NORDISKA KOMMISSIONEN FÖR GEODESI

Minutes of the 27th meeting of the Working Group for Geodynamics within the Nordic Geodetic Commission

Kort og Martikelstyrelsen, Copenhagen April 29, 2003

Participants:

René Forsberg	Denmark
Gabriel Strykowski	
Klaus Schmidt	
S Abbas Khan (first part)	
Jaakko Mäkinen	Finland
Björn Engen	Norway
Björn Ragnvald Petersen	
Ove Christian Dahl Omang	
Hans-Georg Scherneck	Sweden
Andreas Engfeldt	
Mikael Lilje	
Martin Lidberg	
Ludger Timmen	Germany
Olga Gitlein	

Short reports from the institutes

Some reports are available from the home page of the working group at http://www.oso.chalmers.se/~hgs/NKGWG

Denmark

Lots of activities about gravity, but most regarding mapping of the static gravity field rather than the change in gravity. Of special interest for the NKG community is the work performed in the Arctic area.

Shfaqat Abbas Khan has computed time series for the three permanent GPS stations in Denmark. Achieved velocity rates seems to agree with the overall picture of neighbouring stations. However the monument at Buddinge is suspicious to sink.

Finland

Written report enclosed.

Norway

A cleaning up job has been done among data from the permanent GPS stations. Vardö has a considerable velocity difference compared to the model. The bedrock situation in the area is complicated (or bad) and there are thoughts about moving the station.

Comment 1: The velocity difference may be caused by errors in the ice model for the Barents Sea.

Comment 2: Vardö would be an interesting location for an absolute gravity station.

The geodetic activities at the Agricultural University of Ås are about to extend, now also including the discipline of physical geodesy. The application for the purchase of an absolute gravimeter was discussed during a special business meeting yesterday.

Sweden

Written reports from Onsala and Lantmäteriet are enclosed.

Martin Lidberg informs about the status of the re-processing if the Bifrost data set.

Scientific session

The presentation "Absolute gravimetry in Scandinavia: a test field for GRACE" is held by Ludger Timmen, Institut für Erdmessung (IFE), University of Hannover.

During the 5 year effective lifetime of GRACE the maximum land uplift is roughly 5 cm (1 cm/yr). With an approximate dN/dh=6% we get roughly 3mm geoid change (dN) during the GRACE mission period. The sensitivity of GRACE is estimated to dN=0.1 mm (1 sigma) so the land uplift should be well detectable.

IFE has planned for observation of 12 stations once a year during 5 years. For the observation campaigns are scheduled 6 day per station including travel and possible muddle.

Discussion on:

- agreement between old and new absolute gravity instruments (or can the observations already done in the area be used to extend the length of absolute gravity time series without introducing systematic differences)
- reported observed temporary (some days) perturbations in gravity value and its influence on observation strategy
- it may sometimes be sufficient to co-locate absolute gravity with campaign style GPS.

WG Business Session: Planning campaigns, planning instruments, documentation

1§ UEGN 2000

Jaakko informs about the work towards UEGN 2002 (Unified European Gravity Network). The work is co-ordinated through IGGC Europe. The computations will be done by G. Boedecker.

The UEGN 2002 is supposed to be a static gravity system, so for the Nordic area is the epoch of some concern. The gravity has changed in the range of 60 - 70 ugal since the oldest observations was performed in 1966. A "gravity change map" is needed for handling different observation epochs.

The year 2000 is proposed for the epoch of UEGN 2002 in the Nordic area.

The connection between the absolute gravity stations and the gravity networks is important and missing ties should be observed (homework for responsible institutes!).

2§ The NGGOS – AGplan and documentation of its scientific purpose

From the NKG presidium meeting in Espoo a remaining action for the geodynamics WG was recognized. It is concluded that the task to strengthen the scientific motivation for Absolute Gravimetry (AG) in the NGGOS umbrella document is transferred to the NGGOS task force.

Comment from the chairperson:

> *The need for a NGGOS umbrella document was identified from the beginning of the draft work for the AGplan. The role of Absolute Gravimetry must be seen in conjunction with the other efforts and developments in geodesy. The request for a wider scope has been reflected positively by the NKG presidium as an NGGOS task force was considered, which is hereby acknowledged.*
>
> *H.-G. S.*

3§ Update editing of the NGGOS - AGplan. New observing points in Sweden, Norway, see document prepared by Jaakko Mäkinen: Draft plan and Station catalogue.

The task for today is to come up with a definite list of stations for absolute gravity.

Preliminary discussion on stations to be included in the ECGN (European Combined Geodetic Network).

It is concluded that ECGN stations must also be EPN stations. The following stations are proposed for ECGN:

- Denmark will propose the two new EPN stations (Smidstrup, Suldrup) to be ECGN stations.
- Norway propose all EPN stations to be ECGN stations + Trysil + possibly Bodö
- Sweden will propose the existing absolute gravity stations to be ECGN stations, i.e. KIRU, SKEL, MART, ONSA. SKEL will be proposed as a new EPN station.
- Finland is not really discussed during the meeting, however METS, VAAS, JOEN, SODA seems to be obvious candidates.

Collocation information for new EPN stations:

Station	GPS	Abs. Gravity	Tide Gauge	other
SKEL	Since 1994	Since 1992	x	
SMID	Since 2000	To be prepared		
SULD	Since 2000	To be prepared		
TRYS	x	Since 1994		Mobile VLBI (several sessions)
BODO	x		x	

Other potential absolute gravity stations to serve the NGGOS - AGplan.

Sweden:

Preparation of the point **Kramfors**, in the 63º gravity land uplift line, for absolute gravity observations will start within a few weeks, making the station available for observation by the end of the summer. Kramfors is also identified as a future permanent GPS station.

The SWEPOS GPS station **Östersund** will be prepared for AG in the same way as Kramfors. Östersund is located close to the gravity land uplift line between stations Föllinge and Stugun with probably similar land uplift behavior as these stations.

Lantmäteriet have made reservations for a possible 3rd absolute gravity stations. The choice between Arjeplog (SWEPOS) and Vilhelmina (EPN) is discussed. The ideal choice of a gravity station is in flat terrain with small or well controlled ground water variations. Possible changes in masses in the vicinity of the station would mainly cause changed attraction perpendicular to the gravity vector and thus not harm the gravity time series. VILH is located on in a hilly area while ARJE is located in a flat area (however with a near by river). Altogether it is concluded that ARJE is the best choice for a new a.g. station. Therefore **Arjeplog** will be prepared in time for this years a.g. campaign.

It has been proposed to include the IGS station **Borås**, located at SP Swedish National Testing and Research Institute, as an a.g. station.

EPN station **Visby** is also a potential AG station and ECGN candidate with a near by tide gauge. The discrepancy between models and observations regarding vertical movements are however at the moment larger in the north compared to the south. Thus priority is given to northern stations.

Norway:

The choice between Vågstranda and Ålesund is discussed. SK has planned a concrete pier at **Vågstranda** facilitating a.g. observations. By that the gravity land uplift line will be terminated by absolute gravity at its end point. However Vågstranda is not a suitable station for GPS observation. **Ålesund** has permanent GPS, tide gauge, and pier for AG. It is proposed to observe the two stations in parallel for some time (years) where Ålesund finally will become the more important station in the future.

Andöya? Close to Tromsö, but presumably the first tide gauge station in Europe north of Portugal near "deep ocean". The infrastructure is there!

Vardö? Its location far north and close to Barents Sea is of scientific interest. However, station suffers from bad bedrock conditions and will therefore possibly be moved. Proposed AG station.

Discussion on stations to be observed this year

Borås could be done this year to include it in the "absolute gravity club" as an investment for the future, and at the same time serve current technical needs at SP.

Helsingör was observed in 1986. It is not a very suitable station (in a school) but could be re-measured every 10 or 12 year, since it is easy accessible near the ferry.

For new stations it is proposed to install a moisture sensor in the concrete so that observations can be corrected for possible water content in the concrete.

Metsähovi and Onsala will be the main comparison stations.

Stations in Denmark will be observed later after the Scandinavian main campaign this year.

4§ Response to NKG general assembly 2002 resolution no 1. This years gravity campaigns, available instruments…

Norway has given priority to the absolute gravity campaigns this year. However, their relative gravimeters (LaCoste & Romberg) are available for the Gravity land uplift line campaign.

Finland; The campaign is already pretty far organized. Hannu Routsalainen is heading the field campaign and Gabriel Strykowski will join the Finnish team. Start in the beginning of September.

Sweden; Observations will be done by Andreas Engfeldt and Håkan Skatt during the period August 19th to September 29th. The two instruments from Statens Kartverk will be used as well as the two Swedish gravimeters.

5§ Response to ECGN Call for Participation

It is concluded that each responsible institute has to submit a response to the ECGN call individually. The discussion in §3 should serve as a background for this response.

6§ a) NKG Presidium + WG workshops; b) Intermediate NKG Seminars - our opinion.

a) The proposed workshop with the Presidium and the WG chairmen was mentioned very briefly during the meeting. However, the chairman of the WG for geodynamics is positive to attend such a workshop on the Presidium's initiative.

   In order to promote the flow of information between the presidium and the working groups, presidium members are welcome to participate at the working group meetings. Future planning for WG meeting dates are to take this request into consideration.

b) The need for an intermediate seminar:

   The meeting agrees that meetings with widened scope are sometimes needed, and refers to several recent occasions when joint meetings were held on the initiative of the working groups. However, the synergetic advantage emerges only if these meetings have direct relations to actual needs, and when flexibility is retained. Also, a more general geodetic seminar may compete too much with international geodetic meetings outside NGK. Therefore it is concluded that an intermediate seminar is not really needed during this period, but the idea is not dismissed for future consideration.

7§ Other matters

Next meeting will be in Gävle in March or April 2004.