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A mean global gravity field model from the combination of satellite mission and altimetry/gravimetry surface data

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High-resolution global mean gravity field models can be derived from the combination of satellite tracking and surface data. With the CHAMP and GRACE satellite missions, a new generation of such global gravity field models became available. At GFZ Potsdam and GRGS Toulouse, CHAMP- and GRACE-based global gravity models of high resolution are routinely produced in the framework of the EIGEN processing activities (EIGEN = European Improved Gravity model of the Earth by New techniques). Here the latest results of a new generation of gravity model products, labeled EIGEN-04, are presented. These models were obtained from the processing of GRACE, CHAMP and SLR satellite tracking data and are compared with outcomes of former analyses. The satellite-based gravity field parameters are the result of a substantial satellite data reprocessing, based on recently improved processing standards and models. On the other hand, surface gravity data derived from altimetry and gravimetry are globally available, providing a higher resolution than pure satellite data but lacking the high precision in the long-wavelength part. The satellite-based data are combined with partially newly processed surface gravity data sets on the basis of normal equations to derive a global high-resolution gravity field model, combining the high precision and homogeneity in the long- to medium-wavelength part from the satellite data with the short-wavelength resolution of the surface data. The obtained Earth gravity field parameters are an update of former EIGEN models of a resolution corresponding to a

wavelength of 100 km and degree/order 360, respectively.