

# SEG 2024 Conference: Sustainable Mineral Exploration and Development

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## Proterozoic Sediment-Hosted Mineralisation in Southeastern Australia and Links to the Belt-Purcell Basin of North America

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Western Tasmania, in southeastern Australia, is well known for its large endowment of volcanogenic massive sulphide (VMS) deposits relating to the Cambrian Mount Read Volcanics and for Sn±W±magnetite mineral systems related to Devonian granitoids. The Rocky Cape region lies to the northwest of this mineral province and hosts Mesoproterozoic to Neoproterozoic metasedimentary and igneous rocks—the oldest rocks in southeastern Australia. Several historic Cu-Pb-Zn vein-hosted prospects, including the Silver Reward, Strickland, and Balfour prospects, are located within the Rocky Cape Group. Although these deposits were previously thought to be related to Devonian granites that are widespread in southeastern Australia, lead isotope data indicated apparent Mesoproterozoic model ages.

New U-Pb monazite, xenotime, and apatite data and galena Pb isotope data from these prospects indicate that sulphide mineralisation formed at c. 1350 Ma, with several resetting or remobilisation events recorded at c. 1250 Ma, c. 1100 Ma, and c. 950 Ma. Minor cobaltite was found in some of these prospects, highlighting the potential for critical metals. We have also collected new Lu-Hf garnet data (using LA-ICP-QQQ-MS) and monazite data that suggest metamorphism may have been coeval with some of the mineralisation events.

The Rocky Cape Group has been previously correlated with stratigraphy in the Belt-Purcell basin of North America. New data presented here suggest that there is also a correlation between mineralisation ages, particularly those in the Idaho Cu-Co Belt, such as the Merle Cu-Co and Spar Lake Cu-Ag deposits, presenting a new exploration target for northwestern Tasmania and, possibly, elsewhere in southeastern Australia. These new data further support a tectonic link between northwest Tasmania and Laurentia during the transition between supercontinent Nuna breakup and supercontinent Rodinia assembly.