

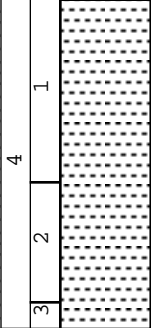
**Core Photo**

1153A-1W WASH CORE

1153A-2W WASH CORE

187-1153A-3W 142.3-151.9 mbsf						
METERS	CORE AND SECTION	GRAPHIC LITH.	DISTURB.	SAMPLE	COLOR	DESCRIPTION
143	1				lt ol BR	<p>CLAY</p> <p>The core consists of a dark brown clay from 0-3 cm. There is a disturbed contact at 3 cm underlain by moderate olive brown clay from 3-55 cm. A subtle but sharp color change occurs at 55 cm to dark grayish brown clay. The edges of the split face of the core show slight disturbance expressed as downturned margins, but most of the core shows no evidence of disturbance. Smear slides show almost exclusively clay with much less than 1% colorless, angular fragments (quartz?) and subrounded to subangular, dark brown, translucent grains. No microfossils recognized.</p>
144	2				dk gy BR	
145	3					
146	4					
147						

**Core Photo**

187-1153A-4W 151.9-209.6 mbsf						
METERS	CORE AND SECTION	GRAPHIC LITH.	DISTURB.	SAMPLE	COLOR	DESCRIPTION
153 4 154	1 2 3			SS BIO	dk gy BR	<p>CLAY</p> <p>This core is dark grayish brown clay. Two intervals of brown clay occur at 80-83 cm and 90-93 cm in Section 2. Smear slide is abundant clay, rare (much less than 1% total) colorless, 1-2 <math>\mu\text{m}</math> angular quartz grains, subrounded to subangular, brown, translucent volcanic glass grains, and silicate microfossils (sponge spicules and dinoflagellates).</p>

**Core Photo**

187-1153A-5W 209.6-233.4 mbsf					
METERS	CORE AND SECTION	GRAPHIC LITH.	SAMPLE	COLOR	DESCRIPTION
210	1				<p>From the top of the core to 7 cm in Section 3, the core is more generally homogenous very dark grayish brown clay. There is a 0.5 cm thick lighter hued layer at 57 cm in Section 1. Below 7 cm in Section 3, the core has a faint coarsely laminated appearance, varying between very dark grayish brown and dark brown. The contacts between the subcentimeter to 2-3 cm thick intervals are indistinct, except for two brown layers at the base of Section 4, where the contacts are more distinct but irregular. The smear slide has abundant clay, with very rare, angular, colorless crystals that look like quartz, and rare lath shaped crystals that have an extinction behavior like plagioclase. There are also relatively more abundant, subrounded to subangular <math>\mu\text{m}</math> sized grains of translucent brown volcanic glass, and rare siliceous microfossils.</p>
211	2			vdk gy BR	
212	3			dk gy BR	
213	4				

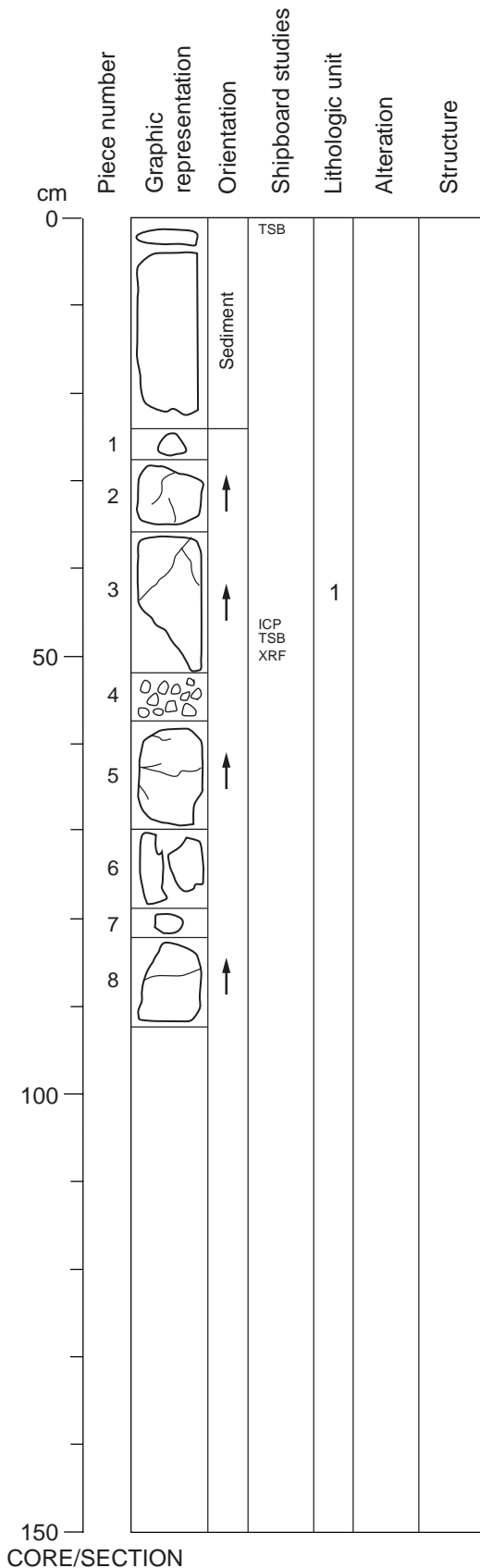
Core Photo

187-1153A-6W 233.4-243.0 mbsf						
METERS	CORE AND SECTION	GRAPHIC LITH.	DISTURB.	SAMPLE	COLOR	DESCRIPTION
234	1			SS	dk gy BR	CLAY From 0 to 132 cm in Section 1 the core is generally homogenous very dark grayish brown clay, as is present in the cores above. The smear slide shows similar components to previous cores as well, with predominantly clay and less than 1% colorless, angular to tabular fragments of plagioclase and quartz, as well as 2-3 µm sized subrounded to subangular particles of brown, translucent, volcanic glass and rare siliceous microfossils.
235	2				dk BR	Manganese crust
236	3			SS	med ye BR	At 132 cm is a 2 mm thick very coarse sand comprised of pieces of a manganese crust, underlain by a thin (mm) light yellow brown sandy layer.
					lt ye BR	CLAY Below the manganese grit to 30 cm in Section 2 is a heterogeneous mix of a very dark brown clay matrix with irregular swirls of light yellow to olive brown silty clay sized sediment. It is difficult to assess the cause of this texture, but it appears to be drilling induced.
						NANNOFOSSIL OOZE From 30 cm in Section 2 to the bottom of Section 3 is a gradational transition from light olive brown to light yellow brown nannofossil ooze. This sediment is silty clay sized, and is comprised of abundant colorless ± 2 µm fragments of calcareous microfossils and similar trace components (quartz, plagioclase, and volcanic glass particles) as in the overlying sediment.

Core Photo

187-1153A-7W 243.0-267.6							
METERS	CORE AND SECTION	GRAPHIC LITH.	DISTURB.	SAMPLE	COLOR	DESCRIPTION	
244	1				It ye BR	NANNOFOSSIL OOZE  From the top of this core to the bottom of Section 3 is a light yellowish brown silty clay sized calcareous ooze. The entire section appears to show core disturbance, with biscuits of more indurated material broken up and embedded in a sticky matrix of clay. The smear slide shows abundant calcareous microfossils with a trace amount of colorless crystals of quartz and plagioclase and rare brown volcanic glass. Smeard throughout the core are submillimeter sized grains of manganese oxide, although these appear to be more abundant in the interval from 50 to 130 cm in Section 2.	
245	2						Section 4 is described on the following hard rock visual core description summary.
246	3						
247	4						

**Core Photo**



**187-1153A-7W-4**

**UNIT 1: APHYRIC BASALT**

**PIECES 1-8**

**INTERNAL CONTACTS:** Glassy rim on outside edge of Piece 5 (~1 cm thick), working half only.

**GROUNDMASS:** Microcrystalline

**COLOR:** Medium gray

VESICLES:	Abundance		Size (mm)		Shape
	%	avg.	max.	min.	
	<1	0.4	0.5	<0.3	round

**Filling:** Bluish white material, probably silica, some with Fe oxyhydroxides, and some are unfilled.

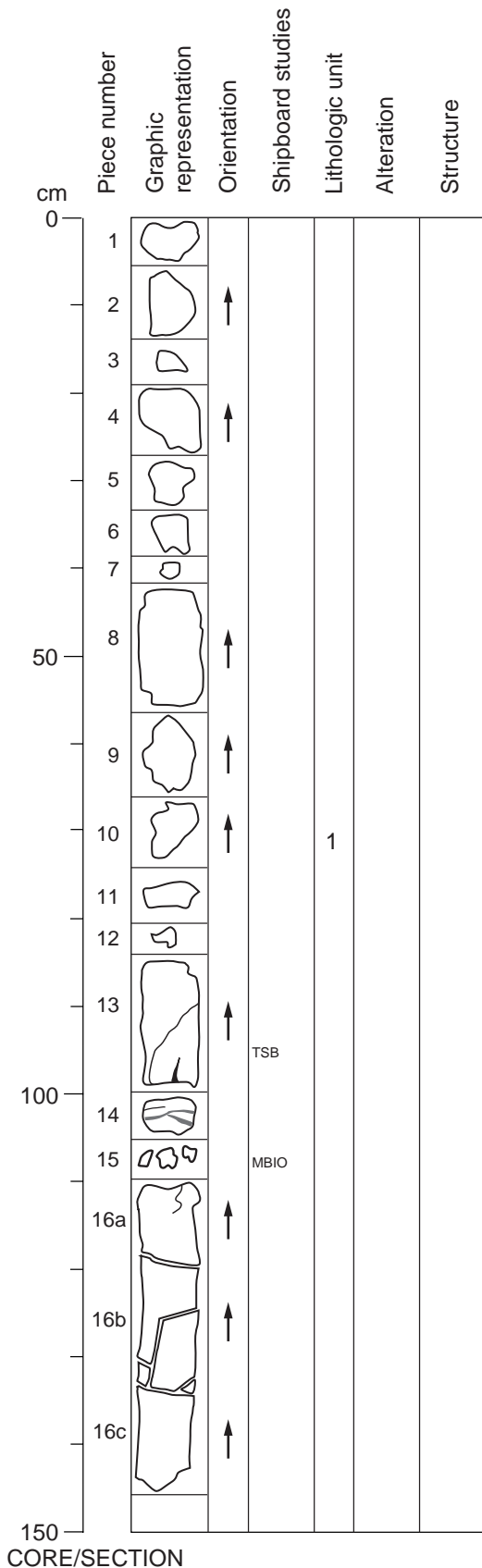
**VEINS/FRACTURES:** Veins are about 1 mm wide and filled with a white material, probably silica, plus Fe oxyhydroxide.

**ALTERATION:** In general, core pieces are slightly altered, with staining to buff color along some outside edges and along fractures. Piece 8 has an alteration halo ~5 mm wide, containing ~10% Fe oxyhydroxide. Pieces 3 and 8 have fragments of veins or surficial coatings of carbonate. Some spotty Mn oxide deposit on the glassy surface of Piece 5 in the working half.

**STRUCTURE:** Pillow lava

**ADDITIONAL COMMENTS:** Euhedral olivine microphenocrysts (<1%) 0.5-2 mm in size are slightly altered to Fe oxyhydroxides on outer surfaces. An alteration zone (~1 cm wide) on Piece 5 appears to follow the boundary between the quenched outer margin and the more crystallized interior, i.e., along the zone of coalesced spherulites. Acicular plagioclase microlites visible in groundmass. The top of Section 4 includes two pieces of limestone (2.5 cm and 15 cm long) respectively which are probably lithified versions of the overlying carbonate mud. The limestone is white in color, slightly mottled in appearance and contains tiny black flecks that are probably Mn oxide. There is no obvious internal structure.

**Core Photo**



187-1153A-8R-1

**UNIT 1: APHYRIC BASALT**

**PIECES 1-16**

**INTERNAL CONTACTS:** Glassy rinds on Pieces 1, 4, and 14 indicate pillow margins. The rinds on Pieces 1 and 4 are 1-2 mm thick and are relatively fresh. The rind on Piece 14 is 2 cm thick and consists of intercalated layers of palagonite and fresh glass. Immediately below the glassy rind in Pieces 1 and 4 is a 1 cm thick chilled margin. Chilled margins are also present in Pieces 6, 13, and 16 which range from 1 cm in Piece 6 to 3.5 cm thickness in Piece 16. In thin section sheath and variolitic textures are common quench textures in the glassy rinds and chilled margins. These textures are highlighted by the orange brown alteration product of surrounding interstitial glass.

**GROUNDMASS:** Microcrystalline

**COLOR:** Medium gray

VESICLES:	Abundance %	Size (mm)		Shape
		avg.	max. min.	
	<1	0.4	0.5 <0.3	round

**Filling:** Partial to full with cryptocrystalline silica, zeolites, calcite and Fe oxyhydroxide

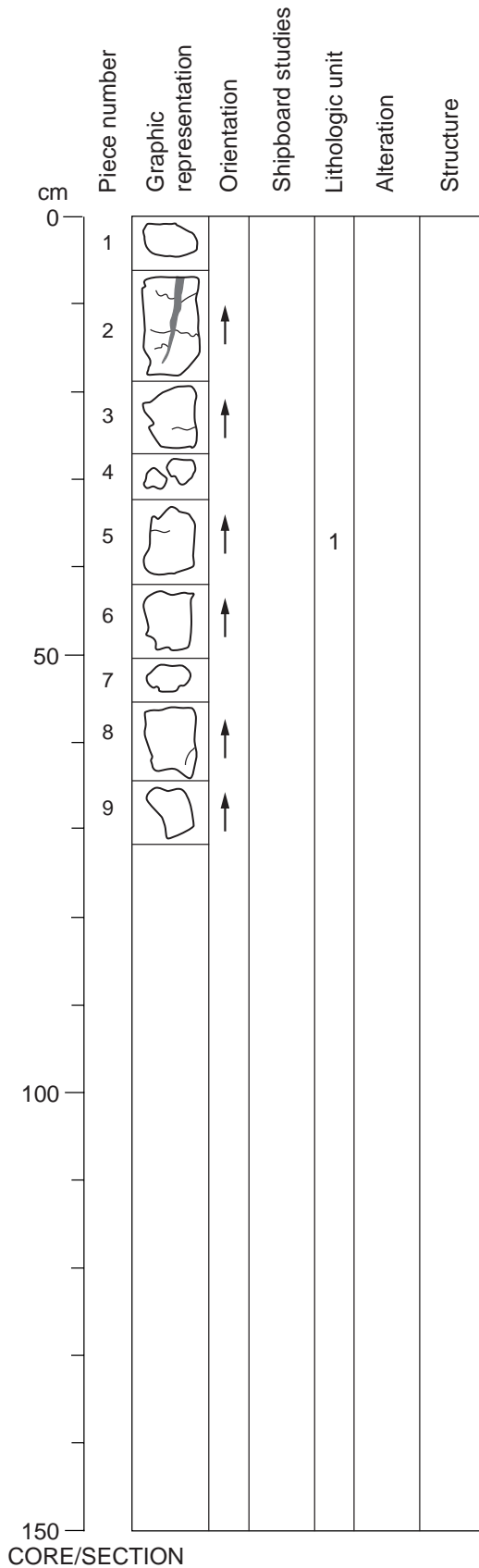
**VEINS/FRACTURES:** Pieces 1, 4, 6, 8, 9, 13, 14, and 16 contain small (<1 mm wide) fractures. Pieces 6 and 14 have fractures running parallel to the glassy rind or chilled margin. Fracture in Piece 14 is 5.5 cm long and up to 3 mm wide. Pieces 13 and 16 have small (<1 mm wide) fractures perpendicular to the chilled margins and have been interpreted as radial cooling fractures. Some fractures in Pieces 6, 13, 14, and 16 are all filled with cryptocrystalline silica and calcareous sediment.

**ALTERATION:** The section is slightly altered. Pieces 1, 4, 13, and 16 have oxidizer layers orange-brown in color 1-2.5 cm thick below their chilled margins. Below these layers the rock is slightly altered aphyric basalt. However Fe oxyhydroxide coatings occur on some fracture surfaces.

**STRUCTURE:** Pillow lavas.

**ADDITIONAL COMMENTS:** Groundmass microphenocrysts of acicular plagioclase up to 2.5 mm long in Pieces 9, 10, and 16. In the remaining pieces groundmass phases are indistinguishable in handsample. Piece 11 is completely surrounded by calcareous material.

**Core Photo**



187-1153A-8R-2

**UNIT 1: APHYRIC BASALT**

**PIECES 1-9**

**GROUNDMASS:** Microcrystalline

**COLOR:** Medium gray

**VESICLES:**

Abundance %	Size (mm)		Shape
	avg.	max. min.	
<1	<1	3 <0.5	rounded to elongated

**Filling:** Partial to full with cryptocrystalline silica, zeolites, calcite and Fe oxyhydroxide

**VEINS/FRACTURES:** Piece 2 has a 10 cm long, 1 mm wide fracture that is filled with calcareous sediment and has a 1 cm wide oxidized halo.

**ALTERATION:** The section is slightly altered. All Pieces have oxidized rinds up to 3 cm thick (in Piece 3) that are orange brown in color. Vugy cavities in Pieces 2, 3, and outside of 5 and 6 are filled with cryptocrystalline silica and zeolites.

**ADDITIONAL COMMENTS:** Intergranular groundmass with acicular plagioclase up to 2.5 mm long in all pieces. Spots of Mn oxide (<1 mm) along fractures of many pieces.

<b>187-1153A-7W-4, 3-6 cm (TS #5)</b>			<b>Unit:</b>			<b>OBSERVER:</b>		<b>Gee</b>	
<b>ROCK NAME:</b> Micrite (limestone)									
<b>WHERE SAMPLED:</b> top of lithified unit									
<b>GRAIN SIZE:</b> microcrystalline									
<b>TEXTURE:</b>									
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS	
			min.	max.	av.				
Calcite	99								
<b>PHENOCRYSTS</b>									
<b>GROUNDMASS</b>									
SECONDARY MINERALOGY	PERCENT		SIZE (mm)				REPLACING / FILLING	COMMENTS	
			min.	max.	av.				
VESICLES/CAVITIES	PERCENT	LOCATION	SIZE (mm)				FILLING / MORPHOLOGY	COMMENTS	
			min.	max.	av.				
<b>COMMENTS :</b> Microcrystalline calcite, crystal size varies across thin section, where crystals are larger there is a higher degree of crystallinity. Quartz also present <1%, and some globular brown altered glass, with larger calcite crystals around. There is no preferred orientation of calcite crystals except around the altered glass globules. Some microfossils present.									

187-1153A-7W-4, 46-49 cm (TS #6)			Unit: 1			OBSERVER:		Russo																					
ROCK NAME:		Aphyric basalt																											
WHERE SAMPLED:		pillow interior (Piece 3)																											
GRAIN SIZE:		microcrystalline																											
TEXTURE:		sheaf quench texture																											
PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS																					
			min.	max.	av.																								
<b>PHENOCRYSTS</b>																													
Plagioclase																													
Olivine																													
Clinopyroxene																													
<b>GROUNDMASS</b>																													
Olivine																													
Plagioclase																													
Clinopyroxene																													
Opaque Minerals																													
Glass																													
Mesostasis																													
<table border="0" style="width: 100%;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%; text-align: center;">1</td> <td style="width: 15%;"></td> <td style="width: 15%; text-align: center;">2.5</td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td></td> <td style="text-align: center;">30</td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">Euhedral.</td> <td></td> <td colspan="2" style="text-align: center;">some olivines are partially altered to iddingsite occur as laths in sheaf quench textures</td> </tr> </table>											1		2.5								30					Euhedral.		some olivines are partially altered to iddingsite occur as laths in sheaf quench textures	
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Includes undifferentiated quench phases and glass.																													
SECONDARY MINERALOGY	PERCENT		SIZE (mm)			REPLACING / FILLING	COMMENTS																						
			min.	max.	av.																								
Clays																													
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)			FILLING / MORPHOLOGY	COMMENTS																						
			min.	max.	av.																								
<b>COMMENTS :</b>																													
~15% of slide is strongly Fe stained, which is noticeable both in the glassy groundmass and individual crystals by the tanish-orange color. Textural example (Digital photomicrograph IMAGE 1). Proportions of groundmass phases difficult to estimate due to predominance of quench textures.																													

187-1153A-8R-1, 95-98 cm (TS #7) Unit: 1 OBSERVER: Gee  
**ROCK NAME:** Aphyric basalt  
**WHERE SAMPLED:** transect across glassy rind/chilled margin of pillow in Unit 1 (Piece 13)  
**GRAIN SIZE:** microcrystalline to cryptocrystalline  
**TEXTURE:** glass with a variety of quench textures, including spherulitic and sheaf

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)			APPROX. COMP.	MORPHOLOGY	COMMENTS
			min.	max.	av.			
<b>PHENOCRYSTS</b>								
<b>GROUNDMASS</b>								
Olivine	see comments below						Various quench textures including chinese lantern, and skeletal.	Microlites vary from <100 to 800 microns.
Plagioclase	see comments below						Variolitic and sheaf textures	~1.6mm across.
Clinopyroxene	see comments below							
Opaque Minerals								
Glass								
Mesostasis	25	40						Includes undifferentiated quench phases + glass.

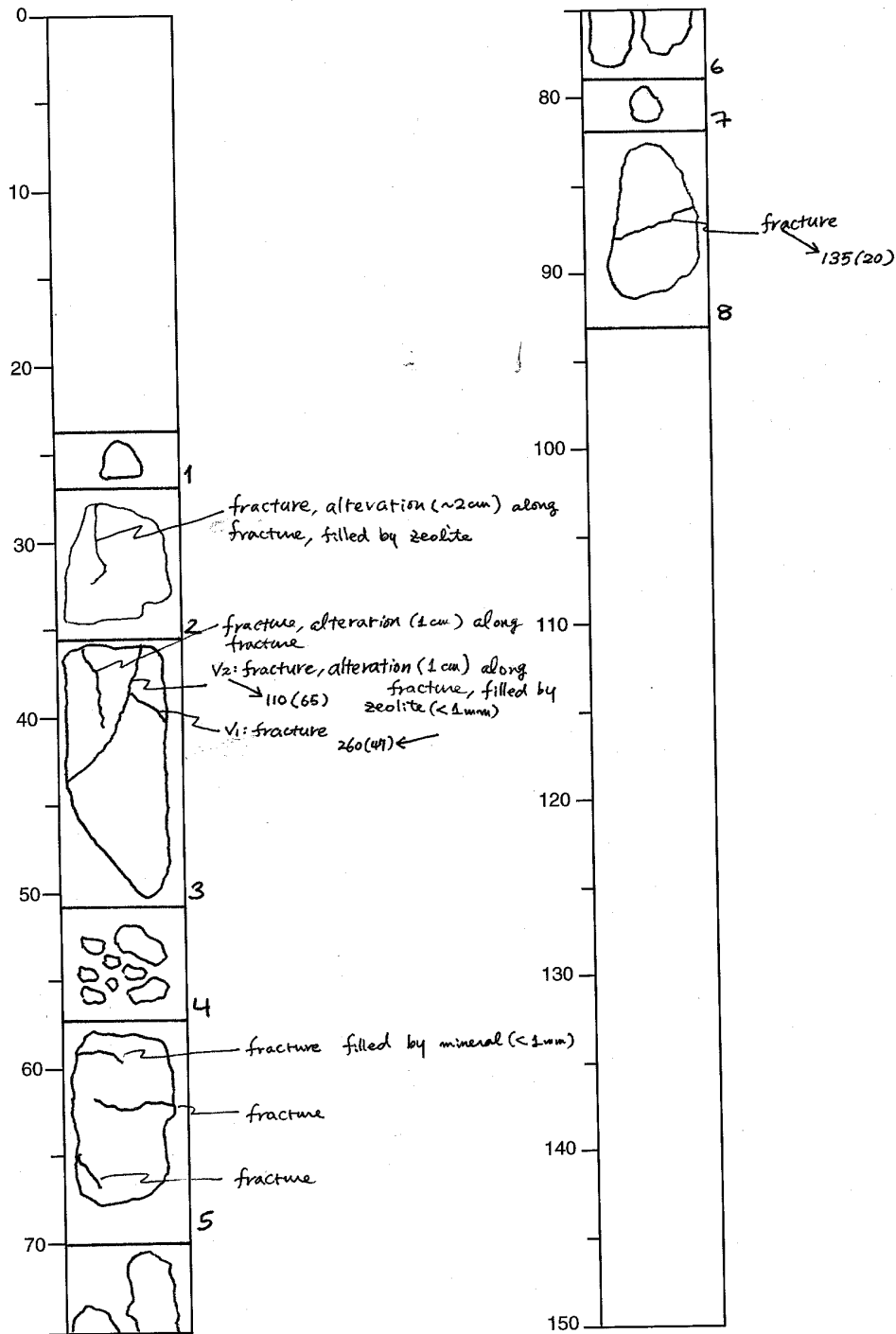
SECONDARY MINERALOGY	PERCENT	LOCATION	SIZE (mm)			REPLACING / FILLING	COMMENTS
			min.	max.	av.		
Fe oxyhydroxide						olivine?	All secondary minerals total ~55-60% of which calcite contributes the least.
Smectite						olivine	
Calcite						olivine (after smectite?)	Also occurs along boundaries of some spherulites and replacing glass/mesostasis within plagioclase sheafs.

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

**COMMENTS :** Thin section shows increasing crystallinity with distance from the glassy rind. Main quench textures are sheaf and spherulitic, forming spherulites visible in hand specimen, these are emphasized by the alteration of interstitial glass between the spherulites. Quench olivine microlites are common. 3 photos taken of texture using camera in natural light, Roll 1 Frames 5-7. One of the striking features of the thin section is the concentration of Fe oxyhydroxide alteration forming rings around plagioclase spherulites. This may be due to concentration of olivine quench crystallization at the edges of the plagioclase sheafs and subsequent replacement of olivine by Fe oxyhydroxide. Photomicrographs also taken of spherulites: Images 10 and 11.

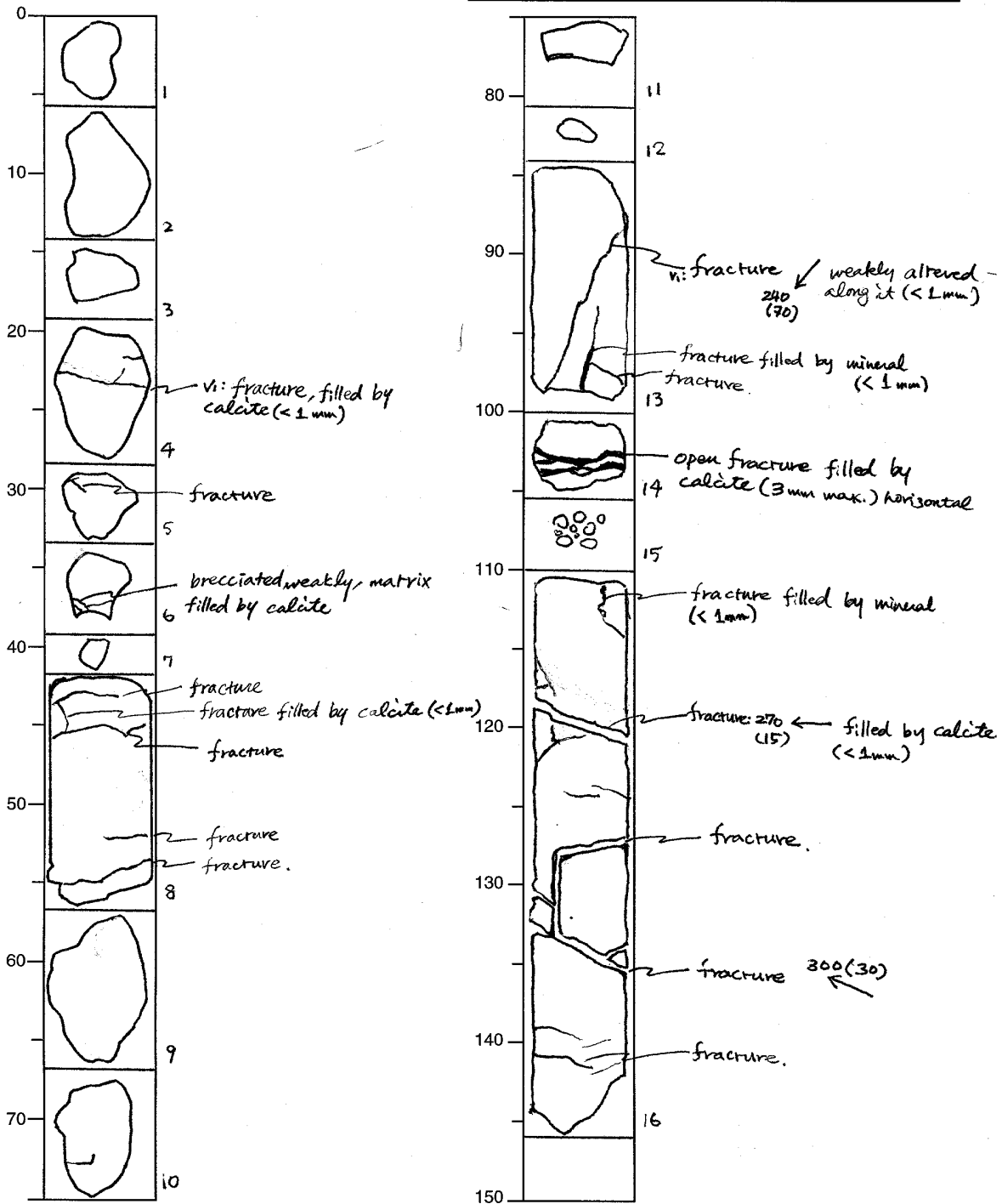
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section
187	1153A	7W	1



STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
189	1153	8R	1A	



STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core
187	1153	8R 2

