

International Altimetry Service (IAS)

<http://ias.dgfi.badw.de>

Chairman of the Steering Committee: Wolfgang Bosch (Germany)

Overview

With the precise surveying of the ocean surface, nearly coinciding with the geoid, satellite altimetry provides fundamental contributions to the geodetic science for the determination of the figure of the Earth and its gravity field. Thus, satellite altimetry definitely has to become a core component of the Global Geodetic Observing System (GGOS). Moreover, there are many other applications which underpin the significant potential of the altimetry technology for oceanography, marine geophysics, hydrology, meteorology, glaciology, and geodesy. Thus, satellite altimetry is a fundamental space technique for Earth system research.

Following endorsements by GLOSS, IAPSO and IAG the **International Altimetry Service (IAS)** was established as initiative of the International Association of Geodesy at its General Assembly, 2007 in Perugia, Italy.

At this time, numerous services for processing and distributing altimeter mission data and value-added products already existed. The IAS initiative did not intend to replace any of the existing service components. But there was a general consensus on the need for an IAS suggesting that an altimetry service can only be realized as an international, mission and agency independent, integrated effort: a distributed approach with close collaboration between data providers, archive and product centres, and research laboratories - similar as for example realized by the International GNSS service (IGS). The general IAS politics is therefore, to act non-competitive, but to identify and pool together national and international resources in altimetry, proposing missing or complementary components for the establishment of an International Altimeter Service and suggesting pilot projects, coordinated on voluntary basis and gradually improving existing services for the benefit of the altimetry community at large.

Activities

The IAS Terms of References were defined and published in Geodesist's Handbook (Drewes, 2008). According to IAG's Bylaws a Steering Committee was constituted. Members of the IAS Steering Committee are

- Yoshi Fukuda (president of IAG Commission 2)
- Cheinway Hwang (chairing IAG Subcommission 2.5 on Satellite Altimetry)
- Ole Anderson (representative for IGFS)
- Richard Gross (for Geophysical Fluids, Vice-President of IAG Commission 3)
- Phil Woodworth (for PSMSL and GLOSS Experts)
- Alexander Braun (ice applications)
- Wolfgang Bosch (Chair, chair of former IAS Planning Group)

2008/03/01 Re-Submission of a proposal for “Coordinating operations and science to establish an International Altimeter Service as a core element of the Global Earth Observing System (COSIAS)” in response to COST Open Call (OC-2007-2-1460)

The COSIAS proposal (Bosch 2007), initially submitted in March 2007 and re-submitted in autumn 2007, was supported by fourteen altimeter experts from nine European countries and eleven international consultants. It can be considered as a broad consensus with the most comprehensive description of necessary activities to coordinate operations and science of satellite altimetry for a Global Earth Observing System. Unfortunately the proposal was rejected in the very last stage of the evaluation process – obviously due to political reasons as it was criticized as a “danger and confusion to existing service elements”. Nevertheless, the COSIAS proposal is certainly a rather complete compilation of requirements to be set up for the establishment and operation of an altimetry service.

2008/04/19 Report of the IAS Chair at IAG Executive Committee Meeting in Vienna

2008/06/24 1st Business Meeting of the IAS-Steering Committee at the International IAG Symposium on Gravity, Geoid & Earth Observation, GGEO2008, Chania, Crete

2008/12/18 Presentation of the IAS Chair on “IAS as a core element of GGOS”, AGU Fall Meeting, San Francisco, Session G31C

Further activities were hindered by the fact that the Steering Committee did not succeed to nominate a chair for the Altimeter Service. A corresponding call remained unanswered. This is certainly caused by the fact that the International Altimeter Service is immediately seen as a competition to existing service elements. Obviously, the intention of IAS to be non-competitive was not recognized. Even one of the most popular data provider was not willing to take over the lead for the IAG service.

Web site development

The intention to set up a Web site on satellite altimetry is for several reasons rather ambitious: The existing service entities and numerous institutes with multi-disciplinary applications of satellite altimetry come along with many excellent Web sites – partly administrated by professional teams; As IAS has no resources at all, it is rather illusionary to set up the ultimate “one-stop shop” for altimeter users.

However, most of the existing altimetry web sites have a rather limited view, focussing either on a particular mission or a specific application. Geodetic applications are in general not well represented. Therefore, the most basic objectives of an IAS Web site is:

- provide users with information on where to get altimetry data and products by compiling and providing associated metadata,
- setting links to existing data providers and giving advice how to read, transform, and apply data and products.
- to improve information and documentation on all altimetry mission data and related products.

An initial compilation of available mission data and their associated data handbooks has been realized (<http://ias.dgfi.badw.de>). A list of the most basic products, their characterization and

links for downloads has been considered. This will inform the user about existing mean sea surface models, sea level anomalies, models of dynamic ocean topography, ocean tide models, and marine gravity data.

Documentation is sometimes insufficient and information on data and product quality (procedures) are often missing. This makes it difficult for users to get sufficient information on how similar products were generated by different groups, how they compare with each other and what specific processing steps have been performed. On the basis of already existing metadata standards (ISO19xxx or the Directory Interchange Format DIF) the IAS Web site will try to develop a general frame for the compilation, representation (e.g. by XML) and provision of metadata for altimeter mission data and derived high-level products and correction models. The WG has to comply with the GGOS Working Group on Data and Information Systems (GGOS WG DIS), the standards of the Open Geospatial Consortium (OGC) and cooperate and contribute to the EU INSPIRE initiative.

Pilot Projects

IAS will foster pilot projects demonstrating how resources can be shared in order to achieve a faster upgrade of altimeter data, a homogeneous long-term time series with consistency across different missions. The pilot projects are aimed at demonstrating particular advantages of a coordinated service and are expected to develop into core elements of the IAS. Following themes have been identified and discussed as possible themes for pilot projects:

- **Orbit as reference frame:** compile processing standards; toolbox to merge new orbits into altimeter records; compare geocentre realisation and geographical error pattern; comparison with crossover statistics;
- **Support to Cal/Val Activities** (with PSMSL & TIGA): Compile results of tide gauge trends, vertical velocities at tide gauges and sea level trends.
- **Ocean tides models:** compilation of state-of-the-art models; toolbox to merge them to altimeter records; transformation to spherical harmonics;
- **Ocean mass redistribution** (with Fluids Bureau): sea level variation minus steric effects (from climatologies, ARGO floats, SMOS.ocean models); effect on Earth rotation (OAM) and gravity field;
- **Marine gravity data** (with IGFS): set links to data sets of NSDC, SIO/NOAA, NGA; harmonize user interfaces; comparison of altimetry derived gravity data with ship-born and satellite-only gravity data;
- **Faster, distributed upgrade and online access of GDR:** Merging of re-tracked sensor data, new orbits and new correction models can take advantage of high granularity of GDRs by de-composing, reprocessing and re-merging. Sharing distributed resources can be accomplished by GRID technology.

References

Bosch W. (2007) Coordinating operations and science to establish an International Altimeter Service as a core element of the Global Earth Observing System (COSIAS)" proposal submitted to COST Open Call (OC-2007-2-1460)

Drewes, H. (2008) Geodesist's Handbook. Journal of Geodesy, Vol. 82(11), Springer, Berlin, DOI: 10.1007/s00190-008-0259-0