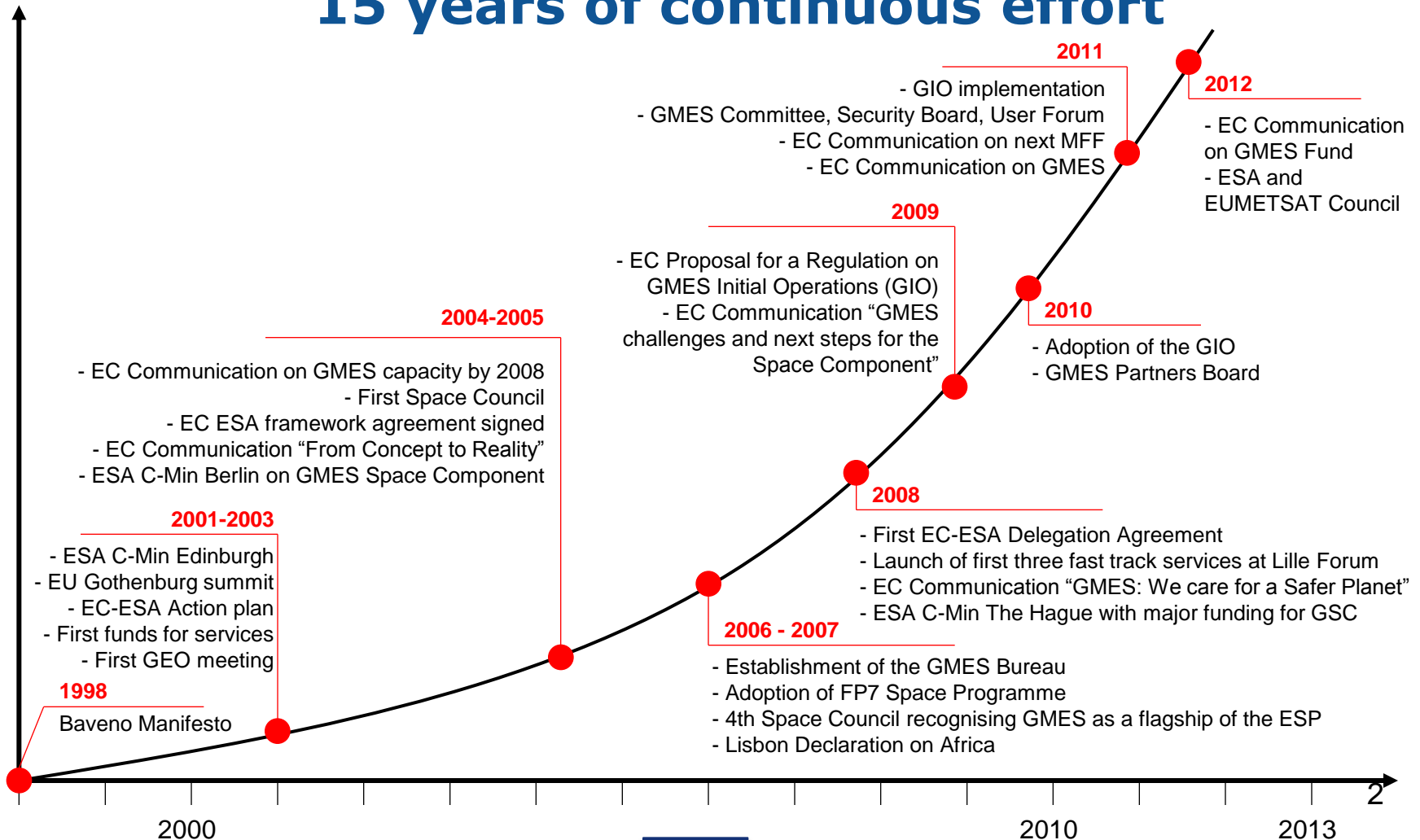


The GMES Programme

Hervé Jeanjean
GMES Bureau
Saint-Malo, 31 May 2012

From Baveno...to GMES Initial Operations 15 years of continuous effort



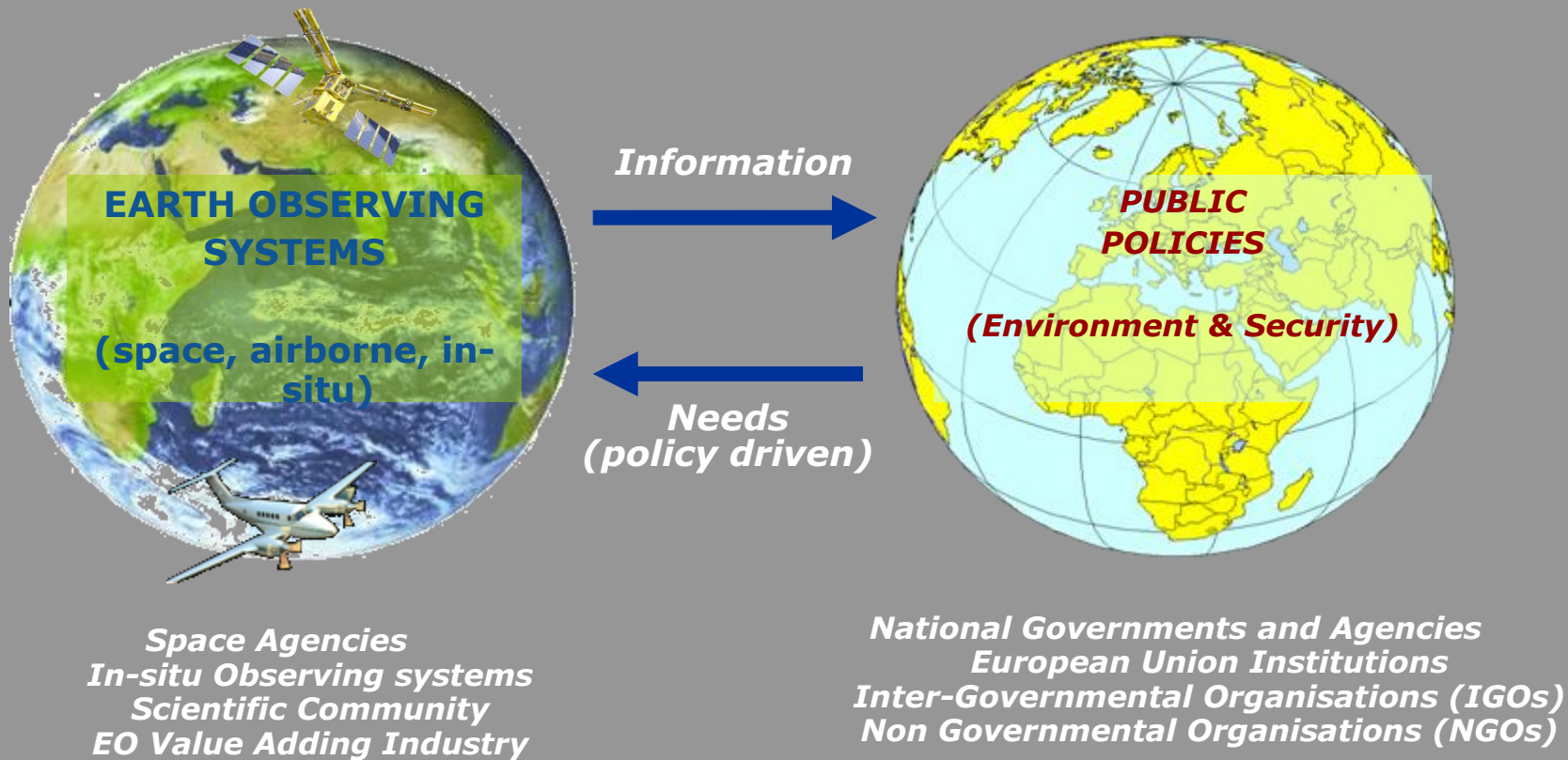
GMES: why an EU lead programme?

- Earth Observation & Monitoring is strategic
 - **Security, risk and crisis management**
 - **Spatial planning**
 - **Monitoring of natural resources**
 - **Meteorology and Climate monitoring**
- *Need for a European autonomous capacity*
- Synergies are mandatory
 - **EO costs for a comprehensive programme like GMES go beyond resources of a single nation**
 - **Market potential for EU wide, regional and local applications services**
- *Pooling of resources at EU level fosters innovation and competitiveness*

What is GMES?

- An autonomous Earth Monitoring system for Europe
- An end user-focused programme of services for environment and security
- An observation infrastructure with the largest fleet of satellites and atmosphere/earth-based monitoring instruments in the world
- Joined-up information for policymakers, scientists, businesses and the public
- Europe's response to the global need for environment and climate monitoring
- Partnership between EU, ESA and Member States and operational agencies

The objective is to provide information services to policy-makers and other users



...but also to strengthen the market



GMES = Earth Monitoring programme

- **Regulation adopted in October 2010**
 - EU-led programme, EC in charge of coordination and management
 - Partnership with ESA and Member States
 - Based on three components: service, space and in situ
 - Initial Operations for the period 2011-2013
 - Definition of organisational arrangements
 - Mixed operational and R&D budget
 - Implementation of the service delivery
 - Data and information policy (Delegated Act)
 - Security issues



Available budget until 2013 : 3.2 Bn €

Space Component : € 2.4 Bn

≈ € 260 million

EU

→ € 100 million (FP6) for fast track services

ESA

→ € 130 million (GSE) and additional studies



≈ € 3 000 million

EU

→ ≈ € 1,210 million from FP7 (GSC, access to space, development of services, in situ component, Preparatory Actions), GMES Initial Operations, and other EC services

ESA

→ ≈ € 1,730 million for GSC built-up, GSE follow-on and Climate Change Initiative



2000

2007

2013⁷

GMES Components

Space Component

Sentinels,
Contributing
Missions
and related
Ground
Segment



GMES



Services Component

Information
services for
marine,
atmosphere,
climate
change, land,
Emergency and
security



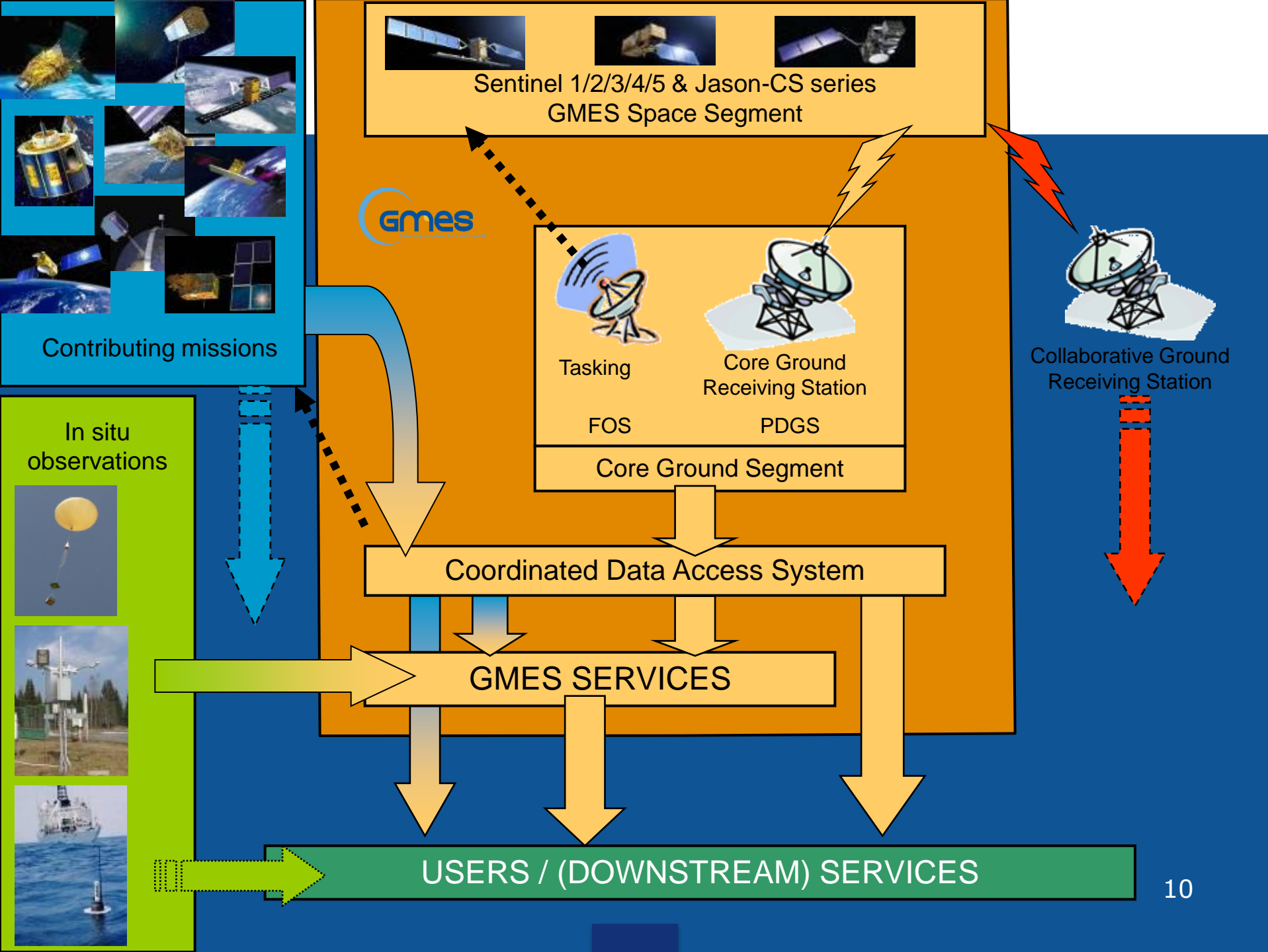
In-situ Component Land, air and water monitoring sensors



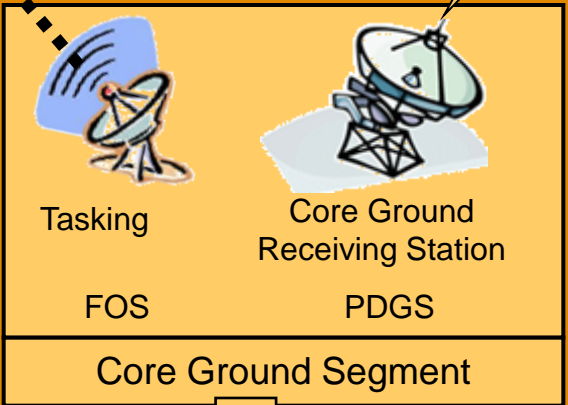
Observation infrastructure

- *In-situ observation infrastructure: air- sea- and ground-based systems and instruments*
 - (e.g. airborne, balloons, floats, ship-borne, measuring stations, seismographs, etc)
 - **Observations mostly within national responsibility, with coordination at European level**
- *Space infrastructure component for GMES: different missions co-ordinated at European level*
 - **Sentinel missions : specifically developed 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)**





Sentinel 1/2/3/4/5 & Jason-CS series
GMES Space Segment

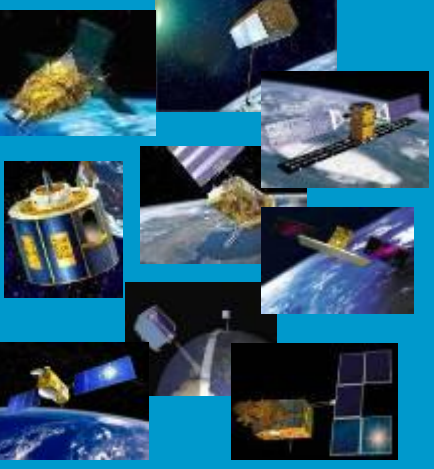


Collaborative Ground Receiving Station

Coordinated Data Access System

GMES SERVICES

USERS / (DOWNSTREAM) SERVICES



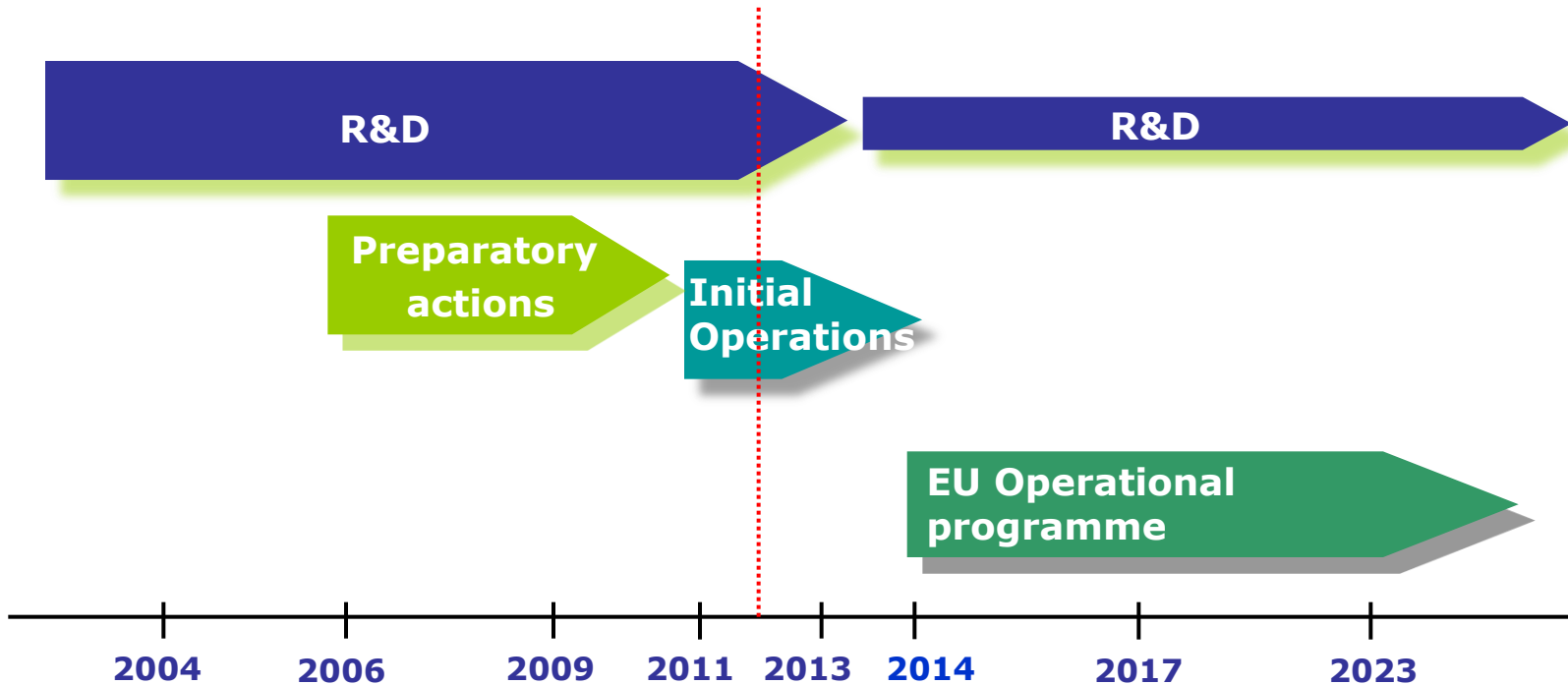
Contributing missions



In situ observations

GMES Timeline

R&D activities progressively transferred into operations



State of play

- **Regulation 911/2010 establishes the GMES programme and its initial operations for 2011-2013**
- **Communication COM(2011) 831 proposed a way forward for 2014-2020**
- **Communication COM(2012) 218 gave recommendations on the GMES Fund**
- ***What's next?* Institutional debate in the EP and Council under the EU Presidencies on the future of GMES and to clarify both its funding and governance**

GMES Services

Monitoring of Earth systems



Land



Marine



Atmosphere

Horizontal applications



Security



Emergency



Climate Change

Scope of GMES Services

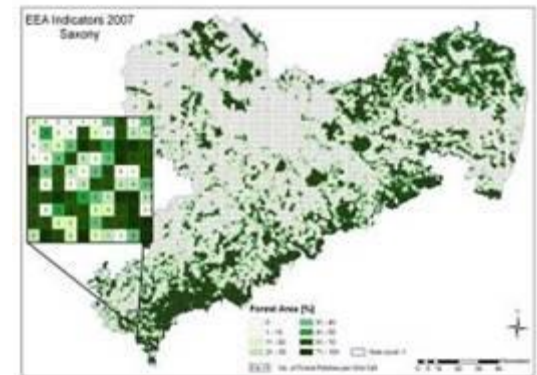
- *GMES services*
 - **Provide standardized common (multi-purpose) information**
 - **Based on common requirements from EU and public MS institutions**
 - **Will support 'public good' data policy**
 - **Supported by EU/public funding (GMES programme)**
- *Downstream sector*
 - **Tailored for specific applications at local, regional, national levels**
 - **EU to encourage and support the implementation of these service layer through incentive measurements (user uptake, R&D)**

GMES Land Monitoring Service

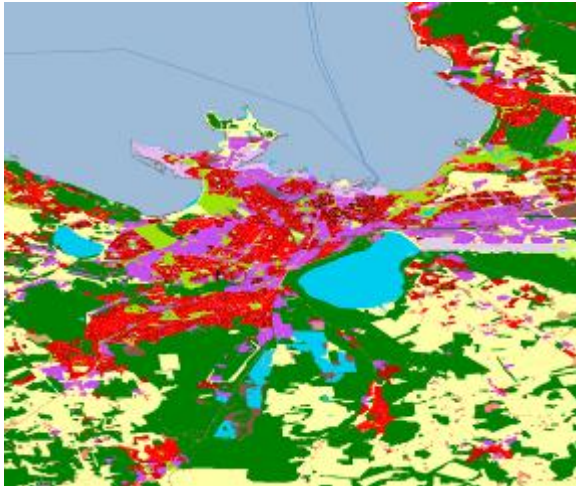
The Land service addresses a wide range of resources and policies at EU and international level (e.g. soils, water, agriculture, forestry, biodiversity, transport etc.)

Very diverse user communities with various requirements.

- Land use
- Forests
- Urban planning
- Water quality
- Crop production
- ...

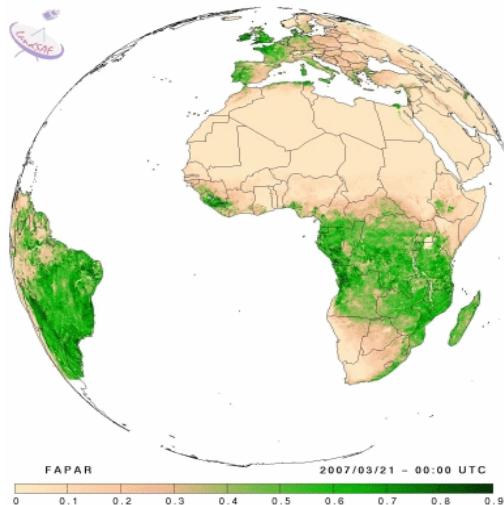


Scope of the Land service



- **4 components** identified from user consultations, and building on precursor activities (Geoland/2, ESA GSE, Corine LC...)

- 1. Global component** : Biophysical parameters (Essential Climate Variables), Land data assimilation schemes (water and carbon), crop yield forecasting
- 2. Pan-EU component**: 5 High-Resolution layers, new Corine exercises (2012 and beyond), support to MS inventories harmonisation
- 3. Local component**: continuity of Urban Atlas, monitoring of EU hot spots (e.g. biodiversity, coastal areas..)
- 4. Access to reference data** at Pan-EU and national level

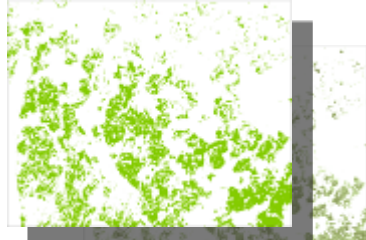


5 High Resolution Layers

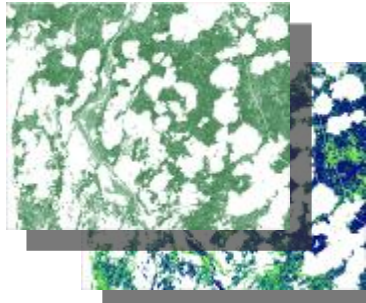
Combination of selected HR layers by a GIS model approach
(Example from Alpine test site)



Sealed Area /
Imperviousness



Vegetation Intensity /
Grassland Indicator



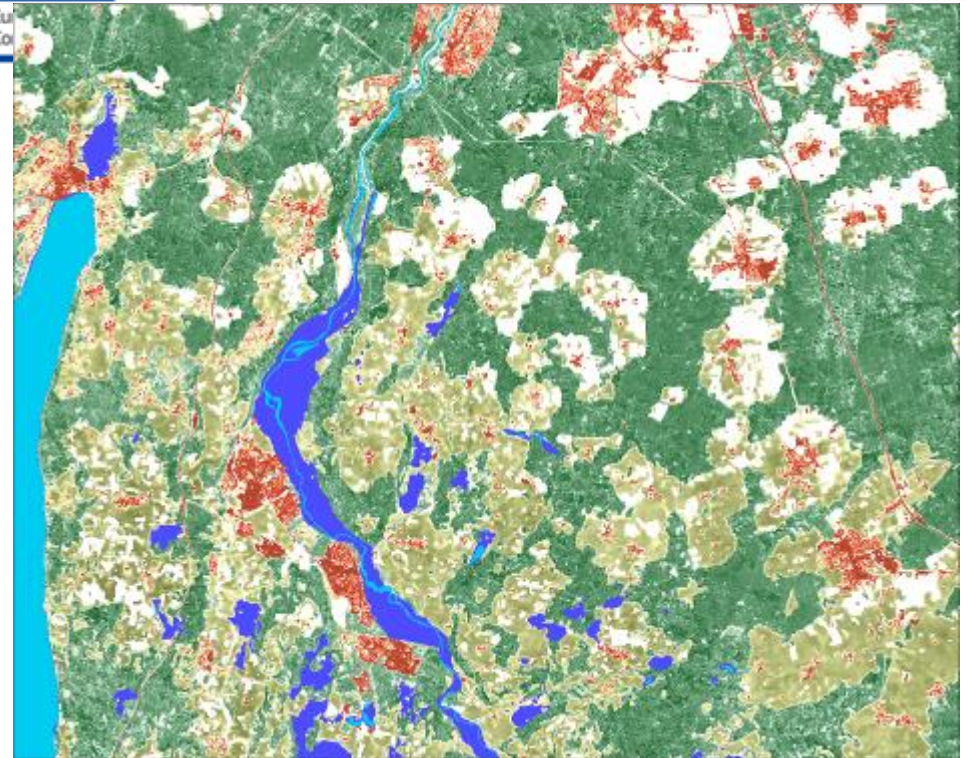
Forest Crown
Cover Density /
Forest Types



Wetlands



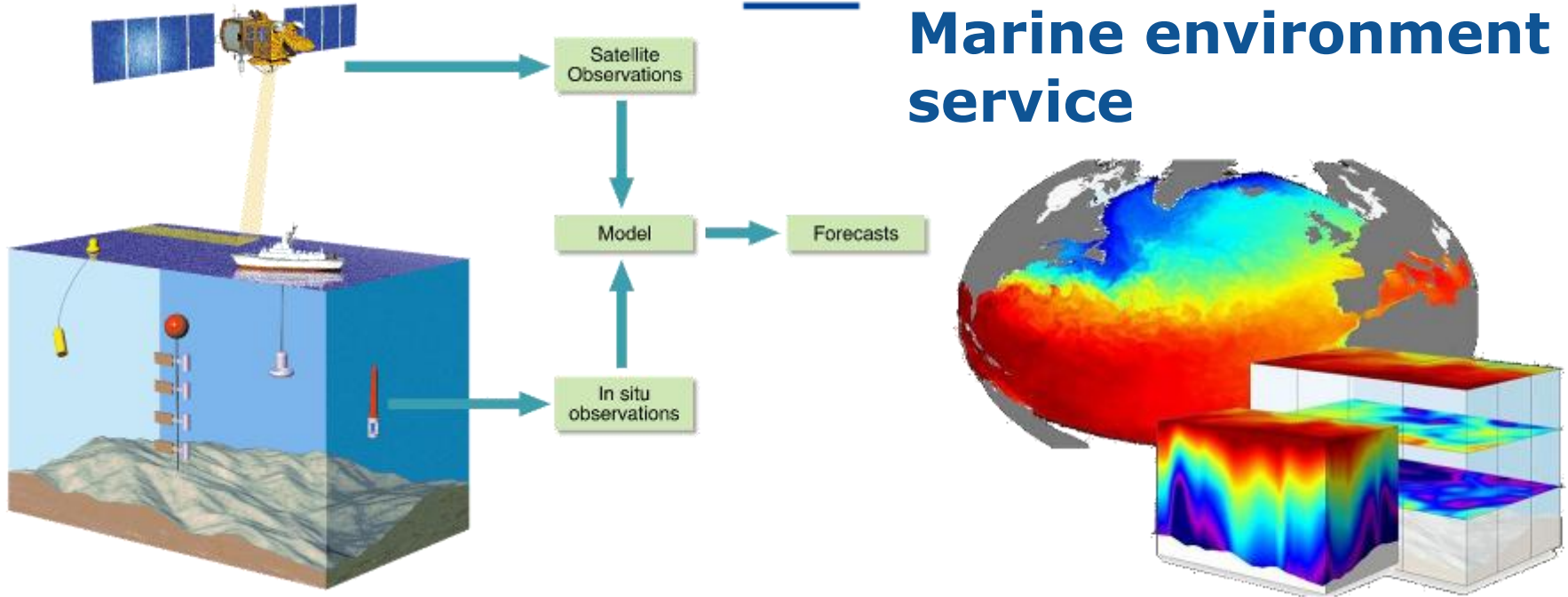
Water



Legend

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

Marine environment service



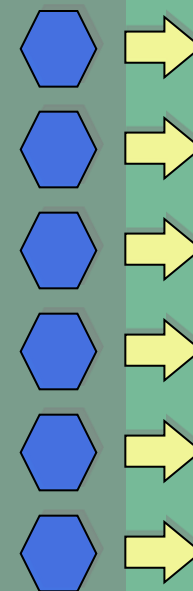
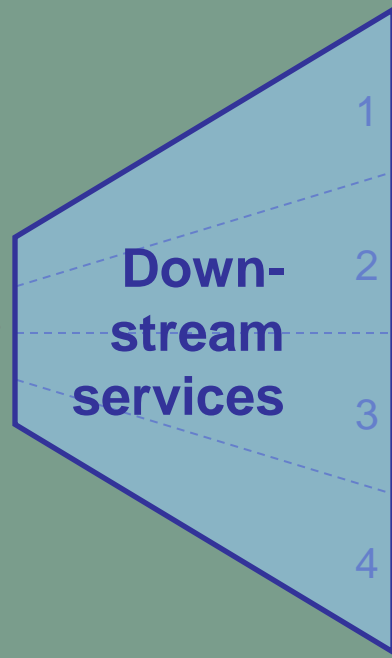
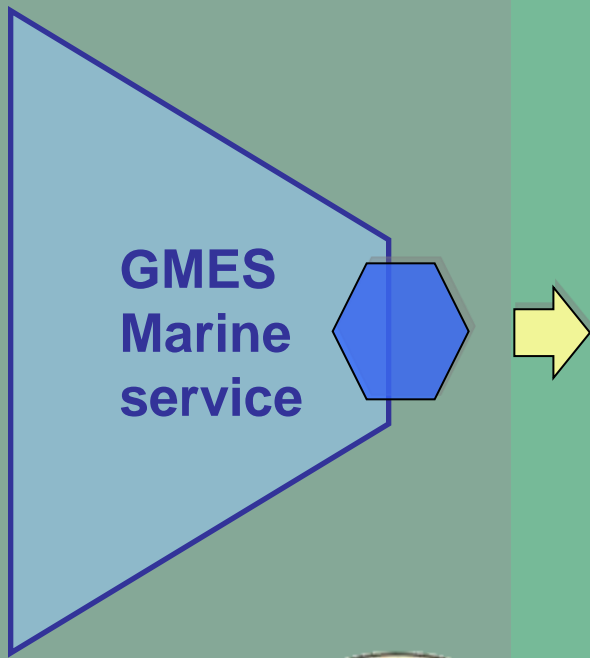
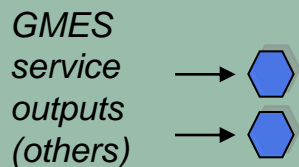
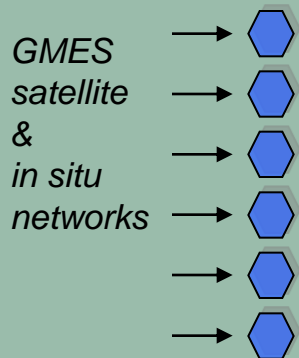
- Global ocean & main European regional seas (Baltic, Med, NE Atlantic, Black Sea, Arctic)
- physical ocean state (“**ocean weather**” and primary ecosystem)
- allow hindcasting, nowcasting, forecasting
- reanalysis for marine ECVs
- evolution towards coastal domain & marine resources



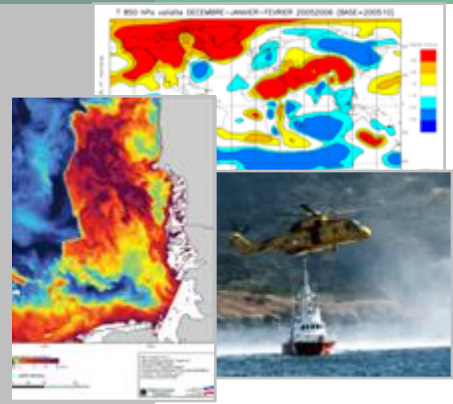
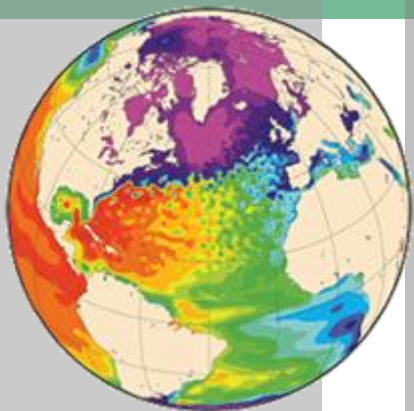
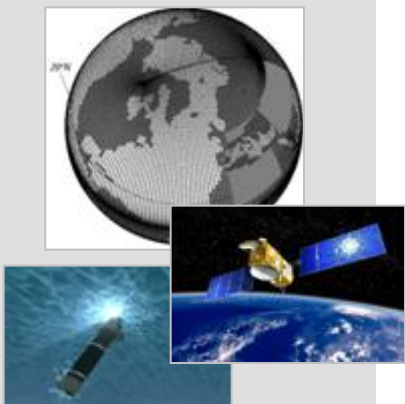
GMES input

Core information (ocean state)

User customized information products



users



4 application areas

Area 1

« MARINE SAFETY »

(maritime operations,
sea pollutions,
ship routes,
search and rescues ...)

Area 3

« COSTAL & MARINE ENVIRONNEMENT »

(Water quality, pollution,
costal activities ...)

Area 2

« MARINE RESOURCES »

(fishery,
ICES, FAO, ...)

Area 4

« CLIMATE & SEASONAL FORECAST »

(Climate change and
impact mitigation,
meteorological forecasting, ..)



OCEAN MONITORING AND FORECASTING

Providing PRODUCTS and SERVICES for all marine applications.

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Search mode: multi-criteria or full catalogue

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» Service commitments & licence

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ABOUT US

NEWS & EVENTS

Costa Concordia: MyOcean alert to help control spill



When the cruiser Costa Concordia ran aground off the Italian coast in January 2012, MyOcean provided the Italian Coast Guard Operational Centre with valuable information on the Mediterranean Sea

EDUCATION

Come and discover how we monitor and forecast the ocean

PRESS/EDITION

» all corners

SCIENTIFIC PUBLICATIONS

» all corners

1 > AN AREA

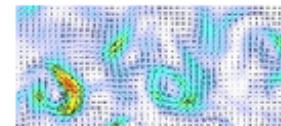
- Global Ocean
- Arctic Ocean
- Baltic Sea
- Atlantic-European North West Shelf-Ocean
- Atlantic-Iberian Biscay Irish-Ocean
- Mediterranean Sea
- Black Sea

2 > A PARAMETER

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

3 > A PRODUCT TYPE

- » Observation
- » Analysis and Forecast



SEARCH



Download the latest MyOcean catalogue

» download PDF



Access full catalogue online

» consult



to continue up till March-April-May 2012.

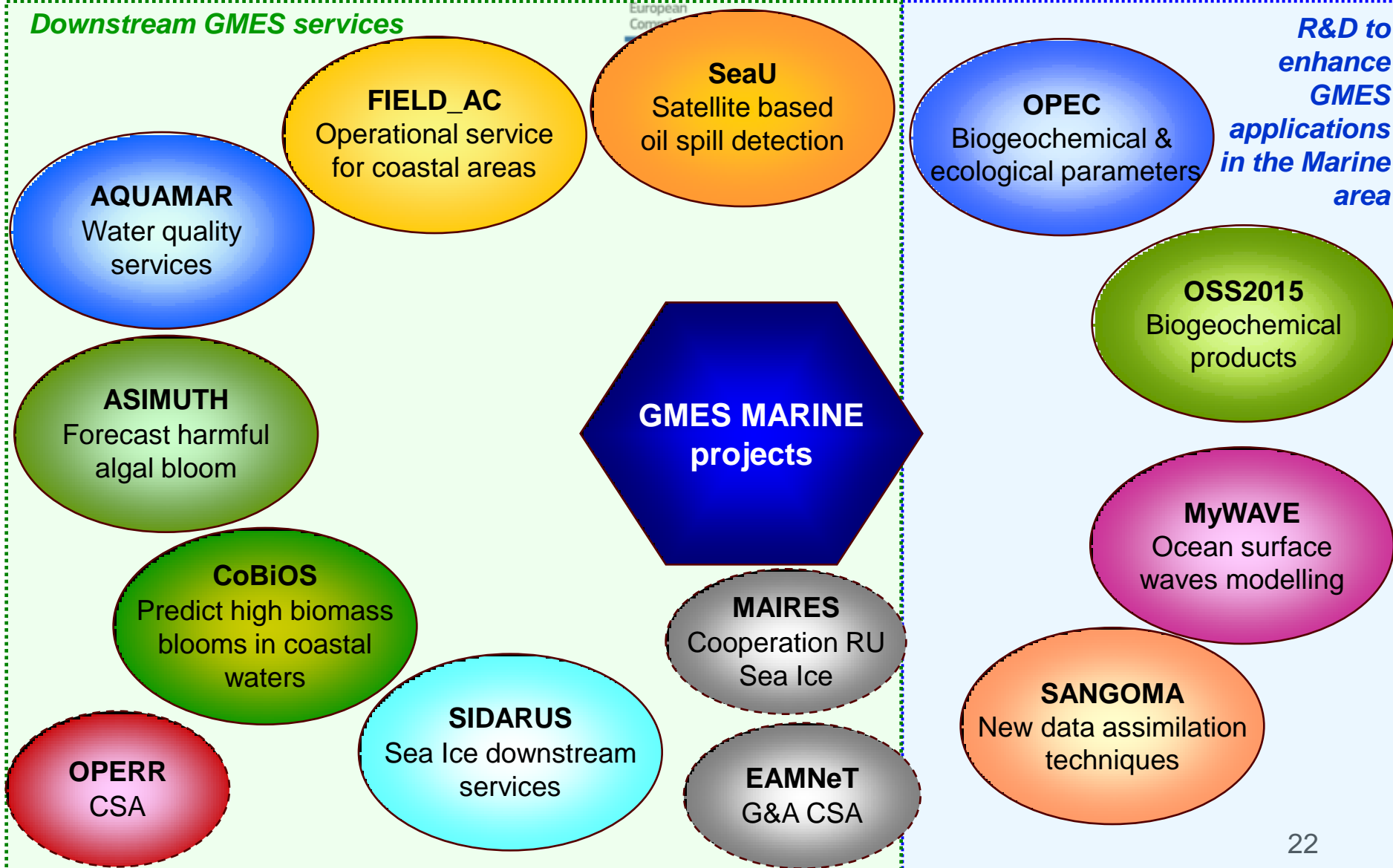
» Learn more



ongoing, even if less intensive than last year one. It is expected

FP7 GMES marine projects

Downstream GMES services



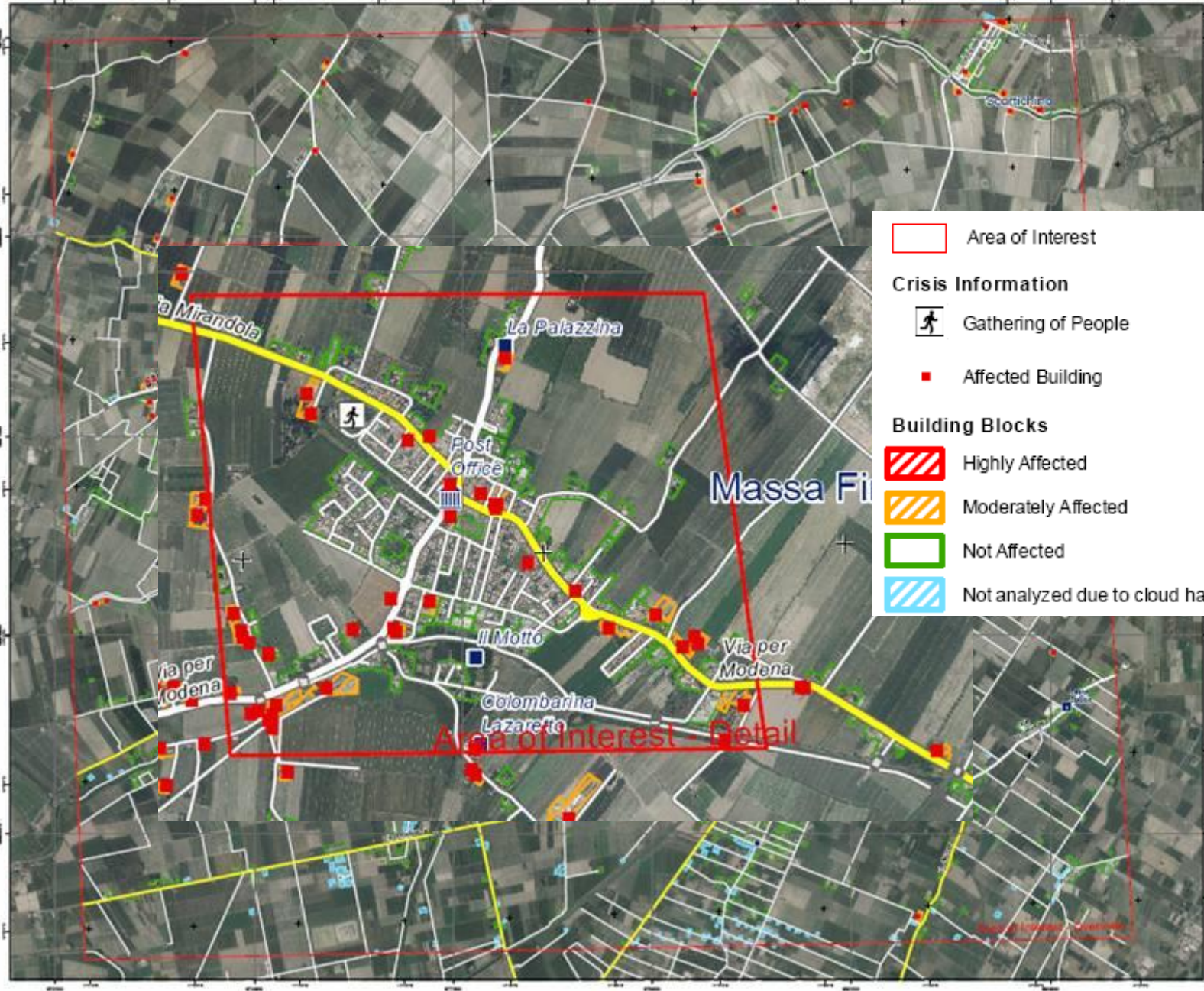
Emergency Management Service

- *The GIO-EMS is an **operational service** offered to the authorised users active in the field of crisis management in
 - the EU Member States
 - the European Civil Protection Mechanism
 - the Commission's Directorates-General (DGs)
 - the participating executive agencies and
 - international humanitarian aid.*
- *The core character of the GIO-EMS lies in the provision upon activation by the authorised user of **timely and accurate information** derived from satellite imaging sensor data in all phases of the emergency management cycle.*

Emergency Management Service

- ***Emergency response***
 - rush mode
 - products on potentially affected areas, disaster extent and damage assessment
- ***Preparedness / prevention, Recovery and Refugee / Internally Displaced Persons***
 - non-rush mode
 - products on pre-disaster geographic reference, risk analysis, post-crisis assessment, mid term impact, rehabilitation and key assets
- ***Natural and man-made disasters, worldwide***
- ***International dimension: Charter on Space and Major Disasters, UN, GEOSS...***





Area of Interest

Crisis Information

Gathering of People

Affected Building

Building Blocks

Highly Affected

Moderately Affected

Not Affected

Not analyzed due to cloud haze

Transportation

Primary Road

Secondary Road

Local Road

Bridge

Points of Interest

Transportation

Institutional

Educational

Medical

Religious

Other

Scale
 1:50000

Disclaimer
 The information provided in this map is for informational purposes only. It is not intended to be used as a basis for any legal or financial decisions. The user assumes full responsibility for any use of the information provided in this map.

Map production
 The map was produced using the following data sources:
 - Aerial imagery: 2012
 - Vector data: 2012
 - Topographic data: 2012

Legend

- Area of Interest
- Primary Road
- Secondary Road
- Local Road
- Bridge
- Gathering of People
- Affected Building
- Highly Affected
- Moderately Affected
- Not Affected
- Not analyzed due to cloud haze
- Transportation
- Institutional
- Educational
- Medical
- Religious
- Other

WELCOME TO THE GMES EMERGENCY MANAGEMENT SERVICE RUSH MODE PORTAL

A SERVICE IN SUPPORT TO THE EUROPEAN EMERGENCY RESPONSE

List of submitted GIO Rush Mode activations - showing the last 5 activations (within the last 90 days)



Atmosphere monitoring service

MACC Project Home - Home

Monitoring atmospheric composition & climate

macc - Monitoring Atmospheric Composition and Climate - is the current pre-operational atmospheric service of the European GEMS programme. MACC provides data records on atmospheric composition for recent years, data for monitoring present conditions and forecasts for the distribution of key constituents for a few days ahead. MACC combines state-of-the-art atmospheric modelling with Earth observation data to provide information services covering European Air Quality, Global Atmospheric Composition, Climate, and UV and Solar Energy.

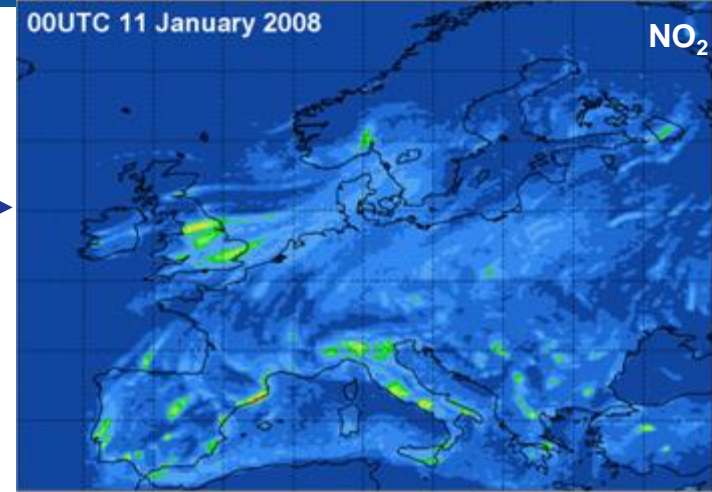
Services by theme: European Air Quality, Global Atmospheric Composition, Climate, UV, Solar Energy, Stratospheric Ozone

Services by user: Health, Environment, Science Community, Cities, Meteorology

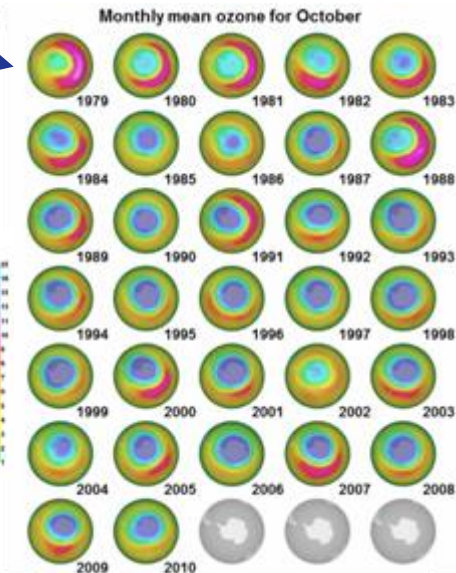
<http://www.gmes-atmosphere.eu>

European Commission

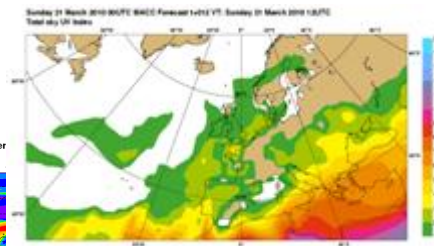
Air-quality forecast



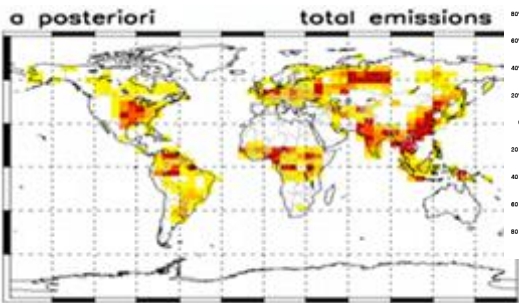
Stratospheric ozone records



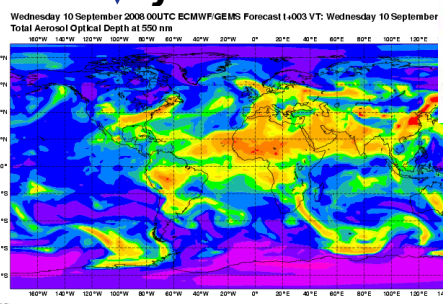
UV index



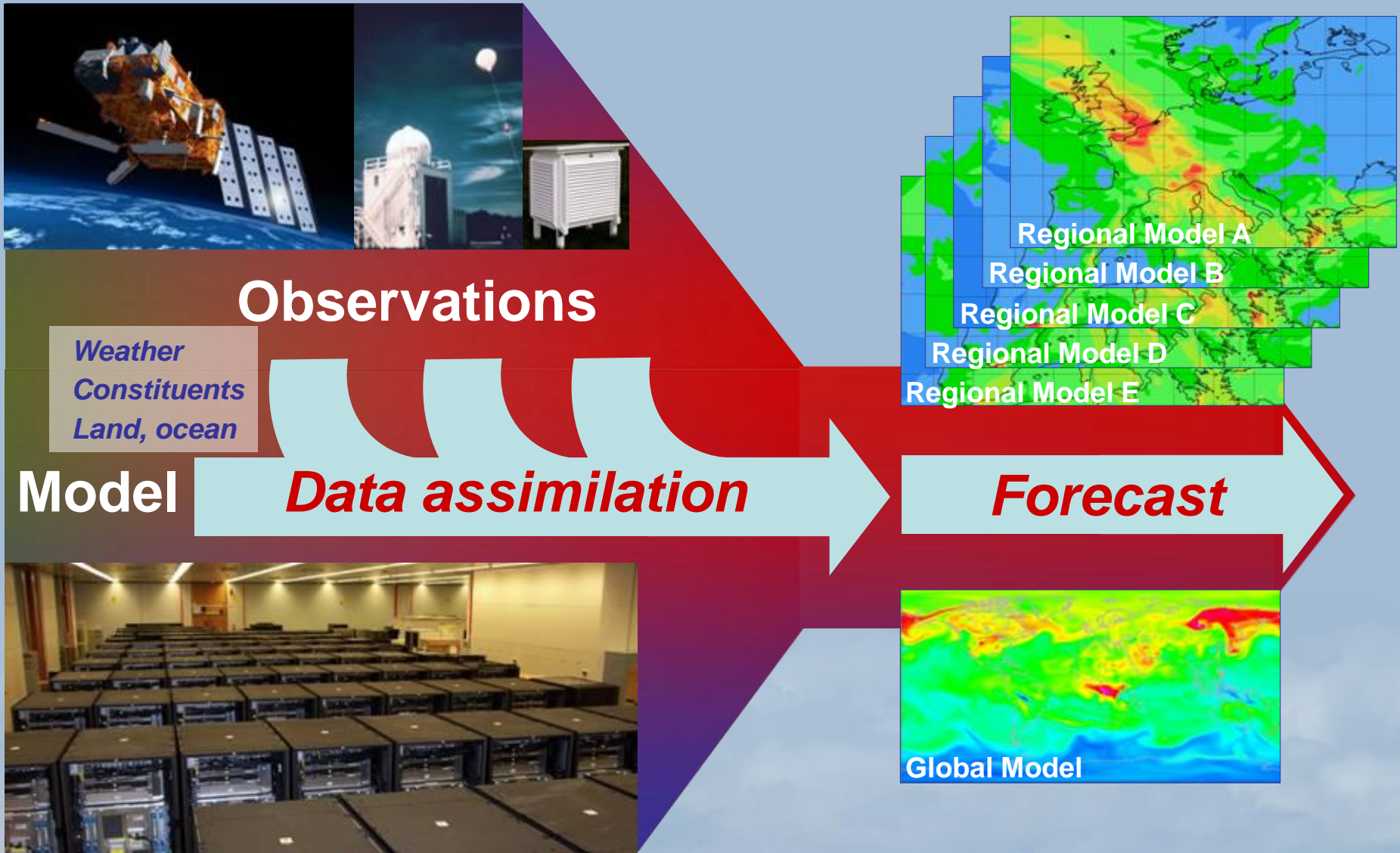
Monthly methane emissions



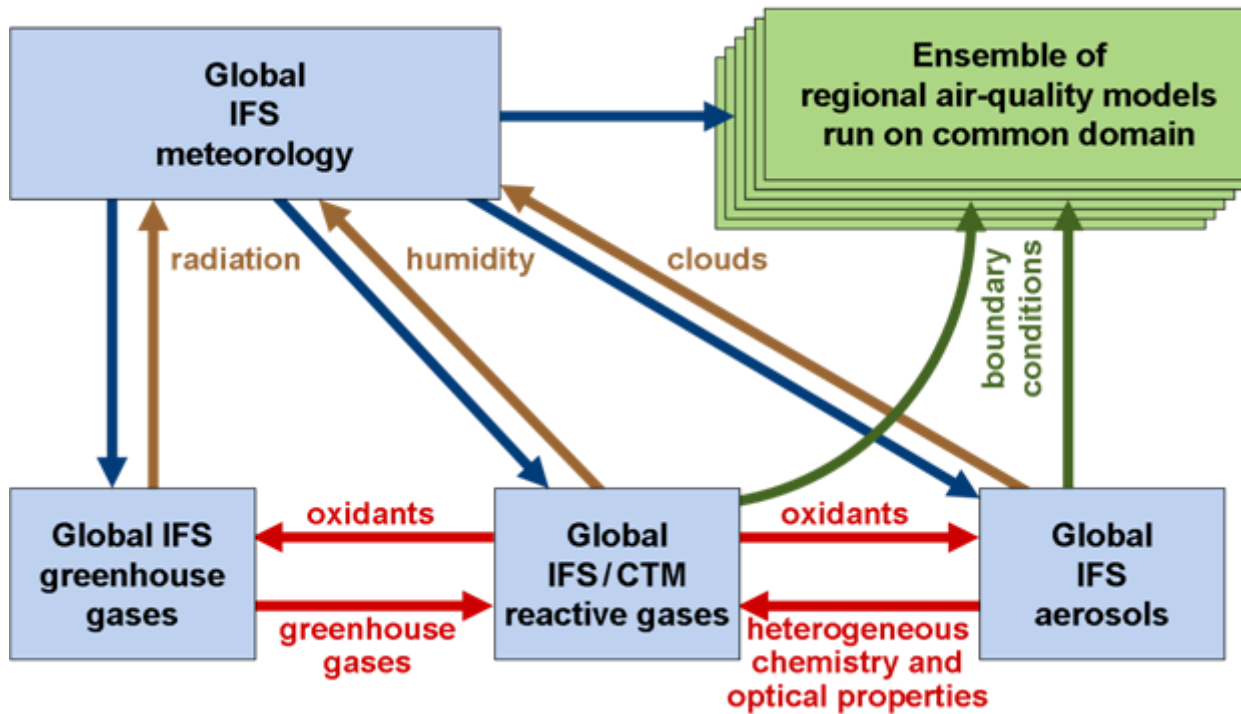
Aerosol forecast



View: general approach



Assimilation and forecast suites



A multi-model ensemble of regional chemistry and transport models distributed in 6 European countries.

3 streams :

- NRT analyses and forecasts
- Delayed mode (6m-1y) analyses
- Re-analyses 2003-...

A global integrated system based on ECMWF meteorological model and including composition.

GMES: next steps

- **2014 onwards: GMES operational phase**
 - Need for long term and sustainable governance and funding
 - New functions to be fulfilled, e.g. operations of services and space component
 - Expected continuity of services and observation architecture based on the built-up phase
 - Critical decisions to be taken soon (launch of Sentinels, GMES Space Component Segment 3, ...)
- **Governance and funding**
 - Communication of the EC on the GMES Fund
 - 2012 : discussion under EU Presidency and General Affairs Council (EU budget for the next MFF)
 - Regulation on the implementation of GMES
 - End 2013 : deadline for adopting new Regulation, together with Multi-annual Financial Framework



Thank you for your attention

More information on:

EC GMES website

<http://ec.europa.eu/gmes>