



Hydrology in Central Europe - a Comparison Between Data from the GRACE Satellite Mission and Ground Superconducting Gravimeters

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The surface gravity field is subject to many influences of mass redistribution within the Earth system, operating at the microgal (10^{-8} m s^{-2}) level and at timescales from minutes to years. We include deformation within the Earth (tides, polar motion), motions within the atmosphere (local, regional, and global loading; also mass attractions), the oceans (non-tidal currents), and near-surface hydrology derived from rainfall (local, regional, and global contributions). In central Europe a network of 7 superconducting gravimeters (the only instrument with the required resolution for this type of work) has been operating for many years, recording variations at the sub-microgal level. Hydrology is the largest component in the un-modelled residual signal, most of which comes from an area within a few hundred m of the instrument. We use data from 2002-2007 to construct a regionalized ground gravity data set that is analyzed by Principal Component (EOF) analysis to extract the predominantly seasonal signal common to all stations. This we compare with the GRACE-derived field using solutions from GFZ Potsdam, CSR Texas, and GRGS Toulouse. There is very good agreement on the phase of the two different types of data, but the amplitude of the ground signal is complicated by the local hydrology around several of the stations, which is both above and below the instrument. We show our most recent analysis and compare the results with the GLDAS global hydrology model from NASA.