Constraining diagenetic timings, processes and reservoir quality in igneous-affected basins

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List of Abbreviations

STB	Stock Tank Barrel
ODP	Ocean Drilling Program
BGS	British Geological Society
SEM	Scanning Electron Microscopy
EDAX	Energy Dispersive X-ray Analysis
QXRD	Quantitative X-ray Diffraction
XRD	X-ray Diffraction
BPIP	British-Irish Palaeogene Igneous Province
SSSI	Sites of Special Scientific Interest
ISAAC	Imaging Spectroscopy and Analysis Centre
ICDD	International Centre for Diffraction Data
SUERC	Scottish University Environment Research Council
FSB	Faroe–Shetland Basin
NAIP	North Atlantic Igneous Province
FSSC	Faroe-Shetland Sill Complex
KCF	Kimmeridge Clay Formation
TOC	Total Organic Content
NTG	Net to Gross
OBS	Ocean Bottom Seismic
FMI	Formation Micro Imager
GS	Genetic Sequence
SMsT	Staffa Magma sub-Type
L	Basalt lava
P	Peperite
cL	Clastogenic lava
T	Basaltic tuff
mscBr	Massive scoria-rich breccia
mscT	Massive scoria rich tuff
scvBr	Scoria rich volcaniclastic breccias
vS	Volcaniclastic siltstone
mcvBr	Massive clast-supported volcaniclastic breccias
mmvBr	Massive matrix-supported volcaniclastic breccia
vlW	Volcaniclastic lithic wacke
C	Conglomerate
vlA	Volcaniclastic lithic arenite
SlA	Sublithic arenite
fC	Flint dominated conglomerate
M	Organic rich Mudstone
Co	Coal
Q	Quartz arenite
D	Dolerite
FMI	Formation Micro-Imager Log
Ppl	Plane polarised light
Xpl	Cross polarised light
FIB-TEM	Focused Ion Beam - Transmission Electron Microscopy

Glossary of terms

A’a lava flow	An a'a lava flow is a type of lava flow that is characterised by having a characterized by a uneven, sharp, clinkery surface. Aa lava flows tend to be thicker (>2 m) and more viscous than Pāhoehoe lava. They are also cooler 800- 100 °C.
Albitisation	The process by which plagioclase feldspar or alkali feldspar is altered and replaced by albite.
Amygdale	Vesicles that are filled by secondary minerals. Often several different minerals can fill one amygdale.
Amygdaloidal basalt	Basaltic rock comprising abundant amygdales.
Aphyric basalt	A basaltic rock that lacks phenocrysts that has a fine grained groundmass.
Authigenic	Authigenic minerals form in place e.g. by precipitation or recrystallization. Once formed they are not transported and remain in position.
Chronostratigraphic correlation	Rocks that have been correlated chronostratigraphically have been correlated in relation to time e.g. all the rocks were deposited at the same time but in potentially different environments.
Clastogenic lava	A lava flow that has formed from the accretion and re-melting of pyroclasts. A clastogenic lava can be identified by visible spatter and scoria clast outlines and vesiculated regions throughout the crystalline lava.
Colonnade	The colonnade comprises the regular well-defined columnar jointed structure part of multi-tiered lava flow. It is normally found at the base of the lava flow unit but can also be found towards the top.
Corrensite	Clay mineral made up of layers of chloritic and smectitic clays. Commonly found in volcanic rocks.
Devitrification	The process by which volcanic glass starts to crystallise.
Diagenesis	The process by which a sediment turns into a rock during burial. This can include physical and chemical changes due to compaction and cementation, weathering and low temperature metamorphism.
Entablature	The entablature comprises the wavy, chaotic columnar jointed structure part of a multi-tiered lava flow. It is normally found towards the top of a lava flow unit. The entablature is thought to be a result of ingressive of water during cooling of the lava flow. Entablature type columnar joints can also be found around objects that disrupt the cooling gradient such as a Tree.
Fluidisation	The process by which pore fluids within a sediment or poorly lithified sedimentary rock are turned to steam and escape. This causes the sediment or rock to behave like a fluid disrupting existing sedimentary structures. This process is common in perperites where a vapour film causes juvenile volcanic clasts to retain their heat as they penetrate the sediment.
Formation micro-imager (FMI)	Down borehole tool that uses microresistivity sensors on pads to record the resistivity of the rock and produce an image of the borehole wall.
Glomeroporphyritic	An igneous rock texture where phenocrysts are grouped together.
Heterolithic bedding	Gneral term for bedding that alternates between mud rich and sand (grade) rich deposits. Commonly found intertidal environments where the sediment source is alternating. Two types include flaser bedding which is mud rich and lenticular bedding which is sand rich.
Hyaloclastite	Auto fragmental igneous rock comprising of angular shards of volcanic glass created when subaerial lava flows come in contact with significant bodies of water.
Hydrocarbon Play	A hydrocarbon play is a group of oil fields or prospects that share common source, reservoir and sealing rocks or traps.

Inflation clefts	Crack like structures that form in the surface as a lava crust as it cools.
K-metasomatism	Metasomatsim is the chemical alteration of a rock from fluids, most commonly of hydrothermal origin. K-metasomatism specifically involves the movement and alteration of potassium.
Multi-tiered basalt flow	A basalt lava flow that comprises colonnade and entablature parts of the flow.
Pāhoehoe lava	
Palagonite	Palagonite is an alteration product of basaltic glass. There are two types of palagonite: fibrous and gel.
Paleosol	An ancient soil.
Paragenesis	The order in which alteration products form during diagenesis or metamorphism.
Peperite	A sedimentray rock that contains both siliciclastic and juvenile volcanic clasts. Most commonly formed when igneous lava or intrusions intrude wet sediment.
Pillow lava	Pillow shaped lava that forms under a large body of water. They are commonly basaltic in composition and form a quenched glassy rim.
Scoria	Mafic vesiculated pyroclasts. Pumice is the silicic version.
Spatter	Elongate and fluidal material ejected out of a fire fountain. Spatter is still molten when it is deposited. Clast shapes are fluidal and clasts often contain chilled margins.
Spherulitic texture	Circular structures that contain crystals radiating out from a single nucleation point.
Tholeiitic basalt	Type of basalt rich in silica and poor in sodium. Commonly found in continental flood basalt flows.
Marine transgression	During a marine transgression the sea level rises causing the coast line to move inland.

Staffa Formation Samples

Sample no.	Location	Grid Ref	Rock Type
AT1	Ardtun	NM 37731 24786	Volcaniclastic lithic arenite
AT2	Ardtun	NM 37742 24798	Volcaniclastic lithic arenite
AT3	Ardtun	NM 37733 24799	Volcaniclastic lithic arenite
AT4	Ardtun	NM 37719 24773	Volcaniclastic lithic arenite
AT5	Ardtun	NM 37719 24782	Volcaniclastic lithic arenite
AT6	Ardtun	NM 377 44 24792	Volcaniclastic lithic arenite
AT7	Ardtun	NM 37732 24787	Volcaniclastic lithic arenite
AT8	Ardtun	NM 37719 24772	Volcaniclastic lithic arenite
AT9	Ardtun	NM 37736 24782	Volcaniclastic lithic arenite
BB1	Biod Buidhe	NM 45006 19243	Volcaniclastic lithic wacke
BB2	Biod Buidhe	NM 45006 19243	Volcaniclastic lithic wacke
BB3	Biod Buidhe	NM 45006 19243	Volcaniclastic lithic wacke
BB4	Biod Buidhe	NM 45014 19243	Volcaniclastic lithic wacke
CA1a	Carsaig Arches - Malcom's Point	NM 49380 18554	Volcaniclastic lithic wacke
CA1b	Carsaig Arches - Malcom's Point	NM 49380 18554	Volcaniclastic lithic wacke
CA1c	Carsaig Arches - Malcom's Point	NM 49380 18554	Volcaniclastic lithic wacke
CA1d	Carsaig Arches - Malcom's Point	NM 49380 18554	Volcaniclastic lithic wacke
CA2	Carsaig Arches - Malcom's Point	NM 49775 18551	Volcaniclastic lithic wacke
CA3	Carsaig Arches - Malcom's Point	NM 49925 18648	Volcaniclastic lithic wacke
CA4	Carsaig Arches - Malcom's Point	NM 50022 18701	Quartz arenite
CA5a	Carsaig Arches - Malcom's Point	NM 50022 18701	Volcaniclastic lithic wacke
CA5b	Carsaig Arches - Malcom's Point	NM 50022 18701	Volcaniclastic lithic wacke
CA6	The Pulpit Rock	NM 50181 18802	Quartz arenite
CA7a	Carraig Mhor	NM 55706 21154	Peperite
CA7b	Carraig Mhor	NM 55706 21154	Pperite
CA8	Carsaig Arches - Malcom's Point	NM 49491 18553	Volcaniclastic lithic wacke
CA9	Carsaig Arches - Malcom's Point	NM 49485 18562	Massive Scoria-rich Breccia
CA10	Carsaig Arches - Malcom's Point	NM 49490 18570	Massive Scoria-rich Breccia
MP01	Malcoms Point	NM 49317 18535	Massive Scoria-rich Breccia
MP02	Malcoms Point	NM 49315 18530	Massive Scoria-rich Breccia
MP03a	Malcoms Point	NM 49219 18537	Sublithic arenite
MP03b	Malcoms Point	NM 49219 18537	Sublithic arenite
MP03c	Malcoms Point	NM 49219 18537	Sublithic arenite
MP03d	Malcoms Point	NM 49219 18537	Volcaniclastic lithic wacke
MP03e	Malcoms Point	NM 49219 18537	Volcaniclastic lithic wacke
MP04a	Malcoms Point	NM 49322 18535	Quartz arenite
MP04a	Malcoms Point	NM 49322 18535	Quartz arenite
MP04b	Malcoms Point	NM 49209 18557	Quartz arenite
MT1	MacCulloch's Tree	NM 40259 27797	Scoria-rich volcaniclastic breccia
MT2	MacCulloch's Tree	NM 40259 27797	Massive Scoria-rich Breccia
MT4	MacCulloch's Tree	NM 40259 27850	Massive Scoria-rich Tuff
MT6	MacCulloch's Tree	NM 40198 28046	Massive Scoria-rich Breccia
MT7	MacCulloch's Tree	NM 40198 28046	Massive Scoria-rich Breccia
MT8	MacCulloch's Tree	NM 40199 28050	Massive Scoria-rich Breccia
MT9 (4)	MacCulloch's Tree	NM 40213 27949	Massive Scoria-rich Breccia
MT3a	The Ladder	NM 40506 27295	Sublithic arenite
MT3b	The Ladder	NM 40506 27295	Sublithic arenite
MT3c	The Ladder	NM 40506 27295	Sublithic arenite
MT3d	The Ladder	NM 40506 27295	Volcaniclastic lithic wacke
MT3e	The Ladder	NM 40506 27296	Scoria-rich volcaniclastic breccia
MT3f	The Ladder	NM 40506 27297	Scoria-rich volcaniclastic breccia
MT3g	The Ladder	NM 40506 27298	Volcaniclastic lithic wacke
MT5	The Ladder	NM 40506 27295	Massive Scoria-rich Tuff

Rosebank Thinsections

Sample no.	Well Number	Depth (ft)	Depth (m)	Rock Type
1	213/26-1	9430.3	2874.4	Basalt
2	213/26-1	9430.9	2874.5	Basalt
3	213/26-1	9431.4	2874.7	Basalt
4	213/26-1	9442.1	2878.0	Basalt
5	213/26-1	9446.4	2879.3	Basalt
6	213/26-1	9446.7	2879.4	Basalt
7	213/26-1	9447.2	2879.5	Basalt
8	213/26-1	9449.1	2880.1	Contact
9	213/26-1	9449.4	2880.2	Contact
10	213/26-1	9450.9	2880.6	Contact
11	213/26-1	9451.8	2880.9	Contact
12	213/26-1	9452	2881.0	Contact
13	213/26-1	9452.3	2881.1	Basalt
14	213/26-1	9473.2	2887.4	Basalt
15	213/26-1	9473.8	2887.6	Basalt
16	213/26-1	9474.2	2887.7	Contact
17	213/26-1	9475.8	2888.2	Contact
18	213/26-1	9476.5	2888.4	Contact
19	213/26-1z	9877.7	3010.7	vien
20	213/26-1z	9887.1	3013.6	Contact
21	213/26-1z	9887.9	3013.8	Contact
22	213/26-1z	9888.3	3014.0	Contact
23	213/26-1z	9886.9	3013.5	Basalt
24	213/27-2	9432.8	2875.1	Contact
25	213/27-2	9433.6	2875.4	Volcaniciclastic
26	213/27-2	9429.3	2874.1	Volcaniciclastic
27	213/27-2	9430.7	2874.5	Volcaniciclastic
28	213/27-2	9441.2	2877.7	Basalt
29	213/27-2	9439.1	2877.0	Contact
30	213/27-2	9438.7	2876.9	Contact
31	213/27-2	9438.1	2876.7	Contact
32	213/27-2	9435.4	2875.9	Basalt
33	213/27-2	9425.4	2872.9	Peperite?
34	213/27-2	9425.8	2873.0	Sublithic arenite
35	213/27-2	9707.5	2958.8	Sublithic arenite
36	213/27-2	9659.3	2944.2	Sublithic arenite
37	213/27-2	9658.7	2944.0	Sublithic arenite
38	213/27-2	9644.7	2939.7	Basalt
39	205/1-1	9617.4	2931.4	Basalt
40	205/1-1	9640.3	2938.4	Basalt

Rosebank Core Samples

Sample no.	Chevron Re	Well Number	Depth (ft)	Depth (m)	Rock Type
1	XTS16	213/27-2	9438.8	2876.9	Volcaniclastic lithic wackes
2	XTS6	213/27-2	9432.8	2875.1	Volcaniclastic lithic wackes
3	XTS21	213/27-2	9625.4	2933.8	Sublithic arenite
5	B32	213/26-1		0.0	basalt
6	XTS4	213/27-2	9428.9	2873.9	Volcaniclastic lithic wackes
7	XTS23	213/27-2	9633.7	2936.4	Sublithic arenite
8	B18	213/26-1	9300.0	2834.6	basalt
9	41	205/1-1	8885.0	2708.1	Volcaniclastic lithic wackes
10	XTS31	213/27-2	9645.9	2940.1	mudstone
11	XTS18	213/27-2	9439.4	2877.1	Basalt
12	XTS8	213/27-2	9434.0	2875.5	Basalt
13	XTS2	213/27-2	9425.9	2873.0	Volcaniclastic lithic wackes
14	XTS3	213/27-2	9427.1	2873.4	Volcaniclastic lithic wackes
15	XTS24	213/27-2	9634.9	2936.7	Conglomerate
16	XTS35	213/27-2	9651.6	2941.8	Sublithic arenite
17	XTS38	213/27-2	9656.7	2943.4	Sublithic arenite
18	XTS49	213/27-2	9677.4	2949.7	Quartz arenite
19	XTS64	213/27-2	9697.5	2955.8	Quartz arenite
20	9	205/1-1	9482.0	2890.1	Basalt
21	B1	213/26-1	9290.0	2831.6	Basalt
22	2	213/27-2	9976.0	3040.7	Volcaniclastic lithic wackes
23	8	213/27-2	9734.0	2966.9	Volcaniclastic lithic wackes
24	35	213/27-2		0.0	Sublithic arenite
25	41	213/27-2		0.0	Sublithic arenite

Staffa Formation point counting data

Staffa Formation	Samples	Quartz	Flint 1	Flint 2	total flint	Plagioclase	microcline	Total Feldspar	Organic fragment	Biotite	muscovite	cystalline lava clast	Pyroclastic clast	Plagioclase Accumlate	Sidromelene/palagonite	Total Basalt lithoclasts	Pyroxene	lithoclasts	mudstone	glucophane	zeolite	Opaques	clay matrix	calcite	Total Matrix	Porosity	Total
CA9	Massive Scoria-rich Breccia	1.4	0	0	0	12	0	12	0.6	0	0	3	58	0	9	70	0	0	0	0	2	0.6	11.6	0.2	11.8	1.6	100
CA10	Massive Scoria-rich Breccia	2	0	0	0	15	0	15	0.2	0	0	0.6	52	0	12	64.6	0	0	0	0	1	2	15	0	15	0.2	100
MP01	Massive Scoria-rich Breccia	1.2	0	0	0	10	0	10	1	0.2	0	2.2	48	0	28	78.2	0	0	0	0	0	0.2	9.2	0	9.2	0	100
MP02	Massive Scoria-rich Breccia	0	0	0	0	5	0	5	0.4	0	0	6	60	0	23	89	0	0	0	0	0	0.6	4.8	0.2	5	0	100
MT2	Massive Scoria-rich Breccia	0.2	0	0	0	8	0	8	1	0	0	2	55	0	22	79	0	0	0	0	4	0.2	7	0	7	0.6	100
MT6	Massive Scoria-rich Breccia	2.2	0	0	0	12.8	0	12.8	0	0	0	4	28	1	32	65	0	0	0	0	2	2	14	1	15	1	100
MT7	Massive Scoria-rich Breccia	0	0	0	0	9	0	9	0	0	0	0	18	0	29	47	0	0	0	0	0	0.2	42	1	43	0.8	100
MT8	Massive Scoria-rich Breccia	0			0	1		1	0	0	0	0	18	0	28	46	0	0	0	0	0	0	53	0	53	0	100
MT9 (4)	Massive Scoria-rich Breccia	0.2	0	0	0	12	0	12	2	0	0	5	17	0	25	47	0	0	0	0	0	2.6	36	0.2	36.2	0	100
MT4	Massive Scoria-rich Tuff	2	0	0	0	9.4	2	11.4	0	0	0	7.3	26.2	0	25.2	58.7	0	0	0	0	0	0.3	25	0.2	25.2	2.4	100
MT5	Massive Scoria-rich Tuff	0.4	0	0	0	12.4	0.2	12.6	0	0	0	9	22	0	16	47	0	0	0	0	0	0	39	0	39	1	100
CA7a	Peperite				0			0								0	0								0		0
CA7b	Pperite				0			0								0	0								0		0
CA4	Quartz arenite	56.6	0	0	0	0.2	0	0.2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2	2.2	38	100
CA6	Quartz arenite	54	0	0	0	0.2	0	0.2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	18	19.8	37.8	5	100
MP04a	Quartz arenite	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	21	36	2	100
MP04a	Quartz arenite	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	25	39	1	100
MP04b	Quartz arenite	52	0	0	0	0.8	0	0.8	1.2	1	0	0	0	0	0	0	0	0	0	0	0	0.4	24	15.6	39.6	5	100
MP03a	Sublithic arenite	38	9.8	18	27.8	3	0.4	3.4	2	0	0	6	0	0	3	9	0	0	0	0	0	0	18.6	0.2	18.8	1	100
MP03b	Sublithic arenite	32.2	11	12	23	3	0	3	0.2	0	0	2.2	0	0	6	8.2	0	1	2	0	0	0	19.4	8	27.4	3	100
MP03c	Sublithic arenite	37	9	4	13	7	1.4	8.4	4	2	1	2	0	0	4	6	0	0.2	2.6	0	0	1	17.8	6	23.8	1	100
MT3a	Sublithic arenite	27	21	6	27	2	0	2	2	0	0	2.2	0	0	1.9	4.1	0	0	0.3	0	0	0	24.4	8	32.4	5.2	100
MT3b	Sublithic arenite	44	20	14	34	8	0.6	8.6	0.8	1	1	2	0	0	0	2	0	0	0	0	0	0	4	4.5	8.5	0.1	100
MT3c	Sublithic arenite	40	13	16	29	10	0	10	3	0.4	0	0.6	0	0	4	4.6	0	0	1	0	0	0	6	2	8	4	100
AT1	Volcaniclastic lithic arenite	26	6	12	18	7	2	9	4	2	1	6.2	0	0	10	16.2	0	0.4	1	0.2	0	0.2	8	12.4	20.4	1.6	100
AT2	Volcaniclastic lithic arenite	21	10	9	19	6	0	6	0	0	0	8	0	0	11	19	0	6	0	0	0	0.1	12	14.9	26.9	2	100
AT3	Volcaniclastic lithic arenite	18	15	11	26	4	0.4	4.4	3	1	0.2	11.8	0	0.2	7	19	0	0	0.2	0	0	0	14.2	10	24.2	4	100
AT4	Volcaniclastic lithic arenite	22	8	6	14	9	1	10	3	0.4	1	11.4	0	0	7	18.4	0	4	2	0	0	0.2	14	8	22	3	100
AT5	Volcaniclastic lithic arenite	17	12	2	14	4	2	6	6	2	0	14	0	0	2	16	0	8	2	0	0	1	10	18	28	0	100
AT6	Volcaniclastic lithic arenite	15	7	11	18	8.6	0.4	9	4	0.2	0	12	0	0.2	4	16.2	4	1.6	0	0	0	1	20	11	31	0	100
AT7	Volcaniclastic lithic arenite	24	16	0.2	16.2	9	0.6	9.6	2	0.2	0.4	3	0	0	11	14	0.2	0	0	0	0	0	27.4	2	29.4	4	100
AT8	Volcaniclastic lithic arenite	17.6	4.6	3.8	8.4	6	3	9	4	2	0.8	8	0	0	2	10	2	4	2.2	0	0	1	15	14	29	10	100
AT9	Volcaniclastic lithic arenite	12.8	24	5	29	3	1	4	2	0.1	0.2	2	0	0	4	6	2	5	3	0.3	0	0	16	19	35	0.6	100
BB1	Volcaniclastic lithic wacke	16	7.6	3	10.6	0	0	0	1.1	0.2	0	7.3	0	0	26.2	33.5	0	2	0	0	0	0.2	31	3	34	2.4	100
BB2	Volcaniclastic lithic wacke	24	11.8	2	13.8	0.2	0	0.2	0	0	0	9	1	0	22	32	0	0	0	0	0	0	29	0	29	1	100
BB3	Volcaniclastic lithic wacke	18.6	14	1.6	15.6	1	0.2	1.2	1.2	0	0	21	0	0	6	27	0	0.4	0.2	0	0	0.2	33	0.6	33.6	2	100
BB4	Volcaniclastic lithic wacke	16	7	8	15	3	1.6	4.6	0	0	0	19	2	1	7	29	0.2	4	1	0.2	0	0	21	5	26	4	100
CA1a	Volcaniclastic lithic wacke	12.8	9	11	20	0.6	0	0.6	0.2	1	0	7	0.2	0.4	18	25.6	0	0.2	0.8	0	1	0.8	34	3	37	0	100
CA1b	Volcaniclastic lithic wacke	12	12.2	0.2	12.4	2	0.2	2.2	0.1	0.2	0	5	2	0.2	18	25.2	0	0	0	0	0.2	0.2	46	0.2	46.2	1.3	100
CA1c	Volcaniclastic lithic wacke	18.2	24	0	24	0.8	0.1	0.9	0.2	0	0	2	4	1	21	28	0.2	0.4	0.2	0	0.2	0.2	27	0.4	27.4	0.1	100
CA1d	Volcaniclastic lithic wacke	14.4	16	1	17	2	0	2	0.2	0.4	0.4	17	1	0.6	5	23.6	0	1	1	0	1	1	32	0	32	6	100
CA2	Volcaniclastic lithic wacke	17.2	4	15	19	2	1	3	0	0	0	8.2	0.6	0	12.8	21.6	0	0	0	0	0	0	34.8	4	38.8	0.4	100
CA3	Volcaniclastic lithic wacke	18.8	6.8	3	9.8	1.6	0.8	2.4	0	0	0	15	6	0.2	6	27.2	0	0	0		1	0	37.8	0.2	38	2.8	100
CA5a	Volcaniclastic lithic wacke	26.6	14	2	16	0	0	0	0.2	0	0	15	15	0.2	6	36.2	0	0.2	0	0	0.1	0.1	13.6	2	15.6	5	100
CA5b	Volcaniclastic lithic wacke	22	3.8	11.4	15.2	0.3	0	0.3	0	0	0	9	6	0	11	26	0	0	0	0	0	0.1	33.2	3	36.2	0.2	100
CA8	Volcaniclastic lithic wacke	9	11	0	11	3	0	3	0.2	0.6	0	9	11	2	11	33	0.2	4	2	0	1	2	29	5	34	0	100
MP03d	Volcaniclastic lithic wacke	13	6.2	4	10.2	4	0.2	4.2	1	0	0	6	9	0	14	29	2	2	0	0	0.4	1	34.2	3	37.2	0	100
MP03e	Volcaniclastic lithic wacke	15.6	4	6	10	6	0	6	4	0	0	7	8	0	10	25	0	0.2	0	0	0	2	31	6	37	0.2	100
MT3d	Volcaniclastic lithic wacke	17	4.8	9	13.8	2	1	3	0	0	0	0	8	0	24	32	0	4	2	0.2	4	1.6	12	10	22	0.4	100
MT3g	Volcaniclastic lithic wacke	24	2	2	4	4	1.2	5.2	0	0	0	0	2	0	25	27	0	0	0	0	6	0.8	17	14	31	2	100

QXRD data

Sample name	% Quartz	% Plagioclase	% K-feldspar	Total feldspar	% Pyroxene	% Glass	% Other	% Calcite	% Analcime	% Corrensite	% Saponite	% Nontronite	% Di-smectite	% Illite/smectite	% Kaolinite	Sum
MT8	3.9	33.1	4.7	37.8	10.6	18.1	1.5	0	1.2	16	10.9	0	0	0	0	137.8
MT5	3	12.7	3.4	16.1	10.9	15.2	2.3	1.1	1.4	6.4	24.8	9	4	5.8	0	116.1
MT3g	31.5	14.4	1.3	15.7	1.4	11	1.4	2.1	0.8	26.9	2.3	4.8	0	0	2.1	115.7
CHEV 6	0.6	2.1	3.1	5.2	5.5	25.1	1.9	0.2	13.2	32.6	15.7	0	0	0	0	105.2
Ca1d	11.2	7	3	10	2.8	11.3	1.9	0	9.8	24.5	3.5	8.8	0	13.8	2.4	110
CHEV13	0.7	0.7	2.6	3.3	4	20.9	2.5	0.2	8	42.2	13.3	4.9	0	0	0	103.3
MT3a	38.8	10.5	8.2	18.7	10	8.2	0.6	0	0.5	7	4.7	0	4.8	6.7	0	118.7
CHEV16	57.8	20.1	7.1	27.2	0.8	2.3	0.6	0	0.4	9.5	0	0	1.1	0.3	0	127.2