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MC-15

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A suite of twenty-one drill core samples from MC-15, drilled south of Mt. Charter, was received for routine petrological examination. Representative thin-sections were prepared and examined in transmitted and oblique incident light. Microscopic data is summarised in the attached tabulated descriptions.

Summary

The bulk of this suite comprises altered basic to intermediate lavas, varying compositionally from basaltic through andesitic to leuco-andesitic on the basis of relict compositional and textural features. Alteration assemblages are partly host-rock controlled, typified by epidote-rich assemblages in basalts in contrast to epidote-deficient altered andesitic types. Individual rocks reflect relatively advanced silicification typically with associated white mica. Several exhibit irregular zones of microcrystalline albitisation concentrated in andesitic facies, particularly fragmental types, but also developed locally in basalts.

Subordinate sediments are dominated by tuffaceous and mildly reworked tuffaceous psammopelites. Sample 383649 represents an unusually mature quartzose sandstone with greenschist metapelite-derived lithic clasts supplemented by minor reworked andesitic lava clasts. This facies clearly reflects a break in the volcanic sequence and contrasts with more typical minor tuffaceous psammopelites in the absence of pyroclastic components.

D. Cowan, B. Sc.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
383634 (T.S. 56813) 9.0	<u>Carbonaceous Pelite</u> . Semi- to sericitic white mica with pervasive carbonaceous matter, fine silt-sized clastic mica flakes; semi-pervasive sericitised feldspar grains, sporadic similarly altered shard fragments.	Sub- to fine millimetric scale alternation of silty shale and argillaceous siltstone. Incipiently crenulated.	ic- Semi-pervasive, incipiently quartz- and sericite-pressure-shadowed syngenetic pyrite.	Siltstone partings are distinctly tuffaceous; reflect pervasive sericitic alteration. Minor traces of splintery clastic quartz.
383635 14.4	<u>Altered Andesite</u> . Abundant sericitised feldspar, subordinate leucoxenitic chloritic sericite-pseudomorphed ferromag. phenocrysts. Altered groundmass of semi-sericitic white mica and near-isotropic chlorite.	"Andesitic" (strongly porphyritic). Weakly flow-banded, vaguely micritic altered groundmass.	Leucoxenised opaques. Traces of secondary micro-quartz, microcrystalline pyrite. Rare apatite.	Thoroughly sericite-chlorite(-quartz)-altered/weakly pyritised flow-banded lava with relict andesitic characteristics.
383636 18.9	<u>Andesitic Tuff Lava</u> . Abundant albitised plagioclase, subordinate leucoxenitic-chloritised ferromag. phenocrysts. Albitised to semi-selectively albite-sericite(-chlorite)-altered groundmass.	Andesitic/trend glomeroporphyritic; massive to moulded lithic-fragmental on a sub- to millimetric scale.	Leucoxenised opaques, traces of apatite, quartz. Semi-pervasive microcrystalline pyrite; rare sphalerite.	Exhibits semi-hybrid features; composite of albite-sericite-chlorite-altered andesitic and relatively albitised "leuco-andesitic" clasts. Traces only of secondary quartz.
383637 36.0	<u>Andesitic Lava Breccia</u> . Albitised/sericite-stained plagioclase and subordinate to minor chloritised ferromag. phenocrysts; albitised/sericite-stained to selectively chloritised feldspar-microlathic groundmass.	Subtrachytic lava-matrixed lava-breccia, with millimetric to centimetric clasts; late chloritic microfractures.	Leucoxenised opaques, traces of pyrite, cloudy microcrystalline epidote, quartz. Traces primary apatite.	Exhibits semi-hybrid characteristics analogous to 383636, with relatively chloritised andesitic clasts; albitised "leuco-andesitic" matrix.
383638 83.0	<u>Amygdaloidal Basalt</u> . Abundant albitised/weakly sericitic plagioclase and unaltered augite phenocrysts, sporadic calcite-chlorite amygdaloids in a groundmass of albitised plagioclase microlaths; chlorite-epidote mesostasis.	Weakly flow-structured, weakly amygdaloidal, strongly porphyritic basaltic. Mildly stressed.	Traces of chromite, minor traces of pyrite, rare ultrafine chalcopyrite. Minor chlorite-calcite veinlets.	Typical pyroxene-rich basaltic characteristics with abundant fresh phenocrystal augite. Stress effects largely restricted to amygdaloids, veinlets.
383639 109.9	<u>Amygdaloidal Basalt</u> . Abundant albitised/saussurite-stained plagioclase and unaltered augite phenocrysts; sporadic chlorite amygdaloids. Groundmass of albitised plagioclase microlaths; saussuritic/chloritic mesostasis.	Analogous to 383638; relatively flow-structured, relatively amygdaloidal.	Chromite, traces of pyrite, pumpellyite; sporadic clots of carbonate and quartz (amygdaloids). Minor cognate xenoliths.	Amygdaloidal, weakly xenolithic, strongly pyroxenic basaltic lava with close affinities to 383638. Relatively chromiferous.
383640 115.2	<u>Tuffaceous Pelite</u> . Semi-sericitic white mica and cloudy microcrystalline albite with clastic muscovite flakes, disseminated to conspicuous albitised "andesitic" lava clasts, feldspar grains, radiolaria and spongy spicules.	Laminated silty shale with sub- to fine millimetric siltstone, fine sandstone partings. Weakly microcrenulated.	Microcrystalline pyrite, pyrrhotite, minor chlorite, carbonaceous matter, sporadic clots of calcite.	Affinities with 383634. Exhibits distal, impure pelitic ashy characteristics, partly obscured by marked albitisation (including alteration of microfossils).
383641 115.8	<u>Tuffaceous Psammopelite</u> . Framework of albitised andesitic lava clasts, minor albite grains, epidote-chlorite-stained feldspathic cement. Partings, beds of tuffaceous pelite (sim. 383640). Sporadic quartz- and chloritic-albitic quartz veinlets.	Planar to slumped semi-turbiditic/weakly graded bedding. Variably stressed veinlets.	Traces carbonaceous matter, clastic hornblende, vein-apatite, zoisite. Disseminated and veinlet-hosted pyrite, pyrrhotite.	Affinities with 383640, relatively weakly (albitised)-microfossiliferous and distinctly psammitic in comparison. Includes minor albitised shard fragments.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
383642 122.1	<u>Andesitic Tuff</u> . Framework of albite-sericite-chlorite-altered porphyritic/variably perlitic lava clasts, minor albitised plagioclase grains with a sparse matrix/cement of semi-sericitic white mica.	Angular to subangular, poorly sorted, lithoclastic, with minor moulded and rare composite clasts.	Leucoxenised opaques. Minor vugs of chlorite, quartz, albite. Traces of cloudy carbonate, pyrite.	Interpreted as a subaqueous lithic tuff; possibly incipiently reworked (e.g. slumped). Devoid of tangible non-volcanic components.
383643 127.4	<u>Andesitic Breccia</u> . Clasts of thoroughly albitised/weakly sericite-stained to selectively chloritised porphyritic/variably perlitic lava. Very sparse interclast matrix of chlorite, minor quartz.	Moulded/weakly flow-structured, psammite to lapilli-grade, lithoclastic.	Leucoxenised opaques, rare fine pyrite. Traces of calcite.	Clasts closely analogous to 383642. In contrast, this rock exhibits typical lava flow breccia characteristics.
383644 154.8	<u>Amygdaloidal "Andesite"</u> . Albitised plagioclase and minor muscovite-quartz-pseudomorphed ferromag. phenocrysts, quartz-muscovite(-chlorite) amygdales in a groundmass of felsitic and secondary quartz, albitised feldspar microlites.	Amygdaloidal, semi-banded, porphyritic, felsitic; incipiently quartz-veined, minor chlorite.	Leucoxenised opaques, rare very fine apatite.	Felsitic, devitrified andesitic amygdaloidal lava; distinctly quartz-muscovite-altered in contrast to 383642, 383643.
383645 173.0	<u>Amygdaloidal "Andesite"</u> . Albitised plagioclase phenocrysts, minor chloritised ferromag. microphenocrysts, sporadic quartz-muscovite amygdales in a chlorite-sericite-stained/partly silicified feldspar-microlitic groundmass.	Analogous to 383644; weakly perlitic and flow-structured in comparison.	Leucoxenised opaques, minor traces of pyrite. Minor chloritic quartz-albite veinlets.	Close affinities with 383644, and similarly altered. Possibly strictly leuco-andesitic, but primarily glassy and thus poorly diagnostic.
383646 182.0	<u>"Leuco-Andesitic" Breccia</u> . Clasts of albitised plagioclase-porphyritic, variously chloritic to chlorite-sericite-altered lava with irregular zones of microcrystalline secondary albitisation.	Lapilli-grade, moulded/flow-structured, lithoclastic.	Leucoxenised opaques, sparse corroded quartz phenocrysts, chlorite veinlets with traces of sphene.	Exhibits leuco-andesitic characteristics in common with 383644, 383645. Late albitisation partly controlled by ill-defined microfractures, clast margins.
383647 241.6	<u>Amygdaloidal Basalt</u> . Albitised/saussuritic epidote-stained plagioclase microlaths, disseminated quartz micro-amygdales; epidote-chlorite-altered mesostasis. Epidote-calcite and quartz-chlorite-calcite veinlets.	Weakly flow-structured/locally flow-brecciated basaltic. Displacive quartz-chlorite-calcite veinlets.	Minor chlorite and epidote-chlorite-quartz amygdales. Traces sphalerite in late veinlets.	Typical basaltic relict compositional and alteration features. Primarily fine-grained subvitic and pyroxene-deficient in comparison with 383638, 383639.
383648 249.5	<u>Amygdaloidal Basalt</u> . Sporadic epidote (+ chlorite, quartz) amygdales in a groundmass of albitised feldspar microlaths with a chlorite/microcrystalline cloudy epidote altered mesostasis.	Strongly flow-structured, amygdaloidal, basaltic.	Rare augite phenocrysts. Sporadic quartz(-chlorite-epidote) and late calcite veinlets. Rare blebs of sphalerite.	Close affinities with 383647 and similarly altered. Distinctly flow-structured in comparison. The rare phenocrystal clinopyroxene is unaltered.
383649 365.0	<u>Protoquartzite</u> . Framework of subangular quartz grains, subordinate muscovite flakes, carbonaceous quartz-mica phyllite clasts. Sericite-chlorite-quartz cement with sporadic clots of calcite.	Weakly bedded, silty fine to medium sandy clastic. Mildly stressed.	Detrital leucoxene, minor clasts of calcitised "andesite". Minor traces of pyrite.	Unusually mature quartzose sandstone with greenschist metapelite clasts supplemented by minor "andesite" clasts. No tuffaceous features.

Sample No.	Classification - Composition	Fabric	Accessories	Comments
383650 360.7	"Andesitic" Tuff. Clasts of variously chloritised to microcrystalline-albitised plagioclase-porphyrific lava, minor streaky fiamme-like clasts of vitric and vitric-crystal tuff. Minor clots of sericite.	Poorly sorted, psammite-grade, flow-structured, semi- to moulded lithic fragmental.	Leucoxenised opaques, minor chloritised ferromags, traces of pyrite. Sporadic quartz-calcite veinlets.	Andesitic/trend leuco-andesitic lithic fragmental. Interpreted as a mildly welded lithic tuff, but possibly strictly a tuff lava. Finer detail obscured by alteration.
383651 369.9	Andesitic Breccia. Clasts of chloritic to semi-selectively albitised lava with albitised plagioclase, sporadic silicified ferromag. phenocrysts, disseminated to conspicuous quartz amygdales. Sporadic vugs of calcite, albite, quartz.	Lapilli- to agglomerate-grade, moulded, lithoclastic, with sporadic interclastic vugs.	Leucoxenised opaques, minor traces of chromite, traces of pyrite, rare chalcopyrite.	Bulk of clasts are perlitic-textured types, typical of Mt. Charter andesites. Amygdaloidal and interclastic cavity-filling quartz was initially chalcedonic.
383652 379.9	Basaltic Breccia. Clasts of partly epidotised/augite-microporphyrific/albitised plagioclase-microlathic, variably chlorite-amygdaloidal lava with irregular marginal microcrystalline-albitised zones. Sporadic calcite-chlorite veinlets.	Lapilli- to agglomerate-grade, moulded, lithoclastic. Mildly sheared/segmented veinlets.	Sporadic chlorite-quartz-pseudomorphed ?orthopyroxene phenocrysts. Traces chromite, pyrite, pale sphalerite.	Texturally similar to 383651, but with distinctly basaltic relict compositional and alteration features. Sphalerite concentrated in marginal albitic alteration zones.
383653 380.7	Amygdaloidal Basalt. Quartz-carbonate-pseudomorphed pyroxene phenocrysts, chlorite-selvedged quartz amygdales in a groundmass of epidotised pyroxene laths, albitised plagioclase microlaths, chloritic mesostasis.	Weakly flow-structured, weakly porphyritic, basaltic.	Minor calcite veinlets. Traces chromite, relics of augite. Minor traces of pyrite, sphalerite.	Close affinities with 383652 in terms of relict compositional and alteration features. Sphalerite concentrated in amygdales and altered ?orthopyroxene phenocrysts.
383654 (T.S. 56833) 395.0	Amygdaloidal Basalt. Sparse quartz-albite-pseudomorphed pyroxene phenocrysts, frequent chlorite amygdales, chlorite-quartz micro-amygdales; chlorite-mesostasised epidotised pyroxene lath, albitised feldspar microlath groundmass.	Flow-structured (orientated amygdales). Amygdaloidal, weakly porphyritic, basaltic.	Traces of chromite, minor relics of augite. Sporadic calcite-quartz veinlets.	Typical altered amygdaloidal basaltic characteristics. Close affinities with 383652 and 383653.