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Comparing grids of observed GOCE gravitational gradients with modeled GOCE gravitational gradients

Michal Šprlák (1), Pavel Novák (1), Milos Vaľko (1,2), Josef Sebera (1,3)

(1) New Technologies for Information Society, Faculty of Applied Sciences, University of West Bohemia, Plzeň, Czech Republic, (2) Research Institute of Geodesy, Topography, and Cartography, Zdiby, Czech Republic, (3) Astronomical Institute, Academy of Sciences of the Czech Republic, Ondřejov, Czech Republic

The satellite gravitational gradiometry mission GOCE provides, among other data products, gravitational gradients that are used for estimation of global gravity field models. For several geo-scientific applications, however, gravitational gradients in a form of regular grids are much more convenient. These may be computed either by interpolating observed gravitational gradients or by spherical harmonic synthesis of geopotential coefficients within global gravity field models.
In this study, differences between values of observed gravitational gradients interpolated to regular grids and gravitational gradients synthesized from the latest geopotential coefficients are analyzed. Different signal contents may be involved in regular grids of gravitational gradients evaluated by the two approaches. This is because part of a valuable signal may be lost either in the interpolation procedure or in spherical harmonic analysis of observed gravitational gradients. The analysis of the differences is performed over several geographic areas and at different altitudes above the Earth's surface.