

Potential for Proterozoic mineralisation in western Tasmania?

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Western Tasmania is well-known for its large endowment of Volcanogenic Massive Sulphide (VMS) mineralisation relating to the Cambrian Mount Read Volcanics, and for Sn±W±magnetite mineral systems related to Devonian granitoids. These mineral deposits are primarily located within the Dundas tectonic element, including the Dundas Trough. The Rocky Cape tectonic element lies to the northwest of this mineral province, and hosts Mesoproterozoic to Neoproterozoic metasedimentary and igneous rocks. The Arthur Metamorphic Complex separates the Rocky Cape element from other Neoproterozoic and Palaeozoic strata in the Dundas element to the east.

Some historic mineral prospects within the Rocky Cape element, such as the Interview River and Strickland prospects, have recently been shown to have Mesoproterozoic Pb isotope model ages, hinting that older mineralisation might be present in western Tasmania. Here we have analysed U-Pb isotopes in monazite, apatite and rutile from some of these prospects to better understand the evolution of these systems. Preliminary U-Pb monazite data from an Andalusite schist, also in the Rocky Cape element, suggests a late Mesoproterozoic metamorphic age, with many grains having been reset to younger ages. Further dating of sulphide-rich samples is needed in this tectonic element to correlate the host rock ages with mineralisation ages.

Deposits that are interpreted to be broadly contemporaneous with the Mount Read Volcanics, such as the Savage River and Alpine deposits, are known to be hosted within the Neoproterozoic metasedimentary/metavolcanics in the Arthur Metamorphic Complex. These two deposits are magnetite and copper-rich, suggesting possible Iron-Oxide Apatite (IOA) or Iron-Oxide Cu-Au (IOCG) affinities – deposit styles that commonly formed during the Proterozoic. However, monazite and apatite from the Savage River deposit show Cambrian and Devonian U-Pb ages, and pyrite shows late Cambrian Pb isotope model ages.

The complicated overprinting patterns of successive hydrothermal events during the Cambrian and Devonian have hindered many attempts to date these deposits. Additional data from these deposits and host rocks is being sought to address whether there may be potential for older, Proterozoic mineralisation in western Tasmania, and to better constrain the overprinting relationships between Proterozoic, Cambrian and Devonian events.