

Hydrological Investigation at Selected Stations with Superconducting Gravimeter

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The superconducting gravimeter is used for the observation of gravity variation. Local and global scale hydrological effect is one of the major sources of the variation. Understanding the impact of the hydrosphere on gravity allows studying the essential geodynamical signal, which might be masked by hydrological variation. Three stations with superconducting gravimeter, namely Conrad, Pecný and Vienna, are analyzed with respect to the hydrological effect on gravity. Effect of global hydrology is studied using several global hydrological models. Thereby, significant differences were found between different hydrological models. The effect of local hydrology is analyzed using in-situ meteorological measurements. These measurements are used for the modelling of soil moisture and its effect on gravity at the Vienna station. This approach allows the calibration of the soil moisture model using gravity measurements and thus can lead to the gravity data assimilation in hydrology. In-situ measurements of soil moisture as well as groundwater level are used for the estimation of the hydrological effect on gravity at the Pecný station. Due to the location of the station in mountain area, the gravity variation analysis at the Conrad observatory is focused on the effect of snow. Calculated hydrological corrections lead to a reduction of the gravity variation observed at mentioned stations.

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