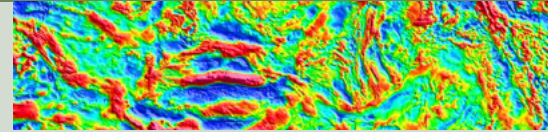




New Gravity Anomaly Map of the Australian Region

Improved coverage to encourage exploration for mineral and energy resources

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Geoscience Australia has recently released a new full-colour Gravity Anomaly Map of the Australian Region at a scale of 1:5 million. It is the third edition of the map and replaces the edition released in 1997. The new map will be a valuable tool for explorers providing new insights into Australia's mineral and energy potential.

Continental Australia has a basic gravity 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. Over the last ten years Australian, state and Northern Territory governments have funded exploration initiatives for the systematic infill of the continent at a grid spacing of 2, 2.5 or 4 kilometres to provide improved coverage in areas which are of scientific or economic interest.

The gravity grid used to create the new edition map was produced from 1.4 million onshore gravity stations which represents 600 000 more stations than was used for the 1997 edition. Many of these additional gravity stations have resulted from the government exploration initiatives mentioned above.

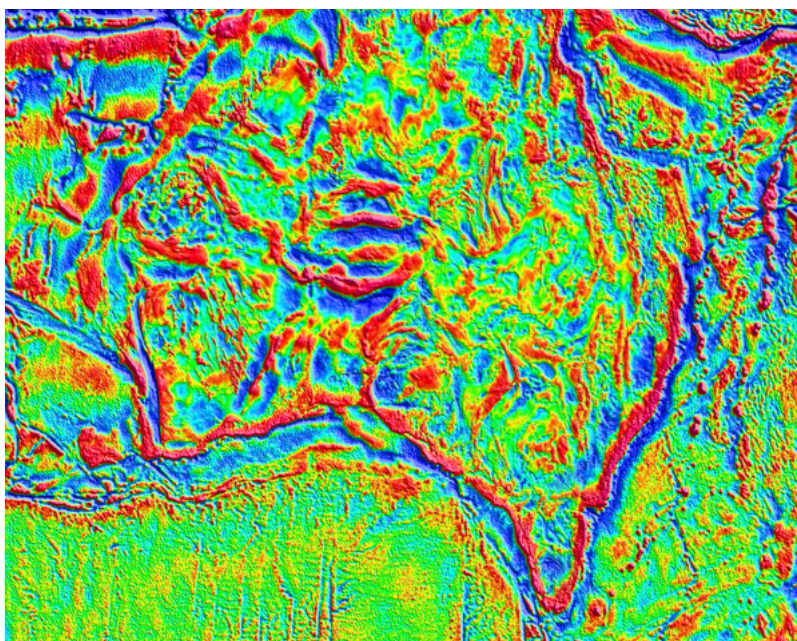


Figure 1. Section of the new Gravity Anomaly Map of Australia.

The new map covers the area from 8° S to 52° S and 100° E to 170° E. Data for the offshore region were extracted from the Marine Gravity from Satellite Altimetry dataset provided by Scripps Institution of Oceanography, California, United States of America.

The main image shows spherical cap Bouguer anomalies onshore and Free Air anomalies offshore after application to the original grid of a high-pass filter with a cut-off wavelength of 500 kilometres. To emphasize the expression of subtle anomalies, an artificial sun-angle 'illumination' from the northeast was used to modify both the saturation and intensity of the original colour image.

Gravity anomalies effectively show the density variations in the Earth's crust. High anomalies (red colours) indicate areas of above-average crustal density or a thinner crust (the crust is lighter than the underlying mantle); low anomalies (purple colours) indicate below-average crustal density or thicker crust. The depth of the crustal bodies having the anomalous density is indicated by the anomaly



wavelength: finer, sharper anomalies indicate shallower bodies while broader, diffuse anomalies indicate deeper bodies.

The gravity grid incorporates improvements made to the data in the Australian National Gravity Database (ANGD). In 2008 data in the ANGD were changed to the new Absolute Gravity Datum 2007 (AAGD07) which superseded the previous ISO GAL84 datum. This new gravity datum was the end result of several years work by Geoscience Australia in creating an absolute datum for the Fundamental Gravity Base Station Network. Other improvements to the ANGD involved the use of ellipsoid heights relative to the GRS80 ellipsoid instead of geoid ground heights, the closed form of the theoretical gravity formula, the closed form equation for the Bouguer correction and a second order approximation for the Free Air correction. These improvements were made to provide more accurate Free Air and Bouguer anomalies and to remove long wavelength errors from the gravity data introduced when using geoid heights in place of ellipsoid heights.

Copies of the map may be obtained from the Geoscience Australia Sales Centre. The gridded dataset can be downloaded free-of-charge in ER Mapper format from the Australian governments Geophysical Archive Data Delivery System (GADDS) download facility.

For more information

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References

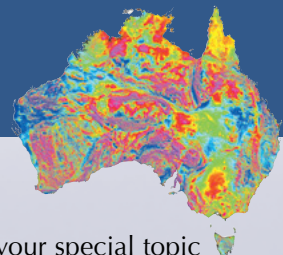
Tracey R, Bacchin M, & Wynne P. 2008. In preparation. AAGD07: A new absolute gravity datum for Australian gravity and new standards for the Australian National Gravity Database. Exploration Geophysics.

Related articles/websites

Gravity Anomaly Map of Australia
Geoscience Australia: Maps of Australia
Scripps Institution of Oceanography
topex.ucsd.edu/marine_grav/mar_grav.html
Geophysical Archive Data Delivery System (GADDS)
"GADDS" at www.geoscience.gov.au/gadds

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