Enhanced Regional Geoscience programs under the CORE initiative

Dorothy Close
CORE initiative funding

4 year (2014-18) $23.8M investment in growing the exploration sector

4 year extension of existing CORE initiative ($3.95M pa)
4 year program to assess shale gas and oil resources ($2.0M pa)

- New focus on understanding the Territory’s onshore petroleum potential
- New geoscience programs to lower risk for minerals and petroleum exploration
- Programs to attract investment into NT resources projects
- Co-funding of industry greenfields drilling and geophysics
Areas of focus and objectives: CORE 2104-18

- Arnhem Province, greater McArthur Basin, Arunta Region (eastern), Amadeus Basin
- Ongoing provision of high quality pre-competitive geoscientific data
- Provision of high quality pre-competitive geoscientific information (interpreted outputs)
- Annual updates at AGES
Objectives and progress to date

- increase resolution of regional geophysical data
- improve understanding of geological framework and evolution
- provide drillhole imagery & spectral data; provide consistent rock property data
- copper (+base metal) focused mineral system studies
- construction of 3D model (basins)
- systematic analysis of shale units for hydrocarbon and mineral prospectivity
Arnhem Province: geological framework

- geological framework mapping to produce series of 1:100k maps and accompanying notes
- continue to build understanding of the evolution of the North Australian Craton: relationship with western Arnhem Land and Pine Creek Orogen
- understand the nature of the basement beneath the McArthur Basin
greater McArthur Basin

- correlatives at surface & beneath cover between McArthur/Birrindudu basins & Tomkinson Province
- > 500 000 km²
- informal package nomenclature until formal correlations are established

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- redefinition to series of stacked basins – unique or similar evolution
greater McArthur Basin: architecture and evolution

- DIP 015
  “Geophysical and structural interpretation of the greater McArthur Basin” PGN Geoscience Report 2014

- analysis & interpretation of existing regional geophysics & published outcrop maps
- interpret fault activation & kinematics influence on the Palaeo-Mesoproterozoic evolution & architecture of the greater McArthur Basin
greater McArthur Basin

- Top down approach – focus on packages with known prospectivity
- 1. Wilton package (Roper/Tijunna/Renner groups) – depocentre = Beetaloo Sub-basin
- 2. Glyde package

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greater McArthur Basin: geophysics

- Improved resolution of geophysical data through acquisition programs
- North McArthur Gravity Survey: ≤ 4km ground gravity
- Dunmarra Magnetic and Radiometric Survey: 400m line spacing
- Data available through GADDS & InfoCentre
greater McArthur Basin: HyLogging & petrophysical data

- Systematic HyLogging of drillcore held by NTGS an Geoscience Australia
- Provision of drill core imagery, spectral data and analysis
- Processed data available through AuScope Discovery Portal
- Interpreted data available as HyLogger Data Packages (HDP) through InfoCentre
- Systematic collection of rock property data including magnetic susceptibility, density
- **DIP 013 “Petrophysical data of the Northern Territory”**
greater McArthur Basin: shale analytical data

- Compilation and systematic analysis of black shale formations
- TOC & Programmed Pyrolysis, Shale Rock Properties, XRD Data, Elemental Kerogen Data, Whole Rock Geochemistry

DIP 014 “Shale resource data from the greater McArthur Basin”
greater McArthur Basin: 3D model

- Construction of 3D model through GOCAD SKUA
- Series of key surfaces: topography, top of the Bessie Creek-Corcoran group and the base Roper Group unconformity and structural framework
- DIP 012 “3D model of the greater McArthur Basin”
greater McArthur Basin: stratigraphic characterisation and correlation

- characterise sedimentary units of Wilton package equivalents.
- dating and provenance studies of selected intervals.
- intra- and interbasinal correlations.
- regional palaeogeographic reconstructions in tectonic context.
greater McArthur Basin: copper mineral systems

- PhD project: UTas-CODES
- Characterising styles of Cu mineralisation:
  - “Amelia style”: Coppermine Creek - Glyde package
  - Redbank/Stanton style – Redbank package
- Investigation chemistry temp, age etc of ore fluids
Arunta Region: geological framework

- geological framework mapping to produce series of 1:100k maps and accompanying notes: Jervois Range, Jinka ...

- continue to build understanding of the evolution of the tectonically active southern margin of North Australian Craton

- provide framework to understand mineral systems
Arunta Region: copper mineral systems

- analysis and characterisation of Jervois base metal system
- comparison to adjoining Bonya Hills area
- undertake similar analysis with other copper bearing systems in the Arunta Region…. Home of Bullion, Hardy’s copper field, Illogwa IOCG
Amadeus Basin: geophysics, 3D model

- West Amadeus Gravity Survey
- Complete gravity coverage of Amadeus Basin at ≤ 4km spacing

**COBRA project (CSIRO)**

- Construction of 3D model through potential field modelling of new gravity
Amadeus Basin: Neoproterozoic stratigraphic characterisation and correlation

- characterise Neoproterozoic stratigraphy of NE Amadeus Basin
- assign reference and type sections
- Stromatolite identification as correlation tool
- collect baseline geochemical and petrological dataset
- assess provenance using U-Pb and Hf detrital zircon analysis
Geophysics and Drilling Collaborations

- collaborative funding for drilling and geophysical acquisition programs in ‘greenfields’ areas
- funding of 50% of costs to a maximum of $100,000 per project
- information open filed 6 months after project completion
- to date: 29,229 drill metres, 12,701 gravity stations, 26,547 EM line kms
Geophysics and Drilling Collaborations

- Funding will continue under CORE initiative
- Change to guidelines
  - Smaller scale programs using innovative techniques
  - Consider deep holes under existing shallow drilling
- Call for applications to Round 8 opened on 9 February
- Close of applications 10am CST 13 April 2015, no extensions

www.minerals.nt.gov.au/collaborations