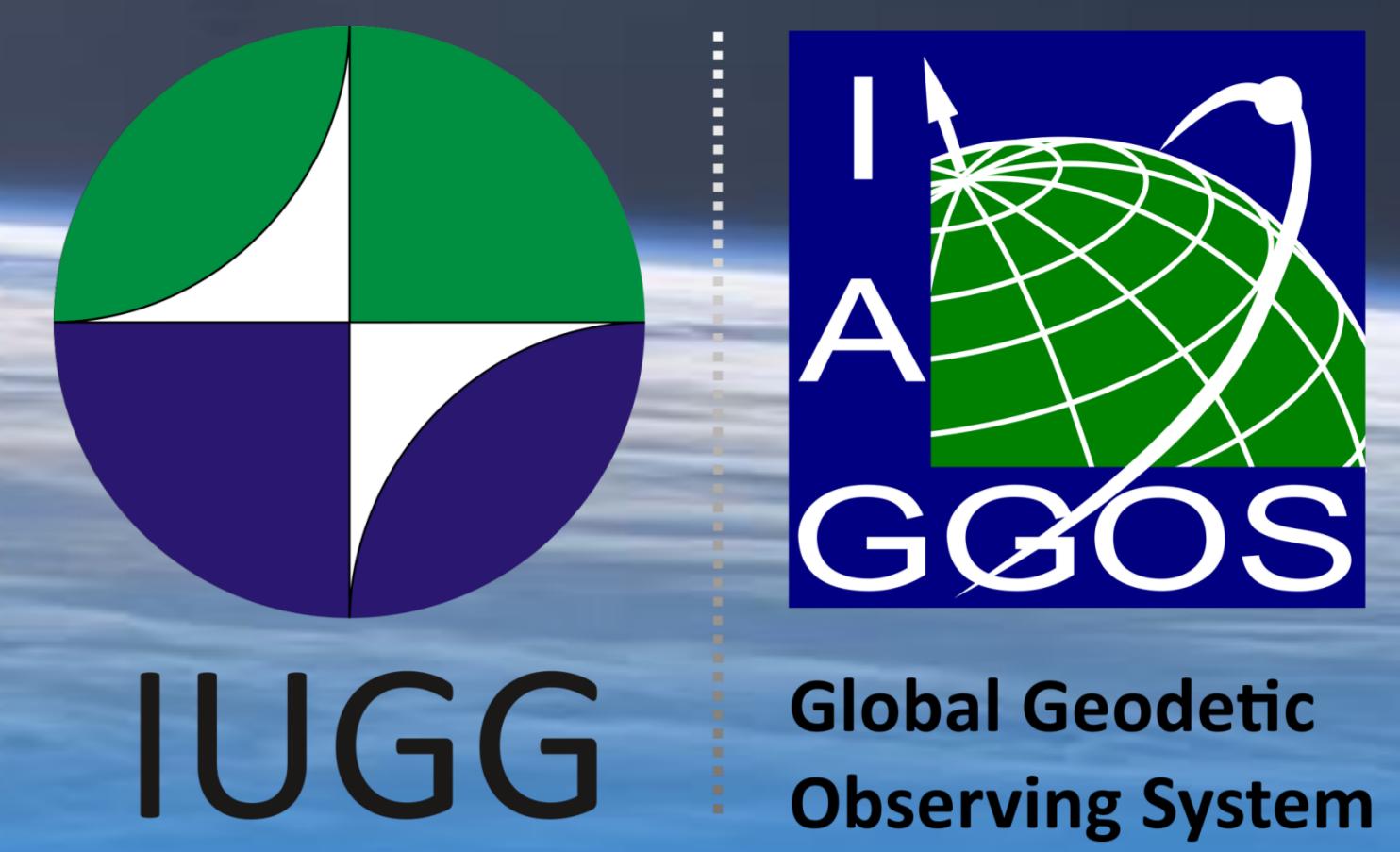


# GGOS

## GLOBAL GEODETIC OBSERVING SYSTEM

### The GGOS Bureau of Products and Standards

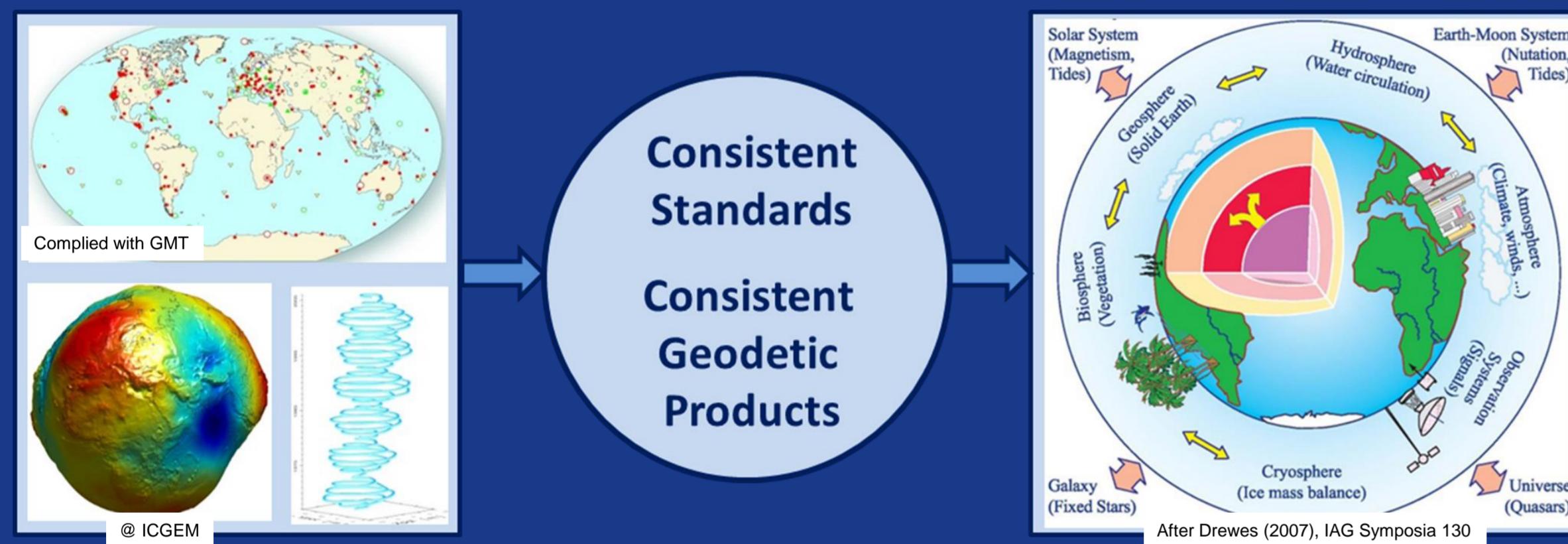


#### Introduction

The GGOS Bureau of Products and Standards (BPS) supports IAG in its goal to obtain consistent products describing the geometry, rotation and gravity field of the Earth.

#### Mission and overall objectives of the BPS:

- to serve as contact and coordinating point for the homogenization of IAG standards and products;
- to keep track of the adopted geodetic standards and conventions across all IAG components, and to initiate steps to close gaps and deficiencies;
- to focus on the integration of geometric and gravimetric parameters and to develop new geodetic products needed for Earth sciences and society.



#### BPS Organizational Structure

The BPS is operated by DGFI-TUM and IAPG of the Technical University of Munich, Germany.

##### BPS staff:

D. Angermann, T. Gruber, M. Gerstl, R. Heinkelmann, U. Hugentobler, L. Sánchez, P. Steigenberger

##### GGOS entities associated to the BPS:

- Committee “Contributions to Earth System Modelling”, Chair: M. Thomas (Germany)
- Joint Working Group “Establishment of the Global Geodetic Reference Frame (GGRF)”, Chair: U. Marti (Switzerland)
- Working Group “ITRS Standards for ISO TC211”, Chair: C. Boucher (France)
- Committee “Definition of Essential Geodetic Variables (EGVs)”, Chair: R. Gross (USA)

The IAG Services and other relevant entities involved with standards designated their representatives as associated members in the BPS to support the Bureau business and to ensure the interaction between the different components.

Position (IAG Service, other entity)	Representatives	Affiliation, Country
IERS Conventions Center	Gérard Petit (until 2016) Nick Stamatakis (since 2017)	BIPM (France) USNO (USA) MIT (USA)
IERS Analysis Coordinator	Thomas Herring	TUM (Germany)
IGS Representative	Urs Hugentobler (BPS staff)	UMBC/NASA (USA)
ILRS Analysis Coordinator	Erricos Pavlis	GSFC/NASA (USA)
IVS Analysis Coordinator	John Gipson	GSFC/CSR (USA)
IDS Representatives	Frank Lemoine, John Ries, Jean-M. Lemoine, H. Capdeville	CNES/GRGS (France)
IGFS Chair	Riccardo Barzaghi	Politec. Milano (Italy)
BGI Chair	Sylvain Bonvalot	IRD (France)
ISG President	Mirko Reguzzoni	Politec. Milano (Italy)
ICGEM Chair	Franz Barthelmes (until 2017) E. Sinem Ince (since 2018)	GFZ (Germany) GFZ (Germany)
IDEAMS Director	Kevin M. Kelly	ESRI (USA)
IGETS Chair	Hartmut Wziontek	BKG (Germany)
Gravity Comm. (corresp. Member)	Jürgen Kusche	Univ. Bonn (Germany)
IAG Representative to ISO	Johannes Ihde (until 2017) Detlef Angermann (since 2018)	BKG, GFZ (Germany)
IAG Communication and Outreach	Josef Ádám	TUM (Germany)
IAU Commission A3 Representative	Catherine Hohenkerk	Univ. Budapest (Hungary)
IAU Representative	Robert Heinkelmann (BPS staff)	United Kingdom
Control Body for ISO Geodetic Registry	Mike Craymer (Chair) Larry Hothem (Vice Chair)	GFZ (Germany) NRCan (Canada) USA

#### BPS tasks:

- to keep track of adopted geodetic standards and conventions in the generation of IAG products;
- to focus on the integration of geometric and gravimetric observations and to support the development of integrated products (e.g., GGRF, IHRF, atmosphere products);
- to contribute to the UN GGIM Subcommittee on Geodesy (e.g. IAG representation in GGRF Focus Group „Data Sharing and Development of Geodetic Standards“);
- to interact with external stakeholders regarding standards (e.g. ISO, IAU, BIPM, CODATA);
- to initiate the establishment of a committee on the definition of Essential Geodetic Variables (EGVs) within the BPS;
- such EGVs could then serve as a basis for a gap analysis to identify further requirements concerning observational properties, networks and products (accuracy, latency, spatial and temporal resolution).

#### Inventory on standards and conventions

- The BPS compiled and maintains an inventory on standards and conventions used for the generation of IAG products.
- Recommendations on numerical standards:
  - The used numerical standards including time and tide systems must be clearly documented for all geodetic products.
  - The geopotential value  $W_0$  issued by IAG resolution No. 1 (2015) should be used as the conventional reference value for geodetic work.
  - The development of a new Geodetic Reference System GRS20XX based on best estimates of the major parameters is desired.
- IERS products, GNSS orbits
  - Celestial reference systems and frames
  - Terrestrial reference systems and frames
  - Earth orientation parameters
  - GNSS satellite orbits
- Gravity-related products
  - Gravity and geoid
  - Height systems and their realization
- General recommendations on IAG products:
  - Consistency of CRF, TRF and EOP (IUGG Res. No.3 (2011)).
  - Standards, conventions and models should be consistently applied for the processing of geometric and gravimetric observations by IAG Services.
  - It is also recommended that a conventional global gravity field model might be useful as reference model to be used for the generation of IAG products.
  - Core networks and co-locations for the integration of the geometric and gravimetric observation techniques need to be improved.



#### Authors

D. Angermann<sup>(1)</sup>, T. Gruber<sup>(1)</sup>, M. Gerstl<sup>(1)</sup>, U. Hugentobler<sup>(1)</sup>, L. Sánchez<sup>(1)</sup>, R. Heinkelmann<sup>(2)</sup>, P. Steigenberger<sup>(3)</sup>

<sup>(1)</sup> Technical University of Munich (TUM), Germany

<sup>(2)</sup> GFZ German Research Centre for Geosciences, Germany

<sup>(3)</sup> German Aerospace Centre (DLR), Germany



#### Reference

Angermann D, Gruber T, Gerstl M, Heinkelmann R, Hugentobler U, Sánchez L, Steigenberger P: GGOS Bureau of Products and Standards: Inventory of standards and conventions used for the generation of IAG products. In: Drewes H., Kuglitsch F., Adám J. (Eds.) *The Geodesist's Handbook 2016. Journal of Geodesy* 90(10), 1095-1156, 10.1007/s00190-016-0948-z, 2016