

ESA and Climate Change

- What is ESA
- Working by project and with users
- Working with global change communities
- Working with international environmental conventions
- Some relevant projects related to Climate Change
- ESA Climate Change Initiative

(GCOS, WCRP, IPCC, JCOMM, ESAC and GTOS are members of the ESA Climate Science Advisory Board)

Olivier Arino

Copenhagen 10/12/2009



What is ESA?

The European Space Agency



• ESA has 17 Member States :

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





The European Space Agency



30 years experience5 centers2000 staff members

- 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

3 billion Euro per year60 satellites developed15 satellites in operation





Objectives:

- to provide global maps of soil moisture and ocean salinity
- to advance our understanding of the freshwater cycle
- to improve climate, weather and extreme-event

forecasting



Working by projects With Users

User Driven Approach





User Commitments



To initiate a project, ESA requests to participating user organizations:

- a Letter of Commitment;
- a User Requirements Document (URD);

Letter of Commitment

I will commit X men/month of work to:

- Coordinate the work of local agencies;
- Consolidate the User Requirements;
- Provide access to data and information useful for the project;
- Organize dedicated ground data collection campaigns for the project;
- Support the validation of the results;
- Assess the final service from a upper User perspective;

User Requirement Document The Service required include the provision of the following geo-information products:

- AAA
- XXX

The area of interest is the following: The timeframe of interest in the following The format of the products should be the following:

The National User Network is made of...

The User

400 User Organisations in GSE 300 New User Organisations in DUE





- ~150 national ministries and agencies
- ~100 research institutions
- ~few private companies and non-governmental organisations
- ~70 new users brought in 2008 and another 70 in 2009

User Consultations in 2008 and 2009







Working with Global Change Communities

ESA Projects relevant to climate change GlobSeries branding





PERMAFROST



Working with International Environmental Conventions

ESA participate to UNFCCC, UNCCD, UNCBD and Ramsar COPs







European Space Agency



ESA satellites providing information over time and space



European Space Agency Agence spatiale européenne



ATSR World Fire Atlas



ATSR World Fire Atlas

07 - 1996





Papers related to ATSR-WFA



Arino and Casadio, 2009

www.esa.int/due/ionia/wfa/

ATSR-WFA: user trends





Registered before 2006 ~ 70



Carbon cycle

GlobCarbon 'Champion' Users



Four key research institutes, one GMES project and one key programme involved to specify needs and use products. VITO implemented and operated the processing.





GlobCarbon products & Validation







GlobCover2009

GLOBCOVER 2009





European Space Agency Agence spatiale européenne

eesa

GlobCover Version 2 - 300m December 2004/June 2006 [ENVISAT MERIS]



GLOBCOVER 2009

Validation - the challenge

- Validate the product using a new EO dataset
- Keep the scientific & validation standards high
- Find a cost-effective solution
- Re-use available resources

...using the already-developed infrastructure from GlobCover V2.2

from 4285 points 16 experts

✓ A large random sample network has been already developed

✓ Use of multiple validation resources as website interface, MERIS FRS data, NDVI dynamics, other high resolution data platforms as Google Earth etc.

✓ Use of the previous validation experience and established expert network

✓ Cost-effective solution

GLOBCOVER 2009



Distribution - News

Newsletter No9 (October 2009) celebrating 1 year from GlobCover 's release.

Download hits from new users are continuously increasing on GlobCover Ionia Website



www.esa.int/due/ionia/globcover

News: GlobCover in the Times Concise Atlas of the World

Distribution strategy is under investigation.





Space Agency





To realize the full potential of the long-term global Earth Observation archives that ESA together with its Member states have established over the last thirty years, as a significant and timely contribution to the ECV databases required by United Nations Framework Convention on Climate Change (UNFCCC).

- Implement all steps necessary for the systematic generation and regular updating of the relevant ECVs,
- A coherent and continuous suite of actions fully coordinated with ongoing international efforts in the climate change community (eg. WCRP, IGBP)
- Ensure full capital is derived from on-going & planned ESA missions for climate purposes,
- Focus on 11 ECVs (ESA missions)



The 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,
- **CEOS** which serves as a focal point for Earth Observation related activities of Space Agencies
- Individual Partner Space Agencies with whom ESA cooperates bilaterally (e.g. NOAA, NASA, JAXA, CNES, Eumetsat)
- International Climate Research Programmes, which represent the collective interests and priorities of the worldwide climate research (e.g WCRP, IGBP)
- EC and National Research Programmes which establish research priorities and provide resources for climate research community within Europe (eg EC Framework Programme)



The Essential Climate Variables:

	ECV	
Ocean	Sea Ice	
	Sea Level	
	Sea Surface Temperature	
	Ocean Colour	
Terrestrial	Glaciers and Ice Caps	12
	Land Cover	
	Fire Disturbance	
Atmosphere	Cloud properties	
	Ozone	
	Aerosol properties	GLOBREROSO
	Greenhouse Gases	













0 5 10 15 20 25 30 °C







Future Perspectives

The next 20 years



- GMES Sentinels free and open data policy
- Doing science with operational observations
- Stimulating exploitation (GMES services)
- Consolidating Climate Change Initiative
- Consolidate institutional relations with International Environmental Conventions