

IC-P3.1 GGP Global Geodynamics Project

(Joint with Commission 2)

Chair: **David Crossley** (USA)

Terms of Reference

The purpose of the Global Geodynamics Project (GGP) is to maintain a network of superconducting gravimeters (SG) to monitor all changes in the Earth's gravity field at periods of seconds and longer. GGP started on July 1, 1997, and since then 1 minute data has been archived in the GGP database at the International Center of Earth Tides (ICET, Commission 3). Due to the strong overlap between Earth Rotation, Earth Tides, and The Gravity Field, GGP became an IAG Inter-Commission Project in 2003, and reports to both Commissions 2 and 3.

The SG is currently the most sensitive and stable instrument for the measurement of the vertical component of the Earth's gravity field, with a time domain error of <0.1 microgal and a frequency domain accuracy of 1 nGal. When combined with absolute gravimetry at the same station, the instruments together are able to measure long term changes in gravity with an error of 1-2 microgal per year. Each SG is the focus of a national effort to provide a continuous gravity record for geodetic and geophysical research. The GGP is an opportunity for the various SG groups to participate in a global campaign to monitor the gravity field and to exchange the raw data. GGP does not have a mandate to establish or fund new stations.

Objectives

The objective of GGP is to maintain standards for the collection of SG data, and provide an accessible database for global use. Precise measurements of the Earth's gravity field are essential to answer a number of important questions in geodesy and geophysics: (a) the gravity effect of the global atmospheric loading and mass re-distribution on the solid Earth, (b) the use of precise tidal analysis to refine estimates of the nearly diurnal free wobble of the Earth and models of oceanic loading, (c) observation of changes in gravity associated with slow and silent earthquakes, tectonic motions, sea-level changes and post-glacial rebound, (d) monitoring the rotation pole of the Earth on a time scale of minutes, (e) accurate observations of seismic normal modes, especially in the long-period band below 1 mHz and to determine precise amplitudes, (f) monitor gravity changes associated with hydrology (soil moisture and groundwater) at fiducial sites, (g) provide ground truth for gravity satellite missions where a sufficient density of SGs are located on the surface, and (h) provide data and information on gravity effects associated with motions of the inner core and in the outer

fluid core.

Program of Activities

GGP meets at least once a year, either at a national conference to hold business meetings, or to hold a GGP Workshop where scientific papers are presented. A GGP Newsletter is circulated at about 6 month intervals, and we maintain a webpage for general information.

SG groups send data to ICET once a month, and the data is archived through an arrangement with ISDC/GFZ in Potsdam. Within 1 year of collection, the data is released to the scientific community.

Membership:

Secretary: J. Hinderer

Representative to GGOS: J. Hinderer

SG group leaders:

Y. Fukuda (Kyoto U., Japan)

J. Hinderer (IPG Strasbourg, France)

C. Hwang (National CTU Taiwan)

Y. Imanishi (Tokyo U., Japan)

J.-W. Kim (Sejong U., S. Korea)

J. Liard (GSC Ottawa, Canada)

B. Meurers (U. Vienna, Austria)

J. Neumeyer (GFZ, Potsdam)

K. Shibuya (NIPR, Tokyo, Japan)

H.-P. Sun (IGG, Wuhan, China)

Y. Tamura (NAO Mizusawa, Japan)

M. van Camp (ROB, Brussels)

H. Virtanen (FGI, Masala, Finland)

H. Wilmes (BKG, Germany)

The GGP mailing list has about 100 names.