Grids of GOCE gravitational gradients for geophysical applications

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In this study we provide global high-resolution grids of gravitational gradients derived from GOCE observations at mean GOCE orbital as well as near-ground altitudes. Equiangular 10 arc-min gradient grids based on GOCE L2 TRF reprocessed data from a period of 2009-13 (August) were especially developed within an ESA STSE GOCE+ project for regional geophysical applications as their signal is less constrained than that synthesized from global gravitational models given in terms of spherical harmonics. Because the GOCE orbital altitude was lowered during 2012-13 for about 30 km, the whole data set was split into two groups that refer to two different reference (mean orbital) altitudes. With gradient data reduced to the mean orbital altitude, we applied the iterative downward continuation based on the spherical Poisson integral equation. The contribution also reviews basic features of gradient data processing steps and compares the gradient grids with both recent spherical harmonic global gravitational models and available crust data. The noise and frequency content of the gradient data at different altitudes are discussed.