

# **GEOSS Joint Asia – Africa Water Cycle Symposium**

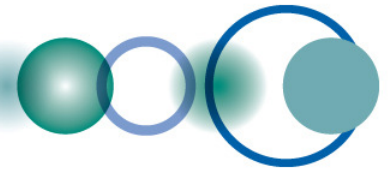
***Needs of Stakeholders and GEOSS Capability***

**25-27 November 2013  
Tokyo**

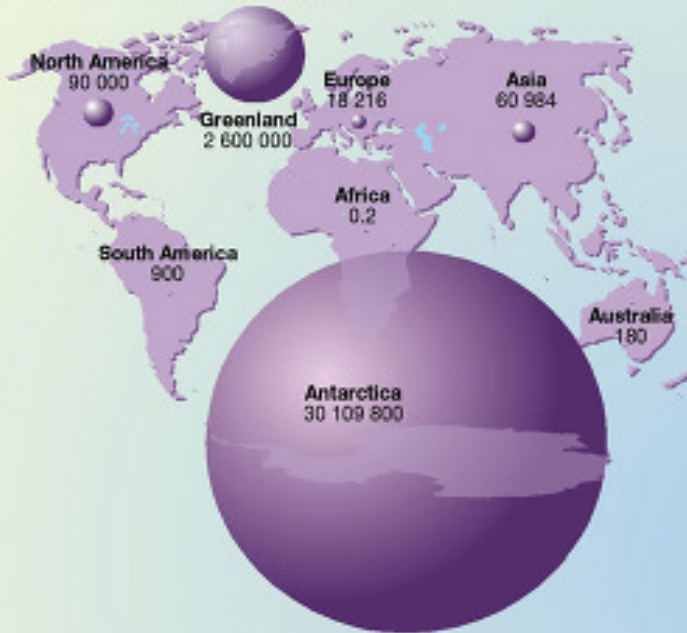
***Douglas Cripe  
GEO Secretariat***



# Where is the water?



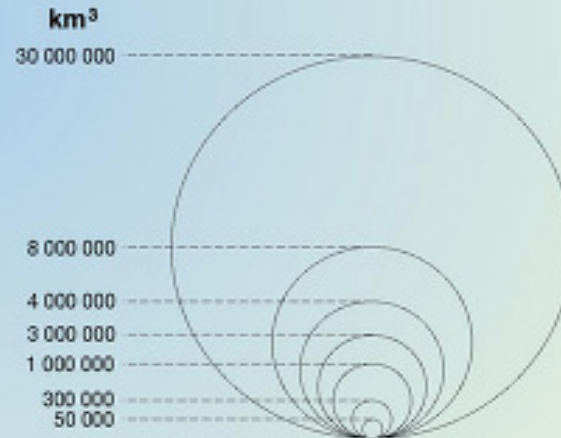
Glaciers and permanent ice caps (km<sup>3</sup>)



Wetlands, large lakes, reservoirs and rivers (km<sup>3</sup>)



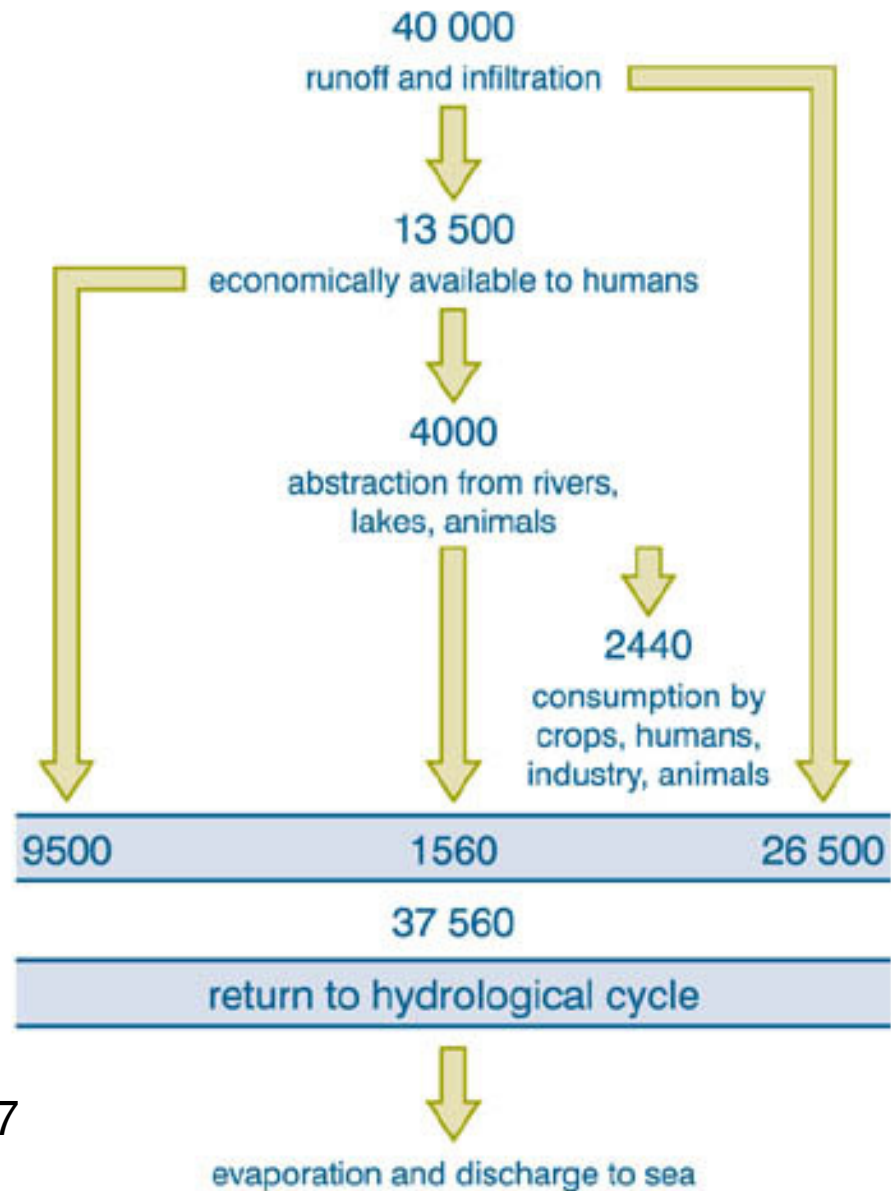
Groundwater (km<sup>3</sup>)



Source: Igor A. Shiklomanov, State Hydrological Institute (SHI, St. Petersburg) and United Nations Educational, Scientific and Cultural Organisation (UNESCO, Paris), 1999; World Meteorological Organisation (WMO); International Council of Scientific Unions (ICSU); World Glacier Monitoring Service (WGMS); United States Geological Survey (USGS).



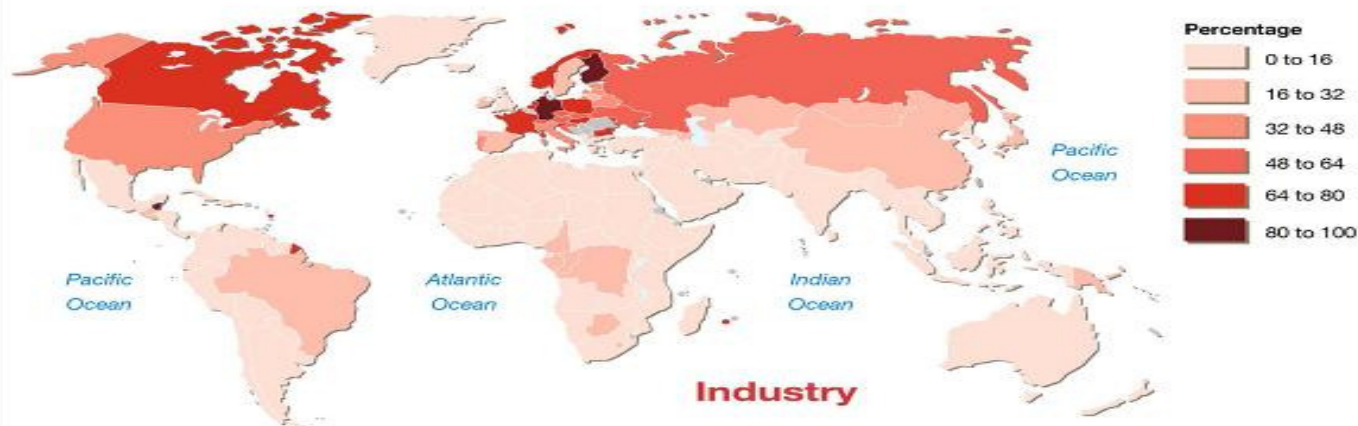
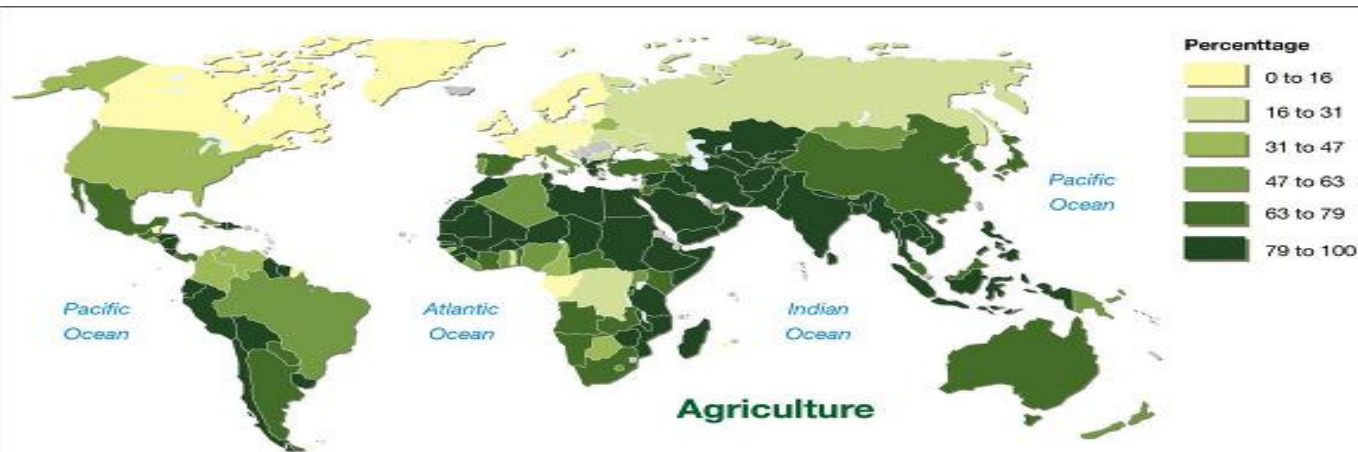
# Where does the water go?



$\text{Km}^3$ , Rohwer et al., 2007

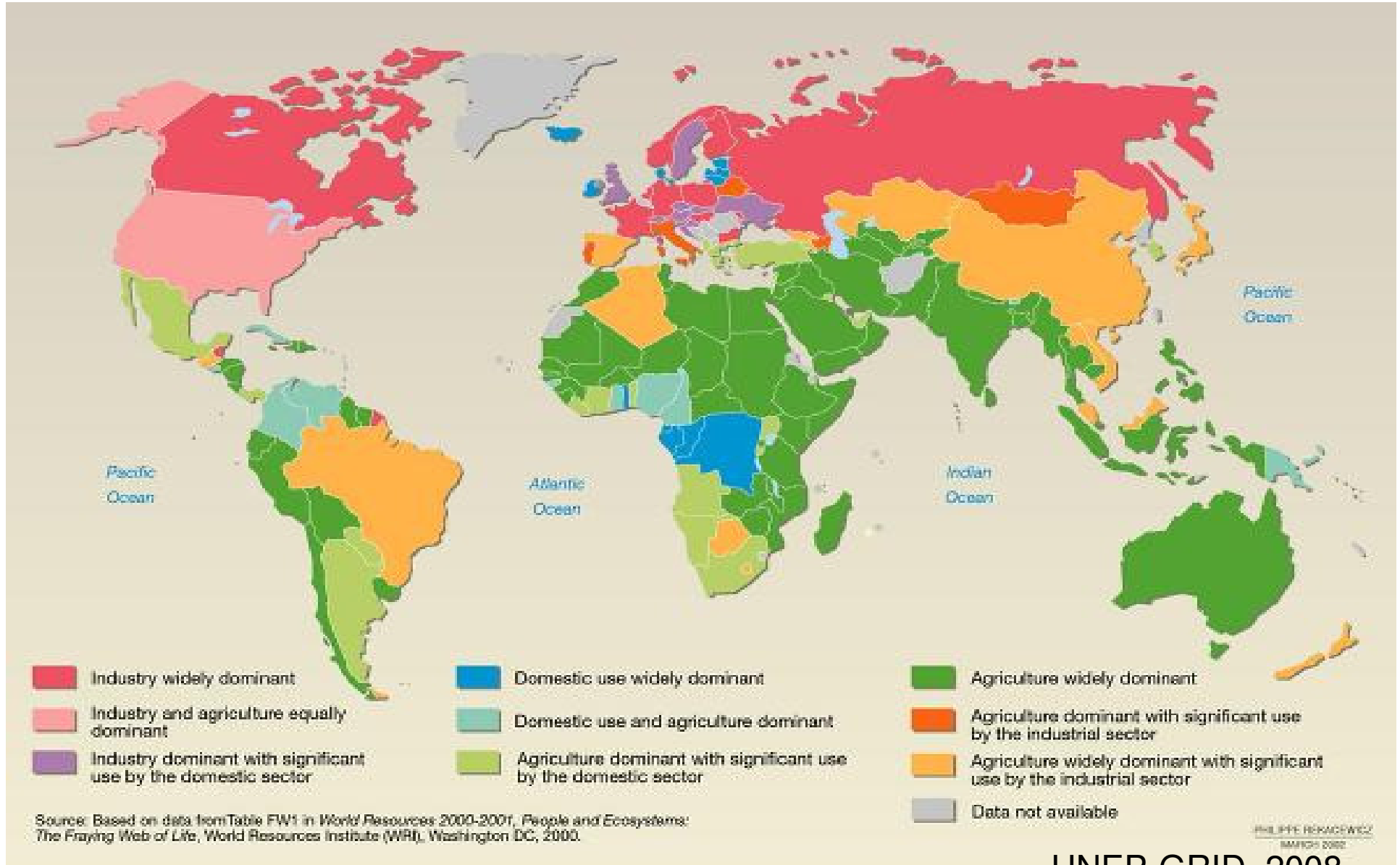
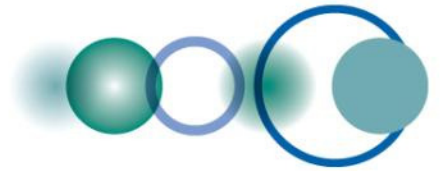


# Water use by sector



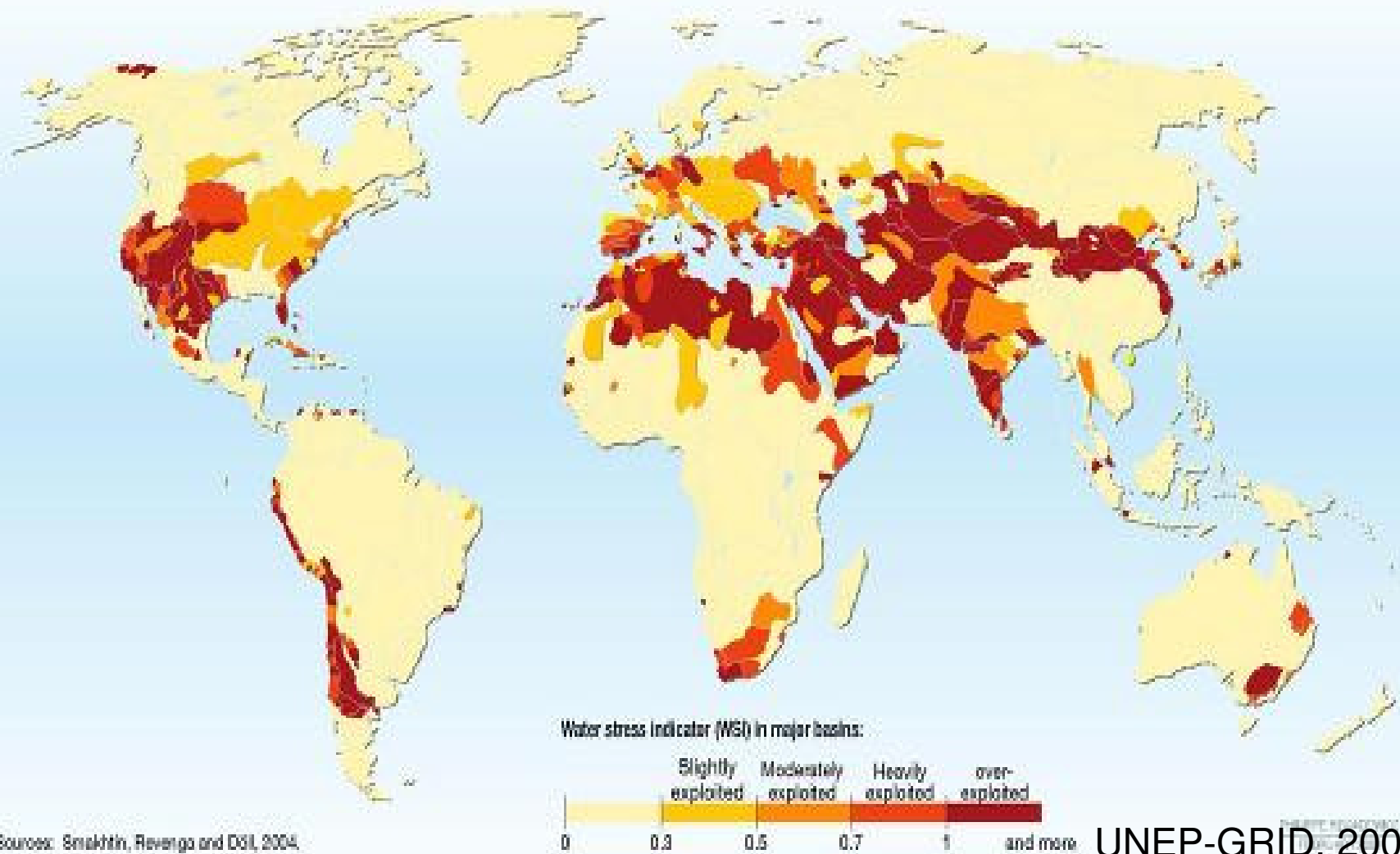
**70% Agriculture  
20% Industry  
10% Domestic**

UNEP-GRID, 2008





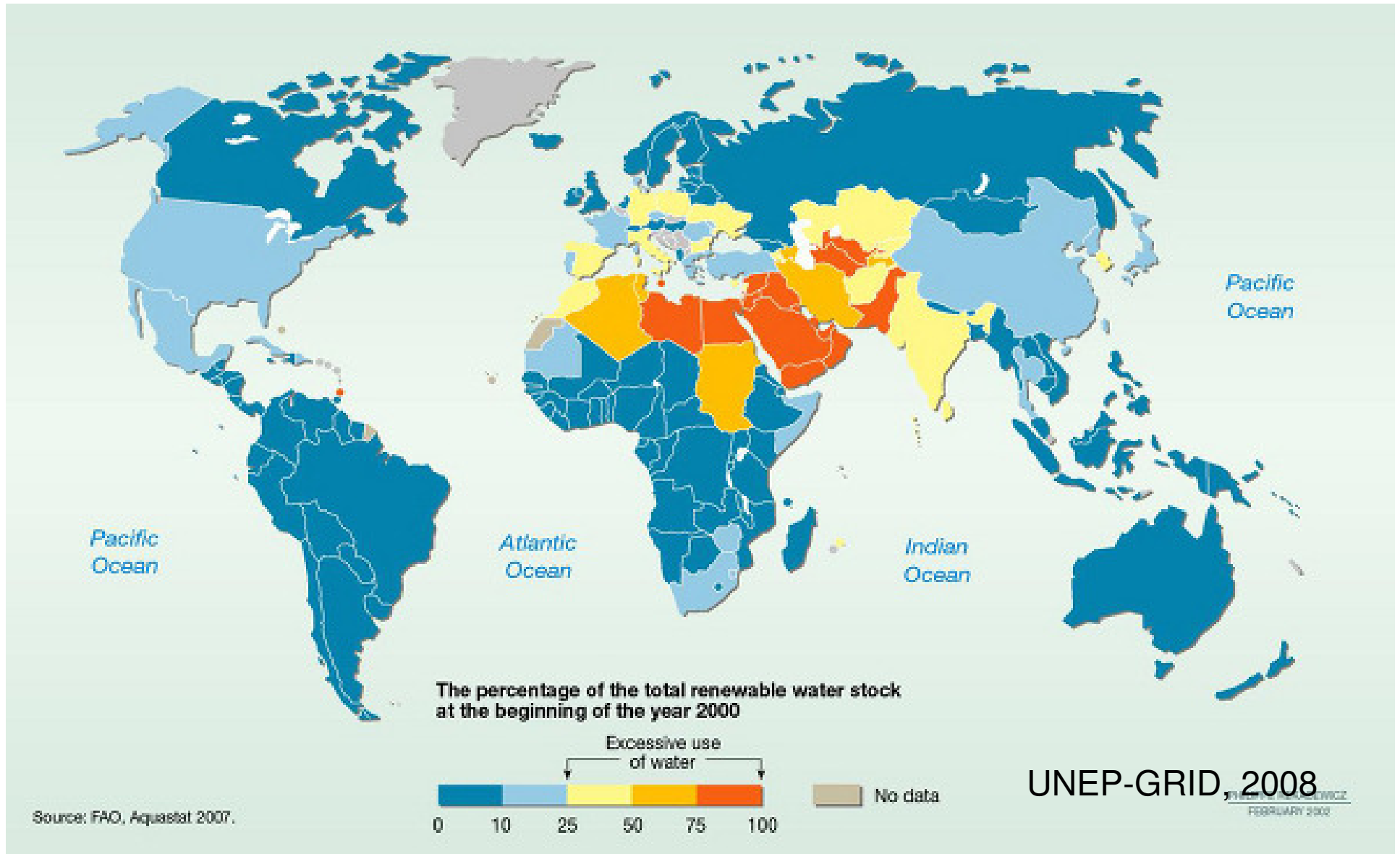
# Water Stress Indicator



Sources: Smakhtin, Revenga and Döll, 2004.

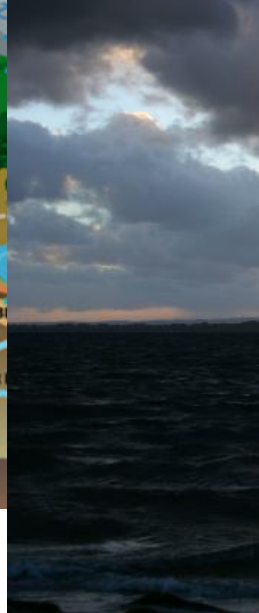
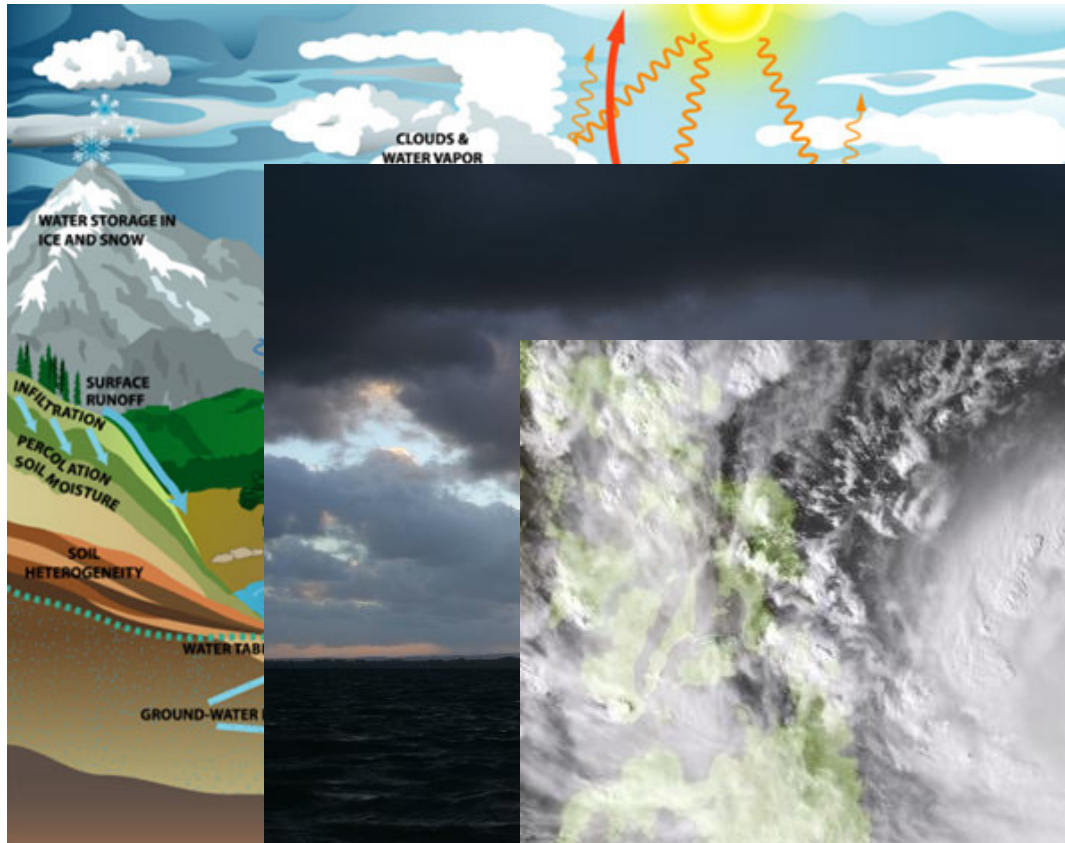
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# Water Scarcity





# End-Users: *Research*







## End-Users: *Management*

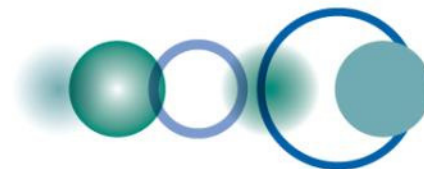




# Observational Data/Information Needs

**Global observations of water cycle variables needed for 4 purposes:**

- **to characterize variability, explore predictability of global energy and water cycle (requires longterm records of significant climate and hydrologic indicators)**
- **to understand complex processes involved in global energy and water cycle in order to model them**
- **to initialize models (NWP, GCM/RCM/CRM) (requires observation-based determination of relevant state parameters)**
- **to develop decision support products/applications for management/sustainable development of the world's water resources (and other water-dependent environmental resources)**



<b>Primary EWVs</b>	<b>Supplemental EWVs (Apply to Water and other SBAs)</b>
Precipitation	Surface Meteorology
Evaporation and Evapotranspiration	Surface and Atmospheric Radiation Budgets
Snow Cover (including Snow Water Equivalent, Depth, Freeze Thaw Margins)	Clouds and Aerosols
Soil Moisture/Temperature	Permafrost
Groundwater	Land Cover, Vegetation and Land Use
Runoff/Streamflow/River Discharge	Elevation/ Topography and Geological Stratification
Lakes/ Reservoir Levels and Aquifer Volumetric Change	Surface Meteorology
Glaciers/ ice sheets	Surface and Atmospheric Radiation Budgets
Water Quality	Clouds and Aerosols
Water Use/Demand (Agriculture, Hydrology, Energy, Urbanization)	Permafrost



# **GEOSS Response: Work Plan**

## **1 Infrastructure**

- **Observation networks**
- **Access to EO**

## **2 Institutions & Development**

- **Data Sharing**
- **Capacity Building**

## **3 Societal Benefits**

- **Water Task**
- **Coordination**



# **GEOSS Response: Work Plan**

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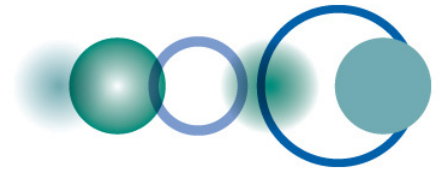
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# GEOSS Provides Coordinated Access to Information from Various Sources



provided by:  

**GEO** GROUP ON EARTH OBSERVATIONS | **GEO Portal**

HOME ABOUT GEOPORTAL SEARCH GEOSS MAP VIEWER CONTACTS

**GEO Portals Usability Survey**

**BROWSE RESOURCES BY SOCIETAL BENEFIT AREAS**

- DISASTERS
- HEALTH
- ENERGY
- CLIMATE
- WATER
- WEATHER
- ECOSYSTEMS
- AGRICULTURE
- BIODIVERSITY

**CAPACITY BUILDING**

**GEOSS Resources for Haiti Earthquake**

**WELCOME TO GEOPORTAL**  
 The GEOportal provides an entry point to access remote sensing, geospatial static and in-situ data, information and services. [More...](#)

**BROWSE RESOURCES BY LOCATION**

Click to browse resources by location



**Ocean Storm in Madagascar**  
 Tropical Storm Hubert hit the southeast coast of Madagascar island on Wednesday 10th March 2010. Officials say at least 36 people have died and [Read the full story](#)

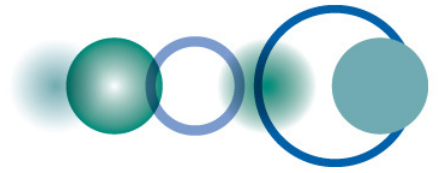
zoom -

**BREAKING NEWS** **EO NEWS**

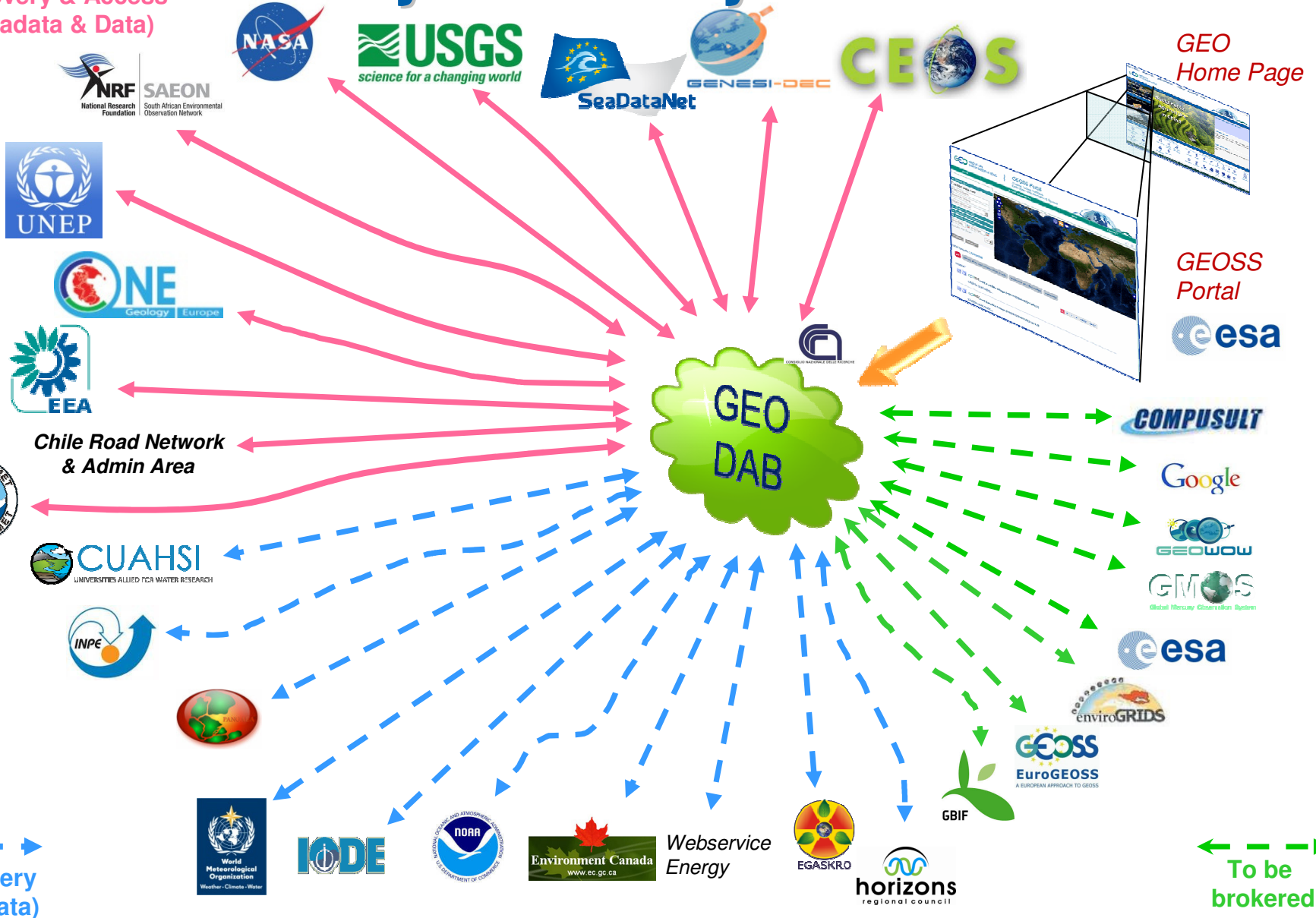
**GEONETCAST**

- GEOSS Common Infrastructure (GCI)**
- About GCI
- REGISTER YOUR RESOURCES
- Standards and Interoperability Registry
- [More about Registry System](#)
- Best practices wiki
- GEO SECRETARIAT**
- News
- GEOSS AUGMENTATION**
- Develop and Test your Services and Processing Components
- AIP-3
- GEOSS Clearinghouses Test Area

# GCI: Enabling a System of Systems



Discovery & Access  
(Metadata & Data)



Discovery  
(Metadata)

To be  
brokered





# **GEOSS Response: Work Plan**

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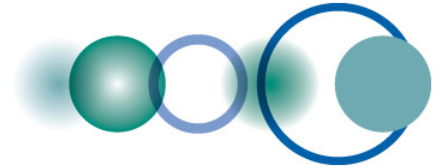
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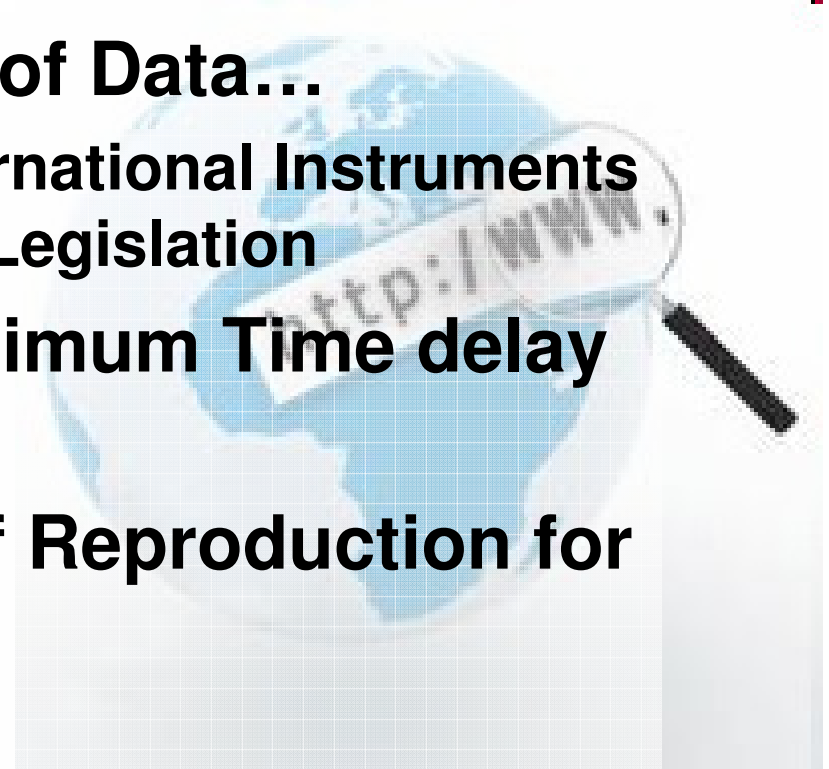
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# **GEOSS Implementation requires: *Data Sharing Principles***

- **Full and Open Exchange of Data...**
  - Recognizing Relevant International Instruments and National Policies and Legislation
- **Data and Products at Minimum Time delay and Minimum Cost**
- **Free of Charge or Cost of Reproduction for Research and Education**





## **GEO Approach to Capacity Building**

- **Build on existing efforts and best practices;**
- **Foster collaboration and partnership, especially with and between developing countries, all levels, across all SBAs**
- **Concentrate on end-to-end Earth observation needs in each of GEO's SBAs, including user requirements; data access, collection, archiving and analysis; and product development and exchange**



# **GEO Approach to Capacity Building**

- **Enhance the sustainability of existing and future Earth observation capacity building efforts by building awareness amongst decision makers in developing countries; and**
- **Facilitate the development of comprehensive, sustainable capacity building efforts that address infrastructure capacity needs, education and training, and building local institutional capacity.**



## Priority Actions

- **GEO Strategy:**
  - **Infrastructure, Institutions, Individuals**
- **Strengthen Earth observation capacity building networks**
  - **facilitating exchange of ideas and best practices;**
  - **promoting new collaborative opportunities;**
  - **encouraging personnel exchanges for training purposes;**
  - **maintaining rosters of experts in water sector;**
  - **facilitating the sharing of human and technical resources;**
  - **promoting the sharing of data, the standardization of methods, information, reports and articles.**



## Priority Actions

- **Enabling capacity building through the GEOSS Web Portal**
- **Sustainable Technology Transfer and Training**
- **Access to Data Sets That Fulfill Specific User Requirements**
- **Fill *in-situ* data gaps**
- **Promoting the development and use of open source software**
- **Facilitating the development of national and regional capacity**
- **Engaging donors through a coordinated approach to Earth observation capacity building priorities**



# **GEOSS Response: Work Plan**

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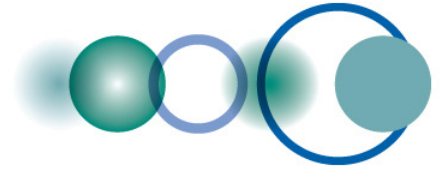
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# Water

Before 2015, GEO aims to:

***Produce comprehensive sets of data and information products to support decision-making for efficient management of the world's water resources, based on coordinated, sustained observations of the water cycle on multiple scales.***





# **WA-01 Integrated Water Information (incl. Floods and Droughts)**

## **Components:**

**C1: Integrated Water-cycle Products and Services**

**C2: Information Systems for Hydro-meteorological Extremes  
(incl. Floods and Droughts)**

**C3: Information Service for Cold Regions**

**C4: Global Water-Quality Products and Services**

**C5: Information System Development and Capacity Building**



# GEO-Water-SBA

## Terrestrial Water Cycle Resources

### Water SBA Sub-Areas:

- ***Surface Waters and Fluxes***
  - Primarily Land Surface Water Cycle Processes
- ***Ground Water Processes***
  - Including Recharge/Discharge & Regolith Processes
- ***Forcing Elements on Terrestrial Hydrology***
  - Surface Meteorology/Hydromet, Surface Radiation budget and Clouds, etc
- ***Water Quality & Water Use***
  - Including Organic, Inorganic, Isotopic & Nutrient/Contaminant Fluxes, and E.g., Water Demand/Draw/Regulation etc)

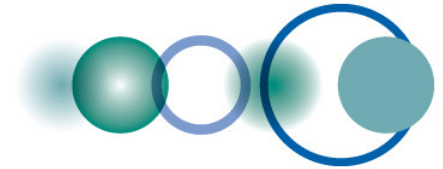


# **African Water Cycle Coordination Initiative: contributing to GEOSS**

**Key messages regarding challenges facing Africa in the water sector:**

- **lack of access to data and data sharing**
- **lack of infrastructure for collecting and analyzing data**
- **lack of funding and resources**
- **need for capacity building, enhancement of capabilities , and retention of expertise**
- **political buy-in and role of national government is critical to the success of any initiative**





## **African Water Cycle Coordination Initiative: contributing to GEOSS**

**Participants considered convergence and harmonization of observational activities, techniques, interoperability arrangements, and effective and comprehensive data management as the most fundamental elements that can be addressed under the GEOSS framework, including activities, programs and guidelines under UN agencies and non-UN agencies (AfDB, ESA, JAXA, NASA etc.).**

***from the 1<sup>st</sup> African Water Cycle Symposium in Tunis***



## In practice...

- **GEOSS Asian Water Cycle Initiative (AWCI)**
- **GEOSS African Water Cycle Coordination Initiative (AfWCCI)**
- **Comunidad para la Información Espacial e Hidrológica en Latino-america y el Caribe (CIEHLYC)**
- **ITC**
  - **GEONETCast toolbox**
- **FP7**
  - **EnviroGRIDS, DEWFORA, Afro-Maison, etc...**
- **Global Drought Information System (GDIS)**
- **Afri-GEOSS**
- **TIGER, DRAGON, SERVIR, etc.**



## Issues: *GEOSS Targeted Gaps*

- **Lack of access to data and associated benefits in developing world**
- **Eroding technical infrastructure**
- **Large spatial and temporal gaps in specific data sets**
- **Inadequate data integration and interoperability**
- **Uncertainty over continuity of observations**
- **Inadequate user involvement**
- **Lack of relevant processing systems to transform data into useful information**

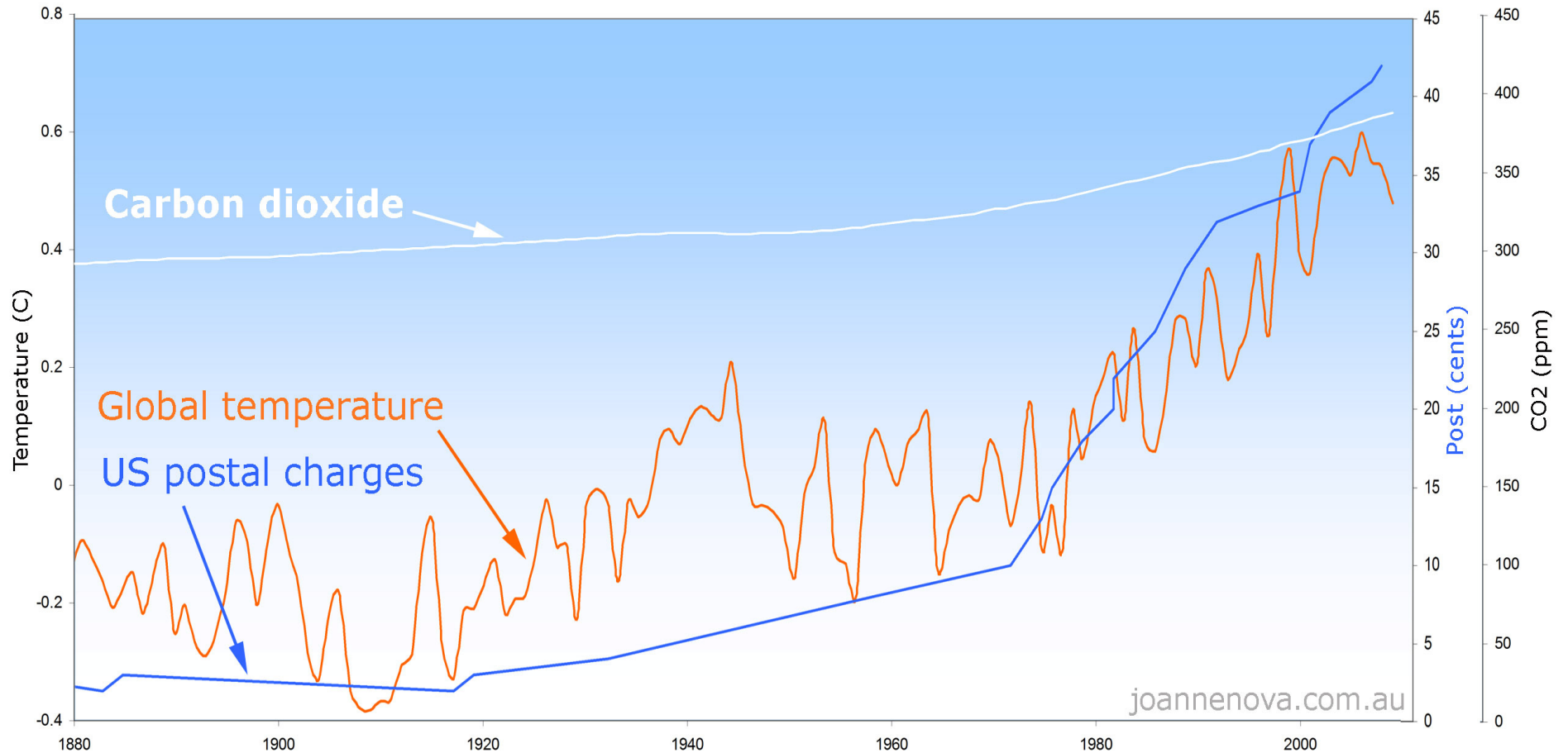


**“The Global Earth Observation System of Systems (GEOSS) is a **coordinating and integrating network of Earth observing and information systems**, contributed on a voluntary basis by Members and Participating Organizations of the intergovernmental Group on Earth Observations (GEO).”**

***•To support informed decision making for society, including the implementation of international environmental treaty obligations.***



# US Postal charges drive Global Warming



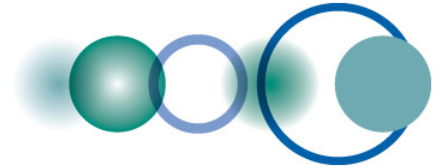


**Thank you!**

***earthobservations.org***

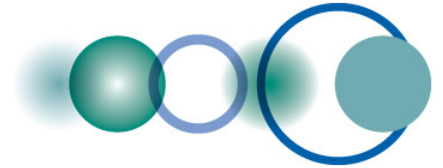
***dcripe@geosec.org***





## **WA-01 linkages...**

- **In-situ systems**
- **Resources & research**
  - **GEOWOW: GEOSSE interoperability for Weather, Oceans Water**
  - **Water Information System**
  - **Horizon 2020**
  - **Belmont Forum**
- **Engaging the end-users**
  - **Science stakeholders**
  - **IWRM**
- **Collaboration with other SBAs**
  - **Agriculture SBA**
  - **Health SBA**
  - **Blue Planet**



## **WA-01 linkages...**

- **World Water Catalogue / World Water Services Online**
- **Model web**
- **Global Initiatives**
  - **GEO BON, GFOI, GEOGLAM**
- **GEO-WON?**
  - **Adaptation to climate change**
  - **Disaster risk reduction**
  - **MDGs / SDBs**
  - **Water-energy-food nexus**



# **Current Status of Earth Observation Capacity Building Initiatives**

- **Limited access to capacity building resources;**
- **Lack of e-science infrastructure for Earth observation education and training;**
- **Need for criteria and standards for Earth observation capacity building;**
- **Gaps between Earth observation research and operational application;**
- **Connectivity inefficiency between providers and users of Earth observation systems;**
- **Need for cooperation within and between developed and developing countries and regions;**
- **Lack of awareness about the value of Earth observations among decision makers; and**
- **Duplication of Earth observation capacity building efforts.**