World Meteorological Organization

Working together in weather, climate and water

Climate observations and services: GCOS and GFCS

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Global Climate Observing System

GCOS
GLOBAL CLIMATE OBSERVING SYSTEM

•GCOS is an internationally coordinated network of observing systems

•GCOS consists of the climate relevant components of existing **atmospheric**, **oceanic** and **terrestrial** observing systems and aims at enhancing them to meet users' needs for climate observations

•The Goal of GCOS is to provide continuous, reliable, comprehensive data and information on the status of the global climate system

•GCOS is sponsored by WMO, UNEP, IOC of UNESCO, and ICSU

• GCOS secretariat; GCOS science advisory panels; 23 National Coordinators and Committees

GCOS Assessment Cycle

What needs to be measured?

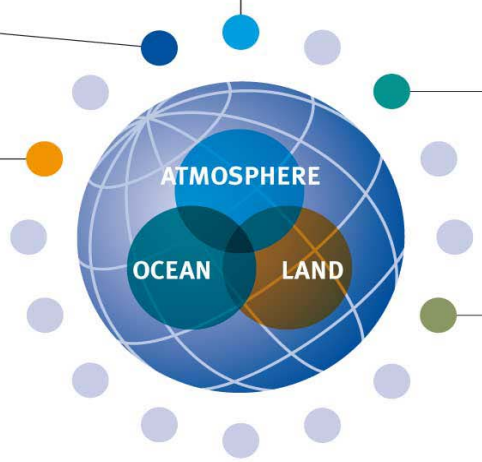
Essential Climate Monitoring Variables (ECVs)
Implementation Plan

Where are we now?

Progress Report

How to do it?

Climate Monitoring Principles
Guidelines for Datasets and Products
Regional Action Plans



How to improve the system?

New Networks
Research
WCRP, IGBP
National Coordination
GCOS Cooperation Mechanism
Contributing Systems
Global Terrestrial Observing System,
Global Ocean Observing System,
WMO Integrated Global Observing System,
and others

By whom/by which means?

Space Agencies
Network Owners
Meteorological Service, Hydrological Service,
Research Organizations, and other institutions
Data and Analysis Centres

Essential Climate Variables (ECVs)

- Global observations feasible (practical, cost-effective)
- High impact on needs of UNFCCC, climate change assessments (IPCC)

Domain	Essential Climate Variables
Atmospheric (over land, sea and ice)	**Surface**[1]**:** Air temperature, Wind speed and direction, Water vapour, Pressure, Precipitation, Surface radiation budget. **Upper-air**[2]**:** Temperature, Wind speed and direction, Water vapour, Cloud properties, Earth radiation budget (including solar irradiance). **Composition:** Carbon dioxide, Methane, and other long-lived greenhouse gases[3]; Ozone and Aerosol, supported by their precursors.[4]
Oceanic	**Surface**[5]**:** Sea-surface temperature, Sea-surface salinity, Sea level, Sea state, Sea ice, Surface current, Ocean colour (for biological activity), Carbon dioxide partial pressure, Ocean acidity, Phytoplankton. **Sub-surface:** Temperature, Salinity, Current, Nutrients, Carbon dioxide partial pressure, Ocean acidity, Oxygen, Tracers.
Terrestrial	River discharge, Water use, Ground water, Lakes, Snow cover, Glaciers and ice caps, Ice sheets, Permafrost, Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (fAPAR), Leaf area index (LAI), Above-ground biomass, Soil carbon, Fire disturbance, Soil moisture

[1] Including measurements at standardized, but globally varying heights in close proximity to the surface
[2] NO_2, SO_2, HCHO and CO in particular
[3] Including measurements within the surface mixed layer, usually within the upper 15m
[4] At selected sites and areas (e.g., coral reefs; boreal and tropical forest areas)

ECV information and data can be found on The Global Observing Systems Information Centre (GOSIC) website: http:// GOSIC.ORG

Example for an IP Action: *ECV - Soil moisture*

- Action T12
- **Action**: Develop Global Terrestrial Network on Soil Moisture
- **Who**: Parties' national services and research programmes, through IGWCO, GEWEX and TOPC in collaboration with space agencies.
- **Time frame**: 2014
- **Performance indicator**: Fully functional GTN-SM with a set of in situ observations (possibly co-located with reference network, cf. T3), with standard measurement protocol and data quality and archiving procedures.
- **Annual Cost Implications**: 1-10M USD (40% in non-Annex-I Parties).

➢ *The proposal to establish an „International Soil Moisture Network (ISMN)" has been supported by ESA within its Climate Change Initiative*

➢ *TU Wien is responsible for the initial implementation (2009-2012):*
http://www.ipf.tuwien.ac.at/insitu

National, Regional Activities and Cooperation Mechanism

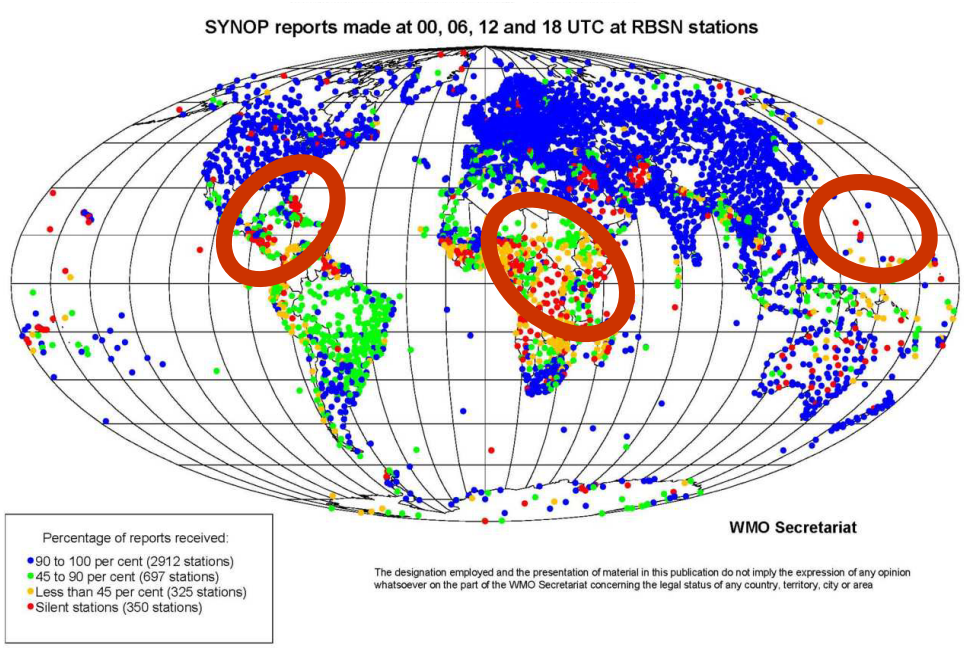
- **National activities**
  - 23 national coordinators and committees

- **Regional activities**
  - GCOS Regional Workshop Programme
  - Climate for Development in Africa Initiative
  - Planned workshop on observation needs for adaptation 2013

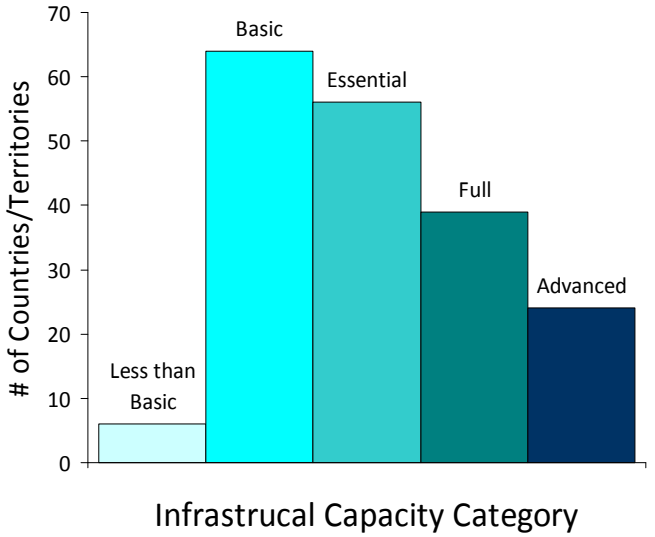
- **GCOS Cooperation Mechanism**
  - Revitalises key stations in baseline networks, using donations made for the purpose

Concern...

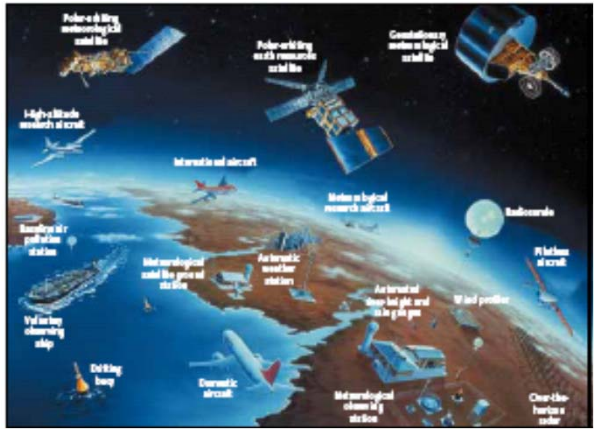
Many countries lack the infrastructural, technical, human and institutional capacities to provide high-quality climate services.



Infrastructural Capacities of Countries as of Aug 2010 to provide Basic, Essential, Full and Advanced Climate Services.

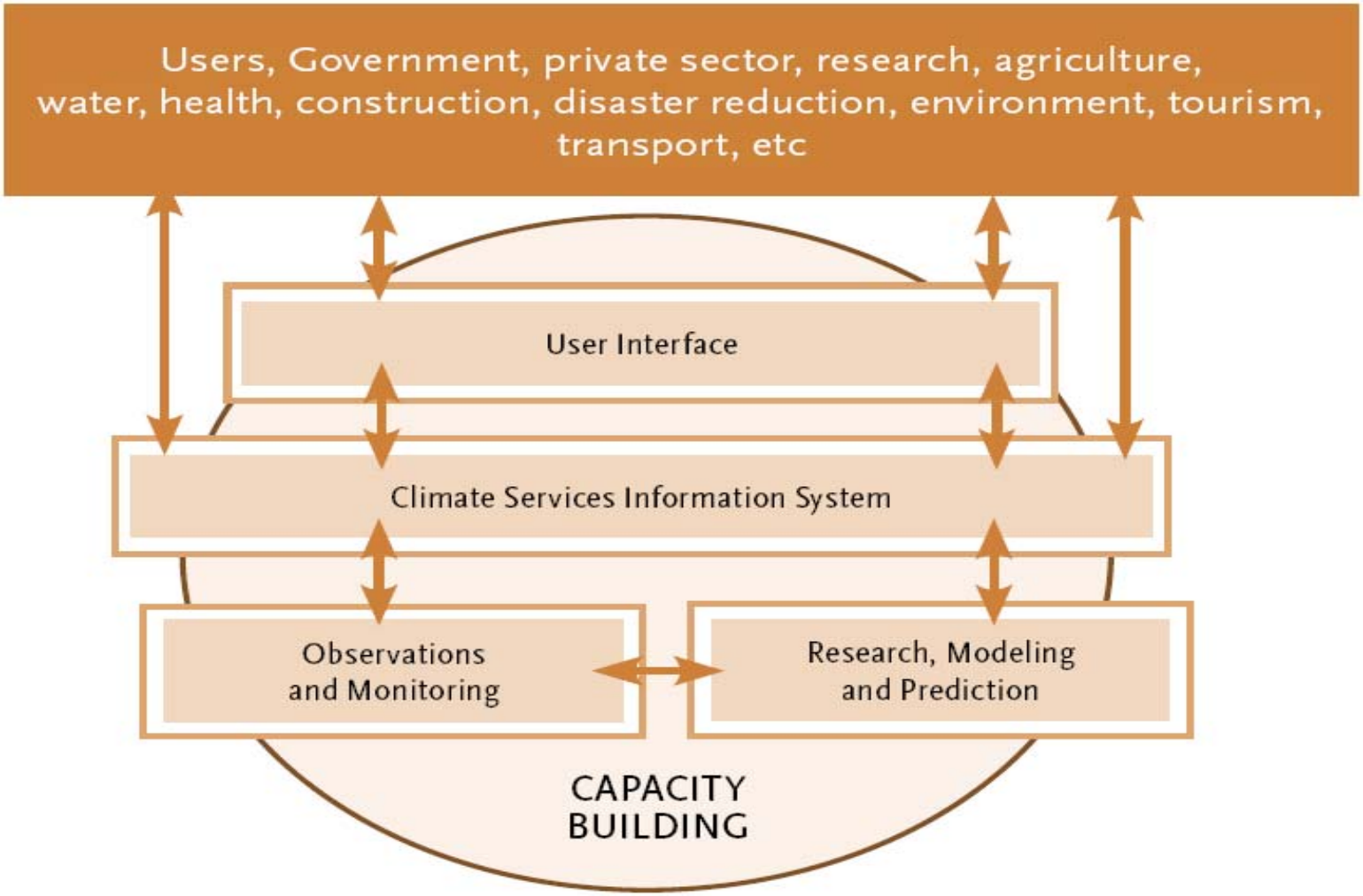


Global Framework for Climate Services



Enable better management of the risks of climate variability and change and adaptation to climate change, through the development and incorporation of science-based climate information and prediction into planning, policy and practice on the global, regional and national scale.

Components


Users, Government, private sector, research, agriculture, water, health, construction, disaster reduction, environment, tourism, transport, etc
User Interface
Climate Services Information System
Observations and Monitoring
Research, Modeling and Prediction
CAPACITY BUILDING

The principles of the GFCS

1 - Priority shall go to building the capacity of climate-vulnerable developing countries

2 - Ensure greater availability of, access to, and use of climate services for all countries

3 - Three geographic domains; global, regional and national

4 - Operational climate services will be the core element of the Framework

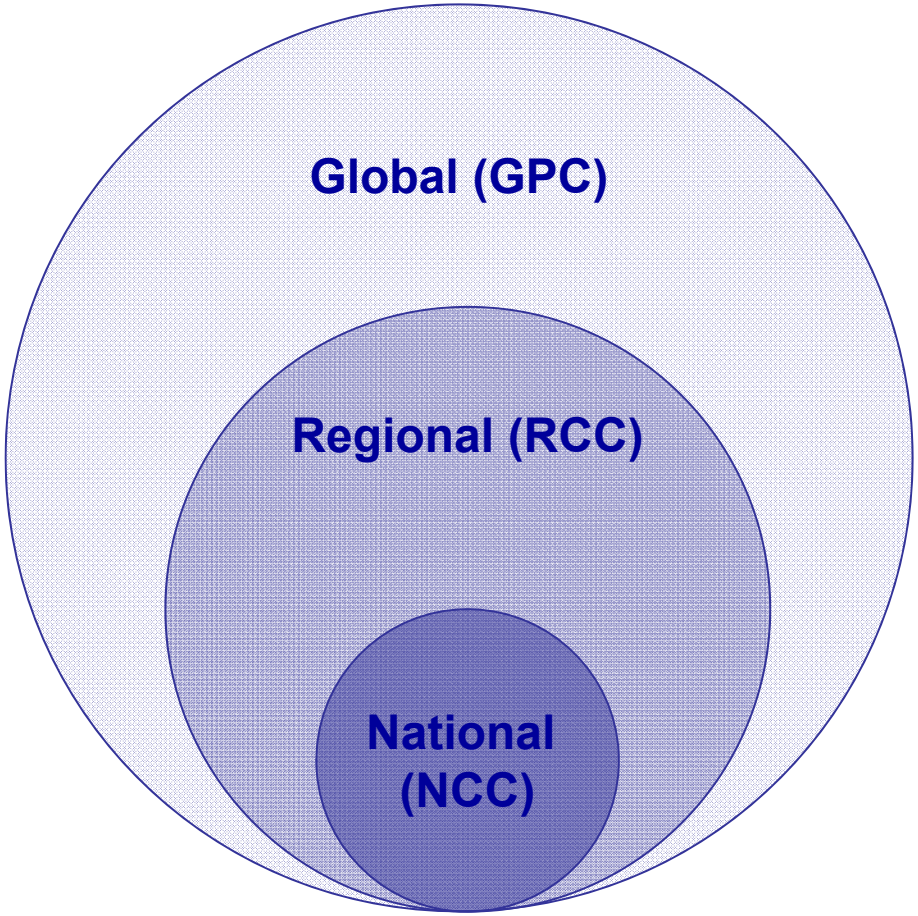
5 - Climate information is primarily an international public good provided by governments, which will have a central role in its management through the Framework

6 - Promote free and open exchange of climate-relevant observational data while respecting national and international data policies

7 - The role of the Framework will be to facilitate and strengthen, not to duplicate

8 - Built on user needs through user – provider partnerships that include all stakeholders

Domains of operation



Short term priority areas

Agriculture

Water

Health

Disaster Risk Reduction

Benefits

- As inputs to hydrological characterisation (e.g. precipitation, evaporation, etc)
- In planning, design, development and operation of water supplies
- In flood and floodplain management and control
- Design and operation of irrigation and drainage systems; and
- For studies associated with power generation, fisheries an conservation, navigation and recreation

Measuring success

The GFCS is successful when:

- Climate information services are used as regular inputs to decisions in the water sector, e.g. in short term water allocation or use to longer term infrastructure development and operations
- The applications of climate information services results in greater efficiencies and effectiveness in the sustainable use of water resources across the sector
- Improved access to accurate and reliable climate information results in appropriate and robust design and construction of water related structures such as culverts, bridges and dams

Process for development of the Implementation Plan

- 13 April 2012: 1st Draft of the Implementation Plan and the governance mechanism
- 25 June – 3 July: Consideration of the 1st Draft in the LXIVth session of the Executive Council
- 6 August: 2nd Draft the Implementation Plan and the governance mechanism
- End of August: Final document of the implementation plan and the governance mechanism
- 29 – 31 October 2012: Extraordinary Congress

For more information:

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