

3D Basin Architecture & Mineral Systems in the Mt Isa Western Succession

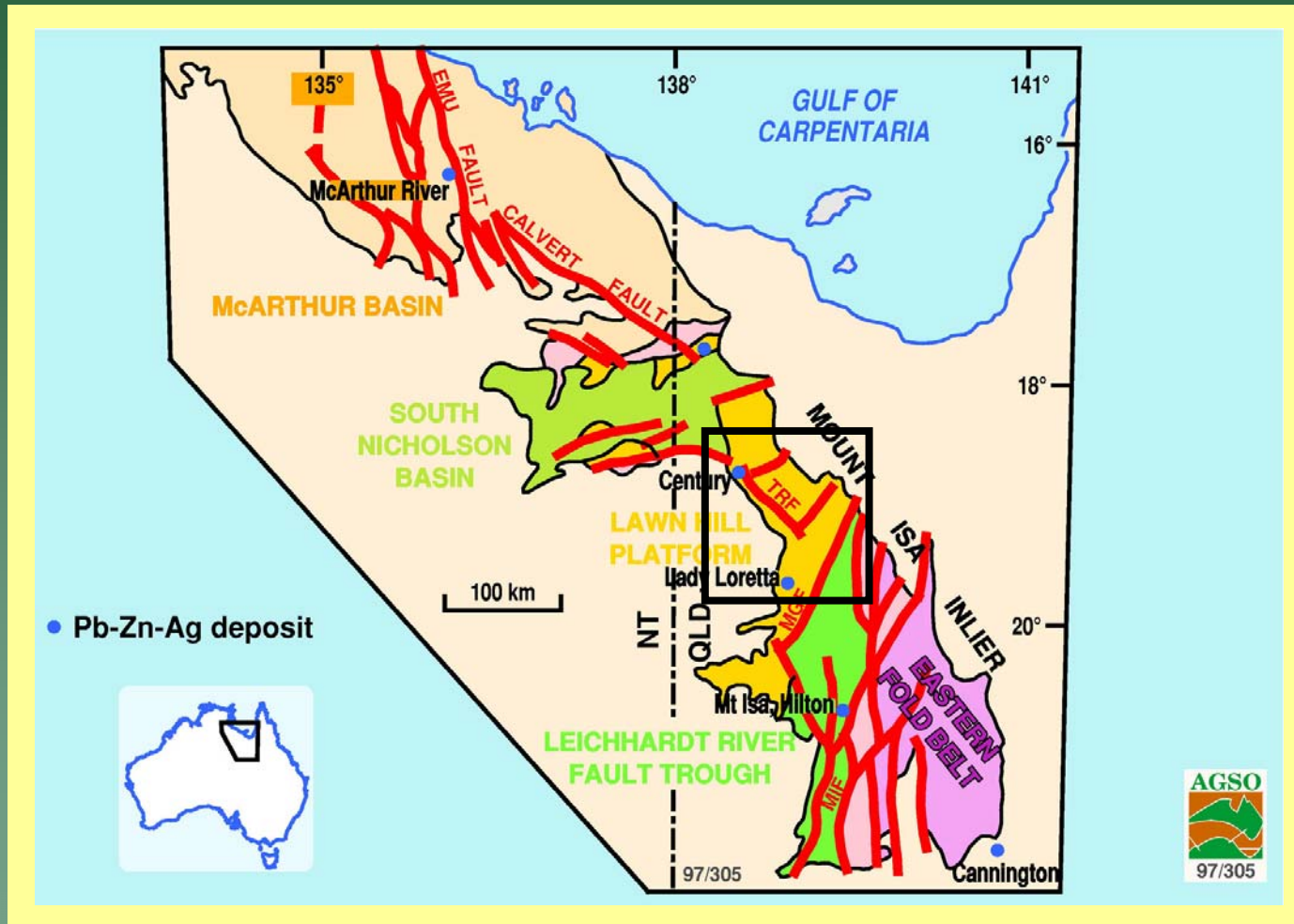
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Mount Isa Pb-Zn-Ag Mineral Province



I1 Project: Deliverables

- Regional-scale 3D basin architecture (GOCAD; VRML*)
 - Serial structural cross-sections ✓
 - 3D isopach maps (lower Haslingden Gp) ✓
- 3D mine-scale geological model (Century) ✓
- Analysis of potential field data (worms) ✓
- Metamorphic map & tectonothermal history ✓
- Definition & timing of hydrothermal events
 - Processed Landsat, ASTER & hyperion images ✓
 - Fluid flow numerical models ✓
- Expanded chronostratigraphic framework (incomplete)
 - Detrital zircon ages & provenance ✓
 - Ar-Ar dating of deformational fabrics (in train)
 - Revised event/space-time plots ✓
- Geodynamic setting & regional synthesis ✓
- Comprehensive mineral deposit database ✗



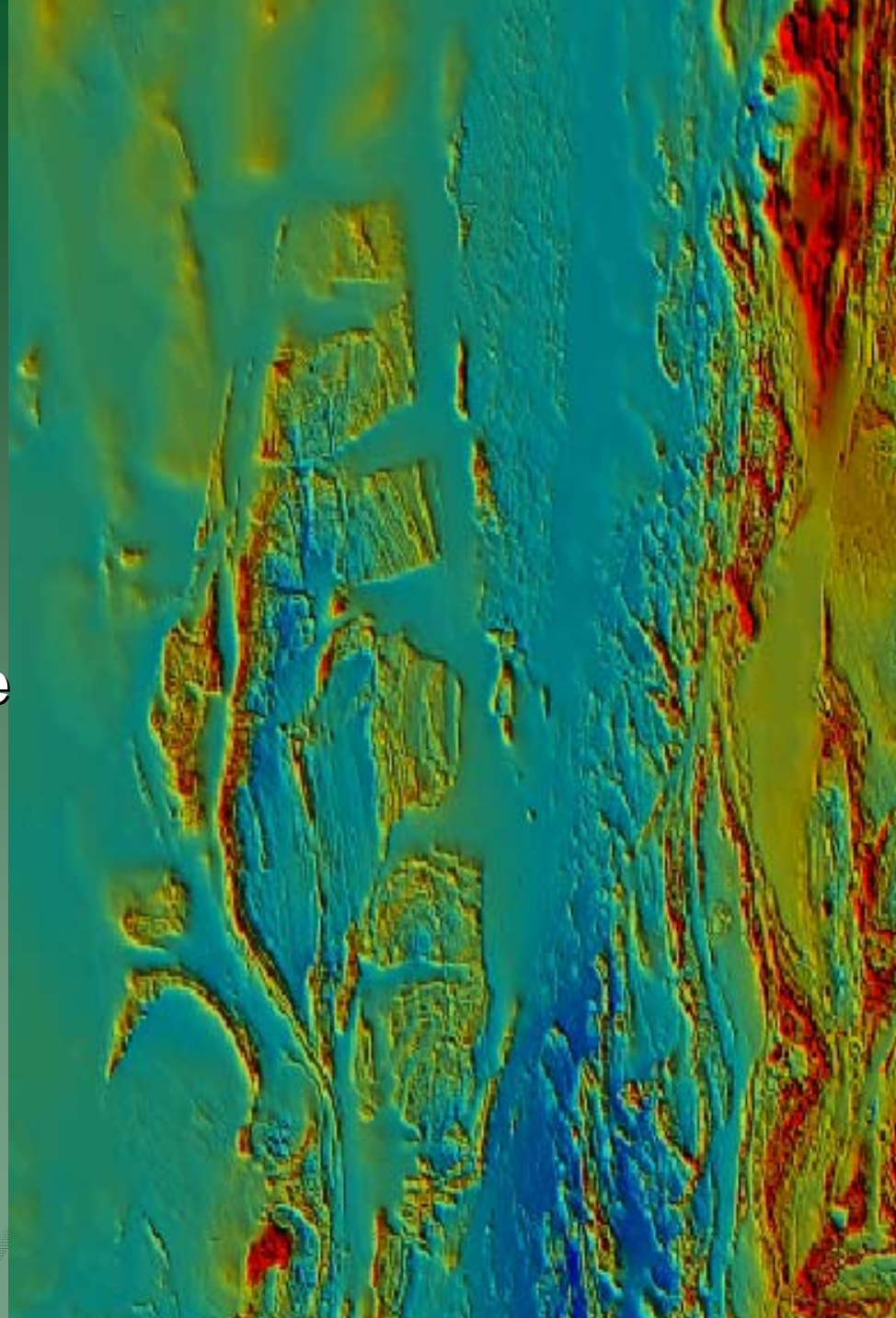
Alignment with Pmd*²CRC Core Questions & Issues

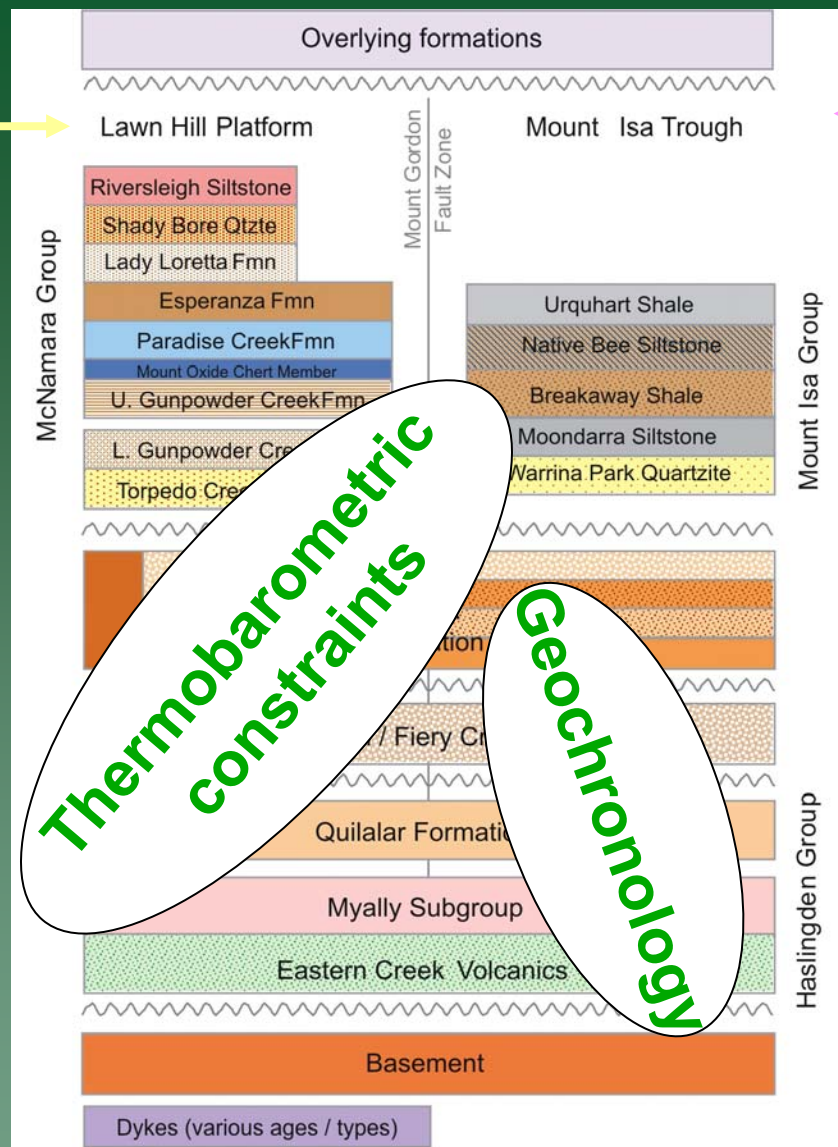
For any mineral system, what are the:

- ✓ **Geodynamic setting & PT history of system?**
- ✓ **Architecture of system?**
- **Fluid composition, source and/or reservoirs?**
- ✓ **Fluid flow drivers & pathways?**
- **Metal transport & depositional processes?**

Project activities & Priorities

- Testing of earlier interpretations
- Integration of sequence stratigraphy & structure
- Focus on early rift template (Myally Subgroup)
- Tectonic setting & tectonothermal history
- Identification of fluid pathways & conduits





Structural
analysis
(this study)

NABRE data

Majority of
new data
(this study)

Structural
analysis

Simplified stratigraphy of the
Mammoth Mines - Alsace region.

Sequence
Stratigraphy

Making a difference?

Geological
Construct

Geometrical
alchemy

Paradigm
shift?

Numerical Modelling

Underpinning
& testing

2/8/2002



Key Conclusions & Outcomes

- Competing geodynamic interpretations resolved into single consistent geological model
- Intracontinental rift → passive margin during interval 1800 – 1640 Ma
- Basin inversion (D1) as fluid driver commencing ca. 1640 Ma and not at 1590 Ma Isan Orogeny
- Mineral potential > Isa or Century-style deposits (e.g. Irish-style Pb-Zn)
- Increased potential for under cover BHT deposits to NE in deeper water (carbonaceous) facies of 1690-1670 Ma Surprise Ck Fm (Prize)

Acknowledgements

- **Fractal Graphics (Geoinformatics)**
 - Processing of potential field data (worming)
- **Xstrata Copper Australia**
 - Access to high resolution aeromagnetics
- **Zinifex**
 - Access to Century Mine
- **Western Metals**
 - Gunpowder Mine facilities for Sequence Stratigraphy field workshops
- **AMIRA**
 - Conference & workshop organisation
- **Geoscience Australia**
 - Drafting facilities, administrative & in-kind financial support