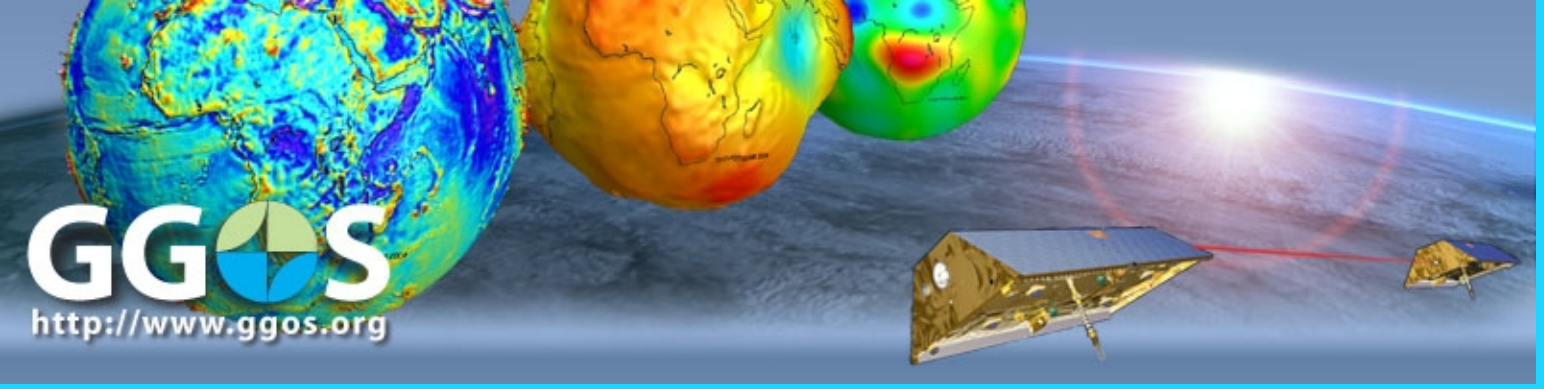


Five Annual Workshops on Developing the Global Geodetic Observing System into a Monitoring System for the Global Water Cycle

Hans-Peter Plag, Richard S. Gross, Norman L. Miller,
Markus Rothacher, Susanna Zerbini

GGOS Mission is to collect, archive and ensure the accessibility of geodetic observations, results and models covering the three fundamental fields of geodesy

- geometry and kinematics of the Earth's surface,
- Earth orientation and rotation, and
- the Earth's gravity field and its variability.

GGOS has the *central theme*

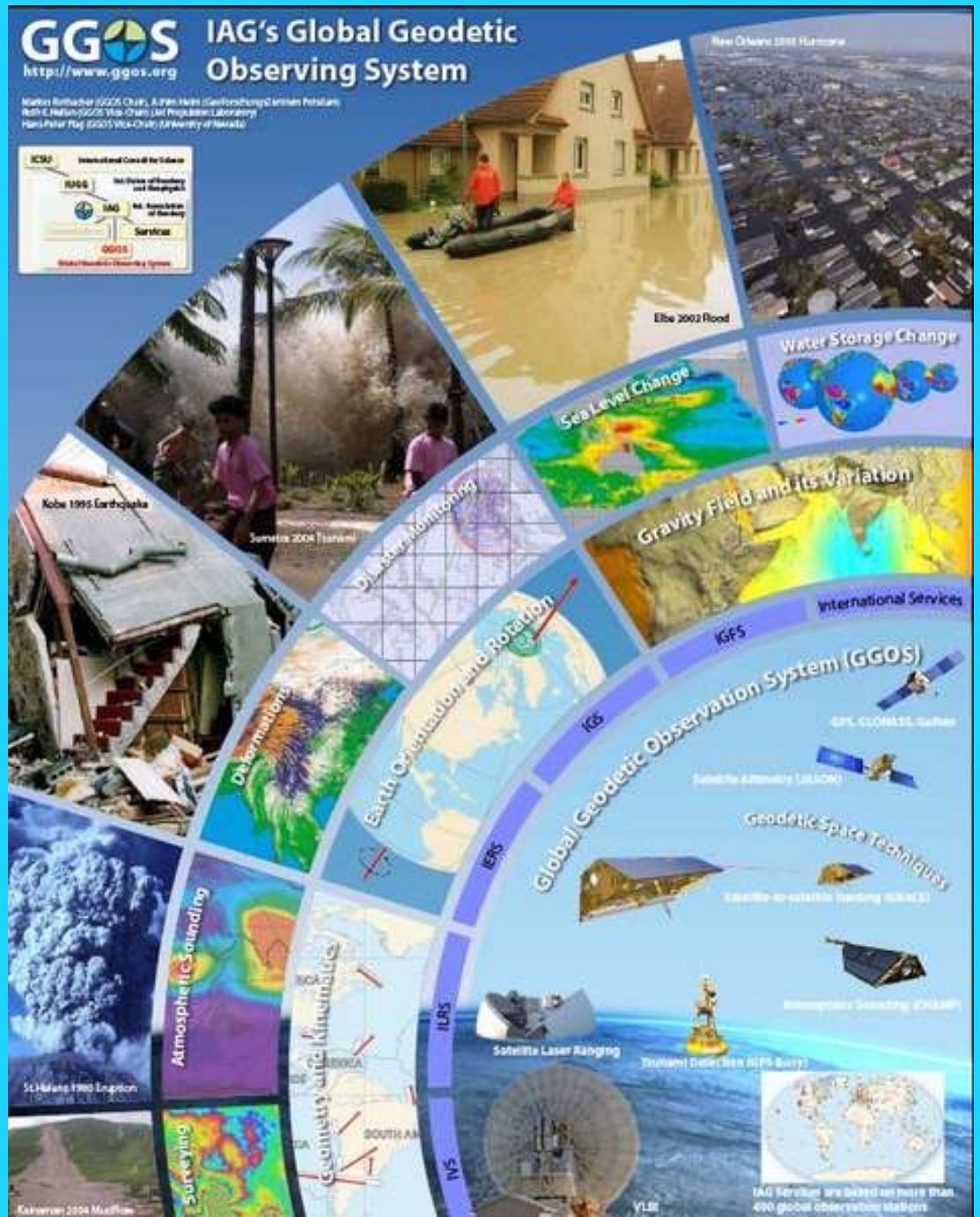
"Global deformation and mass exchange processes in the System Earth"

which includes the activities of GGOS in the following areas:

- The global patterns of tectonic deformation;
- The global patterns of all types of height changes;
- Deformation due to the mass transfer between solid Earth, atmosphere, and hydrosphere including ice;
- Quantification of angular momentum exchange and mass transfer.

Coordination within geodesy

- GGOS aims at maintaining the stability of time series of geometric and gravimetric ***reference frames***;
- GGOS ensures the consistency between the different geodetic ***standards*** used in the geo-scientific community;
- GGOS aims at improving the geodetic ***models*** at the level required by the observations;
- GGOS focuses on all aspects to ensure the consistency of geometric and gravimetric ***products***.


GGOS
http://www.ggos.org
IAG's Global Geodetic Observing System
Elbe 2002 Flood
Water Storage Change
Sea Level Change
Gravity Field and its Variation
Kobe 1995 Earthquake
Sumatra 2004 Tsunami
Deformations
Earth Orientation and Rotation
International Services
IGFS
Global Geodetic Observation System (GGOS)
IGS
IERS
ILRS
IVS
Geodetic Space Techniques
Satellite Laser Ranging
Atmospheric Sounding
Geometry and Dynamics
Surveying
St Helens 1980 Eruption
Kenenan 2004 Mudflow

Objectives of the Workshops

- Explore and develop components of GGOS most relevant for monitoring the water cycle
- Make observations available for assimilation in predictive models of the global water cycle.
- Develop products and algorithms that will allow regional water management to fully utilize the potential of the geodetic techniques for monitoring the regional terrestrial hydrosphere.

Workshop Science Issues

How will projected climate change affect the hydrological cycle and the availability of water to society in the various regions?

- *The development of an integrated dynamic model for the prediction of geodetic signals of daily to interannual surface mass changes.*

- Surface mass changes are the relocation of water mass in the ocean, atmosphere, and terrestrial hydrosphere.

Year 1: Workshop will address mission requirements, options for the design of the missions, options for the deployments and mission operation, and participation in the science and operational mission teams.

- Particular emphasis will be on the participation of emerging space agencies in Africa and Asia.

- Interact with the GEO Task WA-07-02 (Satellite Water Quantity Measurements and Integration with In-situ Data) and CEOS with the goal to discuss a virtual constellation for water cycle monitoring.

- A delivery will be a Workshop summary report with specific recommendations and agreements for the implementation of GRACE follow-on missions.

Year 2: Science of geodetic monitoring of the hydrological cycle:

Workshop will review the state of the art in understanding the quantitative fluxes in the global water cycle.

Will consider the relation between geodetic observations and mass changes in the main reservoirs of the water cycle.

Will clarify the open science questions that the geodetic observations can help to reconcile.

Year 3: *Determination of mass transports in the hydrological cycle from geodetic observations*:

Workshop will focus on the inversion of geodetic observations for surface mass changes and the relation of these changes to parameters of the global water cycle.

Key issues will be comparison of models and algorithms, cross-technique and cross-model validation, including meteorological and climatological models of the water cycle at regional and global scales.

Year 4: *Integration of geodetic observations and products in models of the hydrological cycle*

Workshop will focus on algorithms for assimilation of geodetic observations and products into models of components (terrestrial, atmosphere, ocean) the global water cycle.

Assess the improvements in terms of accuracy, spatial and temporal resolution, and predictive capabilities of the models.

Year 5: *Improving regional water management in Africa and Asia on the basis of geodetic water cycle monitoring*

Workshop will bring together representatives of regional water management authorities and representatives of the research and observation communities involved in the project activities.

Assess the requirements of regional water management, in particular in developing countries, in terms of products derived from space-geodetic observations and the associated models.

The goal is to define a set of products in terms of parameter, spatial and temporal resolution, accuracy, and latency, which can be made available in support of regional water management.