

# Introduction to GEO Water and IGWCO activities

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GEO-DRI WORKSHOP

May 10, 11, 2010

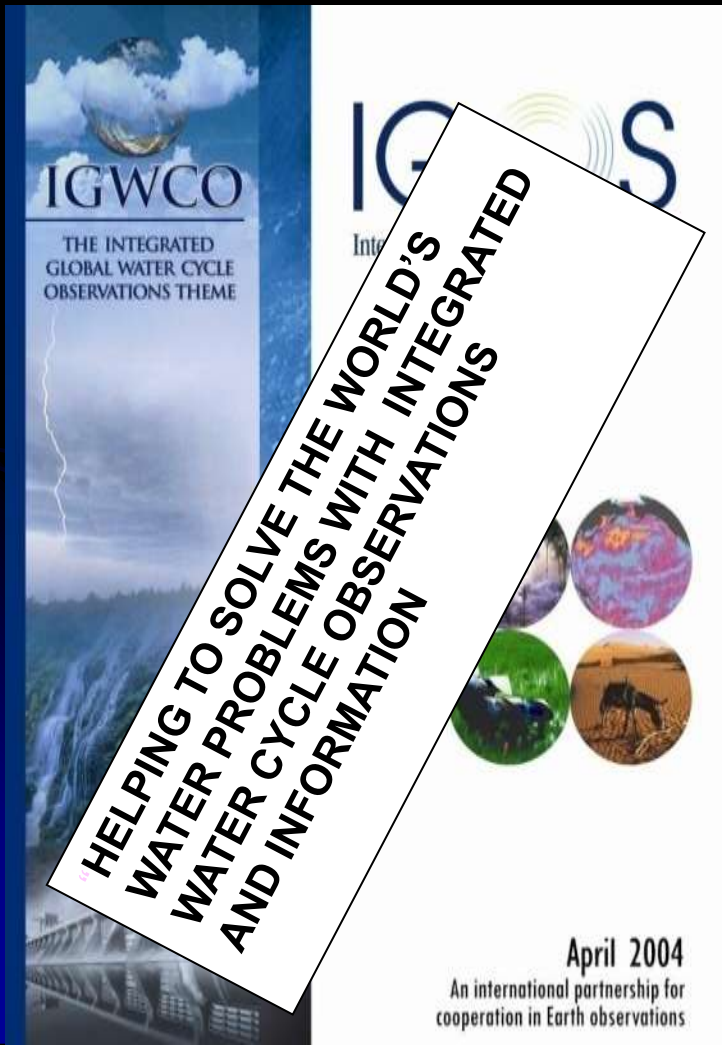
Winnipeg, MB, Canada



**IN 2000- 2004, THE IGWCO THEME WAS DEVELOPED WITHIN IGOS-P TO ASSIST IN ADDRESSING WSSD RESOLUTION #27**

**27. (*Decided*) Improve water resource management and scientific understanding of the water cycle through cooperation in joint observation and research, and encourage and promote knowledge sharing, and provide capacity-building and the transfer of technology, as mutually agreed, including remote-sensing and satellite technologies, particularly to developing countries as well as countries with economies in transition, for this purpose.**

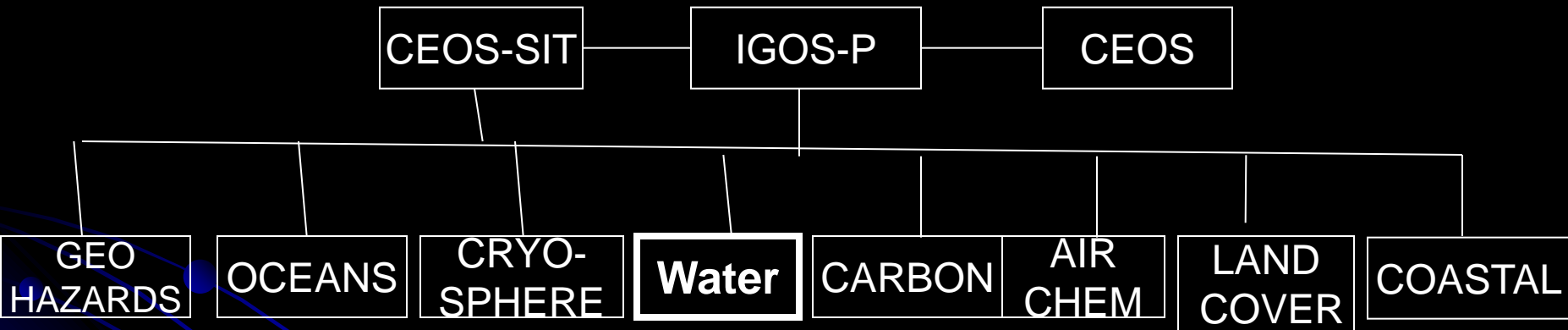
# THE INTEGRATED GLOBAL WATER CYCLE OBSERVING THEME (IGWCO) IS A “BEST EFFORTS” ACTIVITY WITH THE FOLLOWING OBJECTIVES:



1. Provide a framework for guiding decisions on priorities and strategies regarding water cycle observations for:
  - Monitoring climate variability and change,
  - Effective water management and sustainable development of the world's water resources,
  - Societal applications for resource development and environmental management,
  - Specification of initial conditions for weather and climate forecasts,
  - Research directed at priority water cycle questions
2. Promote strategies that facilitate the processing, archiving and distribution of water cycle data products

From 2005-2008

# NEW DIRECTIONS



# THE IGWCO UMBRELLA

INTEGRATED  
PRECIP

SOIL  
MOISTURE

WATER  
QUALITY

RUNOFF

GROUND  
WATER

} VARIABLES

CEOP

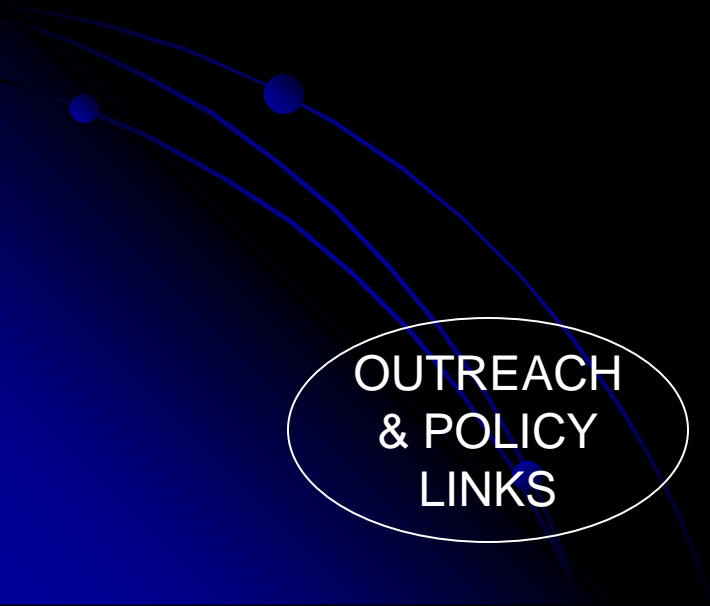
INTEGRATION

OUTREACH  
& POLICY  
LINKS

CAPACITY  
BUILDING

GLOBAL  
WATER  
SYSTEM

APPLICATIONS

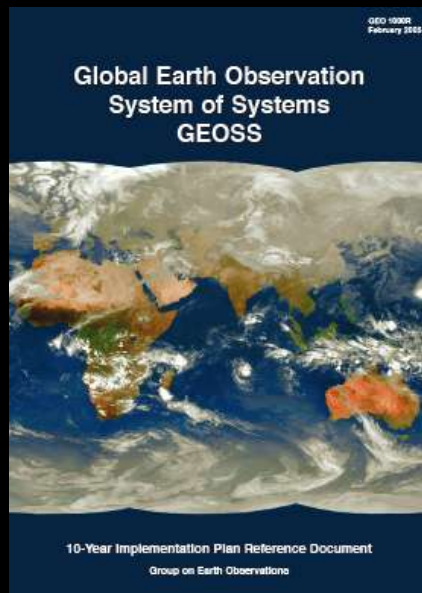




# IN 2005 IGOS-P AND OTHER GROUPS DIRECTED THEIR EFFORTS TO DEVELOPING GEO (GROUP ON EARTH OBSERVATIONS) AN UNOFFICIAL GEO ORGANIZATION CHART



# The Primary Framework: GEOSS: A Global, Coordinated, Comprehensive and Sustained System of Observing Systems



## Relevant Facts:

- Involves ~80 nations and ~50 international organizations who have agreed to work together to build the GEOSS.
- Coordinated by the Group on Earth Observations (GEO) which implements the GEOSS work plan through the best efforts of its community.

Targets



Tasks



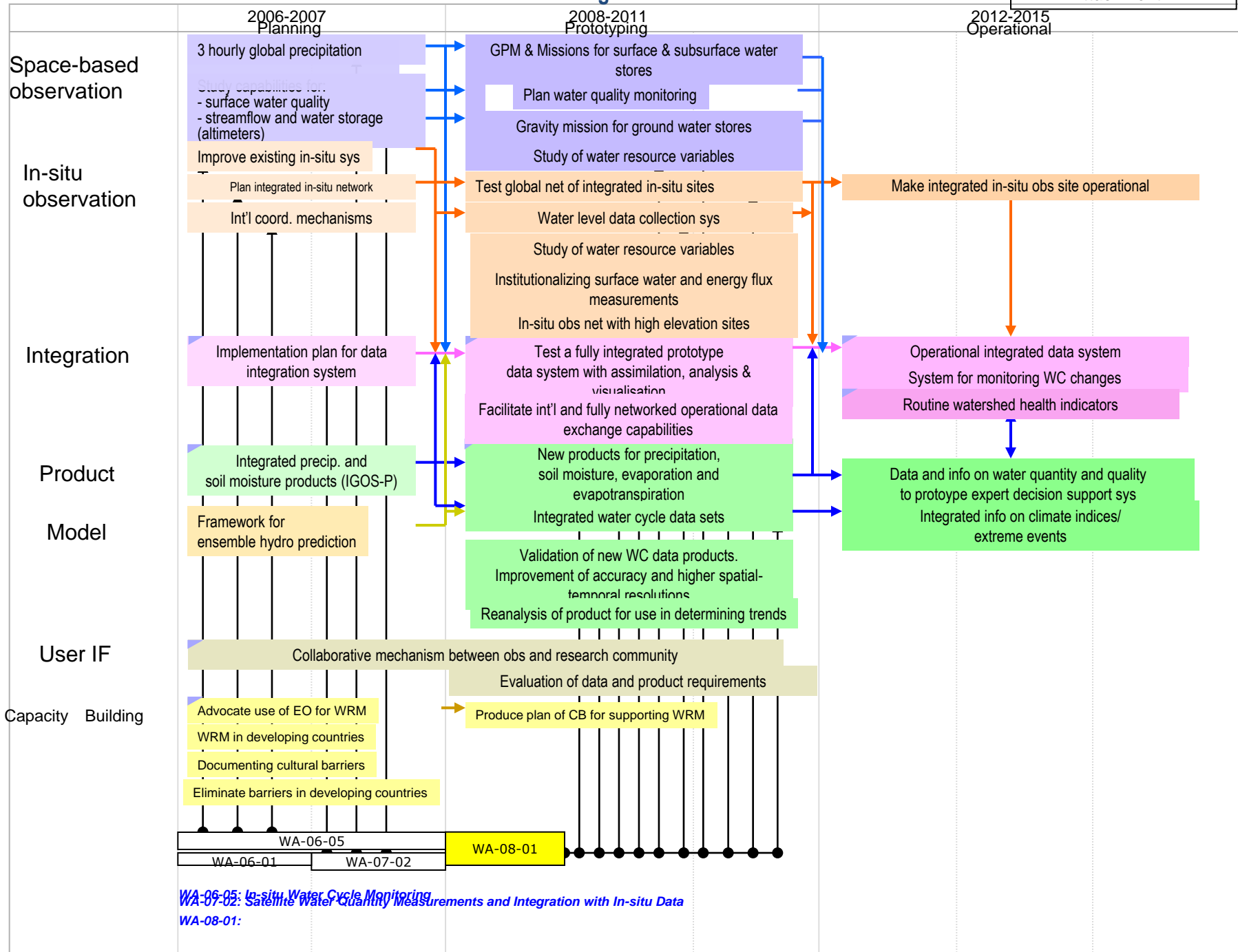
Sub Tasks



## The Water Target


**By 2015, produce comprehensive sets of data, information products and services 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.**

# GEOSS IP Targets - Water





# SOME 2009 HIGHLIGHTS

1. Workshops held by a number of variable-specific groups:
    - Soil moisture in Portugal
    - CEOP meeting in Melbourne Australia
  2. The 5th IGWCO planning meeting was held in Kyoto in February, 2009. The workshop resulted in a number of recommendations including the E2E activity.
  3. Three major regional Capacity Building meetings related to the Water Cycle were held including Asia (in Tokyo, Japan), Africa (Tunisia) and Latin and Caribbean America (Lima, Peru).
  4. The IGWCO SAG continued to support its activities through regular teleconference calls supported by GEO.
  5. An archive centre for soil moisture data was established at the University of Vienna.
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# Water Tasks in the 2009-2011 Work Plan

## **WA-06-02: Droughts, Floods and Water Resource Management**

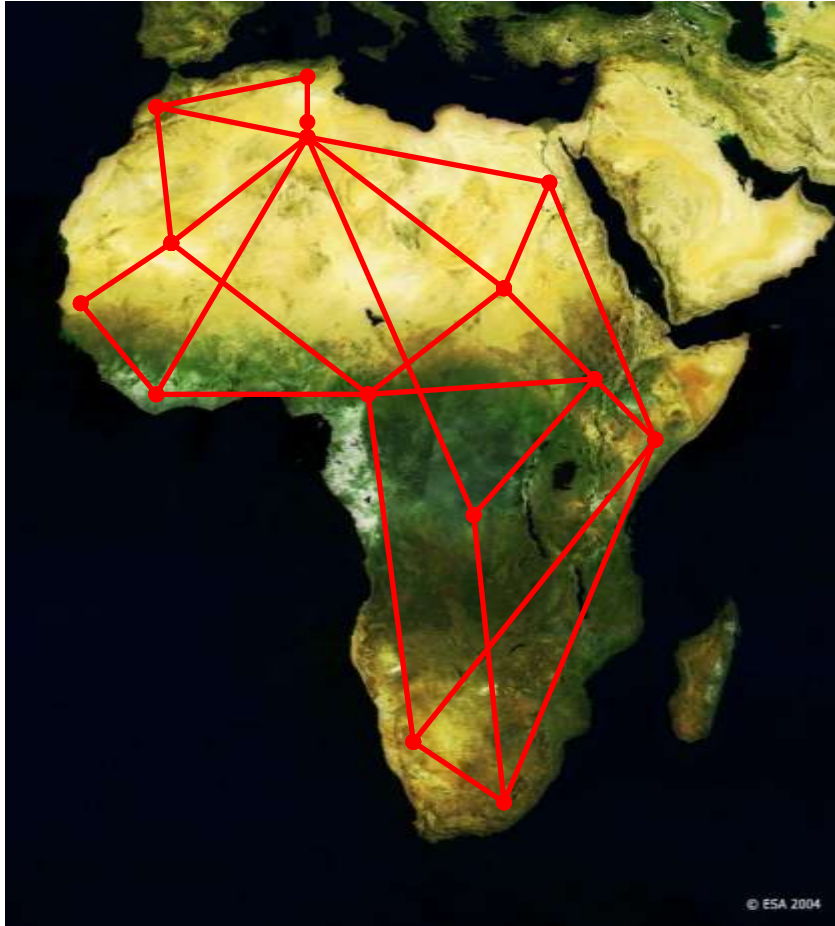
- a) Forecasting and Early Warning Systems for Droughts and Floods*
- b) Impacts from Drought*
- c) ACQWA*
- d) Drought Monitoring*

## **WA-06-07: Capacity Building for Water Resource Management**

- a) Latin America*
- a) Africa*
- b) Asia*

# TIGER

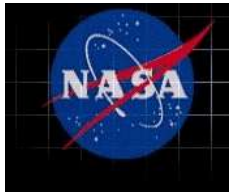
## Water Information & Knowledge Network



TIGER involves more than 200 African experts (universities, technical centers, water authorities)

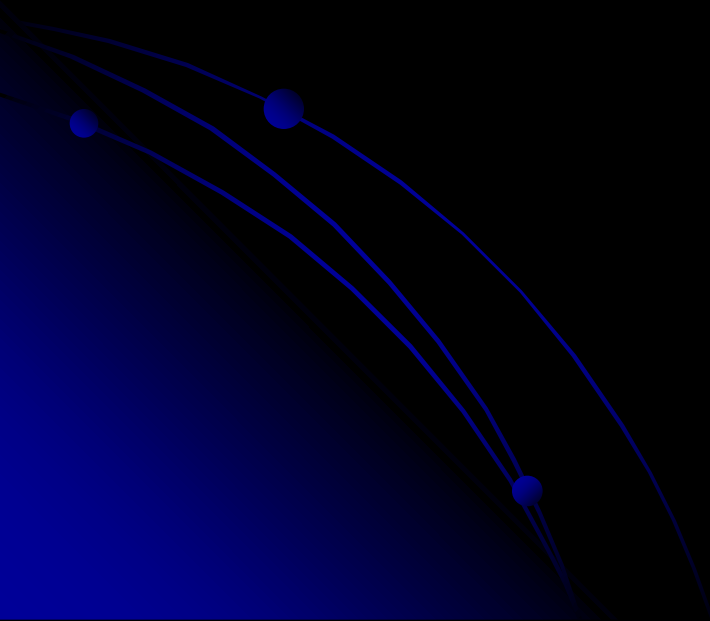
- Actions dedicated to:
  - Facilitate sharing of water knowledge, information and data;
  - Support the development of common water research programs;
  - Identify and promote best practices;

# SERVIR: Geospatial One Stop Shop for Disaster Management in Central America & Mexico

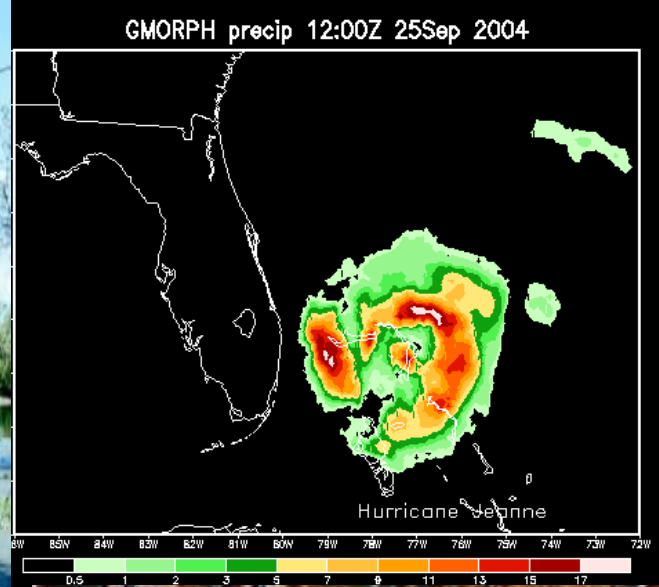


## WA-08-01: Integrated Products for Water Resource Management and Research

- a) *Soil Moisture \**
- b) *Runoff*
- c) *Groundwater*
- d) *Precipitation \**
- e) *Water Cycle Data Integration (CEOP) \*\**
- f) *Pilot Projects for Improved Water Discovery and Quality Assessments*
- g) *Water quality*





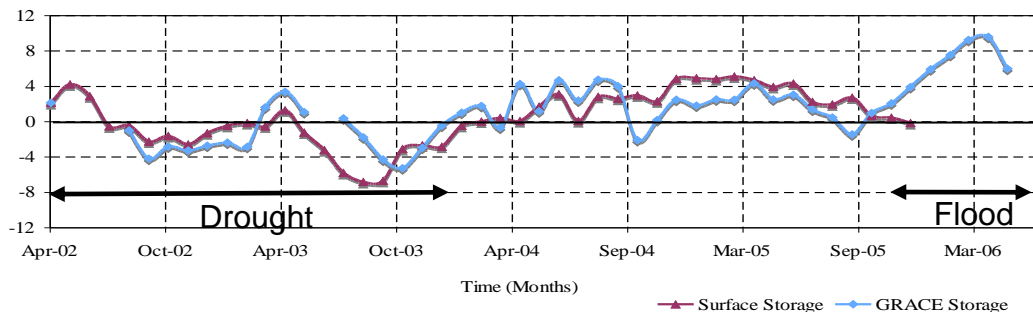


Improvements and expansion of existing satellite missions and emerging assimilation and prediction opening the door to a new era in global water-cycle management

- a) Soil Moisture
- b) Runoff
- c) Groundwater
- d) Precipitation
- e) Water Cycle Data Integration



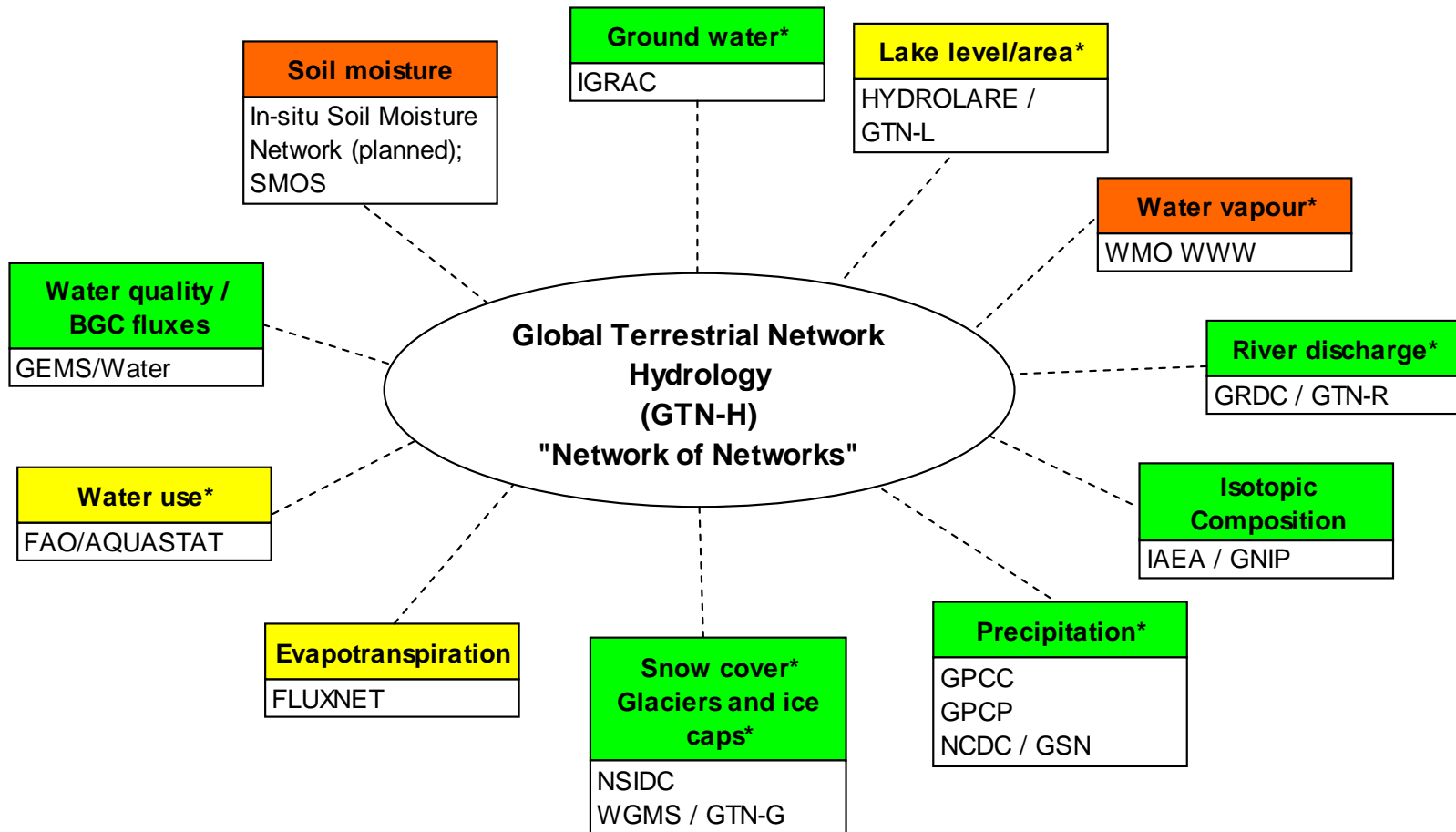
Storages Anomalies in Saskatchewan River Basin



Quality

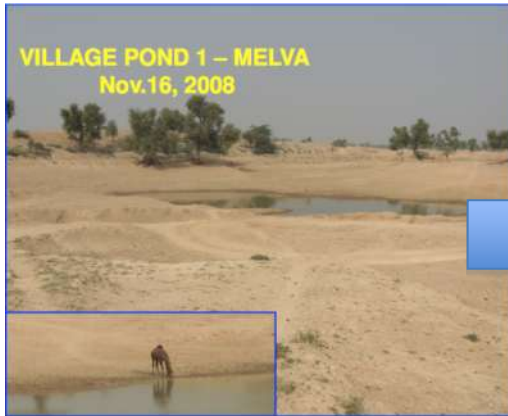


**GTN-H is recognized as a major contributor to many of these subtasks especially discharge, surface water storage and groundwater.**





# IEEE “Water for the World” Program



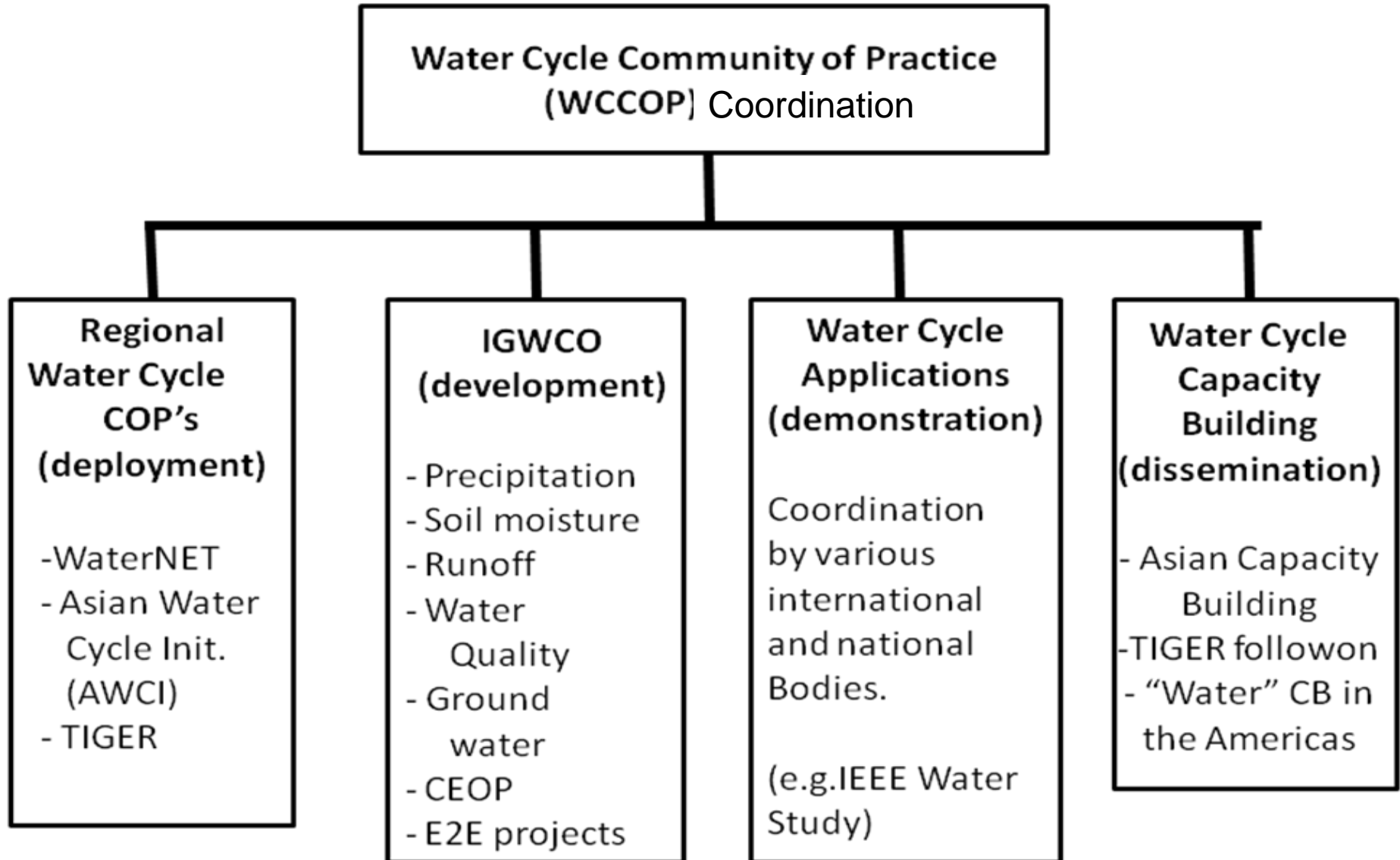
- Developing country focus
- In the field within one year
- Sustainable
- Scalable
- Reusable
- Fundable

Food Security: Water and Sustainable Agriculture - India

Urban Water - Ghana



# PROPOSED STRUCTURE FOR THE WC COMMUNITY OF PRACTICE OF PRACTICE



# US/CANADA GEO PLANS AND ACTIVITIES WILL TEST AND DEMONSTRATE GEO WC TOOLS IN SHARED CANADA/US BASINS

Columbia  
-hydropower  
-irrigation

The IJC and EPA have recently completed studies that are the basis of continued monitoring activities in this area.

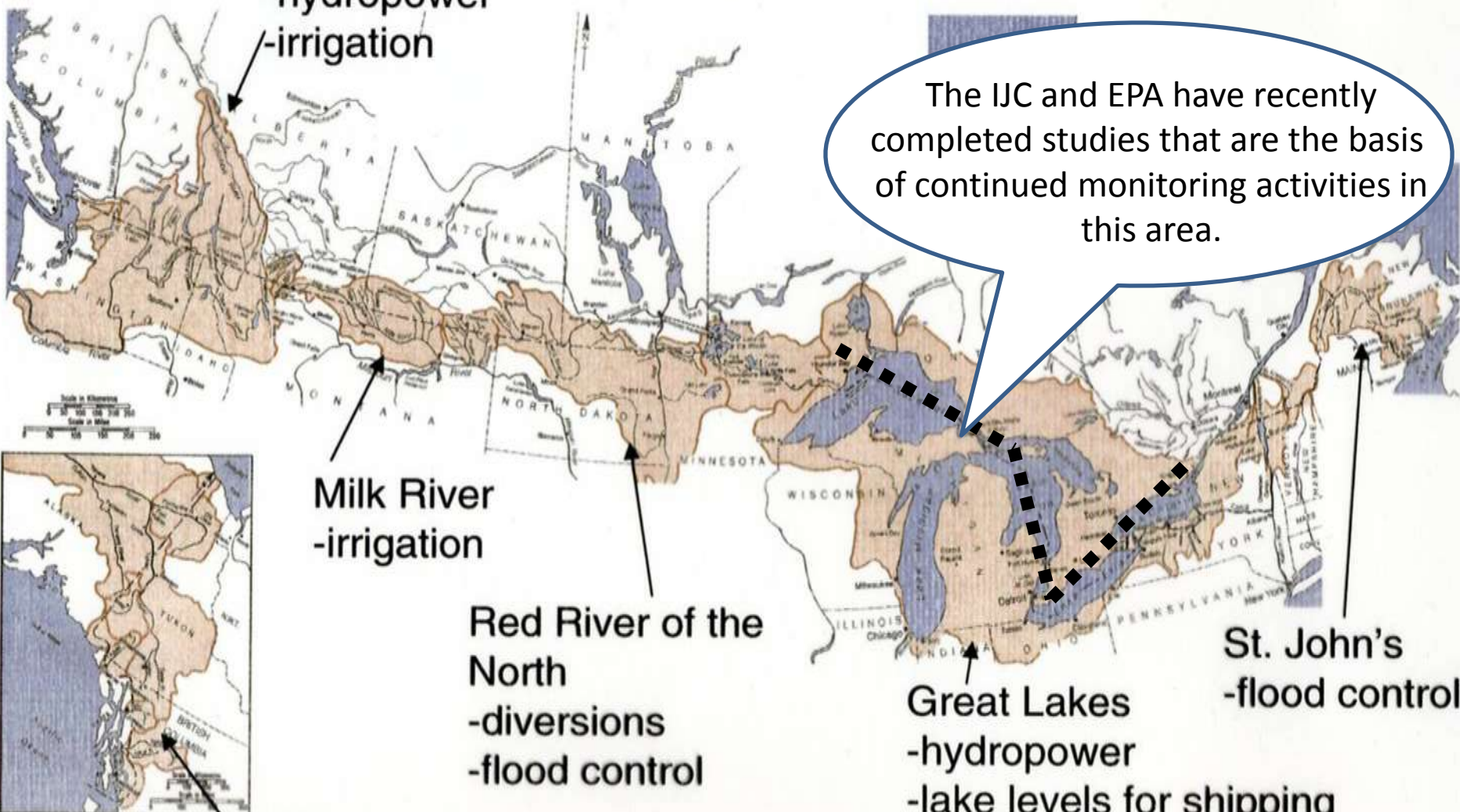
Milk River  
-irrigation

Red River of the North  
-diversions  
-flood control

Great Lakes  
-hydropower  
-lake levels for shipping and recreation  
-commercial fisheries

St. John's  
-flood control

Yukon  
-hydropower





# Review of Water Cycle data needs: Critical/Priority Variables/Parameters

## **[1] Surface Waters, Fluxes, and Processes:**

Precipitation (liquid/snow/ice)

Soil Moisture/Temperature (Surface and Vadose Zone)

Evaporation and Evapotranspiration

Runoff & Stream Flow/River Discharge/Stage...

Lake/Reservoir-Area/Level/Depth....

Snow/Ice Cover & Depth/SWE & Freeze-Thaw Margins,....

Glaciers/Ice Sheets, Permafrost, Frozen Ground—Area/Depth/Mass balance...

## **[2] Ground Water (Including Recharge/Discharge & Regolith Processes)**

Ground Water Table and Charge/Recharge Rates

Aquifer Levels, Geologic Stratification, Volumetric...

Soil type/Texture, Composition, Porosity/Conductivity..

## **[3] Forcing Elements (e.g., Surface Meteorology, Surface Radiation Budgets and Clouds**

SW, LW Surface Radiation Budgets, Albedo, Emissivity, and Clouds

Surface Air Temperature, Relative Humidity/Specific Humidity, Winds, Pressure..

Vegetation Cover/Type, Land Cover & Land Use

Topography and/or Geology

## **[4] Water Quality and Use**

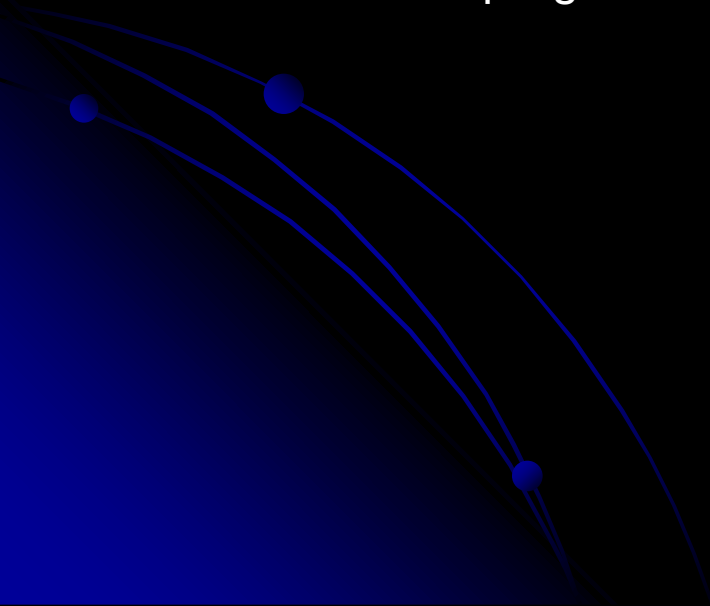
Water Quality/Composition—Organic/Inorganic/Isotopic

Nutrient and Contaminant Effluents/Fluxes into Water Bodies

Water Sources, Water Demand/Use & Regulation

# UPCOMING ACTIONS

1. Review of the 2009 – 2011 GEO Work Plans to determine if there are linkages between Tasks in different SBAs (May 2010).
2. Review of the Water SBA at an upcoming STC meeting (May 2010).
3. Development of inputs for the 2012-2015 GEO Work Plan.
4. Normal progress on the Water SBA Tasks.



## SUMMARY:

Although it suffers from a lack of resources and an institutional framework, IGWCO continues to be an effective mechanism for the water cycle community to provide inputs to GEO. It could serve as a mechanism for advancing coordination between the drought research community and observational and information systems.

