Gravity change from repeated absolute measurements in Estonia, Latvia and Lithuania 1994-2008

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Estonia, Latvia, and Lithuania belong to the margin of the Fennoscandian postglacial rebound (PGR) area. Vertical rates predicted by PGR models are in the range 0 to +3 mm/yr. Our first absolute gravity campaigns in the area were performed with the JILAg-5 gravimeter in 1994-1995 when three stations were measured in each country. All three stations in Lithuania were repeated with the JILAg-5 in 2002 and one of them (Vilnius) with the FG5#221 gravimeter in 2007. In Latvia one station (Riga) was remeasured with the FG5#101 and FG5#107 (D. Stizza, NIMA) in 1986 and with the FG5#221 in 2007. In Estonia two of the stations (Suurupi and Töravere) were remeasured with the FG5#220 in 2007 and with the FG5#221 in 2008, the third (Kuressaare) was only remeasured in 2008 with the FG5#221. This amounts to seven repeated stations with time spans of 8-13 years.

In interpreting gravity change, special attention must be paid to subsurface water storage, as (due to inaccessibility of crystalline bedrock) many stations are on thick sediments, the repeat measurements were partly made in different seasons, and in some cases there is evidence of strong interannual variation in hydrology. We discuss the constraints to PGR implied by the observed gravity change and compare it with PGR models and with available observations of vertical motion.