

SC 2.2: Methodology for Geoid and Physical Height Systems

Chair: Jonas Ågren (Sweden)

Vice-Chair: Artu Ellmann (Estonia)

Terms of Reference

A global height reference frame with high accuracy and stability is required to determine the global changes of the Earth. A major step towards this goal was taken by the IAG resolution (No. 1) for the definition and realization of an international Height Reference System (IHRS), adopted at the IUGG 2015 meeting in Prague. It is now the intention that the IHRS will be globally realized using geometric satellite methods, like GNSS, in combination with gravimetrically determined geopotential values. The latter can be derived using a global geopotential model originating from the dedicated satellite gravity missions, complemented with terrestrial gravity and other information to reduce the omission error. Traditional levelling might also be integrated on a regional or local scale. The IAG SC 2.2 aims at bringing together scientists and geodesists concerned with methodological questions in geoid and height determination, who in different ways contribute to reach the above mentioned goal of a global height system realisation and unification. It includes topics ranging from regional gravimetric geoid determination to the realization and implementation of IHRS in view of the existing regional/local/national height system realisations.

Objectives

The IAG Sub-Commission 2.2 (SC2.2) promotes and supports scientific research related to methodological questions in geoid and height determination, both from the theoretical and practical perspectives, concentrating particularly on methodological questions contributing to the realization of IHRS with the required sub-centimetre accuracy. This includes for instance:

- Realization of the International Height Reference System (support of Joint Working Group 0.1.2)
- Implementation of the International Height Reference Frame, height system unification.
- Studies on W_0 determination.
- Studies on data requirements, data quality, distribution and sampling rate to reduce the omission error to the sub-centimetre level in different parts of the world.
- Investigation of the theoretical framework required to compute the sub-centimetre geoid (support of JSG 0.15)
- Investigation and benchmarking of alternative regional geoid determination methods and software.
- Studies on theoretical and numerical problems related to the solution of the geodetic boundary value problems in geoid determination,
- Studies on time variations of the gravity field and heights due to Glacial Isostatic Adjustment (GIA) and land subsidence.
- Development of relativistic methods for potential difference determination using precise atomic clocks (support of Joint Working Group 2.1)
- Investigating the role of traditional levelling in future regional/local height system realisations.

Program of activities

- Organizing meetings and conferences.
- Inviting the establishment of Special Study Groups on relevant topics.
- Reporting activities of SC2.2 to the Commission 2.
- Communication/interfaces between different groups/fields relevant to the realization of IHRS.

Steering committee

- Chair: Jonas Ågren (Sweden)
- Vice-Chair: Artu Ellmann (Estonia)
- Riccardo Barzaghi (Italy)
- Will Featherstone (Australia)

- René Forsberg (Denmark)
- Jianliang Huang (Canada)
- Johannes Ihde (Germany)
- Gunter Liebsch (Germany)
- Urs Marti (Switzerland)
- Laura Sánchez (Germany)
- Yan Ming Wang (USA)