Mass variations of the Baltic Sea and atmosphere observed with new superconducting gravimeters at Metsʹahovi 2016 - 2017

Heikki Virtanen*[1], Maaria Nordman[1], and Arttu Raja-Halli[1]

[1]Finnish Geospatial Research Institute, National Land Survey (FGI) – Finland

Abstract

Known loading effect of the Baltic Sea was studied with superconducting gravimeter T020 in 1994-2016. Gravity effect can be up to 30 nms-2 and vertical motion 10 mm. In earlier studies we have exploited single tide gauges together with local airpressure and HIRLAM grids.

The new superconducting gravimeters iGrav013 and iOSG022 were installed in Metsʹahovi in 2016. We have modelled the surface of the Baltic Sea into hourly grids using about 30 tide gauges. Stations are located around the shores and the data is downloaded from BOOS and Finnish Meteorological Institute web portals.

We have used SPOTL program package for calculating gravity effect and vertical loading. For atmospheric contribution we have used local airpressure and global services by ATMACS and EOST. Cleaned gravity data were corrected by local tidal mode and also for drift. In addition, hydrological corrections were applied.

Gravity residuals were compared to surface models and different airpressure corrections. We have also used some single tide gauge data to see how the surface models perform.

We present as results standard deviations of time series with different combinations. Some special cases are shown with detailed plots.

*Speaker