



The Gawler Project, and a framework for discovery of Cu, Au and Ni deposits

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and the Gawler Project team

Geoscience Australia
www.ga.gov.au



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A collaborative GA-PIRSA-LEME-UofA project

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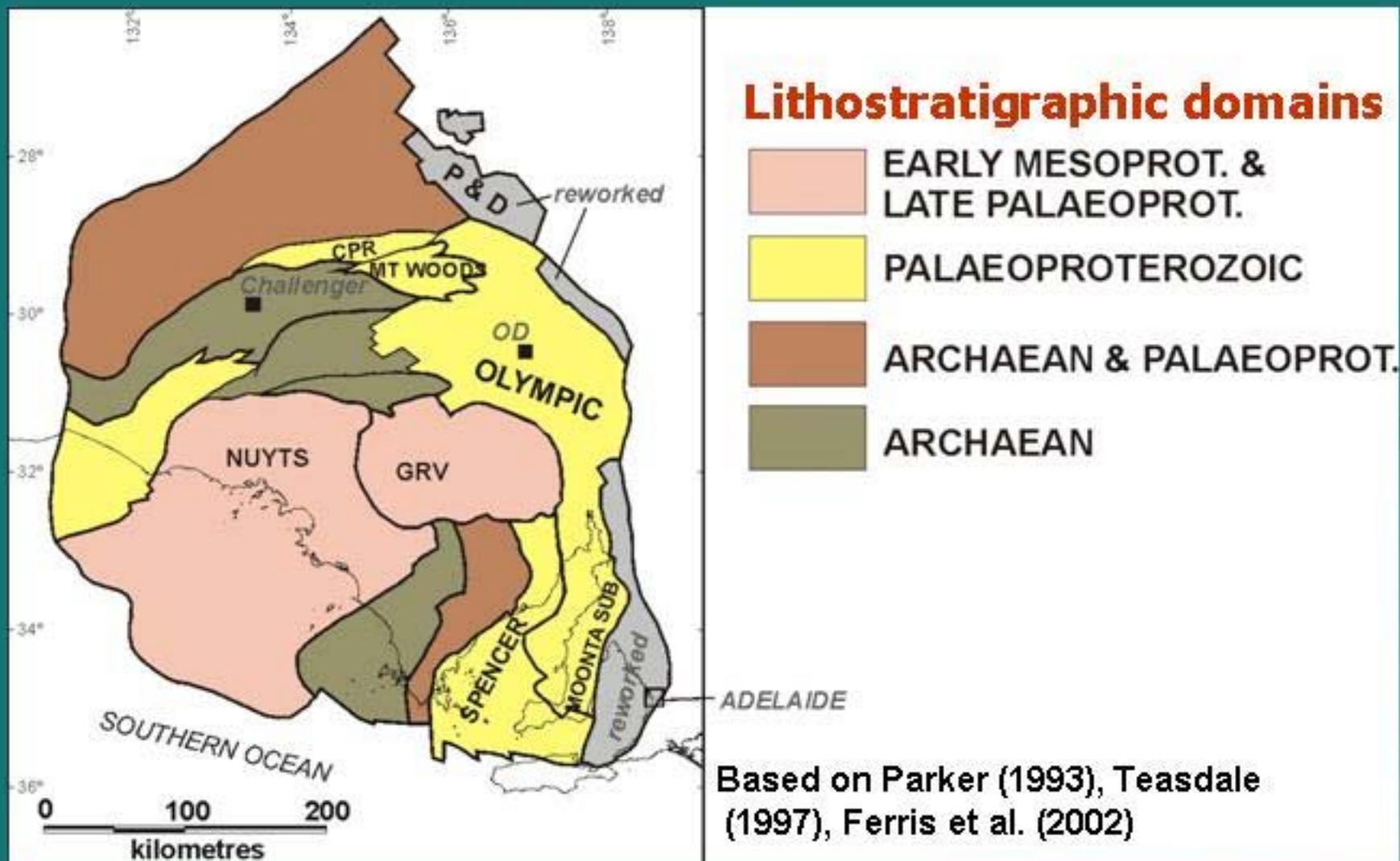


Part 1.

Overview of the Gawler Project in GA

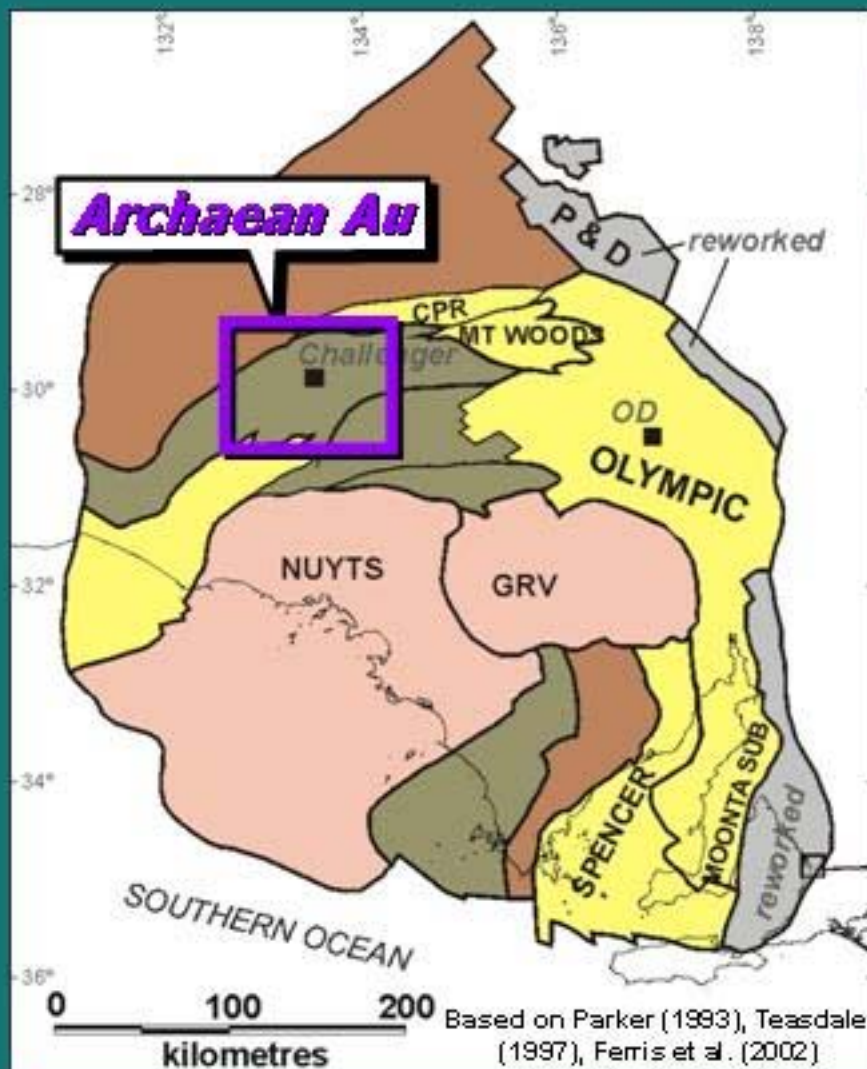
Gawler Project overview

Project modules

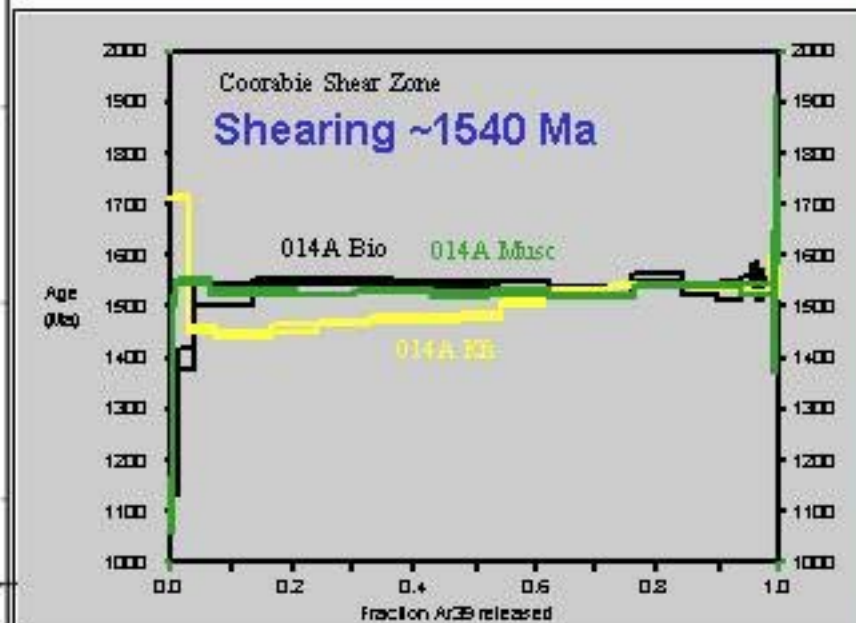


Gawler Project overview

Project modules

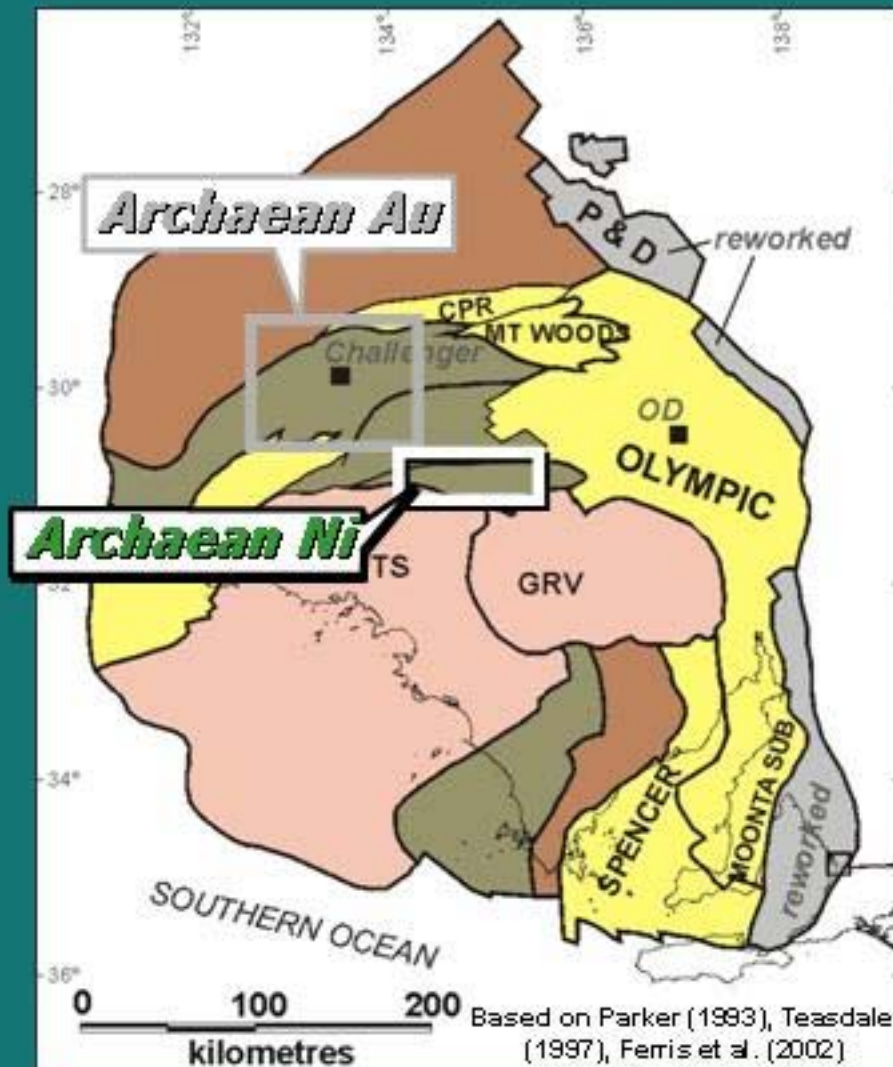


- Region of Challenger Au deposit
- Covered; regional controls not known
- Patrick Lyons: shears & event timing



Gawler Project overview

Project modules

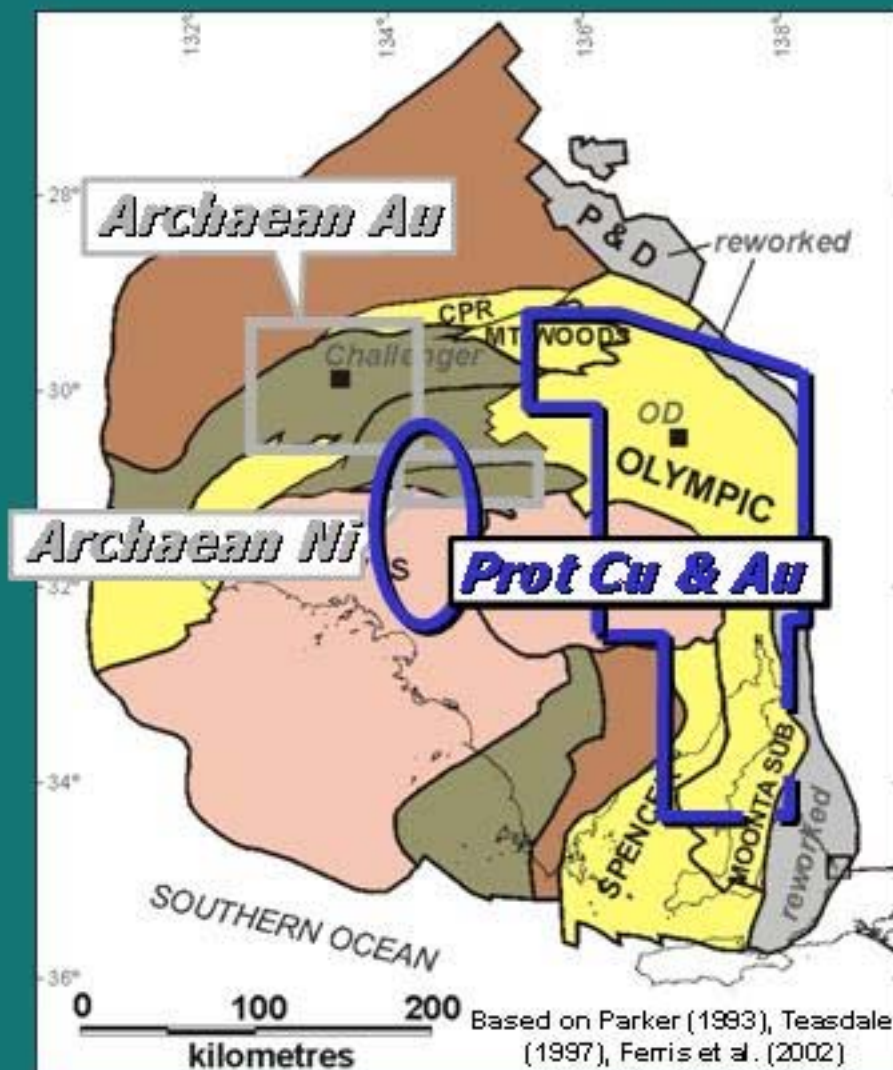


- Archaean Harris Greenstone Belt
- Mostly concealed, 300km strike
- Dean Hoatson: Ni-Cu-PGE potential

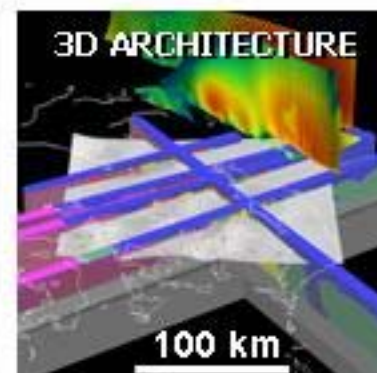
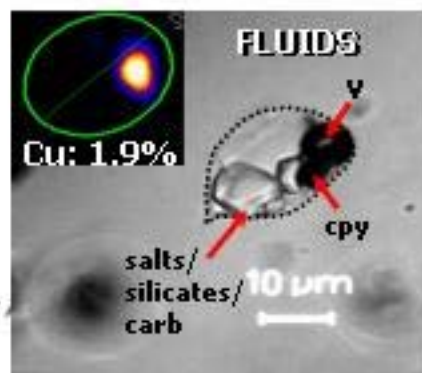


Gawler Project overview

Project modules

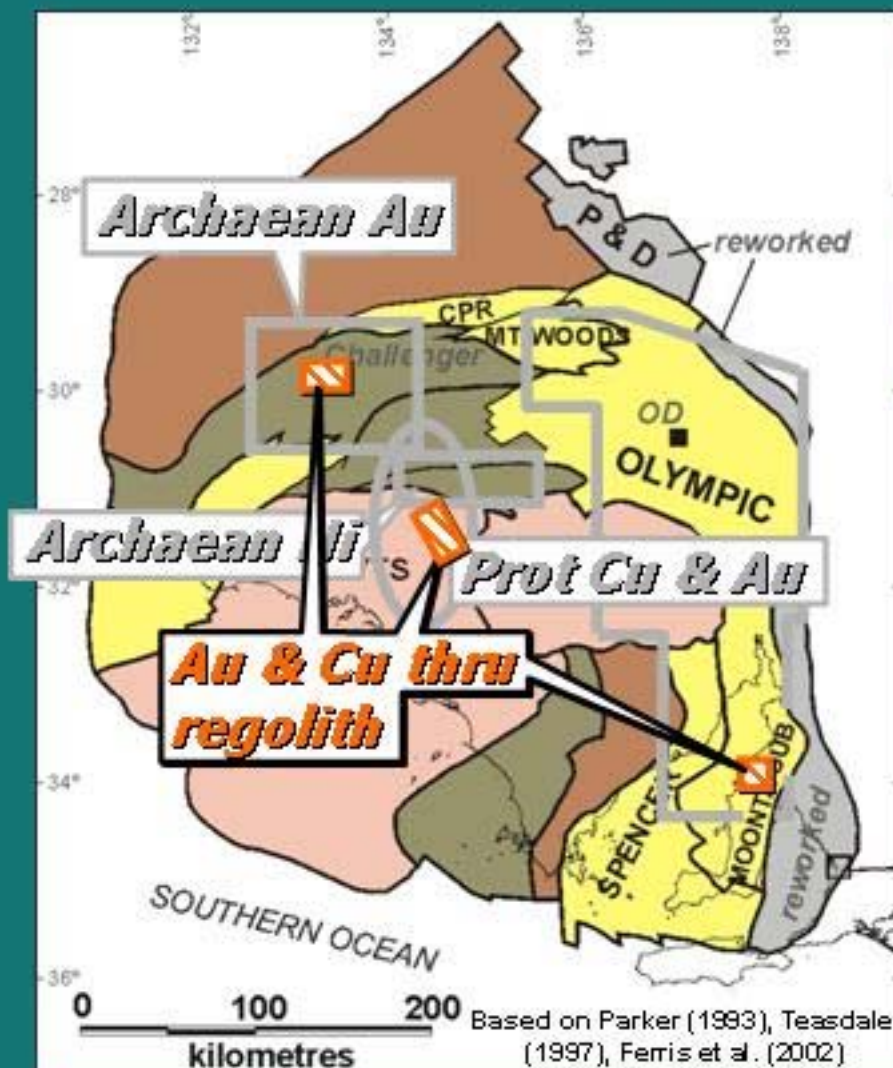


- Fundamental 'ingredients' for formation of Proterozoic Cu & Au
- Data & concepts for area selection decisions & targeting undercover
- Anthony Budd, Nick Direen, Evgeniy Bastrakov, Ollie Raymond will present results
- Summary of 'ingredients' in Part 2

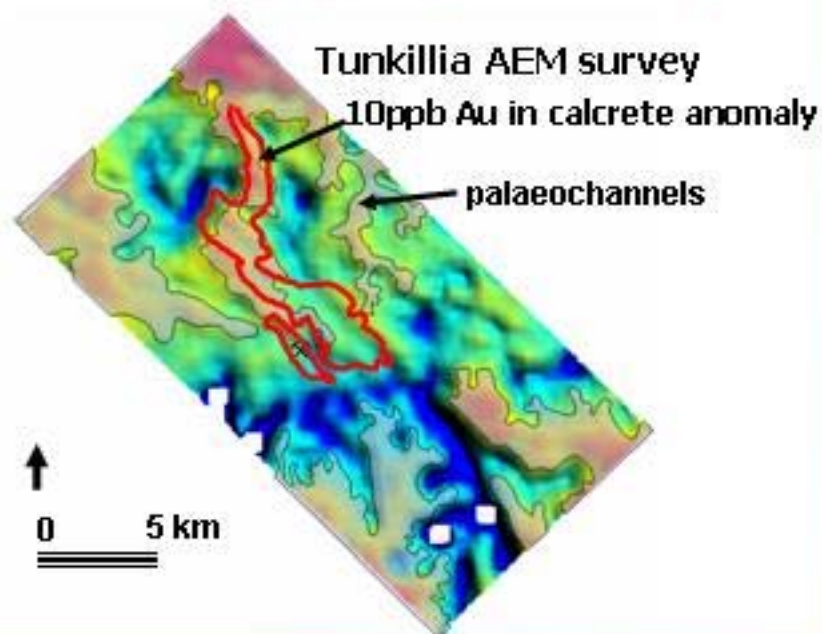


Gawler Project overview

Project modules



- Understanding phys & chemical processes of Au & Cu dispersion to interpret surface geochem anomalies
- AEM surveys in 3 contrasting areas
- Lisa Worrall: Tunkillia case study
- David Grey: hydrogeochemistry tool



Part 2.

Summary of 'ingredients' for Cu-Au area selection

Fe-oxide Cu-Au area selection criteria:-

- 1. HEAT: 1580-1600 Ma oxidised felsic & mafic intrusives (=crustal-scale thermal anomaly)**

1. HEAT: 1580-1600 Ma felsic & mafic intrusives

~1590 Ma granites and deposits / prospects

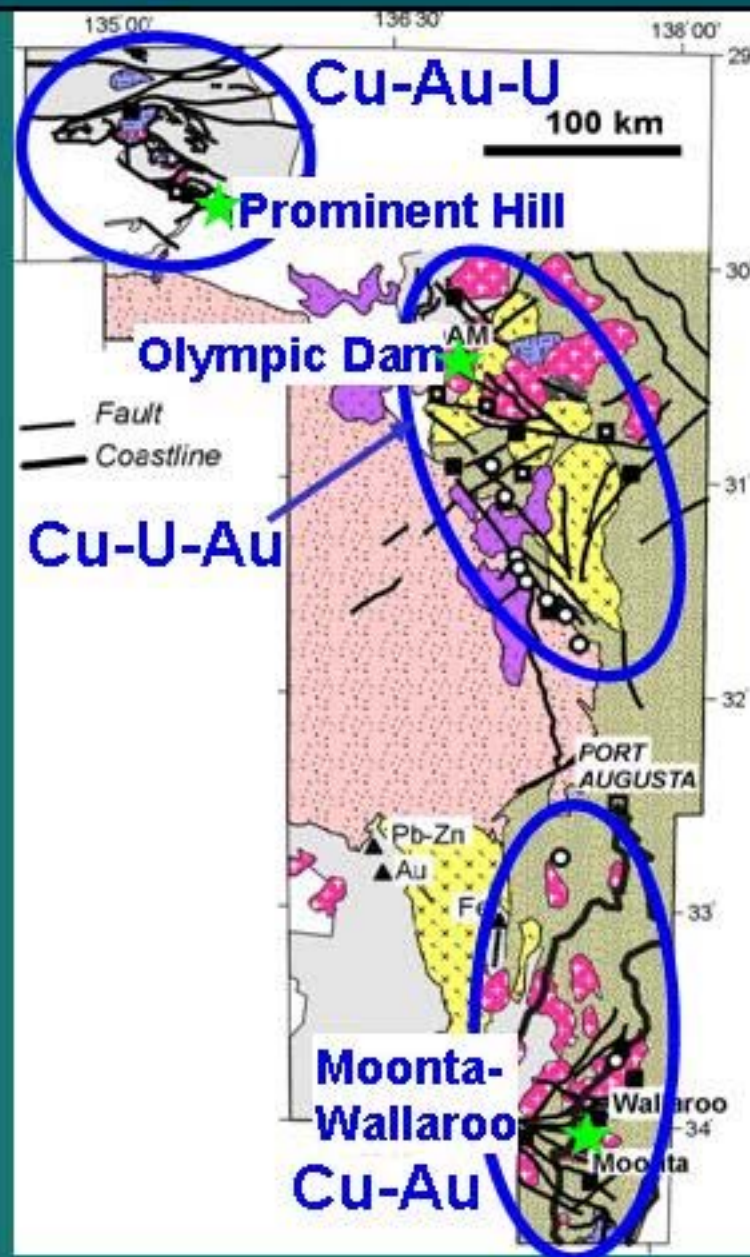
Central Gawler
Au province

Olympic
Cu-Au
province

- Gold
- ★ Copper-gold + U
- Tin
- Lead-zinc-silver
- Hiltaba Suite plutons
- Subdomain outlines

(Anthony Budd)

1. HEAT: 1580-1600 Ma thermal anomalies



Olympic Cu-Au Province

New basement geol interp

3 'footprints' of regional Cu-Au systems

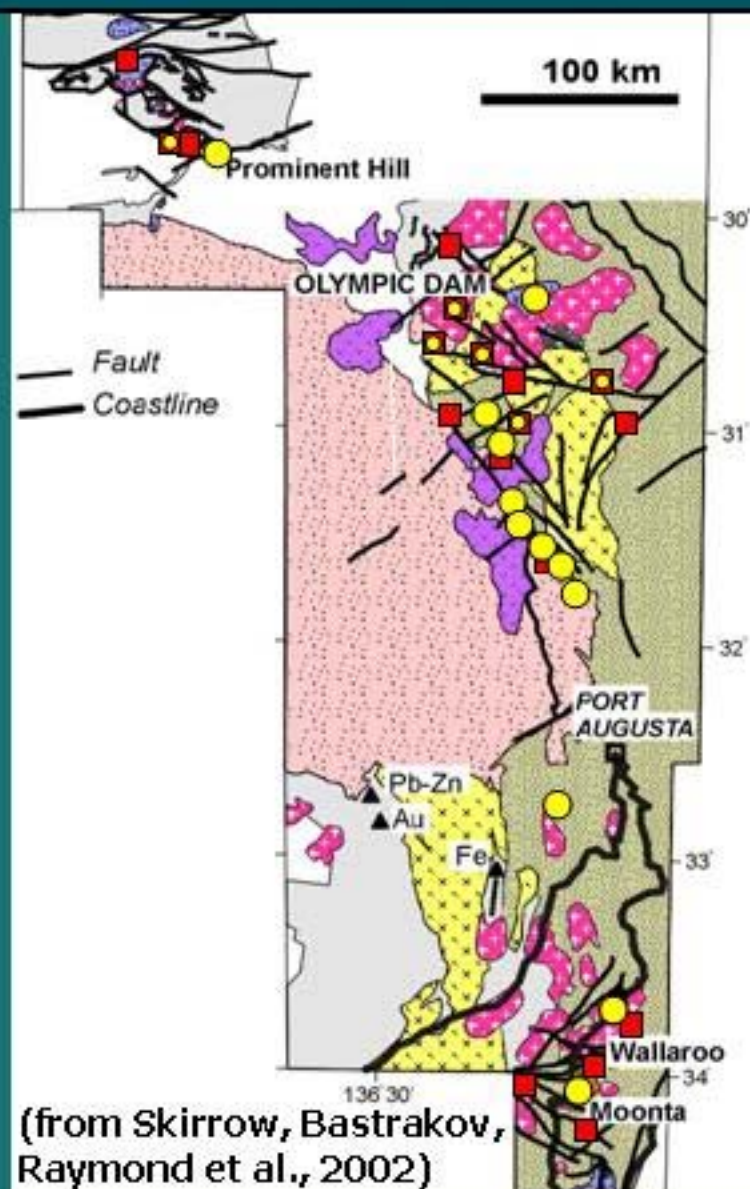
Lithostratigraphy



Fe-oxide Cu-Au area selection criteria:-

- 1. HEAT: 1580-1600 Ma oxidised felsic & mafic intrusives (=crustal-scale thermal anomaly)**
- 2. FLUIDS+METALS: High-temp mt-bearing alteration overprinted by low-temp hematitic alteration (all 1580-1600 Ma); +Cu-fluids**

2. FLUIDS: 1580-1600 Ma high-T & low-T alteration



Alteration types

- Magnetite-rich: CAM (calcsil-alk feld - mt) & mt-biotite**
- Hematite-rich: HSCC (hm - ser - chl - carb + Cu-Au-U)**
- HSCC overprinting CAM / MB**



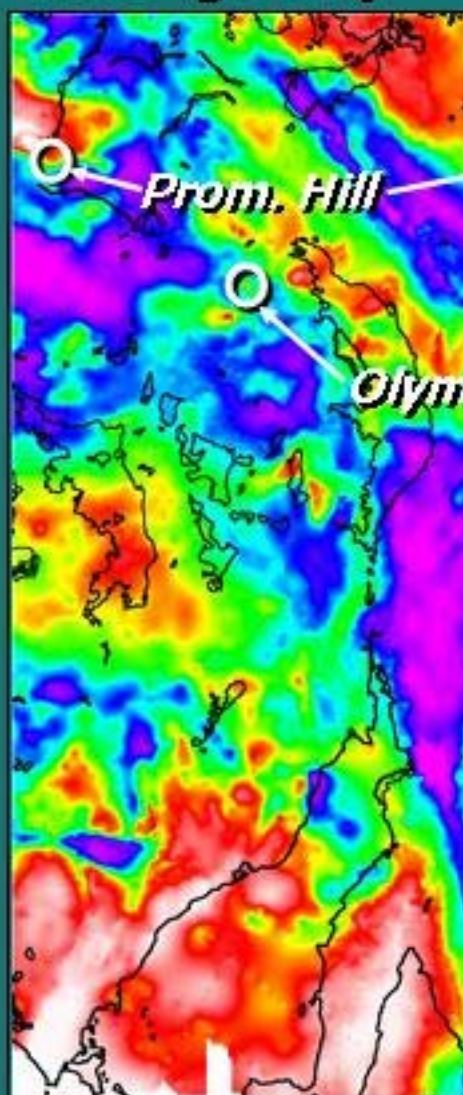
(from Skirrow, Bastrakov, Raymond et al., 2002)

Fe-oxide Cu-Au area selection criteria:-

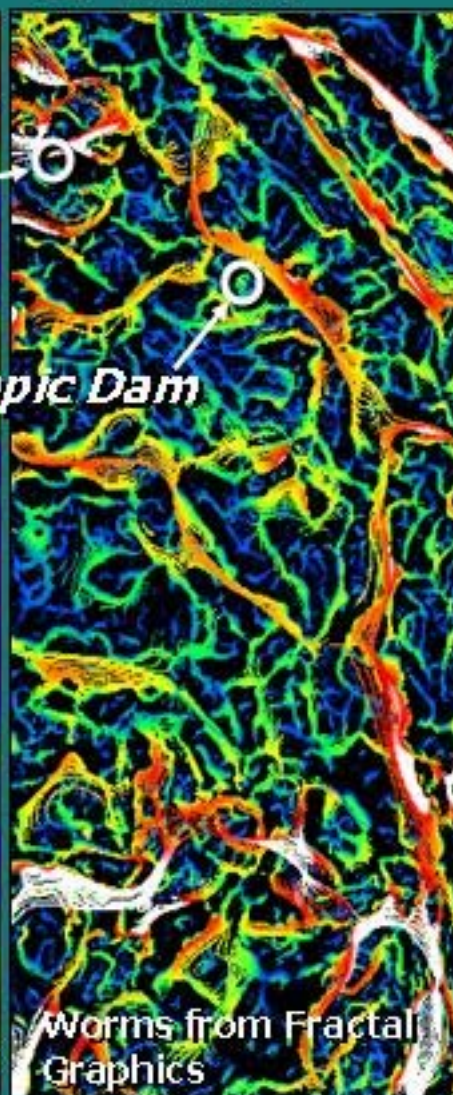
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- 3. PLUMBING: NE & NW regional structures: possible fluid pathways in OD region**

3. PLUMBING: NW & NE crustal structures

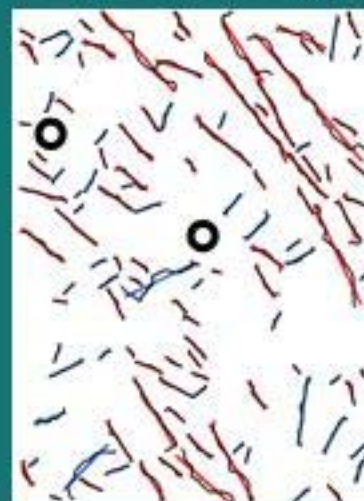
OCGP gravity



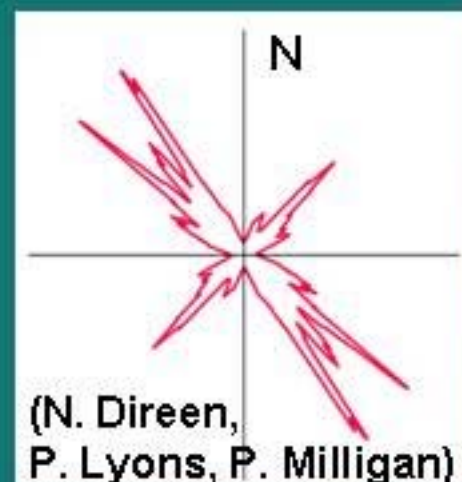
Gravity gradients
or 'worms'



Structure - conjugate NW
& NE worm/fault network



NW worms: red
NE worms: blue
(major straight
structures only)



Worm
azimuth
histogram

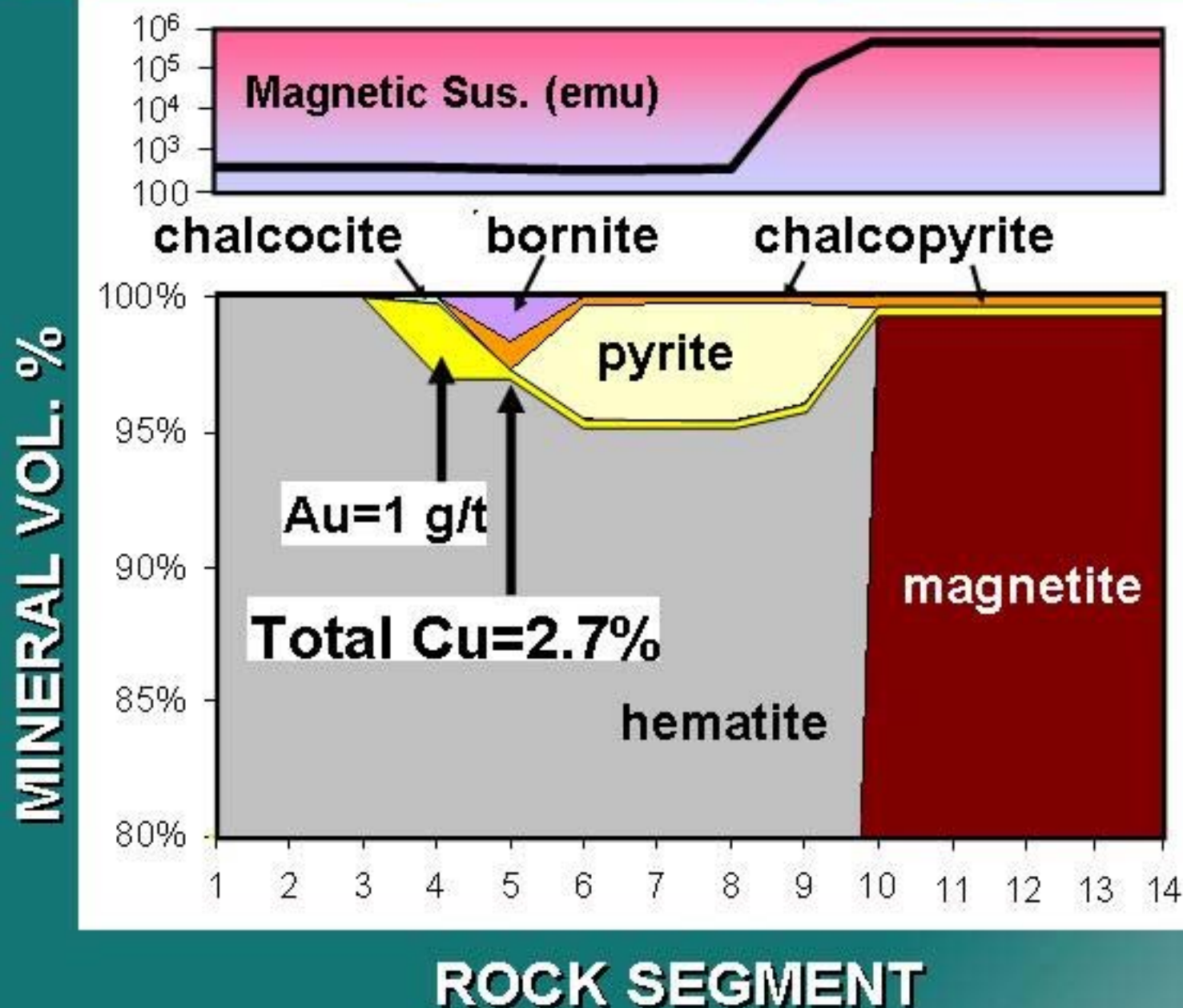


(N. Direen,
P. Lyons, P. Milligan)

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- 2. FLUIDS+METALS: High-temp mt-bearing alteration overprinted by low-temp hematitic alteration (all 1580-1600 Ma); +Cu-fluids**
- 3. PLUMBING: NE & NW regional structures: possible fluid pathways in OD region**
- 4. TRAP: Strong chemical & physical (T-P) gradients, e.g. mt to hm transition, for high-grade Cu-Au deposition**

4. TRAP: Strong chemical & physical gradients



Conclusions on Cu-Au area selection

- **Cu-Au in east & north? (Olympic Cu-Au province)**
- **Au-only in central-west Gawler**
- **Best prospectivity within thermal imprints of Cu-Au systems**
- **Potential for giant hm-dominated or mt-dominated styles in Moonta-Wallaroo-Roopena and Mt Woods footprints**

**Visit www.ga.gov.au/rural/projects/gawler.jsp
for maps, data, 3D model, GISs, publications**

