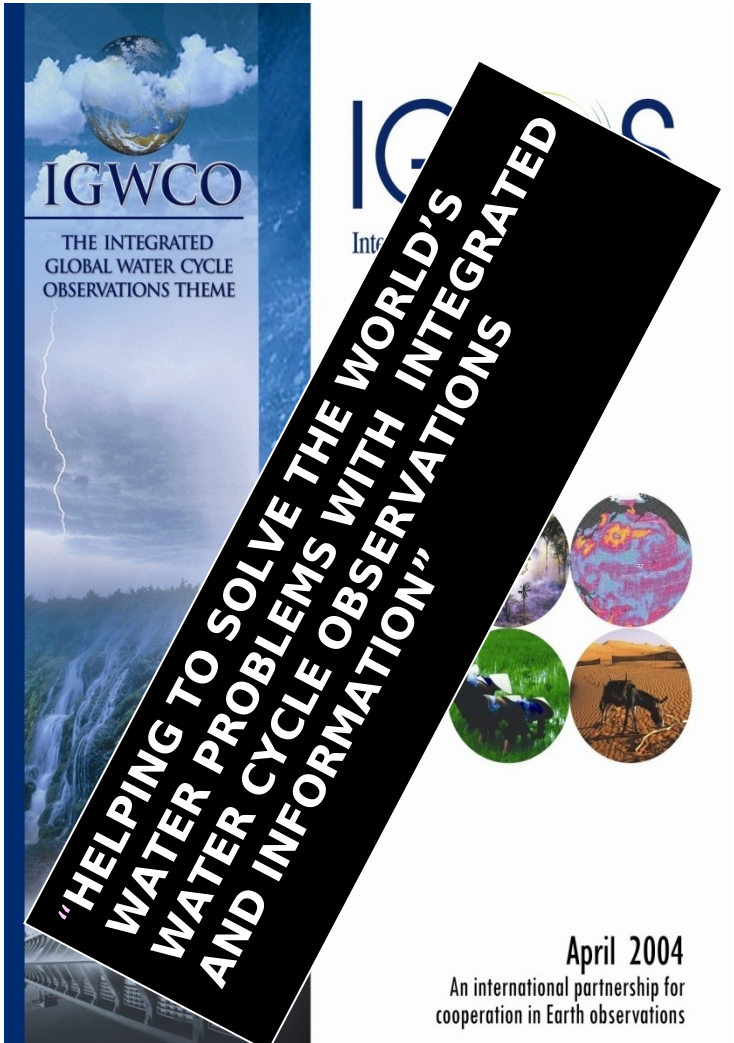
IGWCO PRESENTATION

Rick Lawford
San Francisco
December 10, 2008

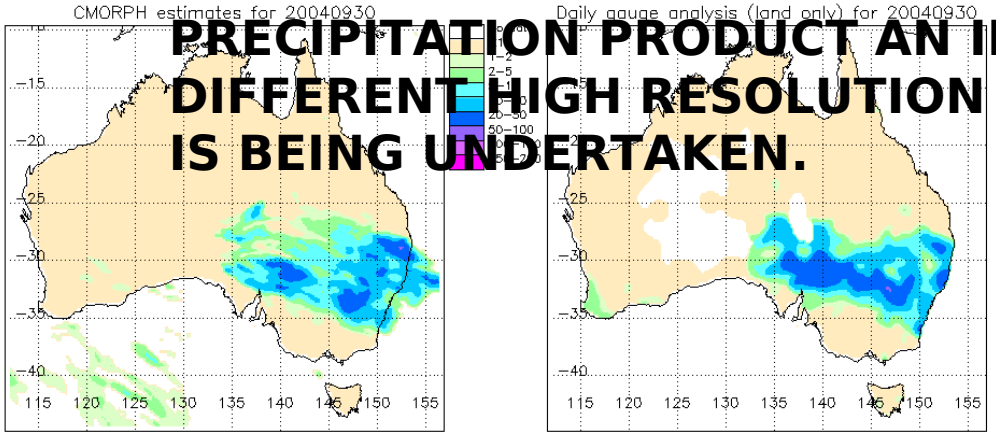
THE INTEGRATED GLOBAL WATER CYCLE OBSERVING THEME (IGWCO) HAS THE FOLLOWING OBJECTIVES:

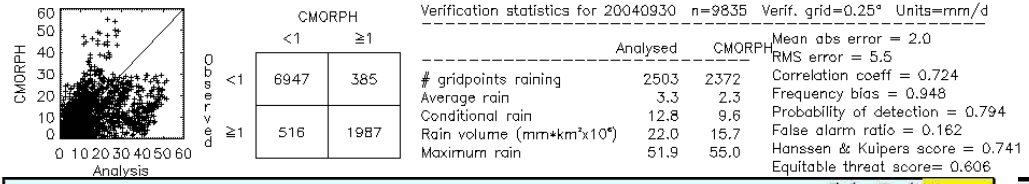


1. Provide a framework for guiding decisions on
   priorities and strategies regarding water cycle
   observations for:
   - Monitoring climate variability and change,
   - Effective water management and sustainable development of the world's water resources,
   - Societal applications for resource development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

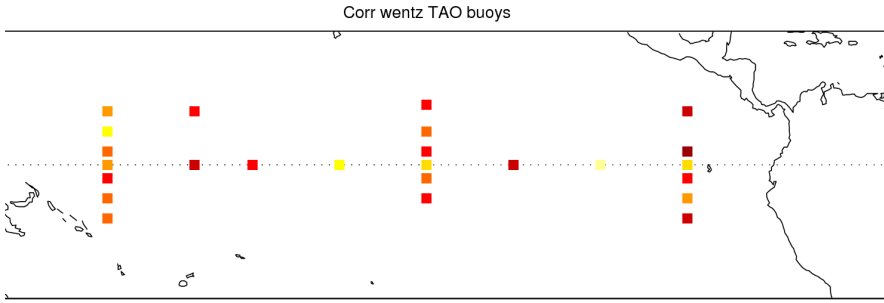
	GOALS	LEADERS	ACTIONS	COMMIT	FUNDING
CEOP	YES	Toshio Koike John Roads	Merger with GHP	YES	YES/JP
PCPN	YES	Phil Arkin	Workshops held	YES	NO
SOIL MOIST.	YES	Tom Jackson Peter v. Ovel	Beijing Workshop planned	YES	NO
RUNOFF	YES	Wolfang Grabs	HARON	YES	NO
WATER QUALITY	YES	Steve Greb	Workshop in Geneva	YES	GEO
GWSP LINKS	PRELIM	Charles Vorosmarty	TBD	NO	NO
GRND WATER	TBD	TBD	TBD	NO	NO
CAP BLDG	YES	AM, CI,RL	EA workshop SA proposal	YES	SOME

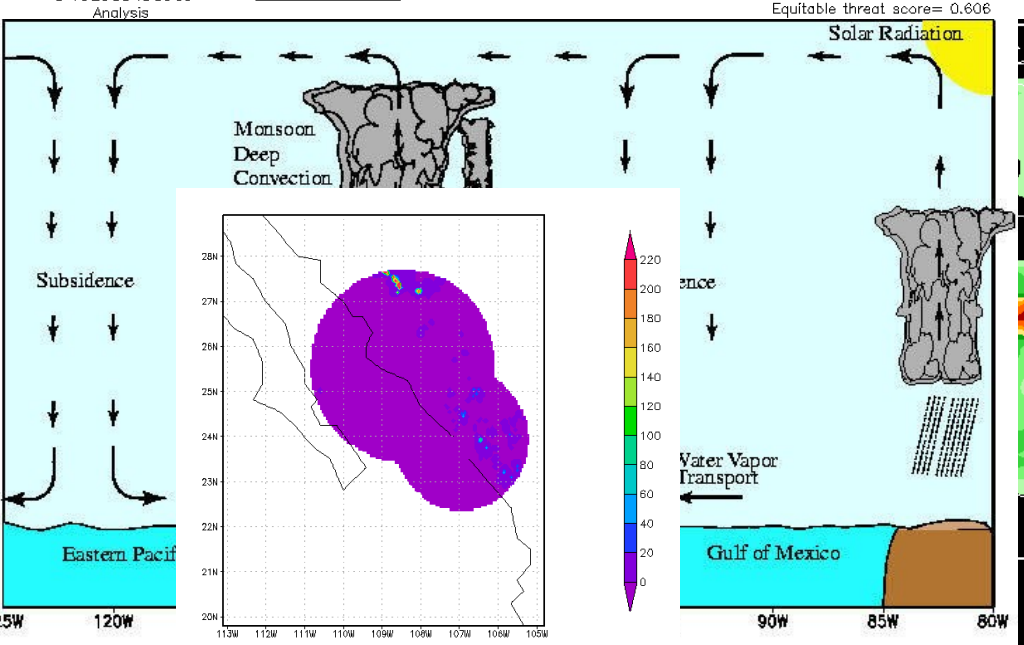
AS THE FIRST STEP IN THE DEVELOPMENT OF AN INTEGRATED PRECIPITATION PRODUCT AN INTERCOMPARISON OF DIFFERENT HIGH RESOLUTION PRECIPITATION PRODUCTS IS BEING UNDERTAKEN.

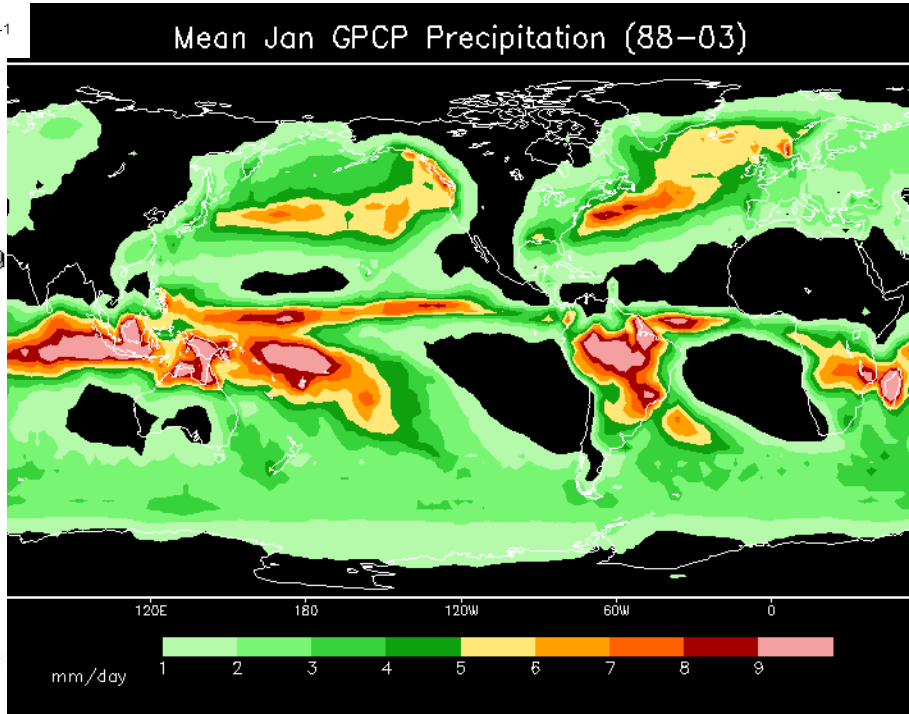




Focus on three-hourly totals over 0.25° and 1.0° products, or finer resolution over wide variety of climatological and

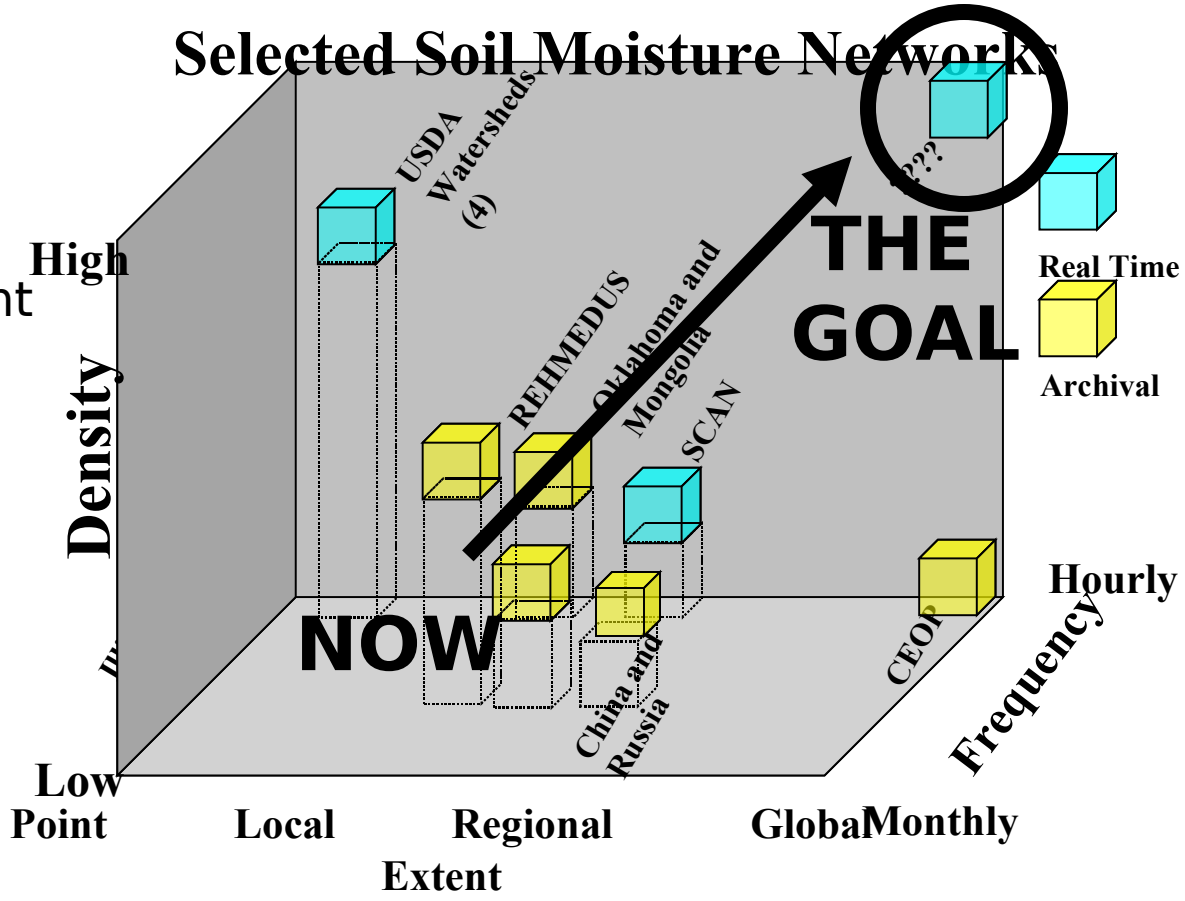






THROUGH ITS SOIL MOISTURE EFFORTS IGWCO IS DEVELOPING A SET OF FOCUS ISSUES THAT ALIGNS WITH THE GLOBAL CLIMATE OBSERVING SYSTEM (GCOS) IMPLEMENTATION PLAN

ISSUES TO BE CONSIDERED FOR A GLOBAL NETWORK:
- Extent of network
- Density
- Frequency of measurement
- Latency
- Availability
- Measurement Technique



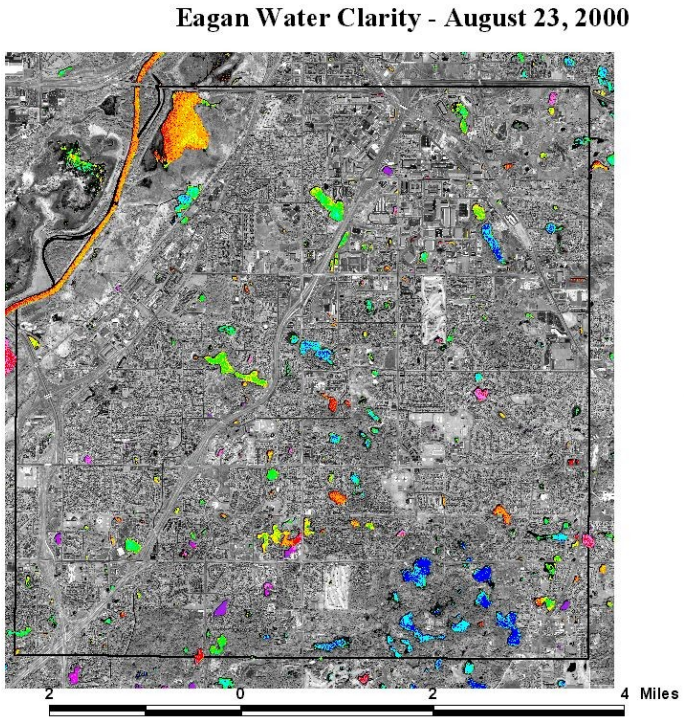
Anthropogenic Stressors

- Low and high flow volumes (minimum flow requirements)
- Eutrophication
- Thermal Discharges
- Diffuse pollution (Urban and Rural)
- Mining discharge (Hard rock gold mining/cyanide)
- Pathogens

SITE SPECIFIC MONITORING

User Groups with Water Quality Concerns

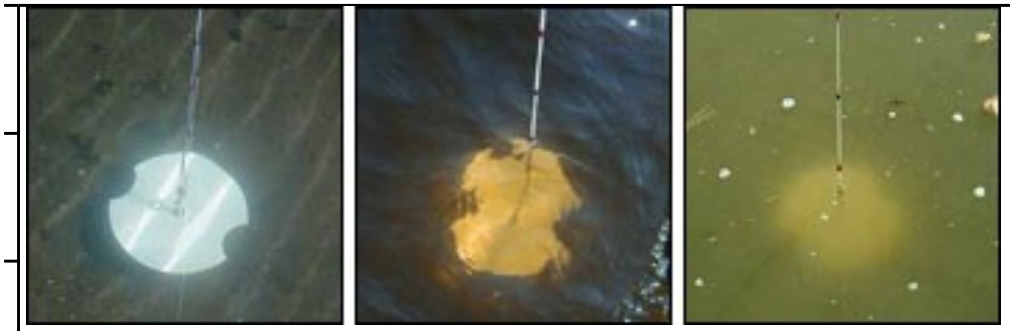
- Municipal drinking and sanitation utilities
- Agriculture
- Recreation
- Industry
- Ecological needs biological integrity

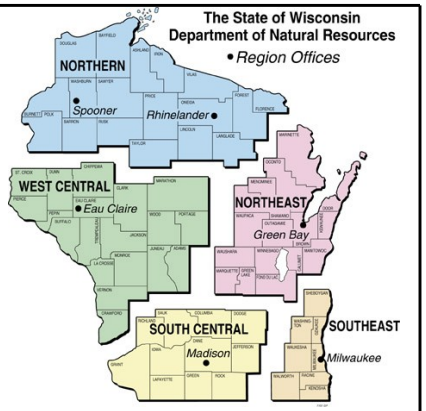


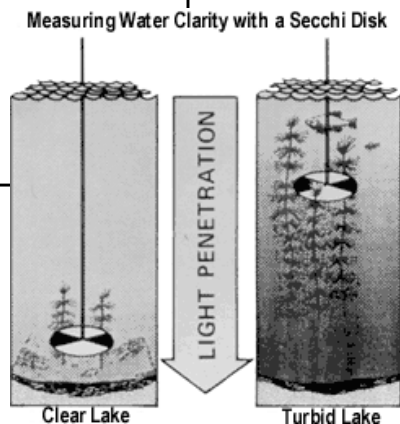
TROPHIC STATUS IMAGES FOR WATER BODIES NEAR EAGAN, MN FROM IKONOS DATA (FROM S. GREB)

GEO WORKSHOP HELD IN MARCH 2007 TO DEVELOP A STRATEGY FOR SATELLITE APPLICATIONS TO WATER QUALITY.

Satellite-generated Secchi disk 2003-05







GEO Inland and Nearshore Coastal Water Quality Remote Sensing Workshop

Key workshop recommendations focused on:

- Continuity of existing satellites
- Development of new and improved sensor/platform technology
- Algorithm development and calibration/validation activities
- Improvements in data accessibility
- Increased education, and capacity building through new demonstration project initiatives
- Formation of a scientific group dedicated to inland and coastal water quality remote sensing

nother workshop is being planned for the USA to assess algorithms for estimatir
ater quality from space.

Hydrological Applications – Runoff Project (HARON) Basic Rationale of the Initiative

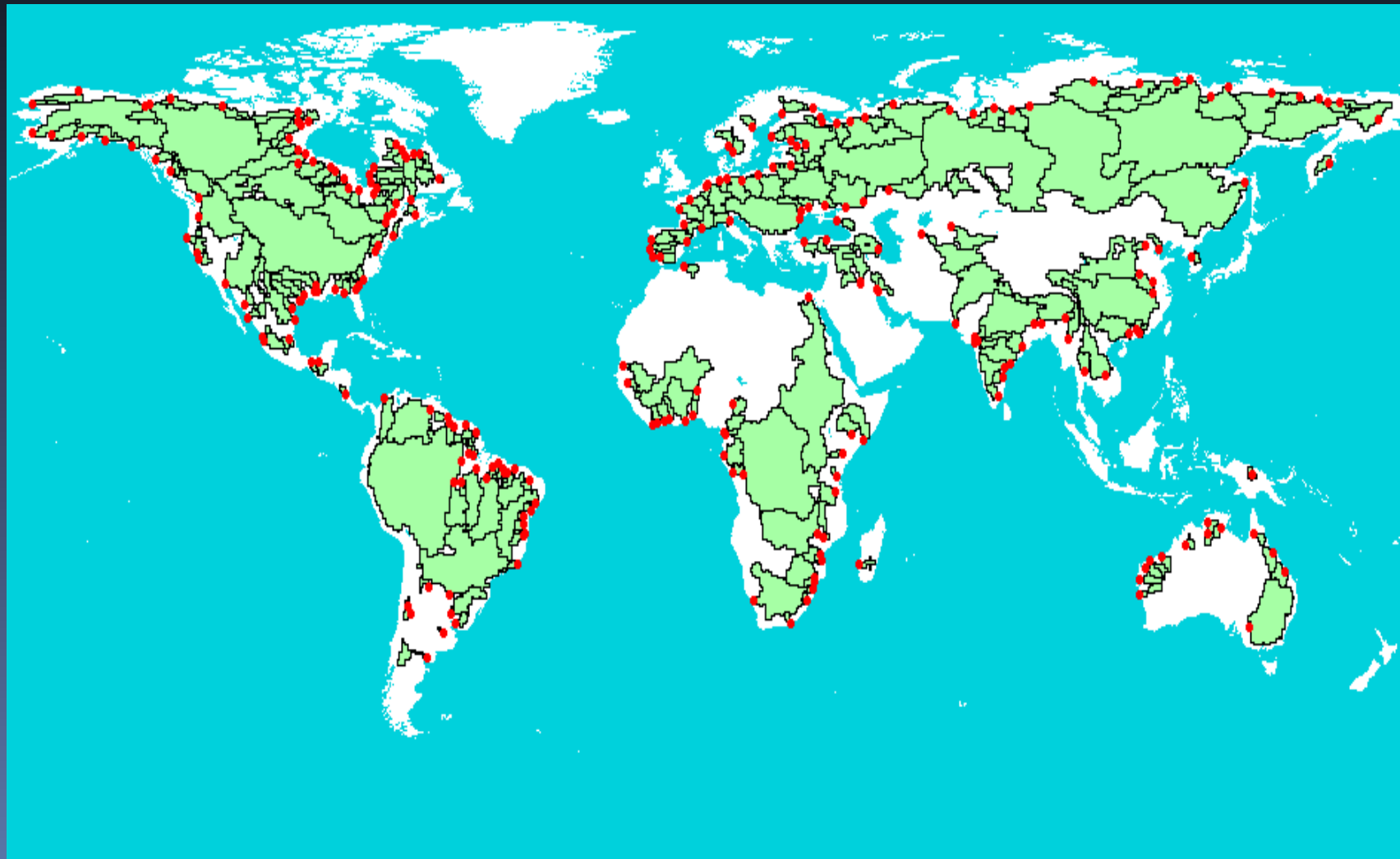
Global monitoring of runoff and lake storage:

- important elements of Integrated Global Observing Systems

- integral parts of water resources management including prevention of water-induced disasters

HARON – IGWCO Runoff Project

Methodology: 251 calculated basins of stations close to the mouth using 0.5 deg



DROLOGICAL APPLICATIONS RUNOFF NETWOR PROJECT (HARON)

Implementation Phases

PHASE I **– Upgrade & sustained maintenance of major global run-off stations, monitoring continental freshwater fluxes into the world's oceans**

PHASE II **–** ***Integration*** **of hydro-meteorological and related** ***in-situ*** **components** ***with satellite observations***

PHASE III **– Consolidation of integrated hydrological observation network development and application of user-oriented information products made available by HARON**

Production of an implementation plan for a broad global water cycle data integration system, combining water cycle in-situ, satellite, and

Results of a joint IGWCO/UNESCO/ Geohazards workshop:

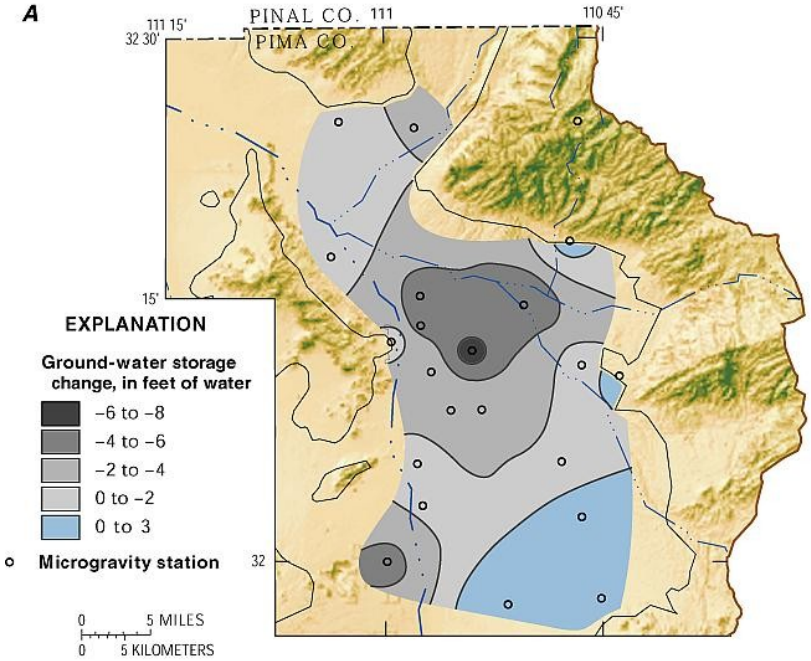
More convergence is needed in national in-situ groundwater monitoring programmes to meet GEOSS objectives

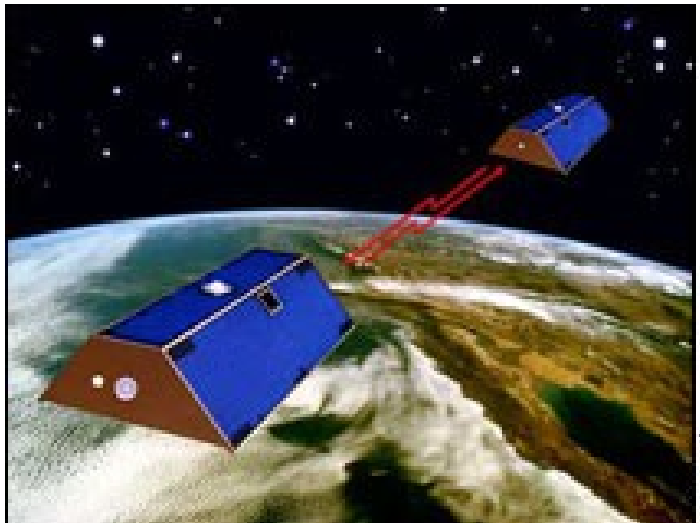
Country	GW monitor. QN Quantity QU Quality	W Wells S Springs Q Qanats	S Special wells O Other wells	O One aquifer-well M More aquifers - well	GW table measurements M Manual S Sensor	Water table frequency measurements per year	GW sampling per year	GW analysis DWS-Drink. Wat.Stan. MI Major Ions S Spec. Variables	GIS	Data accessibility CH Charge N-CH No charge	Data collection C Central V Various
India	QN QU	W	S mostly	O mostly	M 80%	4	1	DWS S	yes	N CH	C
China	QN QU	W S	S O	O M	S mostly	52	2	MI	yes	CH	V
Iran	QN QU	W S Q	S O	O mostly	M	12	2	MI	no	N CH	C V
South Africa	QN QU	W S	S O	O mostly	M S	4 - 12 - 52	2	MI S	no	N CH	C V
Australia	QN QU	W S	S O	O	M S	4	1 mostly	MI S	yes	N CH	C
Brazil - Sao Paulo	QU	W	O	O	-	-	1	DWS S	no	CH	C
Russia	QN QU	W S	S O	O mostly	S mostly	12 - 36	4 - 12	DWS S	yes	N CH	C V
USA	QN QU	W S	S O	O M	S M	variable	1 or more	DWS S	yes	N CH	C V
Poland	QN QU	W S	S O	O	M mainly	1 - 12 - 52	1- 2 or less	DWS S	yes	CH	C
Czech Republic	QN QU	W S	S	O	S 80%	52	2	DWS S	yes	CH	C
England, Wales	QN QU	W S	S O	O 80%	M 80%	12	variable	DWS S	partially	CH	C V

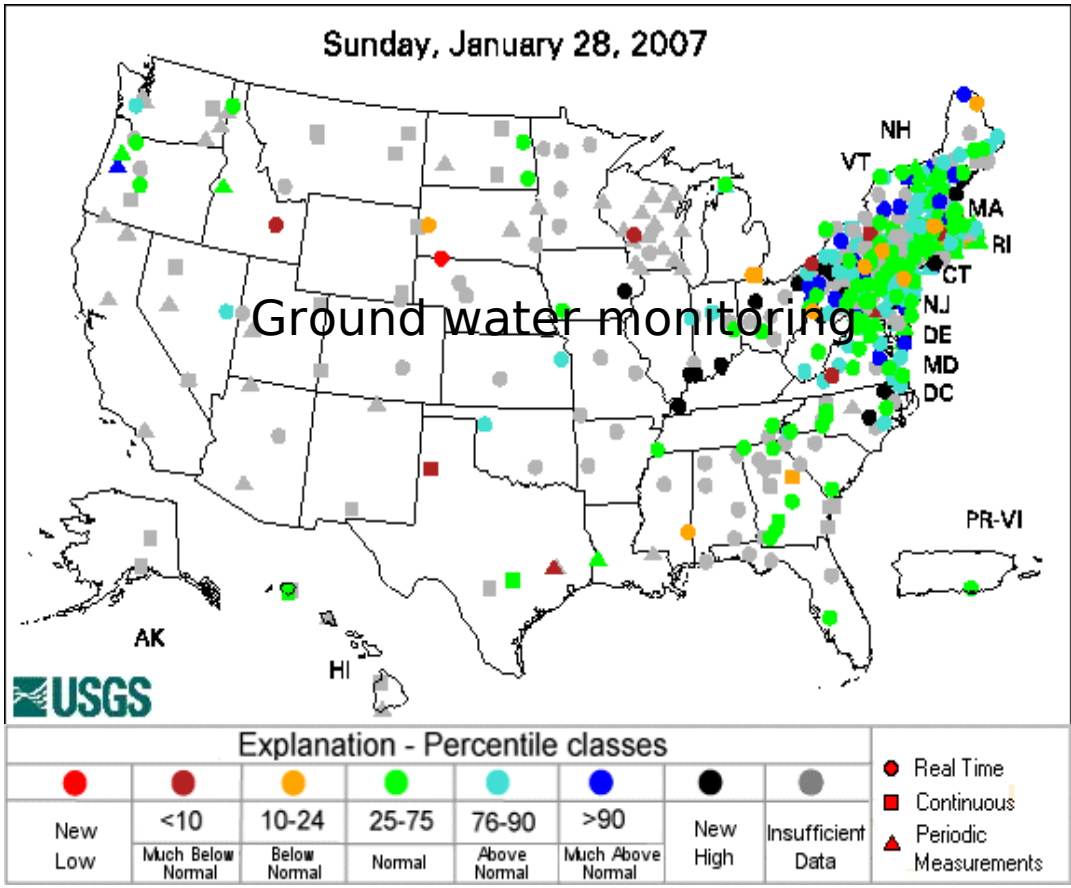
(After Vrba)

While standards are maintained for a number of water cycle variables by WMO there are a number of gaps for groundwater and water quality.

ALTERNATIVES FOR MEASURING GROUND WATER





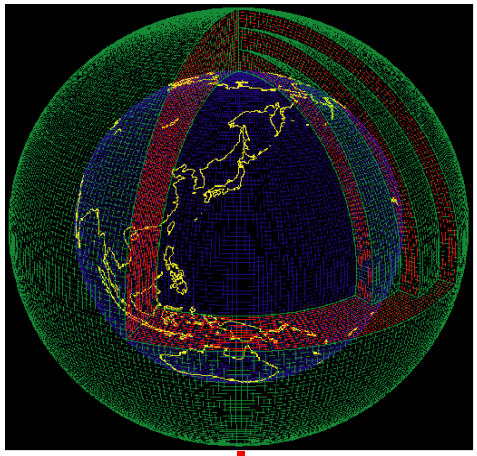


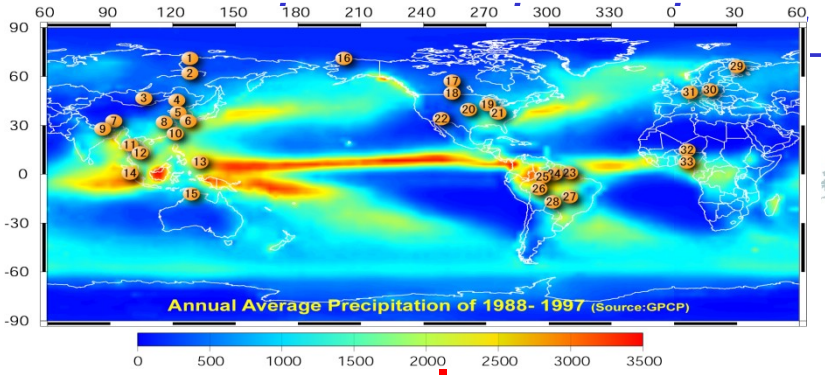
Coordinated Enhanced Observing Period

Three Unique Capabilities

Interoperability Arrangement

A well organized collecting, processing, storing, and disseminating shared data,



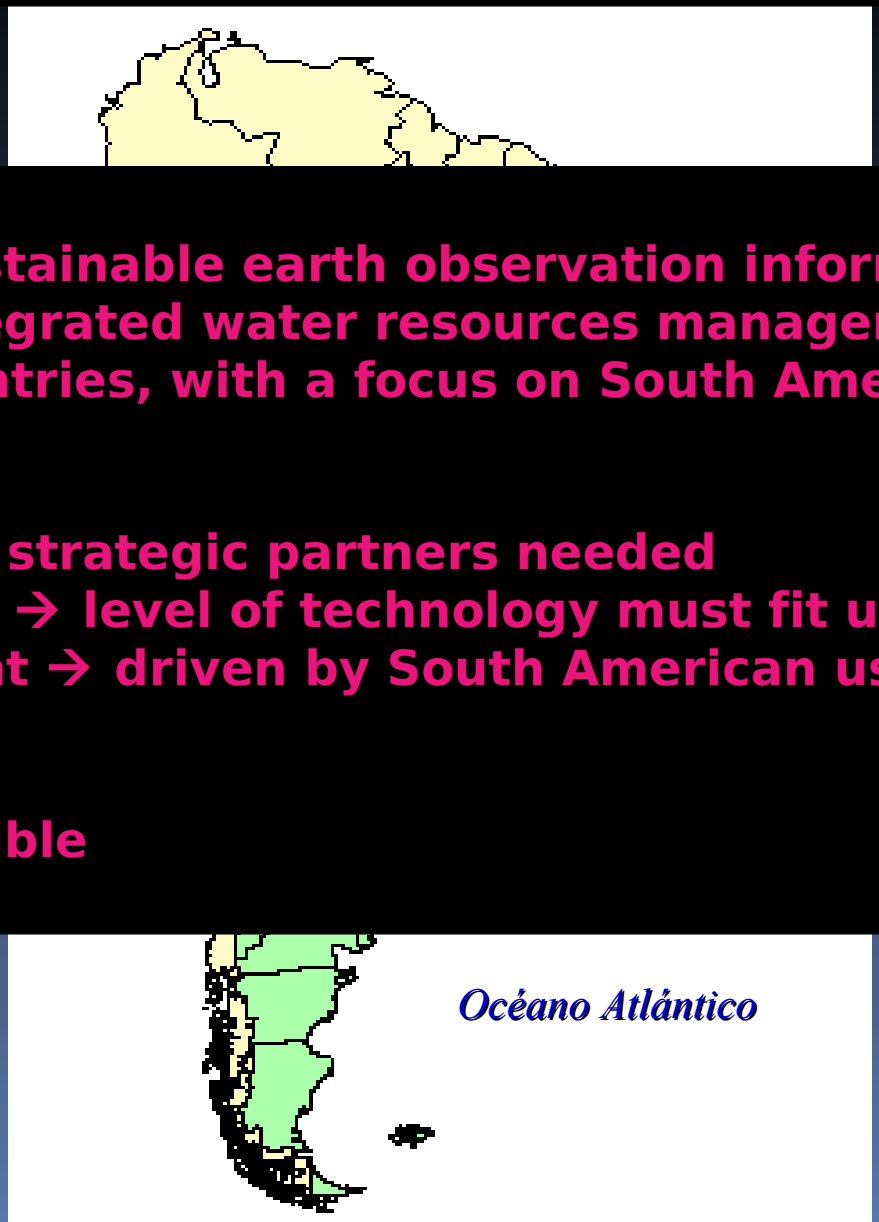


In-Situ Data Archiving Center at NCAR (National Center for Atmospheric Research) of USA

Model Output Data Archiving Center at the World Data Center for Climate, Max-Planck Institute for Meteorology of Germany

Data Integrating/Archiving Center at University of Tokyo and JAXA of Japan

A MODEL FOR A LATIN AMERICA CAPACITY BUILDING INITIATIVE



Mission

"Develop sustainable earth observation information services for integrated water resources management in developing countries, with a focus on South America"

Key requirements

Sustainability → strategic partners needed

Appropriateness → level of technology must fit user's capabilities

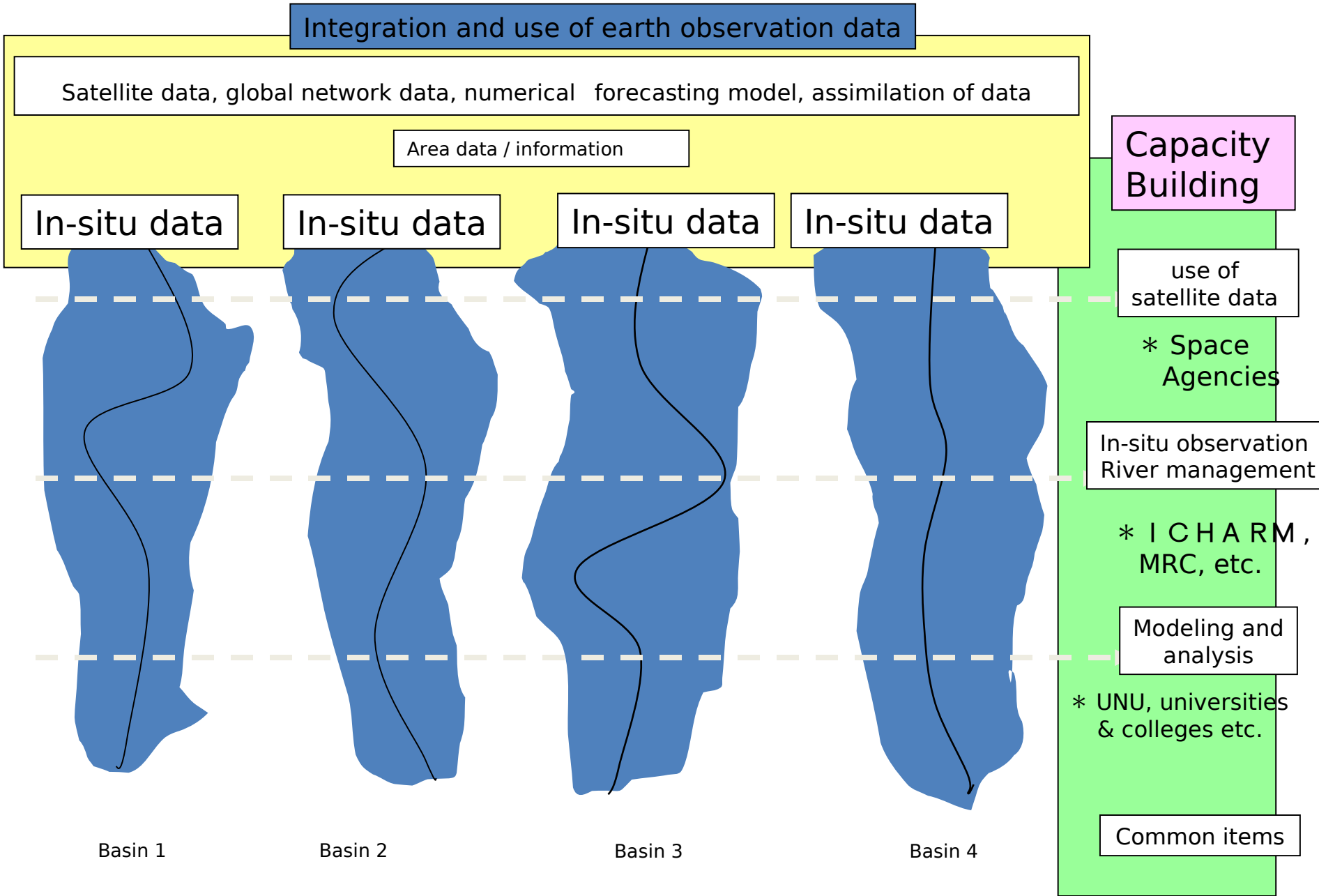
User engagement → driven by South American users

Main Sponsor

CONAE, others possible

The Asian Water Cycle Approach to Integrated River Basin Management:

[integration of earth observation data] + [capacity development] programme



E2E INITIATIVES

The *End-to-End Water* (*E2E-Water*) will demonstrate the value of integrated water cycle observations by developing a full and operational data cycle of environmental information from "producer-to-consumer" / "source-to-sink".

Initial pilots: *Impacts from drought*; assessment of the global water resource base under the "*State of the Global Water System*" and "*Water Towers of the World*."

There will be six supporting objectives:

1) Develop pilot projects that will advance the use of integrated data products within the framework of IGWCO, GEO, and the GEO Water Cycle Community of Practice.

2) Engage core elements of the GTN-H data consortium and principal data provision affiliates;

3) Assemble theme-based application communities, composed of both data users and providers, to articulate the needs of data consumers directly to the data providers and to optimize the relevance and utility of integrated water cycle observations;

4) Develop integrated water cycle data sets, data assimilation schemes, geospatial models, and other necessary tools to serve the needs of the theme-based user community;

5) Translate *E2E-Water* outputs into concrete values that support GEO policy, development, management, and educational priorities.

6) Demonstrate the added value of IGWCO and GEO integrating water cycle information for various applications.

The E2E activity provides a testbed for IGWCO/GWSP indicators that are currently under development.

Water Cycle Tasks in the GEO 2009 – 2011 Work Plan

A-06-02: Droughts, Floods and Water Resource Management
ddress decision-making challenges related to the management of hydrometeorolo
remes and the sustainable use of water.
Forecasting and Early Warning Systems for Droughts and Floods (Lead: U
mprove forecasting methods for extreme events (floods, droughts) used
hydrological services throughout the world – to help bridge the gap
tween research and user communities.
ludes Global Drought Early Warning System (GDEWS), European Flood
rt System (EFAS), GMES/Kopernikus project GEOLAND and HEPEX.
Impacts from Drought (Lead: Canada, WCCP)
ck and analyze impacts from drought (including feedbacks such as soil drying) t
vide a tangible and practical demonstration of the value of integrated water
le observations.
Mountain Water Resources (Lead:EC)
alyze the future of water resources in vulnerable mountain regions in the contex
climate change and increasing extreme events. It will include the European
oject ACQWA (Assessing Climatic change and impacts on the Quantity and qualit
WAter).

Water Cycle Tasks in the GEO 2009 – 2011 Work Plan

A-08-01: Integrated Products for Water Resource Management and Rese

provements and expansion of in-situ networks, combined with new
ellite missions (in addition to existing space-borne Earth observing
tems) and emerging assimilation and prediction capabilities, are
ening the door to a new era in global water-cycle management.

oil Moisture (Lead: ESA and WCRP)

tablish a global soil moisture network suitable for the development of
lti-purpose soil moisture products. Apply in-situ based products to the
ibration and validation of remotely-sensed observations.

Runoff (Lead: Japan (University of Tokyo) and Switzerland (University of Geneva

egrate, in a phased approach, dedicated river gauging networks of existing
drological stations into a global runoff observation network. The main output of
ARON project (Hydrological Applications and Run-Off Network) will be strengthen
situ and satellite monitoring networks of estuaries, rivers, lakes, reservoirs, and
oundwater levels.

Groundwater (Lead: Netherlands (IGRAC))

tablish a Global Groundwater Monitoring Network (GGMN) for a periodic
sessment of global groundwater resources, using information from existing nati
gional and global networks – in order to represent changes in groundwater resou
scales relevant to regional and global resource assessment.

Water Cycle Tasks in the GEO 2009 – 2011 Work Plan

-01 (Cont'd): Integrated Products for Water Resource Management and
ipitation (Lead: CGMS)
e and advance the development and validation of multi-sensor satellite-based
ation estimates, including snowfall. Inputs from the Precipitation Virtual
lation (AR-09-02a) will supplement these efforts.
er Cycle Data Integration (EC (CEOP-AEGIS) and WCRP (GEWEX))
ng satellite launches and plans for new missions provide new global data sets
l supplement the in-situ networks for many water cycle variables. The
ated Energy and water cycle Observations Project (CEOP) under the WCRP
Energy and Water-cycle Experiment (GEWEX) is tailoring and developing tools
ess the various data collections and undertake data integration work over the
t.
Projects for Improved Water Discovery and Quality Assessments (IEEE)
t pilot projects in cooperation with local and national governments and other
zations to provide water where it is needed, but not now available. These
s will be focused on developing countries and realizable in the field within
ar. They will be sustainable, resusable, repeatable, and scalable.

A POSSIBLE WATER CYCLE WC COMMUNITY OF PRACTICE FOR COORDINATING GEO WATER ACTVITIES