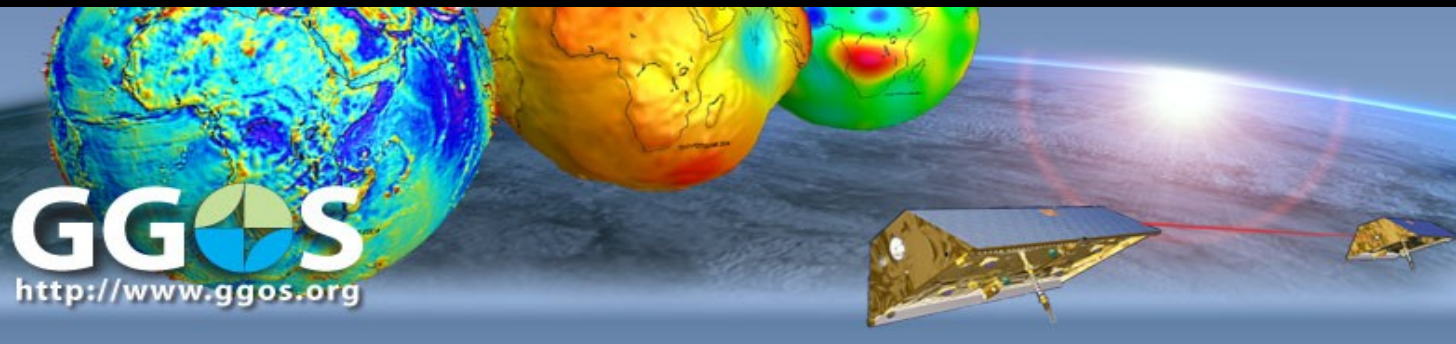




IGCP 565 Project:

Developing the Global Geodetic Observing System into a Monitoring System for the Global Water Cycle

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The Global Geodetic Observing System



International
Association of
Geodesy

The term, and the acronym GGOS, has two very distinct meanings, which should not be confused:

- * the "organization GGOS" consisting of components such as committees, panels, working groups, etc., and*
- * the "observation system GGOS" comprising the infrastructure of many different instrument types, satellite missions, and data and analysis centers.*



The Global Geodetic Observing System



International
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GGOS (*the organization, IAG's Flagship*) has the Mission to:

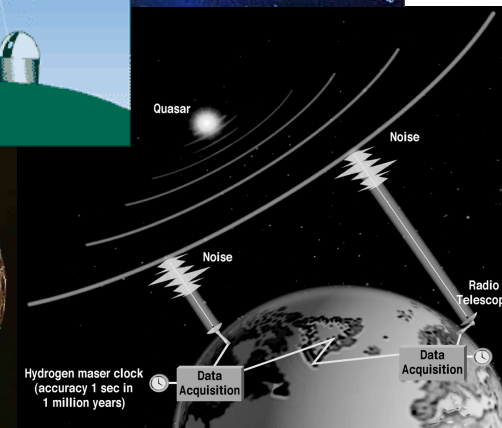
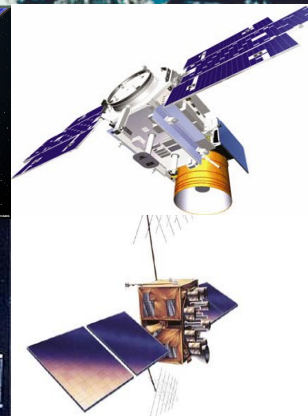
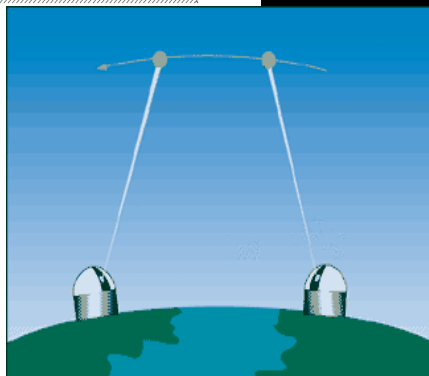
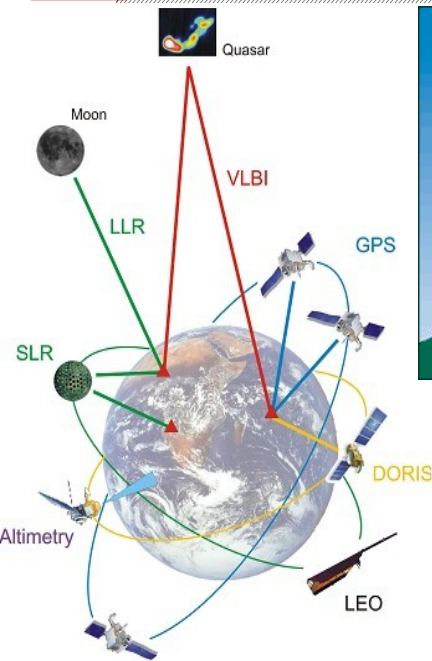
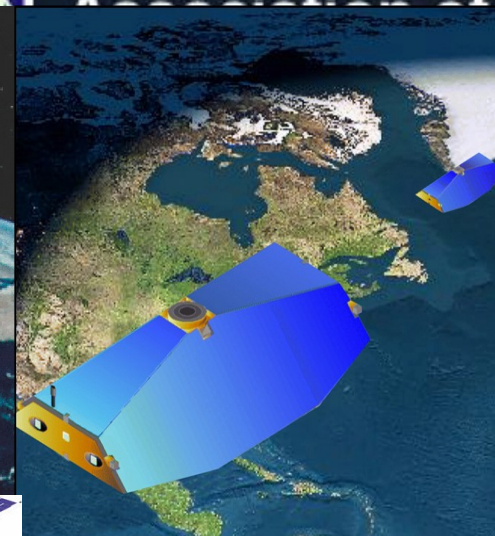
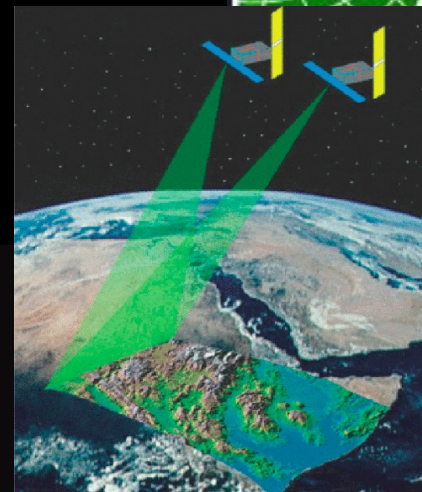
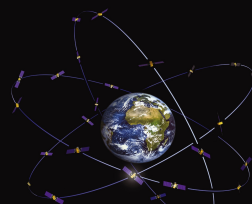
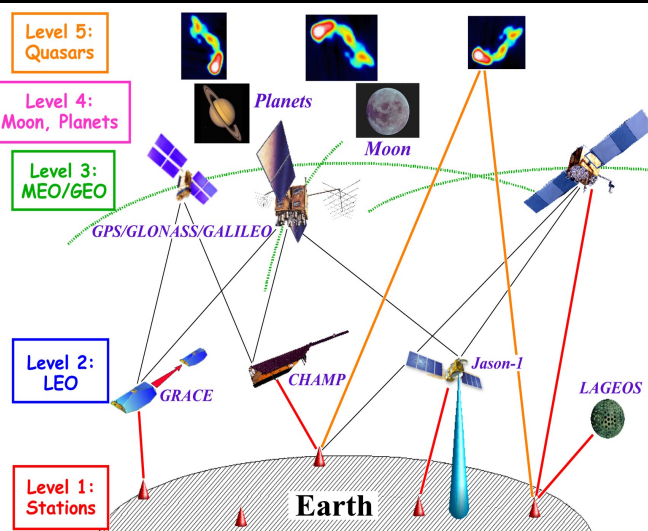
- define** the geodetic infrastructure that is needed to meet scientific and societal requirements;
- advocate** for the establishment and maintenance of this geodetic infrastructure;
- improve** the quality of and accessibility to geodetic observations and products;
- coordinate** interaction between the IAG Services, Commissions, and stakeholders;
- educate** the scientific community about the benefits of geodetic research and the public about the fundamental role that geodesy plays in society.



The Global Geodetic Observing System



International Association of Geodesy



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IGCP 565 Objectives



Origin and Intent:

- Initiated as an outreach from geodesy (GGOS) to hydrology;
- Intended as a framework for the dialog between hydrology and geodesy.

Goals:

- 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.

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IGCP 565 Activities



Research projects:

- on-going projects related to combined analysis of geodetic observations
- proposed projects for assimilation in hydrological models
- planned projects for regional water management

Coordination with:

- GEO Tasks (in particular, Water Tasks)
- IGWCO
- GEWEX
- ...

Specific Activities:

- Series of five annual workshops
 - Funding for participants from developing countries
- Maintain a web page (<http://geodesy.unr.edu/igcp565/>)

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IGCP 565 Research Projects



Current Projects:

- Surface Mass Loads from GRACE, GPS, and Earth Rotation Measurements. NASA, (Gross, Plag, Blewitt).
- Development and Evaluation of a California Water and Energy Model, CEC (Miller et al.).
- Environmental Geodesy: Variations of Sea Level and Water Storage in the Australian Region, Australia (Tregoning, Coleman, Featherstone, Rizos, Watson, Awange, Kuhn, Titov).
- TIVAGAM – Time-Variable Gravity and Surface Mass Processes: Validation, Processing and First Application of Satellite Gravity Data (Rothacher et al.).
- Sea Level, Gravity, and the Earth's Rotation (Gross, Song)

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IGCP 565 Science Issues



- The development of an integrated dynamic model for the prediction of geodetic signals due to daily to interannual surface mass changes.
- Inversion algorithms for combined geodetic observations for surface mass changes.
- Integration/assimilation of the observations in integrated predictive models of the hydrological cycle.
- Development of products relevant for regional water management.

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

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IGCP 565 Workshop 1



*December 11, 2008, San Francisco (prior to GRACE
Science Team meeting): Science of geodetic monitoring
of the hydrological cycle*

Goals:

- Review the state of the art in understanding the quantitative fluxes in the global water cycle;
- Consider the relation between geodetic observations and mass changes in the main reservoirs of the water cycle;
- Clarify the open science questions that the geodetic observations can help to reconcile;
- Report to the GRACE Science Team meeting.

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IGCP 565 Workshop 2-5



WS2, Autumn 2009, (Europe): Geodetic gravity satellite missions

WS3, 2010: Determination of mass transports in the hydrological cycle from geodetic observations

WS4, 2011: Integration of geodetic observations and products in models of the hydrological cycle

WS5, 2012: Improving regional water management in Africa on the basis of geodetic water cycle monitoring

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IGCP 565 Workshop 1 Summary



Statistics:

- Small Workshop, 15 participants, 5 countries, hydrology and geodesy
- Good start of the dialog between hydrology and geodesy
- Presentations will be available at the web page very soon

Reminder:

- 1 billion people without sufficient, clean drinking water, many more based on non-renewable resources
- UN Millennium Development goal: half this number by 2015
- (Only) one contribution: better monitoring as input to management

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IGCP 565 Workshop 1 Summary



Conclusions:

- Main gaps in the hydrological budget: deep groundwater but also evaporation;
- Important problem in water management: seasonal prediction; this requires models with predictive capability;
- Approach to utilize geodetic observations: assimilation into hydrological models;
- Addressing the hydrological question: hybrid of local implementation and global observations and models;
- geodetic observations are valuable on all scales;
- best way to get the products to the users: demonstrate to operational agencies what you can do ...

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Summary/Conclusions



The Global Geodetic Observing System has a great potential to contribute to monitoring of the global water cycle, including groundwater changes, on global to regional scales.

The IGCP 565 Project will exploit this potential for support of regional water management.

The IGCP 565 Project will focus on regional applications in Africa.

The IGCP 565 Project is open for the interested community ...