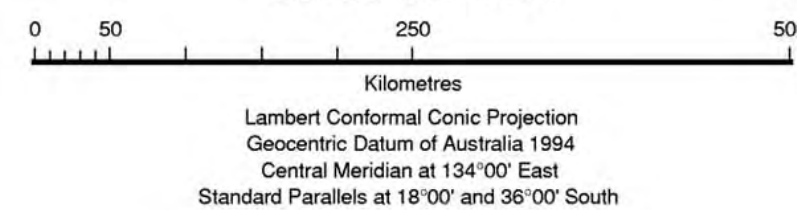


MAGNETIC ANOMALY MAP OF AUSTRALIA

GRADIENT ENHANCED RESIDUALS OF
TOTAL MAGNETIC INTENSITY

SCALE 1:5 000 000



PREFACE:

This edition of the Magnetic Anomaly Map of Australia results from a completely new compilation of Total Magnetic Intensity (TMI) grid data. It has been produced using a new method of matching the individual survey grids and the use of independent data to help constrain long wavelengths. 850 individual grids have been matched and merged into the composite used to produce this image, with the resolution of each grid optimal for the specifications of the source survey line data. Since the Third Edition (Milligan and Tarlowski, 1989), data from many new surveys have been added, acquired mainly by the State and Territory geological surveys. It is estimated that 19 million line-kilometres of survey data were acquired to produce the grid data, 10 million line-kilometres more than for the third edition.

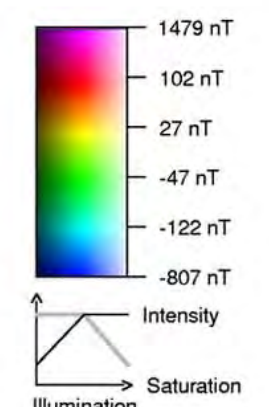
EXPLANATORY NOTES:

This image was compiled from Total Magnetic Intensity survey data held in the National Airborne Geophysical Database by Geoscience Australia. The image is a composite of data acquired from surveys flown by Geoscience Australia, and surveys flown under contract to Geoscience Australia, the State and Territory geological surveys in either separate or joint projects and the private sector. The source data are used with their permission. The data from these surveys were acquired at a range of line spacings (see source diagrams), flying heights, and measurement accuracies (Richardson, 2004). The map also incorporates marine magnetic data from research surveys by Geoscience Australia (Pelkovic and Milligan, 2002) and foreign institutions.

The data supplied by the New South Wales Department of Primary Industries; Department of Business, Industry and Resources Development Northern Territory; Natural Resources and Mines Queensland; Department of Primary Industries and Resources South Australia; Department of Infrastructure, Energy and Resources Tasmania; Department of Primary Industries Victoria and Department of Industry and Resources Western Australia (see source diagram) were acquired at an altitude of 100 m or less along lines spaced 500 m apart or less.

For each survey, the International Geomagnetic Reference Field for the relevant epoch was removed, and a grid created with a cell size of approximately one fifth of the survey line spacing, using the minimum curvature method of Briggs (1974). Some grids were subjected to micro-leveling (Minty, 1991). The gridded data from all the surveys were joined together using a two-stage method, based on the data differences in the overlap regions between adjacent surveys. Initially, a base-shift was applied to each survey to minimise the global set of differences between adjacent surveys. An iterative process was then applied, removing a plane surface from selected surveys to minimise the differences between it and its neighbours. During this iterative process, the base levels of those grids that overlapped with an independent dataset, the Australia Wide Array of Geomagnetic Stations (AWAGS) airborne magnetic data, were constrained by the AWAGS data, to help improve the accuracy of long wavelength information (Minty et al, 2003; Milligan et al, 2001). Remaining high-frequency differences between the grids were smoothed out using a convolution operator. The final grid was created by interpolating all of the data into one grid, with a cell size of 7.2 seconds of arc, which was then reprojected to the Lambert Conformal Conic projection with a cell size of 250 m.

The image was generated from the natural colour palette (magenta high - blue low) using histogram equalisation. To emphasise the expression of short-wavelength anomalies, an artificial illumination was applied from the northeast. The output of the sun-angle image was used to modulate the colour intensity and saturation of the initial colour image in the Hue, Saturation, Value colour space (Milligan et al, 1992).



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It is recommended that this map be referred to as: Milligan, P.R. and Franklin, R., 2004, *Magnetic Anomaly Map of Australia* (Fourth Ed.), 1:5 000 000 scale, Geoscience Australia, Canberra.

Composite TMI grid data at 250 m and 400 m cell sizes are available for free download via the internet using Geoscience Australia's Geophysical Archive Data Delivery System (GADDS) at: <http://www.geoscience.gov.au/gadds>

Further information can also be found on the Internet at: <http://www.ga.gov.au/>

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Copies of this map may be obtained from:
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MAGNETIC ANOMALY MAP
OF
AUSTRALIA
4TH EDITION, 2004

