

Concepts to targets: a scale integrated mineral systems study of the Eastern Yilgarn Craton

Project Code: Y4

Project Leader: Dr Richard Blewett

Y4 will be the integrated successor of the pmd^{CRC} Y2 and Y3 projects. This project will build on the knowledge and expertise developed in the preceding projects and will be guided by the "5 Question" approach to test hypotheses at a range of scales.*

A primary goal the Y4 project will be to build a multi-scaled 4D understanding of the world-class orogenic gold mineral system of the Eastern Yilgarn Craton.

A measure of our success will be the successful application of this understanding to the predictive targeting of undiscovered resources in near mine areas, as well as concepts and hypotheses that can be applied to targeting in data-poor areas.

What are the 5 Questions?

1. What is the geodynamic setting and PT history of the system?

2. What is the architecture of the system?

3. What are the fluids, their sources and/or reservoirs?

4. What are the fluid flow drivers and pathways?

5. What are the metal transport and deposition pathways?

Project Aims

To build a series of well-constrained 3D maps at a variety of scales that integrate:

- + Structural and stratigraphic history
- + Alteration-fluid history
- + Evolution of architecture of the system.

Using a scale-integrated approach, the project will develop criteria to improve:

- + Area selection
- + Near mine exploration, and
- + Ore shoot identification.

It is envisioned that many of the criteria developed in the project can be applied in a generic sense to other terrains.

The project will develop a range of hypotheses from the geodynamic scale to the site specific scale. These hypotheses will be tested with numerical models that will have local and wider application.

The Right Tools for the Job

The project team will utilise a suite of tools developed within the Enabling Technology projects that were completed during Stage 1 of the CRC. New geochronology techniques (eg mica in pyrite Ar/Ar), numerical modelling including chemical and fluid modelling will be utilised to answer key questions about the systems studied.

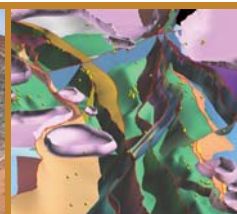
Construction of the region's 3D architecture is an essential tool in the interpretation, understanding and prediction of the location of mineral deposits. The skills developed during Stage 1 research will allow the team to make a quantum leap in understanding the 3D structural relationships in the region and also allow the discrimination of true model attributes and long held assumptions.

Partnerships with Industry

The project team will work closely with sponsors to ensure that research results and deliverables meet their needs and expectations, have a positive impact on their business and deliver tangible value.

Key Deliverables

- + New deformation framework and improved understanding of the PTt evolution of the eastern Yilgarn.
- + Spatially linked multi-scale 3D architecture and databases across the eastern Yilgarn.
- + New magneto-telluric (MT) survey and interpretation linked to existing major seismic transects.
- + Revised tomographic volume for the Yilgarn lithosphere.
- + New processing methodology for potential field inversions and accompanying rock property database.
- + Characterisation of end-member fluids (report).
- + Site specific studies of deformation and alteration (fluid flow) history integrated with the 3D maps to define ore vectors and ore shoots.
- + Maps and database of fluid gradients.
- + Regional scale mineral indicator maps including full ASTER coverage of the eastern Yilgarn.
- + A portfolio of specific and generic numerical and chemical modelling scenarios.
- + Workshops and reports on Yilgarn geodynamics.
- + Quarterly and annual research results delivered via secure web site.
- + Annual Project Development Team meetings to disseminate results.
- + Symposium/workshop on the 4D evolution of the eastern Yilgarn.
- + Synthesis report and database including a new time space event history.



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