

Department of Natural Resources, Mines and Energy

GSQ's New Discovery Program

Technical Workshop for Industry



Mt Isa
20-21st March 2019



Queensland
Government

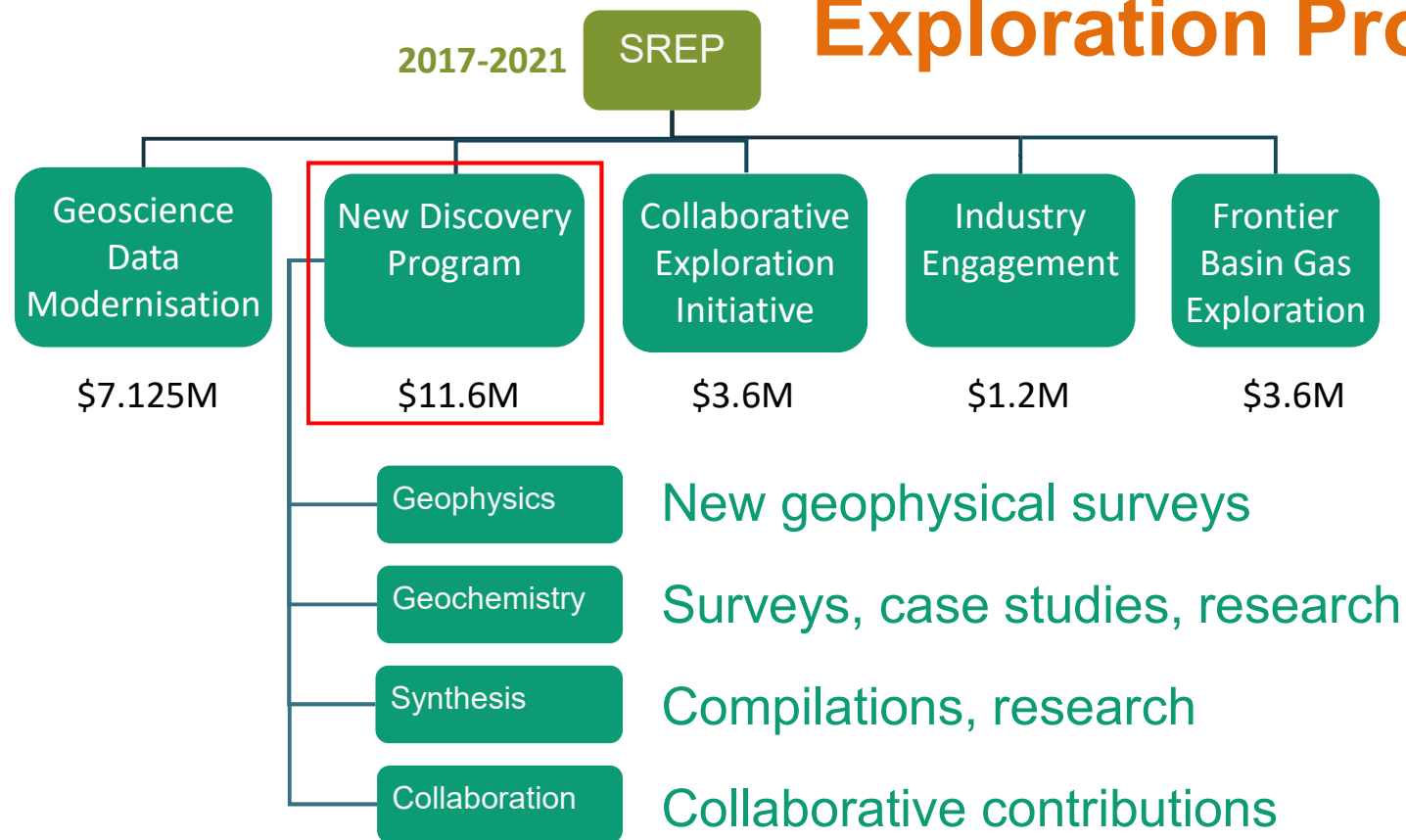
Geological Survey of Queensland

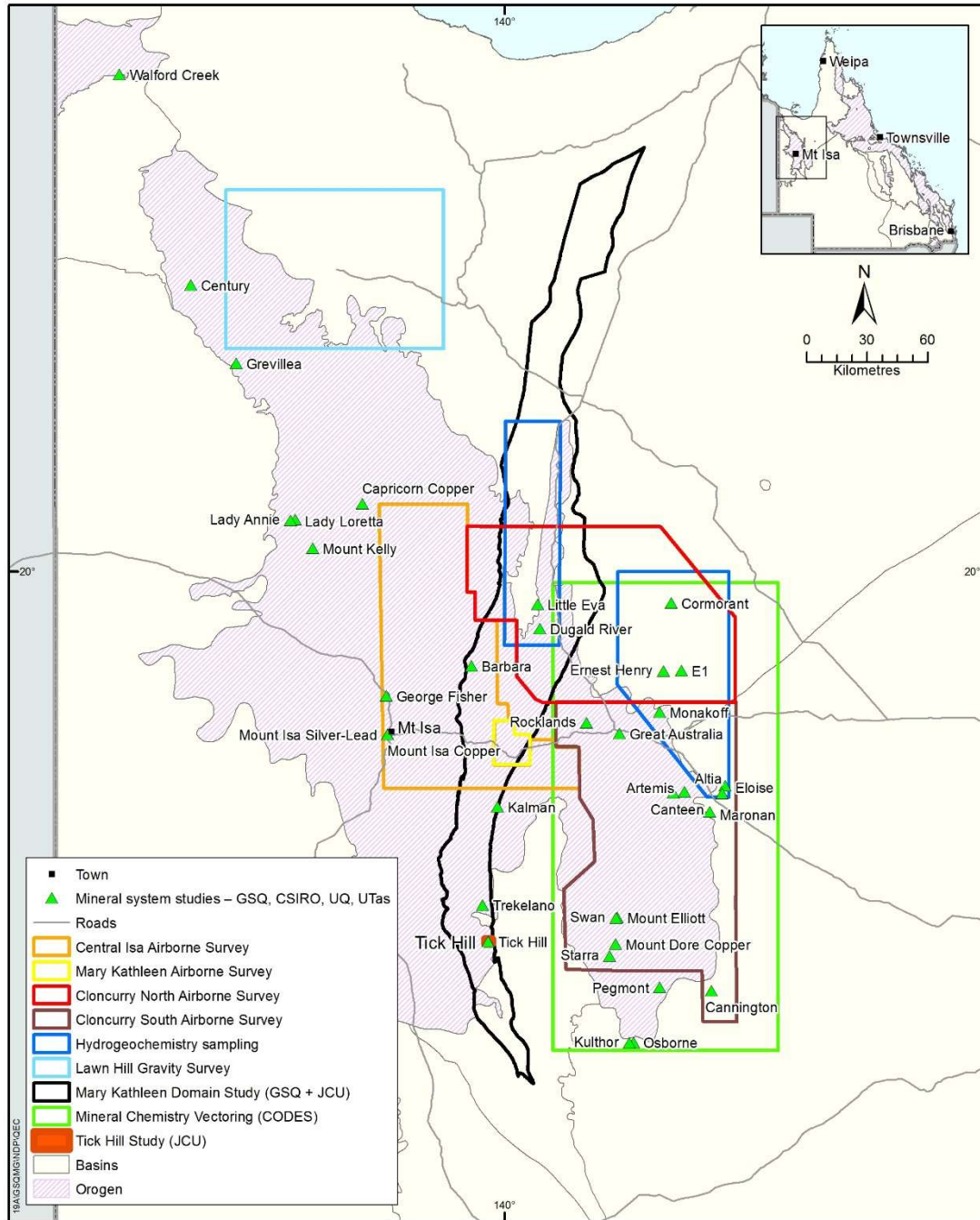


- Our main goal is to enable industry success
- Traditional activities need to be modernised
- Do the jobs that will help industry, but are too big too hard, too expensive for any one company to undertake
 - Regional geophysics (already do well – ongoing)
 - Regional geology.... Of areas under cover; change our map production to mapping under cover
 - Mineral systems studies
- **Greatest value for industry in reducing the unknowns**
 - Minimise risk

GSQ Projects and Funding

Strategic Resources Exploration Program





Coverage of the New Discovery Program



Survey updates

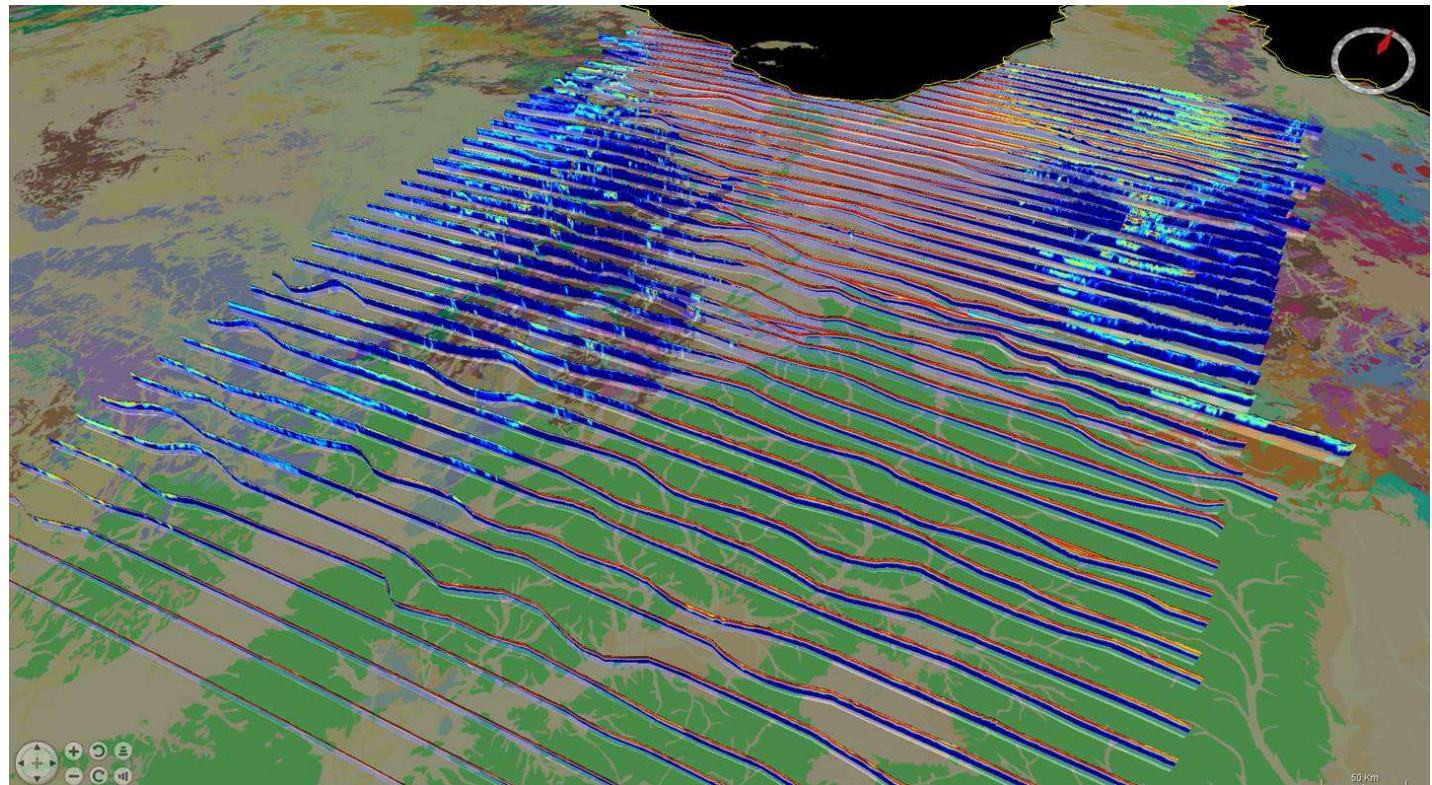


- **GSQ – New Discovery Program**
 - North Cloncurry airmag released
 - Mary Kathleen Domain geology
- **New Discovery Program collaborators**
 - Deposit Atlas (UQ – Rick Valenta)
 - Geochemical Footprints (CODES, UTas – Shaun Barker and Jonathan Cloutier)
 - Ore deposit signatures (CSIRO – Jim Austin)
- **GA – New Data Releases**
 - AusAEM data
 - North Australian geochemical sampling (NAGS) data release
 - Pb isotope map
 - Gravity and Magnetic Inversions Mt Isa to Tennant Ck

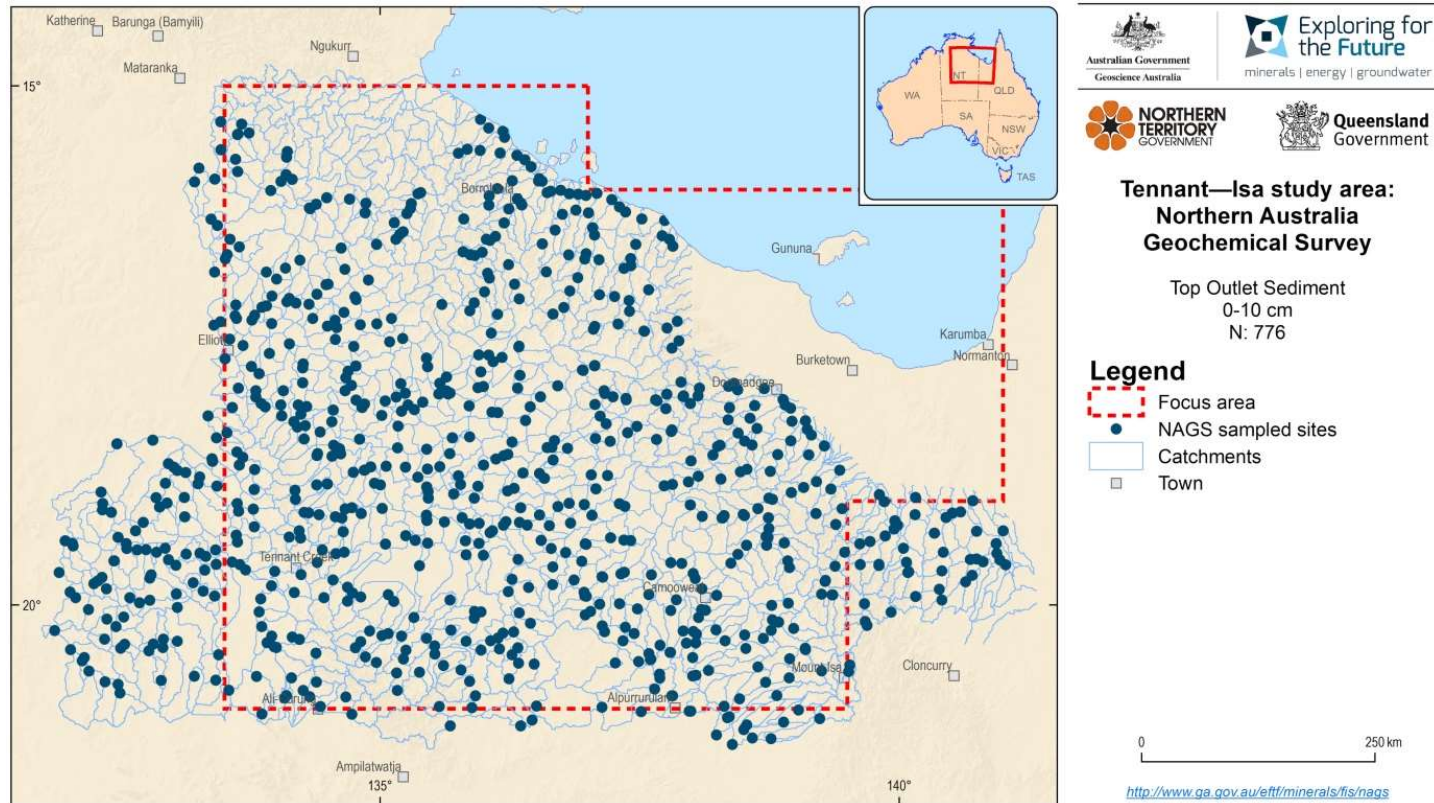
GA - AusAEM



- Released concurrently in Mt Isa and at AGES in Alice Springs
- Presentation tomorrow by Ian Roach



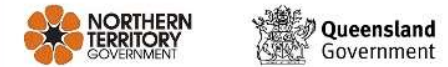
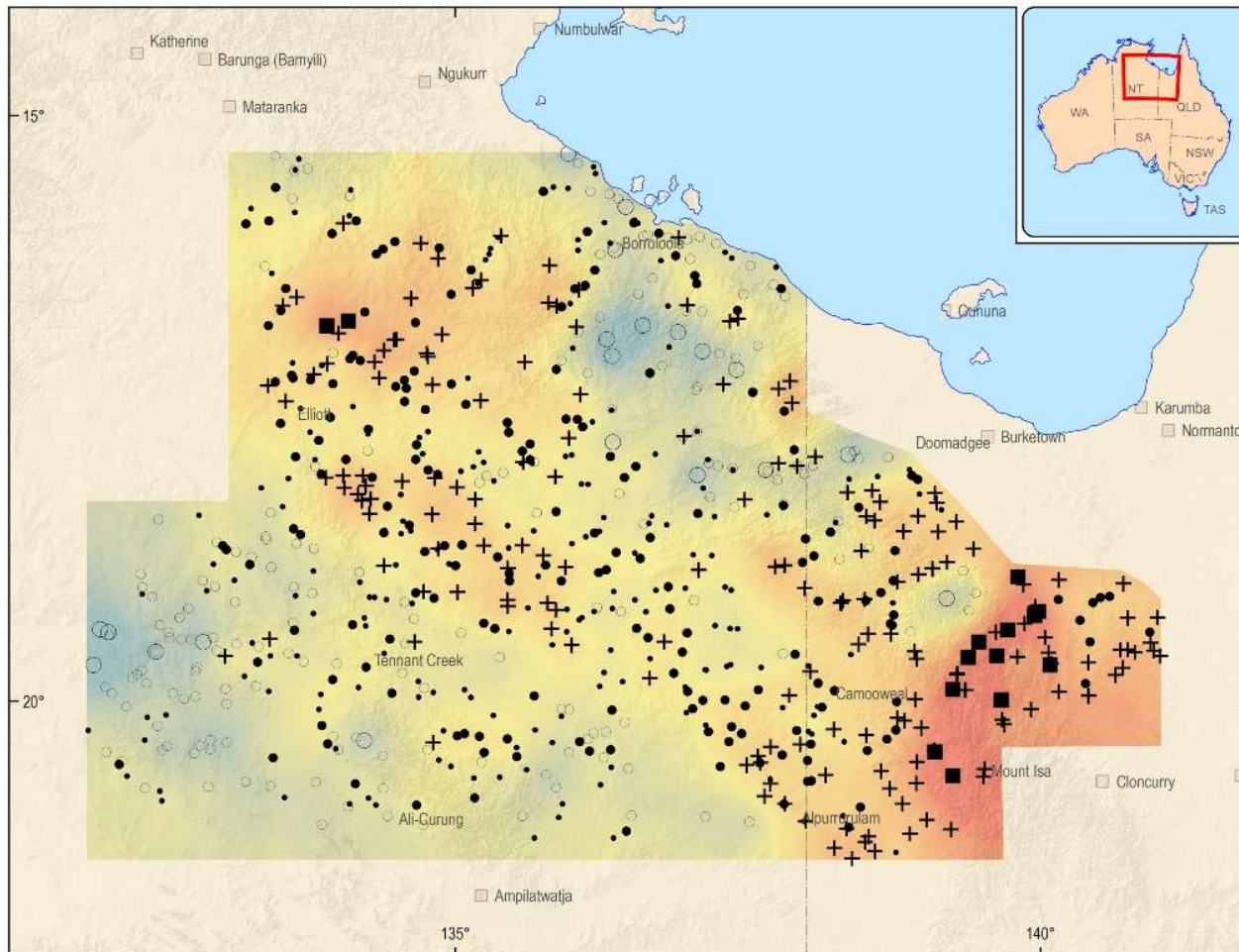
GA – North Australian Geochemical Sampling (NAGS)



- 780 stream sediment samples collected
- 190 digital maps available for download:

<http://bit.ly/GANAGS2>

NAGS Cu



Tennant—Isa study area: Northern Australia Geochemical Survey

Top Outlet Sediment
0-10 cm
Fraction: 0-2 mm
Preparation: **MMI Digestion**
Analysis: ICP-MS
N: 776

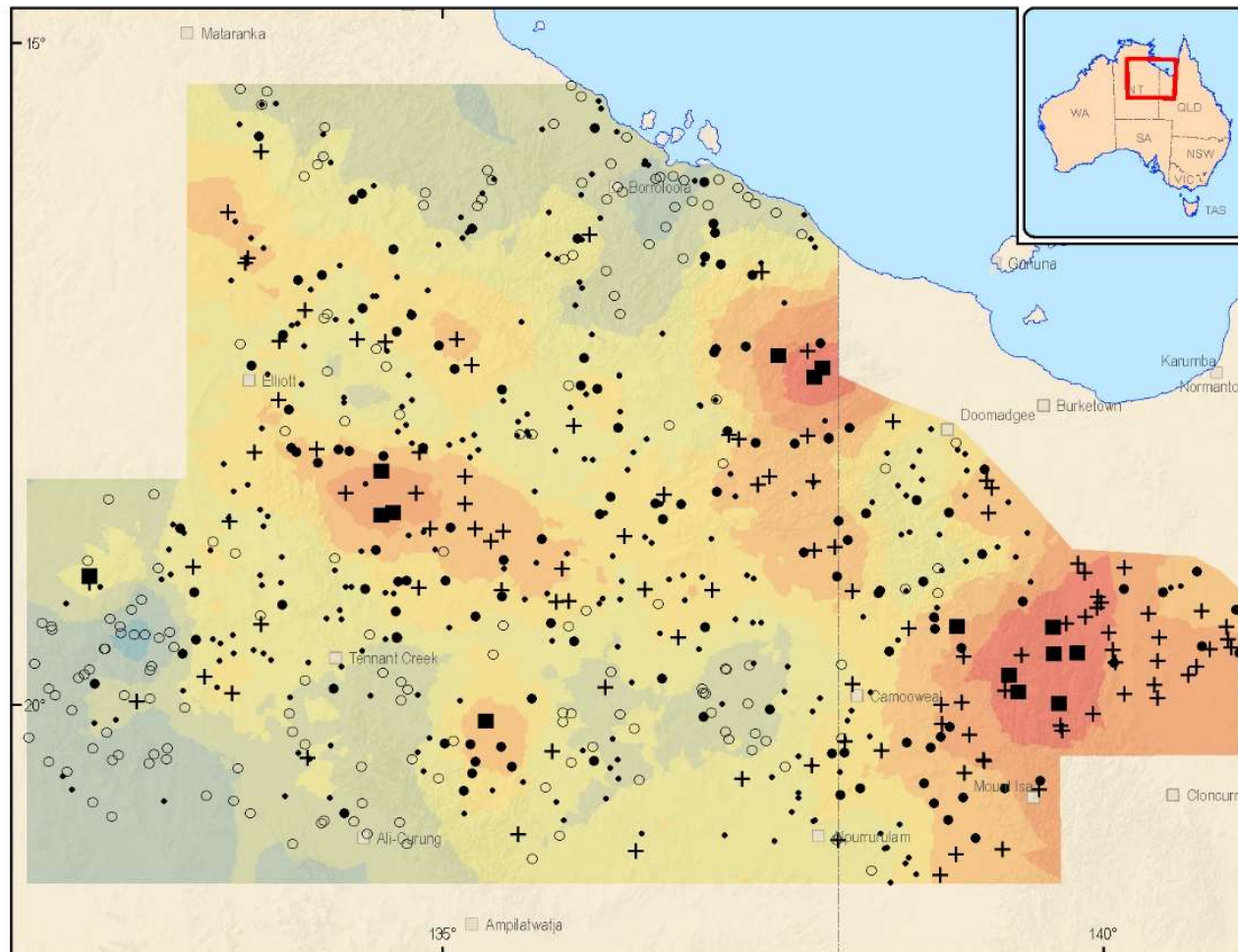
Cu Legend

- Maximum: 19.20 mg/kg
- + Upper Fence: 2.97 mg/kg
- 75%: 1.06 mg/kg
- Median: 0.75 mg/kg
- 25%: 0.52 mg/kg
- Lower Fence: 0.18 mg/kg



<http://www.ga.gov.au/efft/minerals/fis/nags>

NAGS Pd



Tennant—Isa study area: Northern Australia Geochemical Survey

Top Outlet Sediment
0-10 cm
Fraction: <75 μm
Preparation: FA Digestion
Analysis: ICP-MS
N: 690

Pd

Maximum: 5.8 mg/kg



Upper Fence: 2.08 mg/kg



75%: 0.8 mg/kg



Median: 0.6 mg/kg



25%: 0.42 mg/kg



Lower Fence: NA

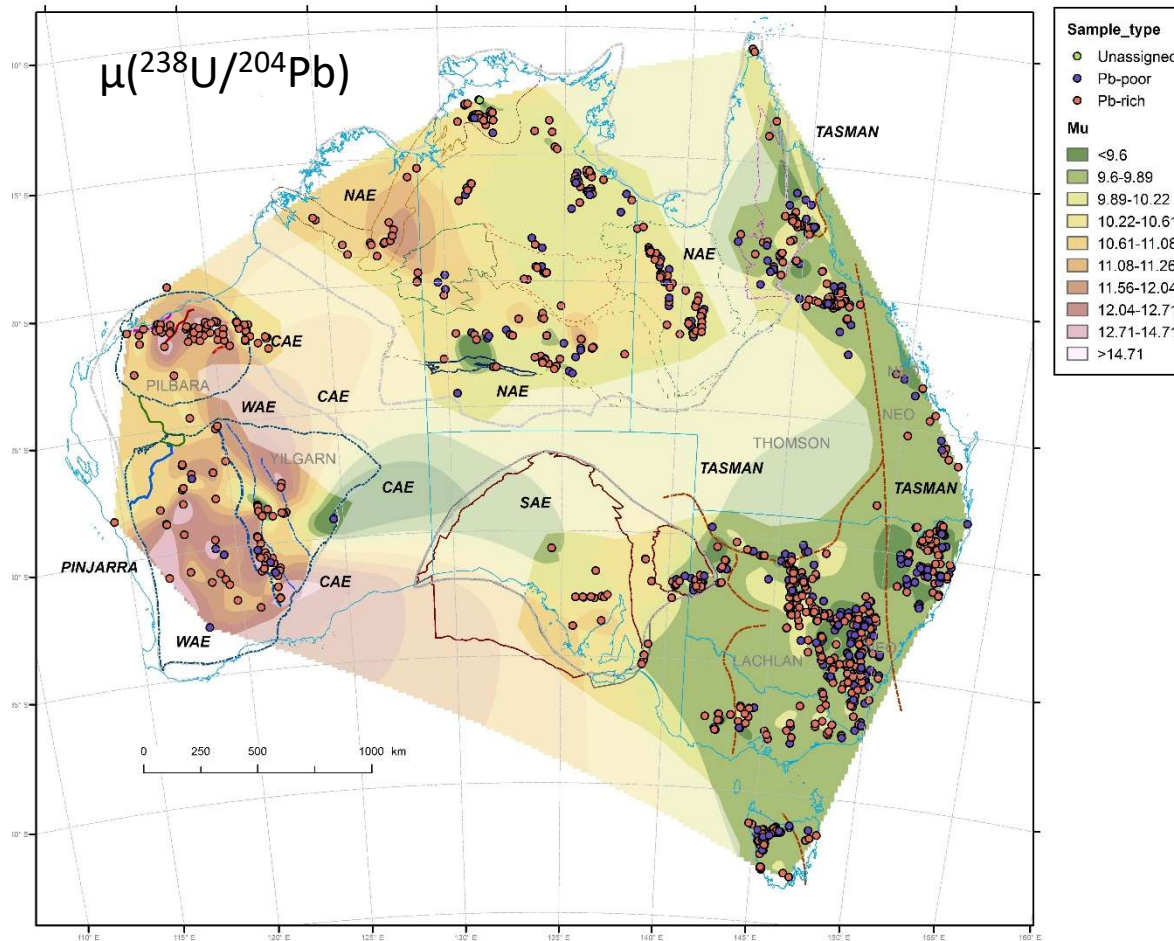


Minimum 0.2 mg/kg



<http://www.ga.gov.au/efft/minerals/fis/nags>

GA – Pb isotope map



Analysis of Pb-rich ore minerals (galena + pyrite)

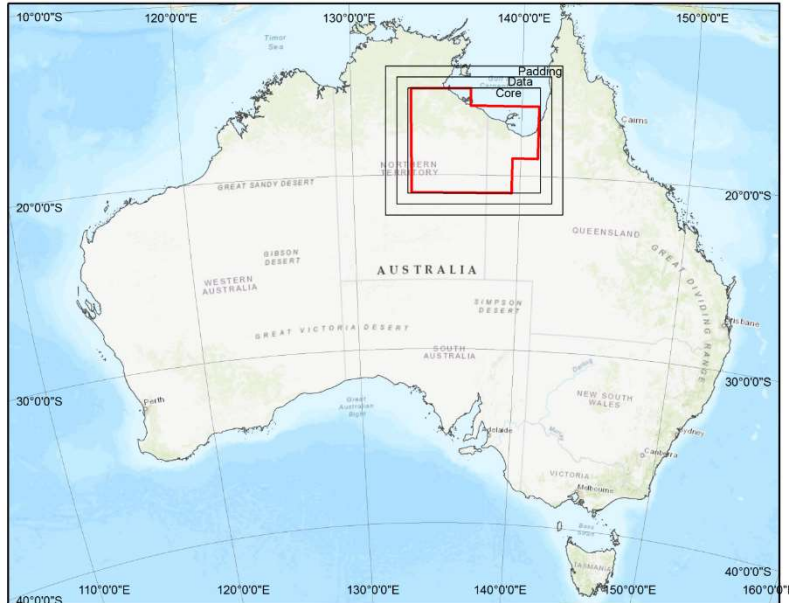
<http://bit.ly/GAPbIsotopes>

Variations in degree of U-enrichment of upper crust (differentiation) in source areas for mineralising fluids

Strong gradients in μ in NW Qld and NT correlate with large base metal deposits

GA Record 2019/01, Huston et al

GA – Magnetite + Hematite Alteration Proxies from 3D gravity and mag inversion

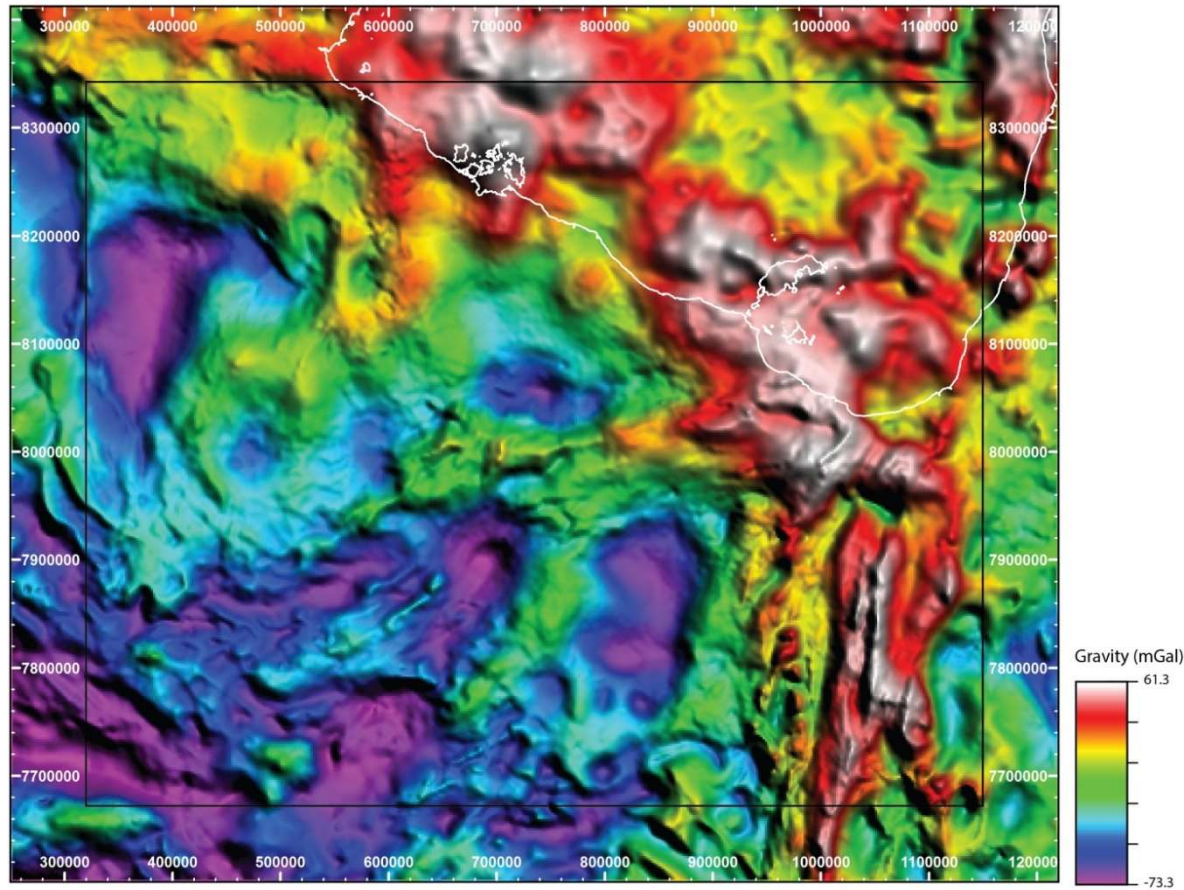


Producing magnetite and hematite alteration proxies using 3D gravity and magnetic inversion

Goodwin & Skirrow, 2018
GA Record TBA

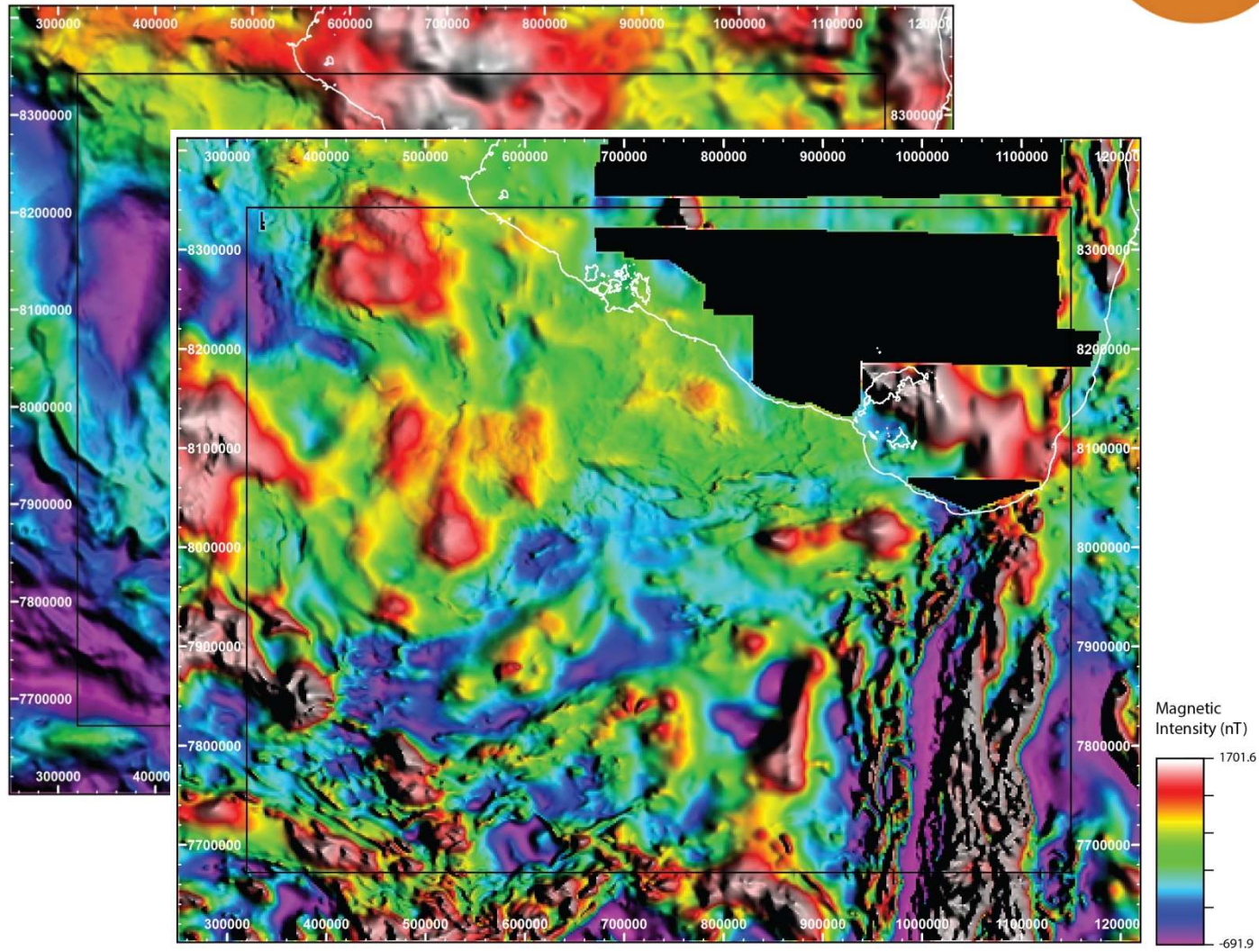
- Predictive tool for detection of mag-hem alteration associated with IOCG deposits
- Mag and gravity inversions
- High density + high mag sus \approx mag alteration
- High density + low mag sus \approx hem alteration
- Areas of inversion model contact are most prospective for IOCG mineralisation

Input data for Inversions



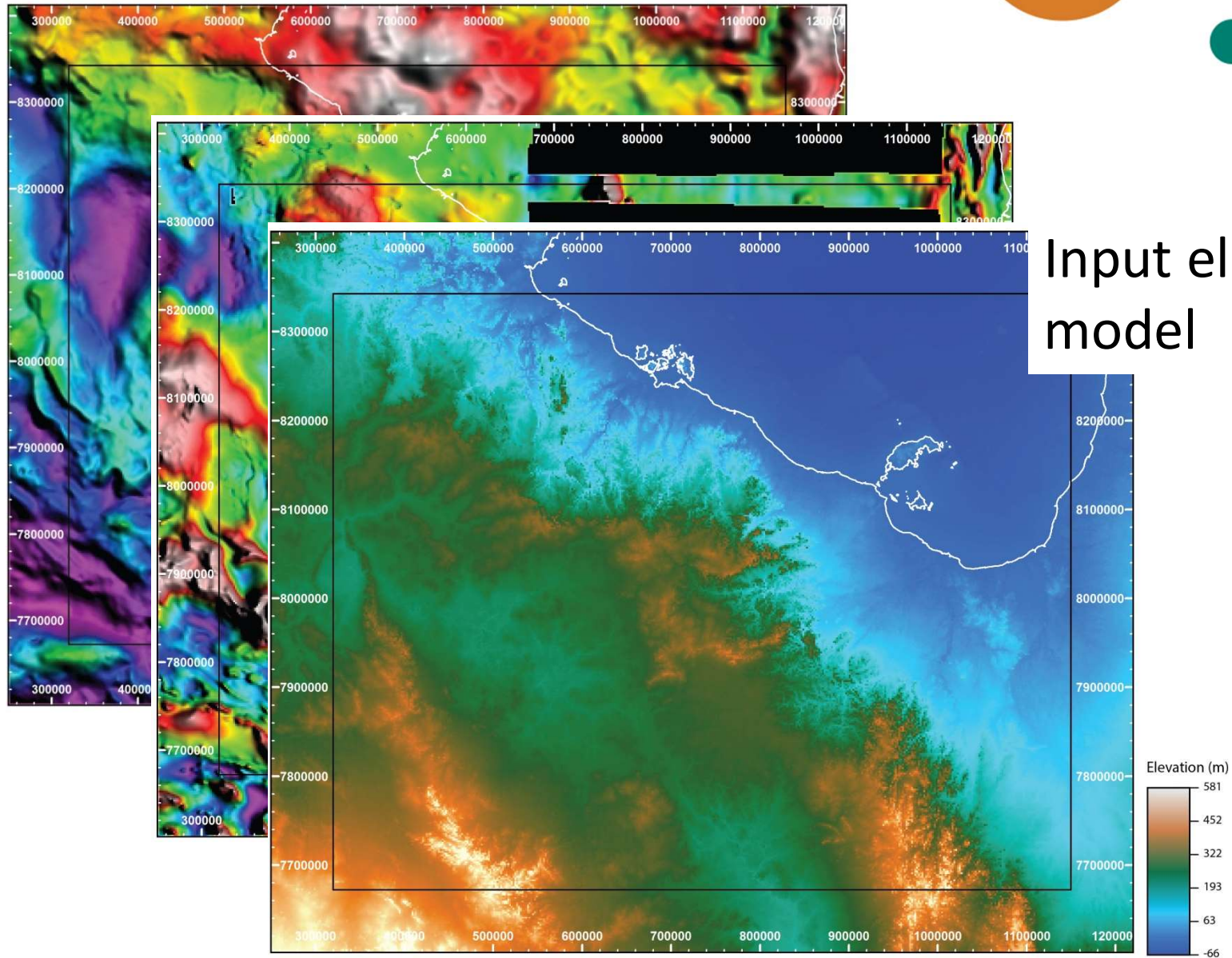
Input gravity

Input data for Inversions

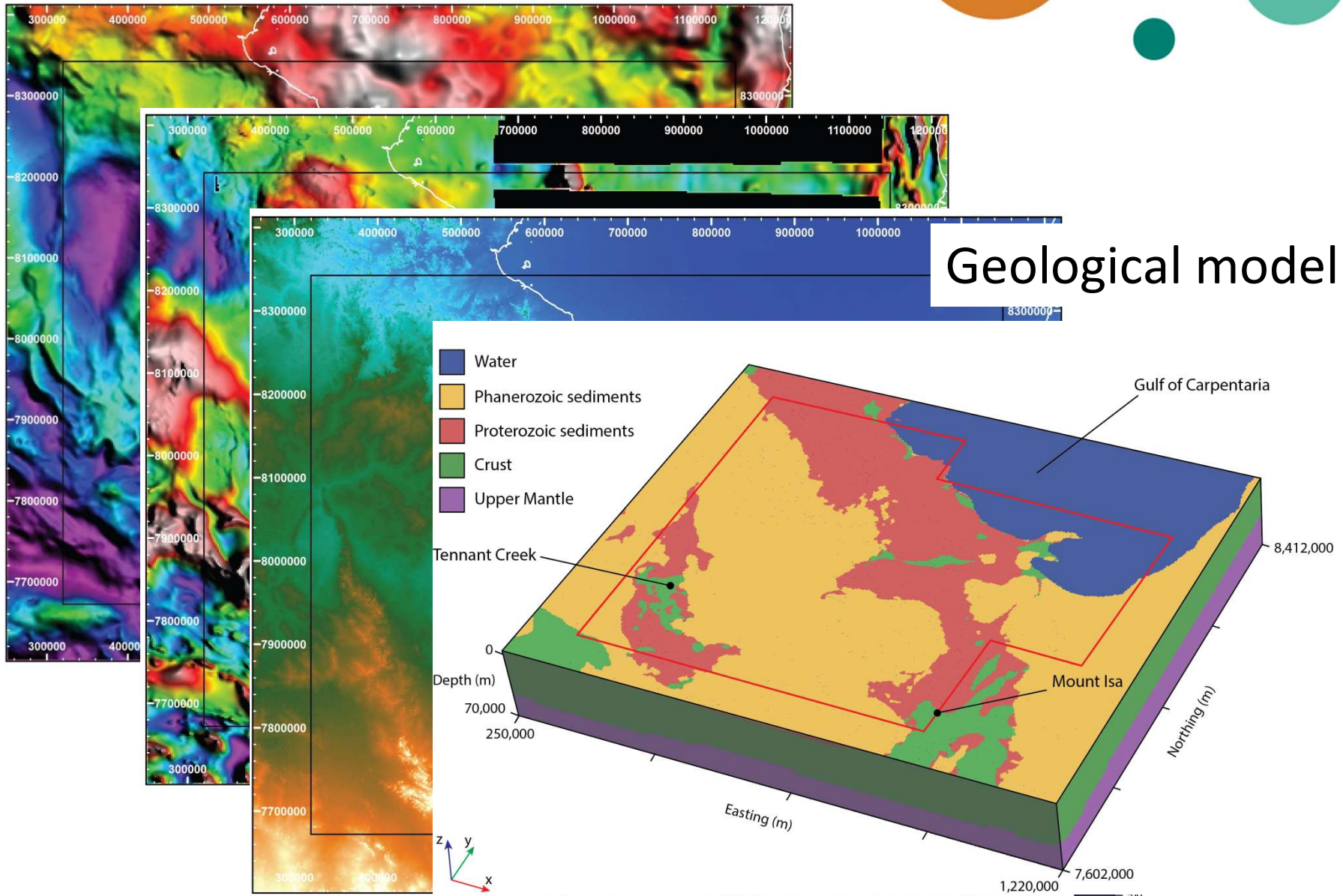


Input magnetics

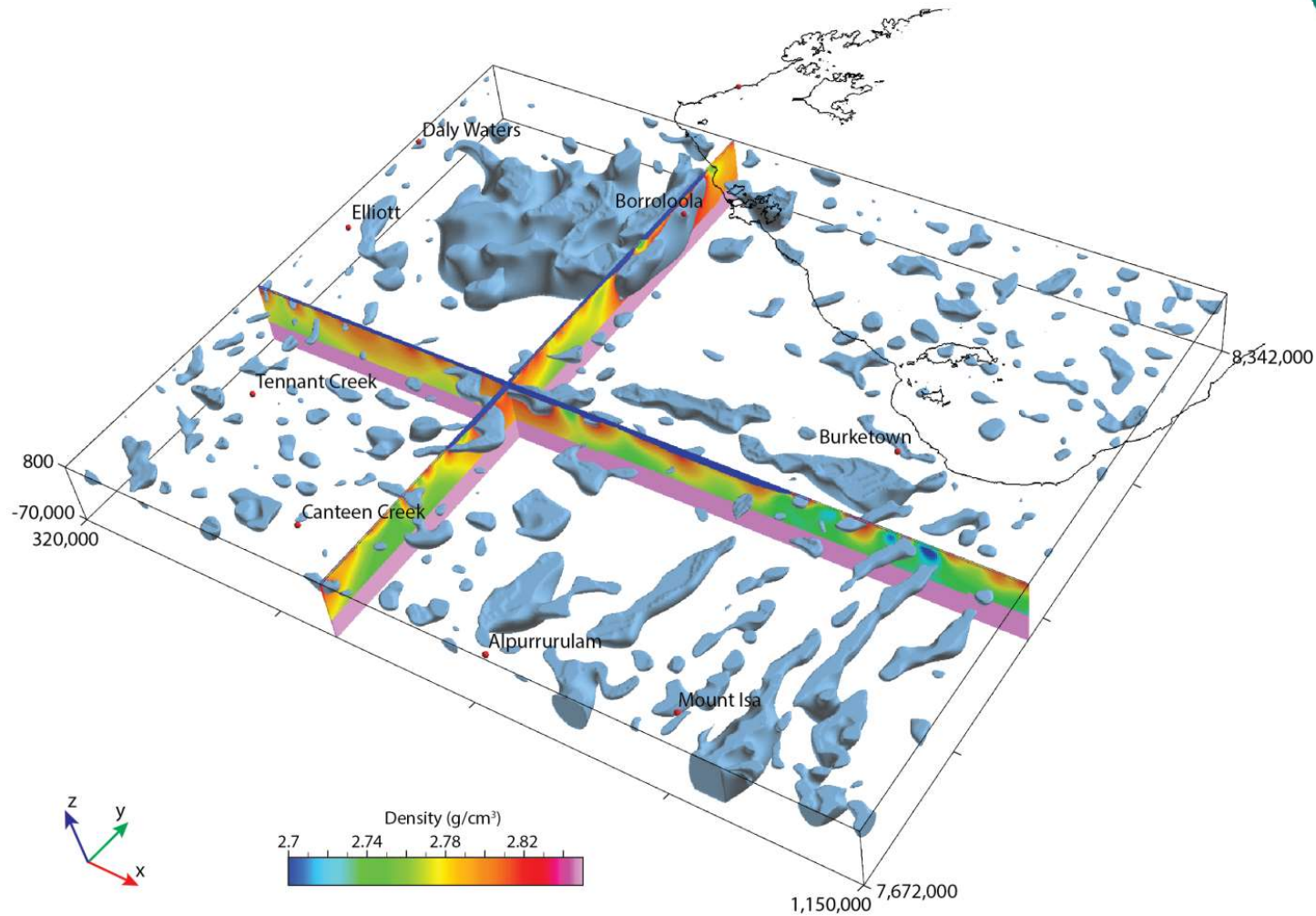
Input data for Inversions



Input data for Inversions

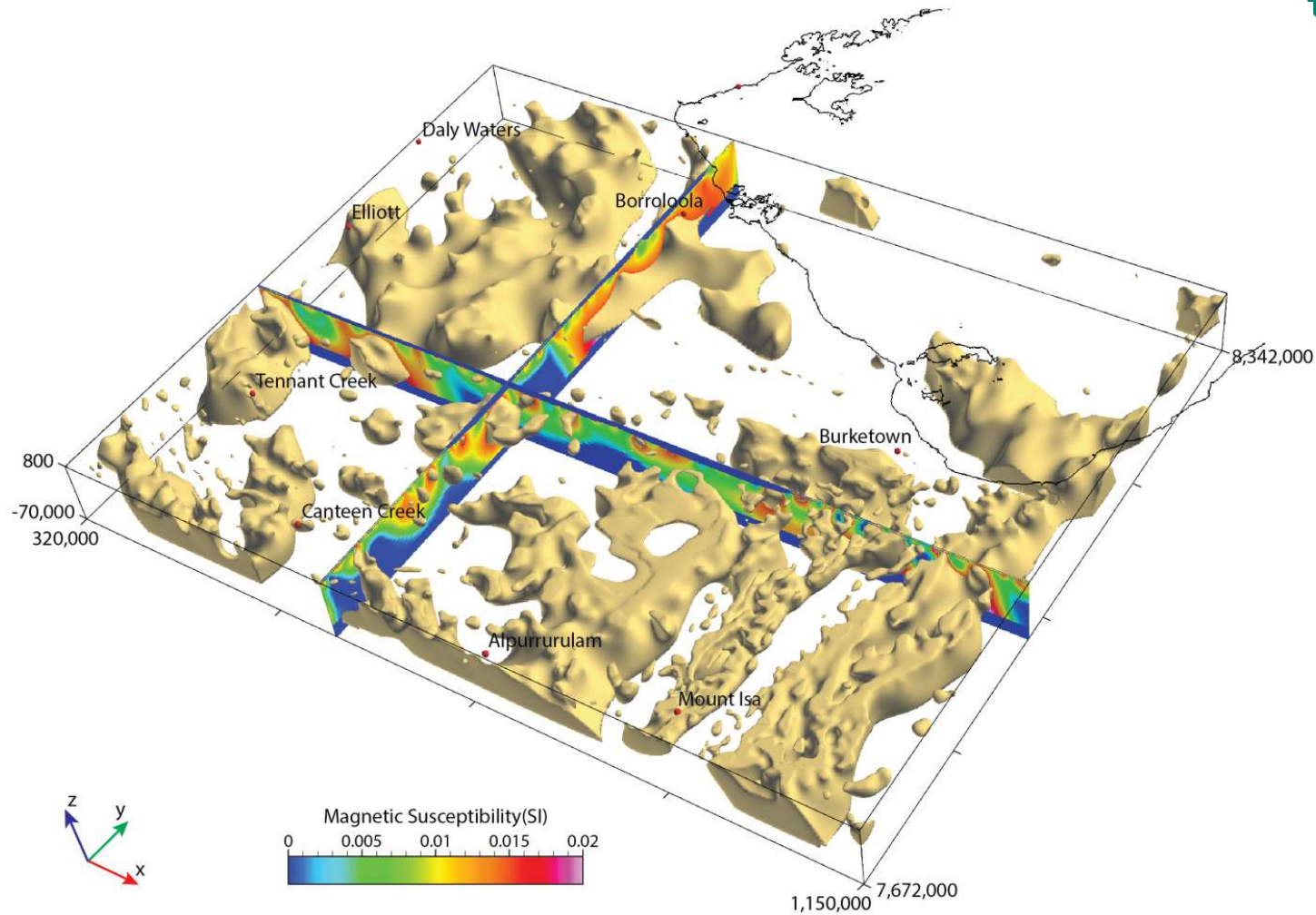


Gravity Inversion



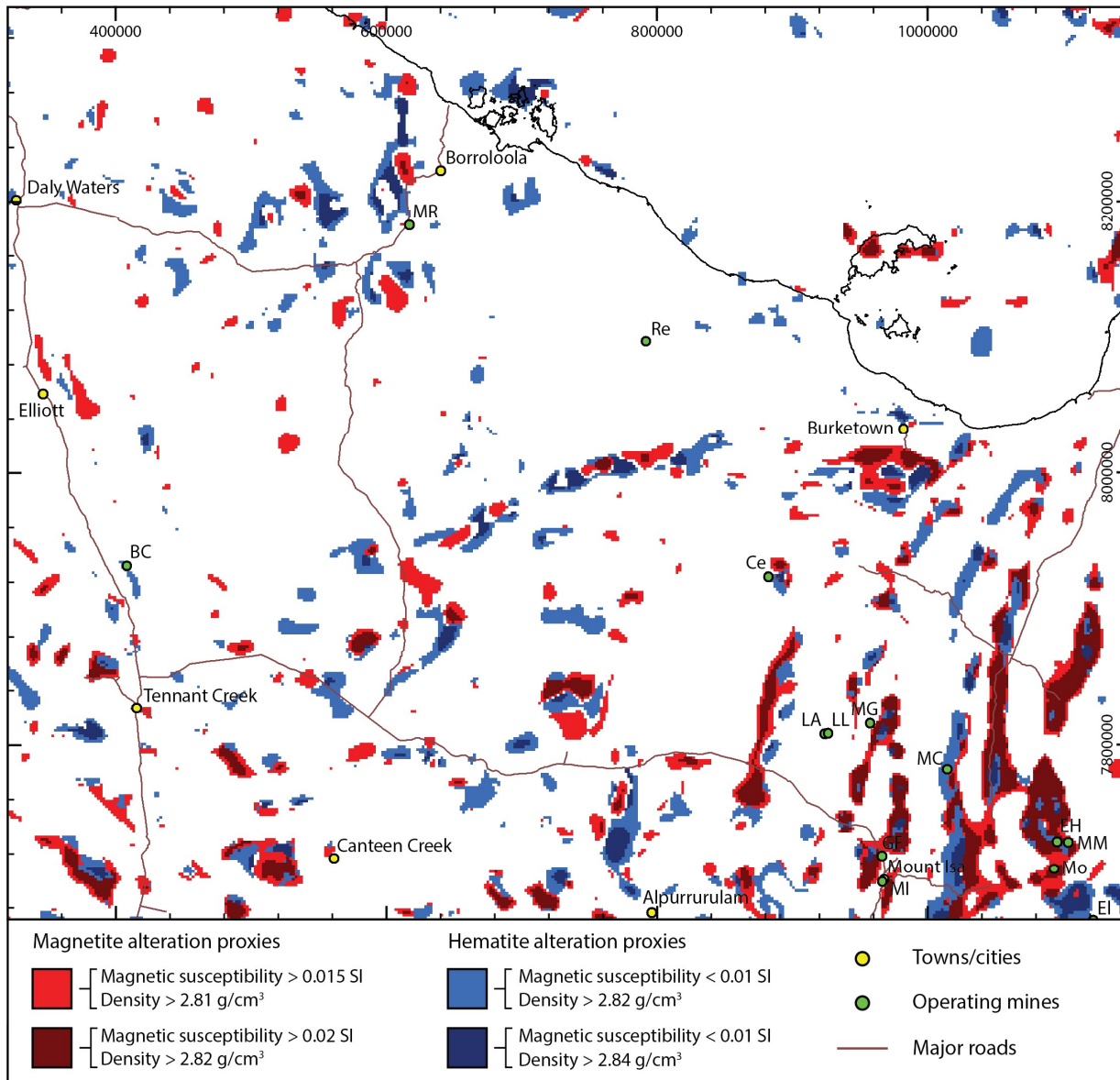
Density model. Iso-surface (blue) showing regions with density $\geq 2.815 \text{ g/cm}^3$.

Mag Sus Inversion



Magnetic susceptibility model. Iso-surface (tan) showing regions with magnetic sus ≥ 0.015 SI.

Application to Mapping IOCG Alteration



Qualitative assessment of magnetite and hematite alteration

Today's Workshop



Today we will hear from:

CODES at the University of Tasmania

Geochemical Footprints of NWQ mineral systems

CSIRO

*Fingerprinting Cloncurry Mineral systems, and
machine learning – geochemistry example*

University of Queensland

Deposit Atlas (Selwyn region)

TruScan

XRF core scanning technology

Industry Spotlight

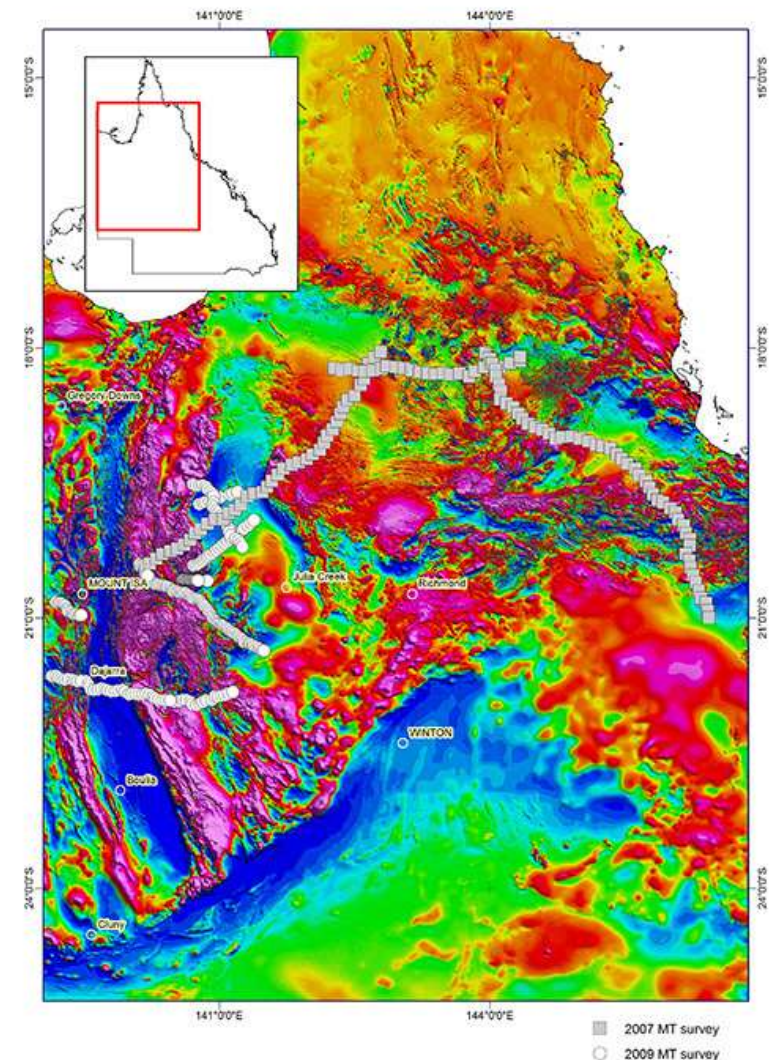
Mount Isa (Glencore)

Jericho (Minotaur)

Elaine Dorothy and others (Hammer Metals)

Workshop Goals

- The survey's goal is to enable industry success through:
 - Dissemination of knowledge
 - Filling in big scale knowledge gaps
 - Enabling collaboration (bringing different groups together)



Workshop Wifi



Select Ibis Styles Conference wifi
Password: GSQLD

Wednesday Program



- **Morning Session**

- Collaborative Partners CODES (UTas) and CSIRO
- UQ – Rick Valenta (Deposit Atlas)

- **Afternoon Session**

- Technology Showcase – TruScan
- Industry Spotlight

- **Networking Session** sponsored by DDH1 Drilling

- On the Deck at Mt Isa Hotel
- From 5pm

- **Dinner 'til late**

- Reservation at MIH
- Pay your own

