ESA Climate Change Initiative

Olivier Arino

Cancun 02/12/2010

European Space Agency

Agenda

Chairman: Olivier Arino (ESA – Senior Advisor)

Opening of the Side Event and introduction to ESA's CCI

Roger Saunders (U.K. Met Office Hadley Centre – Senior EO Scientist)

Bridging the Gap between Satellite Datasets and Climate Models

Emilio Chuvieco (Universidad de Alcalá, Spain – Professor of Geography)

Global Observation of Biomass Burning (ECV Fire)

Anny Cazenave (LEGOS, France – Director of Research)

Monitoring Sea Level Rise from Space (ECV Sea Level)

Frank Martin Seifert (ESA – EO Application Engineer)

Sentinels providing operational EO Data Continuity

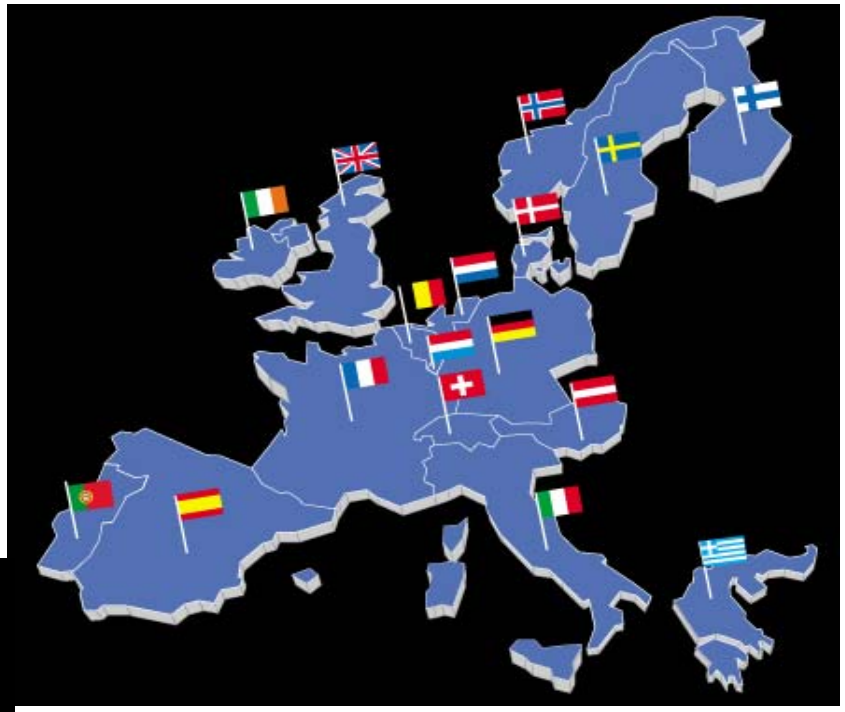
Stefano Bruzzi (CEOS representative)

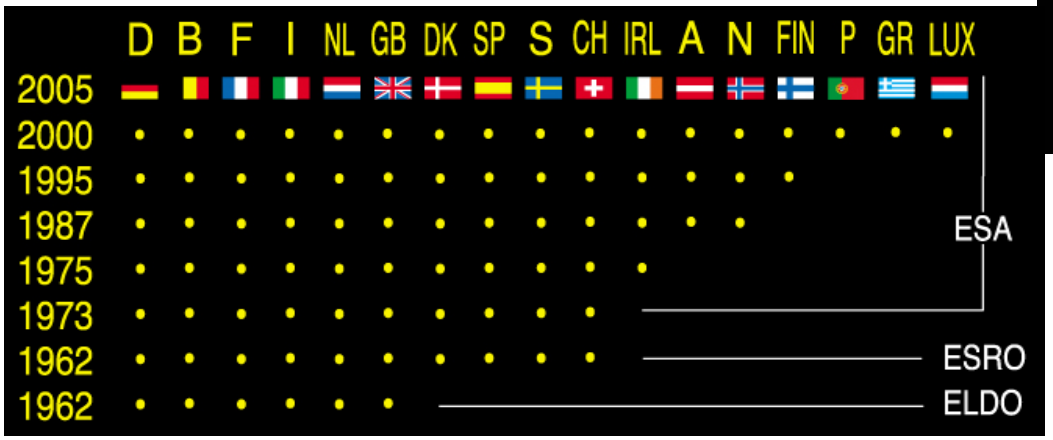
Coordination of Space Agencies to Support Climate Change

Discussion

The European Space Agency

- ESA has 18 Member States :
  - Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Norway, the Netherlands, Portugal, Spain, Sweden, Switzerland, United Kingdom and Czech Republic.
  - Canada takes part in some projects under a cooperation agreement.



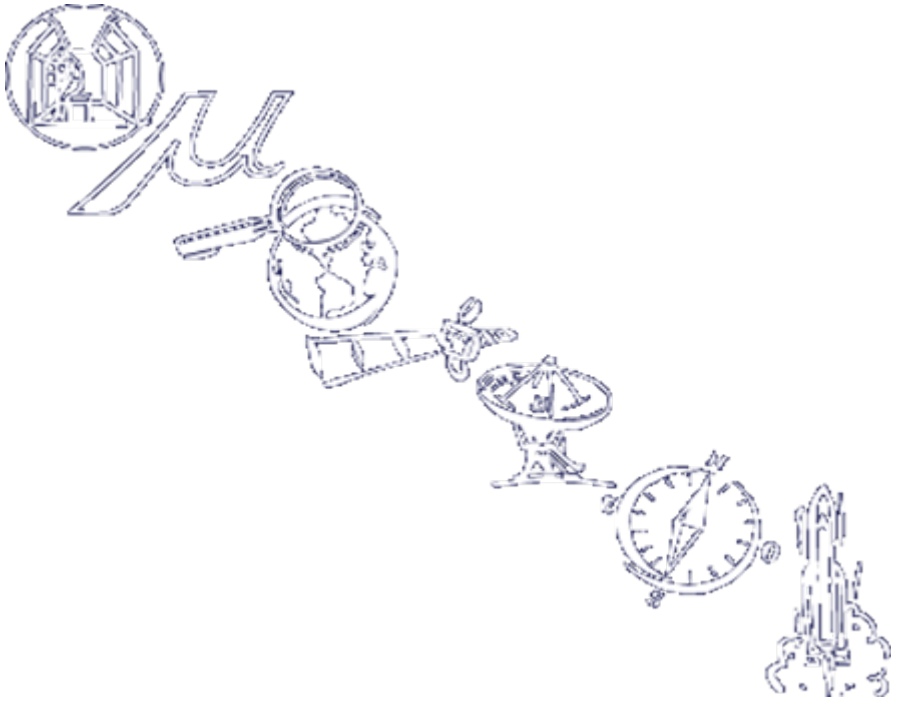


The European Space Agency

30 years experience
5 centers
2200 staff members

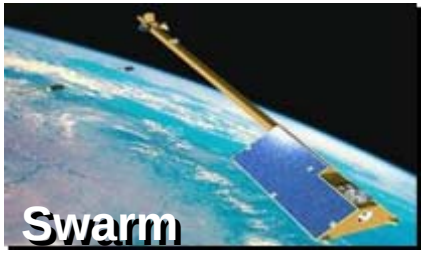
3+ billion Euro per year
70+ satellites developed
20+ satellites in operation

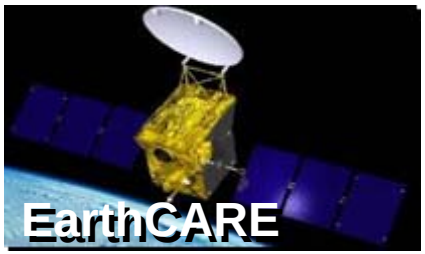
- Human space flight and exploration
  - Microgravity research
    - **Earth Observation**
      Continuous data acquisition
      Long term archive
      Multi-scale capabilities
      Multi-sensor information
      Data Exploitation
      - Telecommunications
        - Satellite navigation
          - Launcher development



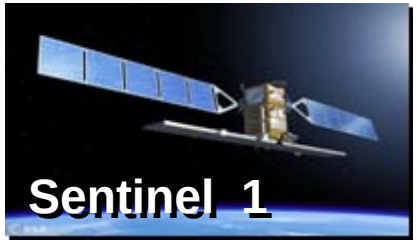
ESA's EO programme
securing 40 years comprehensive long-term climate observations from space

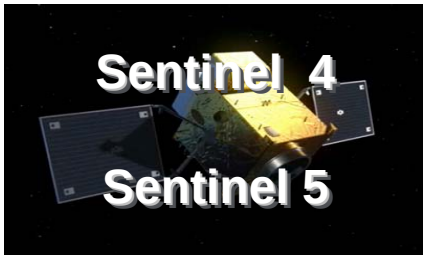
Scientific Missions

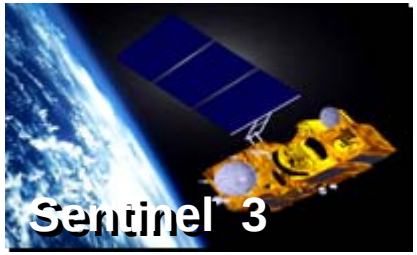


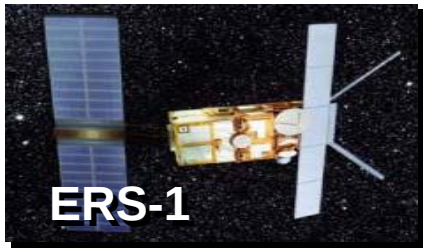


Operational Series (with EUMETSAT/EC)

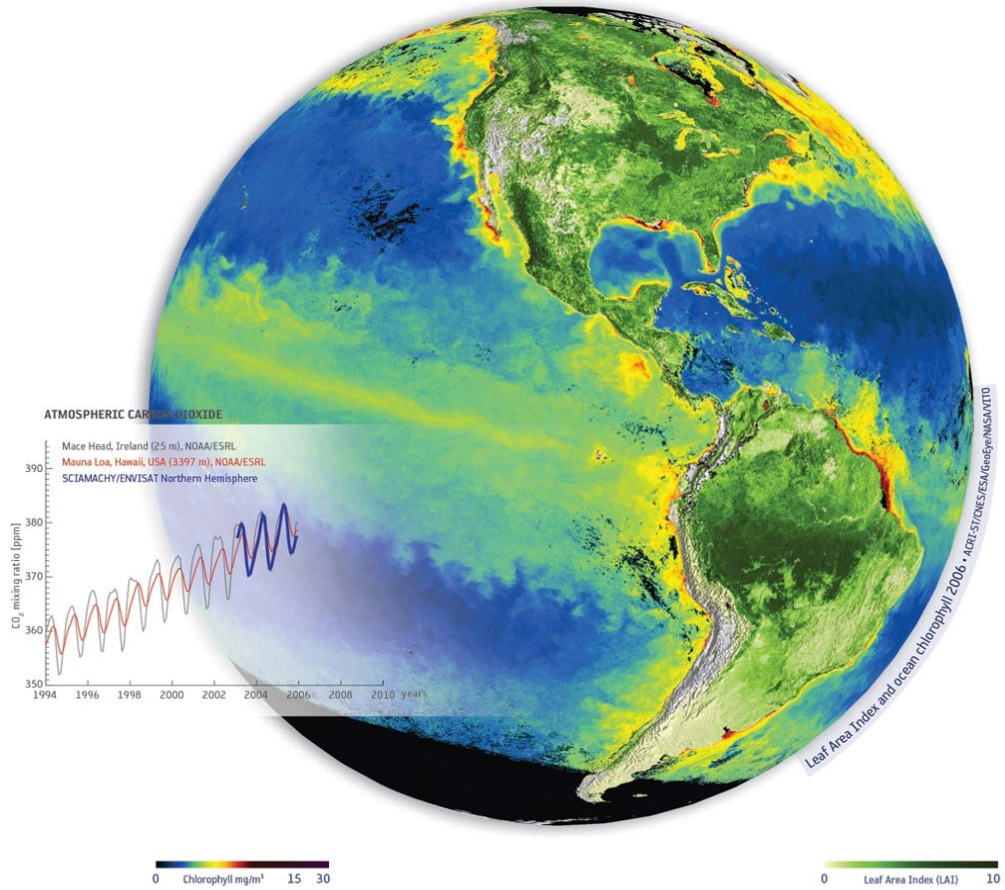




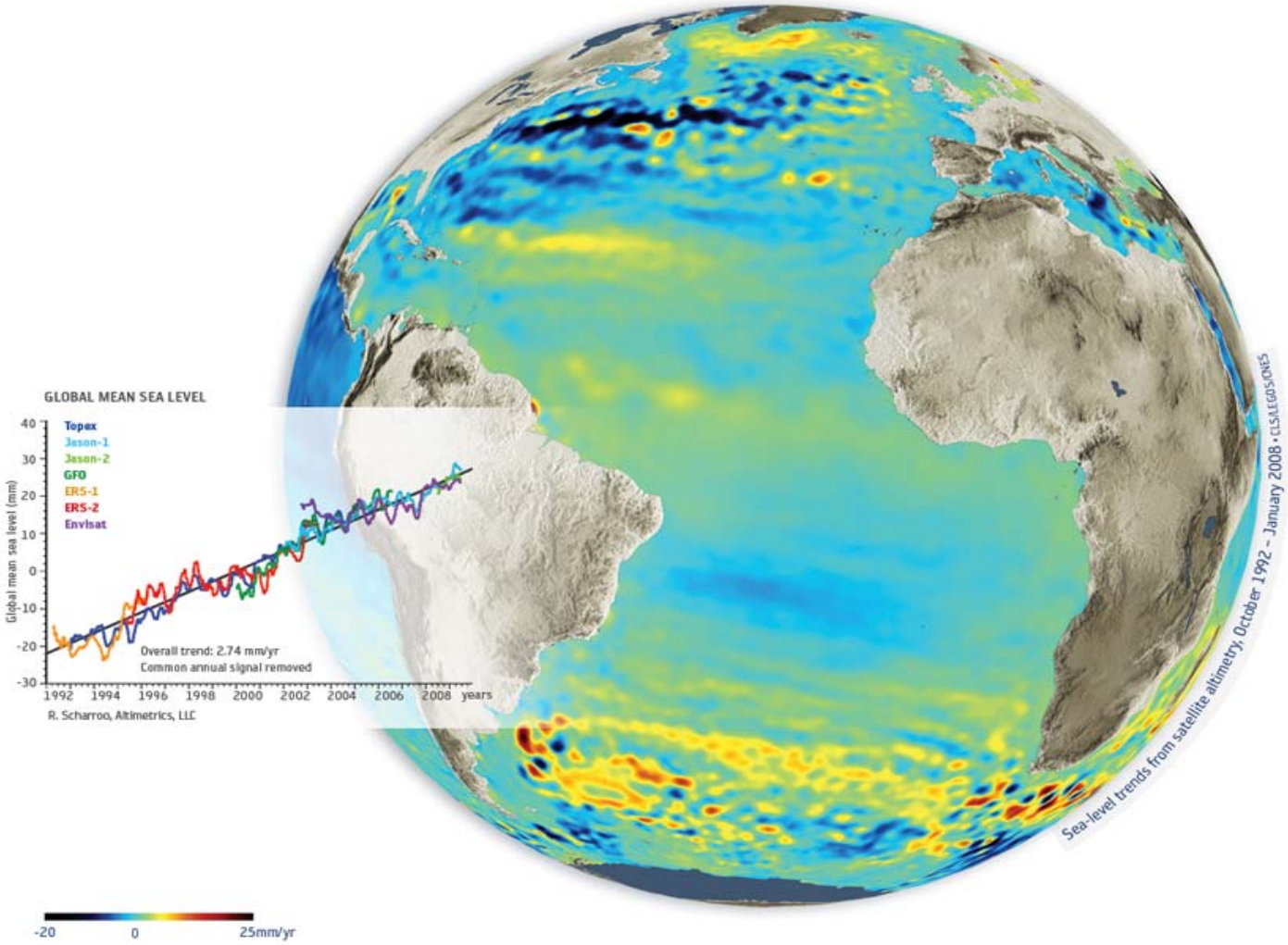




Carbon Cycle

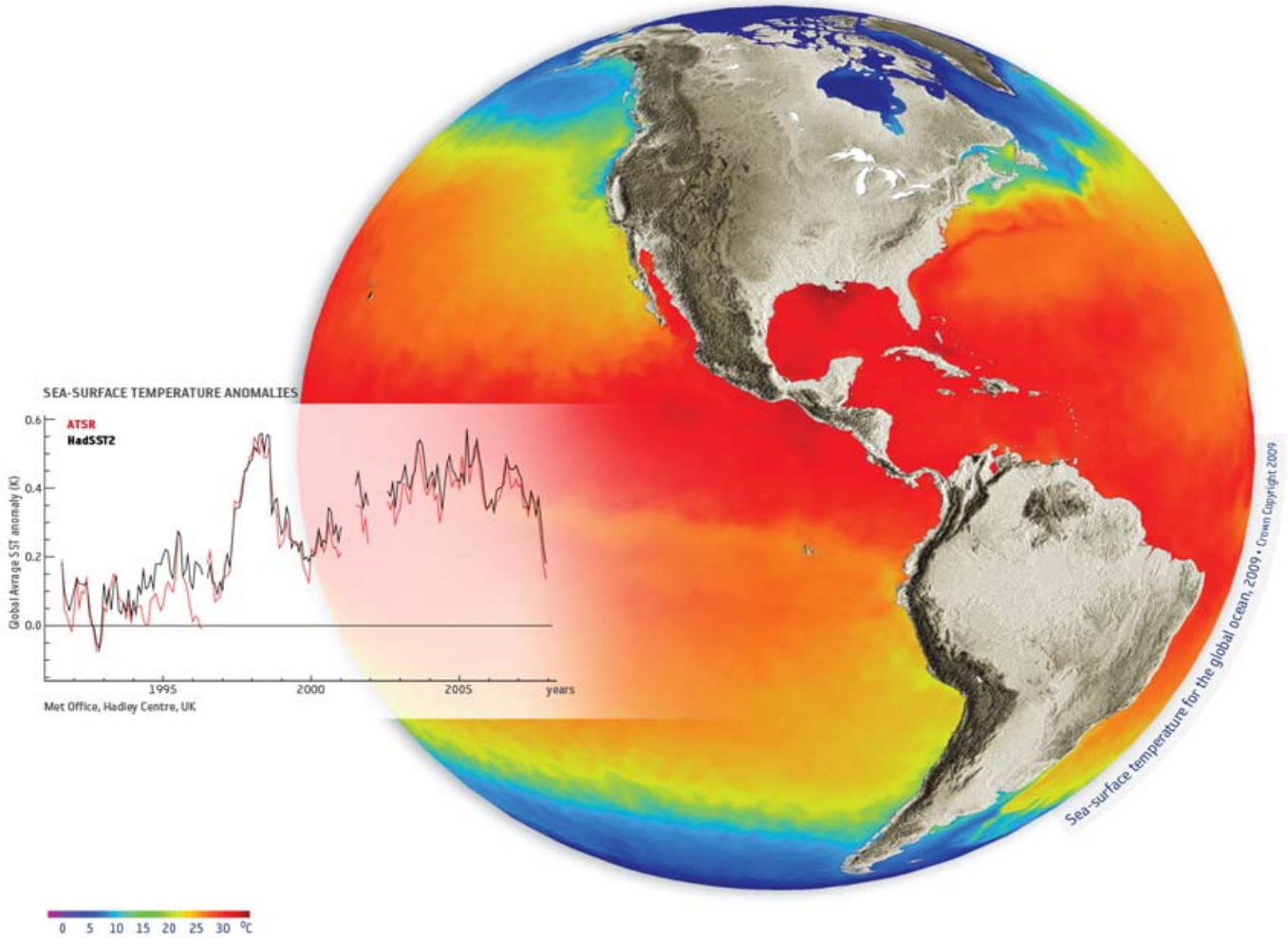


Sea Level

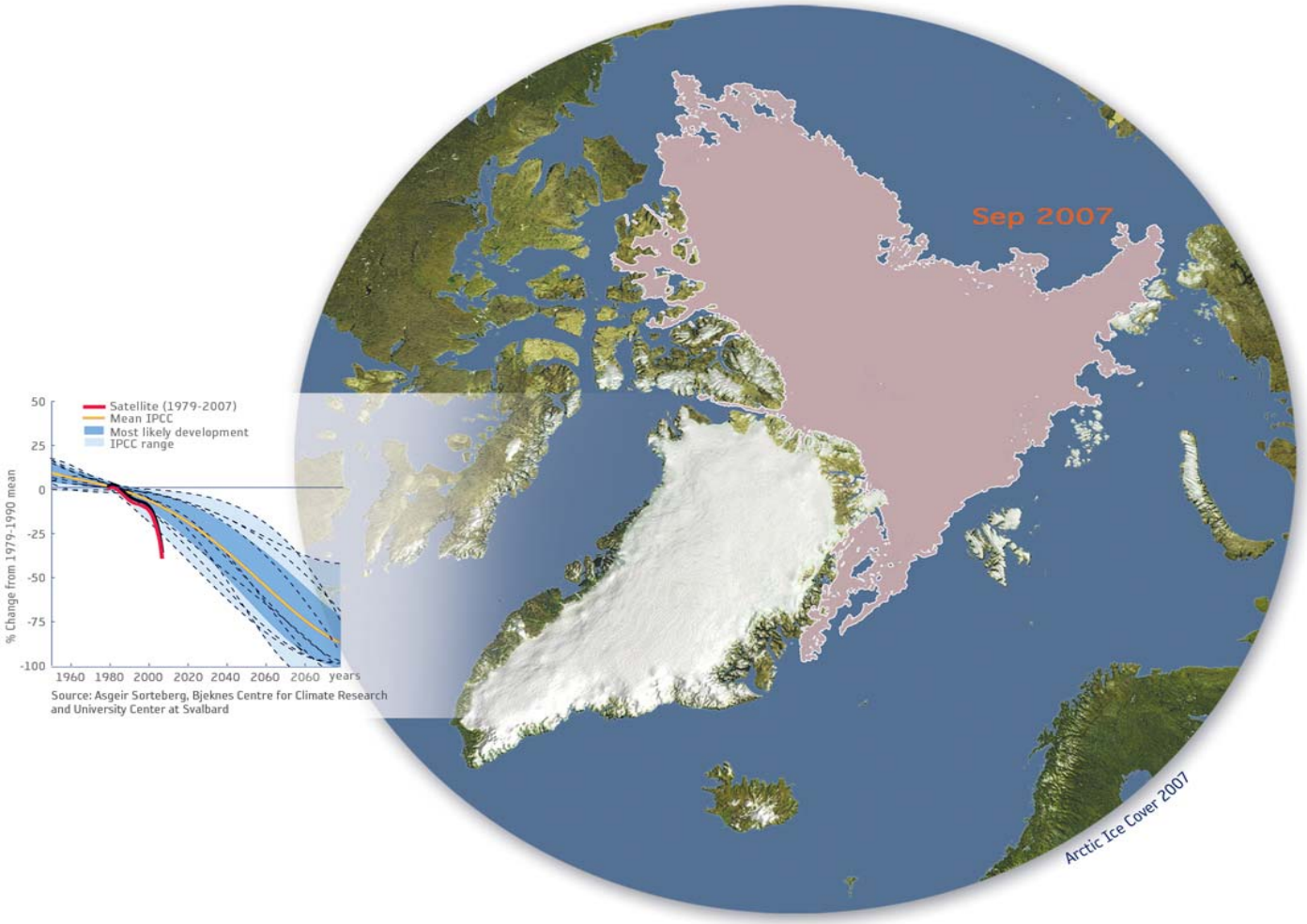


European Space Agency

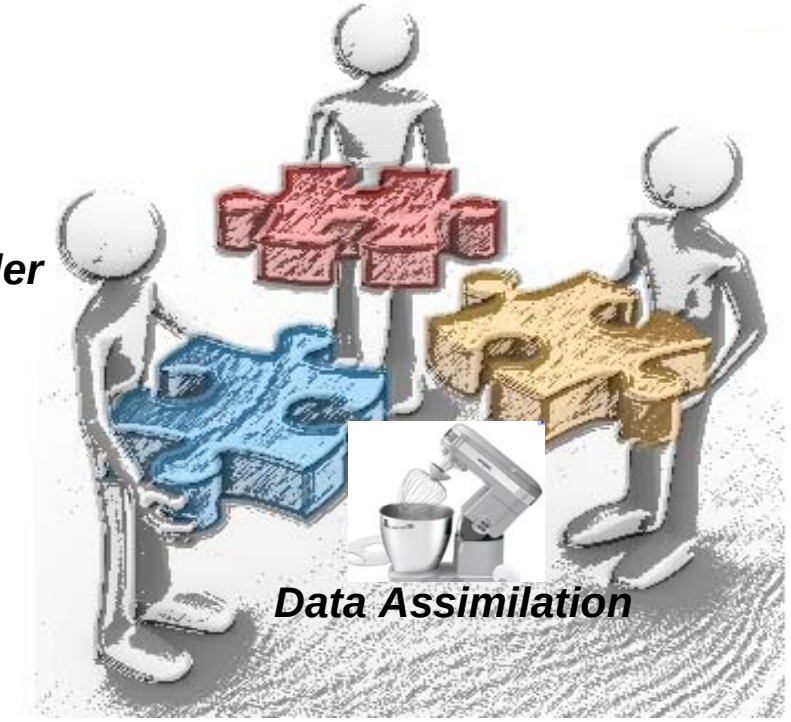
Sea Temperature



Sea Ice

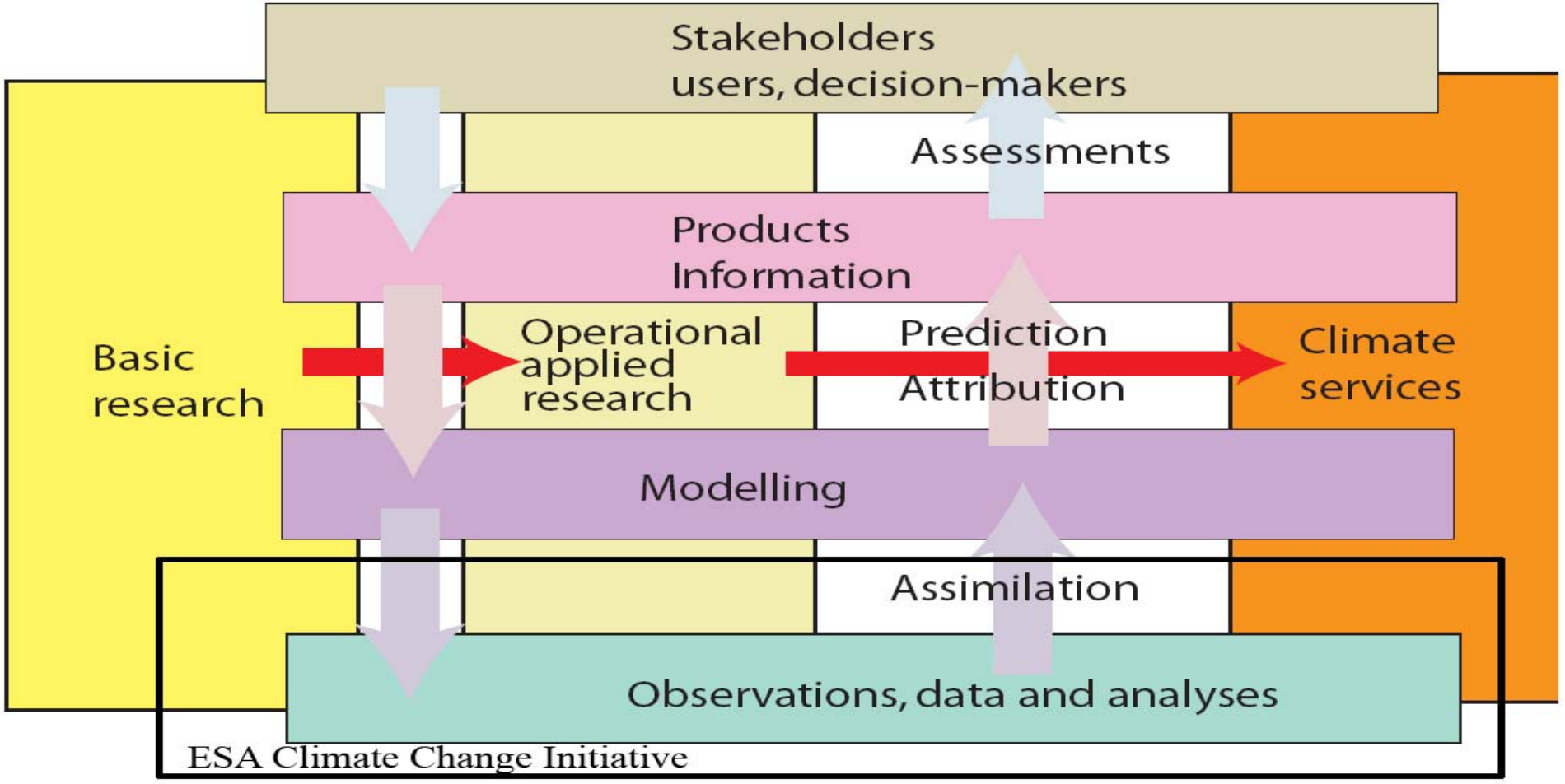

Sep 2007
Satellite (1979-2007)
Mean IPCC
Most likely development
IPCC range
% Change from 1979-1990 mean
50
25
0
-25
-50
-75
-100
1960 1980 2000 2020 2040 2060 2060 years
Source: Asgeir Sorteberg, Bjeknes Centre for Climate Research and University Center at Svalbard
Arctic Ice Cover 2007

Confronting Model with Observations



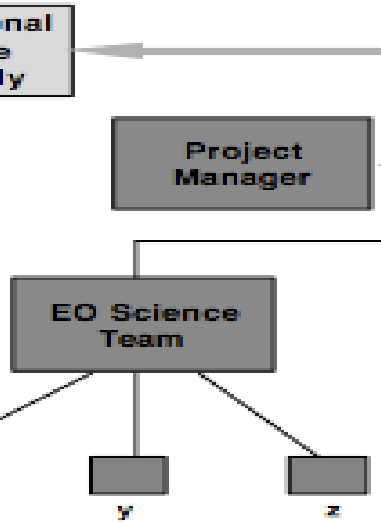
"No one trusts a model except the man who wrote it;
Everyone trusts an observation except the man who made it."
Harlow Shapley

CCI Focus



The climate information system
(*from K. Trenberth: Observational needs for climate prediction and adaptation, WMO Bulletin 57(1), January 2008*)

Elements of the CCI Programme



Algo (retrieval, merging),
Round Robin
Validation

ECV	Science Leader
Cloud	*DWD*
Ozone	*BIRA*
Aerosol	*DLR/FMI*
GHGs	*U Bremen*
SST	*U Edinburgh*
Global Land Cover	*UCL*
Sea level	*CLS*
Ocean Colour	*PML*
Glaciers	*U. Zurich*
Fire Disturbance	*U.Alcala*

Anny Cazenave

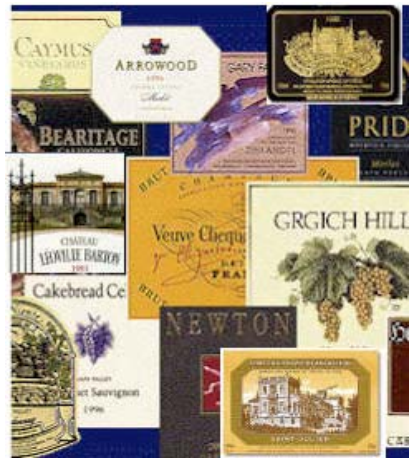
Emilio Chuvieco

CCI: the Essential Climate Variables

	ECV
Ocean	Sea Ice
	Sea Level
	Sea Surface Temperature
	Ocean Colour
Terrestrial	Glaciers and Ice Caps
	Land Cover
	Fire Disturbance
Atmosphere	Cloud properties
	Ozone
	Aerosol properties
	Greenhouse Gases

CCI Challenges: products' traceability and transparency

Labels



Products

Tools & Format

Storage / Access

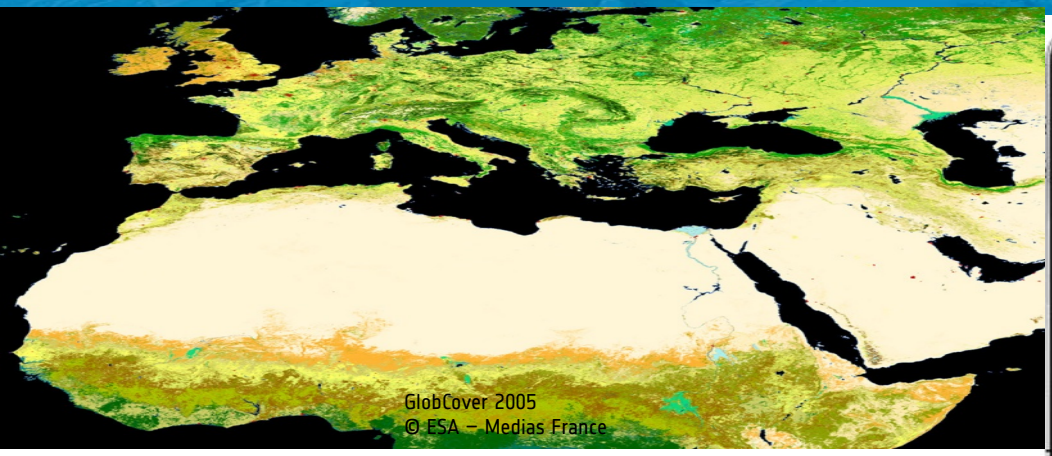
European Space Agency

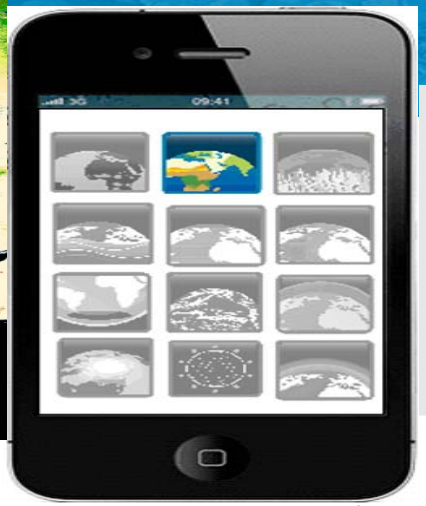
Data Set Proliferation issue, need for D.O.I, Netcdf CF format, openDAP, e.g. CMIP5

→ CLIMATE CHANGE INITIATIVE

Land Cover CCI Newsletter

Issue n. 1 November 2010





In this issue:

Land Cover CCI project description

The Land Cover CCI project aims to design a prototype system delivering a global land product in a consistent way over years and from various EO instruments. Building upon the ESA-GlobCover experiences, this global land cover information is specifically targeting the needs of the climate change community.

The Land Cover objective is to critically revisit the land cover concept itself and all algorithms required for the generation of a global land product in the light of the Global Climate Observing System (GCOS) requirements. The project will benefit from all ESA and Member States missions providing near daily global surface reflectance observation at moderate spatial resolution (ENVISAT MERIS FR & RR, SPOT VEGETATION).

The contribution of ESA SAR sensors will also be investigated to tackle specific land cover discrimination issues. From an extensive user requirements analysis, detailed specifications of the global land cover product are currently defined building on the LCCS. Capitalizing on the GlobCover, GLC2000, GlobAlbedo and GlobCorine experiences, three global land cover maps are planned for the years 2000, 2005 and 2010.

The product accuracy will be estimated thanks to an independent validation process and the error propagation will be closely monitored. In addition, three climate modelers will quantitatively assess relevance and usefulness of the delivered information for their models.

www.esa-landcover-cci.org
dup.esrin.esa.it/projects/summaryp68.asp
www.esa.int/due/ionia/globcover/

CCI International Partners

- **UNFCCC** which coordinates the interests and decisions of its Parties on Climate Policy,
- **GCOS** which represents the scientific and technical requirements of the Global Climate Observing System on behalf of UNFCCC,
- **International Research Programmes**, which represent the collective interests and priorities of the worldwide climate research community (e.g WCRP but also IGBP, IHDP, Diversitas…)
- **Committee on Earth Observation Systems (CEOS)**, which serves as a focal point for Earth Observation activities of Space Agencies
- **Individual Partner Space Agencies** with whom ESA cooperates bilaterally (e.g. Eumetsat, NOAA, NASA, JAXA, CNES…..)
- **EC and National Research Programmes** which establish research priorities and provide resources for climate research community within Europe (eg EC Framework Programme)

CCI Facts

- Supporting UNFCCC parties
- International cooperation: GCOS, CEOS, GEOSS
- Long term global systematic Earth Observations (20 years in the past and 20+ years in the future)
- Confronting climate models and observations
- GMES Sentinels: free and open data policy