Absolute gravimetry at UMB in 2008 – preliminary results obtained with FG5-226

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Abstract
We review the field observation campaigns with the absolute gravimeter FG5-226 in Norway and Sweden in 2008. Instrument comparisons were made at Trysil, Norway (with FG5-233), and Onsala, Sweden (with FG5-220). Observations were made at Arjeplog, Hønefoss, Kautokeino, Kiruna, Onsala, Smøgen, Stavanger, Tromsø, Trondheim, Trysil, Østersund, Ålesund, and Ås. The standard deviations are typically ±2μGal. Special modeling of ocean tide loading has improved the errors at some coastal sites.

Introduction

FG5-226 has continued the time series begun in 2006 throughout 2008 for both Trysil and Ås in preparation for comparison with time series results with GRACE, and to investigate seasonal effects on gravity results. Field campaigns were carried out in Norway and Sweden in July-November. FG5-226 was compared to FG5-233 at Trysil in April and to FG5-220 at Onsala in August. Verification measurements were made at Ås before and after the campaigns.

Observations

Table 1 lists the observing dates and other information for each site. The campaign in July included stations separated by about one day of driving, except from Trondheim to Tromsø where the instrument and the van was shipped by the coastal liner.

Supplementing ground water measurements were made at Tromsø and Trysil. Most sites lack ground water wells altogether. The coastal sites are near tide gauges.

Each site occupation generated between 1000 and 4000 observations (Table 1). Each occupation consisted of 2-3 runs, mostly of duration 24 hours. Hourly or half-hourly data sets consisted of 50 or 100 drops.

The rms-scatter around the mean is typically ±1-3 μGal. This value reflects the instrumental noise at the site and the effects of subjective operator alignments between each run. Occational time series have larger rms-values. They are often due to insufficient modelling of ocean tide loading at coastal sites. This is directly identifiable from the observed time series.

Table 1. Observing log.

Site	Date	No. of obs	precision [µGal]	Observer
Ås	2008 Jan 28	1192	± 2.6	JGG
Ås	2008 Feb 04	1190	± 2.5	KB
Trysil-AC	2008 Feb 13	1191	± 1.6	KB
Ås	2008 Feb 21	1185	± 3.3	JGG
Trysil-AC	2008 Mar 12	1184	± 2.4	KB
Ås	2008 Mar 28	1192	± 2.2	JGG
Trysil-AB	2008 Apr 03-05	3574	± 1.5	BRP
Trysil-AC	2008 Apr 06	1987	± 1.2	BRP
Trysil-AC	2008 Apr 21	291	± 0.7	KB
Ås	2008 May 15-16	2053	± 1.8	JGG, KB
Trysil-AC	2008 May 22	1230	± 1.8	KB
Trysil-AC	2008 Jun 11	1173	±2.3	KB
Ås	2008 Jun 25	1090	± 2.1	KB
Trondheim-AA	2008 Jun 30	3124	± 2.7	KB
Tromsø-A	2008 Jul 07-09	3353	± 2.7	KB, OCDO
Kautokeino	2008 Jul 10-12	1932	± 3.1	KB, BRP
Kiruna	2008 Jul 12	1525	± 2.3	BRP
Arjeplog	2008 Jul 14-16	1279	±2.4	BRP, CG
Østersund	2008 Jul 16-17	989	± 2.5	BRP
Trysil-AC	2008 Jul 17-19	1192	± 2.9	BRP
Hønefoss	2008 Jul 21-22	2243	± 2.6	BRP
Ås	2008 Jul 23-24	2371	± 2.3	BRP, KB
Ås	2008 Aug 12-13	1881	± 3.8	KB, CG
Onsala-AN	2008 Aug 17-19	2321	± 3.5	CG
Onsala-AS	2008 Aug 19-20	1197	± 3.0	CG
Smøgen	2008 Aug 20-22	1882	± 3.5	CG, BRP
Ås	2008 Aug 23-24	2341	± 3.0	CG
Trysil-AC	2008 Aug 28	1232	± 2.6	KB
Ås	2008 Sep 12-13	2378	± 2.7	KB
Ålesund	2008 Sep 22-25	5790	± 2.7	KB
Ås	2008 Oct 03-04	2394	± 2.8	CG
Ås	2008 Oct 23	1294	± 2.7	CG
Ås	2008 Oct 31	1194	± 3.0	CG
Stavanger	2008 Nov 12-13	2795	± 2.5	CG, KB

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