

The International Association of Geodesy's Global Geodetic Observing System

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IGCP 565 Workshop 5: Water Security for Africa
Bringing Together Research, Monitoring, and Managing

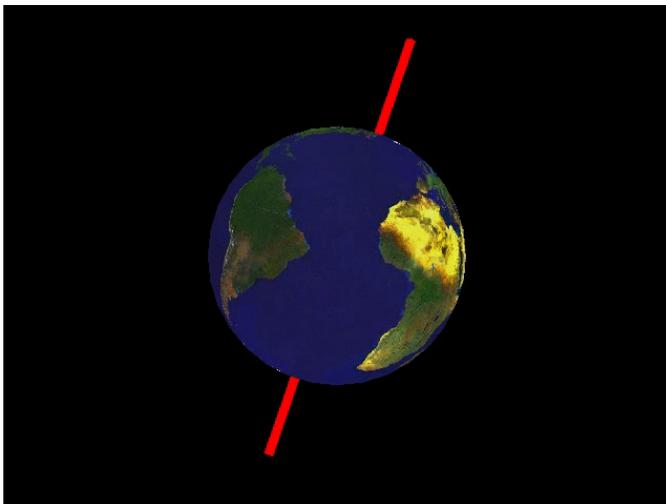
October 29–30, 2012
Johannesburg, South Africa

The Three Pillars of Geodesy

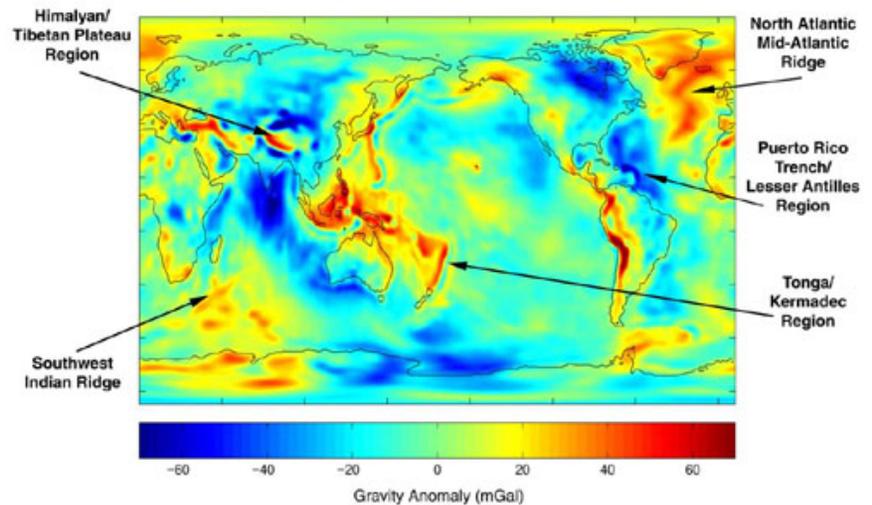


Shape & Deformation

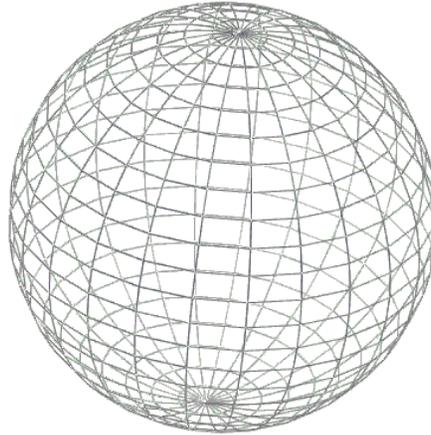
Rotation



Gravity & Geoid

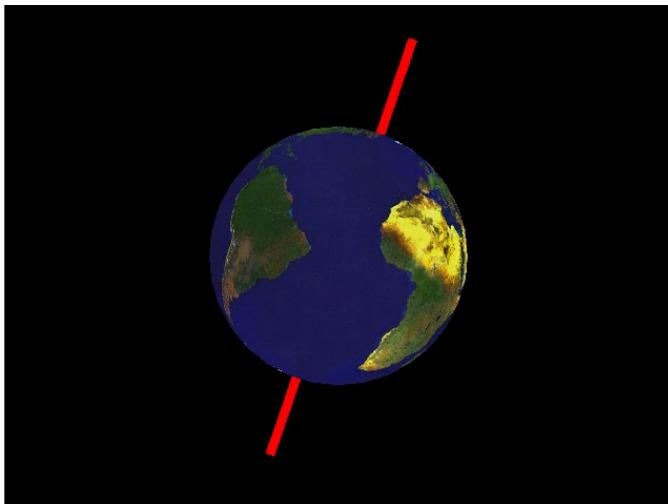


The Three Pillars of Geodesy

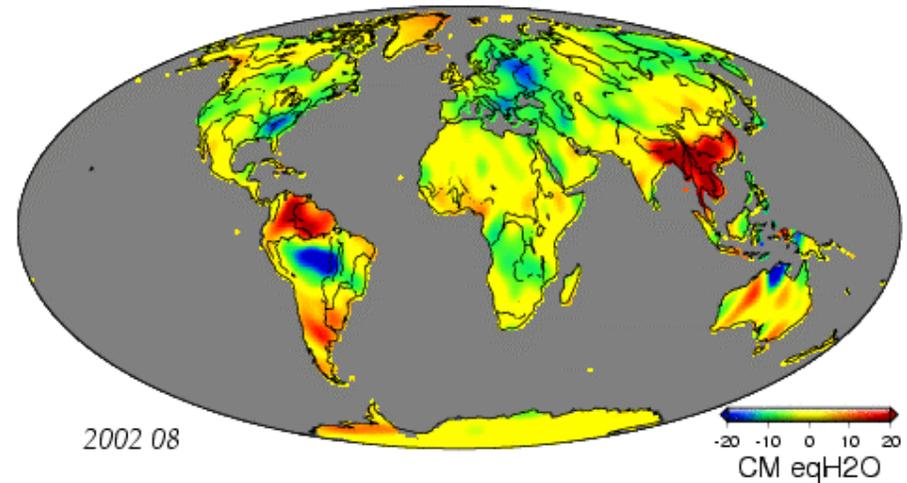


Shape & Deformation

Rotation



Gravity & Geoid



Geodetic Observing Systems

Positioning



GNSS
(Source: NASA)



SLR
(Source: NASA)



DORIS
(Source: NASA)



VLBI
(Source: NASA)

Geodetic Observing Systems

Positioning

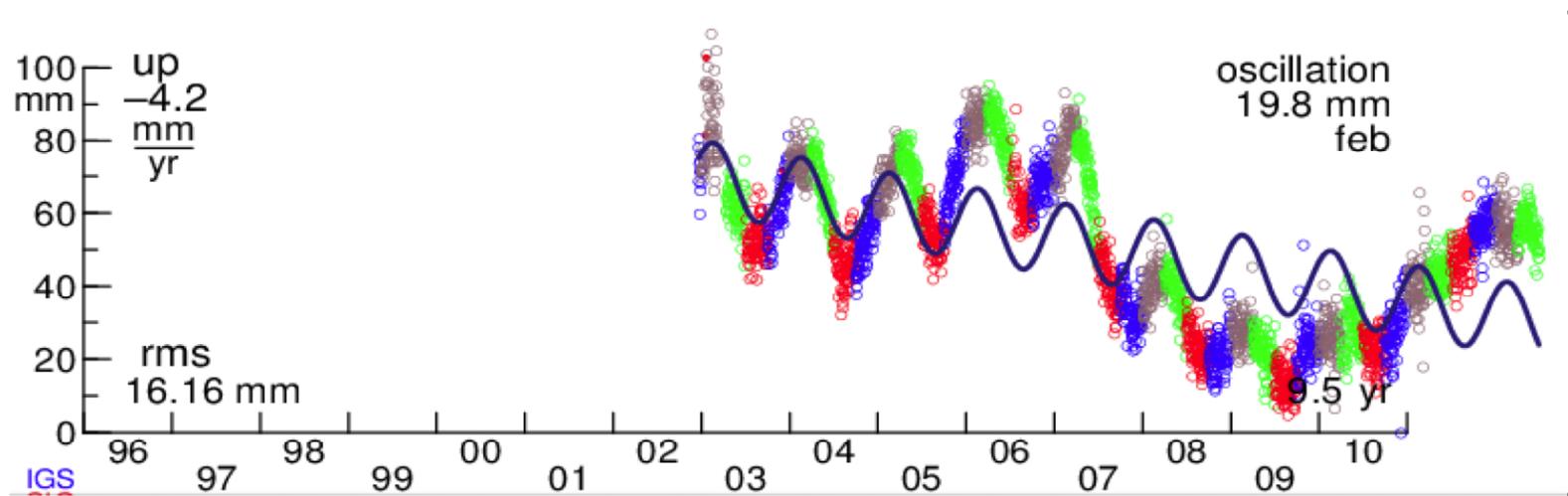
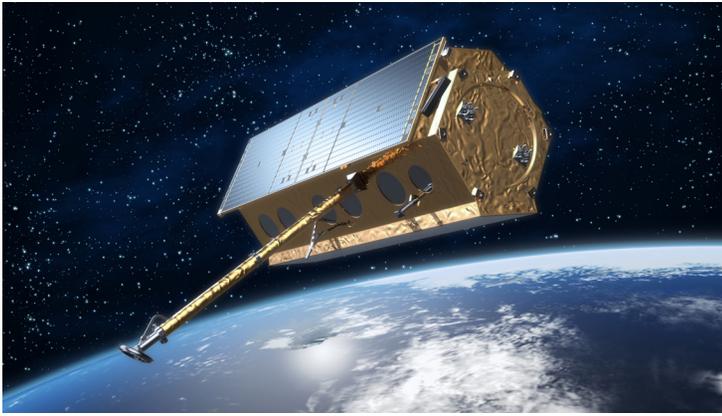


Fig 8 GPS Time Series for 'blsa', Orange County Basin

(Drake et al., 2012)

Geodetic Observing Systems

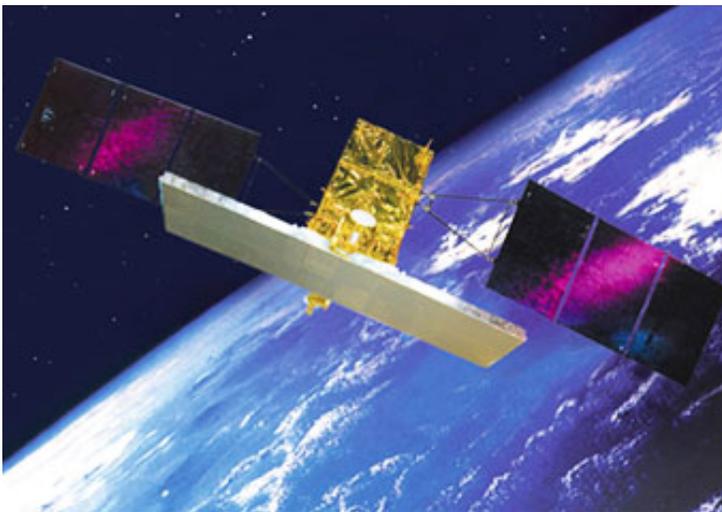
Imaging



TerraSAR-X
(Source: EADS Astrium)



RADARSAT-2
(Source: CSA)



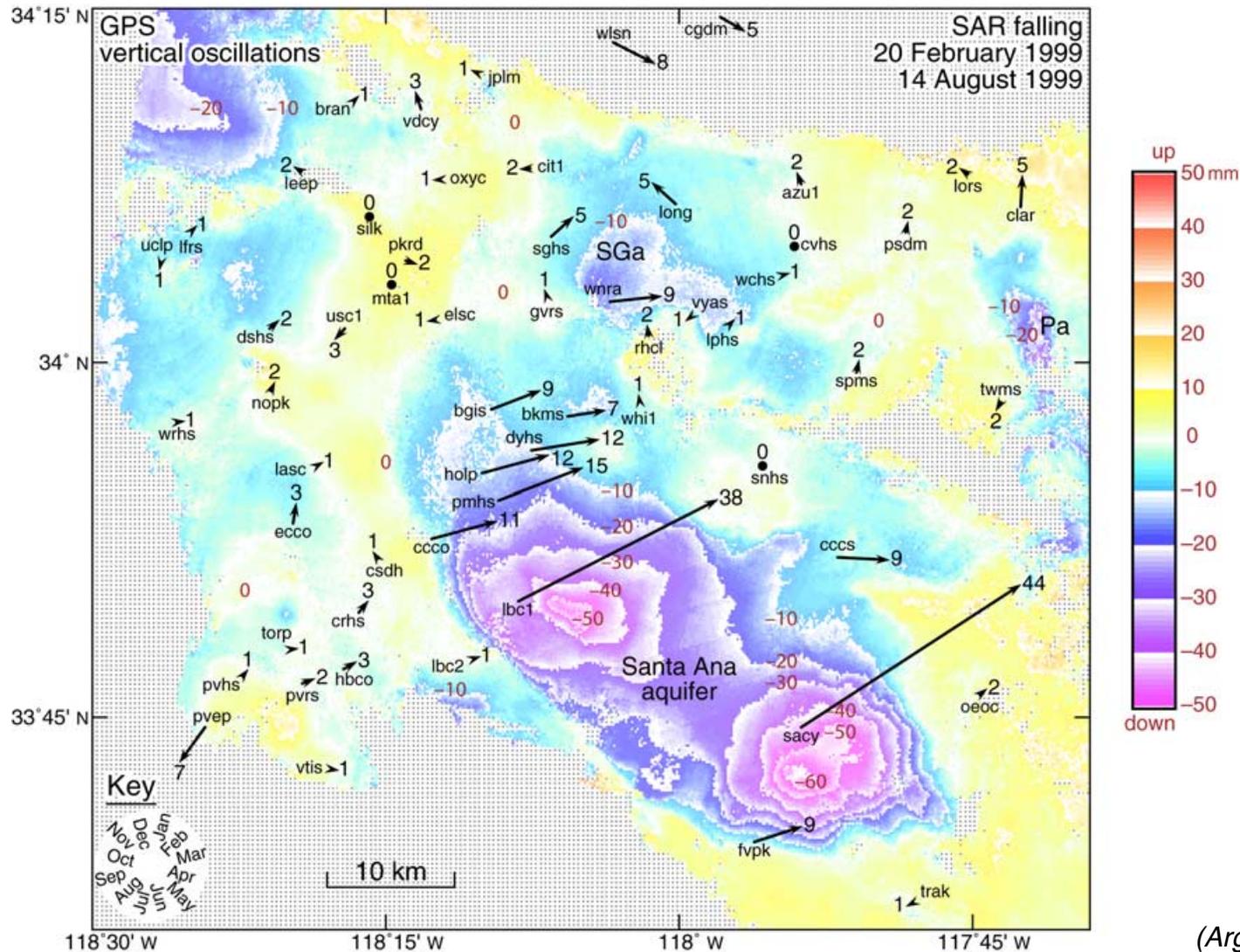
COSMO-SkyMed
(Source: ASI)



RISAT-1
(Source: ISRO)

Geodetic Observing Systems

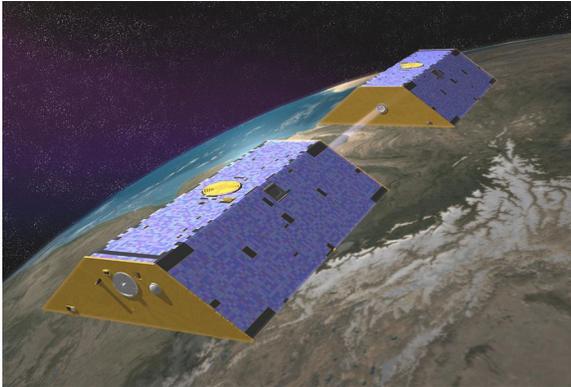
Imaging



(Argus et al., 2005)

Geodetic Observing Systems

Gravity



GRACE

(Source: NASA/JPL)

SLR

(Source: NASA)



**absolute
gravimeter**

(Source: Micro-g LaCoste)

**super-
conducting
gravimeter**

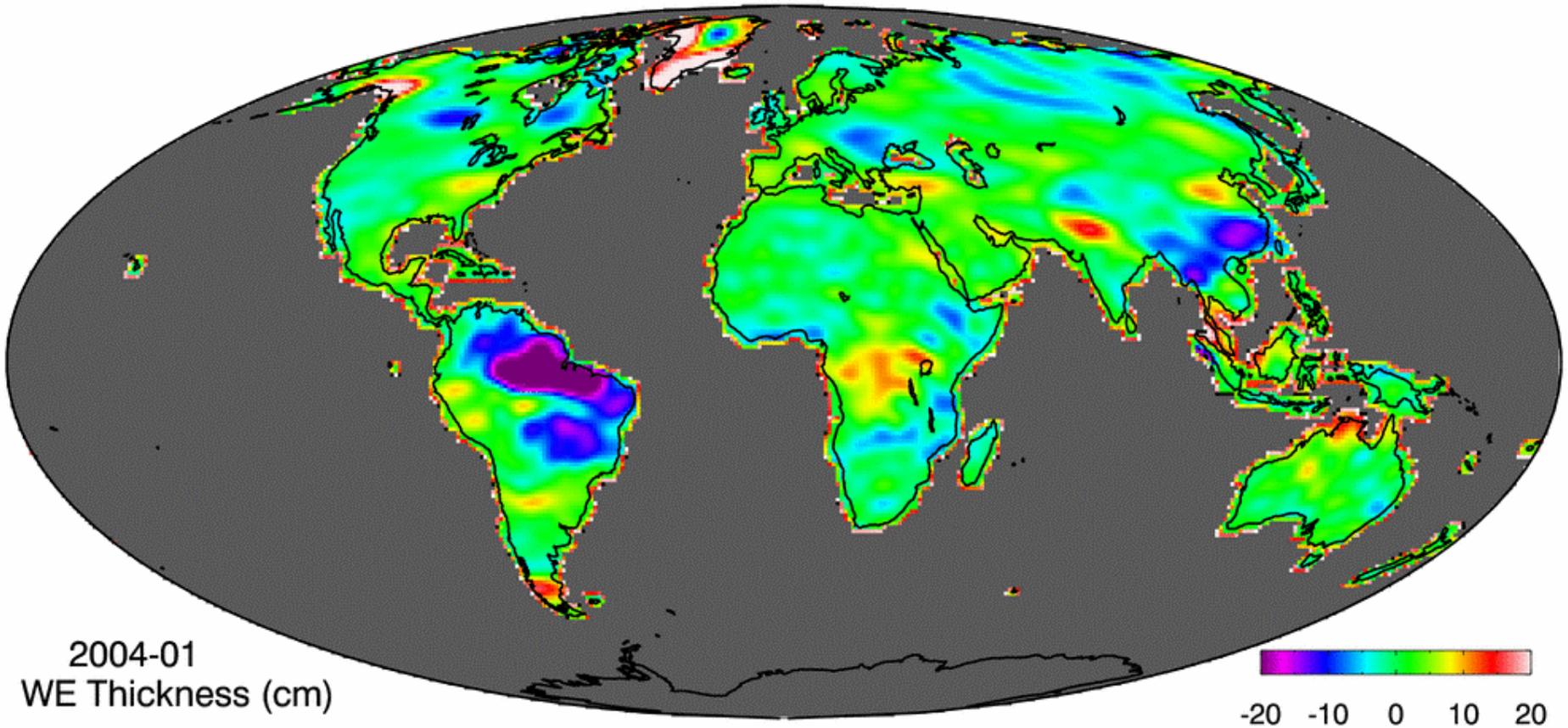
(Source: GWR Instruments)



Geodetic Observing Systems

Gravity

GRACE CSR-SS RL05



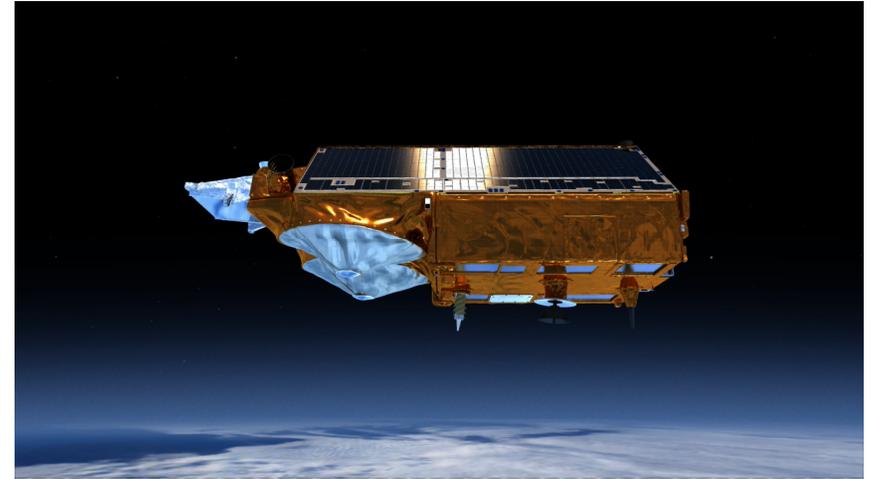
<http://grace.jpl.nasa.gov>

Geodetic Observing Systems

Altimetry



OSTM
(Source: NASA)



CryoSat-2
(Source: ESA)



HY-2A
(Source: CNES)

Geodetic Observing Systems

Altimetry

USDA United States Department of Agriculture
Foreign Agricultural Service

http://www.pecad.fas.usda.gov/cropexplorer/global_reservoir



Toolbox

Lake Vaaldam (0580) Height Variations from Envisat

Lake Vaaldam



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[View 3D Image in Google Earth](#)

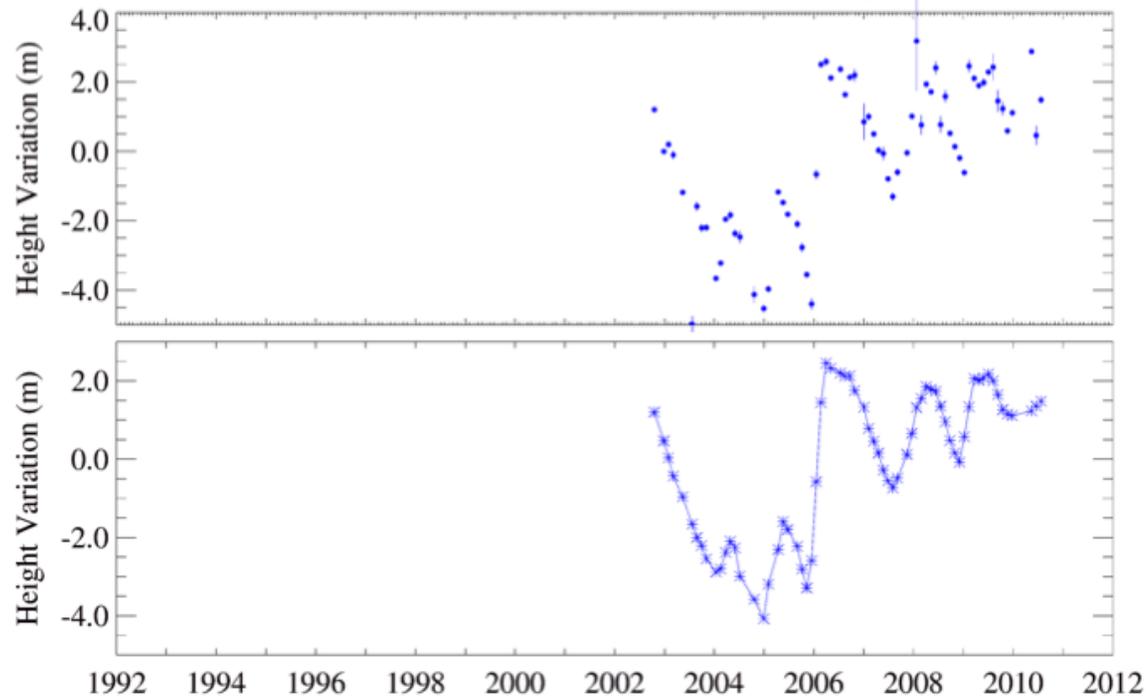
[Click here or on the graph to download the lake level data file](#)

[Click here to view the Reference Datum and Geoid profiles across the lake](#)

[Click here to download the Reference Datum and Geoid profile text file](#)

Lake Vaaldam Height Variations

Envisat Pass 442, Rev 221 - Cycle 12 Geo-referenced 20Hz Along Track Reference



*** Envisat MWR GDR 20hz altimetry

Version Env.1.4
Last valid elevation: 21 July, 2010



Events

- Current date: October 23, 2012
2012-10-22- 2012-10-24 1st Int. VLBI Technology Workshop
2012-10-26- 2012-10-27 25th CODATA General Assembly
2012-10-29- 2012-10-31 SIRGAS Meeting
2012-10-31 TransNav 2013 Marine Navigation and Safety of Sea Transportation Gdynia, Poland Abstract Deadline
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What are our services?

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April 15-19, 2013, Warsaw, Poland

Satellite, Lunar, and Planetary Laser Ranging: Characterizing the Space Segment

ABLOS Conference on the Law of the Sea

Call for papers on Regional and Global Geoid-based Vertical Datums

Geodesy in a Nutshell (NASA movie)



IAG is a Constituent Association of the International Union of Geodesy and Geophysics



Hot Topic



150th Anniversary of IAG

IAG History

The International Association of Geodesy celebrates its 150th Anniversary in 2012. In order to celebrate these memorable years, several documents focusing on the history of Geodesy and our Association will be published on the IAG Website throughout the year.

Please click on this link to read these pages.

For more information, please click here!

GGOS



Next Assembly



IAG Scientific Assembly 2013
Potsdam, Germany

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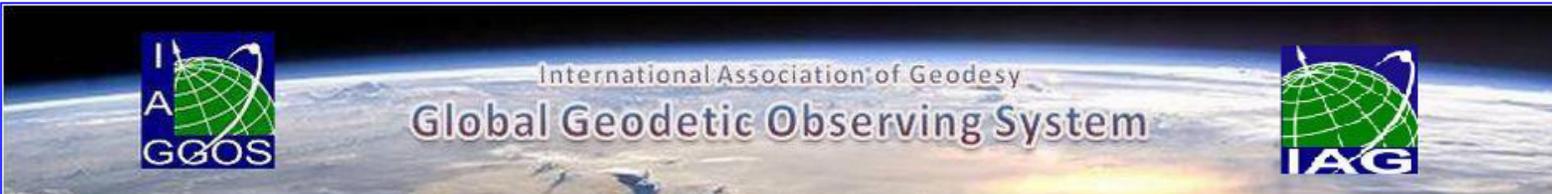
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Geodetic Journey From ancient surveying...

...to modern Earth observation





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The Web asi.it

The Global Geodetic Observing System (GGOS)

GGOS is the Observing System of the [International Association of Geodesy \(IAG\)](#).

GGOS works with the IAG components to provide the geodetic infrastructure necessary for monitoring the Earth system and for global change research. It provides observations of the three fundamental geodetic observables and their variations, that is, the Earth's shape, the Earth's gravity field and the Earth's rotational motion.

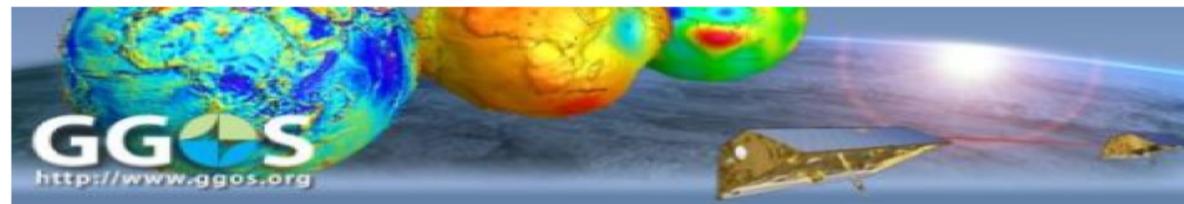
GGOS integrates different geodetic techniques, different models, different approaches in order to ensure a long-term, precise monitoring of the geodetic observables in agreement with the Integrated Global Observing Strategy (IGOS).

GGOS provides the observational basis to maintain a stable, accurate and global reference frame and in this function is crucial for all Earth observation and many practical applications.

GGOS contributes to the emerging Global Earth Observing System of Systems (GEOSS) not only with the accurate reference frame required for many components of GEOSS but also with observations related to the global hydrological cycle, the dynamics of atmosphere and oceans, and natural hazards and disasters.

GGOS acts as the interface between the geodetic services and external users such as the [Group on Earth Observation \(GEO\)](#) and United Nations authorities. A major goal is to ensure the interoperability of the services and GEOSS. With this the geodetic community can provide the global geosciences community with a powerful tool consisting mainly of high quality services, standards and references, and of theoretical and observational innovations.

The [GGOS Portal](#) will provide a unique access point to all geodetic products. Thus, the Portal will emphasize Geodesy's contribution to Earth Observation for assessing geohazards and reducing disaster. The Portal consists of the GGOS Web site and the portal itself, comprising geoportal components like a clearinghouse, a map viewer, and a metadata editor. The GGOS Portal is currently under development.



© GGOS (Pages still under development. Comments, suggestions and corrections are welcome and should be sent to the GGOS Coordination Office ggos_co@asi.it)



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Science Applications

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GEODETIC APPLICATIONS

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Home

The Global Geodetic Observing System Portal (GGOS Portal)

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The GGOS Portal provides a unique access point to all geodetic products. Thus, the Portal will emphasize Geodesy's contribution to Earth Observation for assessing geohazards and reducing disaster. The Portal consists of information to GGOS topics, a metadata catalog including a search engine and an editor, a map viewer, and a list of GGOS products.

News GGOS Portal

- The Global Geodetic Core Network: new version of "Call for Participation"
- GGOS Themes and Template for Proposals under Theme 3
- Pages Topics - Services - ILRS and Topics - Services - IDS updated
- More

Search

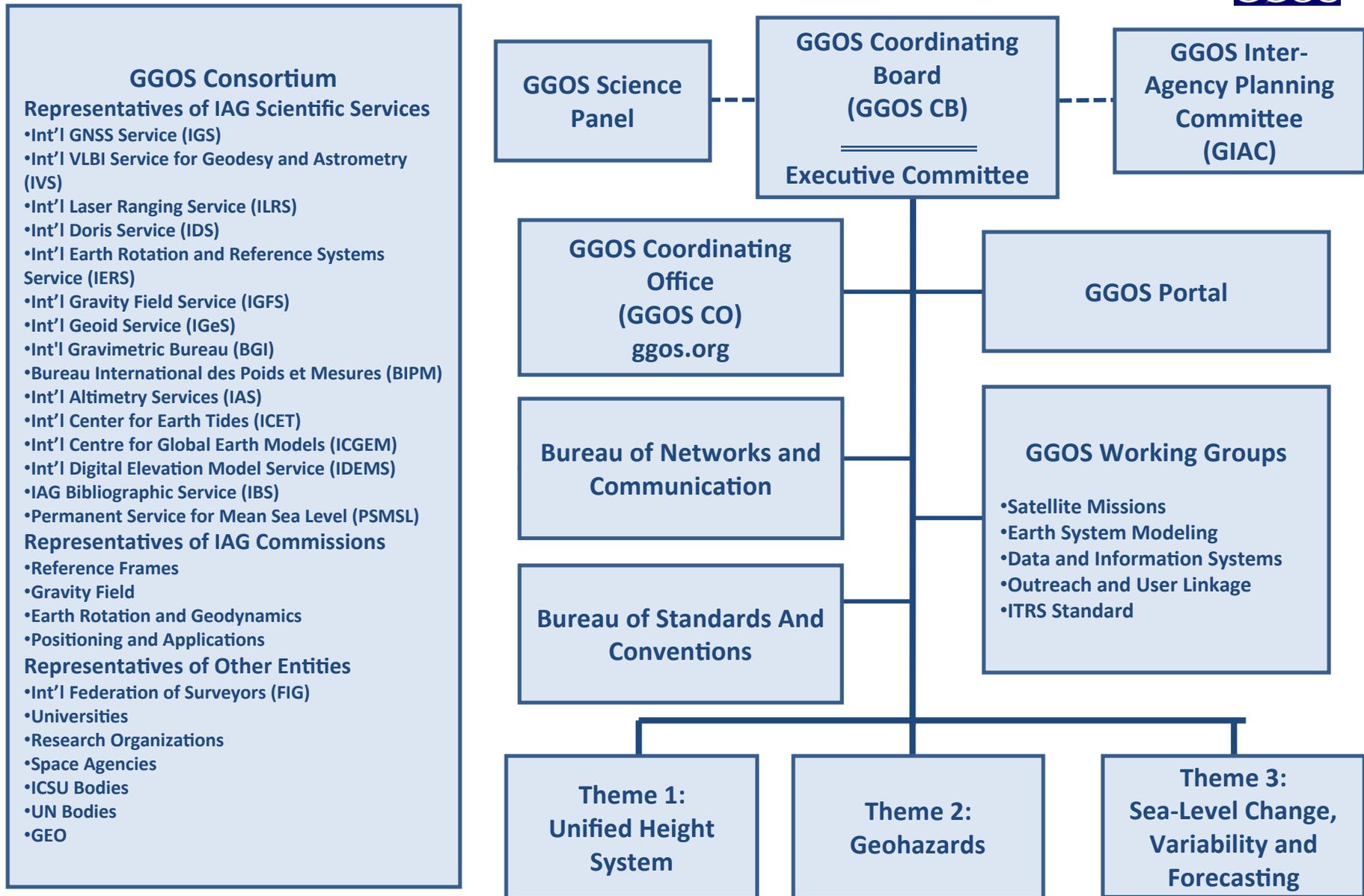
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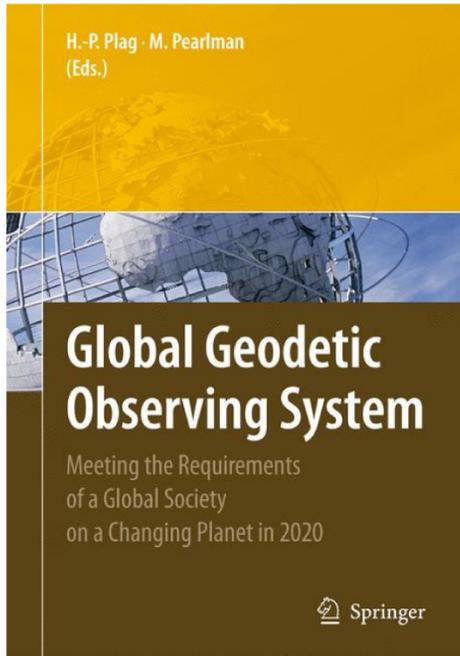
Print Recommend page

Modification date: 17 Aug 2012

Global Geodetic Observing System



GGOS Reference Document



Hans-Peter Plag, University of Nevada, Reno, NV, USA; Michael Pearlman, Harvard Smithsonian Center for Astrophysics, Cambridge, MA, USA (Eds.)

Global Geodetic Observing System

Meeting the Requirements of a Global Society on a Changing Planet in 2020

With the provision of accurate reference frames and observations of changes in the Earth's shape, gravity field and rotation, modern geodesy takes a fundamental role for improved understanding of geodynamics, geohazards, the global water cycle, global change, atmosphere and ocean dynamics, and it supports many societal applications that depend on accurate geo-referencing. To advance geodetic theory, methods and infrastructure for Earth system science and applications, the International Association of Geodesy (IAG) has established the Global Geodetic Observing System (GGOS). This book provides a comprehensive overview of geodesy's contribution to science and society at large, and it identifies user needs and requirements in terms of geodetic observations and products. Specifications for a global geodetic observing system that would meet these requirements lead to considerations of system design and implementation.

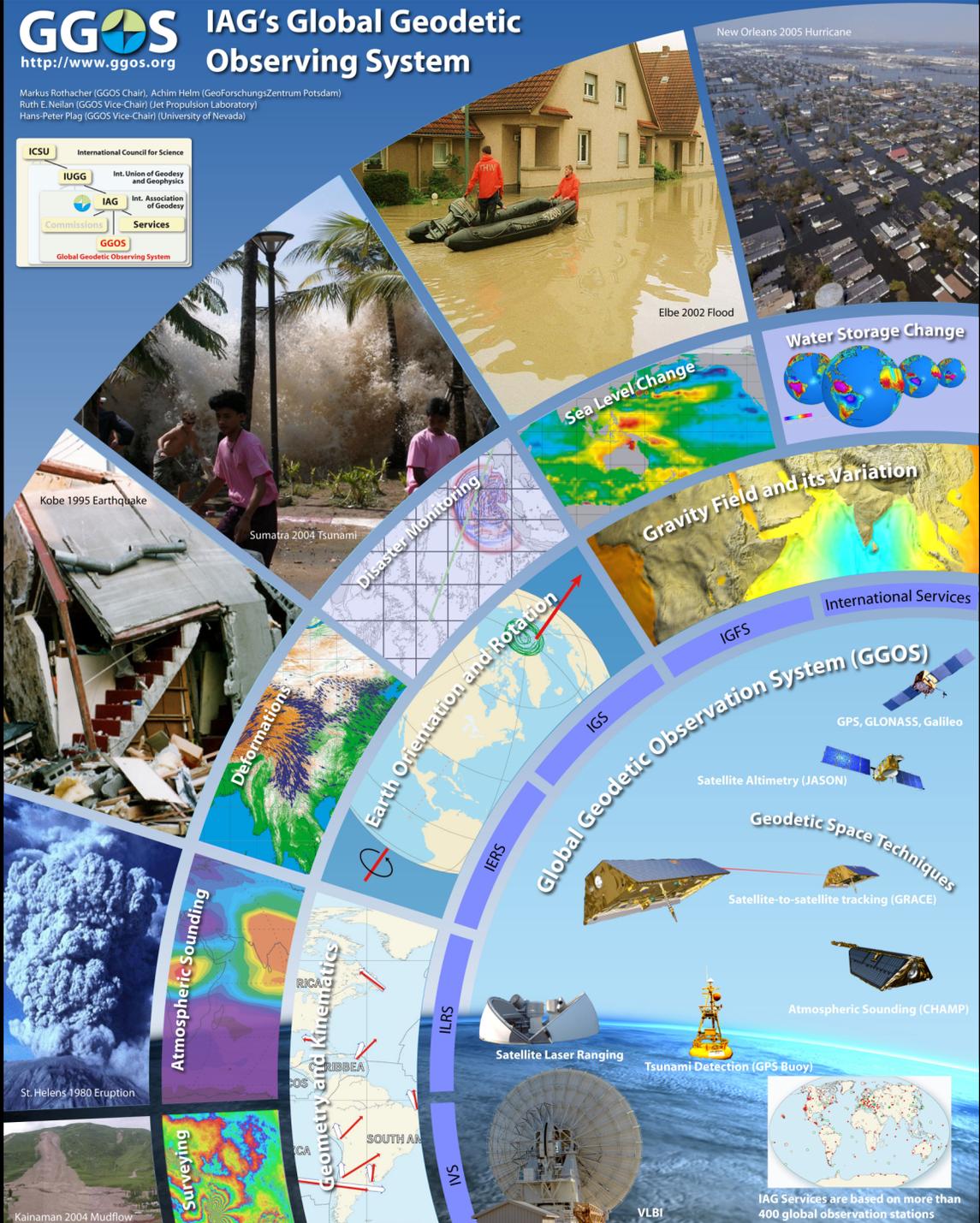
Contents: Executive Summary.- 1 Introduction.- 2 The goals, achievements, and tools of modern geodesy.- 3 Understanding a dynamic planet: Earth science requirements for geodesy.- 4 Maintaining a modern society.- 5 Earth observation: Serving the needs of an increasingly global society.- 6 Geodesy: Foundation for exploring the planets, the solar system and beyond.- 7 Integrated scientific and societal user requirements and functional specifications for the GGOS.- 8 The future geodetic reference frame.- 9 The future Global Geodetic Observing System.- 10 Towards GGOS in 2020.- 11 Recommendations.- References.- Acronyms and abbreviations.- Index.



<http://www.ggos.org>

IAG's Global Geodetic Observing System

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Ruth E. Nellan (GGOS Vice-Chair) (Jet Propulsion Laboratory)
Hans-Peter Plag (GGOS Vice-Chair) (University of Nevada)



New Orleans 2005 Hurricane

Elbe 2002 Flood

Kobe 1995 Earthquake

Sumatra 2004 Tsunami

St. Helens 1980 Eruption

Kainaman 2004 Mudflow

IAG Services are based on more than 400 global observation stations