

Consultative Committee for Mass and Related Quantities
Working Group on Gravimetry
Activity report
(May 2003 - April 2005)

The First Joint Meeting of the CCM WGG and the Study Group 2.1.1 on the Comparison of Absolute Gravimeters (SGCAG) of the Commission 2 (Gravity Field) of the International Association of Geodesy was organized on 26-27 May 2004 at the BIPM. 25 participants from 14 countries have attended this meeting.

The meeting discussed the problems related to metrology in absolute gravimetry and organization of the International Comparisons of Absolute Gravimeters (ICAGs) under the auspices of the CCM, BIPM and IAG.

1.1 For the first time the project of the Technical Protocol for the ICAGs was discussed. This project was developed by the Discussion Group 2 (moderator Alessandro Germak, IMGIC, Italy) following the rules for the key comparisons. The fourth draft of the Technical Protocol was distributed for the further discussion on 18 April 2005.

1.2 The draft requirements to the sites for the regional international comparisons were prepared by Discussion Group 1 (moderator Jacques Liard, NRCAN, Canada) and also discussed at the meeting. Sites in Canada, China, Finland, Luxemburg, Russia, Slovakia and USA have been proposed for regular regional comparisons and, probably, for the future calibrations of the absolute gravimeters.

1.3 The meeting proposed to organize the 7th ICAG in 2005 at the BIPM. The steering committee of the ICAG-2005 was nominated. It consists of L.Vitushkin (BIPM), M.Becker (IPG DTU, Germany), O.Francis (ECGS, Luxemburg), A.Germak (IMGIC, Italy), Z.Jiang (BIPM), Wangxi Ji (NIM, China).

Some proposals for potential improvements of the BIPM capabilities in comparison and calibration of the gravimeters were made, for example, the construction at the BIPM of one or two pillars for relative gravimeters with the gravity difference more than 5 mGal, which is more appropriate for calibration of relative gravimeters in the context of ICAGs.

The working documents of the 1st CCMWGG-SG2.1.1 are available for the members of CCM WGG and SG2.1.1 on the website of the BIPM www.bipm.org (see Consultative Committees; CMM; Working Group on Gravimetry).

2. The first meeting of the steering committee was held on 29 November 2004 at the IMGC (Turin, Italy). It was decided to organize the absolute measurements of the ICAG-2005 at the BIPM in September 2005 and the relative measurements (gravity gradients, links between the sites) in July 2005. Proposals on the programme of absolute and relative (gravity gradients and links between the sites of the BIPM) measurements have been discussed.

3. The Circular Letter 1 on the ICAG-2005 was prepared by the chairman and steering committee, and distributed on 23-24 December 2004.

Currently 20 participants plan to take part in the absolute measurements of the ICAG-2005 at the BIPM.

4. Some members of the CCM WGG (André Clairon (BNM); James Faller (JILA-NIST), Olivier Francis (ECGS), Alessandro Germak (IMGC), Evgeny Krivtsov (VNIIM), Jacques Liard (NRCan), Shigeki Mizushima (NMIJ), Ian Robinson (NPL)) and (Enrique R.Pujol (IGN, Spain) from the SG2.1.1 have informed about their support for the status of a pilot study for the ICAG-2005. Jan Krynsky (IGC, Poland), Philippe Richard (METAS), Michel Van Camp (ROB, Belgium)) from CCM WGG and Vojtech Palinkas (RIGTC, Czech Republic) have supported the status of a key comparison for the ICAG-2005.

In view of the large support for the pilot study status for the ICAG-2005, the steering committee recommends to the CCM to recognize this comparison as a pilot study which will follow the rules for the key comparisons.

The status of a pilot study will make it possible to open the participation in the ICAG-2005 to the laboratories which have the absolute gravimeters but not are nominated as being responsible for the relevant national measurement standards. In addition the associated member laboratories will be able to participate in the comparison.

The Circular Letter 2 on the ICAG-2005 will be distributed after the CCM meeting.

5. The First Joint meeting of the CCM WGG and SGCAG (document WGG/04-41) proposed to recognize the absolute ballistic method of measurement of the acceleration due to gravity as a primary method.

6. In the frame of the preparation to the ICAG-2005 two new sites with the free-fall acceleration difference of about 9 mGal were constructed at the BIPM in 2004.

The development of the procedure of the calibration of the Rb clocks of the absolute gravimeters is in a progress at the BIPM. The BIPM will also provide the calibration of the laser frequencies for participating gravimeters.

7. The organization in 2006 of the conference “Terrestrial Gravimetry (Instrumentation and Metrology)” in St Petersburg (Russia) was proposed by WGG chairman and supported by the president of the Commission “Gravity field” of the IAG, vice-president of the IAG, Geophysical Centre of Russian Academy of Sciences and D.I.Mendeleyev Institute for Metrology. The topics of the conference will cover the gravimetry on the Earth, the shipboard and airborne gravimetry.

L. Vitushkin

CCM WGG chairman