Geophysical Research Abstracts
Vol. 13, EGU2011-12631, 2011
EGU General Assembly 2011

Empirical test of optimal geometry of boundary value problem domain for regional applications using GOCE measurements

Juraj Janák (1), Janka Gírethová (2), Martin Pitoňák (1), and Zuzana Fašková (2)

(1) Slovak University of Technology, Department of Theoretical Geodesy, Bratislava, Slovakia (juraj.janak@stuba.sk), (2) Slovak University of Technology, Department of Mathematics and Descriptive Geometry, Slovakia

Ellipsoidal heights of original GOCE measurements vary within the several tenths of kilometers. It depends mostly, but not solemnly, on latitude as the GOCE orbit is approximately circular. Moreover, ascending and descending orbital arcs of GOCE orbit show a different behavior. Thus also the neighboring measurements belonging to different orbit arcs can manifest large differences in ellipsoidal height. The surface constructed from original location of GOCE measurements is therefore very rough and possess a typical pattern reflecting the GOCE orbit. Such a surface is not convenient for construction of boundary value problem (BVP) and it is necessary to continue measurements up or down into certain fixed ellipsoidal height. Our experiment is focused on determination of optimal fixed height of the upper boundary of computation domain where the BVP is solved. Two different type of testing is performed. The first testing is based on simulated regular boundary data generated from global gravity model EGM2008. The finite element method solution is applied for different domains and compared to the reference values within the overlapping part of the particular domains. The second testing is based on downward continuation of real GOCE data. The condition numbers of normal equation matrix are compared for different levels of continuation.