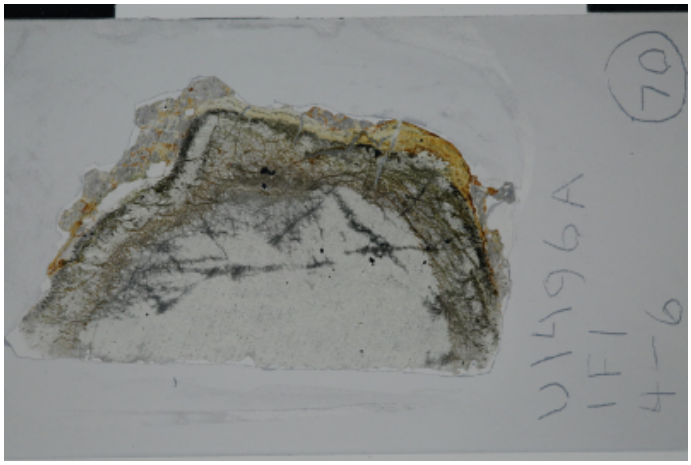
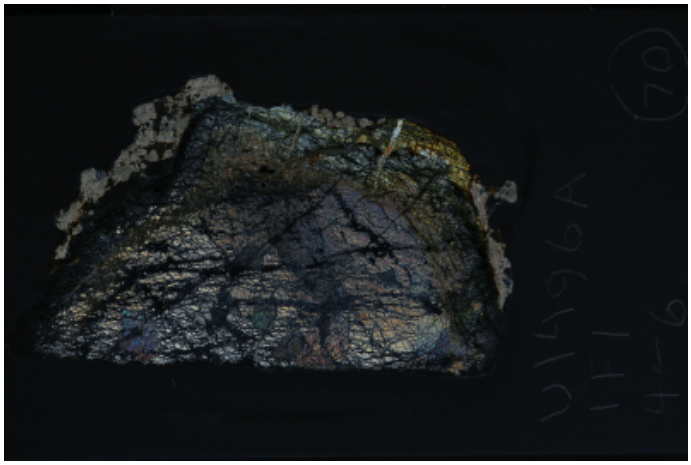
THIN SECTION LABEL ID: **366-U1496A-1F-1-W 4/6-TSB-TS_70** TS no.: 70

Thin Section Summary Description Observer(s): WK/BD/JS/KM

Massive serpentinized dunite (40-50% serpentinzation) with well preserved olivine blasts within serpentinite matrix, forming a mesh-like texture. Single coarse sub-idiomorphic crystals of Cr-spinel. Giant elongate grains up to 12 mm x 4 mm, with some small 1-2 mm subequant grains. Undulatory extinction evident in large grains. Coarse foliated? texture. Distinct domains are sheared with aligned olivine clasts having a shape preferred orientation; sheared domains show more intense serpentinization (80-90%). Conjugate to irregular vein network with chlorite, serpentine and fine-grained carbonate (?) and clay minerals (?) with fibrous spherical growth textures. Veins have alteration seams composed of opaque (sulfate) minerals within serpentine mesh; almost no olivine within the alteration seams.



LIMS image no.: 39777811 Plane-polarized. Slide width 27mm



LIMS image no.: 39777831 Cross-polarized. Slide width 27mm

Intrusive Mantle

Domain/Rock Comment: Dunite with giant elongate grains up to 12 mm x 4 mm, with some small 1-2 mm subequant grains. Undulatory extinction evident in large grains. Coarse foliated texture.

Lithology: **serpentinized dunite** Observer: BD/JS

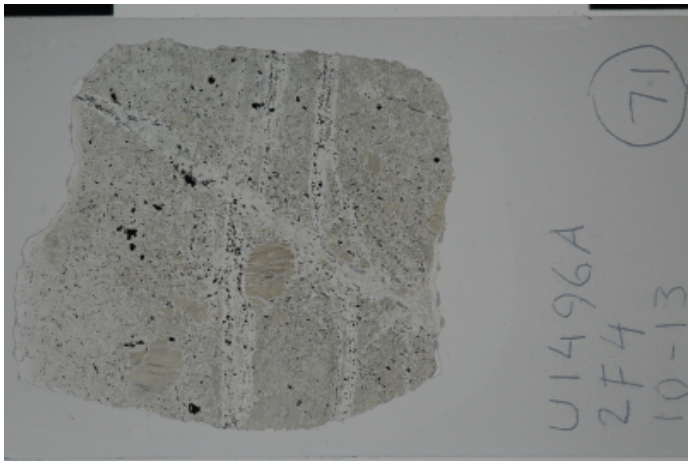
Texture: pseudomorphic coarse grained [366]

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Olivine	100	60	40	6	tabular	elongate	foliated	
Serpentine	NA	50	NA	NA			pseudomorphic	
Spinel	1			0.2	NA	euhedral	inclusions	NA

THIN SECTION LABEL ID: **366-U1496A-2F-4-W 10/13-TSB-TS_71** TS no.: 71

Thin Section Summary Description Observer(s): JP/JS/WK/KM

Massive serpentinized Orthopyroxenite (95% serpentinization/ orthoamphibole) crosscut by fibrous serpentine veins. Modal abundances of primary olivine and opx appear to be about 5% and 95% respectively. Accessory spinel is blocky. Primary texture was decussate. Opx severely altered to pseudomorphic bastite serpentine and higher Bf mineral, probably orthoamphibole (anthophyllite?). Olivine (if present) altered to nonpseudomorphic interpenetrating serpentine. Brucite, magnetite and talc or anthophyllite (colorless mineral with high birefringence color and positive elongation sign) occur in the fibrous serpentine veins with syntaxial or stretched fibres.



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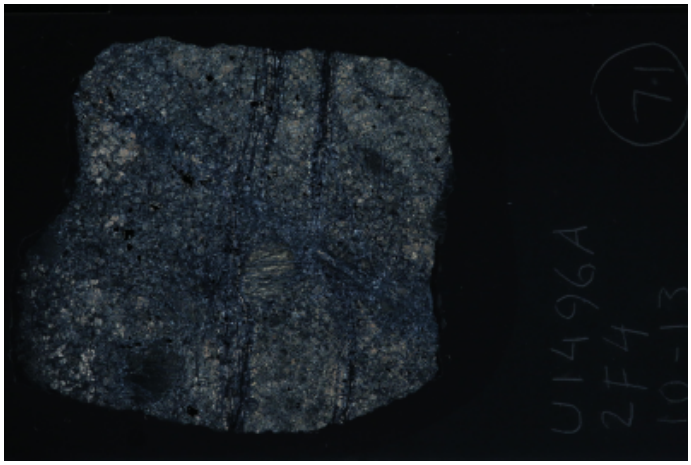


LIMS image no.: 39734651 Cross-polarized. Slide width 27mm

Intrusive Mantle

Interval domain no: **1** Domain rel. abundance (%): 95 Domain name: ultramafic clast

Domain/Rock Comment: Orthopyroxenite, may have some olivine. Mostly rextlized to small grains < 1mm but 2 big 4 mm grains. Texture decussate. Much alteration of Opx may be orthoamphibole.

Lithology: serpentinized orthopyroxenite Observer: JP/JS

Texture: nonpseudomorphic

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Olivine	5	0.5	99				nonpseudomorphic	Some mesh serpentine pseudomorphs after olivine. Trace amount of primary mantle olivine preserved
Serpentine	NA	95	NA	NA		mesh	fibrous	
Orthopyroxene	94			0.5	NA		bastite	Two large Opx grains, 4 mm, in mass of smaller grains, no obvious deformation features. Much of Opx replaced by mineral with higher Bf than serpentine - straw yellow, mid 1st order, 0.014 or so. Probably orthoamphibole like anthophyllite.
Spinel	100			0.6	NA	isometric		NA
Amphibole	40				NA		NA	Replaces Opx

Interval domain no: **2** Domain rel. abundance (%): 5 Domain name: vein

Domain/Rock Comment: Serpentine veins from 0.5 to 2 mm across. Main veins are zoned with magnetite plus serpentine and orthoamphibole in center, massive interpenetrating serpentine on margins. The widest veins have multiple zones of magnetite-serpentine zoning, suggesting progressive growth of vein.

Lithology: **serpentinite vein** Observer: JS

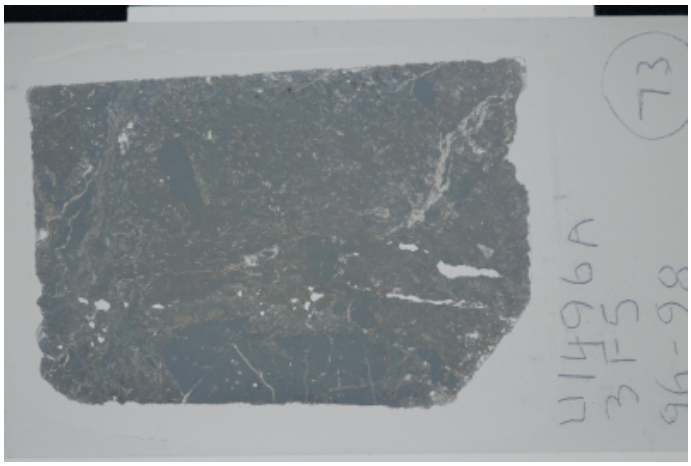
Texture: nonpseudomorphic fine grained [366]

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Amphibole	10				NA		NA	In vein centers with magnetite.
Oxide	5			0.2	NA	isometric		Concentrated in centers of veins.

THIN SECTION LABEL ID: **366-U1496A-3F-5-W 96/98-TSB-TS_73** TS no.: 73

Thin Section Summary Description Observer(s): WK

metamorphic, silicified packstone with lithic clasts; ultrafine grained clay matrix; clasts probably fossiliferous, mostly of spherical shape, partly with falcate shape; lithic fragments completely altered; distinct brownish bands with serpentine and acicular, pigmented minerals; lithic clasts subangular to subrounded; irregular veins, often with splays, zoned mineralization with chlorite in central part, serpentine along wall rock contact; single irregular, tiny microveins and gashes with chlorite and probably epidote. Single spheric clasts surrounded by thin rims of fibrous carbonate.



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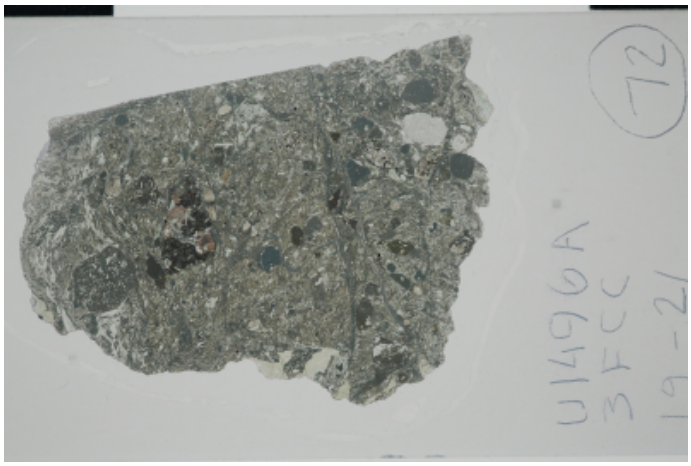
THIN SECTION LABEL ID: **366-U1496A-3F-CC-W 19/21-TSB-TS_72** TS no.: 72

Thin Section Summary Description Observer(s): JP/JS/WK

Volcaniclastic breccia with irregular serpentine vein network. Clasts range from ~50 micrometer to 5 mm in size. They are composed of two types of volcanic rock fragments: moderately cpx-plag-phyric basalt and sparsely cpx-phyric basalt; both are vitrophyres with devitrified black glassy matrix. Plagioclase laths in each clast are completely altered to low birefringence minerals. The breccia matrix consists of altered microcrystaline minerals. Shear bands defined by ultrafine-grained dark-brown symplectite preferentially formed within fine-grained matrix.



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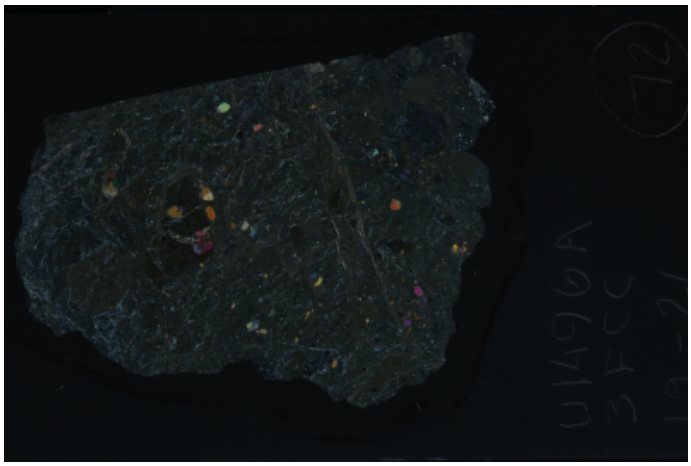

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Extrusive Hypabyssal

Interval domain no.: **1** Domain rel. abundance (%): 70 Domain name: matrix

Lithology: **volcanic matrix** Observer: JP/JS

Texture: Average grain size modal name: microcrystalline [366]

Interval domain no.: **2** Domain rel. abundance (%): 20 Domain name: volcanic clasts

Lithology: **sparsely augite phyric basalt clast** Observer: JP/JS

Texture: Average grain size modal name: microcrystalline [366]

Phenocryst Mineral	Present (%)	Size (mm)	Shape	Habit	Comments
Clinopyroxene	100	0.02	euhedral-subhedral		

Interval domain no.: **3** Domain rel. abundance (%): 10 Domain name: volcanic clasts

Lithology: **moderately plagioclase-augite phyric basalt clast** Observer: JP/JS

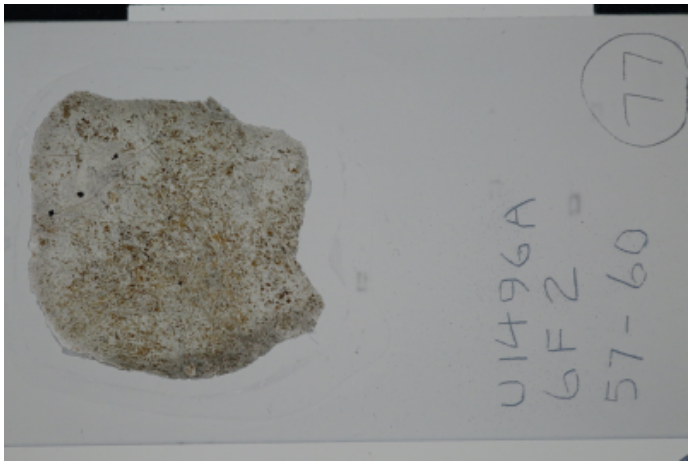
Texture: Average grain size modal name:

Phenocryst Mineral	Present (%)	Size (mm)	Shape	Habit	Comments
Plagioclase	40	0.5			Completely altered
Clinopyroxene	60	0.4			

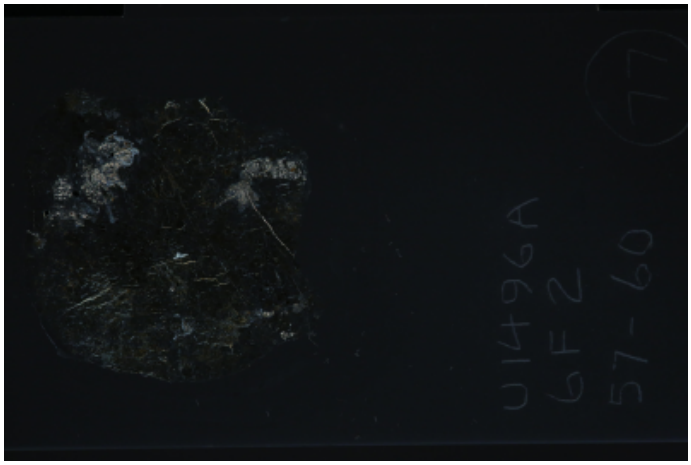
THIN SECTION LABEL ID: **366-U1496A-6F-2-W 57/60-TSB-TS_77** TS no.: 77

Thin Section Summary Description Observer(s): JP/BD/JS/KM

Massive serpentinized harzburgite (100% serpentinization). 75% mesh textured serpentine after olivine and 25% bastite after px. The bastite is associated with amphibole. JS: Very large Opx pseudomorphs (to 4 mm), much smaller Olivine. Px has smooth curvilinear grain boundaries with olivine, no deformation textures. Smaller pxs appear interstitial, filling space between olivines. Large 0.4 mm red brown spinels typically associated with or inside large bastites.



LIMS image no.: 39738221 Plane-polarized. Slide width 27mm



LIMS image no.: 39738241 Cross-polarized. Slide width 27mm

Intrusive Mantle

Domain/Rock Comment: Very large Opx pseudomorphs (to 8 mm), much smaller Opx. Px has smooth curvilinear grain boundaries with olivine, no deformation textures. Smaller pxs appear interstitial, filling space between olivines. Large 0.8 mm red brown spinels typically associated with or inside large bastites.

Lithology: **serpentinized harzburgite** Observer: JP/BD/JS

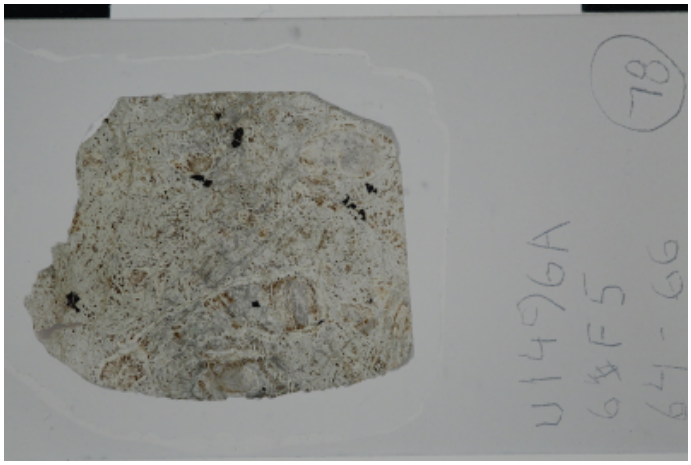
Texture: pseudomorphic

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Olivine	75	0	100			mesh		
Serpentine	NA	100	NA	NA			pseudomorphic	
Orthopyroxene	25			4	NA	interstitial	bastite	The bastite is associated with amphibole.
Spinel	100			0.8	NA			NA

THIN SECTION LABEL ID: **366-U1496A-6F-5-W 64/66-TSB-TS_78** TS no.: 78

Thin Section Summary Description Observer(s): JP/BD/JS

100% serpentinized harzburgite. Original Ol 78%, Opx 20%, and red-brown chrome spinel 2%. Hourglass serpentine after olivine and bastite pseudomorphs after Opx. Olivine up to 6 mm, Opx to 10 mm in size. Smooth curvilinear grain boundaries, no obvious deformation features. Smaller pyroxene grains appear interstitial between olivine grains, like post cumulus phase. Former Cpx?



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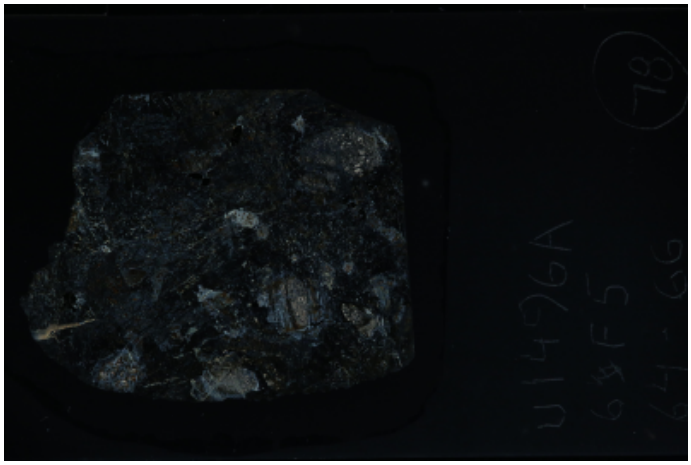


LIMS image no.: 39761941 Cross-polarized. Slide width 27mm

Intrusive Mantle

Domain/Rock Comment: Spinel forms euhedral to subhedral grains up to 1.4 mm across, commonly around 0.8 mm. Other grains interstitial or somewhat flattened. Some associated with Px but most are not.

Lithology: serpentinized harzburgite Observer: JP/BD/JS

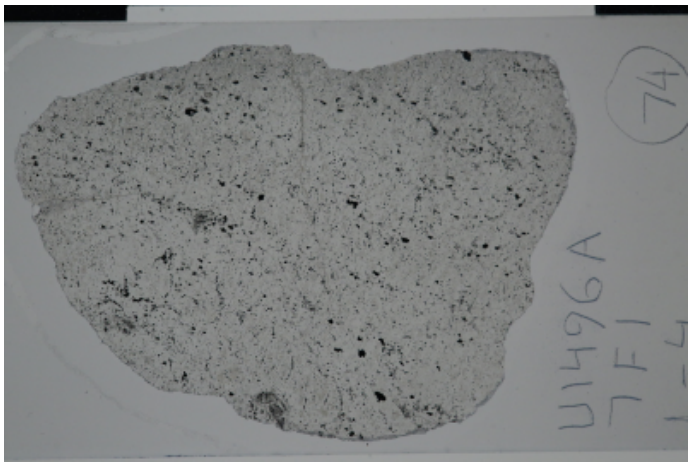
Texture: pseudomorphic

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Olivine	80	0	100	4	tabular	hourglass		
Serpentine	NA	100	NA	NA			pseudomorphic	
Orthopyroxene	20			5	NA	interstitial	bastite	Opx ranges to very large (10 mm) grains, no kinking or other deformation. The large Opx somewhat blocky, but smaller Opx (1-3 mm) appear to fill space between Olivine grains, almost like a post-cumulus phase. Smooth curvilinear grain boundaries. Some of smaller bastites may be Cpx derived.
Spinel	100			0.8	NA	interstitial		NA

THIN SECTION LABEL ID: **366-U1496A-7F-1-W 1/4-TSB-TS_74** TS no.: 74

Thin Section Summary Description Observer(s): JP/JS

Massive serpentinite, nonpseudomorphic, Matrix is composed of interpenetrating serpentine, brucite, magnetite with altered hematite rim and accessory secondary sulfide minerals. No primary modes or textures discernable.



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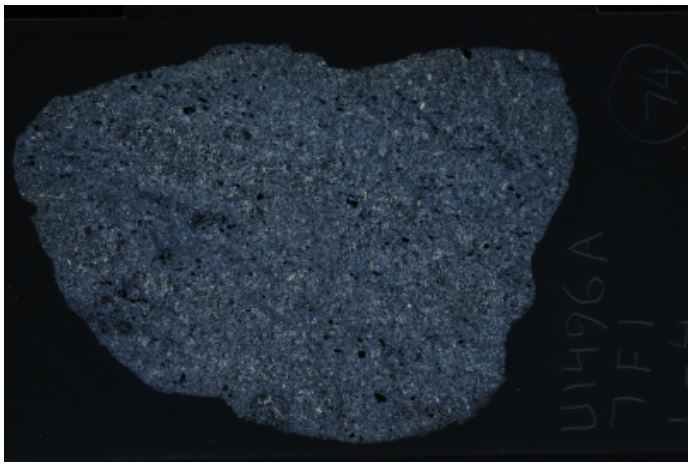


LIMS image no.: 39738201 Cross-polarized. Slide width 27mm

Intrusive Mantle

Lithology: **serpentinite** Observer: JP/JS

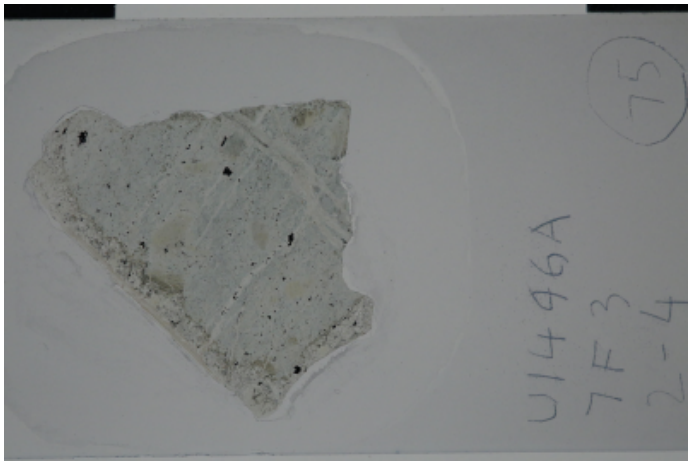
Texture: nonpseudomorphic

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Serpentine	NA	100	NA	NA			interpenetrating	

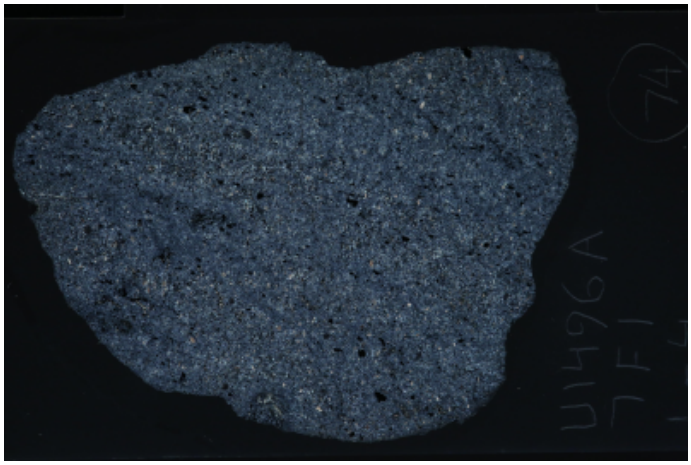
THIN SECTION LABEL ID: **366-U1496A-7F-3-W 2/4-TSB-TS_75** TS no.: 75

Thin Section Summary Description Observer(s): WK/JS/EA

Massive serpentinized harzburgite (100% serpentinization). 75% mesh textured serpentine after olivine and 25% bastite after px. The bastite is associated with amphibole. JS: Very large Opx pseudomorphs. Smaller pxs appear interstitial, filling space between olivines. Large 0.4 mm red brown spinels typically associated with or inside large bastites. Multiple serpentine veins form vein network, mostly antitaxial fibrous vein minerals with multiple growth intervals. EA: Some chlorite associated with bastites after Opx; minute sulfides present throughout sample; a Srp vein with a 3-mm-wide halo present towards one side of the sample. Possible primary texture Protogranular (?).



LIMS image no.: 39777851 Plane-polarized. Slide width 27mm



LIMS image no.: 39738201 Cross-polarized. Slide width 27mm

Intrusive Mantle

Domain/Rock Comment: 1- to 2-mm-wide Srp vein encloses the sample from two sides; there is a about 3-mm-wide halo of (recrysallized?) Srp with very low birefringence colors towards vein; tiny secondary sulfide crystals are common throughout the sample

Lithology: **serpentinized harzburgite** Observer: EA

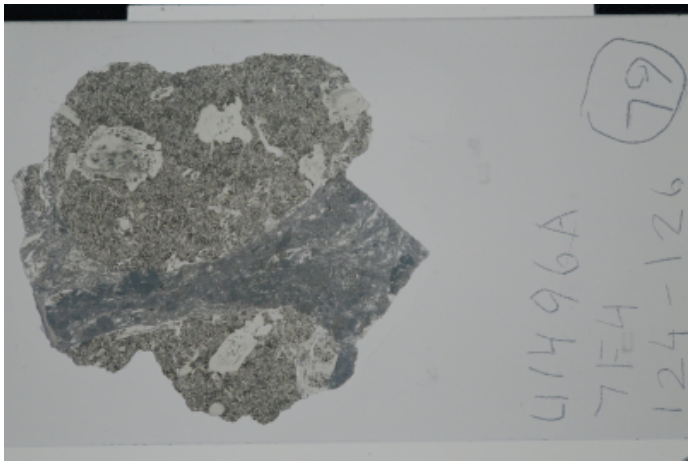
Texture: nonpseudomorphic

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Olivine	80	0	100					Porphyroclastic to equigranular texture; completely altered to Srp
Serpentine	NA	85	NA	NA		mesh	interpenetrating	
Orthopyroxene	15			1.5	NA		bastite	Some Opx crystals cut by Srp veins
Spinel	100			0.6	NA			NA
Amphibole	4			0.8	NA		NA	Amph associated with bastite after Opx
Oxide	0.1			0.1	NA	isometric		Concentrated in few veins

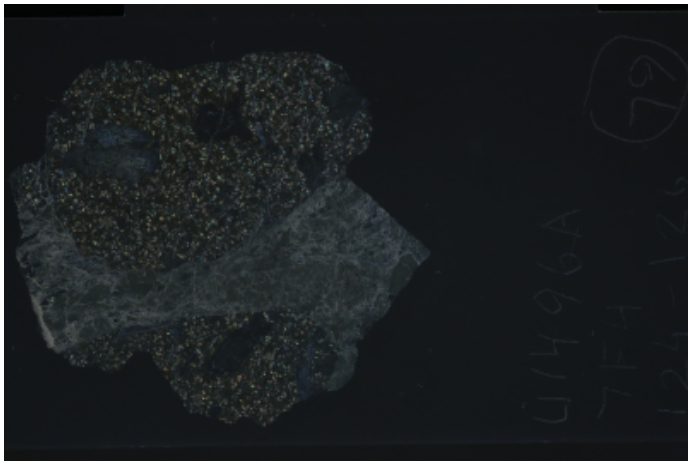
THIN SECTION LABEL ID: **366-U1496A-7F-4-W 124/126-TSB-TS_79** TS no.: 79

Thin Section Summary Description Observer(s): JP/BD/WK

Meta-dolerite. The clast is plagioclase phyric (> 2 mm) metadolerite with matrix composed of equibranular plagioclase and clinopyroxene. Plagiocalse is altered to fine-grained clay mineral, but still preserve albite-like twin and zoning. The breccia matrix consist of brown clay mineral, chlorite and fragments of metadolerite. The sample is crosscut by a thin chlorite vein.



LIMS image no.: 39738261 Plane-polarized. Slide width 27mm

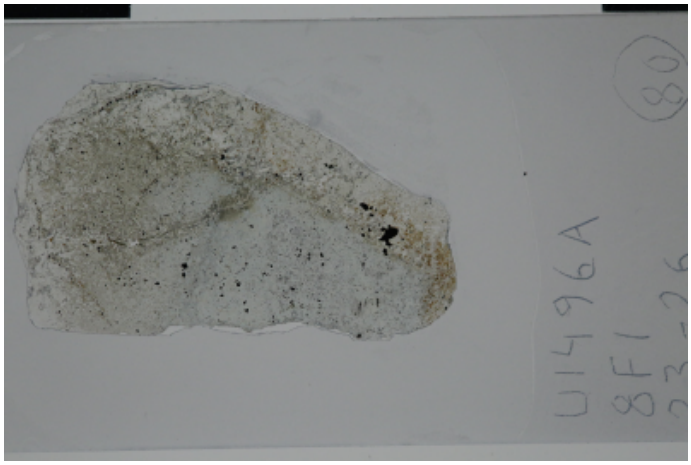


LIMS image no.: 39738281 Cross-polarized. Slide width 27mm

THIN SECTION LABEL ID: **366-U1496A-8F-1-W 23/26-TSB-TS_80** TS no.: 80

Thin Section Summary Description Observer(s): BD/JP/JS/KM

Massive serpentinized harzburgite (about 90% of serpentinization) displaying pseudomorphic mesh and bastite textures that partly recrystallized into interpenetrated lamellae of serpentine. The pseudomorphic texture can be associated with amphiboles. Large euhedral spinels have been observed. JS: Red brown picotite spinals up to 1.2 mm across. Olivine up to 3 mm long and 0.8 mm across; others equant 1-2 mm long, 1 mm across. Smooth curvilinear grain boundaries, no kink bands or undulatory extinction. No kinking in Opx. Opx about same size as olivine, 2-3 mm. Coarse foliated texture? <Not clear (KM)



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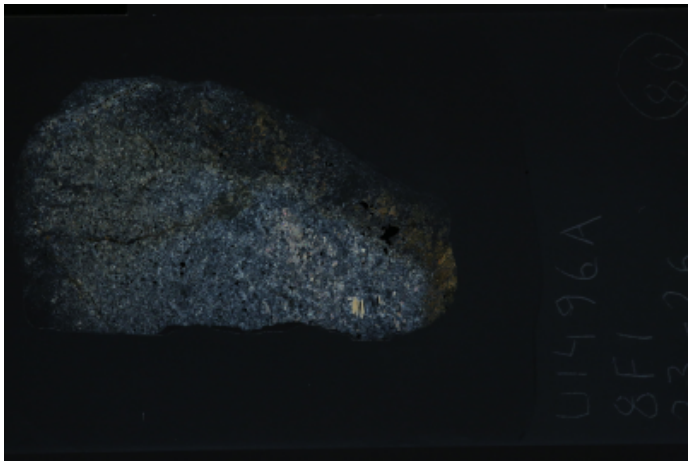


LIMS image no.: 39779831 Cross-polarized. Slide width 27mm

Intrusive Mantle

Domain/Rock Comment: Red brown picotite spinals up to 2.2 mm across. Olivine up to 3.6 mm long and 1.2 mm across; others equant 2-3 mm long, 1 mm across. Smooth curvilinear grain boundaries, no kink bands or undulatory extinction. No kinking in Opx. Opx about same size as olivine, 3-4 mm. Coarse foliated texture?

Lithology: **serpentinized harzburgite** Observer: BD/JP/JS

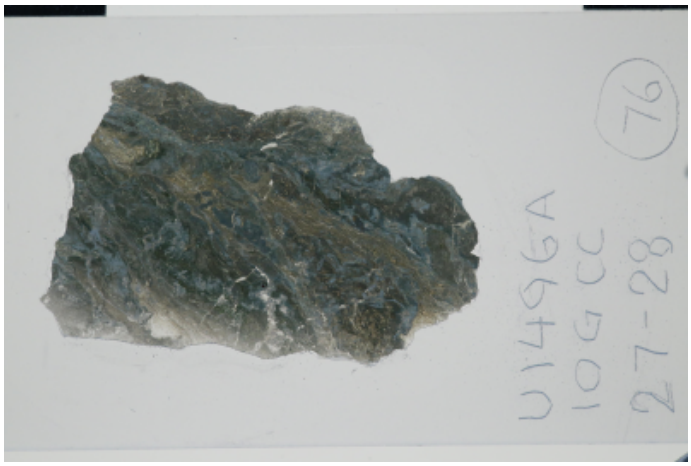
Texture: pseudomorphic

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Olivine	80	10	90	1.5	round	mesh		Round olivine grains preserved in the center of mesh textures
Serpentine	NA	90	NA	NA			pseudomorphic	
Orthopyroxene	20			2	NA		bastite	Some orthopyroxene are preserved in the center of bastite textures.
Spinel	100			0.8	NA			NA

THIN SECTION LABEL ID: **366-U1496A-10G-CC-W 27/28-TSB-TS_76** TS no.: 76

Thin Section Summary Description Observer(s): BD/JP

Meta-basalt thinly recrystallized displaying a white and green layering. The white layers are made of chlorite and amphibole needles. The green layers are thinly recrystallized with epidote like minerals (?).



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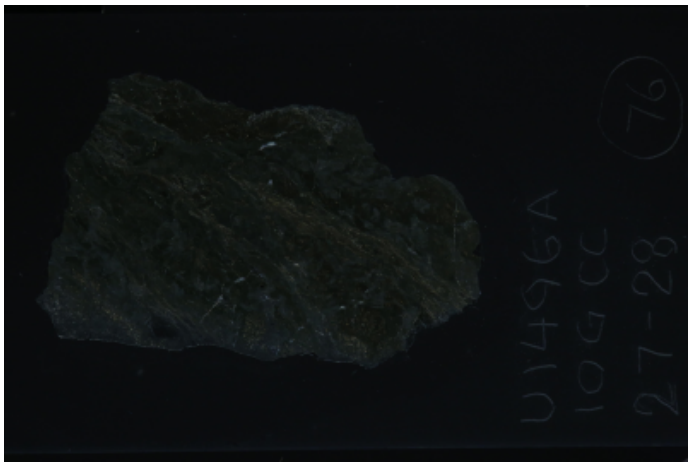
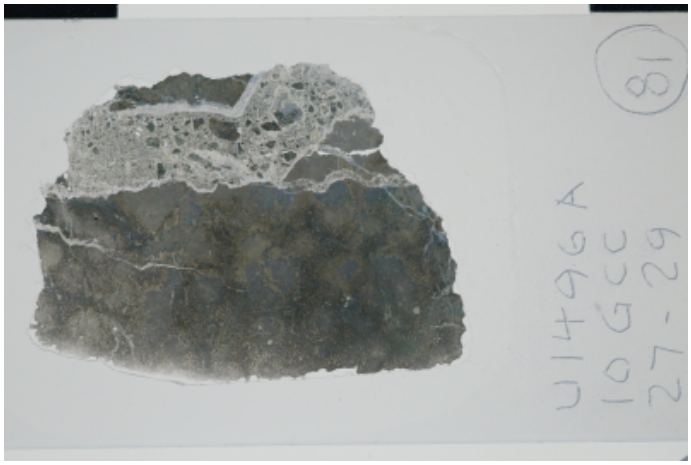


LIMS image no.: 39734731 Cross-polarized. Slide width 27mm

THIN SECTION LABEL ID: **366-U1496A-10G-CC-W 27/29-TSB-TS_81** TS no.: 81

Thin Section Summary Description Observer(s): YI

Volcaniclastic breccia with basaltic clast. 2 % olivine phenocrysts are altered to chlorite. Amygdule and chromian spinel are also included. Groundmass is composed of fun-shaped Cpx and quenched olivine (pseudomorph). Matrix is altered to secondary minerals (actinolite, white mica, etc.).



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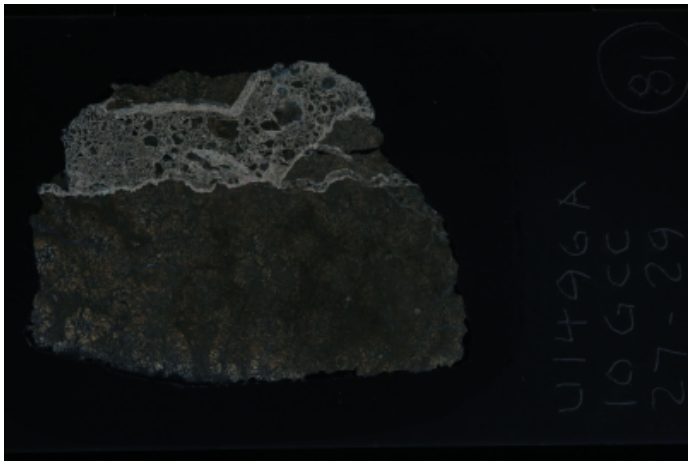


LIMS image no.: 39779871 Cross-polarized. Slide width 27mm

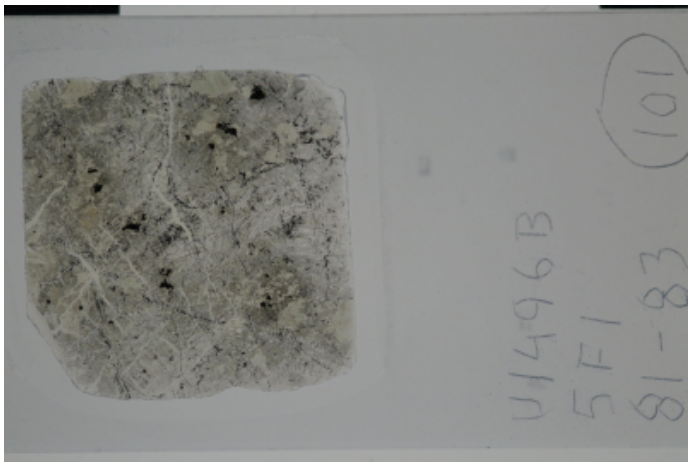
Sediment

Domain/Rock comment:	2 % olivine phenocryst (altered). Amygdule and chromian spinel are also included. Groundmass is composed of fun-shaped Cpx and quenched olivine. Matrix is altered to secondary minerals (actinolite, white mica, etc.).

THIN SECTION LABEL ID: **366-U1496B-5F-1-W 81/83-PMAG-TS_101** TS no.: 101

Thin Section Summary Description Observer(s): WK/BD/KM

Massive serpentinized harzburgite (>95% serpentinization) crosscut by fibrous serpentine veins. Modal abundances of primary olivine and opx appear to be about 85% and 15% respectively. Accessory spinel, fine grained magnetite dispersed within serpentinite matrix. Primary texture was decussate. Opx severely altered to pseudomorphic bastite serpentine. Olivine is altered to pseudomorphic mesh textures partly recrystallized into interpenetrating serpentine; fibrous serpentine veins with syntaxial or stretched fibres; gashes fibrous bent serpentine. (probably antigorite)



LIMS image no.: 39794551 Plane-polarized. Slide width 27mm

LIMS image no.: 39794571 Cross-polarized. Slide width 27mm

Intrusive Mantle

Lithology: **serpentinized harzburgite** Observer: BD

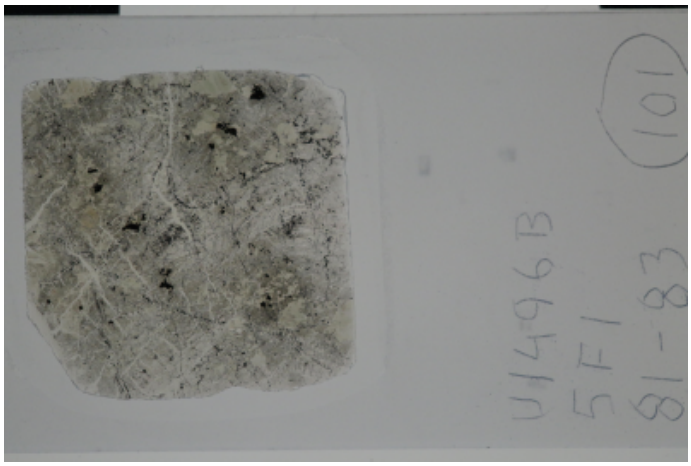
Texture: pseudomorphic

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Olivine	85	5	95			mesh	pseudomorphic	
Serpentine	NA	95	NA	NA			pseudomorphic	
Orthopyroxene	15				NA		bastite	

THIN SECTION LABEL ID: **366-U1496B-5F-1-W 81/83-PMAG-TSB-TS_101** TS no.: 101

Thin Section Summary Description Observer(s): WK/BD/KM

Massive serpentinized harzburgite (>95% serpentinization) crosscut by fibrous serpentine veins. Modal abundances of primary olivine and opx appear to be about 85% and 15% respectively. Accessory spinel, fine grained magnetite dispersed within serpentinite matrix. Primary texture was decussate. Opx severely altered to pseudomorphic bastite serpentine. Olivine is altered to pseudomorphic mesh textures partly recrystallized into interpenetrating serpentine; fibrous serpentine veins with syntaxial or stretched fibres; gashes fibrous bent serpentine. (probably antigorite)



LIMS image no.: 39794551 Plane-polarized. Slide width 27mm

LIMS image no.: 39794571 Cross-polarized. Slide width 27mm

Intrusive Mantle

Lithology: **serpentinized harzburgite** Observer: BD

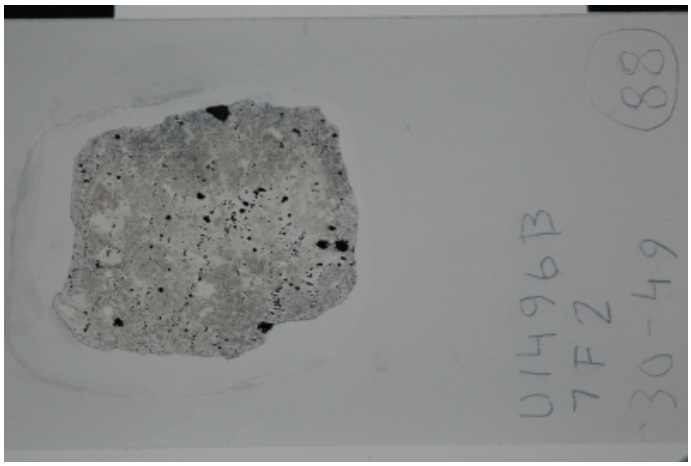
Texture: pseudomorphic

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Olivine	85	5	95			mesh	pseudomorphic	
Serpentine	NA	95	NA	NA			pseudomorphic	
Orthopyroxene	15				NA		bastite	

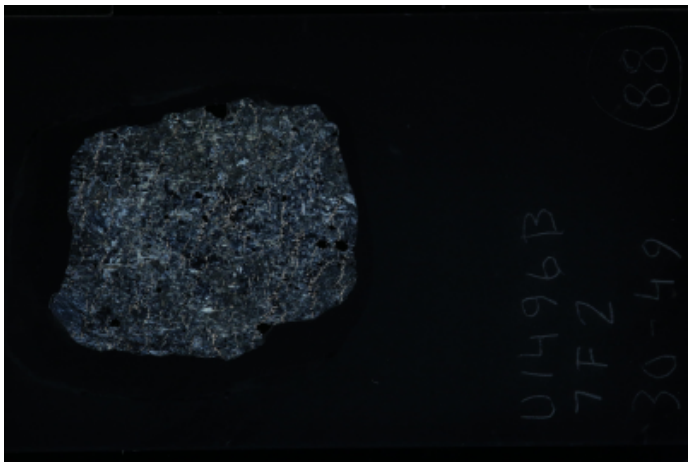
THIN SECTION LABEL ID: **366-U1496B-7F-2-W 30/49-TSB-TS_88** TS no.: 88

Thin Section Summary Description Observer(s): JP/BD

Massive serpentinite. Non-pseudomorphic interpenetrating textured serpentine (antigorite?) crosscut by multiple brucite(?) or a talc-like phase (?) and magnetite veins.



LIMS image no.: 39778011 Plane-polarized. Slide width 27mm



LIMS image no.: 39778031 Cross-polarized. Slide width 27mm

Intrusive Mantle

Domain/Rock Comment: multiple brucite(?) and magnetite veins

Lithology: **serpentinite** Observer: JP/BD

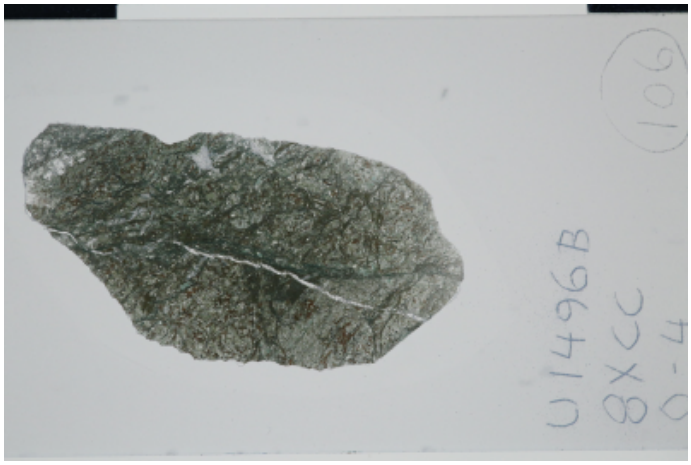
Texture: nonpseudomorphic

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Serpentine	NA	100	NA	NA			interpenetrating	

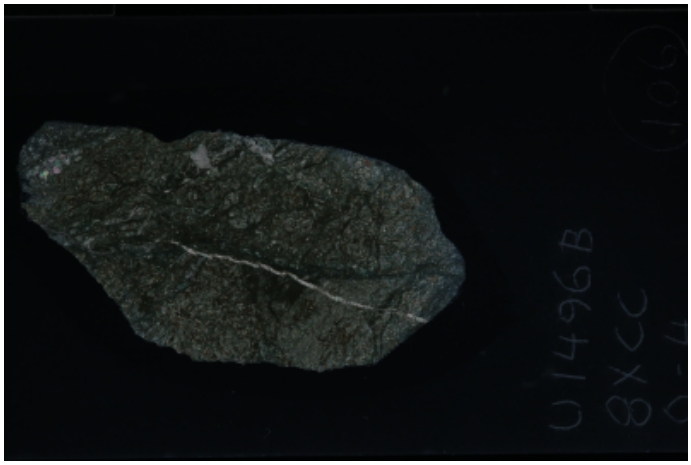
THIN SECTION LABEL ID: **366-U1496B-8X-CC-W 0/4-TSB-TS_106** TS no.: 106

Thin Section Summary Description Observer(s): WK/KM

Strongly deformed titan-augite basalt, with pink-bronze titan augite xtls in GM. Plag and mesostasis all replaced. Intersertal texture in part. Augites are long prismatic crystals. Overlain by abundant acicular needles of rutile (?). General microstructure is cataclastic volcanic/volcaniclastic breccia; mainly matrix-supported; ; poorly sorted clasts, highly variable grain size. Clasts are composed of mainly of pink pyroxene and plagioclase ~300 micrometer in size. Euhedral-subhedral-elongate plagioclase is partly altered to clay minerals. Pink pyroxene is partly altered to chlorite. Distinct Ultracataclastic shear zones (1-2 mm thick), ultrafinegrained amorphous matrix with angular dolerite clasts and plagioclase and pink pyroxene crystals; subangular to subrounded clasts of dolerite and pyroxene, accompanied by shear bands Single mm-thick veins with blocky calcite, irregular vein orientation.



LIMS image no.: 39820761 Plane-polarized. Slide width 27mm



LIMS image no.: 39820781 Cross-polarized. Slide width 27mm

MICROSTRUCTURES

Structure: shear Observer: WK

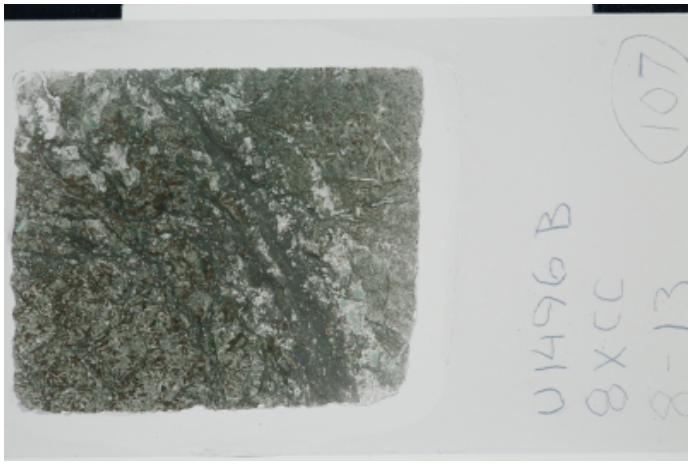
Structure Comment: Distinct Ultracataclastic shear zones (1-2 mm thick), ultrafinegrained amorphous matrix with angular dolerite clasts and plagioclase and pink pyroxene crystals; subangular to subr ounded clasts of dolerite and pyroxene, accompanied by shear bands Single mm-thick veins with blocky calcite, irregular vein orientation.

Fracture/Foliation	Texture	Shape Fabric Intensity
cataclasite	protogranular [MN-BJ80]	moderate

THIN SECTION LABEL ID: **366-U1496B-8X-CC-W 8/13-TSB-TS_107** TS no.: 107

Thin Section Summary Description Observer(s): WK/KM

Strongly deformed titan-augite basalt, with pink-bronze titan augite xtls in GM. Plag and mesostasis all replaced. Intersertal texture in part. Augites are long prismatic crystals. Overlain by abundant acicular needles of rutile (?). General microstructure is cataclastic volcanic/volcaniclastic breccia; mainly matrix-supported; ; poorly sorted clasts, highly variable grain size. Clasts are composed of mainly of pink pyroxene and plagioclase ~300 micrometer in size. Euhedral-subhedral-elongate plagioclase is partly altered to clay minerals. Pink pyroxene is partly altered to chlorite. Distinct Ultracataclastic shear zones (1-2 mm thick), ultrafinegrained amorphous matrix with angular dolerite clasts and plagioclase and pink pyroxene crystals; subangular to subr ounded clasts of dolerite and pyroxene, accompanied by shear bands Single mm-thick veins with blocky calcite, irregular vein orientation.



LIMS image no.: 39817781 Plane-polarized. Slide width 27mm

LIMS image no.: 39817801 Cross-polarized. Slide width 27mm

MICROSTRUCTURES

Structure: shear Observer: WK

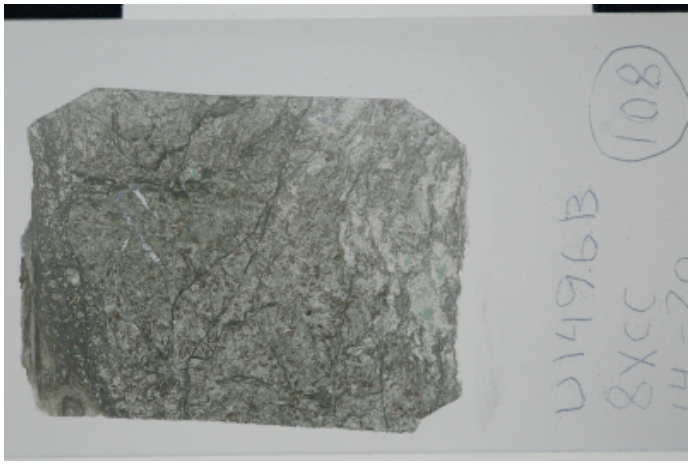
Structure Comment: Distinct Ultracataclastic shear zones (1-5 mm thick), ultrafinegrained amorphous matrix with angular dolerite clasts and plagioclase and pink pyroxene crystals; subangular to subr ounded clasts of dolerite and pyroxene, accompanied by shear bands Single mm-thick veins with blocky calcite, irregular vein orientation.

Fracture/Foliation	Texture	Shape Fabric Intensity
cataclasite	protogranular [MN-BJ80]	weak

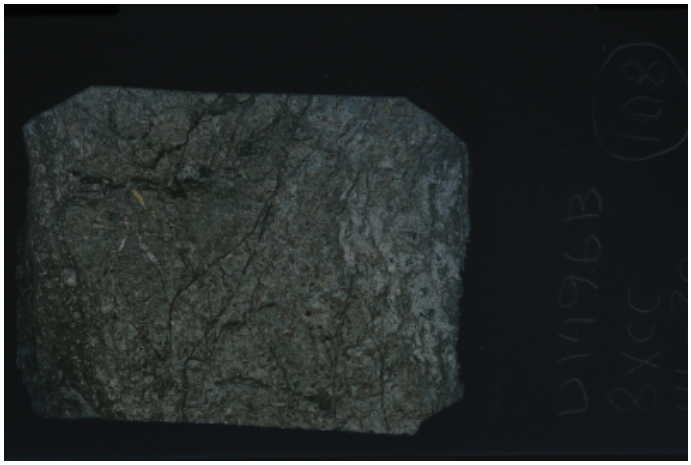
THIN SECTION LABEL ID: **366-U1496B-8X-CC-W 14/20-TSB-TS_108** TS no.: 108

Thin Section Summary Description Observer(s): WK/KM

Strongly deformed titan-augite basalt, with pink-bronze titan augite xtls in GM. Plag and mesostasis all replaced. Intersertal texture in part. Augites are long prismatic crystals. Overlain by abundant acicular needles of rutile (?). General microstructure is cataclastic volcanic/volcaniclastic breccia; mainly matrix-supported; ; poorly sorted clasts, highly variable grain size. Clasts are composed of mainly of pink pyroxene and plagioclase ~300 micrometer in size. Euhedral-subhedral-elongate plagioclase is partly altered to clay minerals. Pink pyroxene is partly altered to chlorite. Gradual transition to ultracataclastic domains, ultrafinegrained amorphous matrix with angular dolerite clasts and plagioclase and pink pyroxene crystals; subangular to subr ounded clasts of dolerite and pyroxene, accompanied by shear bands Single mm-thick veins with blocky calcite, irregular vein orientation.



LIMS image no.: 39817821 Plane-polarized. Slide width 27mm



LIMS image no.: 39817841 Cross-polarized. Slide width 27mm

MICROSTRUCTURES

Structure: shear Observer: WK

Structure Comment: Distinct Ultracataclastic shear zones (1-2 mm thick), ultrafinegrained amorphous matrix with angular dolerite clasts and plagioclase and pink pyroxene crystals; subangular to subr ounded clasts of dolerite and pyroxene, accompanied by shear bands. Single and conjugate mm-thick veins with blocky calcite, irregular vein orientation.

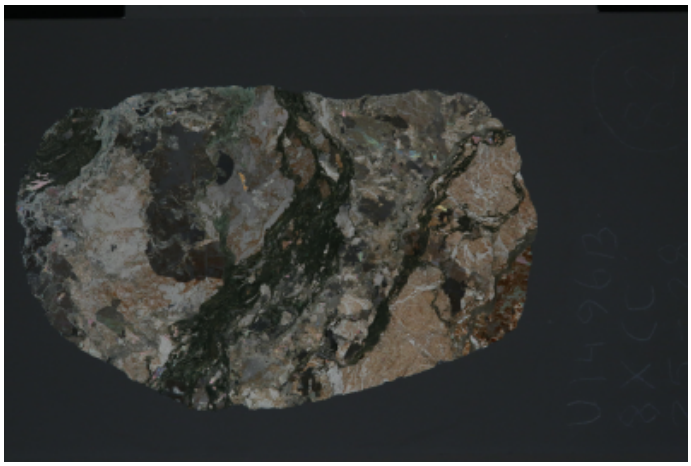
Fracture/Foliation	Texture	Shape Fabric Intensity
cataclasite	protogranular [MN-BJ80]	weak

THIN SECTION LABEL ID: **366-U1496B-8X-CC-W 25/28-TSB-TS_82** TS no.: 82

Thin Section Summary Description Observer(s): JP/BD

Carbonate vein. Red domain consists of carbonate mineral overprinted by secondary alteration clay minerals. Green domain is composed of chlorite, epidote and clay minerals

LIMS image no.: 39738301 Plane-polarized. Slide width 27mm

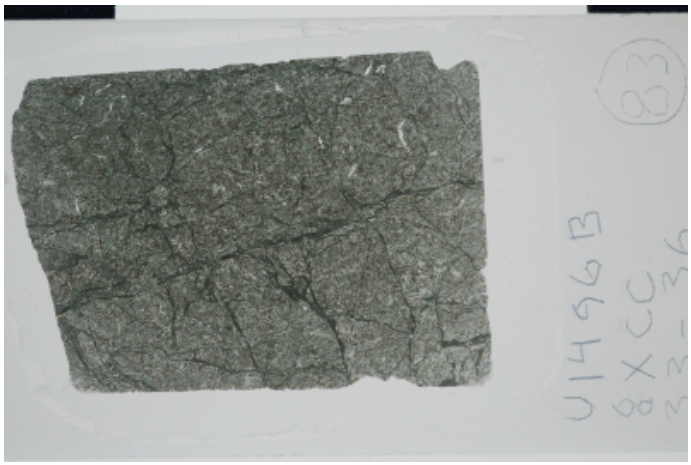


LIMS image no.: 39738321 Cross-polarized. Slide width 27mm

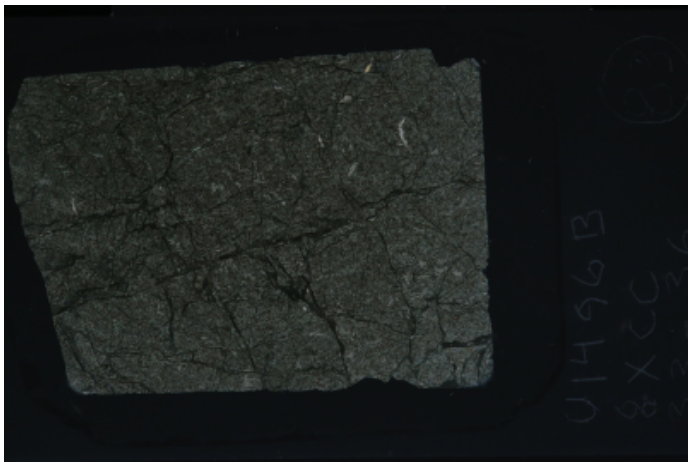
THIN SECTION LABEL ID: **366-U1496B-8X-CC-W 33/36-TSB-TS_83** TS no.: 83

Thin Section Summary Description Observer(s): JP/BD/JS

Meta-dolerite. Fine-grained equigranular. Some plagioclase laths embedded in pink pyroxene crystals. Primary plagioclase is completely altered. Some pyroxene are partly altered to chlorite. Carbonate veins.



LIMS image no.: 39777891 Plane-polarized. Slide width 27mm



LIMS image no.: 39777911 Cross-polarized. Slide width 27mm

Extrusive Hypabyssal

Lithology: **sparsely plagioclase phyric dolerite clast** Observer: JS

Texture: intergranular Average grain size modal name: fine grained [366]

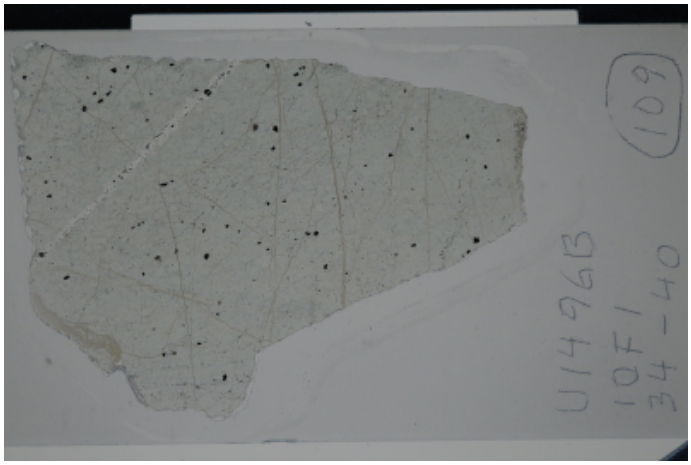
Phenocryst Mineral	Present (%)	Size (mm)	Shape	Habit	Comments
Plagioclase	1	0.8	euhedral	blocky	Rare plagioclase lath microphenocrysts. Altered.

Groundmass Mineral	Original (%)	Replaced (%)	Size Mode (mm)	Shape	Habit	Comment
Plagioclase	50	100	0.3		blocky	
Clinopyroxene	30	99	0.25	subhedral		
Orthopyroxene		99				
Fe-Ti Oxide	3	0	0.01	euhedral-subhedral	equant	

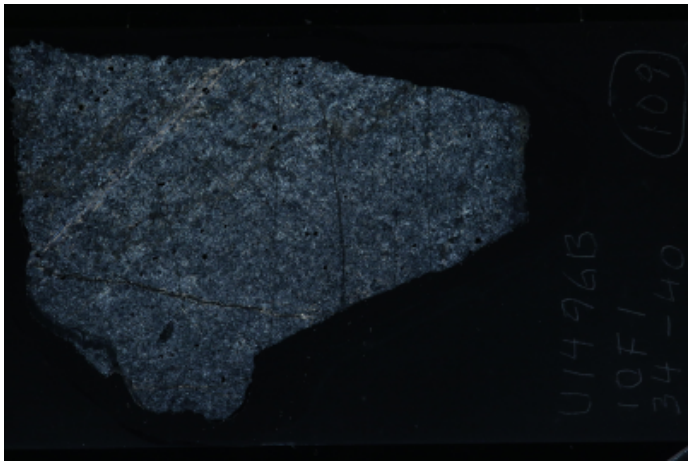
THIN SECTION LABEL ID: **366-U1496B-10F-1-W 34/40-TSB-TS_109** TS no.: 109

Thin Section Summary Description Observer(s): BD/KM

Serpentinite (100% serpentinized) displaying interpenetrated lamellae of serpentine. The rock is crossed by thinely recrystallized veins of brucite or talc (?) with magnetite. Late fibrous chrysotile veins crosscut the serpentine textures. a small bastite?



LIMS image no.: 39816801 Plane-polarized. Slide width 27mm



LIMS image no.: 39816821 Cross-polarized. Slide width 27mm

Intrusive Mantle

Lithology: **serpentinite** Observer: BD

Texture: nonpseudomorphic

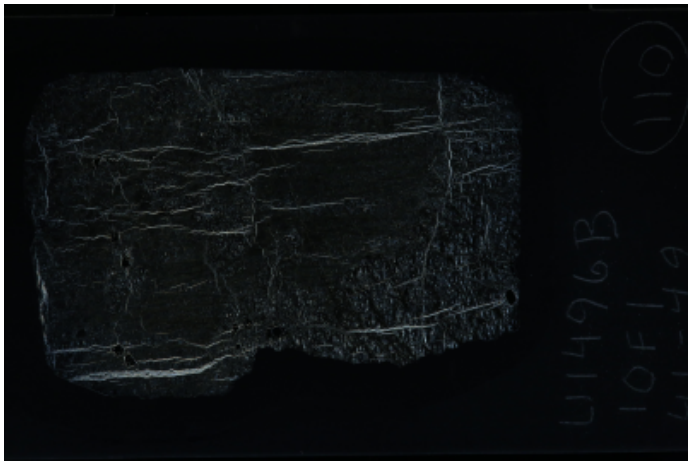
Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Serpentine	NA	100	NA	NA			interpenetrating	

THIN SECTION LABEL ID: **366-U1496B-10F-1-W 41/49-TSB-TS_110** TS no.: 110

Thin Section Summary Description Observer(s): BD/KM

Serpentinized dunite (100% serpentinized) displaying pseudomorphic hourglass and mesh textures. The serpentine textures are oriented and affected by a brownish alteration. Numerous late fibrous and white chrysotile veins crosscut the sample. Euhedral spinels have been observed with some inclusions.

LIMS image no.: 39820801 Plane-polarized. Slide width 27mm



LIMS image no.: 39820821 Cross-polarized. Slide width 27mm

Intrusive Mantle

Lithology: **serpentinized dunite** Observer: BD

Texture: pseudomorphic

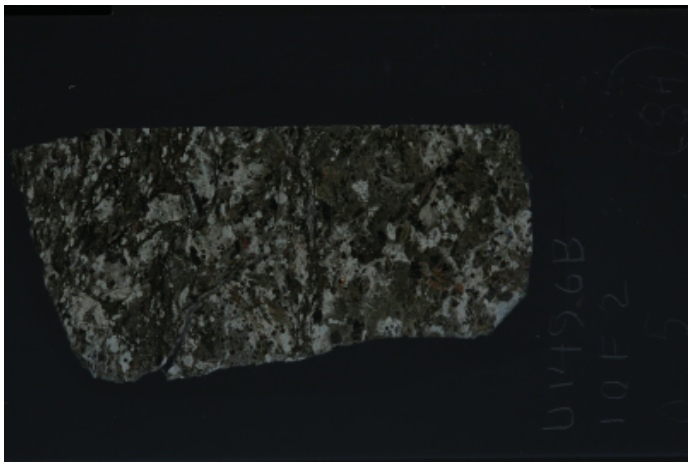
Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Olivine	100	0	100			hourglass	pseudomorphic	
Serpentine	NA	100	NA	NA			pseudomorphic	the mesh is sligthly orientated and affected by a brownish alteration

THIN SECTION LABEL ID: **366-U1496B-10F-2-W 0/5-TSB-TS_84** TS no.: 84

Thin Section Summary Description Observer(s): JP/BD/KJ/WK

Meta-dolerite and breccia. This rock consists of two domains. 1) Medium-grained equigranular meta-dolerite. Euhedral-subhedral pink pyroxene are partly altered to chlorite and plagioclases are completely replaced by fine-grained alteration mineral, Some Na-amphibole? 2) Breccia composed of meta-dolerite clasts and clay mineral matrix. Secondary magnetite and sulfide. Ductile deformation is seen in elongated, boudinaged altered mineral grains surrounded by shear bands in one corner of the thin section.

LIMS image no.: 39777931 Plane-polarized. Slide width 27mm

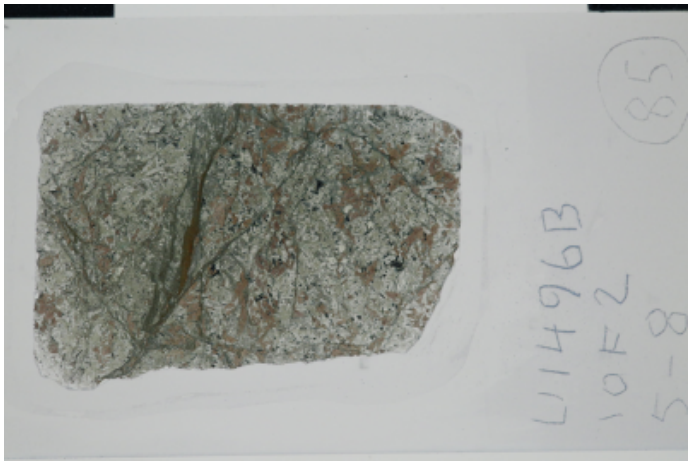


LIMS image no.: 39777951 Cross-polarized. Slide width 27mm

THIN SECTION LABEL ID: **366-U1496B-10F-2-W 5/8-TSB-TS_85** TS no.: 85

Thin Section Summary Description Observer(s): JP/BD/JS/KJ

Meta-dolerite. Fine-grained equigranular. It consists mainly of pink titanaugite and plagioclase ~500 micrometer in size. Euhedral-subhedral plagioclase is completely altered to clay minerals. Pink titanaugite is partly altered to aegirine-augite at rims and along fractures. Reddish clay mineral vein crosscuts the rock.



LIMS image no.: 39777971 Plane-polarized. Slide width 27mm

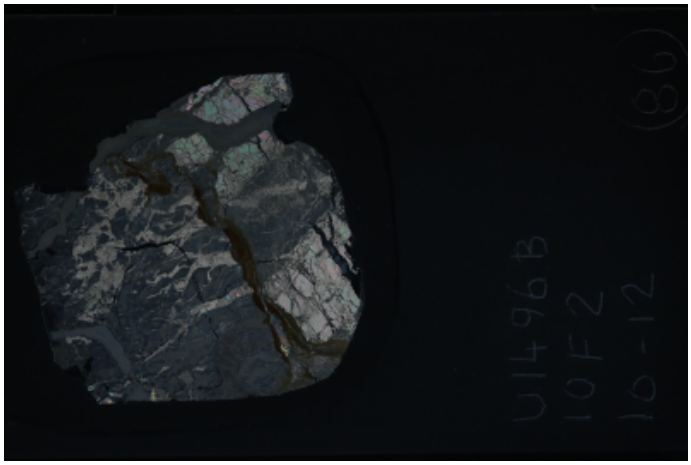
LIMS image no.: 39777991 Cross-polarized. Slide width 27mm

THIN SECTION LABEL ID: **366-U1496B-10F-2-W 10/12-TSB-TS_86** TS no.: 86

Thin Section Summary Description Observer(s): YI/WK

Serpentinite with carbonate veins. Ultrafine grained serpentinite matrix with partly pigmented pseudomorph after olivine (?); pseudomorph are locally surrounded by carbonate rims, transient with carbonate veins. Veins are irregular, splayed, and filled with coarse-grained blocky, and/or fibrous antitaxial calcite, partly with serpentine.

LIMS image no.: 39781951 Plane-polarized. Slide width 27mm



LIMS image no.: 39781971 Cross-polarized. Slide width 27mm

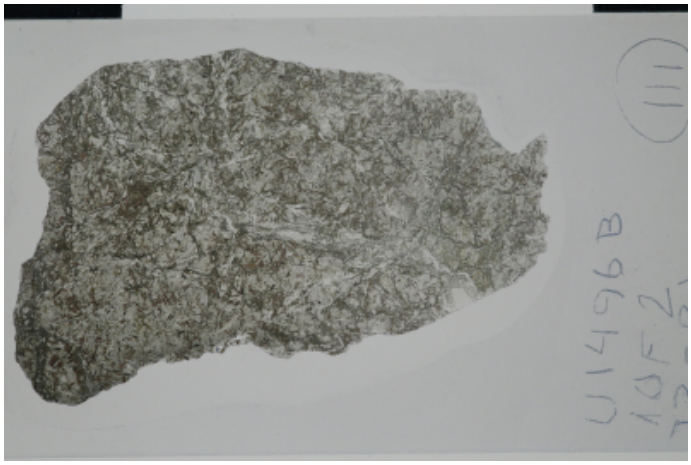
Sediment

Lithology: **serpentinite mudstone with carbonate veins** Observer: YI

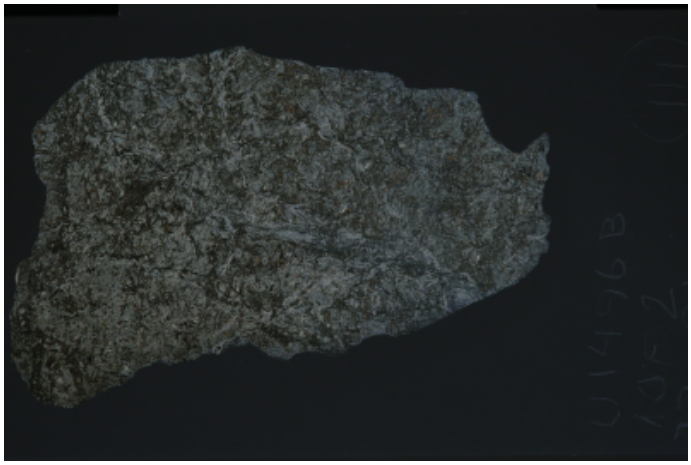
THIN SECTION LABEL ID: **366-U1496B-10F-2-W 13/21-TSB-TS_111** TS no.: 111

Thin Section Summary Description Observer(s): JS/WK

Strongly deformed titanaugite basalt, with pink-bronze titanaugite xtls in GM. Plag and mesostasis all replaced. Intersertal texture in part. Augites are long prismatic crystals. Overlain by abundant acicular needles of titanite. General microstructure is cataclastic volcanic/volcaniclastic breccia; mainly matrix-supported; poorly sorted clasts, highly variable grain size. Clasts are composed of mainly of titanaugite and plagioclase ~300 micrometer in size. Euhedral-subhedral-elongate plagioclase is partly altered to clay minerals. Titanaugite is partly altered to aegirine-augite. Gradual transition to cataclastic domains; dominating fabric/texture is protocataclastic; ultrafine-grained amorphous matrix with angular dolerite clasts and plagioclase and titanaugite crystals; subangular to subrounded clasts of dolerite and pyroxene, accompanied by shear bands. Single mm-thick veins with blocky calcite, irregular vein orientation.



LIMS image no.: 39817861 Plane-polarized. Slide width 27mm



LIMS image no.: 39817881 Cross-polarized. Slide width 27mm

Extrusive Hypabyssal

Lithology: **basalt clast** Observer: JS

Texture: intersertal Average grain size modal name: fine grained [366]

Groundmass Mineral	Original (%)	Replaced (%)	Size Mode (mm)	Shape	Habit	Comment
Plagioclase	55	100	0.3			100
Clinopyroxene	25	20	0.3			pink titan augite, mildy pleochroic
Orthopyroxene		20				
Fe-TI Oxide	3	0	0.4		acicular	Long acicular needles of rutile throughout; looks secondary

MICROSTRUCTURES

Structure: Observer: WK

Structure Comment: General microstructure is cataclastic volcanic/volcaniclastic breccia; mainly matrix-supported; ; poorly sorted clasts, highly variable grain size. Clasts are composed of mainly of pink pyroxene and plagioclase ~300 micrometer in size. Euhedral-subhedral-elongate plagioclase is partly altered to clay minerals. Pink pyroxene is partly altered to chlorite. Distinct Ultracataclastic shear zones (1-2 mm thick), ultrafinegrained amorphous matrix with angular dolerite clasts and plagioclase and pink pyroxene crystals; subangular to subr ounded clasts of dolerite and pyroxene, accompanied by shear bands Single mm-thick veins with blocky calcite, irregular vein orientation. Gradual transition from protolith to cataclastic domains; dominating fabric/texture is protocataclastic.

Fracture/Foliation	Texture	Shape Fabric Intensity
cataclasite	protogranular [MN-BJ80]	weak

THIN SECTION LABEL ID: **366-U1496B-10F-2-W 17/20-TSB-TS_112** TS no.: 112

Thin Section Summary Description Observer(s): JS/WK/KM/KJ

Augite microphyric basalt, with pink-bronze titanaugite microphenocrysts and GM xtls. Plag and mesostasis all replaced, in part by sprays of bright green pleochroic chlorite. Intersertal texture in part. Augites are long prismatic crystals. Abundant interstitial microcrystalline elongated prisms of a highly birefringent, colorless, non-pleochroic mineral with parallel extinction, possibly phengite or anthophyllite. Overlain by abundant acicular needles of titanite. Ultracataclastic, mm-thick shear band with lense-shaped dolerite clasts.

LIMS image no.: 39817901 Plane-polarized. Slide width 27mm

LIMS image no.: 39817921 Cross-polarized. Slide width 27mm

39875321

Plane polarized light, 50x-titanaugite, rutile, orthorhombic amphibole(?). Scale bar 1mm.

39875301

Cross-polarized light, 50x-titanaugite, rutile, orthorhombic amphibole(?). Scale bar 1mm.

Extrusive Hypabyssal

Lithology: **sparsely augite phyric basalt clast** Observer: JS

Texture: microporphyritic Average grain size modal name: fine grained [366]

Phenocryst Mineral	Present (%)	Size (mm)	Shape	Habit	Comments
Clinopyroxene	1	0.8	subhedral	prismatic	

Groundmass Mineral	Original (%)	Replaced (%)	Size Mode (mm)	Shape	Habit	Comment
Plagioclase	50	100	0.3	subhedral		replaced by low Bf minerals.
Clinopyroxene	25	85	0.3	subhedral	prismatic	Like augite microphenocrysts, only smaller.
Orthopyroxene		85				
Fe-TI Oxide	4	0	0.6	subhedral	acicular	Long acicular needles of rutile throughout; looks secondary. Or is it Deerite?

MICROSTRUCTURES

Structure: shear Observer: WK

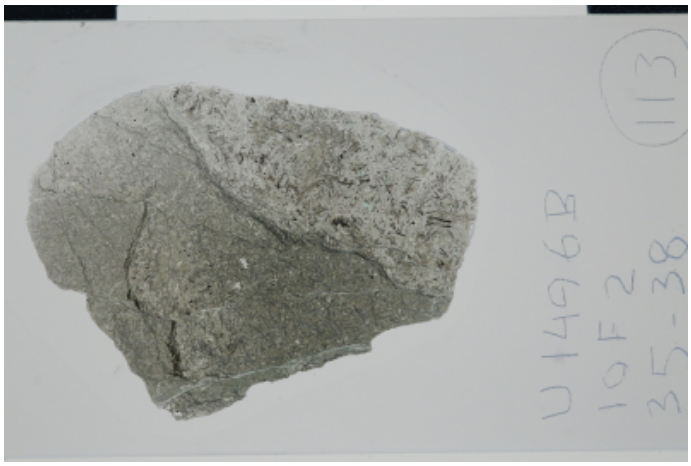
Structure Comment: Ultracataclastic, mm-thick shear band with lense-shaped dolerite clasts.

Fracture/Foliation	Texture	Shape Fabric Intensity
cataclasite	protogranular [MN-BJ80]	weak

THIN SECTION LABEL ID: **366-U1496B-10F-2-W 35/38-TSB-TS_113** TS no.: 113

Thin Section Summary Description Observer(s): JP/JD

Two domains: 1) Lawsonite(?)-bearing metabasalt and 2) tectonically (?) sheared volcanic rock. Domain 1 mainly consists of pink clinopyroxene (titanaugite?) and plagioclase showing interstitial texture. Plagioclases are completely altered to microcrystalline secondary clay minerals with low birefringence color. 50 micrometer sized colorless mineral with straight extinction and negative elongation sign (probably lawsonite) occurs in the matrix. Domain 2 is comprised of microcrystalline clay minerals with lawsonite. Euhedral to subhedral sulfide grains are also observed.



LIMS image no.: 39820841 Plane-polarized. Slide width 27mm

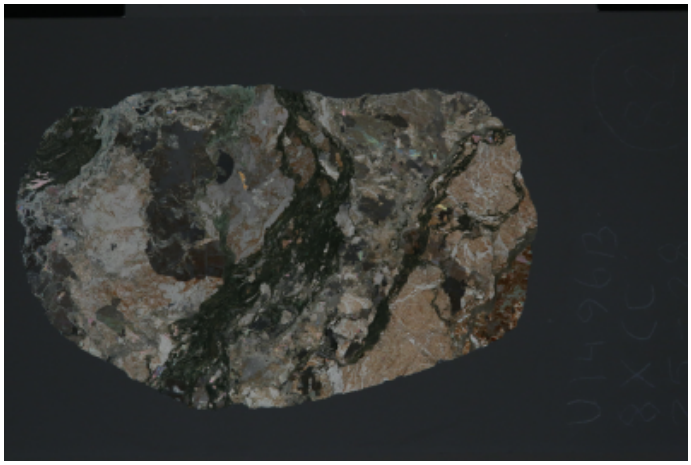
LIMS image no.: 39820861 Cross-polarized. Slide width 27mm

THIN SECTION LABEL ID: **366-U1496C-5R-1-W 5/7-TSB-TS_87** TS no.: 87

Thin Section Summary Description Observer(s): JS/JP/KM

Partly serpentinized harzburgite. Opx have relatively round shapes, up to 3 mm long, avg 1.4 mm. Olivine 0.8-2.5 mm, avg 1.2 mm. Kinks, undulatory extinction evident. Spinels interstitial, holly leaf 1.2 mm max, 0.8 mm avg. Spinel not associated with pyroxene. Weak porphyroclastic texture with some coarse ol occurrence. Single patches of chlorite. irregular thin, zoned serpentine veins.

LIMS image no.: 39738301 Plane-polarized. Slide width 27mm



LIMS image no.: 39738321 Cross-polarized. Slide width 27mm

Intrusive Mantle

Domain/Rock Comment: Partly serpentinized harzburgite. Opx have fish shapes, up to 6 mm long, avg 2.8 mm. Olivine 1-5 mm, avg 2.5 mm. Kinks, undulatory extinction evident. Spinels interstitial, holly leaf 2.4 mm max, 1.5 mm avg. Porphyroclastic texture.

Lithology: **serpentinized harzburgite** Observer: JS/JP

Texture: porphyroclastic coarse grained [366]

Mineral	Estimated Original (%)	Present (%)	Altered (%)	Size Avg. (mm)	Shape	Habit	Texture	Comments/Special Features
Olivine	75	25	66	1.5	elongate			
Serpentine	NA	70	NA	NA				
Orthopyroxene	25			1.4	NA	blocky	bastite	Large 1-2 mm fish shape grains, undulatory extinction. Spinel not associated with px.
Spinel	1			0.8	NA	holly-leaf	interstitial [BJ84]	NA