

Reimagining Northern Territory geology and prospectivity through investment in precompetitive geoscience

Dorothy Close¹

¹Director Regional Geoscience, Northern Territory Geological Survey

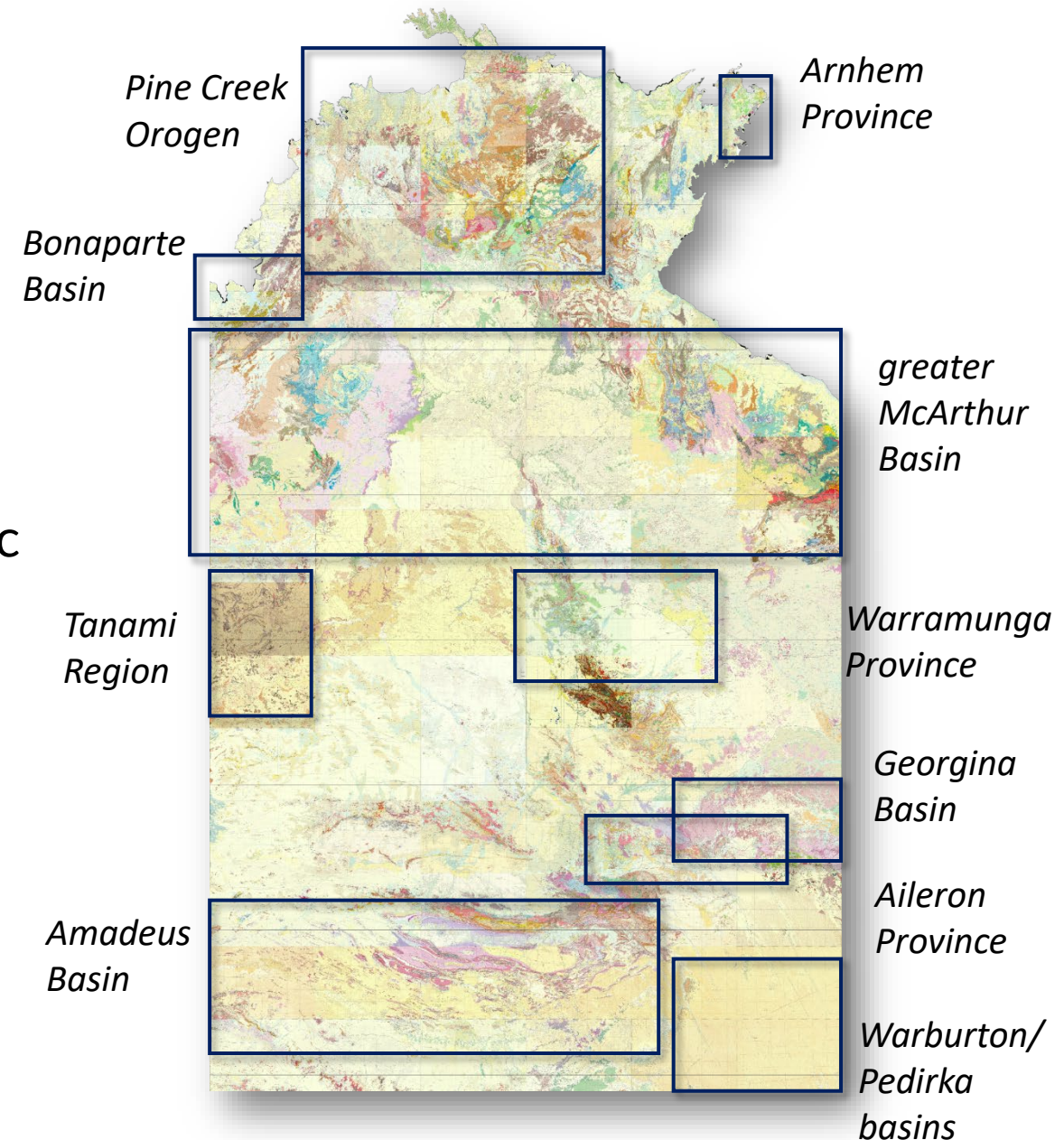
NORTHERN TERRITORY GEOLOGICAL SURVEY
AGES2026
ANNUAL GEOSCIENCE EXPLORATION SEMINAR



Resourcing the Territory program

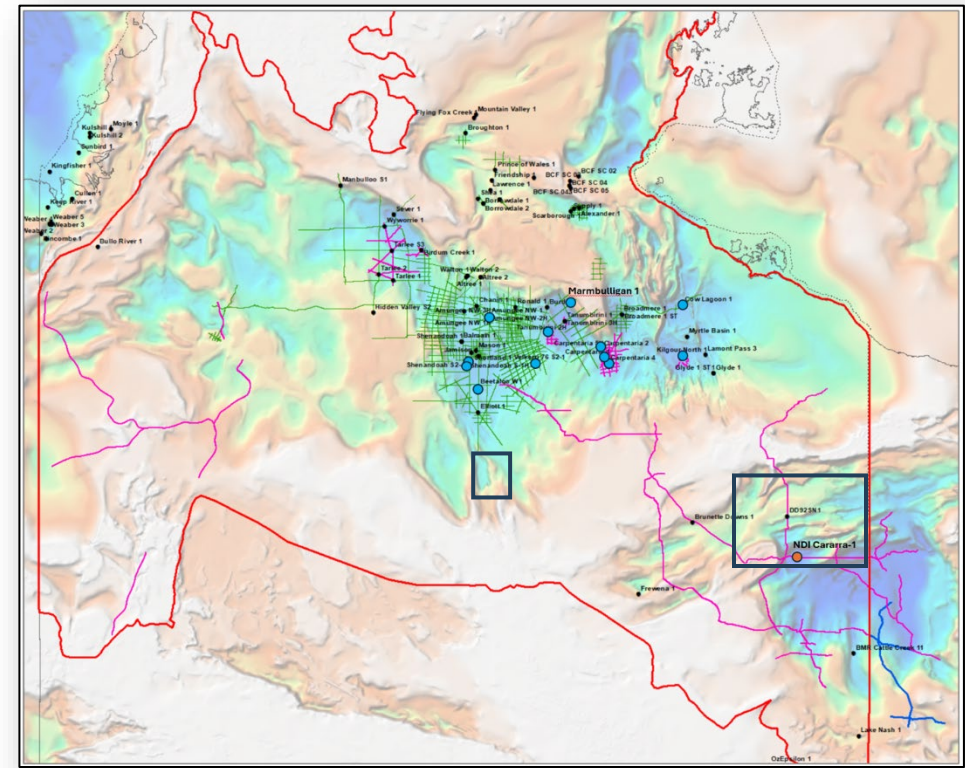
Investing in precompetitive geoscience across the Territory

- Major geophysical acquisition programs
- Uplifting existing geophysical data and improving accessibility
- Extensive multielement geochemistry and isotopic data
- Next edition outcrop maps at 100 000 and 250 000 scale
- Redefining geological framework in basin and basement terrains
- Commodity reviews
- Strategic collaborative partnerships with key research institutions

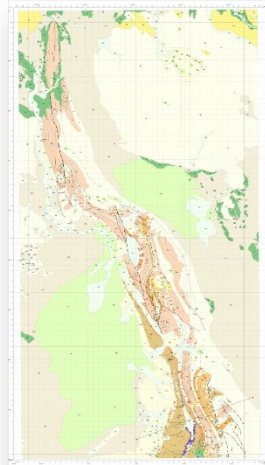


greater McArthur Basin: subsurface and updated geological maps

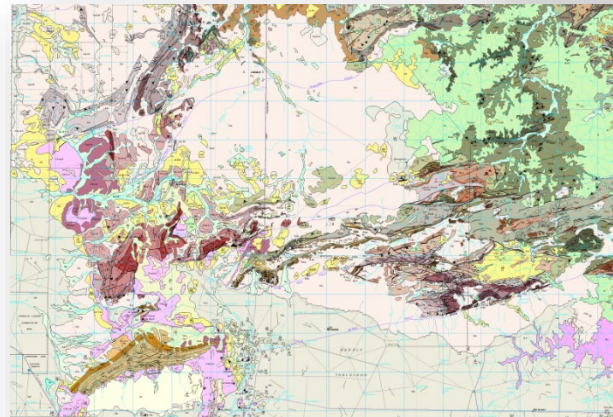
- Updated SEEBASE® incorporating latest seismic data and interpretations in Birrindudu and South Nicholson/Lawn Hill areas: due to be released **2026**
- Interpretation-ready Kingdom seismic project – greater McArthur Basin including Beetaloo Sub-basin: due to be released **2026**
- Integrating structural interpretation and supersequence correlation in the South Nicholson Basin (Jimenez et al, AGES 2026)



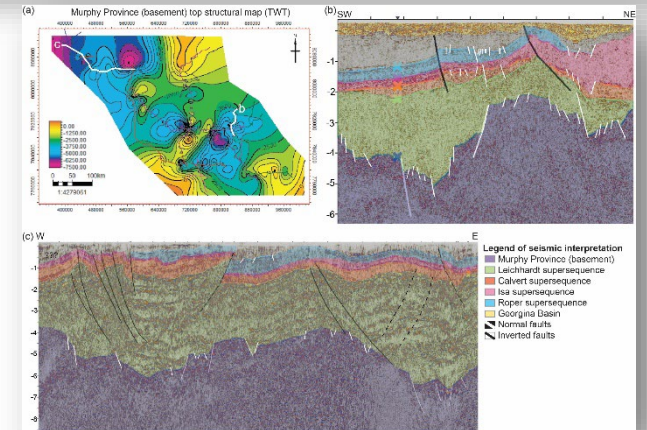
- Mount Drummond 1:250k 3rd ed geology map: released **2025**
- Elliott Special 100k geology map: to be released in **2026**



(Elliott Special 100k)



(Mount Drummond 250k)



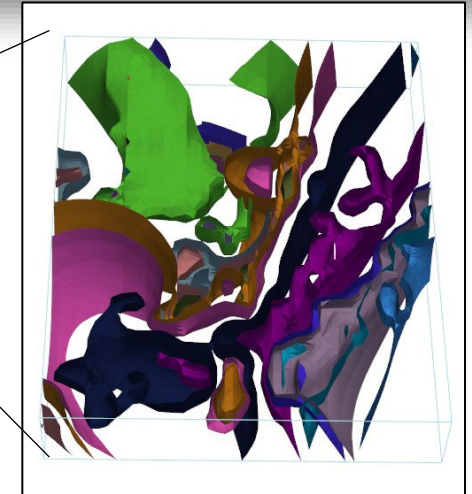
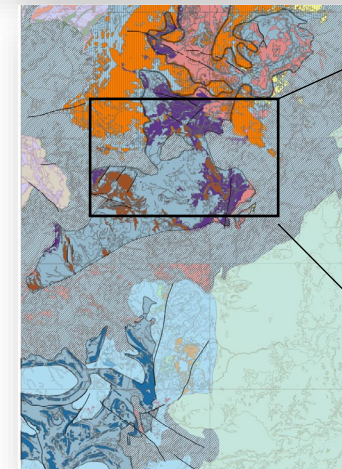
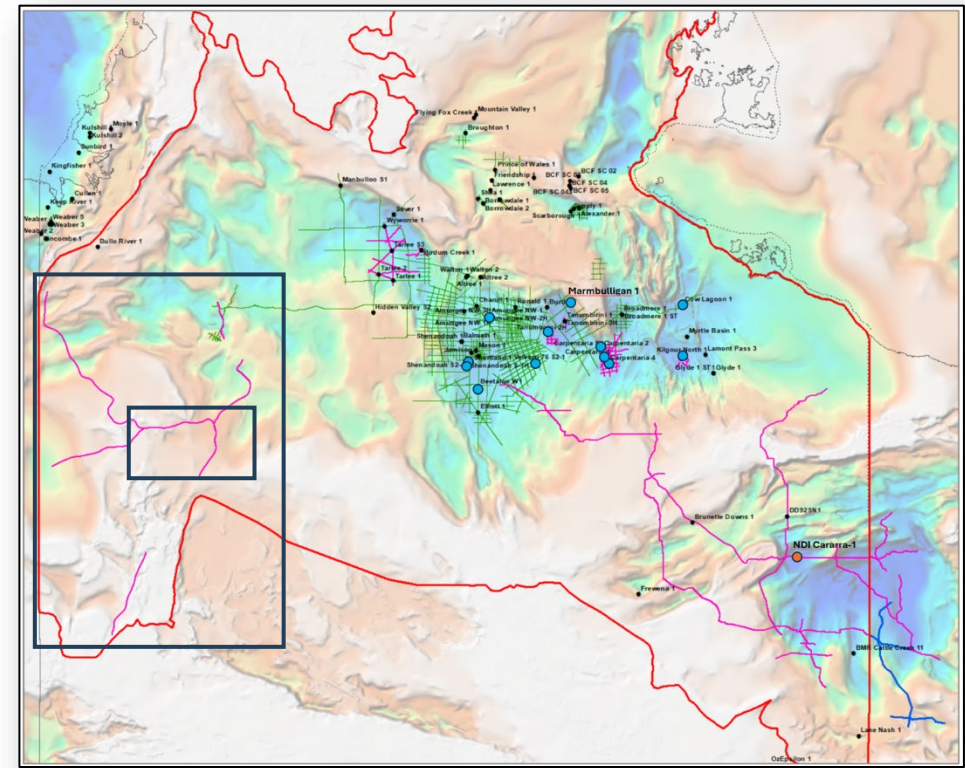
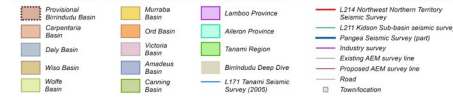
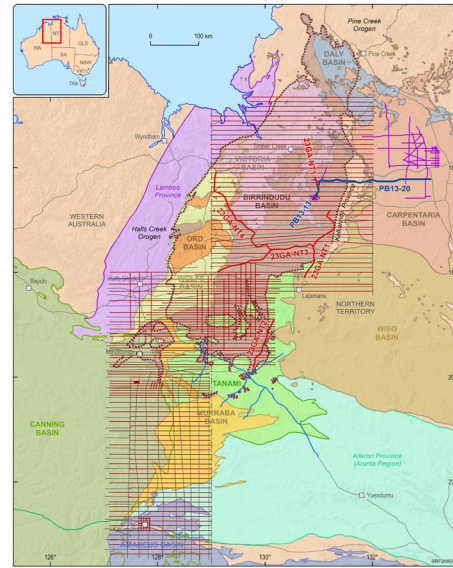
(Jimenez et al, AGES 2026)

greater McArthur Basin: Birrindudu Basin



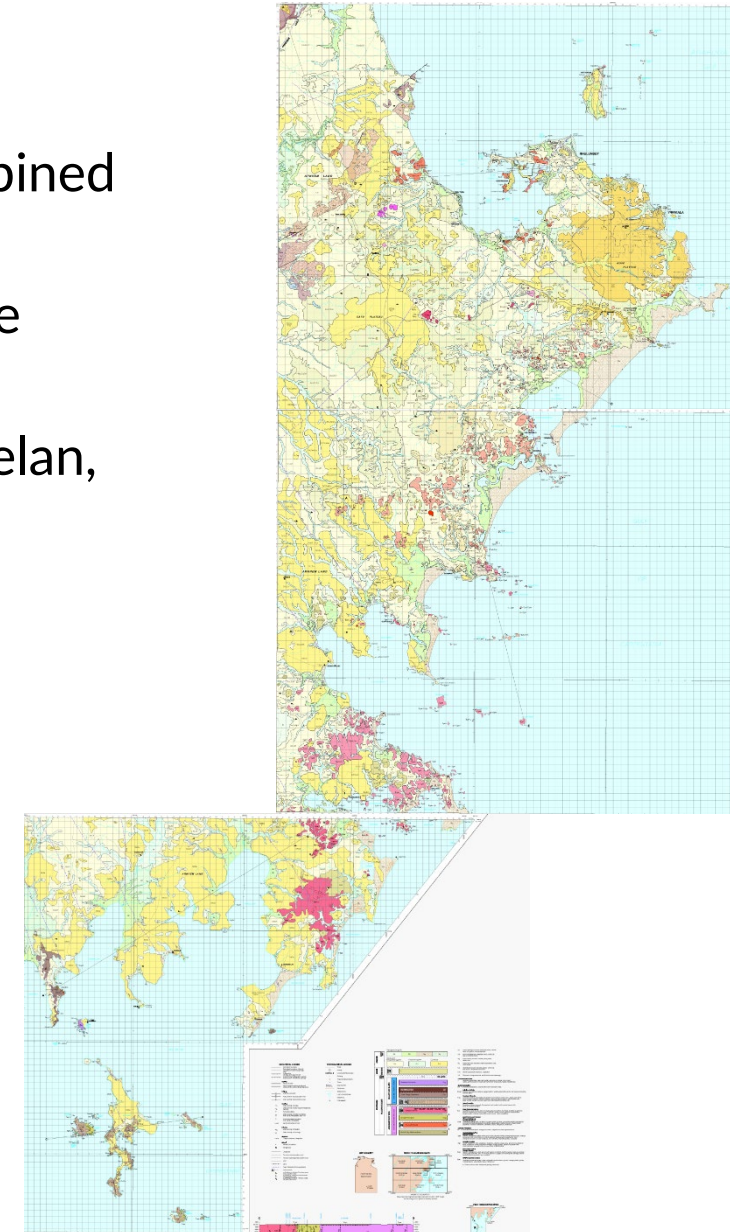
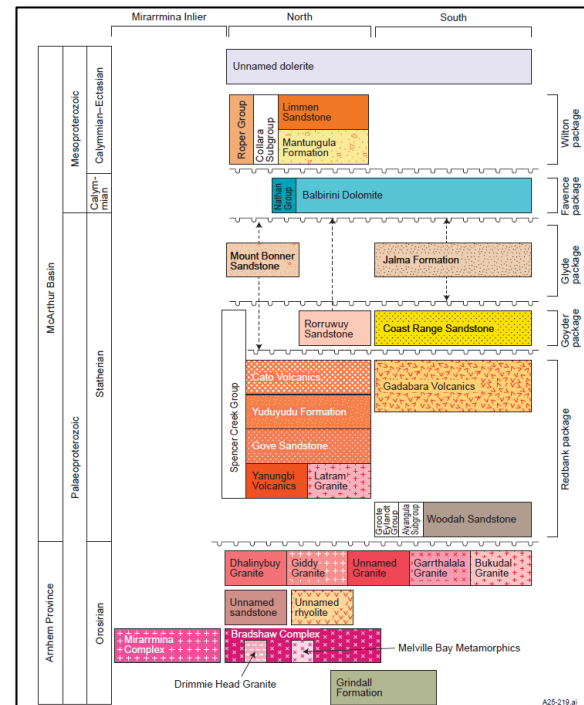
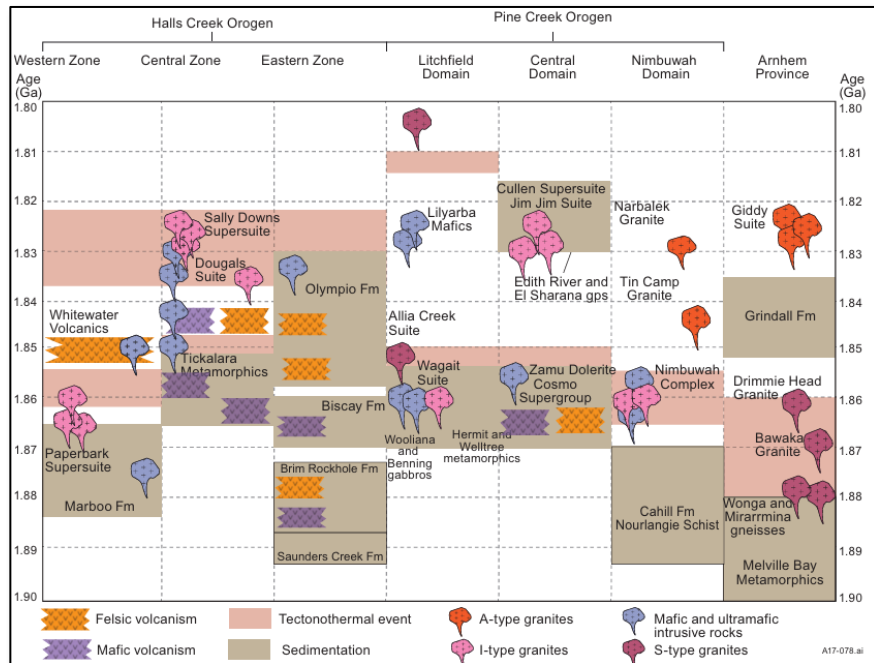
Australian Government
Geoscience Australia

- Geoscience Australia – Resourcing Australia's Prosperity - Birrindudu Deep Dive (Henson, AGES 2025)
 - AEM acquisition: 20km/10km line spacing plus interpretation (Wong, AGES 2026)
 - Targeted geochronology and stratigraphic correlations (Wang, AGES 2026)
- Developing 3D models in selected areas utilising LOOP (open source 3D probabilistic geological and geophysical modelling platform)

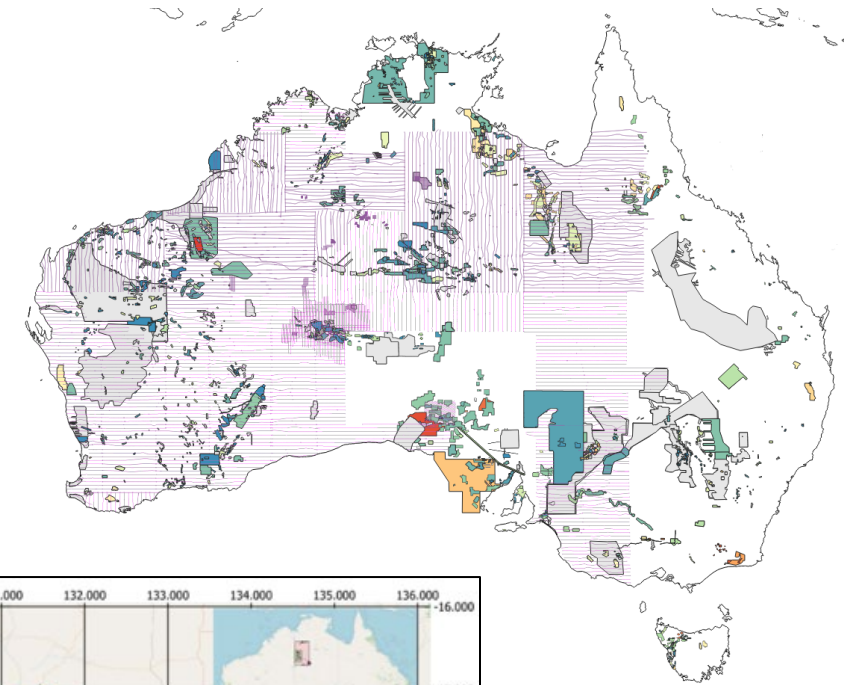


Arnhem Province: updated maps

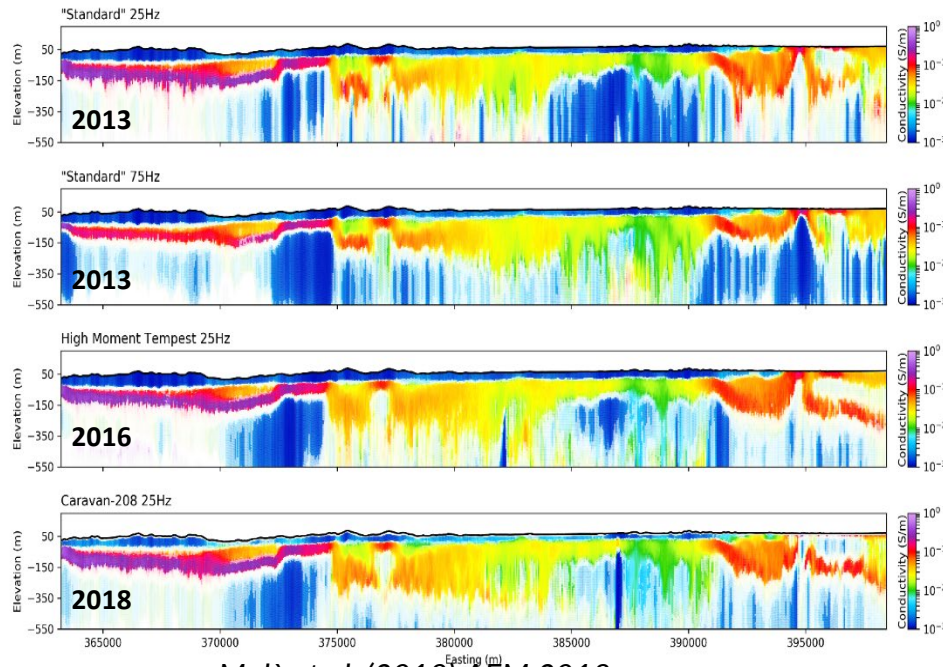
- Gove Special, Caledon Special, Blane Special 100k geology maps and combined explanatory notes: released **2026**
- First dedicated modern geoscientific investigation into the basement to the northeastern McArthur Basin
- Providing correlations to Pine Creek Orogen and Halls Creek Orogen (Whelan, AGES 2017)



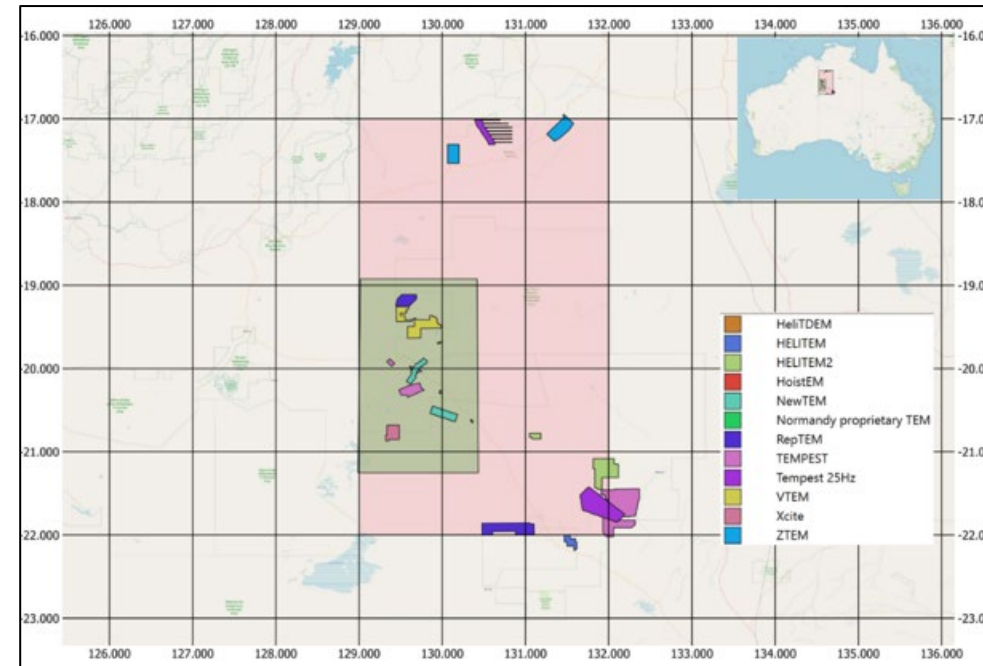
Tanami Region: uplift legacy AEM



- Joint project with CSIRO to uplift legacy AEM
- extracting accurate conductivity-depth model from legacy data to requires inversion
- CSIRO will apply CGT (CSIRO Geophysics Toolkit) to process and invert 22 industry submitted AEM surveys from across the Tanami NT region.



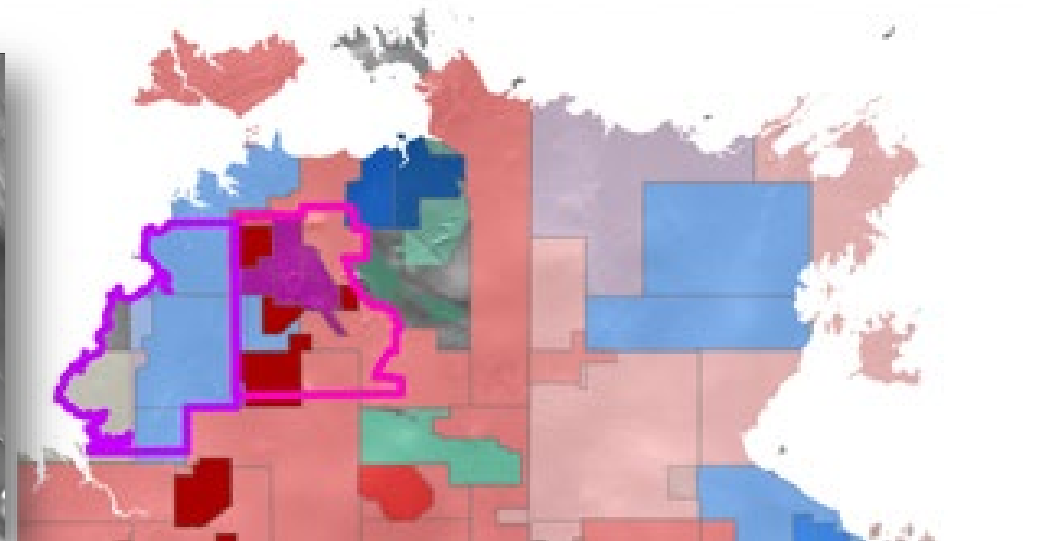
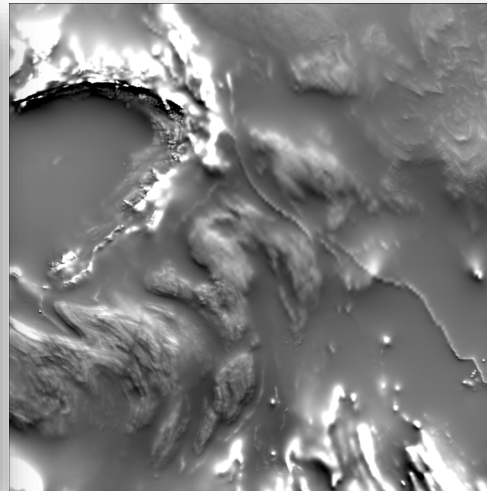
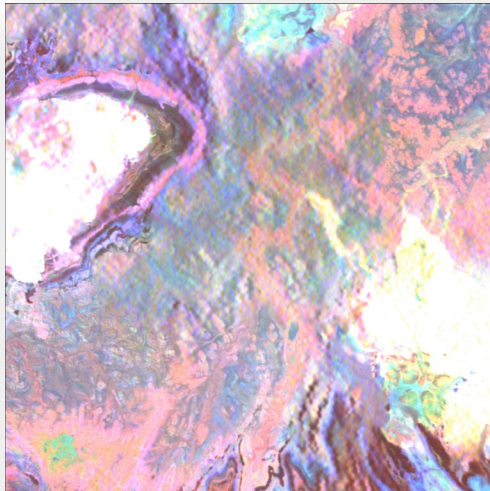
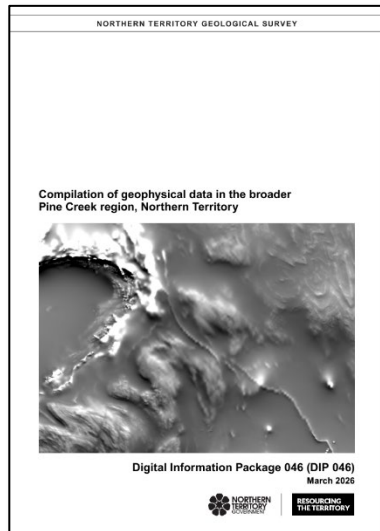
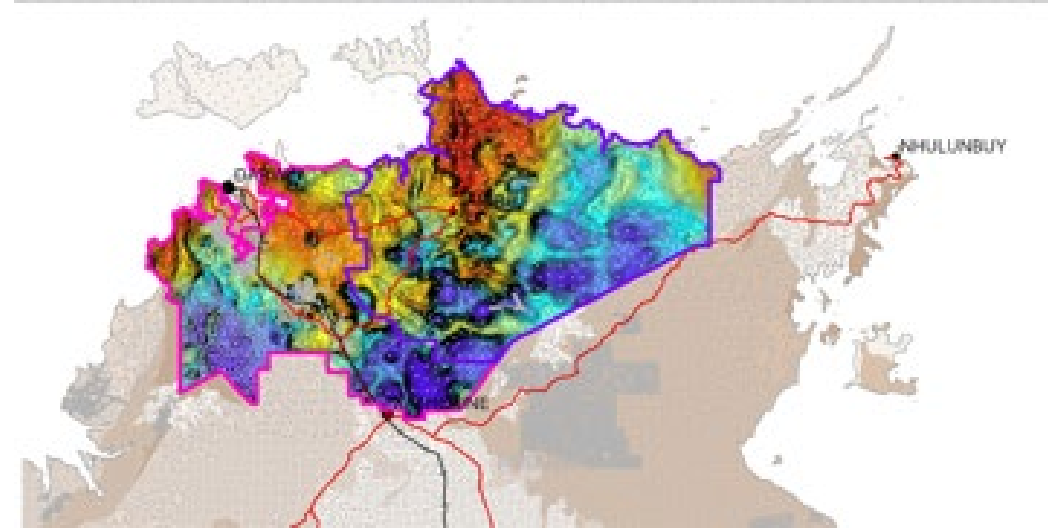
Mulè et al. (2018) AEM 2018



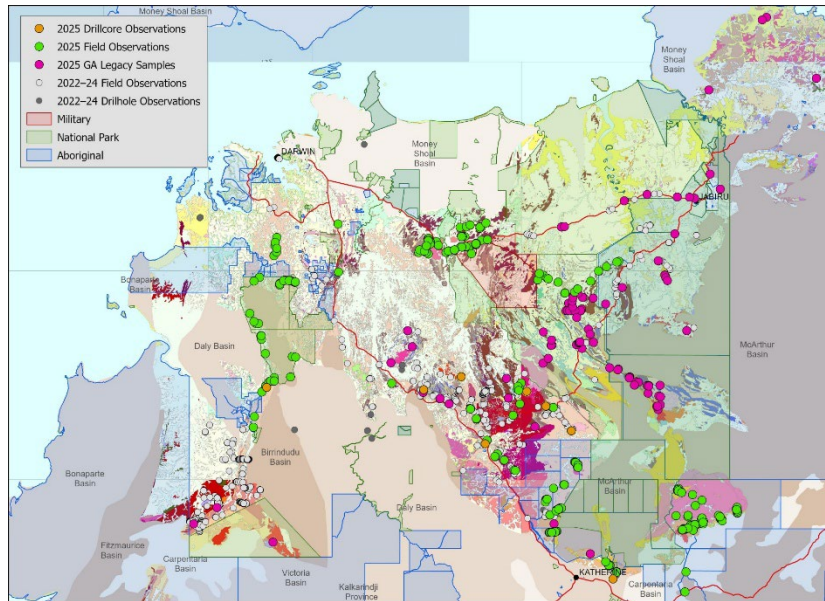
AEM surveys across the Tanami Region NT

Pine Creek Orogen: geophysical overhaul

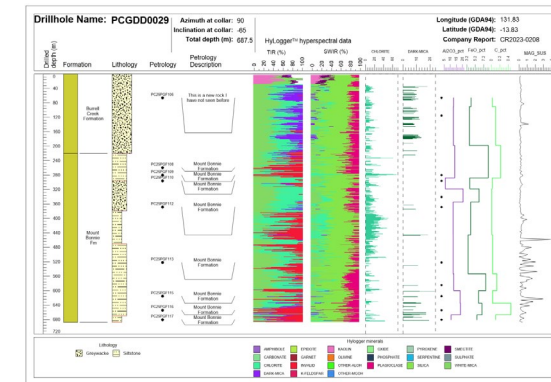
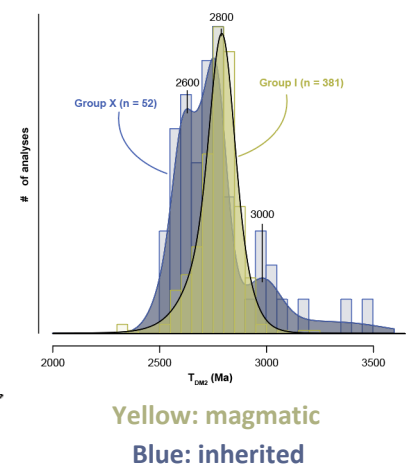
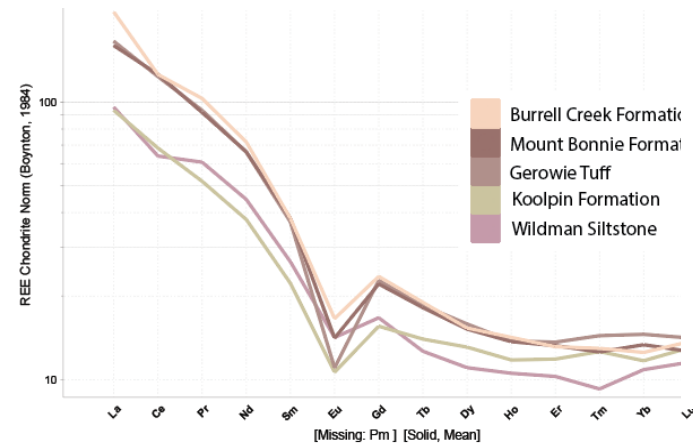
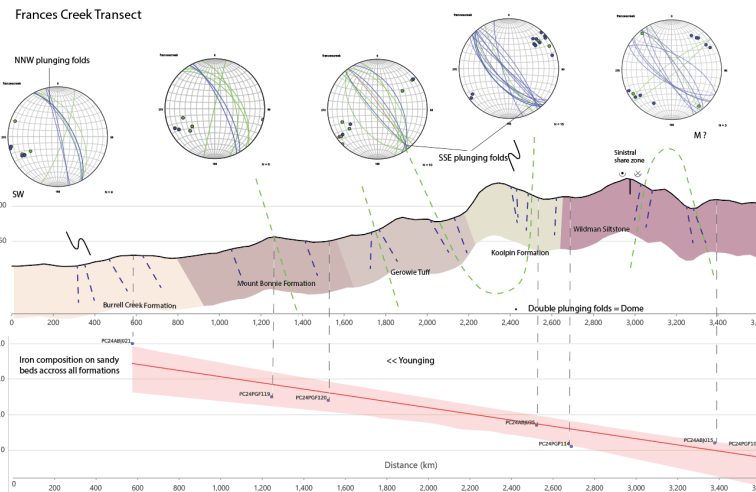
- Ground gravity acquisition Pine Creek Ground Gravity Survey @ 2km spacing or better- released **2025**, West Arnhem Ground Gravity Survey @ 4km spacing: released **2026**
- Airborne magnetic and radiometric acquisition Pine Creek Survey and Cape Scott Survey @ 200m line spacing: acquisition **2026**
- Industry data compilation DIP 046 - spatial index, grids & images of ground gravity, airborne magnetic and radiometric, & (IP) surveys plus Geoscience Australia's Woolner Granite and Rum Jungle TEMPEST AEM Survey: released **2026**. Demonstration of data set at NTGS booth



Pine Creek Orogen: updating geology

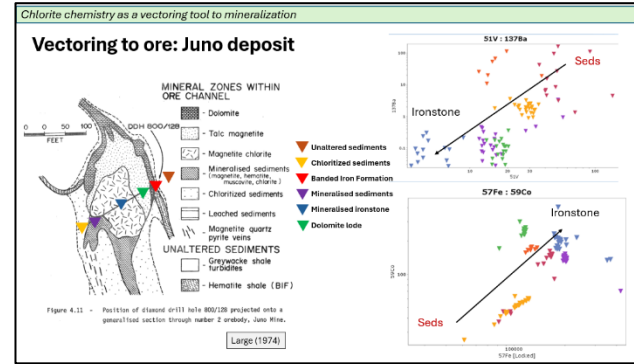
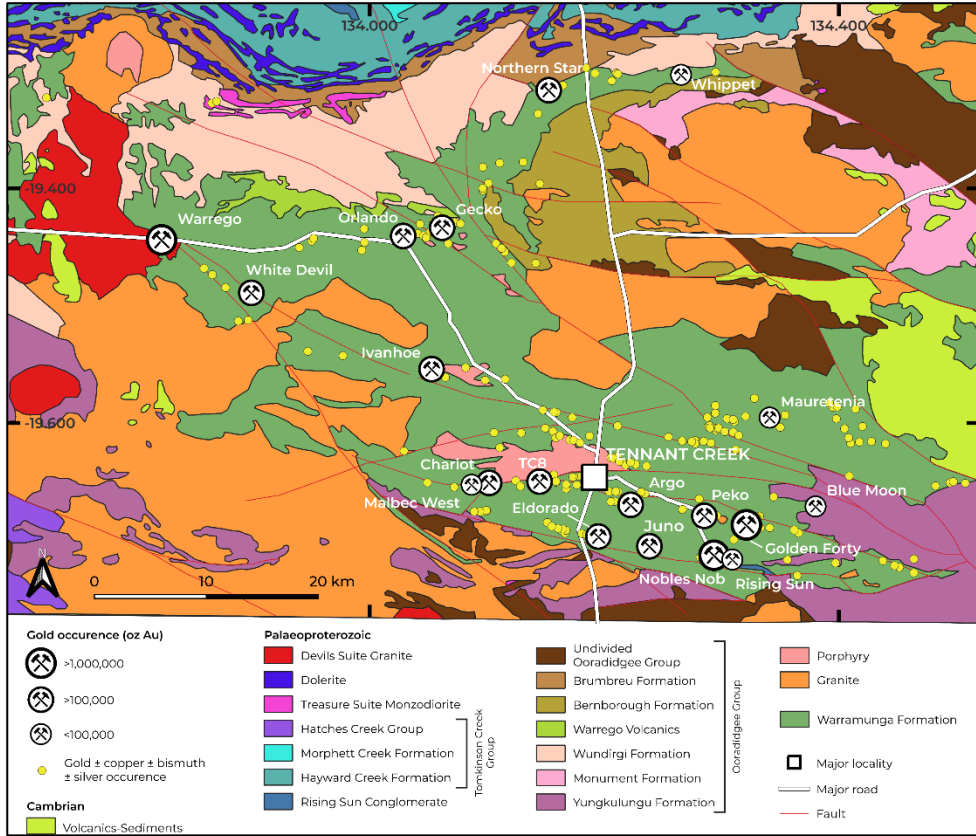


- Stratigraphic characterisation - Field traverses
 - petrology, geochemistry and structural data
 - Stratigraphic characterisation – Drill hole logging
 - Six drillholes logged providing unweathered petrology and geochemistry data
 - Extensive igneous characterisation
 - Full suite geochemical analysis, multi-isotopic analysis
- Leading to stratigraphic and tectonic evolution revision



Warramunga Province : vectoring to mineralisation

Chlorite chemistry as a vectoring tool to mineralisation
Braize, AGES 2025



Multiscale approach

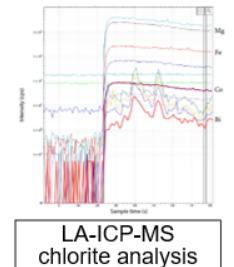
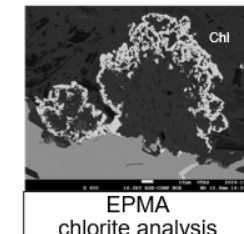
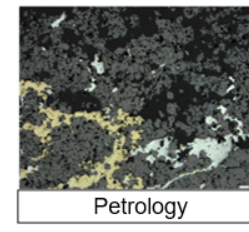
Chlorite chemistry as an exploration tool

1. Chlorite chemistry for near-mine exploration (<100m)

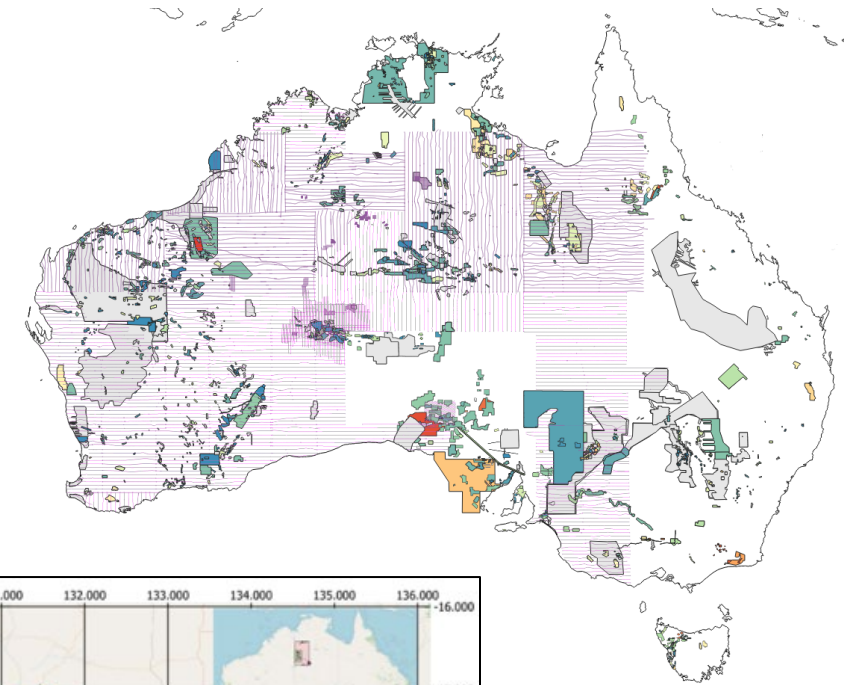
2. Chlorite chemistry for greenfields exploration (>2 km)

3. Chlorite chemistry for deposit characterization

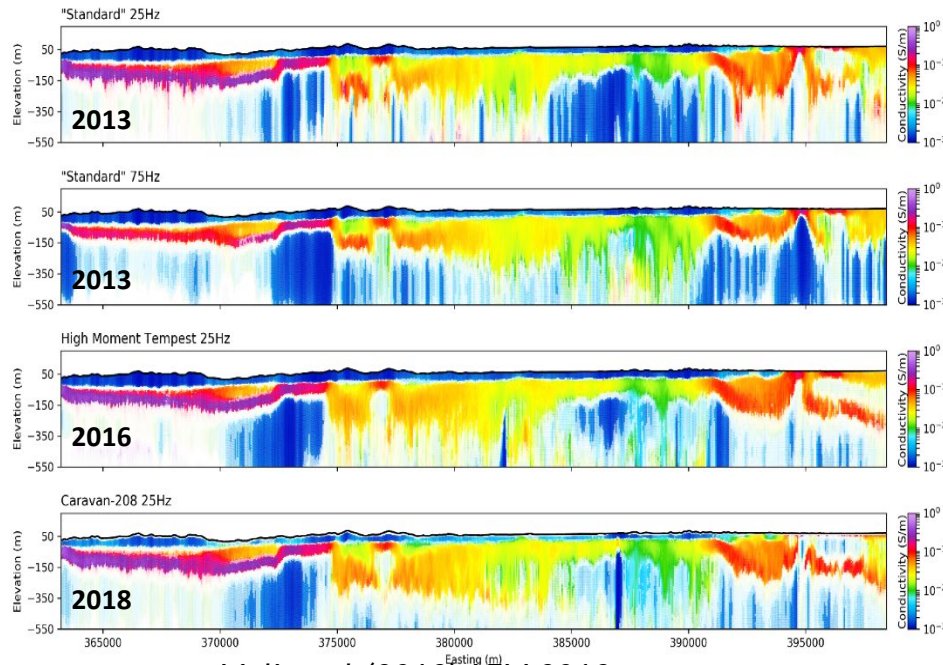
Chlorite chemistry at the deposit scale:
White Devil case study- Braize AGES
2026



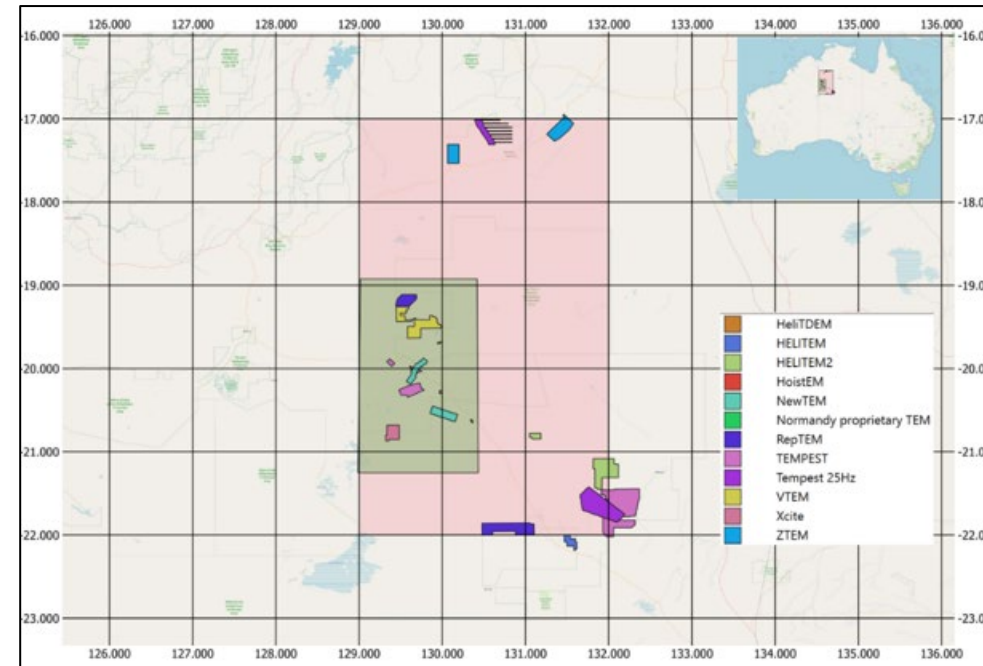
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Mulè et al. (2018) AEM 2018

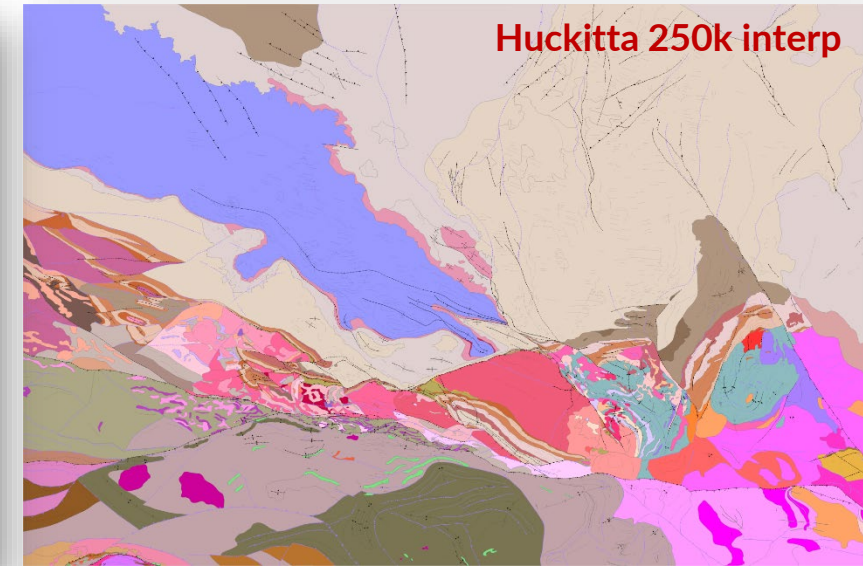
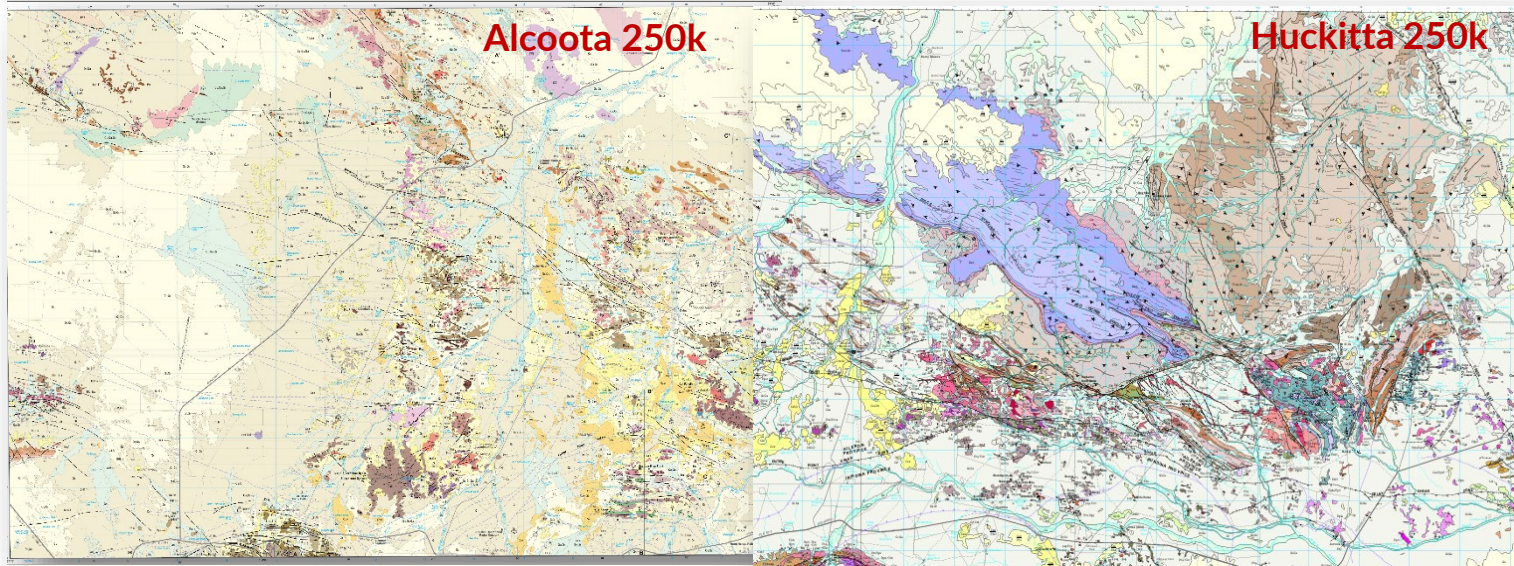
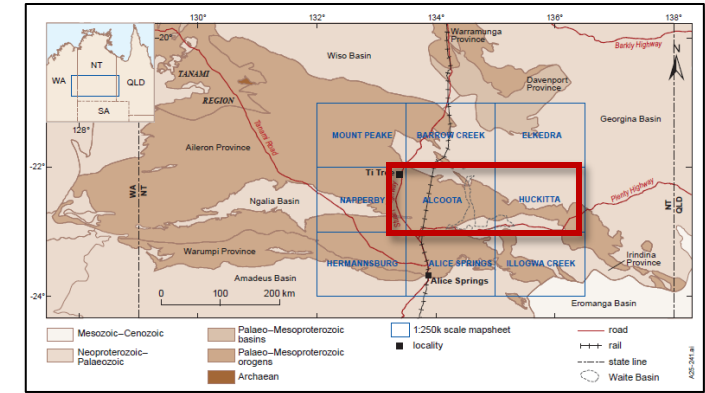


AEM surveys across the Tanami Region NT

Aileron Province: seamless geology maps

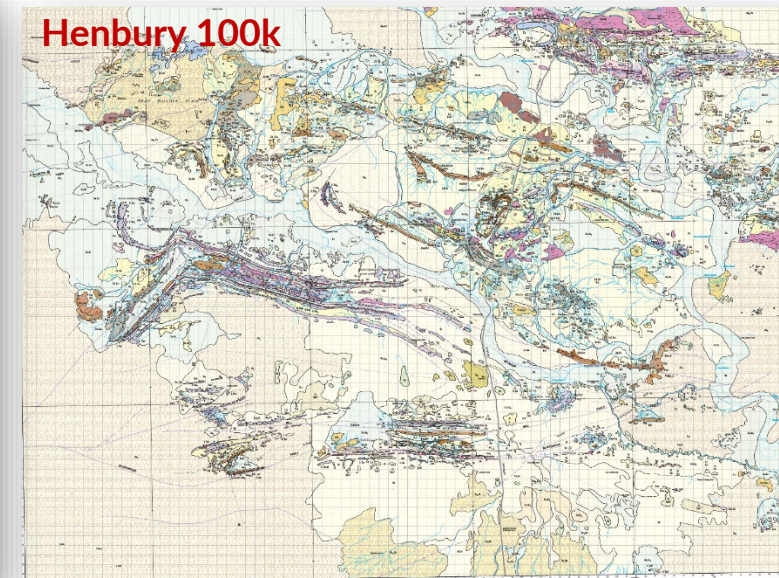
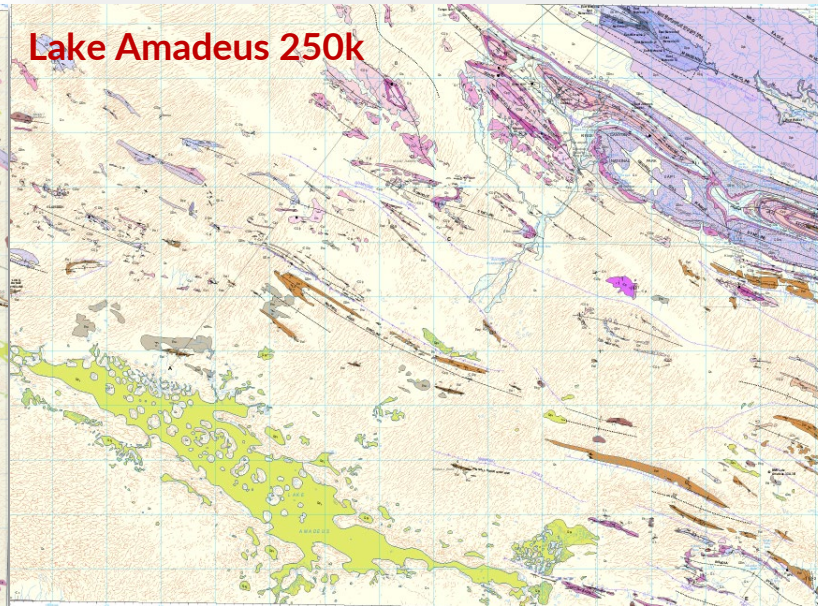
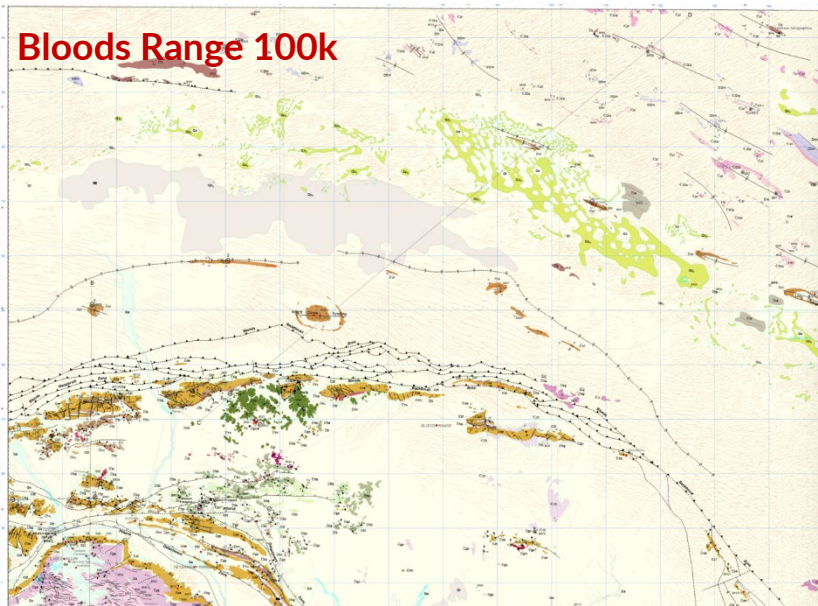
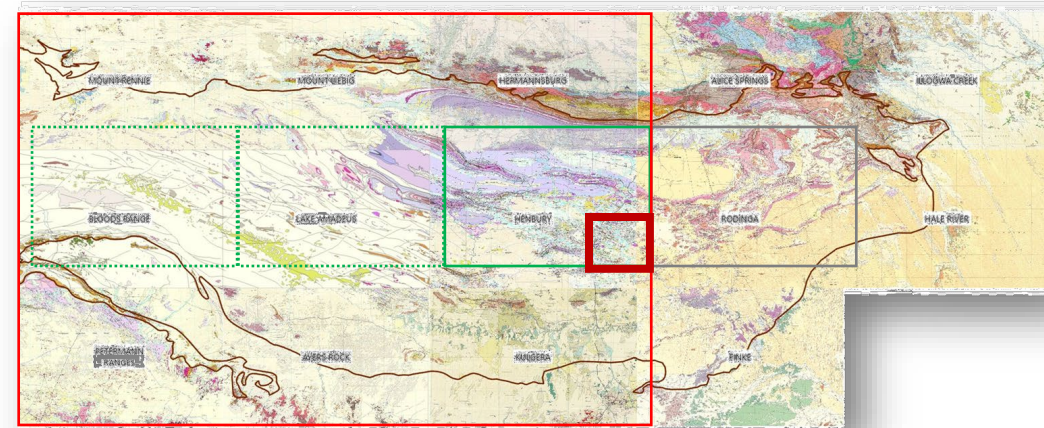
- Huckitta 2nd ed 1:250k geology map and explain notes: published **2025**
- Huckitta 1st ed 1:250k interp geology map and explain notes: to be published **2026**
- Alcoota 2nd ed 1:250 000 geology map and explain notes: to be published **2026**

Geology hosts mineral systems including: syngenetic Cu-Ag-Pb-Zn, orthomagmatic vanadium-titanium and PGE, tungsten-molybdenum skarns, epigenetic copper-tungsten, vein-hosted gold-copper, hydrothermal fluorite-barite



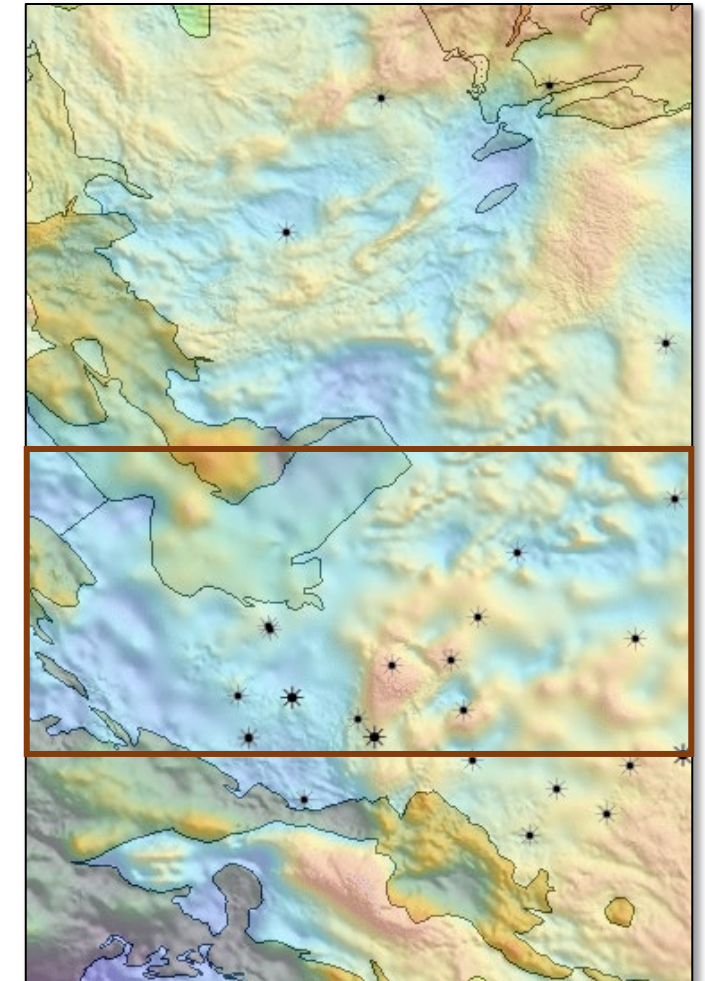
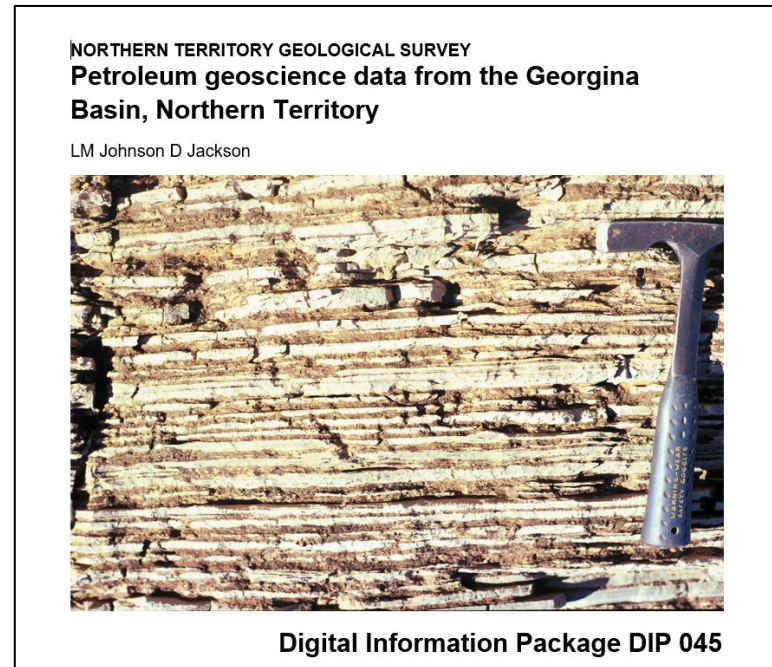
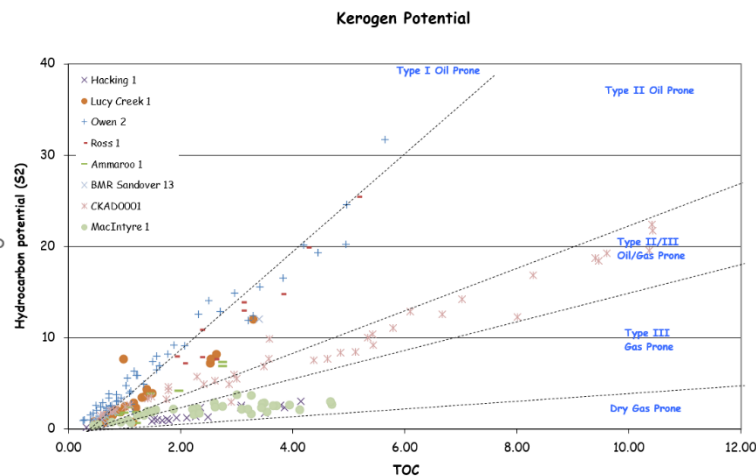
Amadeus Basin: seamless geology maps

- Lake Amadeus 2nd ed 1:250k geology map and explain notes: published **2026**
- Bloods Range 2nd ed 1:250k geology map and explain notes: to be published **2026**
- Henbury 1st ed 1:100 000 geology map and explain notes: to be published **2026**
- Rodinga 2nd ed 1:250 000 geology map and explain notes: to be completed **2026**



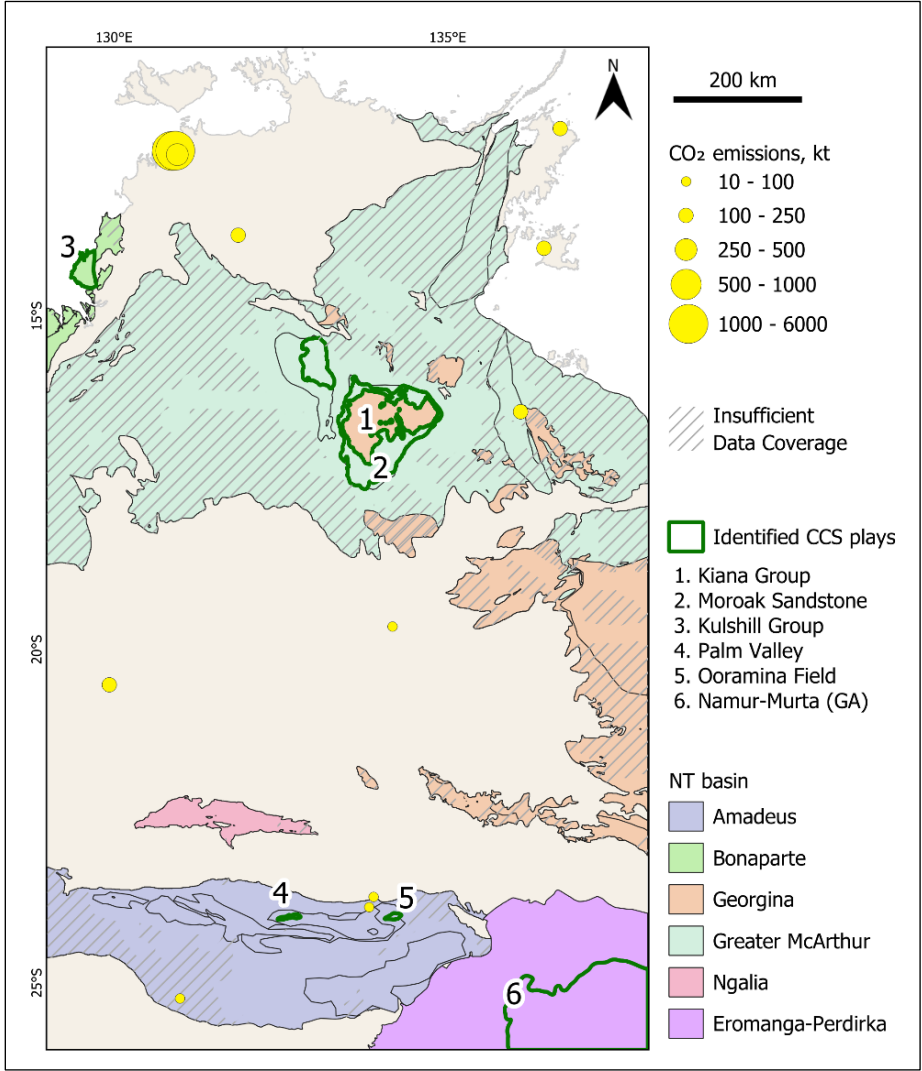
Georgina Basin: gravity acquisition & energy data compilation

- Ground gravity acquisition **2026** – improved resolution from 11km to minimum of 4km spacing – opportunity for industry infill
- DIP045 Petroleum geoscience data: to be released **May 2026**
 - total organic carbon (TOC) and programmed pyrolysis
 - X-ray diffraction (XRD)
 - elemental kerogen analysis
 - organic petrology and reflectance
 - rock mechanics
 - gas geochemistry
 - porosity, permeability and density

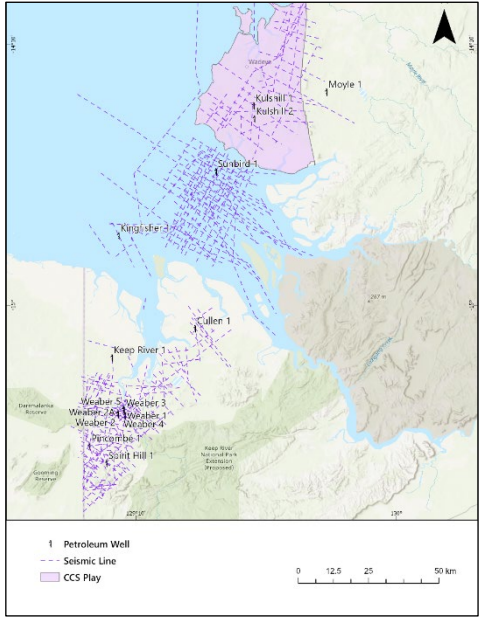
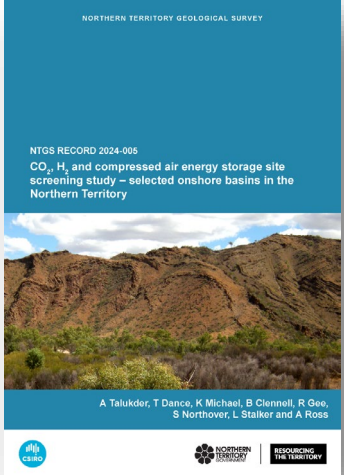


Area of gravity acquisition to be completed in southern Georgina Basin

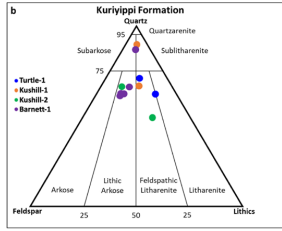
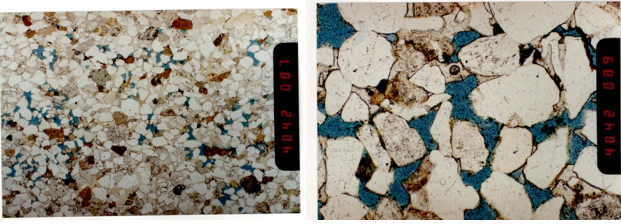
Onshore Bonaparte Basin: Energy systems incl CCS



- NTGS-CSIRO study NTGS Record 2024-005 assessed NT onshore basins for their suitability for CO₂ geological storage- 31 potential plays were identified
- top 6 plays were identified including the Kushill Group in the Bonaparte Basin



- investigate reservoir quality, seal integrity, and CO₂ containment potential by integrating petrophysical, seismic, and laboratory analyses



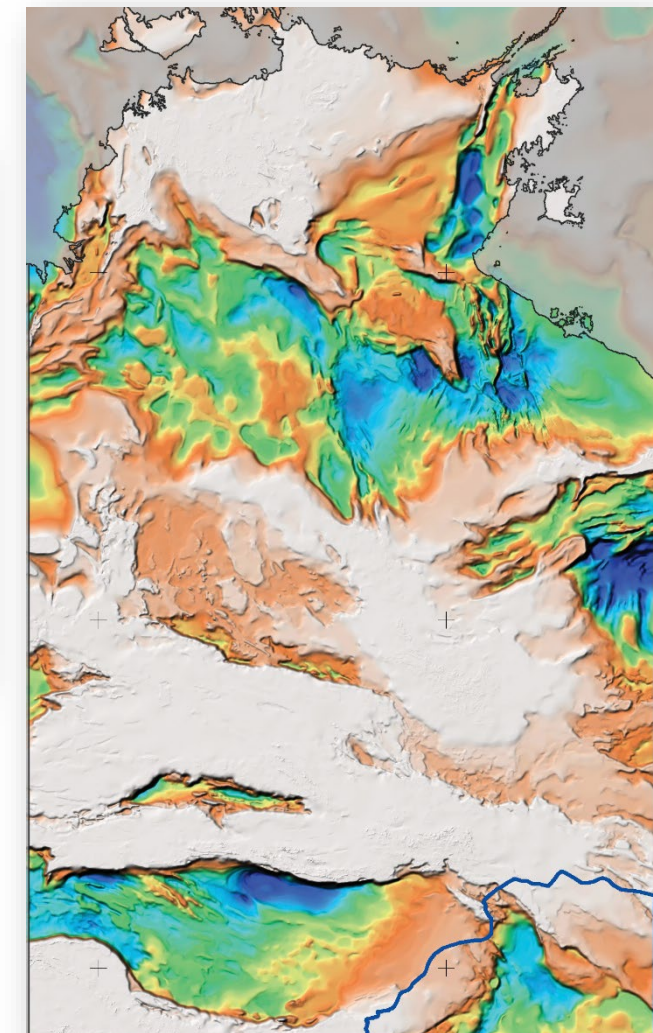
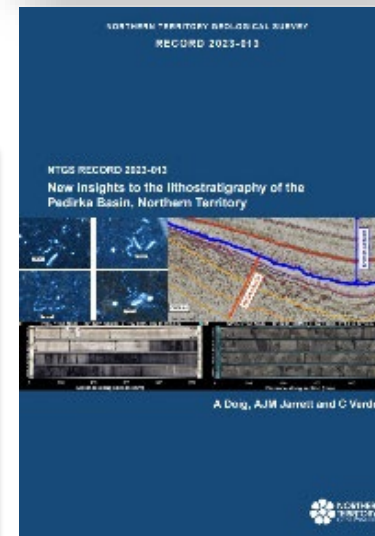
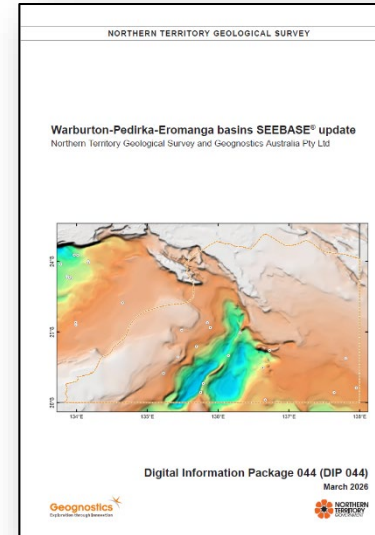
Quartz: 63%, Feldspar: 4%, Clays: 0.3%
Lithics: 4%, Cements: 8%, Porosity: 21%

Warburton/Pedirka/Eromanga basins: updated SEEBASE®

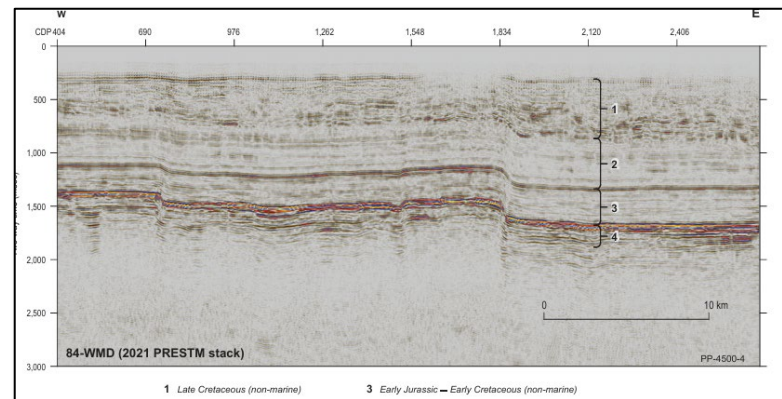
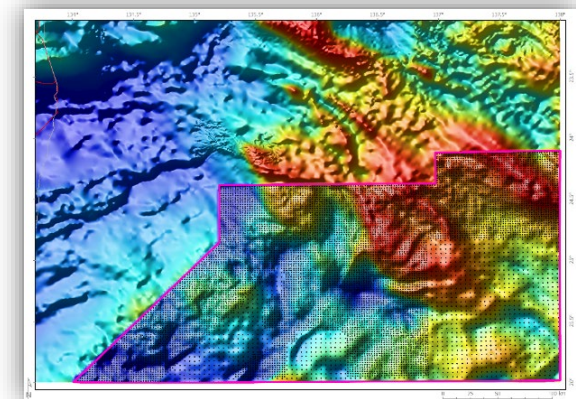
DIP 044: Warburton-Pedirka-Eromanga basins SEEBASE update released **2026**

Incorporation of

- new gravity data: NTGS Pedirka Ground Gravity Survey improved from 11 km to 2-4 km spacing)
- revised lithology & stratigraphy of the Pedirka Basin in the NT
- 3,750 line km of reprocessed legacy 2D seismic data

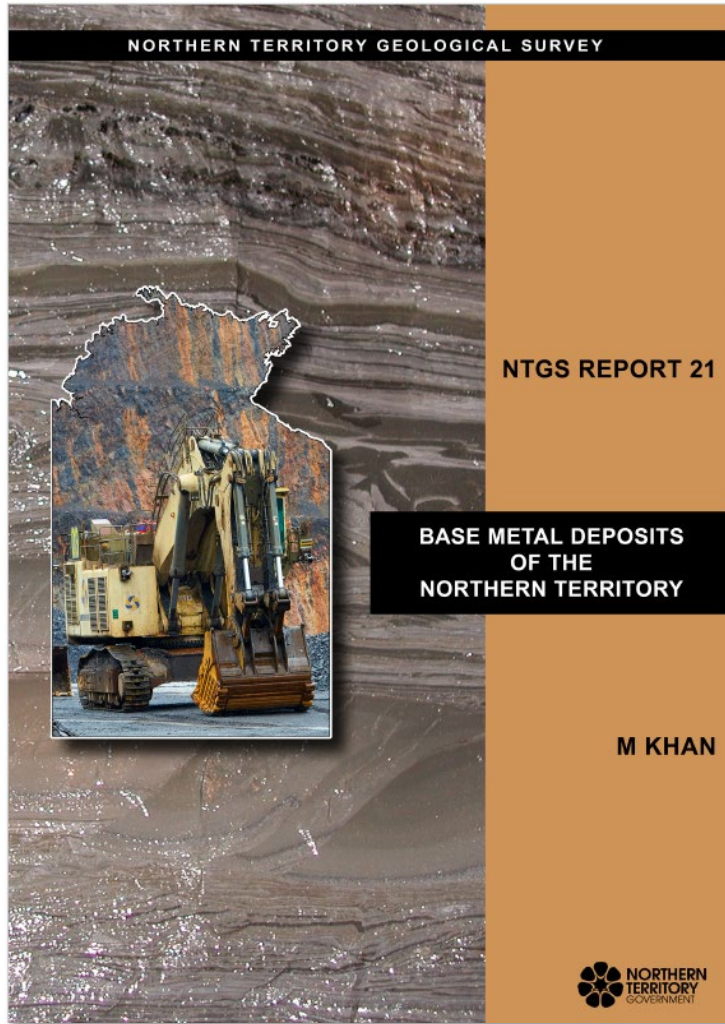


The Northern Territory SEEBASE® Study and GIS (NTGS and Geognostics Australia, 2021)



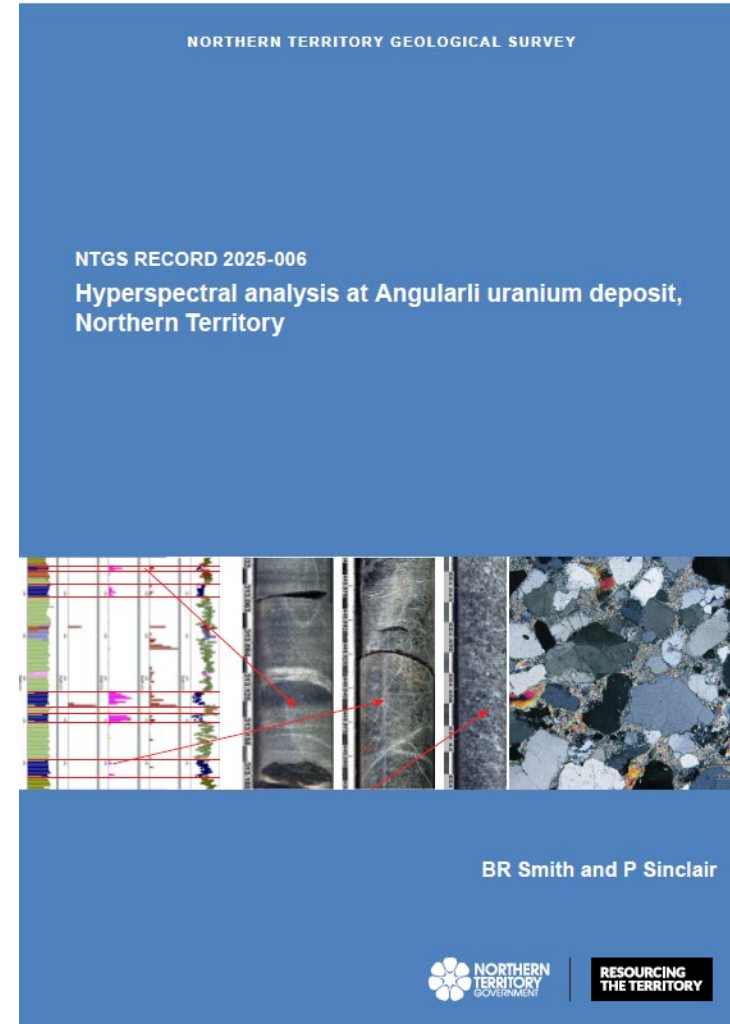
NTGS Record 2023-013

Commodity studies



identifies 826 base metal deposits or occurrences across the geological terranes of the Territory that contain either copper, lead, zinc, nickel or cobalt mineralisation or are polymetallic, many of which include precious metals such as gold and silver.

Released **2026**



integrating spectral data with petrography, x-ray diffraction, geochemistry and geological observations from the Rio Tinto-Cameco Joint Venture, Angularli unconformity-style uranium deposit - identifies mineralogical signatures that could guide future exploration

Released **2025**