



**Australian Government**  

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**Geoscience Australia**

# **GA's Airborne EM Project: Paterson highlights and future work**

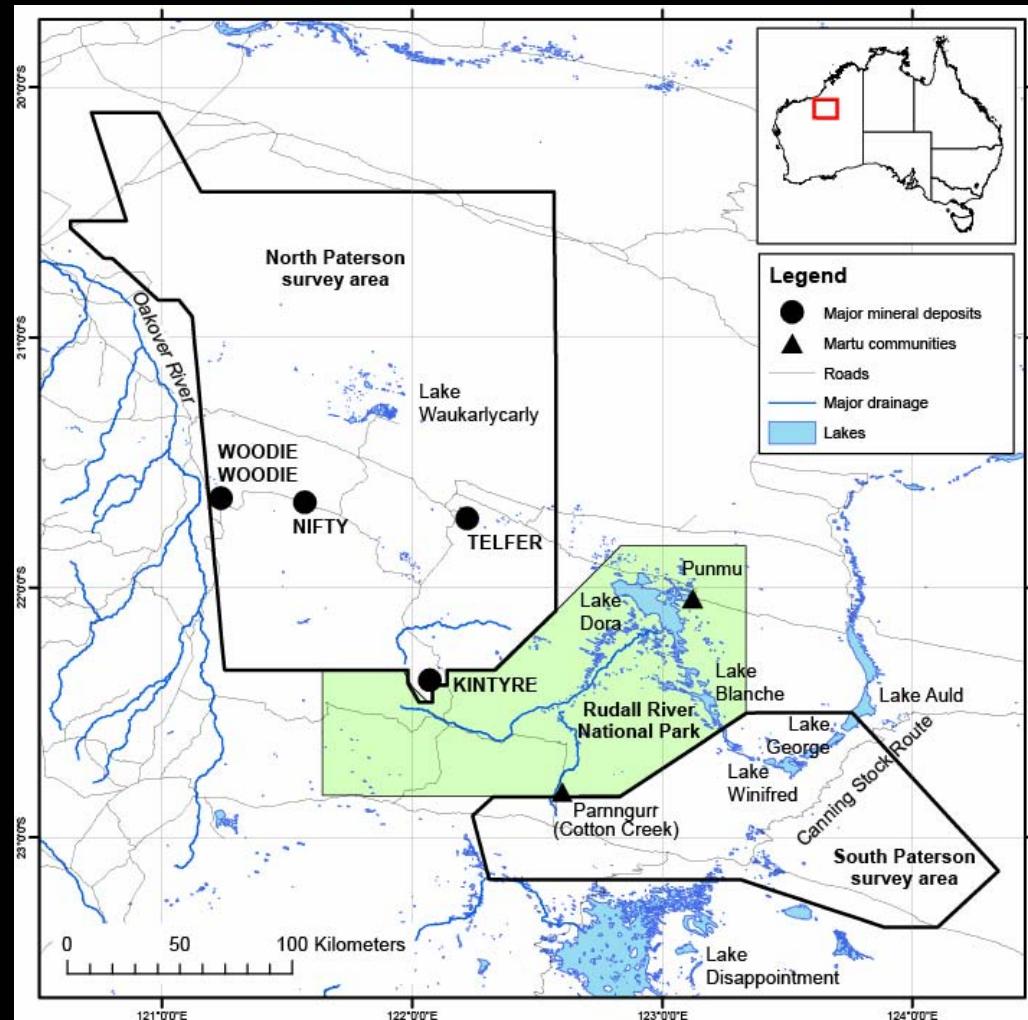
Nick Williams and Alan Whitaker

*On behalf of:*

Ross Brodie, Marina Costelloe, Mike Craig, David Hutchinson,  
Songfa Liu, Ian Roach, Camilla Sorensen

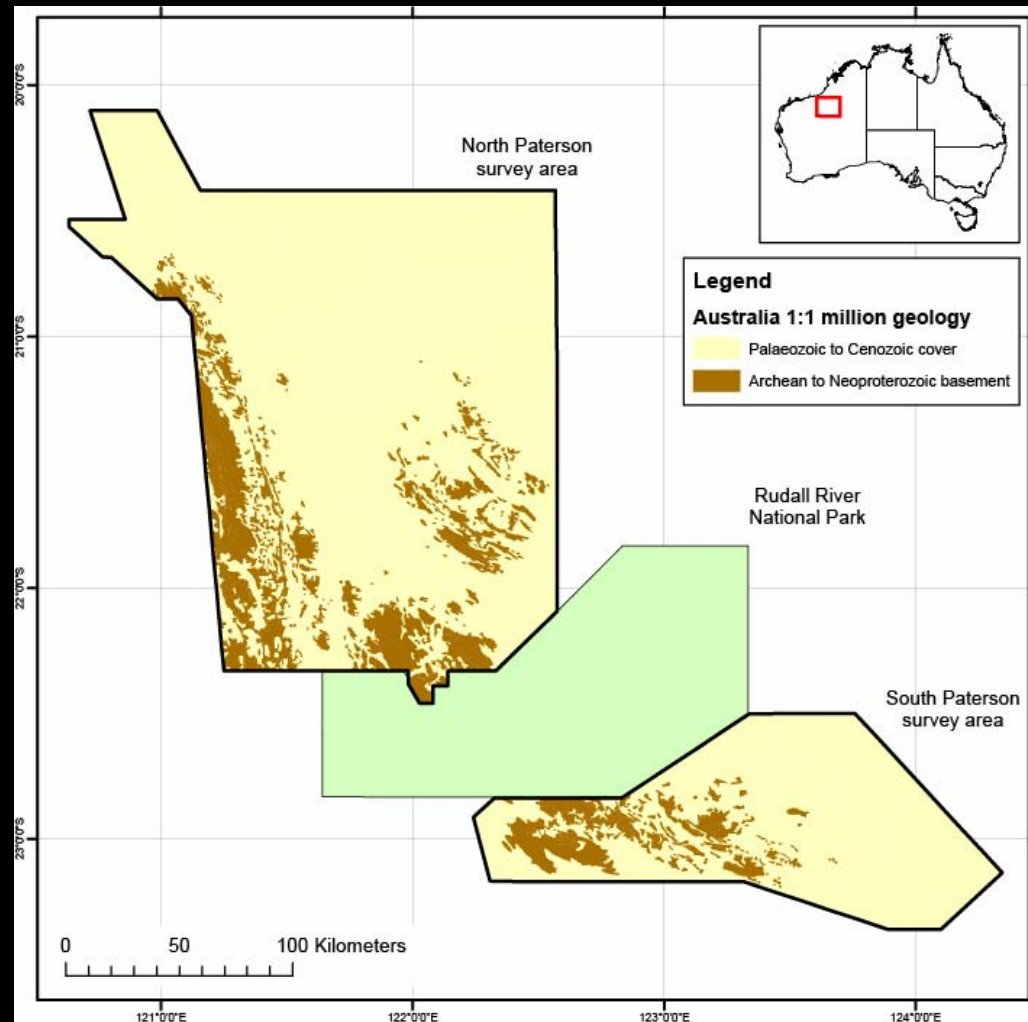
# Paterson AEM survey

- Enhance uranium exploration success in a frontier area
- 28,200 line km over 47,600 km<sup>2</sup>
- Fugro Airborne TEMPEST system
- Line spacing
  - 1, 2 & 6 km
  - 200 m

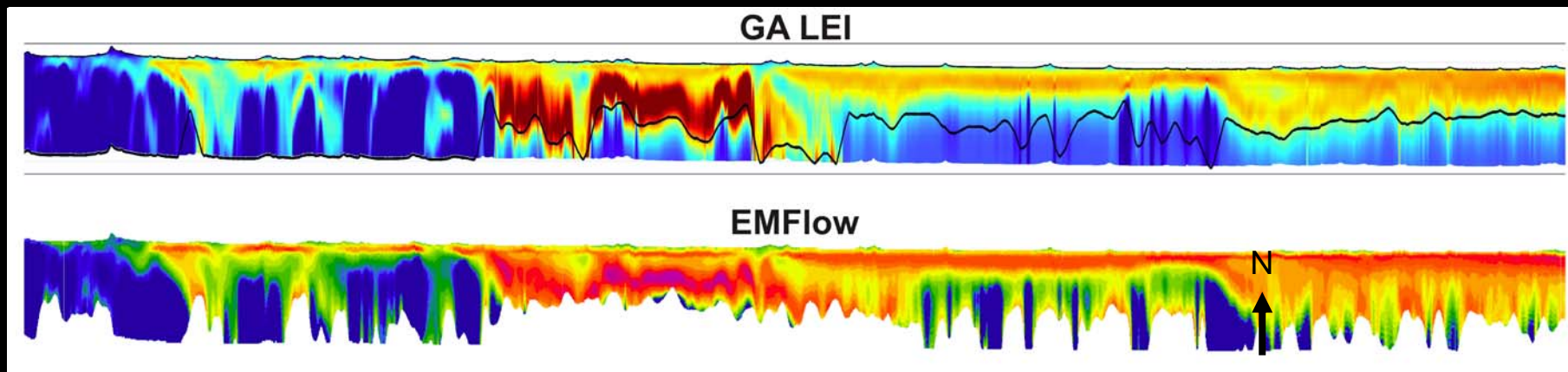
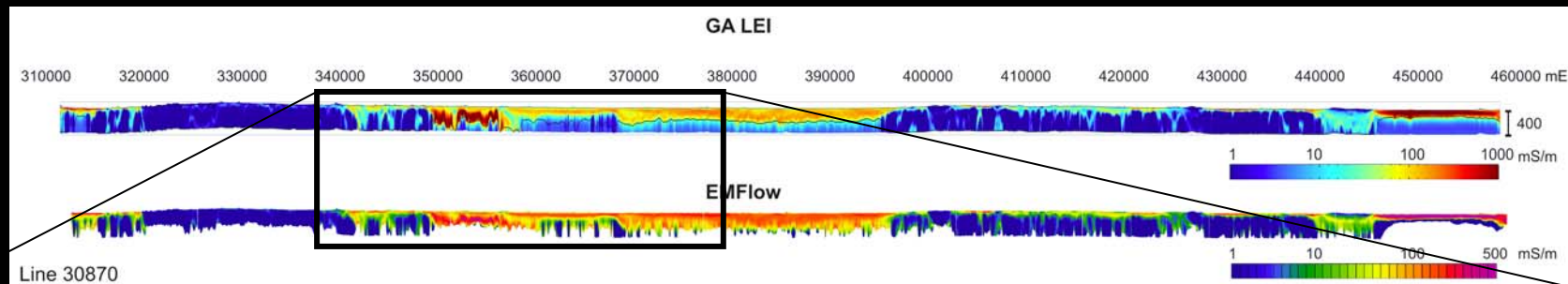


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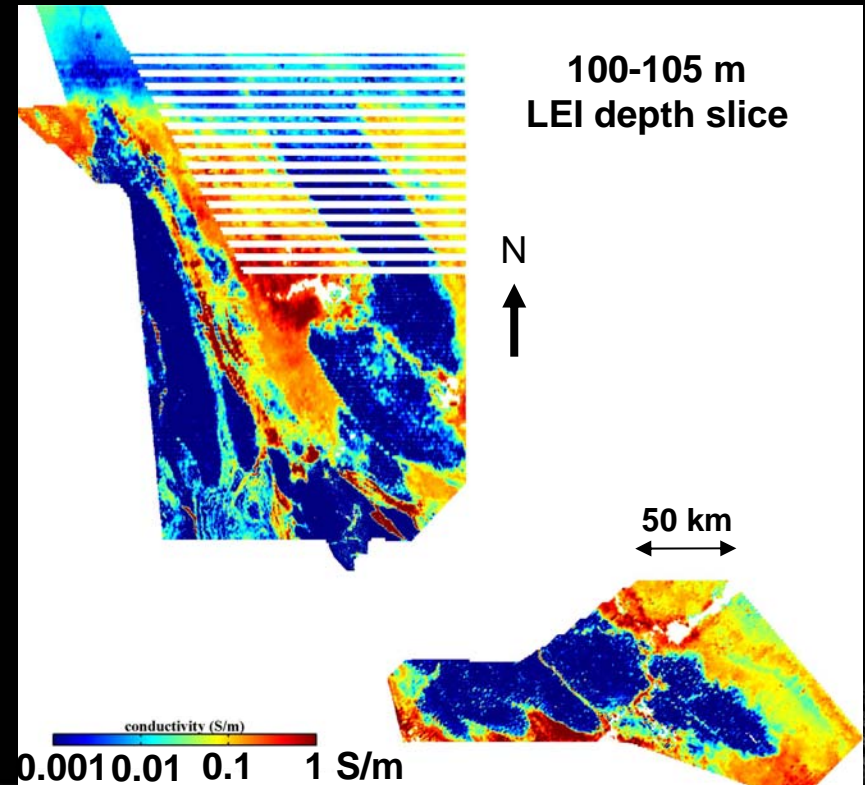
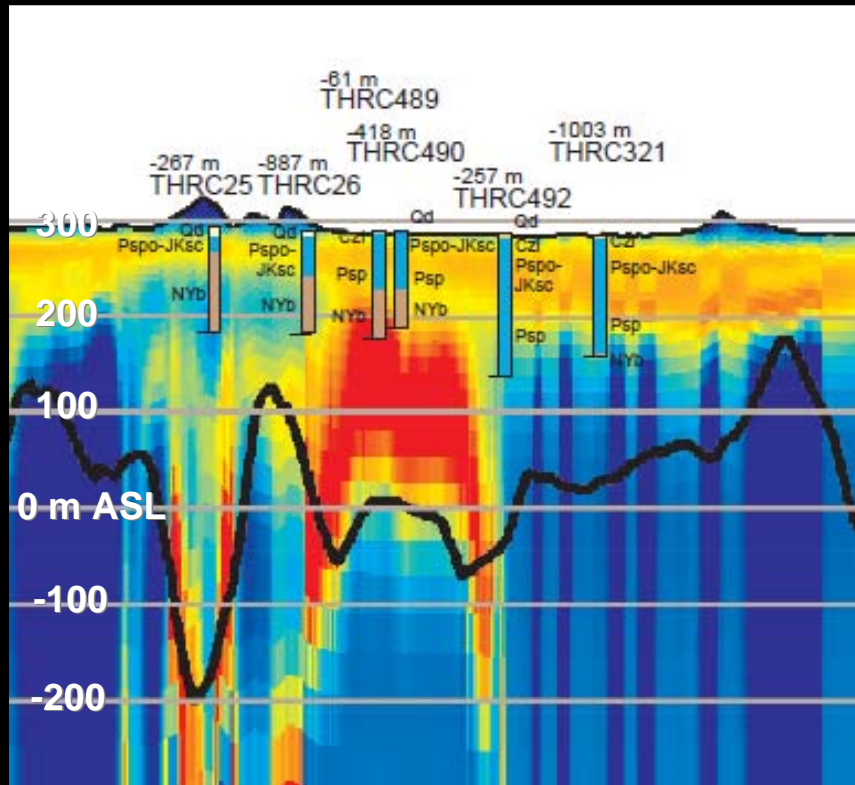
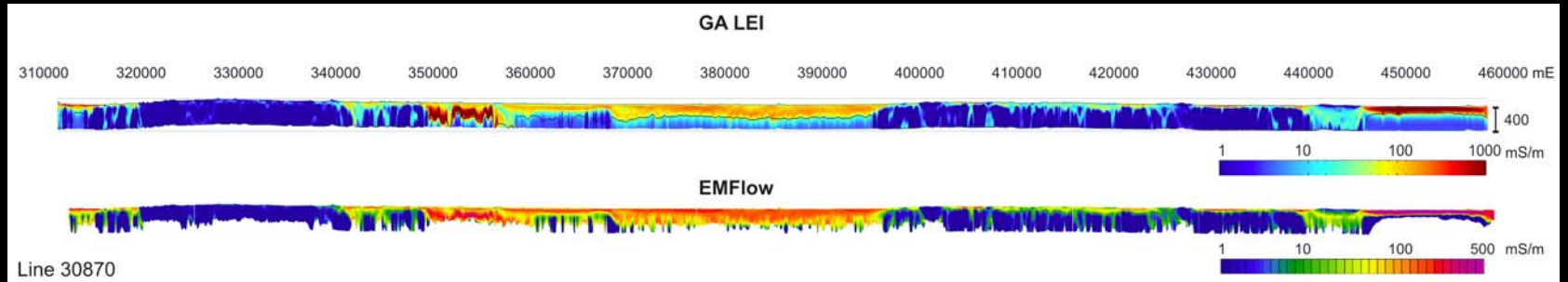


# Goal: Enhanced EM products





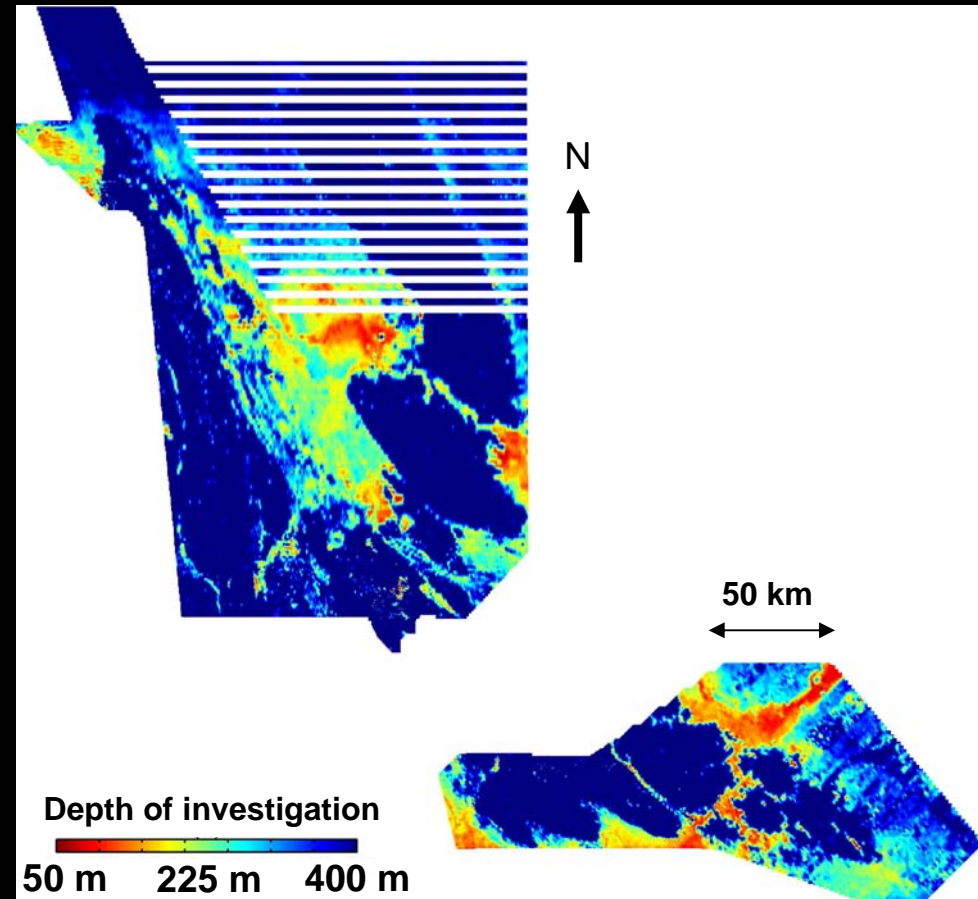
# Goal: Enhanced EM products



# Goal: Improve exploration effectiveness

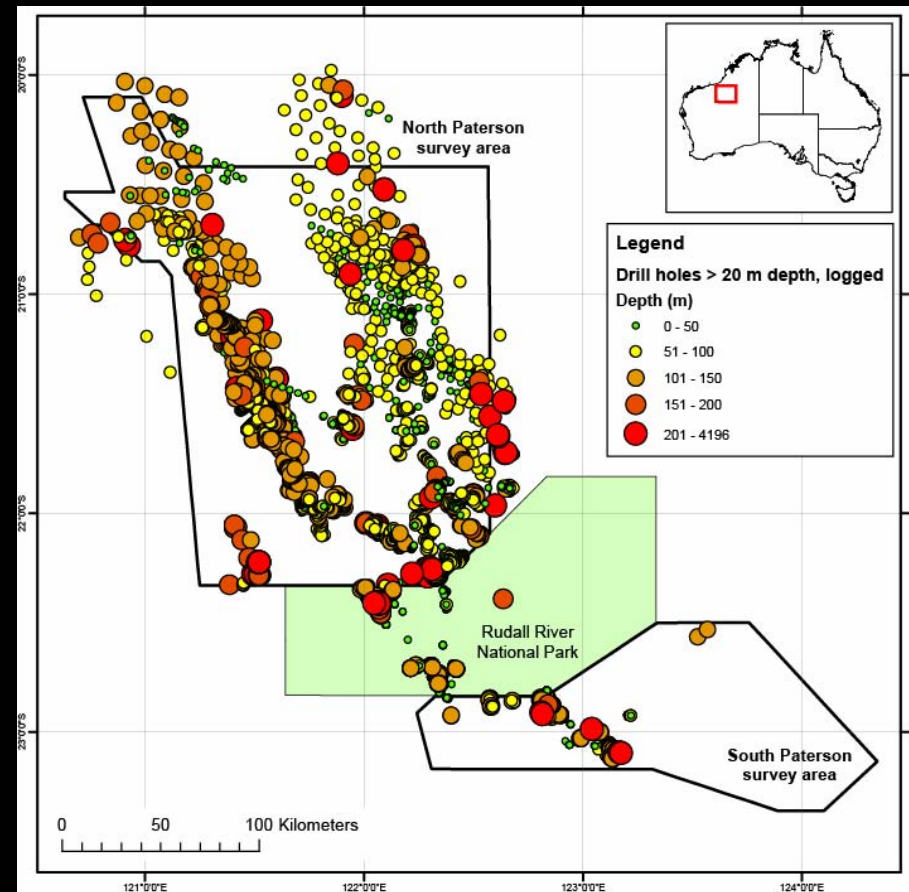
- **AEM Go Map**

- Simple tool to map depth of investigation of AEM surveys
- Regional scale
- Explorers can be sure their investment in future high resolution AEM surveys will be effective



# Goal: Improve exploration effectiveness

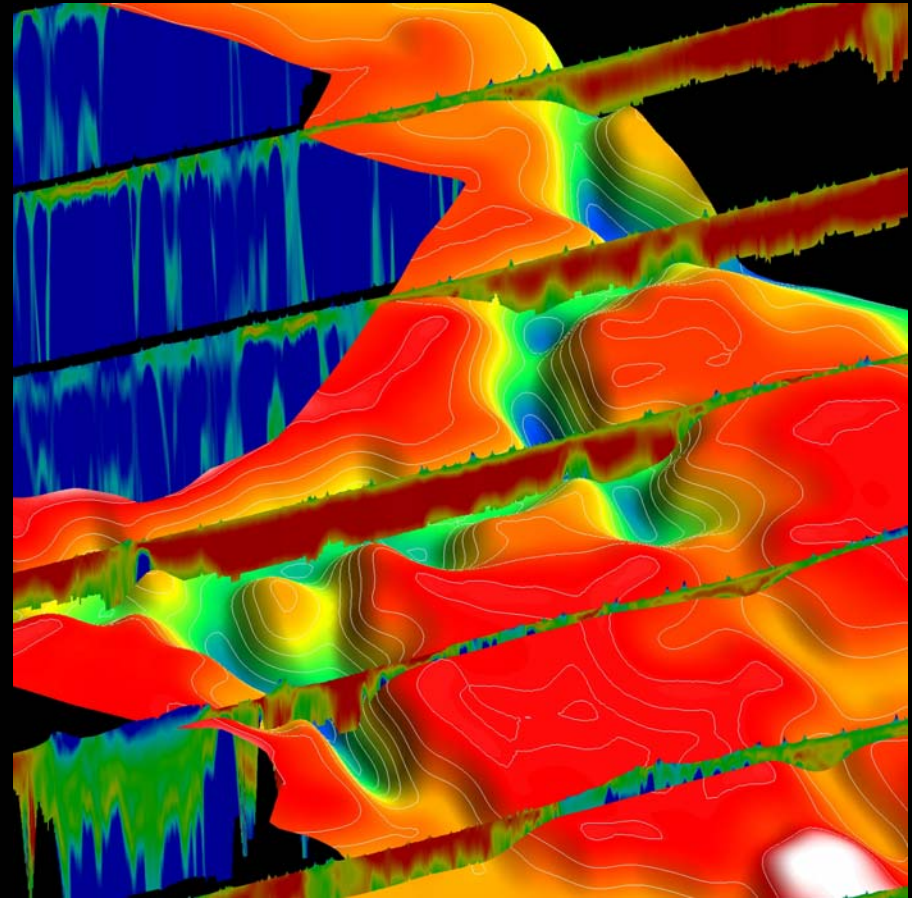
- **Drill hole database**
  - Compilation of digital data for >4,300 historical drill holes
    - Collars & surveys
    - Geology logs
  - GA Record 2009/31 online





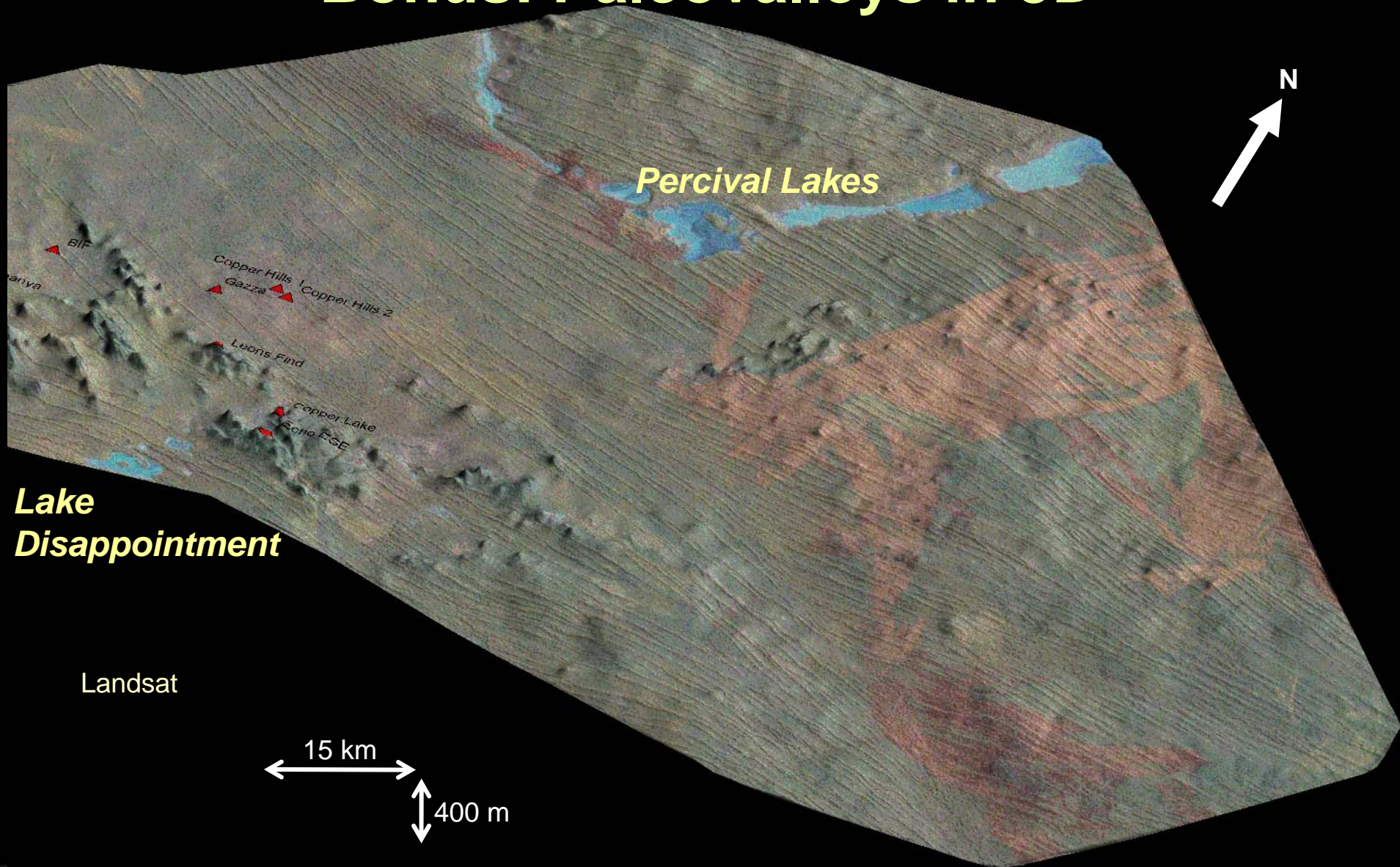
# Goal: Map paleovalleys

- **Sub-Permian paleovalley surface**
  - Mapped in 3D throughout region
  - Uranium explorers might target permeable sandstone packages near reductants



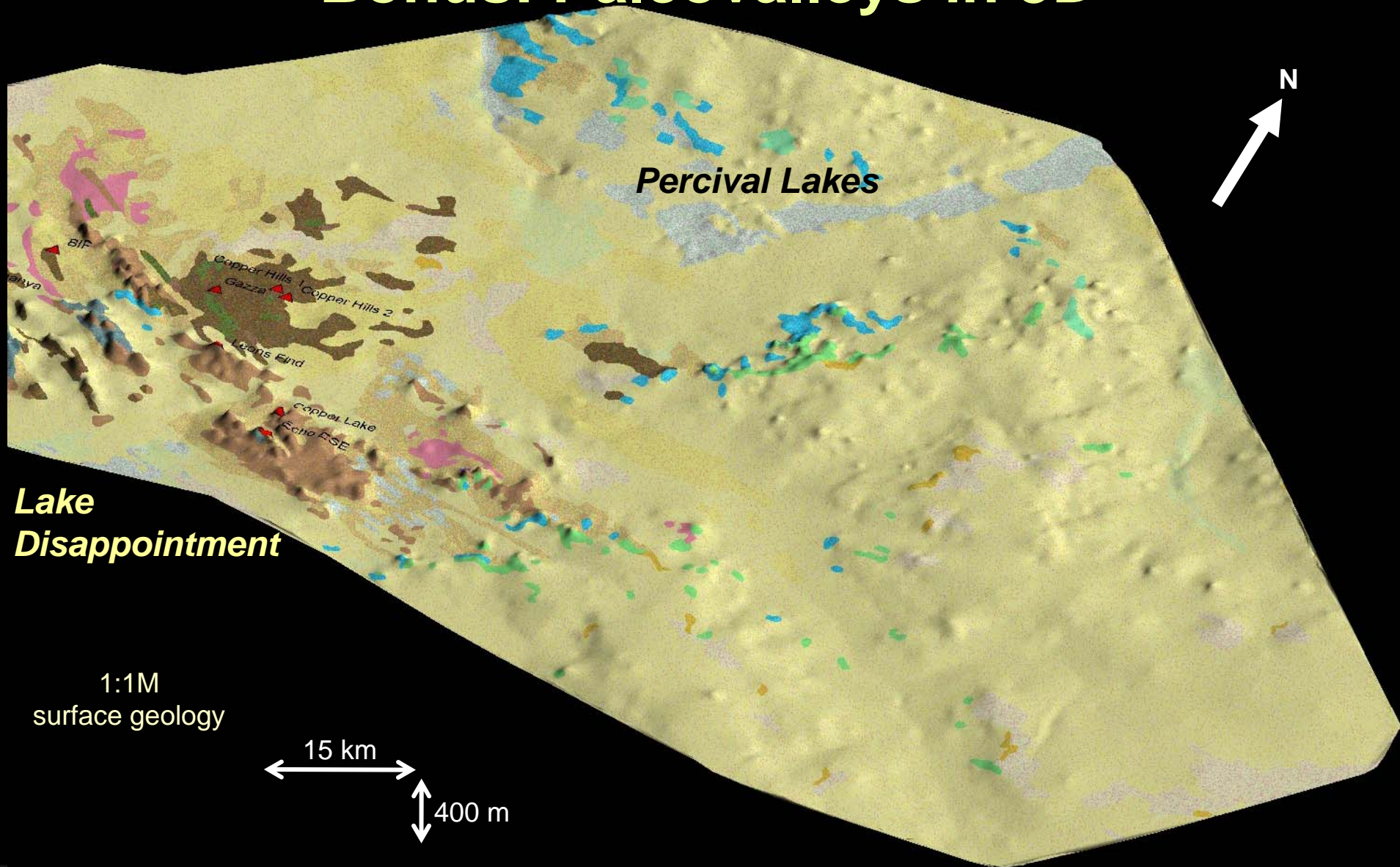


# Bonus: Paleovalleys in 3D



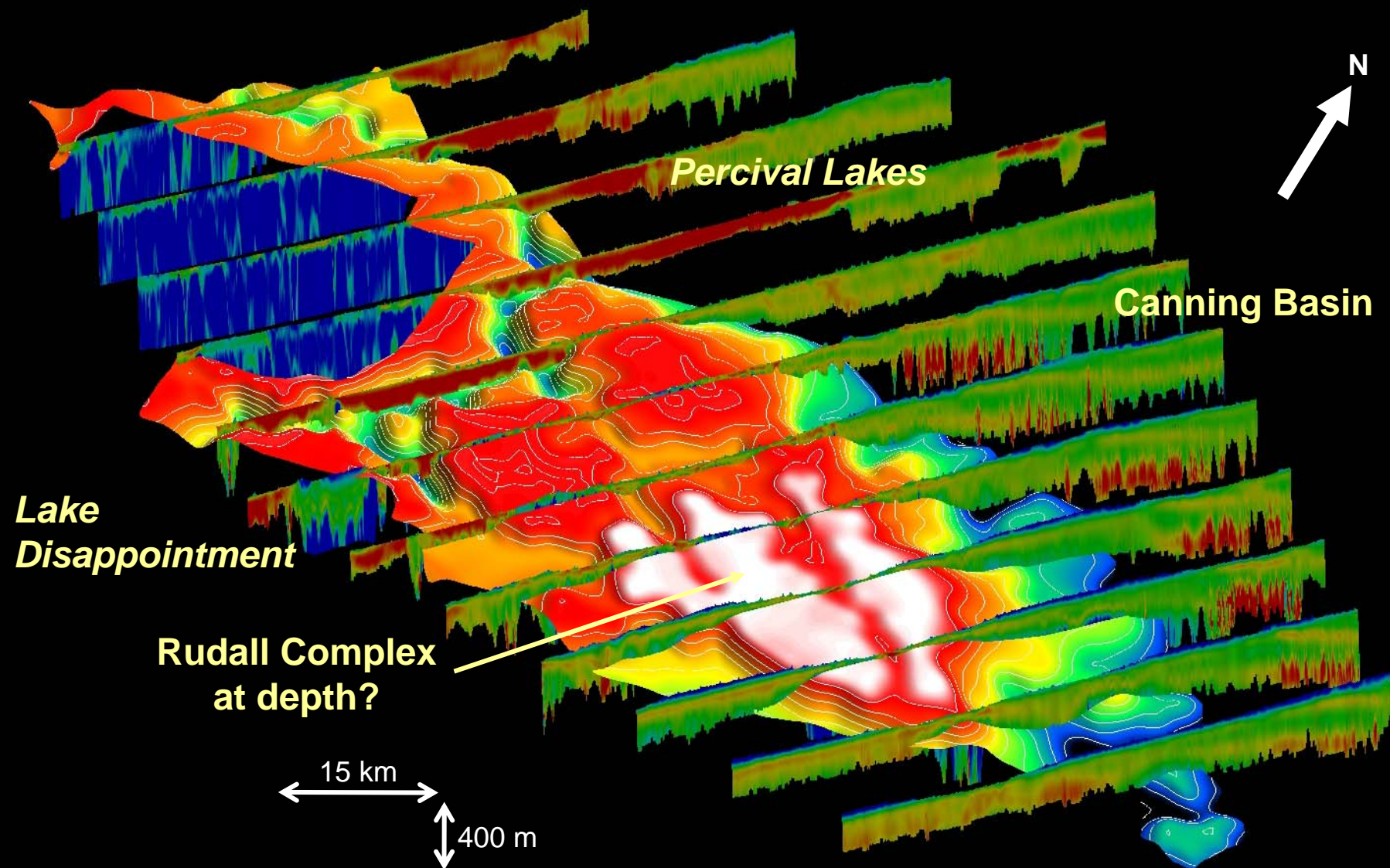


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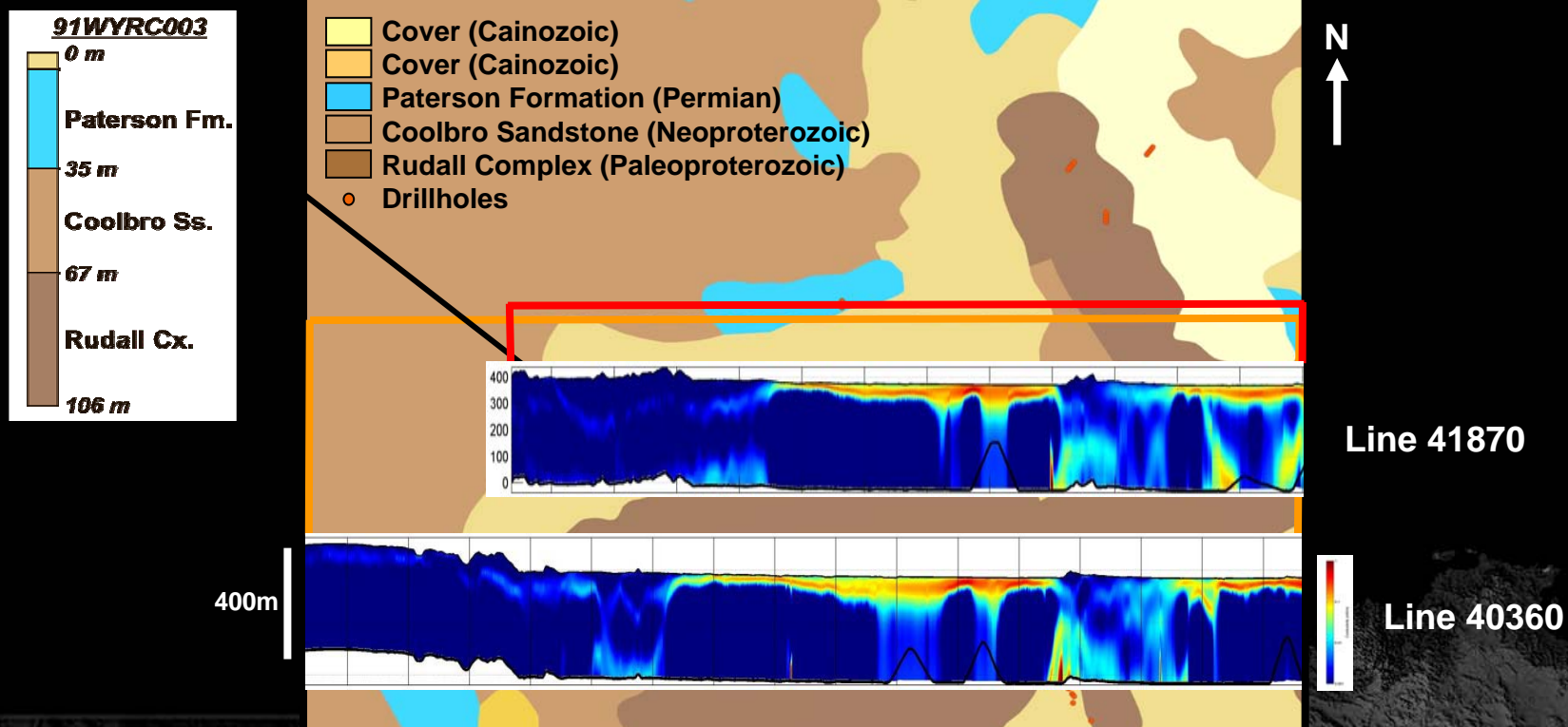
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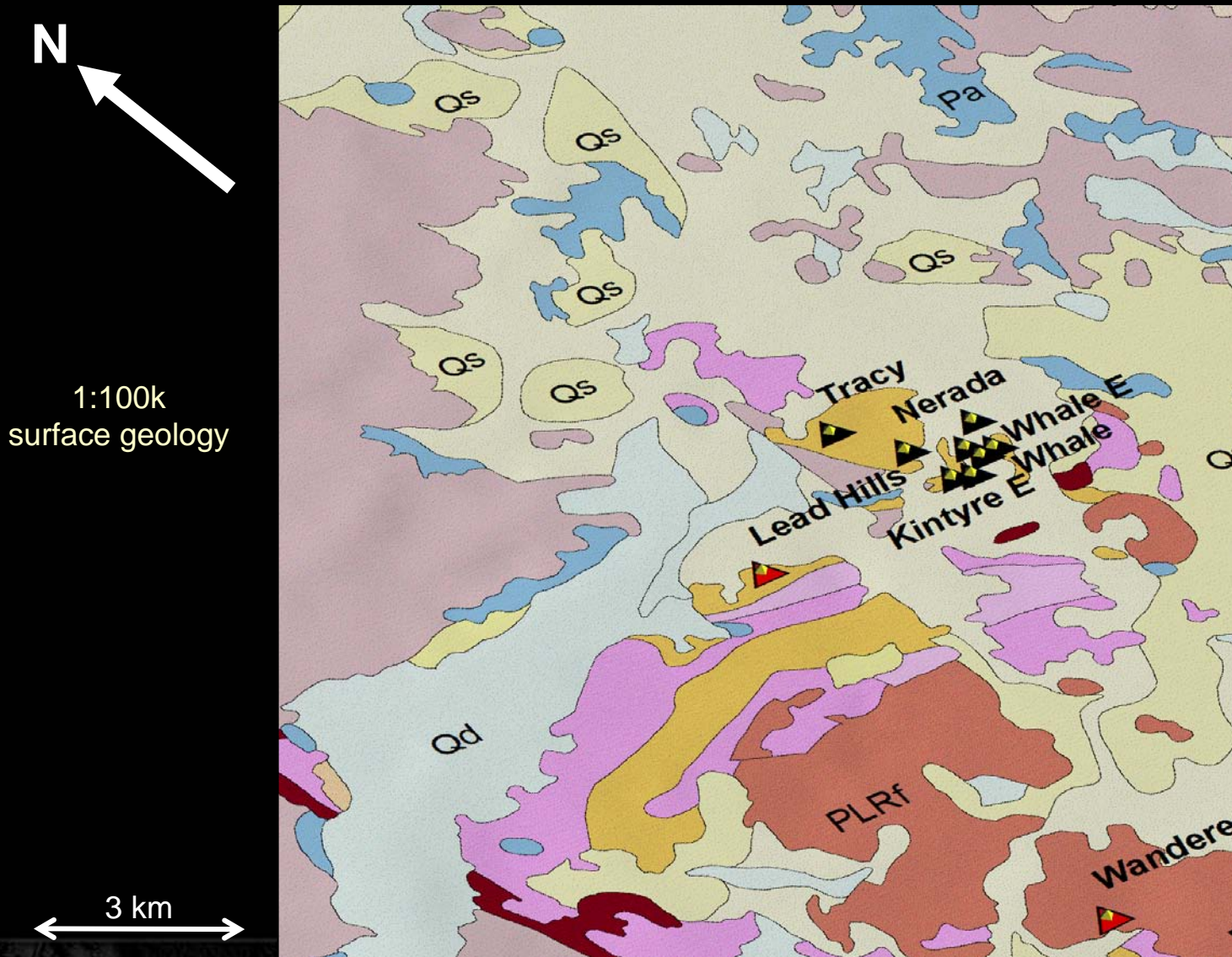


# Goal: Map prospective unconformities

- **Coolbro-Rudall unconformity**
  - Imaged clearly on multiple sections
  - Advantage to those explorers who can effectively target correct position relative to unconformity

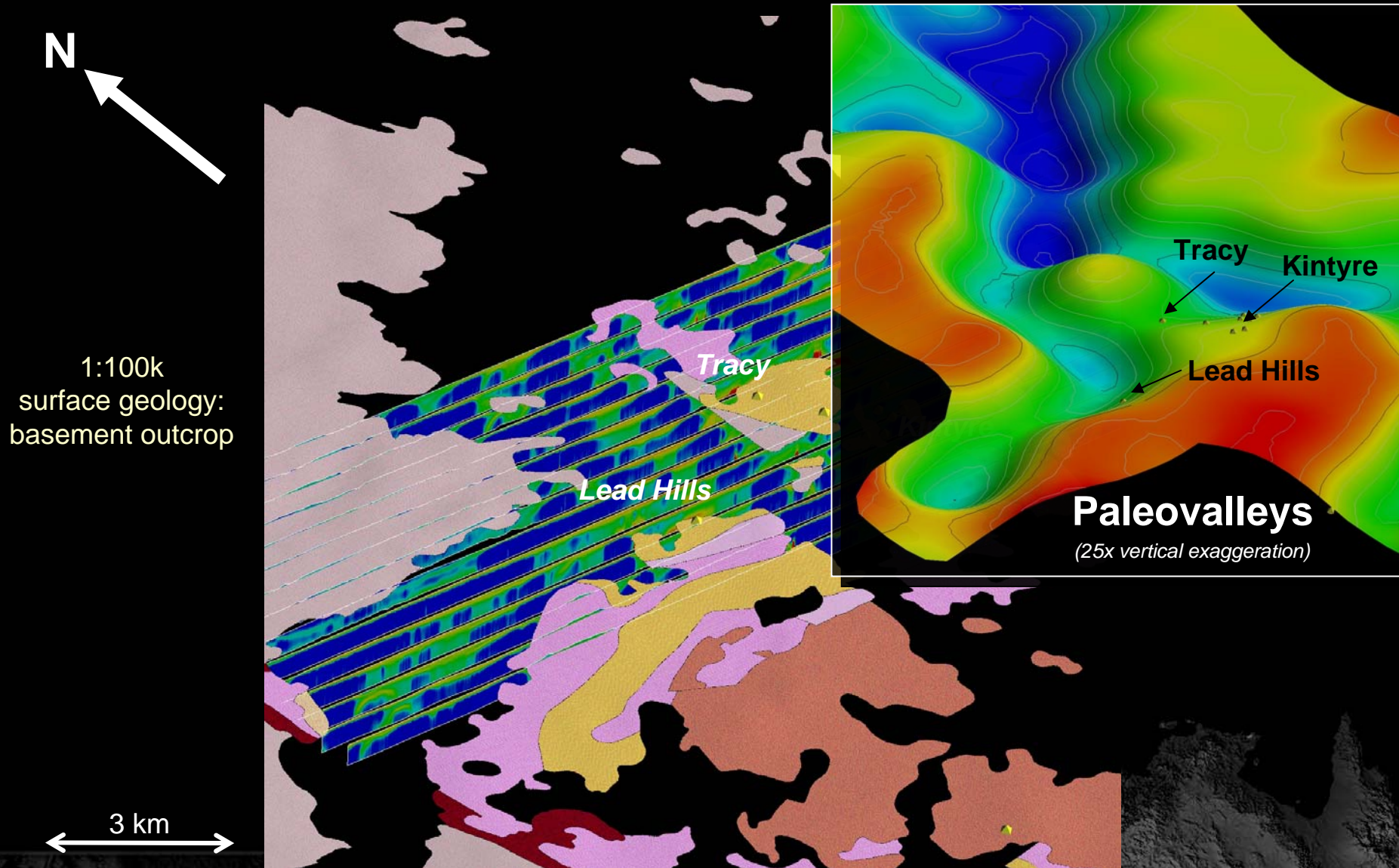


# Bonus: 3D interpretations around Kintyre



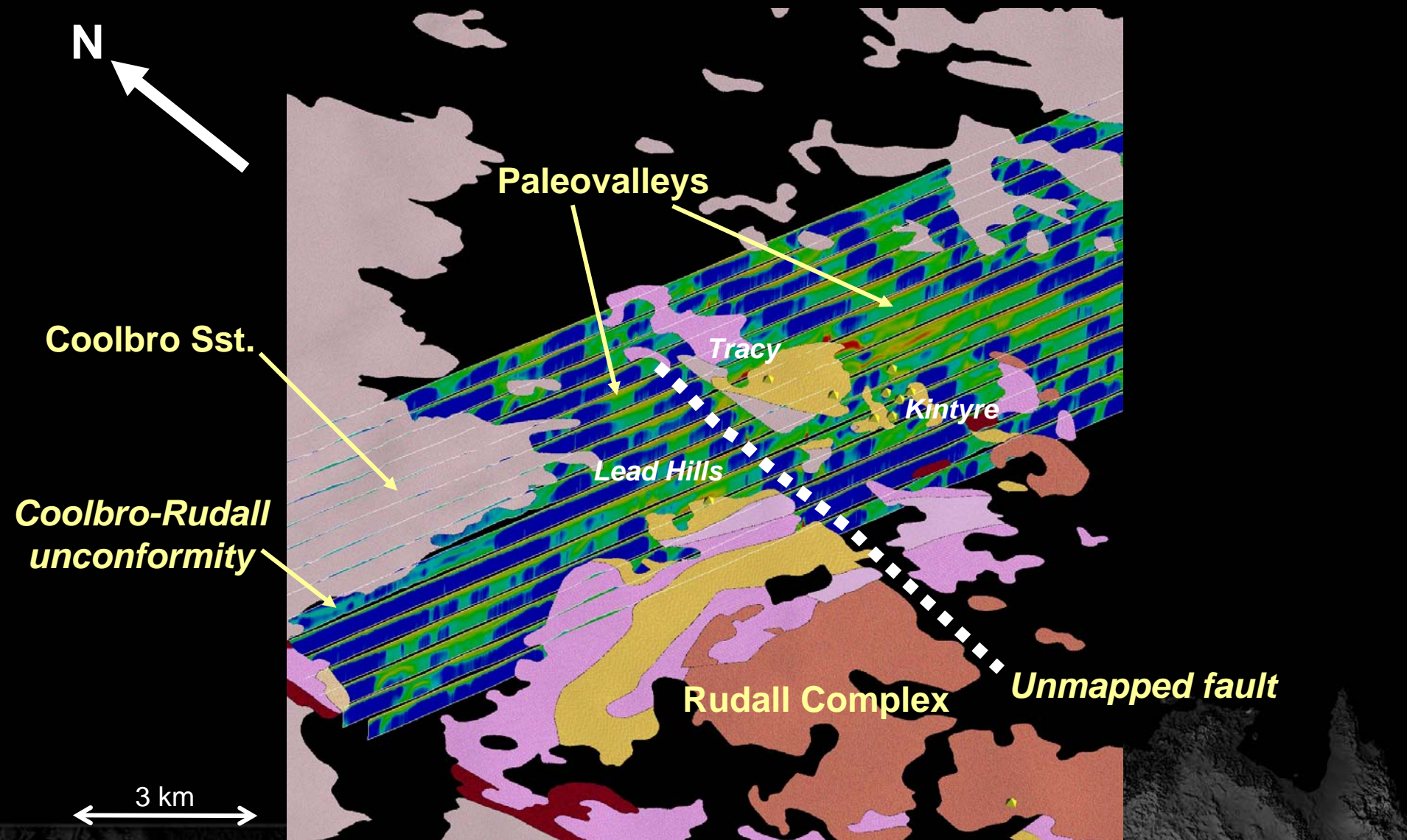


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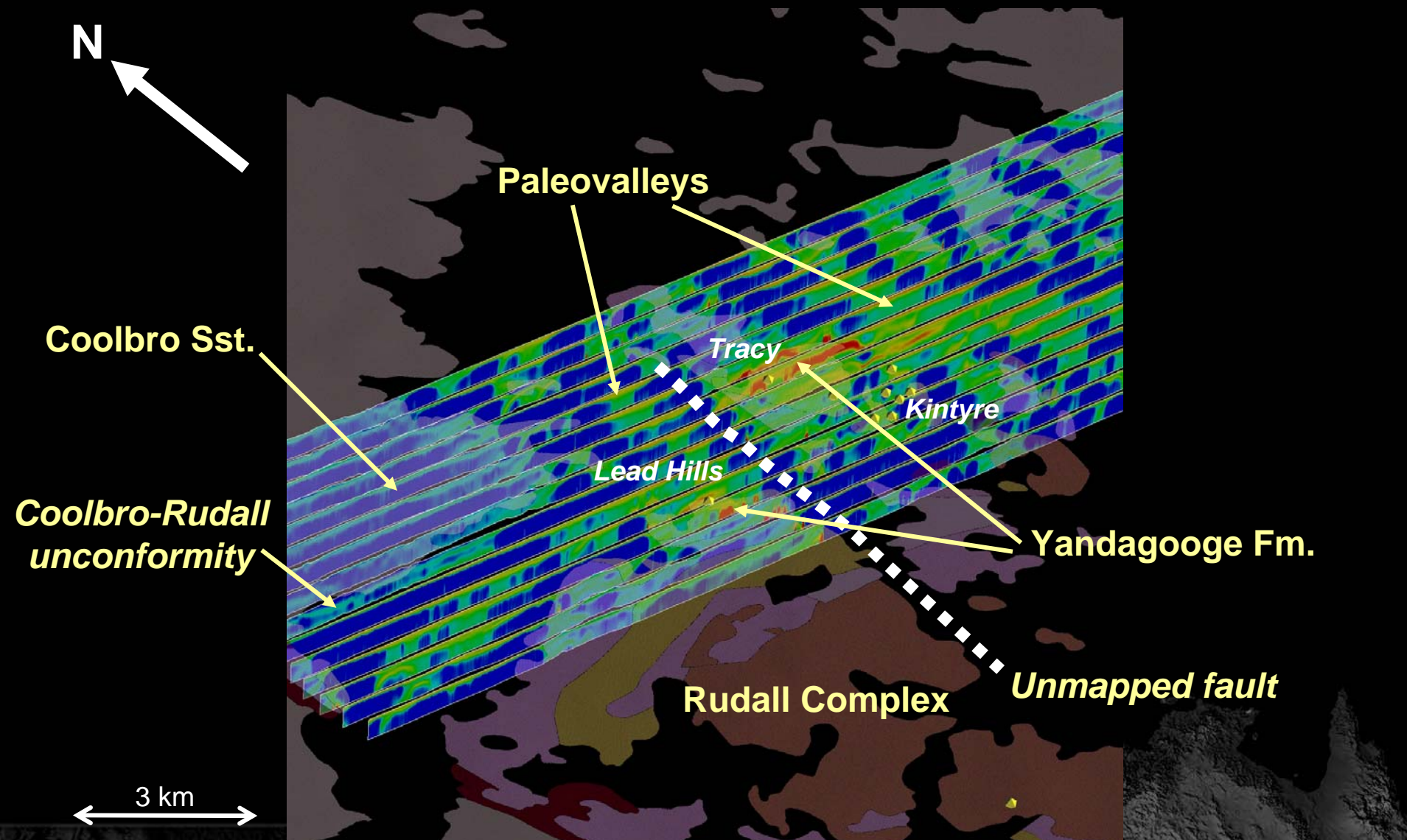




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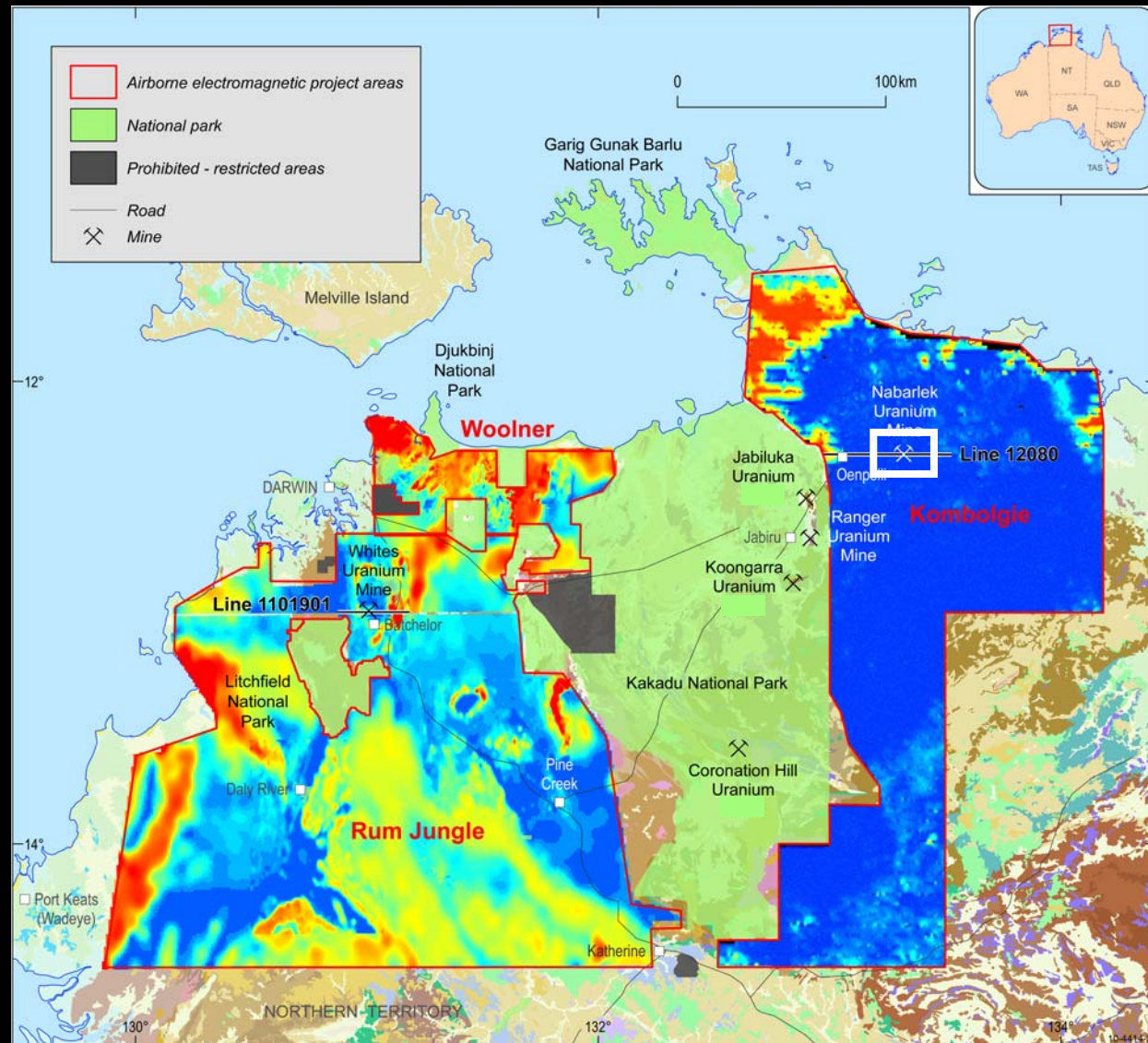
# Paterson products

- Contractor supplied data (Phase 1):
  - *EM Flow line data, multiplots, & grids*
  - GA data – North Paterson (released in 2009)
  - GA data – South Paterson (released in 2009)
  - ALL data (GA + infill) – **Released online today (<http://tiny.cc/aozjl>)**
- Geoscience Australia inversion products (Phase 2)
  - *Layered earth inversions, multiplots, grids & georeferenced images*
  - ALL data (GA + infill) – **Released online today (<http://tiny.cc/ror68>)**
- Geoscience Australia interpretation Records
  - *A drill hole database with explanatory notes for the Paterson TEMPEST AEM survey area (GA Record 2009/31)*
  - *Geological and energy implications of the Paterson Province airborne electromagnetic (AEM) survey (GA Record 2010/12: July 2010)*
- **2 articles in ASEG Preview (April 2010)**



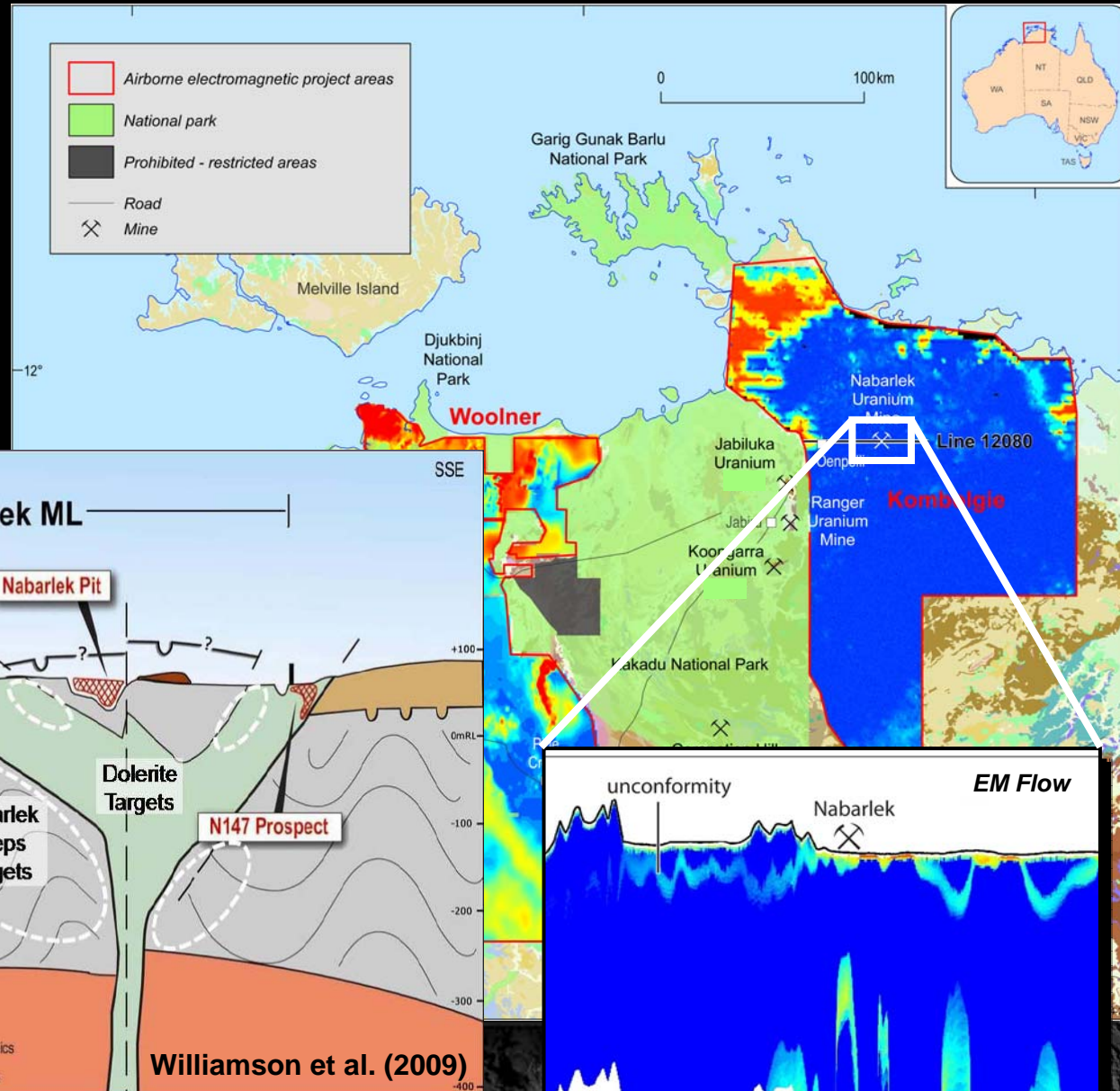
# Pine Creek AEM survey

- 30,000 line km over 75,000 km<sup>2</sup>
- TEMPEST and VTEM data
- Line spacing – 200-5000 m
- Data now available online
- Inversions in July 2010
- Interpretations in March 2011



# Pine Creek AEM survey

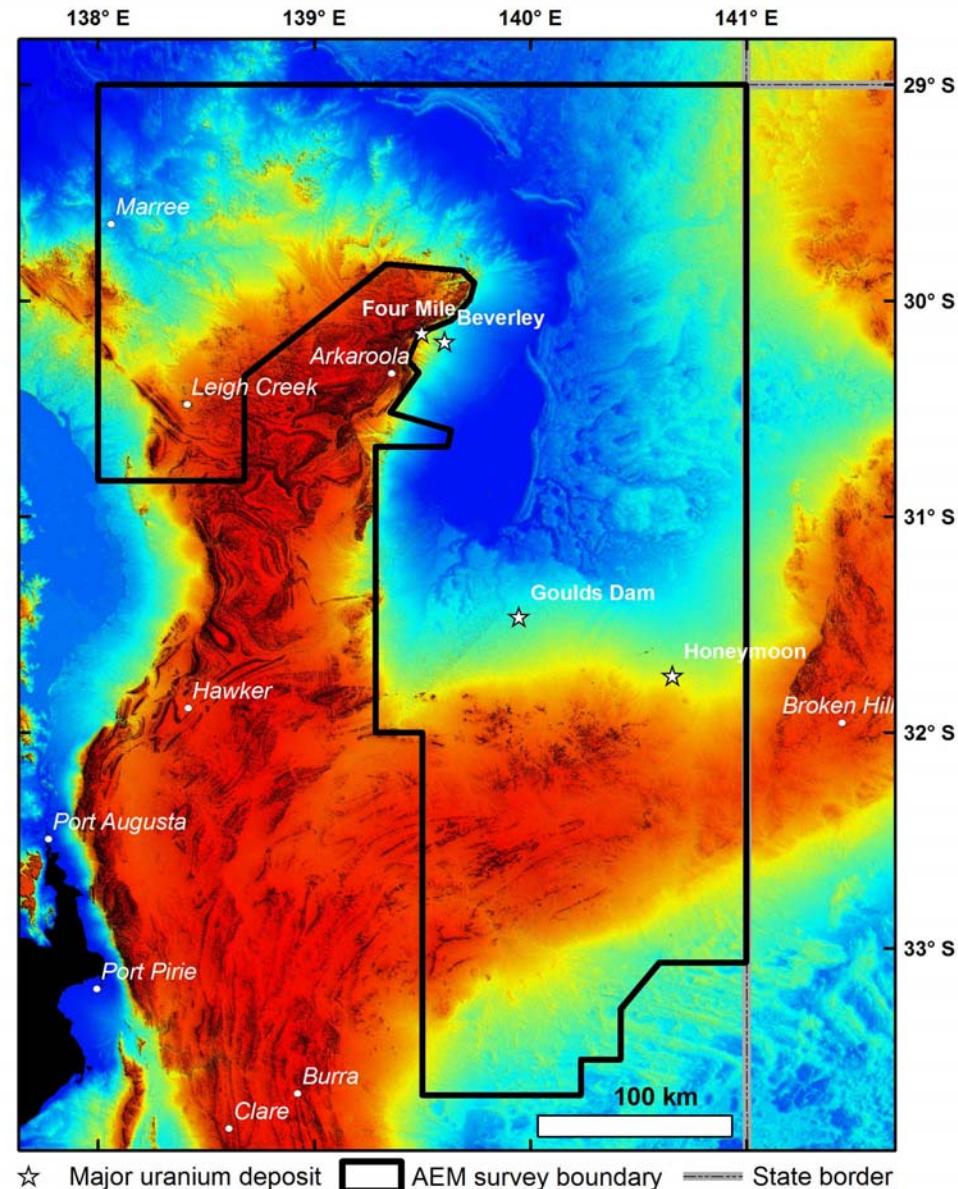
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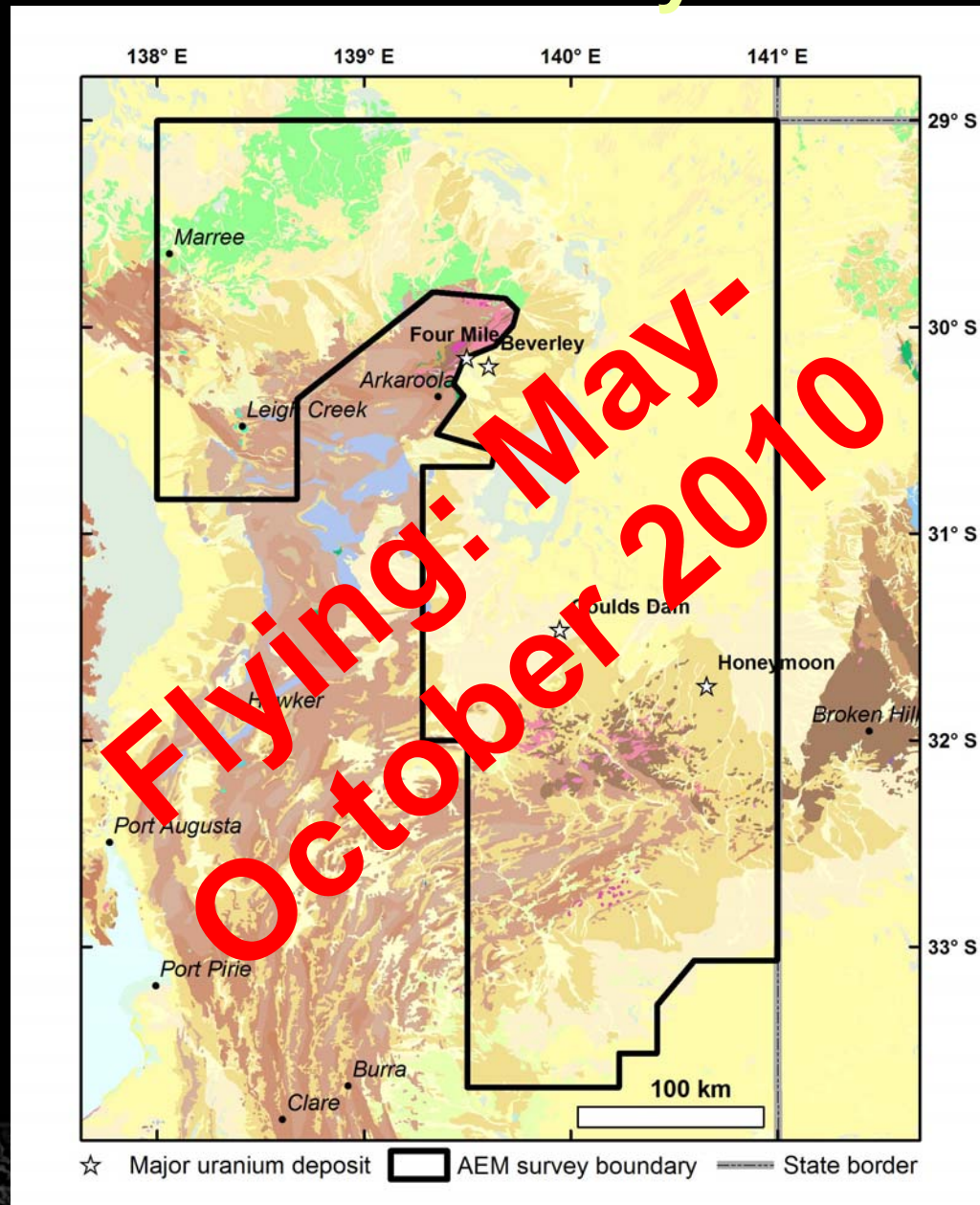
# Frome Embayment AEM survey

- 95,000 km<sup>2</sup> airborne EM survey to enhance uranium and mineral exploration
- >32,000 line km
  - 86 % GA
  - 11 % PIRSA
  - 3 % industry
- Lines spaced at 2.5 or 5 km
- Key regional-scale targets:
  - Paleochannel U hosts
    - Namba Fm into Eyre Fm
    - Eyre Fm into craton
    - Eyre Fm into Bulldog Shale
  - Depth to Benagerie Ridge
  - Faults



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# Acknowledgements

- Geological Survey of Western Australia (especially Paul Morris & Ian Tyler)
  - For hosting this workshop
- Sarah James (Encounter Resources), Greg Street (Fugro Airborne), Tyler Mathieson (Cameco)
  - For presenting their work
- Cameco, Mega Uranium, Rio Tinto, Scimitar/Cauldron Energy, Western Areas
  - Paterson infill partners
- Birla Nifty, Consolidated Minerals, Newcrest
  - Data and logistical support
- Martu people and Western Desert Lands Corporation
  - Land access