



GRAVITY CHANGES RELATED TO VERTICAL CRUSTAL MOTIONS AT METSÄHOVI, FINLAND

H. Virtanen (1), J. Ahola (1)

(1) Finnish Geodetic Institute (heikki.virtanen@fgi.fi/Fax: +358929555211)

We present results on vertical crustal motion as seen in the gravity data of the superconducting gravimeter GWR T020 at Metsähoivi station for years 1994 Ő 2002. We have associated temporal height variations with the loading effects of the atmosphere and of the nearby Baltic Sea at the distance of 15 km. The refined, tide-free gravity data have been corrected for local hydrological effects, such as groundwater level changes. Theoretical loading calculations using appropriate GreenŐs functions are performed for both vertical motion and gravity and the modelled gravity is compared with a large amount of observational data. For Baltic Sea loading effects we have used data of the nearest tide gauge in Helsinki at the distance of 30 km as well as data of several tide gauges around the Baltic. The loading by atmosphere has been computed using a detailed surface pressure field from HIRLAM (High Resolution Limited Area Model) for North Europe. The gravity data are congruent with loading calculations. The loading effect of the Baltic Sea can exceed 10 mm and the deformation by atmosphere 25 mm. However, the effects partly oppose each other. The gravity station is co-located with a permanent GPS station. We show comparisons between variation in GPS height and in gravity observations for some shorter periods. We discuss the results of the loading calculations and achieved improvements in gravity residuals.