



AEM in the search for minerals and water – Geoscience Australia's AEM acquisition programs in the far west of NSW

The use of airborne electromagnetics

AEM

for mineral and ground water
exploration

Australia-wide geoscientific datasets

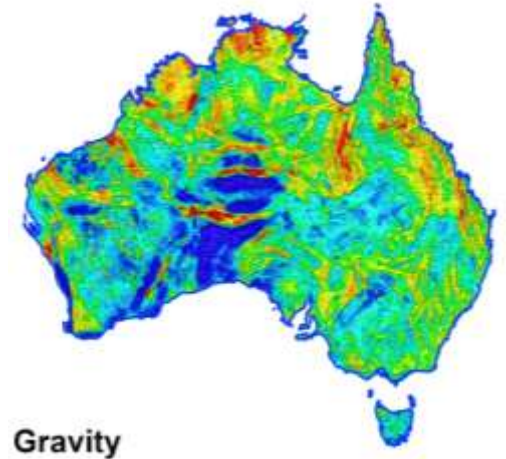
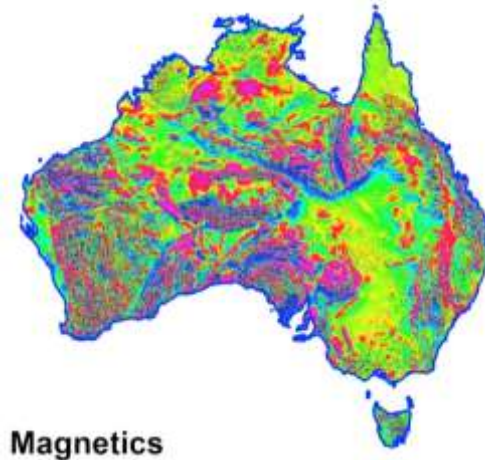
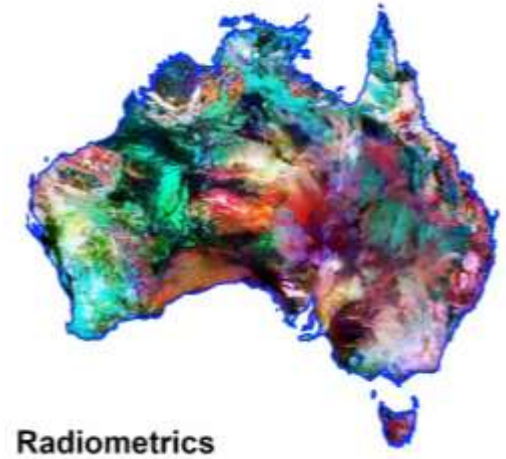
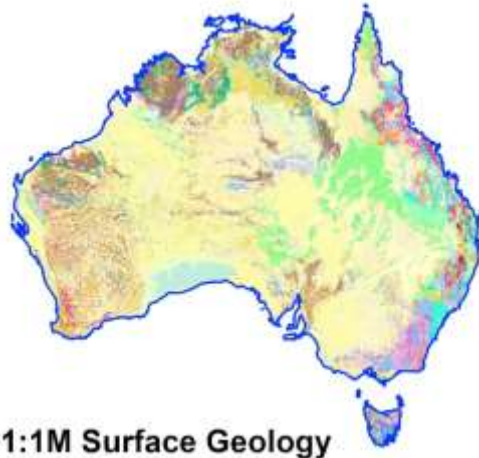
- Resource agnostic
- Infrastructure for innovation and discovery

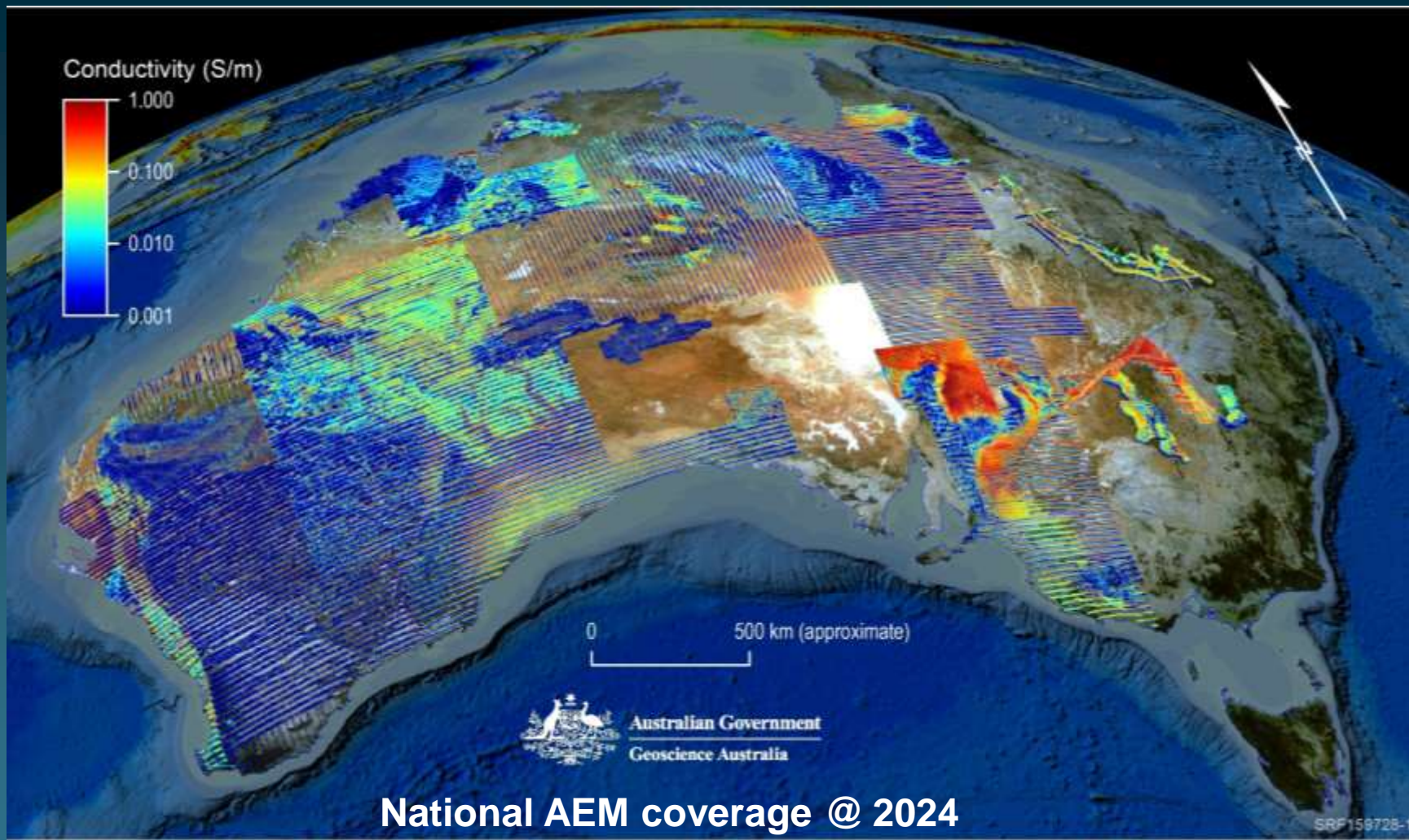


Develop consistent Australia-wide geoscience datasets

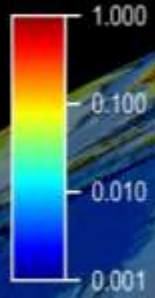
Australia-wide

- National **Gravity** and **Magnetics** critical in discovery of Australian base metal mines
- The levelled **Radiometric** grids are a key contributor to the search for **rare earth elements** and lithium.





Conductivity (S/m)



0 500 km (approximate)

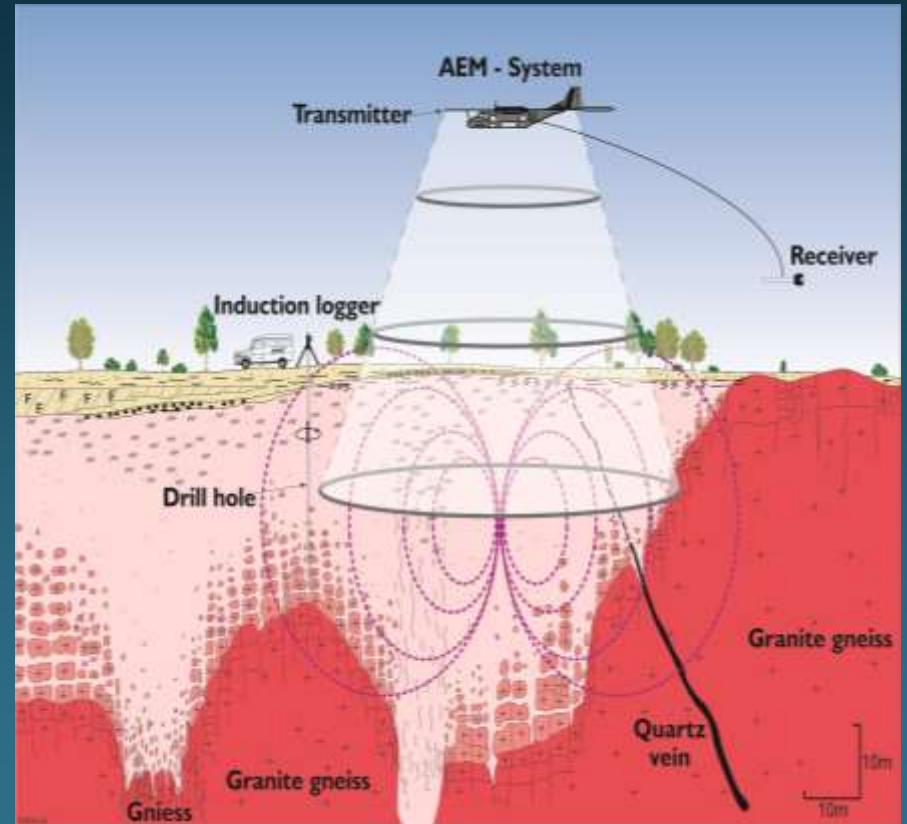
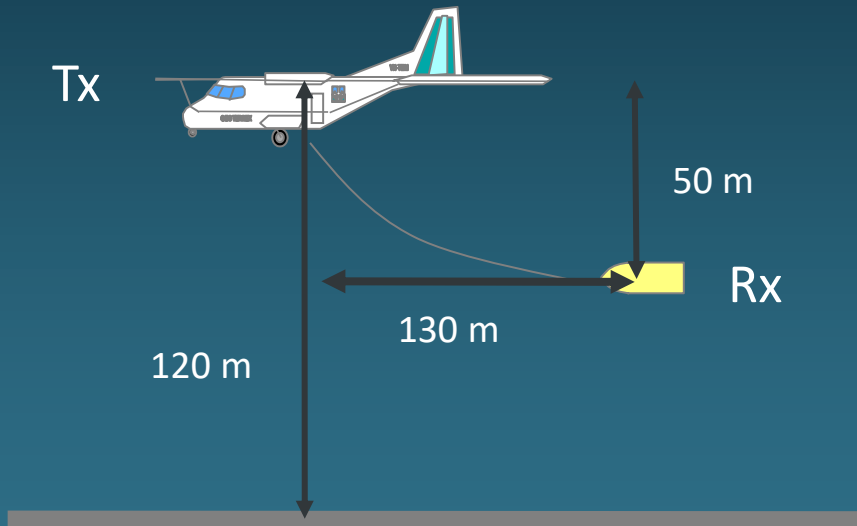


National AEM coverage @ 2024

SRF158728-1

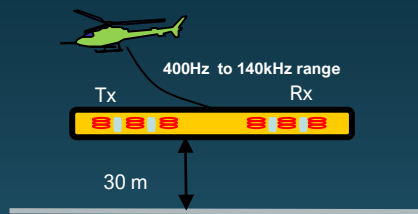
What is airborne EM and how does it work?

Fixed-wing

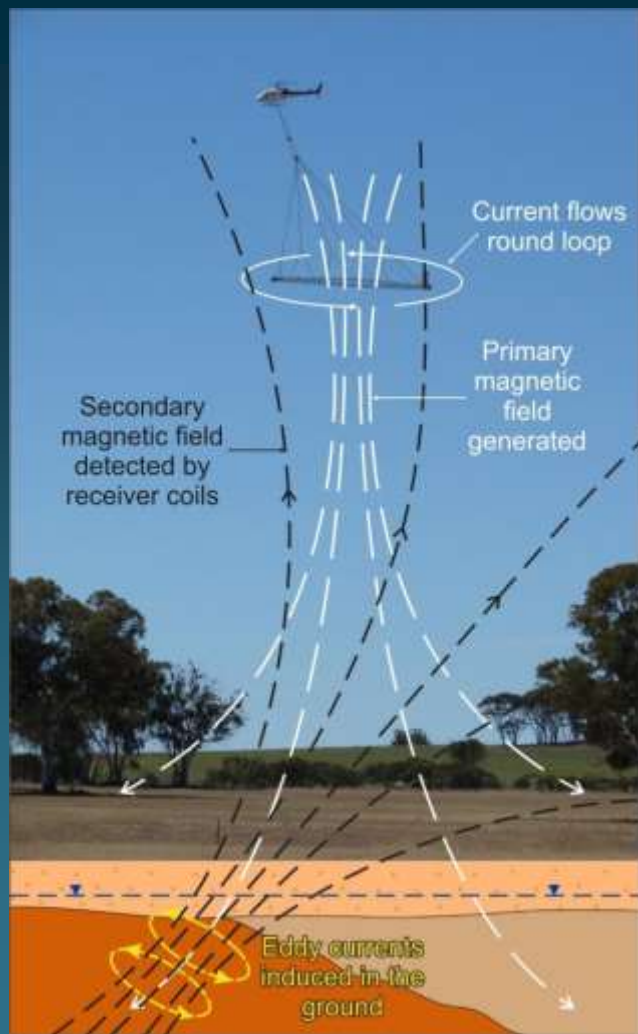
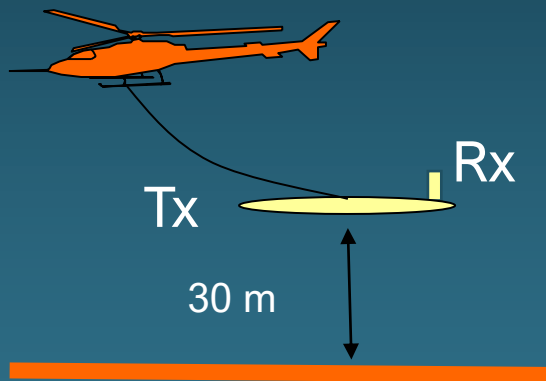


Helicopter

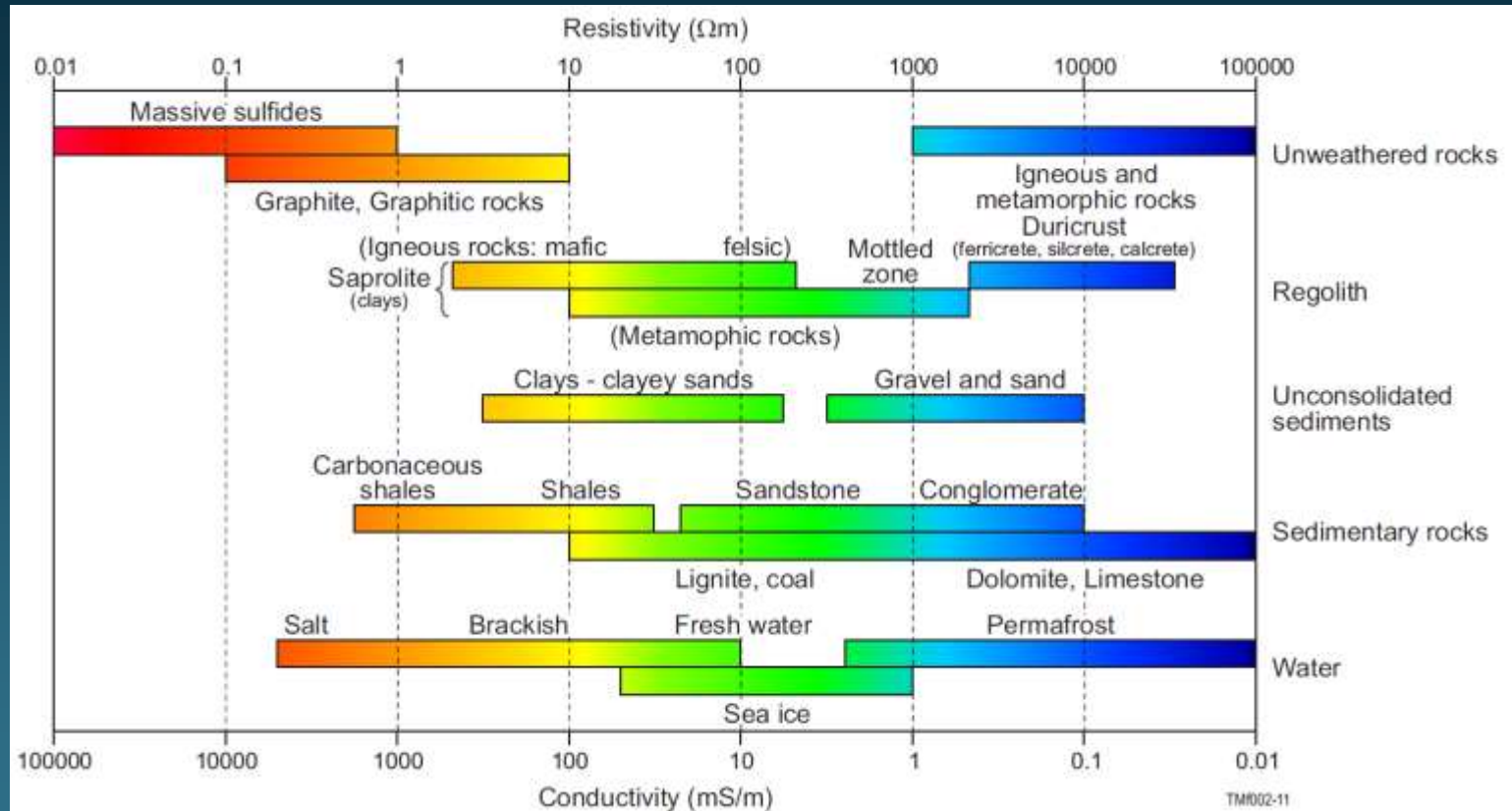
FDEM



TDEM



Conductivity as a proxy of Earth's forming materials



AEM - Standards, calibration and outreach

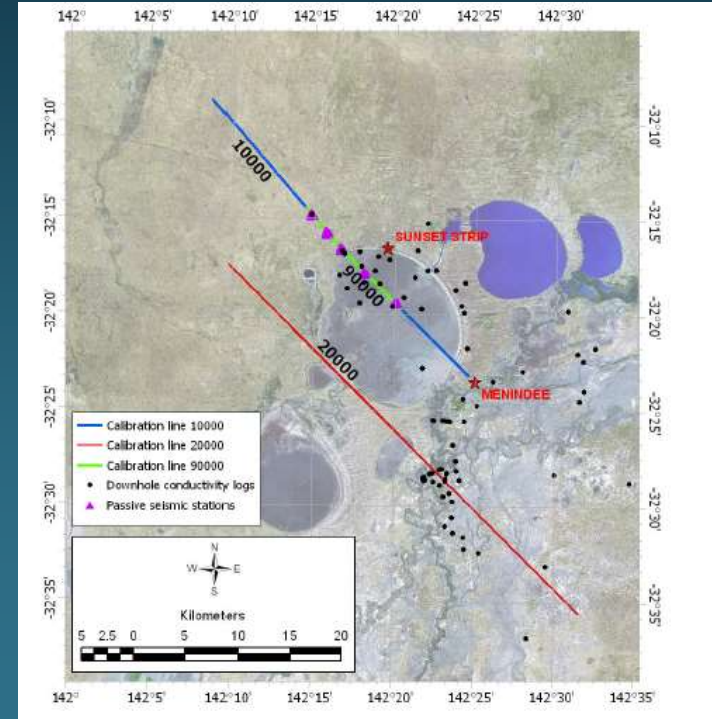
Over Menindee lakes

- GA has played a leading role in AEM standards and calibration
 - Transitioning AEM from qualitative to quantitative
 - AEM system assessment
 - AEM Deed/Contract technical documents

World class AEM test range

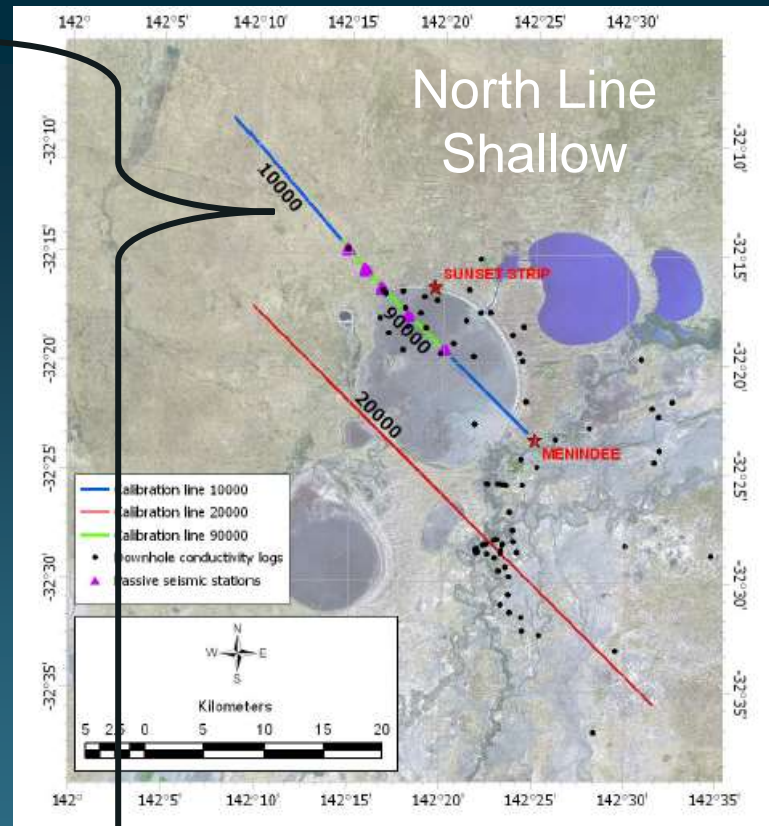
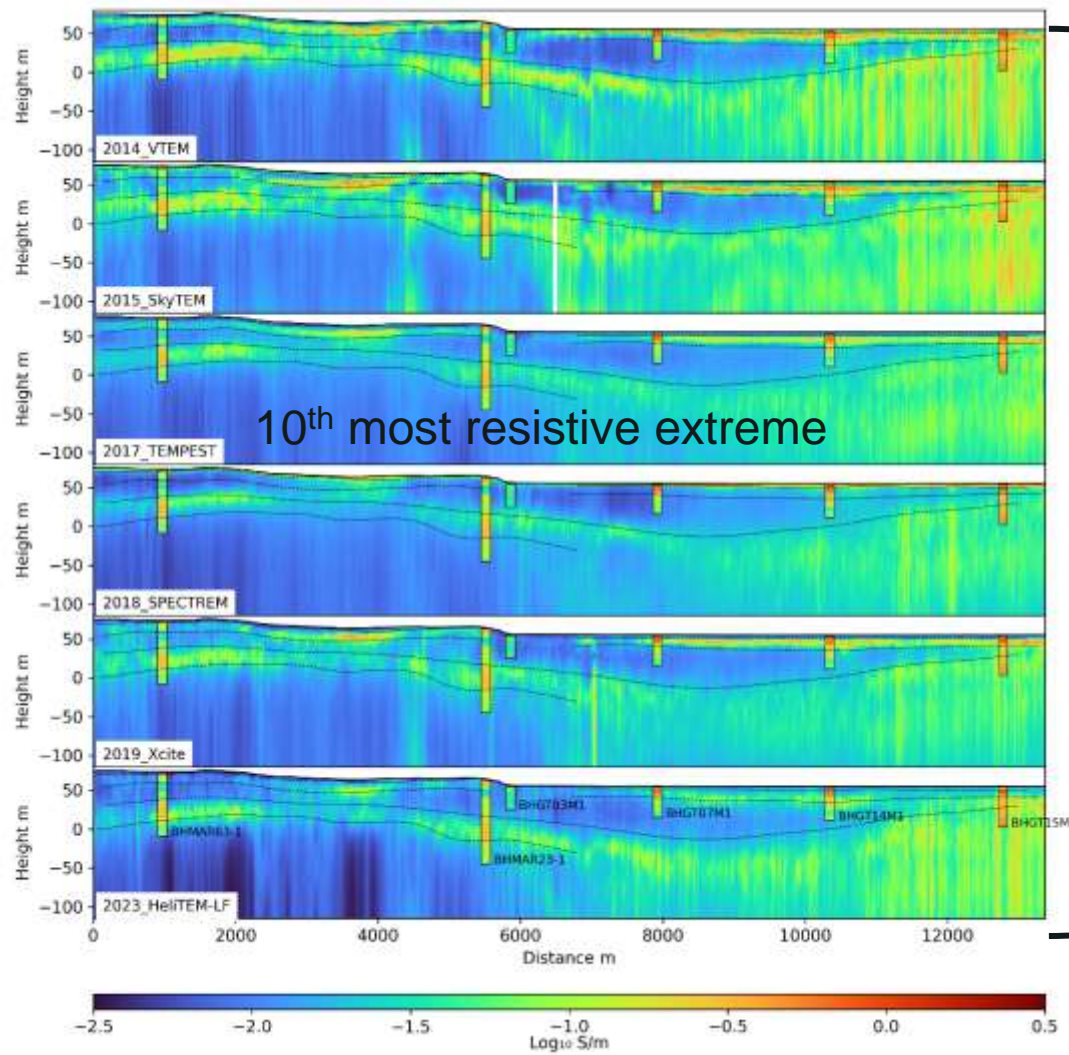
Over Menindee lakes

in NSW

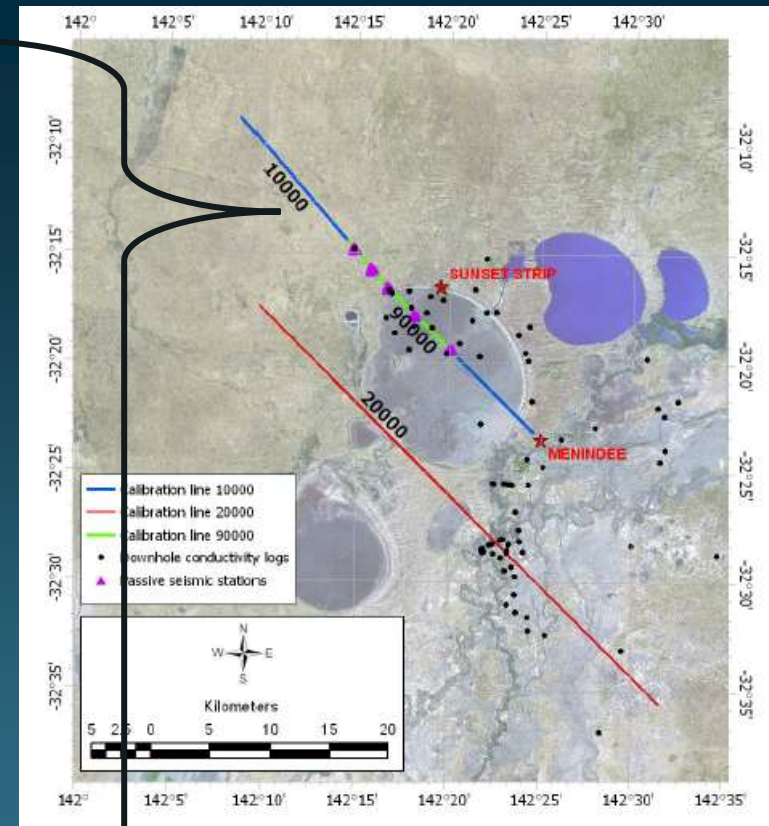
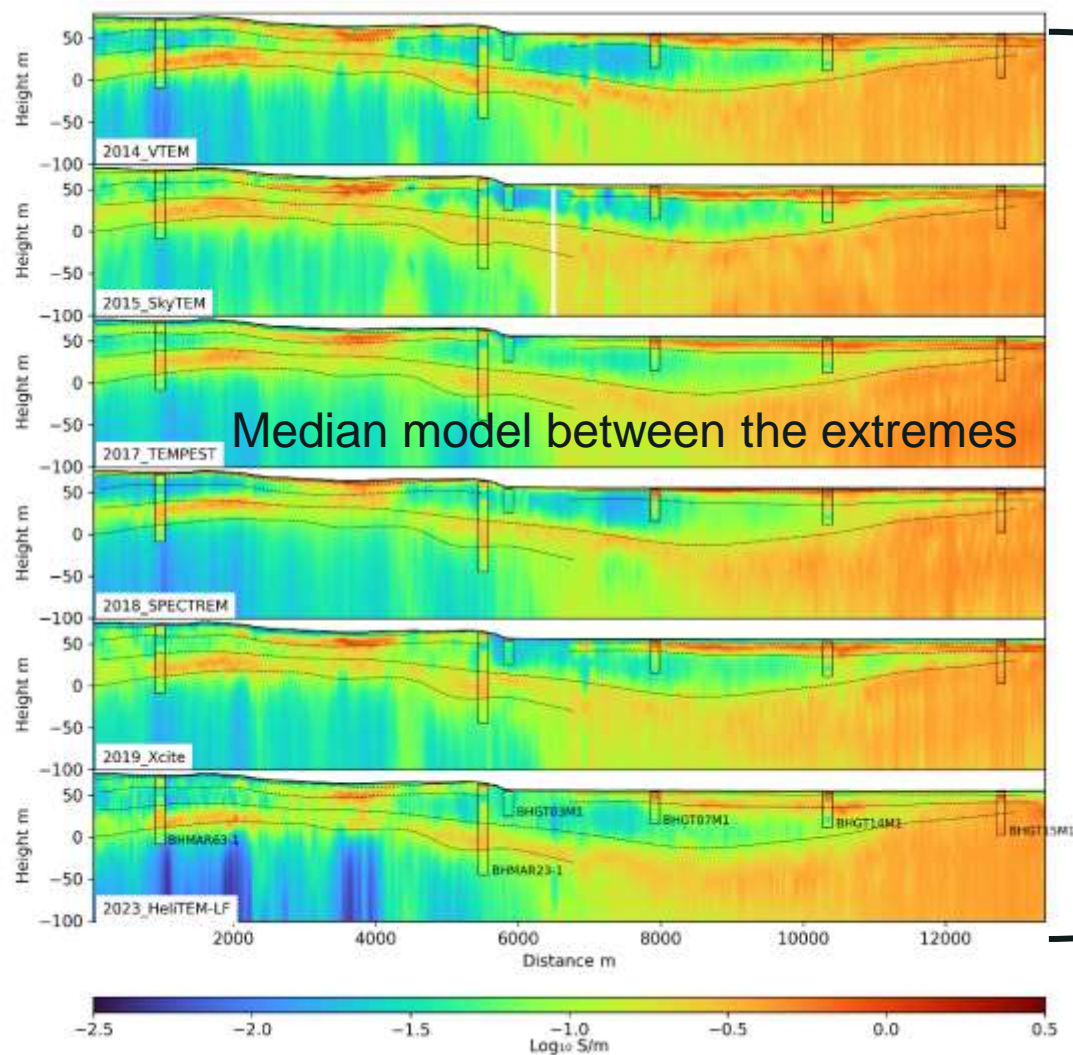


NSW has a world class AEM test range
Over Menindee lakes

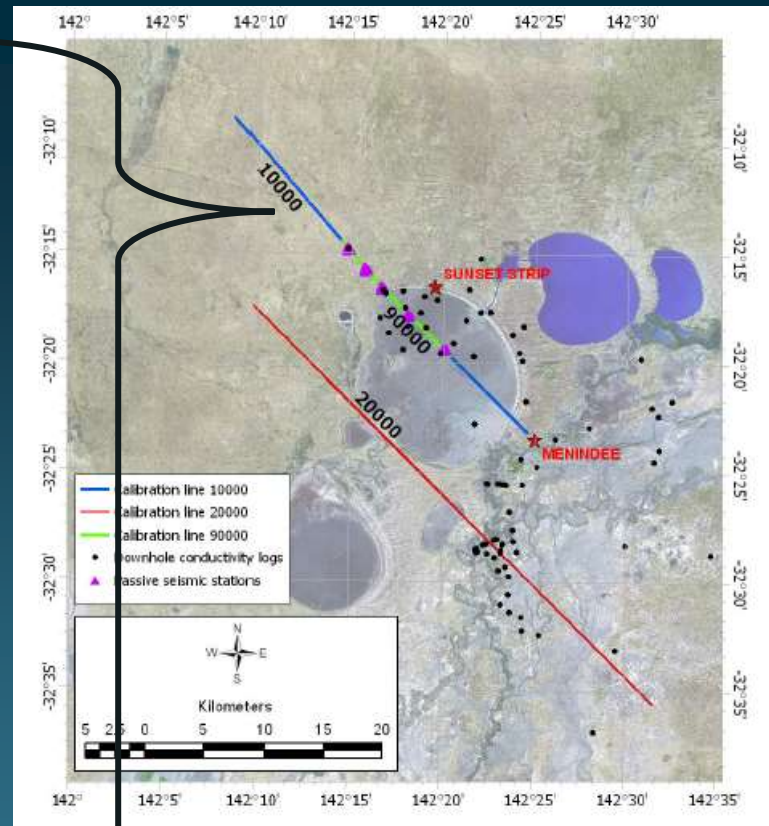
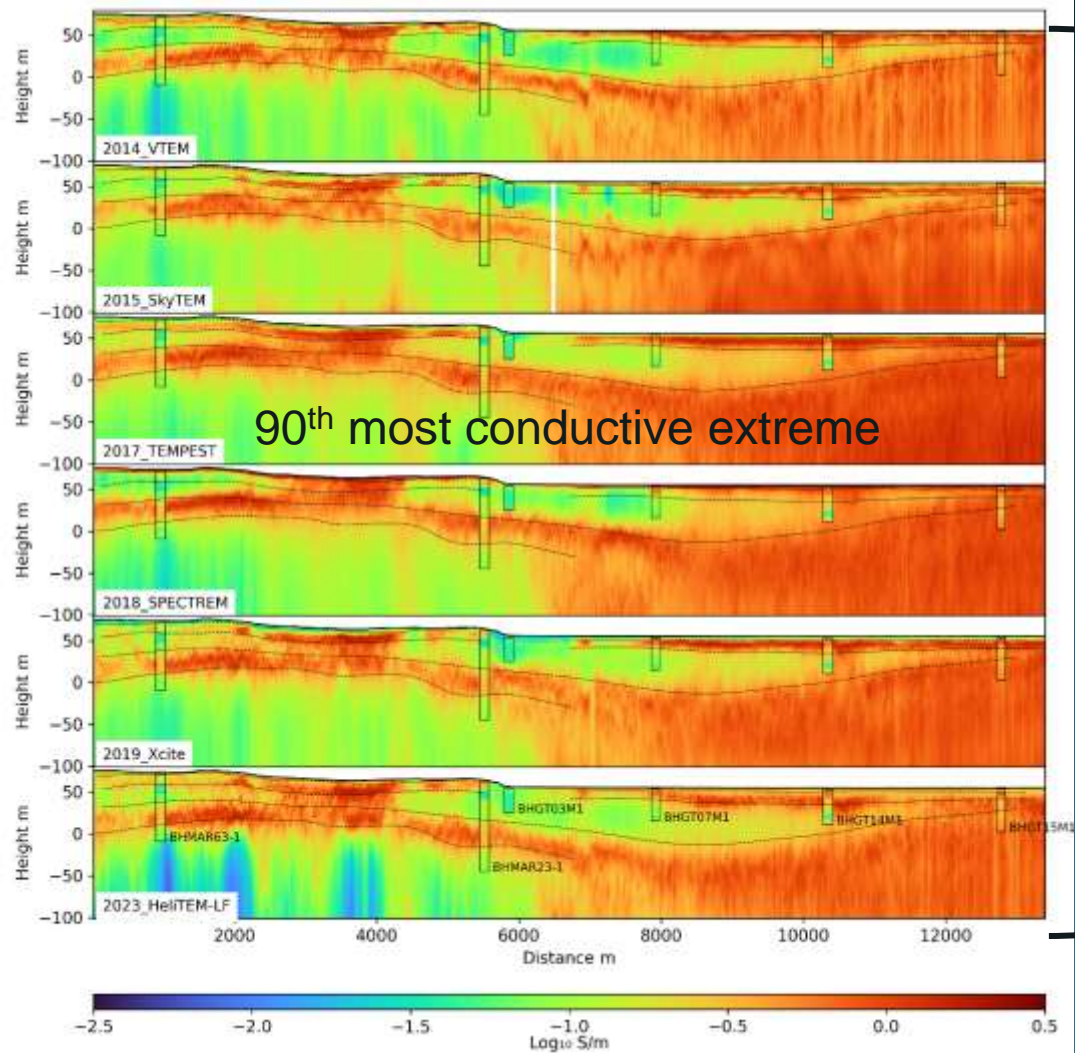




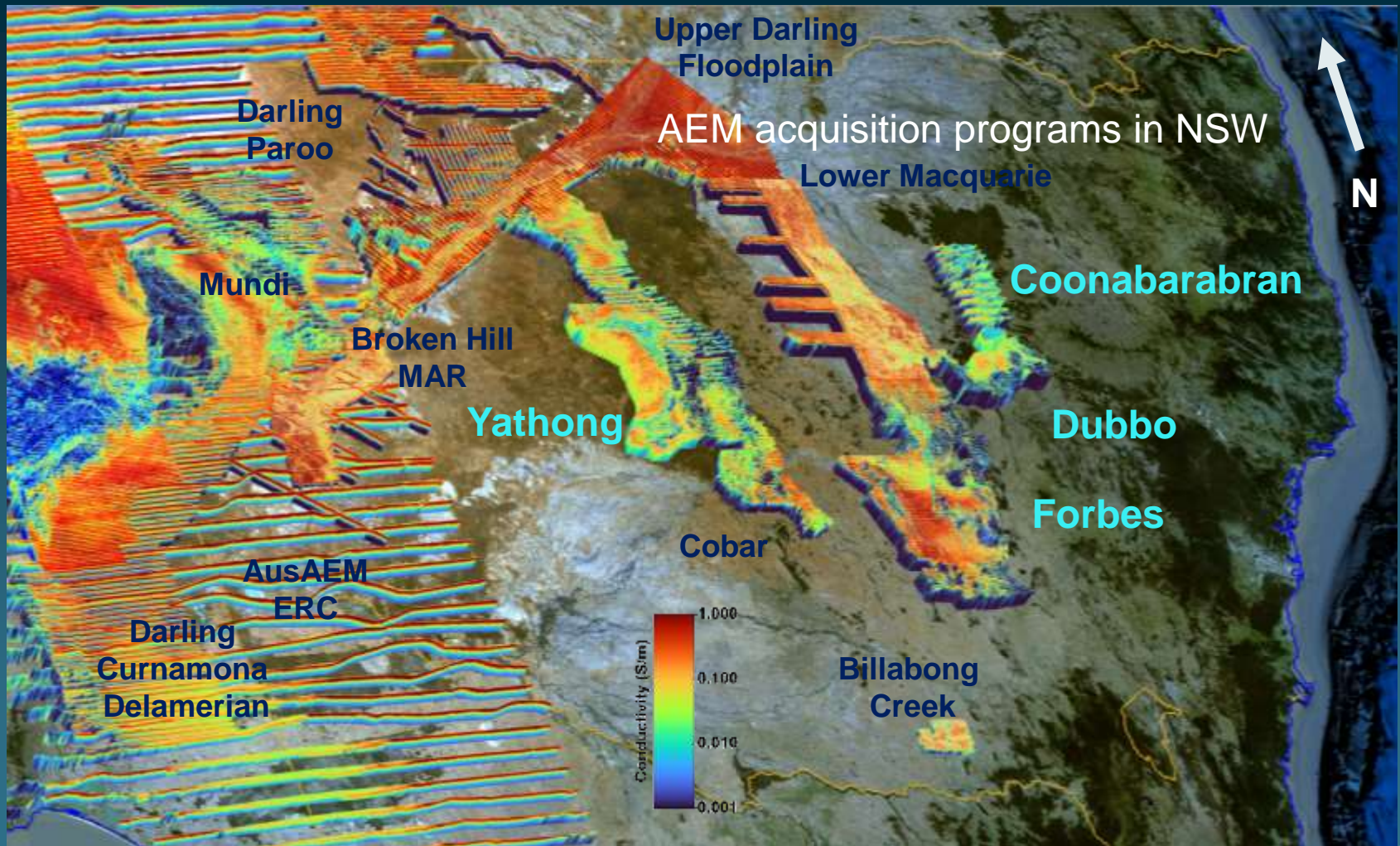
GA developed a Stochastic algorithm samples thousand of models from a probability distribution



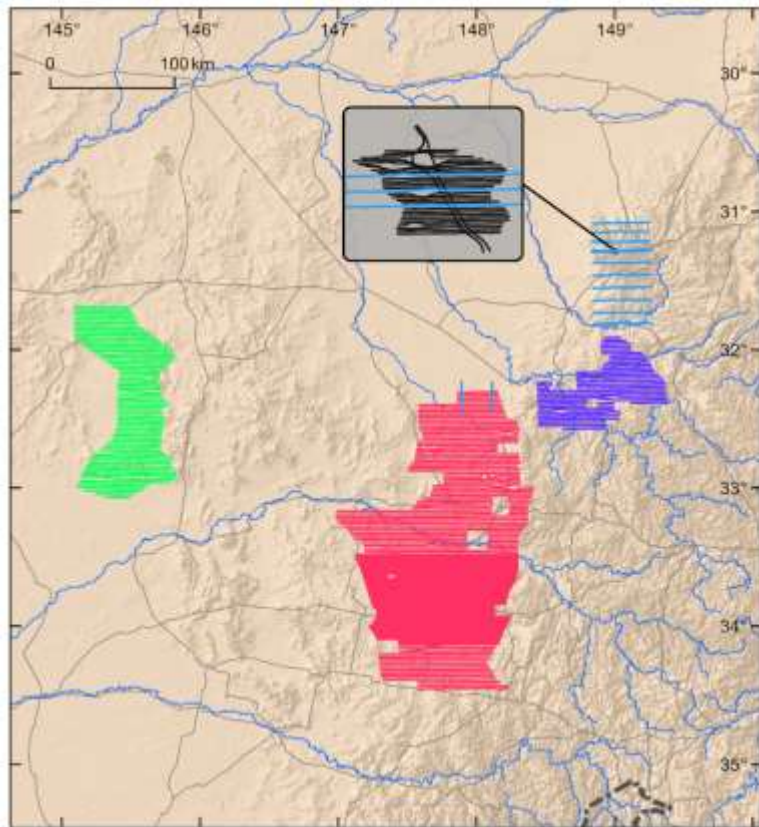
North Line
Shallow



North Line
Shallow



Yesterday's AEM Data release

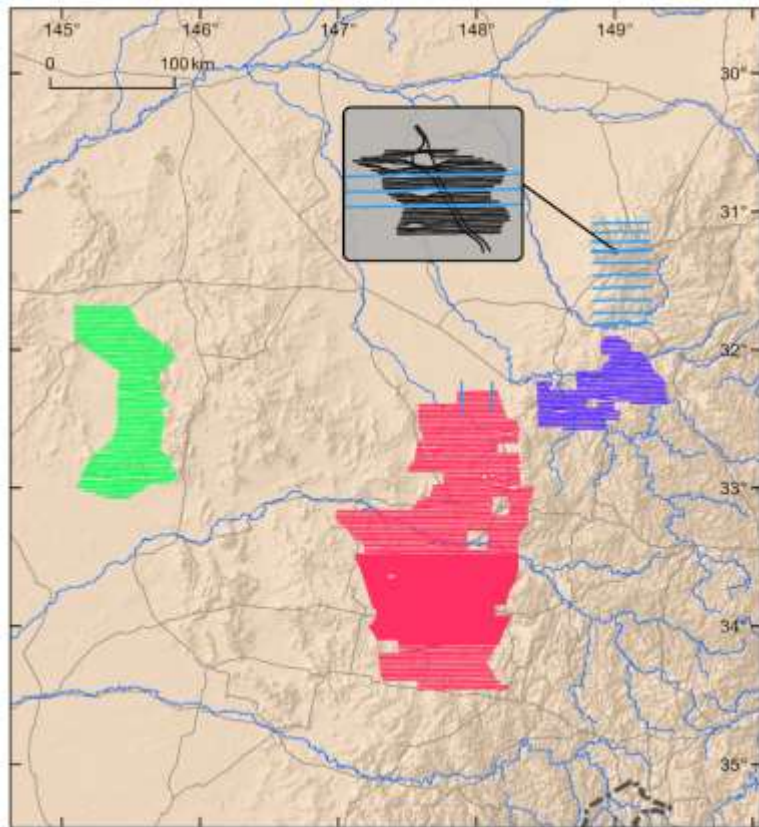


Yathong

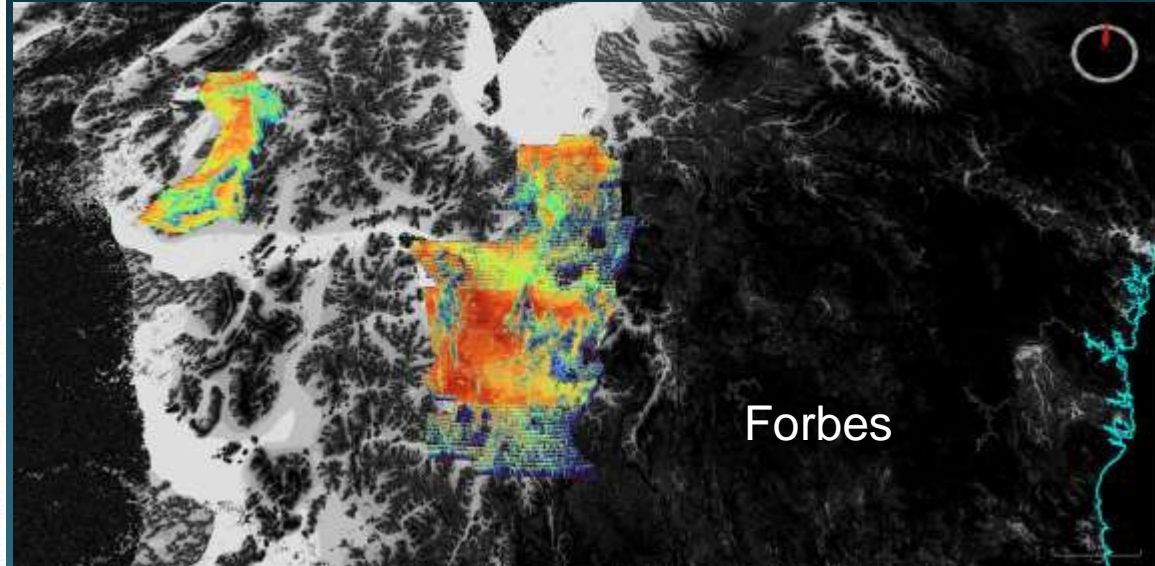
- Coonabarabran AEM Survey
- Coonabarabran Infill AEM Survey
- Dubbo AEM Survey
- Forbes AEM Survey
- Yathong AEM Survey
- Road
- River



Yesterday's AEM Data release

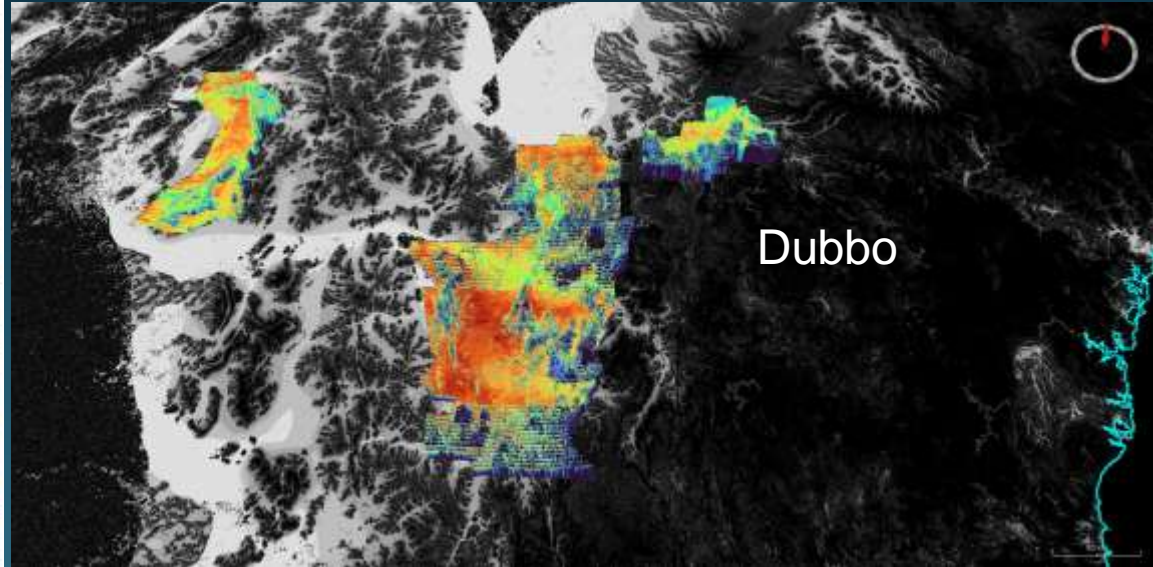
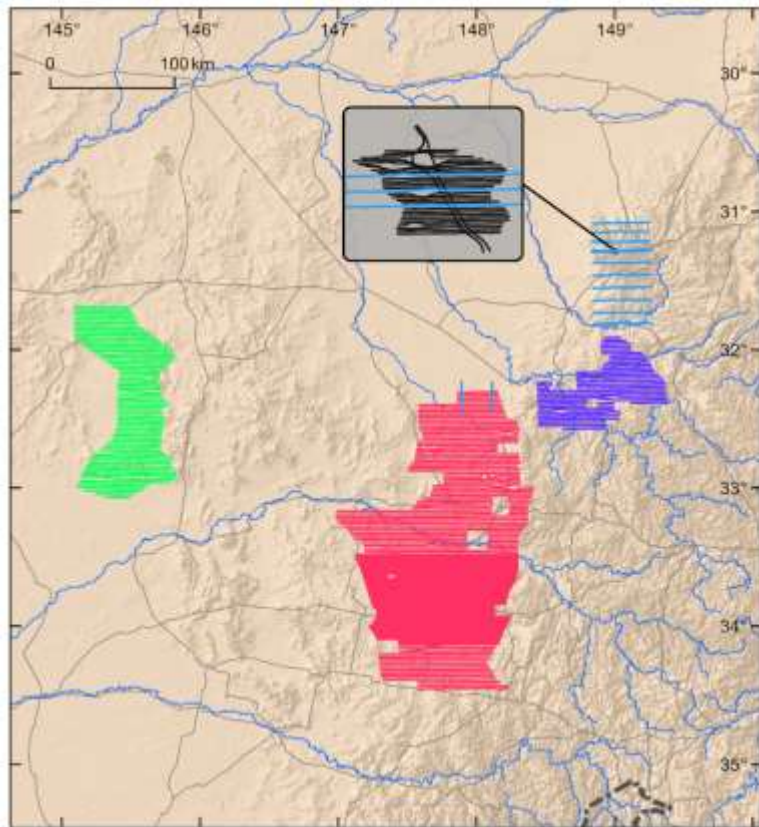


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Forbes

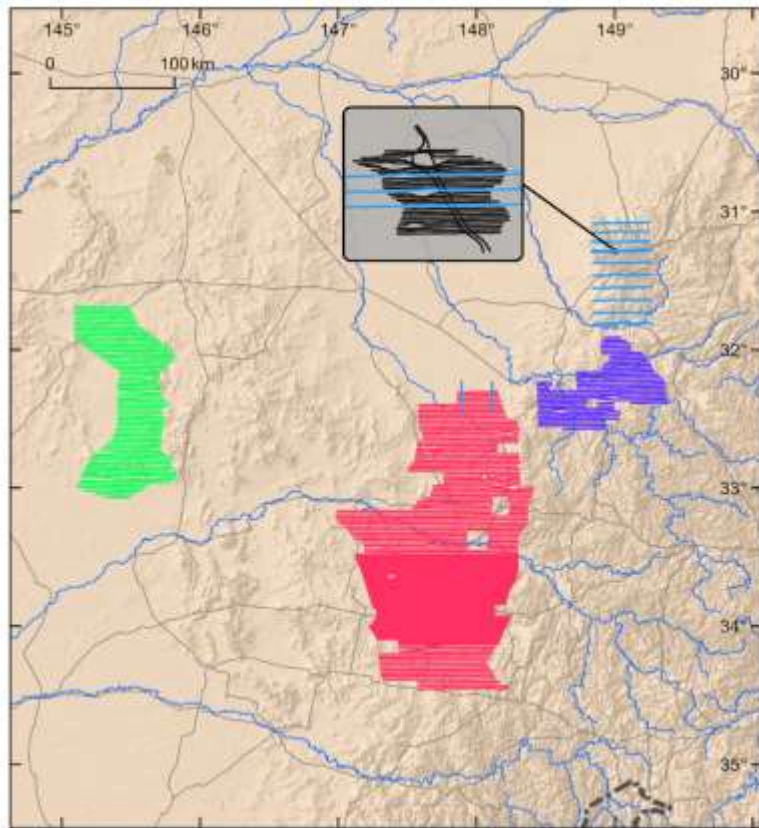
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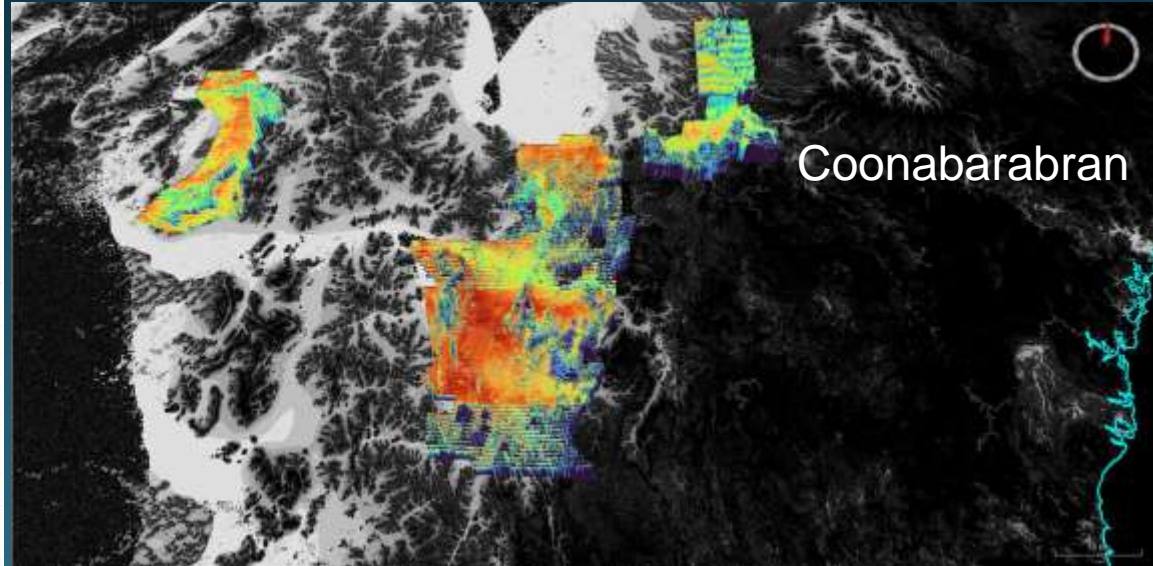
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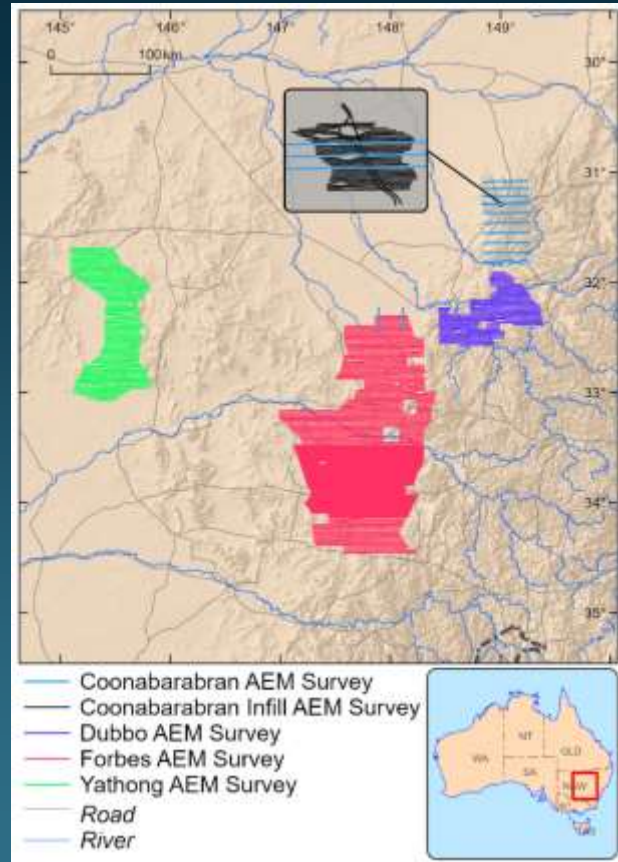
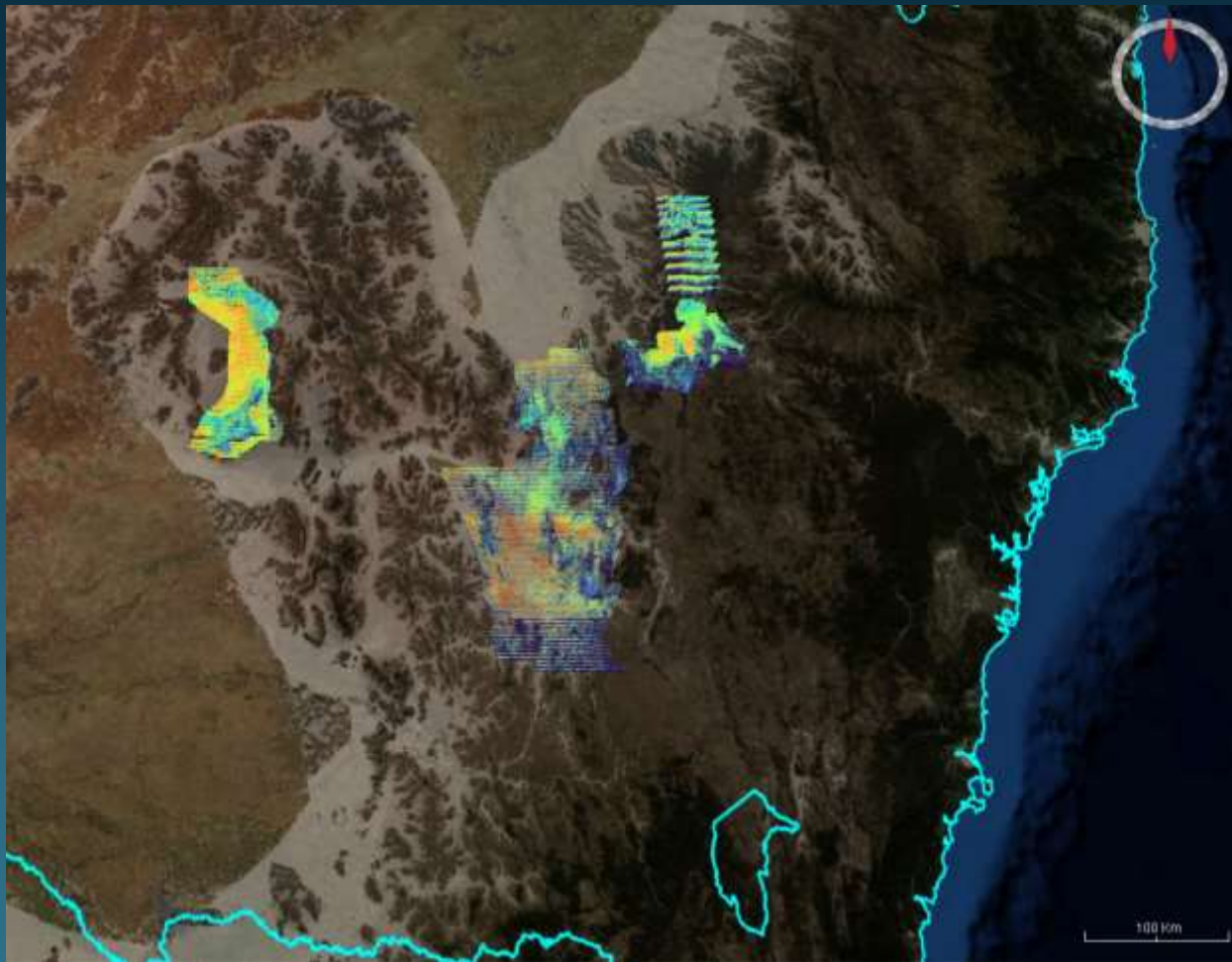


Coonabarabran

PID: <http://pid.geoscience.gov.au/dataset/ga/149118>

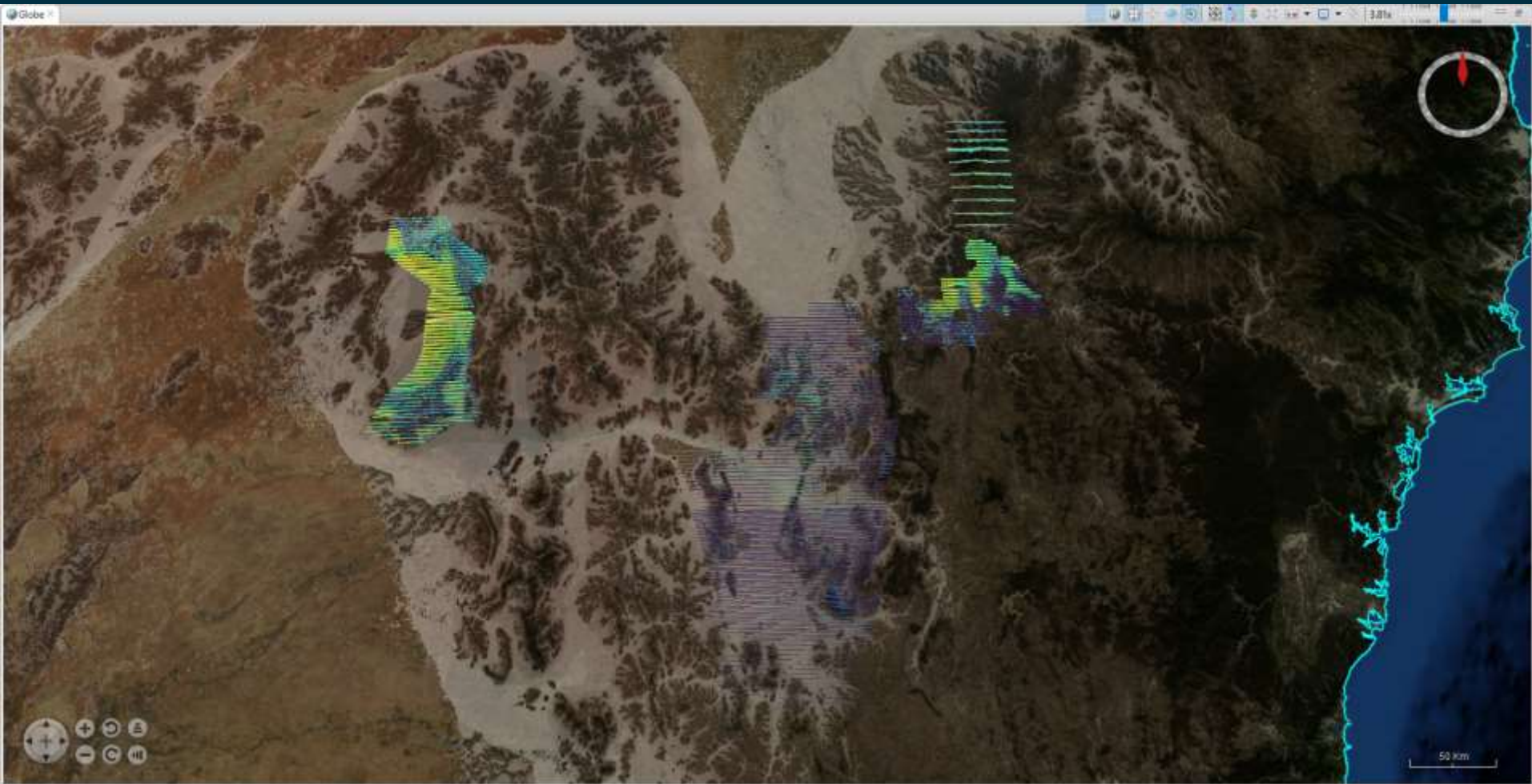
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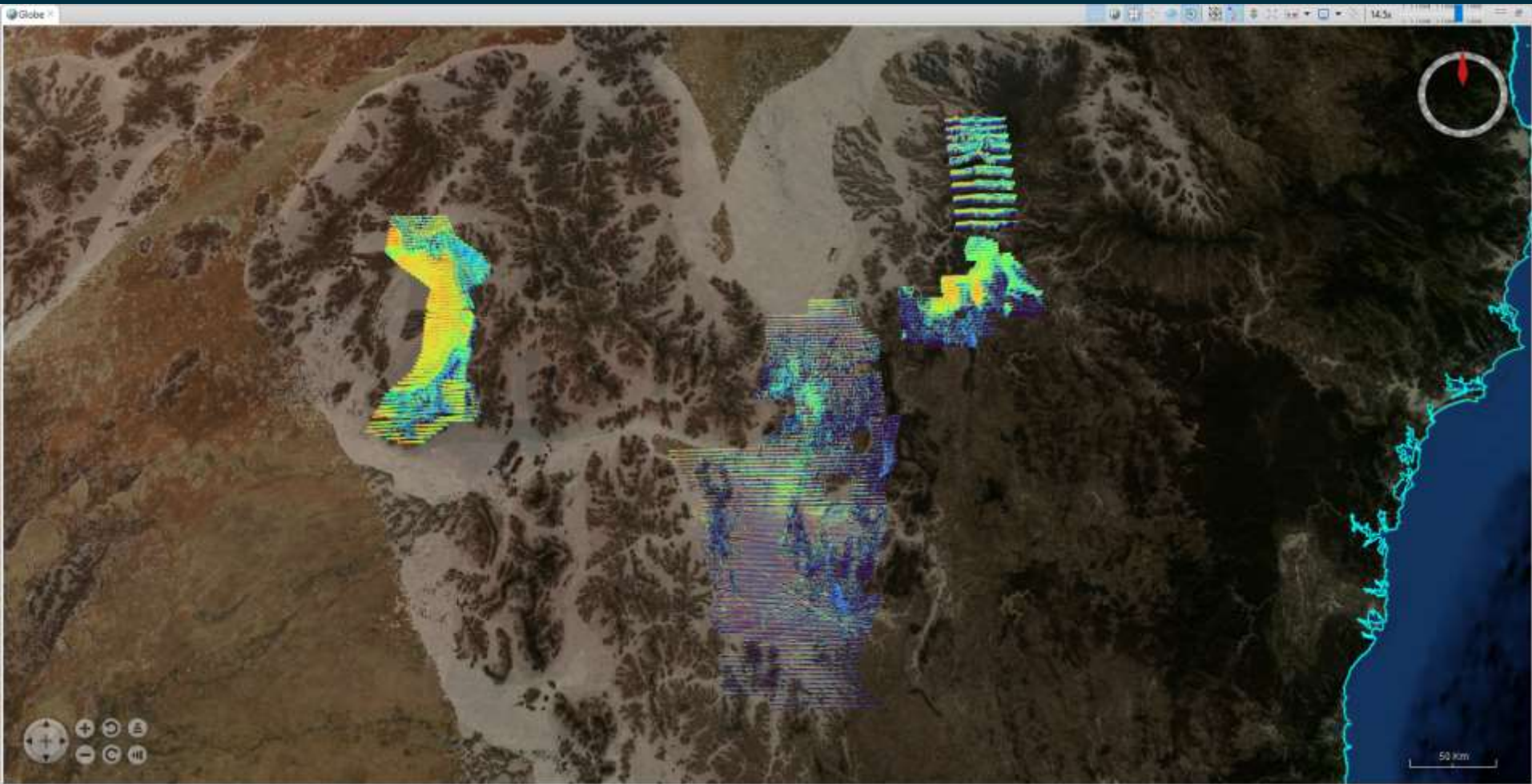
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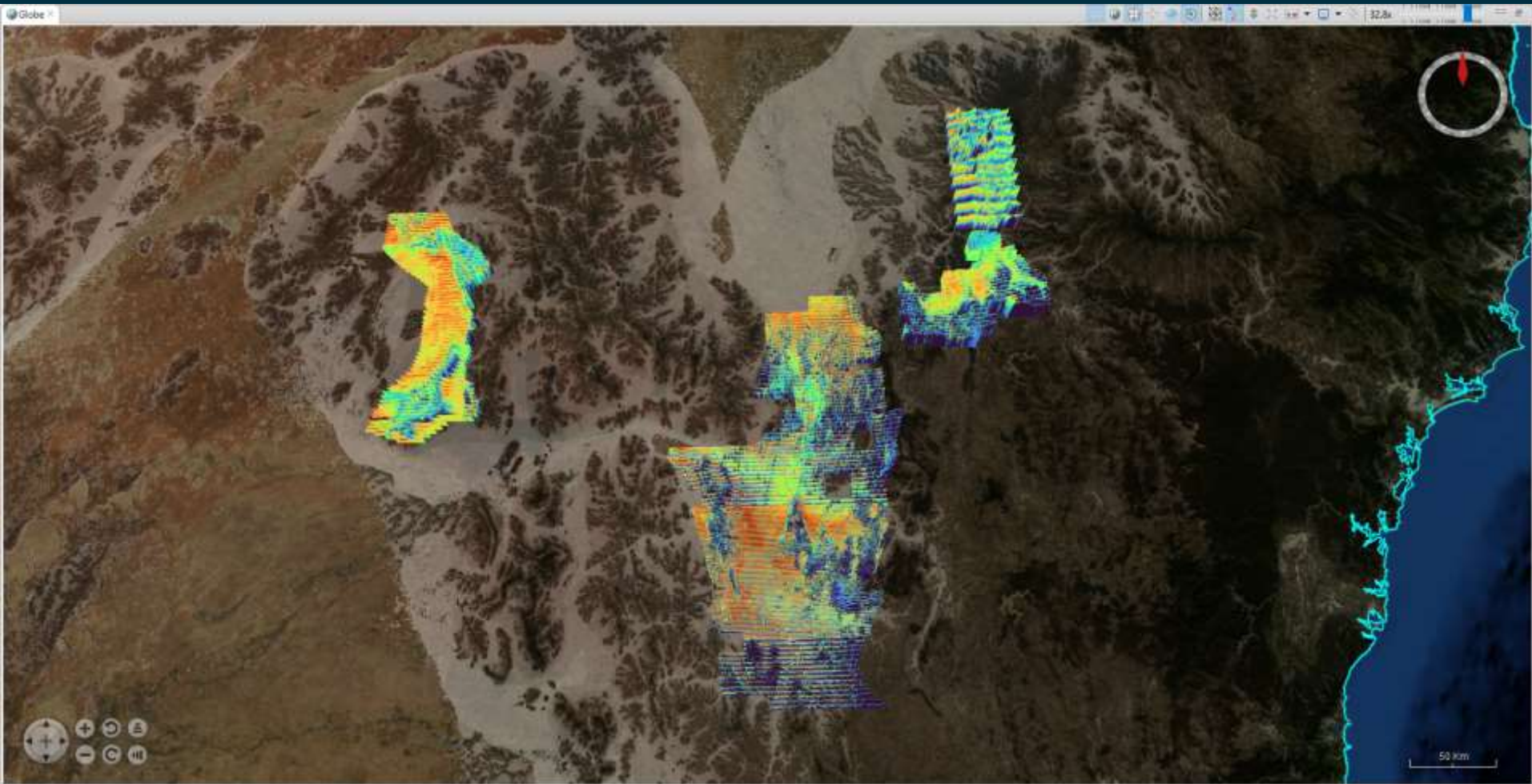


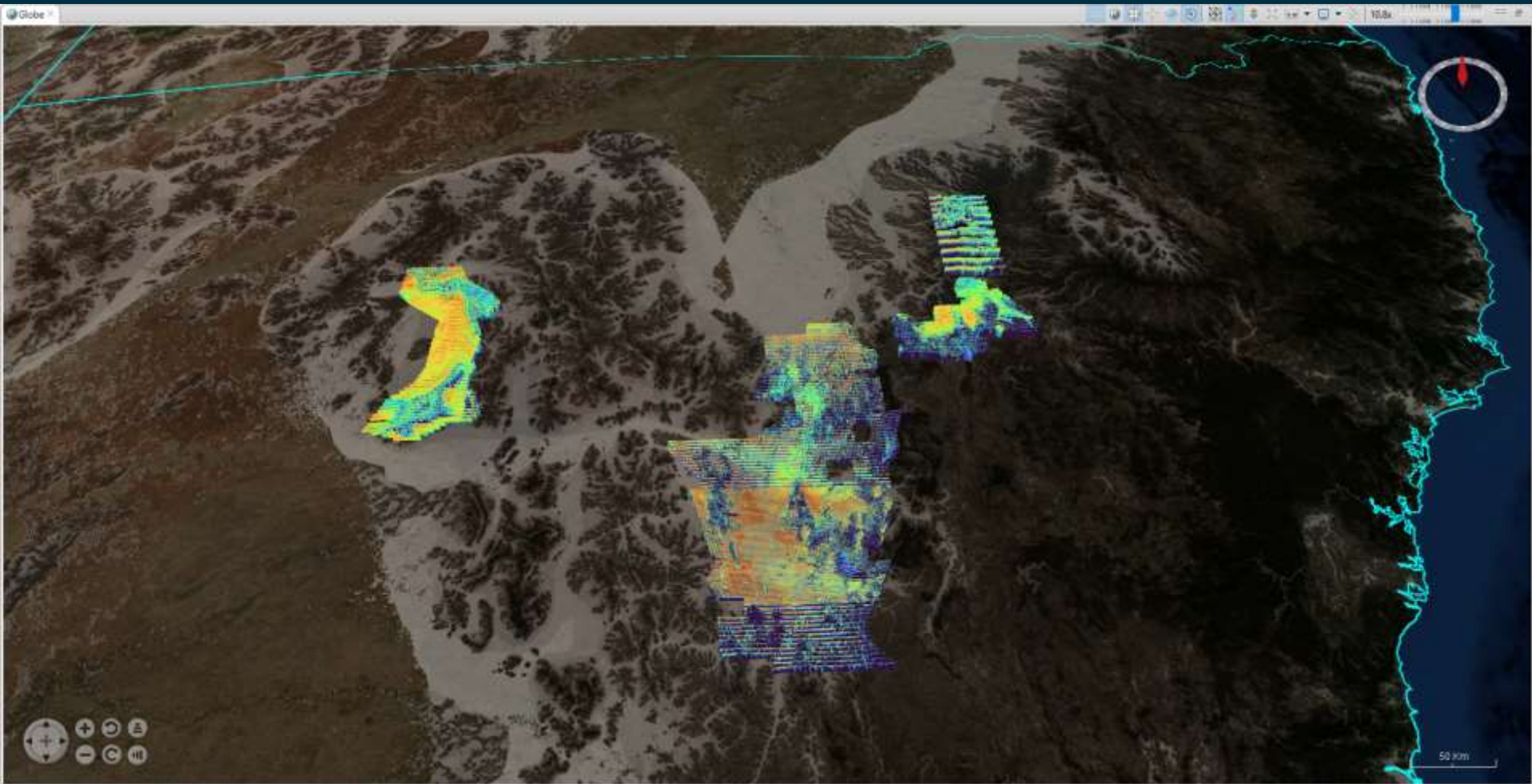


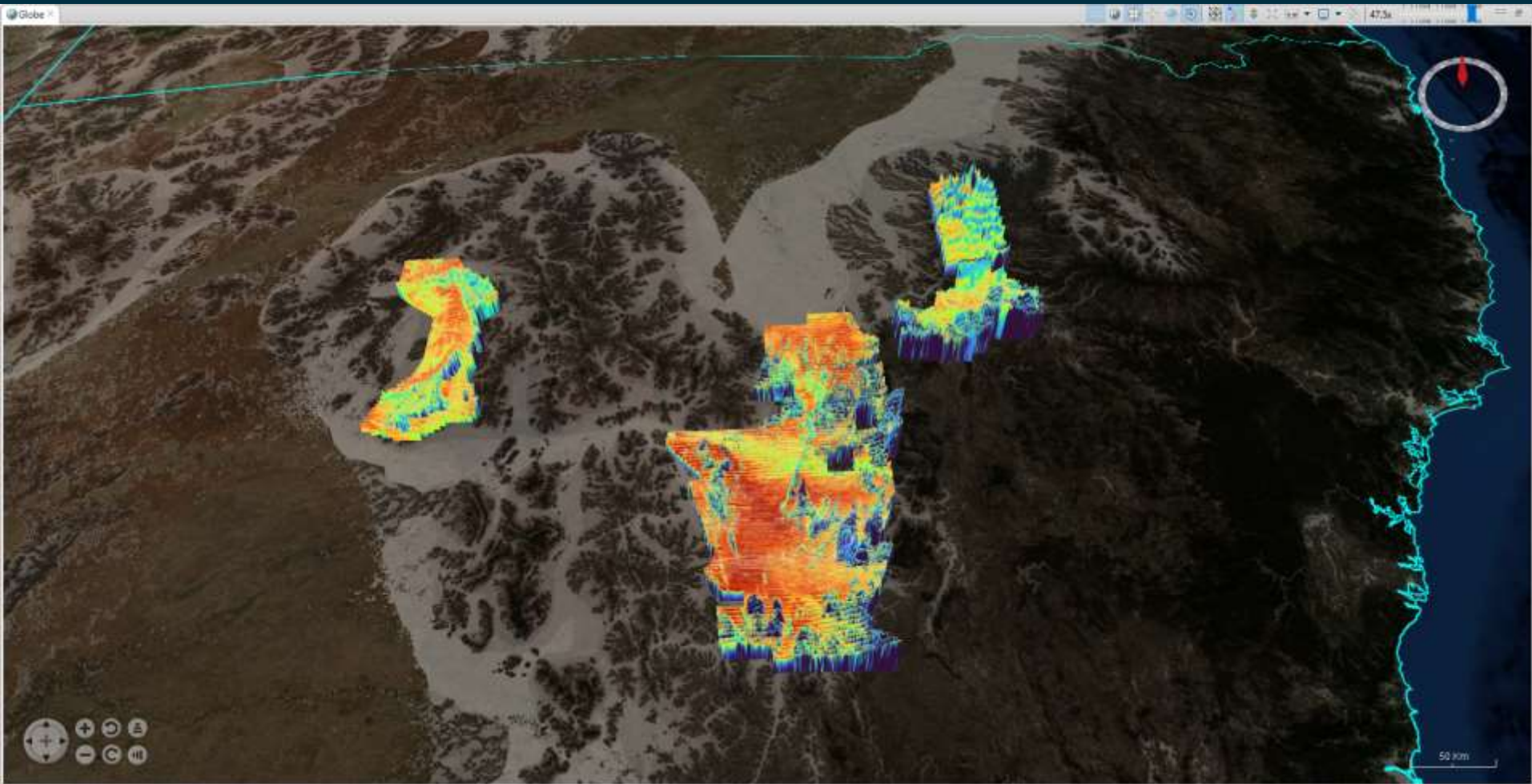


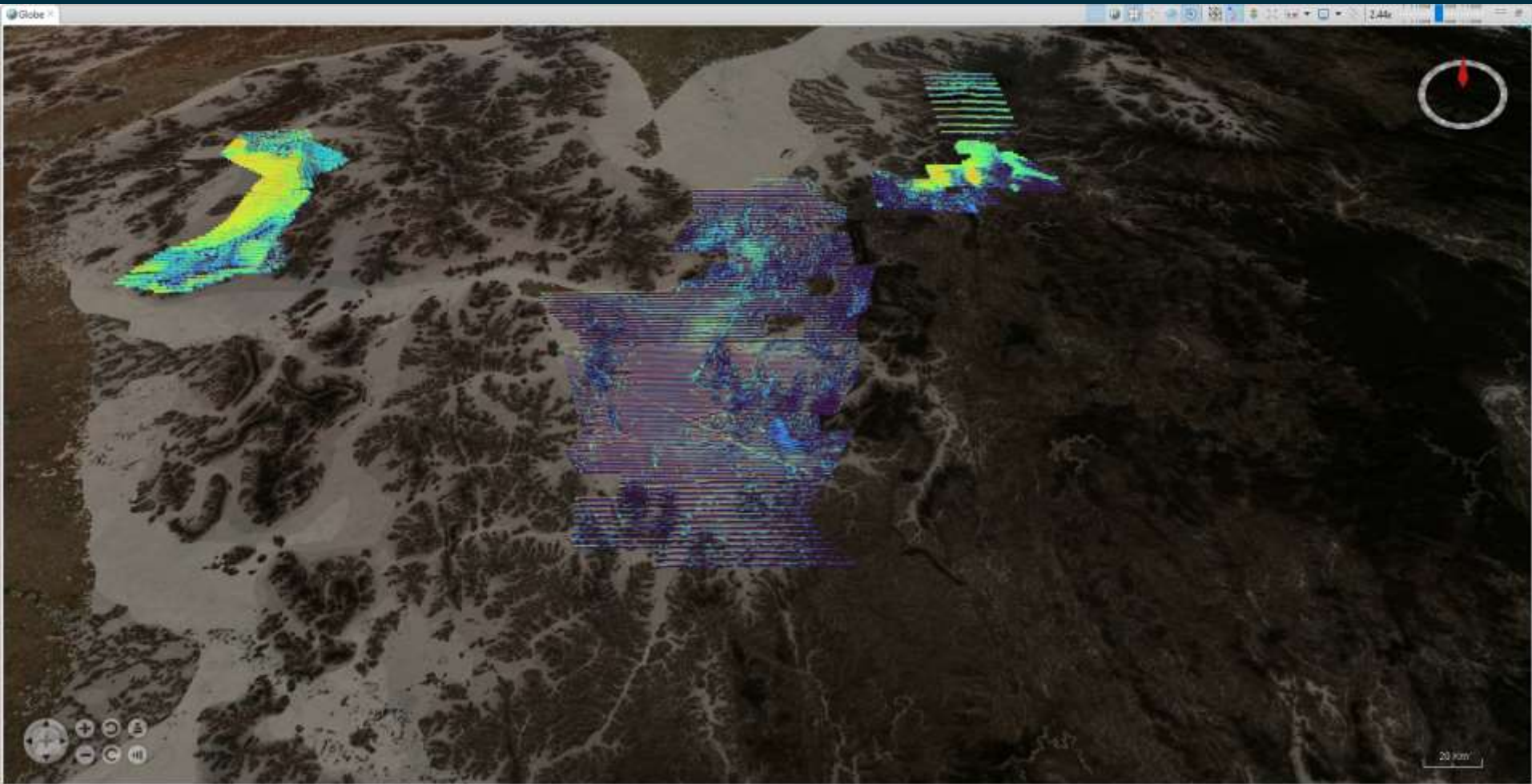


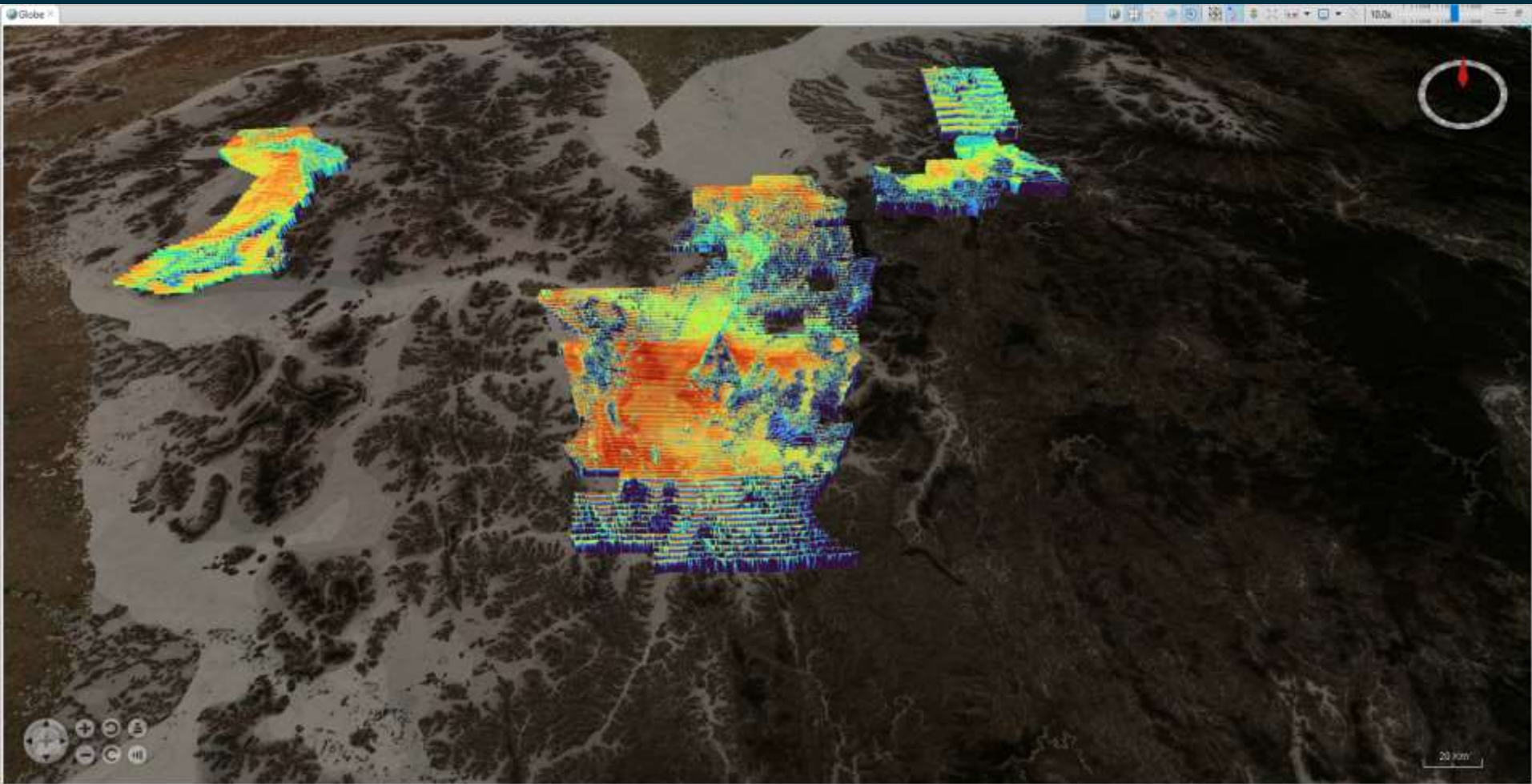


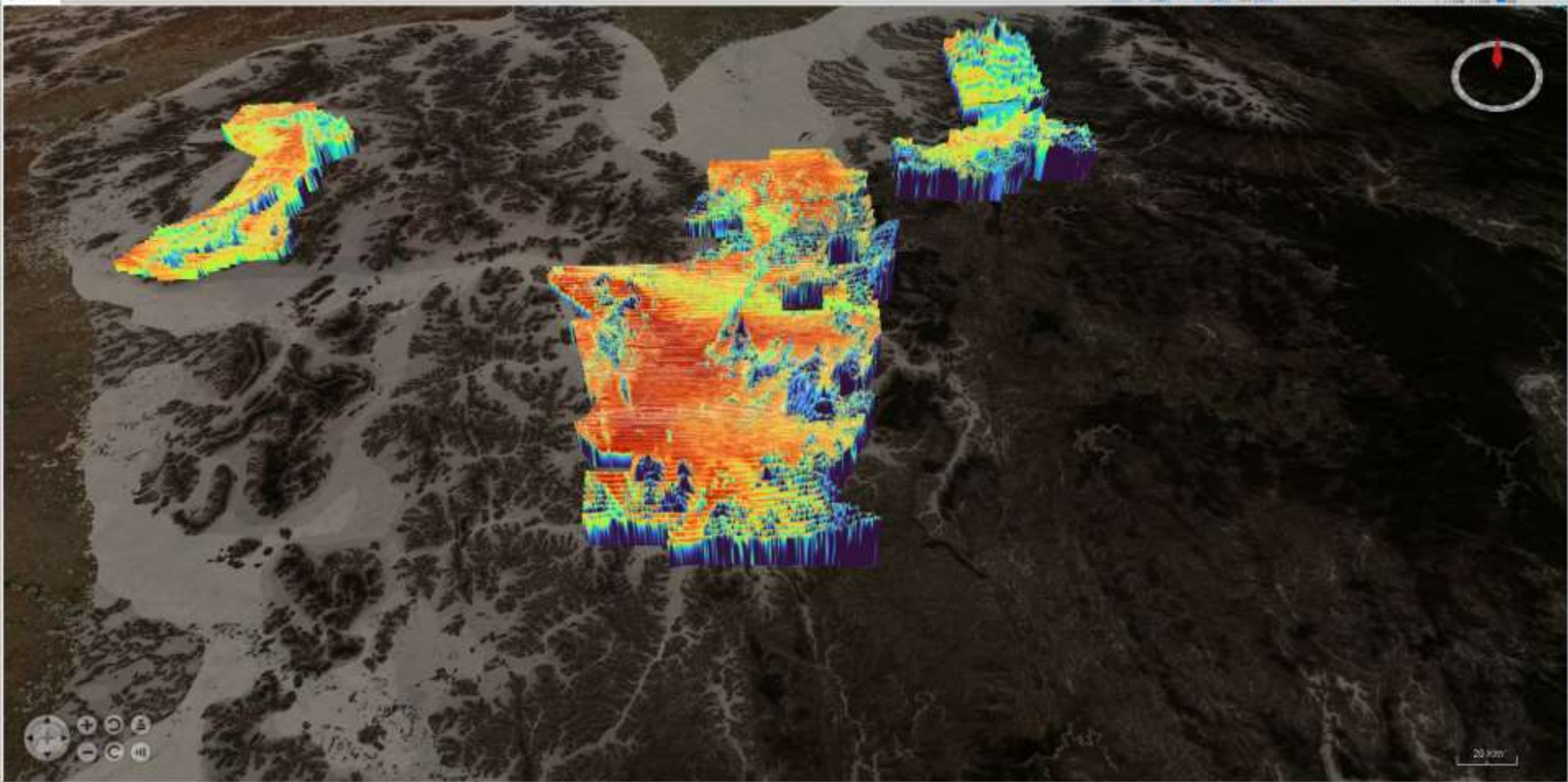


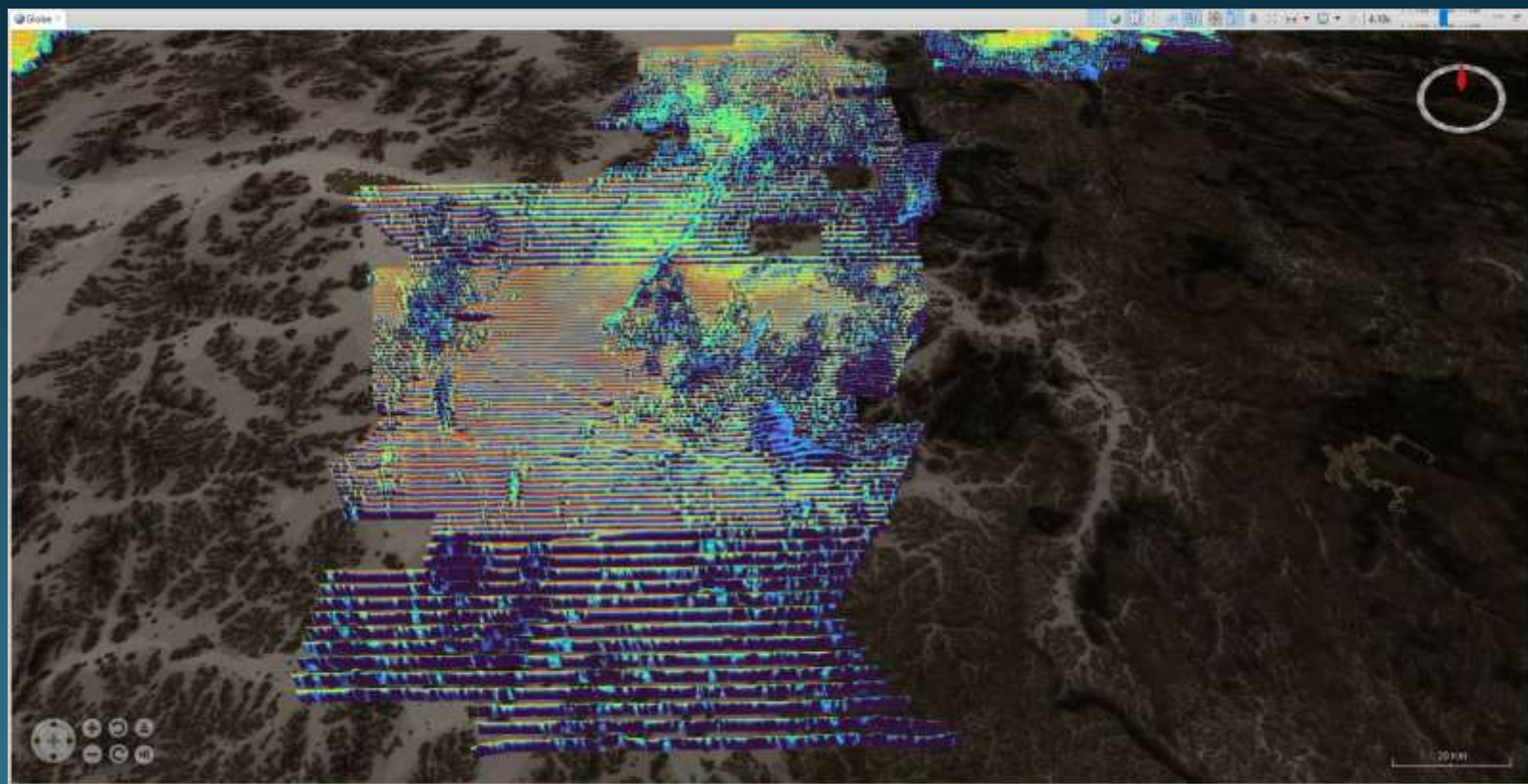


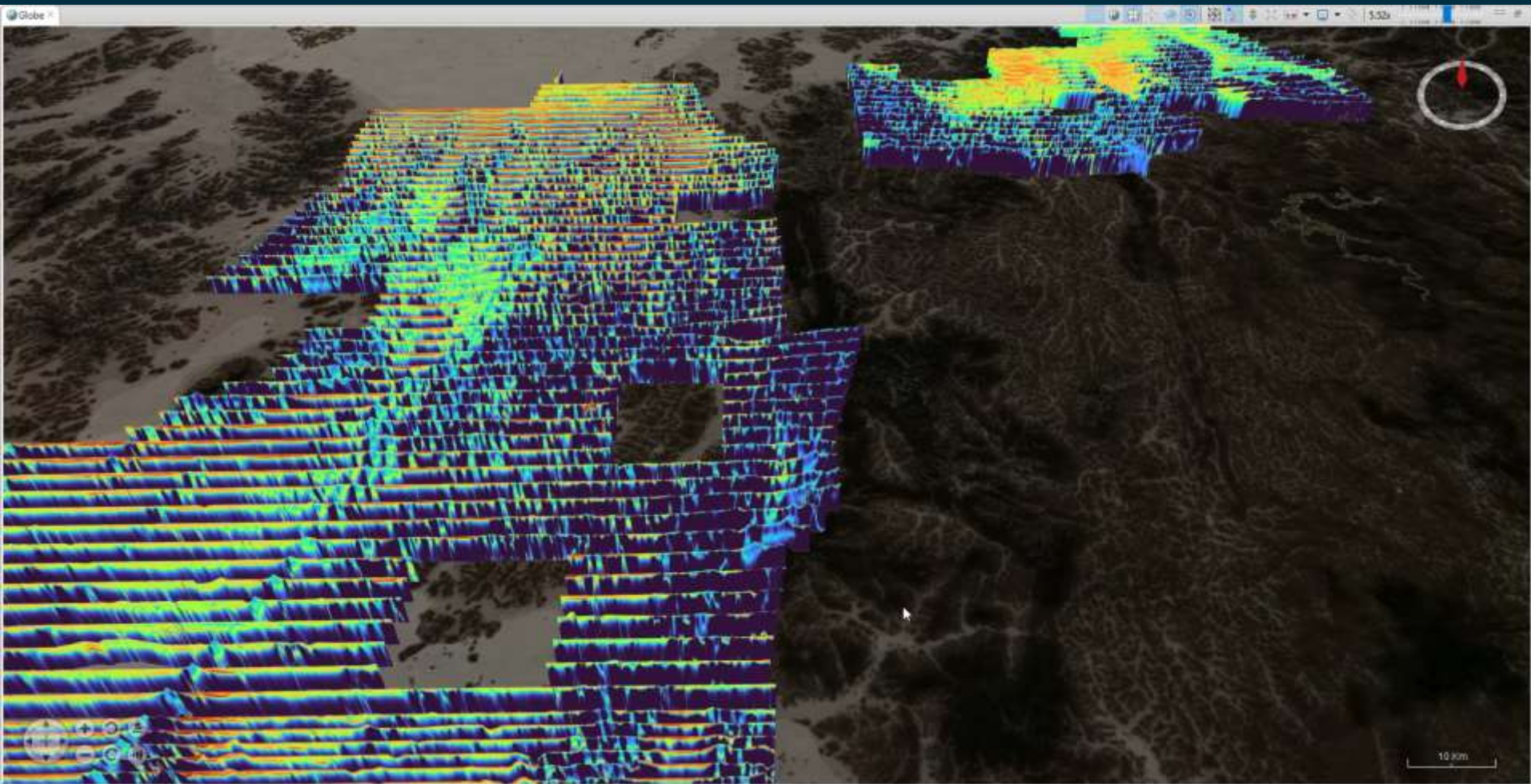


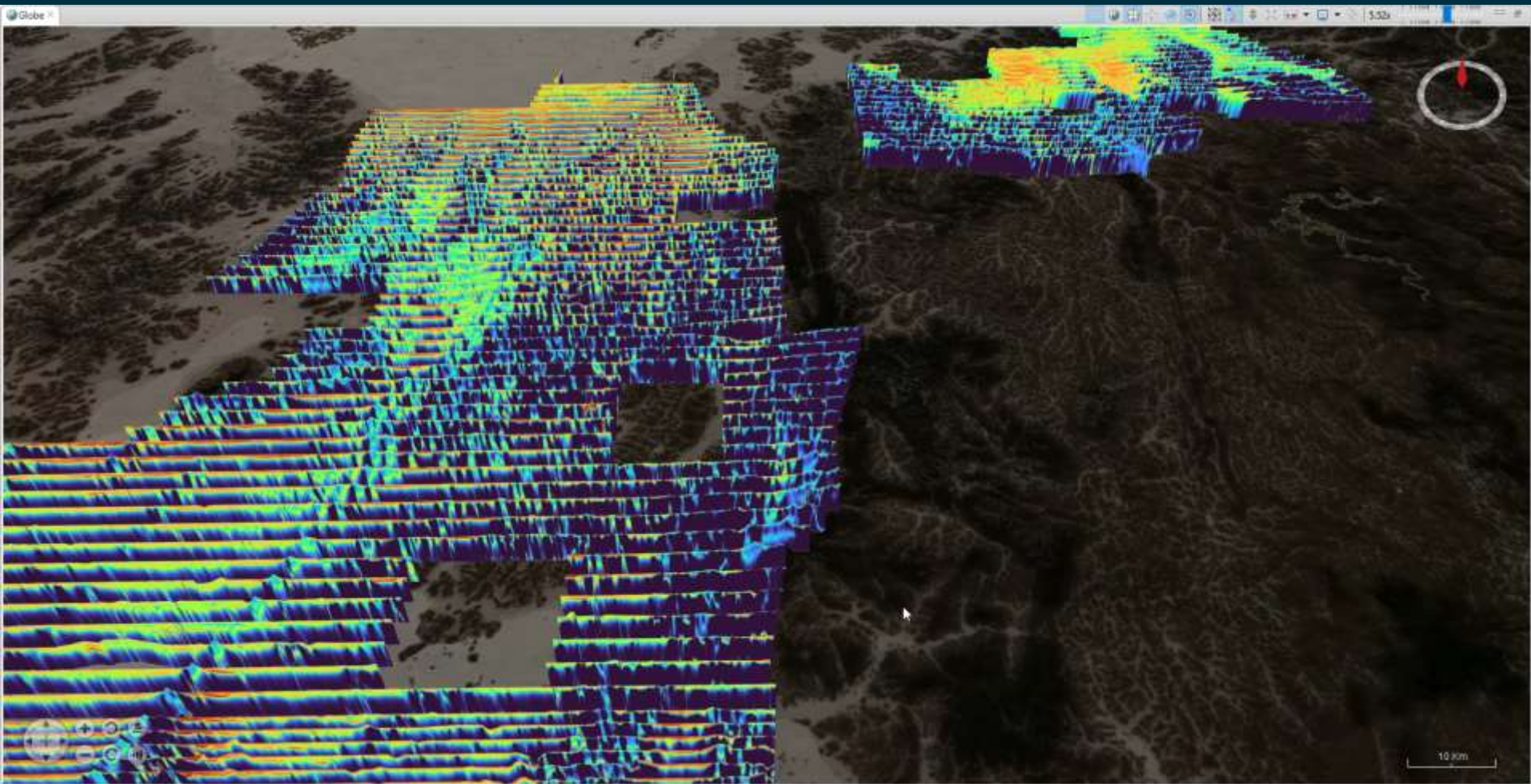






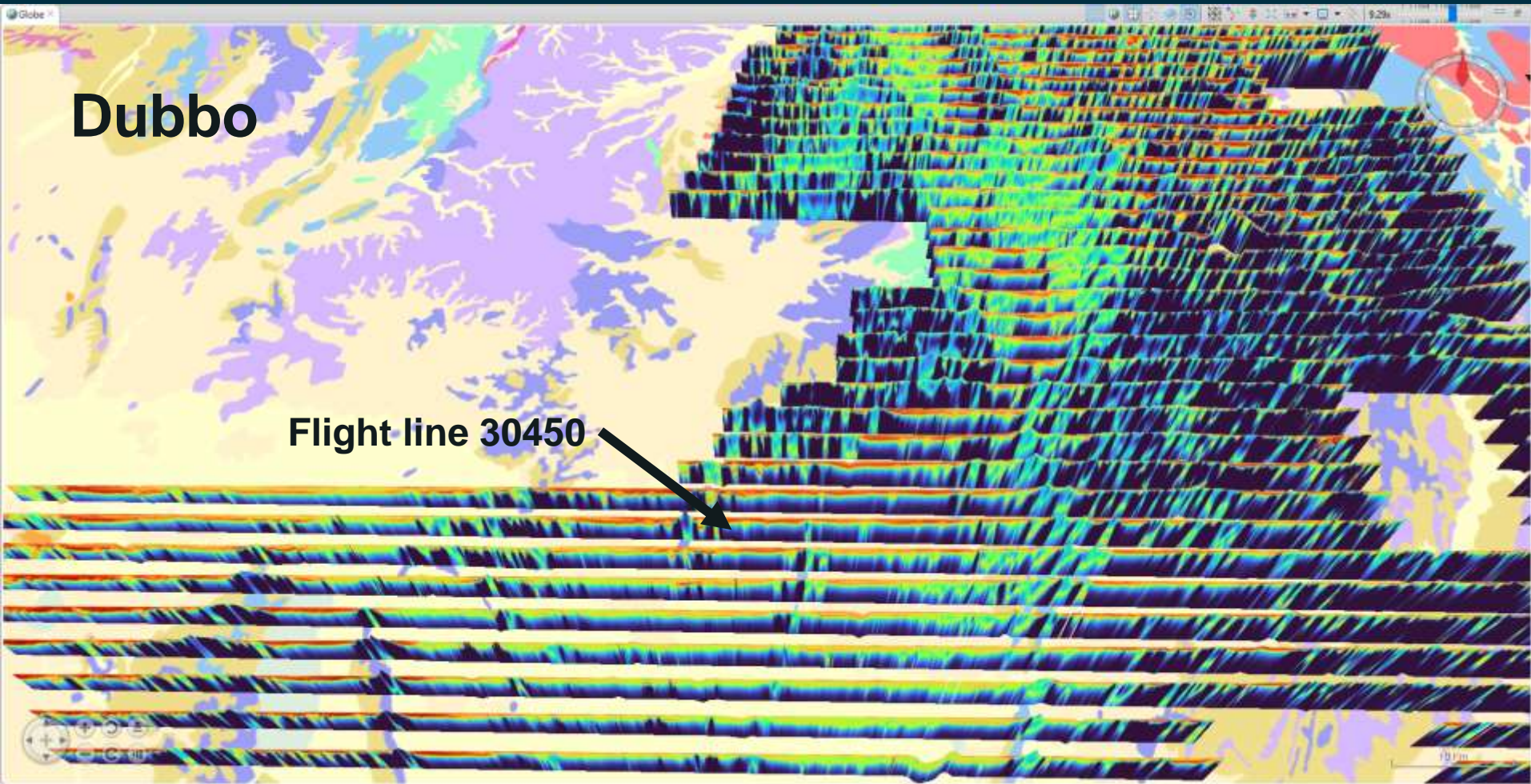
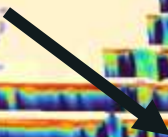


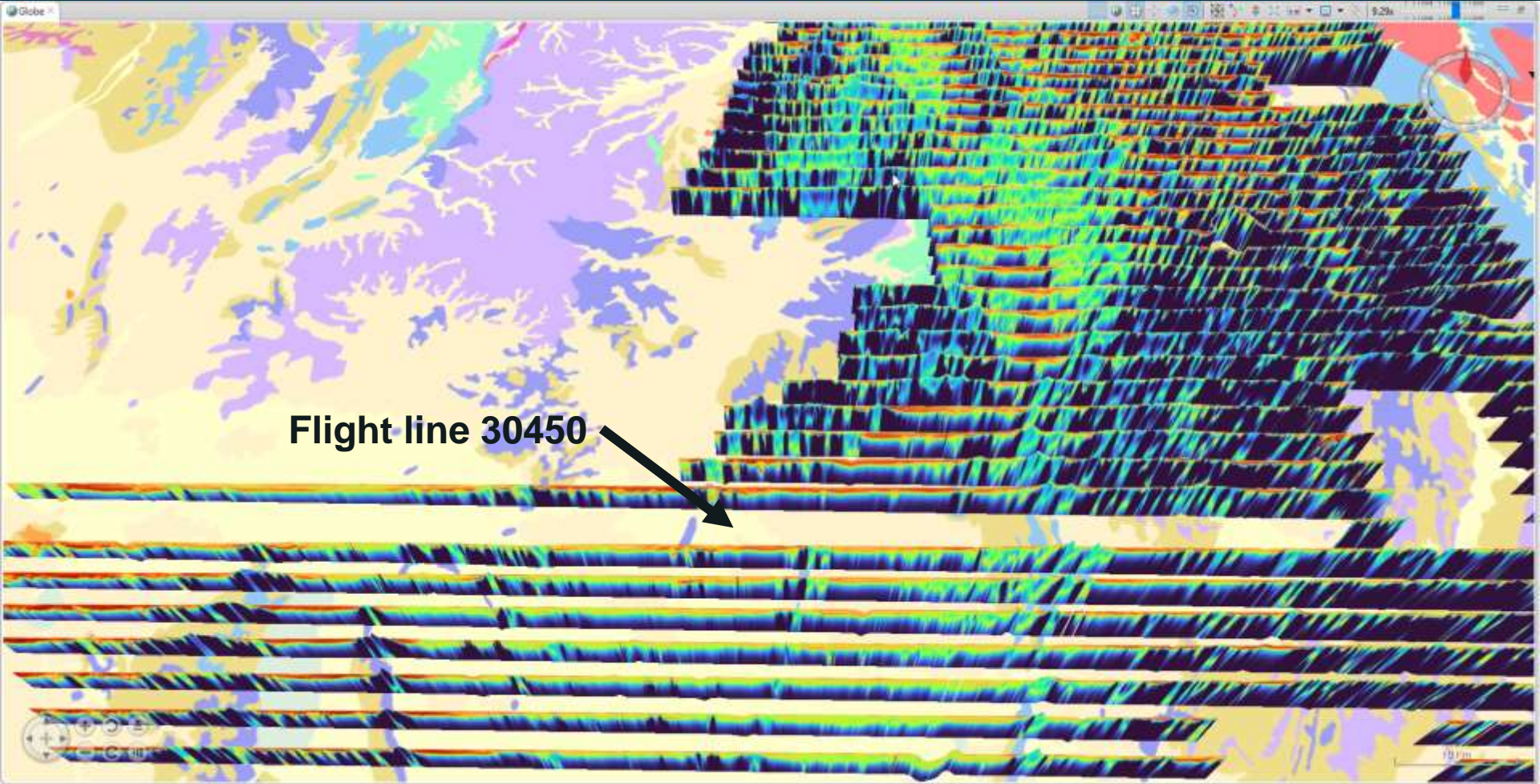




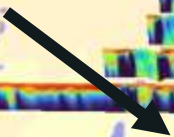
Dubbo

Flight line 30450



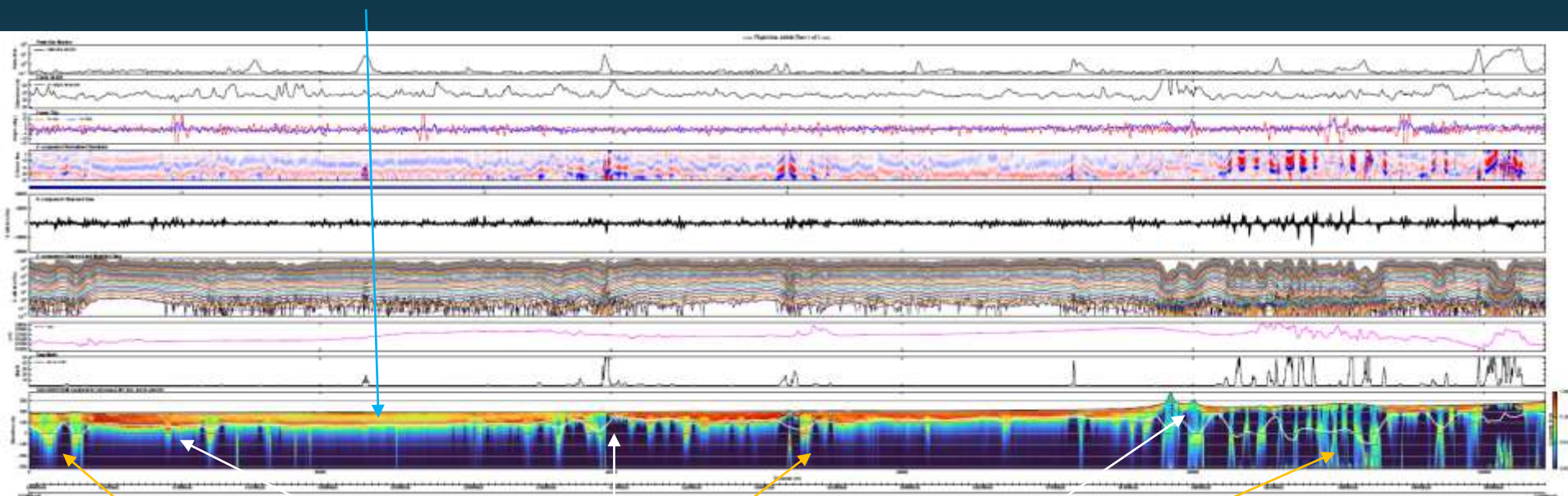


Flight line 30450



Flight line 30450

Potential aquifers

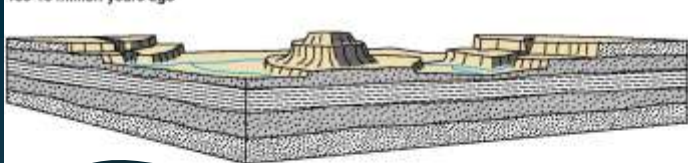


Variable cover thickness

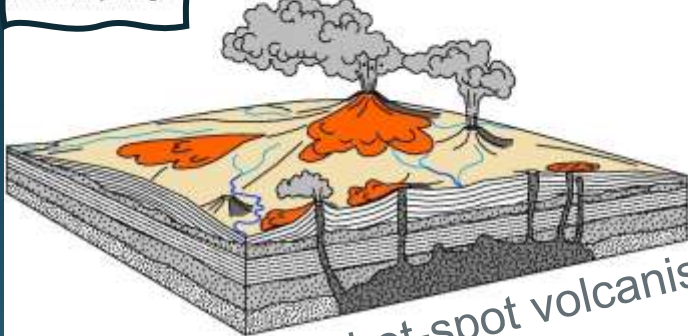
Discrete conductors undercover

Warrumbungle volcanic complex

180-18 million years ago

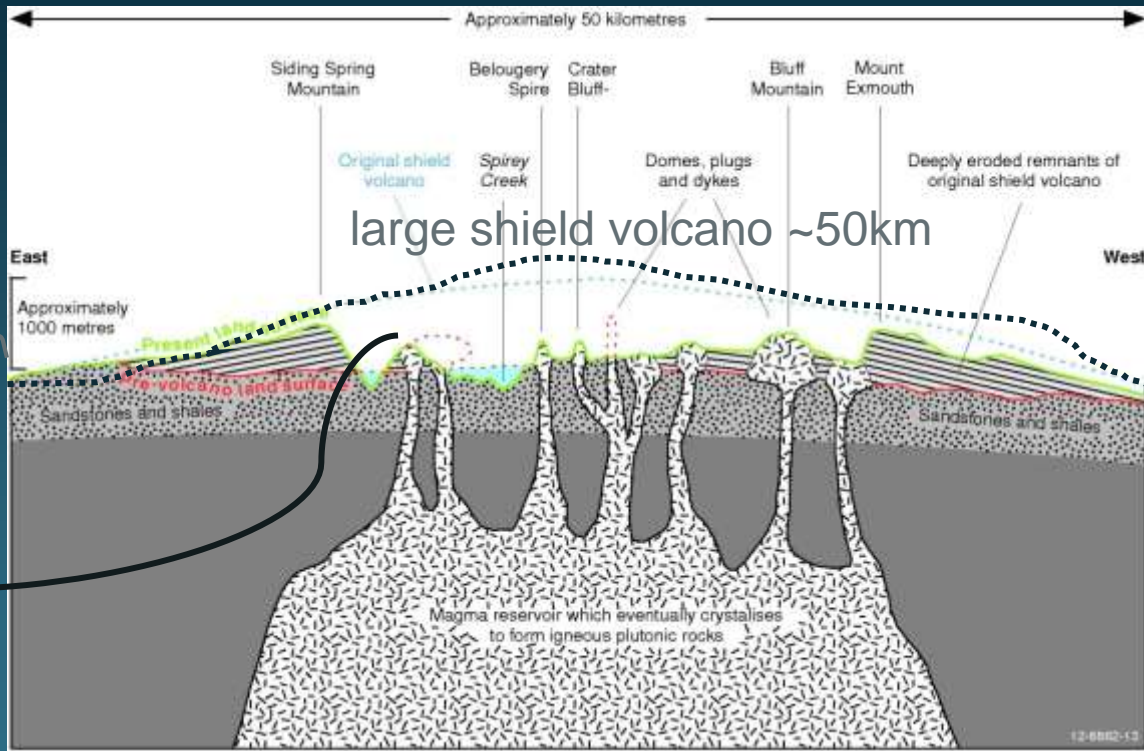
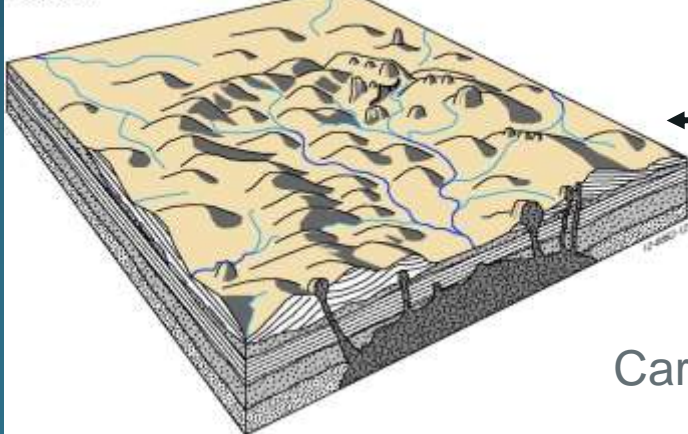


17-13 million years ago



hot-spot volcanism

Present day

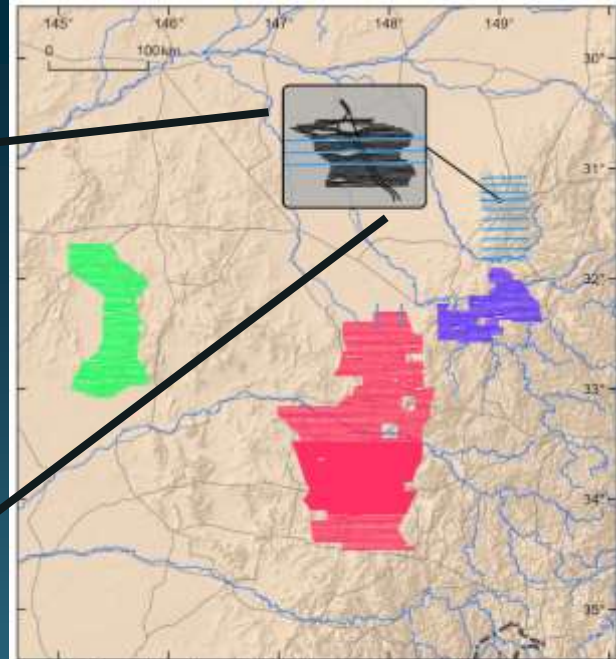


Carved away the current spectacular landforms

Coonabarabran (Infill) Warrumbungles

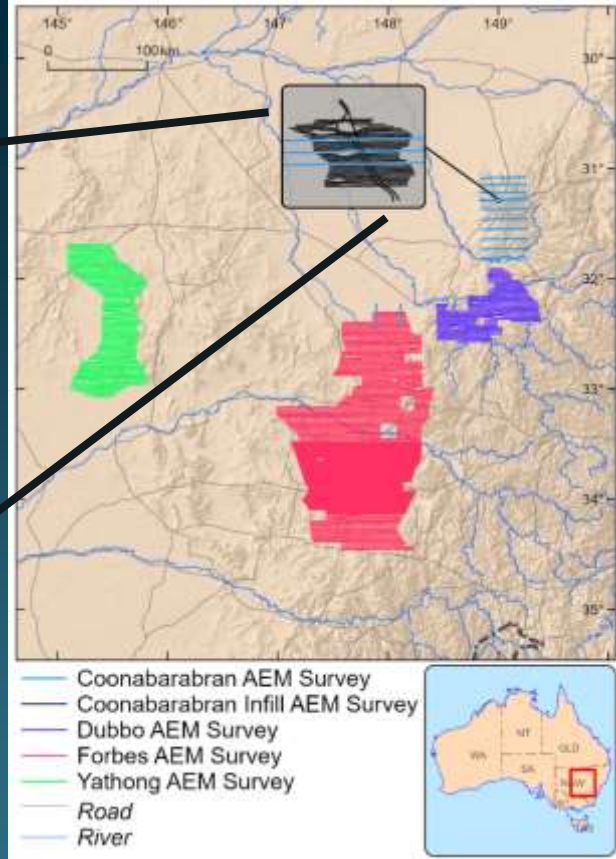
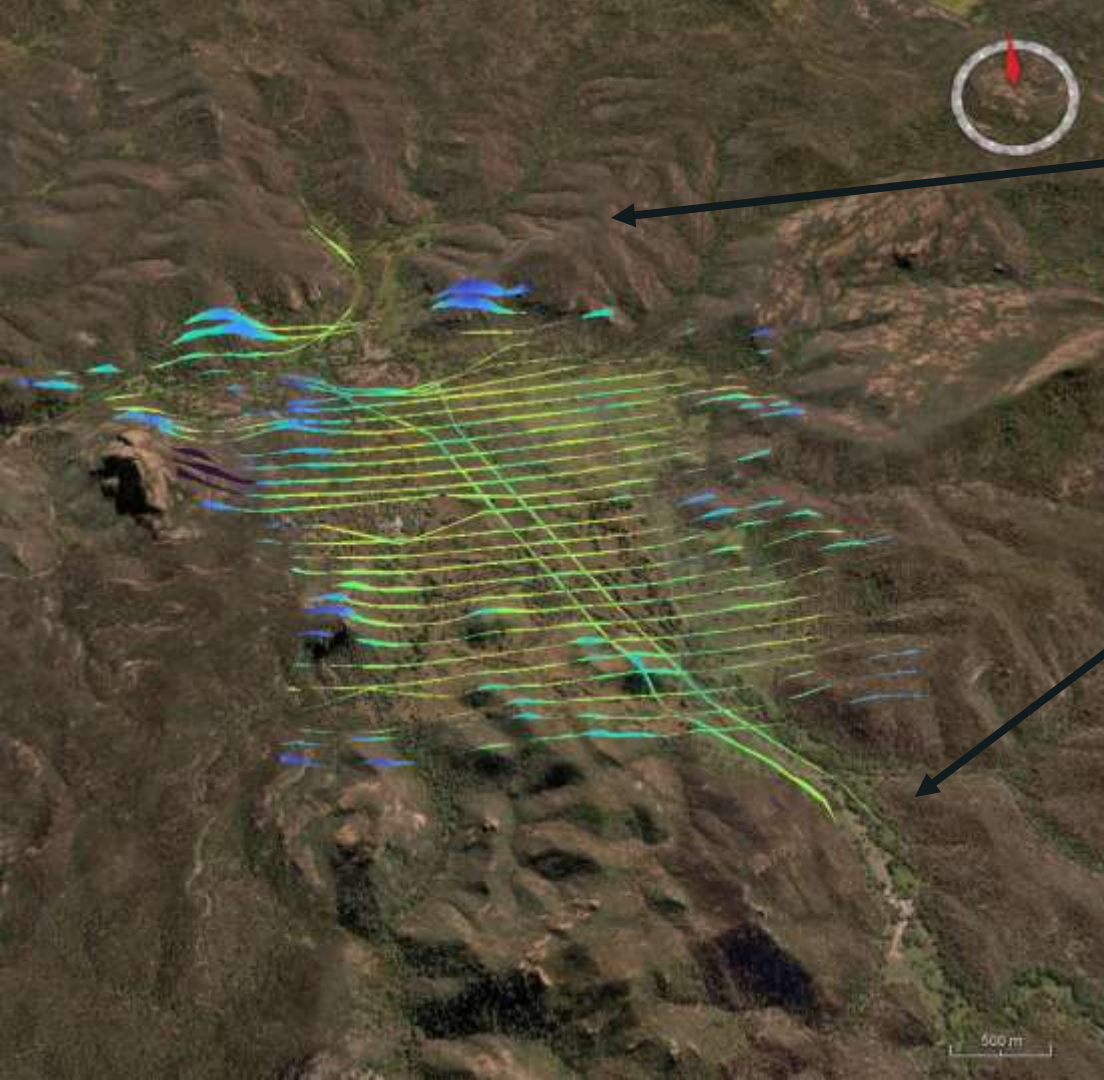


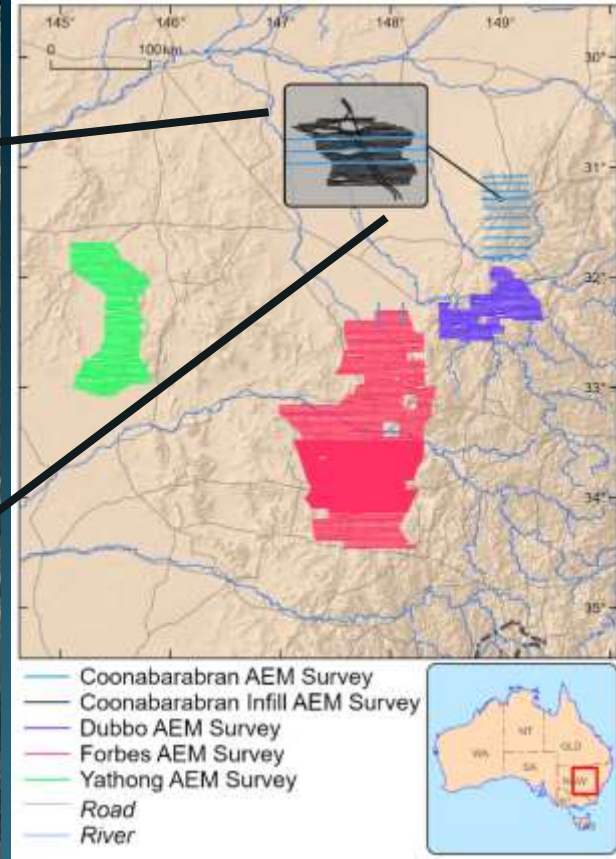
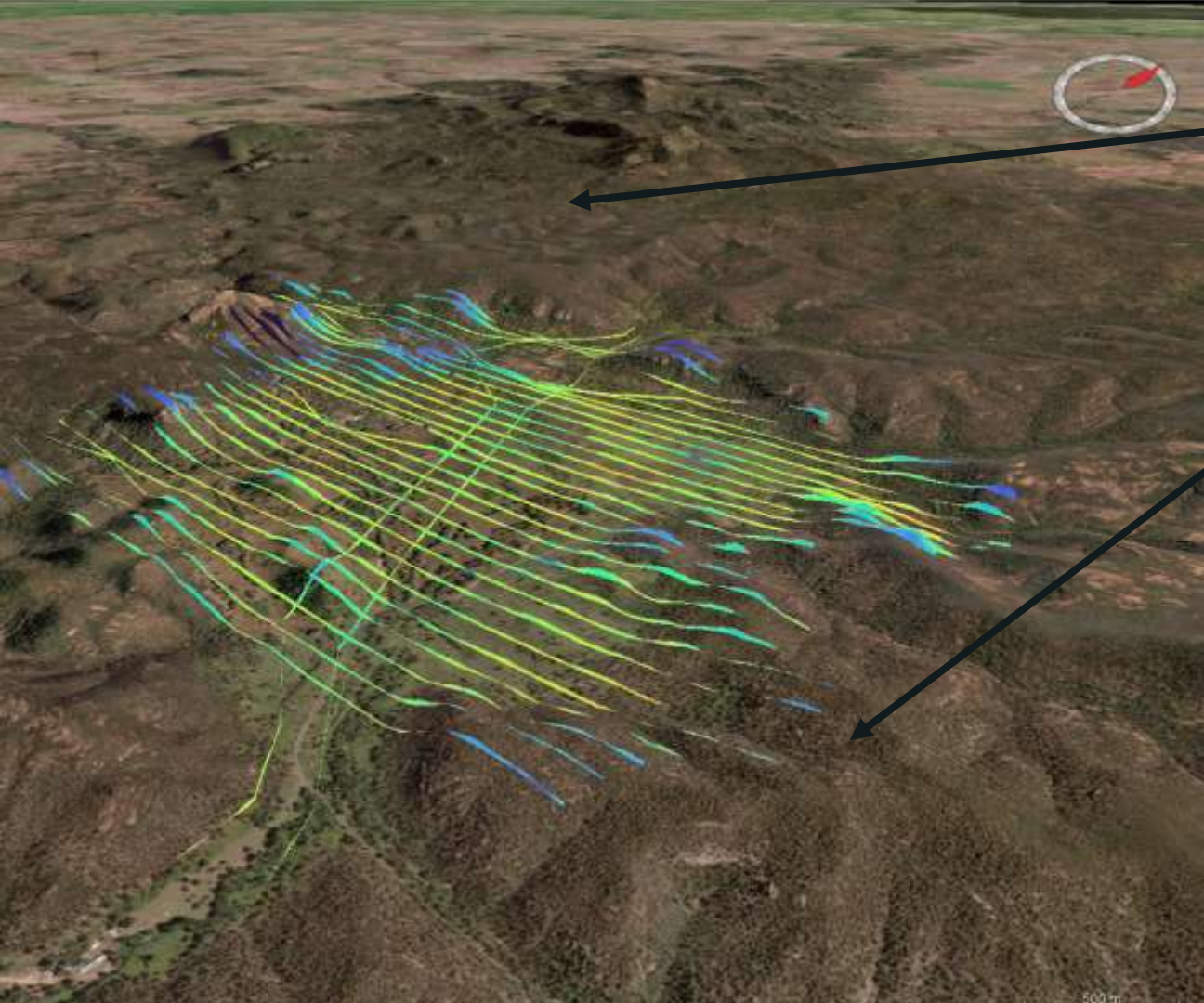
Coonabarabran
Coonabarabran (Infill) Warrumbungles

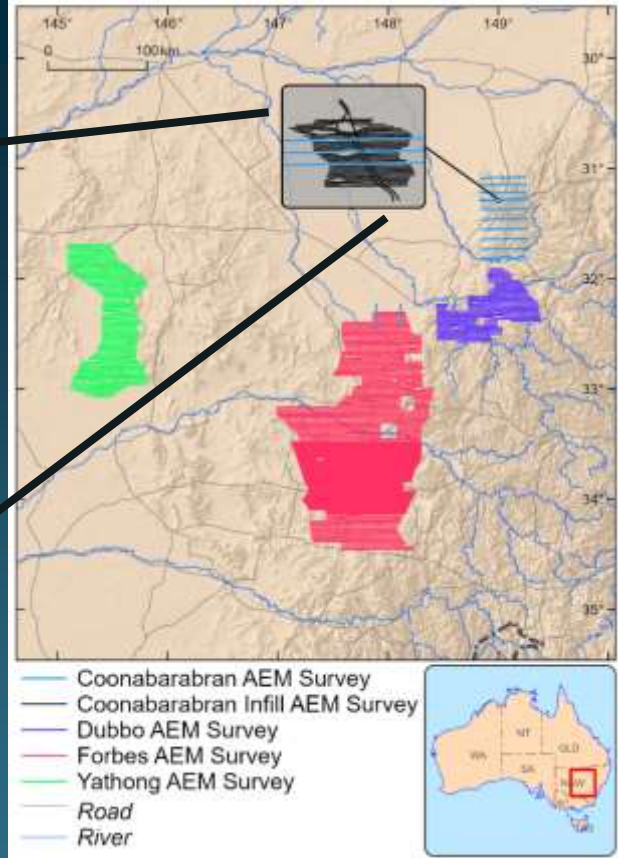
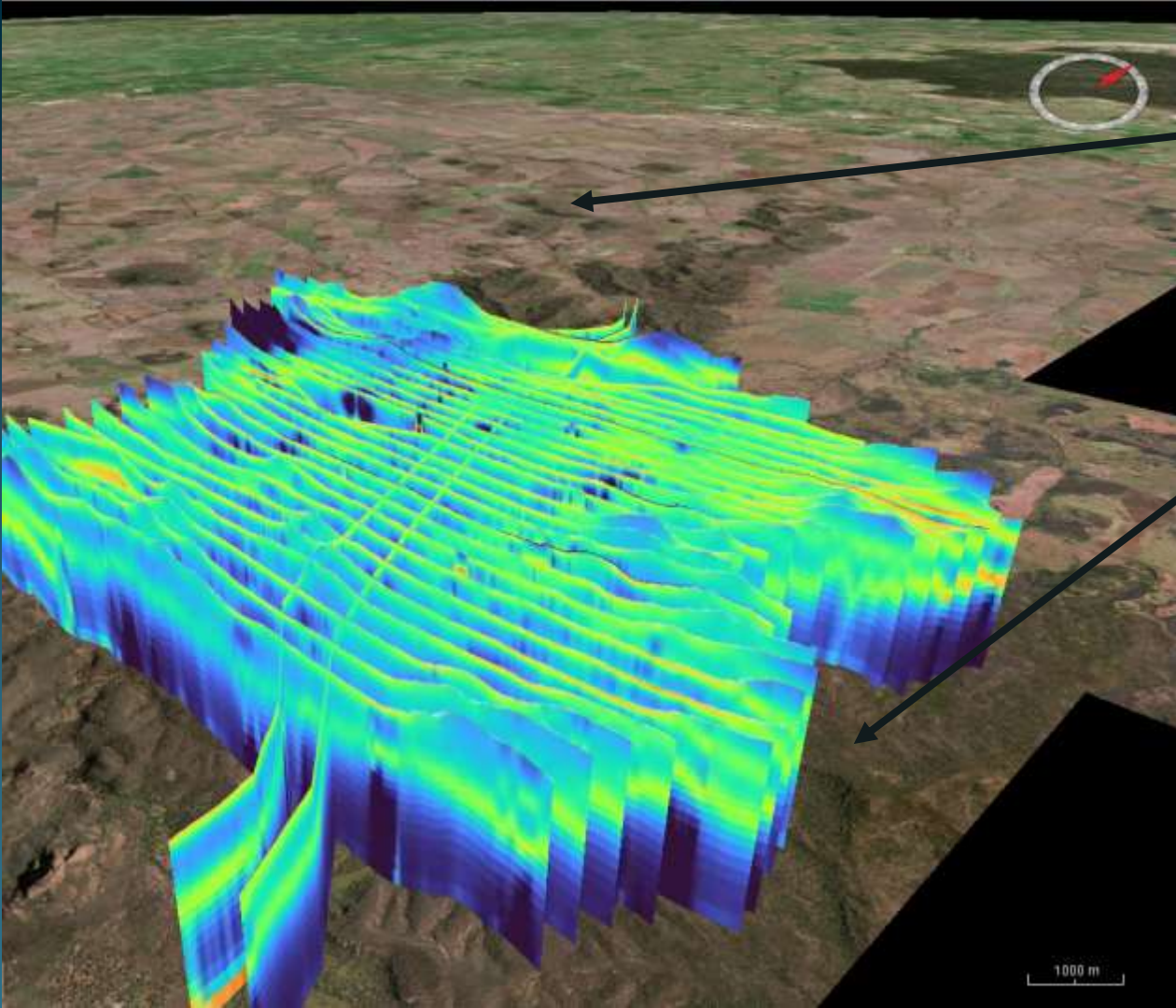


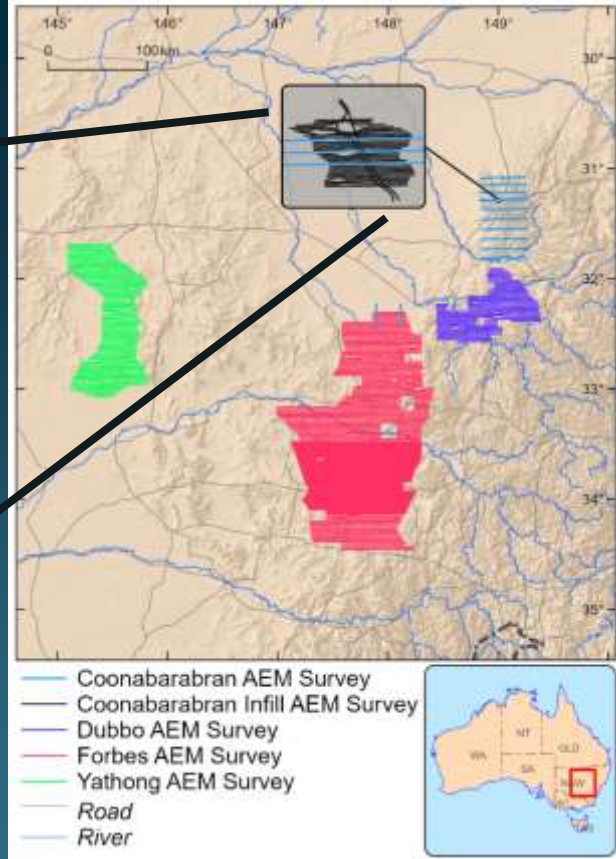
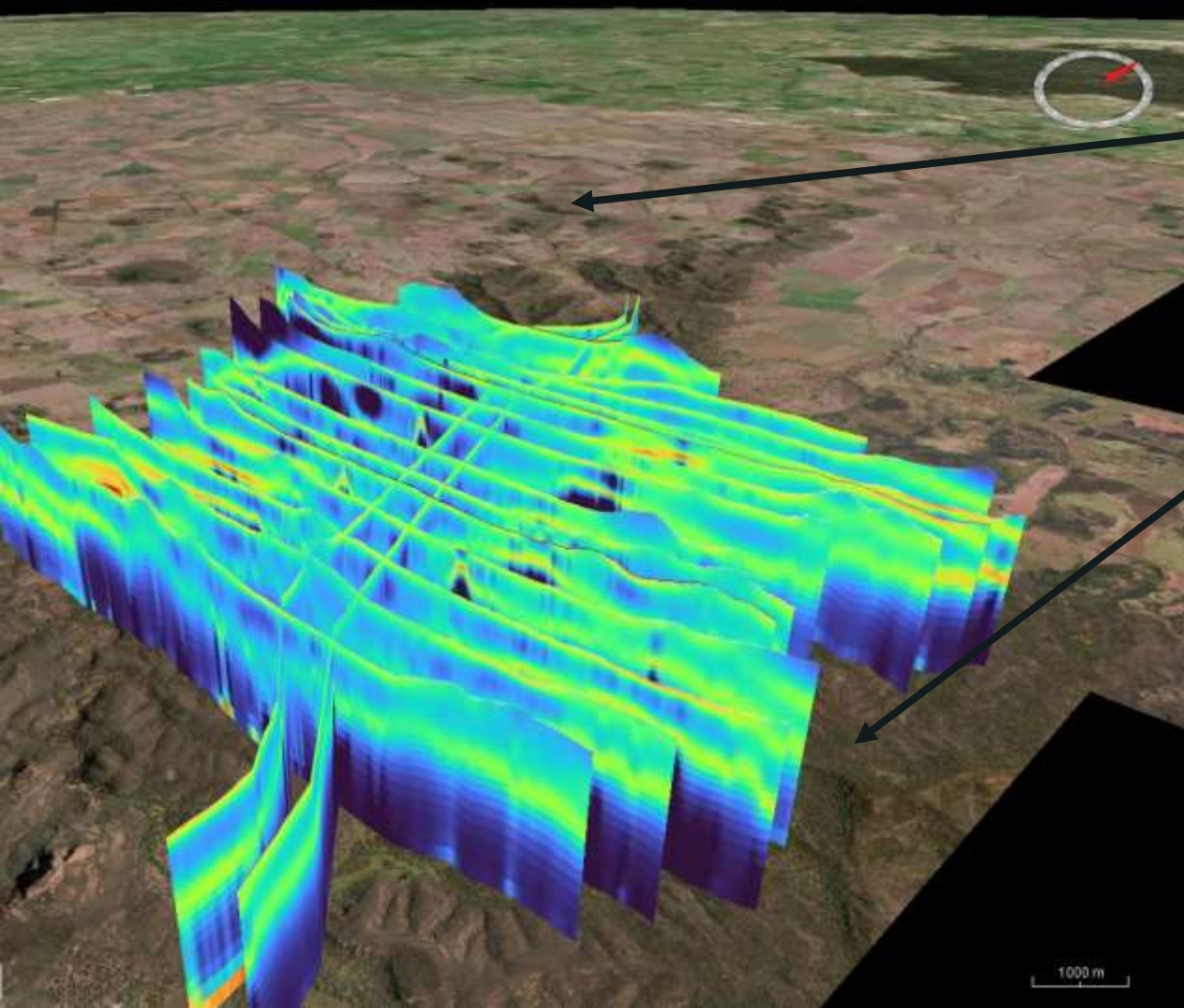
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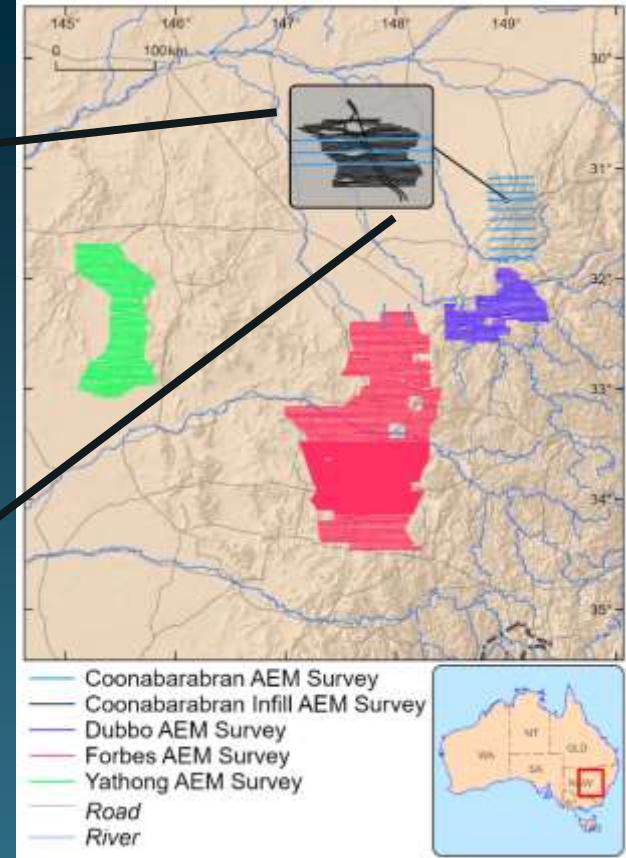
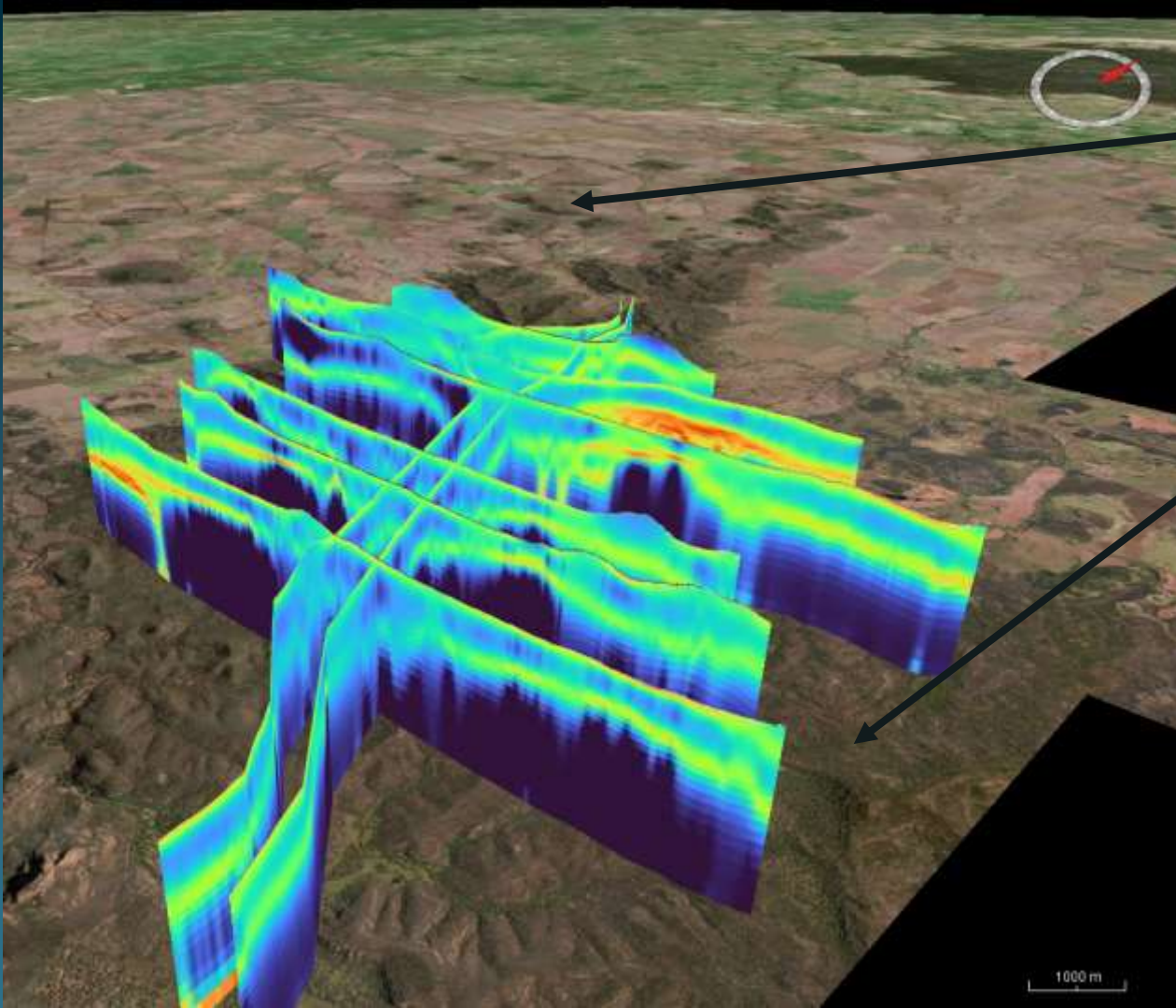


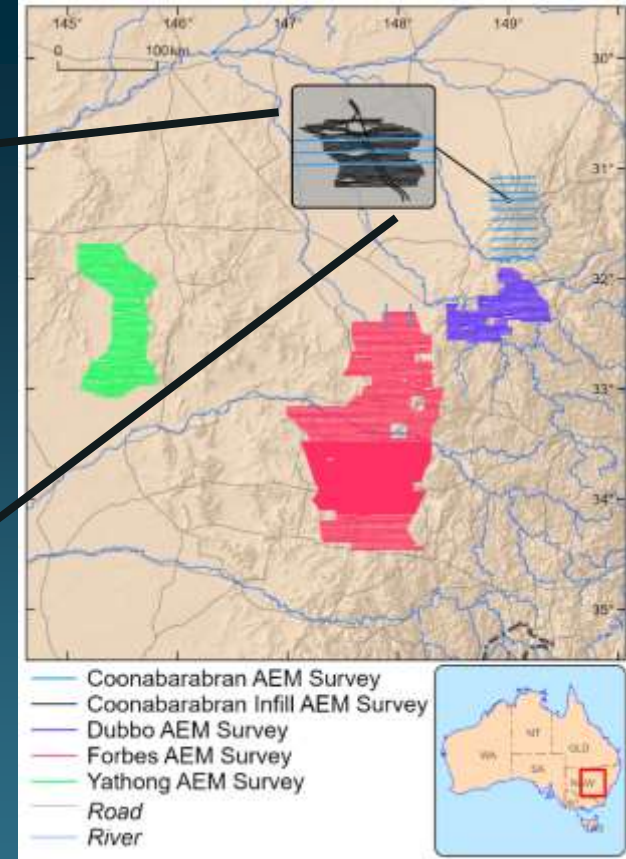
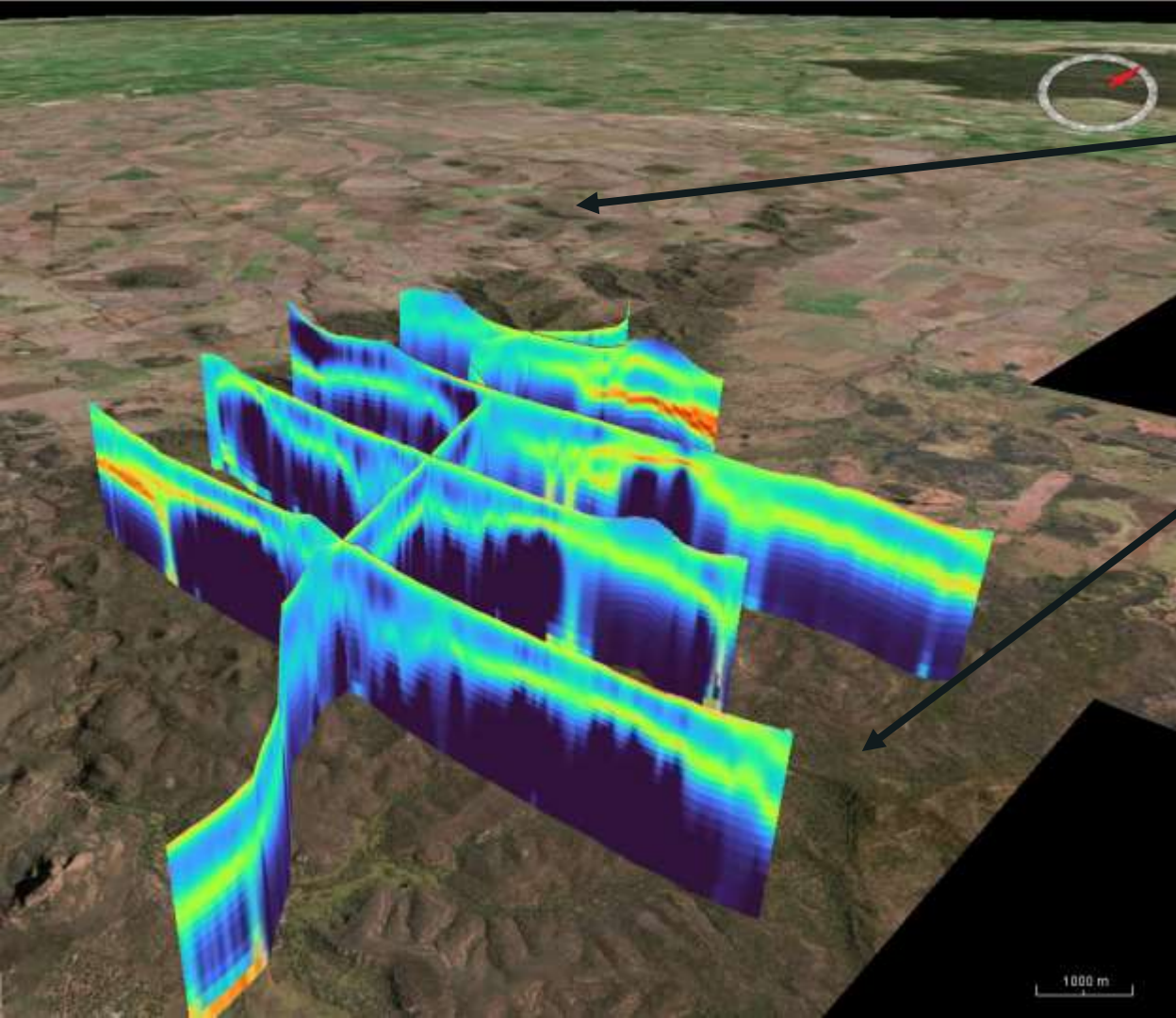


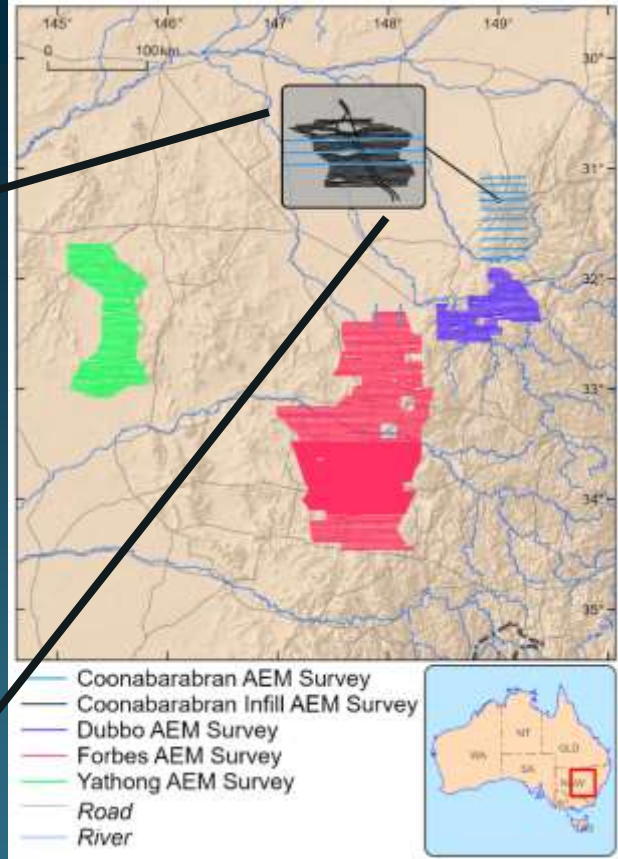
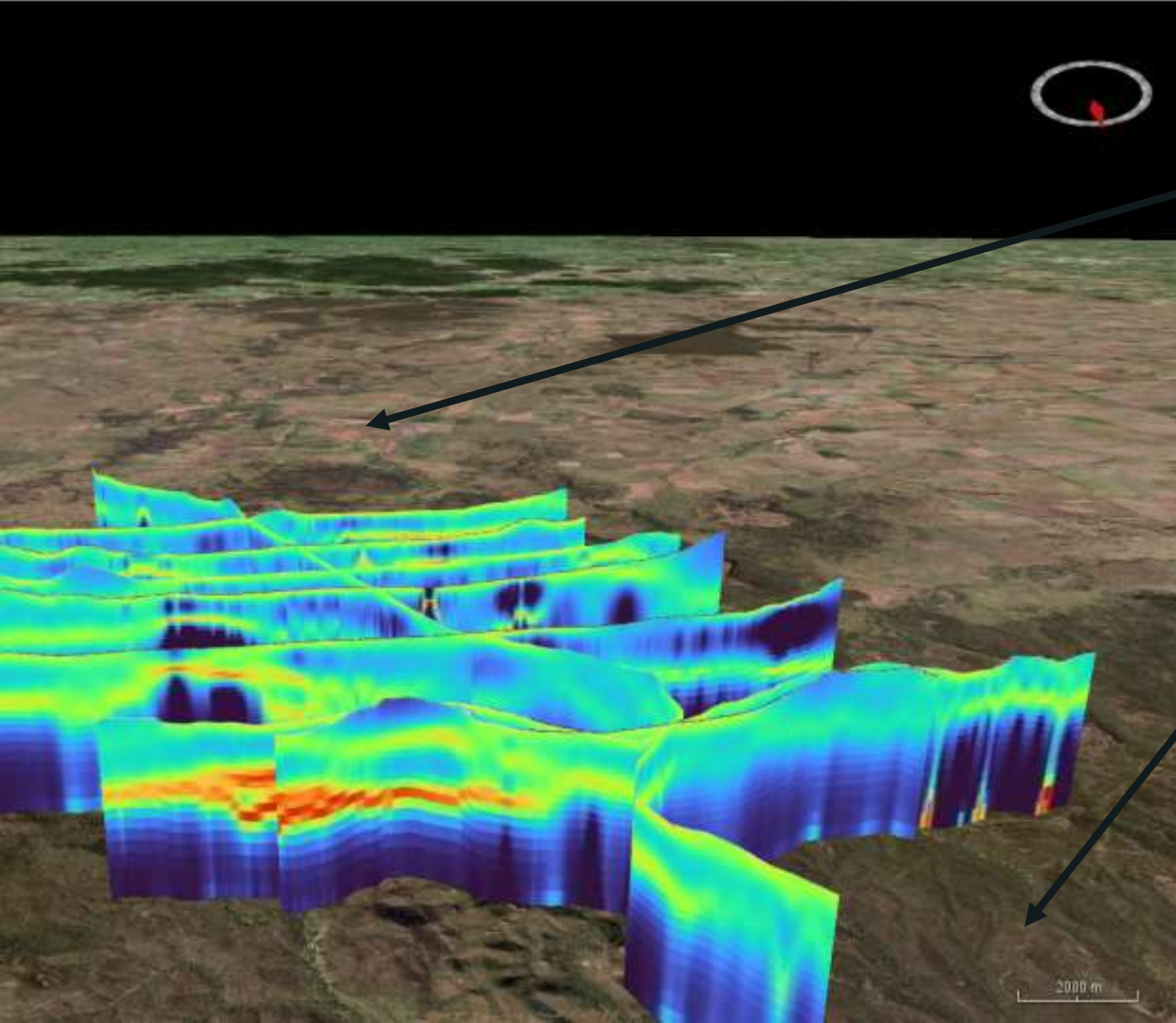








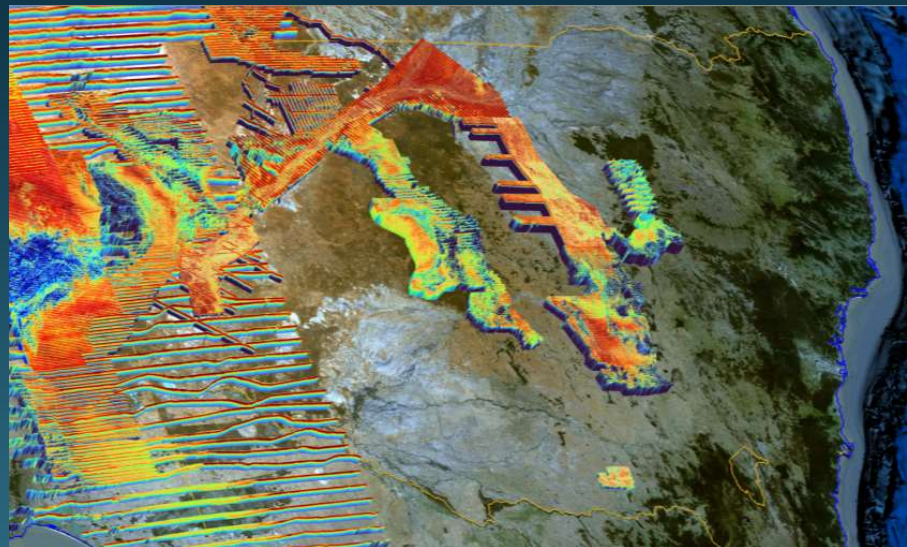




Conclusions

- Covered **prospective** rocks in the region AEM data collected in NSW complements GA, state/territory and industry legacy data
 - part of the **Explorers' Toolkit**
 - data is available for **free**
- Data has highlight
 - Geoelectric character for the main lithostratigraphic units present in the AEM Survey areas – better depth to basement surety & some geological mapping
 - Identification of electrical conductivity anomalies at depth in areas of known and no known mineral resources/occurrences.
 - Successfully helped map known (and potentially new) groundwater water features

Regional NSW AEM coverage @ 2024



AEM for minerals, water and geological mapping