Mines and Wines 2013

Chillagoe IRG - Thinking outside the sediments

David Ward

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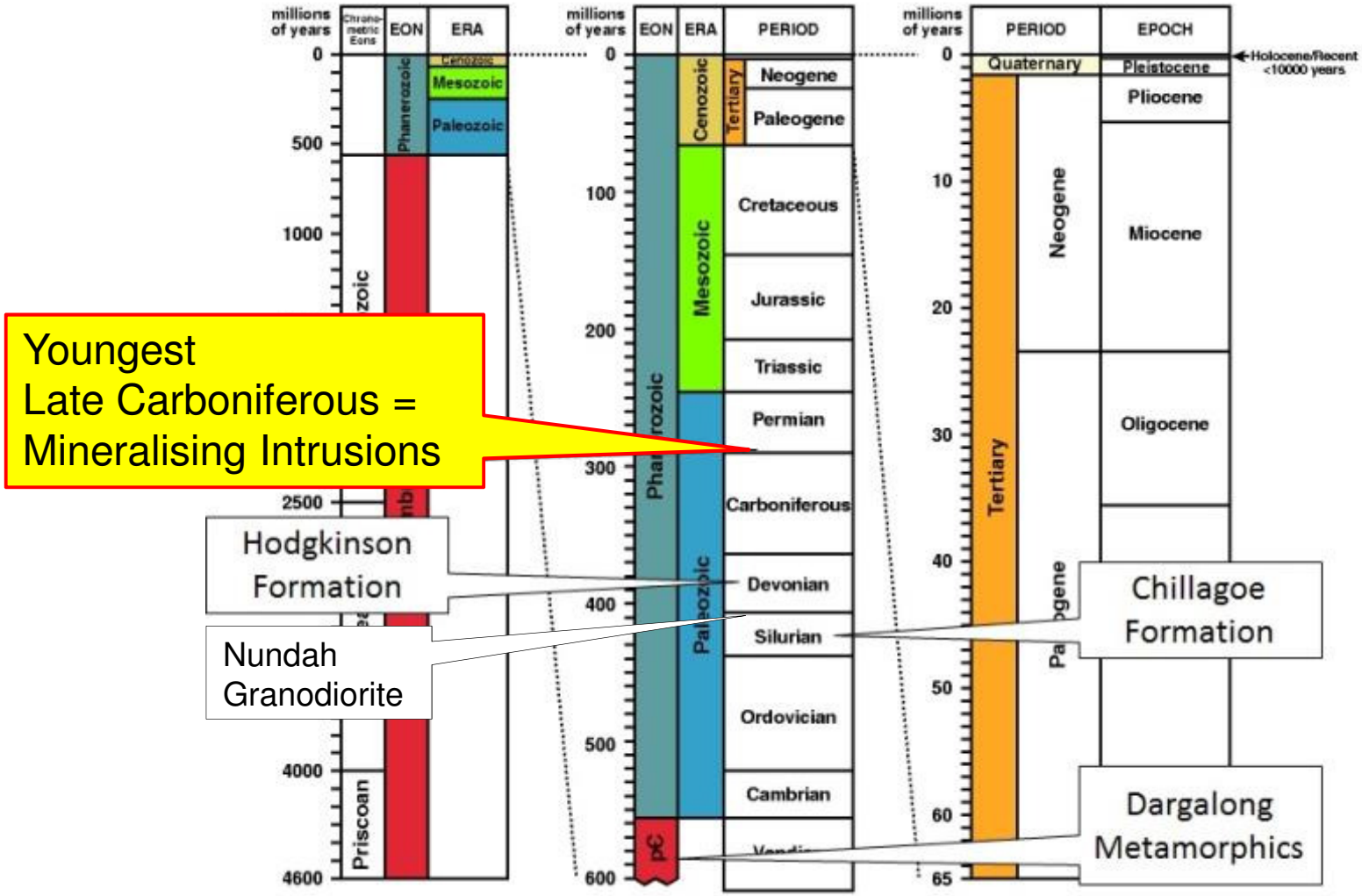
The information in this material that relates to Exploration Results is based on information compiled by Mr David Ward who is a Member of the Australian Institute of Mining and Metallurgy. Mr Ward has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2004 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves".

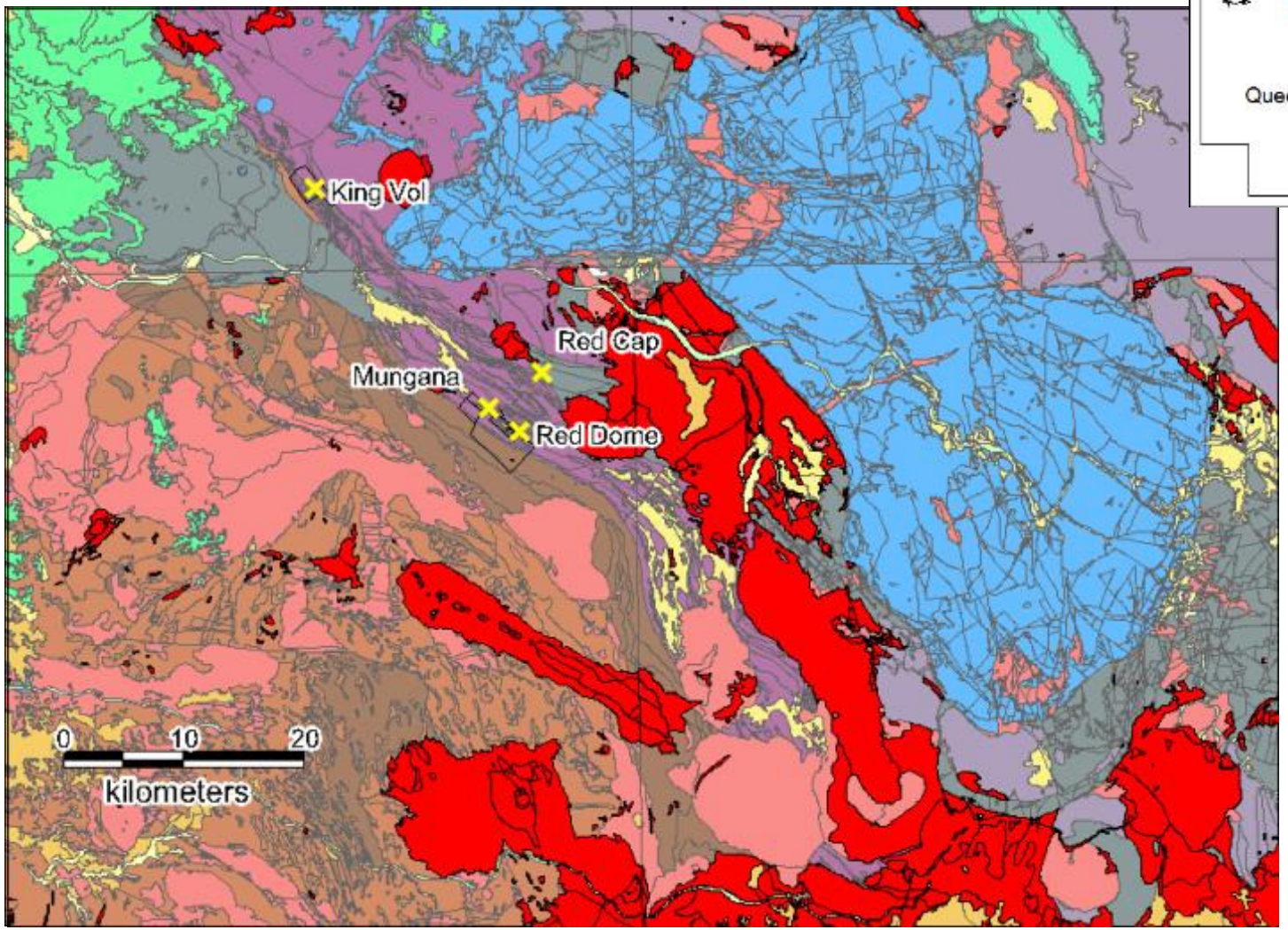
Chillagoe

- Known for massive Pb-Zn-Cu lodes (Mungana, Red Cap, King Vol) and Intrusive Related Gold (Mungana – Red Dome)
- Base-metal deposits form elliptical, short strike with extensive vertical extent
- Gold Mineralisation occurs on and around the rhyolite bodies and associated breccias
  - **All mineralisation; gold, silver, lead, zinc, copper is intrusive related**

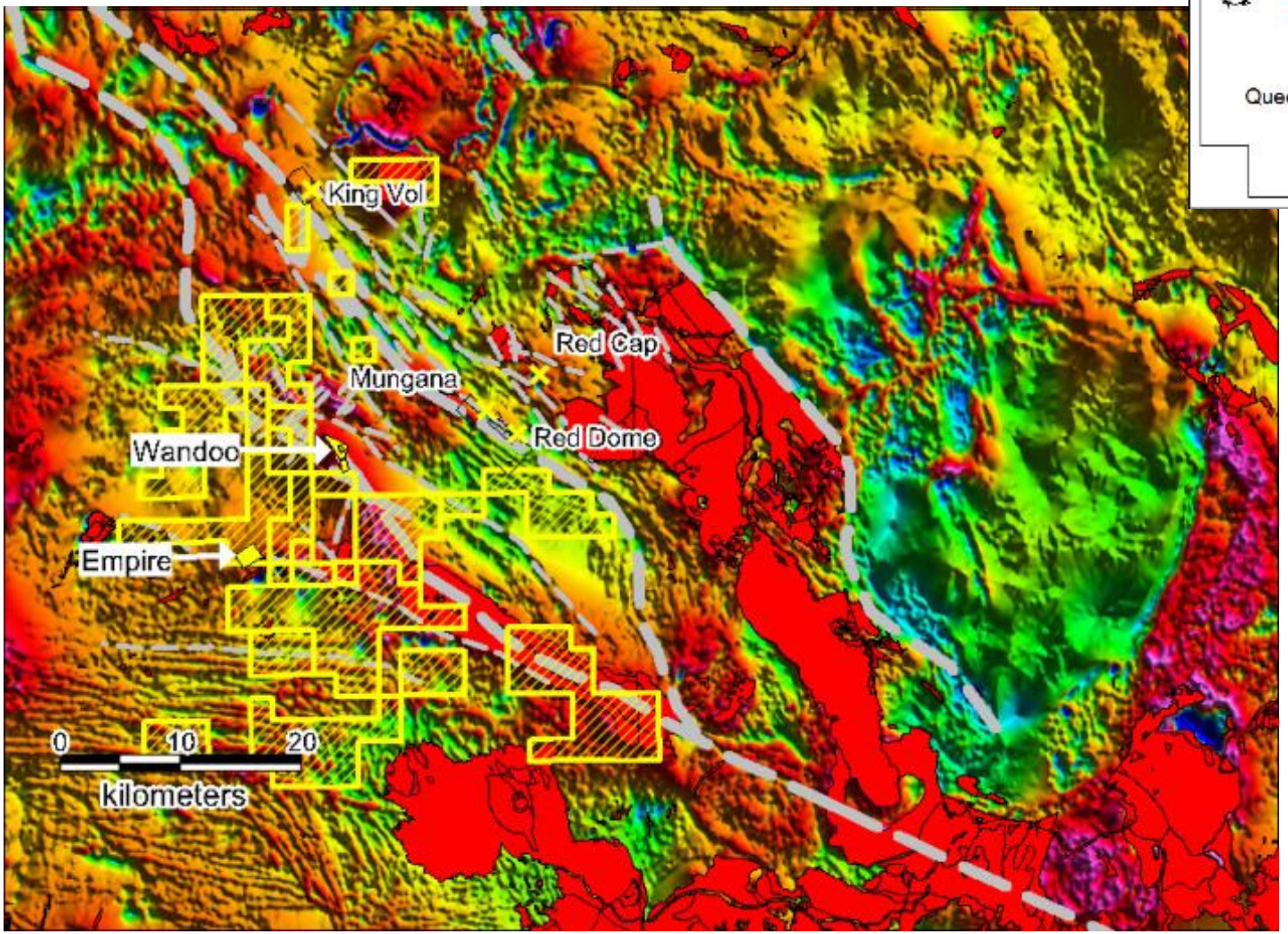
Chillagoe Ages



Regional Geology



Regional Geophysics and Structure

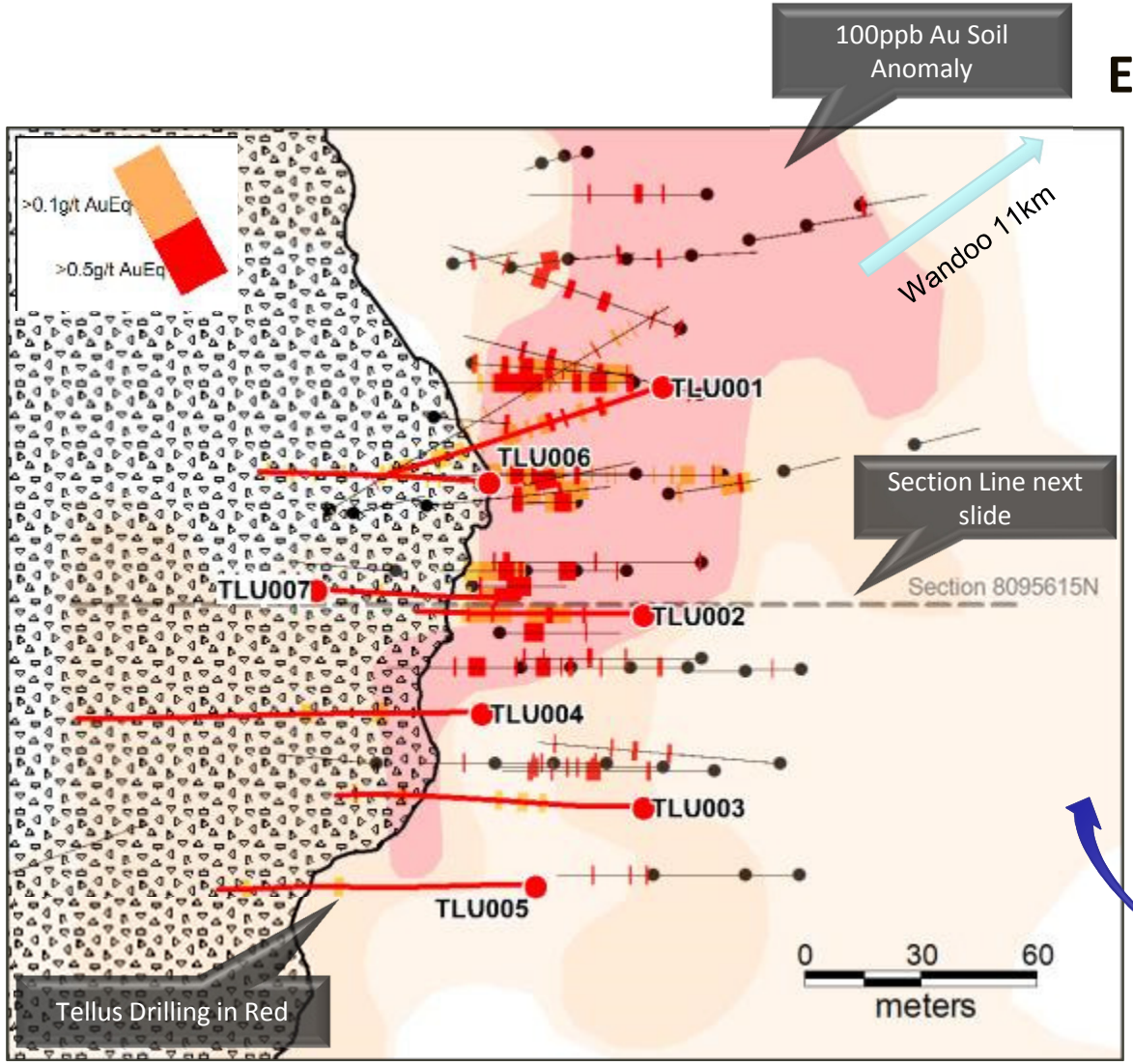


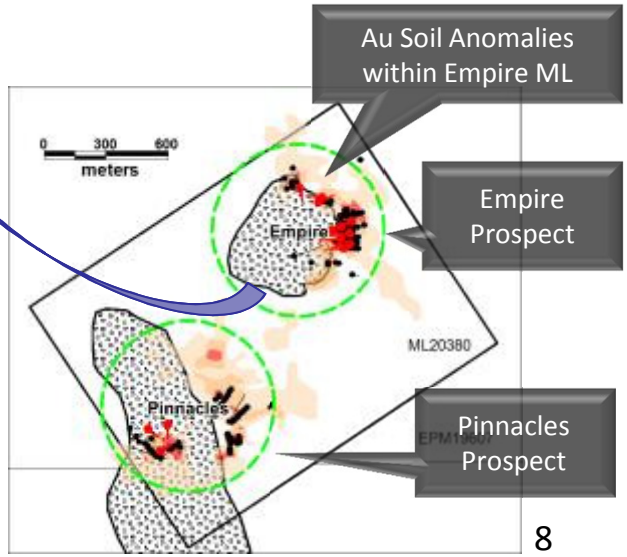
Chillagoe - Mineralisation Style vs Host

- Host Chillagoe Formation
  - Massive base-metal ‘lodes’ appear as boudins along the line of a major fault system related and lateral to rhyolite intrusions
  - Gold occurs in skarns in contact with the rhyolite-porphyry intrusions
- Host Granites-Granodiorites
  - Gold
    - Sheeted quartz veins
    - Epithermal Au-Ag veins (Chalcedonic)
  - Base-metals are present but disseminated around the margins
- Mineralisation is not dependent of the host, related to structure to plumb intrusives

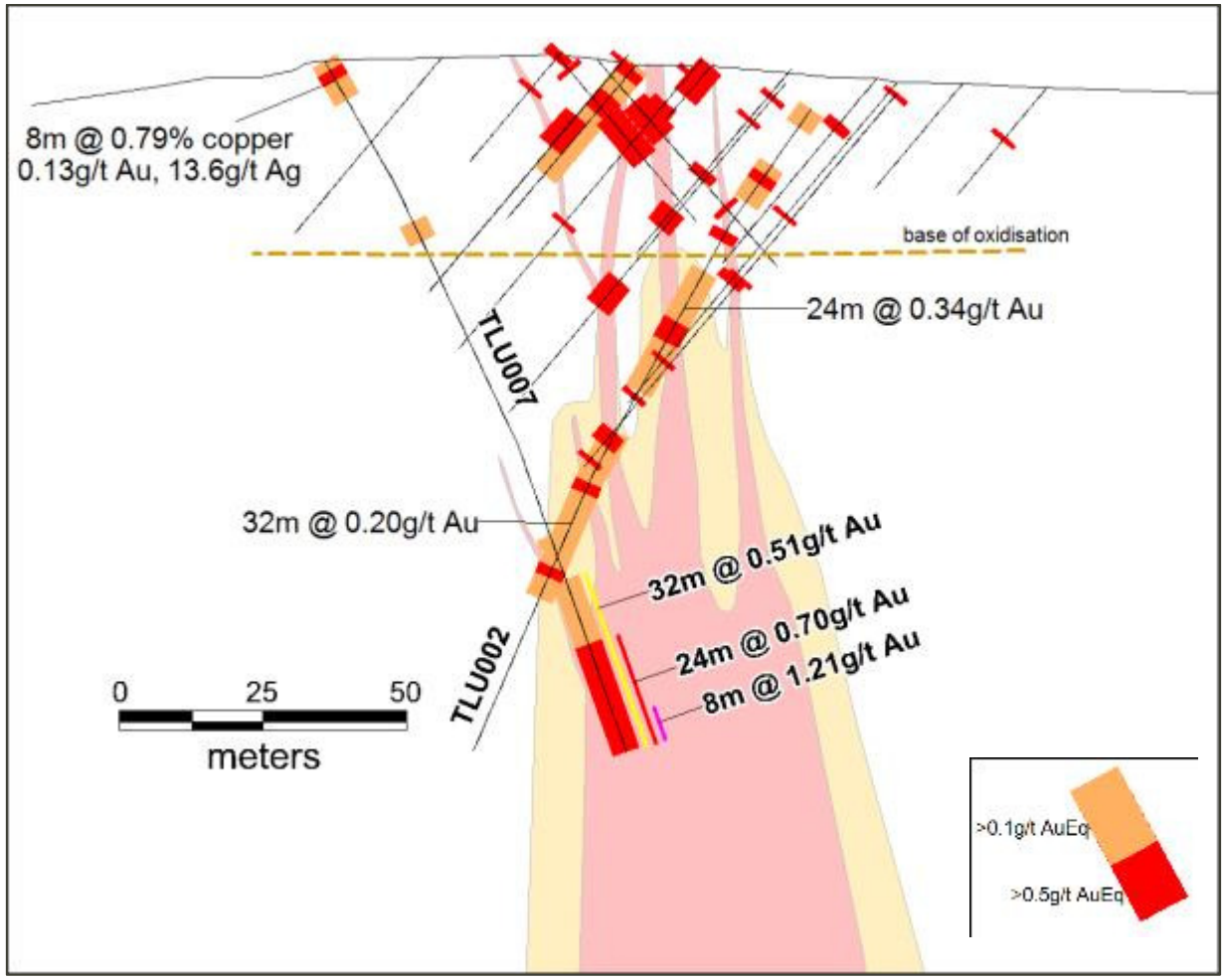
Empire

- Porphyry Intrusions on the margins of a large breccia
- Broad Au Soil anomaly
- Intense serecite (granite host), Intense chlorite (metamorphic host)
- Sheeted veining with a disseminated arsenopyrite halo





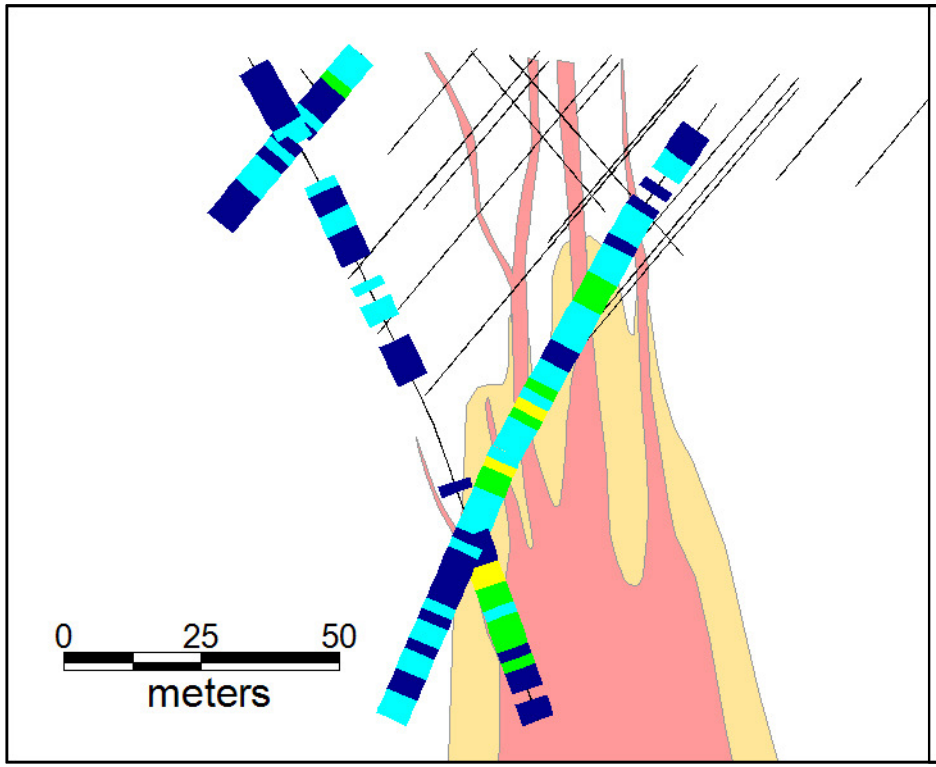
Empire Section with
Mineralisation Interpretation



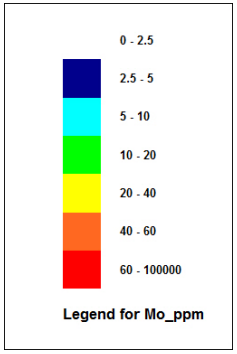
Empire

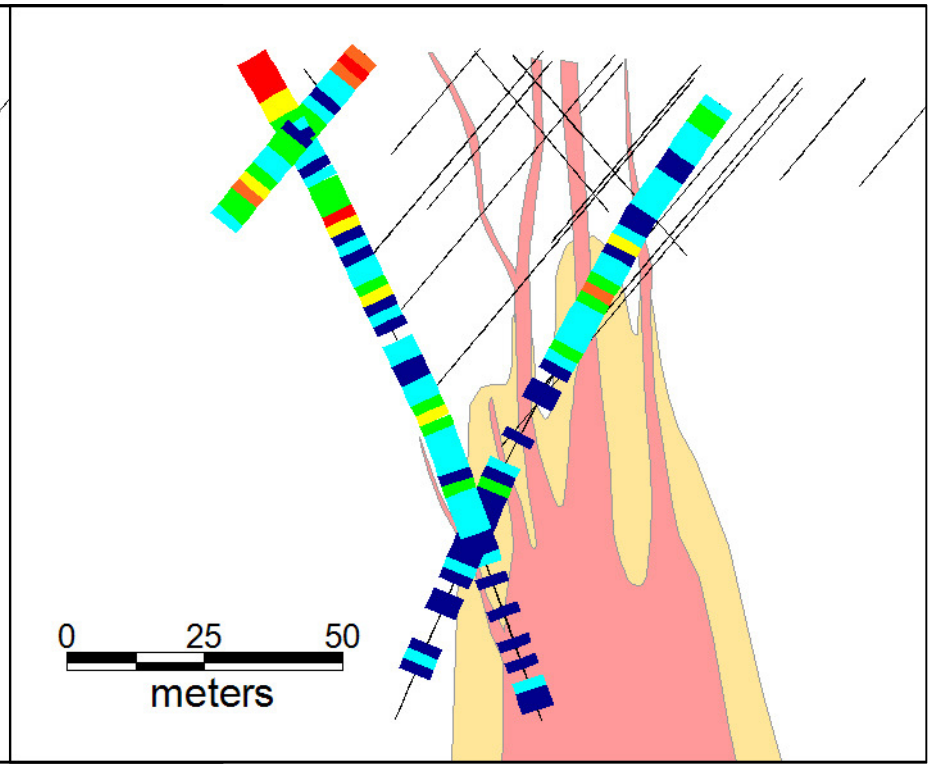
- Sheeted Veins
- Intense serecite alteration around the margins
- Au zone depleted in As
- Open at depth
- Grades increasing to the bottom of hole TLU007
- Red Dome 23km away
- Red Dome is open at >1,000m deep

Trace Element Geochemistry

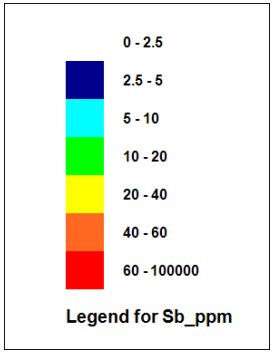


Mo





Sb



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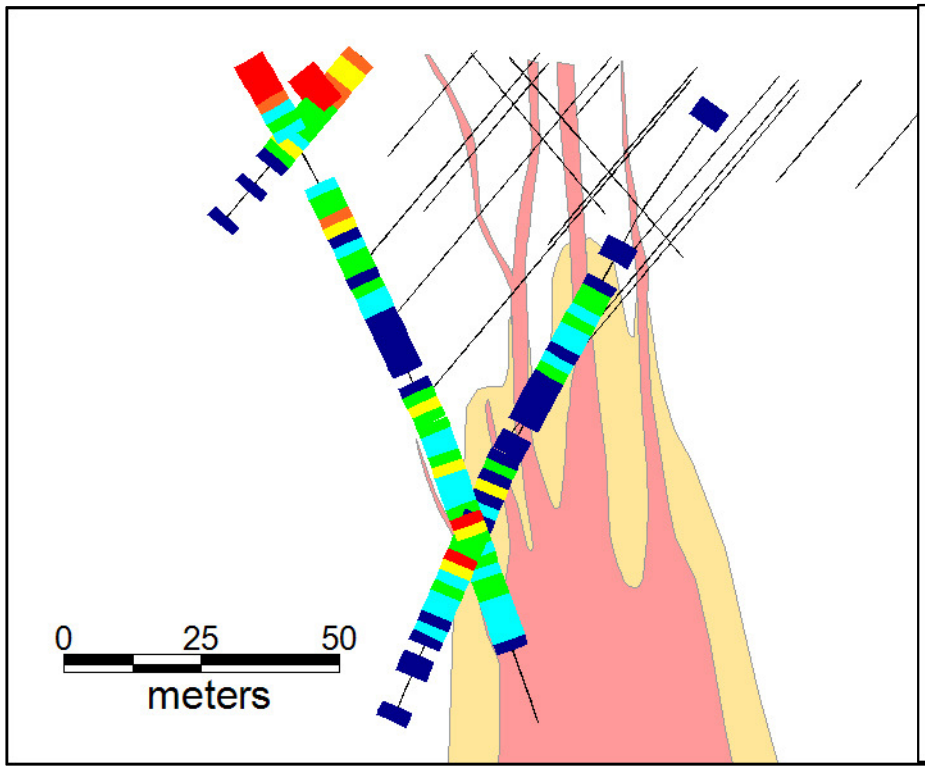
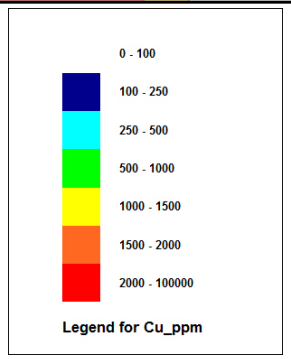
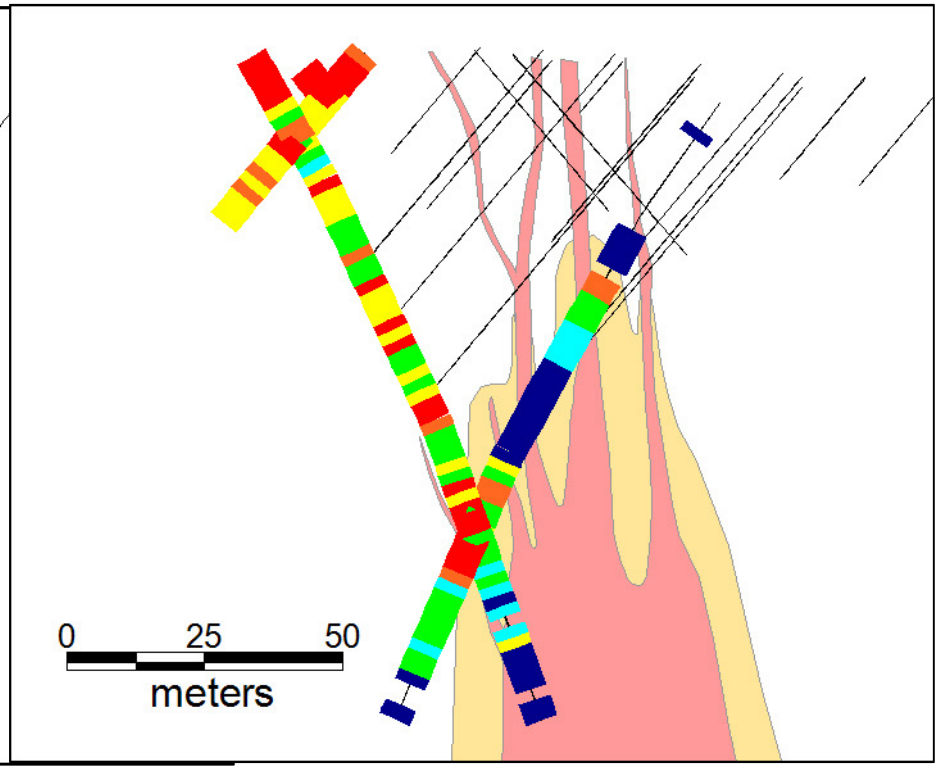
Trace Element Geochemistry

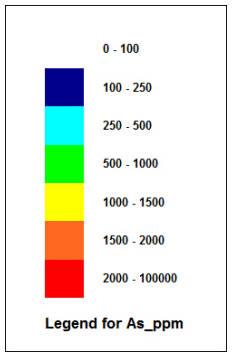


Cu





As



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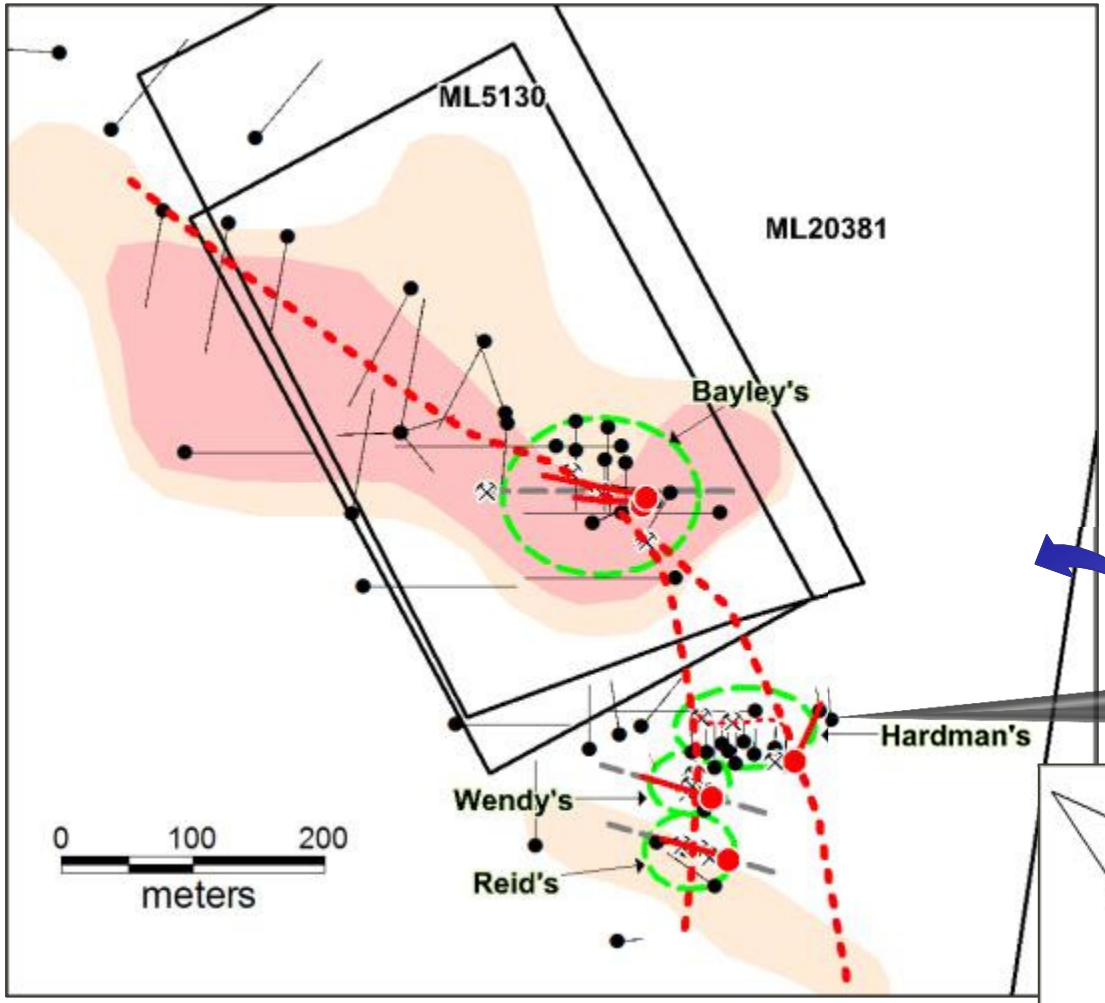
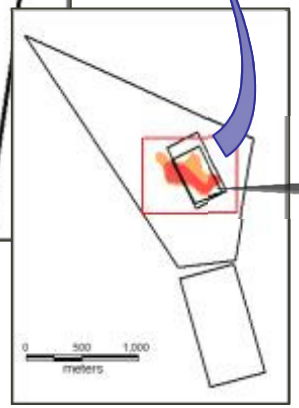
Wandoo



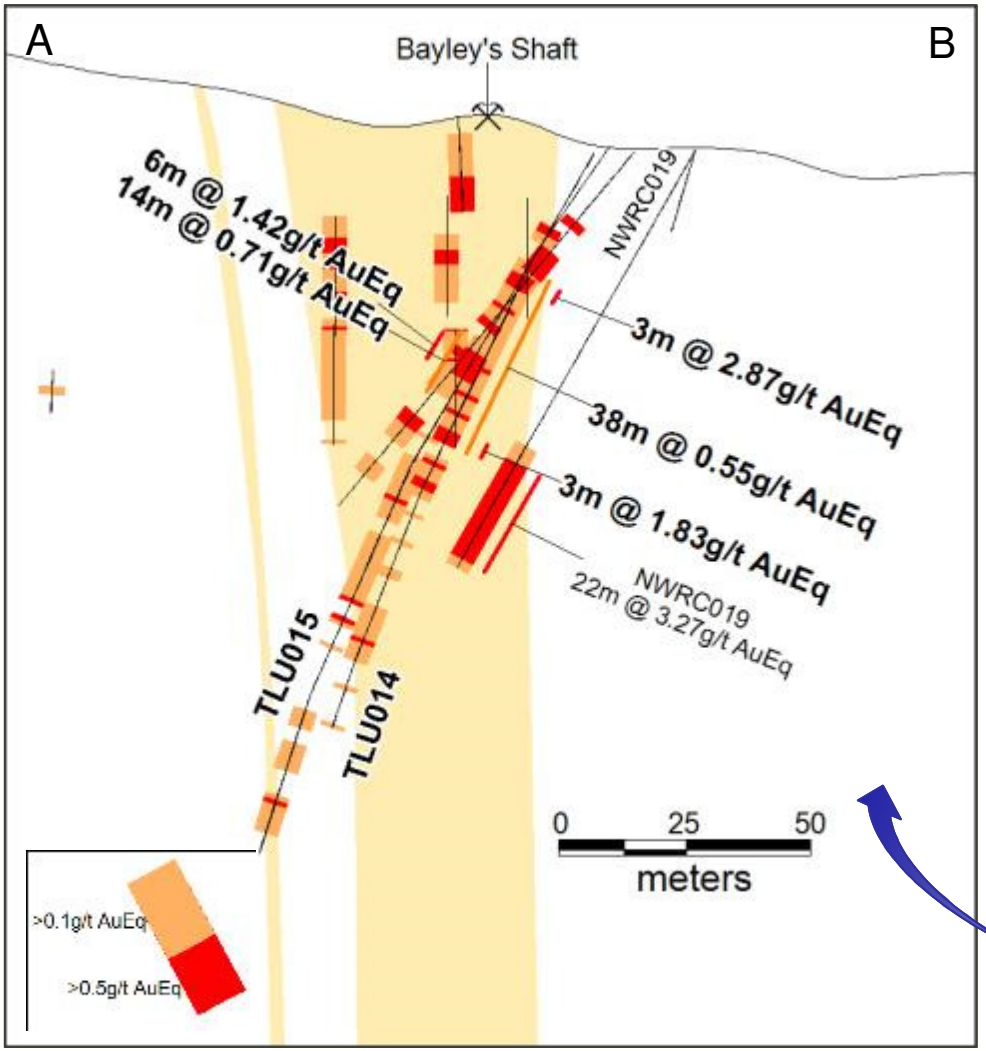
Wandoo

- Widespread gold-silver mineralisation
- Shallow Drilling
- Open at Depth
- Three (3) Granted Mining Leases

Hardman's
1930's Mining
2.4m wide 'lode'
2 oz/t gold
12 oz/t silver



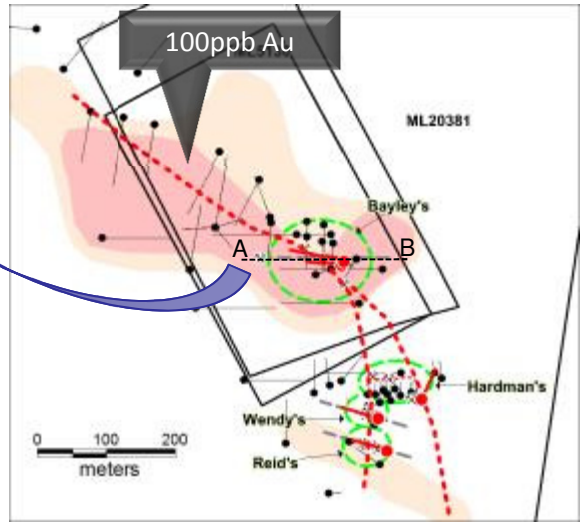
Au Soil Anomalies within Wandoo ML's



Wandoo

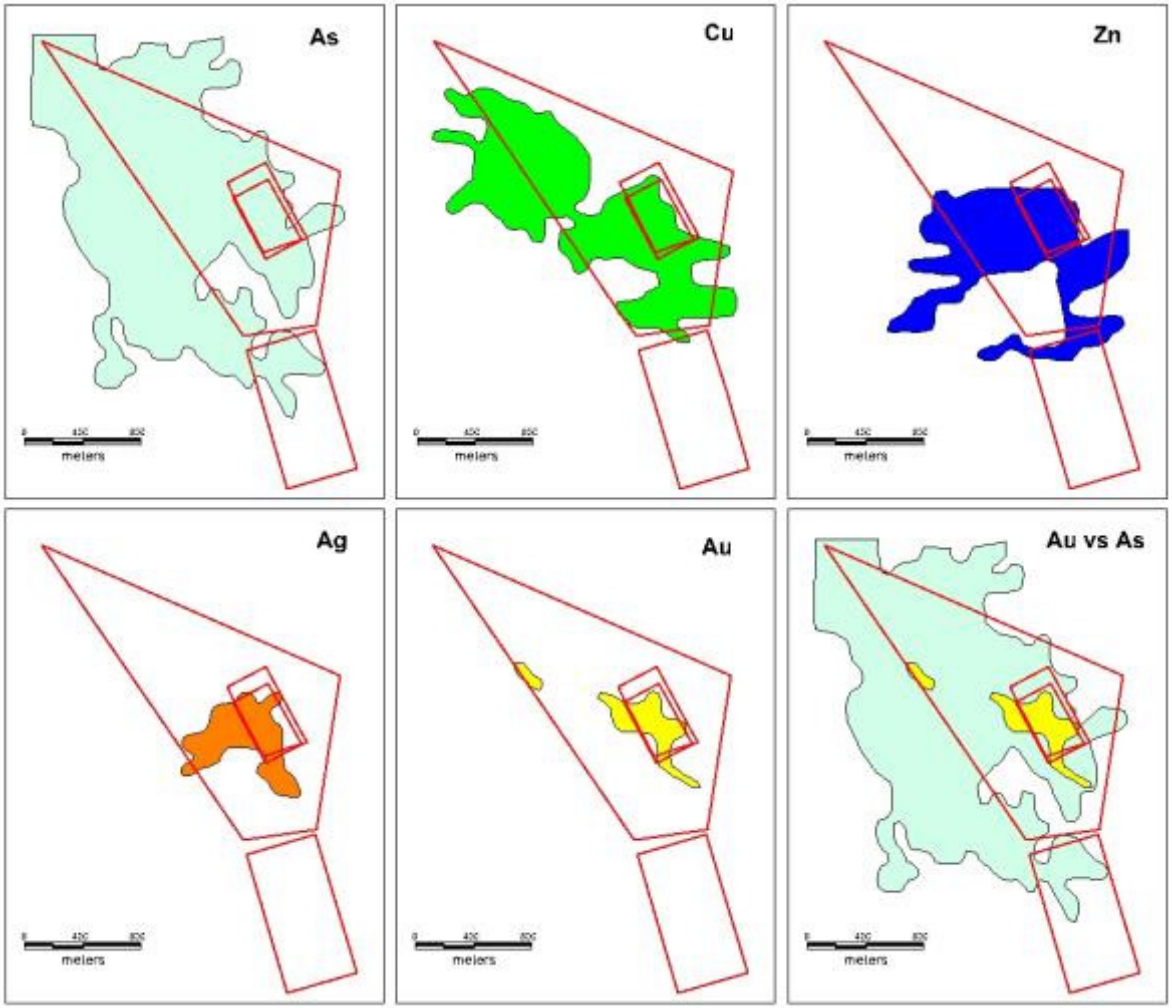
- 600m long x 250m wide +50ppb gold soil anomaly
- Mineralisation as quartz arsenopyrite veining with intense serecite alteration
- Disseminated sphalerite around the margins of the veining (Zn 0.1-0.2%)
- Open at Depth

Wandoo Au Soil Anomaly

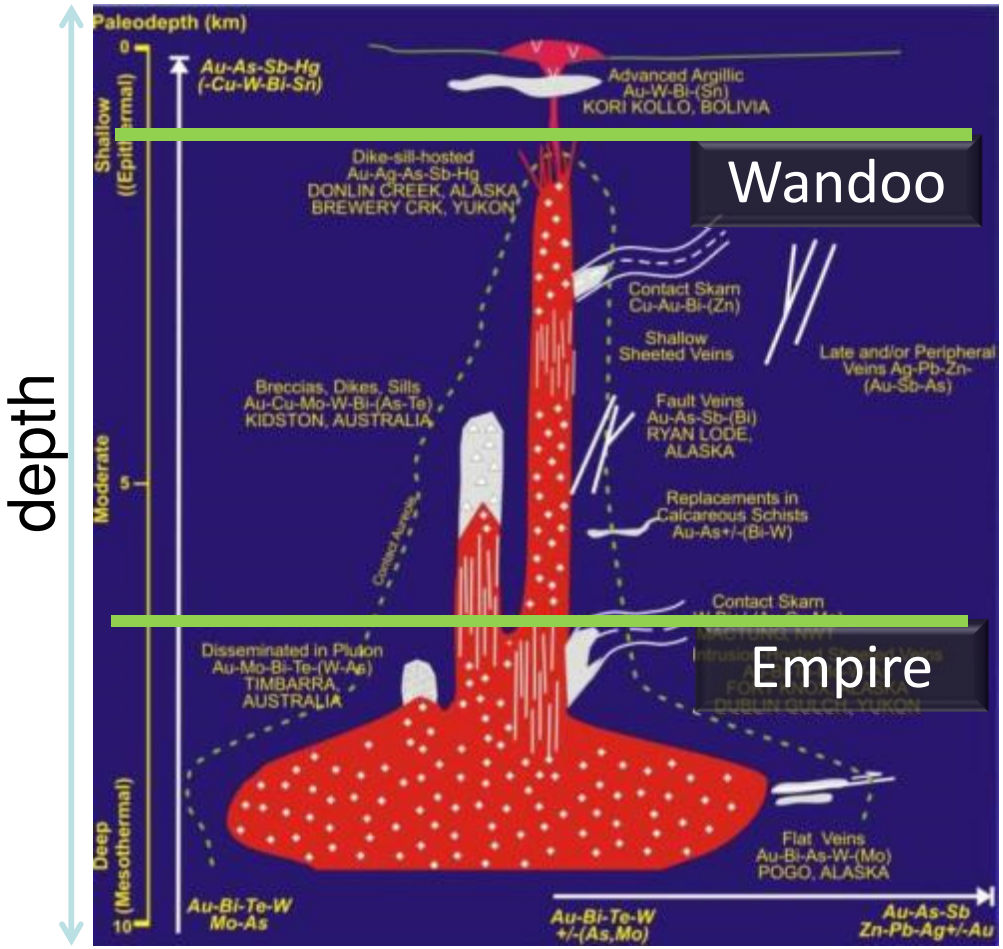


AuEq = Au g/t + (Ag g/t / 50)

Wando - Soil Anomalism



Emplacement Depth



Deposit Model (modified from Lang et al., 1999)

- Wandoo
  - Epithermal Chalcedonic Vein Textures
  - Au-Bi-Ag-As-Sb association
  - Disseminated sphalerite diagnostic around margins of veins
- Empire
  - Sheeted Veins
  - Zonation As-Sb-Cu-Mo-Bi-Au
  - Large disseminated arsenopyrite halo decreasing into gold zone
  - Poor Au repeatability above 50m

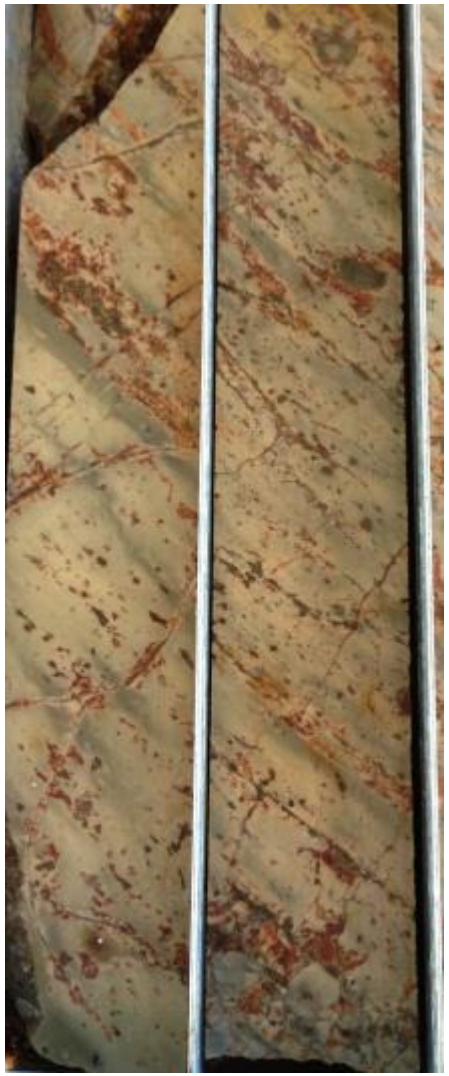
Observational Similarities
Chillagoe v Cobar

- Mineralisation
  - Au-Bi-As-Sb
    - Gold-Bismuth association is characteristic of gold deposits at Chillagoe and Cobar around the margins of rhyolite intrusions and breccias
  - Pb-Zn-Ag-Cu
    - Narrow lenticular vertically continuous high grade lodes of Zn+Pb±Ag and Cu spatially related and distal to gold bearing rhyolite intrusions, true for both Chillagoe and Cobar.
  - Sn Association
    - Tin also characteristic of IRG Deposits (including Chillagoe)
    - Cassiterite has been described in the supergene zone at Elura, "… geochemical guide to the proximity of mineralization is Sn, given that **cassiterite** is chemically unreactive and **present in most of the deposits in the region**." (Leverett, 2005)
    - "Deposit types in general mirror the range of deposit types typical of lithophile mineralisation (Sn, W, Mo) associated with intermediate to felsic granitic plutonism to high level rhyolitic magmatism." (Blevin; on IRGs in Eastern Australia)

Chillagoe and Cobar mineralisation is remarkably similar

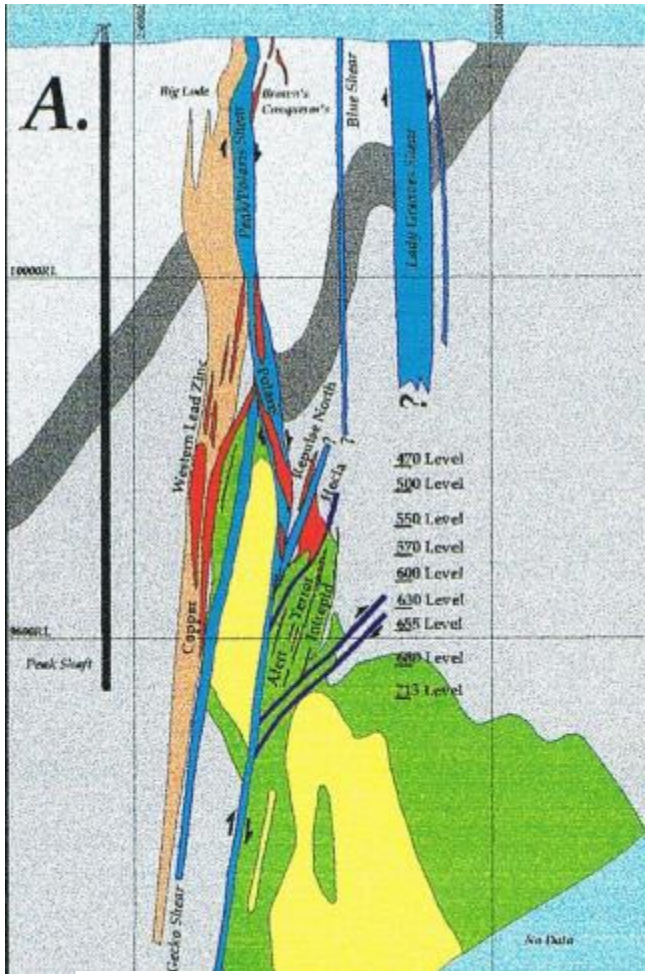
Observational Similarities Chillagoe v Cobar

- Intrusions
  - Nth QLD Rhyolite
    - Layered intrusions described at Red Dome and Mt Wright Ore Bodies (maybe more?)
    - Au forms around the margins, and the core is usually depleted in Au (wipe-out porphyry?)
    - Intrusions into sediments (esp. calcareous) form massive sulphide Pb-Zn and Cu lodes along the structure
  - Peak Rhyolite
    - Described as “a flow banded rhyolite core … banding is defined by a weak primary layering of various proportions of quartz and K-feldspar, representing flow layering (Pontifex, 1993).”

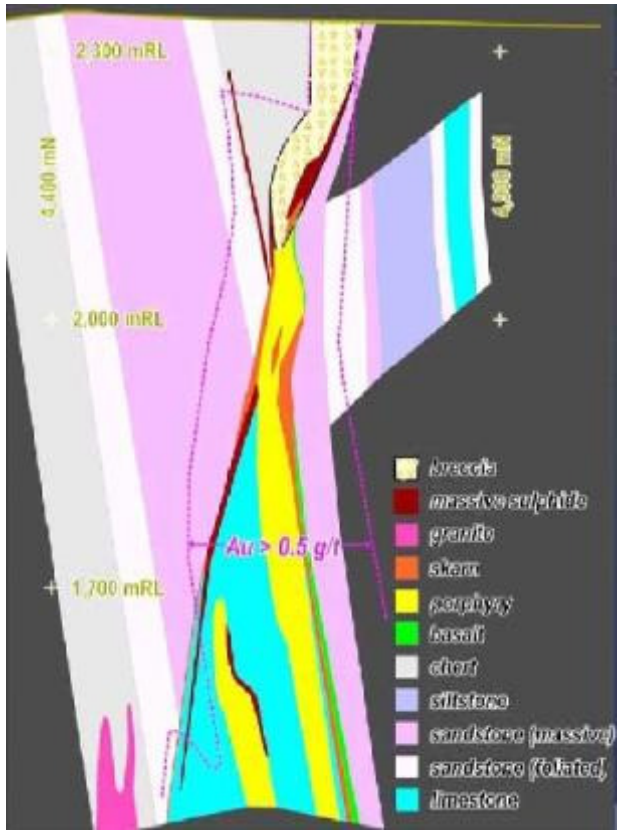


Mt Wright – IRG North QLD

Observational Similarities
Chillagoe v Cobar



Cross-section through the Peak orebody (Stegman and Pocock)



Cross-section through the Mungana orebody (Georgees)

Observational Similarities

- Chillagoe and Cobar
  - Strong long lived north-west oriented fault zone intruded by relatively small bodies of rhyolite
  - Lenticular vertically continuous base metal ‘lodes’ of massive Pb-Zn and Cu developed in sediments normally distal to the intrusions
  - Gold mineralisation formed mainly around the margins of the same rhyolite intrusions and breccias
  - Rhyolite-porphyry intrusions (layered)
  - Au-Bi±Ag±As±Sb associations
  - Tin associated with mineralisation

NSW IRGs

Taking what has been learnt in the Chillagoe District.

Mineralisation is intrusive related and not dependent on the host

Implication – 'Cobar' deposits will have formed outside of the Cobar Basin

Timbarra
Cuttaburra
Tomalla
Mt Adrah
Dargues Reef

Thank You

Thankyou to Tellus Resources Ltd for allowing presentation of the Chillagoe Gold Project data.

www.tellusresources.com.au

Chillagoe was the focus of The Mungana Affair in the 1920's which involved the selling of mining properties at grossly inflated prices to the Queensland Government it was discovered the properties were owned 25% by two former Queensland Premiers