

AusLAMP – Imaging the Australian Lithosphere for Resource Potential

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The Australian Lithospheric Architecture Magnetotelluric Project (AusLAMP) is a collaborative national survey that acquires long-period Magnetotelluric (MT) data on a half-degree grid spacing (approximately 55 km) across the Australian continent. This project aims to map the electrical conductivity structure in the crust and upper mantle beneath the Australian continent. Significant progress has been made under Geoscience Australia's Exploring for the Future program (EFTF). AusLAMP is now around 40% (over 1300 stations) complete. The dataset will be a valuable resource for researchers to understand the tectonic evolution of the Australian plate and its geodynamic processes. This dataset will also provide new insights on resource potential, and help reduce exploration risk.

AusLAMP results show high electrical conductivity in the lithospheric mantle correlated with gradients in seismic velocity, which map major changes in lithospheric thickness. These structures provide pathways for fluids and magmatic flux and represent possible fertile corridors, which have direct links to resource potential. Given that most known major iron oxide copper gold (IOCG) deposits and orogenic gold deposits occur over highly conductive structures and lithospheric boundaries, these observations provide a powerful means of selecting prospective zones for exploration under cover.

This presentation will describe AusLAMP datasets collected as part of EFTF program in an under-explored part of northern Australia. Data from high-resolution regional-scale MT surveys have also provided more evidence to support these insights. Results from these datasets show a significant crust/mantle-scale conductivity anomaly interpreted to be part of the Carpentaria Conductivity Anomaly, which is a major deep electrical conductivity structure across Queensland. The Carpentaria Conductivity Anomaly at the eastern margin of the Mount Isa Province characterises the position and geometry of the major Gidyea Suture Zone. The known gold and copper deposits show a spatial correlation with the suture zone, indicating that this lithospheric structure is potentially acting as a pathway and fundamental control for these IOCG deposits.