

# CREATING FRONTIER OPPORTUNITIES IN NEW SOUTH WALES

## *The Thomson Orogen in NSW A New Frontiers Success Story*



*The Thomson Orogen in NSW*      *A New Frontiers Success Story*      *Creating Frontier Opportunities in New South Wales*

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Department of Primary Industries

# New Frontiers Initiative

II - 2008 – 2011 (\$16.5 million)

(\$5.5 per year between Minerals,  
Petroleum, Information)

## Focus:

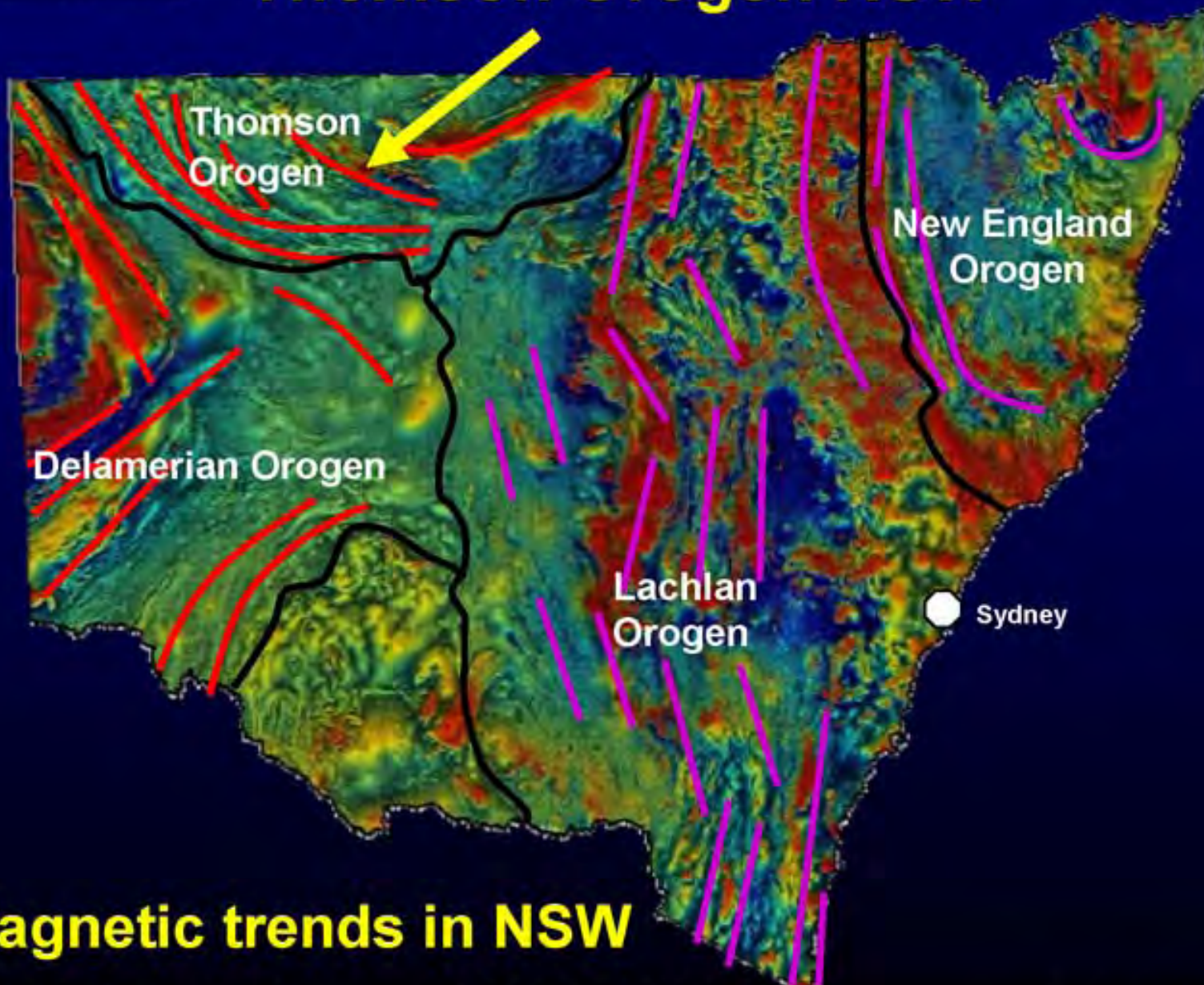
- Areas under cover & underexplored
- Acquisition of high quality data & generating new exploration opportunities

## 2008 – 2009

### Highlights:

- Completion of Koonenberry project – 22 new map products
- New gravity data acquired for 3 areas of state
- Completion of Rankin Springs seismic
- Thomson Orogen - new data, new ideas, exploration take up

# Thomson Orogen NSW



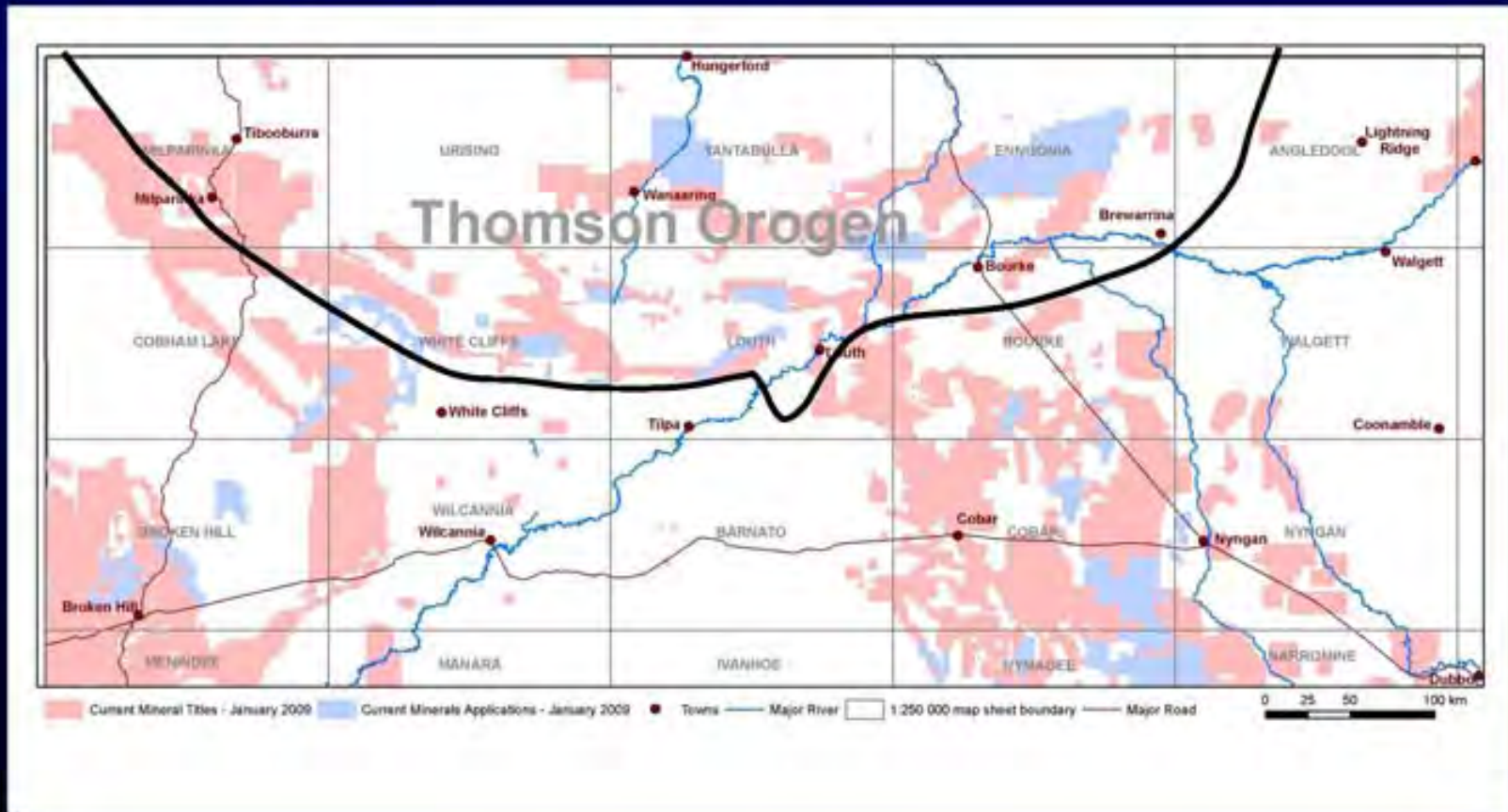
## Magnetic trends in NSW

# Thomson Orogen - NW NSW

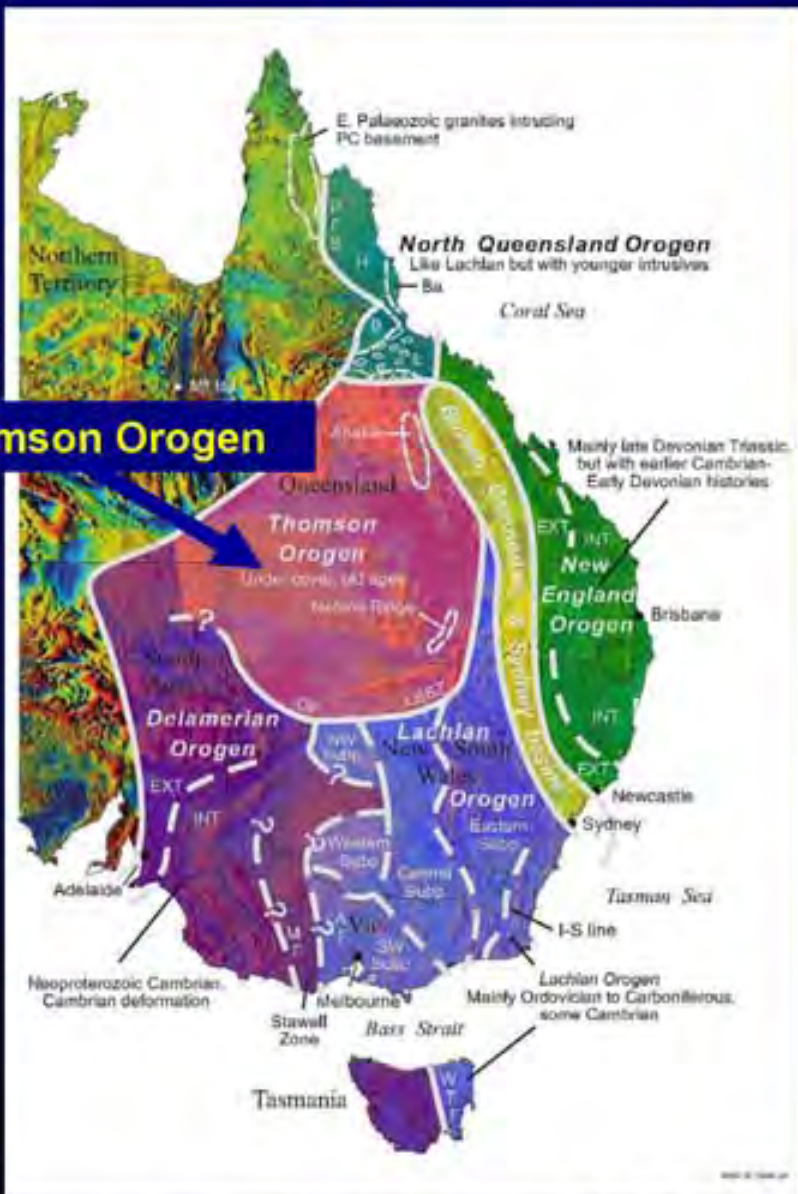
## Exploration Licences & Applications

### 2005 - 2009

Feb 2005    June 2007    Jan 2009

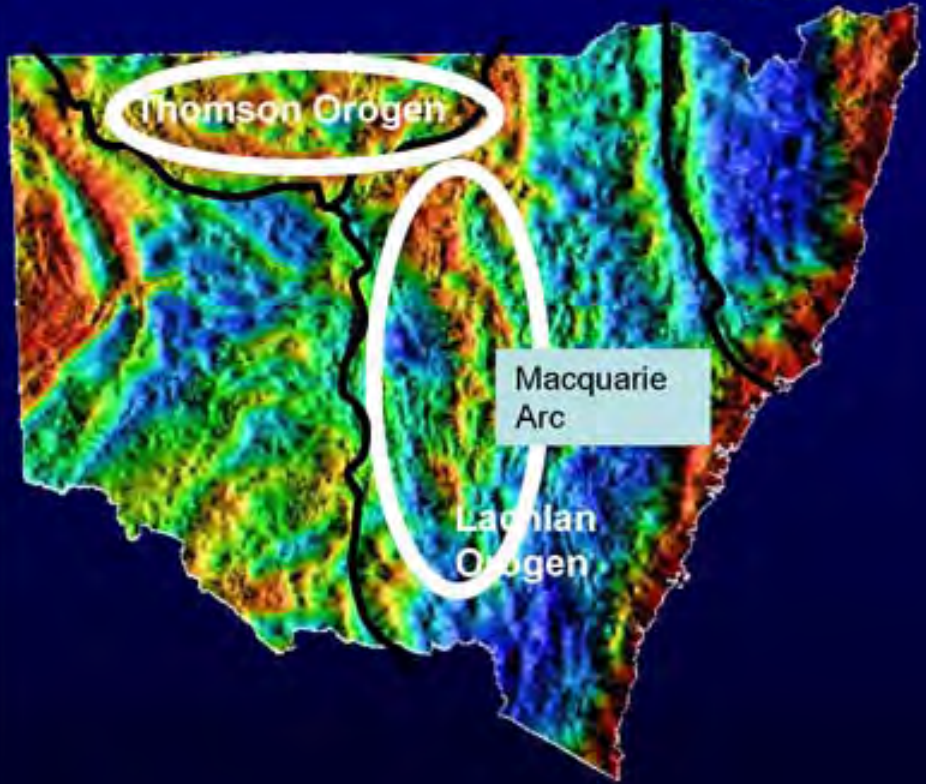


# Tasmanides in Eastern Australia

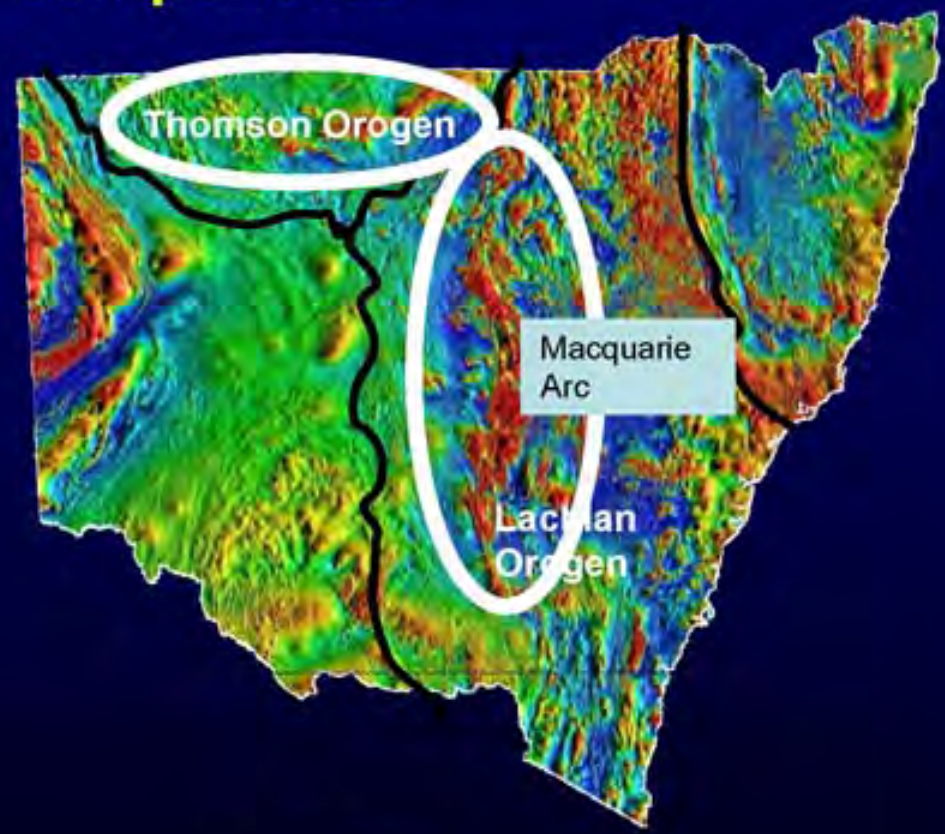


# Thomson & Lachlan Orogens

## Similar gravity and magnetic responses from arc components

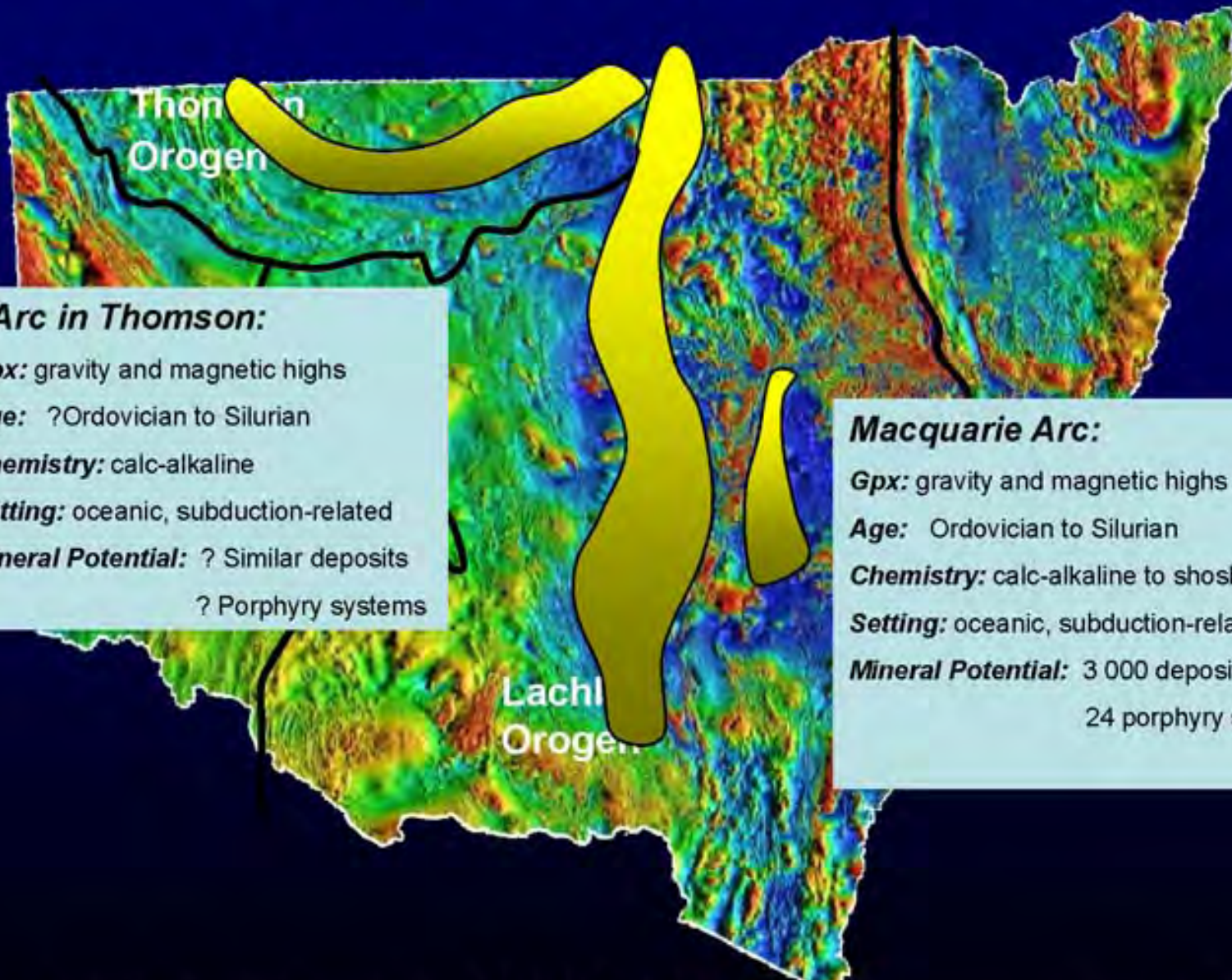


**Bouguer gravity**



**TMI data**

# ?Original or imposed feature



### ?Arc in Thomson:

**Gpx:** gravity and magnetic highs

**Age:** ?Ordovician to Silurian

**Chemistry:** calc-alkaline

**Setting:** oceanic, subduction-related

**Mineral Potential:** ? Similar deposits  
? Porphyry systems

### Macquarie Arc:

**Gpx:** gravity and magnetic highs

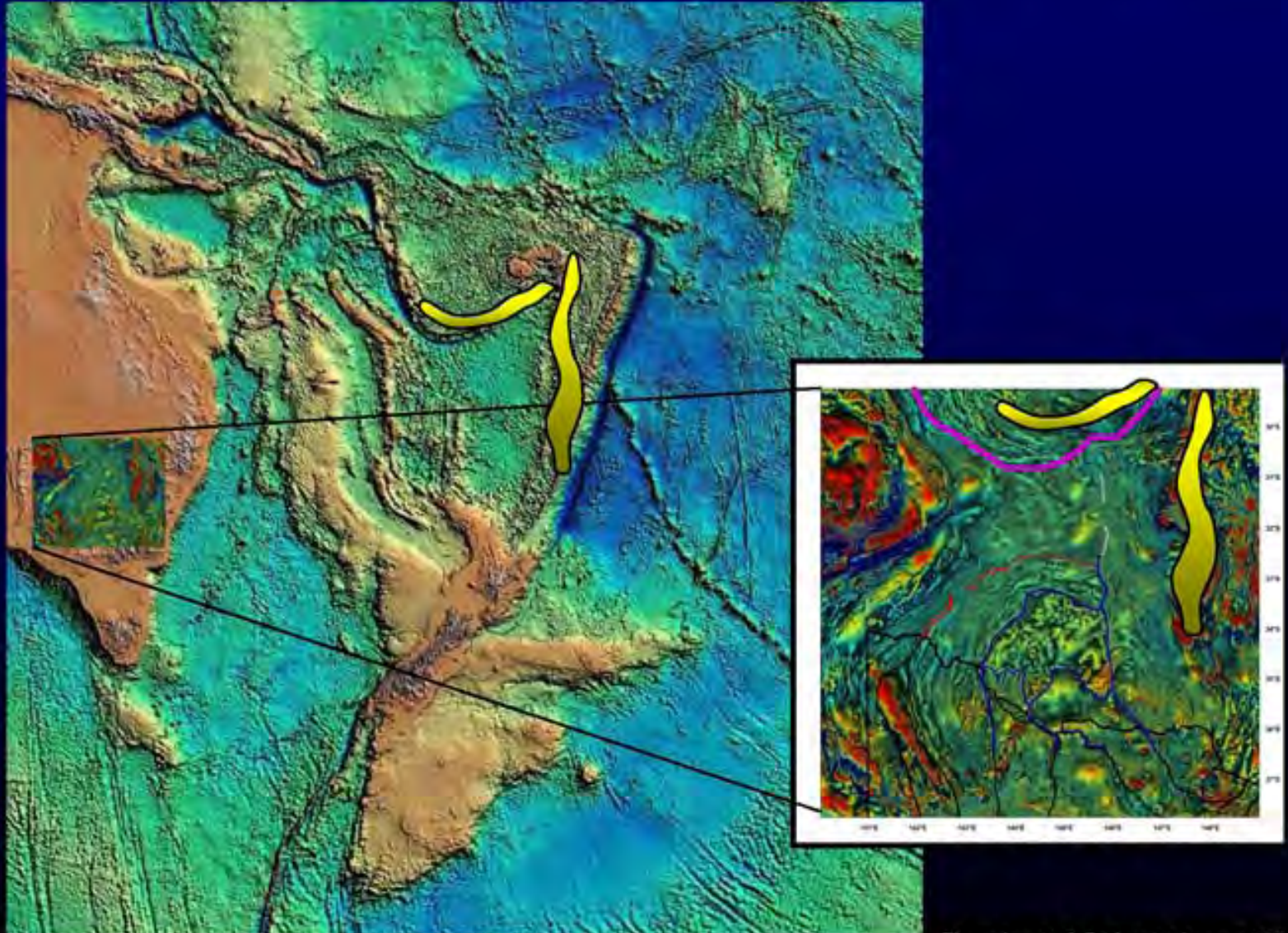
**Age:** Ordovician to Silurian

**Chemistry:** calc-alkaline to shoshonitic

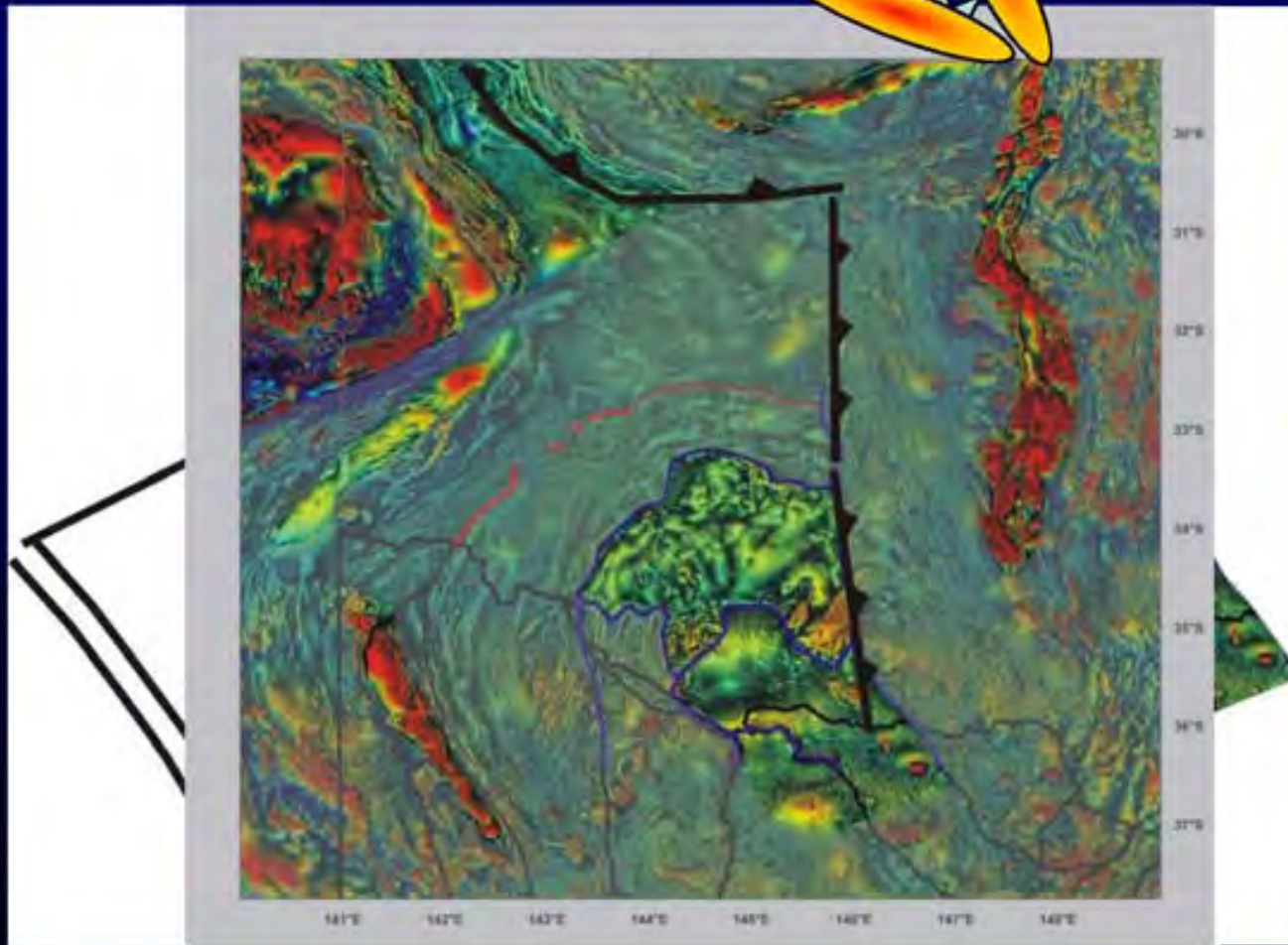
**Setting:** oceanic, subduction-related

**Mineral Potential:** 3 000 deposits  
24 porphyry systems

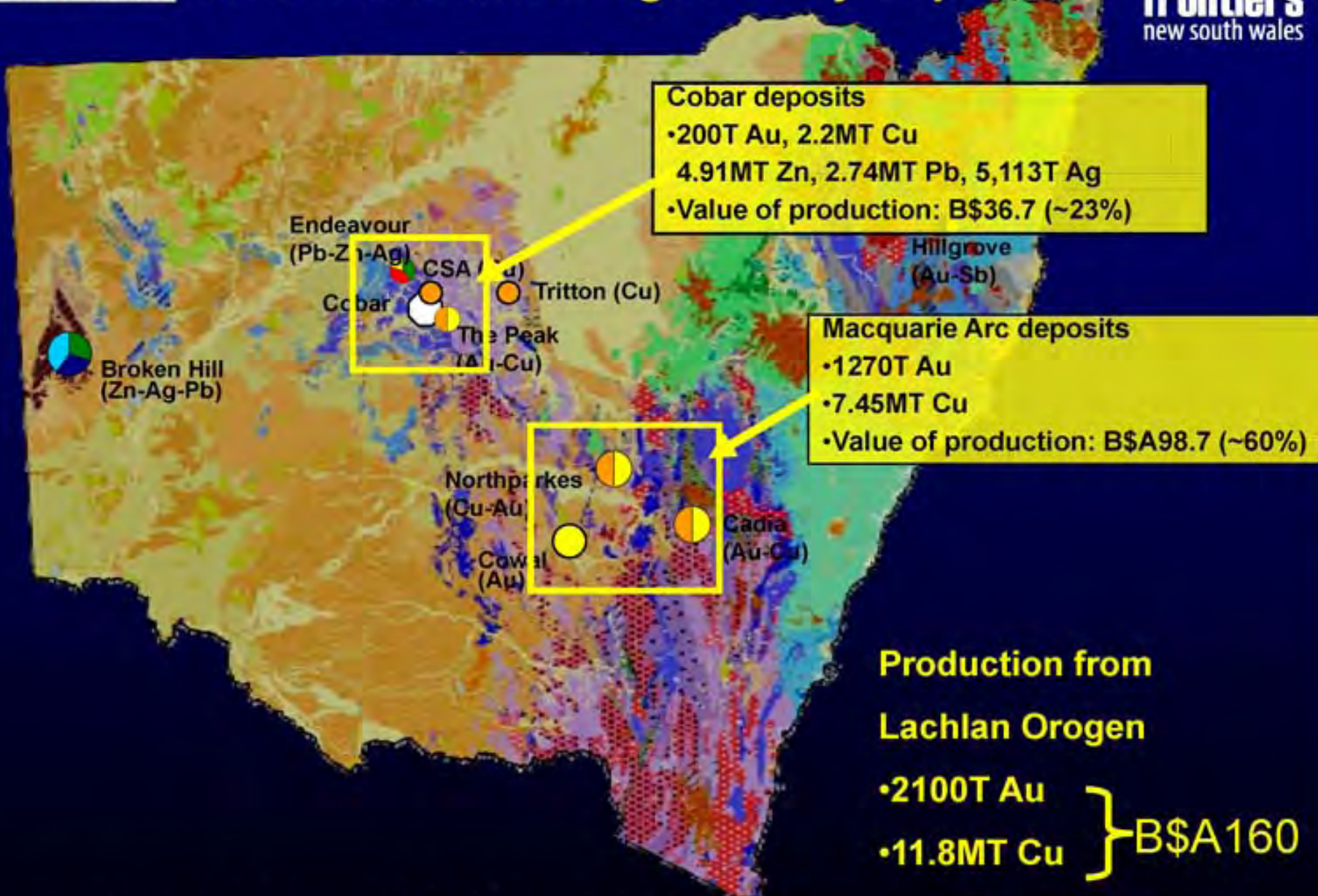
# Original - context and scale



# Imposed - related to Benambran Orogeny



# NSW – Lachlan Orogen – Key Deposits



# THOMSON OROGEN IN NSW - NEW TARGETS



***New Frontiers information:*** new geophysics, geochemistry, geochronology, seismic, drilling, basement interpretation, regolith map & guide, depth to basement

## TARGET

## SETTING

1. Porphyry gold-copper

Oceanic arc (similar to Macquarie Arc)

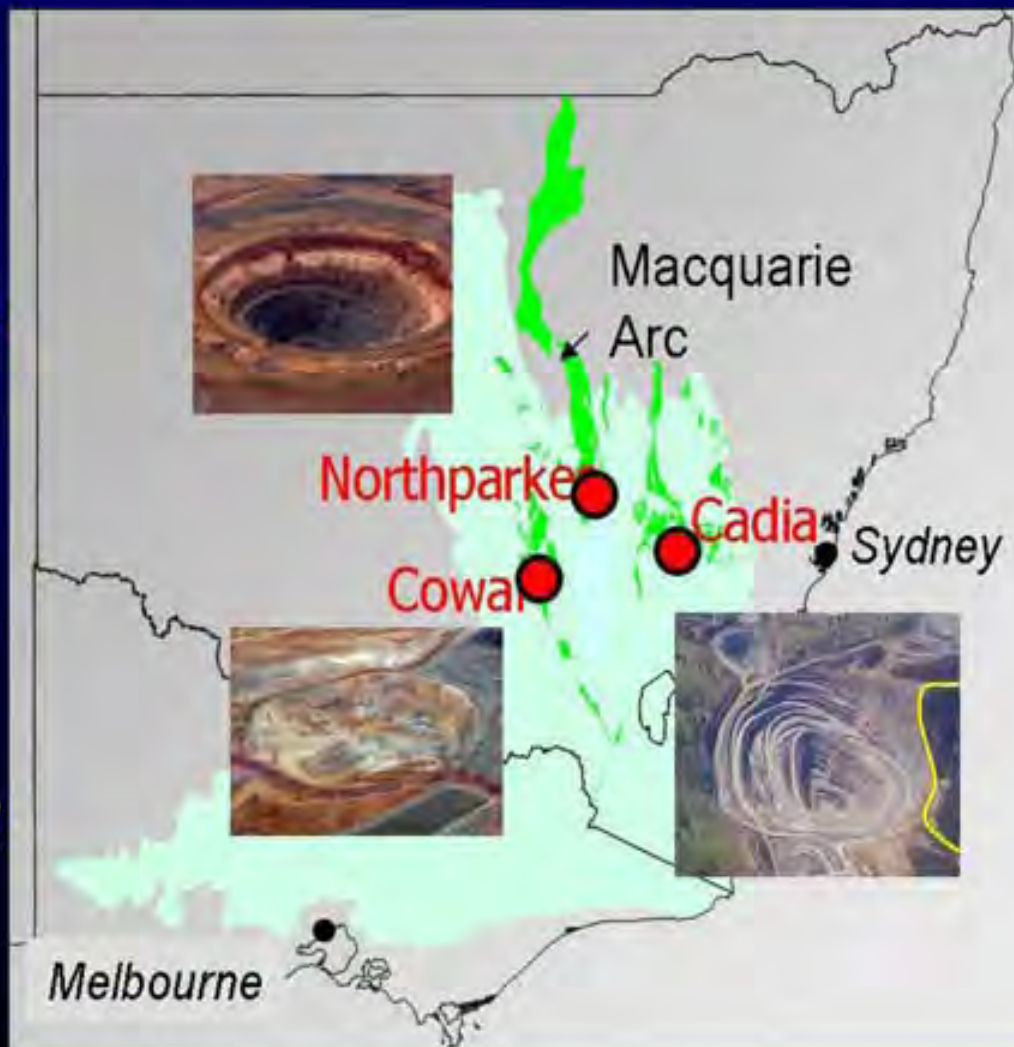
2. Gold-base metals

E. Devonian rifts (extensions of Cobar Basin)

# Lachlan Orogen - Macquarie Arc

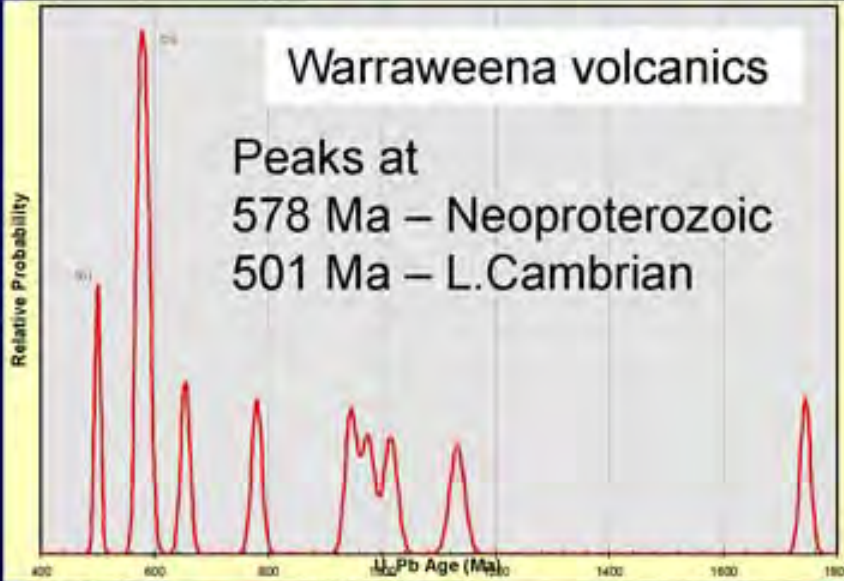
## Setting:

- *Ordovician to early Silurian Volcanic Province*
- *Calc-alkaline to shoshonitic*
- *Subduction-related setting*

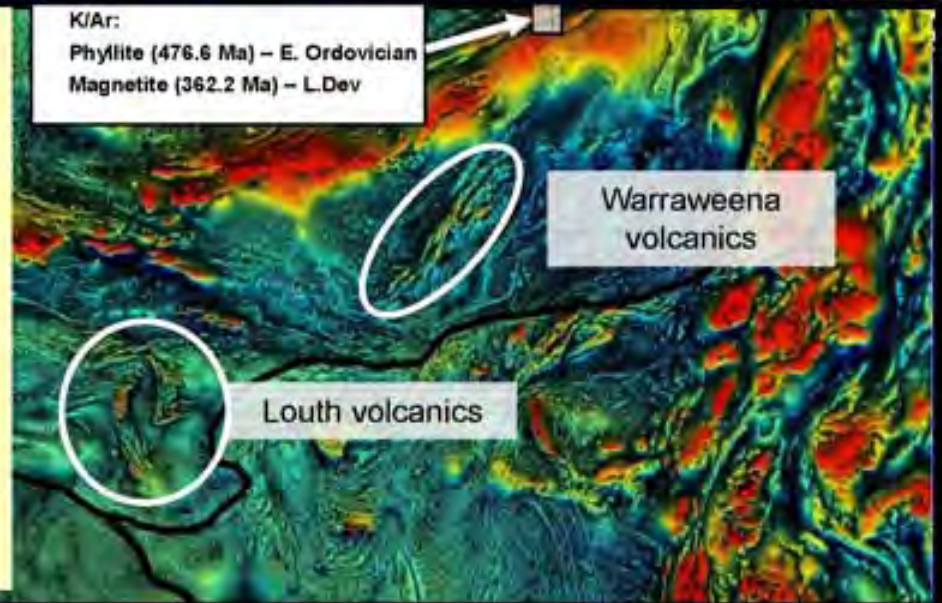


## Warraweena volcanics

Peaks at  
578 Ma – Neoproterozoic  
501 Ma – L. Cambrian

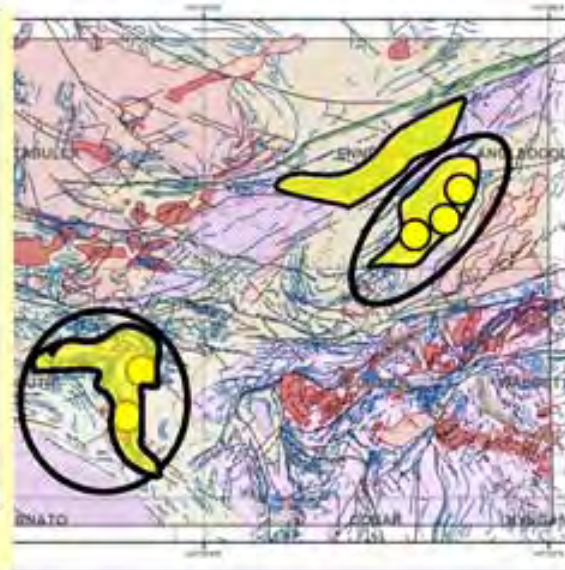
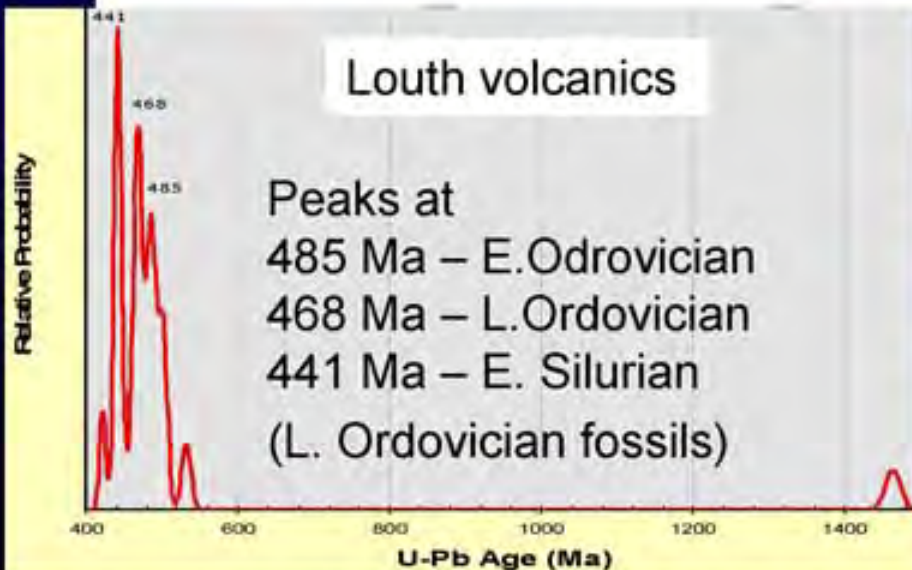


K/Ar:  
Phyllite (476.6 Ma) – E. Ordovician  
Magnetite (362.2 Ma) – L.Dev

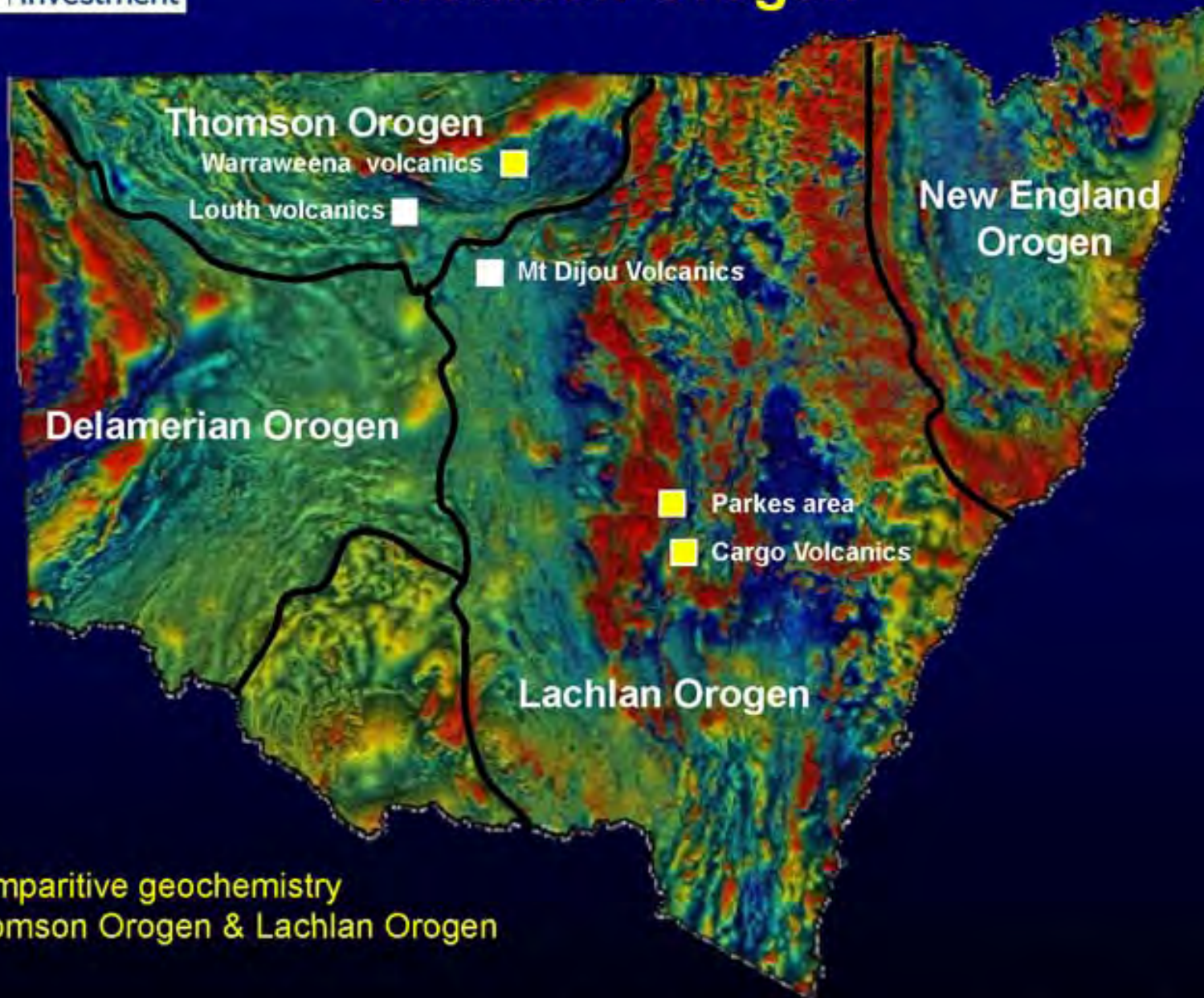


## Louth volcanics

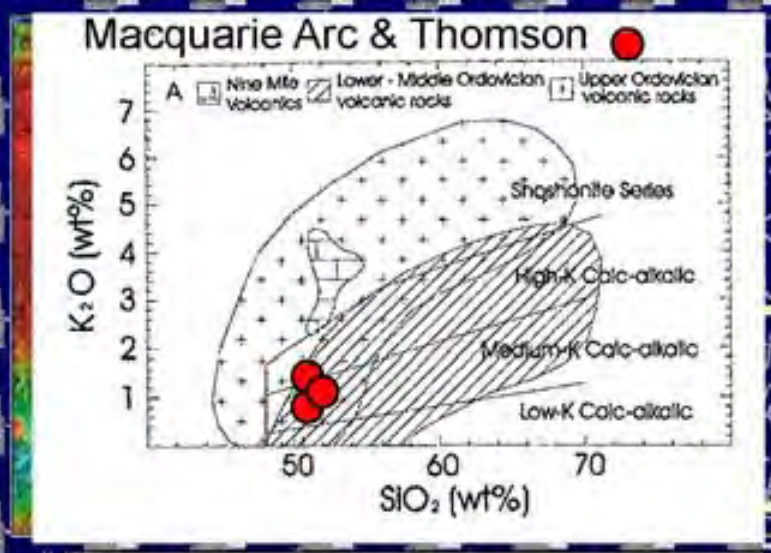
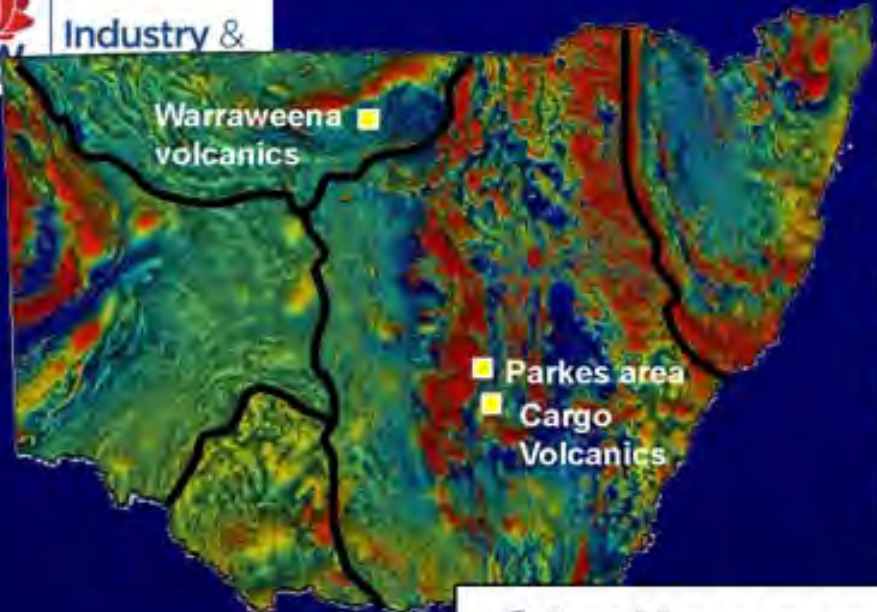
Peaks at  
485 Ma – E. Ordovician  
468 Ma – L. Ordovician  
441 Ma – E. Silurian  
(L. Ordovician fossils)



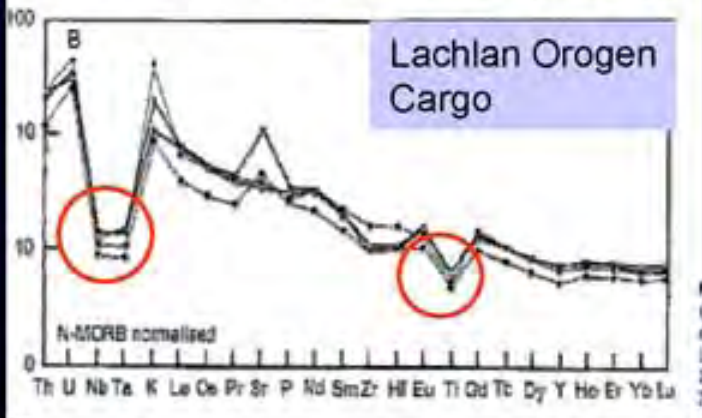
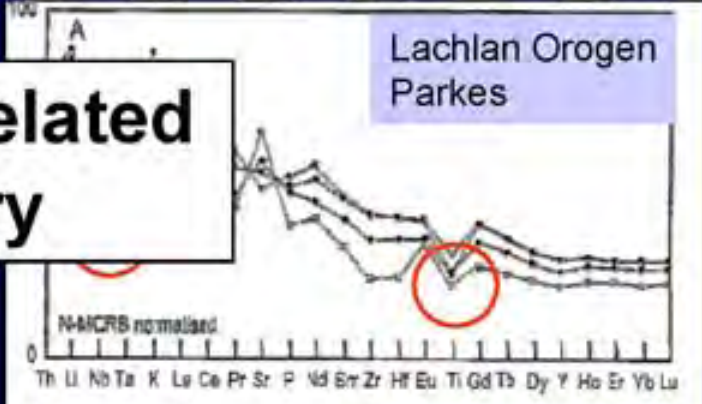
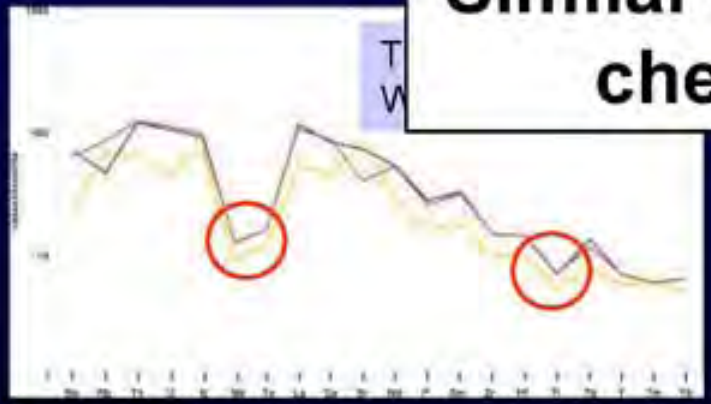
# Thomson Orogen



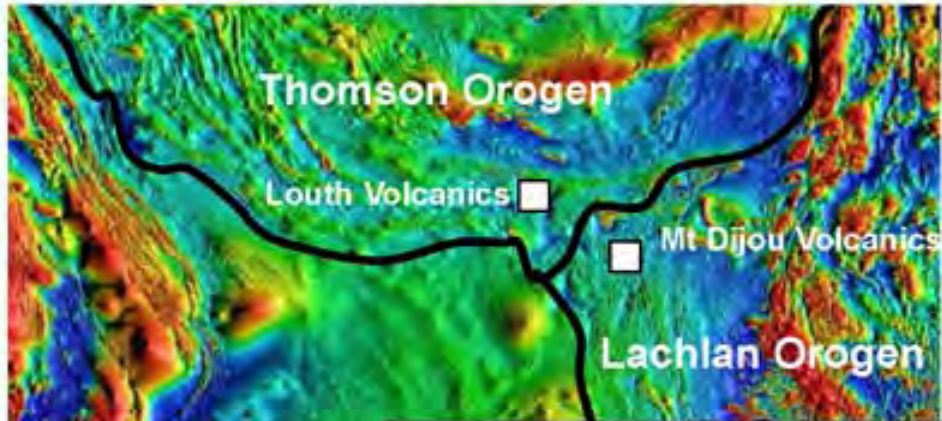
Comparative geochemistry  
Thomson Orogen & Lachlan Orogen



**Similar arc-related chemistry**



All multi-element plots show similar depletion in Ti, Nb and Ta (TnT anomaly) characteristic of subduction-related magmatism



## Major rock types in Louth area

- Mafic volcanic rocks
  - Pillow lava, pillow breccia and hyaloclastite
- Mafic volcanoclastic rocks
- Fine-grained sedimentary rocks

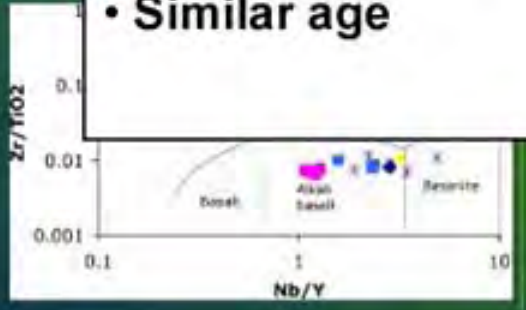


### Louth/Mt Dijou

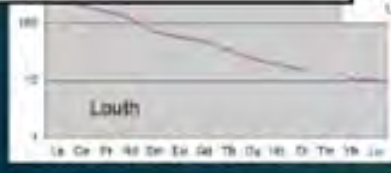
- Both mafic volcanic rocks
- Both alkaline
- Similar OIB-like patterns
- Similar age

## Louth / Mt Dijou

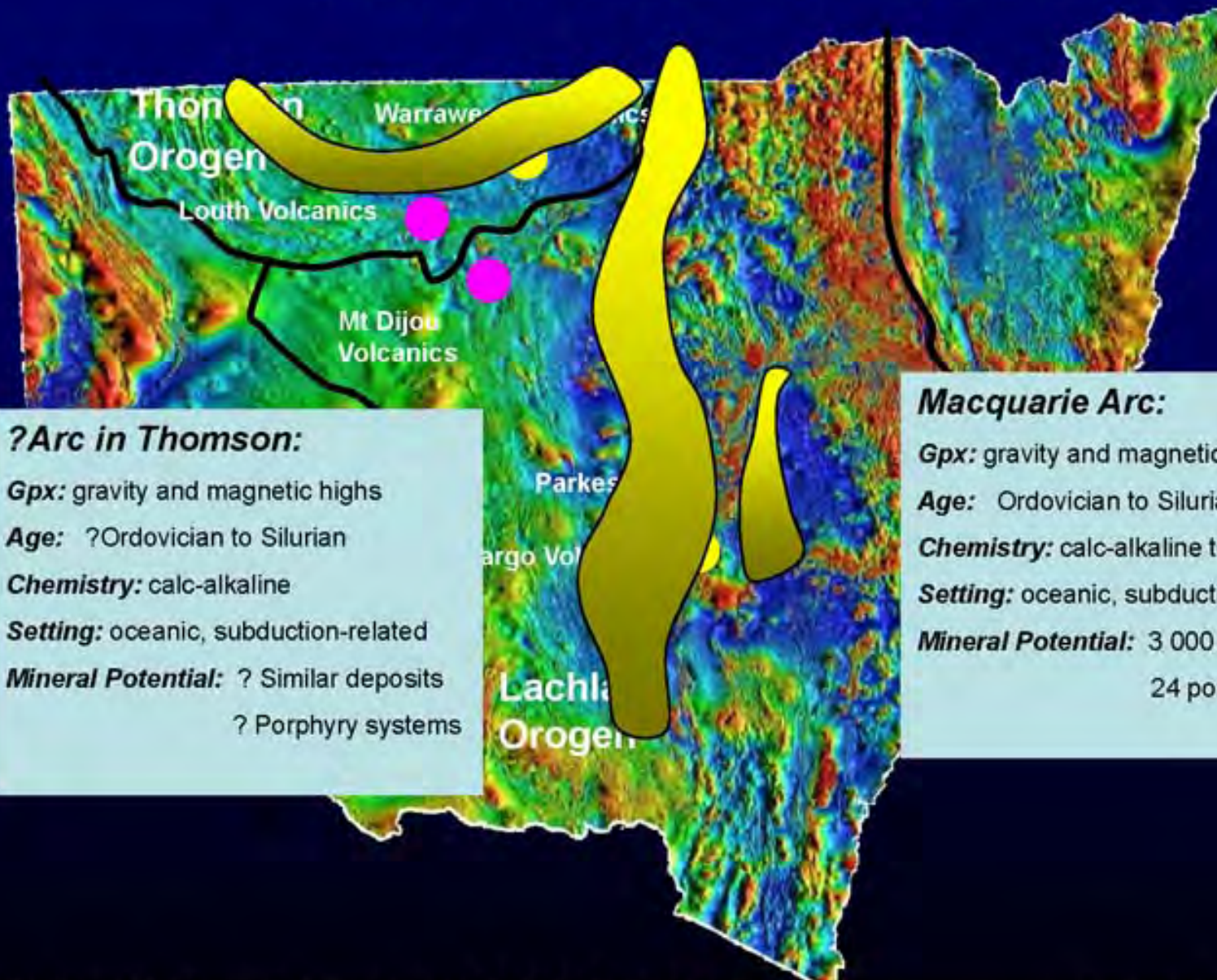
The mafic lavas  
 • Immobile trace elements confirm the alkalic nature of the suite



## Bald Hills - REE



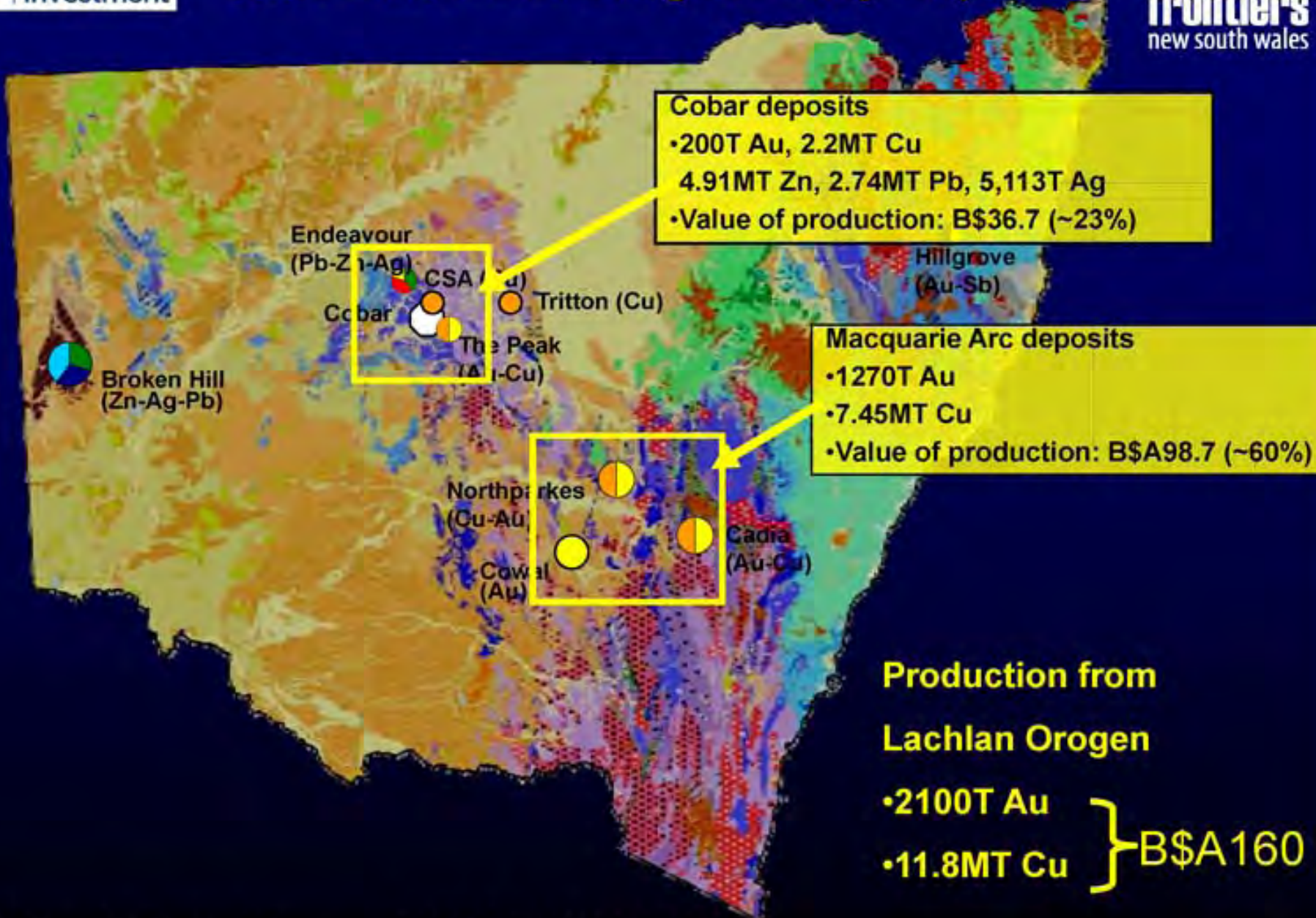
# Macquarie Arc and Thomson



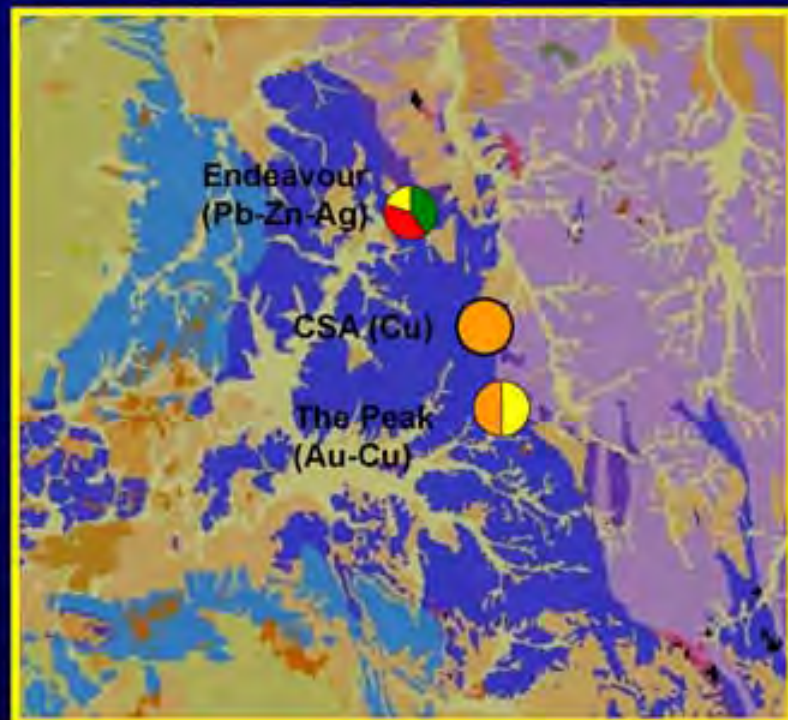
**?Arc in Thomson:**  
**Gpx:** gravity and magnetic highs  
**Age:** ?Ordovician to Silurian  
**Chemistry:** calc-alkaline  
**Setting:** oceanic, subduction-related  
**Mineral Potential:** ? Similar deposits  
 ? Porphyry systems

**Macquarie Arc:**  
**Gpx:** gravity and magnetic highs  
**Age:** Ordovician to Silurian  
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**Setting:** oceanic, subduction-related  
**Mineral Potential:** 3 000 deposits  
 24 porphyry systems

# NSW – Lachlan Orogen – Key Deposits



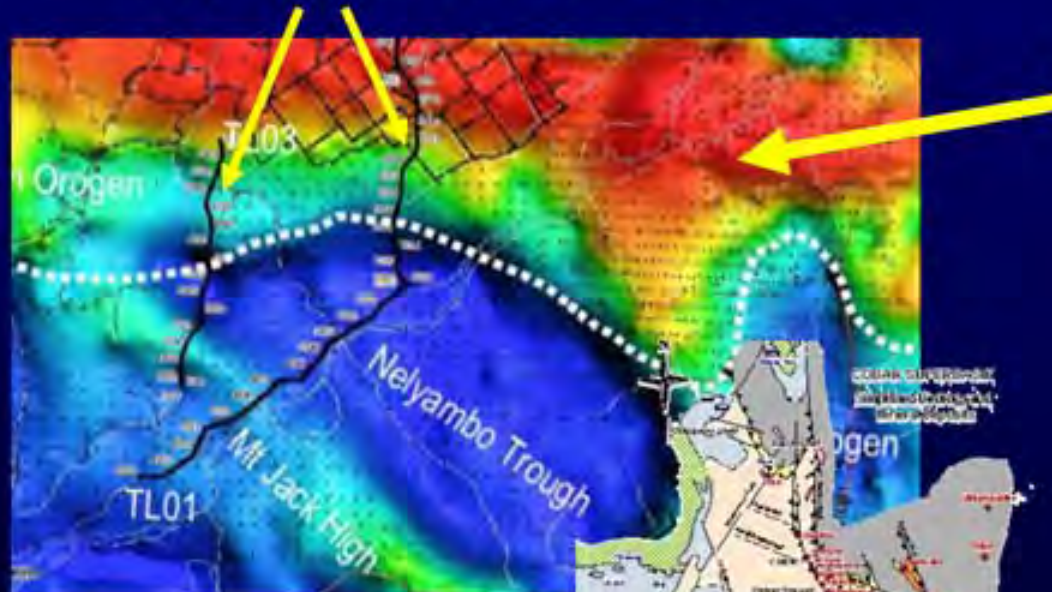
# Cobar deposits



- Sediment hosted massive sulphides & gold in a high strain zone
- Early Devonian Cobar Supergroup, pyrrhotite common

# Cobar Deposits

Deep crustal seismic lines

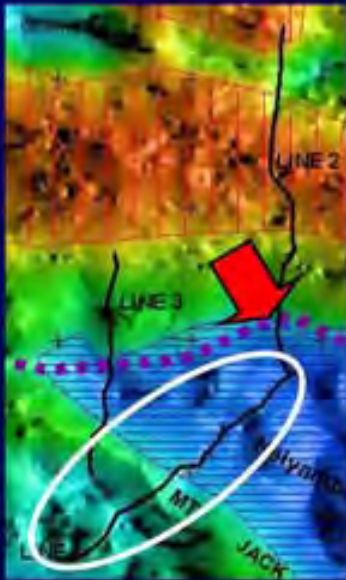


Thomson Orogen

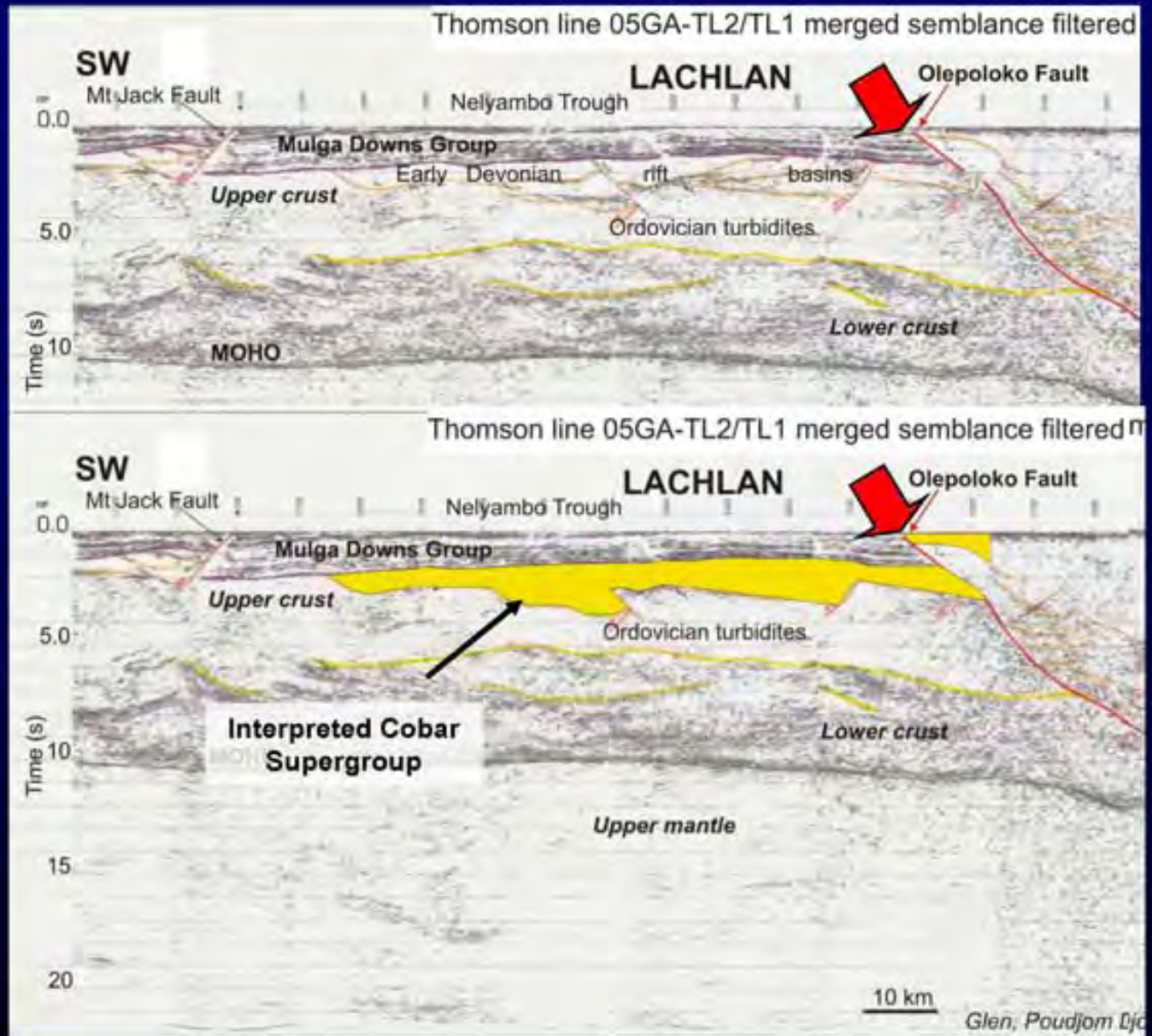
Bouguer gravity

Cobar Basin

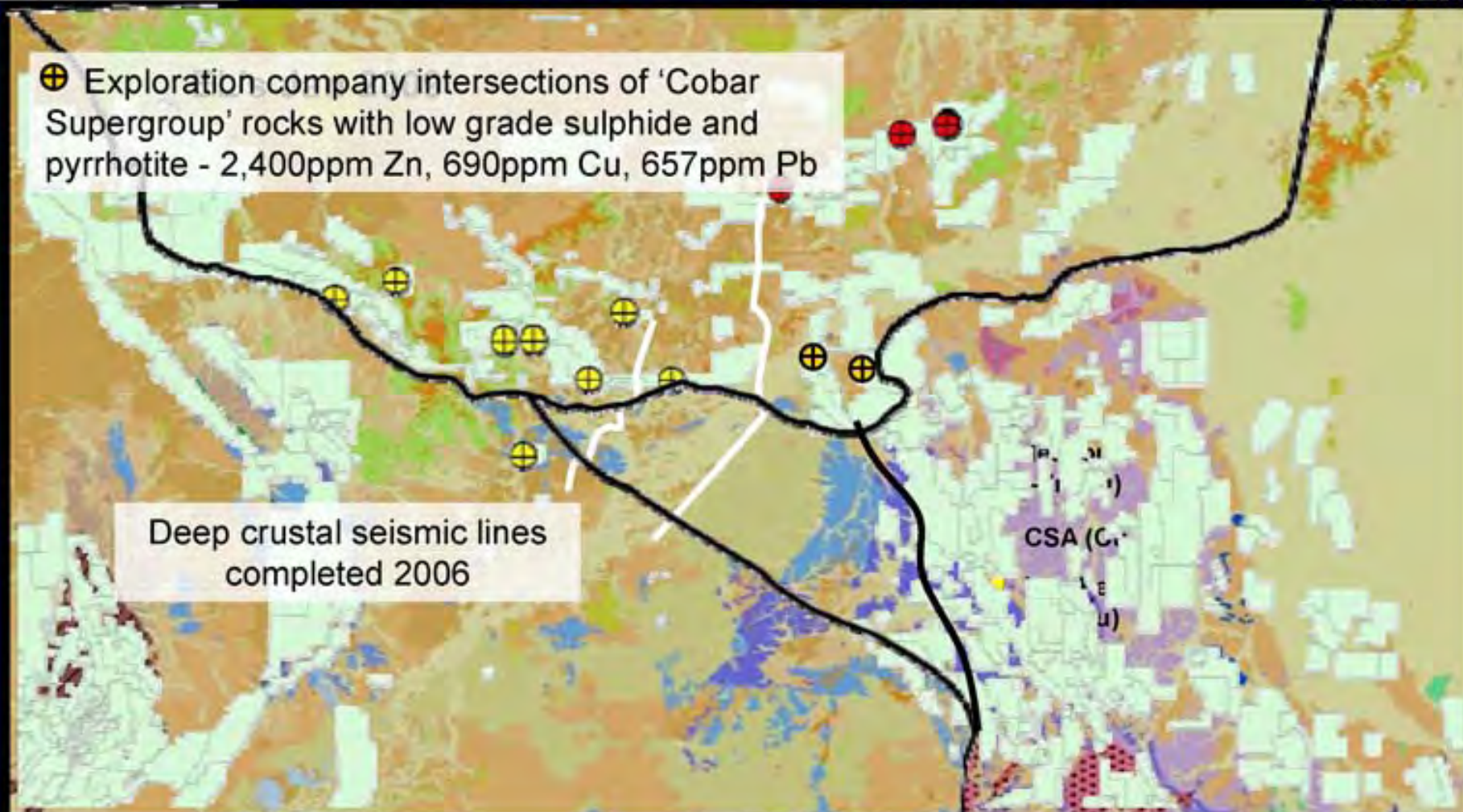




**Line TL1**

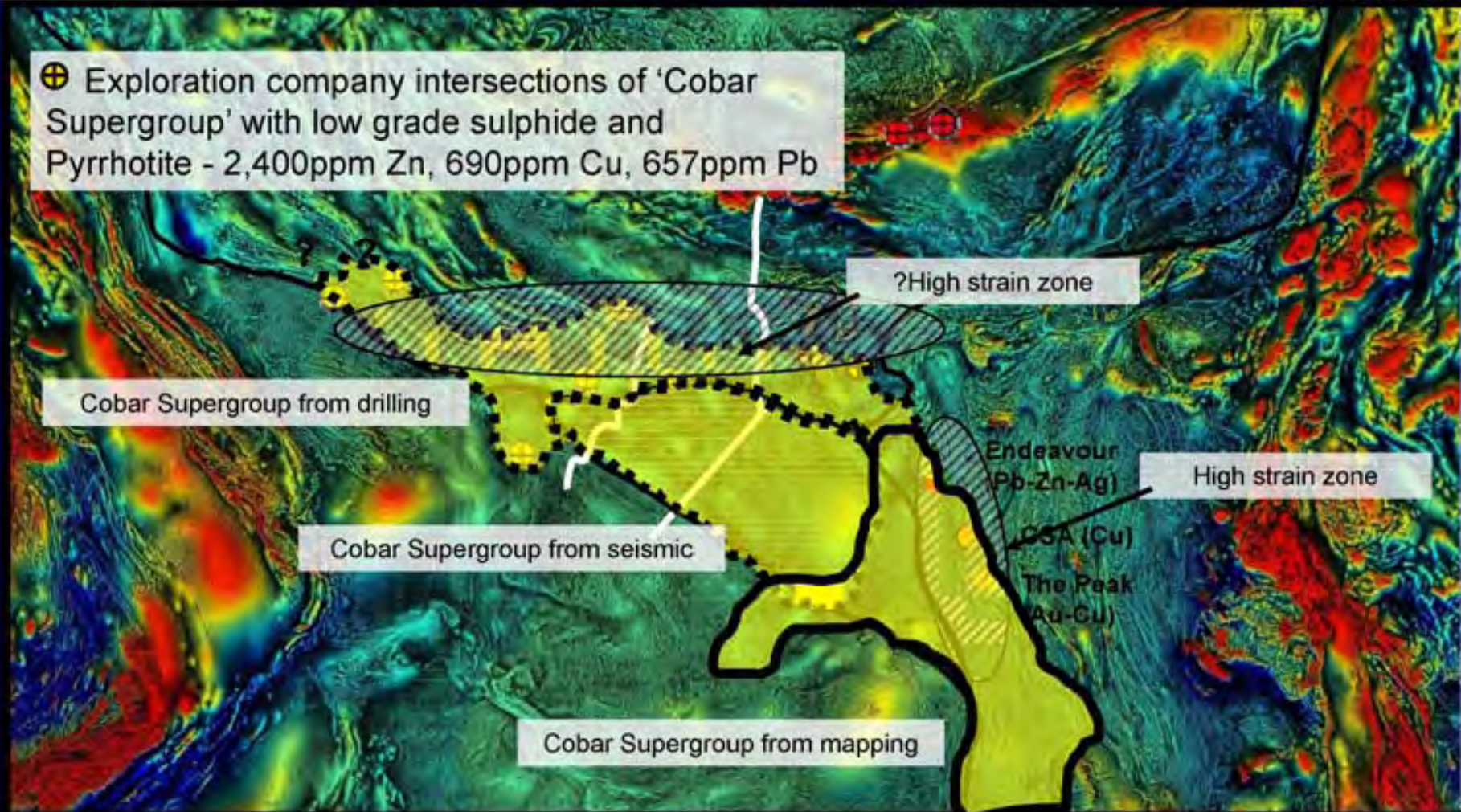


# Thomson Orogen NSW



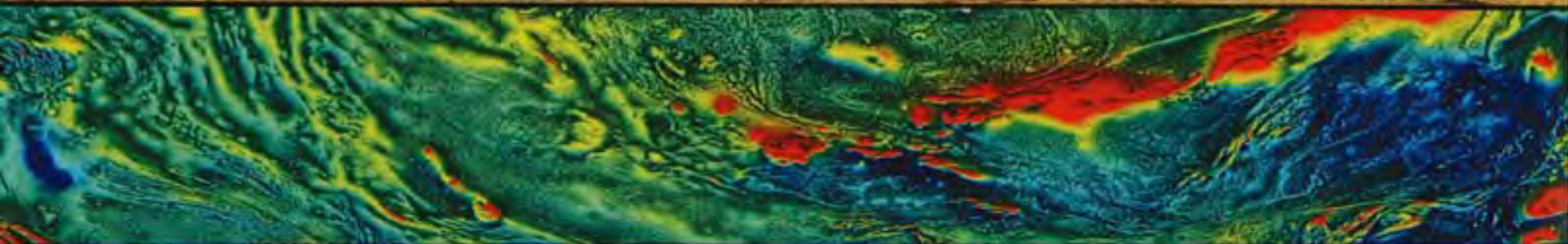
# Thomson Orogen NSW

⊕ Exploration company intersections of 'Cobar Supergroup' with low grade sulphide and Pyrrhotite - 2,400ppm Zn, 690ppm Cu, 657ppm Pb





# Thomson Orogen NSW



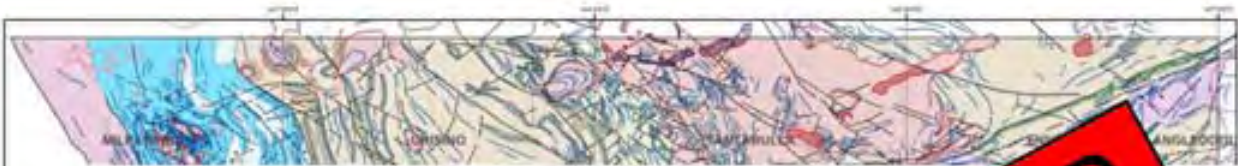
## TARGET

1. Porphyry gold-copper
2. Gold-base metals

## SETTING

- Ord-Sil oceanic arc (similar to Macquarie Arc)
- E. Devonian rifts (extensions of Cobar Basin)

# Thomson Orogen – new data



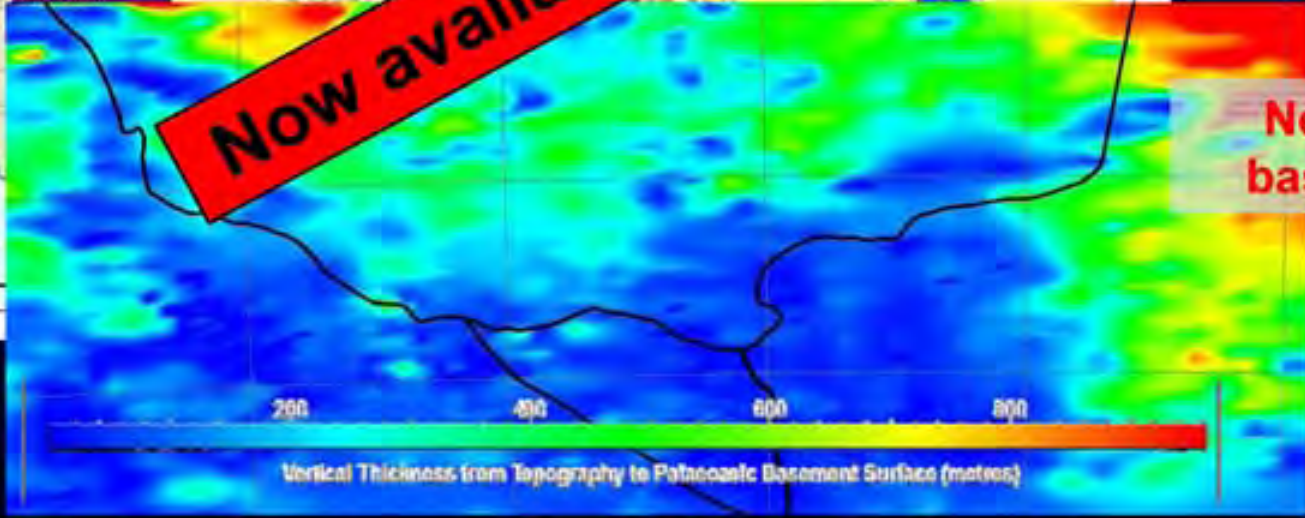
**New basement interpretation**



**New regolith map and explorers guide**

A guide for mineral exploration through and within the regolith in the southwestern

**Now available on DVD**



**New depth to basement map**

**30% of area <300m to basement**



The New South Wales

The New South Wales

The New South Wales

**new**  
**frontiers**  
new south wales

**CREATING FRONTIER OPPORTUNITIES  
IN NEW SOUTH WALES**

**new**  
**frontiers**  
new south wales

**Thank you**

**new**  
**frontiers**  
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