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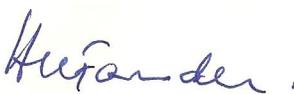
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### REPORT CMS 89/4/28

YOUR REFERENCE: Letter dated 6.4.1989  
DATE RECEIVED: 18th April, 1989  
SAMPLE NOS.: 515481 - 515488  
SUBMITTED BY: S. Rand  
WORK REQUESTED: Petrology

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H.W. Fander, M. Sc.

REPORT CMS 89/4/28

A suite of eight samples of split core from Mount Charter Drill Hole MAC-23 was received for routine petrological description. Representative thin-sections were prepared, examined in transmitted light and, together with respective offcuts, in oblique incident light, with (feldspar, carbonate) stain tests performed as warranted.

Attached descriptions summarise the microscopic data, include interpretative comments, and refer to specific queries, where applicable.

Summary

As sampled, the MAC-23 sequence comprises an upper thoroughly altered and brecciated felsic ("leuco-andesitic") intermediate lava breccia overlying a volcanoclastic breccia unit and a thick "basal" sequence of altered dacitic/rhyodacitic lavas.

Alteration features are rather consistent, with typically pervasive development of sericite-quartz-pyrite assemblages. Individual rocks exhibit polystage vein development with assemblages broadly consistent with the alteration. A rather consistent feature is the temporally intermediate to late-stage barite-bearing veins, variably sulphide-mineralised and predating generally mild but semi-penetrative stress and shearing effects.

The breccia unit, represented by samples 515482 and 515483, is polymict in terms of exhibiting basic to intermediate and acid volcanic debris (515482) and, at least locally (515483), reworked tuffaceous and non-volcanic components. Fabrics reflect a sedimentary slump or "mass-flow" mode of origin, and general features are thus consistent with the so-called volcanoclastic sequences.

D. Cowan, B. Sc.

SAMPLE NO.:

515481

9.9m

(T.S. 61577)

1.

CLASSIFICATION:

"Leuco-Andesitic" Breccia

COMPOSITION:

Lava clasts with frequent albitised/variably sericite-pseudomorphed feldspar phenocrysts, relatively minor quartz-pyrite-, and sericite-pyrite-pseudomorphed phenocrystal ferromags. and altered groundmasses of sericite and sericite-stained crypto- to microcrystalline quartz more or less pervasively stained with very fine to ultrafine pyrite impregnations. Poorly optically defined matrix of strongly sericitic impure chert/cherty argillite. Pervasive irregular networks of sericite-quartz veinlets, films and stringers. Sporadic late irregular quartz-sericite veinlets and vugs.

FABRIC:

Variable and partly obscured by secondary sericite-quartz-healed brecciation effects. Essentially a flow-structured moulded to impure chert-cemented lava breccia with variably perlitic-structured/partly devitrified "lapilli-grade" clasts. Marked secondary fracturing effects partly controlled by the perlitic structures. Weakly/variably sheared and locally sheared sandy/lensoid breccia-textured, where relatively sericitised.

ACCESSORIES:

Rare corroded phenocrystal quartz. Conspicuous very fine leucoxenised opaques, rare microscopic apatite. Sporadic boudinaged/sericite-pressure-shadowed relatively pyritic sericitic stringers.

COMMENTS:

Detail obscured by advanced sericite-quartz-pyrite alteration, pervasive similarly constituted veinlets and subsequent shearing effects. Interpreted as leuco-andesitic on the basis of low phenocrystal ferromag. content and presence of accessory phenocrystal quartz. No detectable barite in area sectioned.

SAMPLE NO.:

515482

26.1 m

(T.S. 61578)

2.

CLASSIFICATION:

Volcanomict Breccia

COMPOSITION:

Random clastic framework of irregular to angular-subangular, thoroughly sericite-quartz-altered lava clasts supplemented by similarly altered sand-sized crystal fragments (semi-selectively sericitised feldspar, silicified ferromags.) cemented by aggregates of variably sericitic crypto- to micro-crystalline quartz. Sporadic vugs, replacements, irregular veinlets, amygdales of medium-grained vein-quartz with minor associated barite. Late crosscutting semi-planar vein (1-2 mm wide) of barite and quartz with disseminated blebs of pale sphalerite.

FABRIC:

Partly obscured by alteration, but essentially poorly sorted (psammite to agglomerate grade) lithic-crystal fragmental with a corrosive/replacive hydrothermal sericitic quartz cement. Clasts include vaguely relict andesitic, leuco-andesitic/dacitic and rare ?basaltic types. Weakly stressed (post-veining) to weakly sheared/incipiently phyllitic, where relatively sericitic.

ACCESSORIES:

Leucoxenised opaques and minor traces of chromite. Thinly/semi-pervasively disseminated fine to ultrafine pyrite, subordinate traces of galena and ?sulphosalt.

COMMENTS:

Compositional and much textural detail obscured by intense quartz-sericite alteration. Relict features consistent with a volcanomict (rather than strictly pyroclastic) sedimentary breccia of "debris mass flow" origin, with an assortment of andesitic, leuco-andesitic/dacitic and minor ?basaltic components. Barite is temporally intermediate to late in the alteration/veining sequence. The composite barite-quartz vein is zoned with semi-lustre-mottled barite core and fine semi-comb-structured crystal quartz margins.

SAMPLE NO.:

515483

31.4m

(T.S. 61579)

3.

CLASSIFICATION:

Tuffaceous Breccia

COMPOSITION:

Random framework of sericitised and sericite-quartz-altered/poorly determinate lava and subordinate tuffaceous lithoclasts, conspicuous sericitised shard fragments, disseminated silt-to fine sand-sized angular to subangular quartz, sericitised feldspar grains and minor quartz-sericite-pseudomorphed ferromags. Minor clasts of bleached-carbonaceous sericitic shale and impure chert. Matrix/cement of sericite and crypto-to microcrystalline quartz. Disseminated fine pyrite. Sporadic discontinuous quartz veinlets with thinly disseminated blebs of pale sphalerite. Crosscutting vein (1-1.3 cm wide) of fine to microcrystalline quartz with disseminated to clustered laths of barite, disseminations of fine-grained pyrite, minor spongy clots of sphalerite and disseminated intraclasts of the altered host rock.

FABRIC:

Poorly sorted/weakly graded silty fine to medium angular sandy clastic, with finer-grained incipiently reverse-graded centimetric interbeds. The vein is weakly stressed, essentially banding-concordant, with irregular margins and disseminated angular intraclasts.

ACCESSORIES:

Disseminations of very fine-grained galena, rare blebs of ?bornite in vein. Host rock exhibits leucoxenitic semi-opaques, minor traces of lithoclast-hosted and clastic chromite, and very thinly disseminated clastic muscovite flakes.

COMMENTS:

Affinities with the 515482 breccia and similarly interpreted. In comparison, this rock is finer-grained, distinctly polymict, and exhibits conspicuous mildly reworked and possibly a little primary ashy tuffaceous debris. Volcanic debris is dominantly "dacitic" material, on the basis of relict compositional/microtextural features. The baritic vein is temporally late, is flanked by, and includes, disseminated spongy clots of pyrite and appears to have developed along a pre-existing pyritic fracture or veinlet.

SAMPLE NO.:

515484

72.0m (T.S. 61580)

4.

CLASSIFICATION:

Rhyodacit

COMPOSITION:

Disseminated extensively sericitised/marginally silicified to quartz-sericite-pseudomorphed plagioclase (?albite) phenocrysts, selectively silicified ?K-feldspar and leucoxene-stained quartz-pseudomorphed amphibole phenocrysts, subordinate relict variably corroded quartz phenocrysts. Altered groundmass of sericitised microcrystalline plagioclase, sericite-stained K-feldspar and subordinate quartz. Sporadic veinlets of quartz, chlorite, barite and fine-grained muscovite.

FABRIC:

Porphyritic/trend glomeroporphyritic, flow-structured and -banded, with a microfelsitic/devitrified groundmass. High-angle discordant, crudely stockwork-style veinlets.

ACCESSORIES:

Minor late displacive chloritic-sericitic microfractures. More or less pervasive ultrafine pyrite; thinly disseminated clots of coarser-grained pyrite partly replacive after disseminated leucoxenised opaques. Disseminated microscopic laths of leucoxenised ?ilmenite in veinlets.

COMMENTS:

Primarily a "hornblende rhyodacite", flow-structured and subvitric. Exhibits sericite-quartz-pyrite alteration, with plagioclase, phenocrystal K-spar and amphibole selectively and differentially altered. This rock is unusual, in the Que-Hellyer situation, in containing relics of K-feldspar, as confirmed by staining.

SAMPLE NO.:

515485 117.1 m (T.S. 61581)

5.

CLASSIFICATION:

Amygdaloidal Rhyodacite

COMPOSITION:

Frequent quartz-sericite-pseudomorphed ?K-feldspar, subordinate similarly altered ferromagnesian, and selectively sericitised ?plagioclase phenocrysts (to 1 mm), frequent micro-amygdales (mean 150 um) of quartz and sericite. Pervasively sericite-stained cryptocrystalline felsic groundmass. Irregular networks of microscale veinlets of quartz with interspersed clots of sericite, disseminated very fine to ultrafine blebs of sulphide (pyrite, galena in part) and disseminated laths of leucoxenic ?ilmenite.

FABRIC:

Strongly porphyritic/weakly glomeroporphyritic, flow-structured micro-amygdaloidal, with irregular to crudely stockwork-style incipiently stressed discontinuous veinlets.

ACCESSORIES:

Traces of barite, minor traces of pale sphalerite and quartz-micro-included carbonate in veinlets. Disseminated leucoxenised opaques and (primary accessory) fine acicular apatite. Pervasive ultrafine pyrite in the sericitic groundmass.

COMMENTS:

Affinities with 515484, enhanced by persistence of relics of K-feldspar in the cryptocrystalline groundmasses, similarly altered, and with an essentially similar veinlet assemblage. In comparison, this rock is micro-amygdaloidal, devoid of phenocrystal quartz, and appears to have included minor microphenocrystal pyroxene supplementing the feldspar-amphibole assemblage.

SAMPLE NO.:

515486

163.9 m (T.S. 61582)

6.

CLASSIFICATION:

Amygdaloidal "Rhyodacite"

COMPOSITION:

Frequent sericite- and relatively minor sericite-quartz-pseudomorphed feldspar phenocrysts, supplemented by leucoxenitic quartz-sericite-pseudomorphed phenocrystal ferromags. and sporadic weakly sericitic quartz amygdales (to 2 mm), with disseminated clusters of pyrite. Altered groundmass of sericitised felsitic-anhedral plagioclase with subordinate similarly-textured quartz and sericite-stained K-feldspar, with disseminated fine to ultrafine pyrite. Sporadic pyritic sericite-quartz veinlets and crosscutting weakly pyritic quartz veinlets. Crosscutting sericite-selvedged vein of barite and quartz with spongy clusters of pyrite and minor films and clots of partly degraded/Fe-stained semi-sericitic white mica (orange in hand specimen).

FABRIC:

Strongly porphyritic, weakly amygdaloidal, flow-structured and weakly banded with a finely felsitic-devitrified groundmass. Incipiently sheared, with stressed/partly recrystallised vein-barite and fractured/pressure-shadowed pyrite clusters.

ACCESSORIES:

Conspicuous ultrafine leucoxenised opaques, minor traces of apatite. Traces of ?hematite in ferromag.-pseudomorphous quartz-sericite aggregates.

COMMENTS:

Affinities with 515484 and 515485 and similarly altered. This rock is similarly devoid of phenocrystal quartz and is relatively deficient in K-feldspar and its alteration products, thus probably strictly "orthoclase-dacitic" in composition. Baritic veining appears temporally late with respect to the bulk of alteration.

SAMPLE NO.:

515487

218.8m (T.S. 61583)

7.

CLASSIFICATION:

Amygdaloidal Dacite

COMPOSITION:

Composite aggregates of sericite and subordinate variably sericite-stained fine anhedral quartz with disseminated sericite-pseudomorphed feldspar phenocrysts, frequent variably sericitic and disseminated-pyritic quartz amygdals, minor leucoxene-stained ferromagnesian phenocryst-pseudomorphous sericite-quartz aggregates. Sporadic pyritic quartz and crosscutting pyritic sericite-quartz veinlets. Minor late veinlets of quartz with a little partly sericitised K-feldspar.

FABRIC:

Porphyritic and relatively amygdaloidal, relative flow-structured (orientated amygdals) with a thoroughly sericitised felsitic-microtextured (devitrified) groundmass. Mildly stressed (post-veining). Weakly displacive, temporally intermediate pyritic sericite-quartz veinlets.

ACCESSORIES:

Conspicuous leucoxenised opaques.

COMMENTS:

Affinities with 515484, 515485 and 515486, but exhibiting relatively orthodox altered dacitic characteristics, with a relative deficiency in altered phenocrystal ferromags. paralleling the (deficient) phenocrystal quartz. Relatively amygdaloidal and flow-structured. Exhibits three generations of veinlets, with the late feldspathic quartz assemblage predating stress effects.

SAMPLE NO.:

515488

277.7m

(T.S. 61584)

8.

CLASSIFICATION: Amygdaloidal Dacite

COMPOSITION:

Frequent weakly pyritic sericite pseudomorphs after phenocrystal feldspar, relatively quite minor chloritic quartz (after pyroxene) and sericitic chlorite (amphibole) pseudomorphs after phenocrystal ferromags., disseminated weakly chloritic and sericitic quartz amygdales in pyrite-stained and extensively sericitised felsitic feldspathic/quartz-deficient groundmass. Sporadic veinlets of quartz with subordinate chlorite, barite, a little calcite, and a disseminated pyrite-galena-chalcopyrite-tetrahedrite(?) sulphide assemblage.

FABRIC:

Porphyritic, amygdaloidal, weakly flow-structured and -banded. Stockwork-style mildly stressed veinlets.

ACCESSORIES:

Leucoxenised opaques. Traces of pale sphalerite, minor traces of leucoxenised ?ilmenite in veinlets.

COMMENTS:

Affinities with 515484 etc., and particularly 515487. Exhibits advanced sericite-quartz(-chlorite-pyrite) alteration. The vein assemblage is analogous to that in 515484, although relatively mineralised and with calcite "substituting" for muscovite.