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EIGEN-05C - A new global mean Gravity Field Model from Combination of Satellite Mission and Altimetry/Gravimetry Surface data

Ch. Förste (1), F. Flechtner (1), R. Schmidt (1), R. Stubenvoll (1), M. Rothacher (1), Jürgen Kusche (1), H. Neumayer (1), R. Biancale (2), J.-M. Lemoine (2), S. Loyer (3), F. Barthelmes (1), S. Bruinsma (2), R. König (1) and Ul. Meyer (1)

(1) GeoForschungsZentrum Potsdam, Dept. Geodesy and Remote Sensing (Telegrafenberg, D-14473 Potsdam, Germany, e-mail: foer@gfz-potsdam.de, fax: ++49 331 288 1169), (2) Groupe de Recherche de Geodesie Spatiale (18, avenue Edouard Belin, F-31055 Toulouse, France, e-mail: richard.biancale@cnes.fr, fax: ++33 5 61 253098), (3) Noveltis Toulouse

The new high-resolution global mean gravity field model EIGEN-05C is presented, which has been derived from the combination of GRACE and LAGEOS satellite tracking data with surface gravity data. This new EIGEN-model (EIGEN = European Improved Gravity model of the Earth by New techniques) is an outcome of the joint data processing activities at GFZ Potsdam and GRGS Toulouse. The basis for the long-wavelength components of this combined model are the latest results of the satellite data processing of both teams, i.e. an update of the EIGEN-GL04S model from GRGS Toulouse and the new EIGEN-GRACE05S model from GFZ Potsdam, the latter obtained from a new GRACE data processing release. These satellite-based data were combined with various surface gravity data sets, some of them new available. For instance, the latest Mean Sea Surface generated at GFZ Potsdam from global altimetry missions was included. The combination with the satellite data was carried out on the basis of full and block-diagonal normal equations to derive a global gravity field model, combining the high precision and homogeneity of the satellite data in the long- to medium-wavelength part with the short-wavelength resolution of the surface data. Furthermore, a special band-limited combination technique was applied to obtain a smooth transition in the wavelength band inferred from satellite-only data to those inferred from surface data. Compared with former EIGEN-models, the extent of the full normal equations from the surface gravity data was increased up to degree/order

240. The estimated Earth gravity field parameters of EIGEN-05C are of a resolution corresponding to a half-wavelength of 55 km and degree/order 360, respectively.