International Geodynamics and Earth Tide Service (IGETS)

https://doi.org/10.82507/iag-travaux2025_igets

Chair: Marta Calvo (Spain)
Central Bureau Director: Jean-Paul Boy (France)

IGETS website - http://igets.u-strasbg.fr

1 Overview

The primary objective of the International Geodynamics and Earth Tide Service (IGETS) is to provide a service to monitor temporal variations of the Earth gravity field through long-term records from ground gravimeters, tiltmeters, strainmeters and other geodynamic sensors. IGETS continues the activities of the Global Geodynamic Project (GGP) and the International Centre for Earth Tides (ICET) since it was established at the IUGG general assembly in Prague 2015.

1.1 Structure

The directing board has been renewed in 2023; its members are :

- E. Antokoletz (BKG, Germany) (Raw Data Preparation Representative),
- J.-P. Boy (EOST, France) (Director of the Central Bureau),
- C. Foerste (GFZ, Germany) (Data Center Representative),
- M. Reich (GFZ, Germany) (Environmental Applications Representative),
- S. Rosat (EOST, France) (Analysis Center Representative),
- H.-P. Sun (Wuhan, China) (Network Representative),
- C. Voigt (GFZ, Germany) (Scientific Product Evaluation),
- S. Bonvalot (OMP, France) (IAG Representative),
- M. Calvo (IGN, Spain) (IAG Representative),
- N. Sneeuw (Univ. Stuttgart, Germany) (IGFS Representative),
- H. Wziontek (BKG, Germany) (ITGRF Representative),
- D. Crossley, J. Hinderer and B. Meurers (Members at large).

M. Calvo has been elected by the Direction Board as the IGETS Chair for the 2023-2027 period.

1.2 Data products

The main products of IGETS are the raw and processed long data records from worldwide superconducting and spring gravimeters, and are hosted at our data center located by the ISDC at GFZ in Potsdam Germany (see https://isdc.gfz.de/igets-data-base/ for all details). The available data products currently are:

- Level 1 products: Raw gravity and local pressure records sampled at 1 or 2 seconds, in addition to the same records decimated at 1-minute samples.
- Level 2 products:1-minute gravity and pressure data corrected for instrumental perturbations, ready for tidal analysis.
- Level 3 products: Gravity residuals after particular geophysical corrections (including solid Earth tides, polar motion, tidal and non-tidal loading effects).

2 Activities during the reporting period 2023-2025

2.1 Status of the IGETS Data Center

The IGETS data sets are stored on an FTP server and are freely available after user registration through an encrypted access via sftp (https://isdc.gfz.de/igets-data-base/). The number of IGETS users is increasing steadily since the launch in Summer 2016.

In June 2025, data from 50 stations and 70 independent sensors (multiple instrument or double-sphere gravimeters) are available, globally distributed, provided by 35 different producers covering a time span of up to 38 years (see Table 1).

All relevant information on the IGETS data base were compiled in the scientific technical report (Voigt et al., 2016, 2017), comprising station and sensor information, available data sets, directory structure, file name convention, repair codes and file formats. Data descriptions originating to a large part from Global Geodynamics Project (GGP) were updated and extended for IGETS.

2.2 Status of the IGETS Analysis Centers

Different product levels are derived from the gravity and atmospheric pressure data recorded with the superconducting gravimeters. Level-1 products are the raw data without preprocessing which are downsampled to 1 min. resolution and are uploaded by the station operators.

The IGETS Analysis Center are providing higher level products: the Level-2 data, i.e. gravity and pressure data corrected for all major instrumental disturbances, ready for tidal analysis (see Table 2 for the data availability) and the Level-3 data, i.e. gravity residuals after correction of all major geophysical signals (see Table 3 for the data availability).

The Level-2 gravity and pressure 1-minute data are corrected for major instrumental disturbance using a remove/restore technique based on a local tide model.
The Level-3 1-minute gravity residuals are derived from the Level-2 data produced by EOST, by subtracting solid Earth tides, tidal ocean loading using FES2014b (Lyard et al., 2021), Polar Motion and Length-Of-Day induced effects, including a static self-consistent ocean response, atmospheric loading based on ERA5 reanalysis (Hersbach et al. et al., 2020) from ECMWF (European Centre for Medium-Range Weather Forecasts) assuming an inverted barometer ocean response to pressure forcing and an instrumental drift. Loading models are

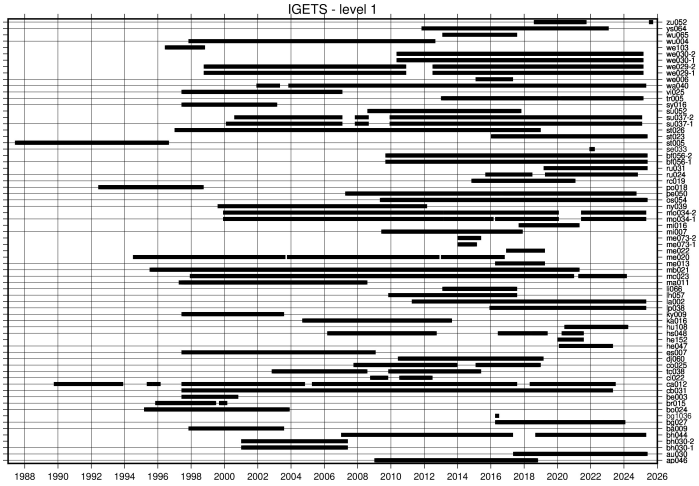

Table 1. Available IGETS level 1 data in June 2025.

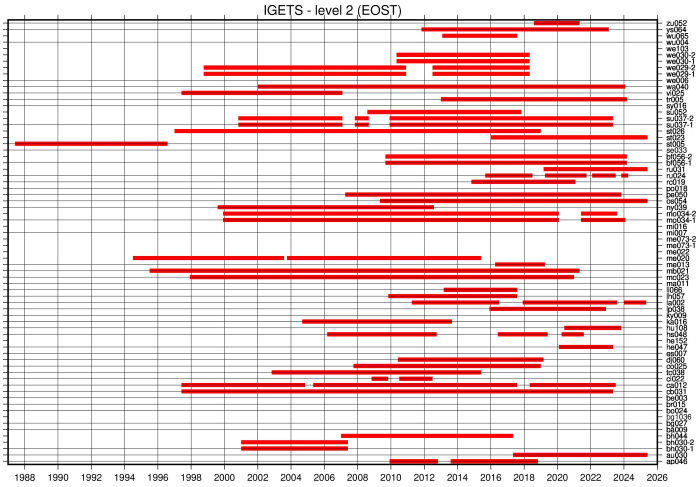

Table 2. Available IGETS level 2 data in June 2025 (EOST products).

also available on the EOST Loading Service (Boy and Lyard, 2008; Boy and Hinderer, 2006; http://loading.u-strasbg.fr/).

Currently, EOST is the only active analysis center, as the University of French Polynesia (Tahiti) stopped its activities in 2023. The research group in Wuhan, China has applied for a new IGETS Analysis Center; its products are currently being reviewed and investigated by the Directing Board.

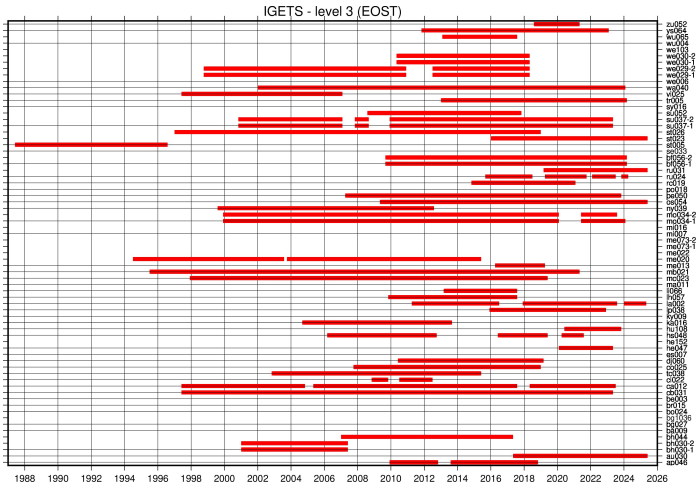

Table 3. Availlable IGETS level 3 data in June 2025 (EOST products).

2.3 Data Publication and Citation – DOI

IGETS established the provision of digital object identifiers (DOI) for the data sets of every station. DOIs are unique and persistent identifiers used to reference and link the individual data sets. The advantages are a clear reference to data sets, to link scientific results with associated publications, an improvement of the access to scientific data and an enhancement of the visibility of research data, encouraging new research to be conducted, and foster scientific cooperation. For Level-1 data, the DOI is assigned for each station, i.e. one for all sensors of a station referencing the station operators. The DOIs of the Level-1 data sets resolve to DOI landing pages with an overview of the station and the data. For data of Level-2 and Level-3, the DOI are assigned for all IGETS stations in total.

2.4 Website, Publications

The IGETS CB maintains a comprehensive website as the primary vehicle for the distribution of information within the IGETS community. A list of publications related to IGETS activities was compiled and is available at the IGETS web page (http://igets.u-strasbg.fr/biblio.php).

2.5 Further activities

At the 20th International Symposium on Geodynamics and Earth Tides, held in August 2024 in Strasbourg, France, a business meeting took place on August 30. During the meeting, site reports were presented, and the Wuhan group proposed itself as a new IGETS Analysis Center. Additionally, the need for a practical workshop for users of superconducting gravimeters was discussed, with plans to hold the workshop in 2026.

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