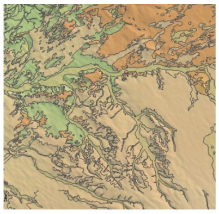
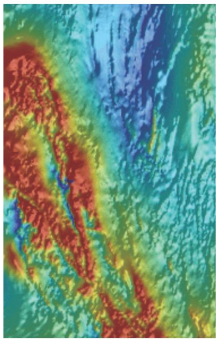


Department of State Development

Metadata: Northern Gawler Province Model

Date Printed: 09/04/2015



Dataset

Title: Northern Gawler Province Model

Custodian: Geological Survey of South Australia. Department of State Development.

Jurisdiction: South Australia

Description

Abstract:

The South Australian Centre for Mineral Exploration Under Cover (CMXUC) is a collaborative research initiative of Primary Industries and Resources, South Australia (PIRSA) and the University of Adelaide. Its aim is to facilitate mineral discovery by defining and implementing the next generation of mineral exploration science. Northern Gawler Province Model Large potential field anomalies have been observed in the Marla Region of Northern South Australia and have been used to define the northern limit of the Gawler Craton. This project's aim was to model the source of those anomalies in order to understand the sources of those anomalies. In this area, basement is buried beneath Neoproterozoic-Recent cover, of the Eastern Officer, Arckaringa and Eromanga Basins, so the first step in the analysis was to constrain the geometry of the basins. The outcropping geology, drillhole data and seismic reflection profiles were used to map out the depth to crystalline basement, and depth to the Base of the Arckaringa Basin. The depth to basement horizon, shows the complex geometry of the Munyarai Trough which forms a foreland to the uplifted Musgrave Block; the Marla Overthrust Zone and Ammaroodinna Ridge which were uplifted after the deposition of Cambrian to Silurian sedimentary rocks; the Middle Bore Fault Zone which was last active during deposition of the Arckaringa Basin and the Wintinna Trough. Note that the geometries of faults are interpreted based on seismic data where the faults are often poorly imaged, especially the Middle Bore Fault. Also shown in the model are isosurfaces of physical properties (density and magnetic susceptibility) for constrained UBC-GIF inversions. To the south of the Middle Bore fault zone anomalies are small, and are often shallowly sourced and the magnetic and gravity anomalies are broadly coincident. To the north of the Middle Bore Fault, a large density body is observed, whereas below the Ammaroodinna Ridge and extending a little to the southeast below the Manya Trough is an offset magnetic anomaly. The largest magnetic susceptibility body appears to dip to the northwest and is consistent with the general dip of structures imaged by the GOMA seismic line (Korsch et al., 2010). To conclude the major potential field anomalies in the region have a basement source, and represent a crust with significantly different properties to the southern Nawa Domain, south of the Middle Bore Fault and the Musgrave Block further to the North. This region may indicate a major geological boundary, although significance and age of the boundary are unclear. However, rocks across the entire region all show evidence of Kimban aged granulite to amphibolite grade metamorphism or magmatism (Fanning et al., 2007; Payne et al., 2008)

References:

Fanning, C.M., Reid, A. and Teale, G., 2007. A geochronological framework for the Gawler Craton, South Australia. Bulletin, 55.

Korsch, R.J. et al., 2010. Geological Interpretation of the deep seismic reflection and magnetotelluric line 08GA-OM1: Gawler Craton-Officer Basin-Musgrave Province-Amadeus Basin (GOMA), South Australia and Northern Territory. In: R.J. Korsch and N. Kositcin (Editors), GOMA (Gawler Craton-Officer Basin-Musgrave Province-Amadeus Basin) seismic and MT Workshop, pp. 63-86.

Payne, J.L., Hand, M., Barovich, K.M. and Wade, B.P., 2008. Temporal constraints on the timing of high-grade metamorphism in the northern Gawler Craton implications for assembly of the Australian Proterozoic. Australian Journal of Earth Sciences, 55: 623-640.

GEN Name: Northern Gawler Province, South Australia

Geographic Extent Polygon: E868000 N7016000, E1036000 N7016000, E1036000 N6848000, E868000 N6848000

North bounding latitude: N7016000

South bounding latitude: N6848000

East bounding longitude: E1036000

West bounding longitude: E868000

Data Currency
Beginning Date: 2009

End Date: 2010

Dataset Status
Progress: Complete

Maintenance: As required

Version Number: 1

Access
Stored format: DIGITAL, 3D-pdf

Available format(s): DIGITAL, 3D-pdf, Gocad

Data Quality

Positional accuracy: Vertical accuracy of the interpolated formation volumes, topographic and basement surfaces are variable due to resampling (topographic surface), interpretation (formation boundaries) and interpolation/unconstrained inversions (formation volumes).

Attribute accuracy: N/A

Contact Information
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Metadata Dates

Add date: 2012-02-20

Change date: 2015-04-09

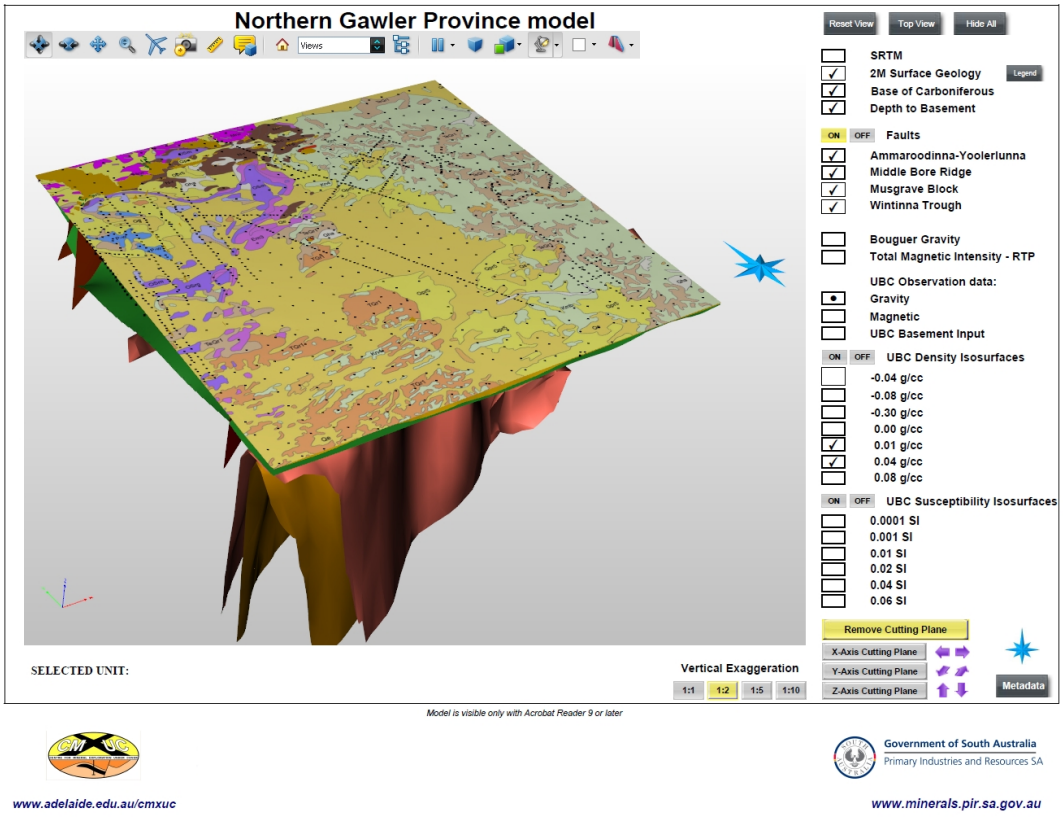
Responsible Party

Responsible party: Chief Geoscientist, Mapping and Exploration, GSSA

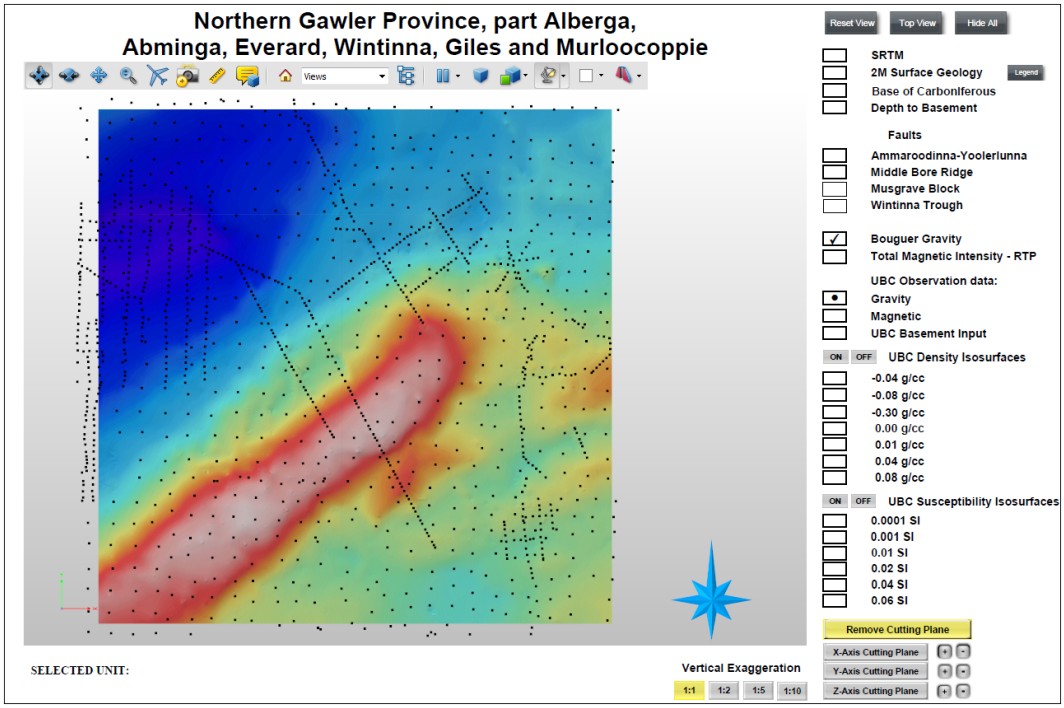
Description

Dimension: x,y,h

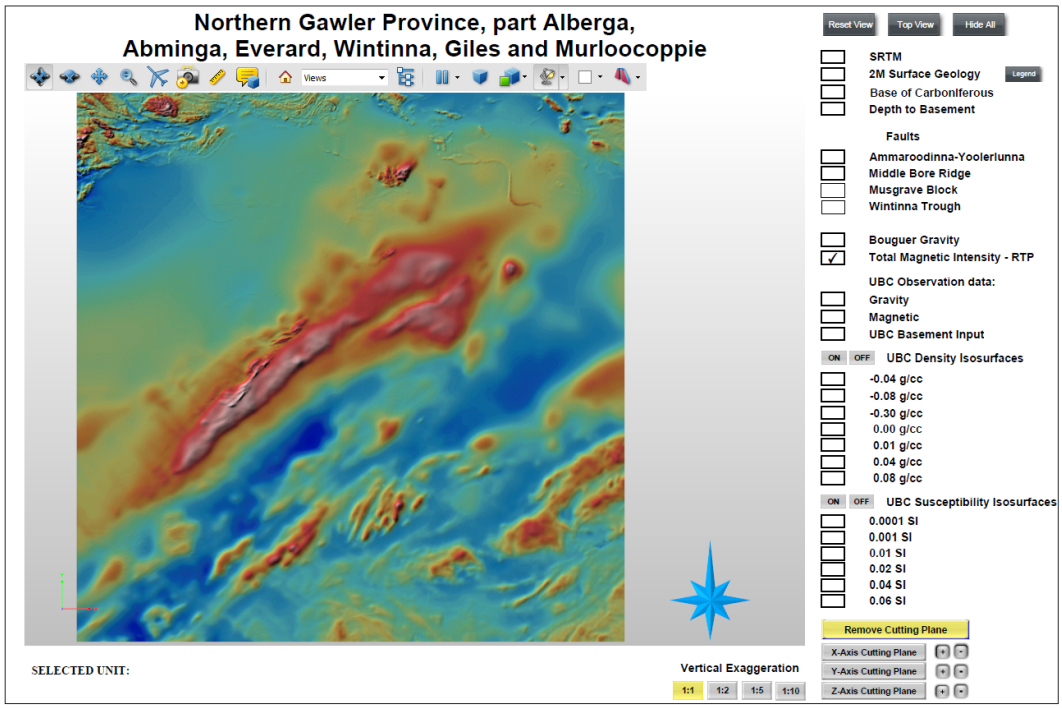
Sample Graphic(s)



Northern Gawler Province model 3D-pdf



Bouguer gravity grid overlayed with UBC gravity observation points



Reduced to pole (RTP) magnetic intensity grid

Usage

Purpose: Exploration geology, 3D visualisation

Use: Exploration geology, 3D visualisation

Usage limitations: This model is presented as a 'proof of concept' only and the accuracy (spatial or otherwise) should not be relied upon for exploration or other decision making processes.

Dataset Associations

Origin

Dataset size: 35.4MB

Projection: UTM Zone 52

Datum: GDA94

Dataset Management

Authorised date: 2011-09-16

Authorised by: Chief Geoscientist, Mapping and Exploration, GSSA

Attributes