

International Altimetry Service (IAS)

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

Chair of the Steering Committee: Wolfgang Bosch (Germany)

Introduction

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. This initiative is non-competitive, but open to identify and pool together international resources in altimetry and to initiate projects completing or gradually improving existing services for the benefit of the altimetry community at large.

Initial activities

The IAS Terms of References were defined and published in The Geodesist's Handbook 2008 (Drewes et al. 2008, p 796).

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 Sub-commission 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 the former IAS Planning Group)

- 2008/03/01 Re-Submission of a Full 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) – rejected in the very last stage of the evaluation process.
- 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

General IAS Politics

Many organizations already provide altimetric data and value-added products. *It is not intended to replace any of the existing service components.* But the consensus on the need for an IAS suggests that a satellite 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, proposes complementary components for the establish-

ment of an International Altimeter Service and suggest pilot projects, coordinated on voluntary basis and gradually improving existing services for the benefit of the altimetry community at large.

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. It is, however, indicative that 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 particular objectives of an IAS Web site should be:

Improve information and documentation on all altimetry mission data and related products. This should happen independently of mission, agency, or application. 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.

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 is in preparation. 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.

Preparation of 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 floaters, 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.

IAS Pilot Project on Ocean Tides (IAS-PP-OT)

A pilot project on ocean tides has been prepared with a draft Call for participation to be submitted on the occasion of the IAG 2009 General Assembly in Buenos Aires. This Call is seeking proposals of groups, agencies, or individuals to contribute to one or more of the following initial, non-exclusive focal points:

- a. Compilation of global ocean tide (OT) models, their error estimates (if available) and their documentation; put them to a common, self-standing format; provide interfaces to other formats or back-transformations to original formats.
- b. Provide an Internet portal, allowing to download global ocean tide models, associated documentation (reports, plots, etc.), and software to evaluate the models. The portal should also inform about the work of the IAS-PP-OT, the progress achieved in modelling ocean tides, and links to research groups involved in ocean tide modelling.
- c. Compare OT models with each other, document and visualize differences.
- d. Provide software allowing to evaluate OT models for ocean areas, at individual observations sites or along the sub-satellite tracks of altimeter satellites; document the interpolation technique and the treatment of admittances.
- e. Provide software to transform OT models to a spherical harmonic representation used for orbit and gravity field determination processes, and other computations required for Earth system science studies.
- f. Evaluate the impact of different OT models on orbit computation (of LEO's) and gravity field determination by altimeter data (crossover statistics) and analysis of residuals of space gravimetry or gradiometry observations (de-aliasing of GRACE and GOCE).
- g. Compile tidal constants, analyse times series of tide gauges, bottom pressure gauges, continuously operating GNSS sites and gravimeter stations in order to validate OT models by means of independent data or to use this data in assimilation approaches.
- h. Compile local or regional ocean tides models, compare them with global OT models and investigate approaches to perform a fusion of global and non-global ocean tide models.

Other pilot projects are under preparation.

References

Bosch, W. and 16 experts from 10 European countries (2007): Coordinating operations and science to establish an International Altimeter Service as a core element of the Global Earth Observing System (COSIAS), COST proposal in response to the Open Call OC-2007-2-1460 (available on request by the primary author)

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