

SAMPLE NUMBER: 56378 HAT-1, 97.5m

**SUMMARY:**

This is a polymict lava breccia dominated by formerly glassy evolved andesite and dacite fragments. Given that diagnosis, it contains a surprising amount of sphene as an alteration product, which may reflect a largely andesitic precursor.

**THIN SECTION DESCRIPTION:**

This is an polymict lava breccia composed dominantly of andesitic to dacitic lava fragments, mainly less than 1cm across. They are invariably plagioclase-phyric, whereas some also contain euhedral phenocrysts of altered cpx, and others a few reacted phenocrysts of quartz. Groundmass textures are considerably more variable than would be able to be produced during explosive eruption of a single flow unit. Many of the larger, dark-coloured fragments are probably from a single unit, being sparsely plagioclase+augite-phyric evolved andesite or dacite, with formerly glassy groundmass that has devitrified to a variable fine- to medium-grained mosaic texture dominated by quartz and albite. In all fragments, plagioclase, which is almost always rather elongate prisms, is totally sericitized, as are the subordinate former augite phenocrysts. A few distinct sugary-textured rhyolite fragments are present, with reacted small quartz phenocrysts. Some more chloritic fragments had microlitic cpx throughout the altered groundmass, and were almost certainly andesitic.

The alteration of this sample is patchy and variable, reflecting the original inhomogeneity in texture and fragment composition. Although sericite is by far the most abundant alteration phase, chlorite is also present (but not common), and brownish, highly birefringent and rather amorphous sphene is quite abundant, often occurring with hematite, but clearly not occupying sites of former FeTi oxides. Sphene and hematite often form trails and concentrations along fragment margins. Since TiO<sub>2</sub> abundances in Mount Read Volcanics are fairly strongly inversely correlated with SiO<sub>2</sub> contents of lavas, the abundant secondary sphene may indicate a more andesitic precursor than the andesite-to-dacite suggested on purely petrographic grounds.

This sample is probably a lava breccia produced by explosive submarine eruption of a rather evolved andesitic magma, that mixed into the breccia odd fragments of other rocks occurring in the vicinity. I don't believe that it has been reworked. I wonder whether the chemistry will be very informative; presumably it will give some hybrid numbers between dacite and andesite.