Regional geoscience and resource potential programs under the *CORE* initiative

Dot Close

AUSTRALIA'S NORTHERN TERRITORY

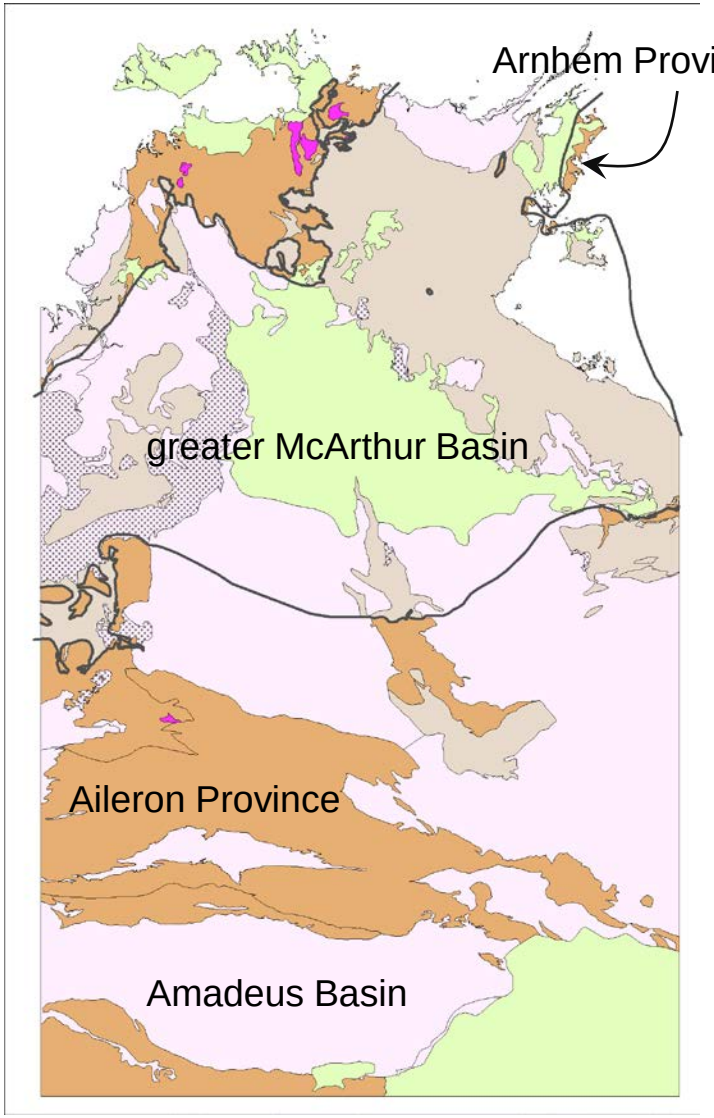
NORTHERN TERRITORY GEOLOGICAL SURVEY
AGES2017
ANNUAL GEOSCIENCE EXPLORATION SEMINAR
Alice Springs, 28–29 March 2017, Northern Territory

Creating Opportunities for Resource Exploration

CORE

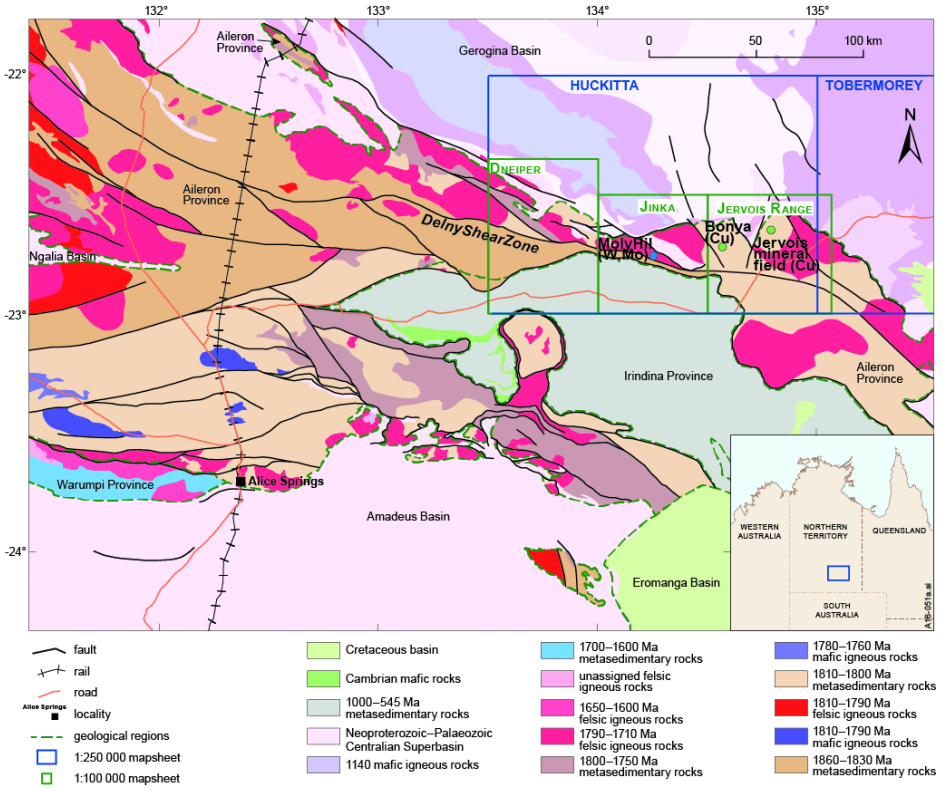
precompetitive geoscience

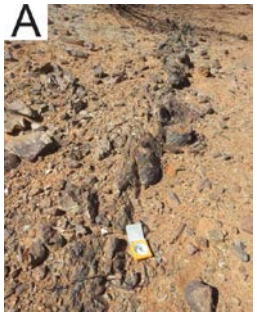
- 4 target areas - identified as high resource potential &/or paucity of key geoscientific information
- Include basins with proven & high potential for both minerals & petroleum
- Tailor projects - address gaps in data & knowledge of geological framework, mineral & petroleum potential

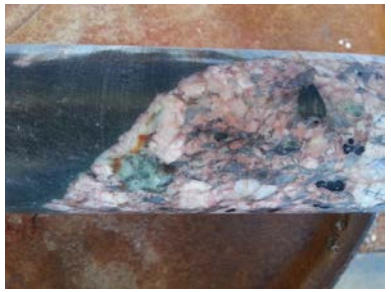


Aileron Province: geological framework

- Continue to build a geological framework
- Depositional, metamorphic, structural and magmatic evolution
- Geodynamic setting
- Provide context for mineral system studies

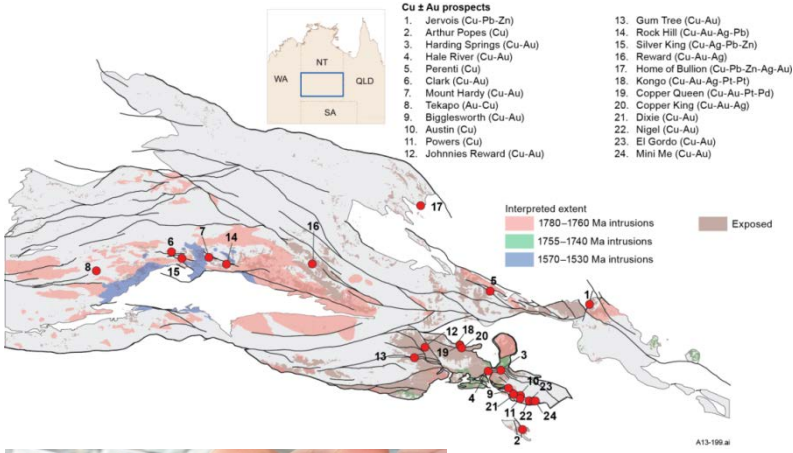






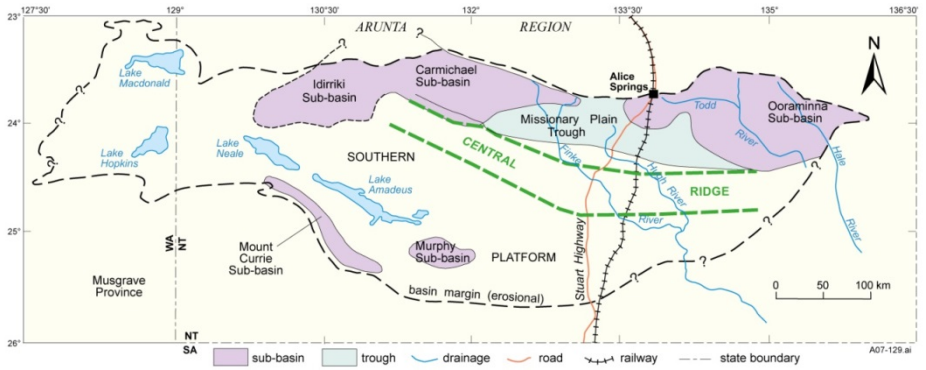
Aileron Province: mineral potential

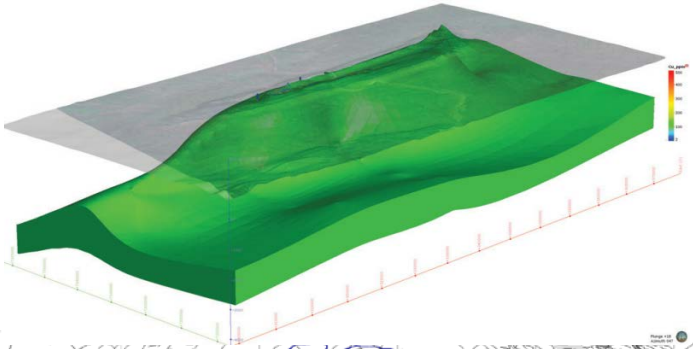
- Mineral systems approach
- Setting and style of mineralisation
- Alteration assemblages as vectors
- Identification of regional scale fluid flow: 1590-1570 Ma (Chewings Orogeny ≈ Olarian Orogeny)

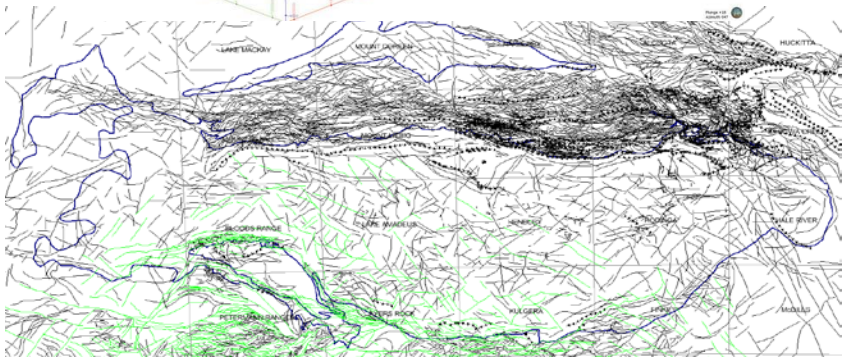


Amadeus Basin: geological framework

- Completion of regional geophysical datasets
- COBRA project (CSIRO)
- Construction of 3D model based on potential field data
- Neoprot stratigraphy characterisation study
- 2nd edition mapping on Henbury 1:250k
- Interpretive geology 1:500k pre-Mesozoic

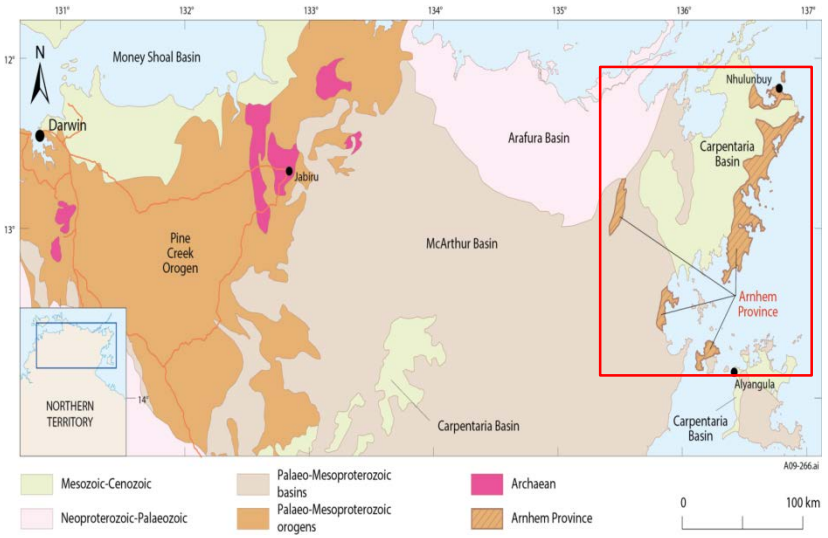


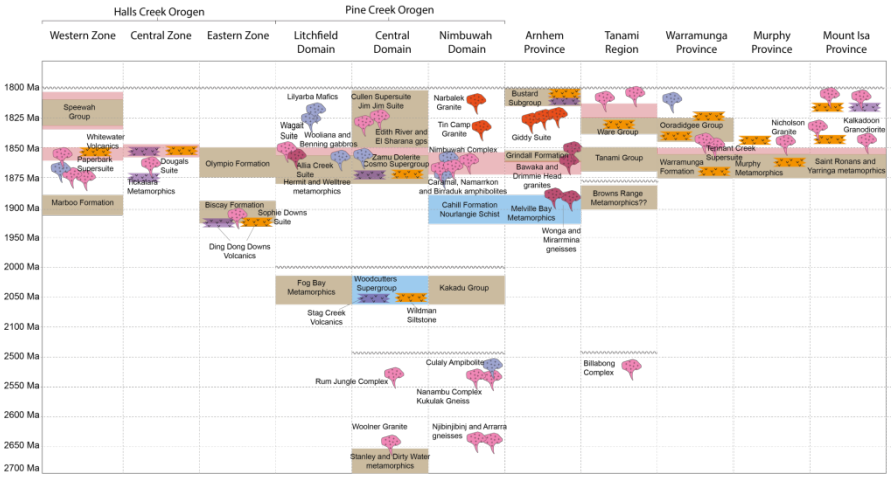




Arnhem Province: geological framework

- Continue to build a geological framework
- Depositional, metamorphic, structural and magmatic evolution
- Geodynamic setting
- Understand links to Pine Creek Orogen
- Basement to the McArthur Basin

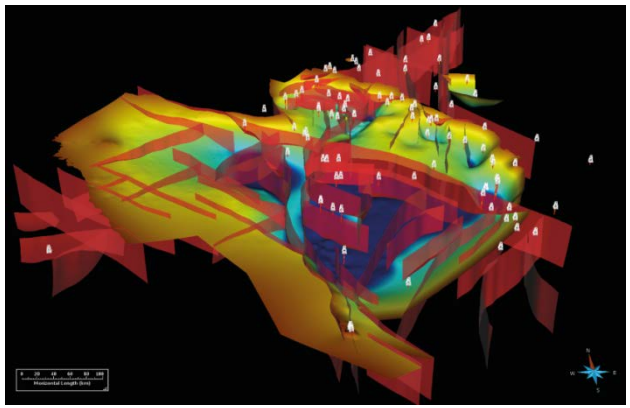




greater McArthur Basin: geological framework

Construction of 3D model

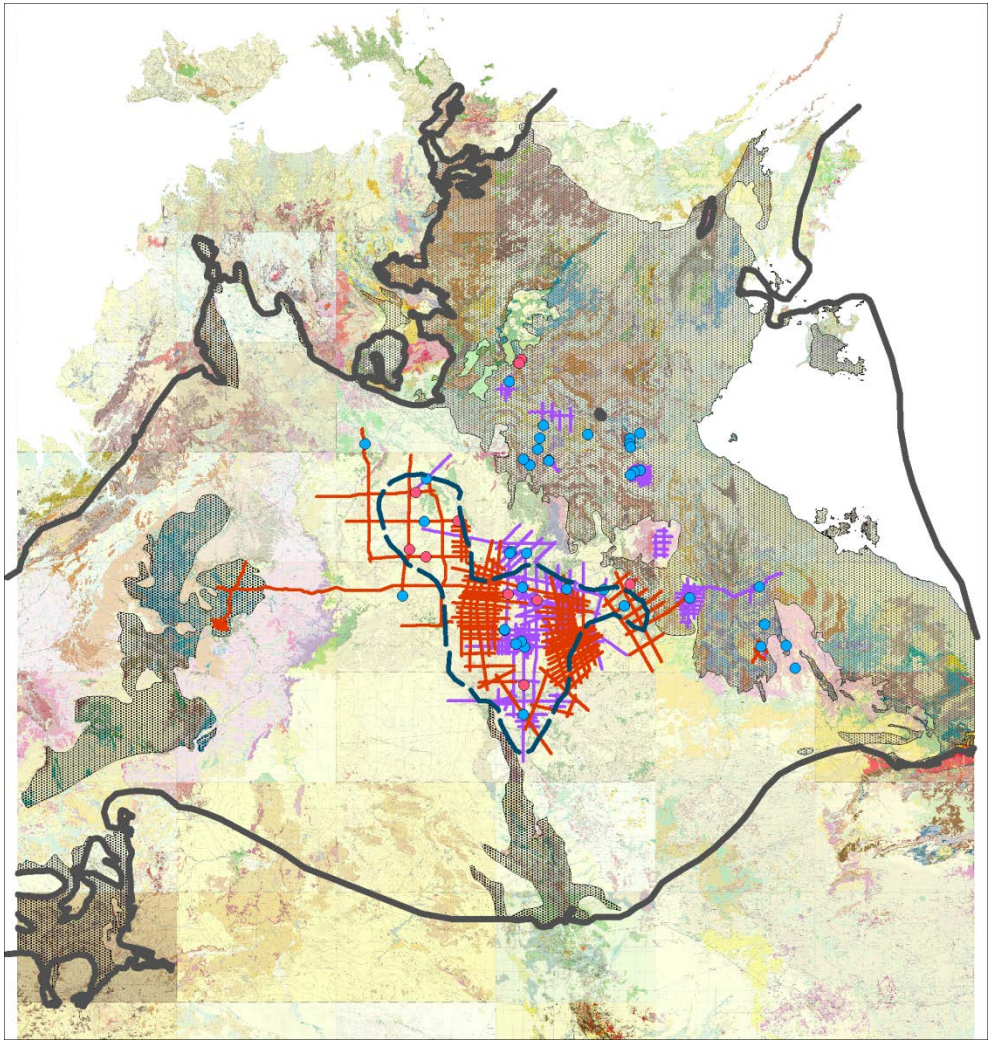
- regional scale stratigraphic correlations and unconformities
- Provide structural architecture of the stacked basin evolution
- Regional scale depth and volume constraints on prospective horizons
- Provide a regional scale 3D model base for nested detailed models



greater McArthur Basin: geological framework

3D model challenges

- Input data and scale constraints
- Importance of petroleum industry data
- Limited subsurface constraints
- Maximising effect of new data to lead to new interpretations

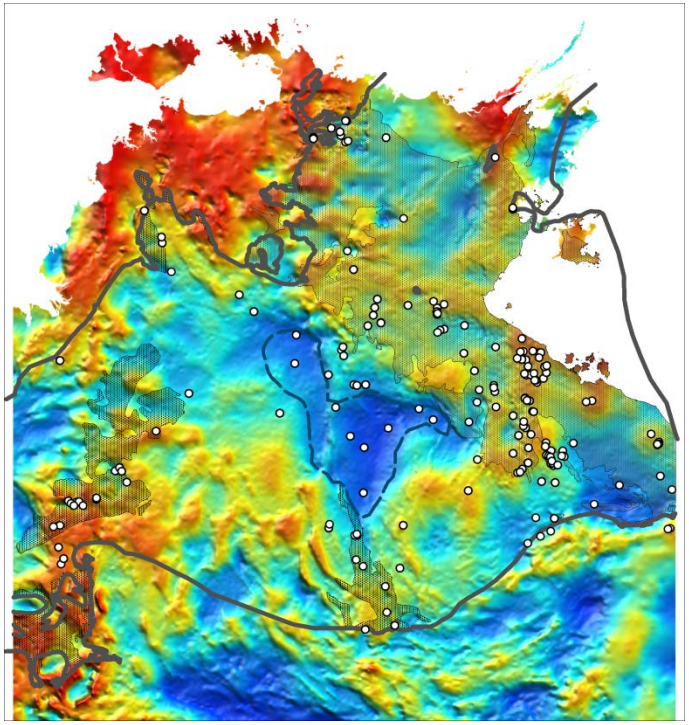


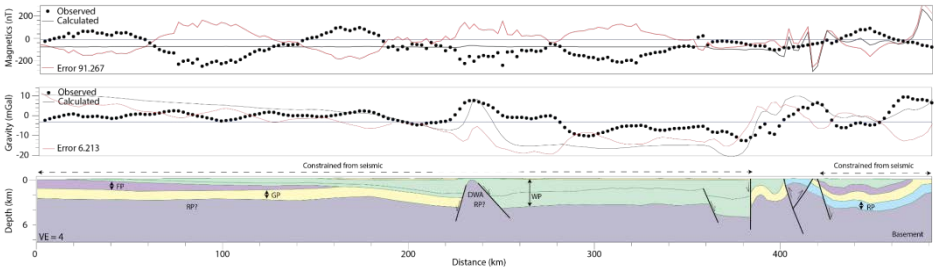
greater McArthur Basin: geological framework

- geophysical structural interp pre new data acquisition
- Interpretation at depositional package scale resolution
- Major basin architectural faults from Palaeo-Mesoproterozoic = input constraint to 3D model

greater McArthur Basin: geological framework

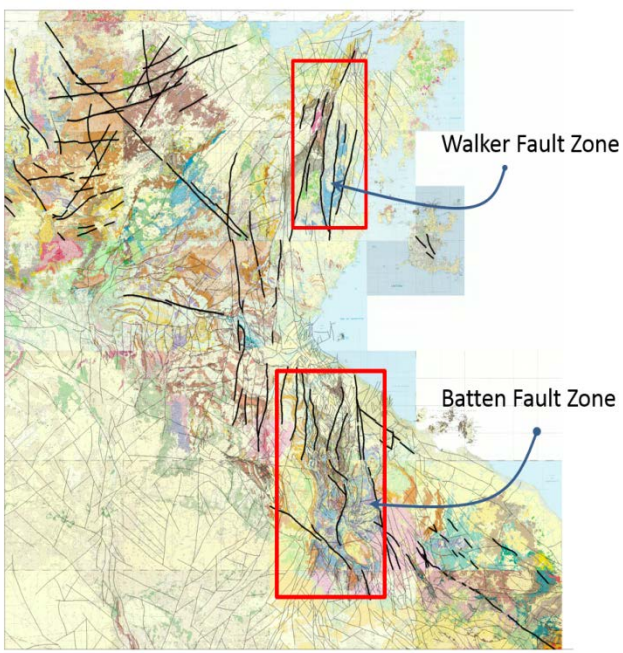
- new regional data acquisition
- HyLogging of all key drillcore
- Acquisition & compilation of rock property data for major formations
- Forward modelling of new geophysical data (constrained petrophysically) – test 3D model

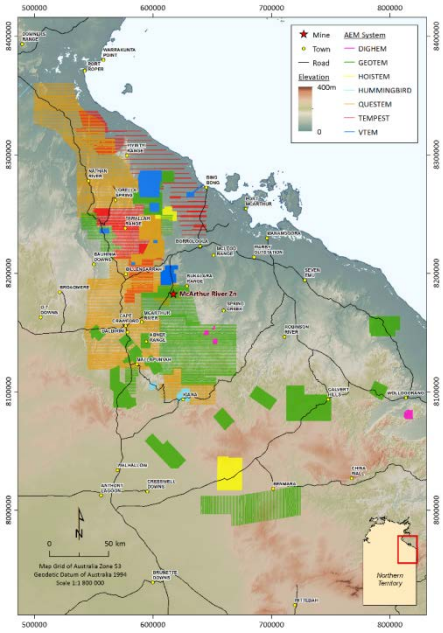


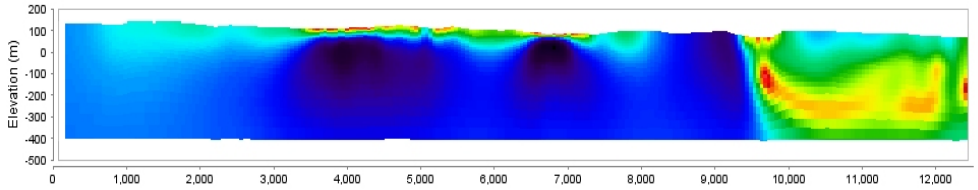


greater McArthur Basin: geological framework

- Reprocess legacy AEM data over Batten Fault Zone
- Model AEM to assess input value to 3D model
- Determine suitability of AEM techniques for conductive horizons in Walker Fault Zone

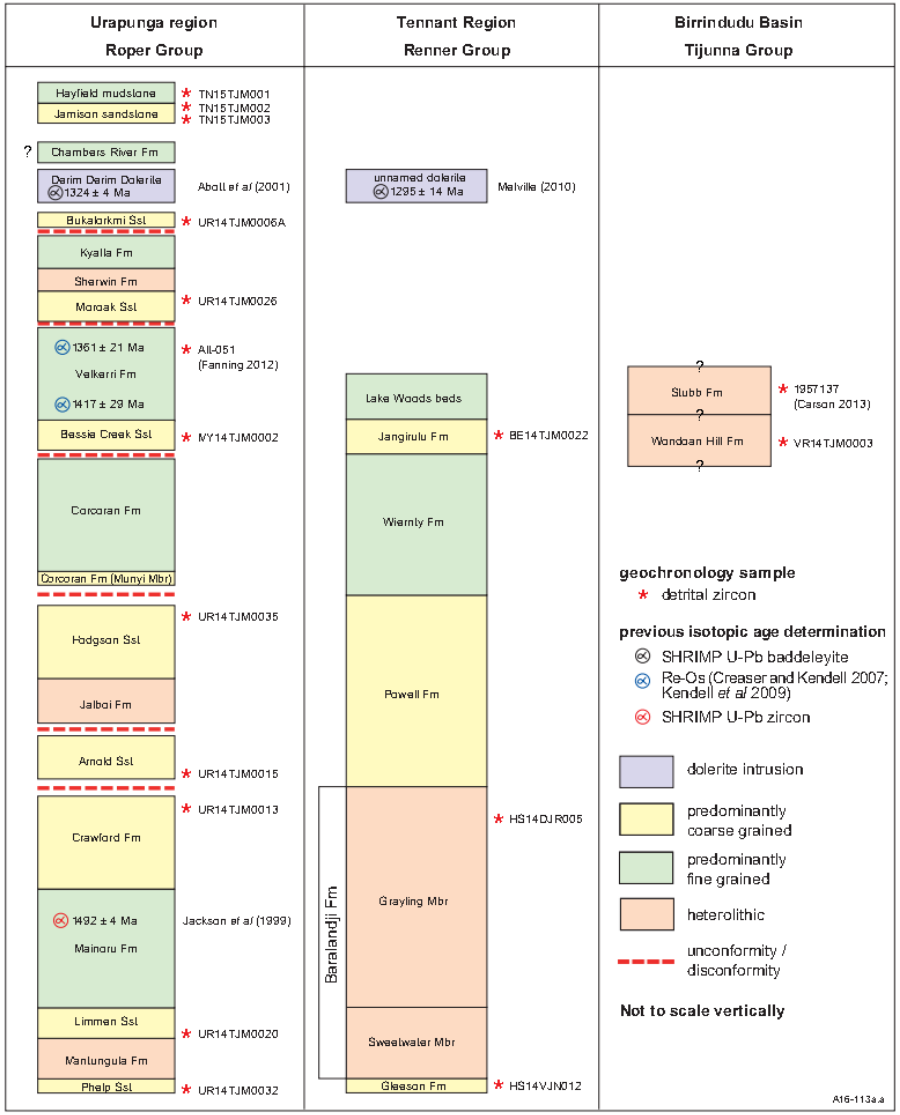






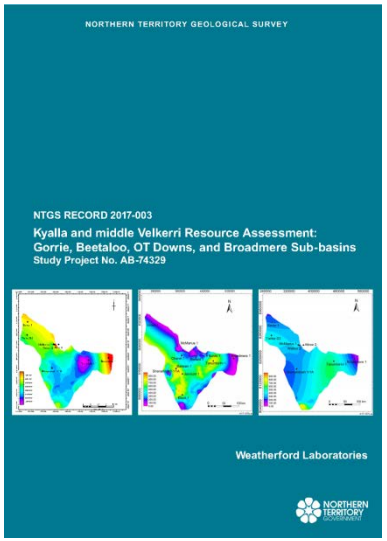
greater McArthur Basin: geological framework

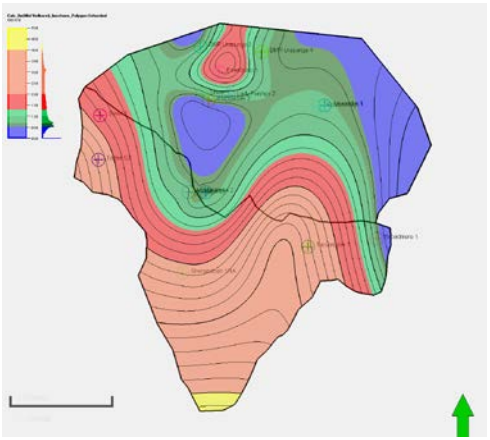
- Stratigraphic characterisation of Mesoproterozoic formations across greater McArthur Basin
- Type/rep sections: U-Pb detrital zircon, Lu-Hf isotopes, whole rock geochem, outcrop & petrographic descriptions

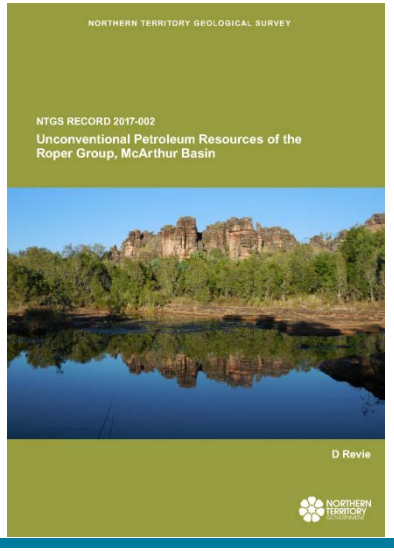


greater McArthur Basin: petroleum potential

- Focus on Mesoproterozoic Roper Group (Beetaloo Sub-basin)
- Key data collection and analysis to understand shale gas potential
- Ongoing release of data
- Utilise regional scale surfaces from 3D model
- Deliver a resource assessment based on open file data

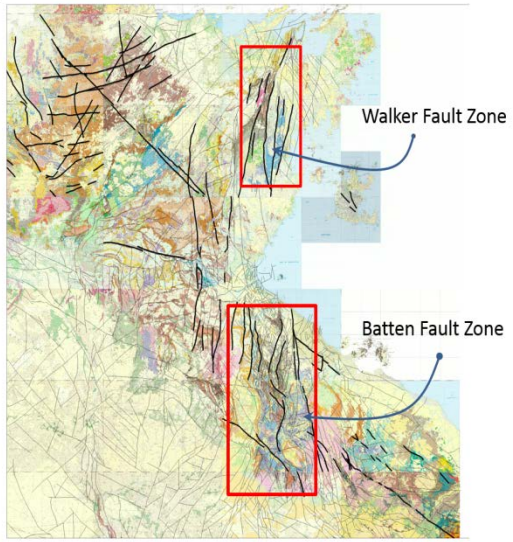


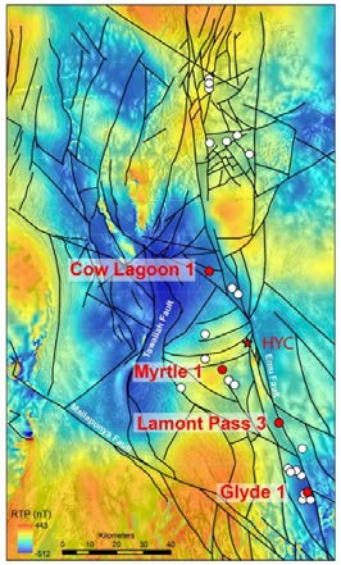


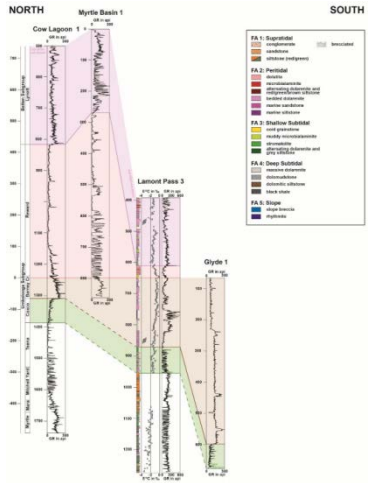


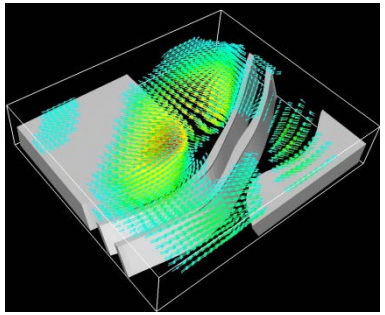
greater McArthur Basin: mineral potential

- Key collaborations: **CSIRO**
- base metals systems McArthur Group in Batten Fault Zone (BFZ)
- Utilise high resolution gravity to interpret structure & stratigraphy in BFZ
- Tectonostratigraphic & biochemical controls on base metal mineralisation, middle McArthur Grp
- Deformation & fluid flow modelling



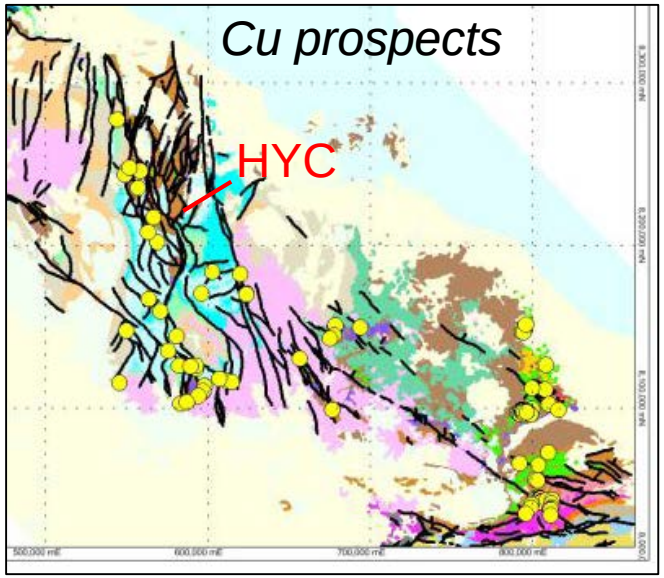


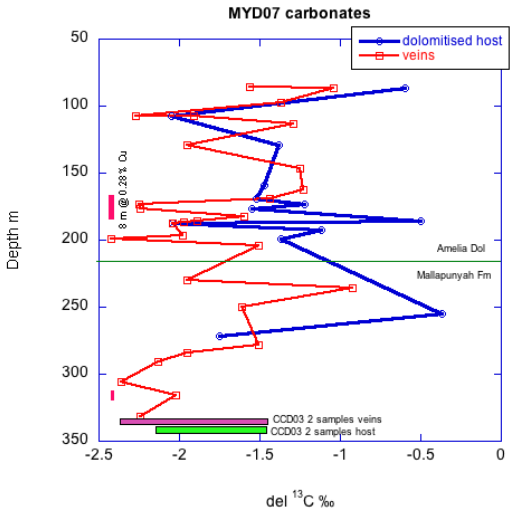




greater McArthur Basin: mineral potential

- Key collaborations: **CODES**
- Copper mineral systems in McArthur Group (Amelia Dolomite)
- Petrological study into textural and mineralogical relationships
- Carbon, oxygen and sulfur stable isotopes analysis of Cu mineralised zones to investigate large scale systems



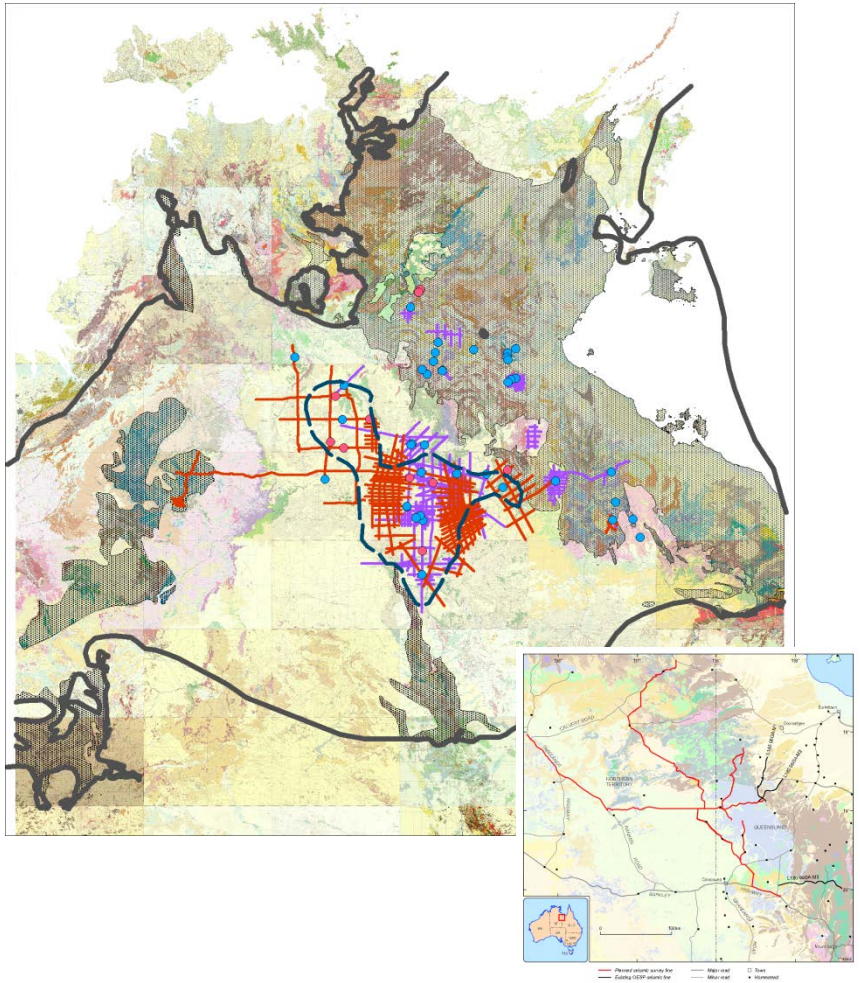


CORE and Exploring for the Future

Australian Government
Geoscience Australia

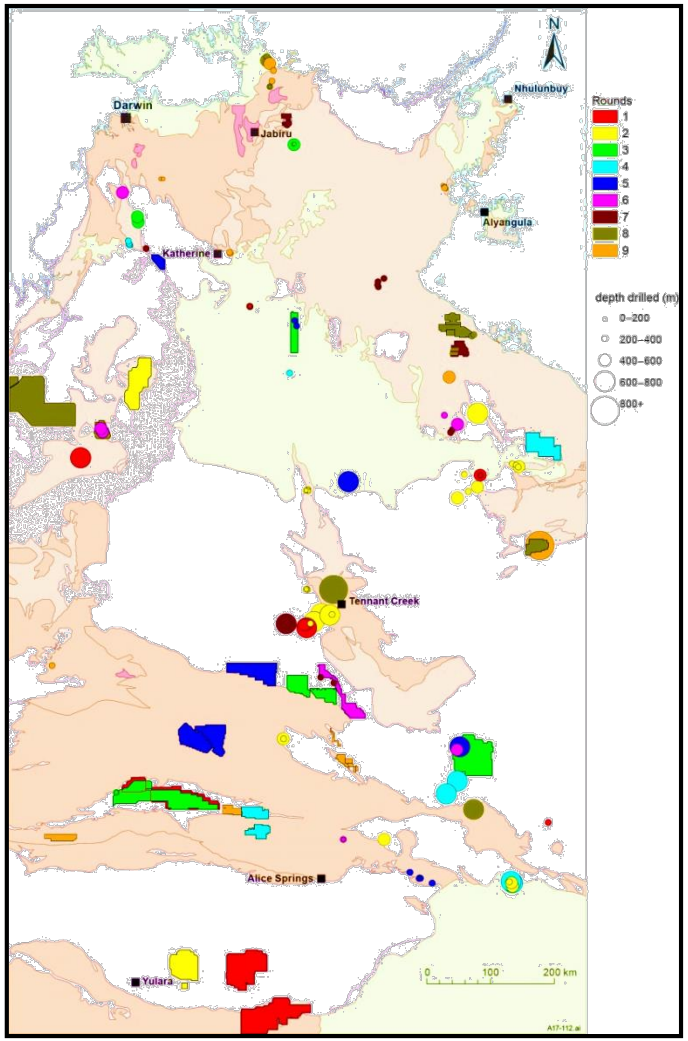
Exploring for the Future
minerals | energy | groundwater

- **Geoscience Australia** major investment in precompetitive geoscience and resource assessment in northern Australia
- Targeted focus area from Mt Isa to Tennant Creek
- Investigating nature of crust at all scales
- Unprecedented data collection in NT
- Dovetails and compliments investigations under CORE



Geophysics and Drilling Collaboration program

- Co-funded greenfields exploration
- Round 9
  - 30 000 line km magnetic & radiometric data + 500 gravity stations: Aileron Province
  - 18 line km passive seismic + 3 x 200m DDH: Ngalia Basin
  - ~900m DDH testing SEDEX/VMS in Pine Creek Orogen
  - >800m DDH in West Arnhem Land
  - ~ 500m DDH in Tanami Region
  - ~ 2km DDH strat equivalents in McArthur Group
  - ~800m DDH in Lawn Hill Platform

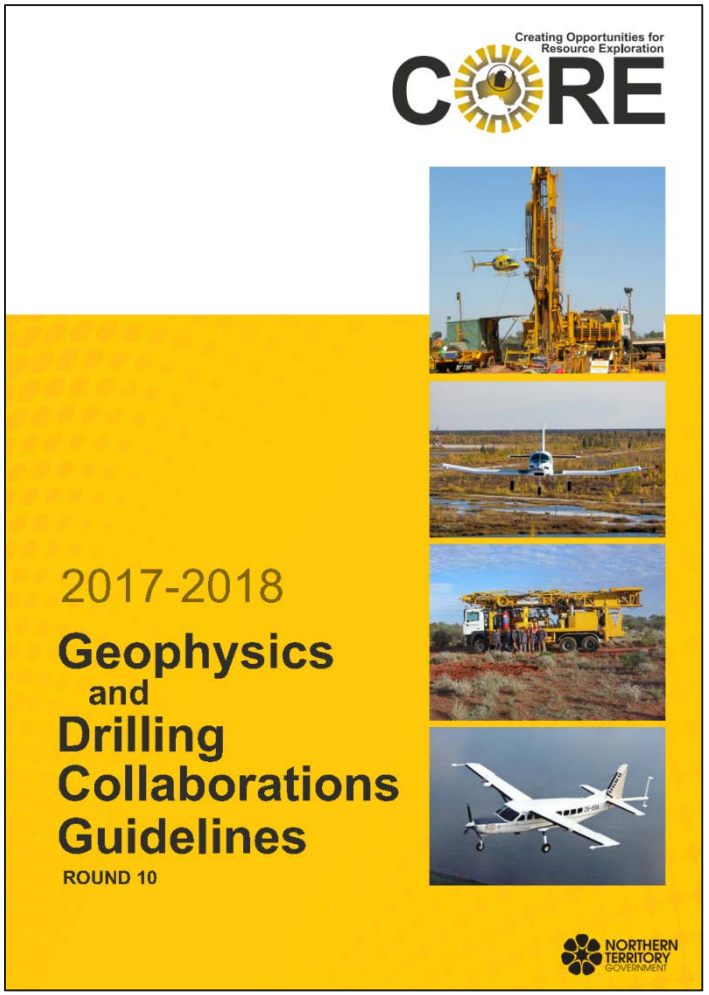


GDC projects Round 1-9

Geophysics and Drilling Collaboration program

Round 10

- Now open for applications
- Total value of program $750 000
- 50% of direct costs up to $100 000
- Data and report open filed 6 months after data acquisition
- Application closing date: April 26th
- Successful projects announced May 2017



www.minerals.nt.gov.au/collaborations

CORE : 2017/18 and beyond

- Complete current commitments in target areas under CORE
- Ongoing research and data collection in greater McArthur Basin through existing collaborations: CSIRO, Geoscience Australia, University of Adelaide, CODES, industry
- Scope innovative regional geoscience programs under a future initiative