Geophysical Research Abstracts
Vol. 20, EGU2018-15106, 2018
EGU General Assembly 2018

Absolute calibration of relative gravity meters in tidal range

Márta Kis (1), András Koppán (1), Gábor Papp (2), Judit Benedek (2), Krisztián Baracza (3), László Szabados (1), András Csontos (1), and Bruno Meurers (4)

(1) Mining and Geological Service of Hungary, Budapest, Hungary (kis.marta@mbfsz.gov.hu), (2) Geodetic and Geophysical Institute, Research Centre for Astronomy and Earth Sciences, Hungarian Academy of Sciences, Sopron, Hungary (papp.gabor@csfk.mta.hu), (3) University of Miskolc, Department of Geophysics, Research Institute of Applied Earth Sciences, Miskolc, Hungary (gfkrixi@uni-miskolc.hu), (4) University of Vienna, Department of Meteorology and Geophysics, Vienna, Austria (bruno.meurers@univie.ac.at)

During absolute calibration a huge mass is vertically moving around the equipment, generating gravity variations. The effect of the moving mass can be precisely calculated from the known mass and geometrical parameters. The scale factor of relative gravity meters can be determined by comparing the theoretical and the measured signal.
Previously authors introduced a method for absolute calibration of LCR gravity meters (with and without feed-back system), applying 1 Hz sample rate and continuous movement of the mass. The construction and measurement method of Scintrex (CG-5) relative gravity meter significantly differ from LCR's, therefore the application of this method is restricted (or impossible). For the fine calibration of these instruments (in tidal range) authors have worked out a new calibration process, taking into consideration of the features of Scintrex instruments. To our knowledge this is the very first experiment for the absolute calibration of Scintrex CG-5. Authors carried out the calibration of Scintrex CG-5 equipments of University of Vienna (Austria) and the University of Miskolc (Hungary).
For the experiments authors applied the moving mass calibrating device (with a cylindrical ring of 3200 kg mass) in the Mátyáshegy Gravity and Geodynamical Observatory Budapest. The maximum theoretical gravity variation produced by the vertical movement of the mass is ab. 110 microGal, so it provides excellent possibility for the [U+FB01]ne calibration of gravimeters in the tidal range.
Magnetic experiments were also carried out on the pillar of the calibration device as well, in order to analyse the magnetic effect of the moving stainless steel-mass. According to the magnetic measurements, a correction for the magnetic effect has been applied on the measured gravimetric data series, depending on the sensitivity of the instruments. In the case of LCR gravity meters with metal spring the magnetic effect of the steel mass can influence the measurements. Systematic tests of Scintrex CG-5 to significant magnetic field changes (magnetic sensitivity) have been performed first by the authors.