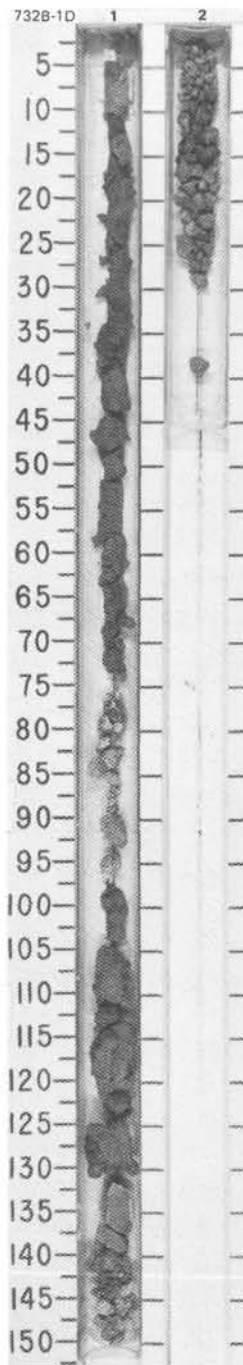


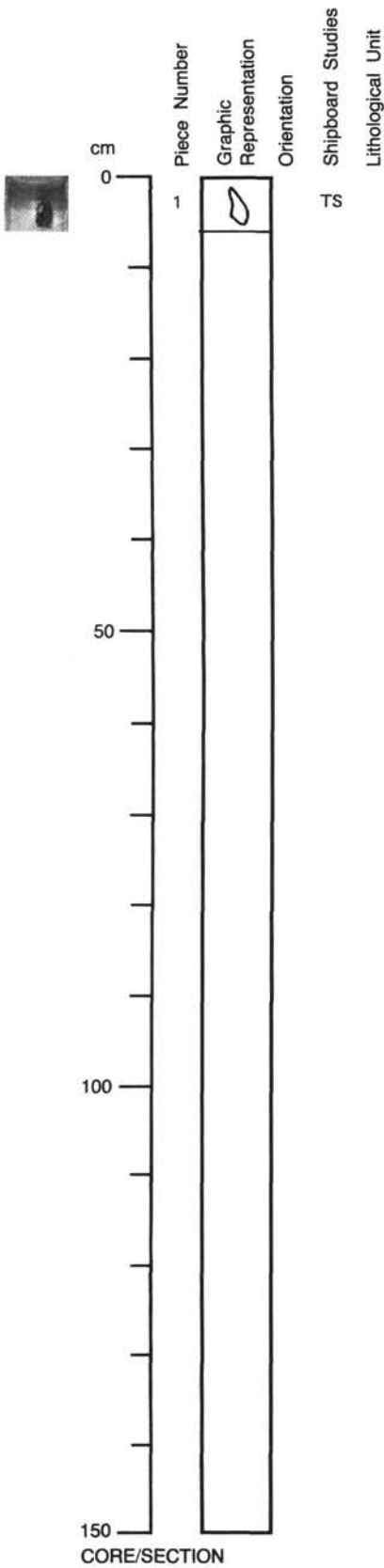
TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER				PALEOMAGNETICS	PHYS. PROPERTIES	CHEMISTRY	SECTION	METERS	GRAPHIC LITHOLOGY	DRILLING DISTURB. BED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION																																																																											
	FORAMINIFERS	NANNOFOSSILS	RADIOLARIANS	DIATOMS																																																																																				
PLEISTOCENE		NN 20-21							0.5 1.0 1				<p>VOLCANIC SAND, MUDDY SILICEOUS OOZE, GRAVEL, SANDY CLAY, and BASALT PEBBLES</p> <p>Core was forcibly extruded from barrel.</p> <p>Major lithologies:</p> <p>a. VOLCANIC SAND, very dark grayish brown (10YR 3/2), 90% of this interval, in Section 1, 0-70 cm. Medium-grained sand grading to coarse-grained sand. Composition is 90% volcanic sand fragments and <5% calcareous and siliceous microfossils. Volcanic sand is well-sorted; ~50% of grains are slightly rounded and 50% are angular to slightly rounded. MUDDY SILICEOUS OOZE, yellowish brown (10YR 5/4), 10% of this interval. 40 to 50% siliceous microfossils, <5% coccoliths, <5% broken foraminifers and 50% clay.</p> <p>b. Clasts of GRAVEL and MUDDY SILICEOUS OOZE, plus distinct gravel pieces, in Section 1, 70-95 cm. GRAVEL is black (10YR 2/1), 1-2 cm diameter, weathered basalt and serpentinite, and subrounded. MUDDY SILICEOUS OOZE is yellowish brown (10YR 5/4).</p> <p>c. SANDY CLAY, brown (10YR 5/3) to yellowish brown (10YR 5/4), with ~20-30% black volcanic gravel, 0.5-2.0 cm diameter; and ~10% coarse sand, very dark grayish brown (10YR 3/2), in Section 1, 95-135 cm.</p> <p>d. BASALT PEBBLES, black (10YR 2/1), 0.5-6.0 cm diameter, with ~30% very dark yellowish brown (10YR 5/4) MUDDY SILICEOUS OOZE, in Section 1, 135-150 cm. Largest clast is plagioclase-clinopyroxene-olivine phyric basalt. Olivine is totally oxidized; other clasts are weathered aphyric basalt.</p> <p>e. PEBBLES, 1-3 cm diameter, angular to subangular, comprising 2 pieces of micro breccia (greenschist facies), 24 pieces of weathered basalt, 5 pieces of greenstone, 9 pieces of diabase, 1 piece of amphibolite gneiss, 21 pieces of gabbro (including 1 coarse-grained rodingitized gabbroic vein in serpentinite), and 20 pieces of serpentinite, in Section 2. 5 cm³ of undifferentiated gravel (<1 cm diameter) to medium-grained sand. Representative pieces of each rock type are described separately.</p> <p>SMEAR SLIDE SUMMARY (%)</p> <table border="1"> <thead> <tr> <th></th> <th>1, 2 D</th> <th>1, 12 M</th> <th>1, 12 D</th> <th>1, 38 M</th> </tr> </thead> <tbody> <tr> <td>Sand</td> <td>80</td> <td>15</td> <td>95</td> <td>5</td> </tr> <tr> <td>Silt</td> <td>—</td> <td>5</td> <td>—</td> <td>5</td> </tr> <tr> <td>Clay</td> <td>20</td> <td>80</td> <td>5</td> <td>90</td> </tr> </tbody> </table> <p>TEXTURE:</p> <p>Sand 80 15 95 5 Silt — 5 — 5 Clay 20 80 5 90</p> <p>COMPOSITION:</p> <table border="1"> <thead> <tr> <th></th> <th>1, 2 D</th> <th>1, 12 M</th> <th>1, 12 D</th> <th>1, 38 M</th> </tr> </thead> <tbody> <tr> <td>Clay</td> <td>20</td> <td>1</td> <td>5</td> <td>90</td> </tr> <tr> <td>Diatoms</td> <td>—</td> <td>50</td> <td>—</td> <td>2</td> </tr> <tr> <td>Feldspar</td> <td>—</td> <td>10</td> <td>20</td> <td>—</td> </tr> <tr> <td>Foraminifers</td> <td>5</td> <td>5</td> <td>—</td> <td>—</td> </tr> <tr> <td>Nannofossils</td> <td>—</td> <td>5</td> <td>—</td> <td>2</td> </tr> <tr> <td>Quartz</td> <td>—</td> <td>5</td> <td>—</td> <td>—</td> </tr> <tr> <td>Radiolarians</td> <td>—</td> <td>Tr</td> <td>2</td> <td>—</td> </tr> <tr> <td>Rock frag.</td> <td>75</td> <td>5</td> <td>75</td> <td>5</td> </tr> <tr> <td>Silicoflag.</td> <td>Tr</td> <td>2</td> <td>—</td> <td>1</td> </tr> <tr> <td>Spicules</td> <td>—</td> <td>15</td> <td>—</td> <td>—</td> </tr> </tbody> </table>		1, 2 D	1, 12 M	1, 12 D	1, 38 M	Sand	80	15	95	5	Silt	—	5	—	5	Clay	20	80	5	90		1, 2 D	1, 12 M	1, 12 D	1, 38 M	Clay	20	1	5	90	Diatoms	—	50	—	2	Feldspar	—	10	20	—	Foraminifers	5	5	—	—	Nannofossils	—	5	—	2	Quartz	—	5	—	—	Radiolarians	—	Tr	2	—	Rock frag.	75	5	75	5	Silicoflag.	Tr	2	—	1	Spicules	—	15	—	—
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Information on Core Description Forms, for ALL sites, represents field notes taken aboard ship. Some of this information has been refined in accord with post-cruise findings, but production schedules prohibit definitive correlation of these forms with subsequent findings. Thus the reader should be alerted to the occasional ambiguity or discrepancy.



SITE 732 HOLE F CORE 2B CORED INTERVAL 4807.0-4822.8 mbsl; 0.0-15.8 mbsf

TIME-ROCK UNIT	BIOSTRAT. ZONE/ FOSSIL CHARACTER				PALEOMAGNETICS	PHYS. PROPERTIES CHEMISTRY	SECTION METERS	GRAPHIC LITHOLOGY	DISTURB. SED. STRUCTURES	SAMPLES	LITHOLOGIC DESCRIPTION																		
	FORAMINIFERS	MAMMOFOSSILS	RADIOLARIANS	DIATOMS																									
PLEISTOCENE		NN 20									<p>DIATOM OOZE</p> <p>Mud scraped from bit.</p> <p>Major lithology: DIATOM OOZE, white (10YR 8/1), 2 x 5 cr diameter, fine grained, with 3 or 4 basalt chips, each < 0.5 cm in length.</p> <p>SMEAR SLIDE SUMMARY (%):</p> <table style="margin-left: 40px;"> <tr> <td></td> <td>CC,</td> </tr> <tr> <td></td> <td>D</td> </tr> </table> <p>TEXTURE:</p> <table style="margin-left: 40px;"> <tr> <td>Sand</td> <td>2</td> </tr> <tr> <td>Silt</td> <td>8</td> </tr> <tr> <td>Clay</td> <td>90</td> </tr> </table> <p>COMPOSITION:</p> <table style="margin-left: 40px;"> <tr> <td>Acc. min.</td> <td>2</td> </tr> <tr> <td>Foraminifers</td> <td>1</td> </tr> <tr> <td>Diatoms</td> <td>92</td> </tr> <tr> <td>Spicules</td> <td>5</td> </tr> </table>		CC,		D	Sand	2	Silt	8	Clay	90	Acc. min.	2	Foraminifers	1	Diatoms	92	Spicules	5
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118-732A-1D-1

UNIT 1: RUBBLE

Piece 1: Mylonite

COLOR: Green-brown.

LAYERING: 1-5 mm, compositional, sequence cannot be determined (sample too small). Contact rather sharp between layers. Azimuth and dip cannot be determined, but are parallel to foliation.

DEFORMATION: Very strong mylonitic foliation, marked by flattened opaques. Lineation not visible. Azimuth and dip cannot be determined. Rotated augens indicate that simple shear was active during deformation. No variation in grain size visible.

PRIMARY MINERALOGY: Olivine, clinopyroxene(?), and oxides. Completely altered.

SECONDARY MINERALOGY:

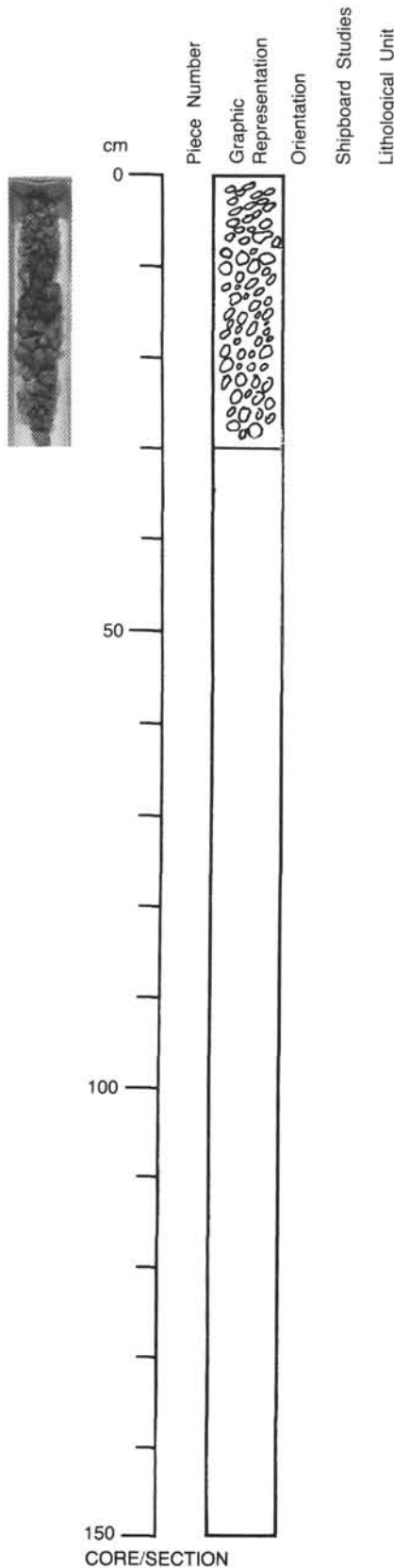
Total percent: 100%.

Texture: Approximately 1-mm-thick layer of actinolite + mixture of amorphous oxides in a fine-grained smectite(?). Rotated augens of opaques + actinolite and chlorite. Flattened opaques with chlorite rims in a matrix of fine-grained serpentine(?).

Percent vein material: Not determined.

Vein material: Not determined.

118-732B-1D-2



UNIT 2: GRAVEL*

Type 1: Micro Breccia (2 pieces)

GLASS: Not determined.
PHENOCRYSTS: None.
GROUNDMASS: Aphyric basalt grains and clasts, <2 mm, and albitized plagioclase clasts, <2 mm, are all subangular in a gray-green aphyritic matrix.
COLOR: Gray.
VESICLES: Not determined.
STRUCTURE: Massive, undeformed. Matrix supported breccia with 50% clasts.
ALTERATION: Moderately altered—replacement in clasts and matrix by chlorite, albite, and clay minerals.
VEINS/FRACTURES: None

Type 2: Aphyric to Sparsely Plagioclase Phyric Basalt (24 pieces)

GLASS: None, no contacts.
PHENOCRYST: Single crystals.
 Plagioclase—Trace (2-3%), 1-2 mm, subhedral, weathered, dull white surfaces.
GROUNDMASS: Microcrystalline.
COLOR: Gray, gray-brown, red-gray.
VESICLES: Rare. Less than 1 mm.
STRUCTURE: Rubble
ALTERATION: Weathered. Dull white plagioclase, altered to clays.
 Groundmass also altered to clays.
VEINS/FRACTURES: None.

Type 3: Metabasalt (5 pieces)

GLASS: None, no contacts.
PHENOCRYSTS: None.
GROUNDMASS: Microcrystalline.
COLOR: Red, gray, gray-green.
VESICLES: None.
STRUCTURE: Rubble.
ALTERATION: Moderately to heavily altered—appear to be metabasalts. Secondary mineralogy inferred to be chlorite, albite, actinolite, and some clays. Probably more than 50% of the original rock is altered.
VEINS/FRACTURES: None.

Type 4: Diabase (9 pieces)

GLASS: None, no contacts.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained. Random orientation. Intersertal to intergranular texture.
 Plagioclase—20-40%, less than 1 mm, euhedral, slightly altered to clays.
 Clinopyroxene—30-40%, less than 1 mm, subhedral, fresh.
COLOR: Gray, gray-brown, brown-gray.
VESICLES: None.
STRUCTURE: Layering. Massive.
ALTERATION: Groundmass moderately altered to clays(?), and chlorite(?).
VEINS/FRACTURES: None.

Type 5: Amphibolite Gneiss (1 piece—working half only)

COLOR: Layers of white and green-black.
LAYERING: <1-2 mm thick, discontinuous, lenticular alternating layers of fine-grained plagioclase and amphibole. Sharp contacts.
DEFORMATION: Foliation defined by phase layering. No lineation. Uniformly recrystallized.
PRIMARY MINERALOGY: Plagioclase and clinopyroxene—completely altered.
SECONDARY MINERALOGY:
 Total percent: 100%.
 Texture: <1 mm aggregates of amphibole and plagioclase.
 Percent vein material: None.
 Vein material: None.

118-732C-2D-1

UNIT 1: RUBBLE

Pieces 1-6

Piece 1: Plagioclase Phyric Basalt

GLASS: None, no contacts.
PHENOCRYSTS: Plagioclase—0.2-0.5 cm, partly altered.
GROUNDMASS: Fine-grained.
COLOR: Not determined.
VESICLES: None.
STRUCTURE: Rubble.
ALTERATION: Reddish oxide. Plagioclase phenocrysts partially altered.
VEINS/FRACTURES: Calcite vein coats part of one surface. No other veins.

Piece 2: Sparsely Plagioclase Phyric Basalt

GLASS: None, no contacts.
PHENOCRYSTS: Plagioclase.
GROUNDMASS: Very fine-grained.
COLOR: Not determined.
VESICLES: None.
STRUCTURE: Metabasalt(?).
ALTERATION: Red oxide. Two plagioclase phenocrysts have recrystallized rims.
VEINS/FRACTURES: None.

Piece 3: Highly Plagioclase Phyric Basalt

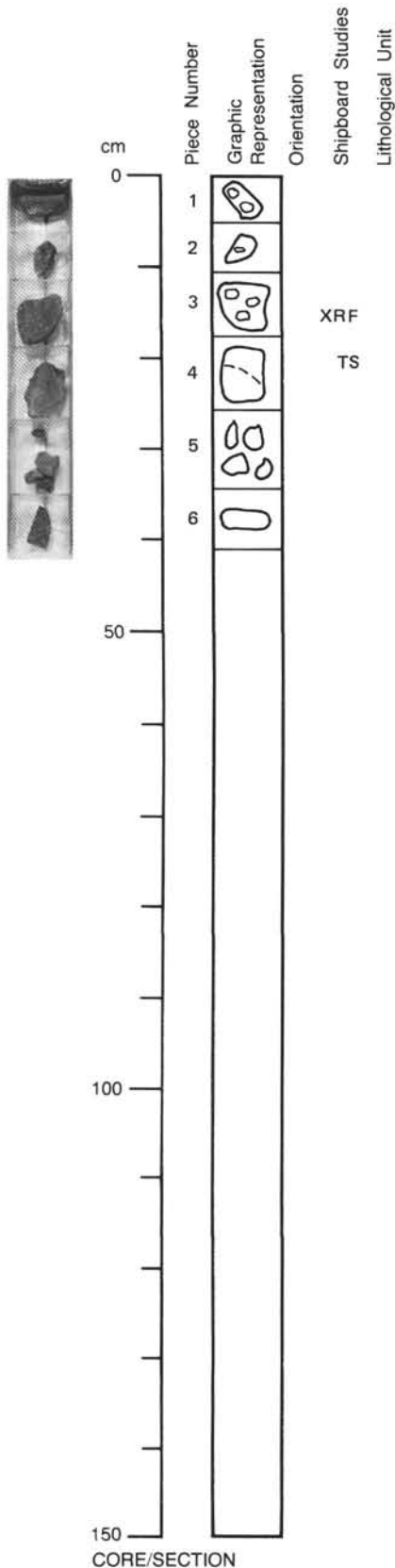
GLASS: None, no contacts.
PHENOCRYSTS: Plagioclase—10%, 0.2-0.5 cm, one megacryst 1 cm long.
GROUNDMASS: Fine-grained. Acicular plagioclase microlites.
COLOR: Dary gray, reddish tint.
VESICLES: None.
STRUCTURE: Not determined.
ALTERATION: Minor oxidative alteration to reddish oxides.
VEINS/FRACTURES: None.

Piece 4: Aphyric Basalt

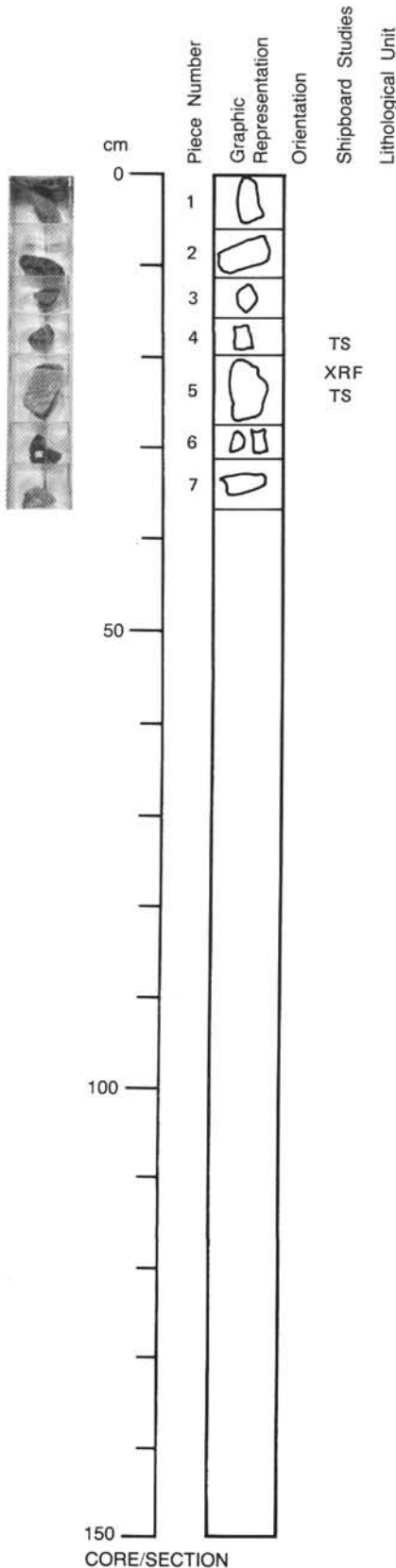
GLASS: None, no contacts.
PHENOCRYSTS: < 1% small plagioclase phenocrysts.
GROUNDMASS: Fine-grained, microlitic.
COLOR: Gray.
VESICLES: None, but some tiny, irregular cavities or pores can be seen.
STRUCTURE: Not determined.
ALTERATION: Faint reddish oxidative halo at one end, filling pore spaces in rock.
VEINS/FRACTURES: None.

Pieces 5 and 6: Indurated Mafic Sandstone

Cemented by iron-oxhydroxides. Sand grains are polymict—basalt, plagioclase, serpentine, and more.
 Grains are quite angular but well sorted.



118-732C-3D-1



UNIT 1: RUBBLE

Pieces 1-7

Piece 1: Aphyric Basalt

No description.

Piece 2: Gabbro

COLOR: Not determined.

LAYERING: Massive.

DEFORMATION: Plagioclase locally deformed and crystal edges granulated. Sample cut by fractures.

PRIMARY MINERALOGY:

Plagioclase—Mode: 68%.

Crystal size: 5-10 mm.

Crystal shape: Anhedral.

Preferred orientation: Locally deformed.

Percent replacement: 60% by clays and albite.

Clinopyroxene—Mode: 27%.

Crystal size: 5-10 mm.

Crystal shape: Anhedral.

Preferred orientation: Not determined.

Percent replacement: ~100% by amphibole with epidote.

Spinel—Mode: 5%.

Crystal size: 2-4 mm.

Crystal shape: Anhedral.

Preferred orientation: Not determined.

Percent replacement: Slightly altered to spinel.

SECONDARY MINERALOGY:

Total percent: ~70%.

Texture: Plagioclase, amphibole, clays, and epidote present.

Percent vein material: Not determined.

Vein material: Hematite/smectite vein. Also chlorite veins, chlorite + epidote veins, chlorite + epidote + amphibole veins, and epidote + amphibole + sphene veins.

Piece 3: Sparsely Plagioclase Phyric Basalt

No description.

Piece 4: Metagabbro

COLOR: Not determined.

LAYERING: Massive.

DEFORMATION: Mortar texture. Sample cut by fractures.

PRIMARY MINERALOGY:

Plagioclase—Mode: 44%.

Crystal size: 2-6 mm.

Crystal shape: Anhedral.

Preferred orientation: Not determined.

Percent replacement: ~50% by chlorite, epidote, hornblende, and albite.

Clinopyroxene—Mode: 42%.

Crystal size: 3-5 mm.

Crystal shape: Anhedral.

Preferred orientation: Not determined.

Percent replacement: ~50% by chlorite, amphibole, and hornblende.

Spinel—Mode: 2%.

Crystal size: Not determined.

Crystal shape: Anhedral.

Preferred orientation: Not determined.

Percent replacement: 50%.

Hornblende—Mode: 2%.

Crystal size: <1 mm.

Crystal shape: Euhedral.

Preferred orientation: Not determined.

Percent replacement: 50%.

SECONDARY MINERALOGY:

Total percent: ~60%.

Texture: Chlorite, epidote, hornblende, and albite replaces plagioclase. Albite forms an anastomosing network. Magnetite in pseudomorphs with amphibole. Clinopyroxene replaced by chlorite, amphibole, and hornblende.

Percent vein material: Not determined.

Vein material: Not determined.

118-732C-3D-1 (continued)

Piece 5: Gabbroic Gneiss

COLOR: Not determined.

LAYERING: Gneissic.

DEFORMATION: Foliated. Sample cut by fractures.

PRIMARY MINERALOGY:

Plagioclase—Mode: 60%.

Crystal size: 1-10 mm.

Crystal shape: Porphyroblasts, crushed or locally recrystallized.

Preferred orientation: Not determined.

Percent replacement: ~50% by chlorite, epidote, and amphibole.

Green hornblende—Mode: 40%.

Crystal size: 1-10 mm.

Crystal shape: Porphyroblasts, kinked and recrystallized.

Preferred orientation: Not determined.

Percent replacement: ~25% by amphibole.

SECONDARY MINERALOGY:

Total percent: ~55%.

Texture: Plagioclase is crushed and locally recrystallized into very small grains (<0.1 mm) or replaced by epidote-amphibole aggregates. Green hornblende replaced by amphibole. Epidote found in aggregates elongated in the foliation.

Percent vein material: Not determined.

Vein material: Epidote.

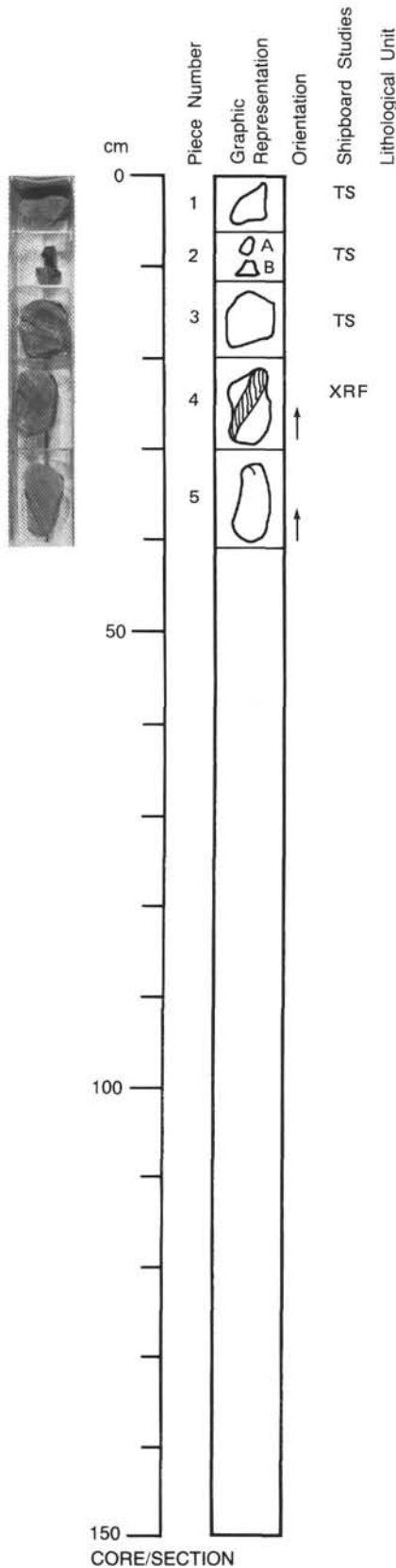
Piece 6: Lithic Sandstone

No description.

Piece 7: Aphyric Basalt

No description.

118-732D-1D-1



UNIT 1: RUBBLE

Pieces 1-5

Piece 1: Sparsely Plagioclase Phyric Basalt

GLASS: None, no contacts.
PHENOCRYSTS: Plagioclase—<0.2-0.5 cm.
GROUNDMASS: Fine-grained. Has two ~0.5 cm gabbroic(?) clots.
COLOR: Not determined.
VESICLES: ~2% filled by chlorite(?).
STRUCTURE: Rubble.
ALTERATION: Plagioclase phenocrysts partly altered to clays. Chlorite(?) replacing groundmass.
VEINS/FRACTURES: Veins of quartz, oxides, and chlorite(?).

Piece 2A: Aphyric Basalt

No description.

Piece 2B: Pyroxene Gabbro

COLOR: Not determined.
LAYERING: Not determined.
DEFORMATION: Not determined.
PRIMARY MINERALOGY: Plagioclase, pyroxene, and oxides. Very coarse-grained.
SECONDARY MINERALOGY: Clays and amphibole. Rock only slightly altered.

Piece 3: Serpentinized Harzburgite

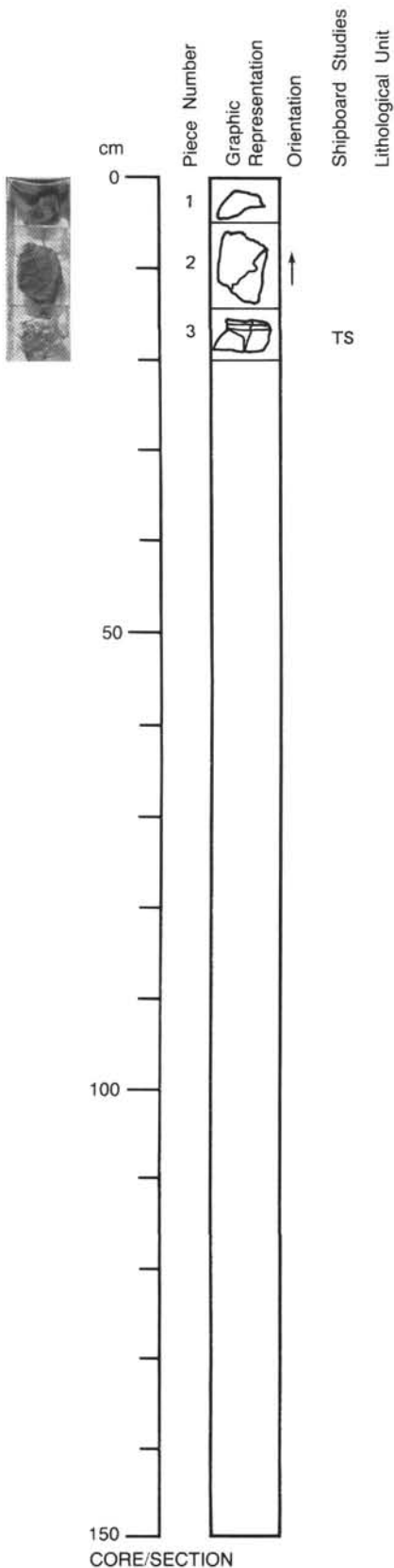
COLOR: Not determined.
LAYERING: Not determined.
DEFORMATION: Pyroxene elongation defines a rough foliation.
PRIMARY MINERALOGY: Olivine and pyroxene.
SECONDARY MINERALOGY: Serpentine. Rock is completely altered.

Piece 4: Diabase with Basalt Dikelet

GLASS: Not determined.
PHENOCRYSTS: Plagioclase.
GROUNDMASS: Fine-grained. Plagioclase, pyroxene, and oxides.
COLOR: Gray.
VESICLES: None.
STRUCTURE: Not determined.
ALTERATION: Clays and amphibole.
VEINS/FRACTURES: 1 cm thick dikelet cuts sample.

Piece 5: Plagioclase Phyric Basalt

No description.



118-732E-1R-1

UNIT 1: RUBBLE

Pieces 1-3

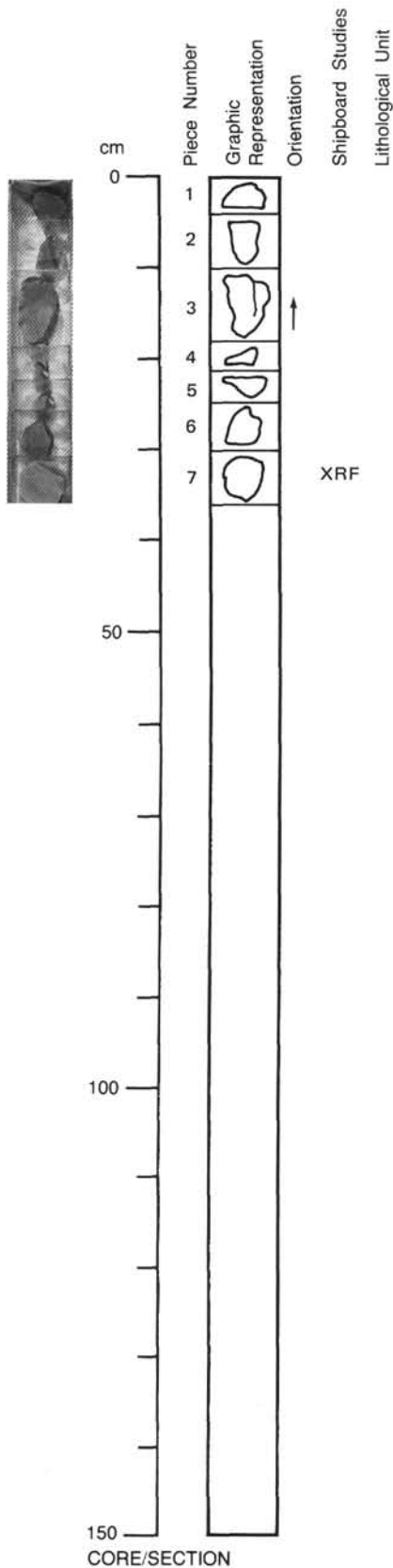
Pieces 1 and 2: Diabase

No description.

Piece 3: Highly Plagioclase Phyric Basalt

- GLASS:** None, no contacts.
- PHENOCRYSTS:** Plagioclase—25%, 2-6 mm, euhedral, slightly altered to chlorite and prehnite.
- GROUNDMASS:** Fine- to medium-grained. Plagioclase, pyroxene, and opaques.
- COLOR:** Not determined.
- VESICLES:** Trace. Mostly filled by chlorite with minor prehnite and actinolite.
- STRUCTURE:** Rubble.
- ALTERATION:** Slightly altered to chlorite, actinolite, and prehnite.
- VEINS/FRACTURES:** Veins of zeolite(?) and chlorite(?).

118-732F-1R-1



UNIT 1: RUBBLE

Pieces 1-7

Piece 1: Moderately Olivine Phyric Basalt

GLASS: None, no contacts.
PHENOCRYSTS: Homogeneous distribution. Olivine, 3-5%, 0.5 mm, subhedral, 100% altered to clay minerals.
GROUNDMASS: Microcrystalline.
COLOR: Dark gray.
VESICLES: None.
STRUCTURE: Rubble.
ALTERATION: Slightly altered. Olivine 100% altered to clay minerals.
VEINS/FRACTURES: None.

Pieces 2, 3, 5, and 6: Aphyric Diabase

GLASS: None, no contacts.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained.
COLOR: Dark gray.
VESICLES: None.
STRUCTURE: Rubble.
ALTERATION: Slightly altered.
VEINS/FRACTURES: Piece 3: Oxidation halo along empty(?) fracture.

Pieces 4 and 7: Aphyric Basalt

GLASS: None, no contacts.
PHENOCRYSTS: None.
GROUNDMASS: Fine-grained.
COLOR: Gray.
VESICLES: None.
STRUCTURE: Rubble.
ALTERATION: Fresh.
VEINS/FRACTURES: Small fracture in each piece.

THIN SECTION DESCRIPTION

118-732A-1D-1 (Piece 1, 0-2 cm)

ROCK NAME: Serpentinized peridotite/mylonite

WHERE SAMPLED: Rubble

TEXTURE: Mylonitic

GRAIN SIZE: Fine

OBSERVER: DCK

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Olivine	—	75	0.1-0.5	Ferric chromite		Fine-grained aphanitic. Completely altered to serpentine.
Pyroxene	—	(?)				
Spinel	—	Tr				
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				COMMENTS
Clays	5	Ol(?), amphibole				Honey colored mineral. Very fine-grained. Represents possible alteration of relict ol or amphibole. Coarser amphibole is stained brown suggesting that the honey-colored mineral is partially replacing amphibole rims.
Chlorite	Tr	Chromite				Rims around ferric chromite (which has replaced spinel).
Serpentine	80	Ol, px				Identification questionable, possibly smectite. Typically very fine-grained. Defines foliation. Anedral. Intergrown with serpentine.
Amphibole(?)	10	Px(?)				
Magnetite	5	Ol, px				

COMMENTS: Fine-grained mylonite. Occasional augen consist of serpentine after px + ferric chromite after spinel. Amphibole(?) schlieren also present; probably represent a replacement of smeared out primary px. Foliation defined by amphibole(?) laths, schlieren, serpentine replacing oriented, elongated ol crystals, and rotated serpentine sheaves.

THIN SECTION DESCRIPTION

118-732B-1D-2 (Piece 1, 5-6 cm)

ROCK NAME: Gabbro gneiss

WHERE SAMPLED: Rubble

TEXTURE: Gneissic

GRAIN SIZE: Fine

OBSERVER: STA

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Clinopyroxene	30	(?)	0.25		Granular Anhedral	Cores are replaced.
Spinel	2	2				
Orthopyroxene	Tr	8				
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				COMMENTS
Plagioclase	50	Plag				Crystal size ranges 0.1-0.3 mm. Granular texture. Metamorphic, recrystallize.
Bastite	8	Opx				Fine-grained. Replacing cpx cores.
Hornblende	10	Cpx				Brown.

COMMENTS: Most of the cpx could be metamorphic. Two stages of deformation: 1) recrystallization of plag + cpx, granulite facies; 2) replacement of opx by bastite. Cpx is recrystallized during deformation, but not opx.

THIN SECTION DESCRIPTION

118-732B-1D-2 (Piece 1, 6-7 cm)

ROCK NAME: Diabase

WHERE SAMPLED: Rubble

TEXTURE: Subophitic

GRAIN SIZE: Medium

OBSERVER: STA, CAN

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	40	50	L(max) = 3.5 W(max) = 1.0		Subhedral	Clear sodic rims. Locally replaced by actinolite.
Clinopyroxene	20	30	L(max) = 1.5 W(max) = 1.0		Subhedral	Replaced by clay and epidote.
Magnetite	10	10	< 0.5		Subhedral	Fresh.
Olivine	—	10				
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				COMMENTS
Clays	10	Ol				Fe-stained smectites.
Chlorite	2	Plag				Pale, blue interference colors.
Epidote	10	Cpx				Yellow, very small grains.
Actinolite	8	Plag				Acicular.

COMMENTS: Greenschist facies overprint.

THIN SECTION DESCRIPTION

118-732B-1D-2 (Piece 1, 7-8 cm)

ROCK NAME: Aphyric diabase

WHERE SAMPLED: Rubble

TEXTURE: Equigranular, holocrystalline

GRAIN SIZE: Fine

OBSERVER: KEM

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	40	50	0.1-0.6		Anhedral, blocky	Replaced by clays. Dusty appearance.
Clinopyroxene	23	23	0.15-0.25		Anhedral, equant	
Oxides	7	7	0.05-0.15	Fe-Ti	Anhedral, equant	
Olivine	—	20				Replaced by clay.
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				COMMENTS
Clays	10	Plag				Occurs along veins and cracks.
Clays	20	Ol				Brown, interstitial. Replaces ol.

THIN SECTION DESCRIPTION

118-732B-1D-2 (Piece 1, 8-9 cm)

ROCK NAME: Serpentinite

WHERE SAMPLED: Rubble

TEXTURE: Mesh texture

GRAIN SIZE:

OBSERVER: KEM

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Clinopyroxene	2	(?)				Partially replaced by serpentine.
Spinel	Tr	Tr		Chromian		
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				COMMENTS
Magnetite	2					
Serpentinite	96					Bastite. Replaces all primary phases.

COMMENTS: Possibly after peridotite.

THIN SECTION DESCRIPTION

118-732B-1D-2 (Piece 1, 9-10 cm)

ROCK NAME: Vein from metagabbro(?)

WHERE SAMPLED: Rubble

TEXTURE: No longer apparent.

GRAIN SIZE: Coarse

OBSERVER: KEM

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	—	(?)				
Clinopyroxene	—	5(?)				
Orthopyroxene	1	1				
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS
Actinolite	4	Px				Colorless. Replaces cpx(?). Forms whiskers on cpx pseudomorphs. Ghost outlines of plag and plag twins in prehnite.
Prehnite	90	Plag(?)				
Serpentine	5					

COMMENTS: This rock is composed totally of secondary minerals. Primary texture and most primary mineralogy is no longer apparent. Orthopyroxene is the only primary mineral remaining. Cpx pseudomorphs are composed of actinolite + serpentine.

THIN SECTION DESCRIPTION

118-732B-1D-2 (Piece 1, 10-11 cm)

ROCK NAME: Aphyric basalt

WHERE SAMPLED: Rubble

TEXTURE: Intergranular

GRAIN SIZE: Microcrystalline

OBSERVER: STA, CAN

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	30	40	<0.1		Euhedral, laths	Extensively altered to colorless clay.
Clinopyroxene	30	30	<0.1		Euhedral, laths	Partially altered to Fe-stained clays.
Magnetite	10	10	0.01		Subhedral	Fresh.
Glass	—	10				Altered to clay.
Olivine	—	10				Replaced by red Feoxyhydroxide + clay(?).
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS
Clays	30	Plag, ol, glass				Fe-stained clay replacing cpx. Clay (smectite?) also replaces an inclusion(?) in a magnetite crystal.

COMMENTS: Low temperature oxidation.

THIN SECTION DESCRIPTION

118-732B-1D-2 (Piece 1, 11-12 cm)

ROCK NAME: Metagabbro

WHERE SAMPLED: Rubble

TEXTURE: Holocrystallin

GRAIN SIZE: Coarse

OBSERVER: STA

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	40	80	>3		Euhedral	Cut extensively by veins.
Clinopyroxene	10	18	3		Euhedral	Amphibole pseudomorphs after cpx.
Spinel	2	2				
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS
Chlorite	2	Plag(?)				Filling veins in cpx. One large vein through plag.
Albite	30	Plag(?)				
Epidote	10	Veins				
Actinolite	5	Plag, cpx				

COMMENTS: Feldspar percentages based on the following distinctions: plag, twinned cores; albite, clear pseudomorphs or turbid regions due to epidote inclusions.

One large vein of clinozosite(?).

Grains are crushed, but not deformed.

THIN SECTION DESCRIPTION

118-732C-2D-1 (Piece 3, 14-17 cm)

ROCK NAME: Moderately plagioclase phyric basalt

WHERE SAMPLED: Rubble

TEXTURE: Porphyritic

GRAIN SIZE: Fine

OBSERVER: KEM

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	—	1	1.0-1.2		Subhedral	Microphenocrysts. Altered to clays.
Plagioclase	4	4	0.5-6.0		Subhedral	Skeletal overgrowths. Zoned and twinned crystals. Altered to clays.
GROUNDMASS						
Plagioclase	40	45	0.1-0.5		Subhedral	Quench overgrowths.
Clinopyroxene	10	10	< 0.1		Subhedral	Occurs in interstices of plag crystals.
Olivine	—	8	0.1-0.2		Subhedral, skeletal	Altered to clays and red mineral (oxide?).
Cryptocrystalline groundmass	30	30	< 0.1			Unidentified groundmass.
Oxides	1	1	< 0.1		Subhedral	Elongate habit, acicular.
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				COMMENTS
Clays	Tr	Plag				Filling thin cracks and veinlets in phenocrysts.
Clays	13	Ol, plag				Substantial replacement of groundmass ol. Local replacement of groundmass plag.
Zeolites	1					Spherical morphology. Replaces some ol.
Chlorite	1	Ol				

THIN SECTION DESCRIPTION

118-732C-2D-1 (Piece 4, 19-21 cm)

ROCK NAME: Aphyric basalt

WHERE SAMPLED: Rubble

TEXTURE: Microporphyritic

GRAIN SIZE: Microcrystalline

OBSERVER: KEM

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	—	1	0.25-0.50		Subhedral, skeletal	Totally replaced by calcite.
Plagioclase	10	20	0.5-1.0		Subhedral, skeletal	Partially altered to albite(?) + clays.
Clinopyroxene	< 1	< 1	0.25	Augite	Anhedral	
GROUNDMASS						
Plagioclase	49	50	≈ 0.5		Skeletal, sheaves	Quench texture.
Cryptocrystalline groundmass	23	23				Unidentified mineralogy.
Oxides	1	1	< 0.01	Magnetite(?)	Anhedral, equant	
Clinopyroxene	5	5	< 0.2	Augite	Anhedral	Interstitial between plag sheaves.
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				
Clays	1	Plag				
Carbonate	1	Ol				
Albite	10	Plag				

COMMENTS: Rapidly cooled basalt with quench crystallization textures.

THIN SECTION DESCRIPTION

118-732C-3D-1 (Piece 2, 5-10 cm)

ROCK NAME: Metagabbro

WHERE SAMPLED: Rubble

TEXTURE: Holocrystalline

GRAIN SIZE: Coarse

OBSERVER: KEM

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	20	68	5-10		Anhedral	Dusty appearance. Altered to clays + albite.
Clinopyroxene	Tr	27	5-10		Anhedral	Completely replaced by amphibole ± epidote.
Spinel	3	5	2-4		Anhedral	
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				COMMENTS
Chlorite	13	Veins				Also in large patches in between granulated plag.
Albite	20	Plag				Replaces plag in a network fashion associated with chlorite and epidote.
Epidote	15	Veins, plag				
Actinolite	27	Cpx, veins				Green to yellow pleochroism.
Sphene	2	Fe-Ti oxides				

COMMENTS: Plag locally deformed and crystal edges granulated (incipient mortar texture).
Veins include chlorite, chlorite + epidote, chlorite + epidote + amphibole, epidote + amphibole + sphene.
Xenolith(?) quench basalt on margin.

THIN SECTION DESCRIPTION

118-732C-3D-1 (Piece 4, 15-18 cm)

ROCK NAME: Metagabbro

WHERE SAMPLED: Rubble

TEXTURE: Mortar

GRAIN SIZE: Very coarse

OBSERVER: STA

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	20	51	2-6		Anhedral	
Clinopyroxene	20	45	3-5		Anhedral	
Spinel	1	2			Anhedral	
Hornblende	1	2	< 1		Anhedral	Red-brown.
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				COMMENTS
Chlorite	5	Plag				
Albite	5	Plag				Anastomosing pattern.
Epidote	1	Plag				Epidote + chlorite replaces plag.
Actinolite	15	Cpx, hbd, plag				Occurs with chlorite, along plag-cpx boundaries.
Hornblende	10	Plag, cpx				Green and brown.
Plagioclase	20	Plag				Granular. Mortar structure.
Prehnite	1	Plag				
Magnetite	1	Spinel				In pseudomorphs with amphibole.

THIN SECTION DESCRIPTION

118-732C-3D-1 (Piece 5, 20-23 cm)

ROCK NAME: Foliated metagabbro

WHERE SAMPLED: Rubble

TEXTURE: Porphyroclastic

GRAIN SIZE: Fine to coarse

OBSERVER: CAN

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	—	60	1-10			
Hornblende	30	40	1-10			Green. Partially recrystallized. Kinked crystals.
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				COMMENTS
Actinolite(?)	15	Plag, hbd				Composition could be an actinolitic hornblende.
Plagioclase	25	Plag				Some porphyroclasts. Crushed or locally recrystallized in very small grains or in an epidote + actinolite aggregate.
Chlorite	< 1	Plag				
Epidote	30	Plag				Found in aggregates defining foliation and in the crosscutting veins.

COMMENTS: The gabbro was first metamorphosed in the green hbd + plag facies. The crushing deformation developed in the actinolite or actinolitic hbd + plag + epidote facies.
Epidote crystallization in veins continued after deformation.

THIN SECTION DESCRIPTION

118-732D-1D-1 (Piece 1, 0-5 cm)

ROCK NAME: Sparsely plagioclase phyric basalt

WHERE SAMPLED: Rubble

TEXTURE: Porphyritic, vesicular

GRAIN SIZE: Fine

OBSERVER: KEM

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	1	2	0.5-2.5		Anhedral	Large patches altered to chlorite + epidote.
GROUNDMASS						
Plagioclase	45	50	0.1-0.6		Skeletal, acicular	Sheaf texture.
Clinopyroxene	25	25	<0.1		Anhedral	Pinkish-brown color. Intersertal texture.
Oxides	1	1	<0.01	Fe-Ti	Anhedral, equant	
Olivine	—	22				Completely replaced by chlorite.
SECONDARY MINERALOGY						
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				COMMENTS
Chlorite	23	Ol, plag.				Also fills vesicles and veins.
Epidote	2	Plag, veins				Occurs with chlorite in veins.
Quartz	2	Plag, veins				Occurs with epidote, replacing plag. Deformed during vein filling.
Oxides	1	Veins				Fe-Ti oxides. Yellowish brown to red oxides. Occurs with chlorite in veins.

VESICLES / CAVITIES	PERCENT	LOCATION	SIZE RANGE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	2	Even	1	Chlorite	Round	Filled by chlorite.

COMMENTS: Difficult to determine how much matrix has been altered due to greenschist facies metamorphism. Phenocrysts and microphenocrysts may be albitized.

THIN SECTION DESCRIPTION

118-732D-1D-1 (Piece 2B, 7-9 cm)

ROCK NAME: Ferrogabbro

WHERE SAMPLED: Rubble

TEXTURE: Orthocumulate

GRAIN SIZE: Very coarse

OBSERVER: STA

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	25	30	< 10			
Clinopyroxene	25	30	2-5			Replaced by actinolite.
Spinel	20	20	3-8			
Orthopyroxene	5	10			Anhedral	Replaced by serpentine + magnetite.
Hornblende	7	10			Anhedral	Brown. Late, intercumulus.
Apatite	Tr					
SECONDARY MINERALOGY						
SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING				
Serpentine	5	Opx(?)				
Clays	3	Hbd				
Actinolite	10	Hbd, plag, px				

THIN SECTION DESCRIPTION

118-732D-1D-1 (Piece 3, 12-18 cm)

ROCK NAME: Serpentinized harzburgite

WHERE SAMPLED: Rubble

TEXTURE: Porphyroclastic

GRAIN SIZE: Coarse

OBSERVER: CAN

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
Olivine	—	70				Completely altered to serpentine. Coarse mesh texture. Altered to magnetite. Partially plucked during polishing. Bastite pseudomorphs after both opx and cpx. Difficult to distinguish between the two px pseudomorphs; rough estimation 25% opx, 5% cpx.
Spinel	Tr	1	1		Lobate	
Pyroxene	—	29	1-5			

SECONDARY MINERALOGY	PERCENT	REPLACING / FILLING	COMMENTS
Serpentine	98	Ol, px	Bastite pseudomorphs after both opx and cpx.
Magnetite	2	Ol, spinel	Occurs as rims around spinel and as scattered grains in serpentine after ol.

COMMENTS: Elongation of px aggregates defines a rough foliation.

THIN SECTION DESCRIPTION

118-732D-1D-1 (Piece 4, 21-25 cm)

ROCK NAME: Moderately plagioclase phyric basalt

WHERE SAMPLED: Rubble

TEXTURE: Subophitic, intersertal

GRAIN SIZE: Fine

OBSERVER: BLM

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	5:5	5:5			Euhedral	One large crystal in host. One crystal in dike. Crystal in dike may be originally from host rock (based on cpx and opaque inclusions). Amphibole ± epidote ± albite occur along rectilinear fractures in the plag.
GROUNDMASS						
Clinopyroxene	32:30	32:30	0.1-0.4		Anhedral	Pronounced alignment in host. Skeletal crystals occur in dikelet.
Plagioclase	39:43	42:45	0.3-1.0		Subhedral	
Spinel	4:10	4:10	0.05-1.00		Anhedral	
Mesostasis	0:0	17:10				
SECONDARY MINERALOGY						
Clays	3(?) : 0	Mesostasis				Probably smectite.
Chlorite	1:2	Mesostasis				Occurs along fractures in plag. Pale green patches alter mesostasis. Also in fractures in plag.
Albite	1:2	Plag				
Actinolite	15:8	Mesostasis				

COMMENTS: 1 cm dike cuts sample (constitutes approximately 20% of the slide). Percentages refer to ROCK:DIKE estimates. Dike has higher percentage of opaques, and is generally finer-grained (0.1 mm average grain size). Dike has a fine-grained border on one side that looks like recrystallized host rock (equigranular, 0.02-0.05 mm grain size).

THIN SECTION DESCRIPTION

118-732E-1R-1 (Piece 3, 17-20 cm)

ROCK NAME: Highly plagioclase phyric diabase

WHERE SAMPLED:

TEXTURE: Porphyritic, ophitic

GRAIN SIZE: Medium

OBSERVER: MEY, STA

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE RANGE (mm)	APPROX. COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	51	55	2-6		Euhedral	Homogeneous cores. Narrow, strongly zoned rims. Altered melt inclusions in cores.
Spinel	Tr	Tr	<0.1	Chromian	Euhedral	Inclusions in plag.
GROUNDMASS						
Plagioclase	22	30	0.4-1.0		Anhedral	Small oikocrysts ophitically enclose plag.
Oxides	2	2	0.1-0.4	Fe-Ti	Subhedral	
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS
Chlorite	7	Plag, veins				
Actinolite	5	Plag, cpx		Also in interstitial areas.		
Prehnite	3	Plag, veins				
VESICLES / CAVITIES	PERCENT	LOCATION	SIZE RANGE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	Tr		1.0	Chlorite ± prehnite ± actinolite	Spherical	One vesicle. Mostly filled with chlorite except for small interior spheres of prehnite.

COMMENTS: Percentages based on 750 point counts.