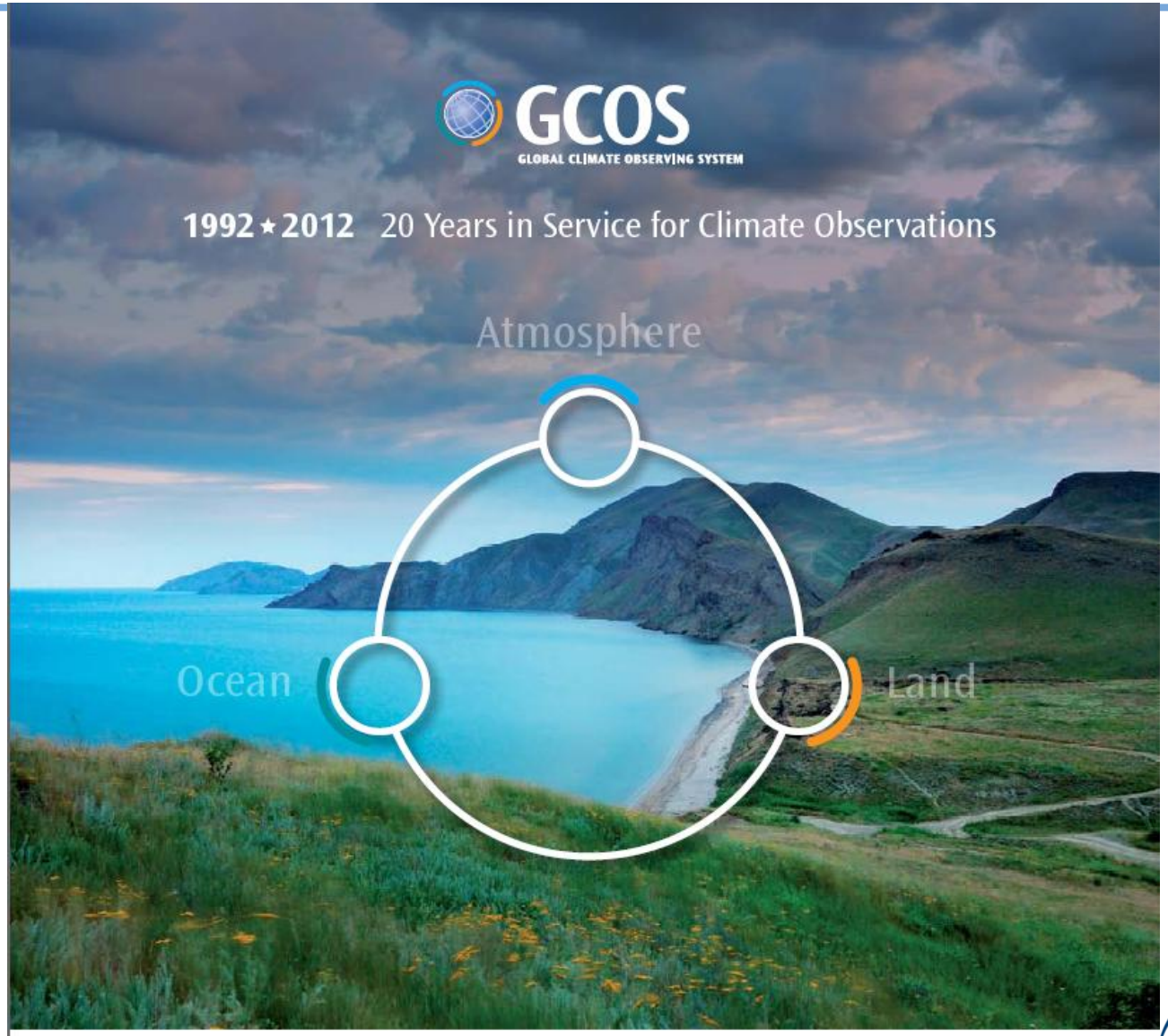
Bericht des GCOS Sekretariats

1. GCOS Rundtisch in Austria
28 September 2012

Carolin Richter, Direktorin, GCOS Secretariat,
c/o WMO, Genf, Schweiz

Concept of the Global Climate Observing System



GCOS
GLOBAL CLIMATE OBSERVING SYSTEM

WMO IOC ICSU UNEP

ICSU
International Council for Science

Scope of GCOS

GCOS encompasses the climate components of:

- the **WMO observing systems (WIGOS: GOS, GAW, WHYCOS, ...)**
- the **IOC-led co-sponsored Global Ocean Observing System (GOOS)**
- the **FAO-led co-sponsored Global Terrestrial Observing System (GTOS)**
- observational elements of **research programmes** (**WCRP**, IGBP, ...)
- other systems contributing climate observations, data management or products

which together form our overall global observing system for climate, and the climate-observing component of the GEO System of Systems

The GCOS programme:

- assesses and communicates overall requirements
- advises on implementation and reporting
- reviews and promotes progress

covering the observations, transmission and management of data, establishment of fundamental climate data records and the formation of products from them

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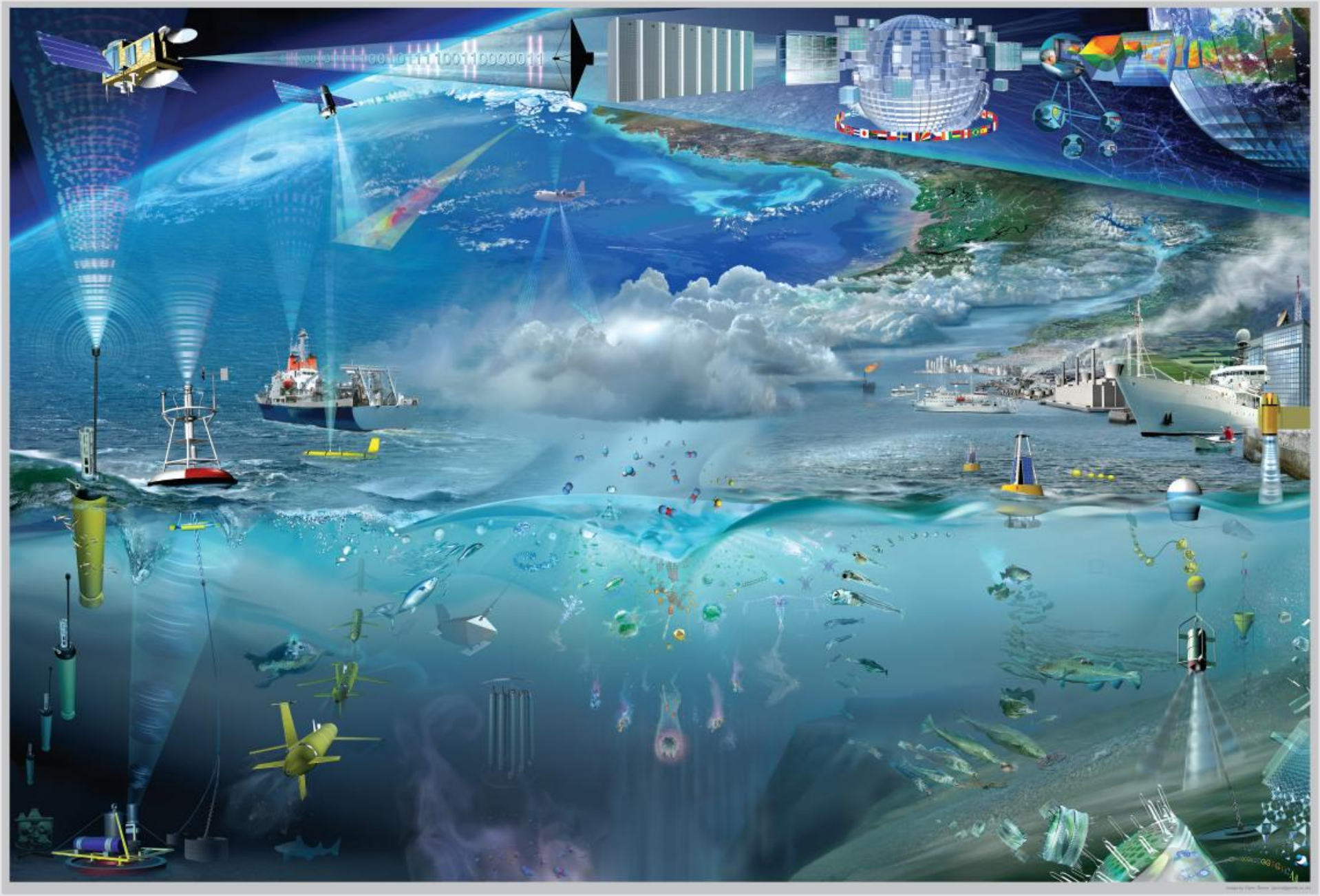
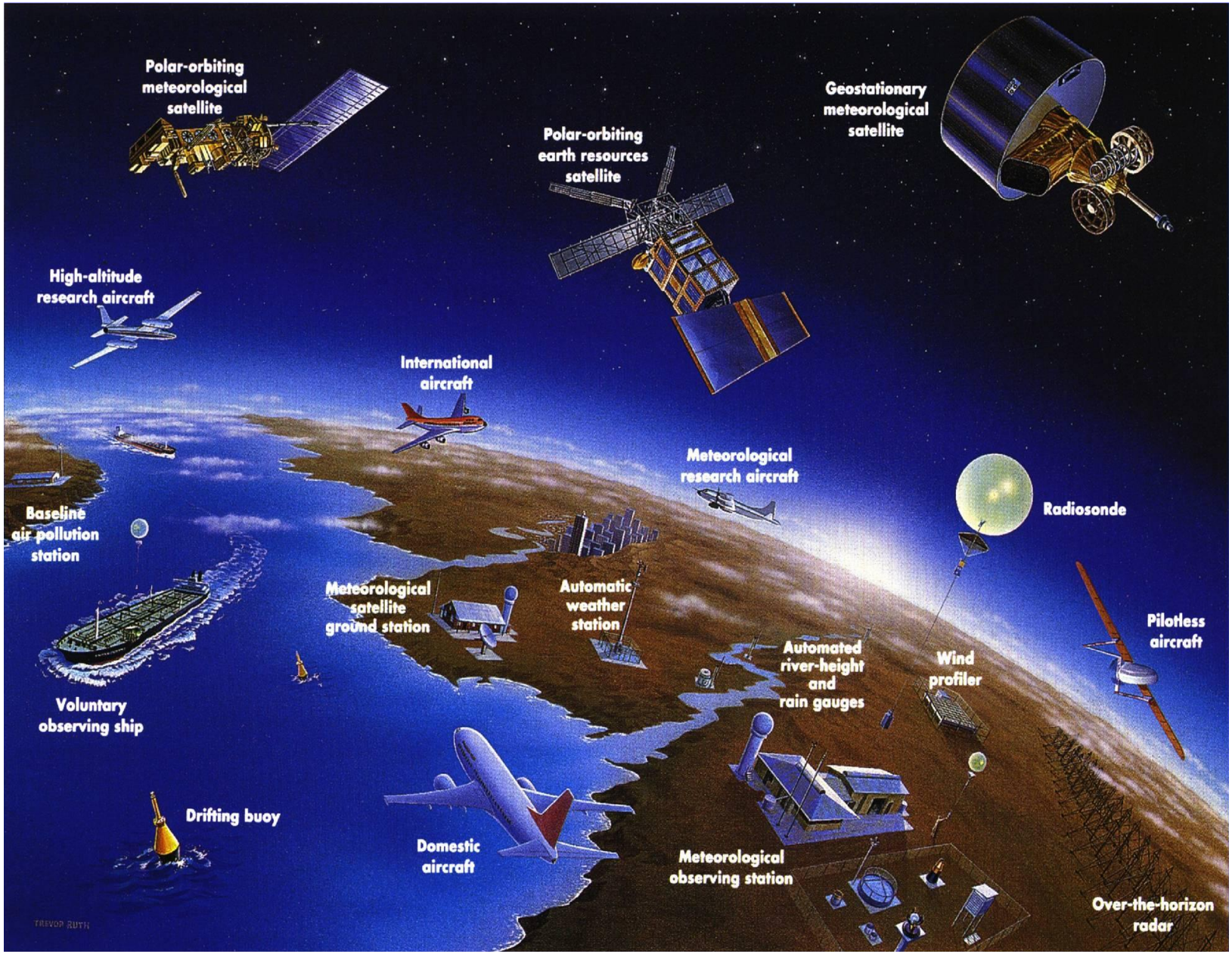


UNESCO ICSU UNEP WMO IOC

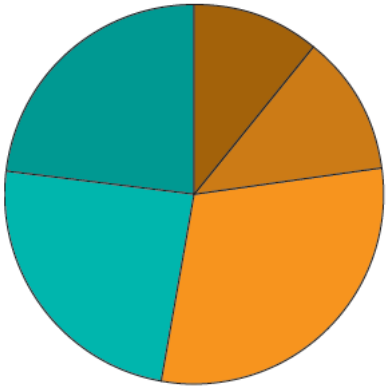
GLOBAL OCEAN OBSERVING SYSTEM www.ioc-goos.org

GOOS

Integrated Global Climate Observing System



How well are we doing in implementing a global observing system for climate ?



- Low progress or no progress at all: 11%
- Moderate-to-low progress: 12%
- Moderate progress: 30%
- Good-to-moderate progress: 24%
- Good progress: 23%

The 2004 Implementation Plan detailed a total of 131 actions, and the 2009 Progress Report listed the status of these actions: good progress, 23%; good-to-moderate progress, 24%; only moderate progress, 30%; moderate-to-low progress, 12%; and low progress or no progress at all, 11%.

Cost estimates for the Global Climate Observing System

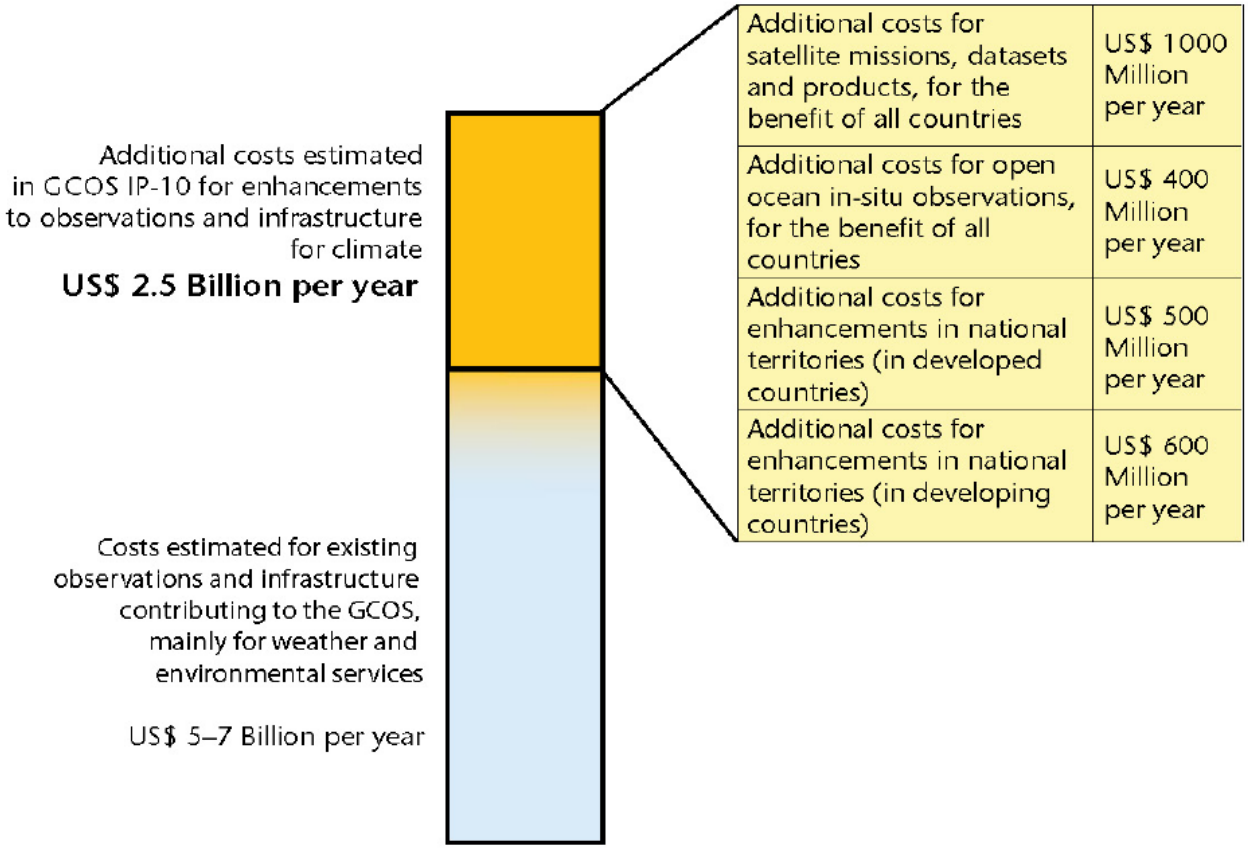


Figure 1: Estimates of the additional annual costs of implementing the IP-10 Actions (in orange), compared to estimates of total annual costs for existing observations and infrastructure contributing to GCOS (in blue).

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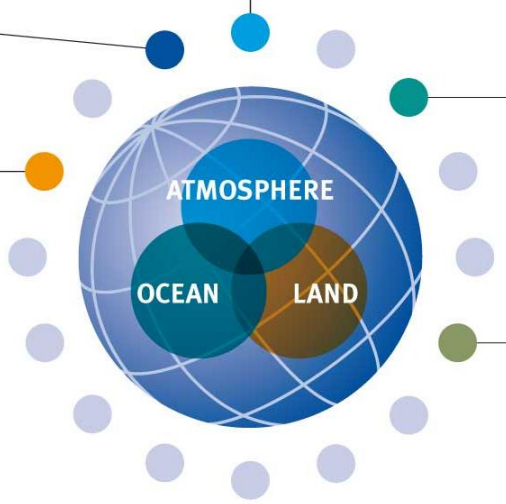
GCOS Continuous Improvement and Assessment Cycle



What needs to be measured?

Essential Climate Monitoring Variables (ECVs)
Implementation Plan

How to do it?

Climate Monitoring Principles
Guidelines for Datasets and Products
Regional Action Plans

By whom/by which means?

Space Agencies

Network Owners
Meteorological Service, Hydrological Service, Research Organizations, and other institutions

Data and Analysis Centres

Where are we now?

Progress Report

How to improve the system?

New Networks

Research
WCRP, IGBP

National Coordination

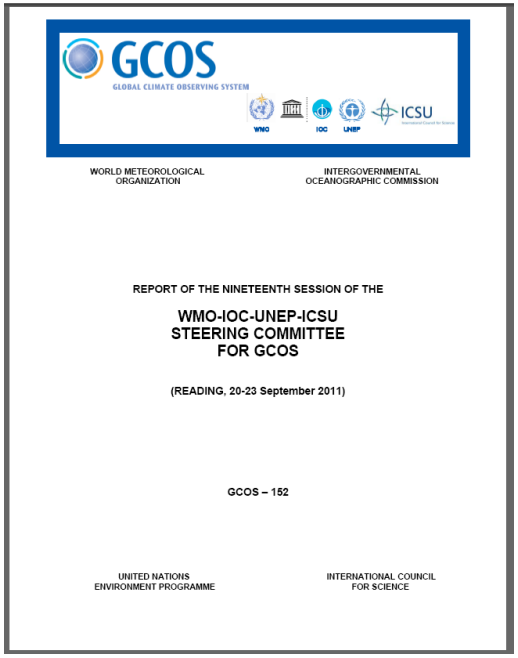
GCOS Cooperation Mechanism

Contributing Systems
Global Terrestrial Observing System,
Global Ocean Observing System,
WMO Integrated Global Observing System,
and others

GCOS
GLOBAL CLIMATE OBSERVING SYSTEM

WMO UNESCO IOC UNEP ICSU International Council for Science

Core activities
Steering Committee, Panels and GCM Board


GCOS
GLOBAL CLIMATE OBSERVING SYSTEM
WMO IOC UNEP ICSU
WORLD METEOROLOGICAL ORGANIZATION
INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
REPORT OF THE NINETEENTH SESSION OF THE
WMO-IOC-UNEP-ICSU
STEERING COMMITTEE
FOR GCOS
(READING, 20-23 September 2011)
GCOS – 152
UNITED NATIONS ENVIRONMENT PROGRAMME
INTERNATIONAL COUNCIL FOR SCIENCE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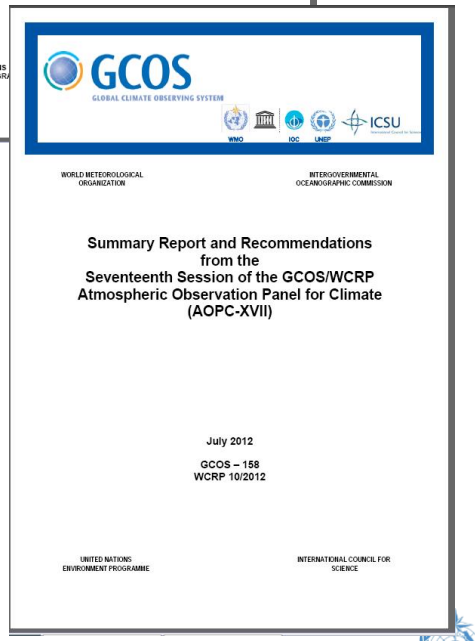
WORLD METEOROLOGICAL ORGANIZATION
INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
REPORT OF THE SEVENTH MEETING OF THE
GCOS COOPERATION MECHANISM BOARD
(READING, 19 September 2011)
GCOS – 151
UNITED NATIONS ENVIRONMENT PROGRA

- 20th Session of the GCOS Steering Committee, WMO, Geneva, Switzerland, 4-7 Sep 2012.
- **Next: SC-21, Sep/Oct 2013**
- 8th Meeting of the GCM Board, Geneva, WMO, 3 Sep 2012. **Next: 9th GCM Board, May 2013 in conjunction with UNFCCC SBSTA38.**

- 14th Session of the GCOS/GTOS/WCRP Terrestrial Observation Panel for Climate (TOPC) Geneva, Switzerland, 1-2 March 2012. **Next: 15th TOPC 7-8 March 2013**
- 17th Sessions of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC), Geneva, Switzerland, 30 April - 3 May 2012. **Next: 18th AOPC 2-5 April 2013**


GCOS
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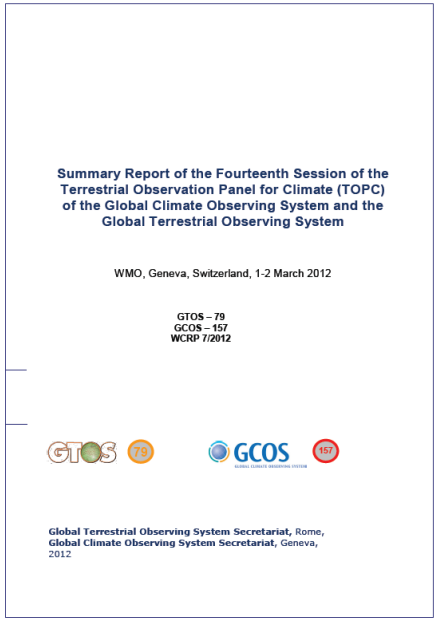
WORLD METEOROLOGICAL ORGANIZATION
INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
Summary Report and Recommendations
from the
Seventeenth Session of the GCOS/WCRP
Atmospheric Observation Panel for Climate
(AOPC-XVII)
July 2012
GCOS – 158
WCRP 10/2012
UNITED NATIONS ENVIRONMENT PROGRAMME
INTERNATIONAL COUNCIL FOR SCIENCE


Summary Report of the Fourteenth Session of the Terrestrial Observation Panel for Climate (TOPC) of the Global Climate Observing System and the Global Terrestrial Observing System
WMO, Geneva, Switzerland, 1-2 March 2012
GTOS – 79
GCOS – 157
WCRP 7/2012
GTOS 79 GCOS 157
Global Terrestrial Observing System Secretariat, Rome,
Global Climate Observing System Secretariat, Geneva,
2012

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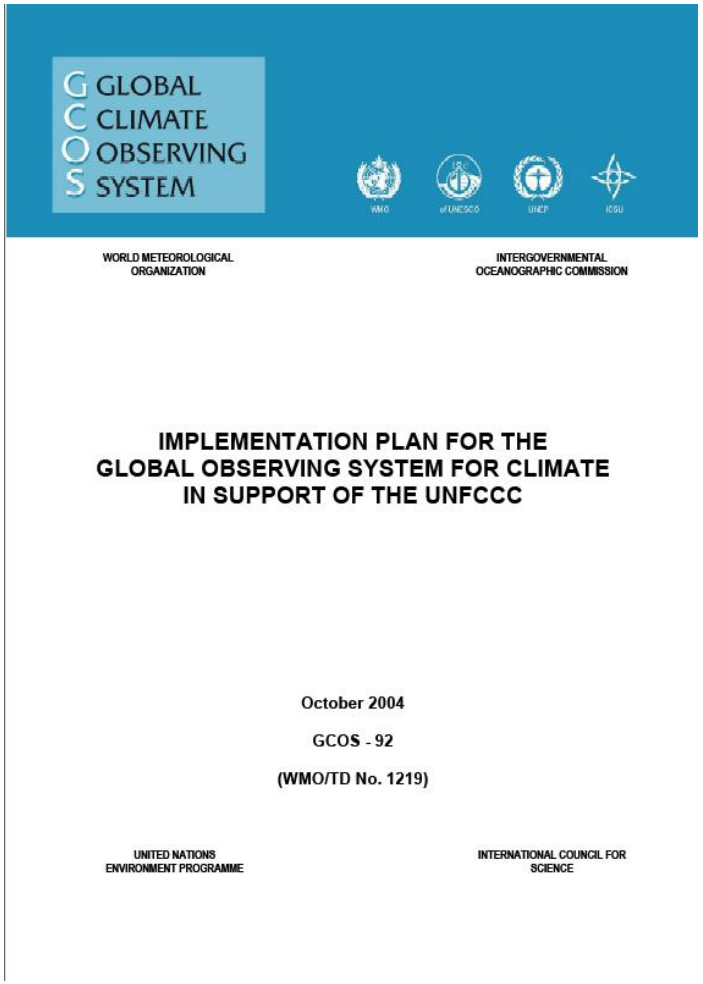
What needs to be measured ?
How to do it ?


GLOBAL CLIMATE OBSERVING SYSTEM

WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

IMPLEMENTATION PLAN FOR THE GLOBAL OBSERVING SYSTEM FOR CLIMATE IN SUPPORT OF THE UNFCCC

October 2004

GCOS - 92

(WMO/TD No. 1219)

UNITED NATIONS ENVIRONMENT PROGRAMME

INTERNATIONAL COUNCIL FOR SCIENCE

Implementation Plan up-date in August 2010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WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

IMPLEMENTATION PLAN FOR THE GLOBAL OBSERVING SYSTEM FOR CLIMATE IN SUPPORT OF THE UNFCCC

(2010 UPDATE)

August 2010

GCOS-138

(GOOS-184, GTOS-76, WMO-TD/No. 1523)

UNITED NATIONS ENVIRONMENT PROGRAMME

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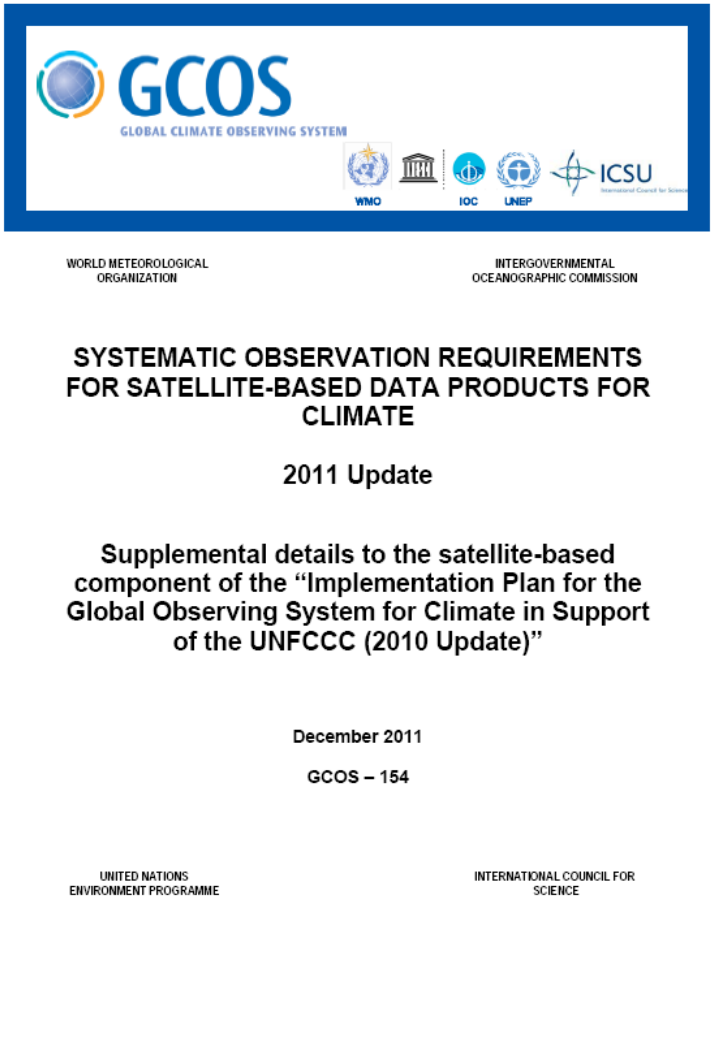
International Council for Science

What needs to be measured ?
How to do it ?



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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

SYSTEMATIC OBSERVATION REQUIREMENTS FOR SATELLITE-BASED DATA PRODUCTS FOR CLIMATE

2011 Update

Supplemental details to the satellite-based component of the "Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC (2010 Update)"

December 2011

GCOS – 154

UNITED NATIONS ENVIRONMENT PROGRAMME

INTERNATIONAL COUNCIL FOR SCIENCE

Satellite Supplement up-date in January 2011

Climate Monitoring Principles Guidelines for Datasets and Products

GLOBAL CLIMATE OBSERVING SYSTEM

WMO of UNESCO UNEP ICSU

WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRA

Guideline for the Generation of Satellite-based Datasets and Prod meeting GCOS Requirements

March 2009

GCOS-128
(WMO/TD No. 1488)

UNITED NATIONS ENVIRONMENT PROGRAMME

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WORLD METEOROLOGICAL ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

Guideline for the Generation of Datasets and Products Meeting GCOS Requirements*

*An update of the "Guideline for the Generation of Satellite-based Datasets and Products meeting GCOS Requirements" (GCOS-128, WMO/TD-No. 1488), including *in situ* datasets and amendments

May 2010

GCOS-143
(WMO/TD No. 1530)

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Monitoring Principles

GCOS CLIMATE MONITORING PRINCIPLES

BASIC PRINCIPLES

1. Assess changes before implementation
2. Overlap of new and old systems
3. Meta-data important
4. Quality data on extreme events
5. Meet needs of IPCC etc
6. Uninterrupted station observations
7. Priority for data-poor regions
8. Specify long-term requirements
9. Promote research to operational transition
10. User-friendly data management systems

SATELLITE SYSTEMS

11. Constant sampling within diurnal cycle
12. Overlap of new and old systems
13. Continuity through launch strategies etc
14. Pre-launch instrument calibration
15. On-board calibration
16. Sustain operational climate products
17. Data systems for user access
18. Keep baseline instruments as long as possible
19. Complementary in situ baseline observations
20. Identify random errors and biases.

Essential Climate Variables - ECVs

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

Composition (3)

- Carbon dioxide
- Methane and other long-lived greenhouse gases
- Ozone and Aerosol supported by their precursors

Upper-air (5)

- Temperature
- Wind speed and direction
- Water vapour
- Cloud properties
- Earth radiation budget (including solar irradiance)

Surface (6)

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

TERRESTRIAL

Biological/Ecological (6)

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

Hydrological (5)

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

Cryospheric (4)

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

Other (1)

- Albedo

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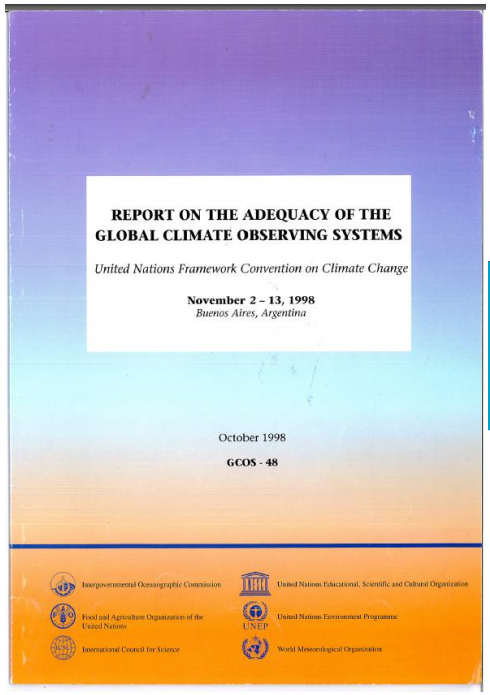
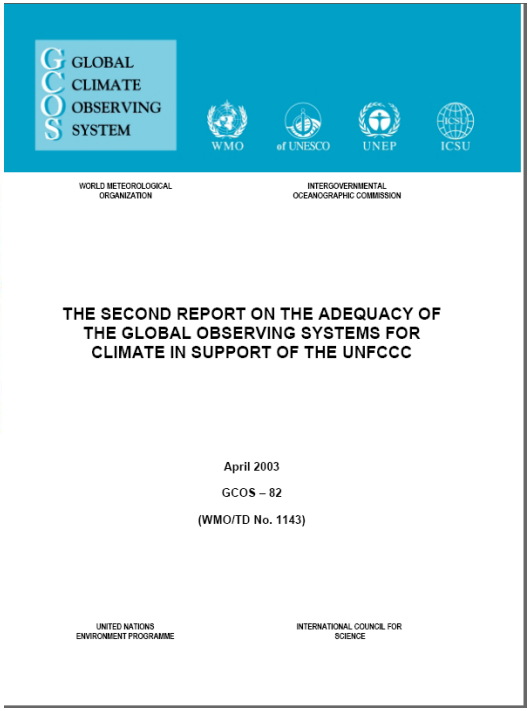
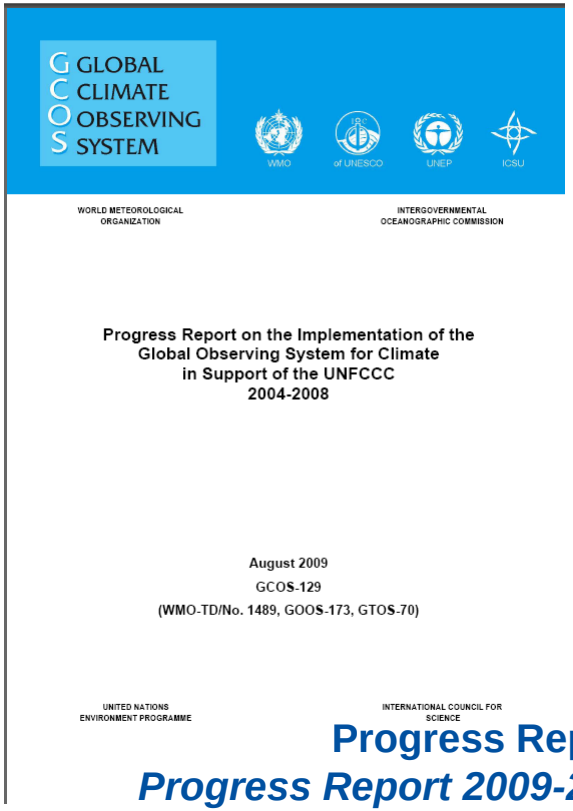
Where are we now ?







Progress Report 2004-2008

Progress Report 2009-2013 (available 2014/2015)

Report on the Adequacy of the GCOS, 1998

Second Report on the Adequacy of the GCOS, 2003

Third Report on the Adequacy, (?) 2014/2015

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Where are we now ?

Where can you get your data ?

www.GOSIC.org
(acts as data access service)

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Where are we (GCOS) now ?

We know quantitatively and qualitatively about the adequacy of climate networks and the availability of climate data records.

We know about how well the GCOS`« agents of implementations » made progress in following the recommended actions of the Implementation Plan and its Satellite Supplement.

We know how much it would cost to observe all required ECVs.

We achieved that space agencies respond to GCOS` plans and even take them into account for their systems planning.

We achieved that National Meteorological Services giving high priority to operation of GCOS Surface Stations and the GCOS Upper-Air Stations.

We achieved that Governments represented by their delegations to the UN Framework Convention for Climate Change acknowledge GCOS reports and findings.

We are managing a significant system improvement trust fund which enables us to renovate climate stations which are not operational anymore.

GCOS – Outreach
(Brochures published in 2010 - 2011)

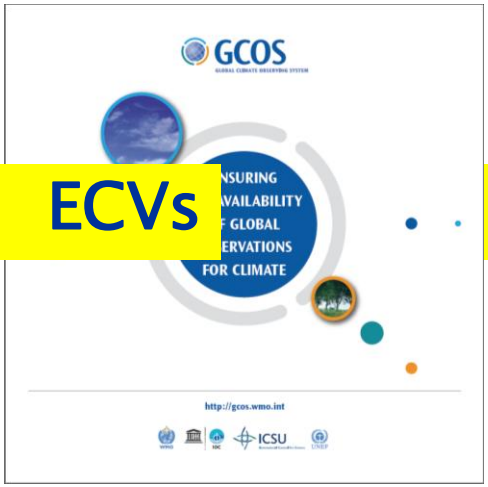
- Available from the GCOS website: gcos.wmo.int

- In general

- Cooperation

- National Coord.

- ECVs



- UNFCCC

- Exec Summary IP-10

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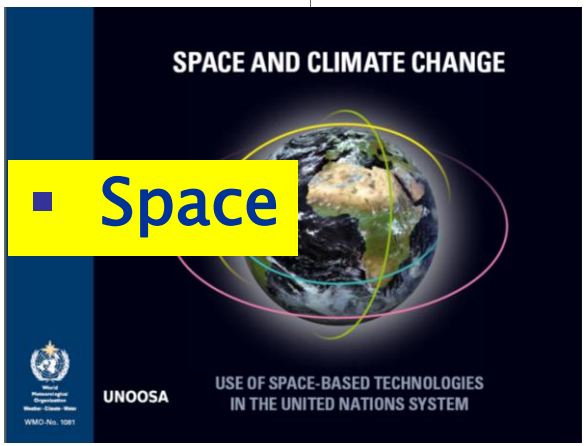
Continuation of the series: GCOS – Outreach

(Brochures published since last SC in Sep 2011)

- Africa

http://gcos.wmo.int

- 20th Anniversary



- Space

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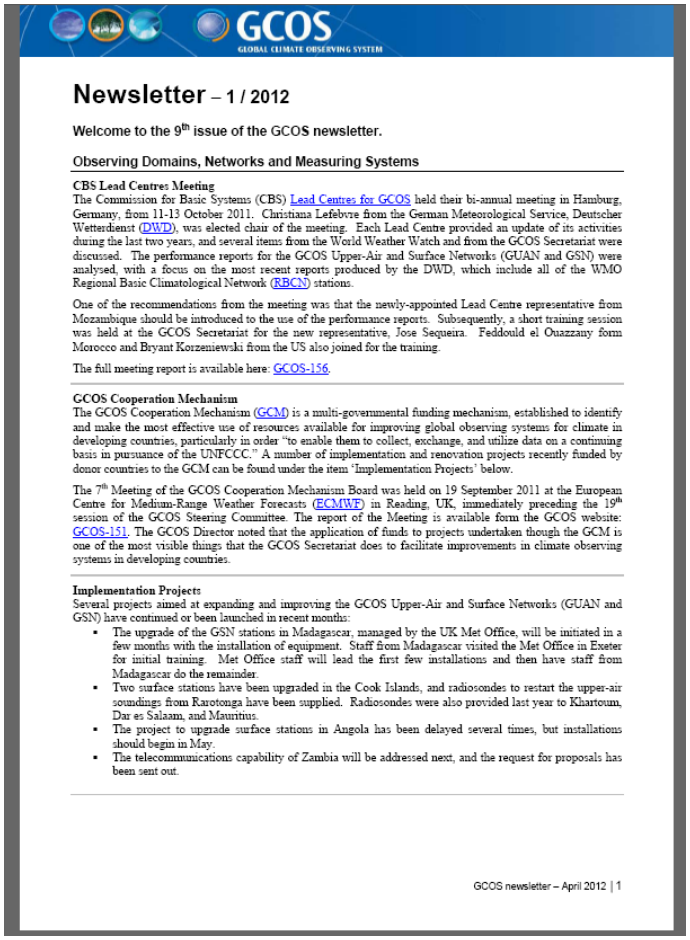
GCOS Newsletter in 2012



GCOS
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Newsletter – 1 / 2012

Welcome to the 9th issue of the GCOS newsletter.

Observing Domains, Networks and Measuring Systems

CBS Lead Centres Meeting
The Commission for Basic Systems (CBS) Lead Centres for GCOS held their bi-annual meeting in Hamburg, Germany, from 11-13 October 2011. Christiana Lefebvre from the German Meteorological Service, Deutscher Wetterdienst (DWD), was elected chair of the meeting. Each Lead Centre provided an update of its activities during the last two years, and several items from the World Weather Watch and from the GCOS Secretariat were discussed. The performance reports for the GCOS Upper-Air and Surface Networks (GUAN and GSN) were analysed, with a focus on the most recent reports produced by the DWD, which include all of the WMO Regional Basic Climatological Network (RBCN) stations.

One of the recommendations from the meeting was that the newly-appointed Lead Centre representative from Mozambique should be introduced to the use of the performance reports. Subsequently, a short training session was held at the GCOS Secretariat for the new representative, Jose Sequeira. Feddould el Ouazzany form Morocco and Bryant Korzeniewski from the US also joined for the training.

The full meeting report is available here: GCOS-156.

GCOS Cooperation Mechanism
The GCOS Cooperation Mechanism (GCM) is a multi-governmental funding mechanism, established to identify and make the most effective use of resources available for improving global observing systems for climate in developing countries, particularly in order "to enable them to collect, exchange, and utilize data on a continuing basis in pursuance of the UNFCCC." A number of implementation and renovation projects recently funded by donor countries to the GCM can be found under the item 'Implementation Projects' below.

The 7th Meeting of the GCOS Cooperation Mechanism Board was held on 19 September 2011 at the European Centre for Medium-Range Weather Forecasts (ECMWF) in Reading, UK, immediately preceding the 19th session of the GCOS Steering Committee. The report of the Meeting is available form the GCOS website: GCOS-151. The GCOS Director noted that the application of funds to projects undertaken though the GCM is one of the most visible things that the GCOS Secretariat does to facilitate improvements in climate observing systems in developing countries.

Implementation Projects
Several projects aimed at expanding and improving the GCOS Upper-Air and Surface Networks (GUAN and GSN) have continued or been launched in recent months:

- The upgrade of the GSN stations in Madagascar, managed by the UK Met Office, will be initiated in a few months with the installation of equipment. Staff from Madagascar visited the Met Office in Exeter for initial training. Met Office staff will lead the first few installations and then have staff from Madagascar do the remainder.
- Two surface stations have been upgraded in the Cook Islands, and radiosondes to restart the upper-air soundings from Rarotonga have been supplied. Radiosondes were also provided last year to Khartoum, Dar es Salaam, and Mauritius.
- The project to upgrade surface stations in Angola has been delayed several times, but installations should begin in May.
- The telecommunications capability of Zambia will be addressed next, and the request for proposals has been sent out.

GCOS
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Newsletter – 2 / 2012

Welcome to the 10th issue of the GCOS newsletter.

Scientific Highlights

4th World Climate Programme (WCRP) International Conference on Reanalysis, Silver Spring, USA, May 7-11

Observing Domains, Networks and Measuring Systems

CBS Lead Centres

BSRN
The 12th bi-annual meeting of the Baseline Surface Radiation Network (BSRN) was held at the Alfred Wegner Institute in Potsdam, Germany, from 1-3 August 2012. Called a 'science and review workshop', the BSRN meeting was an interesting mixture between a scientific conference and a network coordination workshop that brought together BSRN scientists, station managers, data users, and experts in areas related to BSRN. Anna Mikalsen from the GCOS Secretariat provided an overview presentation from the international programme perspective, in which she concentrated on the GCOS implementation strategy and how the BSRN fits into this concept. This strategy involves a hierarchy of complementary types of observing networks that will provide the *in situ* and satellite observations needed to monitor the global climate system, and BSRN has been designated as the GCOS baseline network for the Essential Climate Variable (ECV) 'surface radiation' in 2004. More information is available on the BSRN website: http://www.bsrn.awi.de

GRUAN ICM-4 and Network Design Workshop
The 4th Implementation and Coordination Meeting (ICM-4) of the GCOS Reference UpperAir Network (GRUAN) was hosted by the Japan Meteorological Agency (JMA) in Tokyo, Japan, from 5-9 March 2012. The annual ICMs afford an opportunity for the Working Group on GRUAN (formerly the Working Group on Atmospheric Reference Observations; WG-ARO), the GRUAN Lead Centre, and representatives from current and prospective GRUAN sites, as well as other stakeholders, to review progress, highlight issues and plan the way forward for GRUAN. The meeting report is available here: PDF

GRUAN sites will provide long-term, high-quality, error-characterized upper-air climate records to address the needs of four main scientific user communities, viz. climate change detection and attribution, satellite validation, understanding of atmospheric processes, and numerical weather prediction. The initial network, currently consisting of 15 sites, is expected to eventually expand to 35-40 sites. To carefully plan its expansion and to most effectively advance GRUAN's scientific objectives, a Network Design Workshop was held in Fürstenwalde, Germany, from 13-15 June 2012. Bringing together representatives from the four user communities, this workshop aimed to define the criteria which should guide GRUAN as expands to the full suite of sites. These criteria were captured in four white papers, which will be synthesized into a GRUAN Report later this year.

For further information visit the GRUAN homepage: http://www.gruan.org, or the GRUAN Communication Platform (blog) at: http://gruan.wordpress.com.

GCOS Cooperation Mechanism
The GCOS Cooperation Mechanism (GCM) is a multi-governmental funding mechanism, established to identify and make the most effective use of resources available for improving global observing systems for climate in developing countries, particularly in order "to enable them to collect, exchange, and utilize data on a continuing basis in pursuance of the UNFCCC." A number of implementation and renovation projects recently funded by donor countries to the GCM can be found under the item 'Implementation Projects' below.

The 8th Meeting of the GCOS Cooperation Mechanism Board will be held on 3 September 2012 at the WMO Headquarters in Geneva, back to back with the 20th session of the GCOS Steering Committee.

To be published after the SC-XX

Articles

Article in MTI Magazine, May 2012

International assistance

by Richard K Thigpen

PROGRESS REPORT

An update on worldwide GCOS projects

The Global Climate Observing System has accelerated its program to help implement a number of renovation projects in developing areas around the world

Flourentina – the old tower on the left will be removed

Soon, the Global Climate Observing System (GCOS) hosted by the World Meteorological Organization (WMO) will be 20 years old. For about half of this time, the GCOS Cooperation Mechanism (GCM) has focused on implementing renovation projects in developing areas of the world. These activities were first reported in this magazine in May of 2011 and the GCOS was invited to address the MTI World Technology Expo 2011 in Brussels last year. There was extensive discussion at the Expo with many representatives of international companies about the progress of some of the major projects and about the procedures used by the GCM.

One of the major renovation projects is the replacement of equipment at 11 stations in Madagascar. The surface observing network there has deteriorated over the years and has been further damaged by several typhoons. The renovation will consist of replacements with automated weather systems made by Campbell Scientific.

The project is managed for GCOS by the UK Met Office (UKMO), which has extensive experience in such international projects. In this case, staff from the UKMO have visited some of the stations to determine requirements, and some staff from Madagascar have visited the UKMO in Exeter for initial training. The Met Service of Madagascar has built the 30m wind masts as shown in the picture above – it's not exactly a 'liftable' mast, but meets the requirements. The UKMO will participate in the initial installations and then the staff from Madagascar will install the remainder.

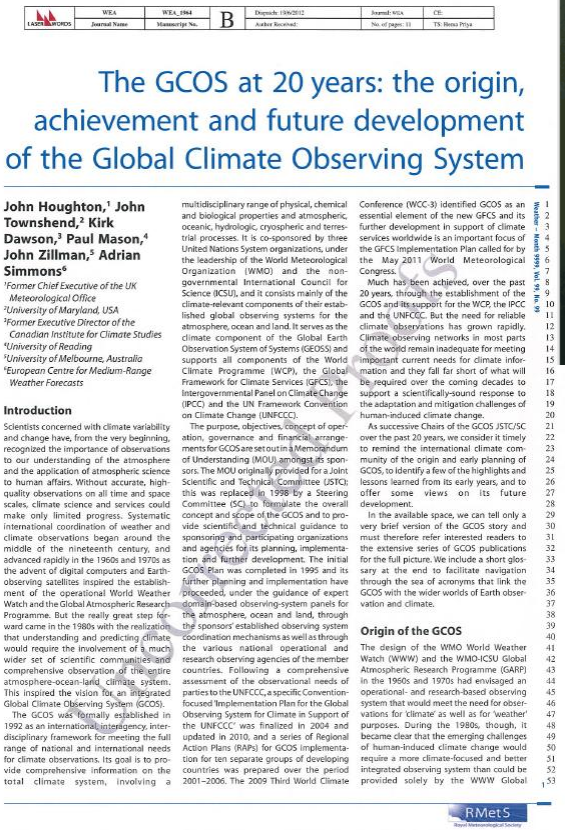
This is not the first time the UKMO has assisted the GCOS, having also carried out renovations at Gan in the Maldives, and at Yerevan, Armenia. The project is funded through the GCM by the Met Service of the Netherlands (KNMI).

Continental support

Several upper air stations were supported last year through the GCM. Switzerland funded the supply of radiosondes and balloons for the GCOS upper air network (GUAN) stations at Dar es Salaam, Tanzania; Vacoas, Mauritius; and Khartoum, Sudan.

A competitive international tender procedure was used at the WMO, and MeteoModem provided the winning offer. MeteoModem's technical staff went to each of the stations for the installation and training. The renovation of stations in

Article to published in the RMetS "Weather" in Sep 2012 issue



The GCOS at 20 years: the origin, achievement and future development of the Global Climate Observing System

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Introduction

Scientists concerned with climate variability and change have, from the very beginning, recognized the importance of observations to our understanding of the atmosphere and the application of atmospheric science to human affairs. Without accurate, high-quality observations on all time and space scales, climate science and services could make only limited progress. Systematic international coordination of weather and climate observations began around the middle of the nineteenth century, and advanced rapidly in the 1960s and 1970s as the advent of digital computers and Earth-observing satellites inspired the establishment of the operational World Weather Watch and the Global Atmospheric Research Programme. But the really great step forward came in the 1980s with the realization that understanding and predicting climate would require the involvement of a much wider set of scientific communities and comprehensive observation of the entire atmosphere-ocean-land climate system. This inspired the vision for an integrated Global Climate Observing System (GCOS).

The GCOS was formally established in 1992 as an international, intergency, inter-disciplinary framework for meeting the full range of national and international needs for climate observations. Its goal is to provide comprehensive information on the total climate system, involving a multidisciplinary range of physical, chemical and biological properties and atmospheric, oceanic, hydrologic, cryospheric and terrestrial processes. It is co-sponsored by three United Nations System organizations, under the leadership of the World Meteorological Organization (WMO) and the non-governmental International Council for Science (ICSU), and it consists mainly of the climate-relevant components of their established global observing systems for the atmosphere, ocean and land. It serves as the climate component of the Global Earth Observation System of Systems (GEOSS) and supports all components of the World Climate Programme (WCP), the Global Framework for Climate Services (GFCS), the Intergovernmental Panel on Climate Change (IPCC) and the UN Framework Convention on Climate Change (UNFCCC).

The purpose, objectives, concept of operation, governance and financial arrangements for GCOS are set out in a Memorandum of Understanding (MOU) amongst its sponsors. The MOU originally provided for a Joint Scientific and Technical Committee (JSTC); this was replaced in 1998 by a Steering Committee (SC), to formulate the overall concept and scope of the GCOS and to provide scientific and technical guidance to sponsoring and participating organizations and agencies for its planning, implementation and further development. The initial GCOS Plan was completed in 1995 and its further planning and implementation have proceeded, under the guidance of expert domain-based observing-system panels for the atmosphere, ocean and land, through the sponsors' established observing system coordination mechanisms as well as through the various national operational and research observing agencies of the member countries. Following a comprehensive assessment of the observational needs of parties to the UNFCCC, a specific Convention-focused Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC' was finalized in 2004 and updated in 2010, and a series of Regional Action Plans (RAPs) for GCOS implementation for ten separate groups of developing countries was prepared over the period 2001–2006. The 2009 Third World Climate Conference (WCC-3) identified GCOS as an essential element of the new GFCS and its further development in support of climate services worldwide is an important focus of the GFCS Implementation Plan called for by the May 2011 World Meteorological Congress.

Much has been achieved, over the past 20 years, through the establishment of the GCOS and its support for the WCP, the IPCC and the UNFCCC. But the need for reliable climate observations has grown rapidly. Climate-observing networks in most parts of the world remain inadequate for meeting important current needs for climate information and they fall far short of what will be required over the coming decades to support a scientifically-sound response to the adaptation and mitigation challenges of human-induced climate change.

As successive Chairs of the GCOS JSTC/SC over the past 20 years, we consider it timely to remind the international climate community of the origin and early planning of GCOS, to identify a few of the highlights and lessons learned from its early years, and to offer some views on its future development.

In the available space, we can tell only a very brief version of the GCOS story and must therefore refer interested readers to the extensive series of GCOS publications for the full picture. We include a short glossary at the end to facilitate navigation through the sea of acronyms that link the GCOS with the wider worlds of Earth observation and climate.

Origin of the GCOS

The design of the WMO World Weather Watch (WWW) and the WMO-ICSU Global Atmospheric Research Programme (GARP) in the 1960s and 1970s had envisaged an operational- and research-based observing system that would meet the need for observations for climate as well as for weather purposes. During the 1980s, though, it became clear that the emerging challenges of human-induced climate change would require a more climate-focused and better integrated observing system than could be provided solely by the WWW Global

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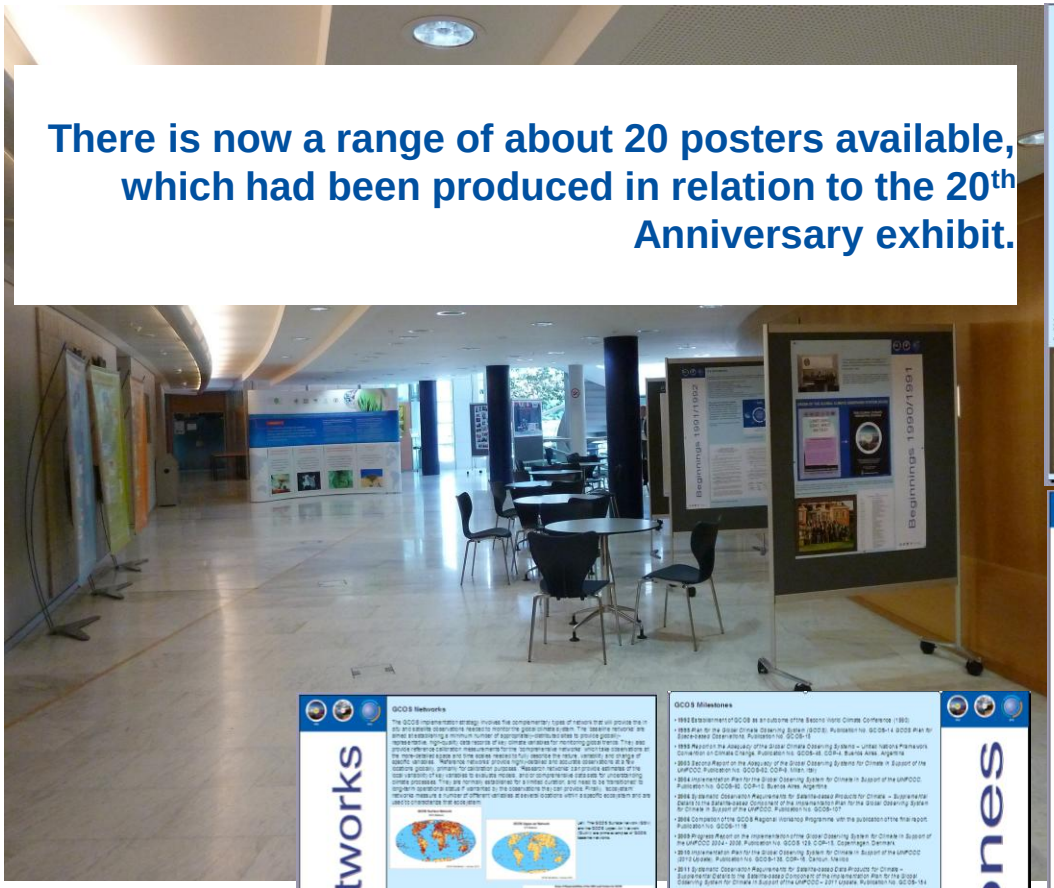
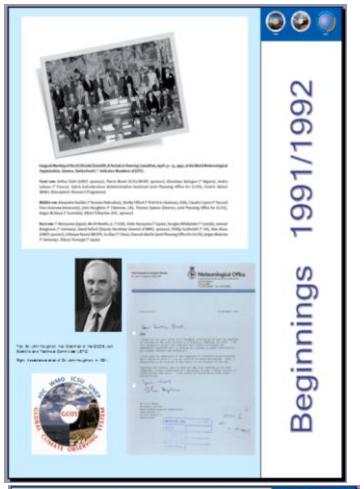
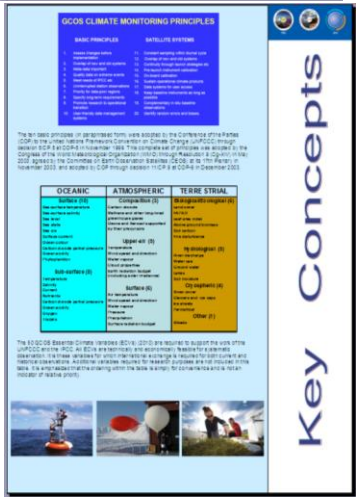
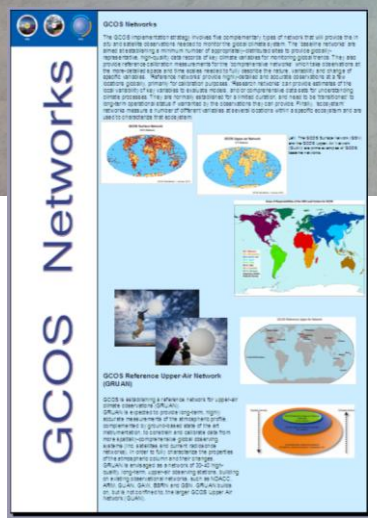
Poster in 2012

There is now a range of about 20 posters available, which had been produced in relation to the 20th Anniversary exhibit.









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Wie viele Leute arbeiten für GCOS?

GCOS Secretariat (5)

GCOS Steering Committee (16 members, 1 Chairman)

GCOS Panels
für Atmosphäre, Ozeane und Land: (3 x 12 members, 3 Chairmen)

Cooperation Mechanism (2)

Mitarbeiter in den GTOS und GOOS Sekretariaten: (2)
National Coordinators: (23, plus staff)

Total: 90+
plus viele Experten, i.e., GRUAN, AGG, rapporteurs…

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Improving the global observing systems for climate ?

- Promote the actions in the GCOS Implementation Plan
- Operate a cooperation mechanism
- Develop Regional Action Plans
- Advocate national coordination

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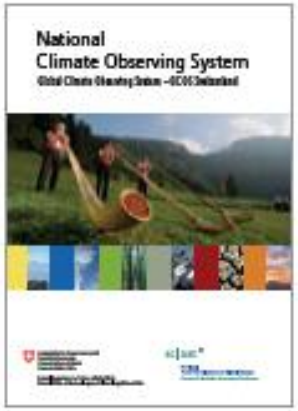
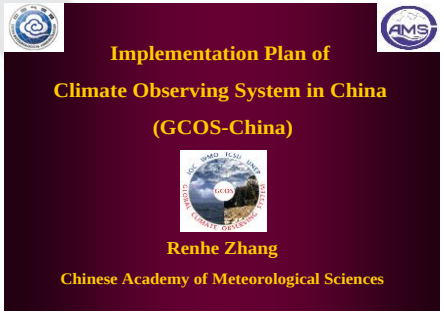
Implementation – national





Examples of effective coordination with Member countries:
Switzerland, Australia, Germany and the United States of America.

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The end of my talk

- **http://gcos.wmo.int**

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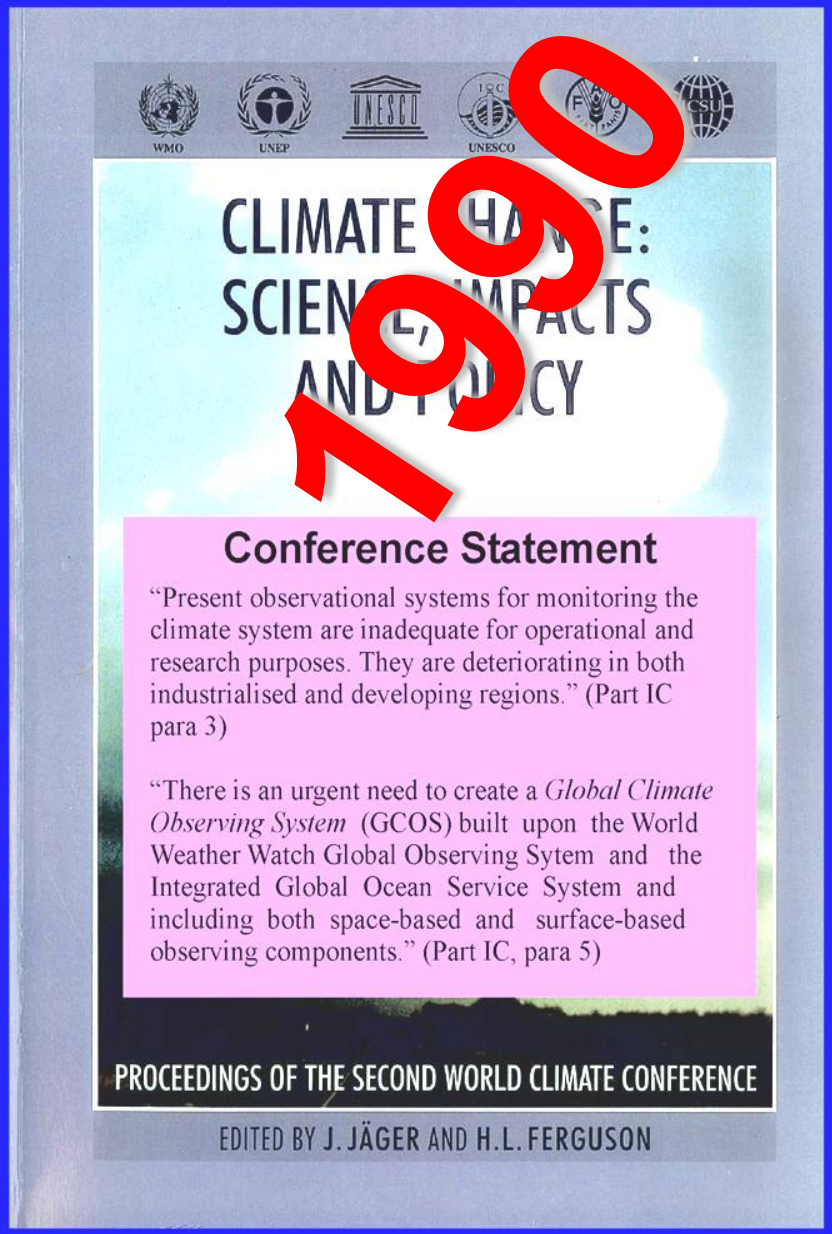
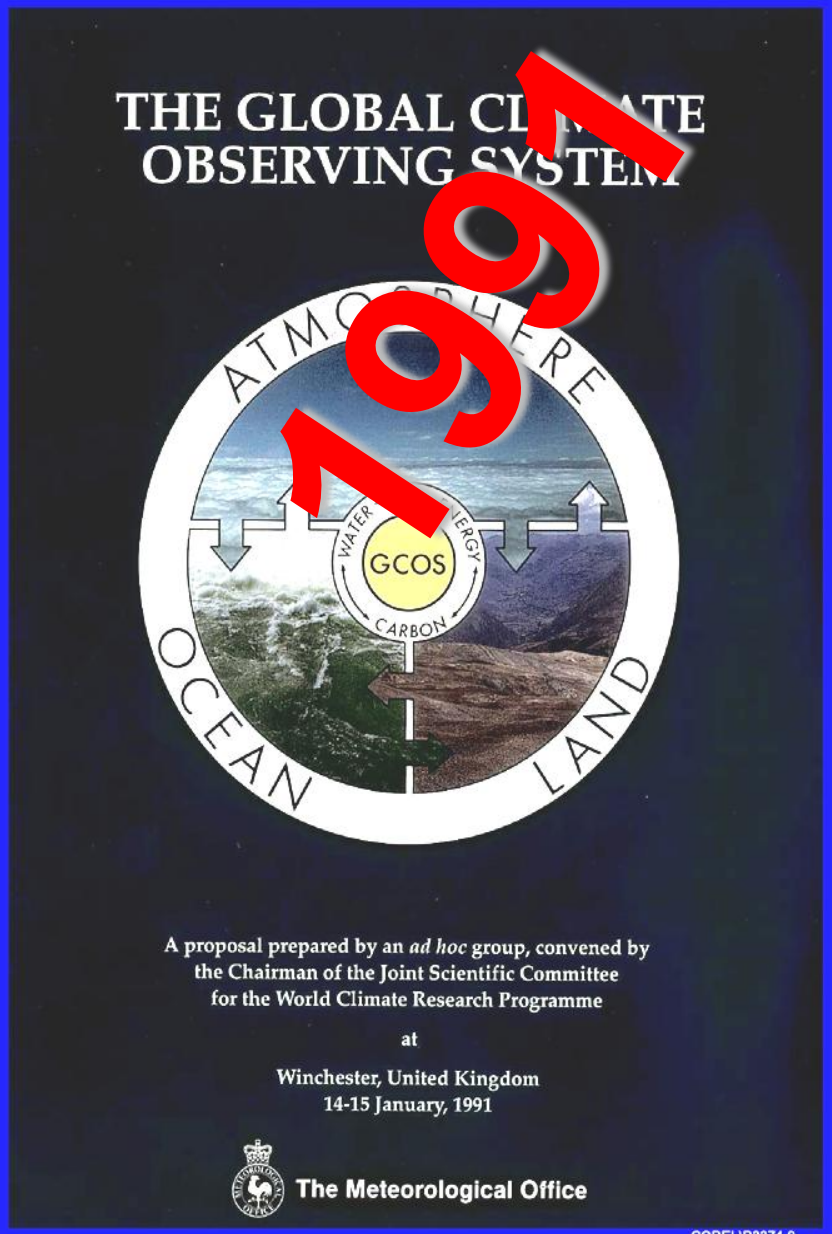
ORIGIN OF THE GLOBAL CLIMATE OBSERVING SYSTEM (GCOS)





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GCOS – Space Based Observations

Committee on Earth Observation Satellites (CEOS):

(Research & Development Satellites)

- CEOS Climate meeting, 1st Feb 2010 → establishment of an Working Group on Climate (chaired by Marc Dowell, JRC)

  GCOS is invited as observer

- Strategic Implementation Team meetings
- Plenary, 24 – 25 October 2012, Bangalore, India

CEOS response to the GCOS Implementation Plan and its Satellite Supplement reported to COP18, SBSTA37, Doha, 25 Nov – 7 Dec 2012

Coordination Group for Meteorological Satellites (CGMS):

(Operational Meteorological (and Climatological) Satellites)

- Plenary 7 – 8 November 2012, Lugano, Switzerland

GCOS – Space Based Observations

- **ESA Climate Change Initiative (CCI)**
- **EUMETSAT – SCOPE-CM Sustained Coordinated Processing of Environmental Satellite Data for Climate Monitoring**
- **Architecture Requirements for Space based Climate Monitoring**

GCOS – In-Situ Based Observations

GRUAN* Meeting ICM-4, 5-9 March 2012, Tokyo, Japan

Next GRUAN meeting (ICM-5), 25-28 February 2013, Cabauw, The Netherlands.

GTN meetings: Global Terrestrial Neworks

WMO Technical Commissions, in particular:

- **Commission for Basic Systems (CBS) (every 2 years), currently met 2012, 2014…**
- **CBS-Lead Centre Meeting for GCOS, 10-14 Oct 2011, Hamburg**
- **Commission for Climatology (CCl) (every 4 years), next in 2014**

GCOS Cooperation Mechanism (GCM): E.g., Madagascar

***GRUAN = GCOS Reference Upper-Air Network**

Table 1. Regional Workshop Programme Schedule

Region	Location of Regional Workshop	Date	Location of Action Plan Meeting	Date
Pacific Islands	Apia, Samoa	August 2000	Honolulu, Hawaii	October 2001
Eastern and Southern Africa	Kisumu, Kenya	October 2001	Nairobi, Kenya	January 2002
Central America and the Caribbean	San José, Costa Rica	March 2002	Bridgetown, Barbados	May 2002
East and Southeast Asia	Singapore, Singapore	September 2002	Beijing, China	March 2003
Western and Central Africa	Niamey, Niger	March 2003	Dakar, Senegal	September 2003
South America	Santiago, Chile	October 2003	Buenos Aires, Argentina	April 2004
Central Asia	Almaty, Kazakhstan	May 2004	Yerevan, Armenia	September 2004
South and Southwest Asia	New Delhi, India	October 2004	Isfahan, Iran	May 2005
Eastern and Central Europe	Leipzig, Germany	April 2005	Ljubljana, Slovenia	September 2005
Mediterranean Basin	Marrakech, Morocco	November 2005	Tunis, Tunisia	May 2006

United Nations
Framework Convention on
Climate Change

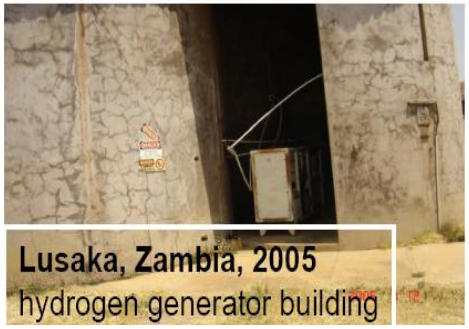
Cooperation Mechanism

GCOS Cooperation Mechanism

revitalises key stations in baseline networks, using donations made for the purpose.

recent or forthcoming projects include support for:

- Climate Surface Network stations in Angola, Cuba, Madagascar and Zambia
- Radio sonde stations at Khartoum, Rarotonga and Yerevan
- Radiation network station in Nigeria



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