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Water storage models for Finland compared with GRACE and the time series of a superconducting gravimeter

H. Virtanen (1), M. Bilker-Koivula (1), J. Mäkinen (1), M. Tervo (1), J. Virtanen (1), B. Vehviläinen (2), M. Huttunen (2), R. Mäkinen (2)

(1) Finnish Geodetic Institute, (2) Finnish Environment Institute

We use the highly accurate hydrological model for Finland, the Watershed Simulation and Forecasting System (WSFS) of the Finnish Environment Institute, and the global models CPC and GLDAS. They are compared with variations in the regional gravity field from monthly GRACE solutions. As an independent dataset we have used the record of the superconducting gravimeter (SG) at Metsähovi. SG gravity residuals are strongly correlated with local groundwater level and with the total water storage in Finland. A key question for the SG observations is the separation of the attraction of near-field water storage from the loading effect of the regional water storage, as the two are strongly correlated and the size of the former depends on very local hydrogeology around the SG. We have used observations of local groundwater, precipitation, soil moisture and model calculations to correct the local gravity effect. In addition, variation in the level of the Baltic Sea influence the GRACE and SG datasets.