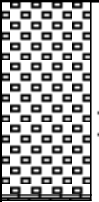

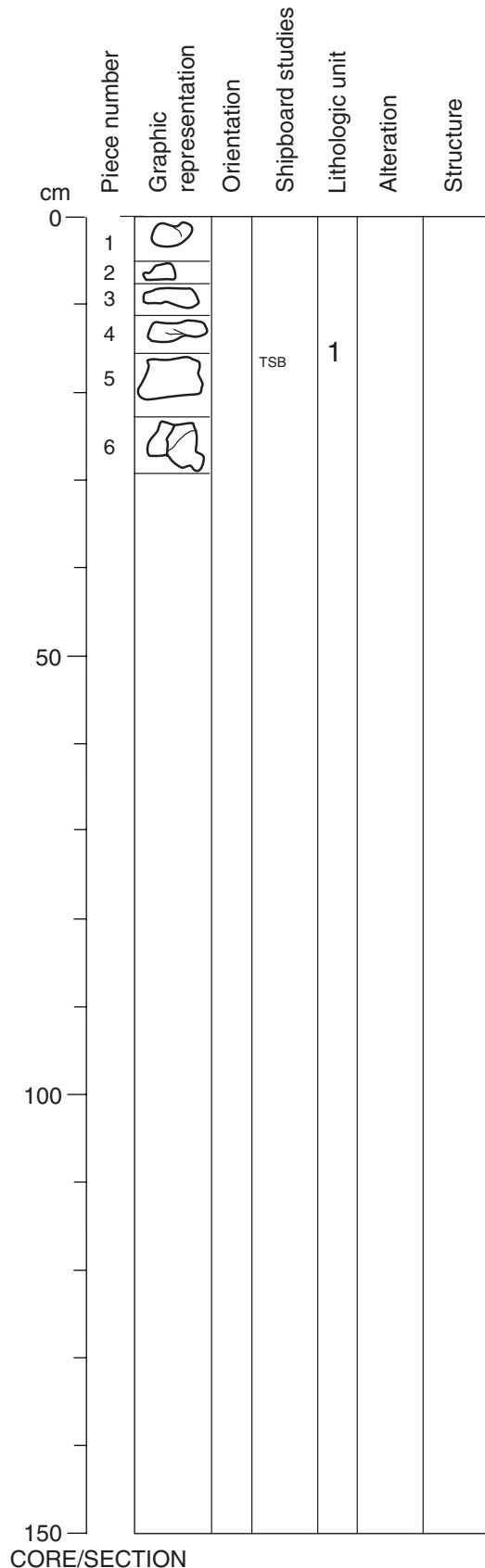


Core Photo

187-1160A-1W (0.0 - 166.0 mbsf)					
METERS	CORE AND SECTION	GRAPHIC LITH.	DISTURB.	COLOR	DESCRIPTION
1				mlt BR WH mdk BR med BR	<p>CALCAREOUS OOZE</p> <p>This wash barrel contains variably colored calcareous clay. Intervals range from 1 cm to 20 cm thick, and vary from white silty clay, to dark brown clay, with rare light gray silty clay layers. Nearly all contacts between layers are sharp but irregular, some over as much as 1 cm. There are rare diffuse contacts, but these may be artifacts of rotary drilling. All intervals effervesce in 10% HCl. From 0 to 45 cm in Section 187-1160A-1W-1 is a severely drilling disturbed interval, below that drilling disturbance is manifested as deformed convex contacts bending down section along core margins and smearing of intervals along the core liner. From 62 to 82 cm in Section 1W-1 is a chalky textured, densely packed, white silty clay. From 94 cm in Section 1W-1 to the base of the core catcher section, the mud is predominantly shades of medium to medium dark brown clay, with a high calcareous component. The bottom 5 cm of the core catcher section contain lithified, subangular to subrounded, 1 to 4 cm sized pieces of carbonate-rich sediment, with abundant mm sized Mn Oxide grains.</p>

Core Photo



187-1160A-2R-1

UNIT 1: APHYRIC BASALT

PIECES 1-6

INTERNAL CONTACTS: Variably palagonitized glassy margin in Piece 2 with a thickness <<1 mm.

GROUNDMASS: Microcrystalline

COLOR: Buff to medium gray

VEVICLES:

Abundance %	Size (mm)			Shape
	avg.	max.	min.	
<1	0.1	1.5	<0.1	round to elongated

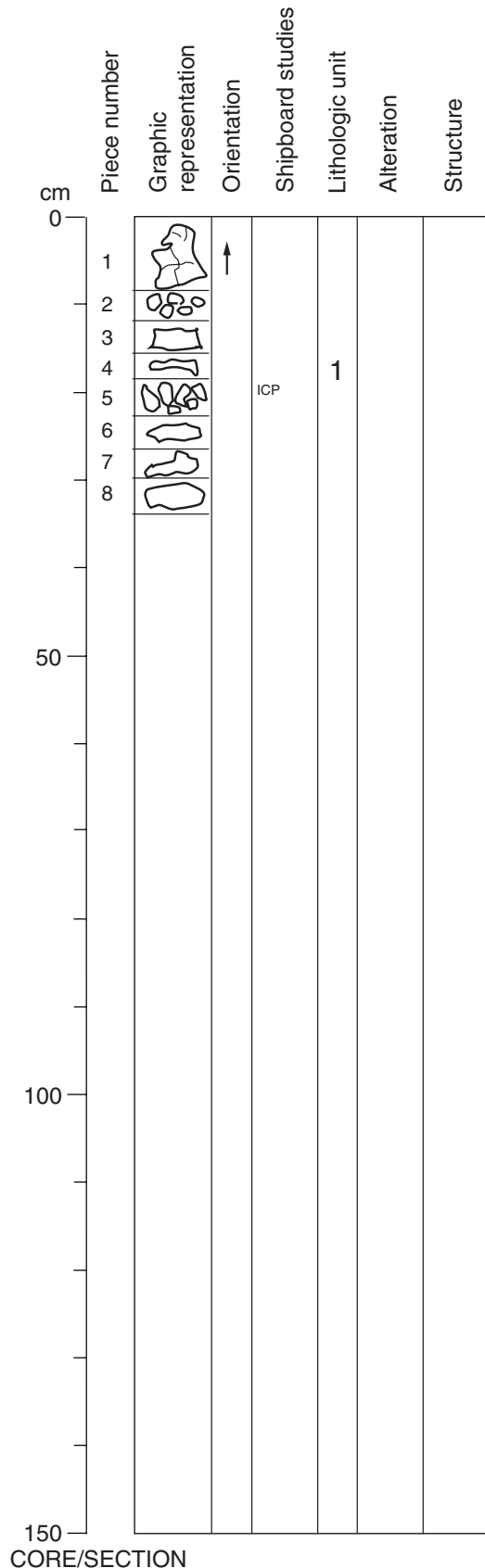
Filling: Variable within a single piece, may be unfilled, lined, partially filled or completely filled by light green clay, yellow clay, Mn oxides, Fe oxyhydroxide, cryptocrystalline blue silica and crystalline quartz. In Piece 3, large vesicles (up to 1 mm) are located in oxidized margin filled with white-pinkish clays, crystalline quartz, and Fe oxyhydroxide.

VEINS/FRACTURES: Piece 6 contains 2 open fractures (<1 mm wide) lined with Fe oxyhydroxide and Mn oxide. They are surrounded by oxidation halos (1 to 3 mm wide).

ALTERATION: Overall the section is slightly to moderately altered. All pieces have oxidation margins ranging from 4 to 8 mm. The outer surfaces of Pieces 3 and 6 have a patchy coating of yellow clay with small (~0.2 mm in diameter) Mn oxide spots and quartz.

ADDITIONAL COMMENTS: Some pieces have sparse iddingsitized olivine and some fresh plagioclase (e.g., Pieces 4 and 5).

Core Photo



187-1160A-3R-1

UNIT 1: APHYRIC BASALT

PIECES 1-8

INTERNAL CONTACTS: Variably palagonitized glassy margin in pebbles (Pieces 2 and 5) ranging from 1.5 to 2 mm.

GROUNDMASS: Microcrystalline

COLOR: Buff to medium gray

VESICLES:

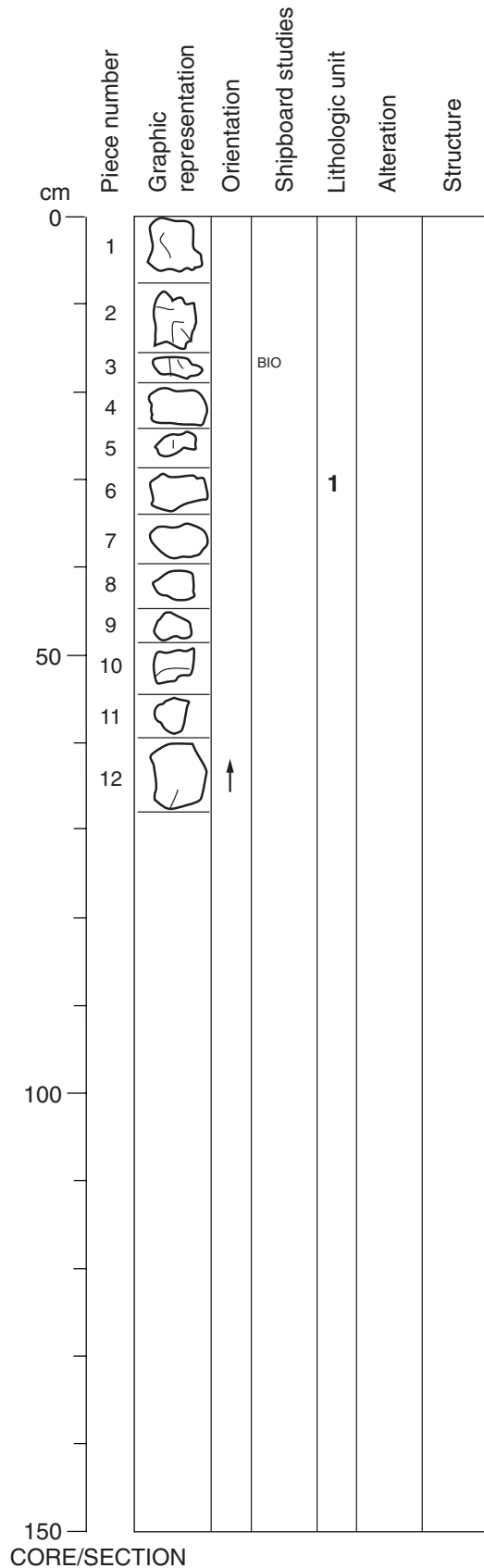
Abundance %	Size (mm)		Shape
	avg.	max. min.	
<1	0.1	1.5 <0.1	round to elongated

Filling: Variable along the section and within a single piece. Vesicles are unfilled, lined, partially filled or completely filled by light green clay, yellow clay, Mn oxide, Fe oxyhydroxide cryptocrystalline blue silica, or crystalline quartz. In Piece 1, patchy vesicles are more abundant in the oxidation margin and are filled with Fe oxyhydroxide and Mn oxide.

VEINS/FRACTURES: Piece 1 contains an open fracture (1 mm wide) lined with Fe oxyhydroxide and Mn oxide. It is surrounded by an oxidation halo (1 to 9 mm wide).

ALTERATION: Overall the section is slightly to moderately altered, variable within a single piece (e.g., Piece 1). Concentric alteration rings (Lysegang rings) have an increasing alteration gradient from the center to the outermost ring (e.g., Pieces 1, 3, 7, and 8). The most altered areas are in the rims and along fracture haloes (e.g., Piece 1). All pieces have oxidized margins ranging from 1 to 6 mm. The outer surface of Pieces 3 and 6 have a patchy coating of white clay with small (~0.1 mm in diameter) Mn oxide spots and quartz. Mn oxide grains are present on the outer surfaces (e.g., Pieces 2, 4, and 7).

Core Photo



187-1160B-1W-1

UNIT 1: APHYRIC BASALT

PIECES 1-12

INTERNAL CONTACTS: Glass rinds and chilled margins are present in Pieces 1, 2, 3, and 5. The thickness of glass margins varies from 0.8 to 1 cm. Palagonite layers are up to 0.5 mm thick and cover and the outermost glass rinds 0.3-0.5 mm palagonite veins dissect the glass subparallel to the quenched margin.

GROUNDMASS: Fine-grained

COLOR: Buff to medium gray

VESICLES:

Abundance %	Size (mm)			Shape
	avg.	max.	min.	
<1	0.25	0.75	0.1	round

Filling: Variable even within a single piece ranging from unfilled, lined, partially filled or completely filled with light green clay, yellow clay, Mn oxides and crystalline quartz.

VEINS/FRACTURES: Open fracture (0.5 mm wide) is present in Piece 10.

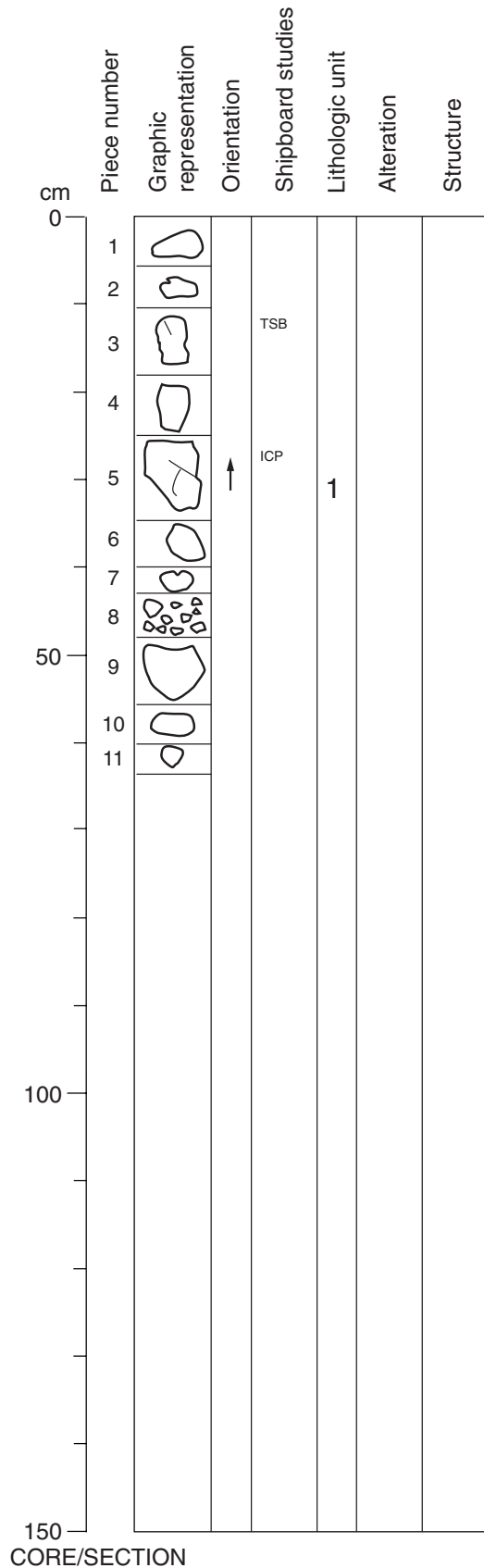
Veins filled by palagonite and quartz occur in the inner part of Piece 1.

ALTERATION: Pieces 1 to 3 are moderately to highly altered, while Pieces 4 to 12 are moderately altered. Around 10% of the groundmass is speckled with clays and Fe oxyhydroxide. Patchy coating of Mn oxide and white clays occur (e.g., Pieces 1 to 4, and 7).

STRUCTURE: None

ADDITIONAL COMMENTS: Pieces 7, 8, 9, and 11 are pebble to cobble sized and have weathered, not cored, outer surfaces.

Core Photo



187-1160B-2R-1

UNIT 1: APHYRIC BASALT

PIECES 1-11

GROUNDMASS: Fine-grained with a granular texture

COLOR: Light to medium gray

VESICLES:

Abundance %	Size (mm) avg.	max.	min.	Shape
<<1	0.3			round

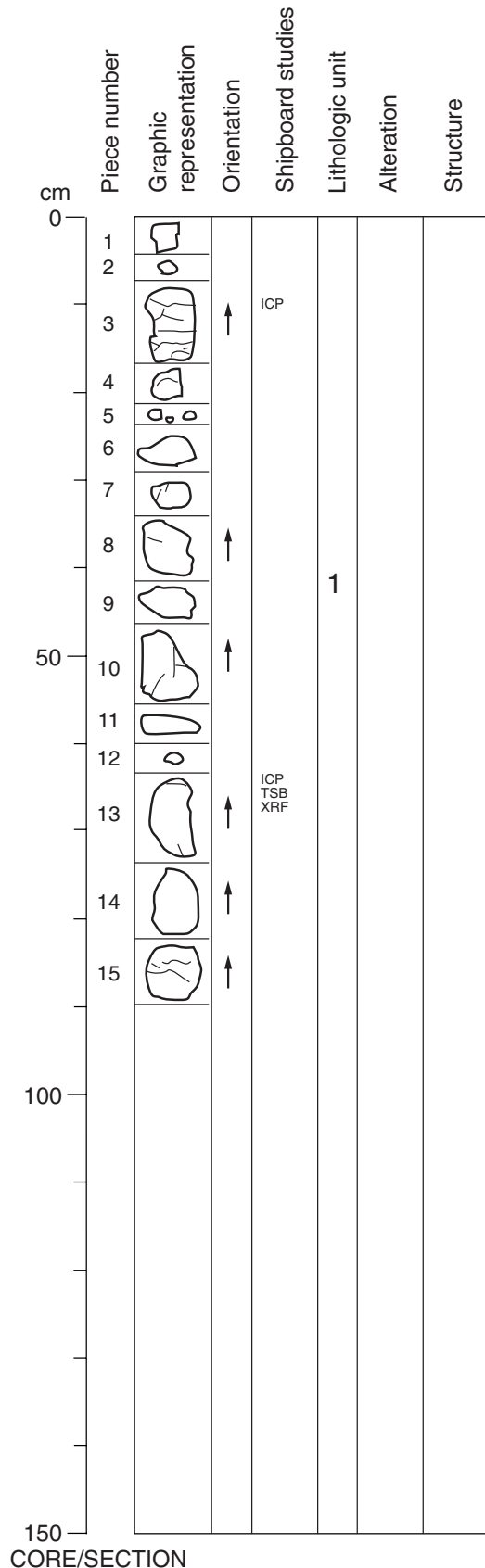
Filling: Rare vesicles (i.e., 1 or 2 visible per piece) range from unfilled to filled concentrically with dark brown clay + Fe oxyhydroxides(?) to yellow brown smectite.

VEINS/FRACTURES: Small discontinuous fractures (1-3 cm) occur in Pieces 3, 4, and 5.

ALTERATION: The section is moderately altered. Alteration is pervasive and consists predominantly of replacement of groundmass olivine by Fe oxyhydroxides + clay. ~80% of all olivine is totally altered. Pieces 3, 4, 5, and 6 have some Fe-staining + Mn oxide spots or patches on outer surfaces.

STRUCTURE: Piece 5 has two relatively flat outer surfaces that form a ~130° degree angle, suggesting that these may be cooling joints, such as those typical of large pillow-lavas.

Core Photo



187-1160B-3R-1

UNIT 1: APHYRIC BASALT

PIECES 1-15

INTERNAL CONTACTS: Chilled margins were recovered on Pieces 1, 2, 3, 6, and 7. Pieces 1 and 3 have ~1 mm of palagonite followed by 5-7 mm of clear glass; glass in the zone of discrete spherulites (1 mm wide) is altered to clay + palagonite; the zone of coalesced spherulites is ~2-3 mm wide. Pieces 2 and 6 consist of ~3 mm of mixed glass + palagonite. Piece 7 has glass on two sides of the piece; one side consists of a layer of palagonite (1 mm thick) and 3 mm of clear glass; glass in the zone of discrete spherulites is altered to clay + palagonite; the zone of coalesced spherulites is ~ 3 mm wide. Glass on the other side of Piece 7 is similar to that in the layer just described and appears as two small finger-like projections into the piece (~0.5 mm wide). Spherulites are small in all pieces (i.e. <-0.2 mm in diameter).

GROUNDMASS: Fine-grained with an equigranular texture

COLOR: Light to medium gray when fresh, light brown when altered.

VESICLES:

Abundance %	Size (mm)		Shape
	avg.	max. min.	
<<1	1	round	

Filling: Rare vesicles range from unfilled (Pieces 9 and 14) to lined with Fe oxyhydroxides (Piece 12). Other pieces are free of vesicles.

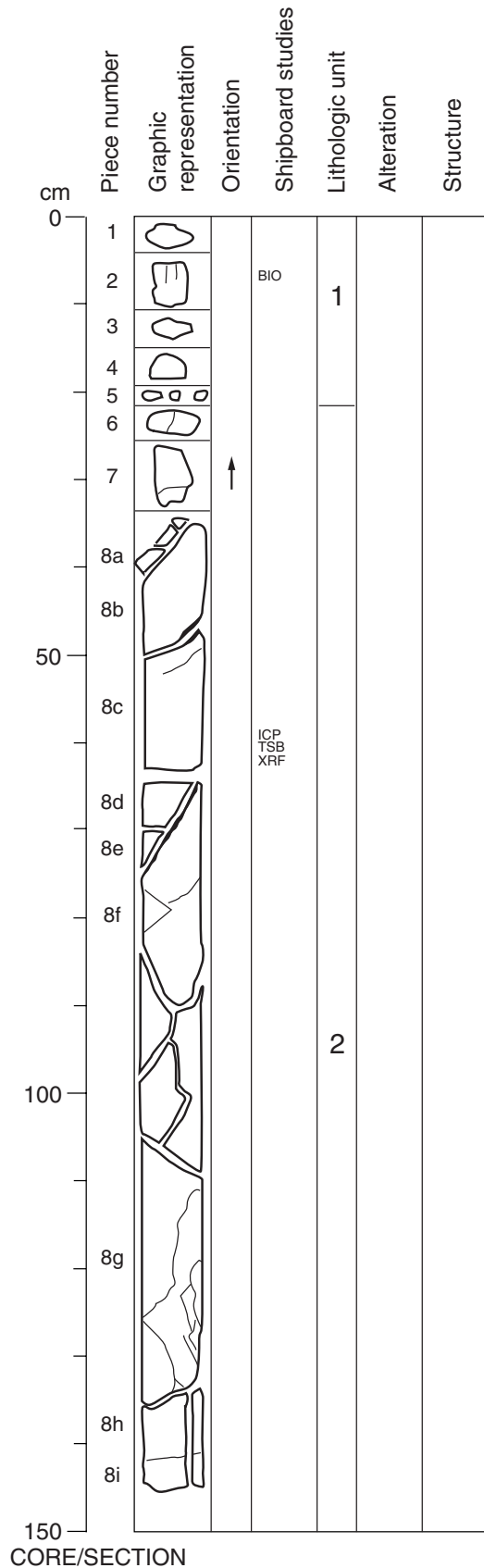
VEINS/FRACTURES: Small discontinuous fractures (1-3 cm long) occur in 1, 3, 4, 7, 8, 10, 13, and 15. In Pieces 4 and 10 they are lined with Fe oxyhydroxides + Mn oxide. In Piece 3, most fractures are radial to the chilled margin; the glass has been palagonitized along these fractures.

ALTERATION: The section is moderately (Pieces 10 to 15) to highly (Pieces 1 to 9) altered. Despite the high degree of alteration of the whole rock, glass of the chilled margins is, however, remarkably fresh. There is some development of alteration halos (~1 cm wide) along outer surfaces (e.g., Pieces 13 and 14), but most alteration is pervasive and consists of replacement of groundmass olivine by Fe oxyhydroxides + clay. ~80% of all olivine is totally altered. Pieces 4 and 8 have Mn oxide spots and patches on outer surfaces.

STRUCTURE: Arcuate shape of Piece 3 and, presence of radial fractures and glass suggests that these are pillow lavas.

ADDITIONAL COMMENTS: Rare olivine microphenocrysts (<1 mm) occur in several pieces (e.g., Piece 9) and are totally replaced by Fe oxyhydroxides.

Core Photo



187-1160B-4R-1

UNIT 1: APHYRIC BASALT

PIECES 1-5

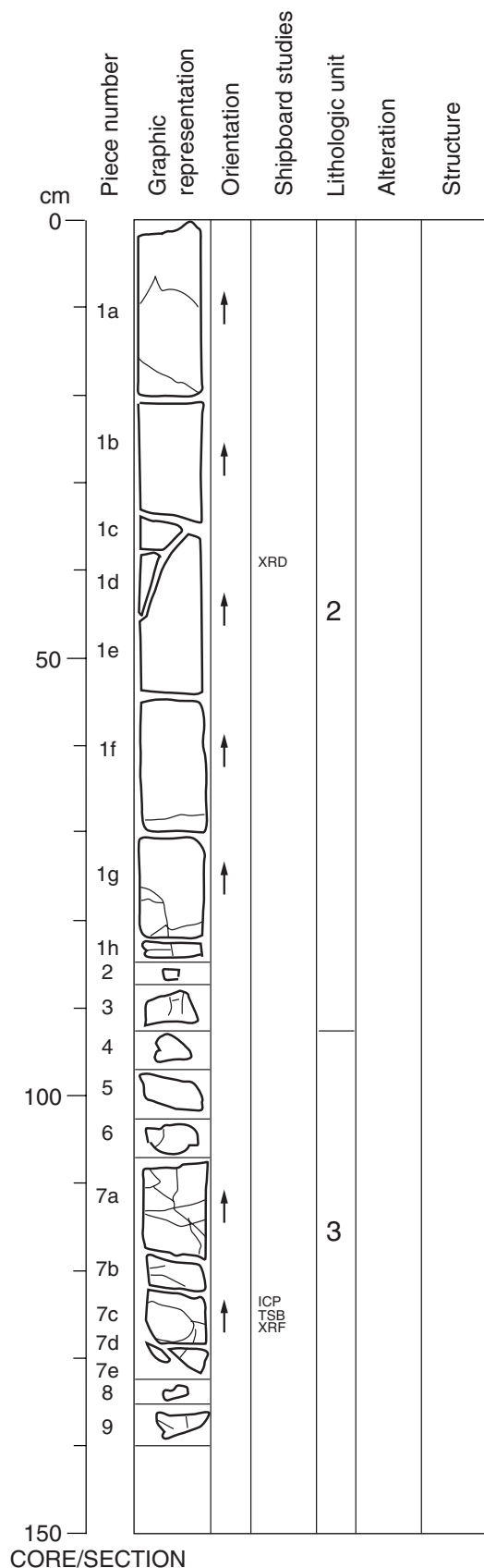
GROUNDMASS: Fine-grained with an equigranular texture
COLOR: Brown to medium gray
ALTERATION: Overall, the section is moderately altered. Pieces 1 and 2 have discontinuous alteration halos on outside surfaces (0.5 - 1 cm wide), but most alteration is pervasive and consists of replacement of groundmass olivine by Fe oxyhydroxides + clay.
STRUCTURE: Not distinguishable

UNIT 2: APHYRIC BASALT

PIECES 6-8

GROUNDMASS: Fine-grained with an equigranular texture
COLOR: Medium gray
VEINS/FRACTURES: Numerous fractures oriented oblique to the core occur in Piece 8 and are lined with chlorite; Piece 7 has a horizontal fracture lined with chlorite. Over the bottom 15 cm of Piece 8g there are several 1 mm wide sparry calcite + Fe oxyhydroxide veins.
ALTERATION: Overall the section is fresh to slightly altered. There are no substantial alteration halos associated with the chlorite-lined fractures and in most places the groundmass is totally fresh. There are wide alteration halos associated with the calcite veins (1-3 cm wide) and associated patchy replacement of groundmass by calcite. Also near these areas (but further away from the calcite veins) there is patchy replacement of groundmass by chlorite. Piece 8 has several vugs filled with botryoidal calcite and/or radiaxial calcite.
STRUCTURE: The number of long continuous pieces indicate a massive flow.
ADDITIONAL COMMENTS: Rare microphenocrysts of plagioclase (1-2 mm) occur in Piece 8.

Core Photo



187-1160B-4R-2

UNIT 2: APHYRIC BASALT

Pieces 1-3

GROUNDMASS: Fine-grained with an equigranular texture

COLOR: Medium gray

VEINS/FRACTURES: Piece 1 is crosscut by numerous fractures/ thin veins that are oriented oblique to the core and filled by chlorite + calcite. Some of the calcite in these veins is radial in habit (e.g., Piece 1c). Pieces 1a and 1b are crosscut by an oblique vein (~1.5 mm wide) filled with Fe oxyhydroxides + Mn oxide + calcite. Piece 1h and the bottom of Piece 1g have a subvertical Fe oxyhydroxide + calcite vein that extends for 2.5 cm upward into Piece 1g and terminates in a chlorite vein/fracture filling, suggesting that the Fe oxyhydroxide + calcite veins are later re-using the earlier chlorite-lined fractures.

ALTERATION: Overall the section is fresh to slightly altered. There are no substantial alteration halos associated with the chlorite-lined fractures and in most places the groundmass is totally fresh. There are wide alteration halos associated with the Fe oxyhydroxide + calcite veins (1-3 cm wide) and associated patchy replacement of groundmass by calcite in Piece 1a. The outer edge of the alteration halos is characterized by a greater abundance of Fe oxyhydroxide than areas closer to the vein. The rock is ~10-20% altered in the alteration halos and these halos constitute ~30% of Piece 1a, 10% of Piece 1g and 95% of Piece 1h.

STRUCTURE: The number of long continuous pieces indicates a massive flow.

ADDITIONAL COMMENTS: Based on the similarity in rock type, vein type and alteration character, Piece 1 of this section is probably continuous with the bottom of the previous section. Rare microphenocrysts of plagioclase (1-2 mm) occur in Piece 1f. Piece 3 has a small amount of pale yellow calcareous sediment filling a cavity on one edge (~4 mm x 7mm).

UNIT 3: MODERATELY PLAGIOCLASE PHYRIC BASALT

Pieces 4-9

LOWER CONTACT: At 93 cm the lithology changes from aphyric to porphyric basalt.

PHENOCRYSTS:	Abundance %	Size (mm)		Shape
		avg.	max. min.	
Plagioclase	3-5	2.5	5 1	tabular

GROUNDMASS: Fine-grained

COLOR: medium gray when fresh (Piece 7c), reddish brown when altered.

VESICLES:	Abundance %	Size (mm)		Shape
		avg.	max. min.	
	<0.5	0.3	0.5 0.1	round

Filling: yellow-green smectite

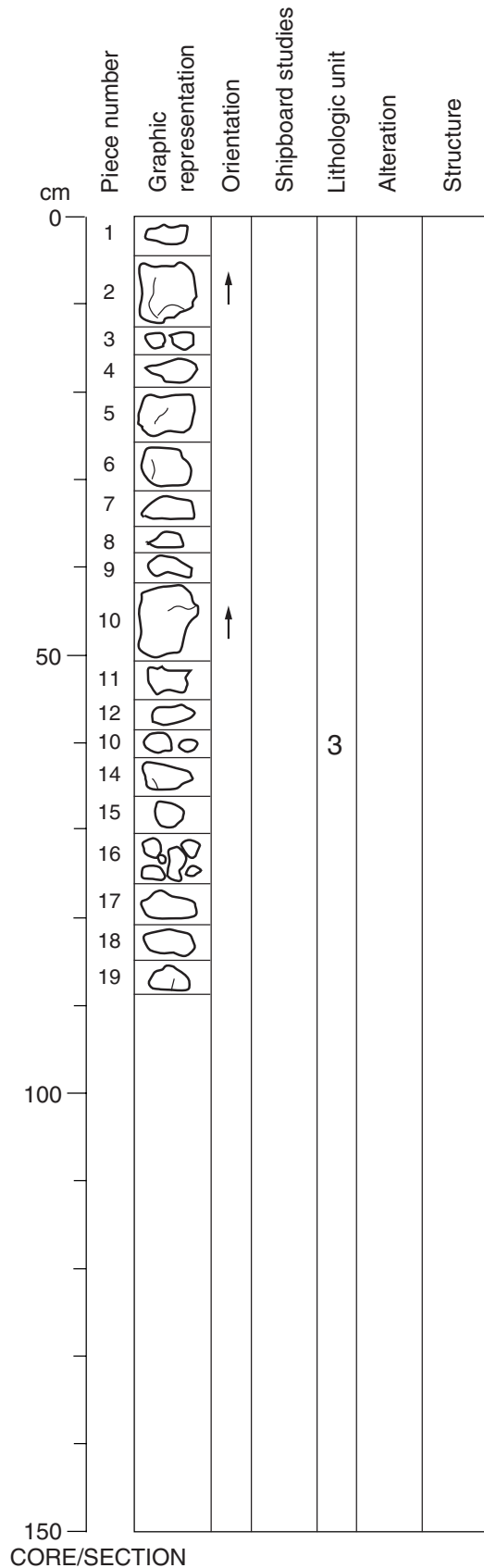
VEINS/FRACTURES: Sparry calcite filled veins, 0.3-1 mm wide in Piece 6 and 7. Vein margins are in places lined with Fe oxyhydroxide. Fracture walls in Piece 7 and 9 are covered with Mn oxide and Fe oxyhydroxide. In Piece 7 the transition from fracturing to veining is developed.

ALTERATION: Overall the unit is moderately altered. The uncut face of Piece 1 is weathered to a buff color with a 5-8 mm wide alteration halo, aligned subparallel to the piece margins. The calcite vein in Piece 6 is surrounded by a 8 mm wide reddish oxidation halo. Groundmass replacement by Fe oxyhydroxide and smectite is pervasive in all pieces and ranges from 50% around oxidation halos in Piece 6 to 40%-25% in Pieces 4, 5, 7, and 9. Some parts of Piece 7c are the least altered in this section.

STRUCTURE: not distinguishable

ADDITIONAL COMMENTS: Plagioclase phenocrysts often possess a light yellow color, either throughout the crystal or along crystal edges/faces. Under the binocular microscope, however they appear fresh even when cut by calcite vein. The color change probably reflects Fe-staining, possibly related to the alteration of groundmass olivine.

Core Photo



187-1160B-5R-1

UNIT 3: MODERATELY PLAGIOCLASE PHYRIC BASALT

Pieces 1-19

	Abundance %	Size (mm)		Shape	
		avg.	max. min.		
Plagioclase	4-5	2.5	7	1	tabular
Total	4-5				

GROUNDMASS: Fine-grained

COLOR: Grayish brown

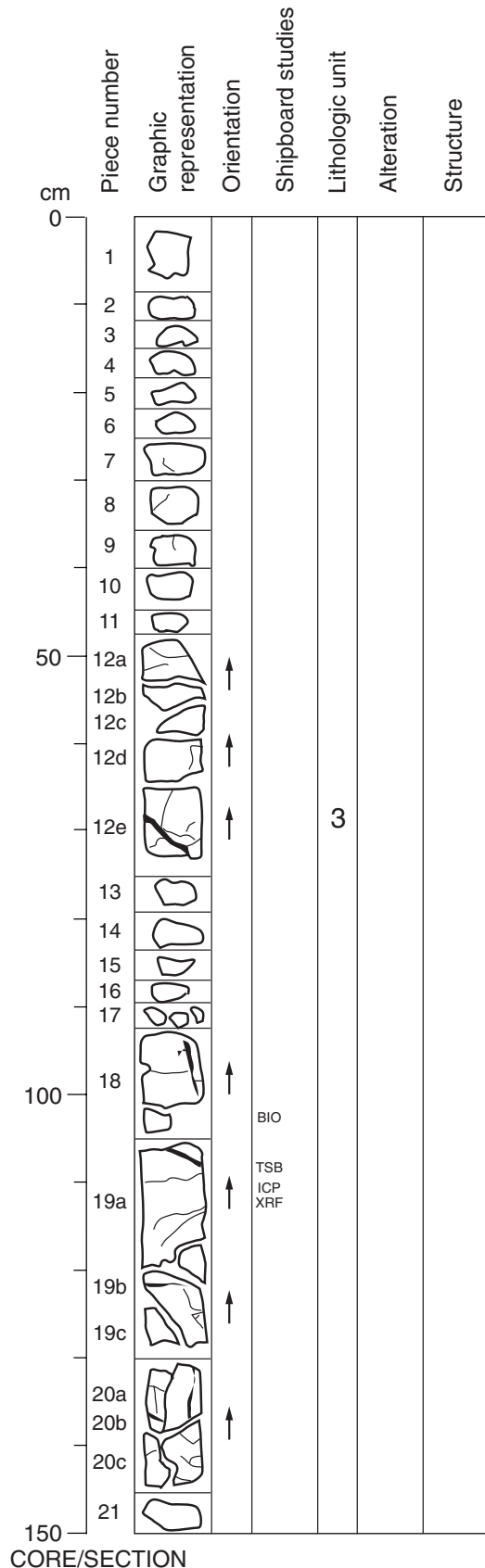
VEINS/FRACTURES: Small fractures occur in Pieces 2, 6, and 14. Piece 10 has a vein of hematite(?) stained cryptocrystalline silica that extends ~1.5 cm into the side of the piece and terminates abruptly.

ALTERATION: Overall the unit is highly altered throughout. Alteration is dominated by pervasive groundmass replacement by Fe oxyhydroxide and smectite. Piece 2 has a coating of Fe-stained calcite + Mn oxide spots on an outside surface, and Piece 4 has a coating of pink sparry calcite. Piece 4 has a 1 cm wide alteration halo on one side. Piece 5 has several vugs filled with euhedral quartz and some botryoidal quartz + Fe oxyhydroxides.

STRUCTURE: Not distinguishable

ADDITIONAL COMMENTS: Plagioclase phenocrysts are partially Fe-stained to a light yellow color, either throughout the crystal or along crystal edges and faces.

Core Photo



187-1160B-6R-1

UNIT 3: MODERATELY PLAGIOCLASE PHYRIC BASALT

PIECES 1-21

PHENOCRYSTS:

	Abundance		Size (mm)		Shape
	%	avg.	max.	min.	
Plagioclase	5	1	5	0.5	prismatic
Olivine	<1	~1	1.3	<1	subhedral
Total	~5				

GROUNDMASS: Microcrystalline

COLOR: Buff (when weathered) to light gray

VESICLES:

	Abundance		Size (mm)		Shape
	%	avg.	max.	min.	
	<1	0.5	0.65	0.2	round

Filling: Variable even in individual pieces and may be lined, partially filled or entirely filled with cryptocrystalline silica, Fe oxyhydroxide or tan-yellow clay. Some vesicles that are filled with the tan-yellow clay are lined with Fe oxyhydroxide.

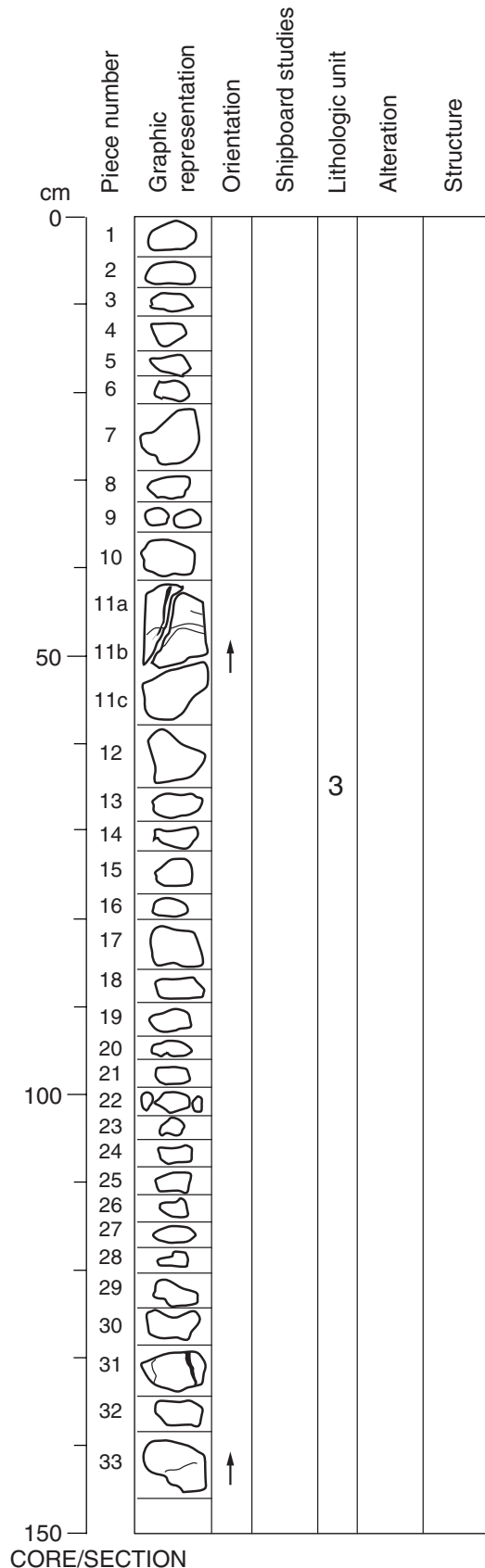
VEINS/FRACTURES: Pieces 12a, 12e, 18, 19b, 20a, 20b, and 20c contain calcite veins that range in width from 0.15 mm in Piece 12a to 1 mm in Piece 18. The calcite vein in Piece 12e also has Mn oxide and Fe oxyhydroxide associated with it. The calcite vein in Piece 18 cuts across vugs (up to 5 mm across) which contain crystalline calcite. Piece 19a has a cryptocrystalline silica vein ~1 mm wide. Piece 12e has an open fracture ~0.15 mm wide.

ALTERATION: Overall the section is moderately to highly altered with Pieces 1 to 11, and 18 being the most altered. The outer surface of Piece 1 has a patchy coating of cryptocrystalline silica with Mn oxide spots ~1 mm in diameter. The open fracture in Piece 12e has a 1 cm wide bleached halo around it. Alteration is pervasive but there are also alteration halos 5 mm to several cm wide associated with calcite veins.

STRUCTURE: None

ADDITIONAL COMMENTS: Pieces 2, 3, 4, 5, 6, 9, 10, 11, 13, 14, 15, 16, 17, and 21 are pebbles to cobble sized with weathered not drilled outer surfaces.

Core Photo



187-1160B-6R-2

UNIT 3: MODERATELY PLAGIOCLASE-OLIVINE PHYRIC BASALT

PIECES 1-33

INTERNAL CONTACTS: Pieces 2, 5, 21, and 25 have chilled margins ~10 mm thick which vary from totally altered (Piece 5) to ~15% altered with fresh glass (e.g., Piece 2). On Piece 21, chilled margin consists of ~3 mm of clear glass with small spherulites. On Piece 2, chilled margin consists of up 7 mm thick clear glass with phenocrysts, but no spherulitic zone is present.

PHENOCRYSTS:

	Abundance %	Size (mm)		Shape
		avg.	max. min.	
Plagioclase	3	2	3 <1	prismatic to rounded
Olivine	<1	0.8	<<1	equant
Total	~3.5			

GROUNDMASS: Fine-grained ~0.5 mm

COLOR: Buff to brownish gray

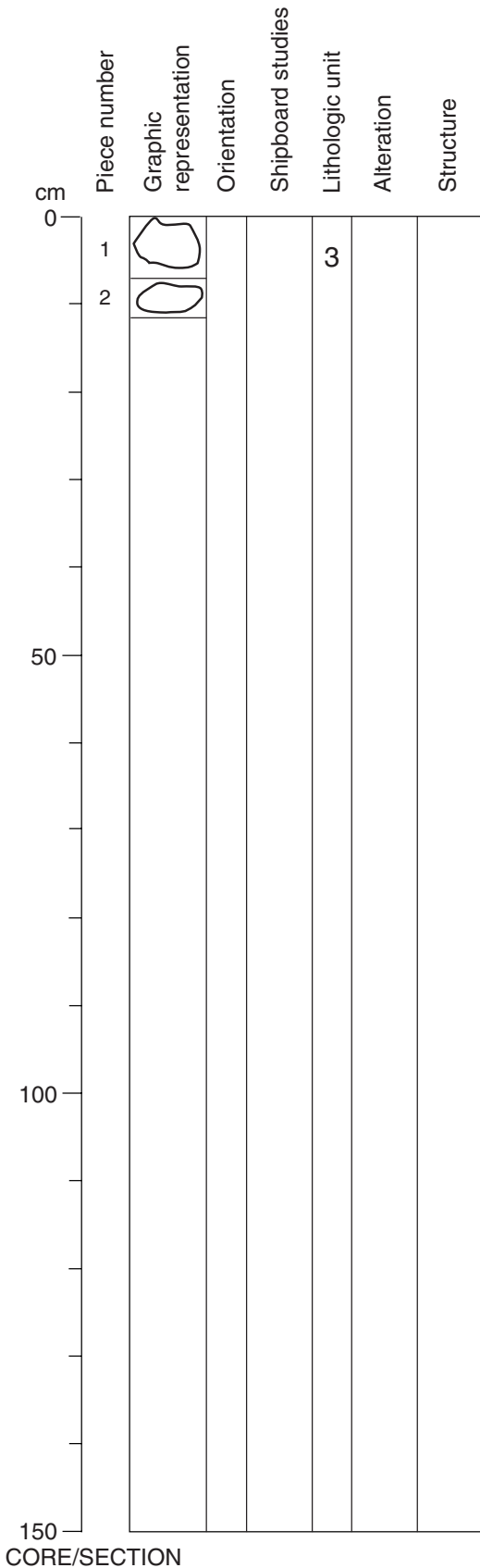
VEINS/FRACTURES: Fractures tend to be crenelated. In Pieces 2, 4, and 5 have fractures <<0.4 mm lined with Mn oxide. Pieces 9a, 11a, 11b, 11c, 11d, 12, 30, and 33 have veins <0.4 mm filled with sparry calcite and Mn oxide. A triangular shaped alteration halo surrounds a vein at the bottom of Piece 11 and is up to 4 cm wide. In many pieces fractures form an anastomosing network (e.g., Piece 2).

ALTERATION: The brown-buff color is caused by Fe oxyhydroxides and clay minerals. Some pieces have patchy oxidization, these may be at the edges as in Piece 4 or more random (e.g., Piece 11c). Alteration can reach ~40% in these areas, with a minimum of ~10%. This section is moderately (Pieces 1, 8 to 31, and 33) to highly (Pieces 2 to 7, and 32) altered overall. Almost all olivine (~90%) has been replaced by Fe oxyhydroxide. Calcite, quartz (frequently Fe-stained) and Mn oxide spots are common coatings on the outside (possibly fracture bound) surfaces. Fibrous radiaxial calcite ~4 mm in diameter on fracture plane in Piece 11a. Mn oxide surrounded by yellow clay in the groundmass of Pieces 10 and 33.

STRUCTURE: Pebble-to cobble-sized rubble

ADDITIONAL COMMENTS: Glomerocrysts of plagioclase and olivine (maximum of 7 mm) comprise up to 40% of phenocrysts in some pieces (e.g., Piece 1), and are present in all pieces. Phenocryst content varies from ~1% in Piece 18 to ~5% in Piece 7.

Core Photo



187-1160B-6R-3

UNIT 3: MODERATELY PLAGIOCLASE-OLIVINE PHYRIC BASALT

PIECES 1-2

	Abundance %	Size (mm)		Shape
		avg.	max. min.	
Plagioclase	3	2	4 <1	prismatic to rounded
Olivine	<1	~1	1 <1	equant
Total	~3			

GROUNDMASS: Fine-grained

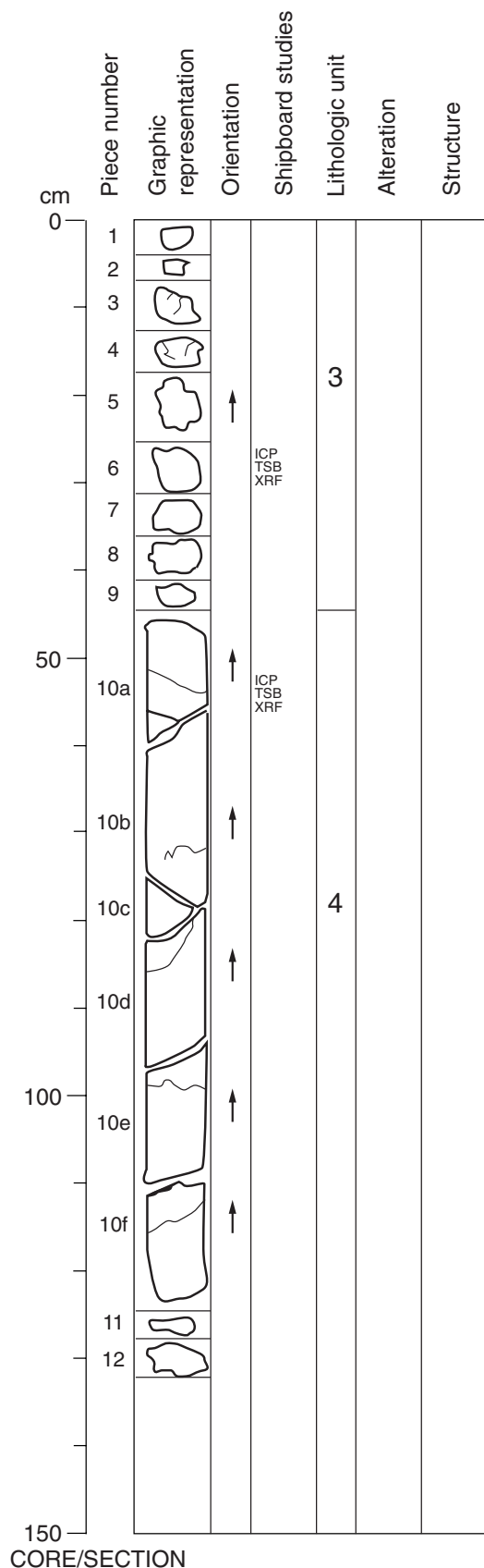
COLOR: Buff to gray

VEINS/FRACTURES: Calcite and Mn oxide in a vein (<0.2 mm) in Piece 1.

ALTERATION: Overall moderately (Piece 1) to highly (Piece 2) altered. Clay in groundmass, olivine replaced (~90%) by Fe oxyhydroxide.

STRUCTURE: Cobble-sized rubble

Core Photo



187-1160B-7R-1

UNIT 3: MODERATELY PLAGIOCLASE-OLIVINE PHYRIC BASALT

PIECES 1-9

INTERNAL CONTACTS: Variably palagonitized glassy margins occur throughout the unit (e.g., Pieces 1, 3, and 4). The thickness ranges from 0.5 to 1.4 cm. Plagioclase phenocrysts are concentrated in the glassy margins. On Piece 3, chilled margin consists of 7 mm clear glass with phenocrysts and of less than 2 mm of glass with small spherulites < 0.5 mm in diameter. On Piece 4, the chilled margin is made of 6 mm clear glass with phenocrysts and 2-3 mm spherulites associated with clay or palagonite, replacing the glass.

PHENOCRYSTS:	Abundance		Size (mm)		Shape
	%	avg.	max.	min.	
Plagioclase	3	2	6	<1	prismatic to rounded
Olivine	~1	~1	1	<1	equant
Total	~4				

GROUNDMASS: Fine-grained

COLOR: Buff (when altered) to gray (when fresh)

VEINS/FRACTURES: On Piece 3, veins filled by quartz and lined by palagonite layers are sub-parallel to the curved glass margin.

ALTERATION: Pieces 1 to 4 are highly altered. Pieces 5 to 9 are moderately altered. Patchy coating of white clays with Mn oxides nodules and sometimes Fe oxyhydroxide or occur on Pieces 3 and 5.

STRUCTURE: The curved glass margin on Piece 3 indicates pillow lavas.

ADDITIONAL COMMENTS: Olivine is replaced (~90%) by Fe oxyhydroxide.

UNIT 4: MODERATELY PLAGIOCLASE PHYRIC BASALT

PIECES 10-12

PHENOCRYSTS:	Abundance		Size (mm)		Shape
	%	avg.	max.	min.	
Plagioclase	3-4	2.5	6	<1	prismatic
Total	3-4				

GROUNDMASS: Fine-grained

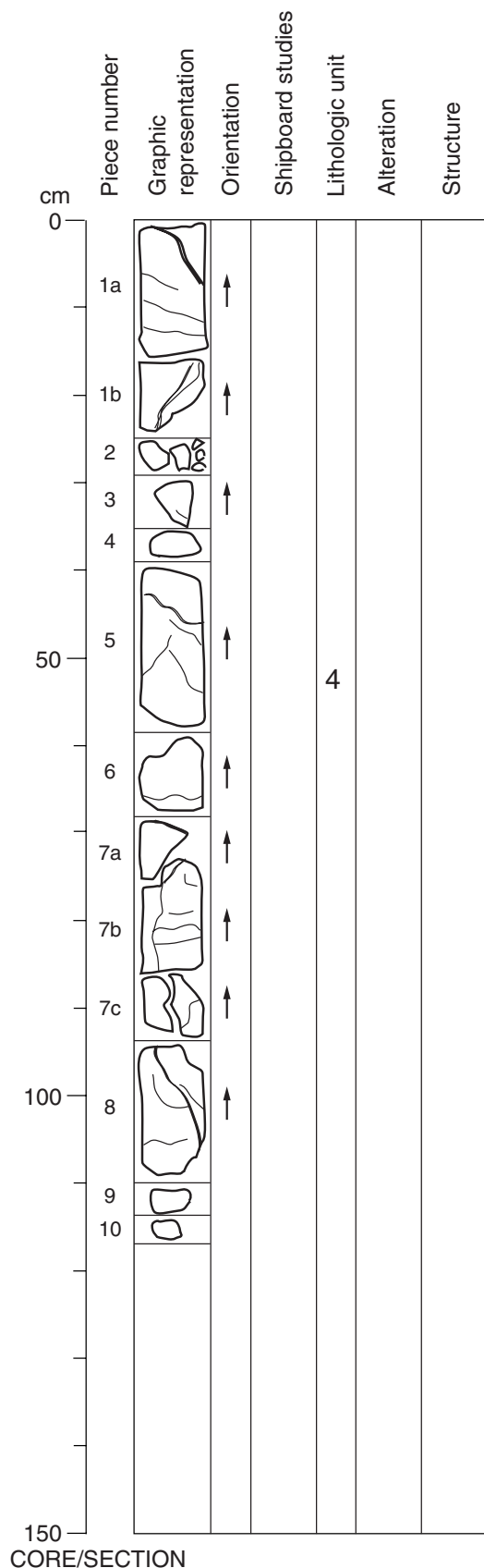
COLOR: Buff (when altered) gray (when fresh)

VEINS/FRACTURES: Numerous fractures occur in Pieces 10a, 10b, and 10d and are lined with chlorite. In Piece 10 f, a 5 mm wide vein is filled with calcite in the central portion that is surrounded by chlorite and lined by Fe oxyhydroxide.

ALTERATION: Overall, the unit is slightly to moderately altered. Altered margins (1.2 - 1.5 thick) occur in Pieces 10a and 10f. An alteration halo is present in Piece 12 (4.5 cm thick).

STRUCTURE: Continuous pieces indicate massive flow.

Core Photo



187-1160B-7R-2

UNIT 4: MODERATELY PLAGIOCLASE PHYRIC BASALT

PIECES 1-10

PHENOCRYSTS:	Abundance %	Size (mm)		Shape
		avg.	max. min.	
Plagioclase	3-4	2	4 <1	prismatic
Total	3-4			

GROUNDMASS: Fine-grained

COLOR: Light gray when fresh, brownish when altered

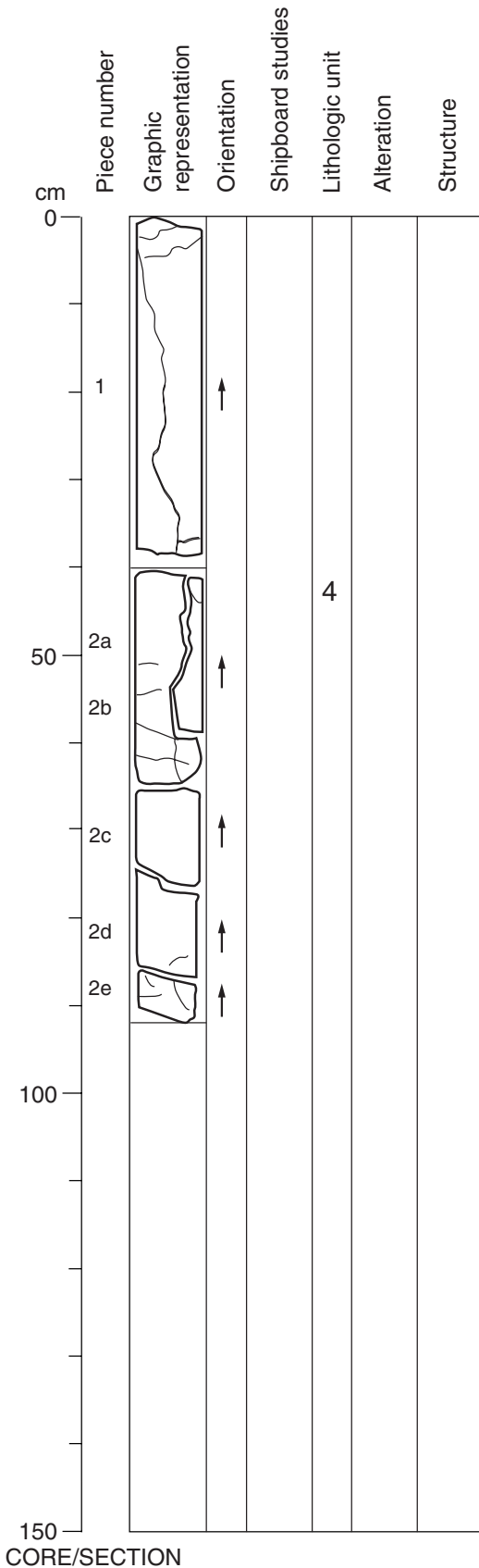
VEINS/FRACTURES: Calcite (and rare quartz) filled veins or fracture faces in all pieces except for Pieces 4, 9, and 10 which are pebbles. Veins vary from <0.2 mm to ~0.5 mm wide. Mn oxide occurs as spots and coatings on the vein walls. Fractures lined only with Mn oxide also occur with calcite filled veins. Calcite filled veins usually have oxidized halos which are 10's of mm wide, up to 40 mm in Piece 8; however Piece 7c has a calcite vein without an oxidized halo. Fractures are only lined with Mn oxide and do not have oxidized halos.

ALTERATION: Overall the section is slightly to moderately altered (~10%).

Clinopyroxene is Fe-stained, causing the brownish coloration of the altered basalt. In places clinopyroxene has been partially replaced by clays and Fe oxyhydroxide (e.g., 7b), and alteration reaches ~25%. Dog-tooth calcite in Piece 2, botryoidal calcite in 5 mm wide vugs in the top of Piece 7a. Piece 7 also has caries cavities towards the top of the piece, close to a fracture face (where clinopyroxene is missing from groundmass).

ADDITIONAL COMMENTS: Clinopyroxene is possibly subophitic, groundmass plagioclase reaches ~1 mm (Piece 7b) and has a felty interlocking texture.

Core Photo



187-1160B-7R-3

UNIT 4: MODERATELY PLAGIOCLASE PHYRIC BASALT

PIECES 1-2

	Abundance %	Size (mm)		Shape
		avg.	max. min.	
Plagioclase	4	2.5	7 1	prismatic to rounded
Total	4			

GROUNDMASS: Fine-grained

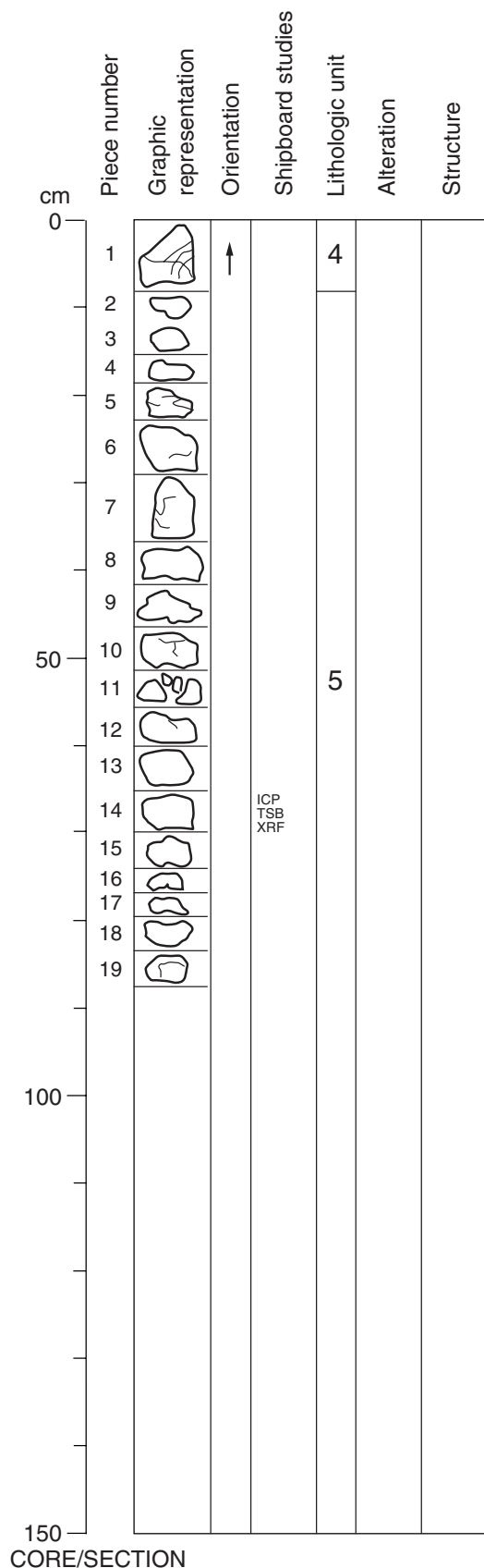
COLOR: Light gray (when fresh), buff when altered.

VEINS/FRACTURES: A sub-vertical vein ~0.2 mm wide, runs the length of this section, filled with a chlorite-clay mix and calcite. Halos are sporadically developed at the tops and bottoms of pieces (e.g., Piece 2a, 2c, and 2d), up to 20 mm thick and adjacent to the chlorite veins (~4-7 mm wide; e.g., Pieces 1 and 2).

ALTERATION: Overall fresh. Some Fe oxyhydroxide after olivine in the base of Piece 2e, most of this piece is Fe-stained.

ADDITIONAL COMMENTS: Plagioclase is concentrated at the bottom of Piece 2a, ~4-5% against ~2% at the top of Piece 2a and Pieces 2c. Interpreted as flow banding of plagioclase. The appearance of olivine microphenocrysts (rare, <0.5% in Piece 2e) may be associated with olivine accumulation at the base of the unit.

Core Photo



187-1160B-8R-1

UNIT 4: MODERATELY PLAGIOCLASE-OLIVINE PHYRIC BASALT

PIECE 1

LOWER CONTACT: At 8 cm the lithology changes from a moderately plagioclase (\pm olivine) phyric massive flow to a sparsely to moderately plagioclase-olivine phyric pillow basalt sequence.

	%	Abundance			Shape
		avg.	max.	min.	
Plagioclase	2	2	2	1	prismatic to rounded
Olivine	2	0.5	0.5	<0.5	equant
Total	4				

GROUNDMASS: Fine-grained

COLOR: Grayish brown.

VEINS/FRACTURES: Numerous unfilled fractures in Piece 1. One surface of the piece is Fe-stained and orange brown and was probably originally a fracture surface.

ALTERATION: The piece is moderately altered, with alteration consisting of pervasive groundmass replacement by Fe oxyhydroxides and clay. Olivine is totally altered to Fe oxyhydroxides; plagioclase is partially Fe-stained.

ADDITIONAL COMMENTS: This piece would appear to be a continuation of the previous section, the presence of olivine indicating accumulation at the bottom of the flow.

UNIT 5: MODERATELY PLAGIOCLASE-OLIVINE PHYRIC BASALT

PIECES 2-19

INTERNAL CONTACTS: Chilled margins were recovered on Pieces 5 and 10.

The chilled margin on Piece 5 consists of 1 mm of palagonite followed by 6 mm of clear glass + phenocrysts and 2 mm of glass + small spherulites; the glass is crosscut by layered palagonite oriented parallel to the chilled margin. Piece 10 consists of 1 mm of palagonite, 7 mm of glass + phenocrysts; the glass surrounding the spherulites in the zone of discrete spherulites is replaced by clay and/or palagonite; the zone of coalesced spherulites is 3 mm wide.

	%	Abundance			Shape
		avg.	max.	min.	
Plagioclase	2	2	4	1	prismatic to rounded
Olivine	1	0.5	0.5	<0.5	equant
Total	4				

GROUNDMASS: Fine-grained

COLOR: Grayish brown to light brown

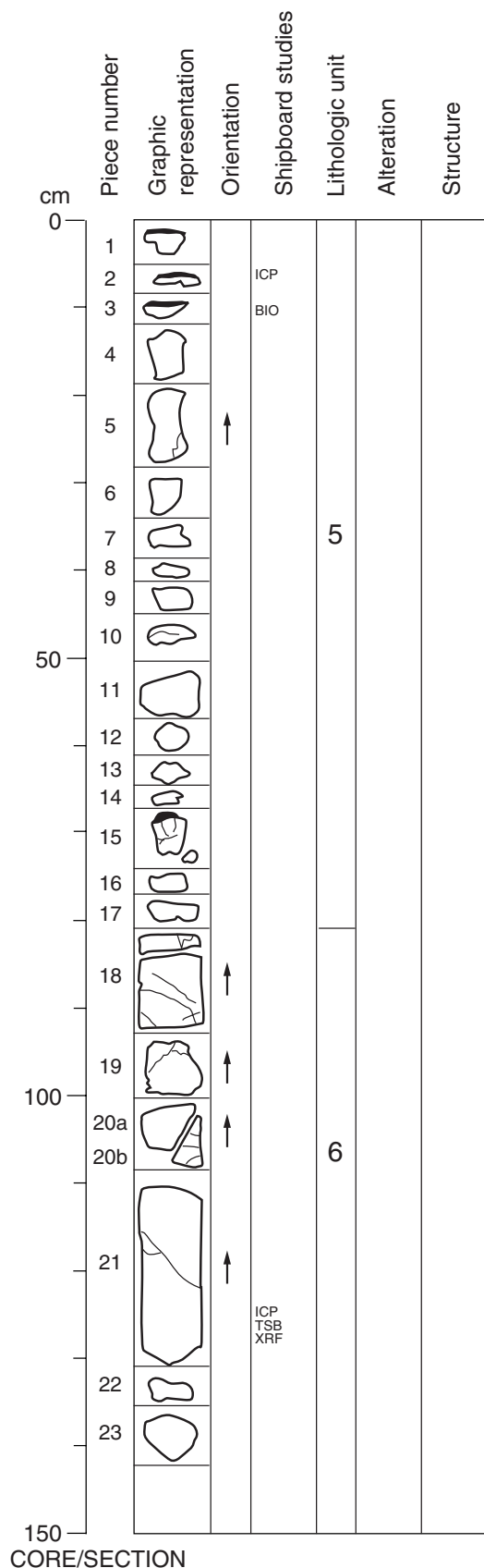
VEINS/FRACTURES: Mn oxide-lined fractures occur in Pieces 4, 5, 10, and 19. There are radial fractures in Piece 5.

ALTERATION: Overall the unit is moderately to highly altered. Alteration is characterized by pervasive replacement of groundmass by Fe oxyhydroxides + brown clay. Pieces 6 and 7 characterize the more intense levels of alteration, having wide halos (~1.5 cm) that are homogeneous in appearance in which groundmass is replaced by Fe oxyhydroxides + clay; the interior of the pieces have patchy alteration texture ranging from orange brown to grayish brown. The grayish brown areas appear to have more smectite and less Fe oxyhydroxides. Olivine is totally altered throughout. Many plagioclase phenocrysts have a light yellow color, either throughout the crystal or along crystal edges/faces, probably due to Fe-staining.

STRUCTURE: probably pillow-lavas

ADDITIONAL COMMENTS: Phenocrysts commonly occur in clusters. Larger plagioclase crystals tend to be rounded and many exhibit sieve textures.

Core Photo



187-1160B-9R-1

UNIT 5: MODERATELY PLAGIOCLASE - OLIVINE PHYRIC BASALT

PIECES 1-17

INTERNAL CONTACTS: Chilled margins were recovered on Pieces 1, 2, 3, and 15. In each case, the chilled margin consist of ~1 mm of palagonite, followed by 4-6 mm of clear glass + phenocrysts and 2 mm of small spherulites surrounded by palagonitized glass and/or clay. The zone of coalesced spherulites is indistinct in Piece 1, and the palagonite occurs with a thin layer of drusy quartz. Piece 2 has some small palagonite layers oriented parallel to the chilled margin within the glassy zone. In Piece 3 the palagonite is associated with an orange to yellow cryptocrystalline silica + Mn oxide.

PHENOCRYSTS:

	Abundance %	Size (mm)			Shape
		avg.	max.	min.	
Plagioclase	1-2	1	3	0.5	prismatic
Olivine	1-2	0.5	0.5	<0.5	equant
Total	2-4				

GROUNDMASS: Fine-grained

COLOR: Grayish brown to light brown

VEINS/FRACTURES: Mn oxide-lined fractures occur in Pieces 1, 2, 7, 10, 13, and 15. There are radial fractures in Pieces 1, 2, 3, and 15.

ALTERATION: Overall the unit is highly altered. Alteration is characterized by pervasive and homogeneous replacement of groundmass by Fe oxyhydroxides + brown clay. Pieces 4, 9, 10, and 11 also include areas with a patchy alteration texture ranging from orange-brown to grayish brown. The grayish brown areas appear to have more smectite and less Fe oxyhydroxides. Olivine is totally altered throughout. Many plagioclase phenocrysts have a light yellow color, either throughout the crystal or along crystal edges/faces, probably due to Fe-staining; some are also dark, particularly in the vicinity of Mn oxide-lined fractures, suggesting that these may also have Mn oxide along microcracks.

STRUCTURE: Probably pillow lavas

ADDITIONAL COMMENTS: Phenocrysts commonly occur in clusters.

UNIT 6: MODERATELY PLAGIOCLASE PHYRIC BASALT

PIECES 18-23

PHENOCRYSTS:

	Abundance %	Size (mm)			Shape
		avg.	max.	min.	
Plagioclase	2-3	1	5	<0.5	tabular
Total	2-3				

GROUNDMASS: Fine-grained

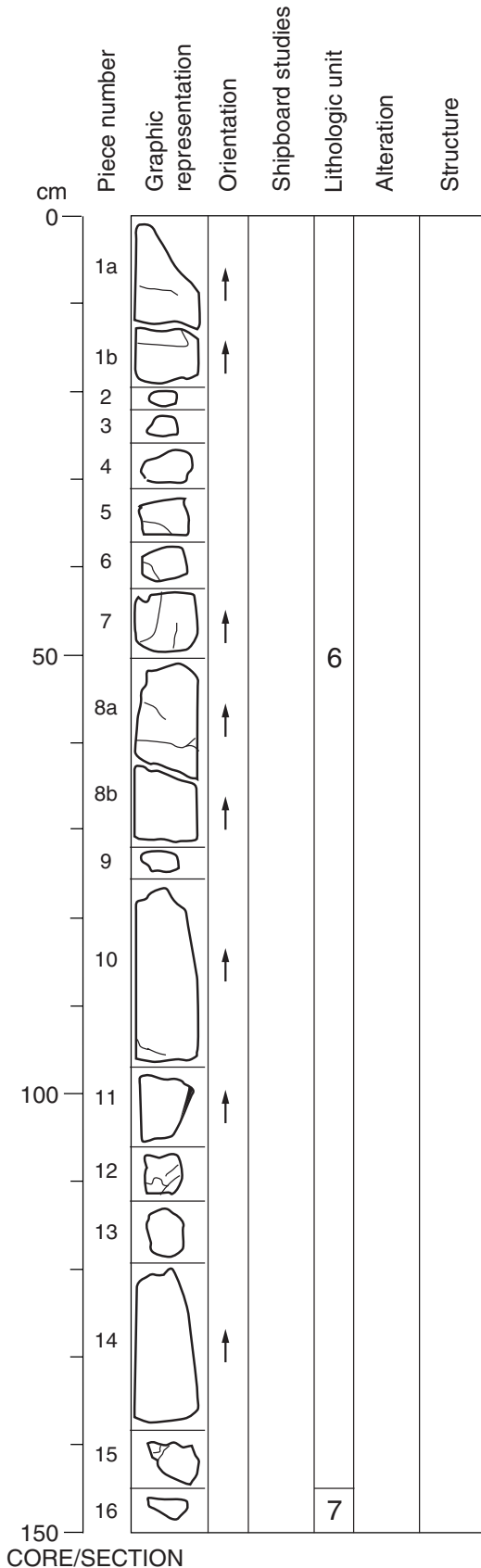
COLOR: Medium gray.

VEINS/FRACTURES: Fractures occur in most pieces, but are lined with a variety of materials. In Piece 18 fractures are lined with Fe oxyhydroxides; in Piece 19 by Mn oxide + Fe oxyhydroxides; in Piece 20 one fracture is lined by cryptocrystalline silica and another by Fe oxyhydroxides + clay + chlorite; a fracture in Piece 21 is lined with cryptocrystalline silica.

ALTERATION: The section is slightly altered, with alteration restricted to alteration halos around veins and along the edges of pieces. Alteration halos range from 0.5 to 1 cm in wide and constitute less than 5% of most pieces.

ADDITIONAL COMMENTS: Phenocrysts commonly occur in clusters of small crystals.

Core Photo



187-1160B-9R-2

UNIT 6: SPARSELY PLAGIOCLASE PHYRIC BASALT

PIECES 1-15

PHENOCRYSTS:

	Abundance %	Size (mm)		Shape
		avg.	max. min.	
Plagioclase	1-2	1	5 0.5	prismatic
Total	1-2			

GROUNDMASS: Fine-grained

COLOR: Medium gray.

VEINS/FRACTURES: Chlorite-lined fractures occur in Pieces 1 and 8; Fe oxyhydroxide and Mn oxide lined fractures occur in Piece 12. Thin (~1 mm wide) veins of calcite + Fe oxyhydroxides occur in Pieces 6 and 7; veins of chlorite + clay(?) + Fe oxyhydroxides occur in Pieces 5 and 15.

ALTERATION: Overall the unit is slightly to moderately altered. Alteration is concentrated in alteration halos around veins and fractures or at the sides of Pieces. Alteration halos around calcite bearing veins are wider (up to 1 cm wide) and oxidative, with groundmass replacement by Fe oxyhydroxides + clay. Alteration halos around chlorite-bearing veins tend to be narrower (~0.5 cm) and have a zoned structure in which the groundmass immediately adjacent to the vein is similar in appearance to unaltered groundmass, but the outer edge of the halo is darker. The origin of these color differences is unclear. Alteration halos make up between 10% and 30% of the rock and ~10%-20% of the rock is altered in the alteration halos. Piece 1 has a fracture surface (which now forms the side of the piece) coated with a yellow cryptocrystalline material (silica/clay); a similar material occurs as small patches on Piece 9 and the bottom of Piece 10. There are fragments of sparry calcite + bright red Fe oxyhydroxide veins on Pieces 5, 6, 7, and 11; Pieces 7 has vug filling of materials similar to the vein, but includes botryoidal calcite, radial calcite and bright red Fe oxyhydroxides. Piece 8 has small vug fillings of sparry calcite as well as patchy groundmass replacement with calcite. near a fracture. There is patchy groundmass replacement (~5% of the piece) by chlorite + a white clay in Pieces 1, 3, 4, 5, 6, and 7.

STRUCTURE: Massive flow

ADDITIONAL COMMENTS: Phenocrysts commonly occur in clusters of small prismatic crystals. Larger crystals are more rounded in shape; a few of these show sieve textures.

UNIT 7: APHYRIC BASALT

PIECE 16

GROUNDMASS: Fine-grained

COLOR: Light gray.

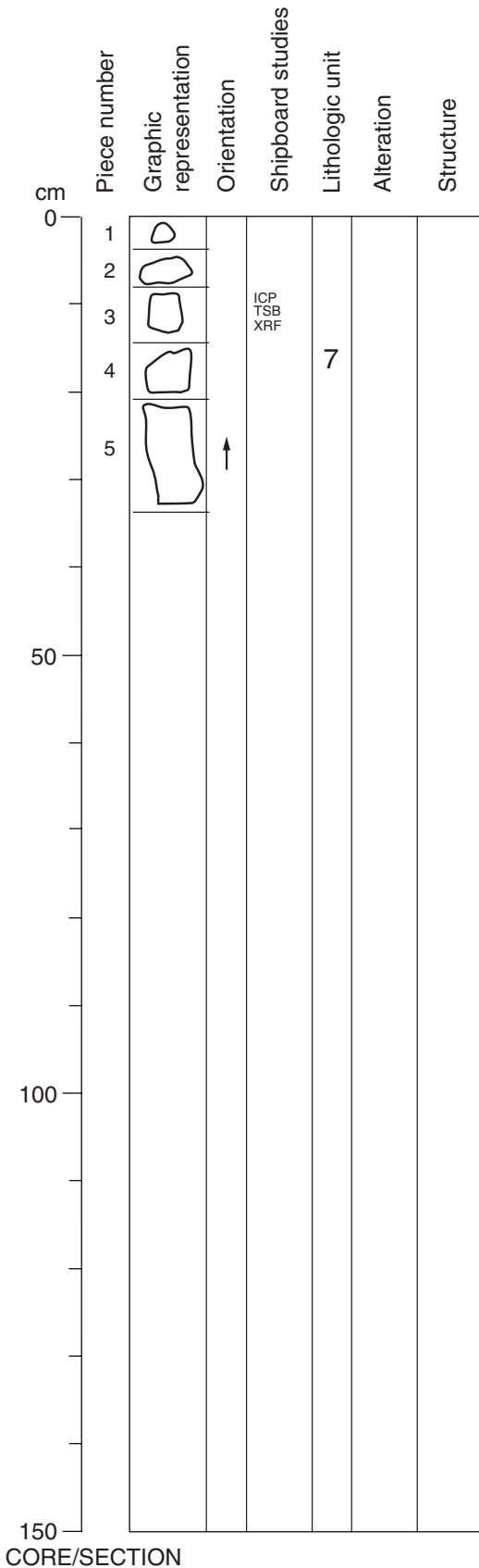
VESICLES:

	Abundance %	Size (mm)		Shape
		avg.	max. min.	
	<<1	1		round

Filling: Unfilled

ALTERATION: The piece is slightly altered with a 5 mm wide alteration halo.

Core Photo



187-1160B-9R-3

UNIT 7: APHYRIC BASALT

PIECES 1-5

GROUNDMASS: Fine-grained

COLOR: Light gray

VESICLES:

Abundance %	Size (mm)			Shape
	avg.	max.	min.	
<1	0.2	0.2	<0.2	round

Filling: In alteration halos, vesicles are filled with dark green smectite; Piece 5 has some vesicles filled with a yellow clay. Elsewhere, vesicles are unfilled.

ALTERATION: Overall the unit is slightly altered. Groundmass olivine is uniformly replaced by Fe oxyhydroxides + clay throughout. Most pieces have alteration halos or zones a few mm up to 1 cm wide where there is a higher proportion of groundmass replacement by smectite.

STRUCTURE: Not distinguishable

ADDITIONAL COMMENTS: Rare olivine microphenocrysts, now totally replaced by Fe oxyhydroxides, observed in Piece 3.

187-1160A-2R-1, 16-17 cm (TS#55)			Unit: 1			OBSERVER:		Kempton	
ROCK NAME:		Aphyric basalt							
WHERE SAMPLED:		top of unit, piece with 1 cm wide alteration halo							
GRAIN SIZE:		fine grained							
TEXTURE:		intergranular to intersertal							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
PHENOCRYSTS									
Plagioclase	<1	<1	0.3	1			prismatic	Occurs predominantly in loose clusters of prismatic plagioclase; albite twins; unzoned to slight normal zoning.	
Olivine									
Clinopyroxene									
GROUNDMASS									
Olivine									
Plagioclase	38	44		0.2			prismatic, subhedral		
Clinopyroxene	35	36		0.1			anhedral, granular		
Opaque Minerals							equant to acicular		
Glass									
Mesostasis	10	20						Includes quench clinopyroxene + glass.	
SECONDARY MINERALOGY	PERCENT		SIZE (mm)				REPLACING / FILLING	COMMENTS	
			min.	max.	av.				
Clays	15						replacing mesostasis, groundmass phases; filling vesicles	Clay constitutes ~30% of the alteration halo, but is 0% in the interior.	
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)				FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.				
Vesicles	2	distributed	0.1	0.3	0.2		filled with smectite / round	Vesicles closest to the edge of the piece are filled with a dark brown mixture of Fe (+Mn?) oxyhydroxides + clay; 3-4 mm in from margin vesicles are filled with a bright yellow brown smectite (some vesicles in the outer margin are lined with this color clay as well); intensity of the color decreases toward the middle of the piece; vesicles are unfilled in the interior of the piece and the boundary between filled and unfilled is relatively sharp. One vesicle in the alteration halo appears to have MnO concretions in the center.	
COMMENTS : Slide plucked during thin section preparation. The groundmass has a patchy appearance, ranging from light to dark, randomly distributed throughout the thin section. The light areas are made up of granular clinopyroxene and prismatic plagioclase in an intergranular texture. The dark areas are made of mesostasis. In at least 2 cases, these patches are spherical, suggesting drain back of liquid into a vesicle, but most are irregular in shape.									

187-1160B-2R-1, 11-13 cm (TS#54)			Unit: 1			OBSERVER:		Kempton	
ROCK NAME:		Aphyric basalt							
WHERE SAMPLED:		top of unit, pillow lava sequence							
GRAIN SIZE:		fine grained							
TEXTURE:		subophitic to intergranular							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
PHENOCRYSTS									
Plagioclase	1	1		1.5			tabular to prismatic	1 large crystal with a partially resorbed core and normal zoning; another with rounded shape and partially resorbed rim; smaller prismatic crystals occur in glomerocrysts.	
Olivine									
Clinopyroxene									
GROUNDMASS									
Olivine	0	4		0.1			equant, subhedral	Totally replaced by Fe oxyhydroxides + clay.	
Plagioclase	44	47		0.8			prismatic, subhedral		
Clinopyroxene	37	40		0.6			anhedral, elongate bundles	Occurs as anhedral, bundle-shaped crystals that are intergrowth with plagioclase; numerous individual segments of the bundles are nonetheless optically continuous over distances of 300-400 microns or have sweeping extinction.	
Opaque Minerals	3	3		<25 microns			skeletal to anhedral (equant)		
Glass									
Mesostasis	0	5						Totally replaced by clays.	
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS		
			min.	max.	av.				
Clays ± Fe oxyhydroxides	15					replacing groundmass mesostasis	The amount of Fe oxyhydroxides increases toward one side of the slide.		
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS		
			min.	max.	av.				
Vesicles	<1								
COMMENTS :		Difficult to assess vesicles because thin section slightly plucked during preparation.							

187-1160B-3R-1, 63-66 cm (TS#56)			Unit: 1			OBSERVER:		Kempton	
ROCK NAME:		Aphyric basalt							
WHERE SAMPLED:		middle of unit							
GRAIN SIZE:		fine grained							
TEXTURE:		intergranular to subophitic							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
PHENOCRYSTS									
Plagioclase	<1			3			tabular, subhedral	Albite twins, unzoned. Forms glomerocrysts.	
Olivine									
Clinopyroxene									
GROUNDMASS									
Olivine	0	4		0.1			equant	95% replaced by Fe oxyhydroxides.	
Plagioclase	45	50		0.4			prismatic		
Clinopyroxene	40	45		0.4				Occurs as anhedral clusters of crystals, sometimes bundle-shaped, that are intergrowth with plagioclase.	
Opaque Minerals	1	1		<50 microns			anhedral, equant, some skeletal		
Glass									
SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS			
		min.	max.	av.					
Clays + Fe oxyhydroxides	14				groundmass phases and mesostasis	30% clay in alteration halo.			
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS		
			min.	max.	av.				
Vesicles	<1		0.1	0.6		filled with pale yellow clay			
COMMENTS :		Description only very general because ~50% of the thin section was polished away during preparation.							

187-1160B-4R-1, 59-62 cm (TS#57)			Unit: 2			OBSERVER:	Kempton	
ROCK NAME:	Aphyric basalt							
WHERE SAMPLED:	massive flow							
GRAIN SIZE:	fine grained							
TEXTURE:	intergranular to subophitic							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
Plagioclase	<1	<1	0.3	0.8	0.5		prismatic to tabular; subhedral to anhedral	Normal zoning dominant, a few with discontinuous zoning; phenocrysts occur almost exclusively in glomerocrysts, only a few discrete phenocrysts.
Olivine	<1	<1	0.3	1.5	0.5		equant, anhedral	Occurs in glomerocrysts with plagioclase; unaltered.
Clinopyroxene								
GROUNDMASS								
Olivine	2	2		0.1			equant, subhedral to anhedral	Unaltered.
Plagioclase	48	48		0.8			prismatic, anhedral	
Clinopyroxene	45	45		2.5			anhedral, granular to elongate	Anhedral, elongate crystals, subophitically enclosing plagioclase up to 1.5 mm long; anhedral, granular crystals 0.1 to 0.3 mm occur interstitial to plagioclase laths.
Opaque Minerals	2	2		<75 microns			equant, anhedral to skeletal	~3% of the opaque minerals are sulfides up to 25 microns in size.
Glass								
Mesostasis	0	3						
SECONDARY MINERALOGY	PERCENT		SIZE (mm)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
Clays	3						replacing interstitial glass(?), filling vesicles	Fills triangular interstitial areas that may have originally been glass or mesostasis; replacement shows a similar zonation to that for the vesicles described below; may be minor replacement of groundmass plagioclase and clinopyroxene by clay adjacent to altered mesostasis.
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)				FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.			
Vesicles	<1						filled with clay, round	Vesicles are lined with a brown cryptocrystalline material (Fe oxyhydroxides + clay?) then partially to filled with a colorless clay growing in a fibrous habit from the walls of the vesicle; in some cases the center of the vesicle is filled with a pale brown clay growing in a radiaxial habit.
COMMENTS :								

187-1160B-4R-2, 122-126 cm (TS#58)			Unit: 3			OBSERVER:		Russo	
ROCK NAME:		Highly phyric plagioclase basalt							
WHERE SAMPLED:		pillow interior							
GRAIN SIZE:		Microcrystalline							
TEXTURE:		Intergranular							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
PHENOCRYSTS									
Plagioclase	15		0.5	3.6	2		Prismatic	Plagioclase are large (2 mm average) and commonly twinned. Phenocrysts frequently occur as glomerocrysts. Approximately 1/3 of the plagioclase contain melt inclusions, which are most commonly found in dense populations (clusters) in the core of the phenocryst (Image136). Cr-spinel was also found included in one phenocryst.	
Olivine									
Clinopyroxene									
GROUNDMASS									
Olivine	~7			0.1			equant, subhedral		
Plagioclase	40			0.4			acicular to lath-like		
Clinopyroxene	30			0.3			quench and anhedral granular		
Opaque Minerals	~2			<50 microns			bleb to equant	Rare equant opaques (ilmenite?) are larger and occur as <1% in the groundmass.	
Glass									
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS		
			min.	max.	av.				
Clays	~5					groundmass/vesicles	Green-brown in color, clay occurs in patches throughout the groundmass.		
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS		
			min.	max.	av.				
	~1			0.15		green-brown clay/round			
COMMENTS :		One of the most highly phyric samples we've recovered. Plagioclase phenocrysts are also in very good shape showing no resorption or sieve textures.							

187-1160B-6R-1, 106-110 cm (TS #59)			Unit:3			OBSERVER:		Hauff	
ROCK NAME:		Moderately plagioclase phyric basalt							
WHERE SAMPLED:		pillow interior							
GRAIN SIZE:		microcrystalline							
TEXTURE:		sub ophytic							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
PHENOCRYSTS									
Plagioclase	3%		0.8	3	2		subhedral/tabular	Fe stained along microcracks in places.	
Olivine									
Clinopyroxene									
GROUNDMASS									
Olivine									
Plagioclase	45		0.1	0.4	0.25		prismatic	Sub ophytic enclosing groundmass plagioclase.	
Clinopyroxene	35	50					parallel growth of laths		
Opaque Minerals									
Glass									
SECONDARY MINERALOGY	PERCENT		SIZE (mm)				REPLACING / FILLING	COMMENTS	
			min.	max.	av.				
Clays	5						clinopyroxene	Occur throughout thin section, but also in mm sized patches or clusters where they make up 50% of the rock.	
Fe oxyhydroxide	10						clinopyroxene	Associated with clays.	
Calcite	2						veins		
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)				FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.				
COMMENTS : A 0.6-1 mm wide sparry calcite vein cuts the thin section. The wall rock is lined with Mn oxide and two generations of calcite present which show different degrees of recrystallization. The boundary between them consists of yellowish smectite and Mn oxide.									

187-1160B-7R-1, 25-29 cm (TS#60)			Unit: 3			OBSERVER:		Kempton	
ROCK NAME:			Moderately plagioclase (-olivine) phyric basalt						
WHERE SAMPLED:			piece typical of unit						
GRAIN SIZE:			microcrystalline						
TEXTURE:			intergranular to intersertal						
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
PHENOCRYSTS									
Plagioclase	3	3	0.2	4	1		prismatic (subhedral) to tabular (rounded)	Altered to clay along parallel microcracks; all with albite twins; normal zoning or unzoned.	
Olivine	0	<1	0.2	0.8	0.5		equant	Totally(?) altered to iddingsite (see comment below).	
Clinopyroxene									
GROUNDMASS									
Olivine	0	5		<100 microns			equant	Totally(?) altered to iddingsite (see comment below).	
Plagioclase	40	40		0.3			prismatic		
Clinopyroxene	43	43							
Opaque Minerals	3	3		<30 microns			equant, anhedral to skeletal	Most are less than 15 microns in size.	
Glass									
Mesostasis	0	5							
SECONDARY MINERALOGY	PERCENT	SIZE (mm)			REPLACING / FILLING	COMMENTS			
		min.	max.	av.					
Clays + Fe oxyhydroxides	11				replacing olivine and mesostasis; filling thin vein	Iddingsite after olivine. There is a thin vein (<25 microns) filled with Fe oxyhydroxides + clay and partially lined with Mn oxides; there is no obvious alteration halo associated with the vein.			
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS		
			min.	max.	av.				
COMMENTS : The thin section is severely plucked, making modal estimates inaccurate; olivine probably particularly underestimated since it looks like these were particularly susceptible to plucking due to their high degree of alteration. Plagioclase ± olivine occurs in loose clusters; some of the plagioclase crystals in the glomerocrysts are not significantly larger than groundmass crystals, suggesting that these are formed during equilibrium crystallization. Plagioclase is seriate, making distinction between largest groundmass and smallest phenocryst arbitrary.									

187-1160B-7R-1, 53-56 cm (TS#61)			Unit: 4			OBSERVER:	Russo	
ROCK NAME:	Moderately plagioclase phyric basalt							
WHERE SAMPLED:	massive flow interior							
GRAIN SIZE:	microcrystalline							
TEXTURE:	intergranular to subophitic							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
Plagioclase	~4		0.5	2	1.1		prismatic	Commonly twinned some phenocrysts display zoning. Only present in half of thin section with subophitic texture.
Olivine	<1			0.6			subhedral	
Clinopyroxene								
GROUNDMASS								
Olivine	~2			0.1			equant	Dispersed throughout the groundmass.
Plagioclase	40			0.5			lath-like	
Clinopyroxene	47			1.1			elongate to granular, anhedral	
Opaque Minerals	~3			0.06			equant to bleb-like	
Glass								
SECONDARY MINERALOGY	PERCENT	PERCENT ORIGINAL	SIZE (mm)			REPLACING / FILLING	COMMENTS	
			min.	max.	av.			
Clays	~3					staining phenocrysts	Light brown to yellow-tan.	
Chlorite	<0.5					fracture lining		
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.			
COMMENTS : Slide grades from intergranular at one end to subophitic at the other, the presence of olivine also correlates with this change, only being present on the subophitic half. An ~20 micron wide fracture cuts diagonally across the thin section, is lined with chlorite and has a 0.25 mm wide halo of yellow-tan clay, causing a discoloration of the groundmass.								

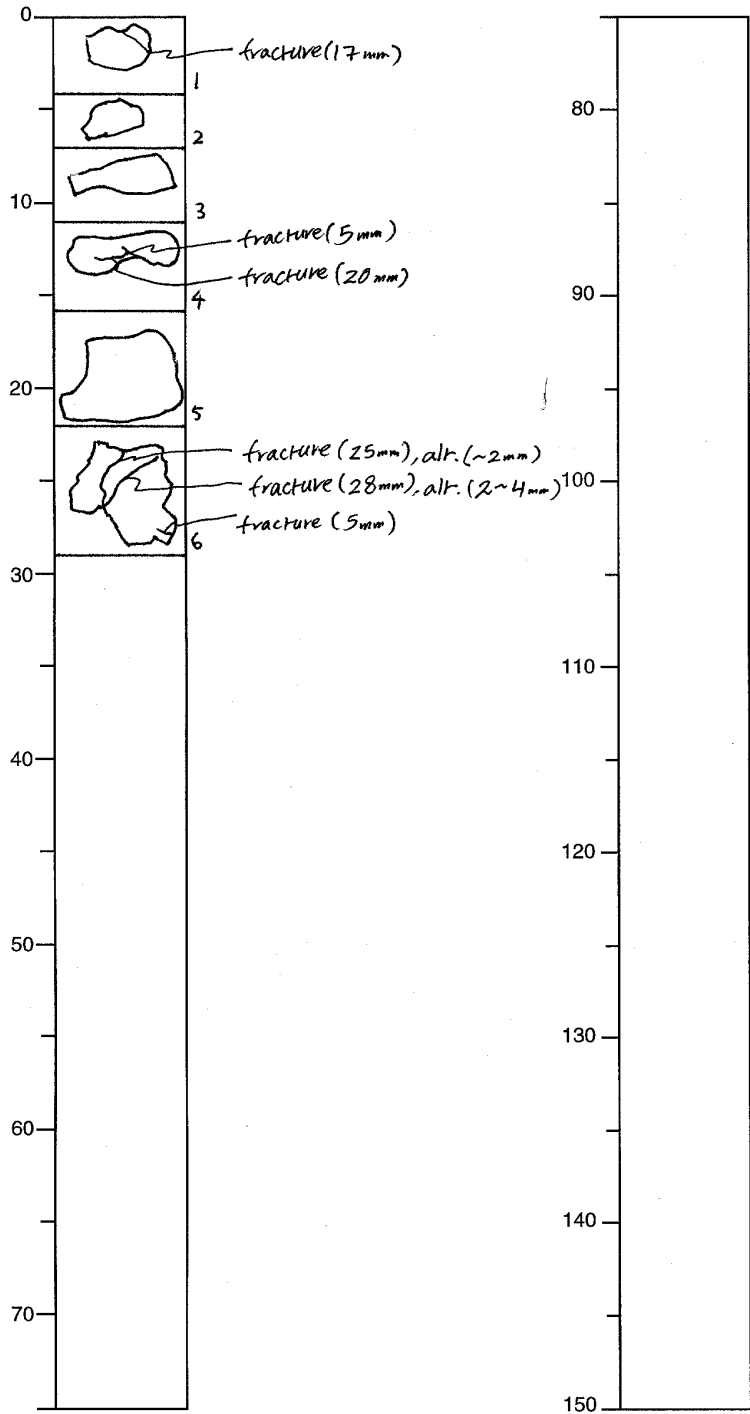
187-1160B-8R-1, 66-70 cm (TS#62)			Unit: 5			OBSERVER:	Russo	
ROCK NAME:	Moderately plagioclase-olivine phyric basalt							
WHERE SAMPLED:	Pillow lava margin							
GRAIN SIZE:	microcrystalline							
TEXTURE:	intersertal							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
Plagioclase	4		0.5	2.1	0.8		prismatic	Commonly twinned, some phenocrysts display zoning. Rare phenocrysts have melt inclusions (up to 20 microns across) concentrated in the cores of the phenocryst. Phenocrysts predominantly occur as glomerocrysts. ~50% replaced by iddingsite. Where phenocrysts are present they occur along with plagioclase in glomerocrysts.
Olivine	1			0.4			equant, subhedral	
Clinopyroxene								
GROUNDMASS								
Olivine								
Plagioclase	35			0.4			lath-like	
Clinopyroxene	30			0.2			quench growths	
Opaque Minerals								
Glass								
Mesostasis	10							
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS	
			min.	max.	av.			
Clays	20					groundmass	Yellow-brown in color, clay replacement is more pervasive at one end of the thin section than the other, presumably representing a transition toward the margin of the pillow from the more crystalline interior.	
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.			
COMMENTS : Patchy calcite is seen filling a void in the groundmass at the same end of the thin section that has more pervasive clay replacement of groundmass.								

187-1160B-9R-1, 125-129 cm (TS#64)			Unit: 6			OBSERVER:	Russo	
ROCK NAME:	Moderately plagioclase phyric basalt							
WHERE SAMPLED:	flow interior							
GRAIN SIZE:	fine grained							
TEXTURE:	intergranular to subophitic							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
PHENOCRYSTS								
Plagioclase	~3		0.5	2	1.1		prismatic	Phenocrysts are commonly twinned and display zoning. Approximately 25% of the phenocrysts have dense populations of melt inclusions most commonly concentrated in the core of the phenocryst (Image 138).
Olivine Clinopyroxene	~2		0.4	0.8	0.5		subhedral to rounded	
GROUNDMASS								
Olivine	~2			0.1			equant	Some larger clinopyroxene subophitically enclosing plagioclase. Most are less than or equal to 60 microns.
Plagioclase	40			0.4			lath-like	
Clinopyroxene	40			1.25			elongate, anhedral	
Opaque Minerals	~3			0.1			equant to bleb-like	
Glass								
SECONDARY MINERALOGY	PERCENT		SIZE (mm)				REPLACING / FILLING	COMMENTS
			min.	max.	av.			
Clays	10						groundmass	Green to brown, sometimes occurring in bands with green clay surrounding brown (Image 139).
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)				FILLING / MORPHOLOGY	COMMENTS
			min.	max.	av.			
COMMENTS : Phenocrysts often occur as glomerocrysts of plagioclase and olivine (Image 137).								

187-1160B-9R-3, 8-12 cm (TS#63)			Unit: 7			OBSERVER:		Russo	
ROCK NAME:		Aphyric basalt							
WHERE SAMPLED:		pillow lava							
GRAIN SIZE:		microcrystalline							
TEXTURE:		intersertal							
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
PHENOCRYSTS									
Plagioclase	<1			1.2			prismatic	Commonly twinned, phenocrysts are rare but where present ~50% occur as glomerocrysts.	
Olivine									
Clinopyroxene									
GROUNDMASS									
Olivine									
Plagioclase	40			0.2	0.1		lath-like		
Clinopyroxene	35			0.1			granular anhedral		
Opaque Minerals	5			0.1	0.04		equant to bleb-like		
Glass									
Mesostasis	5								
SECONDARY MINERALOGY	PERCENT		SIZE (mm)				REPLACING / FILLING	COMMENTS	
			min.	max.	av.				
Clays	10						filling vesicles and replacing groundmass	Yellow-green.	
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)				FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.				
Vesicles	5			0.3	0.2		yellow-green clay and Fe oxyhydroxide/ round		
COMMENTS :									

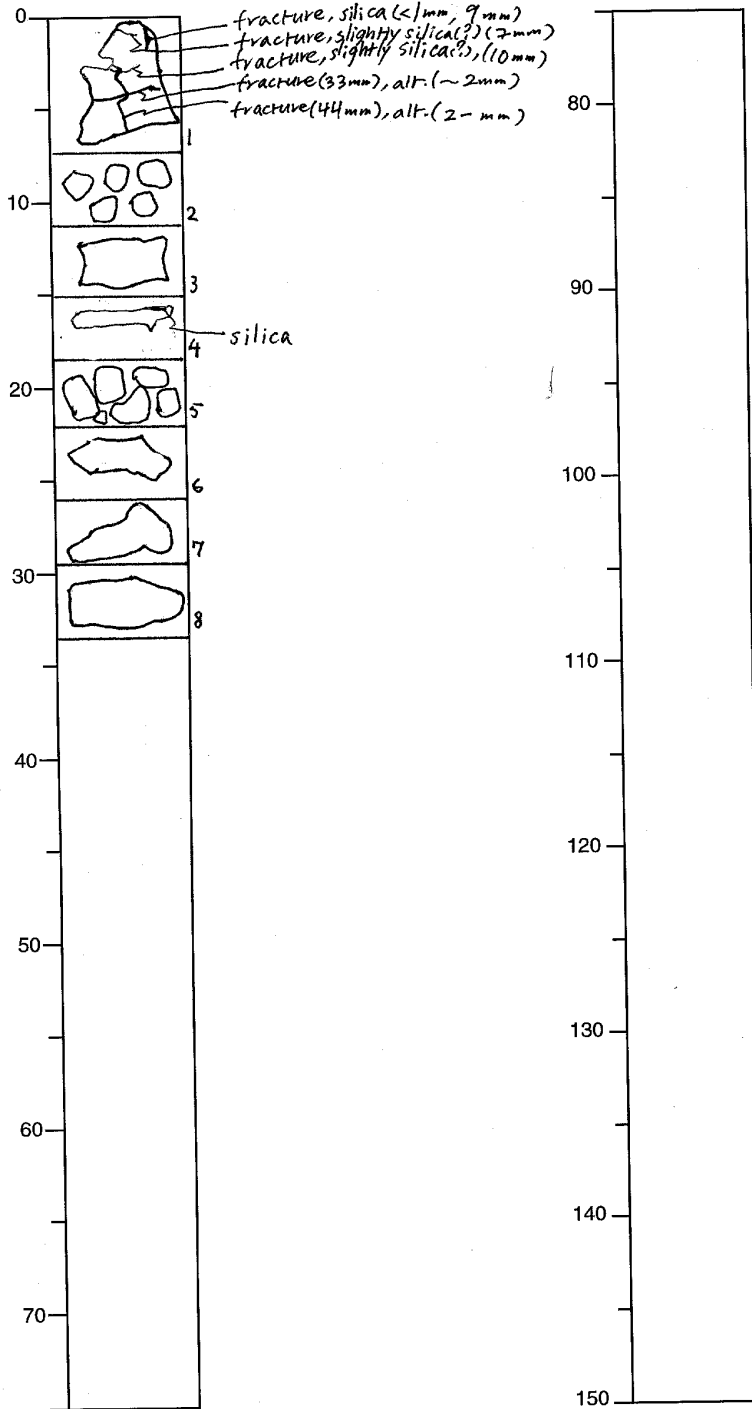
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section
187	1160A	2R	1



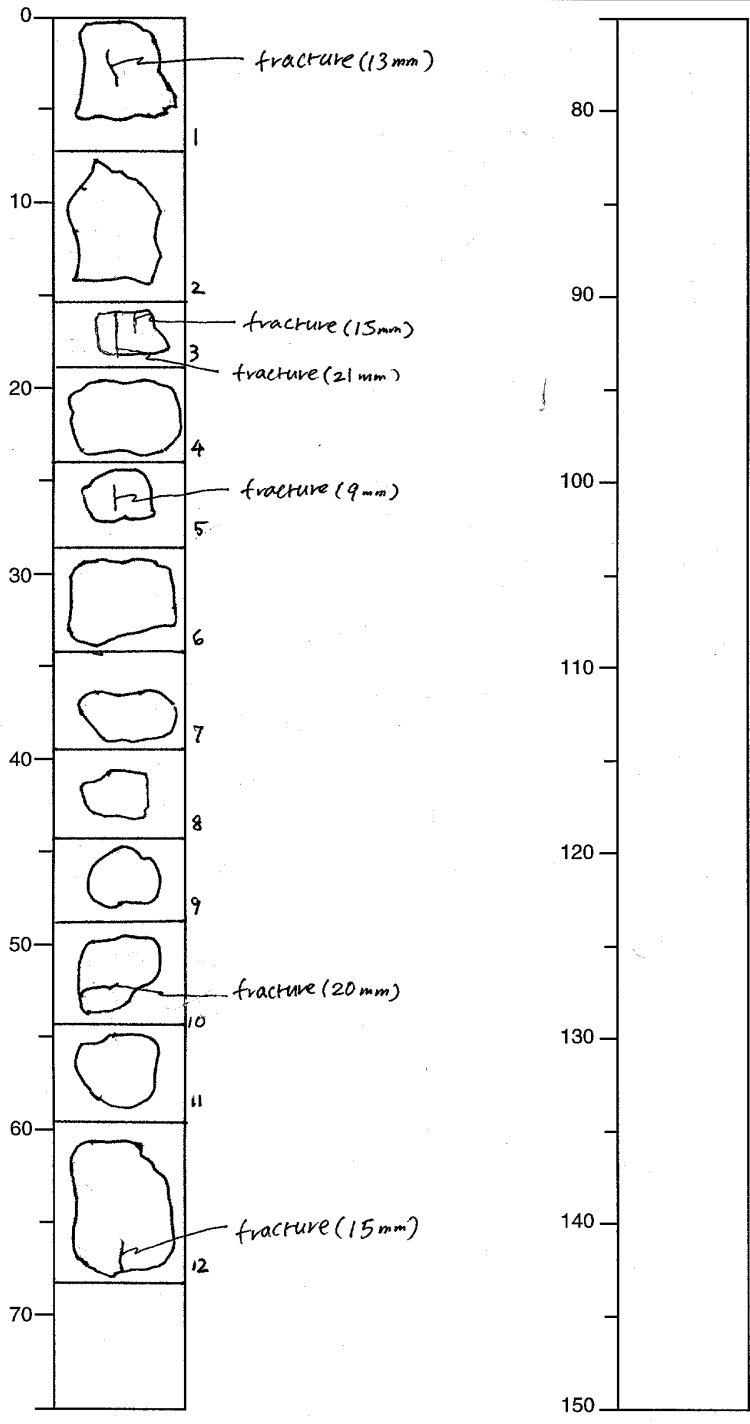
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section
187	1160A	3R	1



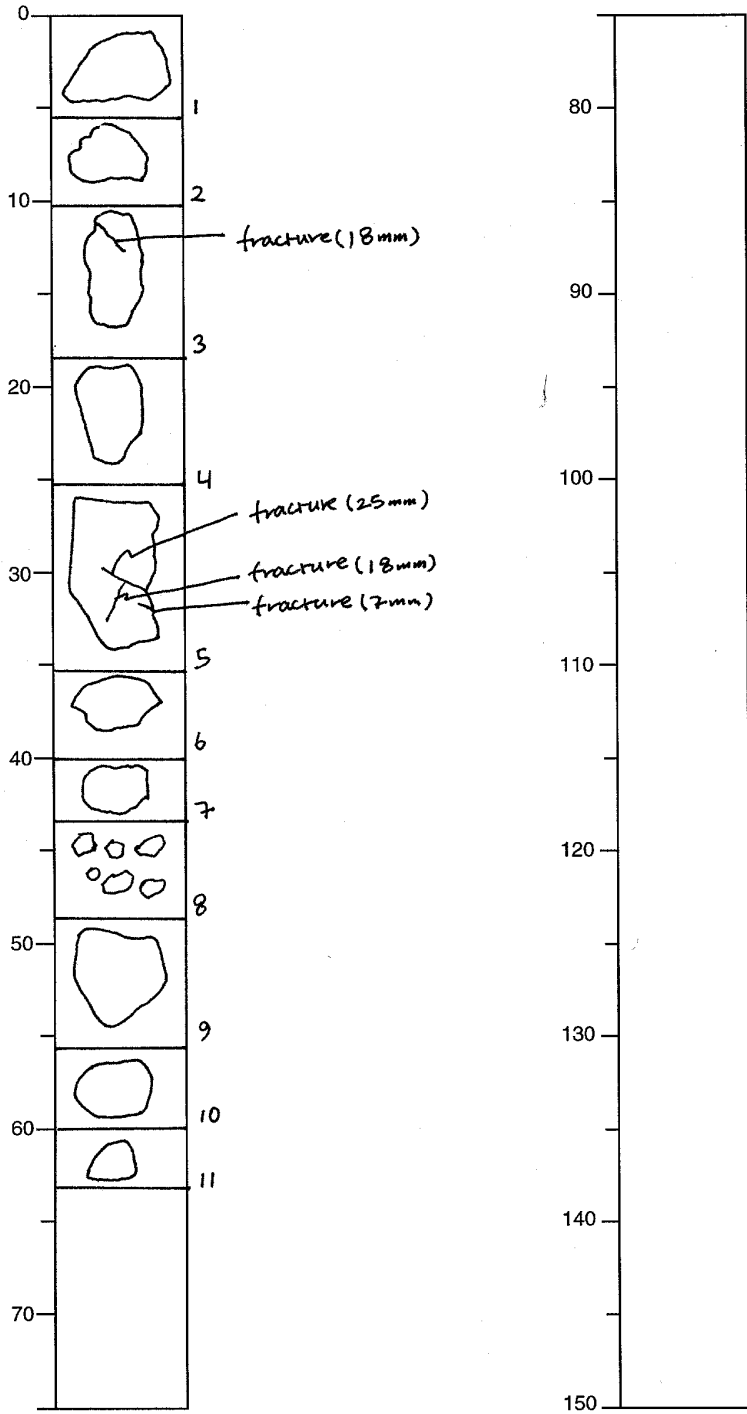
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section
187	1160B	1W	1



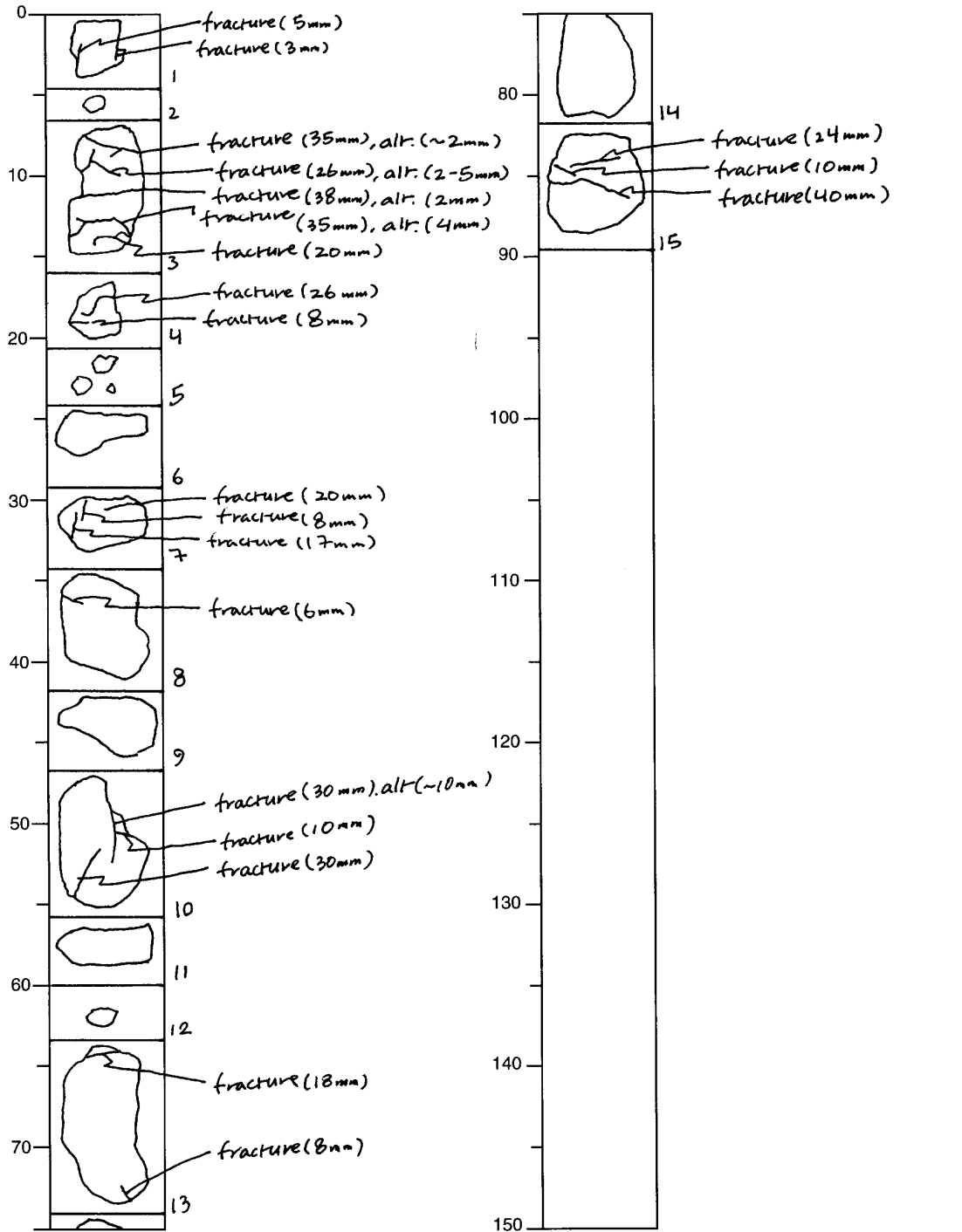
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section
187	1160B	2R	1 F



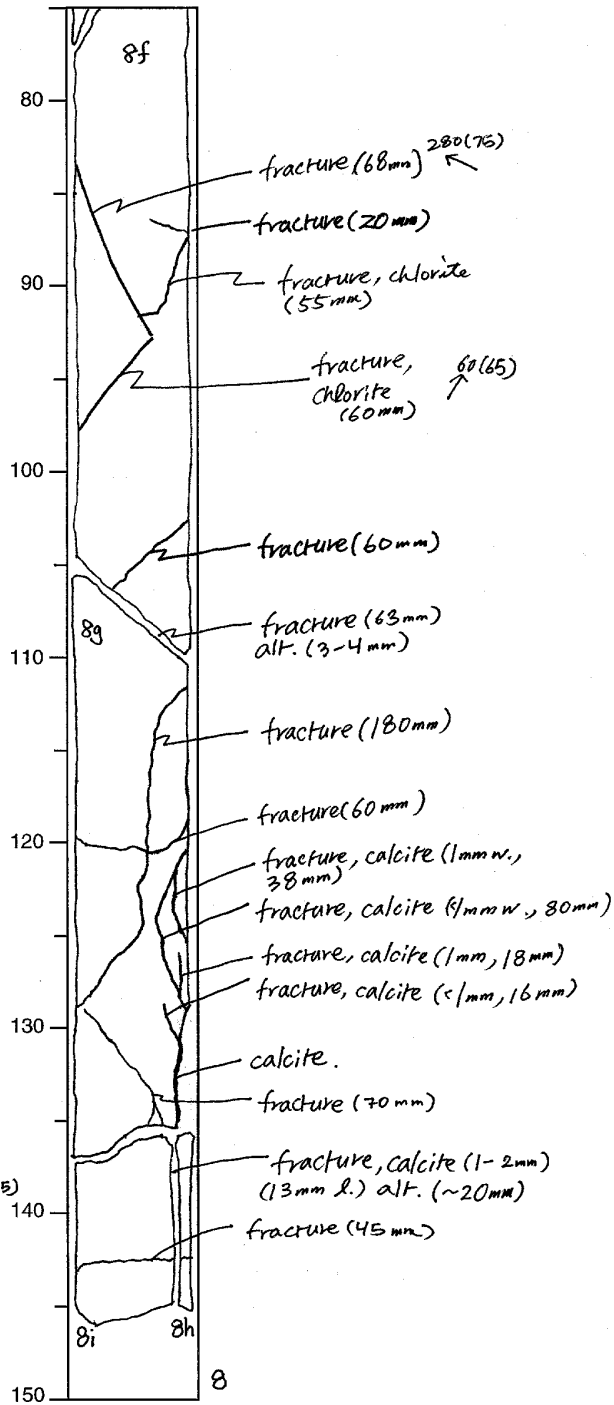
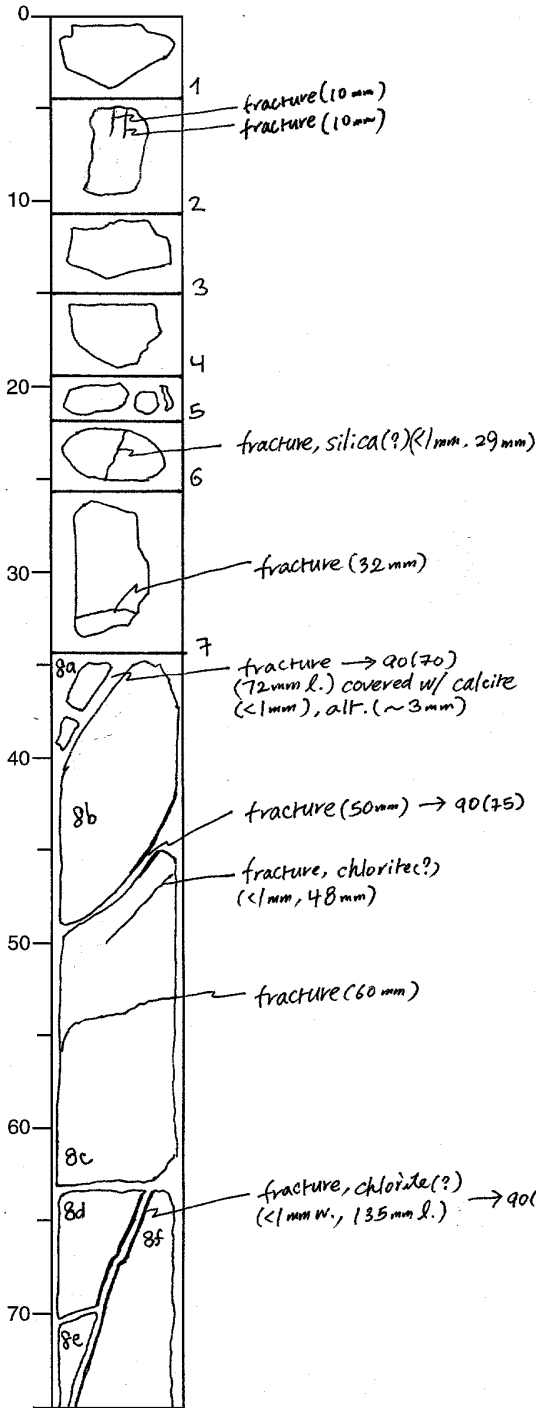
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	3R	1	H.S.



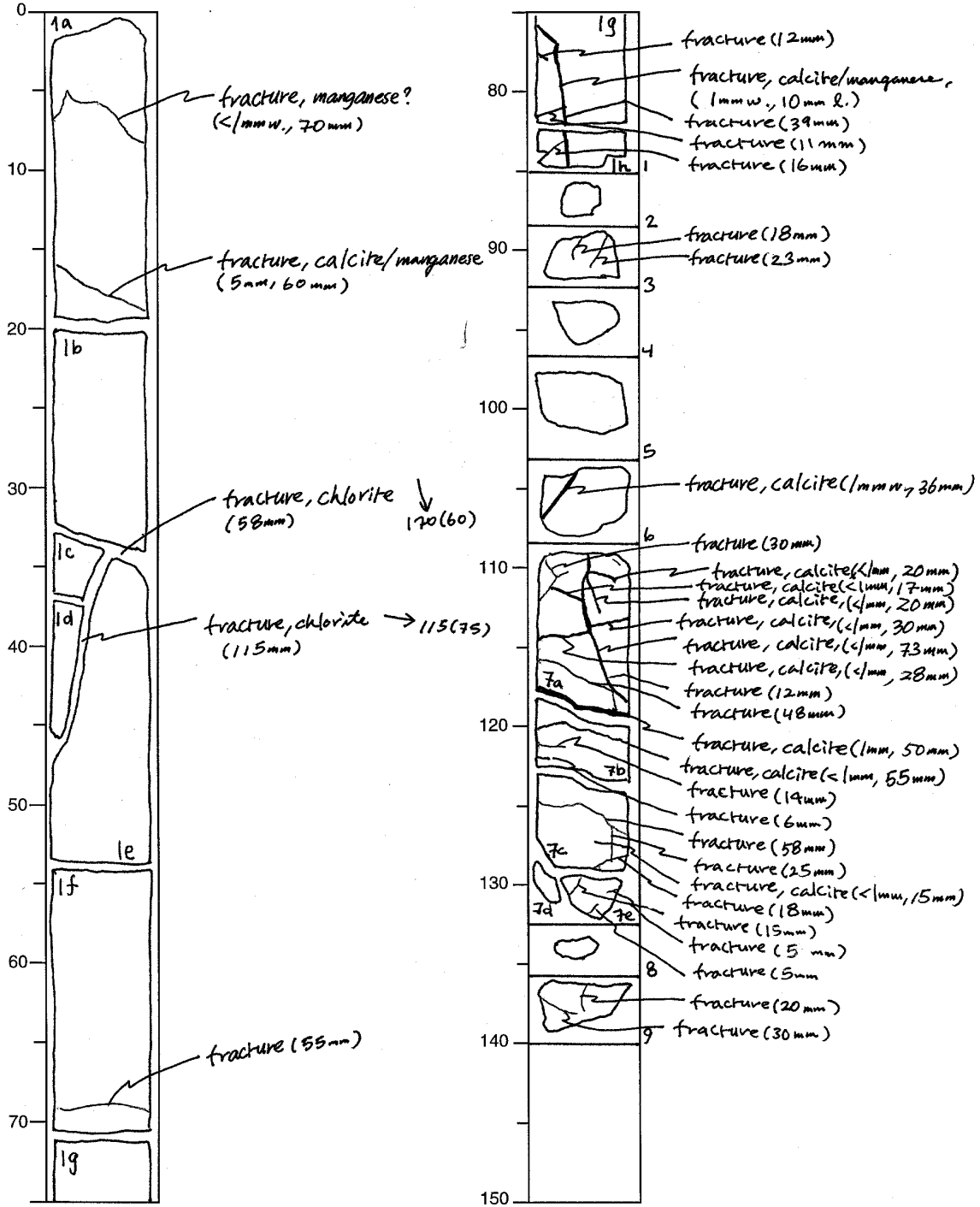
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	4R	1	H.S.



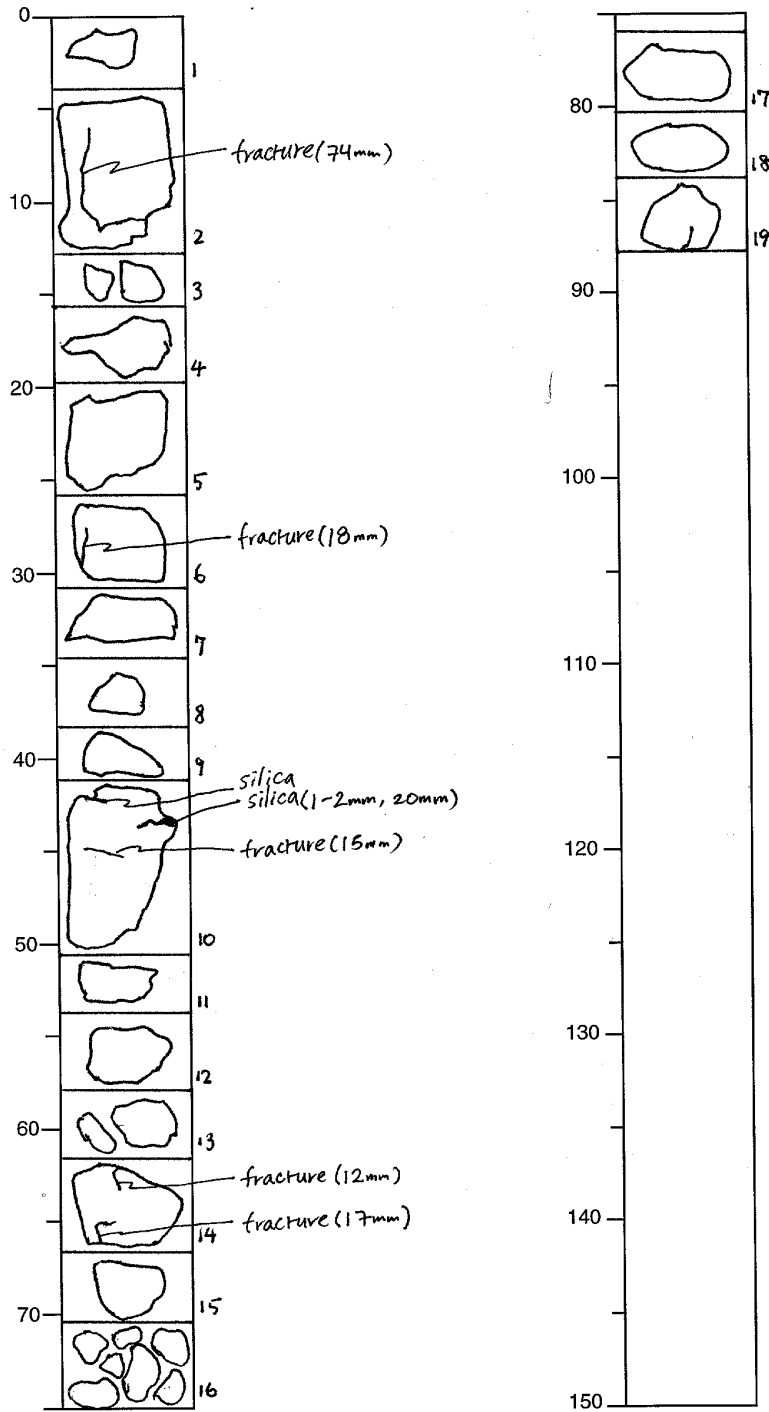
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	4R	2	



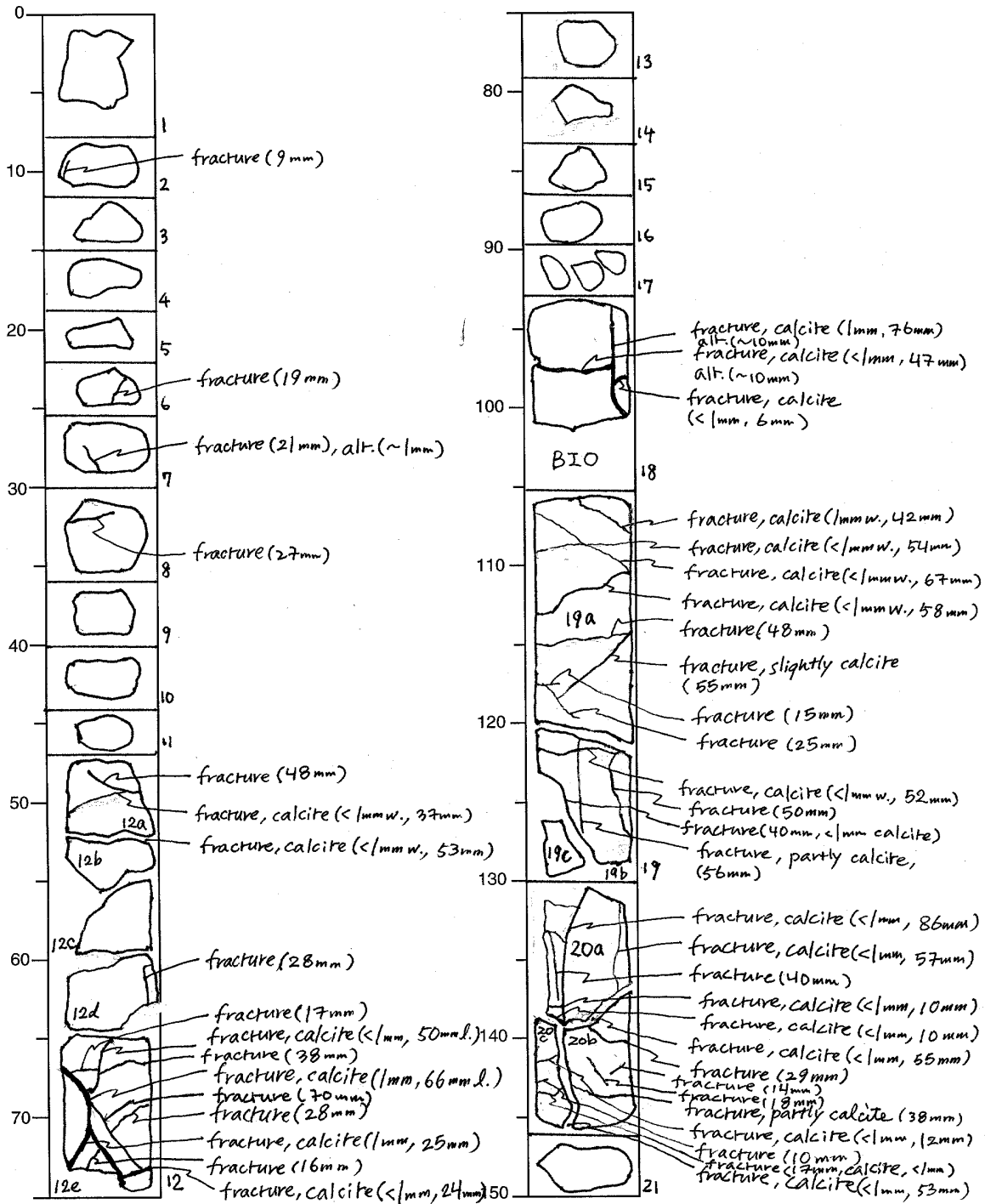
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section
187	1160B	BR	1



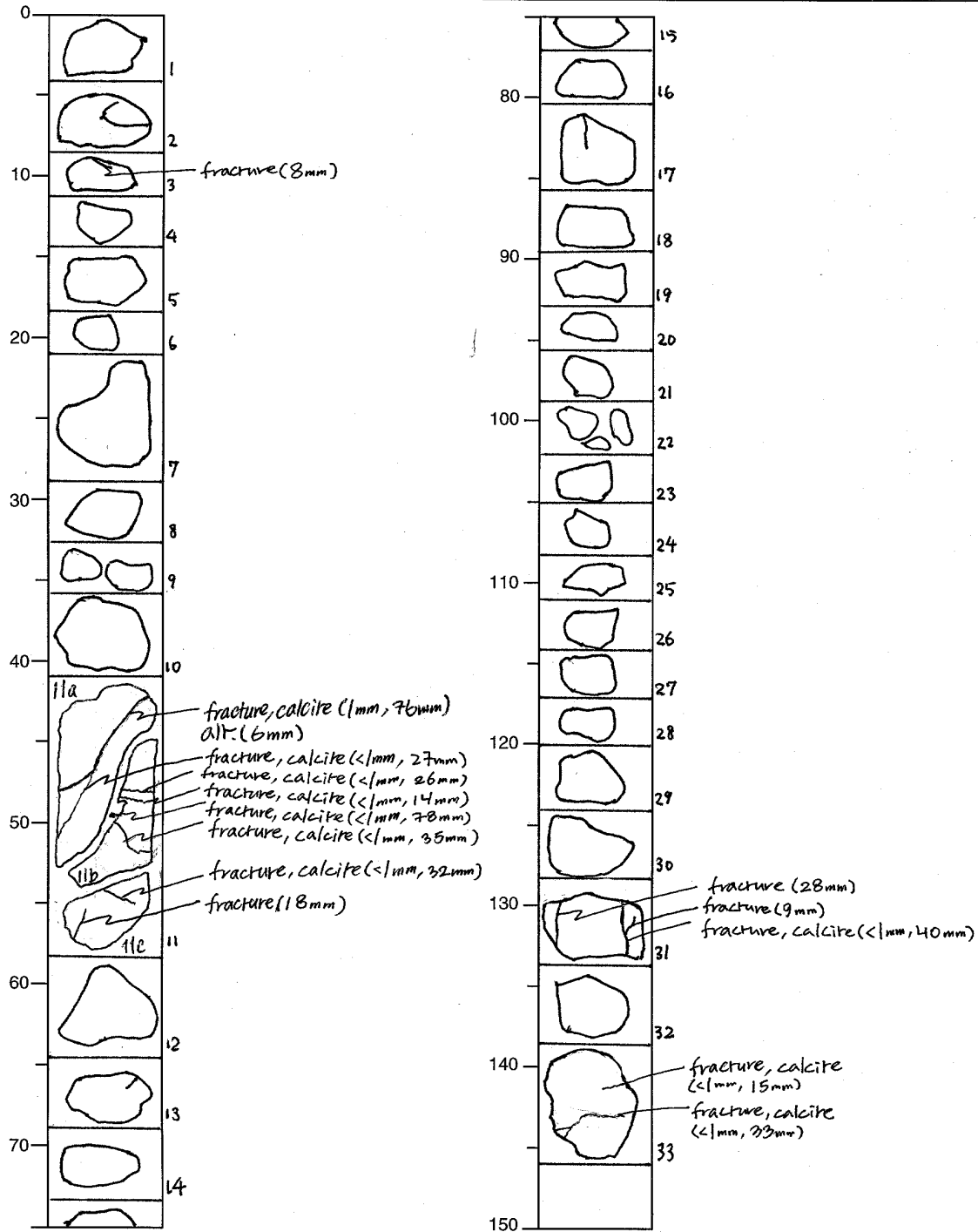
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	6R	1	



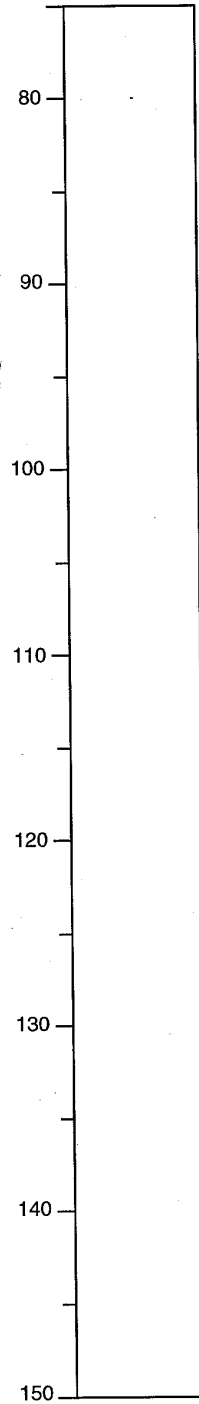
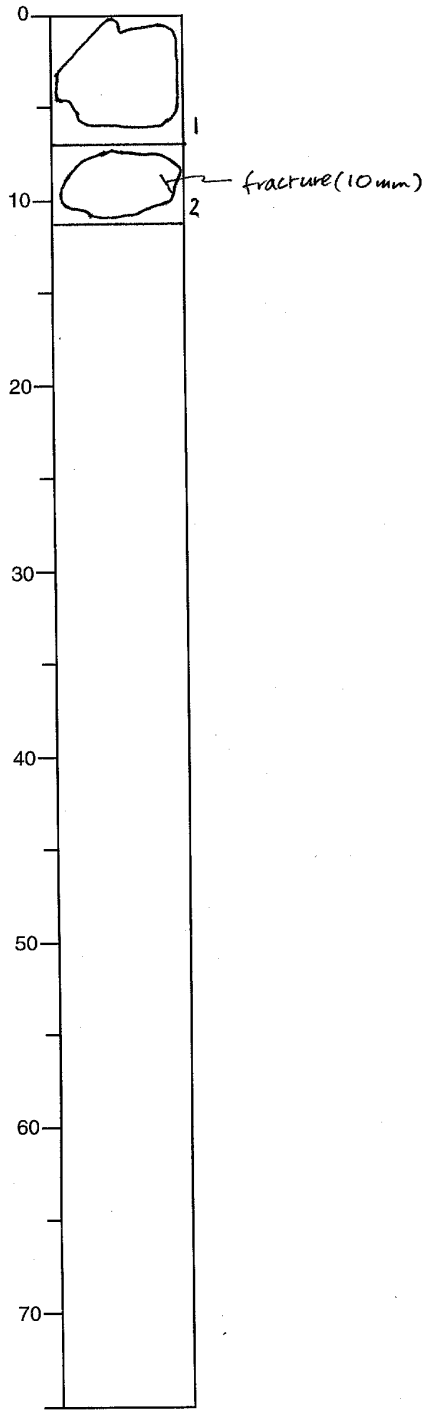
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	6R	2	



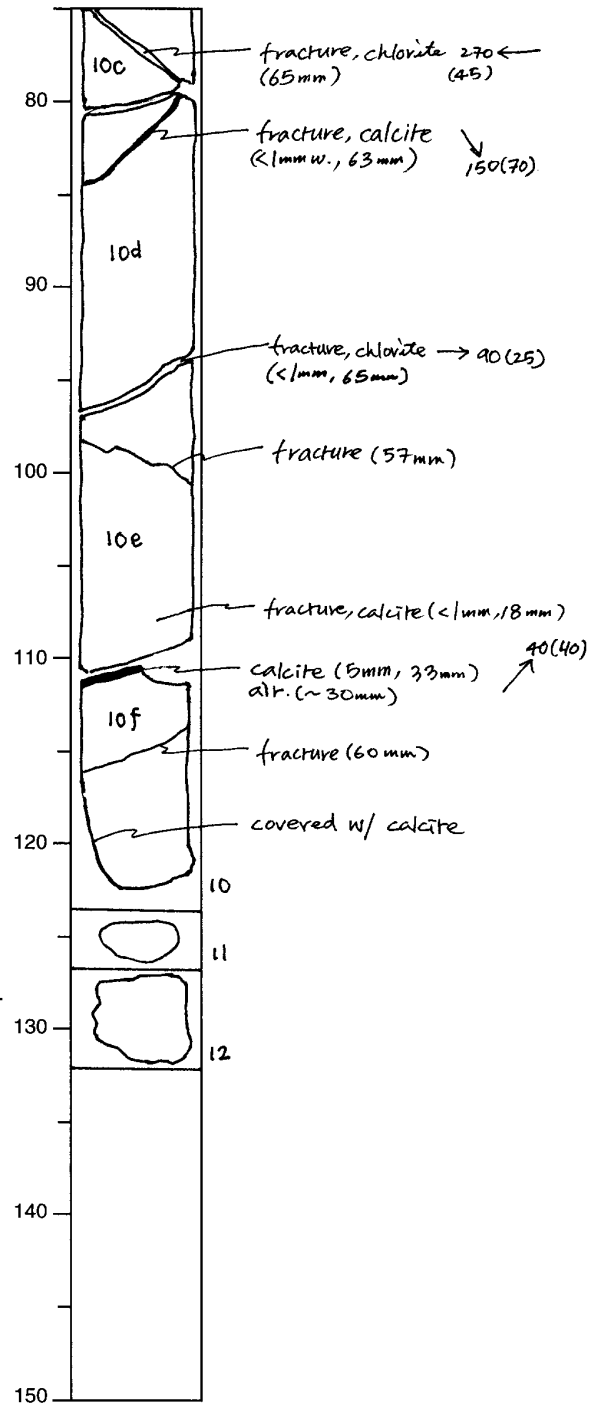
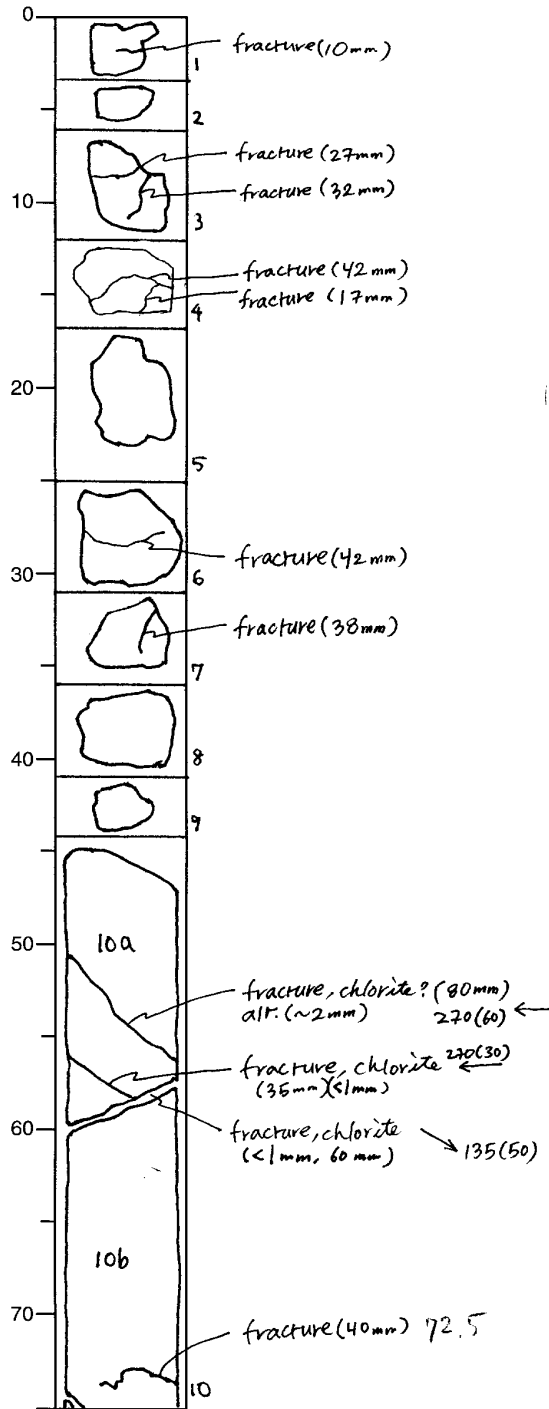
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Sec
187	1160B	6R	3



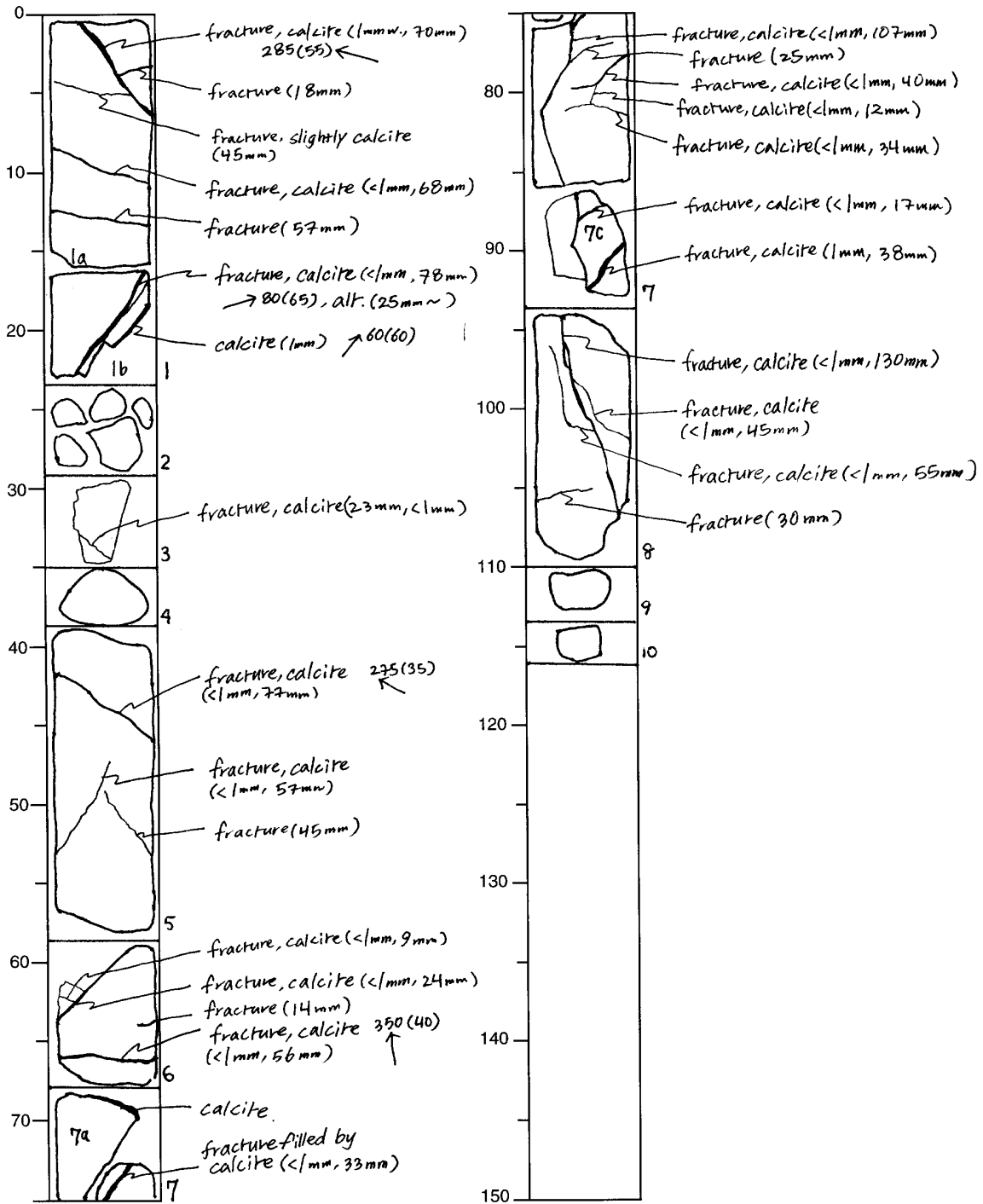
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	7R	1	



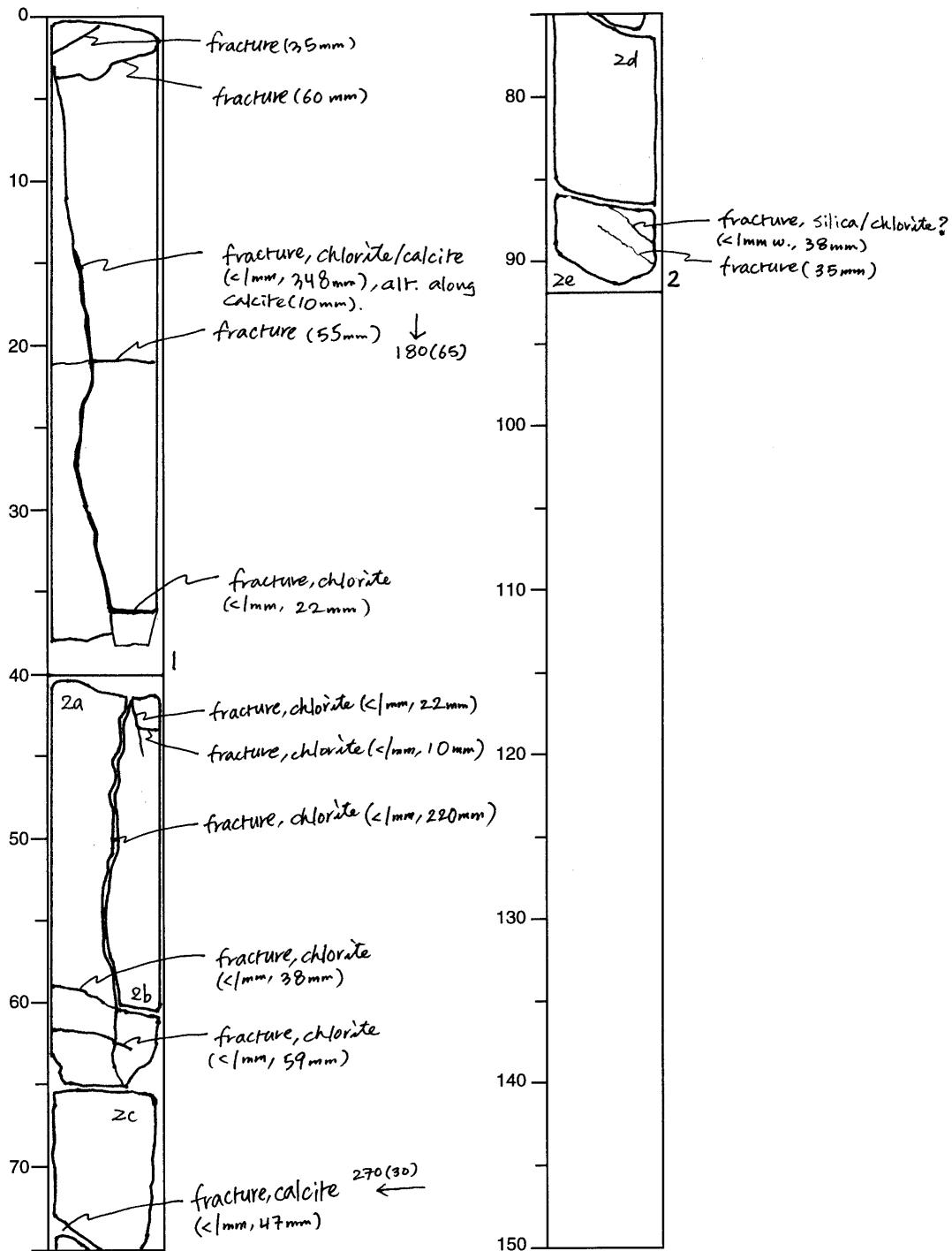
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	7R	2	



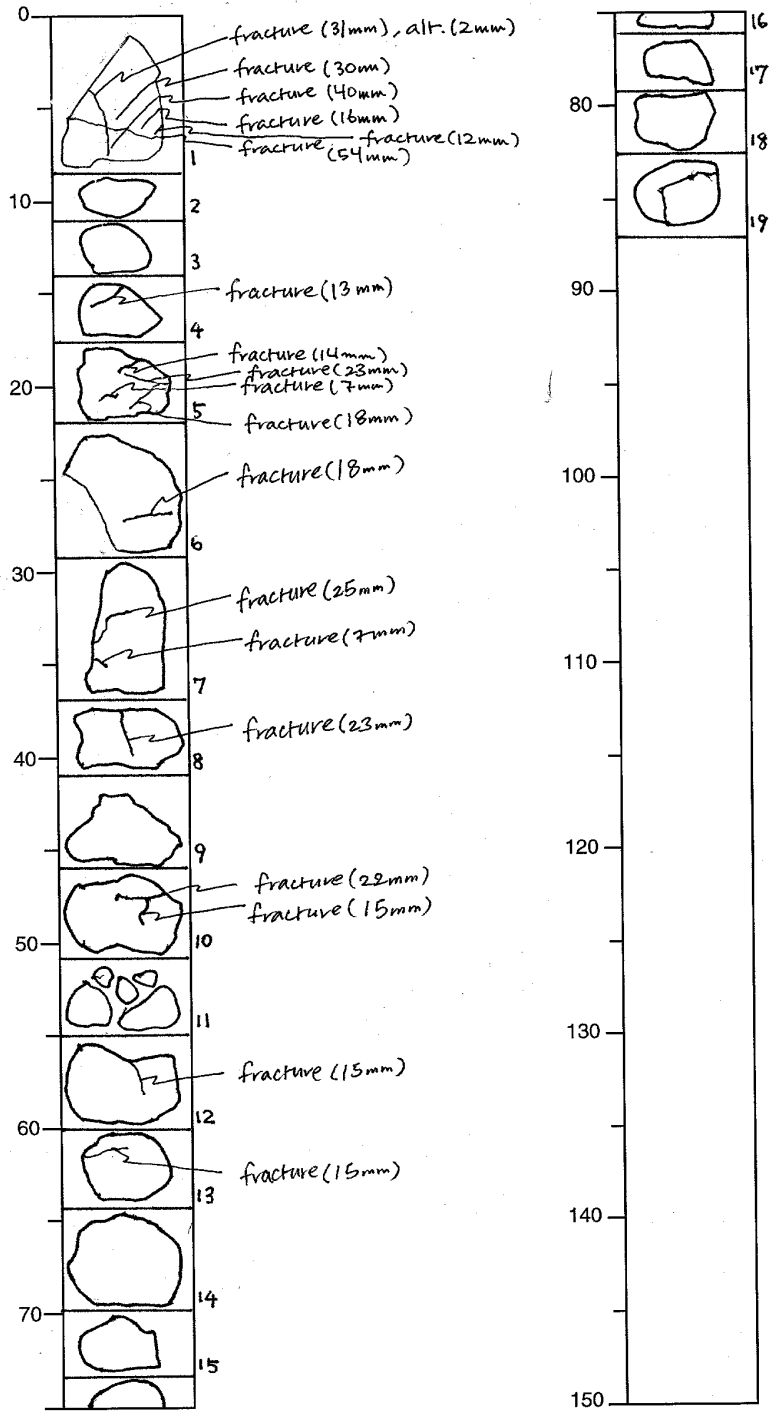
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	7R	3	



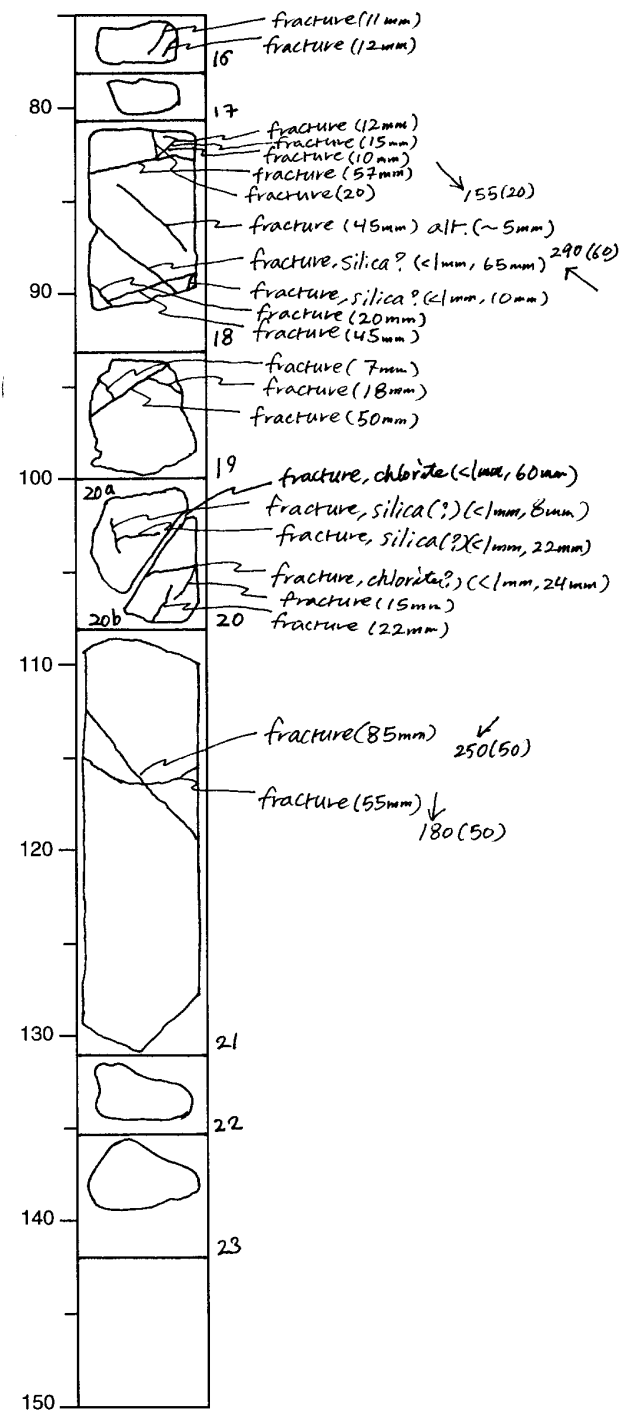
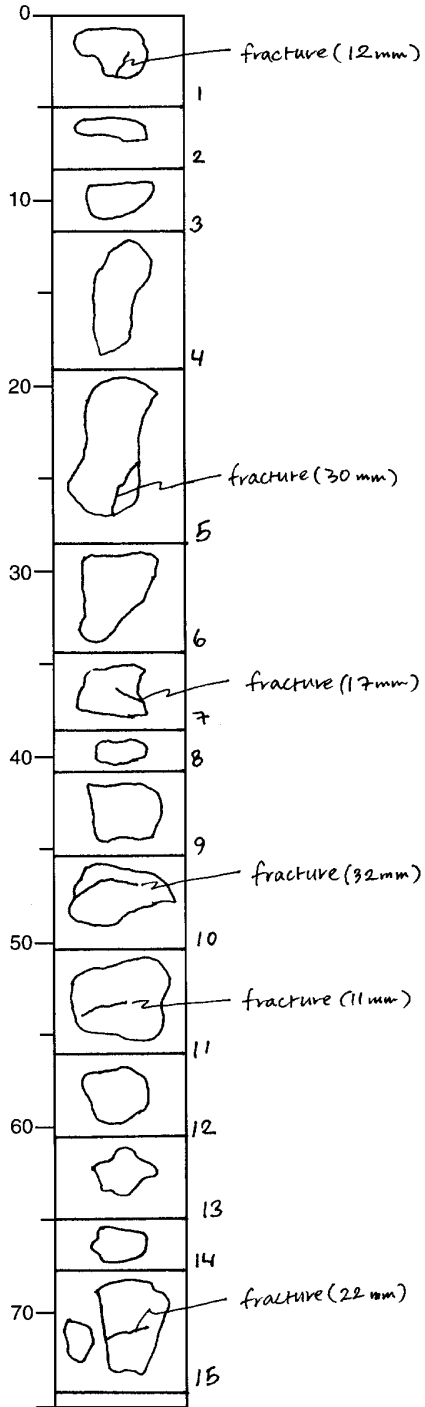
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	8R	1	H.S.



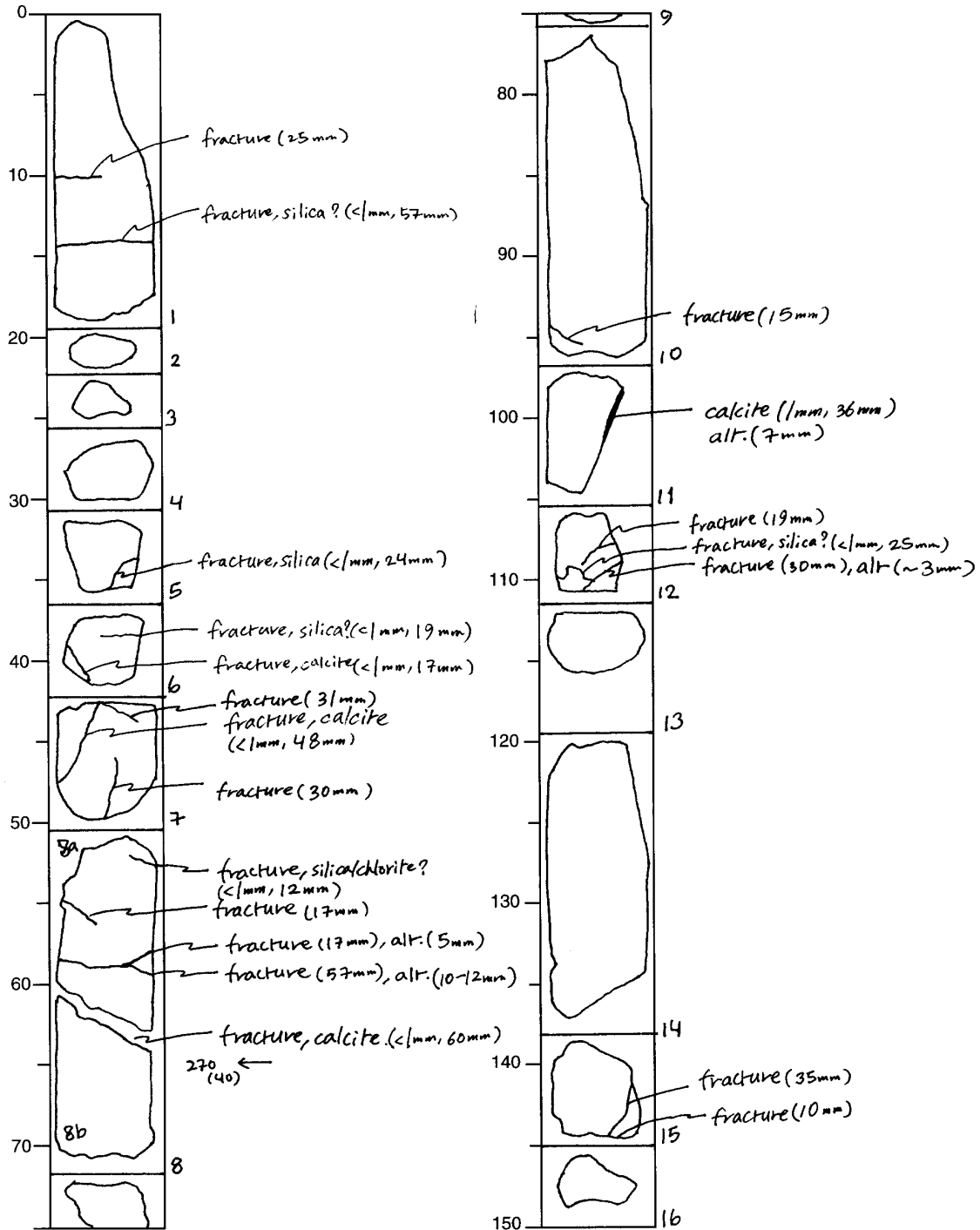
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	QR	1	H.S.



STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
187	1160B	9R	2.	H.S.



STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section
187	1160B	9R	3

