



Downward continuation of second radial derivative of disturbing potential – application for GOCE mission

J. Janak, M. Sprlak and K. Mikula

Slovak University of Technology, Bratislava, Slovakia (janak@svf.stuba.sk, tel.: +421-2-59274537, fax.: +421-2-52925476)

A gradiometer onboard the GOCE satellite will measure the full gravitation tensor at the altitude about 250 km above the sea level. For several applications, e.g. regional gravity field modelling or external calibration/validation of the GOCE data, it is convenient or even necessary to downward continue the measured data down to the earth surface or to the geoid. A procedure based on solution to the inverse Dirichlet boundary-value problem has been developed and first results have been presented at the 3rd GOCE User Workshop, 2006. This contribution is an extension of our study, mainly in regularization of the unstable downward continuation process. The main principle of regularization is based on smoothing the field of second radial derivative of disturbing potential. This can be achieved by removing the topographic-isostatic effect from the measured data. Then the downward continuation process is performed and finally the topographic-isostatic effect can be restored back at the ground or other chosen level. The behaviour of topographic-isostatic effect on second radial derivative of disturbing potential is also studied and discussed.