

SC 2.3: Dedicated Satellite Gravity Missions

Chair: Roland Pail (Germany)

Terms of Reference

Sub-commission 2.3 promotes scientific investigations concerning the dedicated satellite gravity field missions CHAMP, GRACE and GOCE, the development of alternative methods and new approaches for global gravity field processing also including complementary gravity field data types, as well as interfacing to user communities and relevant organizations.

Objectives

The successful launches of the German CHAMP (2000), the US/German GRACE (2002) and the ESA GOCE (2009) missions have led to a revolution in global gravity field mapping by space-borne observation techniques. Due to the fact that they are the only measurement system which can directly observe mass and mass transport in the Earth system, they provide valuable contributions to many geoscientific fields of application, such as geodesy, hydrology, oceanography, glaciology, and solid Earth physics. These missions have proven new concepts and technologies, such as high-low satellite-to-satellite tracking (SST) using the GPS constellation, low-low SST based on micro-wave ranging, and satellite gravity gradiometry (SGG), as well as space-borne accelerometry. GRACE has produced consistent long- to medium-wavelength global gravity field models and its temporal changes. GOCE provides high-accuracy and high-resolution static gravity field models. In combination with complementary gravity field information from terrestrial data, satellite altimetry, an even higher spatial resolution can be achieved. Additionally, based on challenging user requirements, concepts of future gravity field missions are developed and investigated.

Program of Activities

The focus of this sub-commission will be to promote and stimulate the following activities:

- generation of static and temporal global gravity field models based on observations by the satellite gravity missions CHAMP, GRACE, and GOCE, as well as optimum combination with complementary data types (SLR, terrestrial and air-borne data, satellite altimetry, etc.).
- investigation of alternative methods and new approaches for global gravity field modelling, with special emphasis on functional and stochastic models and optimum data combination.

- identification, investigation and definition of enabling technologies for future gravity field missions: observation types, technology, formation flights, etc.
- communication/interfacing with gravity field model user communities (climatology, oceanography/altimetry, glaciology, solid Earth physics, geodesy, ...).
- communication/interfacing with other IAG organizations, especially the GGOS Working Group for Satellite Missions and the GGOS Bureau for Standards and Conventions

Steering committee

- Chair: Roland Pail (Germany)
- Srinivas Bettadpur (USA)
- Sean Bruinsma (France)
- Frank Flechtner (Germany)
- Thomas Gruber (Germany)
- Gerhard Heinzel (Germany)
- Cheinway Hwang (Taiwan)
- Torsten Mayer-Gürr (Austria)
- Federica Migliaccio (Italy)
- Ulrich Meyer (Switzerland)
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