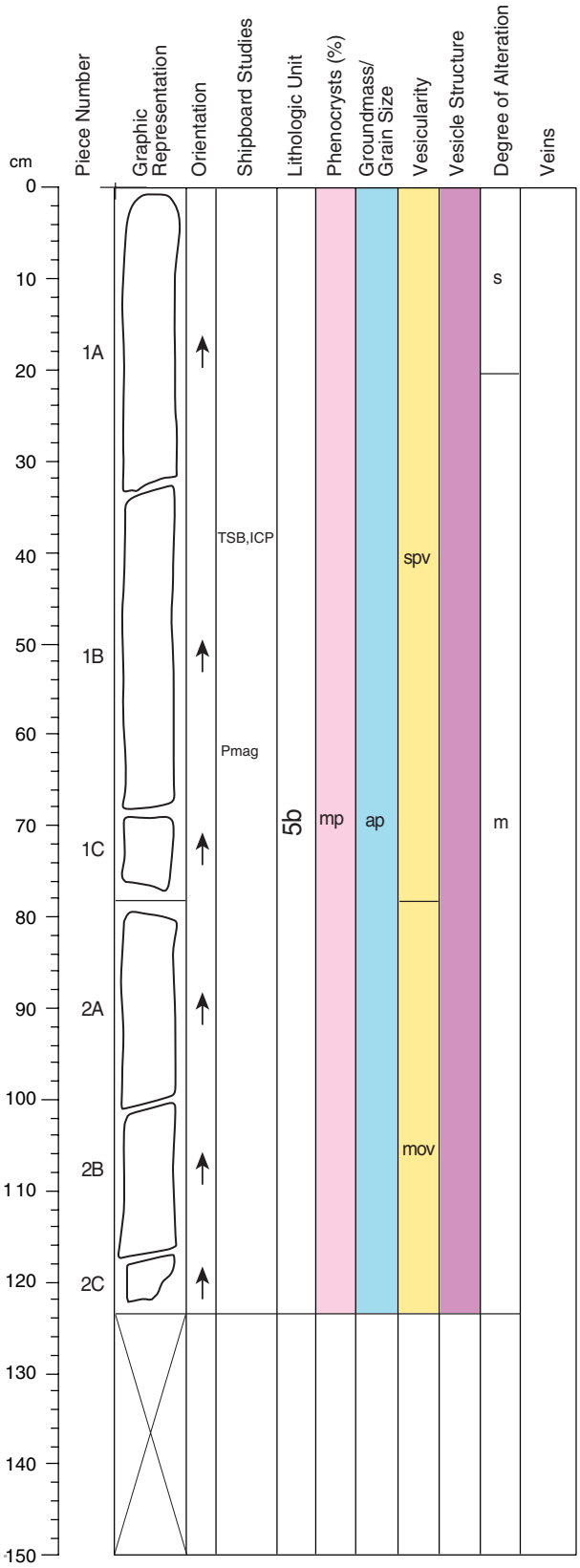
STRUCTURE: Massive.

ALTERATION: Slight. Moderate Fe oxyhydroxide alteration adjacent to flow foliation and small fractures. Vesicles are filled with carbonate, pale green clay and Fe oxyhydroxide. Most olivine is altered to dark yellowish orange (10 YR 6/6) Fe oxyhydroxide or a black mineral. Some of the plagioclase megaphenocrysts have been stained light green.

VEINS/FRACTURES: Sparsely veined. <1 mm wide veins infilled with white carbonate are present.

COMMENTS: 2%-3% of the rock is comprised of 10-20 mm plagioclase-rich xenoliths containing large well-formed plagioclase crystals, and smaller anhedral intergranular clinopyroxene.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-15R-3 (Section top: 93.55 mbsf)

UNIT 5b: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	10	1	3	Subhedral
Olivine:	3	5	1	2	Euhedral to subhedral

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxides and dark gray altered groundmass.

VESICLES:	% Mode	Size (mm): Average	Shape
0-80 cm	5	2	Round
80-124 cm	10	2	Round

COLOR: Medium gray (N5) to dark gray (N3).

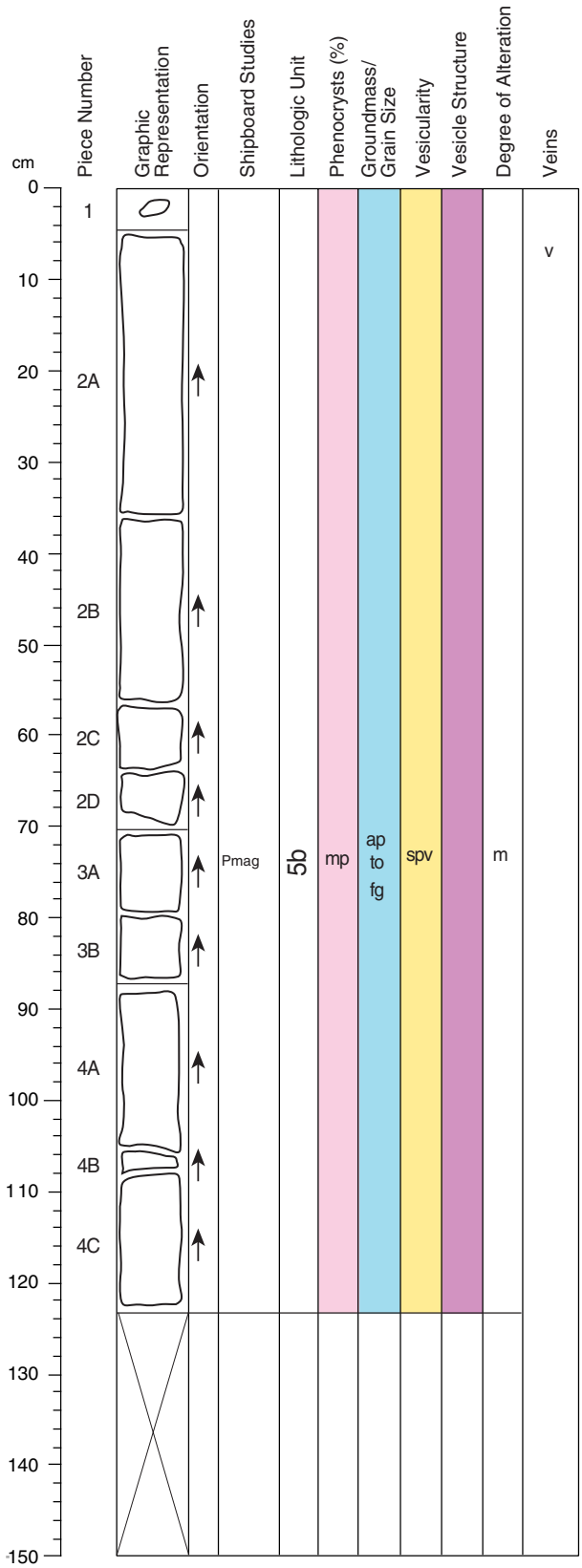
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Spotted appearance due to changes from medium to dark gray. Most vesicles, 80%, filled with blue clay and 20% filled with white carbonate. In Piece 2A (92 cm) a 4 mm vesicle is present containing well-crystallized zeolite.

VEINS/FRACTURES: None.

COMMENTS: Large olivine and plagioclase crystals are often associated; e.g., in Piece 1A at 5 cm a 5 mm unaltered olivine crystal is intergrown with two 1-2 mm plagioclase crystals.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-16R-1 (Section top: 95.0 mbsf)

UNIT 5b: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1A-4C

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	4	14	5	1.5	Euhedral; elongate
Olivine :	2	2	0.8	1	Euhedral; prismatic

GROUNDMASS: Aphanitic to fine grained. Consists of cryptocrystalline plagioclase, clinopyroxene, black oxides and dark green patches which may represent altered groundmass or olivine. Disseminated pyrite is also present.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2-5	3	Round

COLOR: Medium light gray (N6) with a brownish tint.

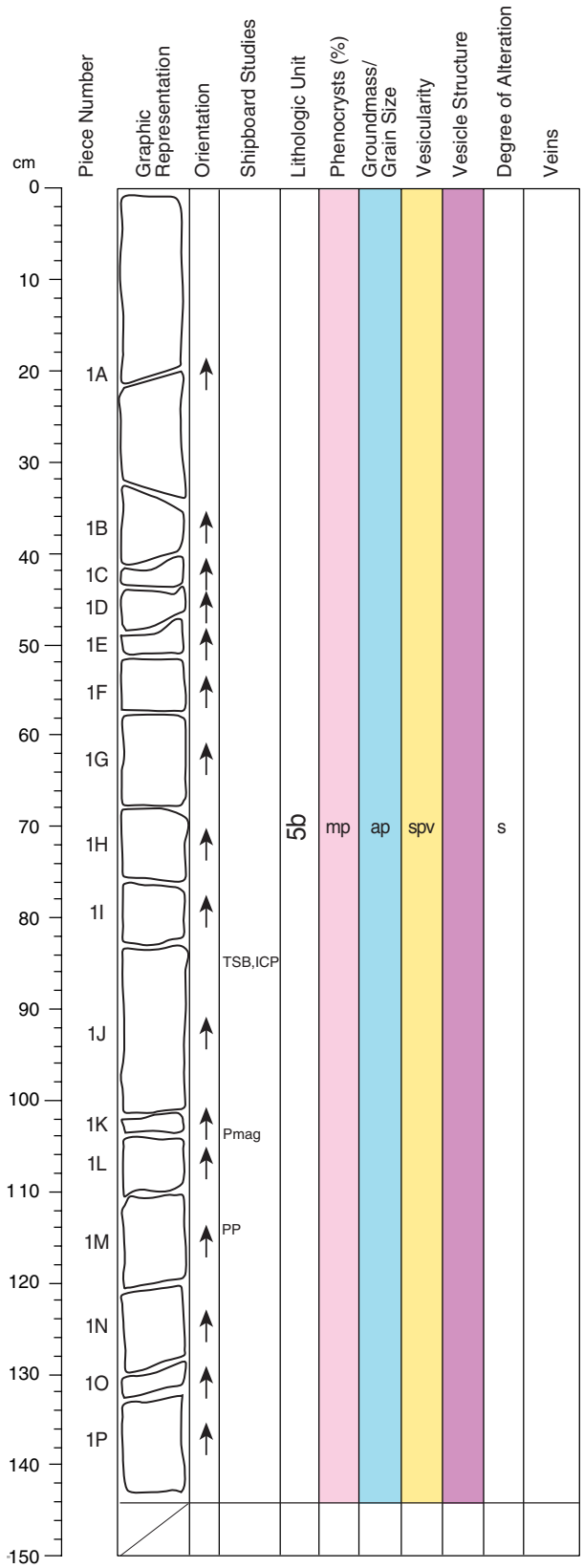
STRUCTURE: Massive. Irregular subparallel flow foliations are present.

ALTERATION: Moderate. Olivine is altered to dark brown and black clay and Fe oxyhydroxide. They occasionally have unaltered centers. Pyroxene is partially altered to green clay. The rock has a brownish hue suggesting the groundmass is altered. Vesicles are filled with pale green clay which expands 50% when wet.

VEINS/FRACTURES: One vein is present in Piece 2A at 8 cm It is <0.1 mm wide and filled with Fe oxyhydroxide.

COMMENTS: Round to irregular shaped plagioclase-rich xenoliths comprise 1-2% of the rock. They are 1-12 mm in size, and consist of plagioclase and clinopyroxene and possibly olivine.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-16R-2 (Section top: 96.24 mbsf)

UNIT 5b: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1A-1P

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	6-7	5	0.5	2	Euhedral; prismatic
Olivine :	2	1	0.5	0.6	

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxides and dark green patches which may represent altered groundmass or olivine.

VESICLES:

	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2	3	Round to irregular and almost angular

COLOR: Dark gray (N3).

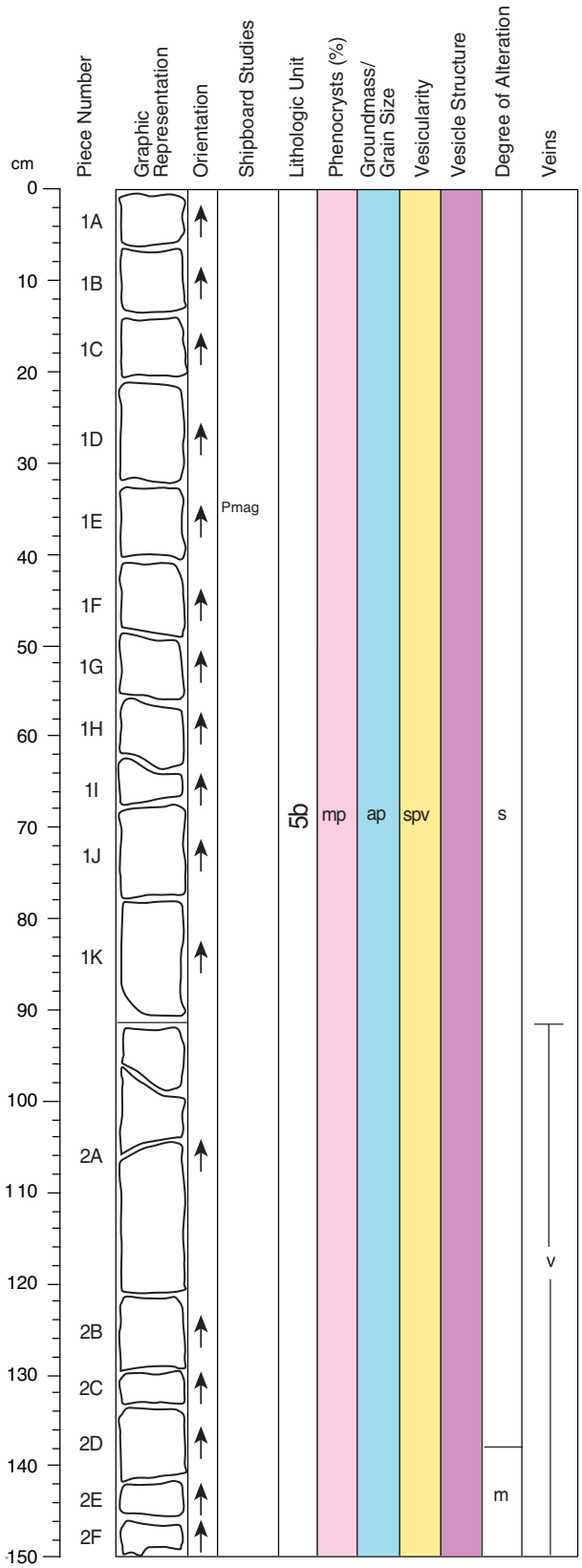
STRUCTURE: Massive.

ALTERATION: Slight. Green altered patches are present in the groundmass and may represent altered olivine. Vesicles are filled with green clay and carbonate.

VEINS/FRACTURES: None.

COMMENTS: Round to irregular-shaped plagioclase-rich xenoliths comprise 1-2% of the rock. They are 1-12 mm in size, and consist of plagioclase and clinopyroxene and possibly olivine.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-16R-3 (Section top: 97.68 mbsf)

UNIT 5b: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	5	1	3	Euhedral
Olivine:	1	4	1	1	Euhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1	2	Round to slightly elongate

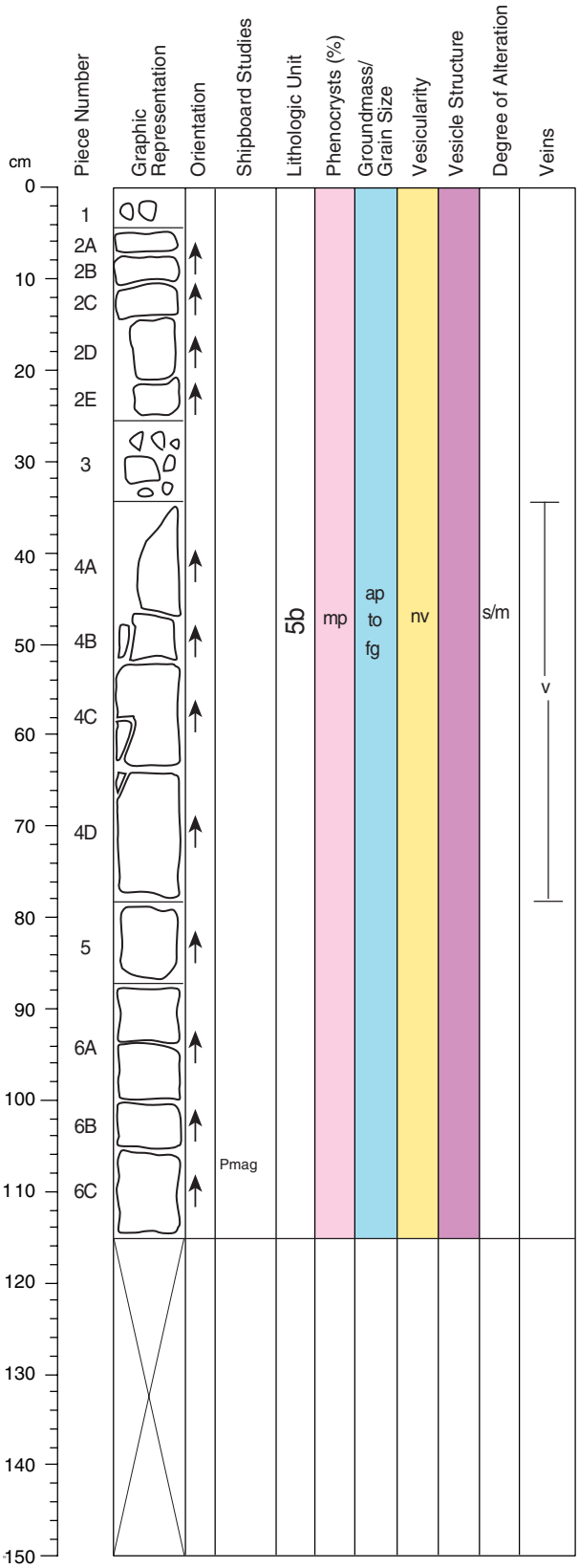
COLOR: Medium light gray (N6). Grayish red adjacent to fractures in moderate altered region.

STRUCTURE: Massive. Irregular subparallel flow foliations are present through the section.

ALTERATION: Slight to moderate. Moderate Fe oxyhydroxide alteration adjacent to small fractures. Vesicles are filled with carbonate and pale green clay. Most olivine is altered to dark yellowish orange (10 YR 6/6) Fe oxyhydroxide. Unaltered olivine is also present, for example in Piece 1J.

VEINS/FRACTURES: Moderately veined. <1 mm wide veins are present in Piece 2. Veins are filled with carbonate.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-16R-4 (Section top: 99.18 mbsf)

UNIT 5b: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-6

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	4	1	2	Euhedral
Olivine:	1	4	1	1	Euhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-3	2	Round to slightly elongate

COLOR: Medium gray (N5).

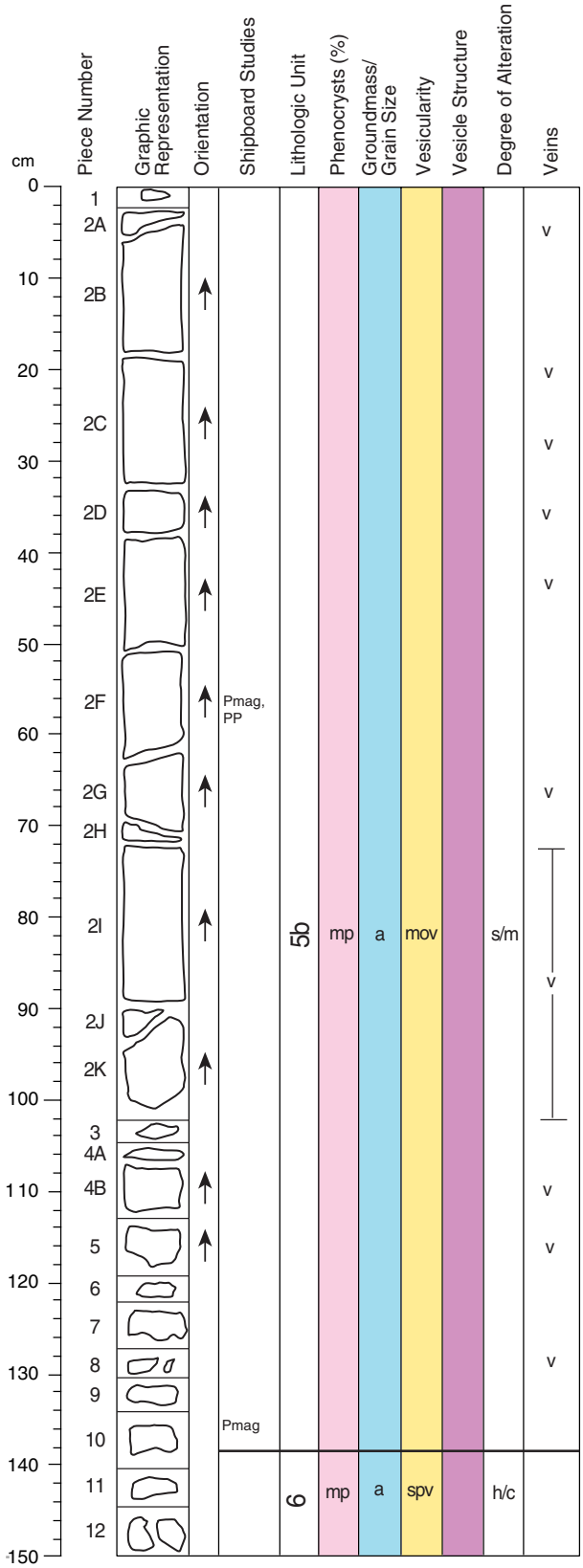
STRUCTURE: Massive. Irregular, subparallel flow foliations are present through the section.

ALTERATION: Slight to moderate. Vesicles are filled with pale green clay. Most olivine is altered to dark yellowish orange (10 YR 6/6) Fe oxyhydroxide.

VEINS/FRACTURES: Moderately veined. 2 mm wide veins are present in Piece 4. Veins are filled with Fe oxyhydroxide.

COMMENTS: A 3 mm wide, irregular vertical halo of Fe oxyhydroxide is present through the section.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-17R-1 (Section top: 100.3 mbsf)

UNIT 5b: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-10

CONTACTS: The boundary between Units 5b and 6 is in Piece 10 between 137 cm and 140 cm, where oxidized sediment (soil horizon?) adheres to a piece of coherent basalt.

PHENOCRYSTS: %	Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	15	1	5	Euhedral to subhedral; blocky
Olivine:	1	2.5	0.5	1	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and glass. Olivine may also be present, but positive identification is difficult.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	5-8	4	Round to elongate

COLOR: Medium light gray (N6). Alteration halos adjacent to veins are pale yellowish brown (10YR 6/2).

STRUCTURE: Massive.

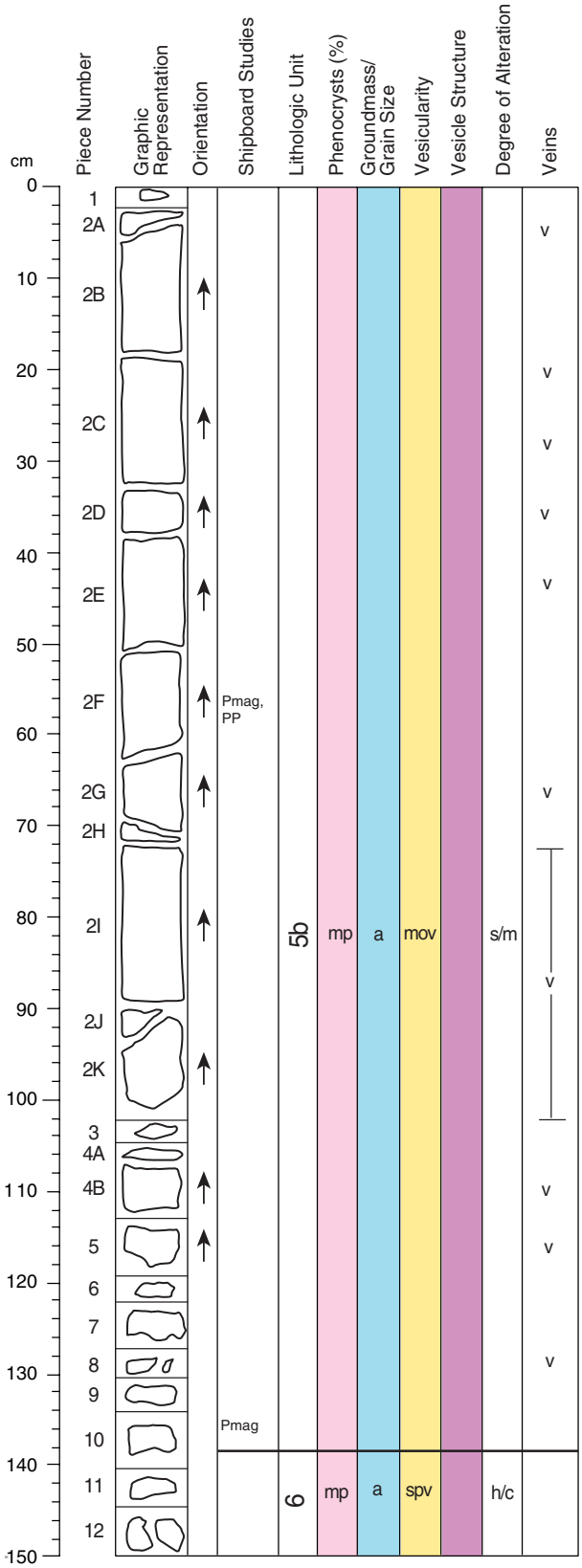
ALTERATION: Slight to moderate. Alteration is most intense in Fe oxyhydroxide alteration halos adjacent to veins. Glass is altered to dark green clay. Olivine phenocrysts are partially replaced by dark green clay and Fe oxyhydroxide along fractures. Plagioclase phenocrysts are partially sericitized. Vesicles are filled with dark green clay and Fe oxyhydroxide.

VEINS/FRACTURES: Sparsely veined. The core is fractured along veins. The veins are <0.1-1 mm wide, horizontal to subhorizontal, and are filled with green clay, Fe oxyhydroxide, and minor white carbonate.

COMMENTS: Plagioclase phenocrysts and vesicles show some alignment parallel to the flow foliation defined by interstitial glass.

(Continued on next page)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-17R-1 (Continued)

UNIT 6: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 10-12

CONTACTS: The boundary between Units 5b and 6 is in Piece 10 between 137 cm and 140 cm, where oxidized sediment (soil horizon?) is adhering to a piece of coherent basalt.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	8	2	4	Euhedral; blocky
Olivine:	3	2.5	1	1.5	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, olivine and altered glass.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	3-5	3	Round

COLOR: Pale reddish brown (5YR 5/2).

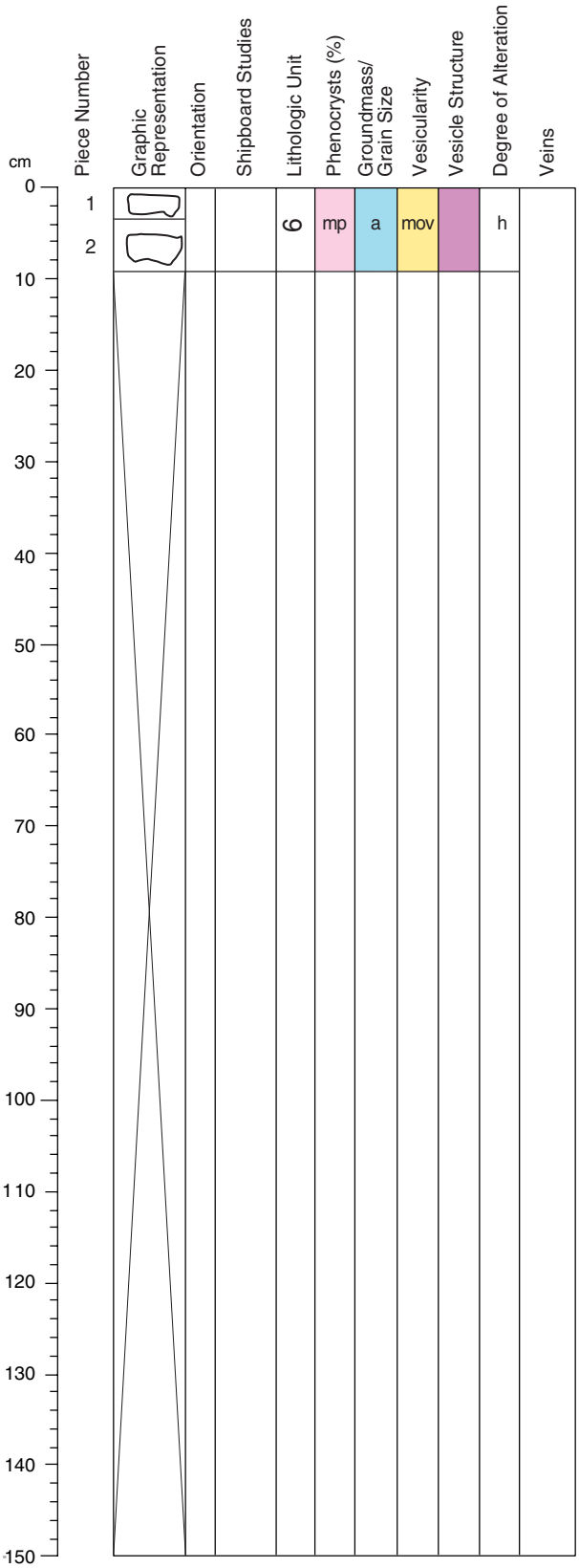
STRUCTURE: Massive.

ALTERATION: High to complete. The oxidized sediment or soil(?) adhering to the basalt in Piece 10 is completely altered. Fe oxyhydroxide is pervasive in Pieces 11 and 12. Olivine phenocrysts and groundmass olivine are completely replaced by Fe oxyhydroxide, and plagioclase phenocrysts are partially sericitized. Vesicles are lined or filled with pale blue clay.

VEINS/FRACTURES: None.

COMMENTS: Plagioclase phenocrysts show some alignment. Based on the presence of a thin soil(?) horizon in Piece 10, and the presence of round (not elongated) vesicles, Pieces 11 and 12 are interpreted to be the weathered flow top of Unit 5.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-17R-2 (Section top: 101.8 mbsf)

UNIT 6: MODERATELY-PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	6	2	4	Euhedral; prismatic
Olivine:	3	2	1	1.5	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
	3-7	3	Roundish

COLOR: Pale reddish brown (5YR 5/2).

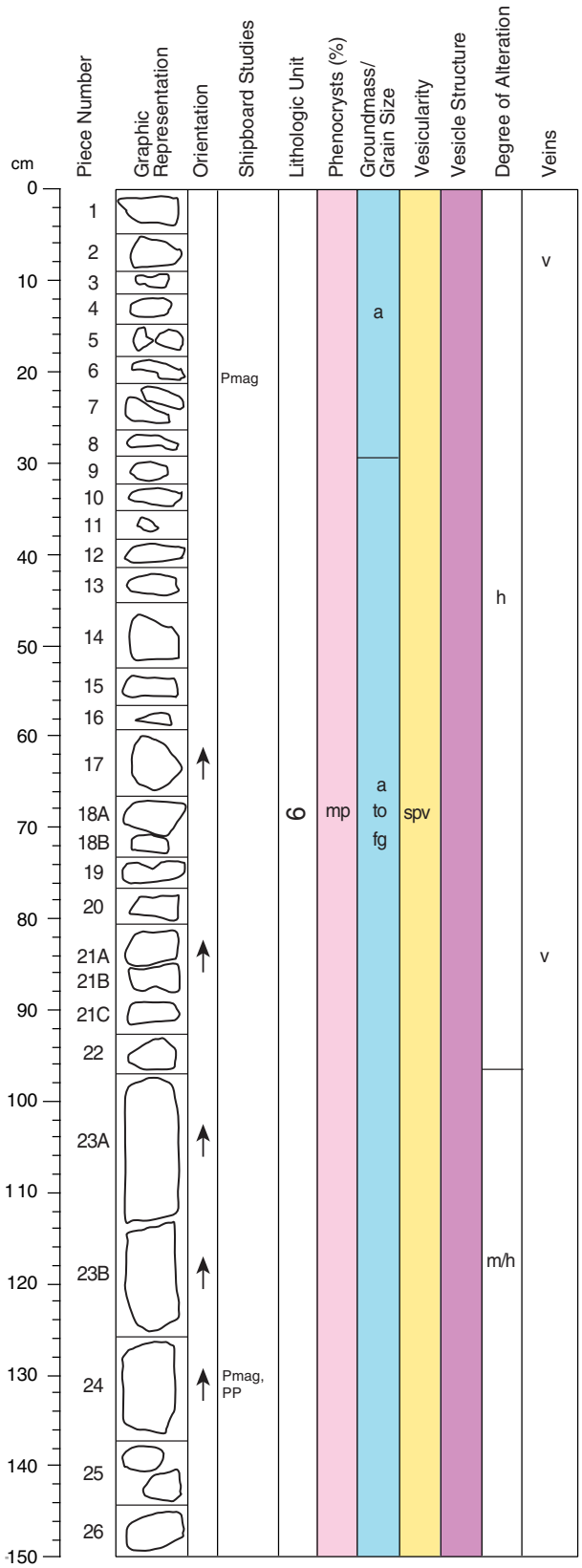
STRUCTURE: Massive.

ALTERATION: High. Olivine phenocrysts and groundmass olivine are completely replaced by Fe oxyhydroxide, and plagioclase phenocrysts are partially sericitized. Vesicles contain blue green clay and Fe oxyhydroxide.

VEINS/FRACTURES: None.

COMMENTS: Plagioclase phenocrysts show some alignment. On the basis of the presence of a thin soil horizon in Section 17R-1, and the presence of rounded (not flattened) vesicles, Section 17R-2 is interpreted to be from the weathered flow top of Unit 6.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-18R-1 (Section top: 103.8 mbsf)

UNIT 6: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-26

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	11	2	5	Euhedral; prismatic
Olivine:	2	2	1	1.5	Subhedral; equant

GROUNDMASS: Aphanitic to fine grained. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-5	3	Round

COLOR: The upper 70 cm of the core is pale reddish brown (5YR 5/2), whereas the lower 80 cm is gray (N6).

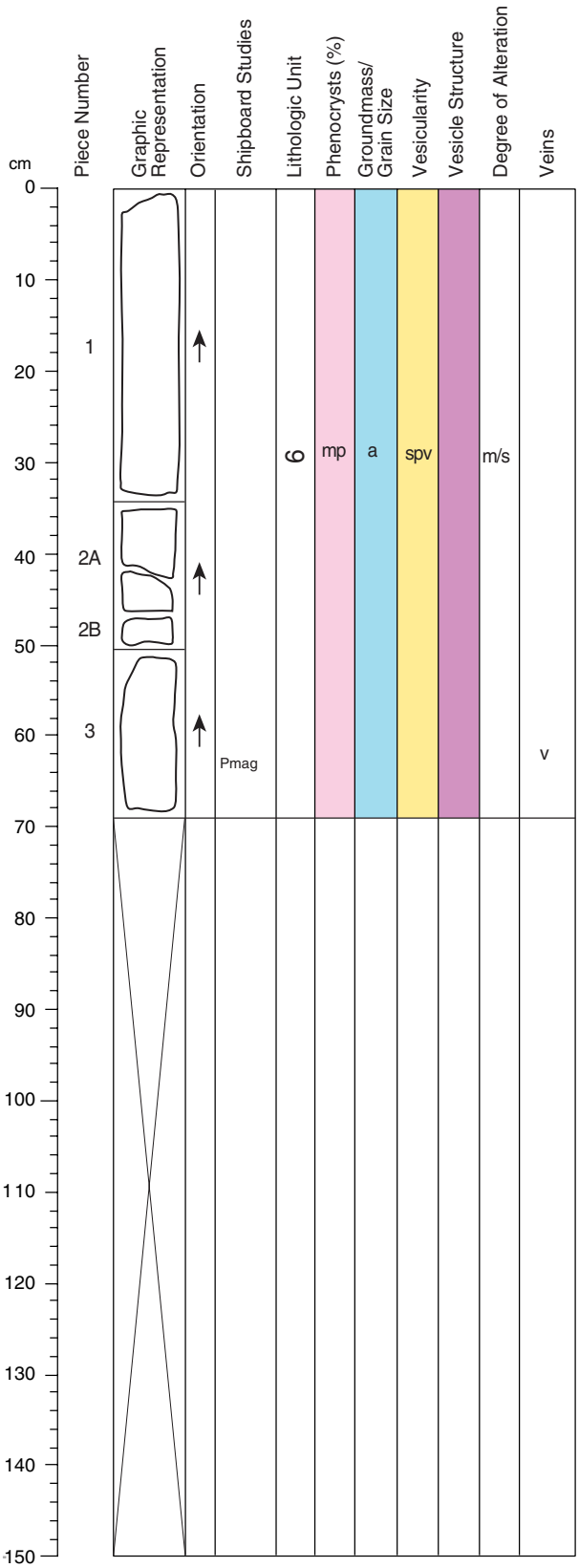
STRUCTURE:

ALTERATION: Moderate to high. The upper part of Section 18R-1 is more altered than the lower part. Olivine phenocrysts and groundmass olivine are completely replaced by Fe oxyhydroxide, and plagioclase phenocrysts are partially sericitized. Vesicles are filled with blue-green clay and occasionally carbonate.

VEINS/FRACTURES: Sparsely veined. 0.5-3 mm wide veins occur in Pieces 2, 17 and 21, and are filled with carbonate and grey-green clay.

COMMENTS: Section 18R-1 is interpreted to be the weathered flow top of Unit 6.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-18R-2 (Section top: 105.3 mbsf)

UNIT 6: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	10	2	5	Euhedral to subhedral; blocky
Olivine:	1	2.2	0.6	1.2	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and glass. Olivine may also be present as highlighted by Fe-oxyhydroxide.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2-5	6	Elongate

COLOR: Medium gray (N5).

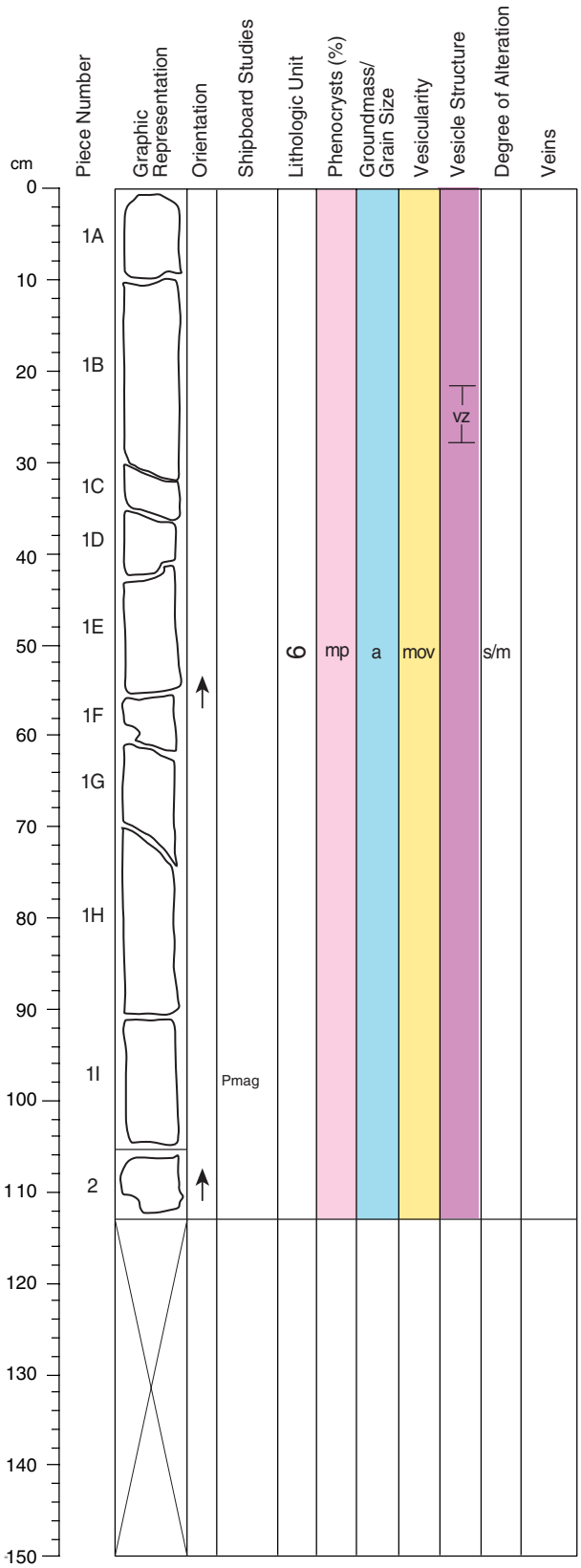
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Most intense in Fe oxyhydroxide alteration halos adjacent to veins. Glass is altered to dark green clay. Olivine phenocrysts are partially replaced by dark green clay and Fe oxyhydroxide along fractures. Plagioclase phenocrysts are partially sericitized. Vesicles are filled with green clay and minor white carbonate.

VEINS/FRACTURES: Sparsely veined. The core is fractured along veins. The veins are <0.1-1 mm wide, horizontal to subhorizontal, and are filled with green clay, Fe oxyhydroxide, and minor white carbonate.

COMMENTS: The long axes of vesicles are aligned in a horizontal direction. Alteration and staining has given the large plagioclase phenocrysts a “speckled” appearance (for instance, the interval 8-9 cm).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-18R-3 (Section top: 105.99 mbsf)

UNIT 6: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	8	2	4	Subhedral; blocky
Olivine:	1	2	0.8	1	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and glass in an intersertal to variolitic texture. Clinopyroxene and olivine(?) are altered to Fe oxyhydroxide.

VESICLES:

	% Mode	Size (mm): Average	Shape
Moderately vesicular	5-8	4	Elongate

COLOR: Medium light gray (N6).

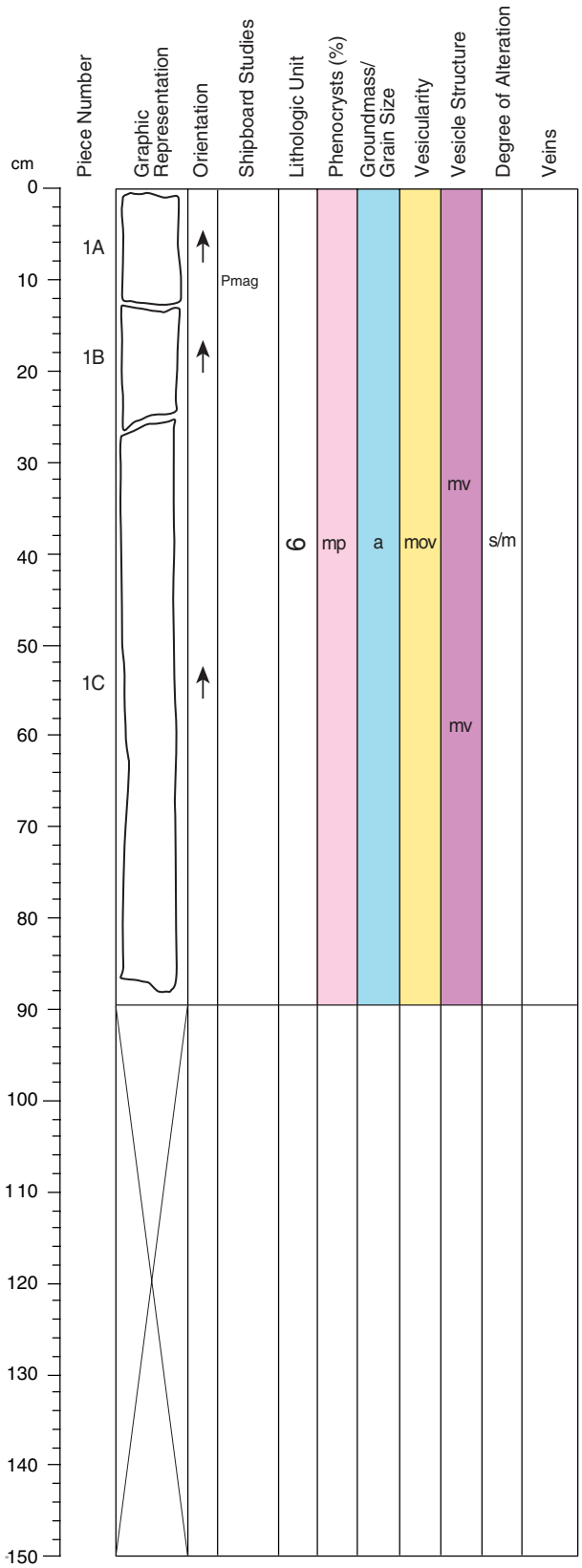
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Glass is altered to dark green clay. Olivine phenocrysts are replaced by dark green clay and Fe oxyhydroxide. Plagioclase phenocrysts are partially sericitized. Vesicles are filled with green clay (which expands when wet) and minor white carbonate. Where filled with carbonate, the vesicles are lined with Fe oxyhydroxide.

VEINS/FRACTURES: Sparsely veined. The core is fractured along veins. The veins are <0.1-1 mm wide and are filled with green clay and minor white carbonate.

COMMENTS: The long axes of vesicles and plagioclase phenocrysts are aligned in a horizontal direction. There is a highly vesicular zone between 23 cm and 29 cm.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-18R-4 (Section top: 107.12 mbsf)

UNIT 6: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	15	3	5	Euhedral to subhedral; blocky
Olivine:	1	1.8	0.6	1	Subhedral; equant

GROUNDMASS: Aphanitic to fine grained. The groundmass consists of plagioclase, clinopyroxene, and glass in an intersertal to variolitic texture. Clinopyroxene and olivine(?) are altered to Fe oxyhydroxide.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	5-8	3	Round to elongate

COLOR: Medium light gray (N6).

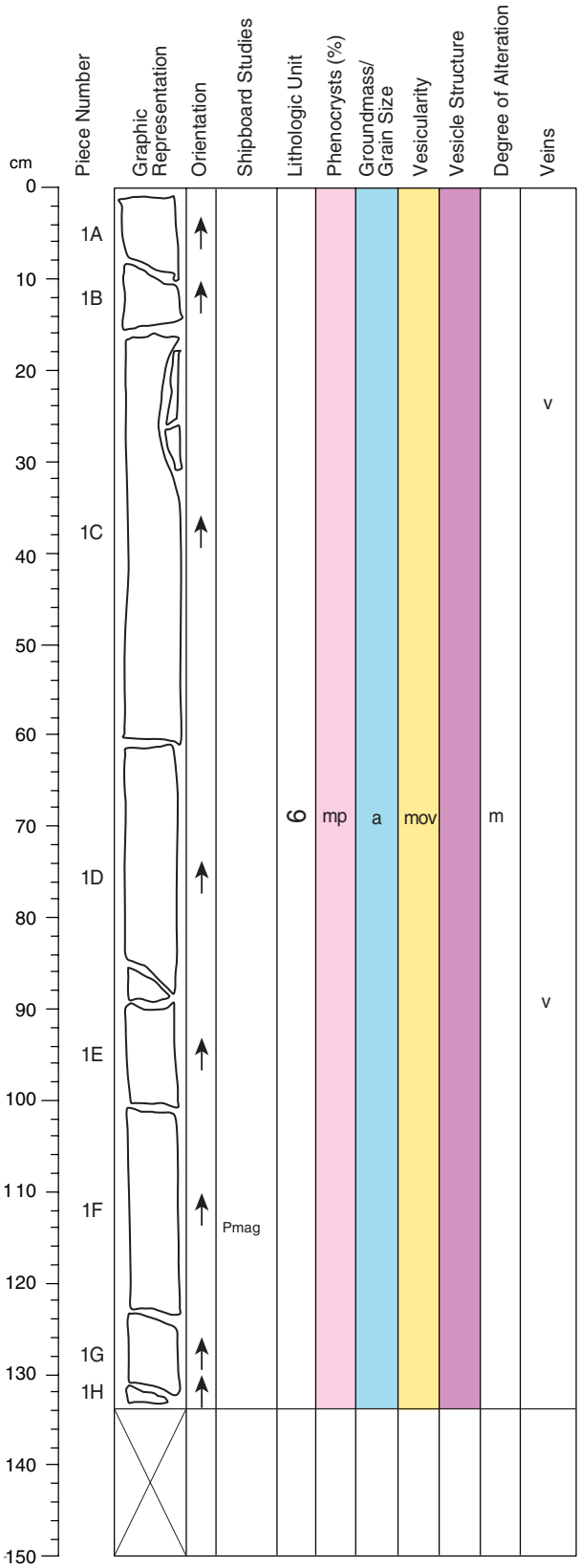
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Glass and olivine phenocrysts are replaced by dark green clay. Plagioclase phenocrysts are partially sericitized. Faint Fe oxyhydroxide alteration halos (up to 1 cm wide) are present adjacent to veins. Vesicles are filled with green clay (which expands when wet) and minor white carbonate.

VEINS/FRACTURES: Sparsely veined. The core is fractured along veins. The veins are <0.1-1 mm wide and are filled with green clay and minor white carbonate.

COMMENTS: A large (2 cm) vesicle is present at 33-35 cm and a vertically elongated vesicle is present at 60-63 cm. Alteration and staining has given the large plagioclase phenocrysts a “speckled” appearance (for example, the interval 59-61 cm).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-18R-5 (Section top: 108.01 mbsf)

UNIT 6: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	15	3	5	Euhedral to subhedral; blocky
Olivine:	1	1.8	0.6	1	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and glass in an intersertal to variolitic texture.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	5-8	3	Round to elongate

COLOR: Medium light gray (N6).

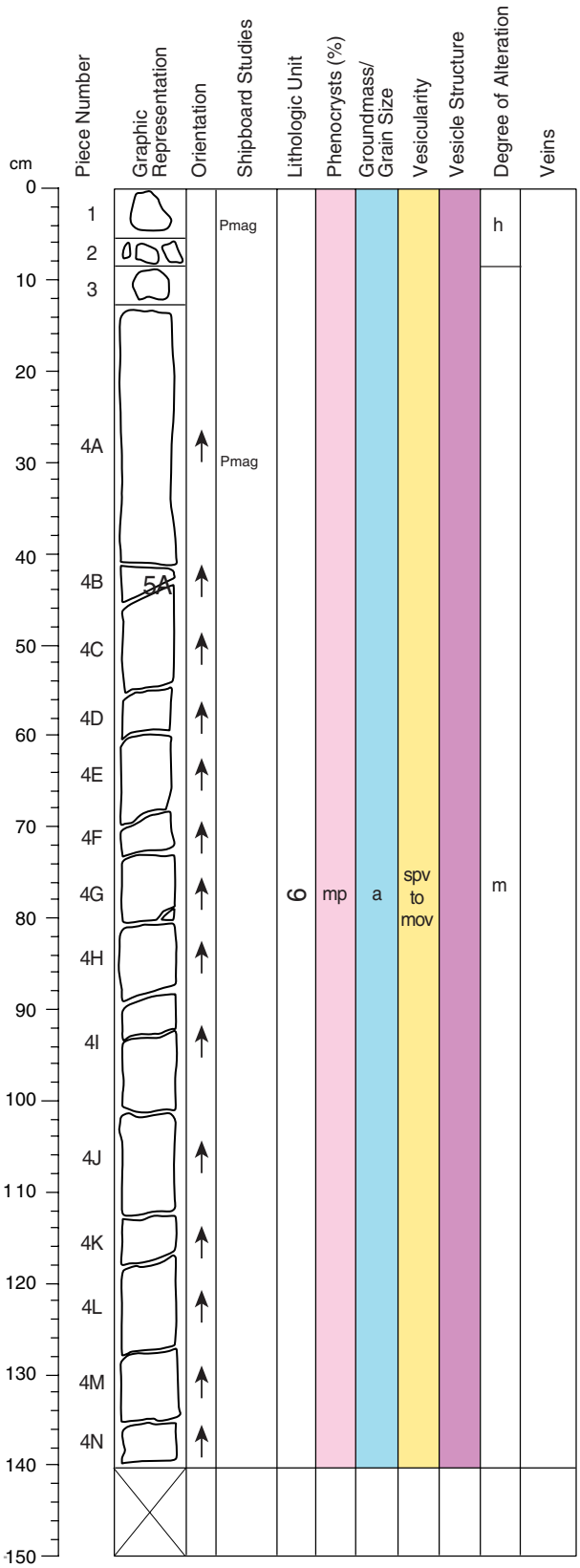
STRUCTURE: Massive.

ALTERATION: Moderate. Glass and olivine phenocrysts are replaced by dark green clay. Plagioclase phenocrysts are partially sericitized. Vesicles are filled with green clay (which expands when wet) and minor white carbonate.

VEINS/FRACTURES: Sparsely veined. The core is fractured along veins. The veins are <0.1-1 mm wide and are filled with green clay and minor white carbonate.

COMMENTS: Vesicles are vertically elongated. Alteration and staining has given the large plagioclase phenocrysts a “speckled” appearance (for example, Piece 1C, 28-29 cm).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-19R-1 (Section top: 109.9 mbsf)

UNIT 6: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	7	8	2	4	Euhedral to subhedral; blocky
Olivine:	1	2	0.5	1.5	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and olivine.

VESICLES:

% Mode	Size (mm): Average	Shape
4-6	4	Elongate

COLOR: Medium light gray (N6).

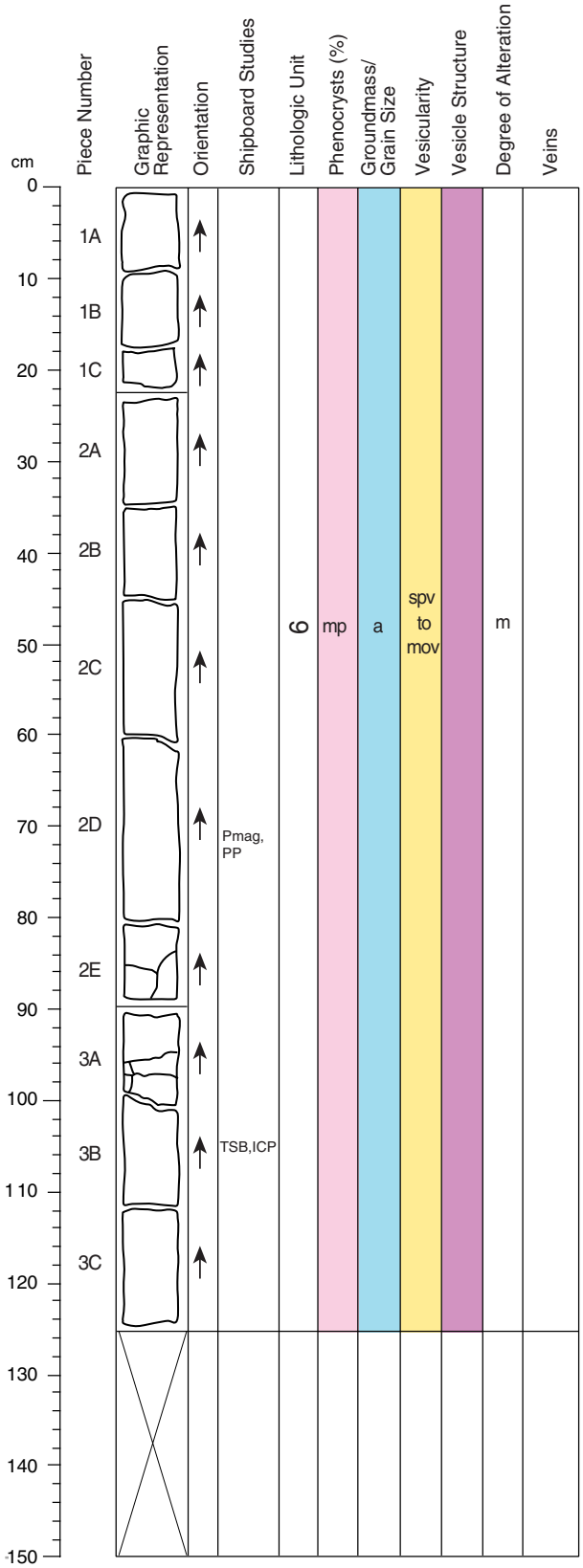
STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts and groundmass olivine is partially to completely replaced by Fe oxyhydroxide and carbonate. Plagioclase phenocrysts have a clouded appearance, due to partial alteration to sericite. Vesicles are filled with gray-green clay (which expands when wet) and minor carbonate.

VEINS/FRACTURES: Sparsely veined. The core is fractured along randomly oriented veins, which are <1 mm wide and are filled with green clay or white carbonate.

COMMENTS: Pieces 1 and 2 are highly altered, vesicular, plagioclase-olivine-phyric red basalt which may be dropstones from higher in the core. Vesicles and plagioclase phenocrysts are preferentially oriented with their long axes within a horizontal plane.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-19R-2 (Section top: 111.3 mbsf)

UNIT 6: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	7	10	2	5	Euhedral to subhedral; blocky
Olivine:	2	4	0.5	2	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and olivine.

VESICLES:

% Mode	Size (mm): Average	Shape
4-6	4	Elongate

COLOR: Medium light gray (N6).

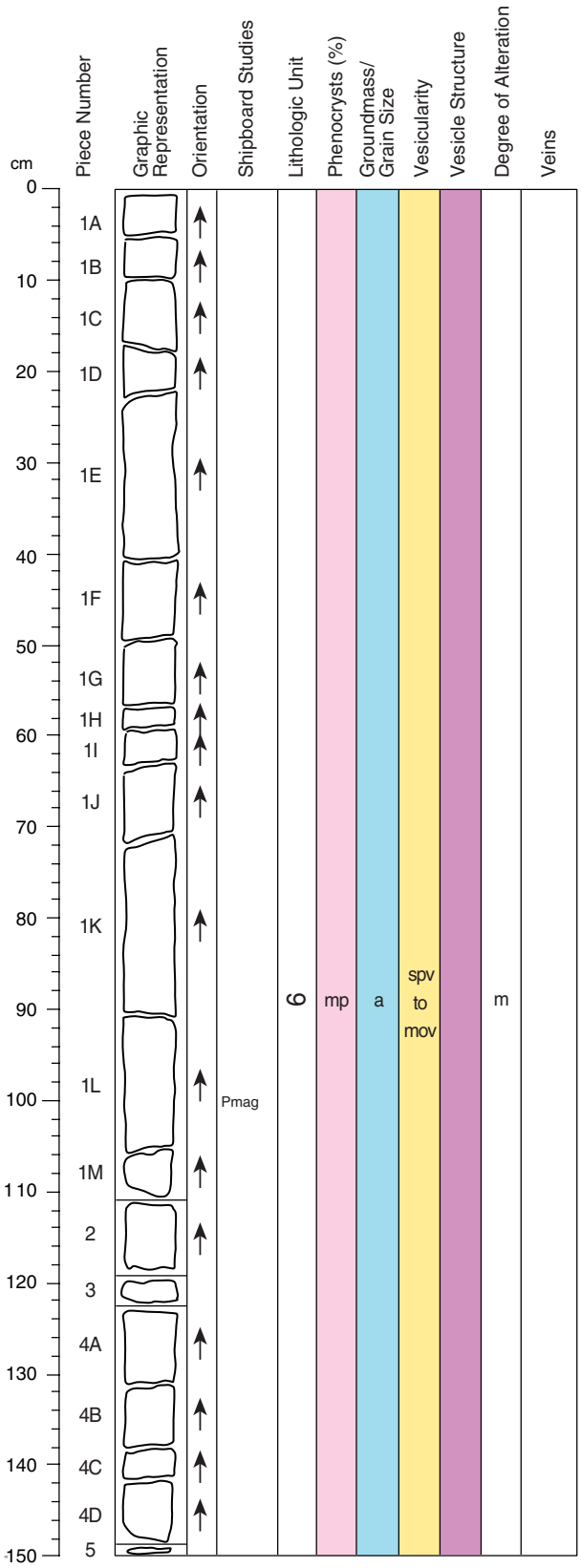
STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts and groundmass olivine are partially to completely replaced by Fe oxyhydroxide and carbonate. Plagioclase phenocrysts have a cloudy appearance due to partial alteration to sericite. Vesicles are filled with gray-green clay (which expands when wet) and minor carbonate.

VEINS/FRACTURES: Sparsely veined. The core is fractured along randomly oriented veins, which are <1 mm wide and are filled with green clay or white carbonate.

COMMENTS: Vesicles and plagioclase phenocrysts are preferentially oriented with their long axes within a horizontal plane. Olivine phenocrysts in 19R-2 are less altered than those in 19R-1.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-19R-3 (Section top: 112.55 mbsf)

UNIT 6: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-5

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	7	13	2	5	Euhedral to subhedral; blocky
Olivine:	2	7	0.5	2	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
	4-6	4	Flattened

COLOR: Medium light gray (N6).

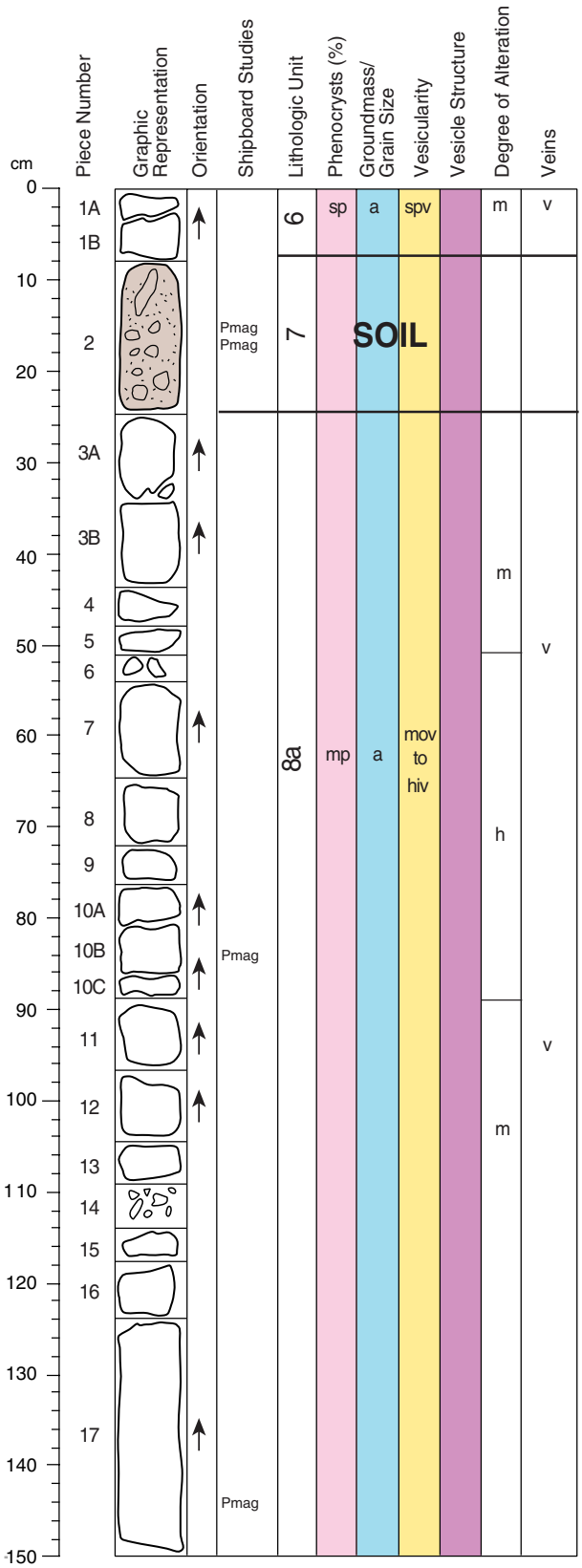
STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts and groundmass olivine are partially to completely replaced by Fe oxyhydroxide and carbonate. Plagioclase phenocrysts have a cloudy appearance due to partial alteration to sericite. Vesicles are filled with gray-green clay (which expands when wet) and minor carbonate.

VEINS/FRACTURES: Sparsely veined. The core is fractured along randomly oriented veins, which are <1 mm wide and are filled with green clay or white carbonate.

COMMENTS: Vesicles and plagioclase phenocrysts are preferentially oriented with their long axes within a horizontal plane. Pieces 1B and 1L contain large, partially altered, highly embayed olivine phenocrysts.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-19R-4 (Section top: 114.05 mbsf)

UNIT 6: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1

CONTACTS: Contact between Units 6 and 7 was not recovered and is tentatively inferred to be between Pieces 1 and 2. Note, however, that the lava fragments in upper part of Piece 2 may belong to this Unit (see description below), which then would place the boundary there.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	8	3	4	Euhedral to subhedral; blocky
Olivine:	<1	1	0.5	1	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, olivine and mesostasis (altered glass).

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	5	<1	Elongate

COLOR: Medium light gray (N6).

STRUCTURE: Indistinct flow foliation is present.

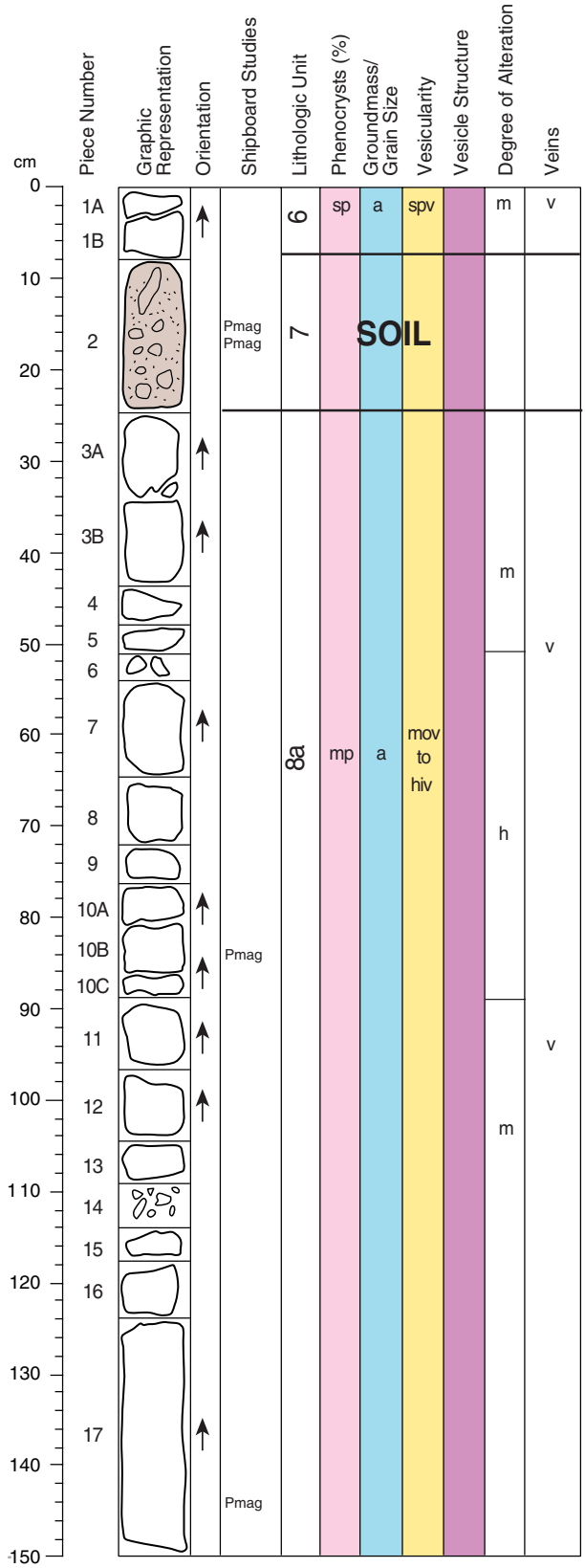
ALTERATION: Moderate. Olivine phenocrysts and groundmass olivine are completely replaced by Fe oxyhydroxide. Vesicles are filled with gray-green clay (which expands when wet).

VEINS/FRACTURES: Sparsely veined. The core is fractured along subhorizontal veins, which are <1 mm wide and are filled with white carbonate.

COMMENTS: Vesicles and tabular and lath-shaped plagioclase phenocrysts are preferentially oriented with their long axes parallel to the horizontal plane of the core.

(Continued on next page)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-19R-4 (Continued)

UNIT 7: RED-BROWN SOIL.

Piece: 2

CONTACTS: The transition at 17 cm from lava fragment dominated (7–17 cm) to soil dominated (17–25 cm) may represent the boundary between Unit 6 and 7. The contact between Units 7 and 8 was not recovered and is inferred to be between Pieces 2 and 3 at 25 cm.

GENERAL DESCRIPTION: Interval with angular (broken) lava fragments mixed in with dark red-brown silty clay (unconsolidated soil?). The lower half from 9–25 cm consists of coherent chunks of clay with relatively few lava fragments. The upper half (7–17 cm) contains angular fragments of altered rusty red-brown, plagioclase-olivine phyric, aphanitic lava, with elongate vesicles. The largest lava fragment has a scoriaceous inclusion and thin autobrecciated horizons are present in other fragments. The exact origin of these rock fragments is uncertain, but their characteristics (especially the groundmass texture) appear to be similar to the lava above rather than the one below.

COLOR: Dark reddish brown (2.5YR 3/3) and very dark gray (7.5YR 3/1) to dark brown (7.5YR 3/2) and brown (7.5YR 4/3 and 4/4).

COMMENTS: Drilling rate was ~1.9 m per hour up until 9 cm into Section 19R-4, when it increased sharply to ~10–20 m per hour over the next 3 m (i.e., across the core interval represented by Piece 2) and then slowed down again. This change in drilling rate suggests that the recovered silty-clay may represent a soil horizon of substantial thickness. The recovered soil horizon becomes darker upward with gradational contacts from reddish to dark brown. At 21 cm the soil matrix is enriched in yellowish material close to the 2-cm thick interval of sub-mm clasts.

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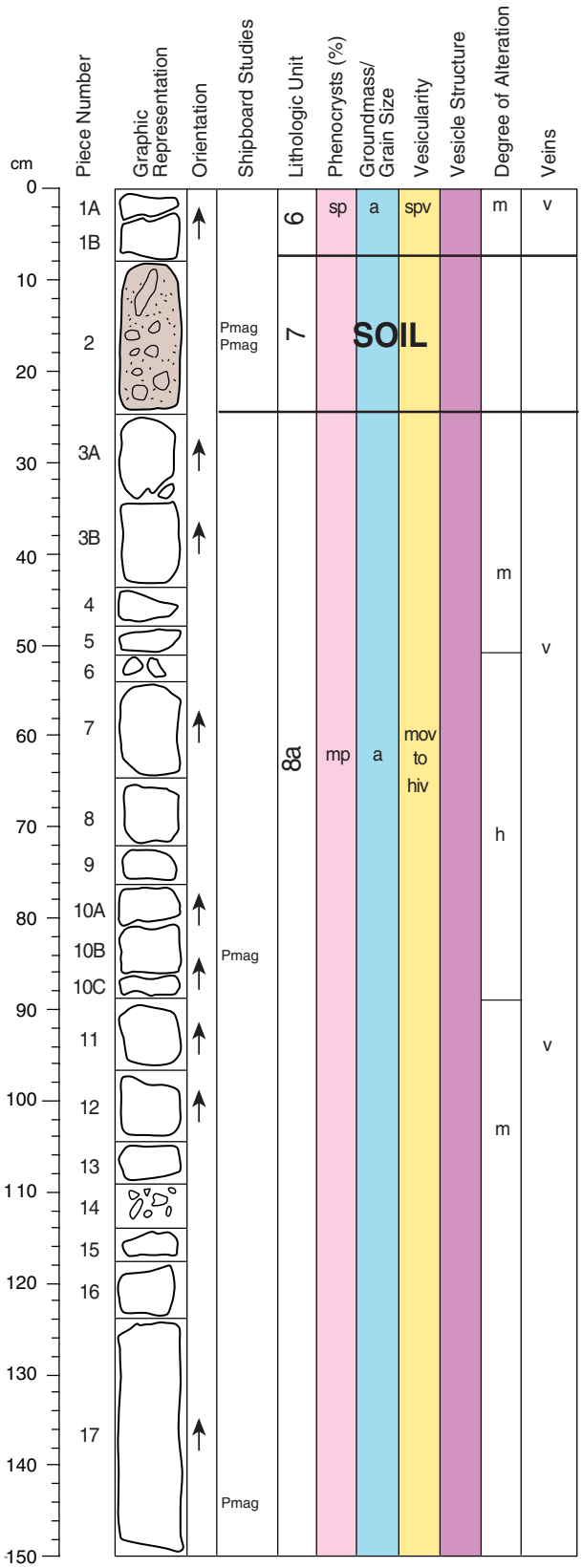
Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-19R-4 (Continued)

UNIT 8a: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 3-17

CONTACTS: None. The contact between Units 7 and 8a was not recovered and is inferred to be at top of Piece 3 at 25 cm.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	4-5	10	1	4	Euhedral to subhedral
Olivine:	2	2	0.5	1.5	Euhedral to subhedral; equant

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, and olivine. Altered glass is seen in Pieces 7-10C. Olivine is recognized by its characteristic shape and fractures, which are highlighted by Fe-oxyhydroxide.

VESICLES:

% Mode	Size (mm): Average	Shape
5-30	<2	Round and irregular

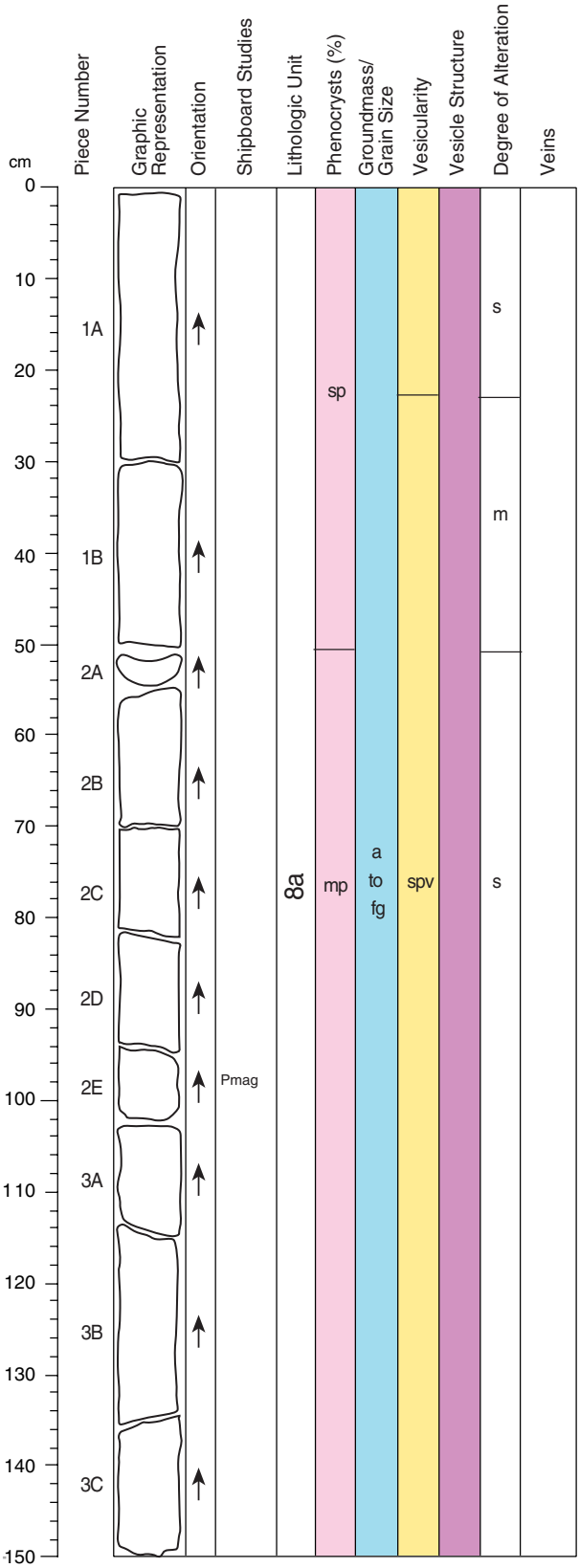
COLOR: Medium gray (N5) to dark gray (N3).

ALTERATION: Moderate to high. Olivine is replaced by white carbonate, Fe oxyhydroxide and black clay. The glassy groundmass in Pieces 7-10C is altered to dark brown clay. Vesicles, when filled, contain gray brown-green clay, which expands when wet.

VEINS/FRACTURES: Sparsely veined. 1-2mm wide carbonate-filled veins are present, oriented parallel to the plane of the core.

COMMENTS:
Plagioclase megacrysts are present. Despite their apparent coherent texture, Pieces 7-10C are fragmental rock of the same lithology as the lava above and below. This interval consists of agglutinated lapilli breccia, where clasts centers are highly vesicular domains surrounded by less vesicular domains representing the agglutinated clast margins. We interpret this to be part of the rubbly scoriaceous flow top. The coherent interval above it (Pieces 3-5) may be a large rubble clast or a lava finger protruding into the breccia. Piece 6 is stained by red clay and may represent fragments that dropped down from the soil interval above (i.e., Unit 5b; Piece 2).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-20R-1 (Section top: 119.6 mbsf)

UNIT 8a: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	14	1.5	4	Euhedral to subhedral; rarely anhedral
Olivine:	2	2	0.8	1	Euhedral to subhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, and olivine. Olivine is recognized by its characteristic shape and partial alteration to Fe oxyhydroxide along fractures and margins.

VESICLES:

	% Mode	Size (mm): Average	Shape
Sparsely Vesicular	1-3	3	Elongate

COLOR: Medium gray (N5).

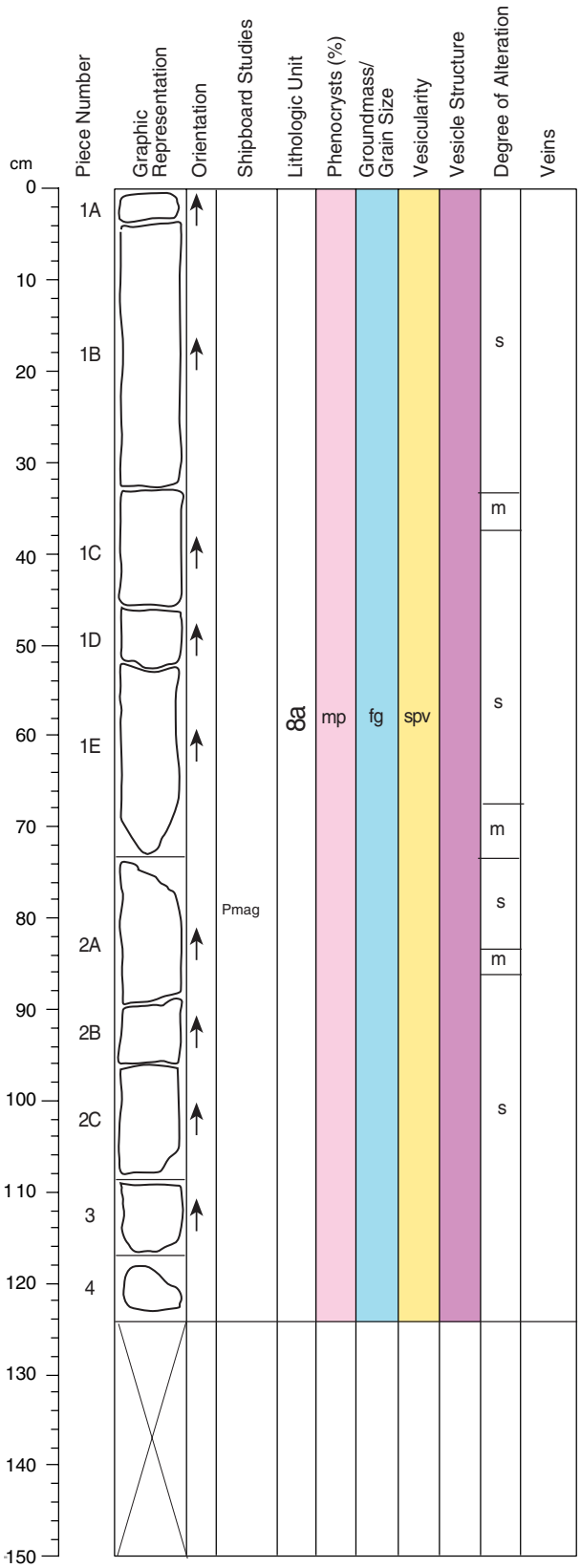
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Olivine phenocrysts and groundmass olivine are partially to completely replaced by Fe oxyhydroxide and carbonate. Much of the groundmass is stained with Fe oxyhydroxide. Vesicles are lined with Fe oxyhydroxide, and filled with gray-green clay, which expands when wet and has a globular texture.

VEINS/FRACTURES: Moderately fractured. The core has many fractures (<1 mm wide) generally oriented parallel to flow direction, and often filled with white mineral (not carbonate).

COMMENTS: Vesicles are preferentially oriented with their long axes parallel to the direction of foliation. Plagioclase exists as a megaphenocryst phase. Some of these are elongate and lath like, others are more subhedral and appear to have small clusters of other minerals (usually clinopyroxene) attached. Frequently these megaphenocrysts show signs of rounding and resorption.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-20R-2 (Section top: 121.1 mbsf)

UNIT 8a: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS: % Grain Size (mm):

	Mode	Max.	Min.	Avg.	Shape/Habit
Plagioclase:	4	11	2	4	Euhedral to subhedral; rarely anhedral
Olivine:	2	3	0.75	1	Euhedral to subhedral; equant

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, and olivine. Olivine is recognized by its characteristic shape and partial alteration along fractures and margins to Fe oxyhydroxide.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely Vesicular	1-3	3	Elongate

COLOR: Medium light gray (N6).

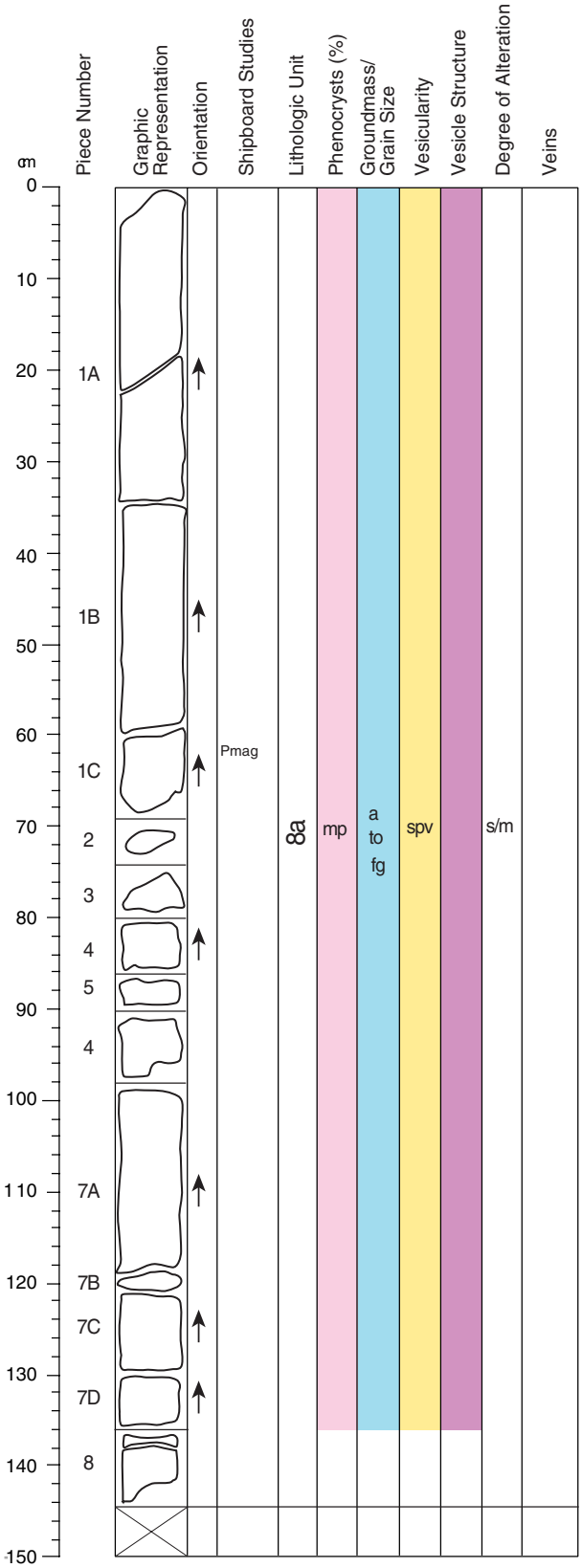
STRUCTURE: Massive. A flow foliation is present throughout. Foliation is strongest from 1-32 cm, and 94-118 cm.

ALTERATION: Slight to moderate. Olivine phenocrysts and groundmass olivine are partially to completely replaced by Fe oxyhydroxide and carbonate. Vesicles are lined with Fe oxyhydroxide, and filled with gray-green clay, which expands when wet. In places, staining by Fe oxyhydroxide occurs along flow foliation.

VEINS/FRACTURES: The core has many fractures and veins (<1 mm wide) generally oriented parallel to flow direction, often filled with white carbonate, clay or Fe oxyhydroxide. Many veins appear to propagate off elongated vesicles.

COMMENTS: Many vesicles are elongated in the direction of flow foliation. Piece 2 contains a 30 mm vesicle lined with black material (on the back of the piece).
Plagioclase exists as a megaphenocryst phase. Some of these are elongate and lath-like, others are more subhedral and appear to have small clusters of other minerals (usually clinopyroxene) attached. Frequently these megaphenocrysts show signs of rounding and resorption, suggesting a xenocrystic origin.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-20R-3 (Section top: 122.34 mbsf)

UNIT 8a: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-8

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	10	2	4	Euhedral to subhedral
Olivine:	2	4	1	1	Euhedral to subhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1	4	Elongate

COLOR: Medium gray (N5).

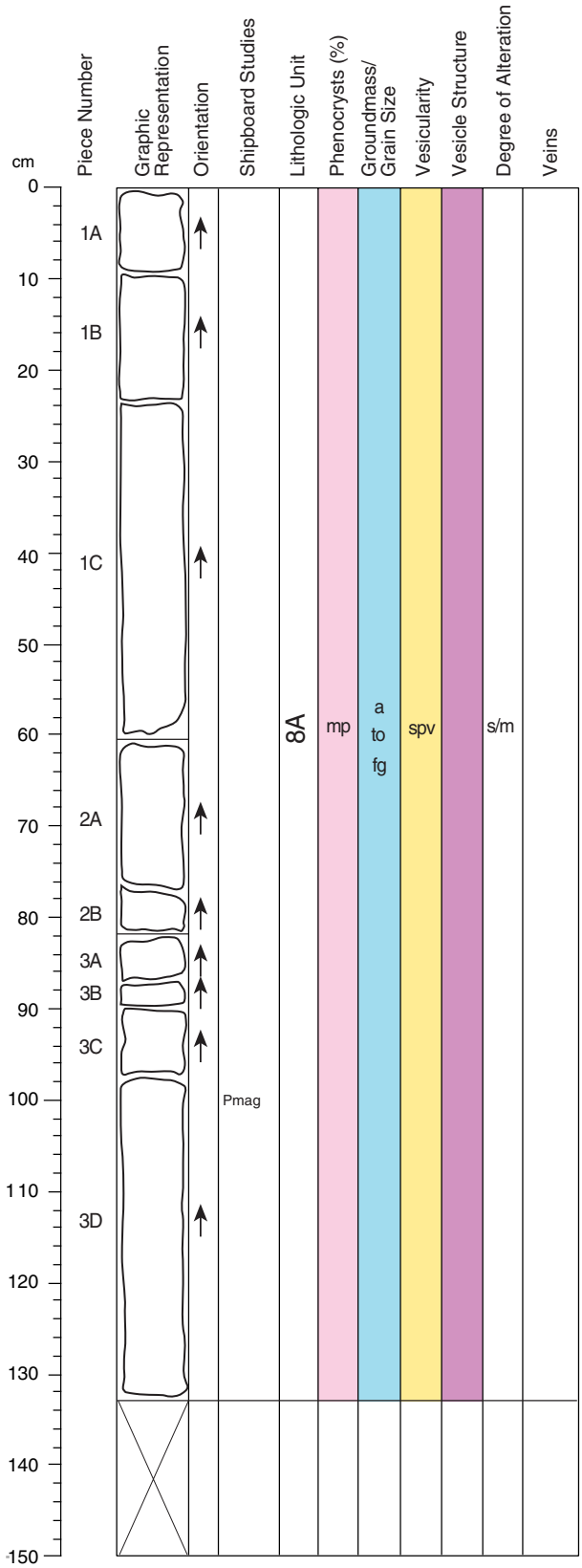
STRUCTURE: Massive. Irregular subparallel flow foliations are present throughout the section.

ALTERATION: Slight to moderate. Olivine phenocrysts and groundmass olivine are partially to completely replaced by Fe oxyhydroxide and carbonate. Vesicles are filled with gray-green clay.

VEINS/FRACTURES: None.

COMMENTS: One 5 mm wide subvertical halo of Fe oxyhydroxide is present in Piece 1B from 36-55 cm.
Some plagioclase megaphenocrysts contain small black minerals (clinopyroxene?), some intergrown with olivine. Some megaphenocrysts show signs of rounding and resorption.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-20R-4 (Section top: 123.8 mbsf)

UNIT 8a: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	10	2	4	Euhedral to subhedral
Olivine:	2	2	1	1	Euhedral to subhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1	2	Round to irregular

COLOR: Medium gray (N5).

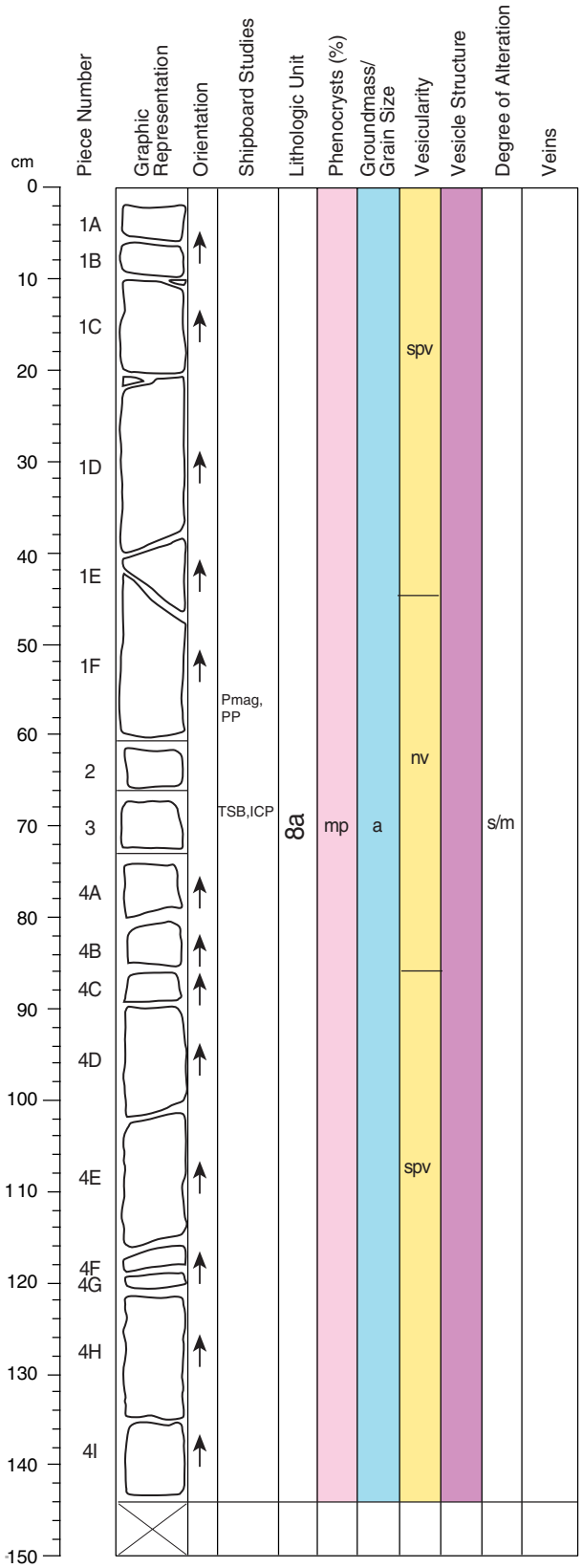
STRUCTURE: Massive. Irregular subparallel flow foliations are present in Pieces 1 to 3C.

ALTERATION: Slight to moderate. Olivine phenocrysts and groundmass olivine are partially to completely replaced by Fe oxyhydroxide and carbonate. Vesicles are filled with gray-green clay and carbonate.

VEINS/FRACTURES: Sparsely fractured. <1 mm wide fractures are present in Pieces 1C, 2A, and 3D.

COMMENTS: Some plagioclase megaphenocrysts contain small black minerals (clinopyroxene?), some intergrown with olivine. Some megaphenocrysts show signs of rounding and resorption.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-20R-5 (Section top: 125.13 mbsf)

UNIT 8a: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-15

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	4	20	1	4	Euhedral to subhedral
Olivine:	1	2	1	1	Euhedral to subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-3	2	Round to irregular

COLOR: Medium gray (N5).

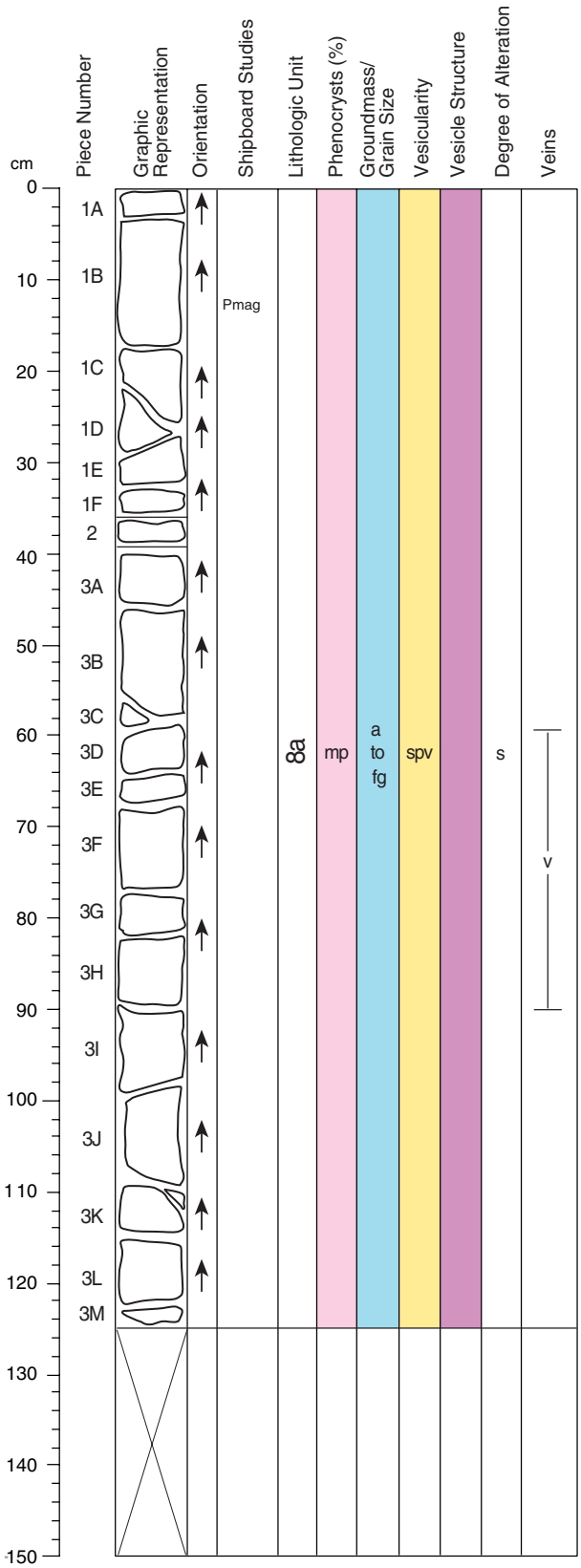
STRUCTURE: Massive. Irregular subparallel, light colored flow foliations are present in Pieces 1F to 3. Faint flow banding is also present in Piece 15.

ALTERATION: Slight to moderate. Olivine phenocrysts and groundmass olivine are partially to completely replaced by Fe oxyhydroxide and carbonate. Vesicles are filled with gray-green clay and carbonate.

VEINS/FRACTURES: Sparsely fractured. Fractures (<1 mm wide) occur in the direction of flow. Many of these are filled with green and darker clay.

COMMENTS: In Piece 1D, at 29 cm, a 20 mm vesicle is filled with green clay (or talc?) and surrounded by white carbonate. Fractures nearby also contain this green mineral.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-20R-6 (Section top: 126.57 mbsf)

UNIT 8a: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	10	2	4	Euhedral to subhedral
Olivine:	2	5	1	1	Euhedral to subhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, and olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1	3	Elongate

COLOR: Medium light gray (N6).

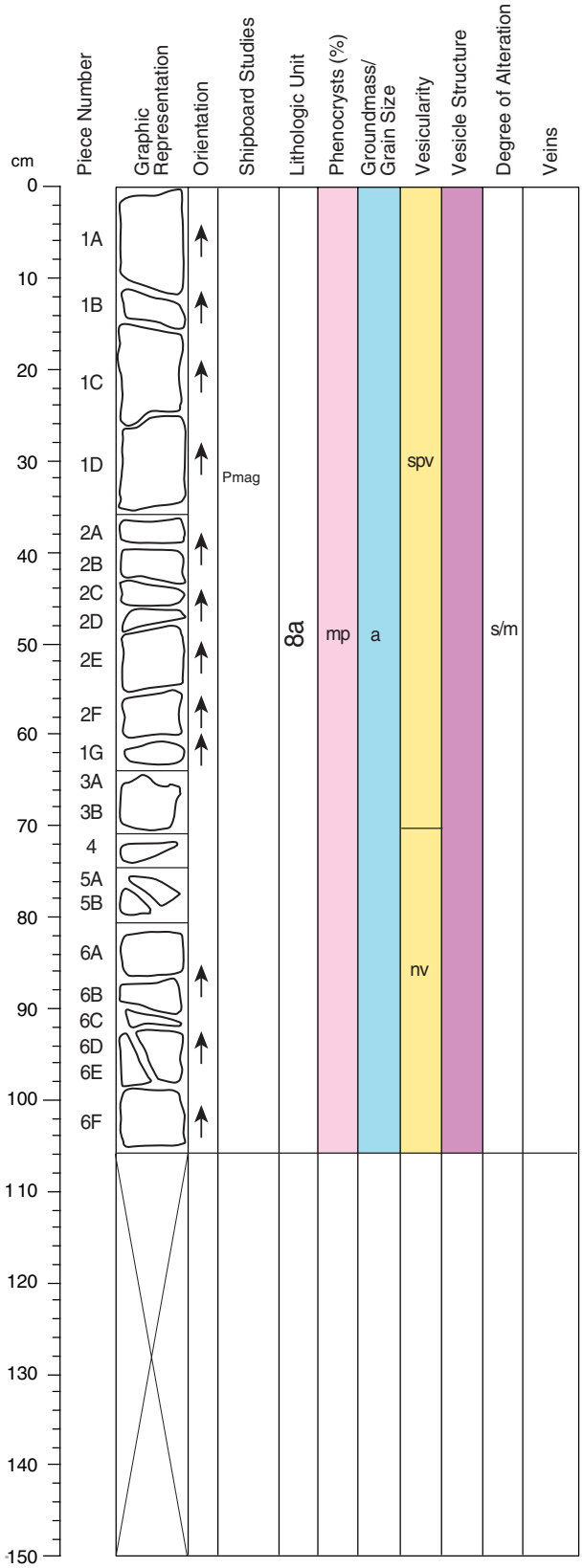
STRUCTURE: Massive. Flow structures are present in Pieces 3H to 3M, defined by the presence of subparallel mm-wide darker bands parallel to the base of the core.

ALTERATION: Slight. Unaltered olivine phenocrysts are present throughout the section.
Vesicles are filled with pale green clay.

VEINS/FRACTURES: Slightly veined. <1 mm wide, randomly oriented veins are present in Pieces 3D-3H, and are filled with carbonate.

COMMENTS: Plagioclase exists as a megaphenocryst phase. Often these appear to have small clusters of other minerals (usually clinopyroxene) attached. Frequently these megaphenocrysts show signs of rounding and resorption.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-20R-7 (Section top: 127.83 mbsf)

UNIT 8a: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-6

CONTACTS: None.

PHENOCRYSTS: % Grain Size (mm):

	Mode	Max.	Min.	Avg.	Shape/Habit
Plagioclase:	4-5	10	2	4	Euhedral to subhedral; rarely anhedral
Olivine:	2	4	2	1	Euhedral to subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and olivine. Olivine is recognized by its characteristic color and partial alteration along fractures and margins to Fe oxyhydroxide.

VESICLES:

% Mode	Size (mm): Average	Shape
<1-3	3	Elongate

COLOR: Medium light gray (N6).

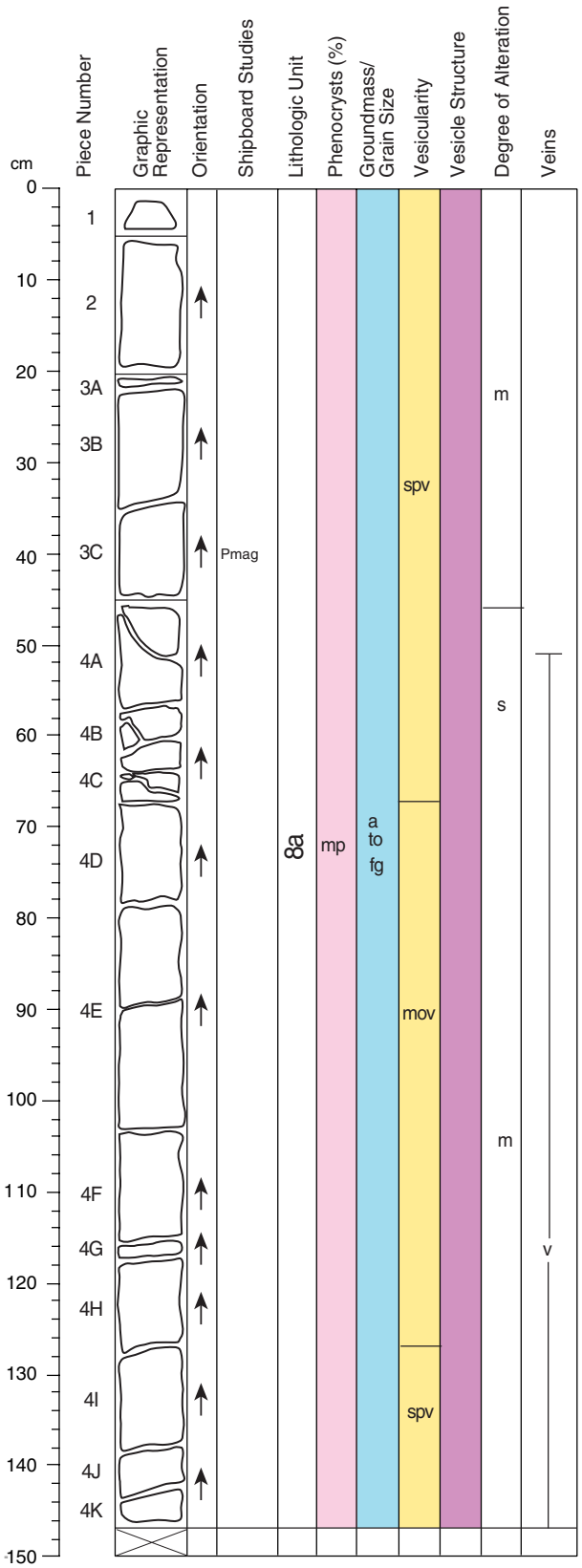
STRUCTURE: Massive. Flow structures are present throughout, defined by the presence of subparallel mm-wide darker bands parallel to the base of the core.

ALTERATION: Slight to moderate. Olivine phenocrysts and groundmass olivine are partially to completely replaced by Fe oxyhydroxide and carbonate. Much of the groundmass is stained with Fe oxyhydroxide. Vesicles are filled with gray-green clay (which expands when wet), Fe oxyhydroxide and minor carbonate.

VEINS/FRACTURES: Moderately fractured. The core has many <1 mm wide fractures generally oriented parallel to flow direction. 3-6 mm wide Fe oxyhydroxide alteration halos frequently occur around these fractures in the interval 1-70 cm.

COMMENTS: Vesicles are preferentially oriented with their long axes parallel to the direction of flow foliation and are up to 11 mm in length. Plagioclase exists as a megaphenocryst phase. Often these appear to have small clusters of other minerals (usually clinopyroxene) attached. Frequently these megaphenocrysts show signs of rounding and resorption.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-21R-1 (Section top: 129.2 mbsf)

UNIT 8a: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3-5	5	1	2	Euhedral to subhedral
Olivine:	2	2	1	1	Euhedral to subhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, altered olivine and glass.

VESICLES:	% Mode	Size (mm): Average	Shape
	2-7	2	Elongate

COLOR: Medium dark gray (N4).

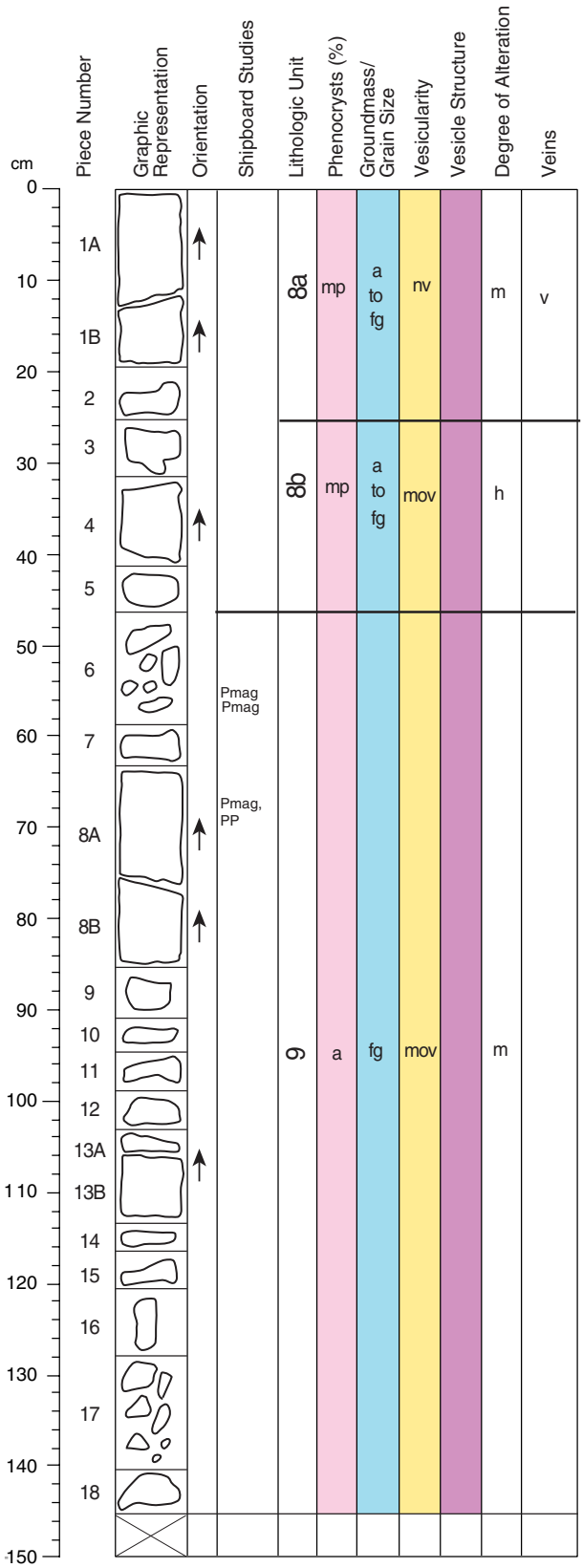
STRUCTURE: Massive. Inclined (25° from horizontal) flow foliations are present throughout the section, defined by the presence of subparallel mm-wide darker bands.

ALTERATION: Slight to moderate. Olivine phenocrysts and groundmass olivine are altered to Fe oxyhydroxide. Vesicles are filled with dark green clay and carbonate, and most are elongated along the flow foliations.

VEINS/FRACTURES: Moderately veined. <1 mm wide, randomly oriented veins are present in Pieces 4D to 4K, and are filled with Fe oxyhydroxide and carbonate.

COMMENTS: Randomly oriented 3-5 wide halos of Fe oxyhydroxide are present in Pieces 2, 3A, 3B, 4A to 4E, and 4I to 4K. Plagioclase exists as a megaphenocryst phase. Often these appear to have small clusters of other minerals (usually clinopyroxene) attached. Frequently these megaphenocrysts show signs of rounding and resorption.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-21R-2 (Section top: 130.67 mbsf)

UNIT 8a: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None observed. The boundary between Units 8a and 8b is inferred to be between Pieces 2 and 3 at 25 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3-5	5	1	2	Euhedral to subhedral
Olivine:	2	2	1	1	Euhedral to subhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, altered olivine and glass.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<1	2	Elongate

COLOR: Medium dark gray (N4).

STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts and groundmass olivine are altered to Fe oxyhydroxide.

VEINS/FRACTURES: Moderately veined. <1 mm wide, randomly oriented veins are present in and are filled with Fe oxyhydroxide and carbonate.

COMMENTS:
Plagioclase exists as a megaphenocryst phase. Often these appear to have small clusters of other minerals (usually clinopyroxene) attached. Frequently these megaphenocrysts show signs of rounding and resorption.

UNIT 8b: PLAGIOCLASE-OLIVINE BASALT AUTOCLASTIC BRECCIA.

Pieces: 3-5

CONTACTS: None observed. The boundary between Units 8a and 8b is inferred to be between Pieces 2 and 3 at 25 cm. The boundary between Units 8b and 9 is inferred to be between Pieces 5 and 6 at 44 cm.

GENERAL DESCRIPTION:
Pieces 1 to 2 are clast-supported autobreccia, with calcite cement. Center of clasts are hypohyaline. Red soil is occasionally present on the outside of these clasts (related to pieces below).

CLAST PETROGRAPHY:

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	6	2	2	Euhedral to subhedral
Olivine:	1	2	1	1	Euhedral to subhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, altered olivine and glass.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	7	0.5	Round to elongate

COLOR: Edges of clasts are dark reddish brown (10R 3/4). Clasts centers are moderate brown (5YR 3/4).

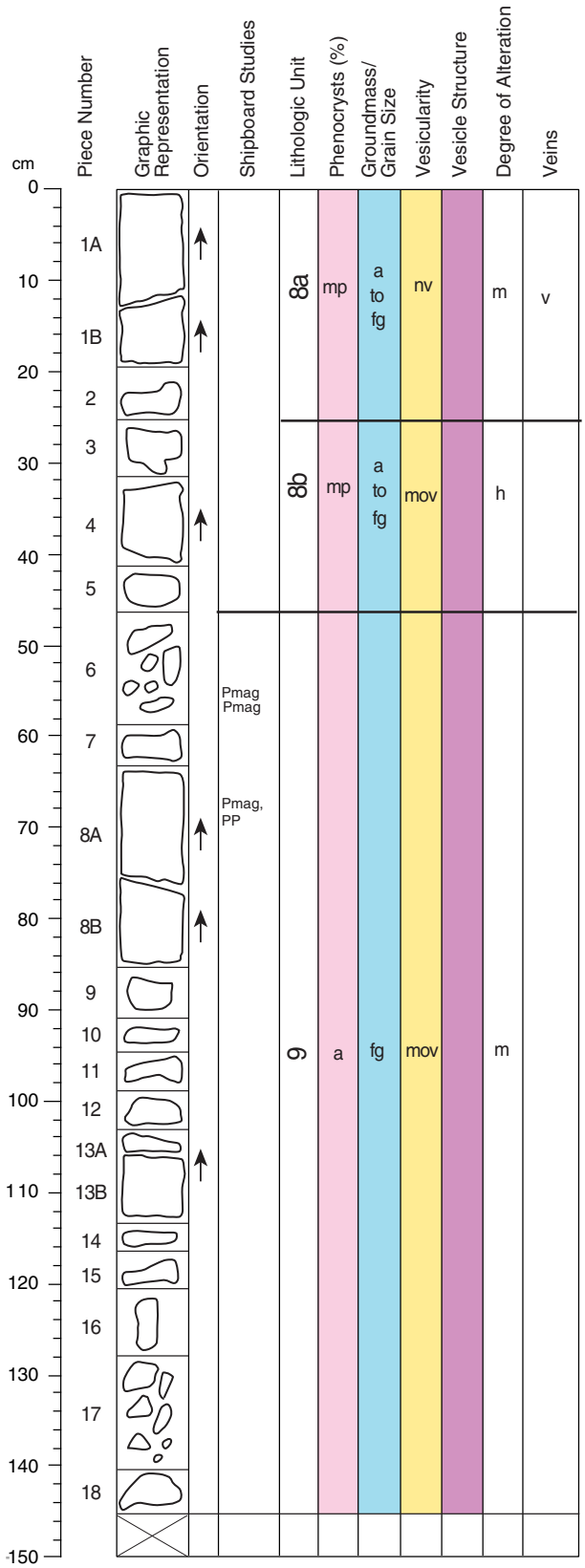
STRUCTURE: Brecciated with calcite cement.

ALTERATION: High. Olivine phenocrysts and groundmass olivine are altered to Fe oxyhydroxide.

VEINS/FRACTURES: None.

(Continued on next page.)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-21R-2 (Continued)

UNIT 9: APHYRIC BASALT.

Pieces: 6-18

CONTACTS: None observed. The boundary between Units 8b and 9 is inferred to be between Pieces 5 and 6 at 44 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	5	1	2	Euhedral to subhedral

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, altered olivine and black glass. Fe oxyhydroxide staining is present throughout.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2-5	<1	Round

COLOR: Medium dark gray (N4).

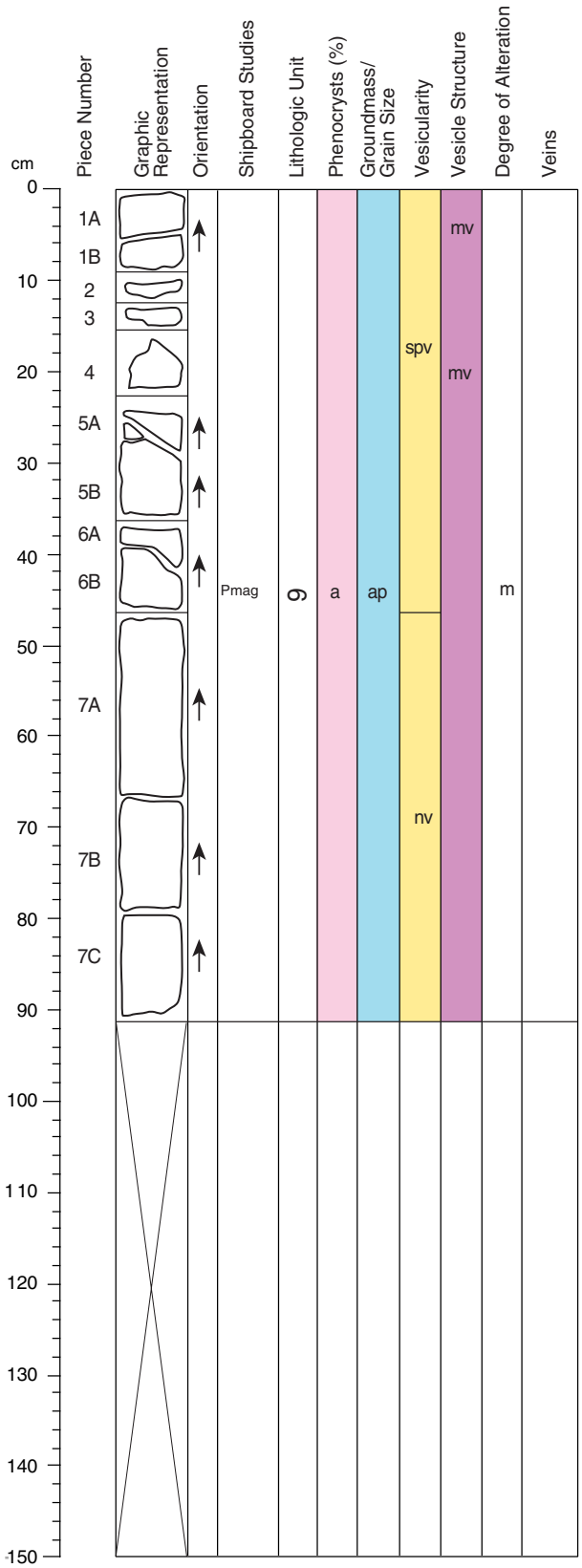
STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts and groundmass olivine are altered to Fe oxyhydroxide. Vesicles are filled with green fibrous clay.

VEINS/FRACTURES: None.

COMMENTS:
Piece 6 is highly weathered, and has red soil on its surface. The amount of weathering decreases down the core section from Pieces 7-18.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-21R-3 (Section top: 132.12 mbsf)

UNIT 9: APHYRIC BASALT.

Pieces: 1-7

CONTACTS: None.

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Pieces 1-6	5	3	Elongate to irregular
Piece 7			Nonvesicular.

COLOR: Medium gray (N5).

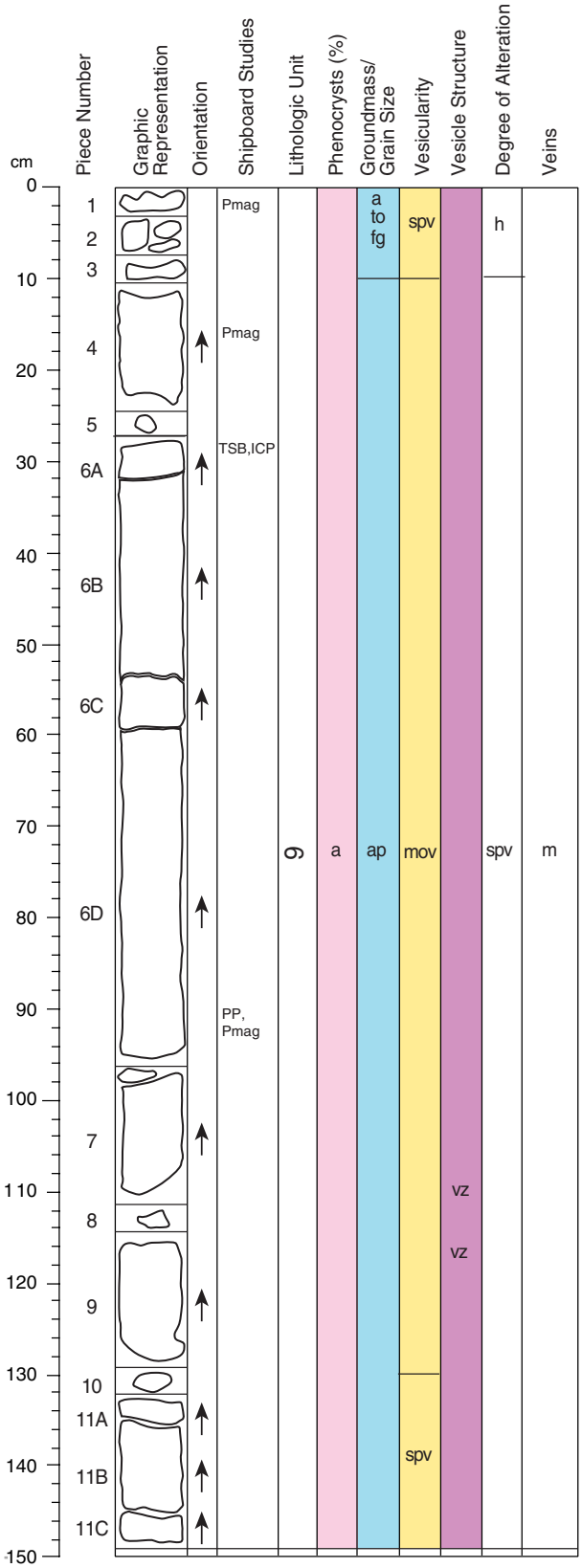
STRUCTURE: Massive.

ALTERATION: Moderate. Groundmass of Pieces 1A-6 contain red brown grains; some may be altered olivine, but olivine is not apparent in Piece 7 where mafic minerals and glassy mesostasis are altered to an unidentified black material.

VEINS/FRACTURES: None.

COMMENTS: Some vesicles in Pieces 1-6 are megavesicles lined or filled with rounded grains of a grayish blue green (5BG 5/2) mineral.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-22R-1 (Section top: 132.9 mbsf)

UNIT 9: APHYRIC BASALT.

Pieces: 1-11

CONTACTS: None.

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered mesostasis and altered olivine.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
	3-15	3	Subround

COLOR: Medium dark gray (N4), except clay-filled vesicles are grayish blue green (5BG 5/2).

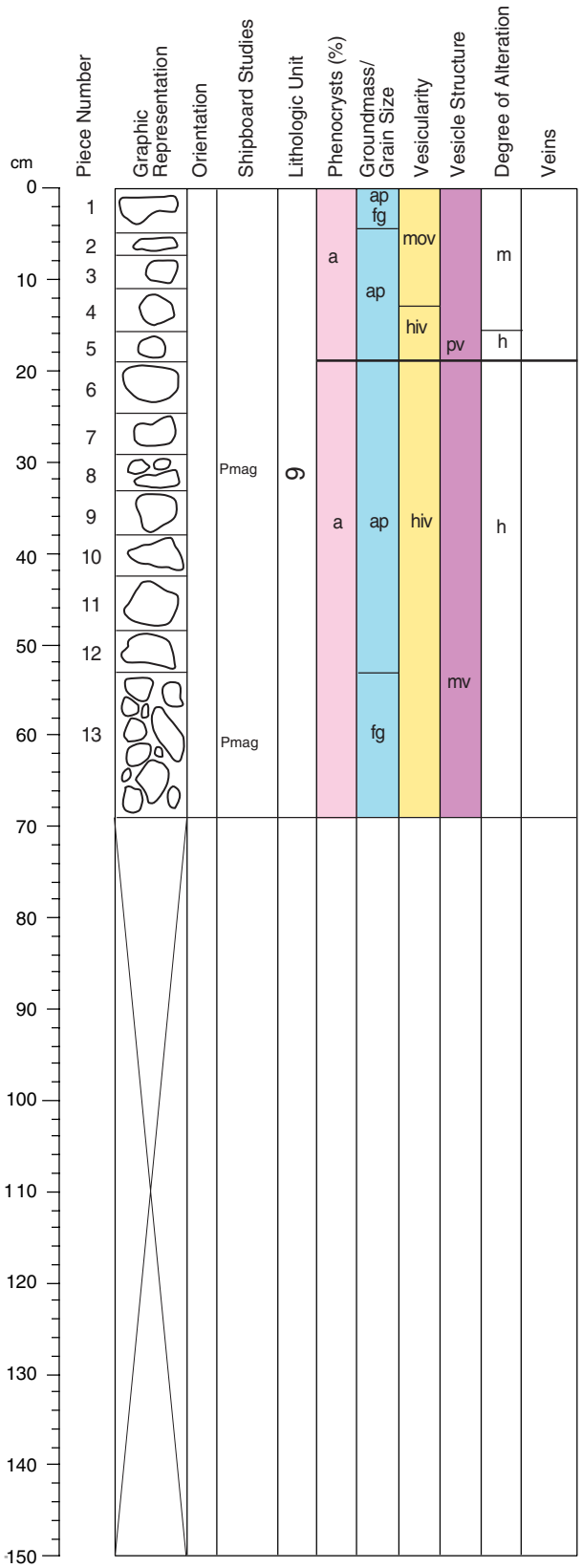
STRUCTURE: Massive.

ALTERATION: Moderate. Very rare olivine phenocrysts (and groundmass olivine in Pieces 7-11) are altered to Fe oxyhydroxide. Elsewhere the groundmass olivine and mesostasis are altered to grayish bluish greenish clay. Vesicles are partly to completely filled with dark bluish gray clay. A few of the vesicles in Pieces 5 and 7 are filled with carbonate.

VEINS/FRACTURES: Sparsely fractured. A few subhorizontal fractures are present. A fracture at the base of Piece 1A has scattered pieces of bluish greenish gray clay.

COMMENTS: Rare plagioclase phenocrysts ~4 mm are present. Even rarer olivine ~2 mm in size and are completely altered to Fe oxyhydroxide. Vesicles increase in frequency and somewhat in size down to 123 cm, and decrease in frequency below 123 cm. Pieces 1-3 are rounded and Pieces 1 and 2 are stained reddish brown, so they are all are assumed to be dropstones from formations above.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-22R-2 (Section top: 134.4 mbsf)

UNIT 9: APHYRIC BASALT.

Pieces: 1-13

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	3	2	2.5	Subhedral; prismatic
Olivine :	<<1	1	0.5	0.7	Subhedral; equant

GROUNDMASS: Aphanitic to fine grained. The groundmass consists of plagioclase, clinopyroxene, altered olivine and black oxide.

VESICLES:

% Mode	Size (mm): Average	Shape
10-25	4	Round

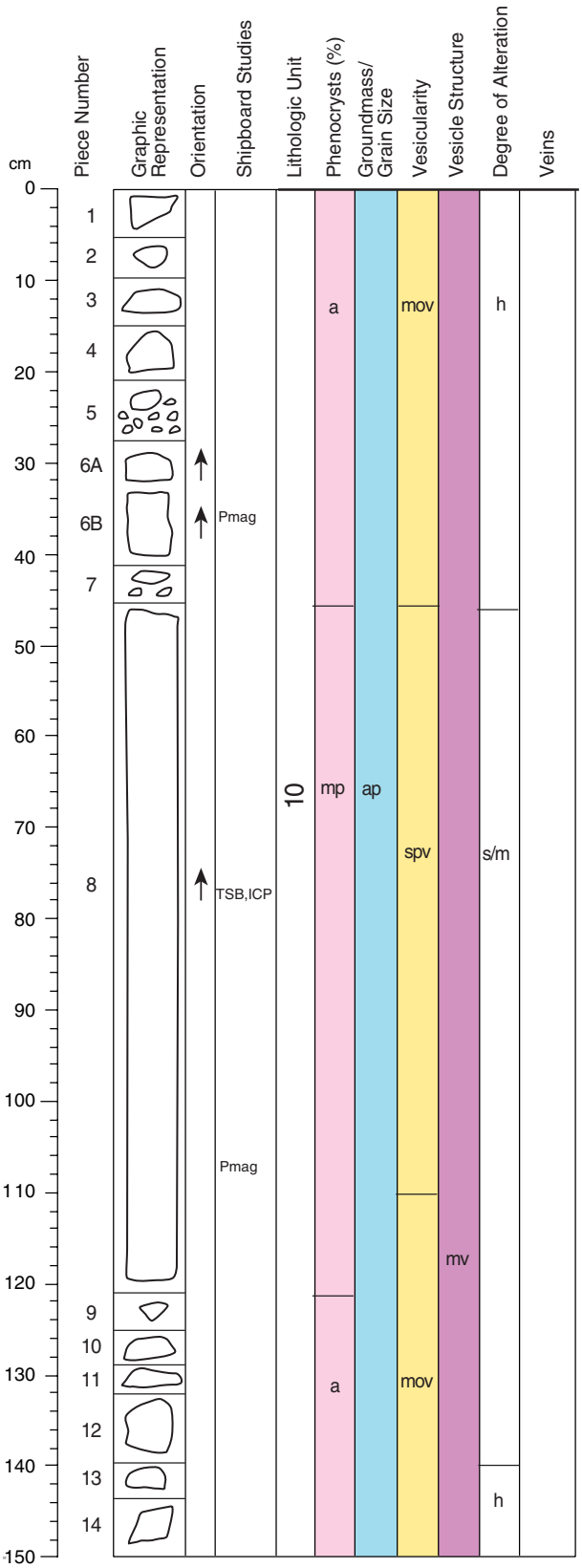
COLOR: Brownish gray (5YR 4/1).

STRUCTURE: Lobed. There is a lobe boundary at 19 cm.

ALTERATION: Moderate to high. Olivine phenocrysts are partially altered to Fe oxyhydroxide. Groundmass olivine is completely altered. Groundmass plagioclase is partially replaced by sericite. Vesicles are lined or filled with gray-green clay or Fe oxyhydroxide, and occasionally with carbonate.

VEINS/FRACTURES: None.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-23R-1 (Section top: 138.9 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-14

CONTACTS: The contact between Units 9 and 10 is inferred to be at the top of Section 23R-1 on the basis of a change from aphyric basalt in Section 22R-2 to sparsely-plagioclase-phyric basalt in Section 23R-1.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	20	1	5	Subhedral

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Pieces 1-7: Moderately Vesicular	20	4	Irregular
Piece 8 : Sparsely Vesicular	5	1	Round
Pieces 9-14: Moderately Vesicular	20	2	Round to oval

COLOR: Medium light gray (N6).

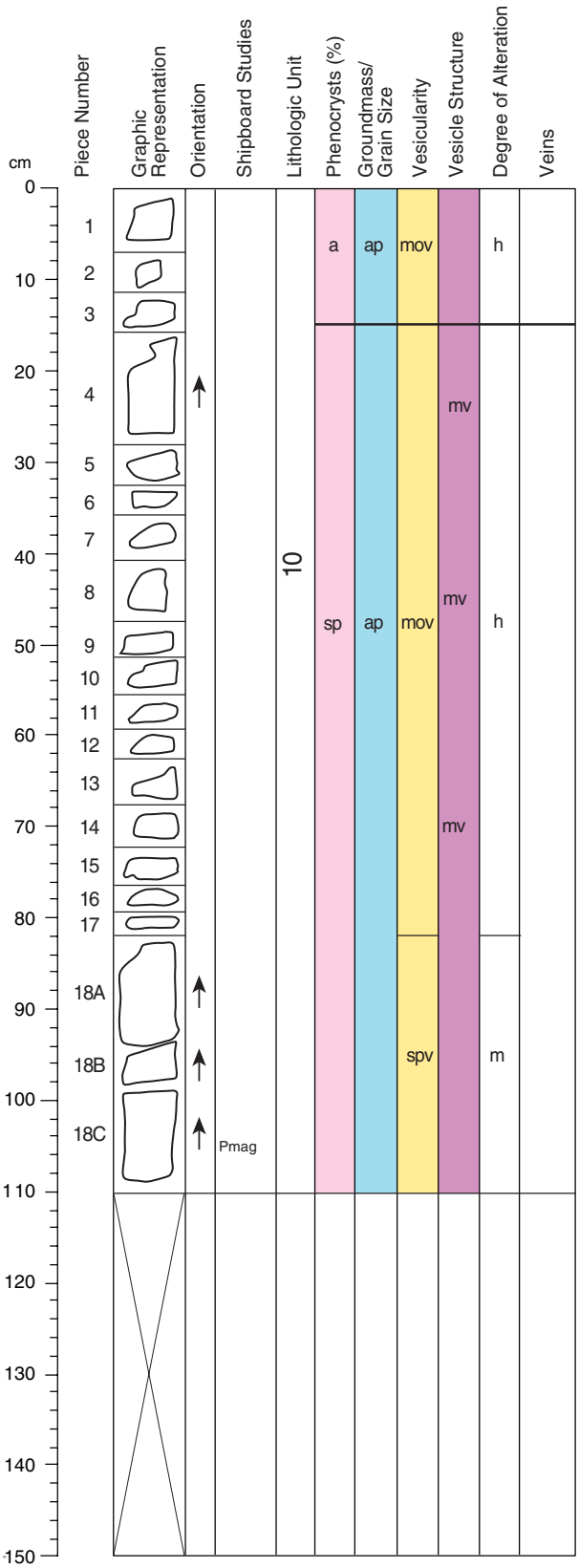
STRUCTURE: Piece 8 is massive; other pieces have large vesicles, with megavesicles present at 112-120 cm in Piece 8.

ALTERATION: Slight to high. Red brown Fe oxyhydroxide is pervasive except for Piece 8; glassy groundmass in Piece 8 is altered to dark gray.

VEINS/FRACTURES: None.

COMMENTS: Plagioclase phenocrysts are heterogeneously distributed.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-23R-2 (Section top: 140.4 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-18

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	10	1	2	Subhedral

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Pieces 1-17:			
Moderately Vesicular	20	3	Irregular
Piece18:			
Sparsely Vesicular	3	2	Round

COLOR: Medium light gray (N6) to weak red (2.5YR 4/2).

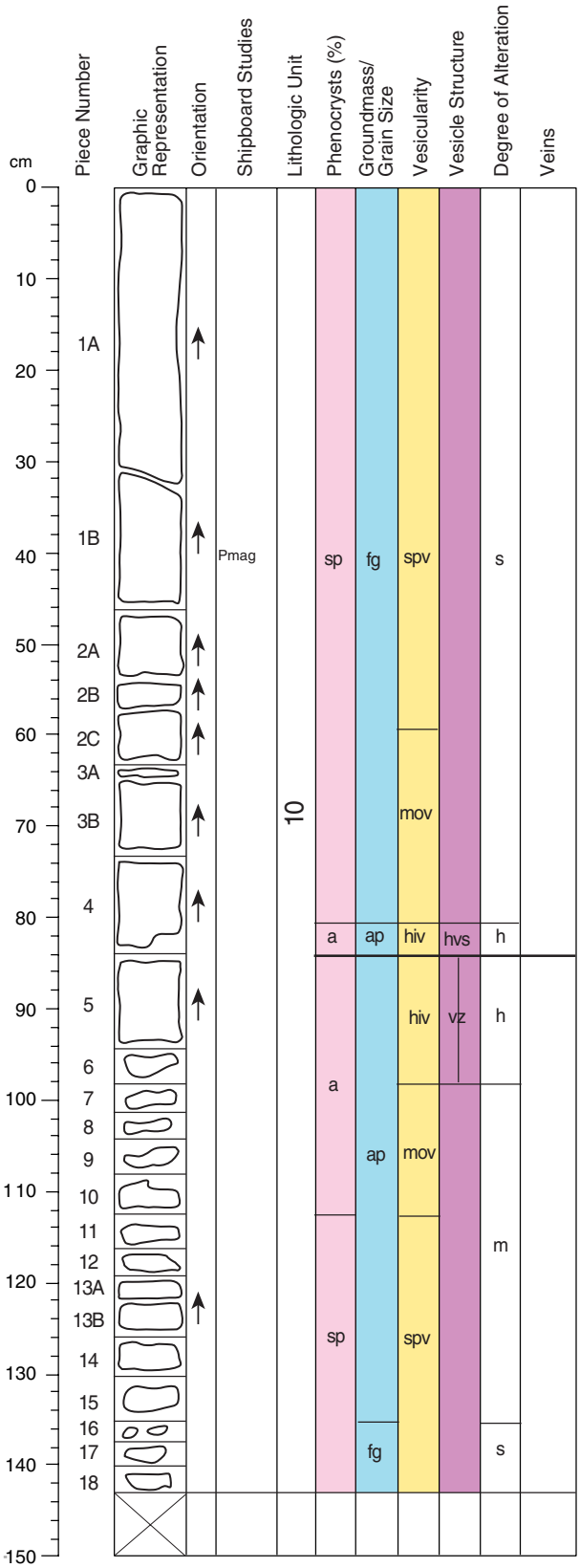
STRUCTURE: Lobed. A lobe boundary is defined by a thin, 1mm, glassy lobe margin which includes plagioclase laths at the top of Piece 3.

ALTERATION: Moderate to high. Red brown Fe oxyhydroxide is pervasive except for Piece 18; glassy groundmass in Piece 18 is altered to dark gray.

VEINS/FRACTURES: None.

COMMENTS: Plagioclase is less abundant than in Section 23R-1. Altered red brown olivine (<1 mm) may be present as a groundmass phase.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-23R-3 (Section top: 141.5 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-18

CONTACTS: None.

PHENOCRYSTS*:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1-2	5	1	3	Subhedral; prismatic
Olivine :	<1	1	1	1	Subhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, altered olivine and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
0-56 cm	1	3	Round to irregular
56-80 cm	7	3	Round to irregular
80-98 cm	21	2	Round to irregular
98-112 cm	7	3	Round to irregular
112-143 cm	3	4	Round to irregular

COLOR: Medium gray (N4). Blackish red (5R 2/2) in highly altered regions. Pale red (5R 6/2) in moderately altered regions.

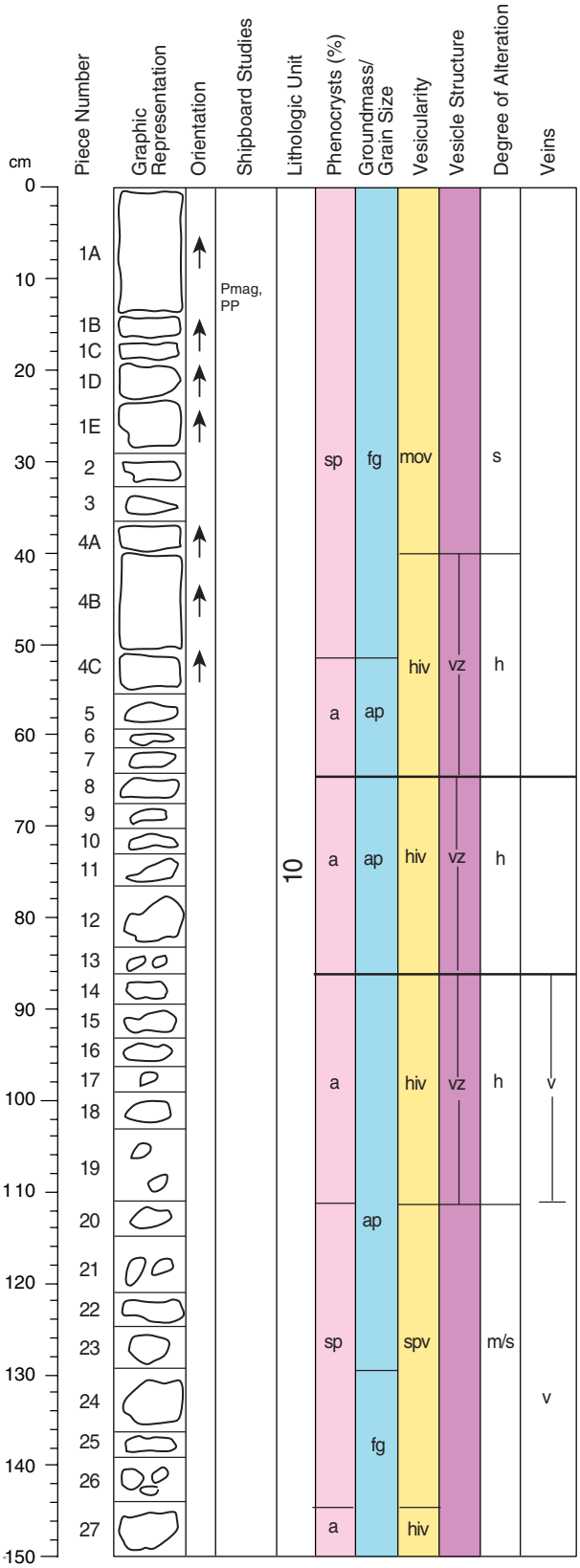
STRUCTURE: Lobed. Lobe margin is present between Pieces 4 and 5 at 84 cm, defined by change in crystalline, vesicularity and altered glass (?).

ALTERATION: Slight to high. Olivine phenocrysts are partially altered to Fe oxyhydroxide. In moderately and highly altered regions, groundmass olivine is completely altered. Vesicles are lined or filled with gray-green clay, Fe oxyhydroxide, carbonate, and occasionally with segregated material.

VEINS/FRACTURES: None.

COMMENTS: Phenocrysts are not evenly distributed in massive lobe interior. The phenocryst content is ~2% in Pieces 1 to 4 and 11 to 18, but <1% in the vesicular part of the lava.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-23R-4 (Section top: 142.93 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-27

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1-2	5	1	3	Subhedral; prismatic
Olivine :	<1	1	1	1	Subhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, altered olivine and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
0-40 cm	5	3	Round to irregular
40-111 cm	21	3	Round to irregular
111-146 cm	1	< 1	Round to irregular
146-150 cm	21	4	Round to irregular

COLOR: Medium gray (N4). Pale red (5R 6/2) in moderately and highly altered regions.

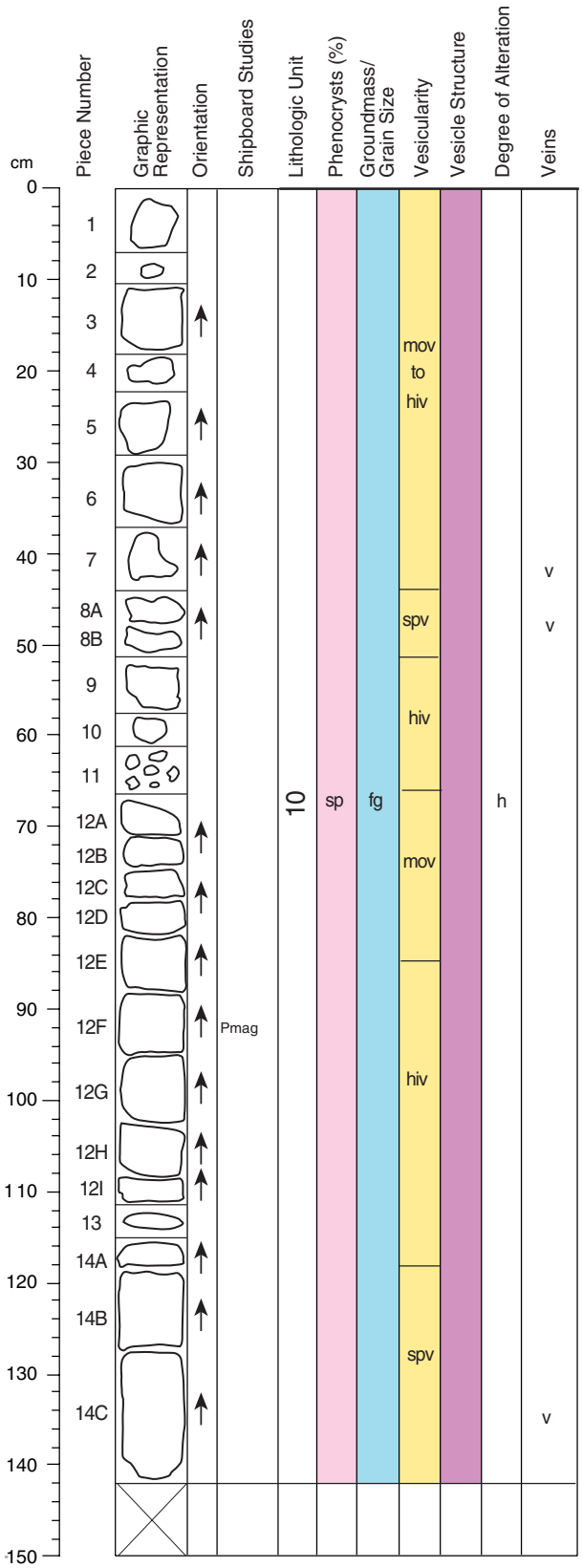
STRUCTURE: Lobed. Lobe margins are present between Pieces 7 and 8 at 64 cm and between Pieces 13 and 14 at 86 cm, defined by changes in crystallinity and vesicularity.

ALTERATION: Slight to high. Olivine phenocrysts are partially altered to Fe oxyhydroxide. In moderately and highly altered regions, groundmass olivine is completely altered. Vesicles are lined or filled with grayish green clay, grayish brown clay, Fe oxyhydroxide and carbonate. Segregated material occasionally is present surrounding vesicles.

VEINS/FRACTURES: Sparsely veined. Grayish brown (5YR 3/2) detrital silt-clay size material fills in the joint cracks in Pieces 14-20.

COMMENTS: Phenocrysts are not evenly distributed in massive lobe interior. The phenocryst content is ~2% in Pieces 1-4B and 20-26; but only <1% in the remaining part of the lava.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-23R-5 (Section top: 144.43 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-14

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	4	1	2	Subhedral; equant

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, altered olivine, black oxides, and glassy mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
	1-25	3	Round to irregular

COLOR: Medium gray (N5). Moderate yellow brown (10YR 5/4) in moderately and highly altered regions.

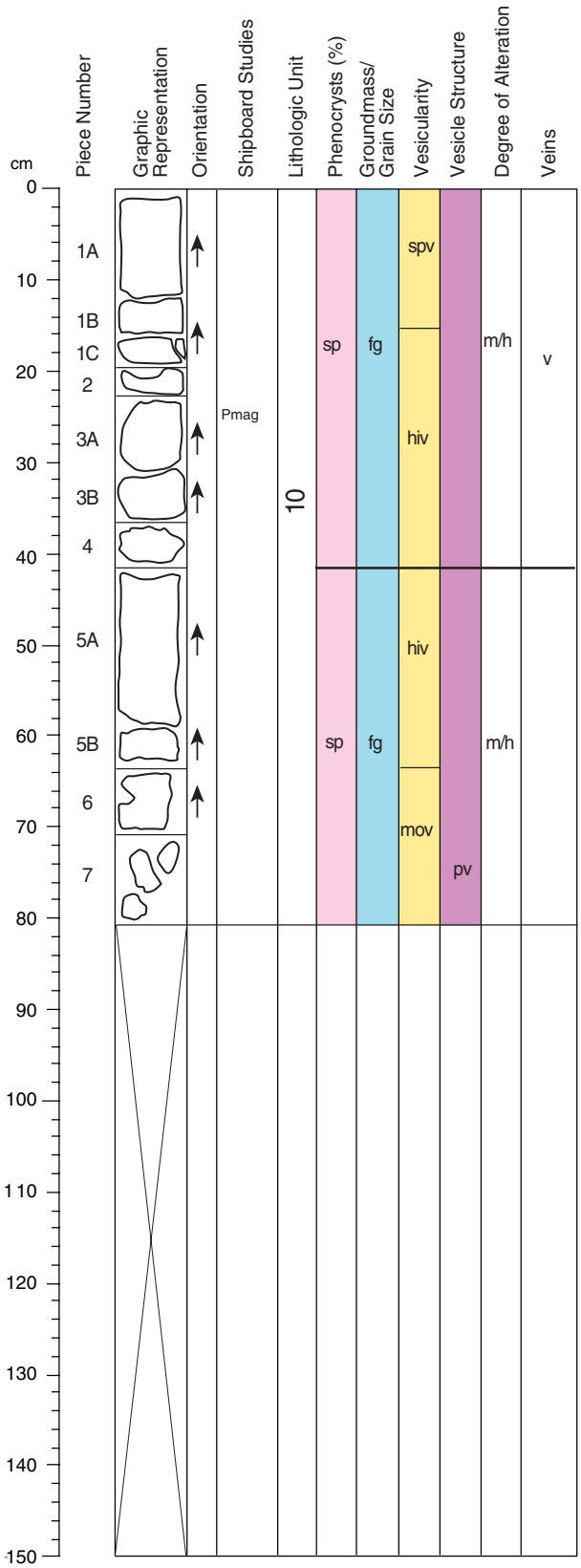
STRUCTURE: Lobed. A lobe margin is present at the top of 23R-5, defined by change in crystallinity and vesicularity.

ALTERATION: High. Olivine phenocrysts are partially altered to Fe oxyhydroxide. In certain regions, groundmass olivine is completely altered and is dark brown in appearance. Glassy mesostasis is completely altered to green clay. Most vesicles are lined or filled with green clay, and ~1% of vesicles are filled with white carbonate. Segregated material surrounds most vesicles. Thin (<3 mm wide) halos of Fe oxyhydroxide occur around veins.

VEINS/FRACTURES: Sparsely veined. Veins 1 mm wide are filled with dark grayish brown clay and lined with Fe oxyhydroxide.

COMMENTS: Vesicle abundance varies throughout the section, ranging from highly vesicular to sparsely vesicular. The size and shape of vesicles also varies.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-23R-6 (Section top: 145.84 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-7

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	4	1	2	Subhedral; equant

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, altered olivine, black oxides and glassy mesostasis.

VESICLES:

% Mode	Size (mm): Average	Shape
1-40	2	Round to irregular

COLOR: Medium gray (N5). Moderate yellow brown (10YR 5/4) in moderately and highly altered regions.

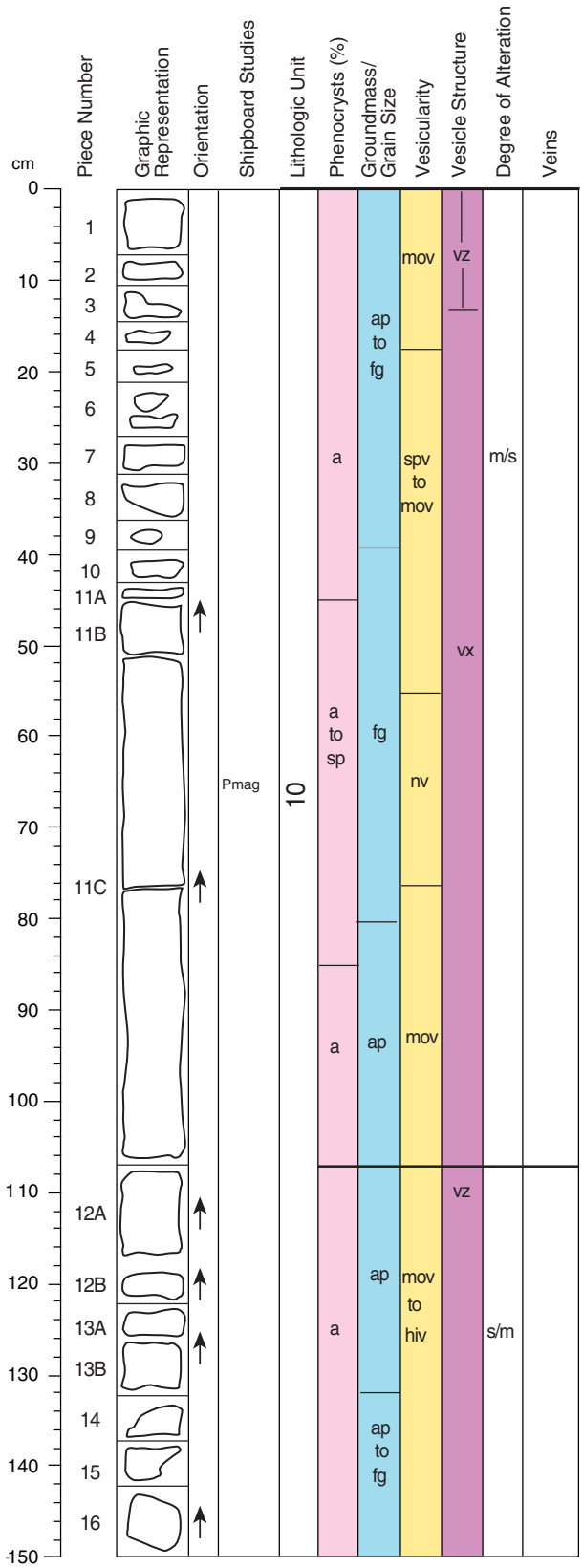
STRUCTURE: Lobed. A lobe margin is present at 40 cm, defined by changes in crystallinity and vesicularity.

ALTERATION: Moderate to high. Olivine phenocrysts are partially altered to Fe oxyhydroxide. In moderately and highly altered regions, groundmass olivine is completely altered and is dark brown in appearance. Glassy mesostasis is completely altered to green clays. Most vesicles are lined or filled with green clay, and ~1% of vesicles are filled with white carbonate. Segregated material surrounds most vesicles. Fe oxyhydroxide staining occurs throughout, and is prominent in a band ~1cm above a highly vesicular zone in Piece 3.

VEINS/FRACTURES: Sparsely veined. Veins 1 mm wide are filled with dark grayish brown clay and lined with Fe oxyhydroxide.

COMMENTS: Vesicle abundance varies throughout the section, ranging from highly vesicular to sparsely vesicular. The size and shape of vesicles also varies. Dark gray flow foliation is present in Piece 1, where many vesicles are elongated parallel to the flow foliation.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-24R-1 (Section top: 148.5 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-16

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	9	7	5	Subhedral
Olivine:	<1	1	1	1	Euhedral

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, altered olivine (?) and mesostasis (altered glass?). Grain size decreases and abundance of mesostasis increases towards inferred lobe boundaries.

VESICLES:	% Mode	Size (mm): Average	Shape
0-56 cm	3-10	6	Round to irregular
56-74 cm	<1	4	Round
74-106 cm	10-20	3	Round to irregular
106-150 cm	15-25	4	Round to irregular

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

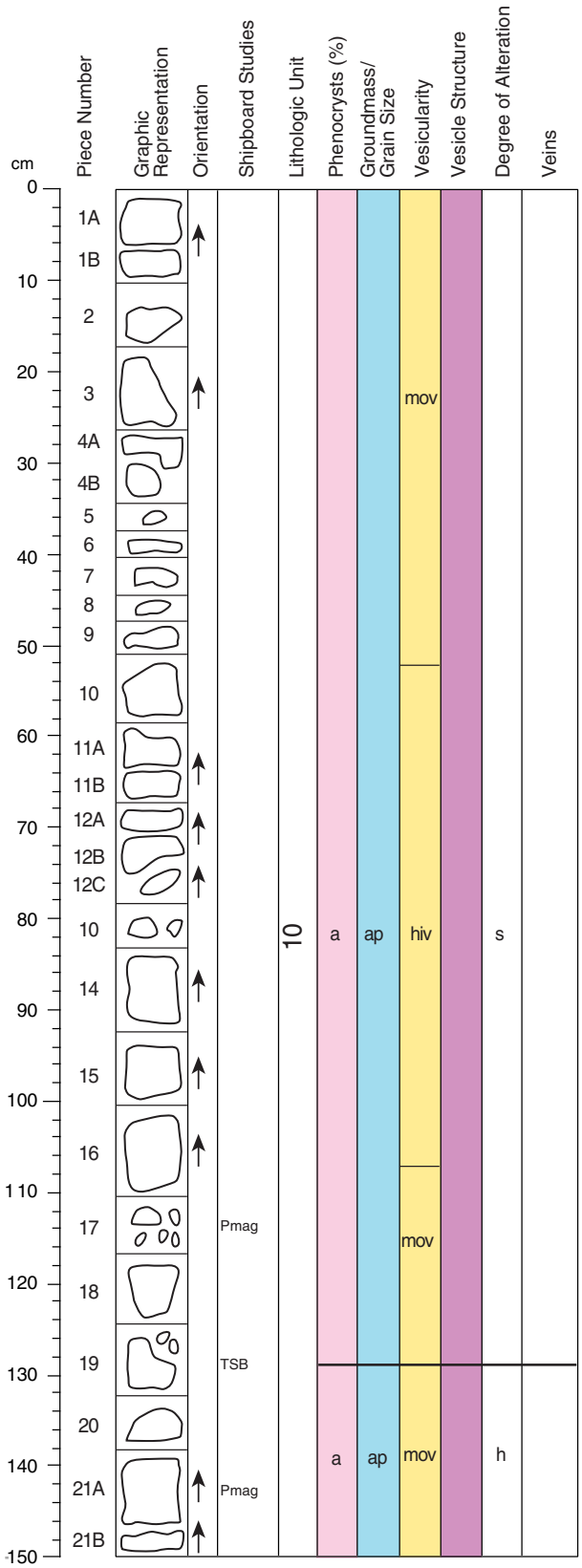
STRUCTURE: The section consists of moderately to highly vesicular lava alternating with nonvesicular (massive) lava. On basis of changes in vesicularity, vesicle size, granularity, and crystallinity we have placed a lobe boundaries at 0 and 106 cm.

ALTERATION: Slight to moderate. Pervasive greenish tint on rock throughout the section and groundmass mesostasis (±pyroxene) are altered to dark green or gray brown clay. Vesicle fill, when present, is green or gray brown clay.

VEINS/FRACTURES: None.

COMMENTS: *Phenocrysts are not evenly distributed and concentrated in the massive interval (i.e., Pieces 11B and 11C; massive lobe interior). The phenocryst content is <1% in massive interval and <<1% in vesicular parts of the lava.
Contact between aphanitic and fine grained lava in Piece 11C is sharp and convoluted.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-24R-2 (Section top: 150.0 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-21

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	3	3	3	Euhedral

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered blue green and red brown mesostasis. Some red brown grains are present which may be altered groundmass olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular (0-50 cm and 104-150 cm)	20	2	Round to irregular
Highly vesicular (50-104 cm)	30	2	Round to irregular

COLOR: Medium gray (N5) to light brownish grey (5YR 6/1).

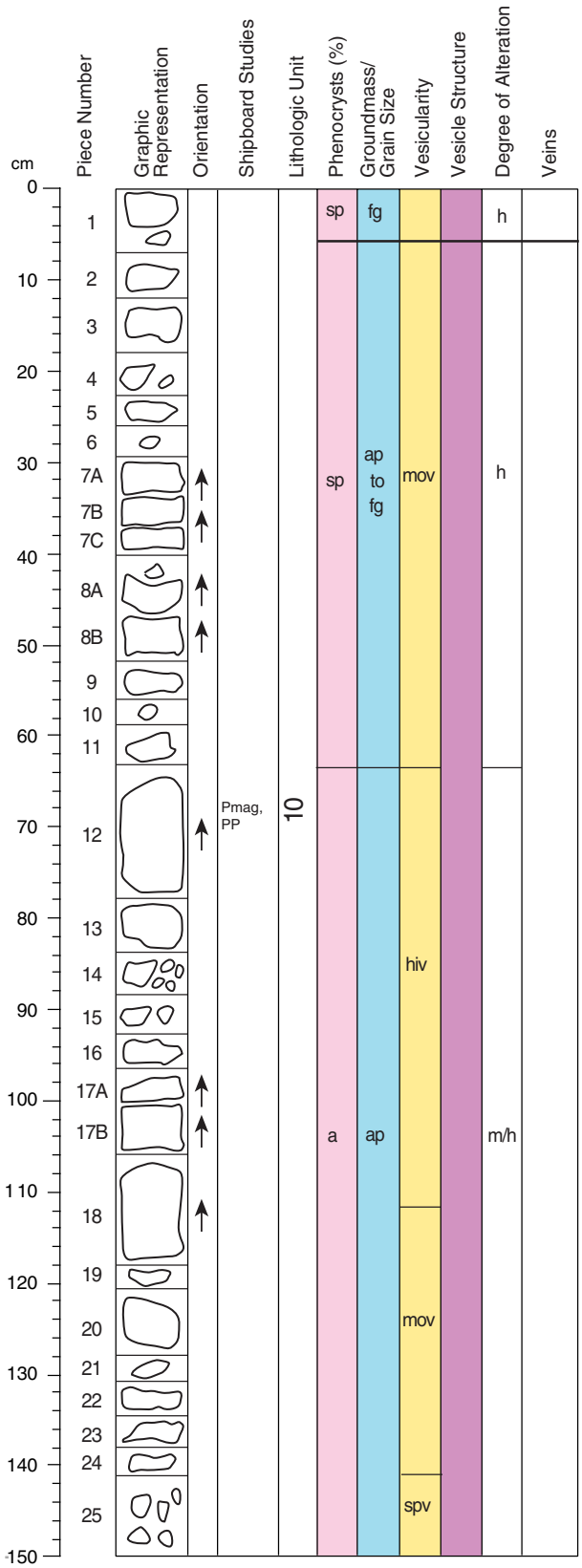
STRUCTURE: Lobed. Piece 19 contains a sharp contact; glass is not present, but there is a change in groundmass color and grain size. Based on vesicularity changes within Piece 16 there may be other lobe contacts.

ALTERATION: Slight to high. Pieces 1-8 have blue gray groundmass; in contrast Pieces 9-21 have red brown staining. There is a wide range in vesicle fillings; gray green vesicle fillings predominate in Pieces 1-8, and yellow green (5GY 7/4) and red brown (10R 4/6) fillings predominate in Pieces 14 and 15. Others are unfilled or filled with white carbonate.

VEINS/FRACTURES: None.

COMMENTS: Plagioclase is much less abundant than in Section 23R-1 and 2. Altered red brown olivine (<1 mm) may be present as groundmass phase. A 15 mm megavesicle is present in Piece 4A.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-24R-3 (Section top: 151.5 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-25

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	3	1	2	Subhedral

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, black colored mesostasis, and highly altered olivine replaced by Fe oxyhydroxide.

VESICLES:	% Mode	Size (mm): Average	Shape
0-64 cm:	5	3	Round to irregular
65-84 cm:	25	0.5	Round
84-113 cm:	25	1.5	Round
113-137 cm:	19	0.5	Round
137-141 cm:	5	3	Round

COLOR: Brownish gray (5YR 4/1) to light medium gray (N6).

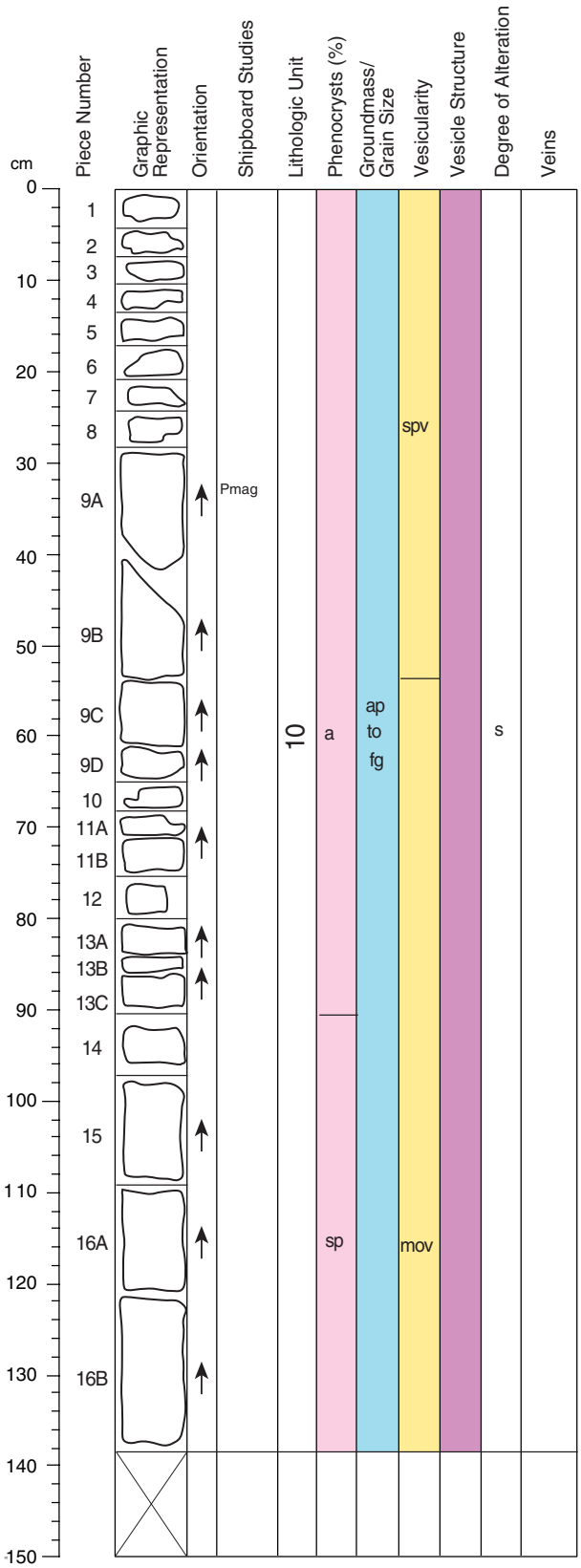
STRUCTURE: Lobed. A lobe boundary is present at 6 cm and is defined by the transition from breccia in Piece 1 to a more massive structure present in Piece 2.

ALTERATION: Moderate to high. Red brown Fe oxyhydroxide is present throughout the groundmass. Vesicles are lined with green clay, slightly infilled with Fe oxyhydroxide, or infilled with white carbonate.

VEINS/FRACTURES: Sparsely veined.

COMMENTS: Piece 1 is volcaniclastic autobreccia with clasts of sparsely plagioclase phyric basalt, similar to the other pieces in this section.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-24R-4 (Section top: 153.0 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-16

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1-2	5	2	3	Subhedral
Olivine:	<1	1	1	1	Euhedral

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, altered olivine, glassy mesostasis altered to green clay, and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
0-53 cm	2	3	Round to irregular
53-138 cm	10	2	Round to irregular

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

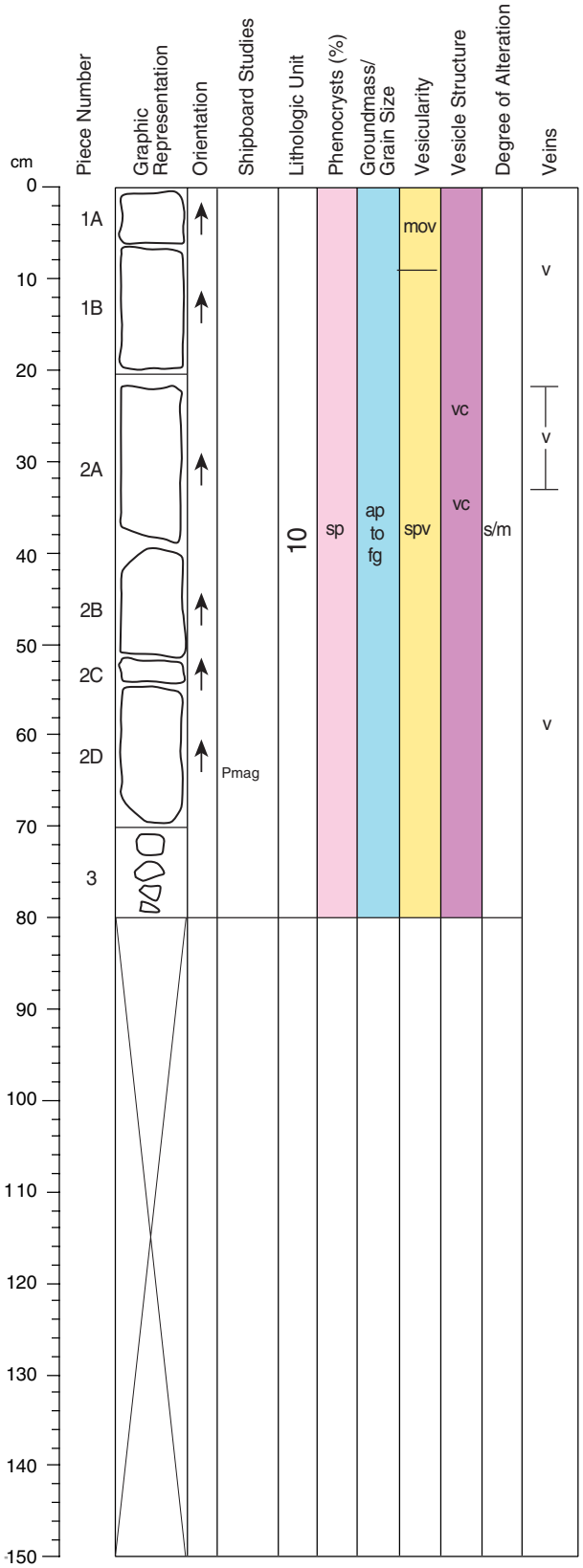
STRUCTURE: No convincing evidence for the presence of lobes was seen in this section.

ALTERATION: Slight. Olivine phenocrysts and groundmass olivine are partially altered to Fe oxyhydroxide. Most vesicles are lined or filled with green clay and segregated material.

VEINS/FRACTURES: Sparsely fractured. <1 mm subvertical fractures are present in Pieces 16A and 16B.

COMMENTS: Phenocrysts are not evenly distributed. The phenocryst content is ~2% in Pieces 14-16 (massive interval); but only <1% in Piece 1-13 (vesicular lava).
A subhorizontal train of vesicles, 1-2 mm in size and with irregular outlines is present in Piece 16B at 129 cm. The vesicles are filled with green clay. Several vesicles are present below this chain at 131-133 cm, filled with green clay or unfilled.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-24R-5 (Section top: 154.38 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1-2	5	2	2	Subhedral
Olivine:	<1	2	1	1	Euhedral

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, altered olivine, glassy mesostasis, and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
0-10 cm	10	3	Round to irregular
10-80 cm	2	1	Round to irregular

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

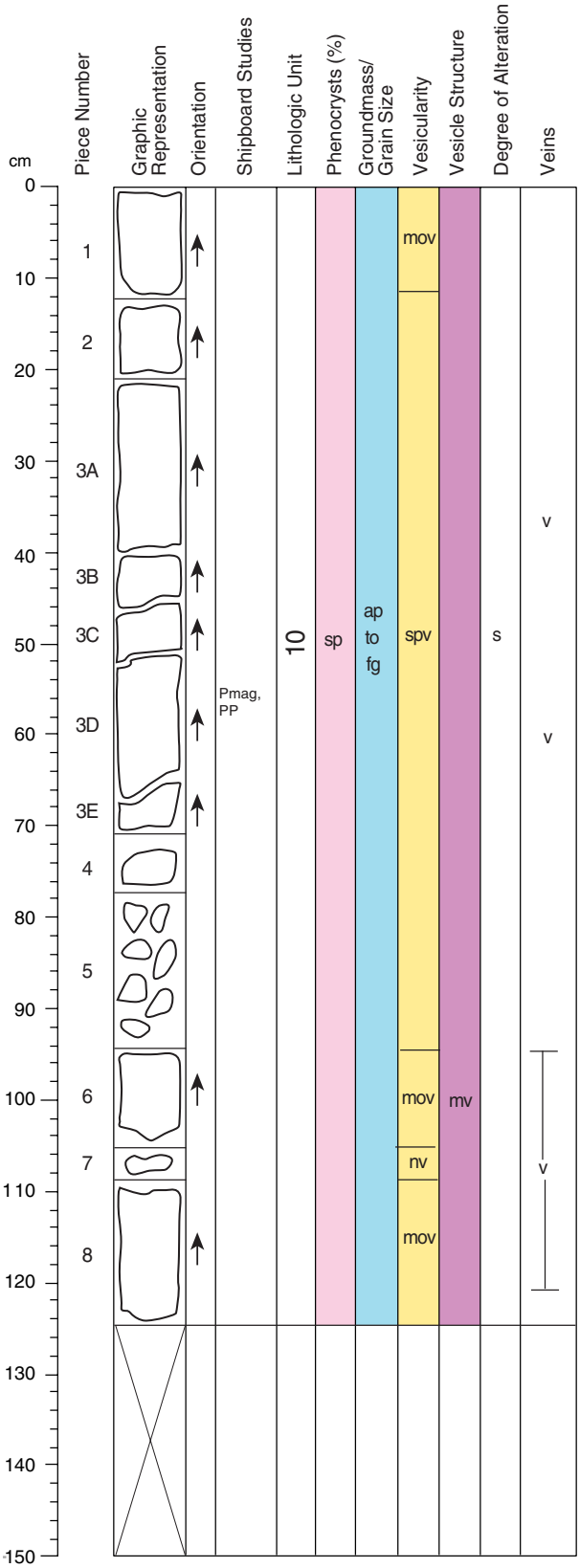
STRUCTURE: No convincing evidence for the presence of lobes was seen in this section.

ALTERATION: Slight to moderate. Olivine phenocrysts and groundmass olivine are partially altered to Fe oxyhydroxide. Glassy mesostasis is altered to green clay. Most vesicles are lined or filled with dark green clay.

VEINS/FRACTURES: Sparsely veined. <1-2 mm wide veins are present in Pieces 1B, 2A, and 2D, filled with pale green clay and carbonate.

COMMENTS: Some plagioclase phenocrysts appear to be intergrown with clinopyroxene and/or olivine (i.e., show an ophitic texture).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-25R-1 (Section top: 158.00 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-8

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1-2	4	1	2	Subhedral to anhedral
Olivine:	<<1	1	1	1	Subhedral

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, altered olivine, glassy mesostasis and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
0-12 cm 6 1 Round			
12-94 cm	1	1	Round to irregular
94-106 cm	5-7	8	Elongate
106-110 cm	<1	1	Round
110 -125 cm	5-7	8	Elongate

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

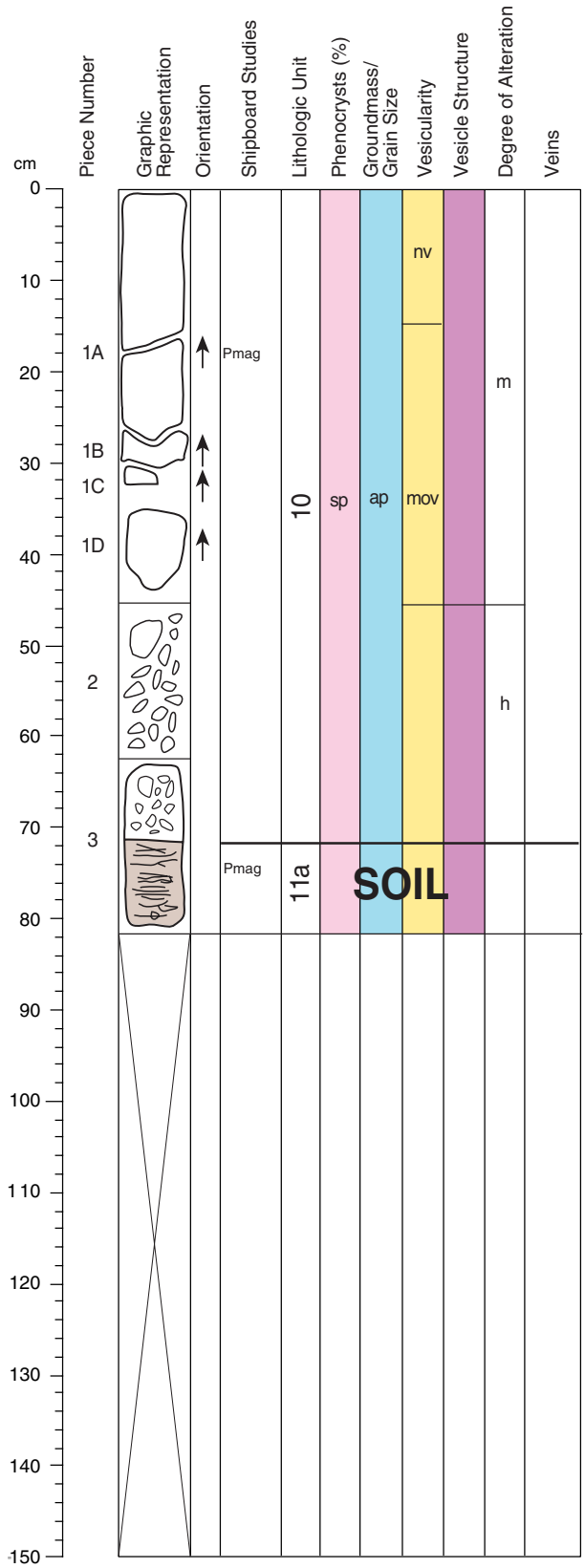
STRUCTURE: Piece 1 is massive. Pieces 2-8 contains flow foliation, defined by the presence of 1-3 mm wide dark subparallel discontinuous laminations and elongation of vesicles.

ALTERATION: Slight. Olivine phenocrysts and groundmass olivine are partially altered to Fe oxyhydroxide, especially adjacent to veins. Glassy mesostasis is altered to green clay. Most vesicles are lined or filled with green clay.

VEINS/FRACTURES: Sparsely veined. Veins are present in Pieces 3A, 3D and Pieces 6-8 and are <1 mm wide and filled with blue-green clay. Native copper was recognized in Pieces 3D and 3E.

COMMENTS: Some plagioclase and clinopyroxene phenocrysts appear to be intergrown (i.e. show a subophitic texture). Most vesicles are surrounded by segregated material.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-25R-2 (Section top: 159.24 mbsf)

UNIT 10: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC to APHYRIC BASALT.

Pieces: 1-3

CONTACTS: The transition in Piece 3 at 71 cm from lava fragment dominated (62-71 cm) to soil (71-81 cm) represents the boundary between Units 10 and 11a.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1-2	4	1	2	Euhedral
Olivine:	<<1	1	1	1	Subhedral to euhedral

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene along with altered olivine and glass.

VESICLES:	% Mode	Size (mm): Average	Shape
0-13 cm	<1	10	Elongate
13-30 cm	10	2	Elongate
30-45 cm	10	<1	Irregular

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

STRUCTURE: Pieces 1A-1D show indistinct flow foliation, defined by 1-2 mm wide dark gray subhorizontal discontinuous bands and elongation of vesicles. Piece 2 and upper half of Piece 3 contain fragments of cemented lapilli breccia, consisting of lapilli-size autoclasts.

ALTERATION: Moderate to high. Olivine phenocrysts and groundmass olivine are completely replaced by dark brown clay and/or Fe oxyhydroxide. Most vesicles are lined or filled with green clay.

VEINS/FRACTURES: None.

COMMENTS: Mixed with dark brown silty clay from the underlying Unit 8b in upper half of Piece 3.

UNIT 11a: RED-BROWN SOIL.

Pieces: 3

CONTACTS: The transition in Piece 3 at 71 cm from lava fragment dominated (62–71 cm) to soil (71–81 cm) represents the boundary between Units 10 and 11a.

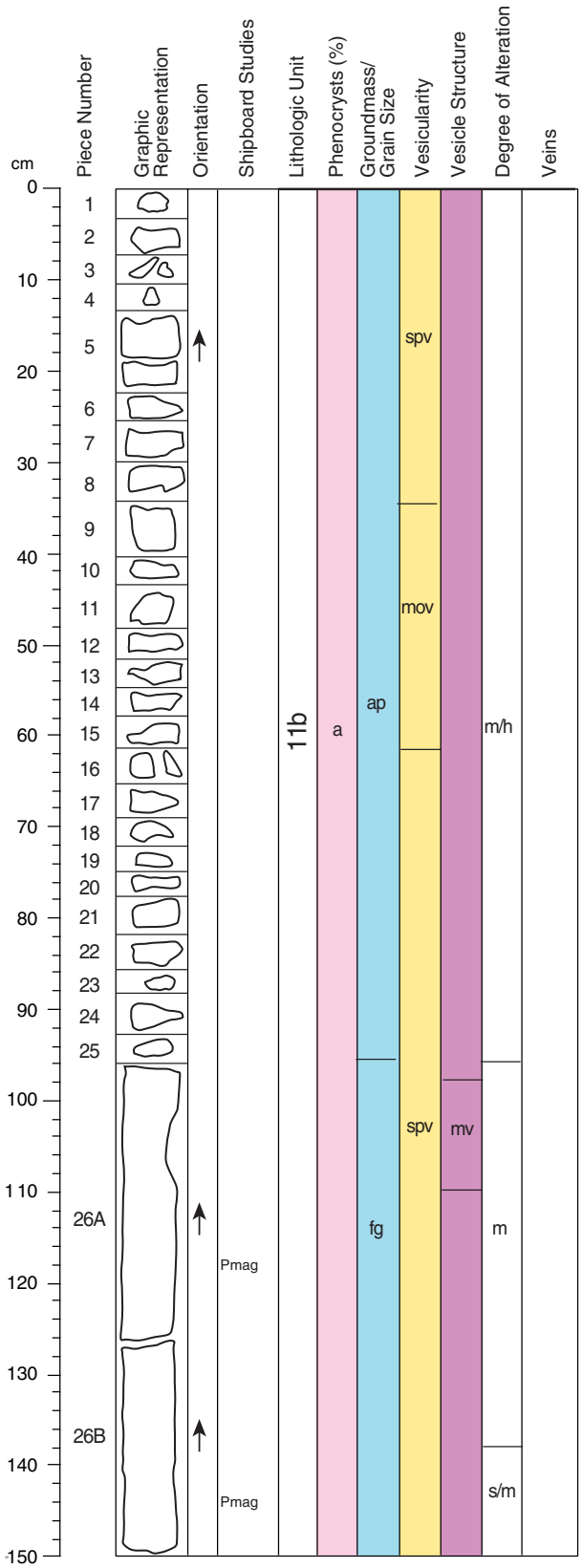
GENERAL DESCRIPTION: Red interbed, with intact soil in Piece 3 between 74–81 cm showing distinct color banding from dusky brown to grayish brown. It has domains that contain relict sub millimeter feldspars that exhibit similar random arrangement as the groundmass plagioclase in the lava below.*

COLOR: Dusky brown (5YR 3/2) to grayish brown (5YR 2/2).

COMMENTS:
Soil horizon of red iron-rich(?) silty clay that has 5 laminae, with color from dusky red (2.5 YR 3/2) to reddish brown (2.5 YR 4/2). The laminae are partly broken up with red clay in fractures. The composition is mainly volcanic glass in different stages of alteration (palagonite), Fe oxides and opaque minerals (probably mostly hematite). Some feldspar and clay occur.

*This may represent the deeply weathered top of the underlying flow.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-26R-1 (Section top: 167.7 mbsf)

UNIT 11b: APHYRIC BASALT.

Pieces: 1-26

CONTACTS: None observed. The upper boundary of Unit 11b is inferred to be at the top of Section 26R-1.

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, olivine, clinopyroxene and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
	1-10	3	Round

COLOR: Brownish gray (5YR 4/1).

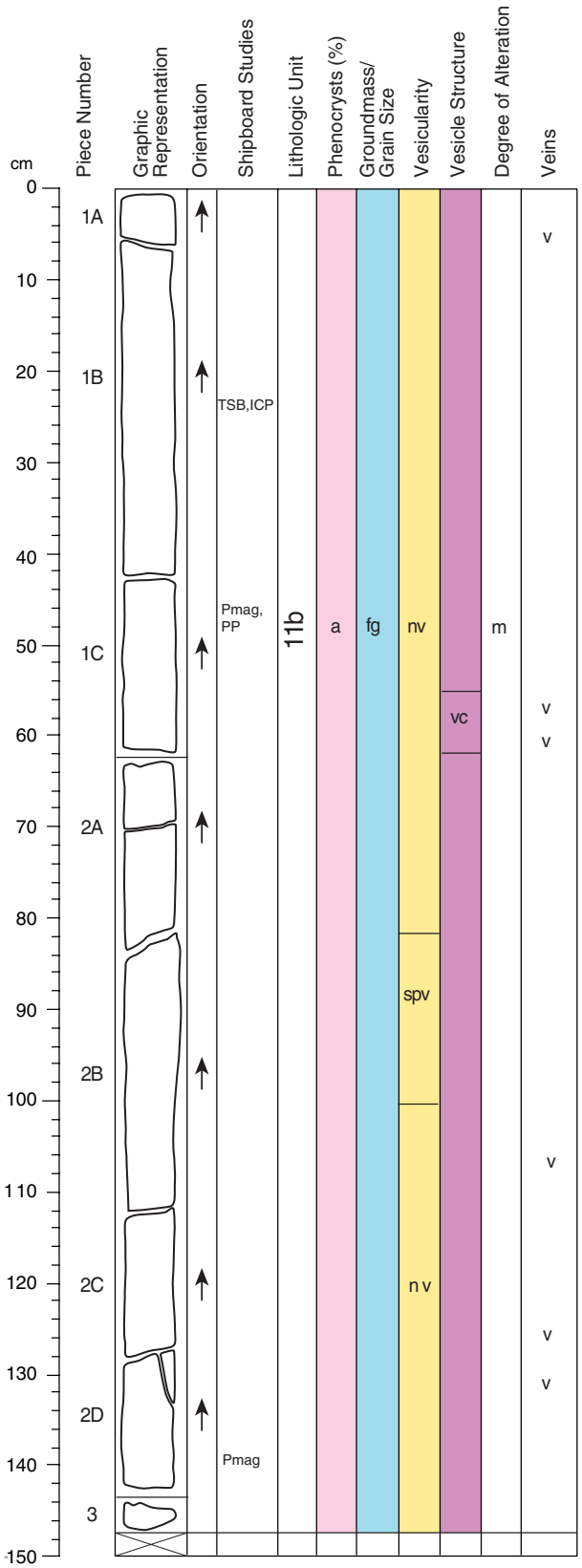
STRUCTURE: Massive.

ALTERATION: Slight to high. Alteration is most intense towards the top of the section. Groundmass olivine is partially to completely altered to Fe oxyhydroxide, except in Piece 26B, where it is unaltered. Vesicles are partially to completely filled with blue-green clay.

VEINS/FRACTURES: Sparsely fractured. Fractures occur in Pieces 2 to 8, are <1 mm wide, and surrounded by brown alteration halos.

COMMENTS: Pieces 1 and 4 appear to be dropstones. A dome-shaped megavesicle in Piece 26A (100-110 cm) is 10 cm in diameter, irregularly shaped, and partially filled with blue-green clay.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-26R-2 (Section top: 169.2 mbsf)

UNIT 11b: APHYRIC BASALT.

Pieces: 1A-3

CONTACTS: None.

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, olivine, clinopyroxene and glass in an intergranular to intersertal texture.

VESICLES:	% Mode	Size (mm): Average	Shape
	0-2	1	Round

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

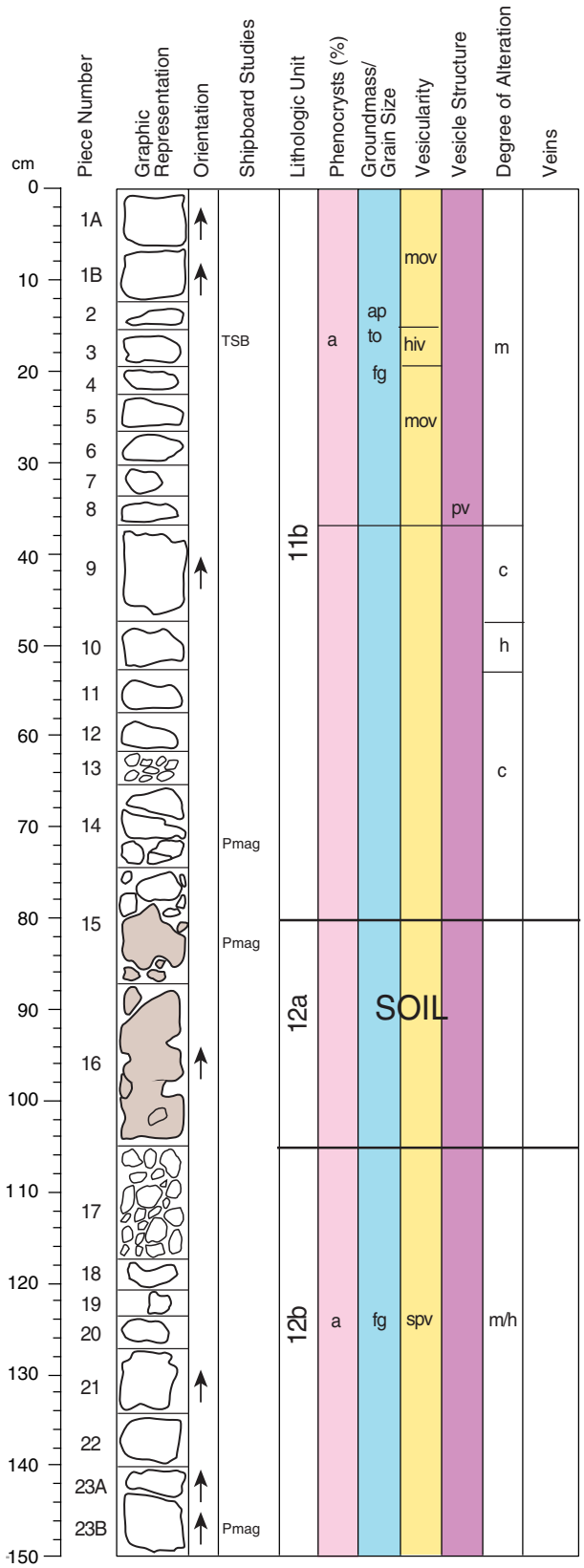
STRUCTURE: Massive.

ALTERATION: Moderate. Dark green clay is pervasive. Olivine and glass are altered to dark green clay. Vesicles are lined with dark green clay and filled with white carbonate.

VEINS/FRACTURES: Sparsely veined. Veins are < 1mm wide and filled with dark green clay and white carbonate. The core has fractured along veins.

COMMENTS: A vesicle cylinder partially with vesicular segregated material is present in Piece 1C from 55-62 cm on the outer surface of the core, and the vesicles in it are filled with dark green clay and white carbonate.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-26R-3 (Section top: 170.67 mbsf)

UNIT 11b: APHYRIC BASALT.

Pieces: 1-15

CONTACTS: None observed. The contact between Units 11b and 12a is inferred to be in Piece 15 (a mixture of basalt fragments and soil) at 80 cm.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Olivine	<1	1	0.4	0.6	Euhedral, equant

GROUNDMASS: Aphanitic to fine grained. The groundmass consists of plagioclase, olivine, clinopyroxene, black oxide, and glass in an intersertal to intergranular texture.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
	10-30	4	Subround to elongate

COLOR: Piece 1-8: light gray (5YR 4/1) to brownish gray (5YR 4/1). Pieces 9-15: cement is light brown (5YR 6/4); clasts are grayish brown (5YR 3/2) to moderate brown (5YR 6/4).

STRUCTURE: Massive (Pieces 1-8); brecciated (Pieces 9-15).

ALTERATION: Moderate to complete. Dark green clay is pervasive and has completely replaced olivine and glass, but olivine is also highlighted by Fe oxyhydroxide. Vesicles are lined with dark green clay and occasionally filled with white carbonate.

VEINS/FRACTURES: One <0.1 mm fracture is present in Piece 1A.

COMMENTS:
Pieces 9-15 represent the basal breccia of Unit 11b. They contain highly to completely altered, angular, lapilli-size autoclasts (up to 3 cm) of the overlying basalt. Most of the clasts are completely oxidized although a few larger clasts contain relict centers of discernable basalt. In these, olivine is highlighted by the alteration and rare olivine phenocrysts are present. They are cemented by a white mineral (clay? zeolite?) that has been stained by the oxidation alteration. The contact between the basalt and the basalt breccia is seen at the top of Piece 9 at 38 cm. Segregated material is present around some vesicles. A pipe vesicle is present in Piece 8.

UNIT 12a: RED-BROWN SOIL.

Pieces: 15–16

CONTACTS: None observed. The contact between Units 11b and 12a is inferred to be in Piece 15 (a mixture of basalt breccia fragments and soil) at 80 cm. The contact between Units 12a and 12b is inferred to be between Pieces 16 and 17 at 105 cm.

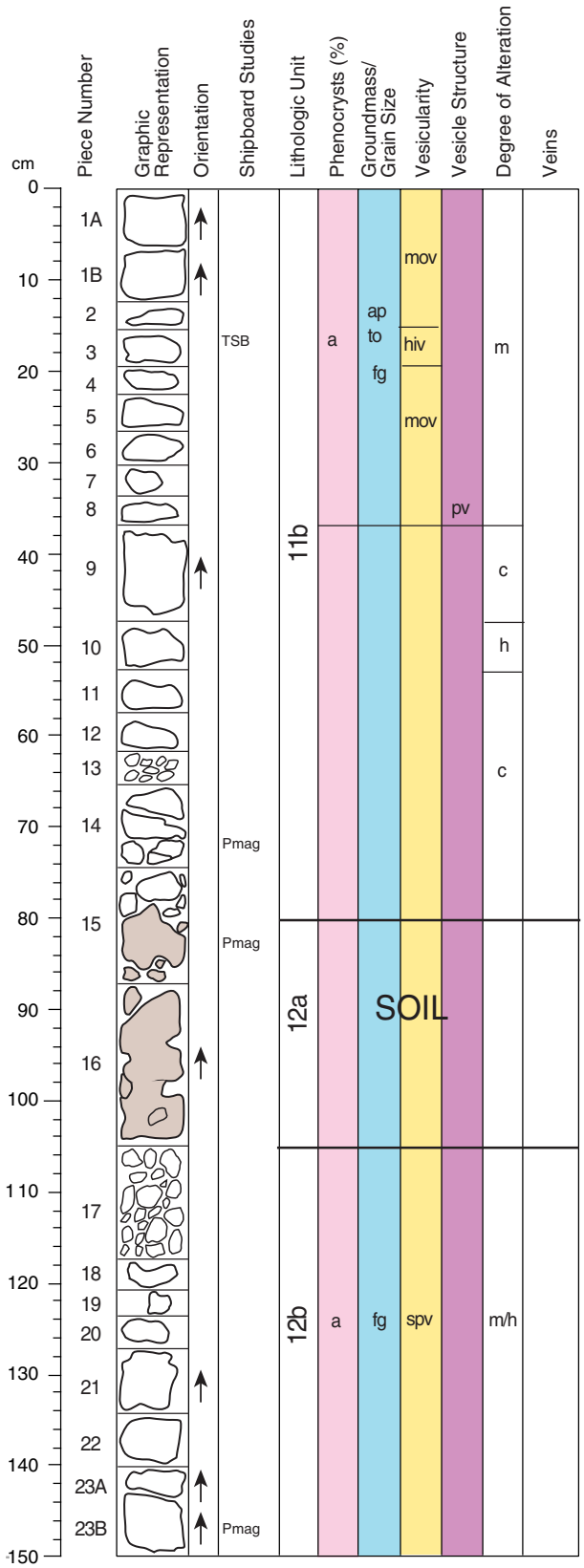
GENERAL DESCRIPTION: Red-brown soil interbed in Piece 16 and half of Piece 15. The grain size coarsens upward to silt- and sand-size basalt fragments. The mineralogy of the larger fragments is of an aphyric basalt containing groundmass olivine and plagioclase. Smaller fragments are completely altered basalt (oxidized).

COLOR: Dusky red (2.5Y 3/2) to very dusky red (2.5Y 2.5/2).

COMMENTS:
This soil is inferred to be the weathered top of the basalt of Unit 12b. The horizon at 79 to 105 cm is a firm, structureless very dusky red clay which contains isolated mm-sized black inclusions at 88 and 91 cm. At 79-87 cm the clay bed is broken into cm to mm-sized fragments including brownish yellow (10YR 6/6) clay cement with similar character to the veins observed in the above material. The cm-size rock fragment at 105-116.5 cm is coated with dusky red material.

(Continued on next page.)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-26R-3 (Continued)

UNIT 12b: APHYRIC BASALT.

Pieces: 17-23

CONTACTS: None observed. The contact between Units 12a and 12b is inferred to be between Pieces 16 and 17 at 105 cm.

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, olivine, clinopyroxene and glass in an intersertal to intergranular texture.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1	4	Round

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

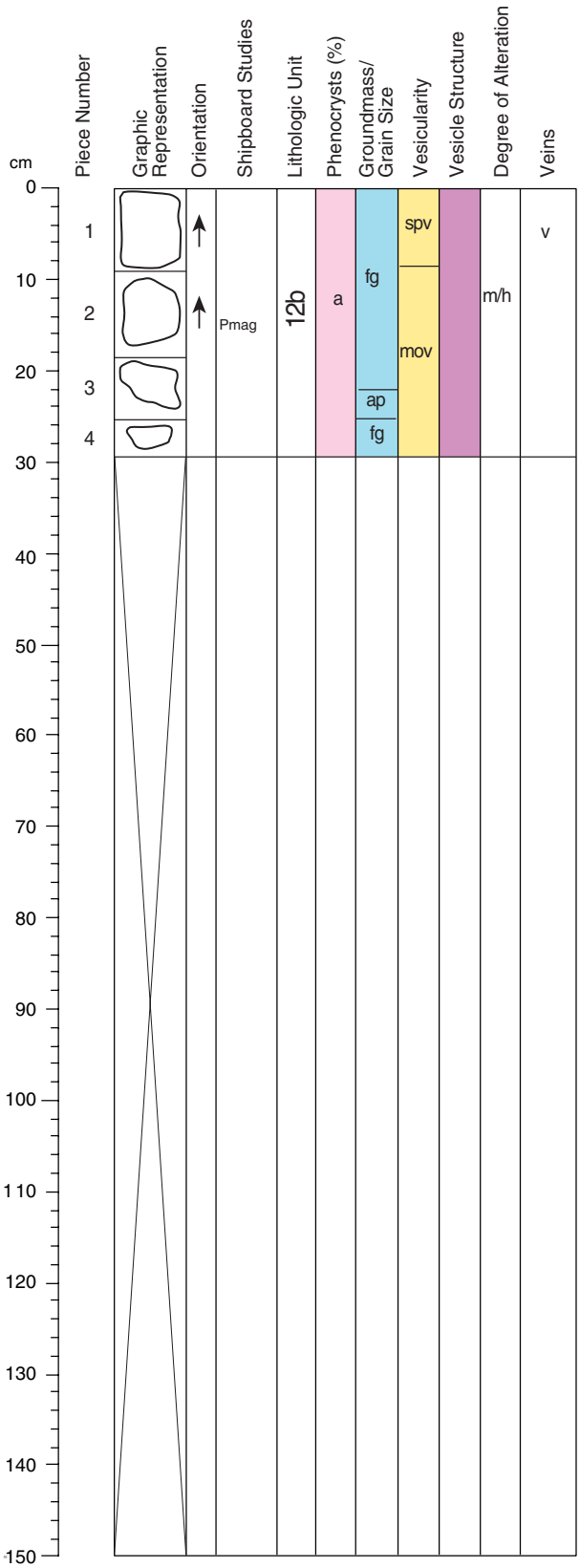
STRUCTURE: Massive.

ALTERATION: Moderate to high. Dark green clay is pervasive and has completely replaced olivine and glass. Olivine is replaced by Fe oxyhydroxide in alteration halos. Vesicles are filled with carbonate or unfilled. All are lined with dark green clay.

VEINS/FRACTURES: Pieces have broken along veins that are defined by Fe oxyhydroxide alteration halos up to 2 cm wide.

COMMENTS:
Piece 17 contains many fragments of basalt that have the red brown soil of Unit 12a adhering to them.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-26R-4 (Section top: 172.17 mbsf)

UNIT 12b: APHYRIC BASALT.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS: None.

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, olivine, clinopyroxene and black oxides.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
	2-10	3	Round

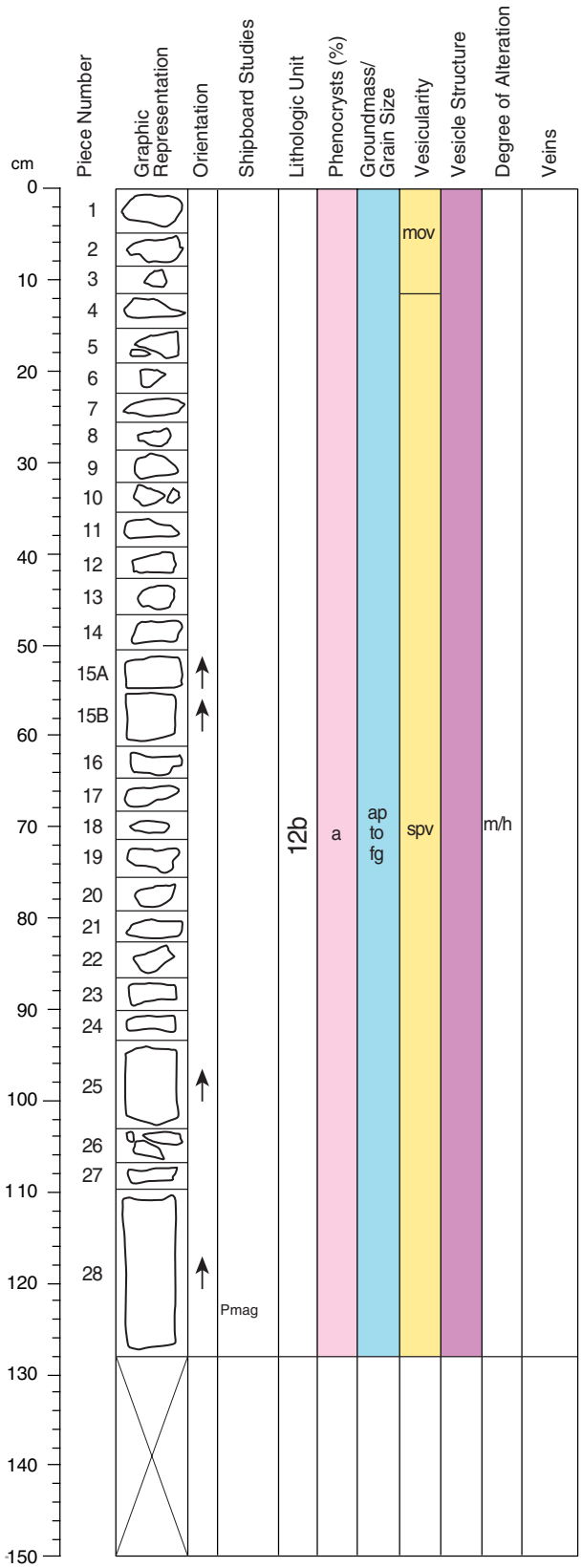
COLOR: Medium gray (N6).

STRUCTURE: Massive.

ALTERATION: Moderate to high. Alteration is most intense close to fractures. Groundmass olivine is partially to completely altered to Fe oxyhydroxide. Vesicles are partially to completely filled with blue-green clay.

VEINS/FRACTURES: Sparsely fractured. Fractures are <0.5 mm wide, and surrounded by brown alteration halos.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-27R-1 (Section top: 177.3 mbsf)

UNIT 12b: APHYRIC BASALT.

Pieces: 1-28

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<<1	3	1	2	Anhedral; prismatic

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, olivine, clinopyroxene and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
	1-15	3	Round

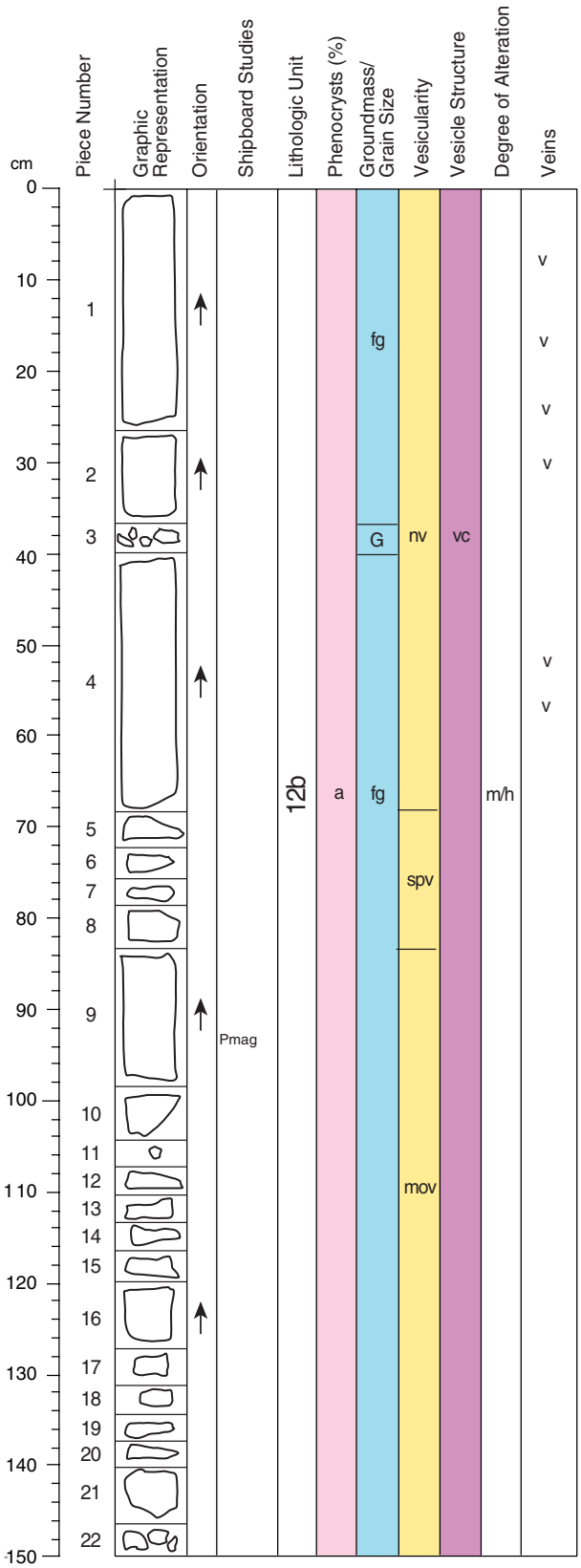
COLOR: Medium gray (N6).

STRUCTURE: Massive.

ALTERATION: Moderate to high. Groundmass olivine is partially altered to Fe oxyhydroxide. Rare plagioclase phenocrysts are partially altered to sericite along fractures. Vesicles are filled with carbonate, or lined with blue-green clay and well-shaped crystals of zeolite.

VEINS/FRACTURES: Sparsely fractured. Fractures are <0.5 mm wide, and lined with blue green clay and Fe oxyhydroxide.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-27R-2 (Section top: 178.58 mbsf)

UNIT 12b: APHYRIC BASALT.

Pieces: 1-22

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<<1	4	2	3	Subhedral; prismatic

GROUNDMASS: Fine grained to glassy. The groundmass consists of plagioclase, olivine, clinopyroxene and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
	0-10	5	Round to irregular

COLOR: Medium gray (N6).

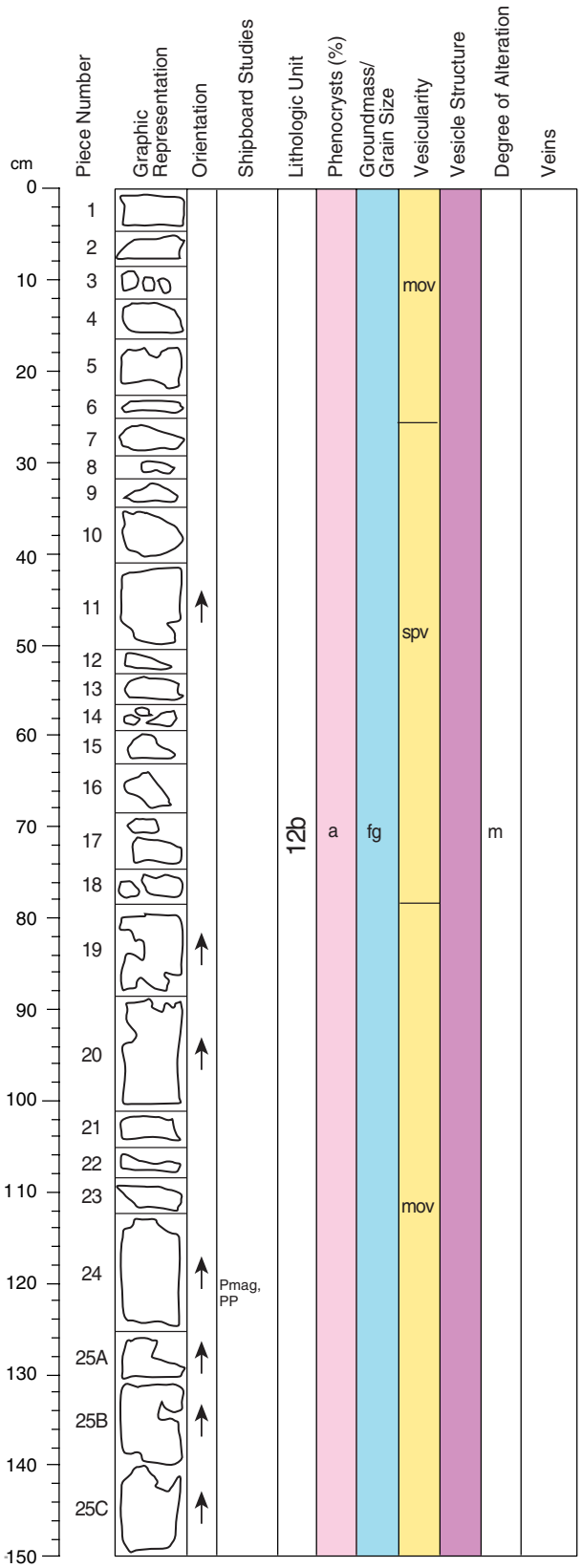
STRUCTURE: Lobed. Altered volcanic glass occurs in Piece 3.

ALTERATION: Moderate to high. Groundmass olivine is partially altered to Fe oxyhydroxide. Rare plagioclase phenocrysts are partially altered to sericite along fractures. Glass in Piece 3 is completely devitrified to gray clay. Vesicles are filled with carbonate, or lined with blue green clay and well-shaped, 0.5 mm wide orange crystals of zeolite.

VEINS/FRACTURES: Sparsely veined. Veins occur in Pieces 1 and 4, and are <0.5 mm wide, and filled with carbonate.

COMMENTS: Piece 3 consists of structureless gray clay, which is interpreted as altered glass in a segregation vein.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-27R-3 (Section top: 180.08 mbsf)

UNIT 12b: APHYRIC BASALT.

Pieces: 1-25

CONTACTS: None.

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, olivine, clinopyroxene and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
	1-10	5	Round and irregular

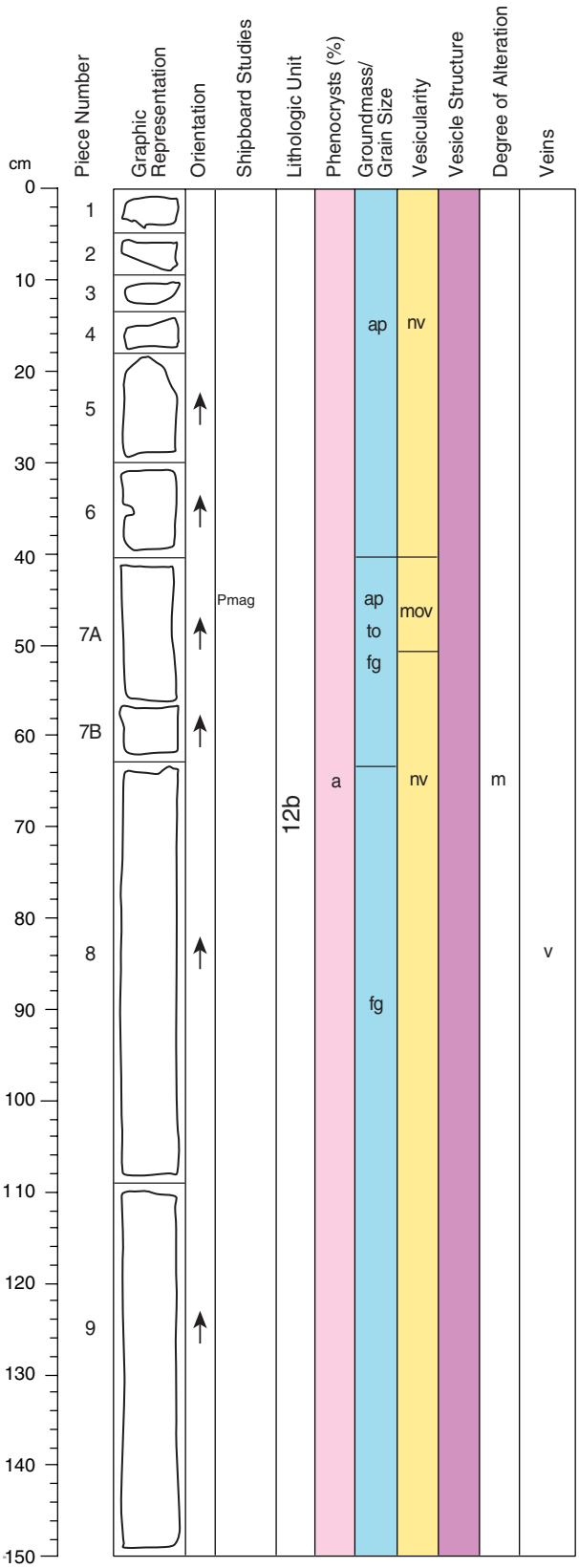
COLOR: Medium gray (N5).

STRUCTURE: Massive.

ALTERATION: Moderate. Groundmass olivine is partially altered to Fe oxyhydroxide. Vesicles are filled with carbonate, or lined with blue-green clay (celadonite), gray clay (or zeolite) and well-shaped crystals of zeolite or carbonate.

VEINS/FRACTURES: Sparsely fractured. Fractures are <0.5 mm wide, and lined with blue green clay and Fe oxyhydroxide or brown clay.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-27R-4 (Section top: 181.58 mbsf)

UNIT 12b: APHYRIC BASALT.

Pieces: 1-9

CONTACTS: None.

PHENOCRYSTS: None.

GROUNDMASS: Fine grained in the upper part of the section and grading to aphanitic in the lower part. The groundmass consists of plagioclase, clinopyroxene, black oxide, altered olivine, and highly altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<<1	3	Subround

COLOR: Medium light gray (N6).

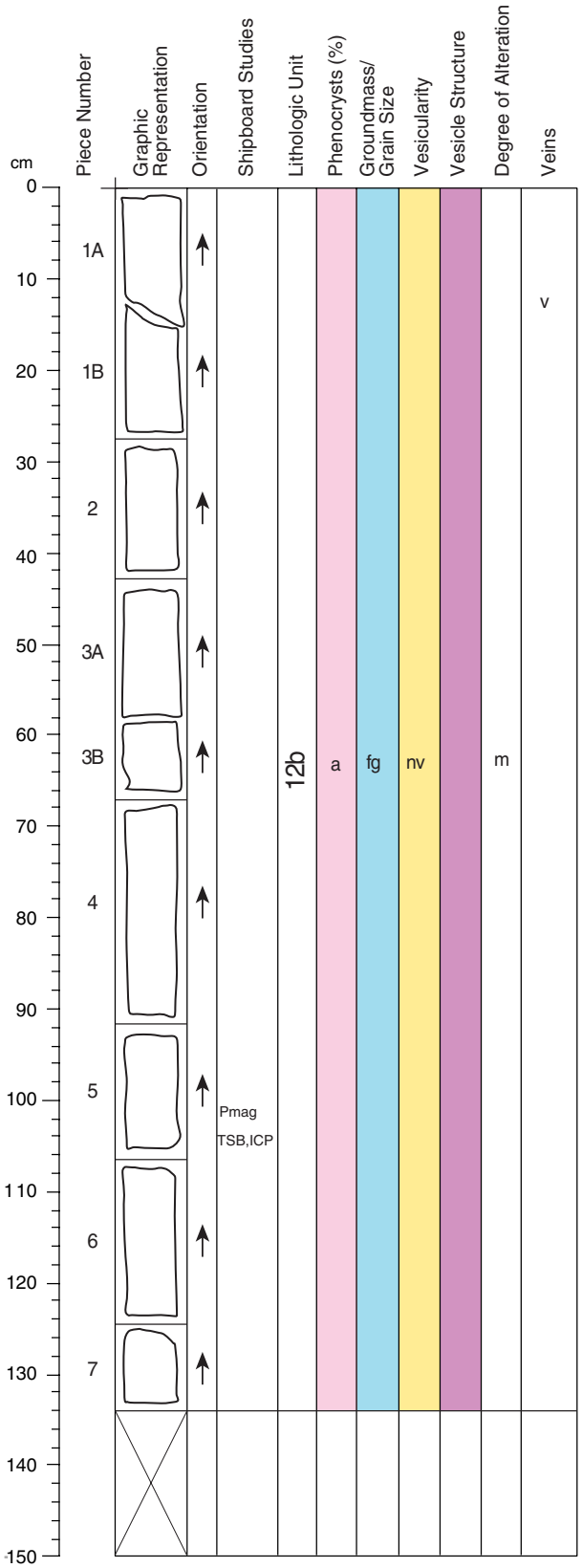
STRUCTURE: Massive.

ALTERATION: Moderate. Groundmass olivine and mesostasis are moderately to highly altered to Fe oxyhydroxide and bluish gray clay, respectively. Groundmass plagioclase is slightly altered. Vesicles are partially to completely filled with bluish greenish gray clay, except one vesicle at 27 cm is filled with white carbonate and vesicles at 40-50 cm are unfilled.

VEINS/FRACTURES: None.

COMMENTS: From 40-50 cm there are 10% vesicles ~2 mm and irregularly shaped. One or two ~4 mm plagioclase phenocrysts are scattered in the section.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-27R-5 (Section top: 183.08 mbsf)

UNIT 12b: APHYRIC BASALT.

Pieces: 1-7

CONTACTS: None.

PHENOCRYSTS: None.

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, black oxide, altered olivine, and moderately altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<<1	3	Subround

COLOR: Medium light gray (N6).

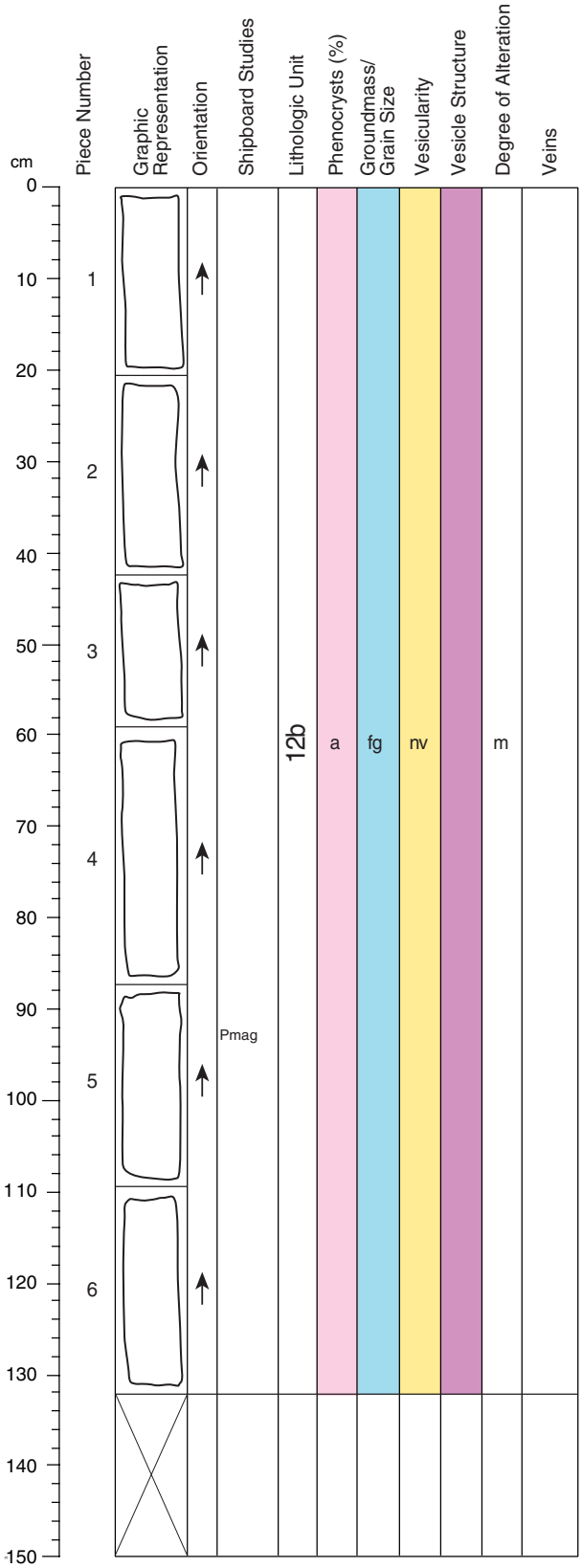
STRUCTURE: Massive.

ALTERATION: Moderate. Groundmass olivine and mesostasis are slightly to moderately altered to Fe oxyhydroxide and bluish gray clay, respectively. Groundmass plagioclase is slightly altered. Vesicles are partially to completely filled with bluish greenish gray clay.

VEINS/FRACTURES: None. A single subhorizontal vein at 12 cm is 1 mm wide and filled with gray clay.

COMMENTS: One or two plagioclase phenocrysts ~4 mm are scattered in the section.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-27R-6 (Section top: 184.42 mbsf)

UNIT 12b: APHYRIC BASALT.

Pieces: 1-6

CONTACTS: None.

PHENOCRYSTS: None.

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, black oxides, altered olivine, and moderately altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<<1	3	Subround

COLOR: Medium light gray (N6).

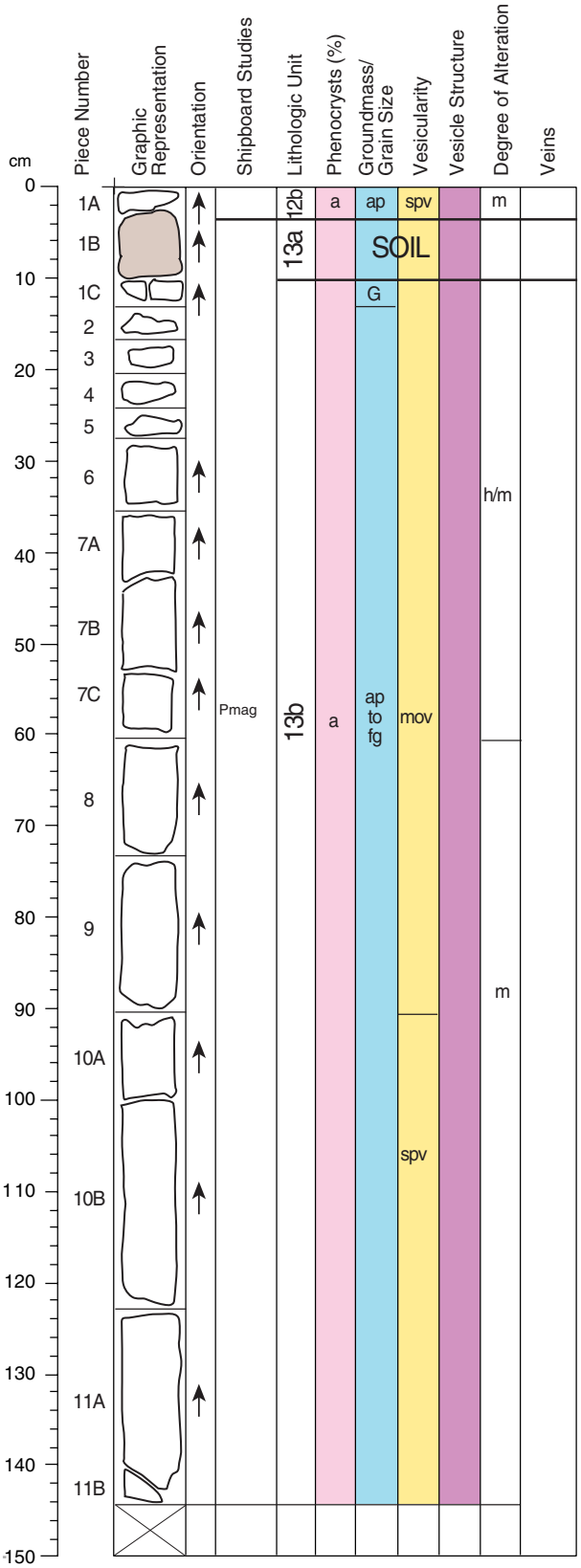
STRUCTURE: Massive.

ALTERATION: Moderate. Groundmass olivine and mesostasis are slightly to moderately altered to Fe oxyhydroxide and bluish gray clay, respectively. Groundmass plagioclase is slightly altered. Vesicles are partially to completely filled with bluish greenish gray clay.

VEINS/FRACTURES: None.

COMMENTS: One or two ~4 mm plagioclase phenocrysts are scattered in the section.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-28R-1 (Section top: 186.9 mbsf)

UNIT 12b: APHYRIC BASALT.

Pieces: 1A

CONTACTS: The boundary with the underlying soil of Unit 13a is at 4 cm between Pieces 1A and 1B.

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxides and partially altered olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	5	4	Round

COLOR: Medium light gray (N6).

STRUCTURE: None.

ALTERATION: Moderate. Groundmass olivine is partially altered to Fe oxyhydroxide. Groundmass plagioclase is slightly altered to sericite. Some vesicles are filled with carbonate, others are lined with blue-gray clay.

VEINS/FRACTURES: None.

UNIT 13a: RED-BROWN SOIL.

Pieces: 1B

CONTACTS: The contact with the overlying aphyric basalt of Unit 12b is at 4 cm, between Pieces 1A and 1B, and the contact with the underlying basalt of Unit 13b is at 10 cm, between Pieces 1B and 1C.

GENERAL DESCRIPTION: Piece 1B (at 0-9 cm) consists of a structureless dark brown soil. It is very fine grained (clay-sized particles), but contains sparse sand-sized pale brown particles.

COLOR: Dark brown (7.5YR 3/3) to pale brown (10YR 6/3).

UNIT 13b: APHYRIC BASALT.

Pieces: 1C-11

CONTACTS: The contact with the overlying soil of Unit 13a is at 10 cm, between Pieces 1B and 1C.

GROUNDMASS: Fine grained to aphanitic. Consists of plagioclase, clinopyroxene, black oxides and partially altered olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
	2-11	4	Round to irregular

COLOR: Gray (N4).

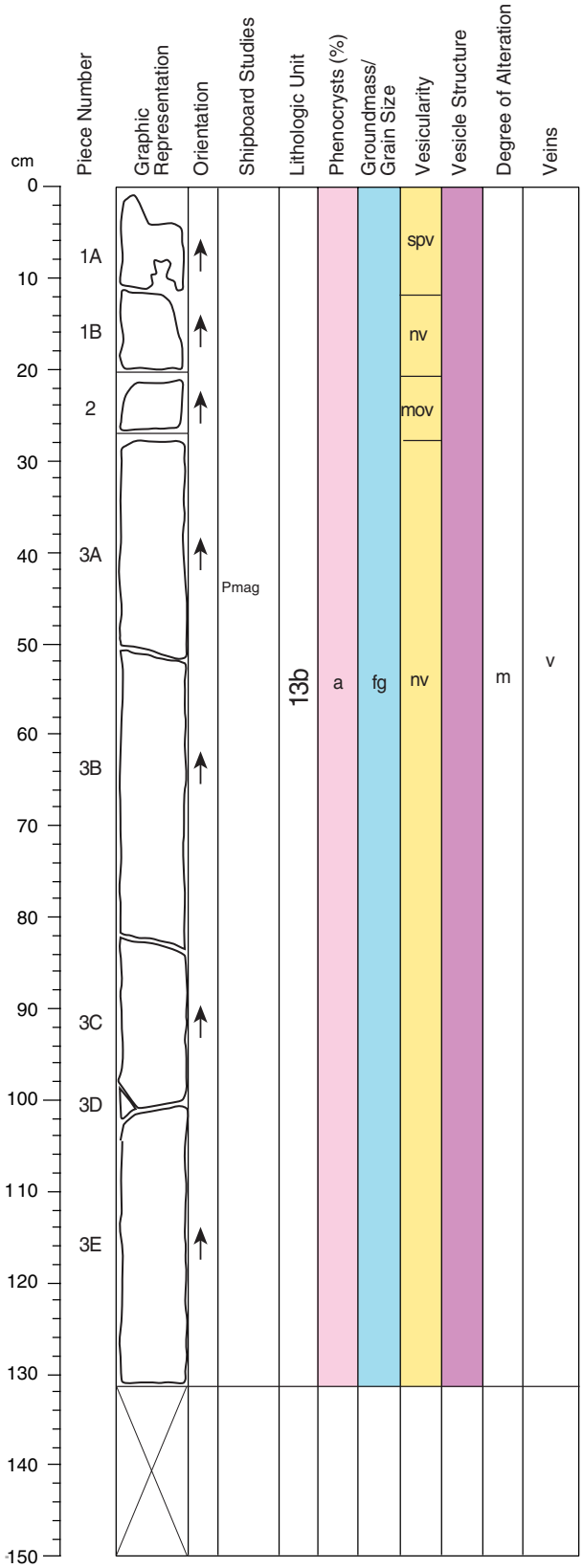
STRUCTURE: Massive.

ALTERATION: Moderate to high. Alteration is highest towards the top of the section. Groundmass olivine is partially altered to Fe oxyhydroxide, and groundmass plagioclase is partially altered to sericite. Vesicles are lined with clay minerals, which may be brown-red, blue-green, or dark green in color. Occasionally, vesicles are filled with carbonate and white zeolite minerals.

VEINS/FRACTURES: None.

COMMENTS: Vesicles are more abundant in the upper half of the section.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-28R-2 (Section top: 188.34 mbsf)

UNIT 13b: APHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, black oxide, altered olivine, and moderately altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
	0-5	3	Round

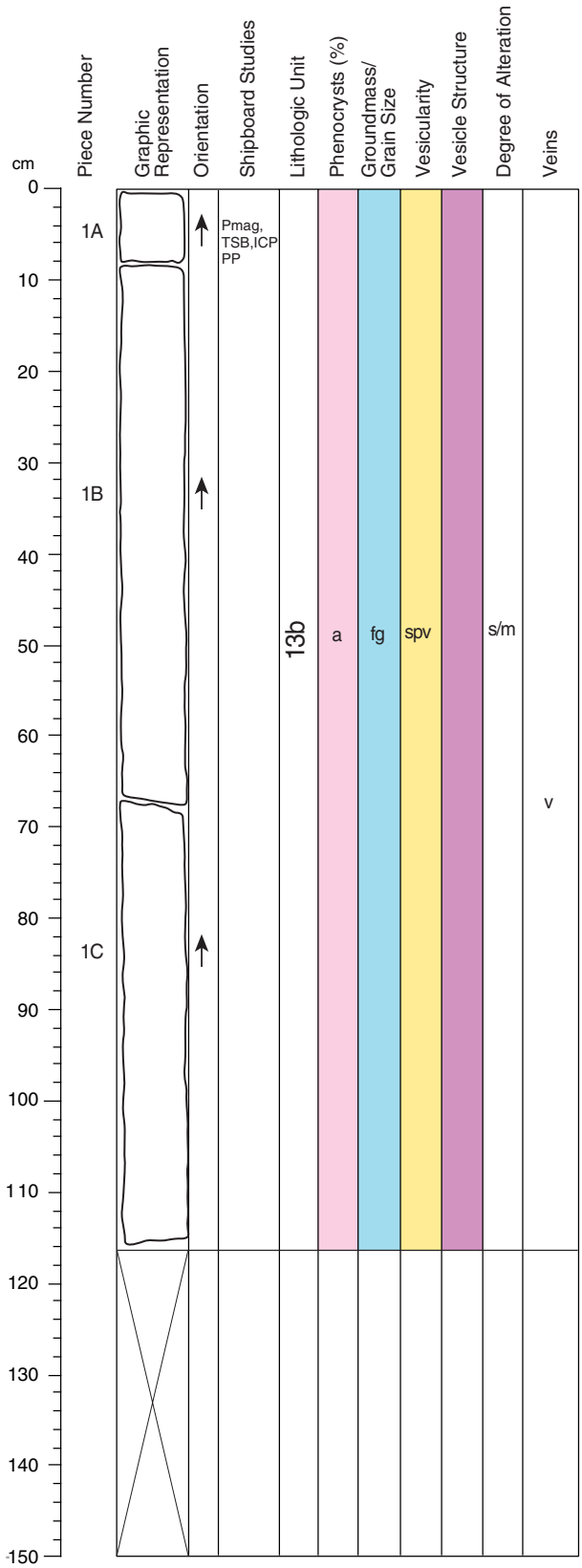
COLOR: Medium light gray (N6) to medium gray (N5)

STRUCTURE: Massive.

ALTERATION: Moderate. Groundmass olivine and mesostasis are slightly to moderately altered to Fe oxyhydroxide, and green clay and carbonate, respectively. Groundmass plagioclase is slightly altered. Vesicles are partially to completely filled with carbonate and green clay or grayish clay and Fe oxyhydroxide.

VEINS/FRACTURES: Sparsely veined. One thin (0.5 mm) vein is present in Piece 2A and is filled with carbonate, green clay, and Fe oxyhydroxide.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-28R-3 (Section top: 189.65 mbsf)

UNIT 13b: APHYRIC BASALT.

Pieces: 1

CONTACTS: None.

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, black oxides, small amounts of altered olivine, and moderately altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-3	2	Round

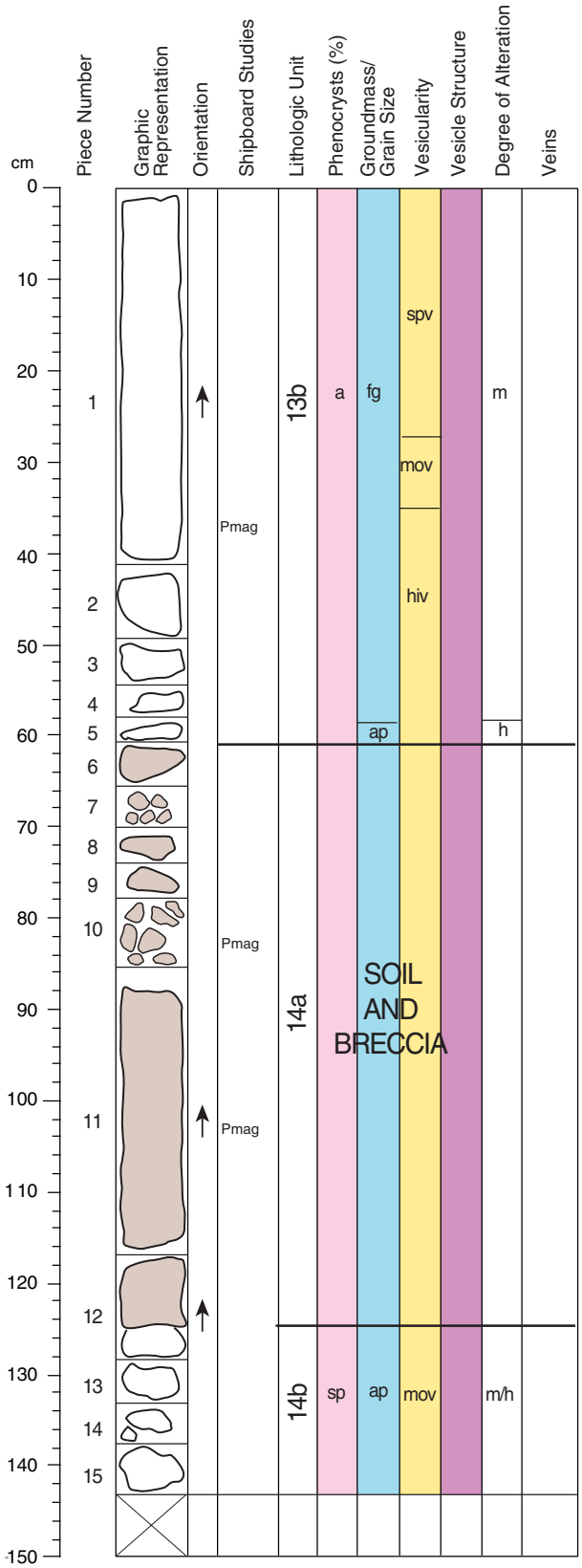
COLOR: Medium light gray (N6) to medium gray (N5).

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Groundmass olivine and mesostasis are slightly to moderately altered to Fe oxyhydroxide, green clay and carbonate. Groundmass plagioclase is slightly altered. Vesicles are completely filled with carbonate and green clay.

VEINS/FRACTURES: One vein/fracture separates Piece 1B and 1C, and is 0.5mm wide and filled with white carbonate.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-28R-4 (Section top: 190.8 mbsf)

UNIT 13b: APHYRIC BASALT.

Pieces: 1-5

CONTACTS: None observed. The boundary between Units 13b and 14a is inferred to be between Pieces 5 and 6 at 60 cm.

GROUNDMASS: Fine grained to aphanitic. Consists of plagioclase, clinopyroxene, small amounts of altered olivine, and glass in an intersertal to intergranular texture.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
	2-30	3	Round to elongate

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

STRUCTURE: Massive.

ALTERATION: Moderate to high. Green clay is pervasive. Glass and olivine are altered to brown clay. Vesicles are filled with zeolite (Pieces 3-5) or green clay (Pieces 1 and 2) or are unfilled and lined with pale blue clay. Fe oxyhydroxide is pervasive in Piece 5.

VEINS/FRACTURES: None.

UNIT 14a: RED-BROWN SOIL AND BRECCIA.

Pieces: 6–12

CONTACTS: The boundary between Units 13b and 14a is inferred to be between Pieces 5 and 6 at 60 cm. The contact between Units 14a and 14b is sharp in Piece 12 at 125 cm.

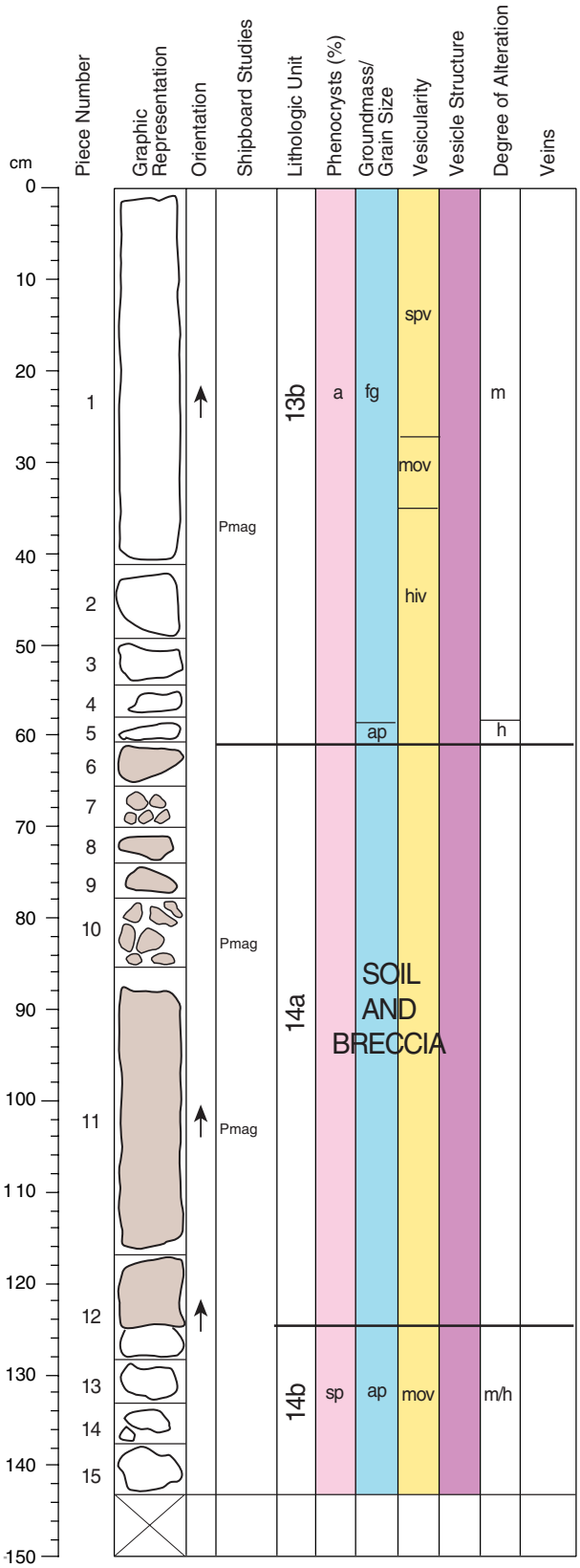
GENERAL DESCRIPTION: Angular, lapilli-size autoclasts (up to 4 cm) of sparsely to moderately vesicular, sparsely plagioclase-phyric basalt are present in Pieces 6, 7, 8, and 10. They are outlined by a 1–2 mm mantle of dark reddish brown clay and are cemented by brown clay. Vesicles (up to 3 mm) are elongate and either unfilled or filled with zeolite. Plagioclase phenocrysts in the basalt clasts are up to 1 cm in an aphanitic groundmass. It is possible that olivine microphenocrysts are present, but alteration precludes positive identification. The clasts are very highly to completely altered. The soil in Piece 11 contains sparsely plagioclase phyric basalt and breccia fragments (up to 3 cm). It is highly disturbed by drilling.

COLOR: Breccia cement: light brown (5YR 5/6). Clasts: dusky yellowish brown (10YR 2/2) to moderate brown (5YR 3/4). Soil: moderate reddish brown (10R 4/6) to dark reddish brown (10R 3/4).

COMMENTS:
The combination of soil and breccia containing lapilli-size autoclasts of sparsely plagioclase phyric basalt is inferred to represent the weathered top of a lava flow.

(Continued on next page.)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-28R-4 (Continued)

UNIT 14b: SPARSELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 12-15

CONTACTS: The contact between Units 14a and 14b is sharp in Piece 12 at 125 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	6	2	4	Subhedral; blocky
Olivine:	1	0.6	0.2	0.3	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and glass in an intersertal to intergranular texture.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	5-10	4	Round to elongate

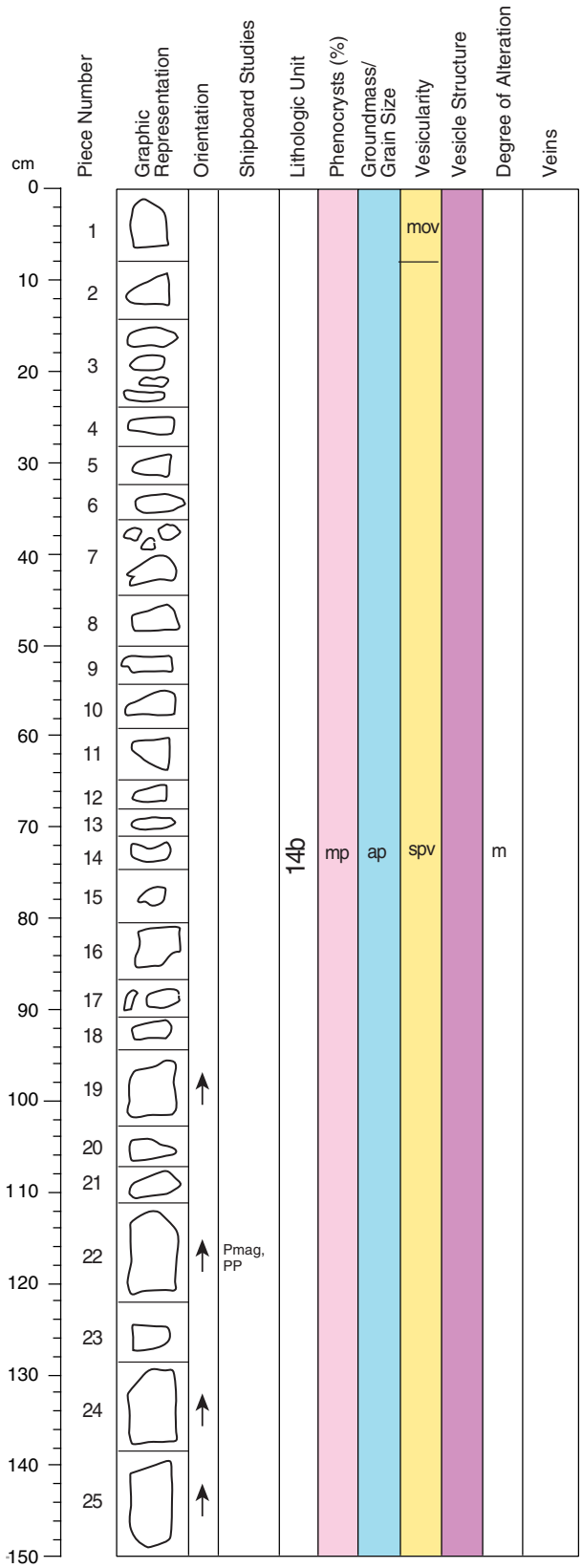
COLOR: Light bluish gray (5B 7/1).

STRUCTURE: None.

ALTERATION: Moderate to high. Blue green clay is pervasive and has completely replaced olivine and glass, but olivine is also highlighted by Fe oxyhydroxide. Vesicles are unfilled or filled with zeolite. Clinopyroxene is partially altered to blue green clay. The plagioclase phenocrysts are altered to clay(?) or replaced by zeolite(?).

VEINS/FRACTURES: One <0.1 mm wide vein is present in Piece 15 and is filled with Fe oxyhydroxide and green clay.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-29R-1 (Section top: 196.5 mbsf)

UNIT 14b: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-25

CONTACTS: None.

PHENOCRYSTS:

	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	10	1	4	Euhedral to anhedral
Olivine:	<1	2	1	1	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and glass in an intersertal to intergranular texture.

VESICLES:

% Mode	Size (mm): Average	Shape
3-7	4	Round to irregular

COLOR: Medium gray (N5).

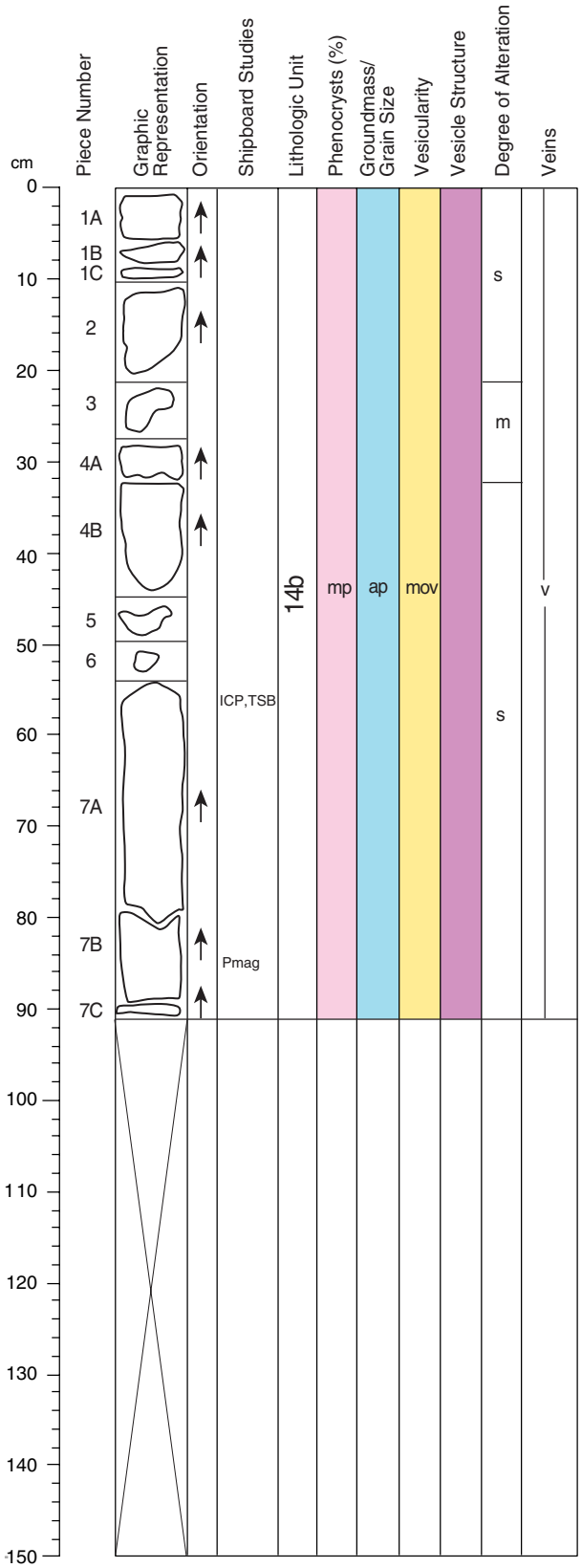
STRUCTURE: Massive.

ALTERATION: Moderate. Fe oxyhydroxide staining in Pieces 2-20 and 25. Olivine is clearly visible when partially altered to yellow orange Fe oxyhydroxide with interiors showing a black alteration product. Largest vesicles (4-10 mm) are partially filled with unidentified grayish blue (5BP 5/2) material; smaller vesicles have unidentified dark gray filling.

VEINS/FRACTURES: None.

COMMENTS: Olivine is associated with a large plagioclase phenocryst at 146 cm in Piece 25.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-29R-2 (Section top: 198.0 mbsf)

UNIT 14b: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-7

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	6-8	20	0.5	3	Subhedral to anhedral
Olivine:	1	1	0.5	0.7	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and glass in an intersertal to intergranular texture.

VESICLES:	% Mode	Size (mm): Average	Shape
0-54 cm	5-6	4	Round
54-90 cm	10	5	Elongate

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

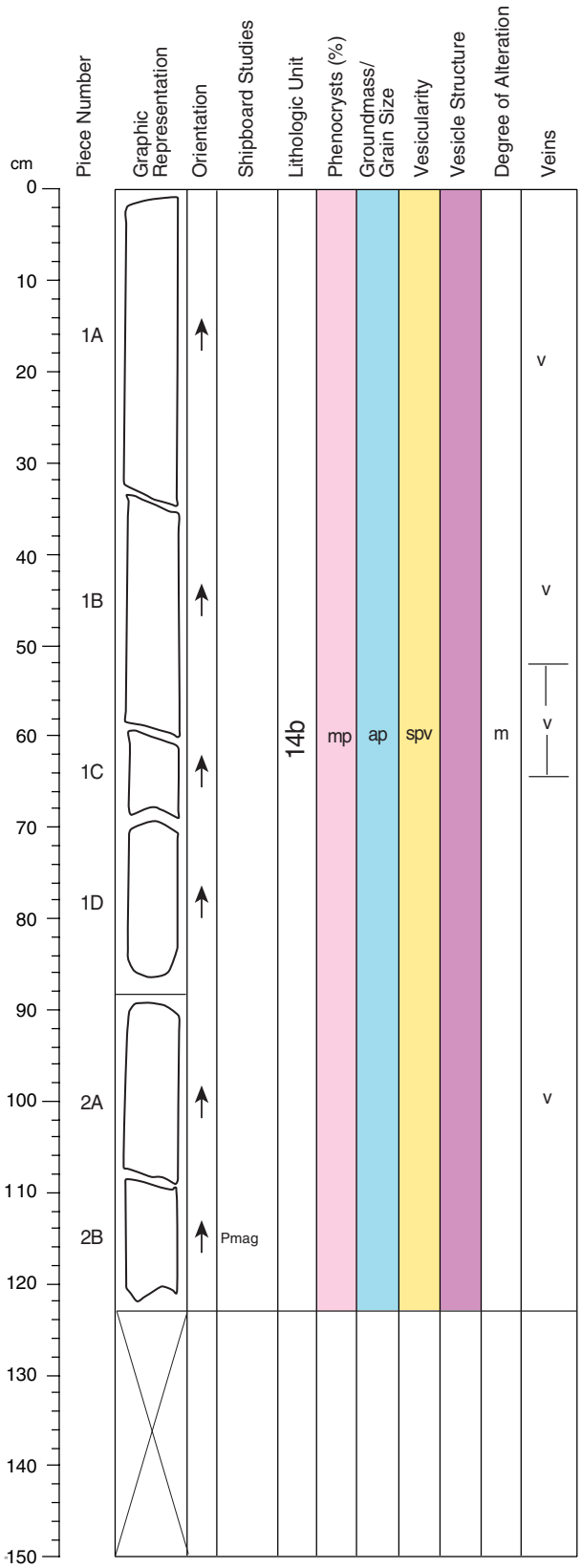
STRUCTURE: Massive from 0-54 cm. From 54-90 cm a flow foliation is present consisting of mm-wide subparallel dark gray bands. In this interval vesicles are elongated parallel to the foliation, along with tabular plagioclase phenocrysts.

ALTERATION: Slight to moderate. Blue green clay alteration is pervasive and has completely replaced olivine and glass, but presence of olivine is highlighted by Fe oxyhydroxide. Vesicles are unfilled or filled with blue green clay (celadonite?) and zeolite. Fe oxyhydroxide staining is often present, particularly near the edges of pieces.

VEINS/FRACTURES: Thin <0.1 mm wide veins are present throughout and are filled with dark brown/black clay. The rock is often fractured along these veins.

COMMENTS: In Piece 7 from 55-60 cm a series of plagioclase phenocrysts have elongate and sinuous shapes with trailing edges and are orientated parallel to foliation direction. This indicates they have been partly deformed by the lava flow. Olivine phenocrysts are occasionally associated with these deformed plagioclase, suggesting they may have a similar origin.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-29R-3 (Section top: 198.91 mbsf)

UNIT 14b: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	5	10	1	4	Euhedral to anhedral
Olivine:	3	4	1	1	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and glass in an intersertal to intergranular texture.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	5	4	Round to elongated

COLOR: Medium gray (N5).

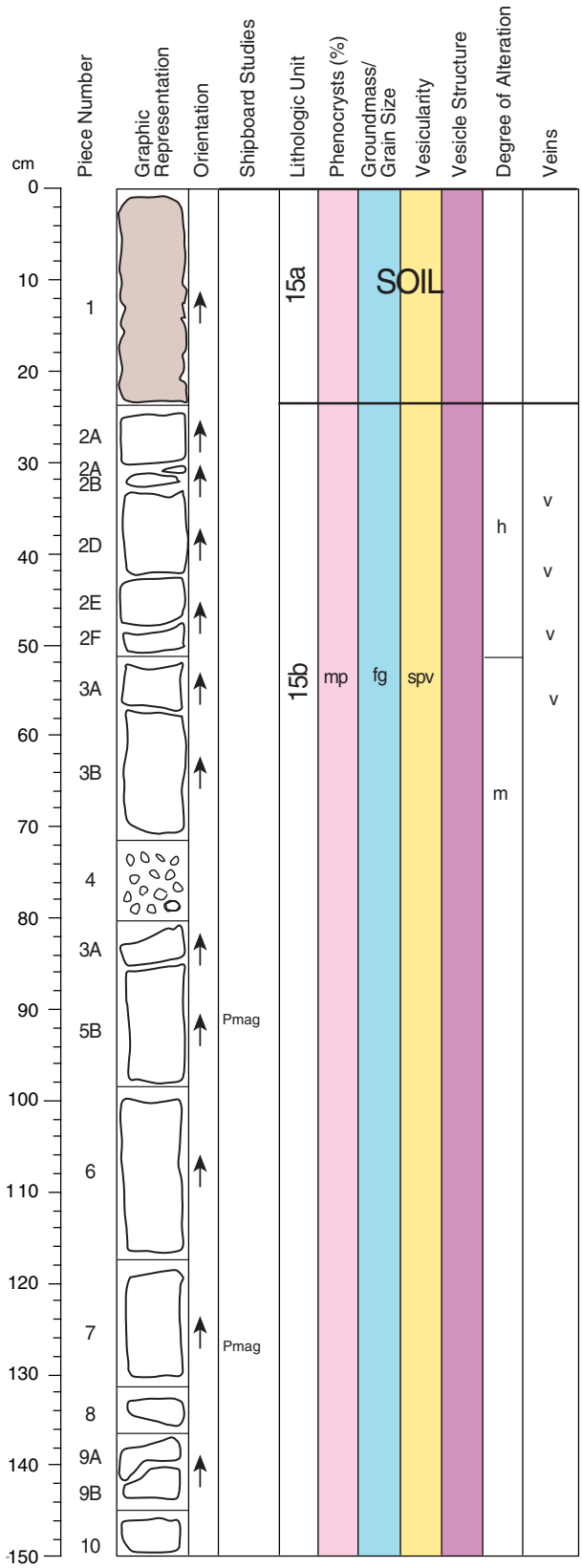
STRUCTURE: Massive. Vesicles are stretched (2:1 to 4:1) and oriented at 45° from horizontal to axis of core. In Piece 1B the tabular ~5 mm plagioclase phenocrysts also have this orientation.

ALTERATION: Moderate. Localized Fe oxyhydroxide staining on all pieces. Olivine is obvious when partially altered to yellow orange Fe oxyhydroxide with interiors showing a black alteration product. Vesicles are filled with dark gray clay.

VEINS/FRACTURES: Sparse. Clay filled veins (~1 mm) occur in Pieces 1A, 1B and 2A; the most prominent is subvertical from 53-67 cm.

COMMENTS: Olivine is most obvious when grains are altered to yellow orange with interiors partially altered to black material; it is less obvious when completely altered to black.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-29R-4 (Section top: 200.13 mbsf)

UNIT 15a: RED-BROWN SOIL

Pieces: 1

CONTACTS: Piece 1 of Section 29R-4 consists of red brown soil. A unit boundary between Units 15a and 15b is present at 22 cm (Piece 2) where there is the transition from soil material to basalt.

GENERAL DESCRIPTION: Interval with angular (broken) lava fragments mixed in with dark red brown silty clay (unconsolidated soil?).

COLOR: Dusky red (10R 3/4)

COMMENTS: Red silty clay with barely distinguishable laminae in varying shades of brown. Three black layers can be distinguished. The major components are altered glass, probably mostly as palagonite in various stages of alteration, and Fe oxide, sometimes as red iddingsite.

UNIT 15b: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 2–10

CONTACTS: The boundary between Units 15a and 15b is present at 22 cm, where there is a sharp transition from soil material to basalt.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	22	2	4	Eubhedral to anhedral
Olivine:	1	1.2	0.8	1	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, Fe oxyhydroxide altered olivine and glass in an intersertal to intergranular texture.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
Sparsely vesicular	2	4	Round to irregular

COLOR: Medium dark gray (N4).

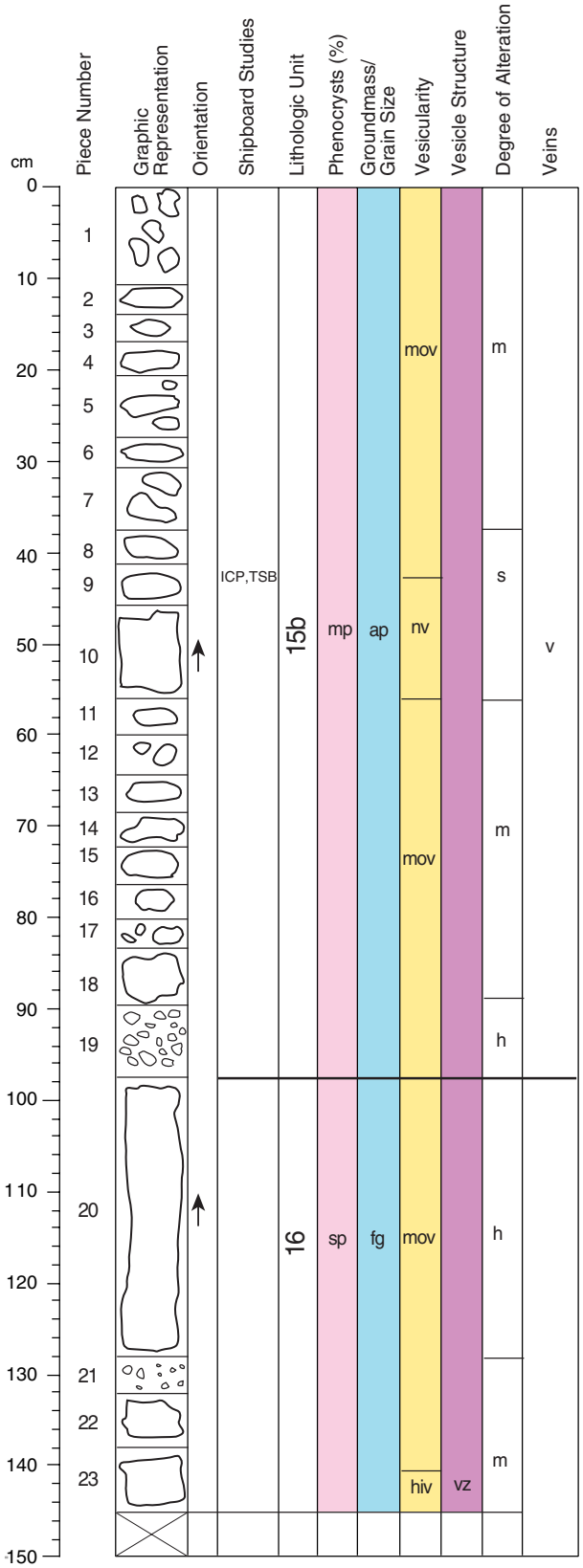
STRUCTURE: Massive.

ALTERATION: High to Moderate. Fe oxyhydroxide staining in Pieces 2A-2F. Olivine is most apparent when partially altered to yellow orange Fe oxyhydroxide and interiors to a black alteration product. Veins are filled with black clay and Fe oxyhydroxide. Vesicles contain dark clay and occasionally white amorphous clay.

VEINS/FRACTURES: Sparsely veined. Most veins occur from 30-60 cm and contain white clay, black clay or Fe oxyhydroxide.

COMMENTS: A Unit boundary is present at 22 cm and is defined by the transition from a soil to a lava.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-30R-1 (Section top: 206.1 mbsf)

UNIT 15b: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT*.

Pieces: 1-19

CONTACTS: None observed. Contact between Unit 15b and Unit 16 is inferred to be between Pieces 19 and 20 as Piece 19 represents the basal breccia of Unit 15b.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	8	1	4	Euhedral to anhedral
Olivine:	2	3	1	2	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and glass in an intersertal to intergranular texture.

VESICLES:	% Mode	Size (mm): Average	Shape
0-42 cm	7	3	Round to elongate
42-56 cm	<1	1	Round to elongate
56-98 cm	15	3	Round to elongate

COLOR: Medium gray (N5).

STRUCTURE: Massive.

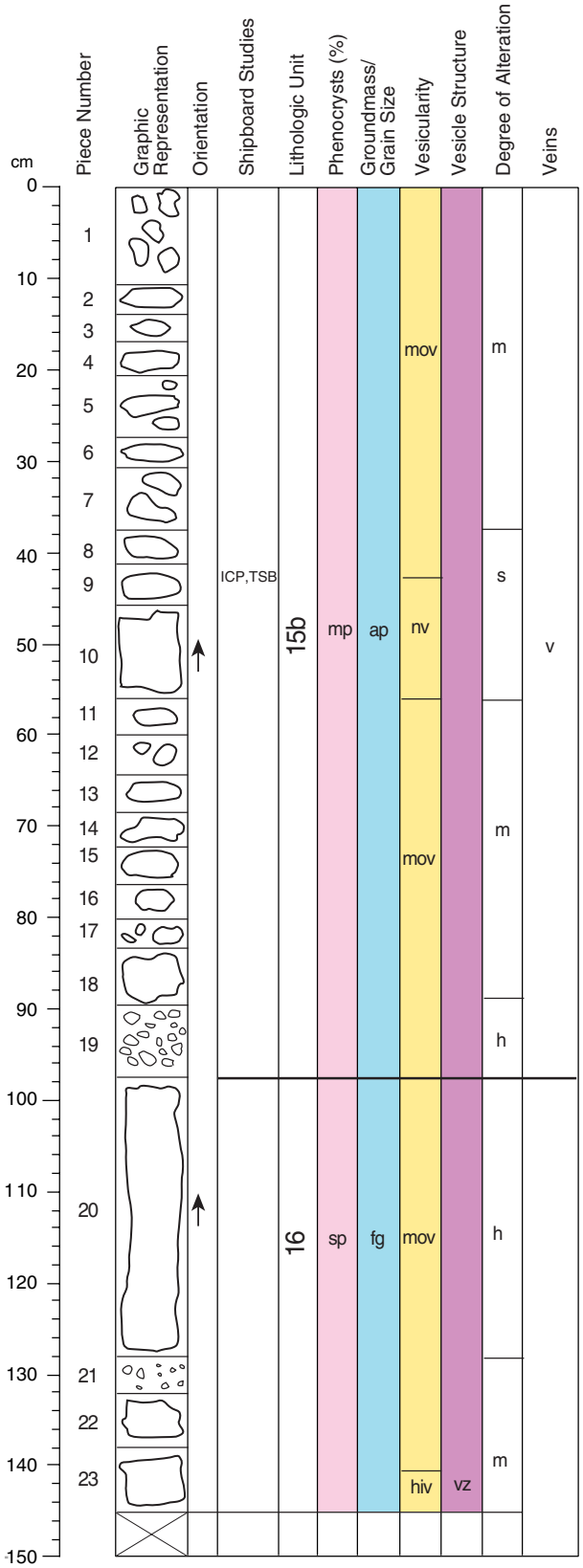
ALTERATION: Slight to high. High in the brecciated zones in Piece 19. The groundmass contains patches of blue-green altered mesostasis. Localized Fe oxyhydroxide staining is present on all pieces. Phenocrystic olivine is altered to yellow orange Fe oxyhydroxide or white carbonate, and is distinguished by the characteristic fractures. Vesicles are filled with white carbonate.

VEINS/FRACTURES: Sparsely veined. Dark brown clay filled veins (~1 mm) occur in Piece 10.

COMMENTS: *While the phenocryst abundance has increased, the unit name is kept the same for consistency. Plagioclase frequently displays embayed margins and often is associated with olivine phenocrysts.

(Continued on next page)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-30R-1 (Continued)

UNIT 16: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 20-23

CONTACTS: None observed. The boundary between Unit 15b and Unit 16 is inferred to be between Pieces 19 and 20 as Piece 19 represents the basal breccia of Unit 15b and Piece 20 represents a weathered flow top.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	4	1	3	Euhedral to anhedral
Olivine:	1	1.5	1.5	1.5	Subhedral; equant

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, and glass in an intersertal to intergranular texture.

VESICLES:	% Mode	Size (mm): Average	Shape
98-142 cm	15	3	Round to elongated
142-146 cm	25	2	Elongated

COLOR: Medium gray (N5).

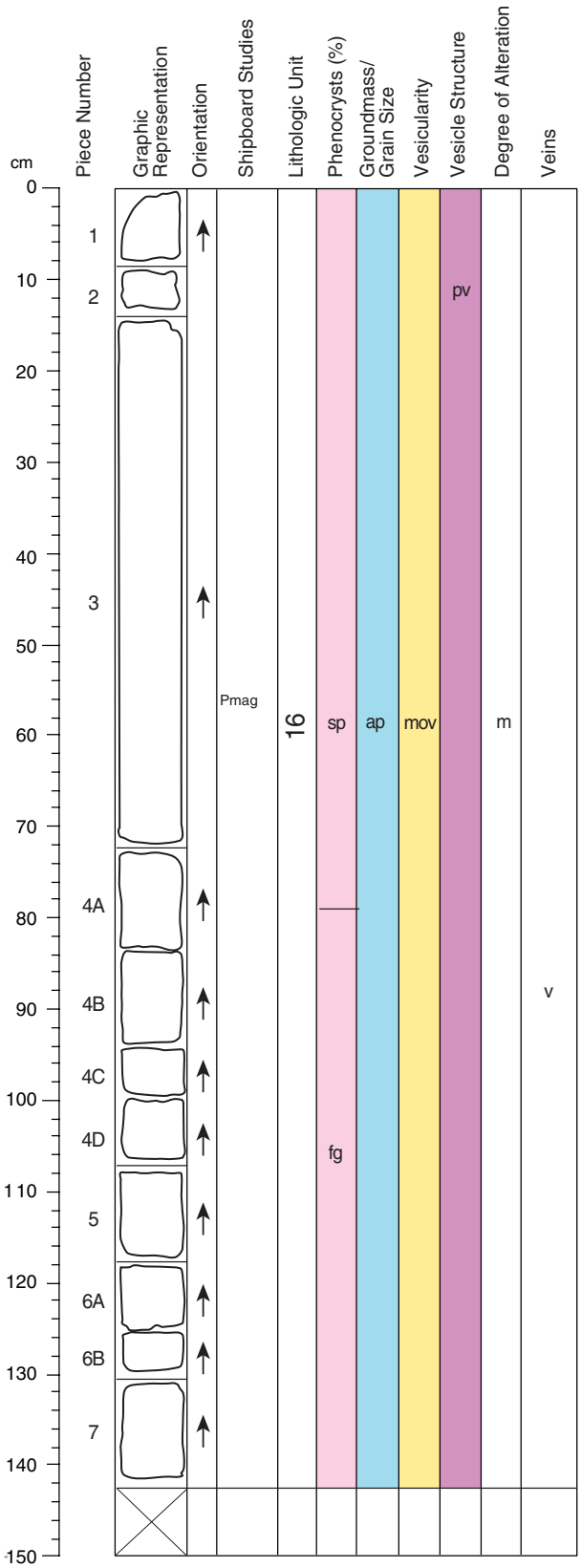
STRUCTURE: Massive. Piece 20 consists of red oxidized brecciated fragments which graduate into the coherent lava of Piece 21 and represent the weathered top of the flow.

ALTERATION: Moderate to high. High in the brecciated zones in Pieces 19-20. The groundmass contains patches of blue-green altered mesostasis. Localized Fe oxyhydroxide staining is present on all pieces. Phenocrystic olivine is altered to yellow orange Fe oxyhydroxide or white carbonate, and is distinguished by the characteristic fractures. Vesicles are filled with white carbonate.

VEINS/FRACTURES: None.

COMMENTS: Plagioclase frequently displays embayed margins and often is associated with olivine phenocrysts. A vesicular zone is present at 142-146 cm and consists of an arcuate subparallel band of elongate and distorted vesicles.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-30R-2 (Section top: 207.55 mbsf)

UNIT 16: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-7

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	10	4	4	Subhedral to anhedral
Olivine:	<1	1	0.5	1	Subhedral; equant

GROUNDMASS: Aphanitic to fine grained. The groundmass consists of plagioclase, clinopyroxene, and glass in an intersertal to intergranular texture. A transition from aphanitic to fine grained is present in Piece 4A.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	15	6	Round to irregular

COLOR: Medium gray (N5).

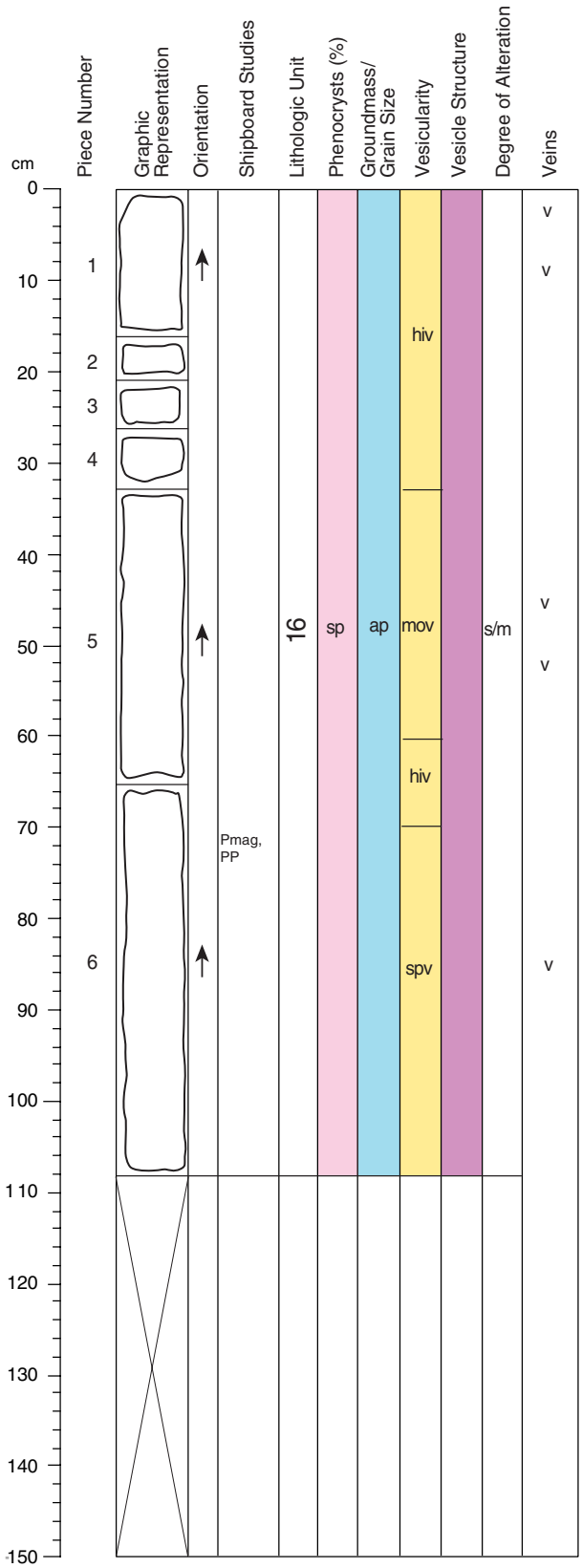
STRUCTURE: Lobed.

ALTERATION: Moderate. The groundmass contains patches of blue-green altered mesostasis. Localized Fe oxyhydroxide staining is present in bands on Pieces 3 and 4. Phenocrystic olivine is altered to yellow orange Fe oxyhydroxide and is distinguished by the characteristic fractures. Vesicles are filled with white very fine grained material (not carbonate), green clay and occasionally Fe oxyhydroxide.

VEINS/FRACTURES: Sparsely veined. <1 mm wide veins occur within the flow banded interval in Piece 4B.

COMMENTS: Plagioclase frequently displays embayed margins and often is associated with olivine phenocrysts (see Piece 4A). Although vesicularity is moderate throughout the section, there are distinct vesicular zones where the size of vesicles decrease downward. From 0-40 cm, vesicles have an average size of ~5 mm. From 40-78 cm, vesicles average 0.8 mm in diameter. From 78-150 cm vesicles have an average size of 10 mm, and many vesicles are coalesced.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-30R-3 (Section top: 208.98 mbsf)

UNIT 16: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-6

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1-2	9	2	4	Euhedral to subhedral
Olivine:	<1	3	1	1	Euhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and glass.

VESICLES:	% Mode	Size (mm): Average	Shape
0-34 cm	25	2	Round to irregular
34-60 cm	10	2	Round to irregular
60-68 cm	25	2	Round to irregular
68-108 cm	5	2	Round to irregular

COLOR: Medium gray (N5).

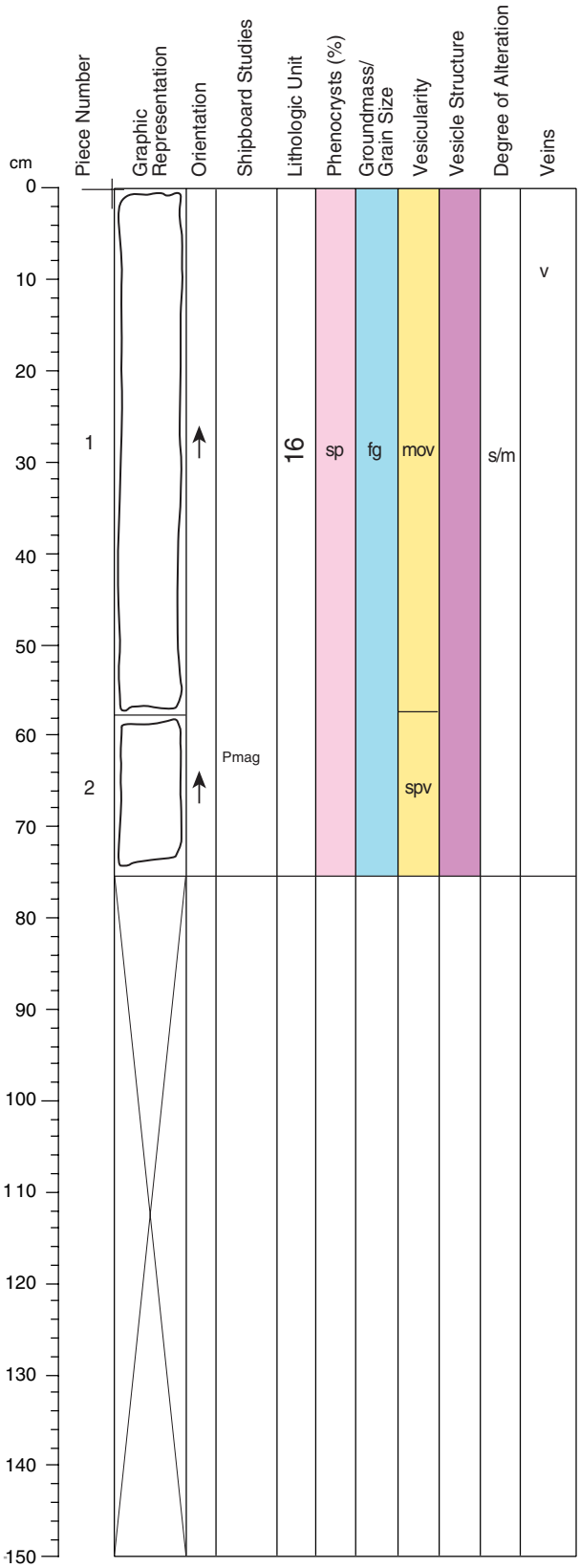
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Vesicles are filled with carbonate, Fe oxyhydroxide, green clay and zeolite (?). Dark green alteration halos around tiny vesicles, 1-2 mm in radius, are present throughout the section. Olivine phenocrysts are altered to Fe oxyhydroxide or replaced by carbonate.

VEINS/FRACTURES: Sparsely veined. <1 mm wide veins are present in Pieces 1, 5 and 6, filled with carbonate, Fe oxyhydroxide, and pale green clay.

COMMENTS: Some plagioclase phenocrysts are intergrown with clinopyroxene and/or olivine.
Some vesicles are elongated along flow foliations.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-30R-4 (Section top: 210.06 mbsf)

UNIT 16: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	5	2	3	Euhedral to subhedral
Olivine:	<1	1	1	1	Euhedral; equant

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, and olivine. Most olivine is altered.

VESICLES:	% Mode	Size (mm): Average	Shape
0-57 cm	10	2	Round
57-75 cm	2	2	Round

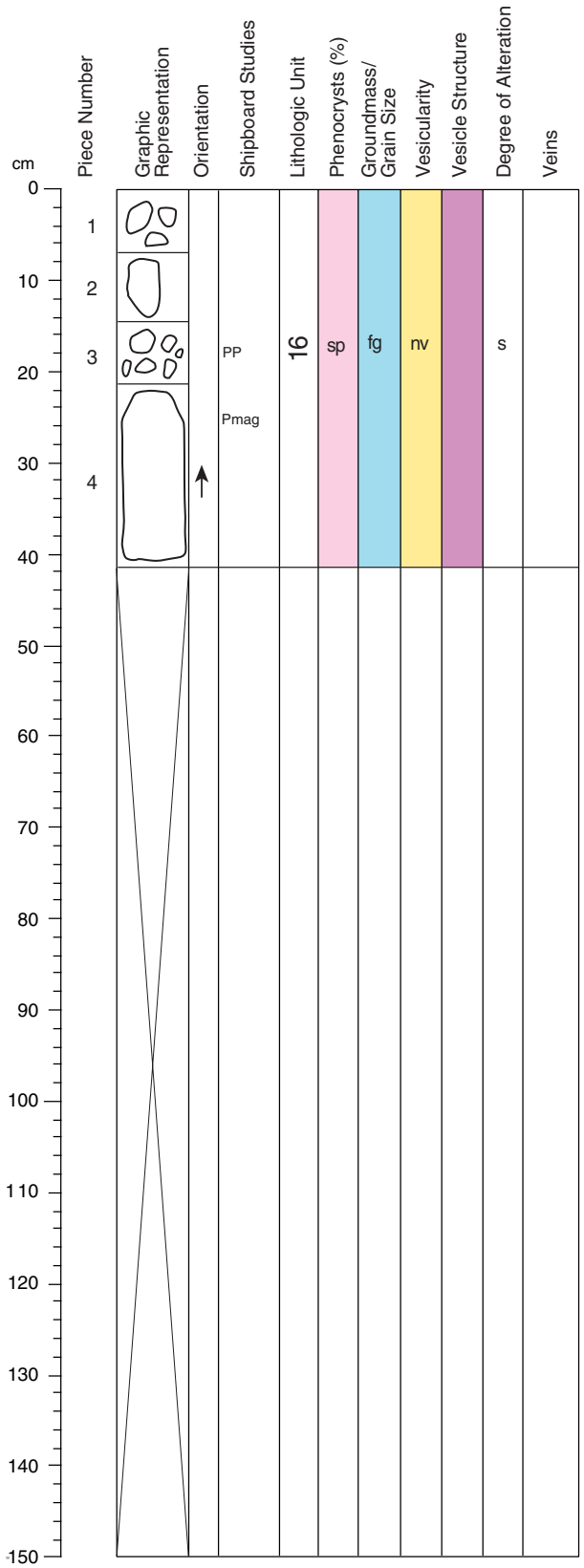
COLOR: Medium gray (N5).

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Vesicles are filled with carbonate, pale green clay and zeolite. Dark green alteration halos around tiny vesicles, 1-2 mm in radius, are present throughout the section. Most olivine phenocrysts are altered to Fe oxyhydroxide or replaced by carbonate. Unaltered olivine is present in both phenocrysts and groundmass.

VEINS/FRACTURES: Sparsely veined. One subhorizontal, carbonate filled vein (<<1 mm) is present in Piece 1 at 10 cm.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-31R-1 (Section top: 215.8 mbsf)

UNIT 16: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	5	2	3	Subhedral

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<0.5	1	Round

COLOR: Medium gray (N5).

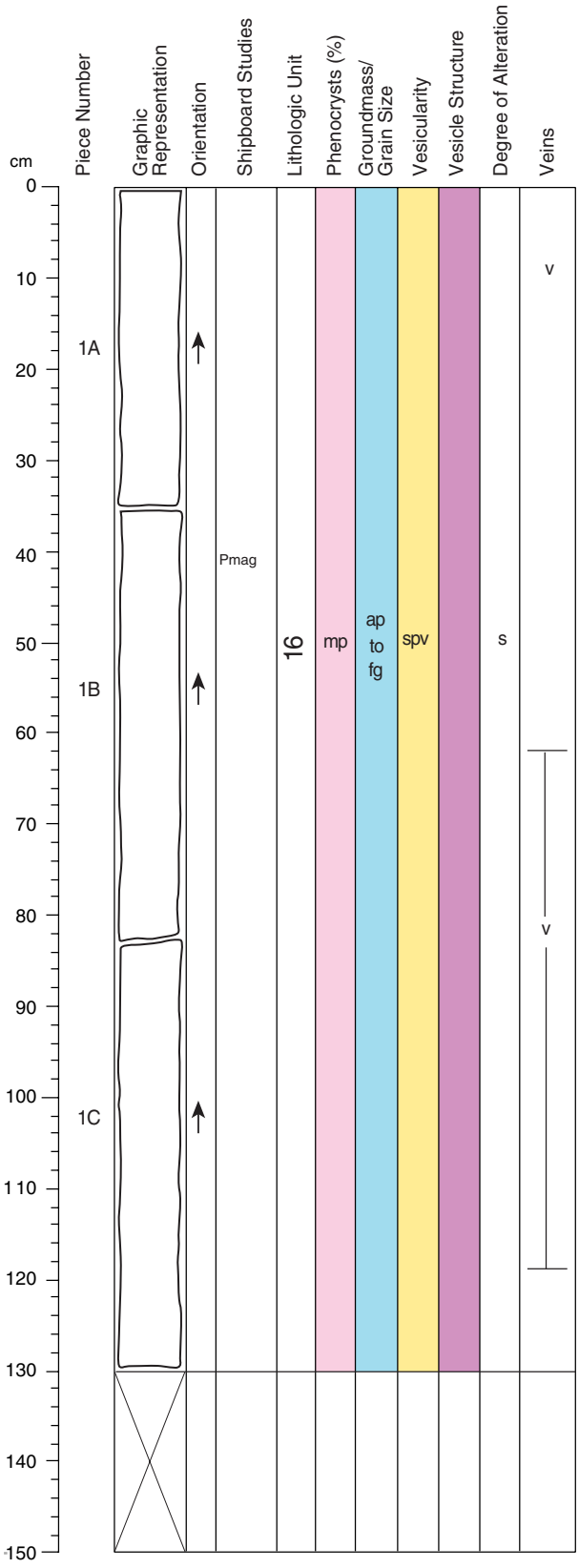
STRUCTURE: Massive.

ALTERATION: Slight. Rare vesicles are filled with pale green clay. Patches of blue-green material in the groundmass represent altered mesostasis.

VEINS/FRACTURES: None.

COMMENTS: There is an absence of phenocrystic olivine in this section, though it is present in the rest of the unit.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-32R-1 (Section top: 217.5 mbsf)

UNIT 16: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	7	2	3	Euhedral to subhedral
Olivine:	1	5	1	1	Euhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, and olivine. Most olivine is unaltered.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	5	3	Round to irregular

COLOR: Medium light gray (N6).

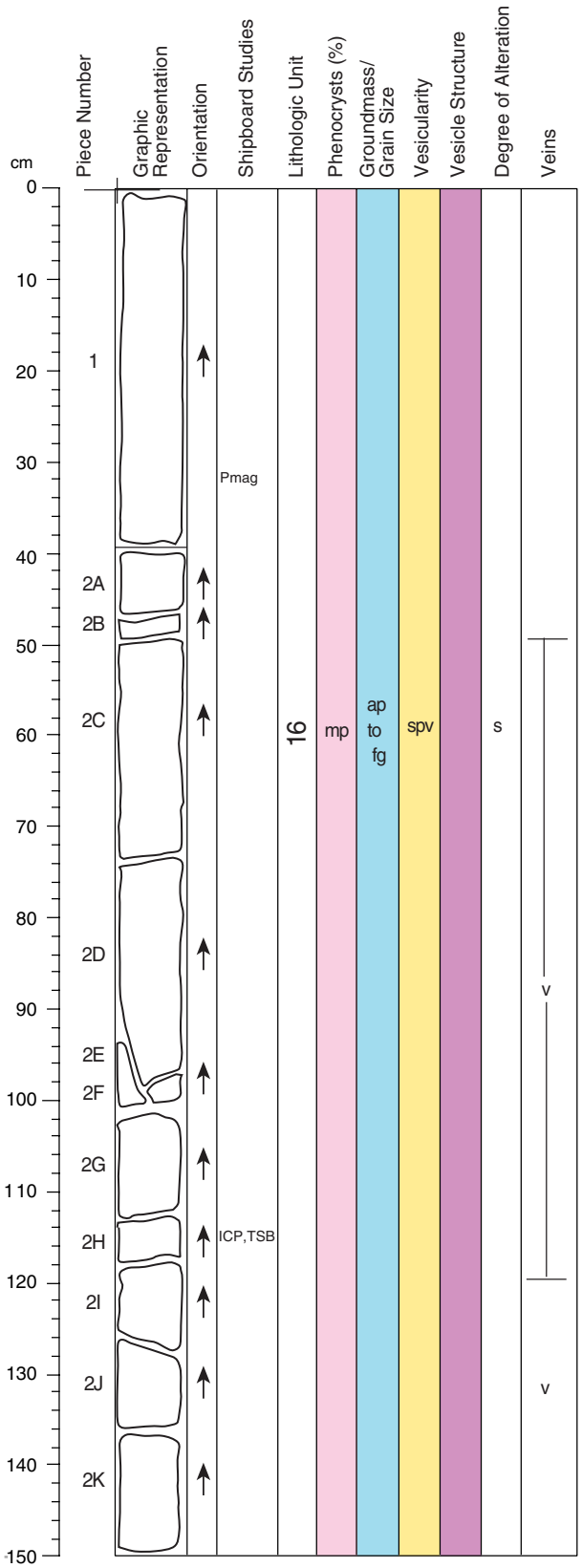
STRUCTURE: Massive.

ALTERATION: Slight. Vesicles are filled with carbonate and zeolite(?). Dark green alteration halos, 1-2 mm in radius, are present around tiny vesicles. Unaltered olivine is present in both groundmass and phenocrysts.

VEINS/FRACTURES: Sparsely veined. One subhorizontal, carbonate filled vein (<1 mm) is present in Piece 1A at 10 cm. Several irregular vesicles, 3-10 mm in size, are lined by this vein. One subvertical vein (2-4 mm), filled by pale green clay and carbonate, is present in Pieces 1B and 1C. Several <1-2 mm wide veins are subparallel to this vein, and filled by carbonate.

COMMENTS: Some plagioclase phenocrysts are intergrown with clinopyroxene and/or olivine.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-32R-2 (Section top: 218.8 mbsf)

UNIT 16: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	10	2	4	Euhedral to subhedral
Olivine:	1	10	1	1	Euhedral; equant

GROUNDMASS: Fine grained to aphanitic. The groundmass consists of plagioclase, clinopyroxene, and olivine. Most olivine is unaltered.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	5	3	Irregular

COLOR: Medium light gray (N6).

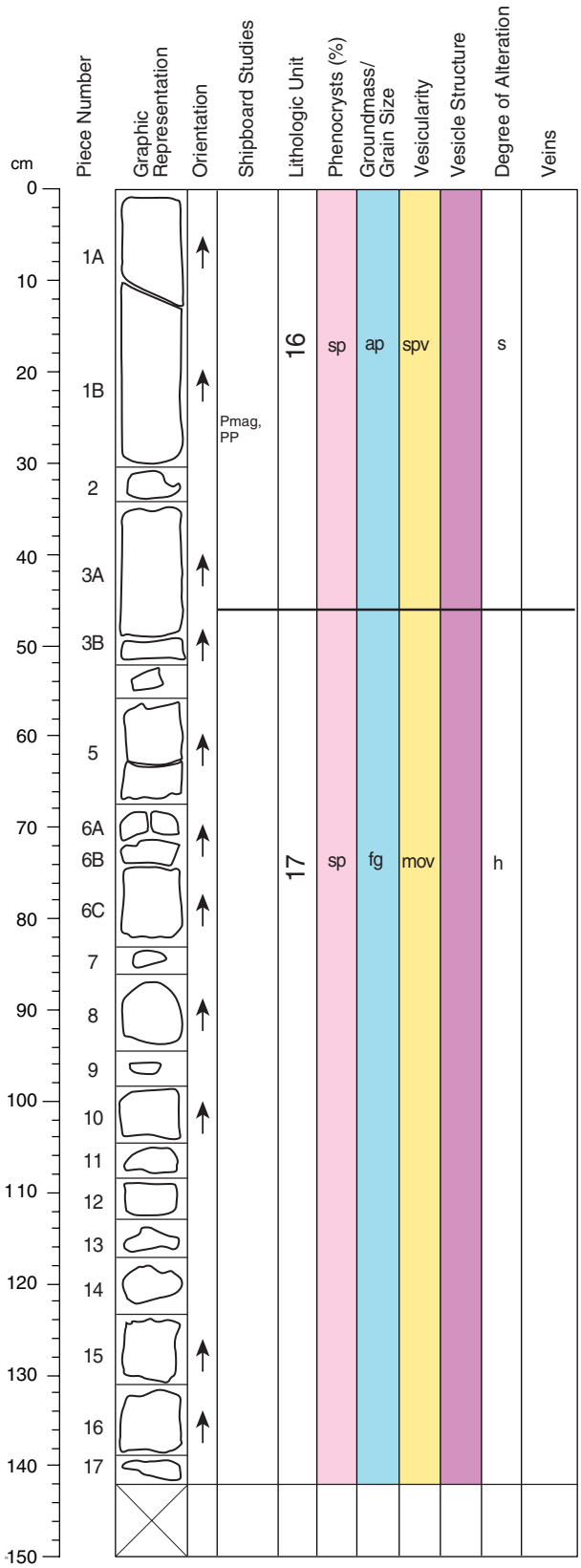
STRUCTURE: Massive.

ALTERATION: Slight. Vesicles are filled with pale green clay, white clay(?), carbonate and zeolite(?). Dark green alteration halos, 1-2 mm in radius, are present around tiny vesicles. Unaltered olivine is present in both groundmass and phenocrysts.

VEINS/FRACTURES: Sparsely veined. <1-4 mm wide veins are present in Pieces 2C-2H and 2J, filled with carbonate and pale green clay.

COMMENTS: Some plagioclase phenocrysts are intergrown with clinopyroxene and/or olivine.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-32R-3 (Section top: 220.3 mbsf)

UNIT 16: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-3A

CONTACTS: A sharp contact convoluted on a mm scale is present between the aphanitic base of Unit 16 and the weathered (oxidized) top of Unit 15 below at 46 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	6	1	3	Euhedral to subhedra

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	5	4	Irregular

COLOR: Medium light gray (N6).

STRUCTURE: Massive.

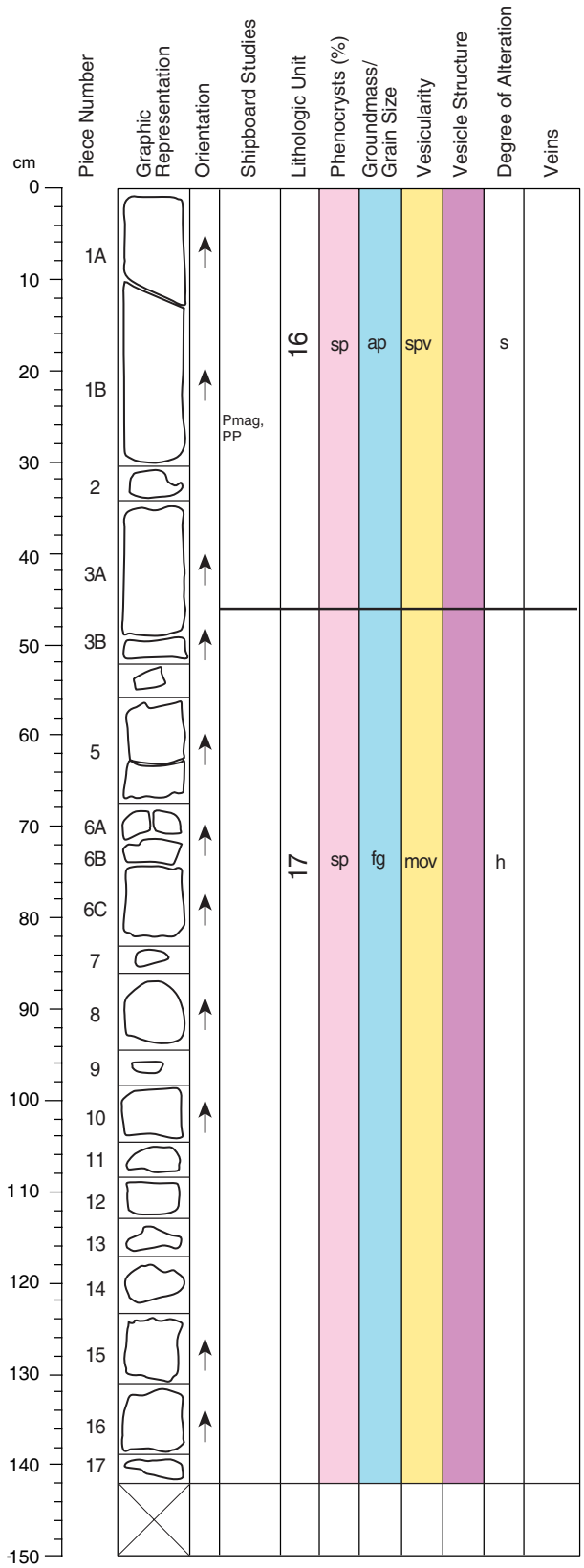
ALTERATION: Slight. Vesicles are filled with carbonate and zeolite(?). Within 2 cm of the basal contact, olivine is picked out as it is altered to Fe oxyhydroxide and plagioclase is altered to sericite(?).

VEINS/FRACTURES: None.

COMMENTS: There is an absence of phenocrystic olivine in this section, though it is present in the rest of the unit.

(Continued on next page)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-32R-3 (Continued)

UNIT 17: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 3B -17

CONTACTS: A sharp contact, convoluted on a mm scale is present between the aphanitic base of Unit 16 and the weathered (oxidized) top of Unit 17 below at 46 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	3	1	2	Subhedral
Olivine:	<1	1.5	1	1	Equant; euhedral

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, and olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	8-10	4	Round to irregular

COLOR: Dark brown (10YR 3/2) in more altered areas and medium light gray (N6) in less altered pieces.

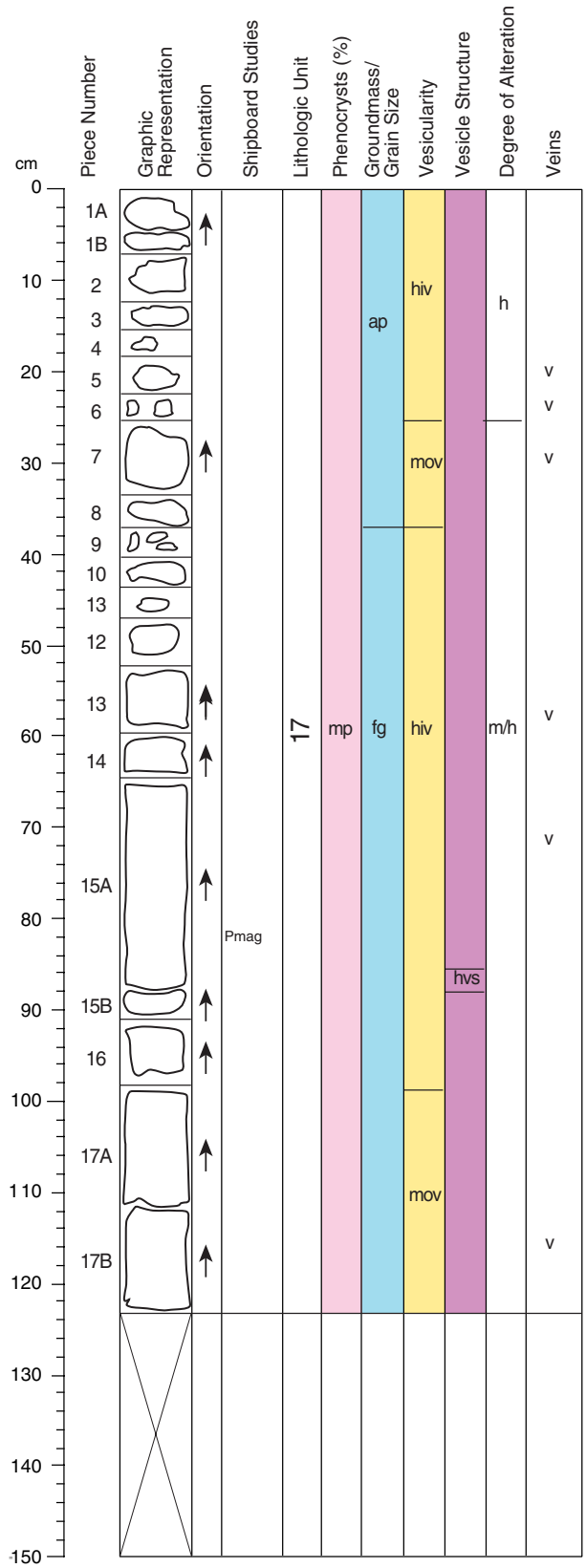
STRUCTURE: Pieces 3-8 are brecciated and represent a flow top.

ALTERATION: High. Pieces 3-17 represent the penetrative oxidation zone of a flow top, where lava breccia is oxidized and cemented with brown clay. Some vesicles are filled with white non carbonate, possibly zeolite(?). Other vesicles remain unfilled.

VEINS/FRACTURES: None.

COMMENTS: Plagioclase phenocrysts have embayed margins and appear resorbed.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-32R-4 (Section top: 221.71 mbsf)

UNIT 17: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRI BASALT.

Pieces: 1-17

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	10	2	5	Euhedral to subhedral; blocl
Olivine:	2	1	0.1	0.3	Euhedral; equant

GROUNDMASS: Aphanitic to fine grained. The groundmass consists of plagioclase, clinopyroxene, altered glass, and possibly altered olivine in an intergranular to subtrachytic texture.

VESICLES:	% Mode	Size (mm): Average	Shape
	10-25	4	Elongate to irregular

COLOR: Medium dark gray (N4) to medium light gray (N6) in Pieces 7-17B. Dark reddish brown (10R 3/4) to dark yellowish brown (10 YR 4/2) in Pieces 6.

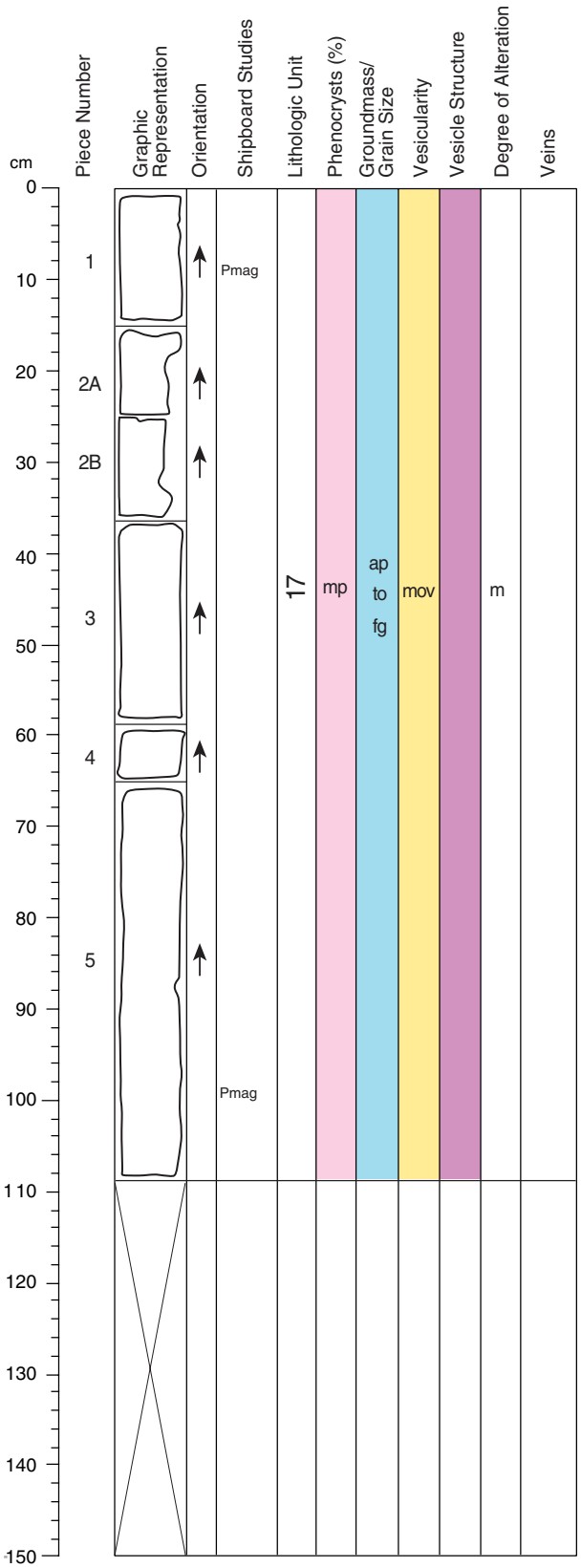
STRUCTURE: Massive.

ALTERATION: Moderate to high. Green clay is pervasive. Olivine is altered t dark green clay and Fe oxyhydroxide. Vesicles are partially to totally filled wit blue-green clay, green clay, zeolite, or Fe oxyhydroxide. Groundmass mesostasis is altered to dark green clay.

VEINS/FRACTURES: Sparsely veined. The core has broken along some veins. Veins are <0.1 0.5 mm wide, randomly oriented, and filled with pale blue-green clay and Fe oxyhydroxide.

COMMENTS: A highly vesicular flow top grades into a moderately vesicular flow interior. A horizontal vesicle sheet is present in Piece 15A at 86-88 cm. This is most prominent on the outer core surface. It is filled with aphanitic segregated material. Vesicles decrease in size from Piece 1 to Piece 7, then increase to Piece 17B. Olivine may be a microphenocryst phase and the groundmass has grown to the same size.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-32R-5 (Section top: 222.94 mbsf)

UNIT 17: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-5

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	5	1	3	Euhedral to anhedral
Olivine:	<1	2	<1	1	Subhedral

GROUNDMASS: Aphanitic to fine grained. The groundmass consists of plagioclase, clinopyroxene, altered glass, and possibly altered olivine in an intersertal to intergranular texture.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	10	5	Irregular

COLOR: Dark gray (N3).

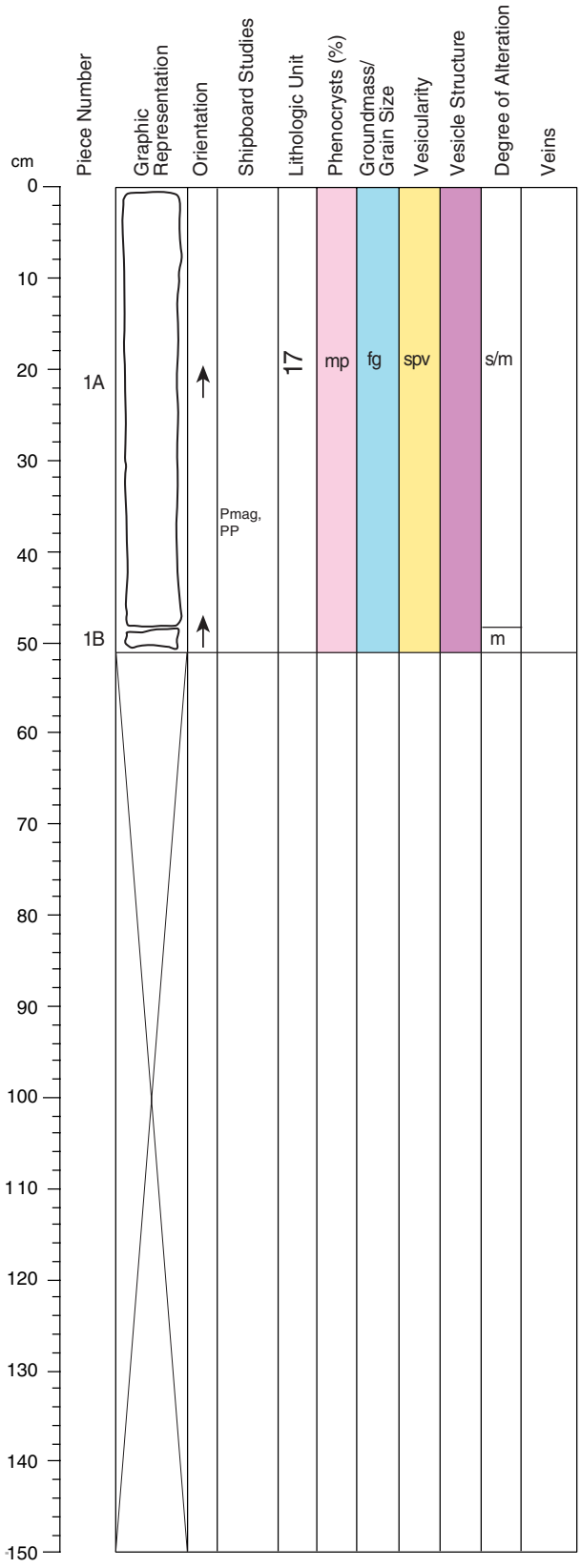
STRUCTURE: Massive.

ALTERATION: Moderate. Fe oxyhydroxide staining in Piece 5. Olivine is obvious when partially altered to yellow orange Fe oxyhydroxide. Groundmass mesostasis is altered to dark gray unidentified material.

VEINS/FRACTURES: None.

COMMENTS: All pieces include large (5-40 mm) vesicles; some may contain segregated material; e.g., Piece 5 at 83 cm.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-33R-1 (Section top: 225.4 mbsf)

UNIT 17: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	6	3	5	Subhedral; prismatic
Olivine:	<1	2	1	2	Anhedral; equant

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, olivine and glass.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2	3	Round

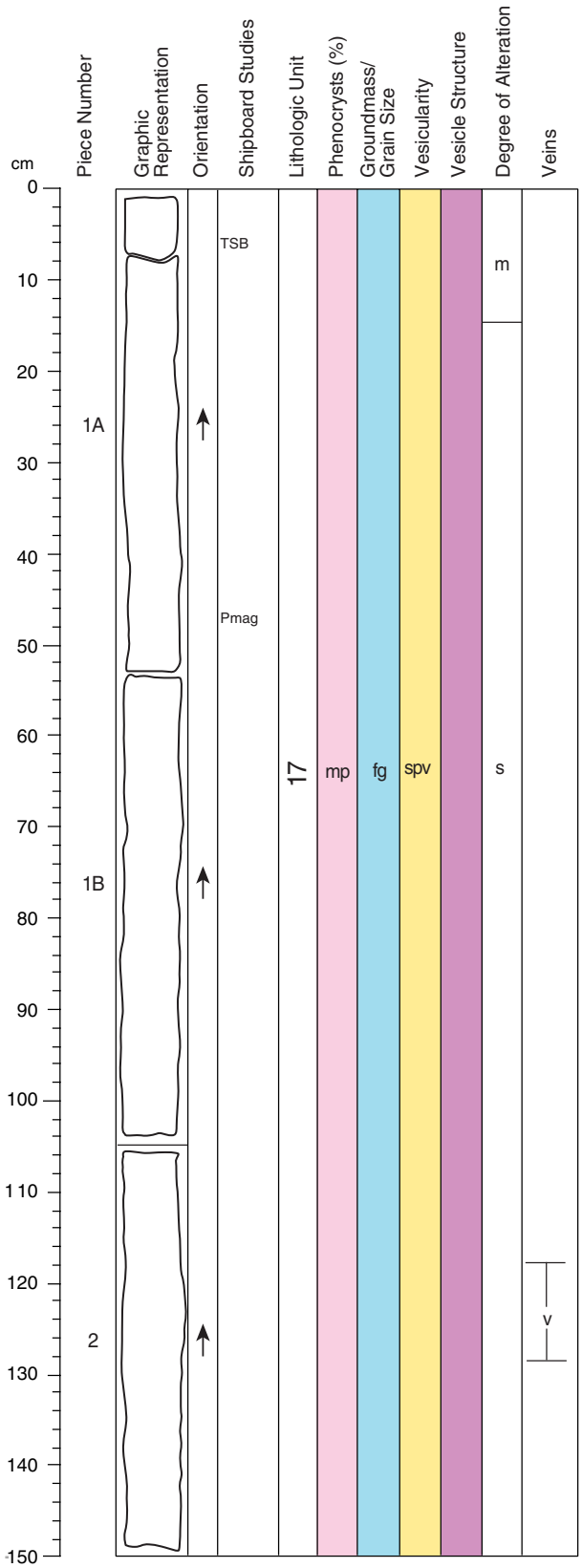
COLOR: Medium gray (N5).

STRUCTURE: Massive.

ALTERATION: Moderate. Olivine is unaltered, or very slightly altered to Fe oxyhydroxide close to fractures. Vesicles are filled with blue-green clay, and occasionally contain radiating acicular crystals of a white zeolite mineral. Glass within the groundmass is altered to blue green clay.

VEINS/FRACTURES: Sparsely fractured. Fractures are <0.5 mm wide, lined with blue-green clay, and surrounded by 1 cm wide brown alteration haloes.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-33R-2 (Section top: 225.91 mbsf)

UNIT 17: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	7	2	4	Subhedral; prismatic
Olivine:	<1	3	1	2	Subhedral; equant

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, olivine and glass.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2	3	Round

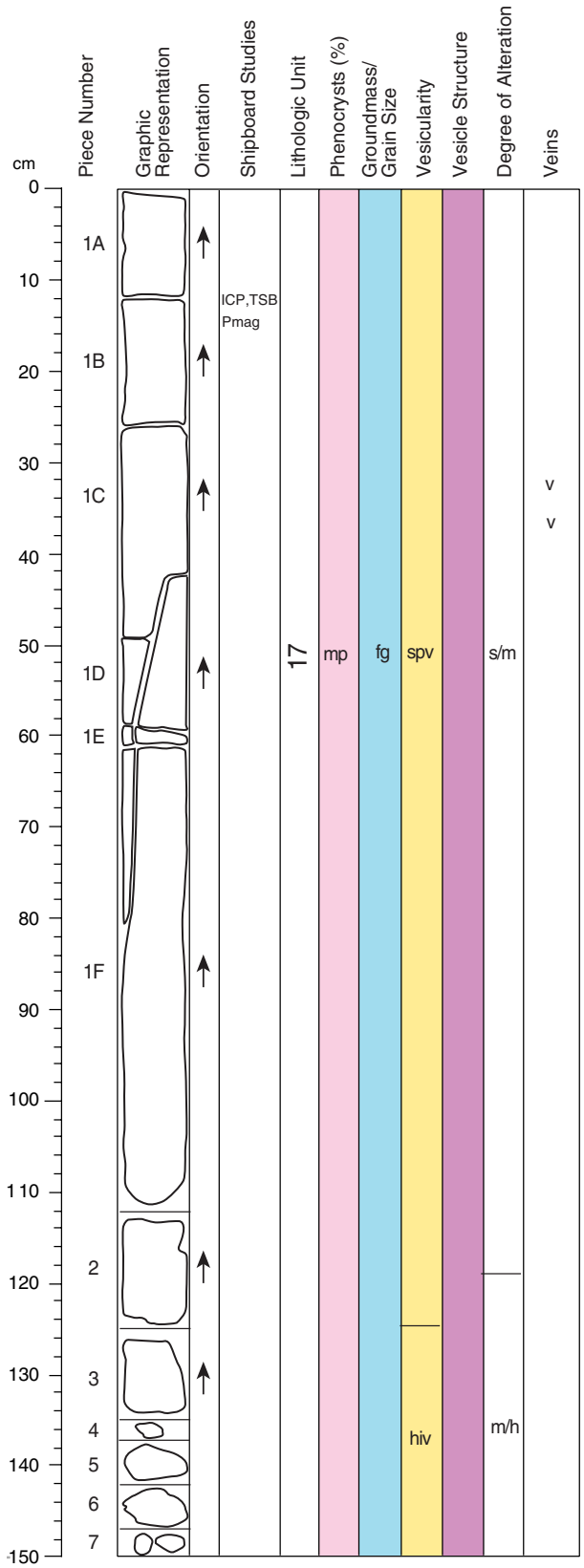
COLOR: Medium gray (N5).

STRUCTURE: Massive.

ALTERATION: Moderate to slight. Olivine is unaltered, or very slightly altered to Fe oxyhydroxide close to fractures. Vesicles are filled with blue-green clay. Glass within the groundmass is altered to blue-green clay.

VEINS/FRACTURES: Sparsely fractured. Subhorizontal fractures, <0.5 mm wide, are present in the topmost 17 cm of Piece 1. Fractures are filled with blue-gray clay, and surrounded by brown alteration halos. Between 116 and 128 cm, a 1-2 mm wide vein is filled with gray clay and a white zeolite.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-33R-3 (Section top: 227.41 mbsf)

UNIT 17: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRI BASALT.

Pieces: 1-7

CONTACTS: None.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Plagioclase:	4	18	1	6	Subhedral; prismatic

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, and altered olivine and mesostasis.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
	3-25	3	Subround to elongate

COLOR: Medium gray (N5), plus reddish brown staining near veins in Piece 2

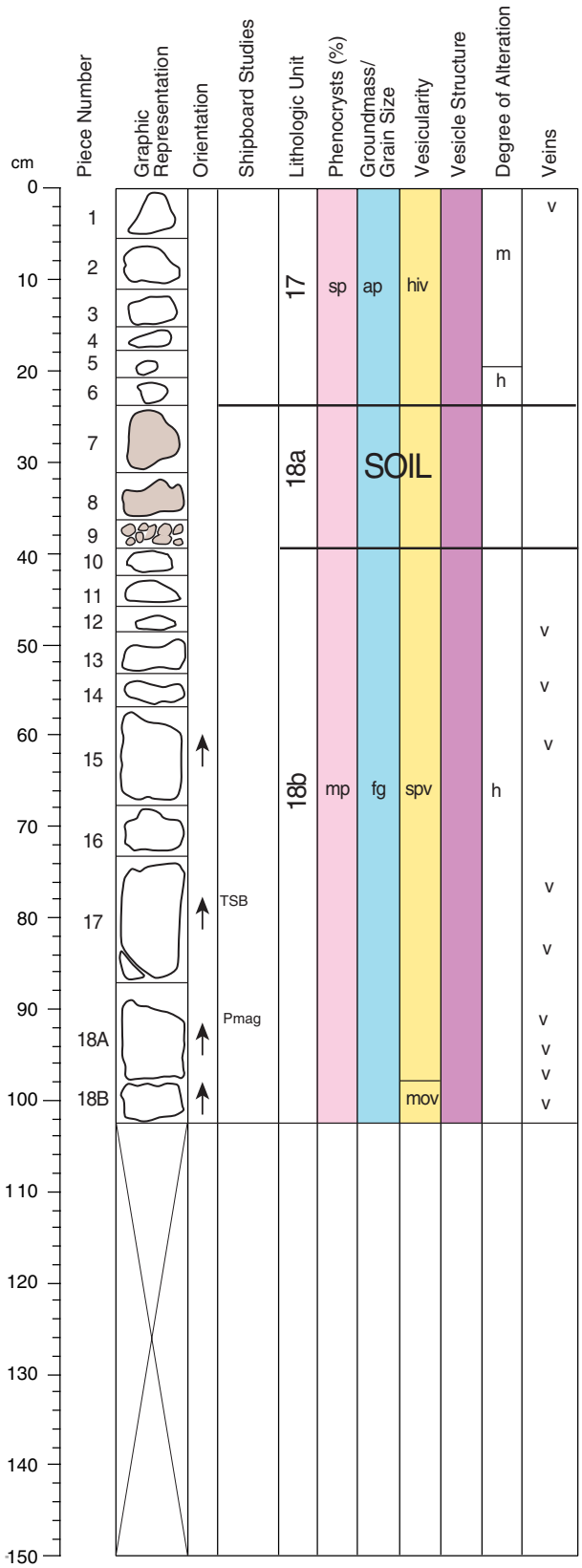
STRUCTURE: Massive.

ALTERATION: Moderate to high. Plagioclase is unaltered in Piece 1, but moderately to highly altered in Pieces 2-7. Groundmass is moderately to highly altered to bluish gray clay. Vesicles in Piece 1 are filled with bluish gray clay. Vesicles in Pieces 2-7 are lined with bluish gray clay. Veins in Piece 2 have Fe oxyhydroxide halos. Pieces 5-7 have Fe oxyhydroxide on their exteriors.

VEINS/FRACTURES: Moderately veined. Veins are subhorizontal to subvertical, ~1 mm wide (except one at 33 cm is ~3 mm wide), and filled with bluish gray clay and whitish gray carbonate.

COMMENTS: Pieces 1 and 2 have hardly any vesicles, while Pieces 3-7 are moderately vesicular and may be the flow base of this Unit.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-33R-4 (Section top: 228.91 mbsf)

UNIT 17: SPARSELY TO MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT.

Pieces: 1-6

CONTACTS: The contact between the basalt of Unit 17 and the soil of Unit 18a may be preserved at the top of Piece 7. However, this is an unoriented piece, so the boundary is inferred to be between Pieces 6 and 7 at 24 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	7	4	5	Euhedral; prismatic
Olivine:	<1	0.5	0.1	0.3	Euhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered glass (and maybe olivine) in a subtrachytic to intersertal texture.

VESICLES:	% Mode	Size (mm): Average	Shape
Highly vesicular	21-25	3	Round to elongate

COLOR: Dark gray (N3) to medium dark gray (N4) in Pieces 1-3. Brownish gray (5YR 4/1) to pinkish gray (5YR 8/1) in Pieces 4-6.

STRUCTURE: None.

ALTERATION: Moderate to high. Plagioclase is moderately to highly altered. Olivine is replaced by Fe oxyhydroxide and dark green clay. Vesicles are generally unfilled and lined with blue green clay and Fe oxyhydroxide, and are occasionally filled with zeolite.

VEINS/FRACTURES: One vein on the edge of Piece 1 is filled with Fe oxyhydroxide (or brown clay) and zeolite.

COMMENTS: Pieces 3-6 are highly altered and lighter in color than Pieces 1 and 2, with Piece 6 being a breccia with highly altered basalt cm-size clasts.

UNIT 18a: RED-BROWN SOIL.

Pieces: 7–9

CONTACTS: The contact between the basalt of Unit 17 and the soil of Unit 18a may be preserved at the top of Piece 7. However, this is an unoriented piece, so the boundary is inferred to be between Pieces 6 and 7 at 24 cm. The boundary between Units 18a and 18b is inferred to be between Pieces 9 and 10 at 39 cm.

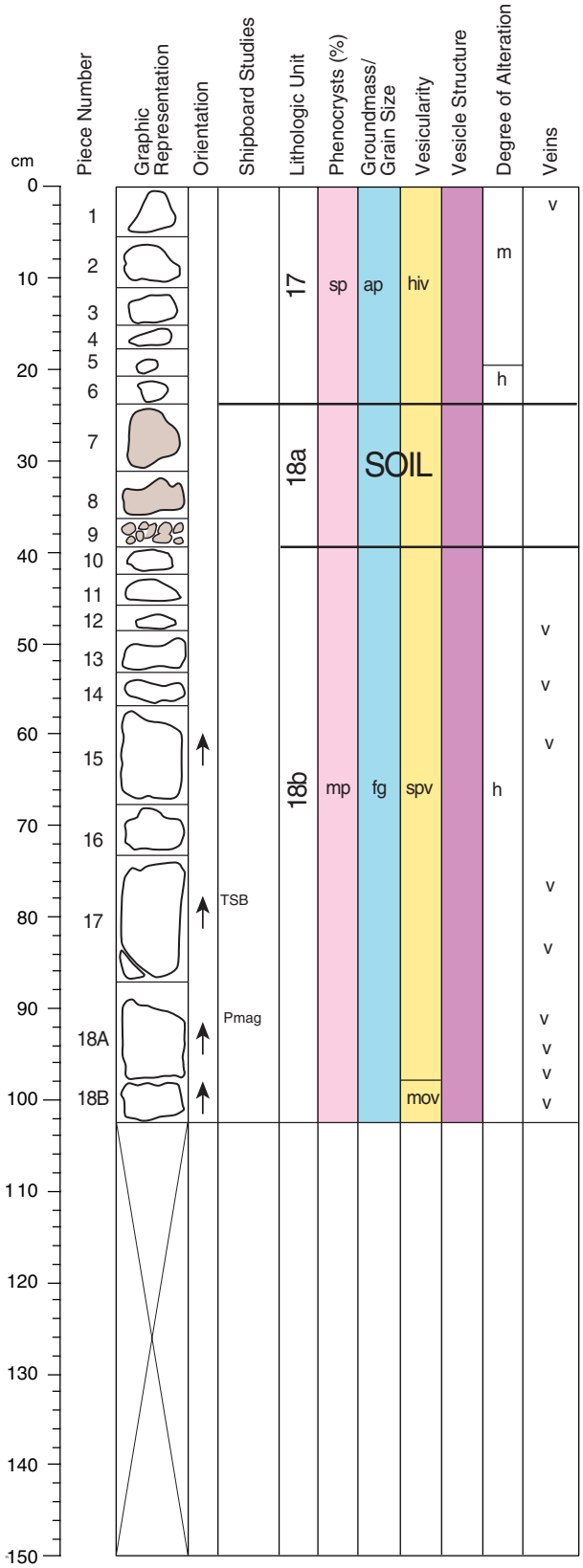
GENERAL DESCRIPTION: This red-brown soil interbed shows a gradation in color from dark reddish brown in Piece 7 to dark yellowish brown in Pieces 8 and 9. The vesicular basalt clast at the top of Piece 7 is similar to the basalt of Unit 17, i.e., olivine is completely replaced by Fe oxyhydroxide and there is a subtrachytic texture. It may contain an altered glassy selvage where it is in contact with the soil. Basalt clasts in Piece 7 are ~2 cm x 1 cm, subround to angular, and highly to completely altered. The dark yellowish brown pieces are finer grained and contain several smaller (1 x 0.5 cm), completely altered, subround basalt clasts. There are abundant black oxide crystals throughout the soil, some have distinctive octahedral shapes. Larger ones are found in the dark reddish brown region of Piece 7. Altered plagioclase crystals are randomly distributed throughout the soil.

COLOR: Dark reddish brown (5YR 3/4) to dark yellowish brown (10YR 4/2).

COMMENTS: This soil is inferred to be the weathered top of basalt Unit 18b. At 29 cm the two beds are interfaced by a sub-cm sharp undulated layer of yellow oxide (limonite?). The dark reddish clay contains a larger amount of Fe oxide than the yellowish portion.

(Continued on next page)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-33R-4 (Continued)

UNIT 18b: APHYRIC TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 10-17

CONTACTS: None observed. The boundary between Units 18a and 18b is inferred to be between Pieces 9 and 10 at 39 cm.

PHENOCRYSTS:

	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Olivine:	5	3	0.1	0.5	Euhedral; equant

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, and altered glass (and maybe olivine) in an intergranular to subtrachytic texture.

VESICLES:

%	Size (mm):	
Mode	Average	Shape
2-10	2	Round to elongate

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

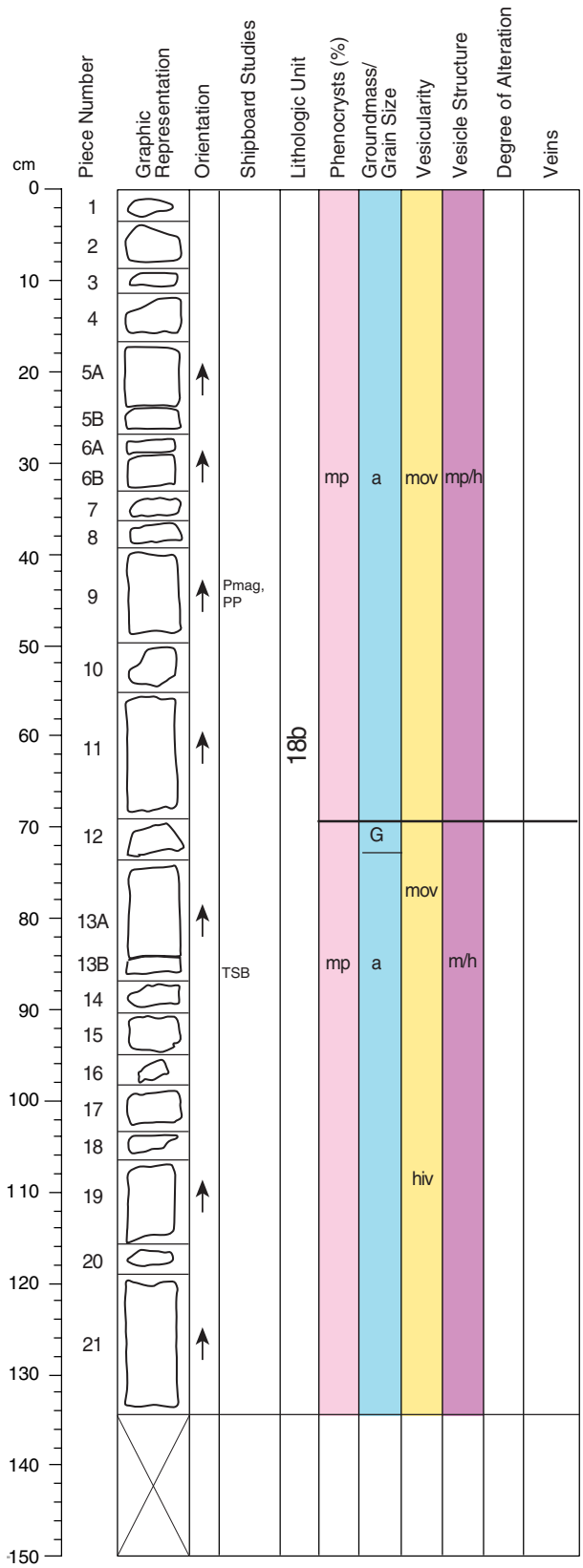
STRUCTURE: Massive.

ALTERATION: High. Olivine is replaced by Fe oxyhydroxide and zeolites. Glass is altered to dark green clay and Fe oxyhydroxide. Vesicles are filled with zeolite, dark green clay, or Fe oxyhydroxide. Fe oxyhydroxide alteration halos (up to 1 cm wide) are present adjacent to veins.

VEINS/FRACTURES: Sparsely to moderately veined. Veins are <0.1-5 mm wide, subvertical to subhorizontal (occasionally curved), and filled with zeolite and Fe oxyhydroxide.

COMMENTS: Olivine is seriate between a groundmass and phenocryst phase and occasional exhibits a skeletal habit. It is possible that olivine is a microphenocryst phase and the groundmass has grown to the same size as the smaller olivines. If so, the olivine mode is 12% to 15%.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-34R-1 (Section top: 235.0 mbsf)

UNIT 18b: APHYRIC TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-21

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	2-6	1	0.2	0.5	Subhedral; equant

GROUNDMASS: Aphanitic to glassy.

VESICLES:	% Mode	Size (mm): Average	Shape
	3-25	4	Rounded

COLOR: Medium gray (N5).

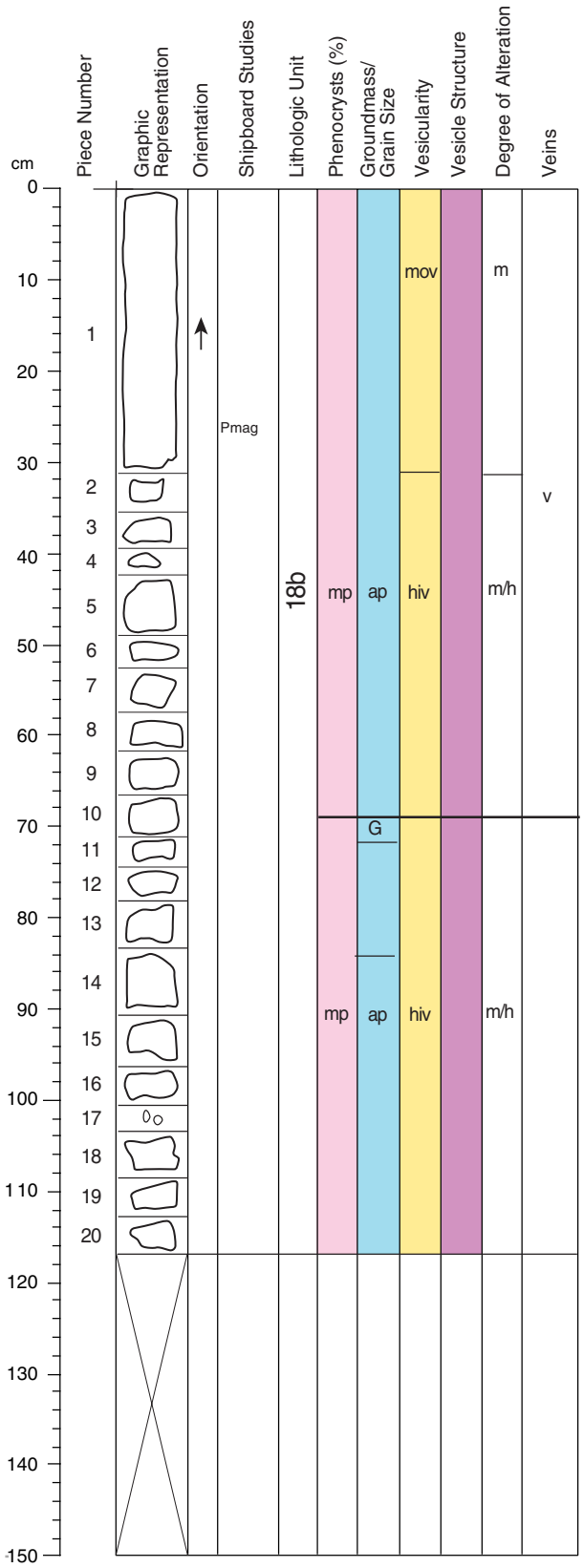
STRUCTURE: Lobed.

ALTERATION: Moderate to high. Olivine microphenocrysts are altered to Fe oxyhydroxide or dark green clay. Glass in Piece 12 is almost completely altered to brown clay. Vesicles are partially to completely filled with a variety minerals, including carbonate, zeolite, and white, blue-gray and pale green clay.

VEINS/FRACTURES: None.

COMMENTS: A lobe boundary at 69 cm is marked by altered glass in Piece 12. Olivine microphenocrysts appear to be more abundant in the upper part lobes. Olivine is seriate between a groundmass and phenocryst phase. It is possible that olivine is a microphenocryst phase and the groundmass has grown to the same size as the smaller olivines. If so, the olivine mode is 10% 15%.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-34R-2 (Section top: 236.34 mbsf)

UNIT 18b: APHYRIC TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-20

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	2-6	1	0.5	0.8	Anhedral; equant

GROUNDMASS: Cryptocrystalline to glassy.

VESICLES:	% Mode	Size (mm): Average	Shape
	5-25	3	Round to irregular

COLOR: Medium gray (N5).

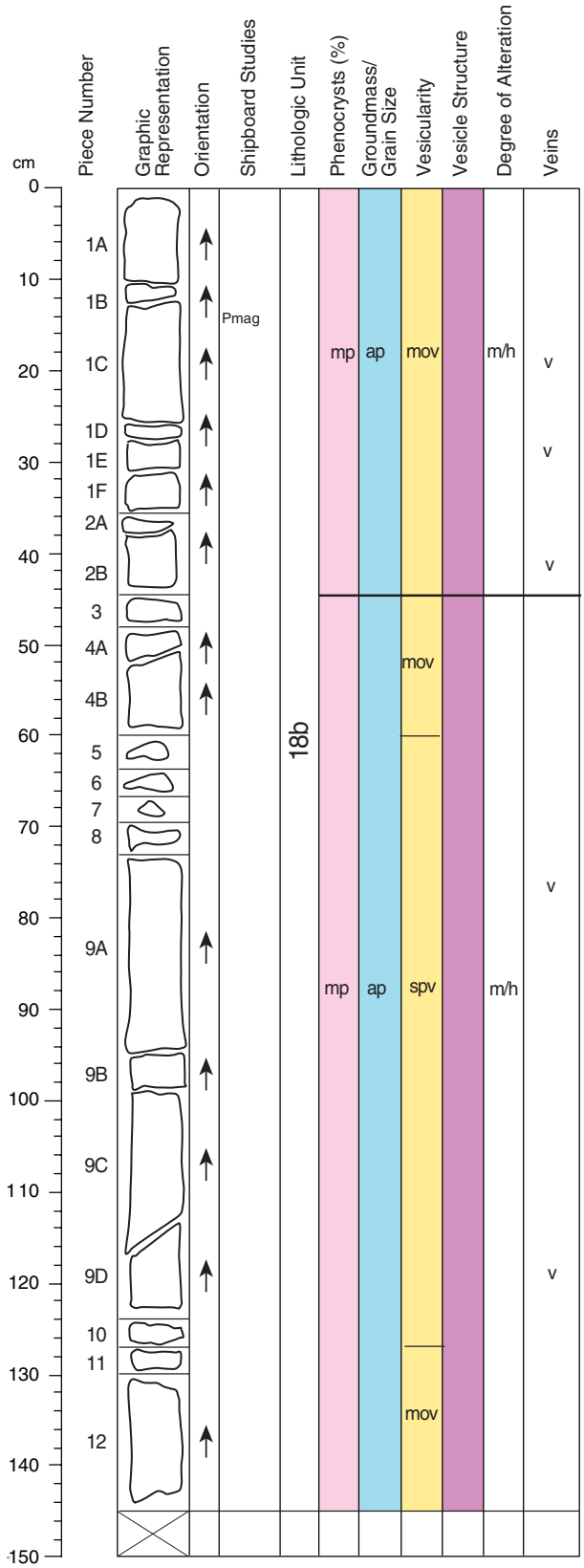
STRUCTURE: Lobed. At 67-70 cm in Piece 10, there is a hanging contact between lobes.

ALTERATION: Moderate to high. Olivine microphenocrysts are altered to Fe oxyhydroxide or dark green clay. Glass in Pieces 8 to 20 is almost completely altered. Vesicles are partially to completely filled with a variety of minerals, including carbonate, zeolite, and white, blue-gray and pale green clay.

VEINS/FRACTURES: Sparsely veined. Veins are present in Pieces 3 and 5, they are <1 mm wide, and filled with pale brown clay and Fe oxyhydroxide.

COMMENTS: Pieces 8 to 20 have a brecciated appearance, and contain partially to completely altered glass. This has been caused by penetrative alteration along highly vesicular zones and there is continuity in the groundmass across the apparent breccia clasts.
Olivine is seriate between a groundmass and phenocryst phase. It is possible that olivine is a microphenocryst phase and the groundmass has grown to the same size as the smaller olivines. If so, the olivine mode is 10%-15%.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-34R-3 (Section top: 237.5 mbsf)

UNIT 18b: APHYRIC TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-12

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	2-6	1	0.3	0.6	Subhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered olivine and mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
	3-20	2	Irregular to subround

COLOR: Medium gray (N5).

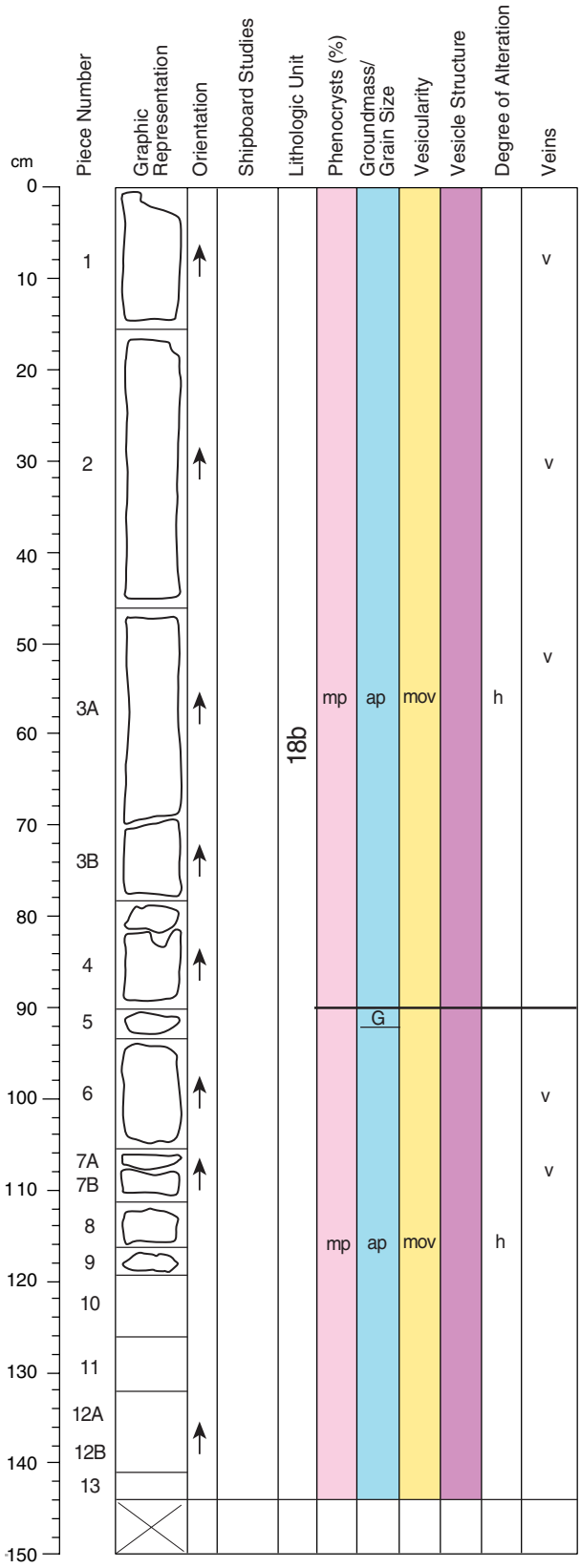
STRUCTURE: Lobed. The lobe boundary is defined by the possible lobe margin (suggested on the basis of grain size changes) at the base of Piece 2E and a change in vesicularity (smaller and irregular above and larger and subround below).

ALTERATION: Moderate to high. Groundmass olivine is replaced by Fe oxyhydroxide and dark greenish gray clay. Mesostasis is altered to dark gray clay. Vesicles are filled or partly filled with carbonate, dark greenish gray clay, or Fe oxyhydroxide.

VEINS/FRACTURES: Moderately veined. Veins are ~4 mm wide, randomly oriented, and filled with light gray carbonate, dark greenish gray clay, and Fe oxyhydroxide.

COMMENTS: Olivine phenocrysts are difficult to see because they are replaced by the same dark greenish gray clay that fills vesicles. Olivine is seriate between a groundmass and phenocryst phase. It is possible that olivine is a microphenocryst phase and the groundmass has grown to the same size as the smaller olivines. If so, the olivine mode is 10%-15%.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-34R-4 (Section top: 238.95 mbsf)

UNIT 18b: APHYRIC TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-13

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	2-6	3	0.5	1	Euhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered olivine and mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	5-10	4	Subround

COLOR: Medium gray (N5).

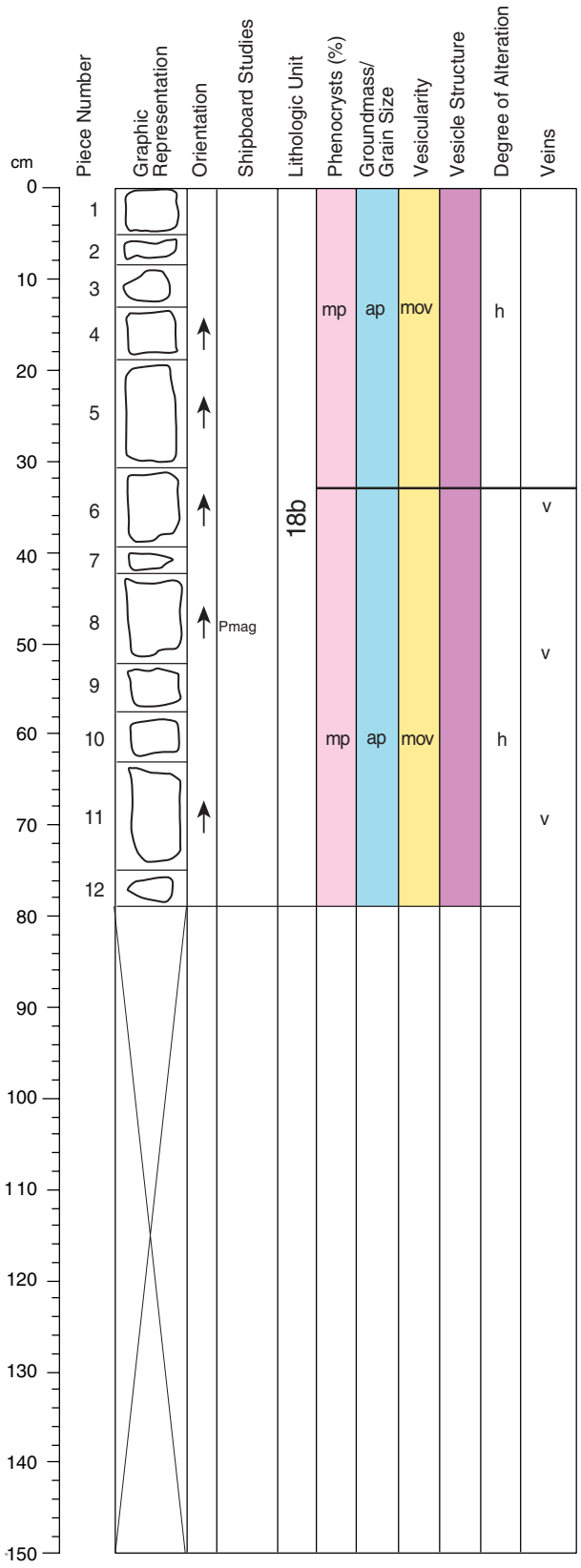
STRUCTURE: Lobed. The boundary is a quenched glassy lobe margin represented in Piece 5 at 90 cm.

ALTERATION: High. Olivine is replaced by Fe oxyhydroxide and dark green clay. Mesostasis is altered to dark green clay. Vesicles are filled or partly filled with carbonate, dark greenish gray clay, or Fe oxyhydroxide. Pieces 10-13 have Fe oxyhydroxide and medium brown clay attached to their exteriors.

VEINS/FRACTURES: Sparsely to moderately veined. Veins are <2 mm wide, subhorizontal (occasionally curved), and filled with carbonate and Fe oxyhydroxide.

COMMENTS: Olivine may be more abundant than reported here but is difficult to see because it is replaced by the same dark greenish gray clay that fills vesicles and replaces mesostasis.
Olivine is seriate between a groundmass and phenocryst phase. It is possible that olivine is a microphenocryst phase and the groundmass has grown to the same size as the smaller olivines. If so, the olivine mode is 10%-15%.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-34R-5 (Section top: 240.39 mbsf)

UNIT 18b: APHYRIC TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-12

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	1-6	2	0.5	1	Euhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of plagioclase, clinopyroxene, and altered olivine and mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	5-10	3	Subround to elongate

COLOR: Medium gray (N5).

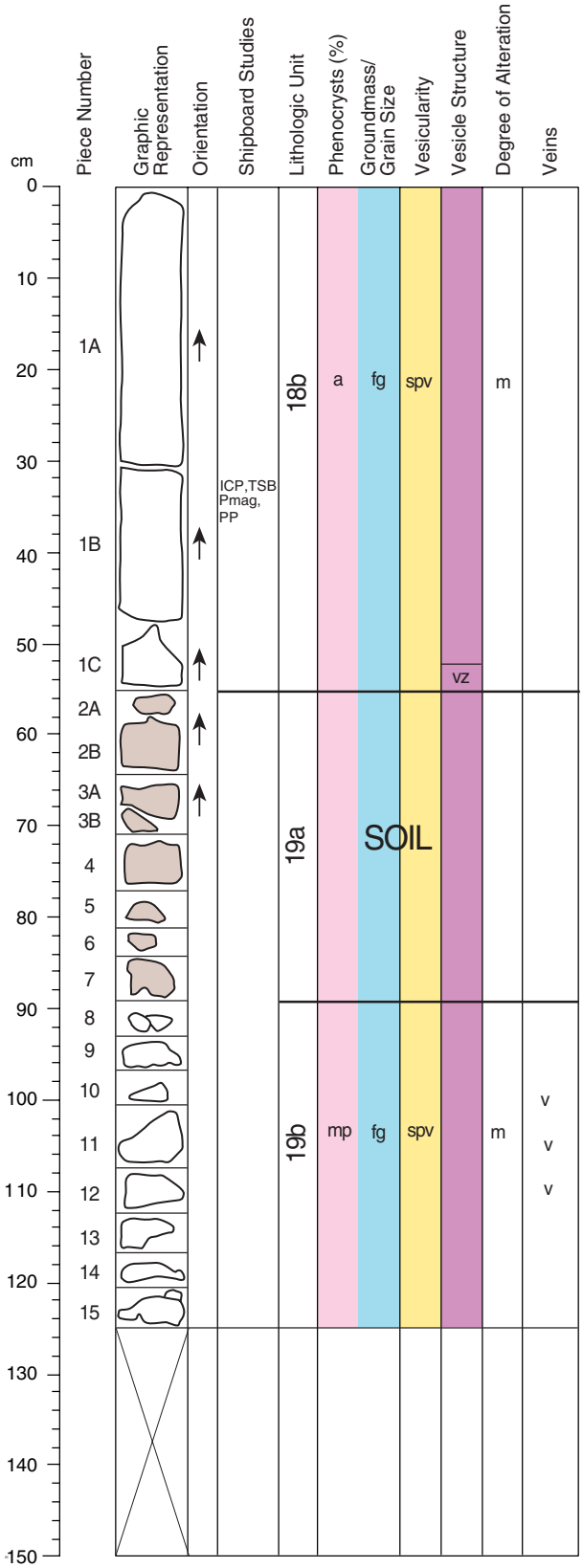
STRUCTURE: Lobed. The lobe boundary is the chilled top of Piece 6 at 33 cm.

ALTERATION: High. Olivine is replaced by Fe oxyhydroxide and dark green clay. Mesostasis is altered to dark green clay. Vesicles are filled or partly filled with carbonate, dark greenish gray clay, or Fe oxyhydroxide.

VEINS/FRACTURES: Sparsely to moderately veined. Veins are <1 mm wide, subhorizontal (occasionally curved), and filled with carbonate and Fe oxyhydroxide.

COMMENTS: Olivine is easily identified in Pieces 1 and 6 where it is replaced by Fe oxyhydroxide. Olivine may also be present in other pieces but is difficult to see because it is replaced by the same dark greenish gray clay that fills vesicles and replaces mesostasis.
Olivine is seriate between a groundmass and phenocryst phase. It is possible that olivine is a microphenocryst phase and the groundmass has grown to the same size as the smaller olivines. If so, the olivine mode is 10%-15%.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-35R-1 (Section top: 244.6 mbsf)

UNIT 18b: APHYRIC TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1

CONTACTS: The contact between Unit 18b and 19a is at 57 cm, between Pieces 1 and 2.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	6	2	4	Subhedral; prismatic

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, olivine and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-3	4	Rounded

COLOR: Medium gray (N5).

STRUCTURE: Lobed (lobe boundaries were identified in this Unit in Core 34R).

ALTERATION: Moderate. Groundmass olivine is slightly altered to Fe oxyhydroxide. Vesicles are filled with gray-green clay, and occasionally with a white zeolite.

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

COMMENTS: Vesicles are more abundant in Piece 1C, towards the inferred base of Unit 18b. Some baked sediment fills cracks on the lower side of Piece 1C.

UNIT 19a: RED-BROWN SOIL.

Pieces: 2–7

CONTACTS: The contact with the overlying basalt of Unit 18b is at 57 cm, between Pieces 1 and 2. The contact between Units 19a and 19b is at 91 cm, between Pieces 7 and 8.

GENERAL DESCRIPTION: The soil contains angular to rounded fragments o vesicular, highly olivine-phyric basalt, up to 4 cm in diameter, which are simila to the lava of the underlying Unit 19b. Olivine crystals in these rock fragments are completely pseudomorphed by gold colored secondary minerals. Groundmass minerals are highly to completely altered. The matrix is composed of sand to silt grade sediment, with an Fe oxyhydroxide cement. There is some coarse layering of clasts. A few clasts are composed of very fine grained, structureless material, possibly mudstone, or completely devitrified glass.

COLOR: Moderate brown (5YR 3/4) to light brown (5YR 5/6).

COMMENTS:This soil is inferred to be the weathered top of basalt Unit 19b. The soil at 65 to 90 cm consists of cm-thick beds with sharp, undulating contacts containing more consolidated mm to sub-mm clasts of clay. There is a faintly layered structure at 70 to 77 cm. Piece 2B has slightly inclined bluish gray material within the matrix.

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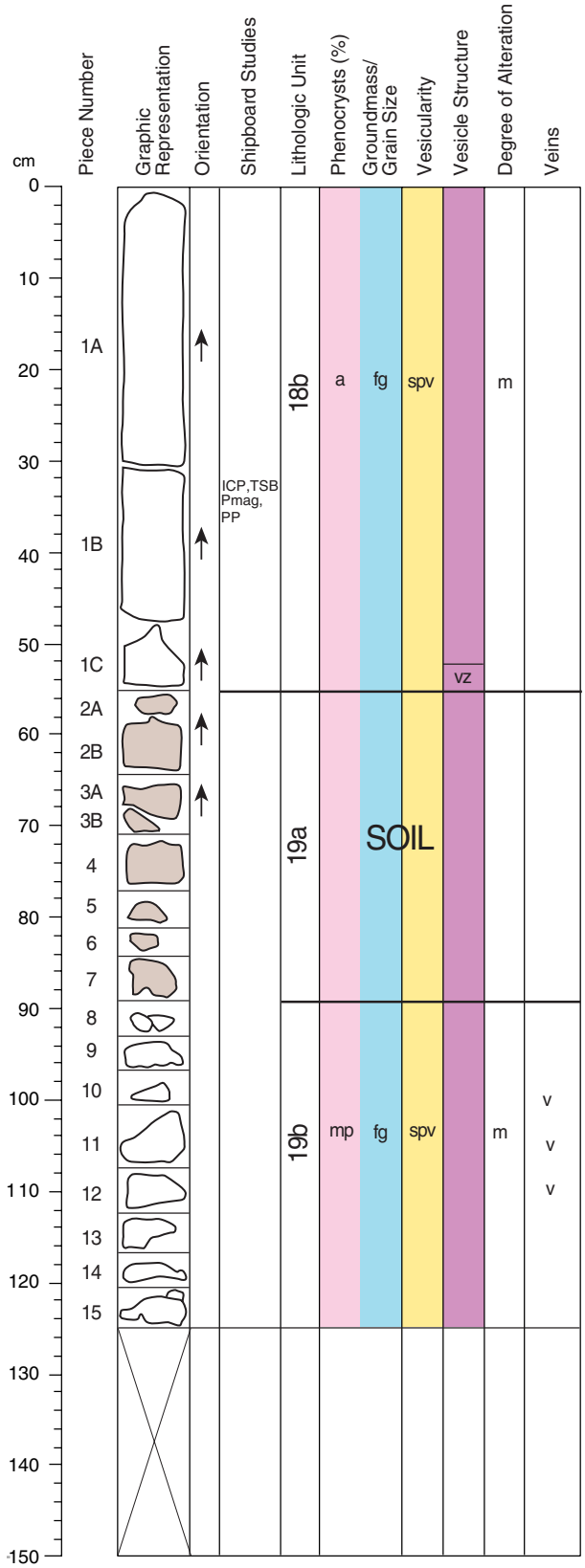
Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-35R-1 (Continued)

UNIT 19b: MODERATELY TO HIGHLY OLIVINE-PHYRIC BASALT*.

Pieces: 8-15

CONTACTS: None observed. The boundary between Units 19a and 19b is inferred to be between Pieces 7 and 8 at 91 cm.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Olivine:	4-8	2	0.5	1.2	Euhedral to subhedral; equar

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, and glass in an intergranular to intersertal texture.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
Sparsely vesicular	3-5	4	Round to elongate

COLOR: Dark gray (N4) to medium gray (N5).

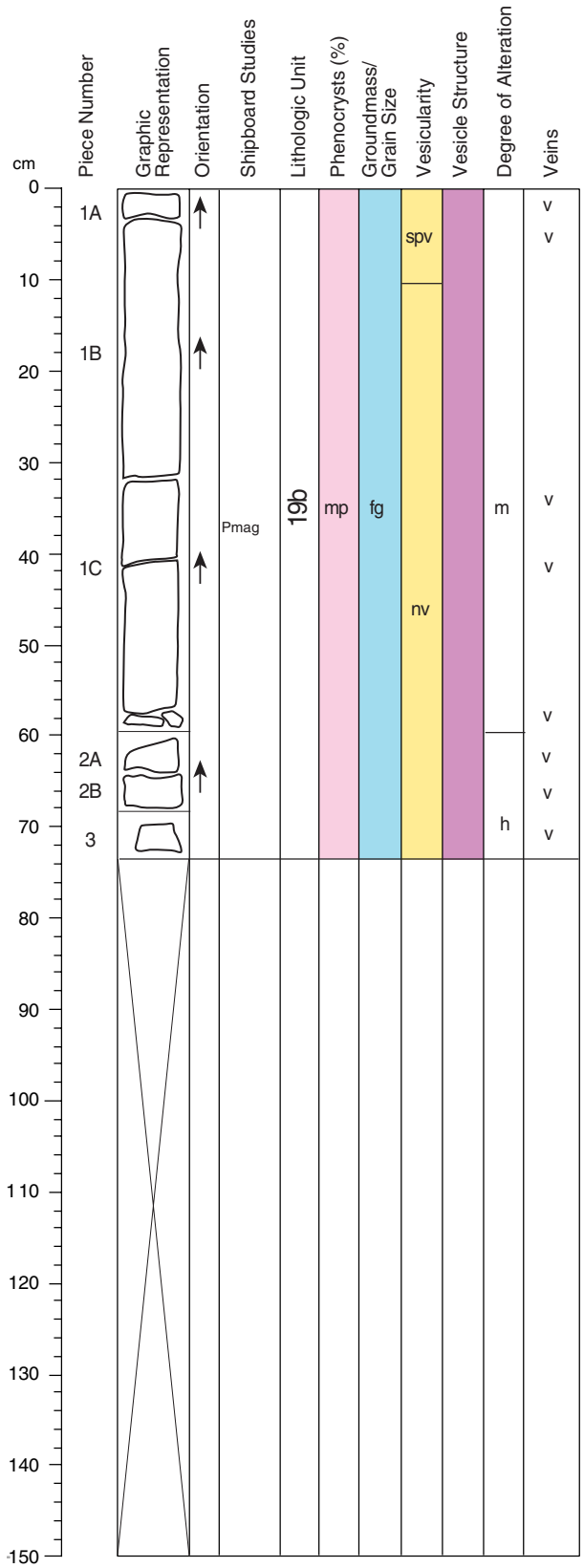
STRUCTURE: None.

ALTERATION: Moderate. Dark green clay is pervasive. Olivine is altered to dark green clay and Fe oxyhydroxide. Glass is altered to dark green clay. Vesicles are filled with green clay or zeolite.

VEINS/FRACTURES: Sparsely veined. Veins are 2-3 mm wide and filled with green clay and Fe oxyhydroxide.

COMMENTS: * The abundance of olivine changes dramatically throughout Unit 19b and ranges from sparsely to highly olivine-phyric. The majority of the unit is in the moderately to highly olivine-phyric range.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-35R-2 (Section top: 245.85 mbsf)

UNIT 19b: MODERATELY TO HIGHLY OLIVINE-PHYRIC BASALT*.

Pieces: 1-3

CONTACTS: None observed.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Olivine:	4-8	1.5	0.5	1	Euhedral to subhedral; equar

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, clinopyroxene, and glass in an intergranular texture.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
	0-5	2	Round

COLOR: Medium light gray (N6) to greenish gray (5G 6/1) in Pieces 1A-1C. Dark yellowish brown (10YR 4/2) in Pieces 1D-3.

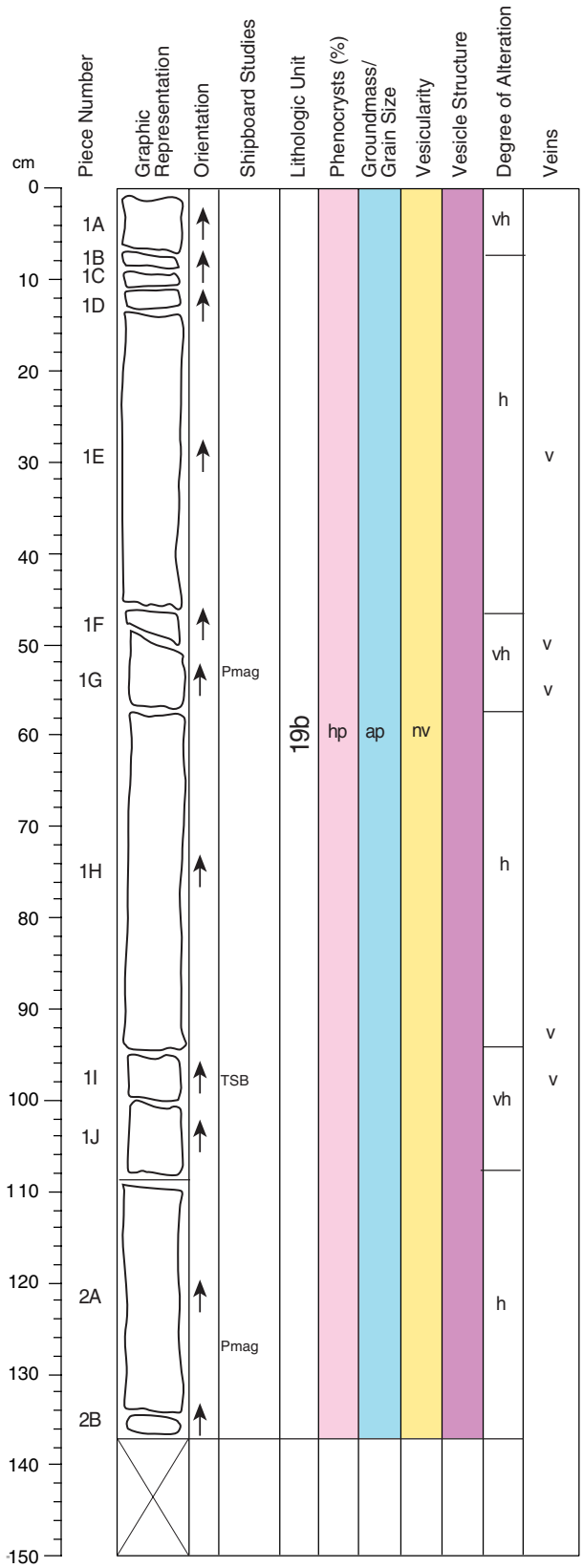
STRUCTURE: Massive.

ALTERATION: Moderate to complete. Oxide alteration in Pieces 1D-3 has highlighted the olivine phenocrysts and also replaced clinopyroxene. Dark green clay is pervasive in Pieces 1A-1C and has replaced olivine and glass. Vesicles are filled with green clay with minor white carbonate and zeolite.

VEINS/FRACTURES: Sparsely veined. Veins are <0.1-2 mm wide and filled with green clay and white carbonate in Pieces 1A-1C and Fe oxyhydroxide and zeolite in Pieces 1D-3.

COMMENTS:* The abundance of olivine changes dramatically throughout Ur 19b and ranges from sparsely to highly olivine-phyric. The majority of the unit is in the moderately to highly olivine-phyric range.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-35R-3 (Section top: 246.58 mbsf)

UNIT 19b: MODERATELY TO HIGHLY OLIVINE-PHYRIC BASALT*.

Pieces: 1A-2B

CONTACTS: None.

PHENOCRYSTS:

	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Olivine:	10-20	3	0.5	1.5	Euhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of altered plagioclase clinopyroxene, olivine and mesostasis.

VESICLES: Nonvesicular.

COLOR: Dark gray (N4) to medium gray (N5). Interval of light brown (5YR 5/6) to moderate yellowish orange (10YR 5/4) is present at 0-10 cm.

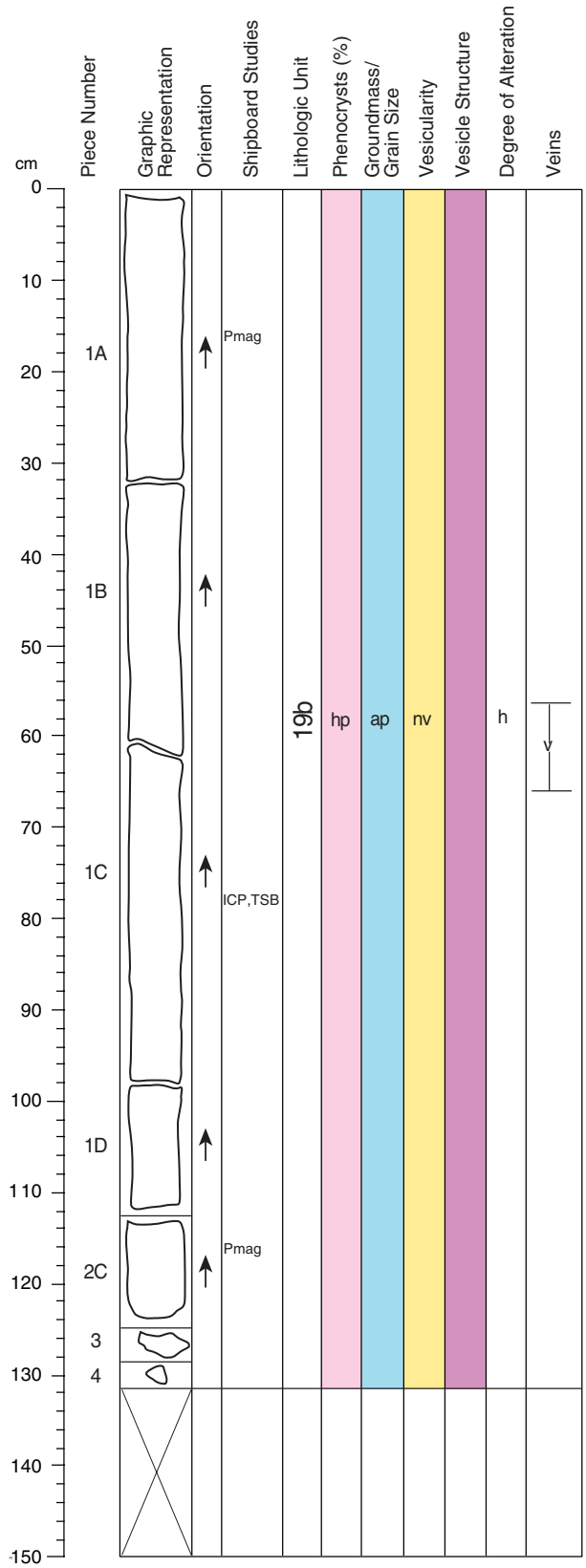
STRUCTURE: Massive.

ALTERATION: High to very high. Olivine is completely replaced by green, lig yellowish green, and golden brown minerals as well as Fe oxyhydroxide and green clay. Groundmass is highly altered to dark gray clay. Highly altered in interval 0-10 cm and adjacent to veins.

VEINS/FRACTURES: Sparsely veined. Veins are 2-5 mm wide, and filled wi green clay and zeolite. The core has fractured along veins.

COMMENTS: * The abundance of olivine changes dramatically throughout Unit 19b and ranges from sparsely to highly olivine-phyric. The majority of th unit is in the moderately to highly olivine-phyric range.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-35R-4 (Section top: 247.94 mbsf)

UNIT 19b: MODERATELY TO HIGHLY OLIVINE-PHYRIC BASALT*.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	5-20	4	0.5	2	Euhedral; equant

GROUNDMASS: Aphanitic. The groundmass consists of altered plagioclase, clinopyroxene, olivine and mesostasis.

VESICLES: Nonvesicular.

COLOR: Medium gray (N4), plus medium brown staining within 20 mm of the vein at 57-66 cm.

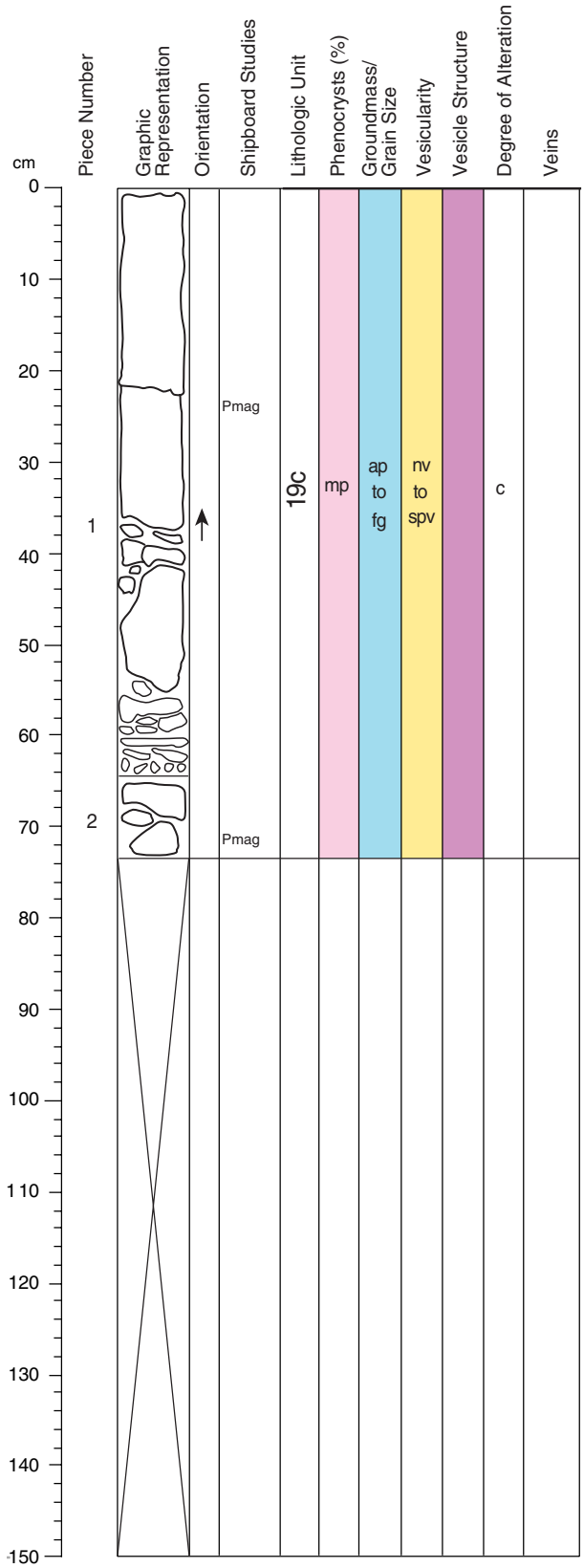
STRUCTURE: Massive.

ALTERATION: High. Olivine is completely replaced by green, light yellowish green, and golden brown minerals as well as Fe oxyhydroxide and green clay. Groundmass is highly altered to dark gray clay.

VEINS/FRACTURES: Sparsely veined. Vein at 57-66 cm is curved, 1 mm wide, and filled with dark greenish gray clay and Fe oxyhydroxide.

COMMENTS: * The abundance of olivine changes dramatically throughout Unit 19b and ranges from sparsely to highly olivine-phyric. The majority of the unit is in the moderately to highly olivine-phyric range.
Olivine decreases in size and abundance below 70 cm.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-35R-5 (Section top: 249.25 mbsf)

UNIT 19c: OLIVINE BASALT BRECCIA.

Pieces: 1-2

CONTACTS: None observed. The contact between Units 19b and 19c is inferred to between Sections 35R-4 and 35R-5.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	3-10	5	0.5	1	Subhedral to euhedral; equar

GROUNDMASS: Aphanitic to fine grained? Only black oxides can be identified.

VESICLES:	% Mode	Size (mm): Average	Shape
	0-5	2	Round to elongate

COLOR: Very dusky red (10R 2/2), dark reddish brown (10R 3/4), and grayis brown (5YR 3/2).

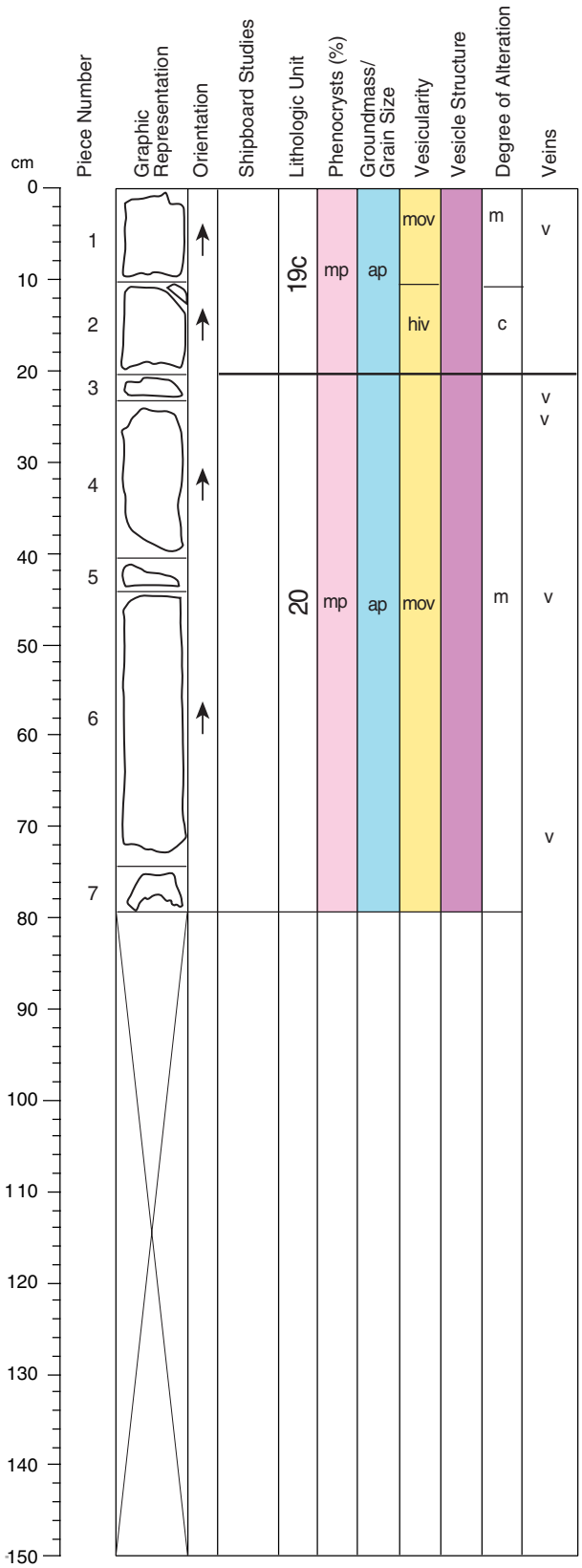
STRUCTURE: Clast supported breccia.

ALTERATION: Complete. Fe oxyhydroxide is pervasive. Vesicles are filled with zeolite and zeolite replaces mesostasis. Olivine is completely replaced b Fe oxyhydroxide and zeolite, but is still identifiable. Zeolite forms the cement of the breccia.

VEINS/FRACTURES: None identified.

COMMENTS: Consists of angular 2->50 mm basalt autoclasts in a clast supported framework.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-36R-1 (Section top: 254.3 mbsf)

UNIT 19c: OLIVINE BASALT BRECCIA.

Pieces: 1-2

CONTACTS: None observed. The boundary between Units 19c and 20 is inferred to be between Pieces 2-3 (at 20 cm) in Section 36R-1.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	3-10	5	0.5	1	Subhedral to euhedral; equan

GROUNDMASS: Aphanitic to fine grained? Only black oxide can be identified

VESICLES:	% Mode	Size (mm): Average	Shape
	0-5	2	Round to elongate

COLOR: Very dusky red (10R 2/2), dark reddish brown (10R 3/4), and grayish brown (5YR 3/2).

STRUCTURE: Clast supported breccia.

ALTERATION: Complete. Fe oxyhydroxide is pervasive. Vesicles are filled with zeolite and zeolite replace mesostasis. Olivine is completely replaced by Fe oxyhydroxide and zeolite, but is still identifiable. Zeolite forms the cement of the breccia.

VEINS/FRACTURES: None identified.

COMMENTS: Continuation of basalt breccia in Section 35R-5. Angular 2->50 mm basalt autoclasts in a clast supported framework. Piece 1 may represent a single slightly altered clast. Piece 2 is highly altered and clasts are cemented by a transparent rhombic mineral that does not react with HCl.

UNIT 20: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 3-7

CONTACTS: None recovered. Boundary is inferred to be between Pieces 2 and 3 at 20 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	7	6	1	2	Subhedral to euhedral; equan

GROUNDMASS: Aphanitic. Only plagioclase and black oxide can be identified.

VESICLES:	% Mode	Size (mm): Average	Shape
0-10 cm	10	<1	Round to irregular
10-20 cm	50	1	Round to irregular
20-80 cm	7	2	Round to irregular

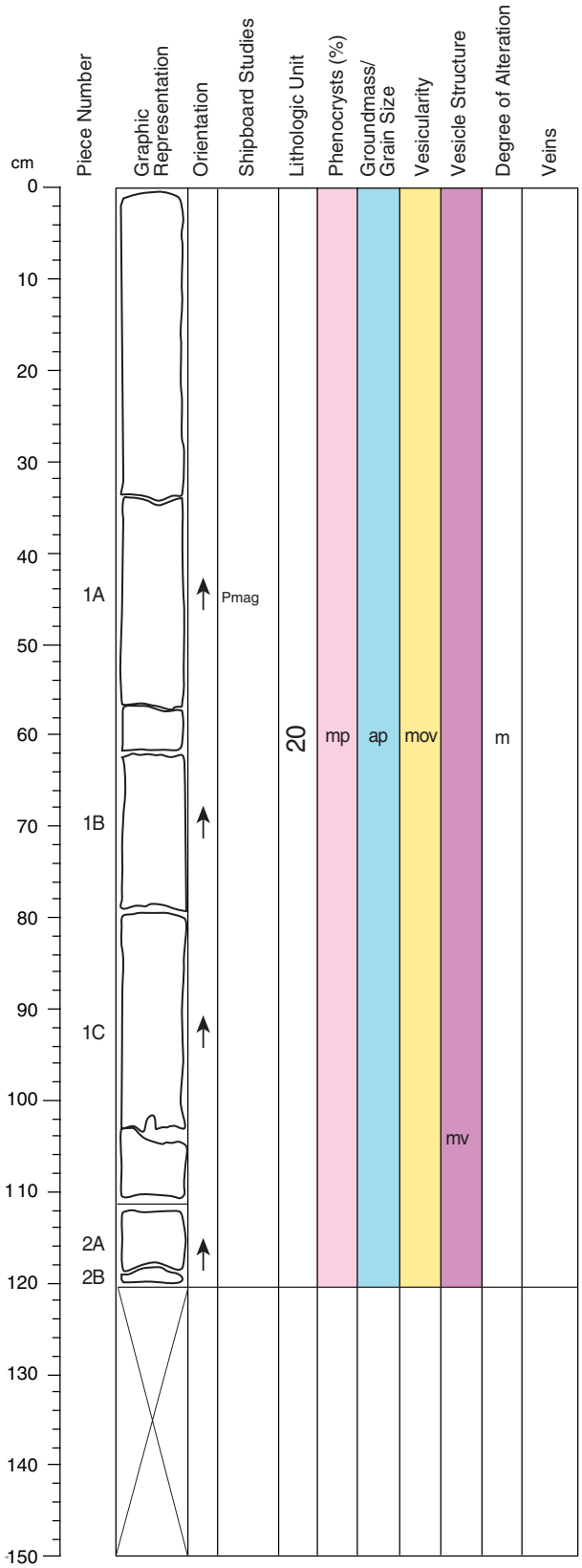
COLOR: Medium gray (N5). Pale reddish brown (10R 5/4) in Piece 2.

STRUCTURE: Massive.

ALTERATION: Moderate to complete. Olivine phenocrysts are altered to Fe oxyhydroxide, or replaced by carbonate. Piece 2 is completely altered to pale reddish brown (10R 5/4) clay. Vesicles are filled with carbonate, green clay and a transparent mineral with rhombic cleavage that does not react with HCl (gypsum?).

VEINS/FRACTURES: Sparsely veined. <1-7 mm wide veins are present throughout the section, and filled with carbonate, pale green clay and a transparent mineral with rhombic cleavage that does not react with HCl (gypsum?).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-36R-2 (Section top: 255.1 mbsf)

UNIT 20: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None observed.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	9	8	0.25	2	Subhedral to euhedral; equan

GROUNDMASS: Aphanitic. Only plagioclase and black oxides can be identified.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	8	5	Round to irregular

COLOR: Medium light gray (N6). The vesicle fill color is greenish gray (5G 6/1).

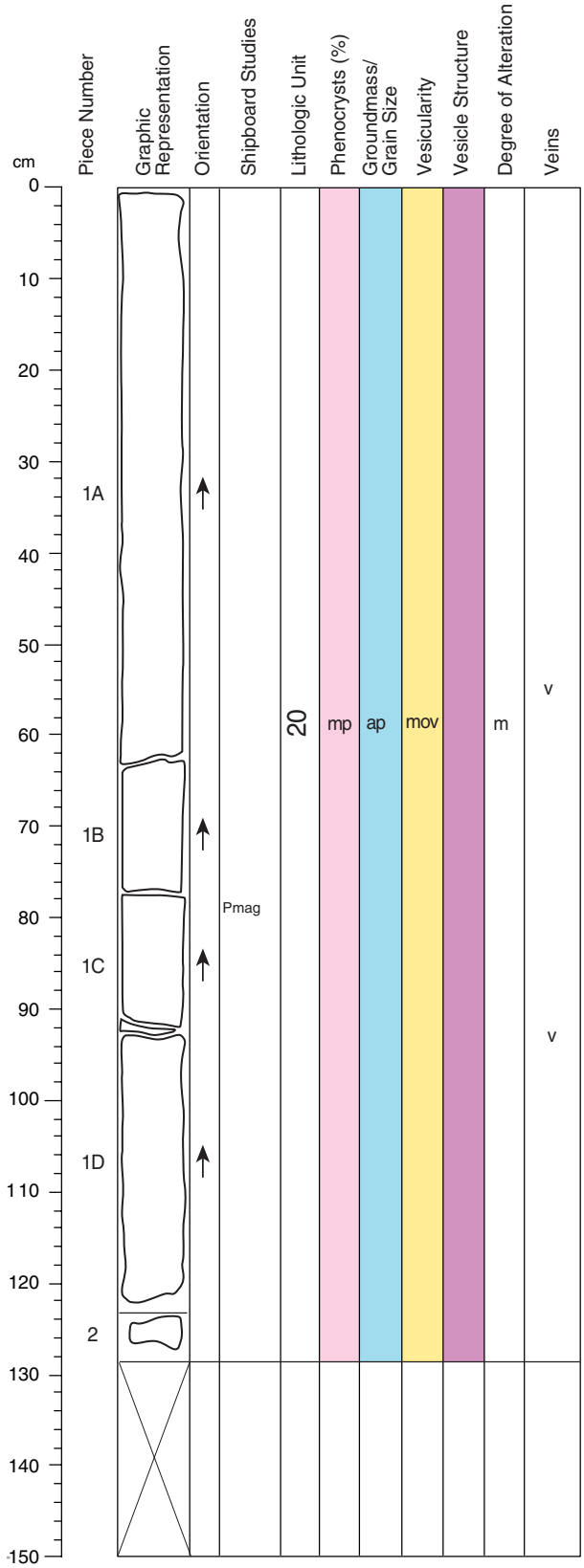
STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts are altered to Fe oxyhydroxide, or replaced by carbonate. Fractures in olivine phenocrysts contain Fe oxyhydroxide. Vesicles are filled with green clay (possibly some talc) and contain white carbonate along their rims.

VEINS/FRACTURES: None.

COMMENTS: Piece 1C contains a large (50 mm) megavesicle spanning the width of the core. This vesicle is filled with euhedral, hexagonal, light tan crystals.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-36R-3 (Section top: 256.3 mbsf)

UNIT 20: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None observed.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	7	8	1	2	Euhedral to anhedral
Plagioclase:	<1	2	2	2	Euhedral

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene and altere mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	15	3	Round to irregular

COLOR: Greenish gray (5G 6/1).

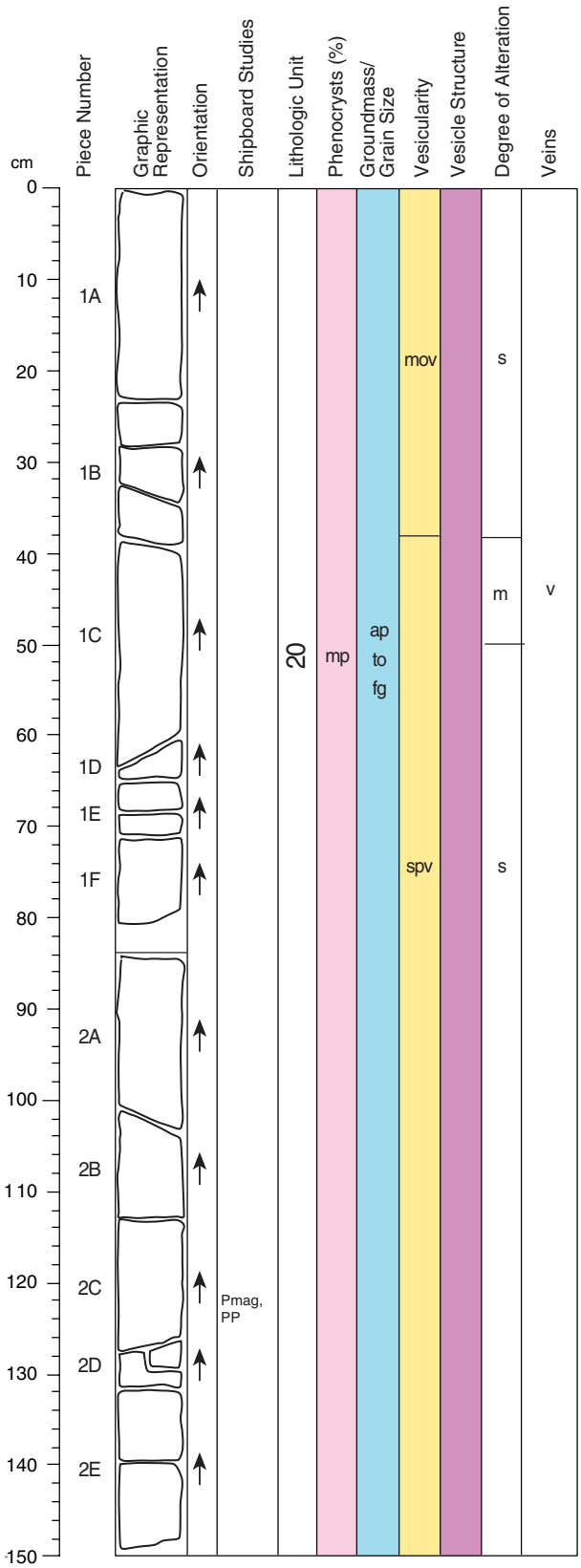
STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts range in extent and type of alteration; i.e., from red brown (Fe oxyhydroxide), to yellow with patches of unidentified black material to completely black. Vesicles are filled with very pale green unidentified material (90%) and white carbonate (10%).

VEINS/FRACTURES: Rare. Two horizontal 1mm veins filled with dark greenish clay.

COMMENTS: Vesicle shape varies. Vesicles 1-2 mm wide are round, and those >10 mm are irregular. A rare plagioclase phenocryst is present in Piece 10.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-36R-4 (Section top: 257.59 mbsf)

UNIT 20: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	6	4	1	2	Subhedral to euhedral; equant

GROUNDMASS: Aphanitic to fine grained. Consists of plagioclase, blue green mesostasis, olivine and clinopyroxene.

VESICLES:	% Mode	Size (mm): Average	Shape
1-40 cm	3-6	4	Round to elongate
40-150 cm	4-2	4	Round to elongate

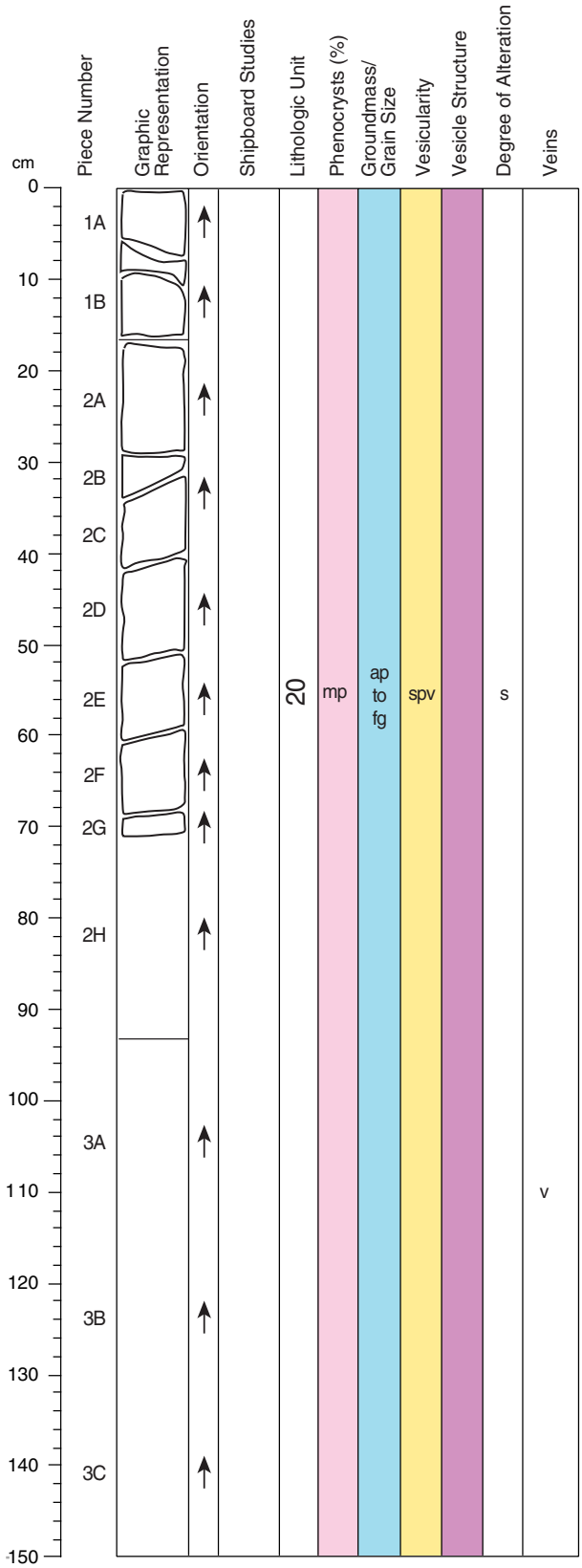
COLOR: Dark gray green (5G 4/1).

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Moderate adjacent to thin vein (40-42 cm) where a Fe oxyhydroxide halo is present. Mesostasis is altered to blue green clay. Vesicles are filled with both blue green clay and white carbonate in a nonsystematic arrangement. Olivine is completely replaced by Fe oxyhydroxide and zeolite, but is still identifiable.

VEINS/FRACTURES: Sparse. A thin (<2 mm) vein is present at 40-42 cm and is filled with brown clay and white carbonate.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-36R-5 (Section top: 259.09 mbsf)

UNIT 20: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	4-5	3	1	1.5	Subhedral to euhedral; equant

GROUNDMASS: Aphanitic to fine grained. Consists of plagioclase, blue green mesostasis, olivine and clinopyroxene.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2-3	3	Round to irregular

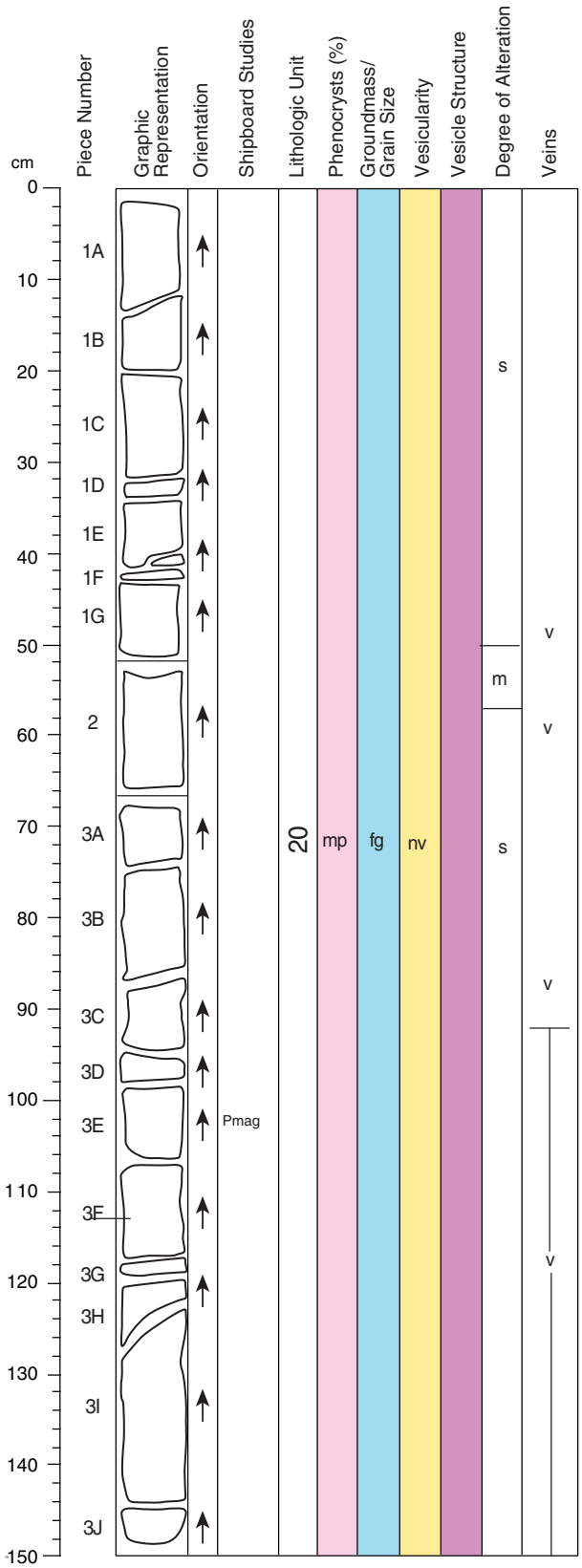
COLOR: Dark gray green (5G 4/1).

STRUCTURE: Massive.

ALTERATION: Slight. Mesostasis is altered to blue green clay. From 0-50 cm vesicles are filled with blue green clay and from 51-150 cm are filled with white carbonate. Olivine is completely replaced by Fe oxyhydroxide and zeolite.

VEINS/FRACTURES: Sparse. A thin (1 mm) vein is present at 110-112 cm and is filled with green clay and white carbonate.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-36R-6 (Section top: 260.59 mbsf)

UNIT 20: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	3-4	3	1	1.5	Subhedral to euhedral; equan

GROUNDMASS: Fine grained. Consists of plagioclase, green mesostasis, olivine and clinopyroxene.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<1	1.5	Round

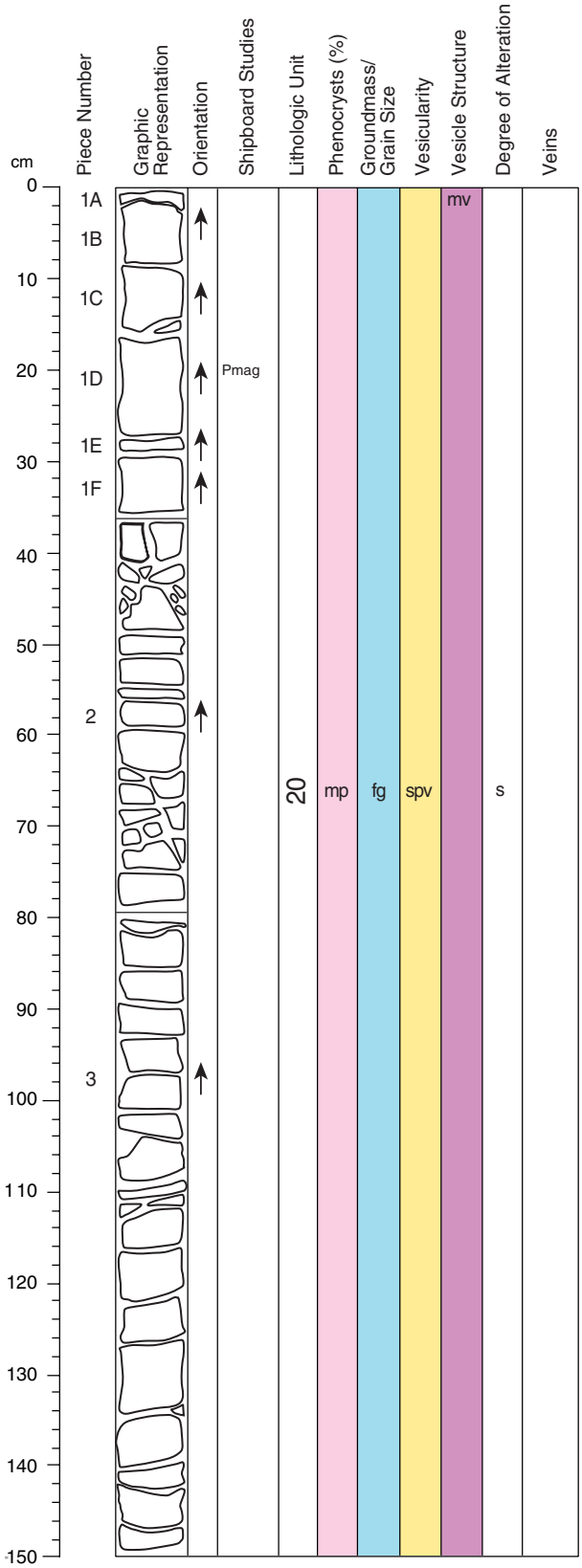
COLOR: Dark gray green (5G 4/1).

STRUCTURE: Massive.

ALTERATION: Moderate to slight. Mesostasis is altered to green clay. Rare vesicles are filled with white carbonate. Phenocrystic olivine is completely replaced by Fe oxyhydroxide and zeolite, although groundmass olivine appears fresh. A 10 mm wide Fe oxyhydroxide halo is present around a vein that is not preserved but is marked by the break from Piece 1G to 2.

VEINS/FRACTURES: Sparse. Thin (<1 mm) veins are present throughout (and more concentrated in a zone from 92-150 cm) and are filled with gray clay. The core frequently fractures along these veins.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-36R-7 (Section top: 262.09 mbsf)

UNIT 20: MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	9	10	1	1.5	Subhedral to euhedral; equan

GROUNDMASS: Fine grained. Consists of plagioclase, green mesostasis, olivine and clinopyroxene.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2	5	Round

COLOR: Medium light gray (N6).

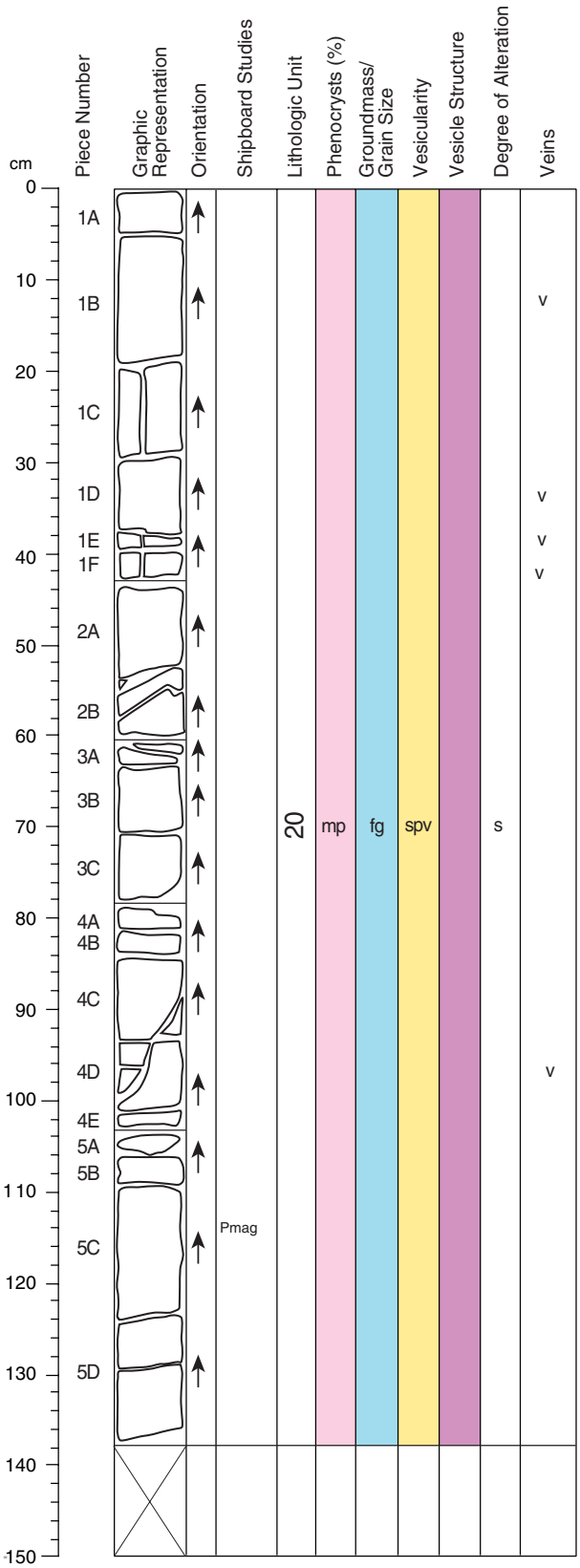
STRUCTURE: Massive.

ALTERATION: Slight. Mesostasis is altered to green clay. Phenocrystic olivin is completely replaced by Fe oxyhydroxide and zeolite, although groundmass olivine appears fresh. Vesicles are filled with green clay, talc, zeolite or white carbonate. Vesicles above approximately 80 cm are filled with white carbonate, and vesicles below 80 cm are filled with zeolite.

VEINS/FRACTURES: Sparse. Thin (<1 mm) veins are present throughout an are filled with gray clay. The core frequently fractures along these veins.

COMMENTS: A single 10 mm plagioclase phenocryst is present in the center of Piece 1D. A 45 mm megavesicle is present in Piece 1A and filled with greenish blue talc.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-37R-1 (Section top: 264.0 mbsf)

UNIT 20: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-5

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	10	8	0.5	2	Subhedral to euhedral; equant

GROUNDMASS: Fine grained. Consists of plagioclase, green mesostasis, olivine and clinopyroxene.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	3	3	Irregular

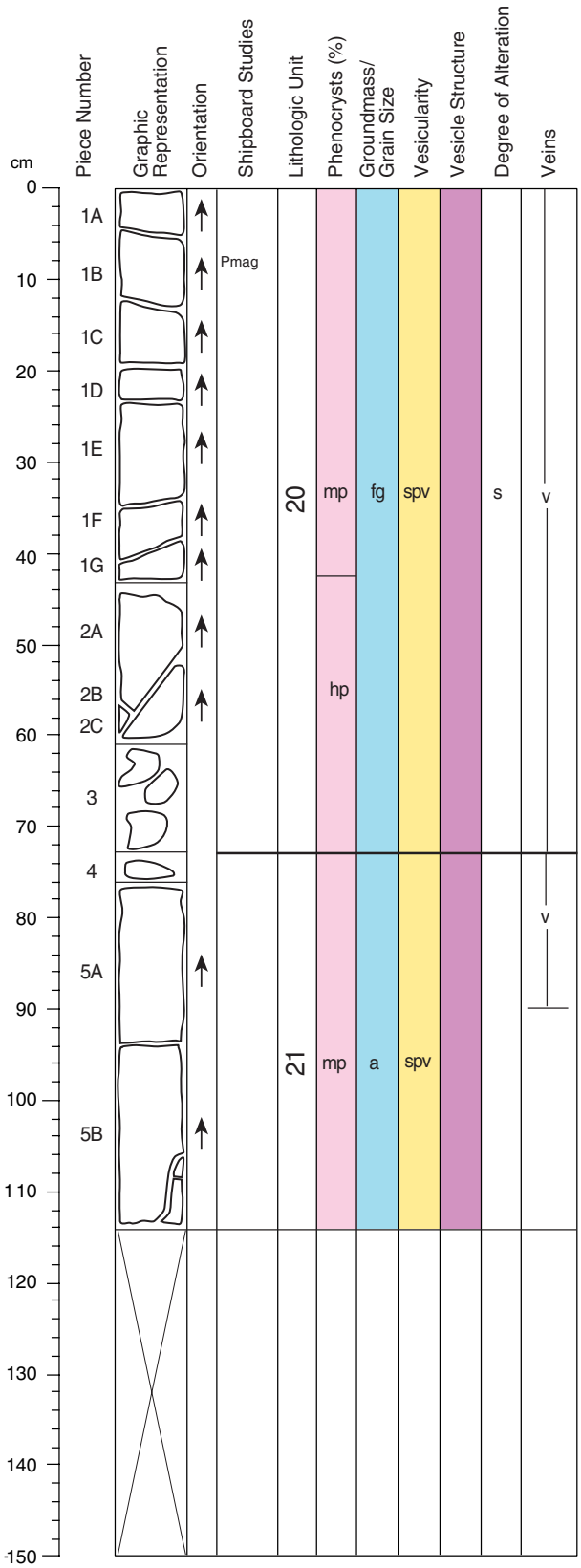
COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Slight. Mesostasis is altered to green clay. Phenocrystic and groundmass olivine are unaltered. Vesicles are filled with pale green clay, talc and carbonate.

VEINS/FRACTURES: Sparsely veined and highly fractured. <1-2 mm wide, subvertical veins are present in Pieces 1B, 1D-1F, and 4D, and filled with carbonate and pale green clay. Fractures are present throughout the section.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-37R-2 (Section top: 265.5 mbsf)

UNIT 20: SPARSELY TO MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None observed. Contact between moderately olivine-phyric basalt (Unit 20) and olivine-plagioclase phyric basalt (Unit 21) is inferred to be at 73 cm based on the presence of brown strongly oxidized pieces in Piece 3-4 and a weathered flow top in Piece 5.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine: 0-42 cm	7	5	1	2	Subhedral to euhedral; equant
42-73 cm	11	3	1	1.5	Subhedral to euhedral; equant

GROUNDMASS: Fine grained. Consists of plagioclase, green mesostasis, clinopyroxene and possibly olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2-3	4	Round to irregular

COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Slight. Mesostasis is altered to green clay. Phenocrystic olivine is completely replaced by Fe oxyhydroxide, dark clay and zeolite. Rare vesicles are filled with green clay or talc.

VEINS/FRACTURES: Sparse. Thin (<1 mm) subhorizontal fractures are present throughout.

UNIT 21: MODERATELY TO HIGHLY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 3-5

CONTACTS: None observed. Contact between moderately olivine-phyric basalt (Unit 20) above and olivine-plagioclase phyric basalt (Unit 21) is inferred to be at 73 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	5	6	1		Subhedral to euhedral; equant
Plagioclase:	1	5	1	2.5	Anhedral to euhedral

GROUNDMASS: Aphanitic. Consists of plagioclase, green mesostasis, clinopyroxene and olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	3	4	Round to irregular

COLOR: Medium light gray (N6).

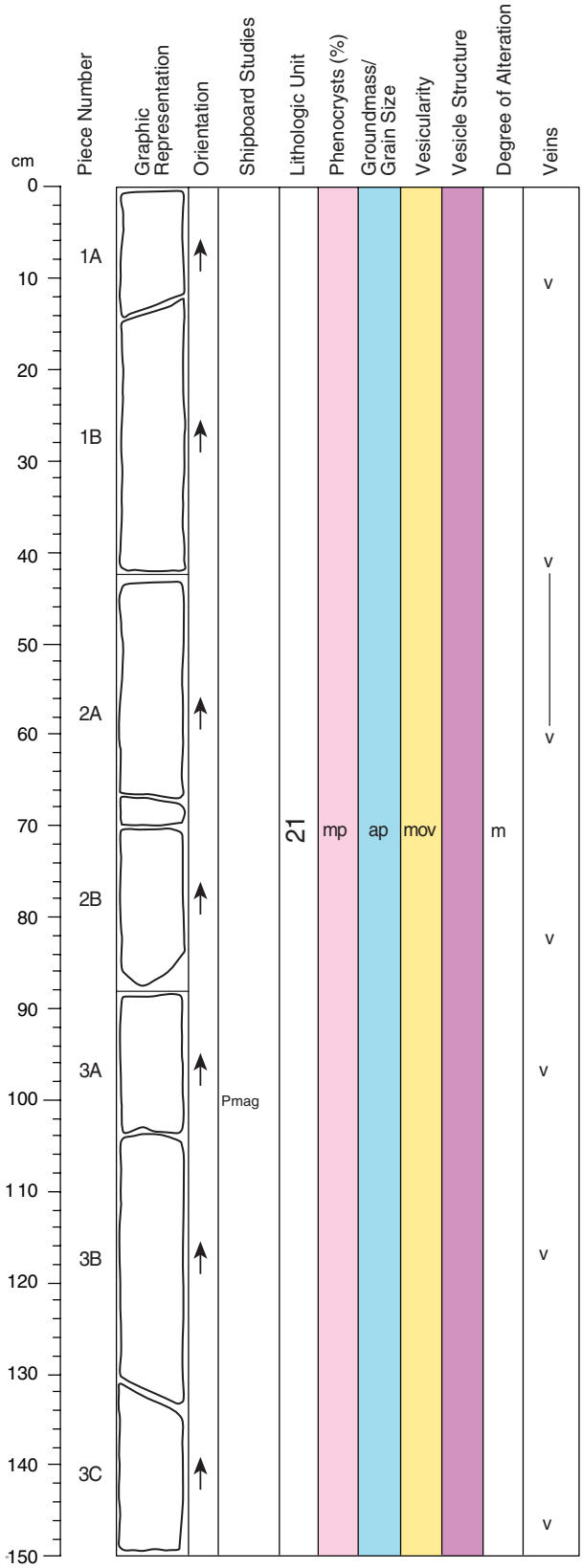
STRUCTURE: Massive.

ALTERATION: Slight. Mesostasis is altered to green clay. Phenocrystic olivine is completely replaced by Fe oxyhydroxide, dark clay and zeolite. Groundmass olivine is easy to identify as it is altered to Fe oxyhydroxide. Vesicles are filled with blue white material.

VEINS/FRACTURES: Moderately veined. Thin (<1 mm) subhorizontal fractures are present throughout. Intense veining is present in a zone from 73-90 mm and consists of <1 mm wide dendritic veins filled with white blue zeolite (?) and Fe oxyhydroxide.

COMMENTS: Piece 3 represent part of the oxidized brecciated top of the flow and contains several clinopyroxene phenocrysts. Some plagioclase phenocrysts appear resorbed and are often associated with olivine.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-37R-3 (Section top: 266.64 mbsf)

UNIT 21: MODERATELY TO HIGHLY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	5	8	1	3	Subhedral to euhedral
Plagioclase:	2	10	5	7	Subhedral

GROUNDMASS: Aphanitic. Consists of plagioclase, green mesostasis, clinopyroxene and possibly olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	7	7	Round to irregular

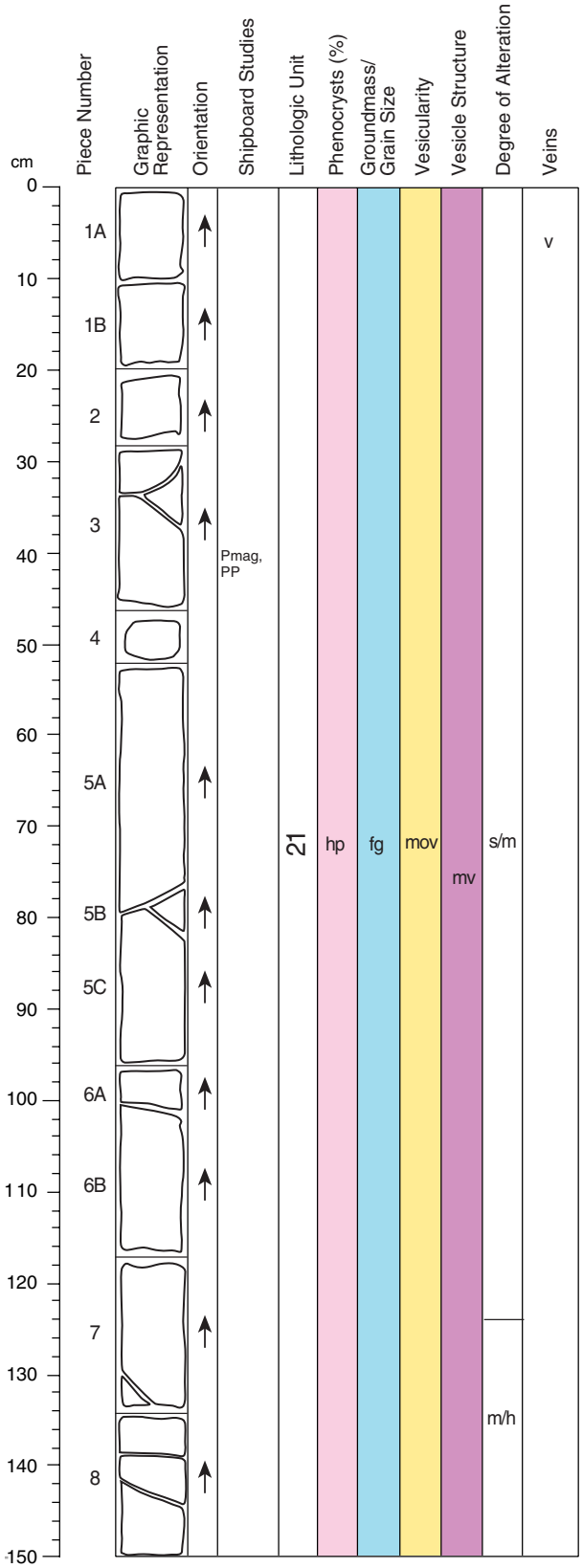
COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts are altered to dark green clay and Fe oxyhydroxide. Bands of Fe oxyhydroxide (~1 cm) are present around fractures and veins.

VEINS/FRACTURES: Sparse. Thin (<1 mm) veins filled with Fe oxyhydroxide are present throughout.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-37R-4 (Section top: 268.14 mbsf)

UNIT 21: MODERATELY TO HIGHLY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-8

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	10	15	1	4	Subhedral to euhedral
Plagioclase:	2	6	2	3	Subhedral

GROUNDMASS: Fine grained. The groundmass consists of plagioclase, green mesostasis, clinopyroxene and olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	10	3	Round to irregular

COLOR: Medium light gray (N6).

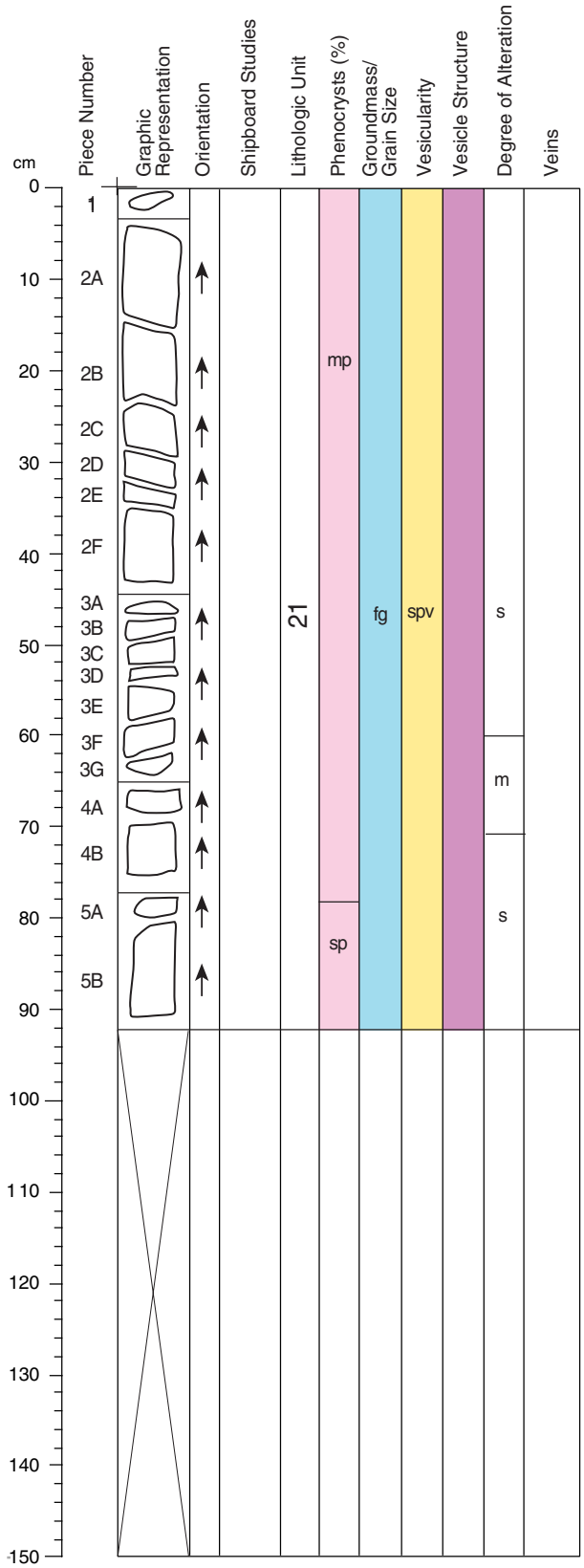
STRUCTURE: Massive.

ALTERATION: Slight to moderate from 0-128 cm and moderate to high from 128-150 cm. Most olivine phenocrysts are altered to Fe oxyhydroxide, but unaltered olivine phenocrysts are present throughout the section. Most groundmass olivine is unaltered. Vesicles are filled with pale green clay, talc and Fe oxyhydroxide. Bands of Fe oxyhydroxide (~1 cm) are present around fractures and veins.

VEINS/FRACTURES: Sparsely veined and highly fractured. One subvertical, thin (<1 mm) vein filled with Fe oxyhydroxide and green clay is present in Piece 1A at 8 cm. Fractures are present throughout the section.

COMMENTS: Some plagioclase phenocrysts are intergrown with olivine.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-37R-5 (Section top: 269.64 mbsf)

UNIT 21: MODERATELY TO HIGHLY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-5

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	3-4	4	1		Subhedral to euhedral; equant
Plagioclase:	1	5	1	2.5	Anhedral to euhedral

GROUNDMASS: Fine grained. Consists of plagioclase, green mesostasis, clinopyroxene, olivine and black oxide.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2	4	Elongate

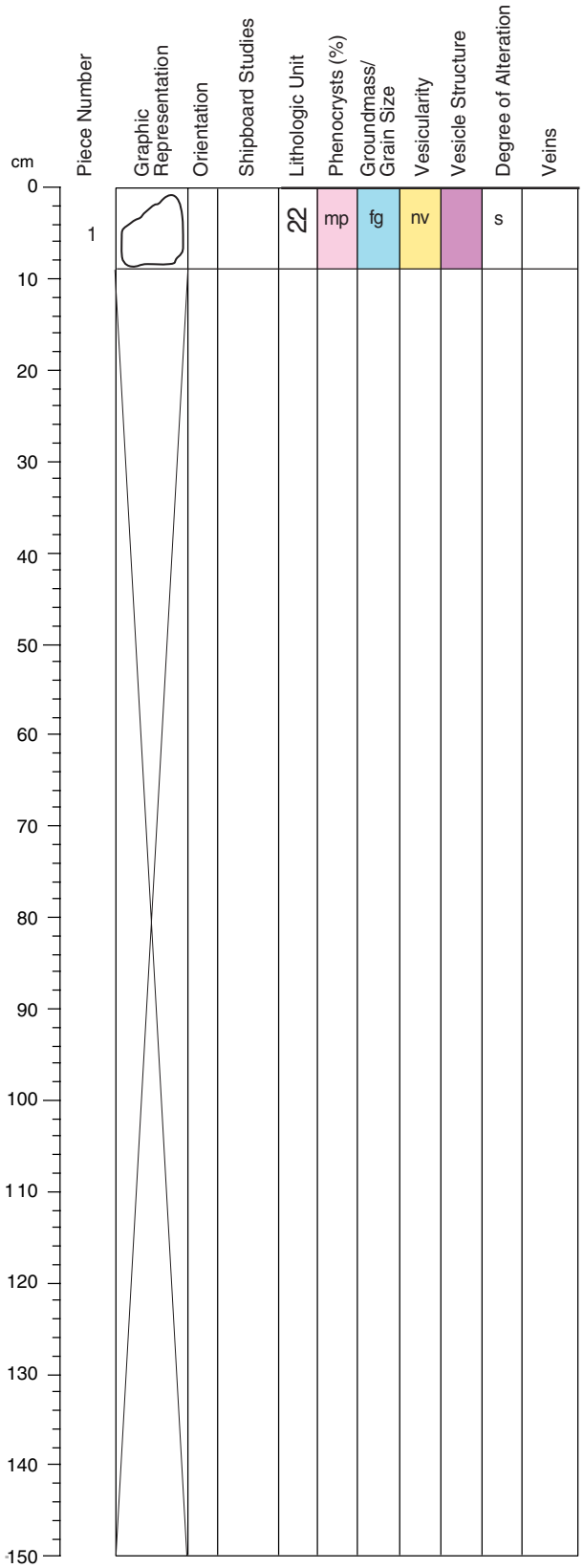
COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Slight. Mesostasis is altered to green clay. Phenocrystic olivine is completely replaced by Fe oxyhydroxide, dark clay and zeolite. Groundmass olivine is easy to identify as it is altered to Fe oxyhydroxide. Vesicles are filled with blue white material. From 64-75 cm a stain of Fe oxyhydroxide is present.

VEINS/FRACTURES: Moderately fractured. Thin (<1 mm) subhorizontal fractures are present throughout.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-38R-1 (Section top: 273.6 mbsf)

UNIT 22: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1

CONTACTS: None observed. The boundary between Units 21 and 22 is inferred to be at the top of Section 38R-1.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	4.5	2	-	Euhedral to subhedral
Olivine:	3-5	4	0.5	1	Subhedral to euhedral; equan

GROUNDMASS: Fine grained. Consists of plagioclase, green mesostasis, clinopyroxene, olivine and black oxide.

VESICLES: Nonvesicular.

COLOR: Medium gray (N5).

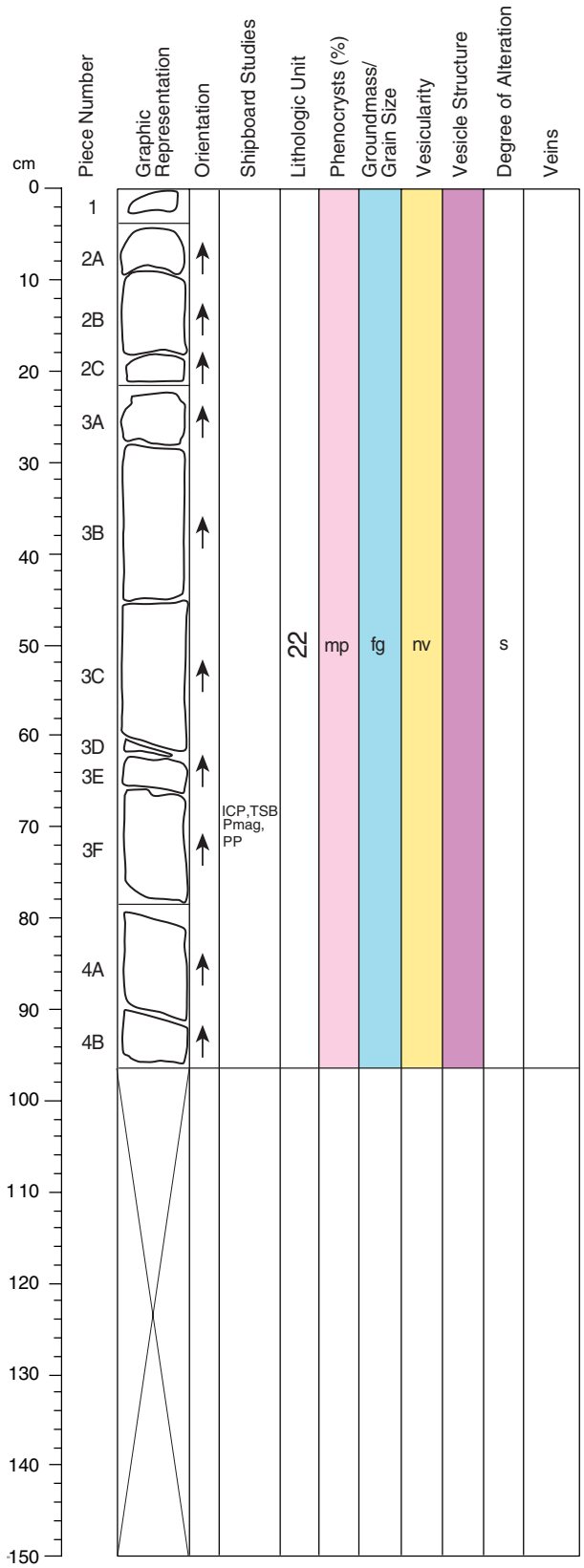
STRUCTURE: None.

ALTERATION: Slight. Olivines are generally unaltered, except along fractures and a few examples that are mostly replaced by dark green clay

VEINS/FRACTURES: None.

COMMENTS: Only 2 plagioclase phenocrysts are present.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-39R-1 (Section top: 274.6 mbsf)

UNIT 22: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	4	2	3	Subhedral; prismatic
Olivine:	6	5	1	3	Subhedral; equant

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, and black oxides. Olivine is rare or absent.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<1	2	Round

COLOR: Gray (2.5Y 6/0).

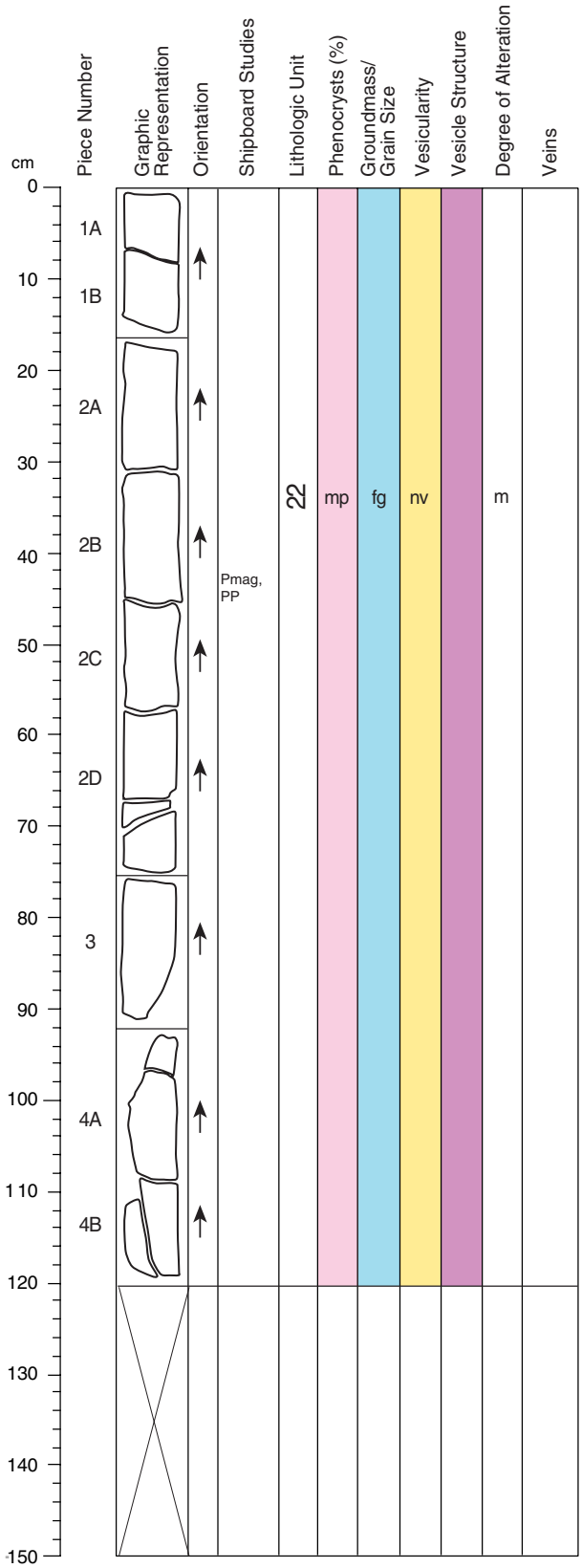
STRUCTURE: Massive.

ALTERATION: Slight. Olivine phenocrysts are slightly altered along fractures to Fe oxyhydroxide, and plagioclase phenocrysts are very slightly altered to sericite along cracks. Vesicles are filled with pale green clay.

VEINS/FRACTURES: None.

COMMENTS: Olivine phenocrysts are generally unaltered in this section.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-40R-1 (Section top: 275.6 mbsf)

UNIT 22: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-4

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	3	2	3	Subhedral; prismatic
Olivine:	6	4	1	2	Subhedral; equant

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, and black oxides. Olivine is rare or absent.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<1	2	Round to elongate

COLOR: Greenish gray (5GY 6/1).

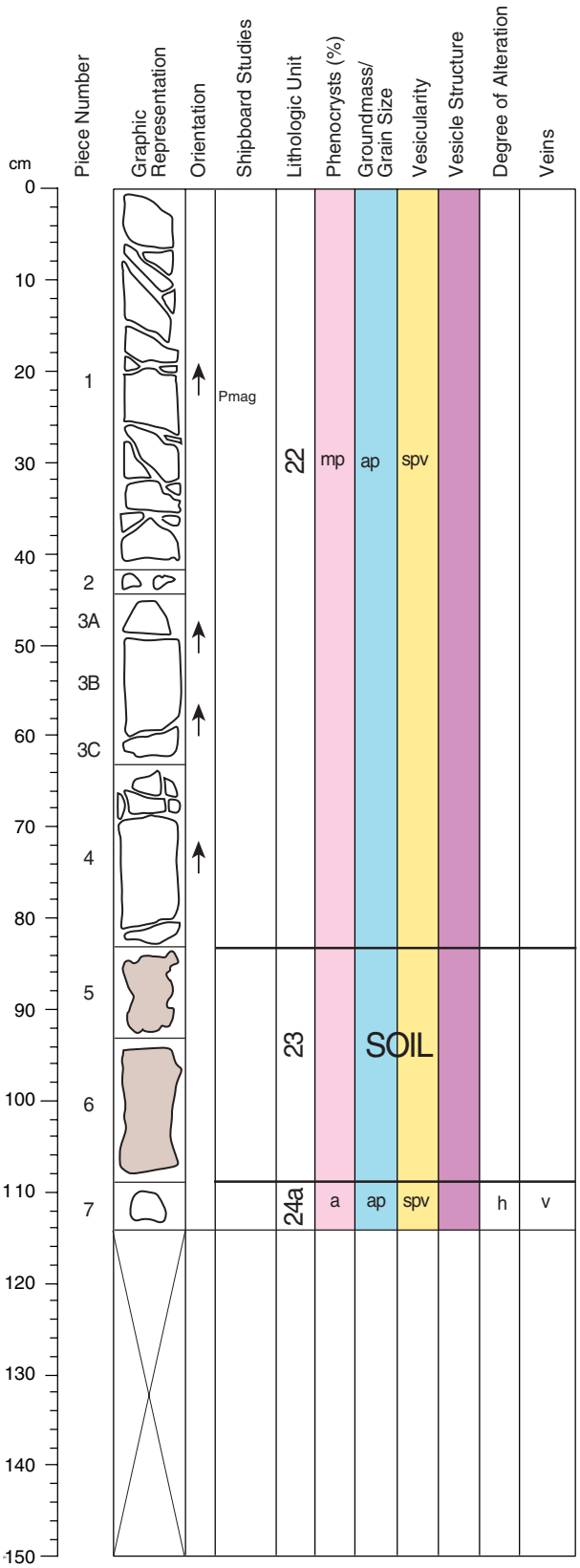
STRUCTURE: Massive.

ALTERATION: Moderate. Alteration is more severe in the lower half of the section (between 50 and 120 cm). Olivine phenocrysts are slightly to completely altered to Fe oxyhydroxide. Vesicles are filled with dark green clay.

VEINS/FRACTURES: Moderately fractured. Fractures are most common between 50 cm and 120 cm; they are <1 mm wide, and contain green clay, Fe oxyhydroxide and a white 'soapy' mineral.

COMMENTS: Only three plagioclase phenocrysts are visible in this section. Olivine phenocrysts in Piece 1 are generally unaltered, whereas those in Pieces 2 to 4 are partly to completely altered.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-40R-2 (Section top: 276.8 mbsf)

UNIT 22: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-4

CONTACTS: The boundary between Unit 22 and the underlying Unit 23 (red-brown soil) is at 82.5 cm, between Pieces 4 and 5.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	2	1	2	Subhedral; prismatic
Olivine:	5	3	0.5	2	Subhedral; equant

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, and black oxides. Olivine is rare or absent.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	3	3	Elongate

COLOR: Greenish gray (5GY 6/1).

STRUCTURE: Massive.

ALTERATION: Moderate. Olivine phenocrysts are slightly to completely altered to Fe oxyhydroxide. Vesicles are filled with dark green clay.

VEINS/FRACTURES: Highly fractured. Fractures are <1 mm wide, and contain green clay and Fe oxyhydroxide.

UNIT 23: RED-BROWN SOIL.

Pieces: 5–6

CONTACTS: None.

GENERAL DESCRIPTION: Soil horizon moderately disturbed consisting of very dark structureless clay (83-92 cm) and occasionally silty-sandy material, which becomes finely fragmented at the top (94-97 cm). Piece 6 is broken in inclined, tabular fragments at 92 to 109 cm.

COLOR: Very dark gray (5YR 3/1) to dark reddish brown (5YR 3/2 and 2.5YR 3/4).

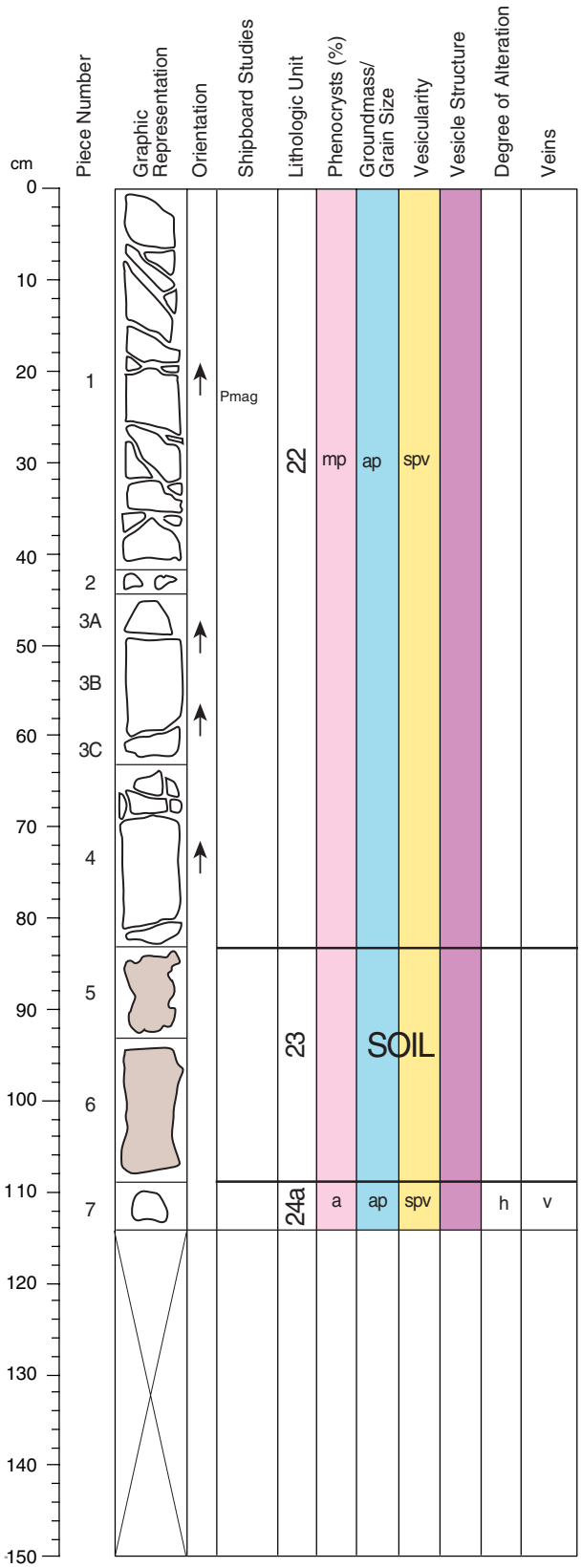
STRUCTURE: None.

VEINS/FRACTURES: A few 2 mm wide veins filled with a yellowish white mineral and light greenish gray material are present at the top of Piece 5.

COMMENTS: The soil contains a few 2-10 mm fragments of what may have been aphyric basalt, but there is no evidence that this was entirely derived from the underlying basalt so it is considered a separate unit.

(Continued on next page)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-40R-2 (Continued)

UNIT 24a: APHYRIC BASALT.

Pieces: 7

CONTACTS: None. Upper contact is inferred to be between this Piece and the reddish brown soil in Piece 6, at 109 cm.

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, and black oxides.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	5	2	Elongate

COLOR: Medium dark gray (N4).

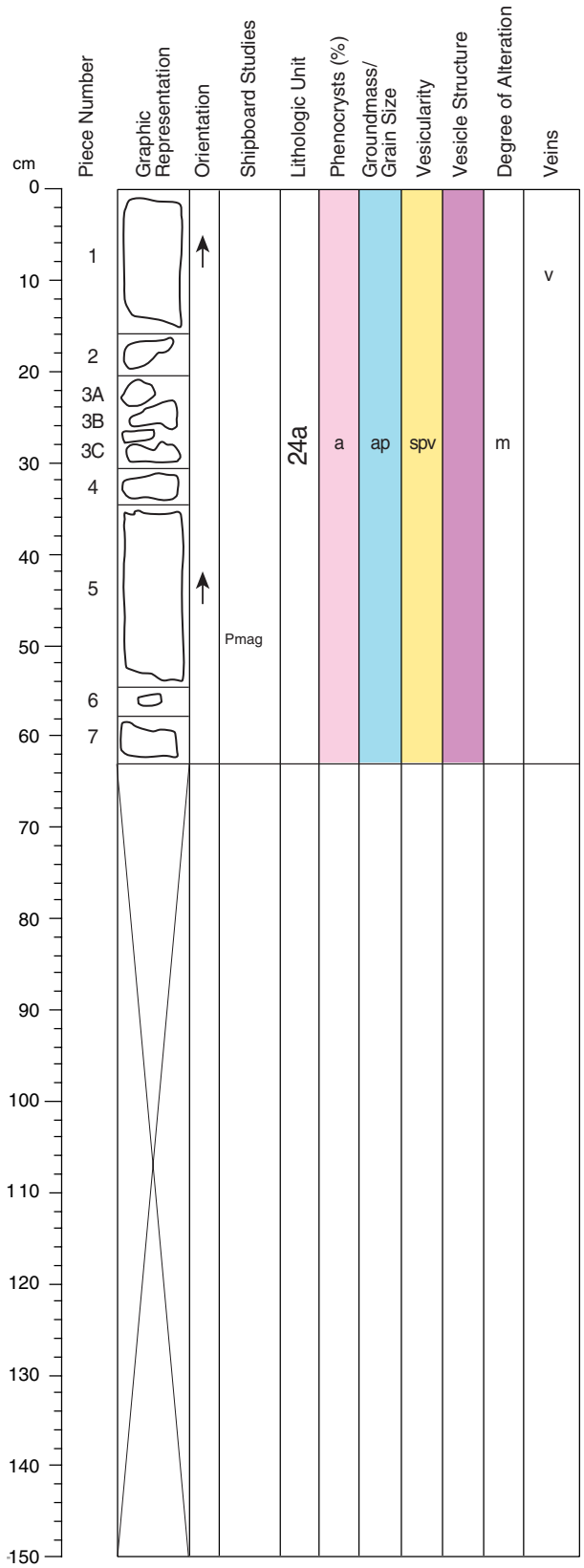
STRUCTURE: None. One cobble only.

ALTERATION: High. Groundmass is altered to dark gray clay. All but a few of the vesicles are filled with Fe oxyhydroxide, zeolite, or dark gray clay. Vesicles are filled with dark green clay. Fe oxyhydroxide alteration halos ≤5 mm wide are present around the veins.

VEINS/FRACTURES: Highly veined. Veins are 1 mm wide, curved, and filled with Fe oxyhydroxide.

COMMENTS: This single 4 cm cobble is probably derived from the fractured and weathered top of the flow represented by the next core (Core 41R).

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-41R-1 (Section top: 283.2 mbsf)

UNIT 24a: APHYRIC BASALT.

Pieces: 1-7

CONTACTS: None.

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxides, and altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-3	3	Subround to elongate

COLOR: Medium gray (N5).

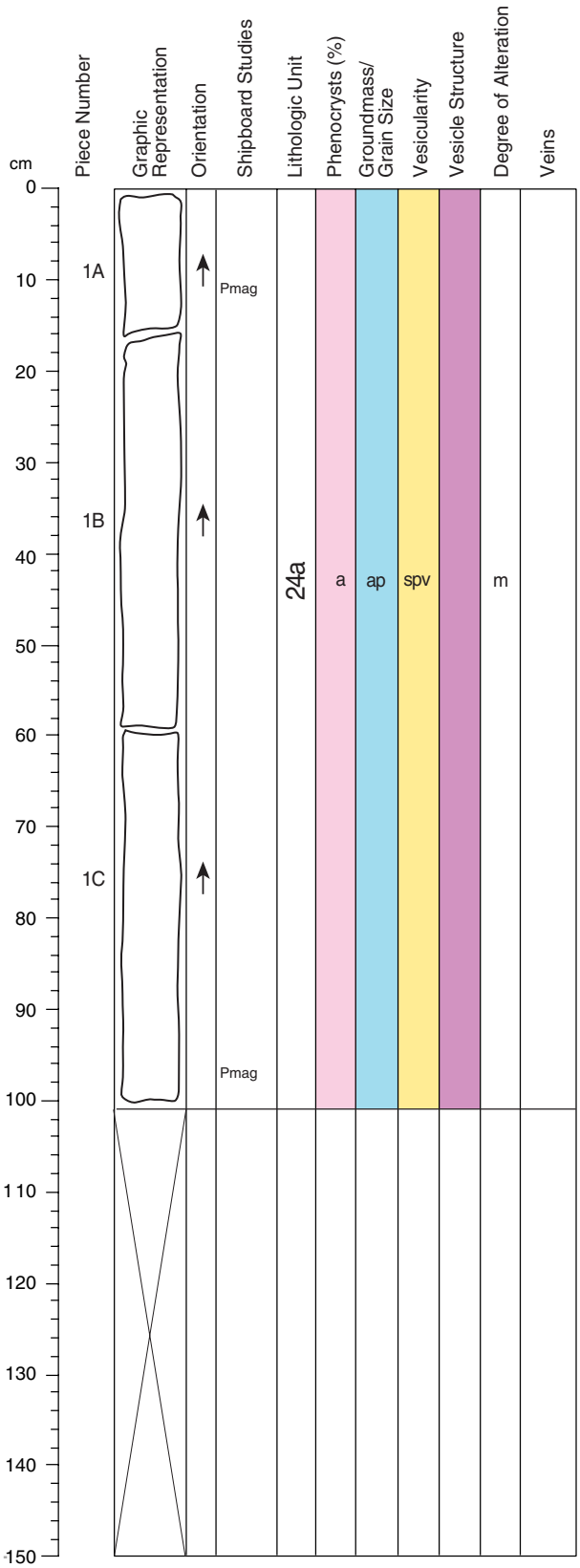
STRUCTURE: Massive.

ALTERATION: Moderate. Groundmass mesostasis is altered to dark gray clay. All but a few of the vesicles are filled with bluish greenish gray clay. A few vesicles in Piece 1 are filled with Fe oxyhydroxide, and a few vesicles in Piece 5 are filled with carbonate. A few vesicles are unfilled, but a lined with bluish greenish gray clay. Pieces 1 and 3 are stained with Fe oxyhydroxide.

VEINS/FRACTURES: Moderately veined in Piece 1, but no veins elsewhere. Vein in Piece 1 is diagonal, 1 mm wide, and filled with Fe oxyhydroxide and light gray zeolite.

COMMENTS: Possible flow foliation is present in Pieces 4 to 7, consisting of 1-3 mm wide bands of darker material 5-8 mm apart.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-41R-2 (Section top: 283.82 mbsf)

UNIT 24a: APHYRIC BASALT.

Pieces: 1

CONTACTS: None.

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxides, and altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-3	3	Subround to elongate

COLOR: Medium gray (N5).

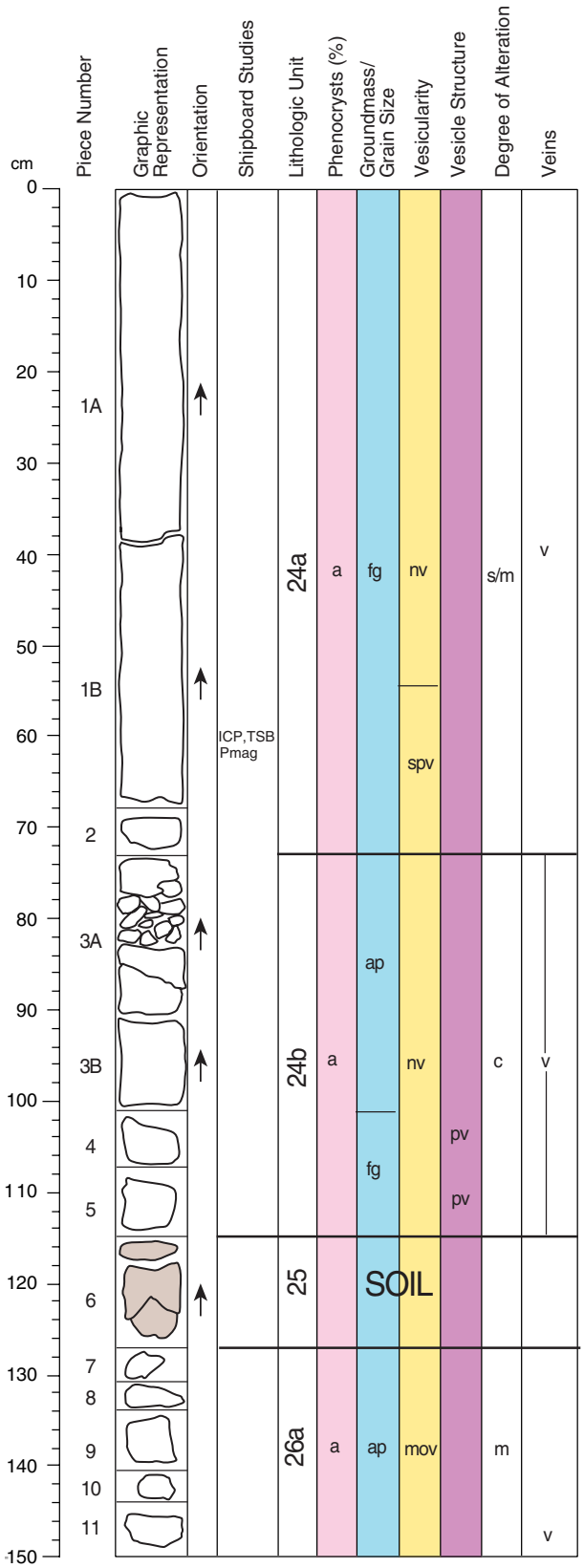
STRUCTURE: Massive.

ALTERATION: Moderate. Groundmass mesostasis is altered to dark gray clay. All but a few of the vesicles are filled with bluish greenish gray clay.

VEINS/FRACTURES: None.

COMMENTS: Possible flow foliation is present, consisting of 1-3 mm wide bands of darker material 5-8 mm apart.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-41R-3 (Section top: 284.84 mbsf)

UNIT 24a: APHYRIC BASALT.

Pieces: 1-2

CONTACTS: None observed. The boundary between Units 24a and 24b is inferred to be between Pieces 2 and 3A at 73 cm.

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, black oxides, and altered mesostasis (glass?) in an intergranular to intersertal texture.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-3	3	Subround to elongate

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

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Groundmass mesostasis is altered to dark green clay and highlights a horizontal flow foliation. Vesicles are filled with white carbonate and pale green clay.

VEINS/FRACTURES: One horizontal vein is present at 40 cm. It is 3-4 mm wide and filled with green clay and white carbonate.

COMMENTS: A horizontal flow foliation is present and vesicles are elongate parallel to this.
One subhedral plagioclase phenocryst (~2 x 2 mm) is present at 27 cm. One ~0.5 mm subhedral olivine microphenocryst, altered to dark green clay, is present in Piece 2.

UNIT 24b: APHYRIC BASALT BRECCIA.

Pieces: 3-5

CONTACTS: None observed. The boundary between Units 24a and 24b is inferred to be between Pieces 2 and 3A at 73 cm. The boundary between Units 24b and 25 is inferred to be between Pieces 5 and 6 at 114 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	<1	0.8	0.2	0.44	Subhedral; equant

GROUNDMASS: Aphanitic to fine grained. Black oxides and, occasionally, plagioclase laths are identifiable.

VESICLES: Nonvesicular*.

COLOR: Grayish brown (5YR 3/2) in Pieces 3 and 4. Very dusky red (10R 2/2 in Piece 5.

STRUCTURE: Brecciated.

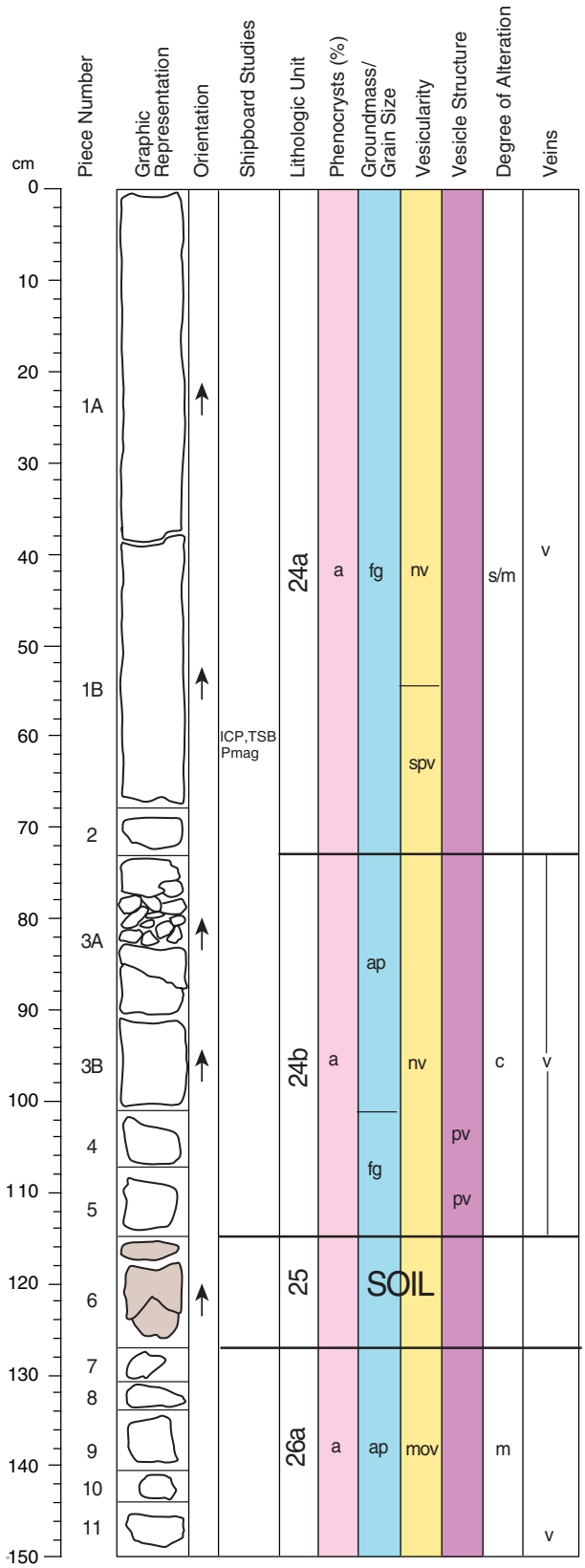
ALTERATION: Complete.

VEINS/FRACTURES: Highly veined. Veins are vertical, <0.1-2 mm wide and filled with white clay and zeolite that have been stained by the products of basalt alteration.

COMMENTS: Rare olivine microphenocrysts are highlighted by complete replacement by Fe-oxyhydroxide. Black oxide is present throughout, but is particularly noticeable in Piece 5, above the soil horizon. An apparent clast in Piece 5 is round (0.5 x 2 cm) and is fine grained; the subtrachytic texture and rare olivine microphenocrysts are highlighted by the alteration.
* Pipe vesicles are preserved in Pieces 4 and 5. They are filled with white clay and zeolite, the same material that fills veins. They are 1-2 cm long and ~3 mm wide.

(Continued on next page)

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-41R-3 (Continued)

UNIT 25: RED-BROWN SOIL.

Pieces: 6

CONTACTS: Lower contact is a sharp boundary in Piece 6 at 123 cm with the basalt unit below. Upper contact with Unit 24b breccia is inferred to be at 114 cm, between Pieces 5 and 6.

GENERAL DESCRIPTION: Slightly disturbed soil horizon of dark reddish brown clay and silty-clay soil. At the bottom the firm red clay is slightly fractured into three parts due to the drilling disturbance.

COLOR: Dusky red (10R 3/4) to dark reddish brown (2.5 YR 3/3 and 3/4). Very dark gray (10YR 3/1) and very dark grayish brown (10YR 3/2).

STRUCTURE: None.

COMMENTS: There is no evidence that this soil was entirely derived from the underlying basalt so it is considered a separate unit.

UNIT 26a: APHYRIC TO SPARSELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 6-11

CONTACTS: Sharp contact with the overlying soil at 123 cm in Piece 6.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	6	1	3	Subhedral to elongate

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxides, and altered olivine and mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	5-15	3	Subround to elongate

COLOR: Medium gray (N4).

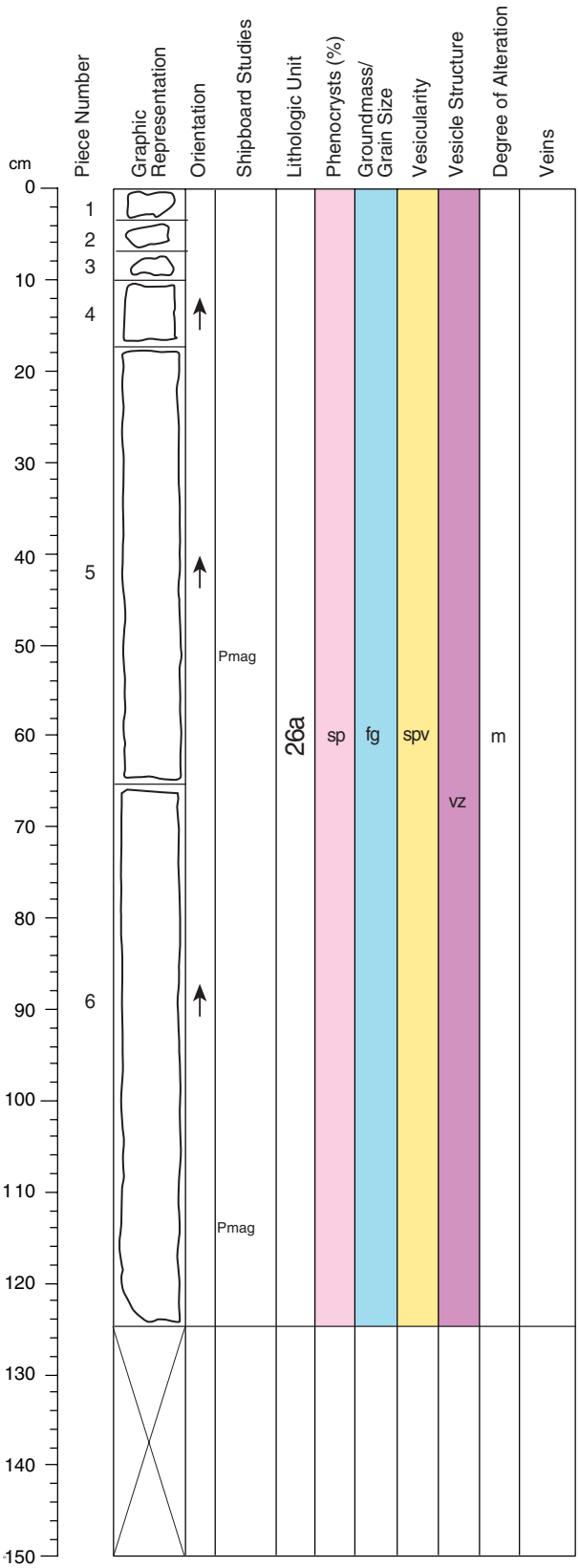
STRUCTURE: None.

ALTERATION: Moderate. Groundmass olivine is altered to Fe oxyhydroxide. Groundmass mesostasis is altered to dark gray clay. Some vesicles in Piece 6 are filled with zeolite, and others are lined with bluish gray clay. Vesicles in Pieces 7 and 8 are lined with bluish gray clay and Fe oxyhydroxide. Vesicles in Pieces 10 and 11 are filled with greenish gray clay.

VEINS/FRACTURES: None.

COMMENTS: Vesicles are largest and most abundant in Piece 9, less so in Pieces 6-8, and smallest and least abundant in Pieces 10 and 11. The vesicularity of these pieces and the presence of the soil horizon in unit above suggest that this is the vesicular top of the flow in Section 4.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-41R-4 (Section top: 286.34 mbsf)

UNIT 26a: APHYRIC TO SPARSELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-6

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	2	12	3	5	Subhedral; prismatic

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, black oxides and altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2	10	Round to irregular

COLOR: Dark greenish gray (5G 4/1).

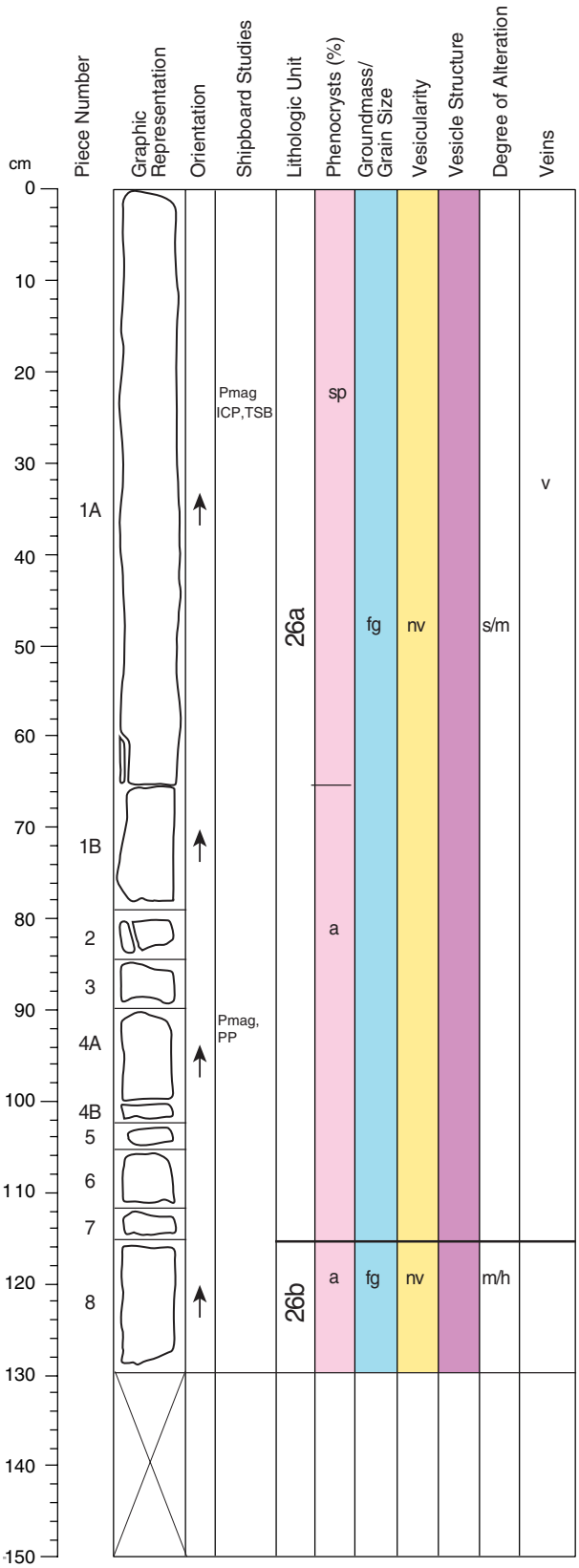
STRUCTURE: Massive.

ALTERATION: Moderate. Groundmass mesostasis is partially altered. Vesicles are filled with carbonate, and grey-green to brown clay.

VEINS/FRACTURES: Sparsely fractured. Fractures are randomly oriented, <0.5 mm wide, and lined with dark green clay and Fe oxyhydroxide.

COMMENTS: Rare, large vesicles in Piece 5 are up to 5 cm in diameter.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-41R-5 (Section top: 287.58 mbsf)

UNIT 26a: APHYRIC TO SPARSELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-7

CONTACTS: The contact between Units 26a and 26b is inferred to be at 115 cm between Pieces 7 and 8.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1-2	5	1	2	Subhedral; prismatic

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, black oxides and altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	1	5	Round to irregular

COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Groundmass mesostasis is partially altered. Vesicles are filled with green clay or gray clay. Pervasive Fe oxyhydroxide alteration in Piece 2.

VEINS/FRACTURES: Sparsely fractured. One vein at 34 cm is <0.5 mm wide and filled with green clay.

UNIT 26b: APHYRIC BASALT BRECCIA.

Pieces: 8

CONTACTS: Contact between Unit 26a and 26b is inferred to be between Piece 7 and 8 at 115 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	5	1	2	Subhedral; prismatic

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, black oxides and altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	1	5	Round to irregular

COLOR: Moderate yellowish brown (10YR 5/4), to dark yellowish orange (10YR 6/6) and medium dark gray (N4).

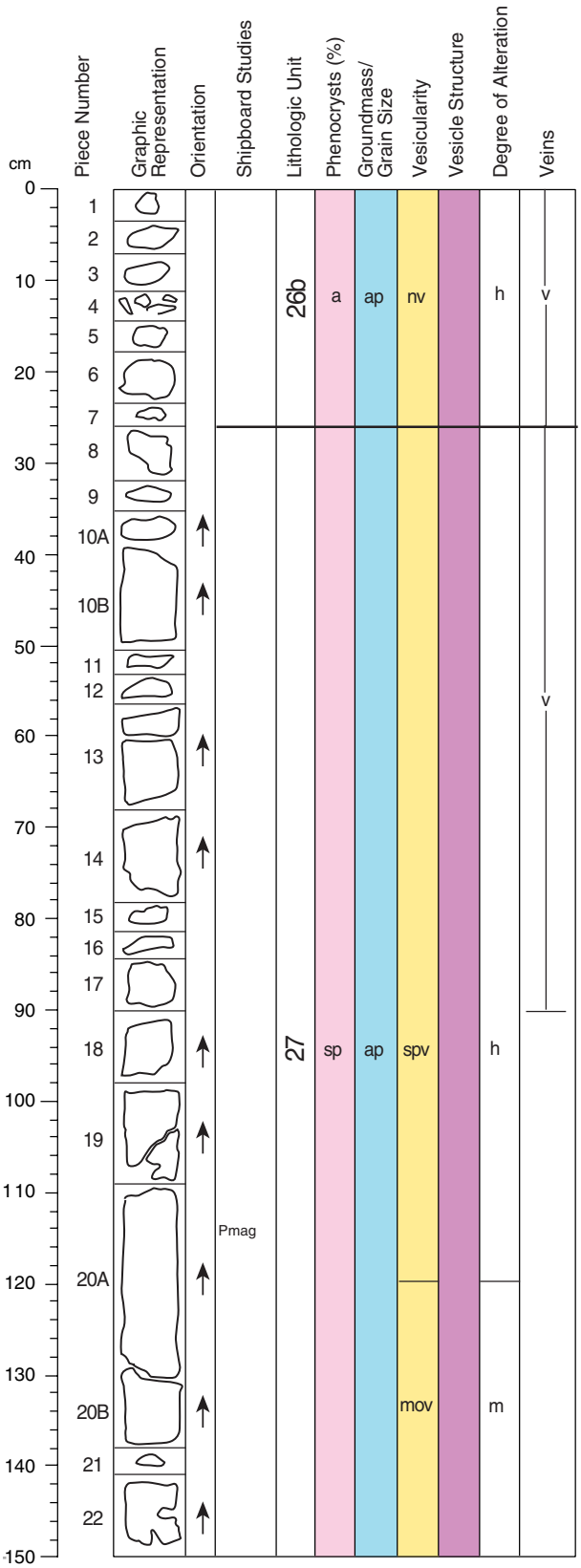
STRUCTURE: Massive.

ALTERATION: Moderate to high. Groundmass mesostasis is mostly altered. Vesicles are filled with green clay.

VEINS/FRACTURES: Sparsely fractured. One vein, <0.5 mm wide, is filled with green clay.

COMMENTS: This piece has a brecciated appearance with a matrix consisting of Fe oxyhydroxide, brown clay and probably zeolite.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-42R-1 (Section top: 292.8 mbsf)

UNIT 26b: APHYRIC BASALT BRECCIA.

Pieces: 1-7

CONTACTS: Contact between Units 26b and 27 is inferred to be between Piece 7 and 8 at 26 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	5	1	2	Subhedral; prismatic

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxides and altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	1	5	Round to irregular

COLOR: Moderate brown (5YR 5/4).

STRUCTURE: Massive.

ALTERATION: High. Plagioclase phenocrysts are highly altered. Groundmass is highly to completely altered to Fe oxyhydroxide, reddish brown clay, and light gray zeolite, and vesicles are filled with zeolite.

VEINS/FRACTURES: Highly veined. The veins are ~1 mm wide and filled with light gray zeolite.

COMMENTS: This piece has a brecciated appearance with a matrix consisting of Fe oxyhydroxide, brown clay and probably zeolite.

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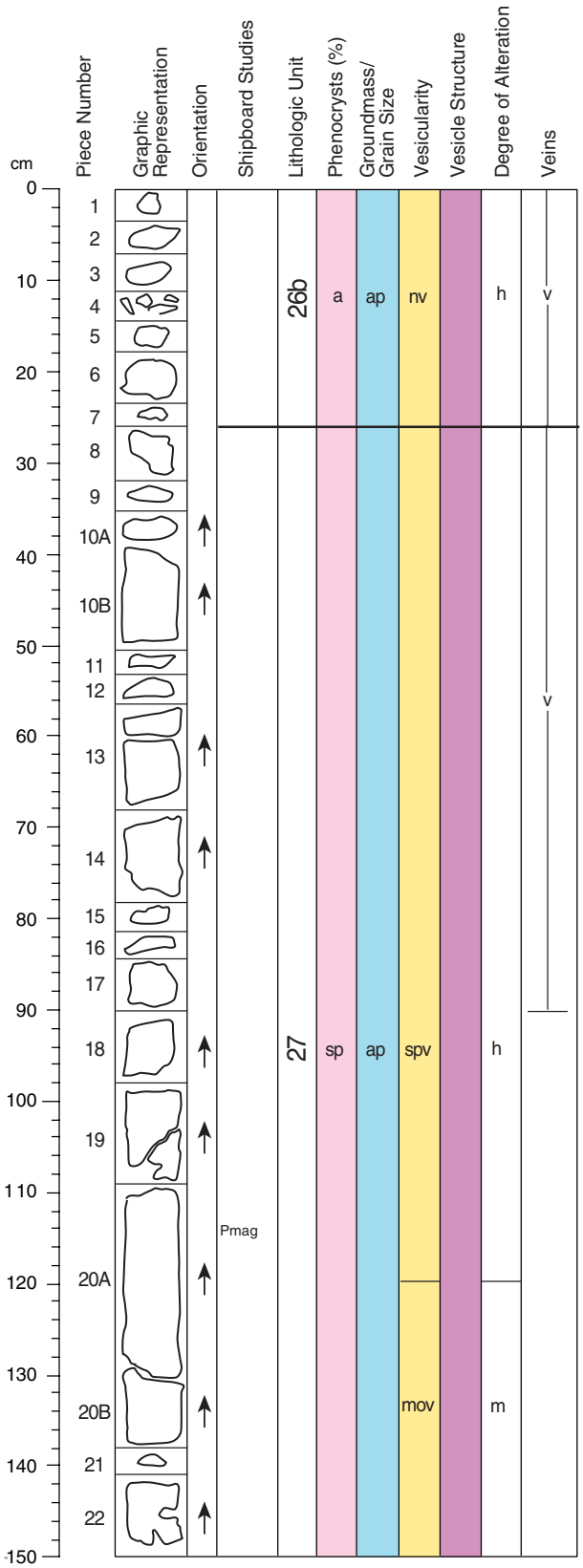
Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-42R-1 (Continued)

UNIT 27: APHYRIC TO MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 8-22

CONTACTS: None observed. The boundary between Units 26b and 27 is inferred to be between Pieces 7 and 8 at 26 cm.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	36	2	5	Euhedral to elongate

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxides, and altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
	2-10	2	Elongate to irregular

COLOR: Moderate brown (5YR 3/4) from 0-33 cm, grading into brownish gray (5YR 4/1) from 33-121 cm, grading into medium bluish gray (5B 5/1) below 121 cm.

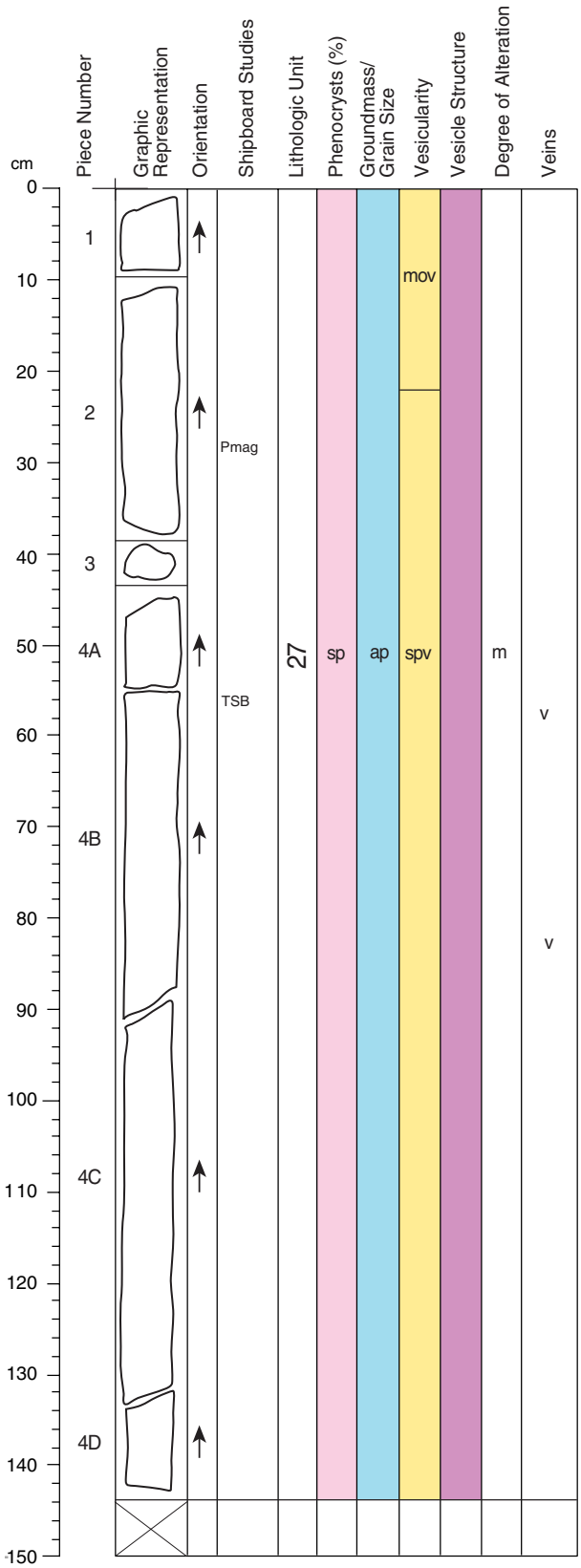
STRUCTURE: Massive.

ALTERATION: Moderate to high.
26-33 cm: Highly altered. Plagioclase phenocrysts are highly altered. Groundmass is highly to completely altered to Fe oxyhydroxide, reddish brown clay, and light gray zeolite, and vesicles are filled with zeolite. This interval represents ~2 cm of soil and weathered basalt.
33-121 cm: Plagioclase phenocrysts are moderately altered. Groundmass is highly altered to Fe oxyhydroxide, reddish brown clay, and light gray zeolite, and vesicles are filled to partly filled with zeolite, carbonate, and bluish gray clay.
121-150 cm: Plagioclase phenocrysts are slightly altered. Groundmass is moderately altered to dark gray clay, and vesicles are lined with greenish gray clay.

VEINS/FRACTURES: Varied.
0-50 cm: highly veined. The veins are ~1 mm wide and filled with light gray zeolite.
50-90 cm: sparsely veined. The veins are ~1 mm and filled with light gray zeolite.
90-150 cm: none.

COMMENTS: Changes in color and alteration are consistent with this being a weathered top of the flow represented by the sections below.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-42R-2 (Section top: 294.3 mbsf)

UNIT 27: APHYRIC TO MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-4D

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	15	2	10	Subhedral; prismatic

GROUNDMASS: Aphanitic. Plagioclase, clinopyroxene and black oxide are identifiable.

VESICLES:	% Mode	Size (mm): Average	Shape
0-20 cm	6	7	Round to irregular
20-150 cm	3	4	Irregular

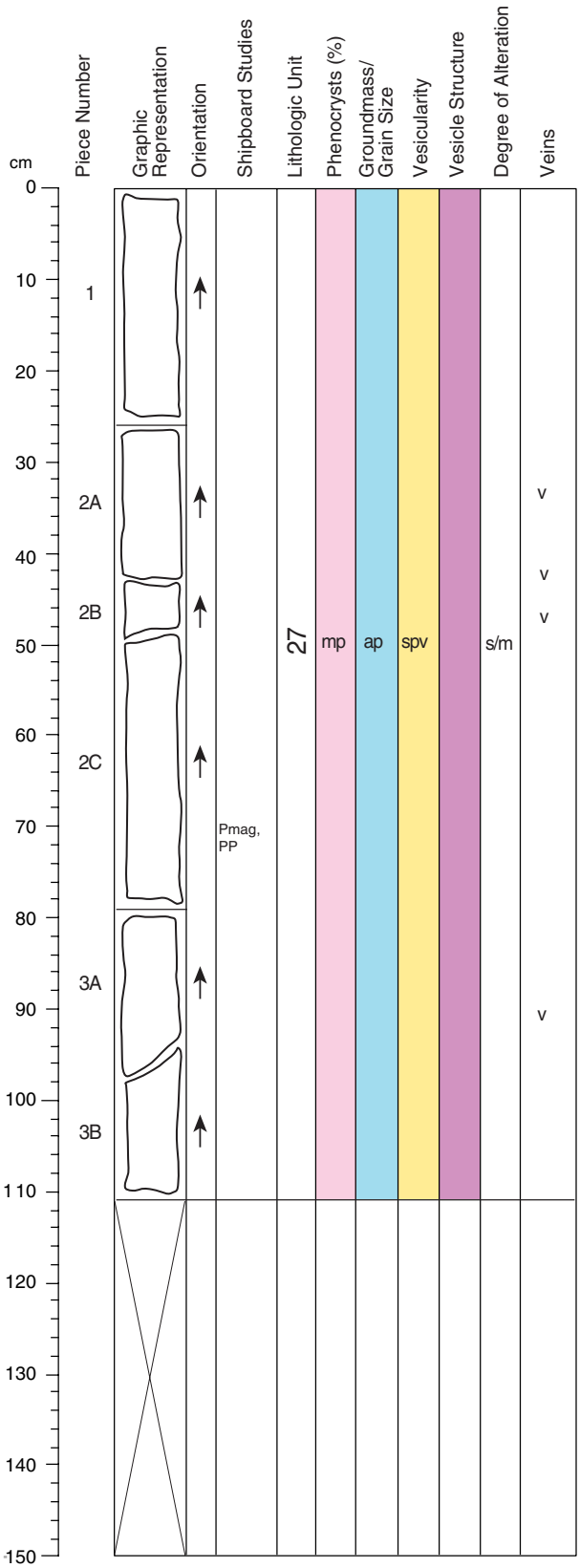
COLOR: Greenish gray (5GY 6/1).

STRUCTURE: Massive.

ALTERATION: Moderate. Fe oxyhydroxide altered clinopyroxene is abundan in the groundmass. Vesicles are filled with green clay.

VEINS/FRACTURES: Sparsely veined. Veins are randomly oriented <1 mm wide, and filled with green and dark gray clay and carbonate. Fractures commonly occur along these veins.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-42R-3 (Section top: 295.74 mbsf)

UNIT 27: APHYRIC TO MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-3

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	3	20	5	9	Subhedral; prismatic

GROUNDMASS: Aphanitic. Plagioclase, clinopyroxene and black oxide are identifiable.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	3	7	Round to irregular

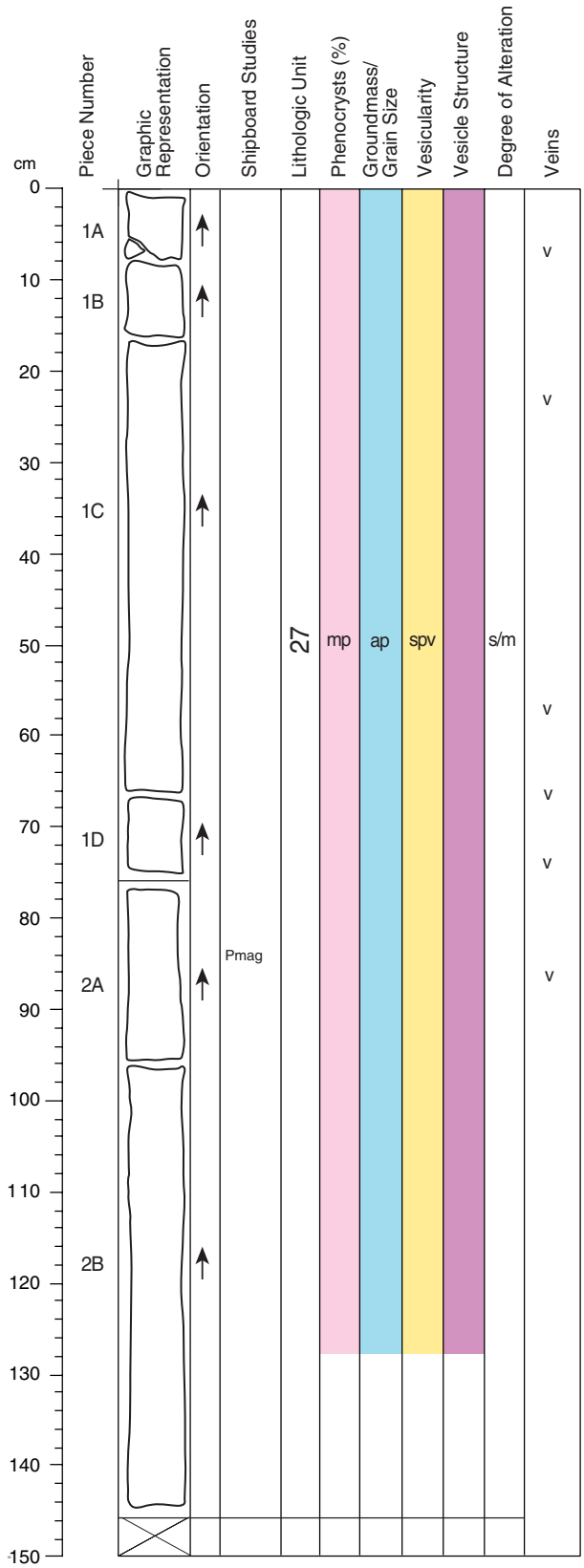
COLOR: Greenish gray (5GY 6/1).

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Plagioclase phenocrysts are very slightly altered to sericite along cracks. Vesicles are filled with grey-green clay, occasionally with carbonate.

VEINS/FRACTURES: Sparsely veined. Veins are randomly oriented <1 mm wide, and filled with green and dark gray clay and carbonate. Fractures commonly occur along these veins.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-42R-4 (Section top: 296.84 mbsf)

UNIT 27: APHYRIC TO MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	6	20	2	9	Subhedral; prismatic

GROUNDMASS: Aphanitic. Plagioclase, clinopyroxene and black oxide are identifiable.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	3	4	Round to irregular

COLOR: Greenish gray (5GY 6/1).

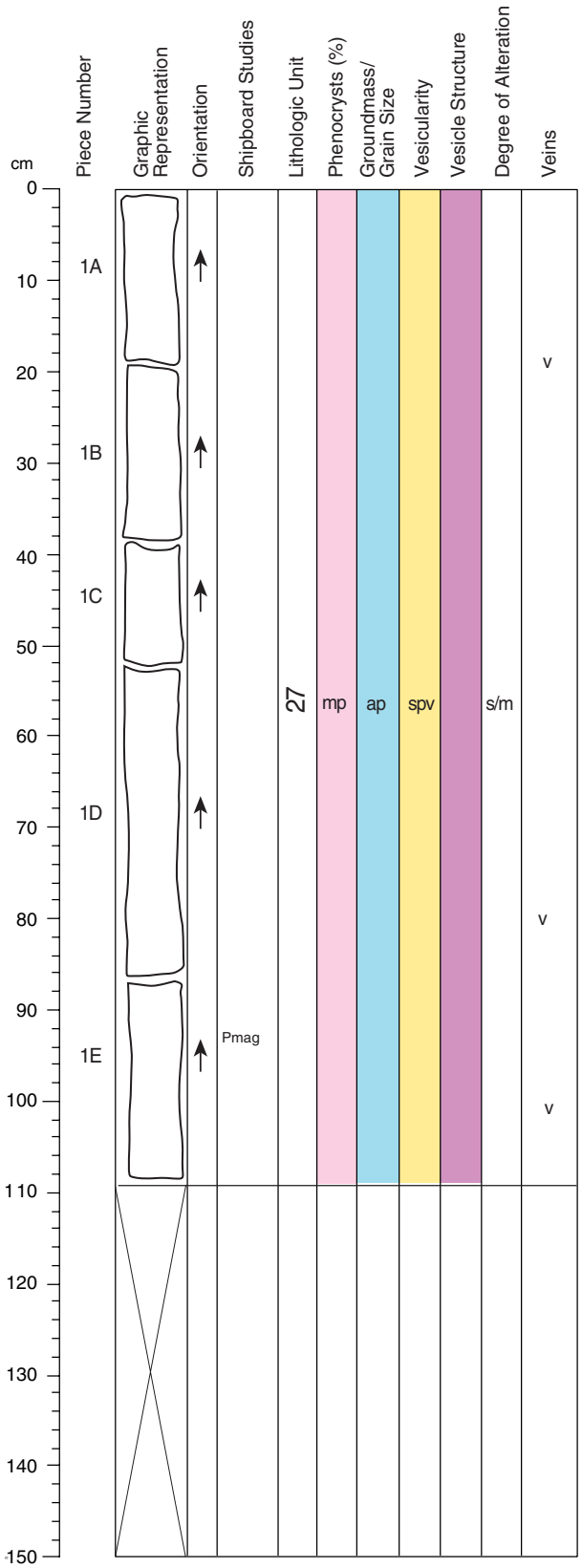
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Plagioclase phenocrysts are very slightly altered to sericite along cracks. Vesicles are filled with grey-green clay, occasionally with carbonate. Olivine in Piece 1D is partially altered to Fe oxyhydroxide and gray-green clay.

VEINS/FRACTURES: Sparsely veined. Veins are randomly oriented <1 mm wide, and filled with green clay and carbonate.

COMMENTS: Piece 1D at 67 cm contains a 2.5 cm-sized xenolith/glomerocrystic assemblage of olivine and plagioclase.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-42R-5 (Section top: 298.29 mbsf)

UNIT 27: APHYRIC TO MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	6	13	2	6	Subhedral; prismatic

GROUNDMASS: Aphanitic. Plagioclase, clinopyroxene and black oxide are identifiable.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	3	3	Rounded

COLOR: Greenish gray (5GY 6/1).

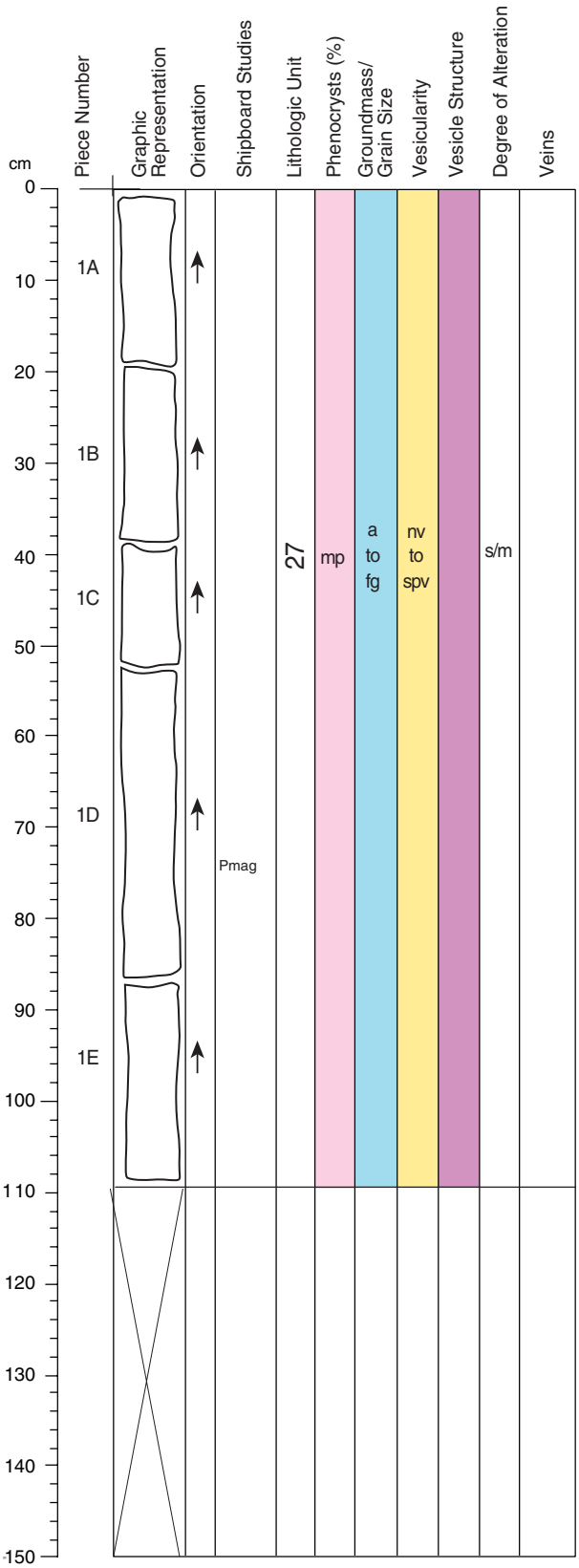
STRUCTURE: Massive.

ALTERATION: Slight to moderate. Plagioclase phenocrysts are very slightly altered to sericite along cracks. Vesicles are filled with gray-green clay, occasionally with carbonate.

VEINS/FRACTURES: Sparsely veined. Veins are present in Pieces 1A, 1D and 1E, are <1 mm wide, and filled with green clay and a white mineral (not carbonate).

COMMENTS: A single, anhedral olivine phenocryst, partially altered to Fe-oxyhydroxide, is present in Piece 1E at 93 cm.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-42R-6 (Section top: 299.39 mbsf)

UNIT 27: APHYRIC TO MODERATELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	7	18	2	7	Subhedral; prismatic

GROUNDMASS: Aphanitic. Plagioclase, clinopyroxene and black oxide are identifiable.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1-2	3	Rounded

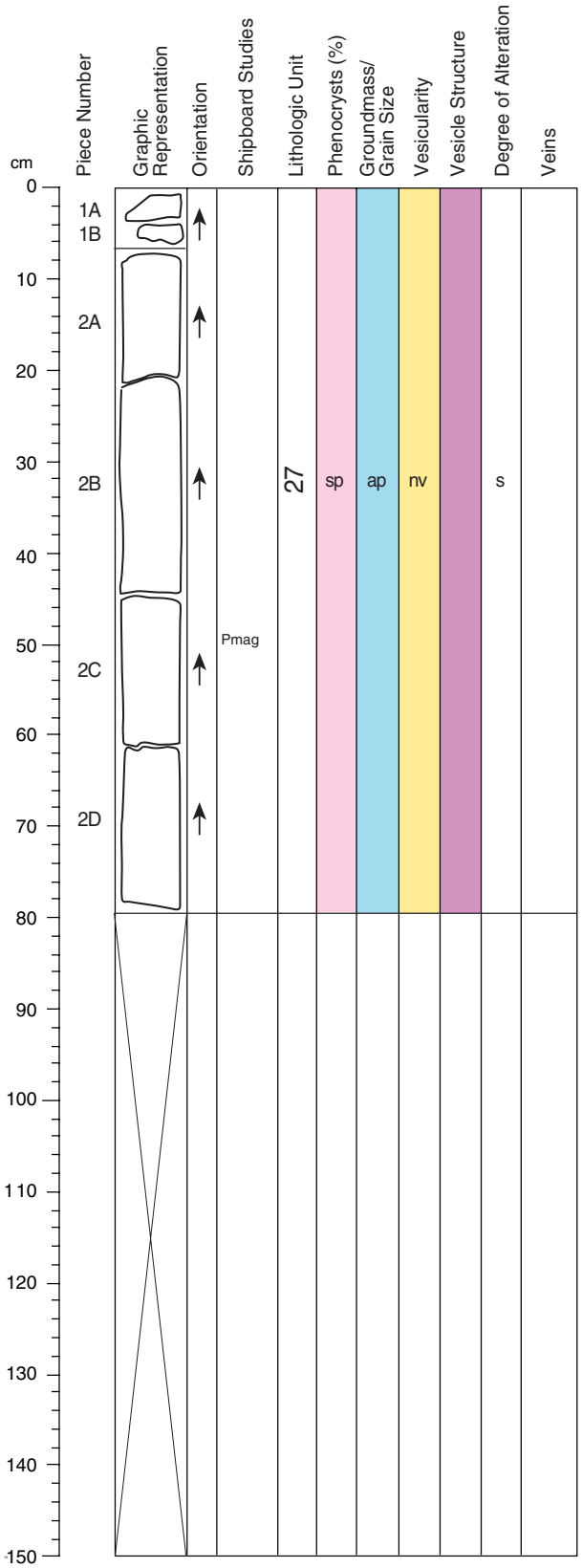
COLOR: Greenish gray (5GY 6/1).

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Plagioclase phenocrysts are very slightly altered to sericite along cracks. Vesicles are filled with gray-green clay, occasionally with carbonate.

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

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-43R-1 (Section top: 302.5 mbsf)

UNIT 27: APHYRIC TO SPARSELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1-2	15	2		Anhedral; prismatic

GROUNDMASS: Aphanitic. Plagioclase, clinopyroxene, and olivine are identifiable.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<<1	3	Round

COLOR: Greenish gray (5GY 6/1).

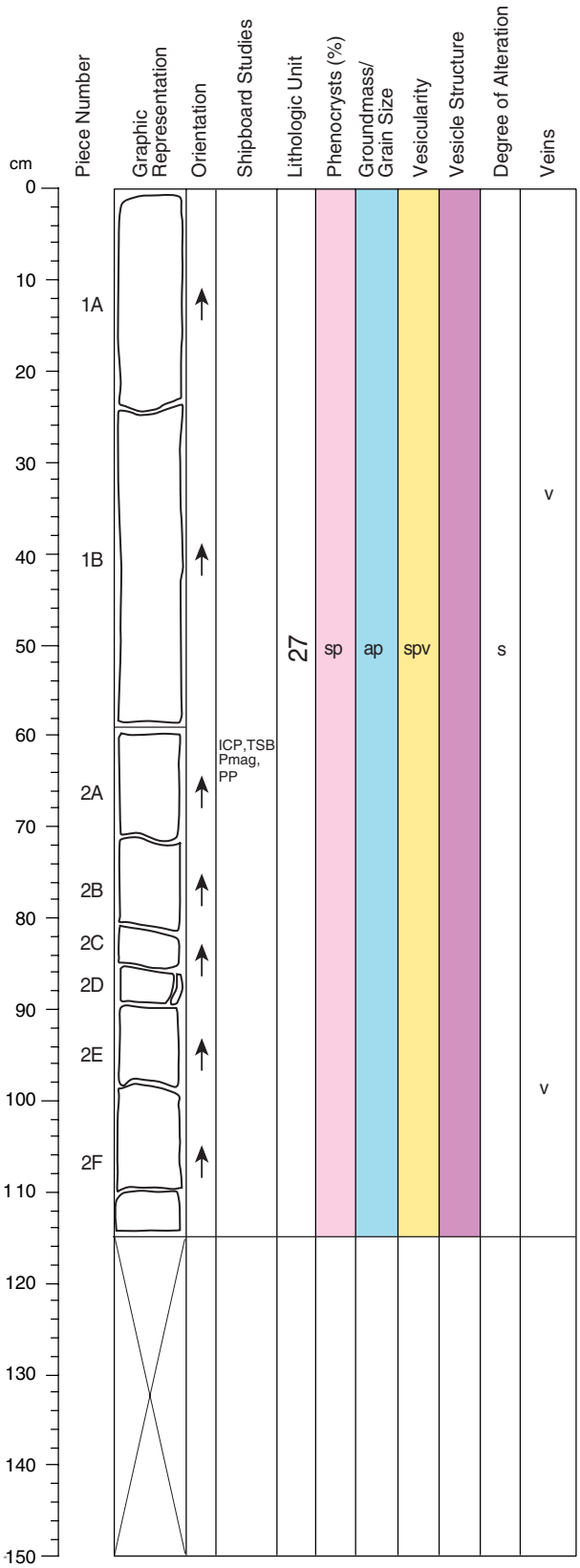
STRUCTURE: Massive.

ALTERATION: Slight. Mesostasis is altered to gray-green clay. Vesicles are filled with gray green clay and occasionally with carbonate. Some olivine in the groundmass is slightly altered to Fe oxyhydroxide although some remains unaltered.

VEINS/FRACTURES: None.

COMMENTS: One plagioclase megacryst at 33 cm has what appears to be altered olivine attached.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-43R-2 (Section top: 303.3 mbsf)

UNIT 27: APHYRIC TO SPARSELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1-2	13	2		Anhedral; prismatic

GROUNDMASS: Aphanitic. Plagioclase, clinopyroxene, and olivine are identifiable.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2	5	Rounded to irregular

COLOR: Greenish gray (5GY 6/1).

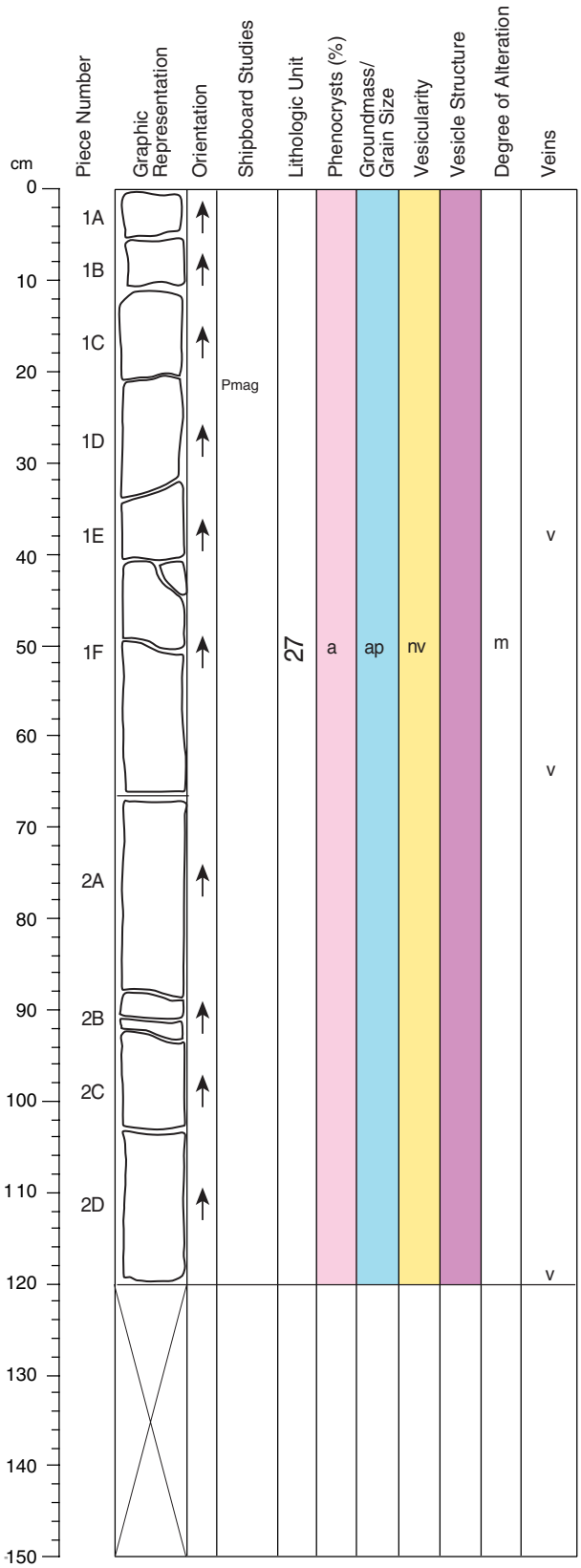
STRUCTURE: Massive.

ALTERATION: Slight. Olivine in groundmass is slightly to highly altered to Fe oxyhydroxide.

VEINS/FRACTURES: Sparsely veined. Veins <1 mm are filled with white carbonate or gray clay. Vesicles are filled with gray green clay.

COMMENTS: Darker sub-mm wisps of gray material are present and are presumed to represent preferential alteration along planes of a weakly developed flow foliation.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-43R-3 (Section top: 304.44 mbsf)

UNIT 27: APHYRIC TO SPARSELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-2

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	10	1	3	Subhedral

GROUNDMASS: Aphanitic. Plagioclase, clinopyroxene and possibly olivine. Groundmass shows spotted appearance on a mm-scale, probably reflecting altered mesostasis.

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	<<1	3	Elongated

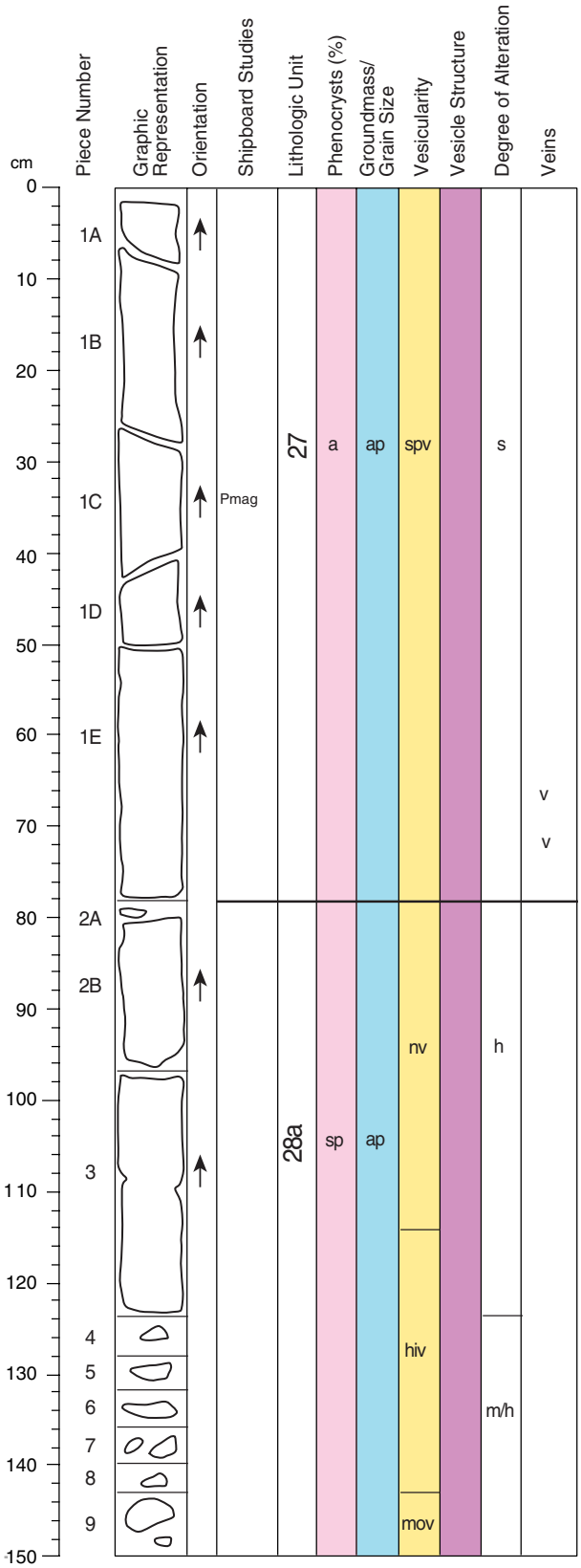
COLOR: Light gray (N7).

STRUCTURE: Massive.

ALTERATION: Moderate. Mesostasis is altered to gray-green clays. Vesicles are filled with gray-green clay and occasionally with carbonate.

VEINS/FRACTURES: Sparsely veined. <1 mm veins are filled with carbonate or light green clay. The bottom surface of Piece 2D has a vein with a 10 mm carbonate inclusion.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-43R-4 (Section top: 305.63 mbsf)

UNIT 27: APHYRIC TO SPARSELY PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1

CONTACTS: Contact between Unit 27 (aphyric basalt) and Unit 28a (sparsely to moderately olivine-plagioclase-phyric basalt) is inferred to be between Piece 1 and 2 at 78 cm.

PHENOCRYSTS:	%	Grain Size (mm):			
	Mode	Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1 6	3	4		Subhedral

GROUNDMASS: Aphanitic. Groundmass consists of plagioclase, clinopyroxene and olivine. Groundmass shows spotted appearance on a mm-scale, probably reflecting altered mesostasis.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
Sparsely vesicular	5	4	Round to irregular

COLOR: Medium gray (N5).

STRUCTURE: Massive.

ALTERATION: Slight. Mesostasis is altered to gray-green clay. Vesicles are filled with gray-green clay and occasionally with carbonate. Most groundmass olivine is unaltered.

VEINS/FRACTURES: Sparse. <1 mm wide, randomly oriented veins are present in Piece 1E, and filled with green clay and carbonate.

UNIT 28a: SPARSELY OLIVINE-PHYRIC BASALT.

Pieces: 2-9

CONTACTS: Contact between Unit 27 (aphyric basalt) and Unit 28a (sparsely to moderately olivine-plagioclase-phyric basalt) is inferred to be between Piece 1 and 2 at 78 cm.

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

GROUNDMASS: Aphanitic. Groundmass consists of plagioclase, clinopyroxene, and altered olivine.

VESICLES:	%	Size (mm):	
	Mode	Average	Shape
78-115 cm	0		
115-143 cm	25	3	Round to irregular
143-150 cm	7	1	Round to irregular

COLOR: Medium dark gray (N4). Moderate brown (5 YR 4/4) to grayish brown (5 YR 3/2) in Pieces 2 and 3.

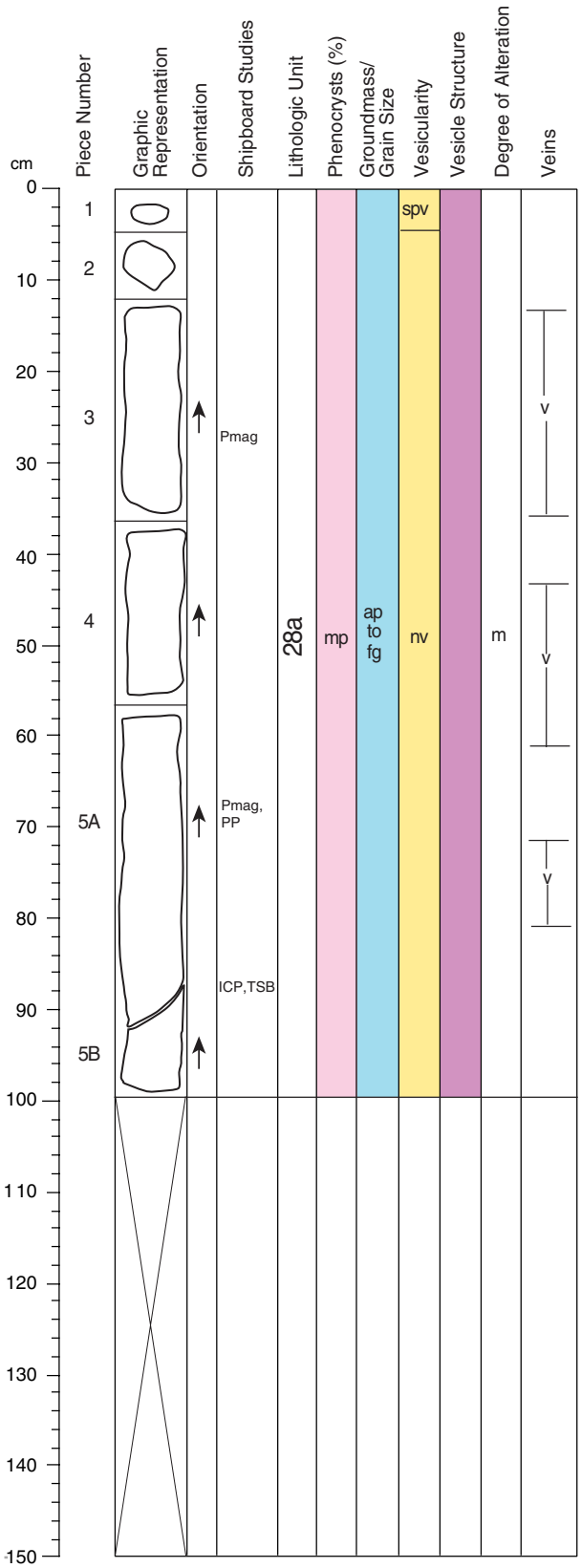
STRUCTURE: Lobed. Lobe margin is inferred to be at the top of Piece 2, due to the presence of a highly weathered flow top represented in Pieces 2 and 3.

ALTERATION: High to moderate. Vesicles are filled with pale green clay, carbonate and zeolite(?). Olivine phenocrysts and most groundmass olivine are altered to Fe oxyhydroxide. Some groundmass olivine, however, is unaltered.

VEINS/FRACTURES: None.

COMMENTS: Pieces 2 and 3 represent deeply weathered flow top of the Unit 28 lava. Domains (1-30 mm in diameter) of unaltered olivine phyric lava give the horizon an apparent breccia like texture. Fractures are infiltrated by silt-clay size detrital material. The top of Piece 2 is taken to be the boundary between Unit 27 and Unit 28a.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-44R-1 (Section top: 312.2 mbsf)

UNIT 28a: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-5

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	5	4	0.5	1	Euhedral to subhedral
Plagioclase:	1	8	3	4	Euhedral

GROUNDMASS: Aphanitic to fine grained. Groundmass consists of plagioclase, clinopyroxene, and olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
0-5 cm	7	2	Elongate
5-100 cm	<<1	1	Round

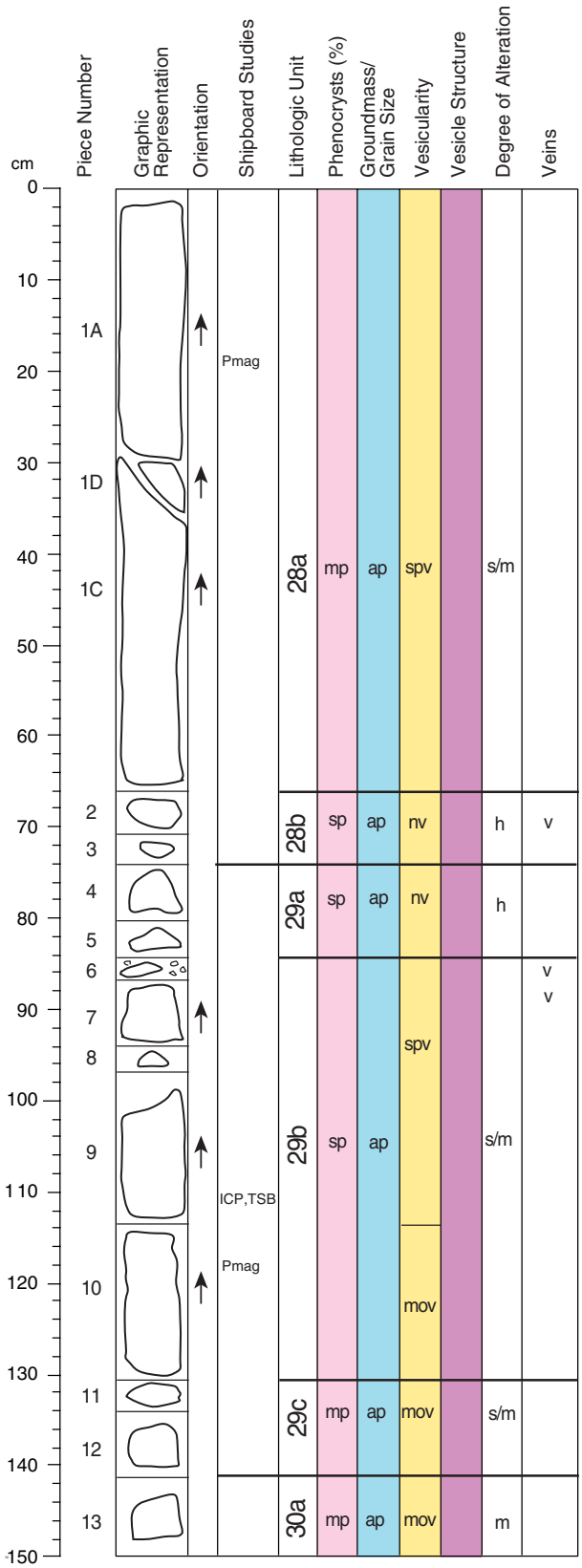
COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Moderately veined. Vesicles are filled with pale green clay and occasionally with carbonate. 2-15 mm wide halos of Fe oxyhydroxide are present throughout the section. Olivine phenocrysts are altered to Fe oxyhydroxide. Most groundmass olivine, however, is unaltered.

VEINS/FRACTURES: Moderate. <1-2 mm wide veins are present throughout the section, and are filled with carbonate, green and dark clay.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-44R-2 (Section top: 313.2 mbsf)

UNIT 28a: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1

CONTACTS: None observed. Boundary is inferred to be at 66 cm in between Pieces 1 and 2 due to the presence of breccia in Piece 2.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	7	4	0.5	1	Subhedral
Plagioclase:	1	8	1	4	Euhedral

GROUNDMASS: Aphanitic. Plagioclase and clinopyroxene are visible.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	1	6	Irregular to round

COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Moderate in areas adjacent to veins where >30 mm Fe oxyhydroxide halos are present. Vesicles are filled with pale green clay. Olivine phenocrysts are altered to black material and plagioclase phenocrysts appear to be sericitized.

VEINS/FRACTURES: Sparsely veined. Occasional <1 mm wide veins are present throughout the section, and filled with dark clay.

COMMENTS: A faint flow foliation is present throughout, as defined by thin (<1 mm) dark subparallel wisps.

UNIT 28b: OLIVINE-PLAGIOCLASE-PHYRIC BASALT BRECCIA.

Pieces: 2-3

CONTACTS: None observed. Contact between olivine-plagioclase phyric basalt (Unit 28a) and breccia (Unit 28b) below is inferred to be between Piece 1 and 2 at 66 cm. Contact between Units 28a and 29a is thought to be between Pieces 3 and 4 (74 cm).

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

GROUNDMASS: Aphanitic. Plagioclase and possibly clinopyroxene are visible.

VESICLES: Nonvesicular.

COLOR: Clasts are grayish red (10R 4/2) and matrix is pale red (5R 6/2).

STRUCTURE: Subunit is a clast supported breccia consisting of angular clasts 1-20 mm in size in a zeolite veined cement.

ALTERATION: High. Basalt clasts are altered to a grayish red color. Olivine phenocrysts are altered to a white material.

VEINS/FRACTURES: Highly veined. Thin <1 mm wide pale red zeolite filled veins form a meshwork texture throughout the interval and form the cement of this breccia.

COMMENTS: Subunit represents the basal breccia of Unit 28. Soil is found on the edges of both Piece 2 and 3.

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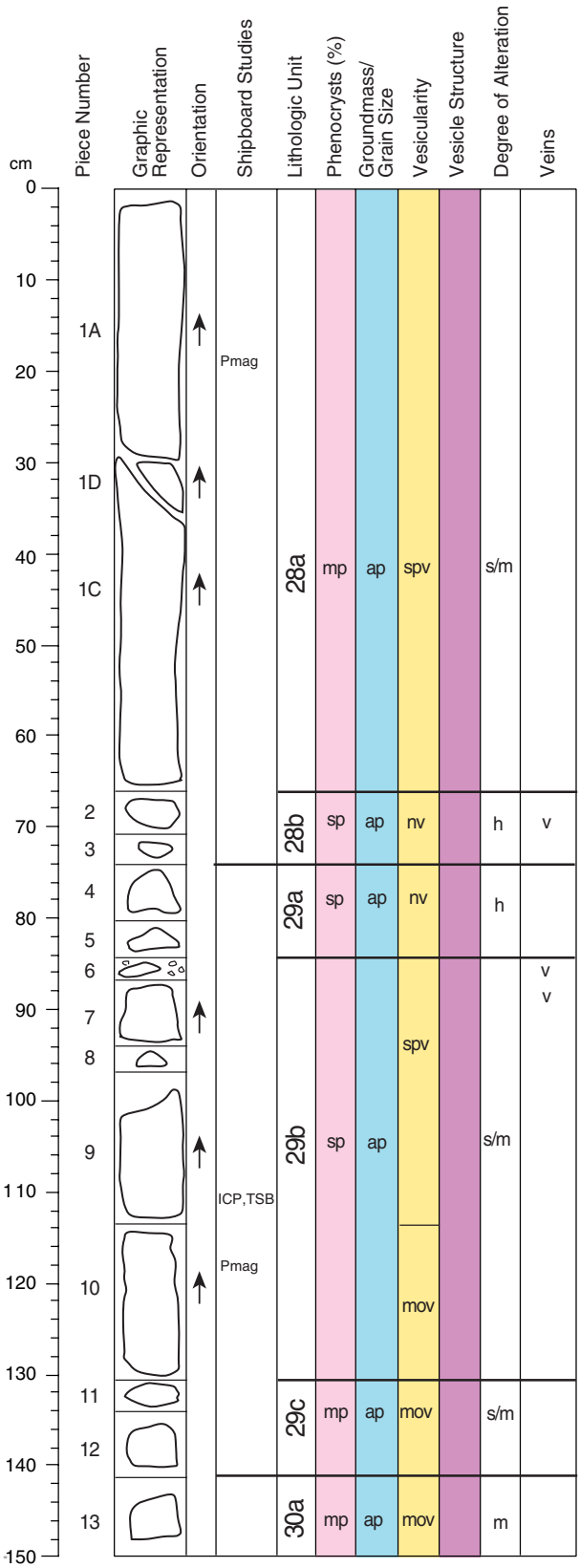
Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-44R-2 (Continued)

UNIT 29a: OLIVINE BASALT BRECCIA.

Pieces: 4-5

CONTACTS: None observed. Contact between olivine-plagioclase basalt breccia (Unit 28b) and breccia (Unit 29a) below is inferred to be between Piece 3 and 4 (78 cm). Contact between Unit 29a and 29b are inferred to be between Pieces 5 and 6 (84 cm).

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	2	1.5	0.5	1	Subhedral

GROUNDMASS: Aphanitic. Plagioclase and possibly clinopyroxene are visible

VESICLES:	% Mode	Size (mm): Average	Shape
Nonvesicular	4	2	Round

COLOR: Clasts are grayish red (10R 4/2) and dark reddish brown (10R 3/4) and matrix is pale red (5R 6/2).

STRUCTURE: Clast supported lapilli breccia. Subunit is a clast supported breccia consisting of angular clasts 1-14 mm in size in a fine grained detrital matrix and represents a scoriaceous flow top.

ALTERATION: High. Basalt clasts are altered to a grayish red color. Olivine phenocrysts are altered to a white material (zeolite?). Vesicles are filled with white zeolite.

VEINS/FRACTURES: None.

COMMENTS: The breccia has been infiltrated by detrital silt to clay size material.

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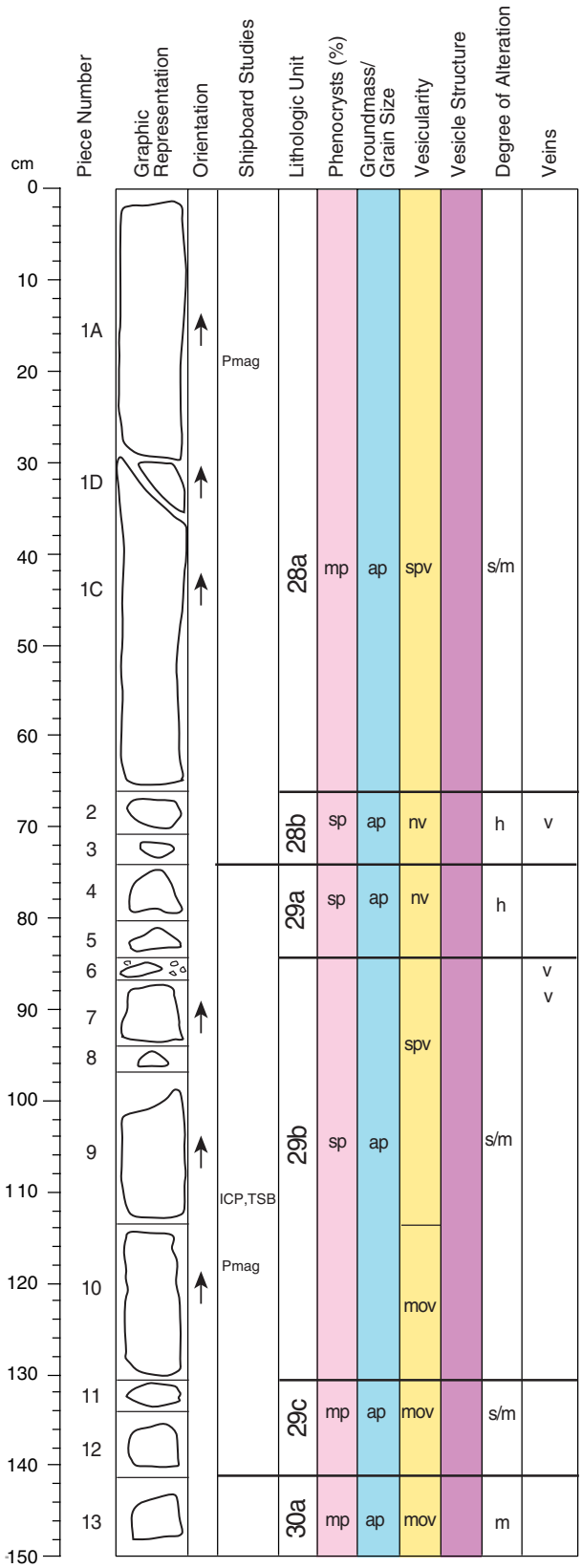
Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-44R-2 (Continued)

UNIT 29b: MODERATELY OLIVINE-PHYRIC BASALT.

Pieces: 6-10

CONTACTS: None observed. Contact between brecciated flow top (Unit 29b) above and moderately olivine-phyric basalt below is inferred to be between Piece 5 and 6 (84 cm). Contact between Unit 29b and 29c (basal breccia) is inferred to be between Pieces 10 and 11 (130 cm).

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	2	1	0.5	0.75	Subhedral

GROUNDMASS: Aphanitic. Plagioclase, clinopyroxene and variably altered olivine are visible.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	7	3	Irregular

COLOR: Medium light gray (N6).

STRUCTURE: Massive.

ALTERATION: Slight to moderate. Phenocrystic olivine is altered to brown/black clays. Groundmass olivine is variable altered: some is unaltered whilst some is altered to Fe oxyhydroxide. Vesicles in Pieces 6 to 9 are filled with white zeolite and those in Piece 10 are filled with green clay.

VEINS/FRACTURES: Variable. Abundant thin white zeolite-filled veins are present in Pieces 6 and 7 and form a meshwork texture.

COMMENTS: Phenocrystic olivine is not much larger than groundmass olivine and is sometimes difficult to distinguish. In Piece 10 abundant vesicles are present, irregular in shape and elongated approximately parallel to the base of the core.

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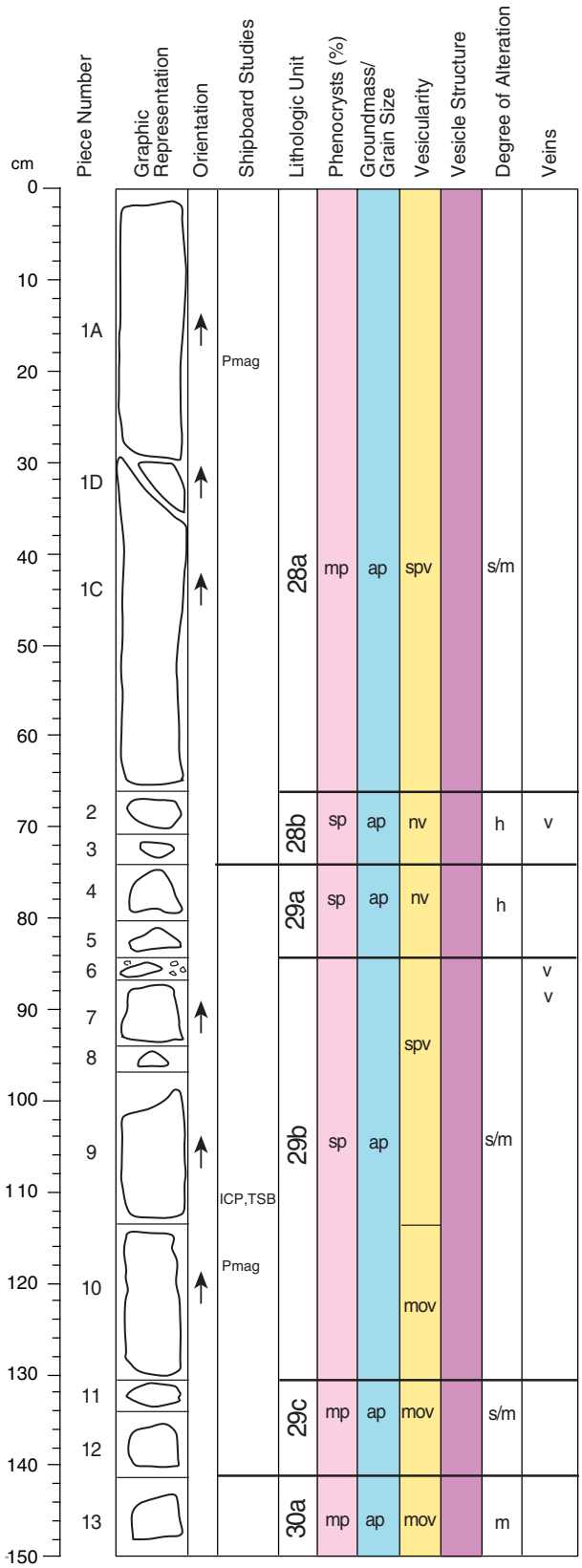
Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-44R-2 (Continued)

UNIT 29c: OLIVINE BASALT BRECCIA.

Pieces: 11

CONTACTS: None observed. Contact between moderately olivine-phyric basalt (Unit 29b) above and basal breccia is inferred to be between Piece 10 and 11 (130 cm). Contact between Unit 29c and 30a is inferred to be between Pieces 11 and 12 (134 cm).

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	3	1	0.5	0.75	Subhedral

GROUNDMASS: Aphanitic. Plagioclase, clinopyroxene and variably altered olivine are visible.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	7	3	Irregular

COLOR: Clasts are grayish red (10R 4/2) and dark reddish brown (10R 3/4) and matrix is pale red (5R 6/2).

STRUCTURE: This subunit consists of subangular basalt fragments in a clast supported framework, cemented with white zeolite.

ALTERATION: Slight to moderate. Phenocrystic olivine is altered to brown/black clays and Fe oxyhydroxide. Vesicles are filled with white zeolite and those in Piece 10 are filled with green clay.

VEINS/FRACTURES: Sparsely veined. Extremely thin zeolite veins form the cement of this breccia.

COMMENTS: We interpret the interval to represent the basal flow breccia.

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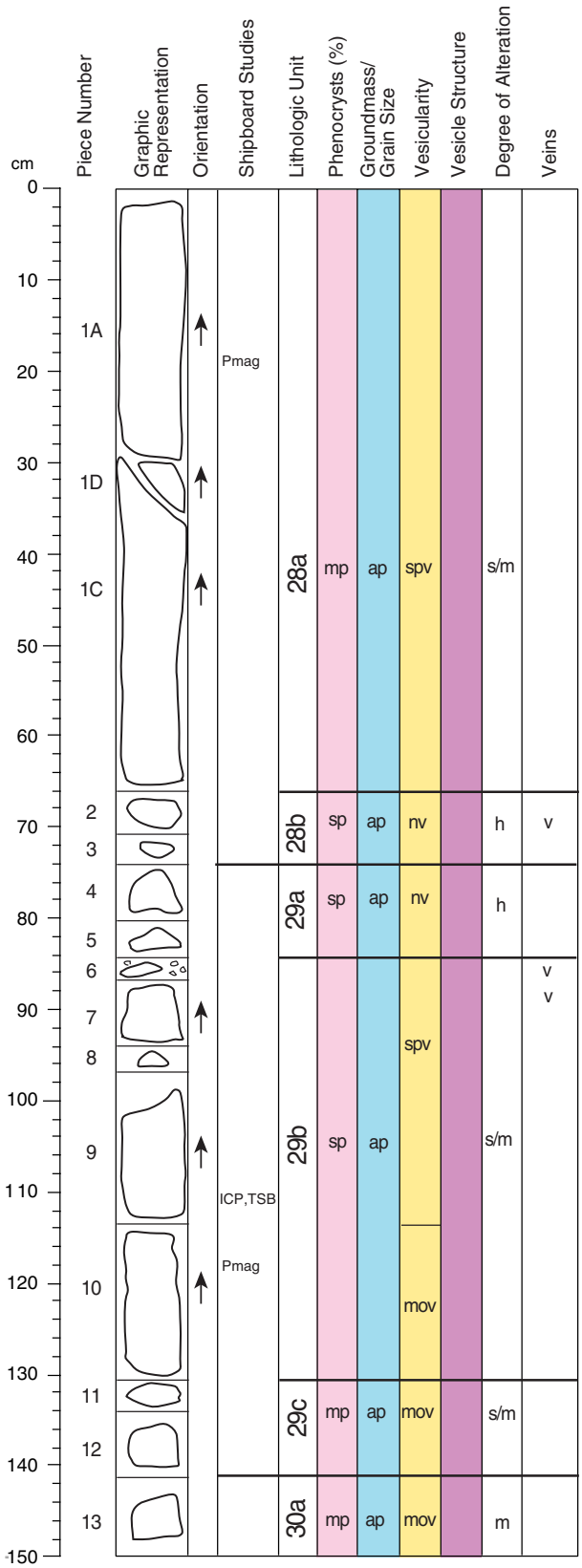
Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-44R-2 (Continued)

UNIT 30a: OLIVINE PLAGIOCLASE BASALT BRECCIA.

Pieces: 12-13

CONTACTS: None observed. The contact between Units 29c and 30a is inferred to be between Pieces 11 and 12 (134 cm).

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	3	1.5	0.5	1	Subhedral to anhedral
Plagioclase:	1	1	0.5	0.75	Euhedral to subhedral

GROUNDMASS: Aphanitic. Plagioclase and possibly clinopyroxene are visible.

VESICLES:	% Mode	Size (mm): Average	Shape
Moderately vesicular	5	1	Round

COLOR: Clasts are grayish red (10R 4/2) and dark reddish brown (10R 3/4) and matrix is pale red (5R 6/2).

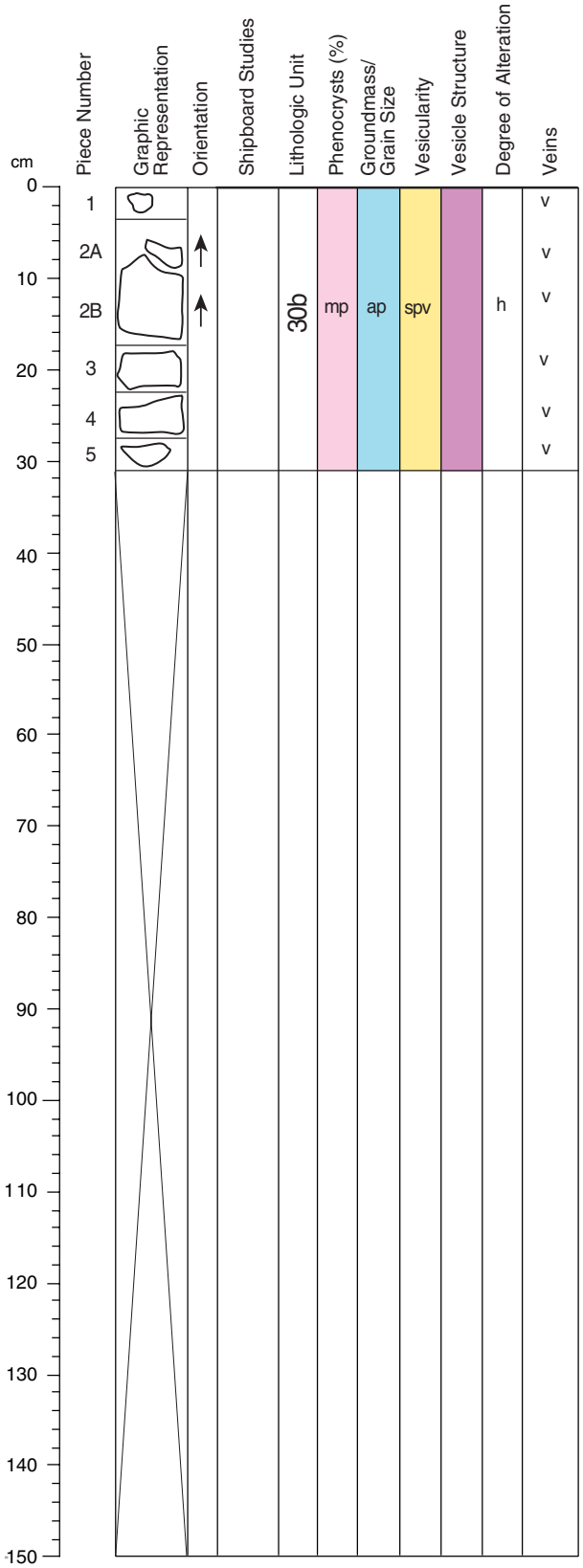
STRUCTURE: This subunit consists of subangular basalt fragments in a clast supported framework, cemented with white zeolite and detrital white/pale brown material.

ALTERATION: Moderate. Phenocrystic olivine is altered to brown/black clays and Fe oxyhydroxide. Plagioclase appears to be partly altered to sericite. Vesicles are filled with white zeolite.

VEINS/FRACTURES: Sparsely veined. Extremely thin discontinuous zeolite veins form the cement of this breccia.

COMMENTS: We interpret the unit to represent the flow top rubble to Unit 30b.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-44R-3 (Section top: 314.7 mbsf)

UNIT 30b: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-5

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Olivine:	5	4	0.5	1	Euhedral to subhedral
Plagioclase:	<1	3	1	2	Euhedral

GROUNDMASS: Aphanitic to fine grained. Consists of plagioclase, clinopyroxene, and olivine.

VESICLES:	% Mode	Size (mm): Average	Shape
Sparsely vesicular	2	6	Irregular

COLOR: Blackish red (5R 2/2).

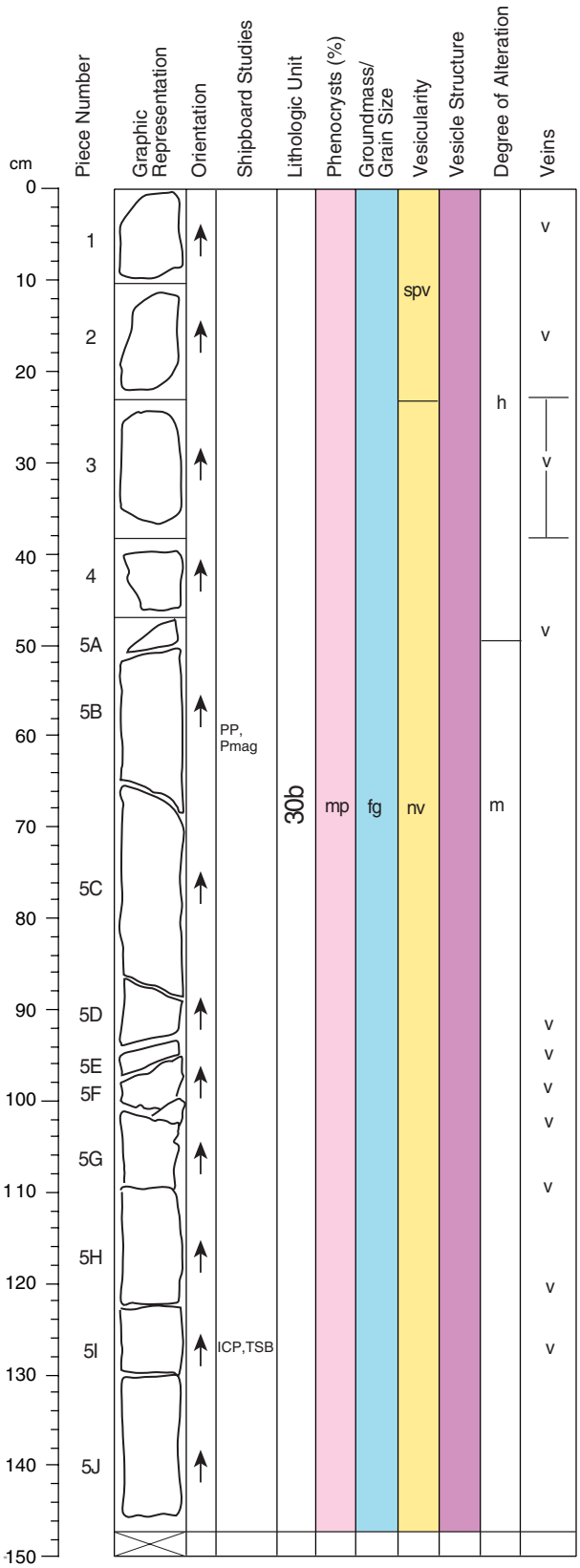
STRUCTURE: Massive.

ALTERATION: High. Pieces 1 to 2B consist of a weathered flow top, and are highly altered to Fe oxyhydroxide. Groundmass olivine is altered to Fe oxyhydroxide throughout. Vesicles are filled with zeolite.

VEINS/FRACTURES: Moderately veined. <1-2 mm wide veins are present throughout the section, and are filled with white minerals (zeolite) and Fe oxyhydroxide.

COMMENTS: Fine bands of red where mesostasis appears to be preferentially altered are also present.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-45R-1 (Section top: 321.5 mbsf)

UNIT 30b: MODERATELY OLIVINE-PLAGIOCLASE-PHYRIC BASALT.

Pieces: 1-5J

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	1	10	2	5	Euhedral to subhedral; blocky
Olivine:	3-5	1.3	0.2	0.4	Euhedral to subhedral; equant

GROUNDMASS: Fine grained. Consists of plagioclase, clinopyroxene, black oxide, and altered mesostasis (glass) in an intergranular texture.

VESICLES:	% Mode	Size (mm): Average	Shape
	0-3	1-2	Irregular

COLOR: Medium dark gray (N4), medium light gray (N6), very dusky red purple (5RP 2/2).

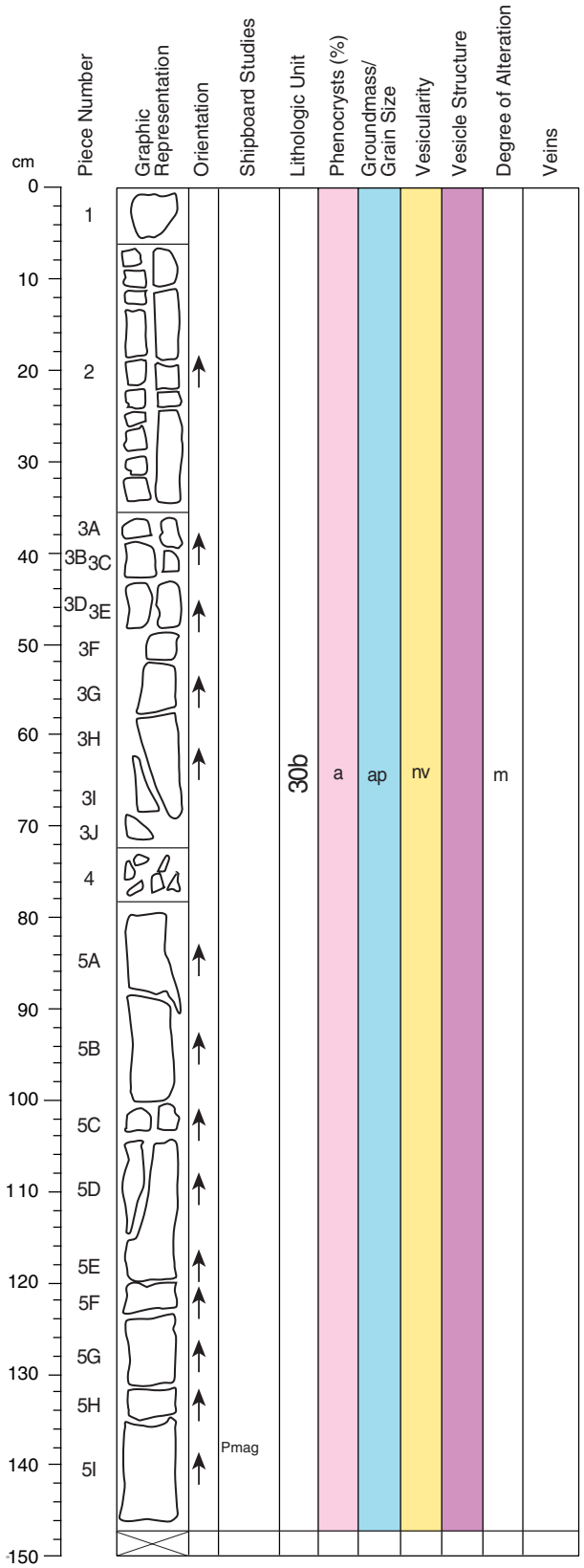
STRUCTURE: Massive.

ALTERATION: Moderate to high. Plagioclase phenocrysts are slightly altered and replaced by green clay. Groundmass (glassy mesostasis) is moderately altered to dark green clay and Fe oxyhydroxide. Fe oxyhydroxide is pervasive in Pieces 1 to the top of Piece 5B. Green clay is pervasive in Pieces 5B to 5J. Clinopyroxene and olivine are partially altered to Fe oxyhydroxide and green clay in Pieces 5A to 5J. Olivine is completely altered to Fe oxyhydroxide in Pieces 1 to 4. Fe oxyhydroxide alteration halos (up to 5 mm wide) are present adjacent to several veins in the interval 81-90 cm.

VEINS/FRACTURES: Sparsely to moderately veined. Veins are <0.1-0.2 mm wide, randomly oriented, and filled with green clay and Fe oxyhydroxide.

COMMENTS: Pieces 1 and 2 are sparsely vesicular. A weak flow foliation is highlighted by the glassy mesostasis in Pieces 5A to 5J. Plagioclase-olivine glomerocrysts are present in Piece 5H.

Core Photo



IGNEOUS ROCK VISUAL CORE DESCRIPTION

197-1205A-45R-2 (Section top: 322.94 mbsf)

UNIT 30b: APHYRIC BASALT*.

Pieces: 1-5

CONTACTS: None.

PHENOCRYSTS:	% Mode	Grain Size (mm): Max.	Min.	Avg.	Shape/Habit
Plagioclase:	<1	5	1	3	Euhedral

GROUNDMASS: Aphanitic. Consists of plagioclase, clinopyroxene, black oxide, and altered mesostasis.

VESICLES: None.

COLOR: Medium gray (N5).

STRUCTURE: Massive.

ALTERATION: Moderate. Plagioclase phenocrysts are slightly altered. Groundmass is moderately altered to dark gray clay.

VEINS/FRACTURES: Highly fractured. Rock is broken into many pieces along fractures.

COMMENTS: *This is a continuation of Unit 30b from Section 45R-1, but the abundance of phenocrysts has decreased markedly.
Fine bands of darker material in groundmass may be flow structures.

1205A **Smear Slides**

Sample						Texture			Mineral														Biogenic						Rock	
Core	Core Type	Section	Top (cm)	Depth (mbsf)	Lithology	Sand	Silt	Clay	Accessory Minerals	Calcite	Carbonate	Clay Mineral	Fe Oxide	Feldspar	Glauconite	Opaques	Organic Calcite	Palagonite	Phillipsite	Pyrite	Quartz	Volcanic Glass	Bryozoa	Coccolith	Foraminifers	Nannofossils	Sponge Spicules	Theracosphera	Clay Size Particles	Comments
1	R	1	0	0.00	D	60	30	10	*	69	*	*	3	3	*	3	*	*	*	*	3	*	*	3	*	*		3	14	Calcareous silty sandstone
1	R	1	4	0.04	D	60	35	5		65			11	2	4	2					2			2			*	*	11	Calcareous silty sandstone
1	R	1	9	0.09	D	55	35	10		56			2	4		2		11			2			4			2	4	11	Calcareous vitric sandstone
2	R	1	5	4.65	M	30	65	5	3	64			13	3		5		5			3								5	Calcareous sandy siltstone
2	R	1	30	4.90	D	30	65	5		63			10	4	2	4					2	2						2	10	Calcareous sandy siltstone
3	R	1	10	14.30	M	60	20	10		67						11	4		2						4		4	2	4	Calcareous silty sandstone
4	R	1	12	23.82	D	35	60	5		38		10				10	10		19						10			*	4	Calcareous sandy siltstone
4	R	1	87	24.57	D	30	65	5		31			8	3		8	3		16			8		3	16			2	3	Calcareous sandy siltstone
4	R	CC	5	24.87	D	45	45	10		57			4			4	2		4						19			2	9	Calcareous sandy siltstone
5	R	1	10	33.30	D	65	25	10		45			11	1		6	11	6	1			6			6				7	Calcareous silty sandstone
5	R	1	20	33.40	D	65	25	10	*	47			8	3		8	8		3			8			8		*		8	Calcareous silty sandstone
5	R	1	55	33.75	D	60	35	5	*	63			8			8	8		2			3	*						8	Calcareous silty sandstone
6	R	3	72.5	45.81	D	25	15	60			32	2	11	16	1			16		5		16				*				Red soil
6	R	3	73.5	45.82	M	30	50	15	13			13	9			37													28	Red soil
15	R	2	15	92.27	M	50	20	30		4		2	8	3		17		42					8						17	Vitric clayey sandstone
19	R	4	14	114.19	D	5	25	70					10	10		17		13											50	Red iron clay
19	R	4	21	114.26	D	10	20	70		3				10		17		17											52	Red iron clay

Hole 1205A **Thin Section Log**

Leg	Site	Hole	Core	Type	Section	Top (cm)	Bot (cm)	Depth (mbsf)	Piece	Comments	ICP?*	UNIT	Ship Code
197	1205	A	1	R	1	5	8	0.05		Sediment			1432872
197	1205	A	2	R	1	36	39	4.96		Sediment			1432873
197	1205	A	5	R	2	31	33	34.19	7	Hawaiite (?) clast in conglomerate. Next to ICP.	YES	1	1732893
197	1205	A	5	R	2	36	39	34.24		Conglomerate matrix			1432880
197	1205	A	5	R	2	101	103	34.89	21	Hawaiite (?) clast in conglomerate. Next to ICP.	YES	1	1432895
197	1205	A	6	R	2	13	15	43.93	1A	Plagioclase megaphyric basalt. Next to PMAG and ICP	YES	1	1432897
197	1205	A	6	R	2	55	57	44.35	4	Alteration, Vein.		1	1432885
197	1205	A	7	R	1	83	85	53.03	17	Altered vesicular top of unit		3a	1432906
197	1205	A	8	R	1	59	61	57.49	4	Olivine-Phyric Basalt. Next to ICP	YES	3b	1432966
197	1205	A	9	R	2	65	67	60.61	2A	Olivine-plag-phyric basalt. Next to ICP	(YES)	3b	1432967
197	1205	A	10	R	2	73	75	63.85	3E	Next to PMAG & ICP samples, includes large plag phenocryst	(YES)	3b	1432979
197	1205	A	11	R	1	73	75	66.93	2A	Basalt with large plagioclase phenocryst		3b	1432981
197	1205	A	11	R	4	42	44	70.47	1F	Next to PMAG & ICP samples, includes large plag phenocryst	(YES)	3b	1432982
197	1205	A	12	R	2	114	116	73.88	3A	Fresh olivine-plag-phyric basalt, Unit 3b	YES	3b	1432991
197	1205	A	13	R	3	27	29	78.79	2A	Aphyric part of Unit 2b	YES	3b	1432993
197	1205	A	15	R	1	7	9	90.77	2	Very fine sediment		4	1433003
197	1205	A	15	R	2	138	140	93.50	10	2 plagioclases in Unit 5b.		5b	1433017
197	1205	A	15	R	3	37	39	93.92	1B	Sample of Unit 5b olivine-plag-phyric basalt	(YES)	5b	1433009
197	1205	A	16	R	2	84	86	97.10	1J	Basalt with large plagioclase phenocryst in TSB, not in ICP	YES	5b	1433013
197	1205	A	19	R	2	104	106	112.34	3B	Olivine-plag-phyric basalt of Unit 6 next to ICP	YES	6	1433038
197	1205	A	20	R	5	67	68	125.80	3	Olivine-plagioclase-phyric sample of Unit 8a	YES	8a	1433050
197	1205	A	22	R	1	28	30	133.18	6A	Aphyric basalt	YES	9	1433094
197	1205	A	23	R	1	77	78	139.67	8	Plagioclase phyric basalt	YES	10	1433096
197	1205	A	24	R	2	124	130	151.24	19	Non-glassy flow contact		10	1433098
197	1205	A	26	R	2	23	25	169.43	1B	Basalt of Unit 11b, next to ICP	YES	11b	1433130
197	1205	A	26	R	3	16	18	170.83	3	Alteration vesicle filling		11b	1433120
197	1205	A	27	R	5	103	105	184.11	5	Unit 12b, massive portion, fresh glass olivine	YES	12b	1433118
197	1205	A	28	R	3	4	6	189.69	1A	Basalt of Unit 13b, next to PMAG/ICP	YES	13b	1433132
197	1205	A	29	R	2	55	58	198.55	7A	Plagioclase phenocrysts, next to Unit 14b ICP	YES	14b	1433167
197	1205	A	30	R	1	42	44	206.52	9	Unit 15b	YES	15b	1433176
197	1205	A	32	R	2	114	116	219.94	2H	Unit 16	YES	16	1433178
197	1205	A	33	R	2	5	7	225.96	1A	Alteration, Vein.		17	1433200
197	1205	A	33	R	3	11	13	227.52	1B	Unit 17, moderately plag-olivine phyric basalt	YES	17	1433198
197	1205	A	33	R	4	77	79	229.68	17	Alteration, Vein.		18b	1433201
197	1205	A	34	R	1	85	87	235.85	13B	Alteration - XRD		18b	1433207
197	1205	A	35	R	1	32	34	244.92	1A	First Olivine Tholeiite	YES	18b	1433227
197	1205	A	35	R	3	97	99	247.55	1J	Alteration		19b	1433216
197	1205	A	35	R	4	77	79	248.71	1C	2nd Olivine Tholeiite	YES	19b	1433238
197	1205	A	36	R	5	50	51	259.59	2D	3rd Olivine Tholeiite	YES	20	1433246
197	1205	A	37	R	5	28	29	269.92	2C	Alkali basalt?	YES	21	1433257
197	1205	A	39	R	1	69	70	275.29	3F	4th Olivine Tholeiite	YES	22	1433263
197	1205	A	41	R	3	59	61	285.43	1B	Unit 24 - fresh aphyric basalt	YES	24a	1433286
197	1205	A	41	R	5	24	26	287.82	1A	Unit 26a plag-phyric basalt	YES	26a	1433288
197	1205	A	42	R	2	55	57	294.85	4B	Alteration, Vein.		27	1433297
197	1205	A	43	R	2	58	60	303.88	2A	Unit 27 basalt next to ICP	YES	27	1433316
197	1205	A	44	R	1	87	88	313.07	5A	Unit 28a basalt nect to ICP	YES	28a	1433328
197	1205	A	44	R	2	110	112	314.30	9	Unit 29b basalt next to ICP	YES	29b	1433330
197	1205	A	45	R	1	126	128	322.76	5I	Unit 30b basalt next to ICP	YES	30b	1433338

*In the ICP column, (YES) represents an ICP sample that was taken, but not run in order to save argon. YES denotes sample that has been run.

Hole 1205A **Sedimentary Thin Sections**

Sample									Texture			Mineral										Rock				
Site	Hole	Core	Core Type	Section	Top	Bottom	Depth (mbsf)	Lithology	Sand	Silt	Clay	Accessory Minerals	Calcite	Clay Mineral	Fe Oxide	Feldspar	Hematite	Opaques	Organic Calcite	Palagonite	Volcanic Glass	Bioclasts	Micrite	Mud clast)	Rock Fragment	Comments
1205	A	1	R	1	5	8	0.05	M	70	25	5	2	25	5		3		10	30		5				20	Thin Section. Calcareous sand. Volcanic glass is altered. Organic calcite consists of benthic foraminifers, bryozoans, red algae, and rounded clasts. Rock fragments include rounded pebbles.
1205	A	2	R	1	36	39	4.96	M	30	65	5		20	5			5		20		5			25	20	Thin Section. Calcareous siltstone. Volcanic glass is altered. Organic calcite consists of red algae, bryozoans, and benthic foraminifers.
1205	A	5	R	2	36	39	34.24	M					30						40				2	6	22	Thin Section. Calcareous conglomerate. Organic calcite consists of red algae, bivalve, and foraminifers. Rock fragments include rounded basalt pebbles.
1205	A	15	R	1	7	9	90.77	M						65	10			5		8	2	10				Thin Section. Fine grained vitric sandstone. Volcanic glass is fresh. Brown clay and palagonite may be altered glass.

THIN SECTION:	**197-1205A-5R-2, 31-33**	**Piece No.: 7**			**Unit: 1**	**OBSERVER: CRN, SR, PT.**
ROCK NAME:	Trachyte? Hawaiite?					
WHERE SAMPLED:	Cobble in basal conglomerate of sediment section.					
GRAIN SIZE:	Aphanitic, microcrystalline.					
TEXTURE:	Trachytic.					

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm) min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
GROUNDMASS							
Plagioclase	55	55	0.1	0.7	0.5	Subhedral laths	
Clinopyroxene	5	10	0.05	0.2	0.1	Anhedral	Interstitial to plagioclase laths. Altered to clay.
Titanomagnetite	10	10	0.01	0.1	0.05	Euhedral to subhedral, skeletal	Very slight alteration to maghemite in a few crystals.
Olivine	0	1	0.1	0.3	0.15	Euhedral to subhedral, equant	Maybe present both as microphenocrysts and a groundmass phase.
Sulfide	Trace	Trace			<0.01	Blebs	Inclusions in titanomagnetite.
Glass/mesostasis	0	24					Interstitial and altered to clay.

SECONDARY MINERALOGY	**PERCENT**	**SIZE (mm) min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Green clay	13				Glass, clinopyroxene, vesicles	Probably saponite/nontronite.
Fe oxyhydroxide	4				Clinopyroxene, glass	
Goethite	3				Olivine, glass	
Chlorite	10				Glass/groundmass	Incipient - not well crystallized.

VESICLES/ CAVITIES	**PERCENT**	**LOCATION**	**SIZE (mm) min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vesicles	1		1	3		Green clay (celadonite?), round	

COMMENTS: Olivine may be more ubiquitous. Alteration makes identification difficult. See Photomicrograph 1205-179. Trachytic texture Photomicrograph 1205-180. Photomicrograph 1205-196 of saponite and goethite replacing groundmass.

Photomicrograph 1205-179. Field of view 1.25 mm, PPL.
Photomicrograph 1205-180. Field of view 5 mm, XPL.
Photomicrograph 1205-196. Field of view 0.625 mm, PPL.

THIN SECTION:	**197-1205A-5R-2, 101-103**		**Piece No.: 21**			**Unit: 1**	**OBSERVER: CRN, PT, SR**
ROCK NAME:	Hawaiite?						
WHERE SAMPLED:	Cobble in basal conglomerate.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Trachytic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
GROUNDMASS							
Plagioclase	30	40	0.2	1.2	0.8	Subhedral to euhedral; tabular	Larger laths exhibit optical zonation.
Olivine	0	15	0.01	0.15	0.08	Euhedral, equant	Completely altered; shape suggests olivine.
Titanomagnetite	10	10	0.01	0.1	0.01	Euhedral to subhedral	Octahedra. Mostly <0.01 mm.
Glass/mesostasis	0	35					

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Green clay	10				Glass, clinopyroxene, olivine	
Brown clay	30				Glass, clinopyroxene, plagioclase	
Goethite	8				Glass	
Fe oxyhydroxide	12				Glass, olivine	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vesicles	1				5	Empty, lined with Fe oxyhydroxide	Only one large vesicle is present. Plagioclase laths are aligned concentrically around the vesicle.

COMMENTS:	Photomicrograph 1205-181 for altered groundmass olivine. Photomicrograph 1205-182 of titanomagnetite and goethite.	**Photomicrograph 1205-181.** Field of view 0.625 mm, PPL. **Chapter 5, Figure F17H.** Field of view 0.25 mm, RL.

THIN SECTION:	**197-1205A-6R-2, 13-15**	**Piece No.: 1A**			**Unit: 1**	**OBSERVER: CRN, PT, SR**
ROCK NAME:	Moderately to Highly Plagioclase-Phyric Basalt.					
WHERE SAMPLED:						
GRAIN SIZE:	Fine grained.					
TEXTURE:	Intergranular to intersertal.					

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	15	15	6	8	7	Subhedral	Two small and two large plagioclase phenocrysts dominate the section. They exhibit optical zonation (Photomicrograph 1205-183). Resorbed along margins (Photomicrograph 1205-184).
GROUNDMASS							
Plagioclase	35	35	0.2	0.6	0.5	Subhedral laths	
Clinopyroxene	20	20	0.05	0.2	0.1	Subhedral to anhedral	Many sections exhibit weak sector zonation (Photomicrographs 1205-186, 1205-187).
Olivine	0	5	0.5	1.2	0.8	Euhedral; equant	Completely replaced by calcite.
Sulfide	Trace	Trace			<0.01	Bleb	Inclusions in titanomagnetite.
Titanomagnetite	8	8	0.01	0.1	0.08	Subhedral octahedra, skeletal	Unaltered. Occasional ilmenite oxidation lamellae.
Glass/mesostasis	0	17					Completely altered to clay.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Green clay	7				Glass	
Brown clay	10				Glass	
Calcite	5				Olivine	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS:	Resorbed plagioclase (Photomicrograph 1205-197).	**Photomicrograph 1205-183.** Field of view 1.25 mm, XPL. **Photomicrograph 1205-184.** Field of view 5 mm, XPL. **Photomicrograph 1205-186.** Field of view 0.625 mm, XPL. **Photomicrograph 1205-187.** Field of view 0.625 mm, XPL. **Photomicrograph 1205-197.** Field of view 1.25 mm, XPL.

THIN SECTION:	**197-1205A-6R-2, 55-57**	**Piece No.: 4**			**Unit: 1**	**OBSERVER: CRN, PT.**
ROCK NAME:	Moderately to Highly Plagioclase-Phyric Basalt.					
WHERE SAMPLED:	For alteration.					
GRAIN SIZE:	Fine grained.					
TEXTURE:	Subtrachytic.					

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	7	7	4	8		Subhedral to euhedral	Optically zoned with resorption features.
GROUNDMASS							
Plagioclase	30	30					
Clinopyroxene	20	20					
Titanomagnetite	8	8	0.01	0.15	0.1	Subhedral octahedra	Skeletal. Occasional ilmenite oxidation lamellae. Looks resorbed along margins.
Olivine	0	5	0.05	0.15	0.1	Euhedral, equant	Completely replaced by Fe oxyhydroxide that makes these small olivines stand out in thin section (Photomicrograph 1205-185).
Glass/mesostasis	0	12					Completely altered to Fe oxyhydroxide, green clay, and goethite.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Calcite	15	15			Vein	
Fe oxyhydroxide	10	10			Vein, olivine, glass	
Green clay	5				Glass	
Goethite	5				Vein, glass	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vein	25		0.1	7	4	Calcite, Fe oxyhydroxide, green clay, goethite	

COMMENTS: Photomicrograph 1205-188: One end of 1.5 cm long plagioclase phenocryst showing a resorption layer. Photomicrograph 1205-198 of trachytic texture.

Photomicrograph 1205-185. Field of view 1.25 mm, PPL.
Photomicrograph 1205-188. Field of view 5 mm, XPL.
Photomicrograph 1205-198. Field of view 1.25 mm, XPL.

THIN SECTION: 197-1205A-7R-1, 83-85 **Piece No.: 17** **Unit: 3a** **OBSERVER: CRN, PT.**
ROCK NAME: Sparsely to Moderately Olivine-Plagioclase-Phyric Basalt.
WHERE SAMPLED: Altered vesicular top of unit.
GRAIN SIZE: Aphanitic, microcrystalline.
TEXTURE: Subtrachytic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Olivine	0	5	0.3	2	0.8	Euhedral; equant	Completely altered to Fe oxyhydroxide and grades into groundmass olivine.
GROUNDMASS							
Plagioclase	0	45	0.1	0.8	0.3	Subhedral laths	Completely altered to zeolite?
Clinopyroxene		?					
Titanomagnetite	2	10	<0.01	0.03		Subhedral to anhedral octahedra	Mostly altered to maghemite.
Olivine	0	4	0.05	0.5	0.2	Euhedral to subhedral; equant	Completely altered to Fe oxyhydroxide.
Glass/mesostasis	0	?					Completely altered to zeolite(?), goethite and Fe oxyhydroxide.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Zeolite	60?				Plagioclase and glass	
Fe oxyhydroxide	25				Olivine, glass(?)	
Titanomaghemite	8				Titanomagnetite	
Goethite	5					

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
Vesicles	3	Random				Unfilled/irregular	

COMMENTS: Groundmass and phenocryst olivine stands out due to alteration (Photomicrograph 1205-199)
Degree of alteration makes identification of original clinopyroxene and glass impossible. Pseudomorphed plagioclase laths defined a contorted texture indicating plastic flow.

Photomicrograph 1205-199. Field of view 1.25 mm, XPL.

THIN SECTION:	**197-1205A-8R-1, 59-61**		**Piece No.: 4**			**Unit: 3b**	**OBSERVER: CRN, PT.**
ROCK NAME:	Sparsely to Moderately Olivine-Plagioclase-Phyric Basalt.						
WHERE SAMPLED:	Next to ICP sample.						
GRAIN SIZE:	Aphanitic. Microcrystalline to cryptocrystalline.						
TEXTURE:	Subtrachytic.						

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm) min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Olivine	4	5	0.1	0.8	0.5		Only partially altered (Photomicrographs 1205-190 and 1205-191). Slightly pleochroic.
Plagioclase	<1	<1	0.2	0.4	0.3	Subhedral; blocky	Only a few crystals exhibiting resorption features.
GROUNDMASS							
Plagioclase	45	45	0.05	0.3	0.2	Subhedral laths	
Clinopyroxene	10	10					Just starting to crystallize.
Titanomagnetite	12	12	<0.01	0.08		Euhedral to subhedral skeletal octahedra	Rare maghemite alteration along cleavage planes.
Sulfide	Trace	Trace			0.01	Bleb	Inclusions in primary phases. Pentlandite?
Chromite	Trace	Trace			0.05	Anhedral	Occasional inclusions in olivine phenocrysts (Photomicrograph 1205-192). This could be an early titanomagnetite phase (less evolved and slightly less "pink" than the groundmass titanomagnetite).
Glass/mesostasis	0	27					

SECONDARY MINERALOGY	**PERCENT**	**SIZE (mm) min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Green clay	28				Olivine and mesostasis	Present along fractures in olivine and has completely replaced smaller olivine crystals.
Pyrite	Trace				Mesostasis	

VESICLES/ CAVITIES	**PERCENT**	**LOCATION**	**SIZE (mm) min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS: Titanomagnetite is abundant in this rock. Rounded chromite inclusions in olivine. No groundmass olivine is identified in this section.

Chapter 5, Figure F16I. Field of view 1.25 mm, PPL.
Photomicrograph 1205-191. Field of view 1.25 mm, XPL.
Chapter 5, Figure F17R. Field of view 0.25 mm, RL.

THIN SECTION:	**197-1205A-9R-2, 65-67**	**Piece No.: 2A**	**Unit: 3b**
ROCK NAME:	Sparsely to Moderately Olivine-Plagioclase-Phyric Basalt.		
WHERE SAMPLED:	Next to ICP sample.		
GRAIN SIZE:	Aphanitic. Microcrystalline.		
TEXTURE:	Subtrachytic to trachytic.		

OBSERVER: CRN, PT, SR.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Olivine	0	5	0.1	1.2	0.4	Subhedral	Completely replaced by green clay and calcite.
GROUNDMASS							
Plagioclase	35	35	0.05	0.3	0.15	Subhedral laths	
Clinopyroxene	20	20	<0.01	0.05	0.01	Subhedral to anhedral	Subophitic texture is starting to develop at one end of the section (Photomicrograph 1205-200).
Titanomagnetite	15	15	0.01	0.2	0.08	Subhedral to euhedral	Octahedra. Ilmenite oxidation lamellae in titanomagneite around the Fe oxyhydroxide vein.
Olivine	0	10			<0.1		Difficult to tell from altered glass.
Glass/mesostasis	5	15					

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Calcite	2				Olivine	
Fe oxyhydroxide	13				Olivine, glass	
Green clay	10				Olivine, glass	Celadonite.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
Vein	1	Either end	0.01	0.2		One is Fe oxyhydroxide, the other green clay	

COMMENTS: There is a lot of titanomagnetite in this sample. One plagioclase phenocryst is present showing resorption (Photomicrograph 1205-201).

Photomicrograph 1205-200. Field of view 1.25 mm, PPL.
Photomicrograph 1205-201. Field of view 1.25 mm, PPL.

THIN SECTION:	**197-1205A-10R-2, 73-75**	**Piece No.: 3E**	**Unit: 3b**
ROCK NAME:	Sparsely to Moderately Olivine-Plagioclase-Phyric Basalt.		
WHERE SAMPLED:	Next to PMAG and ICP Samples.		
GRAIN SIZE:	Aphanitic. Microcrystalline.		
TEXTURE:	Subtrachytic to trachytic.		

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm) min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Olivine	2	6	0.1	0.6	0.5	Euhedral to subhedral	Partially altered to green clay and breaking down to oxide minerals. Unaltered centers remain on larger crystals and exhibit slight pleochroism.
GROUNDMASS							
Plagioclase	40	40	0.05	0.5	0.2	Subhedral laths	
Clinopyroxene	15	15			<0.1	Anhedral	Interstitial.
Titanomagnetite	15	15				Eunhedral to subhedral	Octahedra.
Olivine	2	10			<0.1	Subhedral to euhedral	Partially altered to green clay and Fe oxyhydroxide.
Glass/mesostasis	5	14					Partially altered to green clay and Fe oxyhydroxide.

SECONDARY MINERALOGY	**PERCENT**	**SIZE (mm) min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Green clay	15					Nontronite/saponite?
Fe oxyhydroxide	6					
Pyrite	Trace				Glass	

VESICLES/ CAVITIES	**PERCENT**	**LOCATION**	**SIZE (mm) min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS:	Pronounced trachytic texture - convoluted flow pattern (Photomicrograph 1205-202).	**Chapter 5, Figure F16N.** Field of view 5 mm, XPL.

THIN SECTION:	**197-1205A-11R-1, 73-75**	**Piece No.: 2A**	**Unit: 3b**
ROCK NAME:	Sparsely to Moderately Olivine-Plagioclase-Phyric Basalt.		
WHERE SAMPLED:			
GRAIN SIZE:	Fine grained to aphanitic (microcrystalline).		
TEXTURE:	Subtrachytic to subophitic.		

OBSERVER: CRN, PT, SR.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	max.	av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Plagioclase	10	10	2	15	6	Subhedral; blocky	One single plagioclase crystal exhibits resorption features.
Olivine	0	6	0.4	1	0.6	Euhedral	Altered to green clay and replaced by calcite and Fe oxyhydroxide.
GROUNDMASS							
Plagioclase	35	35	0.05	0.3	0.1	Subhedral laths	
Clinopyroxene	20	20	0.05	0.6	0.4	Subhedral to anhedral	Larger clinopyroxene crystals exhibit slight pleochroism.
Titanomagnetite	10	10	0.01	0.2	0.05	Euhedral octathedra	Unaltered, even around veins.
Olivine	0	10	0.05	0.2	0.1	Euhedral to subhedral	Altered to green clay.
Glass/mesostasis	5	9					

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	max.	av.	REPLACING / FILLING	COMMENTS
Calcite	3				Olivine	
Fe oxyhydroxide	8				Olivine, vein, mesostasis	
Green clay	8				Olivine, mesostasis	Celadonite.
Saponite	1				Vein	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	max.	av.	FILLING / MORPHOLOGY	COMMENTS
Vein	1					Fe oxyhydroxide and saponite	Extends into plagioclase mass and has an oxidation halo associated with it.

COMMENTS: One large plagioclase mass (10 x 10 mm) contains 5 crystals. The largest one has slightly deformed twin lamellae (Photomicrograph 1205-204). None exhibit optical zonation. Vein of Fe oxyhydroxide (<0.01 mm wide) traverse the plagioclase crystals and titanomagnetite inclusions (~0.3 mm) are present. This may be because of magma infiltrating the plagioclase crystals along fractures. A subophitic texture is present (Photomicrograph 1205-203).

Photomicrograph 1205-203. Field of view 5 mm, XPL.
Chapter 5, Figure F16D. Field of view 5 mm, XPL.

THIN SECTION:	**197-1205A-11R-4, 42-44**	**Piece No.: 1F**	**Unit: 3b**
ROCK NAME:	Sparsely to Moderately Olivine-Plagioclase-Phyric Basalt.		
WHERE SAMPLED:	Next to PMAG and ICP samples.		
GRAIN SIZE:	Fine grained.		
TEXTURE:	Subtrachytic to subophitic.		

OBSERVER: CRN, PT, SR.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Plagioclase	8	8	2	8	6	Subhedral	Largest plagioclase cluster exhibits no zonation (Photomicrograph 1205-195), but a smaller one does (Photomicrograph 1205-194).
Olivine	0	5	0.4	2	0.6	Subhedral	Completely replaced by clay and calcite, and reacting to oxide minerals.
GROUNDMASS							
Plagioclase	35	35	0.05	0.3	0.15	Subhedral laths	
Clinopyroxene	18	18	0.1	1.5	1	Subhedral	Groundmass crystals have grown around plagioclase laths.
Titanomagnetite	12	12	0.01	0.2	0.1	Euhedral to subhedral octahedra	Slight development of ilmenite oxidation lamellae and rare maghemite alteration along cleavage planes and fractures.
Olivine	0	7			<0.1	Euhedral to subhedral	Replaced by green clay and Fe oxyhydroxide.
Glass/mesostasis	5	15					Partially replaced by green clay and Fe oxyhydroxide.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Calcite	3				Olivine	
Fe oxyhydroxide	8				Olivine, glass	
Green clay	10				Olivine, glass	Celadonite
Goethite	1				Olivine, glass	

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

COMMENTS: Largest plagioclase cluster has had melt pervade along fractures. Calcite inclusions are probably replaced melt inclusions. Titanomagnetite is also present as inclusions.

Photomicrograph 1205-194. Field of view 0.625 mm, XPL.
Photomicrograph 1205-195. Field of view 5 mm, XPL.

THIN SECTION:	**197-1205A-12R-2, 114-116**		**Piece No.: 3A**			**Unit: 6**	**OBSERVER: PT, CRN, SR.**
ROCK NAME:	Sparsely to Moderately Olivine-Plagioclase-Phyric Basalt.						
WHERE SAMPLED:	Next to ICP sample.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Subtrachytic to subophitic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	<0.5	<0.5			1	Anhedral	Round. Zoned rim with ring of inclusions towards rim. Photomicrograph 1205-228.
Olivine	2.5	3	0.6	2.5	0.8	Euhedral to subhedral	Altered along rims and fractures to brown clay. Smaller phenocrysts difficult to distinguish from groundmass (near seriate texture).
GROUNDMASS							
Plagioclase	40	40	0.05	0.3	0.15	Subhedral laths	
Clinopyroxene	28	28	0.1	1.5	1	Subhedral	Groundmass crystals have grown around olivine (Photomicrograph 1205-205) and plagioclase laths.
Titanomagnetite	10	10	0.01	0.2	0.1	Euhedral to subhedral octahedra	Slight development of ilmenite oxidation lamellae and rare maghemite alteration along cleavage planes and fractures.
Olivine	7	9			<0.1	Euhedral to subhedral	Replaced by green clay and Fe oxyhydroxide.
Glass/mesostasis	5	10					Partially replaced by green clay and Fe oxyhydroxide.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Brown clay	5.5				Olivine, glass	
Green clay	2				Olivine, glass	Saponite/nontronite?

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS:	Relatively unaltered rock.	**Chapter 5, Figure F16L.** Field of view 1.25 mm, XPL. **Photomicrograph 1205-228.** Field of view 0.625 mm, XPL.

THIN SECTION: 197-1205A-13R-3, 27-29 **Piece No.: 2A** **Unit: 3b** **OBSERVER: PT, CRN, SR.**
ROCK NAME: Sparsely to Moderately Olivine-Plagioclase-Phyric Basalt.
WHERE SAMPLED: Next to ICP sample.
GRAIN SIZE: Fine grained.
TEXTURE: Subtrachytic to subophitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Plagioclase	3	3	1	1.5	1	Subhedral to anhedral	Large rounded plagioclase shows resorption rim and inclusion trail (Photomicrograph 1205-206)
Olivine	<0.5	3	0.6	2	0.9	Euhedral to subhedral	Replaced by brown and green clay, and reacting to oxide minerals. Rare unaltered cores can be seen.
GROUNDMASS							
Plagioclase	35	35	0.05	0.3	0.15	Subhedral laths	
Clinopyroxene	25	25	0.1	4	2	Subhedral	Subophitic - surrounds plagioclase.
Titanomagnetite	10	10	0.01	0.2	0.1	Euhedral to subhedral octahedra	Slight development of ilmenite oxidation lamellae.
Olivine	0	9	0.1	0.6	0.3	Euhedral to subhedral	Replaced by green brown clay.
Glass/mesostasis	2	15					Partially replaced by green and brown clay.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Green clay	25				Olivine, glass	Saponite/nontronite.

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

COMMENTS: Photomicrographs 1205-207 and 1205-208 of altered olivine in groundmass. Photomicrographs 1205-226 and 1205-227 of ilmenite oxidation lamellae.

Chapter 5, Figure F16B. Field of view 1.25 mm, XPL.
Photomicrograph 1205-207. Field of view 5 mm, XPL.
Photomicrograph 1205-208. Field of view 5mm, XPL.
Chapter 5, Figure F17J. Field of view 0.25 mm, RL.
Chapter 5, Figure F17K. Field of view 0.25 mm, RL.

THIN SECTION:	**197-1205A-15R-2, 138-140**	**Piece No.: 10**				**Unit: 5b**	**OBSERVER: PT, CRN, SR, RK, JG.**
ROCK NAME:	Moderately Plagioclase-Olivine-Phyric Basalt.						
WHERE SAMPLED:							
GRAIN SIZE:	Fine grained.						
TEXTURE:	Porphyritic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	20	20	1	14	7	Subhedral to anhedral	Largest plagioclase is fractured, zoned and strained, and has some clinopyroxene and olivine inclusions associated (Photomicrograph 1205-211).
Olivine	<0.5	0.5	1	2.5	1.75	Subhedral	Altered to brown and green clay along fractures.
GROUNDMASS							
Plagioclase	28	31	0.05	0.3	0.15	Subhedral laths	Partially altered to green clay.
Clinopyroxene	19	22	0.05	0.2	0.1	Subhedral	Partially altered to green clay.
Titanomagnetite	10	10	0.01	0.15	0.05	Euhedral to subhedral octahedra	
Olivine	5	11.5	0.1	0.6	0.3	Euhedral to subhedral	Partially replaced by green brown clay.
Glass/mesostasis	0	5					Replaced by green brown clay.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Chlorite	1				Groundmass	
Sericite/illite	2				Plagioclase along fractures	
Green clay	11				Olivine, glass, pyroxene, plagioclase	
Zeolite	3				Vesicles and glass	
Calcite	1				Vesicles	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vesicles	3	Throughout	0.3	2	1	Zeolite or calcite	

COMMENTS:	**Chapter 5, Figure F16A.** Field of view 5 mm, XPL.

THIN SECTION: 197-1205-15R-3, 37-39. **Piece No.:** 1B **Unit:** 5b **OBSERVER:** PT, CRN, SR.
ROCK NAME: Moderately Plagioclase-Olivine-Phyric Basalt.
WHERE SAMPLED: Next to ICP sample.
GRAIN SIZE: Fine grained.
TEXTURE: Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Plagioclase	5	5	1	4	2	Subhedral to anhedral	Plagioclase are fractured, zoned and strained, and occasionally only small fragments of larger crystals remain, as evidenced from zonation patterns.
Olivine	0	0.5	0.35	1.5	0.5	Subhedral	Altered to brown and green clay ?
GROUNDMASS							
Plagioclase	28	30	0.05	0.3	0.15	Subhedral laths	Partially altered to green clay.
Clinopyroxene	15	18	0.05	0.2	0.1	Subhedral	Partially altered to green clay.
Titanomagnetite	12	12	0.01	0.1	0.05	Euhedral to subhedral octahedra	Occasional ilmenite oxidation lamellae may be present.
Olivine	9	15	0.1	0.6	0.3	Euhedral to subhedral	Partially replaced by green brown clay.
Pentlandite	Trace	Trace			<0.01	Bleb	Inclusions in primary minerals.
Glass/mesostasis	0	19.5					Altered to green clay.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Green clay	41				Olivine, glass, pyroxene, plagioclase	Celadonite.
Pyrite	Trace				Groundmass	

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

COMMENTS: One plagioclase xenocryst contains inclusions of fresh clinopyroxene and titanomagnetite (Photomicrographs 1205-212, 1205-213).

Photomicrograph 1205-212. Field of view 5 mm, XPL.
Photomicrograph 1205-213. Field of view 1.25 mm, XPL.

THIN SECTION:	**197-1205A-16R-2, 84-86**	**Piece No.: 1J**	**Unit: 6**
ROCK NAME:	Moderately plagioclase-olivine-phyric basalt containing a (cognate?) gabbroic xenolith.		
WHERE SAMPLED:	Next to ICP sample.		
GRAIN SIZE:	Microcrystalline.		
TEXTURE:	Subtrachytic to intergranular.		

OBSERVER: CRN, PT, SR.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Plagioclase	10	10	15	4	6	Euhedral to subhedral; blocky	Complex zoning. Twinning is truncated by zonation. Some resorption along margins.
Clinopyroxene	2	2	4	6	5	Anhedral	Interstitial to olivine and plagioclase in the xenolith.
Olivine	0	2	0.6	0.9	0.7	Subhedral	Olivine of phenocryst size is only in the xenolith. Completely altered to olive clay and replaced by calcite.
GROUNDMASS							
Plagioclase	35	35	0.05	0.3	0.1	Subhedral laths	
Clinopyroxene	20	20			0.05	Anhedral	
Olivine	5	10	0.05	0.3	0.2	Subhedral to anhedral	Partially replaced by olive clay.
Titanomagnetite	10	10	<0.01	0.08	0.05	Euhedral to subhedral, skeletal	Octahedra. Several ilmenite oxidation lamellae present. Generally unaltered.
Glass/mesostasis	5	11					Partially altered to green clay.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Olive green clay	6				Olivine	Saponite/nontronite.
Calcite	1				Olivine	
Green clay	5				Glass/mesostasis	
Iddingsite	1				Olivine	

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

COMMENTS: Contains a large (1-2 cm!) gabbroic xenolith, consisting of altered olivine, clinopyroxene and zoned plagioclase. See Photomicrographs 1205-214, 1205-215. The mineralogy of this xenolith is included in the phenocryst description, as this may be a rip-off clast from the magma chamber/ conduit wall. Complex zonation in Photomicrographs 1205-216 to 1205-220.

Chapter 5, Figure F16K. Field of view 5 mm, XPL.
Photomicrograph 1205-215. Field of view 5 mm, XPL.
Chapter 5, Figure F16C. Field of view 5 mm, XPL.
Photomicrograph 1205-217. Field of view 5 mm, XPL.
Photomicrograph 1205-218. Field of view 1.25 mm, PPL.
Photomicrograph 1205-219. Field of view 5 mm, XPL.
Photomicrograph 1205-220. Field of view 5 mm, XPL.

THIN SECTION: 197-1205A-19R-2, 104-106 **Piece No.: 3B** **Unit: 6** **OBSERVER: CRN, PT, SR.**
ROCK NAME: Moderately Plagioclase-Olivine-Phyric Basalt.
WHERE SAMPLED: Next to ICP sample.
GRAIN SIZE: Microcrystalline.
TEXTURE: Seriate. Intergranular to intersertal. Occasionally subtrachytic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Plagioclase	4	4	2	4	2.5	Subhedral; blocky	Glomerocrystic and optically zoned. Resorption along margins.
Olivine	1	1	0.1	0.5	0.3	Subhedral; equant	Completely altered to olivine green clay. Seriate with groundmass.
GROUNDMASS							
Plagioclase	30	30	0.05	0.3	0.1	Subhedral laths	
Clinopyroxene	30	30					Weakly pleochroic.
Olivine	0	8	0.01	0.1	0.06	Subhedral to anhedral	Seriate with phenocrysts. Completely altered to and highlighted by olive green clay.
Titanomagnetite	12	12	0.01	0.07	0.05	Euhedral to subhedral	Skeletal octahedra. Unaltered.
Glass/mesostasis	5	15					Partially altered to green clay.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Olive green clay	8				Olivine	Saponite/nontronite.
Green clay	10				Glass/mesostasis	Celadonite.

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

COMMENTS:

THIN SECTION: 197-1205A-20R-5, 67-68 **Piece No.: 3** **Unit: 8A** **OBSERVER: CRN, SR, PT.**
ROCK NAME: Moderately Plagioclase-Olivine-Phyric Basalt.
WHERE SAMPLED: Next to ICP sample.
GRAIN SIZE: Aphanitic. Microcrystalline.
TEXTURE: Seriate. Intergranular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Olivine	3	4	0.1	0.5	0.4	Subhedral	Partially altered to green clay. Seriate texture with groundmass olivine.
Plagioclase	2	2	0.5	3	1	Subhedral	Optically zoned and exhibiting resorption.
GROUNDMASS							
Plagioclase	40	40	0.1	0.5	0.35	Subhedral laths	
Clinopyroxene	30	30			<0.05	Anhedral	
Olivine	5	7	0.05	0.1		Euhedral to subhedral	Partially altered to green clay. Seriate texture with phenocrysts.
Glass/mesostasis	3	5					Partially altered to green clay.
Titanomagnetite	12	12	0.01	0.2	0.1	Euhedral octahedra. Skeletal	Rare ilmenite oxidation lamellae. Rare maghemite alteration along cleavage planes.
Pentlandite	Trace	Trace			<0.05	Blebs	Inclusions in primary minerals.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Green clay	5				Olivine, glass	
Pyrite	Trace				Glass?	Secondary pyrite is interstitial.

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

COMMENTS:

THIN SECTION:	**197-1205A-22R-1, 28-30**		**Piece No.: 6A**			**Unit: 9**	**OBSERVER: CRN, PT, SR.**
ROCK NAME:	Aphyric Basalt.						
WHERE SAMPLED:	Next to ICP sample.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Subtrachytic to intergranular.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	1	1			5	Subhedral	One plagioclase phenocryst is present and exhibits resorption and zonation.
GROUNDMASS							
Plagioclase	45	50	0.2	0.8	0.3	Subhedral laths	Altered to sericite(?) adjacent to vesicles.
Clinopyroxene	21	21			<0.1	Anhedral	
Olivine	0	8	0.1	0.3	0.2	Euhedral to subhedral; equant	Completely altered to green clay.
Titanomagnetite	10	10	0.01	0.2	0.15	Subhedral octahedra; skeletal	Ilmenite oxidation lamellae are common. Occasional alteration to maghemite along cleavage planes is observed.
Glass/mesostasis	2	10					Altered to green clay.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Green clay	11				Olivine, glass	Celadonite.
Zeolite	5				Vesicles, groundmass	
Sericite	5				Plagioclase	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vesicles	5	Throughout	1	6	3	Zeolite	The basalt adjacent to the vesicles is more highly altered. Plagioclase laths are completely sericitized in these zones that are up to 1 mm wide.

COMMENTS:	Photomicrograph 1205-239 of glass replaced by zeolite and lined by celadonite.	**Photomicrograph 1205-239.** Field of view 0.625 mm, PPL.

THIN SECTION: 197-1205A-23R-1, 77-78 **Piece No.:** 8 **Unit:** 10 **OBSERVER:** CRN, SR, PT.
ROCK NAME: Sparsely Plagioclase-Olivine-Phyric to Aphyric Basalt.
WHERE SAMPLED: Next to ICP sample.
GRAIN SIZE: Fine grained.
TEXTURE: Subophitic to intersertal.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Plagioclase	3	3	2	5	3	Euhedral	Not zoned or resorbed.
GROUNDMASS							
Plagioclase	40	40	0.2	0.9	0.4	Subhedral laths	
Clinopyroxene	26	26	0.1	1	0.6	Anhedral to subhedral	Larger grains are intergrown with plagioclase.
Olivine	0	8	0.05	0.3	0.1	Subhedral; equant	Altered to green clay.
Titanomagnetite	3	3	0.01	0.1	0.06	Euhedral octahedra; skeletal	Rare ilmenite oxidation lamellae. No maghemite.
Glass/mesostasis	0	20					Altered to green clay.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Green clay	10				Olivine, glass	
Brown clay	10				Glass	Saponite/nontronite.
Zeolite	3				Glass	
Incipient chlorite	Trace				Glass	
Pyrite	5				Glass	Disseminated in the groundmass.

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

COMMENTS:

THIN SECTION:	**197-1205A-24R-2, 124-130**		**Piece No.: 19**			**Unit: 10**	**OBSERVER: CRN, JG, SR, PT.**
ROCK NAME:	Sparsely Plagioclase-Olivine-Phyric to Aphyric Basalt.						
WHERE SAMPLED:	Altered flow top breccia. Welded clasts.						
GRAIN SIZE:	Aphanitic. Microcrystalline.						
TEXTURE:	Brecciated. Subtrachytic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
GROUNDMASS							
Plagioclase	0	40	0.05	0.4	0.1	Subhedral laths	Altered to low-birefringent clay(?) or zeolite(?).
Clinopyroxene	0	25	<0.01	0.15	0.1	Anhedral to subhedral	Altered to moderately birefringent clay(?).
Olivine	0	15	0.02	0.1	0.05	Euhedral to subhedral; equant	Completely altered to Fe oxyhydroxide or iddingsite.
Titanomagnetite	2	5	<0.01	0.05	0.03	Subhedral octahedra	Extensive alteration to maghemite along cleavage planes.
Glass/mesostasis	0	15					Altered to low-birefringent clay(?) or zeolite(?).

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Zeolite	55				Plagioclase, glass	
Moderate-biref clay	25				Clinopyroxene	
Fe oxyhydroxide/ iddingsite	15				Olivine	
Maghemite	3				Titanomagnetite	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS: See Photomicrographs 1205-221 and 1205-222 for general texture and olivine alteration. In reflected light, the altered olivines look like they have been replaced with goethite. The thin section is of welded clasts in a flow top breccia. See Photomicrograph 1205-223.

Photomicrograph 1205-221. Field of view 5 mm, PPL.
Chapter 5, Figure F16M. Field of view 1.25 mm, PPL.
Photomicrograph 1205-223. Field of view 5 mm, PPL.

THIN SECTION:	**197-1205A-26R-2, 23-25**		**Piece No.: 1B**			**Unit: 11b**	**OBSERVER: PT, SR.**
ROCK NAME:	Aphyric Basalt.						
WHERE SAMPLED:	Next to ICP sample.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Subophitic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	2	2	1	4	2.5	Subhedral	Evidence of resorption. Optically zoned. Partially sericitized.
Olivine	0	1	0.25	1	0.75	Euhedral to subhedral; equant	Altered to green brown clay.
GROUNDMASS							
Plagioclase	46	46	0.5	1	0.75	Subhedral laths	
Clinopyroxene	30	30	1	3	2	Subhedral to anhedral	Crystals are intergrown with plagioclase.
Titanomagnetite	5	5	0.01	0.25	0.15	Subhedral to euhedral octahedra	Slightly altered to maghemite along fractures.
Glass/mesostasis	0	16					Altered to green clay.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Green clay	17				Olivine and glass	Well-crystallized saponite/nontronite.
Mica - stilpnomelane?	Trace				Groundmass olivine?	
Pyrite	Trace				Groundmass	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vesicles	<1		2	2	2	Zeolite	

COMMENTS: No groundmass olivine is visible. However, some equant crystals in pockets around the ophitic clinopyroxene now replaced with clay may have been olivine. Also, one brown, pleochroic crystal is seen (mica, biotite-phlogopite or stilpnomelane) that may be replacing olivine.

THIN SECTION: 197-1205A-26R-3, 16-18 **Piece No.:** 3 **Unit:** 11b **OBSERVER:** SR
ROCK NAME: Aphyric Basalt.
WHERE SAMPLED: Alteration.
GRAIN SIZE: Fine grained.
TEXTURE:

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	max.	av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
GROUNDMASS							
Plagioclase	0	40					Totally replaced.
Clinopyroxene?	0	?					Totally replaced.
Olivine	0	10					Totally replaced.
Glass/mesostasis	0	50					Totally replaced.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	max.	av.	REPLACING / FILLING	COMMENTS
Iddingsite	10				Olivine	
Zeolite	70				Glass, plagioclase	
Fe oxyhydroxide	5				Olivine, glass, vesicle	
Brown clay	5				Vesicles	
Analcite	10				Vesicles	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	max.	av.	FILLING / MORPHOLOGY	COMMENTS
Vesicle	20					Zeolite, brown clay, Fe oxyhydroxide	

COMMENTS:

THIN SECTION:	**197-1205A-27R-5, 103-105**		**Piece No.: 5**			**Unit: 12B**	**OBSERVER: CRN, JG, SR, PT.**
ROCK NAME:	Aphyric Basalt.						
WHERE SAMPLED:	Next to ICP sample.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Subtrachytic to subophitic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	1	1	1	4	2.5	Subhedral	Evidence of resorption. Optically zoned (see Photomicrograph 1205-225). Partially sericitized.
GROUNDMASS							
Plagioclase	46	46	0.1	0.8	0.5	Subhedral laths	
Clinopyroxene	30	30	0.1	1	0.8	Subhedral to anhedral	Larger crystals are intergrown with plagioclase.
Olivine	0	8	0.05	0.25	0.1	Euhedral to subhedral; equant	Altered to brown clay.
Titanomagnetite	5	5	0.01	0.25	0.15	Subhedral to euhedral octahedra	Unaltered except for occasional ilmenite oxidation lamelllae (see Photomicrograph 1205-224).
Glass/mesostasis	0	10					Altered to green clay.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Brown clay	8				Olivine	
Green clay	5				Glass	
Zeolite	5				Fibrous	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS:	**Chapter 5, Figure F17N.** Field of view 0.25 mm, RL. **Photomicrograph 1205-225.** Field of view 1.25 mm, XPL.

THIN SECTION:	**197-1205A-28R-3, 4-6**		**Piece No.: 1A**			**Unit: 13b**	**OBSERVER: PT, CRN, SR.**
ROCK NAME:	Aphyric Basalt.						
WHERE SAMPLED:	Next to PMAG and ICP samples.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Subophitic to intersertal.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
GROUNDMASS							
Plagioclase	45	45	0.2	1	0.75	Subhedral laths	
Clinopyroxene	30	30	1	3	2	Subhedral to anhedral	Crystals are intergrown with plagioclase. Pleochroic.
Olivine	5	10	0.2	0.5	0.35	Euhedral to subhedral	Partly replaced by brown clay. Often have unaltered centers.
Titanomagnetite	1	5	0.01	0.25	0.15	Subhedral to euhedral octahedra	Unaltered except for extensive ilmenite oxidation lamellae and maghemite along fractures.
Pentlandite	Trace				0.01	Bleb	Inclusions in primary minerals.
Glass/mesostasis	0	10					Altered to green clay.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Green clay	15				Olivine and glass	Saponite/nontronite.
Maghemite	4				Titanomagnetite	
Pyrite	Trace			0.05	Glass	
Chlorite	<1					Incipient.

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS:	Photomicrograph 1205-231 of subophitic texture. Some unaltered olivine in groundmass; concentrated on left margin of section. Photomicrographs 1205-232 and 1205-233. Clays are starting to form micas.	**Photomicrograph 1205-231.** Field of view 1.25 mm, XPL. **Photomicrograph 1205-232.** Field of view 1.25 mm, XPL. **Photomicrograph 1205-233.** Field of view 1.25 mm, PPL.

THIN SECTION:	**197-1205A-29R-2, 55-58**		**Piece No.: 7A**			**Unit: 14b**	**OBSERVER: PT, CRN, SR.**
ROCK NAME:	Sparsely to Moderately Plagioclase-Olivine-Phyric Basalt.						
WHERE SAMPLED:	Next to ICP sample.						
GRAIN SIZE:	Microcrystalline.						
TEXTURE:	Trachytic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	15	15	1	15	3	Subhedral	Spectacular evidence of resorption, fracturing and zonation.
Olivine	0	3	0.25	1.5	1	Euhedral to subhedral	
GROUNDMASS							
Plagioclase	30	30	0.2	1	0.75	Subhedral laths	
Clinopyroxene	24	24	0.05	0.1	0.08	Subhedral to anhedral	Crystals are intergrown with plagioclase. Pleochroic.
Olivine	0	10	0.08	0.15	0.1	Euhedral to subhedral	Replaced by brown clay. May possibly be microphenocrysts.
Glass/mesostasis	0	8					
Titanomagnetite	10	10	0.08	0.2	0.1	Subhedral to euhedral octahedra	Extensive ilmenite oxidation lamellae. Maghemite rims on many crystals along clevage planes and fractures.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Green clay	21				Olivine and glass	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vesicles	1.5	Throughout	1	2	1.5	Zeolite	Brown radiating crystals, high 1st order colors.

COMMENTS:	Extremely well-defined trachytic texture - even the megacrysts are aligned. Photomicrographs 1205-234 to 1205-237 of plagioclase megacrysts showing embayments, resorption, straining and zonation. Photomicrograph 1205-249 of a vesicle.	**Photomicrograph 1205-234.** Field of view 5 mm, XPL. **Chapter 5, Figure F16G.** Field of view 5 mm, XPL. **Chapter 5, Figure F16E.** Field of view 5 mm, XPL. **Chapter 5, Figure F16F.** Field of view 5 mm, XPL. **Photomicrograph 1205-249.** Field of view 0.625 mm, XPL.

THIN SECTION:	**197-1205A-30R-1, 42-44**	**Piece No.: 9**			**Unit: 15b**	**OBSERVER: PT, CRN, SR.**	
ROCK NAME:	Sparsely to Moderately Plagioclase-Olivine-Phyric Basalt.						
WHERE SAMPLED:	Next to ICP sample.						
GRAIN SIZE:	Microcrystalline.						
TEXTURE:	Subophitic, subtrachytic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	5	5	1	4	2	Subhedral	Plagioclases are strained, subrounded and show evidence of resorption.
Olivine	0	3	0.25	1.5	1	Euhedral to subhedral	Altered to bright red brown iddingsite. Photomicrograph 1205-238.
GROUNDMASS							
Plagioclase	32	32	0.005	0.4	0.2	Subhedral laths	
Clinopyroxene	24	24	0.05	0.1	0.15	Subhedral to anhedral	Crystals are intergrown with plagioclase. Pleochroic.
Olivine	0	12	0.08	0.15	0.2	Euhedral to subhedral	Altered to bright red brown iddingsite.
Glass/mesostasis	0	20					Replaced by pale blue-green material - very distinctive.
Titanomagnetite	2	4	0.05	0.15	0.1	Subhedral to euhedral octahedra	Extensively replaced by maghemite.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Iddingsite	15				Olivine	
Blue green clay (?)	12				Glass	Celadonite.
Maghemite	2				Titanomagnetite	
Green clay	8					Saponite.

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS:	A faint flow foliation is present, defined by subparallel wisps of clay material.	**Photomicrograph 1205-238.** Field of view 1.25 mm, PPL.

THIN SECTION:	**197-1205A-32R-2, 114-116**		**Piece No.: 2H**			**Unit: 16**	**OBSERVER: CRN, JG, PT.**
ROCK NAME:	Sparsely to Moderately Plagioclase-Olivine-Phyric Basalt.						
WHERE SAMPLED:	Next to ICP sample.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Intergranular to subophitic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	5	5	1	2.7	2	Subhedral	Contains embayments, fractures.
Olivine	1	2	0.4	1.8	1	Euhedral to anhedral	Partially to completely replaced by brown clay.
GROUNDMASS							
Plagioclase	26	35	0.05	0.4	0.3	Subhedral laths	Moderate alteration to clay.
Clinopyroxene	30	32	0.4	1.1	0.8	Anhedral	Enclose/partially enclose plagioclase laths.
Olivine	0	11	0.01	0.1	0.1	Subhedral	Partially to completely replaced by brown clay.
Titanomagnetite	5	5	<0.01	0.12	0.1	Subhedral skeletal octahedra	Oxidation to ilmenite is extensive and not restricted to cleavage planes.
Glass/mesostasis	0	10					

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Brown clay	18				Replacing olivine, clinopyroxene	
Green clay	15				Replacing glass, olivine	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS:

THIN SECTION:	**197-1205A-33R-2, 5-7**		**Piece No.: 1A**			**Unit: 17**	**OBSERVER: SR**
ROCK NAME:	Sparsely to Moderately Plagioclase-Olivine-Phyric Basalt.						
WHERE SAMPLED:	Alteration.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Subophitic to ophitic.						

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm) min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase						Euhedral	Show strong zonation and twinning.
GROUNDMASS							
Plagioclase	30	30					
Clinopyroxene	20	20					Ophitic.
Olivine	0	10				Euhedral	Totally replaced by iddingsite.
Titanomagnetite	5	5					Partially altered..
Glass/mesostasis	0	30					Replaced by Fe oxyhydroxide saponite and zeolite.

SECONDARY MINERALOGY	**PERCENT**	**SIZE (mm) min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Iddingsite	10				Olivine	
Fe oxyhydroxide/ Goethite	10				Glass and vein	
Analcite	5				Vein	
Saponite/nontronite	10				Glass and vein	
Zeolite	10				Glass	

VESICLES/ CAVITIES	**PERCENT**	**LOCATION**	**SIZE (mm) min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vein	5					Analcite 20%, Saponite 20%, Goethite 40%	

COMMENTS:	Photomicrograph 1205-246 of deformed plagioclase. Photomicrograph 1205-247 of vein filling.	**Photomicrograph 1205-246.** Field of view 5 mm, XPL. **Photomicrograph 1205-247.** Field of view 5 mm, PPL.

THIN SECTION: 197-1205A-33R-3, 11-13 **Piece No.:** 1A **Unit:** 17 **OBSERVER:** PT, CRN, SR.
ROCK NAME: Altered Sparsely to Moderately Plagioclase-Olivine-Phyric Basalt.
WHERE SAMPLED: Next to ICP sample.
GRAIN SIZE: Microcrystalline.
TEXTURE: Subophitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	max.	av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
GROUNDMASS							
Plagioclase	35	35	0.5	1.5	1	Subhedral laths	
Clinopyroxene	24	24	1	3	1.5	Subhedral to anhedral	Crystals are intergrown with plagioclase. Pleochroic.
Olivine	0	15	0.2	0.8	0.6	Euhedral to subhedral	Replaced by green brown clay.
Glass/mesostasis	0	19					Replaced by green brown clay.
Titanomagnetite	6	7	0.05	0.15	0.1	Subhedral to euhedral octahedra	Extensive ilmenite oxidation lamellae. Maghemite is developed along fractures and cleavage planes.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	max.	av.	REPLACING / FILLING	COMMENTS
Green brown clay	34				Olivine and glass	
Maghemite	1				Titanomagnetite	

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

COMMENTS:

THIN SECTION:	**197-1205A-33R-4, 77-79**	**Piece No.: 17**			**Unit: 18b**	**OBSERVER: SR**
ROCK NAME:	Aphyric to Moderately Olivine-Phyric Basalt.					
WHERE SAMPLED:	Alteration.					
GRAIN SIZE:	Fine grained.					
TEXTURE:	Intergranular.					

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Olivine	0	15	0.1	0.5	0.2	Euhedral	Totally replaced by iddingsite.
GROUNDMASS							
Plagioclase	20	20					
Clinopyroxene	10	10					
Titanomagnetite	5	5					Sometimes altered to maghemite.
Glass/mesostasis	0	50					

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Iddingsite	15				Olivine	
Zeolite	25				Vein and groundmass	
Celadonite	20				Glass and vein	
Brown clay	5				Vein	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vein	10						

COMMENTS:	Photomicrograph 1205-244: Olivine replaced by iddingsite, groundmass replaced by celadonite. Photomicrograph 1205-245: Close up, vein filled by brown clay, celadonite and olivine replaced by iddingsite.	**Photomicrograph 1205-244.** Field of view 5 mm, PPL. **Photomicrograph 1205-245.** Field of view 0.625 mm, PPL.

THIN SECTION:	**197-1205A-34R-1, 85-87**		**Piece No.: 13B**			**Unit: 18b**	**OBSERVER: SR**
ROCK NAME:	Aphyric to Moderately Olivine-Phyric Basalt.						
WHERE SAMPLED:	Alteration.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Intergranular.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Olivine	0	15	0.1	0.5	0.2	Euhedral	Completely replaced by iddingsite, brown clay and calcite.
GROUNDMASS							
Plagioclase	30	30					
Clinopyroxene	20	25					
Titanomagnetite	5	5					Slightly altered to maghemite.
Glass/mesostasis	0	25					

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Iddingsite	10				Olivine	
Brown clay	8				Glass and olivine	
Green clay (saponite/ nontronite ?)	5				Glass	
Zeolite	15				Glass	
Calcite	2				Olivine	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vesicle	30					Zeolite	

COMMENTS:	Photomicrograph 1205-243 of vesicle filled with zeolite, olivine replaced by calcite.	**Photomicrograph 1205-243.** Field of view 1.25 mm, XPL.

THIN SECTION:	**197-1205A-35R-1, 32-34**	**Piece No.: 1A**				**Unit: 18b**	**OBSERVER: JG, CRN, SR, PT.**
ROCK NAME:	Aphyric to Moderately Olivine-Phyric Basalt.						
WHERE SAMPLED:	First olivine tholeiite.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Subophitic to intersertal.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Olivine	0	10	0.3	0.6	0.5	Subhedral	Completely replaced by brown clay.
GROUNDMASS							
Plagioclase	33	33	0.2	1	0.5	Subhedral laths	
Clinopyroxene	28	28	0.5	1	0.8	Subhedral to anhedral	Slightly pleochroic.
Titanomagnetite	3	3	0.01	0.1	0.08	Skeletal octahedra and dendric forms	Unaltered-rare illmenite oxidation lamellae.
Olivine	0	18	0.1	0.2	0.15	Subhedral	Completely pseudomorphed by brown clay.
Glass/mesostasis	0	8	0.01	0.08	0.06		Completely replaced by brown clay.
Cr-spinel	Trace		0.01	0.15	0.1	Euhedral	Inclusions in altered olivine.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Brown clay	36				Glass and olivine	Fibrous.

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vein	<1				0.02	Brown clay	

COMMENTS:	This is the first sample taken from the tholeitic basalt. The olivine is extremely weathered, small and occurs in bands of highest abundance. Chrome-spinel is seen rimmed with titanomagnetite, see Photomicrograph 1205-248. Clay is well-crystallized. Maybe incipient formation of mica from groundmass clay?	**Chapter 5, Figure F17V.** Field of view 0.25 mm, RL.

THIN SECTION:	**197-1205A-35R-3, 97-99**		**Piece No.: 1J**			**Unit: 19b**	**OBSERVER: SR**
ROCK NAME:	Moderately to Highly Olivine-Phyric Basalt.						
WHERE SAMPLED:	Alteration.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Intergranular to subophitic.						

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm) min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Olivine	0	20				Euhedral, equant	Completely replaced by iddingsite and brown clay.
GROUNDMASS							
Plagioclase	30	30					
Clinopyroxene	10	20					Partly replaced by zeolite and clay.
Titanomanetite	5	5					Mostly altered to maghemite with ilmenite exsolution.
Glass/mesostasis	0	25					Replaced by zeolite and brown clay.

SECONDARY MINERALOGY	**PERCENT**	**SIZE (mm) min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Brown clay	5				Olivine	
Iddingsite	15				Olivine	
Zeolite	30				Glass, clinopyroxene	
Analcite	5				Glass and filling vesicles	

VESICLES/ CAVITIES	**PERCENT**	**LOCATION**	**SIZE (mm) min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vesicle	5					Analcite	

COMMENTS:	Photomicrograph 1205-240 of glass replaced by zeolite and olivine replaced by iddingsite. Photomicrographs 1205-241and 1205-242 of olivine replaced by iddingsite, brown clay and including a vesicle filled by zeolite.	**Photomicrograph 1205-240.** Field of view 0.625 mm, PPL. **Photomicrograph 1205-241.** Field of view 1.25 mm, PPL. **Photomicrograph 1205-242.** Field of view 1.25 mm, XPL.

THIN SECTION:	**197-1205A-35R-4, 77-79**	**Piece No.: 1C**	**Unit: 19b**
ROCK NAME:	Moderately to Highly Olivine-Phyric Basalt.		
WHERE SAMPLED:	Interior of flow, next to ICP sample.		
GRAIN SIZE:	Fine grained.		
TEXTURE:	Subophitic to intersertal.		

OBSERVER: CRN, JG, PT.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Olivine	0	15	0.8	2	1	Euhedral	Completely altered to slightly birefringent brown clay and Fe oxyhydroxide. Embayments and hollow centers are evidence for resorption.
GROUNDMASS							
Plagioclase	30	38	0.15	1	0.5	Euhedral to subhedral laths	
Clinopyroxene	30	34	0.25	1.8	1	Subhedral to anhedral	
Olivine	0	10	0.1	0.3	0.25	Euhedral to subhedral laths	Completely altered to Fe oxyhydroxide. Possibly microphenocrysts.
Titanomagnetite	2	3	<0.01	0.2	0.08	Subhedral skeletal octahedra and dendrites	Extensive ilmenite oxidation lamellae and partially replaced by maghemite.
Glass/mesostasis	12						
Cr-spinel	<1	<1			0.01	Subhedral	Inclusions in altered olivine.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Maghemite	1					
Fe oxyhydroxide	3				Rimming and filling fractures in olivine	
Green clay	12				Glass, olivine	
Brown clay	5				Glass, olivine	
Calcite	4				Olivine	

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

COMMENTS: Photomicrograph 1205-251 displays an olivine phenocryst that is undergoing resorption.

Photomicrograph 1205-251. Field of view 5 mm, XPL.

THIN SECTION: 197-1205A-36R-5, 50-51 **Piece No.: 2D** **Unit: 20** **OBSERVER: CRN, JG, PT.**
ROCK NAME: Sparsely to Moderatey Olivine-Phyric Basalt.
WHERE SAMPLED: Next to ICP sample.
GRAIN SIZE: Fine grained.
TEXTURE: Intersertal to subtrachytic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Olivine	22	30	0.25	2.25	1.8	Euhedral to subhedral	Includes phenocryst and microphenyocryst phase. Variable alteration. Edges of grains highly to completely altered to brown clay and Fe oxyhydroxide.
GROUNDMASS							
Plagioclase	27	30	0.2	1.8	1	Euhedral to subhedral laths	
Clinopyroxene	8	15	0.17	0.5	0.25	Subhedral to anhedral	
Titanomagnetite	10	10	<0.01	0.1	0.08	Subhedral skeletal octahedra	Extensive ilmenite oxidation not restricted to lamellae. Occasional maghemite development along fractures and cleavage planes. Also seen as inclusions in groundmass olivine.
Olivine	0	5			0.05	Equant; euhedral	Altered to green clay.
Glass/mesostasis	0	10					Altered to brown clay.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Brown clay	23				Olivine, plagioclase, glass	
Green clay	10				Groundmass olivine	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	FILLING / MORPHOLOGY	COMMENTS
Vesicles	<1					Brown clay	

COMMENTS: Olivine is both a phenocryst and microphenocryst phase. In addition, altered olivine is present in the groundmass (now green clay). Titanomagnetite inclusions are found in microphenocryst olivine. See Photomicrograph 1205-250. **Chapter 5, Figure F17S.** Field of view 0.25 mm, XPL.

THIN SECTION:	**197-1205A-37R-5, 28-29**	**Piece No.: 2C**			**Unit: 21**	**OBSERVER: CRN, PT, JG.**	
ROCK NAME:	Moderately to Highly Plagioclase-Olivine-Phyric Basalt.						
WHERE SAMPLED:	Next to ICP sample.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Subophitic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Olivine	2.5	3	2	6	4	Anhedral	Largest grain has extremely embayed margins (Photomicrograph 1205-257). Altered to iddingsite along fractures.
Plagioclase	5	5	1	4	1.4	Anhedral	Grains show evidence for resorption (embayments, rounding, melt inclusion trails).
GROUNDMASS							
Plagioclase	32	36	0.15	0.7	0.5		
Clinopyroxene	21	25	0.2	1	0.6		
Titanomagnetite	4	4	<0.01	0.05	0.04	Subhedral skeletal octahedra	Extensive development of ilmenite oxidation lamellae, but no maghemite.
Olivine	8	12	0.2	0.4	0.3	Euhedral	May possibly be microphenocrysts rather than groundmass. Partly altered to brown clay.
Glass/mesostasis	0	15					Altered to green clay.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Iddingsite	0.5				Fractures and embayments	
Brown clay	12				Clinopyroxene and glass	
Green clay	15				Groundmass	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS:	Olivine size is bimodal. Smaller ones may be microphenocrysts.	**Chapter 5, Figure F16H.** Field of view 5 mm, XPL.

THIN SECTION:	**197-1205A-39R-1, 69-70**	**Piece No.: 3F**				**Unit: 22**	**OBSERVER: CRN, PT, JG.**
ROCK NAME:	Moderately Olivine-Plagioclase-Phyric Basalt.						
WHERE SAMPLED:	Flow interior.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Subophitic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Olivine	2.75	3	0.2	1.1	0.9	Subhedral to anhedral	Partly altered to brown clay.
Plagioclase	2	2	0.1	1.2	0.8	Subhedral to anhedral	Contains embayments and melt inclusion trails.
GROUNDMASS							
Plagioclase	38	38	0.2	0.1	0.15	Subhedral	
Clinopyroxene	30	30	0.8	0.5	0.4	Anhedral	
Titanomagnetite	7	7	<0.01	0.1	0.08	Subhedral skeletal octahedra	Ilmenite oxidation lamellae are present. Rare maghemite along cleavage planes and fractures. Titanomagnetite inclusions in olivine.
Olivine	12	15	0.05	0.15	0.1	Euhedral	Contains Cr spinel inclusions. Occasionally altered to brown clay.
Glass/mesostasis	0	5					Altered to green clay.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Brown clay	3.25				Olivine	
Green clay	5				Glass	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS:

THIN SECTION:	**197-1205A-41R-3, 59-61**		**Piece No.: 1B**			**Unit: 24a**	**OBSERVER: CRN, PT.**
ROCK NAME:	Aphyric Basalt.						
WHERE SAMPLED:	Flow interior.						
GRAIN SIZE:	Aphanitic, microcrystalline.						
TEXTURE:	Altered; intersertal.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Olivine	0	1	0.1	0.3	0.2	Subhedral	Altered to brown clay.
GROUNDMASS							
Plagioclase	36	36	0.01	0.3		Subhedral	
Clinopyroxene	28	28	1	0.2	0.8	Anhedral	Slightly altered to green clay along some edges.
Titanomagnetite	4	5	<0.01	0.07	0.05	Subhedral skeletal octahedra and dendrites	Extensive development of ilmenite oxidation lamellae. Maghemite is present along cleavage planes.
Glass/mesostasis	0	30					Altered to green clay.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Maghemite	1				Titanomagnetite	
Calcite	1				Vesicles	
Green clay	29				Mesostasis	
Brown clay	1				Olivine	

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vesicles	1			2		Calcite	

COMMENTS: No evidence is seen for the presence of groundmass olivine in this section. This is possibly due to the degree of alteration.

THIN SECTION: 197-1205A-41R-5, 24-26 **Piece No.: 1A** **Unit: 26a** **OBSERVER: CRN, PT.**
ROCK NAME: Aphyric to Sparsely Plagioclase-Phyric Basalt.
WHERE SAMPLED: Lobe interior.
GRAIN SIZE: Aphanitic.
TEXTURE: Ophitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Olivine	0	2	0.25	0.6	0.5	Subhedral	Altered to brown clay and Fe oxyhydroxide.
GROUNDMASS							
Plagioclase	38	42	0.15	0.5	0.4	Subhedral to anhedral	Slightly altered to brown clay and Fe oxyhydroxide.
Clinopyroxene	21	27	0.3	1	0.5	Subhedral to anhedral	Slightly altered to brown clay and Fe oxyhydroxide.
Titanomagnetite	3	4	0.04	0.2	0.13	Subhedral skeletal octahedra	Extensive development of ilmenite oxidation lamellae. Maghemite is present along cleavage planes and around the rims of the titanomagnetite crystals.
Olivine	0	8	0.1	0.3	0.2	Anhedral to subhedral	Entirely altered to green and brown clay.
Glass/mesostasis	10	17					Altered to green clay.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Maghemite	1				Titanomagnetite	
Green clay	12				Glass, olivine	
Brown clay	10				Plagioclase and clinopyroxene	
Iddingsite	5				Groundmass and olivine	

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

COMMENTS:

THIN SECTION:	**197-1205A-42R-2, 55-57**		**Piece No.: 4B**			**Unit: 27**	**OBSERVER: SR**
ROCK NAME:	Aphyric to Moderately Plagioclase-Phyric Basalt.						
WHERE SAMPLED:	Alteration.						
GRAIN SIZE:	Fine grained.						
TEXTURE:	Subophitic.						

PRIMARY MINERALOGY	**PERCENT PRESENT**	**PERCENT ORIGINAL**	**SIZE (mm) min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Plagioclase	1	1				Euhedral.	One phenocryst on the edge of the section.
GROUNDMASS							
Plagioclase	30	30					
Clinopyroxene	20	20					
Olivine	0	5				Euhedral.	Totally replaced by iddingsite.
Titanomagnetite	3	5					Replaced by maghemite.
Glass/mesostasis	0	39					

SECONDARY MINERALOGY	**PERCENT**	**SIZE (mm) min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Iddingsite	5				Olivine	
Calcite	2				Edge of the thin section, fracture?	
Zeolite	19				Fracture, vesicle, glass	
Saponite/nontronite	18				Glass	Could occasionally be incipient mica (chlorite).
Maghemite	2				Titanomagnetite	

VESICLES/ CAVITIES	**PERCENT**	**LOCATION**	**SIZE (mm) min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**
Vesicle	2					Zeolite	

COMMENTS:

THIN SECTION:	**197-1205A-43R-2, 58-60**	**Piece No.: 2A**	**Unit: 27**
ROCK NAME:	Aphyric to Moderately Plagioclase-Phyric Basalt.		
WHERE SAMPLED:	Flow interior, next to ICP sample.		
GRAIN SIZE:	Fine grained.		
TEXTURE:	Ophitic.		

OBSERVER: CRN, PT, JG.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Olivine	0.75	1	0.6	1.9	0.8	Subhedral	Altered along fractures to extremely pleochroic mottled well cleaved brown mineral - biotite or phlogopite?
Plagioclase	1	1	0.35	1	0.5	Anhedral	Embayments indicate resorption.
GROUNDMASS							
Plagioclase	36	36	0.12	0.43	0.3	Subhedral to anhedral	
Clinopyroxene	25	29	0.5	1.9	2	Anhedral	Partly altered to brown clay.
Titanomagnetite	6	6	<0.01	0.2	0.15	Subhedral skeletal octahedra and dendrites	Extensive ilmenite oxidation that is not confined to lamellae. Maghemite is present along cleavage planes and fractures. See Photomicrographs 1205-252, 1205-253.
Olivine	11	20	0.1	0.3	0.2	Subhedral to anhedral	Partly altered to brown clay.
Glass/mesostasis	3	7					Altered to brown clay.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Brown clay	17.25					

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

COMMENTS: Photomicrograph 1205-258 of olivine phenocryst in ophitic textured groundmass. Photomicrograph 1205-259 of ophitic groundmass. "spotty texture" seen in hand specimen is the result of concentration of brown clay and opaques in between ophitic clinopyroxene. Olivine is altered to a brown mica (biotite or phlogopite?) (e.g., Photomicrographs 1205-274 to 1205-277). Note: we infer this biotite to be a deuteric phase.

Chapter 5, Figure F17L. Field of view 0.25 mm, RL.
Chapter 5, Figure F17M. Field of view 0.25 mm, RL.
Photomicrograph 1205-258.
Photomicrograph 1205-259. Field of view 5 mm, XPL.
Photomicrograph 1205-260. Field of view 1.25 mm, PPL.
Chapter 5, Figure F16J. Field of view 5 mm, PPL.
Photomicrograph 1205-275. Field of view 5 mm, PPL.
Photomicrograph 1205-276. Field of view 1.25 mm, PPL.
Photomicrograph 1205-277. Field of view 1.25 mm, PPL.

THIN SECTION:	**197-1205A-44R-1, 87-88**		**Piece No.: 5A**			**Unit: 28a**	**OBSERVER: CRN, PT.**
ROCK NAME:	Moderately Olivine-Plagioclase-Phyric Basalt.						
WHERE SAMPLED:	Flow interior, next to ICP sample.						
GRAIN SIZE:	Aphanitic.						
TEXTURE:	Trachytic/foliated, occasionally subophitic.						

PRIMARY	**PERCENT**	**PERCENT**	**SIZE (mm)**				
MINERALOGY	**PRESENT**	**ORIGINAL**	**min.**	**max.**	**av.**	**MORPHOLOGY**	**COMMENTS**
PHENOCRYSTS							
Olivine	0	3	0.1	0.5	0.3	Anhedral	Some look sheared. Replaced by brown clay.
Plagioclase	1	1	0.3	1	0.5	Subhedral to anhedral	
GROUNDMASS							
Plagioclase	36	40	0.15	0.4	0.3	Subhedral	
Clinopyroxene	23	25	0.15	0.6	0.5	Anhedral	Subophitic texture - frequently surrounds olivines along with plagioclase.
Titanomagnetite	14	14	<0.01	0.1	0.03	Subhedral skeletal octahedra and dendrites	Extensive development of ilmenite oxidation lamellae, but no maghemite.
Glass/mesostasis	0	12					Replaced by brown clay, iddingsite.
Olivine	0	?5	0.1	0.3	0.2	Euhedral	Replaced with brown clay and ?iddingsite. Note: presence of olivine is uncertain.

SECONDARY		**SIZE (mm)**				
MINERALOGY	**PERCENT**	**min.**	**max.**	**av.**	**REPLACING / FILLING**	**COMMENTS**
Brown clay	13				Olivine phenocrysts/groundmass	
Chlorite	10				Olivine and groundmass	
Iddingsite	3				Olivine	Possibly brown mica.

VESICLES/			**SIZE (mm)**				
CAVITIES	**PERCENT**	**LOCATION**	**min.**	**max.**	**av.**	**FILLING / MORPHOLOGY**	**COMMENTS**

COMMENTS:	Photomicrograph 1205-260 of apparently sheared relict olivine.	**Photomicrograph 1205-260.** Field of view 1.25 mm, PPL.

THIN SECTION:	**197-1205A-44R-2, 110-112**	**Piece No.: 9**	**Unit: 29b**	**OBSERVER: CRN, PT, JG.**
ROCK NAME:	Moderately Olivine-Phyric Basalt.			
WHERE SAMPLED:	Flow interior, next to ICP sample.			
GRAIN SIZE:	Aphanitic.			
TEXTURE:	Intersertal.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	max.	av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Olivine	0	6	0.1	1.7	0.5	Euhedral to subhedral	Altered to brown clay.
Plagioclase	2	2	0.6	3.5	1.5	Subhedral to anhedral	
GROUNDMASS							
Plagioclase	20	28	0.05	0.35	0.2	Euhedral to anhedral	Partly altered to clay.
Clinopyroxene	32	32	0.1	0.4	0.25	Anhedral	Partly altered to chlorite?
Titanomagnetite	13	14	0.01	0.05	0.04	Subhedral skeletal octahedra	Extensive development of ilmenite oxidation lamellae. Maghemite is present along cleavage planes and fractures, as well as around rims (Photomicrograph 264).
Olivine	0	8	0.05	0.1	0.1	Euhedral	Altered to iddingsite/brown mica.
Glass/mesostasis	0	10					Altered to chlorite.

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	max.	av.	REPLACING / FILLING	COMMENTS
Maghemite	1				Titanomagnetite	
Iddingsite	8					This may be brown mica.
Chlorite	15					
Brown clay	9					

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

COMMENTS:	Photomicrograph 1205-261 of subrounded plagioclase with olivine attached. Photomicrograph 1205-262 of apparently sheared relict olivine.	**Photomicrograph 1205-261.** Field of view 1.25 mm, PPL. **Chapter 5, Figure F160.** Field of view 1.25 mm, PPL. **Photomicrograph 1205-264.** Field of view 0.25 mm, RL.

THIN SECTION: 197-1205A-45R-1, 126-128 **Piece No.: 5I** **Unit: 30b** **OBSERVER: CRN, PT, JG.**
ROCK NAME: Aphyric to Moderately Olivine-Plagioclase-Phyric Basalt.
WHERE SAMPLED: Flow interior, next to ICP sample.
GRAIN SIZE: Aphanitic, microcrystalline.
TEXTURE: Trachytic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	MORPHOLOGY	COMMENTS
PHENOCRYSTS							
Olivine	0	5	0.2	0.4	0.3	Anhedral, elongate	Altered to dark brown clay, iddingsite and incipient brown mica.
GROUNDMASS							
Plagioclase	28	28	0.45	0.1	0.2	Euhedral to subhedral	Some altered to chlorite.
Clinopyroxene	23	23	0.3	0.9	0.65	Anhedral	
Titanomagnetite	11	14	0.01	0.1	0.08	Subhedral skeletal octahedra	Ilmenite oxidation is pervasive. Maghemite along cleavage planes and rims of titanomagnetite crystals.
Olivine	~1	20	0.1	0.3	0.2	Euhedral	Most are altered to iddingsite. Some have chromite inclusions (1205-278).
Glass/mesostasis	0	10					

SECONDARY MINERALOGY	PERCENT	SIZE (mm) min.	SIZE (mm) max.	SIZE (mm) av.	REPLACING / FILLING	COMMENTS
Maghemite	3				Titanomagnetite	
Apatite	<1			0.1		
Iddingsite	19				Olivine	Is this iddingsite or brown mica?
Chlorite	15				Glass and plagioclase	

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

COMMENTS: Photomicrograph 1205-263 of altered olivine and plagioclase phenocryst. An alteration phase replacing groundmass olivine may be iddingsite or brown mica. Euhedral altered olivine (now iddingsite or brown mica?) is partially enclosed in clinopyroxene (i.e., ex-olivine oikocrysts) and some have chromite inclusions. Chlorite or clay replaces groundmass (Photomicrograph 1205-279).

Photomicrograph 1205-263. Field of view 1.25 mm, PPL.
Photomicrograph 1205-278. Field of view 0.25 mm, PPL.
Photomicrograph 1205-279. Field of view 0.625 mm, PPL.

Hole 1205A **Alteration Log**

Unit	Core	Section	Section Top (mbsf)	Alteration Degree	FeOx	CaCO3	Brn C	Sap Nontronite	Py	Cel	Zeol	Vesicularity	CaCO3	Brn C	GC	Py	DKGC	Zeol	FeOx
1A	6	1	42.7	2.5	x			x				1			x				x
1A	6	2	43.8	2	x	x			x			0.5	x		x				
1A	6	3	45.08	3	x	x						1.5	x						x
2A	7	1	52.2	2.5	x			x				1.5	x						
2A	7	2	53.62	2.5	x			x				2	x						
2B	8	1	56.9	1				x				0							
2B	8	2	58.24	1	x							0							
2B	9	1	58.9	2	x	x		x				1							
2B	9	2	59.96	1.5	x							0.5							
2B	10	1	61.7	1	x							0.5			x				x
2B	10	2	63.12	1.5	x							0							
2B	10	3	64.5	1	x							0.5			x			x	
2B	10	4	66	1.5	x					x		0							
2B	11	1	66.2	1.5	x					x		0							
2B	11	2	67.65	1.5	x					x		0							
2B	11	3	68.93	1.5	x					x		0							
2B	11	4	70.05	1.5	x					x		0							
2B	12	1	71.3	2	x							1			x			x	
2B	12	2	72.74	1.5	x			x				1			x			x	
2B	12	3	74.24	1				x			x	0							
2B	13	1	76.1	1.5				x			x	0.5			x			x	
2B	13	2	77.12	1.5				x				0.5			x			x	
2B	13	3	78.52	2	x			x			x	0							
2B	13	4	79.85	2.5	x					x		0						x	x
2B	14	1	81	1				x				1			x			x	
2B	14	2	82.5	1	x							1.5			x			x	
2B	14	3	84	1	x							1.5			x			x	
4	15	1	90.7	1	x							1			x			x	x
4	15	2	92.12	1	x							1			x			x	x
4	15	3	93.55	1.5						x	x	1.5					x	x	
4	16	1	95	1	x		x	x				1.5			x				
4	16	2	96.24	1	x			x				1			x			x	
4	16	3	97.68	1.5	x							1			x			x	
4	16	4	99.18	1.5	x							1			x				
4	17	1	100.3	1.5	x					x		2			x		x		
5A	17	2	101.8	3	x					x		1							
5A	18	1	103.8	3	x							1					x	x	
5A	18	2	105.3	1.5	x			x				1			x			x	
5A	18	3	105.99	1.5	x			x		x		2			x			x	x
5A	18	4	107.12	1.5	x			x				2			x			x	
5A	18	5	108.01	1.5				x				2			x			x	
5A	19	1	109.9	2	x			x				2			x			x	
5A	19	2	111.3	2	x			x				2			x			x	
5A	19	3	112.55	2	x			x				2			x			x	
5A	19	4	114.05	2	x			x				2			x			x	
8A	20	1	119.6	1.5	x						x	1			x			x	
8A	20	2	121.1	1.5	x						x	1			x			x	
8A	20	3	122.34	1.5	x						x	1						x	
8A	20	4	123.8	1.5	x						x	1			x			x	
8A	20	5	125.13	1.5	x						x	1			x			x	
8A	20	6	126.57	1								1			x			x	
8A	20	7	127.83	1.5	x						x	0.5			x			x	x
8A	21	1	129.2	1.5	x							2					x	x	
9	21	2	130.67	2	x							0.5			x				
9	21	3	132.12	2	x							2					x		
9	22	1	132.9	2	x			x		x		3					x		
9	22	2	134.4	2.5	x			x				3			x			x	x
10	23	1	138.9	2	x							2							

Hole 1205A **Alteration Log**

Unit	Core	Section	Section Top (mbsf)	Alteration Degree	FeOx	CaCO3	Brn C	Sap Nontronite	Py	Cel	Zeol	Vesicularity	CaCO3	Brn C	GC	Py	DKGC	Zeol	FeOx
10	23	2	140.4	2.5	x							1.5							
10	23	3	141.5	2	x							2			x			x	
10	23	4	142.93	2	x							2			x		x	x	x
10	23	5	144.43	3	x			x				2			x			x	
10	23	6	145.84	2.5	x			x				3			x			x	
10	24	1	148.5	1.5				x		x		2			x			x	
10	24	2	150	2	x					x		2.5			x		x	x	x
10	24	3	151.5	2	x			x				2.5			x			x	
10	24	4	153	1	x							1.5			x				
10	24	5	154.38	1.5	x			x				1.5					x		
10	25	1	158	1	x			x				1.5			x				
10	25	2	159.24	2.5	x		x					1.5			x				
11B	26	1	167.7	2	x							2					x		
11B	26	2	169.2	2						x		1					x	x	
12B	26	3	170.67	3	x					x		2.5					x	x	
12B	26	4	172.17	2.5	x							1					x		
12B	27	1	177.3	2.5	x							2					x	x	
12B	27	2	178.58	2.5	x					x	x	1.5			x		x	x	
12B	27	3	180.08	2	x					x	x	1.5					x	x	
12B	27	4	181.58	2	x					x	x	0.5					x	x	
12B	27	5	183.08	2	x					x	x	0.5						x	
12B	27	6	184.42	2	x					x	x	0.5					x	x	
13B	28	1	186.9	2	x							0.5					x	x	
13B	28	2	188.34	2	x			x			x	1			x			x	
13B	28	3	189.65	1.5	x			x			x	1			x			x	
13B	28	4	190.8	2.5	x			x				1.5			x			x	
13B	29	1	196.5	2	x							1.5					x	x	
13B	29	2	198	1.5	x					x		1.5					x	x	
13B	29	3	198.91	2	x							1						x	
15B	29	4	200.13	2.5	x							1						x	x
16	30	1	206.1	2	x							1.5					x	x	
16	30	2	207.55	2	x					x	x	2.5						x	
16	30	3	208.98	1.5	x			x			x	2			x			x	x
16	30	4	210.06	1.5	x						x	2			x			x	
16	31	1	215.8	1						x		0.5			x				
16	32	1	217.5	1						x		1						x	
16	32	2	218.8	1	x					x		1			x			x	
17	32	3	220.3	3	x		x				x	1			x			x	
17	32	4	221.71	2.5	x			x		x		2			x		x	x	x
17	32	5	222.94	2	x						x	2							
17	33	1	225.4	2								1					x	x	
17	33	2	225.91	2	x							1					x	x	
17	33	3	227.41	2.5						x		2					x	x	
18B	33	4	228.91	3	x						x	3					x	x	x
18B	34	1	235	2.5	x		x			x		2			x		x	x	x
18B	34	2	236.34	2.5	x					x		2.5			x		x	x	x
18B	34	3	237.5	2.5	x					x	x	2.5					x	x	x
18B	34	4	238.95	3	x					x		2					x	x	x
18B	34	5	240.39	3	x					x		2					x	x	x
18B	35	1	244.6	2	x							1			x			x	
19B	35	2	245.85	3	x					x		1.5			x			x	
19B	35	3	246.58	3.5	x			x		x		0							
19B	35	4	247.94	3	x			x		x		0							
19C	35	5	249.25	5	x						x	1							
19C	36	1	254.3	5	x						x	1							
20	36	2	255.1	2	x						x	2			x			x	
20	36	3	256.3	2	x							2			x			x	
20	36	4	257.59	1.5	x					x		2					x	x	
20	36	5	259.09	1						x		2					x	x	

1205A **Alteration Log**

Unit	Core	Section	Section Top (mbsf)	Alteration Degree	FeOx	CaCO3	Brn C	Sap Nontronite	Py	Cel	Zeol	Vesicularity	CaCO3	Brn C	GC	Py	DKGC	Zeol	FeOx
20	36	6	260.59	1.5				x				1						x	
20	36	7	262.09	1				x				1			x		x	x	x
20	37	1	264	1				x				1			x			x	
20	37	2	265.5	1				x		x	x	2					x	x	x
21	37	3	266.64	2	x					x		1							
21	37	4	268.14	1.5	x							2			x			x	x
21	37	5	269.64	1				x				1					x	x	x
22	38	1	273.6	1						x		0							
22	39	1	274.6	1	x							0.5			x				
22	40	1	275.6	2	x							0.5					x		
22	40	2	276.8	2	x							1					x		
24A	41	1	283.2	2						x		1					x		x
24A	41	2	283.82	2						x		1					x	x	
24A	41	3	284.84	1.5						x		1			x			x	
26A	41	4	286.34	2	x			x			x	0.5			x			x	
26B	41	5	287.58	1.5	x			x			x	0.5			x			x	
26B	42	1	292.8	3	x		x				x	0.5						x	
27	42	2	294.3	2	x		x				x	1.5			x				
27	42	3	295.74	1.5							x	1.5			x			x	
27	42	4	296.84	1.5	x			x			x	1			x			x	
27	43	1	302.5	1.5	x			x			x	1			x			x	
27	43	2	303.3	1.5	x			x			x	1			x			x	
27	43	3	304.44	1.5	x			x			x	0.5			x			x	
28A	43	4	305.63	2.5	x			x				1			x			x	
28A	44	1	312.2	2	x						x	1			x			x	
28B	44	2	313.2	3	x						x	1							
30B	44	3	314.7	2	x		x				x	1							
30B	45	1	321.5	2.5	x			x				1.5							
30B	45	2	322.94	2						x	x	0							

1205A **Vein Log**

Identifiers				Position		Vein						Halo				
				Section	Section	Top	Bot	Width	App.	Mineralogy	Proportions	Color	Width	Mineralogy	Proportions	
Unit	Core	Sec	Piece	Top	Bottom	(cm)	(cm)	(mm)	Orient.		(%)		(mm)		(%)	
			#	(mbsf)	(mbsf)											Comments
1	6R	1	5a	42.7	43.2	50	56	2	i	BrnC-FeOx	50-50					
1	6R	2	3	43.8	44.2	40	56	1-2	i	GC-BrnC-FeOX	10-40-50					
1	6R	2	5	43.8	44.76	96	101	2	i	FeOx+/-CaCO3	90-10					
3B	10R	2	2	63.12	63.3	18	21	1	i	FeOx	100					Pervasive FeOx alteration
3B	10R	2	5b	63.12	64.32	120	121	2	sh	Black oxide	100	Lbrn	2	FeOx	100	
3B	10R	3	6b	64.5	65.72	122	123	0.5	i	Dk GC-FeOx	80-20	Lbrn	2	FeOx	100	
3B	11R	1	1b	66.2	66.3	10	18	2	i	Dk GC-FeOx	80-20	Lbrn	5	FeOx	100	
3B	11R	1	1b	66.2	66.4	20	26	1	i	Dk GC-FeOx-CaCO3	80-10-10	Lbrn	3	FeOx	100	
3B	11R	2	7	67.65	68.19	54	56	2	sh	Dk GC-FeOx	90-10	Lbrn	2	FeOx	100	
3B	11R	4	2ab	70.05	70.81	76	90	0.5	i	Dk GC	100					Several small thin veins (<0.5 mm)
3B	12R	1	2b	71.3	71.52	22	27	1	i	GC+/-FeOx	98-2					
3B	12R	1	4bc	71.3	72.37	107	134	1-2	i	CaCO3-GC-FeOx	10-70-20	Lbrn	2	FeOx	100	Pervasive FeOx alteration around vein
3B	13R	2	1bc	77.12	77.22	10	13		i	GC	100					Border of piece
3B	13R	2	1de	77.12	77.64	52	53		sh	GC	100					Border of piece
3B	14R	2	8	82.5	83.24	74	79	0.8	sv	FeOx-Geothite-GC	50-30-20	Lbrn	2			
3B	14R	3	9	84	84.8	80	90	1-2	sh	CaCO3-GC	50-50					
5B	15R	1	10b	90.7	92	130	135	0.5	i	CaCO3-GC-FeOx	30-30-30	Lbrn				
5B	16R	4	4ad	99.18	99.61	43	74	2-3	sv	GC	100					
5B	17R	1	10-11	100.3	101.7	140	150	2-8	i	Cel	100					With vesicle
5B	17R	1	5	100.3	101.41	111	113	2	sh	FeOx-GC	10-90					
6	19R	2	2	111.3	111.64	34	35	2	sh	Zeol-GC	70-30					
8A	19R	4	10-11	114.05	114.93	88	92	1-3	i	CaCO3-GC-FeOx	90-5-5					
8A	19R	4	3b	114.05	114.41	36	40	0.5	i	Zeol-GC-FeOX	10-80-10					
8A	20R	2	1b	121.1	121.17	7	8	2	sh	GC	100					
8A	20R	7	1b	127.83	127.94	11	12	1	sh	GC	100					Others very thin veins
8A	21R	1	2	129.2	129.8	60	61	0.2	sh	GC-Zeol	50-50					
10	23R	5	2	144.43	144.59	16	18	0.5	i	GC	100					Some pervasive FeOx alteration
10	25R	2	14bc	159.24	160.48	124	132	0.2	i	GC	100					
11B	26R	1	1b	167.7	167.9	20	32	0.2	i	GC-Zeol	50-50					
12B	27R	2	5	178.58	178.77	19	20	0.5	sh	FeOx-Zeol	70-30					
12B	27R	2	1	178.58	178.59	1	26	0.5	sv	Zeol-GC	20-80					
12B	27R	4	2	181.58	181.84	26	36	0.5	sv	Zeol-GC	20-80					
12B	27R	4	7	181.58	182.08	50	52	0.2	sh	Zeol	100					Partial filling only
12B	27R	4	7	181.58	182.42	84	85	1	sh	Zeol	100					
12B	27R	5	1	183.08	183.2	12	14	1	sh	Zeol-GC	40-60					
13B	28R	2	3ab	188.34	188.87	53	55	1-2	sh	Zeol	100					
14B	29R	3	2bc	198.91	199.41	50	58	1	sv	GC-FeOx-Zeol	30-40-30					
15B	29R	4	3	200.13	200.7	57	59	2	sh	FeOx-GC-Zeol	20-70-10					
15B	29R	4	3	200.13	200.77	64	65	2	sh	FeOx-GC-Zeol	20-70-10					
16	32R	1	1ab	217.5	217.57	7	9	3-4	sh	Zeol	100					
16	32R	1	1bc	217.5	218.14	64	113	2	sv	Zeol	100					
16	32R	2	1bc	218.8	219.35	55	106	2-4	i	Zeol	100					
16	32R	3	15	220.3	221.56	126	128	2	sh	BrnC-FeOx	50-50					
17	33R	2	1	225.91	225.95	4	14	0.5	sh	Zeol-black oxide	20-80					Several thin veins/fractures
17	33R	2	2	225.91	227.07	116	130	1-2	i	Zeol-GC-FeOX	60-20-20					
17	33R	3	1bcd	227.41	227.73	32	36	2	i	Zeol-GC	70-30					
17	33R	3	1c	227.41	227.72	31	58	1	sv	Zeol-GC-black oxide	30-30-30					
18B	34R	3	1c	237.5	237.67	17	26	5	i	Zeol-GC-BrnC	70-20-10					
18B	34R	3	9	237.5	238.25	75	76	2	sh	Zeol-GC-BrnC	80-10-10					
18B	34R	4	3	238.95	239.43	48	49	1	sh	Zeol-GC	90-10					
18B	34R	4	6	238.95	239.9	95	98	2	sh	Zeol-Geothite-GC	80-10-10					
19B	35R	3	1fg	246.58	247.02	44	46	2	sh	Zeol-G caly	50-50					
19B	35R	3	1gh	246.58	247.48	90	94	3	sh	Zeol	100					
19B	35R	3	1gh	246.58	247.12	54	84	0.5	i	Zeol	100					
19B	35R	4	1ab	247.94	248.28	34	36	10	sh	Zeol-GC	80-20					
19C	36R	1	4	254.3	254.68	38	40	-	sh	Gypse	100					

1205A **Vein Log**

Identifiers				Position		Vein						Halo				
				Section	Section	Top	Bot	Width	App.	Mineralogy	Proportions	Color	Width	Mineralogy	Proportions	
Unit	Core	Sec	Piece	Top	Bottom	(cm)	(cm)	(mm)	Orient.		(%)		(mm)		(%)	
			#	(mbsf)	(mbsf)											Comments
19C	36R	1	2ab	254.3	254.73	43	53	0.5	i	Zeol-GC	50-50					
20	36R	3	1bc	256.3	257.2	90	93	2	sh	Zeol	100					
20	36R	3	1ab	256.3	256.84	54	56	3	sh	GC	100					
20	36R	4	1c	257.59	258.02	43	44	2	sh	Zeol-GC-FeOx	40-50-10					
20	36R	5	2c	259.09	260.43	134	136	1	sh	Zeol	100					
20	36R	7	1ab	262.09	262.1	1	3	10	sh	Zeol	100					
24A	41R	1	1	283.2	283.2	0	14	0.5	i	Zeol-FeOx/BrnC	30-70					
27	42R	4	1c	296.84	297.17	33	54	1	sh	Zeol	100	Dk G	2			
27	43R	2	1b	303.3	303.61	31	32	0.5	sh	Zeol	100					
28A	44R	1	3	312.2	312.34	14	32	1	i	GC	100	Dk G	2-5			
28A	44R	1	4-5	312.2	312.57	37	99	0.5	i	GC	100	Lbrn	2-15	FeOX		
28A	44R	2	1b	313.2	313.74	54	60	1-2	sh	GC-celadonite-FeOX	60-30-10	Lbrn	15	FeOX		