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Geodynamics at Ås - an annual report 2004-2005.

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Geodynamic phenomena are studied by both geometrical and physical observing techniques by members of the geodesy group at Ås. In the past year, time series analyses of VLBI and GPS data have been analyzed to understand why different techniques give different station motions. Possible contributors to the observed differences may be atmospheric effects, instrumental and system effects, and/or different realizations of global terrestrial reference systems. A particular study by Oddgeir Kristiansen, Bjørn Ragnvald Pettersen, and graduate student Liv Trongmo focuses on Ny-Ålesund, where data from two GPS-stations and the VLBI-facility are intercompared. Time series of baselines from other VLBI/GPS-sites are analyzed to avoid problems with reference frames. Precise point positioning of GPS-stations with a variety of elevation cut-off angles were also made using ITRF 2000. Differences between instruments and techniques are particularly large in the uplift rate, but quite noticeable also in the horizontal velocity components of Ny-Ålesund.

A gravity laboratory was established at Ås with the assistance of Institut für Erdmessung, Universität Hannover, who visited with their FG5-220 in March 2004. We received our own instrument (FG5-226) from the manufacturer in April 2004. Following initial testing and verification of the instrument, five persons at Ås received basic training in operating FG5-226. As part of a field verification program, observations were made at Hønefoss, Trysil, Trondheim, and Ålesund by Ove Christian Dahl Omang, Bjørn Ragnvald Pettersen, and Jon Glenn Gjevestad Svendsen. Although site results compared acceptably with earlier measurements by others, we noticed odd behavior and episodically larger scatter than expected. During test runs at Ås to investigate further, the drive belt in the vacuum chamber broke. After consulting with the manufacturer it was replaced by us and FG5-226 was taken to Onsala by Dagny Lysaker and Jon Glenn Gjevestad Svendsen for comparison with FG5-220 and FG5-221 in October 2004. Again results compared fine, but the scatter of FG5-226 was much larger than the other instruments. Smøgen was measured by Lysaker and Andreas Engfeldt of the National Land Survey of Sweden, and Stavanger was visited by Svendsen and Pettersen in November 2004. We received logistics support and access to the gravity stations of the Norwegian Mapping Authority throughout this activity. In Onsala and Smøgen we received assistance by the National Land Survey of Sweden.

FG5-226 was sent air-cargo to the manufacturer in March 2005 for service and repair. It has been a time consuming experience to search for the source of the problems. Some moving parts of the dropping changer have been replaced by the manufacturer. The instrument is expected to return to Norway in late May, when it will begin its 2005 observing campaign.