



International Gravimetric Bureau (BGI)

web: bgi.cnes.fr:8110/

Director: Sylvain Bonvalot (France)

Objectives and Terms of Reference

The main task of BGI is to collect, on a world-wide basis, all gravity measurements and pertinent information about the gravity field of the Earth, to compile them and store them in a computerized data base in order to redistribute them on request to a large variety of users for scientific purposes. The data consists of relative and absolute gravity measurements (mainly 3-D coordinates of station, gravity value, corrections, anomalies...), mean free air or Bouguer anomaly values, gravity maps, reference station descriptions, publications dealing with the Earth's gravity field. Other data types are sometimes used for data validation and geophysical analysis, such as satellite altimetry derived geoid height and gravity anomalies, digital terrain models, spherical harmonic coefficients of current global geopotential models.

BGI has been developing various algorithms and software for data validation and analysis, as well as its own data management system. A large number of services are offered to the users (see below).

All kinds of gravity data can be sent to BGI, with or without restrictions of redistribution to be specified by the contributors, sometimes in the form of a protocol of usage.

Program of Activities

The main orientations consist (i) to consolidate the terrestrial gravity databases (relative and absolute) and (ii) to ease the consultation and diffusion of gravity data and products for end-users. BGI will also continue operating with its supporting organizations, in educational, research and development activities with the aim to maintain a high level of competence and to improve the efficiency and the quality of its services.

- Activities related to gravity database: The main achievements consist in the relative gravity database and in the database of reference gravity stations. Collection of new dataset as well as existing dataset will be encouraged in order to improve the global data coverage and accuracy. Incoming datasets are carefully evaluated and validated using protocols and software already developed at BGI. Global data and products derived from satellite altimetry and gravity missions are to be more and more frequently used to validate land and sea measurements. The achievement of a worldwide Absolute gravity database will be top prioritized in the next few years.

- Activities of diffusion of gravity data and products: New functionalities will be implemented in relation with the database management to perform direct downloads of open-file data or products from the BGI webpage and allow inter-operability between other sites hosting gravity-related databases. BGI will also contribute to the release of updated digital gravity data products (maps, grids...) for educational and research purposes. The bibliography database will be also continued.

- Other activities: Link with the commission for the Geoid in data preparation in view of geoid computations and evaluations to be performed by the International Service for the Geoid. Link with other research groups in the validation of satellite derived gravity data and products to improve our global knowledge of the Earth's gravity field. Contribution to the dissemination of educative materials related to gravimetry. Continuation of the publication of the Newton's Bulletin jointly with IGeS.

Structure and membership

BGI depends of the International Association of Geodesy (IAG) of the International Union of Geodesy and Geophysics (IUGG). It is one of the offices of the Federation of Astronomical and Geophysical Services (FAGS). Since 2001, it is one of the "Centers" of the International Gravity Field Service (IGFS) which coordinates within the IAG, the servicing of the geodetic and geophysical community with gravity field-related data, software and information.

The BGI central office (management, secretariat and technical staff) is located in Toulouse, France, in the premises of the Observatoire Midi-Pyrénées. Since 1998, BGI is supported by French Organizations (see below) whose contributions to BGI over four year renewable periods are defined by a covenant. The supporting French organizations are:

- the Bureau de Recherches Géologiques et Minières (BRGM),
- the Institut National des Sciences de l'Univers (INSU/CNRS),

- the Centre National d'Etudes Spatiales (CNES),
- the Ecole et Observatoire des Sciences de la Terre (EOST)
- the Ecole Supérieure des Géomètres et Topographes (ESGT),
- the Institut de Physique du Globe de Paris (IPGP),
- the Institut de Recherche pour le Développement (IRD),
- the Institut Géographique National (IGN),
- the Service Hydrographique et Océanographique de la Marine (SHOM),
- the Université de Montpellier 2 (UM2)

Each supporting organization has a representative member in the BGI Coordinating Committee. The Coordinating Committee contributes twice a year to the orientation and evaluation of the BGI activities.

BGI address:

Bureau Gravimétrique International
 18, Avenue Edouard Belin
 31401 Toulouse Cedex 9, France
 Phone: 33-5 61 33 29 80
 Email: bgi@cnes.fr, bonvalot@ird.fr

Providing data to BGI

Essential quantities and information for gravity data submission are (see BGI website for more details):

(1) Position of the site:

- Latitude, longitude (and related accuracy).
- Elevation or depth (and related accuracy).
- For land data: elevation of the site (on the physical surface of the Earth).
- For water stations: water depth.

(2) Measured (observed) gravity, corrected to eliminate the periodic gravitational effects of the Sun and Moon, ocean loading, and the instrument drift.

(3) Reference (base) station (s) used. For each reference station (a site occupied in the survey where a previously determined gravity value is available and used to help establish datum and scale for the survey), give name, reference station number (if known), brief description of location of site, and the reference gravity value used for that station. Give the datum of the reference value; example: IGSN 71.

(4) Give supplementary elevation data for measurements made on towers, on upper floor of buildings, inside of mines or tunnels, atop glacial ice. When applicable, specify whether gravity value applied to actual measurement site or it has been reduced to the Earth's physical surface (surface topography or water surface). Also give depth of actual measurement site below the water surface for underwater measurements.

(5) For marine gravity stations, gravity value should be corrected to eliminate effects of ship motion, or this effect should be provided and clearly explained.

(6) For absolute gravity measurements, station coordinates and description, average gravity value and all related corrections are required.

Services

The most frequent service BGI can provide is data retrieval over a limited area. Data are sent on digital form or transferred electronically. Data coverage plots may also be provided, usually over 20° * 20° areas. Cases of massive data retrieval requests may be considered; they are studied and may be processed in a specific way. The simplest way for users is to acquire the open files of the BGI database, which are on two CDs. Consultation of Absolute gravity database will be soon available.

Other services include: Data screening; Supply of reference base station information; Data evaluation and gridding; Computation of mean values; Supply of information on existing maps.

The costs of the services have been established in view of the categories of users—mostly contributors of measurements and scientists, and also considering the large amount of our host organizations. The charging policy is explained in detail in the BGI website.

Some of the services may be provided free of charge upon request, to data contributors, individuals working in universities, such as students, and generally to any person who can contribute to the BGI activities on a data or documentation exchange basis.