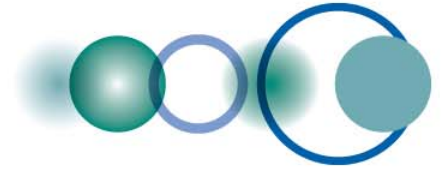


The GEO, GEOSS and QA4EO

Rob Koopman
GEO Secretariat

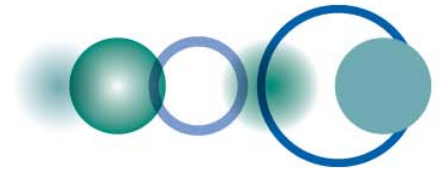
QA4EO workshop,
Antalya 29/09 - 01/10/2009





Overview

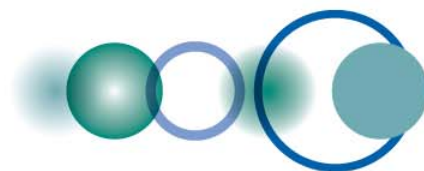
- GEO and GEOSS
 - Introduction
 - Successes
 - Challenges
- GEOSS in practice
- GEO and QA4EO



GEO, the Group on Earth Observations

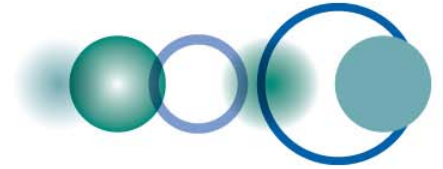
An Intergovernmental Organization with **80** Members
and **56** Participating Organizations





THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS



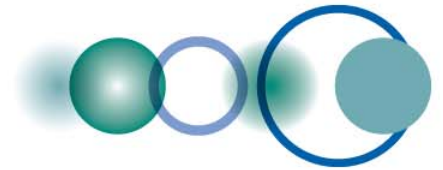


The Cape Town Ministerial Summit, 2007

The Summit was the opportunity:

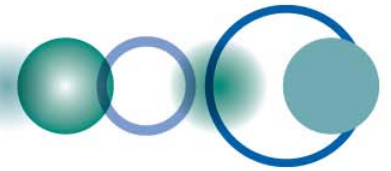
- To highlight **early progress** of GEO and **key achievements** in the Implementation of GEOSS (The First 100 Steps to GEOSS, The Full Picture)
- For Ministers to commit to emerging priorities through **The Cape Town Declaration.**





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.



G8 L'Aquila Summit 2009

RESPONSIBLE LEADERSHIP FOR A SUSTAINABLE FUTURE

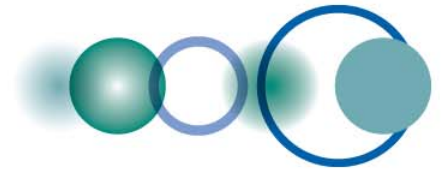


Natural disasters

To address the increased threats of **natural disasters** and **extreme weather phenomena** caused by **climate change**, such as increased flooding, storm surges, droughts and forest fires, we will act to **improve risk preparedness**, prevention, **monitoring** and response times, particularly in **developing countries**, by:

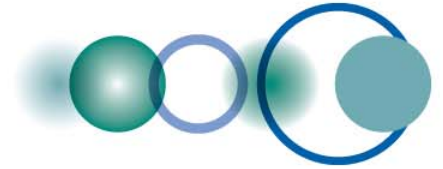
a) defining common guidelines for disaster prevention and management to be used in developing national plans, in collaboration with the UN International Strategy for Disaster Reduction (UNISDR) and the World Meteorological Organisation (WMO), building on the Hyogo Framework for Action and on national experiences, as well as improving management of risks, awareness raising and training of the population and civil protection real-time response, such as logistical support for emergency situations;

b) supporting the ongoing work on the development of the Global Earth Observation System of Systems (GEOSS).

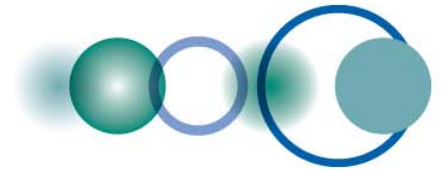


A Global, Coordinated, Comprehensive and Sustained System of Observing Systems





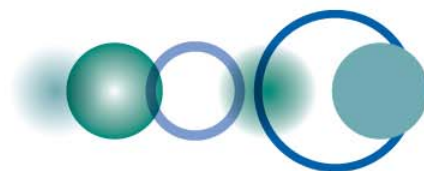
- Develop and Connect Observing Systems and Ensure Access to Data**
- Integrate Observations and Models to Develop Information Systems**
- Foster Regional Cooperation**



GEO Progress

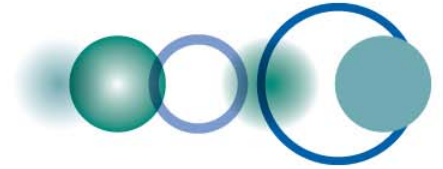


- **EOS I – July 2003: Washington DC**
 - 34 Members
 - 20 International Organizations
- **EOS II – April 2004: Tokyo**
 - 47 Members
 - 26 International Organizations
- **EOS III – February 2005: Brussels**
 - 60 Members
 - 34 International Organizations
- **EOS IV – Nov 2007: Cape Town**
 - 74 Members
 - 52 International Organizations
 - First Ministerial Meeting Since 10 Year Plan Adopted
- **EOS V – Nov 2008: Bucharist**
 - 75 Members
 - 51 International Organizations
- **EOS VI – Nov 2009: Washington DC**
 - 80 Members
 - 56 International Organizations

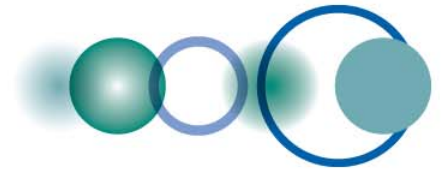


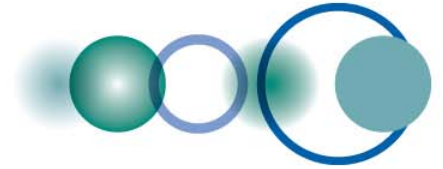
THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS





Successes

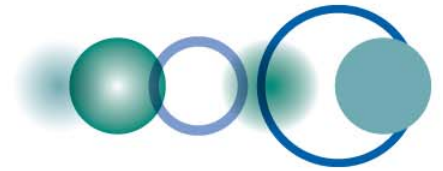




The Tower of Babel

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





GEO Portal (ESRI, Compusult, ESA)

GEOPortal - GEO-Portal - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.geoportal.org/web/guest/geo_home

BBC IHT igwco wmo wmo-portal CSU ATS GTN-R Google Translate

GEO - Group on Earth Observations | GEOPortal - GEO-Portal

GEO GROUP ON EARTH OBSERVATIONS | **GEO Portal** | **esa**

HOME ABOUT GEOPORTAL CONTACTS NEWS MAP VIEWER go ADVANCED SEARCH DOWNLOAD GEOPORTAL ABOUT GEO

Provide Feedback to GEO

BROWSE RESOURCES BY SOCIAL BENEFIT AREAS

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

Europe Asia

South America Africa Africa

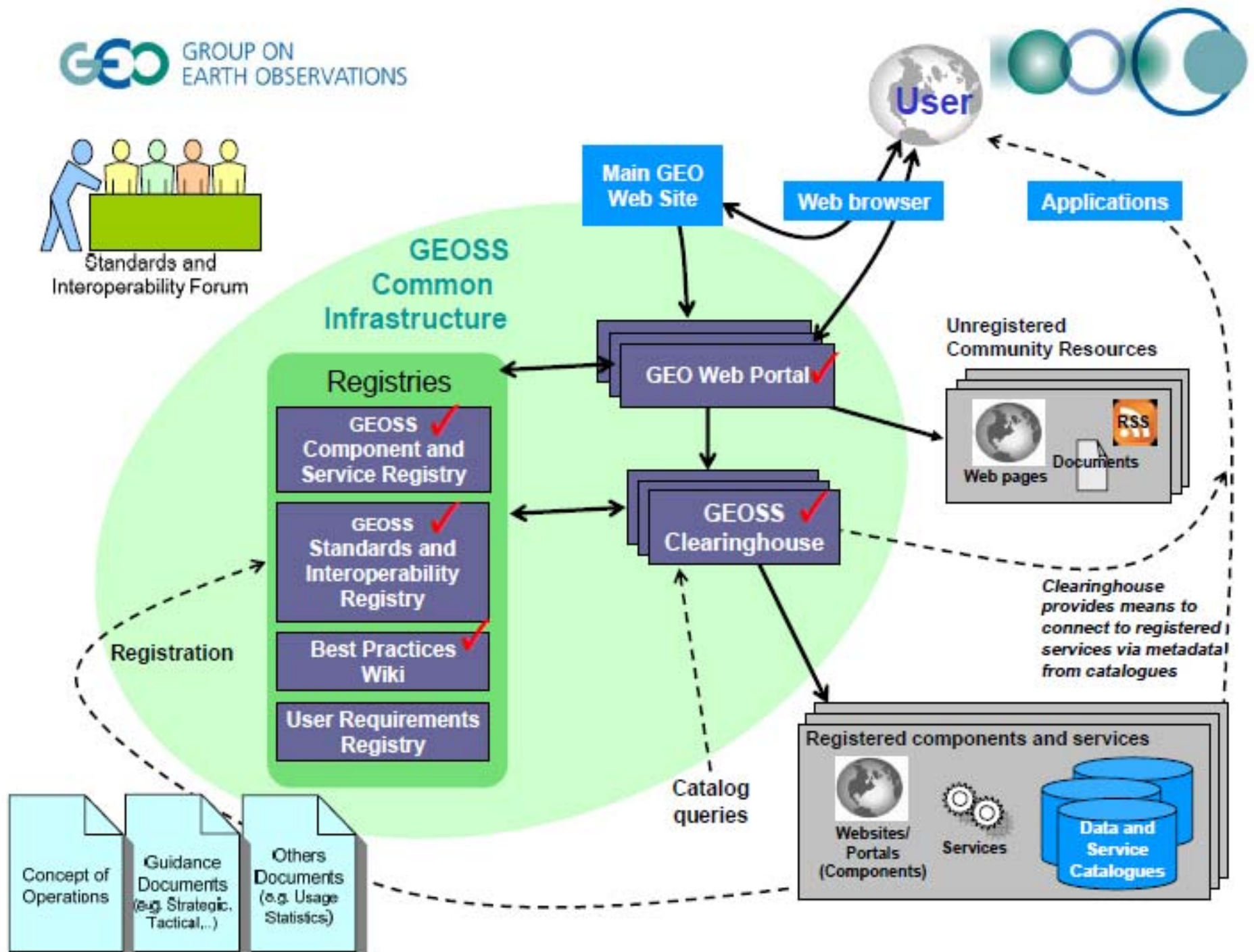
The planet's 2nd largest continent, includes (53) individual countries. It contains the Nile River, the world's longest,

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...](#)





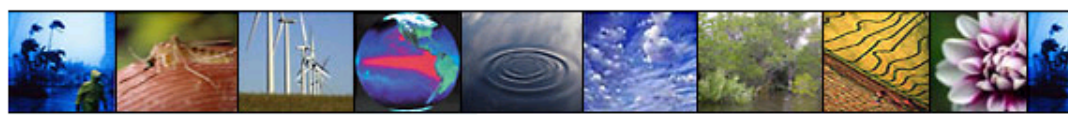
The Global Earth Observation System of Systems (GEOSS)

GEOSS themes:

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

GEOSS
Common Infrastructure
 GEO Portal
 Components Registry

Home



Are you new to GEO and GEOSS? Find out more [here!](#)

Highlights

The GEOSS Common Infrastructure (GCI)		
Evaluating the GEO Portal prototypes	Components registration	Standards registration
Evaluate the GEO Portals	Register your components	Register your standards here
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.	The GEO community is invited to register its data bases, catalogues, services and tools in the GEOSS Components and Services Registry	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 Iguagu, Brazil from 4 to 7 November. The goal of the Symposium is to advance international collaboration on monitoring the

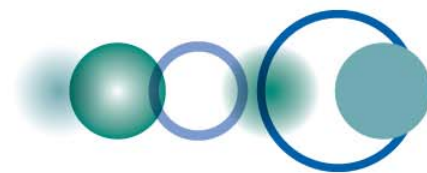
What's new?

GEO joins forces with Biodiversity Convention

The member governments of the Convention on Biological Diversity adopted a decision last May formally recognizing the role that GEOSS can play in achieving the Convention's goals. In an effort to enhance their collaboration on meeting governments' expectations, the heads of the GEO and CBD Secretariats signed a Memorandum of Understanding on 8 September. The MOU is posted [here](#).

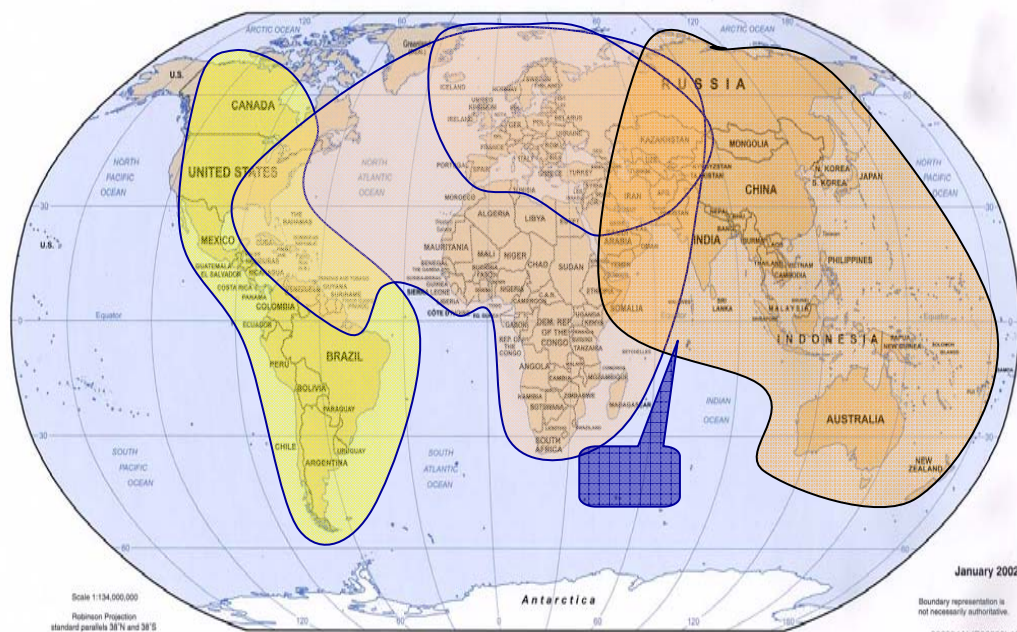
Estonia becomes the 75TH member of GEO

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



GEONETCast

A Space-based Dissemination System for Data, Products, Services and Early Warning



Global Coverage

Contributors

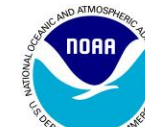


EUMETSAT



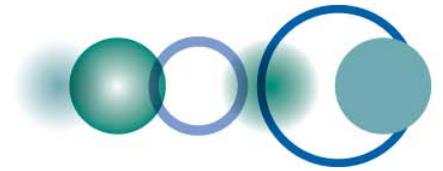
CMA

中国气象局
www.cma.gov.cn



NOAA

ROSHYDROMET

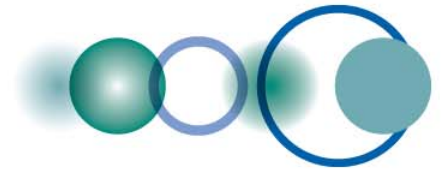


GEONETCast Receiving Stations

- Dedicated personal computer (~ \$1000)
- Satellite antenna dish (1-3 m) (~ \$300-1200)
- DTH receiver card or box (~ \$200)



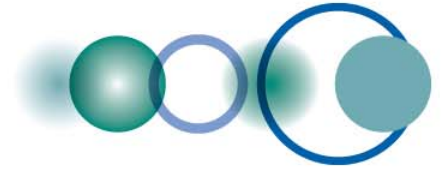
Data analysis and processing should be done on separate computer(s)



GEO Data Sharing Principles

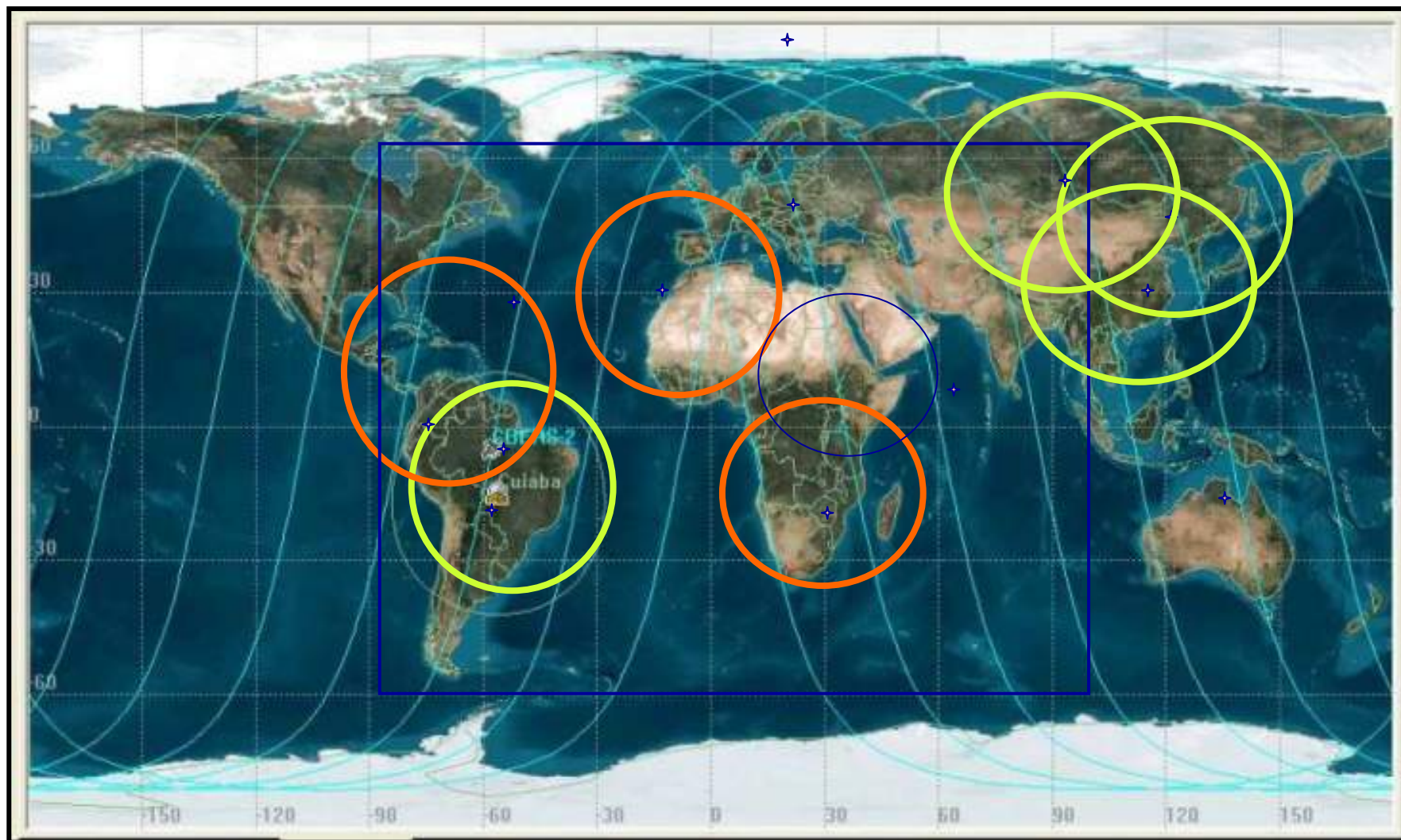
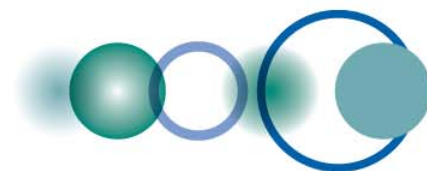
- **Full and Open Exchange of Data, recognizing Relevant International Instruments and National Policies**
- **Data and Products at Minimum Time delay and Minimum Cost**
- **Free of Charge or minimal Cost for Research and Education**

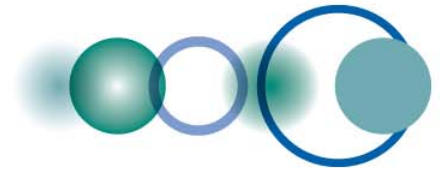




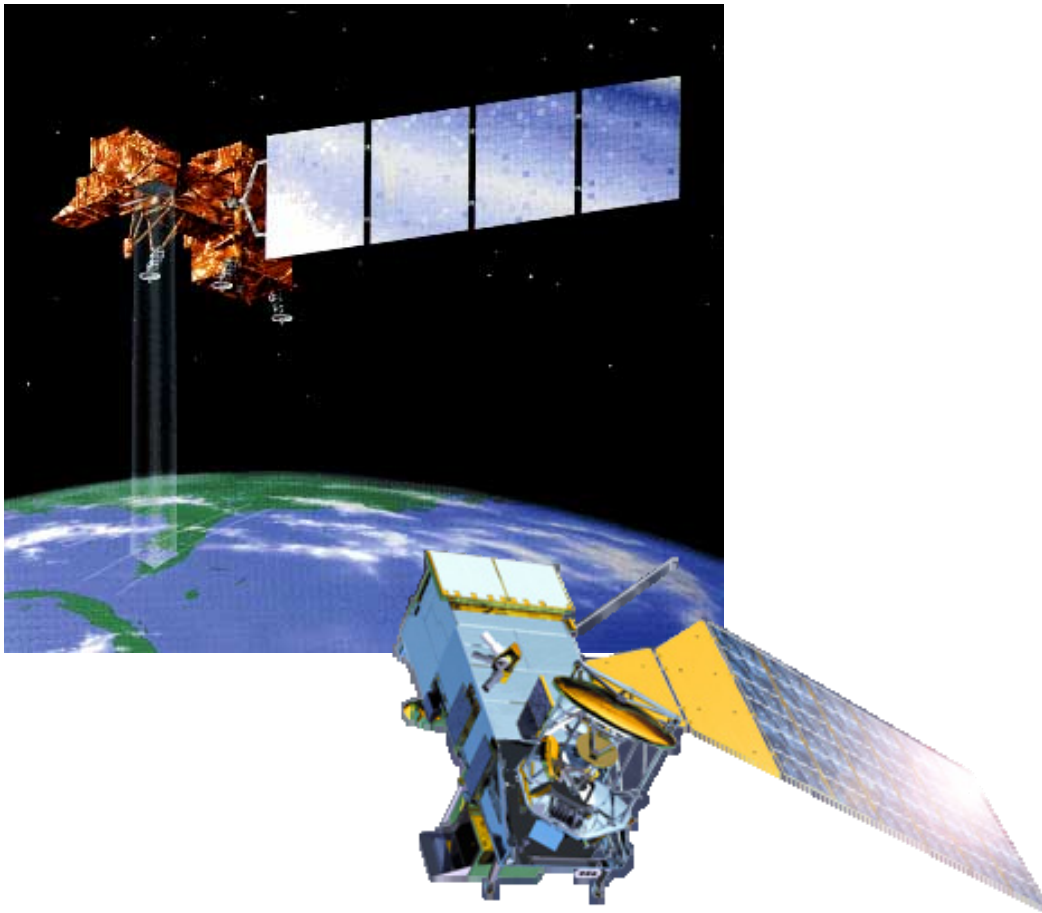
Free and Open Access to CBERS Data in Africa and the Caribbean (China, Brazil, RSA, Spain, Egypt)



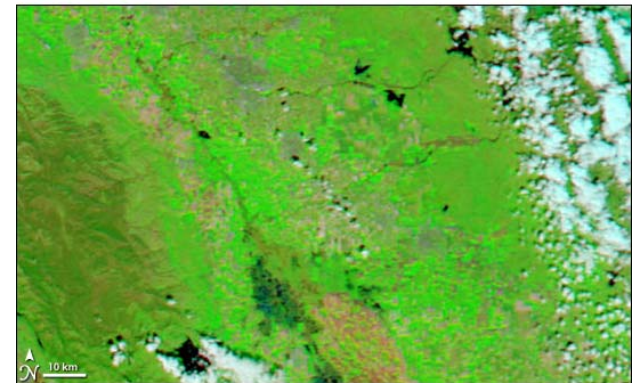




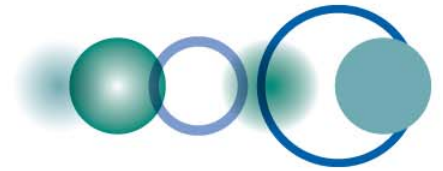
Free and Open Access to the LANDSAT Archive (USGS - USA)



April 13, 2006

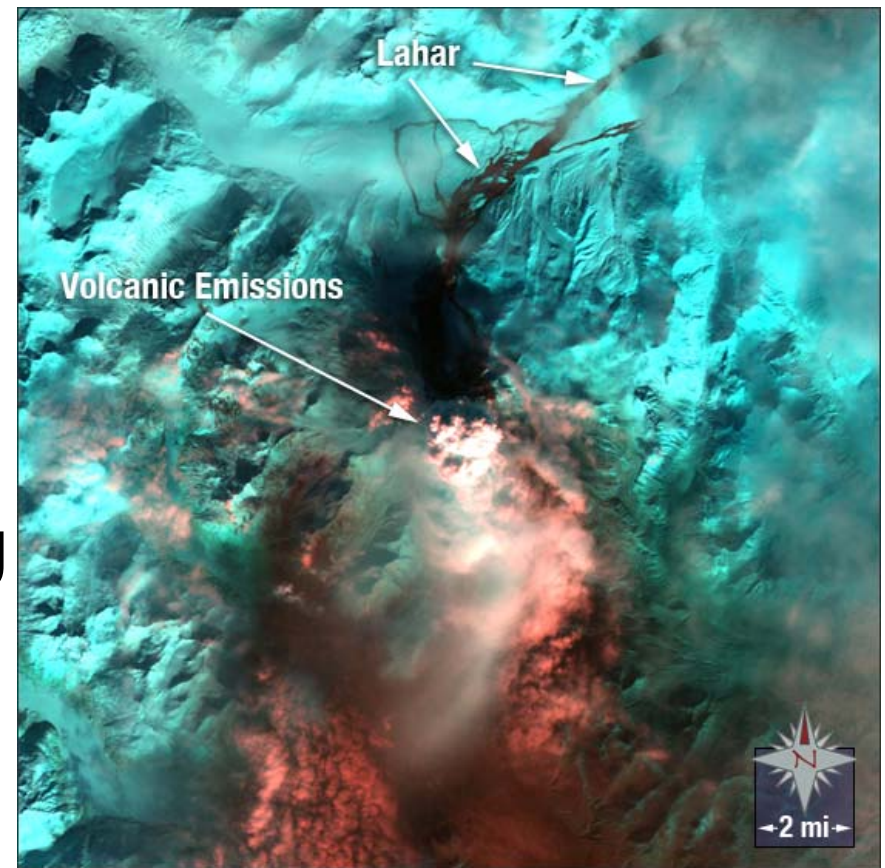


March 19, 2006



Land Surface Imagery value to GEOSS

- Ecosystems management
- Water management
- Climate modeling
- Global change research
- Disaster management
- Oil and mineral exploration
- Agricultural yield forecasting
- Pollution monitoring
- Land surface change
- Cartographic mapping
- Forests monitoring

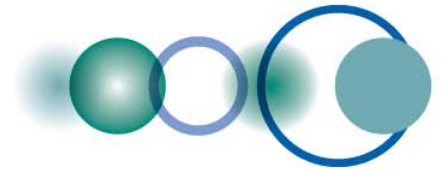


[Mount Redoubt Eruption](#)

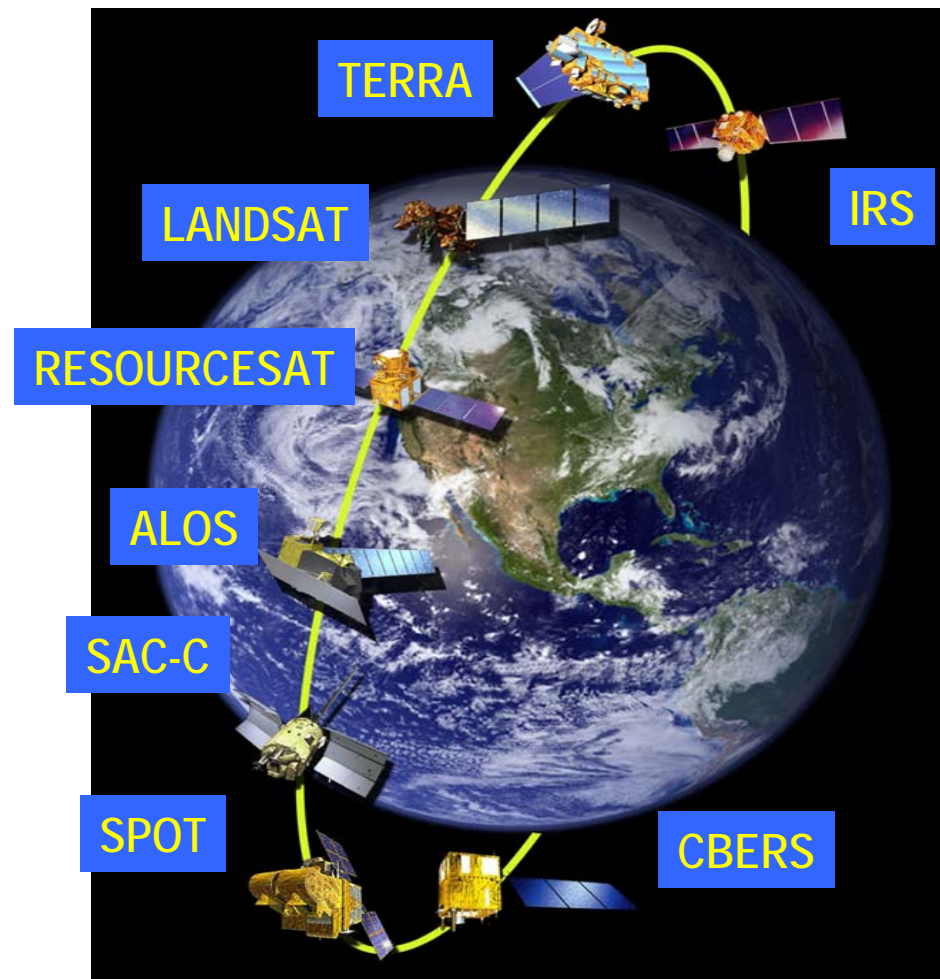
March 22, 2009, the Alaskan stratovolcano Mount Redoubt started a succession of eruptions

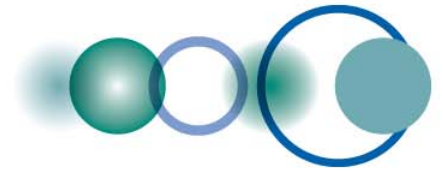


- Accepted concept of granting direct access to GEO Members
- Activated for GEO Member Ukraine during flooding
 - Through the intervention of GEO upon request of support from Ministry of Environment
 - 31 July request - activation 1 August
- Discussion is ongoing to consolidate framework for allowing practical implementation of concept
 - Identification of sub-regional centers

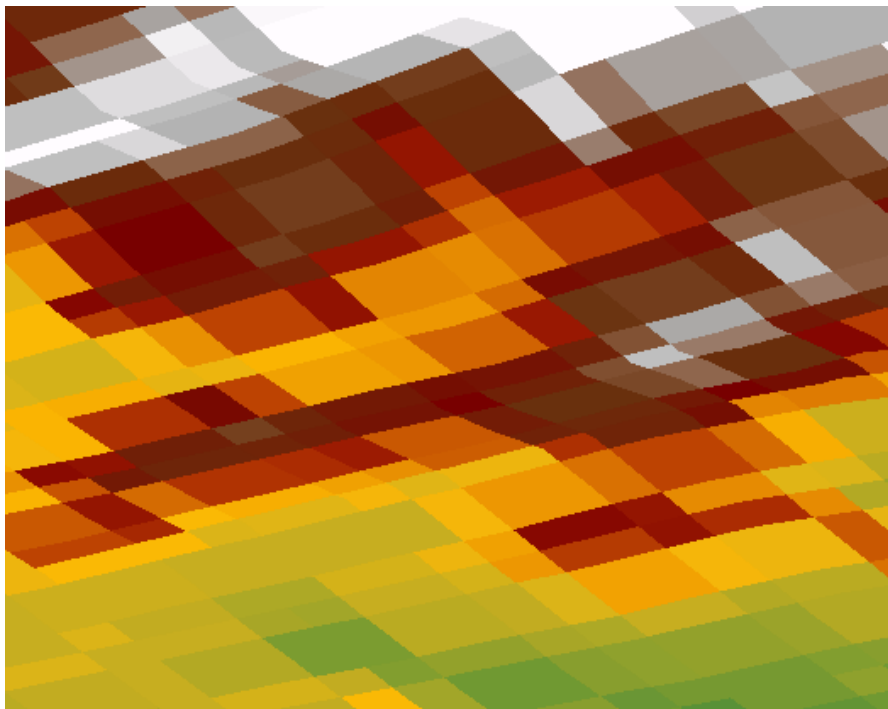


Access to Imagery with the Land Surface Imaging Constellation (CEOS)



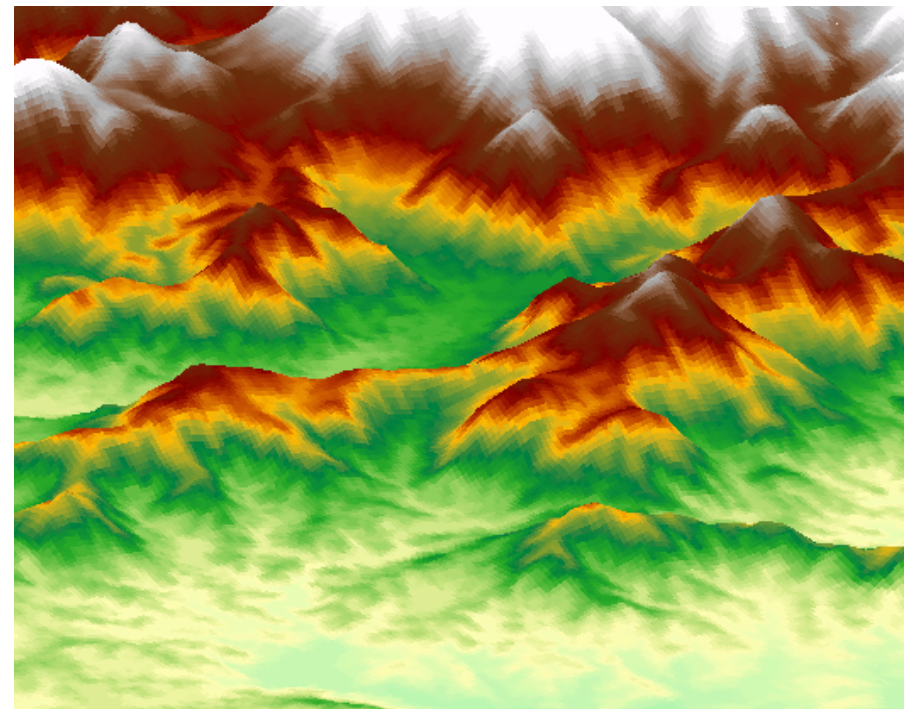


A global DEM at 30 meter resolution derived from ASTER data



90 m

Comparison courtesy of V. Gorokhovich, CIESIN

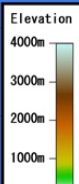


30 m

ASTER Global DEM of Japan

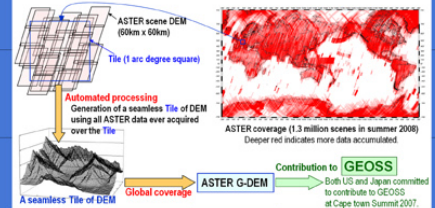
Freely accessible
online since
release on
29 June '09

30 metres spatial resolution



Features of ASTER G-DEM

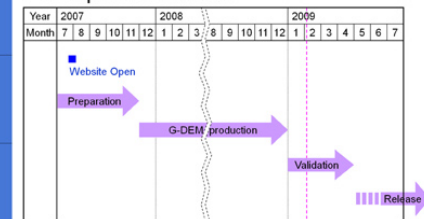
- International joint project between METI and NASA.
- Generation of seamless DEM globally using about 1.3 million ASTER data
- Available for high-latitude zone and steep mountainous areas
- Enhanced accuracy due to the use of multiple ASTER data



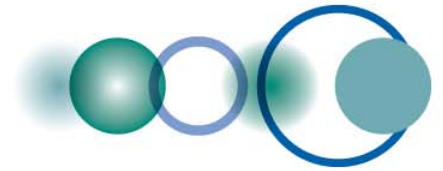
Characteristics of ASTER G-DEM

	ASTER G-DEM	SRTM3 Shuttle Radar Topography Mission Data at 3 Arc-seconds	GTOPO30 Global 30 Arc-Second Elevation Data Set
Data source	ASTER	Space shuttle radar	From organizations around the world that have DEM data.
Generation and distribution	METERSDAC NASA/USGS	NASA/ANGA/USGS	USGS
Release	2009 ~ (plan)	2003 ~	1996 ~
Data acquired period	2000 ~ 2008	11 days (in 2000)	
DEM grid size	30m	90m	1000m
DEM accuracy (stdev.)	±7m ~ (expectation)	±10m ~	±30m
DEM coverage	83 degrees north - 83 degrees south	60 degrees north - 56 degrees south	Global
Area of missing data	Areas with no ASTER data due to constant cloud cover	Topographically steep area (due to radar characteristics)	None

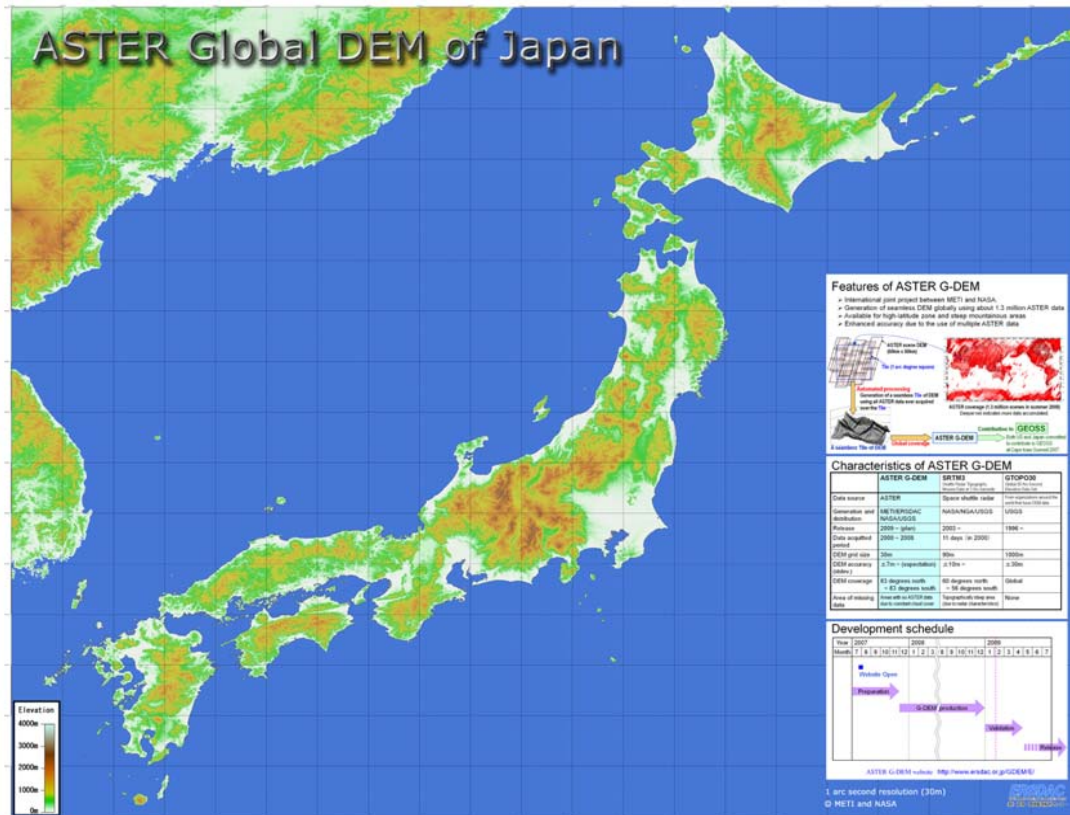
Development schedule

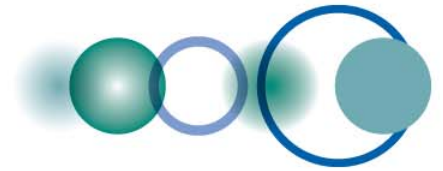


ASTER G-DEM website <http://www.ersdac.or.jp/GDEM/>

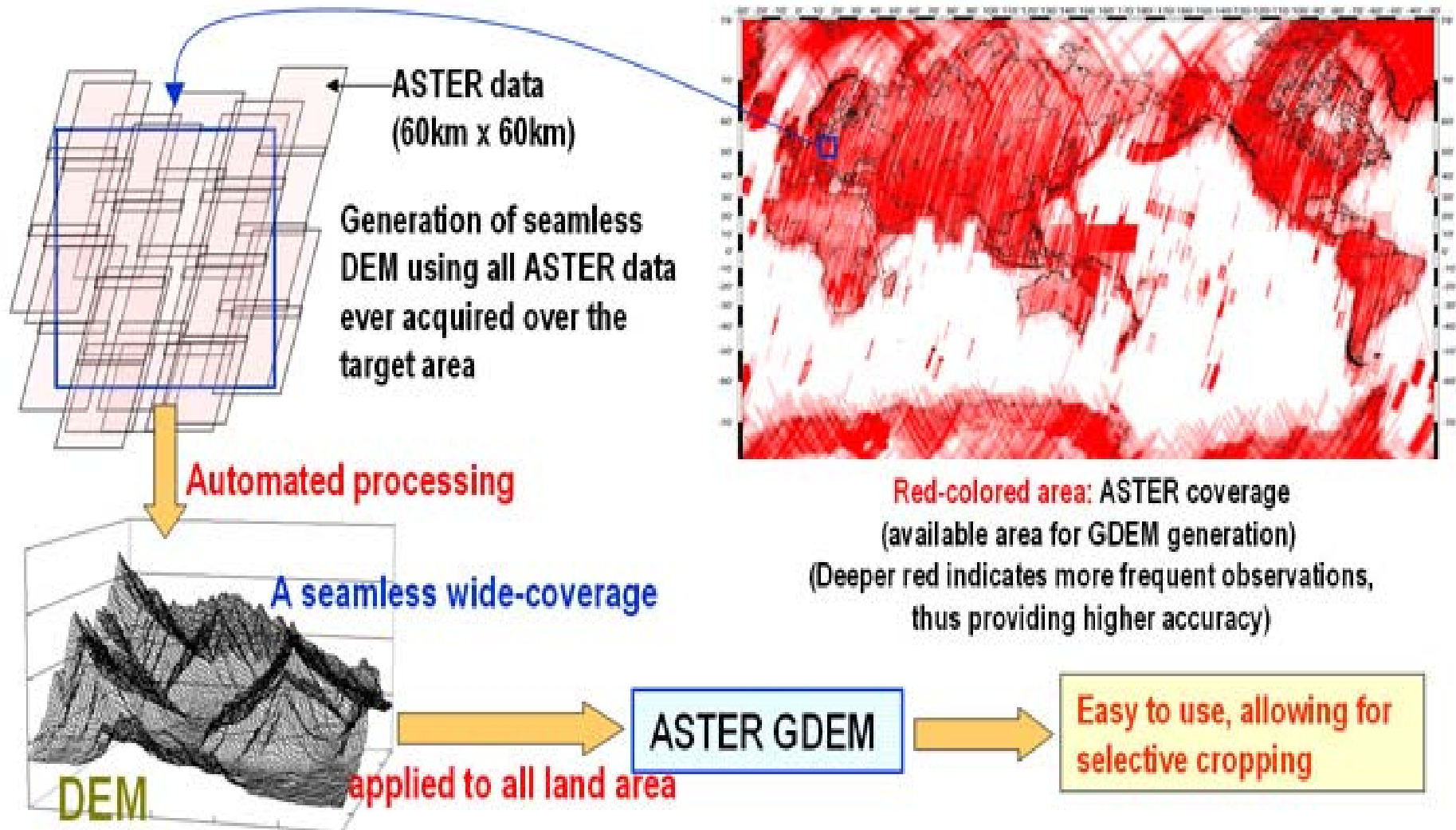


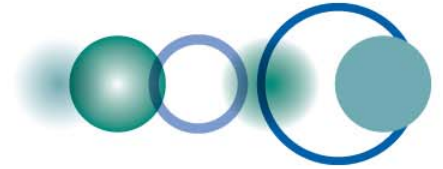
A global DEM at 30 meter resolution from ASTER data freely accessible online since release on 29 June 2009



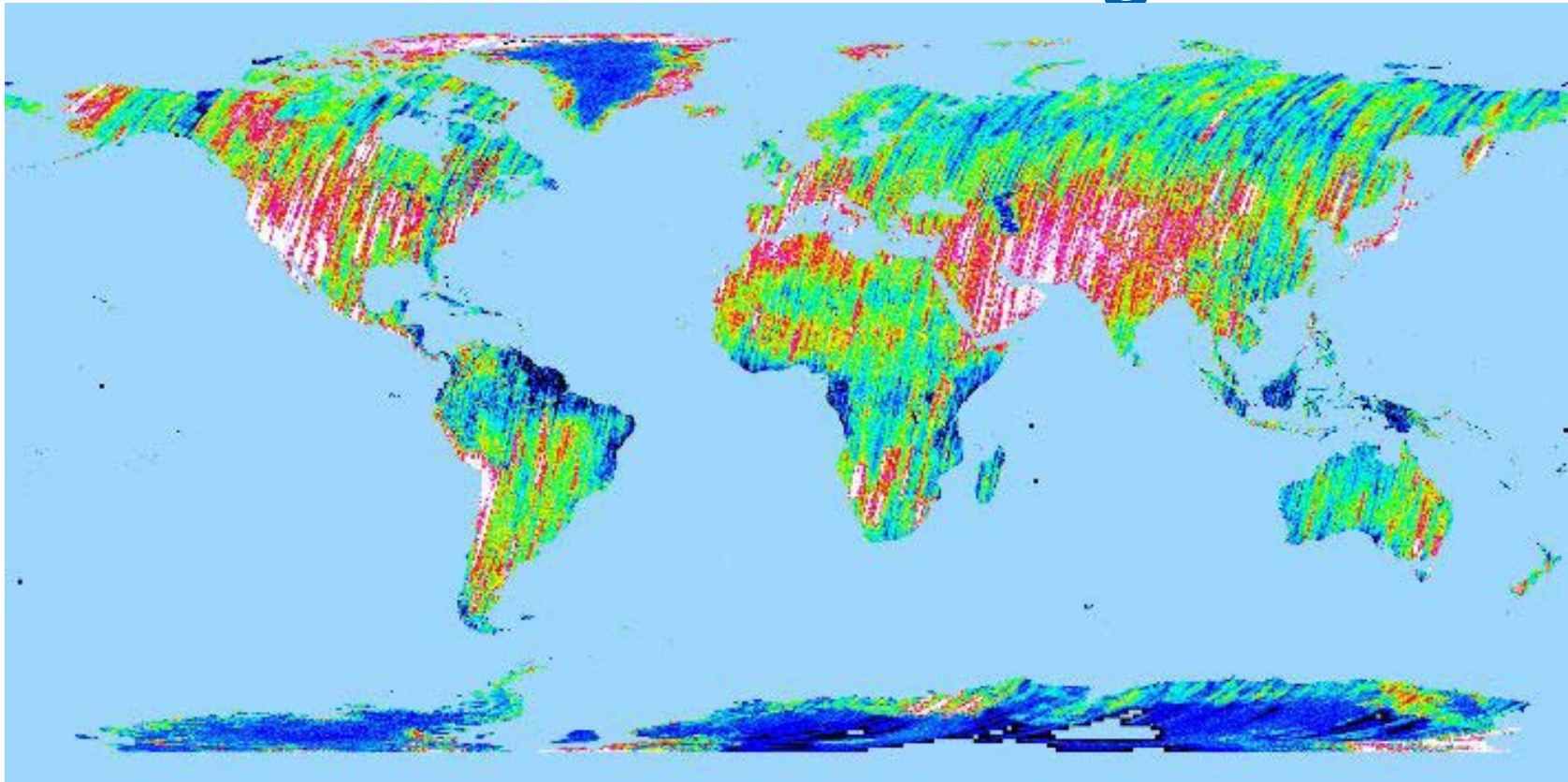


ASTER Global DEM generation





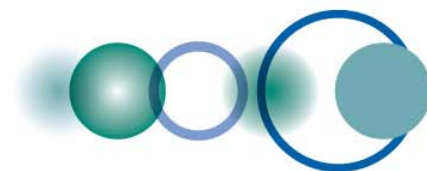
ASTER GDEM stacking number



経済産業省
Ministry of Economy,
Trade and Industry

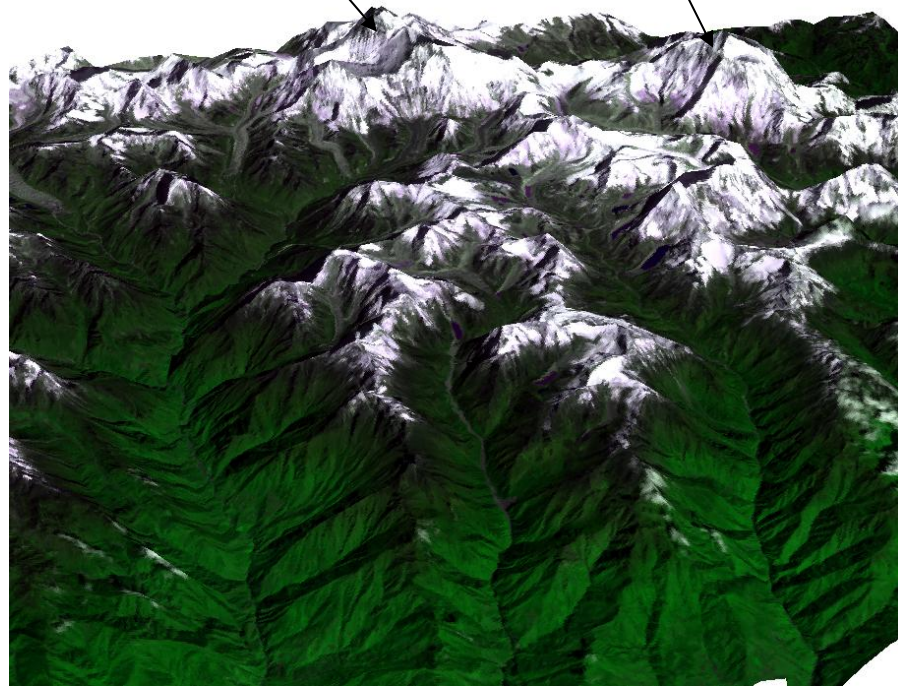


USGS
science for a changing world.



Mt. EVEREST

Mt. Kanchenjunga

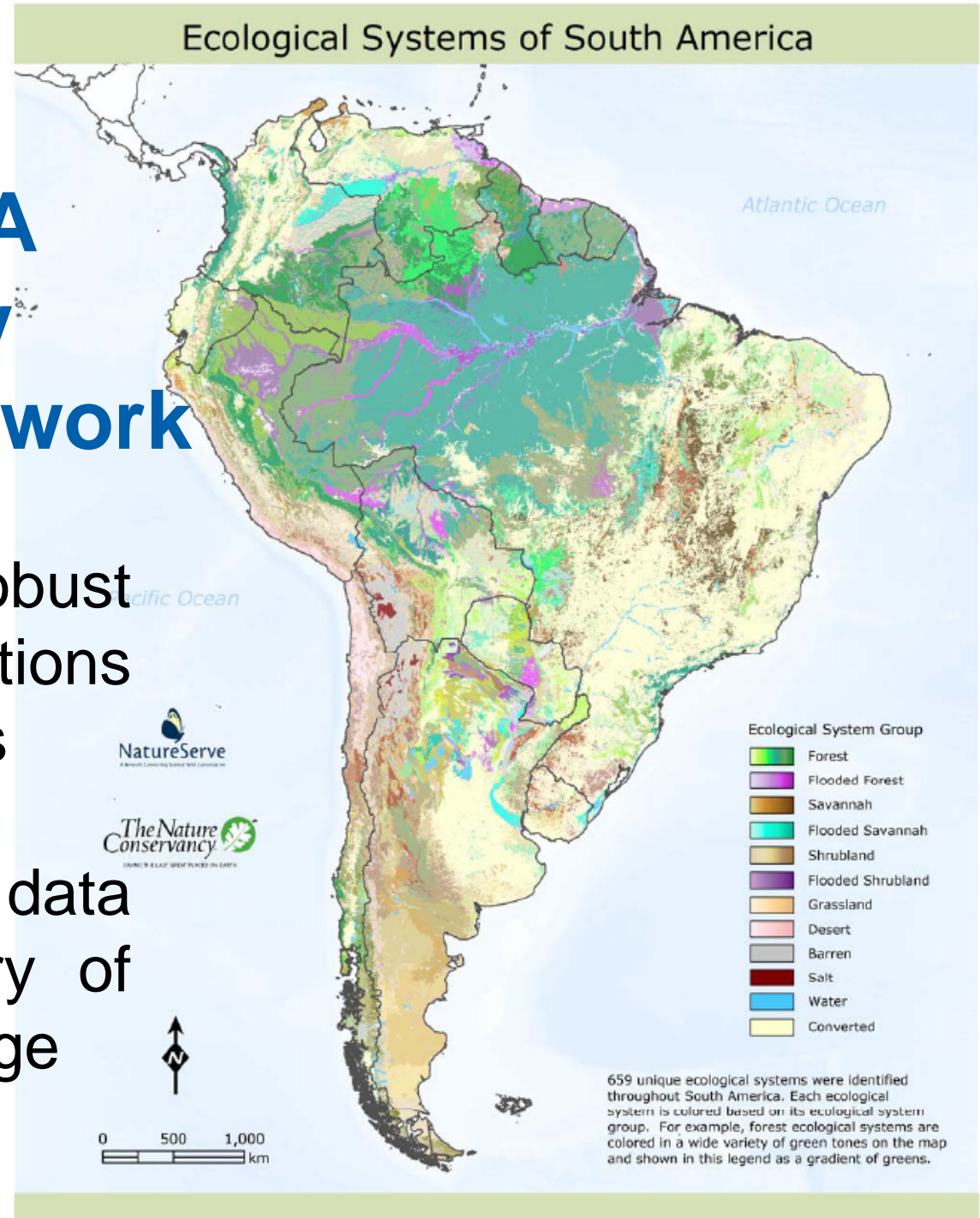


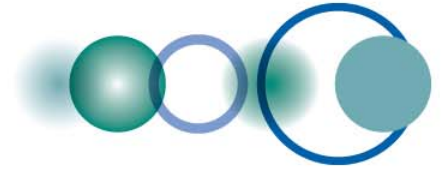
SRTM

ASTER

GEO BON : A Biodiversity Observation Network

- Provide a global, robust framework for observations of biodiversity changes
- Coordinate the data gathering and delivery of biodiversity information

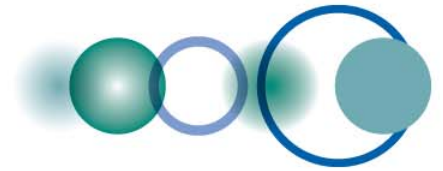




GEO Biodiversity Observation Network

- Established April 2008 with 100+ members
- Eight Topical Working Groups on implementation
- Community of Practice
- Steering Committee Chaired by Bob Scholes, CSIR, South Africa

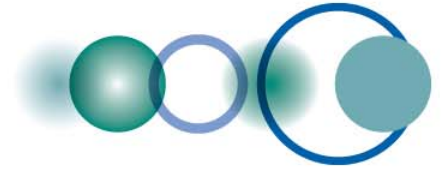




GEO BON and the Convention on Biological Diversity

- CBD Decision IX/15: *invites* Parties, other Governments, relevant organizations, scientists and other relevant stakeholders to support GEO BON
- COP-10, Nagoya, 2010
- Need for a 2010 baseline
- Improved measurements of future trends





Forest Carbon Tracking (Australia, Brazil, Finland, Japan, Norway, USA, EC, FAO, GOFC-GOLD, CEOS)

To implement an operational information system (observations, processing to relevant forest cover information and information distribution), able to support National level assessments and international agreements.



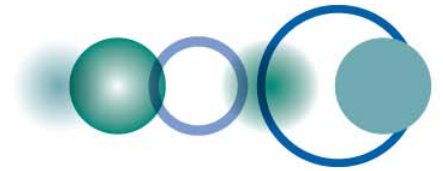


Forest Mapping and Carbon Tracking

- ❖ Forest monitoring is essential to tackling climate variability and change, dealing with adaptation and evaluating other services.
- ❖ GEO is working actively on forest monitoring and is developing a collaborative forest monitoring system which will
 - consolidate observation requirements and reference products;
 - coordinate the provision of remote sensing data
 - integrate data from different sources in order to ensure operational observations and relevant products;
 - define and activate a limited number of test sites for pilot projects focused on in situ observation, validation of methodologies and tools, and capacity building.
 - Led by Australia, Finland, Japan, Norway, USA, the European Commission, FAO, GOFC-GOLD, CEOS and GTOS.

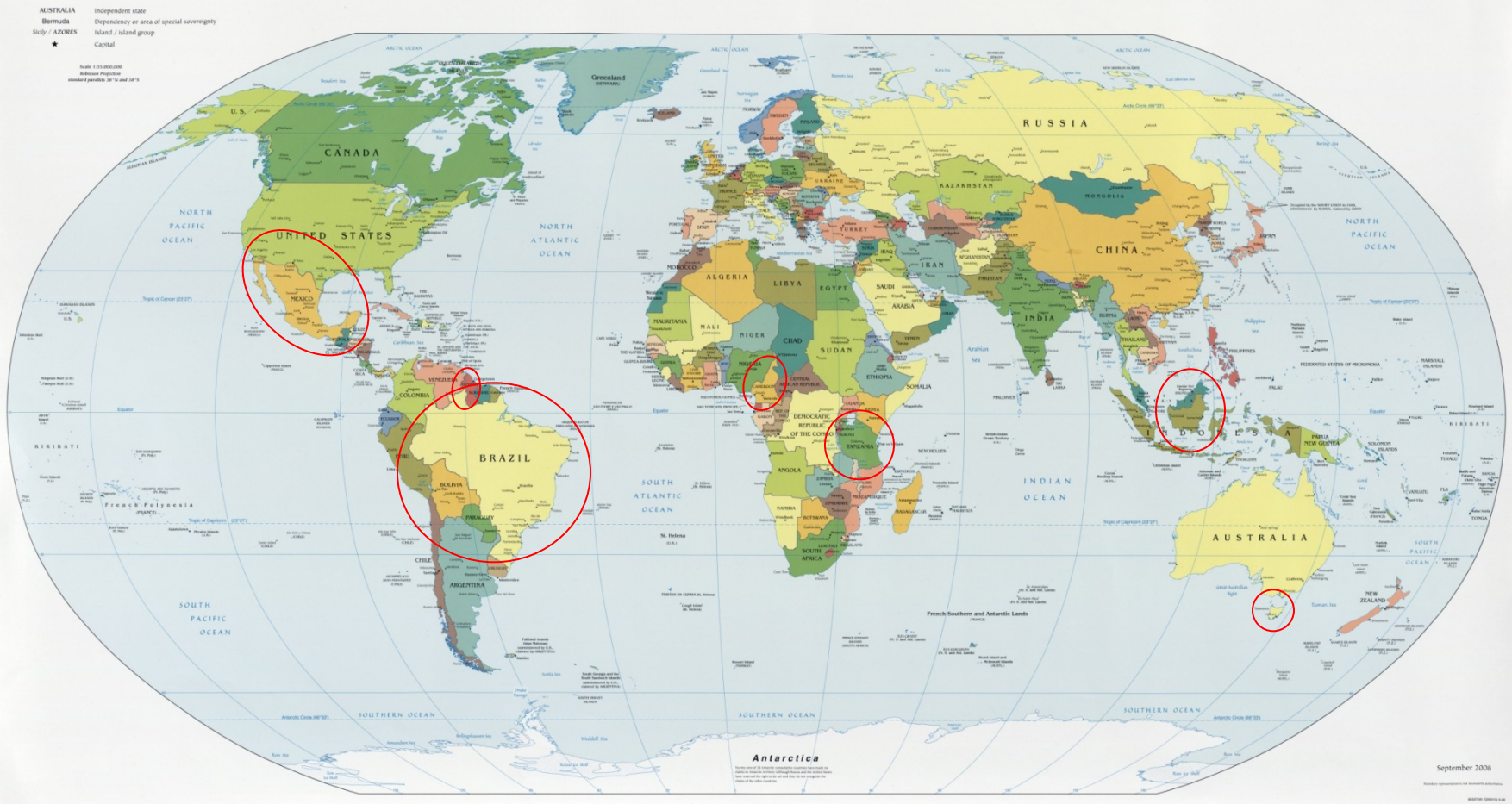
**Initial results to be obtained in time for their presentation
to UNFCCC COP 15 – December 2009**

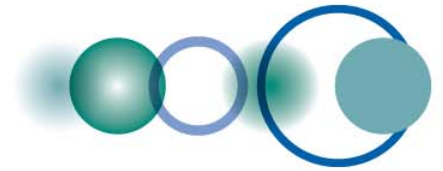




National Demonstrators

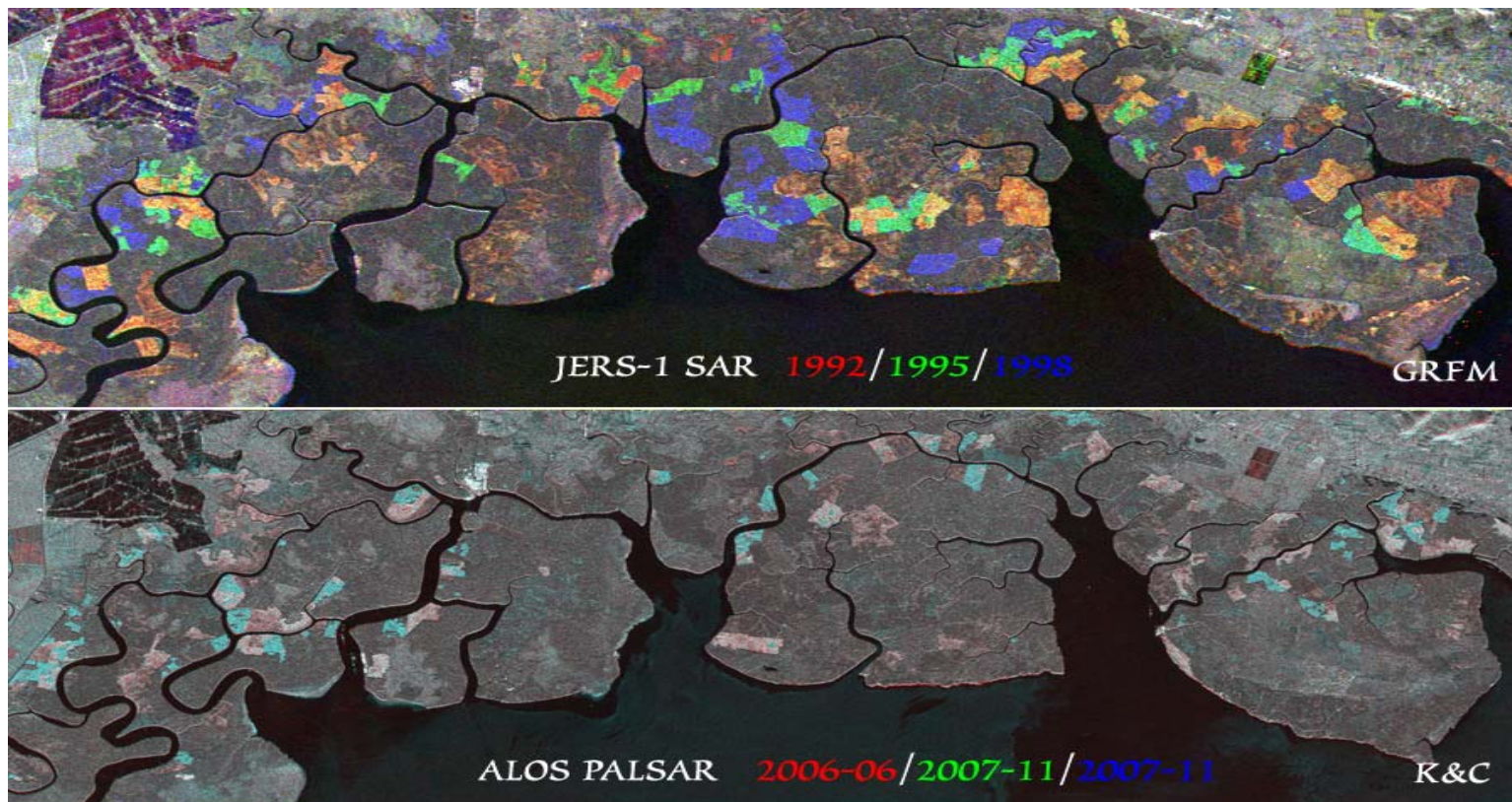
Political Map of the World, September 2008

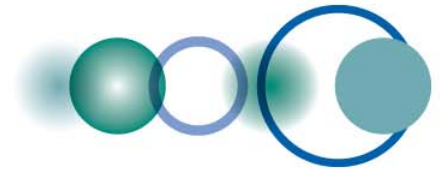




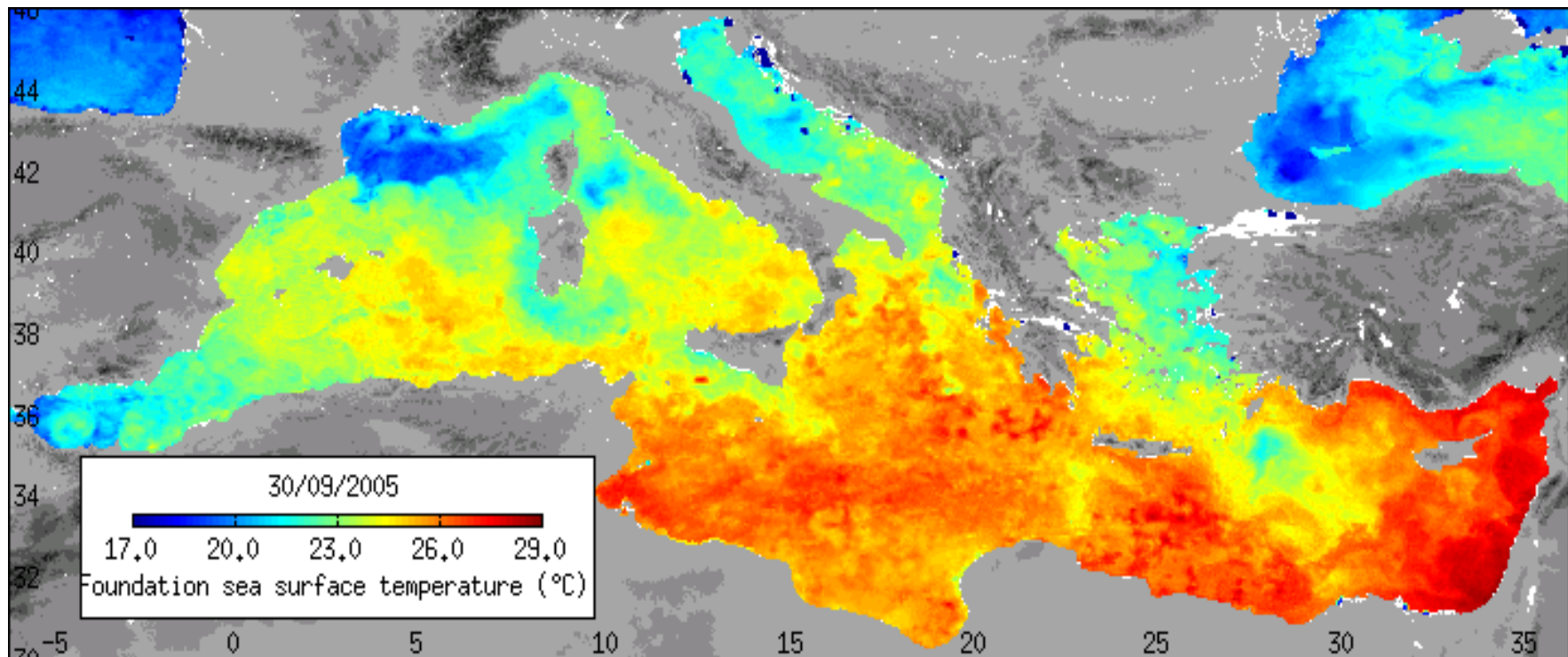
Forest Carbon Tracking

Space agencies, through CEOS, have confirmed their support to the Task and data acquisition over these Demonstrators has started.





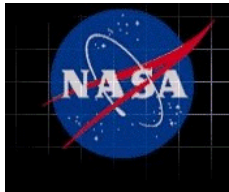
High Resolution Mediterranean Sea Surface Temperature from 4 different satellites



The Medspiration project combines SST data measured independently by different satellites into a set of products that represent the best measure of SST, presented in a form that can be assimilated into numerical ocean forecasting models.



SERVIR: Geospatial One Stop Shop for Disaster Management in Central America & Mexico

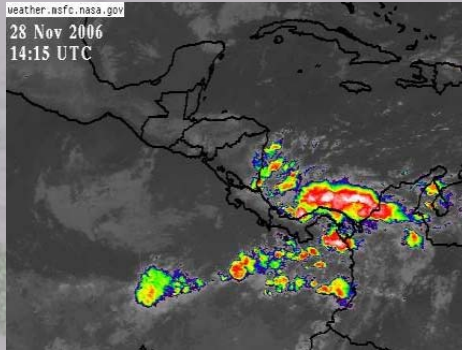
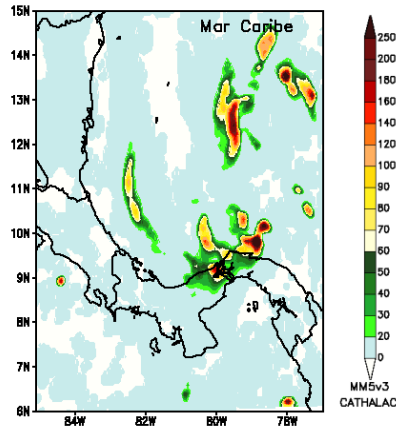


USAID
FROM THE AMERICAN PEOPLE



SERVIR Response to Flooding in Panama, November 2006

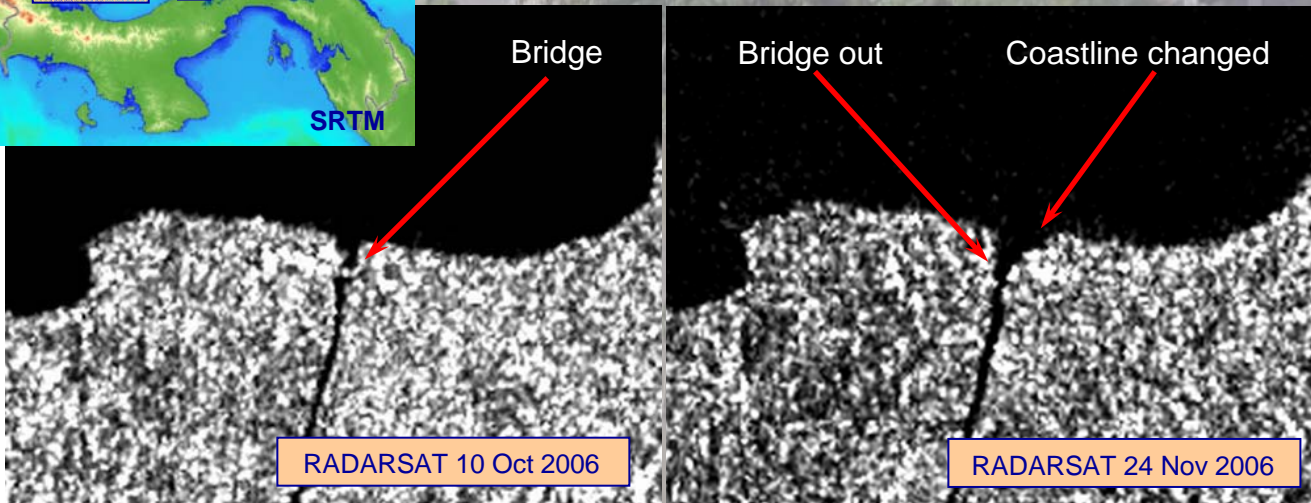
3-hour Peak Rainfall
23 Nov 2006 08UTC



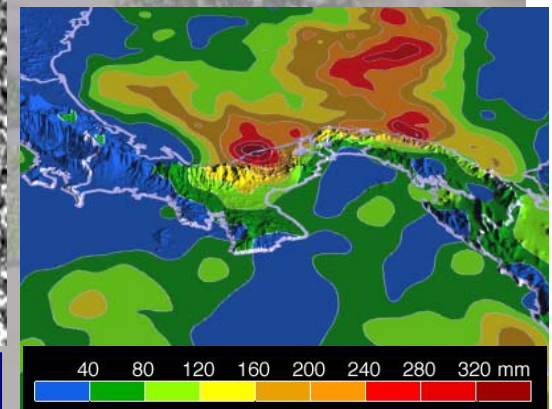
Met products such as MM5 (left), WRF, and SPoRT model outputs, along with GOES imagery (above), provide a continuous support mechanism for decision makers.



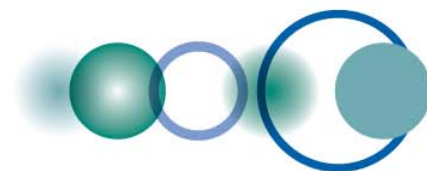
Panamanian President Martin Torrijos (left) consults with meteorologist Annette Quinn and Director of CATHALAC Emilio Sempres at the SERVIR facility in the City of Knowledge, Panama.



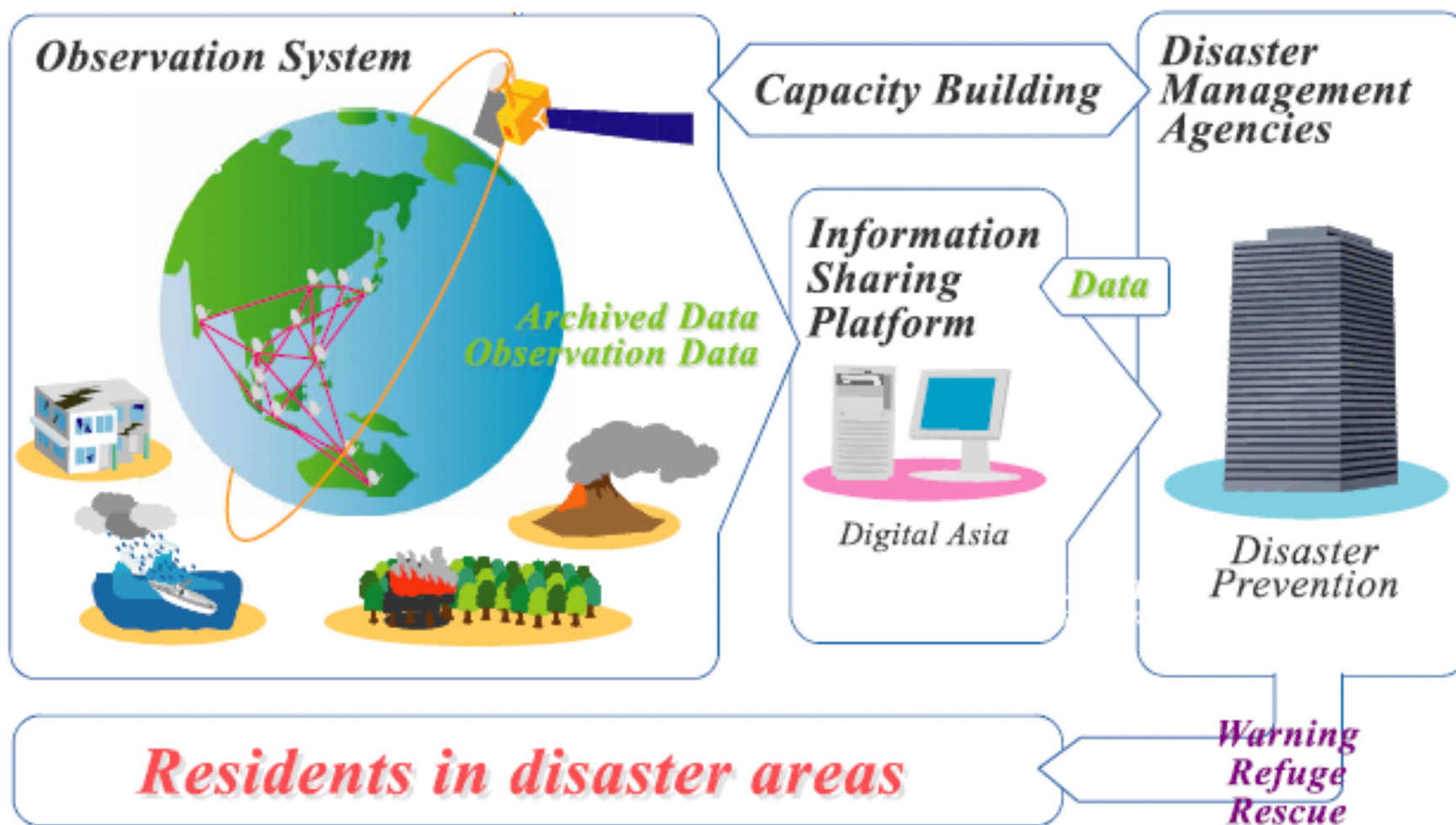
TRMM data (below) are used to show total rainfall accumulation over the period November 20-28, 2006.

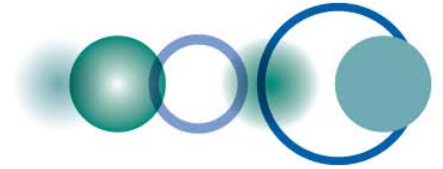


Change detection analysis (above) based on RADARSAT data near Rio Indio, Panama. These images help the Panamanian disaster response agency to focus their efforts in the areas of the flood's greatest impact.

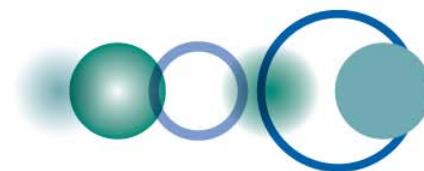


Sentinel Asia: Disaster Management Support System for Asia-Pacific Region

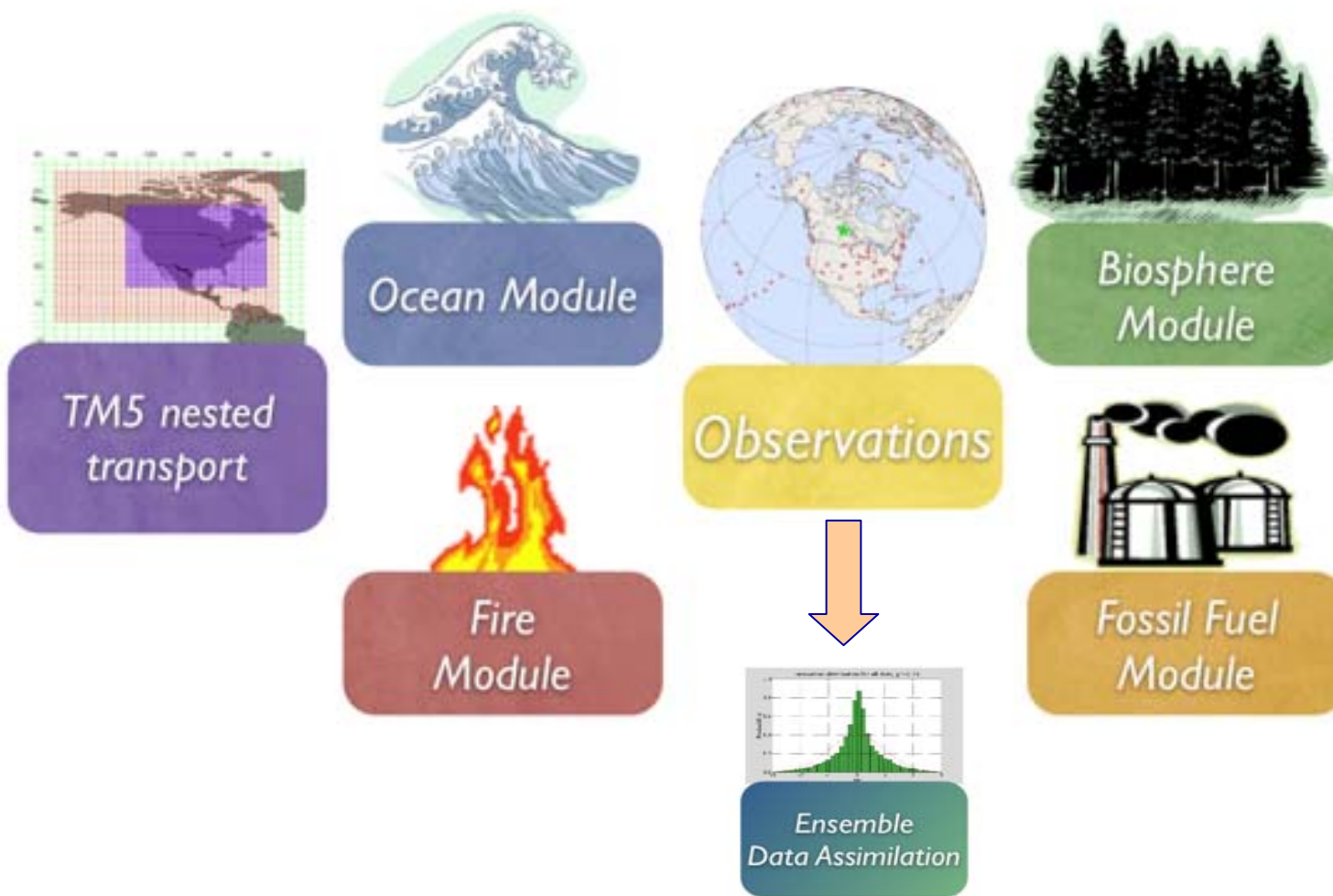


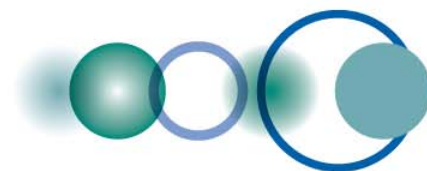


Prospects



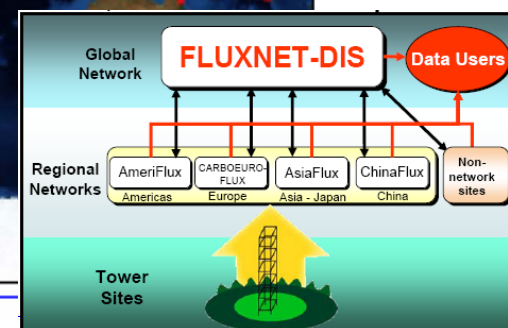
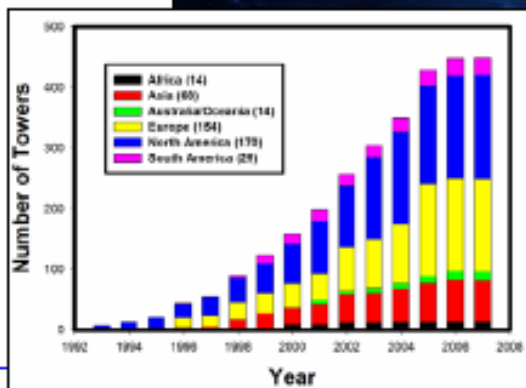
A global carbon monitoring system

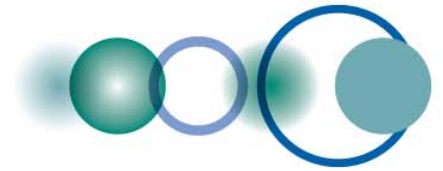




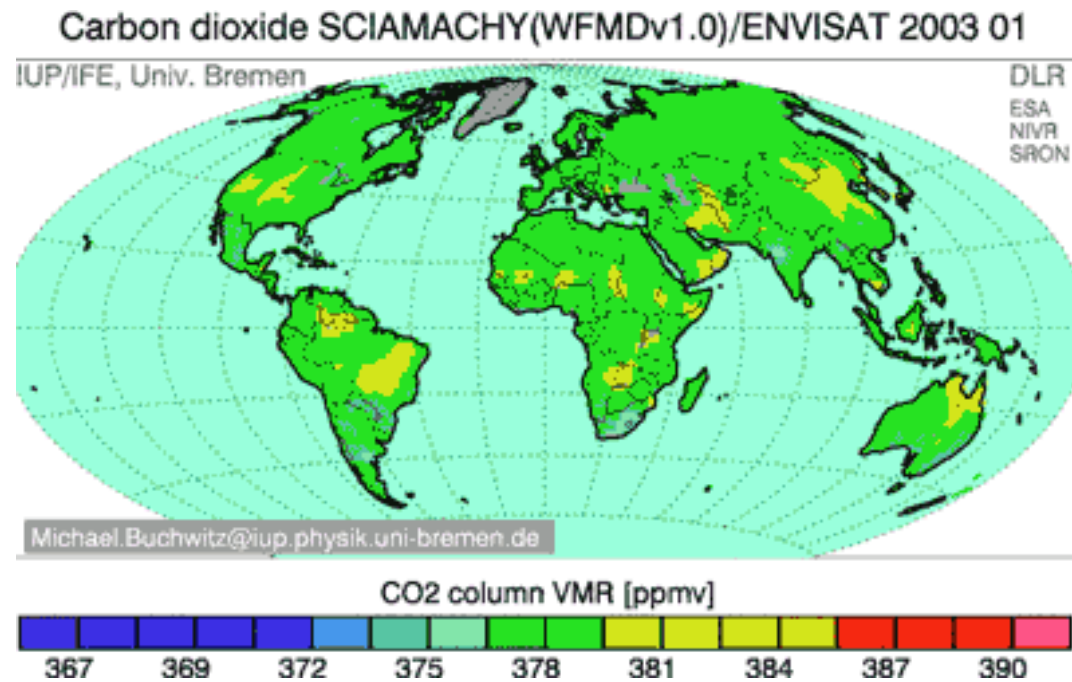
Fluxnet: A Global Network of Flux Tower Networks

More than 550 towers from >10 regional networks and 46 countries worldwide

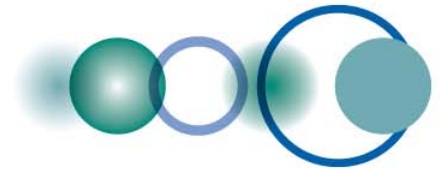




Space Observations



2003-2005



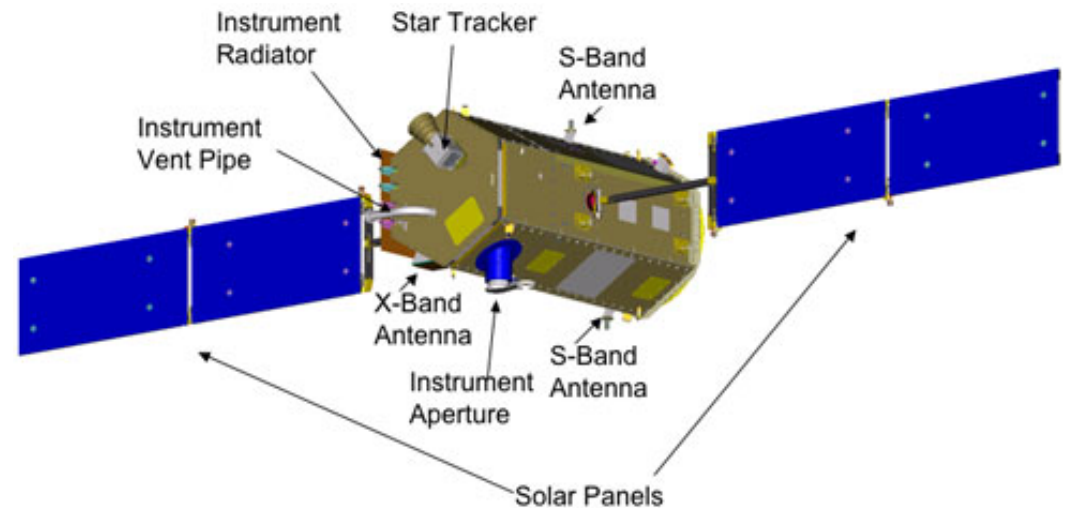
Space Observations

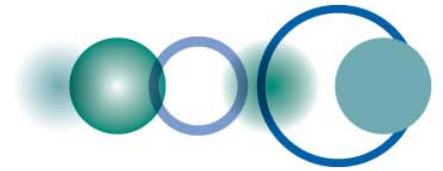
GOSAT (JAXA)
Launched on 23 January

OCO (NASA)
Launch failure

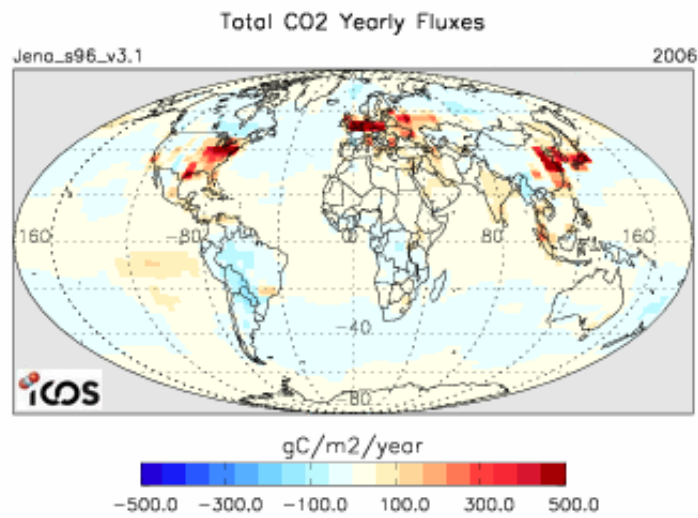
**SCIAMACHY (DLR, NIVR) on
Envisat (ESA)**
Launched in 2002

AIRS on Aqua (NASA)
Launched in 2002

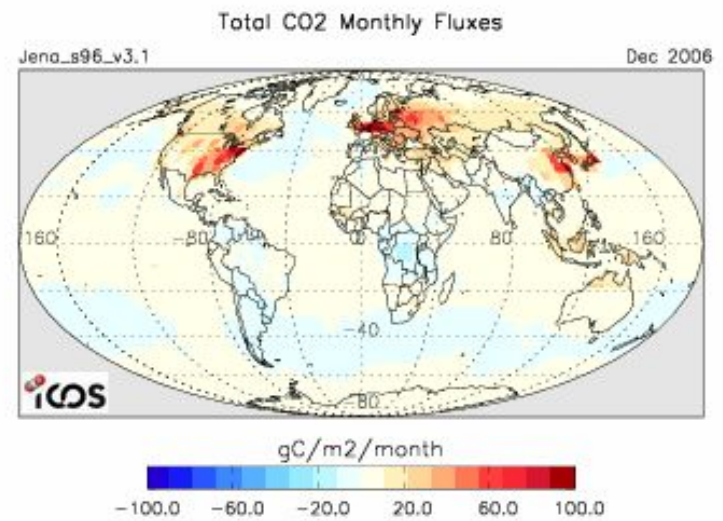


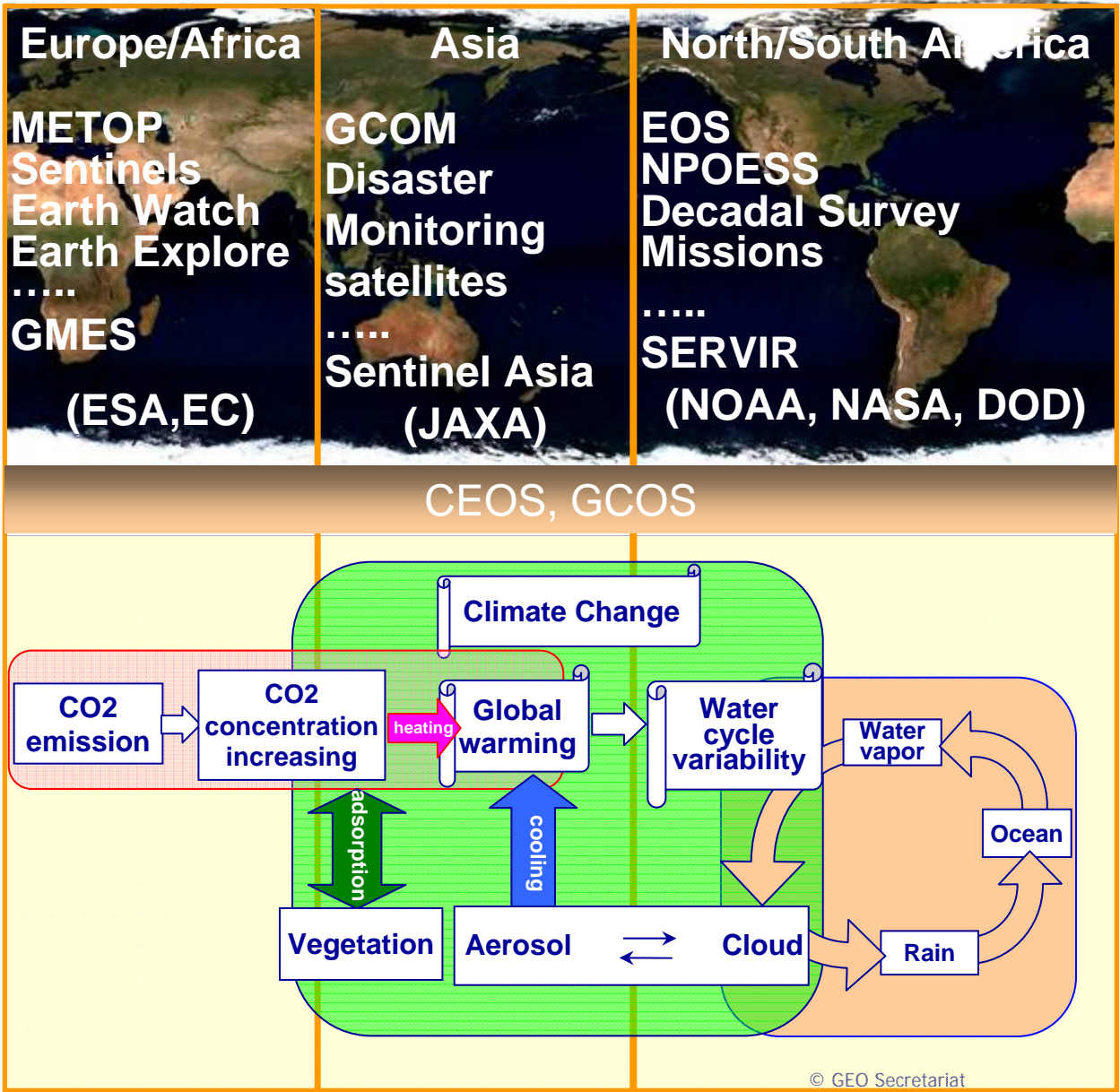


Yearly fluxes 1996-2006

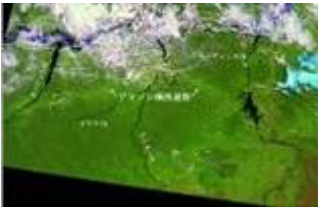


Monthly fluxes 2006

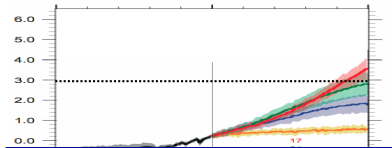




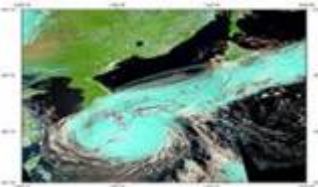
Concrete global observation systems



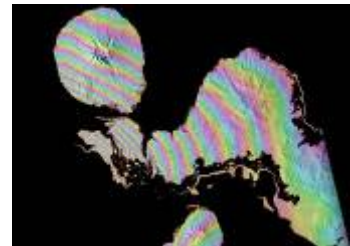
Global Forest Monitoring System



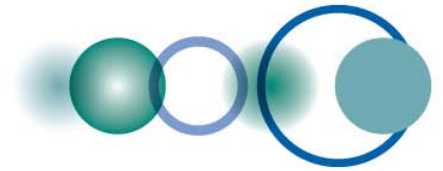
Greenhouse Gases Monitoring System



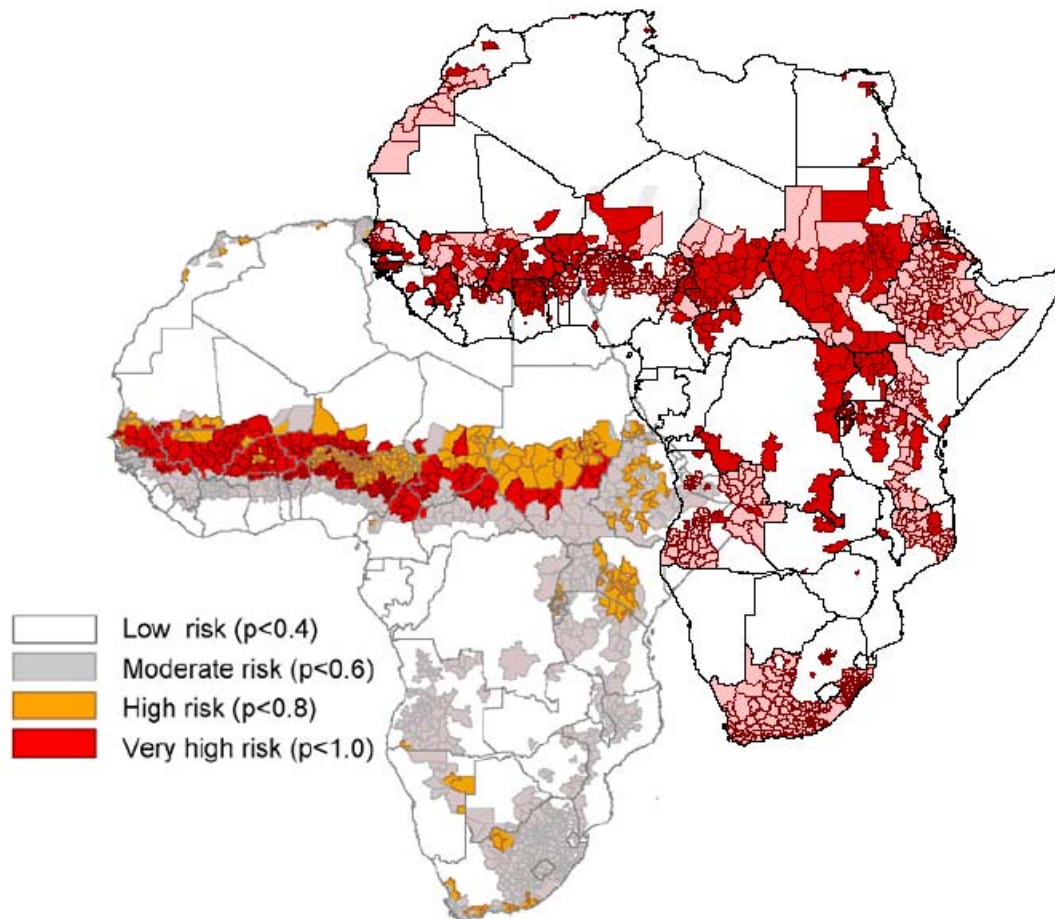
Global Water Cycle Monitoring System



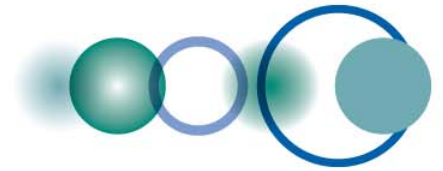
Global Disaster Monitoring System



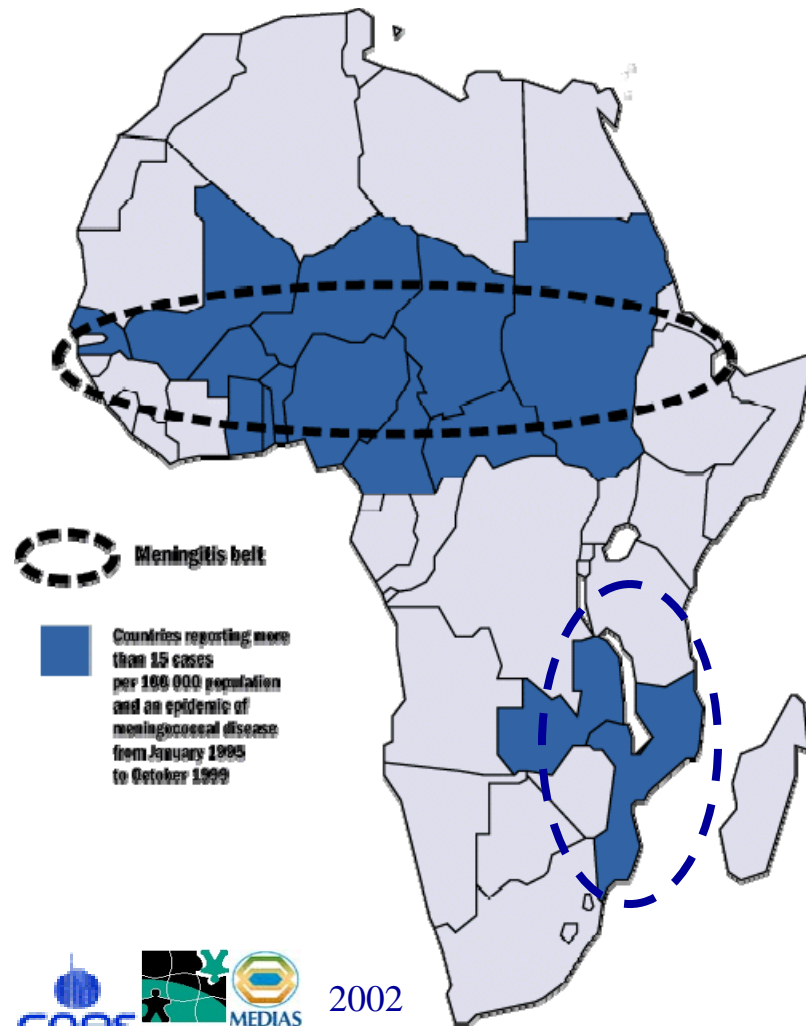
MERIT: Meningitis Environmental Risk Information Technologies (USA, WMO, Switzerland)



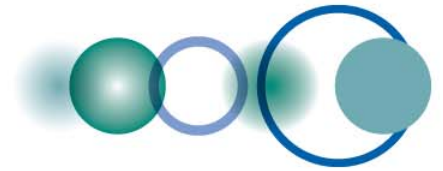
Plan WHO
Meningitis
Vaccination
Campaigns



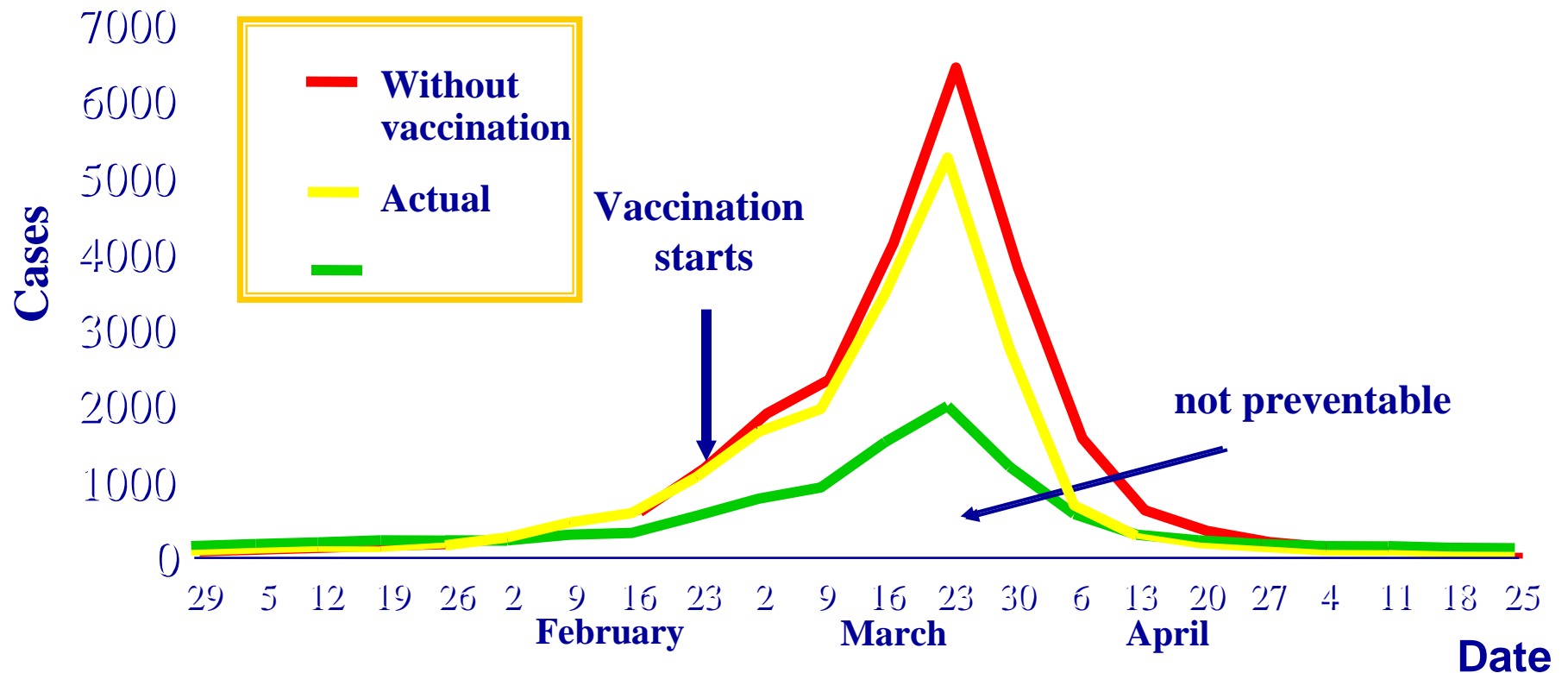
Plan WHO Meningitis Vaccination Campaigns



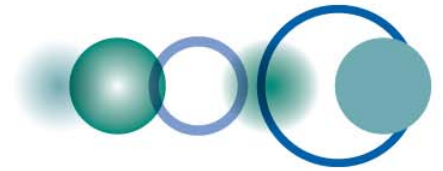
Relative Positions of « Meningitis Belt » and Intertropical Convergence Zone (July and January)



Meningitis: The problem to be tackled

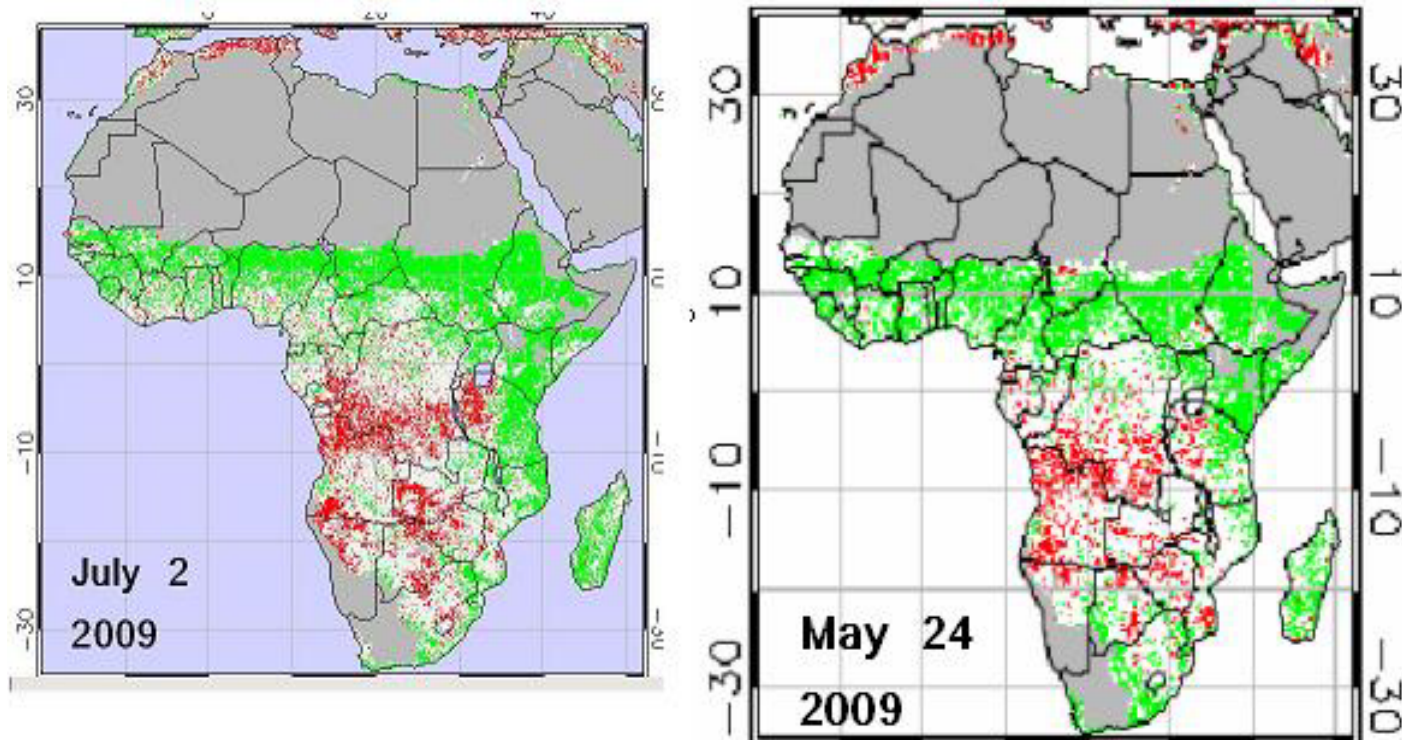


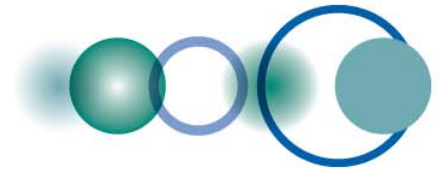
Epidemic in Ghana, 1997- Wood et al., Lancet 2000



Malaria Risk Mapping

Risk Maps based on Vegetation Health (VHI),
Moisture Conditions (VCI) and Thermal Conditions
(TCI). All estimations from AVHRR.



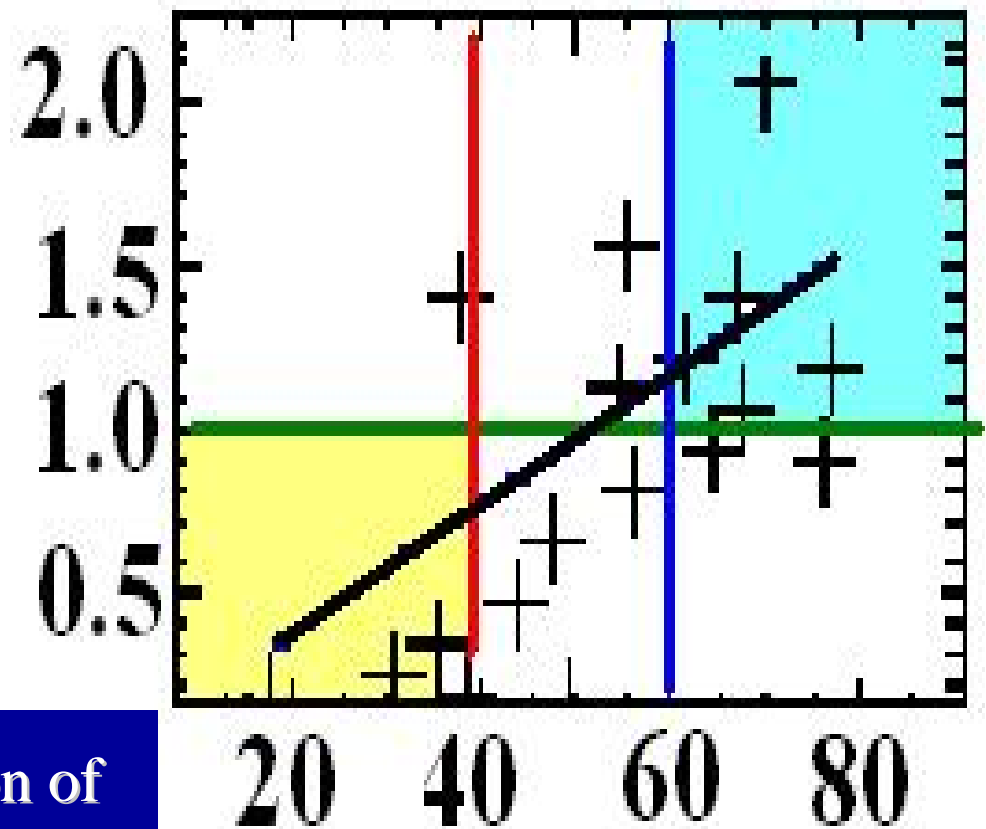


Correlation of Annual Malaria Incidence (AMI) with Moisture Index (VCI) in India

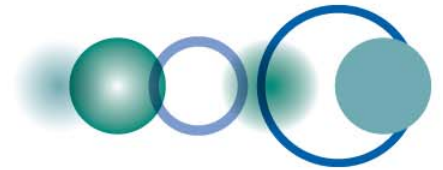
VCI < 40 (dry) –
Lower AMI

VCI > 60 (wet) –
Larger AMI

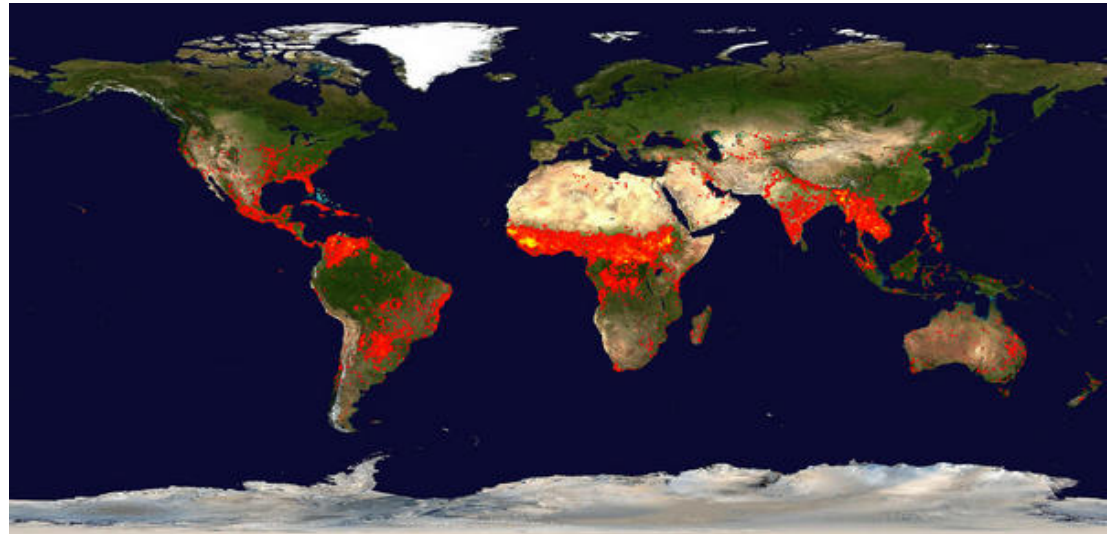
Rainfall 600 mm/year



VCI is a good proxy for estimation of
vegetation health & malaria epidemic



Wildand Fire: Global Source of Multiple Hazards



Significant Ecosystem damage

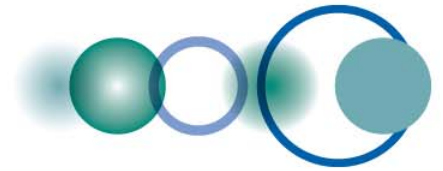
- **Degradation in forest/grassland health due to uncontrolled burning**
- **Agriculture and land degradation with losses in production**
- **Hydrological changes resulting in desertification and flooding**

Significant loss of life, including negative societal impact and economic losses

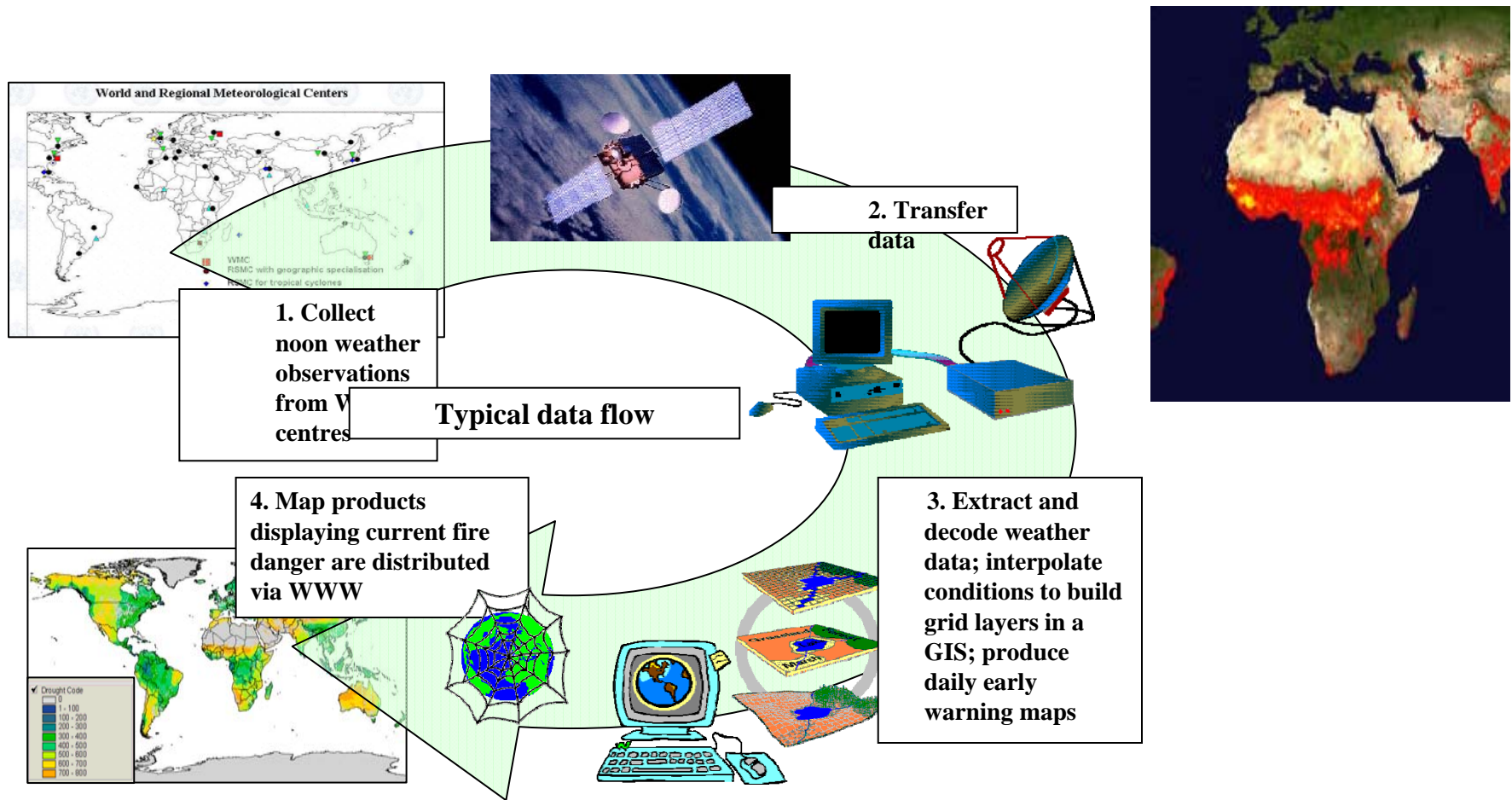
- **Losses and vulnerability at urban-rural interface increasing**
- **Global health impact due to smoke and emissions**
- **Disruption of transport due to changes in visibility**
- **Costly fire suppression programs**

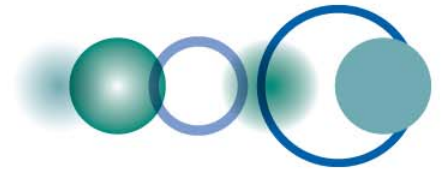
Potential impact on climate change

- **Global carbon cycle impact**



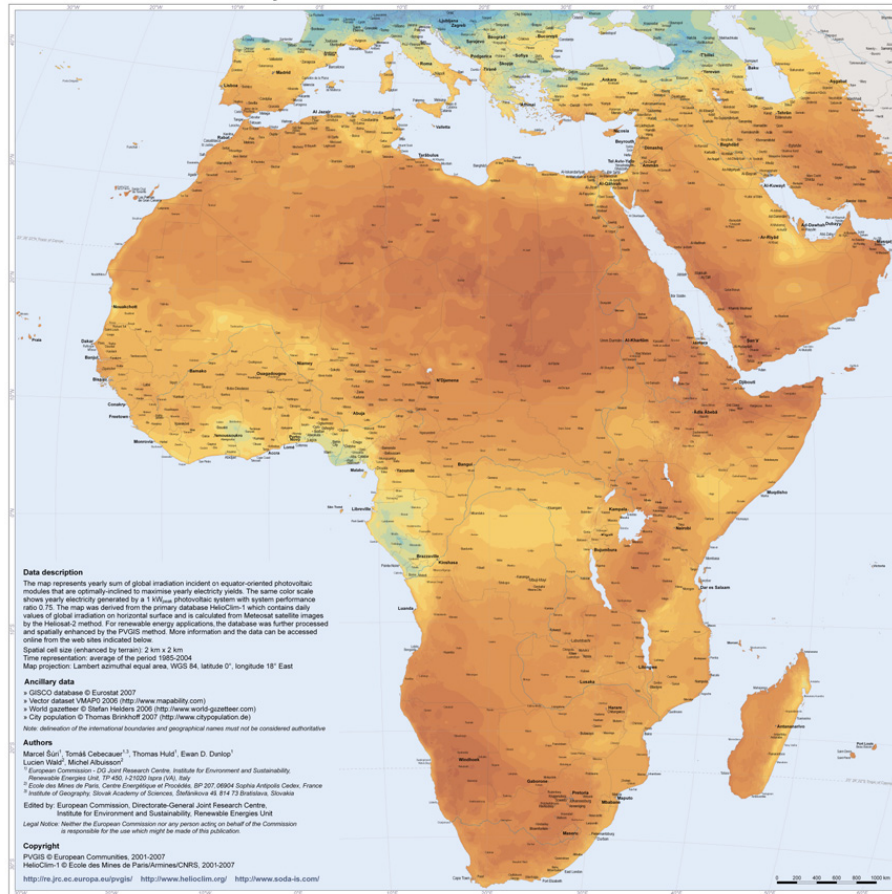
Wildland Fire Early Warning



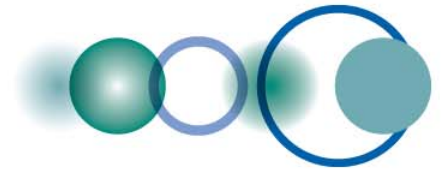


GEOSS for AFRICA

Photovoltaic Solar Electricity Potential in the Mediterranean Basin, Africa, and Southwest Asia

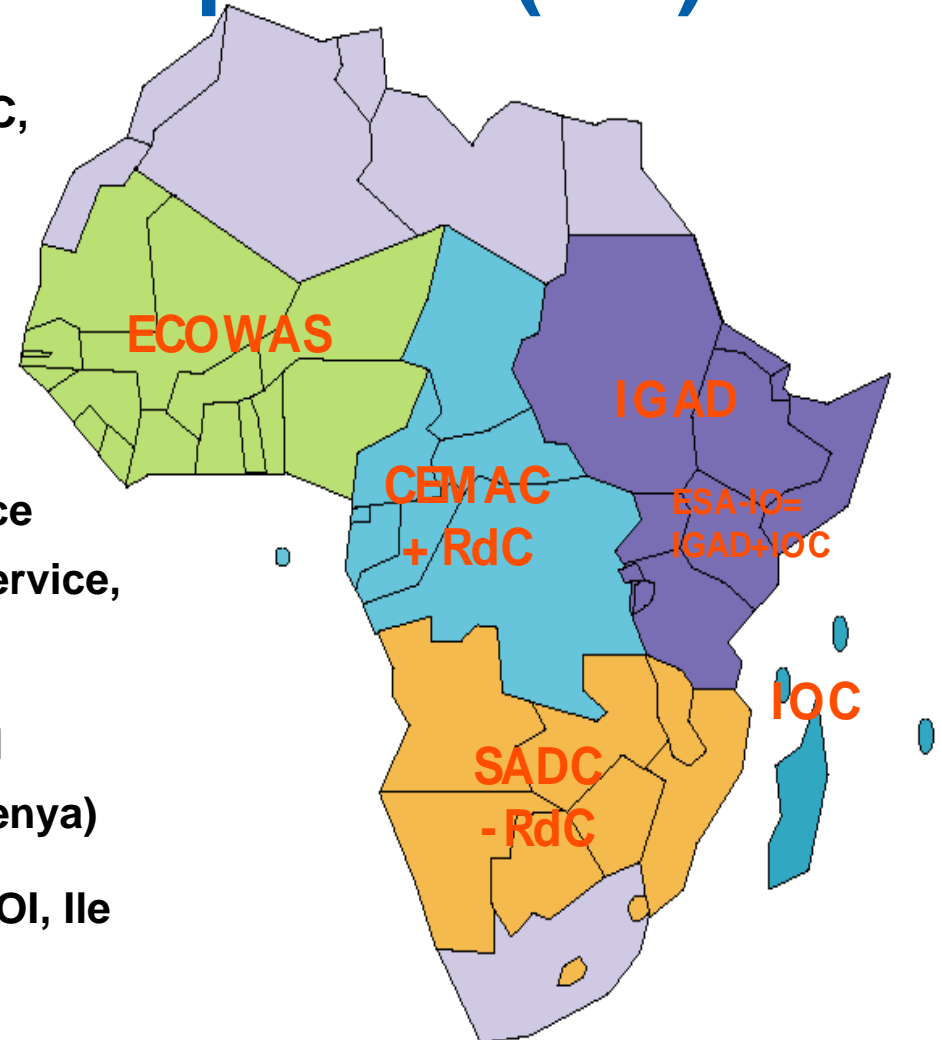


GEONETCast, CBERS, SERVIR, Sand and Dust Storm Warning System, AEGOS, Wildland Fire Early Warning System, Puma, AMESD and GMES Africa, BIOTA, TIGER, SoDa, MERIT, African Protected Areas, ClimDev Africa, ChlorOGIN, GeoAFRICA



African Monitoring for Environment and Sustainable Development (EC)

- Water Resource Management, (CEMAC, CICOS, RDC)
- Water Management for Cropland and Rangeland Management (ECOWAS, AGRHYMET, Niger)
- Agricultural & Environmental Resource Management (SADC, Meteorological Service, Botswana),
- Land Degradation, Mitigation & Natural Habitat Conservation (IGAD, ICPAC, Kenya)
- Marine & Coastal Management (IOC, MOI, Ile Maurice)



SERVIR Africa (under development)

File Edit View History Bookmarks Tools Help


http://www.servir.net/africa/

BBC IHT Edicom igwco wmo wmo-portal GTN-R Google Translate

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search...

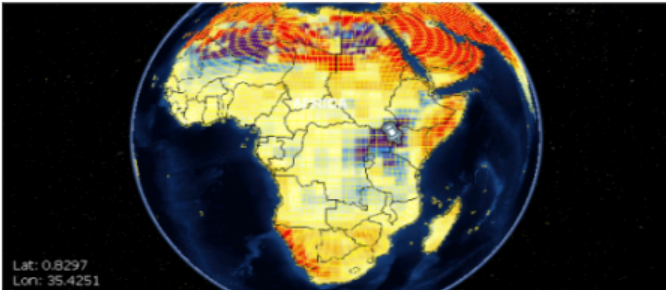
 **The SERVIR-Africa website is under development.**

Over the next few weeks, we will continue to add new content and functionality. Please check back soon, or [sign up](#) to receive notification of changes.

Coming Soon - Online Map Tools

Featured Map | Viewer 2D | Viewer 3D

Title: **SERVIR-Viz Climate Mapper** [More info...](#)
Source: SERVIR
Date: Future decadal scenarios



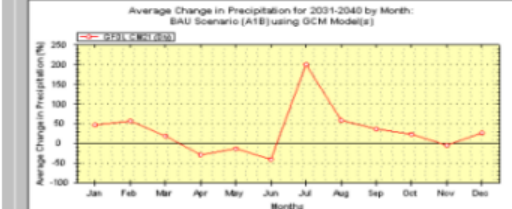
Lat: 0.8297
Lon: 35.4251

Choose Theme | Set Parameters | Graph | Map

Location: Lat: 0.8297 Lon: 35.4251

Average Annual Change in Precipitation (TIDr) = **+53.5**
Average Annual Change in Precipitation (TIDMid) = **-2.1**
Average Annual Change in Precipitation (TIDWet) = **+16.7**

Average Change in Precipitation for 2031-2040 by Month:
BNU Scenario (A1B) using GCM Model(s)



Actions:

Close Map

Opacity: [Slider]

Graph by XY Location

Show Spatial Average Grid

Show Country Boundaries

Export Graph

SERVIR Mission

Enabling the use of Earth observations and predictive models for timely decision making to benefit society

Latest Community News

- [Latest SDI-Africa newsletter \(January 2009\)](#)
- [Launch of African Soil Information Service \(AfSIS\)](#)
- [Lake Chad Basin Commission advancing geospatial data infrastructure](#)
- [Artificial light causing night time stresses to coral reefs](#)
- [University Buea \(Cameroon\) Remote Sensing Centre goes operational](#)

[More...](#)

Latest SERVIR News

- [Introductions to SERVIR-Africa facility](#)
- [SERVIR-Africa launches at RCMRD](#)
- [East and southern African Land Ministers put their support behind SERVIR-Africa](#)
- [Use of NASA satellite rainfall data for flood modeling](#)
- [SERVIR-Africa team members to attend AARSE 2008](#)

[More...](#)

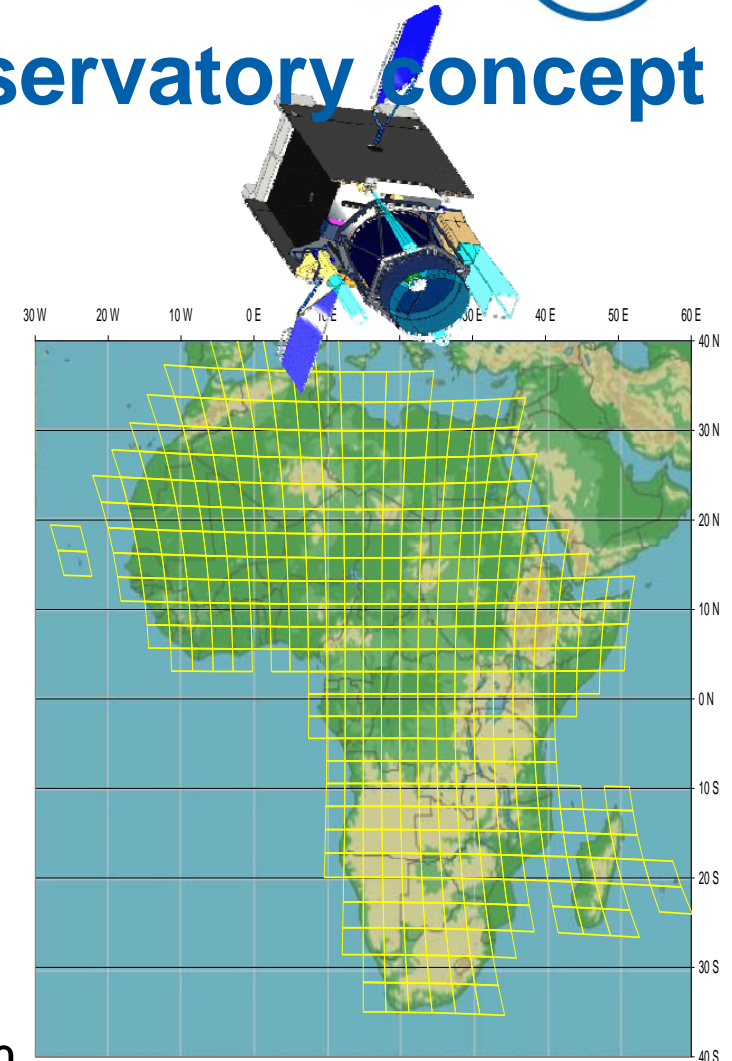
Done

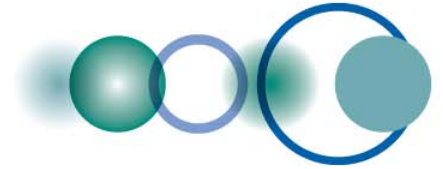
Start Novell GroupWis... AFWCI presentations AFWCS.new.ppt 8.CBC at STC De... HARON.igrac.pp... SERVIR AFRIC... wwdr2_ch_4.pdf... 2:28 PM



Geo Africa, a new Space Observatory concept

- **Permanent geostationary optical mission** for operational delivery of ~20m resolution images
- **Africa total coverage every 4 days**, land and coastal areas with an imaging capability from 5 to 8 million km²/day, by scenes of 300*300 km
- **Flexible programming**
- **Fast access** and **permanent monitoring** of crisis zone
- A complete Ground segment **located in** and **operated by Africa**, capacity to have **several Regional Exploitation Centres** for sensing demands, receive Image data, deliver products
- An **operational delivery** of the complete system possible **2014**
- A **lifetime in orbit of 7-10 years**

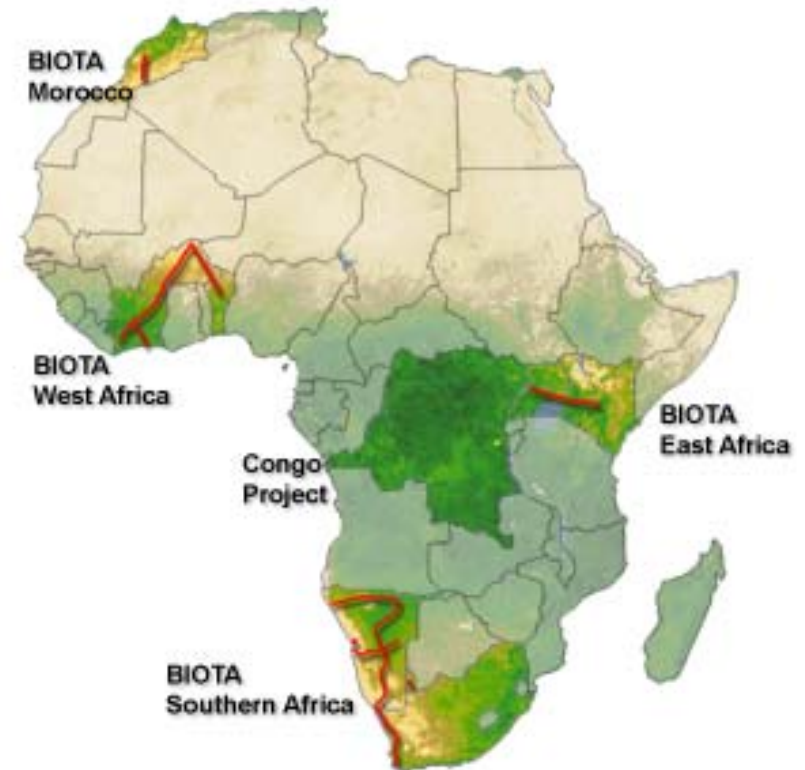




BIOTA AFRICA

**A Contribution
to GEOBON**

BIOdiversity
monitoring
**Transect analysis
in Africa**





ChloroGIN Africa - Microsoft Internet Explorer provided by Plymouth Marine Laboratory

http://www.npm.ac.uk/rsg/projects/chlorogin/index.php?map.x=171&map.y=20

File Edit View Favorites Tools Help

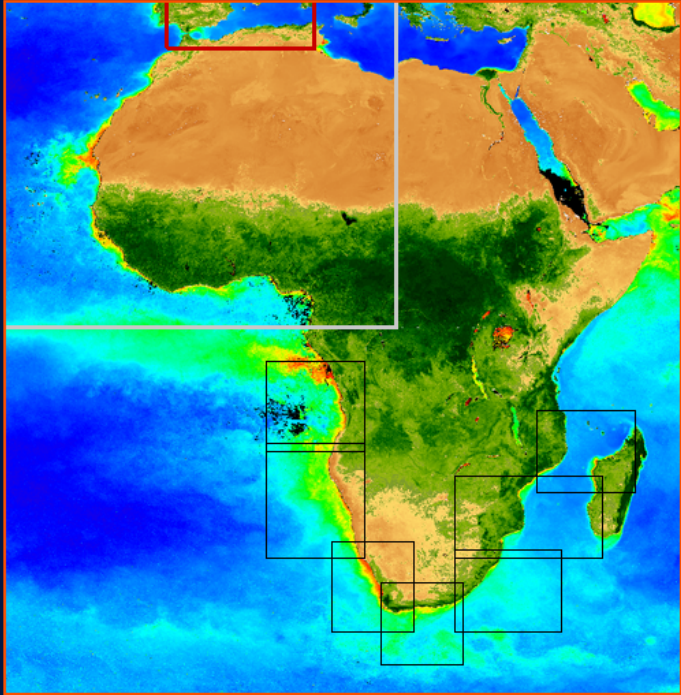
ChloroGIN Africa

ChloroGIN Africa

Home Contact

The Chlorophyll Global Integrated Network (ChloroGIN) project aims to promote in situ measurement of chlorophyll in combination with satellite derived estimates. The project was initiated following recommendations of the "Plymouth Chlorophyll Meeting and Workshops (Extended Antares Network)" sponsored by GOOS, GEO, IOCCG, PML and POGO 18 - 22 Sept 2006.

This portal provides a simple interface to ocean colour and sea-surface temperature satellite data over Africa processed by the [University Of Cape Town](#), [EC Joint Research Centre](#) and Plymouth Marine Laboratory. The portal was inspired by the [Antares network](#) that provides satellite coverage over South America.



Areas selected:
Choose date (YYYY-MM-DD) and press 'Apply':

2007 04 10 Apply

[Select today]

Name:	Provider:	Boundary:	
West Mediterranean	PML	44.9N, -8E, 34N, 10E	View
Cape Verde Large 4km	PML	18.9N, -27E, 13N, -21E	View
JRC full	JRC	-30W, -50S, 60E, 40N	View

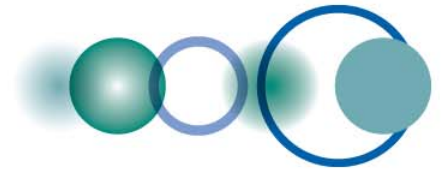
[\[Reset selection\]](#)

About date selection:
Data availability for preferred date selected is dependant on the individual data provider. Please verify that the data actually viewed is for the preferred date selected.

Done

Local intranet 100%

PML PLYMOUTH MARINE LABORATORY UNIVERSITY OF CAPE TOWN EUROPEAN COMMISSION DIRECTORATE GENERAL Joint Research Centre



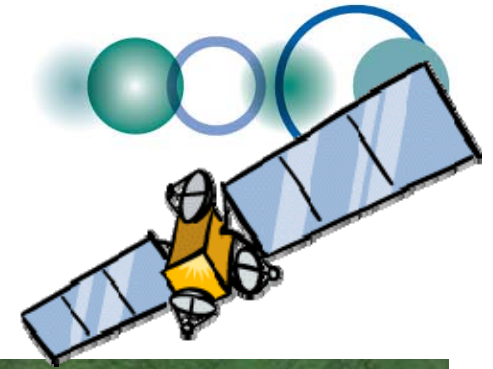
AEGOS objectives

African-European Georesources Observation System



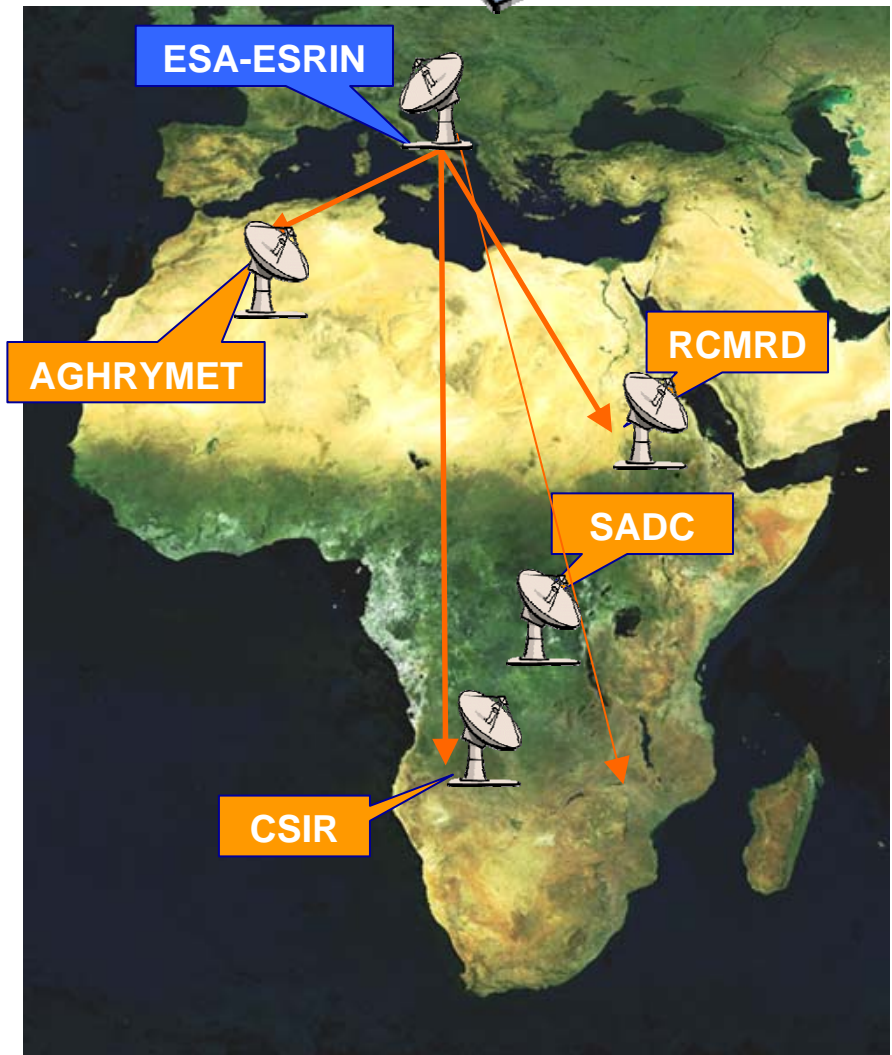
- > Design a pan-African infrastructure of interoperable data and user-oriented services to strengthen the sustainable use of georesources in Africa
- > Safeguard, share, valorise the knowledge and data archived in African and European geological surveys
- > Support geoscientific communities and institutional decision-makers for sustainable development public policies
- > Create a network of contributing partners

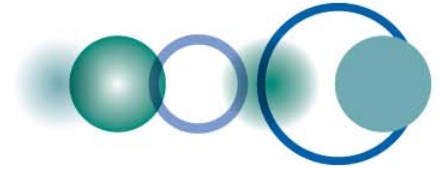
TIGER



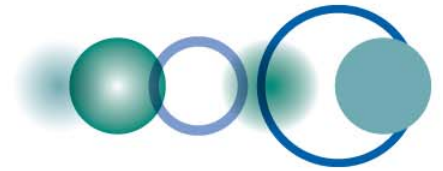
- **Provide easy and free access to EO data** : ESA data (more than 2000 scenes); Radarsat images (CSA); ESA third party missions (SPOT 1-4, ALOS...); CSIR provided access to Landsat over the SADC area;

Make available dedicated datasets over Africa (in preparation): MERIS Mosaic; Vegetation data (NDVI series); Radarsat Mosaic;





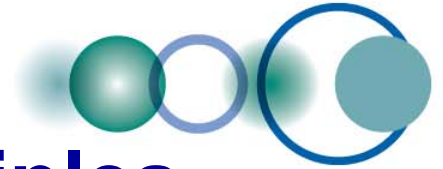
Challenges



GEO Data Sharing Principles

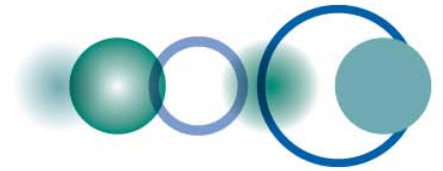
- **Full and Open Exchange of Data, recognizing Relevant International Instruments and National Policies**
- **Data and Products at Minimum Time delay and Minimum Cost**
- **Free of Charge or minimal Cost for Research and Education**



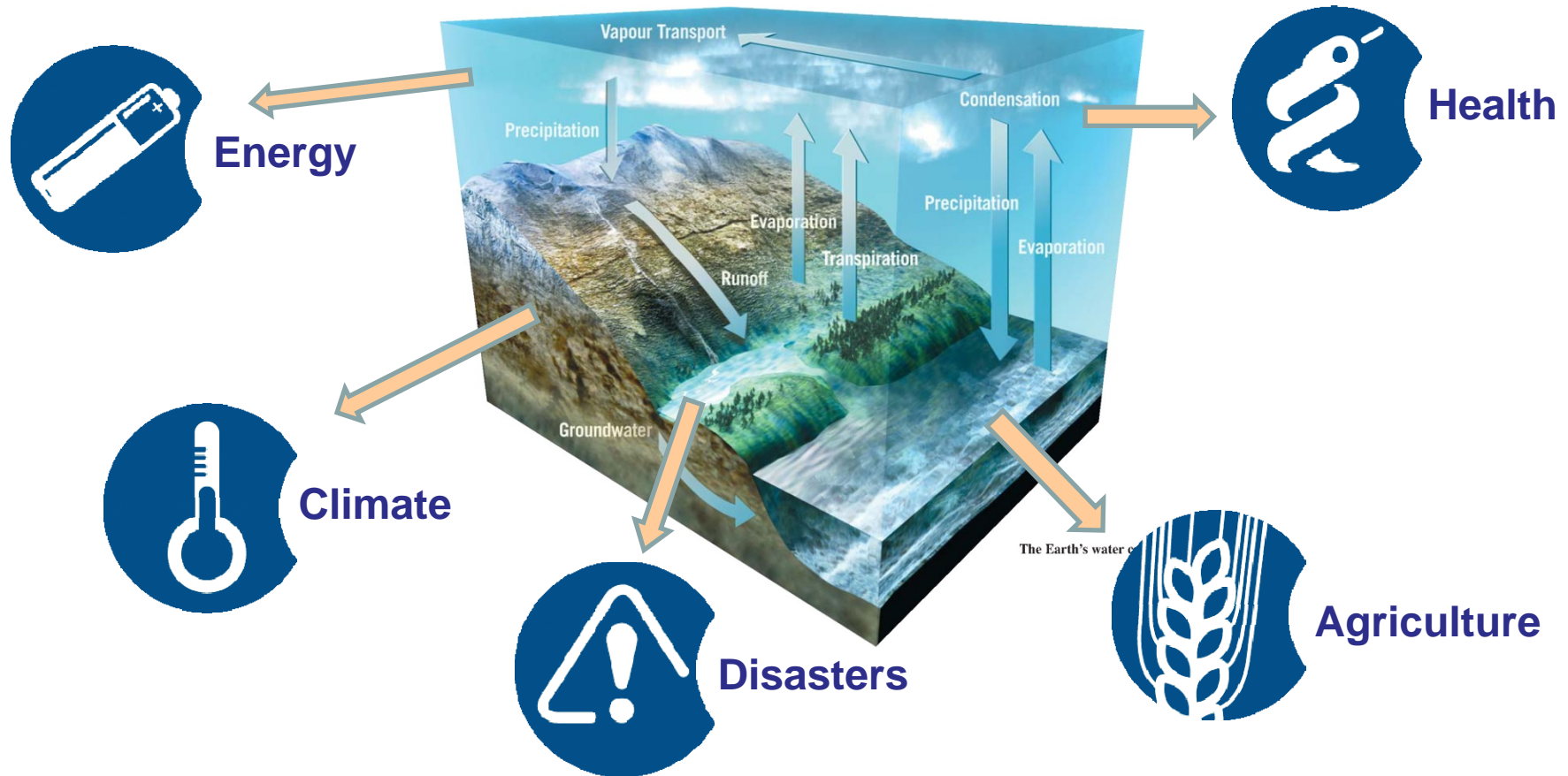


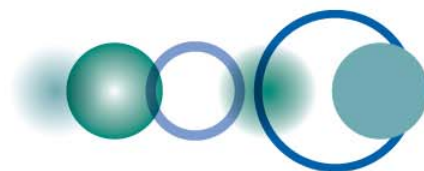
GEOS Data Sharing Principles

- Success of GEOS is contingent upon
 - Manner in which the GEOS Data Sharing Principles are implemented
 - Both by the individual elements of GEOS and by GEO Members
- No single set of rules will apply to all types, sources, and uses of data
 - Clear set of guidelines, definitions, and minimum expectations will help to improve the sharing of data within GEOS
- GEOS Data Sharing Principles
 - Facilitate the application of data by diverse users in the key societal benefit areas
 - Establish overarching strategic policy goals
 - For data access and use
- Implementation Guidelines for GEOS Data Sharing Principles
 - Designed to facilitate the development of clear, balanced, and workable data sharing policies and procedures
 - Consistent with the GEOS Data Sharing Principles
- Policies and procedures will be vital to the effective and efficient operation of GEOS and its long-term sustainability

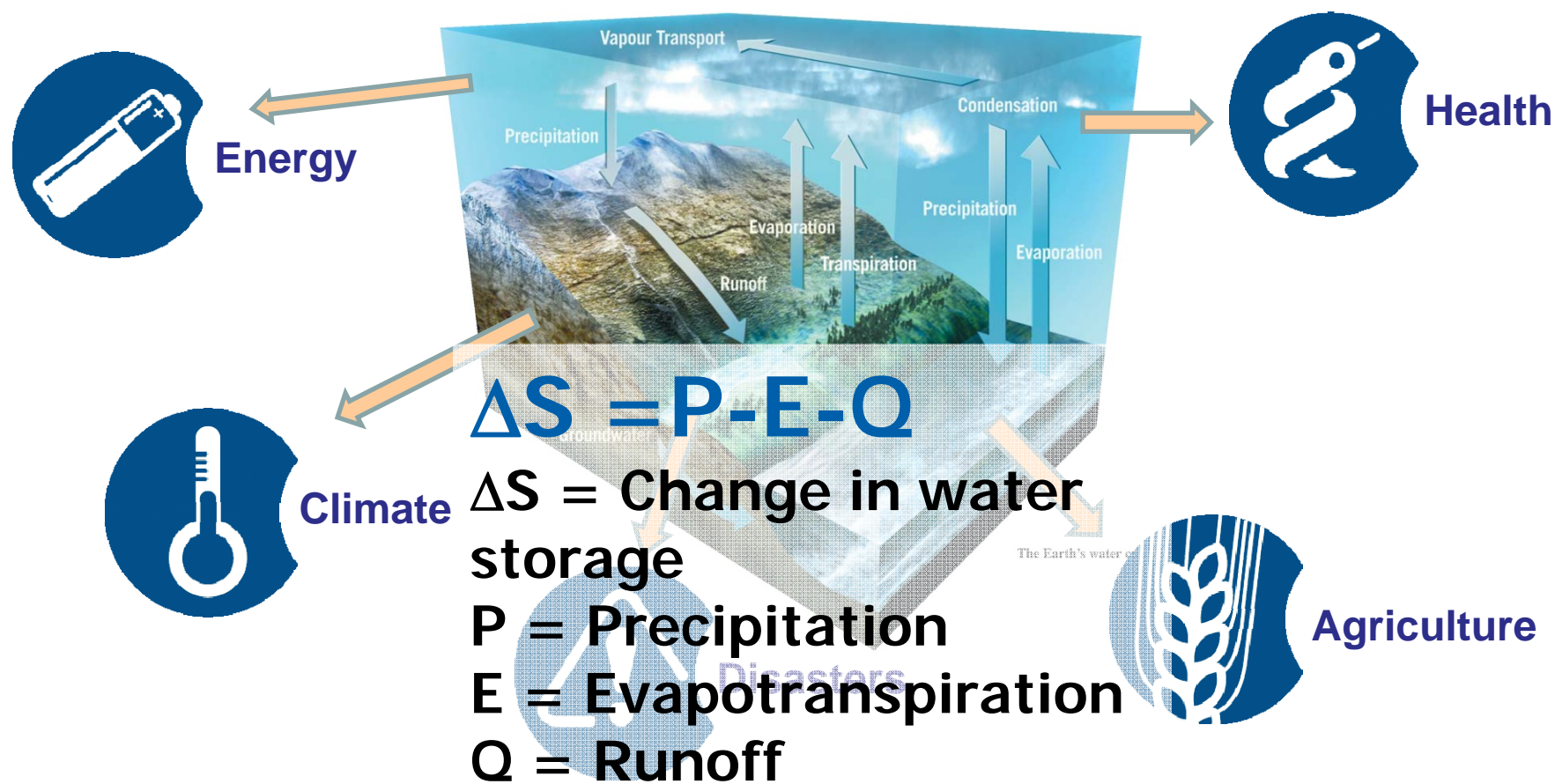


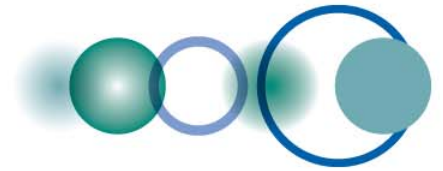
Integrated Water Cycle Management (WMO, Gewex, France, Japan, ...)



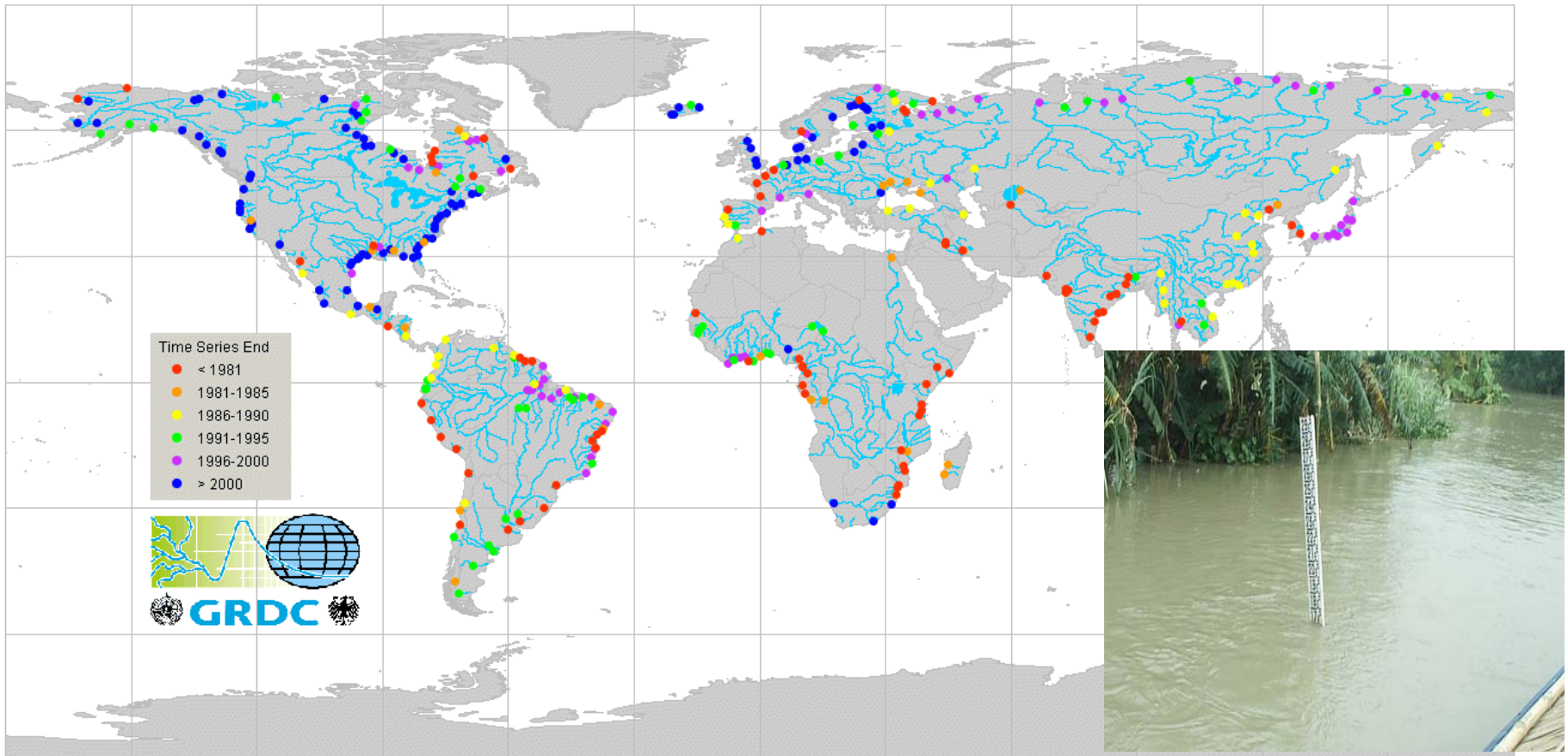


Estimating Runoff from Space (France, USA, Australia, The Netherlands...)



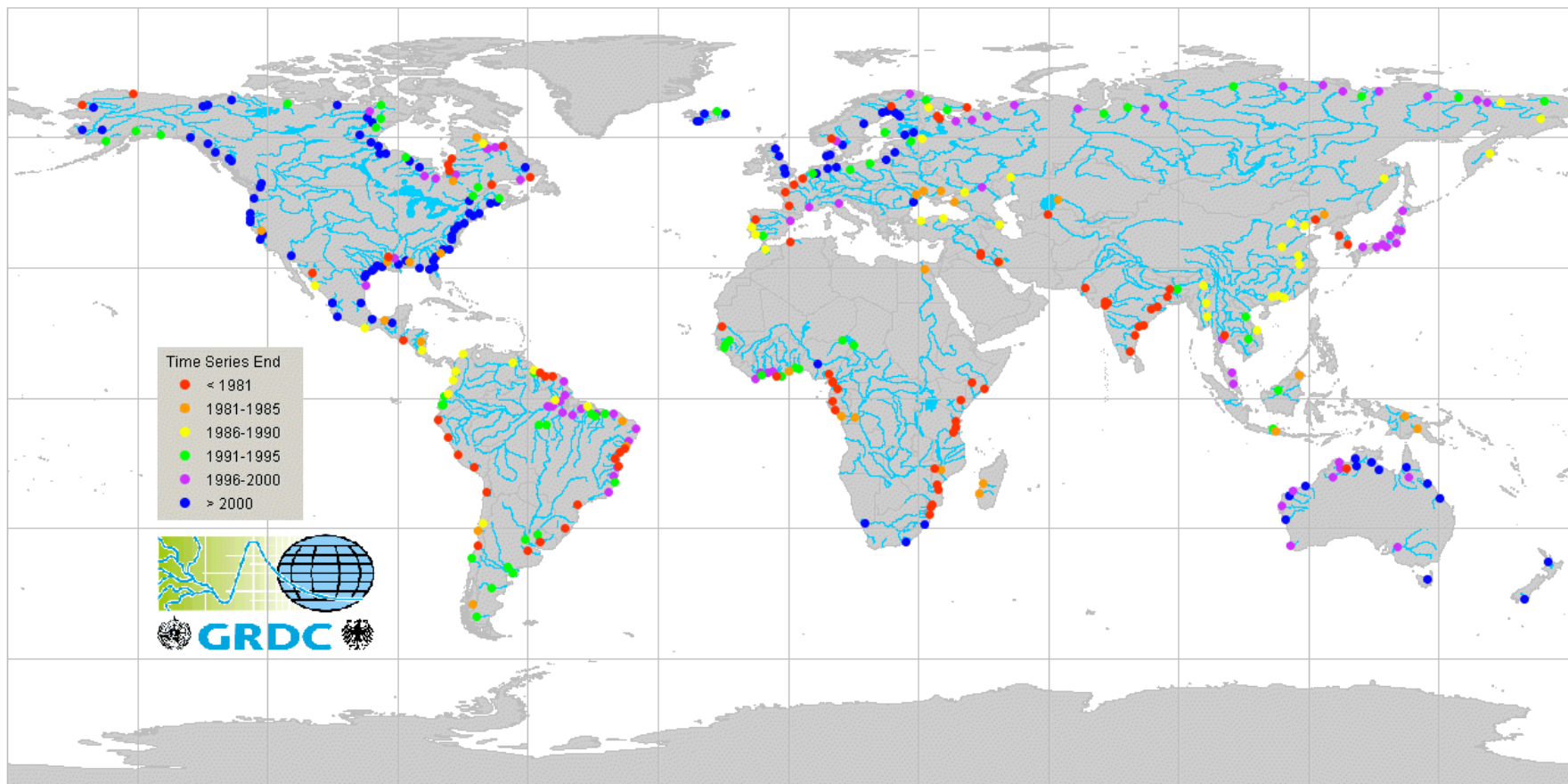


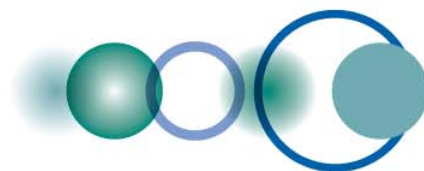
Restore network of in-situ stations for river discharge (WMO, Gewex, France, Japan, ...)



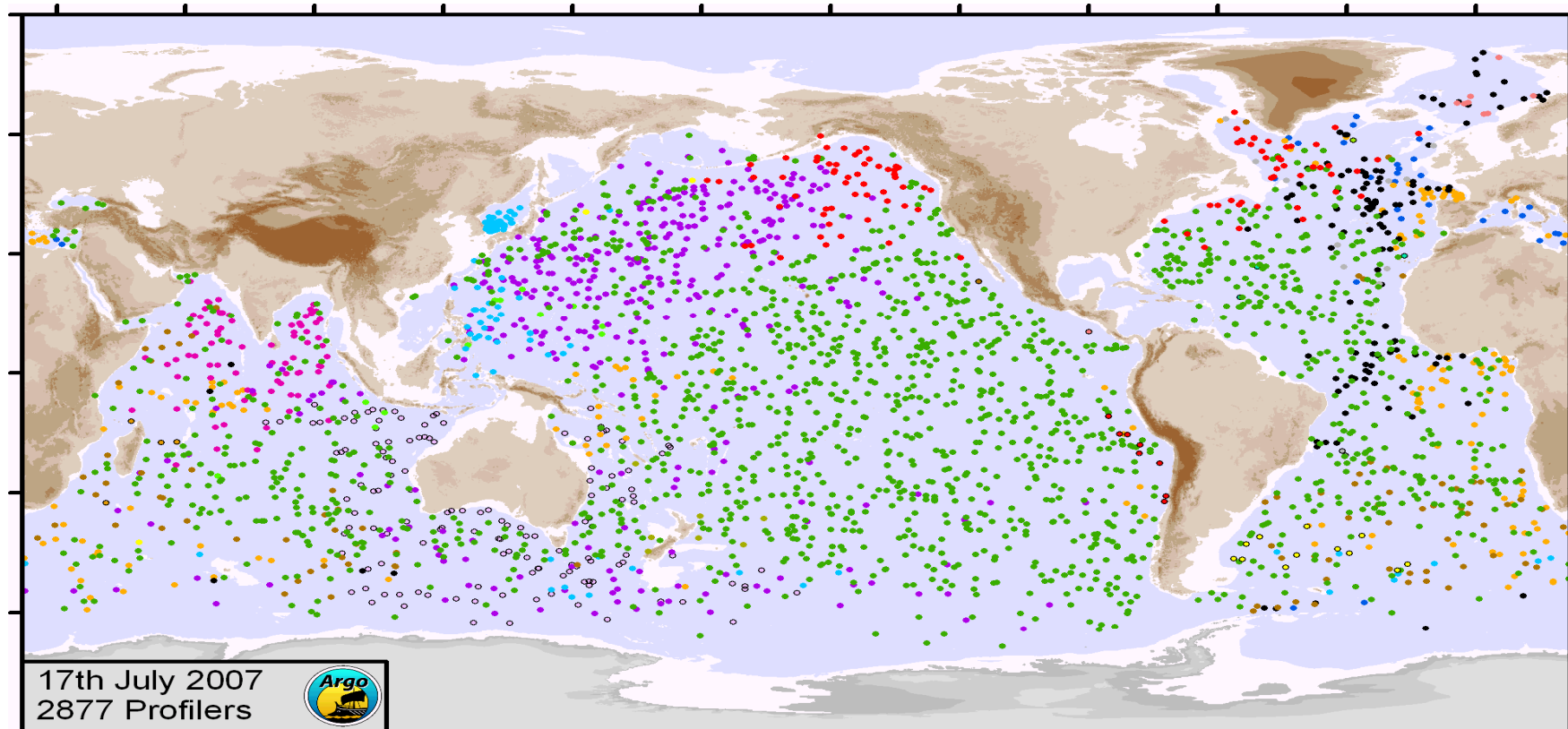


Upgrade and integrate in-situ stations (river discharge, ...) ...





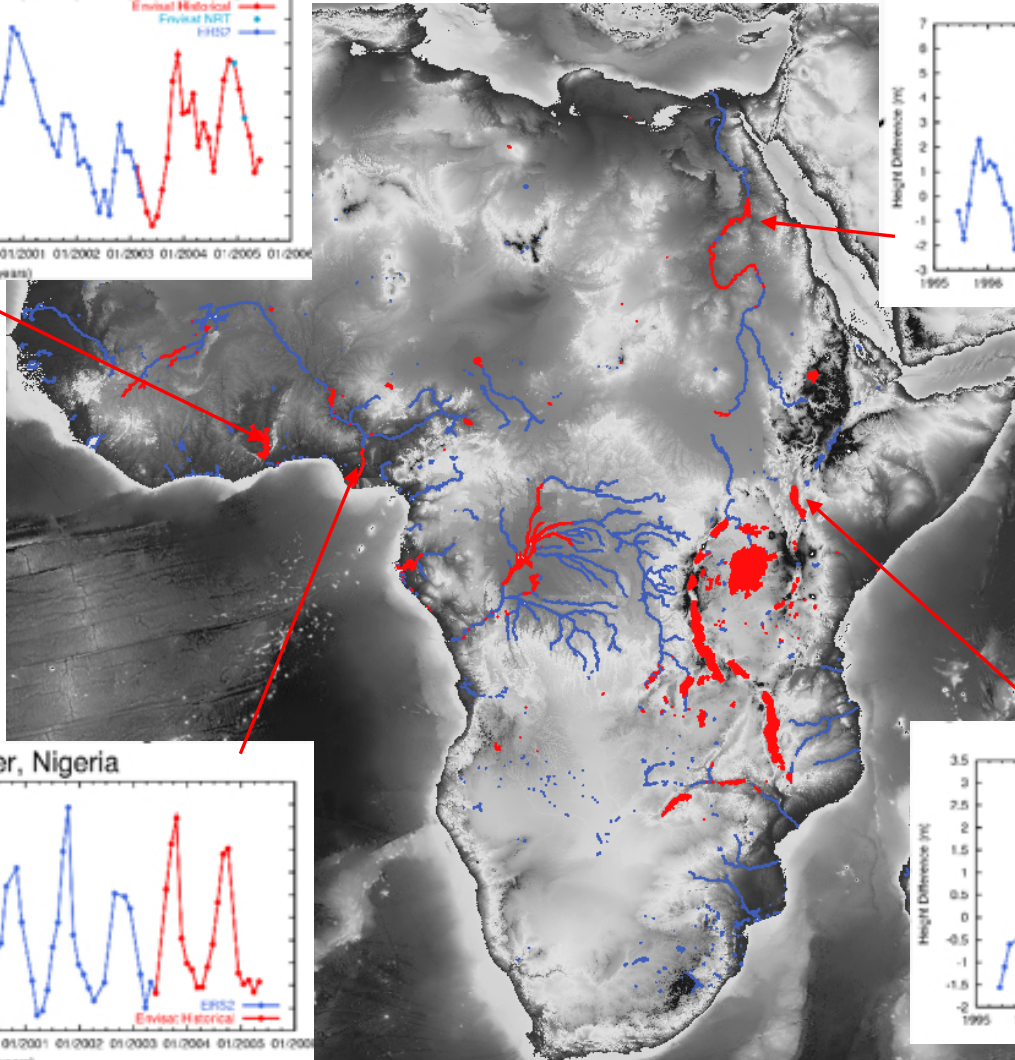
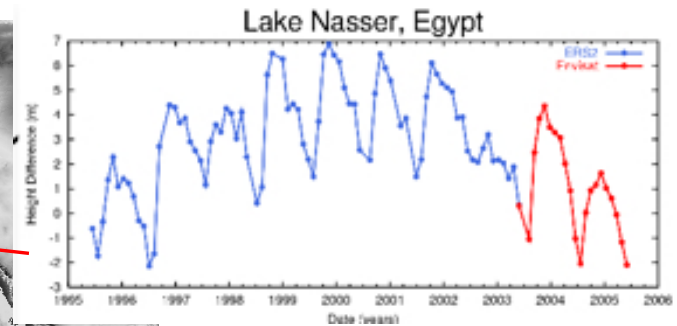
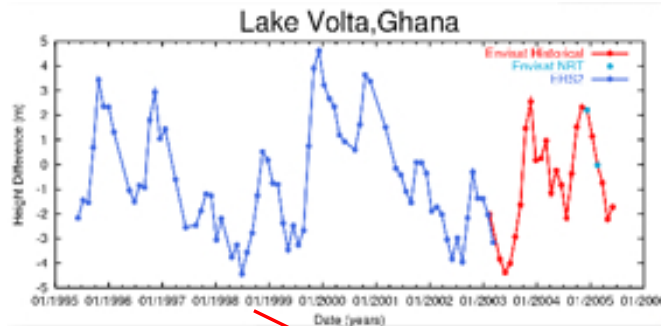
Long-term Sustainability (e.g., ARGO)



- | | | | |
|-----------------|---------------------|----------------------|------------------------|
| Argentina (12) | Costa Rica (1) | Japan (378) | Norway (8) |
| Australia (136) | European Union (31) | Korea, Rep. of (102) | Russian Federation (3) |
| Brazil (2) | France (172) | Mauritius (4) | Spain (3) |
| Canada (98) | Germany (126) | Mexico (1) | United Kingdom (92) |
| Chile (8) | India (77) | Netherlands (10) | United States (1593) |
| China (12) | Ireland (1) | New Zealand (7) | |

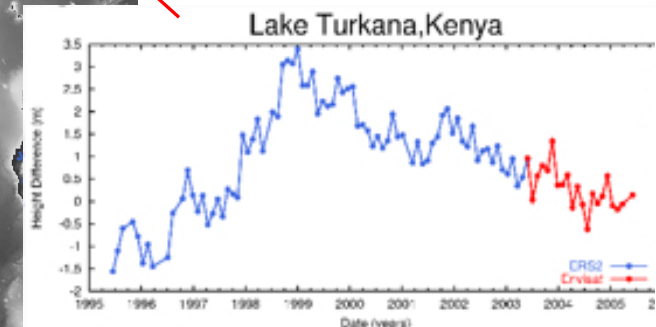


Altimetry over Lakes and Rivers



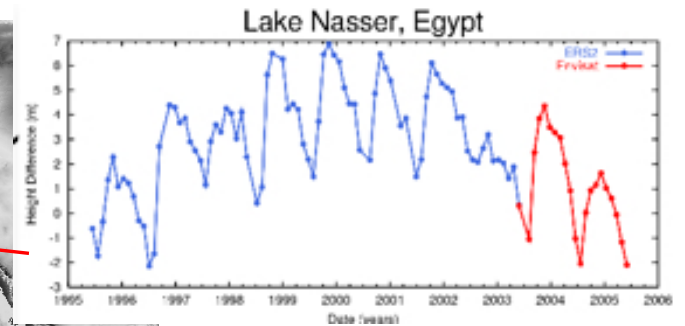
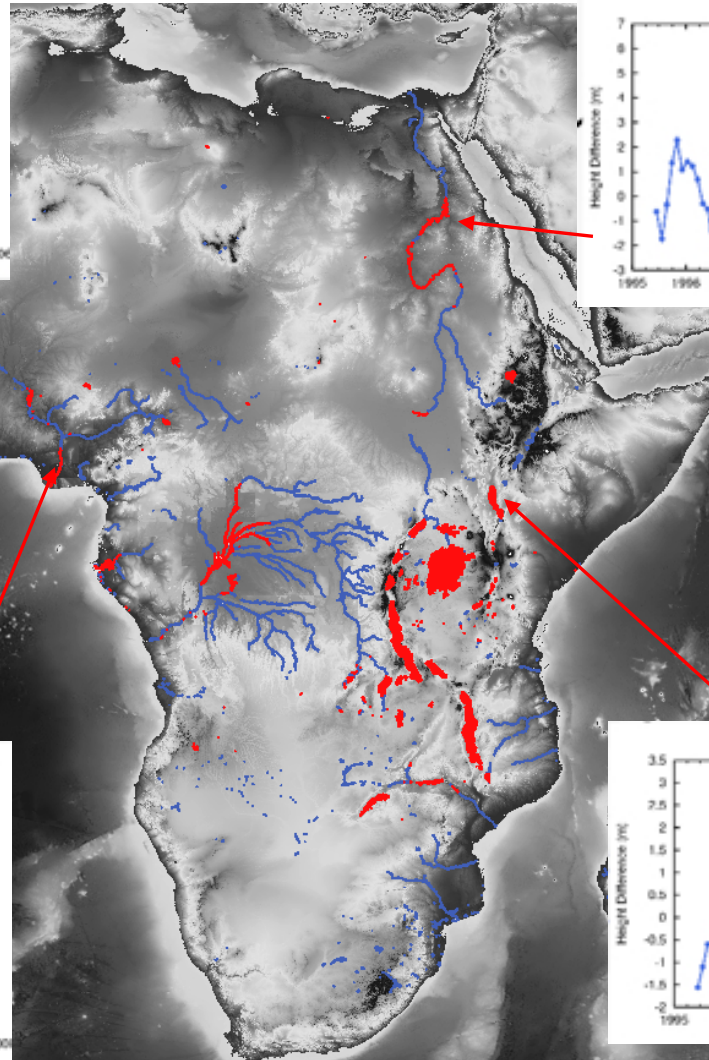
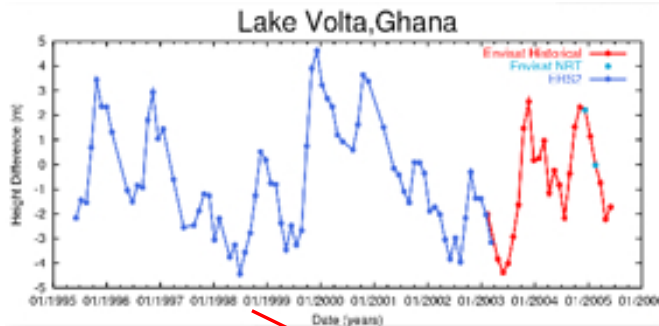
Red indicates area where NRT products are currently generated

Blue indicates area where products may be generated in the future.



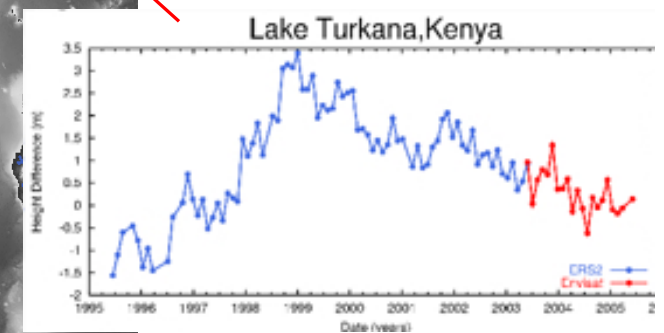
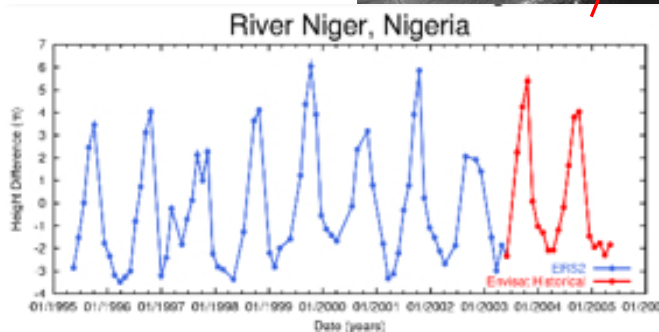


...together with space observations.



Red indicates area where NRT products are currently generated

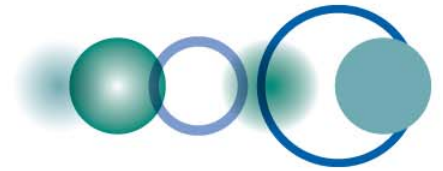
Blue indicates area where products may be generated in the future.



GEOBON Biodiversity Observation Network

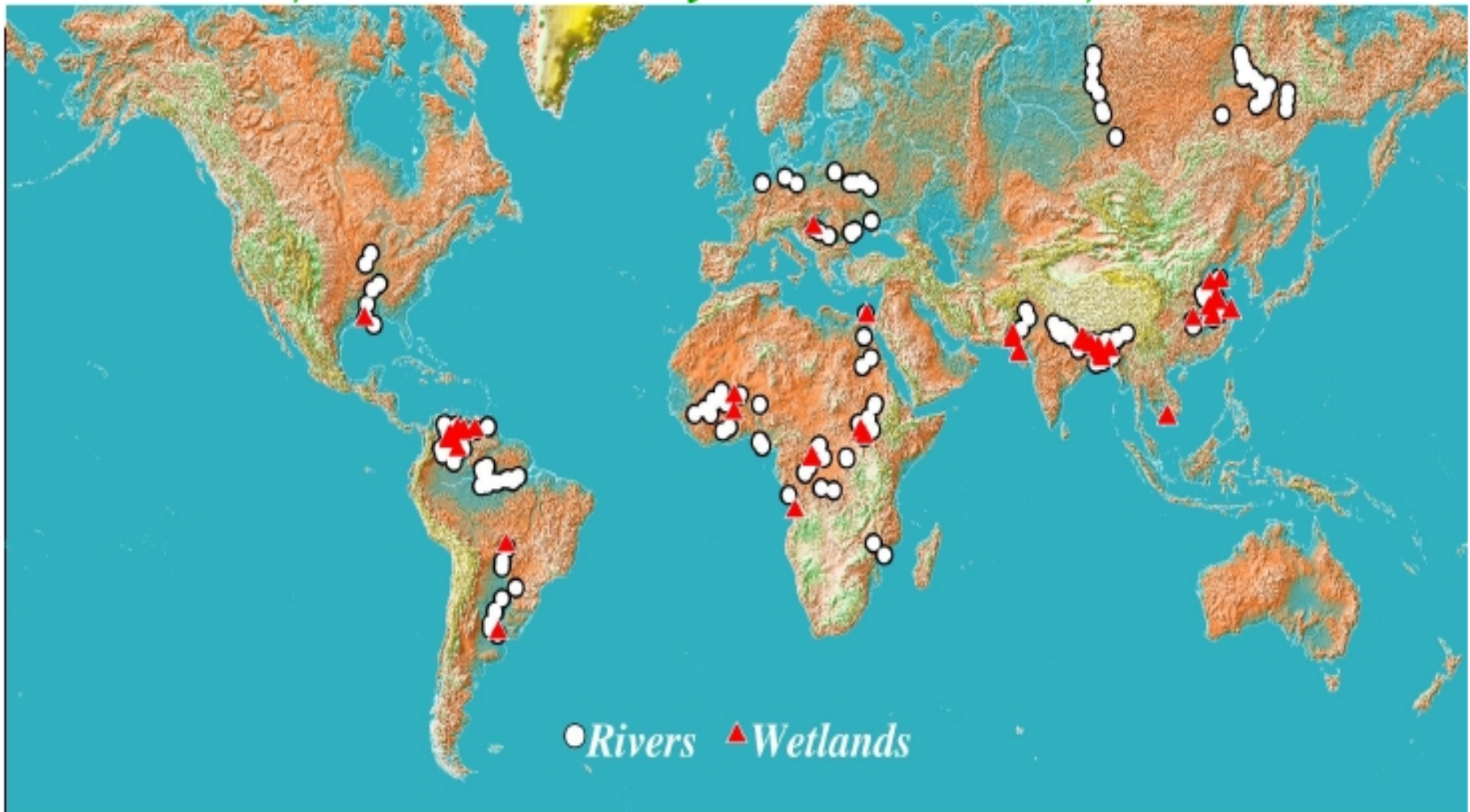
- Provide a global, robust framework for observations of biodiversity changes
- Coordinate data gathering and delivery of biodiversity change information

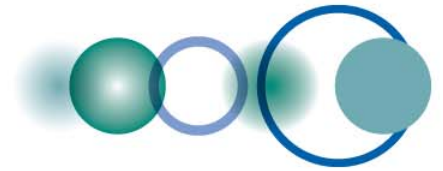




Hydroweb (France)

Map of virtual stations over large rivers and wetlands in «Hydroweb»



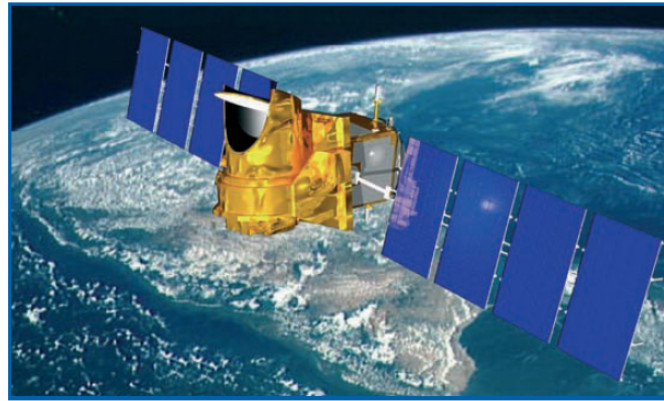


Virtual Constellations

Participants

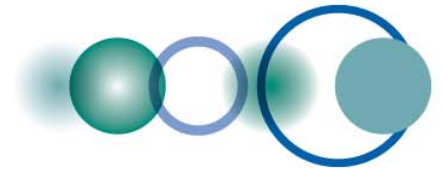
Australia, Germany, Japan, USA,
CEOS, ESA, NASA, GCOS, GTOS,
IEEE, WMO.

*The French-Indian MEGHA-Tropiques mission,
planned for flight in 2009, is proposed as part
of the Global Precipitation Constellation*

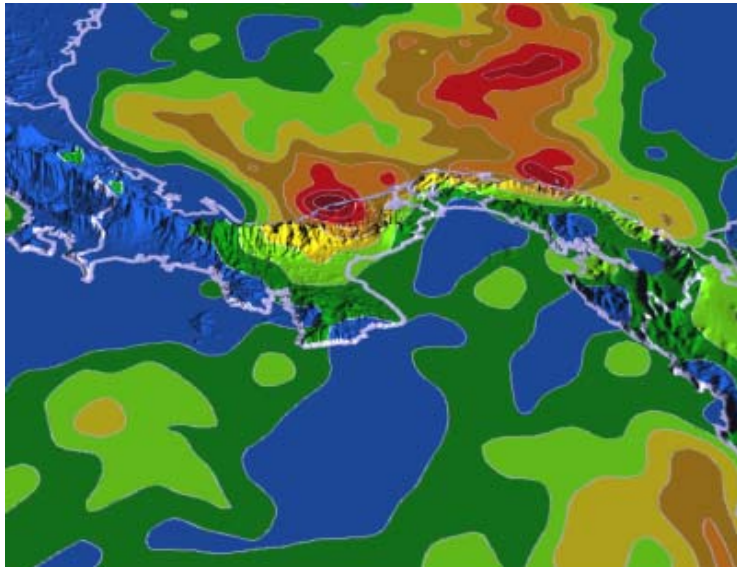


- Atmospheric Composition
- Land Imaging
- Precipitation
- Ocean Surface Topography
- Ocean Color
- Ocean Surface Vector Winds





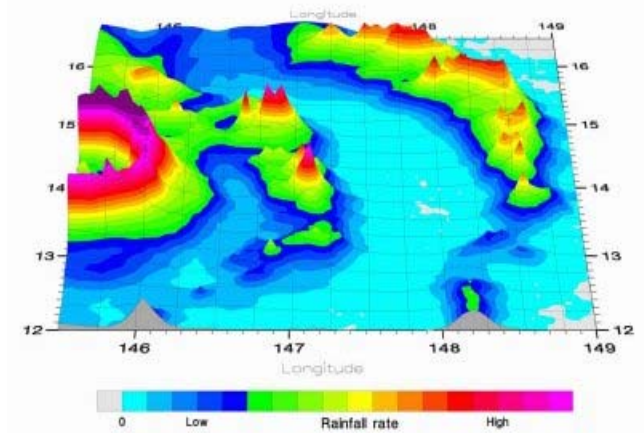
Precipitation (USA, Japan)



TRMM



GPM





Iridium NEXT

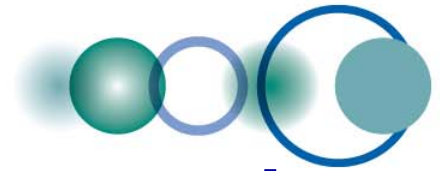
NEXT Earth Observation Mission (cont)

6

- Sensor selection to maximize EO capability and minimize impact (cost) on commercial Iridium satellite design
- Iridium NEXT ground infrastructure to collect data from the constellation
- To use existing data processing infrastructure as far as possible
- Data to be made available to all GEO members

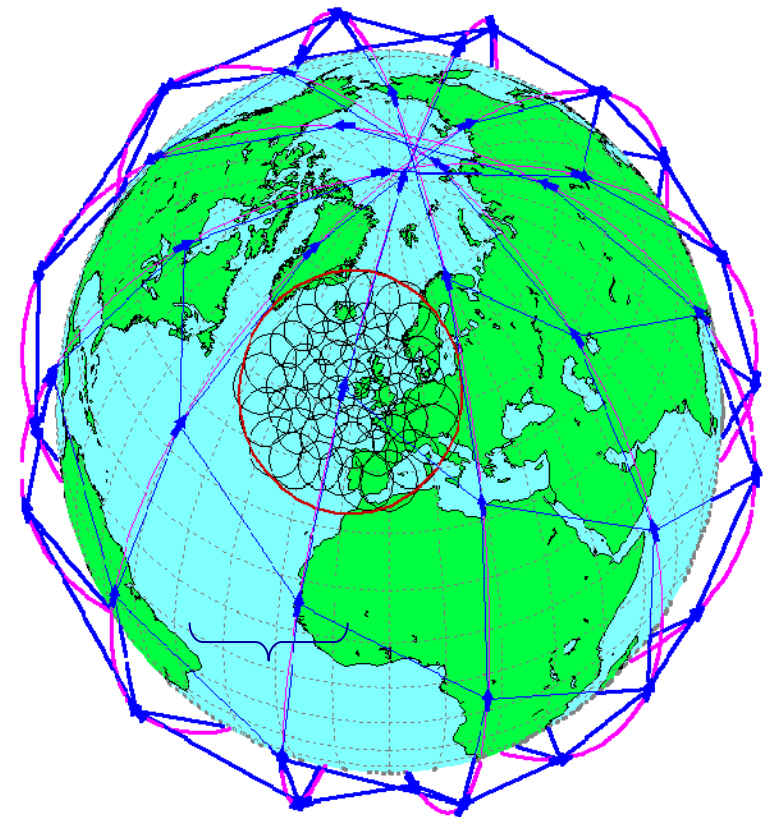
<u>Sensor</u>	<u>Quantity</u>	<u>Measured Parameter(s)</u>
Altimeter	24	Wave height & wind speed; mean sea level; ice height
GPS Occultation	12	Atmospheric water vapour content & temperature profile
Optical Imager	6	Broad band radiometer; ocean colour & land imaging
Radiometer	24	Earth radiation budget; energy source for climate system

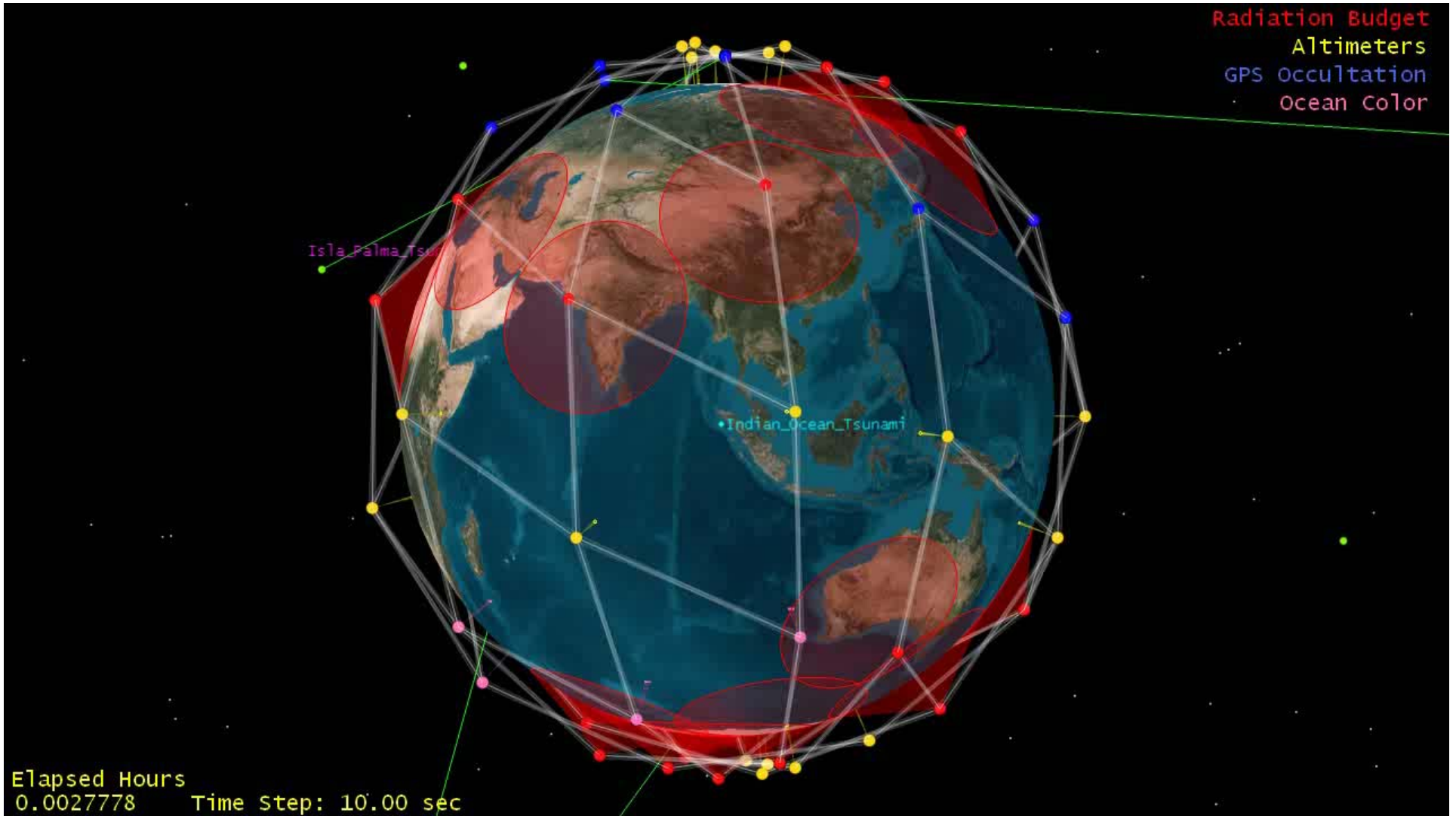
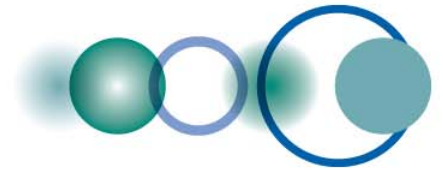
N.B. Sensor selection is open to discussion, e.g. atmospheric chemistry is also being considered but SARs are too large. Also land imaging is well covered in the planned Landsat Continuity missions.

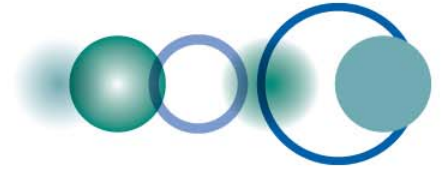


IRIDIUM Secondary Payload Opportunity

- **Constellation Comprises 66 Satellites**
 - **Near-polar Low Earth Orbit (LEO)**
 - **780 Km (485 Mi) Altitude**
- **6 Planes Of 11 Vehicles**
 - **Nearly Circular Polar Orbits (86.4° Inclination)**
 - **Provide Global Coverage**
- **Feasibility study of four possible missions**
 - **Altimetry**
 - **GPS Radio Occultation**
 - **Earth Radiation Budget**
 - **Ocean/Land Imager**

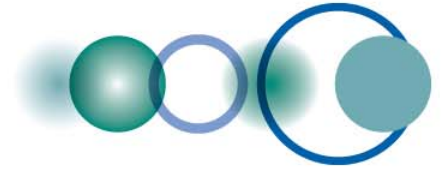




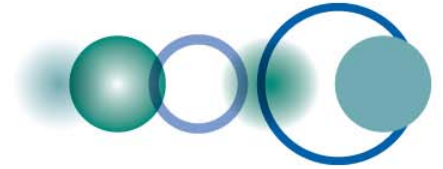


GEOSS Implementation

- Ensure Access for All**
- Make Basic Data Sets Available**
- Develop End-to-end Services**
- Coordinate Observing Systems**



GEOSS in Practice



Guiding Documents

Founding documents (2005)

- GEOSS 10-year implementation plan
- GEOSS 10-year plan reference document
- GEO Rules of Procedure (Updated Nov 2008)

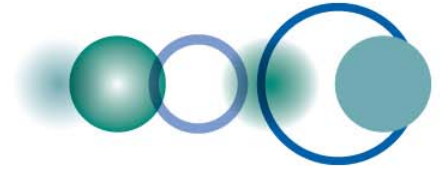
Cape Town Ministerial Summit (2007)

- Cape Town Declaration

Guidance

- Strategic Guidance Document
- Tactical Guidance Document
- Strategic Targets: GEOSS Implementation by 2015 (draft)

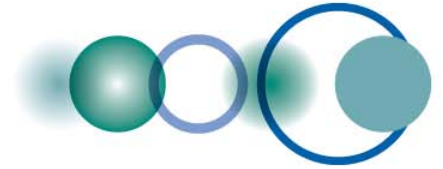
GEO Work plan (see next page)



Working Documents

GEO workplan:

- GEO Work Plan 2007-2009 (closed)
- GEO Work Plan 2009-2011 (living document, currently v1.2)
- Work Plan Progress Reports
- Task Sheets (one per task, living documents, migration to online version in progress)
- Task Force Documents
- Monitoring and Evaluation Reports



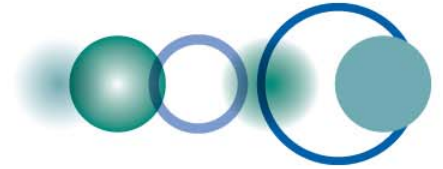
Organisation

Governance

- **Ministerial Summit**
- **Plenary**
- **Executive Committee**

Support

- Secretariat
- Committees for the 4 transverse areas
- Task Teams
- Ad Hoc Task Forces
- Communities of Practice
- Calls for Proposals
- Pilot Projects



Organisation

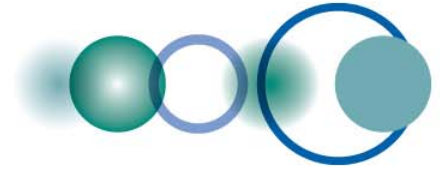
Governance

- Ministerial Summit
- Plenary
- Executive Committee

- **Architecture and Data**
- **Science and Technology**
- **Capacity Building**
- **User Interface**

Support

- Secretariat
- **Committees for the 4 transverse areas**
- Task Teams
- Ad Hoc Task Forces
- Communities of Practice
- Calls for Proposals
- Pilot Projects



Organisation

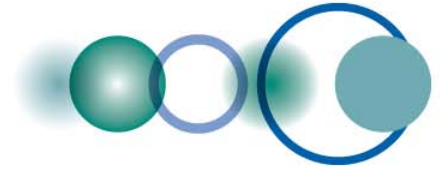
Governance

- **Ministerial Summit**
- **Plenary**
- **Executive Committee**

Support

- Secretariat
- Committees for the **transverse areas**
- Task Teams
- **Ad Hoc Task Forces**
- Communities of Practice
- Calls for Proposals
- Pilot Projects

- **GCI Initial Operations Capability**
- **Data Sharing**



Organisation

Governance

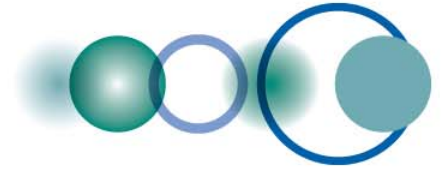
- Ministerial Summit
- Plenary
- Executive Committee

Support

- Secretariat
- Committees for the Implementation of the Strategy
- **Task Teams**
- Ad Hoc Task Forces
- Communities of Practice
- Calls for Proposals
- Pilot Projects

- Transverse tasks DA, AR, CB, ST, UI and
- SBA tasks AG, BD, CL, DI, EC, EN, HE, WA, WE,

http://earthobservations.org/geoss_ts.shtml

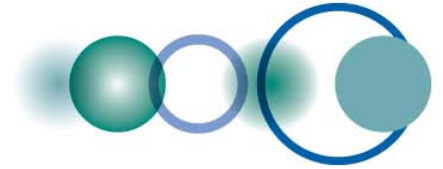


Organisation

- **Air Quality and Health**
- **Atmospheric Chemistry** (former IGOS Atm. Chemistry theme – IGACO)
- **Biodiversity**
- **Carbon Cycle** (former IGOS Carbon theme – IGCO)
- **Coastal Zone** (reflecting former IGOS Coastal theme)
- **Cryosphere** (former IGOS Cryosphere theme)
- **Energy**
- **Forests**
- **Geohazards** (former IGOS Geohazards theme)
- **Global Agricultural Monitoring** (former IGOS Land sub-theme)
- **Water Cycle** (former IGOS Water Cycle Theme – IGWCO)

Ad hoc Task Forces

- **Communities of Practice**
- Calls for Proposals



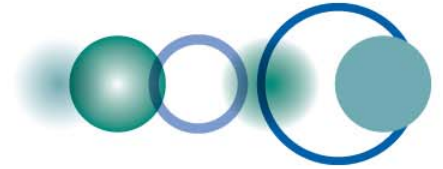
Organisation

Governance

- **Ministerial Summit**
- **Plenary**
- **Executive Committee**

Support

- Secretariat
- Com **• Decision-Making Support**
- Task Teams
- Ad Hoc Task Forces
- Communities of Practice
- **Calls for Proposals**
- Pilot Projects



Organisation

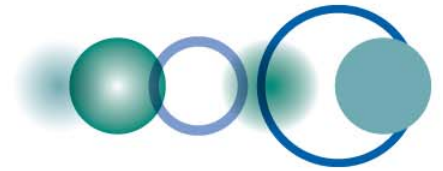
Governance

- **Ministerial Summit**
- **Plenary**
- **Executive Committee**

Support

- Secretariat
- Com
- Task Teams
- Ad Hoc Task Forces
- Communities of Practice
- Calls for Proposals
- **Pilot Projects**

•Architecture Implementation



Home About GEO Meetings News Room Documents

Home

The Global Earth Observation System of Systems (GEOSS)
2009-2011 Work Plan
Task Sheets (August 2009)

GEOSS themes:
Disasters

Are you new to GEO and GEOSS? Find out more [here!](#)

GEOSS on-line

Scroll below for a sampling of GEOSS information resources; more sites can be found [here](#).

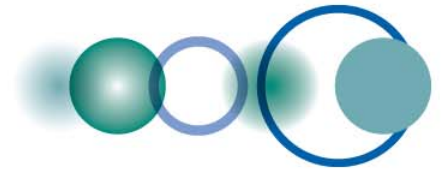
Announcing release of Global Digital Elevation Model (DEM)
Japan's Ministry of Economy, Trade and Industry (METI) and the US National Aeronautics and Space Administration (NASA) released the ASTER GDEM on 29 June. By providing a well-validated, high-resolution global topography

What's new

GEO News Issue
(21 July 2009)

GEO-VI web
Information on
Plenary meeti
details on regi
exhibits, accom

<http://earthobservations.org/documents.shtml>



GEO Tasks

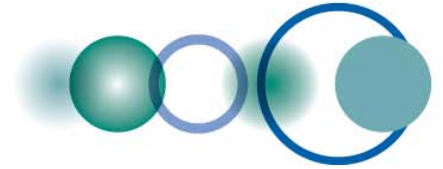
**GEOSS Common Infrastructure
Standards and Interoperability
Data Sharing Guidelines
Transverse activities**

**Harmonisation
Collaboration
Political leverage**



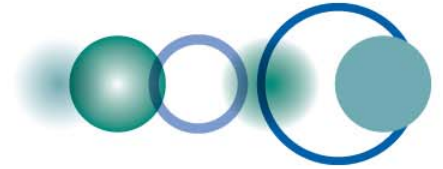
**Contributed
Activities**

**Voluntary
Consensus-based**



&





Quality Assurance in the 10-year Plan

.....

The purpose of GEOSS is to achieve comprehensive, coordinated and sustained observations of the Earth system, in order to improve monitoring of the state of the Earth, increase understanding of Earth processes, and enhance prediction of the behavior of the Earth system. GEOSS will meet the need for timely, **quality** long-term global information as a basis for sound decision making, and will enhance delivery of benefits to society

.....

Through GEOSS, they will share observations and products with the system as a whole, and will take the necessary steps to ensure that the shared observations and products are **accessible, comparable, and understandable**, by supporting common standards and adaptation to users needs

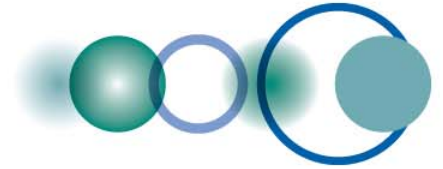
.....

GEOSS, collectively, has several functional components:

- To monitor **performance** against the defined requirements and intended benefits.

.....

Integration of in situ, airborne and space-based observations within the various societal benefit areas will be encouraged, as will the establishment of global, efficient, and representative networks of in situ observation to support process studies, satellite data **validation**, and algorithm and model development, as well as the detection, documentation and attribution of change.



Quality Assurance in the Reference Document

.... GEOSS observations and products are to be observed, recorded and stored in clearly defined formats, with metadata and quality indications to enable search and retrieval,

.... Observations of the same variable in different places or by different agencies may not be able to be combined, because the methods used to measure it are different, do not follow agreed standards or are not adequately intercalibrated, or because.

..... None of the above actions will be effective in the long term unless there is a fundamental commitment to continuation of observations at an acceptable level of accuracy and coverage for all targeted users. Participation in GEOSS implies an acceptance of this need for adequacy and continuity

.....continued

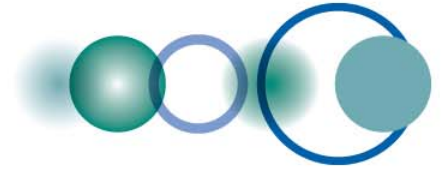


Quality Assurance in the Reference Document

.....

5.3.3 Data and Product Quality

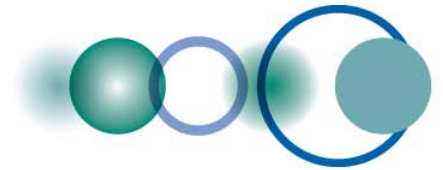
GEOSS will advocate the association of quality assessments with all Earth Observation data. It is clear that observation data of known quality from calibrated sensors are essential. For instance, the ability to perform long-term “traceability” is highly dependent on complete and accurate metadata about precision and accuracy. Calibration must be addressed during product creation, and validation is required to ensure the quality of the resulting product. In addition to useful quality descriptions, greater standardization of quality control procedures may be needed. Quality control procedures should be developed and implemented. These should include provision for calibrating space-based instruments through solar and lunar observations and coordinating defined Earth sites for vicarious calibration.



Quality Assurance in the Reference Document

.... The standard for geospatial metadata is ISO 19115: Geographic Information – Metadata. This standard facilitates the exchange and integration of data and information by giving a standard description of the identification, extent, quality, spatial and temporal scheme, spatial reference and distribution specifics of geospatial Data

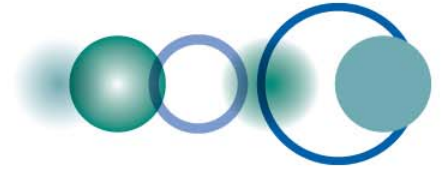
..... Other standards typically are needed for the appropriate interchange of particular kinds of data. These include standards on calibration and methodology, among many others. GEOSS will promote convergence to common standards for each of these various aspects.



Quality Assurance in the 2009-2011 Work Plan

DA-09-01: Data Management a) GEOSS Quality Assurance Strategy

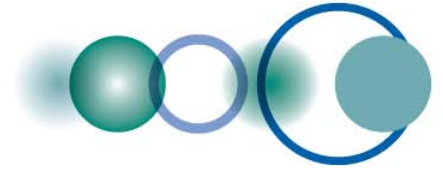
Develop a GEO data quality assurance **strategy**, beginning with space-based observations and evaluating expansion to in-situ observations, taking account of existing work in this area, and including quality issues of derived information products. Develop a GEO data quality assurance strategy and **implementation process**, beginning with space-based observations and expanding to in-situ observations, taking account of existing associated GEOSS quality assurance work, and including the quality issues of Earth observation information products. A Quality Assurance framework for Earth Observation (QA4EO) has been developed and is now being implemented. As a consequence of implementation, it is proposed that GEOSS data set registration include **associated quality assurance information** to enable harmonization and interoperability, which during the transitional phase could be a voluntary self declaration of compliance with respect to QA4EO and/or at least its underlying principles.



How to Integrate QA4EO into GEO

There is no pre-defined recipe, but the following is recommended.

- Proceed with open review process.
 - This weeks workshop is a key event for this
- Make the links to the Committees and SBA's.
 - The GEO Secretariat has begun this process
 - The new initiative of the Task-Level workshop will the best opportunity for major progress
- Demonstrate benefits through pilot projects
 - Some are ongoing, but need to be summarised at executive level
 - Further pilot projects are to be implemented
- Report to the executive Committee
 - The Architecture and Data Committee is the best vehicle for this
 - The Exectutive Committee should set the path towards adoption.

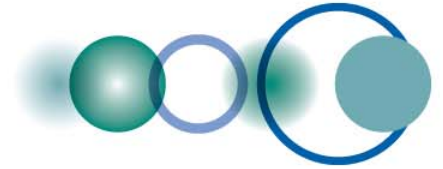


From Theory to Practice

The previous slides addressed the formal declarations.

The next days the practical side of QA4EO will be highlighted and explored

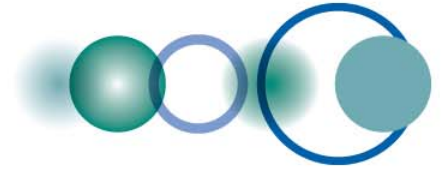
There are several challenges ahead. To list just a few:



Challenges

Now that the high-level framework is there:

- How to develop the lower-level guidelines (e.g. those specific to one SBA or a sub-domain within an SBA)
- How to engage those providing data or services to the SBA's into QA4EO
- How to go beyond self-declaration, whilst maintaining a peer-to-peer relation
- How to quantify QA4EO implementation progress across the domains?
- Can we further strengthen the links to the Data Sharing and Architecture Implementation efforts? And all other QA4EO impact areas in GEO (see next slide)



QA4EO's impact areas

- Committees for the 4 transverse areas: **All, but especially ADC, UIC**
- Task Teams: **Nearly all** --- Note new initiative of task-level workshop to strengthen connection between SBA and transverse tasks
- Ad Hoc Task Forces: **IOC and DSTF**
- Communities of Practice: **All**
- Pilot Projects: **Architecture Implementation**

Thank you!

