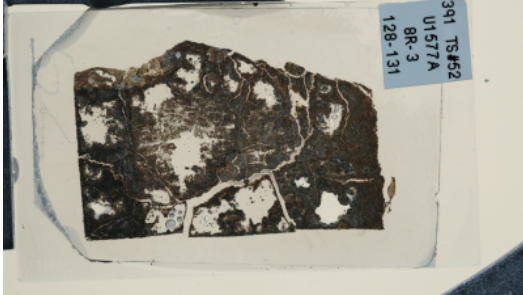
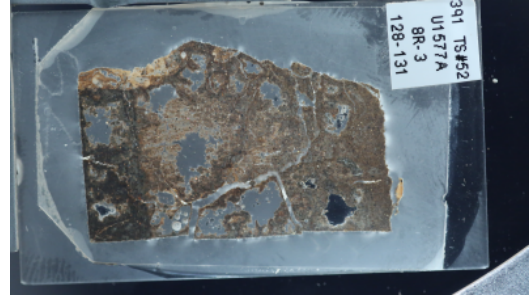


THIN SECTION LABEL ID:	<b>391-U1577A-8R-3-W 128/131-TSB-TS# 52</b>	Thin section no.:	52
Observer:	DB	Piece no.:	
Thin section thickness:		Unit/subunit:	II
Thin section summary:	Very altered vitric tuff with rare pseudomorphs of vesicular glass and fresh feldspars (0.1-0.2 mm). One rare microlithic lithic (0.1 mm) found.		

Plane-polarized: 60911201

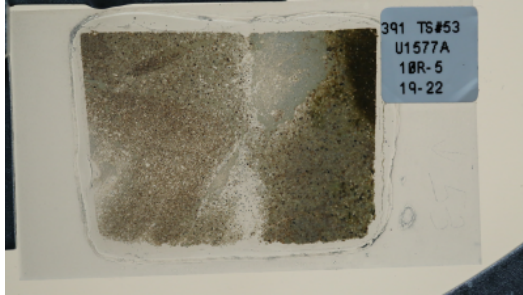


Cross-polarized: 60911221



THIN SECTION LABEL ID:	<b>391-U1577A-10R-5-W 19/22-TSB-TS#53</b>	Thin section no.:	53
Observer:	DB	Piece no.:	
Thin section thickness:		Unit/subunit:	IIA
Thin section summary:	Very altered vitric tuff with planktonic foraminifera mixed with secondary brown clay. Rare crystals of feldspar. The thin section is too thick to evaluate the occurrence of ferromagnesian minerals. Some areas appear bioturbated with more carbonate. Rare ghosts of vitric clasts, most of which appear vesiculated.		

Plane-polarized: 60918011



Cross-polarized: 60918031



THIN SECTION LABEL ID: **391-U1577A-10R-5-W 67/69-TSB-TS#54**

Thin section no.: 54

Observer: DB

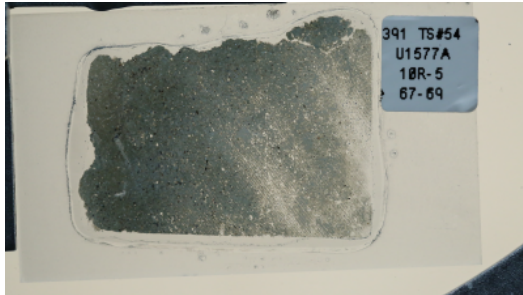
Piece no.:

Thin section thickness:

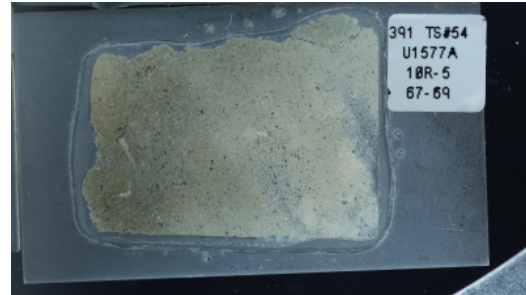
Unit/subunit: IIIA

Thin section summary: Very altered vitric tuff with planktonic foraminifera mixed with secondary brown clay. Rare crystals of feldspar. Rare ghosts of vitric clasts, most of which appear vesiculated (size 0.1-0.5 cm); vesicles range in shape from rounded to elongated to pumice-like.

Plane-polarized: 60918051



Cross-polarized: 60918071



THIN SECTION LABEL ID: **391-U1577A-12R-7-W 4/8-TSB-TS# 57**

Thin section no.: 57

Observer: DB

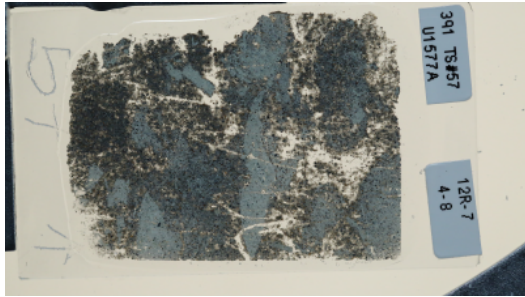
Piece no.:

Thin section thickness:

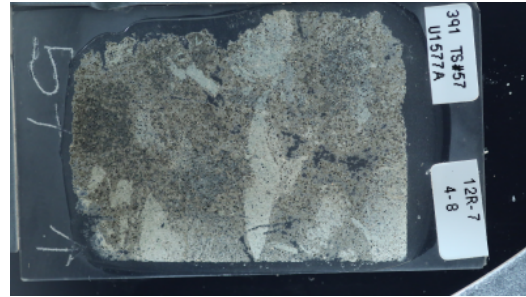
Unit/subunit: IIC

Thin section summary: Altered, bioturbated vitric tuff. Volcanic glass is commonly palagonized or replaced by secondary clays, with rare fresh remnants. The vitric clasts and their pseudomorphs are highly vesicular, with rounded to highly elongated vesicles (forming an apparent continuum of fabrics). Some clasts are pumiceous. Vitric clast size is 40-200 um. Rare feldspars are euhedral and fresh. The volcanoclasts are extensively dispersed in a matrix of clay and pelagic nannofossil-foraminifera ooze.

Plane-polarized: 60917951



Cross-polarized: 60917971



THIN SECTION LABEL ID: **391-U1577A-17R-3-W 29/32-TSB-TS# 55**

Thin section no.: 55

Observer: DB

Piece no.:

Thin section thickness:

Unit/subunit: IIIB

Thin section summary: Hyaloclastite with abundant fresh glass. The vitric clasts sometimes include large (mm-sized) feldspars or otherwise more commonly feldspar microlites. Pyroxenes may occur but could not be determined due to the high thickness of the thin section. The glass is not vesicular.

Plane-polarized: 60911281



Cross-polarized: 60911261



THIN SECTION LABEL ID: **391-U1577A-17R-4-W 78/81-TSB-TS#56**

Thin section no.: 56

Observer: DB

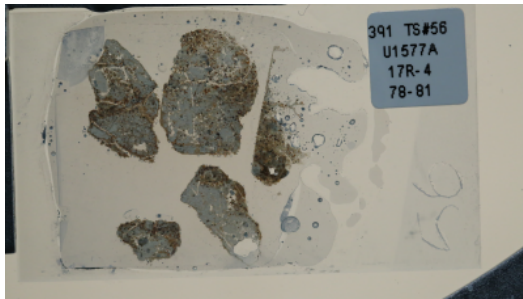
Piece no.:

Thin section thickness:

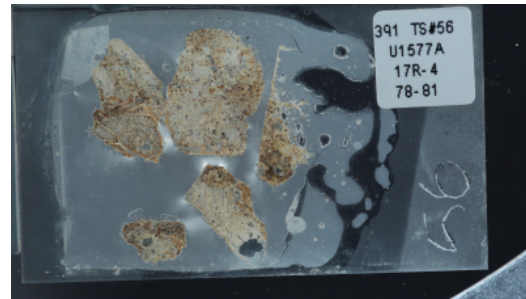
Unit/subunit: IIIC

Thin section summary: Very altered vitric tuff with planktonic foraminifera mixed with secondary brown clay. Rare crystals of feldspar. The thin section is too thick to evaluate the occurrence of ferromagnesian minerals. Some areas appear bioturbated with more carbonate. Rare ghosts of vitric clasts, most of which appear vesiculated (size 0.1-0.5 cm); 1 occurrence of altered pumice (size 0.5 x 0.2 cm).

Plane-polarized: 60918091

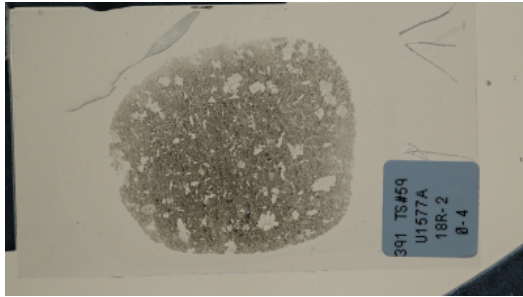


Cross-polarized: 60918111

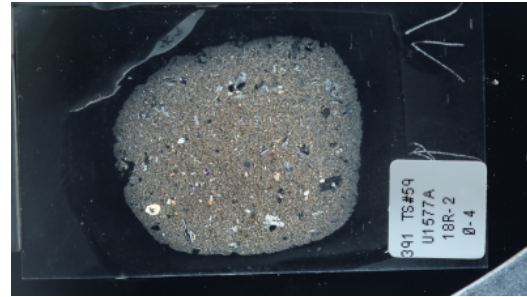


THIN SECTION LABEL ID: **391-U1577A-18R-2-W 0/4-TSB-TS# 59** Thin section no.: 59  
 Observer: WN Piece no.:  
 Thin section thickness: Unit/subunit:  
 Thin section summary: Porphyritic aphanitic with large (>1cm) glomerocrysts of plagioclase and clinopyroxene. Olivine phenocrysts and microcrystalline mesostasis have been completely replaced by serpentine. Mild oscillatory zonation is visible in larger plagioclase phenocrysts. Rare, round (0.8mm diameter) vesicles are filled with a black clay. Contains a crystal clot that appears to be accumulated material removed from the side/floor of the magma chamber.

Plane-polarized: 60913191



Cross-polarized: 60913211



### Igneous Petrology

**Lithology:** moderately

**plagioclase-augite-olivine phyric basalt massive lava flow**

**Grain size distribution:** bimodal

**Groundmass grain size (avg.):** microcrystalline

**Major texture:** porphyritic

**Minor Texture:** aphanitic

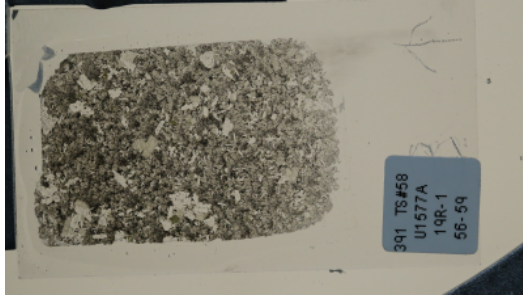
Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Olivine	3		3	0.08	0.3	subhedral	subhedral	Completely replaced by serpentine.
Plagioclase	13	13		0.12	1.7	subhedral	tabular	Subhedral and fragmented. Oscillatory zoning is common in larger phenocrysts and glomerocrysts. Some larger grains have mildly sieved centers, potentially with glass pockets.
Clinopyroxene	6	6		0.1	0.3	subhedral	equant	subophitic glomerocrysts with plag.

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Plagioclase	20	20		0.06	0.4	euhedral	elongate	Needle-like, skeletal crystals
Clinopyroxene	20	20		0.02	0.08	subhedral	equant	
Fe-Ti oxide	3		3			subhedral	equant	N/A
Mesostasis	35		35	N/A	N/A	N/A	N/A	Groundmass appears to be entirely serpentinized, similar to olivine.

Vesicle	Original (%)	Empty (%)	Filled (%)	Size min. (mm)	Size max. (mm)	Shape	Comments
Vesicle	1		1	0.6	1	rounded	Completely filled with clay.

THIN SECTION LABEL ID: **391-U1577A-19R-1-W 56/59-TSB-TS# 58** Thin section no.: 58  
 Observer: MT Piece no.:  
 Thin section thickness: Unit/subunit:  
 Thin section summary: Moderately phyrlic, plagioclase, olivine, augite basaltic lava flow. The phenocrysts are slightly medium grained, whereas the groundmass is microcrystalline. Groundmass consists of plagioclase, olivine, augite, Fe-oxides and mesostasis. Some olivine grains have been altered to serpentine.

Plane-polarized: 60913151



Cross-polarized: 60913171



### Igneous Petrology

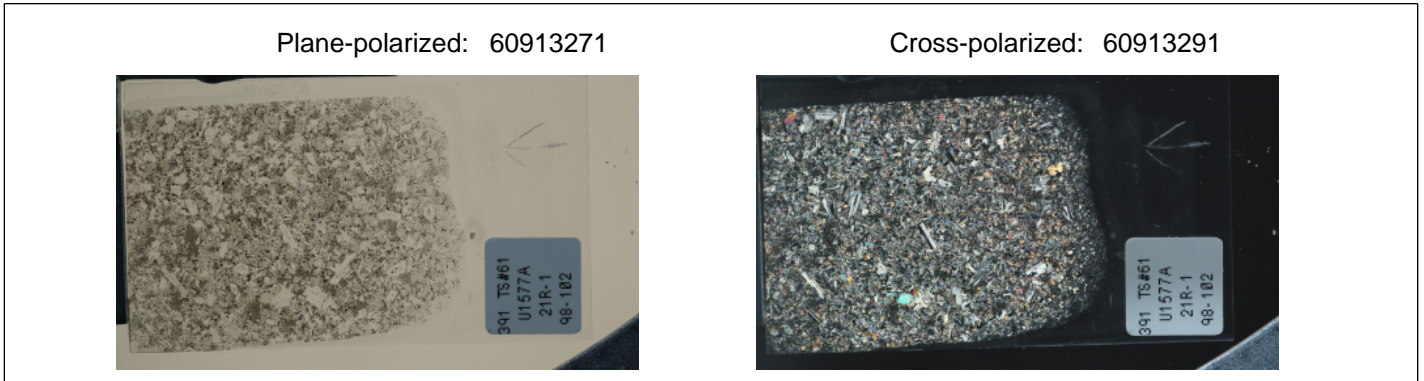
**Lithology:** moderately **plagioclase-olivine-augite phyrlic basalt lava flow**  
**Grain size distribution:** bimodal **Groundmass grain size (avg.):** microcrystalline  
**Major texture:** glomeroporphyritic **Minor Texture:** aphanitic

Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Olivine	4	3	1	0.2	1.2	anhedral	anhedral	Some olivine show alteration by serpentine
Plagioclase	8	8		0.2	2	subhedral	tabular	Oscillatory zoning is observed in some larger grains. There is also an occurrence of discrete elongated black to pale brown features in some plagioclase.
Clinopyroxene	2	2		0.2	0.8	anhedral	equant	May contain plagioclase grains

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Olivine	5	2	3	0.02	0.2	anhedral	subequant	Most of the of the olivine groundmass is replaced
Plagioclase	20	20		0.02	0.2	subhedral	elongate	Needle like, randomly oriented grains. some grains surround olivine phenocrysts
Clinopyroxene	15	15		0.02	0.2	anhedral	equant	
Fe-Ti oxide	5		1	0.04	0.2	interstitial	subequant	N/A
Mesostasis	40	10	30	N/A	N/A	N/A	N/A	Microlites are common



THIN SECTION LABEL ID: **391-U1577A-21R-1-W 98/102-TSB-TS# 61** Thin section no.: 61  
 Observer: WN Piece no.:  
 Thin section thickness: Unit/subunit:  
 Thin section summary: Highly phyric, plagioclase-clinopyroxene-olivine-bearing massive basalt. Most (if not all) olivine has been replaced by serpentine/saponite. Often found in glomerocrysts or very large clusters of other minerals; rarely found by itself among groundmass or mesostasis. Plagioclase phenocrysts come in a large range of sized. The largest (>1 cm) are often more blocky, found in glomerocrysts, and show subtle zoning. The large phenocrysts also have sieved interiors. Smaller phenocrysts are more tabular and usually lack zoning. Clinopyroxene have subophitic textures, often showing late-stage crystallization after olivine and plag. Both blocky and skeletal Fe-Ti oxides are large enough to be considered phenocrystic. Most of the is microcrystallized to oxides and clinopyroxene (the thin crystals reveal low 1st order colors)



### Igneous Petrology

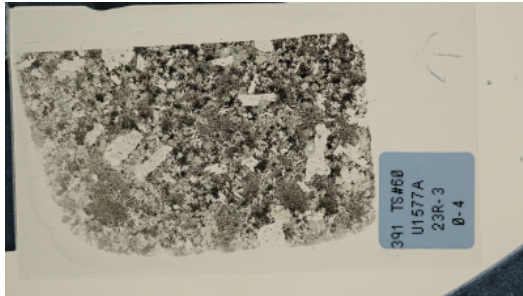
<b>Lithology:</b>	highly	<b>plagioclase-augite-olivine phyric basalt massive lava flow</b>
<b>Grain size distribution:</b>	bimodal	<b>Groundmass grain size (avg.):</b> fine-grained
<b>Major texture:</b>	porphyritic	<b>Minor Texture:</b> microlitic

Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Olivine	7	1	6	0.08	0.4	subhedral	subhedral	Most (if not all) olivine has been replaced by serpentine/saponite. Often found in glomerocrysts or very large clusters of other minerals; rarely found by itself among groundmass or mesostasis.
Plagioclase	25	25	0	0.2	2.2	subhedral	tabular	Plagioclase phenocrysts come in a large range of sized. The largest (>1 cm) are often more blocky, found in glomerocrysts, and show subtle zoning. The large phenocrysts also have sieved interiors, some of which may be glassy melt inclusions. Smaller phenocrysts are more tabular and usually lack zoning.
Clinopyroxene	10	10		0.1	0.4	subhedral	equant	subophitic textures, often showing late-stage crystallization after olivine and plag.
Oxide Fe-Ti	6	6		0.08	0.2	subhedral	subhedral	Both blocky and skeletal Fe-Ti oxides are large enough to be considered phenocrystic.

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Plagioclase	7	7		0.05	0.2	subhedral	elongate	Slender, skeletal crystals dominate groundmass plag textures
Clinopyroxene	7	7		0.01	0.1	subhedral	equant	
Fe-Ti oxide	3	6	6	0.02	0.05	subhedral	elongate	N/A
Mesostasis	35	30	5	N/A	N/A	N/A	N/A	Most of this is microcrystallized to oxides and clinopyroxene (the thin crystals reveal low 1st order colors)
Glass				N/A	N/A	N/A	N/A	No remaining glass (not counting inclusions in plag)

THIN SECTION LABEL ID: **391-U1577A-23R-3-W 0/4-TSB-TS# 60** Thin section no.: 60  
 Observer: MT Piece no.:  
 Thin section thickness: Unit/subunit:  
 Thin section summary: Plagioclase-olivine-augite phyric basalt. The groundmass is composed of plagioclase, olivine, augite, Fe-oxides as well as mesostasis. Olivine phenocrysts may occur in clusters and some grains have been altered to serpentine. JWS: Groundmass is very fine grained, with intergranular texture - very different from TS61. Normal seriate groundmass missing; phenocrysts are giant with no seriate groundmass grading into phenocrysts, gloms. Mesostasis less extensive than in TS61, but groundmass much finer.

Plane-polarized: 60913231



Cross-polarized: 60913251



### Igneous Petrology

**Lithology:** moderately **plagioclase-olivine-augite phyric basalt massive lava flow**  
**Grain size distribution:** bimodal **Groundmass grain size (avg.):** cryptocrystalline  
**Major texture:** porphyritic **Minor Texture:** microlitic

Phenocrysts	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Olivine	4	3	1	0.2	0.4	anhedral	anhedral	May occur in clusters. Replacement by serpentine.
Plagioclase	4.5	4	0.5	0.4	2.4	subhedral	tabular	
Clinopyroxene	2	2		0.2	0.6	subhedral	equant	

Groundmass	Original (%)	Present (%)	Replaced (%)	Size min. (mm)	Size max. (mm)	Shape	Habit	Comments
Olivine	15	12	3	0.04	0.2	anhedral	equant	
Plagioclase	14	12	2	0.04	0.4	subhedral	elongate	
Clinopyroxene	15	15						
Fe-Ti oxide	10		1	0.01	0.1	interstitial	elongate	N/A
Mesostasis	35	35		N/A	N/A	N/A	N/A	