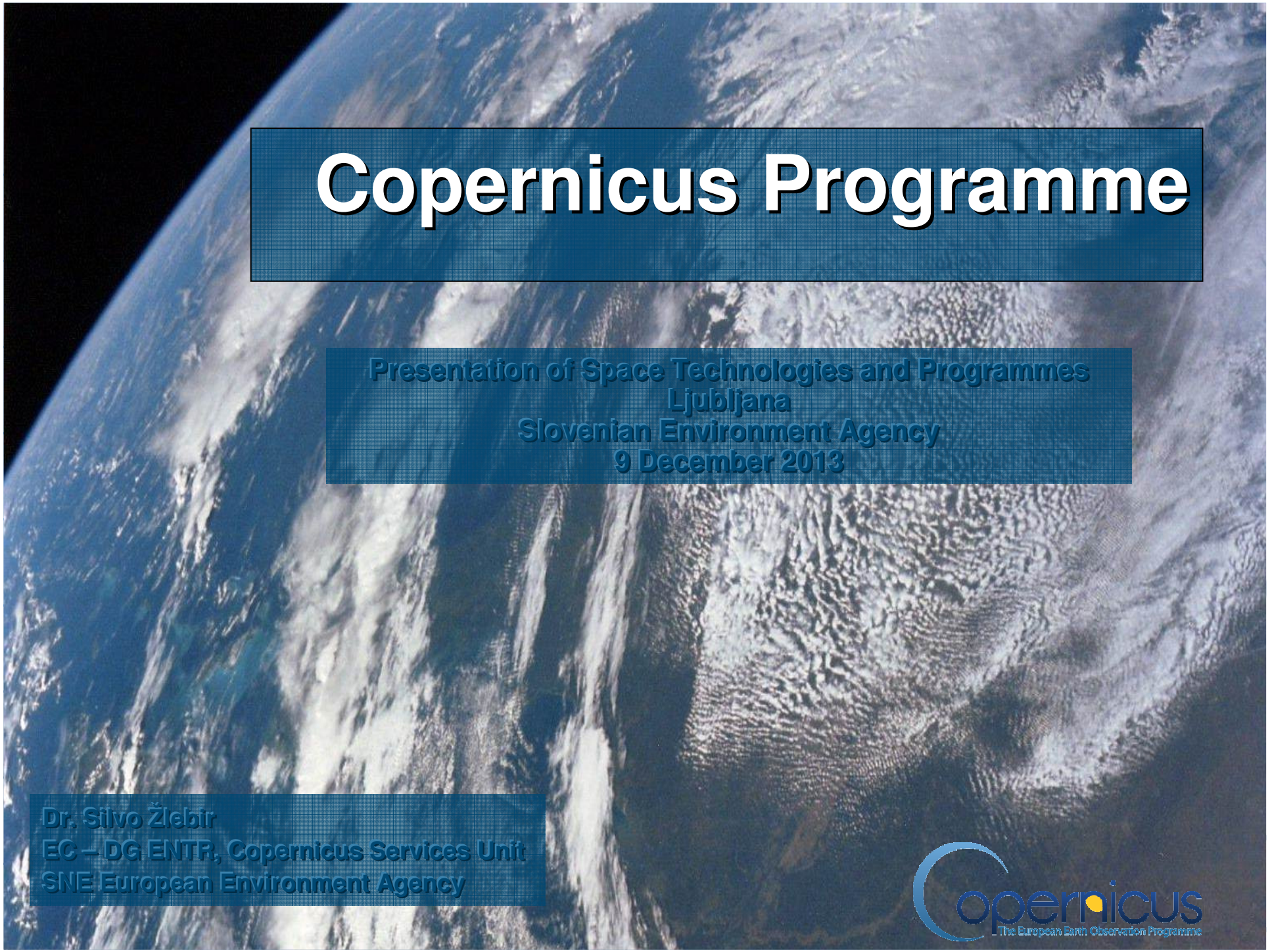


Copernicus Programme

Presentation of Space Technologies and Programmes
Ljubljana
Slovenian Environment Agency
9 December 2013

Dr. Stivo Žlebir
EC – DG ENTR, Copernicus Services Unit
SNE European Environment Agency

Copernicus
The European Earth Observation Programme

Outline

- What is Copernicus?
- Some applications: from core to downstream
- Governance and funding
- State of play, future actions

What is Copernicus?

- Once completed, one of the largest integrated Earth Observation systems
- An end user-focused programme of services for environment and security
- A source of information for the public, policymakers, scientists and businesses
- EU to GEO/GEOSS contribution

Copernicus 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

Copernicus Space Infrastructure

- **Dedicated mission**
  - ESA Sentinels 1 - 5, 5P
  - To comply specific operational needs of the Copernicus programme
  - To be launched in a period 2014-2020
  - Employing new technologies, replacing end-of life missions
- **Contributing missions**
  - ESA, EUMETSAT, EU MS, international, commercial
  - Existing and future

Copernicus In-situ Infrastructure

- **To rely on existing monitoring systems**
  - Ground-based, seaborne and airborne sensors, radars/lidars…
  - Operational and research
  - MS, EU, International…

Copernicus Services

Monitoring of Earth systems

Land

Marine

Atmosphere

Horizontal applications

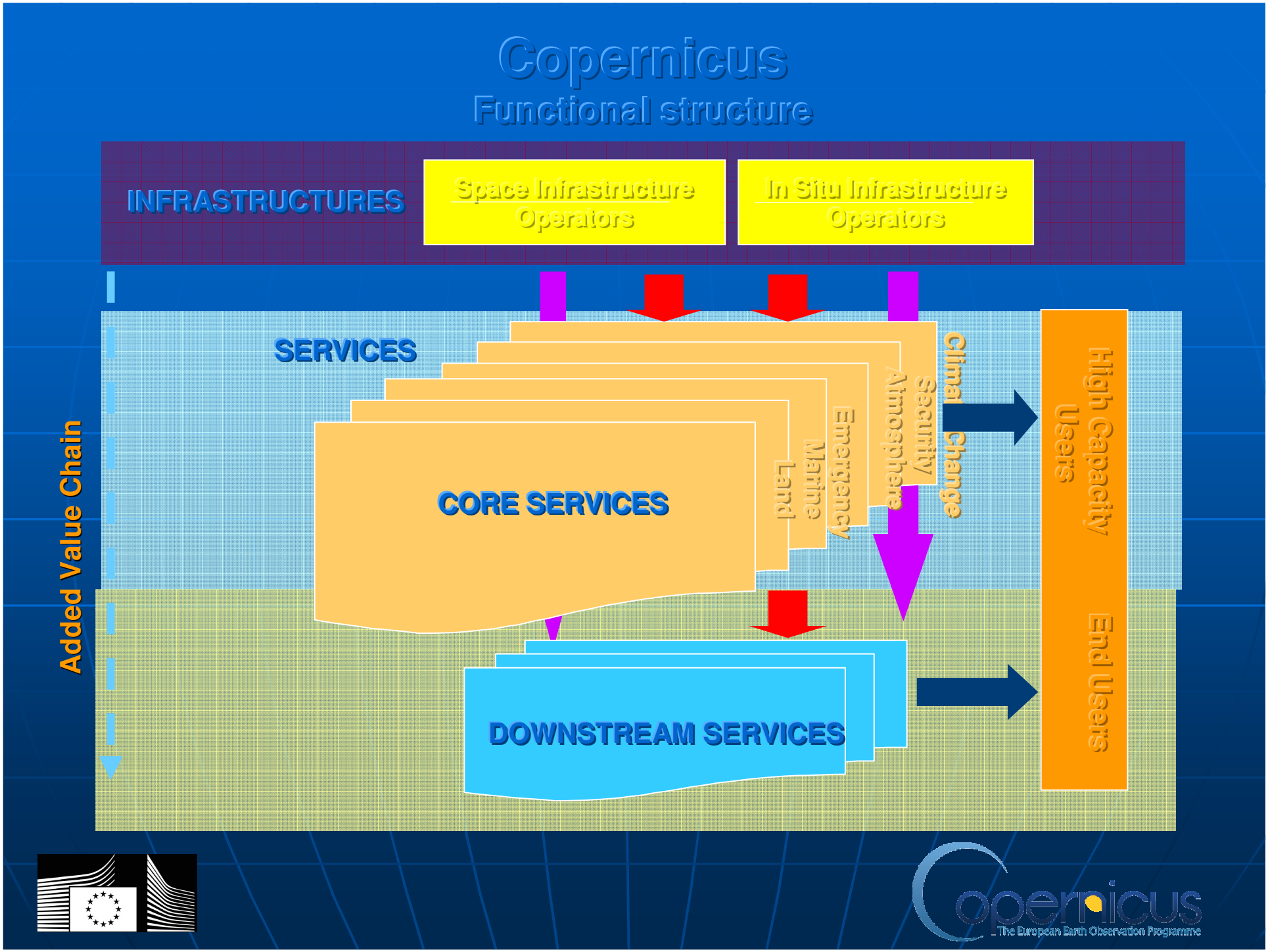
Emergency

Climate Change

Security

⇒ Output: Value-Added Services

Copernicus
Functional structure



Copernicus
The European Earth Observation Programme

Copernicus data policy

- A **Copernicus Data and Information Policy** shall provide for **full, free and open access** to information (limited only by occasions of significant security sensitivity)

- Delegated Act on Copernicus data and service information

  COMMISSION DELEGATED REGULATION (EU) of 12.7.2013
  supplementing Regulation (EU) No 911/2010 of the European Parliament and of the Council on the European Earth monitoring programme (GMES) by establishing registration and licensing conditions for GMES users and defining criteria for restricting access to GMES dedicated data and GMES service information

- Coherence with the **INSPIRE directive**

Copernicus programme
Foreseen Economic Benefit

- A cost-benefit analysis was conducted taking account of the Copernicus funding from MFF 2014-2010

  €3.8 Bn => an average of €541 Mio/year

- Expected minimum financial benefit by 2030 is ~ € 30 Bn
- For every €1 spent we get a return of ~ € 3.2
- An estimated minimum of ~ 48,000 jobs to be created

Outline

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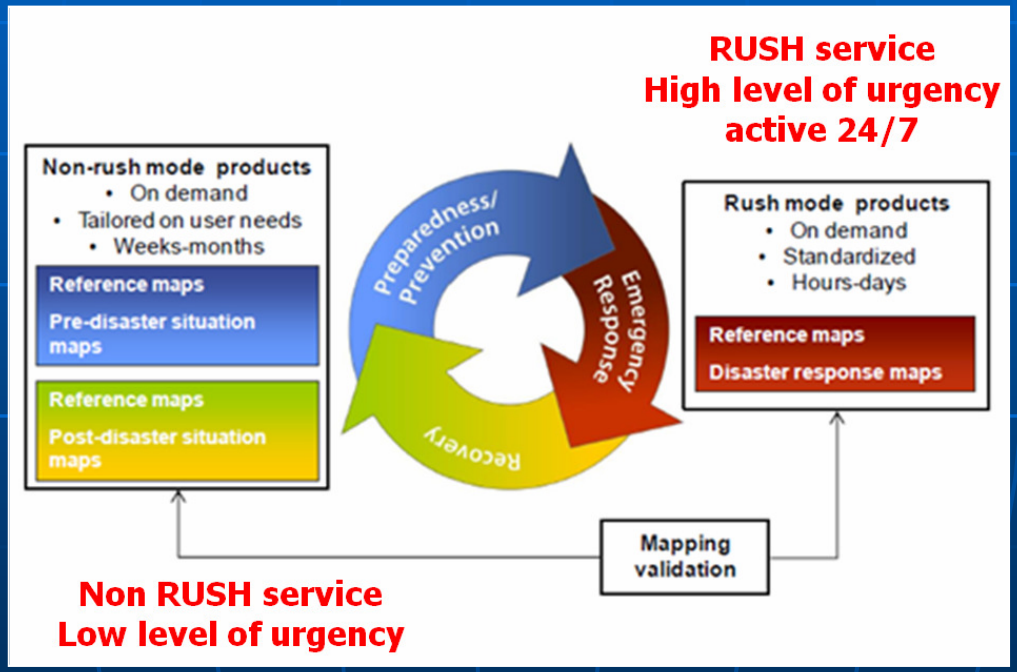
Emergency Menagement Service
Provided by JRC EC

Mapping Activations



Emergency Management Service
Number of activations

Summary of the Copernicus EMS - Mapping Activations				
Type of Disaster	Number of Activations	Number of Reference Maps	Number of Delineation Maps	Number of Grading Maps
Earthquake	2	17	17	16
Flood	18	122	148	0
Forest fire, wild fire	9	26	23	13
Industrial accident	2	6	2	0
Other	10	59	6	0
Wind storm	1	6	6	0
[Total: 01.04.2012 - 17.09.2013]	42	236	202	29

Status September 17, 2013

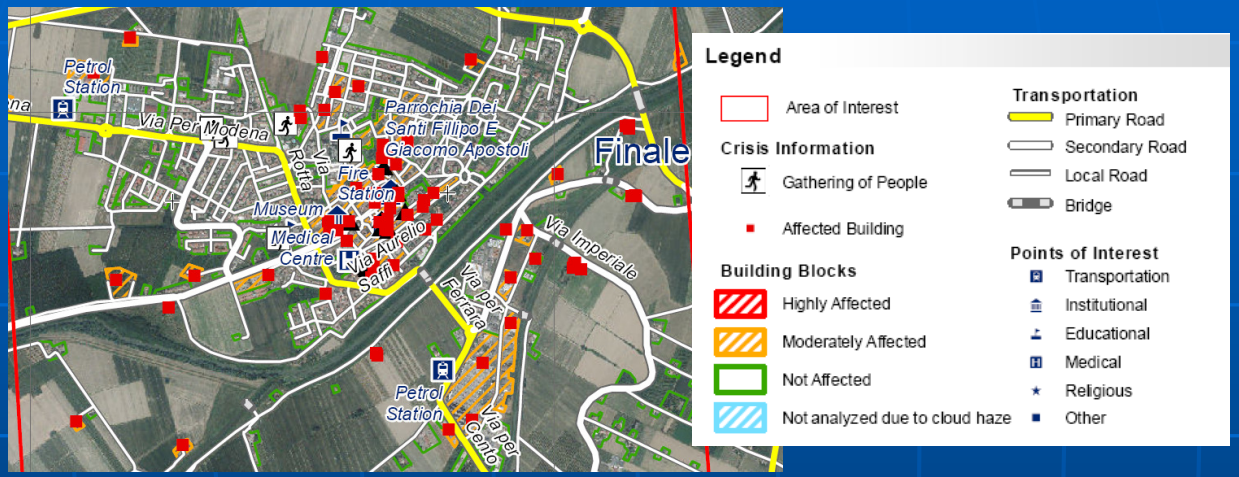
Latest Copernicus EMS – Activations

Title	Event Date	Type	Country
Flood in Central and Southern Italy	2013-12-01	Flood	Italy
Flood in Sardinia	2013-11-18	Flood	Italy
Flood in Marche and Umbria	2013-11-11	Flood	Italy
Tropical Storm in Somalia	2013-11-09	Wind Storm	Somalia
Typhoon in Philippines	2013-11-08	Wind Storm	Philippines

Copernicus EMS Activations in Slovenia

Title	Event Date	Type	Country
Floods in Slovenia	2013-03-30	Flood	Slovenia
Floods in Slovenia	2012-11-05	Flood	Slovenia

Emergency Management Service



Italian earthquake

Japan tsunami

Land Monitoring Service
Provided by EEA and JRC

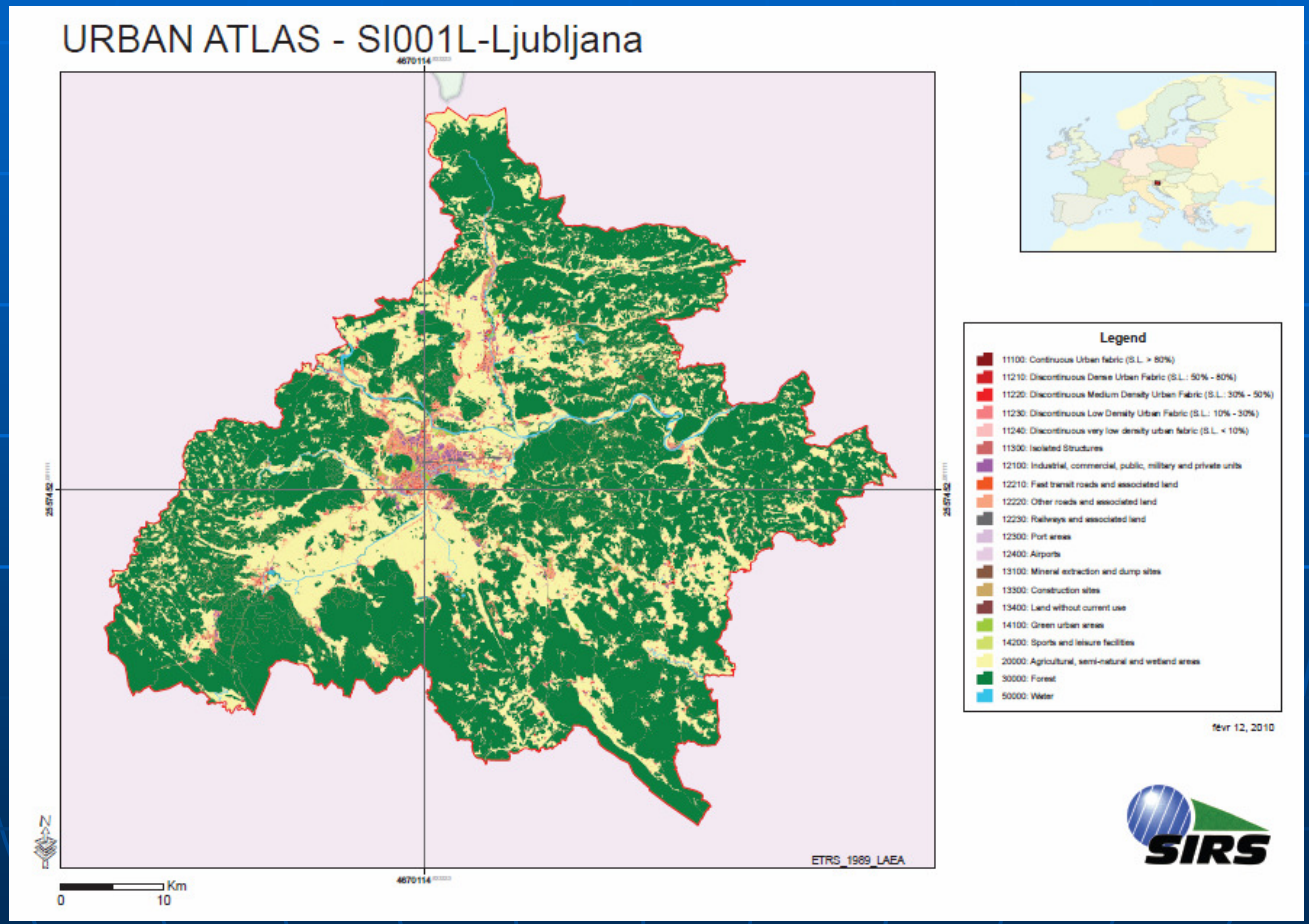
URBAN ATLAS

- Spatial planning, a tool to monitor effects (positive or negative) of structural investment decisions
- Proper monitoring of Urban sprawl

- Cover 305 Larger Urban Zones (LUZs)
  - •Cities > 100 000 inhabitants
  - •At least one city per European region

- Uses the specifications developed by GSE Land project
  - •Geometric resolution : 1:10.000,
    - 0.25ha MMU in urban zones,
    - 1ha MMU outside
  - •Positional Accuracy : ± 5 m
  - •21 thematic classes

Land Monitoring service
Urban Atlas (Ljubljana)



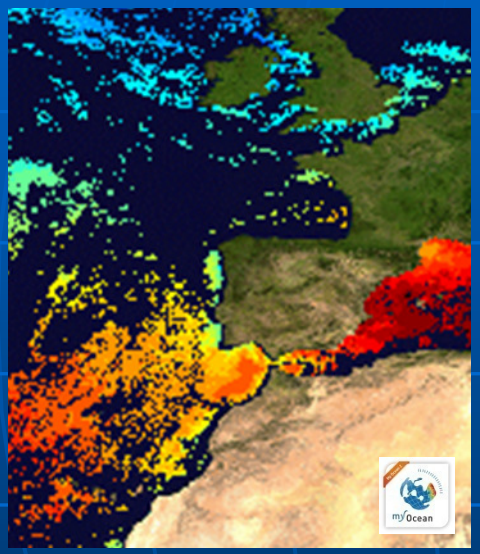
Marine Monitoring Service

Provided by MyOcean

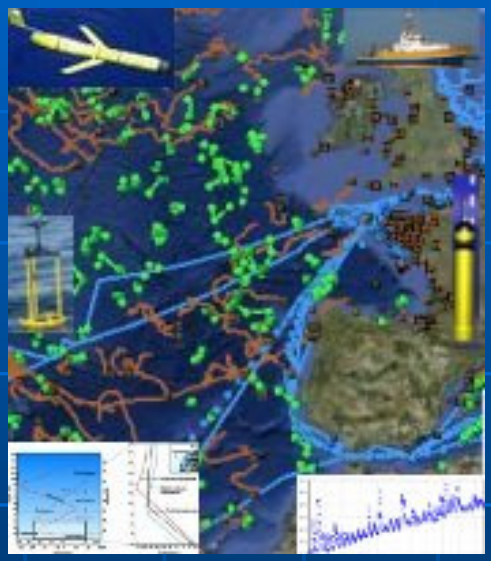
- Currents
- Temperature
- Salinity
- Sea ice
- Sea level
- Surface winds
- Biogeochemistry

Marine Monitoring Service
Sea Surface Temperature

Late June 2012

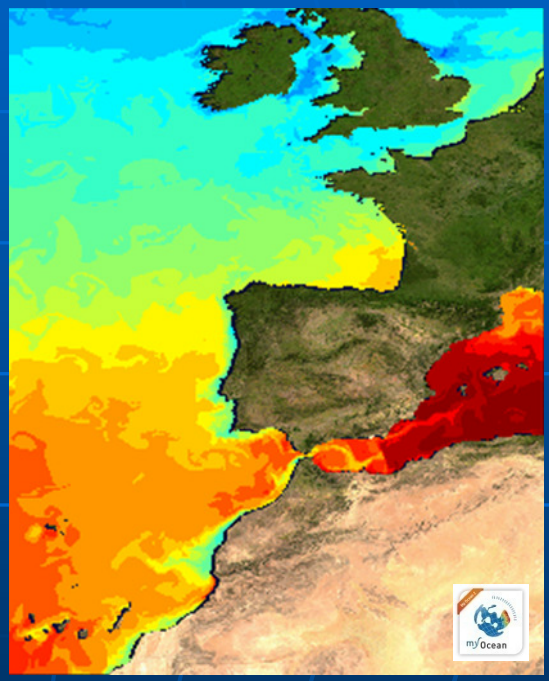


SST – satellite observation



in-situ measurements

Independent observation and measurements

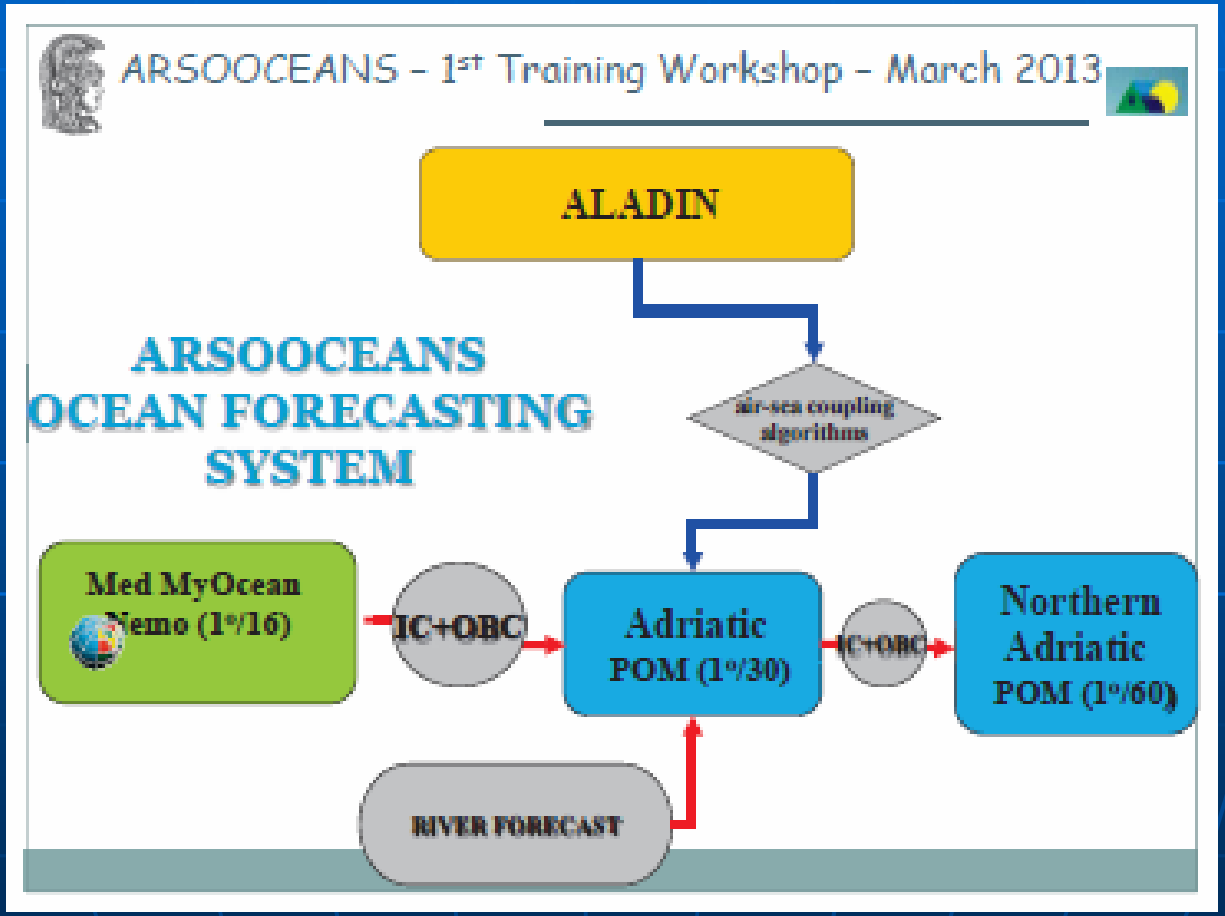


Assimilated model product

Marine Monitoring Service

Regional and Local Models

Nesting of models, IC and OBC

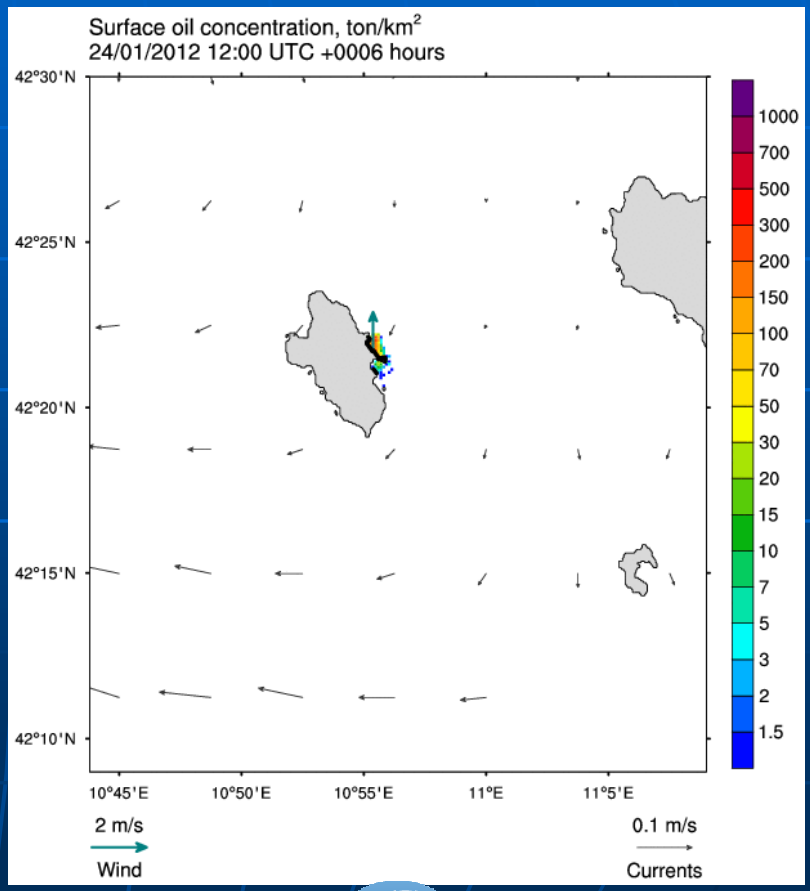


Marine Monitoring Service

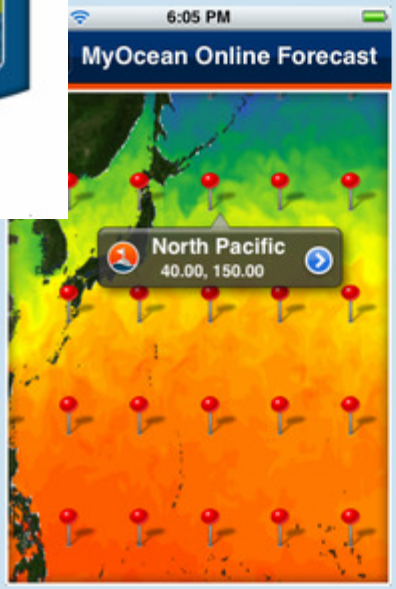
The daily forecast of oil spill scenarios from Costa Concordia

13 January 2012

The ship contains 2500 Tons of oil (API 17) which are supposed to spill out in 72 hours



MyOcean iPhone app



Atmosphere Monitoring Service
Provided by MACC-II

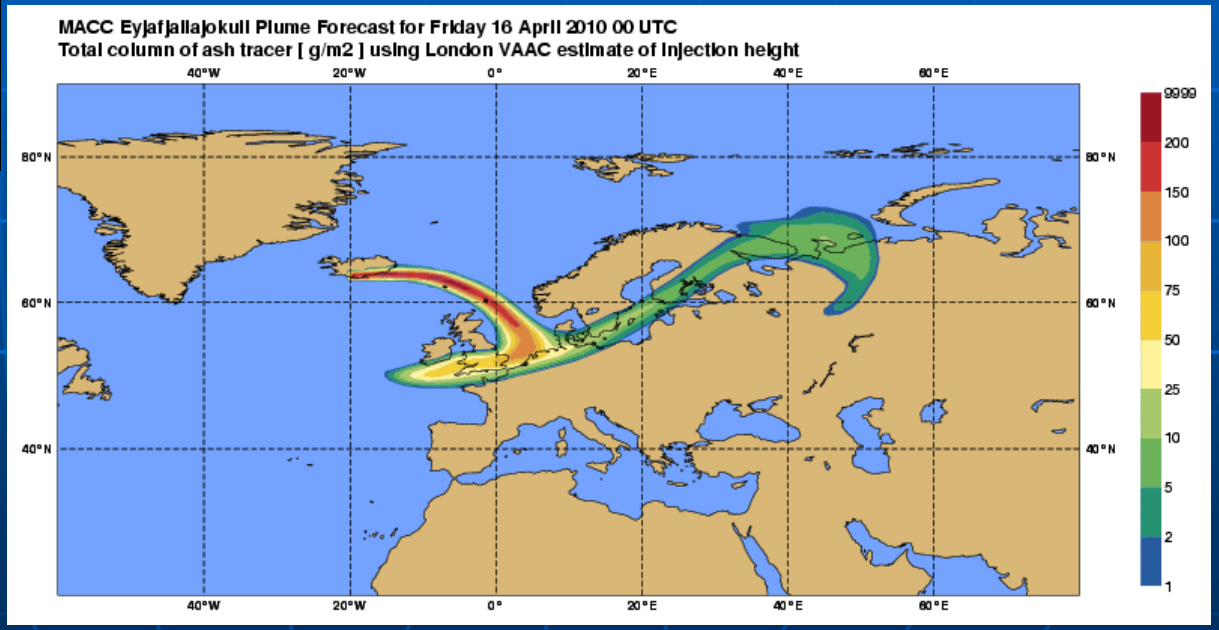
1. **Air Quality for Europe**
   (O3, NO, NO2, CO, SO2, PM10, PM2.5)

2. **Global Atmospheric composition**
   (Greenhouse gases, reactive gases, aerosol, stratospheric O3)

3. **Climate Forcing**
   (CO2, CH4, monitoring and reanalysis of fluxes)

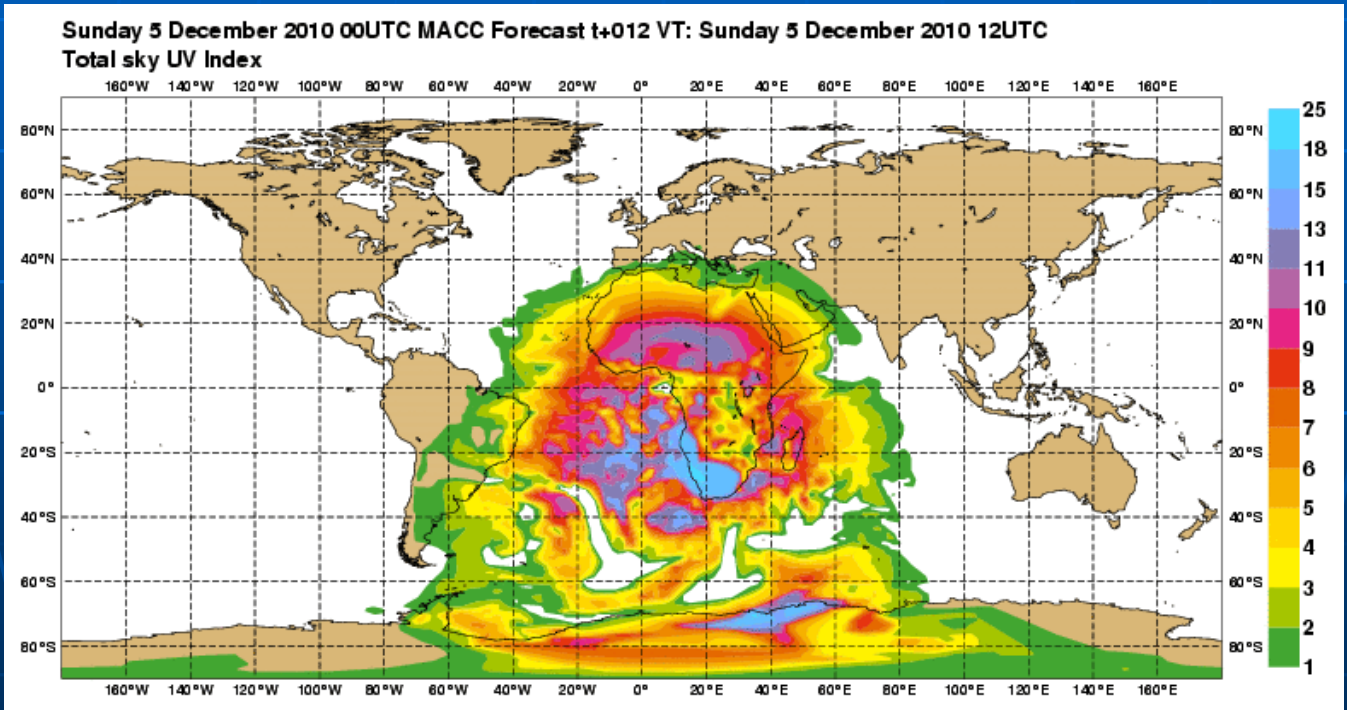
4. **Solar Energy, UV**
   (Ozon records, ultraviolet radiation)

Atmosphere Monitoring Service
Volcano Eyjafjallajökull case



Atmosphere Monitoring Service

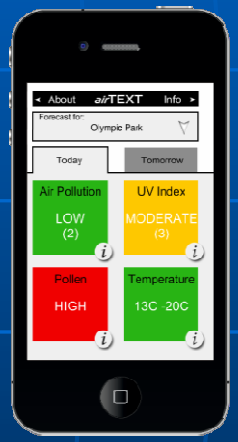
UV and Solar Energy
Example: UV index



Atmosphere Monitoring Service

Downstream opportunities
"Air quality information where people live"

Launched for 2012 Olympics, London

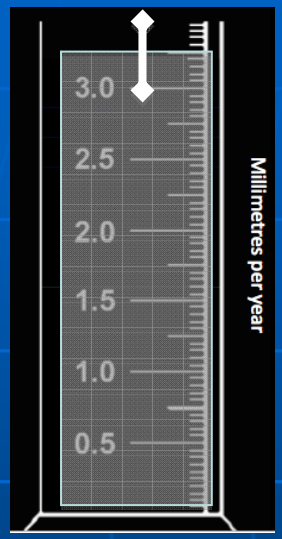


- More tham 120 regular downloads of MACC-II data daily

Climate Change Service
FP7 Projects

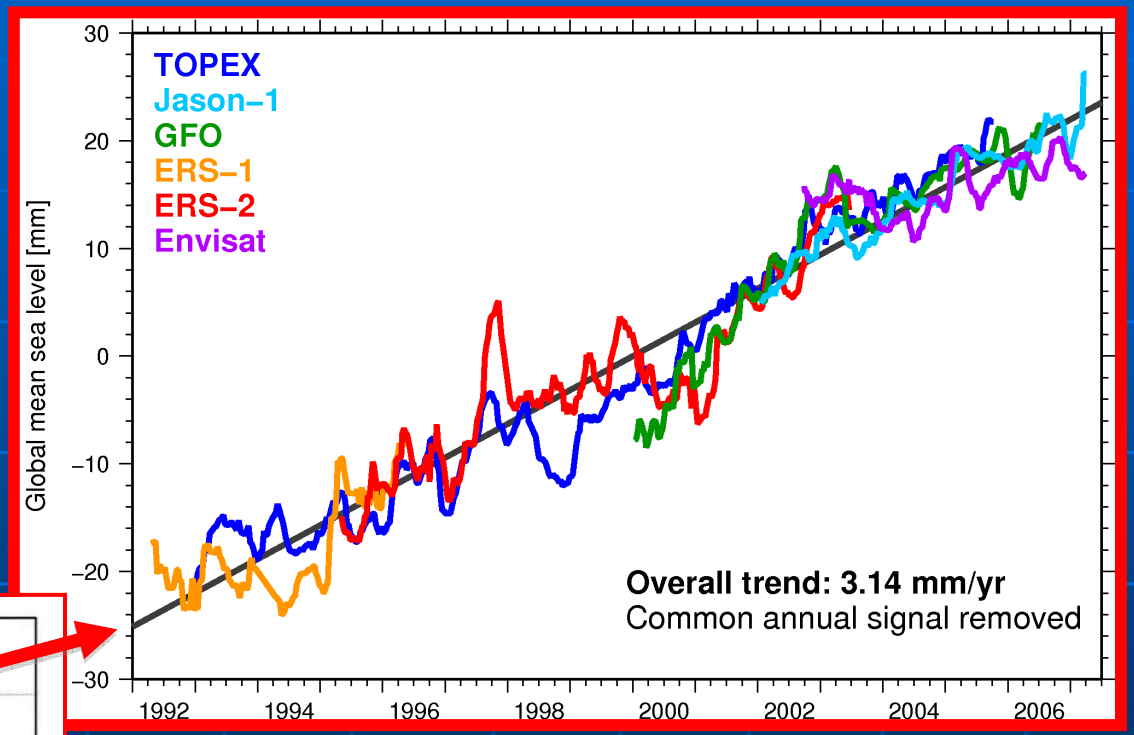
1. Climate monitoring & modelling
2. Earth system re-analysis & Attribution products
3. Climate impact indicators & GHG emission inventories

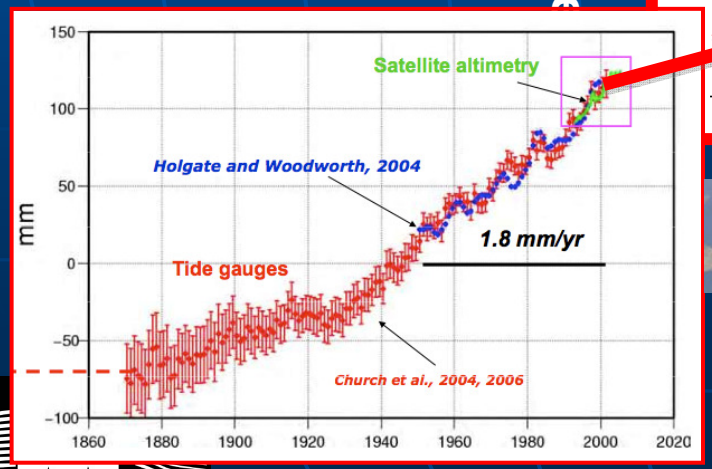
Climate Change Service
Global sea-level rise



Trend
+3.1 mm/yr
±0.7 mm/yr

Millimetres per ye





Copernicus
The European Earth Observation Programme

Some Copernicus Applications

User Uptake Project – EC funded

- **Land**
  - Land Use and Soil Sealing Indicators
  - Use of Land Service data by users in Spain – farming and drought management
- **Marine**
  - Supporting the Marine Strategy Framework Directive
  - Copernicus Products for Coastal Ecosystem Analysis
  - Web Tool to Support Uptake of Marine Products
- **Atmosphere**
  - PM10 Pollution Event Analysis
  - Long-Range Pollutant Transport - Impact on Air Quality in Remote Regions

EU reporting relevant !

Outline

- What is Copernicus?
- Some applications: from core to downstream
- Governance and funding
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GMES/Copernicus evolution

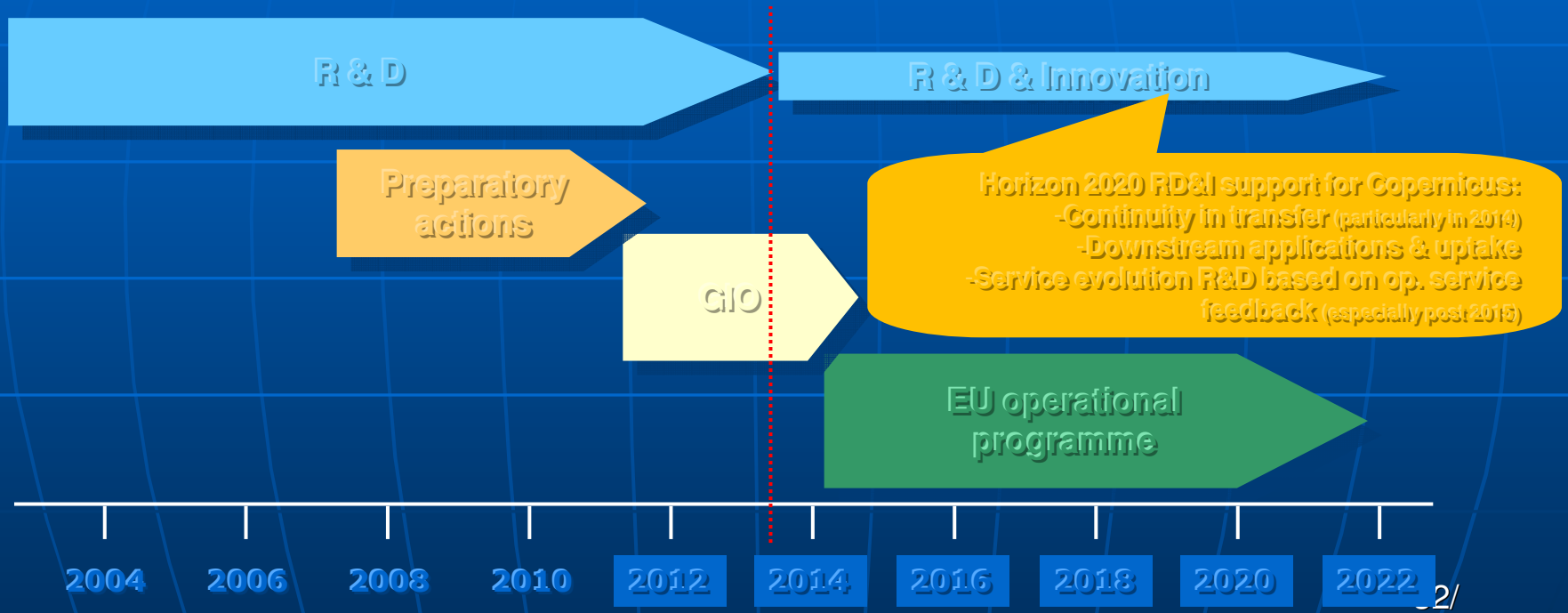
- **Global Monitoring for Environment and Security:**
  - predecessor of Copernicus until 2013
  - established by Regulation (EU) No 911/2010
- **Until end-2013:** funding for GMES from
  - GMES Initial Operations (GIO) – 107 mio EUR
  - FP7 funded pre-operational projects
- **From 2014:**
  - Copernicus operational phase
  - funding from 2014-2020 MFF: **€3.8 Bn**

FP7 GMES projects overview

79 GMES projects from 2007 to 2012 FP7 space calls, of which 57 Downstream projects.

	Total	*D/S*
• Land	Euro 53 m	Euro 23 m
• Marine	Euro 90 m	Euro 57 m
• Atmosphere	Euro 44 m	Euro 8 m
• Emergency	Euro 49 m	Euro 16 m
• Security	Euro 34 m	Euro 10 m
• Climate Change	Euro 19,5 m	Euro 16 m
• Specific support actions	Euro 5,5 m	
• Total EU contribution:	Euro 295 m	Euro 130 m

GMES/Copernicus
Evolution & Transfer to Operations



Outline

- What is Copernicus?
- Some concrete applications: from core to downstream
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Copernicus programme Actions 2014

- **Adoption:**
  - **New Copernicus Regulation**
- **Calls for the expression of interest**
- **Delegation agreements**
  - **ESA, EUMETSAT, EMSA, EEA, ECMWF…**
- **On-going activities**
  - **FP7/H2020 projects, Services development & operations**

Thank you for your attention