

GMES Services Benefits for Africa

**GMES and Africa
1st Workshop on Marine and Coastal Areas
9-10 October, 2012
Mombasa, Kenya**

GMES Bureau



Outline

- **GMES – An introduction**
- **Service applications**
- **Opportunities for Africa**

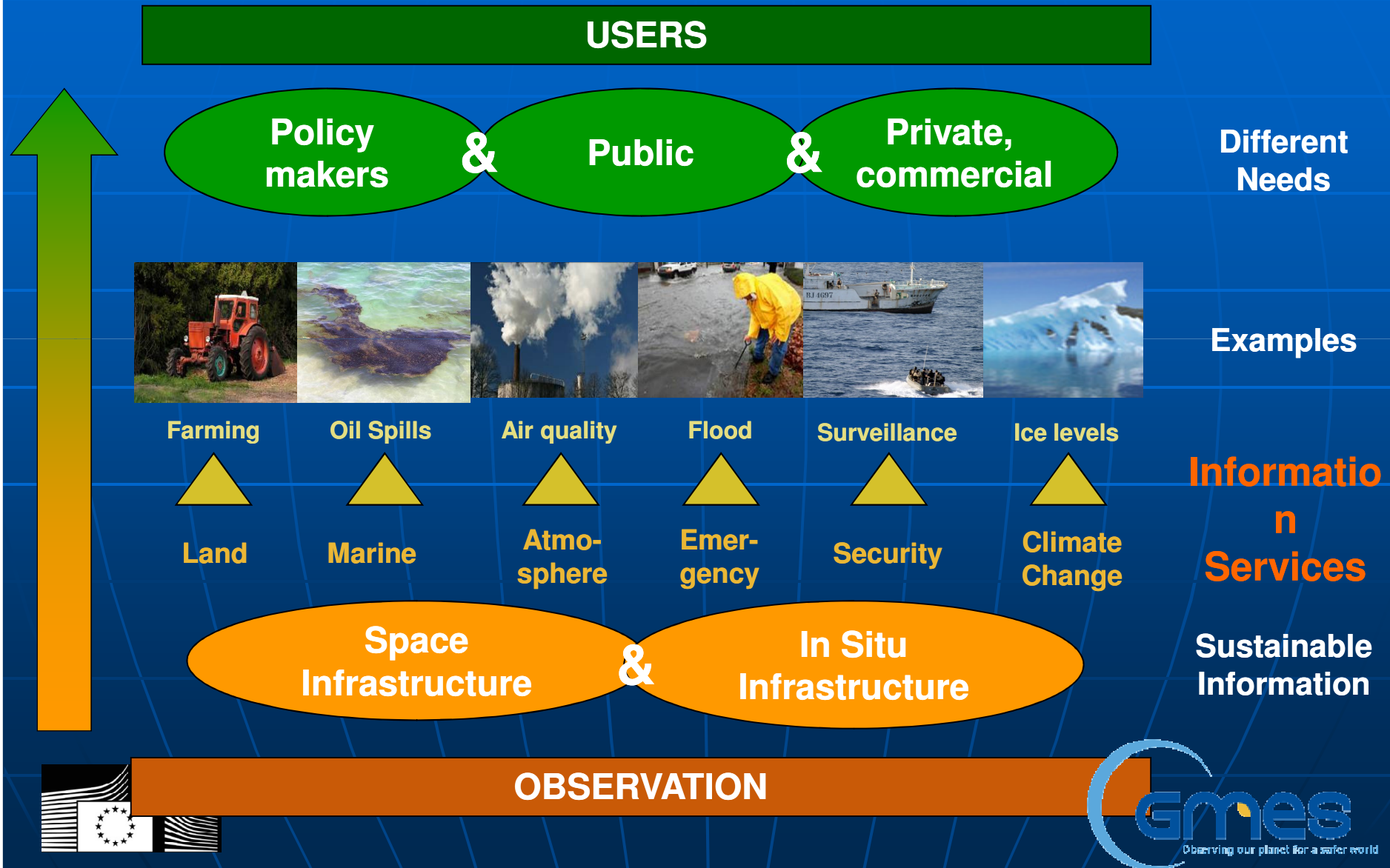


What is GMES?

- An **user driven integrated** Earth Observation system (EO and in-situ data) for environment and security applications with global reach
- A source of information for **policymakers**, scientists, business and the public at large
- GMES is a joint EU – ESA initiative

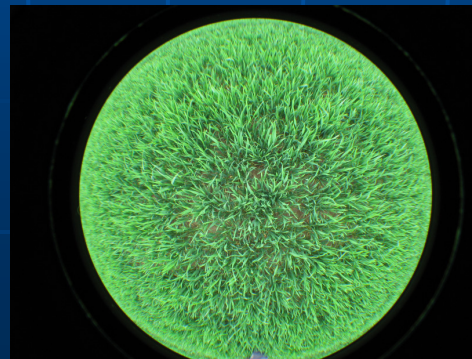


GMES Overall View: from infrastructure to users



GMES In situ component

- Observation mostly within **national responsibilities**, with coordination at European level
- **Air, Sea and Ground** based systems and instruments
- Led for Europe by the **European Environmental Agency (EEA)**

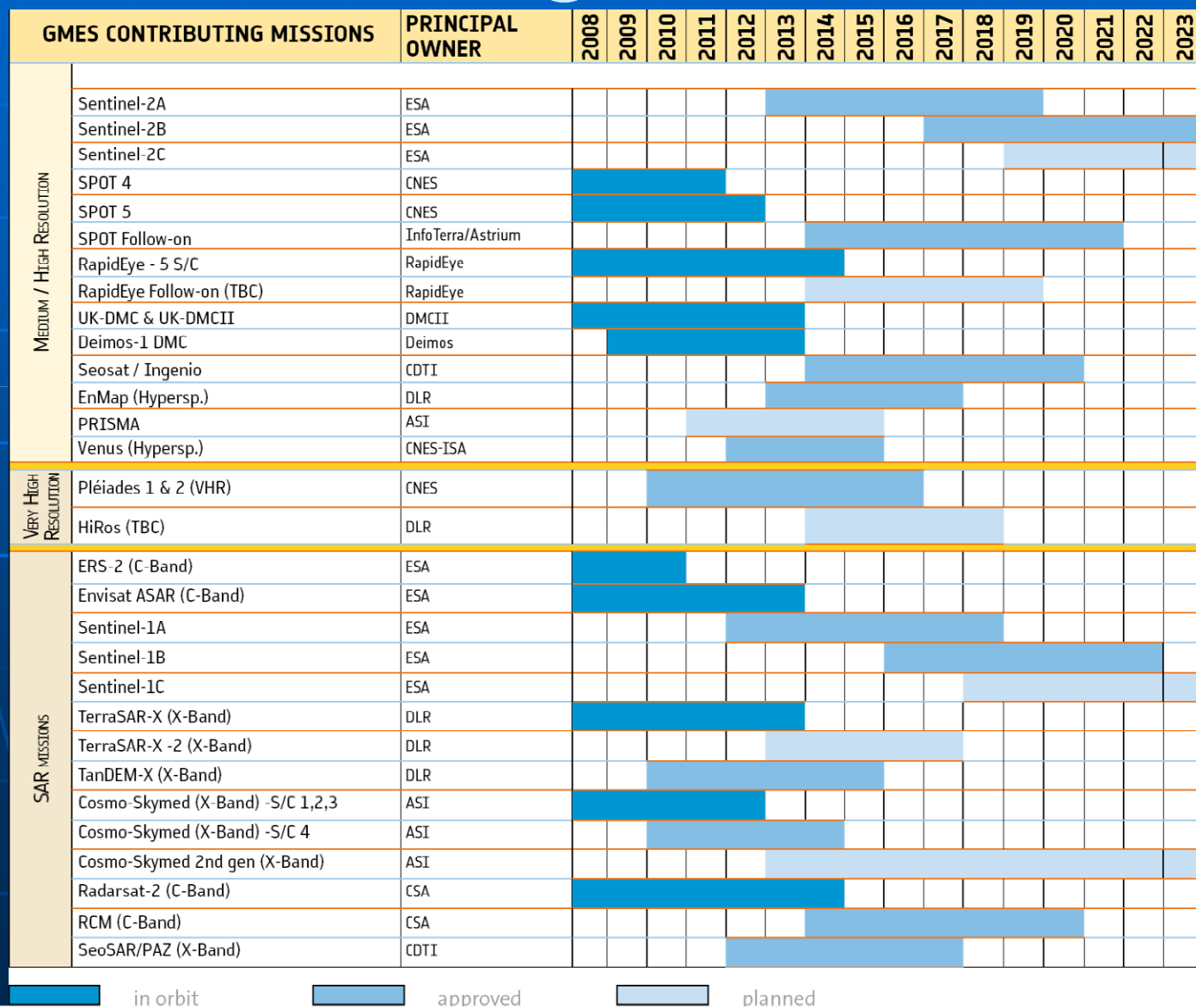


GMES Space Infrastructure

- **SENTINELS** – EO missions developed specifically for GMES
- **Contributing** missions – EO missions built for purposes other than GMES but offering part of their capacity to GMES (EU/ESA MSs, EUMETSAT, Commercial, International)
- Led for by the **European Space Agency** (ESA)



GMES – Space Segment Contributing Missions

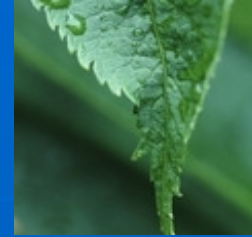


Outline

- GMES – an introduction
- **Service applications**
 - Land
 - Marine
 - Atmosphere
 - Emergency Response
 - Security
 - Climate Change
- Opportunities for Africa



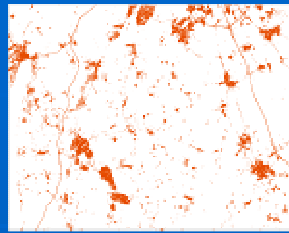
I. Land



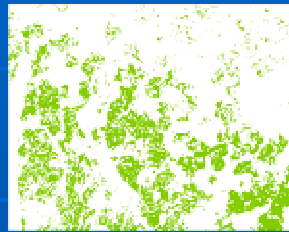
1. Pan-EU Land Cover
(5 High Resolution layers of main land-cover classes)
2. EU Local component
(‘hot spot’ zooming on areas of interest using VHR images)
3. Global component
(Global Terrestrial Variables produced on near real time and on a ten-days basis)



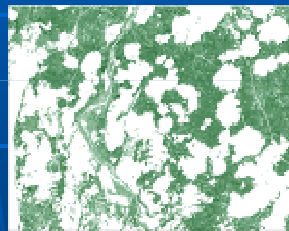
5 HR layers under development (GIS model approach) Example from Alpine test site



Imperviousness



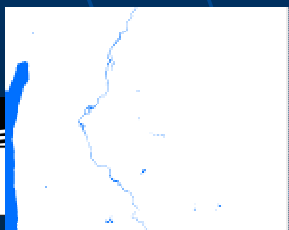
Vegetation Intensity



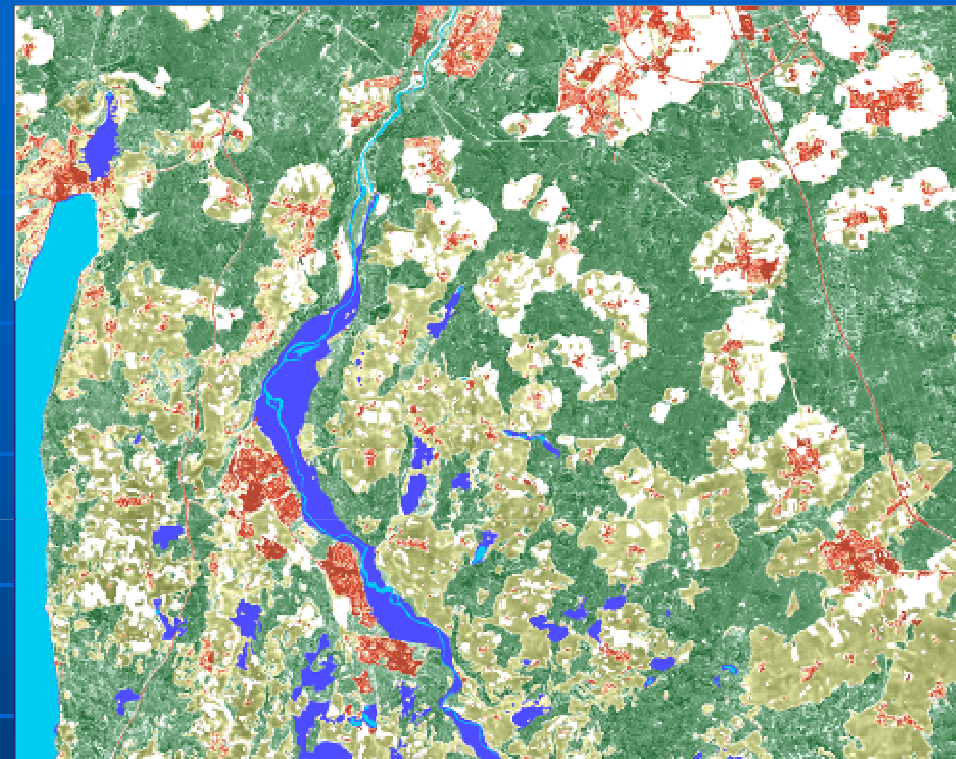
Forest Crown Cover Density



Wetlands



Water

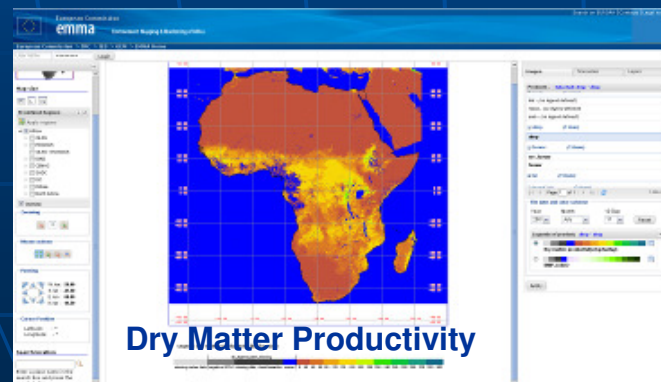
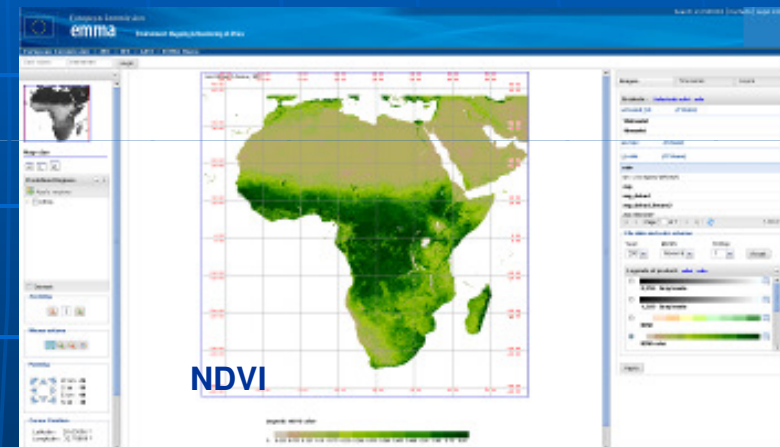
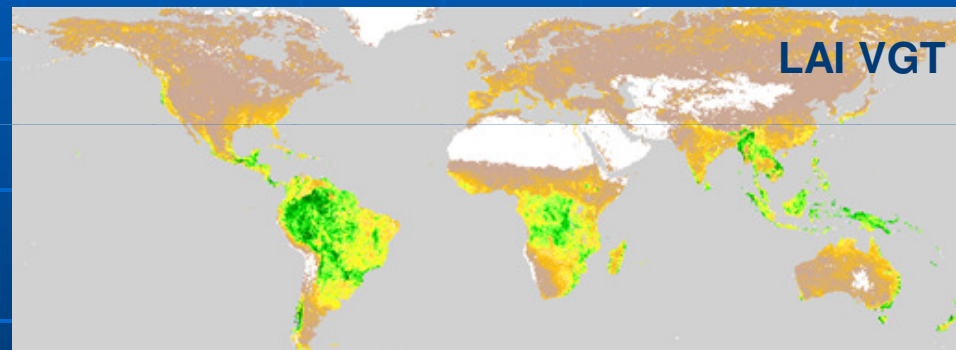


Legend

- Degree of Imperviousness (in %)
- Vegetation Intensity Indicator
- Forest Crown Cover Density (in %)
- Wetlands
- Water
- Other (e.g. Agriculture)

Global component

Product	NRT / Off-line	Spatial Resolution	Spatial coverage	Temporal Resolution	Sensor (back-up)
LAI, fCover, fAPAR, DMP, NDVI, Phenology	NRT	1 km	Global	10-days	VGT (MODIS)
Time series of vegetation products	Off-line	4 km	Global	10-days	AVHRR + VGT
Burnt areas + seasonality	NRT	1 km	Global	Daily	VGT

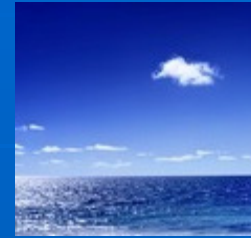


Global component applications

- Crop Monitoring and Food Security
- Natural Resources monitoring
- Water Management and Drought
- Terrestrial Carbon Cycle monitoring



II. Marine



The GMES marine monitoring services provide information on the state of physical ocean and marine ecosystems for the global ocean and the European regional areas.



Four application areas

- maritime safety
- marine environment and coastal regions
- marine resources
- seasonal meteorological forecasting and climate monitoring



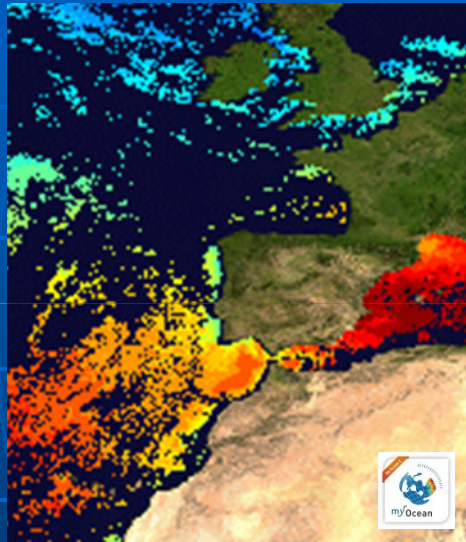
Observations/models provide information about different ocean parameters

- **Temperature**
- **Salinity**
- **Currents**
- **Sea ice**
- **Sea level**
- **Wind**
- **Biogeochemistry**



Sea Temperature

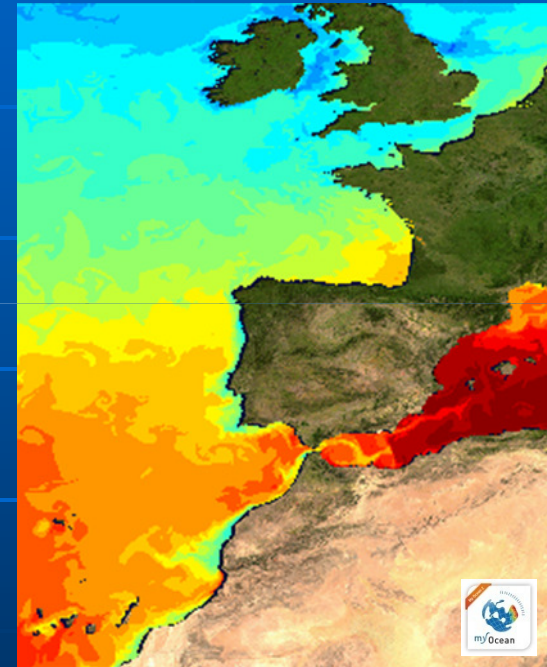
Late June 2012



**SST – satellite
observation**



**in-situ
measurements**



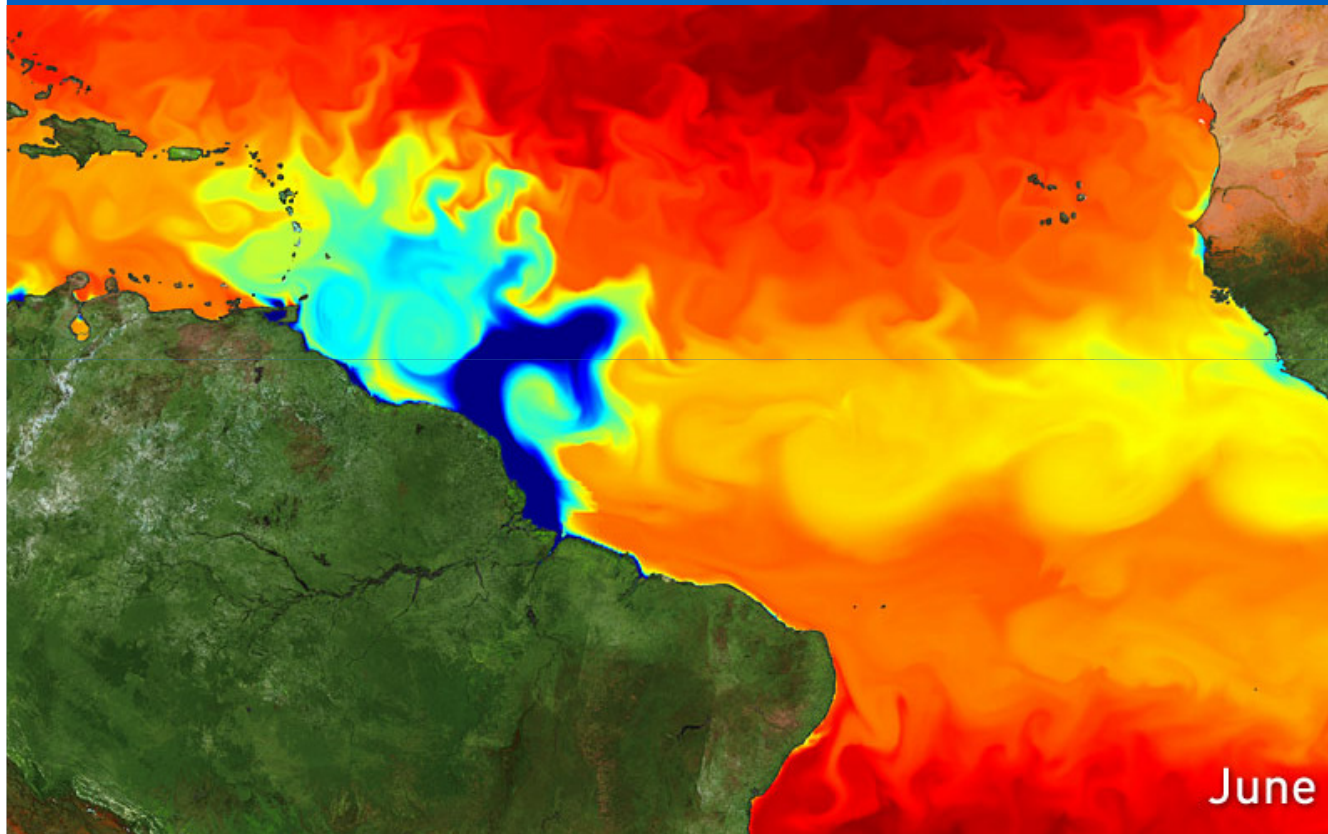
Assimilated model product

Independent observation and measurements



Source my ocean

Sea Surface Salinity



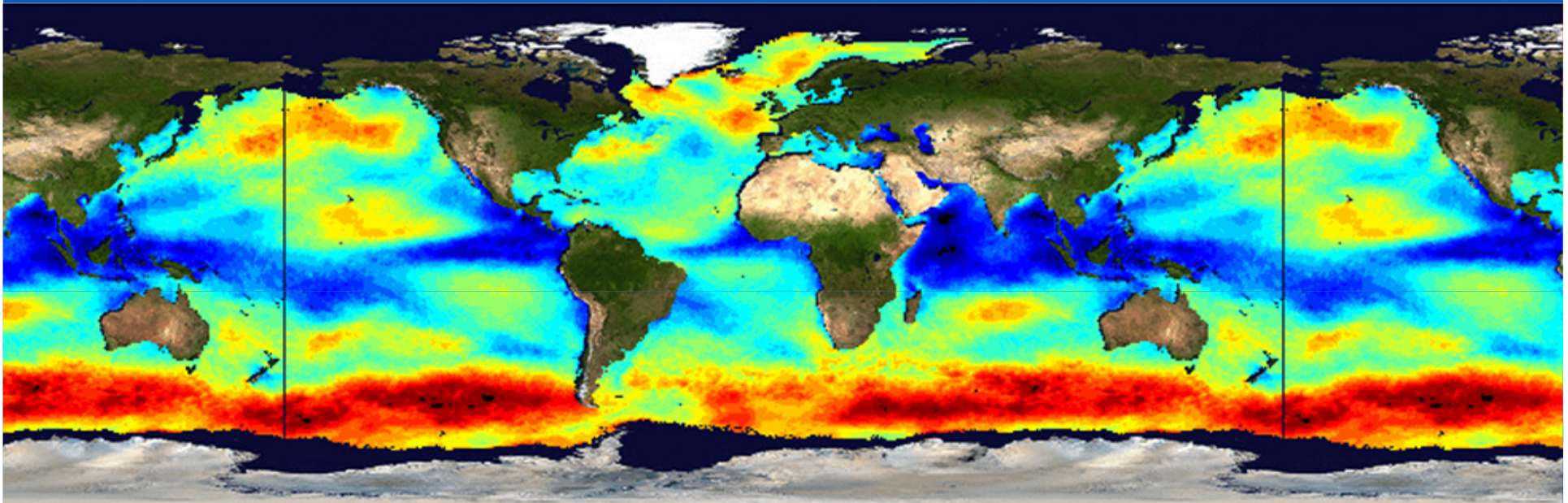
Sea Surface Salinity is a key parameter to estimate the influence of oceans on climate.

Along with temperature, salinity is a key factor that determines the density of ocean water and thus determines the convection and re-emergence of water masses.

The Amazon fresh water plume can be seen hundreds of kilometres from the river mouth.



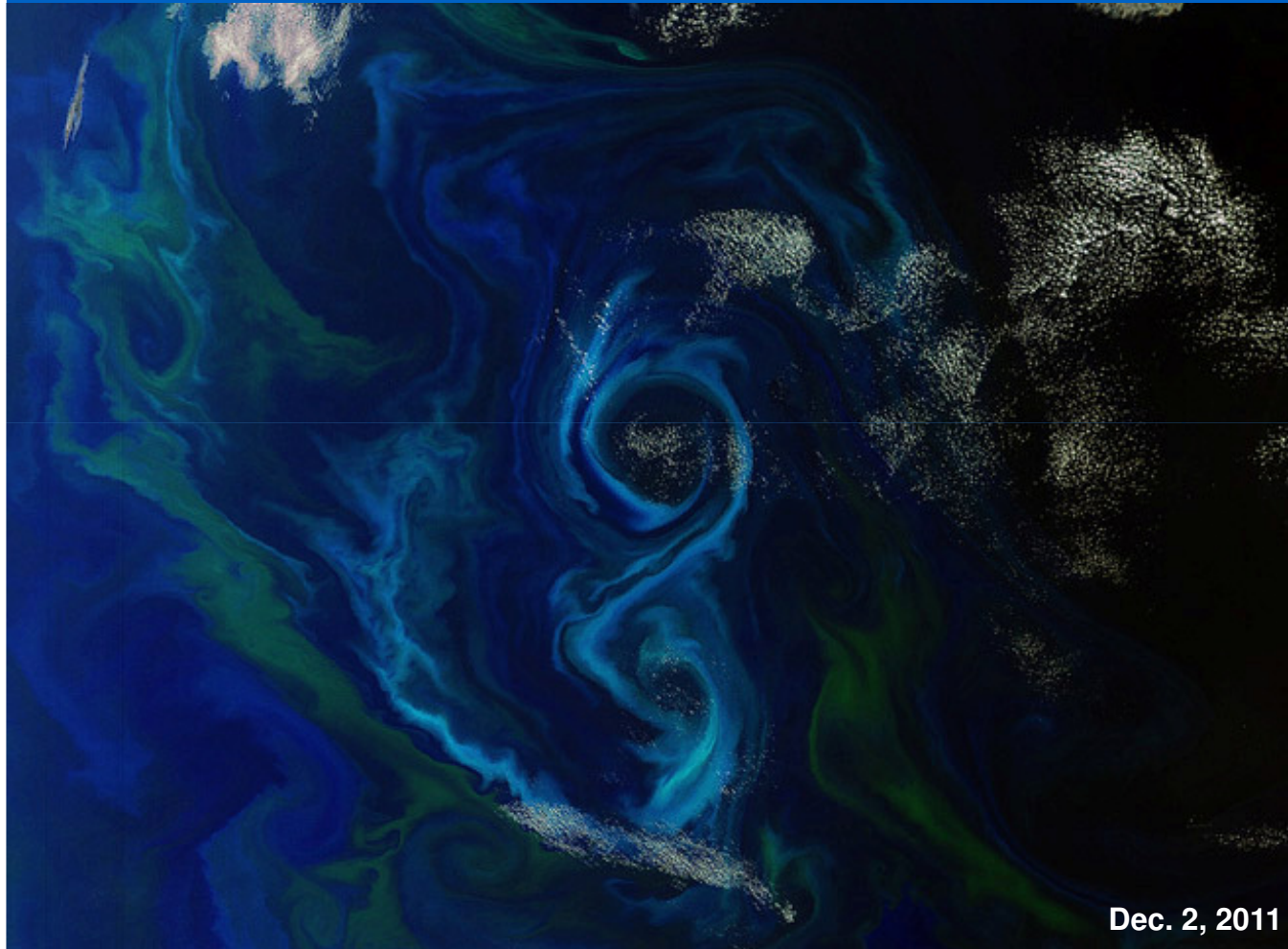
Surface winds



Global wind field, monthly mean, April 2012
Wind speed 10m above sea water



Phytoplankton bloom



Phytoplankton bloom swirls a figure-of-8 in the South Atlantic Ocean about 600 km east of the Falkland Islands.

Once a bloom starts, an ocean colour sensor can make an initial identification of its chlorophyll pigment, and therefore its species and toxicity.



Source: ENVISAT (ESA)

MyOcean Portal

■ <http://www.myocean.eu.org>



OCEAN MONITORING AND FORECASTING

Providing PRODUCTS and SERVICES for all marine applications.

[» MARITIME SAFETY](#)[» MARINE RESOURCES](#)[» COASTAL & MARINE ENVIRONMENT](#)[» WEATHER, CLIMATE & SF](#)

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NEWS & EVENTS

Launch Event "The Growing Use of GMES across Europe's Regions" 10th October 2012 - Brussels.



NEREUS, the Network of European Regions Using Space Technologies and ESA, the European Space Agency are pleased to invite you to a special event on Wednesday, 10 October 2012 from 19.00 to 22.00 – European Parliament – Brussels to inaugurate the joint publication "The Growing Use of GMES across Europe's Regions".

[» more](#)

MYOCEAN SCIENCE DAYS 2012



«MyOcean Science Days»
2nd Edition
19-21 November 2012, Germany

More on : <http://www.myocean.eu/web/16-news-events.php?item=602>

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SCIENTIFIC PUBLICATIONS

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UPDATE ON SATELLITE DATA SUPPLY TO MyOcean2



Space-based observation systems and data are essential for GMES in general and for MyOcean services in particular. What about the recent Envisat end of mission? What impacts on MyOcean services and products for users?

[» Learn more](#)

La Niña, the terrible Sister



Following its elder brother (El Niño) from mid-2010, La Niña has in turn wreaked havoc on Pacific coasts (and more). Catastrophic flooding in Australia, in particular, occurred in December 2010-January 2011. A new La Niña episode is ongoing, even if less intensive than last year one. It is expected to continue up till March-April-May 2012.

[» Learn more](#)

PRODUCT SHOWCASE

FP7 Research Activities - Marine

Downstream GMES services

SIDARUS
Sea Ice downstream services

OPERR
CSA

ASIMUTH
Forecast harmful algal bloom

CoBIOS
Predict high biomass blooms in coastal waters

FIELD_AC
Operational service for coastal areas

SeaU
Satellite based oil spill detection

MyOcean 2
Core service

AQUAMAR
Water quality services

R&D to enhance GMES applications in the Marine area

OSS2015
Biogeochemical products

OPEC
Biogeochemical & ecological parameters

MyWAVE
Ocean surface waves modelling

SANGOMA
New data assimilation techniques



IV. Emergency Response

e.g. Coastal areas : Japan Tsunami



Services Implementation

(R&D-FP7)

		Land	Marine	Atmosphere	Emergency	Security	Cl. Change
FP7 Projects	Core	GEOLAND2	MYOCEAN* MYOCEAN2	MACC* MACCII	SAFER*	GMOSAIC*	
	Service Evolution / R&D	BIO_SOS MS.MONIN A ISAC MYWATER SIRIUS GLOWASIS IMAGINES** LOTUS** GLASS** SenSyF**	MYWAVE OPEC OSS2015 SANGOMA	NORS	LAMPRE** IncREO** SENSUM** PREFER**	G-SEXTANT** G-NEXT** SAGRES** LOBOS** NEREIDIS DOLPHIN SIMITYS	EURO4M MONARCH-A CARBONES ReCOVER REDDAF
	Downstream applications	CRYOLAND FRESHMON EUFODOS WatPlan MALAREO	FIELD AC AQUAMAR ASIMUT COBIOS SeaU SIDARUS OPERR EAMNET	PASODOBLE ENDORSE	EVOS DORIS SubCOAST PANGEO GeoPICTURE* GARNET-E		REDDINESS REDD-Flame
	Inter. Coop						
GIO	Operational Services	Pan EU Land Global Land			EMS- Mapping EFAS		



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Access to Data and Products

- GMES is an **operational program**; main users are operational entities (public and private) and the **Science** community
- GMES is a **public good**. Overriding goal is to provide full and open access to data and products (security restrictions may apply)



Africa-EU Cooperation on EO

- **GMES can support African users**
 - **African institutions can provide input to the definition of the scope of GMES Services in particular through the GMES and Africa action plan**
 - **GMES Data Policy makes satellite data and GMES Service products available to African partners**
 - **Cooperation exists today through several R&D funded projects**



International Cooperation

- GMES and GMES and Africa partners should ensure a **coordinated approach** for an international cooperation strategy, building on coherent **cooperation schemes**
 - **GMES and Africa initiative** (Africa-EU)
 - **Group on Earth Observations** (Multilateral)



Thank you

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<http://ec.europa.eu/enterprise/policies/space/gmes/>

[http://ec.europa.eu/enterprise/policies/space/research/fp7-projects/index en.htm](http://ec.europa.eu/enterprise/policies/space/research/fp7-projects/index_en.htm)

