predictive mineral discovery
COOPERATIVE RESEARCH CENTRE

Tectonic evolution of the Tasman Fold Belt System in northeastern Queensland: towards predictive mineral discovery

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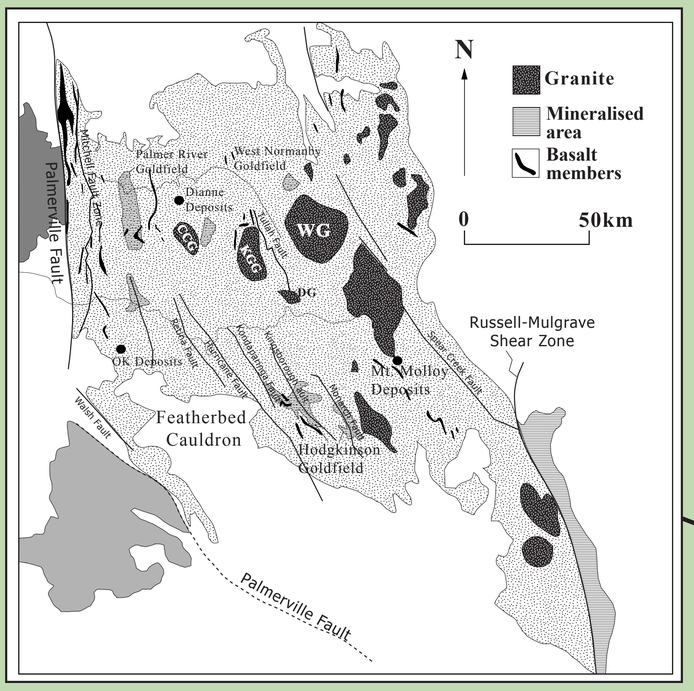
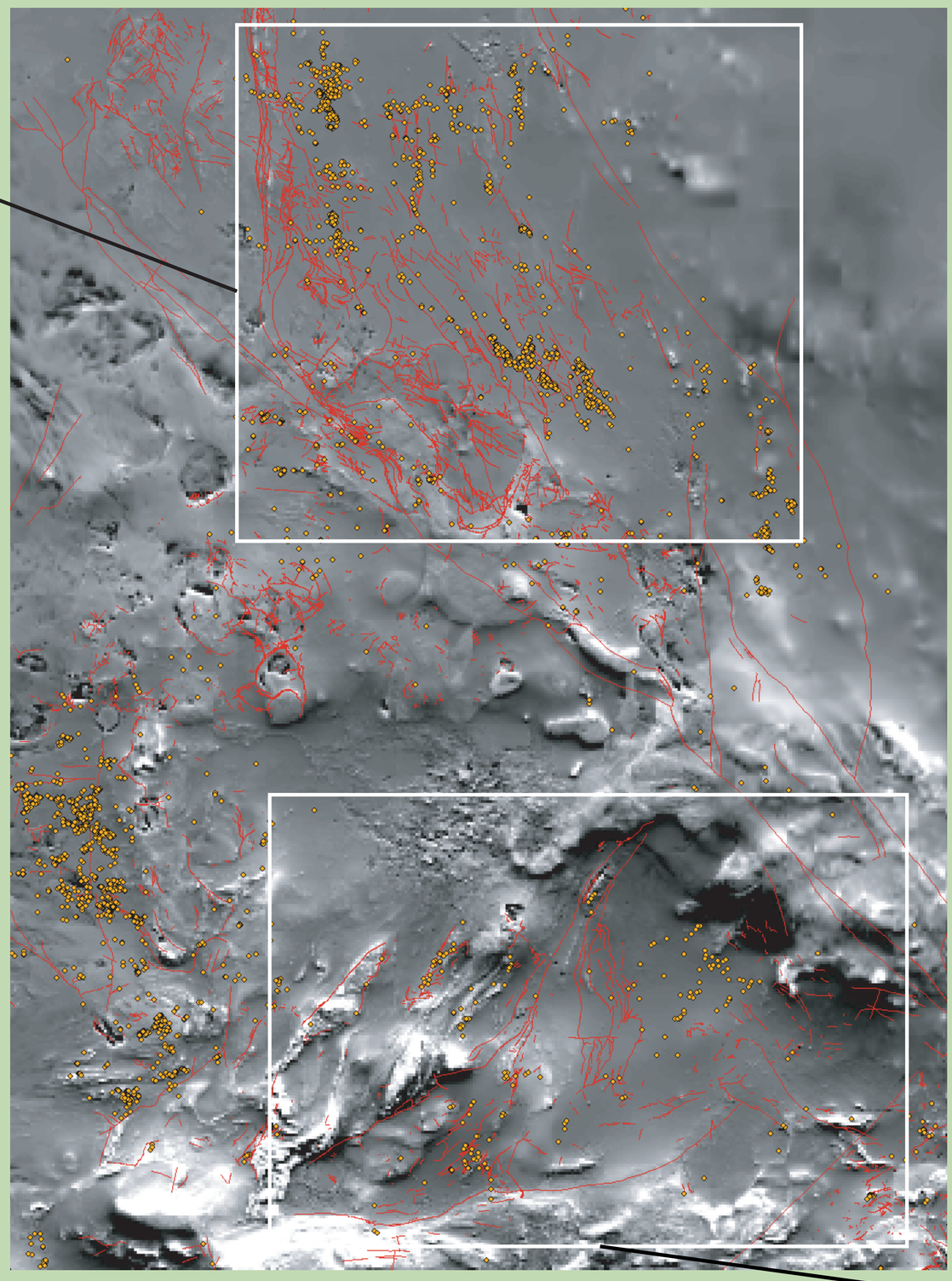
PhD project - Architecture (A1) Project

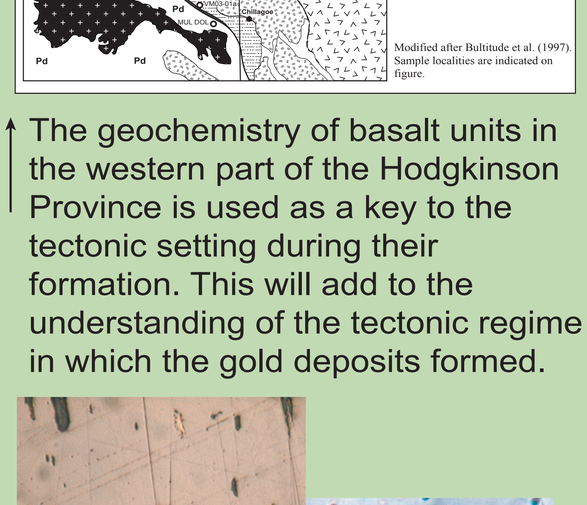


Simplified geology of the Hodgkinson Province. Areas of interest include the Palmer River and Hodgkinson goldfields, the Palmerville Fault and basalt unit localities (image far right).

The Hodgkinson and Broken River Provinces have been selected as key localities to address the relationships between gold deposition and fault structures. Research on all scales utilising a variety of techniques and comparison between the two provinces is expected to deliver significant outcomes for predictive mineral discovery.

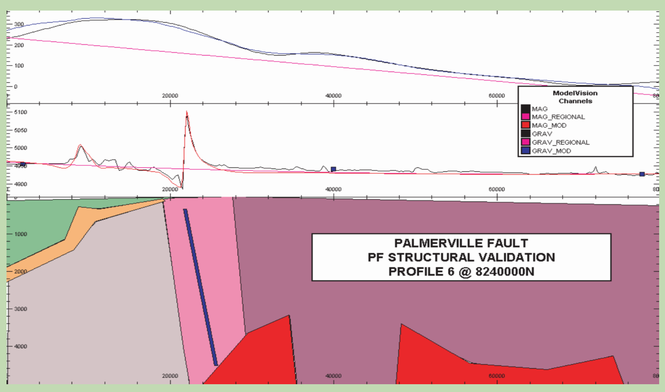


Total magnetic intensity image of northeast Queensland combined with GA fault and gold occurrences database. Outlines in white correspond with Hodgkinson Province (top) and Broken River Province (bottom).



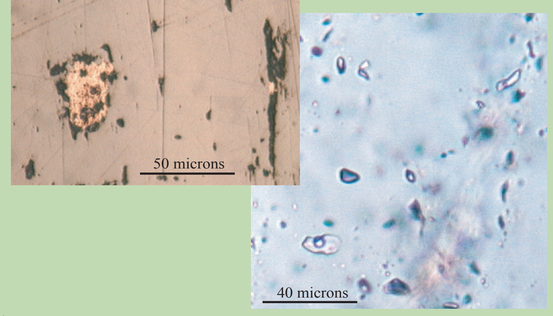
Modified after Bultitude et al. (1997). Sample localities are indicated on figure.

The geochemistry of basalt units in the western part of the Hodgkinson Province is used as a key to the tectonic setting during their formation. This will add to the understanding of the tectonic regime in which the gold deposits formed.



Geophysical modelling will constrain the sub-surface nature of the largely unmineralised Palmerville Fault and may provide clues for the significance of this major terrane-bounding structure.

Paragenetic relationships at the various gold deposits will be investigated and their association with the deformation history and nearby fault structures will be unravelled.



Petrographic and fluid inclusion studies will provide insight into the physical and chemical characteristics from gold deposits in both provinces. Ore fluid sources will be constrained and mineralisation events will be placed in a temporal framework.

Re-Os dating of sulphides and Ar-Ar whole-rock dating of dykes intruding the mineralised deposits will provide temporal constraints for the mineralising events throughout both provinces.

Geological map of the Broken River Province, indicating the location of the Amanda Bel Goldfield, one of the main study locations.

Project deliverables:

* Comparison of structural and metallogenic relationships in the Hodgkinson and Broken River Province from micro- to macro-scale.
* Temporal constraints on gold mineralisation and deformation events in both provinces.
* Insights into factors that control gold mineralisation.
* Determination and validation of critical parameters that control endowment of major faults in the study area.
* Constraints on the Palaeozoic tectonic evolution of the northern part of the Tasman Fold Belt System.