



On the differences and compatibility of global and GOCE-based models of the gravity field of the Earth

P. Holota (1) and O. Nesvadba (2)

(1) Research Institute of Geodesy, Topography & Cartography, Department of Geodesy and Geodynamics, Zdiiby 98, Czech Republic (holota@pecny.asu.cas.cz, 00420 284890056), (2) Land Survey Office, Pod Sídlištěm 9, 182 11 Praha 8, Czech Republic

Global models of the gravity field of the Earth that involve terrestrial measurements and GOCE-based gravity field models represent two different sources of information on the gravity field of the Earth. The aim of this paper is to focus on their combination. The problem has an essential tie to potential theory and it is not difficult to realize that by nature it is an overdetermined problem. Therefore, methods typical for the solution of boundary-value problems of potential theory will be applied together with an optimization approach, target function and regularization techniques. The aim also is to demonstrate the effect of the two different data sources on the resulting solution and to show its spectral and space domain interpretation. In particular, the use of gravity field information contained in satellite-only models of the gravity field of the Earth or alternatively in GOCE gradiometric data in common with terrestrial gravity measurements is discussed in the paper. The compatibility of these two different data sources is given a considerable attention. The theoretical background outlined above is applied and compatibility indicators are defined. Subsequently numerical tests confronting data derived from EGM2008 and from the latest release of GOCE-based gravity model are performed. Results of this analysis are summarized and interpreted.