

Overview of progress in WMO Programmes relevant to IGWCP

W.E. Grabs, WMO

February 2005

Note:

**Snapshot character of the presentation in a fast moving
development process of**

Increasing thematic and organizational complexity

Urgency to

- define common areas of work**
- Consider mergers of programme parts**
- Define joint activities including pooling of experts and
resources**

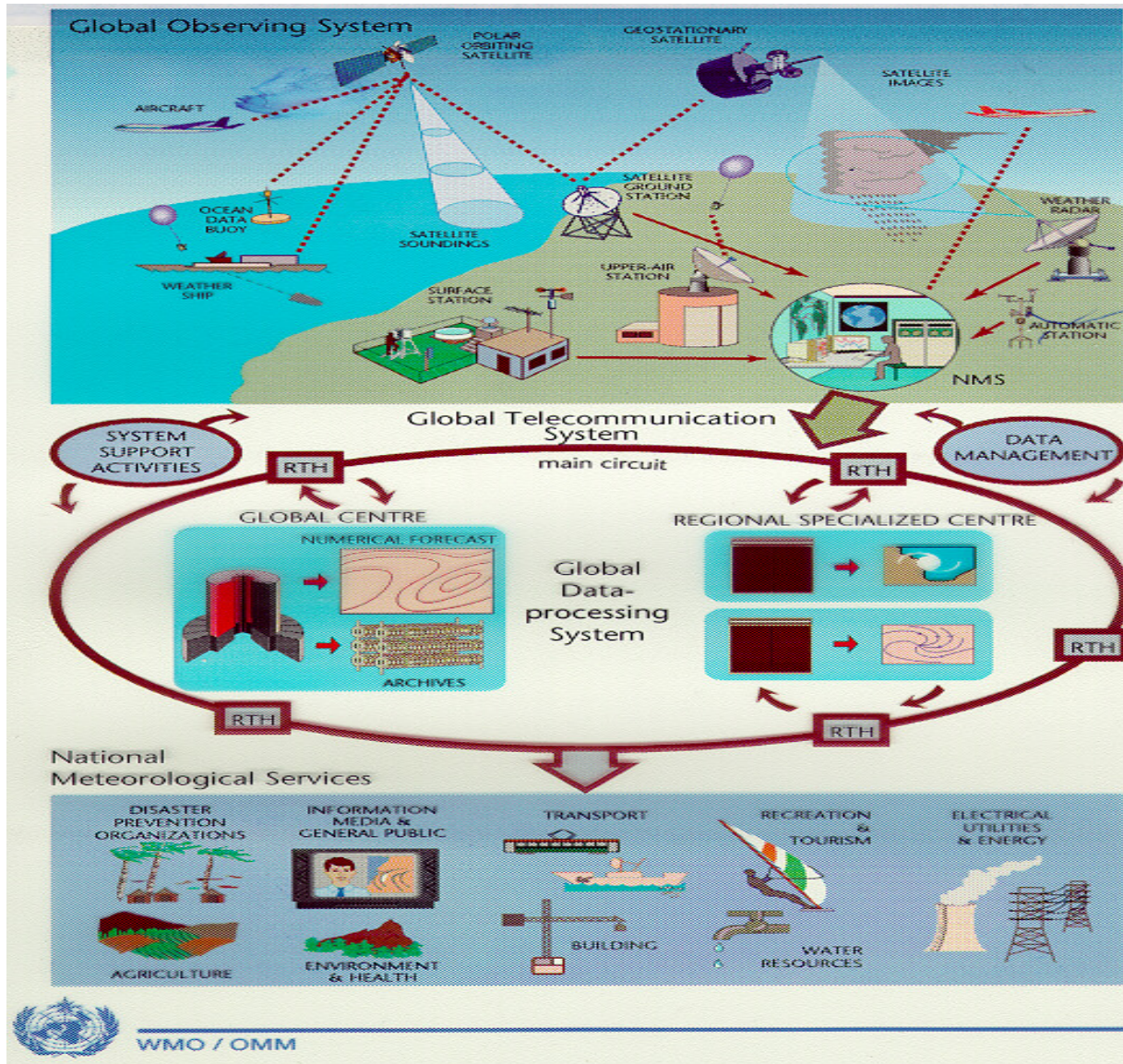
WMO's Global Operational Network

NMHSs of 187 countries contribute to GOS every day

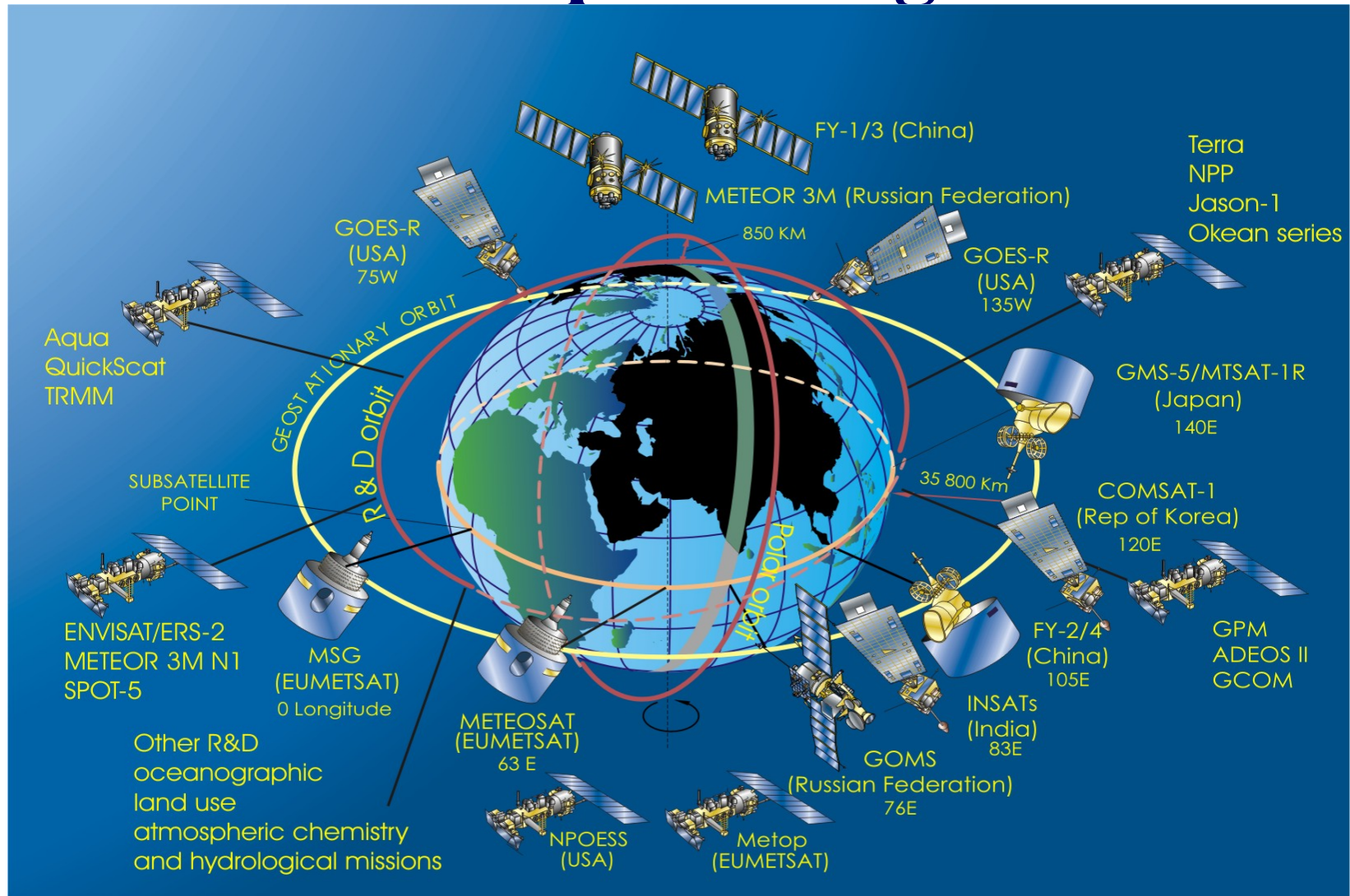
3 World Meteorological Centres

40 Regional Specialized Centers

NMHSs deliver products and services



WMO Space Programme



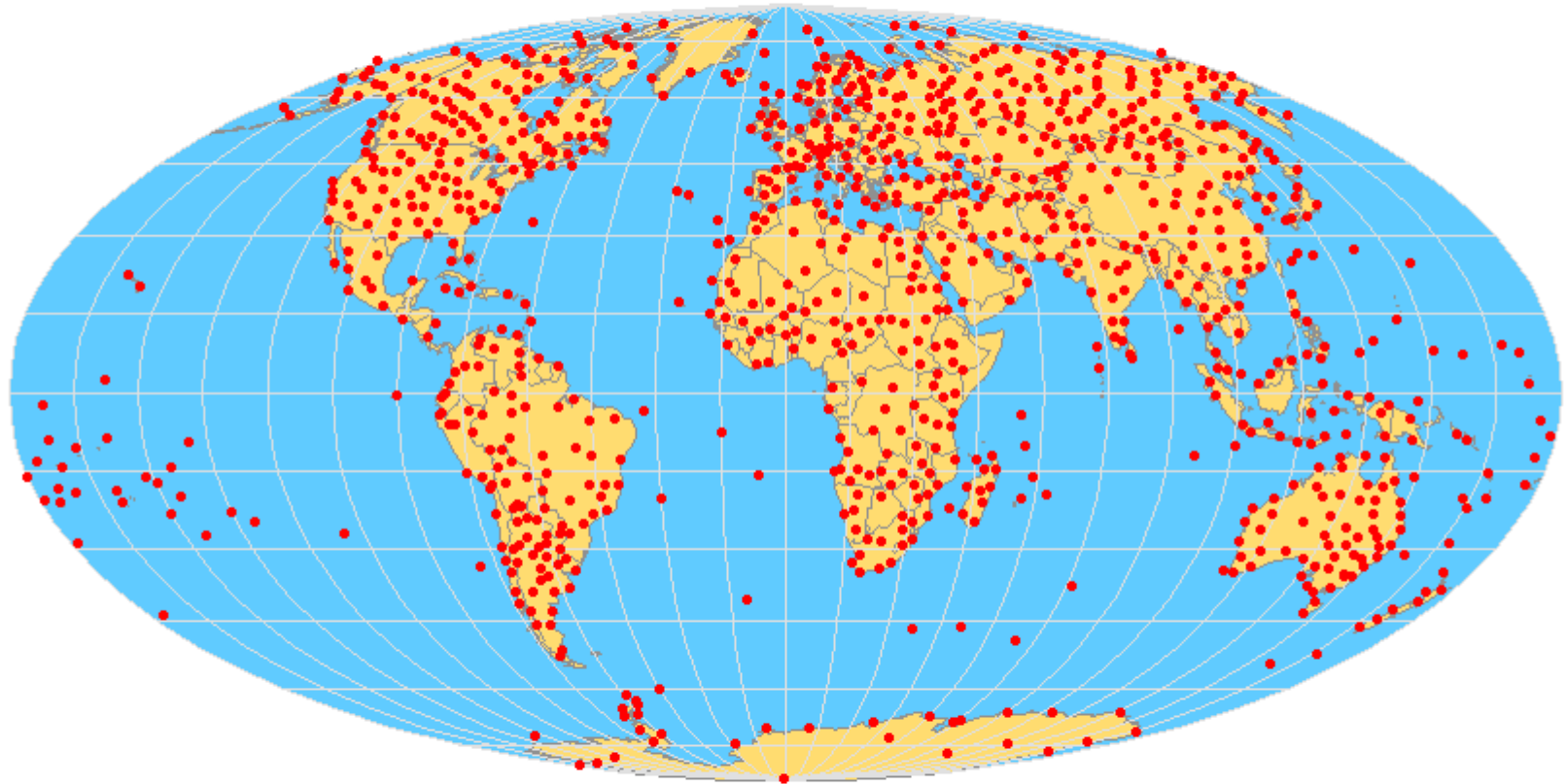
Unparalleled international cooperation has been achieved in satellite activities.

WMO Consultative Meetings on High Level Policy on Satellite Matters

Fourteenth WMO Congress (May 2003):

- Dialogue between WMO and environmental satellite communities had matured rapidly
- Institutionalized “WMO Consultative Meetings on High-level Policy on Satellite Matters” by resolution to establish formally dialogue with environmental satellite agencies
- Chaired by the President of WMO
- WMO Bureau members
- Heads of space agencies

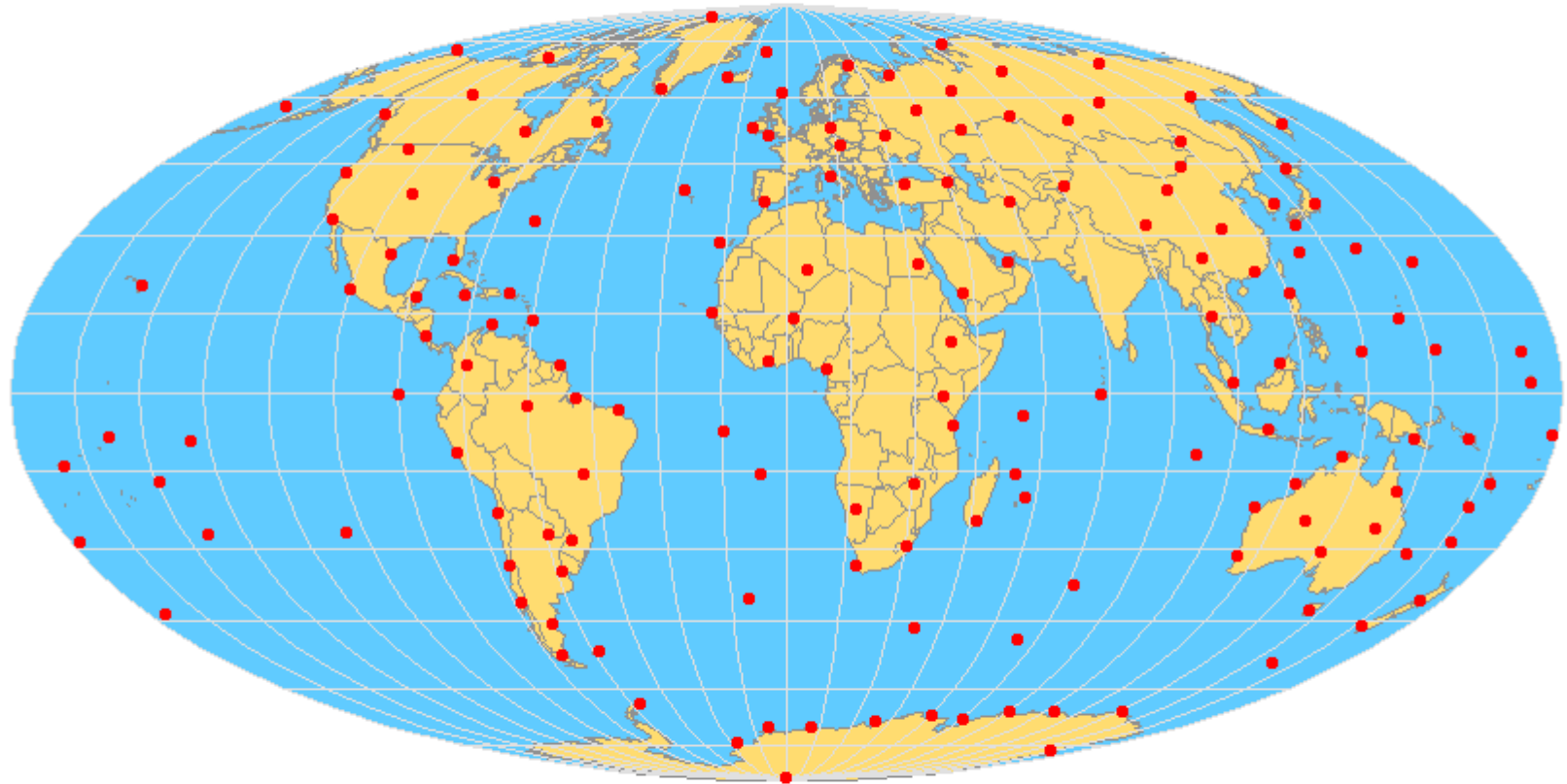
GCOS Surface Network (998 Stations)



GCOS Secretariat, 1 January 2005

ECVs addressed: Surface air temperature, Surface air pressure,
Surface wind speed and direction, Precipitation, Water vapour

GCOS Upper-air Network (161 Stations)



GCOS Secretariat, 1 January 2005

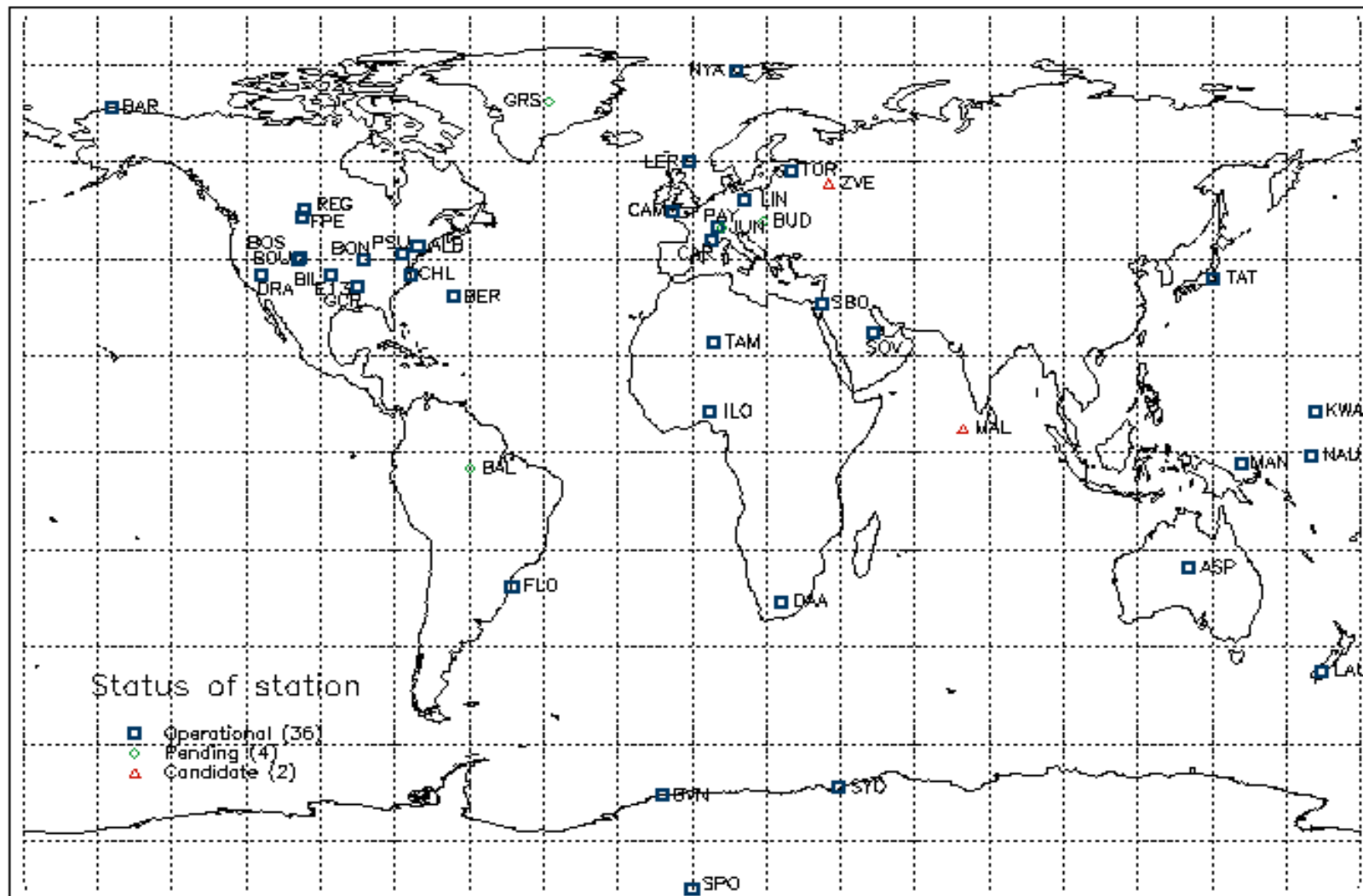
ECVs addressed: Upper-air temperature, Upper-air pressure, Upper-air wind speed and direction, Water vapour

The GAW Global Observatories

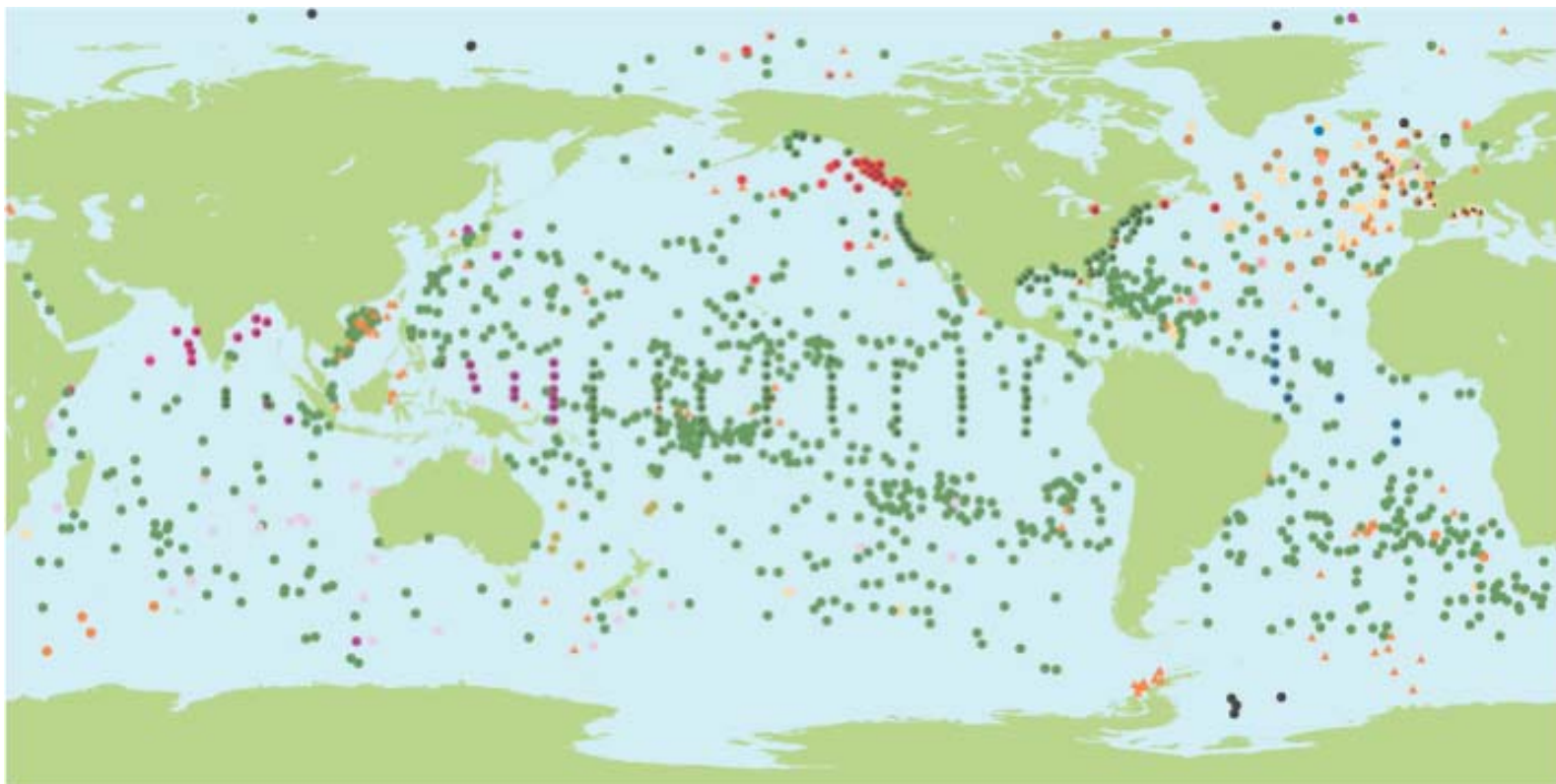


ECVs addressed: Carbon dioxide, Methane and other greenhouse gases, Ozone, Aerosol properties

Baseline Surface Radiation Network



ECV addressed: Surface radiation budget



DBCPC status by country, January 2005 (data buoys reporting on GTS)

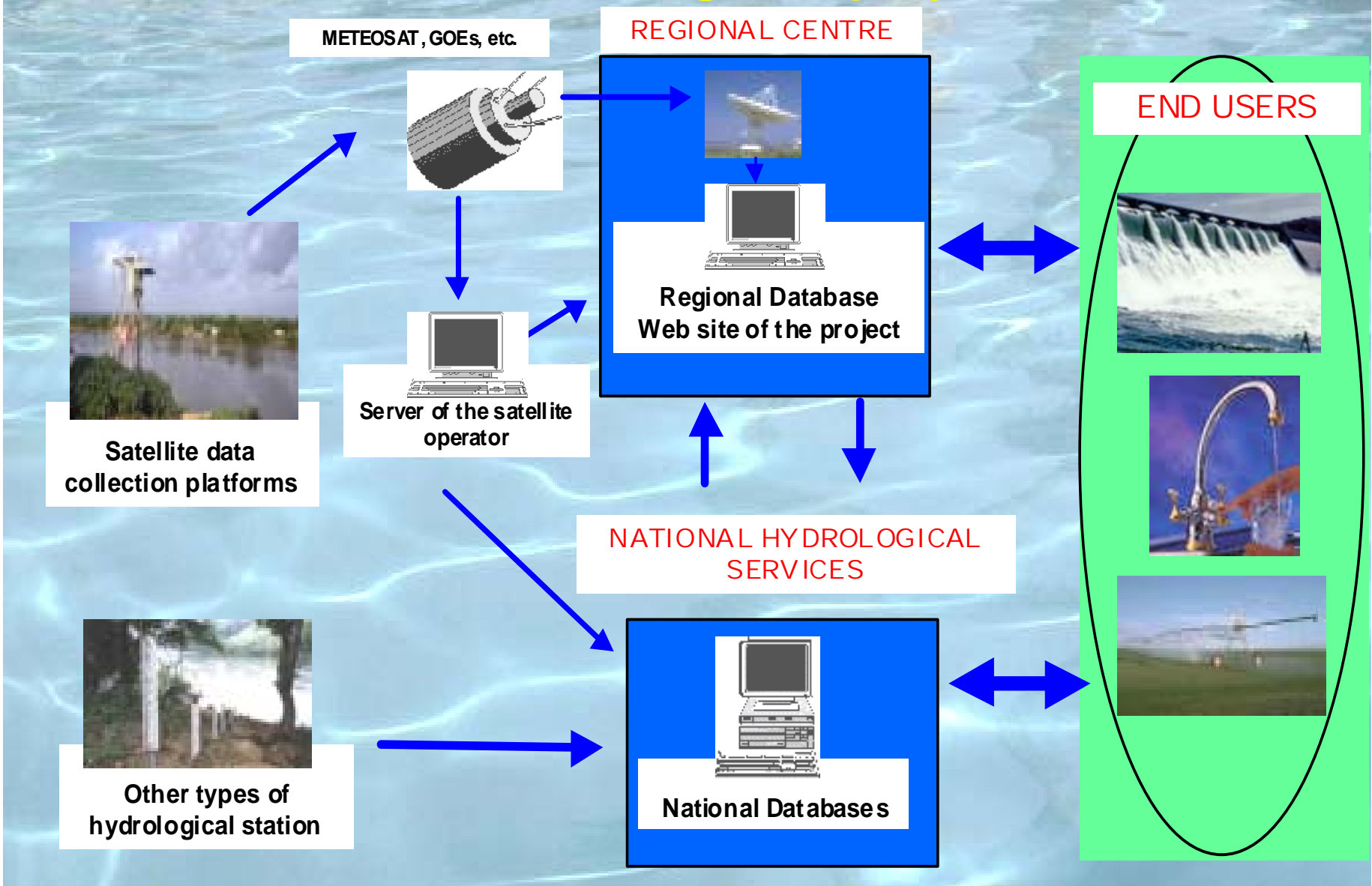
Drifting buoys: 970

Moored buoys: 186

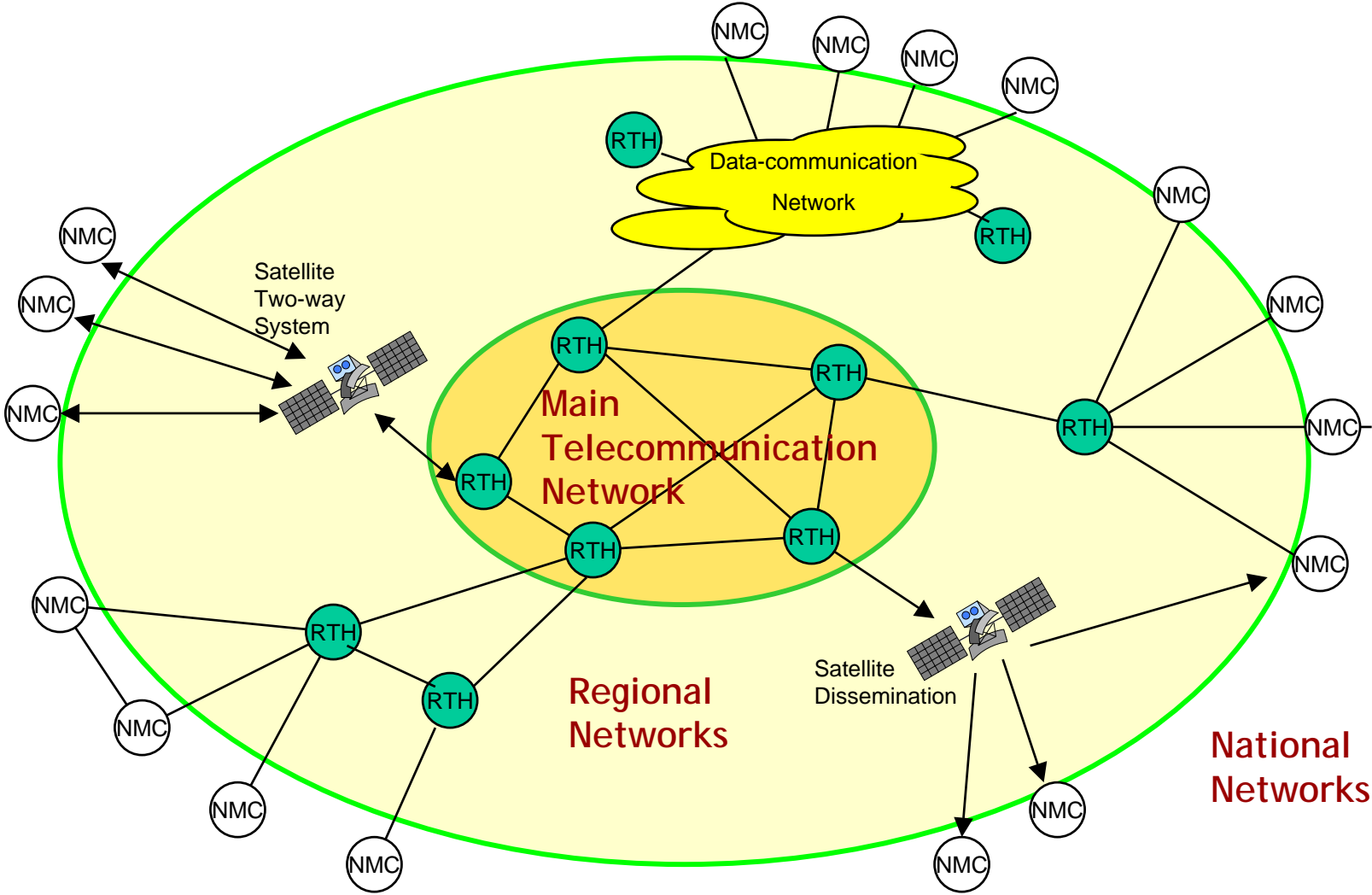
- | | | |
|--------------------|--------------------------|----------------------------|
| ● AUSTRALIA (28) | ● BRAZIL (2) | ● BRAZIL/FRANCE/USA (8) |
| ● CANADA (7, 19) | ● FRANCE (29, 6) | ● GERMANY (12) |
| ● INDIA (2, 9) | ● IRELAND (2, 2) | ● JAPAN (6, 15) |
| ● NETHERLANDS (1) | ● NEW ZEALAND (7) | ● NORWAY (10) |
| ● SOUTH AFRICA (8) | ● UNITED KINGDOM (31, 7) | ● UNITED STATES (827, 118) |
| ⊙ MOORINGS | ▲ UNKNOWN | |

ECVs addressed: Sea-surface temperature, Surface currents, other ocean-related
 (Map dynamically generated at: http://www.oco.noaa.gov/page_status_reports_global.jsp)

Flow of hydrological data and information within a HYCOS regional project












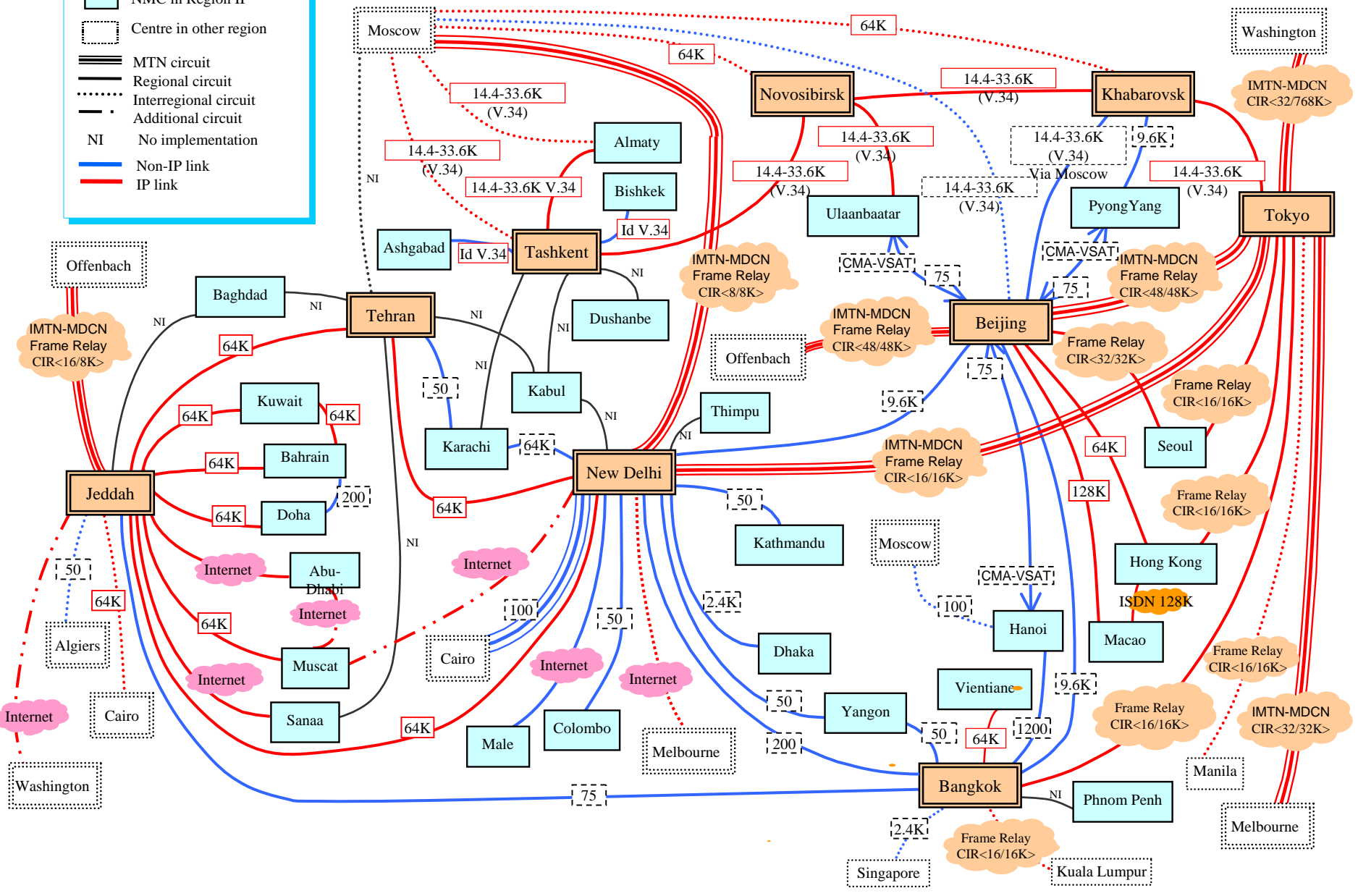
Structure of the Global Telecommunication System



Regional Meteorological Telecommunication Network for Region II (Asia)

Current status as of December 2004

	RTH in Region II
	NMC in Region II
	Centre in other region
	MTN circuit
	Regional circuit
	Interregional circuit
	Additional circuit
NI	No implementation
	Non-IP link
	IP link



OVERVIEW

Global Terrestrial Network Hydrology (GTN-H)

Status February 2005

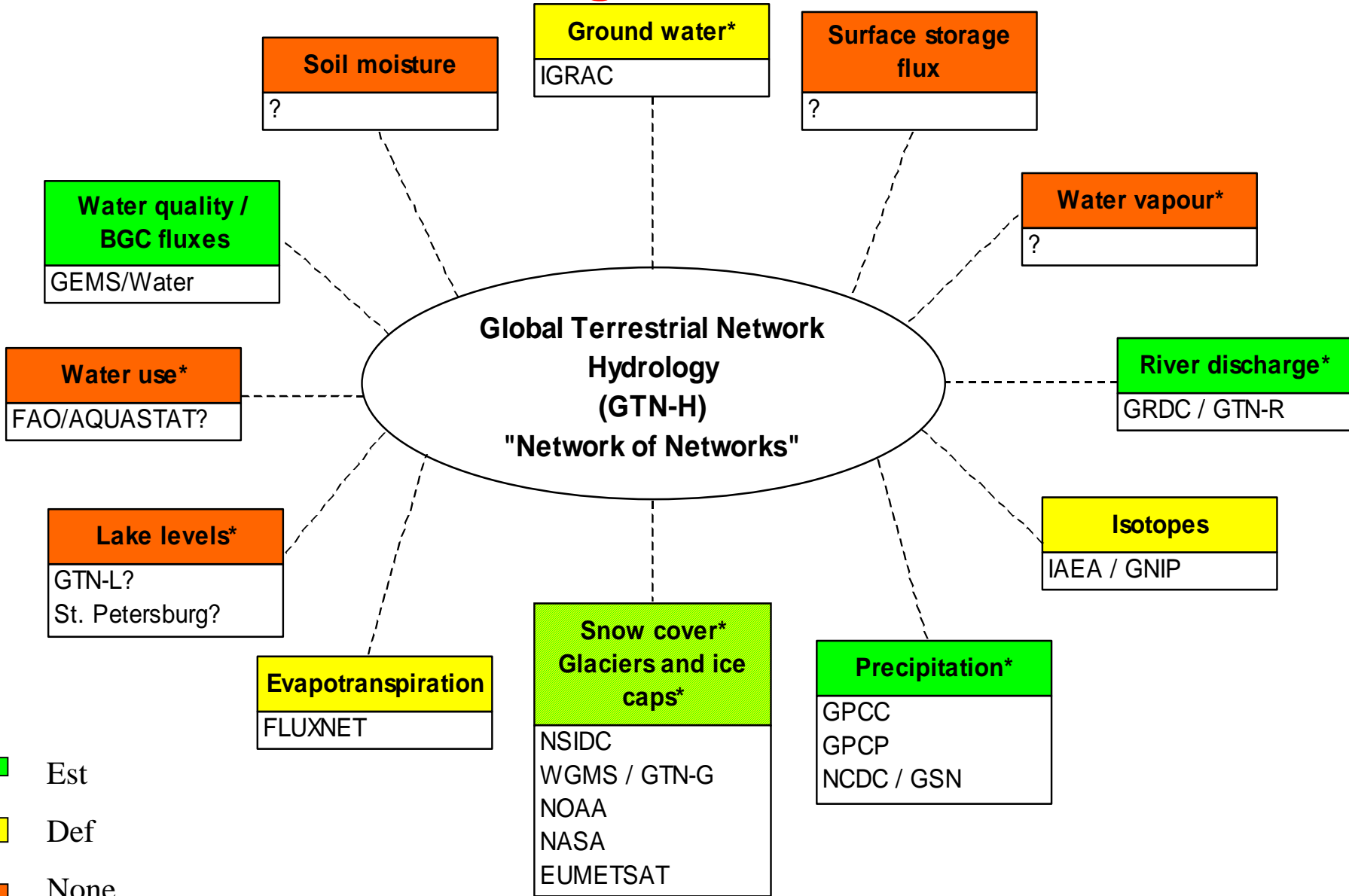
Global Terrestrial Network Hydrology (GTN-H)

- Global hydrological “network of networks” for climate in GCOS
- Building on existing networks and data centres
- Provide access to global hydrological (meta)data
- Develop relevant products + documentation
- Promote standard operating practices
- Promote free exchange of data and products
- Meet needs of science community and decision-makers

Global Terrestrial Network Hydrology (GTN-H)

- Initiated by WMO/HWR, GCOS, GTOS
- Established in 2001/2002
- Key partners: GRDC, GPCC, GEMS/Water, CSRC U New Hampshire
- Major contributions by Met Service of Canada, USGS
- Second Meeting of the GTN-H Panel in July 2005

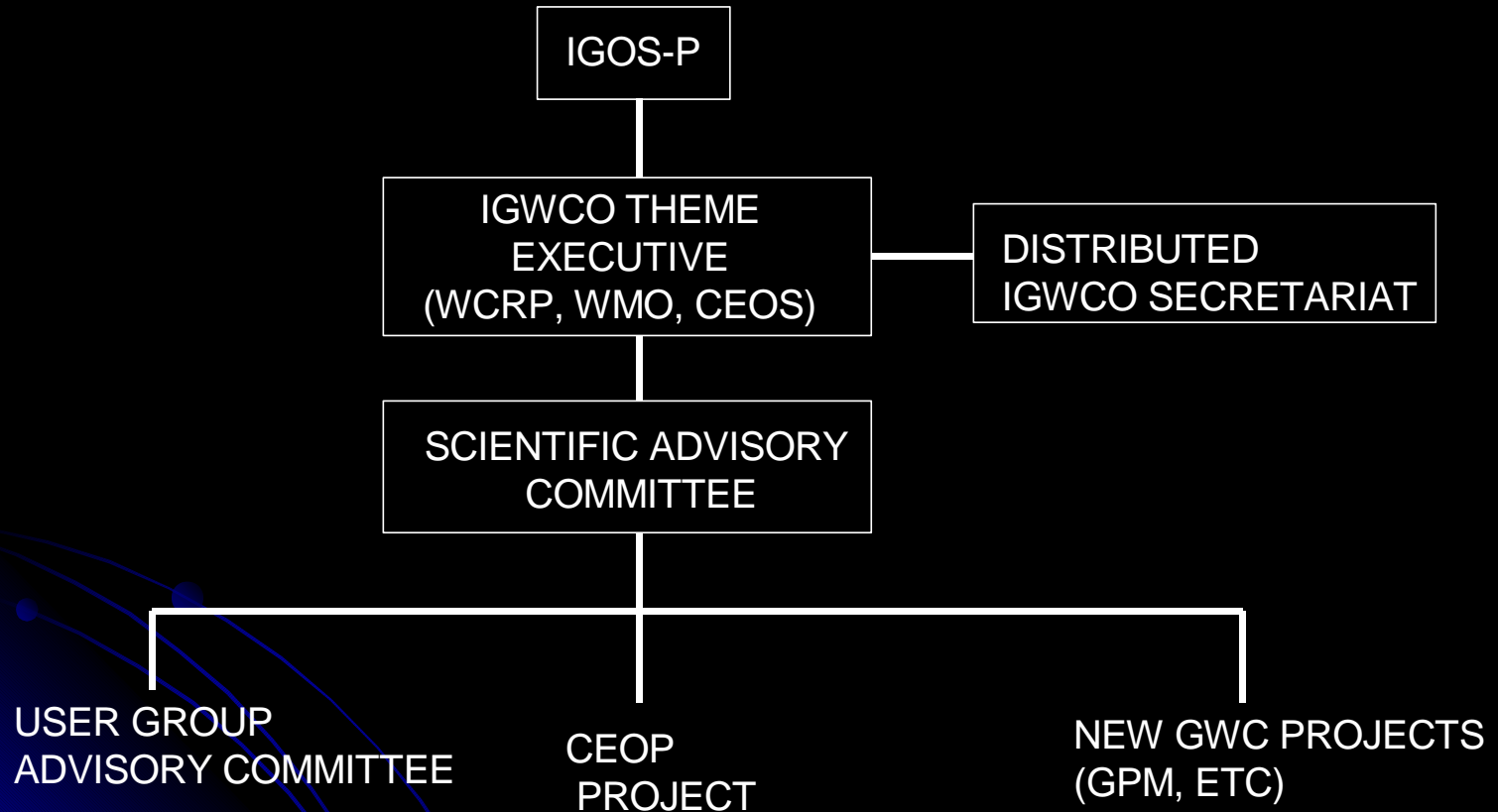
GTN-H Configuration 2-2005



- Est
- Def
- None
- * ECV

GTN-H in IGOS-P context

IGWCO IMPLEMENTATION PLAN



GTN-H in GEO context

ad hoc Group on Earth Observation (GEO)
comprehensive, coordinated, and sustained
capacity-building



data exchange in a full and open manner with minimum time delay and minimum cost
10 year implementation plan
close coordination between research communities and obs./prediction organizations

Implementation of IGOS-Water Cycle Theme

Leadership

**Observation/Prediction
Organizations**

**WMO-WWW GOS
WMO-GTN-H**

CEOS

Space Agencies

Research Communities

WCRP

GEWEX/CLIVAR/CIIC

CEOP as the First Element of the IGOS Water Cycle Theme

Coordination and Cooperation

WCRP - CEOS Space Agencies - NWPCs Affiliated to WMO

GTN-H Projects (Toronto 2002): status 02/2005

- 1.** Products that improve our understanding of what is available and how to access it (e.g., metadata, maps)
- 2.** Products that enhance baseline or core hydrological data and improve our knowledge of hydrology (e.g., gridded runoff datasets, mapped statistics)
- 3.** Products that result from the integration of existing datasets (e.g., biogeochemical fluxes)
- 4.** Products that are designed to address specific science questions (e.g., reference hydrological datasets for use in detecting climate change)

GTN-H Projects: status 02/2005

Project 1.1 Development of GTN-H website. (Coordinator)

Done (March 2004); hosted by U New Hampshire (<http://gtn-h.unh.edu>); ready for expected products and further content

Project 1.2 Inventory of existing data products, databases, and organizations. (Coordinator)

Partly implied in GTN-H configuration; Partly in GTOS/TEMS Hydrology module

River discharge core network defined by GRDC; identified sources in GRDC report 30, Dec 2003, Annex I

Project 1.3 Demonstration of metadata. (GRDC)

Final draft GRDC report (in review) November 2004.

GTN-H Projects: status 09/2004

Project 2.1 Development of gridded runoff datasets based on water balance model. (UNH)

<http://www.grdc.sr.unh.edu>

Interactive basin explorer; download section (station, basin, runoff (meta)data; observed vs. estimated values?)

Project 2.2 Map product on real-time hydrological conditions. (GRDC)

On basis of defined 380 stations river discharge network, demonstrate near real-time monitoring tool (NRT);

Development of NRT web portal finished in Aug 2004 with aid of additional IT staff at GRDC; currently prototype phase (November 2004)

GTN-H Projects: status 02/2005

Project 3.1 Mapping of biogeochemical fluxes. (GEMS-Water)

No progress made as yet.

Project 4.1 Reference hydrological dataset. (USGS)

Criteria for reference hydrological datasets: Draft developed

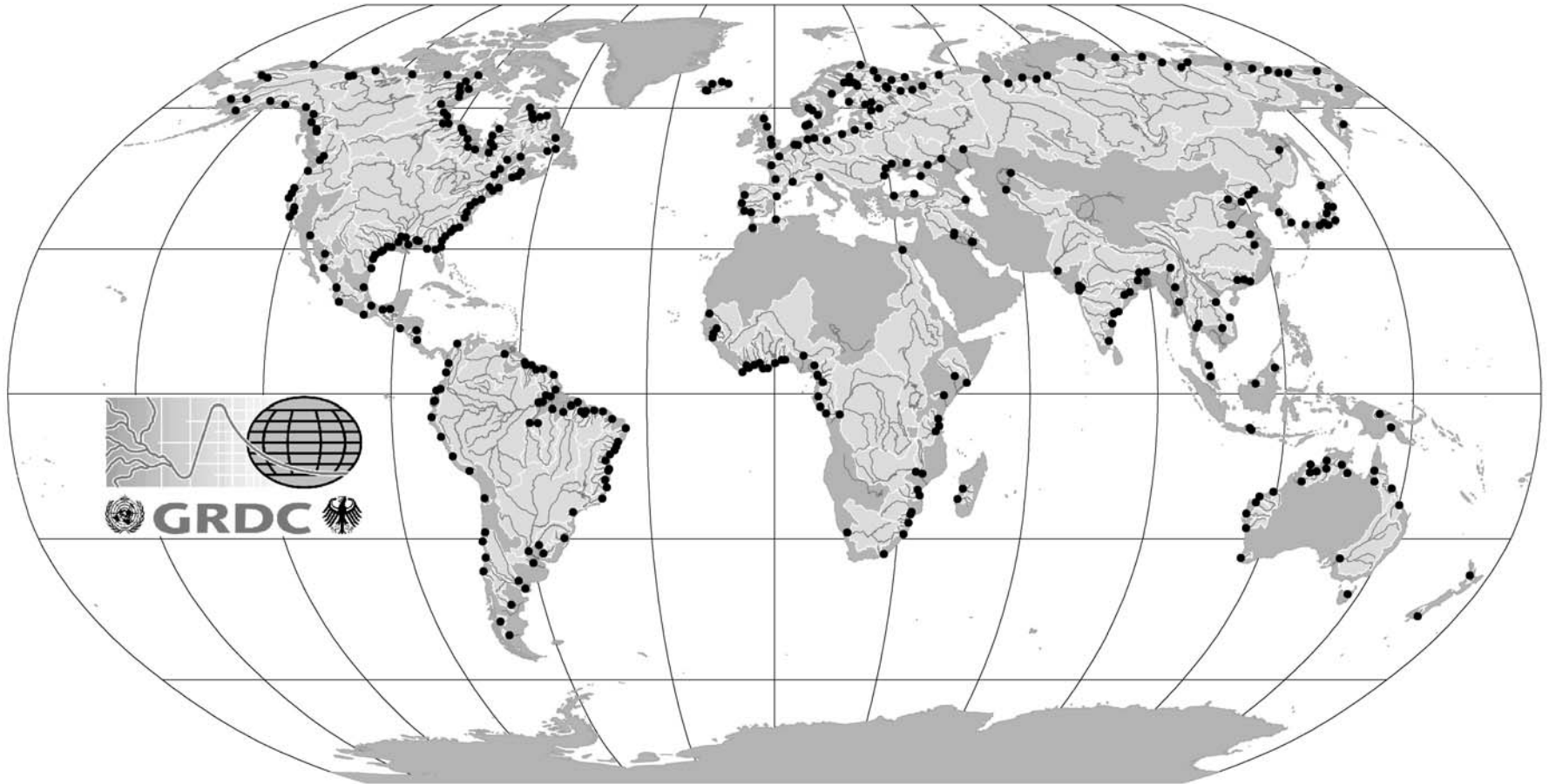
Criteria for identification of pristine river basins: CHy
AWG, March 2005

GTN-H Projects: status 02/2005

Project 4.2 GTN-H Variables & Networks Criteria. (WMO, GCOS)

- 2AR states: Essential Climate Variables (ECV)
River discharge, Water use, Ground water, Lake levels, Precipitation, Snow cover, (Soil moisture)
GCOS Implementation Plan:
Specific measures for each ECV (i.e. Network definitions, Research strategies, Data management functions); What network is needed?
- River Discharge: 380 station network defined, data acquisition in progress
- Precipitation: GCOS Surface Network, GPCC
- Global monthly “First-Guess” Precip. Product available

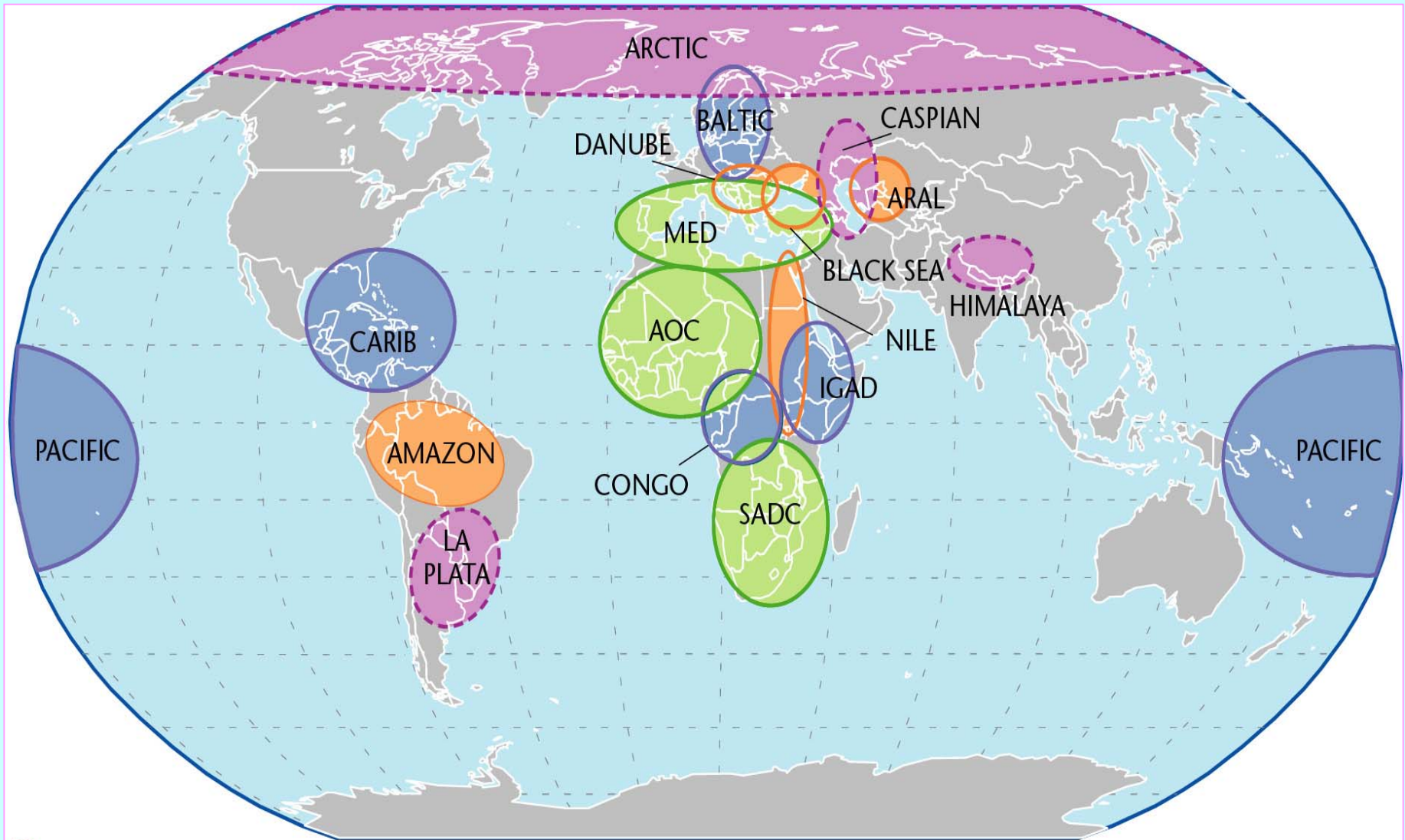
Proposed river discharge baseline network (GTN-R; 380 stations)



ECV addressed: River discharge

***WHYCOS is a Technical
Tool to facilitate regional
and basin-level
Cooperation in
Hydrology and Water
Resources Management***

The establishment of Objective-Driven
Hydrological Information Systems
and support to
Product Development
is at the core of the WHYCOS concept



August 2000

- Being implemented
- Project document prepared
- Project outline proposed
- Other proposals

REGIONAL IMPLEMENTATION OF WHYCOS

WMO Monitors, Detects, and Develops Early Warnings for Natural Hazards Related to Weather, Climate and Water



Severe Storms, Cold Spells, Heat Waves, Tropical Cyclones (Hurricanes and Typhoons), Storm Surges, Floods, Droughts, forest fires, locust swarms, etc...

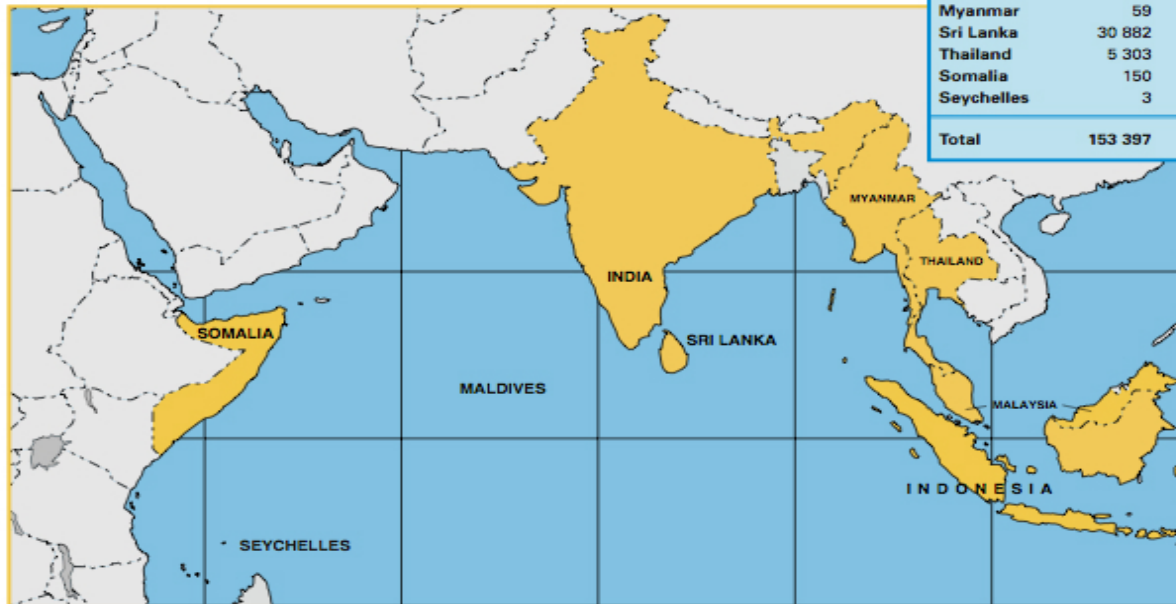
WMO Multi-Hazard Strategy for Natural Disaster Risk Reduction

- Coordinated, user-driven approach
- Strong partnerships, international, regional and national levels
- Advance global capabilities for space- and land-based observations
 - WMO's observation programmes
 - GEOSS
- Enhanced early warnings
 - Global capabilities delivered at regional & national levels
- Enhanced role of National Meteorological and Hydrological Services
- National capacity building, training, sharing best practices
- Awareness raising and education



WMO's Contributions to Tsunami Early Warning Systems

Work with UNESCO-IOC, ISDR and other partners to contribute relevant capabilities to the tsunami early warning system



	Dead	Missing	Displaced
India	10 327	5 628	NA
Indonesia	106 523	12 047	694 760
Malaysia	68	6	8 000
Maldives	82	26	21 663
Myanmar	59	3	3 205
Sri Lanka	30 882	6 088	504 440
Thailand	5 303	3 396	NA
Somalia	150	NA	5 000
Seychelles	3	NA	NA
Total	153 397	27 194	1 237 068

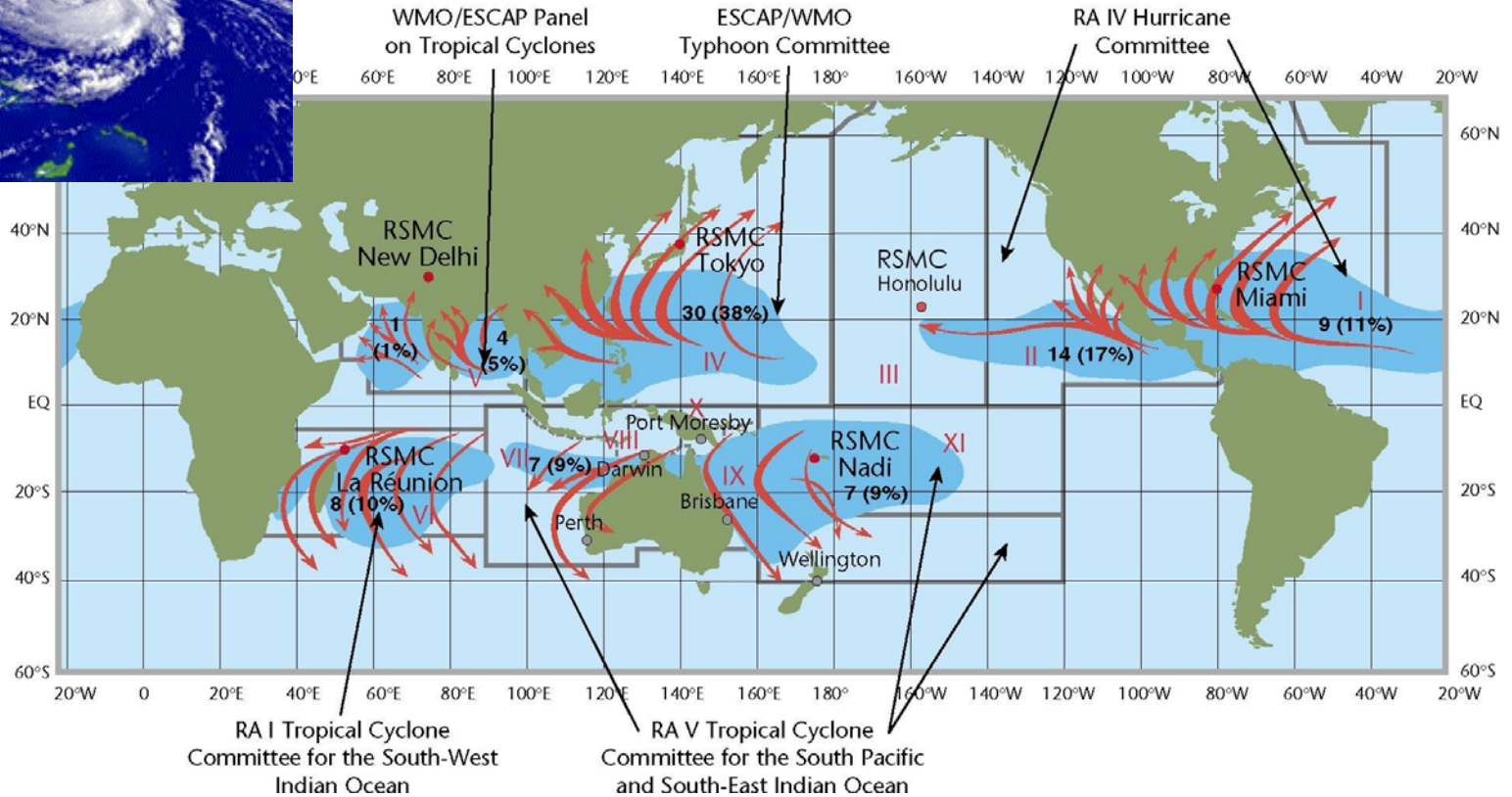
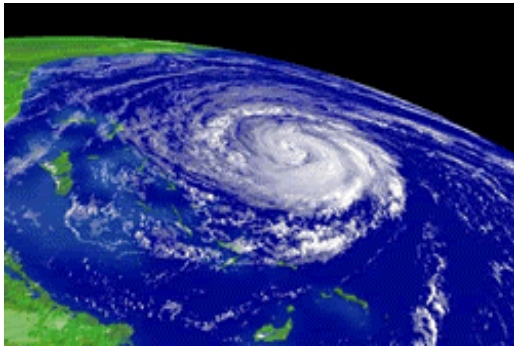
Latest figures as of 10 January 2005.
(The figures in this table are official government figures)

Countries most affected

WMO's Contributions to Tsunami Early Warning Systems

- Global Telecommunication System
- WMO Space Programme
- Multi-hazard early warning systems
- Enhance contributions of NMHSs
- Technology transfer, and capacity building
- Promotional and educational programmes

WMO's Global Tropical Cyclone Early Warning System



From Storm-Surge Warning to Coastal Flood Management

- National Hydrological Services prepare coastal flood warnings based on storm-surge forecasts developed by National Meteorological Services and communicate with relevant authorities to ensure timely and accurate flood warnings.



THORPEX

A World Weather Research Programme

Accelerating improvements in the accuracy
of one-day to two weeks high-impact weather
forecasts

for the benefit of society, economy and
environment

2005 2015...



A photographic collage depicting the societal, economic and ecological impacts of severe weather associated with four Rossby wave-trains that encircled the globe during November 2002.

Director AREP Department

Mission

THORPEX is an international **research** programme of WMO aimed at extending the limits of predictability, and at increasing the accuracy of high-impact weather forecasts from day 1 to day 14.

THORPEX builds upon ongoing advances within the basic-research and operational-forecasting communities.

It will make progress by enhancing international collaboration between these communities, such as WGNE/WWRP/CBS and with users of forecast products.

THORPEX International Science Plan

Research on weather forecasts from 1 to 14 days
lead time

4 research sub-programmes:

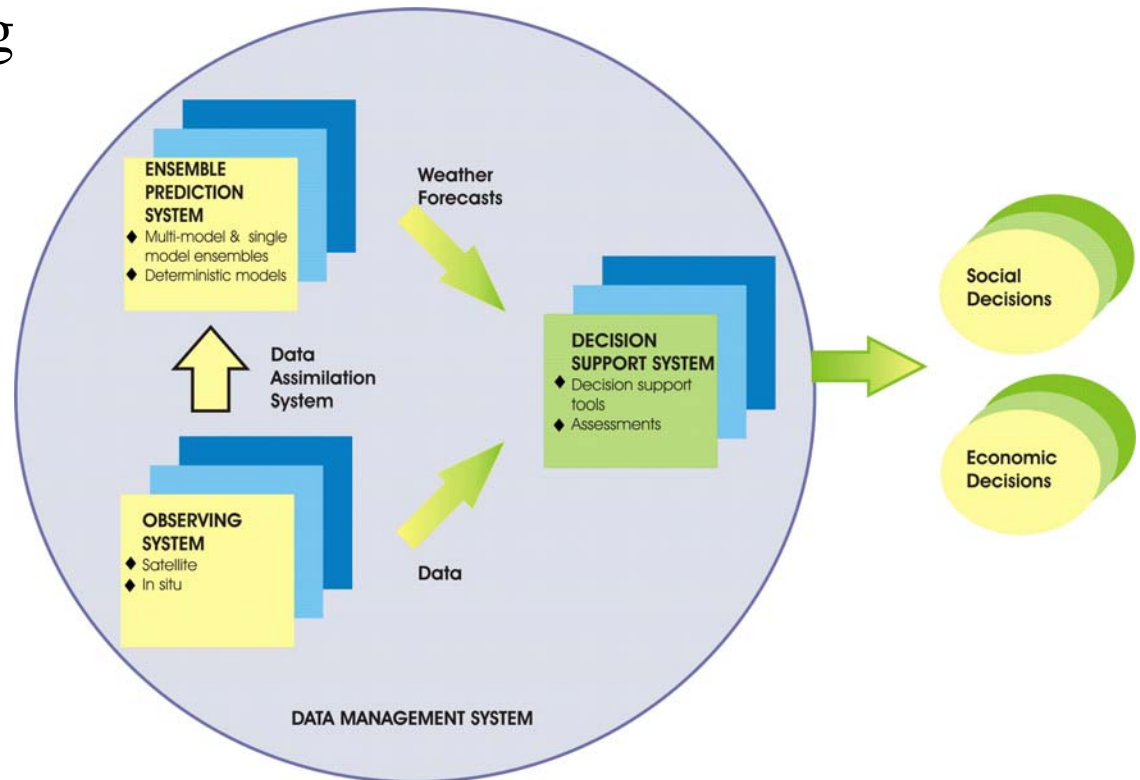
- Predictability and Dynamical Processes;
- Observing Systems;
- Data Assimilation and Observing Strategies;
- Societal and Economic Applications

Full version of THORPEX International Science
Plan

www.wmo.int/thorpex/mission.html

THORPEX International Science Plan

- Emphasis on ensemble prediction
- Emphasis on global-to-regional influences on weather forecast skill
- **Interactive forecast systems** “tuned” for end users using targeted observations called on in ‘sensitive areas’, adaptive DA, grid computing



THORPEX International Implementation Plan

Approved by the ICSC on 2 December 2004.

Connected with

- WWW, DPM, WMO Space Programme, **WCRP**, WCP, HWR, AMP
- Regional research programmes
- International initiatives (e.g. IPY, GEOSS)

www.wmo.int/thorpex/implementation.html

Demonstration Projects

- Disaster mitigation and reduction in developing and least developed countries (e.g., Flood response)
- Economic efficiency in developed countries (e.g. Energy generation)
- 4 components to these projects:
 - The ensemble forecasting system, which provides a probabilistic forecast;
 - An interpreted weather forecast;
 - Decision support tools derived from the probabilistic forecast; and
 - Evaluation of the use of the decision support tool.
- Candidate projects:
 - Global Prediction; Flood Mitigation in Europe (France flash floods), Chile, South East Asia; Water Management in North Africa and Middle East, Increasing Efficiency in Electrical Generation in North America, Special Events (**Beijing Olympics Games**), **Sand and Dust Storm Research**

Thank you