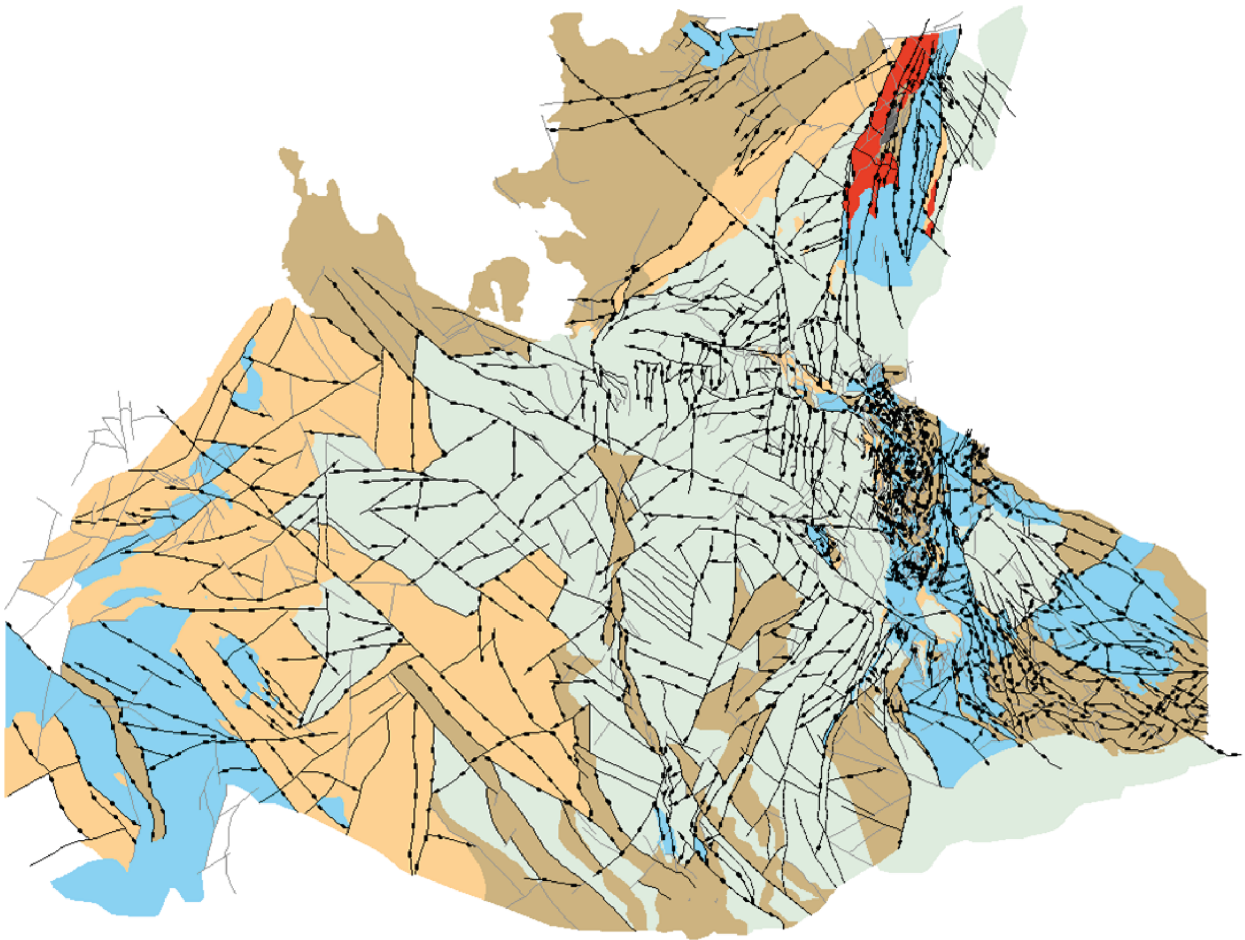


Geophysical and structural interpretation of the greater McArthur Basin



DEPARTMENT OF MINES AND ENERGY

MINISTER: Hon. David Tollner

CHIEF EXECUTIVE: Ron Kelly

NORTHERN TERRITORY GEOLOGICAL SURVEY

EXECUTIVE DIRECTOR: Ian Scrimgeour

Geophysical and structural interpretation of the greater McArthur Basin.

BIBLIOGRAPHIC REFERENCE: Geophysical and structural interpretation of the greater McArthur Basin. *Northern Territory Geological Survey, Digital Information Package DIP 015* (March 2015).

(Digital Information Package / Northern Territory Geological Survey ISSN 1445-5358)

DATA FORMATS: MapInfo, ArcGIS

Keywords: Northern Territory, greater McArthur Basin, geophysical interpretation, structural interpretation, geophysical inversion, gravity, magnetic, gravity inversion, Bouguer anomaly, gravity 3D modelling, basement density, Redbank package, Walker Fault Zone, Birrindudu Basin, Goyder package, Glyde package, Favenc package, Wilton package, Batten Fault Zone, Mount Isa, Lagoon Creek Fault Zone, Tomkinson Province.

EDITOR: GC MacDonald. Publication and layout: KJ Johnston

Northern Territory Geological Survey
3rd floor Paspalis Centrepoint Building
Smith Street Mall, Darwin
GPO Box 4550
Darwin NT 0801, Australia

Arid Zone Research Institute
South Stuart Highway, Alice Springs
PO Box 8760
Alice Springs NT 0871, Australia

For further information contact:
Minerals and Energy InfoCentre
Phone: +61 8 8999 6443
Website: <http://www.minerals.nt.gov.au/ntgs>
Email: geoscience.info@nt.gov.au

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Potential-field interpretation mapping of the greater McArthur Basin..... DIP015_PGN_mapping.pdf
Depth to basement estimates based on gravity inversion over the greater McArthur Basin
.....DIP015_PGN_DepthToBasement.pdf
GIS dataset in MapInfo format DIP015_greaterMcArthurBasin_MapInfo.wor
GIS dataset in ArcGIS format DIP015_greaterMcArthurBasin_ArcGIS.mxd
Metadata (ANZLIC Profile)..... DIP015_Metadata.pdf

SUMMARY

The greater McArthur Basin is a Palaeo to Mesoproterozoic basin that contains key stratigraphic intervals prospective for both petroleum and mineral resources. Much of the basin remains a greenfields exploration province with limited past exploration and therefore lacking in information on the basin architecture and geological evolution. Numerous investigations since the late 1990s have recognised contiguous stratigraphic correlations between the McArthur Basin, Birrindudu Basin and Tomkinson Province, of which the outcropping and undercover extent are informally referred to as the greater McArthur Basin (Close 2014).

PGN Geoscience was contracted by NTGS to produce a potential field (magnetic and gravity) structural interpretation of the greater McArthur Basin and depth to basement estimates derived from unconstrained gravity inversion. The work focussed on understanding the basin architecture and evolution through time, and identifying potential growth faults and depocentres. Stratigraphic units across the greater McArthur Basin have been collated into packages based on their geophysical textural relationships and stratigraphic correlations. Each package is separated by major unconformities associated with significant basin inversion events (Betts *et al* 2014).

Geophysical interpretation and inversion are based on the following datasets:

- Onshore_geodetic_Spherical_Cap_Bouguer_June_2009 830 metre survey (GADDS)
- Magnetic_Map_of_Australia_grid_fifth_edition_80m_cell_size (GADDS)
- Southern_McArthur_Basin_Gravity_p201381_Spherical_Cap_Bouguer 2013 - 800 metre (GADDS)
- Fergusson River P425 BMR and Katherine Mt Evelyn P428 BMR magnetic grid (NTGS).

Geophysical images have been tailored using upward continuation, low pass, high pass, band pass, tilt derivative, first vertical derivative, automatic gain correction and reduce to pole filters; and were imaged with various sun-shade orientations and colour stretches to highlight different structural trends and textures.

Interpretations have also considered the NTGS 1:250 000 scale geological maps and explanatory notes and the McArthur Basin 1:1 000 000 scale geological map.

This DIP presents the interpretation project titled 'Potential-field interpretation mapping of the greater McArthur Basin' and the inversion project titled 'Depth to basement estimates based on gravity inversion over the greater McArthur Basin'; both provided in pdf format. A GIS package is supplied containing interpreted extents of the packages and faults attributed with movement timing and kinematics where this information could be interpreted, as well as grids of depth to basement and average density derived from inversion products in both MapInfo and ArcGIS formats.

REFERENCES

- Betts PG, Armit R and Ailleres L, 2014. Unravelling the McArthur Basin fault architecture and comparisons with the Mount Isa terrane: in *'Annual Geoscience Exploration Seminar (AGES) 2014. Record of abstracts'*. Northern Territory Geological Survey, Record 2014-001, 94–100.
- Close DF, 2014. The McArthur Basin: NTGS' approach to a frontier petroleum basin with known base metal prospectivity: in *'Annual Geoscience Exploration Seminar (AGES) 2014. Record of abstracts'*. Northern Territory Geological Survey, Record 2014-001, 85-89.