Mary Kathleen Domain Geology

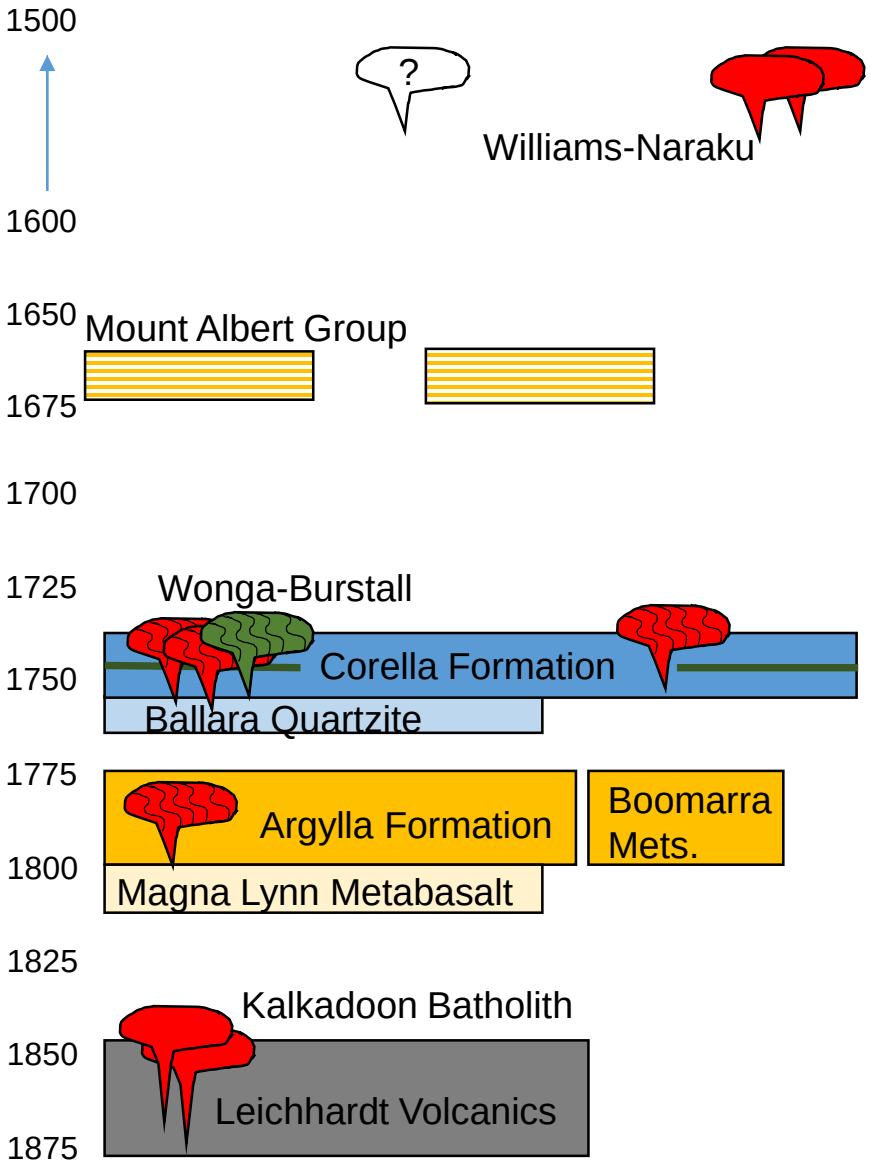
September 2019 update

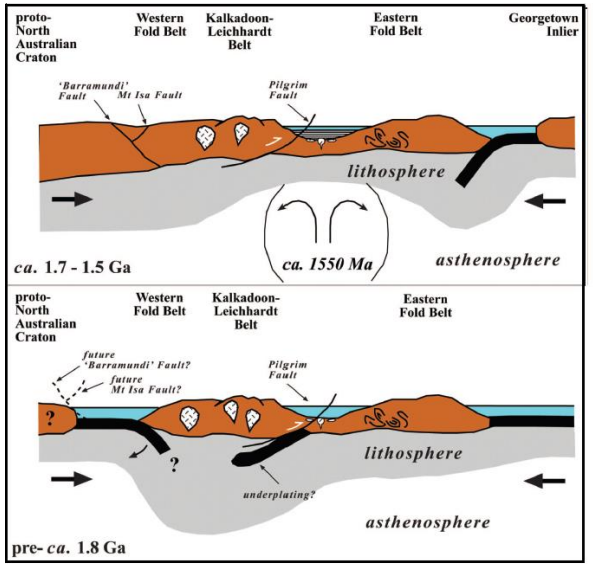
GSQ, Geoscience Australia

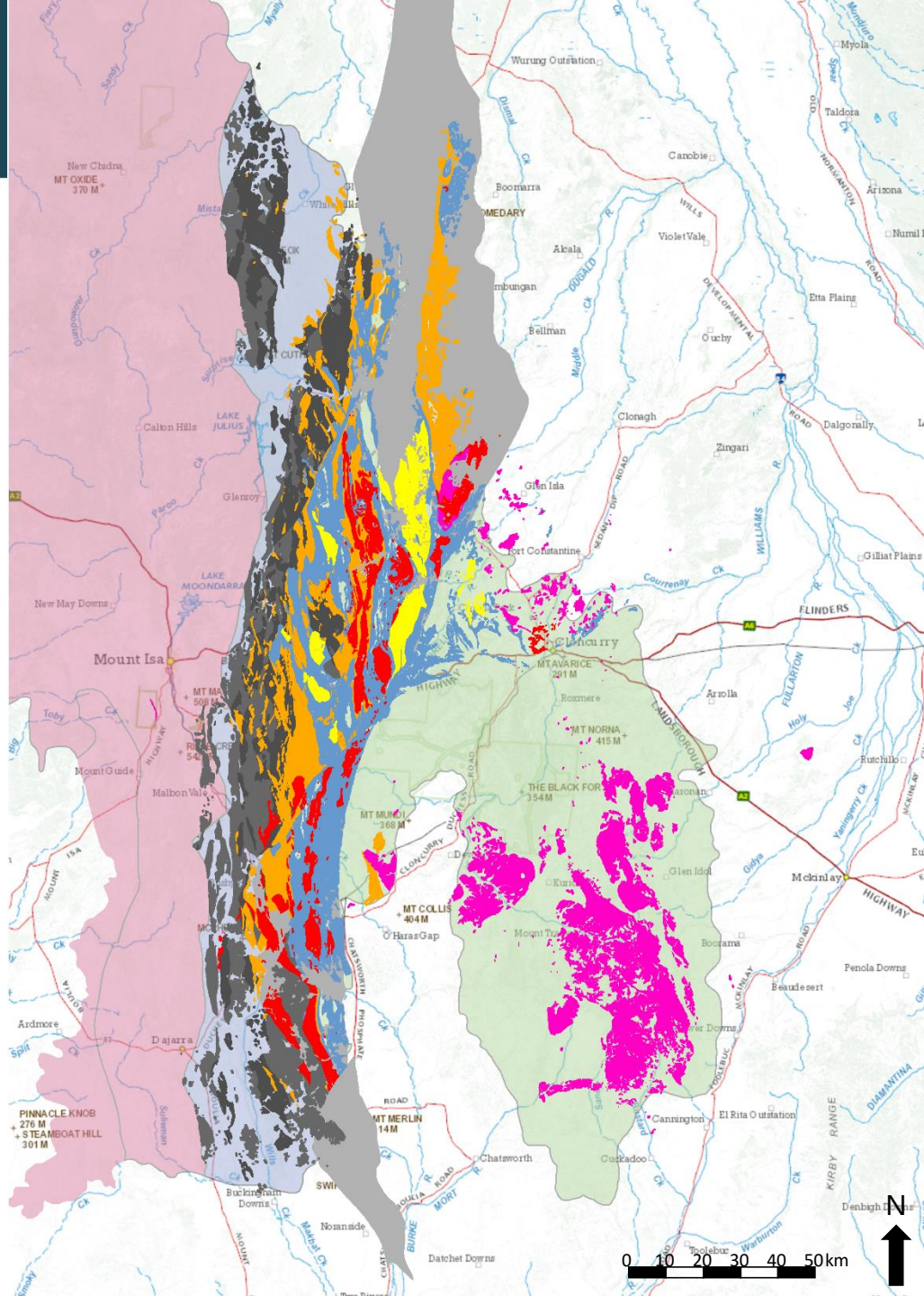
Overview

- Defining the magmatic history of the southern portion of the Mary Kathleen domain, incorporating the Argylla Suite and Wonga Belt
- Asses the geochronology of the southern part of the Corella Formation including the Mount Philp Breccia
- Assessing the extent and effect of Williams Supersuite magmatism
- Provision of a framework for the understanding of the relationship between magmatism and mineralisation

Geological Background

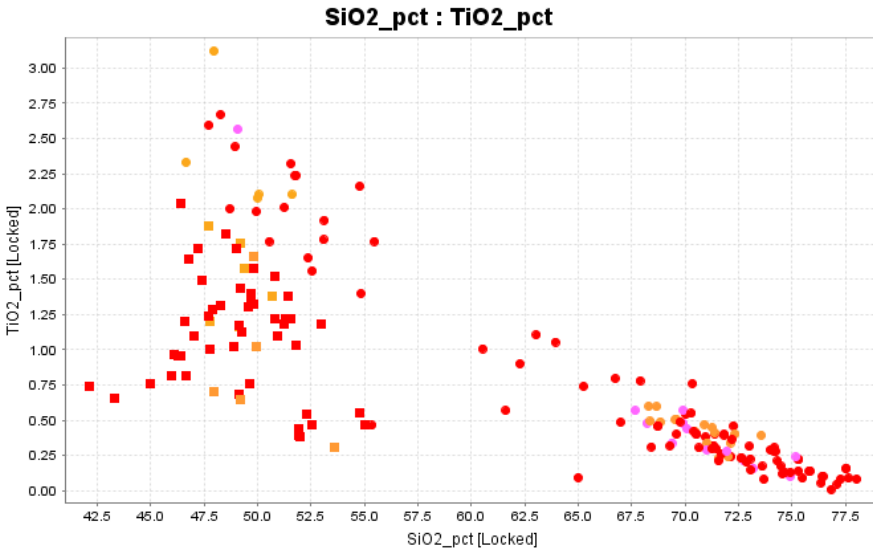


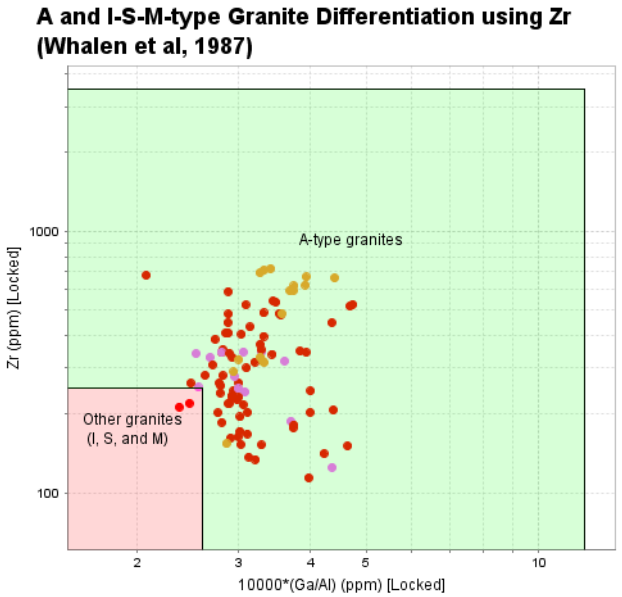


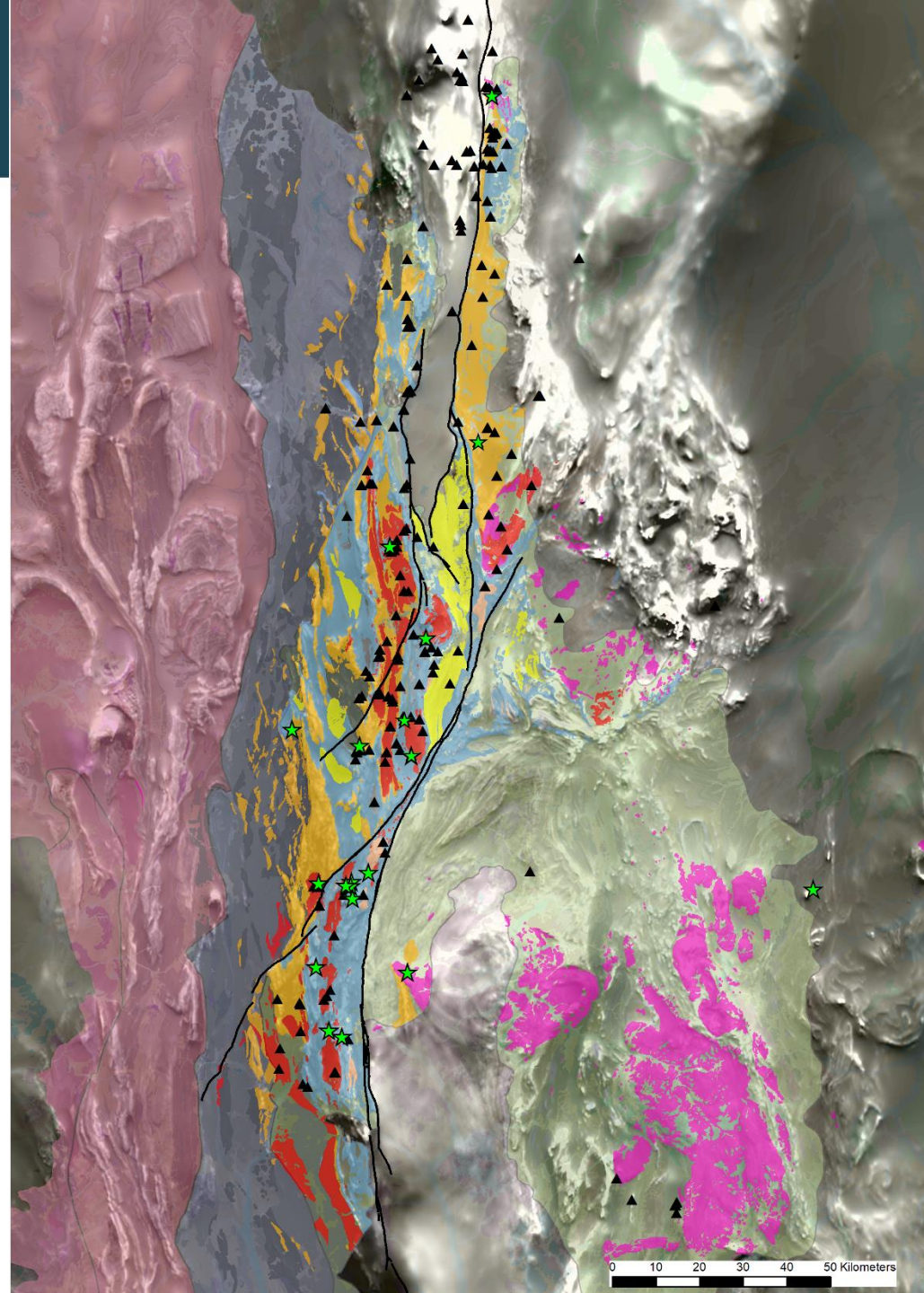


New Work

- Geochronology
  - 15 Preliminary Shrimp Dates
  - 4 LA-IMCPS Titanite
- Geochemistry -300 analyses

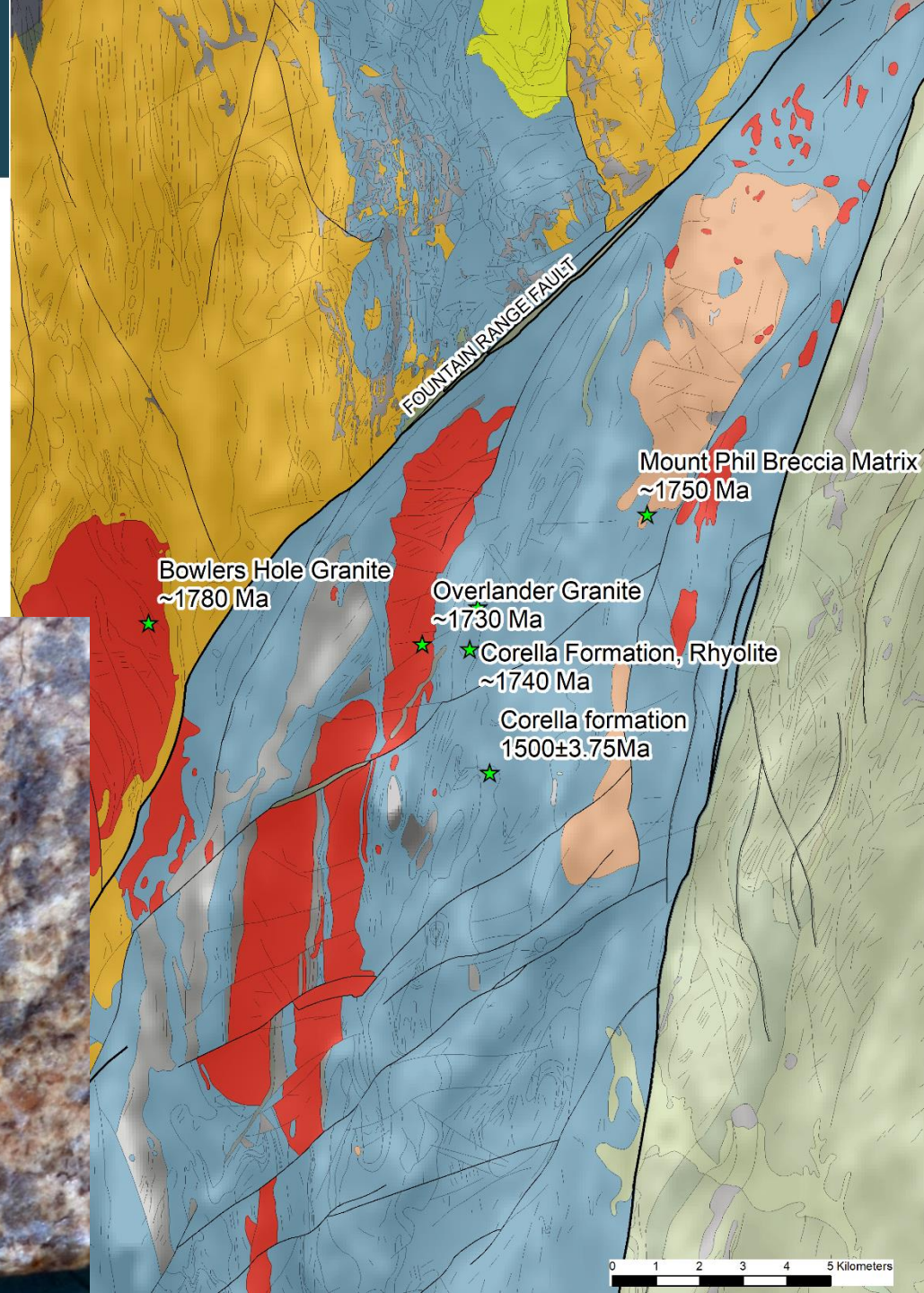






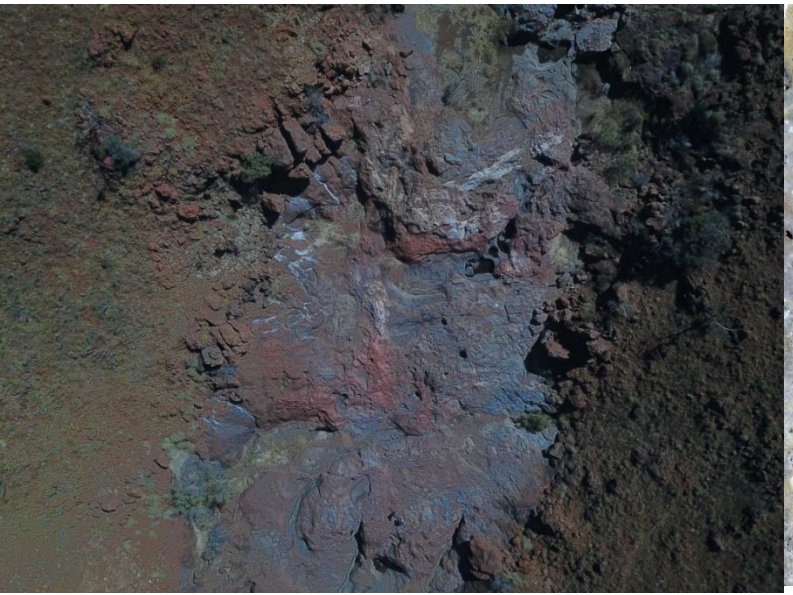
Overlander and Bowlers Hole

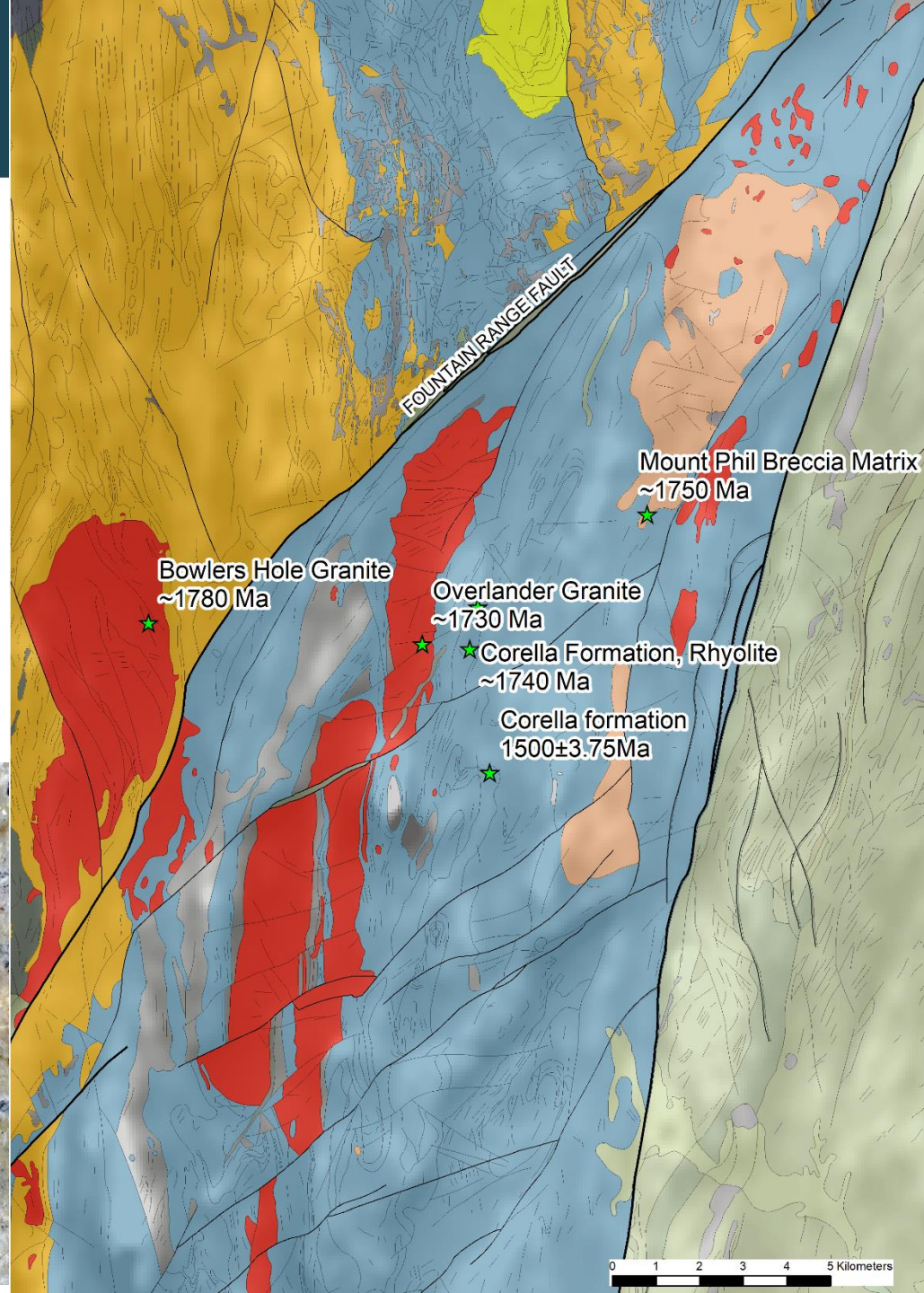
- Bowlers hole granite ~1780Ma
- Overlander granite ~1730Ma
- Mafic rocks from the Corella formation, 1500±3.75 Ma metamorphic cooling age



Mount Philp area

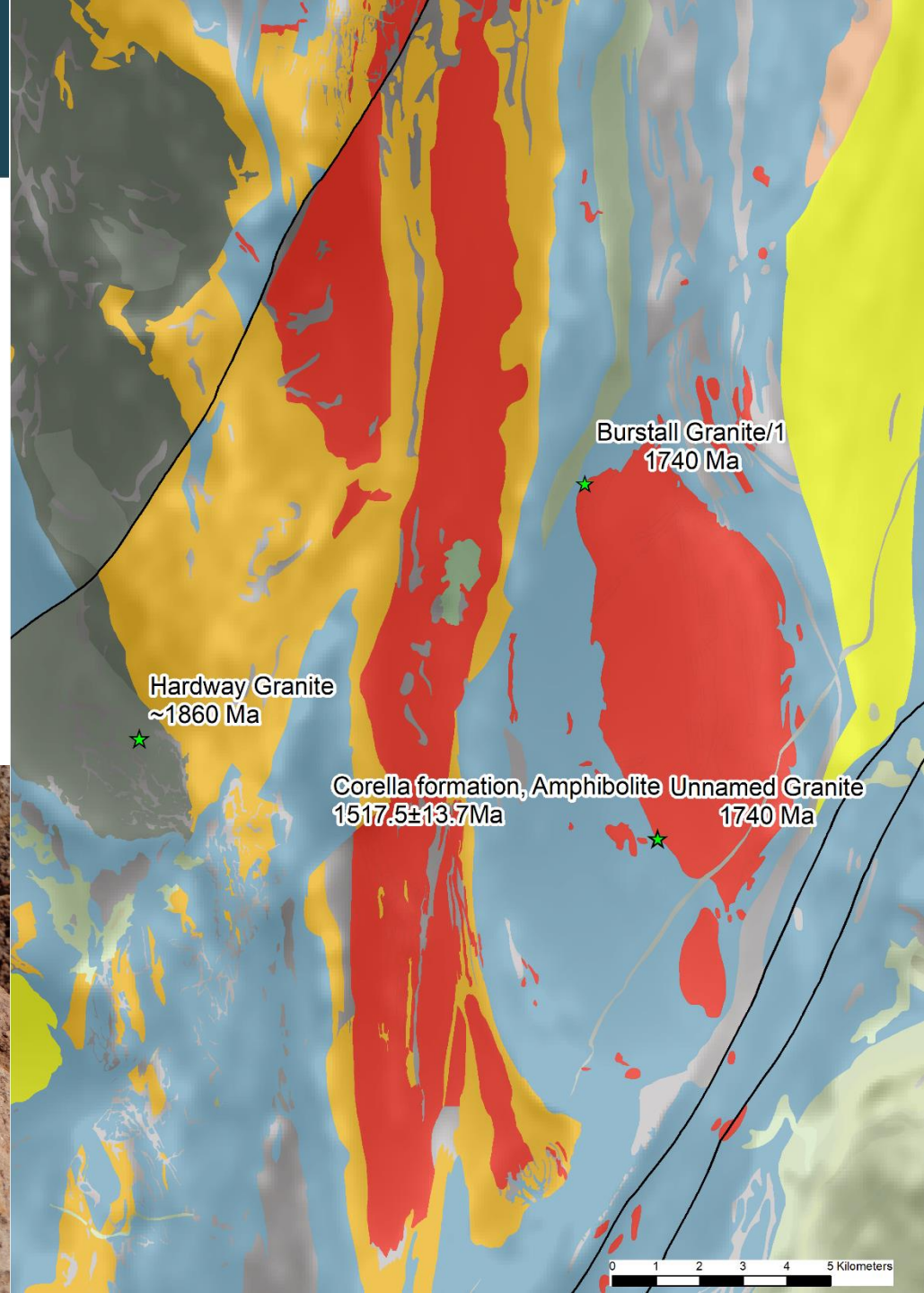
- Mount Philp Breccia ~1750 Ma MDA, not conclusive but indicates the Mount Philp Breccia is comprised of material sourced from the Corella Formation or Wonga-Burstall suite and may well be a part of the magmatic system.
- Two samples of Rhyolite Corella formation ~1740 Ma crystallisation with ~1515 Ma metamorphic age, indicates the volcanic component of the volcanic component of the Corella formation is coeval with the Wonga-Burstall.





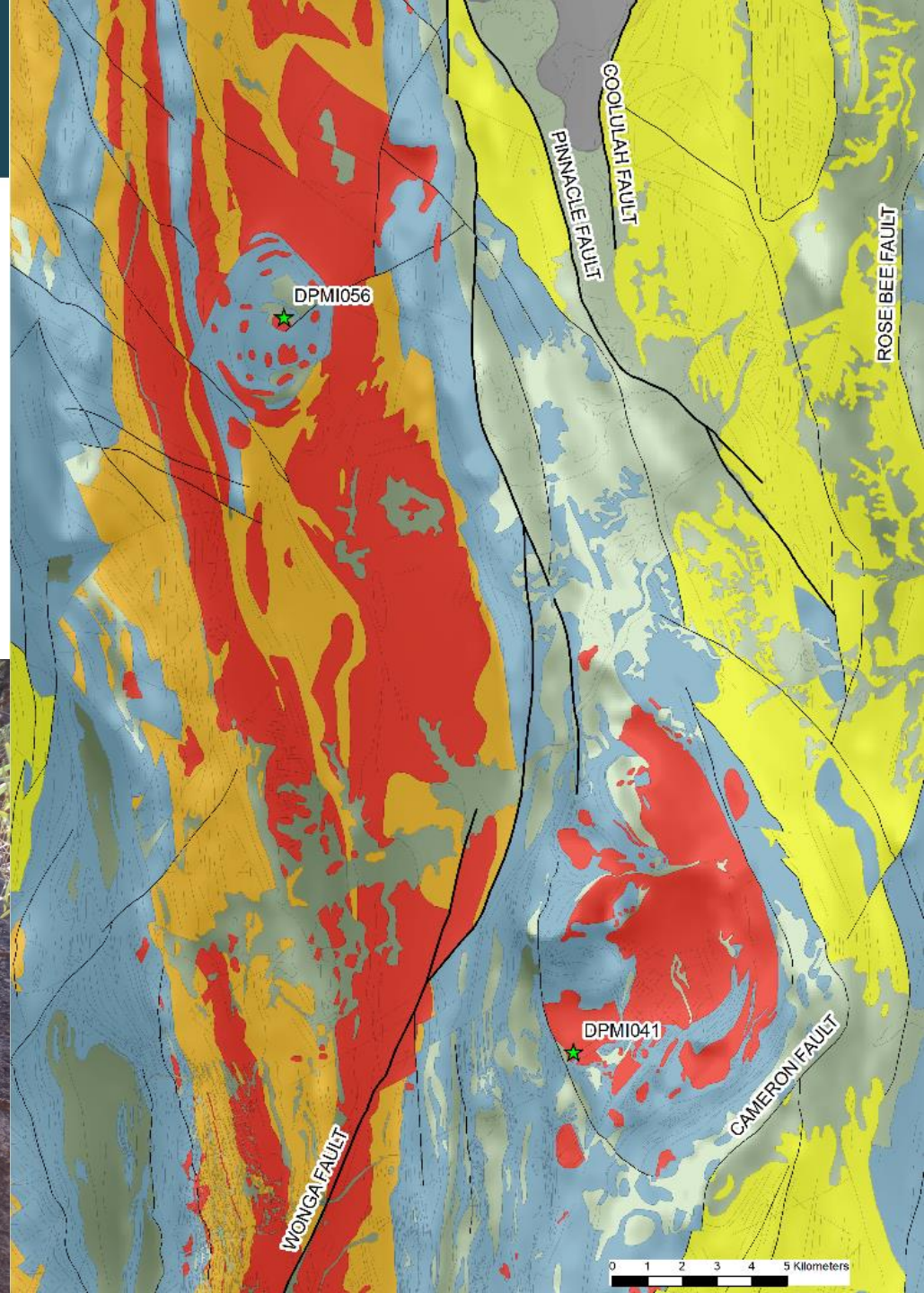
Mount Colin

- Mount Colin, ~1740 Ma Corella formation titanite granite ~1550 Ma titanite
- Northern unfoliated fine grained high marialitic part of the Burstall granite/1 returned 1740ma
- Hardway Granite ~1860 Ma KLB



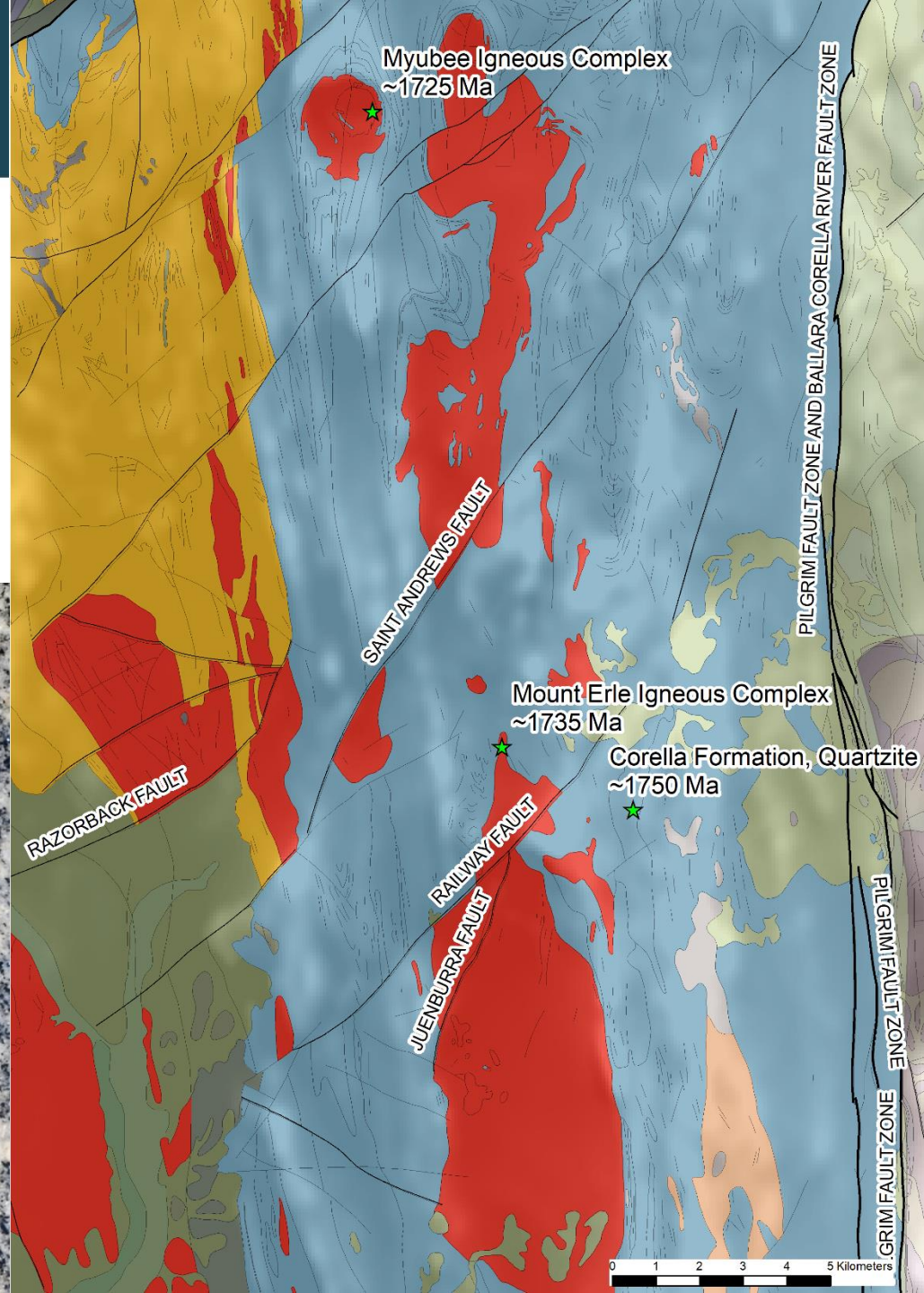
Godkin area

- Mount Godkin consists of a complex of skarn and granite which intrudes the Corella formation
- Mount Godkin granite has indications of high level of intrusion, vesicular porphyritic phases so was thought to have potential to be part of the Williams suite.
- To the north of mount Godkin, west of the Wonga fault is cryptic intrusion similar in composition and age but poorly expo
- These two s

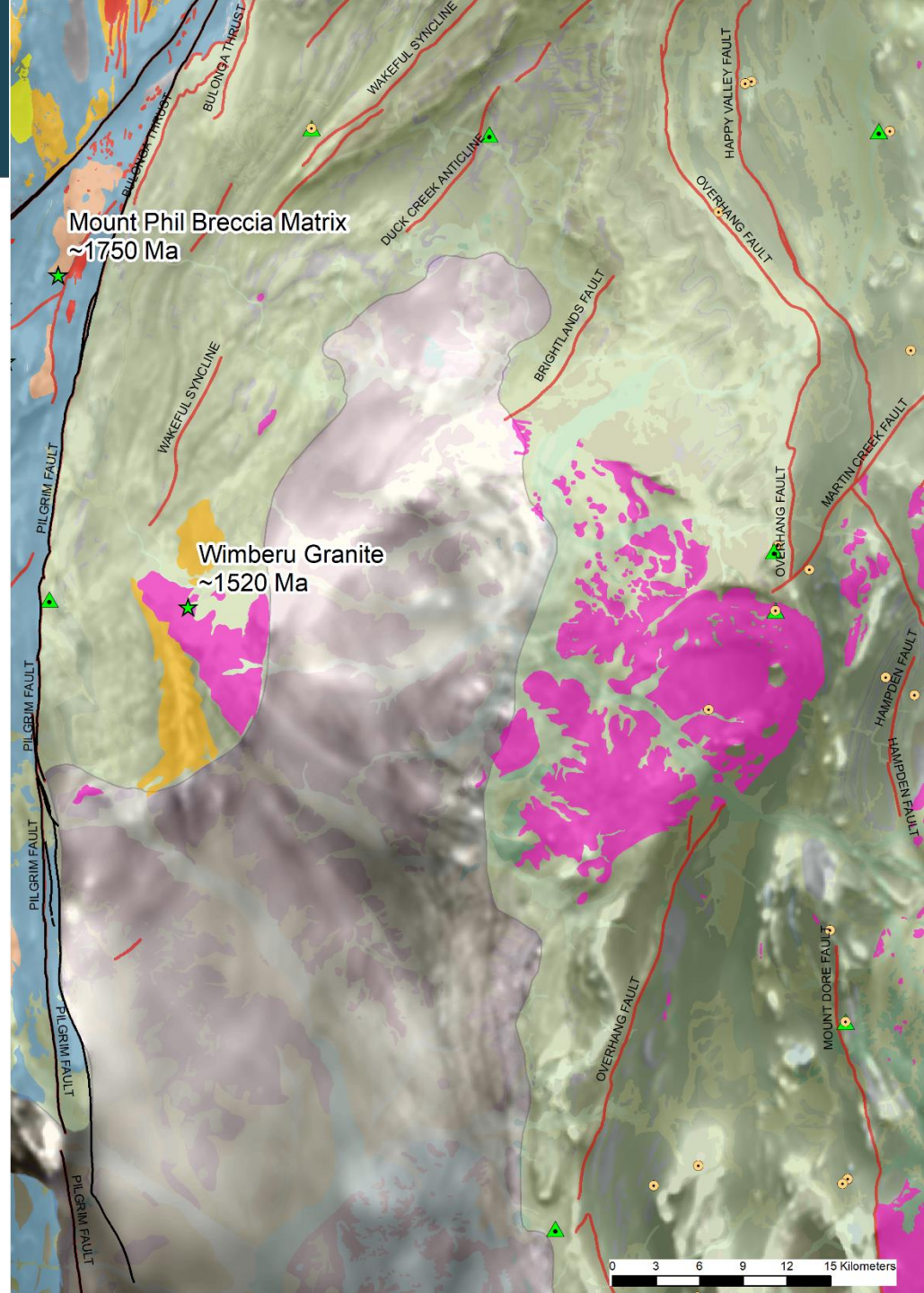


Myubee, Mount Erle

- Myubee ~1725 Ma
- Mount Erle ~1735 Ma
- Southern Corella Quartzite ~1750 Ma

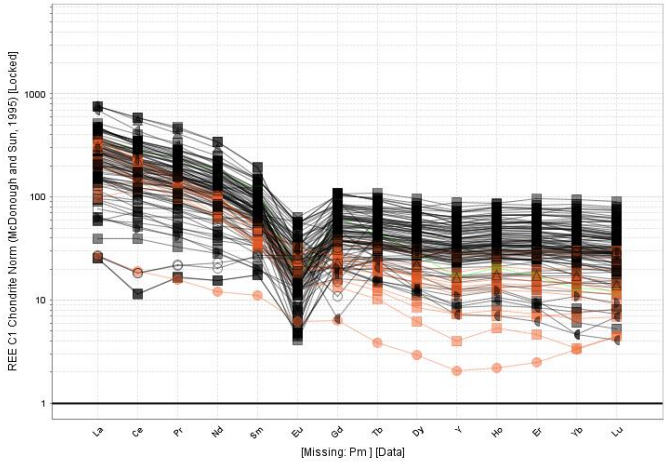


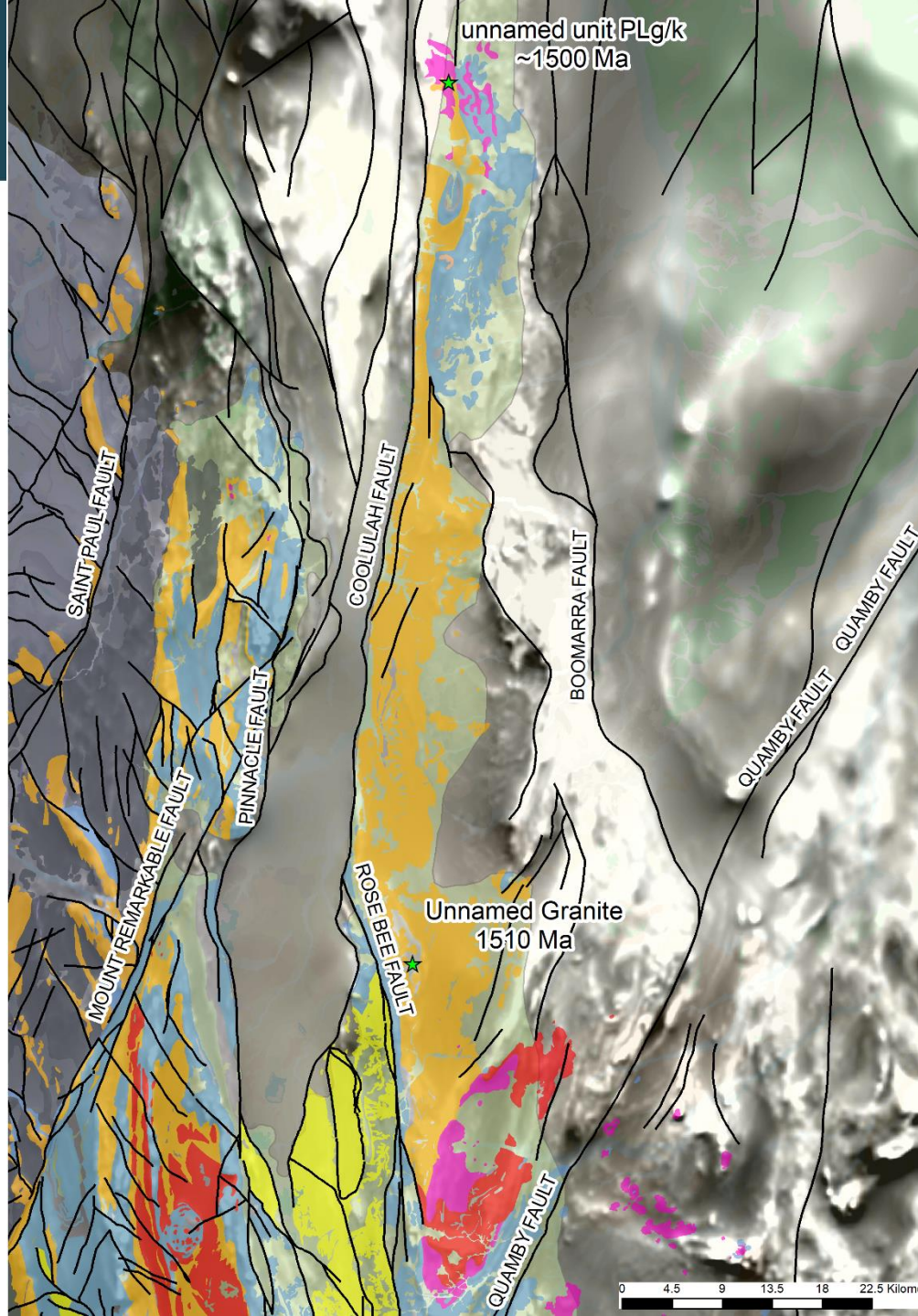
Wimberu Granite 1520 Ma



~1500 Ma granite

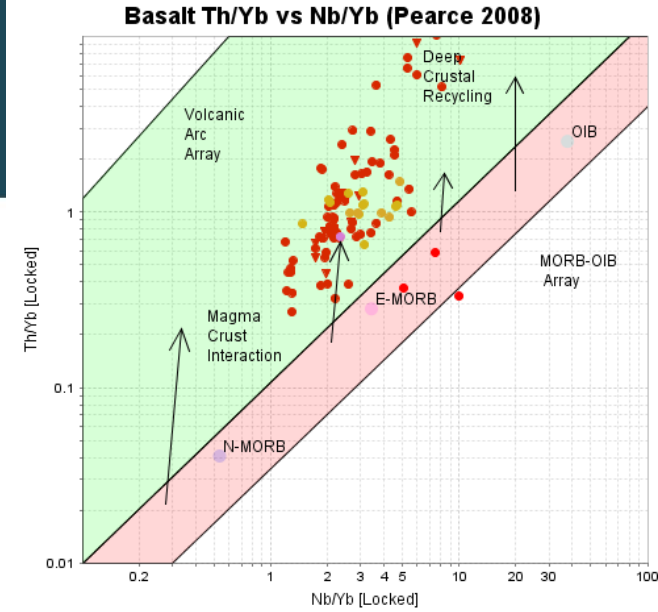
- The Mavis granodiorite associated with the Dipvale granodiorite is the eastern most portion of the mapped Williams suite in northern part of the Mount Isa inlier
- In the most extreme north of the eastern part of the MKD there is some poorly exposed unnamed granite which is similar in age and composition
- To the east of the rosebee fault a small body of unmapped granite with a ~1510 Ma crystallisation age
- Prelim geochem indicates this suite can be characterised using REEE geochemistry has a much less pronounced Eu anomaly and relatively flat pattern

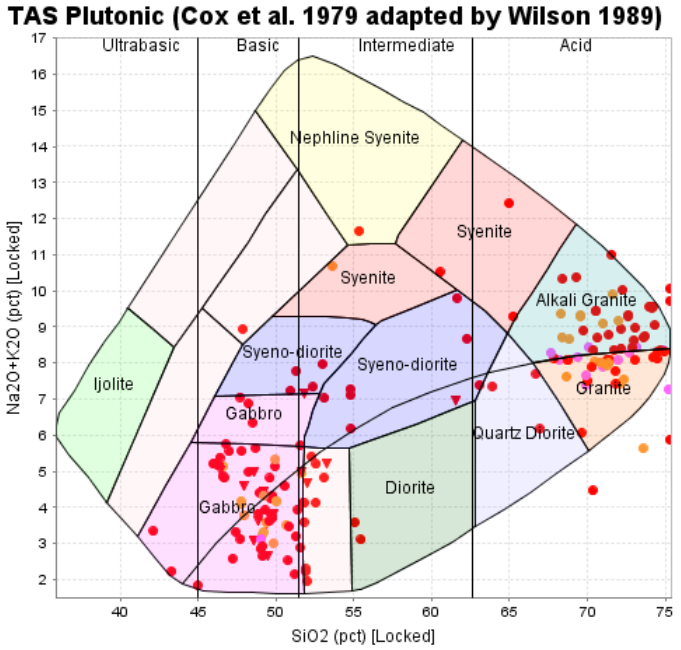




Geochemistry

- Work in progress second suite samples not yet processed
- Mafic Geochemistry indicates a diversity of source
- Define suites in Argylla aged granites and Wonga-Burstall suites
- Relationship between Corella dykes and the mafic component of the Wonga Burstall suite

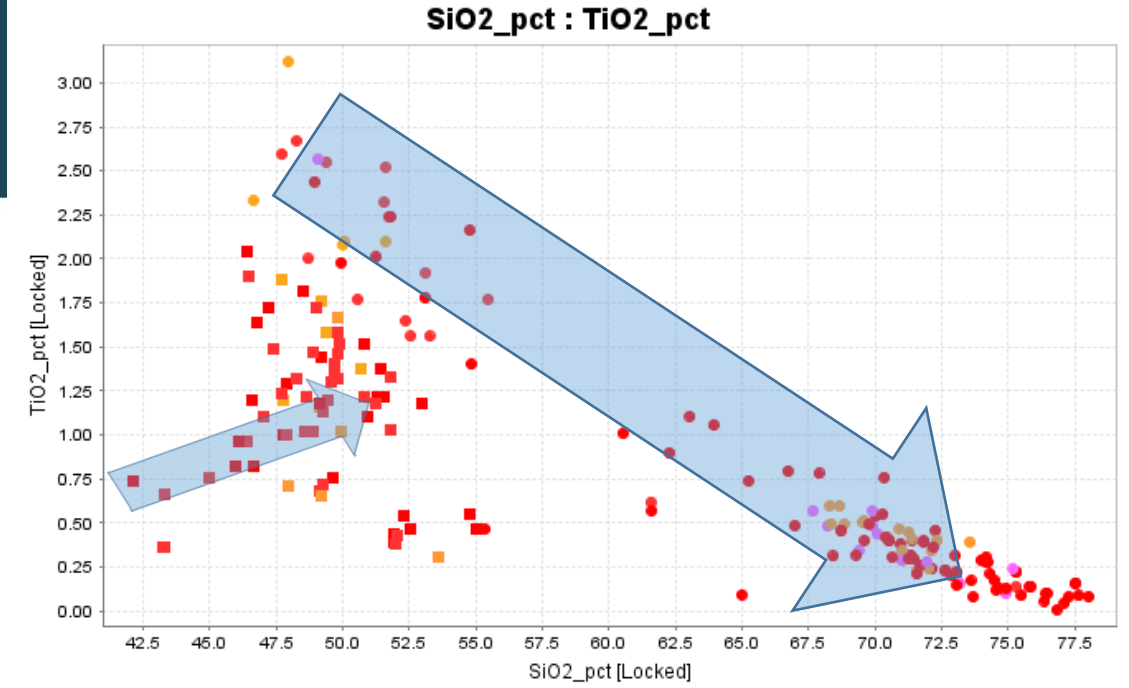


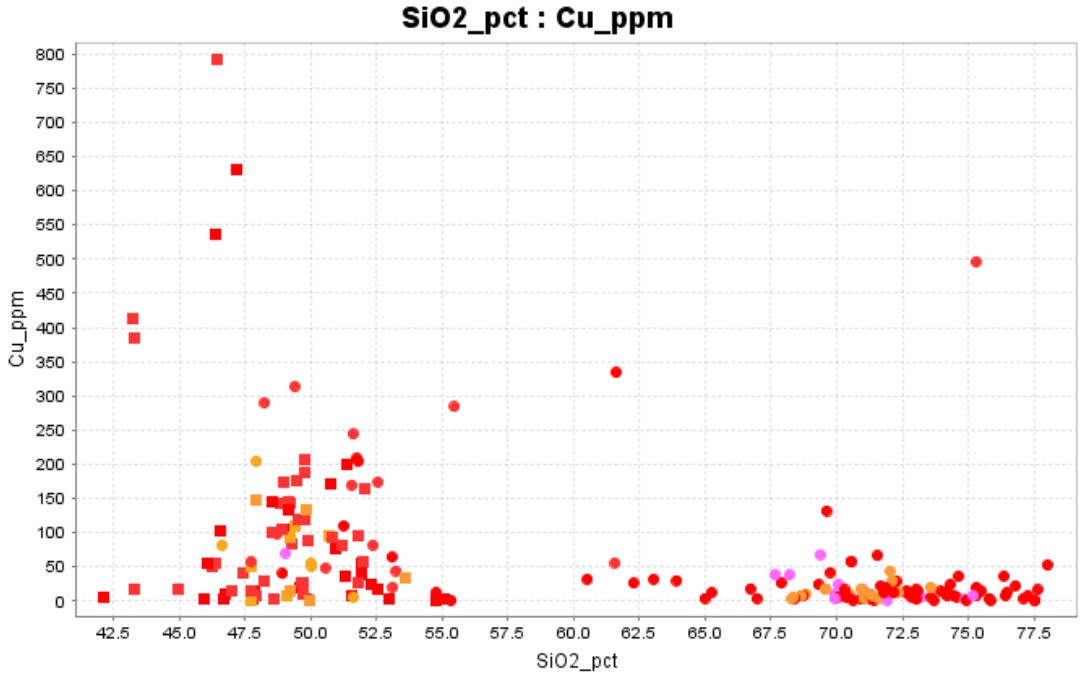


Magma fertility

- Preliminary work from JCU indicates gabbroids and granites may be different evolution trends

- Copper concentrated in mafic rocks, very limited amount of intermediate rocks





Outputs & Future Work

Descriptive GSQ record of magmatic rocks

LA-ICPMS dating campaign at QUT

O-Hf transect

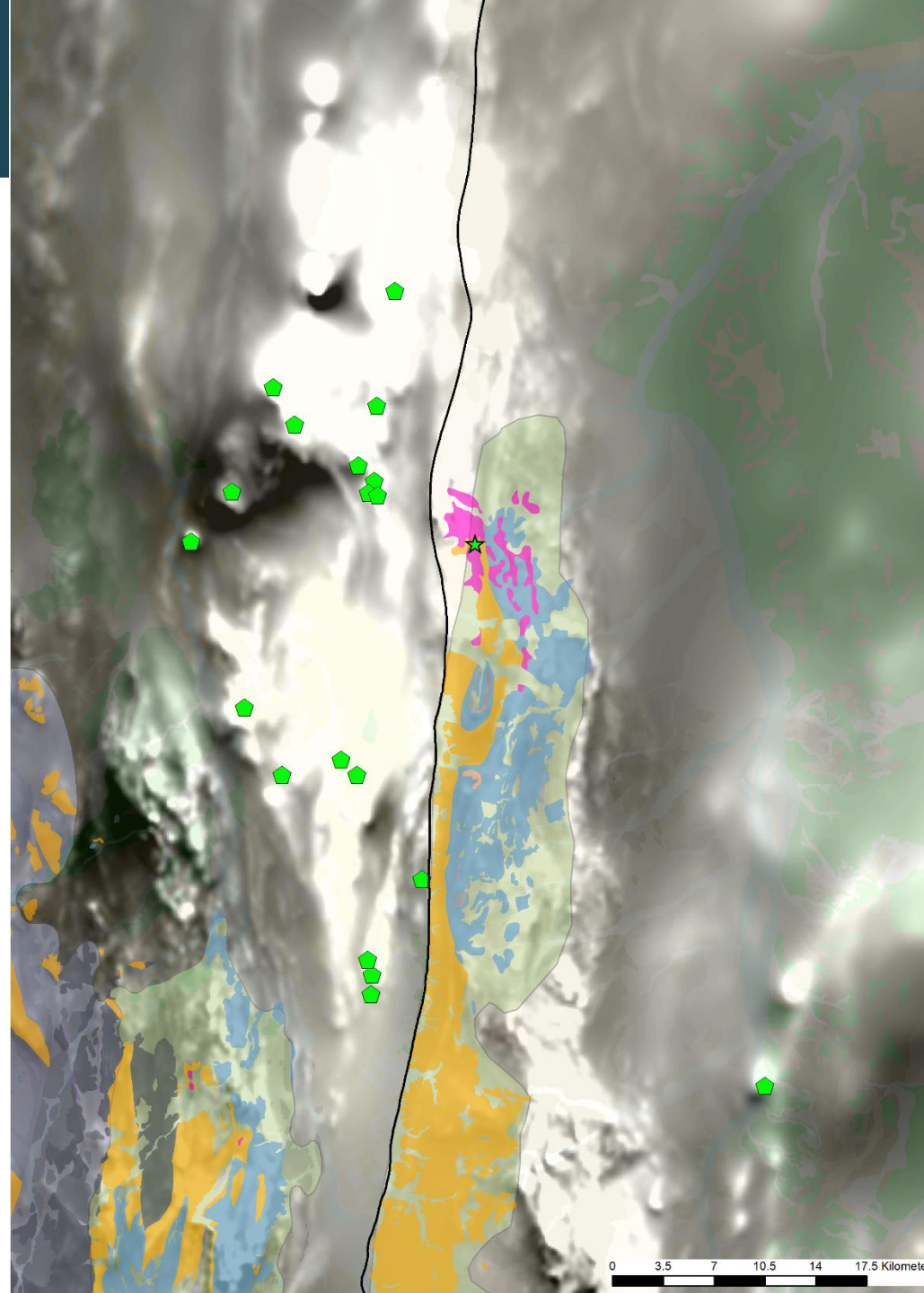
Corella Geochronology

Undercover area

Strucutral interpretation in northern part of belt

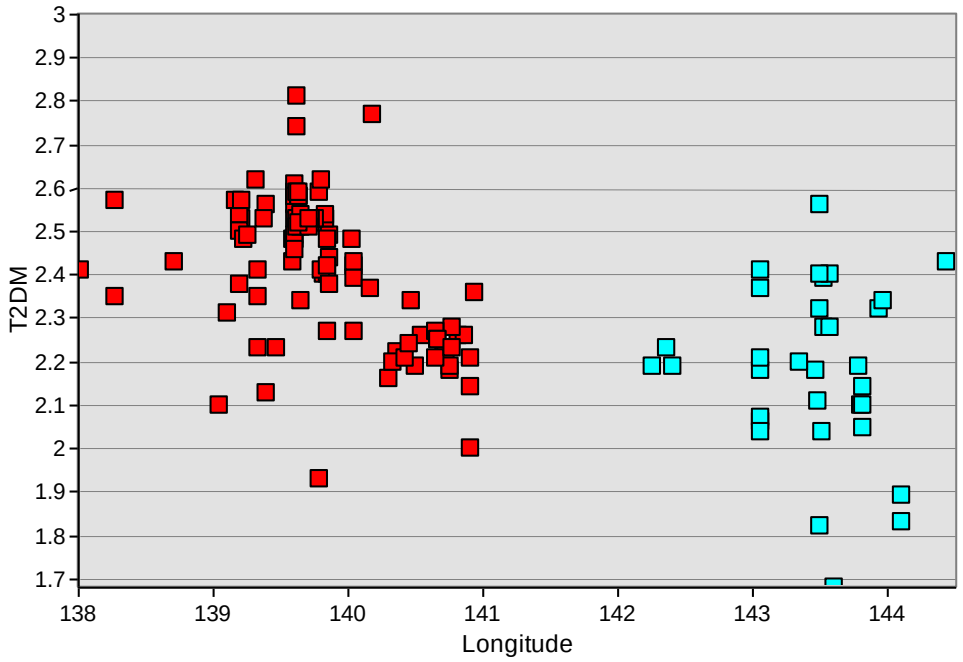
Northern Undercover area

- 19 cores sampled from historical exploration
- Extend the geochemistry and geochronology into the undercover area
- Currently mapped as Corella Formation and Mount Albert group, contains a significant number of intrusions and large alteration systems

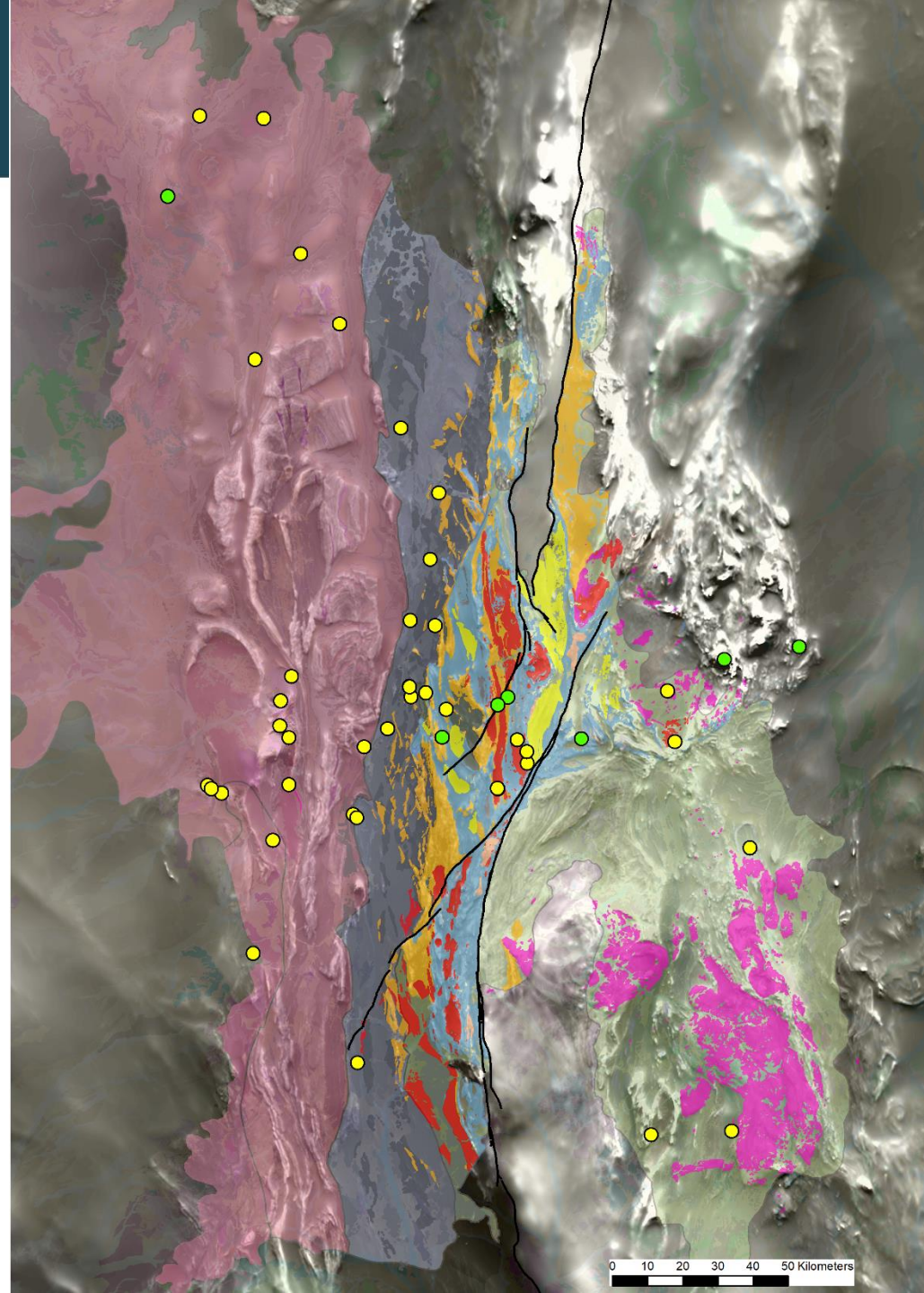


O-Hf Transect

- Utilising mostly existing Shrimp mounts to characterise the lower crust



Nd model ages (Champion, 2013)



Acknowledgements

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- Thanks to our collaborators JCU, QUT and Geoscience Australia.