Introduction

Global Climate Observing System (GCOS)

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Chairman, GCOS Steering Committee

GCOS Workshop, in collaboration with UNFCCC and IPCC

10 – 12 February 2015, Bonn

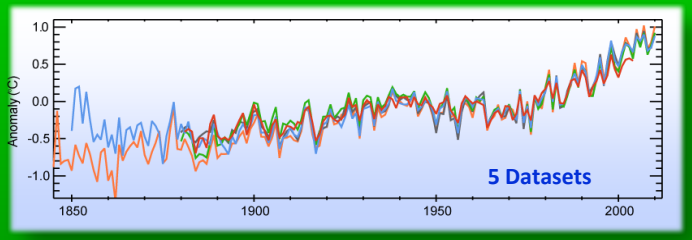
GCOS GLOBAL CLIMATE OBSERVING SYSTEM

WMO UNESCO IOC UNEP ICSU International Council for Science

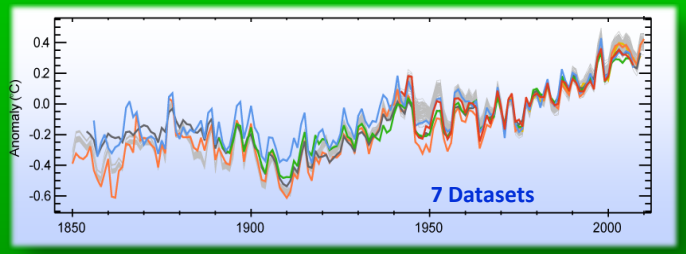
The Importance of Climate Observations- surface temperatures

Observations made in the past have unequivocally demonstrated that the climate system is warming.

Land Surface Air Temperature



Sea Surface Temperature



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Climate observations must be enhanced and continued into the future, to enable users to.....

detect further climate change and determine its causes.

model and predict the climate system.

Climate observations must be enhanced and continued into the future, to enable users to.....

assess impacts of climate variability and change.

monitor the effectiveness of policies for mitigation climate change.

Climate observations must be enhanced and continued into the future, to enable users to.....

support adaptation to climate change.

develop climate information services.

promote sustainable national and economic development.

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Climate observations must be enhanced and continued into the future, to enable users to.....

meet other requirements of the UNFCCC and other international concventions and agreements.

UNFCCC Convention May 1992

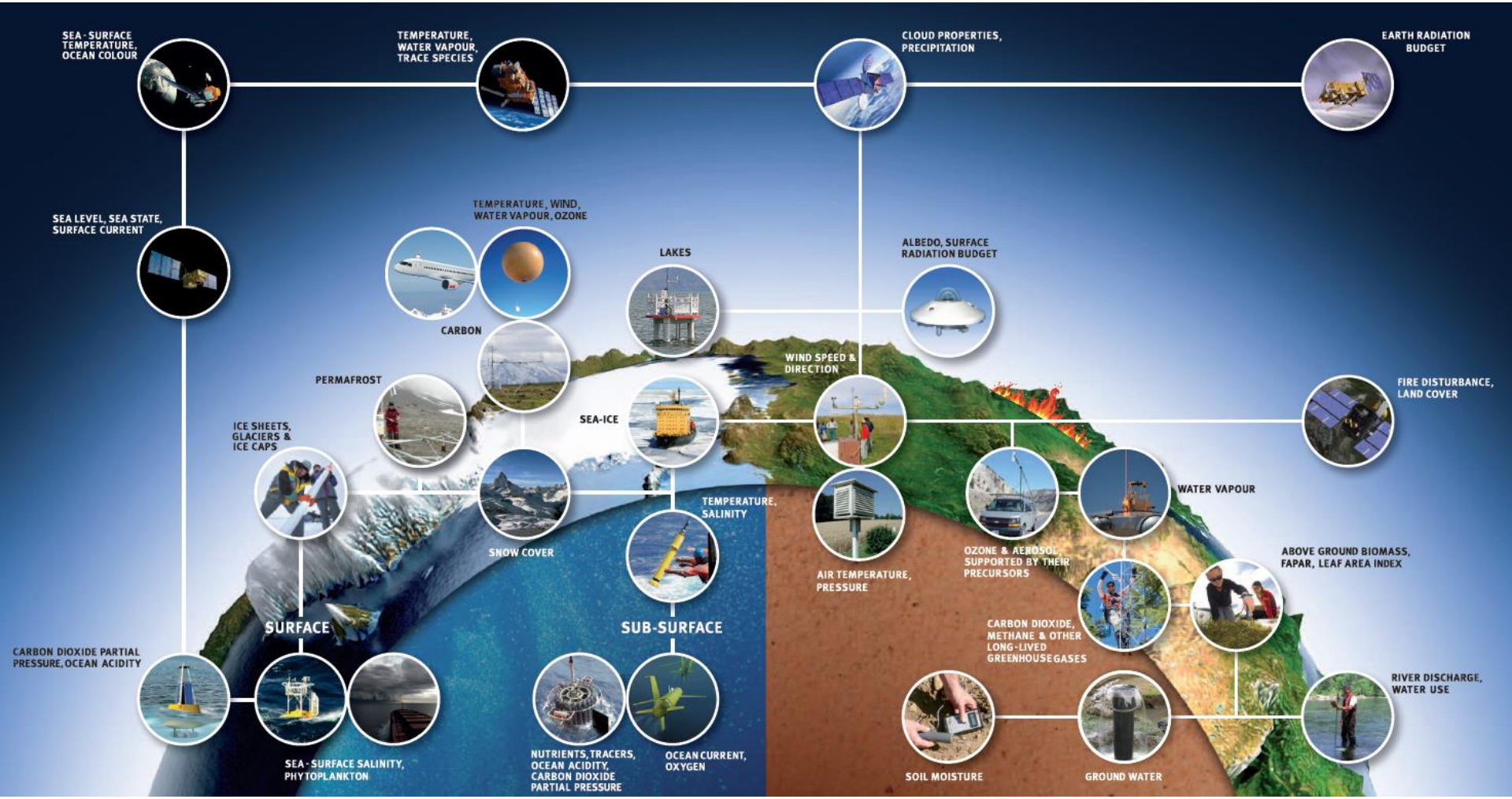
Article 4 Commitments

- All Parties shall: 1(g) Promote and cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives related to the climate system…….

Article 5 Research and Systematic Observations

- In carrying out their commitments under Article 4, paragraph 1(g), the Parties shall: (a) Support and further develop…programs and networks or organizations aimed at defining, conducting, assessing and financing research, data collection and systematic observation, taking into account the need to minimize duplication of effort; (b) Support international and intergovernmental efforts to strengthen systematic observation …. particularly in developing countries, and to promote access to, and the exchange of, data and analyses thereof……

Coordination of Climate Observing Systems



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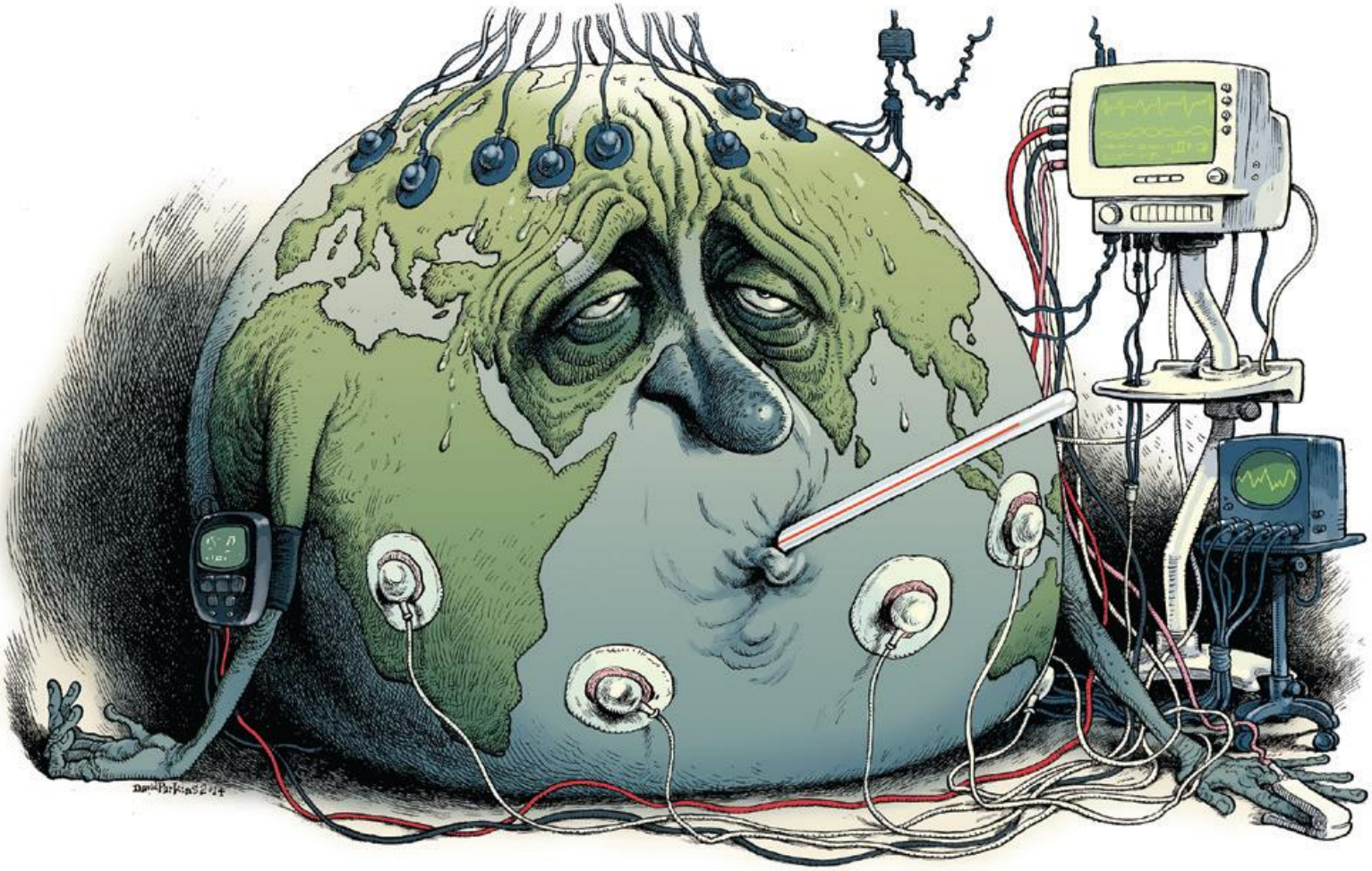

Credit: Victor & Kennel, Nature Climate Change, 2014.

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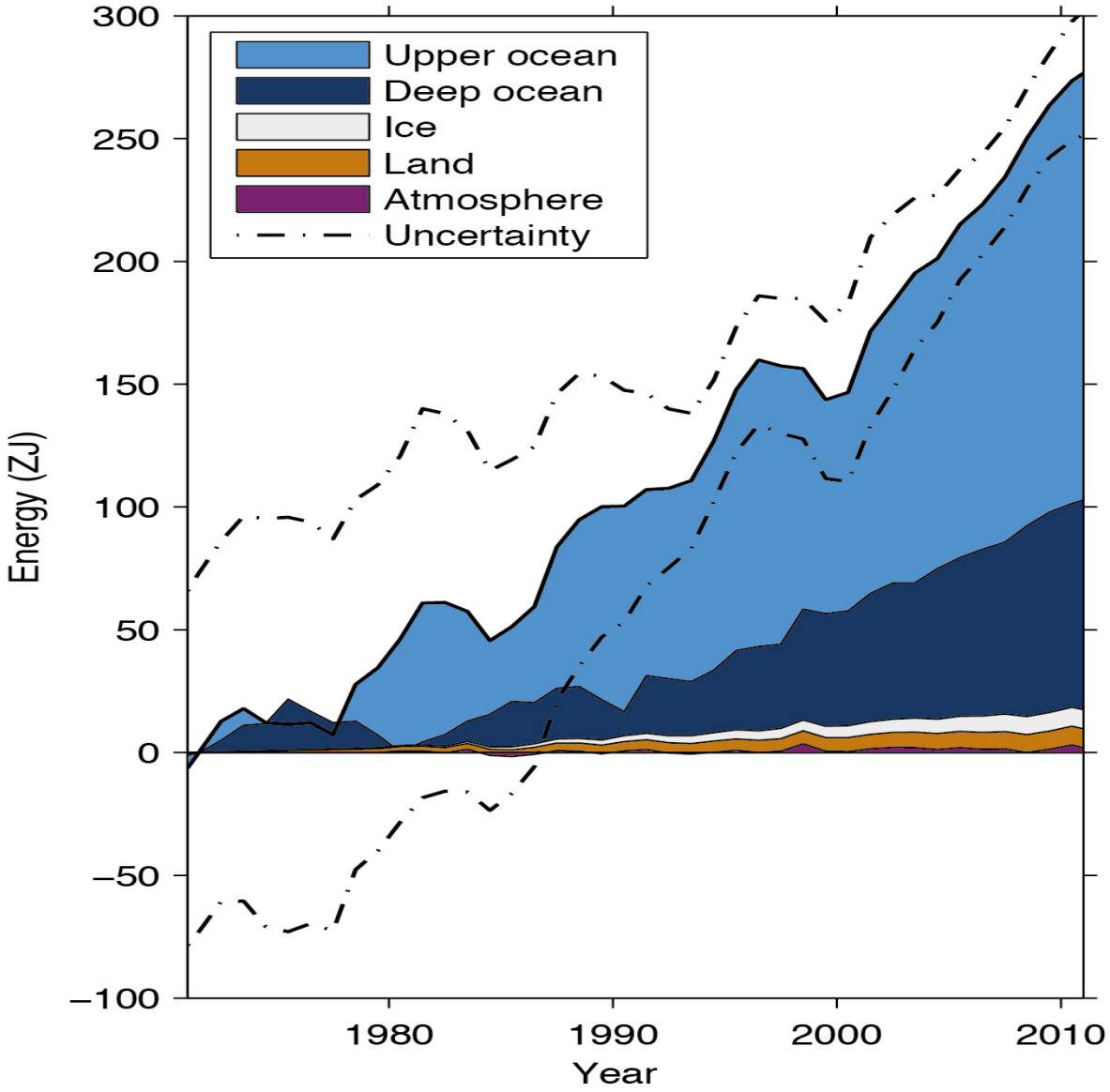
The Importance of Climate Observations – total energy content



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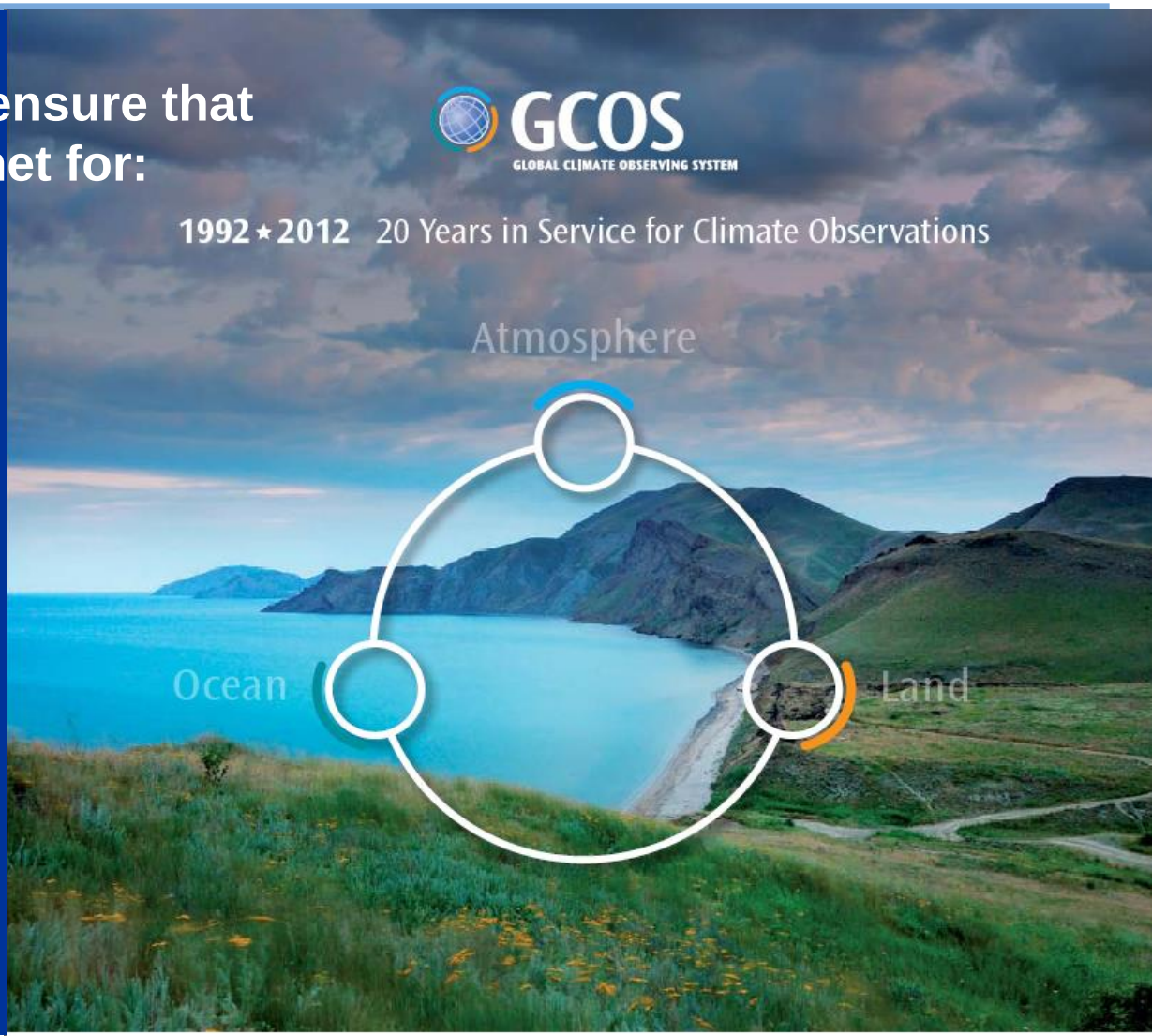
Objectives of the GCOS Programme

GCOS was set up to help ensure that observational needs are met for:

- monitoring
- research
- applications

GFCS now provides the organisational basis for the service element.



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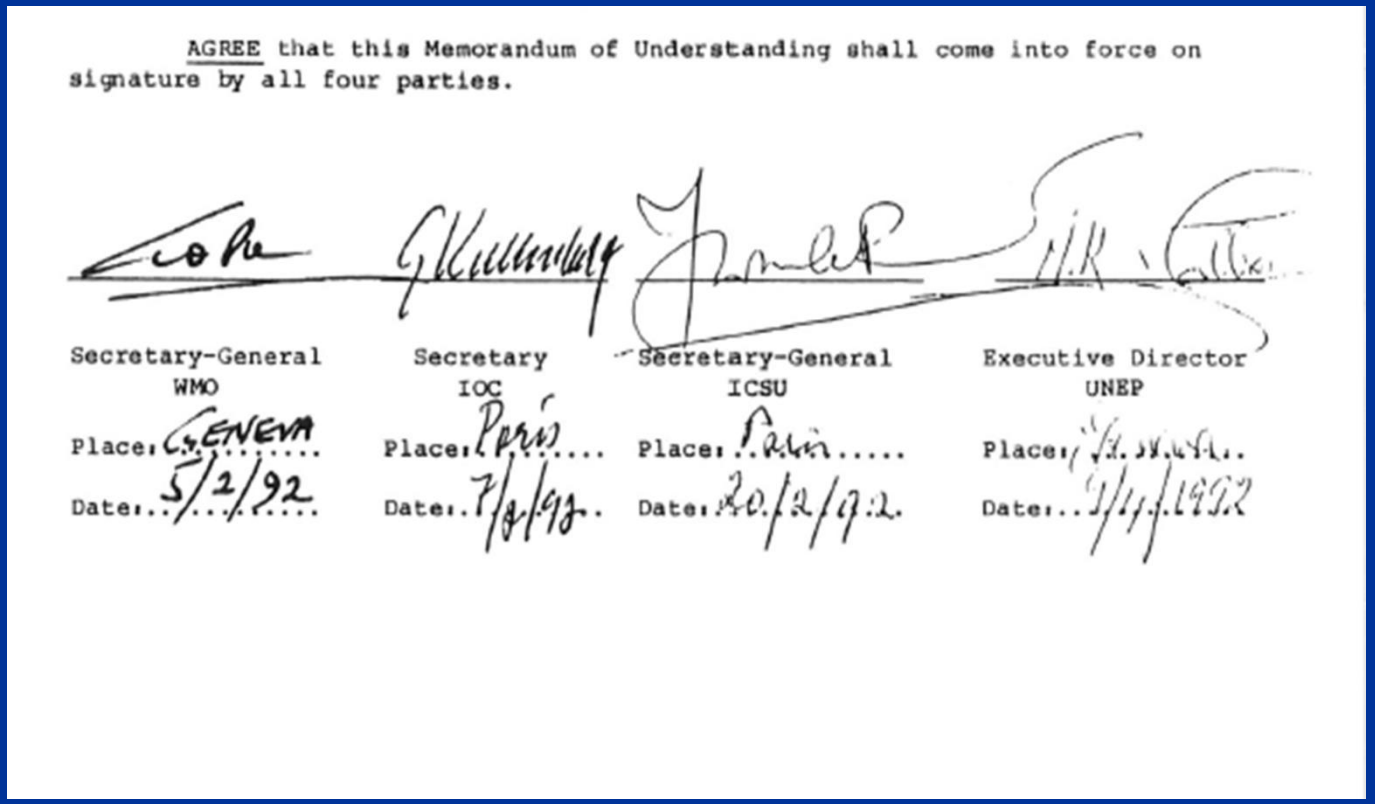
GCOS Memorandum of Understanding



AGREE that this Memorandum of Understanding shall come into force on signature by all four parties.

Secretary-General WMO	Secretary IOC	Secretary-General ICSU	Executive Director UNEP
Place: GENEVA	Place: Paris	Place: Paris	Place:
Date: 5/2/92	Date: 7/8/92	Date: 20/2/92	Date: 9/4/1992

This MoU defines the rationale for the establishment of GCOS and its purpose, concept of operation, governance and financial arrangements.

Signed on 9. April 1992 by WMO, IOC, ICSU and UNEP; updated in 1998

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Status
Achievements & Expert Panels

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Overview of atmospheric products

Essential Climate Variable (ECV)	Global Products
Wind Speed and Direction	Surface wind retrievals
Precipitation	Estimates (liquid & solid)
Upper-air Temperature	Temperature retrievals
Upper-air Winds	Upper-air wind retrievals
Water Vapour (Trop., strat.)	Total column, profiles
Cloud Properties	Amount, top P & T, etc.
Earth Radiation Budget	TOA/Surf. ERB, irradiance
CO_2, CH_4 and other GHGs	GHG retrievals (regional)
Ozone	Total column, profiles
Aerosol Properties	Optical depth, albedo, etc.
Precursors of O_3 & Aerosols	Retrievals of precursors, e.g. NO_2, SO_2, HCHO & CO

Table credit of: J.-L. Fellous, CEOS WGClimate, Asheville, NC, USA

GCOS Surface Network (GSN)

Air Temperature, Pressure
Water Vapour
Wind speed and direction
Radiation Budget

GCOS Reference Upper-Air Network (GRUAN)

New network, hybrid observing system composed out of research and operational sites.

Monitoring of vertical profiles of atmospheric ECVs.

GCOS • GOOS • WCRP
OOPC Ocean Observations Panel for Climate

Overview of oceanic products

Essential Climate Variable (ECV)	Global Products
Sea-surface Temperature	Integrated SST analyses based on satellite and *in situ* data records
Sea-surface Salinity	Datasets for research on sea-surface salinity
Sea Level	Sea level global mean and regional variability
Sea State	Wave height, other measures of sea
Sea Ice	Sea-ice concentration, extent, edge, supported by thickness & drift
Ocean color	Ocean radiometry, Chl-a

Table credit of: J.-L. Fellous, CEOS WGClimate, Asheville, NC, USA

Surface ECVs from in-situ systems only:

Current, Ocean acidity,
Carbon dioxide partial pressure, Phytoplankton

Sub-Surface ECVs from in-situ systems only:

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

Deep Ocean Strategy

Explore the «Blue Planet»

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TOPC Terrestrial Observation Panel for Climate

Overview of terrestrial products

Essential Climate Variable (ECV)	Global Products
Lakes	**Lake levels, areas**
Snow Cover	**Snow areal extent, SWE**
Glaciers and Ice Caps	**2D vector outlines, DEM**
Ice Sheets	**Elevation changes**
Albedo	**BRDF**
Land Cover	**Moderate/High res. maps**
FAPAR	**Maps**
LAI	**Maps**
Biomass (Forest)	**Regional, above ground**
Fire Disturbance	**Maps, burnt areas/active**
Soil Moisture	**Maps**
(***Land surface Temperature***)	***Temperature records***

ECVs from in-situ systems only:

Soil Carbon, River discharge, Water Use, Ground Water, Permafrost

International Surface Temperature Initiative (ISTI)

www.surfacetemperatures.org

Explore the «White Continent»

Table credit of: J.-L. Fellous, CEOS WGClimate, Asheville, NC, USA

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Plans (2014 – 2016)

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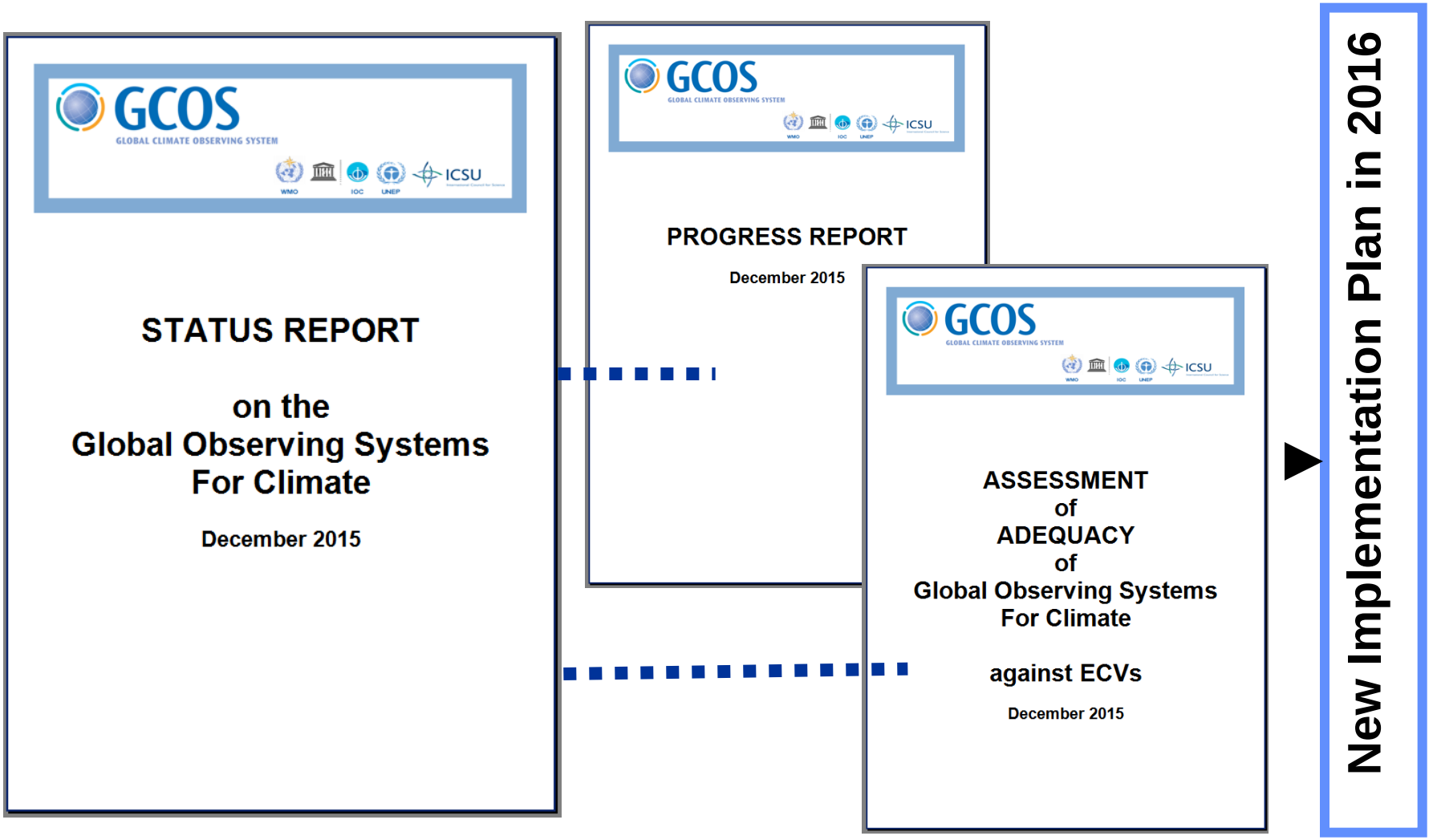
Next Status Report and New Implementation Plan



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