

Preparation of GOCE data for regional gravity field modelling

Juraj Janák, Martin Pitoňák
Department of Theoretical Geodesy¹

Abstract: The GOCE first satellite gradiometry mission was launched in March 2009. The first measurement phase started in autumn 2009. The first GOCE Level 1b data has been available for users since April 2010 and GOCE Level 2 since July 2010.

In our contribution we describe the first steps that are necessary to perform in order to prepare the GOCE data for the gravity modelling in a particular region. The aim is to prepare the data suitable for boundary condition for the geodetic boundary value problem. First we shortly describe the transformation between particular reference frames. Having the data in a Local North-Oriented Frame (LNOF), we can compute the disturbing gravity tensor applying the normal gravity field. Next, we deal with the transformation between the Cartesian and spherical components of the disturbing gravity tensor. Consequently, a downward continuation and transformation into gravity anomaly can be performed applying the inverse problem, see (Janák et al., 2009), based on derivatives of the Pizzetti integral formula (Pizzetti, 1911). Solving the inverse problem it is possible to obtain the gravity anomalies on a spherical surface from each component of the disturbing gravity tensor. Various aspects and problems connected with the above described steps are discussed.

Key words: GOCE, gravity field modelling, normal gravity field, disturbing gravity tensor, downward continuation

References

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¹ Department of Theoretical Geodesy, Faculty of Civil Engineering, Slovak University of Technology, Radlinského 11, 813 68 Bratislava, Slovak Republic, e-mail: juraj.janak@stuba.sk, martin.pitonak@stuba.sk