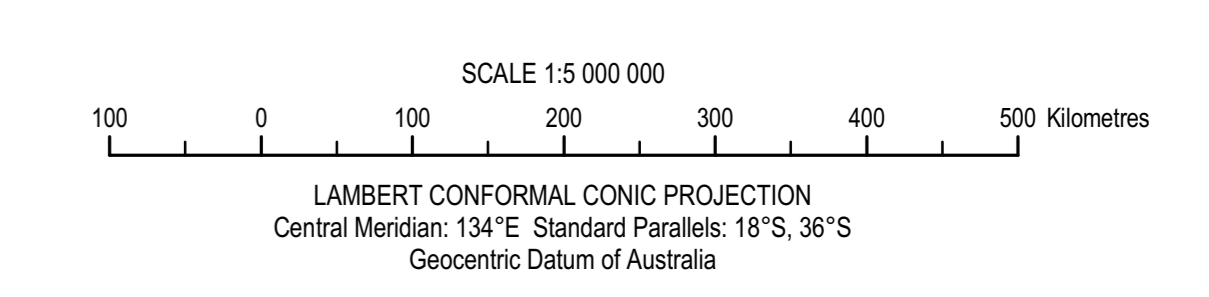
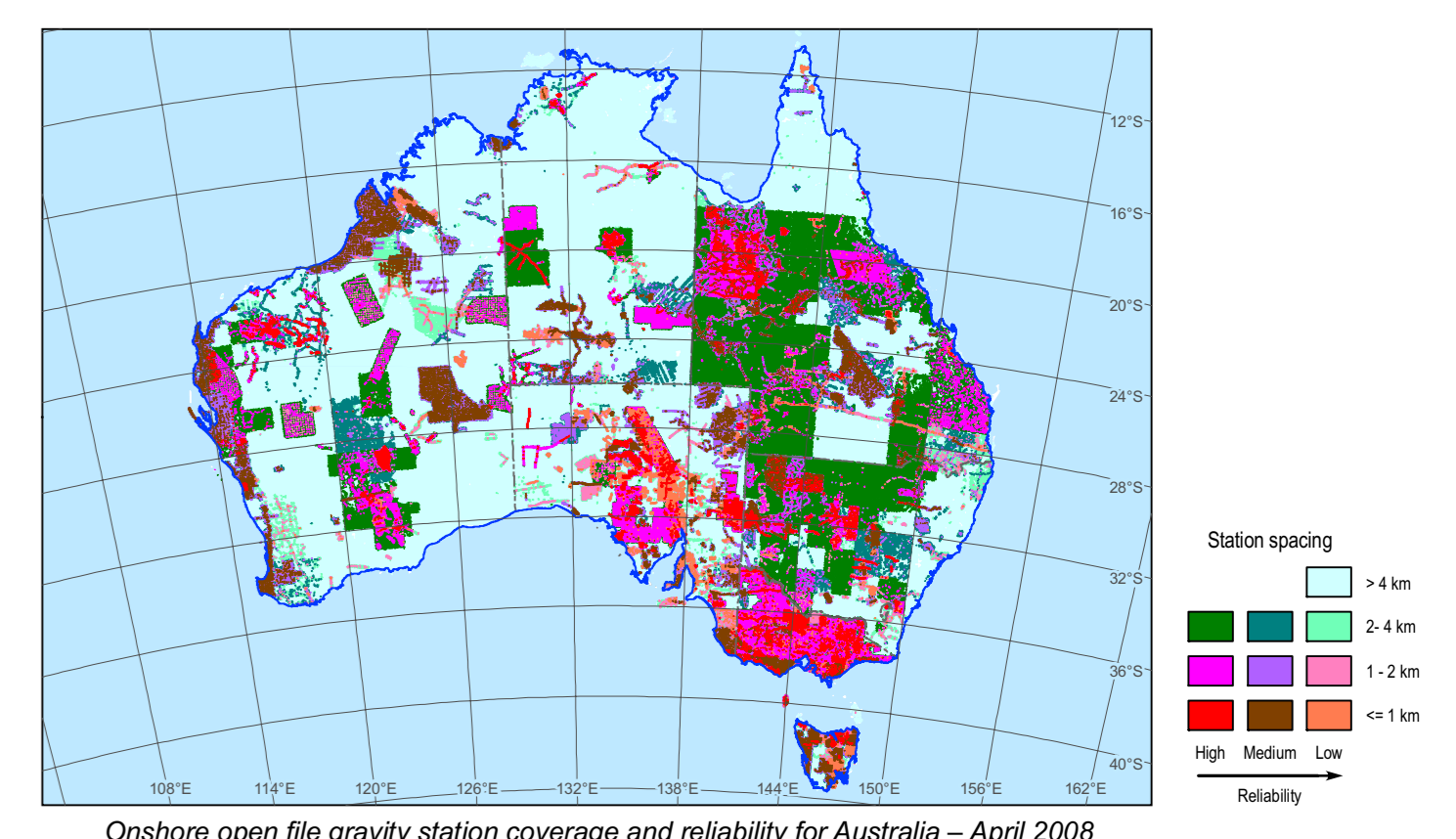
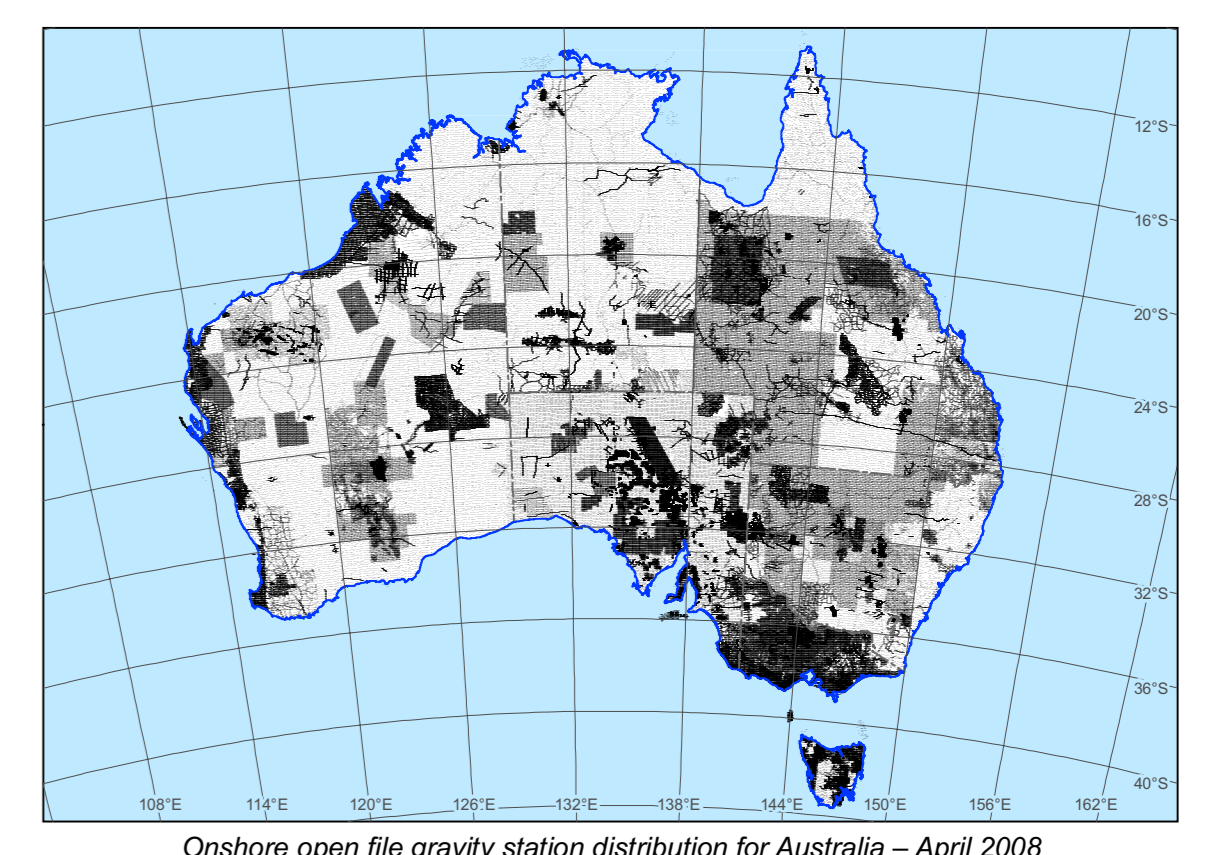


GRAVITY ANOMALY MAP OF THE AUSTRALIAN REGION



EXPLANATORY NOTES

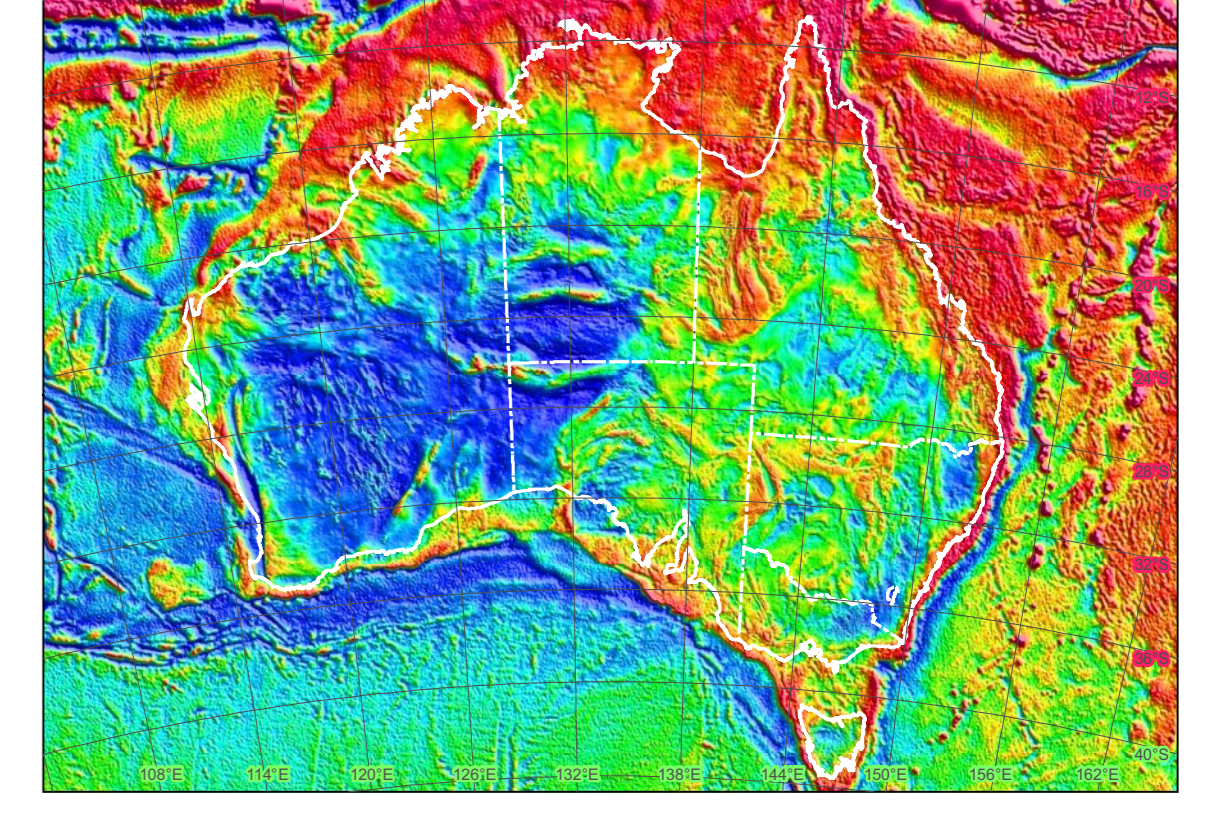
This image is derived from observations recorded at approximately 1.4 million gravity stations held in the Australian National Gravity Database (ANGD) by Geoscience Australia (GA), and free-air gravity anomaly data derived from satellite altimetry by Sandwell and Smith (1997) over marine areas. The onshore data were acquired by the Commonwealth, State and Territory Governments, the mining and exploration industry, universities and research organisations from the 1950s to the present day. Continental Australia has a basic station spacing coverage of 11 kilometres, with South Australia, Tasmania and part of New South Wales covered at a spacing of 7 kilometres. Victoria has station coverage of approximately 1.5 kilometres. Recent Federal, State and Territory Government initiatives have funded systematic infill at a grid station spacing of 2, 2.5 or 4 kilometres to provide improved coverage in areas of scientific or economic interest. Other areas of detailed coverage have been surveyed by private companies for exploration purposes. Over the continental region only open file data as held in the ANGD at May 2008 were used in the creation of the grid. The diagram below shows the distribution of these onshore stations. Data derived from satellite altimetry were used over the marine region.



In both images spherical cap Bouguer gravity anomalies are shown onshore while free-air anomalies are shown offshore. The gravity anomalies are based on the Australian Absolute Gravity Datum 2007 and 1964 Geocentric Datum of Australia (Tracey et al., 2008).

The onshore Bouguer gravity anomalies were calculated using a density of 2.67 t/m³. Offshore free-air gravity anomalies were based on gravity (VRS 1) and topography (VRS 1) data extracted from the Marine Gravity from Satellite Altimetry dataset (Sandwell and Smith, 1997, 2005). These data were combined with the GA onshore gravity data and gridded using a variable density gridding technique provided by the INTREPID Geophysics software package. The data were gridded to a cell size of 800 metres using Lambert Conformal Projection coordinates with standard parallels of 18° and 36° south and a central meridian of 134° east.

The large image shows Bouguer gravity anomalies onshore and free-air gravity anomalies offshore after applying a high-pass filter with a cut-off wavelength of 500 kilometres. The image below is of the gravity data without the application of the filter.



In both the large and small images, to emphasize the expression of subtle anomalies, an artificial sun-angle "illumination" from the northwest was used to modify both the saturation and intensity of the original colour image.

The geocentric version of the grid used for the preparation of the image and the original onshore point located data are available online from Geoscience Australia at: <http://www.geoscience.gov.au/ga5ds>

REFERENCES

Tracey, R., Bacchin, M., and Wynne, P., 2008, AAGD07: A new absolute gravity datum for Australian gravity and new standards for the Australian National Gravity Database: Exploration Geophysics, (in prep).

Sandwell, D.T., and Smith, W.H.F., 1997, Marine gravity anomaly from Geosat and ERS 1 satellite altimetry. *Journal of Geophysical Research*, v. 102, No. B5, p. 10039-10054.

Sandwell, D.T., and Smith, W.H.F., 2005, Retracking ERS-1 altimeter waveforms for optimal gravity field recovery. *Geophysical Journal International* 163 (1), p. 79-89.

ACKNOWLEDGEMENTS

Marine Gravity - Satellite Altimetry dataset information

Offshore free-air gravity anomalies shown in this map are derived from data extracted from the Marine Gravity from Satellite Altimetry dataset available at: http://topex.ucsd.edu/marine_grav/mar_grav.html

These data were used with the permission of David Sandwell and Walter Smith.

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3051 μm^2
382 μm^2
64 μm^2
-16 μm^2
-100 μm^2
-2637 μm^2

Intensity

Saturation

Illumination

It is recommended that this map be referred to as: Bacchin, M., Milligan, P.R., Wynne, P., and Tracey, R., 2008, Gravity Anomaly Map of the Australian Region (Third Edition), scale 1:5 000 000, Geoscience Australia, Canberra.

Cartography: S. Mezzomo.

Published by Geoscience Australia, Department of Resources, Energy and Tourism, Canberra, Australia. Issued under the authority of the Federal Minister for Resources, Energy and Tourism.

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