

SAMPLE NUMBER: 563785 HAT-1, 62.5m

SUMMARY:

This is a strongly carbonate-altered, Hellyer-type, formerly cpx+olivine-phyric basaltic lava with distinctive quartz xenocrysts and not uncommon hematite-altered, disseminated and fine-grained pyrite.

THIN SECTION DESCRIPTION:

This sample is a massive, thoroughly carbonate-altered porphyritic basaltic lava. Major phenocryst phases were clinopyroxene and olivine, but both phases have been totally replaced by calcite. Due to the strong calcite overprint, it is difficult to estimate accurately the relative abundances of clinopyroxene and olivine, although I am certain olivine was subordinate. Mainly euhedral clinopyroxene phenocrysts probably made up around 10 modal% of this rock, whereas olivine phenocrysts made up less than 5 modal%. Both phases are rarely larger than 1mm long, although some definite former cpx phenocrysts reach 2mm long; phenocrysts grade in size through microphenocrysts to groundmass crystals. Some former cpx and olivine phenocrysts have clusters of hematite(?) euhedral and subhedral crystals growing in the replacing calcite. In this section, there are at least five quite large (to 2mm across) xenocrysts of quartz that have been strongly reacted around the margins and fractured internally. Calcite is even overprinting these quartz xenocrysts, which appear to be monocrystalline volcanic quartz rather than polycrystalline pelitic metamorphic grains. Well-preserved small chromite euhedra occur in some altered olivine crystals.

The groundmass of this sample was quite crystalline relative to many of the quenched Hellyer basalts, implying derivation from within a reasonably thick flow unit or dyke. The groundmass is extensively altered and recrystallized, but was clearly made up of abundant stubby prisms of augite, and almost certainly quite abundant longer prisms of plagioclase. Both are totally replaced by calcite, and interstitial material (altered glass?) has recrystallized to a messy aggregate of quartz, chlorite and patchy fine-grained hematite. Small disseminated cubes of hematite-altered pyrite are relatively common.

I have no doubt that this sample is a Hellyer basalt. It has suffered considerably stronger hydrothermal alteration, dominated by carbonate-pyrite (hematite) alteration, than many Hellyer basalts I have seen. The presence of quartz xenocrysts draws comparison with basalts from Sock Ck Sth and MAC-27 (eg 563714).