





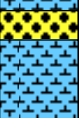

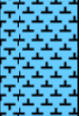

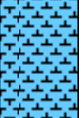


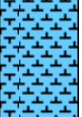

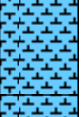

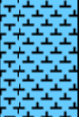

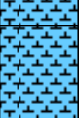

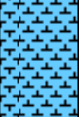





Core Photo

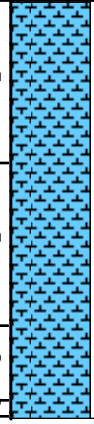

Site 1136 Hole A Core 2R						Cored 4.7-14.4 mbsf		
METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
1							SS	<p>FORAMINIFER-BEARING NANNOFOSSIL OOZE</p> <p>Age: early to middle Eocene</p> <p>General Description: This core is white (N9) FORAMINIFER-BEARING NANNOFOSSIL OOZE with variable amounts of sand and pebbles, which are ice-rafted dropstones. Well rounded coarse sand and pebbles of variable lithology occur in Section 1, 0-44 cm. A large gabbro pebble (6x4x4 cm) occurs at the base of this gravel interval. A second interval of sand and pebbles occurs in Section 1, 95-118 cm, and includes a 4-cm long piece of granite. The sand and pebbles appear to have been concentrated into gravel by drilling disturbance and are drilling slurry. The foram-bearing nannofossil ooze ranges from highly soupy drilling disturbance to undisturbed sections. In sections 2-5, the fossil ooze also contains sand and gravel in the soupy sections. Undisturbed intervals appear to be: Section 1, 44-95 cm; Section 2, 0-44 cm; Section 6, 24-55 and 100-150 cm; Section 7, 0-50 cm; CC, 0-7 cm.</p>
1							SS	
2								
3								
4								
5								
6								
7								
8								
9								
10								

1136A-1R NO RECOVERY

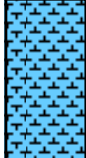

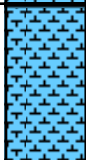

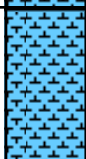
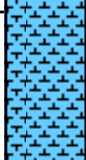
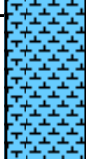
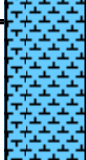


Core Photo

Site 1136 Hole A Core 3R							Cored 14.4-23.9 mbsf	
METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
1								<p>FORAMINIFER-BEARING NANNOFOSSIL OOZE</p> <p>Age: early to middle Eocene</p> <p>General Description: This core consists of white (N9) FORAMINIFER-BEARING NANNOFOSSIL OOZE. Some intervals are soupy and highly disturbed by drilling. Undisturbed intervals are: Section 1, 0-150; Section 2, 0-35 cm; Section 3, 100-150; Section 4, 0-130; Section 5, 0-100; Section 6, 75-115, CC, 0-7.</p>
1.1								
2								
2.1								
3								
3.1								
4								
4.1								
5								
5.1								
6								
6.1								
7								
7.1								
8								
8.1								

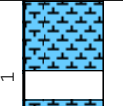

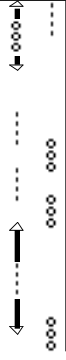
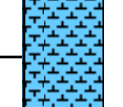
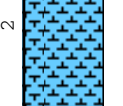

Core Photo

Site 1136 Hole A Core 4R						Cored 23.9-33.4 mbsf		
METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
1								<p>NANNOFOSSIL OOZE</p> <p>Age: early to middle Eocene</p> <p>General Description: This core consists of white NANNOFOSSIL OOZE with <10% foraminifers. A 2-cm diameter granite pebble occurs at the top of the core and probably fell down the hole during drilling.</p>
1-1						SS		
2						SS		
3						PAL		

Core Photo



























Site 1136 Hole A Core 6R						Cored 42.8-52.1 mbsf		
METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
1	1					SS	<p>FORAMINIFER-BEARING NANNOFOSSIL OOZE</p> <p>Age: early to middle Eocene</p> <p>General Description: This core consists of white FORAMINIFER-BEARING NANNOFOSSIL OOZE. A 3cm x 2cm x 1cm rounded pebble of pyritic gabbro occurs in Section 1, 5cm and is an ice-rafted pebble that probably fell downhole during drilling. A few angular fragments of CHERT are also scattered in the core in: Section 2, 107 cm (yellow, 1 cm diameter); Section 6, 6 cm (gray, 1cm x 2cm); Section 6, 37 cm (several granules); and Core Catcher, 2 cm (yellow, 1 cm).</p>
2	2						
3	3						
4	4					SS	
5	5						
6	6						
7	7					PAL	

Core Photo

Site 1136 Hole A Core 7R							Cored 52.1-60.9 mbsf	
METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
1								FORAMINIFER-BEARING NANNOFOSSIL OOZE Age: early to middle Eocene General Description: This core consists of white FORAMINIFER-BEARING NANNOFOSSIL OOZE. Pieces of light brown CHERT occur in Section 1 at 0-8 cm and 31 cm and have apparently fallen downhole during drilling .
1								
2								
3							SS PAL	

1136A-8R NO RECOVERY

Core Photo

Site 1136 Hole A Core 9R						Cored 70.3-79.9 mbsf		
METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
1								FORAMINIFER-BEARING CALCAREOUS OOZE
1								Age: middle Campanian
2							SS	General Description: This core consists of very light brown FORAMINIFER-BEARING CALCAREOUS OOZE. Rare silt-sized palagonitized glass shards are disseminated throughout. Some core intervals are partially lithified to chalk. Fibrous plates of calcite (<0.5 cm thick and <1 cm wide) are present in Section 6, 60 cm. A gabbro pebble is present at the top of the core and probably fell downhole during drilling.
2								
3								
4								
4							SS	
5								
5							SS	
6								
6							SS	
7								
7							PAL	

Core Photo

Site 1136 Hole A Core 10R							Cored 79.9-89.5 mbsf	
METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
1 1							SS	<p>BROWN ZEOLITIC CALCAREOUS VOLCANIC CLAYEY SAND</p> <p>Age: middle to late Albian</p> <p>General Description: This core consists of BROWN ZEOLITIC CALCAREOUS VOLCANIC CLAYEY SAND. Dropstone pebbles and a belemnite occur at core top (Section 1, 0-3 cm). The sand grades from coarse (Section 1, 0-25 cm) downward to medium sand (Section 1, 25-87 cm), and is subangular to subrounded and well-sorted. Four pebbles of oxidized massive basalt occur in Section 1, 30, 47, 75, and 80 cm. Brown BRECCIA comprises Section 1, 87-92 cm, and has pebbles up to 1 cm diameter.</p>




Core Photo

Site 1136 Hole A Core 11R							Cored 89.5-99.2 mbsf	
MEETERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
						XX	PAL	<p>CARBONATE-BEARING ZEOLITIC SILTY CLAY</p> <p>Age: middle to late Albian</p> <p>General Description: This core consists of dark greenish gray CARBONATE-BEARING ZEOLITIC SILTY CLAY. The core is fragmented by drilling. A granitic dropstone pebble occurs at the top of the core and probably dropped down hole during drilling.</p>

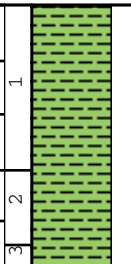

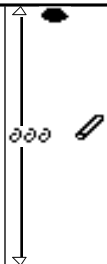

Core Photo

Site 1136 Hole A Core 12R							Cored 99.2-108.8 mbsf	
METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
2 1							SS PAL	<p>CARBONATE-BEARING ZEOLITIC SILTY CLAY</p> <p>Age: middle to late Albian</p> <p>General Description: This core consists of dark greenish gray CARBONATE-BEARING ZEOLITIC SILTY CLAY. A Bryozoan is present in Section 1, 15 cm. A green celadonite? bleb 1 cm in diameter occurs in Section 1, 7cm. Two light gray lithified sandstone pebbles occur in Section CC, 7-16 cm and appear to be ice-rafted dropstones emplaced by drilling disturbance.</p>

Core Photo

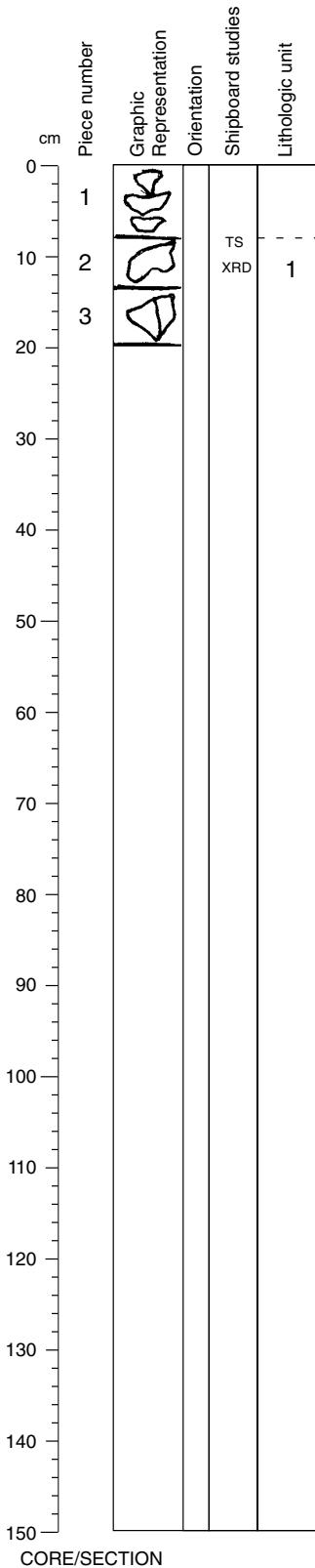
Site 1136 Hole A Core 13R							Cored 108.8-118.4 mbsf	
METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
							PAL	<p>CARBONATE-BEARING ZEOLITIC SILTY CLAY</p> <p>Age: middle to late Albian</p> <p>General Description: This core consists of dark greenish gray CARBONATE-BEARING ZEOLITIC SILTY CLAY. Moderately bioturbated. Some green mineral stains (celadonite?) and shell fragments are scattered throughout the core.</p>

Core Photo

Site 1136 Hole A Core 14R							Cored 118.4-128 mbsf	
METERS	SECTION	GRAPHIC LITH.	BIOTURB.	STRUCTURE	ACCESSORIES	DISTURB.	SAMPLE	DESCRIPTION
1 1 2 3								<p>CARBONATE-BEARING ZEOLITIC SILTY CLAY</p> <p>Age: middle to late Albian</p> <p>General Description: This core consists of dark greenish gray CARBONATE-BEARING ZEOLITIC SILTY CLAY with common shell fragments. Moderately bioturbated. Green celadonite is present at contacts with sandier portions. Celadonite is also present in surrounding burrows. Benthic foraminifers occur along with a bryozoan at in Section CC, 10 cm.</p>

Core Photo

183-1136A-15R-1 Section top: 128.00 (mbsf)



UNIT 1: MODERATELY PLAGIOCLASE-OLIVINE-PHYRIC BASALT

Pieces: 2-3 (Piece 1 is sedimentary)

CONTACTS: None recovered; inferred to be above Piece 2

	% Mode	Grain Size (mm):		Shape/Habit
		Max	Avg.	
Plagioclase:	5-102	0.2	0.5	Tabular euhedral
Olivine:	<1	0.2	0.3	Equant euhedral

GROUNDMASS: Fine grained

VESICLES: Sparse

COLOR: Medium greenish gray

STRUCTURE: Massive

ALTERATION: Moderate

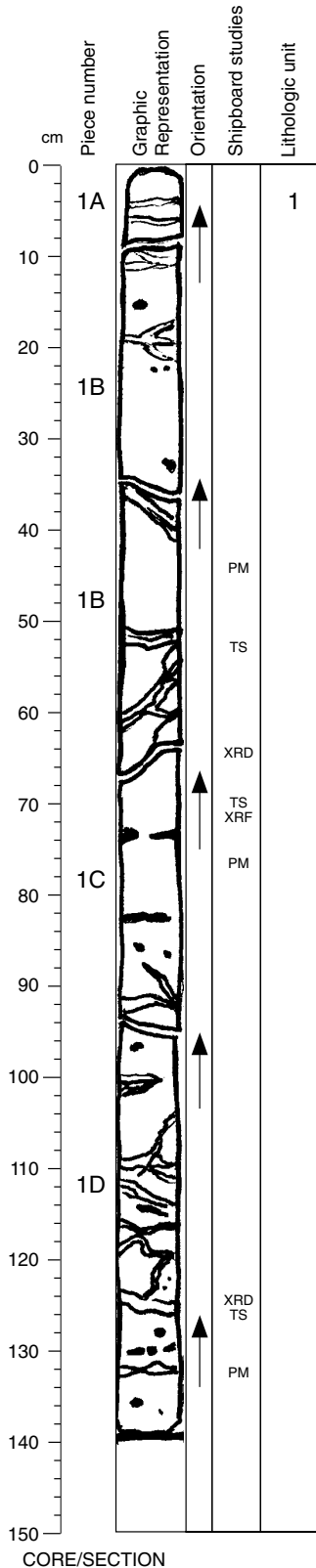
VEINS/FRACTURES: One vein filled with pale green clay

COMMENTS: Piece 1 is a dark, greenish gray zeolite-bearing sandstone similar to that in Core 14R.

Core Photo

183-1136A-15R-2

Section top: 128.20 (mbsf)



UNIT 1: MODERATELY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces: 1

CONTACTS: None

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit
	Mode	Max	Min	
Plagioclase:	5-10	4	2	Euhedral laths
Olivine:	1-2	2	0.3	Euhedral equant
Clinopyroxene:	1-4	2	0.8	Subhedral to anhedral

GROUNDMASS: Fine grained

COLOR: Medium grayish green to medium gray

VESICLES: Sparse to moderate; filled with dark green clay and calcite.

STRUCTURE: Massive. Breccia band at 111 cm consists of angular, dark green fragments in carbonate matrix. Faint, subhorizontal (10° dip) foliation defined by preferred orientation of wispy black streaks in matrix. Two-cm-wide subhorizontal vesicle sheet at 130 cm.

ALTERATION: High from 0-110 cm, moderate from 110-140 cm

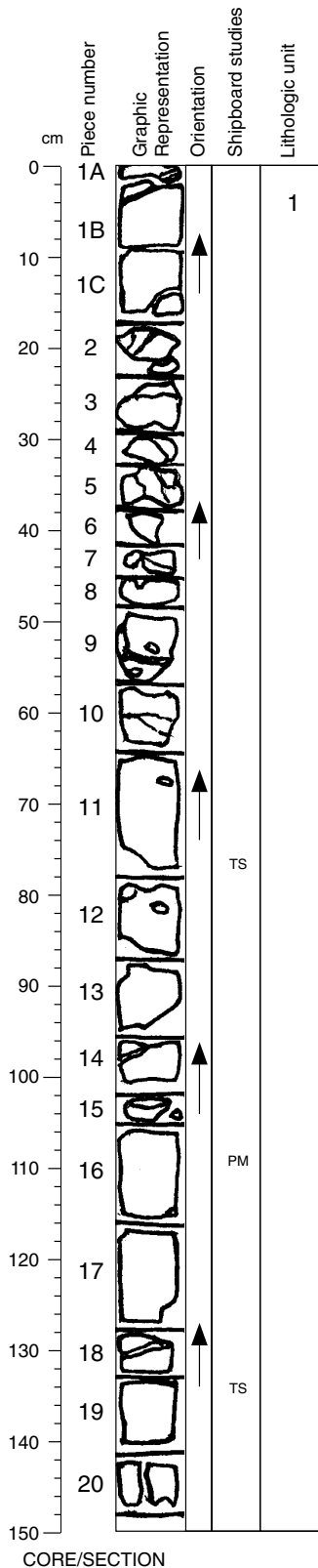
VEINS/FRACTURES: Subhorizontal to subvertical veins <1 to 15 mm wide, filled with carbonate and/or dark green clay

COMMENTS: Sparse 1-5 mm patches of plagioclase and a dark green clay are present in Piece 1D (altered megacrysts?). There is a region of high magnetic susceptibility (measured on the AMST [archive magnetic susceptibility track]) near the vein and filled vesicle zone on Piece 1D at ~129 cm.

Core Photo

183-1136A-15R-3

Section top: 129.59 (mbsf)



UNIT 1: MODERATELY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces: 1-20

CONTACTS: None

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit
	Mode	Max	Avg.	
Plagioclase:	5-10	4	2	Laths (larger, green; some glomerocrysts) and anhedral small, white)
Olivine:	<1	2	1	Euhedral, fractured; altered rims and fractures
Clinopyroxene:	2-3	1	0.5	Anhedral (some could be Fe-Ti oxides)

GROUNDMASS: Fine grained

VESICLES: Sparse; most lined with green gray and filled with calcite.

COLOR: Gray

STRUCTURE: Massive

ALTERATION: Slight

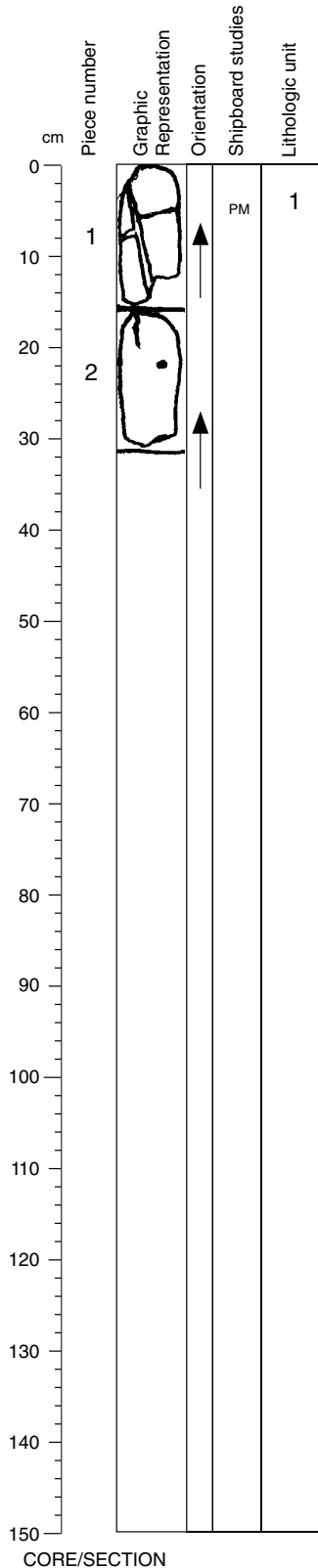
VEINS/FRACTURES: Numerous subhorizontal and subvertical veins and fractures filled with calcite and green clays.

COMMENTS: Occasional plagioclase megacrysts (glomerocrysts), up to 10 mm. Subvertical vesicle cylinders at 10-17 cm.

Core Photo

183-1136A-15R-4

Section top: 131.06 (mbsf)



UNIT 1: MODERATELY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces: 1, 2

CONTACTS: None

	% Mode	Grain Size (mm):		Avg.	Shape/Habit
		Max	Min		
Plagioclase:	5	3	0.3	1.5	Laths, other euhedral shapes, commonly as glomerocrysts; anhedral microphenocrysts
Olivine:	<1	1	0.25	0.5	Euhedral to subhedral
Clinopyroxene:	2-3	1	0.25	0.5	Anhedral microphenocrysts

GROUNDMASS: Fine grained

VESICLES: Sparse; filled with green clay.

COLOR: Gray

STRUCTURE: Massive

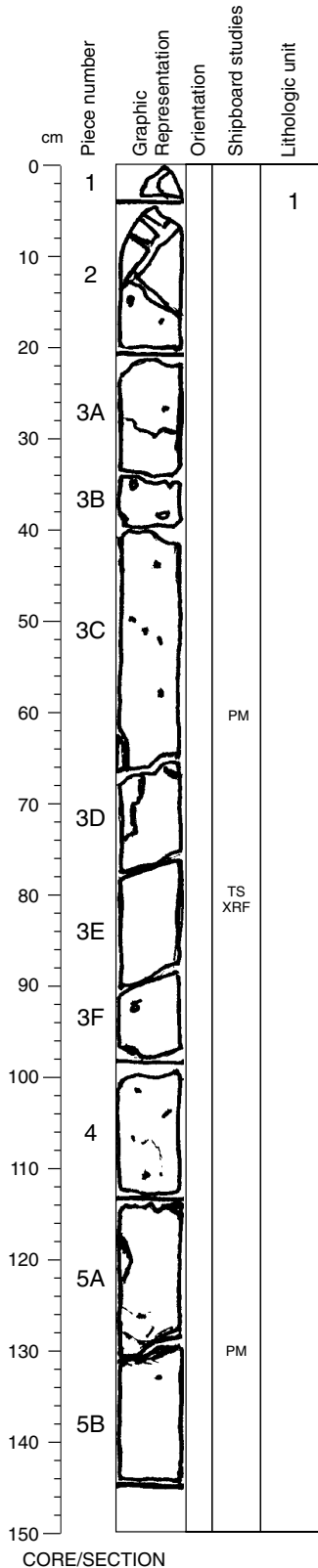
ALTERATION: Slight

VEINS/FRACTURES: Veins up to 3 mm wide; filled with calcite and green clay.

COMMENTS: Piece 1 has a 1-cm plagioclase megacryst, showing alteration typical of plagioclase in this section; plagioclase core is fresh, white to slightly brown, with a 0.1-0.2 mm dark green altered rim. Smallest plagioclase phenocrysts are completely altered to dark green.

Core Photo

183-1136A-16R-1 Section top: 137.60 (mbsf)



UNIT 1: HIGHLY PLAGIOCLASE-CLINOPYROXENE-OLIVINE-PHYRIC BASALT

Pieces: 1-5

CONTACTS: None

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit	
	Mode	Max	Min		Avg.
Plagioclase:	10	10	1	2	Small euhedral and large subhedral laths
Olivine:	<1	0.5	0.2	0.3	Equant subhedral
Clinopyroxene:	2-3	0.5	0.1	0.3	Subhedral to anhedral

GROUNDMASS: Fine grained

VESICLES: Very sparse; filled with calcite and green clay.

COLOR: Medium grayish brown

STRUCTURE: Massive, with major veins at 0-10 cm and 88-90 cm

ALTERATION: Slightly altered

VEINS/FRACTURES: Numerous veins and fractures up to 15 mm wide; filled with calcite and green clay.

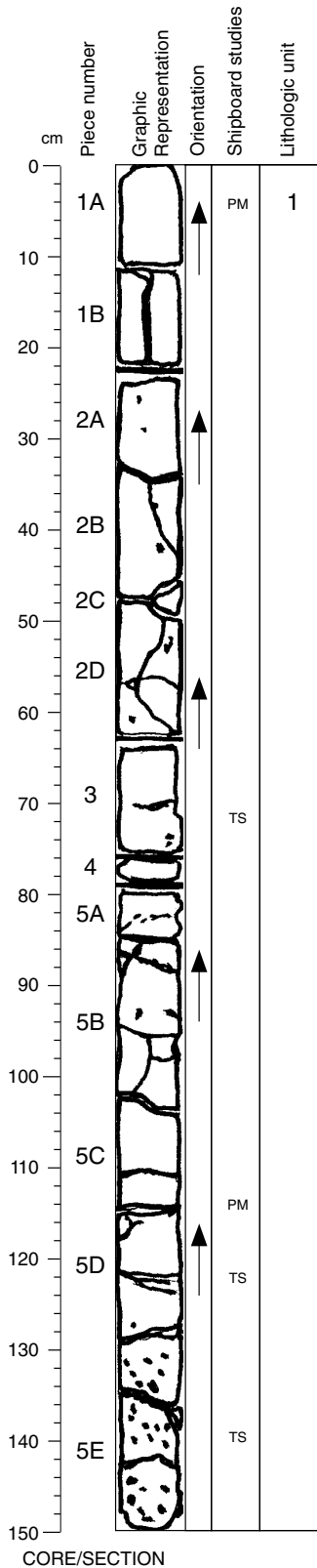
COMMENTS: Olivine grains rimmed and veined by sulfide (?). Two populations of phenocrysts; larger population includes plagioclase (>5 mm) and olivine (>2 mm) that appear to be intergrown.

CORE/SECTION

Core Photo

183-1136A-16R-2

Section top: 139.06 (mbsf)



UNIT 1: MODERATELY PLAGIOCLASE-CLINOPYROXENE-PHYRIC BASALT

Pieces: 1-5

CONTACTS: Not recovered; inferred to be below Piece 5

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit
	Mode	Max	Min	
Plagioclase:	2-103	0.5	1.5	Green laths and asglomerocrysts; also anhedral to subhedral white microphenocrysts
Olivine:	<1	3	0.25	Euhedral to subhedral
Clinopyroxene:	2-3	1	0.25	Anhedral

GROUNDMASS: Fine grained

VESICLES: Nonvesicular except in Piece 5, where vesicle abundance increases downward to 1-2% at base of section. Vesicles are 1-5 mm and filled concentrically with clays and only a trace of calcite.

COLOR: Reddish gray

STRUCTURE: Massive

ALTERATION: Slight at top to moderate at bottom; pink-bronze reflections (in cracks in clinopyroxene?) color the groundmass. Reddish tinge increases down section.

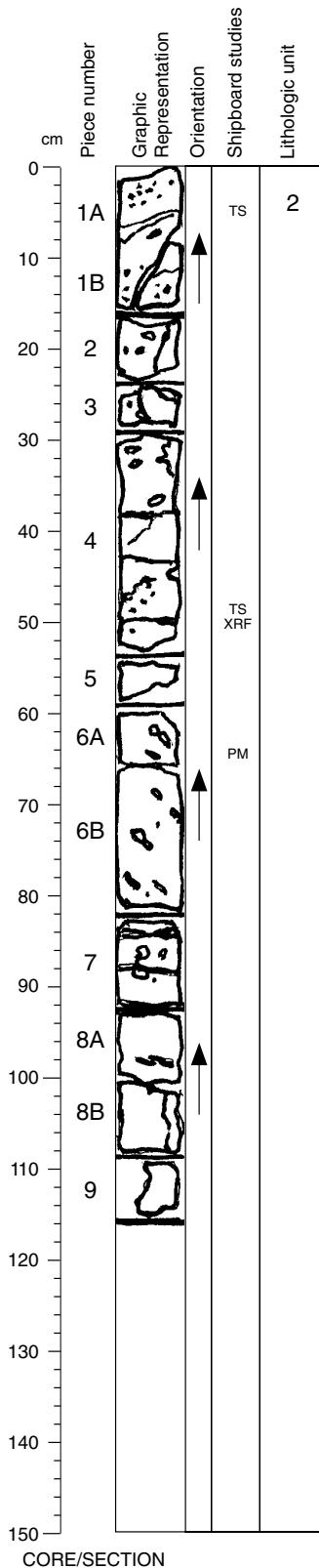
VEINS/FRACTURES: Numerous veins and fractures up to 3 mm wide; filled with clay (lining) and calcite (interior).

COMMENTS:

CORE/SECTION

Core Photo

183-1136A-16R-3 Section top: 140.56 (mbsf)



UNIT 2: SPARSELY PLAGIOCLASE-PHYRIC BASALT

Pieces: 1-9

CONTACTS: Not recovered; inferred to be above Piece 1

	% Mode	Grain Size (mm)		Shape/Habit	
		Max	Min		Avg.
Plagioclase:	1-3	10	1	2	Small euhedral laths; larger rounded subequant grains
Clinopyroxene:	<<1	1	0.3	0.5	Subhedral, equant

GROUNDMASS: Fine grained

VESICLES: <1% to 20%; abundant small (<1 mm) spherical to irregular vesicles at top of unit (1-17 cm); sparse, larger (1 to 3 mm), sub-spherical elsewhere. Vesicles are typically clay-lined and calcite-filled.

COLOR: Medium gray

STRUCTURE: Massive with vesicle trains trending at ~45° in upper half.

ALTERATION: Slight to moderate

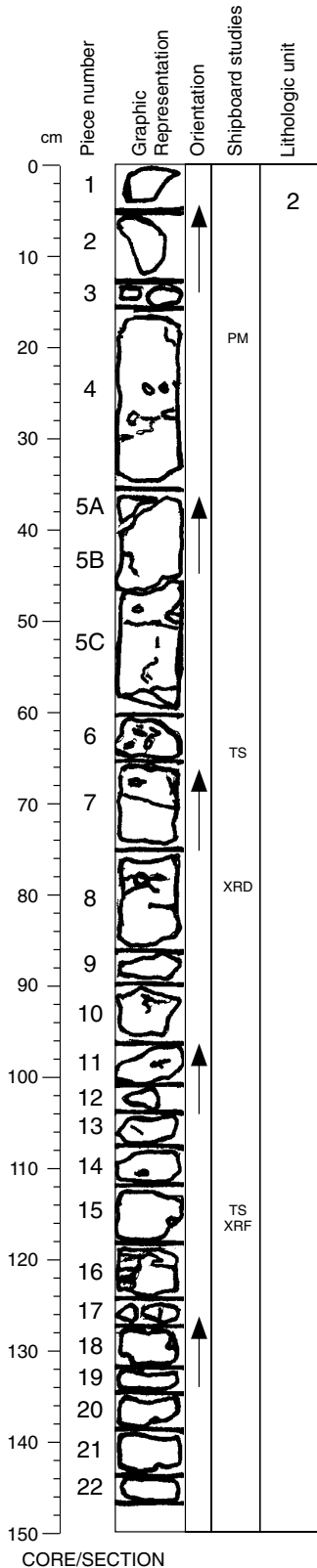
VEINS/FRACTURES: Numerous carbonate or clay-filled veins up to 5 mm wide.

COMMENTS: Piece 1 contains abundant vesicles in very fine-grained groundmass, and clinopyroxene phenocrysts (2-3%).

Core Photo

183-1136A-17R-1

Section top: 143.90 (mbsf)



UNIT 2: MODERATELY PLAGIOCLASE-PHYRIC BASALT

Pieces: 4-22 (For description of Pieces 1-3, see Comments below)

CONTACTS: None

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit	
	Mode	Max	Min		Avg.
Plagioclase:	2-5	5	0.5	1-2	Euhedral laths and larger rounded subequant
Clinopyroxene:	<<1	0.5	0.3	0.4	Subhedral equant

GROUNDMASS: Fine grained

VESICLES: Sparse; large, irregular shapes; filled with clay and carbonate.

COLOR: Medium gray

STRUCTURE: Massive. Oriented glassy wisps define foliation with 30-40° dip. Vesicle-rich patch at 58- 66 cm is surrounded by slightly coarser basalt.

ALTERATION: Slight to moderate

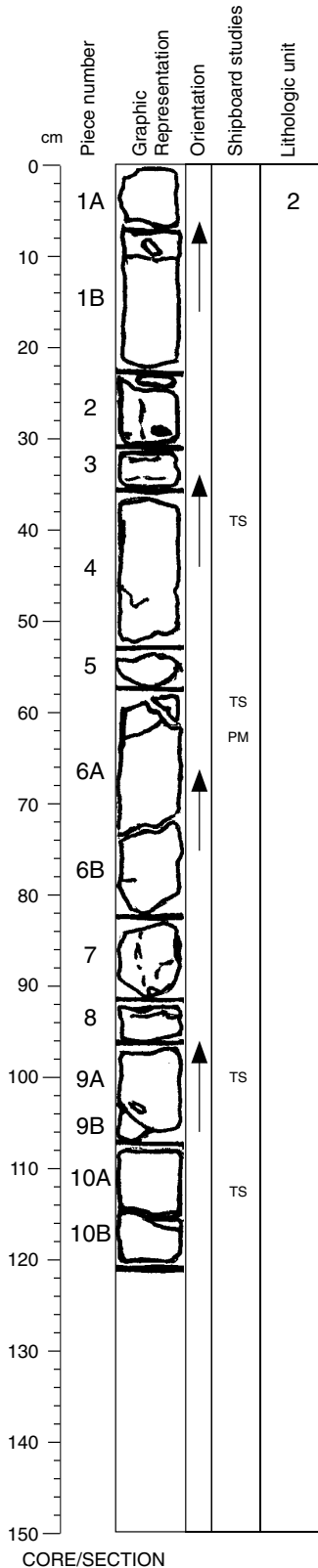
VEINS/FRACTURES: Subhorizontal, carbonate-filled veins have irregular form and orientation; clay-filled veins are 1-10 mm.

COMMENTS: Pieces 1-3 appear to be dropstones (ice-rafted debris) and probably dropped in from higher in the section; all appear to be felsic gneiss.

Core Photo

183-1136A-17R-2

Section top: 145.38 (mbsf)



UNIT 2: MODERATELY PLAGIOCLASE-CLINOPYROXENE-PHYRIC BASALT

Pieces: 1-10

CONTACTS: None

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit	
	Mode	Max	Min		
Plagioclase:	2-103	0.5	1.5	Euhedral to subhedral, green phenocrysts (> 1mm); glomerocrysts (with clinopyroxene); microphenocryst laths (<1 mm)	
Clinopyroxene:	2	1	0.25	0.5	Subhedral to anhedral; associated with plagioclase-rich glomerocrysts

GROUNDMASS: Fine grained

VESICLES: Sparse; filled vesicles are rare and generally 5-7mm in diameter; vesicle fill includes clay and calcite.

COLOR: The core is dark gray and faintly red in patches.

STRUCTURE: Massive

ALTERATION: Slight to moderate. Bands of reddish alteration in the groundmass are present in Pieces 6B-10.

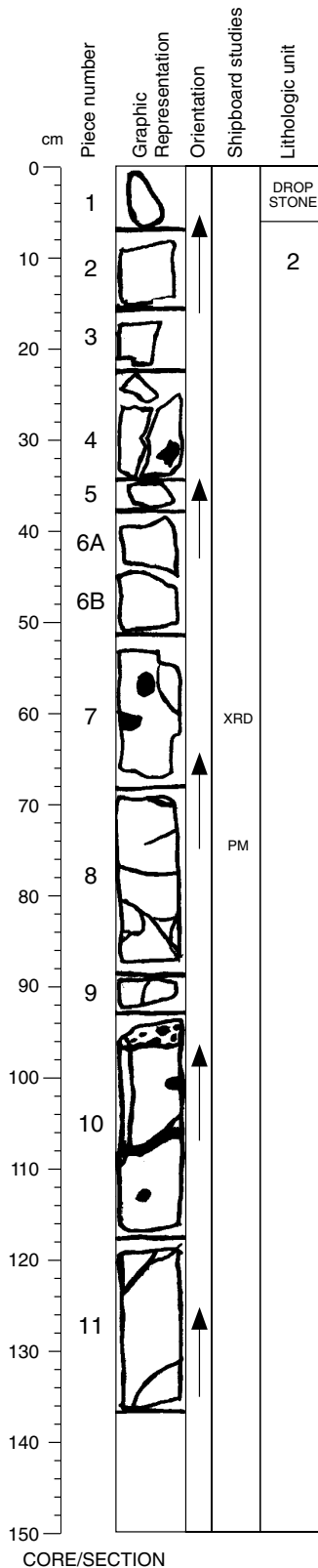
VEINS/FRACTURES: Numerous veins and fractures up to 2 mm wide; filled with green clays and calcite.

COMMENTS: Rare plagioclase megacrysts (≤ 10 mm) are associated with clinopyroxene.

CORE/SECTION

Core Photo

183-1136A-18R-1 Section top: 147.30 (mbsf)



UNIT 2: MODERATELY PLAGIOCLASE-PHYRIC BASALT

Pieces: 2-11 (For description of Piece 1, see Comments below)

CONTACTS: None

	% Mode	Grain Size (mm):		Avg.	Shape/Habit
		Max	Min		
Plagioclase:	2-5	10	1	5	Larger grains are glomerocrysts with clinopyroxene; smaller are euhedral laths
Clinopyroxene:	<1	2	0.5	1	Subhedral (associated with plagioclase-rich glomerocrysts)

GROUNDMASS: Fine grained

VESICLES: Sparse; irregular, rounded, filled with calcite and clays.

COLOR: Medium gray; faintly red in patches (Pieces 3-7).

STRUCTURE: Massive, with a vesicle-rich patch at the top of Piece 10.

ALTERATION: Slight to moderate

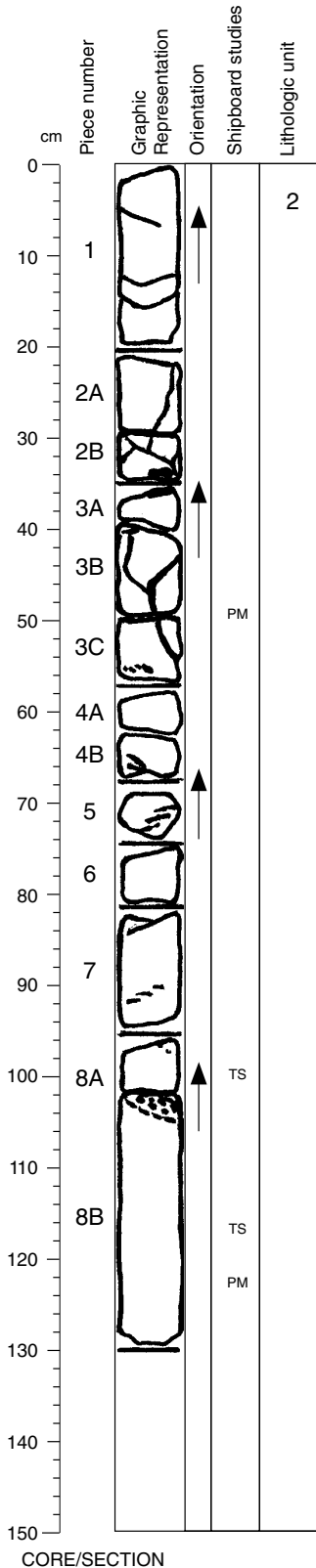
VEINS/FRACTURES: Pieces 8-11 are cut by clay- and calcite-filled veins (1-3 mm thick), oriented perpendicular or parallel to the core.

COMMENTS: Piece 1 appears to be a dropstone (ice-rafted debris) and probably dropped in from higher in the section.

Core Photo

183-1136A-18R-2

Section top: 148.68 (mbsf)



UNIT 2: MODERATELY PLAGIOCLASE-PHYRIC BASALT

Pieces: 1-8

CONTACTS: None

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit
	Mode	Max	Min	
Plagioclase:	2-10	2	1	Euhedral laths and in glomerocrysts with clinopyroxene
Clinopyroxene:	<1	1	0.5	Subhedral (associated with plagioclase-rich glomerocrysts)

GROUNDMASS: Fine grained

VESICLES: Sparse; vesicles filled with calcite and green clay.

COLOR: Medium gray

STRUCTURE: Massive, with a vesicle-rich patch at the top of Piece 8B.

ALTERATION: Slight to moderate

VEINS/FRACTURES: Rare, large (2 mm wide) fractures filled with dark green clays and narrow (<0.5 mm) veins filled with calcite.

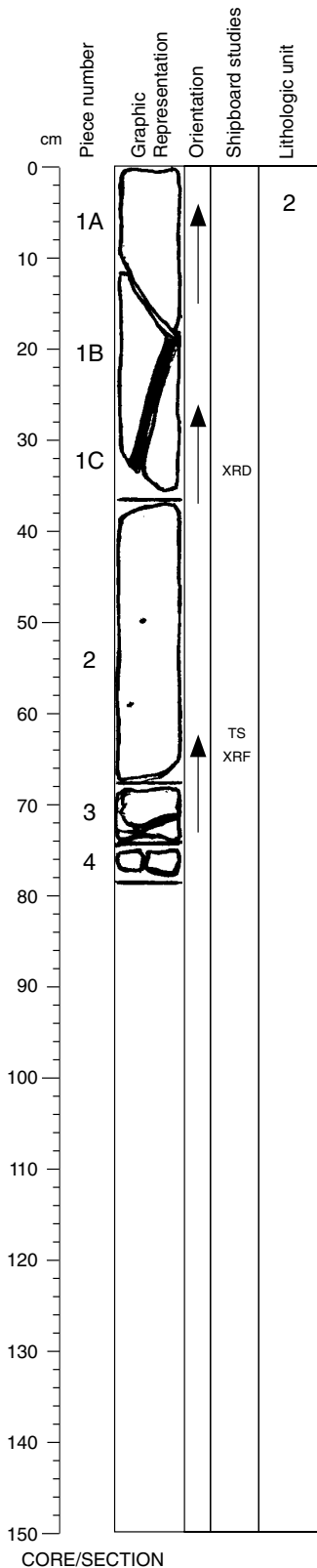
COMMENTS: Vesicle sheets have provided a path for fluids moving through the rock to replace groundmass pyroxene with clays, whereas massive portions are generally much less altered.

CORE/SECTION

Core Photo

183-1136A-18R-3

Section top: 149.98 (mbsf)



UNIT 2: MODERATELY PLAGIOCLASE-PHYRIC BASALT

Pieces: 1-4

CONTACTS: None

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit	
	Mode	Max	Min		Avg.
Plagioclase:	2-10	2	1	1.5	Euhedral laths and glomerocrysts with clinopyroxene
Clinopyroxene:	<1	1	0.5	0.5	Subhedral (associated with plagioclase-rich glomerocrysts)

GROUNDMASS: Fine grained

VESICLES: Sparse, irregular; filled with green clay.

COLOR: Medium gray, slightly green in the most altered areas

STRUCTURE: Massive

ALTERATION: Slight to moderate (especially close to veins)

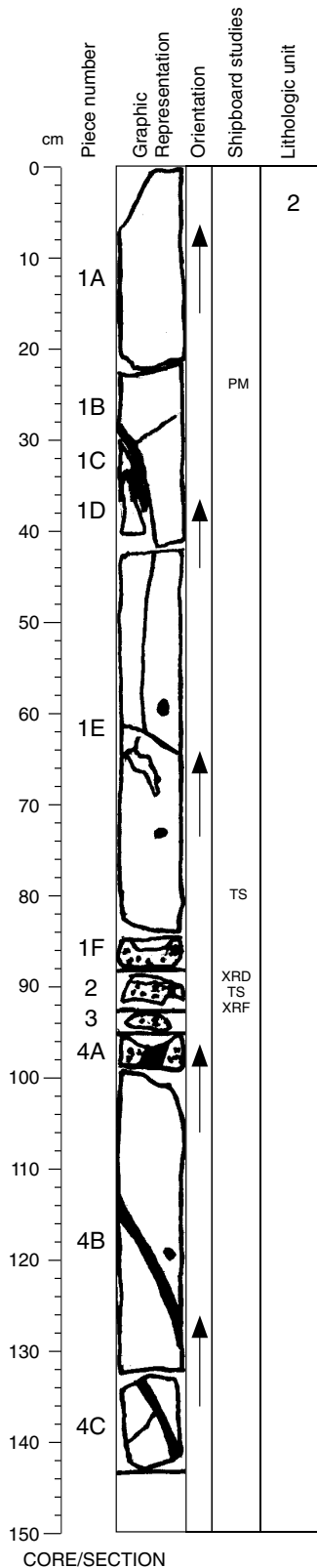
VEINS/FRACTURES: Variable widths (0.1 to 10 mm); filled with green clay and calcite.

COMMENTS:

Core Photo

183-1136A-18R-4

Section top: 150.79 (mbsf)



UNIT 2: APHYRIC BASALT

Pieces: 1-4

CONTACTS: None

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit	
	Mode	Max	Min		Avg.
Plagioclase:	<1	32	1	1.5	Glomerocrystic with clinopyroxene; euhedral laths
Clinopyroxene:	<<1	0.5	0.1	0.3	Subhedral (associated with plagioclase-rich glomerocrysts)

GROUNDMASS: Fine grained

VESICLES: Large train of clay-filled vesicles extends from the bottom of Piece 1 to top of Piece 4.

COLOR: Medium gray, slightly green in the most altered areas

STRUCTURE: Massive

ALTERATION: Slight to moderate (especially close to veins)

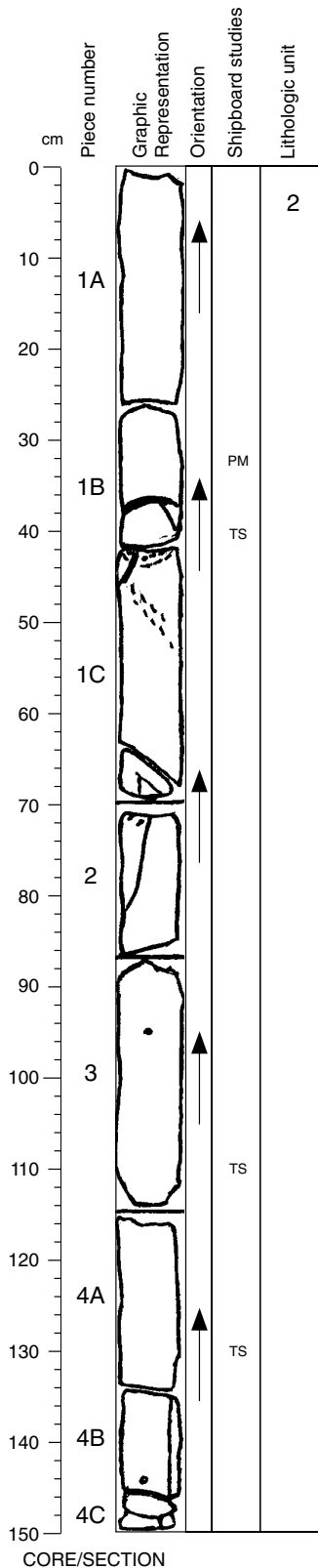
VEINS/FRACTURES: Numerous veins of variable width (0.5-11 mm).

COMMENTS:

CORE/SECTION

Core Photo

183-1136A-18R-5 Section top: 152.23 (mbsf)



UNIT 2: MODERATELY PLAGIOCLASE-PHYRIC BASALT

Pieces: 1-4

CONTACTS: None

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit
	Mode	Max	Min	
Plagioclase:	2-10	2	0.5	Subhedral, as individual crystals and in glomerocrysts (in ≤12 mm clusters) with clinopyroxene
Clinopyroxene:	1	1	0.5	Subhedral (associated with plagioclase-rich glomerocrysts)

GROUNDMASS: Fine grained

VESICLES: Sparse, round, filled with dark olive green clays; vesicles are concentrated in 20 mm zone between Pieces 1B and 1C.

COLOR: Dark greenish gray; lighter gray around vesicle train.

STRUCTURE: Massive; alteration zone in Piece 1C.

ALTERATION: Slight to moderate; pyroxenes and mesostasis are variably altered to clays; pyroxene nearly completely replaced by clays in zone of focused vesicles.

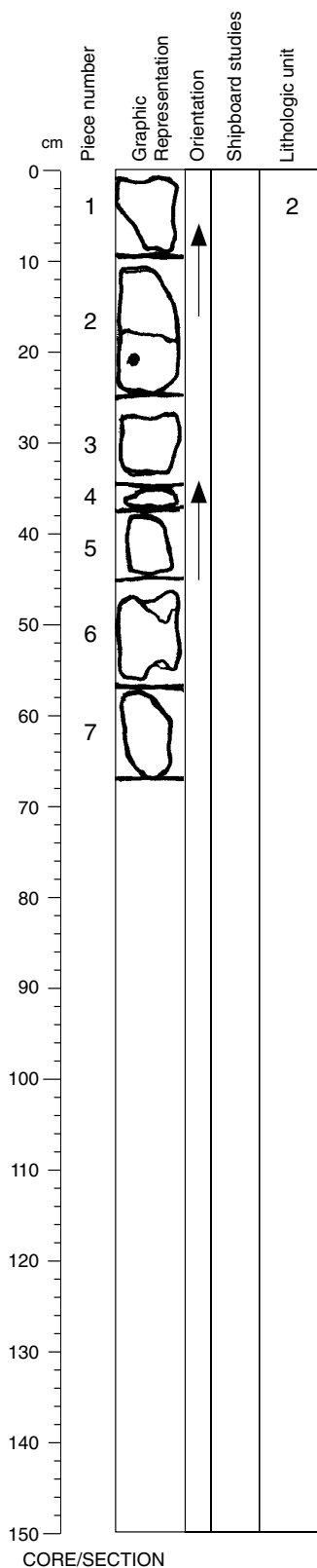
VEINS/FRACTURES: Numerous veins and fractures (0.1-3 mm wide), filled with green clay and calcite.

COMMENTS:

Core Photo

183-1136A-18R-6

Section top: 153.73 (mbsf)



UNIT 2: MODERATELY PLAGIOCLASE-PHYRIC BASALT

Pieces: 1-7

CONTACTS: None

PHENOCRYSTS:	% Grain Size (mm):			Shape/Habit	
	Mode	Max	Min		
Plagioclase:	2-10	1.5	0.5	0.6	Glomerocrystic (≤ 8 mm) with subhedral clinopyroxene
Clinopyroxene:	1	1	0.5	0.5	Subhedral (associated with plagioclase-rich glomerocrysts)

GROUNDMASS: Fine grained

VESICLES: Sparse, rounded, filled with blue-green to dark olive green clays.

COLOR: Dark greenish gray

STRUCTURE: Massive

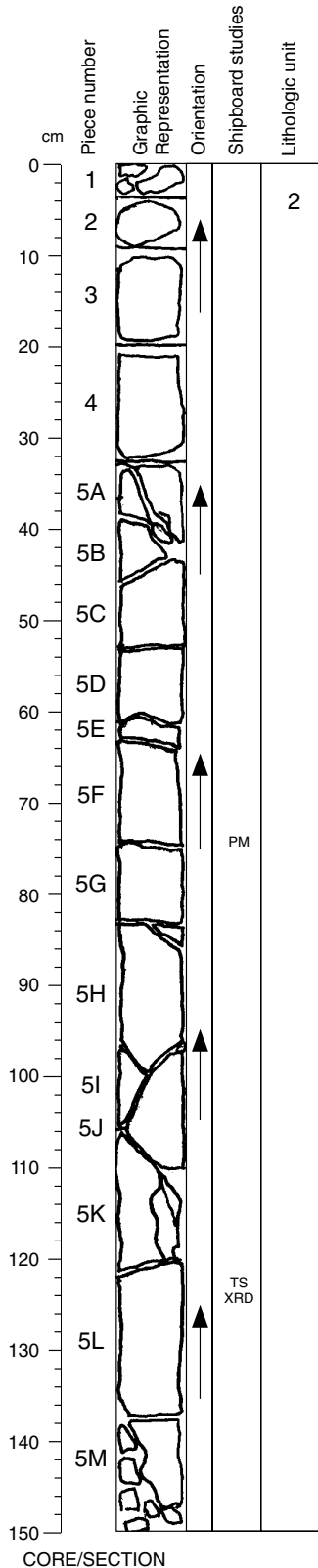
ALTERATION: Slight to moderate; pyroxenes and mesostasis are variably altered to clays.

VEINS/FRACTURES: Numerous fractures (< 0.2 mm), filled with green clays.

COMMENTS: Groundmass pyroxene is partially altered; plagioclase is generally fresh.

Core Photo

183-1136A-19R-1 Section top: 156.90 (mbsf)



UNIT 2: HIGHLY PLAGIOCLASE-PHYRIC BASALT

Pieces: 1-5

CONTACTS: None

PHENOCRYSTS:	%	Grain Size (mm):			Shape/Habit
		Mode	Max	Min	
Plagioclase:	15	1	0.3	0.5	Subhedral laths and inglomerocrysts with clinopyroxene
Clinopyroxene:	3	1	0.2	0.5	Subhedral (associated with plagioclase-rich glomerocrysts)

GROUNDMASS: Fine grained

VESICLES: Sparse, generally subrounded, ≤6 mm long; mostly filled with pale blue-green clays.

COLOR: Bluish gray

STRUCTURE: Massive

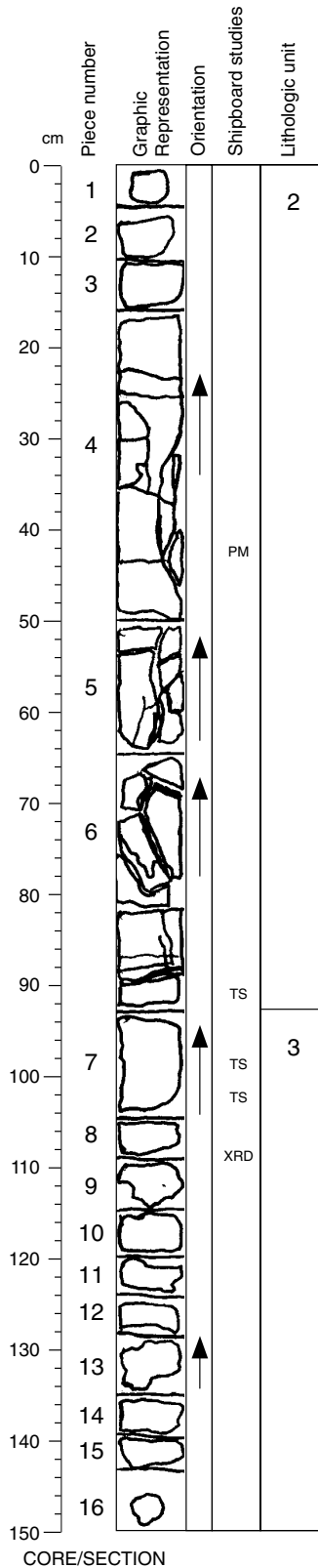
ALTERATION: Slight groundmass alteration

VEINS/FRACTURES: Numerous veins and fractures from 0.1 to 2 mm wide; filled with multiple generations of clay minerals.

COMMENTS: Rounded to subangular glomerocrysts of intergrown plagioclase and clinopyroxene (≤11 x 12 mm in Piece 5F) make up 2-3% of rock. Most have 10-20% alteration.

Core Photo

183-1136A-19R-2A Section top: 158.44 (mbsf)



UNIT 2: MODERATELY PLAGIOCLASE-PHYRIC BASALT

Pieces: 1-6

CONTACTS: Not recovered; inferred to be below Piece 6

	% Grain Size (mm):			Shape/Habit	
	Mode	Max	Min		
Plagioclase:	1-5	7	1	3-4	Laths and other euhedral forms with greenish rims; occurs in glomerocrysts with a mafic mineral (clinopyroxene?)
Olivine:	0-2	0.5	0.2	0.3	Anhedral to subhedral
Clinopyroxene:	1-2	1	0.3	0.5	Subhedral, equant

GROUNDMASS: Fine grained; decreases to aphanitic at the bottom of the section.

VESICLES: Sparse, partially filled, 1-4 mm. The lower 15 mm of Piece 6 has abundant angular to irregular, partially filled vesicles <0.5 mm across. Vesicle filling is clay.

COLOR: Medium gray

STRUCTURE: Massive

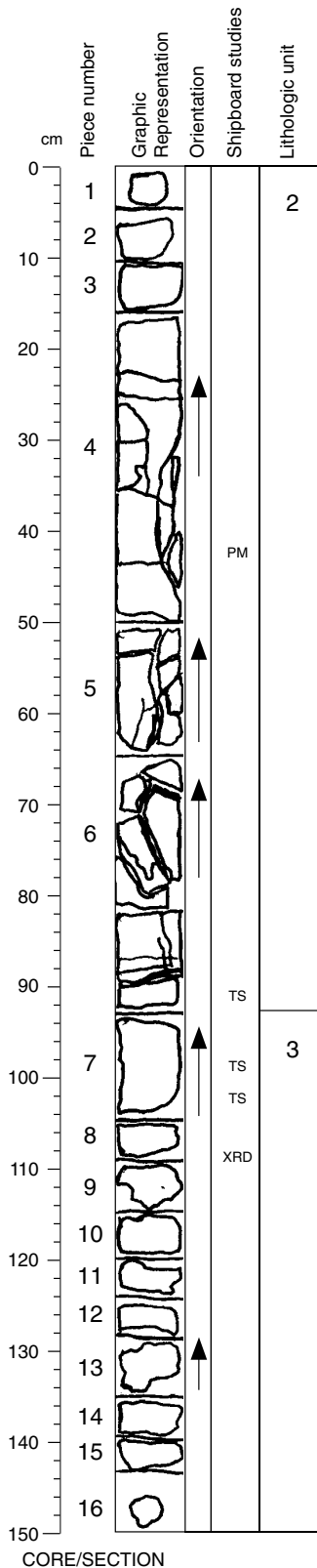
ALTERATION: Slight

VEINS/FRACTURES: Veins are numerous, up to 3 mm wide, filled with a dark green clays. Pieces 1 and 2 contain part of a much wider (>10 mm), dark green clay-filled vein. Most pieces are broken along preexisting cracks and veins.

COMMENTS: The basalt progressively changes downward from sparsely to moderately phyric, but is aphanitic at the base. Base of flow is interpreted to be below Piece 6 on the basis of decrease in grain size and phenocrysts and increase in vesicle abundance.

Core Photo

183-1136A-19R-2B Section top: 158.44 (mbsf)



UNIT 3: MODERATELY PLAGIOCLASE-PHYRIC BASALT

Pieces: 7-16

CONTACTS: Not recovered; inferred to be above Piece 7

	% Grain Size (mm):			Shape/Habit
	Mode	Max	Min	
Plagioclase:	5-152	0.1	0.3	Euhedral laths, skeletal; glomerocrysts with clinopyroxene
Clinopyroxene:	1	2	0.5	Subhedral to anhedral in glomerocrysts

GROUNDMASS: Fine grained to aphanitic

VESICLES: Moderately vesicular; vesicles are empty or filled with zeolites and clays.

COLOR: Dark gray

STRUCTURE: Brecciated; probably a flow top; fragments cemented by volcanoclastic sedimentary matrix.

ALTERATION: Complete

VEINS/FRACTURES:

COMMENTS:

**CORE DESCRIPTIONS
SMEAR SLIDES, SITE 1136**

Sample											Texture			Mineral							Biogenic			
Leg	Site	H	Cor	CT	Sct	Top	Depth	Lithology	Sand	Silt	Clay	Amphibole	Calcite	Celadonite	Feldspar	Glauconite	Palagonite	Quartz	Zeolite	Foraminifers	Nannofossils	Sponge Spicules	Comments	
183	1136	A	2	R	1	60	5.3	D			D									C	D			
183	1136	A	2	R	1	115	5.85	D	C	C	D	P			C				C		D			
183	1136	A	2	R	3	83	8.53	D			D									C	D			
183	1136	A	2	R	6	130	13.5	D			D								*	R	D			
183	1136	A	3	R	1	100	15.4	D			D									C	D			
183	1136	A	4	R	1	100	24.9	D			D									P	D			
183	1136	A	4	R	3	50	27.4	D			D									P	D	*		
183	1136	A	5	R	1	80	34.2	D			D									C	D			
183	1136	A	5	R	4	80	38.7	D			D									C	D			
183	1136	A	6	R	1	80	43.6	D			D					P				C	D			
183	1136	A	6	R	4	80	48.1	D			D				P					C	D			
183	1136	A	7	R	2	80	54.4	D			D									C	D			
183	1136	A	9	R	2	60	71.9	D			D		D				P			C				
183	1136	A	9	R	4	105	75.35	D			D		D				P			C				
183	1136	A	9	R	5	120	77	D			D		D				P			C				
183	1136	A	10	R	1	20	80.1	D	D								C		D	R	R			
183	1136	A	10	R	1	40	80.3	D	D								C		D	R	R			
183	1136	A	10	R	1	50	80.4	D	D								C		D	R	R			
183	1136	A	10	R	1	75	80.65	D	D								C		D	R				
183	1136	A	12	R	1	10	99.3	D			D						C		D			P		
183	1136	A	12	R	CC	5	99.53	D			D						C		D	R		A		
183	1136	A	14	R	1	10	118.5	D			D			P			C		D					

THIN SECTION:	183-1136A-10R1, 89-92, Piece	Unit: 1	OBSERVER:	LM
ROCK NAME:	Silicified (mafic volcanic) breccia.			
WHERE SAMPLED:	Breccia cobble at base of volcanoclastic sediments in Unit 1.			
GRAIN SIZE:	Varies from 0.01 - 5 mm.			
TEXTURE:	Silicification and multiple stages of brecciation. Smaller clasts subangular to subrounded, coarser clasts angular. Clasts are delineated by the presence of iron oxides. Primary internal texture is no longer preserved.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			

PHENOCRYSTS
None preserved

GROUNDMASS
None preserved

SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS
			min.	max.	av.		
Hematite/Goethite	35	0				Mafic glass(?)	
Chalcedony	50	0				Amorphous silica(?)	After mafic glass via amorphous silica(?)
Quartz	15	0				Veins	

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
Veins	15		0.05	1	0.3	Quartz	

COMMENTS : Hydrothermal silicification of rock. Primary internal texture is no longer preserved. Internally the primary material has been replaced by iron oxides (hematite) and oxyhydroxides (goethite) and sprays and sheafs of chalcedony. The material has become indurated and brecciated then silicified and brecciated again. Finally quartz veins cross-cut the section. There are clasts within a breccia matrix that themselves are internally brecciated. The presence of secondary iron oxides and proximity to volcanic sediments above and below suggest that this breccia has a mafic volcanic origin.

THIN SECTION:	183-1136A-15R1, 8-14, Piece 2	Unit: 1	OBSERVER:	CRN,NTA,JB
ROCK NAME:	Highly plagioclase-olivine-phyric basalt.			
WHERE SAMPLED:	Middle of flow, Unit 1.			
GRAIN SIZE:	Medium to coarse phenocrysts in a fine-grained groundmass.			
TEXTURE:	Glomerophyric with granular to intersertal groundmass.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	9	10	5	10	7	~An85		Fresh zoned plagioclase dominant (~An85, up to 5 mm); small altered olivines (~0.2 mm).
PHENOCRYSTS								
Plagioclase	9	10	0.6	1.2	0.9		Subhedral to euhedral	One phenocryst in thin section
Clinopyroxene	<1	<1	0.2	0.4	0.3		Subhedral	
Olivine	0	1	0.2	0.5	0.3		Euhedral to subhedral	
GROUNDMASS								
Plagioclase	30	40	0.1	0.3	0.2	~An75		Altered to brown-green clay (celadonite/saponite). Altered to brown-green clay (celadonite/saponite). Titanomagnetite dominates. No maghemite exsolution associated with the titanomagnetite. Titanomagnetite is skeletal or sub- to euhedral, but is a groundmass phase. Very rare sulfide associated with alteration.
Clinopyroxene	0	15						
Glass	0	20			n/a			
Titanomagnetite	5	5	0.05	0.1	0.1			
Sulfide	Trace	Trace						

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clay	40				Vesicles, mesostasis, plagioclase, olivine, glass.	Groundmass is highly altered. Plagioclase is little affected but clinopyroxene and glass are completely replaced by secondary minerals.
Celadonite/saponite	8				Glass.	

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
Vesicles	<1		1	1	1	Ovoid, filled with brown clay and green saponite(?)	

COMMENTS : Extinction angles suggest glomerocryst and phenocryst plagioclase are of similar composition (~An85) whereas groundmass plagioclase is ~An75. The rock has a green color due to green clays that replace clinopyroxene and glass in the groundmass. Blue-green clay in veins and replacing some of the mesostasis is celadonite (K-Fe³⁺ mica). Brown-orange color of alteration minerals and grain boundaries is due to the presence of iron-oxyhydroxides.
Photomicrograph #: 1136A-3 - Zoned plagioclase in glomerocryst (x10 objective, xp)

THIN SECTION:	183-1136A-15R2, 51-54, Piece 1B					Unit:1	OBSERVER:	CRN, LM
ROCK NAME:	Highly plagioclase-clinopyroxene-olivine-phyric basalt.							
WHERE SAMPLED:	Massive center of Unit 1, in veined region.							
GRAIN SIZE:	Medium to coarse phenocrysts in a fine-grained groundmass.							
TEXTURE:	Glomerophyric with hypocrySTALLINE, intergranular to intersertal groundmass.							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	4.5	5	3	6	5	~An65	Rounded to subangular	Predominantly plagioclase. Coarse irregular zonation is evident in several plagioclase crystals. A discontinuous plagioclase overgrowth (<0.1 mm wide) surrounds some clusters. Plagioclase is replaced by sericite(?) in regions close to veins. A rounded patch of brown clay in one glomerocryst could be an altered olivine. Plagioclase = 98%; olivine(?) = 2%.
PHENOCRYSTS								
Plagioclase	8	10	1	2	1.2	~An50	Subhedral laths	
Clinopyroxene	3	6	0.8	1.5	1		Subhedral to euhedral	Moderately altered stubby prisms.
Olivine	0	4	0.4	0.6	0.5		Subhedral to euhedral	Highly altered. Grain shape barely discernable.
GROUNDMASS								
Plagioclase	25	35	0.1	0.25	0.2		Subhedral	
Clinopyroxene	2	20	0.05	0.2	0.1		Subhedral to euhedral	
Glass	0	15			n/a			
Titanomagnetite	5	5	<0.05	0.2	0.1		Subhedral to euhedral	Range of textures from elongate forms with serrated rims to stubby octahedra with silicate inclusions suggests rapid crystallization. Rare magnetite exsolution is seen in some crystals.
Pentlandite	tr	tr	0.5	1	n/a			Intergrown with titanomagnetite in vein. Two patches observed.
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS	
			min.	max.	av.			
Clay	30					Veins	Celadonite.	
Brown clay	13					Veins, glass and clinopyroxene	Saponite or nontronite.	
Calcite	5					Veins		
Talc	1					Clinopyroxene and olivine		
Sericite	tr					Plagioclase (?)		
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.			
Veins	15		0.05	?		Clay, carbonate	Only one contact of a large vein was seen, so maximum width can only be estimated as > 3 mm. Filling is predominantly celadonite, followed by carbonate and brown clay.	
COMMENTS :	<p>Macroscopic observation: highly altered and oxidized. Celadonite (with subordinate brown clay) veining along two sides. One small <0.1-mm-wide, celadonite vein traverses the section. Numerous wispy celadonite veins cross-cut and alter the wall-rock. Basalt is commonly very strongly oxidized along the vein margins. Hematite in the veins is broken by multiple veining events.</p> <p>Groundmass and phenocrysts are highly altered adjacent to veins.</p> <p>Red hematite and yellow-gold goethite stain secondary products, especially where associated with smectitic clays and altered silicates.</p> <p>Photomicrograph # 1136A-17 - glomerocryst with glass inclusions (x2.5 objective, ppl).</p>							

THIN SECTION:	183-1136A-15R2, 68-69, Piece 1C					Unit:1	OBSERVER:	CRN, DW
ROCK NAME:	Highly plagioclase-olivine-clinopyroxene-phyric basalt.							
WHERE SAMPLED:	Massive interior of Unit 1.							
GRAIN SIZE:	Medium to coarse phenocrysts in a fine-grained groundmass.							
TEXTURE:	Intergranular to intersertal.							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	5	5	4	9	6	~An65	Rounded clusters comprising subhedral grains	Predominantly plagioclase, some zoned, up to 5mm, with very rare 0.3-0.5 mm clinopyroxene grains. Plagioclase crystals contain abundant glass inclusions. Thin (100 µm wide) plagioclase rims surround some grains.
PHENOCRYSTS								
Plagioclase	8	10	0.6	1.5	1		Subhedral	
Clinopyroxene	0.5	1	0.3	0.5	0.4		Subhedral	
Olivine	0	3	0.4	0.8	0.5		Subhedral to euhedral	
GROUNDMASS								
Plagioclase	40	45	0.05	0.2	0.1		Subhedral to euhedral	
Clinopyroxene	5	15	0.05	0.1	0.08		Subhedral to euhedral	
Glass	0	15			n/a			
Titanomagnetite	5	5	0.01	0.1	0.06		Subhedral	Titanomagnetite exhibits fine maghemite exsolution. Both skeletal and subhedral titanomagnetite are present. No observable sulfide.
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS	
			min.	max.	av.			
Clay	36					Vesicles, olivine, plagioclase, clinopyroxene, glass	The groundmass is moderately altered. Clay minerals are saponite or smectite	
Iddingsite	1					Olivine		
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.			
Vesicles	1		0.5	1	0.6	Clay (saponite?) filling round vesicles		
Vein	2				0.5	Brown and green clays and iron oxyhydroxides	Has 3 mm oxidation halo	
Veinlets						Celadonite	Thin wispy veinlets	
COMMENTS :	One ~0.3 mm wide vein traverses the section. Photomicrograph # 1136A-2 - altered olivine phenocrysts (x10 objective, xp).							

THIN SECTION:	183-1136A-15R2, 127-129, Piece 1D	Unit: 1	OBSERVER:	CRN, DW
ROCK NAME:	Sparsely plagioclase-phyric basalt.			
WHERE SAMPLED:	Vesicle layer in interior of Unit 1.			
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass.			
TEXTURE:	Porphyritic with subophitic to intersertal groundmass.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS								
Plagioclase	2	2	1	5	4		Subhedral to euhedral	Plagioclase looks fractured but fresh. Many grains may be xenocrysts because they have ~0.2 mm wide overgrowths on them. They may be similar to glomerocrysts in other sections. They contain abundant glass inclusions.
GROUNDMASS								
Plagioclase	35	40	0.1	1.2	0.8			Plagioclase looks fresh, but edges of larger groundmass crystals appear to be resorbed by the devitrified mesostasis.
Clinopyroxene	2	5	0.2	1	0.8			Clinopyroxene is altered, but fresh selvages remain.
Glass	0	40						Glass is devitrified to very fine-grained silicates (clays) and oxides.
Titanomagnetite	10	10	0.05	2.5	1			Two generations of opaques; larger (0.1-2.5 mm and smaller (<0.05 mm). Larger ones are sub- to euhedral to elongate (serated margins); smaller are skeletal to anhedral. Little maghemite exsolution is evident. No sulfides observed.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Carbonate	15				Veins and vesicles	
Clay	35				Pyroxene and vesicles	
Zeolite	2				Vesicle, veins	

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
Vesicles	10		4	10	6	Carbonate/round to ovoid	Partially or totally filled.
Veins	5		0.1	0.4	0.3	Carbonate, minor zeolite.	Veins are 0.1-0.4 mm wide and traverse one side of the section.

COMMENTS : The grain size and the habit of plagioclase grains in the groundmass varies considerably. In most of the rock, moderate-sized (200 microns) plagioclase grains lie in a quench-textured groundmass made up of very fine, elongate, curved plagioclase grains and devitrified glass. In other parts, the plagioclase laths are smaller and more abundant. Interstitial melt has oozed into a vesicle and solidified to glass and plagioclase microlites oriented parallel to the vesicle margin. In patches of quench-textured groundmass in the medium-grained material, the proportion of opaques reaches ~20%, but their size is very small (<50 microns).

No olivine was observed in this section, and the proportion of clinopyroxene in the groundmass is unusually low. The section has a brown hue, and is only moderately altered.

Photomicrograph #:
 1136A-4: Area showing different grain size, carbonate-filled vein and empty vesicle (x2.5 objective, ppl)
 1136A-5: As 4: but xp
 1136A-6: Devitrified mesostasis, skeletal titanomagnetite and plagioclase (x10 objective, ppl).

THIN SECTION:	183-1136A-15R3, 75-77, Piece 11	Unit:1	OBSERVER:	NTA, DW
ROCK NAME:	Highly plagioclase-clinopyroxene-olivine-phyric basalt.			
WHERE SAMPLED:	Flow interior, Unit 1.			
GRAIN SIZE:	Medium to coarse phenocrysts in a fine-grained groundmass.			
TEXTURE:	Glomerophyric with a hypocrySTALLINE, intersertal groundmass.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	5	5	4	7			Irregular and subrounded in outline; comprising several grains or individual crystals; some glomerocrysts are surrounded by thin (100-200 μm) outer rims of plagioclase.	Individual grains are well-rounded to subhedral and closely intergrown with very little interstitial glass. The plagioclase grains are finely zoned and contain abundant glass inclusions in cores or aligned in trains parallel to grain boundaries. Glass inclusions are of two types, either irregular shaped ~50 microns in size, or ~10 micron polygonal crystals with gas bubbles.
PHENOCRYSTS								
Plagioclase	10	10	0.2	4	0.5		Subhedral to euhedral laths, some slightly skeletal.	
Clinopyroxene	2	2	0.2	1	0.4		Stubby euhedral prisms.	
Olivine	0	1	0.2	0.4	0.25		Equant, euhedral.	
GROUNDMASS								
Plagioclase	40	40	0.1	0.25			Subhedral to euhedral laths.	Wide range of grain sizes.
Clinopyroxene	5	20	0.1	0.2			Stubby euhedral prisms.	
Glass	0	15					Interstitial.	
Titanomagnetite	5	5	0.05				Equant, euhedral grains and irregular laths.	

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clay	30				Glass, clinopyroxene, plagioclase	Most of clinopyroxene in groundmass is altered, but not the larger phenocrysts; plagioclase is slightly altered along fractures
Iddingsite	1				Olivine	Brown clay and iron oxhydroxides

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
Zeolite + clay	traces				0.25		Clay rimmed, zeolite filled

COMMENTS : One rounded patch (1 cm across) has a markedly smaller grain size than the remainder of the rock; another is abnormally rich (20%) in clinopyroxene phenocrysts.

THIN SECTION:	183-1136A-15R3, 133-136, Piece 19					Unit:1	OBSERVER:	RD
ROCK NAME:	Highly plagioclase-clinopyroxene-phyric basalt.							
WHERE SAMPLED:	Interior of Unit, in veined region.							
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass.							
TEXTURE:	Porphyritic-seriate with a hypocrySTALLINE, intersertal groundmass.							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	3	3	2	5	4	~An65	Subhedral, elongate; some large examples (1-5 mm) are fragmental.	Generally fresh; trains of melt inclusions as large as 0.1 mm Oscillatory zoning. Clinopyroxene and olivine are also present.
PHENOCRYSTS								
Plagioclase	9	9	0.5	1.5	1	~An60	Euhedral	Uniform, mainly unaltered.
Clinopyroxene	5	5	0.2	0.5	0.3		Subhedral, often elongate and fragmental; some equant	Mainly fresh.
Olivine	0	<1	0.2	0.5			Subhedral to anhedral	Replaced by green clays (cores), iddingsite (rims).
GROUNDMASS								
Plagioclase	25	35	0.05	0.2	0.1		Laths	Mostly fresh; some cores altered to clays along cleavage planes. Wide range of grain sizes.
Clinopyroxene	10	25	0.05	0.2	0.1		Anhedral, equant	Variably altered to clays.
Titanomagnetite	2	2	0.05	0.1			Subhedral to anhedral	Exsolution lamellae of ilmenite.
Glass	0	20						Devitrified intersertal pools, altered to reddish and dark brown clays.
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS	
			min.	max.	av.			
Clays	45					Glass and clinopyroxene in groundmass	Dark brown and light brown varieties.	
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.			
Vesicles	<1		1	2		Brown clays		
Veins	2	cross-cutting			1	2 generations of clay, calcite and zeolites.	In chronological order: clays, zeolite, calcite.	
COMMENTS :	Section taken to assess alteration minerals and their order of formation. The alteration is manifested in thin section by brown staining of groundmass minerals, replacement of plagioclase at margins and along fractures. Alteration of clinopyroxene is similar to that seen in other sections.							

THIN SECTION:	183-1136A-16R1, 80-82, Piece 3E					Unit: 1	OBSERVER:	JB
ROCK NAME:	Moderately plagioclase-clinopyroxene-olivine-phyric basalt.							
WHERE SAMPLED:	Interior of Unit 1.							
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass.							
TEXTURE:	Glomerocrysts in a hypocrySTALLINE, intergranular, groundmass.							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	7.5	7.8	2	8		An 75	Subrounded to irregular clusters.	Glomerocrysts are 2 - 8 mm across and are dominantly composed of large (largest 5mm, average 2 mm) plagioclase crystals (similar to the large phenocrysts described below) with rare smaller (average 0.5 mm) clinopyroxene or olivine grains. Two 0.15 mm euhedral dark red-brown spinels are included near the rim of one glomerocryst. The external plagioclase margins of the largest glomerocryst are mantled by a 0.5 mm plagioclase rim. The crystal form and zoning patterns in the largest glomerocryst indicate crystal growth outward from the center.
PHENOCRYSTS								
Plagioclase	1	1	0.5	2.75	2		Large phenocrysts: subhedral stubby laths	Large phenocrysts: some have oscillatory zoning, occasional anhedral zoned cores (corroded?) with euhedral overgrowths. Others have a zone and/or core of fine grained dark material which could represent either devitrified glass or alteration products after corrosion.
	4	4	0.75	2.5	1		Microphenocrysts: euhedral high aspect ratio laths	Microphenocrysts: continuously zoned, some have zones and/or cores of fine grained dark material cf. large phenocrysts and glomerocrysts.
Clinopyroxene	2	2	0.1	1	0.4		Subhedral to anhedral	Present in glomerocrysts and as individual grains
Olivine	0	1	0.2	1	0.4		Euhedral to anhedral	Present in a few glomerocrysts and as individual grains
GROUNDMASS								
Plagioclase	49	50	0.1	1.25	0.6	An 62	Subhedral laths with irregular terminations	Very variable crystal sizes.
Clinopyroxene	22	25	0.025	0.125	0.075		Mostly anhedral, some stubby prisms	
Titanomagnetite	2.7	2.7	<0.01	0.5	0.2		Laths and anhedral equant grains	Contains maghemite exsolution lamellae.
Glass	0	6						
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
Iddingsite	1	0					Olivine	Yellow-brown with fractures highlighted in red-orange.
Clays	9	0					Glass and clinopyroxene	
Saussurite	1.5	0					Plagioclase	Plagioclase alteration may include devitrified glass inclusions.
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)				FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.			
Vesicles					0.8		Natrolite, round	Only one present.
COMMENTS :	<p>Grouped under the term glomerocryst are large clusters containing plagioclase and other minerals and smaller grains with rounded, inclusion-rich cores and euhedral plagioclase rims. The size of these grains is little different from those of the larger plagioclase grains of the seriate groundmass. Good example of growth interference in glomerocrysts</p> <p>Photomicrograph #:</p> <p>1136A-10: Growth interference in glomerocryst + zonation in plagioclase (x2.5 objective, xp)</p> <p>1136A-19: Spoon-shaped glomerocryst (x2.5 objective, ppl)</p> <p>1136A-20: As 19, but crossed polars</p> <p>1136A-22: Typical texture (x10 objective, ppl).</p>							

THIN SECTION:	183-1136A-16R2, 75-77, Piece 3	Unit: 1	OBSERVER:	NTA, MP
ROCK NAME:	Seriata-textured plagioclase-clinopyroxene-olivine-phyric basalt.			
WHERE SAMPLED:	Lower portion of Unit 1.			
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass.			
TEXTURE:	Seriata, porphyritic with hypocrySTALLINE, intersertal groundmass.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
Plagioclase	3	3	0.2	3	0.3	An 75-80	Subhedral laths, some slightly skeletal, with corroded cores and abundant glass inclusions	Classic seriata texture. Continuous variation in grain size from largest phenocrysts to finest microlites. The estimate of 2% refers to a population of large, stubby to elongate corroded phenocrysts.
Clinopyroxene	2	2	0.2	0.9	0.5		Stubby euhedral prisms	
Olivine	0	1	0.2	0.5	0.3		Equant, euhedral	
GROUNDMASS								
Plagioclase	50	50	<0.1	0.3	0.2	An 55-60	Subhedral to euhedral laths	No evidence of maghemite exsolution. No sulfides observed.
Clinopyroxene	5	25	<0.1	0.2	0.1		Stubby euhedral prisms	
Glass	0	15					Interstitial	
Titanomagnetite	5	5	0.05				Equant, euhedral grains and irregular laths	

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clay	35				Glass, clinopyroxene, plagioclase	Most clinopyroxene in groundmass is altered, but not the phenocrysts; plagioclase is slightly altered along fractures.
Iddingsite	1				Olivine	

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
None seen							Some holes are either vesicles or plucked mineral grains

COMMENTS : A glomerophyric texture is poorly developed: some large phenocrysts of plagioclase and clinopyroxene form loose clusters but have not intergrown in the way seen in other sections.

THIN SECTION:	183-1136A-16R2, 122-125, Piece 5D					Unit: 1	OBSERVER:	CRN
ROCK NAME:	Highly plagioclase-clinopyroxene-olivine phyric basalt.							
WHERE SAMPLED:	Lower part of Unit 1 in region of veins and alteration.							
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass.							
TEXTURE:	Porphyritic with intergranular groundmass.							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	3	3	4	9	6		Two large examples consist of individual plagioclase crystals containing smaller rounded inclusions of plagioclase. Other glomerocrysts contain 3 to 6 smaller subhedral grains, closely intergrown.	Plagioclase-dominated with minor clinopyroxene. The larger plagioclase grains (~9 mm) have fine oscillatory zoning and contain abundant glass inclusions. Some clusters have a thin rim of plagioclase.
PHENOCRYSTS								
Plagioclase	12	12	1	2.5	1.4		Subhedral	Fresh to slightly altered
Clinopyroxene	1	2	0.8	1.5	0.9		Subhedral to anhedral	Partially altered.
Olivine	0	1	0.5	0.9	0.7		Subhedral to euhedral	Completely altered to green-brown clay.
GROUNDMASS								
Plagioclase	40	40	0.1	0.6	0.4		Subhedral	
Clinopyroxene	2	20	0.1	0.3	0.25		Subhedral	Groundmass clinopyroxene is completely altered to clay.
Glass	0	20			n/a			
Titanomagnetite	5	5	0.05	0.2	0.1		Subhedral	Exsolution of maghemite in titanomagnetite. Some titanomagnetite grains are elongated with serrated edges. No sulfide observed.
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS	
			min.	max.	av.			
Carbonate	8						Veins	
Clay	30						Clinopyroxene, olivine and glass.	
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.			
Veins	8		0.5	1.5	n/a		Carbonate	
Vesicles	1		1	1	1		Round, empty.	
COMMENTS :	<p>Macroscopic observation: Vein through the center (0.5 mm wide), veins at numbered end (up to 1.5 mm wide). Section has a brown hue.</p> <p>Size and number of glomerocrysts is smaller than in section from higher in the flow.</p> <p>Photomicrograph #:</p> <p>1136A-1: Glomerocryst - rim + olivines (x2.5 objective, ppl)</p> <p>1136A-7: zoned plagioclase in glomerocryst (x2.5 objective, xp).</p>							

THIN SECTION:	183-1136A-16R-2, 140-142, Piece 5E	Unit:1	OBSERVER:	RD
ROCK NAME:	Sparsely plagioclase-phyric basalt.			
WHERE SAMPLED:	Interior of Unit 1 in a vesicular zone.			
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass.			
TEXTURE:	Porphyritic-seriate with a hypocristalline, intergranular, groundmass.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	2	2	0.5	2	1	An60	Subhedral stubby laths	Associated minerals are altered clinopyroxene and olivine. Some grains have normal zoning.
PHENOCRYSTS								
Plagioclase			0.5	1	0.75	An60	Euhedral blades	Unzoned, with corroded margins.
Clinopyroxene	0	2	0.5	1	0.75		Anhedral	Completely replaced with clays.
Olivine	0	4	0.1	0.5	0.3		Euhedral to subhedral	Completely replaced with iddingsite.
GROUNDMASS								
Plagioclase	25	45	0.1	0.6	0.4		Laths	Centers and cleavage planes altered to clays.
Clinopyroxene	10	35	0.1	0.4	0.2			Largely replaced with clays.
Titanomagnetite	3	3	<0.01	0.5	0.2		Laths and acicular grains.	
Glass	0	10					Intersertal	Totally replaced with clays.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clays	50				Clinopyroxene, feldspar, glass	
Iddingsite	0.5				Olivine	
Zeolites	10				Vesicle interiors, replacing rare plagioclase phenocrysts/glomerocrysts.	

VESICLES/	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
Vesicles	6	random	0.5	2	1	Rounded vesicles filled with zeolites and clays.	Zeolites (?) at margins, clays filling interiors.

COMMENTS : Glomerocrysts contain tabular grains of plagioclase, intergrown with subhedral clinopyroxene and occasional olivine, the latter two completely replaced by clays. Well-crystallized groundmass is also largely replaced with clays, leaving primary plagioclase and opaques.

THIN SECTION:	183-1136A-16R-3, 4-8, Piece 1A					Unit:2	OBSERVER:	RD
ROCK NAME:	Sparsely plagioclase-phyric basalt.							
WHERE SAMPLED:	Top of Unit 2.							
GRAIN SIZE:	Medium-grained phenocrysts in a very fine-grained groundmass.							
TEXTURE:	Vesicular, porphyritic-seriate with a hypocrySTALLINE, intergranular groundmass.							

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
Plagioclase	1	1	0.5	1			Subhedral stubby laths in larger crystals. Isolated phenocrysts form more elongate euhedral laths.	Plagioclase alone or rarely in clusters with altered clinopyroxene. Oscillatory zoning in some crystals.
Clinopyroxene	0	<1	0.1	0.5			Anhedral	Completely replaced with clays.
Olivine	0	<1	0.1	1			Euhedral	Completely replaced with iddingsite.
GROUNDMASS								
Plagioclase	40	45	0.1	0.6	0.4		Laths	Uniform grain size, generally unaltered.
Clinopyroxene	20	25					Anhedral	Intergranular, partially replaced with clays.
Titanomagnetite	5	5	<0.01	0.1	0.1		Equant and blocky to fine elongate blades	
Olivine	0	<1	0.1	0.1			Euhedral to subhedral	Replaced with iddingsite.
Glass	10	24						Devitrified, partially replaced with clays.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clays	15				Clinopyroxene and vesicles	
Calcite	8				Vesicles and veins	

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			MORPHOLOGY/FILLING	COMMENTS
			min.	max.	av.		
Vesicles	15	random	0.5	5	1	Clays and calcite filling rounded vesicles.	
Veins	<5		0.5	1		Calcite filling sinuous veins.	

COMMENTS : Does not contain compact, densely intergrown glomerocrysts of the type found in other sections. Most phenocrysts are isolated and only a few examples form loose clusters. A highly altered rock with abundant veins and vesicles. Almost all of the clinopyroxene is replaced by clays, and plagioclase is partially altered.

THIN SECTION:	183-1136A-16R3, 51-53, Piece 4	Unit: 2	OBSERVER:	MP, NTA
ROCK NAME:	Moderately plagioclase-clinopyroxene-phyric basalt.			
WHERE SAMPLED:	Interior of Unit 2.			
GRAIN SIZE:	Medium- to coarse-grained phenocrysts in very fine-grained groundmass.			
TEXTURE:	Porphyritic-seriate with a intersertal to hypohyaline groundmass.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
Plagioclase	6	8	n/a	20	1		Euhedral to skeletal laths. One subhedral megacryst was 2 cm long before sectioning.	Many larger grains have rounded cores surrounded by euhedral rims. Some have cores filled with brown to black altered glass. Most contain abundant glass inclusions (< 20 microns). Plagioclase and clinopyroxene phenocrysts aggregate to form loose clusters.
Clinopyroxene	1	1	n/a	1	0.5		Subhedral equant.	
GROUNDMASS								
Plagioclase	35	40			0.1		Microlites.	Wide range of grain sizes.
Clinopyroxene	15	30			0.05		Subhedral equant.	
Glass	0	15			n/a		Intersertal.	
Titanomagnetite	8	8			0.04			

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Brown clay, clay	35					Principally glass and groundmass clinopyroxene. Plagioclase in the groundmass is only slightly altered.

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
Vesicles	<1			2		Clays and zeolites.	

COMMENTS : Well-developed plagioclase rims and skeletal habits of some plagioclase phenocrysts.

THIN SECTION: 183-1136A-17R1, 60-64A, Piece 6
ROCK NAME: Sparsely plagioclase-phyric basalt.
WHERE SAMPLED: Middle of Unit 2, coarse-grained segregation vein.
GRAIN SIZE: Fine grained but extremely variable see Comment.
TEXTURE: Glomeroporphyritic, intersertal.
NOTE: Texture and percentages on this sheet are for finer-grained areas. See 183-1136A-17R1, 60-64B for coarse-grained vein.

Unit:2 **OBSERVER:** **JB**

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS								
Type 1	6	6	2	9	-		Intergrown tabular and anhedral grains	Plagioclase aggregates. Individual grains 0.5 - 8 m. External margin of glomerocryst has 0.1 - 0.2 mm plagioclase rim separated from the glomerocryst proper by a discontinuous zone of glass inclusions.
Type 2	<1	<1	0.5	3	1		Radiating clusters of laths	Plagioclase and clinopyroxene. Size and morphology similar to phenocrysts
PHENOCRYSTS								
Plagioclase	2	2	0.25	1	0.5		Ragged edged laths	
Clinopyroxene	0.25	0.25	0.25	0.75	0.4		Subhedral to anhedral some elongate	
GROUNDMASS								
Plagioclase	50	50	0.05	0.2	0.1		Laths	Wide range of grain sizes.
Clinopyroxene	35	35	0.025	0.075	0.05		Stubby laths	
Glass	0	6	-	-			Interstitial	
Titanomagnetite	2.5	2.5	<0.01	0.2	0.05		Variable. Laths, equant and anhedral.	
SECONDARY MINERALOGY								
MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS	
			min.	max.	av.			
Clays	6					Glass.	Tan colored.	

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

COMMENTS : The sample consists of a 1-cm-wide vein of coarser-grained material within glomerophric fine-grained basalt.
 Macroscopic observations: Glomerocryst cluster in one area, largest 9 mm across. Grain size in the groundmass is extremely variable. Coarser areas are more glass rich than finer grained areas and in the largest segregation area exhibit beautiful quench textures (Photomicrograph # 1136A-12). The interstices of the glomerocryst cluster are also filled with coarser material whereas finer than average groundmass surrounds the glomerocryst in a 0.25 mm wide zone. Coarser areas also occur as small isolated patches unrelated (at least in the plane of the thin section) to other features. The largest coarser grained segregation is traversed by a 1 mm wide vein (filling not preserved). The margins of this segregation, both on the coarser and finer side are finer grained relative to areas further from the margin. This is best seen in reflected light. In hand specimen the coarse segregations are associated with a vesicle-rich area indicating that this was a volatile-rich region.
 Photomicrograph #:
 1136A-12: Boundary between host basalt and coarse segregation (x10 objective, ppl)
 1136A-13: As above - plagioclase growing into vein (x5 objective, ppl)
 1136A-21: Typical texture in segregation (x5 objective, ppl)

THIN SECTION: 183-1136A-17R1, 60-64B, Piece 6 **Unit:2** **OBSERVER:** JB
ROCK NAME: Highly plagioclase-clinopyroxene-phyric basalt.
WHERE SAMPLED: Middle of Unit 2, coarse-grained segregation vein.
GRAIN SIZE: Variable but generally fine-grained - see comments below.
TEXTURE: Hyalophitic, seriate.
NOTE: Texture and percentages on this sheet are for large coarse-grained area. See 183-1136A-17R1, 60-64A for finer-grained areas.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GROUNDMASS								
Plagioclase	35	35	0.5	1.5	0.5		Laths and other euhedral forms	Cores often riddled with included glass and lath ends spikey, possibly suggesting relatively rapid growth.
Clinopyroxene	12	12	0.05	0.6	0.3		Subhedral to anhedral	Pale pink in plane polarized light
Titanomagnetite	6	6	0.025	0.4	0.1		Variable, ranging from elongate blades with serated edges to skeletal to solid equant grains.	Textures probably result from rapid growth.
Glass	0	48						Contains tiny fronds of quenched transparent mineral (plagioclase) and equant opaques (<10 microns).

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clays	48				Glass	

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

COMMENTS : The sample consists of a 1-cm-wide vein of coarser-grained material within glomerophric fine-grained basalt. This sheet only describes the texture and abundances of minerals in the coarse-grained vein. See 17R1, 60-64A for general description.

THIN SECTION:	183-1136A-17R1, 111-117, Piece 15					Unit: 2	OBSERVER:	KN, RD	
ROCK NAME:	Plagioclase-clinopyroxene-phyric basalt.								
WHERE SAMPLED:	Interior of Unit 2.								
GRAIN SIZE:	Coarse glomerocrysts in a fine-grained groundmass.								
TEXTURE:	Rare glomerocrysts in an hypocrystalline, intergranular groundmass.								
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
GLOMEROCRYSTS	2	2	1	5			Irregular clusters of subhedral to rounded grains.	Larger glomerocrysts are composed of plagioclase with rare patches of clay that could have replaced olivine. Looser clusters contain plagioclase and clinopyroxene.	
PHENOCRYSTS									
Clinopyroxene	2	2	0.5	1			Subhedral	Generally unaltered.	
Olivine	0	<0.5?	0.1	0.5			Anhedral	Completely replaced with clays.	
GROUNDMASS									
Plagioclase	40	45	0.1	1	0.4		Laths	Uniform grain size, generally fresh. Wide range of grain sizes.	
Clinopyroxene	10	20					Subhedral	Intergranular, partially replaced with clays.	
Titanomagnetite	5	5	<0.01	0.1	0.1		Equant and blocky with some irregular blades		
Glass	0	25						Devitrified, partially replaced with clays.	
SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS			
		min.	max.	av.					
Clays	40				Clinopyroxene, glass	Brown and dark green.			
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)			MORPHOLOGY/FILLING	COMMENTS		
			min.	max.	av.				
Vesicles	<1	random	1	1	1	Round, clays			
COMMENTS :	Rare glomerocrysts and megacrysts composed dominantly of tabular plagioclase, and some loose clusters including fresh clinopyroxene, in a seriate-textured intergranular groundmass of partially altered plagioclase, clinopyroxene, magnetite and glass. Because of the seriate texture porphyritic and groundmass plagioclase could not be distinguished. Photomicrograph #: 1136A-16: Typical texture with glomerocryst (x2.5 objective, ppl) 1136A-18: Glomerocryst plagioclase with rim (x2.5 objective, ppl).								

THIN SECTION:	183-1136A-17R2, 37-40, Piece 4					Unit:2	OBSERVER:	JM	
ROCK NAME:	Moderately plagioclase-clinopyroxene-phyric basalt.								
WHERE SAMPLED:	Interior of Unit 2.								
GRAIN SIZE:	Coarse glomerocrysts in a fine-grained groundmass.								
TEXTURE:	Glomerocrystic with a hypocrystalline, intersertal groundmass.								
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
GLOMEROCRYSTS	8	8	0.4	3	0.8	An65-70	Large, irregular glomerocrysts containing stubby, subhedral plagioclase grains and rarer loose clusters.	Dominated by plagioclase with very rare clinopyroxene in loose clusters.	
PHENOCRYSTS									
Clinopyroxene	2	2	0.1	1	0.4		Subhedral, commonly elongate	Some in glomerocrysts, some as isolated phenocrysts. Ranges from relatively fresh to moderately altered.	
GROUNDMASS									
Plagioclase	40	45	0.05	0.3	0.1		Laths	Variable grain sizes.	
Clinopyroxene	20	30	0.02	0.07	0.03		Anhedral, equant	Mostly relatively fresh.	
Titanomagnetite	3	3	0.02	0.15	0.05		Subhedral, equant to acicular	Variably altered to clays.	
Glass	0	15							
SECONDARY MINERALOGY	PERCENT		SIZE (mm)				REPLACING / FILLING	COMMENTS	
			min.	max.	av.				
Clays	30						Glass and clinopyroxene	Brown to olive color.	
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)				FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.				
	<<1								
COMMENTS :	Massive, compact, moderately porphyritic rock with two generations of plagioclase. Weak preferred orientation of plagioclase phenocrysts.								

THIN SECTION:	183-1136A-17R2, 57-60, Piece 6A					Unit: 2	OBSERVER:	CRN,MP
ROCK NAME:	Moderately plagioclase-clinopyroxene-phyric basalt.							
WHERE SAMPLED:	Interior of Unit 2.							
GRAIN SIZE:	Medium to coarse phenocrysts in a fine-grained groundmass.							
TEXTURE:	Glomerophytic with intersertal to hyalocrystalline groundmass.							

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	8	8		10			Rounded	A single, very large glomerocryst consists of complexly intergrown strongly zoned plagioclase grains.
PHENOCRYSTS								
Plagioclase	1	1	0.5	2	1.2		Subhedral	Plagioclase reasonably fresh.
Clinopyroxene			0.3	0.9	0.5		Subhedral to anhedral	
Olivine								
Glomerocrysts				10			Rounded	
GROUNDMASS								
Plagioclase	40	45	0.1	0.25	0.2		Subhedral	Plagioclase looks reasonably fresh. Wide range of grain sizes.
Clinopyroxene	8	14	0.05	0.2	0.1		Anhedral	Partially altered to clays
Glass	0	28			n/a			
Titanomagnetite	5	5	0.05	0.2	0.1		Subhedral to anhedral	Titanomagnetite occurs as either stumpy subhedral crystals or elongate "laths" with serated edges. No sulfides observed.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clay	35				Vein and glass	Moderately altered - most alteration is associated with vein material.
Zeolite (natrolite?)	4				Vein	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
Vein			0.1	0.5	0.4	Brown clay and clear zeolite(?)	Two small, clay-filled veins (~0.1-0.2mm wide) diverge 90 degrees from the main vein observed macroscopically.
Vesicles?	5		0.5	2	1	Empty, irregular	These could be holes in the slide as they are irregular and interlinking.

COMMENTS :	Melt has oozed into vesicles and solidified to glass-rich, plagioclase-poor patches. The grain size and relative proportion of plagioclase increase towards a vesicle train. There is a late stage segregation at one edge of the thin section. It consists of plagioclase (45% 1-2 mm), clinopyroxene (20% 1-2 mm), titanomagnetite (12% 0.2-1.8 mm) and glass (altered to brown clay): 23%. There is a smaller population of titanomagnetite associated with the altered glass (<<0.1 mm). Pyroxenes have small, almost continuous overgrowths (~50 microns wide). The contact between the vein and host basalt is sharp but no chilling or broken crystals are seen. Some plagioclase grains appear to have nucleated at the margin and grown into the segregation vein. A discontinuous, 0.1-0.5mm wide, vein crosses the section. The fine-grained matrix has a brown-green hue. Photomicrographs: 1136A-8 strongly zoned glomerocryst of plagioclase, 1136A-9 contact between basalt host and segregation, 1136A-14 as above
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THIN SECTION: 183-1136A-18R2, 101-104A, Piece 8B **Unit:** 2 **OBSERVER:** CRN
ROCK NAME: Highly plagioclase-clinopyroxene-phyric basalt.
WHERE SAMPLED: Middle of Unit 2, Vesicle Train.
GRAIN SIZE: Medium-grained phenocrysts in a fine-grained groundmass (0.1-0.3mm).
TEXTURE: Porphyritic with a hypocrystalline, intergranular to intersertal groundmass.
NOTE: Due to the presence of two textural domains in this slide, it is described on two sheets. Sheet A describes the non-vesicular portion. Sheet B describes the vesicular portion.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	2	2	5	6	5.5	~An70	Subhedral	Only two glomerocrysts in the section. One is made up of plagioclase crystals (~An70), some of which exhibit zonation contains several subrounded melt inclusions (<0.1 mm) and the second contains equal amounts of plagioclase (~An70) and either altered clinopyroxene or glass.
PHENOCRYSTS								
Plagioclase	11	12	0.8	1.8	1.3	~An50	Subhedral	Fresh.
Clinopyroxene	2	5	0.5	1	0.6		Subhedral to anhedral	Moderate alteration.
GROUNDMASS								
Plagioclase	29	30	0.1	0.35	0.25		Subhedral	Fresh.
Clinopyroxene	15	30	0.05	0.25	0.1		Anhedral	
Glass	0	15			n/a			
Titanomagnetite	6	6	<0.05	0.15			Subhedral-anhedral	Stubby, equant octahedra and elongate quench (with serated rims) forms are present. Octahedra contain inclusions of the main silicate minerals.
Chalcopyrite	Trace	Trace			<0.1		Anhedral	Only one piece observed, associated with alteration.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Brown clay	35				Glass, clinopyroxene	

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

COMMENTS : Macroscopic observation: two textural regions each occupying approximately 50% of the section. (A) fine grained basalt with plagioclase phenocrysts and one glomerocryst; (B) highly vesicular region (vesicles up to 1 cm diameter, round to ovoid) with the same grain size but a larger proportion of mesostasis. One discrete plagioclase crystal (~2 mm; subhedral) exhibits overgrowth rimming (~0.1-0.2mm) and zonation, typically seen in glomerocryst plagioclase. Contact between the textural domains is sharp, although plagioclase crystals span the boundary.

THIN SECTION: 183-1136A-18R2, 101-104B, Piece 8B **Unit:2** **OBSERVER:** **CRN**
ROCK NAME: Aphyric vesicular basalt.
WHERE SAMPLED: Middle of Unit 2, Vesicle Train.
GRAIN SIZE: Fine grained (0.1-0.6mm).
TEXTURE: Seriate, hypocrySTALLine, intersertal to intergranular basalt.
NOTE: Due to the presence of two textural domains in this slide, it is described on two sheets. Sheet A describes the non-vesicular portion. Sheet B describes the vesicular portion.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GROUNDMASS								
Plagioclase	29	30	0.1	2	0.6		Subhedral to anhedral	Complete size gradation from coarsest to finest, making designation of phenocryst phases impossible. Plagioclase is fresh, but it is intergrown with the more altered clinopyroxene and contains occasional inclusions.
Clinopyroxene	15	30	0.1	3	0.5		Subhedral to anhedral	Large clinopyroxene grains are present, up to 3 mm long. These are not phenocrysts as they crystallized around groundmass plagioclase.
Glass	0	30						Glass contains abundant fine (<0.05 mm) opaques.
Titanomagnetite	10	10	<0.05	0.9	0.25		Subhedral to anhedral	Two groups: very fine grained (<0.05 mm) associated with the interstitial glass; and the "normal" late-stage coarser grained variety. In the latter group, the elongate "quench" form predominates over the stubby, equant octahedral form. No maghemite exsolution observed.
Pentlandite	Trace	Trace			<0.05		Anhedral	Associated with alteration.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Brown Clay	35				Glass, clinopyroxene, vesicle fill	
Zeolite	10				Vesicle fill	Zeolite has very low birefringence.

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
Vesicles	20	Within the vesicle sheet	1	10	8	Zeolite, brown clay, trace pyrite/round to ovoid.	

COMMENTS : Macroscopic observation: two textural regions each occupying approximately 50% of the section.(A) fine grained basalt with plagioclase phenocrysts and one glomerocryst; (B) highly vesicular region (vesicles up to 1 cm diameter, round to ovoid) with the same grain size but a larger proportion of mesostasis.
Large (5mm) irregular pools of glass (now altered to red-brown clay) are concentrated at the contact between regions of different grain size.

THIN SECTION:	183-1136A-18R2, 114-116, Piece 8B					Unit 2	OBSERVER:	RD
ROCK NAME:	Moderately plagioclase-clinopyroxene-phyric basalt.							
WHERE SAMPLED:	Interior of Unit 2.							
GRAIN SIZE:	Medium to coarse phenocrysts in a fine-grained groundmass.							
TEXTURE:	Porphyritic with a hypocrySTALLINE, seriate, intersertal groundmass.							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	10	10	1	5	5	~An65	Subhedral, elongate	Generally fresh; trains of melt inclusions. Oscillatory zoning in plagioclase. Most glomerocrysts are fragmented plagioclase, with minor altered clinopyroxene.
PHENOCRYSTS								
Plagioclase	12	12	0.5	1	3	~An55	Phenocrysts are subhedral	Uniform, mainly fresh.
Clinopyroxene	2	2	0.2	0.5	0.3		Subhedral, often elongate and fragmented; some equant; mostly intergrown with plagioclase in glomerocrysts	Grains in glomerocrysts replaced by clays.
GROUNDMASS								
Plagioclase	45	45	0.03	0.2	0.08		Laths	Mostly fresh. Wide range of grain sizes.
Clinopyroxene	10	20	0.03	0.15	0.06		Anhedral, equant	Variably altered to clays.
Titanomagnetite	2	2	0.02	0.2	0.1		Subhedral to anhedral, equant, elongate and irregular shapes	
Glass	0	10						Totally replaced with light brown to dark green clays.
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS	
			min.	max.	av.			
Clays	20					Glass and clinopyroxene in groundmass	Dark greenish brown outside of vein; reddish in vein (oxidation/iron oxyhydroxides)	
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.			
Vesicles	<1					Partially filled with dark green clays.		
COMMENTS :	Massive, compact rock with relatively fresh plagioclase phenocrysts and microlites.							

THIN SECTION:	183-1136A-18R3, 63-65, Piece 2	Unit: 2	OBSERVER:	CRN
ROCK NAME:	Highly plagioclase-clinopyroxene-phyric basalt.			
WHERE SAMPLED:	Middle of Unit 2.			
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass (0.1-0.3mm).			
TEXTURE:	Porphyritic with a hypocrystalline, intergranular to intersertal groundmass.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
Plagioclase	11	12	0.8	1.8	1	~An 55	Subhedral laths	Slightly altered. A few of the larger phenocrysts have an almost continuous plagioclase overgrowth (~0.1 mm wide) which suggests they may be disaggregated glomerocrysts.
Clinopyroxene	3	5	0.6	1.2	0.7		Subhedral, stubby prisms	Moderately altered. Very slight overgrowths/zonation on some basal sections.
GROUNDMASS								
Plagioclase	33	35	0.1	0.3	0.2		Subhedral	Fresh.
Clinopyroxene	15	25	0.05	0.1	0.06		Anhedral	Fresher than other samples.
Glass	0	15			n/a			Glass altered to clay.
Titanomagnetite	7	7	0.1	0.25	0.15		Subhedral to anhedral	Elongate with serated margins and stubby octahedra.
Pentlandite	1	1	<0.05	0.1	0.08		Anhedral	Late stage phase - can be found as inclusions in titanomagnetite or can be seen partially enclosing titanomagnetite. Patchy distribution.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clay	30				Glass, clinopyroxene, plagioclase	

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

COMMENTS: Macroscopic observation: homogeneous thin section with no veins or visible vesicles. The rock has a brown-green hue. Plagioclase phenocrysts are visible. There are occasional patches (up to 5mm diameter) - glomerocrysts - containing plagioclase and clinopyroxene that are of the same size and composition as the discrete phenocryst phases. Photomicrograph #: 1136A-11: Primary pentlandite and titanomagnetite (x10 objective, reflected light, ppl).

THIN SECTION:	183-1136A-18R4, 80-82, Piece 1E	Unit:2	OBSERVER:	JM
ROCK NAME:	Moderately plagioclase-clinopyroxene-phyric basalt			
WHERE SAMPLED:	Segregation vein in the interior of Unit 2.			
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass.			
TEXTURE:	Porphyritic with a hypocrySTALLINE, intersertal groundmass.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
Plagioclase	6	6	0.2	1.5	0.6	~An60	Subhedral, elongate	Generally fresh. Some glomerocrysts (0.5-1.5 mm), which are often fragmented, some with minor clinopyroxene Ranges from relatively fresh to moderately altered. Some equant; mostly intergrown with plagioclase in glomerocrysts.
Clinopyroxene	1	1	0.2	0.5	0.3		Subhedral, often elongate and fragmented	
GROUNDMASS								
Plagioclase	40	42	0.03	0.2	0.08		Laths	Mostly fresh. Wide range of grain sizes. Variably altered to clays.
Clinopyroxene	20	30	0.03	0.15	0.06		Anhedral, equant	
Titanomagnetite	5	7	0.02	0.2	0.1		Subhedral to anhedral, equant, elongate and irregular shapes	
Glass	0	15						

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clays	30				Glass, clinopyroxene in groundmass	Dark greenish brown outside of vein; reddish in vein (more palagonitic?)

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
	<1						Only one seen.

COMMENTS : The rock is cut by an ~8 mm wide segregation, which differs from its surroundings by having abundant pools of glass that alter to reddish clays and palagonite, whereas outside the segregation, glass is less abundant and the clays are dark green-brown.

THIN SECTION:	183-1136A-18R4, 89-92, Piece 2	Unit: 2	OBSERVER:	NTA
ROCK NAME:	Aphyric basalt.			
WHERE SAMPLED:	Segregation sheet with coarser-than-normal grain size in Unit 2.			
GRAIN SIZE:	Fine-grained.			
TEXTURE:	Hypocrystalline intersertal.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
None								
GROUNDMASS								
Plagioclase	31	31	0.03	0.6	0.2		Subhedral, slightly skeletal laths with abundant irregular glass inclusions.	Mostly unaltered.
Clinopyroxene	10	12	0.03	0.2	0.1		Anhedral, equant	Most are fresh, some altered to clays.
Titanomagnetite	5	5	0.02	0.9	0.1		Subhedral, subequant, skeletal grains and long, thin, skeletal blades.	
Glass	0	52						Irregular, roughly equant pools of brown to black glass, paler in fine-grained section.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clays	45				Glass, clinopyroxene in groundmass	Pale red-brown to almost black and opaque.

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
Vesicle	<1			2		Lined by brown clay with zeolites at center.	One vesicle only.

COMMENTS : One side of the section is finer grained (average size of plagioclase laths ~0.2 mm) and lacks elongate opaque blades, but otherwise texture and mineralogy is similar.
 Note: this section is from the sample that has usually high contents of Nb, Zr, Ti etc.
 Photomicrograph #:
 1136A-15: Two habits of titanomagnetite (x20 objective, reflected light, ppl)

THIN SECTION:	183-1136A-18R5, 38-42, Piece 1B					Unit:2	OBSERVER:	CRN
ROCK NAME:	Highly plagioclase-clinopyroxene-phyric basalt							
WHERE SAMPLED:	Mid-to-lower part of Unit 2							
GRAIN SIZE:	Fine grained (0.2-0.6 mm)							
TEXTURE:	Hypocrystalline, intergranular to intersertal							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	1	1	n/a	n/a	4	~An65	Subhedral	Only one glomerocryst consisting of several zoned plagioclase crystals.
PHENOCRYSTS								
Plagioclase	12	15	1	2.5	1.5	~An50	Subhedral	Reasonably fresh (slight alteration).
Clinopyroxene	5	8	0.8	1.5	1		Subhedral	Slightly to moderately altered.
GROUNDMASS								
Plagioclase	25	30	0.2	0.6	0.4		Subhedral	Slight alteration on plagioclase.
Clinopyroxene	8	20	0.05	0.2	0.1		Anhedral-subhedral	
Glass	0	20			n/a			Replaced by low birefringent zeolite or brown clay
Titanomagnetite	6	6	0.1	0.5	0.25		Subhedral-anhedral	Stubby octandra predominate - a few elongated quench crystals with serated edges are present. Most have inclusions of the main silicate minerals. No maghemite exsolution observed.
Pentlandite	Trace	Trace			<0.05		Anhedral	Associated with alteration.
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS	
			min.	max.	av.			
Brown clay	28						Vein, glass, clinopyroxene, plagioclase	
Zeolite	15						Glass and veins	
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.			
Veins	5		0.1	2.5	n/a		Brown clay and low birefringent zeolite(?). Most has been plucked out during section preparation. Apophyses of basalt present in vein.	
COMMENTS :	Macroscopic observation: a bifurcating vein traverses the section (0.1-2.5mm wide). Fine grained matrix with plagioclase phenocrysts discernible. Section has a brown-green hue.							

THIN SECTION:	183-1136A-18R5, 111-112, Piece 3	Unit 2	OBSERVER:	RD, MP
ROCK NAME:	Sparsely plagioclase-clinopyroxene-phyric basalt.			
WHERE SAMPLED:	Interior of Unit 2.			
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass.			
TEXTURE:	Porphyritic-seriate with a hypocrystalline, intersertal groundmass (intergranular to hypohaline patches).			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	5	5	2	5	4	~An65	Subhedral, elongate. Generally unaltered trains of melt inclusions. Oscillatory zoning.	Plagioclase dominates, associated minerals are clinopyroxene, opaques and equant to irregular patches that may be olivine.
PHENOCRYSTS								
Plagioclase	15	15	0.5	1.5	1	~An55	Euhedral laths	Mainly unaltered.
Clinopyroxene	5	5	0.2	0.5	0.3		Subhedral, commonly elongate and fragmented; some are equant.	
Olivine	0	1						
GROUNDMASS								
Plagioclase	30	30	0.03	0.2	0.08		Laths	Mostly unaltered. Wide range of grain sizes.
Clinopyroxene	25	30	0.03	0.15	0.06		Anhedral, equant	Variably altered to clays.
Titanomagnetite	1	1					Subhedral to anhedral	
Glass	5	15						Devitrified intersertal pools and altered to light brown clays.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clays	15				Glass, and clinopyroxene in groundmass.	Dark green and light brown varieties.

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

COMMENTS : Massive, compact rock with relatively fresh plagioclase phenocrysts and microlites; clinopyroxene is much less altered than in other samples.

THIN SECTION:	183-1136A-19R1, 70-73, Piece 5F	Unit:2	OBSERVER:	NTA
ROCK NAME:	Plagioclase-clinopyroxene-phyric basalt.			
WHERE SAMPLED:	Microgabbro xenolith in interior of Unit 2.			
GRAIN SIZE:	Fine-grained phenocrysts in a very fine-grained groundmass.			
TEXTURE:	Porphyritic-seriate with a hypocrySTALLINE, intergranular groundmass.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	<1	<1	0.5	>1			Subrounded, containing one large euhedral grain and several smaller grains	One broken megacryst at the edge of the section; another small cluster.
PHENOCRYSTS								
Plagioclase	15	15	0.2	1	0.5		Subhedral laths	Crude preferred orientation of laths.
Clinopyroxene	2	2	0.2	0.4			Subhedral	
Olivine	0	<0.5?	0.1	0.5			Anhedral	Some small, completely altered grains could be olivine.
GROUNDMASS								
Plagioclase	35	35	0.1	0.2	0.15		Laths	Uniform grain size, generally fresh.
Clinopyroxene	25	25	0.02	0.05	0.03		Subhedral	Intergranular, partially replaced with clays.
Titanomagnetite	5	5	<0.01	0.1	0.1		Equant, blocky skeletal with some irregular blades	
Glass	0	20						Devitrified, partially replaced with clays.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Brown clays	20				Glass	

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)			MORPHOLOGY/FILLING	COMMENTS
			min.	max.	av.		
Vesicles	<1	random	1	1	1	Round, clays	

COMMENTS : The xenolith is about 12 mm across and is subangular. It has a granular texture and is composed of medium-sized grains of plagioclase and clinopyroxene, and several small grains (0.1 to 0.4 mm) probably olivine now replaced by brown clay. The plagioclase forms subhedral laths, 2 to 9 mm long; the clinopyroxene anhedral grains 1 to 5 mm across. Glass (now altered to brown clay) forms thin films along grain contacts and larger pools in some interstices. Equant grains of titanomagnetite occur only in the larger glass pools.

All clinopyroxene grains are riddled with evenly distributed, small (10 microns), irregular- to polyhedral-shaped, composite inclusions of glass, silicates, oxides. The same type of inclusions forms regular layers just inside the margins of plagioclase grains. Several clinopyroxene and plagioclase grains near the margin of the xenolith are highly altered, perhaps because they contained a higher-than-average proportion of inclusions.

The glass films and pools, and the inclusions in the silicate minerals are interpreted to have resulted from melting when the xenolith was incorporated in the host basalt.

1136A-23: Microgabbro xenolith (x2.5 objective, ppl)

THIN SECTION:	183-1136A-18R4, 80-82, Piece 1E	Unit:2	OBSERVER:	JM
ROCK NAME:	Moderately plagioclase-clinopyroxene-phyric basalt			
WHERE SAMPLED:	Segregation vein in the interior of Unit 2.			
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass.			
TEXTURE:	Porphyritic with a hypocrySTALLINE, intersertal groundmass.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
Plagioclase	6	6	0.2	1.5	0.6	~An60	Subhedral, elongate	Generally fresh. Some glomerocrysts (0.5-1.5 mm), which are often fragmented, some with minor clinopyroxene Ranges from relatively fresh to moderately altered. Some equant; mostly intergrown with plagioclase in glomerocrysts.
Clinopyroxene	1	1	0.2	0.5	0.3		Subhedral, often elongate and fragmented	
GROUNDMASS								
Plagioclase	40	42	0.03	0.2	0.08		Laths	Mostly fresh. Wide range of grain sizes. Variably altered to clays.
Clinopyroxene	20	30	0.03	0.15	0.06		Anhedral, equant	
Titanomagnetite	5	7	0.02	0.2	0.1		Subhedral to anhedral, equant, elongate and irregular shapes	
Glass	0	15						

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Clays	30				Glass, clinopyroxene in groundmass	Dark greenish brown outside of vein; reddish in vein (more palagonitic?)

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
	<1						Only one seen.

COMMENTS : The rock is cut by an ~8 mm wide segregation, which differs from its surroundings by having abundant pools of glass that alter to reddish clays and palagonite, whereas outside the segregation, glass is less abundant and the clays are dark green-brown.

THIN SECTION:	183-1136A-19R1, 122-125, Piece 5L					Unit:2	OBSERVER:	RD, MP
ROCK NAME:	Sparsely plagioclase-clinopyroxene-phyric basalt							
WHERE SAMPLED:	Interior of Unit 2							
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass.							
TEXTURE:	Porphyritic-seriate with hypocrySTALLINE, intersertal groundmass.							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS Oscillatory zoning	1	1	2	5	4	~An65	Subhedral, elongate; some fragmental	Generally fresh; trains of melt inclusions as large as 0.1 mm
PHENOCRYSTS								
Plagioclase	9	9	0.5	1.5	1	~An60	Euhedral	Uniform, mainly fresh
Clinopyroxene	5	5	0.2	0.5	0.3		Subhedral, often elongate and fragmented; some equant	Mainly fresh
GROUNDMASS								
Plagioclase	30	35	0.03	0.2	0.08		Laths	Mostly fresh. Wide range of grain sizes.
Clinopyroxene	20	35	0.03	0.15	0.06		Anhedral, equant	Variably altered to clays
Titanomagnetite	1	1	0.05	0.2	0.1		Subhedral to anhedral	
Glass	5	20						Devitrified intersertal pools and altered to light brown clays
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS	
			min.	max.	av.			
Clays	35					Glass, clinopyroxene in groundmass	Dark brown and light brown varieties	
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.			
Vesicles	2		1	3		Brown clays		
COMMENTS :	Massive, compact rock with relatively fresh plagioclase phenocrysts and microlites.							

THIN SECTION:	183-1136A-19R2, 89-92, Piece 6	Unit:2	OBSERVER:	CRN
ROCK NAME:	Highly plagioclase-clinopyroxene-olivine-phyric basalt.			
WHERE SAMPLED:	Bottom of Unit 2.			
GRAIN SIZE:	Medium-grained phenocrysts in a fine-grained groundmass (0.1-0.2mm decreasing to <0.1mm at one end of section).			
TEXTURE:	Porphyritic with a hypocrySTALLINE, intergranular to intersertal groundmass, trachytic in places.			

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
GLOMEROCRYSTS	5	5	3	8	5	~An60		Made up of plagioclase; some crystals are zoned. Occasional discontinuous overgrowth rims (<0.1mm) are observed on some crystals. Reasonably unaltered. Sub-micron melt(?) inclusions in some plagioclase crystals.
PHENOCRYSTS								
Plagioclase	5	8	0.6	2	1	~An45-48	Subhedral	Variably altered - some completely, others are fresh.
Clinopyroxene	3	5	0.4	0.8	0.5		Subhedral to anhedral	Stubby prisms and basalt sections are variably altered. Fresh areas still present.
Olivine	0	3	0.2	0.4	0.3		Subhedral	Seen primarily in the finer grained area.
GROUNDMASS								
Plagioclase	15	30	0.1	0.3	0.2		Subhedral laths	Moderately altered groundmass plagioclase. Sub-parallel alignment of plagioclase.
Clinopyroxene	5	30	0.05	0.1	0.08		Anhedral	Highly altered.
Glass	0	15						Glass totally altered to brown clay.
Titanomagnetite	4	4	<0.05	0.2	0.08		Subhedral to anhedral	Elongate (quench) crystals as well as stubby octahedra that have silicate inclusions.
Pentlandite	Trace	Trace			<0.1		Anhedral	Associated with vesicle fill.

SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS
		min.	max.	av.		
Brown Clay	50				Glass, clinopyroxene, vesicles, plagioclase	Glass, clinopyroxene, olivine?, vesicles
Zeolite	12				Vesicles	

VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.		
Vesicles	20	Irregular	0.4	2	1	Brown clay-zeolite(?). Round to ovoid, some inter-connecting.	Larger ones found in a band across the center of the section. Smaller ones found at end away from etched section number.

COMMENTS: Macroscopic observation: Distinct layering with a zone of large brown vesicles (up to 2 mm) traversing the center of the section.

THIN SECTION:	183-1136A-19R2, 98-101, Piece 7					Unit: 3	OBSERVER:	NTA	
ROCK NAME:	Basaltic breccia.								
WHERE SAMPLED:	Brecciated top of Unit 3.								
GRAIN SIZE:	Fine-grained phenocrysts in a very fine-grained to glassy groundmass.								
TEXTURE:	Fragments with glassy textures.								
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
GROUNDMASS									
Plagioclase	0	35			0.3		Laths	Completely altered to zeolites. Proportion, size and habit difficult to discern.	
Glass	0	65						Major component of fragments.	
SECONDARY MINERALOGY	PERCENT		SIZE (mm)				REPLACING / FILLING	COMMENTS	
			min.	max.	av.				
Clays	90						Glass and plagioclase	Various shades of brown.	
Zeolites	10						Glass and plagioclase	Microcrystalline intergrown.	
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)				FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.				
Vesicles	0 to 10%		1	5			Brown clays, zeolites	Many fragments are only sparsely vesicular.	
COMMENTS :	The rocks is made up of fragments varying in size from sub-microscopic to several cm. Form of fragments is equant to highly irregular. Igneous texture consisting of fine plagioclase phenocrysts in a fine-grained groundmass is poorly preserved.								

THIN SECTION:	183-1136A-19R2, 101-104, Piece 7					Unit: 3	OBSERVER:	NTA	
ROCK NAME:	Basaltic breccia.								
WHERE SAMPLED:	Brecciated top of Unit 3.								
GRAIN SIZE:	Some coarse glomerocrysts but mainly very fine-grained to glassy.								
TEXTURE:	Fragments with glomerophyric to glassy textures.								
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
GLOMEROCRYSTS	0	1	1	5			Compact, irregular aggregates	Subhedral to euhedral grains of plagioclase. Completely altered.	
GROUNDMASS									
Plagioclase	0	35			0.3		Laths	Completely altered. Proportion, size and habit difficult to discern.	
Glass	0	65						Major component of fragments.	
SECONDARY MINERALOGY	PERCENT		SIZE (mm)				REPLACING / FILLING	COMMENTS	
			min.	max.	av.				
Clays	100						Glass and plagioclase	Various shades of brown.	
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)				FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.				
Vesicles	10?		2	10			Brown clays	Many fragments are only sparsely vesicular.	
COMMENTS :	The rocks is made up of fragments varying in size from sub-microscopic to several cm. Form of fragments is equant to highly irregular. Igneous texture consisting of fine plagioclase phenocrysts in a fine-grained groundmass is poorly preserved.								