

New gravity dataset will help unveil the Antarctic continent

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More than 50 scientists from research institutions in eight countries, among others Germany, UK, USA and Russia have been actively collaborating since 2003 to make this gravity data compilation possible, coordinated by Mirko Scheinert of Technische Universität Dresden, Germany.

Gravity anomalies are based on highly accurate measurements of the Earth's [gravity field](#) and are used in geodesy and geophysics to determine for example height measurements with respect to mean global sea level (geoid) and as a tool to probe deep into the Earth's interior. Detailed [gravity data](#) measurements have been collected over most of the globe augmented by recent satellite-derived missions. However, performing terrestrial [gravity](#) measurements has proven significantly more challenging in Antarctica due its extension, remoteness and thick ice sheet cover.

Over the last decade, in particular, the international research community has deployed aircrafts equipped with gravity meters to collect a huge amount of new gravity data over Antarctica. The latest gravity anomaly dataset is based on 13 million data points and covers an area of 10 million km², corresponding to 73% of the Antarctic continent (equal to the entire area of Europe).

Using these Antarctic gravity datasets new global models of Earth's gravity field with a resolution of up to 10 km can be constructed said Mirko Scheinert. Before we put together all the available terrestrial

Antarctic gravity data we had to rely mainly on lower resolution (ca 100 km) satellite observations to construct such models.

Fausto Ferraccioli from the British Antarctic Survey and a co-author of the study said: "what is exciting for me is that these data provide geoscientists with a new tool to investigate the deep structure of the least understood continent on Earth and study how subglacial geology and tectonic structures can influence the topography hidden beneath the Antarctic ice sheets. Gravity data, for example, can help us study the extent of subglacial sedimentary basins in both West and East Antarctica and estimate geothermal heat flux, which in turn can influence ice sheet dynamics".

Overall, the new dataset of gravity anomalies will therefore help improve our knowledge of the state and evolution of the Antarctic continent further underpinning current research to better understand Antarctica's role in climate change and [global sea-level](#) rise.

More information: M. Scheinert et al. New Antarctic Gravity Anomaly Grid for Enhanced Geodetic and Geophysical Studies in Antarctica, *Geophysical Research Letters* (2016). [DOI: 10.1002/2015GL067439](#)

Provided by Dresden University of Technology

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