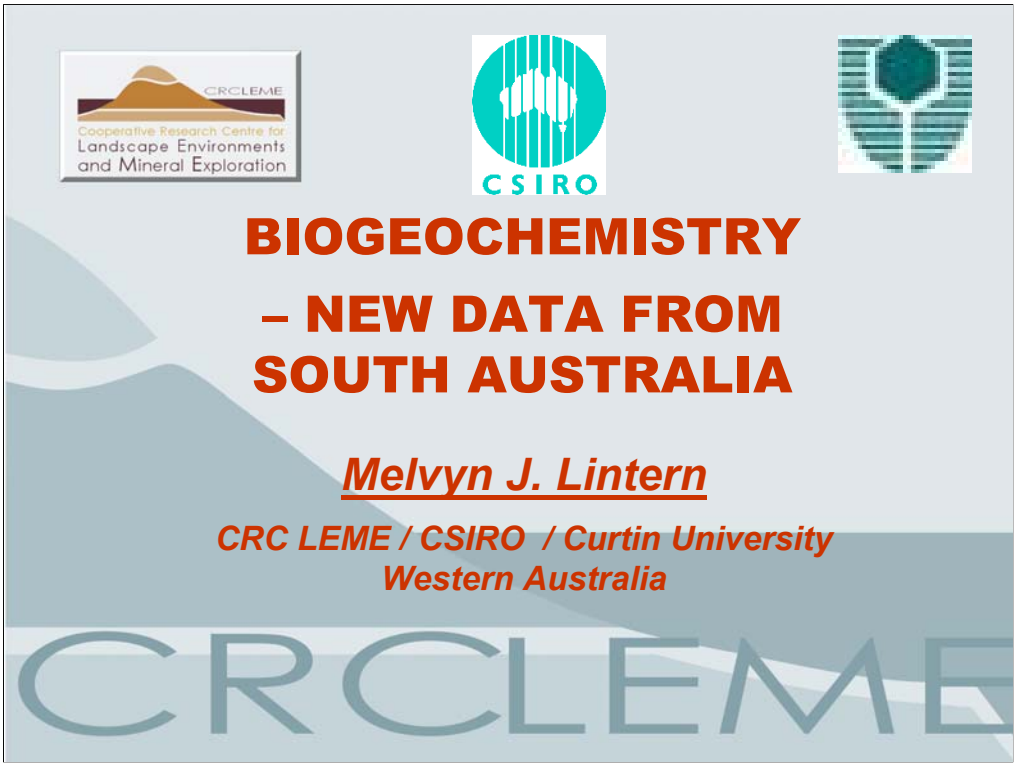

Share with you data

Thank colleagues at GS SA and at CSIRO for Program Leadership and assistance with some of the figures

Exploration issues

- Deeply weathered terrain – little outcrop
- Regolith often leached of elements including gold
- Transported overburden
- How and what to sample in this type of environment

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Exploration issues – old continent, largely tectonically stable Cratons, deep weathering (both sense of the word, intensity and thickness), acid leaching of saprolite, transported overburden (added complication)

What to sample – laterites and calcretes – what happens when these fail – vegetation?

Vegetation

- Do metals in plants reflect underlying mineralization?
- How effective are biogeochemical techniques in transported overburden?
- Which plants to sample?

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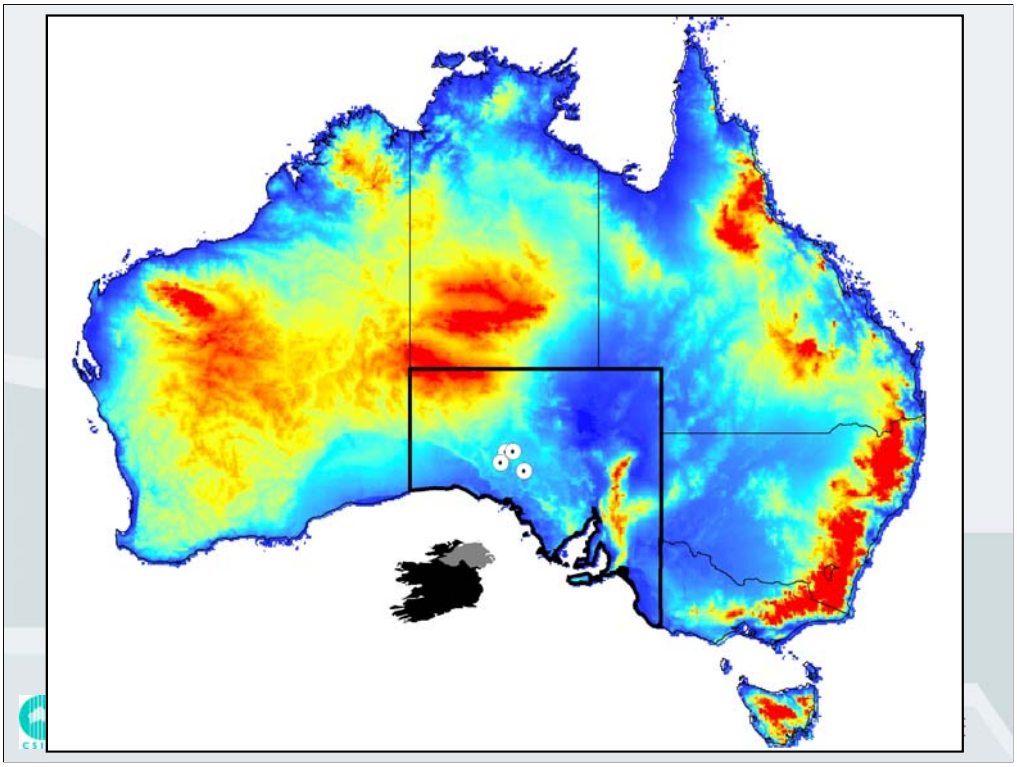
Questions we need to ask before vegetation can be considered

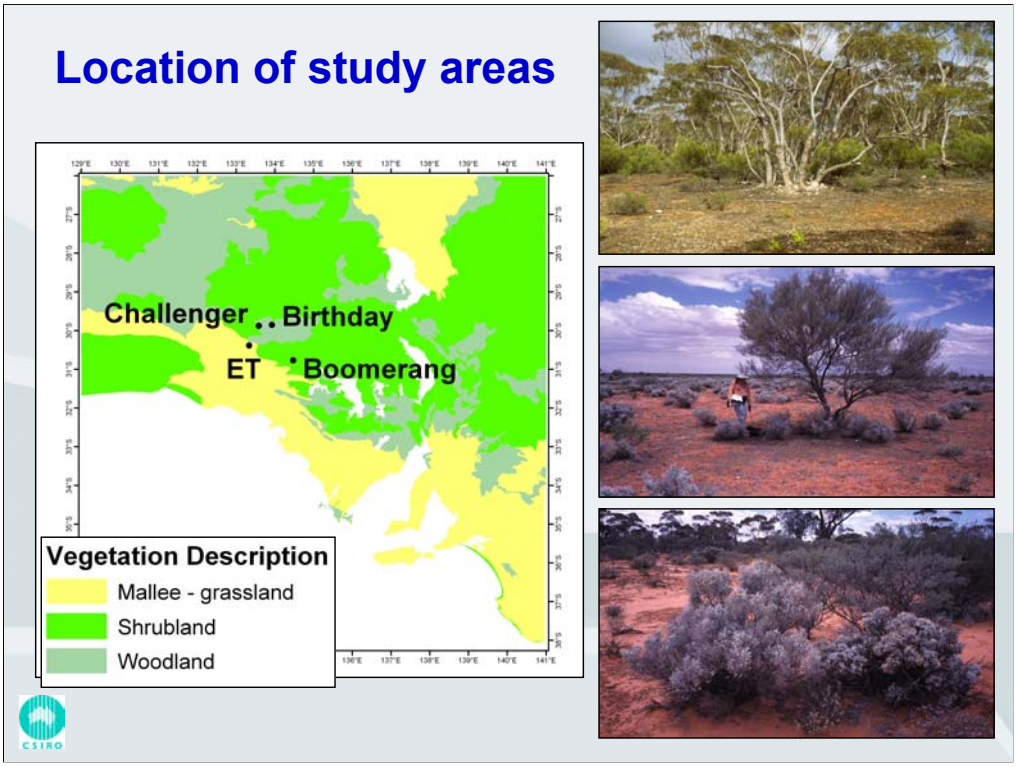
Transported overburden where we would really like to see veg work

More information becomes available with each study



Map of Australia with Ireland present as overlay

Flat – on a saddle between Mesozoic and Tertiary seas

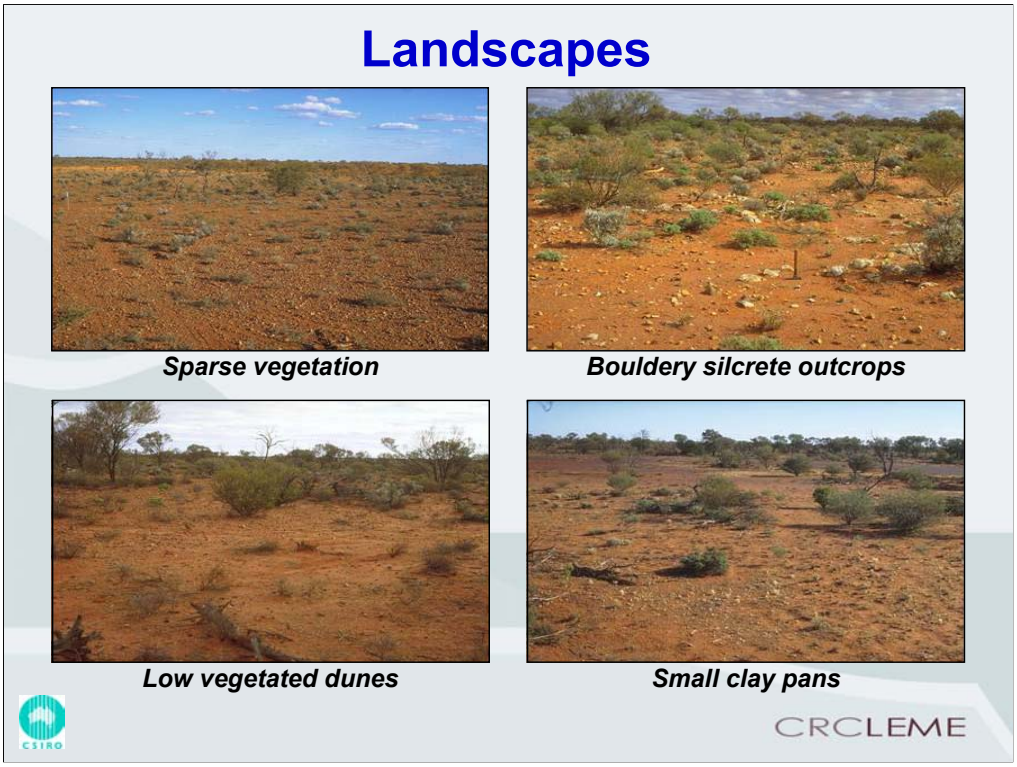


Oversimplification of veg types.

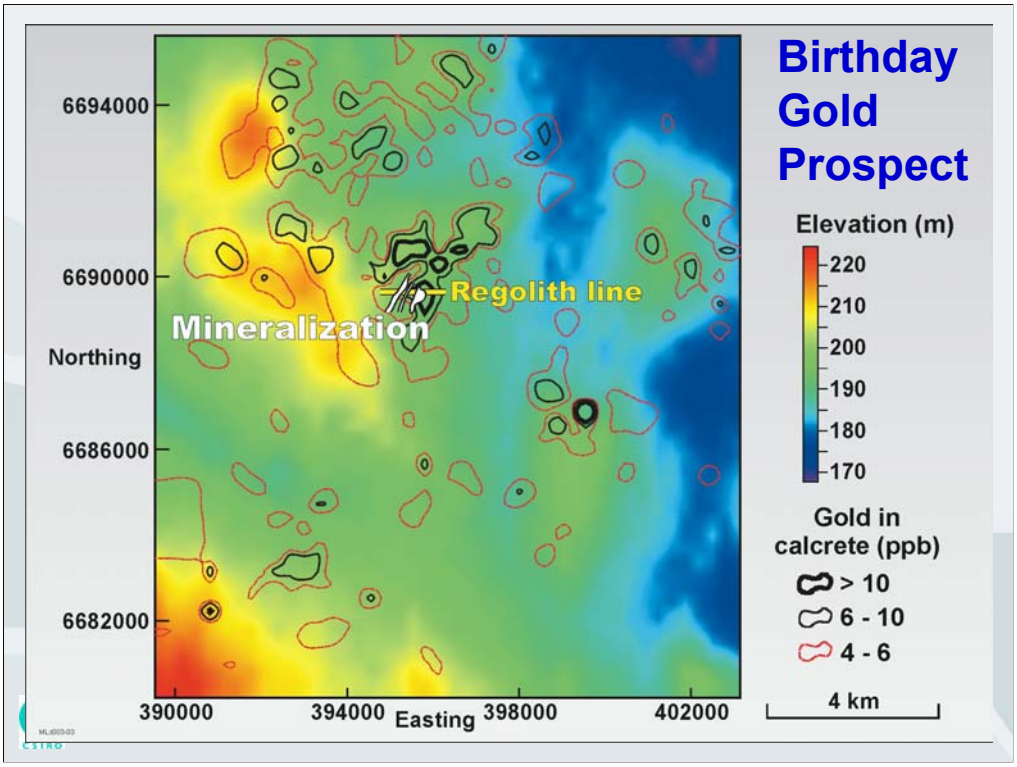
Four gold prospects in the Archaean Gawler Craton South Australia will be briefly looked at and sampling media (including veg will be compared)

Veg is sparse – desert – rainfall below 200 mm

Bluebush



Plants are scattered and belong to several different species. Need to carefully choose the right species

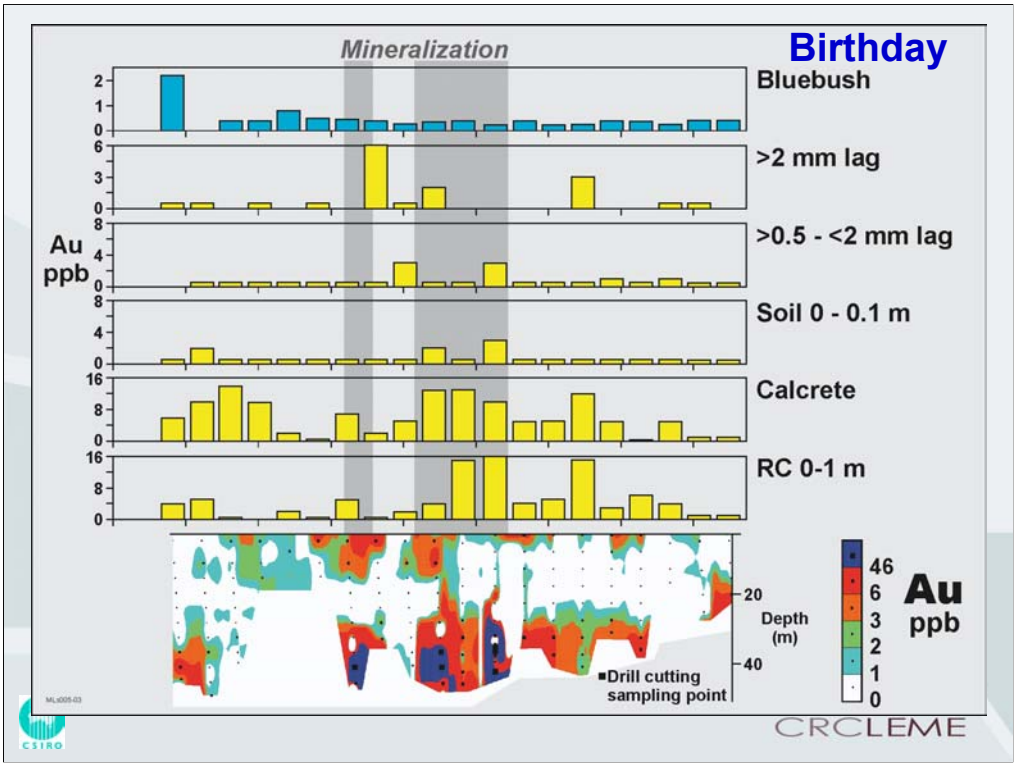


DEM

Sub-economic gold prospect

Gold in calcrete reflecting mineralization, patchy Au in calcrete elsewhere

1.5 km Regolith line – orientation line for study – traverses across mineralization – compare sample media



Bluebush only veg present across the traverse – chosen for sampling. Worked in WA.

Bluebush – not good, but interesting peak on western end of the traverse where we have no drilling information OVER 2 ppb (significant in WA)

Many of the other sample media effective – reasonable contrast but false backgrounds

Message

- Vegetation does not indicate known mineralization or reflect regolith
- Soil and calcrete are useful indicators of underlying mineralization
- Unexplained anomaly on the western end of the line.

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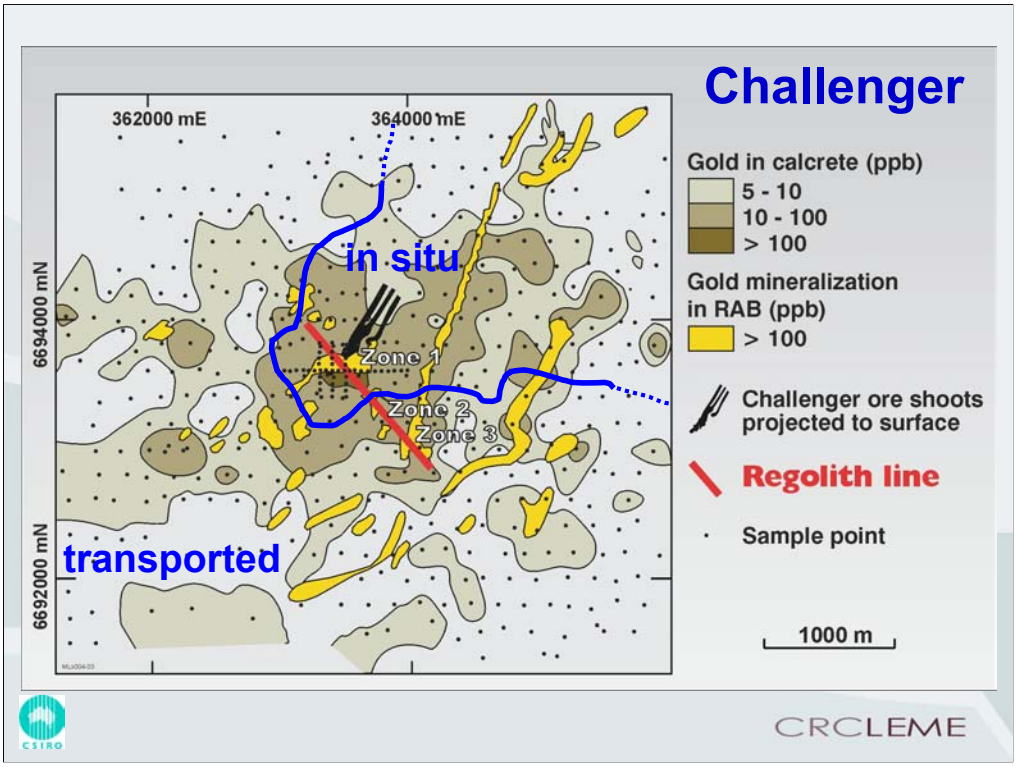
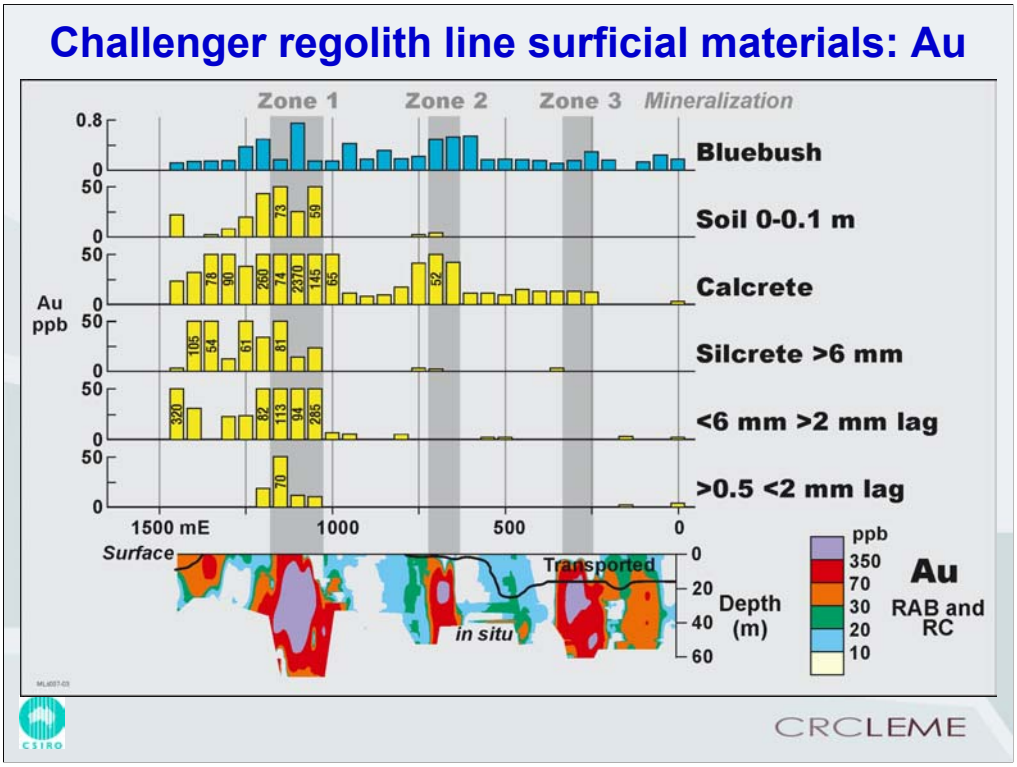


Features:

1) Now Active gold Mine (0.5 Moz)
2) 4 km by 4 km area
3) Main zone of mineralization surrounded by large anomaly of over a km in dimension.
4) Very high Au concentrations in calcrete but are patchily distributed

Why would you want to use veg anyway – CLICK – BECAUSE transported overburden.

1) Not all mineralization appears to have a strong Au-in-calcrete anomaly above it. Not all anomalies have mineralization.

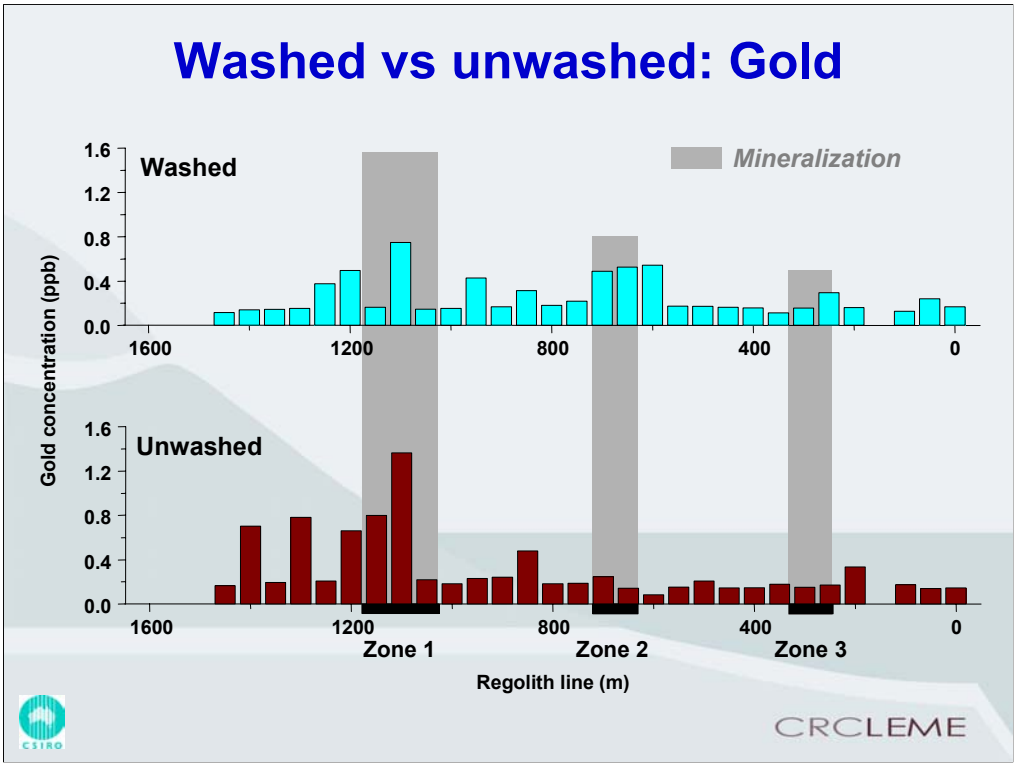


Features:

1) Vegetation sparse but bluebush found along the line – in fact only bluebush over mineralisation itself. Concentrations of less than 1 ppb present – this would be considered background in WA. Why? Desert in short term moisture very locally derived so not getting any Au bearing solutions around plant roots. Surprise. As anomalous in plants but concentrations are low (4 ppm).
2) Soil – not surprisingly 73 ppb over Z1 – but > Ca contents here also ("calcrete" contamination). 4 ppb over Z2. <1 ppb over Z3. As and Cu also
3) Calcrete - >2 ppm over Z1; 50 over Z2 and <10 ppb over Z3. Come onto later
4) Silcrete – biggest surprise since know one had reported Au in silcrete before. Come onto later.

At Challenger, small experiment on whether you need to wash plants. Washed in jet of cold water. Bluebush leaf. Hairy as adaptation to reduce water loss

1) Bluebush particularly dirty with clay and sand grains, drill dust
2) After washing still have some particles left



Same scale

Sample in homogeneity – washing appears to add gold over Zone 2!

Gold is reduced indicating that some on outside of plant – probably associated with dust

Gold still present in sample

Concentrations very low

Message

- Gold in vegetation can indicate presence of mineralization but contrast is poor
- Regolith materials such as calcrete show better contrast than vegetation
- Washing vegetation appear to remove some dust
- Gold lower in washed sample but sample heterogeneity could explain this

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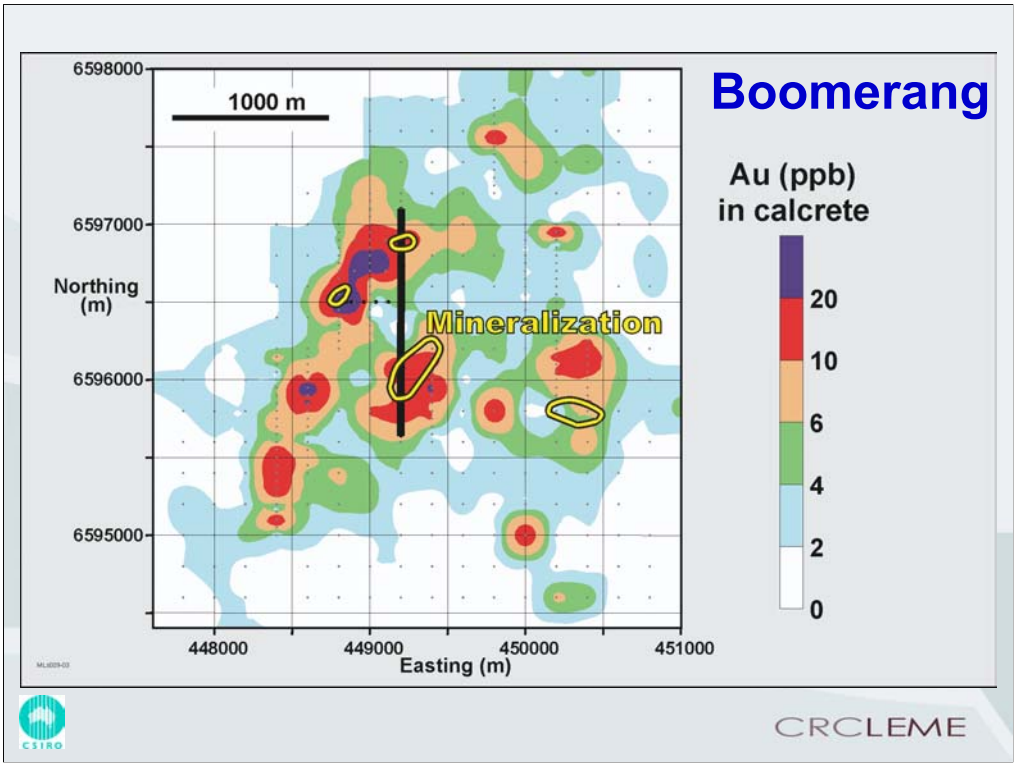
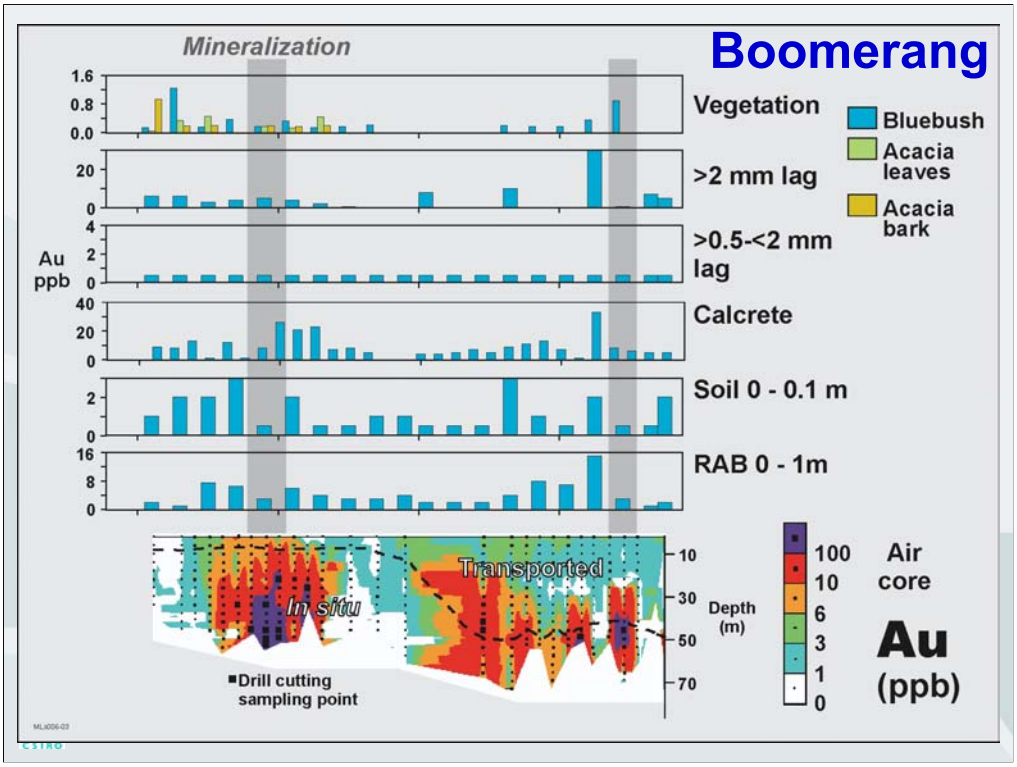


Sub economic Au prospect Gawler Craton

Prospect partly overlain by up to 5 m of aeolian gypseous sediments – POINT OUT regolith line –

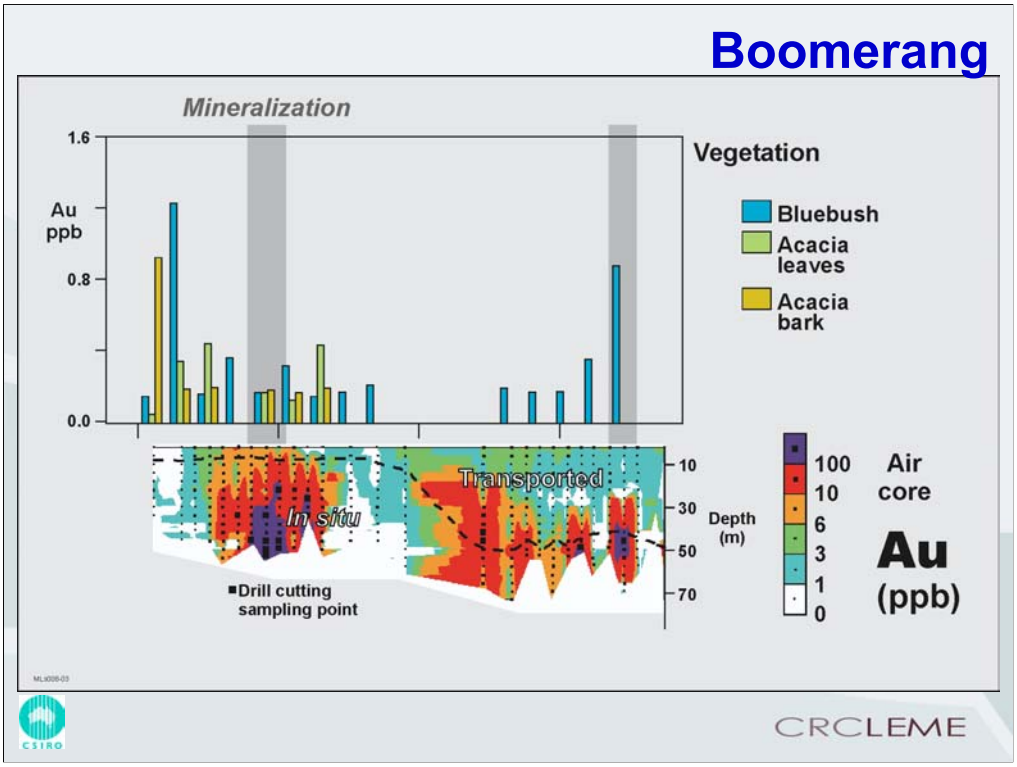
AND thick tertiary fluvio-lacustrine sediments



Palaeochannel – unsure of its orientation

Despite aeolian cover - there is a response in calcrete and a weaker one in soil

Veg – poor.



Acacia “leaves” and bark compared – no relationship – neither associated with mineralization

Note concentrations in bluebush – higher than Challenger where we have gold near surface – not seeing anything.

Values are spurious

2 ppb as cut-off background-anomaly in WA still holds

Message

- Calcrete the best sample medium
- Vegetation poor sample medium
- Different plant species and organs have different elemental concentrations – poorly understood

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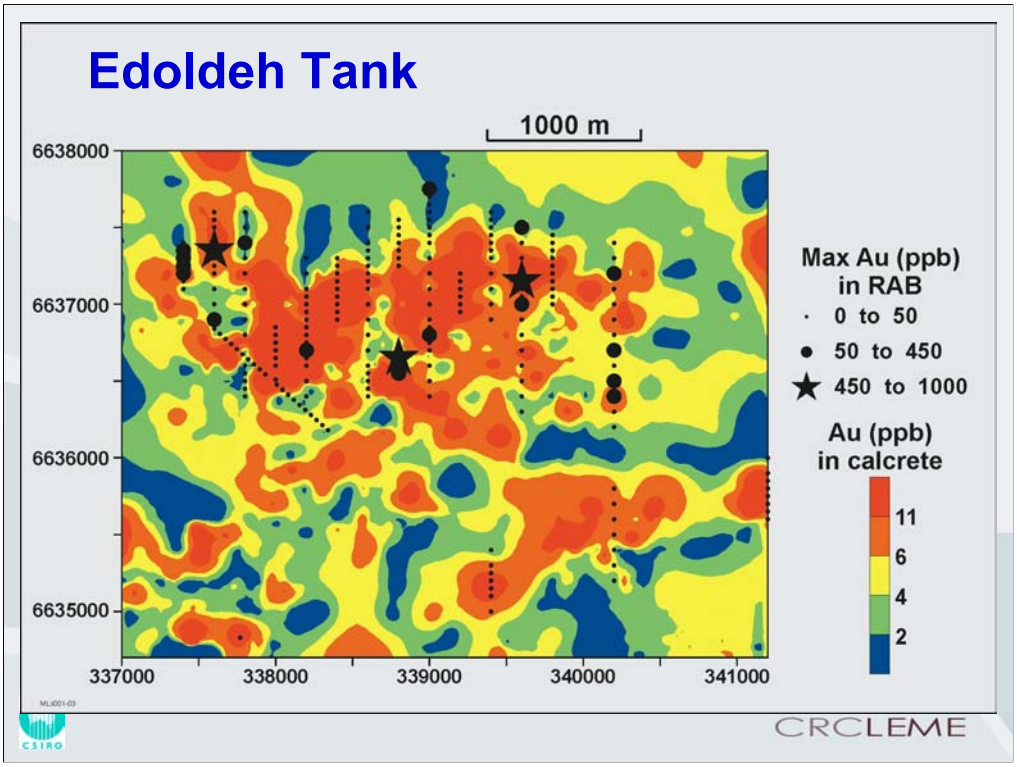
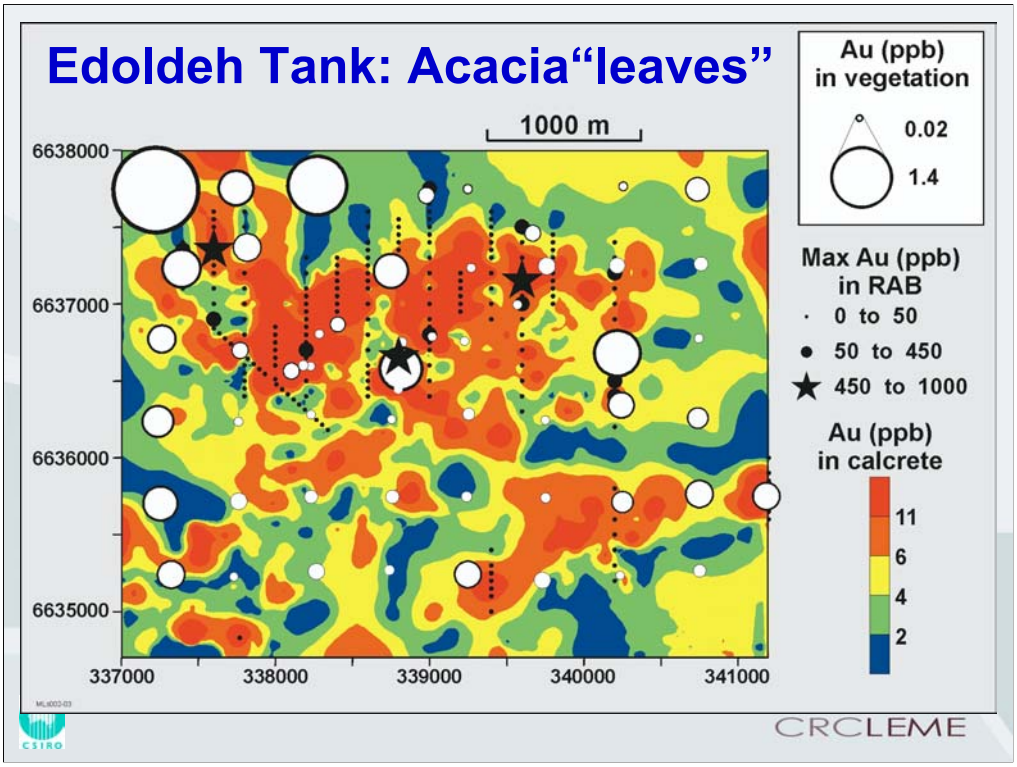


Plan of Gold Prospect on edge of Great Victoria Desert in SA. Sandy

Intriguing site as Sub-economic but large and intense (100 ppb Au) Au in calcrete anomaly (contrast with other sites in that this is open woodland) which has been largely drilled.

POINT OUT mineralization (stars and black dots)



Acacia leaves – bluebush not present throughout

Vegetation high in NW – why? No drilling

Concentrations still below 1.5 ppb

Message

- Regolith mostly concealed by sand
- Large surficial anomaly but little mineralization
- Poor agreement between regolith, vegetation and mineralization data
- Coherent vegetation anomalies in W and NW – possibly slope related

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Conclusions

- Vegetation contains Au – further evidence for Au mobility in soil environment
- One single plant species not ubiquitously present
- Gold in vegetation not a reliable indicator of underlying mineralization
- (Multi-element geochemistry not particularly valid for Au deposits in the Archaean of the Gawler Craton)

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Conclusions (cont.)

- Calcrete good indicator of known mineralisation
- Biogeochemical Au anomalies in desert terrains are poorly understood – may be trying to tell us something … but what?

  Slope effects? Soil moisture effects?

  More research required

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