Minutes of Meeting, Working Group on Absolute Gravimetry
St. Petersburg, 23.06.2010

Agenda

1. Absolute Gravity Database AGrav
   - Circular letter
   - Planned contributions
   - Presently represented areas in the database
   - Data policy (rounding of gravity values for public access)
   - Comments, Proposals
2. Establishment of Global Absolute Gravity Reference System
   - Possible sites
   - Participation
   - Preparation of Call for Participation
3. Standards for Absolute Gravity Measurements

1. Absolute Gravity Database AGrav

An overview was given by H. Wilmes with reference to his circular letter of May 2010 asking all groups with absolute gravimeters for support and contribution to the International Database for Absolute Gravity Measurements. The database acts as the official database of BGI and is supported by the IGFS. It has reached operational status now. A number of stations and observations are already present (more than 400 sites, about 1400 observations). The database enables cooperation and data exchange between AG groups and it enhances the visibility of absolute gravimetry. It ensures long term availability of the valuable AG measurements. The data policy ensures that data property remains with the institutions and persons which carried out the measurements. The database also provides access to the public. For this (metadata) access the gravity values are cut to mgal resolution.

Contributions to the database:

- J. Mäkinen: Data upload is scheduled for near future.
- J. Krynski: Provision of A10 measurements in Poland.
- M. Barlik: FG5 measurements are already uploaded.
- R. Davis: Measurements of ICAG comparisons and FG5-108 of BIPM will be provided.
- L. Vitushkin: 3 years of AG measurements with FG5 at BIPM are available, with a limitation on the applied corrections (no ocean tidal loading).
- M. Lim: Measurements with FG-L available, instrument took part in ICAG 2009.
- L. Vitushkin: storage of results of ICAG (offsets) in database proposed.
- B. Karaböce: Discussion on reference height: Must always be specified but should be chosen individually depending on instrument, no recommendation of specific height.
- Y. Fukuda: Proposes to introduce recommendations and checkpoints for data compilation and upload to the database.
- D. Ruess: Gravity gradient for processing might differ from gradient for height transfer, which might be non-linear, especially in mountainous regions (like the alps)
- L. Timmen: Discussion on rounding of gravity values for public access. Rounding to mGal-level is too restrictive with respect to applications in sea and air-borne gravimetry. IGSN71

was established for ship-borne gravimetry and for such applications the values from the AGrav database should be “open access”. He suggests that the release of full values or the individual rounding can be defined by each institution.

- M. Amalvict: Proposal to cut data individually as needed by the data policy of the respective institution
- H. Wziontek: Database will be modified in a way that the data owners can specify to provide full resolution data to the public or select a rounding parameter.
- J. Krynski: Agrees, default value for rounding gravity values should be applied.
- H. Wilmes: There are still large gaps visible in the global station coverage. He proposes to involve further institutions and colleagues. Contributions for Africa, Russia, China, Japan Australia, arctic regions etc. are welcome!

2. Establishment of Global Absolute Gravity Reference System

The discussion under this topic is related to a presentation with the same title during session 2 of the symposium on June 22, 2010. A pdf-copy of the presented viewgraphs is included. H. Wilmes shortly repeats the requested features of stations: repeated absolute gravity measurements which document the variability, connection of gravity (physical) observations with geometrical sensors (permanent GNSS, possibly others), selected sites equipped with a superconducting gravimeter, selected stations with connection to tide gauges. AG comparisons are an important condition of the reference system, standards for models and corrections need to be fixed.

The Global Geodetic Observing System (GGOS) relies on three groups of observables: Earth’s shape, Earth’s gravity field and Earth’s rotation; GGOS requests consistent geometric and gravitational data.

The new gravity reference system shall replace the IGSN71 and improve the uncertainties of the gravity reference by more than an order of magnitude.

- H. Wilmes asks for candidate sites for the reference network, for contributions to the definition of station requirements, and for contributions and support in the preparation of a “Call for Participation”.
- L. Vitushkin: A new station near St. Petersburg will be established.
- L. Timmen: Suggests the revival of IAGBN-plans, where 31 stations world-wide were planned. Suggests not planning too many stations, in case of IfE a maximum of three stations might be maintained. Referring to GGOS, connection to other techniques is necessary.
- V. Palinkas: Requirement should be a reference station and the participation in ICAG
- J. Krynski: Suggests not to establish something artificial and not aiming for a too homogeneous station distribution. It should be started with already existing stations since no funding for new stations with special requirements can be expected. An evolution is possible from a regional station distribution to the global scale.
- Y. Fukuda: Questions the need in a new gravity network since the gravity standard is realized by the instruments themselves.
- V. Palinkas: Emphasizes the importance of a network to document time variations in gravity which are mostly impossible to model.
- J. Krynski: Proposes to circulate station requirements and a call to participate.
- Y. Fukuda: GNSS measurements and data or models for hydrology should be included, also tide gauges.
- H. Wilmes: Not all techniques must be available at every station, but repeated AG and permanent GNSS should be considered as a minimum, SG is preferred.
- Krynski: Proposes ECGN stations as starting frame for a network.

- V. Palinkas: Minimum requirement for stations are either AG measurements each two months or the combination of AG and SG, start with a number of SG stations.
- H. Wilmes: For the combination of AG and SG, AG measurements in 6 month interval turned out to be sufficient for the determination of SG instrumental drift.
- The participants were asked for their contribution to the preparation of a Call for Participation for a Global Gravity Reference System.

M. Amalvict, M. Barlik, J. Krynski, V. Palinkas, L. Timmen and H. Wilmes offered to contribute to the preparation of the “Call for Participation”.

3. Standards for Absolute Gravity Measurements

- V. Palinkas: Need in global standards illustrated by the still mostly incorrect treatment of the amplitude factor of the 18.6 years tidal wave.
- H. Wilmes: Suggests the circulation of a list of improvements
- J. Mäkinen: Standards should be started and based on IERS conventions, e.g. model choice for Ocean Tide Loading
- The participants were asked for their support with the definitions of standards

M. Eckl, B. Karaböce, J. Mäkinen, V. Palinkas, D. Ruess, H. Wziontek and H. Wilmes offered to contribute to the preparation of “Standards for Gravimetry”.

Enclosures:

- Participants list
- Invitation to contribute to the Absolute Gravity Database AGrav of BGI and BKG
- “Establishment of a Global Absolute Gravity Network”, Presentation during the IAG Symposium on Terrestrial Gravimetry, St. Petersburg 2010