T	HIN SECTION LABEL ID:	391-U1575A-22R-3-W 1	1/15-TSB-TS #1	-TS #1 Thin section no.: 1				
	Observer:	DB		Piece no.:				
	Thin section thickness:			Unit/subunit:	Unit III			
	Thin section summary:	Foraminifera sandstone and nannofossils. Minor component (feldspars an controlled by the relative due to the occurrence of	or poorly washed packstone with cement locally between the forar d palagonized glass). The lamin abundance of clay and nannofo calcite cement.	a matrix compose ninifera. Rare volc ae seen in the core ssils; it could also	ed of clay anicastic e are be locally			
_								
	Plane-p	oolarized: 60513251	Cross-polarize	ed: 60513271				





THIN SECTION LABEL ID:	391-U1575A-22R-5-W 2/6	-TSB-TS # 2	Thin section no	o.: 2
Observer:	DB		Piece no.:	
Thin section thickness:			Unit/subunit:	Unit III
Thin section summary:	Bioclastic sandstone or gra subrounded to rounded bio well as foraminifera. Rare	ainstone. Includes common oclasts (e.g. echinoderm an volcaniclasts and intraclasts	red algae and a larg d inoceramid shell fr s. Only partly cemen	e diversity of agments), as ted by calcite.
Plane-p	olarized: 60513211	Cross-pola	arized: 60513231	
	NS Q		225	301





 THIN SECTION LABEL ID:
 391-U1575A-22R-6-W 21/24-TSB-TS# 3
 Thin section no.: 3

 Observer:
 JLS
 Piece no.:

 Thin section thickness:
 Unit/subunit:

 Thin section summary:
 Highly plagioclase-augite phyric lava flow with glomerophyric and intersertal texture.

 Thin section contains large PLAG and CPX glomerocrysts and has a groundmass of PLAG, CPX, and altered glass. All OL phenocrysts have been altered to iddingsite and vesicles have been filled.

Plane-polarized: 60513291





#### **Igneous Petrology**

Lithology:

moderately

Grain size distribution:

: bimodal

Major texture: g

glomeroporphyritic

plagioclase-augite phyric basalt lava flow

Groundmass grain size (avg.): fine-grained

Minor Texture:

intersertal

Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Olivine	10	0	10	0.4	3	subhedral	subhedral	OL pheocrysts are altered to iddigsite.
Plagioclase	5	5	0	0.8	3	euhedral	elongate	PLAG phenocrysts occur as individual crystals and glomerocryst. Some PLAG cores also exhibit sieve textue.
Clinopyroxene	11	10	1	0.6	1.5	subhedral	subequant	CPX occurs as glomerocrysts alongside plagioclase. Individual phenocrysts are small and often altered. Zoning is rare but present in the rims of large CPX phenocrysts.
Oxide Fe-Ti	0.1	0.1	0	0.01	0.02	anhedral	anhedral	
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Plagioclase	20	20	0	0.04	0.4	anhedral	elongate	
Clinopyroxene	13	10	3	0.02	0.08	subhedral	subequant	
Fe-Ti oxide	7	0.1	10	0.002	0.015	anhedral	elongate	N/A
Glass	55	25	30	N/A	N/A	N/A	N/A	
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments	
Vesicle	0.5	0	0.5			rounded		

THIN SECTION LABEL ID:	391-U1575A-23R-1-W 52/55-T	SB-TS# 12	Thin section no.: 12
Observer:	JWS		Piece no.:
Thin section thickness:			Unit/subunit:
Thin section summary:	Highly plagioclase-augite-phyric Plagioclase and pyroxene are b inclusions. Groundmass consis Fe-oxides.	basalt with glomeroporph oth found in glomerocrysts of fine grained plagioclas	yritic and aphanitic textures. and often contain melt se and pyroxene with skeletal
Plane-p	olarized: 60547121	Cross-polarize	d: 60547141



Lithology:	hi	ghly				olagioclase-aug ava flow	⊢augite phyric basalt			
Grain size distr	ibution	: bi	modal			(	Groundmass gra	ain size (avg.):	microcrystalline	
Major texture:		gl	omeroj	oorphyi	ritic	I	Minor Texture:		aphanitic	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	4	0	4	0.05	0.4	subhedral	subhedral	Iddingsite		
Plagioclase	12	12	0	0.4	2.2	euhedral	tabular	Plag-rich glomero	crysts with augite	
Clinopyroxene	8	8	0	0.4	1.2	subhedral	elongate			
Oxide Fe-Ti	4	4								
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	8	0	8	0.05	0.2	subhedral	equant	iddingsite		
Plagioclase	20	20	0	0.1	0.4	euhedral	tabular	slender laths		
Clinopyroxene	10	10	0	0.02	0.2	anhedral	subequant			
Fe-Ti oxide		4	4					N/A		
Mesostasis	32	32	0	N/A	N/A	N/A	N/A			
Glass	0	0	0	N/A	N/A	N/A	N/A			
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments			
Vesicle	1		1	0.2	0.6	rounded	clay-filled			

Observer: Thin sectio	I LABE	:L ID: ness:	<b>391-U</b> WN	1575A	-23R-2	-W 44/48-1	ГSB-TS# 11	Thin section no.: 11 Piece no.: Unit/subunit:		
Thin sectio	n sumi	mary:	Highly holocr altered	plagio ystallin d to idd	clase-o e grou ingsite	clinopyroxe ndmass. S . Interstitial	inopyroxene-phyric basalt with a variable intersertal to dmass. Sparse olivine phenocrysts are present but completely Interstitial glass is also altered. Groundmass olivine = alkali basalt.			
	I	Plane-po	olarized	l: 605	13171		C	ross-polarized: 60513191		
			X		541 TS#1 239-2		ar TSM1 di-dR			
Igneous Pet	trolo	<b>gy</b> hi	ghly				plagioclase-au lava flow	igite phyric basalt		
Grain size distri	bution	; bi	modal				Groundmass	grain size (avg.): fine-grained		
Major texture:		gl	omerop	oorphyr	itic		Minor Texture	: intersertal		
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	3	0	3	0.1	0.7	subhedral	subhedral	altered to iddingsite		
Plagioclase	10	10	0	0.3	2.6	euhedral	elongate	Present as phenocrysts and glomerocrysts. Polysynthetic twinning is common. A single crystal recorded extensive sieve texture with a thin, fresh rim. Other crystals are fresh and unzoned.		
Clinopyroxene	7	7	0	0.2	1.4	subhedral	equant	Exists as phenocrysts and in glomerocrysts with plagioclase. Simple twinning is visibible in multiple grains.		
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	5		5			subhedral	equant	altered to iddingsite		
Plagioclase	18	17	1	0.02	0.3	euhedral	elongate	long, thin blades		
Clinopyroxene 38		35	3	0.02	0.06	subhedral	subequant			
Clinopyroxene	Fe-Ti oxide 12		3	0.01	0.06	subhedral	equant	N/A		
Clinopyroxene Fe-Ti oxide	12									

THIN SECTIO Observer: Thin sectio Thin sectio	N LABE on thick	EL ID: ness: mary:	<b>391-U</b> DB Micrite	1575A e infills	<b>-24R-1</b> in a vo	-W 26/31-TS	<b>B-TS #4</b> Isalt. Possible	Thin section no.: 4 Piece no.: Unit/subunit: Unit IV burrows and micropeloidal cement.			
		Plane-po	olarized	d: 605	12831		Cro	ss-polarized: 60512851			
		A. C. C.		-92 192 193	Zeru			adi 184 546-1			
Igneous Petrology       Lithology:     moderately   plagioclase-augite phyric basalt								ite phyric basalt			
Grain size distr	ribution	: bi	imodal			14 (1	Groundmass gra	ain size (avg.): glass			
Major texture:	button	p	orphyri	tic		N	/linor Texture:	or Texture: hypohyaline			
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments			
Olivine	0	0	0								
Plagioclase	15	15	0	0.2	1.4	euhedral	tabular	Isolated plag phenocrysts, or gloms of mostly plag			
Clinopyroxene	4	4	0	0.4	1.4	subhedral	equant				
Oxide Fe-Ti	2	2	0	0.05	0.1	anhedral	anhedral				
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments			
Olivine	3	0	3	0.1	0.4	euhedral	equant	red oxide			
Plagioclase	12	12	0	0.04	0.4	euhedral	elongate	laths			
Clinopyroxene	0	0	0								
Fe-Ti oxide	6	2	0	0.01	0.03	subhedral	equant	N/A			
Glass	58	0	58	N/A	N/A	N/A	N/A				
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments				
Vesicle	0	0	0								

THIN SECTION LABEL ID: Observer: Thin section thickness: Thin section summary:

#### 391-U1575A-24R-3-W 74/77-TSB-TS# 10

WN, JWS

Thin section no.: 10

Piece no.:

Unit/subunit:

Highly plagioclase-clinopyroxene-phyric basalt with subophitic textures in intersertal to holocrystalline groundmass. Glassy mesostasis contains abundant skeletal crystals. Sparse olivine is present but altered to serpentine.

Plane-polarized: 60513131

#### **Igneous Petrology**

Lithology:

highly

bimodal

Grain size distribution:

Major texture:

Vesicle

glomeroporphyritic

0.6

1

1

Groundmass grain size (avg.):	fine-grained
Minor Texture:	intersertal

plagioclase-augite-olivine phyric

filled with 1-2 secondary minerals

basalt lava flow

Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Olivine	3	0	3	0.1	0.2	euhedral	euhedral	Completely altered to saponite.
Plagioclase	9	8	1	0.2	3.7	euhedral	tabular	Sparse phenocrysts with zoned interiors. The interiors display mild sieve textures.
Clinopyroxene	3	3		0.2	2	subhedral	elongate	Subophitic. Exists as phenocrysts and glomerocrysts. Often highly fractured.
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Plagioclase	18	17	1	0.03	0.3	subhedral	elongate	Slender plagioclase lathes, some with skeletal interiors.
Clinopyroxene	30	30		0.02	0.1	subhedral	equant	
Fe-Ti oxide	12		3	0.01	0.1	subhedral	elongate	N/A
Mesostasis	25	20	5	N/A	N/A	N/A	N/A	contains abundant skeletal phases
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments	

subrounded

Cross-polarized: 60513151



1

THIN SECTION LABEL ID:	391-U1575A-25R-1-W 13/16-TSB-TS# 9	Thin section no.: 9
Observer:	WN	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Highly plagioclase-clinopyroxene-phyric basalt with inters porphyritic textures. Plagioclase and pyroxene are both for as phenocrysts. Olivine is present but completely altered. abundant skeletal Fe-Ti oxides.	ertal, glomeroporphyritic, and bund as glomerocrysts as well Glassy mesostasis contains



## **Igneous Petrology**

Lithology: highly						plagioclase-augite-olivine phyric basalt lava flow				
Grain size distr	ibution	: bi	bimodal				Groundmass gra	ain size (avg.):	cryptocrystalline	
Major texture:		a	ohanitio	:			Minor Texture:		porphyritic	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	5	0	5	0.1	0.5	subhedral	subhedral	Completely altere saponte.	d to a pale green material, likely	
Plagioclase	18	15	3	0.2	3	subhedral	tabular	Zoned cores some	etimes display sieve texture	
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Plagioclase	18	17	1	0.08	0.3	euhedral	elongate	slender groundma skeletal cores	ass plag, sometimes with hollow,	
Clinopyroxene	22	22	0	0.02	0.1	subhedral	equant			
Fe-Ti oxide	12		5	0.01	0.06	subhedral	subequant	N/A		
Mesostasis	25	20	5	N/A	N/A	N/A	N/A	contains abundan	t skeletal Fe-Ti oxides	
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments			
Vesicle	0.5		0.5	0.3	0.3	rounded	Calcite infill			

Cross-polarized: 60513111



THIN SECTION LABEL ID:	391-U1575A-25R-2-W 106/109	9-TSB-TS# 5 Thin section no.: 5
Observer:	JWS	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Highly plagioclase-augite-olivin phenocrysts as well as gloms v grains commonly display oscilla to yellow clay, probably saponi of Kspar.	ne phyric basalt. Plagioclase occurs as individual with augite and less commonly olivine. Large tabular atory zoning, especially in outer margins. Olivine altered te. Some plagioclase crystals have thin exsolution blebs
Plane-p	oolarized: 60512871	Cross-polarized: 60512891



#### **Igneous Petrology**

Lithology:

highly

plagioclase-augite-olivine phyric basalt lava flow

Grain size distribution:

#### Major texture:

Groundmass grain size (avg.):

**Minor Texture:** 

Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	2	0	2	0.4	1.6	euhedral	euhedral	Completely altered to saponite, pseudomorphs olivine shape	
Plagioclase	14	14	0	0.3	2.6	euhedral	tabular		
Clinopyroxene	12	12	0	0.4	1	subhedral	equant		
Oxide Fe-Ti	1	1	0	0.04	0.3	euhedral	euhedral		
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	2		2						
Plagioclase	30	30	0	0.06	0.4	euhedral	tabular		
Clinopyroxene	28	28	0	0.06	0.2	anhedral	subequant		
Fe-Ti oxide	2	1	2	0.04	0.1	euhedral	equant	N/A	
Mesostasis	5	5	0	N/A	N/A	N/A	N/A		
Glass	4		4	N/A	N/A	N/A	N/A		
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	1		1	0.04	0.1	rounded	Clay filled		

THIN SECTION LABEL ID:	391-U1575A-25R-3-W 81/84-TSB-TS# 8	Thin section no.: 8
Observer:	JWS	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Highly plagioclase-augite-phyric basalt with glom Plagioclase and pyroxene are both found in glom inclusions. Groundmass consists of fine grained Fe-oxides.	neroporphyritic and intersertal textures. nerocrysts and often contain melt plagioclase and pyroxene with skeletal

Plane-polarized: 60513051





## **Igneous Petrology**

Lithology:		hi	ghly				plagioclase-augite phyric basalt lava flow		
Grain size distri	ibution	: bi	modal				Groundmass gra	ain size (avg.): fine-grained	
Major texture:		gl	omero	oorphy	ritic	l	Minor Texture:	intersertal	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	0	0	0					Some clay patches may be former olivine.	
Plagioclase	10	10	0	0.25	3	euhedral	tabular	Almost all plag forms glomercrysts with pyroxene. Several large isolated Plag crystals (not in gloms) have thin needle like inclusions aligned in planes - looks like may be Kspar exsolution!	
Clinopyroxene	5	5	0	0.2	1.4	euhedral	equant	Almost all pyroxene forms glomercrysts with Plag. Cpx commonly has slight pinkish pleochroism, suggesting titan augite.	
Oxide Fe-Ti	2	2		0.06	0.4	euhedral	euhedral		
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Plagioclase	25	25	0	0.1	0.4	euhedral	tabular	Slender laths	
Clinopyroxene	25	25	0	0.06	0.3	anhedral	subequant		
Fe-Ti oxide	10	2	0			euhedral	elongate	N/A	
Mesostasis	13	10	3	N/A	N/A	N/A	N/A		
Glass	10		10	N/A	N/A	N/A	N/A	Devitirfied	
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	1	0	1	0.4	0.8	rounded	Clay filled		

391-U1575A-25R-3-W 81/84-TSB-TS# 8 Page 1 of 0

THIN SECTION LABEL ID:	391-U1575A-25R-4-W 7/10-TSB-TS# 7	Thin section no.: 7
Observer:	JLS	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Highly plagioclase-augite-phyric basalt with glomeroporp Plagioclase and pyroxene are both found in glomerocrys inclusions. Groundmass consists of fine grained plagiocl Fe-oxides.	hyritic and intersertal textures. ts and often contain melt ase and pyroxene with skeletal

Plane-polarized: 60513011





Lithology:	highly						plagioclase-augite phyric basalt lava flow		
Grain size distri	: bi	modal				Groundmass gra	fine-grained		
Major texture: glome		omerop	orphyr	itic		Minor Texture:		interstitial	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	0	0	0						
Plagioclase	10	10	0	0.5	3	euhedral	tabular	Plagioclase phenocrysts often exhibit sieve texture and contain large melt inclusions.	
Clinopyroxene	7	5	2	0.2	1.3	euhedral	equant	CPX phenocryst ex	khibit oscillatory zoning.
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Plagioclase	17	15	2	0.09	0.6	anhedral	elongate		
Clinopyroxene	30	30	0	0.01	0.05	anhedral	subequant		
Fe-Ti oxide	15		0	0.02	0.06	anhedral	elongate	N/A	
Glass	25	25	0	N/A	N/A	N/A	N/A		

 THIN SECTION LABEL ID:
 391-U1575A-25R-5-W 54/57-TSB-TS# 6
 Thin section no.: 6

 Observer:
 JLS
 Piece no.:

 Thin section thickness:
 Unit/subunit:

 Thin section summary:
 Highly augite-plagioclase-phyric basalt with glomeroporphyritic and intersertal textures.

 Plagioclase and pyroxene are often found in glomerocysts. Pyroxene often contains melt inclusions. Groundmass consists of fine grained plagioclase and pyroxene with skeletal Fe-oxides.

Cross-polarized: 60512991



#### **Igneous Petrology**

augite-plagioclase phyric basalt Lithology: highly lava flow Grain size distribution: bimodal Groundmass grain size (avg.): fine-grained Major texture: glomeroporphyritic Minor Texture: ophitic Size Size Original (%) Replaced (%) Habit Phenocrysts Shape Comments Present (%) min. max. (mm) (mm) Olivine phenocrysts appear to be altered to Olivine 1 0 1 0.3 0.4 subhedral subhedral serpentine. Glomerocrysts of plag exhibit oscillatory zoning Plagioclase 26 25 0.3 4 euhedral tabular 1 and rare exsolution lamellae. CPX often encloses plagioclase phenocrysts and 27 25 0.3 3 Clinopyroxene 2 subhedral equant some exhibit exolution lamellae. Size Size Original Replaced (%) Habit Comments Groundmass Present (%) min. max. Shape (mm) (mm) Olivine 4 0 4 0.05 0.2 euhedral equant to serpentine. Plagioclase 7 5 2 0.03 0.2 anhedral elongate Clinopyroxene 13 10 3 0.01 0.3 anhedral subequant N/A Fe-Ti oxide 10 0.01 0.06 anhedral elongate 1 12 2 N/A N/A N/A N/A Mesostasis 10 17 7 10 N/A N/A N/A N/A Glass

٦

THIN SECTION LABEL ID:	391-U1575A-26R-2-W 22/26-	<b>TSB-TS# 18</b> Thin section no.: 18		
Observer:	JLS	Piece no.:		
Thin section thickness:		Unit/subunit:		
Thin section summary:	<ul> <li>Highly plagioclase-augite-phyric basalt with glomeroporphyritic and intersertal tex Plagioclase and pyroxene often found in glomerocysts. Plagioclase phenocrysts exhibit sieve texture and exsolution lamellae. Groundmass consists of fine graine plagioclase and pyroxene with skeletal Fe-oxides.</li> </ul>			
Plane-p	oolarized: 60560671	Cross-polarized: 60560691		



Lithology:	highly						plagioclase-augite phyric basalt lava flow			
Grain size distribution:			modal				Groundmass grain size (avg.): fine-grained			
Major texture:		gl	omerop	oorphyr	itic		Minor Texture:		intersertal	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	3	0	3	0.4	0.8	subhedral	subhedral	Altered to clay (sag	ponite).	
Plagioclase	17	15	2	0.4	2	euhedral	tabular	Glomerocrysts of p	olag often exhibit sieve texture.	
Clinopyroxene	13	10	3	0.5	1.3	subhedral	equant	Melt inclusons are	common.	
Oxide Fe-Ti	5	5	0	0.4	0.6	anhedral	anhedral			
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Plagioclase	22	20	2	0.09	0.2	anhedral	elongate			
Clinopyroxene	16	15	1	0.03	0.2	subhedral	subequant			
Fe-Ti oxide	2	5	3	0.002	0.015	anhedral	elongate	N/A		
Glass	22	15	7	N/A	N/A	N/A	N/A			

Obconver		LID.	291-0	1575A-	201-3	- • • • • • • • • • • • • • • • • • • •	B-12# 19	Thin section no 19		
Observer.			JLS	Piece no.:						
Thin section	nin section thickness: Unit/subunit:									
Thin section summary: Moderately plagioclase-augite-phyric basalt with glomeroporphyritic and interserta textures. Plagioclase and pyroxene often found in glomerocysts. Groundmass is h altered.										
	F	Plane-pc	olarized	l: 6056	60711		C	ross-polarized: 60560731		
sor Tsard Bena Bena Bena Bena Bena										
Igneous Pe	trolo	gy								
Lithology:	moderately plagioclase-augite phyric basalt lava flow									
Grain size distr	ibution:	: bi	modal				Groundmass g	rain size (avg.): microcrystalline		
Major texture:		gl	omerop	oorphyri	itic		Minor Texture: intersertal			
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
	0	0								
Olivine								Plag often exhibits sieve texture.		
Olivine Plagioclase	6	5	1	0.4	1	euhedral	tabular	Plag often exhibits sieve texture.		
Olivine Plagioclase Clinopyroxene	6 4	5 3	1	0.4 0.4	1 0.8	subhedral	tabular equant	Plag often exhibits sieve texture. Melt inclusions often present.		
Olivine Plagioclase Clinopyroxene Groundmass	6 4 Original	5 3 Present (%)	1 1 Replaced (%)	0.4 0.4 Size min. (mm)	1 0.8 Size max. (mm)	subhedral Shape	tabular equant Habit	Plag often exhibits sieve texture.         Melt inclusions often present.         Comments		
Olivine Plagioclase Clinopyroxene Groundmass Plagioclase	6 4 Original (%) 15	5 3 Present (%) 10	1 1 Replaced (%) 5	0.4 0.4 Size min. (mm) 0.02	1 0.8 Size max. (mm) 0.2	eunedrai subhedrai Shape anhedrai	tabular equant Habit elongate	Plag often exhibits sieve texture. Melt inclusions often present. Comments		
Olivine Plagioclase Clinopyroxene Groundmass Plagioclase Clinopyroxene	6 4 Original (%) 15 5	5 3 Present (%) 10 2	1 1 Replaced (%) 5 3	0.4 0.4 Size min. (mm) 0.02 0.005	1 0.8 Size max. (mm) 0.2 0.1	eunedrai subhedrai Shape anhedrai subhedrai	tabular equant Habit elongate subequant	Plag often exhibits sieve texture.         Melt inclusions often present.         Comments		
Olivine Plagioclase Clinopyroxene Groundmass Plagioclase Clinopyroxene Fe-Ti oxide	6 4 Original (%) 15 5 1	5 3 Present (%) 10 2	1 1 Replaced (%) 5 3	0.4 0.4 Size min. (mm) 0.02 0.005 0.001	1 0.8 Size max. (mm) 0.2 0.1 0.01	eunedrai subhedrai Shape anhedrai subhedrai anhedrai	tabular equant Habit elongate subequant elongate	Plag often exhibits sieve texture.         Melt inclusions often present.         Comments         N/A		

TS#17 U1575 27R-1 52-54 ٦

THIN SECTION LABEL ID: Observer: Thin section thickness:	<b>391-U1575A-27R-1-W</b> JLS	52/54-TSB-TS# 17 Piece no.: Unit/subunit:
Thin section summary:	Highly plagioclase-augi Plagioclase and pyroxe inclusions. Plagioclase Groundmass consists o Groundmass also has u	e-phyric basalt with glomeroporphyritic and intersertal textures. ne are both found in glomerocrysts and often contain melt and pyroxene also exhibit zoning and exsolution lamellae. f fine grained plagioclase and pyroxene with skeletal Fe-oxides. naltered glass.
Plane-p	oolarized: 60547971	Cross-polarized: 60547991



Lithology:		hi	ghly						
Grain size distr	ibution	: bi	modal			(	Groundmass gra	ain size (avg.):	fine-grained
Major texture:	glomeroporphyritic			ritic	Minor Texture:			ophitic	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	0	0							
Plagioclase	11	10	1	0.8	2.5	euhedral	tabular	Plagioclase often co	ntain exsoluion lamellae.
Clinopyroxene	9	7	2	0.5	1.3	subhedral	equant	CPX often exhibit se Pheoncrysts also cor oscillations near the	ctor and oscillatory zoning. ntain melt inclusion rich ir rims.
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	3	0	3	0.05	0.3	euhedral	equant	Altered to serpentin	e
Plagioclase	30	30	0	0.03	0.2	anhedral	elongate		
Clinopyroxene	17	15	2	0.02	0.25	anhedral	subequant		
Fe-Ti oxide	15			0.01	0.08	anhedral	elongate	N/A	
Glass	15	5	10	N/A	N/A	N/A	N/A		
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	1		1	0.1	0.4	rounded	Clay filled		

THIN SECTION LABEL ID:	391-U1575A-28R-1-W 119/122-TSB-TS# 16	Thin section no.: 16
Observer:	WN	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Lava flow with (1) a darker macroscopic hue and, (2) hue. The difference between the two domains is due olivine altered to saponite/serpentine but the other mi were largely unaltered. In Domain 2, the olivine and p altered to iddingsite, providing the lighter orange tint. zones are identical. Both are highly plagioclase-clinop intersertal, fine-grained groundmass. Groundmass phenocrysts but not tabular phenocrysts. Block plagic clinopyroxene show disequilibrium textures (i.e. varyi	a lighter/more orange macroscopic to alteration minerals: In Domain 1, neral phases and groundmass batches of groundmass were Mineralogically and texturally, the pyroxene-olivine-phyric in an nases consist of plagioclase, sible in blocky plagioclase poclase and all phenocrystic ng degrees of core resorption).

#### Plane-polarized: 60548131





Lithology:		hi	ghly				plagioclase-augite-olivine phyric basalt lava flow		
Grain size distri	ibution	: bi	modal				Groundmass gra	ain size (avg.):	fine-grained
Major texture:		in	terserta	al			Minor Texture:		glomeroporphyritic
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	4	0	4	0.06	0.5	subhedral	subhedral	Completely altered with a greenish alt	t to saponite, providing the rock eration hue.
Plagioclase	16	15	1	0.1	2.4	subhedral	tabular	Numerous plag populations. The largest phenocrysts are blocky and sometimes show oscillatory zoning. These phenocrysts can also show resorption textures in their interior. Elongate plag phenocrysts show twinning but not zoning.	
Clinopyroxene	8	7	1	0.1	1.2	subhedral	elongate	Occurs as both ph Many are highly fra resorption feature	enocrysts and glomerocrysts. actured. Some phenocrysts show s and mild zoned rims.
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Plagioclase	25	25		0.05	0.12	euhedral	elongate	Long and slender. centers.	Many are skeletal with hollow
Clinopyroxene	15	15		0.02	0.1	subhedral	subequant		
Fe-Ti oxide	7		4	0.02	0.07	subhedral	equant	N/A	
Mesostasis	25	20	5	N/A	N/A	N/A	N/A	cryptocrystalline, l	prown with only minor oxidation
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	3		3	0.1	0.6	rounded	Filled with clay and calcite		

Igneous Pe	trolo	gy								
Lithology:		hi	ghly				plagioclase-augite-olivine phyric basalt lava flow			
Grain size distri	ibution	: bi	modal				Groundmass g	Groundmass grain size (avg.): fine-gr		
Major texture:	Major texture: intersertal				Minor Texture:		glomeroporphyritic			
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	4	0	4	0.06	0.5	subhedral	subhedral	Completely altere rock with a reddis	d to iddingsite, providing the h alteration hue.	
Plagioclase	16	15	1	0.1	2.4	subhedral	tabular	Numerous plag po phenocrysts are b oscillatory zoning show resorption t plag phenocrysts	opulations. The largest locky and sometimes show . These phenocrysts can also extures in their interior. Elongate show twinning but not zoning.	
Clinopyroxene	8	7	1	0.1	1.2	subhedral	elongate	Occurs as both ph Many are highly fr resorption feature	enocrysts and glomerocrysts. actured. Some phenocrysts show s and mild zoned rims.	
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Plagioclase	25	25		0.05	0.12	euhedral	elongate	Long and slender. centers.	Many are skeletal with hollow	
Clinopyroxene	15	15		0.02	0.1	subhedral	subequant			
Fe-Ti oxide	7		4	0.02	0.07	subhedral	equant	N/A		
Mesostasis	25	10	15	N/A	N/A	N/A	N/A	cryptocrystalline,	brown with only minor oxidation	
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments			
Vesicle	3		3	0.1	0.6	rounded	Filled with clay	and calcite		

TS#1

٦

THIN SECTION LABEL ID: Observer: Thin section thickness:	<b>391-U1575A-29R-1-W 43/46-T</b> \$ WN	SB-TS# 15	Thin section no.: 15 Piece no.: Unit/subunit:			
Thin section summary:	Pillow basalt with (1) a glassy rin contain plagioclase and clinopy present in sparse amounts but i domain consists of fresh basalti The pillow interior has a highly a with skeletal plagioclase ground groundmass, but clinopyroxene	assy rim domain and a (2) pillow interior domain. Both domain clinopyroxene phenocrysts and glomerocrysts. Olivine is also ts but it has been completely replaced by iddingsite. The glass basaltic glass with plagiclase microlite and bands of palagonit nighly altered matrix that appears to be highly oxidized glass groundmass crystals. Altered olivine is also present in the poxene and Fe-Ti oxides are not present				
Plane-p	oolarized: 60548051	Cross-polarized	d: 60548071			



Lithology: moderately						plagioclase-augite-olivine phyric basalt pillow lava flow				
Grain size distribution:		: bi	modal				Groundmass grain size (avg.): cryptocrystalling			
Major texture:		ap	bhanitic	:			Minor Texture:		porphyritic	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	2	0	2	0.06	0.1	euhedral	euhedral	Completely altered	d to iddingsite	
Plagioclase	10	10		0.15	1.8	euhedral	tabular	Plag occurs mostly also in occasional altered olivine. Sor show varying degr	v as individual phenocrysts but glomerocrysts with cpx and me grains are fresh while others rees of sieving.	

								show varying degrees of sieving.	
Clinopyroxene	4	4		0.3	0.8	subhedral	equant	Most cpx have sieve texture centers and rounded exteriors. No compositional zoning is visible but the some of the sieve holes run subparallel to crystal exterior. Rare cpx crystal clusters are present (cumulate?).	
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	1		1	0.02	0.08	subhedral	elongate	completely altered to iddingsite	
Plagioclase	8	8		0.01	0.05	subhedral	elongate	Tiny, skeletal groundmass plag.	
Fe-Ti oxide			2					N/A	
Glass	75		75	N/A	N/A	N/A	N/A	Most of the groundmass, apart from skeletal plagioclase, is oxidized glass	
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	1		1	0.08	0.16	rounded	clay filled		

Igneous Pe	etrolo	gу								
Lithology:		m	oderat	ely			plagioclase-augite-olivine phyric basalt pillow lava flow			
Grain size distr	ibution	: bi	imodal				Groundmass grain size (avg.): glass			
Major texture:		vi	trophyı	ic			Minor Texture:	porphyritic		
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	2	0	2	0.06	0.4	euhedral	euhedral	Completely altered to iddingsite		
Plagioclase	6	6	0	0.1	1.4	euhedral	tabular	Plag occurs mostly as individual phenocrysts but also in occasional glomerocrysts with cpx and altered olivine. Grains are fresh without sieving or resorbtion		
Clinopyroxene	2	1.5	0.5	0.12	0.8	subhedral	equant	Most cpx have sieve texture centers. No compositional zoning is visible but the some of the sieve holes run subparallel to crystal exterior. Rare cpx crystal clusters are present (cumulate?).		
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Plagioclase								No groundmass plagioclase visible		
Fe-Ti oxide			2					N/A		
Glass	90	45	45	N/A	N/A	N/A	N/A	Glass is either fresh with microlites or altered (in veins) to palagonite. Microlites are present in the glass (5-7%)		
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments			
Vesicle	2		2	0.08	0.14	rounded	clay filled			

THIN SECTION LABEL ID: 391-U1575A-30R-2-W 6/10-TSB-TS# 14 Observer: JWS Thin section thickness: Thin section summary:

Thin section no.: 14

Piece no.:

Unit/subunit:

Highly plagioclase-augite phyric basalt with glomerocrysts of plagioclase-augite and plagioclase-olivine, as well as phenocrysts of plagioclase, augite, and olivine. Subophitic to intergranular groundmass of plagioclase, augite, olivine, and oxides. The occurrence of euhedral olivine in the groundmass indicates that this is an alkali basalt, not tholeiitic.

Plane-polarized: 60547261



_		_
Igneous	Petro	logy

Lithology:

highly

Grain size distribution:

bimodal

Major texture:

glomeroporphyritic

plagioclase-augite-olivine phyric basalt lava flow

Groundmass grain size (avg.):

**Minor Texture:** 

medium-grained subophitic

Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	8	0	8	0.2	0.7	subhedral	subhedral	Altered to saponite.	
Plagioclase	12	12	0	0.3	3.2	euhedral	Plag occurs as individual phenocrysts and as glomercrysts with pyroxene. Inclusions rare absent.		
Clinopyroxene	9	9	0	0.3	0.8	subhedral	equant	Augite occurs almost always in glomerocrysts with plagioclase. Minimal zoning. Small clusters of pyroxene with equilibrium grain boundaries look like xenocrysts; some have plag+pyroxenene.	
Oxide Fe-Ti	15	15	0	0.02	0.06	subhedral	subhedral		
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	6	0	6	0.05	0.12	euhedral	equant	Altered to serpentine	
Plagioclase	20	20	0	0.05	1	euhedral	elongate	Subophitic to ophitic, enclosed in pyroxene.	
Clinopyroxene	30	30	0	0.04	0.4	anhedral	subequant		
Fe-Ti oxide		15	8					N/A	
Glass	0	0	0	N/A	N/A	N/A	N/A		
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	0.05		0.05	0.1	0.5	rounded	Clay filled		

1 TS#13 U1575 

THIN SECTION LABEL ID:	391-U1575A-31R-1-W	<b>40/43-TSB-TS# 13</b> Thin section no.: 13
Observer:	WN	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Highly plagioclase-clir porphyritic textures. P glomerocrysts as well oxides. Pockets of cry	opyroxene-phyric basalt with intersertal, glomeroporphyritic, and lagioclase and pyroxene are both found as subophitic as phenocrysts. Glassy mesostasis contains abundant Fe-Ti stal-free glass are completely altered.
Plane-p	oolarized: 60547201	Cross-polarized: 60547241
a state	31R-1 48-43	alk-1 48-43

Igneous Pe	etrolo	gy								
Lithology:		hi	ghly				plagioclase-augite phyric basalt lava flow			
Grain size dist	ribution	: bi	modal				G	roundmass gra	ain size (avg.):	fine-grained
Major texture:		in	terserta	al		Minor Texture:				porphyritic
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape		Habit	Comments	
Olivine	0	0								
Plagioclase	13	10	3	0.25	1.4	subhedral		tabular	Single phenocyrst: plagioclase. A few larger phenocrysts Alteration is patch within the t.s.	and glomerocrysts of show resorbed interiors. A few show oscillatory zoning. y and tied to zones of alteration
Clinopyroxene	10	7	3	0.2	1	subhedral		equant	Present as suboph phenocryts. Altera specific side of the	itic glomerocrysts and single tion is patchy and present on a thin section.
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape		Habit	Comments	
Plagioclase	23	20	3	0.05	0.12	euhedral		elongate	slender lathes, son	ne with hollow, skeletal centers
Clinopyroxene	20	15	5	0.01	0.1	subhedral		subequant		
Fe-Ti oxide	12			0.02	0.07	subhedral		subequant	N/A	
Mesostasis	15		15	N/A	N/A	N/A		N/A	most looks to be to	urned to iddingsite
Glass	7		7	N/A	N/A	N/A		N/A	red in color	
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape		Comments		
Vesicle	1		1	0.4	1	rounded		clay filled		

 THIN SECTION LABEL ID:
 391-U1575A-32R-1-W 49/52-TSB-TS# 20
 Thin section no.: 20

 Observer:
 JLS
 Piece no.:

 Thin section thickness:
 Unit/subunit:

 Thin section summary:
 Highly plagioclase-augite-phyric basalt with glomeroporphyritic and intersertal textures.

 Plagioclase is often found in glomerocysts. Groundmass consists of fine grained plagioclase and pyroxene with skeletal Fe-oxides. Green clay can be found in altered regions of the sample.

Plane-polarized: 60560751

Cross-polarized: 60560771



Lithology:		hi	ghly				plagioclase-augite phyric basalt lava flow			
Grain size distr	ibution	: bi	modal				Groundmass gra	ain size (avg.):	fine-grained	
Major texture:	glomero			oorphy	ritic		Minor Texture:		intersertal	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	0	0								
Plagioclase	11	10	1	0.5	3.4	euhedral	tabular	Plag glomerocryst	s often contain melt inclusions.	
Clinopyroxene	5	3	2	0.4	1	subhedral	equant			
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Plagioclase	27	25	2	0.02	0.3	anhedral	elongate			
Clinopyroxene	18	15	3	0.01	0.1	subhedral	subequant			
Fe-Ti oxide	10			0.01	0.05	anhedral	elongate	N/A		
Glass	29	20	9	N/A	N/A	N/A	N/A			
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments			
Vesicle	3	0	3	0.05	1	rounded	Clay filled			

THIN SECTION LABEL ID:	391-U1575A-33R-3-W 56/60- <sup>-</sup>	<b>TSB-TS# 25</b> Thin section no.: 25
Observer:	YK, WN	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Highly plagioclase-pyroxene-o plagioclase +/-pyroxene in a fe phase glomerocrysts. There m conspicuous cleavage and and order interference colors. Olivi iddingsite. The groundmass as oxides in a dark mesostasis. S	blivine-phyric basalt with phenocrysts and glomerocrysts of elty groundmass. Subophitic textures a common in 2- nay be 2 pyroxene populations (1) bright orange with omalous interference colors, and (2) colorless with 2nd ine is present as a phenocryst but is completely altered to ssemblage consists of plagioclase, pyroxene, and Fe-Ti Sparse vesicles are completely filled.
Plane-r	oolarized: 60620241	Cross-polarized: 60620261



.g		37								
Lithology:		hi	ghly				plagioclase-augite-olivine phyric basalt lava flow			
Grain size distr	ibution	: bi	imodal				ain size (avg.):	microcrystalline		
Major texture: glom			omero	porphy	ritic		Minor Texture:		subophitic	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	3	0	3	0.1	1	subhedral	subhedral	Completely altere Alteration minera	d iddingsite and/or clay. l is very bring orange.	
Plagioclase	10	10		0.16	1.4	subhedral	tabular	Aside from the lar a seriate texture, r between phenocr	gest phenocrysts, plagioclase has naking it difficult to discern yst and groundmass grains.	
Clinopyroxene	7	5	2	0.1	0.5	subhedral	equant	Two populations orange with prom- orange interferen 2nd order interfer pyroxene is likely pyroxene show m	of pyroxene are visible: (1) bright ounced cleavage and anomalous ce colors, and (2) colorless with ence colors. The orange a pseudomorph. Colorless ild and sporadic zoning.	
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Plagioclase	30	30		0.15	0.2	euhedral	elongate	Long, slender hab	its in a felty pattern	
Clinopyroxene	25	20	5	0.02	0.12	subhedral	equant			
Fe-Ti oxide	7		3	0.01	0.05	euhedral	equant	N/A		
Mesostasis	18	15	3	N/A	N/A	N/A	N/A			
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments			
Vesicle	3		3	0.1	0.3	subrounded	filled with a clay	filled with a clay mineral		

٦

THIN SECTION LABEL ID:	391-U1575A-35R-1-W 96/100-TSB-TS# 23	Thin section no.: 23
Observer:	WN	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Pillow basalt with (1) a glassy rim domain and a (2) contain plagioclase and clinopyroxene phenocrysts present (~3-5%) but it has been completely replace of plagioclase, subophitic plagioclase + clinopyroxec clinopyroxene + olivine assemblages. The glassy d without microlites. Phenocrysts in this region have gradual (as opposed to a sharp) transition to the pil consists of highly oxidized glass with phenocrysts. not present.	pillow interior domain. Both domains and glomerocrysts. Olivine is also ed by iddingsite. Glomerocysts consist ene, and subophitic plagioclase + omain consists of fresh basaltic glass glass alteration halos. There is a low interior. The pillow interior Clinopyroxene and Fe-Ti oxides are



Cross-polarized: 60560971



Lithology:		m	oderate	ely			plagioclase-augite-olivine phyric basalt pillow lava flow			
Grain size distri	ibution	: bi	modal				Groundmass gra	ain size (avg.):	cryptocrystalline	
Major texture:	xture: aphanitic					Minor Texture:		porphyritic		
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	7	0	7	0.1	0.6	subhedral	subhedral	Completely altere	d to iddingsite	
Plagioclase	13	12	1	0.1	1.8	euhedral	tabular	Blocky plag shows elongate plag is le in various states o others look broker	minor oscillatory zoning. More ss likely to show zoning. Plag is f freshness - some are fresh while n with partilally resorbed interiors	
Clinopyroxene	4	4		0.06	0.2	subhedral	equant	Many cpx have rounded corners and lightly sieve textured interiors. They can be present as stand alone phenocrysts or as glomerocrysts with plagioclase =/- olivine.		
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Plagioclase	3	3		0.04	0.15	euhedral	elongate	Very thin and som	etimes skeletal	
Clinopyroxene	1	1		0.02	0.04	euhedral	equant			
Fe-Ti oxide			7					N/A		
Glass	72		72	N/A	N/A	N/A	N/A			

Igneous Pe	trolo	gy									
Lithology: moderately						plagioclase-augite-olivine phyric basalt pillow lava flow					
Grain size distribution: bimo							Groundmass grain size (avg.): glass				
Major texture:		vi	trophyr	ic			Minor Texture:	porphyritic			
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments			
Olivine	4	0	4	0.04	0.12	subhedral	subhedral	Completely altered to iddingsite			
Plagioclase	11	10	1	0.1	1.2	euhedral	tabular	Blocky plag shows minor oscillatory zoning. More elongate plag is less likely to show zoning. Plag is in various states of freshness - some are fresh while others look broken with partilally resorbed interiors			
Clinopyroxene	5	5		0.06	0.2	subhedral	equant	Many cpx have rounded corners and lightly sieve textured interiors. They can be present as stand alone phenocrysts or as glomerocrysts with plagioclase =/- olivine.			
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments			
Plagioclase								No groundmass plagioclase visible			
Fe-Ti oxide			4					N/A			
Glass	80	50	30	N/A	N/A	N/A	N/A				
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments				
Vesicle	1	0.5	0.5	0.2	0.4	subrounded	Partially filled wit	th zeolite.			

THIN SECTION LABEL ID: Observer: Thin section thickness: Thin section summary:	Thin section no.: 24 Piece no.: Unit/subunit: Unit IV inifera and rare possible	
Plane-p	Darized: 60619981 Cross-polariz	ed: 60620181

THIN SECTION LABEL ID:	391-U1575A-35R-3-W 97/10	01-TSB-TS# 22 Thin section no.: 22				
Observer:	JWS		Piece no.:			
Thin section thickness:			Unit/subunit:			
Thin section summary:	Moderately plagioclase-augit well as gloms with augite. Mu Plagioclase is very clear, no glomerocrysts; smaller pyrox (subophitic), but large grains	e phyric basalt. Plag occurs a ich of the augite is highly alte inclusions. Pyroxene typically ene grains commonly intergra are discrete. No mixing textu	as individual phenocrysts as red to saponite (?). / occurs with plagioclase in own with plagioclase ires evident.			
[						
Plane-p	olarized: 60560831	Cross-polarize	d: 60560851			

![](_page_26_Picture_3.jpeg)

Lithology:		m	oderate	ely			plagioclase-augite phyric basalt lava flow		
Grain size distri	ibution	se	eriate				Groundmass gra	ain size (avg.):	fine-grained
Major texture:		gl	omeroj	oorphy	ritic		Minor Texture:		intersertal
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	0	0						Can't tell if there w altered to saponite measure of prior o	as any olivine because Cpx is e, obscuring any potential livine.
Plagioclase	13	12	1	0.5	1.6	euhedral	tabular	Plag occurs as indi gloms with augite	vidual phenocrysts as well as
Clinopyroxene	12	6	6	0.2	2	subhedral	equant	Occurs as phenocr Much of the augite adjacent Cpx grair	ysts and gloms with plagioclase. e is altered to saponite, while as are completely fresh.
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	4	3	1	0.08	0.2	subhedral	equant		
Plagioclase	28	25	3	0.06	0.3	euhedral	tabular		
Clinopyroxene	30	20	10	0.06	0.3	anhedral	subequant		
Fe-Ti oxide	3			0.01	0.02	subhedral	equant	N/A	
Mesostasis	15	15		N/A	N/A	N/A	N/A	very fine grained	
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	1	0	1	0.5	0.8	rounded	Clay filled		

THIN SECTION LABEL ID:	391-U1575A-35R-5-W 0/4-TS	<b>B-TS# 21</b> Thin section no.: 21
Observer:	JWS	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Highly plagioclase-augite-oliv well as gloms with augite and and olivine typically occur with intergrown with plagioclase (s olivine shows that this is alkal	ne phyric basalt. Plag occurs as individual phenocrysts as more rarely olivine. Very clear, no inclusions. Pyroxene n plagioclase in glomerocrysts; pyroxene commonly ubophitic). No mixing textures evident. Groundmass i basalt.
Plane-p	oolarized: 60560791	Cross-polarized: 60560811

![](_page_27_Picture_3.jpeg)

Lithology:		hi	ghly				plagioclase-augite-olivine phyric basalt lava flow		
Grain size distribution: bimodal				Groundmass grain size (avg.): fine-grain				fine-grained	
Major texture:		gl	omerop	oorphy	ritic		Minor Texture:		subophitic
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	2	0	2	0.15	1	euhedral	euhedral	Completely altere	d to saponite.
Plagioclase	15	15	0	0.25	1.6	euhedral	tabular	Plag occurs as ind gloms with augite clear, no inclusion	ividual phenocrysts as well as and more rarely olivine. Very s.
Clinopyroxene	9	9	0	0.2	0.6	subhedral	equant		
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	4	0	4	0.05	0.1	subhedral	equant	Altered to serpent	ine
Plagioclase	30	30	0	0.1	0.4	subhedral	tabular		
Clinopyroxene	20	20	0	0.04	0.2	anhedral	subequant		
Fe-Ti oxide	2		2			anhedral		N/A	
Mesostasis	18	12	6	N/A	N/A	N/A	N/A		
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	0	0	0						

Thin section summary: F g o		UnivSubunit.
n a u v a	Highly plagioclase-augite phyric basalt. Plag occurs as gloms with augite. Very clear, no inclusions. Large tabu oscillatory zoning in outer margins. Augite typically occu more rarely as individual phenocrysts. Some of the aug adjacent augite grains are completely fresh. Augite in g untwinned, with smooth grain boundaries. and minor blo was primary olivine because at least some saponite psi augite.	individual phenocrysts as well as lar grains commonly display urs as gloms with plagioclase, ite is altered to saponite, while loms is clear, typically ebby exsolution. Can't tell if there uedomorphs clearly replace

![](_page_28_Picture_3.jpeg)

![](_page_28_Picture_4.jpeg)

Lithology:		hi	ghly				plagioclase-augite phyric basalt lava flow		
Grain size distr	ibution	: bi	modal				Groundmass grain size (avg.): fine-grained		
Major texture:		gl	omeroj	oorphy	ritic		Minor Texture:	intergranular	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	0	0						Can't tell if there was any olivine because Cpx is altered to saponite, obscuring any potential measure of prior olivine.	
Plagioclase	14	14	0	0.4	2.6	euhedral	tabular	Plag occurs as individual phenocrysts as well as gloms with augite. Very clear, no inclusions. Large tabular grains commonly display oscillatory zoning in outer margins.	
Clinopyroxene	11	8	3	0.3	0.8	subhedral	equant	Typically occurs as gloms with plagioclase, more rarely as individual phenocrysts. Some of the augite is altered to saponite, while adjacent augite grains are completely fresh. Augite in gloms is clear, typically untwinned, with smooth grain boundaries. and minor blebby exsolution.	
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Plagioclase	34	30	4	0.1	0.6	euhedral	tabular	Subophitic to intersertal textures.	
Clinopyroxene	24	18	6	0.07	0.4	anhedral	subequant		
Fe-Ti oxide	2			0.01	0.1	anhedral	elongate	N/A	
Mesostasis	15	15		N/A	N/A	N/A	N/A	Small plag laths in poorly crystallized pyroxene, with abundant Fe-Ti oxides.	
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	1	0	1	0.1	0.5	rounded	Clay-filled; some	have radial calcite in center.	

THIN SECTION LABEL ID:	391-U1575A-38R-3-W 10/13-TSB-TS# 26	Thin section no.: 26
Observer:	JWS	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Highly plagioclase-augite-olivine phyric basalt. Pla phenocrysts as well as gloms with augite and less inclusions. Large tabular grains commonly display in outer margins. Olivine altered to yellow clay, pr augite attached to very large plagioclase. Some p exsolution blebs of Kspar.	agioclase occurs as individual s commonly olivine. Very clear, no y normal continuous zoning, especially obably saponite. Rare very large olagioclase crystals have thin

Plane-polarized: 60620281

![](_page_29_Picture_4.jpeg)

![](_page_29_Picture_5.jpeg)

Lithology:		hi	ghly				plagioclase-augite-olivine phyric basalt lava flow			
Grain size distri	ibution	se se	eriate				Groundmass grain size (avg.): fine-grained			
Major texture:		gl	omeroj	oorphy	ritic		Minor Texture:		intersertal	
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	4	0	4	0.15	0.5	euhedral	euhedral	Altered to yellow c	lay, probably saponite	
Plagioclase	14	14	0	0.4	2.1	euhedral	tabular	Plagioclase occurs as gloms with augi Very clear, no inclu commonly display especially in outer	as individual phenocrysts as well te and less commonly olivine. Isions. Large tabular grains normal continuous zoning, margins.	
Clinopyroxene	10	8	2	0.2	1.9	anhedral	equant	Rare very large aug plagioclase.	jite attached to very large	
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments		
Olivine	5	0	5	0.06	0.2	subhedral	equant			
Plagioclase	32	32	0	0.04	0.25	euhedral	tabular			
Clinopyroxene	22	18	4	0.03	0.5	anhedral	subequant			
Fe-Ti oxide			4					N/A		
Mesostasis	12	12	0	N/A	N/A	N/A	N/A	Small plag laths in with abundant Fe- interstitial glass. Pr eruption.	poorly crystallized pyroxene, Ti oxides. Appears to be former obably quenched melt on	
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments			
Vesicle	0	0	0							

٦

THIN SECTION LABEL ID: Observer:	<b>391-U1575A-39R-3-W 78/81</b> - JWS	<b>TSB-TS# 27</b> Thin section no.: 27Piece no.:			
Thin section thickness:		Unit/subunit:			
Thin section summary:	Highly plagioclase-augite phy across, typically just plagiocla euhedral but completely repla Imperfect, looks like butterfly probably devitrified glass. The	<sup>7</sup> plagioclase-augite phyric basalt. Plagioclase forms giant glomerocrysts up 3 mm s, typically just plagioclase but some with augite. Olivine microphenocryst are tral but completely replaced by clays (saponite?). Sector zoning common. fect, looks like butterfly wings. Aphanitic groundmass is entirely mesostasis; bly devitrified glass. There is no typical crystalline groundmass.			
Plane-p	oolarized: 60620321	Cross-polarized: 60620341			

![](_page_30_Picture_3.jpeg)

Lithology:	highly					plagioclase-augite-olivine phyric basalt lava flow			
Grain size distr	: bi	imodal			Groundmass grain size (av			vg.): cryptocrystalline	
Major texture:		glomeroporphyritic					Minor Texture: aphanitic		aphanitic
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	3	0	3	0.15	0.5	euhedral	euhedral	Alterred to yellow clay, with hematite.	
Plagioclase	14	14	0	0.15	2	euhedral	tabular	Plagioclase forms giant glomerocrysts up 3 mm across, typically just plagioclase but some with augite.	
Clinopyroxene	10	8	2	0.1	0.7	anhedral	equant	Sector zoning com butterfly wings.	mon. Imperfect, looks like
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Fe-Ti oxide			3					N/A	
Mesostasis	72	70	2	N/A	N/A	N/A	N/A		
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	2	0	2	0.2	1	rounded	Filled with clay, calcite		

THIN SECTION LABEL ID:	391-U1575A-39R-7-W 25/29	-TSB-TS# 28	Thin section no.: 28				
Observer:	JLS		Piece no.:				
Thin section thickness:			Unit/subunit:				
Thin section summary:	Highly plagioclase-augite-phyric basalt with glomeroporphyritic and intersertal textures. Plagioclase and pyroxene are both found in glomerocrysts and often contain melt inclusions. Groundmass consists of fine grained plagioclase and pyroxene with skeletal Fe-oxides.						
Plane-polarized: 60620781 Cross-polarized: 60620801							

![](_page_31_Picture_3.jpeg)

#### **Igneous Petrology**

Lithology:

highly

#### Grain size distribution:

#### glomeroporphyritic **Minor Texture:** intergranular Major texture: Size Size Original (%) Replaced (%) Habit Phenocrysts Present (%) min. Shape Comments max. (mm) (mm) Olivine 0 0 Plagioclase forms in glomerocrysts and often contains melt inclusions. 15 15 0 0.8 tabular Plagioclase 3.5 euhedral Sector and oscillatory zoning is present it the pyroxene phenocrysts. Pyroxene also occurs in glomerocrysts. Clinopyroxene 12 10 2 0.5 1 subhedral equant Size Size Original (%) Replaced (%) Groundmass Shape Habit Comments Present (%) min. max. (mm) (mm) 0.08 Plagioclase 21 20 1 0.3 euhedral elongate Clinopyroxene 12 10 2 0.04 0.2 subhedral subequant Fe-Ti oxide 7 N/A 0.005 0.2 anhedral elongate Glass 30 N/A N/A N/A N/A 33 3 Original (%) Size min. (mm) Size max. (mm) Vesicle Empty (%) Filled (%) Shape Comments 2 Vesicle 0 2 0.2 0.5 rounded Filled with clay.

plagioclase-augite phyric basalt lava flow

fine-grained

Groundmass grain size (avg.):

41R-2 46-48 

THIN SECTION LABEL ID:	391-U1575A-41R-2-W 46/48-TSB-	TS# 29 Thin section no.: 29
Observer:	JWS	Piece no.:
Thin section thickness:		Unit/subunit:
Thin section summary:	Highly plagioclase-augite-olivine ph well as gloms with augite. Very clear display oscillatory zoning in outer n plagioclase, more rarely as individu saponite, while adjacent augite gra with smooth grain boundaries. and primary olivine because at least so	nyric basalt. Plag occurs as individual phenocrysts as ar, no inclusions. Large tabular grains commonly nargins. Augite typically occurs as gloms with ual phenocrysts. Some of the augite is altered to ins are completely fresh. Augite in gloms is clear, minor blebby exsolution. Can't tell if there was me saponite psuedomorphs clearly replace augite.
Plane-p	olarized: 60620431	Cross-polarized: 60620501

![](_page_32_Picture_3.jpeg)

•									
Lithology:	moderately						plagioclase-augite phyric basalt lava flow		
Grain size distri	ibution	se se	eriate				Groundmass gra	ain size (avg.):	fine-grained
Major texture:		glomeroporphyritic					Minor Texture: intersertal		
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine	0	0							
Plagioclase	10	10	0	0.3	1.2	euhedral	tabular	Plag occurs as individual phenocrysts as well as gloms with augite. Very clear, no inclusions. Large tabular grains commonly display oscillatory zoning in outer margins.	
Clinopyroxene	10	7	3	0.1	0.3	anhedral	equant		
Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments	
Olivine								Can't tell if there is groundmass olivine because augite alters to similar saponite phase.	
Plagioclase	35	35	0	0.05	0.3	euhedral	tabular		
Clinopyroxene	18	10	8	0.05	0.25	anhedral	subequant		
Fe-Ti oxide	1					subhedral	equant	N/A	
Mesostasis	25	20	5	N/A	N/A	N/A	N/A	Small plag laths in poorly crystallized pyroxene, with abundant Fe-Ti oxides. Appears to be former interstitial glass - plag laths feather out into Px, as if into melt. Probably quenched melt on eruption.	
Glass	0	0	0	N/A	N/A	N/A	N/A		
Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments		
Vesicle	1	0	1	0.1	0.3	rounded	Clay-filled		