GROUP ON
EARTH OBSERVATIONS

GEO Water Societal Benefit Area

Gravity Satellite Mission Workshop
30 September – 2 October 2009
Graz University of Technology

Douglas Cripe, GEO Secretariat

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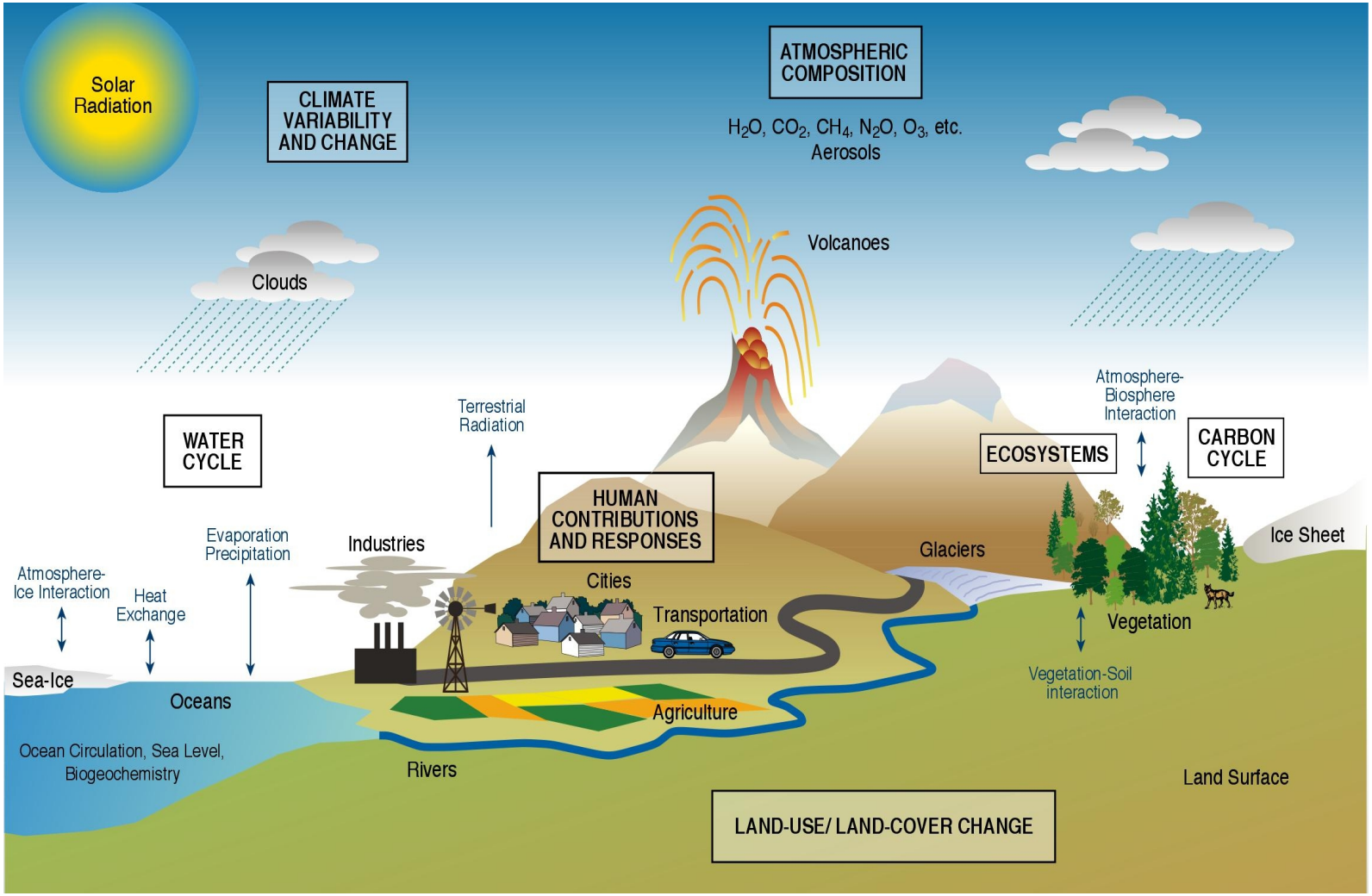
The Earth is a complex system of systems



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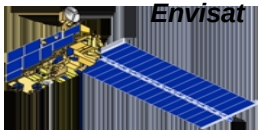

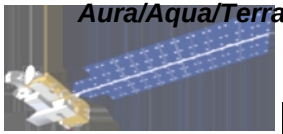

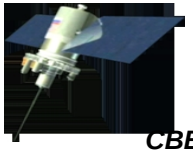

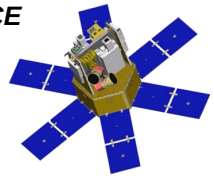

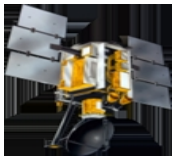

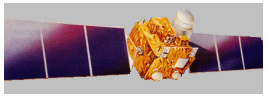

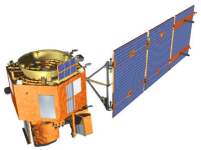

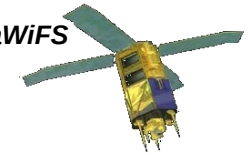

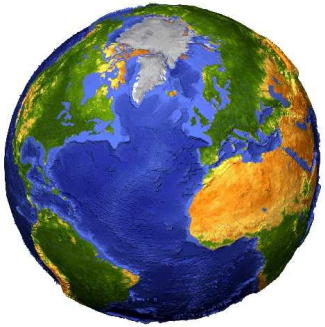

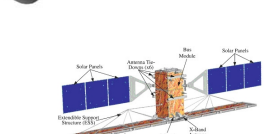

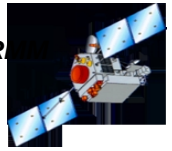

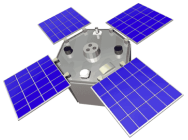

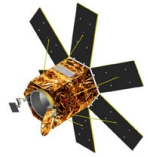

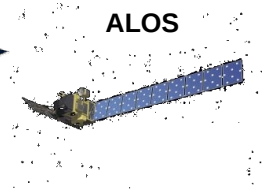

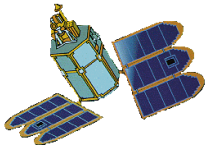

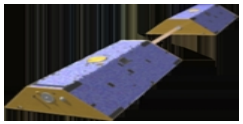

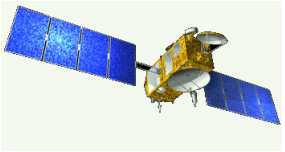

Space Observation Systems

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The Tower of Babel problem…

Need for:

- **Earth observation Coordination**
- **Interoperable Architecture and Formats**
- **Data Sharing**

… to benefit fully from Earth Observation Systems

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GEO, the Group on Earth Observations

An Intergovernmental group with 80 Members and 57 Participating Organizations

U.S. Department of State, Washington DC
July 31, 2003

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What is GEO?

- launched in response to calls for action by the 2002 World Summit on Sustainable Development and by the G8 (Group of Eight) leading industrialized countries
- voluntary partnership of governments and international organizations
  - 79 member governments + EC
  - 57 Participating Organizations (PO)
- provides a framework within which these partners can develop new projects and coordinate their strategies and investments
- charged with developing GEOSS

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What is GEOSS?

- **the Global Earth Observation System of Systems**
- **an integrating infrastructure for Earth observing and information systems to support informed decision making for society**
- **10-year implementation plan**
- **2015: Global, Coordinated, Comprehensive and Sustained System of Observing Systems**

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GEOSS Implementation Requires: Interoperability of Systems

Need for an Interoperable Architecture and Standard Formats to benefit fully from Earth Observation Systems

- **Technical Specifications for Collecting, Processing, Storing, and Disseminating Data and Products**
- **Based on Non-proprietary Standards**
- **Defining System Compliance for Contribution to GEOSS**

GEOSS Implementation requires: Data Sharing Principles

- **Full and Open Exchange of Data…**
  - Recognizing Relevant International Instruments and National Policies and Legislation
- **Data and Products at Minimum Time delay and Minimum Cost**
- **Free of Charge or Cost of Reproduction for Research and Education**

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GEOSS: main objectives

- **Improve and Coordinate Observation Systems (avoid duplications)**
- **Provide Easier & More Open Data Access**
- **Foster Use (Science, Applications)**
- **Building Capacity**
- **Identify gaps in observations (based on user requirements)**

…Earth Observation Systems should be coordinated and shared internationally

… to answer Society's need for informed decision making

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GEOSS: A Global, Coordinated, Comprehensive and Sustained System of Observing Systems

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…we will accelerate efforts within the Global Earth Observation System of Systems (GEOSS), ... in priority areas, inter alia, climate change and *water resources management,* by strengthening observation, prediction and data sharing. ... capacity building for developing countries … interoperability and linkage …

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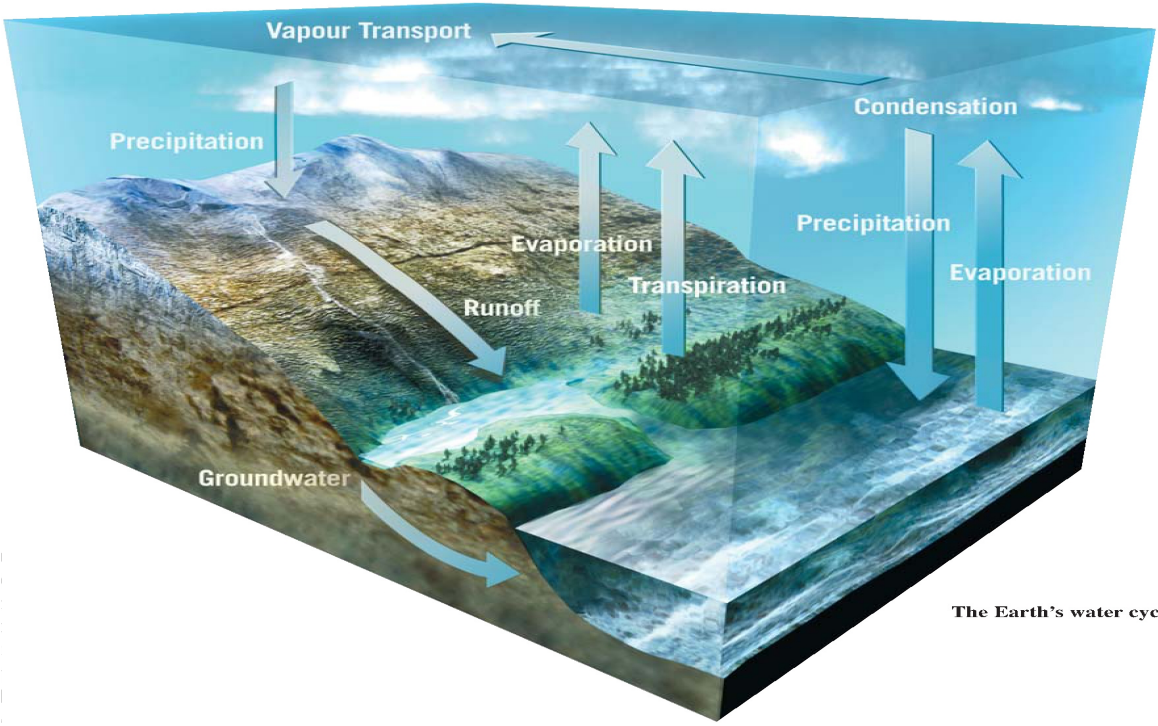
Understanding the Water Cycle

- **Variability**
- **Causes and consequences**
- **Predictions**
- **Integrated Water Resources Management**



The Earth's water cyc

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GEOSS Strategic Target for Water

Before 2015, GEO aims to:

Produce comprehensive sets of data and information products to support decision-making for efficient management of the world's water resources, based on coordinated, sustained observations of the water cycle on multiple scales.

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This will be achieved through:

- **development of a sustained, operational monitoring system for the global water cycle, combining space-based, airborne, and in-situ observation networks which will:**
  - **address water resources in terms of quantitative availability and water quality;**
  - **include integrated in-situ reference sites for monitoring essential variables for water cycle measurement;**
  - **allow for different types of measurements to be planned in a structured way across variables, sensors, platforms and nations and in some cases development of sensor technology;**
  - **deliver a broad range of integrated data products that cover many different spatial and temporal scales, combining detailed point *in-situ* measurements with coarser comprehensive coverage provided by satellites.**

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This will be achieved through:

- **development of widely available, sustained water cycle data sets and related information products, at both global and basin scales, tailored to the near- and long-term needs of stakeholders and end-users, which will:**
  - **exploit past and current *in-situ* and satellite-based observations as well as fostering their integration into advanced models for integrated water resource management;**
  - **promote the next generation of improved/enhanced products and innovative observations (with special emphasis on observational gaps: e.g., precipitation and run-off at high latitudes and water quality measurements from space), for water resources management.**

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This will be demonstrated by:

- **An operationalized and sustained global network of *in-situ* observation sites.**
- **Increased availability of information products and services for monitoring changes in the water cycle, including clouds and precipitation, appropriate for both research and integrated water resource management.**
- **Increased availability of data and information, including quantity and quality of both surface and groundwater, to support a water cycle decision making system.**
- **Routine, reliable production of “watershed” and human health indicators from satellite data, surface and subsurface data, and data assimilation capabilities.**

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WA-08-01
Integrated Products for Water Resource Management and Research

- **WA-08-01a: Soil Moisture**
  - **Peter van Oevelen, GEWEX**
- **WA-08-01b: Runoff**
  - **Wolfgang Grabs, WMO**
- **WA-08-01c: Groundwater**
  - **Sophie Vermooten, IGRAC**
- **WA-08-01d: Precipitation**
  - **George Huffman, IPWG**
- **WA-08-01e: CEOP**
  - **Toshio Koike, University of Tokyo**
- **WA-08-01f: Pilot Projects for Improved Water Discovery and Quality Assessments**
  - **John Lyon, IEEE**
- **WA-08-01g: Global Water Quality Monitoring**
  - **Steve Greb, State of Wisconsin**

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GEO Portal

- **Provides web-based interface for searching and accessing the data, information, imagery, services and applications available through GEOSS.**
- **Connects users to data bases, services and portals that provide reliable, up-to-date, integrated and user-friendly information – vital for the work of decision-makers, managers and other users of Earth observations.**

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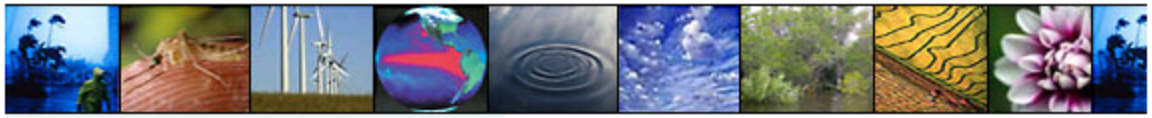
Home

The Global Earth Observation System of Systems (GEOSS)

GEOSS themes:

- Disasters
- Health
- Energy
- Climate
- Water
- Weather
- Ecosystems
- Agriculture
- Biodiversity

GEOSS Common Infrastructure



Are you new to GEO and GEOSS? Find out more here!

Highlights

The GEOSS Common Infrastructure (GCI)

Evaluating the GEO Portal prototypes

Evaluate the GEO Portals

The assessment phase for the GEO Portals runs until May 2009. The Portals are updated regularly so please make repeat visits and provide your feedback.

Components registration

Register your components

The GEO community is invited to register its data bases, catalogues, services and tools in the GEOSS Components and Services Registry

Standards registration

Register your standards here

The GEO community is encouraged to register standards, protocols and other specifications for ensuring an interoperable "system of systems" in the GEOSS Registry

Brazil to host GEO Forest Monitoring Symposium

The Brazilian National Institute for Space Research (INPE) and the Group on Earth Observations (GEO) are organizing a major symposium on forest monitoring in Foz do Iguaçu, Brazil from 4 to 7

What's new?

Estonia becomes the 75TH member of GEO

The Government of Estonia has joined the Group on Earth Observations, bringing the total GEO membership to 74 countries plus the EC. Estonia's Minister of the Environment informed the Secretariat of his government's decision on 17 July. The Head of the Remote Sensing and Marine Optics Department, Estonian Ministry of Education and Research will serve as GEO Principal and the Counsellor on Monitoring o the Ministry of the Environment will serve as GEO Alternate. See the updated GEO membership list.

Registration open for 2008 GEOSS in the Americas Symposium

The second annual Symposium

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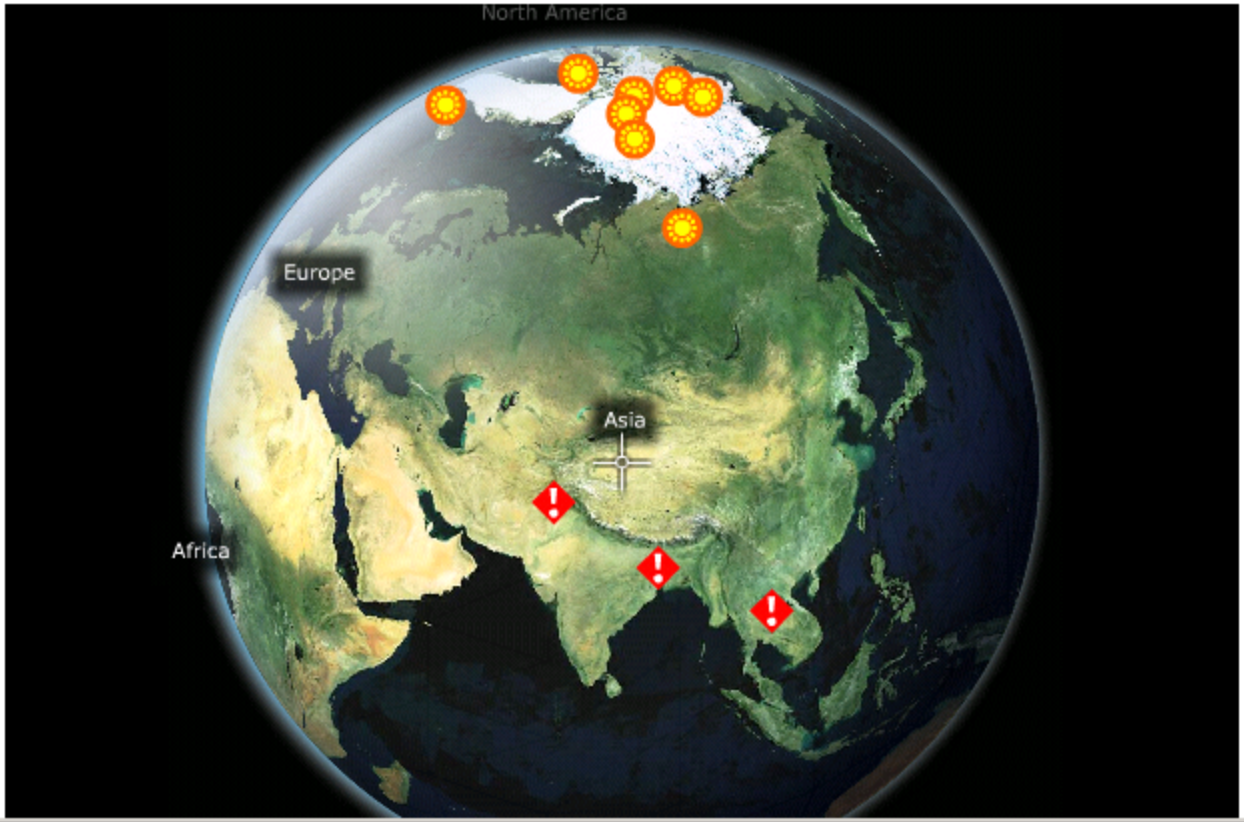
Provide Feedback to GEO

BROWSE RESOURCES BY SOCIAL BENEFIT AREAS

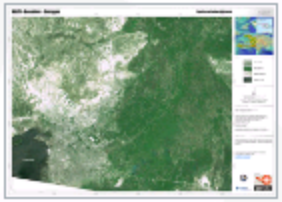
- DISASTERS
- HEALTH
- ENERGY
- CLIMATE
- WATER
- WEATHER
- ECOSYSTEMS
- AGRICULTURE
- BIODIVERSITY



BREAKING NEWS

HURRICANES IN HAITI, EXTENSION OF CALL

On 11 September charter activation 220 was extended for a third time to cover the area hit successively by Hurricane Gustav, Hurricane Hanna, and Hurricane Ike, as the city of Gonaives remained under water and media reported about 500 dead.



More...

WELCOME TO GEOPORTAL

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Provide Feedback to GEO

SELECT A COUNTRY/CONTINENT

Select a Region

BROWSE RESOURCES BY SOCIAL BENEFIT AREAS

- DISASTERS
- HEALTH
- ENERGY
- CLIMATE
- WATER

- Water Cycle
- Resource Management
- Impacts of

Browsing for: Water

WATER

Information Services (118)

View All

- Early warning (5)
- Monitoring services (14)
- Analysing services (7)
- Mapping services (12)
- Assessment services (5)
- Alert systems (1)
- Geospatial web services (12)
- Data processing (2)
- Data Provision (61)

International Initiatives (12)

View All

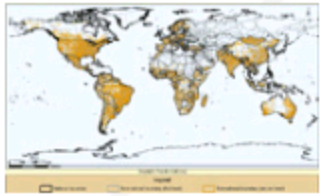
Asian Water Cycle Initiative
The Asian Water Cycle Initiative's goal is to better understand the mechanism of Asian water cycle variability and to improve its predictability, and ...
more ...

DIVERSITAS
DIVERSITAS was established in 1991, with the goal of developing an international, non-governmental umbrella programme that would address the complex s ...
more ...

EGY - Electronic Geophysical Year

Service Providers (75)

IMAGES



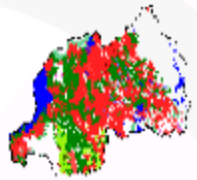


IMAGE GALLERY

MAPS

Data Provision (61)

ADDS - African Data Dissemination Service

The African Data Dissemination Service (ADDS) provides Internet access to the data collected for the FEWS NET activity.

The Goal of the Fa ...

more ...

Atlas of the Cryosphere

The National Snow and Ice Data Center (NSIDC) Atlas of the Cryosphere is a map server that provides data and information pertinent to the frozen regio ...

more ...

CEOS IDN - CEOS International Directory Network

The CEOS International Directory Network (CEOS IDN) is an international effort developed to assist researchers in locating information on available da ...

more ...

Demonstration EO application profile WMS server

The WMS application profile for EO products specifies how a WMS may be used to interactively browse and evaluate the spatial metadata (bitmasks) assoc ...

more ...

Earthnet OnLine

Earthnet Online is the entry point for scientific-technical information on Earth Observation activities by the European Space Agency (ESA).

Th ...

more ...

ECHO - Earth Observations System ClearingHOuse

The Earth Observations System ClearingHOuse (ECHO) is a clearinghouse of spatial and temporal metadata enabling the science community to exchange data ...

more ...

EEA Data service

The data service provides almost all data sets and applications which have been used in European Environment Agency's periodical environmental reports ...

more ...

Envisat Data Dissemination System - DDS

Hydrological Applications and RunOff Network (HARON)

Rationale

- ***The innovation HARON brings is the provision of near real-time monitoring of large scale rivers and lakes from existing in-situ observation infrastructures, combined with satellite observations based on radar altimetry, to establish an enhanced infrastructure for water in hydrological research and water resource management.***

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FP7-SPACE-2009

- **The objective of the FP7 space work programme is to support a European Space Policy focusing on applications such as GMES (*Global Monitoring for Environment and Security*), with benefits for citizens…**

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SPA.2010.1.1-04 Stimulating the development of GMES services in specific areas

Projects may develop products and services for

- **efficient water resource management and usage (including issues relating to agricultural production, river basin characteristics, monitoring changes in the state of irrigated areas, the ecological environment and flood management)**
- **identifying vulnerabilities related to water based on relevant long-term observations (including trends on available water resources and support to projections of changes in floods and droughts).**

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Sea level monitoring

- **Long-term monitoring of sea level and its regional variability by satellite altimetry is a priority currently recognised by several international programmes:**
  - **Global Climate Observing System (GCOS)**
  - **International Geosphere Biosphere Programme (IGBP)**
  - **World Climate Research Programme (WCRP)**

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"The Global Earth Observation System of Systems (GEOSS) is a coordinating and integrating network of Earth observing and information systems, contributed on a voluntary basis by Members and Participating Organizations of the intergovernmental Group on Earth Observations (GEO)."

- ***To support informed decision making for society, including the implementation of international environmental treaty obligations.***

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"Improving water-resource management through better understanding of the water cycle "

GEO 10-Year Implementation Plan

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Thank you!

dcripe@geosec.org

earthobservations.org