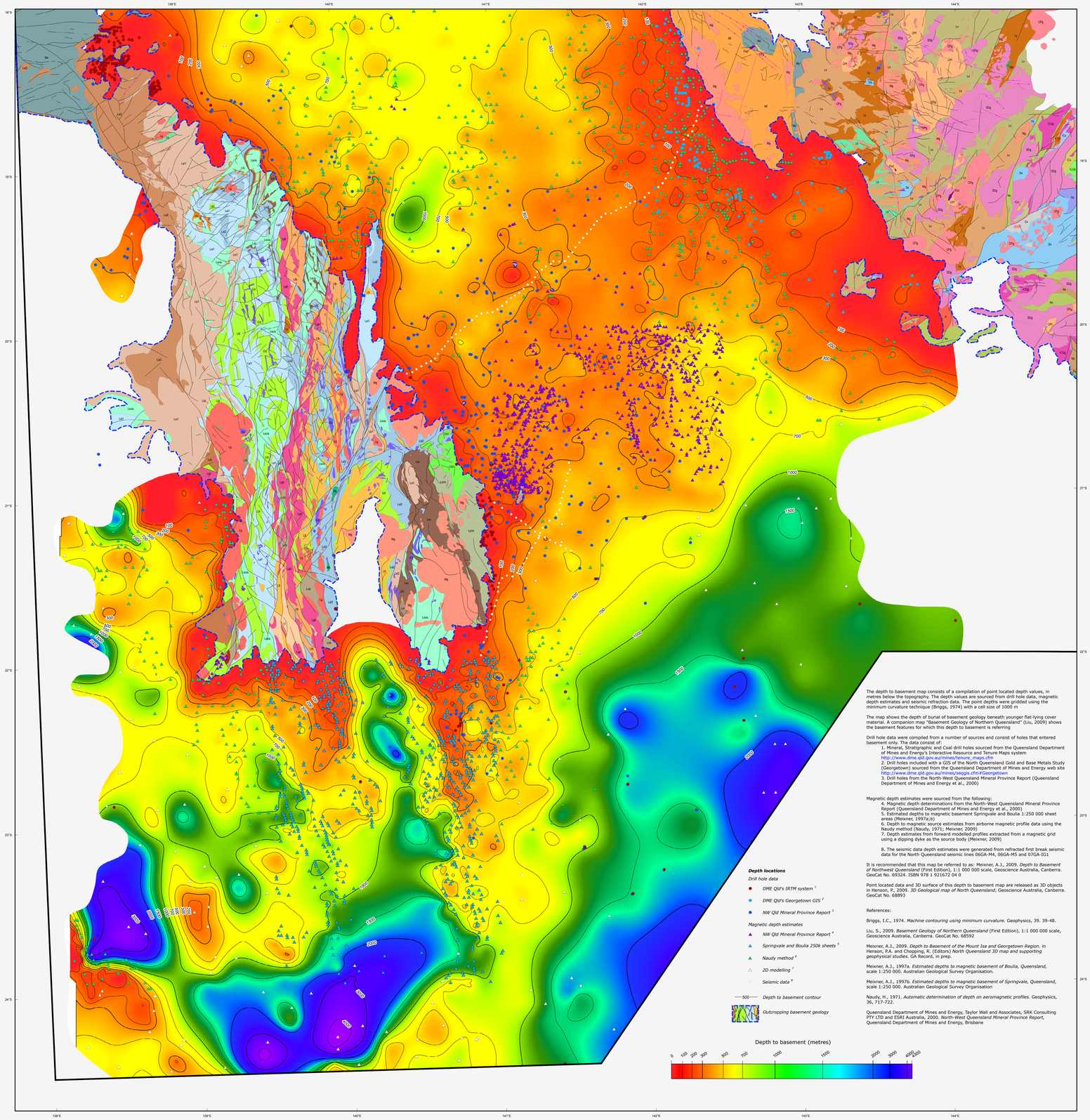
# DEPTH TO BASEMENT OF NORTHWEST QUEENSLAND




The depth to basement map consists of a compilation of point located depth values, in metres below the topography. The depth values are sourced from drill hole data, magnetic depth estimates and seismic refraction data. The point depths were gridded using the minimum curvature technique (Briggs, 1974) with a cell size of 1000 m

The map shows the depth of burial of basement geology beneath younger flat-lying cover material. A companion map "Basement Geology of Northern Queensland" (Liu, 2009) shows the basement features for which this depth to basement is referring

Drill hole data were compiled from a number of sources and consist of holes that entered basement only. The data consist of:

1. Mineral, Stratigraphic and Coal drill holes sourced from the Queensland Department of Mines and Energy's Interactive Resource and Tenure Maps system http://www.dme.qld.gov.au/mines/tenure_maps.cfm
2. Drill holes included with a GIS of the North Queensland Gold and Base Metals Study (Georgetown) sourced from the Queensland Department of Mines and Energy web site http://www.dme.qld.gov.au/mines/seqgis.cfm#Georgetown
3. Drill holes from the North-West Queensland Mineral Province Report (Queensland Department of Mines and Energy et al., 2000)

Magnetic depth estimates were sourced from the following:

4. Magnetic depth determinations from the North-West Queensland Mineral Province Report (Queensland Department of Mines and Energy et al., 2000)
5. Estimated depths to magnetic basement Springvale and Boulia 1:250 000 sheet areas (Meixner, 1997a;b)
6. Depth to magnetic source estimates from airborne magnetic profile data using the Naudy method (Naudy, 1971; Meixner, 2009)
7. Depth estimates from forward modelled profiles extracted from a magnetic grid using a dipping dyke as the source body (Meixner, 2009)

8. The seismic data depth estimates were generated from refracted first break seismic data for the North Queensland seismic lines 06GA-M4, 06GA-M5 and 07GA-I01

It is recommended that this map be referred to as: Meixner, A.J., 2009. *Depth to Basement of Northwest Queensland* (First Edition), 1:1 000 000 scale, Geoscience Australia, Canberra. GeoCat No. 69324. ISBN 978 1 921672 04 0

Point located data and 3D surface of this depth to basement map are released as 3D objects in Henson, P., 2009. *3D Geological map of North Queensland*, Geoscience Australia, Canberra. GeoCat No. 68893

References:


Briggs, I.C., 1974. *Machine contouring using minimum curvature.* Geophysics, 39. 39-48.

Liu, S., 2009. *Basement Geology of Northern Queensland* (First Edition), 1:1 000 000 sheet, Geoscience Australia, Canberra. GeoCat No. 68592

Meixner, A.J., 2009. *Depth to Basement of the Mount Isa and Georgetown Region.* in Henson, P.A. and Chopping, R. (Editors) *North Queensland 3D map and supporting geophysical studies.* GA Record, in prep.

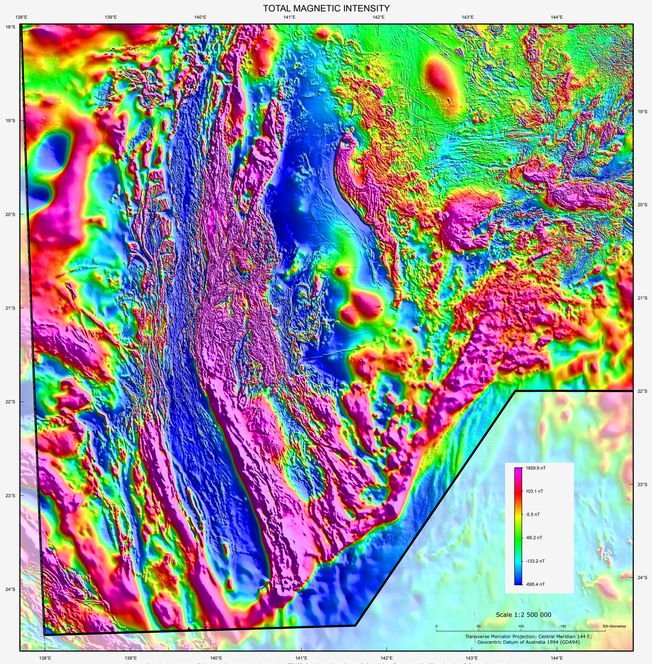
Meixner, A.J., 1997a. *Estimated depths to magnetic basement of Boulia, Queensland,* scale 1:250 000. Australian Geological Survey Organisation.

Meixner, A.J., 1997b. *Estimated depths to magnetic basement of Springvale, Queensland,* scale 1:250 000. Australian Geological Survey Organisation

Naudy, H., 1971. *Automatic determination of depth on aeromagnetic profiles.* Geophysics, 36, 717-722.

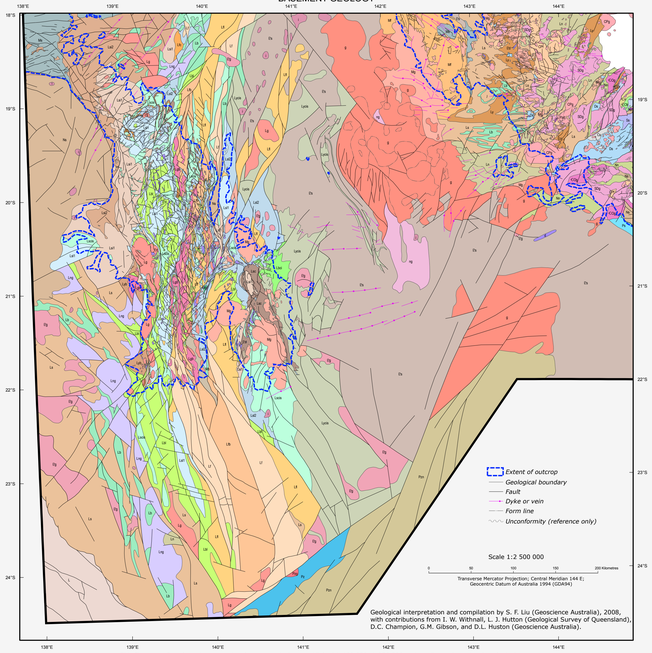
Queensland Department of Mines and Energy, Taylor Wall and Associates, SRK Consulting PTY LTD and ESRI Australia, 2000. *North-West Queensland Mineral Province Report,* Queensland Department of Mines and Energy, Brisbane


## TOTAL MAGNETIC INTENSITY



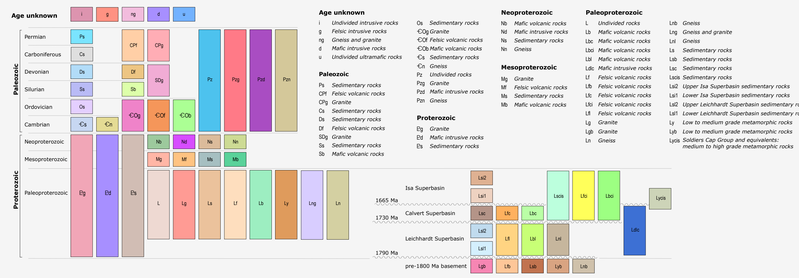

A pseudocolour image of the total magnetic intensity (TMI) (reduced to the pole), with a "sun-angle illumination" from the north-east. Separate survey grids of TMI data have been merged into the composite grid from which this image is derived, with original survey data acquired by the Department of Mines and Energy, Queensland and Geoscience Australia.

## BASEMENT GEOLOGY




Geological interpretation and compilation by S. F. Liu (Geoscience Australia), 2008, with contributions from I. W. Withnall, L. J. Hutton (Geological Survey of Queensland), D.C. Champion, G.M. Gibson, and D.L. Huston (Geoscience Australia).

This "basement" geology interpretation drew extensively on published 1:100 000, 1:250 000 and smaller scale regional geological maps and the analysis of grids of regional aeromagnetic data with line spacings between 100 m and 1.5 km from Geoscience Australia's aeromagnetic database. Bouguer Gravity and bore hole data were also used to complement the interpretation.




**Age unknown**

- *i* Undivided intrusive rocks
- *g* Felsic intrusive rocks
- *ng* Gneiss and granite
- *d* Mafic intrusive rocks
- *u* Undivided ultramafic rocks

**Paleozoic**

- Ps Sedimentary rocks
- CPf Felsic volcanic rocks
- CPg Granite
- Cs Sedimentary rocks
- Ds Sedimentary rocks
- Df Felsic volcanic rocks
- SDg Granite
- Ss Sedimentary rocks
- Sb Mafic volcanic rocks
- Os Sedimentary rocks
- €OQg Granite
- €OQf Felsic volcanic rocks
- €OQb Mafic volcanic rocks
- €Cs Sedimentary rocks
- €Cn Gneiss
- Pz Undivided rocks
- Pzg Granite
- Pzd Mafic intrusive rocks
- Pzn Gneiss

**Proterozoic**

- Eg Granite
- Ed Mafic intrusive rocks
- Es Sedimentary rocks

**Neoproterozoic**

- Nb Mafic volcanic rocks
- Nd Mafic intrusive rocks
- Ns Sedimentary rocks
- Nn Gneiss

**Mesoproterozoic**

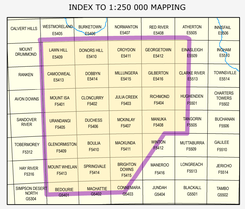
- Mg Granite
- Mf Felsic volcanic rocks
- Ms Sedimentary rocks
- Mb Mafic volcanic rocks

**Paleoproterozoic**

- L Undivided rocks
- Lg Granite
- Ln Gneiss
- Lnb Gneiss
- Lng Gneiss and granite
- Lni Gneiss
- Ls Sedimentary rocks
- Lsb Sedimentary rocks
- Lsc Sedimentary rocks
- Lscb Sedimentary rocks
- Lf Felsic volcanic rocks
- Lfb Felsic volcanic rocks
- Lfc Felsic volcanic rocks
- Lfd Felsic volcanic rocks
- Lfe Felsic volcanic rocks
- Lg Granite
- Lgb Granite
- Ln Gneiss
- Lsa Sedimentary rocks
- Lsa1 Upper Isa Superbasin sedimentary rocks
- Lsa2 Lower Isa Superbasin sedimentary rocks
- Lsa2 Upper Leichhardt Superbasin sedimentary rocks
- Lsa1 Lower Leichhardt Superbasin sedimentary rocks
- Ly Low to medium grade metamorphic rocks
- Lyb Low to medium grade metamorphic rocks
- Lysb Soldiers Cap Group and equivalents: medium to high grade metamorphic rocks

NOTE: For this interpretation of basement rock, the flat lying Cenozoic and Mesozoic cover materials have been removed across the map area; Paleozoic sediments have also been removed in the Mount Isa area in the west (north of the Diamantina Fault or northwest of the Thomson Orogen).

INDEX TO 1:250 000 MAPPING




MAP LOCALITY


Scale 1:1 000 000

25 0 25 50 75 100 125 150 Kilometres

Transverse Mercator Projection; Central Meridian 144 E; Geocentric Datum of Australia 1994 (GDA94)

Depth to basement image generated by A. J. Meixner

Geophysical image processing by P. R. Milligan

Cartography by L. M. Highet

Produced by GIS Services Group, Onshore Energy and Minerals Division, Geoscience Australia using ESRI ArcGIS 9.3 software

Copies of this map can be downloaded from the Geoscience Australia internet site at: http://www.ga.gov.au or by contacting:

Sales Centre, Geoscience Australia
GPO Box 378, Canberra, ACT, 2601
Ph (02) 6249 9519, Fax (02) 6249 9982
Email: sales@ga.gov.au

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