



## **EIGEN-GL05C - A new global combined high-resolution GRACE-based gravity field model of the GFZ-GRGS cooperation**

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High-resolution global gravity field models play a fundamental role in geodesy and Earth sciences, ranging from practical purposes, like precise orbit determination, to scientific applications, like investigations of the density structure of the Earth's interior. In this contribution we present the latest EIGEN-model, EIGEN-GL05C (EIGEN = European Improved Gravity model of the Earth by New techniques), complete to degree and order 360 (corresponding to half-wavelength of 55 km), which was achieved jointly by GFZ Potsdam and GRGS Toulouse. As its precursor EIGEN-GL04C (released in March 2006) the model is derived from a combination of GRACE and LAGEOS satellite tracking data with surface gravity data; however, it is based on substantial changes and improvements compared to the previous model. EIGEN-GL05C incorporates a further extended GRACE and LAGEOS data set, covering almost the whole GRACE period from mid 2002 to end of 2007, but also newly available gravity anomaly data for Europe and Australia. New processing features are the complete reprocessing of the GRACE and LAGEOS data using the recent RL04 standards and background models in GFZ (mixed with the GRACE/LAGEOS processing in GRGS based on the 10-day model series) and a further extension of full normal equations from terrestrial data to maximum degree and order 260 (restricted to 179 for EIGEN-

GL04C). Another new topic investigated with EIGEN-GL05C is the estimation of secular and seasonal gravity variations for long and medium wavelengths simultaneously along with mean gravity coefficients; this may provide a simple a priori model of conventionally unmodeled gravity field variations, e.g., from hydrology or secular changes in the ice shields which become relevant in many geodetic and geoscientific applications.