Geophysical Research Abstracts
Vol. 19, EGU2017-17225, 2017
EGU General Assembly 2017

Determination of beam-position dependent transfer functions of LCR-G gravimeters by means of moving mass calibration device in the Mátyáshegy Gravity and Geodynamical Observatory, Budapest

András Koppán (1), Márta Kis (1), László Merényi (1), Gábor Papp (2), Judit Benedek (2), and Bruno Meurers (3)

(1) Geological and Geophysical Institute of Hungary, Budapest, Hungary (kis.marta@mfgi.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 Vienna, Department of Meteorology and Geophysics, Wien, Austria (bruno.meurers@univie.ac.at)

In this presentation authors propose a method for the determination of transfer characteristics and fine calibration of LCR relative gravimeters used for earth-tide recordings, by means of the moving-mass gravimeter calibration device of Budapest-Mátyáshegy Gravity and Geodynamical Observatory. Beam-position dependent transfer functions of four relative LCR G type gravimeters were determined and compared.
In order to make these instruments applicable for observatory tidal recordings, there is a need for examining the unique characteristics of equipments and adequately correcting these inherent distorting effects. Thus, the sensitivity for the tilting, temporal changes of scale factors and beam-position dependent transfer characteristics are necessary to be determined for observatory use of these instruments.
During the calibration a cylindrical ring of 3200 kg 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 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 was applied on the measured gravimetric data series.
The calibration process is aided by intelligent controller electronics. A PLC-based system has been developed to allow easy control of the movement of the calibrating mass and to measure the mass position. It enables also programmed steps of movements (waiting positions and waiting times) for re[U+FB01]ned gravity changes. All parameters (position of the mass, CPI data, X/Y leveling positions) are recorded with 1/sec. sampling rate. The system can be controlled remotely through the internet.
Authors wish to express their thanks to OTKA (Hungarian Scientific Research Fund) for their support (OTKA-K101603, OTKA K109060).