

Contrasting styles of mineralisation along the Capburn Fault, East Otago, New Zealand

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ABSTRACT

Gold deposits in the Otago Schist are hosted in a variety of structural settings that are related to two main pulses of mineralisation: i) during Late Jurassic to Early Cretaceous compression and ii) Late Cretaceous extension. The Macraes mine (>10 Moz Au resource) is hosted in the largest known mineralised structure, the Hyde Macraes Shear Zone (HMSZ), which formed under ductile conditions in lower greenschist facies rocks that were exhumed through the brittle-ductile transition (BDT) in the Early Cretaceous. In contrast, current estimated resources (~3 Moz Au) hosted in the Rise and Shine Shear Zone (RSSZ) formed later, under analogous ductile conditions in upper greenschist facies rocks that were exhumed through the BDT in the mid-Cretaceous. Both the HMSZ and RSSZ are truncated by Late Cretaceous normal faults, the Footwall Fault (FF) and Thomson Gorge Fault (TGF) respectively. These faults are significant discontinuities that juxtapose lower greenschist facies rocks against upper greenschist facies rocks. The Late Cretaceous Capburn Fault lies along strike with the FF and TGF. Recent drilling by New Peak Minerals as part of an Earn-In Agreement with Mineral Rangahau Ltd has targeted anomalous Au and As in soils and rock chips, in upper greenschist facies rocks on the SW side of the fault. Rare crystal plastic deformation textures in metamorphic quartz and associated hydrothermal rutile intersected in these drill holes show similarities to ductile-deformed mineralised quartz and host schist at both HMSZ and RSSZ. In the same drill holes, relatively undeformed, euhedral quartz that infills mineralised brittle fractures is more consistent with late stage, near surface hydrothermal processes. Although the current Au and As intersections are not economic, Capburn host rock textures and alteration are similar to mineralised rocks in the shear zones along strike and this suggests that similar deformation processes have affected the schist on the SW side of the Capburn Fault.