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Titel des Beitrags: Satellite gravity gradient grids for geophysics

Abstract: The Gravity field and steady-state Ocean Circulation Explorer (GOCE) satellite aimed at determining the Earth’s mean gravity field. GOCE delivered gravity gradients containing directional information, which are complicated to use because of their error characteristics and because they are given in a rotating instrument frame indirectly related to the Earth. We compute gravity gradients in grids at 225 km and 255 km altitude above the reference ellipsoid corresponding to the GOCE nominal and lower orbit phases respectively, and find that the grids may contain additional high-frequency content compared with GOCE-based global models. We discuss the gradient sensitivity for crustal depth slices using a 3D lithospheric model of the North-East Atlantic region, which shows that the depth sensitivity differs from gradient to gradient. In addition, the relative signal power for the individual gradient component changes comparing the 225 km and 255 km grids, implying that using all components at different heights reduces parameter uncertainties in geophysical modelling. Furthermore, since gravity gradients contain complementary information to gravity, we foresee the use of the grids in a wide range of applications from lithospheric modelling to studies on dynamic...
topography, and glacial isostatic adjustment, to bedrock geometry determination under ice sheets.