

## **Minutes of the Web-Meeting of IAG JWG 2.1.1 “Establishment of the International Gravity Reference Frame”**

**Wednesday, 22 Feb. 2023, 14:00 UTC**

Status: 17.04.2023

**Chair: Hartmut Wziontek (Germany)**

**Vice-chair: Sylvain Bonvalot (France)**

### **Agenda:**

Discussion of a proposal for an IAG resolution for the International Terrestrial Gravity Reference System ITGRS

### **Discussion**

The status of ITGRS/F was summarized by the chair of JWG 2.1.1 and an overview about previous IAG resolutions relevant for terrestrial gravity was given. After Resolution No. 4 of 2019 and the publication of 2021 authored by members of the JWG [1] a resolution will be proposed to IAG by JWG 2.1.1 to adopt the International Terrestrial Gravity Reference System (ITGRS). The ITGRS Conventions 2020 included in [1] already comprise aspects of the system definition, like the zero-tide system, the ISO 2533:1975 standard atmosphere for atmospheric corrections and the IERS reference pole for the correction of polar motion effects. A resolution draft text was circulated in advance and discussed during the meeting.

Comments received after a presentation [2] at the GGOS UAW in October 2022 and from the IAG EC meeting in December 2022 were also debated. This was in particular whether and how to include accuracy requirements in the system definition and whether or not to include a gravity rate of change, in analogy to ITRF velocities.

The participants of the meeting agreed in the following: Although an accuracy requirement for absolute gravity observations was found to be important, it cannot be part of the system definition. It rather follows the general GGOS requirements and becomes part of the frame (ITGRF) as the systems realization. Also, a gravity rate of change is considered as part of the frame, because it is not directly related to the system definition, rather to (repeated) absolute gravity observations at specific stations as part of the ITGRF infrastructure.

It was proposed to include a statement on accuracy in the “Considering” section and to propose to IAG a general statement on the system definition which allows for future changes. Further, the IERS reference pole of the Earth’s rotational axis should be defined in agreement with space geodetic techniques. According to sections 5.4.1 the IERS TN 36 [3], it is the Celestial Intermediate Pole (CIP) in the ITRS, ignoring secular variations.

## **Draft Resolution**

### *Considering*

the relative accuracy achievable with state-of-the-art absolute gravimeters of a few part in a billion, the IAG resolution No. 2 adopted 2015 in Prague and the IAG resolutions No. 9.2 and No. 16.3 adopted 1983 in Hamburg and the importance of an International Terrestrial Gravity Reference System (ITGRS) for geodesy and geosciences

### *Adopts,*

the ITGRS as the preferred gravity system based on the instantaneous acceleration of free-fall expressed in SI and related to the zero-tide system, the reference atmosphere and the Celestial Intermediate Pole (CIP) in the ITRS.

## **Participants**

Ezequiel Antokoletz, Sylvain Bonvalot, Przemysław Dykowski, Andreas Engfeldt, Reinhard Falk, Mingqiang Hou, Juraj Janák, Zhou Jiangcun, Qingchao Liu, Jaakko Mäkinen, Urs Marti, Ana Matos, Vojtech Pálinkáš, Vicky Smith, Walter Subiza, Heping Sun, Derek vanWestrum, Arturo Villar and Hartmut Wziontek.

## **References**

- [1] Wziontek, H, Bonvalot, S, Falk, R, Gabalda, G., Mäkinen, J, Pálinkáš, V, Rülke, A and Vitushkin, L (2021) Status of the International Gravity Reference System and Frame, Journal of Geodesy 95:7 <https://doi.org/10.1007/s00190-020-01438-9>
- [2] Wziontek, Hartmut, Bonvalot, Sylvain, & IAG Joint Working Group 2.1.1. (2022, October 23). Advances in the definition and realisation of a modern gravity reference system. Zenodo. <https://doi.org/10.5281/zenodo.7270578>
- [3] IERS Conventions (2010). Gérard Petit and Brian Luzum (eds.). (IERS Technical Note ; 36) Frankfurt am Main: Verlag des Bundesamts für Kartographie und Geodäsie, 2010. 179 pp., ISBN 3-89888-989-6