

BROVEY MAPPING
SERVICES



Exploring in the last frontier: Skarn mineralisation, Attunga District, NSW

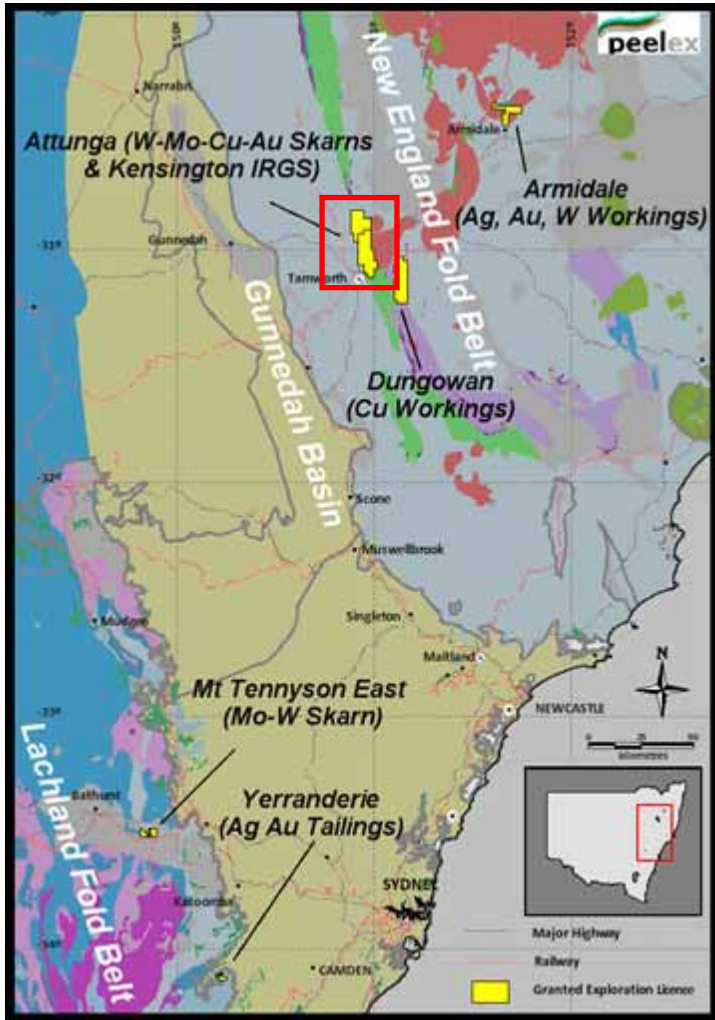
Latest exploration findings and interpretations

Nancy Vickery, Joshua Leigh and Michael Oates

Outline

- Recent geological mapping
- Mineralisation associated with the Attunga W deposit and Attunga Cu Mine
- Mapping and exploration results
- Recommendations for the future

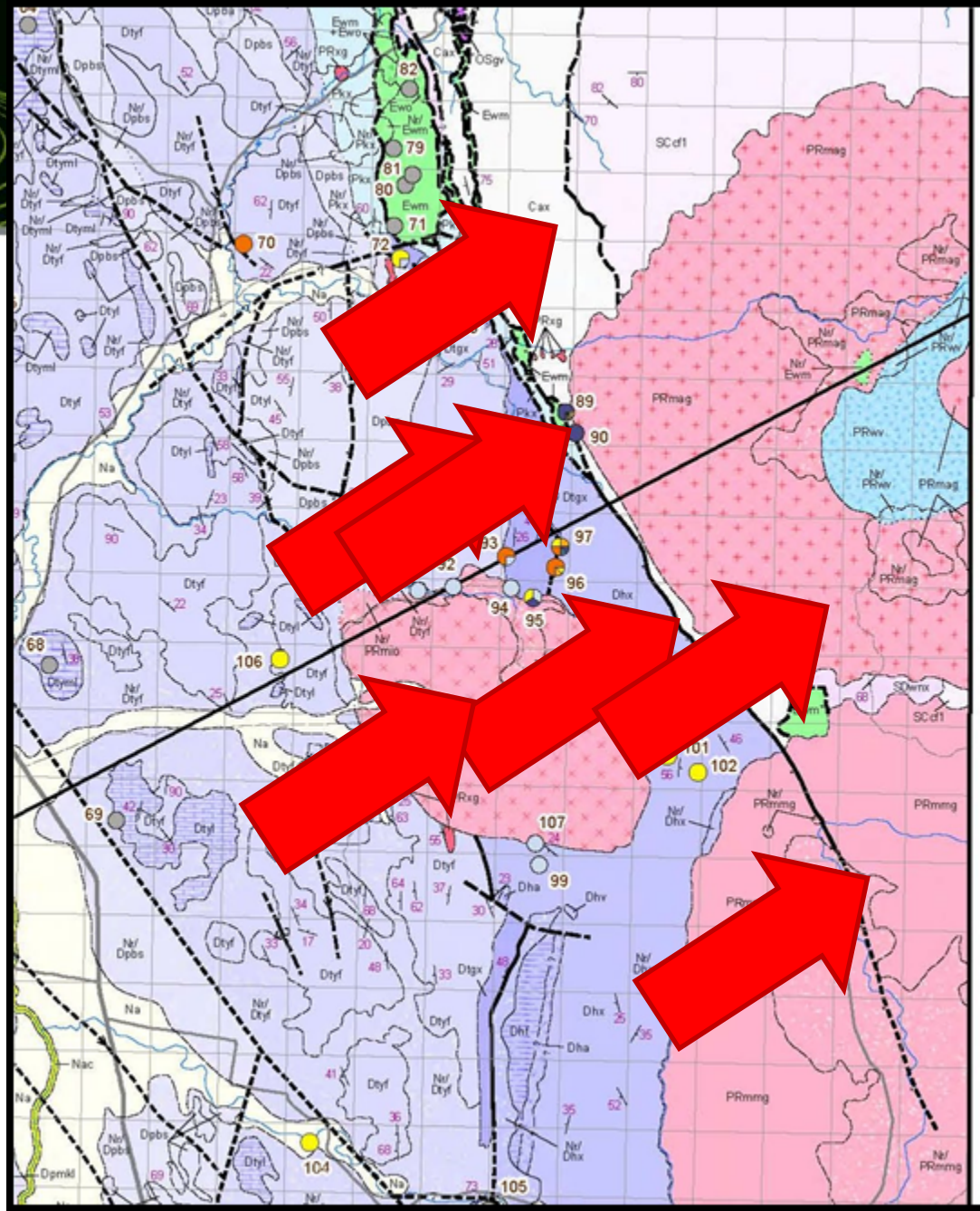
Attunga Project



- Located approximately 20 km north of Tamworth
- ELs 100% owned by Peel Exploration
- ELs occupy an area that straddles the Peel Fault, and includes the Inlet Monzonite
- Several historic workings are the target of new exploration work

Local Geology

- The tenement straddles the regionally significant Peel Fault
- Juxtaposes eastern-most portions of the Devonian Tamworth Group (to the west) and Devonian-Carboniferous Wisemans Arm and Cara Formations of the Central Block (to the east).
- The tenement area incorporates portions of the Attunga Creek and Moonbi monzogranites and the Inlet Monzonite
- The early Permian Kensington Formation locally overlies these rocks along the trace of the Peel Fault



Excerpt from Manilla 1:100K map, in press, GSNSW

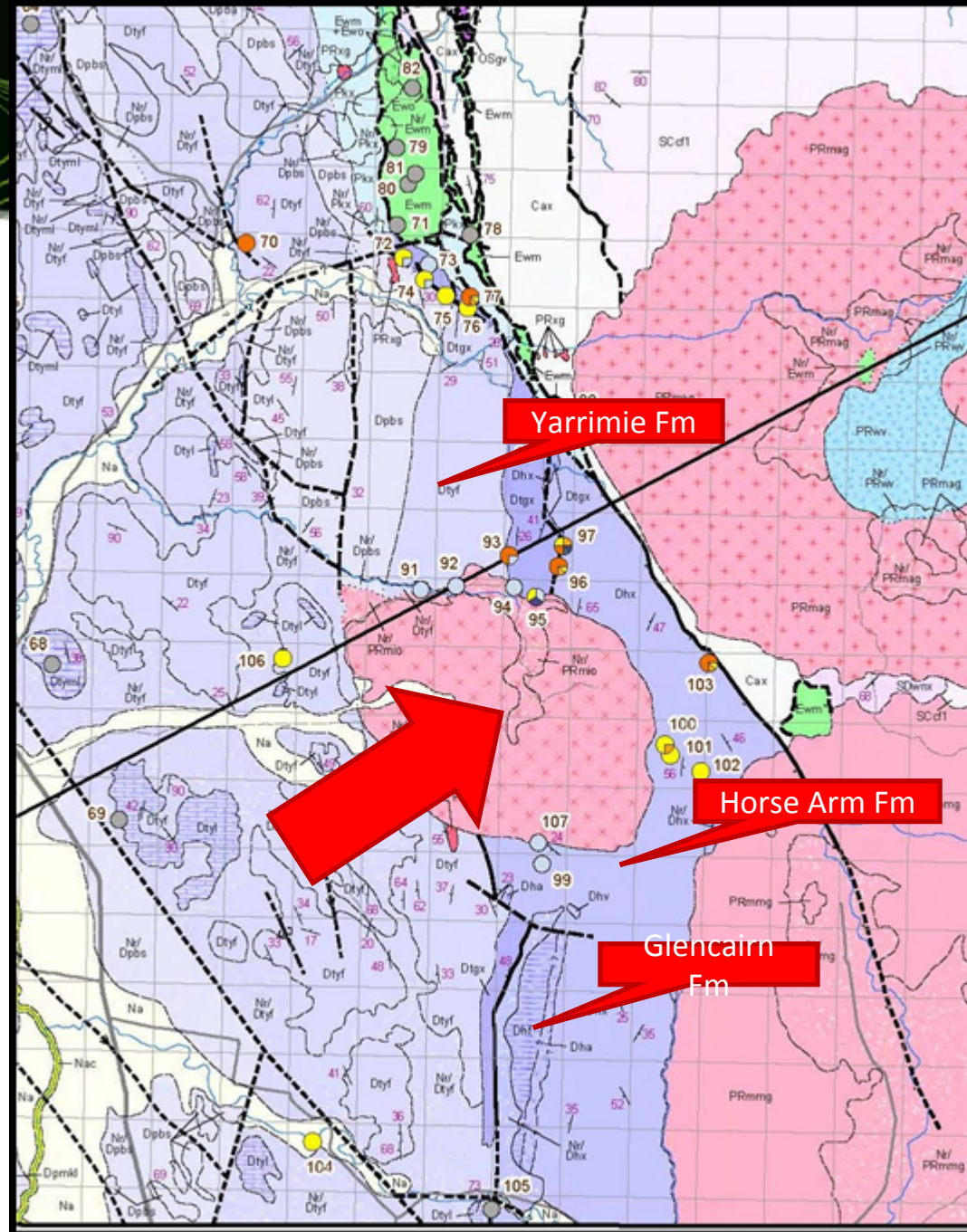
Local Geology

The Inlet Monzonite intrudes into the Tamworth Group, west of the Peel Fault

The Tamworth Group locally comprises shallow to deep marine turbidites of the Horse Arm, Glencairn and Yarrimie formations

The units are dominated by volcanoclastic (andesitic) greywacke, mudstone, conglomerate and limestone

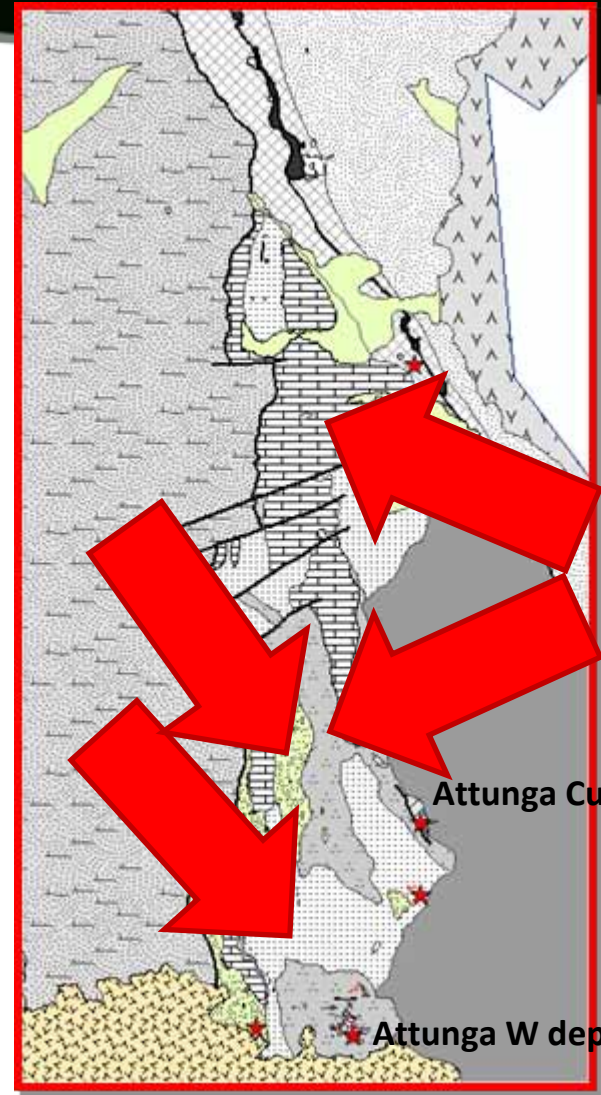
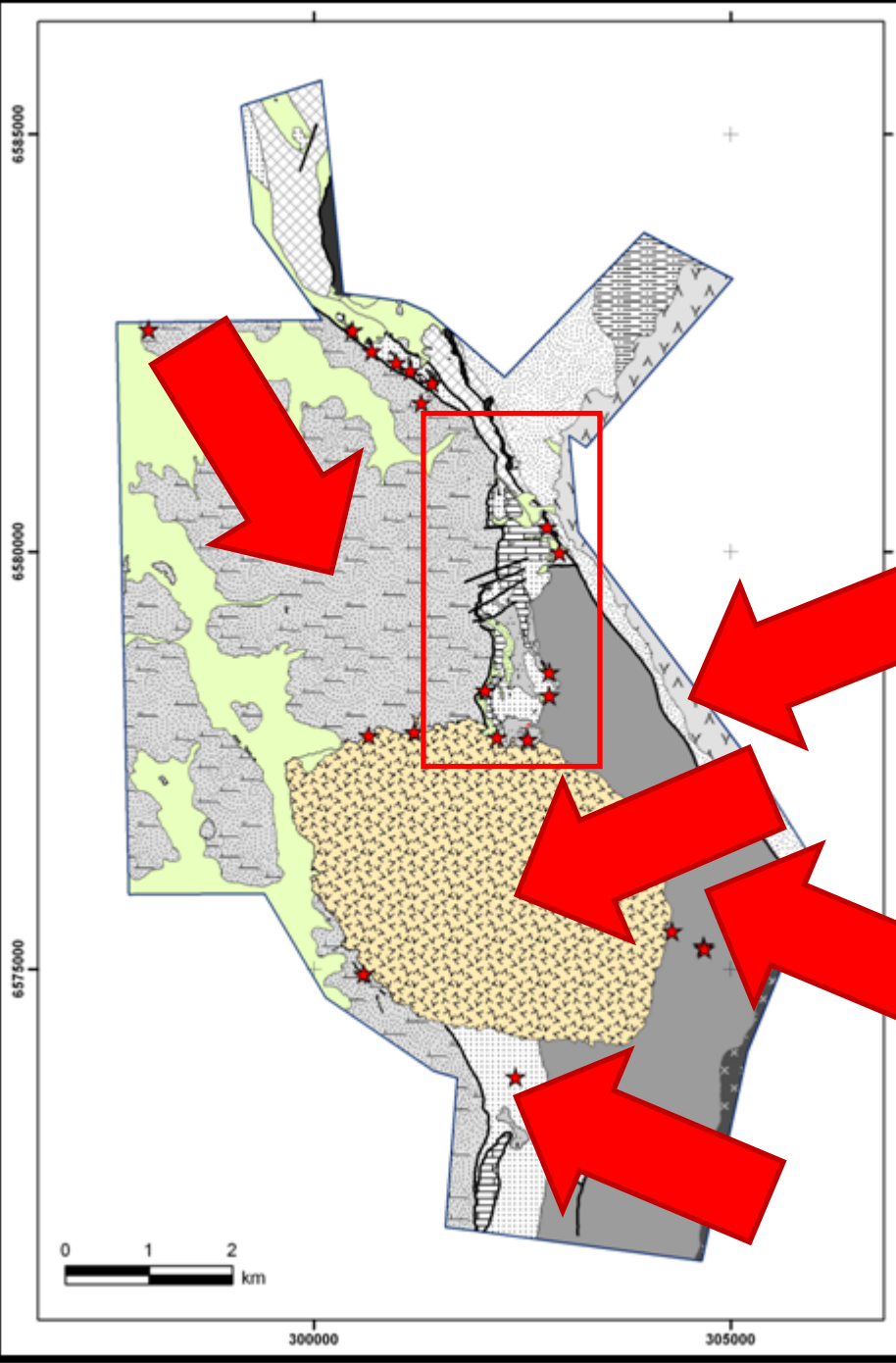
Limestone members are locally significant within the Glencairn and Yarrimie formations



Geological mapping

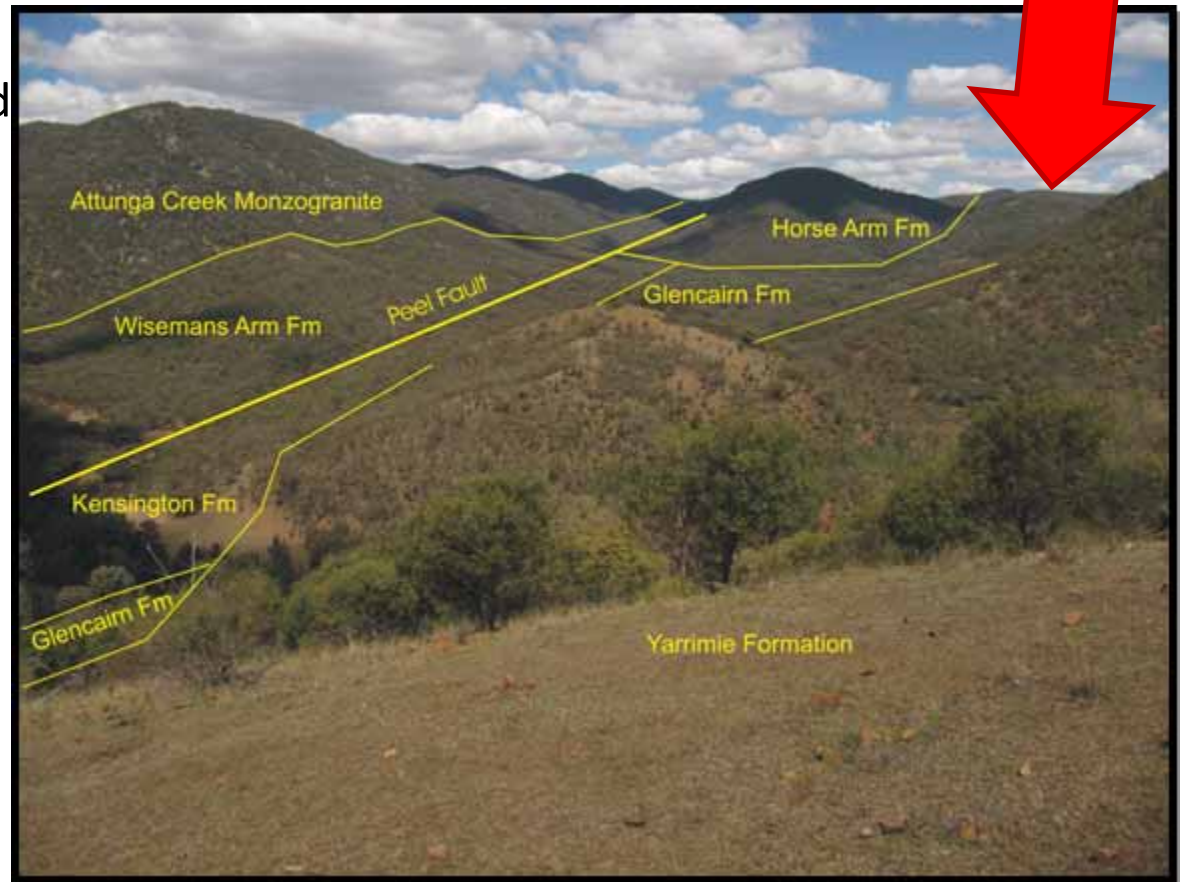
- The area is dominated by west dipping and facing sedimentary rocks of the Tamworth Group
 - Horse Arm Formation
 - Glencairn Formation
 - Yarrimie Formation
- These units are in fault contact. Unknown thicknesses have been removed along the top and base of each
- Low grade regional metamorphism (prehnite-pumpellyite facies) has affected the Tamworth Group
- This metamorphism has been overprinted locally and variably by thermal metamorphism associated with the intrusion of the Moonbi Supersuite

Geological mapping



Findings from geological mapping

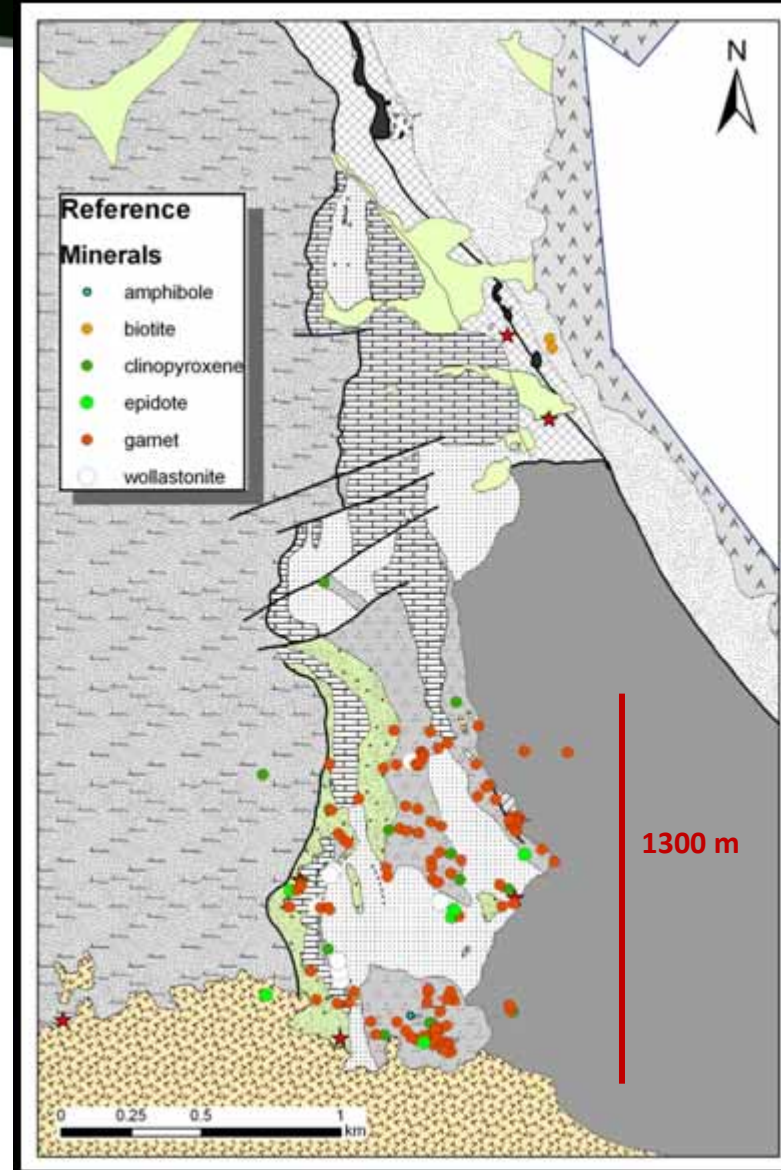
- The prominent valley north of the Inlet Monzonite is occupied by variably altered rocks of the Glencairn Formation
- On either side are prominent ridges, of Attunga Creek monzogranite, Horse Arm Fm (east) and Yarrimie Fm (west)
- There is a close correlation between geology and geomorphology, including major faults, geological boundaries etc.



View looking SE towards the Attunga Creek monzogranite

Findings from geological mapping

- Skarn-style alteration and mineralisation has affected reactive rocks within the Glencairn Fm, and to a lesser extent, the Yarrimie and Horse Arm formations
- Contact metamorphism north of the Inlet Monzonite extends for over 1 km in the limestones of the Glencairn Formation
- Peak mineral assemblage includes wollastonite, garnet, pyroxene and titanite
- Retrograde minerals include epidote, actinolite and calcite

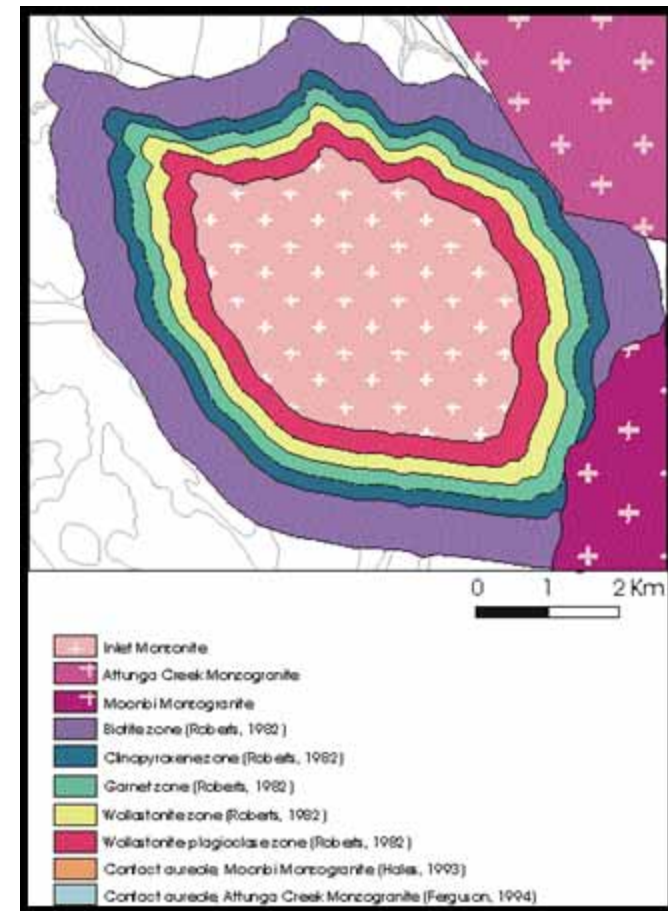


Geological mapping



The Inlet Monzonite

- The Inlet Monzonite is an I-type hornblende-bearing granitoid
- It is the most mafic member of the Moonbi Supersuite and the only to intrude entirely west of the Peel Fault
- It is also one of the least fractionated members of the Moonbi Supersuite
- A significant contact aureole has been identified, particularly to the north



Historic Mineral Occurrences

- These include:
 - The Attunga Copper Mine-7
 - Attunga Tungsten Skarn (Prospect 1)-1
 - O Shaft-5
 - P Shaft-6

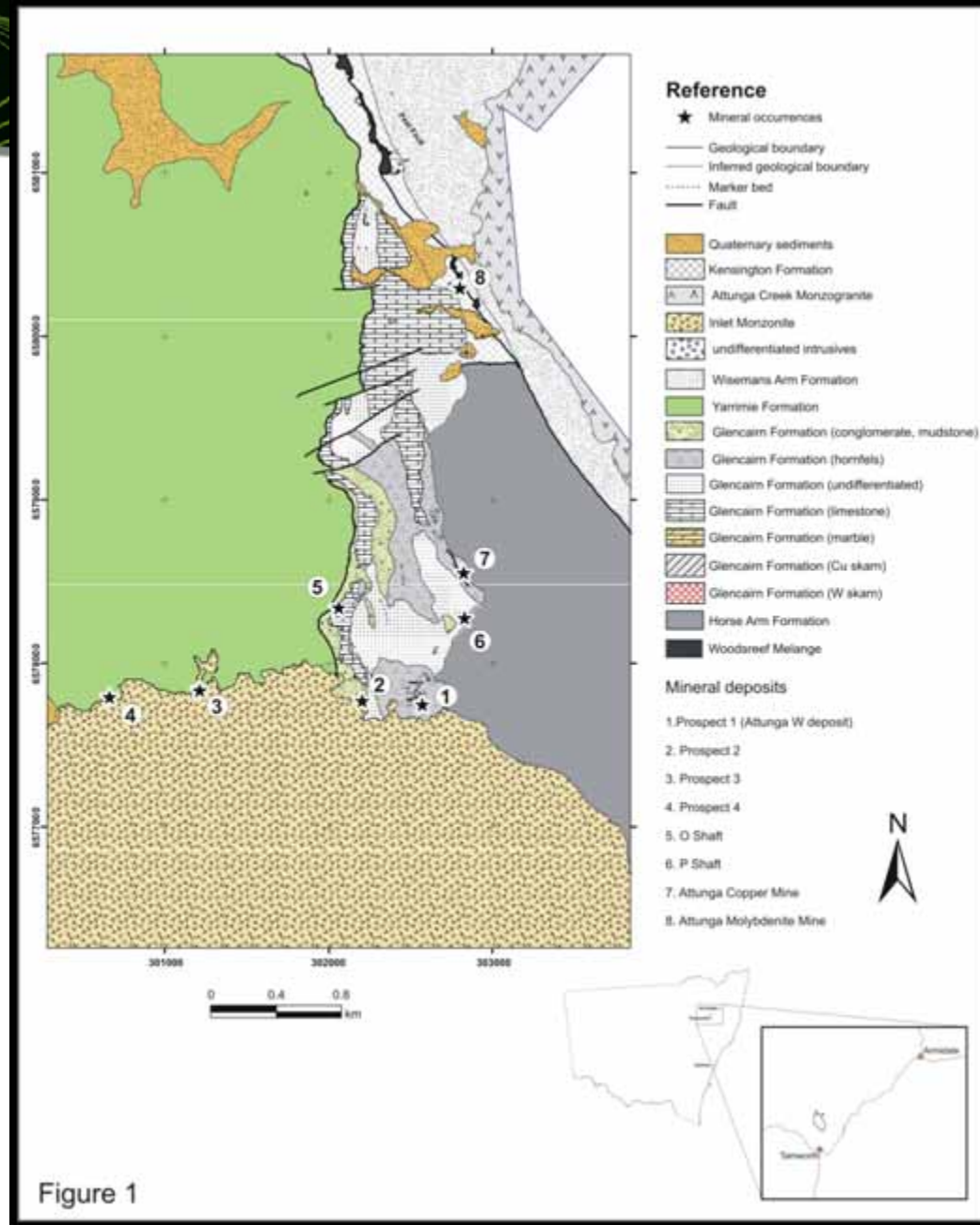


Figure 1

Exploration results

- Peelex have identified a resource at Prospect 1 of 1.29Mt @ 0.61% WO₃.
- Tungsten is found in scheelite in a coarse grained granoblastic garnet-quartz-pyroxene-magnetite rock.
- Drilling in 2009 at the Attunga Copper Mine intersected 75m @ 1.02 g/t Au, 0.87% Cu, 0.09% Mo, 0.06% Bi and 22g/t Ag with high grade portions within.
- In 2010 Peelex discovered further significant Cu-Ag-Au-Bi mineralisation in an RC/Diamond drilling programme at the Attunga Cu Mine



Exploration results

- In 2010 further intersections from drillhole ACM008 returned 5.6m at 0.44% Mo, 0.70 g/t Au, 12 g/t Ag, 0.45% Cu and 1.4m at 22.70 g/t Au, 13 g/t Ag, and 0.70% Cu



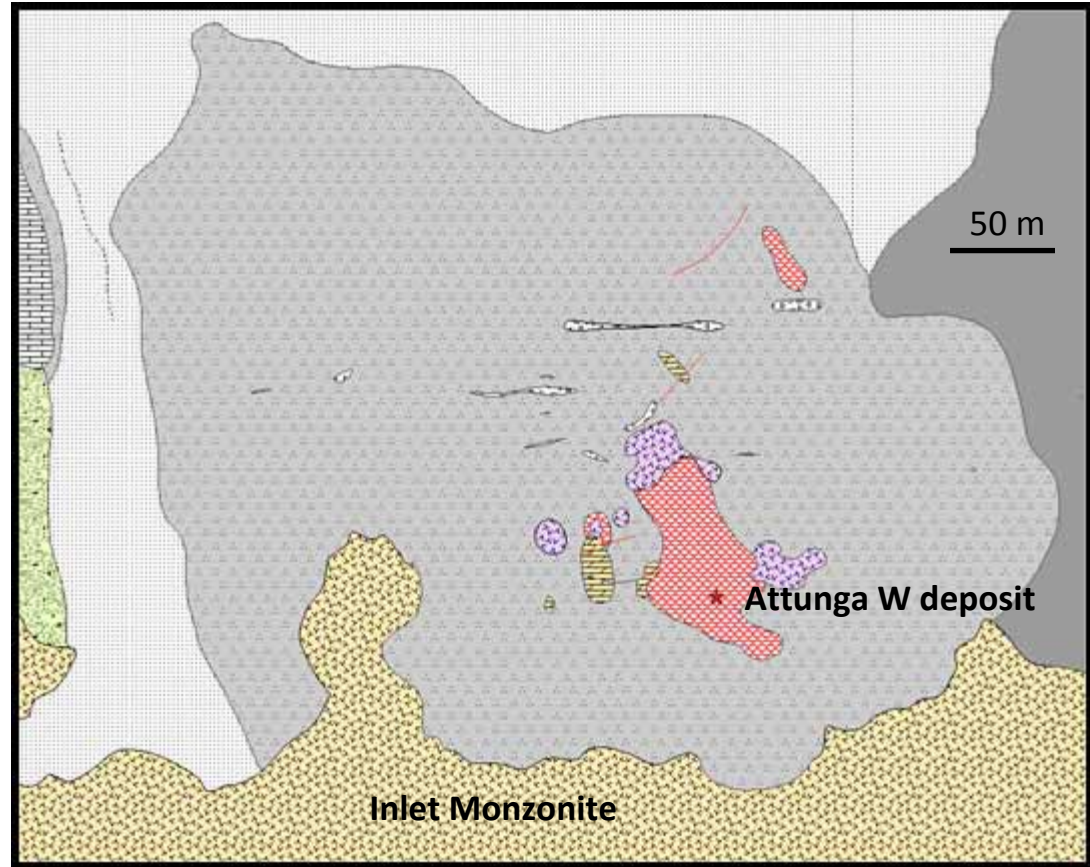
Mineralisation - Attunga W deposit

- Attunga W deposit is located proximal to the Inlet Monzonite and is associated with a prograde mineral assemblage of scheelite-garnet-quartz-magnetite-calcite-titanite
- This assemblage has been overprinted by retrograde epidote-actinolite-calcite assemblage
- Mo occurs in molybdenite and minor powellite
- Metal correlations between W and Mo indicate an intimate association



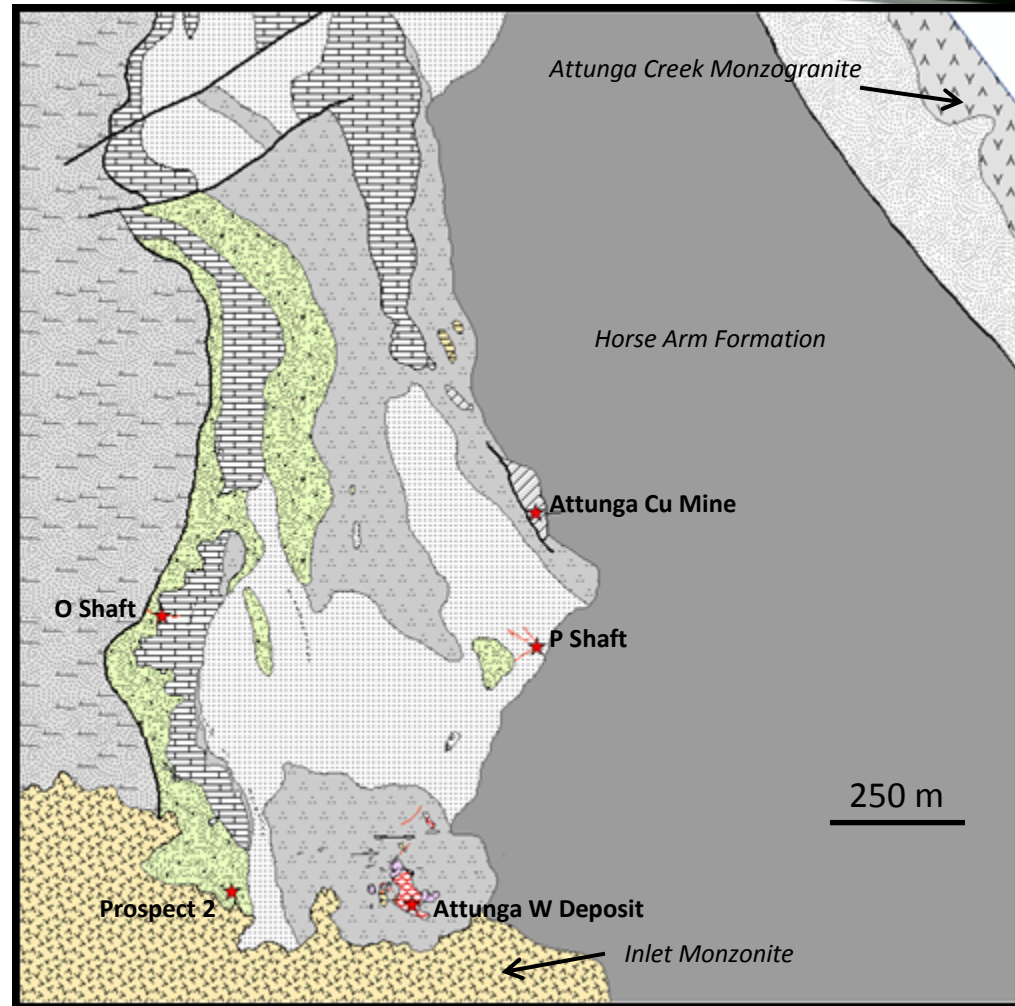
Mineralisation - Attunga W deposit

- Hosted within coarse grained metasomatised limestone
- Located within 100 m of the Inlet Monzonite boundary and in contact with endoskarn



Mineralisation-Attunga Cu mine

- Located approximately 800 m north of the Inlet Monzonite and 1300 m west of the Attunga Creek Monzogranite
- Adjacent to the Horse Arm Fm

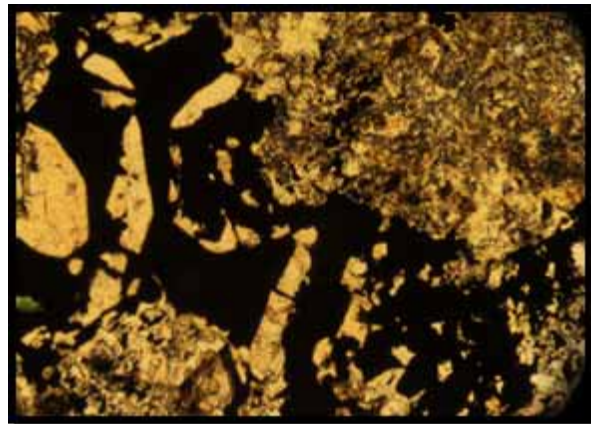
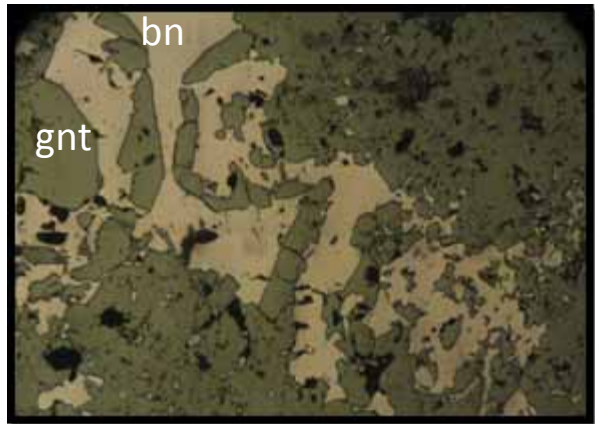
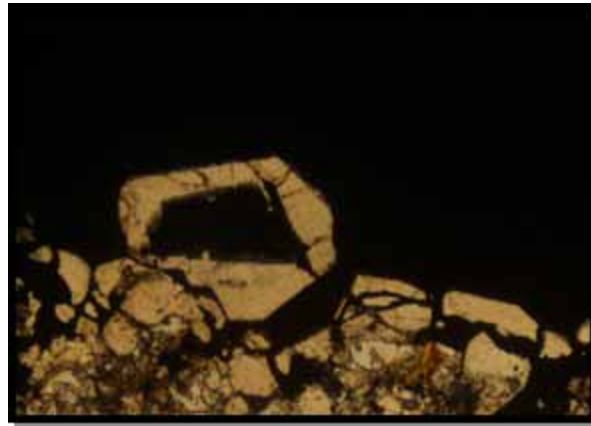
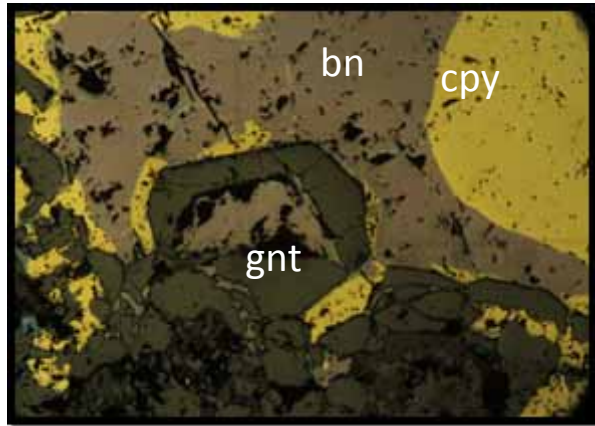


Mineralisation-Attunga Cu mine



- Hosted within a bioclastic limestone unit of the Glencairn Formation
- Occurs proximal to a NW trending shear zone
- Skarn development occurred post-deformation
- Prograde garnet-pyroxene-calcite-titanite dominated assemblage with a significant retrograde epidote-amphibole overprint
- Cu mineralisation spatially associated with the retrograde assemblage, forming interstitial to prograde mineral grains and partially rimming and replacing them

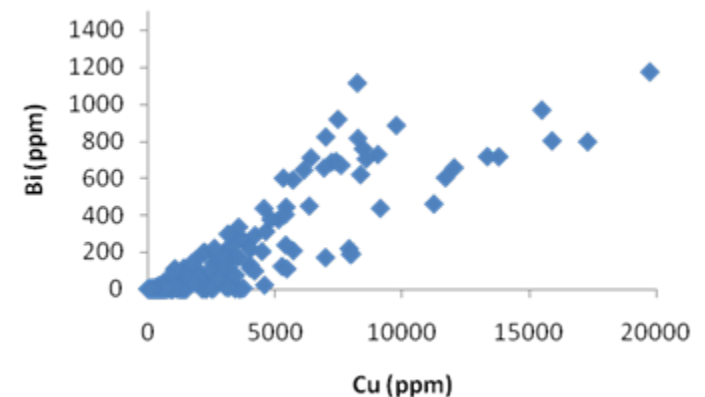
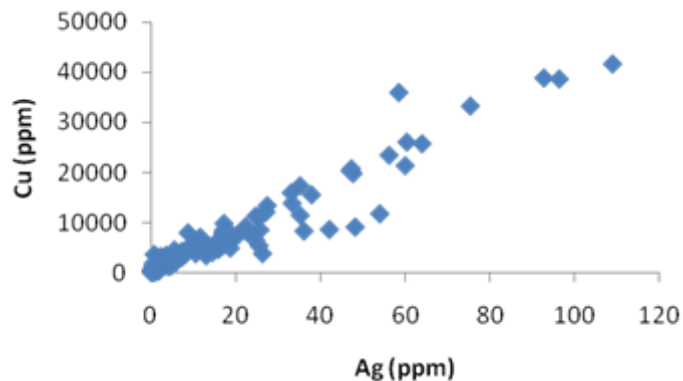
Mineralisation - Attunga Cu mine



- Chalcopyrite and bornite infilling cracks and rimming porphyroblastic garnet
- FOV 2 mm

Mineralisation-Attunga Cu mine

- Metal occurrence and zonation is complex
- The metal assemblage is Cu-Ag-Bi-Au±Mo±W±Sb
- There is a high correlation between Cu, Ag, Bi and to a lesser extent, Au.
- There is a high and low Bi series with respect to Cu values
- Mo and W correlate well, where W is elevated
- Despite enrichment, there is a poor correlation between Cu and Mo
- W-Mo mineralisation may pre-date Cu mineralisation
- This may be indicative of multiple fluid mineralising events



Skarn-style alteration



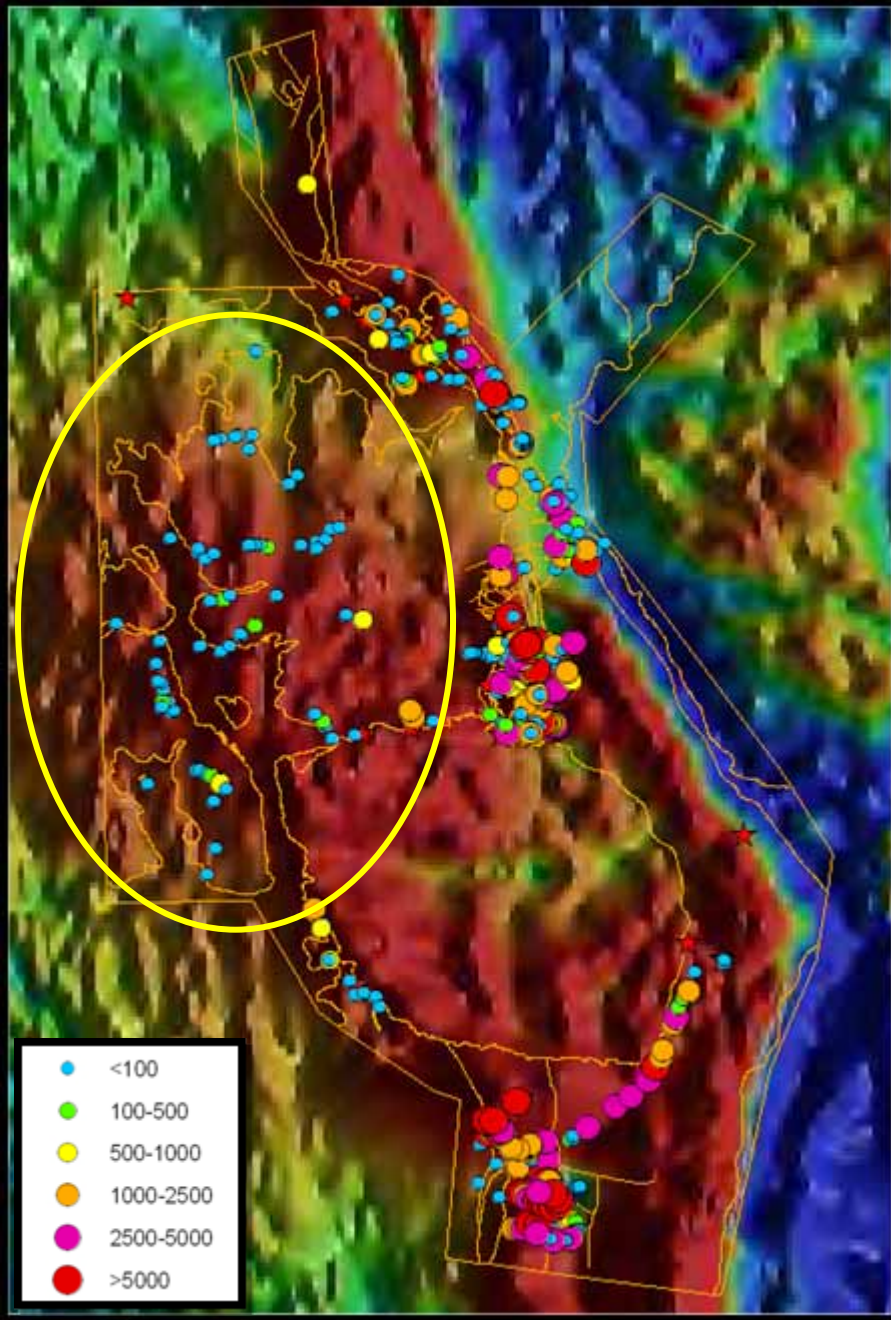
Granites and mineralisation

- Previous interpretations favour a simple zoned model for skarn mineralisation
- Preliminary petrographic and geochemical analysis indicates multi-stage mineralisation
- Proximal W (Mo), distal Cu (Mo) to the Inlet Monzonite
- The Attunga Cu Mine is located too far from the surface contact with the Inlet Monzonite (approx. 800 m) and Attunga Creek Monzogranite (1300 m)
- Mo mineralisation is typically proximal to the intrusion in skarn systems
- The hosting limestone unit terminates at the southern end of the deposit

Granites and mineralisation

- Recent U/Pb SHRIMP dating of zircon grains has established a latest Permian-Early Triassic magmatic age for the Inlet Monzonite (Black, 2007) of 253.4 ± 2.3 Ma
- Re-Os dating of molybdenite from the Attunga Copper Mine has yielded an age of 258.5 ± 0.8 Ma (Normal and Blevin, unpublished data)

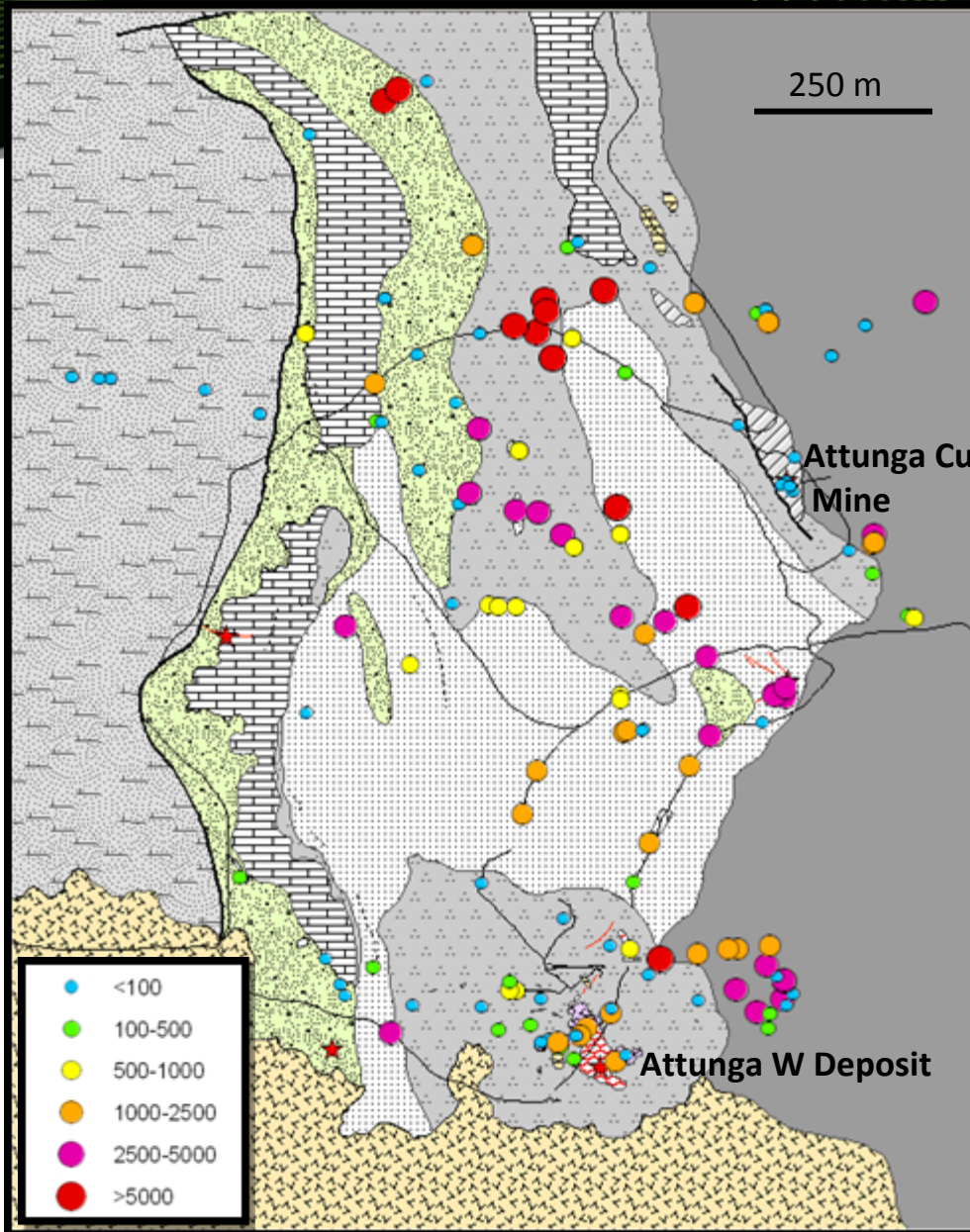
Regional magnetics



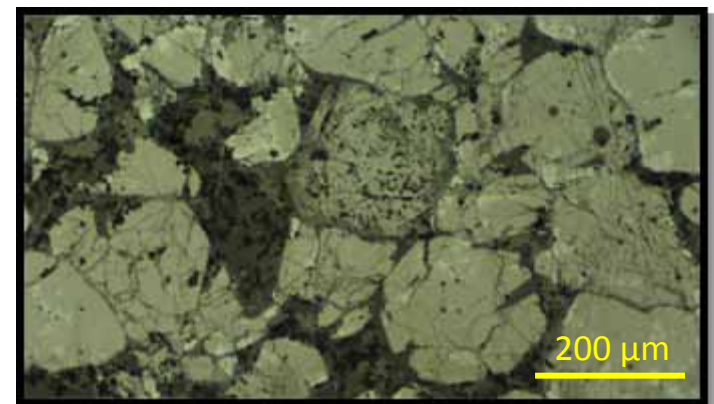
Hill shaded TMI image (Peel South data, GSNSW)

- The Inlet Monzonite is significantly more magnetic than other plutons in the Moonbi Supersuite (ave 700×10^{-5} SI cf 25×10^{-5} for the Attunga Creek Monzogranite)
- Greywackes within the Glencairn and Horse Arm Fms are locally intensely magnetic
- The Yarrimie Formation is uniformly subdued in response
- The Inlet Monzonite may dip shallowly to the NW under the Yarrimie Fm
- This may account for the wider aureole developed north of the Inlet Monzonite and mineralisation proximal to a shallow granite contact

Geological mapping and magnetics



- Magnetic susceptibility measurements indicate significant variation from primary (sedimentological) and secondary (metasomatic) sources
- Magnetite is associated with mineralisation at Prospect 1
- Cu mineralisation is not associated with magnetite
- Detrital magnetite occurs in greywackes in the Glencairn Fm



Conclusions

- Copper and tungsten skarn mineralisation in the Attunga district is hosted by reactive sedimentary rocks of the Tamworth Group
- Limestone members of the Glencairn Formation are the most favourable hosts, but volcanoclastic sedimentary rocks are locally important
- Mineralisation is identified on all sides of the Inlet Monzonite but a clear causal relationship has not been established
- The contact aureole is wider to the north of the Inlet Monzonite
- Regional magnetic data suggests that the Inlet Monzonite dips shallowly to the NW
- Petrographic and geochemical evidence suggest that mineralisation was multi-stage
- Geochronological data support a temporal association between skarn mineralisation and granitoid emplacement of the Moonbi Supersuite

Further work

- Where to begin?
- Detailed petrogenetic study of the Cu and W occurrences
- Modelling of regional magnetic data to better refine the shape of the Inlet Monzonite at depth
- Detailed geophysical survey
- Gravity survey over the granitoids
- Detailed soil/rock chip geochemical survey after evaluation of previous work