

### **Critical Minerals Potential in the Delamerian Orogen Margin: Exploring the Sustainable Prosperity**

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The collaboration between Geoscience Australia's Exploring for the Future (EFTF) program, Resourcing Australia's Prosperity (RAP) initiative, and MinEx CRC's National Drilling Initiative (NDI) marks a significant advancement in Australia's geoscientific research and resource exploration. The EFTF program (2016–2024) enhanced the understanding of Australia's geology, supporting economic growth and sustainable resource management by providing comprehensive pre-competitive geoscientific data. Building on EFTF's success, the 35-year, \$3.4 billion RAP initiative, launched in July 2024, focuses on accelerating the discovery of critical minerals, groundwater, and other resources. It aims to support a resilient and sustainable resource sector through innovative data, research, and analysis. The NDI, managed by MinEx CRC, complements these efforts by conducting extensive drilling campaigns to map regional geology and identify potential mineral systems, leveraging advanced drilling technologies to maximize data collection and improve geological knowledge.

In the Delamerian Orogen, this collaboration is pivotal. The Cambrian-Ordovician-aged Delamerian Orogen, formed during the transition from a passive margin to an active subduction margin along Gondwana's eastern edge, is one of Australia's largest and most under-explored provinces. Despite being mostly covered by younger rocks and sediments, mineralisation has been encountered in drilled areas, particularly along the eastern margin. This collaborative project analyses the in-situ chemistry of sulfides and alteration minerals from key prospects across the Delamerian Orogen aiming to assess critical mineral potential across the metallogenic province. The in-situ analyses highlight distinct differences in sulfides and alteration chemistry between the different deposit styles across the region with showing strong variations in their regional prospectivity of multiple critical minerals which may cause by complex paragenesis and element deportment mechanisms. These efforts, integrating new geophysical data, stratigraphic drilling, and geochemical analysis, aim to provide a new understanding of the Delamerian Orogen's critical mineral potential, aiding mineral exploration and supporting sustainable resource management in the region.