



Integrated Global Water Cycle Observation Theme (IGWCO)

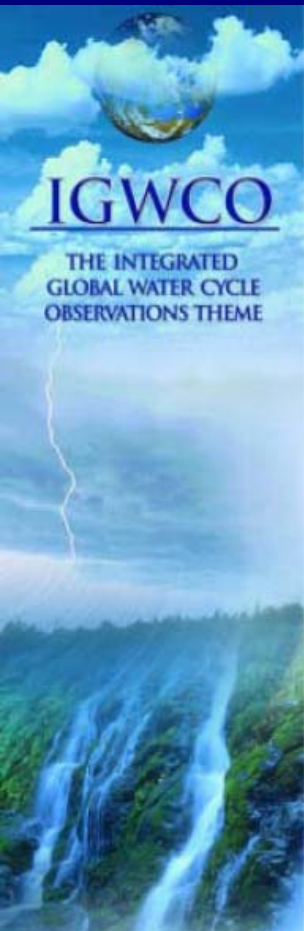


Wolfgang Grabs (WGrabs@wmo.int)

14th Session of the Integrated Global Observing
Strategy Partners

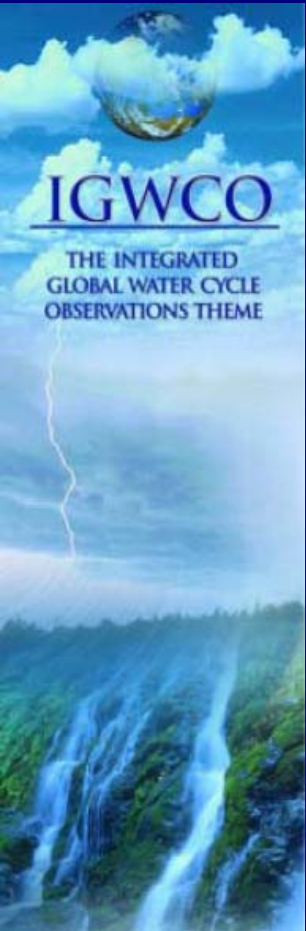
30 May 2007, Paris, France

Recent IGWCO Activities



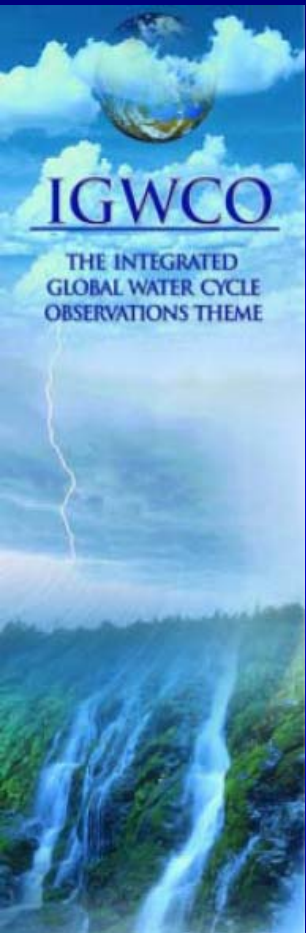
- 2nd Asian Water Cycle Symposium, Bangkok, September 2006;
- Buenos Aires Capacity Building Development Proposal Workshop, November 2006;
- IGWCO Website online, December 2006;
- IGWCO Assessment Report completed, January 2007;
- 3rd Annual IGWCO Planning Meeting, Washington DC, March 2007;
- Inland and Near-shore Coastal Water Quality Remote Sensing Workshop, Geneva, March 2007;
- **Draft « Community of Practice » document circulated, April 2007;**
- IGWCO Planning Meeting Report completed, May 2007

Major Achievements - Precipitation



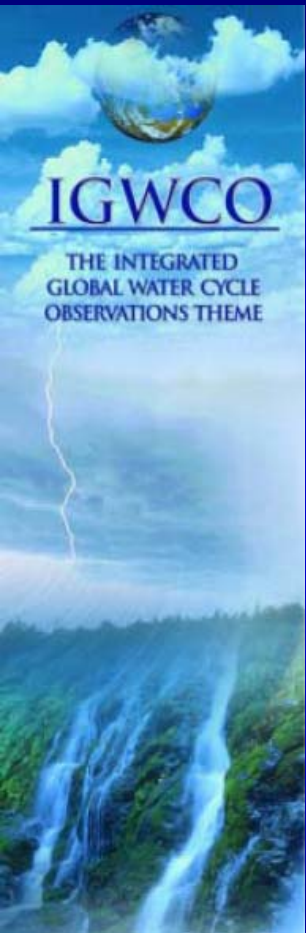
- Program to Evaluate High Resolution Precipitation Products (PEHRPP) launched.
 - Interim results discussed at 3rd IPWG Workshop, Melbourne 2006
 - Validation/intercomparison precipitation datasets from regional campaigns now available:
 - <http://www.bom.gov.au/bmrc/SatRainVal/validation-intercomparison.html>
- Gridded precipitation datasets from the Coordinated Enhanced Observation Period (CEOP) are also available:
 - <http://www.gewex.org/ceop.htm>

IGWCO Integrated Precipitation Product



- “Requirements:”
 - appropriate resolution - $\leq 25\text{km}$, 3 hourly
 - regular availability
 - adequate accuracy/precision and suitable error characteristics
- Three candidates currently, all with various strengths:
 - TMPA: combined rain gauge/passive microwave product
 - PERSIANN: precipitation estimates based on infrared brightness temperature image provided by geostationary satellites, combined with daytime visible images
 - CMORPH: “morphing” technique uses a combination of precipitation estimates from passive microwave and cloud motion from geostationary IR
- Both rain gauge observations and model forecasts have potential benefits and should be incorporated into these algorithms
- PEHRPP Workshop scheduled for December 3-5, 2007
 - Planned to be hosted by WMO in Geneva
 - Will provide recommendations to IPWG and IGWCO

Major Achievements – Water Quality



- Recent advances in remote sensing mapping tools suggest amount of terrestrial surface freshwater has been previously underestimated.
- Empirical approach to measuring water clarity from space-borne sensors is being explored (State of Wisconsin).
- Long-term trends of select global lakes being studied by NASA Energy- and Water-Cycle Sponsored Research (NEWS) program.
- Global Water Watch (GWW) program initiated.
- Focus on arsenic problem in Bangladesh drinking water as part of UNESCO Millenium Development Goals.
- GEO Inland and Nearshore Coastal Water Quality Remote Sensing Workshop (27-29 March 2007, Geneva)

IGWCO Water Quality Product

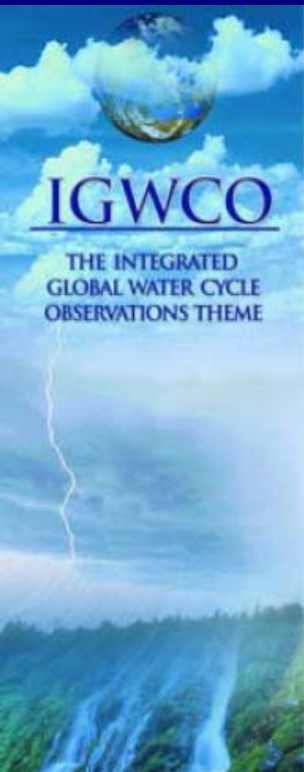


- Remote Sensing Methods for Lake Assessment
 - Held at NALMS - Nov 7, 2006. Indianapolis, Indiana
 - total number of lakes over 0.01 km² is 3x10⁸
 - total surface area covering appx 2.8 percent of the land surface
 - reservoirs constitute 2.6 x 10⁵ km² - little is known about the cumulative water quality impact of these impoundments.
- Full day of instruction on sensors, data analysis, costs, and expected results.
 - Lakes will be classified using spectral and physical factors, and models will be developed relating satellite measurements to water clarity and other in-lake conditions.
 - A guidance manual is currently being published, an excellent tool for use in future.

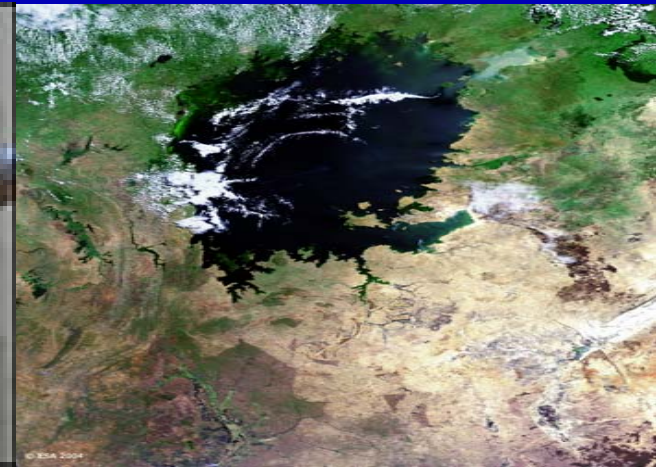
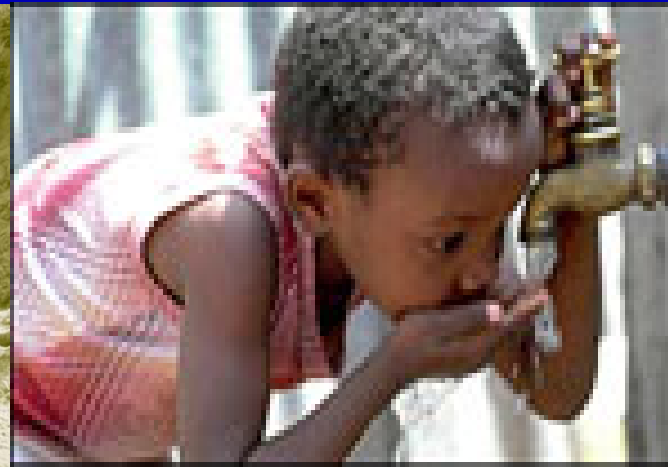
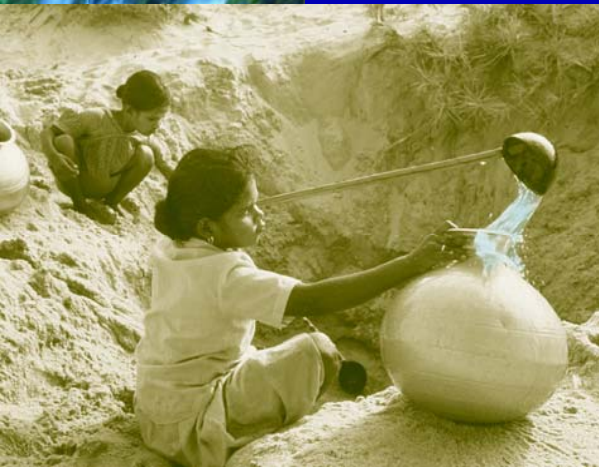


International capacity building workshops to be held.

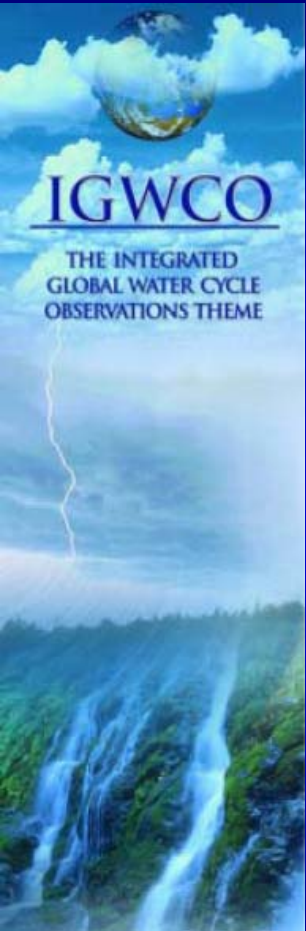
Major Achievements – Capacity Building



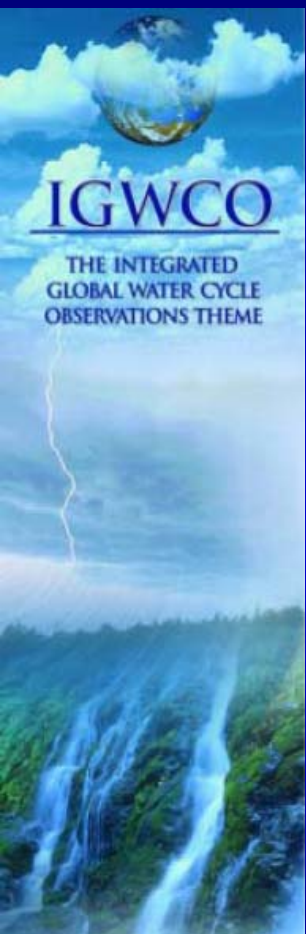
- Asian Water Cycle Symposia
 - Tokyo, November 2005; Bangkok, September 2006
- South American Capacity Building Development Proposal Workshop
 - Buenos Aires, November 2006
- African TIGER Initiative
- Focus on Bangladesh arsenic groundwater contamination
- GEO Work Plan WA-06-06
 - water resource management workshops in South America, Asia, Africa



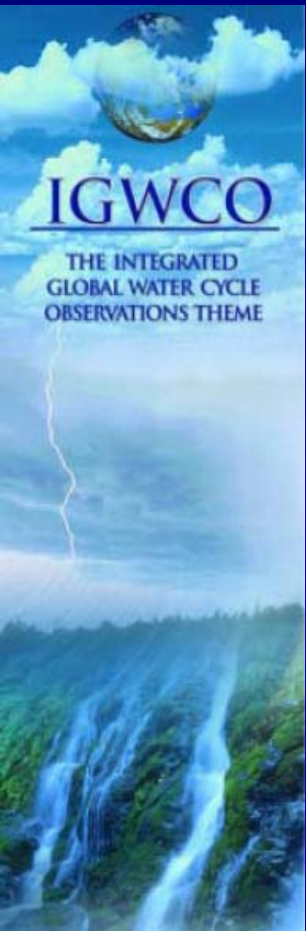
IGWCO and Soil Moisture



- Objective: integrated soil moisture product, optimally combining *in-situ* and remotely sensed data with modeling/data assimilation from forecasting operations.
- Soil Moisture Working Group established in 2005
 - planning 2nd workshop for Beijing November 14-15, 2007
- ESA' s Soil Moisture and Ocean Salinity Mission (SMOS) making progress.
 - Launch date set for 2008
- Cloud and Land Surface Interaction Campaign (CLASIC) planned.
 - *in-situ* and remote sensing project, covering land and atmosphere will be employed during the summer of 2007, in US Midwest
- GCOS has named soil moisture as one of its emerging Essential Climate Variables (ECV).
 - placing an emphasis on developing an experimental soil-moisture product from existing networks and satellite observations, in collaboration with IGWCO



- Linkages enhanced with International Groundwater Assessment Centre (IGRAC).
 - working to establish a sustainable Global Groundwater Monitoring System (GGMS)
- Links enhanced with UNESCO International Hydrological Programme (IHP).
- Groundwater Working Group has recently been established, comprised of GARS, UNESCO, TIGER, and IGWCO.
 - Groundwater Workshop planned in Netherlands, autumn 2007
 - inventory needs for groundwater information for applications
 - review existing groundwater information systems, develop and promote initiatives to address the gaps
 - identify opportunities for applying remote sensing data in the identification, mapping and management of ground water resources
 - assist IGOS-P Global Water Cycle and Geohazards Observations themes in responding to GEO targets that have implications for groundwater observational systems, including activities related to capacity building



Hydrological Applications and Run-Off Network (HARON)

In line with IGWCO, GCOS and GEWEX main objectives:

- Improve and support the closure of the global water budget.
- Support water resources management (in context of food security).

Initial phase:

- Upgrade and sustained maintenance of major global run-off stations. monitoring continental freshwater fluxes into the world's oceans.

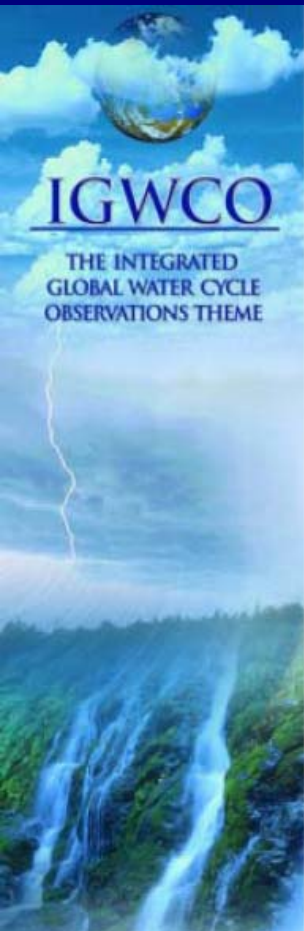
2nd Phase:

- Combine hydro-meteorological and related in-situ components with satellite observations.

3rd Phase:

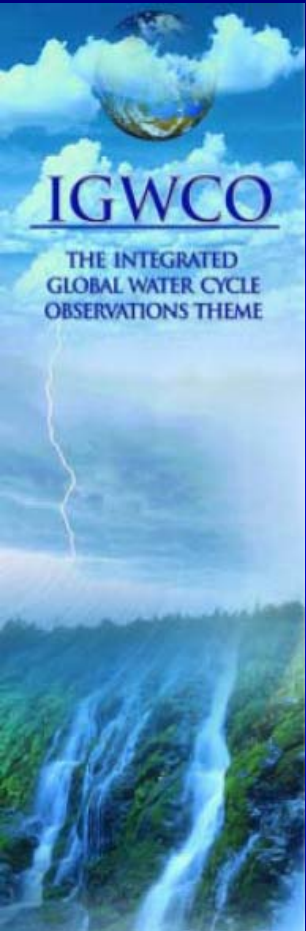
- Produce implementation plan for broad global water cycle data integration system combining *in-situ*, satellite data and model outputs.

HARON



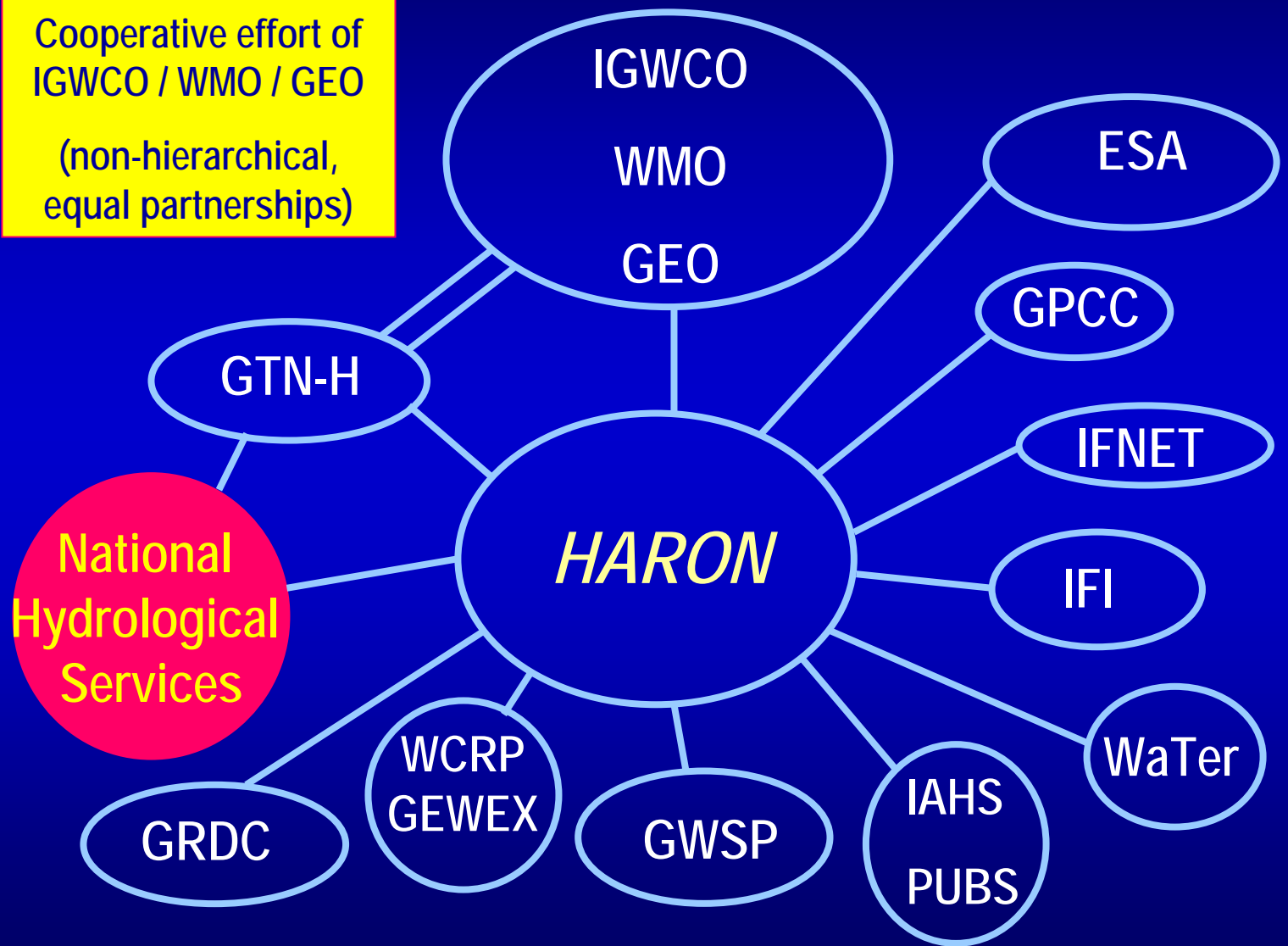
Project *Raison d'être*:

- Near real-time regional and global computation of the water balance as an important input for climate models and seasonal forecasting.
- Validation of large-area precipitation fields against basin-wide hydrological records to adjust/fine-tune Global Circulation Models.
- Detection of changing hydrological patterns of river runoff on seasonal and interannual scale as a signal of climate variability.
- Estimation of regional and global bio-geochemical fluxes from the continents into world oceans.
- Land-borne emissions in water bodies into coastal zones.
- Variation of freshwater fluxes from the continents and their influence on the thermohaline circulation in global oceans.

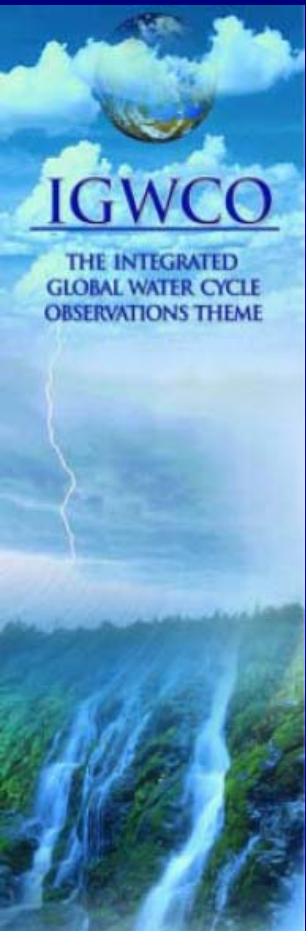


Cooperative effort of
IGWCO / WMO / GEO

(non-hierarchical,
equal partnerships)



open to others...

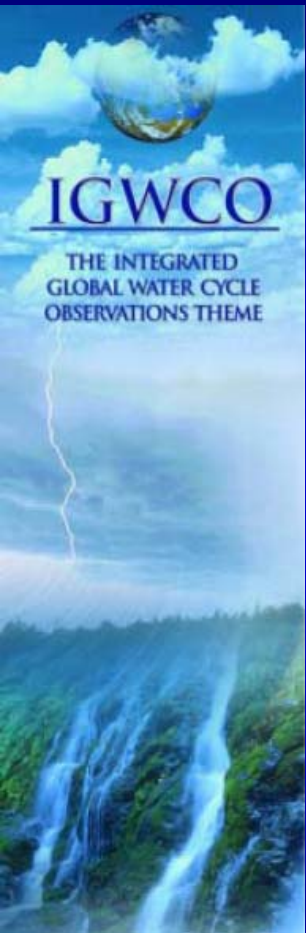


IGWCO Assessment Report

Summary of Findings:

- IGWCO is a “best efforts” endeavor.
 - a number of IGWCO activities have been opportunity-driven (as opposed to objective-driven).
- Cross-cutting within the IGOS-P family of themes needs to be promoted - through IGOS itself?
- Improve links between GTN-H projects and IGWCO objectives.
- Improve links between GEWEX projects and IGWCO objectives.
- Proactive search for project funding should be undertaken.
- Review of the IGWCO visibility/outreach strategy shows that it is still valid.

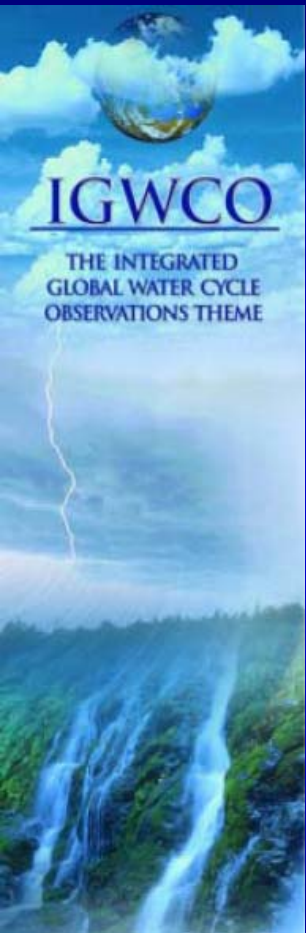
IGWCO and CEOP



Coordinated Energy and Water Cycle Observation Project (CEOP)

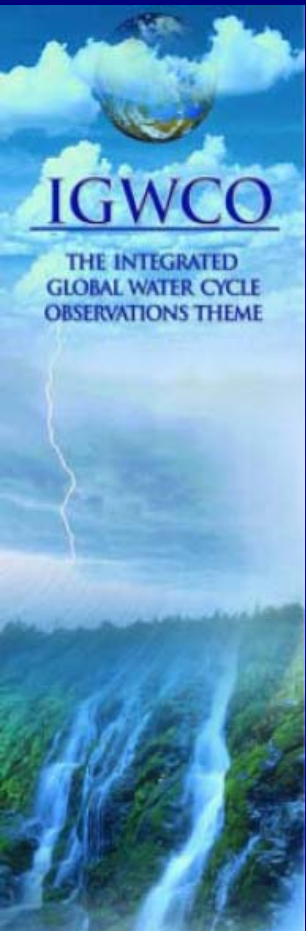
- Initiative of the University of Tokyo (Prof. T. Koike).
- Objective: produce datasets that satisfy needs of environmental policymakers while supporting scientific and operational environmental programs.
 - ✓ Phase I complete:
 - 3 EOPs carried out (35 terrestrial reference centers, 12 NWP/Data assimilation centers, 9 satellite projects)
 - ISO TC/211 19115 metadata standard
 - Datasets available online
 - ✓ Phase II underway:
 - Additional EOPs planned
 - Cooperation with GEOSS, WCRP/GEWEX, IGWCO emphasized
- CEOP provides a unique opportunity for coordination among Regional Hydrological Projects (RHPs).

IGWCO and GEO



- Unique characteristic of IGWCO: it sets up strategies, identifies partners, attempts to foster collaboration.
- IGWCO has proven to be a principal partner with GEO.
 - IGWCO cooperated in definition and implementation of GEO Water Tasks
- GEO objectives are similar, on a broader scale.
 - GEO enjoys broad financial and political support
- ***Executive Decision: IGWCO should be gradually phased into GEO to avoid redundancy and streamline efforts.***
 - IGWCO will develop a strategy to serve both GEO and IGOS-P.
 - IGWCO leads will remain intact for the 2007-2009 work plan (next 12 months), while focusing on GEO requirements.
 - IGWCO prepared to act as strategic think tank, making use of technical, scientific, and supporting institutional infrastructure of its partners in support of GEO.
 - ***IGWCO will make further efforts to streamline activities towards watertasks of GEO.***

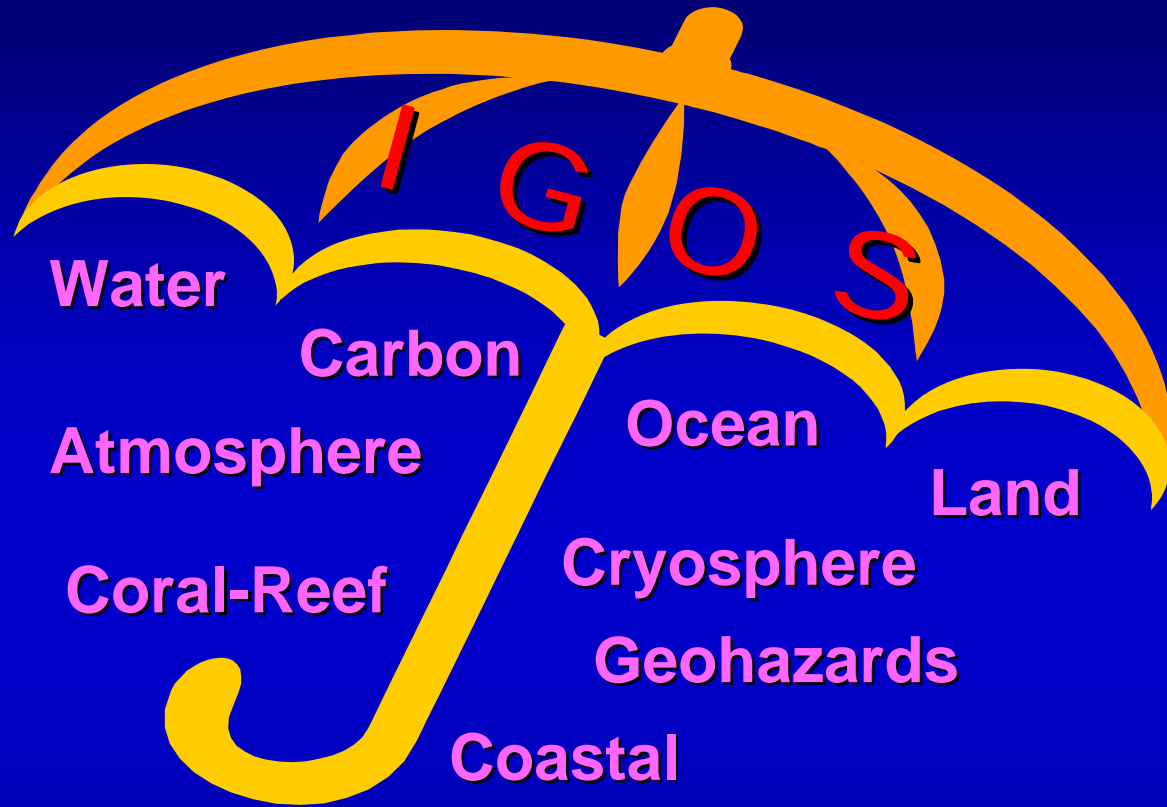
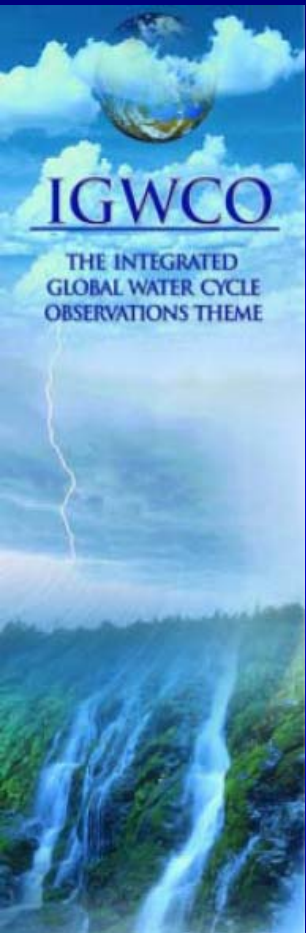
IGWCO and the future...



Investigate/initiate linkages/synergies with:

- Atmospheric Radiation Measurement (ARM)
- Stable isotope ratios in river flow to measure impact of land use changes in basin hydrology
- Radar altimetry to measure water stages in lakes, rivers, and reservoirs
- Doppler lidar to measure river surface velocity
- Centre for Groundwater Studies (CGS)
- WMO Hydrology and Water Resources Programme (HWRP)
- UNESCO International Hydrological Programme (IHP)

IGWCO view of "Integration" in IGOS



IGWCO view: Cross-Theme Integration is urgently *needed!*

- IGOS should be more more than a theme generator.
- IGOS should initiate cross-theme integration as priority to enhance synergy between themes.



IGWCO Website

For News, Meetings, Documents, more information, please visit:

<http://www.wmo.int/pages/prog/igwco/igwco.index.shtml>

Thank you

