The superconducting gravimeter (SG) no. T020 has been operating continuously at Metsähovi since August 1994. After corrections for known time-variable gravity effects, such as tides, atmosphere and the Baltic Sea, the gravity residual (8 microgals peak-to-peak 1994–2010) mostly comes from variation in terrestrial water storage. The hydrological effects in gravity are generated (1) by the attraction of local water storage in the fractures of the crystalline bedrock, (2) by the attraction of local water storage in sediments, (3) by the attraction of local snow on the ground and on the laboratory roof, and (4) by the loading and attraction by regional and global water storage. If we want to use the record of the SG for discriminating between different regional/continental hydrological models, or for validating GRACE observations, physical modelling of the effects (1,2,3) is required.

Since 1994 the station is equipped with two borehole wells in the crystalline bedrock. The station stands on bedrock and surrounding sediments are thin (0.2 to 4 meters) but geologically quite complex. In 2006 two arrays of Time Domain Reflectometer sensors of soil moisture were installed by the Finnish Environment Institute. In 2008–2009 we installed more sensors in the sediments: ten capacitive arrays for soil moisture, a 20 x 20 meter grid of 21 x 21=441 probes for soil resistivity, 5 access tubes for radiometric measurement of soil moisture and density, 11 tubes for groundwater. We assess the local hydrology using these sensors, and present preliminary joint modelling of the effects (1–4).