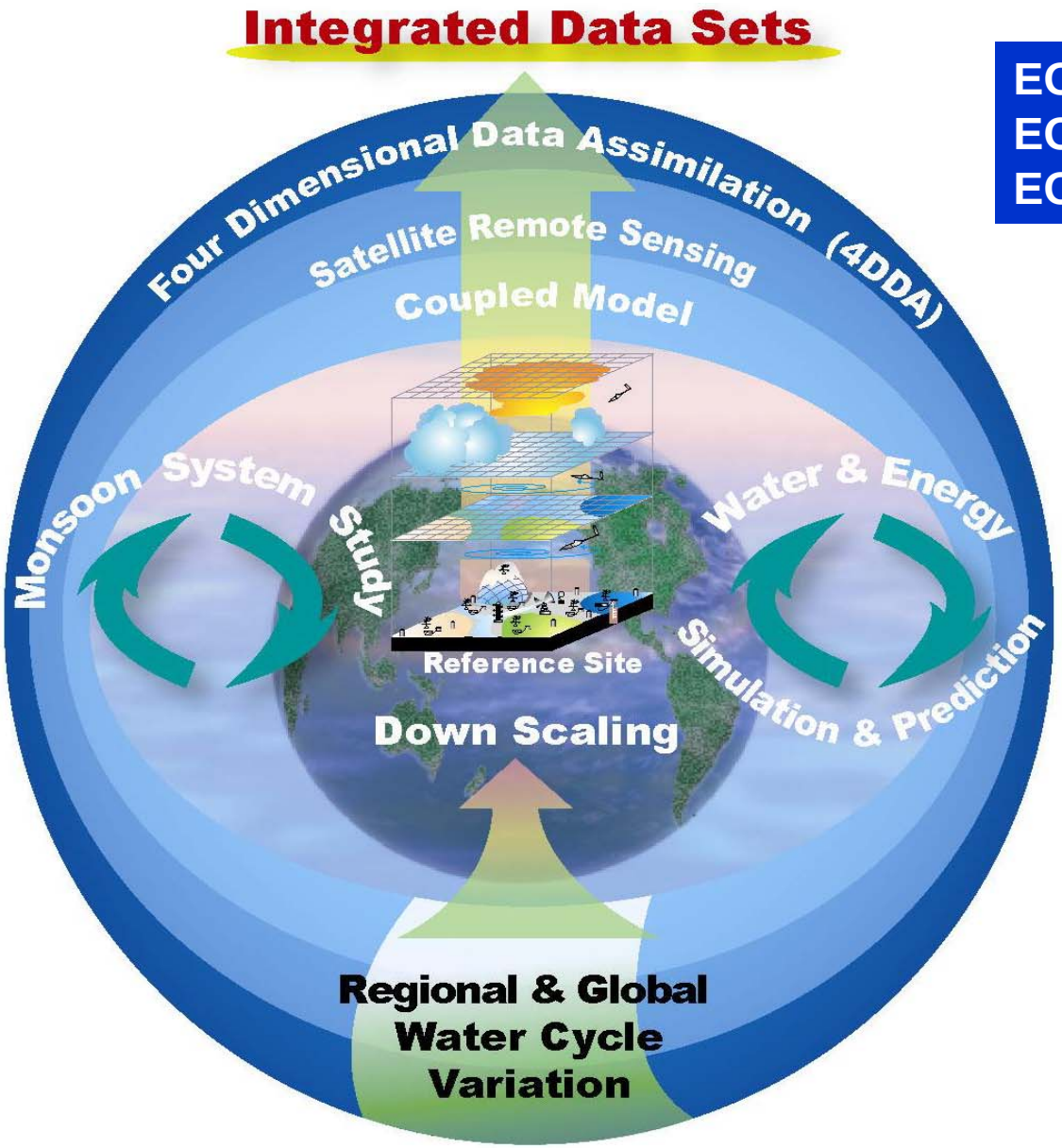
Coordinated Enhanced Observing Period

an Element of WCRP (CEOP) initiated by GEWEX



EOP1: Jul.-Sep. 2001
EOP3: Oct. 2002 - Sep. 2003
EOP4: Oct. 2003 - Dec. 2004

http://www.ceop.net

CEOP SCIENTIFIC OBJECTIVES

LONG-TERM GUIDING GOAL

**To understand and model
the influence of continental hydroclimate processes on
the predictability of global atmospheric circulation
and
changes in water resources,
with a particular focus on the heat source and sink regions
that drive and modify the climate system and anomalies.**

OVERALL OBJECTIVE 1

To better document and simulate water and energy fluxes and reservoirs over land on diurnal to annual temporal scales and to better predict these on temporal scales up to seasonal for water resources application.

Water & Energy Simulation & Prediction (WESP)

OVERALL OBJECTIVE 2

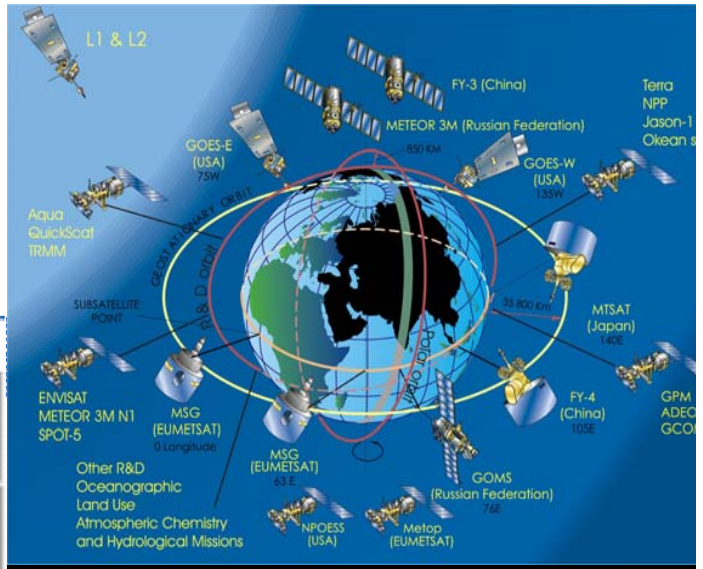
Document the seasonal march of the monsoon systems, assess their living mechanisms, and investigate their possible physical connections.

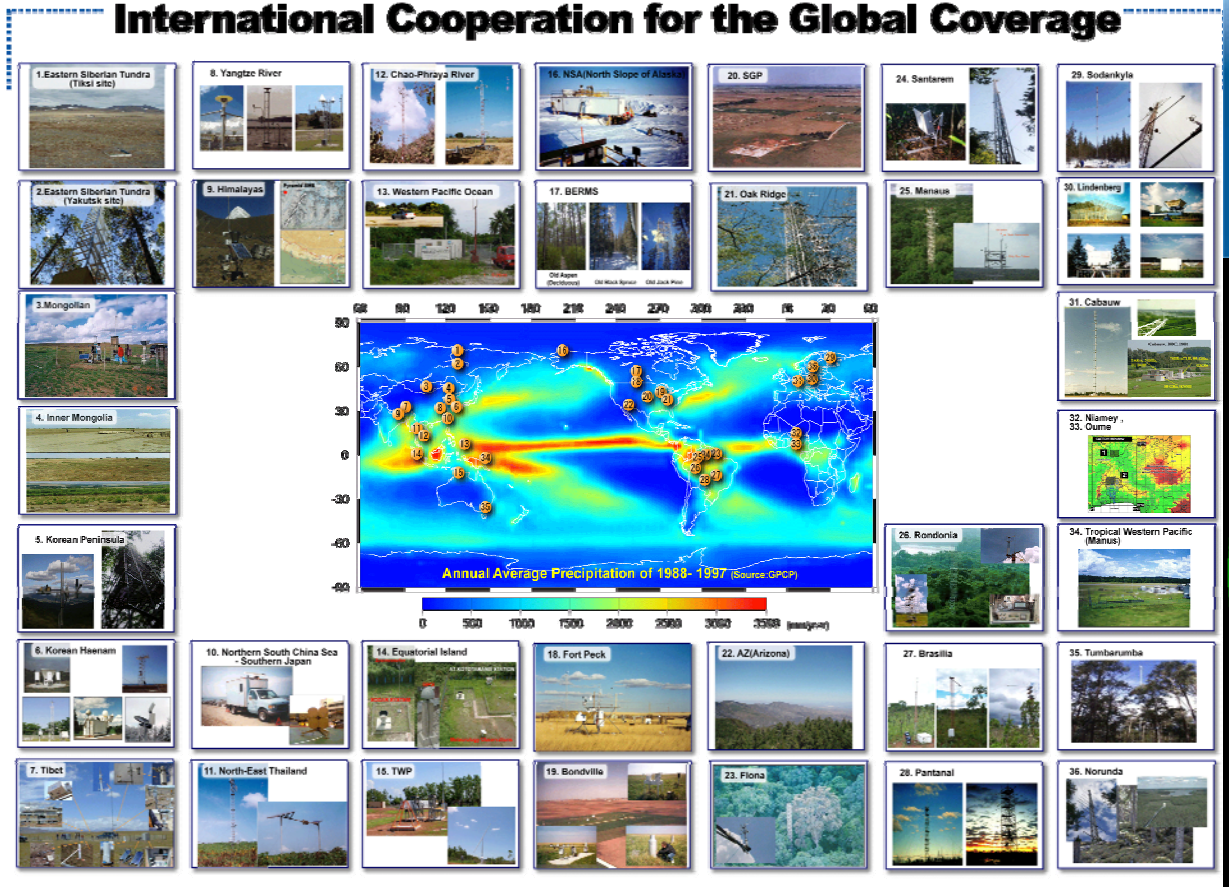
CEOP Intern-Monsoon Study (CIMS)

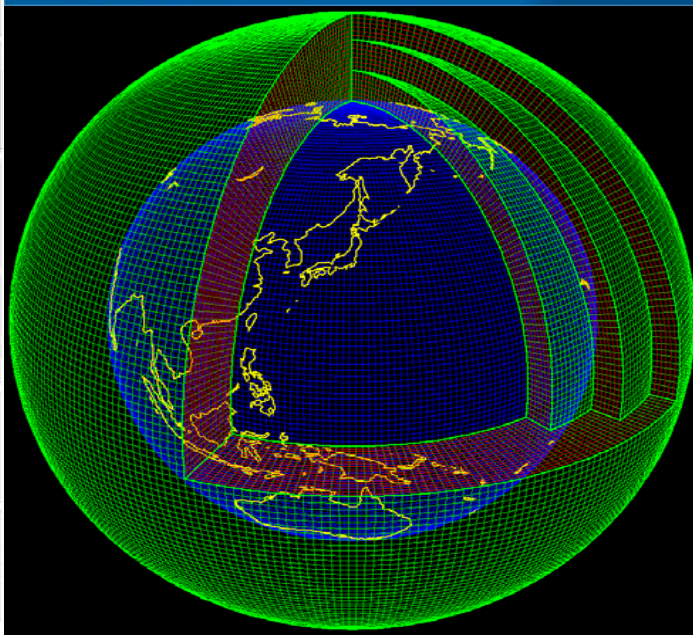
Coordinated Enhanced Observing Period
Three Unique Capabilities

Convergence of Observations

A Prototype of the Global Water Cycle Observation System of Systems



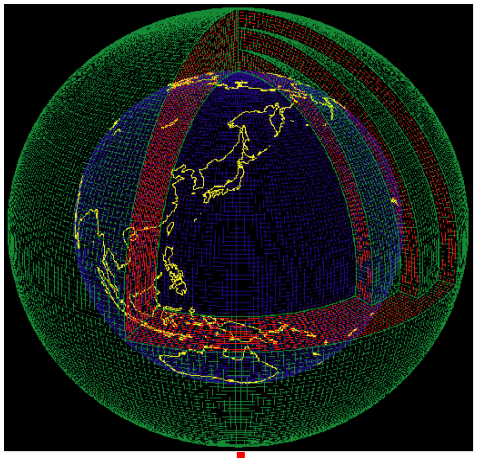


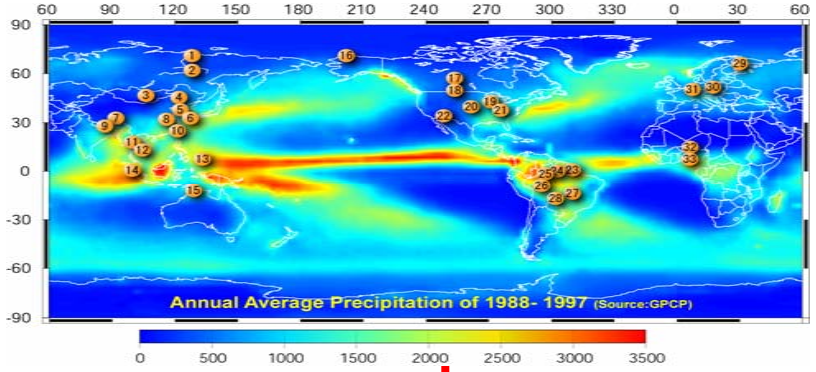


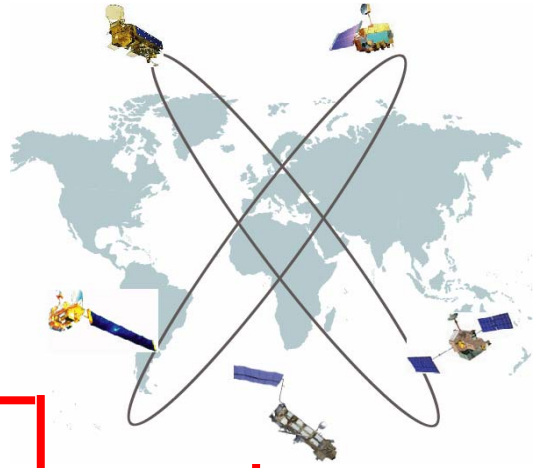
Coordinated Enhanced Observing Period
Three Unique Capabilities

Interoperability Arrangement

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







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

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

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

Coordinated Enhanced Observing Period

Three Unique Capabilities

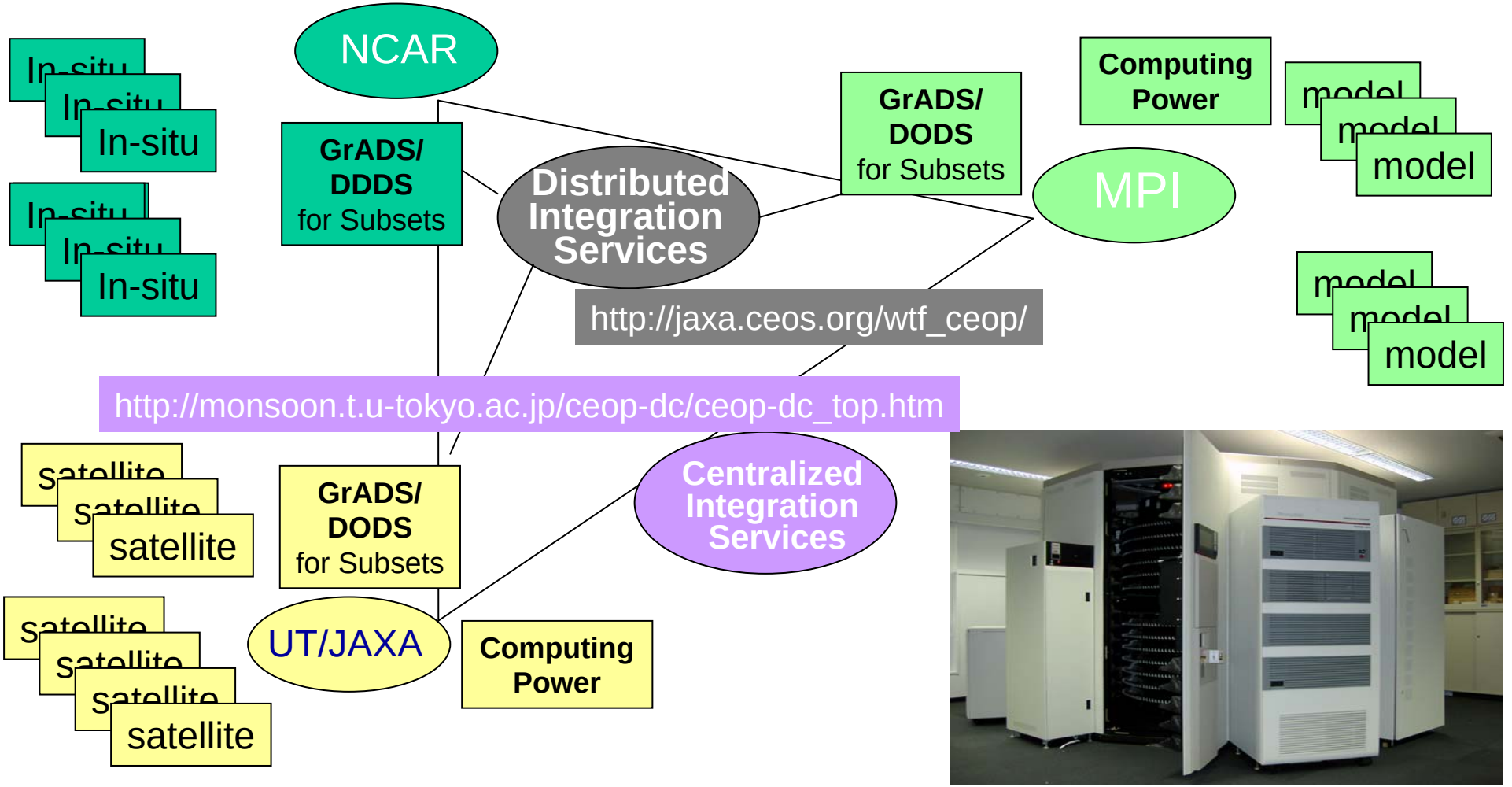
Reference Site Scale

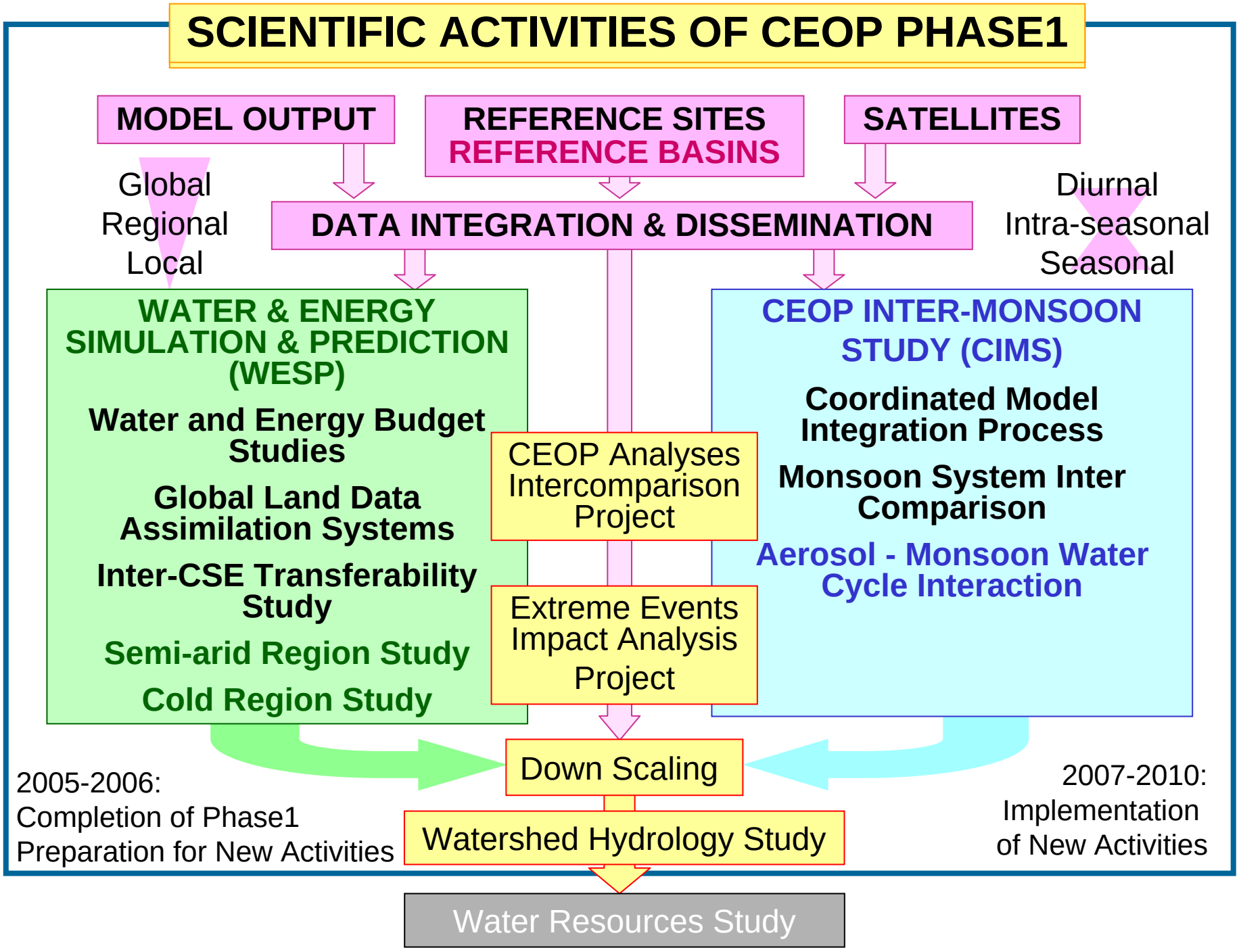
Platform	Sensor	Level	Description	EOP-1	EOP-3	EOP-4
AQUA	AMSR-E	L1B	Brightness Temperature		■	■
		L2, L3	Soil Moisture		■	■
			Snow Water Equivarent		■	■
			Rain Rate		■	■
			Water Vapor		■	■
			Cloud Liquid Water		■	■
			Sea Surface Temperature		■	■
			Sea Surface Wind Speed		■	■
ADEOS-II	AMSR	L1B	Brightness Temperature		■	■
		L2, L3	Soil Moisture		■	■
			Snow Water Equivarent		■	■
			Rain Rate		■	■
			Water Vapor		■	■
			Cloud Liquid Water		■	■
			Sea Surface Temperature		■	■
			Sea Surface Wind Speed		■	■
	GLI	L1B	Radiance		■	■
		L2, L3	Precipitable water		■	■
			Sea Surface Temperature		■	■
			Snow Grain Size		■	■
			Aerosol Optical Thickness		■	■
			Cloud Parameter		■	■
			Cloud Liquid Water		■	■
			1km Surface Reflectance		■	■
			Vegetation Index		■	■
TRMM	TMI	L1B	Brightness Temperature	■	■	■
		L2, L3	Rain Rate Profile	■	■	■
			Surface Rain	■	■	■
	PR	L2, L3	Rain Rate Profile	■	■	■
			Surface Rain Rate	■	■	■
DMSP F13,14,15	SSM/I	L1B	Brightness Temperature	■	■	■
GMS	SVISSR	L1B	Radiance	■		
NOAA	AVHRR	L1B	Radiance	■		
TERRA/AQUA	MODIS	L1B	Radiance	■		

Coordinated Enhanced Observing Period
Three Unique Capabilities

Data Management

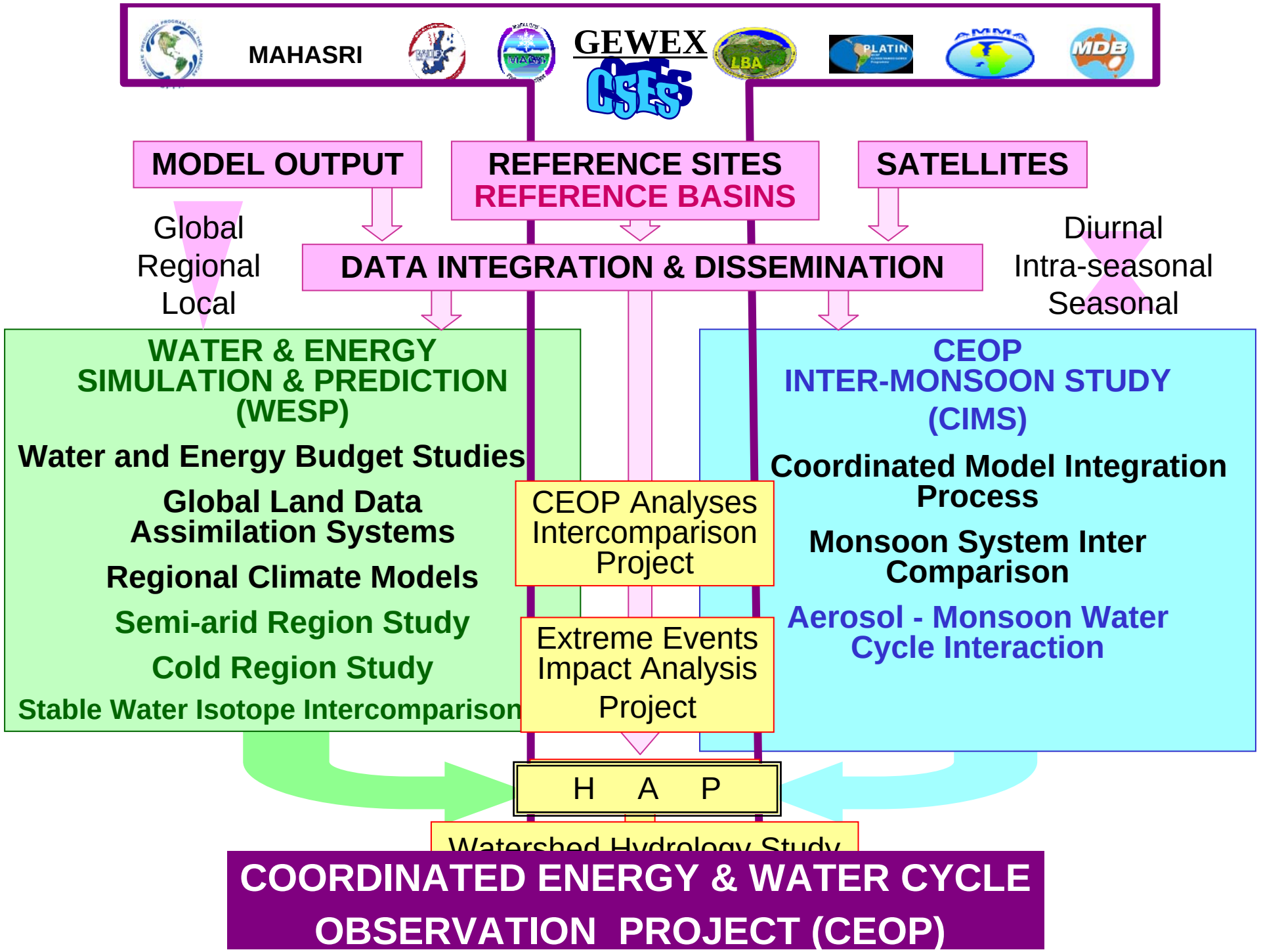
Distributed- and Centralized- Data Integration Functions

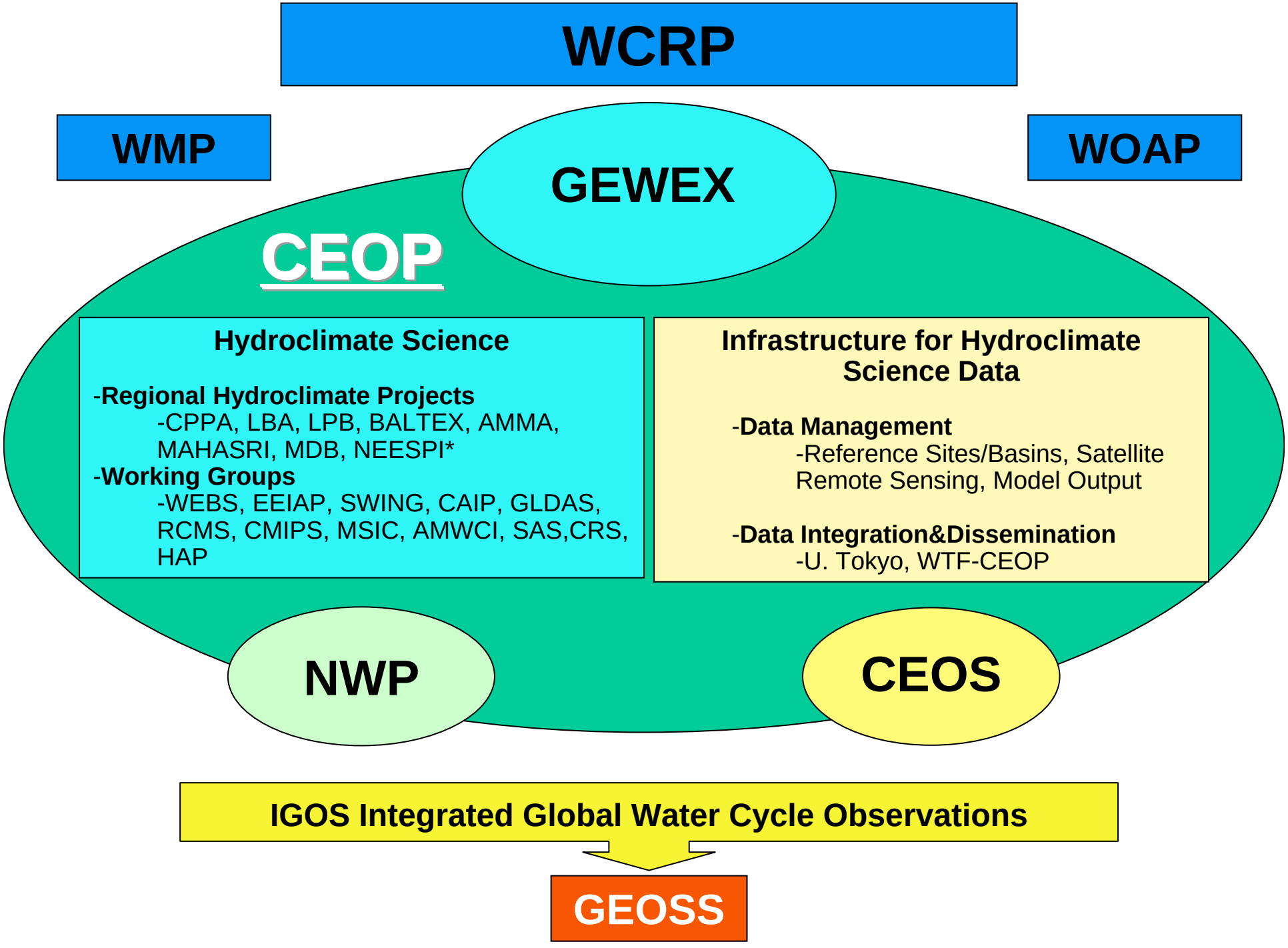



SCIENTIFIC ACTIVITIES OF CEOP PHASE1
MODEL OUTPUT
REFERENCE SITES
REFERENCE BASINS
SATELLITES
Global
Regional
Local
DATA INTEGRATION & DISSEMINATION
Diurnal
Intra-seasonal
Seasonal
WATER & ENERGY SIMULATION & PREDICTION (WESP)
Water and Energy Budget Studies
Global Land Data Assimilation Systems
Inter-CSE Transferability Study
Semi-arid Region Study
Cold Region Study
CEOP Analyses Intercomparison Project
Extreme Events Impact Analysis Project
CEOP INTER-MONSOON STUDY (CIMS)
Coordinated Model Integration Process
Monsoon System Inter Comparison
Aerosol - Monsoon Water Cycle Interaction
Down Scaling
Watershed Hydrology Study
Water Resources Study
2005-2006:
Completion of Phase1
Preparation for New Activities
2007-2010:
Implementation
of New Activities

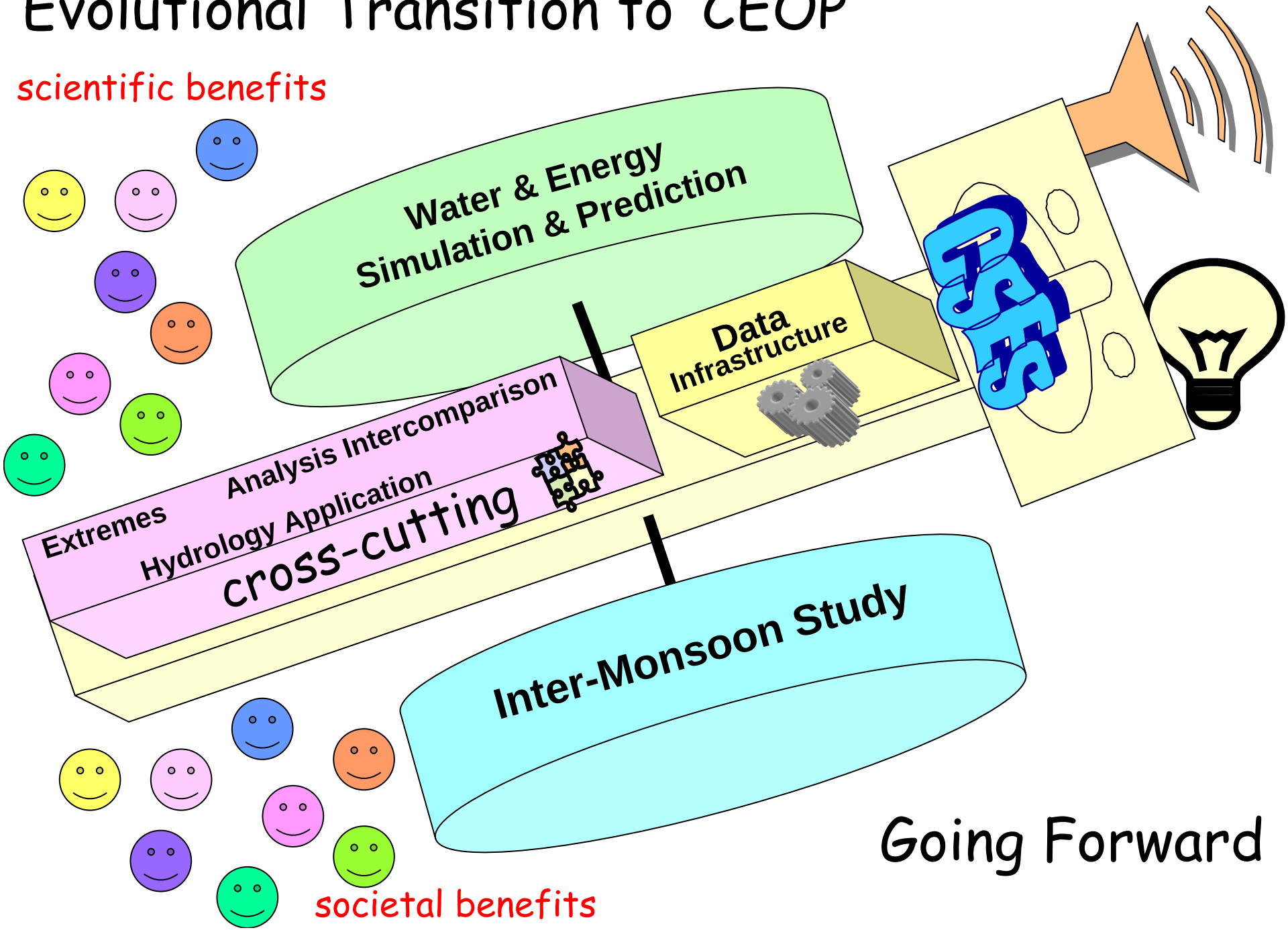
GHP-CEOP
-evolutional transition-

- A new 'science' – 'data infrastructure' coordination body for continental hydroclimate science.
- Functions of scientific coordination panel, observation convergence, interoperability arrangement, and data management .
- Science oversight by GEWEX and data management oversight by WOAP.
- Once a year meeting on science coordination, planning, and project implementation.
- Coordinated Energy & Water Cycle Observation Project (CEOP)


MAHASRI
GEWEX
CSES
LBA
PLATIN
AMMA
MDB
MODEL OUTPUT
REFERENCE SITES
REFERENCE BASINS
SATELLITES
Global
Regional
Local
DATA INTEGRATION & DISSEMINATION
Diurnal
Intra-seasonal
Seasonal
WATER & ENERGY SIMULATION & PREDICTION (WESP)
Water and Energy Budget Studies
Global Land Data Assimilation Systems
Regional Climate Models
Semi-arid Region Study
Cold Region Study
Stable Water Isotope Intercomparison
CEOP Analyses Intercomparison Project
Extreme Events Impact Analysis Project
CEOP INTER-MONSOON STUDY (CIMS)
Coordinated Model Integration Process
Monsoon System Inter Comparison
Aerosol - Monsoon Water Cycle Interaction
H A P
Watershed Hydrology Study
COORDINATED ENERGY & WATER CYCLE OBSERVATION PROJECT (CEOP)


WCRP
WMP
GEWEX
WOAP
CEOP
Hydroclimate Science
-Regional Hydroclimate Projects
-CPPA, LBA, LPB, BALTEX, AMMA, MAHASRI, MDB, NEESPI*
-Working Groups
-WEBS, EEIAP, SWING, CAIP, GLDAS, RCMS, CMIPS, MSIC, AMWCI, SAS,CRS, HAP
Infrastructure for Hydroclimate Science Data
-Data Management
-Reference Sites/Basins, Satellite Remote Sensing, Model Output
-Data Integration&Dissemination
-U. Tokyo, WTF-CEOP
NWP
CEOS
IGOS Integrated Global Water Cycle Observations
GEOSS

Evolutional Transition to 'CEOP'



Going Forward

GROUP ON EARTH OBSERVATIONS

Global Earth Observation System of Systems

Toshio Koike
The University of Tokyo

Vision for GEOSS

The vision for GEOSS is to realize
a future wherein decisions and actions for
the benefit of humankind
are informed by
coordinated, comprehensive and sustained
Earth observations and information.

Three Meanings of "A System of Systems"

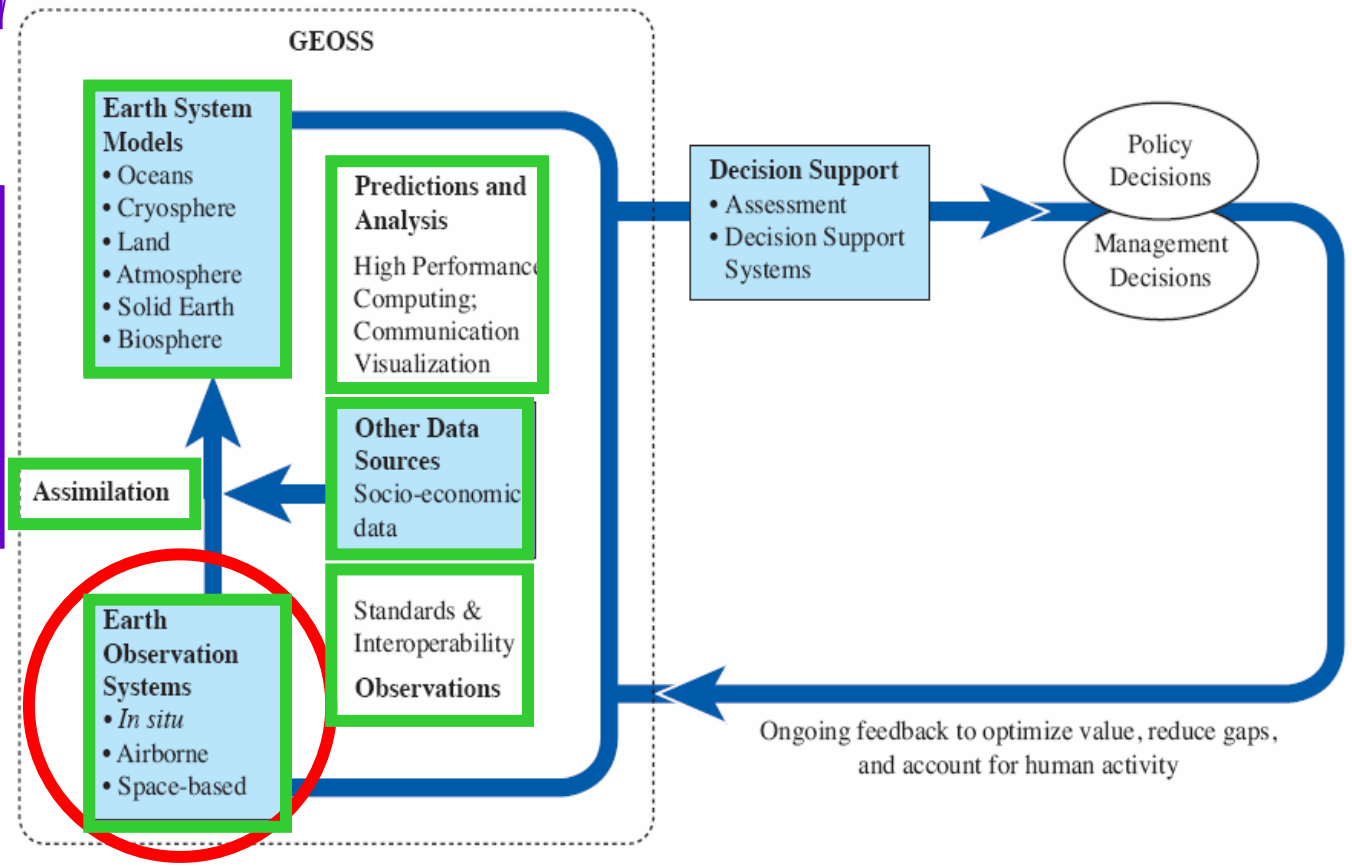
Disaster | Health | Energy

Climate | Weather

A System for Coordinating the Nine Socio Benefit Areas

Water | Agriculture | Ecosystem | Biodiversity

A System for Integrating Observation, Modeling, and Data Management Systems



A System for Converging Observation Systems Worldwide

4 Climate: Understanding, assessing, predicting, mitigating, and adapting to climate variability and change

The climate has impacts in each of the other eight societal benefit areas. Coping with climate change and variability demands good scientific understanding based on sufficient and reliable observations. GEOSS outcomes will enhance the capacity to model, mitigate, and adapt to climate change and variability. Better understanding of the climate and its impacts on the Earth system, including its human and economic aspects, will contribute to improved climate prediction and facilitate sustainable development while avoiding dangerous perturbations to the climate system.

GEOSS 10-Year Implementation Plan, Section 4.1.4

CL-07-01: Seamless Weather and Climate Prediction System

Initial support has been expressed by ICSU, WCRP, WMO

Support the development of a THORPEX/WCRP initiative on "International Weather, Climate and Earth-system Science", to better address uncertainties associated with climate variability and change, and related societal impacts.

Related activities will include: Promote international multi-disciplinary (physics-biology-chemistry) collaboration on the development of a high-resolution seamless weather/climate global prediction system - including coupled atmosphere-ocean data assimilation. Support the development of an international framework for the design and implementation of a unified approach toward weather, climate, Earth system, and societal-economic research.

6 Weather: Improving weather information, forecasting and warning

The weather observations encompassed by GEOSS are based on the requirements for timely short- and medium-term forecasts. GEOSS can help fill critical gaps in the observation of, for example, wind and humidity profiles, precipitation, and data collection over ocean areas; extend the use of dynamic sampling methods globally; improve the initialization of forecasts; and increase the capacity in developing countries to deliver essential observations and use forecast products. Every country will have the severe-weather-event information needed to mitigate loss of life and reduce property damage. Access to weather data for the other societal benefit areas will be facilitated.

GEOSS 10-Year Implementation Plan, Section 4.1.6

WE-07-01: Data Assimilation for Operational Use

Initial support has been expressed by Australia and WMO.

Advocate and facilitate the development and implementation of advanced data assimilation systems that will be able to fully exploit a broad spectrum of surface-based and space-based Earth observations.

This Task should be focused on promoting operational use and closely coordinated with CL-07-01 and WE-06-03.

5 Water: Improving water-resource management through better understanding of the water cycle

> Water-related issues addressed by GEOSS will include: precipitation; soil moisture; streamflow; lake and reservoir levels; snow cover; glaciers and ice; evaporation and transpiration; groundwater; and water quality and water use. GEOSS implementation will improve integrated water-resource management by bringing together observations, prediction, and decision-support systems and by creating better linkages to climate and other data. In situ networks and the automation of data collection will be consolidated, and the capacity to collect and use hydrological observations will be built where it is lacking.
>
> *GEOSS 10-Year Implementation Plan, Section 4.1.5*

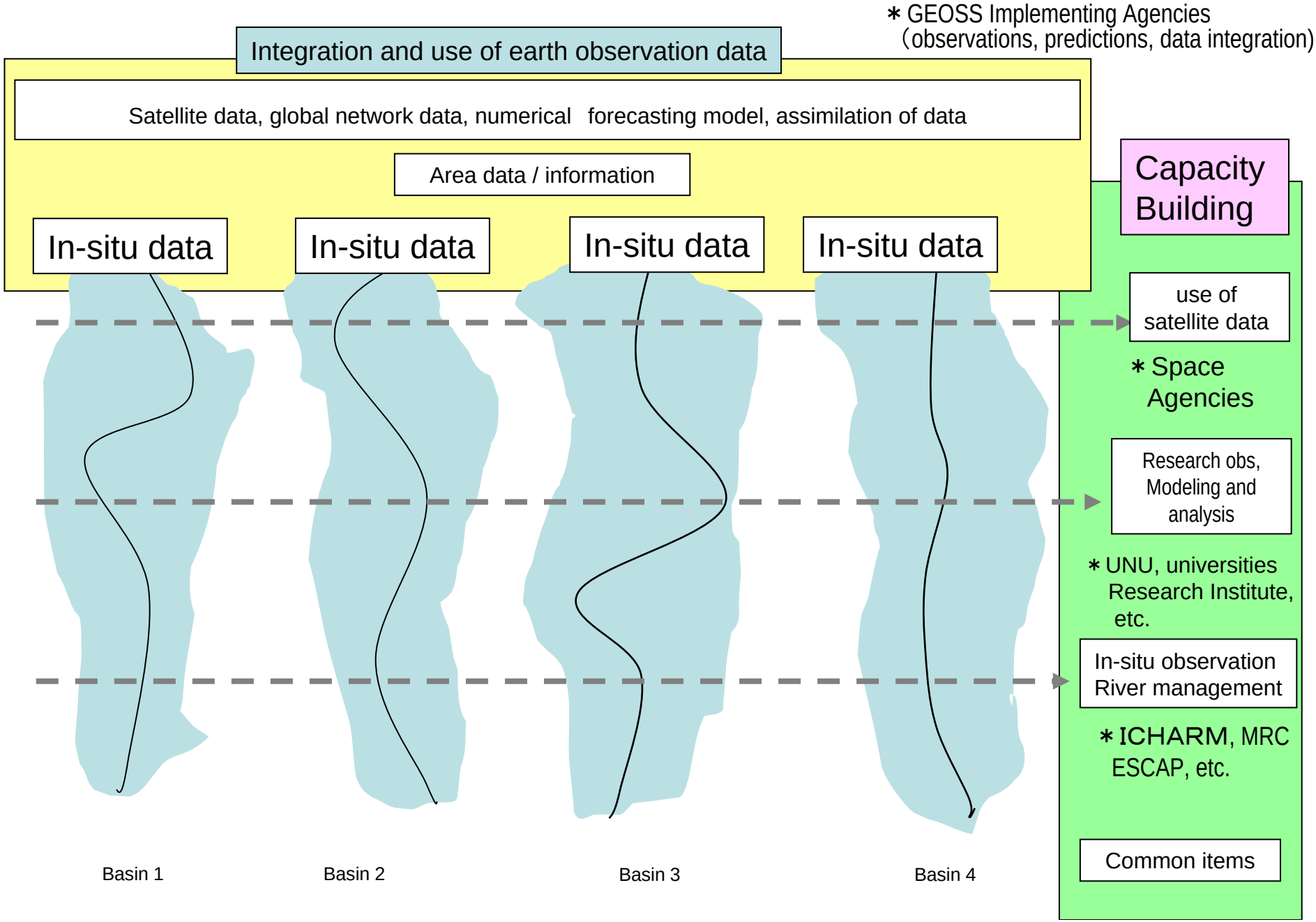
WA-07-02: Satellite Water Quantity Measurements and Integration with In-situ Data

Initial support has been expressed by IAG, GCOS, WCRP, CEOS and IGWCO.

Develop an operational mechanism to provide water level observations in rivers, lakes/reservoirs and estuaries from satellite observations to support the upgrade of deficient run-off water gauge networks. Combine different types of satellite data that are relevant for water quantity measurements (snow water equivalent, streamflow) with in-situ observations for better accuracy and global coverage. Produce an implementation plan for a broad and operational global water cycle data integration system that combines in-situ, satellite data and model outputs. An international symposium is proposed to be held to assess techniques and their maturity for transitions to operations. A workshop is planned in 2007.

GEOSS/Asian Water Cycle Initiative

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



WA-06-07: Capacity Building Program for Water Resource Management

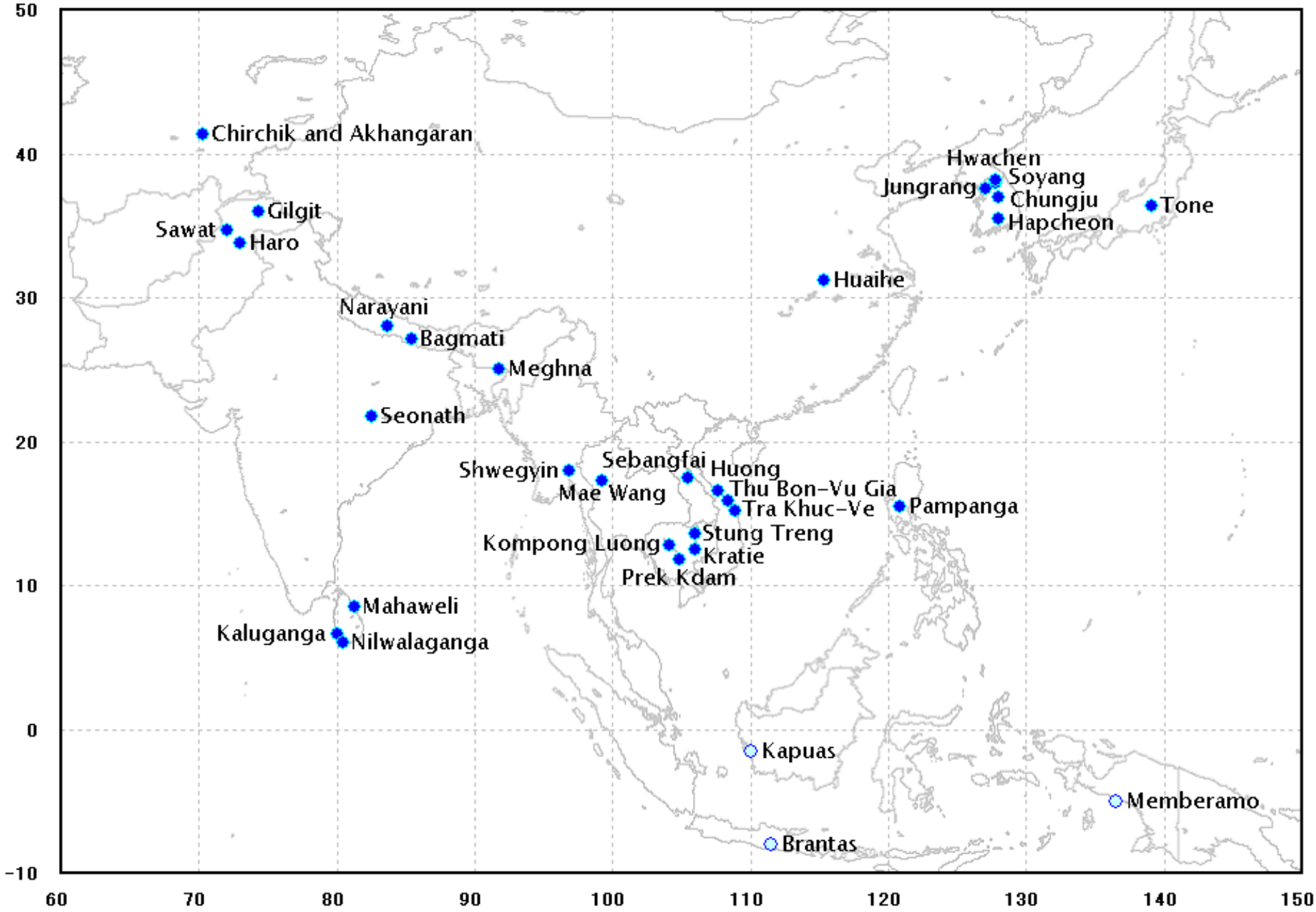
This Task is led by IGOS-P.

Initiate capacity building programs to develop tools for using remote sensing data in support of water management, and to show the value of Earth observations generally in water resource management. The program will be initiated in Latin America and will then be extended to Asia and Africa. Linkages with existing efforts of GEO Members and Participating Organisations will be made.

WA-07-01: Global Water Quality Monitoring

Initial support has been expressed by IGWCO, NASA, JAXA, ESA, CSIRO, ICSU, CEOS and POGO.

Many aspects of water quality monitoring and assessment, both in-situ and remotely sensed are severely deficient. Many countries lack the technical, institutional, and financial resources to conduct proper assessments using in-situ water quality monitoring methods for terrestrial sources and in the coastal ocean. Remote-sensed operational systems of global-scale freshwater quality are non-existent. Operational observation systems need to be developed, and the resulting information systems should be made compatible and interoperable as part of the system of systems. This Task is built on the outcomes of the water quality workshop in 2006 (1st Inland and Coastal Water Quality workshop)and first pilot projects are being planned to begin in Asia as a result of the Asia Water Resource Management Capacity Building Workshop. This Task has relevant synergies with HE-07-02.


Chirchik and Akhangaran
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Sawat
Haro
Narayani
Bagmati
Meghna
Seonath
Shwegyin
Sebangfai
Huong
Mae Wang
Thu Bon-Vu Gia
Tra Khuc-Ve
Pampanga
Stung Treng
Kompong Luong
Kratie
Prek Kdam
Mahaweli
Kaluganga
Nilwalaganga
Huaihe
Hwachen
Jungrang
Soyang
Chungju
Hapcheon
Tone
Kapuas
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