

INTRODUCTION TO THE INTEGRATED GLOBAL WATER CYCLE OBSERVATIONS THEME OF THE IGOS-P

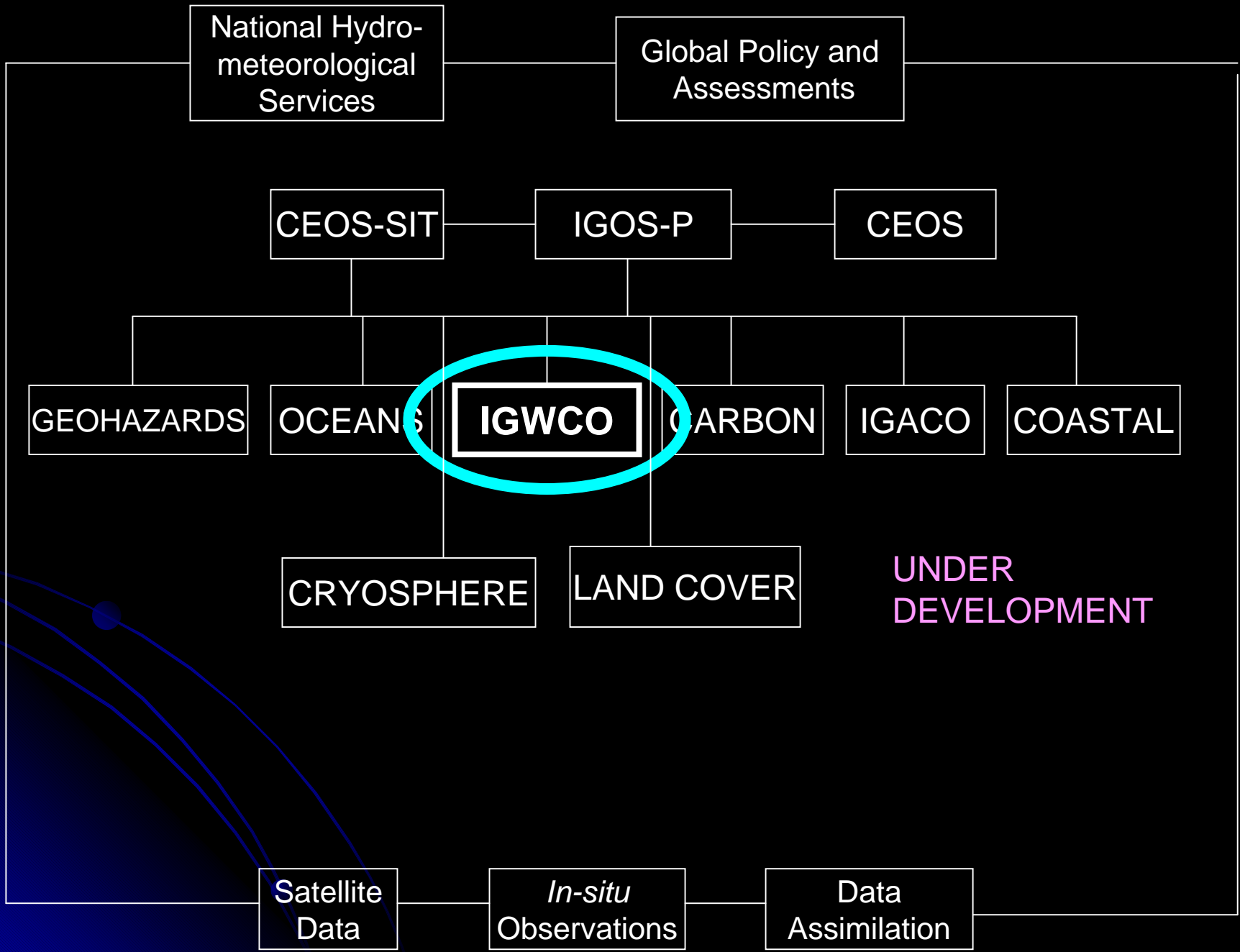
**CEOP/IGWCO WORKSHOP
FEBRUARY 28, 2005**

**RICK LAWFORD
DIRECTOR, IGPO**



INTRODUCTION TO THE INTEGRATED GLOBAL WATER CYCLE OBSERVATIONS THEME OF THE IGOS-P

- 1. RETRACING THE STEPS**
 - 2. HIGHLIGHTS FROM THE PLAN**
 - 3. TOWARDS IMPLEMENTATION**
- 



National Hydro-meteorological Services

Global Policy and Assessments

CEOS-SIT

IGOS-P

CEOS

GEOHAZARDS

OCEANS

IGWCO

CARBON

IGACO

COASTAL

CRYOSPHERE

LAND COVER

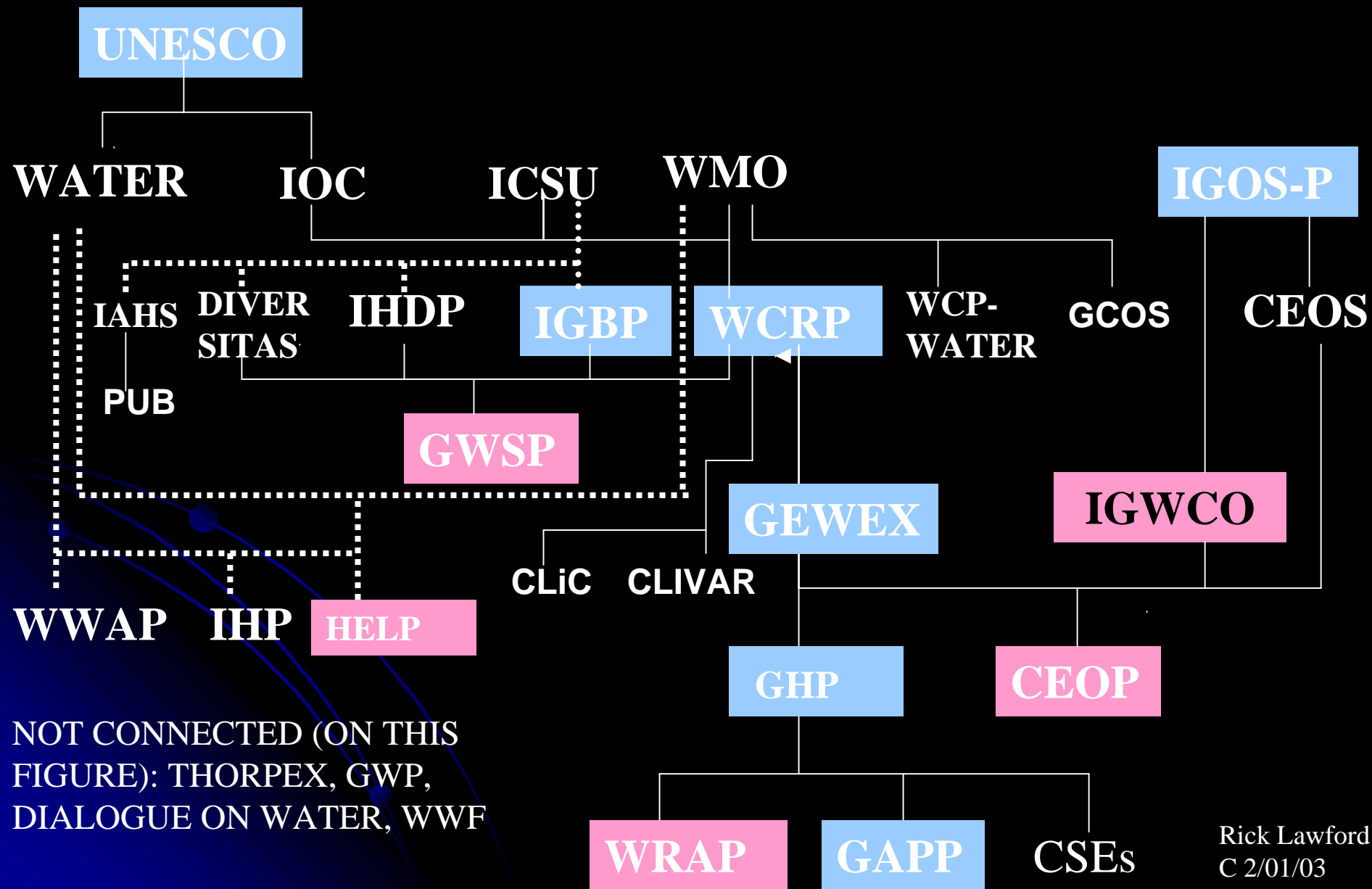
UNDER DEVELOPMENT

Satellite Data

In-situ Observations

Data Assimilation

IGWCO IS ESTABLISHING ITSELF IN THE INTERNATIONAL FRAMEWORK OF WATER AND CLIMATE ACTIVITIES!



NOT CONNECTED (ON THIS FIGURE): THORPEX, GWP, DIALOGUE ON WATER, WWF



TIME

2002 – WRITING TEAM WAS ESTABLISHED AND WORKSHOPS WERE PLANNED.

2001 - IRVINE WORKSHOP LED TO A THEME PROPOSAL THAT WAS ACCEPTED BY CEOS AND IGOS-P.

2000 - CEOS AND IGOS-P ADOPTED CEOP AS THE PRECURSOR TO A GLOBAL WATER CYCLE THEME (GWC). WCRP WAS INVITED TO TAKE THE LEAD IN DEVELOPING A IGWCO THEME PROPOSAL.



2003 - THREE WORKSHOPS WERE HELD IN JANUARY – MARCH (NA,E,J) AND A DRAFT REPORT WAS SUBMITTED TO IGOS-P IN JUNE. THE REPORT WAS REVISED AND ACCEPTED BY IGOS-P IN NOVEMBER 2003.

2002 – WRITING TEAM WAS ESTABLISHED AND WORKSHOPS WERE PLANNED.



**2004 - IGWCO REPORT FINALIZED AND DISTRIBUTED AT GEO-IV AND EOS-II SUMMIT.
INTERNATIONAL IGOS WORKSHOP DEVELOPED INITIAL IGWCO IMPLEMENTATION PLAN
IMPLEMENTATION PLANNING ADVANCED AND COMMITTEE STRUCTURES WERE POPULATED.
IGWCO IDEAS WERE USED IN TEXT OF THE GEOSS TYIP.**



2005 – IMPLEMENTATION PLANNING ADVANCED AT THE CEOP/IGWCO WORKSHOP IN TOKYO.

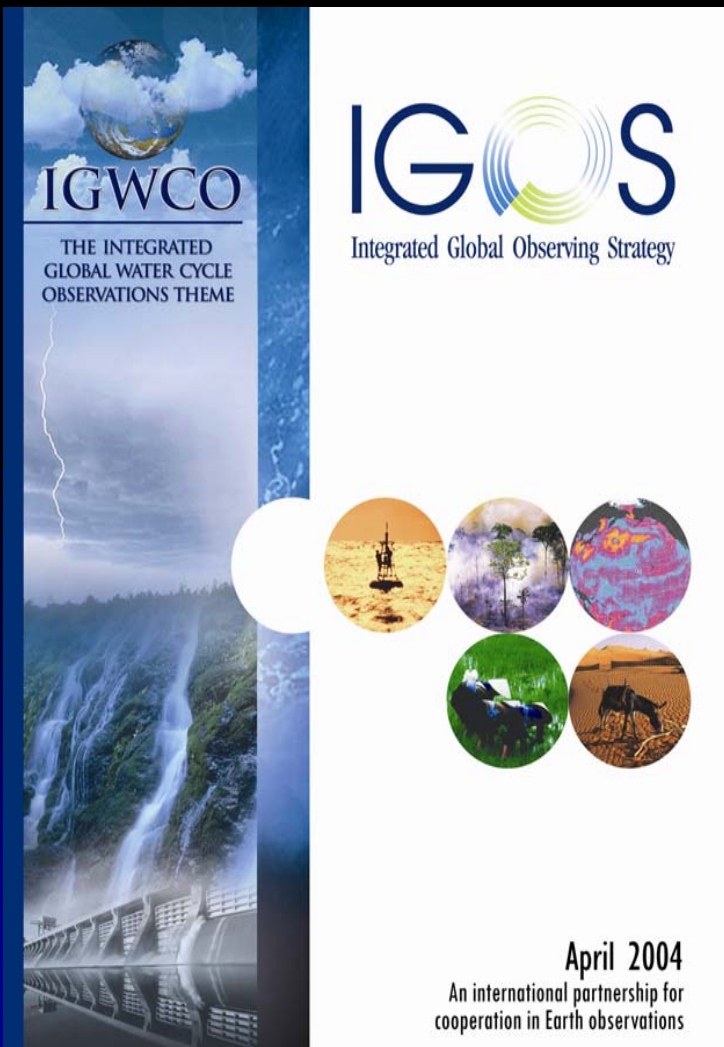


IGWCO FULL IMPLEMENTATION MMV



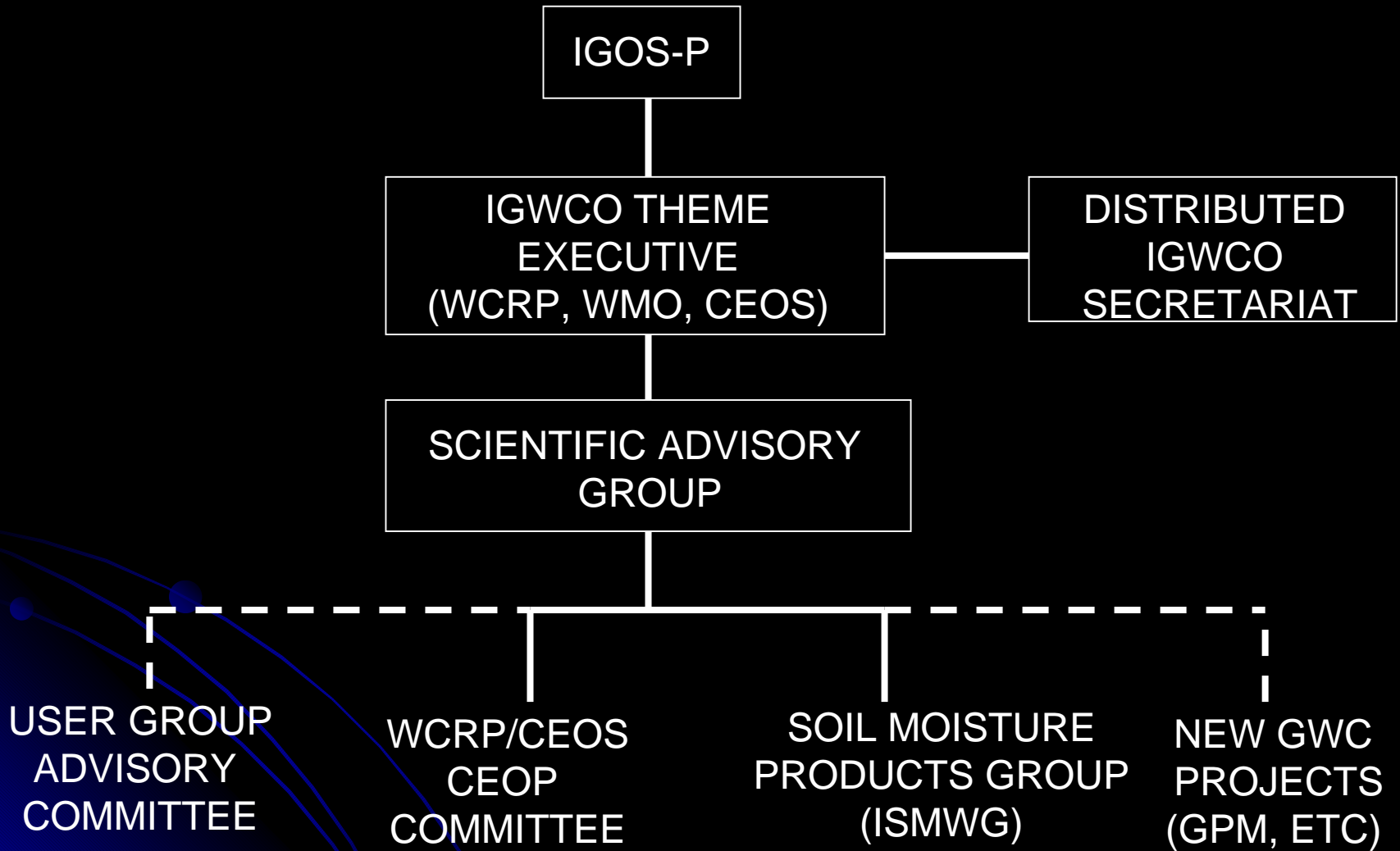
IGWCO OBJECTIVES

“HELPING TO SOLVE THE WORLD’S WATER PROBLEMS WITH INTEGRATED WATER CYCLE OBSERVATIONS AND INFORMATION”

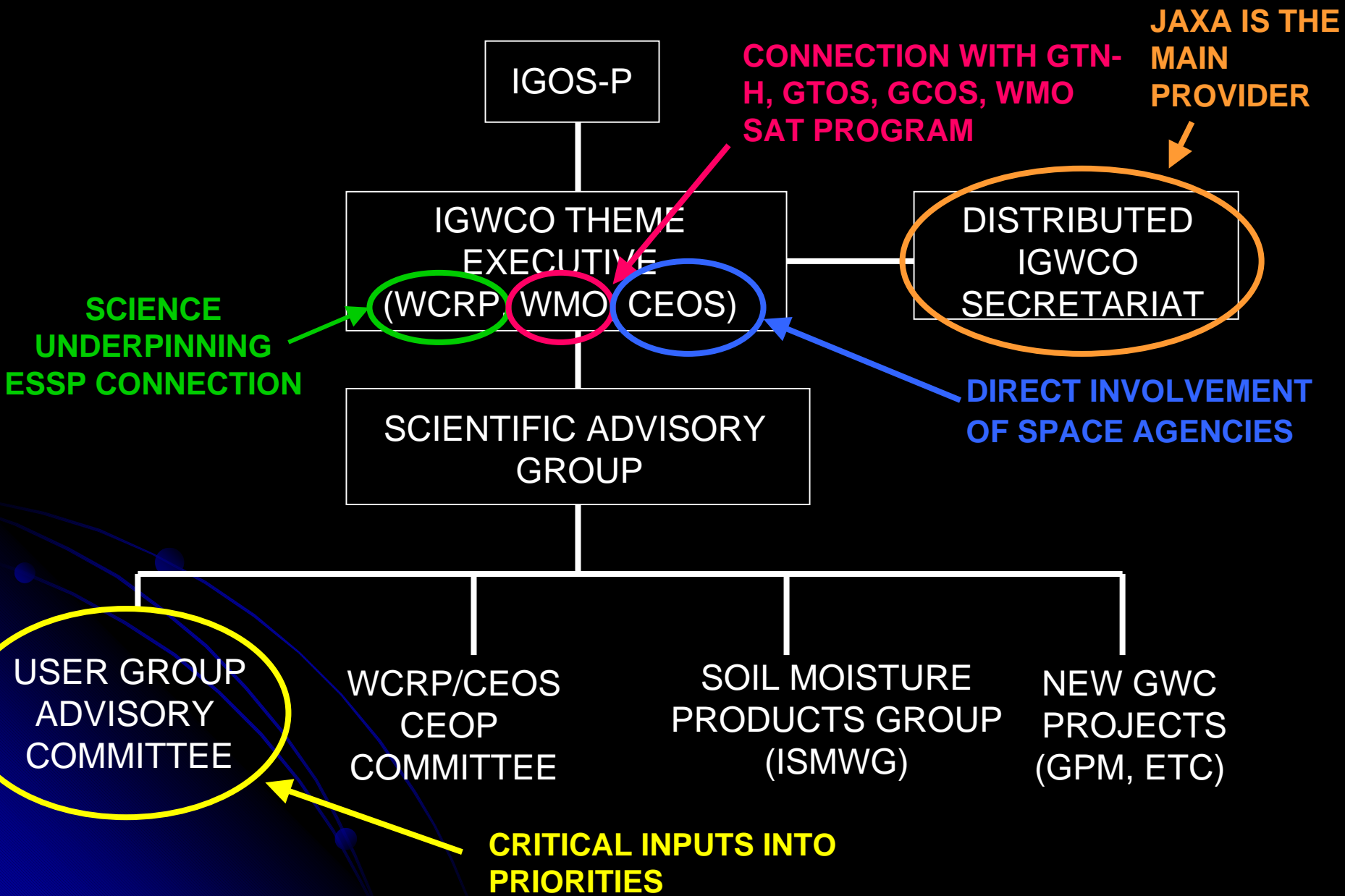


1. Provide a framework for guiding decisions on priorities and strategies regarding water cycle observations for:
 - Monitoring climate variability and change,
 - Effective water management and sustainable development of the world’s water resources,
 - Societal applications for resource development and 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

IGWCO IMPLEMENTATION



MANAGEMENT STRUCTURE FOR IGWCO IMPLEMENTATION



MEMBERS OF THE IGWCO EXECUTIVE:

- WCRP (RICK LAWFORD: ALTERNATIVE: GILLES SOMMERIA)
- WMO (AVINASH TYAGI: ALTERNATIVE: DON HINSMAN)
- CEOS/ JAXA (TASUKU TANAKA: ALTERNATIVE: CHU ISHIDA)

MEMBERS OF THE SCIENCE ADVISORY GROUP (SAG):

- PHILIP ARKIN (GCOS LINKS, PRECIPITATION, USA)
- JOSEF ASHBACHER (CEOS/ESA, APPLICATIONS, FRANCE)
- PILAR CORNEJO (ECUADOR, HELP)
- JARED ENTIN (CEOS/ NASA, WATER CYCLE, USA)
- WOLFGANG GRABS (WMO, SURFACE HYDROLOGY, SWITZERLAND)
- SHARON GOMEZ (GMES, ZIMBABWE)
- MICHAEL HALES (CEOS/ NOAA, WSSD, USA)
- EINAR-ARNE HERLAND (CEOS/ ESA, WATER CYCLE MISSIONS, HOLLAND)
- TOSHIO KOIKE (CEOP, SOIL MOISTURE, JAPAN)
- TOM JACKSON (AGRICULTURE, SOIL MOISTURE, USA)
- CHANGMING LIU (CHINA)
- KENJI NAKAMURA (CEOS/ JAXA, PRECIPITATION, JAPAN)
- CHARLES VOROSMARTY (GWSP, APPLICATIONS, USA)

-(MORE MEMBERS WILL BE ADDED AS NEEDS FOR EXPERTISE ARE IDENTIFIED)

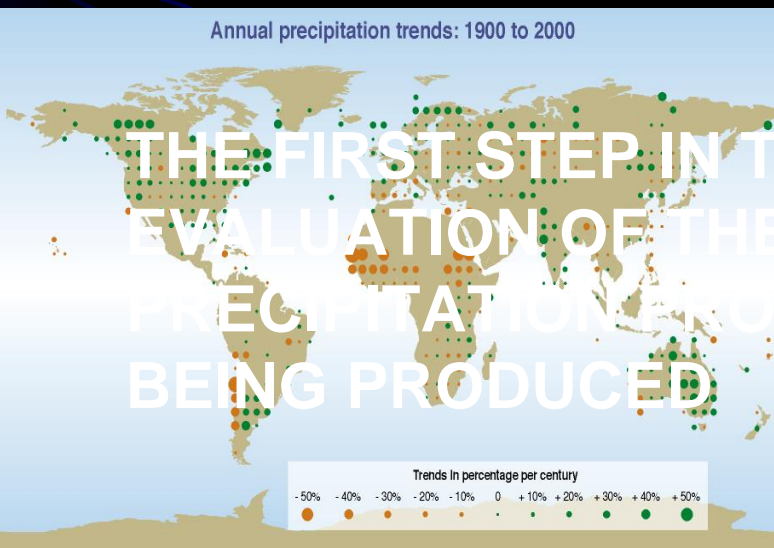
PRECIPITATION: MOISTURE SUPPLIED BY THE ATMOSPHERE FOR LIFE ON EARTH

ISSUE:

PRECIPITATION DETERMINES THE ANNUAL AMOUNT OF RENEWABLE WATER, RIVER RUNOFF AND THE LATENT HEAT RELEASED IN THE ATMOSPHERE. IT IS POORLY PREDICTED ON LONGER TIME SCALES AND IS POORLY MEASURED OVER MUCH OF THE EARTH'S SURFACE.

IGWCO HAS COMMITTED ITSELF TO THE DEVELOPMENT OF AN INTEGRATED PRECIPITATION PRODUCT

REGIONAL PRECIPITATION TRENDS EXIST



THE FIRST STEP IN THIS DEVELOPMENT WILL BE THE EVALUATION OF THE HIGH RESOLUTION GLOBAL PRECIPITATION PRODUCTS THAT ARE CURRENTLY BEING PRODUCED

TRMM



GPM



SOIL MOISTURE: DETERMINES WATER AVAILABILITY FOR PLANT GROWTH AND EVAPORATIVE FLUXES

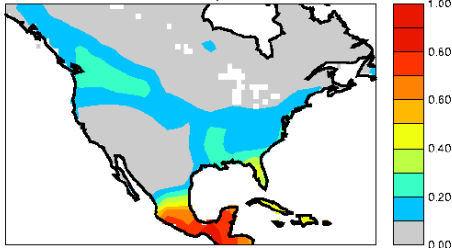
SOIL MOISTURE AFFECTS THE RECYCLING OF MOISTURE AND PREDICTION OF PRECIPITATION.

ISSUES:

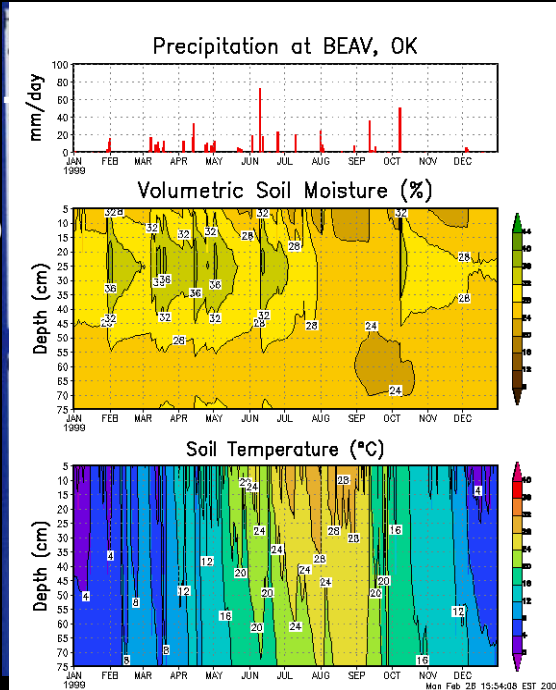
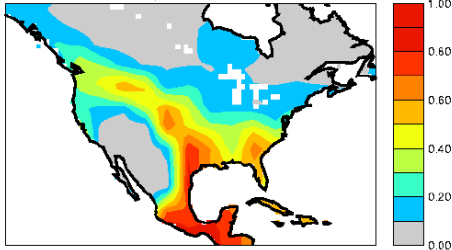
1. SOIL MOISTURE IS REPRESENTED DIFFERENTLY (AND GENERALLY POORLY) BY VARIOUS MODELS.
2. IN-SITU MEASUREMENTS FOR CALIBRATION OR INITIALIZATION OF MODELS ARE VERY LIMITED IN THE LENGTH AND QUALITY OF RECORD AND THE AREAS REPRESENTED.

Index of Precipitation Predictability (JJA):

Given Predictability of SSTs

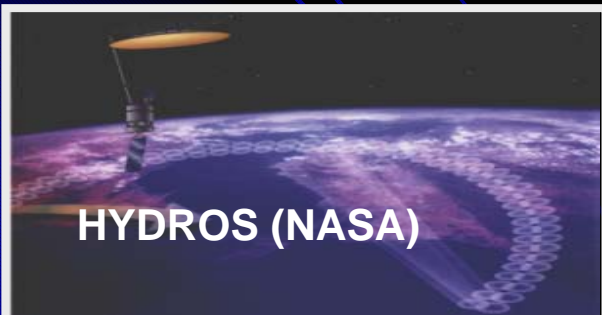


Given Predictability of SSTs and Land Moisture



RANGE OF RESULTS OF IN-SITU MEASUREMENTS OF SOIL MOISTURE ARE VERY LIMITED (ROBOCK)

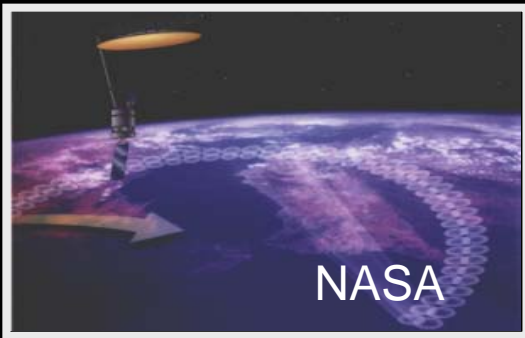
NEW OPPORTUNITIES FOR SPACE-BASED OBSERVATIONS:



HYDROS (NASA)



SMOS (ESA)



HYDROS

INTERNATIONAL SOIL MOISTURE WORKING GROUP (ISMWG)



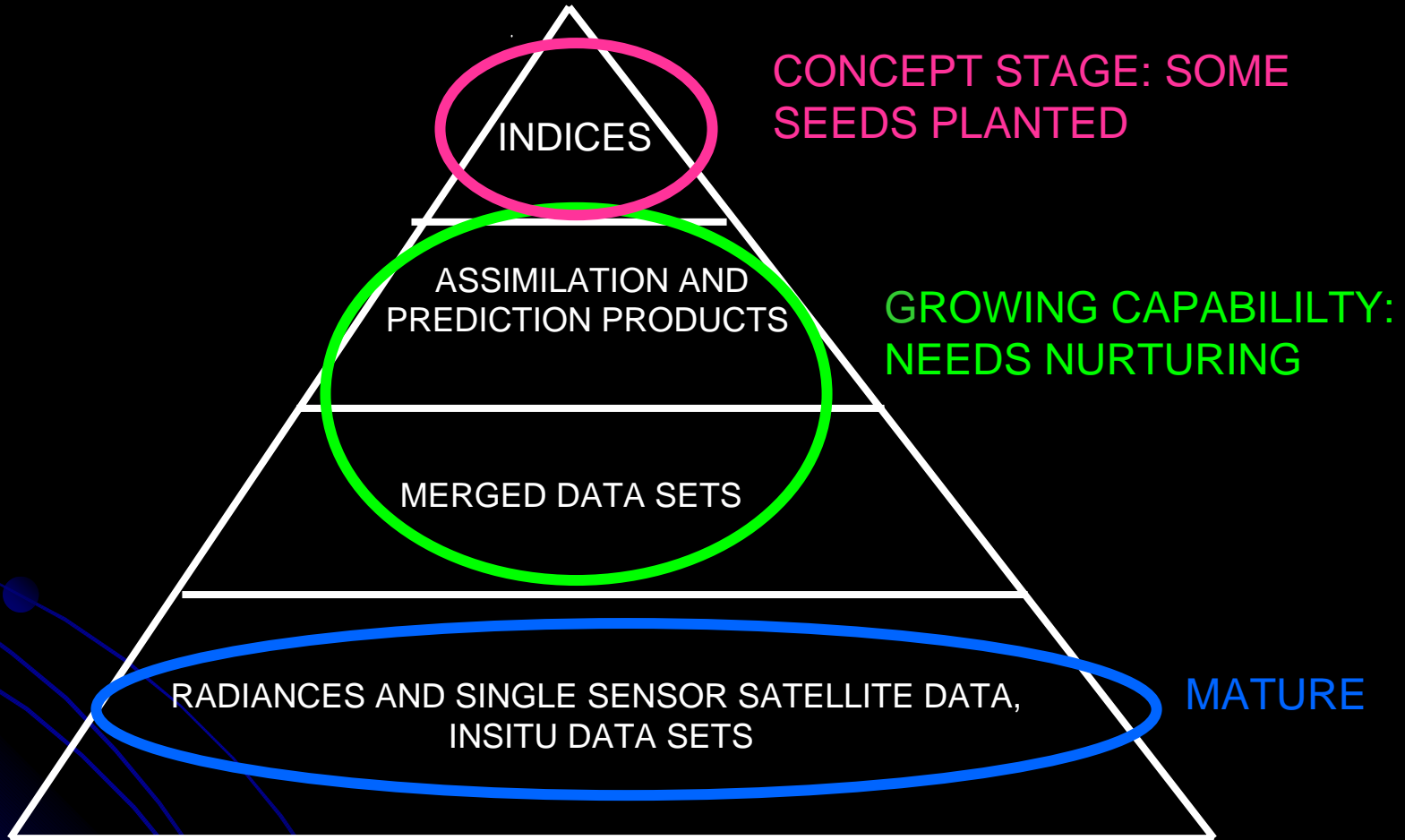
SMOS

CENTRAL GOALS:

- 1) algorithm enhancements
- 2) multiple satellite cross calibration and use of vicarious calibration targets
- 3) increase the acceptance of satellite soil moisture products
- 4) facilitate the instrumentation of soil moisture networks worldwide
- 5) promote and facilitate the use of satellite soil moisture products
- 6) Promote sharing of data to address the above objectives.

ISMWG, acting on behalf of IGWCO, will address the GCOS goal of **developing a quasi-operational soil moisture product** and **implementation of a soil moisture reference network** within the next 10 years

TURNING DATA INTO KNOWLEDGE THROUGH INDICATORS STEPS TO GROWING A CAPABILITY TO ADVISE POLICY

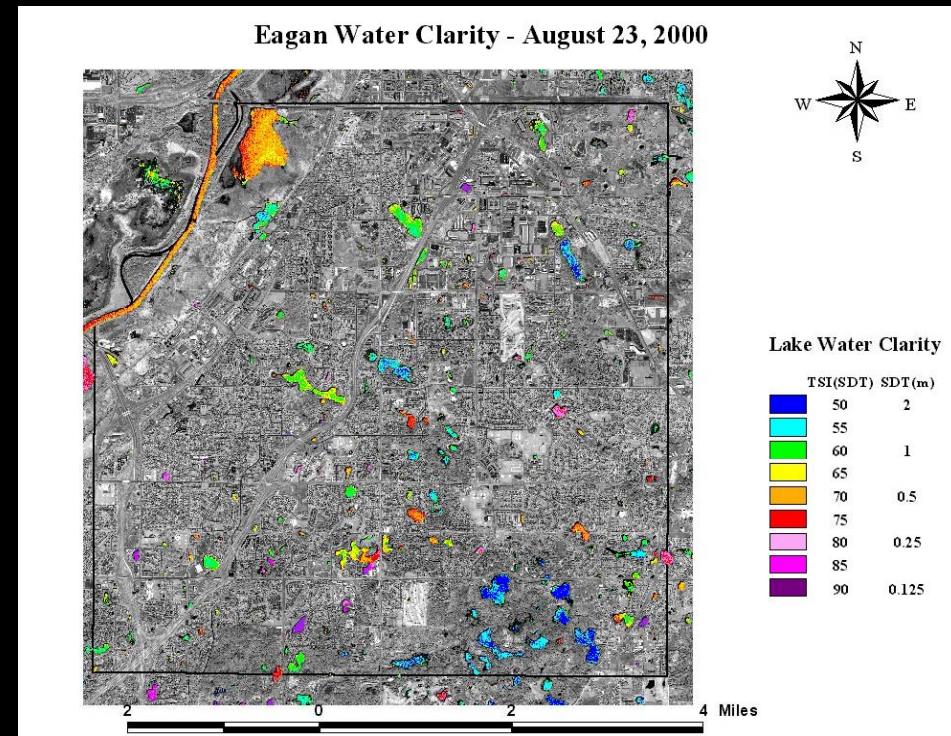


INDICATORS PROPOSAL:

REMOTE SENSING PROVIDES THE POTENTIAL TO ASSESS THE STATUS OF WATER RESOURCES FROM SPACE. HOWEVER, THERE ARE MANY QUESTIONS THAT NEED TO BE ADDRESSED INCLUDING WHETHER THE BEST SPACE-BASED APPLICATIONS RELATE TO WATER QUALITY OR WATER QUANTITY, ETC. THIS ACTIVITY MAY BE A GOOD OPPORTUNITY TO BRING SOCIO-ECONOMIC DATA (SUCH AS WATER USE DATA) TOGETHER WITH SATELLITE DATA TO ADDRESS A SOCIAL ISSUE.

WORKPLAN:

AS THE FIRST STEP IN LAUNCHING AN INDICATORS ACTIVITY, IGWCO PLANS TO HOLD A WORKSHOP TO EXPLORE USEFUL DIRECTIONS. A PLAN FOR THE WORKSHOP HAS BEEN DEVELOPED (BASED ON THE USE OF WATER IN AGRICULTURE).

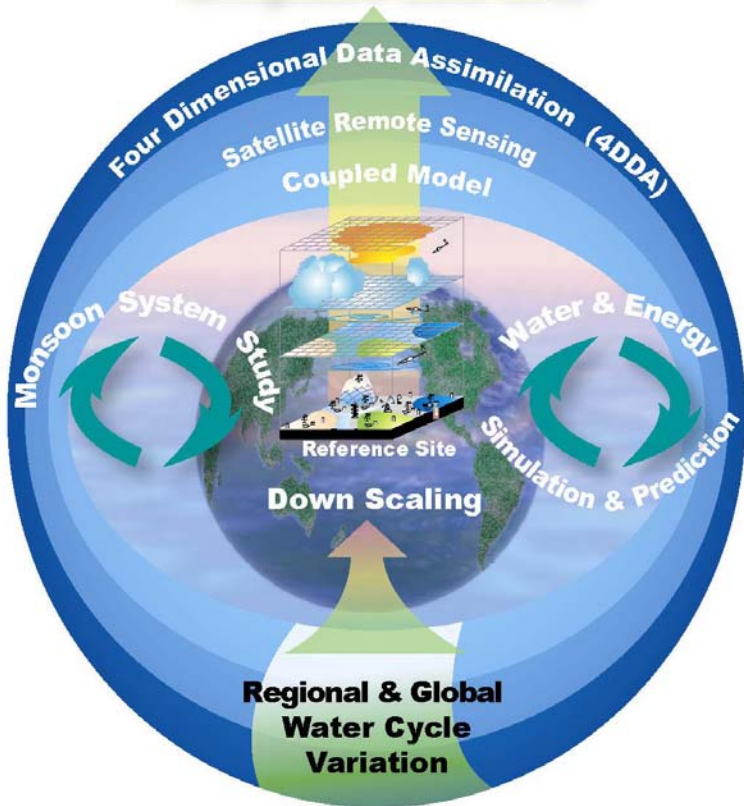


TROPHIC STATUS IMAGES FOR WATER BODIES NEAR EAGAN, MN FROM IKONOS DATA (FROM S. GREB)



HAS PROVIDED IGWCO WITH EXPERIENCE USING A RESEARCH-OPERATIONS PARADIGM AND IN INTEGRATED DATA SET DEVELOPMENT

Integrated Data Sets



CEOP, THE FIRST ELEMENT OF IGWCO, BRINGS TOGETHER THE EXPERTISE AND CAPABILITIES OF:

- 5 MAJOR SPACE AGENCIES THAT PROVIDE DATA (JAXA, ESA, EUMETSAT, NASA, NOAA)
- 11 MAJOR NUMERICAL WEATHER PREDICTION CENTERS IN PROVIDING MODEL OUTPUTS (ECMWF, NCEP, GMAO, JMA, ECPC, ETC)
- 18 NATIONS IN PROVIDING REFERENCE SITE DATA (MANY OF WHICH HAVE RESTRICTIVE DATA POLICIES).
- WCRP/ CEOS CEOP COMMITTEES BRING ALL THESE GROUPS TOGETHER

CEOP DEMONSTRATES THAT RESEARCH PROGRAMS CAN DEVELOP NEW APPROACHES TO PROBLEMS. A RESEARCH-OPERATIONS PARTNERSHIP IS VIEWED AS ESSENTIAL TO ACHIEVE THE GOALS OF IGWCO.



NOW IN UNDER DEVELOPMENT



GLOBAL WATER SYSTEM DATA



(SUPPORT FOR THE GLOBAL WATER SYSTEM PROJECT)

GWSP ISSUES OF PRIMARY INTEREST TO IGWCO:

Theme 1: What are the magnitudes of anthropogenic and environmental changes in the global water system and what are the key mechanisms by which they are induced?

Theme 2. What are the main linkages and feedbacks within the earth system arising from changes in the global water system?

Theme 3. How resilient and adaptable is the global water system to change, and what are sustainable water management strategies?

Cross-Cutting Activity 1: Building the GWSP Information Base

POSSIBLE IGWCO/GWSP LINKS TO BE DISCUSSED:

1. IGWCO CONTRIBUTIONS TO GWSP FAST TRACK INITIATIVES
2. IGWCO RESPONSE TO THE ICSU PAPER ON SOCIO-ECONOMIC INDICATORS.
3. IGWCO INDICATORS ACTIVITIES.

**ANOTHER IMPORTANT DISCUSSION TOPIC:
WHAT CAN GWSP DO FOR IGWCO?**



WATER CYCLE MEASUREMENTS WILL HAVE GLOBAL BENEFITS IF DEVELOPING COUNTRIES GAIN THE CAPABILITY OF USING THESE DATA

(Capacity Development- Technology, Education/Training and Field Applications)



- Developing nations should be provided with the hardware and software to access all IGWCO data products and forecasts.
- Training materials should be developed and sessions carried out in developing countries.



IGWCO WILL WORK ACTIVELY TO SUPPORT THE TRANSFER OF ADVANCED TECHNOLOGIES TO THE DEVELOPING WORLD. IGWCO ENVISIONS WORKING CLOSELY WITH UNESCO AND SPACE AGENCIES (CEOS) TO ACHIEVE THIS GOAL.

EARTH OBSERVATIONS AND SUSTAINABLE DEVELOPMENT

PLANS ARE BEING DEVELOPED FOR CSD-13. (ALL OF THIS IS TENTATIVE AT PRESENT.)

-PARTICIPATION IN THE PARTNERS FAIR WITH:

- TRAINING SESSION (NASA, CEOP, GWSP)
- THREE WORKSHOPS

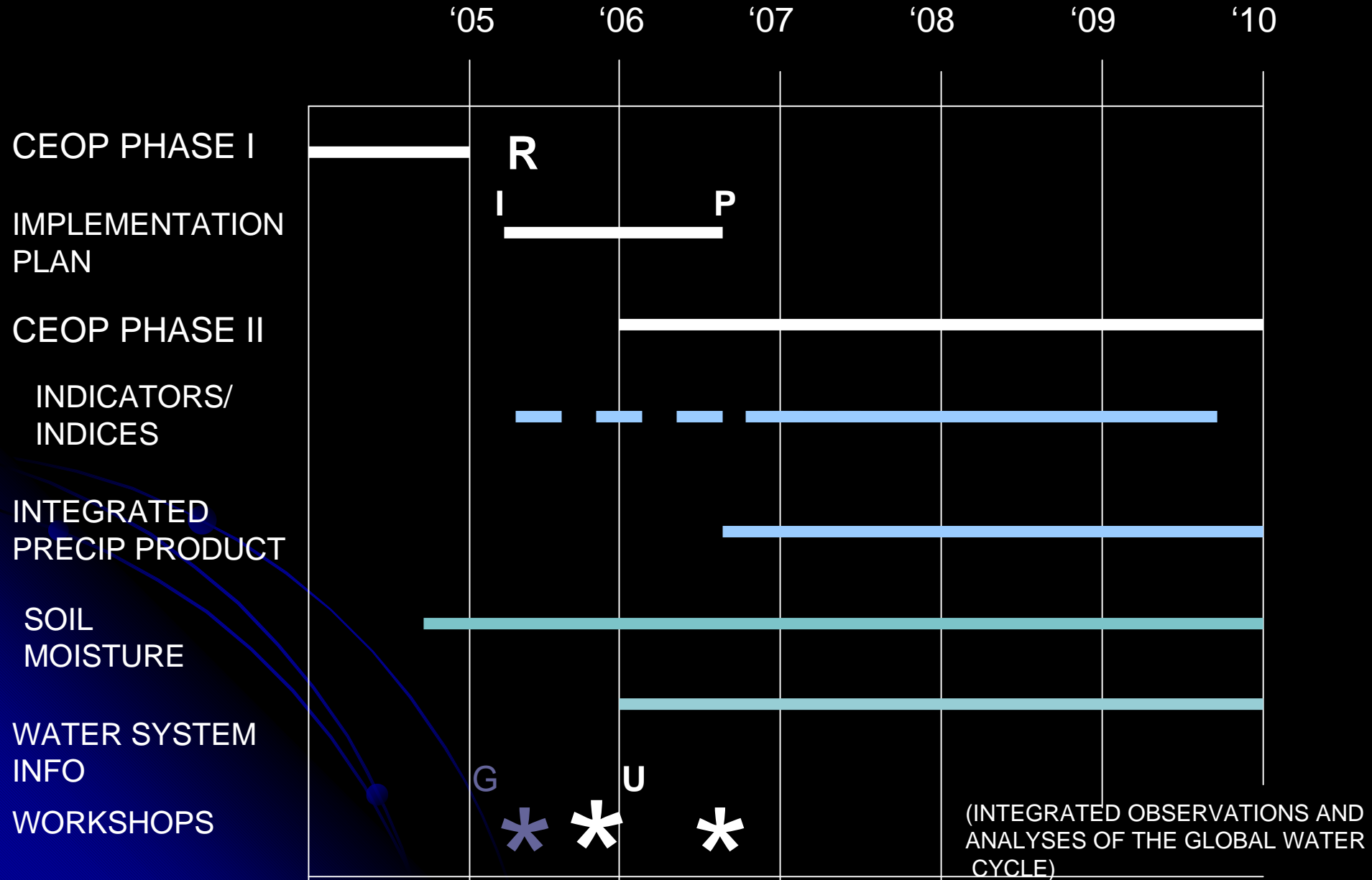
-PARTICIPATION IN HIGH LEVEL SESSIONS:

- IGOS-P AND/OR GEOSS
- ICSU



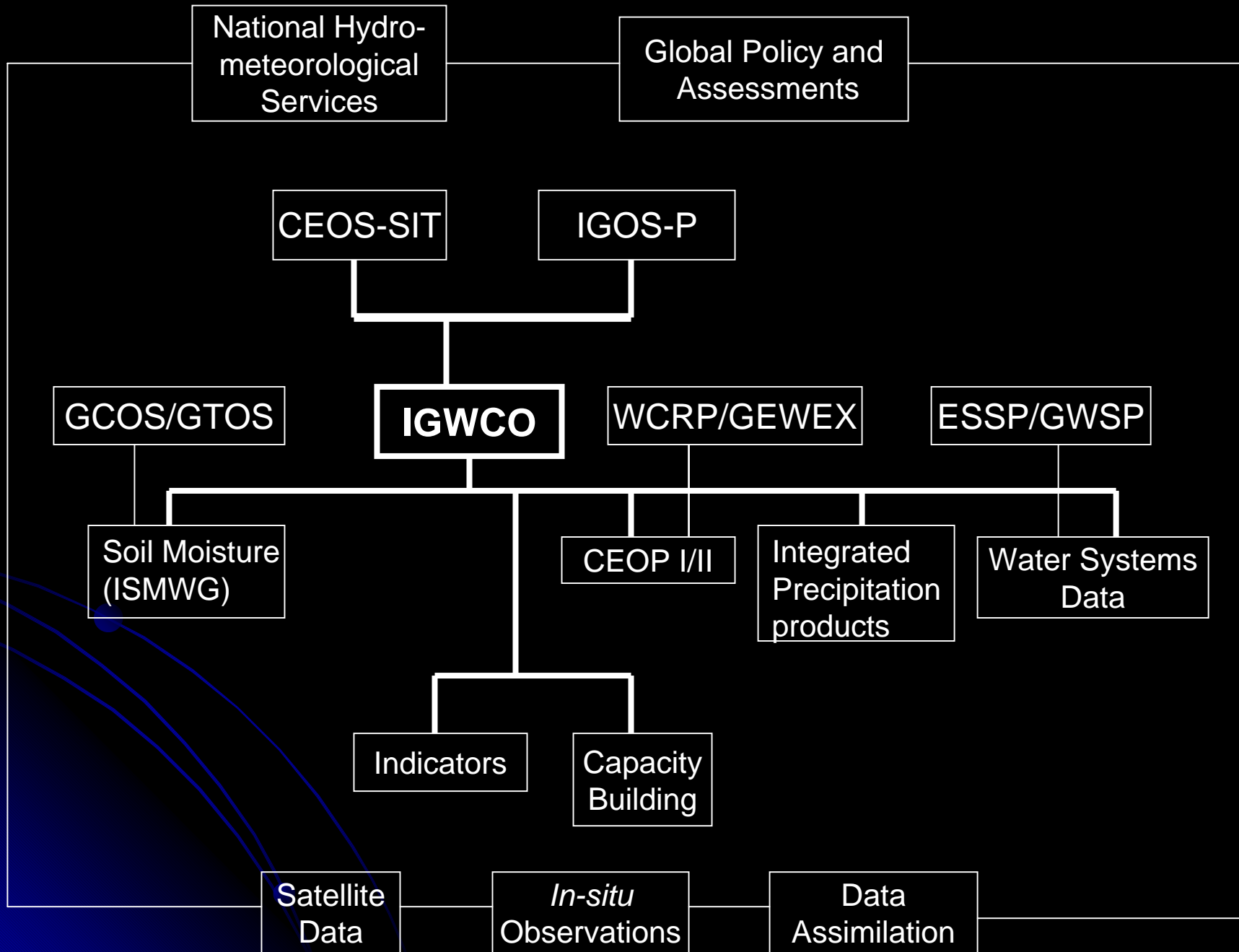
(APRIL, 2005 CSD-13 MEETS AT THE UN IN NEW YORK)

CURRENT DRAFT IMPLEMENTATION TIMETABLE

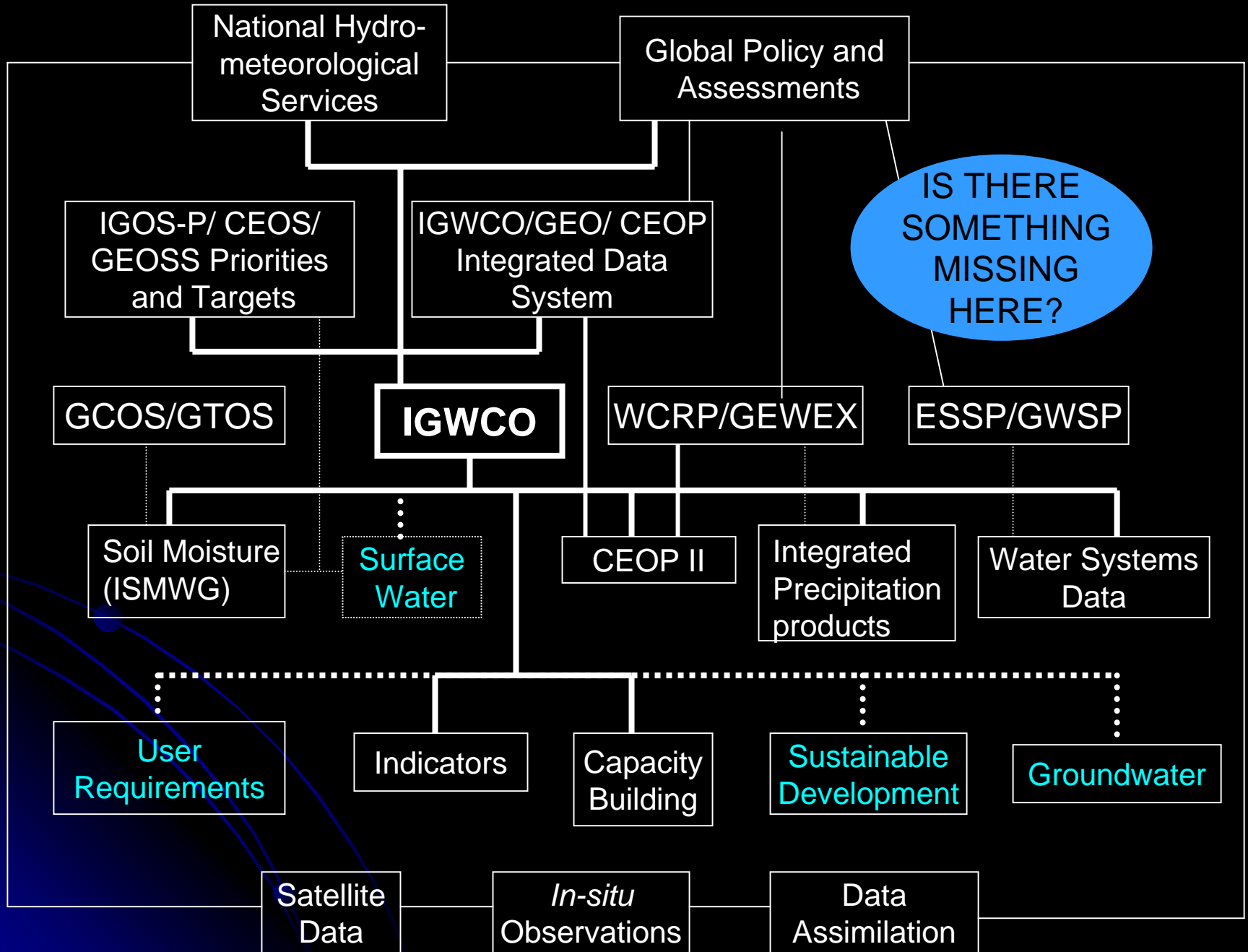


	GOALS	LEADERS	ACTIONS	COMM TO DEADLINES	FUNDING SOURCE
CEOP II	DRAFT	Toshio Koike Sam Benedict	Draft plan prepared	YES	JAXA, MEXT
INT. PRECIP	DRAFT	Phil Arkin	Discussions	Some	NO
GWSP	DRAFT	Charles Vorosmarty	SOME	Driven by GWSP Agenda	NASA seed money
ISMWG	YES	Tom Jackson	Coordination Ongoing	YES	NASA
INDICATOR	DRAFT	Pilar Cornejo	Draft Workshop Proposal	NO	Opportunity Area
REG WKSH	P. DRAFT	Michael Hales	Draft Workshops proposal	YES FOR LA	NOAA, CONAE JAXA, ETC

WHERE WE ARE NOW



WHAT WE PROPOSE TO HAVE IN THE FINAL IMPLEMENTATION PLAN



Towards a Global Observing System of Systems

The background of the slide is a collage of various Earth observation and data collection methods. It features several satellites in orbit, some with large solar panels. There are also images of commercial and military aircraft flying over the ocean. A large oil tanker is visible in the lower left, and a coastal area with buildings and infrastructure is shown in the lower right. The overall theme is global data collection and monitoring.

IGOS-P IS DEVELOPING
THE STRATEGY FOR
INTEGRATING
OBSERVATIONAL
SYSTEMS

GEO IS DEVELOPING
A PLAN FOR AN
INTEGRATED GLOBAL
EARTH OBSERVING
SYSTEM OF SYSTEMS
(GEOSS)

IGEP (GEWEX, ESSP, ETC) IS
CARRYING OUT THE RESEARCH
NEEDED TO DEVELOP A PREDICTION
SYSTEM TO SUPPORT WATER
MANAGEMENT

IGWCO LINKAGES TO ENSURE SUCCESS



GWC

AGENDA 21
WSSD
WWF

CEOS:
SPACE
AGENCIES

COP
SUPPORT
TO IPCC

G8:
WATER &
SECURITY

REPRESENTATIVES
OF INTERNATIONAL
USER GROUPS

INTRA
IGOS
THEMES:
(CC, OCEANS
ATMOS CHEM.
HAZARDS)

INTERNATIONAL
PROGRAMS:
ESSP: GWSP
WCRP: GEWEX,
CLIVAR, CliC
UNESCO: HELP
WMO: GTN-H
WCP-WATER
IGBP, IHDP, IAEA

"NATIONAL"
PROGRAMS
USGWC
JAPAN WI
GLOWA
EC WATER
CHINA GWC

THE HISTORY OF MEASUREMENT HAS STRONG LINKS TO SOCIETY'S DEVELOPMENTS IN WATER USE

**EPOCH #1: WATER NATURE'S GIFT TO MANKIND
(DAWN OF CIVILIZATION TO LAST CENTURY)**

WATER IS ESSENTIAL FOR LIFE

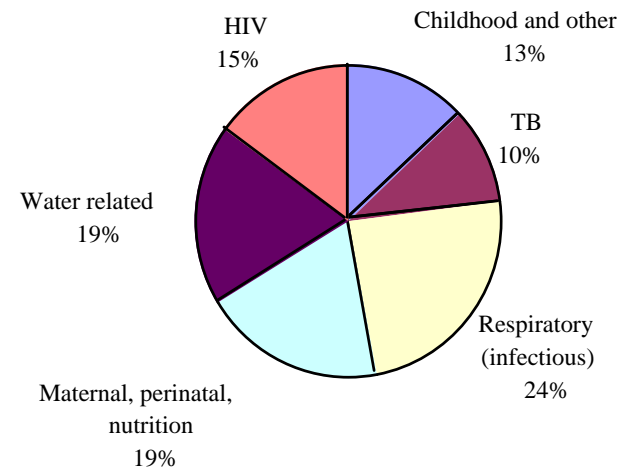


**EPOCH #2: WATER AND DEVELOPMENT
(LATE 1800'S TO PRESENT)**

WATER IS ESSENTIAL FOR PROSPERITY

**EPOCH #3: WATER AND THE ENVIRONMENT
(APPROX. MID-1960'S TO THE PRESENT)**

**WATER IS ESSENTIAL FOR HEALTH (FOR
HUMANS AND ECOSYSTEMS)**

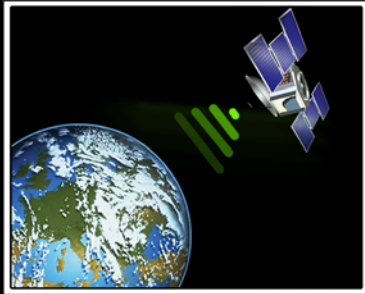


A VISION THAT COULD INSPIRE MORE NORTH-SOUTH COLLABORATION:

IMPLEMENT A NEW EPOCH OF WATER MANAGEMENT IN OUR LIFETIMES THAT IS

FACILITATED BY OBSERVATIONS AND IMPROVED PREDICTION SYSTEMS.

OBSERVATIONS



IMPROVED CAPABILITY TO ASSIMILATE AND PREDICT

Land Atmosphere



cf. Sorooshian

INTEGRATED DECISION SUPPORT SYSTEMS

A DECISION PROCESS

INFORMATION INPUTS:
- QUALITY AND COVERAGE
- SPACE/TIME SCALE MATCHES

EXTERNALITIES:
- VULNERABILITIES
- TIME FRAME FOR DECISIONS
- ECONOMIC/SOCIAL FACTORS

SUBJECTIVE FACTORS:
- VALUES
- SOCIO-ECONOMIC PRESSURES

DECISION PROCESS

ACTION

OBJECTIVES OF THE IGWCO WORKSHOP

1. TO GAIN CONSENSUS ON THE MAJOR ELEMENTS OF THE IGWCO IMPLEMENTATION PLAN.
 2. TO DEFINE NEEDS AND OBTAIN COMMITMENTS FOR SPECIFIC PROJECTS IN THE IGWCO IMPLEMENTATION PLAN.
 3. TO OBTAIN PERSONAL COMMITMENTS FOR RELATED SHORT TERM ACTIVITIES (E.G. PARTICIPATION IN CSD-13 EVENTS, PRECIPITATION EVALUATION WORKSHOP, CAPACITY BUILDING, ETC)
 4. TO DEVELOP RECOMMENDATIONS AND PLANS FOR:
 - HOW IGWCO WILL LINK WITH OTHER IGOS THEMES
 - HOW IGWCO WILL LINK TO GEOSS.
- 