

143-865A-91R-01 (Piece 13B, 126–127 cm)

OBSERVER: BAK

WHERE SAMPLED: Sill; Unit 1

ROCK NAME: Altered microphyric olivine-pyroxene basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Microporphyrritic, intersertal.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	2	2	0.5–1.5	An _{60–70}	Subhedral.	Fresh.
Olivine	0	8	0.5–1.0		Subhedral.	Pseudomorphed by clay minerals and iron oxides.
Clinopyroxene	Tr	12	0.5–2.0	Augite	Subhedral.	Almost entirely pseudomorphed.
GROUNDMASS						
Plagioclase	47	52	<0.5	An _{60–70}	Laths.	Fresh.
Clinopyroxene	12	20	<0.5	Augite	Grains.	
Opaque mineral	5	5	<0.5		Grains.	Feathery texture: titanomagnetite(?).
Spinel	1	1	<0.5		Euhedral.	Very deep red, high relief, inside olivine.
Apatite	Tr	Tr	<0.5		Euhedral.	Very small short prisms.
Glass	0	Tr			Anhedral.	
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	20					Matrix and pseudomorphing ferromagnesian minerals (green and brown smectite).
Carbonate	5					Patches in matrix.
Iron oxide	8					Alteration product of ferromagnesian minerals (feathery texture).

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	2	Random	0.5–2.5	Calcite and zeolites	Subrounded	

COMMENTS: A highly altered basalt in which only the plagioclase laths and occasional grains of clinopyroxene have survived.

143-865A-91R-03 (Piece 4, 51–52 cm)

OBSERVER: CAS

WHERE SAMPLED: Sill; Unit 1

ROCK NAME: Altered microphyric olivine-clinopyroxene-plagioclase basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intersertal (altered groundmass).

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	10	0.25–2.0		Subhedral to anhedral.	
Plagioclase	1	3	0.25–1.0		Laths.	Subhedral to anhedral; too altered to determine composition.
Clinopyroxene	Tr	5	0.25–2.5		Subhedral.	
GROUNDMASS						
Plagioclase	30	45	<0.25		Laths.	Feathery, quenched, partly altered.
Olivine	0	5	<0.25		Subhedral.	All altered.
Clinopyroxene	0	20	<0.25		Variolites.	Variolitic, quenched, all altered.
Spinel	1	1	<0.1		Subhedral.	Deep red, high relief, included in olivines.
Opaque mineral	2	2	<0.25		Anhedral.	
Glass	0	10			Anhedral.	Completely altered.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	64	Ferromagnesian minerals and plagioclase				Green and brown smectite.
Chlorite	2	Ferromagnesian minerals				Chamosite and penninite(?).

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	20	Random	0.5–8.0	Clay and chlorite	Subrounded	Oolitic textured, fine to crystal fibers elongate (chlorite?).

COMMENTS: This is a highly altered basalt taken from an alteration halo of Unit 1. Ferromagnesian minerals are almost entirely altered and even the plagioclase, which remains relatively fresh in other sections, has been partially altered.

143-865A-93R-03 (Piece 6, 85–86 cm)

OBSERVER: BAK

WHERE SAMPLED: Sill, Unit 3

ROCK NAME: Microphyric olivine-pyroxene basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic, intergranular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	1	1	0.3–1.0	An _{60–70}	Subhedral.	Slightly altered.
Clinopyroxene	0	8	0.5–3.0	Augite	Subhedral.	Completely altered.
Olivine	0	5	0.3–1.0		Subhedral.	Completely pseudomorphed by clays.
GROUNDMASS						
Plagioclase	44	49	0.1–0.5	An _{60–70}	Laths.	Slightly altered.
Clinopyroxene	15	30	<0.2	Augite	Grains.	Slightly altered.
Opaque minerals	6	7	<0.7	Titano-magnetite	Grains.	
Apatite	Tr	Tr	<0.2		Grains.	
Spinel	Tr	Tr	<0.3		Grains.	Enclosed in olivine pseudomorphs.
Pyrite	1	1	<0.2		Grains.	
Glass	0	Tr			Anhedral.	
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	17	Matrix grains and ferromagnesian minerals				Green and brown smectites.
Chlorite	6	Pyroxene				
Iron oxide mineral	5	Ferromagnesian minerals				
Zeolites	3	Plagioclase and clinopyroxene				Long prismatic crystals.
Carbonate	2					

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
Vesicles	<1	Random	0.1–1.0	None	Irregular

COMMENTS: Plagioclase laths, groundmass clinopyroxenes, and opaque oxide minerals have survived. The remainder of the components are pseudomorphed and severely altered.

143-865A-94R-04 (Piece 1, 5–6 cm)

OBSERVER: BAK

WHERE SAMPLED: Sill, Unit 4

ROCK NAME: Microphyric pyroxene-olivine basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Microporphyritic, intersertal.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	1	1	0.3–1.0	An _{60–70}	Subhedral.	Laths with feathery and irregular edges.
Clinopyroxene	0.5	8	0.5–3.0	Augite	Subhedral.	
Olivine	0	5	0.3–1.0		Subhedral.	Completely pseudomorphed.
GROUNDMASS						
Plagioclase	29	49	0.1–0.5	An _{60–70}	Laths.	Some are variolitic.
Clinopyroxene	2	30	<0.2	Augite	Grains.	Some are fibrous or spherulitic.
Opaque mineral	2	7	<0.3	Titano-magnetite(?)	Grains.	
Glass	0	Tr	<0.3		Anhedral.	
Spinel	Tr	Tr	<0.3		Grains.	Mostly enclosed by olivine pseudomorphs.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	35.5	Matrix minerals				Also replaces matrix variolites and glass. Mostly brown smectite.
Carbonate	15	Olivines and pyroxenes				Also in vesicles.
Iron oxide mineral	15	Matrix and ferromagnesian minerals				
VESICLES/ CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	
Vesicles	3	Random	0.5–1.5	Calcite and clay minerals	Subrounded	

COMMENTS: A highly altered basalt in contact with muddy limestone. The contact is sharp and the basalt is chilled over a distance of 2 mm. The sediment is slightly recrystallized at contact.

143-866A-171R-2 (Piece 1, 17-19 cm)

OBSERVER: CAS

WHERE SAMPLED: Top of Unit 1 at contact.

ROCK NAME: Highly pyritized and calcified basalt.

GRAIN SIZE: Microcrystalline to fine-grained.

TEXTURE: Intergranular to intersertal (altered interstices between plagioclase).

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	Tr.	Tr.	-	-	Grains.	Anhedral and completely altered to calcite and pyrite.
Pyroxene	Tr.	Tr.	-	-	Grains.	Anhedral and completely altered to calcite and pyrite.
GROUNDMASS						
Plagioclase	50	55	<0.5	~An ₂₀	Subhedral laths.	Very irregular grain boundaries; cloudy.
Fe-Ti oxide	2	2	<0.2		Grains.	Subhedral to anhedral.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	10	Ferromagnesian minerals and plagioclase				Mostly greenish and some brownish smectite(?).
Calcite	16	Ferromagnesian minerals				Very irregular, anhedral grains between plagioclase laths.
Chlorite	~2	Ferromagnesian minerals				Greenish, some with "Berlin blue" birefringence.
Pyrite	20	Ferromagnesian minerals and Fe oxides				Half of a large (~1 cm diameter) subrounded patch in one corner of the slide; other grains are finely (<0.3 mm) disseminated.
VESICLES/CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	Tr	-	-	Calcite and pyrite	Anhedral	Hard to differentiate from possibly original pyroxene-olivine phenocrysts.

COMMENTS: Grain size gets finer towards the contact with the limestone in the other half of the slide, but there is no obvious chilled margin present (i.e., no quenched, feathery, or variolitic plagioclase present at the contact). Limestone (micritic with the bioclasts) is separated from the basalt by a layer (0.4 to 1 cm wide) of sparry calcite. The limestone contains elongated, subrounded grains of basalt, thus the contact may be depositional.

143-866A-177B-1 (Piece 3, 22-23 cm)

OBSERVER: CAS

WHERE SAMPLED: Unit 3

ROCK NAME: Moderately phyric olivine-plagioclase-clinopyroxene basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intergranular; directive.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	5	0.3-2.3	-	Prisms.	Subhedral to anhedral; some are skeletal; completely pseudomorphed.
Plagioclase	4	4	0.25-7.0	An ₄₄₋₆₀	Grains.	Subhedral to anhedral; embayed boundary and has glass inclusions now turned to clay minerals.
Clinopyroxene	-1	1	0.25-2.0	-	Grains.	Subhedral to anhedral; slightly altered.
Fe-Ti oxide	Tr	Tr	0.1-0.5	-	Grains.	Anhedral.
GROUNDMASS						
Plagioclase	40	40	<0.3	-	Laths.	Show flow direction.
Clinopyroxene	20	20	<0.2	-	Grains.	Intergranular texture.
Fe-Ti oxide	20	20	<0.1	-	Grains.	Subhedral to euhedral.
Olivine	0%	10	<0.3	-	Grains.	Completely pseudomorphed.
Spinel	«1	«1	<0.1	-	Grains.	Dark brown, mostly attached to olivine pseudomorphs.
SECONDARY/ MINERALOGY						
	REPLACING/ PERCENT	FILLING				
Clay	14	Ferromagnesians and plagioclase				
Chlorite	Tr	Olivine				
Talc	Tr	Olivine				
COMMENTS						
						Green and brown smectite(?).
						Possibly mineral inside olivine pseudomorphs.
VESICLES/ CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	
None						

COMMENTS: Except for olivine and "glass" inclusions in the plagioclase megacrysts, the sample is only slightly altered. Plagioclase megacrysts have embayed/resorbed boundaries and may have suffered secondary albitization.

143-866A-179R-3 (Piece 4C, 46-48 cm)

OBSERVER: CAS

WHERE SAMPLED: Unit 6

ROCK NAME: Highly phyric plagioclase-olivine-pyroxene basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intergranular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	3	0.3-1.6	-	Prisms.	Anhedral to subhedral; completely pseudomorphed.
Plagioclase	16	20	0.5-10.0	Sodic	Laths.	Anhedral because of embayed boundaries; moderately to highly altered.
Clinopyroxene	0	1	0.3-0.8	-	Grains.	Anhedral to subhedral; completely altered.
Fe-Ti oxide	<1	1	0.1-0.8	-	Grains.	Anhedral to euhedral.
GROUNDMASS						
Plagioclase	30	40	0.05-0.3	An ₁₈₋₂₈	Laths.	Anhedral; cloudy due to moderate alteration.
Fe-Ti oxide	8	10	0.05-0.1	-	Grains.	Anhedral to subhedral.
Clinopyroxene	5	15	0.05-0.3	-	-	Anhedral; highly altered.
Olivine	0	-	-	-	-	Completely altered.
SECONDARY MINERALOGY						
	REPLACING/ PERCENT	FILLING				COMMENTS
Clay	40	Ferromagnesians and plagioclase				Mostly brown and lesser green smectite(?).
Zeolite	Tr	Ferromagnesians				
Chlorite	Tr	Ferromagnesians				
Fe-oxyhydroxide	Tr	Ferromagnesians				
Albite	Tr	Plagioclase				
VESICLES/CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15	Random	0.5-10.0	Clays, chlorite, zeolite	Subrounded	Highly amygdaloidal basalt.

COMMENTS: Possibly two generations of plagioclase phenocrysts: megacrysts or xenocrysts and groundmass phenocrysts. Both plagioclase phenocrysts are too cloudy/altered to give reasonable compositional estimate. Plagioclase megacrysts had inclusions that are now completely altered to clay. Megacrysts are now albitic in composition. The whole sample itself is highly altered.

143-866A-180R-4 (Piece 2G, 121-122 cm)

OBSERVER: CAS

WHERE SAMPLED: Unit 6.

ROCK NAME: Highly phyric plagioclase-olivine-clinopyroxene basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intergranular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	2	0.25-2.2	-	Prisms.	Some are skeletal; anhedral to subhedral; completely pseudomorphed.
Plagioclase	15	20	0.5-7.0	Sodic.	Laths.	Anhedral because of embayed boundaries.
Clinopyroxene	0	1	0.25-2.0	-	Grains.	Anhedral to subhedral; completely altered.
Fe-Ti oxide	~1	~1	0.2-0.4	-	Grains.	Anhedral.
GROUNDMASS						
Plagioclase	30	40	0.05-0.5	An ₁₆₋₂₄	Laths.	Anhedral; cloudy due to moderate alteration.
Fe-Ti oxide	10	10	0.05-0.2	-	Grains.	Anhedral; a few grains are clustered.
Clinopyroxene	1	15	0.05-0.2	-	Grains.	Anhedral; very highly altered.
Olivine	0	-	-	-	Grains.	Completely altered.
Spinel	Tr	Tr	0.05-1.0	-	Grains.	Inside plagioclase megacrysts and olivine pseudomorphs.
SECONDARY MINERALOGY						
	REPLACING/ PERCENT	FILLING				COMMENTS
Clay	43	Ferromagnesians and plagioclase				Smectite(?).
Calcite	Tr	Plagioclase				
Zeolite	Tr	Ferromagnesians				
Chlorite	Tr	Ferromagnesians				
Fe-oxyhydroxide	Tr	Ferromagnesians				Mainly stains on clays or as rims around olivine and clinopyroxene pseudomorphs.
Albite	Tr	Plagioclase				
VESICLES/CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	
Vesicles	3	Random	0.1-2.0	Clays, chlorite, zeolite	Irregular shape	

COMMENTS: Very similar to 143-866A-179R-3, Piece 1c, 46-48 cm, except less vesicular and the Fe-oxyhydroxides are darker. Plagioclase composition, again is hard to estimate because of alteration.

143-866A-187R-1 (Piece 14, 86-88 cm)
 ROCK NAME: Sparsely microphyric olivine
 basalt.
 GRAIN SIZE: Fine-grained.
 TEXTURE: Intergranular; directive.

OBSERVER: CAS

WHERE SAMPLED: Unit 11.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITIONS	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	3	0.25-0.8	-	Prisms.	Anhedral to subhedral; some are skeletal; completely pseudomorphed.
Fe-Ti oxide	«1	<1	0.1-0.25	-	Grains.	Anhedral to subhedral.
Clinopyroxene	0	<1	0.25-0.6	-	Grains.	Anhedral to subhedral; completely altered.
GROUNDMASS						
Plagioclase	30	40	0.05-0.3	-	Laths.	Anhedral; moderately altered - cloudy.
Clinopyroxene	10	20	0.05-0.3	-	Grains.	Anhedral; moderately to highly altered.
Fe-Ti oxide	8	8	<0.1	-	-	Grains. Anhedral to subhedral; some are acicular.
Olivine	0	3	<0.25	-	Grains.	Anhedral; completely pseudomorphed.
Spinel	«1	«1	<0.1	-	Grains.	Anhedral; high relief, brownish grains inside olivine pseudomorphs.
SECONDARY MINERALOGY						
	REPLACING PERCENT	FILLING				COMMENTS
Clay	51	Ferromagnesians, plagioclase				Mostly brownish smectite(?).
Zeolite	Tr	Ferromagnesians				
Chlorite	Tr	Ferromagnesians				
Albite	Tr	Plagioclase				
VESICLES/CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	~1	Random	0.2-2.0	Clays, zeolite, chlorite	Very irregular shapes	One vesicle elongated parallel to flow; microveinlet also present.

COMMENTS: This sample is also similar to the other samples except it is less amygdaloidal and does not have plagioclase megacrysts.