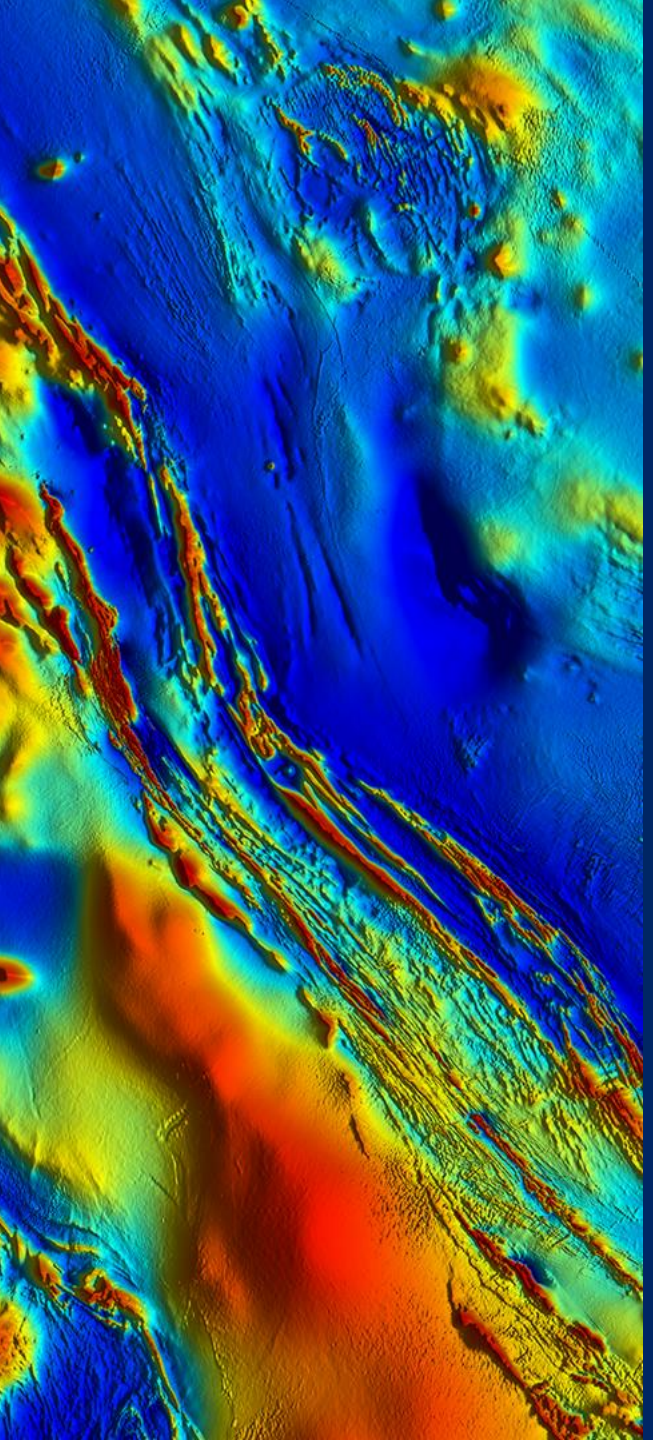


The Geological Survey of NSW statewide geophysics data program

Lots of data for everyone

Astrid Carlton
Principal Geophysicist

10 May 2024

Contents

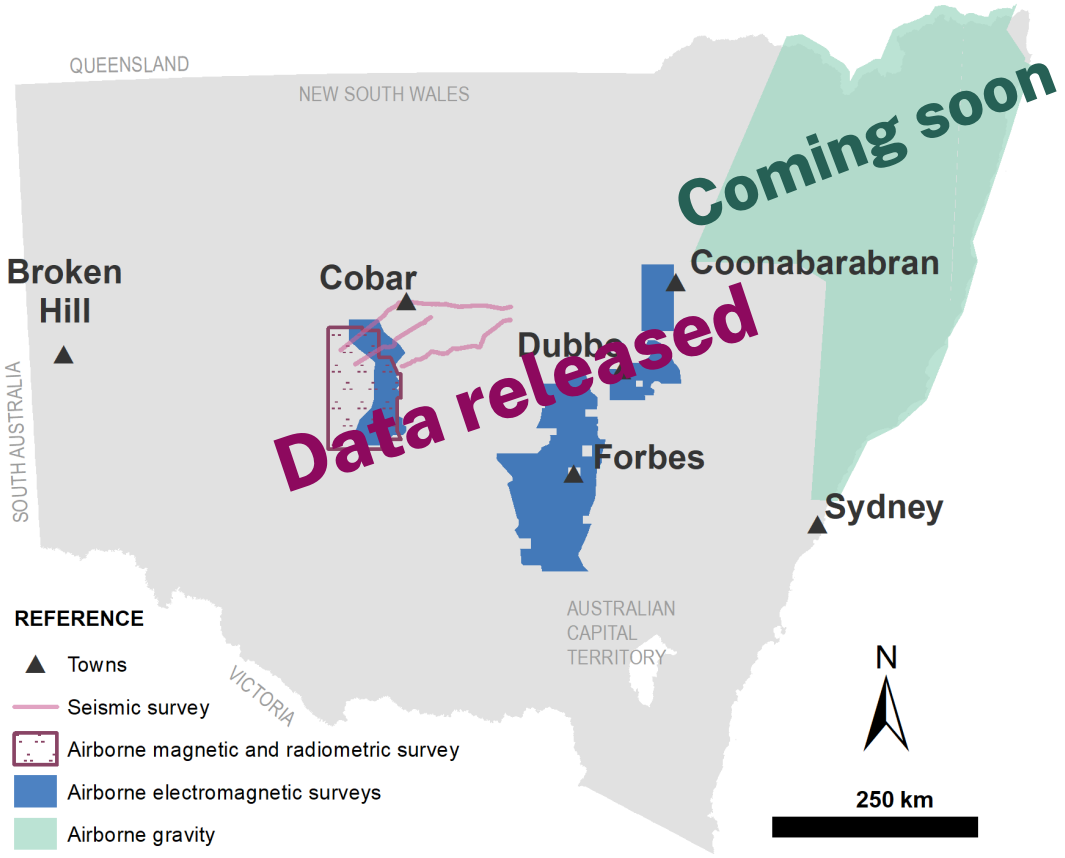
Ground personnel coordinating with pilot whilst landing an electromagnetic sensor.

Lots of data for everyone

Recently completed geophysical surveys

1

Our largest geophysical acquisition program



Map showing completed geophysical acquisition areas

We have acquired new data over 1/5 of the state.

New geophysical data ready for download:

- Yathong magnetic and radiometric survey
- Yathong airborne electromagnetic (AEM) survey
- Forbes AEM survey
- Dubbo AEM survey
- Coonabarabran AEM survey
- Cobar– Yathong seismic survey.

Coming soon:

- New England airborne gravity.

Why survey these areas?

They are prospective for:

- groundwater resources and
- critical minerals for the energy transition.

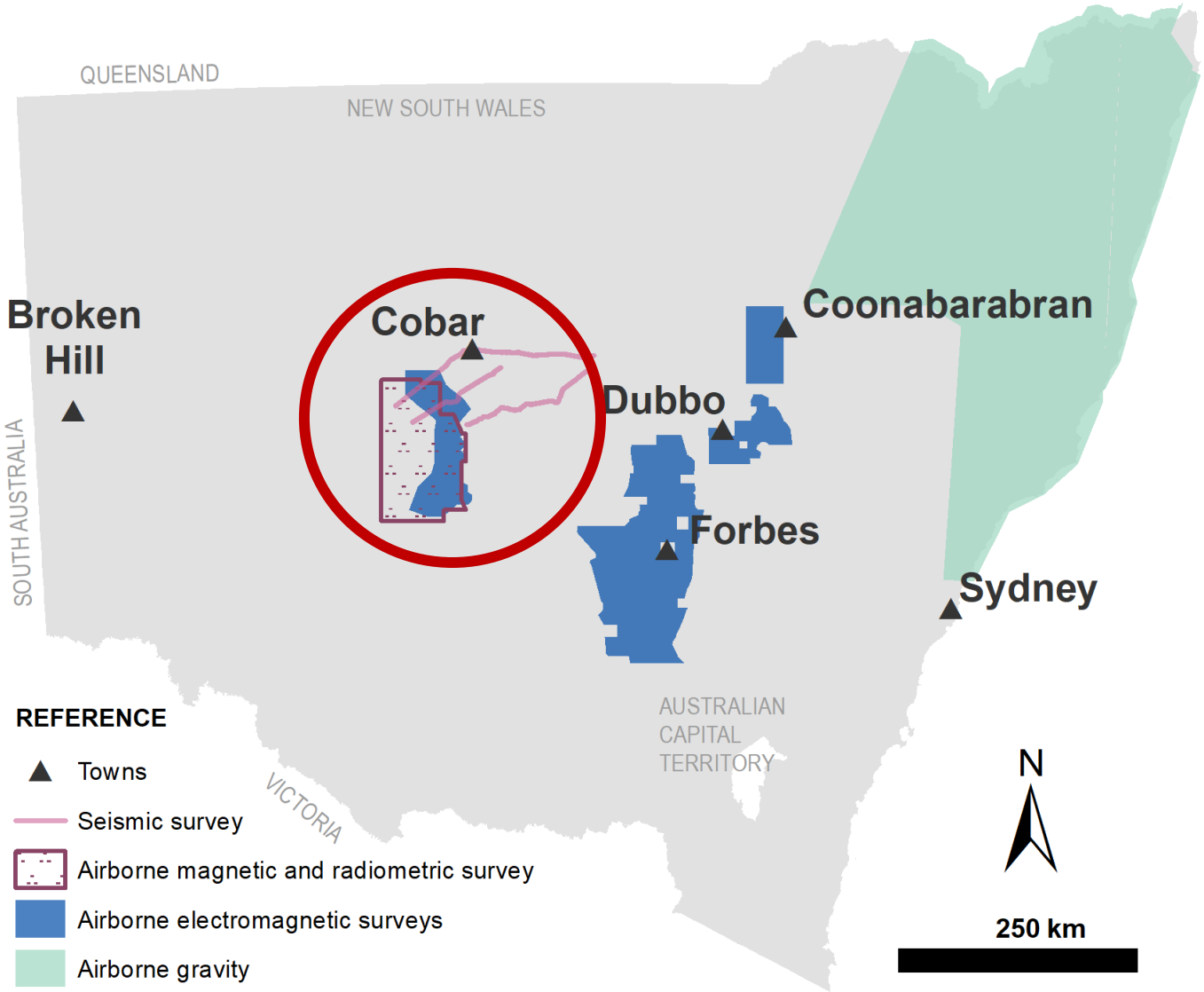
Renewable energy sources

Lots of data for everyone

Preview of newly released data

2

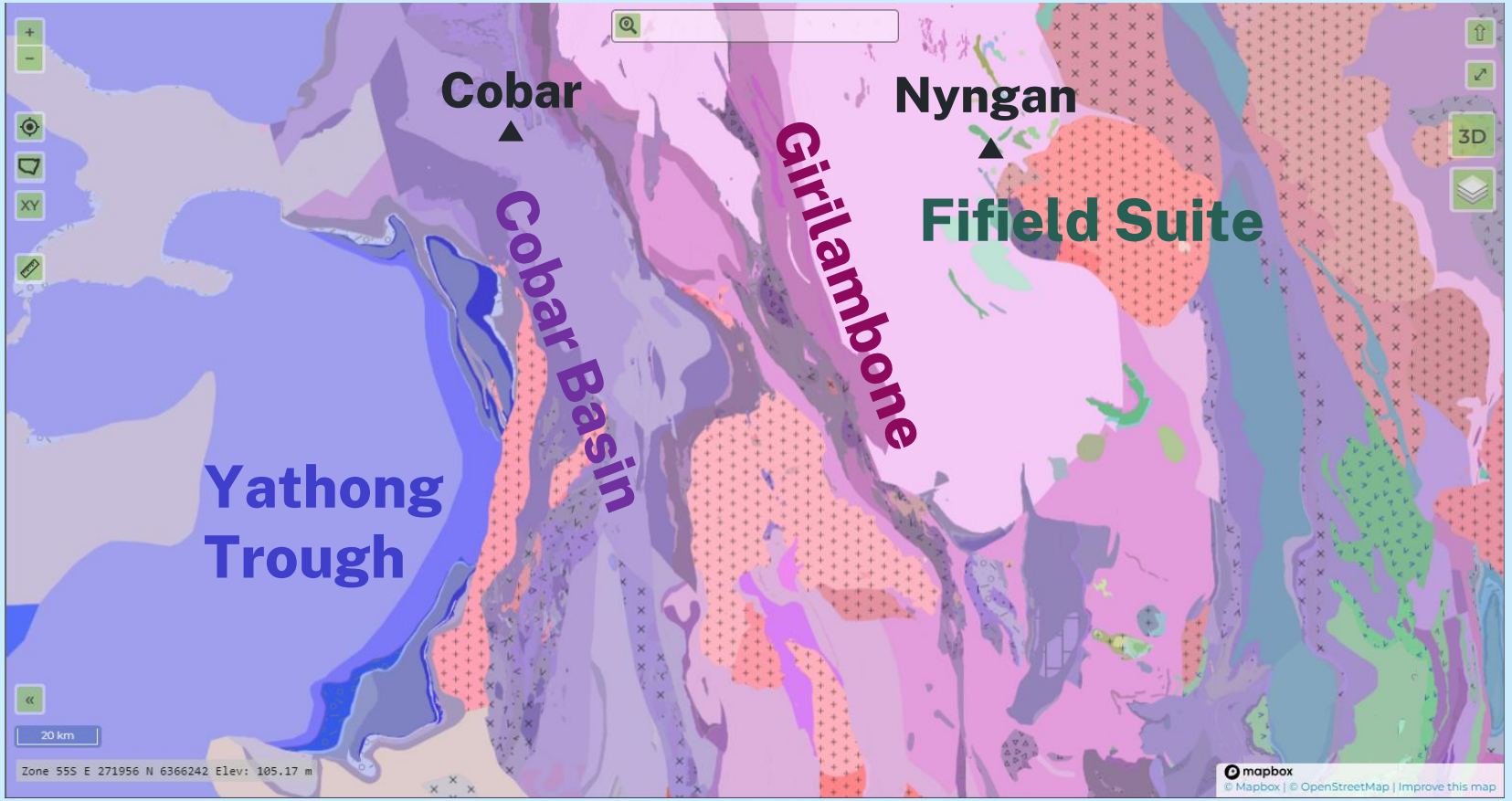
Central western NSW



Map showing completed geophysical acquisition areas

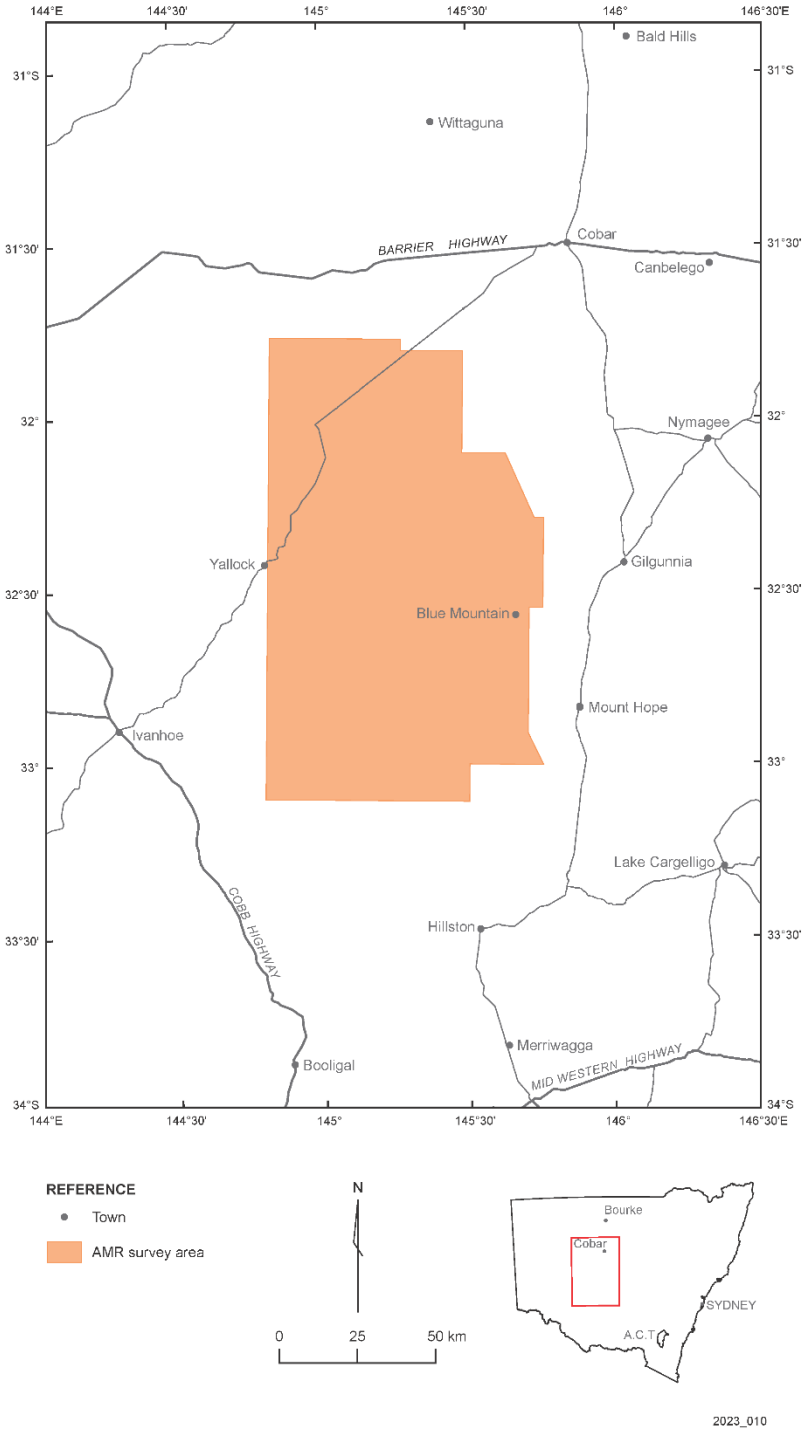
Central western NSW geological setting

Yathong, Cobar and Nyngan regions



Here we need to better understand the:

- geometry
- faults and
- structures.



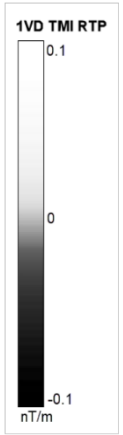
Yathong magnetic and radiometric survey

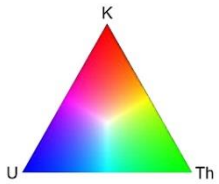
We surveyed the majority of the Yathong Trough with:

- 200 m line spacing
- 80 m terrain clearance
- using gradient magnetic sensors and an extra-large spectrometer.

Map showing AMR survey area

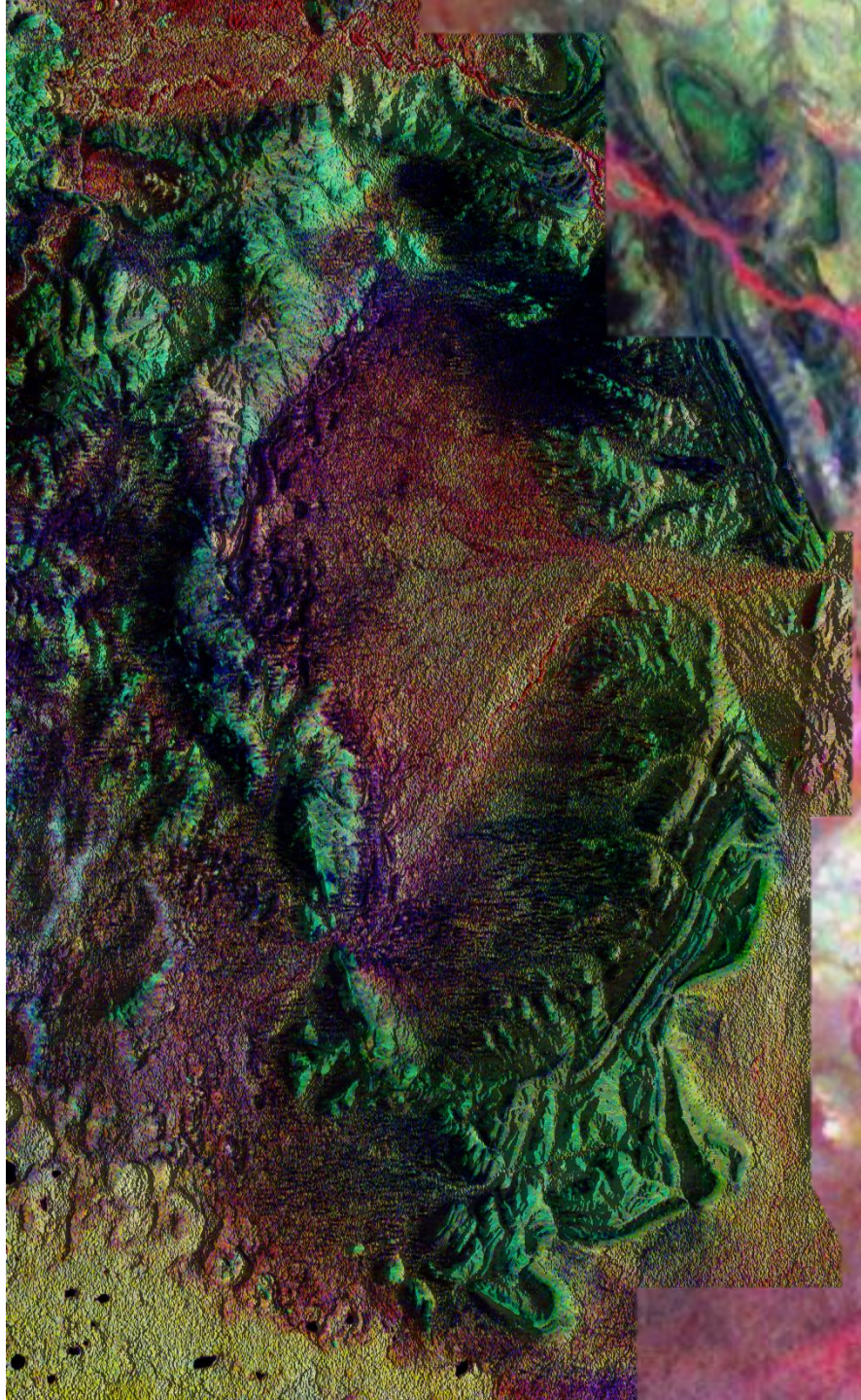
Yathong AMR: before and after

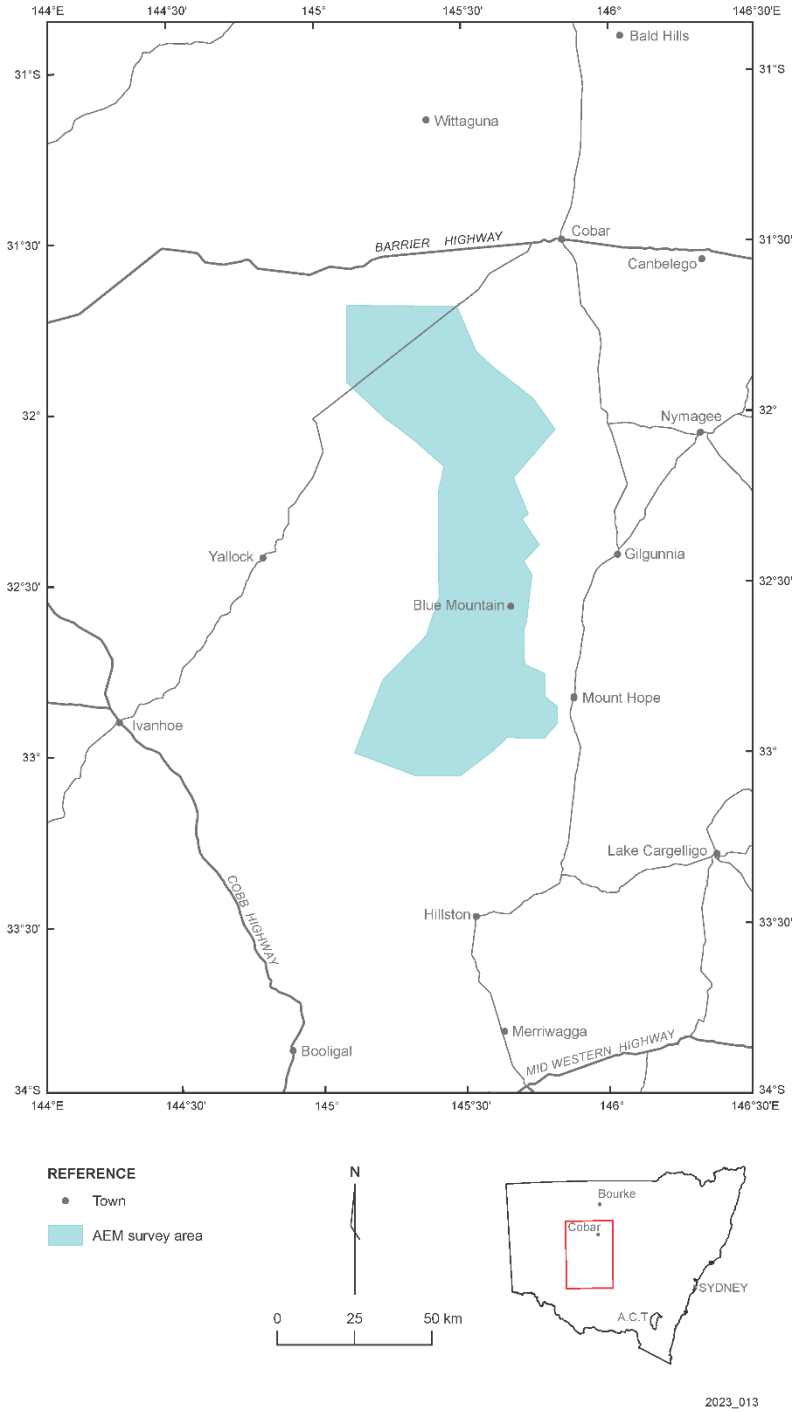




Left: first vertical derivative of the total magnetic intensity, reduced to the pole

Right: ternary radiometric image





Map showing Yathong AEM survey area

Yathong airborne electromagnetic survey

Focus on eastern boundary of Yathong Trough.

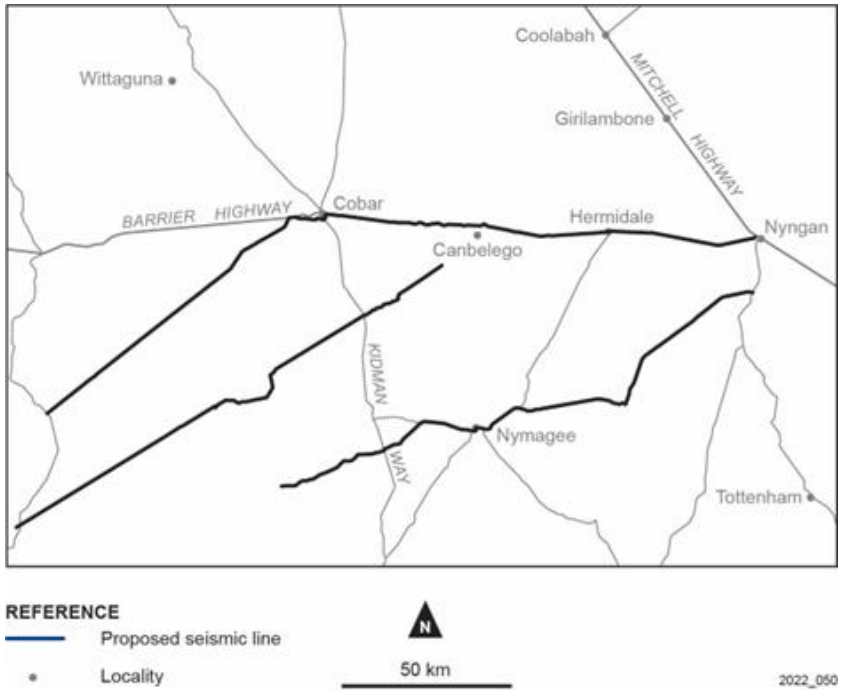
We used the HeliTEM system with:

- 12.5 Hz sensor
- lines spaced 2.5 km apart
- 60 m terrain clearance.

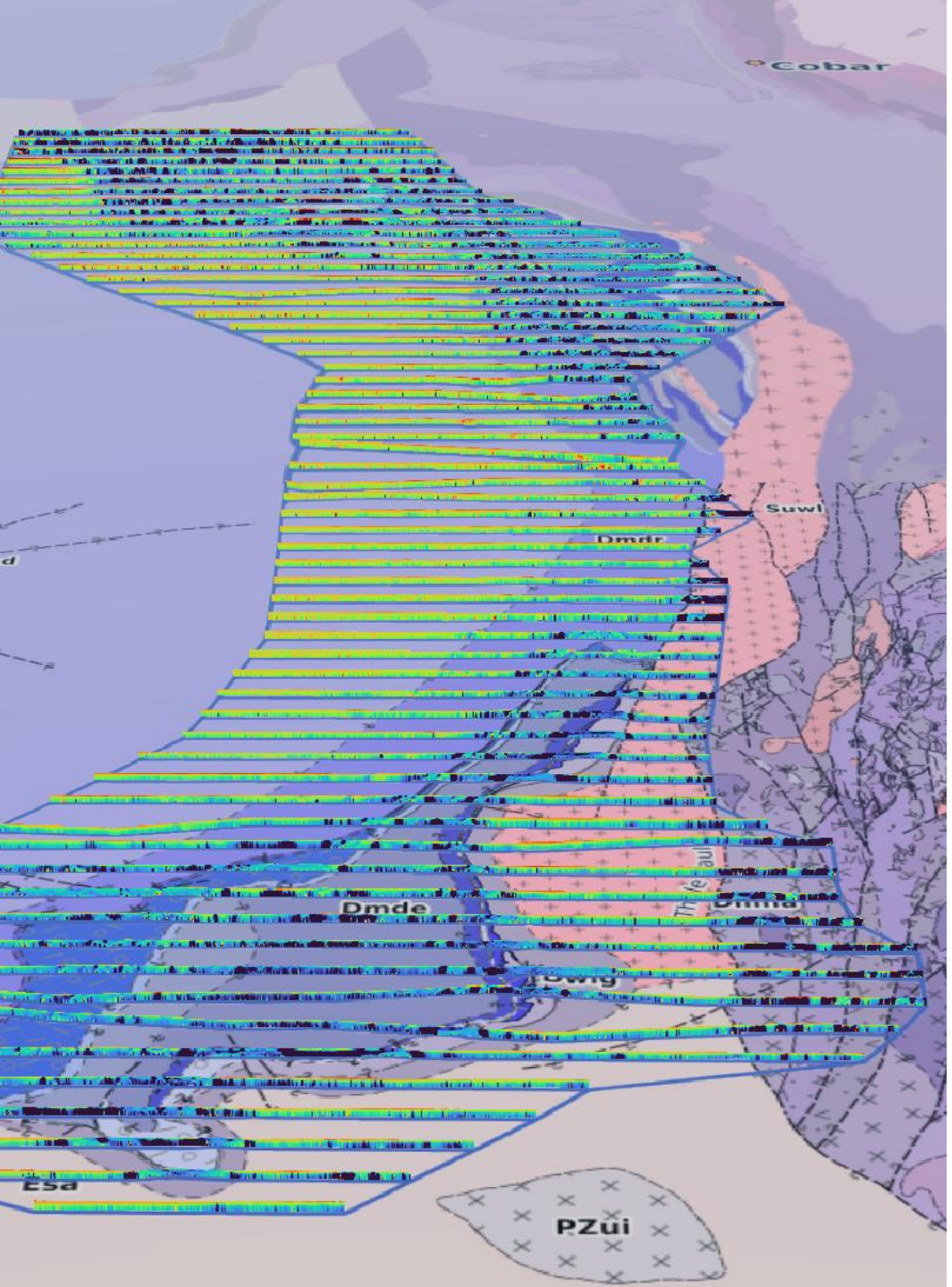
Cobar–Yathong seismic and AEM data

Video showing our new geophysical data in central western NSW (courtesy of Max Milz, Geophysicist)

500 km of deep reflection crustal seismic data over the troughs, basins and faults.



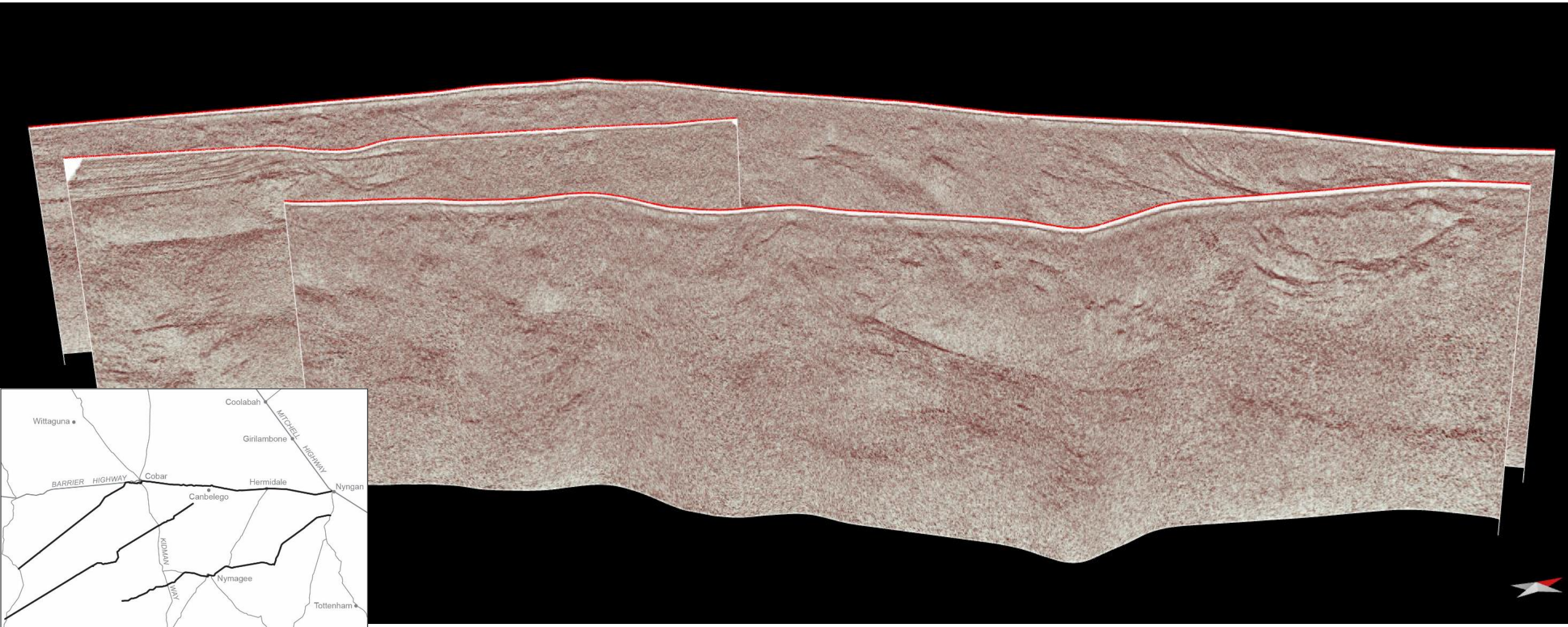
Map showing seismic survey lines



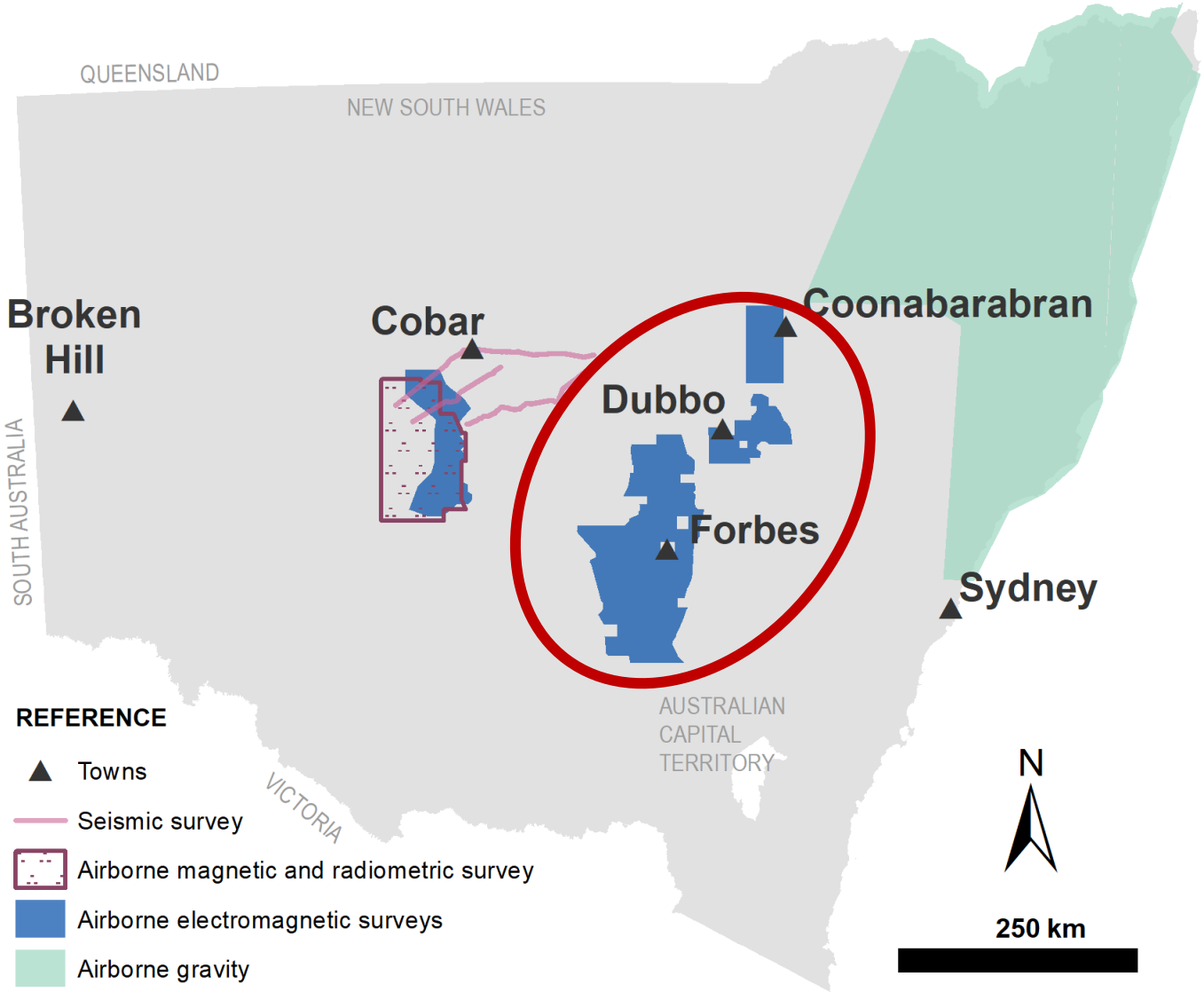
Yathong AEM

Yathong AEM curtains in MinView

Cobar–Yathong seismic survey



Central eastern NSW

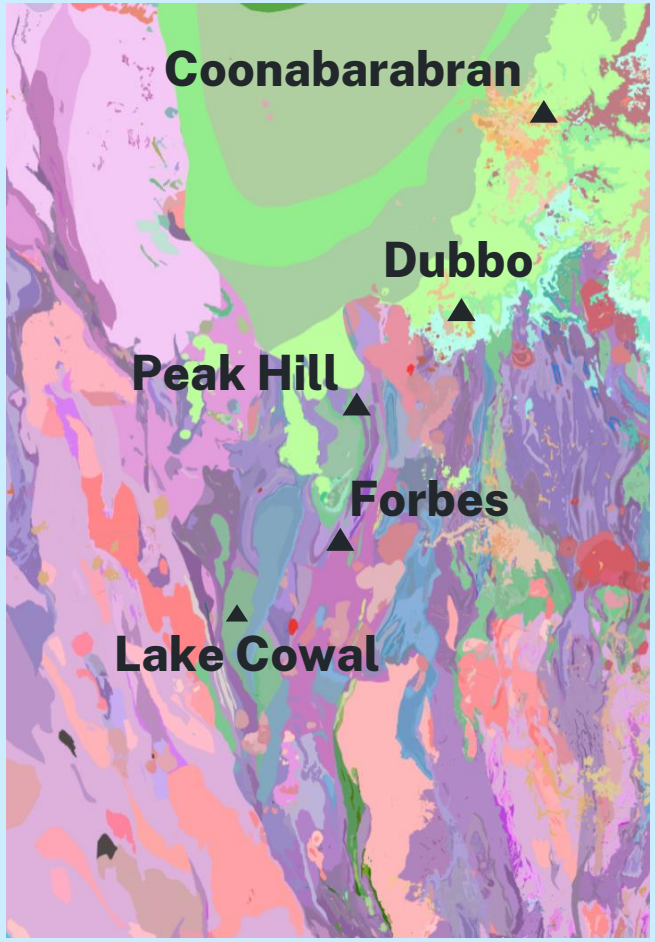


Map showing completed geophysical acquisition areas

Central eastern NSW geological setting

Forbes, Dubbo and Coonabarabran regions

Here we need to better understand the extent of rock units undercover.



Cenozoic igneous

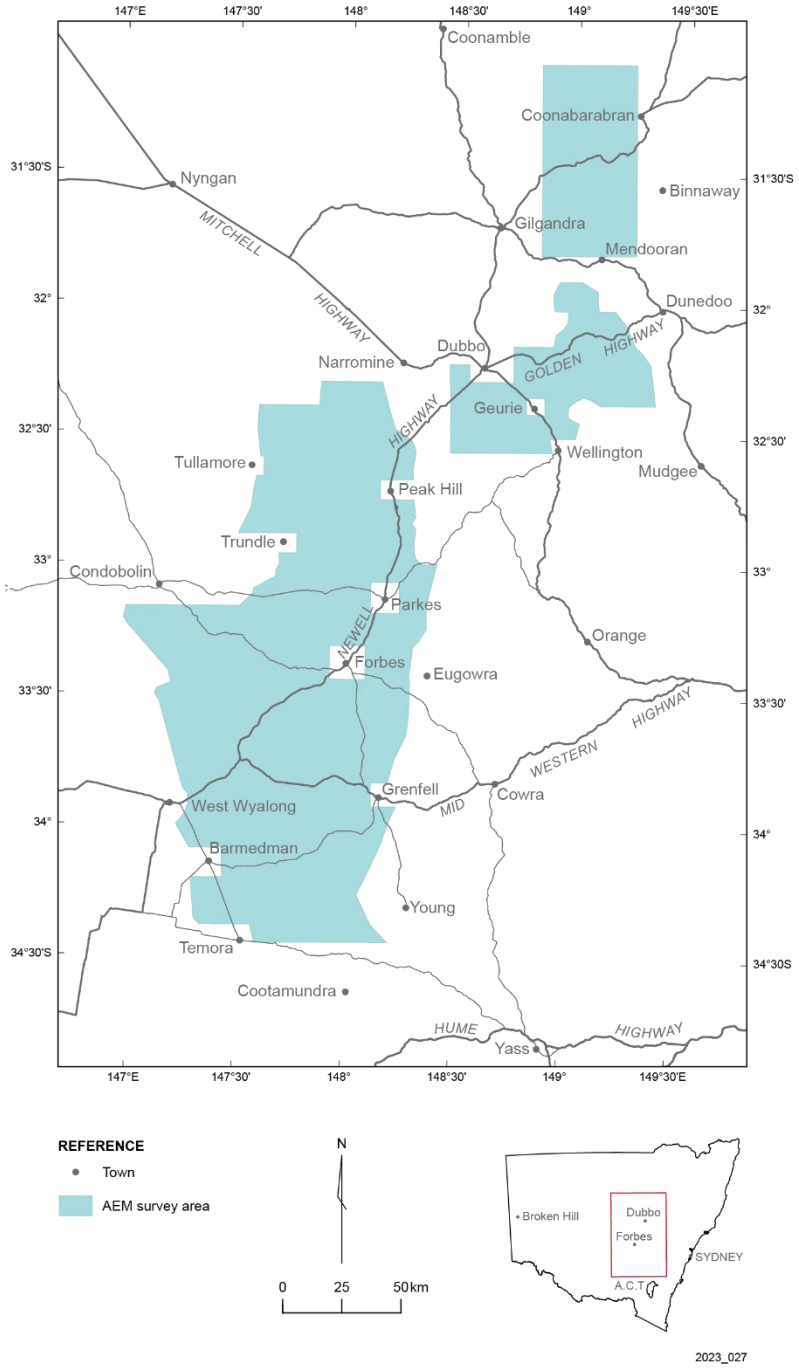
Jurassic sedimentary

Permian–Mesozoic igneous

Parkes Thrust

Devonian basins

Fifield Suite

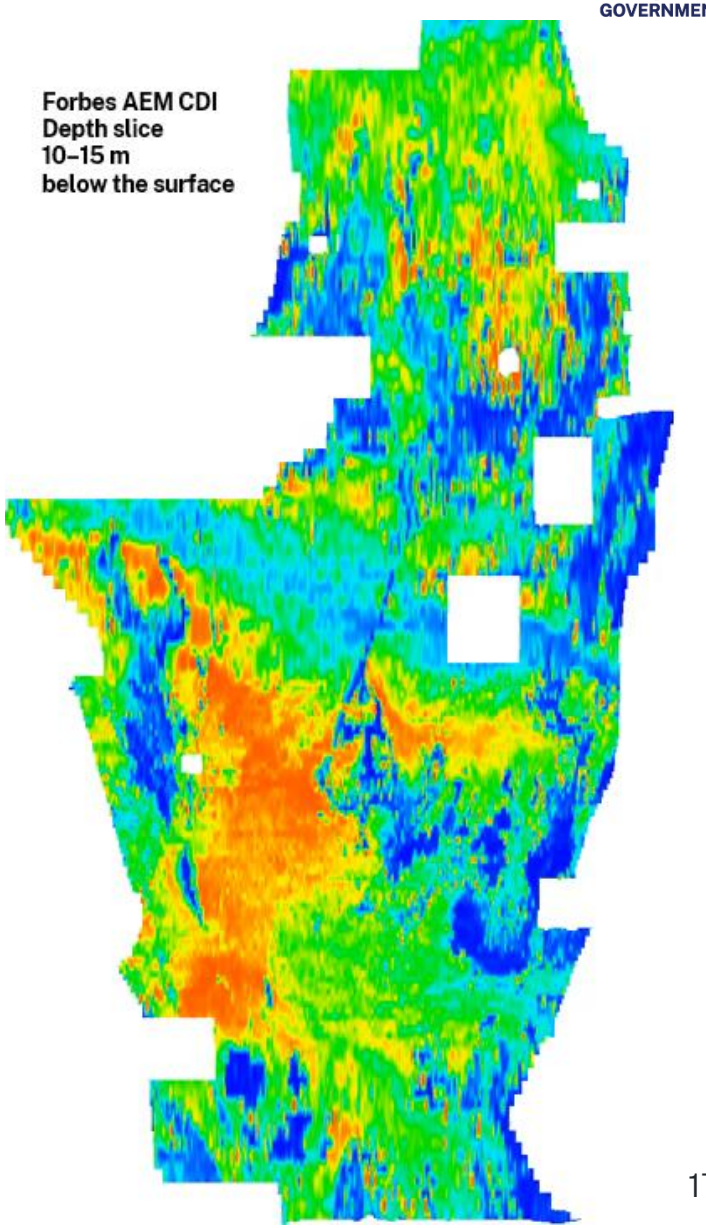


Forbes–Dubbo AEM survey

- Same sensor as used in the Yathong AEM survey
- Variable line spacing
- 60 m terrain clearance.

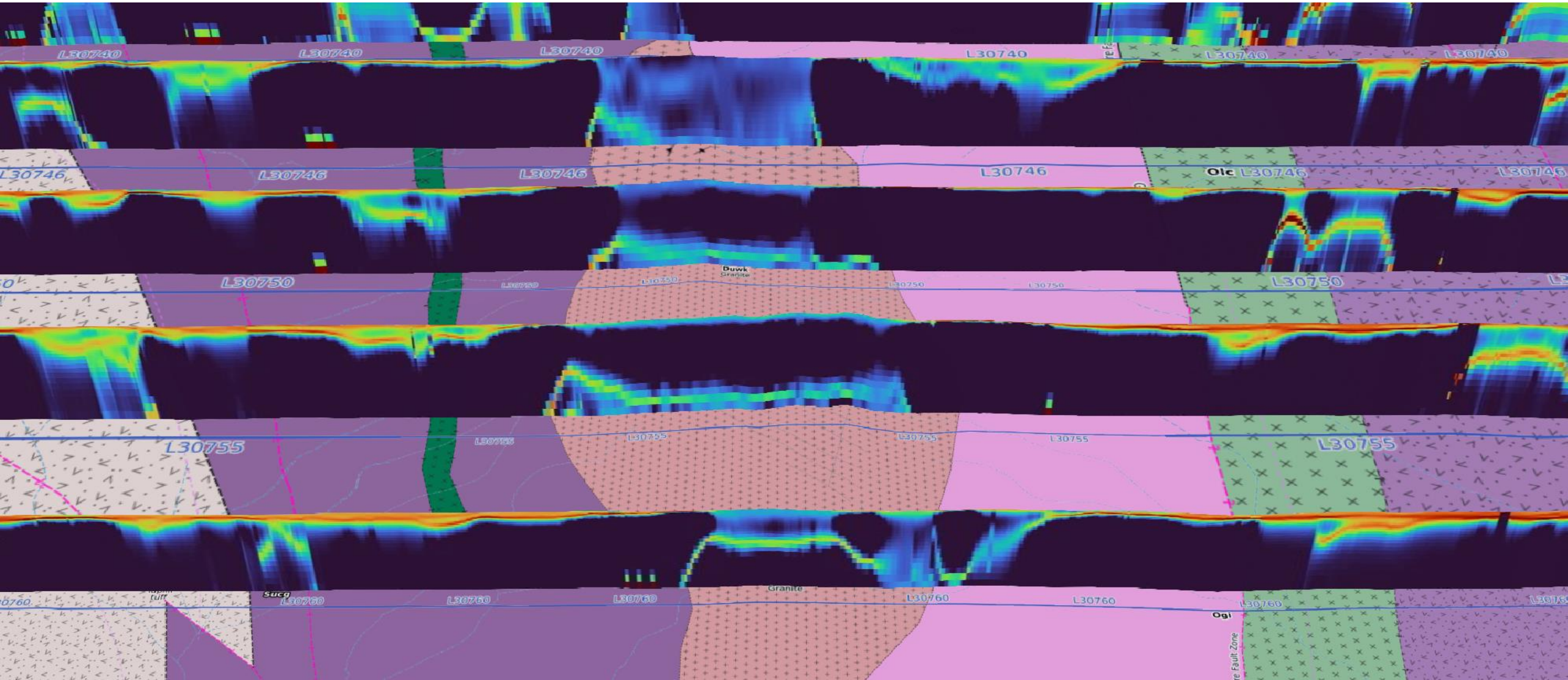
Left: map of survey area

Right: depth slices from Forbes AEM survey



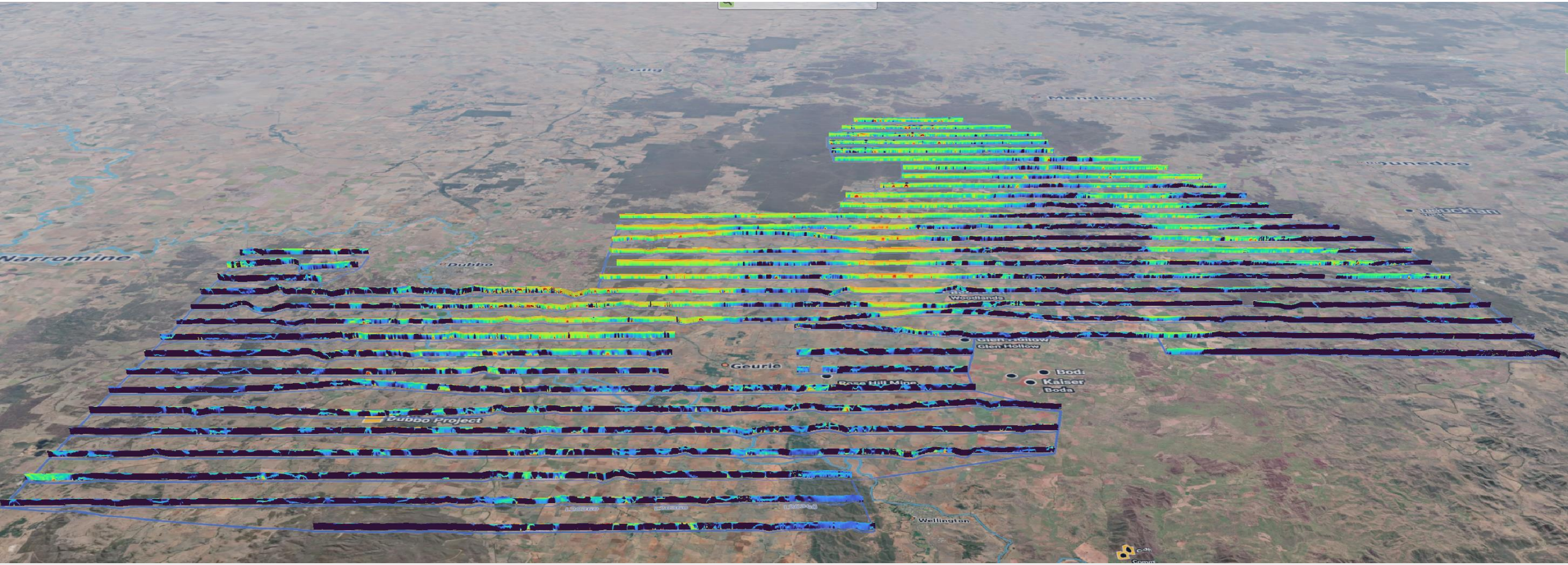
Forbes AEM survey

1.25–2.5 km spaced lines



Dubbo AEM survey

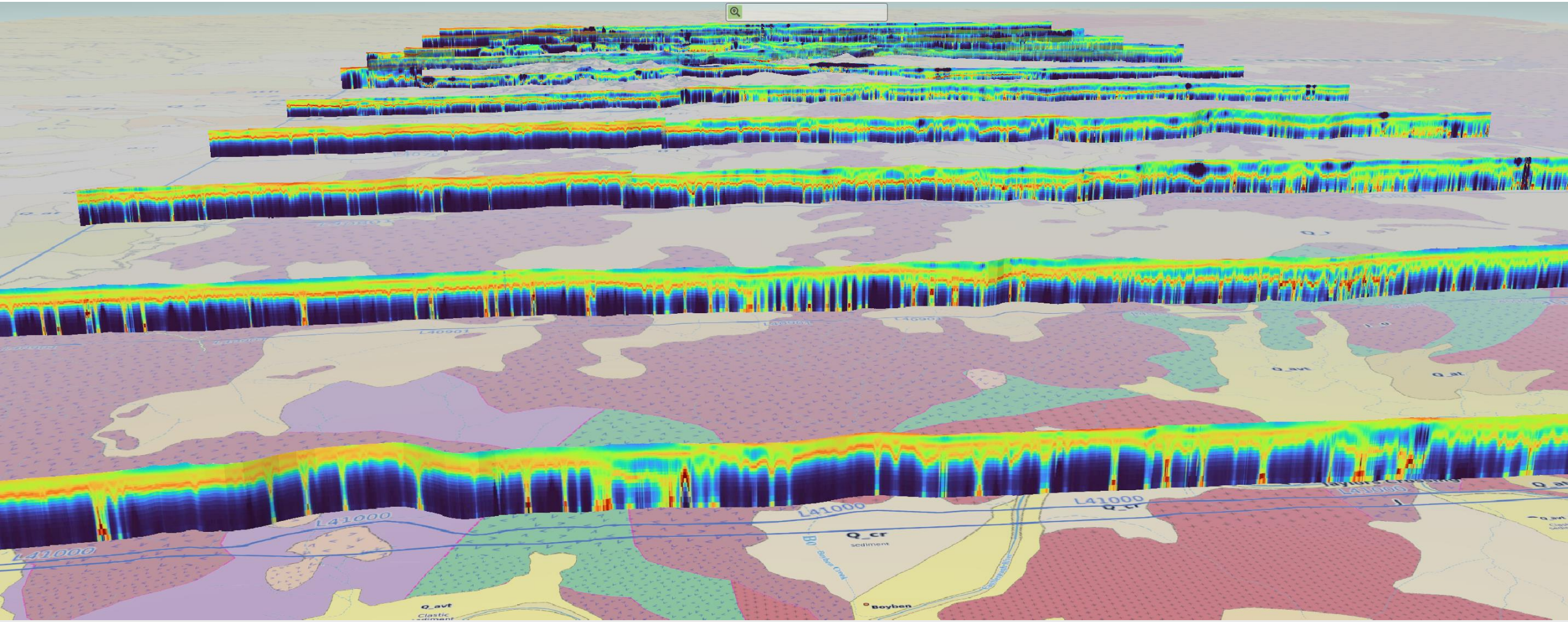
2.5 km spaced lines



Dubbo AEM curtains in MinView 3D, looking north

Northern Extension AEM

7 km spaced lines



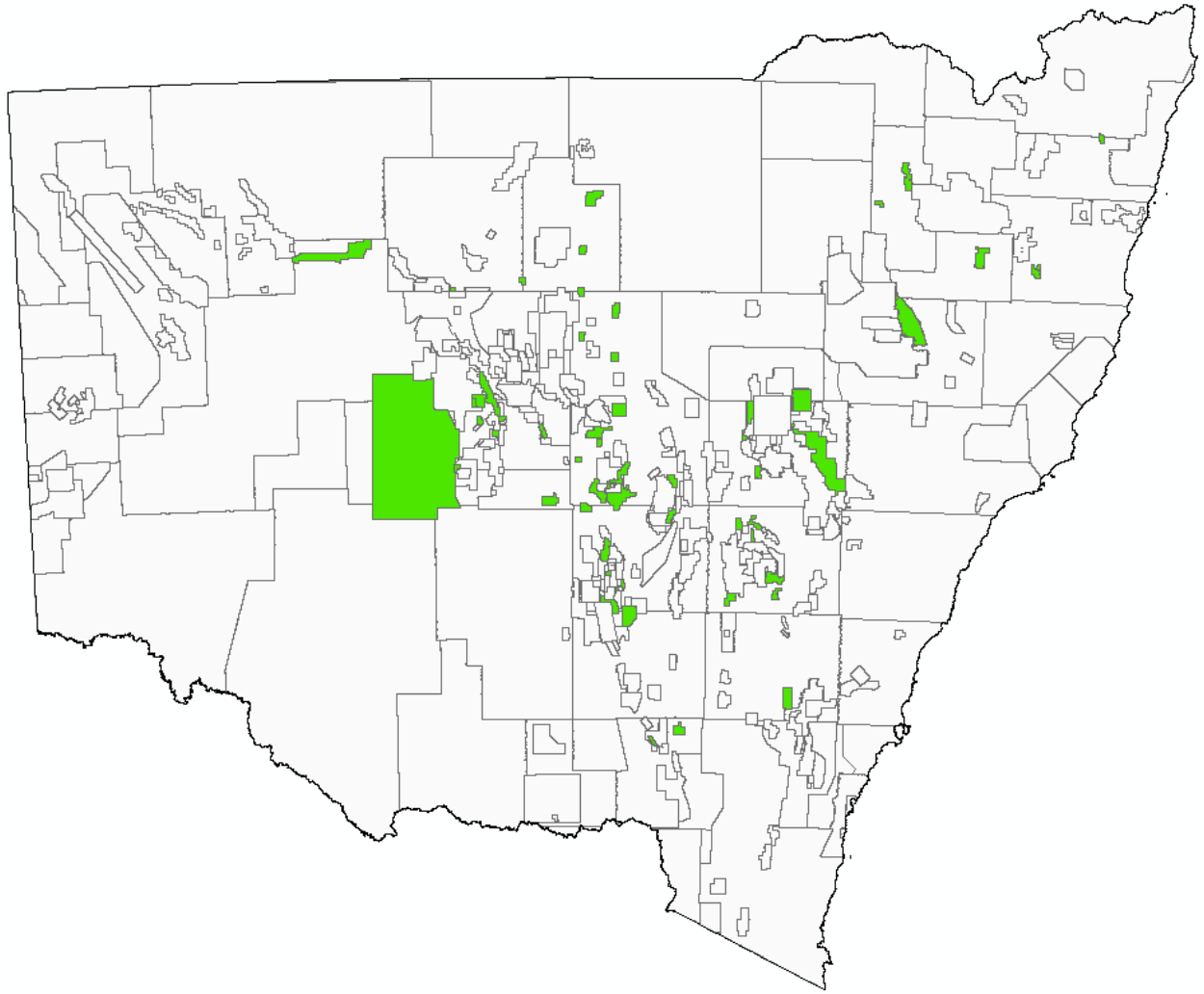
Northern Extension AEM curtains in MinView 3D with NSW Seamless Geology in background, looking North.

Lots of data for everyone

Statewide magnetic merge

3

2024 statewide magnetic merge



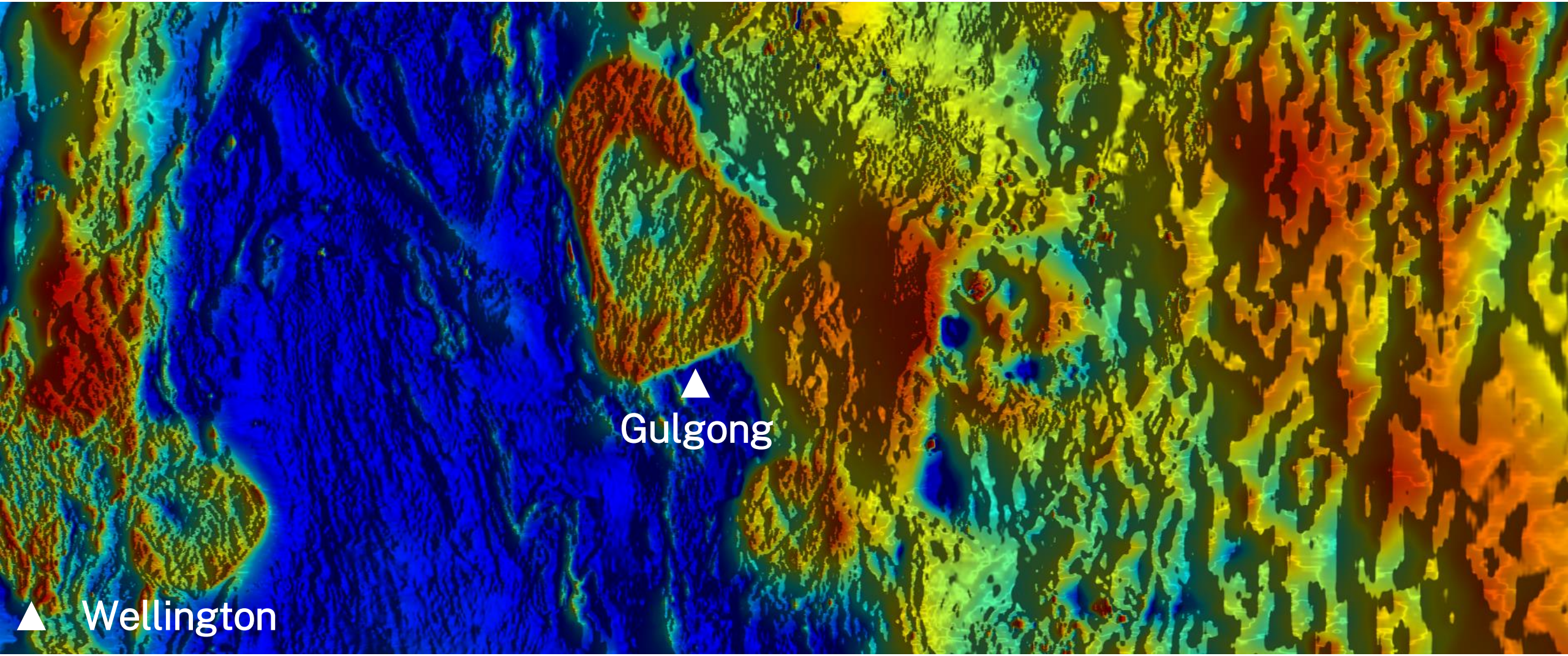
The statewide magnetic merge is updated once every 2 years.

- 53 new surveys added.
- 350 surveys in our merge.
- New data covers 2.6% of the state.
- ~$1m value added.
- Open-file company data covers 88,000 km^2 (11% of the state).
- Estimated total value of the merge $32.1m

Next year the radiometric and gravity merges will be updated and released.

Map showing all the magnetic and radiometric surveys incorporated into the statewide merge. The new surveys added are shown in green (courtesy of Sam Matthews).

2022–2024 statewide magnetic merge



2022 total magnetic intensity merge and the new 2024 merge (Courtesy of Sam Matthews)

Lots of data for everyone

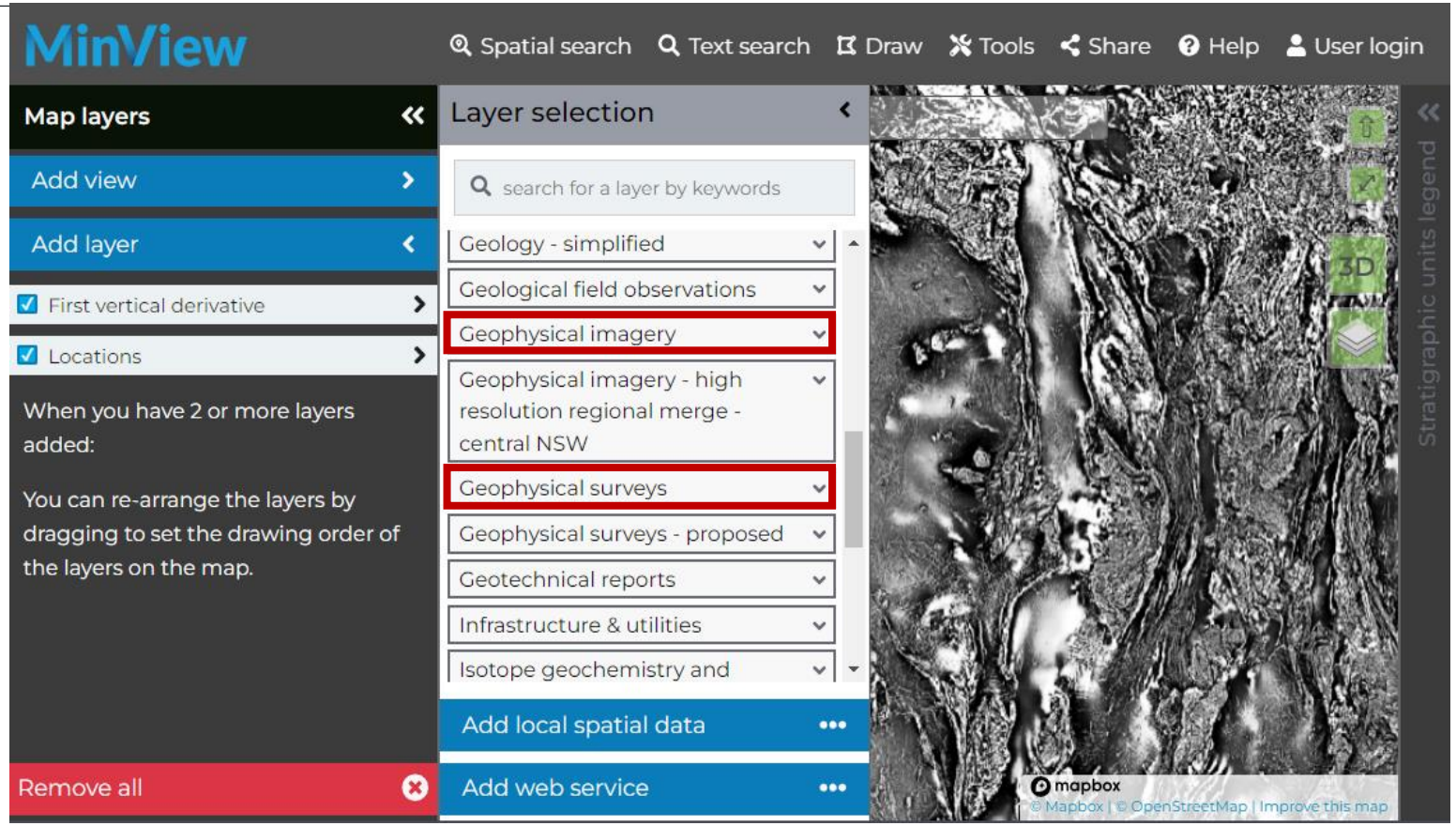
How to download our data

4

Data access through MinView

All our open-file data is available through our online geoscience platform, MinView.

minview.geoscience.nsw.gov.au/



MinView with layer selection panel

Question time