4 GGFC Workshop

A GGFC Workshop was held in Vienna on 20 April 2012 with the goal of allowing the Special Bureau Chairs, the GGFC Product Centers, and the GGFC user community to review the structure and data holdings of the GGFC and to make suggestions for new products. Thirty scientists from the geodetic community attended the workshop with an agenda of 20 presentations! In addition to presentations by the SB chairs, there were presentations 1) reviewing some of the newly proposed GGFC Provisional Products, 2) comparing models with geodetic observations, 3) showing geodetic observations driven by fluid redistribution, and 4) providing a statement of current issues and future challenges for the GGFC and geodetic community.

Program

The following presentations were given at the workshop:

1) GGFC: Current Status

The GGFC Special Bureau for the Oceans: Providing Ocean Products for Geodesy
Richard S. Gross

Special Bureau for Hydrology
Jianli Chen

Combination Products
Tonie van Dam, Mike Thomas

Global Geophysical Fluids: an IERS RS/PC Perspective
Brian Luzum et al.

2) GGFC: Proposed new Products

Mass Loading Products at NASA GSFC
D. MacMillan, D. Erikson; Chopo Ma (presenter)

High-resolution models of surface displacements caused by atmospheric, oceanic and hydrological loads
Jean-Paul Boy

Atmospheric effects in space geodesy: plans and perspectives
Johannes Boehm et al.

The GRACE AOD product release 05
H. Dobslaw et al.; Rolf König (presenter)

3) Comparison of Models with Observations

Consistency of Crustal Loading Signals Derived from Models & GPS: Inferences for GPS Positioning Errors
Jim Ray et al.

SLR Test Products Using ECMWF Atmospheric Loading and Gravity
Erricos C. Pavlis, Magdalena Kuzmicz-Cieslak

Evaluations of Global Geophysical Fluid Models Based on Broad-band Geodetic Excitations
Wei Chen, Jim Ray

How well can we estimate the displacements associated to loading?
Pierre Valty et al.

4) Observations

Degree 2 and Geocenter Variations from Satellite Laser Ranging
Minkang Cheng

Low degree harmonic series from LAGEOS
Rolf König

Global Mass Balance Effects on the Earth‘s Rotation Rate
Haoming Yan, Ben F. Chao

5) Issues and Future Challenges

On the challenges of developing a mass conserving system model
Maik Thomas et al.

How to deal with coordinate systems in numerical weather models? - Goals of the newly formed IAG SSG12
Thomas Hobiger et al.

Mitigation of unmodelled non-tidal atmospheric pressure loading into parameters of a global GNSS solution
Rolf Dach et al.

Call for space geodetic solutions corrected for non-tidal atmospheric loading (NT-ATML) at the observation level
Xavier Collileux et al.

Uncertainties in models for glacial isostatic adjustment
Wouter van der Wal, Valentina Barletta

Satellite Gravity Measurements and the Global Water Cycle
Jianli Chen

The detailed workshop program and copies of most of the presentations are available at <http://www.iers.org/Workshop2012>.

Recommendations

The highlights of the meeting are summarized in the following recommendations:

1. Special bureaux should investigate forming intra-fluid/intra-model weighted combined products of available models (including forecasts), in part to investigate ways to quantify (relative) errors of each model. However, this might complicate efforts to form multi-fluid products with full internal consistency (see below).

2. The GGFC should promote the development and use of dynamic barometer models and products, especially for short-period (less than ~10 d) applications.
3. Greater availability of sub-daily product sampling should be sought for all surface fluids (down to 3 hr or shorter).
4. Special bureaux should consider ways to move towards adoption of common product formats (and delivery modes), at least for load grids.
5. Efforts should be made to reduce the latency of the availability of the products required for operational use (for example especially when oceanic forcing is used). This might be addressed by provision of suitable forecast products if their accuracy is sufficient.
6. The GGFC should lead a community effort to review and elaborate recommended procedures and algorithms to compute EOP excitations from geodetic time series, especially to ensure the best fidelity for the high-frequency regime.
7. Apparent large discrepancies in surface hydrology EOP excitations should be investigated in view of the relatively better performance of such models in computing local surface load displacements than for global angular momentum variations. It seems likely that large-scale time-variable biases in the hydrology models might degrade globally integrated products, like EOP excitations.
8. Working with the Technique Services and the greater geodetic community, the utility of load corrections in geodetic data reductions needs to be much better quantified and put on a sound statistical basis taking account of actual SNR values for the loads as a function of sampling intervals.
9. Global mass conservation is one of the biggest issues facing the community. Mass conserving system models (i.e. atmosphere+ocean +water storage) do not exist for geodetic applications. The current solution is to sum different models. This leads to inconsistencies. Recommendation: Only models (for example ocean and hydrology) that are forced by the same atmospheric model and consider continental discharge into the oceans should be combined to compute total effects.
10. At the same time, a much better understanding of the nature and magnitude of internal measurement errors by all the space geodetic techniques is needed, especially at short temporal samplings, if these are to be used to evaluate fluid-based load models.

Tonie van Dam, Wolfgang R. Dick