



Moving-mass gravimeter calibration in the Mátyáshegy Gravity and Geodynamical Observatory (Budapest)

Márta Kis, Andras Koppán, Péter Kovács, and László Merényi

Geological and Geophysical Institute of Hungary, Earth Physics, Budapest, Hungary (kis.marta@mfgi.hu)

A gravimeter calibration facility exists in the Mátyáshegy Gravity and Geodynamical Observatory of Geological and Geophysical Institute in Hungary. 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 main target of the calibration device was to reach a relative accuracy of 0.1-0.2% for the calibration of Earth-tide registering gravimeters. The maximum theoretical gravity variation produced by the vertical movement of the mass is ab. 110 microGal, so it provides excellent possibility for the fine calibration of gravimeters in the tidal range.

The instrument was out of order for many years and in 2012 and 2013 it was renovated and automatized. The calibration process is aided by intelligent controller electronics. A new 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 refined 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.

As it is well known that variations of the magnetic field can influence the measurements of metal-spring gravimeters, authors carried out magnetic experiments on the pillar of the calibration device as well, in order to analyze the magnetic effect of the moving stainless steel-mass. During the movements of the mass, the observed magnetic field has been changed significantly. According to the magnetic measurements, a correction for the magnetic effect was applied on the measured gravimetric data series.

In this presentation authors show the facility in details and the numerical results of tests carried out by applying LCR G gravimeters.