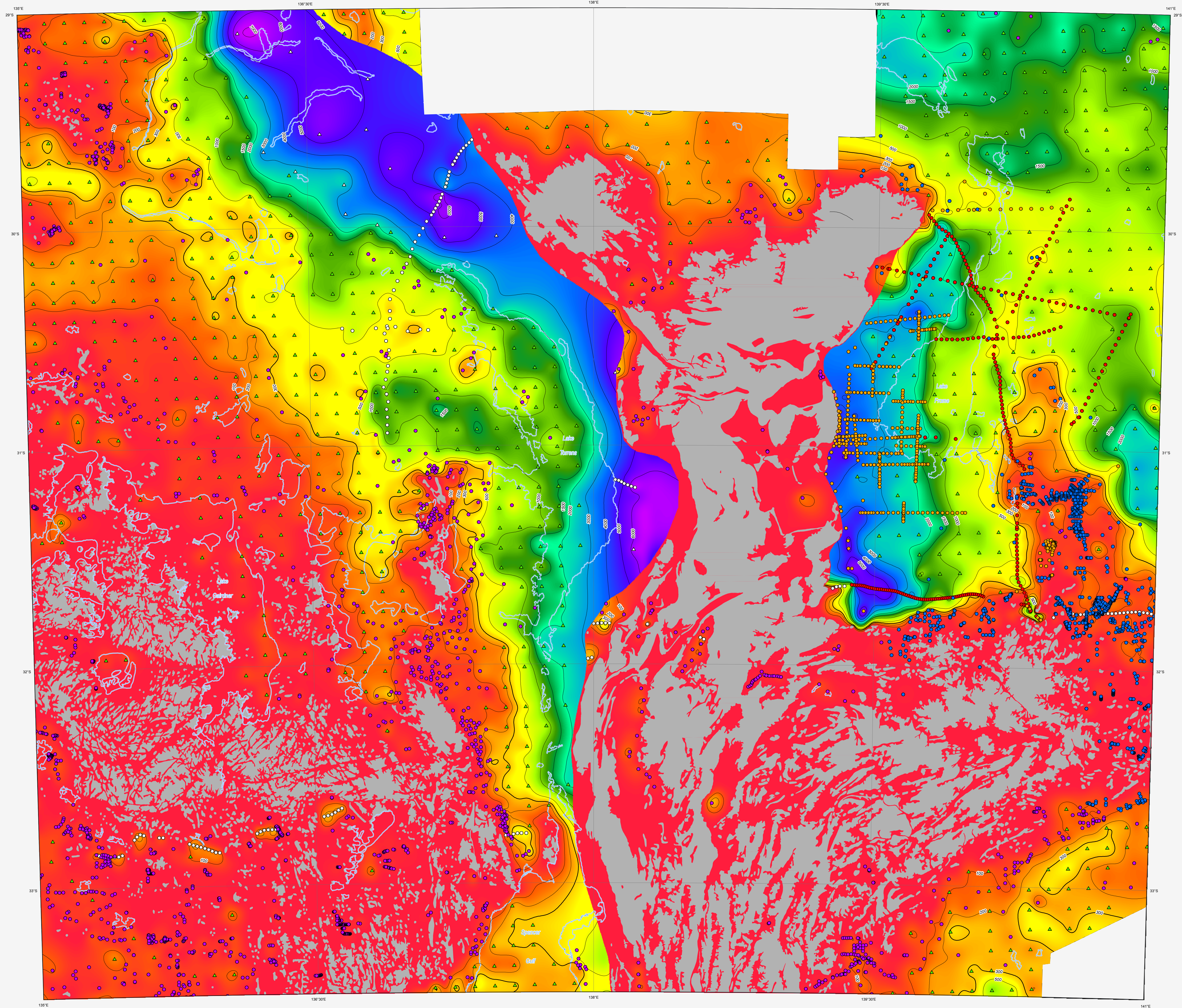
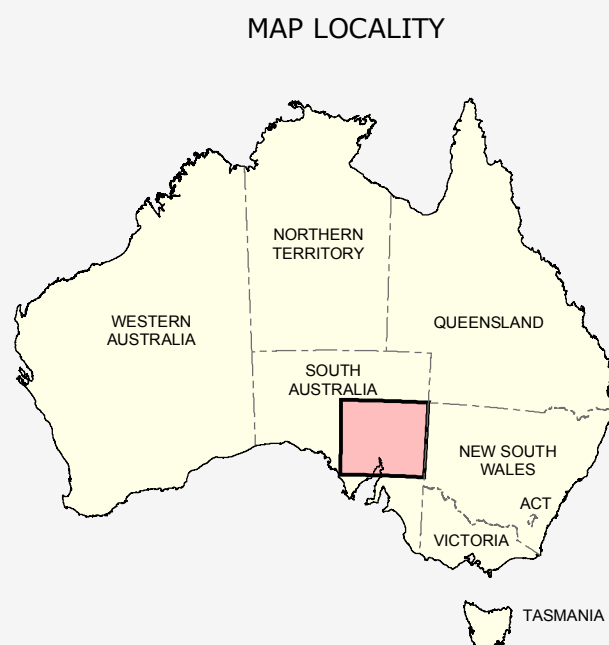


# DEPTH TO MAGNETIC BASEMENT OF GAWLER - CURNAMONA REGION



INDEX TO 1:250 000 MAPPING

MARLBOROUGH	WARRA	LAKE EYRE	OPFERBARN	STEELECO	YALALAN
1630	1630	1630	1630	1630	1630
COSSIGUIN	WILLABRINA	CEPHORIN	MARRE	CHALABRA	WARRAMBA
1630	1630	1630	1630	1630	1630
TRICOLA	KISSOGAN	WARRAMBA	COPLEY	TRICOLA	WARRAMBA
1630	1630	1630	1630	1630	1630
CHALABRA	WARRAMBA	TRICOLA	WARRAMBA	CHALABRA	WARRAMBA
1630	1630	1630	1630	1630	1630
WARRAMBA	CHALABRA	TRICOLA	WARRAMBA	CHALABRA	TRICOLA
1630	1630	1630	1630	1630	1630
CHALABRA	WARRAMBA	TRICOLA	WARRAMBA	CHALABRA	WARRAMBA
1630	1630	1630	1630	1630	1630
WARRAMBA	CHALABRA	TRICOLA	WARRAMBA	CHALABRA	TRICOLA
1630	1630	1630	1630	1630	1630

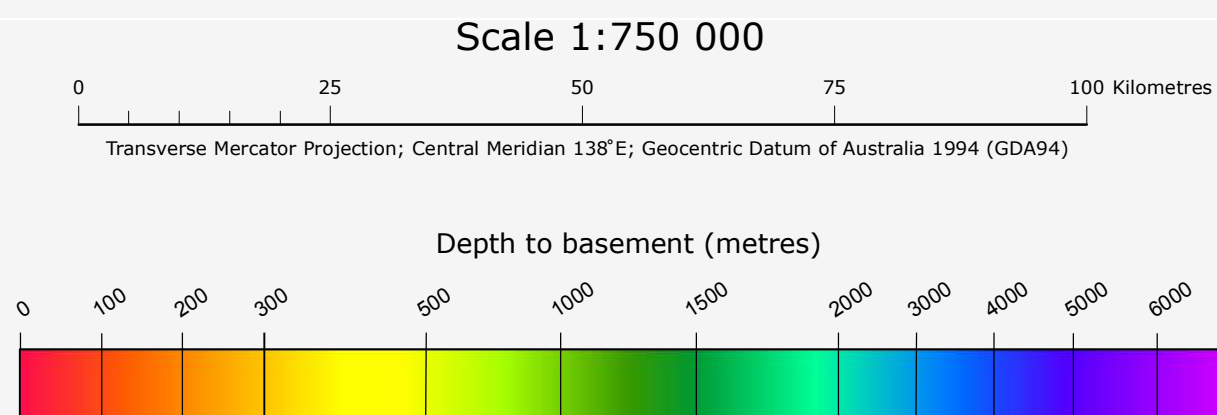


**Depth locations**

- GA spectral method <sup>1</sup>
- GA 3D modelling <sup>2</sup>
- PIRSA Curramona 3D drill hole <sup>3</sup>
- GA - PIRSA seismic <sup>4</sup>
- PIRSA Curramona 3D seismic <sup>5</sup>
- PIRSA Curramona 3D <sup>6</sup>
- Unassigned depths from PIRSA's Curramona Province - 3D Sedimentary Basin model <sup>7</sup>

— 500 — Depth to basement contour

Outcropping basement geology



The depth to magnetic basement map was constructed from a compilation of point located depth values below topography consisting of depth to magnetic source estimates, basement drill hole intersections and interpreted seismic depth estimates. These point depths were combined with mapped geology (Whitaker et al., 2008), to delineate outcropping basement, and gridded using Interpolated variable density gridding routine using a reduction factor of 5 and a cell size of 1000 m.

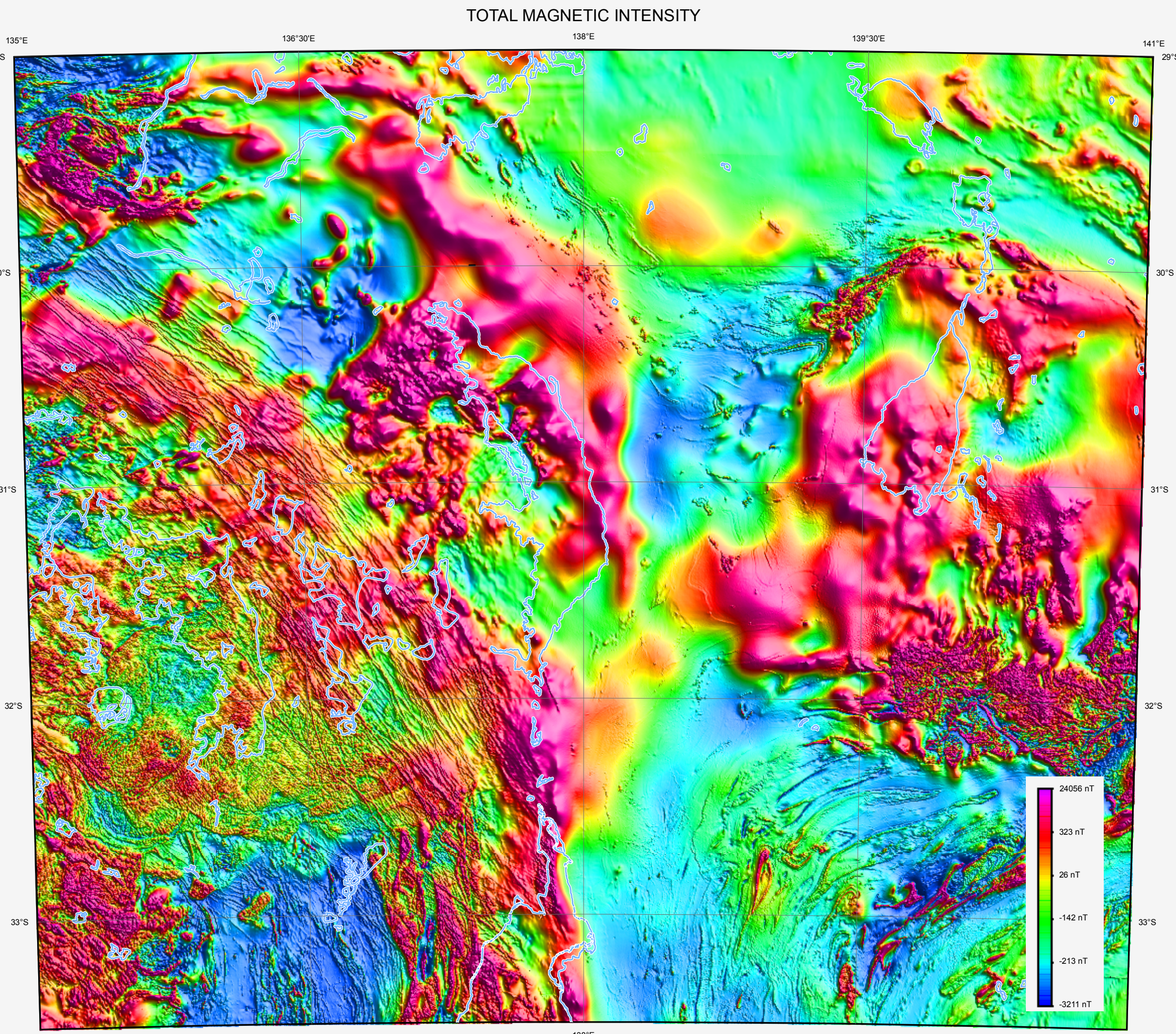
The depth to basement points consist of the following:

- Depth estimates generated from gridded magnetic data using the spectral domain method (Spector and Grant, 1970).
- Depth estimates to magnetic sources from manual 3D forward modelling.
- Basement intersections from drill hole data (Cowie, W.M., PIRSA, pers. com., 2010).
- Basement intersections from drill hole data sourced from PIRSA's Curramona Province - 3D Sedimentary Basin model.
- Depth estimates to interpreted magnetic basement from seismic lines (GSA-CU, GSA-CU, GSA-CU, GSA-CU, GSA-CU and GSA-CU).
- Seismic depth to basement estimates from PIRSA's Curramona Province - 3D Sedimentary Basin model.
- Unassigned depths from PIRSA's Curramona Province - 3D Sedimentary Basin model.

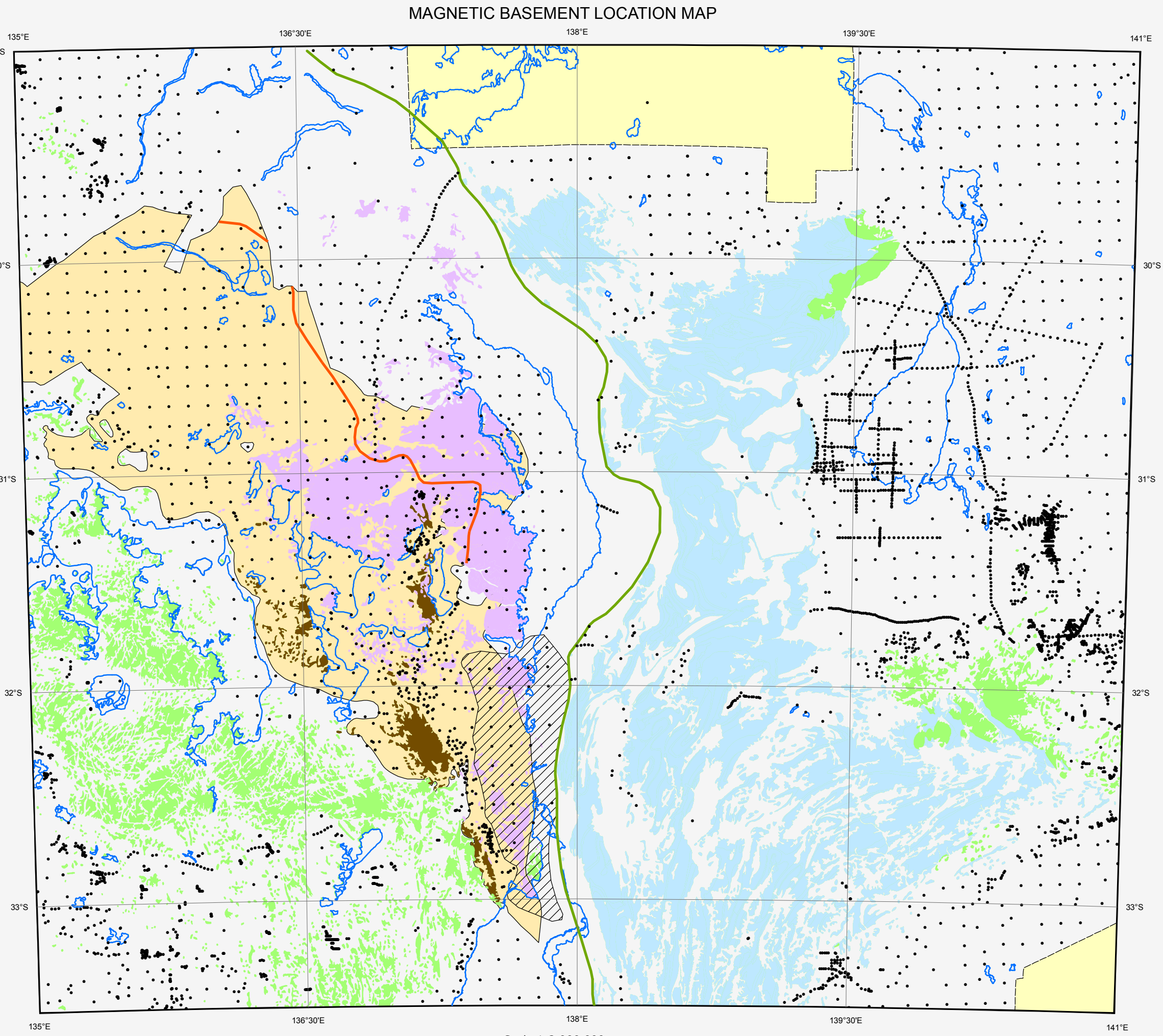
It is recommended that this map be referred to as: Melner, A.J., and Roy, I.G., 2010. Depth to magnetic basement map of the Gawler-Curnamona region, South Australia (First Edition), 1:750 000 scale, Geoscience Australia, Canberra. GeoCat No. 70594, ISBN 978 9121781 13 1.

References:

- <sup>1</sup> <http://www.intrepid-geophysics.com/ig/index.php?lang=EN&menu=products-intrepidsoftware>
- <sup>2</sup> [http://www.pirsa.gov.au/minerals/geology/3d\\_geological\\_models/curnamona-sedimentary\\_basin\\_model](http://www.pirsa.gov.au/minerals/geology/3d_geological_models/curnamona-sedimentary_basin_model)
- <sup>3</sup> <http://www.ga.gov.au/minerals/research/national/seismic/index.jsp>
- Spector, A., and Grant, F.S., 1970, *Statistical models for interpreting aeromagnetic data*. Geophysics, 35, 283-302.
- Whitaker, A.J., Claville, H.D., English, P.M., Stewart, A.J., Retter, A.J., Connolly, D.P., Stewart, C.A., and Fisher, G.L., 2008, *Surface geology of Australia*, 1:1,000,000 scale, South Australia [Digital Dataset], Geoscience Australia. <http://www.ga.gov.au>



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 Primary Industries and Resources, South Australia, Geoscience Australia and open file data acquired by companies.



**Depth locations**

- Outcropping Neoproterozoic sediments of the Adelaide Rift System
- Outcropping Pandurra Formation
- Carnewell Basin (Cowie, 2006)
- Outcropping Neoproterozoic sediments of the Stuart Shelf (not included as magnetic basement)
- Outcropping Pre-Neoproterozoic basement
- Substandard magnetic data

The depth to magnetic basement in this study is interpreted to delineate the top of the pre-Neoproterozoic units with the following three exceptions. These exceptions are due to the nature of the magnetisation of these units:

- To the southwest of this line, the Pandurra Formation of the Carnewell Basin has been assigned to the basement, while to the northeast, the Pandurra Formation has been assigned to the cover. The Pandurra Formation is a flat lying sequence of non-magnetic arenaceous sediments which has been intruded by the magnetic Gardiner Dyke Swarm over the majority of its area, with the exception of the north-eastern portion which appears to be devoid of magnetic dikes. It is interpreted that the magnetic depth estimates are sourced from the magnetic Gardiner dikes in the southwest and hence delineates the top of the Pandurra Formation. To the northeast, the magnetic depth estimates are interpreted to delineate magnetic sources within the basement to the Pandurra Formation and hence the depth to magnetic basement in this region defines the base of the Pandurra Formation.
- To the west of this line, the Neoproterozoic of the Stuart Shelf has been assigned to the cover, while to the east, the Neoproterozoic of the Adelaide Rift System has been assigned to the basement. The Neoproterozoic of the Stuart Shelf in the west, with the exception of the Bada Volcanics (see below), are generally flat lying and non-magnetic. It is interpreted that the magnetic signature in this region is dominated by magnetic sources within the basement to the Neoproterozoic and the depth to magnetic basement surface is, therefore, delineating the base of the Neoproterozoic. In the east, the magnetic signature is dominated by magnetic stratigraphy within the Neoproterozoic of the Adelaide Rift System and the depth to magnetic source estimates are, therefore, interpreted to delineate the depth to the top of the Neoproterozoic.
- In this region the magnetic anomalies are interpreted to be sourced from Bada Volcanics within the Neoproterozoic sequence. The magnetic basement surface in this region, therefore, defines a stratigraphic horizon within the Neoproterozoic sequence.

A summary of the geology of the region can be found in Korsch and Kostcin (2010).

References:

- Cowie, W.M., 2006, *Solid geology of South Australia: peeling away the cover*. MESA Journal, 43, 4-15.
- Korsch, R.J., and Kostcin, N., editors, 2010. *South Australian Seismic and MT Workshop 2010*. Geoscience Australia, Record, 2010/10.