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Observing absolute gravity change in the Fennoscandian postglacial rebound area

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Absolute gravity measurements in the Fennoscandian postglacial rebound area started already in 1976 when a team from Istituto di Metrología "G. Colonnetti" (Torino) measured six stations with the rise-and-fall gravimeter IMGC (Cannizzo et al., 1978). In 1980 two stations were measured by the team of the AN SSSR from Novosibirsk, using the gravimeter GABL (Arnautov et al., 1982). From the beginning the goal was to establish reference values for future remeasurement in order to detect gravity change due to the postglacial rebound. The maximum uplift rates are 1 cm/yr, which implies a surface gravity change of about -2 microgal/yr. In 1988, regular repeat measurements were began by the Finnish Geodetic Institute (FGI) with the JILAg-5. An important advance was the introduction of FG5 gravimeters into the work by BKG (Frankfurt a/M) and NOAA (Boulder, CO) in 1993.

In 2003 annual large-scale campaigns with FG5 gravimeters started, coordinated by the Working Group for Geodynamics of the Nordic Geodetic Commission (NKG). This was prompted by the launch of the GRACE satellite gravity mission, which made it important to collect a comprehensive set of ground-truth values of gravity change during the lifetime of the satellite pair. The initial participation by gravimeter teams of Leibniz Universität Hannover, FGI and BKG has since expanded to include the University of Life Sciences (Ås, Norway) and Lantmäteriet (Gävle, Sweden). At present some 50 sites have repeated absolute measurements and most of them are co-located with continuous GPS.

We give an overview of the sites, instrumentation and campaigns, and show examples of results achieved so far.