

163-989A-1R-04 (Piece 1B, 81-82 cm)

OBSERVER: DAY

WHERE SAMPLED: Unit 1

ROCK NAME: Moderately plagioclase phyric basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Porphyritic, intersertal, variolitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Plagioclase	3.2	3.2	3.0			Form rounded clusters of essentially plagioclase-pure glomerocrysts. Partial resorption and overgrowth.
<b>GROUNDMASS</b>						
Plagioclase	49.9	49.9	0.5-1.0		Subhedral laths.	Acicular, simple twinned, in part skeletal.
Clinopyroxene	27.5	27.5	0.2-0.4	Augite.	Anhedral.	Interlocked to form variolitic clusters.
Fe-Ti oxides	7.9	7.9	0.01-0.05	Magnetite.	Euhedral.	Skeletal in places.
Mesostasis	0	11.5	<0.1		Anhedral.	
<b>SECONDARY MINERALOGY</b>						
Clays	11.5	REPLACING/ FILLING Mesostasis.				COMMENTS

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	7	Random.	1.0-3.0	Clay lined.	Rounded.	These appear to be bubbles.
Cavities	6	Interstitial.	0.5-1.0	Clay and very minor pyrite.	Angular.	

COMMENTS: Plagioclase grows as radial clusters, with a subophitic relationship with granular augite. The interstices between clusters are filled with mesostasis and vesicles. Rock is moderately altered. Mode estimated by counting 1000 points.

163-989A-2R-04 (Piece 1, 89-90 cm)

OBSERVER: DAY

WHERE SAMPLED: Unit 1

ROCK NAME: Aphyric basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intersertal, variolitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	36.8	36.8	0.5-1.0		Subhedral laths to acicular blades.	
Augite	21.2	21.2	0.2-0.5		Equant to dendritic.	
Fe-Ti oxides	2.6	2.6	0.01-0.02	Magnetite.	Euhedral.	
Olivine	0	0.6	0.1-0.2		Subhedral.	Altered to brown clay.
Mesostasis	0	38.9				Altered to clay.
<b>SECONDARY MINERALOGY</b>						
Clays	38.9	REPLACING/ FILLING Mesostasis.				COMMENTS
Clays	0.6	Olivine.				

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	14	Evenly distributed.	<2.5	Zeolite with clay lining.	Subspherical to irregular.	

COMMENTS: This rock is moderately altered. Intergrown plagioclase blades and augite form radiating clusters (<1 mm diameter). Mode estimated by counting 1000 points. Sample is from an apparent "internal magmatic contact," with irregular quenched patches with a microcrystalline to glassy mesostasis (now altered to clays).

SITE 989

163-989A-3R-06 (Piece 1B, 38-39 cm)  
 ROCK NAME: Aphyric basalt.  
 GRAIN SIZE: Fine-grained.  
 TEXTURE: Intersertal, variolitic.

OBSERVER: DAY

WHERE SAMPLED: Unit 1

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Olivine	0	0.3	<0.5		Euhedral.	Microphenocrysts. Replaced by brown clay.
<b>GROUNDMASS</b>						
Plagioclase	45.5	45.5	0.5-1.0		Subhedral laths.	Acicular, radiating, skeletal.
Augite	30.1	30.1	0.2-0.4		Anhedral.	Granular between plagioclase in clusters.
Fe-Ti oxide	5.9	5.9	0.01-0.05	Magnetite.	Euhedral.	Disseminated.
Mesostasis	0	18.2				Replaced by clay.
<b>SECONDARY MINERALOGY</b>						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clays	18.2	Mesostasis.				
Clays	0.3	Olivine.				
<b>VESICLES/CAVITIES</b>						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	4.6	Random.	1.0-2.0	Clay lined.	Rounded.	These probably represent bubbles and are commonly surrounded by mesostasis halos.
Cavities	4	Interstitial.	<1.0	Clay.	Irregular.	These are late stage gas cavities/miroles.

COMMENTS: The rock is moderately altered. Plagioclase and augite intergrowths form radiating clusters approximately 1-1.5 mm across. Essentially these are varioles with subophitic cores. Interstices between varioles are filled with mesostasis (now dark clay and Fe-Ti oxides). Mode estimated by counting 1000 points.

163-989B-1R-04 (Piece 8, 114-115 cm)  
 ROCK NAME: Aphyric basalt.  
 GRAIN SIZE: Fine-grained.  
 TEXTURE: Intersertal, intergranular, variolitic.

OBSERVER: DAY

WHERE SAMPLED: Unit 1

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Plagioclase	0.2	0.2	1-1.5		Subhedral laths.	Strongly zoned with subhedral to euhedral cores.
<b>GROUNDMASS</b>						
Plagioclase	38.5	38.5	to 1.2		Laths to acicular blades.	Commonly intergrown with clinopyroxene in spherulitic clusters. Commonly skeletal.
Clinopyroxene	33.0	33.0	to 1.0	Augite.	Anhedral to subhedral, equant.	Commonly concentrically zoned. Commonly intergrown with plagioclase.
Olivine	0	0.3	to 1.0		Euhedral or subhedral.	Totally altered to brown clay. Could be considered as microphenocrysts.
Fe-Ti oxide	3.1	3.1	to 0.2	Magnetite.		Skeletal.
Mesostasis	24.9					Totally altered to brown clay.
<b>SECONDARY MINERALOGY</b>						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clays	25-30	Mesostasis, vesicles, olivine.				Brown clays and very minor blebs of pyrite.
<b>VESICLES/CAVITIES</b>						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	2.3	Random.	to 3.0	Brown clay.	Subrounded to irregular.	Concentric linings of brown clay, rarely totally filled.

COMMENTS: Rock is moderately altered. Plagioclase and augite form either semi-spherulitic clusters, subophitic intergrowth, or occur as individual grains. Mode estimated by counting 1000 points.

163-989B-2R-01 (Piece 5, 88-89 cm)

OBSERVER: JFA

WHERE SAMPLED: Interior of Unit 1

ROCK NAME: Aphyric basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intersertal, intergranular, subophitic, variolitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Plagioclase	1.2	1.2	0.5 - 3.0		Subhedral, blocky.	Most commonly in glomeroporphyritic clumps. Some look resorbed on margins. Two sizes of melt inclusions: 20-50 micrometers and <5 micrometers; larger ones randomly distributed, smaller ones occur densely in apparent crystal growth belts.
<b>GROUNDMASS</b>						
Plagioclase	36.8	36.8	to 1.2		Subhedral to anhedral laths.	Most lathlike and elongate skeletal, some blockier in shape.
Clinopyroxene	28.5	28.5	to 0.8	Augite.	Subhedral-anhedral.	Sector, sweep zoning common; rare grains with multiple twinning on 001 plane. Grains are slightly pleochroic pink to greenish brown; larger grains have non-aligned melt inclusions.
Olivine	0	Trace	to 0.4		Euhedral-subhedral.	Totally replaced by greenish clays; identification is uncertain.
Magnetite	2.2	2.2	to 0.1		Skeletal.	Look unexsolved; point count estimate is likely high due to skeletal nature (may be closer to 1% in mode).
Mesostasis	0	31.3				Completely altered to greenish-brown clays.
<b>SECONDARY MINERALOGY</b>						
Clay	PERCENT 35	REPLACING/ FILLING Mesostasis, vesicles.				COMMENTS Greenish-brown, replacing mesostasis and possible olivine. Estimate of abundance based on point count estimate of mesostasis plus estimate of in filling of vesicles. Saponitic(?) in composition.
Sulfide	Trace.	Mesostasis.				Irregular grains to 0.02 mm. Probably pyrite.
<b>VESICLES/CAVITIES</b>						
Vesicles	PERCENT 7.1	LOCATION Distributed.	SIZE (mm) to 2	FILLING Greenish-brown clays.	SHAPE Round to Irregular.	COMMENTS Lined or filled with greenish-brown clays. Some have two generations of infilling--one lining vesicle margins, and one infilling that seems structureless.

COMMENTS: Clusters of blocky, anhedral clinopyroxene are intergrown with radiating laths of plagioclase, with these separated by mesostasis; these clusters represent abundant centers of crystal nucleation. The mineral estimates are based on 1000 point counts, done using both transmitted and reflected light. The rock is moderately altered. Called aphyric basalt as plagioclase phenocrysts judged to be less than 1% of entire thin section. Vesicles commonly filled with 2 generations of greenish-brown clay minerals. The bands of concentric clay line the rims of cavities, whereas the interior filling, where present, can be either structureless or comprises an intergrowth of tiny circular clusters of radiating grains.

163-989B-6R-02 (Piece 2B, 56-57 cm)

OBSERVER: JFA

WHERE SAMPLED: Across grain size change in Unit 1.

ROCK NAME: Aphyric basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intergranular, intersertal, variolitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	35-40	40-45	to 1.0		Lathlike to skeletal acicular.	As radiating clusters with anhedral clinopyroxene. Partially altered to clays (few percent) in finer-grained, more mesostasis-rich portion of section.
Clinopyroxene	30-35	35-40	to 0.5	Augite.	Anhedral.	Sweep and sector zoning common. Intergrown with plagioclase in clusters. 2V is 55 to 60 degrees; optically positive. Partially altered to brown clays (few percent) on side of thin section that is finer grained with greater amount of mesostasis.
Magnetite	1	1	to 0.08		Skeletal.	Look unexsolved.
Mesostasis	0	20-30				Totally replaced by brown clays.
<b>SECONDARY MINERALOGY</b>						
Brown clays	PERCENT 25-35	REPLACING/ FILLING Mesostasis, clinopyroxene, plagioclase.				COMMENTS Brown clay with minor blebs and micro-veinlets of pyrite.
Pyrite	Trace.	In mesostasis.				As blebs (to 10 micrometers) and micro-veinlets.
<b>VESICLES/CAVITIES</b>						
Vesicles	PERCENT 3-5	LOCATION Patchily distributed.	SIZE (mm) to 4	FILLING Clay, carbonate.	SHAPE Round to irregular.	COMMENTS Partly to totally filled with brown clay, with narrow bands of concentric clay on margins, and the interiors partially filled with clay spherules. Rare examples have calcium carbonate infilling.

COMMENTS: Thin section is cut across apparent grain-size boundary in core. Finer-grained portion is richer in both vesicles and mesostasis (30% vs. 20%), with clusters of plagioclase and clinopyroxene more cleanly separated by one another. Finer-grained portion is also more altered, with both plagioclase and clinopyroxene slightly to moderately altered to brown clays. Olivine alteration products could not be confidently identified, although several scientists believe that trace amounts were originally present. Rock is moderately altered.

SITE 989

163-989B-6R-02 (Piece 3, 133-136 cm)

OBSERVER: DAY

WHERE SAMPLED: Unit 1

ROCK NAME: Aphyric basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intergranular, intersertal, variolitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	40.2	40.2	to 2.4		Laths and skeletal acicular.	Several spherulitic clusters with intergranular clinopyroxene.
Clinopyroxene	21.7	21.7	to 1.2	Augite.	Anhedral to subhedral equant; sometimes in sheafs.	Commonly intergranular between plagioclase blades. Zoning is common.
Olivine	0	0.9	to 1.0		Euhedral to subhedral.	Altered to brown clay. May represent microphenocrysts.
Fe-Ti oxide	4.1	4.1	to 0.3	Magnetite.	Subhedral to skeletal.	
Mesostasis	0	33.1				Totally replaced by brown clays.
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS
Clays	35-40	Mesostasis.				Brown clay and pyrite.
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	10.0	Random.	to 3.0	Zeolite, brown clay and minor pyrite.	Subrounded to irregular.	Brown clay linings, some infilled by zeolite (3.8%). Two habits of clay: concentric rims and intergrown spherulites.

COMMENTS: This section includes a 1-cm-thick highly vesicular zone surrounded by a fine-grained, quenched rock. Intergrown plagioclase blades and equant augites commonly form spherulitic aggregates. The mesostasis may possibly represent altered glass. The rock is moderately altered.

163-989B-7R-04 (Piece 1A, 43-47 cm)

OBSERVER: CAS

WHERE SAMPLED: Across textural boundary in Unit 1.

ROCK NAME: Aphyric basalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intersertal, intergranular, variolitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	30-35	35-40	to 1.0		Acicular to skeletal.	Occurs as radiating clusters, intergrown with clinopyroxene. Has skeletal habit in finer-grained portion of section, where it is commonly partially altered.
Clinopyroxene	30-35	30-35	to 0.5		Subhedral to acicular.	Tends to occur as subhedral crystals intergrowth with plagioclase laths in coarser portion of section. The crystal habit is acicular in the finer-grained portion (variolitic texture); partially altered where fine-grained. Sweep zoning is common.
Magnetite	1	1	to 0.1		Euhedral to skeletal.	No exsolution.
Mesostasis	20-25					Totally replaced by brown clays.
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS
Brown clay	20-30	Mesostasis, plagioclase, clinopyroxene.				Brown clay replaces mesostasis and concentric lines vesicles.
Pyrite	Trace.	In mesostasis.				Occurs as very small, scattered grains.
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	4-10	Patchy.	to 4 mm	Clay, carbonate.	Round to irregular.	More abundant and larger in finer-grained portion of section.

COMMENTS: Oriented thin section. Top includes an internal contact (flow top?) between extremely fine-grained, mesostasis and vesicle-rich portion and more normal, fine-grained, intersertal basalt. Finer-grained section has a variolitic texture, and plagioclase crystals commonly show skeletal habits. Mesostasis surrounding vesicles is particularly fine-grained. Coarser areas are typified by radiating plagioclase intergrown with subhedral clinopyroxene, with clumps separated by mesostasis. The entire section is moderately altered, with alteration most prevalent in the finer-grained region. Alteration to clay has also occurred along grain margins, cleavage planes and internal fractures. Vesicles contain brown clay, and rare carbonate.

163-989B-10R-02 (Piece 1, 7-8 cm)

OBSERVER: DAY

WHERE SAMPLED: Unit 1

ROCK NAME: Aphyric basalt.

GRAIN SIZE: Fine- to medium-grained.

TEXTURE: Intergranular, intersertal, subophitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Olivine	0	Trace			Euhedral to subhedral.	Totally altered to brown clays.
<b>GROUNDMASS</b>						
Plagioclase	35-40	35-40	to 2.0		Laths to acicular blades.	Show subophitic intergrowth with clinopyroxene.
Clinopyroxene	35-40	35-40	to 1.2	Augite.	Anhedral to subhedral, equant.	
Fe-Ti oxide	1-2	1-2	to 0.5	Magnetite.	Subhedral.	Some glomerocrysts up to 1 mm.
Mesostasis	0	20-25				Totally altered to brown clay.
<b>SECONDARY MINERALOGY</b>						
Clays	PERCENT 20-25	REPLACING/ FILLING Mesostasis and olivine.				COMMENTS Massive brown clay and some pyrite.
<b>VESICLES/CAVITIES</b>						
Vesicles	PERCENT 1-3	LOCATION Random.	SIZE (mm) to 3.0	FILLING Brown clay.	SHAPE Subrounded to irregular.	COMMENTS Brown clay linings, spherulitic clays intergrown in vesicle cavities.

COMMENTS: Rock is moderately altered, groundmass plagioclase and clinopyroxene are unaltered except for clay minerals along grain boundaries, cleavage planes and fractures. Clinopyroxene and plagioclase are evenly distributed, and may form scattered subophitic clusters.

163-989B-10R-03 (Piece 2, 133-134 cm)

OBSERVER: DAY

WHERE SAMPLED: In Unit 1 (vesicle-rich patch).

ROCK NAME: Aphyric basalt.

GRAIN SIZE: Fine- to medium-grained.

TEXTURE: Intergranular, intersertal.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	30-35	35-40	to 1.5		Laths.	Strong concentric zoning ubiquitous. Partially altered to clays.
Clinopyroxene	30-35	35-40	to 1.8	Augite.	Anhedral, subhedral, equant.	Commonly zoned (sector, concentric). Partially altered to clays.
Olivine	0	Trace	to 1.2		Euhedral to subhedral.	Totally altered to brown clays.
Fe-Ti oxides	2-4	2-4	to 0.08	Magnetite.	Anhedral, subhedral, skeletal.	
Mesostasis	0	10-15				Totally altered to brown clays.
<b>SECONDARY MINERALOGY</b>						
Clays	PERCENT 30-35	REPLACING/ FILLING Mesostasis, olivine, clinopyroxene, plagioclase.				COMMENTS Brown clay, very fine pyrite, rare iron oxyhydroxides.
<b>VESICLES/CAVITIES</b>						
Vesicles	PERCENT 15-18	LOCATION Pervasive.	SIZE (mm) to 3.0	FILLING Clay, zeolite.	SHAPE Subrounded to irregular.	COMMENTS Filled with clay and variolitic zeolites.

COMMENTS: Rock is moderately altered and vesicular. Brown clay replaces mesostasis, partly replaces plagioclase and clinopyroxene, and invades cleavage planes. Plagioclase and augite are evenly distributed and only rarely form subophitic clusters.

SITE 989

163-989B-10R-07 (Piece 5A, 54-55 cm)

OBSERVER: ARN

WHERE SAMPLED: Near base of flow of Unit 1.

ROCK NAME: Aphyric basalt.

GRAIN SIZE: Fine-grained to microcrystalline.

TEXTURE: Intersertal to intergranular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
Plagioclase	30-35	30-35	up to 0.8		Elongate laths with anhedral margins.	Abundant glass inclusions concentrated along core zones. Minor alteration of some grains to clay. A small proportion of grains are intergrown with pyroxene in fine, radiating structures.
Clinopyroxene	30-35	30-35	up to 0.4	Augite.	Subhedral, subequant.	Colorless, moderately zoned, abundant inclusions. Slight alteration to clay.
Magnetite	2	2	<0.1-0.2		Equant, skeletal.	Concentrated in mesostasis, apparently nucleating on, and growing out, from silicates.
Olivine	0	1-2	0.1-0.6		Polyhedral, non-skeletal.	Altered to brown clay.
Mesostasis	0	15-20			Evenly distributed and in patches.	Altered to brown clay.
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	15-20	Mesostasis.				Brown clay and minor pyrite.
Clay	1-2	Olivine.				Brown clay.
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	15-20	Disseminated.	0.1-1.6	Lined, some filled with brown clay.	Subspherical to irregular.	All vesicles lined with concentric rims of brown clay. Cores are filled with massive or intergrown, 20-mm clay spherules.

COMMENTS: The rock is much finer grained than overlying parts of the flow. Radiating plagioclase-pyroxene clusters are sporadically developed. Altered olivines, filled vesicles and mesostasis are not easily distinguished and estimated proportions may be wrong. The rock is moderately altered; clay replaces olivine and mesostasis, fills vesicles and coats grain boundaries and fractures. A second estimate of phases by APS is: plagioclase, 40%; clinopyroxene, 30%; magnetite, 5%; olivine alteration ghosts, 1%; mesostasis, 25% (now altered); secondary clay, 25%.

163-989B-11R-01 (Piece 10, 87-90 cm)

OBSERVER: ARN

WHERE SAMPLED: Across margin of vesicle patch in Unit 2

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

GRAIN SIZE: Fine-grained to microcrystalline.

TEXTURE: Seriate, intergranular, glomeroporphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	3-5	3-5	up to 1.0		Elongate laths.	Inclusions along core zones; isolated or in radiating clusters; strongly zoned.
Clinopyroxene	1-2	1-2	up to 0.8	Augite.	Anhedral, equant.	Colorless, isolated or in clusters of stubby to rounded grains, simple twinning on 001 plane in few; 2V=55; strong sector
and						sweep zoning.
Olivine	0	1-5	0.2-0.3		Polyhedral.	Some clearly identified grains are altered to brown-green clay; a larger proportion of subangular patches of almost black clay may replace olivine of mesostasis, or fill vesicles.
GROUNDMASS						
Plagioclase	35-40	35-45	up to 0.4		Elongate laths.	
Clinopyroxene	35-40	35-40	up to 0.1		Anhedral, equant.	
Iron oxides	2	2	<0.1		Sub-skeletal.	
Mesostasis	0	5-10				
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS
Clays	1-5	Olivine.				Pale green and dark green in color.
Clays	15-20	Vesicles and mesostasis.				
Pyrite	Trace.					Trace amount replacing mesostasis.
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	5-50	Disseminated.	0.3-2.0	Zeolite, carbonate, clay.	Rounded.	

COMMENTS: The vesicle patch is almost spherical, approximately 2 cm across. It has the same mineralogy as the rock but is distinguished by: (a) more abundant vesicles, approximately 30% cf. 5% in the rock; (b) more common clusters of clinopyroxene and plagioclase; (c) a few larger-than-normal oxide grains (approximately 0.15 mm); (d) irregular regions in which plagioclase and pyroxene are altered to brown-green clay, perhaps surrounding altered glass. The rock has a seriate texture and could be called aphyric: it probably was aphyric when erupted, except for glomeroporphyritic pyroxene. A small vein is filled with saponite-dominated, smectite-illite irregular mixed-layer clay. Rock is moderately altered. APS has given a second estimate of phases as follows. Phenocrysts: plagioclase, 5%; clinopyroxene, 3%; olivine, <1% (now altered). Groundmass: plagioclase, 40%; clinopyroxene, 30%; iron oxides, 4%; mesostasis, 16% (more in vesicle-rich patch). Vesicle-rich patch may represent a melt-segregation patch.

163-989B-12R-01 (Piece 8B, 84-88 cm)

OBSERVER: DAY

WHERE SAMPLED: Unit 2

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

GRAIN SIZE: Fine-grained to microcrystalline.

TEXTURE: Glomeroporphyritic, seriate, intergranular, intersertal, non-vesicular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Olivine	0	0.8	up to 1.0		Euhedral.	Altered to dark brown clay. Difficult to differentiate from infilling of irregular vesicles; JFA estimates mode at 3%-5%. Two generations-largest and earliest-form glomeroporphyritic clumps with resorption along margins. These have oscillatory and normal zoning, with melt inclusions distributed along growth bands. The second generation are lathlike, 0.1 mm or larger.
Plagioclase	3.1	3.1	0.3-1.0	An80 to An60.	Tabular.	
Clinopyroxene	1.9	1.9	0.2-0.5	Augite.	Anhedral.	
<b>GROUNDMASS</b>						
Plagioclase	34	34	0.05-0.1		Irregular laths.	Intergrown with groundmass clinopyroxene.
Augite	41.9	41.9	0.05-0.1		Anhedral.	
Fe-Ti oxide	3.0	3.0	0.05-0.3	Magnetite.	Anhedral to euhedral.	
Mesostasis	0	15.3				
<b>SECONDARY MINERALOGY</b>						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clays	15.3	Mesostasis.				Dark brown clay and very minor pyrite.
Clays	0.8	Olivine.				Dark brown clay. Massive or intergrown spherulite.

COMMENTS: Moderately altered. Cross-cut thin (1 mm) wispy clay vein. Minor oxidation (ferric staining-Fe(O,OH)x). Mode estimated by counting 1000 points.