



Geological Survey of NSW update

4 May 2021

Outline

- Key Achievements – over the last year
- Ongoing Work



Key achievements



MinEx CRC



Hydrogeochemistry of the Cobar Region

N. Reid, R. Thorne, C. Folkes, P.J. Gilmore, T. Pinchand.

EP 207556

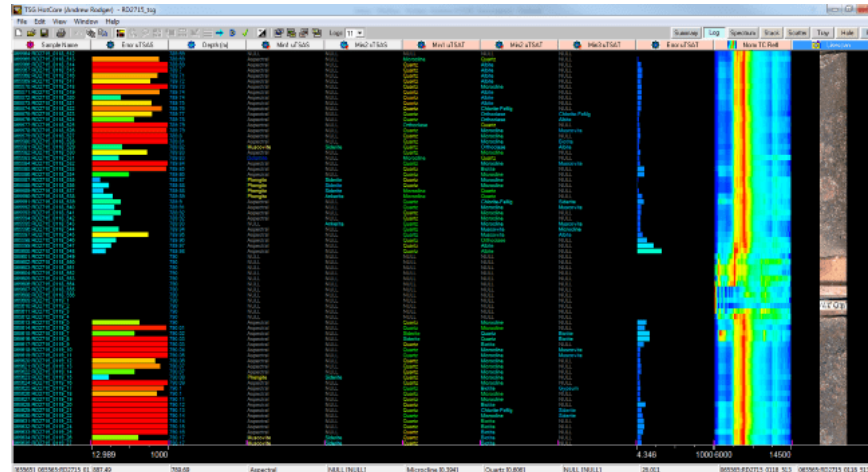
October 2020



NSW MINERAL SYSTEM MODELS

A mineral system model for Cu–Au–Pb–Zn–Ag systems of the Cobar Basin, central Lachlan Orogen, New South Wales

November 2020



Quarterly Notes

June 2020 | No. 152

Geological Survey of New South Wales

Alteration response to mineralisation in the Cobar mineral district, central Lachlan Orogen, New South Wales: a HyLogger™ case study

Authors

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¹ formerly of Geological Survey of NSW

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Key words: Cobar Basin, HyLogger, hyperspectral, spectral reflectance, alteration, metamorphism, mineralisation, chlorite, white mica, feldspar



MinEx CRC – HyLogger™ data

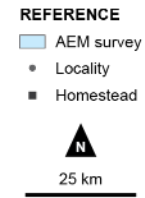
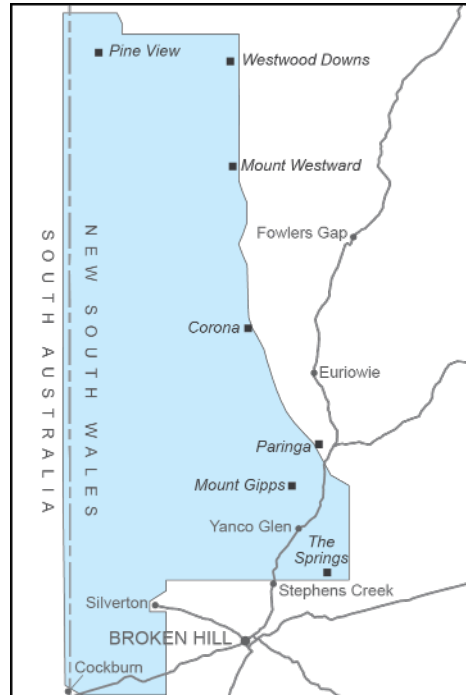
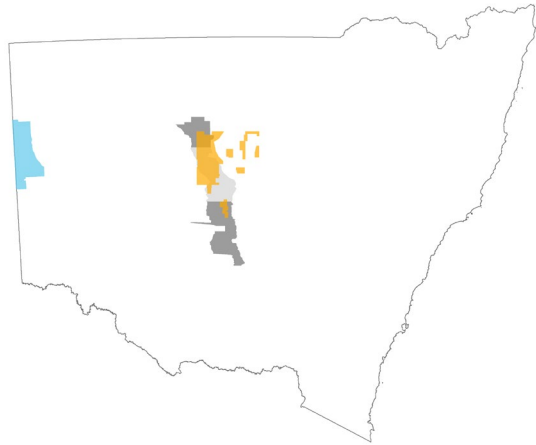
HyLogger™ data

- 143 additional holes in 2020
- 630 total holes scanned
- 163 km drillcore

AuScope Discovery Portal

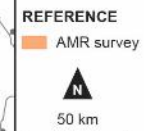
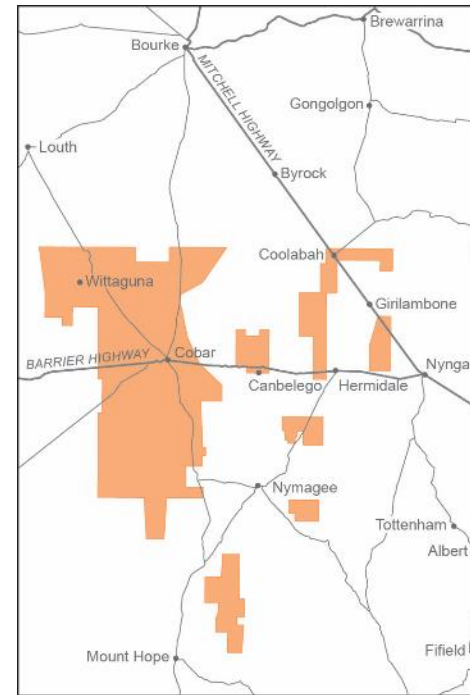


MinEx CRC geophysical surveys



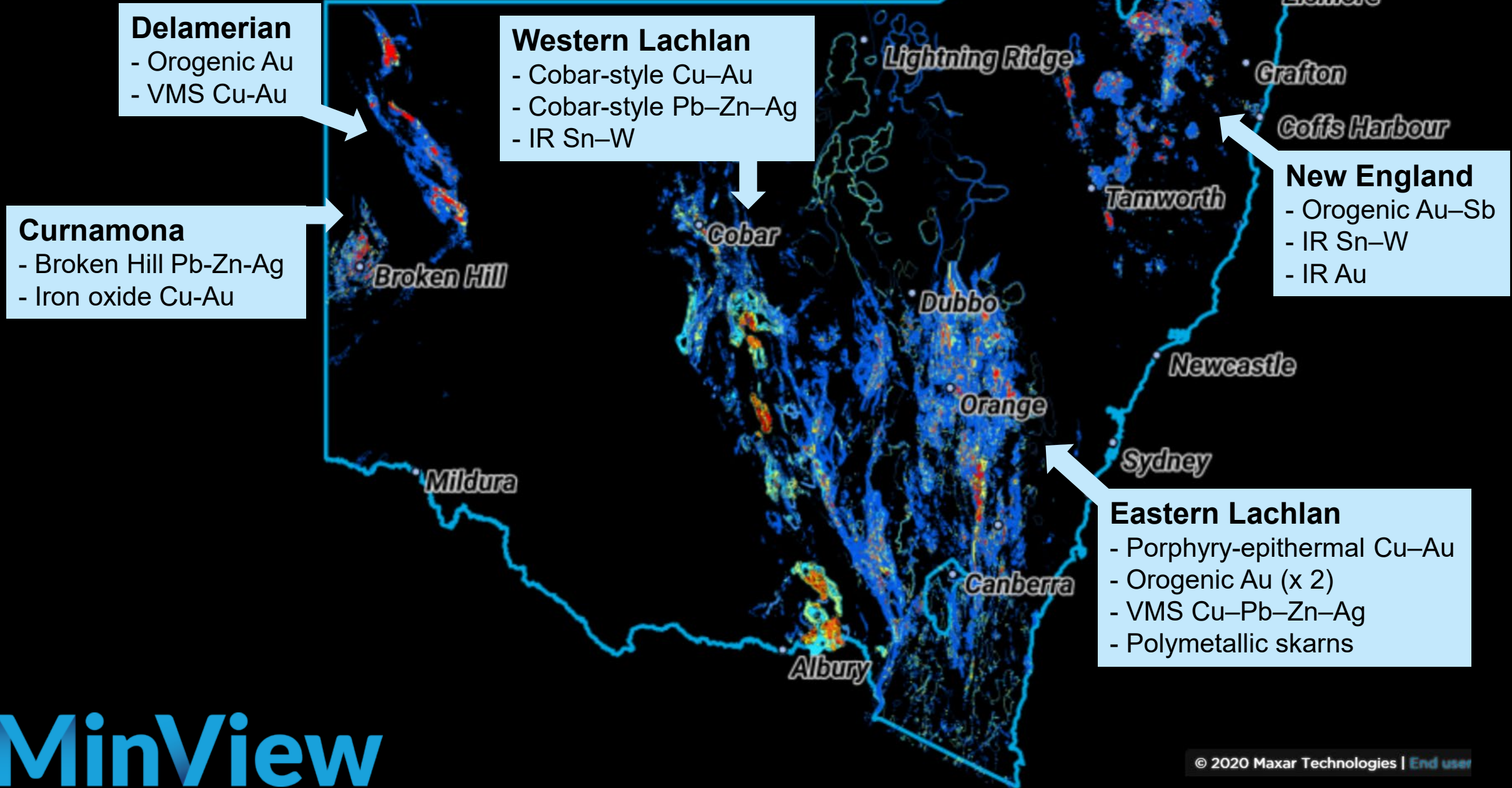
2021_006

Mundi AEM 2021
April completed



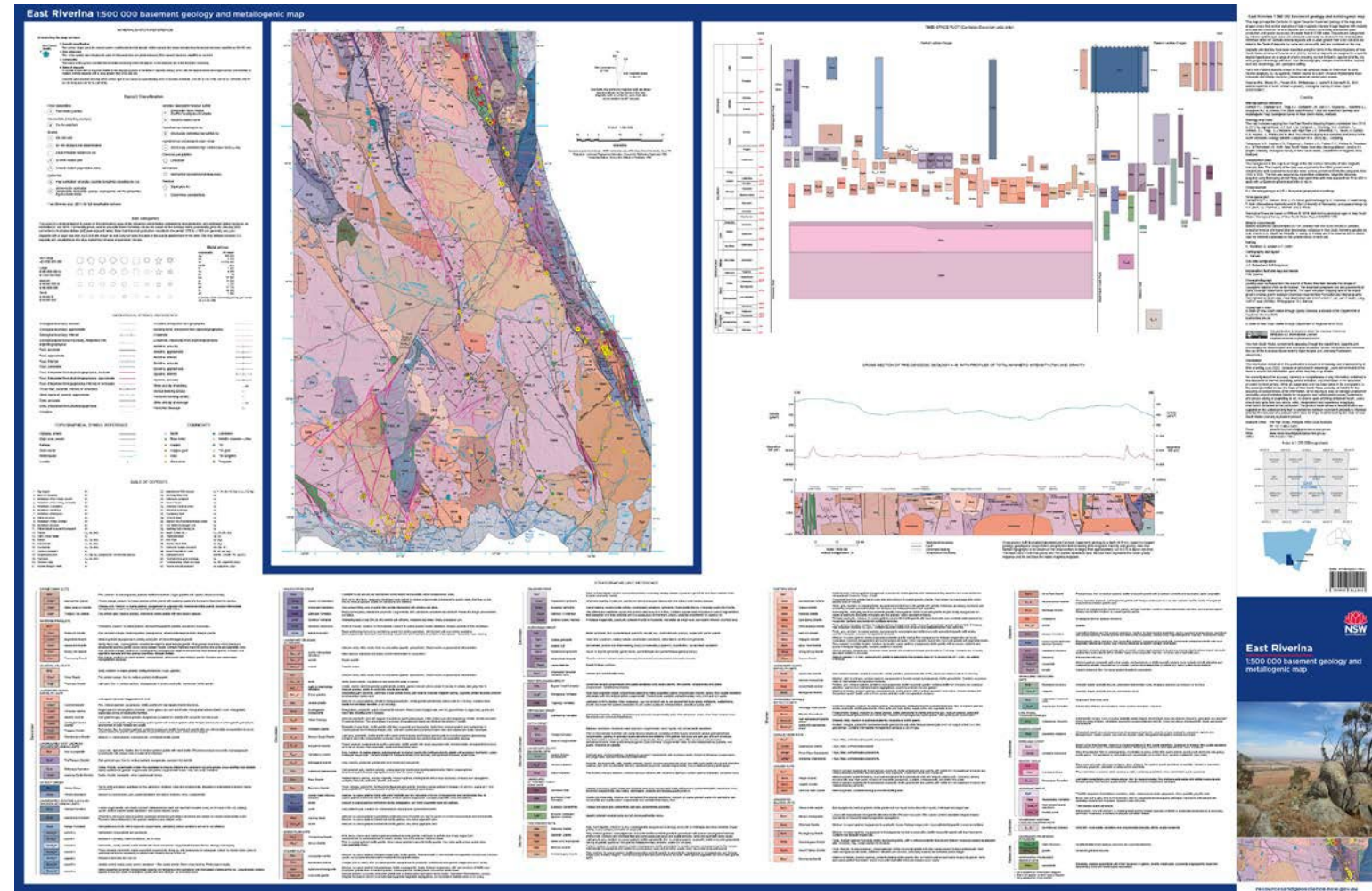
2020_088

Cobar AMR 2021
May–June



Mapping – East Riverina metallogenic map

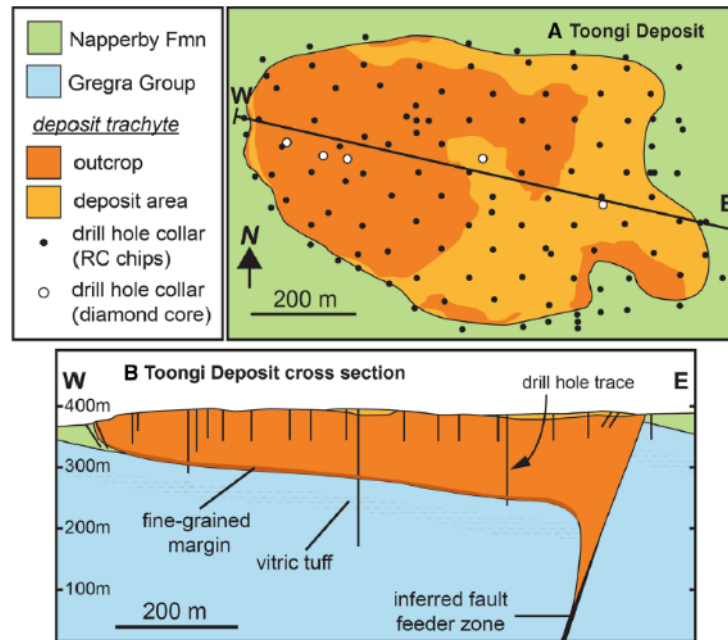
- Basement geology and mineral deposits
- 1:500,000 scale
- 10 km deep cross-section



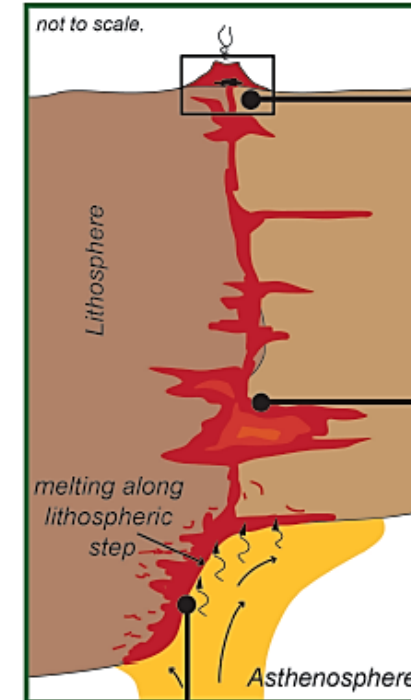
Mineral system models

Peralkaline magmatism in NSW

- Mesozoic/Cenozoic volcanism
- Jurassic syenites of ELO
- Devonian granites (Temora)



Peralkaline volcanic deposits (e.g., Toongi, NSW)



Ore deposition processes

How do ore metals precipitate?
Are hydrothermal fluids important?
Hydrothermal fluid composition?
What is the role of degassing?
What is the role immiscibility?

WORKPLAN:

magmatic/hydrothermal experiments
studies of natural ore systems

Ore metal enrichment processes

How do ore metals become enriched in magmas?
What is the role of fractionation/replenishment & tapping?
What role do melt volatiles play in enriching ore metals?

WORKPLAN:

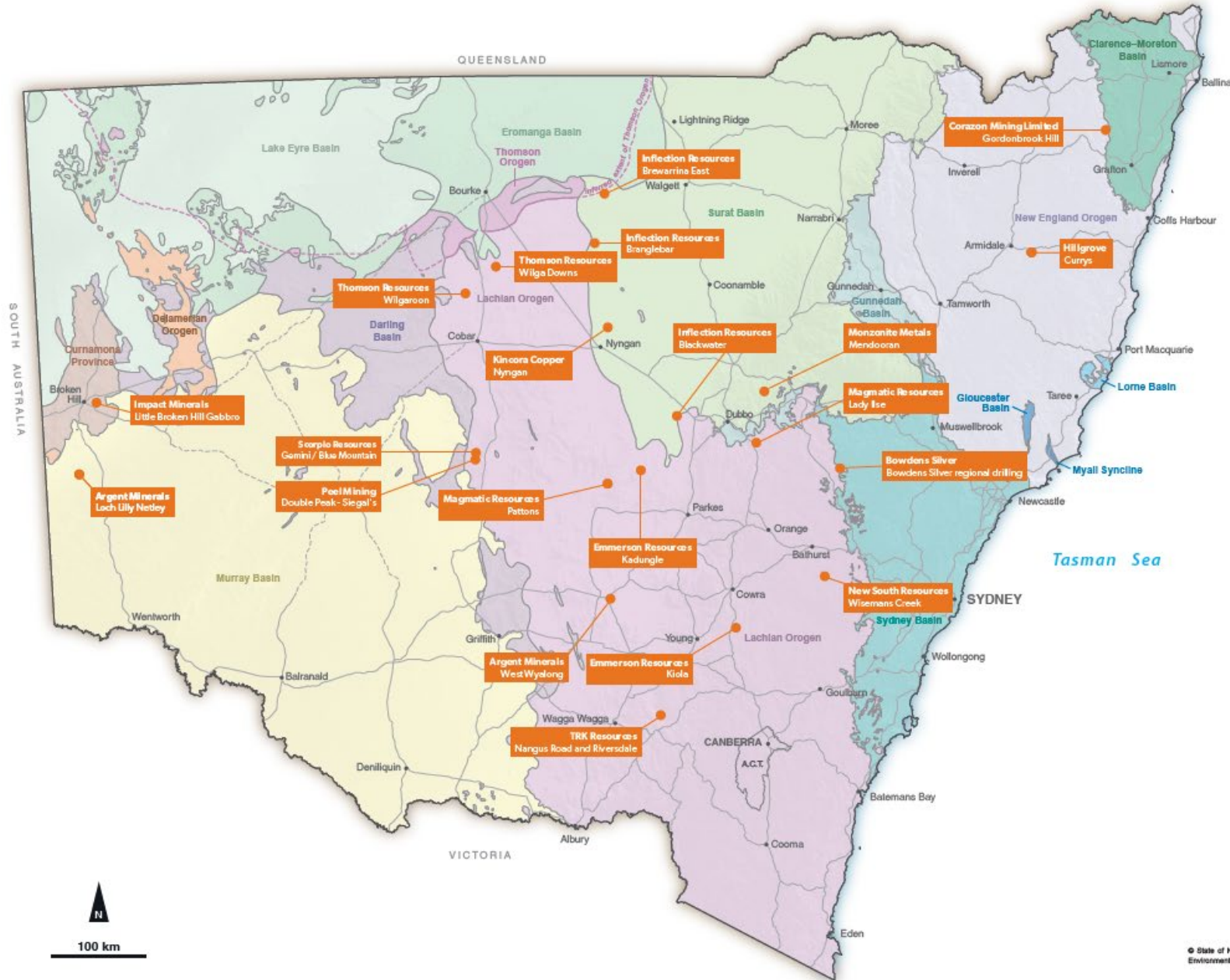
magmatic/hydrothermal experiments
magma evolution modelling

Lithospheric structure controls

Do lithospheric steps allow production of fertile magmas?
Can lithospheric architecture be used to target for prospective areas for mineralisation?

WORKPLAN:

linking field studies with lithospheric architecture analysis



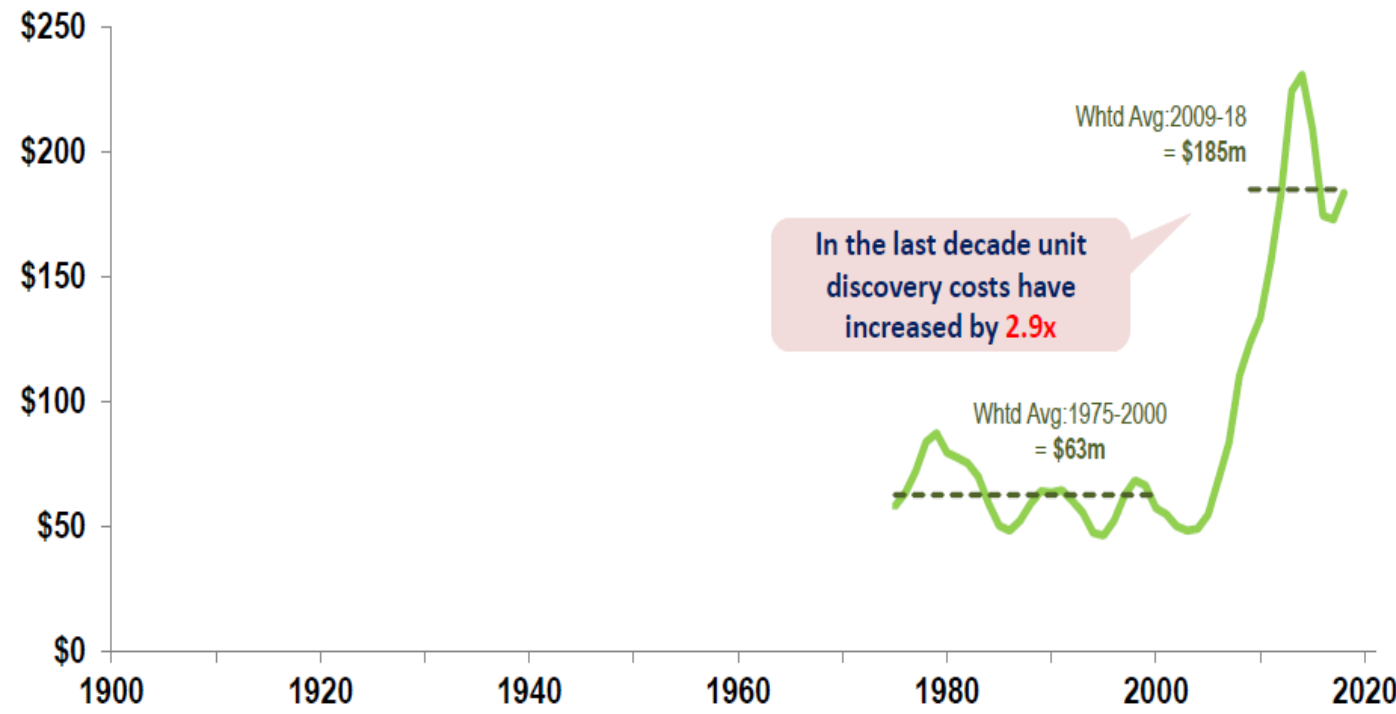
Ongoing work – assisting discoveries

Discoveries in NSW

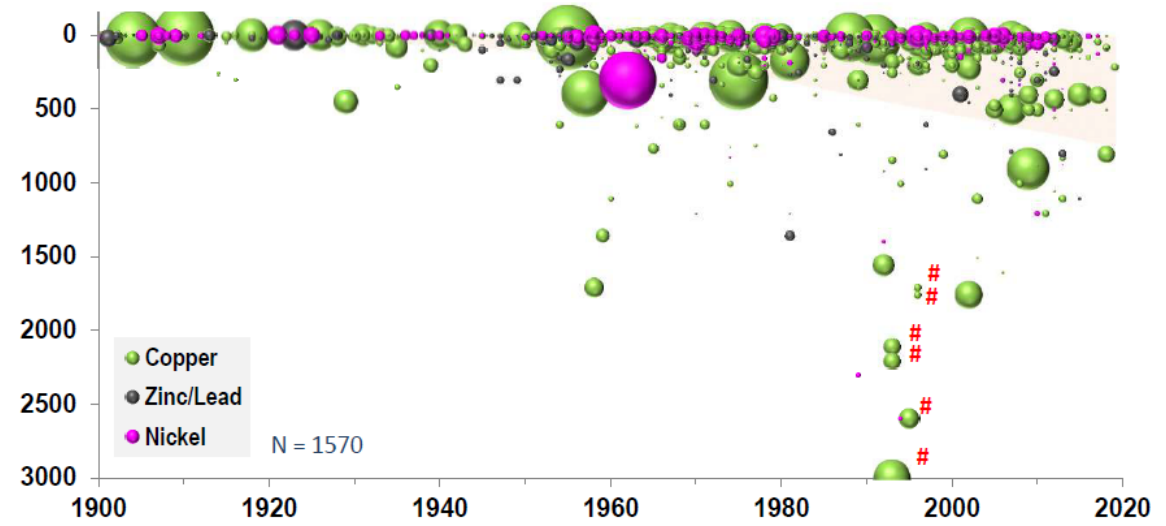
- Pre-competitive data has had a role in many modern mineral discoveries in NSW – (e.g. Endeavor, Northparkes, Dapville, Cadia, Toongji, Bowdens, McPhillamys, Hawsons Iron, Collerina).
- However, discovery rate is declining.
- Focus of pre-competitive data has now moved to under cover.



Average Cost per Discovery (2020 US\$m)



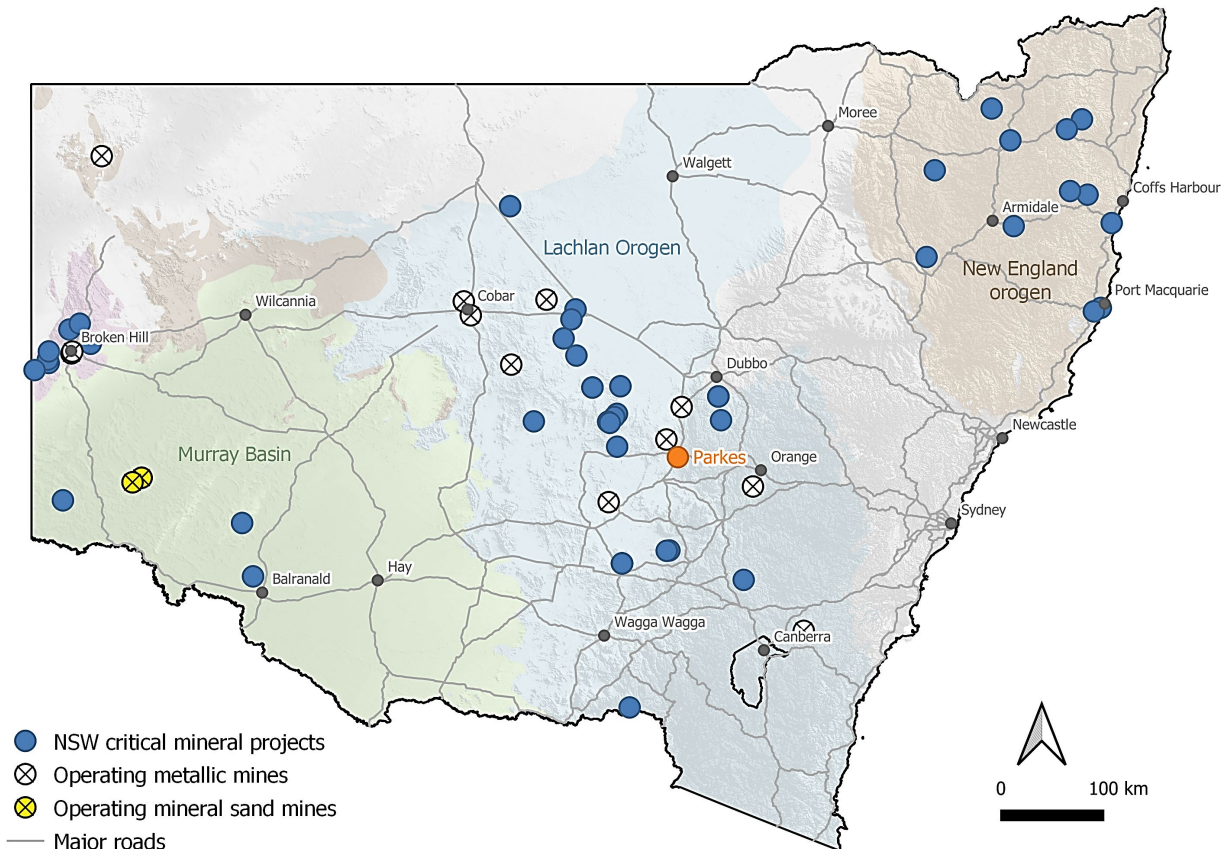
Depth of Cover (Metres)



Critical minerals - renewed focus

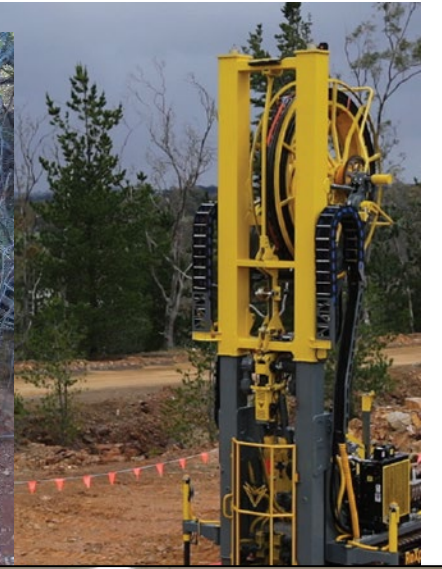
- 10 advanced critical mineral projects
- 7 project summaries included in the Australian Critical Minerals Prospectus 2020 (in red)

Project	Critical Minerals
Dubbo	REE (+ Zr, Nb, Hf, Ta)
Narraburra	REE (+ Zr, Nb, Hf, Th, Ga, Li)
Broken Hill Cobalt (Thackaringa)	Co
Nyngan Scandium	Sc
Platina Scandium (Owendale)	Sc
Sunrise	Co, Sc
Hillgrove	Sb
Atlas-Campaspe	Minerals sands (Ti, Zr)
Balranald	Minerals sands (Ti, Zr)
Copi	Minerals sands (Ti, Zr)



Data - under cover

- Mapping
- Geophysical surveys
- Geochemistry
- Hyperspectral data
- Drilling

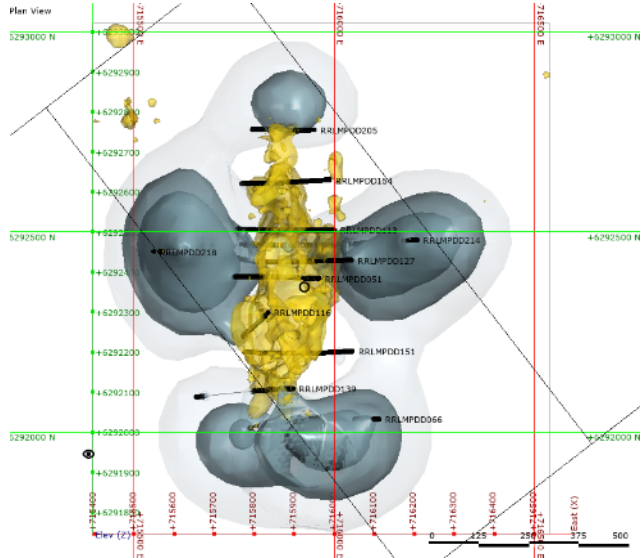
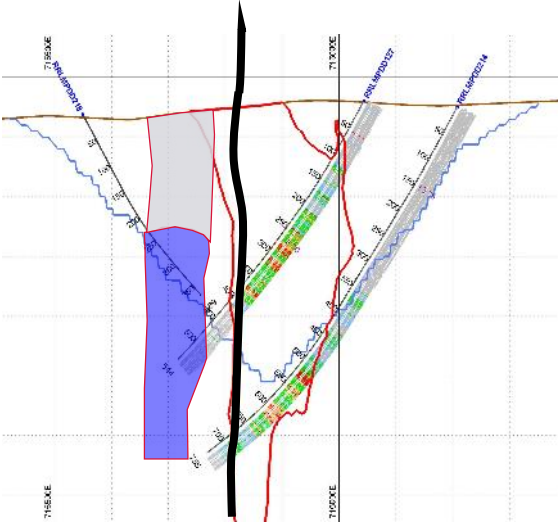
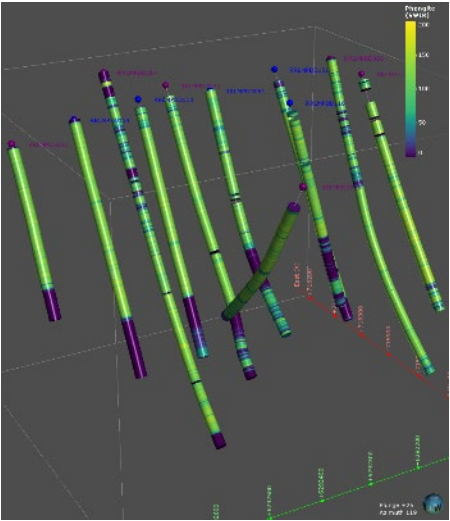
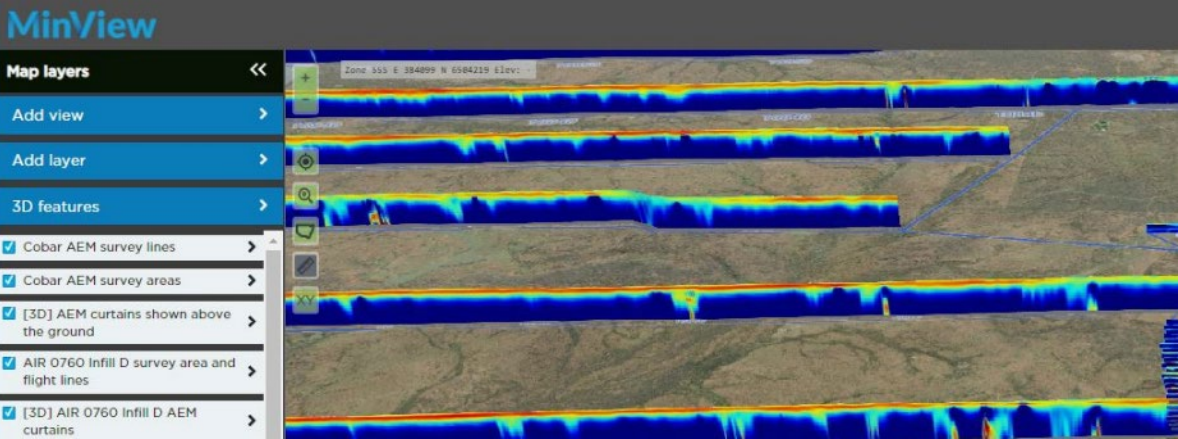


Collaboration enhances data collection and products: GSNSW collaborates with state, national and international government agencies and scientific bodies.



Data integration

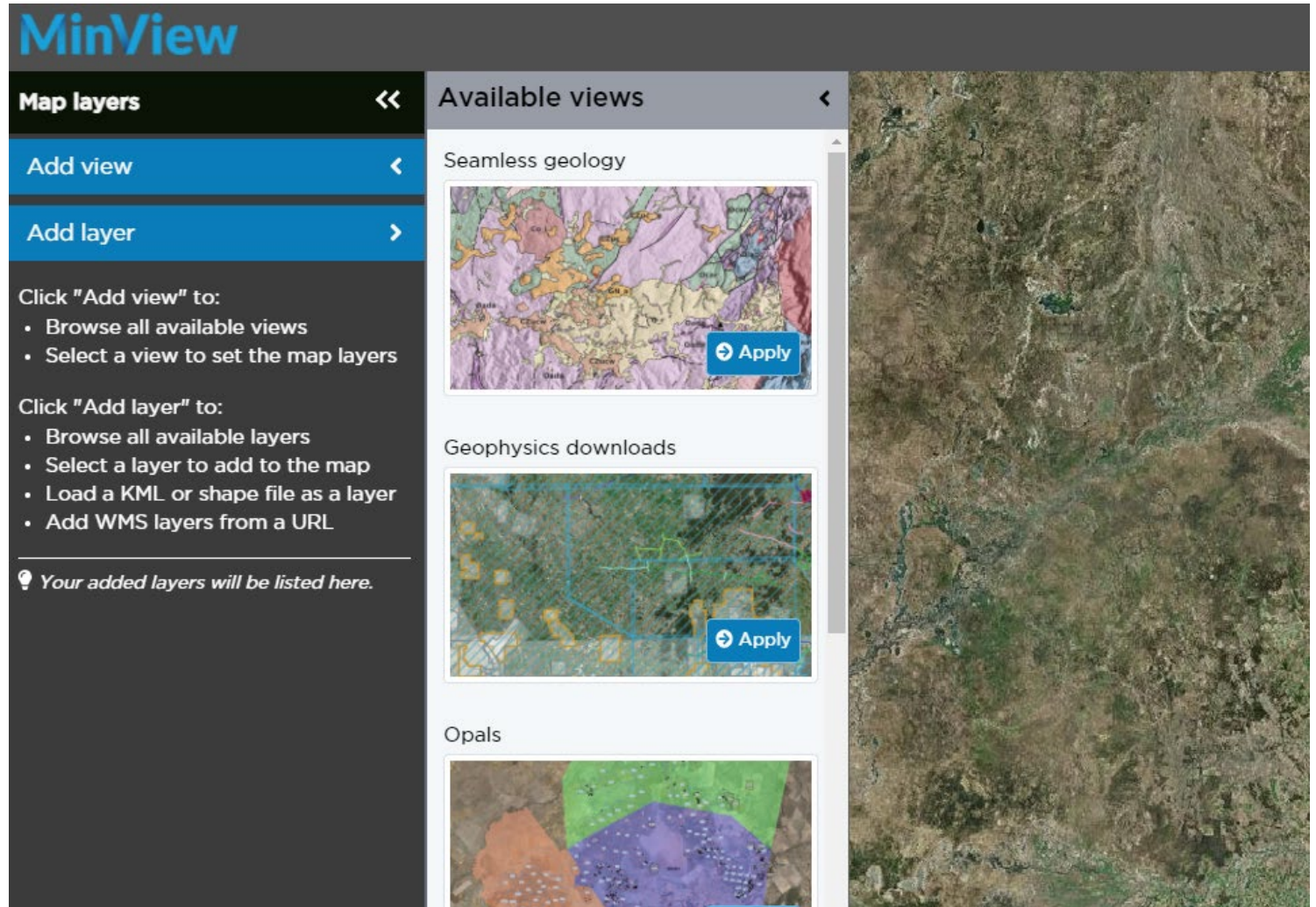
- Data science
 - managing large datasets
 - cleaning data
 - formats (e.g. Seamless)



Data – delivery

Easy public access from a single interface to all validated non-confidential geoscientific and supportive reference data stored by the Geological Survey of NSW.

- Seamless geology
- Mineral potential mapping
- Alteration studies (HyLogger™)
- Mineral systems models
- Modelling
- Publications



Thankyou





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