

Resourcing Western Australia - Mineral, Geochemical and Isotopic Datasets to Accelerate the Discovery of Critical Mineral Resources in Western Australia

Rose Turnbull¹, Erin Gray¹, Imogen Fielding¹, Jack Lowrey¹, Sandra Romano¹, Tim Ivanic¹, Matt de Paoli¹, Fawna Korhonen¹, Klaus Gessner¹

¹Geological Survey Of Western Australia, Perth, Australia

With global demand increasing for the critical mineral resources essential for the clean energy transition, the Western Australian government is investing significantly in data acquisition initiatives that support exploration activities to accelerate the discovery and extraction of critical mineral resources across the State. The collection and integration of multiple precompetitive geoscience datasets is a critical component of exploration success, by enabling us to better understand mineral systems, where these are likely to be located across the state, and improving our ability to detect them undercover.

The Geological Survey of Western Australia (GSWA) is the custodian of several significant datasets, (e.g., geological maps, geophysics, geochronology, geochemistry) and is internationally recognised for our ability to collect and freely disseminate the large and specialised datasets required to advance exploration. In addition to increasing the data density and spatial coverage of existing datasets, we are actively investing in the acquisition of complementary statewide datasets, notably isotopic tracers, that will provide an increased understanding of the 4D geological evolution of WA, with an emphasis on imaging major crustal boundaries through time. An additional investment is the acquisition of a State-funded Tescan Integrated Mineral Analyser (TIMA), which will provide mineral characterisation to support several regional projects, including the Heavy minerals map of WA, and characterization of mine waste materials. This presentation will present preliminary results from these two nascent projects.

An inhouse TIMA will also increase GSWA's ability to identify minerals in-situ within ore deposits to target direct dating of mineralization. This presentation will also provide an overview of the current mineralogical, geochemical and isotopic datasets that exist for WA, including our newly compiled geochronology database of mineralization ages, and updated isotope maps and datasets (Hf, Nd, O, Pb) that inform on lithospheric architecture and crustal and evolution.