GMES Services Benefits for Africa

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

GMES Bureau

European Commission

GMES
Observing our planet for a safer world

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

USERS

Policy makers & **Public** & **Private, commercial**

Different Needs

Examples

Farming	Oil Spills	Air quality	Flood	Surveillance	Ice levels
Land	Marine	Atmo-sphere	Emer-gency	Security	Climate Change

Information Services

Space Infrastructure & **In Situ Infrastructure**

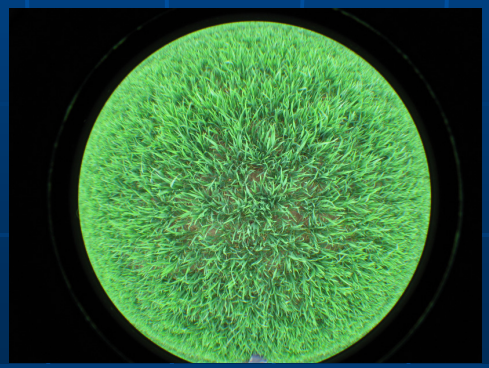
Sustainable Information

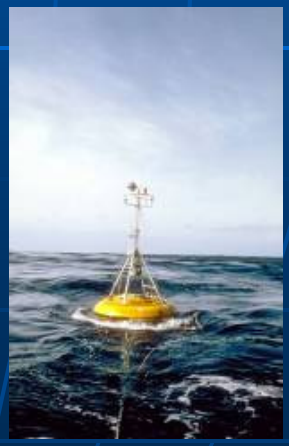
OBSERVATION

GMES Observing our planet for a safer world

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)

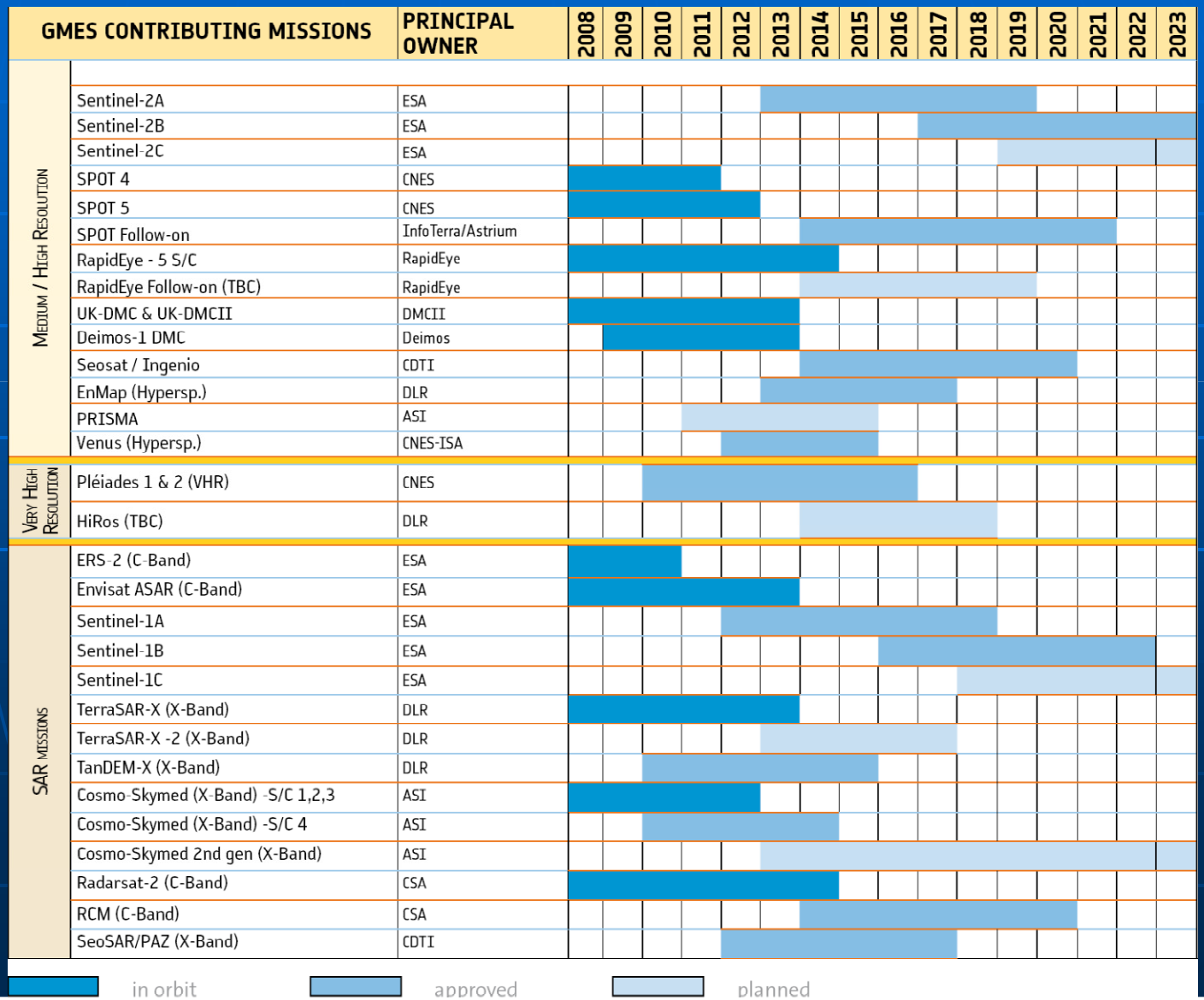




GMES Space Infrastructure

- **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**

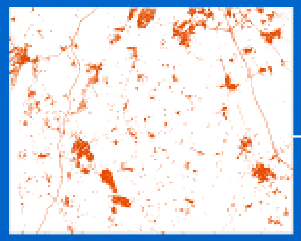
I. Land

1. **Pan-EU Land Cover**
   (5 High Resolution layers of main land-cover classes)

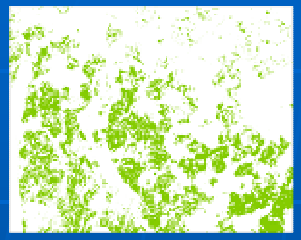
2. **EU Local component**
   ('hot spot' zooming on areas of interest using VHR images)

3. **Global component**
   (Global Terrestrial Variables produced on near real time and on a ten-days basis)

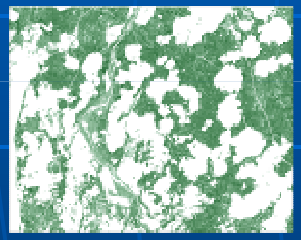
5 HR layers under development (GIS model approach) Example from Alpine test site



Imperviousness



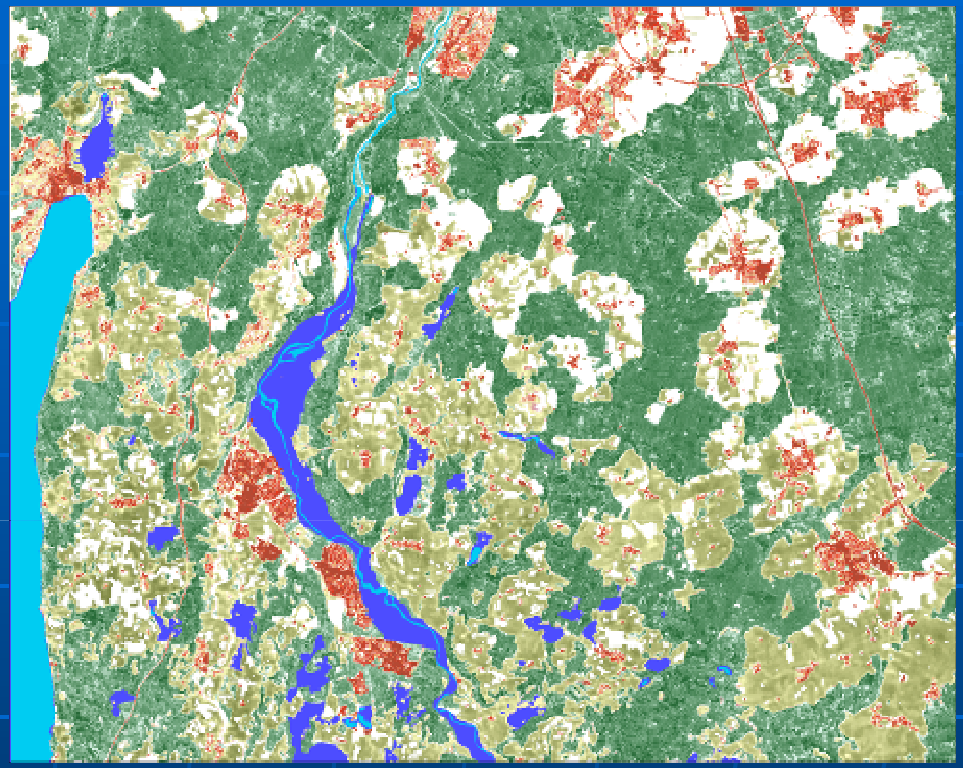
Vegetation Intensity



Forest Crown Cover Density

Wetlands

Water

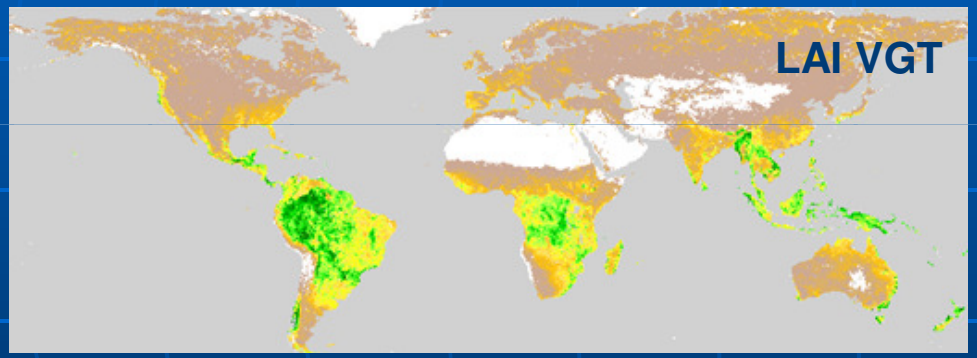


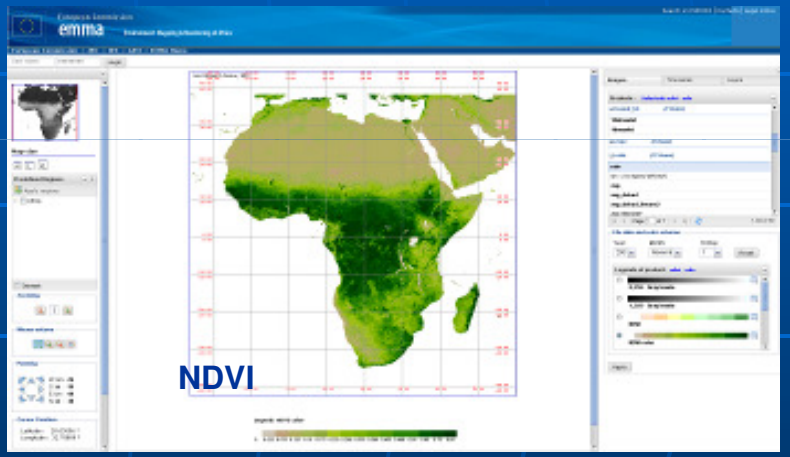
Legend

- 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

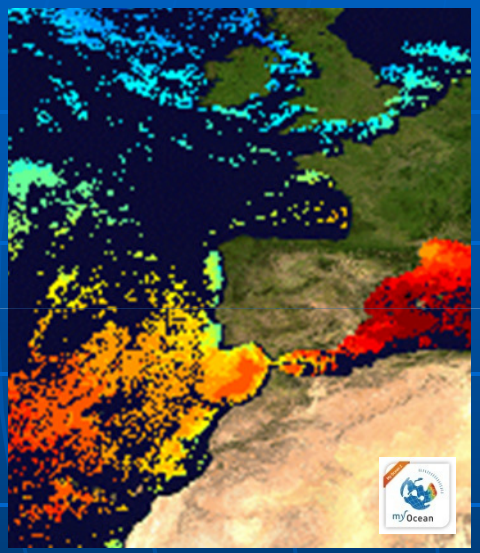
- maritime safety
- marine environment and coastal regions
- marine resources
- seasonal meteorological forecasting and climate monitoring

Observations/models provide information about different ocean parameters

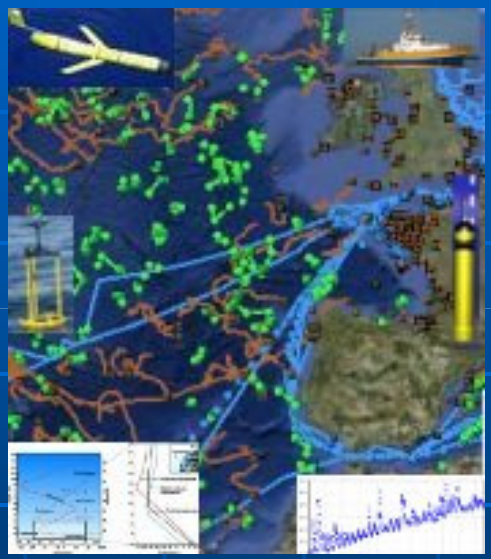
- Temperature
- Salinity
- Currents
- Sea ice
- Sea level
- Wind
- Biogeochemistry

Sea Temperature

Late June 2012

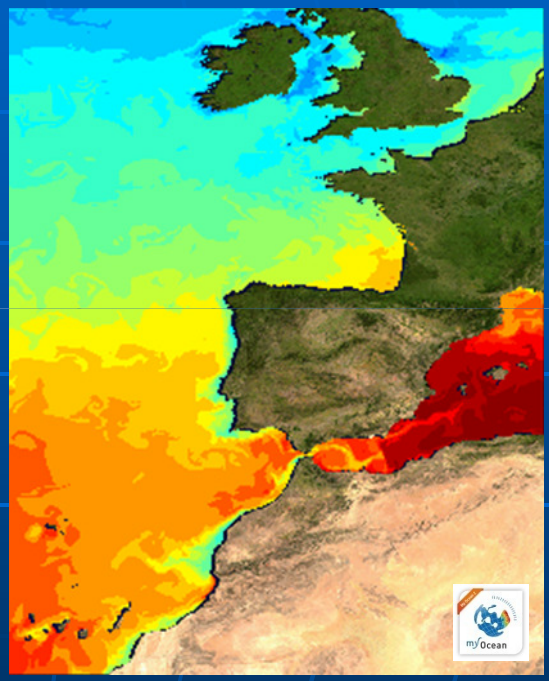


SST – satellite observation



in-situ measurements

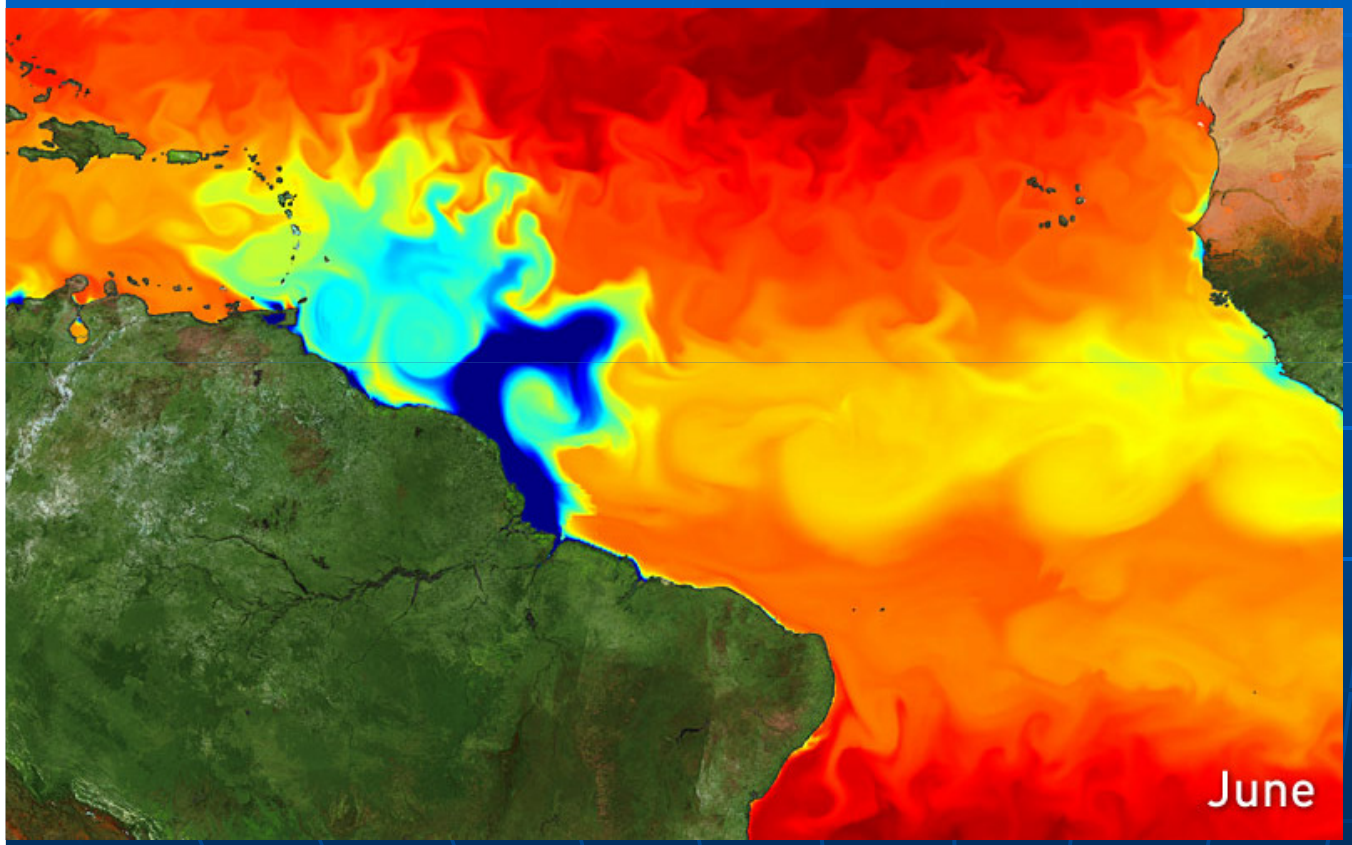
Independent observation and measurements



Assimilated model product

Source my ocean

Sea Surface Salinity



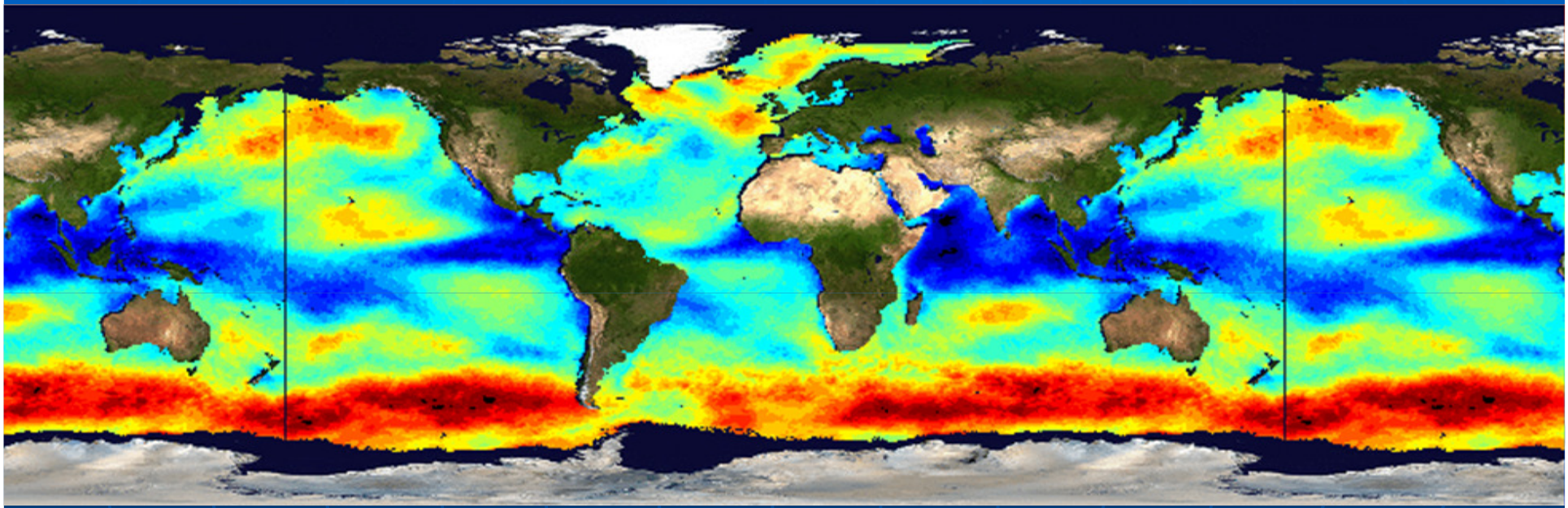
Sea Surface Salinity is a key parameter to estimate the influence of oceans on climate.

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.

Source my ocean

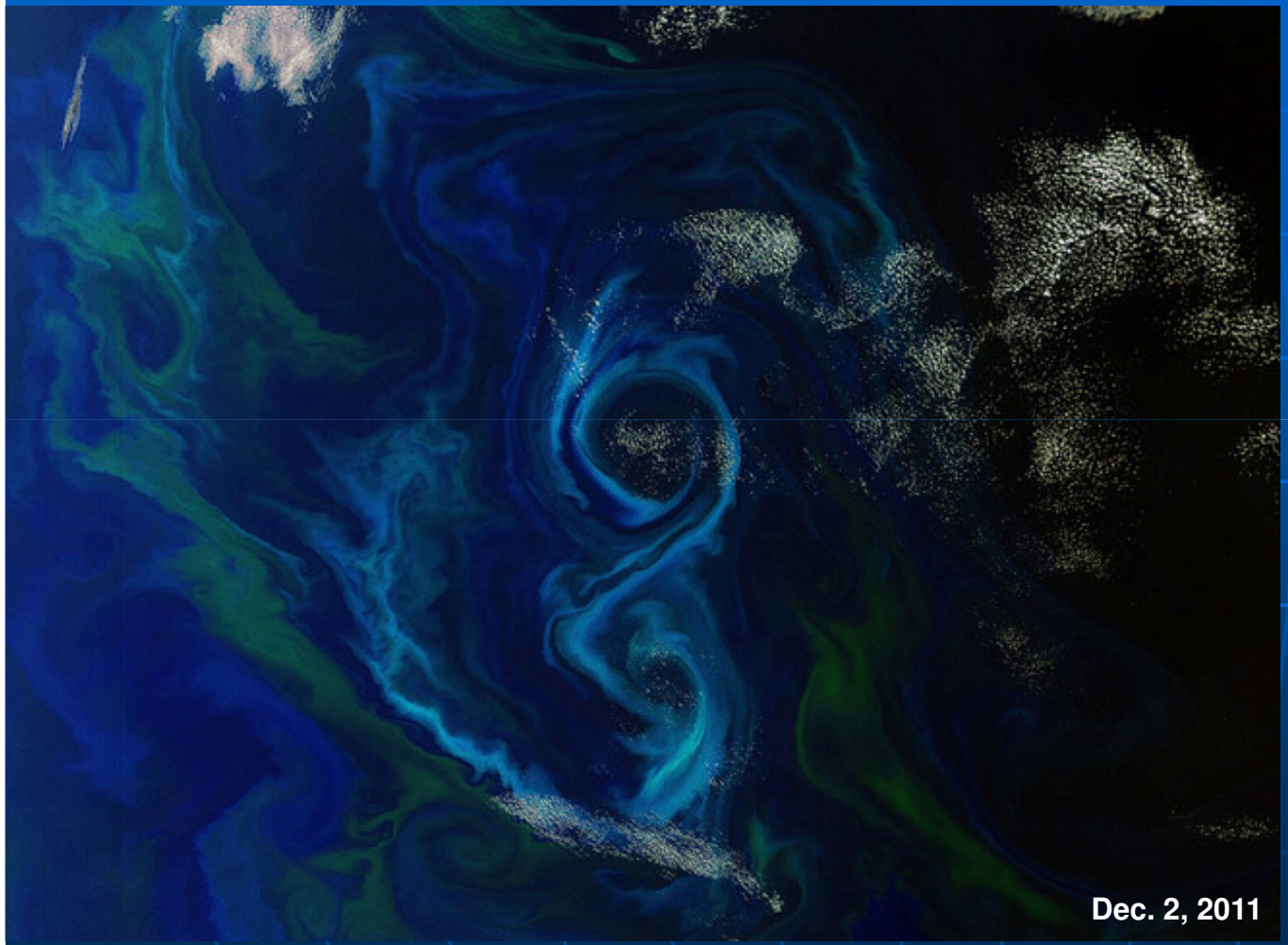
Surface winds



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.

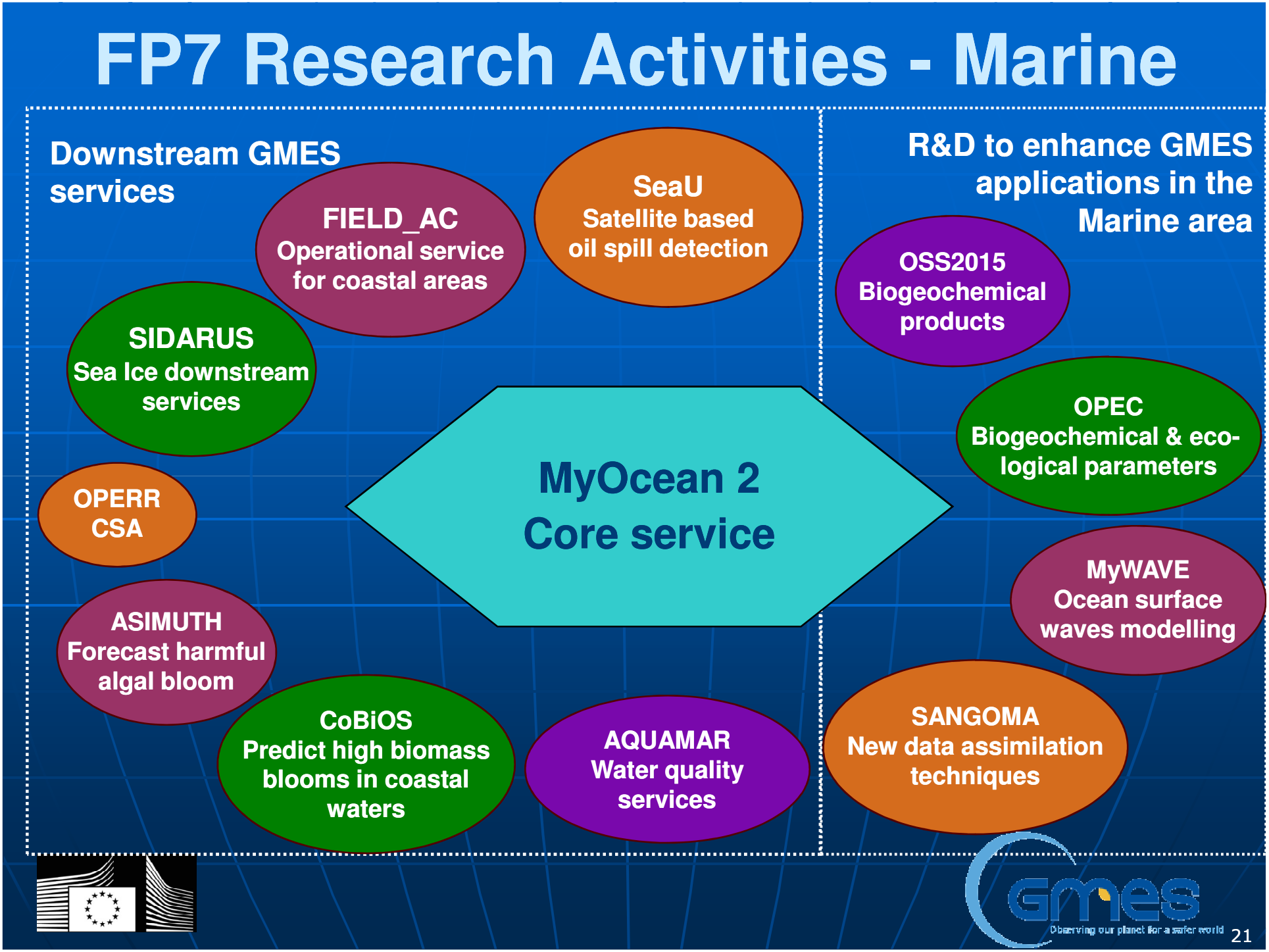
Once a bloom starts, an ocean colour sensor can make an initial identification of its chlorophyll pigment, and therefore its species and toxicity.

Source: ENVISAT (ESA)

MyOcean Portal

- **http://www.myocean.eu.org**

FP7 Research Activities - Marine



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.MONINA 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	FIELD AC AQUAMAR ASIMUT COBIOS SeaU SIDARUS OPERR	PASODOBLE ENDORSE	EVOSS DORIS SubCOAST PANGEO GeoPICTURE*		REDDINESS REDD-Flame
	Inter. Coop	WatPlan MALAREO	EAMNET		GARNET-E		
GIO	*Operational Services*	Pan EU Land Global Land			EMS-Mapping EFAS		

Outline

- GMES - an introduction
- Service Applications
- **Opportunities for Africa**

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

entr-gmes-bureau@ec.europa.eu

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

http://ec.europa.eu/enterprise/policies/space/research/fp7-projects/index_en.htm