



GEOSS Climate Priorities

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Mankind has become a Geophysical Parameter

Geophysics has become a Political Issue

... Earth Observations are needed to inform decisions





Our Planet is a System of Systems







Any Single Problem Requires Many Data Sets

Any Single Data Set Serves Many Applications

... Observation Systems should be shared across disciplines



GEOSS Imperative

- Some 30% of our economy is tied to the environment
- Scientific **understanding** and ongoing knowledge of the Earth system is fundamental for well informed **economic decision making**
- Sustained Earth observations are critical
- Systems interoperability and open data access is fundamental

A global approach to Earth observation is required













GEOSS - Global Earth Observation System of Systems...

- Coordinate and Sustain Observation Systems
- Provide Easier & More Open Data Access
- Foster Use through Science, Applications and Capacity Building

... to answer Society's need for informed decision making







Environment and Climate Change

To respond to the growing demand for Earth observation data, we will accelerate efforts within the Global Earth Observation System of Systems (GEOSS), which builds on the work of UN specialized agencies and programs, in priority areas, inter alia, climate change and water resources management, by strengthening observation, prediction and data sharing. We also support capacity building for developing countries in earth observations and promote interoperability and linkage with other partners.



Vision

- Link together the world's diverse Climate information
 - Observing systems
 - Data processing centres
 - Models
 - Dissemination systems
 - Decision support capabilities
- Support integrated data sets and user information services







- Strong Climate arm is fundamental to a successful GEOSS
- Essential to and supports all SBAs
 - Vast range of user communities
- Support adaptation and mitigation under UNFCCC
- Support to IPCC assessments
- Climate information as a global public good
 - Data Sharing Principles with open access /
- Support science and research community
 - Including modellers





GEOSS Climate SBA

Understanding, assessing, predicting, mitigating, and adapting to climate variability and change

- The climate has impacts in each of the other eight societal benefit areas.
- Coping with climate change and variability demands good scientific understanding based on sufficient and reliable observations.
- GEOSS outcomes will enhance the capacity to model, mitigate, and adapt to climate change and variability.
- Better understanding of the climate and its impacts on the Earth system, including its human and economic aspects, will contribute to improved climate prediction and facilitate sustainable development while avoiding dangerous perturbations to the climate system.



GEOSS Climate Tasks

• A Climate Record for Assessing Variability and Change

- Sustained Reprocessing and Reanalysis of Climate Data
- Extending the Record of Climate Variability at Global Scale
- Key Climate Data from Satellite Systems
- Environmental Information for Decision-making, Risk Management and Adaptation
 - Towards Enhanced Climate, Weather, Water and Environmental Prediction
 - Climate Information for Decision-making, Risk Management and Adaptation
- Global Carbon Observation and Analysis System
 - Integrated Global Carbon Observation (IGCO)
 - Forest Carbon Tracking
 - Global Monitoring of Greenhouse Gases from Space

Sustained Observing Systems

- Global Terrestrial Observations for Climate
- Legacy of the International Polar Year 2007-08
- Global Ocean Observation System
- Global Observing System (GOS)







- Efficiently and Effectively integrate the GEOSS Climate Component
 - Requires that tasks be well coordinated
- Organize a GEOSS workshop in March 2009
 - In coordination with WMO / GCOS / WCRP
 - For all GEO climate task teams
- Workshop will discuss and coordinate the efforts of the task teams
 - Discuss gaps, synergies and linkages
 - Agree to a coordination and information-sharing process through 2011



GEOSS Future Directions

- Develop GEO Data Policy Principles
- Begin Global Earth Observing Systems Inventory
- Assess global observation gaps
- Implement operational tools, e.g., GEOPORTAL, GEONETCAST
- Demonstrate national, regional, global Earth observation programs in support of climate, health, agriculture, water, capacity building
- Promote use of Earth observations in modeling & data assimilation efforts
- Explore ways to sustain successful R & D observations
- Engage academic and industrial partners



Thank you!



Thank you!

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A Climate Record for Assessing Variability and Change

Extend and improve the quality of the past climate record through advanced data reanalysis and reconstruction in the atmosphere, ocean, land and sea ice domains. Generate high-quality temporally-homogeneous estimates of the past climate to support analyses of climate variability and change.

- Sustained Reprocessing and Reanalysis of Climate Data
- Extending the Record of Climate Variability at Global Scale
- Key Climate Data from Satellite Systems





A Climate Record for Assessing Variability and Change

- Sustained Reprocessing and Reanalysis of Climate Data
 - This sub-task is led by CEOS, GCOS and WCRP
 - Ensure the development of international mechanisms to coordinate and maintain sustained climate data reprocessing and reanalysis efforts. With regard to the reprocessing of historical datasets (to obtain consistent long-time series of satellite records), make relevant synergies with Key Climate Data from Satellite Systems

• Extending the Record of Climate Variability at Global Scale

- This sub-task is led by IGBP
- Support and coordinate activities towards a global coverage of high-resolution, well-dated reconstructions of past climate parameters (e.g. temperature, precipitation, pressure) in the ocean and on land to better understand past modes of climate variability.
- Focus on the last 2000 years and the extension of instrumental records.
- Encourage activities that promote proxy calibration, quantitative data-model comparisons, and better understanding of interdecadal and longer climate change at global and regional scales.
- Key Climate Data from Satellite Systems
 - This sub-task is led by NASA, NOAA, CEOS, GCOS and WMO
 - Establish actions securing the provision of key data for climate studies and forecasting





Environmental Information for Decision-making, Risk Management and Adaptation

- Support the integration of climate and environmental risk management into adaptation processes. Coordinate and drive the development of tailored climate products and services. Encourage the use of this information by policy and decision makers (at all levels), and initiate user-oriented activities to do both increase the demand, and foster the supply, of climate and environmental services for development.
- Towards Enhanced Climate, Weather, Water and Environmental Prediction
- Climate Information for Decision-making, Risk Management and Adaptation





Environmental Information for Decision-making, Risk Management and Adaptation (cont)

- Towards Enhanced Climate, Weather, Water and Environmental Prediction
 - This sub-task is led by Australia (BOM), WMO, WCRP and IGBP
 - Strengthen the ability worldwide to deliver new and improved climate, weather, water and environmental services.
 - Key research activities relate to: (i) Seamless weather, climate and Earth system
 prediction; (ii) Multi-scale organization of tropical convection and interaction with the
 global circulation; (iii) Data assimilation for coupled models as a prediction and
 validation tool for weather and climate research; and (iv) Information to assess risks,
 and benefits of climate/weather predictions, for society and the global economy.
 - This sub-task includes the continuation of former Task WE-07-01 (Data Assimilation and Modelling for Operational Use).





Environmental Information for Decision-making, Risk Management and Adaptation (cont)

- Climate Information for Decision-making, Risk Management
 and Adaptation
 - This sub-task is led by GCOS and WCRP
 - Promote the resourcing and implementation of the Climate for Development in Africa Programme (ClimDev Africa). The programme is to improve the availability, exchange and use of climate information & services at national, local and regional levels – in support of economic growth and achievement of the Millennium Development Goals. African partners include the African Union, the UN Economic Commission for Africa, the African Development Bank, and the African National Meteorological and Hydrological Services. In addition, implement the programme "Climate Observations and Regional Modelling in support of climate risk management and sustainable development." This programme is to assist the developing and least developed countries of Eastern Africa to undertake and appropriately use climate projections in adaptation planning.





Global Carbon Observation and Analysis System

Implement a global carbon observation and analysis system addressing the three components of the carbon cycle (atmosphere, land and ocean). Develop robust tools and methodologies for high-precision CO2 measurements and carbon storage evaluation.

- Integrated Global Carbon Observation (IGCO)
- Forest Carbon Tracking
- Global Monitoring of Greenhouse Gases from Space





Global Carbon Observation and Analysis System (cont)

- Integrated Global Carbon Observation (IGCO)
 - Led by EC (COCOS) and USA (NOAA, USGS), and supported by the Carbon Cycle Community of Practice (former IGCO)
 - Support the development of a global integrated global carbon observation system, including improved global networks of in-situ CO2 observations, absorption of CO2 by the oceans and resulting acidification caused.





Global Carbon Observation and Analysis System (cont)

- Forest Carbon Tracking
 - Led by Australia (CSIRO), Japan (JAXA), Norway (NSC), CEOS, FAO and GTOS (GOFC-GOLD), and supported by the Carbon Cycle (former IGCO) and Forest Communities of Practice
 - Coordinate the definition, development and validation of robust tools and methodologies for the evaluation of carbon storage in forests, considering also impacts of forest fires. Build upon GEO efforts in forest monitoring, carbon observation and modelling to foster the use of these tools coordinating the timely provision of observations required for their operational use. Promote and facilitate the development of reference, coherent and validated databases. Preliminary activities will include: (i) Coordination of tools and methodologies assessment; (ii) Coordination of observations (securing continuity); (iii) Coordination of reference datasets production; (iv) Improvement of access to observations, datasets, tools and expertise; (v) Pilot initiatives to demonstrate capabilities; and (vi) Capacity building.





Global Carbon Observation and Analysis System (cont)

- Global Monitoring of Greenhouse Gases from Space
 - Led by Japan (JAXA), USA (NASA), CEOS and ESA, and supported by the Carbon Cycle (former IGCO) and Forest Communities of Practice
 - Foster the use of space-based greenhouse gas (GHG) observations and consolidate data requirements for the next-generation GHG monitoring missions. Establish an international group in close cooperation with the CEOS Atmospheric Composition constellation and the Carbon Cycle Community of Practice, to initially generate and implement plans for the end-to-end utilization of space-based GHG data, particularly those of GOSAT and OCO to be launched in early 2009.





Sustained Observing Systems

- Establish actions for the maintenance and expansion of observing systems for climate and weather, including terrestrial, oceanic, air-borne and spacebased. Promote stable, reliable and long-term operations of climate and weather observing networks. In particular, accelerate the implementation of the Global Climate Observing System (GCOS) in line with the "Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC".
- Key Terrestrial Observations for Climate
- Legacy of the International Polar Year 2007-08
- Global Ocean Observation System
- Global Observing System (GOS)



- Key Terrestrial Observations for Climate
 - Led by GTOS
 - Develop intergovernmental mechanisms for coordinating terrestrial observations needed for climate studies and forecasting. Develop a framework for the preparation of guidance materials, standards, and reporting guidelines for terrestrial (including land-coast interface) observing systems for climate and associated data, metadata, and products to expand the comprehensiveness of current networks and facilitate exchange of data.



- Legacy of the International Polar Year 2007-08
 - Led by WCRP and supported by the Cryosphere Community of Practice
 - Coordinate with the International Polar Year (IPY) to enhance the utilization of Earth observations in all appropriate realms (including, but not limited to, sea and land ice, permafrost, coastal erosion, physical and chemical polar ocean changes, marine and terrestrial ecosystem change, biodiversity monitoring and impacts of increased resource exploitation and marine transport). Ensure an appropriate legacy for IPY projects and advocate for the continuation of relevant efforts beyond the duration of the IPY.



- Global Ocean Observation System
 - This sub-task is led by GOOS, IEEE and POGO, and is supported by the Coastal Zone Community of Practice
 - Enhance and improve the coordination of coastal/open-ocean observations and modelling initiatives, in support of a global ocean observation system. Related activities will include: Improve the global coverage and data accuracy of the coastal/open ocean observing systems as well as the management and archiving of the resulting data and information. Contribute to the implementation of global coastal and open ocean observing networks using the mechanism of GOOS and Regional Alliances. In particular sustain and extend the network of Argo buoys and encourage the establishment of a Program Office to ensure the ongoing implementation of this global array of profiling floats in the ocean. Building on existing capabilities, develop a global coordinated information and data system for deep-ocean monitoring to better understand the dynamics of the ocean processes throughout the ocean water column.



• Global Observing System (GOS)

- This sub-task is led by WMO
- Achieve a complete and stable Global Observing System (GOS). The surface-based component should include in-situ, airborne, land and possibly ocean measurements; high priority should be given to a stable, and as much as possible automated, fully functional World Weather Watch Upper Air Network and the further development of the Aircraft Meteorological Data Relay (AMDAR) programme. The space-based component should include operational geostationary and polar components building upon WMO efforts to (i) increase spatial and temporal resolution for geostationary imagers and sounders, and (ii) provide a broader availability of polar Doppler wind profiles for initial operational testing.