



Australian Government
Geoscience Australia



Government of South Australia
Primary Industries and Resources SA

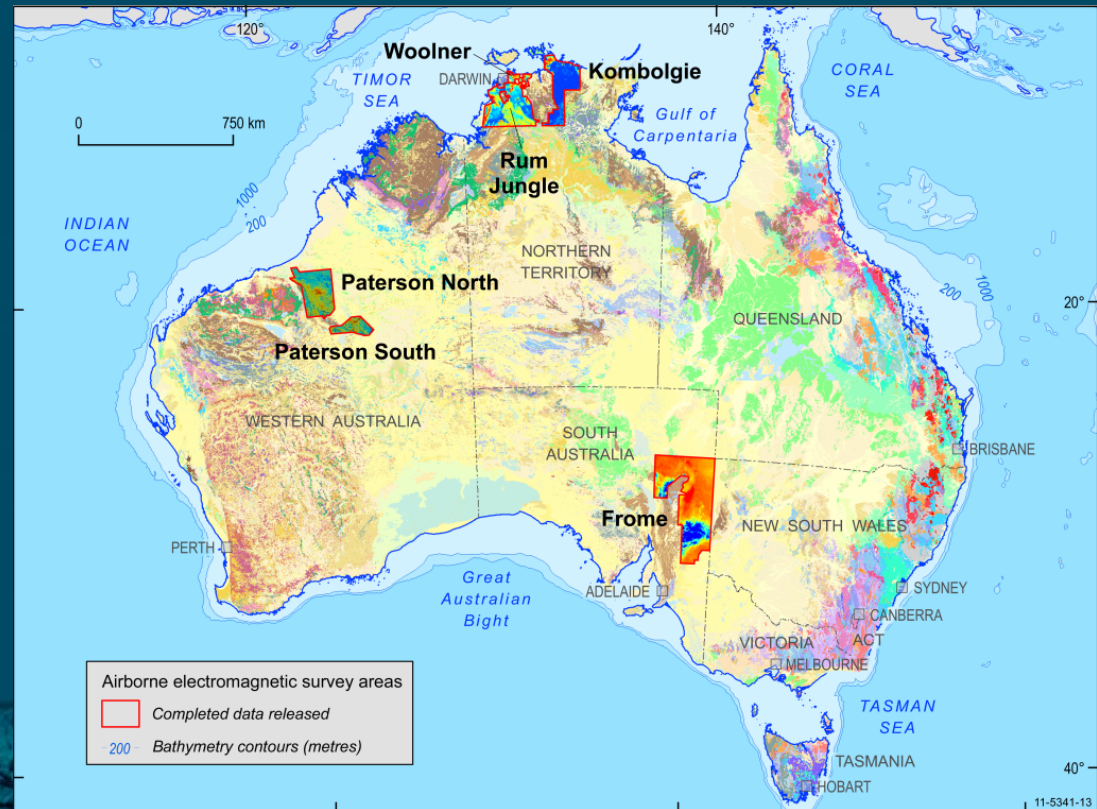
The Frome AEM survey

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Geoscience Australia

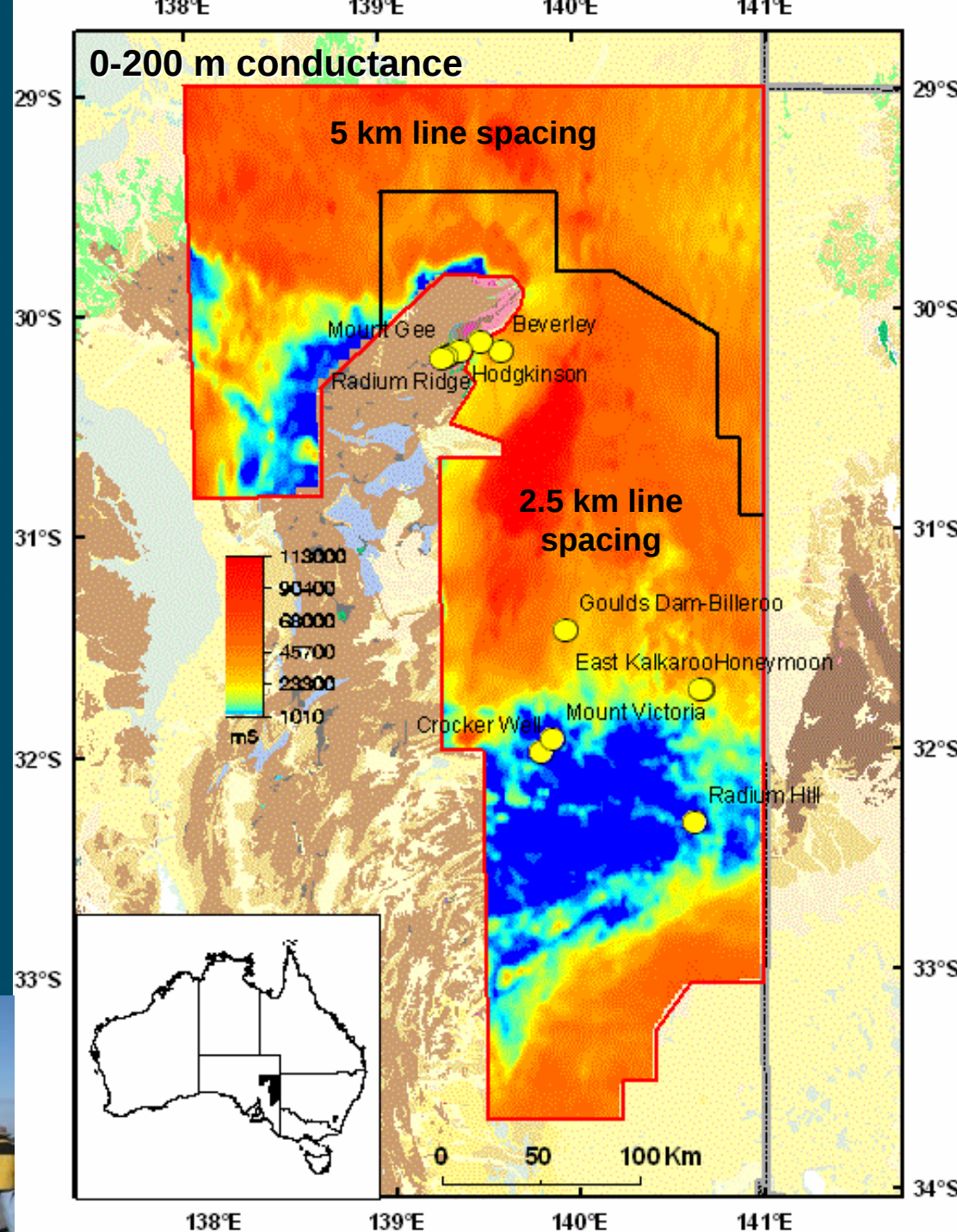
The Onshore Energy Security Program

- OESP - a 5-year Commonwealth-funded program supporting the search for onshore energy commodities
- 3 regional AEM surveys in U-endowed provinces:
 - Paterson 2007-08
 - Pine Creek 2008-09
 - **Frome 2010**



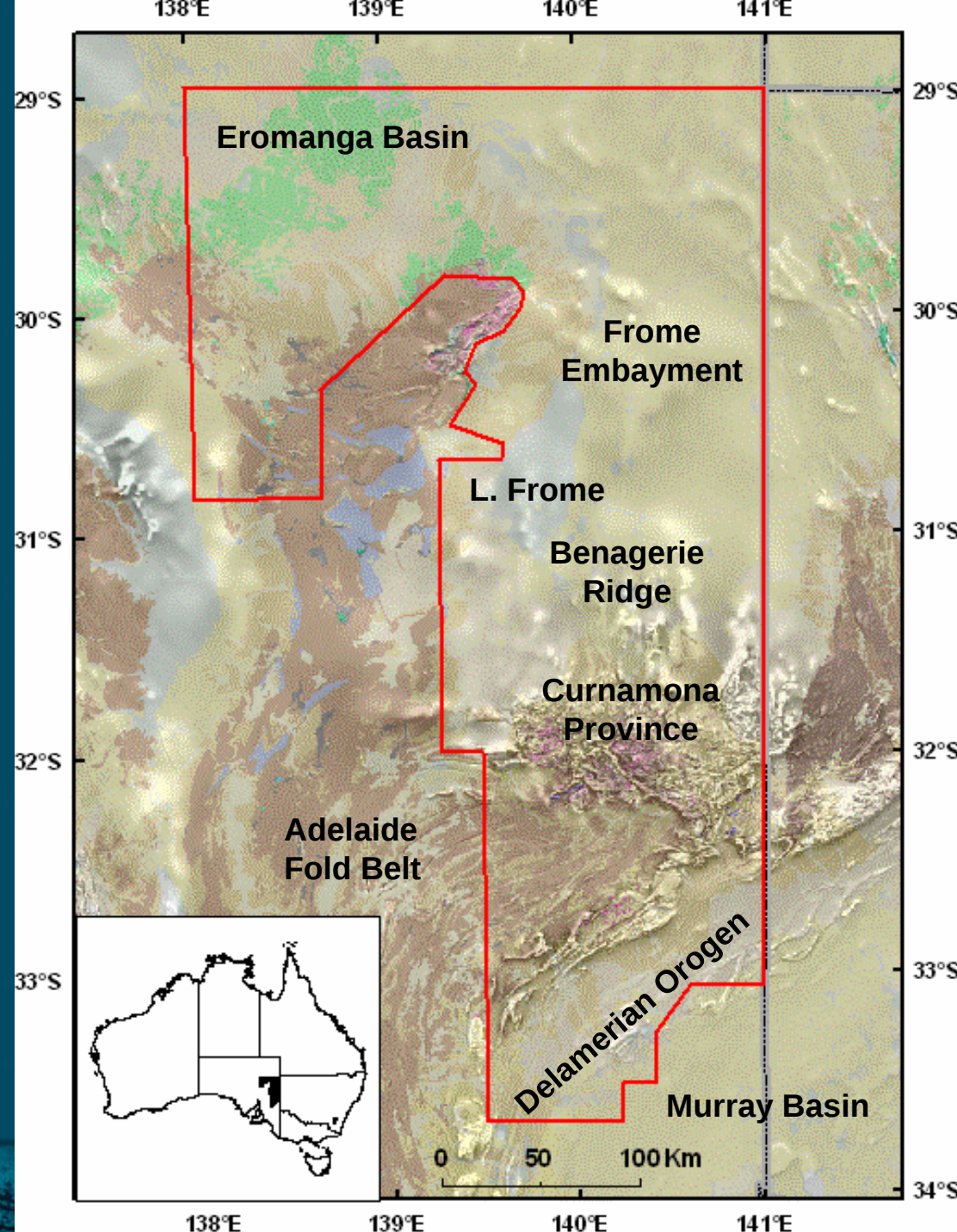
The Frome AEM survey

- Fugro TEMPEST™
- Flown 22 May-2 November 2010
- 95 450 km²
- 32 317 line km
- 2.5 km & 5 km line spacing
- Flown in conjunction with PIRSA's Carriewerloo Basin survey lines
- Largest survey of its type in Australia



Regional geology

- Survey targets:
 - Frome Embayment (Callabonna Sub-basin)
 - Benagerie Ridge
 - Curnamona Province
 - Delamerian Orogen
 - Adelaide Fold Belt
 - Murray Basin
 - Eromanga Basin
- All highly prospective



Frome AEM survey design

- To assist regional-scale exploration and mapping by providing pre-competitive data on:
 - Palaeochannel-hosted U systems
 - Regional faults acting as fluid pathways
 - Mesozoic & Cenozoic stratigraphy
 - Major erosion surfaces
 - Depth and extent of the Benagerie Ridge and the Delamerian Orogen
 - Conductors associated with massive sulfides (Cu-Au, Pb-Zn-Ag) in Proterozoic-Paleozoic rocks
 - Cover thickness over Proterozoic-Paleozoic rocks

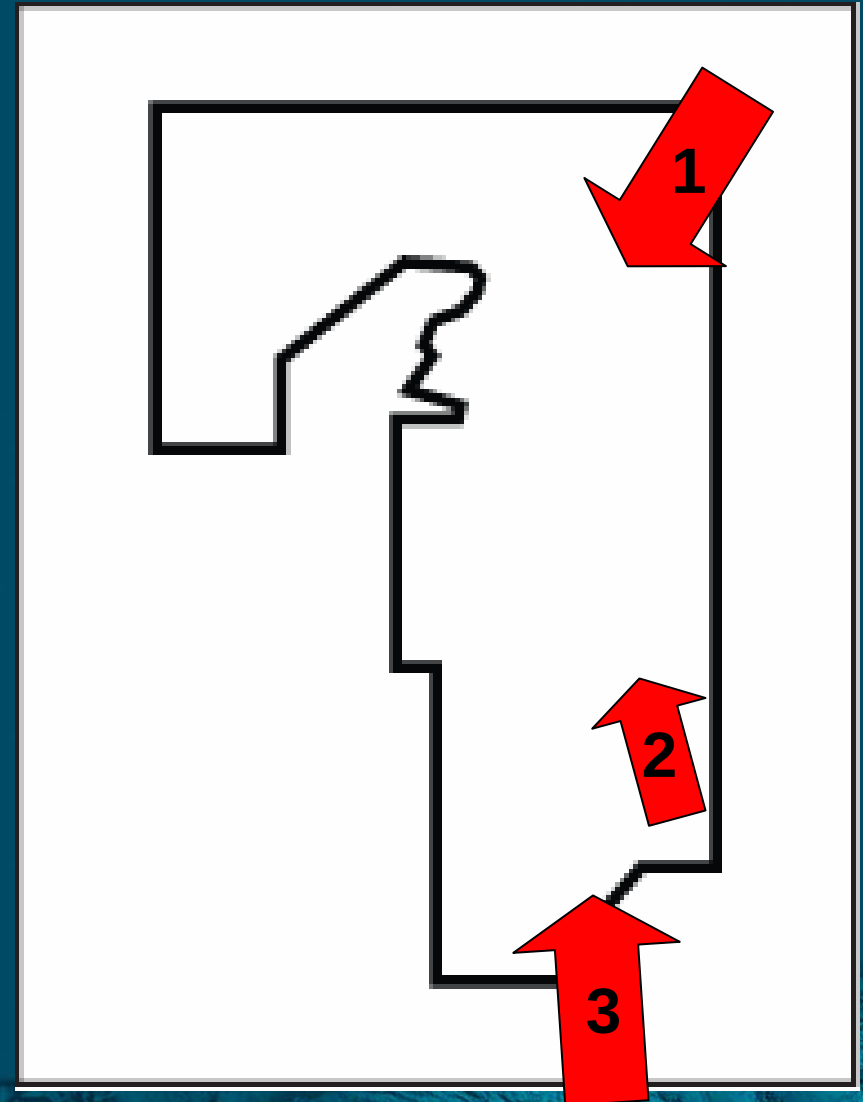
Frome AEM survey results

- Flying height of 100 m (usually 120 m)
- Excellent signal-to-noise ratio for the entire survey
- Excellent data showing a variety of target geological features



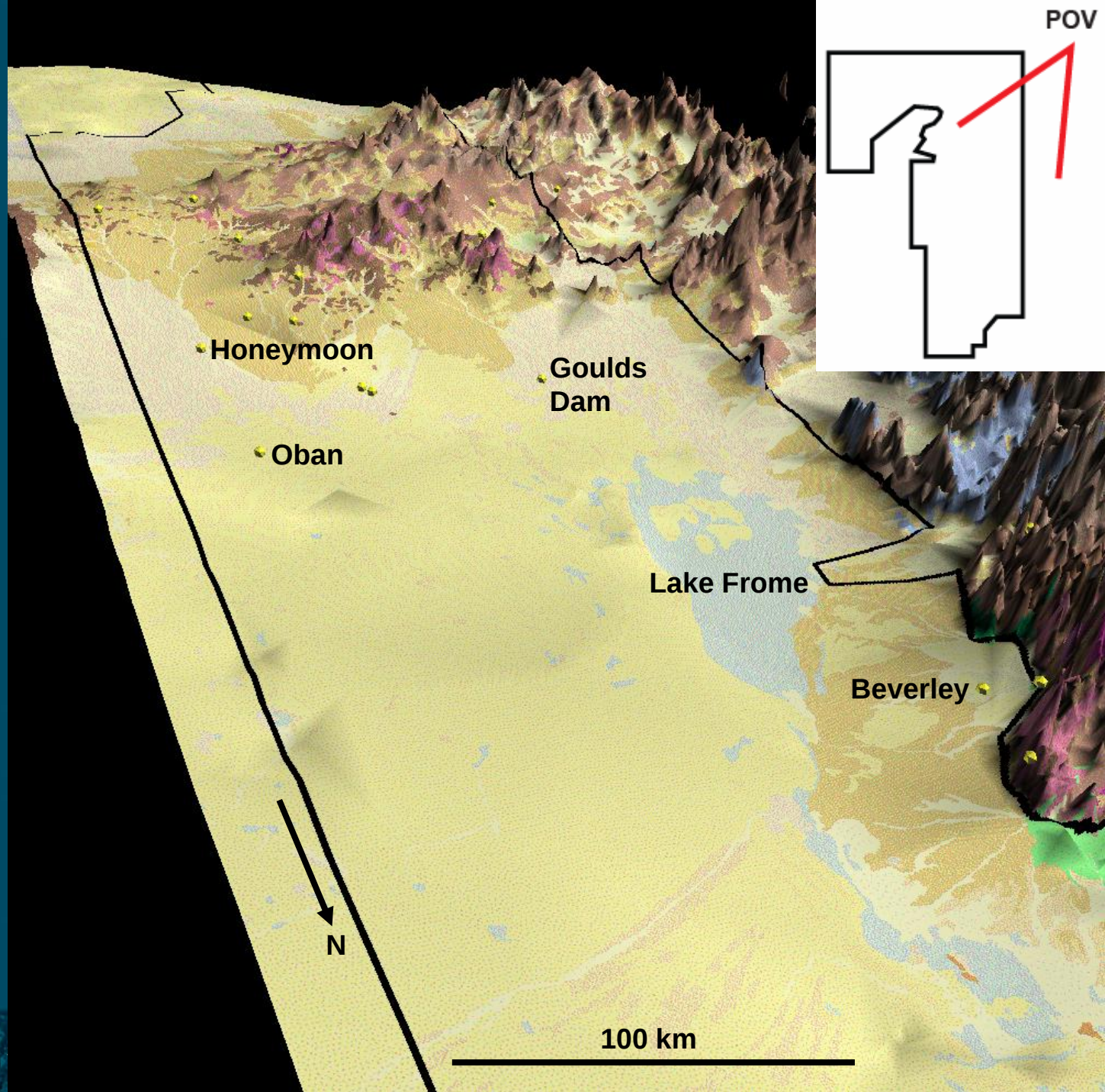
Preliminary interpretations

- The following shows just a few highlights from the Frome AEM data
 1. Benagerie Ridge
 2. Yarramba Palaeovalley
 3. Delamerian Orogen



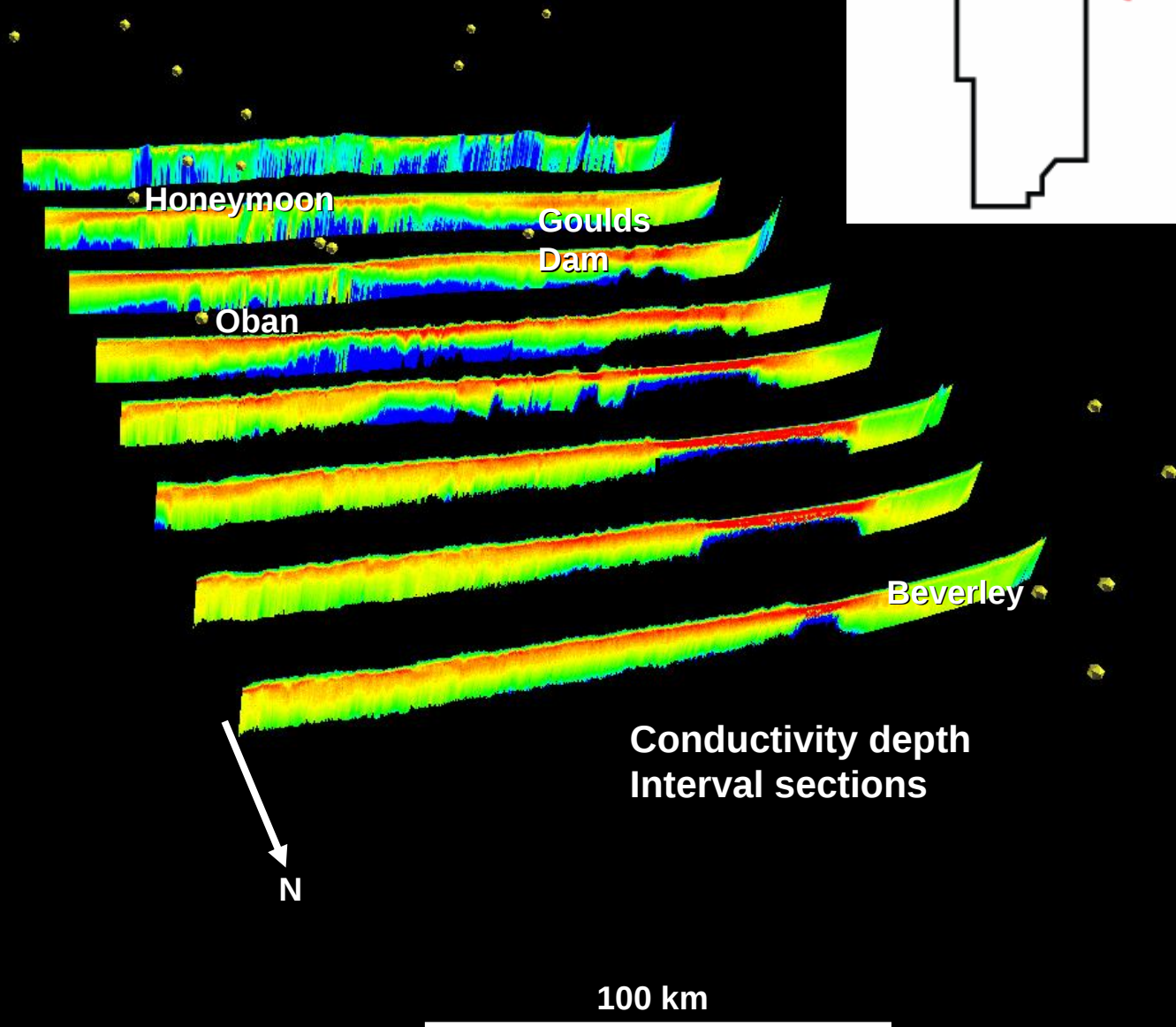
Benagerie Ridge

- Depth to resistive basement
GOCAD model
- Surface geology
draped over DEM
- Curnamona
Province rocks
under Mesozoic-
Cenozoic cover
- Highly
prospective:
Au-Cu-Pb-Zn-Ag
- Uranium in
Cenozoic cover
sequence
- Drill hole control
where available



Benagerie Ridge

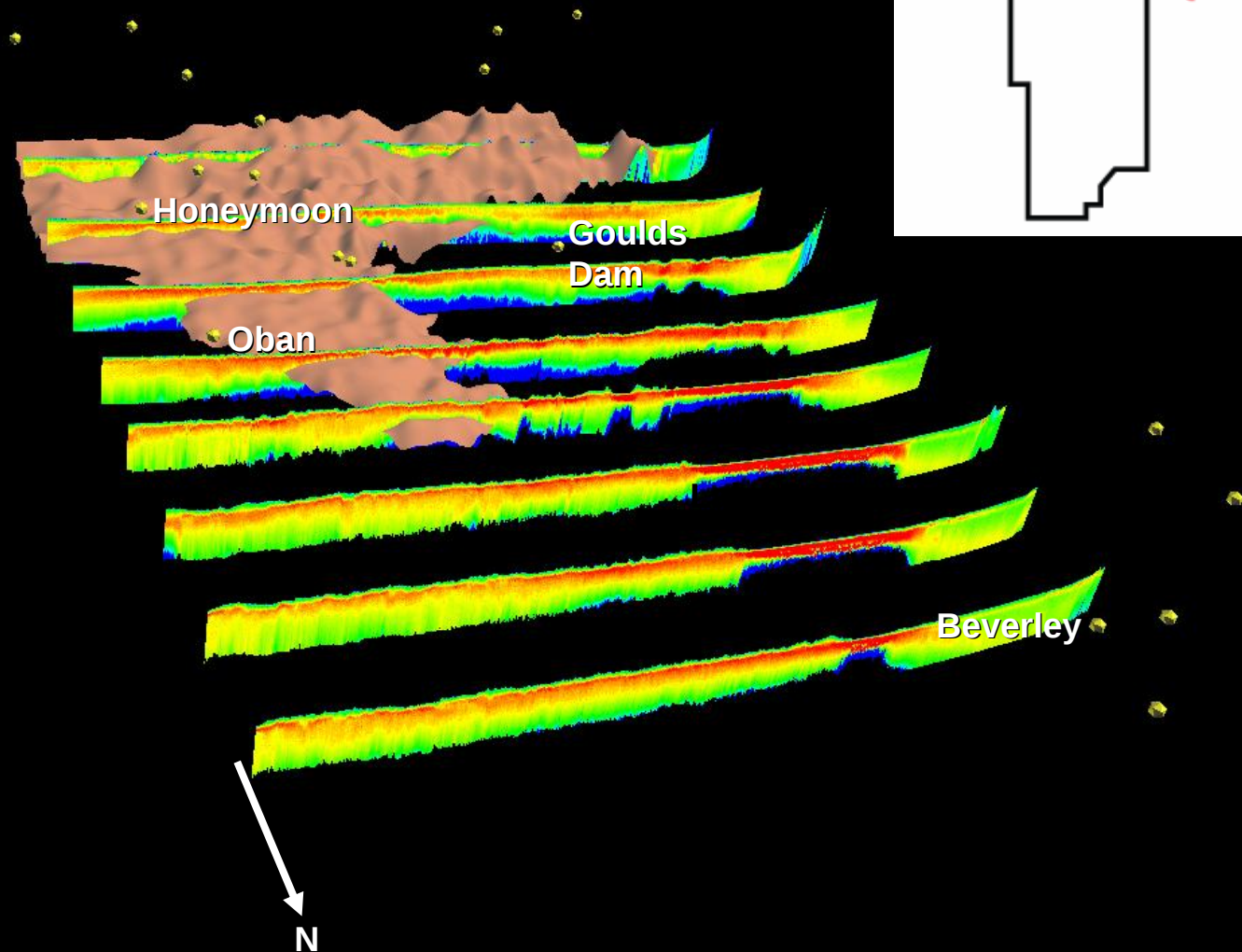
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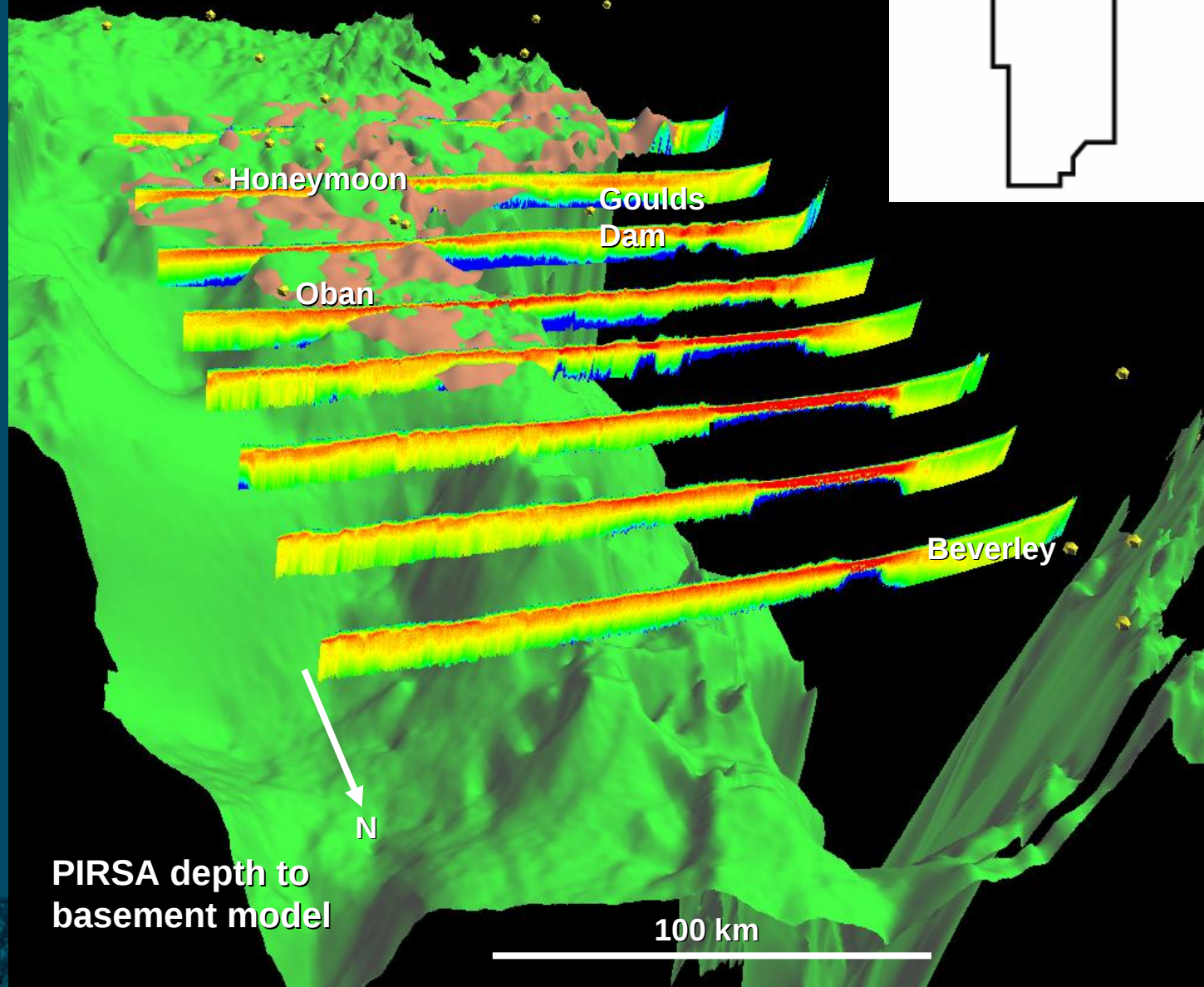
New AEM-derived
Benagerie Ridge Model



Benagerie Ridge

- Depth to resistive basement GOCAD model
- Surface geology draped over DEM
- Curnamona Province rocks under Mesozoic-Cenozoic cover
- Highly prospective: Au-Cu-Pb-Zn-Ag
- Uranium in Cenozoic cover sequence
- Drill hole control where available

New AEM-derived Benagerie Ridge Model

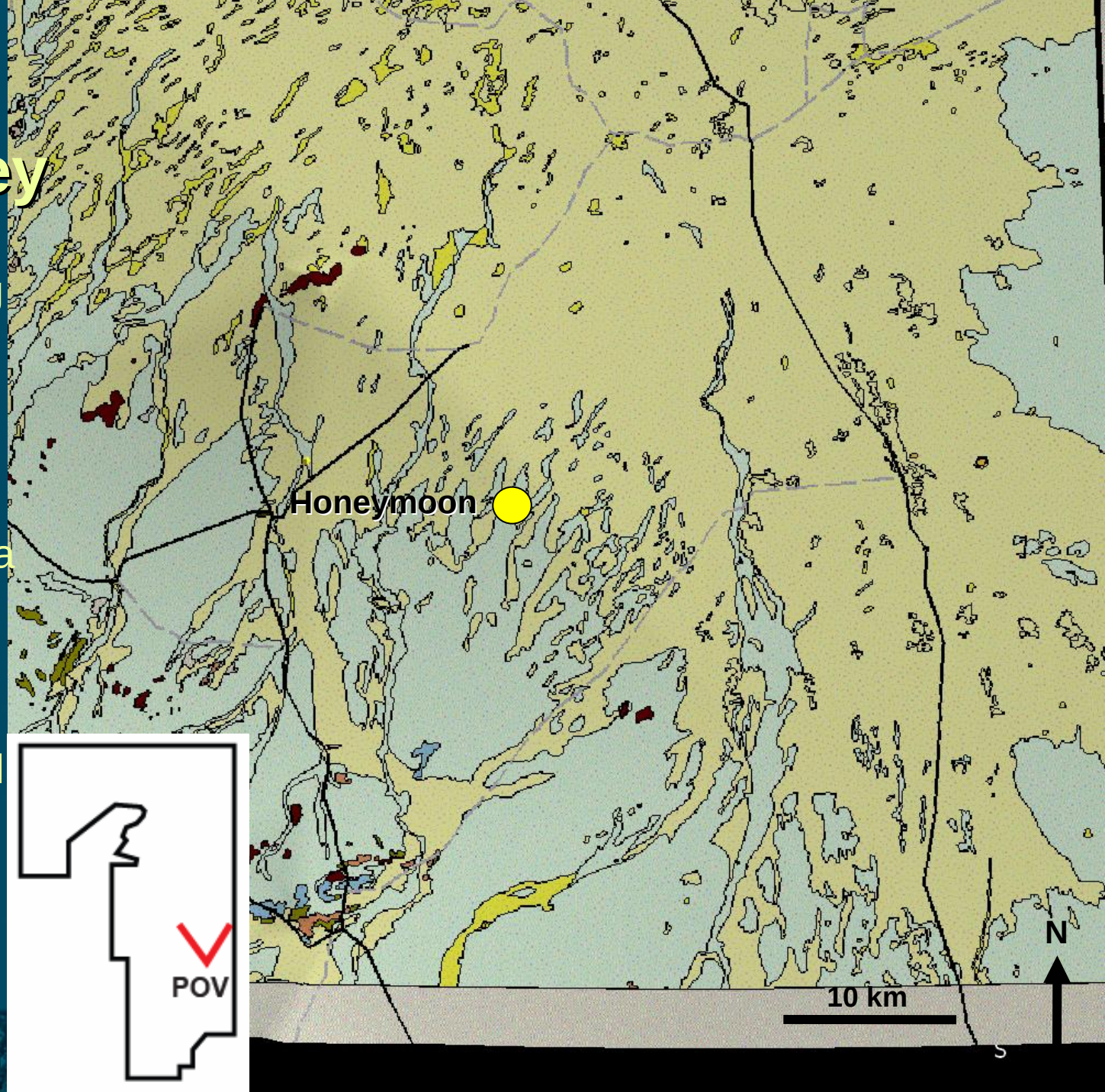


PIRSA depth to basement model

100 km

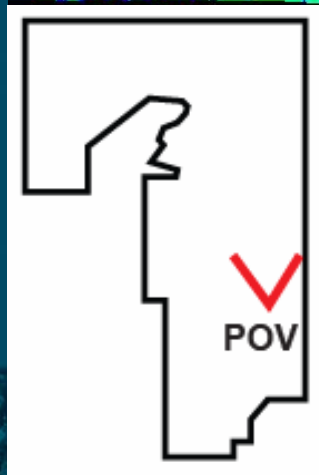
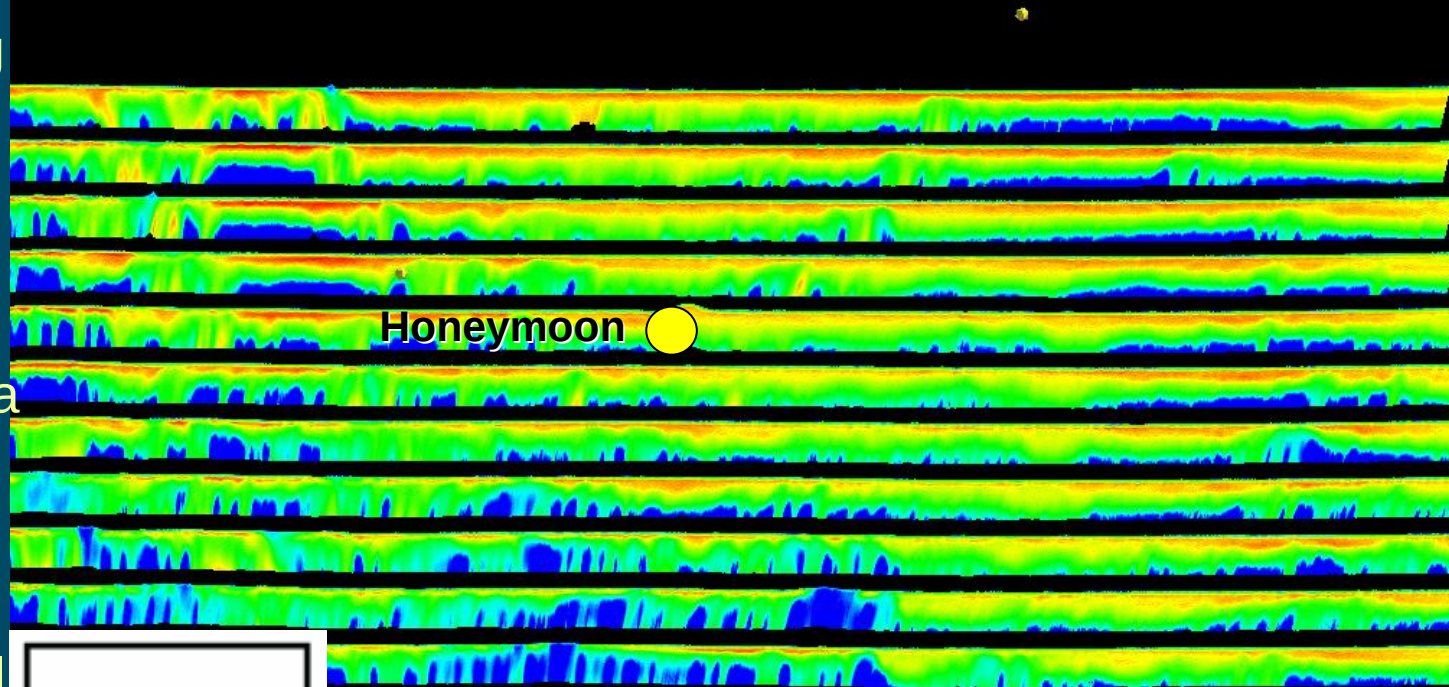
Yarramba Palaeovalley

- Major U-bearing palaeovalley system
- Conductive Cenozoic cover over Curnamona Province of variable conductivity
- Drill hole control where available



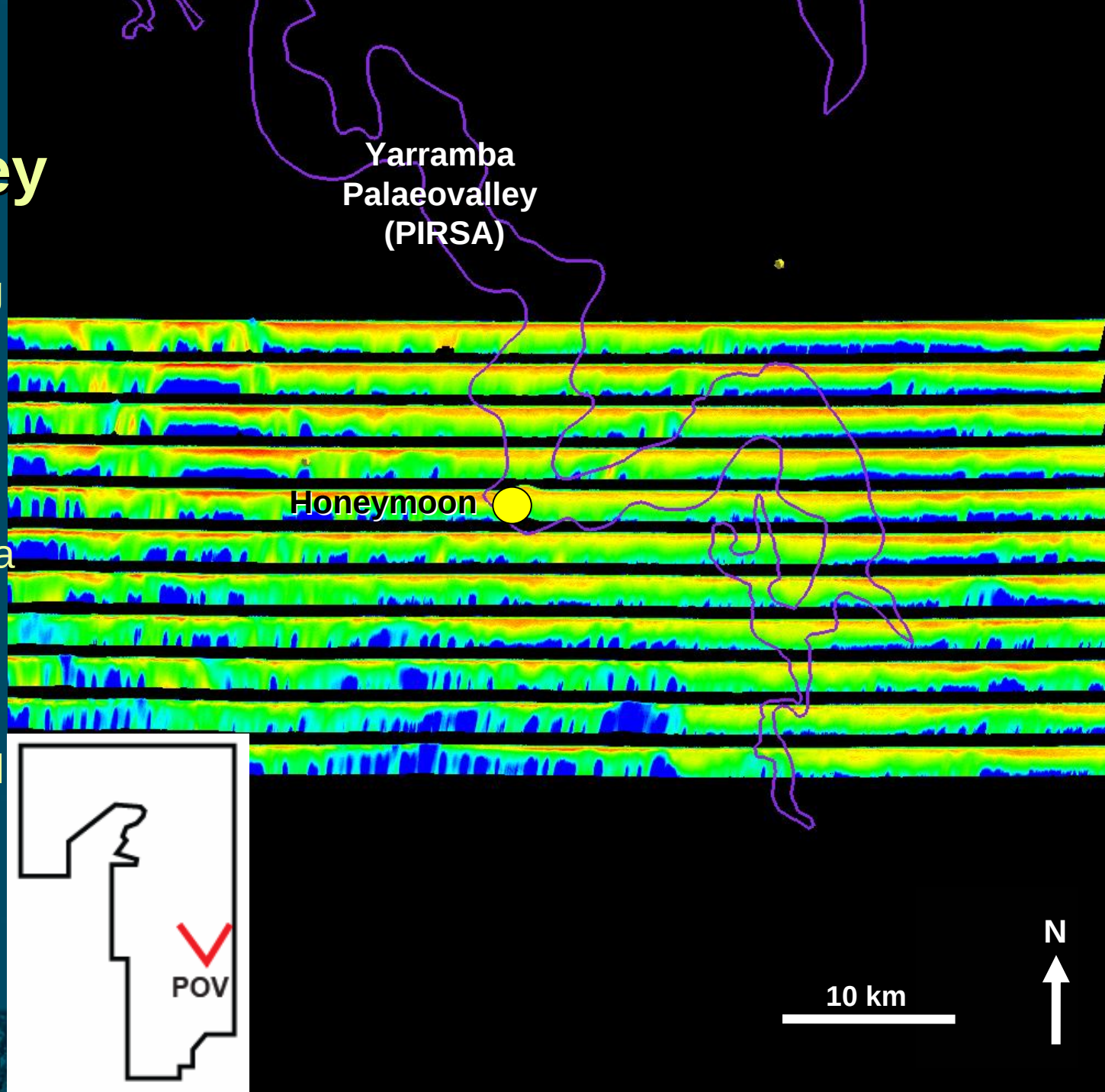
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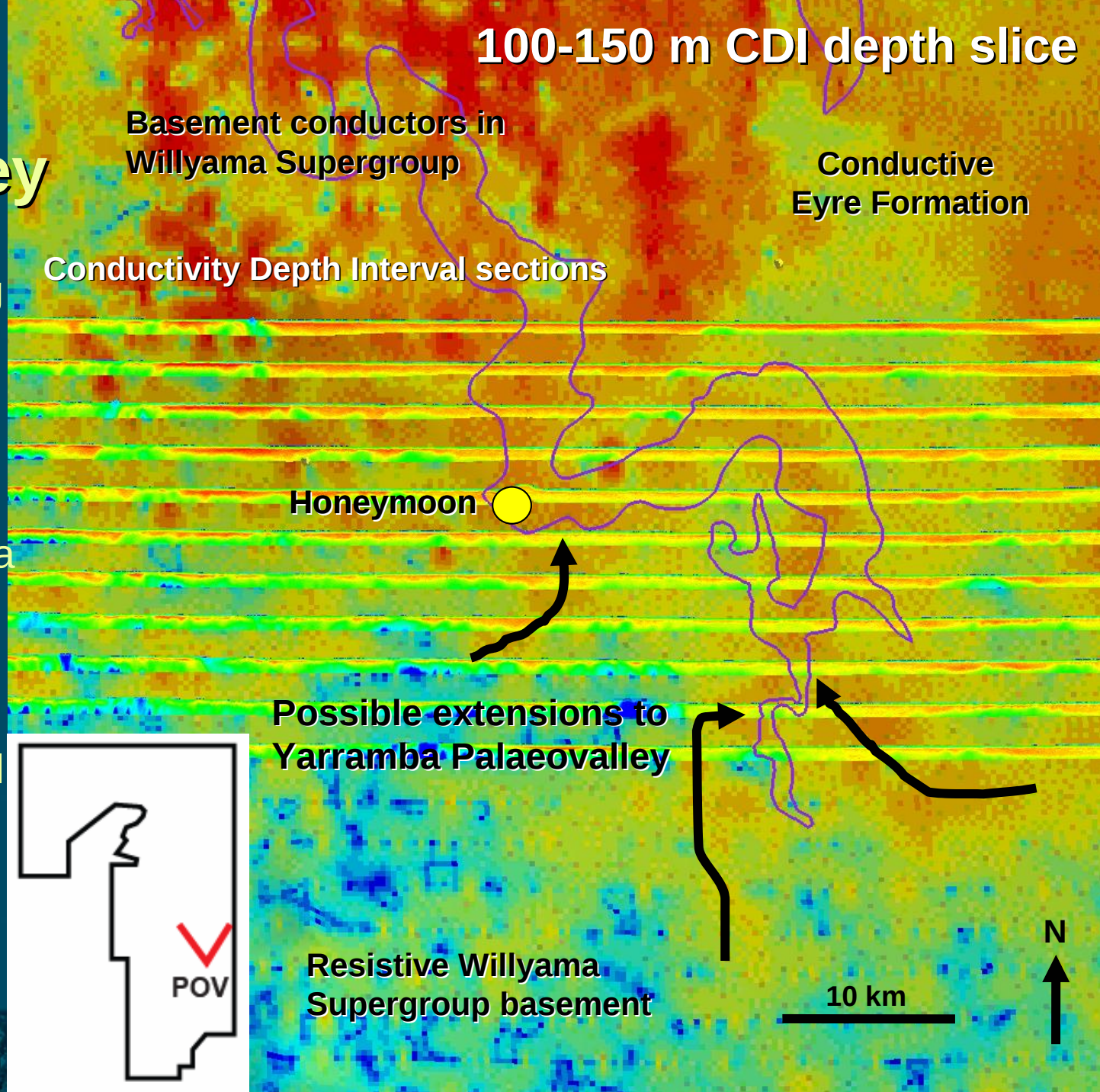
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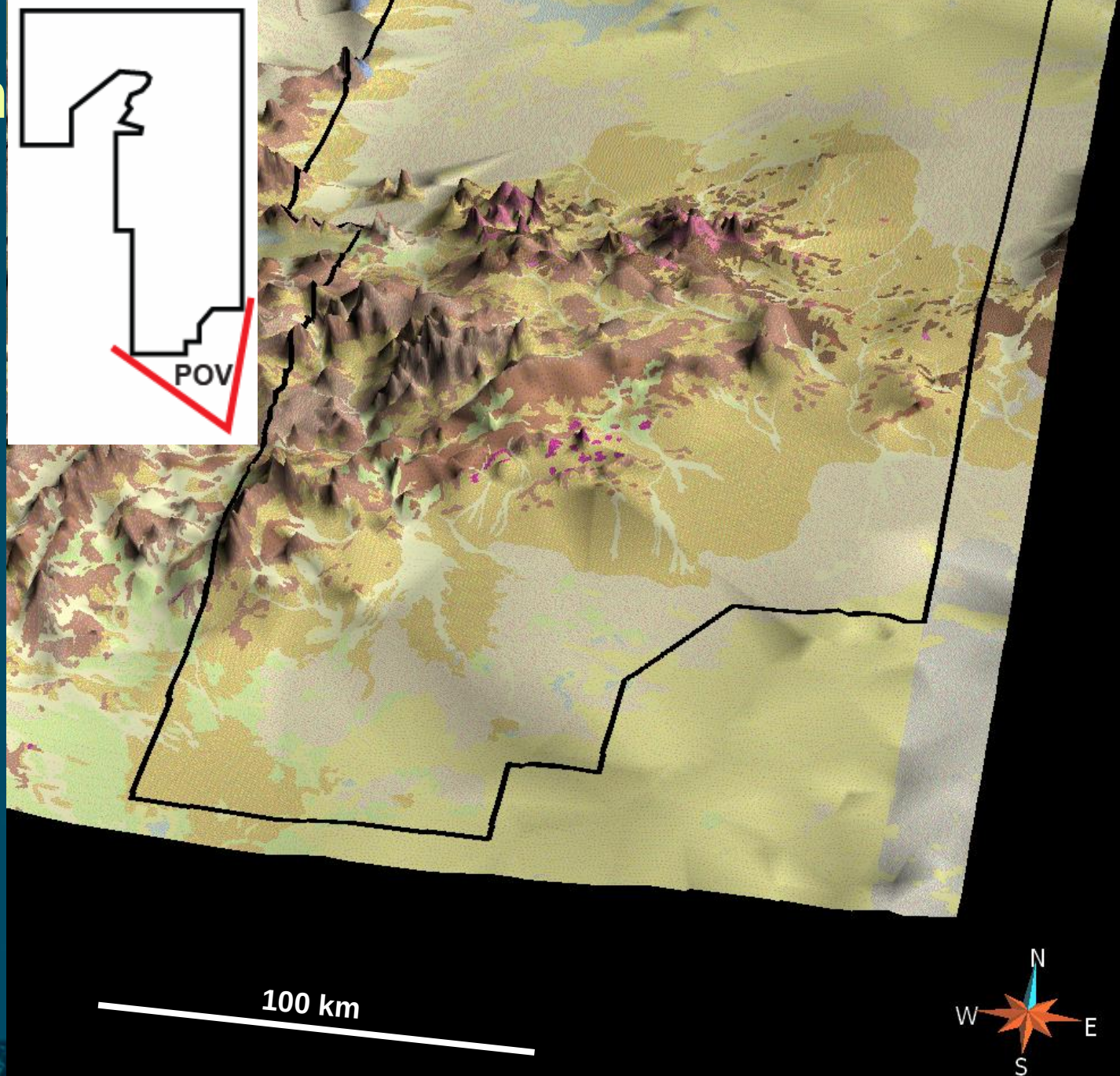
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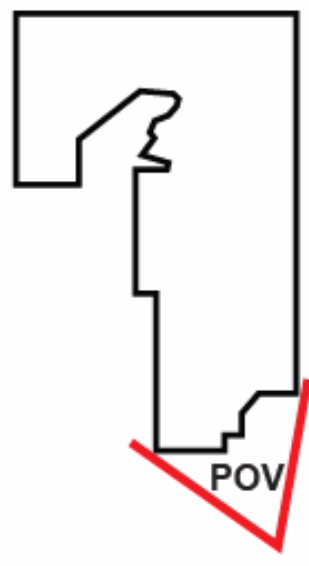
Delamerian Orogen

- Depth to resistive basement GOCAD model
- Conductive Cenozoic cover over resistive Proterozoic-Paleozoic basement
- Drill hole control where available

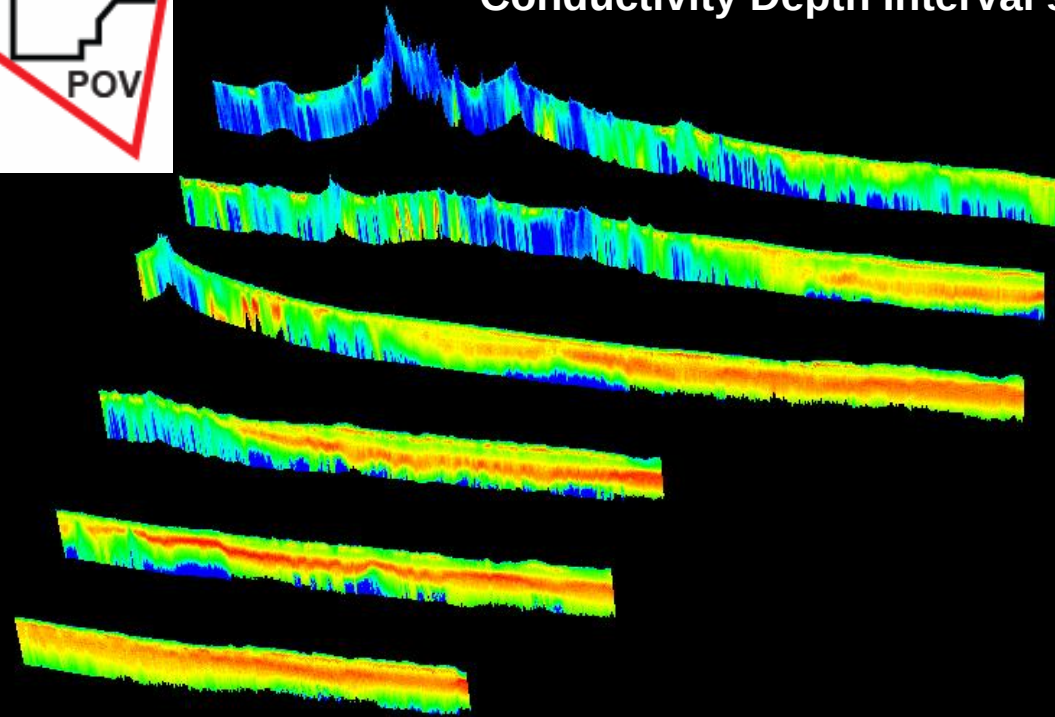


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Conductivity Depth Interval sections



100 km

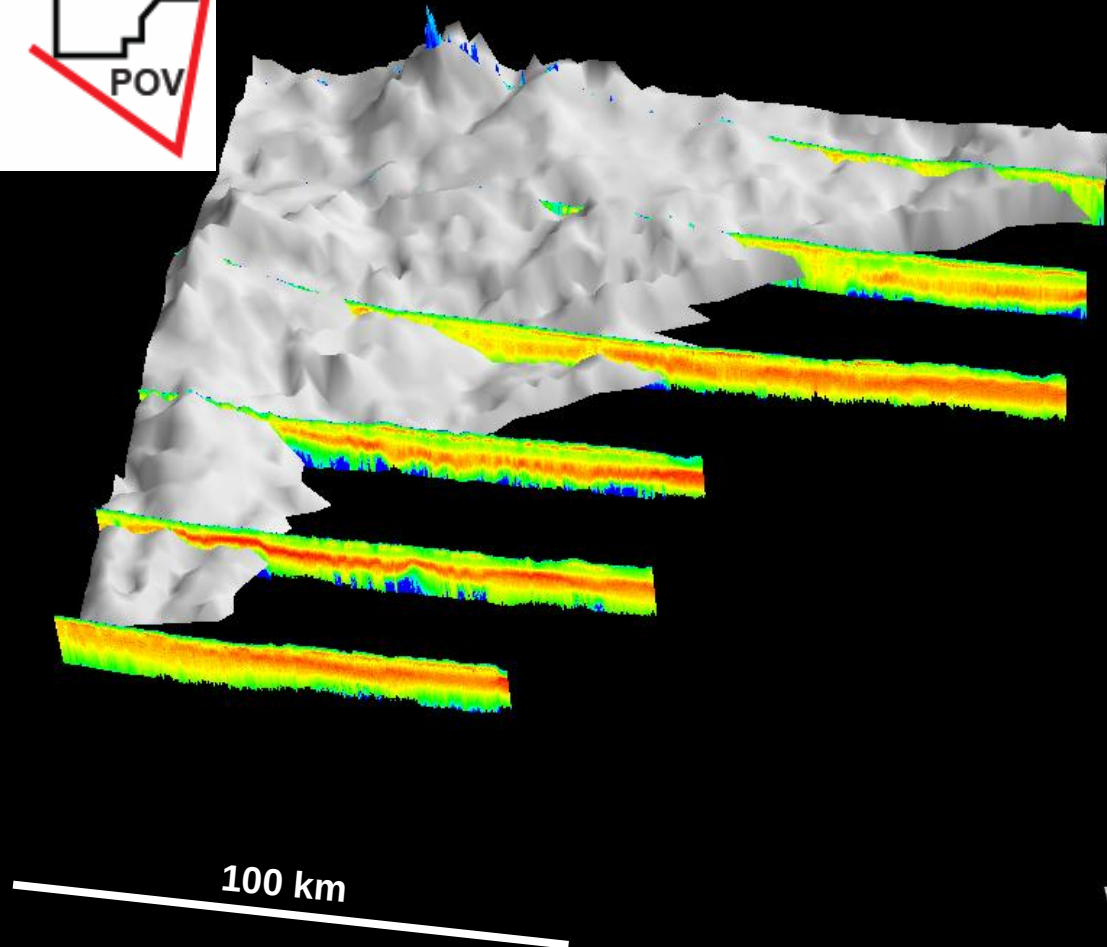


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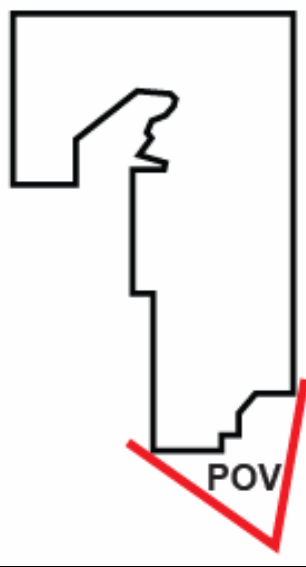


Modelled resistive basement surface

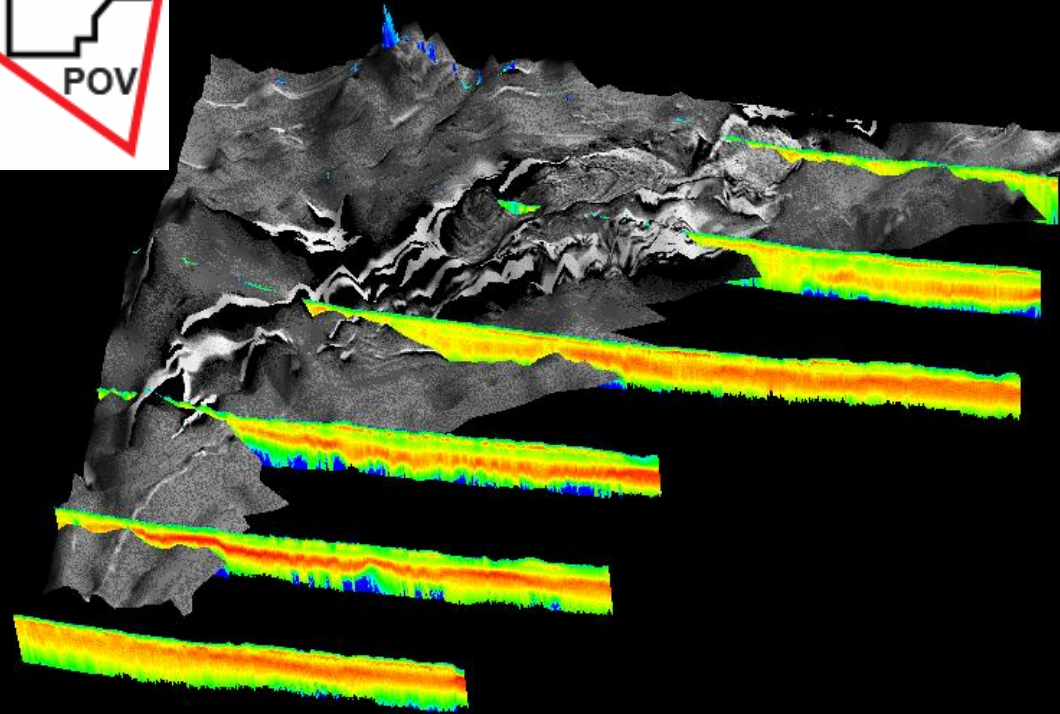


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TMI 1VD draped over modelled resistive basement surface

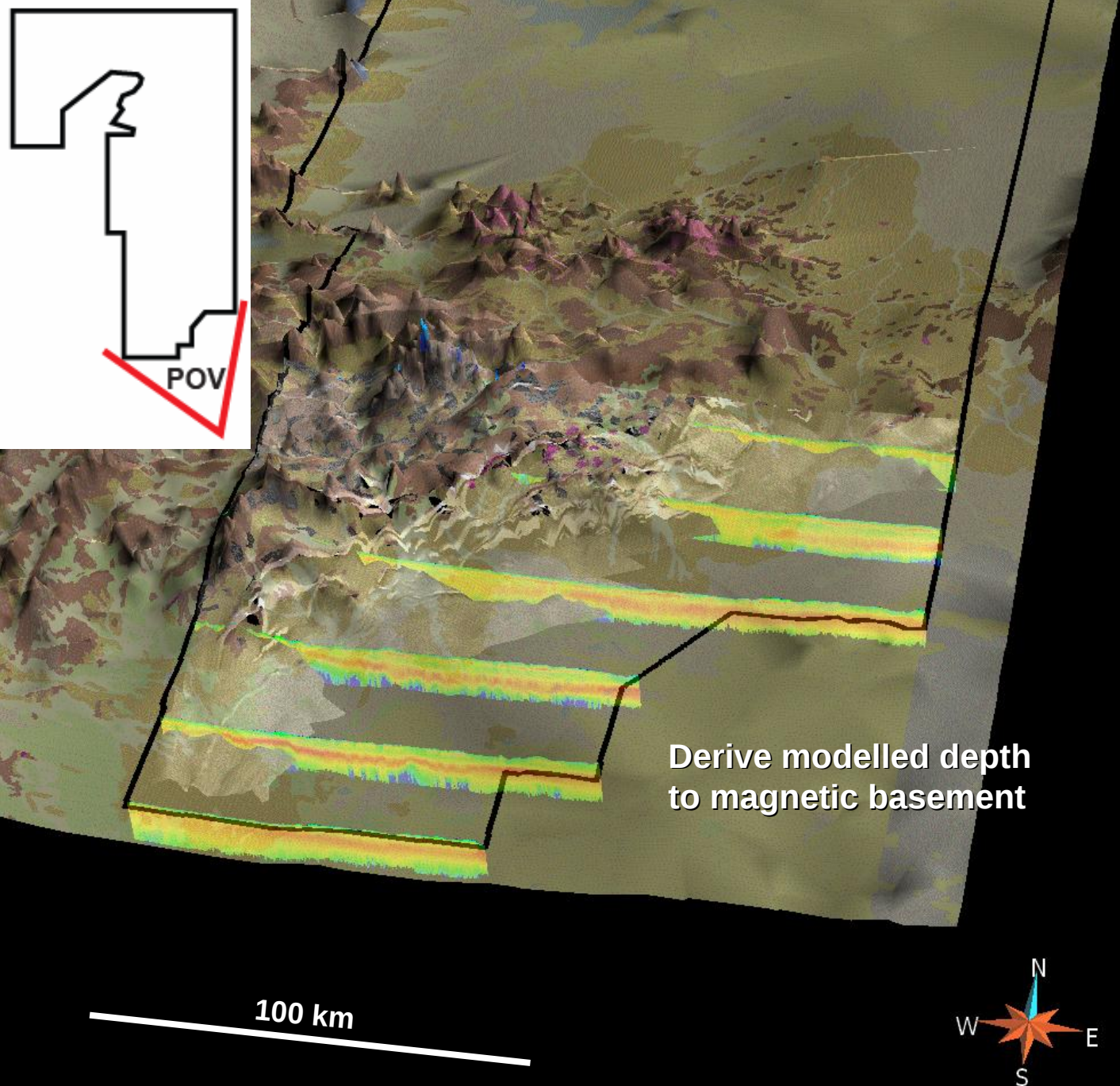


100 km



Delamerian Orogen

- Depth to resistive basement GOCAD model
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Conclusions

- New information from the Frome AEM survey:
 - New palaeovalley interpretations for U exploration
 - Large faults offset conductivity contrasts
 - Continuous Cenozoic & Mesozoic stratigraphy mapped in Callabonna Sub-basin and Eromanga Basin
 - Erosion surfaces mapped on Benagerie Ridge and Delamerian Orogen
 - Location of discrete conductors in Proterozoic
 - Improved “depth to” information overall
 - Groundwater resources

Phase 1 data release

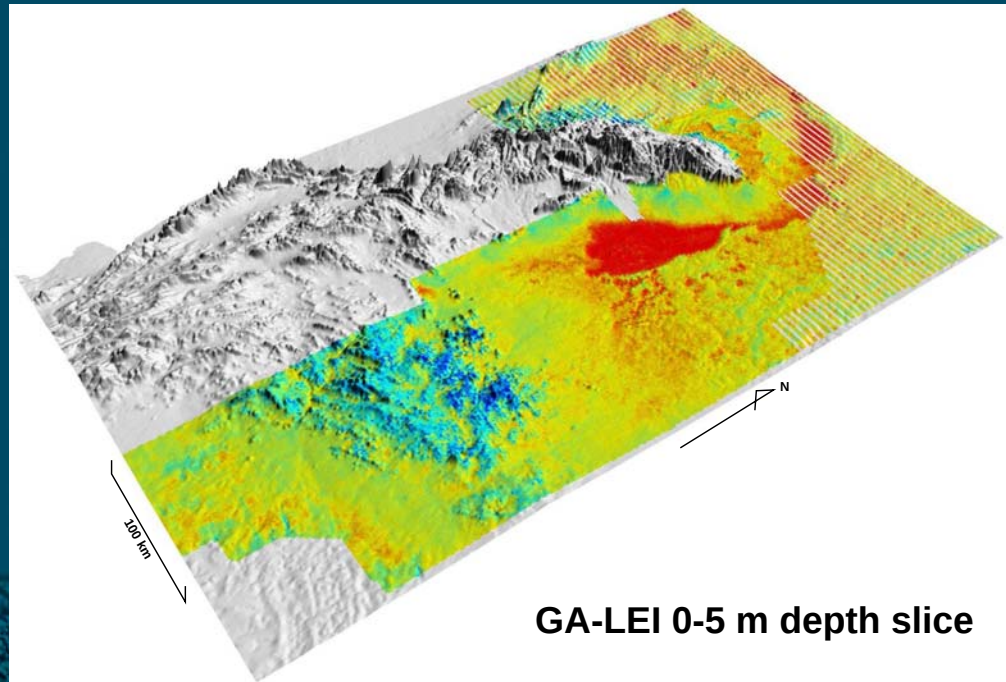
- Now available for free download at:

<http://www.ga.gov.au/energy/projects/airborne-electromagnetics.html>

- EM Flow™ depth slices (grids)
- ASCII data set
- EM Flow™ multiplots
- **Soon to come:**
 - EM Flow™ georeferenced JPEG images for GIS and GOCAD triangulated surfaces

Phase 2 data release

- Geoscience Australia layered earth inversion (GA-LEI)
 - Geolocated conductivity sections for GIS
 - Conductivity grids (depth & elevation slices)
 - Depth of investigation (DOI) grid
- Available mid-2011



GA-LEI 0-5 m depth slice

Acknowledgements

- **Survey partners:**
 - PIRSA
 - Callabonna Uranium Ltd. consortium
- **Logistics & data:**
 - Adelaide Resources Ltd.
 - Alinta Energy Ltd. Leigh Creek coalfield
 - Cauldron Energy Ltd.
 - Curnamona Energy Ltd.
 - Heathgate Resources
 - Uranium One Inc.
- **The team:**
 - GA: Ross C. Brodie, Marina Costelloe, David Hutchinson, Subhash Jaireth, Alan Whitaker, Nick Williams;
 - PIRSA: Tim Baker, Tania Dhu, Martin Fairclough, Steve Hore, Bernd Michaelsen, Tania Wilson.