

US EPA ARCHIVE DOCUMENT



Group on
Earth Observations

Global Earth Observing System of Systems (GEOSS): Progress and Plans

**User Interface Committee Meeting
1-3 August 2007**

Douglas Muchoney, GEO Secretariat



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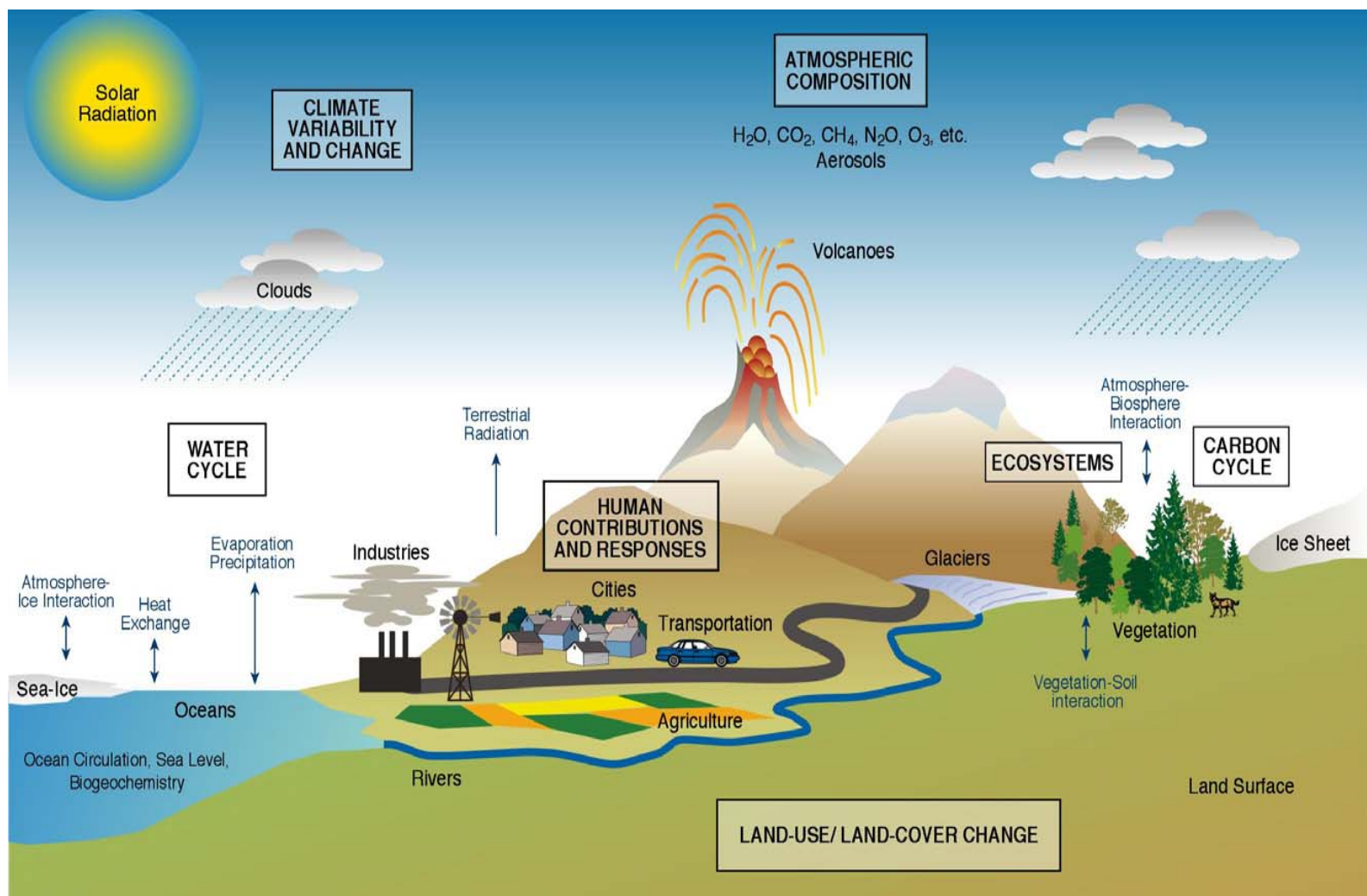
GEO MINISTERIAL SUMMIT

Cape Town

30 November 2007



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The Earth is a complex system of systems

I do not know how the parts are interconnected, and how each part accords with the whole; for to know this it would be necessary to know the whole of nature and all of its parts.

Baruch Spinoza 1632-1677



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**Any Single Problem Requires Many
Data Sets**

**A Single Data Set Will Serve Many
Communities**

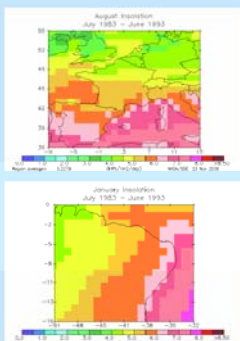


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SSE Data Set



Access through:
<http://eosweb.larc.nasa.gov/sse/>

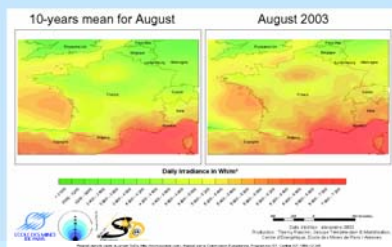


- Monthly averaged from 11 years of data (1983-1993)
- Data tables for a particular location
- Color plots on both global and regional scales
- Over 200 satellite-derived meteorology and solar energy parameters
- Data for the RETScreen® Clean Energy Project Analysis Software

Helioclim Database



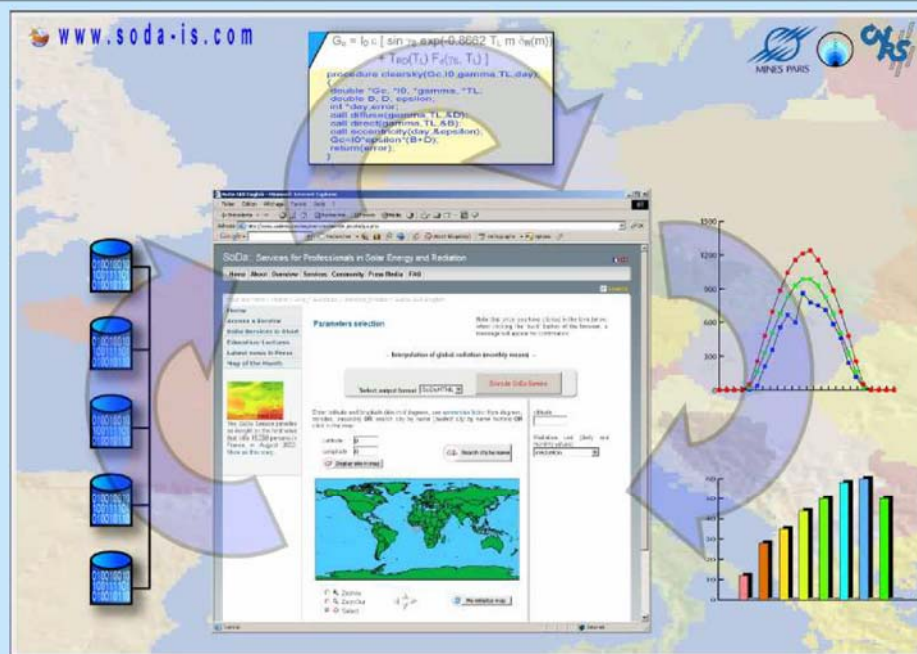
Access through SoDa:
<http://www.soda-is.com/>



- Database and time-series of irradiance or irradiation
- Produced by the processing of satellite images, especially from the Meteosat series of satellites
- Covering Europe, Africa, the Mediterranean Basin, the Atlantic Ocean and part of the Indian Ocean
- Period runs from 1985 onwards

Solar Energy

The SoDa Service Integrator





IGOS-P Migration to GEO

- IGOS-P-13bis meeting in Buenos Aires 12 November 2006
- Transition Document (Doc 11 to ExCo 3-4 July 2007)
- Active Role of Theme Teams in the Communities of Practice
- Continuation of IGOS Theme Team Reports with (new) emphasis from requirements to implementation of recommendations/activities
- Representation of Theme Teams in GEO Committees (UIC, STC, ADC, CB)
- Agreed at IGOS-P-14 that Co-chairs will monitor overall transition
- Transition Document completed in time for IGOS –P-14bis in Cape Town 27 November 2007



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Ministerial Summit Preparations

- Report on Progress (TF2 Draft V4.1, 20 July 2007)
- Early Achievements
- Draft Agenda
- Draft Declaration
- Booths
- Publication – The Full Picture: Tudor Rose
- Don't Forget: GEO Plenary



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Relation of IGOL Recommendations to GEO Tasks

Sub-Theme	Status	Bodies carrying out tasks
Land Cover	Largely transitioned to GEO:DA-07-02 & 03	GOFC-GOLD, FAO/GTOS, CEOS etc
Land Use/ Change	Ag LU transitioned to GEO: GEO needs a more comprehensive global LU activity.	GOFC-GOLD and FAO/GTOS
Fire	Partly transitioned to GEO: DI-06-13	GOFC-GOLD and FAO/GTOS
Biodiversity/Conservation	Report submitted to GEO	GEO, CBD, WHC etc.
Agriculture	Transitioned to GEO: AG-07-03	IGOL Ag Team with FAO and GEO
Biophysical Properties (relating to Ecosystem Dynamics)	Many remote sensing needs correspond to GIP; in situ needs development. Regional: GEO Task: EC-06-07.	- GCOS/CEOS for RS; Ag NPP to GEO-Ag. - In situ: Fluxnet. - Ecosystem props TBD.
Soils	On-going	FAO; ISRIC
Human Settlement /Socio-Economic Data.	Needs development. Note IGOL will include population.	Needs additional international coordination.
Water Availability & Use,	Introduced by FAO: needs more development	FAO + Water Theme
Topography	Main recommendations unlikely to change © GEO Secretariat	GEO task on-going



GEO Biodiversity Observation Network





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GEO Biodiversity Observation Network: What is it?

- A Network of Networks of Biodiversity Information Data Providers and Users
- An ecoregion-based *framework* for global planning and management applications
- A global *data development and analysis* effort
- An *advisory resource* for other networks and processes like IABIN, the Convention on Biological Diversity, the Conservation Measures Partnership, the UN Millennium Development Goals, etc.

GEO Biodiversity Observation Network – Successes to Date

- Diversitas has launched the GEO BioObservation.org website with a declaration and mechanism to join the network:
<http://www.bioobservation.net/>
- Interoperability Demo (IP3), Biodiversity and Climate Change (FAO, ESA, GBIF, U. of Toronto, U. of Florence, Italy)
- Primarily through the USGS/NBII-supported Global Data Toolkit (GDT; <http://rockyitr.cr.usgs.gov/gitan/>) and partnerships with GBIF, WCMC-UNEP, IABIN and most recently with Conservation International, IUCN and the Zoological Society of London, the GDT is or will be used for Threatened and Endangered Species assessments, and supporting the global biodiversity assessments (like mammals, amphibians and reptiles).

GEO Biodiversity Observation Network – Successes to date

- The functionality of the GDT has increased tremendously, as have the data holdings. Modules now include protected areas, BirdLife and species assessments (T&E and global).
- Integrate the *Model GEO Biodiversity Observation Network* portal and the *Global Data Toolkit* (<http://rmgsc.cr.usgs.gov/GITAN/>) into the GEO WebPortal.
- Demo the *Rapid Biological and Ecological Assessment of Biosphere Reserves* project showing power of integrating data and providing models and tools such as ATtILLA landscape and hydro models and the GEO ecosystem model.
- Formation of the new *GEO Invasive Species Monitoring Network*.
- Release of the *Rapid Land Cover Mapping Tool*.



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GEO Value-Added

- Cost Saving: reduce redundant data collection, management and analyses
- Integrated Analysis: Data Sharing and Interoperability allows for analyses that would not be performed
- Capacity Building: providing data and tools



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





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GEOSS will Address Nine Societal Benefit Areas

1. Reduction and Prevention of Disasters
2. Human Health and Epidemiology
3. Energy Management
4. Climate Variability & Change
5. Water Management
6. Weather Forecasting
7. Ecosystems
8. Agriculture
9. Biodiversity





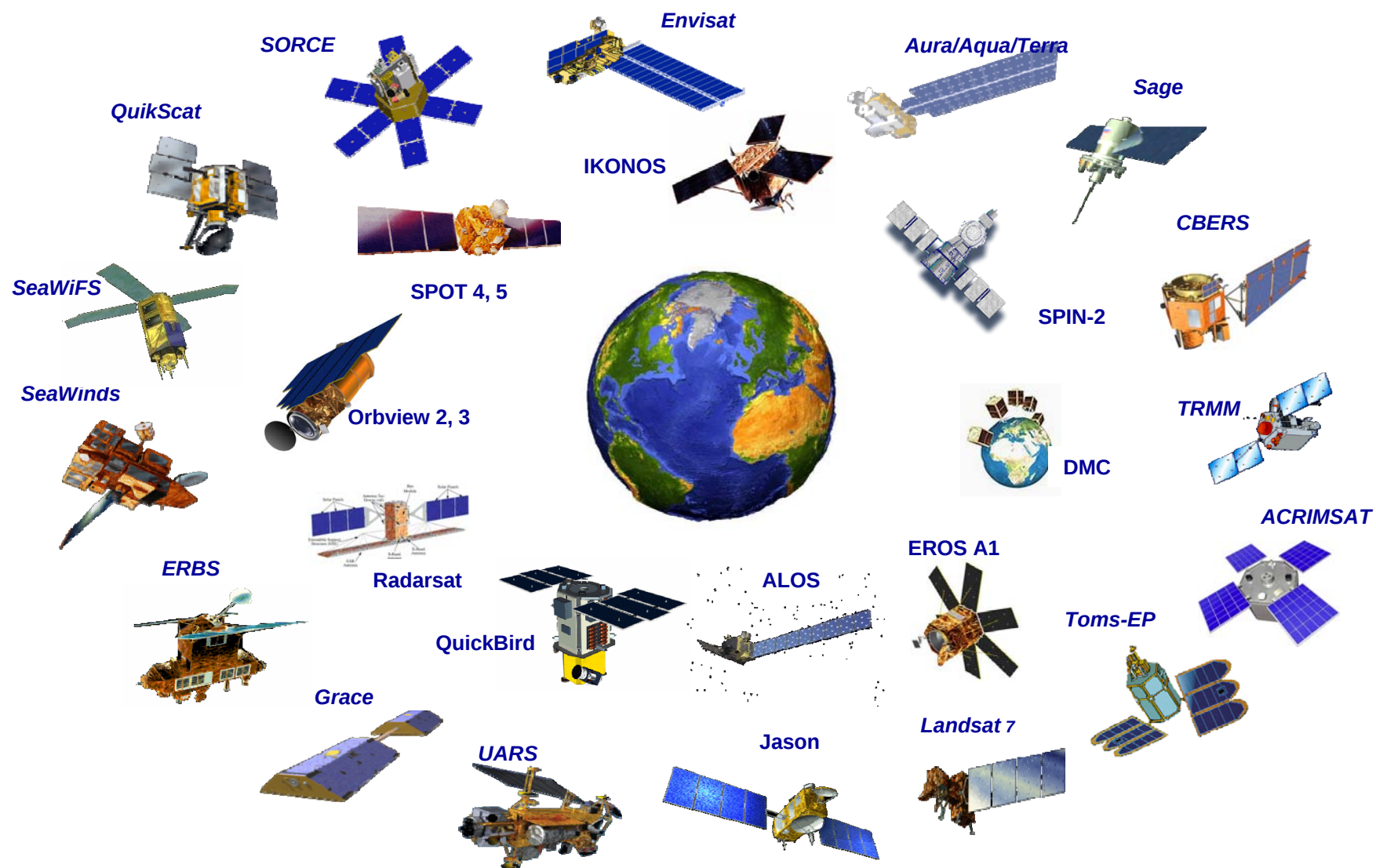
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GEOSS achievement through 5 Transverse Areas

- 1. Architecture**
- 2. Data Management**
- 3. User Engagement**
- 4. Capacity Building**
- 5. Outreach**



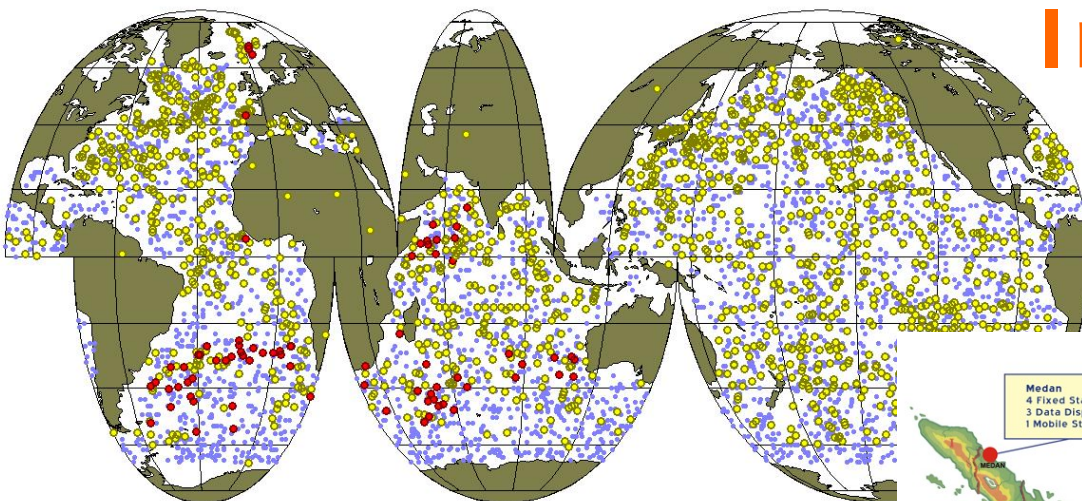
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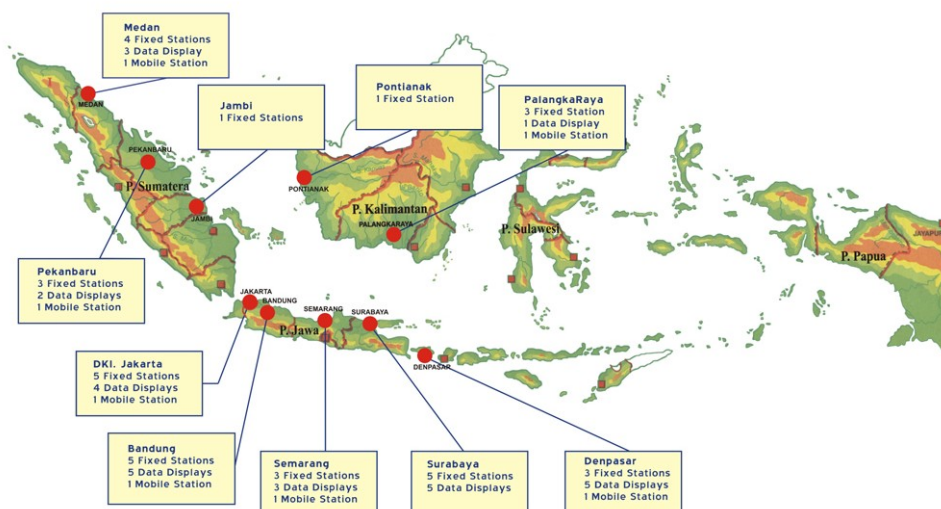
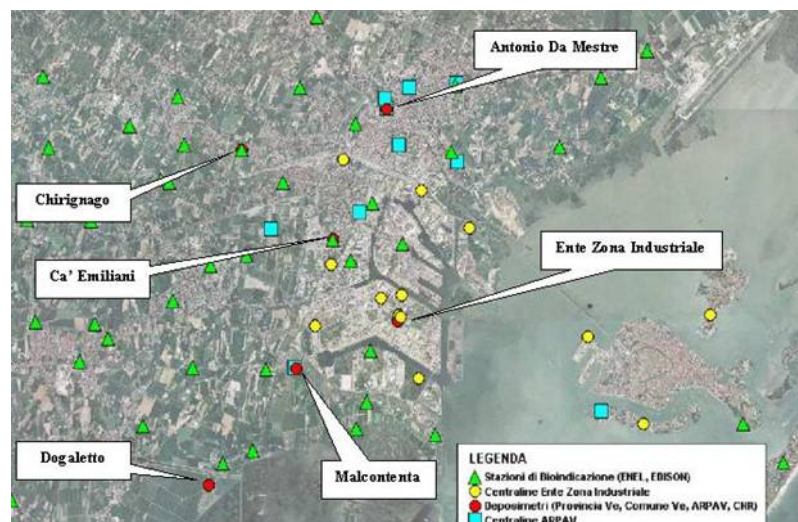
Space Observation Systems

© 2000 Earthlink

Global Argo Float Array (red – Argo UK; yellow – all Argo; blue – proposed array)



In Situ Observation Systems

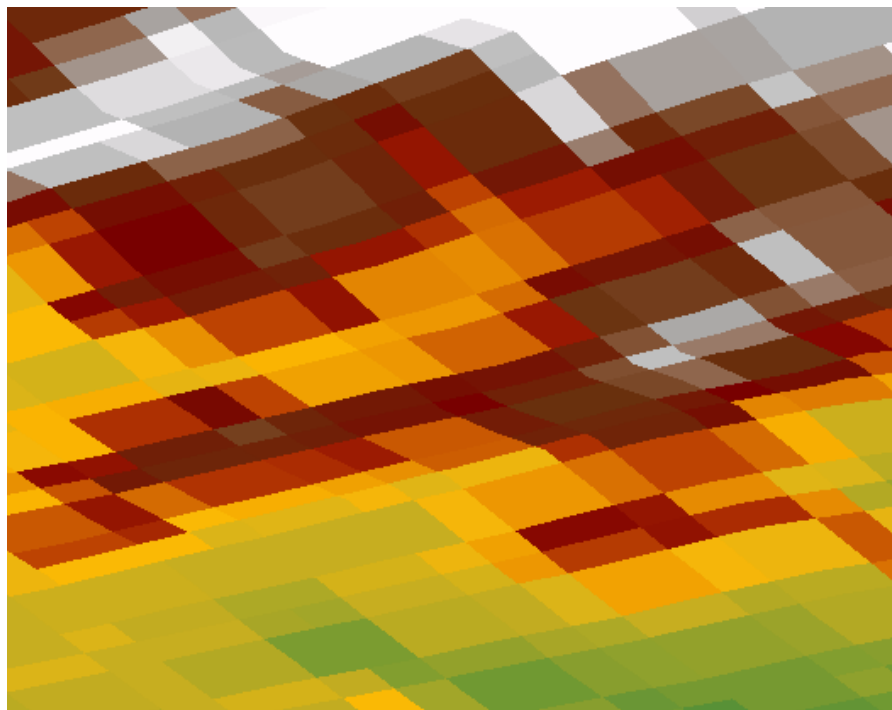


Assistant Deputy for Environmental Impact Control Facility
Deputy Minister for Technical Infrastructure for Environmental Management
Ministry Environment

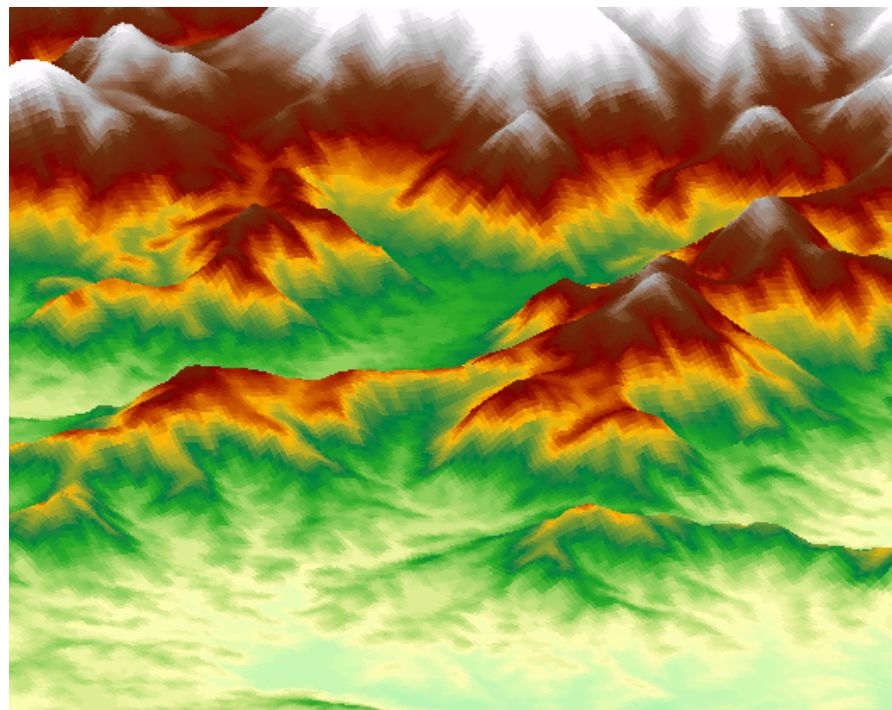


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Data Policy



90 m



30 m

Comparison courtesy of V. Gorokhovich, CIESIN

© GEO Secretariat



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Let's not forget aerial

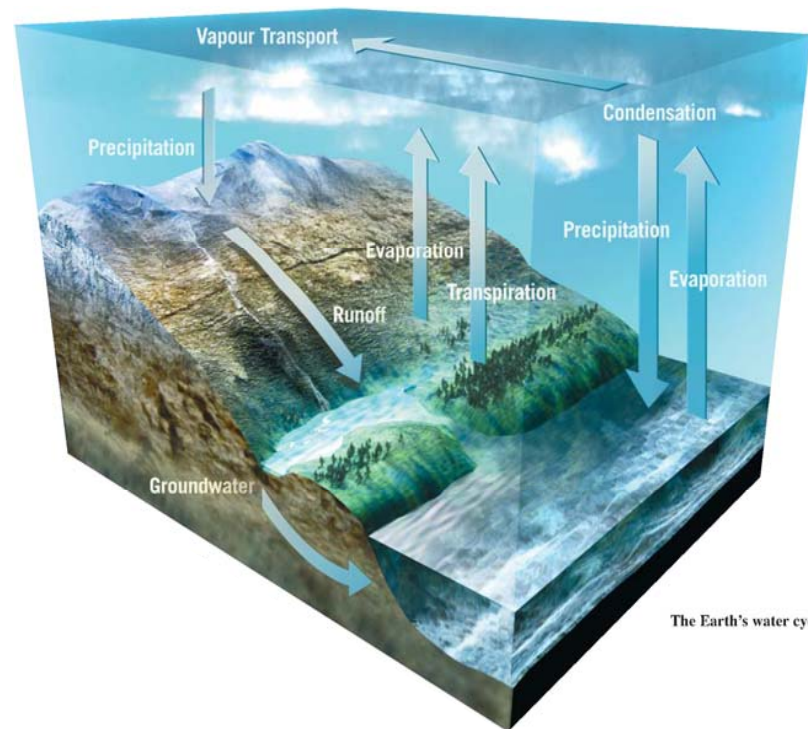




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Understand Continental Water Cycle

- Power Generation
- Irrigation
- Drinking & Sanitation
- Flood Prevention
- Understanding Sea-level Rise

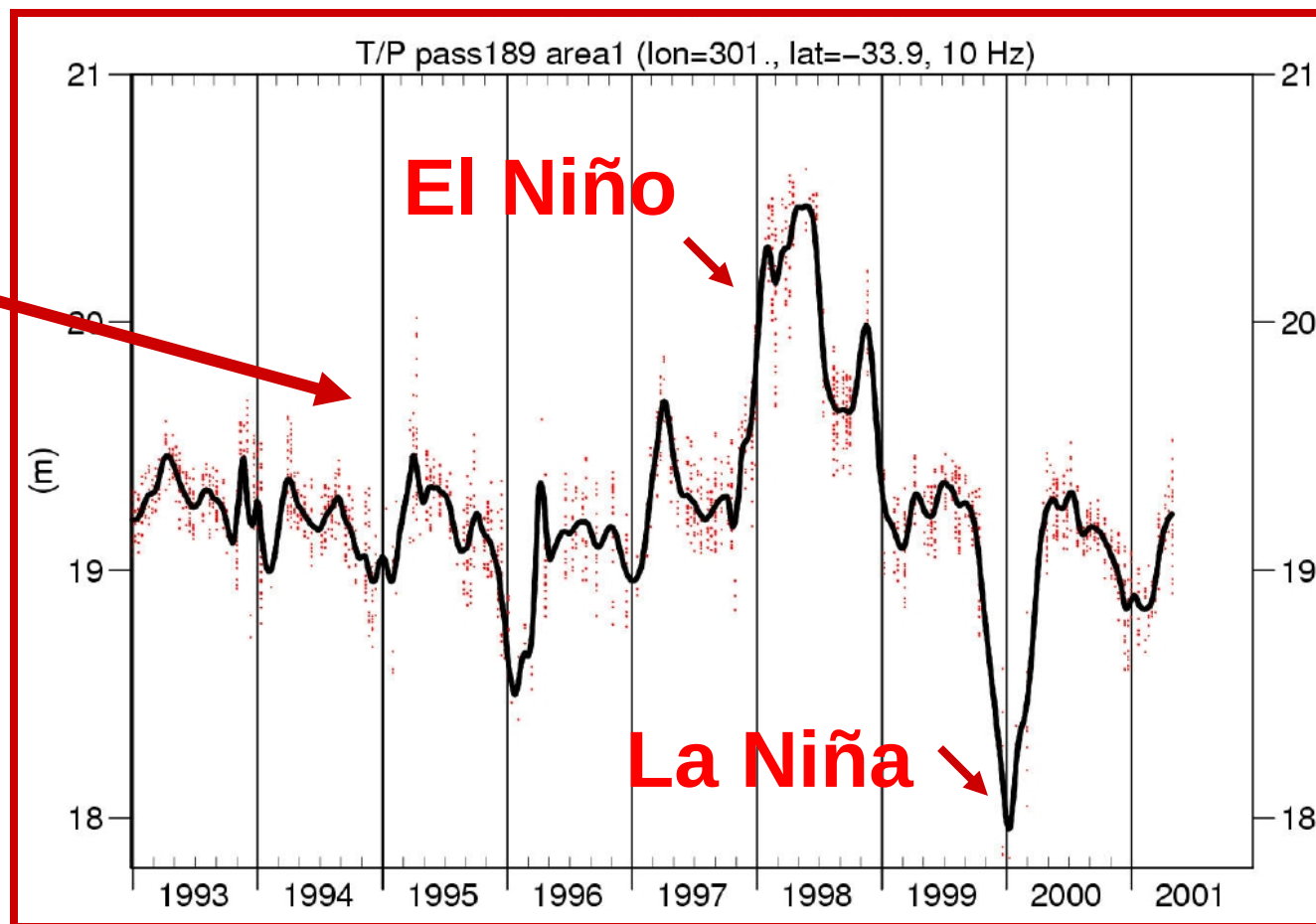
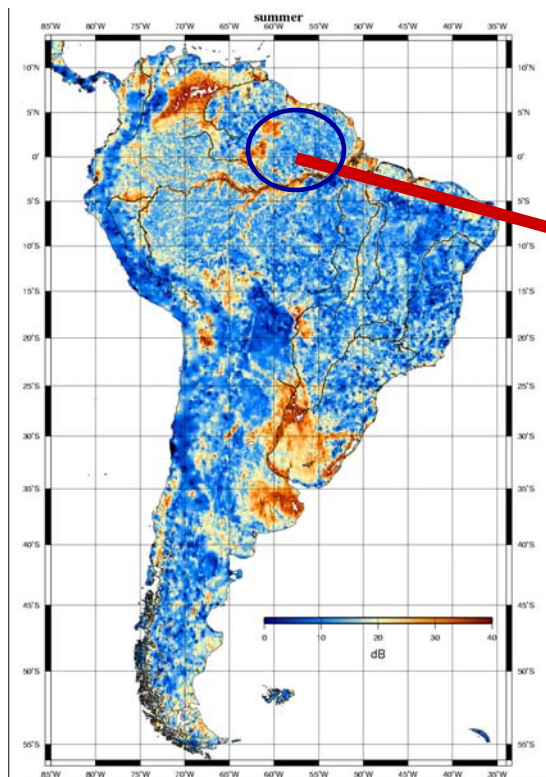




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Integrate Space and In-situ Observations

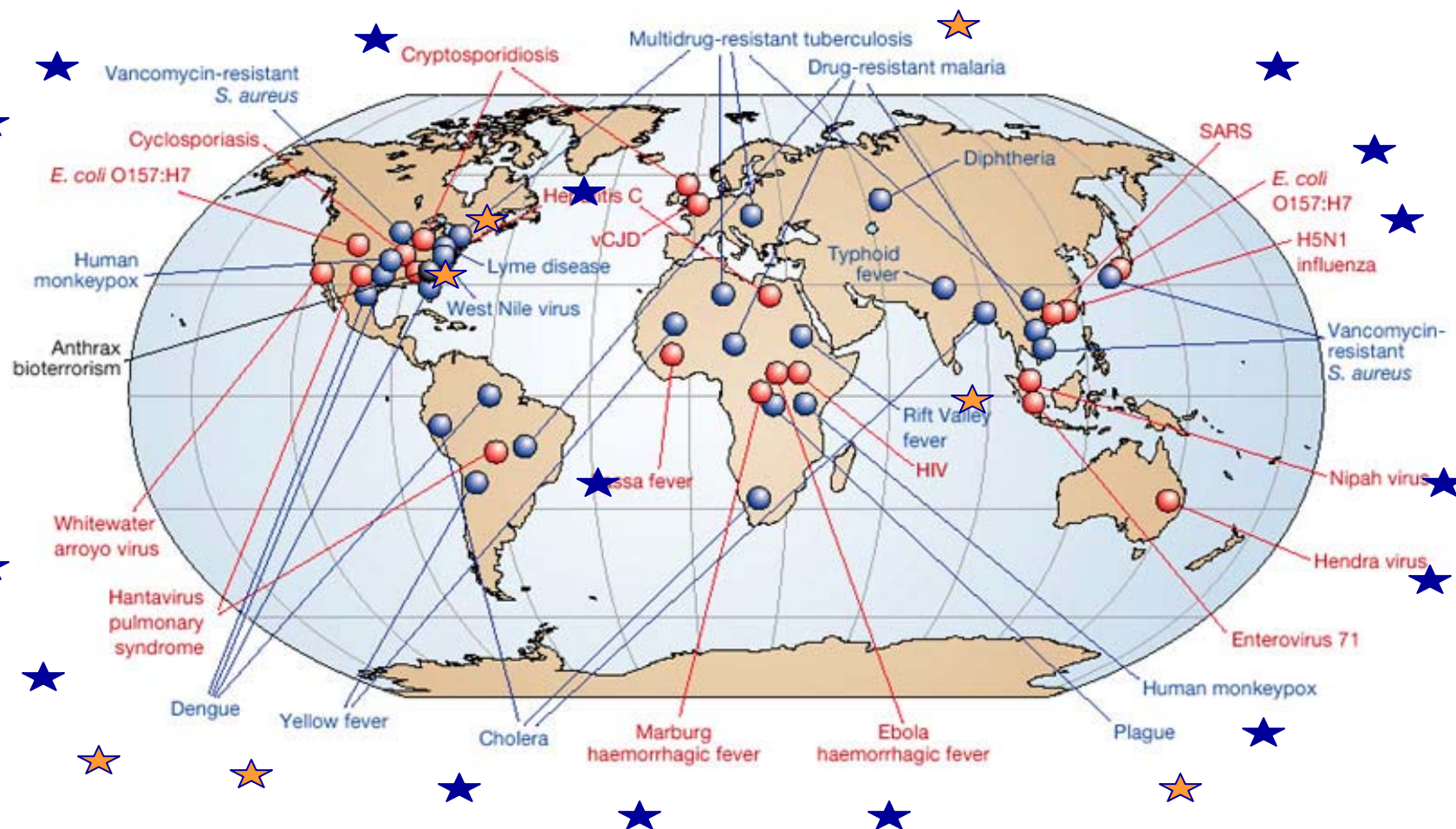
PARANA





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Understand Global Emerging Diseases



EMERGING
RE-EMERGING

★ ZOOONOTIC
★ VECTOR-BORNE

* Modified from Morens et al. 2004 *Nature* 430:242

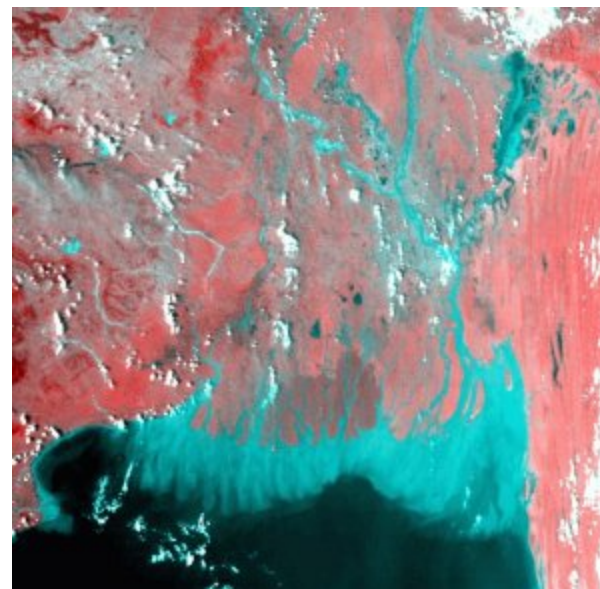
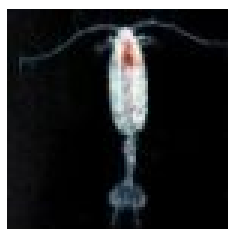


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Forecast Outbreaks

**Vibrio Cholerae has a
Marine Zoonotic Cycle
Associated with Algal
Blooms and
Sea Surface Temperature**

COPEPOD



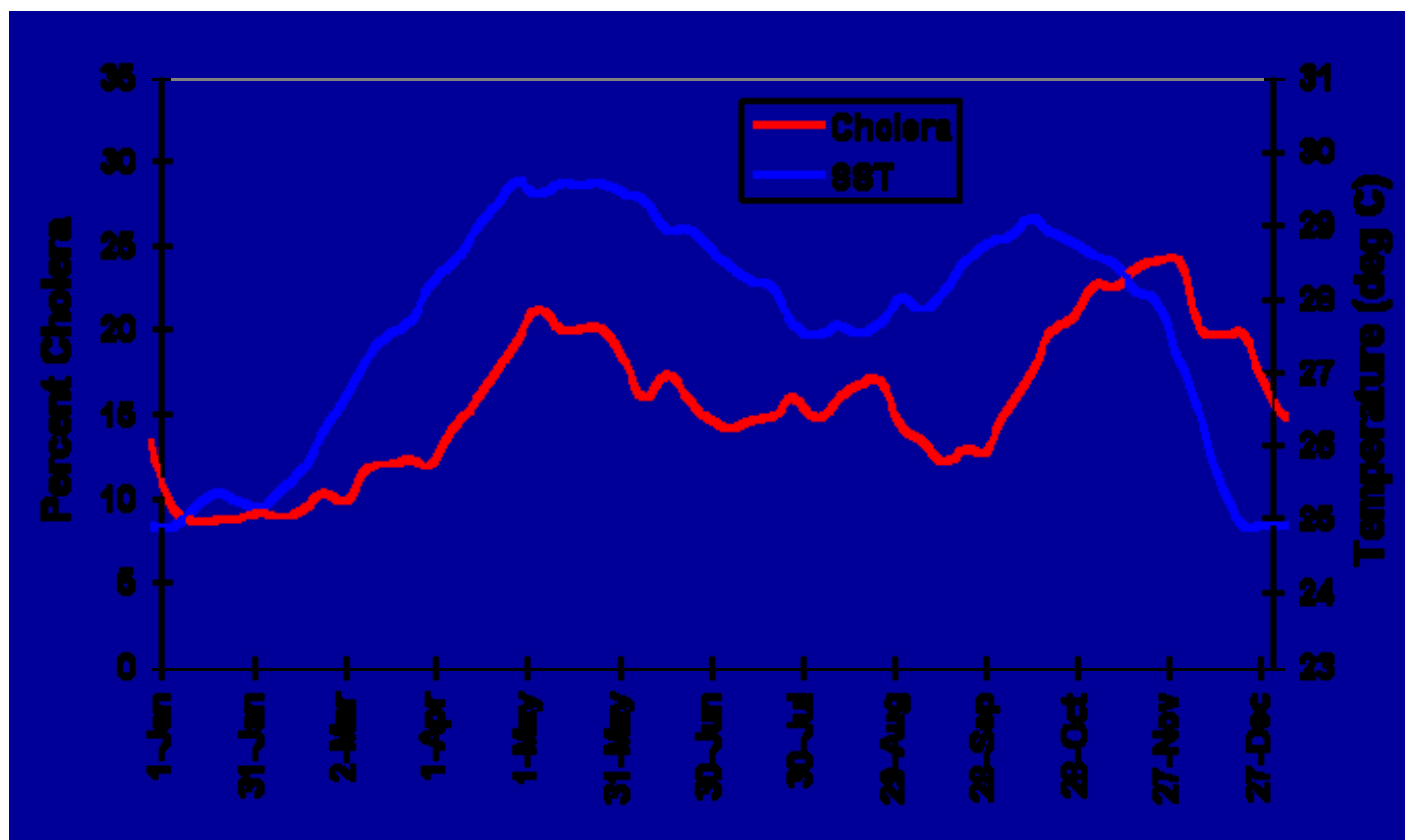
BAY OF BENGAL

AVHRR SEPT 1992
FALSE COLOR INFRARED



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CHOLERA CASES FOLLOW SEA SURFACE TEMPERATURE



BAY OF BENGAL



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A Warning System for Sand and Dust Storms

WHY a Sand and Dust Storm – Warning System?

HUMAN HEALTH

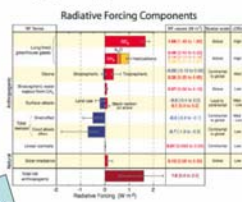
Bronchial tubes
Eye infections
Asthma
Heart stress



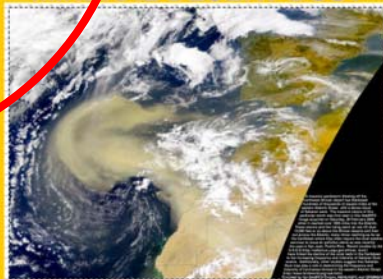
Related to epidemics of lethal
Meningitis in the Sahel Belt

CLIMATE AND METEOROLOGY

Dust causes large
uncertainties in
assessing climate
forcing by
atmospheric
aerosols

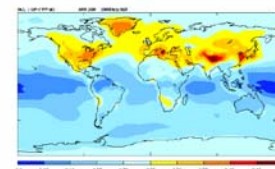


MINERAL DESERT DUST



IMPACTS

OZONE CHEMISTRY



OCEANIC AND TERRESTRIAL BIOCHEMICAL CYCLES

Iron
deposition
into the
oceans,
increasing
nitrification
processes



LIFE AND PROPERTY



VISIBILITY

Severe reduction of visibility
on road and airports affecting
operations



Infection of coral reefs

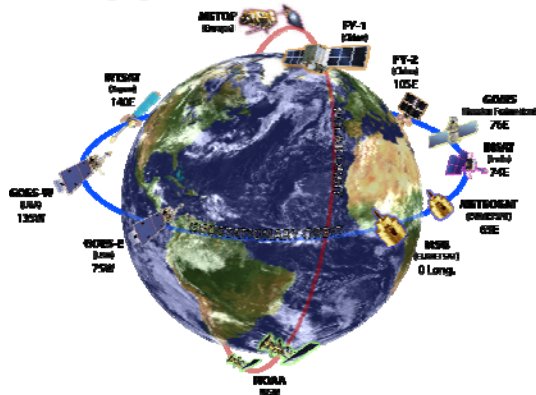


THORPEX

A World Weather Research Programme

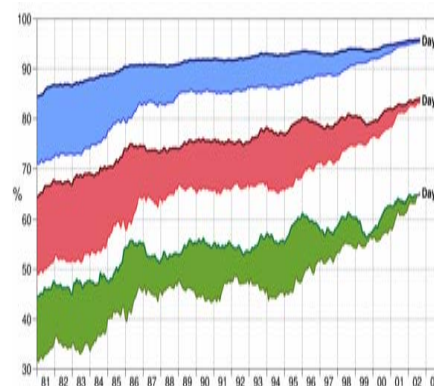
THORPEX will develop, demonstrate and evaluate a multi-model, multi-analysis and multi national ensemble prediction system, referred to as THORPEX Interactive Grand Global Ensemble.

Access to WEATHER data for other societal benefit areas are facilitated and supported



Connecting Systems

Connecting People



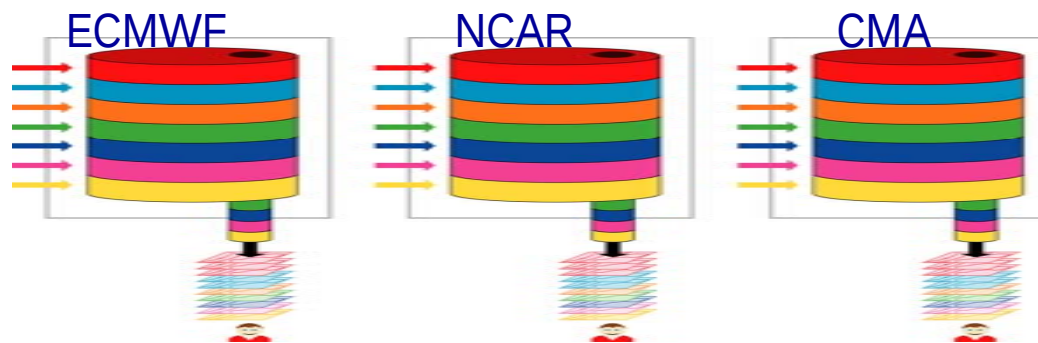
GEO Role

- Data available to 9 GEO SB Areas
- Broad & easy access through GEO Portal
- Awareness of data availability
- Development of socio-economic applications
- Data policy



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TIGGE data bases open for general user access - expected 2007



TIGGE Core Dataset

- Global ensemble forecasts to around 14 days generated routinely at different centres around the world
- Outputs collected in near real time and stored in a common format for access by the research community
- Easy access to long series of data is necessary for applications such as bias correction and the optimal combination of ensembles from different sources



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CBERS Data for Africa and the Caribbean



*China Brazil Earth Resources Satellite



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From Satellite to End-Users

- **CBERS Data to Africa and Caribbean will be Available Free of Charge**
- **Data Reception and Image Processing in Africa**
 - Southern Africa – SAC (South Africa)
 - North and Western Africa - Maspalomas (Spain)
 - Possibly North & Eastern Africa – Malindi (Italy/Kenya)
- **Products Distribution to Users**
 - GEOPortal
 - GEONETCast



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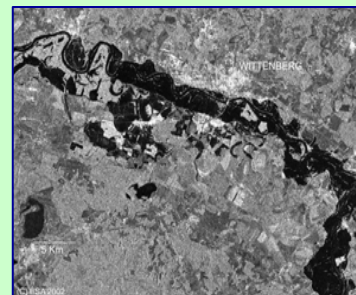
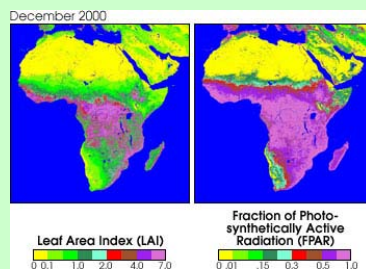
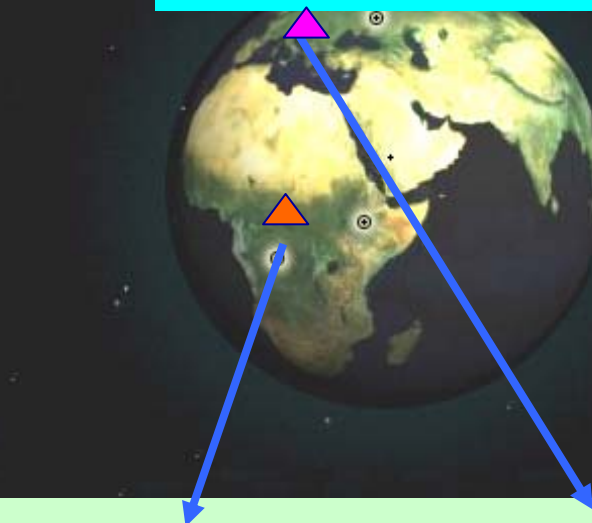
A Portal to DATA and SERVICES

Search by theme

Disaster
Health
Energy
Climate
Water
Weather
Ecosystem
Agriculture
Biodiversity

Direct Access
To
Data & Services

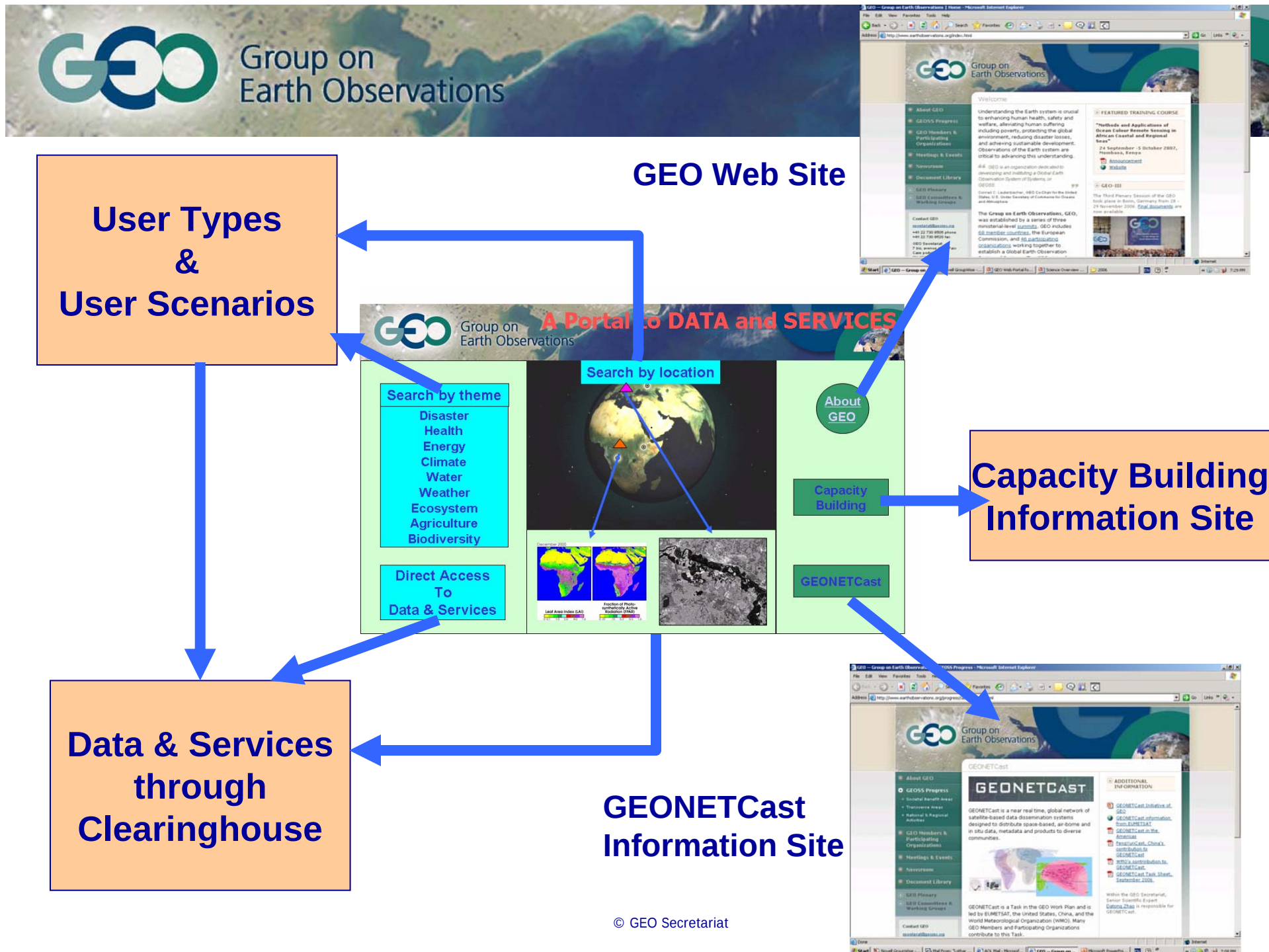
Search by location



About
GEO

Capacity
Building

GEONETCast





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GEO Web Portal - Objective -

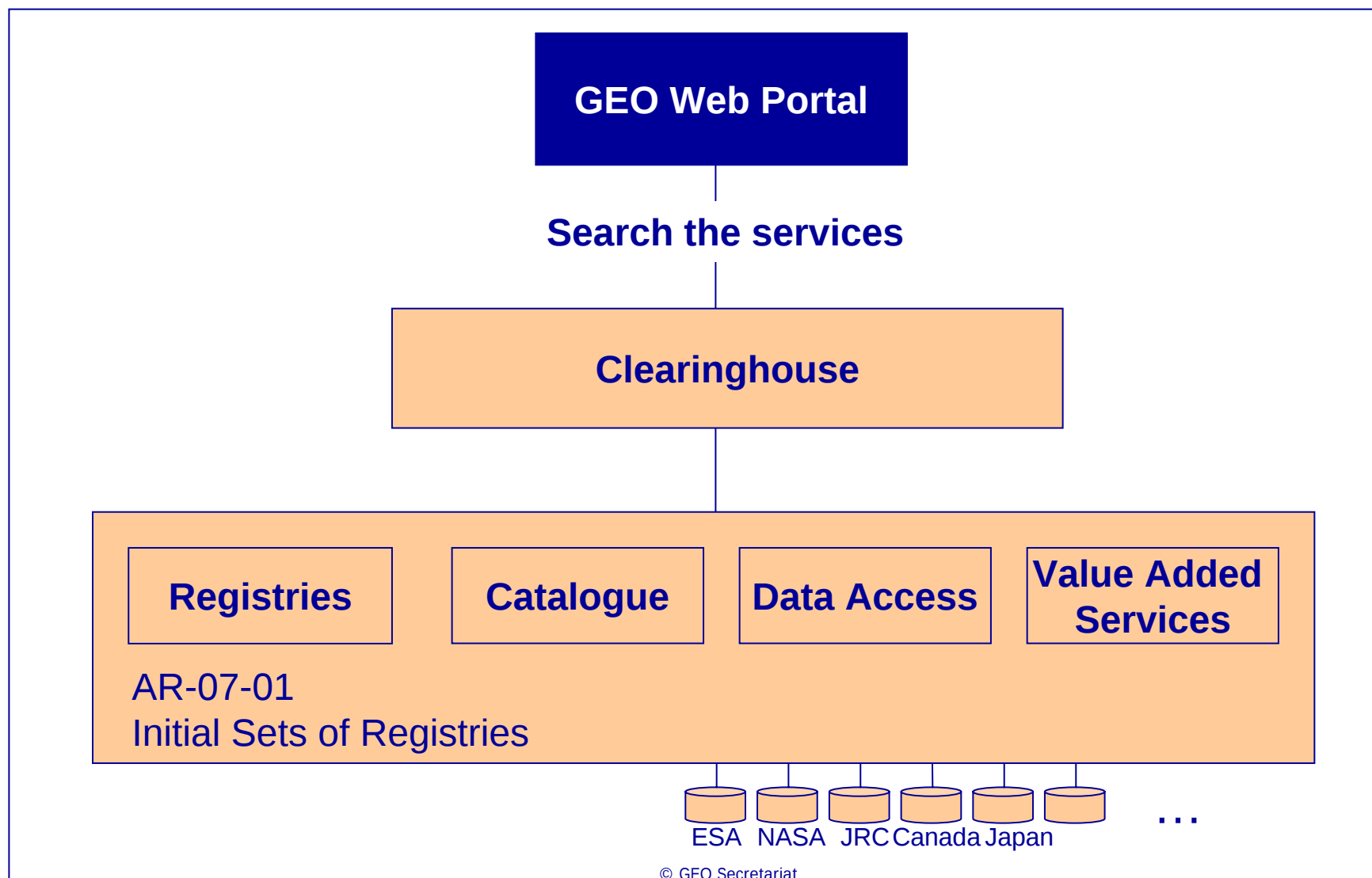
Define a model prototype system for access to all Earth observation data

- **The Web Portal to support GEO-wide content management, SBA community collaboration space, and user interface access to clearinghouse and registered GEOSS resources**
- **The Clearinghouse to provide search and additional services of GEOSS services and resources;**
- **Utilize existing systems and develop recommendations for GEOSS interoperability arrangements**



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AR-07-02 CFP

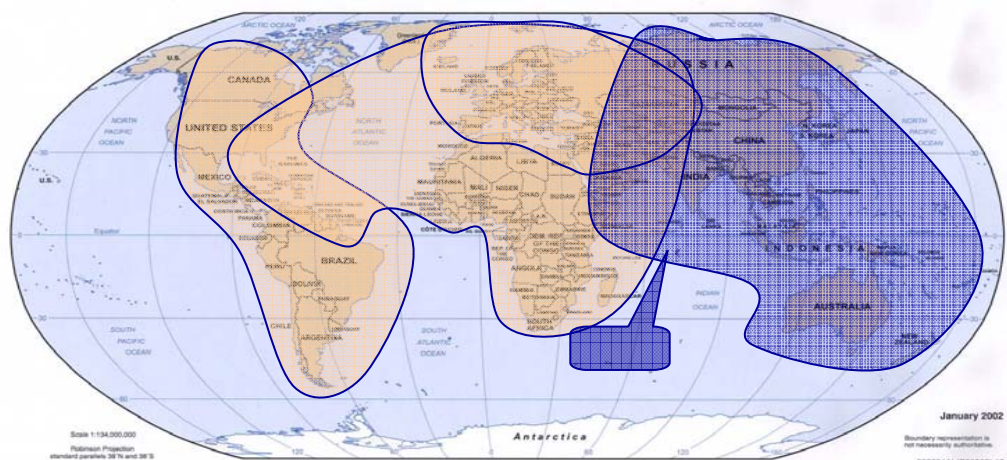




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GEONETCast

- EUMETCast: Europe (Ku band), Africa and Caribbean (C band)
- GEONETCast-Americas : North-, Central & South-America
 - pilot EUMETCast-C band for 2006-2008
 - transition to a NOAA ADM by 2008
- FengYunCast: Asia-Pacific regions
 - trial to be followed by operational system (C-band)
- MITRA satellite data dissemination system: Potential Contributor



Coverage Areas



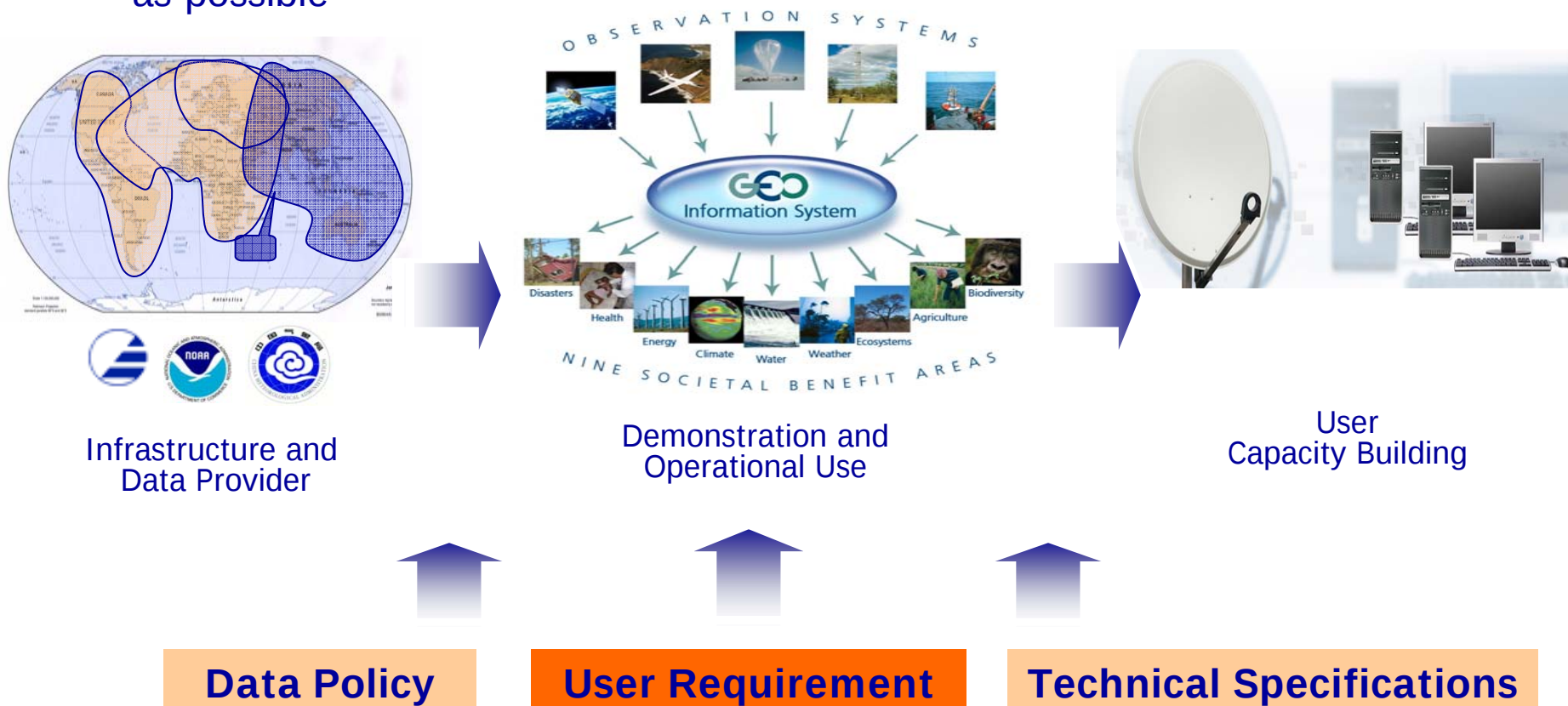
Main Contributors

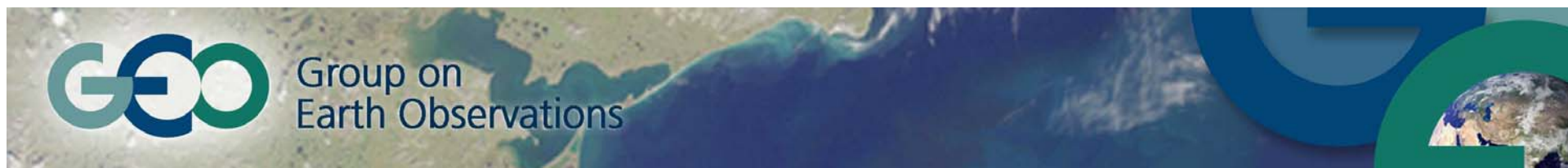


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GEONETCast

- A near real-time system to disseminate space-based, air-borne and in situ data, metadata and products through satellites
- The vision is to provide easy access to as much data and as many people as possible





GEO Biodiversity Observation Network





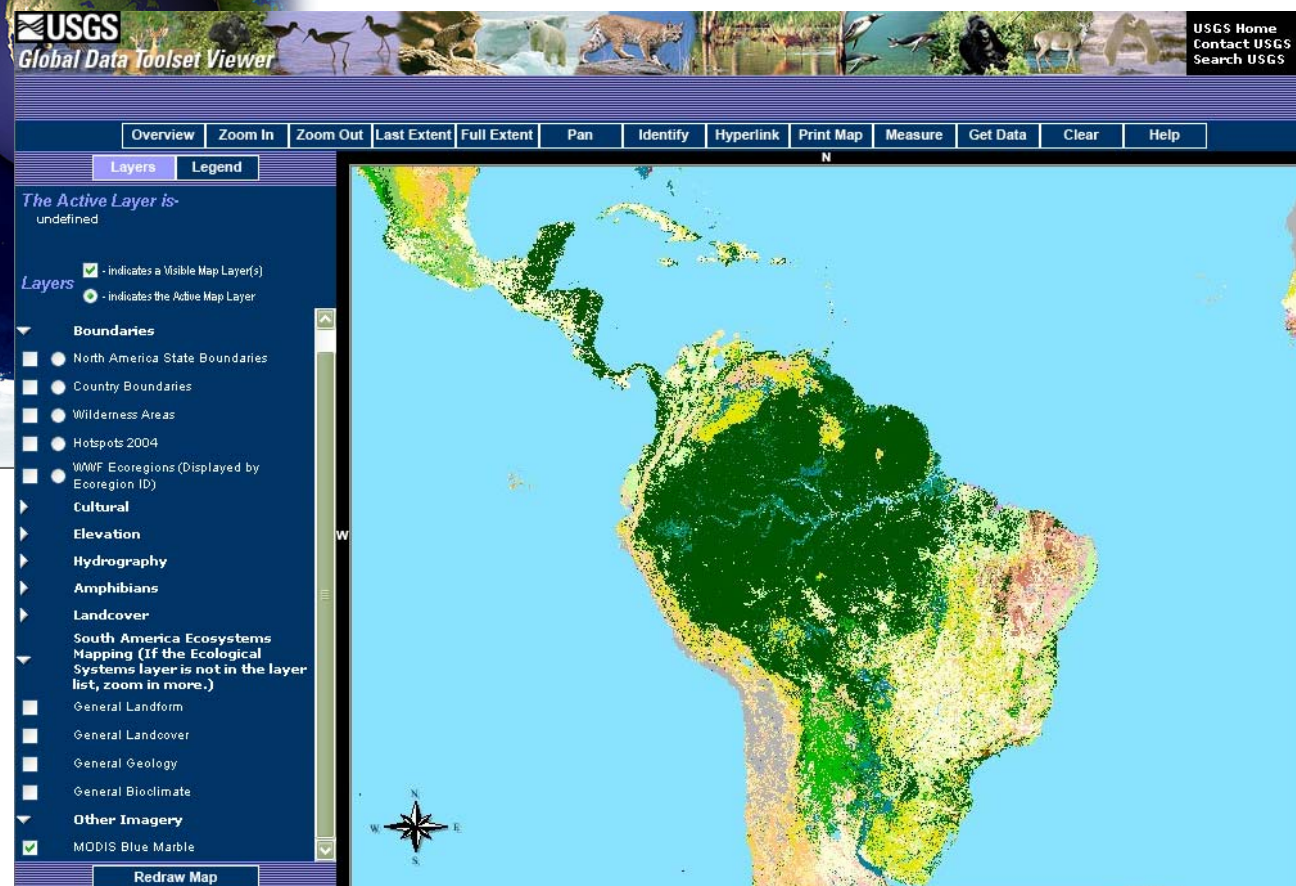
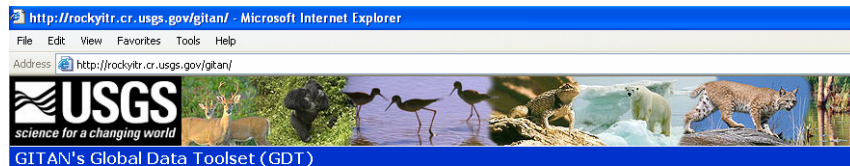
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- An ecoregion-based *framework* for global planning and management applications
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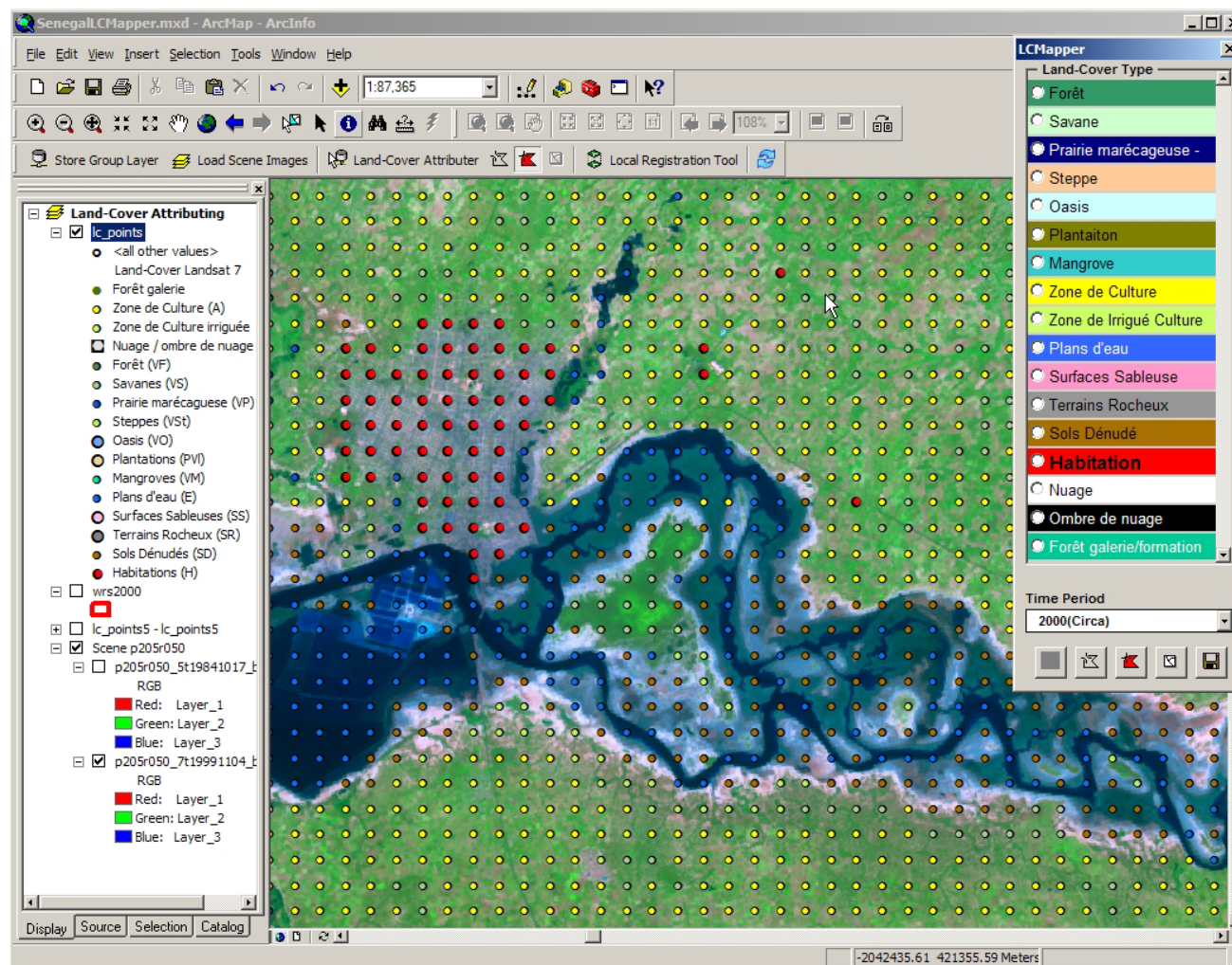
GEO Global Data Toolset





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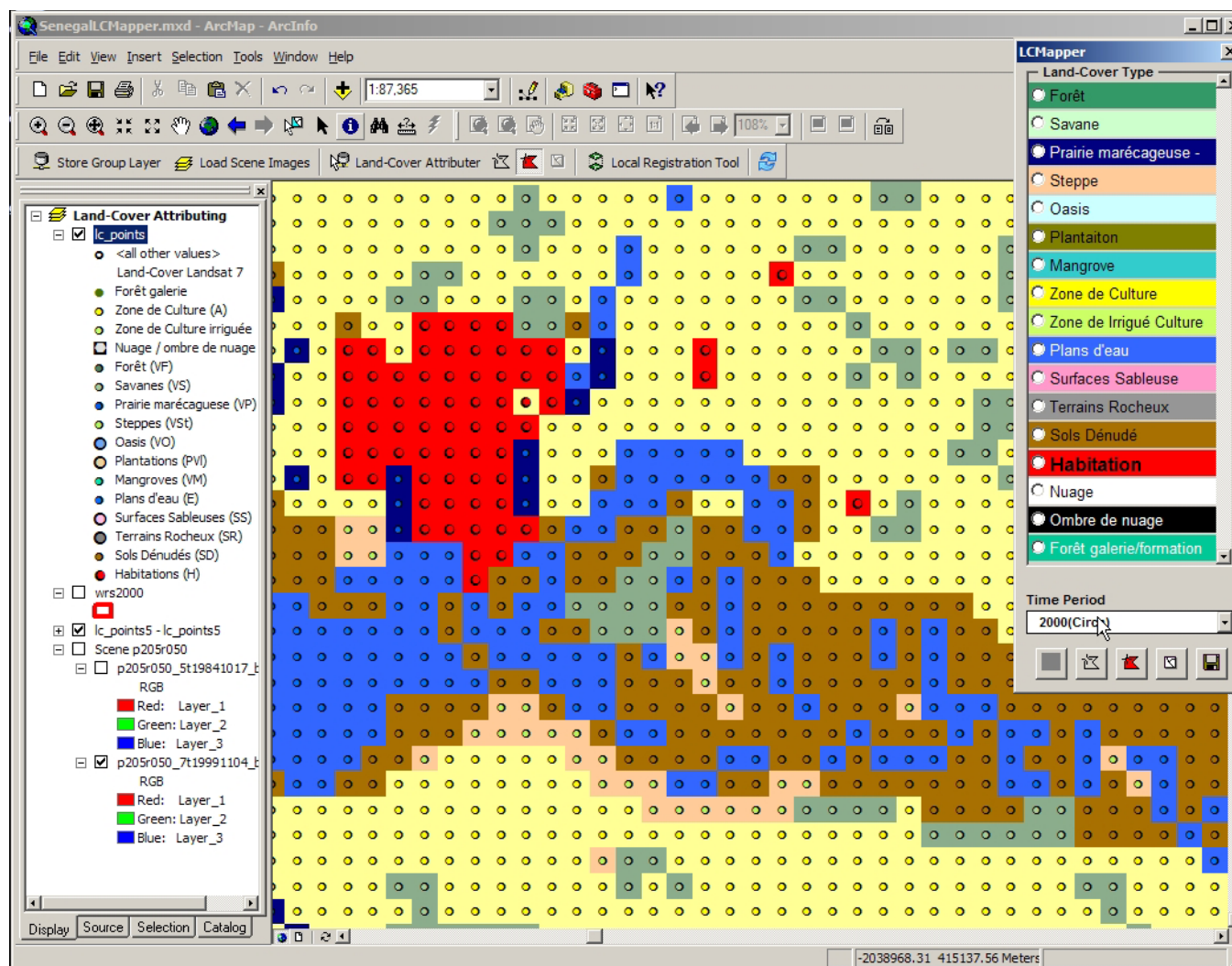
Senegal: Rapid Land Cover Mapping





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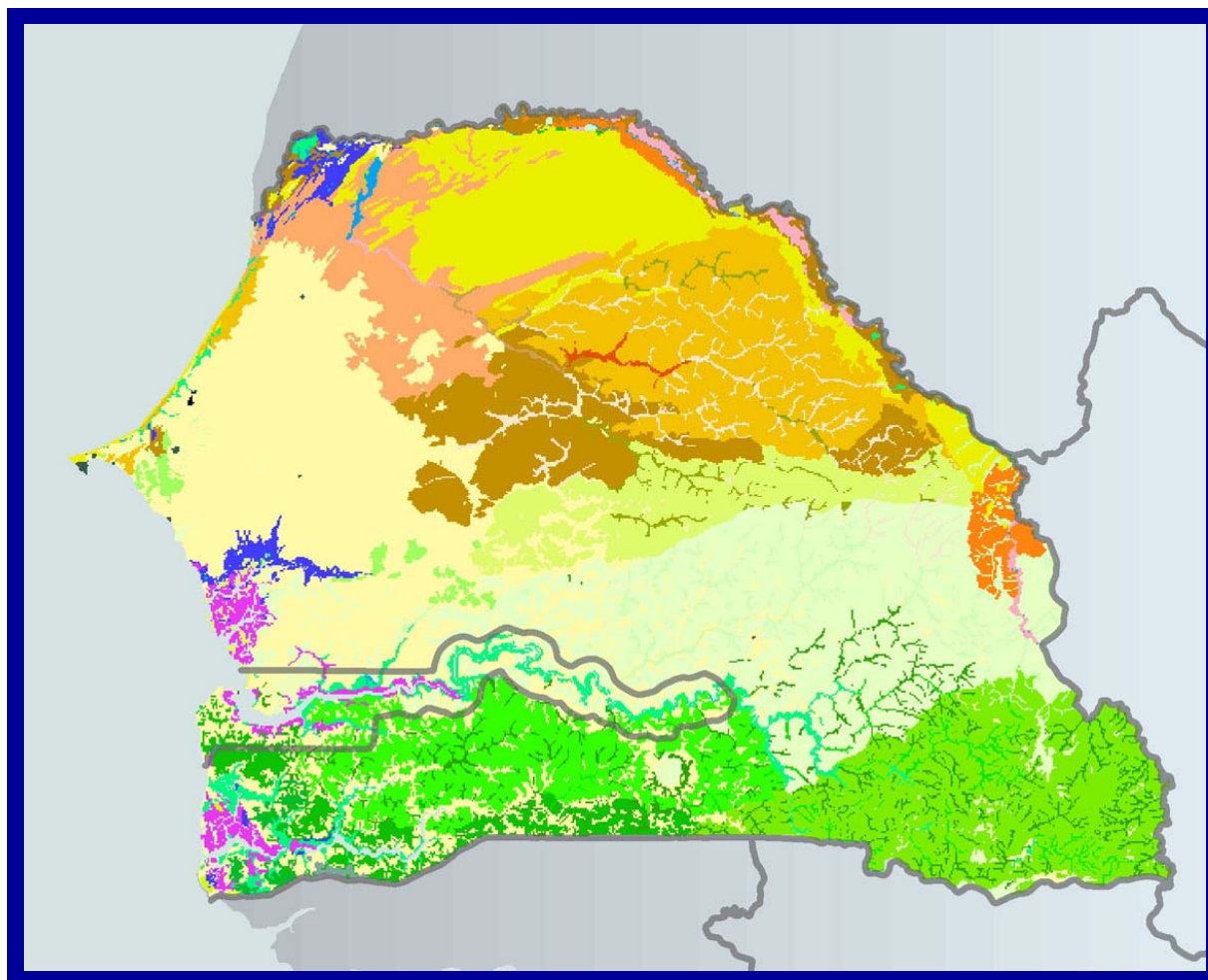
Senegal: Rapid Land Cover Mapping





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Senegal: Rapid Land Cover Mapping



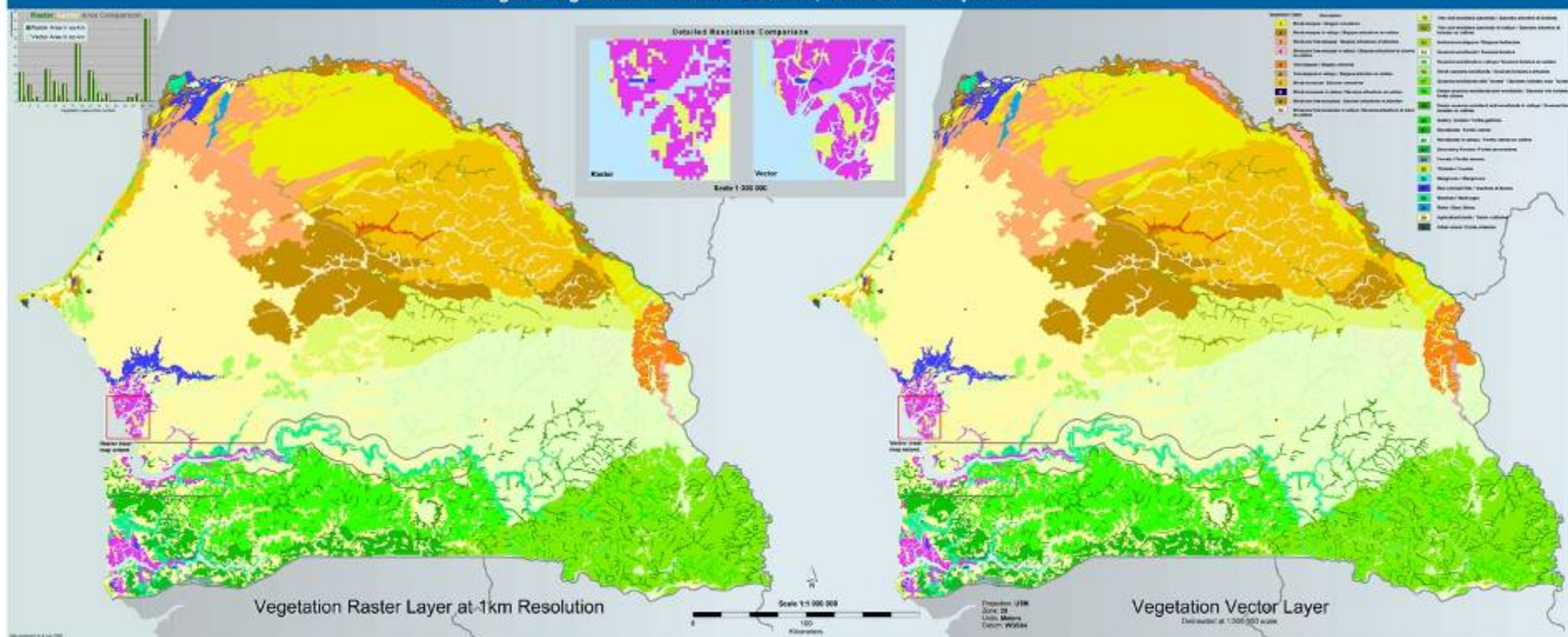
Senegal Land Cover – 0.5 km Resolution Raster



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Sahel/West Africa Land-Use/Land-Cover

Senegal Vegetation Cover Raster, Vector Comparison





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GEO Value-Added

- Cost Saving: reduce redundant data collection, management and analyses
- Integrated Analysis: Data Sharing and Interoperability allows for analyses that would not be performed
- Capacity Building: providing data and tools



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Thank
You!

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