Activities of the Global Climate Observing System (GCOS)

Dialogue with the systematic observation community

COP 19, Warsaw, Poland
Wednesday 13 November 2013

Dr Carolin Richter, Director, GCOS Secretariat

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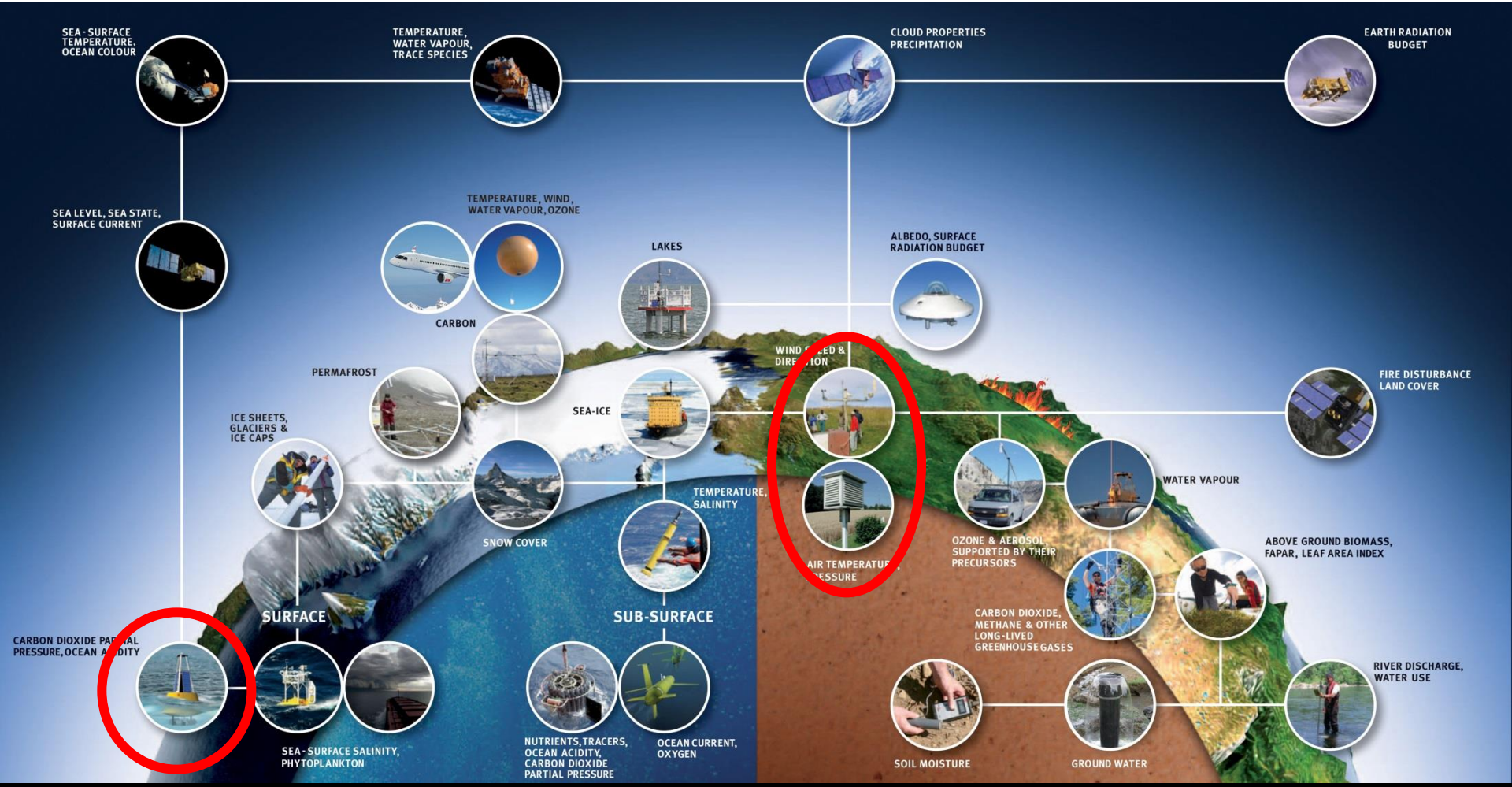
Global Climate Observing System

Energy, Carbon and Water Cycle are of high relevance for UNFCCC, Global Framework for Climate Services and for Climate Research!

A changing climate
will change those life-essential cycles.

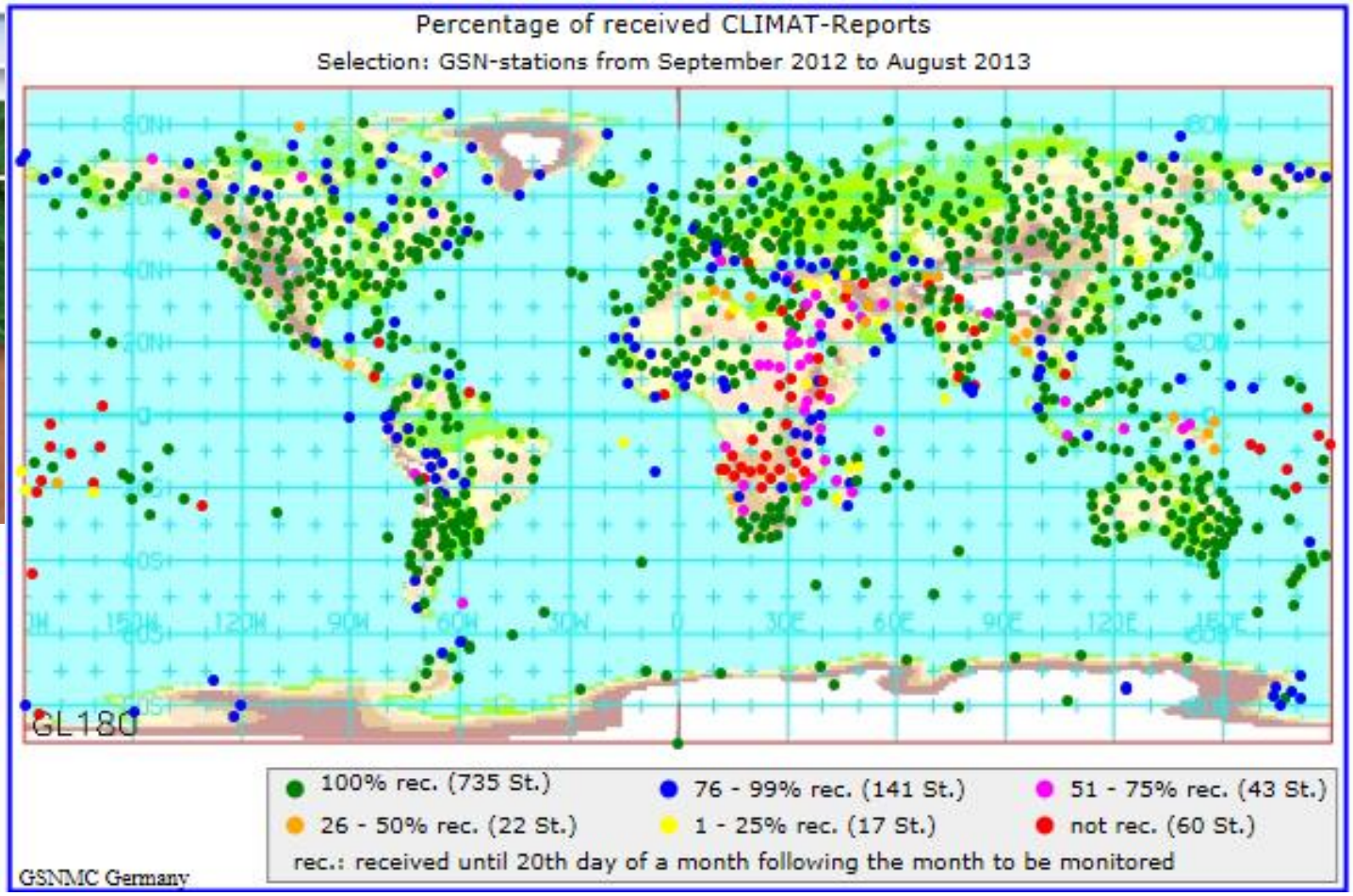
What do we need to observe ?

Concept: Global Observations for Climate & ECVs



The GCOS includes surface-based, air-borne, and space-based components and constitutes, in aggregate, the climate observing component of the Global Earth Observation System of Systems (GEOSS).

GCOS Cooperation Mechanism: Monitoring



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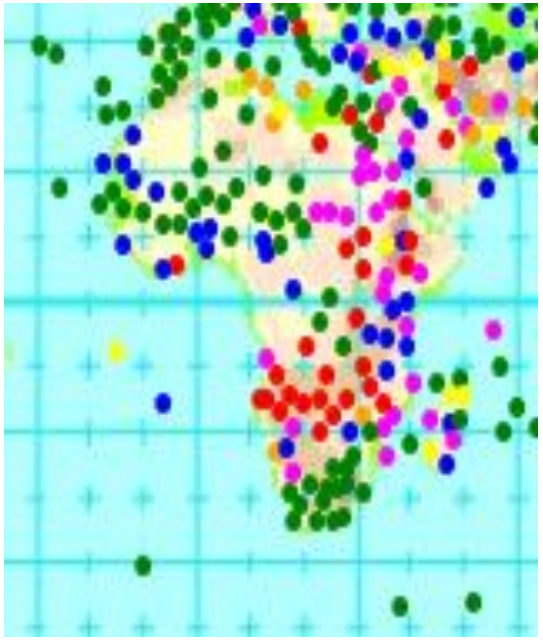
GCOS Cooperation Mechanism: Data Access



GCOS Monitoring of CLIMAT messages shows poor results both in terms of availability and coverage.

But is this the true situation?

Data access for global use is restricted by:
(1) Political
(2) Lack of understanding of benefits
(3) Communications (intra & external)
(4) Relying on country for processing and coding
(5) Focal point being National Met Service
(6) Projects not specifying and/or insisting on global availability

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OOPC Ocean Observations Panel for Climate

Ocean Observations Panel for Climate

Why do we need an OOPC?

A strong focus on Oceans in the IPCC WG 1 Report

"When we talk about Global Warming, we really mean ocean warming"

(Steve Rintoul (per comm), IPCC Coordinating Lead Author, Ocean Observations chapter)

GCOS Panels and Partners: Oceans - Tropical Atmosphere Ocean

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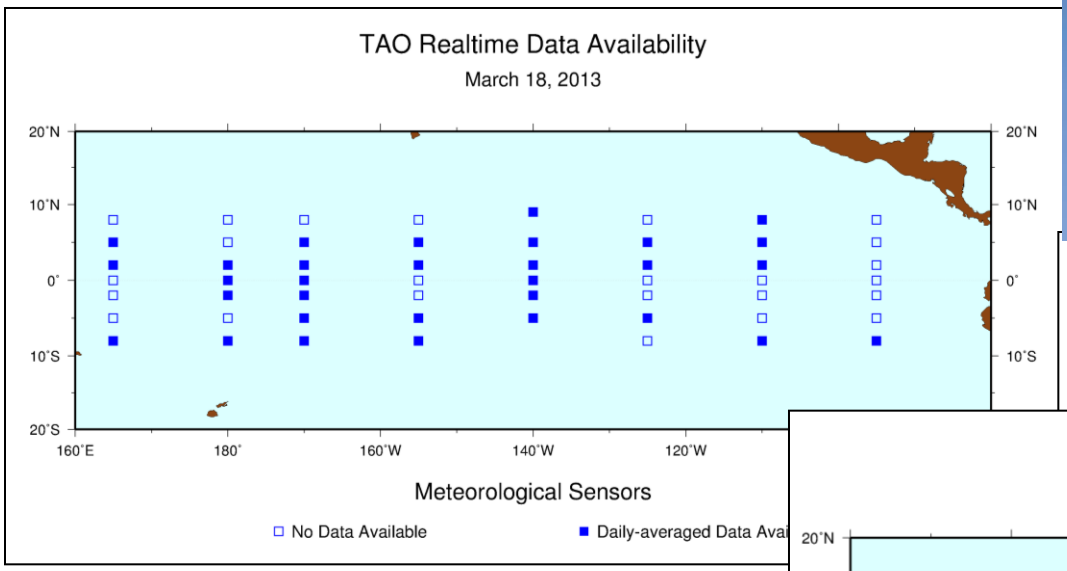
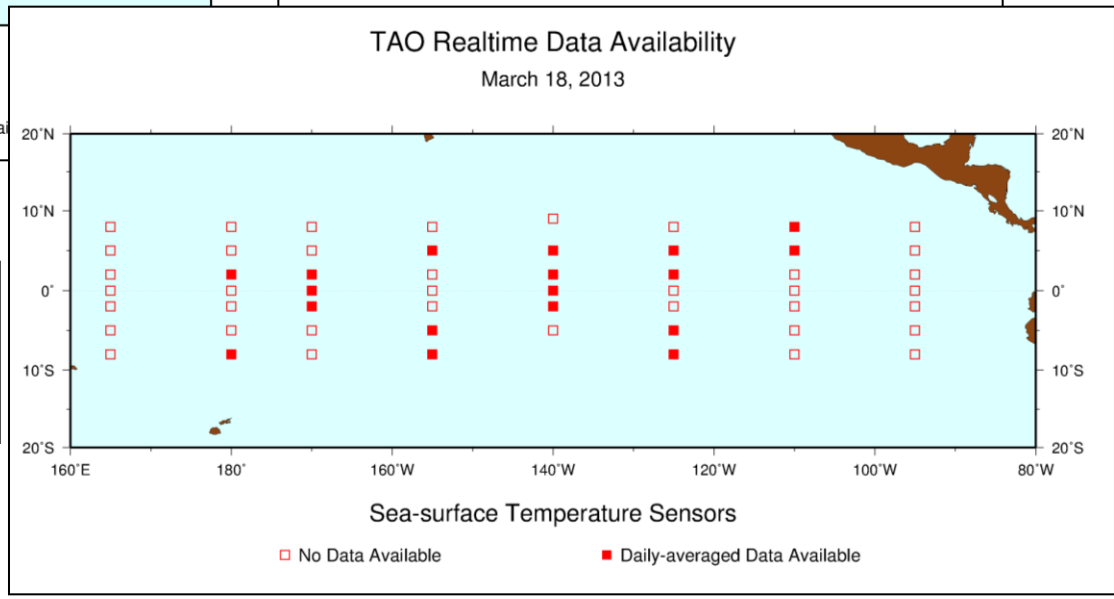
OOPC Ocean Observations Panel for Climate



24 of 55 TAO moorings not transmitting

Daily data return: 37.9%



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The Global Ocean Observing System GOOS

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GCOS Panels and Partners: Oceans - Tropical Pacific Observing System

A Future Sustained Tropical Pacific Ocean Observing System for Climate Research and Forecasting

International and Multidisciplinary Scientific Requirements for the Tropical Pacific Observing System for 2020 (TPOS-2020)

www.ioc-goos.org/tpos2020

27-30 January 2014, La Jolla CA, USA

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GCOS and UN-partners: Workshop on Observations for Adaptation

- organized by GCOS in partnership with IOC of UNESCO and UNEP, supported by the DECC, UK.
- hosted by DWD, Offenbach, Germany, 26-28 February 2013.
- 45 participants, including representatives of the GCOS community, UNFCCC Secretariat and representatives of sectors in which adaptation to climate variability and climate change is, or is likely to become, an important concern:

→ closely aligned with the implementation of the GFCS

→ results will also directly feed into the preparation of the next assessment report of the adequacy of global observations for climate , to be developed in the 2014/15 timeframe.

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GCOS and UN-partners: Workshop on Observations for Adaptation

Cross-cutting issues:

- Risk Management
- Early Warning Systems
- Research, Modeling and Assessment
- Data Rescue and Management

Sectors:

- Water Resources
- Coastal Zones
- Health
- Forestry
- Agriculture
- Energy
- Transport

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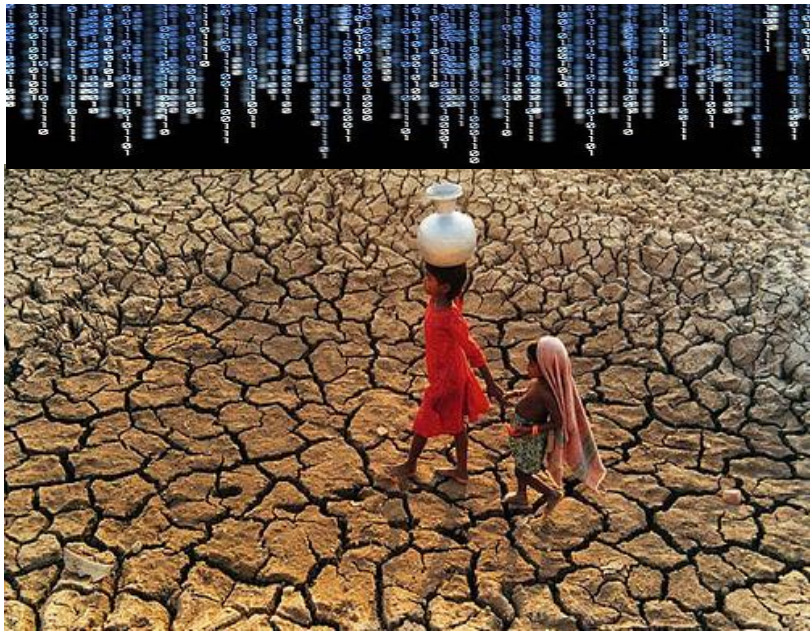
GCOS and UN-partners: Workshop on Observations for Adaptation

Key Needs to Present Existing Information

Need to present existing information in forms of relevance to users:

- develop information and products in close consultation with users;
- invest in the ground-based network of primary hydro-meteorological observations;
- establish and improve mechanisms to provide data access and data descriptions.

Even when it's raining data,
there is an information drought.



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GCOS and UN-partners: Workshop on Observations for Adaptation

Conclusions from the Workshop

Common themes regarding observational requirements were the needs:

- for higher spatial and temporal resolution;
- to focus on regions where climate change will have significant effects on key sectors and where there are vulnerable populations;
- to develop infrastructure and governance to support sustained data rescue;
- to support research initiatives such as PROVIA and Future Earth.

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Summary of GCOS` recent Activities

- **Enabling global observations for climate – relating ECVs to energy, water and carbon cycles**
- **GCOS system improvements through the Cooperation Mechanism**
- **GCOS Expert Panels successfully supported by partner programmes (GOOS, WCRP, WMO, IOC of UNESCO), for example: Ocean Observations Panel for Climate**

  - advice/guidance for ocean networks (e.g., TAO)

  - working on future systems, e.g., Tropical Pacific Ocean Observing System

- **GCOS and its UN partners working on observations for adaptation to climate variability and change**

  - WMO-IOC of UNESCO-UNEP Workshop, Offenbach, Germany, February 2013

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Thank you and Credits to:

GCOS Cooperation Mechanism:

Tim Oakley, GCOS Implementation Manager, GCOS Secretariat

Ocean Observations Panel for Climate:

Dr Katy Hill, OOPC, Technical Secretary, GCOS Secretariat

Adaptation Workshop:

Dan Muller, seconded from NOAA in 2013 to GCOS Secretariat

Stefan Rösner, seconded from DWD in 2012/13 to GCOS Secretariat

Anna Mikalsen, Programme Officer, GCOS Secretariat

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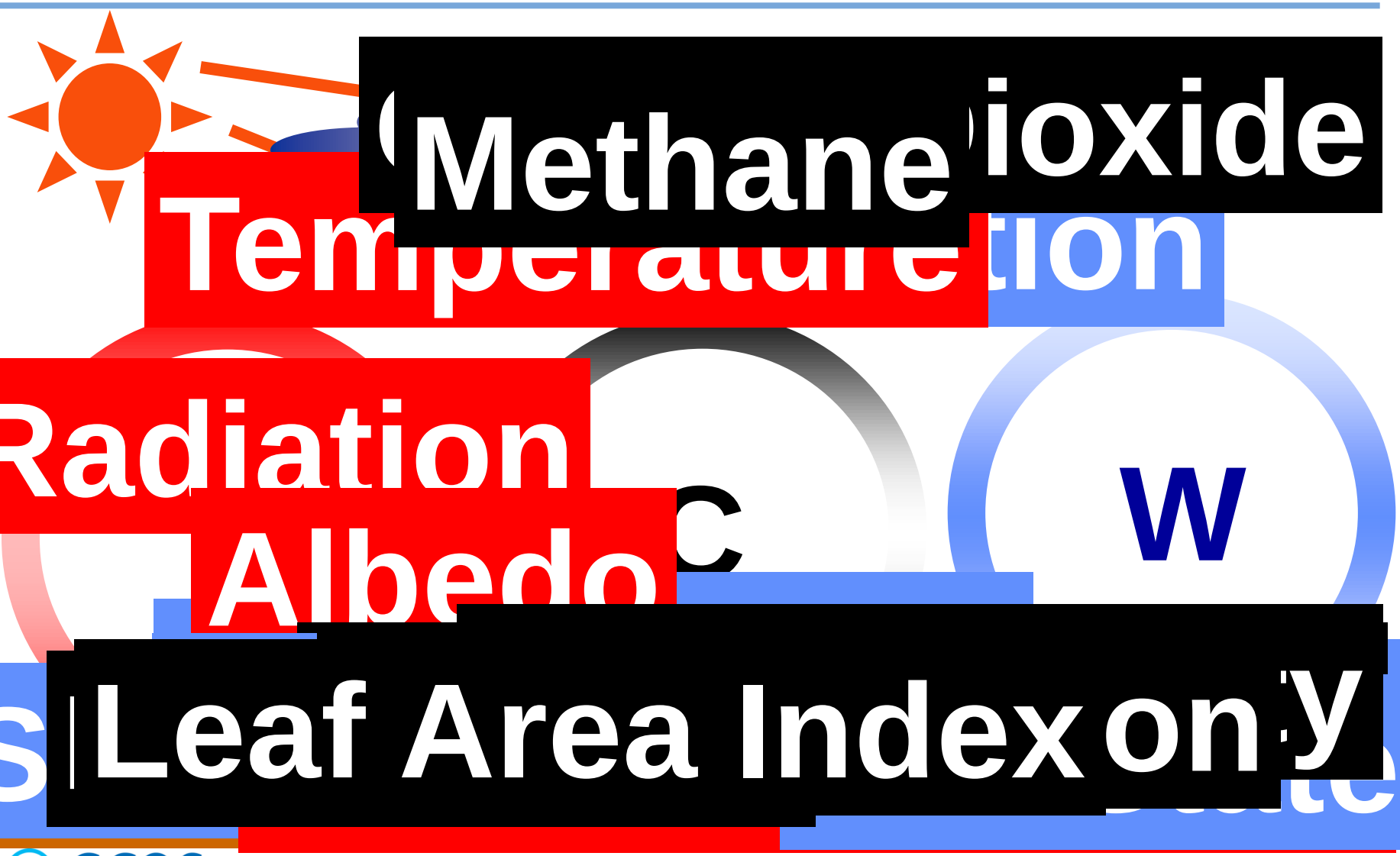
GCOS Essential Climate Variables – ECVs



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Essential Climate Variables

OCEANIC

Surface (10)

- Sea-surface temperature
- Sea-surface salinity
- Sea level
- Sea state
- Sea ice
- Surface current
- Ocean colour
- Carbon dioxide partial pressure
- Ocean acidity
- Phytoplankton

Sub-surface (8)

- Temperature
- Salinity
- Current
- Nutrients
- Carbon dioxide partial pressure
- Ocean acidity
- Oxygen
- Tracers

ATMOSPHERIC

Surface (6)

- Air temperature
- Wind speed and direction
- Water Vapour
- Pressure
- Precipitation
- Surface radiation budget

Upper-air (5)

- Temperature
- Wind speed and direction
- Water Vapour
- Cloud properties
- Earth radiation budget (incl. solar irradiance)

Composition (5)

- Carbon dioxide
- Methane
- Other long-lived greenhouse gases
- Ozone, supported by its precursors
- Aerosol, supported by its precursors

TERRESTRIAL

Biological/Ecological/Other (7)

- Land Cover
- FAPAR
- Leaf area index
- Above ground biomass
- Soil carbon
- Fire disturbance
- Albedo

Hydrological (5)

- River discharge
- Water use
- Ground water
- Lakes
- Soil moisture

Cryospheric (4)

- Snow cover
- Glacies and ice caps
- Ice sheets
- Permafrost

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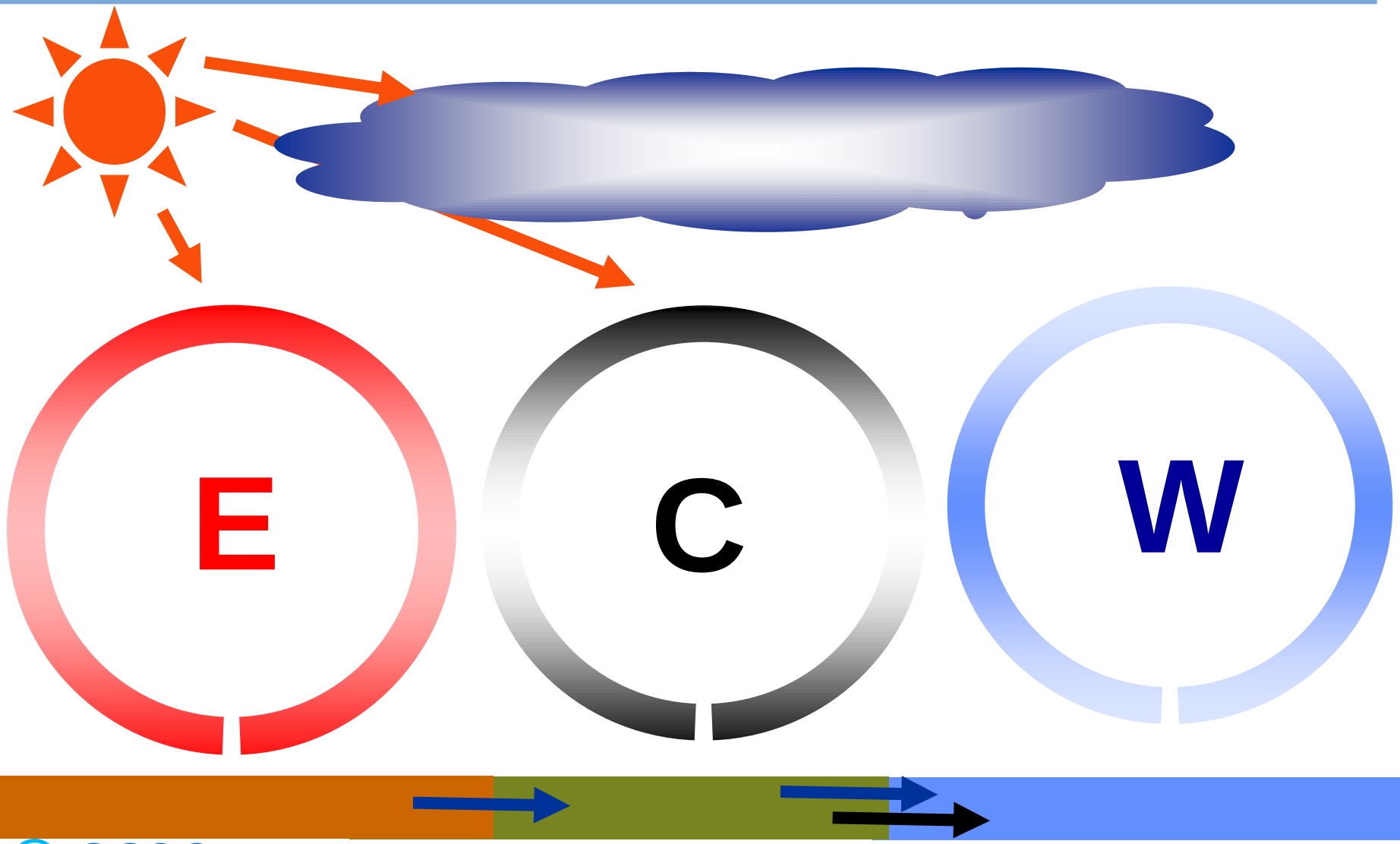
GCOS: Energy-, Carbon-, Water- Cycles



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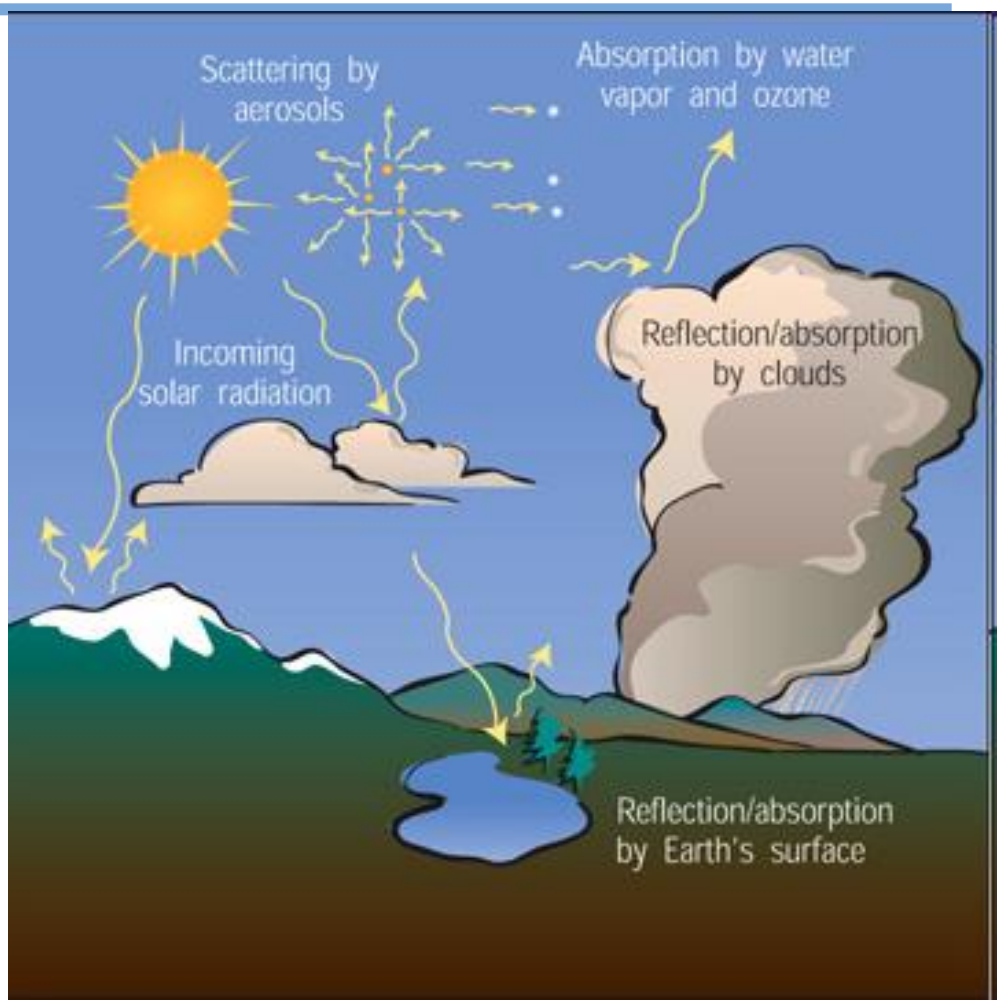
Energy cycle is a process where by energy from the sun is taken up by plants which absorbs the energy in their chloroplast. Plants collect energy from the sun and use carbon dioxide



Credit: public domain PNG image

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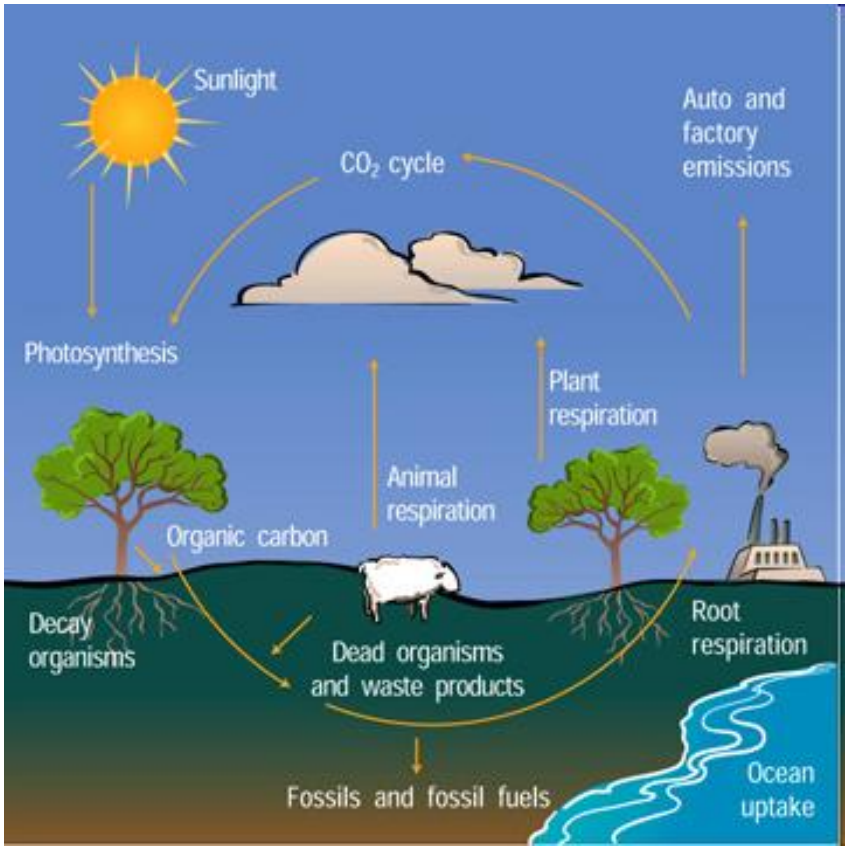
The carbon cycle is one of the major biogeochemical cycles describing the flow of essential elements from the environment to living organisms and back to the environment again. This process is required for the building of all organic compounds and involves the participation of many of the earth's key forces. The carbon cycle has affected the earth throughout its history; it has contributed to major climatic changes, and it has helped facilitate the evolution of life.



Credit:NCAR

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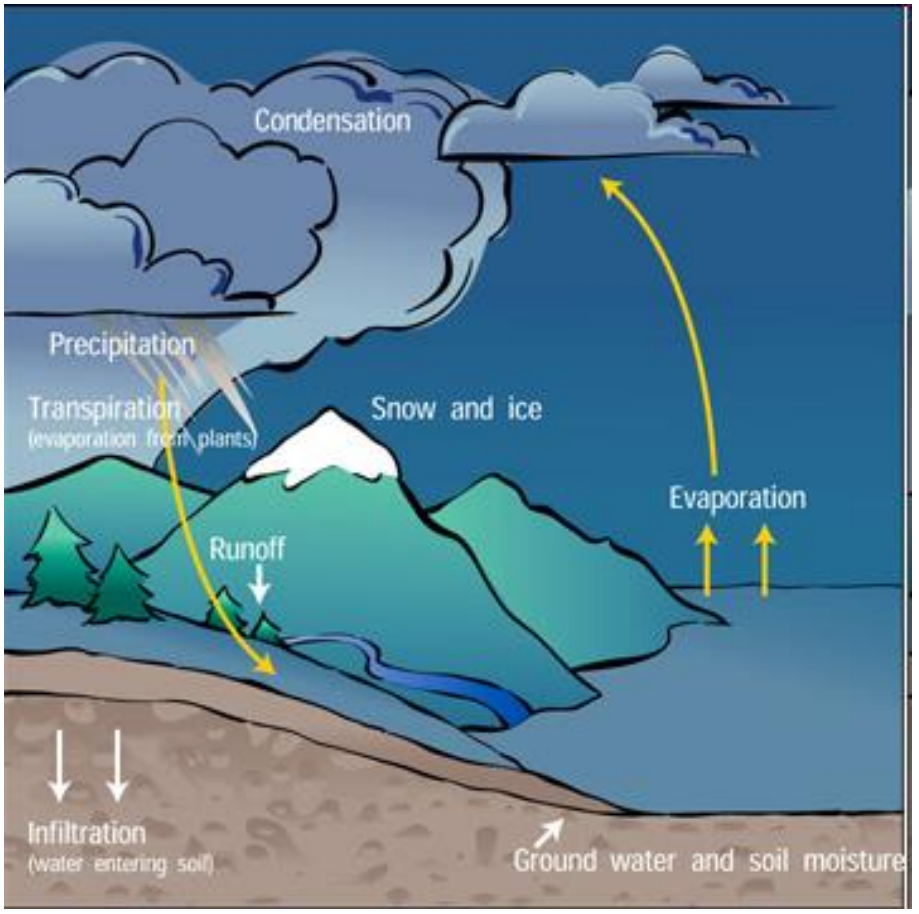
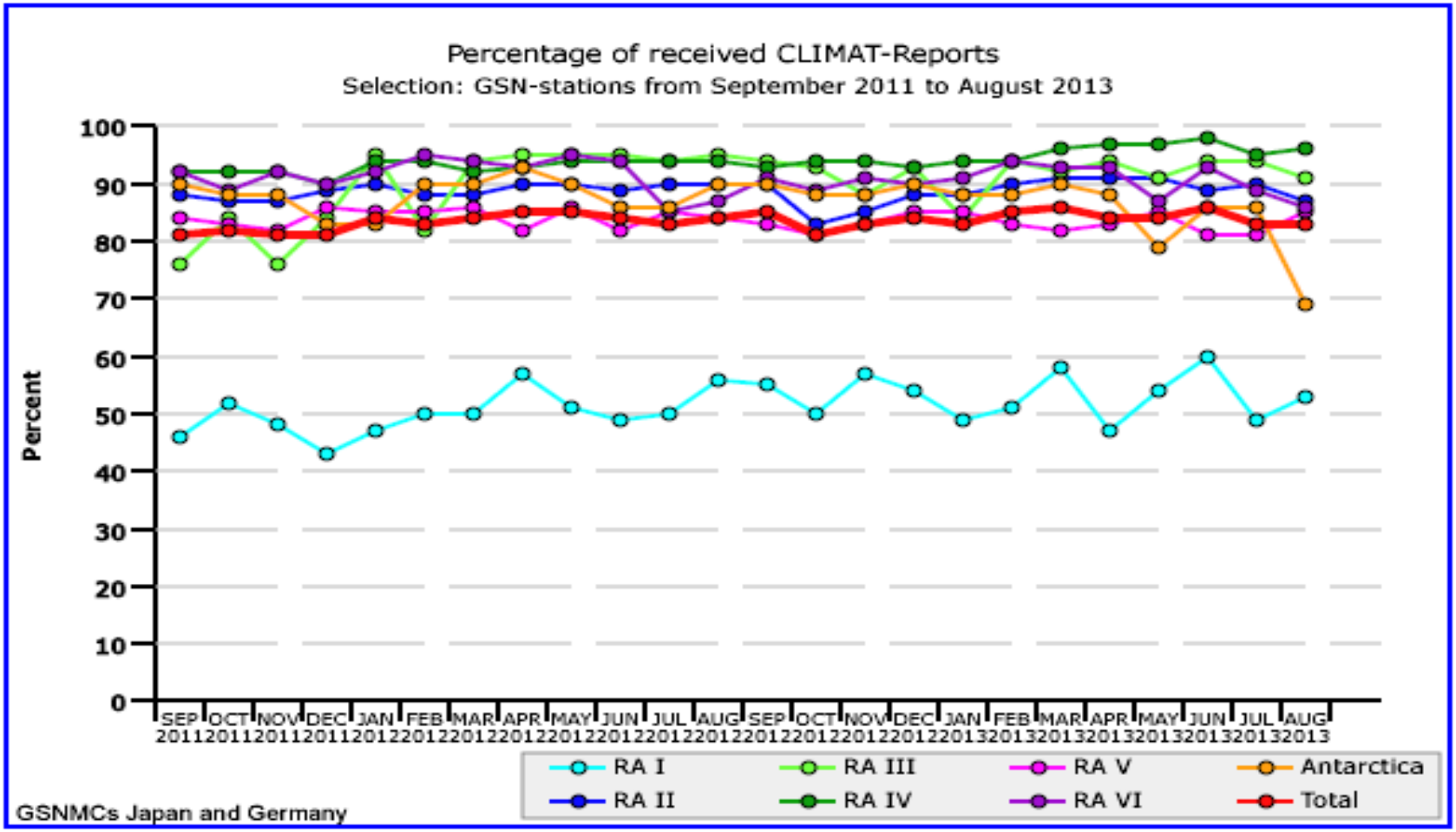
Water cycle is a cycle of evaporation and condensation that controls the distribution of the earth's water as it evaporates from bodies of condenses, water, precipitates, and returns



DWD Monitoring 2012



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GCOS Cooperation Mechanism - ECMWF Monitoring & NCEP