I1: Mt Isa Western Succession 3D Architecture and Ore Systems
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**Landsat, ASTER, Hyperion & PIMA**

- a) Alsace 1:100 000 sheet
- b) Bull Creek (north) and Crystal Creek (south)
- c) close-up of Bull Creek Syncline
- d) Landsat image of Century area showing clay (red), iron oxides (green) and silica (blue) compared to hyperion.
- e) Hyperion image of Century area showing phengite (red), muscovite (green) and kaolinite (blue).
- f) ASTER image of Century showing phengite (red), muscovite (green) and kaolinite (blue).

**SHRIMP U-Pb Zircon Dating**

Use zircon age populations to:
- Constrain (maximum) depositional ages for lithologies of the Haslingden Group, Quilalar Formation, and Bigie Formation.
- Describe sedimentary units from the Leichhardt (ca 1800 to 1750 Ma), Calvert (ca 1730 to 1690 Ma), and Isa (ca 1670 to 1570 Ma) Superbasins. Can these age populations be used to characterise changes in provenance through time and help understand basin evolution?
- Compare sedimentary units across identified supersequence boundaries to test models describing unconformities vs structural repetition of stratigraphy.

**Analysing Metamorphic Grade**

Estimates of metamorphic grade, that is, the P-T conditions to which the rocks were subjected, can be made through ilite crystallinity and b0 cell dimension analysis in low grade (subgreenschist facies) terranes. Although this method has been questioned, it is the only way to obtain P-T information for subgreenschist facies rocks such as those of the Western Succession. We are in the process of analysing 36 samples from the Mt Isa Western Succession. This data will enable us to understand the metamorphic setting of the study area.

**Ground-truthing With PIMA**

The Portable Infra-red Mineral Analyser is being used to ground-truth satellite-borne hyperspectral imagery through SWIR analysis. Processing satellite imagery (e.g. ASTER) produces threshold mineralogical maps that indicate probable mineralogy. However, this needs to be constrained by SWIR analysis of samples.

**PIIMA Analyses of the Myally Subgroup**

Example analyses derived from formations in the Myally Subgroup.

- a) Photographs of each formation
- b) Stacked PIMA traces from several samples
- c) Matched PIMA to absorption features

**ASTER and Landsat**

- a) ASTER image of Century / Termite Range Fault area. Clay fraction has been subdivided into phengite (red), muscovite (green) and kaolinite (blue).
- b) Solid geology for Century region.
- c) Landsat image of Century area showing clay (red), iron oxides (green) and silica (blue) compared to d) ASTER scene of Century area processed to show phengite (red), muscovite (green) and kaolinite (blue).
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Sequence
Stratigraphic
Approach

As an integral component of the 3D map construction, critical model components are validated with potential field data (gravity and high resolution airborne magnetics). Shown here is E-W section 7816000N, crossing the Mount Gordon Fault Zone near Mammoth Mines (Camooweal, NQ).

Using an interpreted cross-section as a basic structural framework (not shown), key magnetic and contrasting-density blocks are fitted to the cross-section and the resultant response compared against field data.

Wavelet-based multiscale edge analysis ('worms')

Sheet 1 (north)
Sheet 2 (south)

Domain 1
Domain 2
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