Geophysical Research Abstracts
Vol. 12, EGU2010-7103-3, 2010
EGU General Assembly 2010

Gravitational tensor in the GOCE reference frame by direct harmonic synthesis

Josef Sebera (1,2,3), Carl A. Wagner (6), Aleš Bezděk (2), Johannes Bouman (3), Jaroslav Klokočník (2), Jan Kostelecký (1,5), Pavel Novák (4,5)

(1) Department of Advanced Geodesy, Czech Technical University, Prague, Czech Republic (josef.sebera@fsv.cvut.cz), (2) Astronomical Institute, Academy of Sciences of the Czech Republic, Ondřejov, Czech Republic (jklokocn@asu.cas.cz, bezdek@asu.cas.cz), (3) Deutsches Geodätisches Forschungsinstitut (DGFI), Munich, Germany (bouman@dgfi.badw.de), (6) Laboratory for Satellite Altimetry, NOAA, Silver Spring, USA (Carl.Wagner@noaa.gov), (5) Research Institute for Geodesy, Topography and Cartography, Zdiby, Prague, Czech Republic (kost@fsv.cvut.cz), (4) Department of Mathematics, Faculty of Applied Sciences, University of West Bohemia, Plzeň (Pilsen), Czech Republic (pavel.novak@pecny.cz)

The first realisation of satellite gradiometry, ESA's satellite GOCE, successfully collects a new type of observation, i.e. all components of the gravitational tensor measured by six accelerometers (Electrostatic Gravity Gradiometer). The relevant data processing will be a very demanding task. It includes (among others) many steps with a large number of equations and unknowns, where the complexity can be roughly described by the amount of observations and the satellite altitude. A quick look into the quality of the measured values and their reliability can be also provided by using an a priori gravity field model to synthesize the tensor measurements. Since the observations are measured in the GOCE reference frame with measured orientation parameters, generated values have to be rotated from the conventional frame (Earth-Fixed System, Local North Oriented Frame) to the GOCE reference frame. Here we compare the conventional formulas for gravity gradients and direct harmonic synthesis using rotated base functions according to Hotine's formalism.