

THIN SECTION LABEL ID: **375-U1520C-2R-1-W 23/25-TSB-TS15**

TS no.: 15

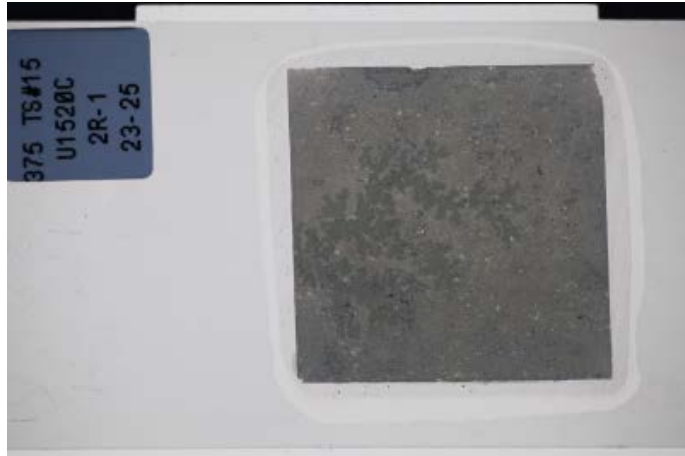
Requestor Group: Sedimentology

Observer: OLIV

Summary Description

Light greenish gray marl

Plane-polarized



46435211

Cross-polarized



46435231

SEDIMENT DETAILS

Lithology: marl

Grain sorting: well [2014]

Cement form: microcrystalline

Sand [%]: 0

Silt [%]: 1

Clay [%]: 99

Detailed description

Some lithoclast/extraclast grains have calcite rim and micriti/clay core. Ooid-like structures are micritized.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	P	Terrestrial organic matter	
Feldspars	T	Radiolarians		Pyrite (framboids)	
Clay minerals	C	Mollusk		Pyrite (euhedra)	
Chert		Other bioclast	C	Pyrite (grain coatings)	
Mudstone		Peloid		Calcite	C
Siltstone/Sandstone	T	Carbonate mud	D	Dolomite, authigenic	
Clear glass	T	Heavy minerals	T	Zeolite - phillipsite, clinoptilolite	
Colored glass		Micas (biotite, musc., chl.)		Fe/Mn Oxide	R
Altered volcanic (palagonite)	R	Glauconite	T		
Other volcanic		Opaques	R		

THIN SECTION LABEL ID: **375-U1520C-6R-2-W 11/14-TSB-TS05**

TS no.: 5

Requestor Group: Sedimentology

Observer: OLIV

Summary Description

Light greenish gray marl moderetely mixed with dark gray tephra by bioturbation

Plane-polarized



46364201

Cross-polarized



46364251

SEDIMENT DETAILS

Lithology: marl

Grain sorting: moderate [2014]

Cement form: microcrystalline

Sand [%]: 1

Silt [%]: 1

Clay [%]: 98

Detailed description

Ooids have traces of preserved concentric structure and nucleous with dense mineral. Most ooids are micritized. Bioturbation zone is rich in Fe/Mn oxide and opaque grains. The boundary of bioturbation and calcareous mudstone is dense minerals rich. Some grains are altered by serpentine. Olivine are present and some are altered by serpentine.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Feldspars	R	Radiolarians	R	Pyrite (framboids)	
Clay minerals	C	Mollusk	R	Pyrite (euhedra)	
Chert		Other bioclast	P	Pyrite (grain coatings)	
Mudstone		Peloid		Calcite	P
Siltstone/Sandstone		Carbonate mud	A	Dolomite, authigenic	
Clear glass	C	Heavy minerals	R	Zeolite - phillipsite, clinoptilolite	
Colored glass		Micas (biotite, musc., chl.)	T	Fe/Mn Oxide	C
Other volcanic		Opaques	P		

THIN SECTION LABEL ID: **375-U1520C-6R-CC-W 9/12-TSB-TS06**

TS no.: 6

Requestor Group: Sedimentology

Observer: OLIV

Summary Description

Light greenish gray marl

Plane-polarized



46364371

Cross-polarized



46364391

SEDIMENT DETAILS

Lithology: marl

Grain sorting: moderate [2014]

Cement form: microcrystalline

Sand [%]: 1

Silt [%]: 9

Clay [%]: 90

Detailed description

Ooids are micritized. Some grains are altered by serpentine. Olivine are present and some are altered by serpentine. Feldspars have no evidence of authigenic features.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	P	Terrestrial organic matter	
Feldspars	T	Radiolarians		Pyrite (framboids)	
Clay minerals	C	Mollusk		Pyrite (euhedra)	
Chert	R	Other bioclast	C	Pyrite (grain coatings)	
Mudstone		Peloid		Calcite	C
Siltstone/Sandstone		Carbonate mud	D	Dolomite, authigenic	
Clear glass	C	Heavy minerals	T	Zeolite - phillipsite, clinoptilolite	
Altered volcanic (palagonite)	P	Glauconite	T		
Other volcanic		Opaques	R		

THIN SECTION LABEL ID: **375-U1520C-8R-5-W 110/112-TSB-TS10**

TS no.: 10

Requestor Group: Sedimentology

Observer: OLIV

Summary Description

Bioturbation and disrupted clasts across a tuff/marl boundary

Plane-polarized



46364491

Cross-polarized



46364511

SEDIMENT DETAILS

Lithology: marl

Grain sorting: moderate [2014]

Cement form: microcrystalline

Sand [%]: 15

Silt [%]: 35

Clay [%]: 60

Detailed description

Ooids have traces of preserved concentric structure. Most ooids are micritized. Bioturbation zone is rich in Fe oxide and opaque grains. Some grains are altered by serpentine. Olivine are present and some are altered by serpentine. Stylolites are present.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	A	Terrestrial organic matter	
Feldspars	R	Radiolarians		Pyrite (framboids)	
Clay minerals	C	Mollusk		Pyrite (euhedra)	
Chert	R	Other bioclast	P	Pyrite (grain coatings)	
Mudstone		Peloid		Calcite	P
Siltstone/Sandstone	P	Carbonate mud	C	Dolomite, authigenic	
Clear glass	C	Heavy minerals	R	Zeolite - phillipsite, clinoptilolite	
Colored glass	T	Micas (biotite, musc., chl.)		Fe/Mn Oxide	C
Altered volcanic (palagonite)	A	Glauconite			
Other volcanic	P	Opagues	C		

THIN SECTION LABEL ID: **375-U1520C-9R-5-W 0/2-TSB-TS11**

TS no.: 11

Requestor Group: Sedimentology

Observer: KUTT

Summary Description

foraminiferous Tuff

Plane-polarized



46435011

Cross-polarized



46435031

SEDIMENT DETAILS

Lithology: foraminiferous ash/tuff

Grain sorting: well [2014]

Cement form:

Sand [%]: 5

Silt [%]: 70

Clay [%]: 25

Detailed description

devitrified foraminifer-rich tuff with some vague glass shard/pumiceous clast remnants in matrix most probably mixed with clay (either primary or from alteration). Possible zeolites and other alteration products. Mineral assemblage (pl, amp, px, ap) reflects magmatic origin.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	A	Terrestrial organic matter	
Feldspars	P	Radiolarians		Pyrite (framboids)	
Clay minerals	C	Mollusk		Pyrite (euhedra)	
Clear glass	C	Heavy minerals	P	Zeolite - phillipsite, clinoptilolite	
Altered volcanic (palagonite)	D	Glauconite			
Other volcanic		Opaques	R		

THIN SECTION LABEL ID: **375-U1520C-11R-2-W 29/31-TSB-TS12**

TS no.: 12

Requestor Group: Sedimentology

Observer: KUTT

Summary Description

Calcareous mudstone

Plane-polarized

Cross-polarized



46435121



46435121

SEDIMENT DETAILS

Lithology: calcareous mudstone

Grain sorting: moderate [2014]

Cement form: microcrystalline

Sand [%]: Silt [%]: 15

Clay [%]: 85

Detailed description

homogenous mudstone with nannofossils and forams and thin filled carbonate veins. Bioturbation traces include coarser silt fractions, or represent reworked mud clasts

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz	T	Foraminifers	C	Terrestrial organic matter	
Feldspars	P	Radiolarians		Pyrite (framboids)	
Clay minerals	A	Mollusk		Pyrite (euhedra)	
Mudstone		Peloid		Calcite	A
Siltstone/Sandstone	R	Carbonate mud		Dolomite, authigenic	
Clear glass	R	Heavy minerals	T	Zeolite - phillipsite, clinoptilolite	
Colored glass		Micas (biotite, musc., chl.)		Fe/Mn Oxide	R
Altered volcanic (palagonite)	T	Glauconite			
Other volcanic		Opaques	P		

THIN SECTION LABEL ID: **375-U1520C-12R-5-W 70/72-TSB-TS13**

TS no.: 13

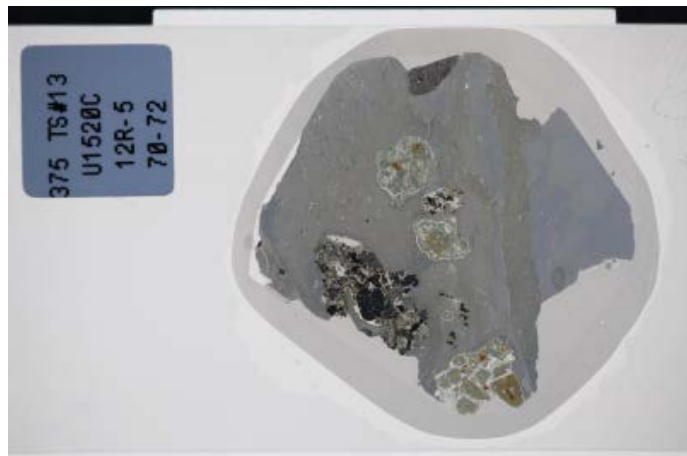
Requestor Group: Sedimentology

Observer: OLIV

Summary Description

Debris flow deposits including basalt and chalk clasts. Marl matrix. Clasts are angular to sub-rounded and granule to fine pebble size.

Plane-polarized



46435141

Cross-polarized



46435161

SEDIMENT DETAILS

Lithology: debris flow

Grain sorting: poor [2014]

Cement form: microcrystalline

Sand [%]: 10

Silt [%]: 20

Clay [%]: 70

Detailed description

The debris flow deposit contains here clasts from reworked volcanoclastic sandstones, chalk, and basalts of different alteration stages, in a marly matrix with foraminifers.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	C	Terrestrial organic matter	
Feldspars	T	Radiolarians		Pyrite (framboids)	
Clay minerals	C	Mollusk		Pyrite (euhedra)	
Chert	T	Other bioclast	P	Pyrite (grain coatings)	
Mudstone		Peloid		Calcite	P
Siltstone/Sandstone		Carbonate mud	A	Dolomite, authigenic	
Clear glass	R	Heavy minerals		Zeolite - phillipsite, clinoptilolite	
Colored glass		Micas (biotite, musc., chl.)		Fe/Mn Oxide	R
Altered volcanic (palagonite)	A	Glauconite	T		
Other volcanic		Opauques	R		

THIN SECTION LABEL ID: **375-U1520C-15R-6-W 26/27-TSB-TS17**

TS no.: 17

Requestor Group: Sedimentology

Observer: NODA

Summary Description

chalk

Plane-polarized



46468261

Cross-polarized



46468281

SEDIMENT DETAILS

Lithology: chalk

Grain sorting: poor [2014]

Cement form: microcrystalline

Sand [%]: 5

Silt [%]: 50

Clay [%]: 45

Detailed description

chalk composed of sand- to silt-size foraminifers and micritic matrix. Foram-rich lamina is present.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	C	Terrestrial organic matter	
Feldspars		Radiolarians		Pyrite (framboids)	R
Chert		Other bioclast	P	Pyrite (grain coatings)	
Siltstone/Sandstone		Carbonate mud	D	Dolomite, authigenic	

THIN SECTION LABEL ID: **375-U1520C-18R-2-W 112/114-TSB-TS18**

TS no.:

Requestor Group: Sedimentology

Observer: OLIV

Summary Description

Pale brown muddy chalk

Plane-polarized



46450821

Cross-polarized



46450841

SEDIMENT DETAILS

Lithology: chalk

Grain sorting: moderate [2014]

Cement form: microcrystalline

Sand [%]: 1

Silt [%]: 4

Clay [%]: 95

Detailed description

Ooids and foraminifers are micritized.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	P	Terrestrial organic matter	
Feldspars	T	Radiolarians		Pyrite (framboids)	
Clay minerals	P	Mollusk		Pyrite (euhedra)	
Chert	T	Other bioclast	P	Pyrite (grain coatings)	P
Siltstone/Sandstone		Carbonate mud	D	Dolomite, authigenic	
Colored glass		Micas (biotite, musc., chl.)		Fe/Mn Oxide	T
Altered volcanic (palagonite)		Glauconite	T		
Other volcanic		Opaques	P		

THIN SECTION LABEL ID: **375-U1520C-25R-1-W 53/56-TSB-TS19**

TS no.: 19

Requestor Group: Sedimentology

Observer: NODA

Summary Description

volcaniclastic conglomerate

Plane-polarized



46450881

Cross-polarized



46450881

SEDIMENT DETAILS

Lithology: volcaniclastic conglomerate

Grain sorting: poor [2014]

Cement form:

Sand [%]: 100

Silt [%]: 0

Clay [%]: 0

Detailed description

volcaniclastic conglomerate composed of altered basalt clasts surrounded by palagonite rims. Zeolite matrix.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Siltstone/Sandstone	R	Carbonate mud		Dolomite, authigenic	
Clear glass		Heavy minerals		Zeolite - phillipsite, clinoptilolite	C
Altered volcanic (palagonite)	M	Glauconite			

THIN SECTION LABEL ID: **375-U1520C-26R-1-W 60/62-TSB-TS22**

TS no.: 22

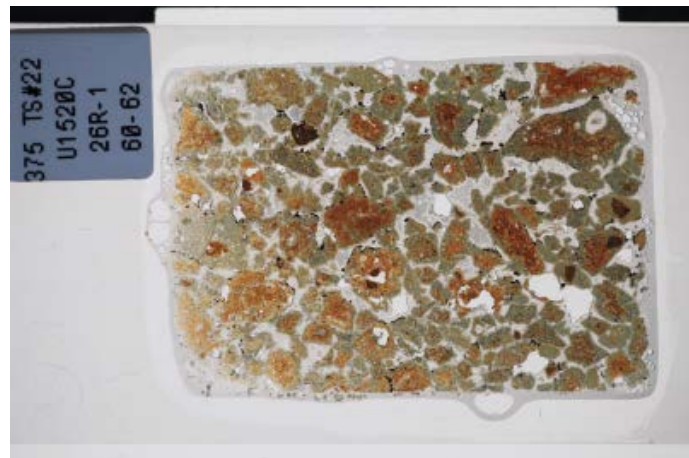
Requestor Group: Sedimentology

Observer: OLIV

Summary Description

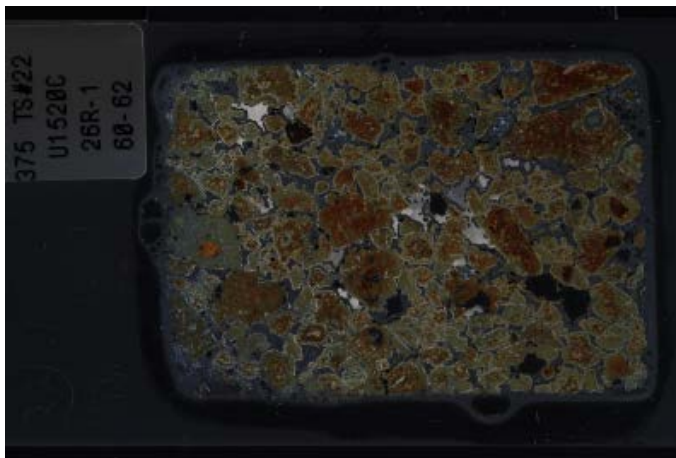
conglomerate

Plane-polarized



46468061

Cross-polarized



46468081

SEDIMENT DETAILS

Lithology: volcaniclastic conglomerate

Grain sorting: poor [2014]

Cement form:

Sand [%]: 70

Silt [%]: 20

Clay [%]: 10

Detailed description

Conglomerate consists entirely of basalt fragments. The clasts are altered (Palagonite, Fe oxides and clay) and cemented by zeolite and some calcite. Matrix is not visible. Clasts have abundant calcite spherulites. There are many porosity intergranular. Most clasts content pyrite.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Feldspars	P	Radiolarians		Pyrite (framboids)	
Clay minerals	A	Mollusk		Pyrite (euhedra)	C
Mudstone		Peloid		Calcite	C
Clear glass		Heavy minerals	T	Zeolite - phillipsite, clinoptilolite	C
Colored glass	P	Micas (biotite, musc., chl.)		Fe/Mn Oxide	C
Altered volcanic (palagonite)	D	Glauconite			
Other volcanic		Opagues	P		

THIN SECTION LABEL ID: 375-U1520C-30R-1-W 45/48-TSB-TS24

Requestor Group: structure

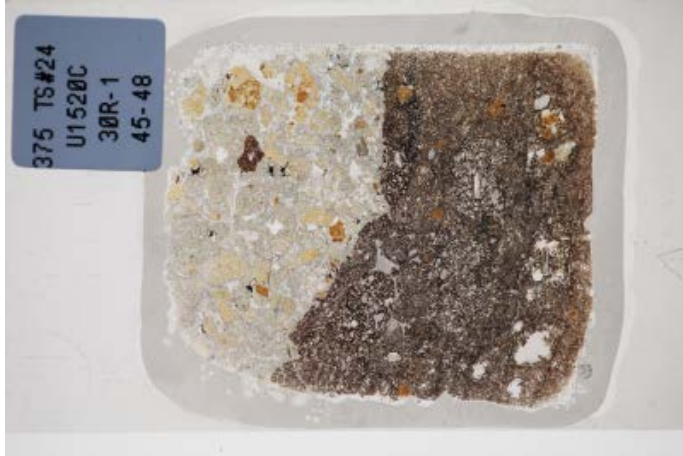
Summary Description

Volcaniclastic sedimentary rock in sharp contact with volcanic breccia

TS no.:

Observer:

Plane-polarized



46468141

Cross-polarized



46468161

THIN SECTION LABEL ID: **375-U1520C-34R-1-W 35/37-TSB-TS25**

TS no.: 25

Requestor Group: Sedimentology

Observer: OLIV

Summary Description

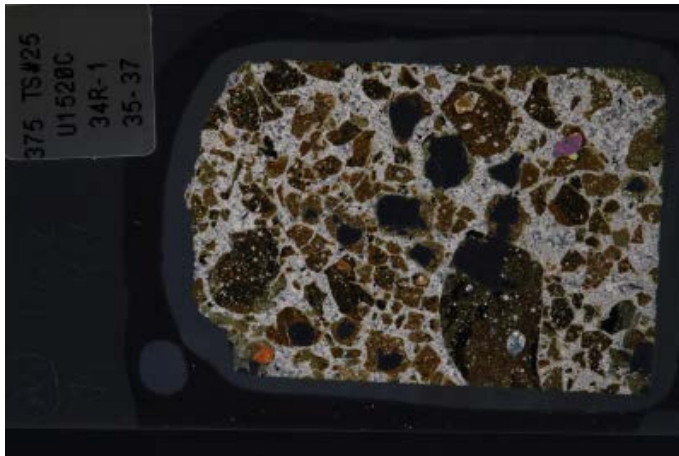
darker colored conglomerate

Plane-polarized



46468181

Cross-polarized



46468201

SEDIMENT DETAILS

Lithology: volcanoclastic conglomerate

Grain sorting: poor [2014]

Cement form:

Sand [%]: 70

Silt [%]: 20

Clay [%]: 10

Detailed description

Conglomerate consists entirely of basalt fragments in different stages of alteration. Clasts are altered (Palagonite, Fe oxides and clay) and cemented by calcite. Matrix are not visible. Some clasts content pyrite. Clasts have abundant calcite spherulites.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Feldspars	P	Radiolarians		Pyrite (framboids)	
Clay minerals	A	Mollusk		Pyrite (euhedra)	P
Mudstone		Peloid		Calcite	A
Clear glass		Heavy minerals	P	Zeolite - phillipsite, clinoptilolite	
Colored glass	C	Micas (biotite, musc., chl.)		Fe/Mn Oxide	P
Altered volcanic (palagonite)	A	Glauconite			
Other volcanic	C	Opagues	P		

THIN SECTION LABEL ID: **375-U1520C-34R-1-W 92/94-TSB-TS26**

TS no.: 26

Requestor Group: Sedimentology

Observer: OLIV

Summary Description

lighter greenish conglomerate

Plane-polarized



46468221

Cross-polarized



46468241

SEDIMENT DETAILS

Lithology: volcaniclastic conglomerate

Grain sorting: poor [2014]

Cement form:

Sand [%]: 70

Silt [%]: 20

Clay [%]: 10

Detailed description

Conglomerate consists of basalt fragments in different stages of alteration. Clasts are altered (Palagonite, Fe oxides and clay) and cemented by calcite. Matrix are not visible. Some clasts content pyrite. Clasts have abundant calcite spherulites. One angular dark sedimentary cast appears like lydite.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Clay minerals	A	Mollusk		Pyrite (euhedra)	C
Mudstone		Peloid		Calcite	C
Clear glass		Heavy minerals	P	Zeolite - phillipsite, clinoptilolite	C
Colored glass	C	Micas (biotite, musc., chl.)		Fe/Mn Oxide	C
Altered volcanic (palagonite)	D	Glauconite			
Other volcanic	T	Opaques	P		

THIN SECTION LABEL ID: 375-U1520C-34R-4-W 10/12-TSB-TS27

TS no.: 27

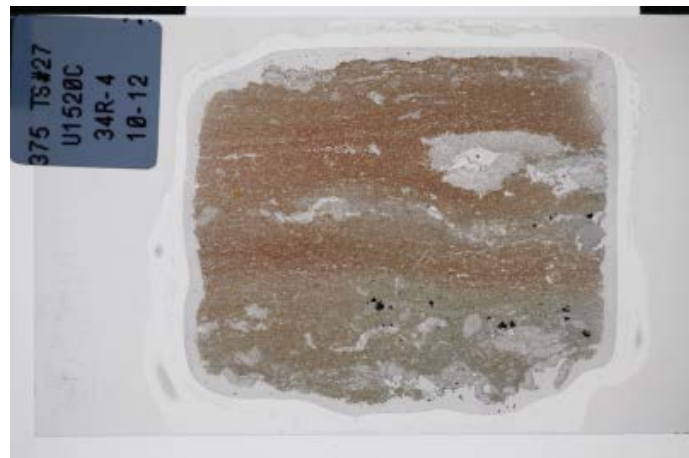
Requestor Group: Sedimentology

Observer: NODA

Summary Description

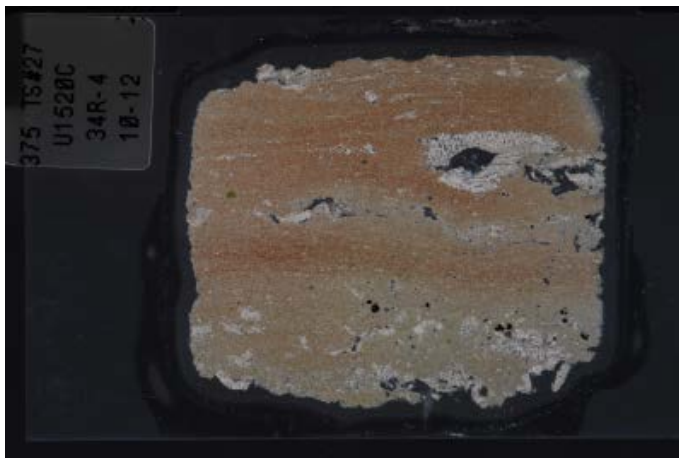
pinkish chalk

Plane-polarized



46468641

Cross-polarized



46468661

SEDIMENT DETAILS

Lithology: chalk

Grain sorting: moderate [2014]

Cement form: microcrystalline

Sand [%]: 40

Silt [%]: 30

Clay [%]: 30

Detailed description

Carbonate turbidite. Grain-supported packstone with calcareous mud matrix. Grains are composed of foraminifer, shell fragments of mollusk, and other unspecified bioclasts. Sand-sized, brownish-greenish altered glass and basalt fragments are present.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	P	Terrestrial organic matter	
Clay minerals		Mollusk	P	Pyrite (euhedra)	
Chert		Other bioclast	D	Pyrite (grain coatings)	
Siltstone/Sandstone		Carbonate mud	C	Dolomite, authigenic	
Altered volcanic (palagonite)	P	Glauconite			
Other volcanic		Opaques	R		

THIN SECTION LABEL ID: **375-U1520C-40R-2-W 49/51-TSB-TS30**

TS no.: 30

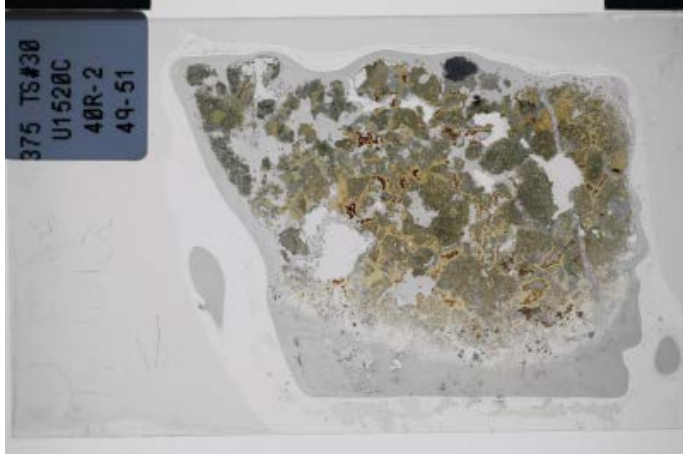
Requestor Group: Sedimentology

Observer: NODA

Summary Description

Volcaniclastic conglomerate

Plane-polarized



46468721

Cross-polarized



46468741

SEDIMENT DETAILS

Lithology: volcaniclastic conglomerate

Grain sorting: poor [2014]

Cement form: microcrystalline

Detailed description

Highly vesicular but stronger altered volcanic glasses are dominant. Matrix is filled by Palagonite, clay, Fe oxides, and calcite. Vesicles are filled by calcite

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Clay minerals	C	Mollusk		Pyrite (euhedra)	
Mudstone		Peloid		Calcite	A
Colored glass	C	Micas (biotite, musc., chl.)		Fe/Mn Oxide	P
Altered volcanic (palagonite)	D	Glauconite			
Other volcanic		Opauques	R		

THIN SECTION LABEL ID: **375-U1520C-41R-1-W 47/49-TSB-TS31**

TS no.: 31

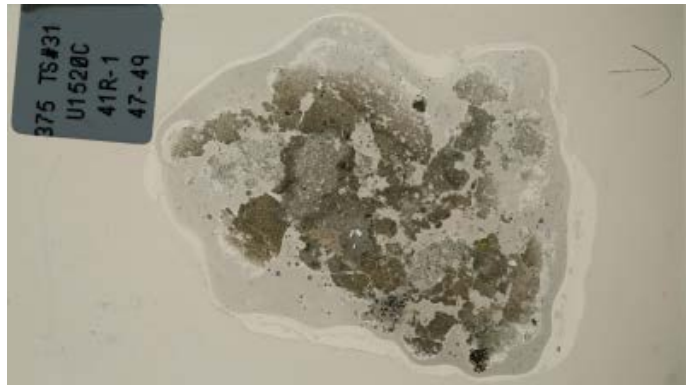
Requestor Group: Sedimentology

Observer: NODA

Summary Description

Volcaniclastic conglomerate

Plane-polarized



46470801

Cross-polarized



46470821

SEDIMENT DETAILS

Lithology: volcaniclastic conglomerate

Grain sorting: poor [2014]

Cement form:

Detailed description

Conglomerate consists mainly of basalt clasts. All clasts are amygdaloidal/vesicular microcrystalline plagioclase basalt showing trachytic texture. Glass is partly devitrified and palagonitized. Vesicles are filled by calcite, epidote or chlorite. Calcite cementation

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	T	Terrestrial organic matter	
Feldspars	P	Radiolarians		Pyrite (framboids)	
Clay minerals	C	Mollusk		Pyrite (euhedra)	
Mudstone		Peloid		Calcite	C
Clear glass		Heavy minerals		Zeolite - phillipsite, clinoptilolite	P
Colored glass	R	Micas (biotite, musc., chl.)		Fe/Mn Oxide	P
Altered volcanic (palagonite)	D	Glauconite			

THIN SECTION LABEL ID: **375-U1520C-41R-3-W 43/45-TSB-TS32**

Requestor Group: Structure

Summary Description

Laminated carbonate vein

TS no.:

Observer:

Plane-polarized



46470841

Cross-polarized



46470861

MICROSTRUCTURES

Microstructure: vein

Rock name: Laminated vein in volcaniclastics

Microstructure comment: Laminated vein with blocky and fibrous crystals. Elongate crystals are perpendicular to the vein wall.

Detailed description Laminated vein containing elongate wall rock fragments and wall rock inclusion trails that are parallel to the vein margin. The morphology varies from fibrous to blocky, with fibers perpendicular to the vein margin.

THIN SECTION LABEL ID: **375-U1520C-42R-3-W 137/139-TSB-TS33**

TS no.: 33

Requestor Group: Sedimentology

Observer: NODA/O
LIV

Summary Description

clayey silt

Plane-polarized



46470881

Cross-polarized



46470901

SEDIMENT DETAILS

Lithology: clayey siltstone

Grain sorting: moderate [2014]

Cement form: microcrystalline

Sand [%]: 5

Silt [%]: 60

Clay [%]: 35

Detailed description

Clayey siltstone is laminated and show normal grading at some part, which is composed of sand-sized spherical grains (amygdules in basalt?) and carbonaceous fragments in addition to silt-sized quartz and feldspar. Radiolarian are present.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz	P	Foraminifers		Terrestrial organic matter	p
Feldspars	P	Radiolarians	T	Pyrite (framboids)	
Clay minerals	A	Mollusk		Pyrite (euhedra)	
Colored glass		Micas (biotite, musc., chl.)	T	Fe/Mn Oxide	R
Altered volcanic (palagonite)	C	Glauconite			
Other volcanic		Opauques	R		

THIN SECTION LABEL ID: **375-U1520C-42R-4-W 42/45-TSB-TS34**

TS no.: 34

Requestor Group: Sedimentology

Observer: NODA/O
LIV

Summary Description

Laminated clayey siltstone

Plane-polarized



46468761

Cross-polarized



46468781

SEDIMENT DETAILS

Lithology: clayey siltstone

Grain sorting: moderate [2014]

Cement form: microcrystalline

Sand [%]: 5

Silt [%]: 50

Clay [%]: 45

Detailed description

Laminated siltstone including microfossils (foraminifers and radiolarian), plagioclase, and quartz with large fragments of inoceramid bivalve shells. Authigenic pyrite.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	C	Terrestrial organic matter	
Feldspars	T	Radiolarians	T	Pyrite (framboids)	P
Clay minerals	C	Mollusk	P	Pyrite (euhedra)	
Mudstone	P	Peloid		Calcite	
Siltstone/Sandstone		Carbonate mud		Dolomite, authigenic	T
Colored glass		Micas (biotite, musc., chl.)		Fe/Mn Oxide	T

THIN SECTION LABEL ID: **375-U1520C-43R-2-W 86/89-TSB-TS35**

TS no.: 35

Requestor Group: Sedimentology

Observer: NODA

Summary Description

volcaniclastic siltstone

Plane-polarized



46473711

Cross-polarized



46473731

SEDIMENT DETAILS

Lithology: volcaniclastic siltstone

Grain sorting: poor [2014]

Cement form: microcrystalline

Sand [%]: 20

Silt [%]: 60

Clay [%]: 20

Detailed description

Siltstone consists of sand to silt-size angular basalt and altered glass fragments within clayey matrix. Many greenish to transparent, sand to silt-size (0.15 mm) spherical grains are probably amygdules liberated from vesicular basalt, Inside of these spherical grains are replaced by zeolite or clay minerals. But some of them are possibly radiolarians and foraminifers. There are many authigenic pyrite in the matrix.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	R	Terrestrial organic matter	
Feldspars		Radiolarians	P	Pyrite (framboids)	C
Clay minerals	C	Mollusk		Pyrite (euhedra)	
Clear glass		Heavy minerals		Zeolite - phillipsite, clinoptilolite	P
Colored glass		Micas (biotite, musc., chl.)		Fe/Mn Oxide	R
Altered volcanic (palagonite)	D	Glauconite			

THIN SECTION LABEL ID: **375-U1520C-43R-CC-W 22/25-TSB-TS36**

TS no.: 36

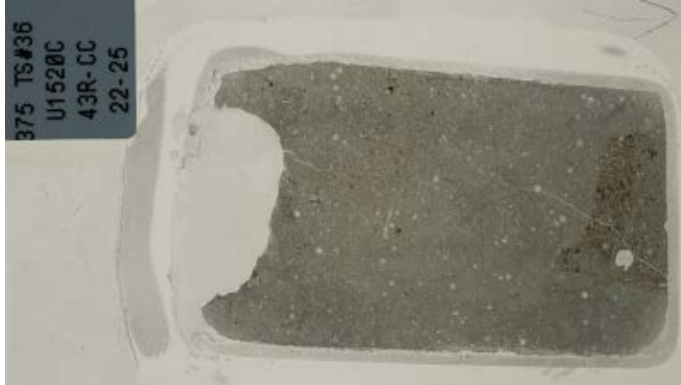
Requestor Group: Sedimentology

Observer: NODA

Summary Description

Limestone

Plane-polarized



46473751

Cross-polarized



46473771

SEDIMENT DETAILS

Lithology: limestone

Grain sorting: moderate [2014]

Cement form: microcrystalline

Detailed description

Limestone includes recrystallized foraminifers with calcite cementation. Occasionally greenish spherical grains. Silt-sized authigenic pyrites are observed.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Quartz		Foraminifers	C	Terrestrial organic matter	
Feldspars		Radiolarians		Pyrite (framboids)	R
Clay minerals	C	Mollusk		Pyrite (euhedra)	
Mudstone		Peloid		Calcite	M
Siltstone/Sandstone		Carbonate mud		Dolomite, authigenic	R
Colored glass		Micas (biotite, musc., chl.)		Fe/Mn Oxide	T
Altered volcanic (palagonite)	R	Glauconite			

THIN SECTION LABEL ID: **375-U1520C-44R-1-W 29/31-TSB-TS37**

TS no.: 37

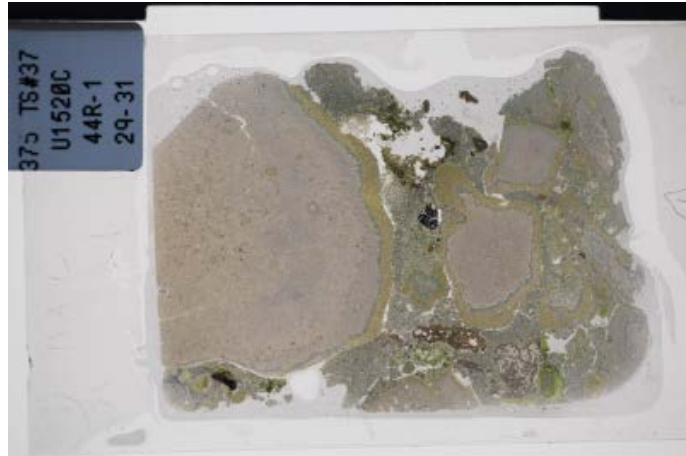
Requestor Group: Sedimentology

Observer: NODA

Summary Description

Basalt breccia

Plane-polarized



46468801

Cross-polarized



46468821

SEDIMENT DETAILS

Lithology: volcaniclastic conglomerate

Grain sorting: poor [2014]

Cement form:

Sand [%]: 80

Silt [%]: 10

Clay [%]: 10

Detailed description

Volcaniclastic conglomerate is composed mostly of granule- to pebble-size angular basalt clasts. Basalt clasts show intersertal texture and include fine-grained microcrystalline euhedral plagioclase phenocrysts. Highly altered. Components of matrix are unclear, possibly calcite and clay minerals.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Mudstone		Peloid		Calcite	P
Siltstone/Sandstone		Carbonate mud	C	Dolomite, authigenic	
Altered volcanic (palagonite)	M	Glauconite			

THIN SECTION LABEL ID: **375-U1520C-44R-1-W 102/104-TSB-TS38**

TS no.: 38

Requestor Group: Sedimentology

Observer: NODA

Summary Description

vesicular basalt

Plane-polarized



46468841

Cross-polarized



46468861

SEDIMENT DETAILS

Lithology: basalt

Detailed description

vesicular basalt composed mostly of plagioclase phenocrysts, showing interstitial texture. Some vesicles are filled by calcite. Fe/Mg phenocrysts are replaced by chlorite or clay minerals.

Grain abundance

T=Trace; R=Rare; P=Present; C=Common; A=Abundant; D=Dominant; M=Major

Grain	Abundance	Grain	Abundance	Grain	Abundance
Feldspars	D	Radiolarians		Pyrite (framboids)	
Mudstone		Peloid		Calcite	P
Colored glass		Micas (biotite, musc., chl.)		Fe/Mn Oxide	P
Other volcanic		Opaques	P		

THIN SECTION LABEL ID: **375-U1520C-2R-1-W 4/6-TSB-TS04**

TS no.: 4

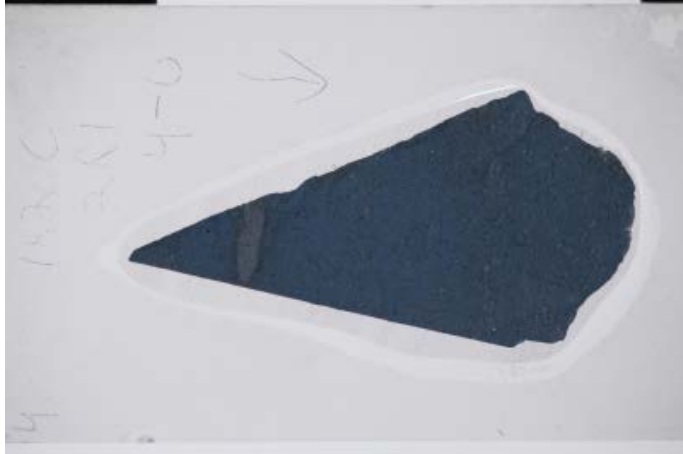
Requestor Group: Structure

Observer: AF

Summary Description

Striated fault surface in marl, preserved in cross-section along the edge of the thin section.

Plane-polarized



46364161

Cross-polarized



46364181

MICROSTRUCTURES

Microstructure: fault rock

Rock name: Marl with slip surface

Microstructure comment: Recrystallised carbonate

Detailed description

A striated fault surface has developed in a coherent, relatively homogeneous and isotropic marl. The fault surface is composed of fine, recrystallised carbonate in a sub-mm layer that is texturally distinct from the host rock. There are rare carbonate filled fractures, markedly two at a high angle to the fault zone that are traced through the sample. There are others, which are thinner and shorter, forming small anastomosing networks locally at a low angle to the fault surface.

Feature type	Observation	Intensity rank
Fracture abundance	rare	n/a

THIN SECTION LABEL ID: 375-U1520C-8R-1-W 4/6-TSB-TS07

TS no.: 7

Requestor Group: Structure

Observer: AF

Summary Description

Marl with fracture mesh

Plane-polarized



46364411

Cross-polarized



46364431

MICROSTRUCTURES

Microstructure: fracture

Rock name: Marl

Detailed description

Fracture system in marl, with two sets of fractures filled by very fine grained green material. A dominant set appears to have a normal sense of shear, and is present throughout the section. A second set is locally present at sub-mm spacing and leads to creation of fine (< 0.1 mm edges) prismatic (in 2D) host rock clasts where the fracture sets cross.

Feature type	Observation	Intensity rank
Fracture abundance	common	n/a
Fault rock intensity	moderate fracturing	2

THIN SECTION LABEL ID: **375-U1520C-8R-2-W 70/72-TSB-TS08**

TS no.: 8

Requestor Group: Structure

Observer: AF

Summary Description

Normal faulted carbonate layer in clay matrix

Plane-polarized



46364451

Cross-polarized



46364471

MICROSTRUCTURES

Microstructure: fracture

Rock name: Marl

Microstructure comment: Fracture boudinage

Detailed description Carbonaceous layer within a clay-rich interval ~ 2mm thick has been extended parallel to bedding by domino normal faulting. The faults are largely healed by carbonate recrystallisation.

Feature type	Observation	Intensity rank
Fracture abundance	common	n/a
Fault sense of shear	normal	n/a

THIN SECTION LABEL ID: 375-U1520C-8R-2-W 86/88-TSB-TS09

TS no.: 9

Requestor Group: Structure

Observer: AF

Summary Description

Marl, with some preferentially oriented clays forming a local fabric

Plane-polarized

Cross-polarized



46434971



46434991

MICROSTRUCTURES

Microstructure:

Rock name:

Marl

Detailed description

Local fabric defined by preferential orientation of platy minerals

THIN SECTION LABEL ID: 375-U1520C-10R-1-W 40/43-TSB-TS16

TS no.: 16

Requestor Group: Structure

Observer: AF

Summary Description

Minor stylolites in marl

Plane-polarized



46450781

Cross-polarized



46450801

MICROSTRUCTURES

Microstructure:

Rock name: Marl

Microstructure comment: Stylolites

Detailed description Small, sub-mm to a few mm long, stylolites with mm spacing and 0.1-0.2 mm amplitude. Dissolution of fossils along some stylolites, on the order of 0.1 mm of dissolution.

Feature type	Observation	Intensity rank
Fabric intensity	weak	n/a

THIN SECTION LABEL ID: 375-U1520C-11R-2-W 29/31-TSB-TS12

TS no.: 12

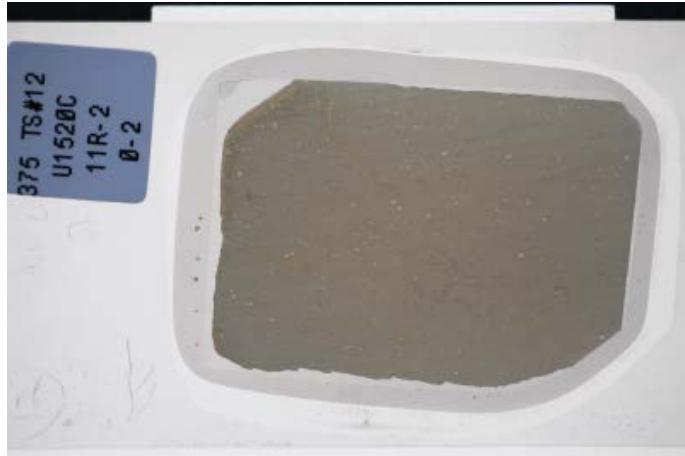
Requestor Group: Structure

Observer: AF

Summary Description

Bedding parallel stylolites in bioturbated calcareous mudstone, crosscut by higher angle fine fractures

Plane-polarized



46435101

Cross-polarized



46435121

MICROSTRUCTURES

Microstructure:

Rock name:

Bioturbated calcareous mudstone

Microstructure comment:

Pressure solution seam crosscut by thin filled fractures

Detailed description

Fine, spaced stylolites are parallel to bedding, and crosscut by higher angle thin, carbonate filled fractures with rims. Host rock is very fine grained and bioturbated.

Feature type	Observation	Intensity rank
Fabric intensity	moderate	n/a
Fracture abundance	rare	n/a

THIN SECTION LABEL ID: 375-U1520C-13R-4-W 60/63-TSB-TS14

TS no.: 14

Requestor Group: Structure

Observer: AF

Summary Description

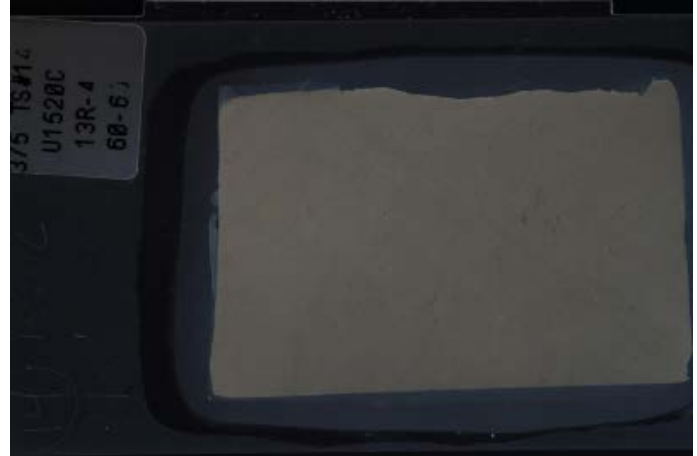
Mostly recrystallised fault in marl

Plane-polarized



46450741

Cross-polarized



46450761

MICROSTRUCTURES

Microstructure: fracture

Rock name: Marl

Microstructure comment: Minor fault

Detailed description A fault is apparent in coreface, but difficult to see in the thin section, presumed largely recrystallised within the marl. Some minor fractures are present

Feature type	Observation	Intensity rank
Fabric intensity	weak	n/a
Fracture abundance	rare	n/a
Fault rock intensity	minor fracturing	1

THIN SECTION LABEL ID: 375-U1520C-18R-2-W 112/114-TSB-TS18

TS no.: 18

Requestor Group: Structure

Observer: AF

Summary Description

Coarser clast in clay matrix with flow fabric

Plane-polarized



46450821

Cross-polarized



46450841

MICROSTRUCTURES

Microstructure: color banding

Rock name: Debris flow

Microstructure comment: Clast in debris flow

Detailed description Coarser clast within debris flow in chalk. Fossils appear largely undisturbed by flow, but are locally distorted by pressure solution. Irregular grain boundaries and minor interfingering of muddy and silty sediments attest to soft sediment flow. Strong fabric defined by preferential orientation of platy minerals.

Feature type	Observation	Intensity rank
Fabric intensity	moderate	n/a

THIN SECTION LABEL ID: **375-U1520C-25R-1-W 53/56-TSB-TS19**

TS no.: 19

Requestor Group: Structure

Observer: AF

Summary Description

Cemented volcanoclastic

Plane-polarized



46450861

Cross-polarized



46450881

MICROSTRUCTURES

Microstructure: vein

Rock name: Volcaniclastic conglomerate

Microstructure comment: Cemented volcanoclastic

Detailed description Carbonate precipitate forms a cement in conglomerate. Thin veins crosscut the cement.

THIN SECTION LABEL ID: 375-U1520C-25R-1-W 78/80-TSB-TS20

TS no.: 20

Requestor Group: Structure

Observer: AF

Summary Description

Massive, elongate blocky, horizontal tensile vein in volcanoclastic

Plane-polarized



46450901

Cross-polarized



46450921

MICROSTRUCTURES

Microstructure: vein

Rock name: Volcanoclastic conglomerate

Microstructure comment: Carbonate vein in volcanoclastics

Detailed description Subhorizontal carbonate vein in volcanoclastic conglomerate cemented by other carbonate. The vein appears to contain elongate-blocky crystal at high angle to the vein margin, but the section is thick. Vein generally crosscuts the cement, but some cement may also be connected to the vein - difficult to tell in thick section.

THIN SECTION LABEL ID: **375-U1520C-25R-2-W 101/102-TSB-TS21**

TS no.: TS21

Requestor Group: Structure

Observer: Juli Morgan

Summary Description

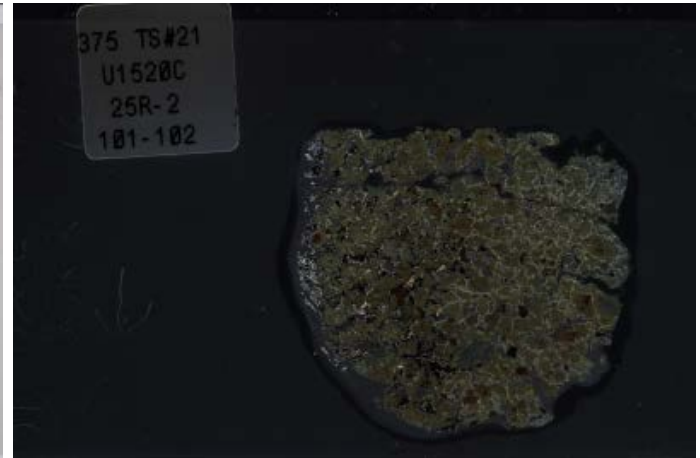
Volcaniclastic sediment with inclined fracture vein, banded black on vein edges to white center. Black pore filling disseminated within the wall matrix; zeolite fills remaining pore space; vein material not on thin section; volcanic clasts highly altered and locally fibrous, rimmed by phyllosilicate band.

Plane-polarized



46468021

Cross-polarized



46468041

MICROSTRUCTURES

Microstructure: vein

Rock name: Vein in volcaniclastic conglomerate

Microstructure comment: Black rim of vein is botryoidal; interstices filled with zeolite

Detailed description Volcaniclastic sediment with inclined fracture vein, banded black on vein edges to white center. Black pore filling disseminated within the wall matrix; zeolite fills remaining pore space; vein material not on thin section; volcanic clasts highly altered and locally fibrous, rimmed by phyllosilicate band.

Feature type	Observation	Intensity rank
Fracture abundance	rare	n/a
Fault rock intensity	minor fracturing	1

THIN SECTION LABEL ID: **375-U1520C-26R-4-W 85/87-TSB-TS23**

TS no.: TS23

Requestor Group: Structure

Observer: Juli Morgan

Summary Description

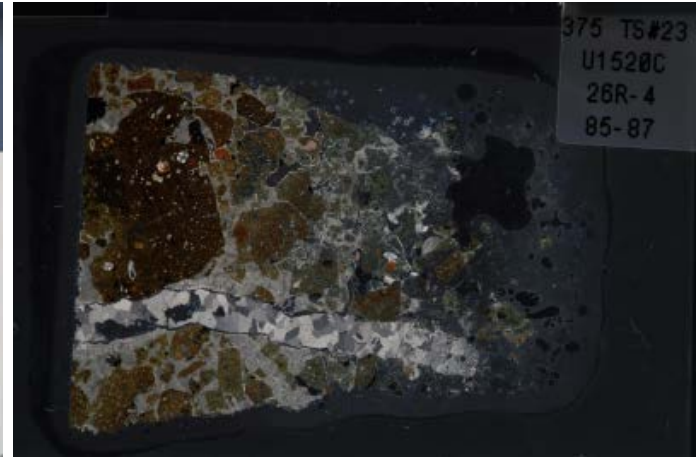
Cemented volcanoclastic sediment with intersecting veins; vein filling is compositionally banded; calcite, acicular zeolite, blocky calcite; pores filled with black opaque botryoidal phase, and zeolite; volcanic clasts highly altered.

Plane-polarized



46468101

Cross-polarized



46468121

MICROSTRUCTURES

Microstructure comment: Cemented volcanoclastic sediment with intersecting veins

Detailed description Cemented volcanoclastic sediment with intersecting veins; vein filling is compositionally banded; calcite, acicular zeolite, blocky calcite; pores filled with black opaque botryoidal phase, and zeolite; volcanic clasts highly altered.

THIN SECTION LABEL ID: **375-U1520C-34R-6-W 50/52-TSB-TS28**

TS no.:

Requestor Group: Structure

Observer:

Summary Description

Foliated carbonaceous mudstone with thin composite carbonate-zeolite veins

Plane-polarized



46468681

Cross-polarized



46468701

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: vein Rock name: Carbonaceous mudstone

Microstructure comment: Foliated mudstone with thin carbonate-zeolite veins

Detailed description Foliated mudstone with sub-mm foliation spacing. Fine grained secondary mineral growth around the edges of clasts within the mudstone, typically symmetric to weakly asymmetric. Thin veins are composed of fine grained carbonate and zeolite, with no particular pattern or cross-cutting relationships. A few veins about a carbonate structure that comprise aligned inoceramid prisms..

Feature type	Observation	Intensity rank
Fracture abundance	rare	n/a

THIN SECTION LABEL ID: 375-U1520C-40R-1-W 45/47-TSB-TS29

TS no.: TS29

Requestor Group: Structure

Observer: Juli Morgan

Summary Description

Massive calcite vein within volcanoclastic sediment; evidence for zeolite locally. Slide very thick and poorly polished.

Plane-polarized



46473671

Cross-polarized



46473691

MICROSTRUCTURES

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

Microstructure: Vein Rock name: Calcite vein

Microstructure comment: Massive calcite vein within volcanoclastic sediment; evidence for zeolite locally. Slide very thick and poorly polished, so no images taken.

Feature type	Observation	Intensity rank
Fabric intensity	moderate	n/a
Fracture abundance	rare	n/a