



 **OPEN DAYS**
13th European Week of
Regions and Cities
Brussels 12-13 October 2015

 **Regione Emilia-Romagna**

 **Europe in my Region/City**
September|October|November 2010

A Sea of challenges in the Adriatic and Ionian Area
Bologna, 17th November 2015

The COPERNICUS Programme
Marine Environment Monitoring Service

Cristina Sabbioni
Institute of atmospheric Sciences and Climate - ISAC
National Research Council - CNR



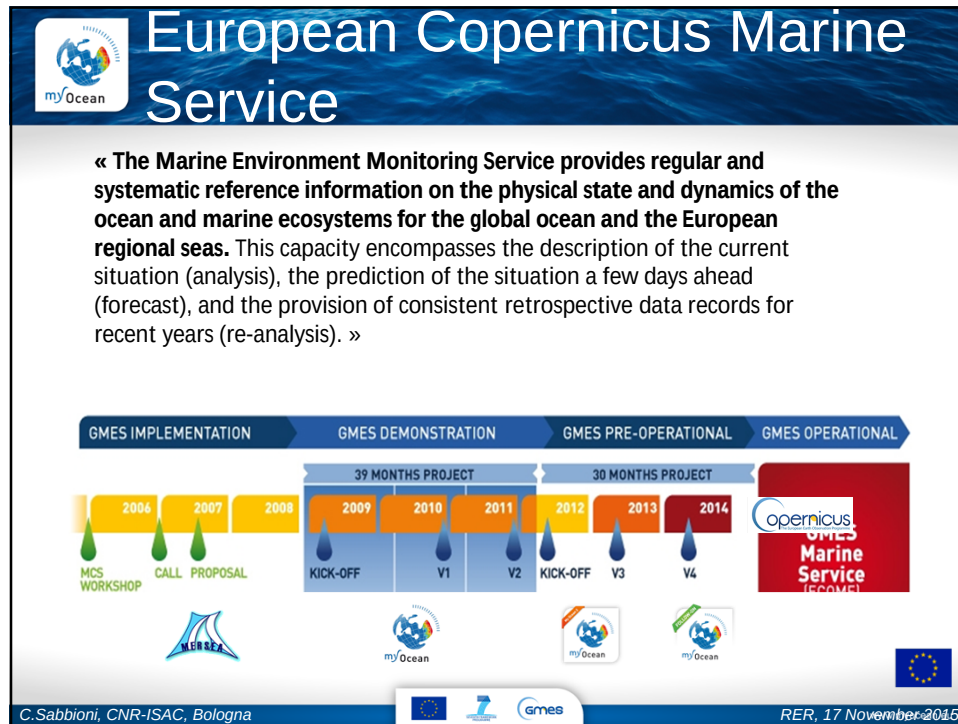
Outline

- **What is the European Copernicus Marine Service**
- **From MyOcean a CMEMS: status of implementation**
- **The Satellite component of CMEMS**
- **CNR-ISAC research in CMEMS: recent results and future goals**

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RER, 17 November 2015



MyOcean marine service

Pan-European fully Integrated System and Service

MyOcean (3 years) & MyOcean2 (2,5 years) & MyOcean FO (6 Months)
 ~60 partners from ~28 countries
 ~11 M€/year EC Grant

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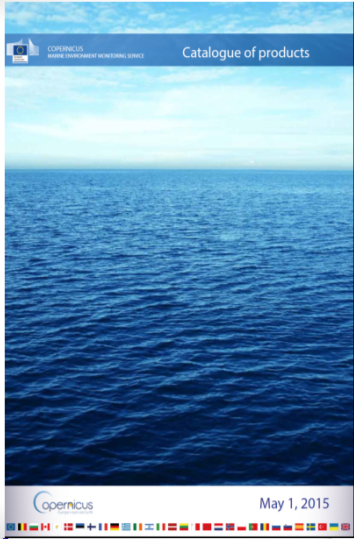
The CMEMS Web portal

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CMEMS Products



Catalogue of products

May 1, 2015

MULTIYEAR MODELS

DATA	PRODUCTS	CHARACTERISTICS
SEA	Sea Level	Global, 1/4°, 1/2°, 1°, 2°, 4°, 8°, 16°, 32°, 64°, 128°, 256°, 512°, 1024°, 2048°, 4096°, 8192°, 16384°, 32768°, 65536°, 131072°, 262144°, 524288°, 1048576°, 2097152°, 4194304°, 8388608°, 16777216°, 33554432°, 67108864°, 134217728°, 268435456°, 536870912°, 1073741824°, 2147483648°, 4294967296°, 8589934592°, 17179869184°, 34359738368°, 68719476736°, 137438953472°, 274877906944°, 549755813888°, 1099511627776°, 2199023255552°, 4398046511104°, 8796093022208°, 17592186044416°, 35184372088832°, 70368744177664°, 140737488355328°, 281474976710656°, 562949953421312°, 1125899906842624°, 2251799813685248°, 4503599627370496°, 9007199254740992°, 18014398509481984°, 36028797018963968°, 72057594037927936°, 144115188075855872°, 288230376151711744°, 576460752303423488°, 1152921504606846976°, 2305843009213693952°, 4611686018427387904°, 9223372036854775808°, 18446744073709551616°, 36893488147419103232°, 73786976294838206464°, 147573952589676412928°, 295147905179352825856°, 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mercator-ocean.eu
marine.copernicus.eu

Copernicus 

CMEMS & TACs

Copernicus (2015-2021)
CMEMS: Copernicus Marine Environment
 Monitoring Service Operational service
 Started 1 May of 2015

C. Sabbioni, CNR-ISAC, Bologna RER, 17 November 2015

Copernicus Marine Environment Monitoring Service (CMEMS)

Objective: Set up an **European service** providing **every day** information on the **physical** and **ecosystem state** of the **oceans** and **European regional seas**

Observations

Ocean Color
SST Wind Sea Ice
Sea Level
In Situ

Models

Global Ocean
Arctic Ocean
Baltic Sea
Atlantic NWS
Atlantic IBI
MED

TAC **MFC**

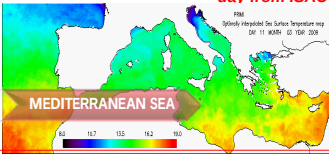
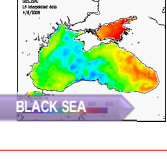
COPERNICUS MARINE ENVIRONMENT MONITORING SERVICE

G. Sabbioni, CNR-ISAC, Bologna

CNR - ISAC Activities in CMEMS

- ISAC leads Copernicus **Ocean Color (OC)**
- ISAC is responsible for the **Sea Surface Temperature (SST)** Mediterranean and Black Sea products
- ISAC developed the **Multi sensors** satellite OC and SST processing chains
- ISAC is responsible to **archive and disseminate** SST, OC and wind satellite products covering **global ocean** and **European Seas (NRT and last 30 years of observations)**

150 Dataset are produced & delivered to Copernicus 5200 users every day from ISAC

Potential Application for Cultural Heritage

anomalies that triggered heavy rains around Pompei Archeological Area

5 September 2015 SST Anomaly (5°C)

SST heating is generally connected to strong atmospheric events

Monitoring and Forecasting of these patterns help to assess the vulnerability of archaeological sites along the coast

The catastrophic effect of heavy rains in Pompei

(CNR-ISAC)

RER, 17 November 2015

Code	Ocean Region	coverage	NRT L3	NRT L3	REP L3	REP L4
GLO	Global Ocean	90.0 ° S - 90.0 ° N 180.0 ° W - 180.0 ° E	Multi (MODIS+VIIRS)	Multi (MODIS+VIIRS)	multi (SeaWIFS+MODIS+MERIS)	
ARC	Arctic Ocean	67.0 ° N - 90.0 ° N 180.0 ° W - 80.0 ° E	single MODIS & VIIRS		Multi (SeaWIFS+MODIS+MERIS)	
BAL	Baltic Sea	53.0 ° N - 66.85 ° N 9.25 ° W - 30.25 ° E	single MODIS		Multi (SeaWIFS+MODIS+MERIS)	
ATL	Atlantic Ocean	20.0 ° N - 66.0 ° N 46.0 ° W - 13.0 ° E	single MODIS & VIIRS	Multi (MODIS+VIIRS)	Multi (SeaWIFS+MODIS+MERIS)	
MED	Mediterranean Sea	30.0 ° N - 46.0 ° N 6.0 ° W - 36.5 ° E	single MODIS & VIIRS	single MODIS & VIIRS	Multi (SeaWIFS+MODIS+MERIS)	Multi Based on L3
BS	Black Sea	40.0 ° N - 48.0 ° N 26.5 ° W - 42.0 ° E	single MODIS & VIIRS	single MODIS & VIIRS	Multi (SeaWIFS+MODIS+MERIS)	Multi Based on L3
EUR	European Sea	20N - 65.85 N 30 W - 42 E	Single (MODIS)			

30 OC Products (184 datasets) covering the **global** ocean and the **European Regional Seas**.

6 MYO Specific products for MED MFC (internal) -> now part of the CMEMS OCTAC external products

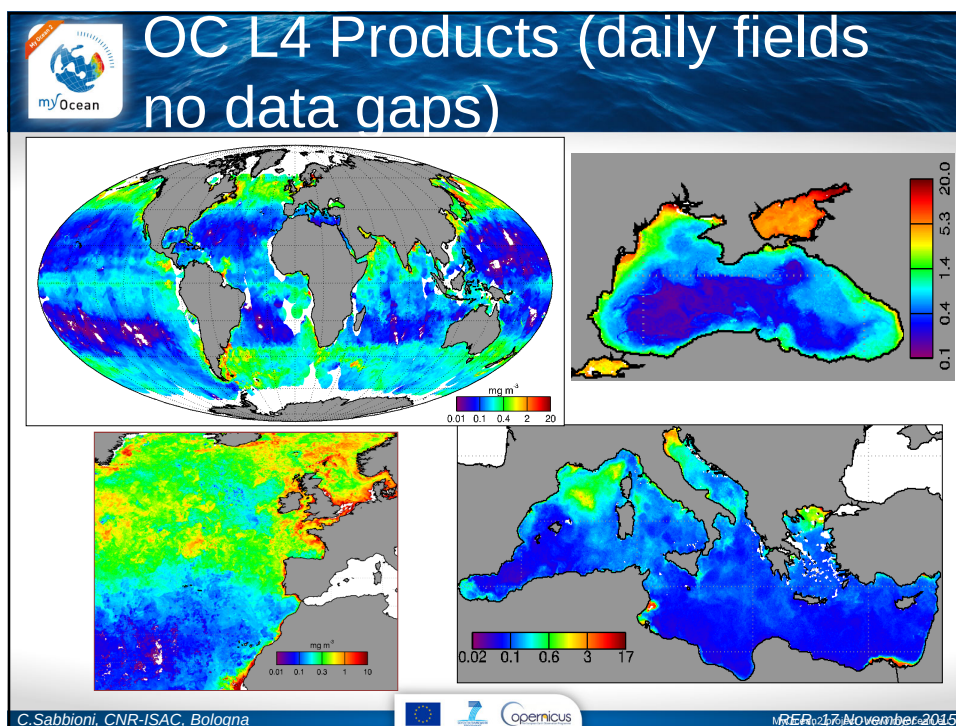
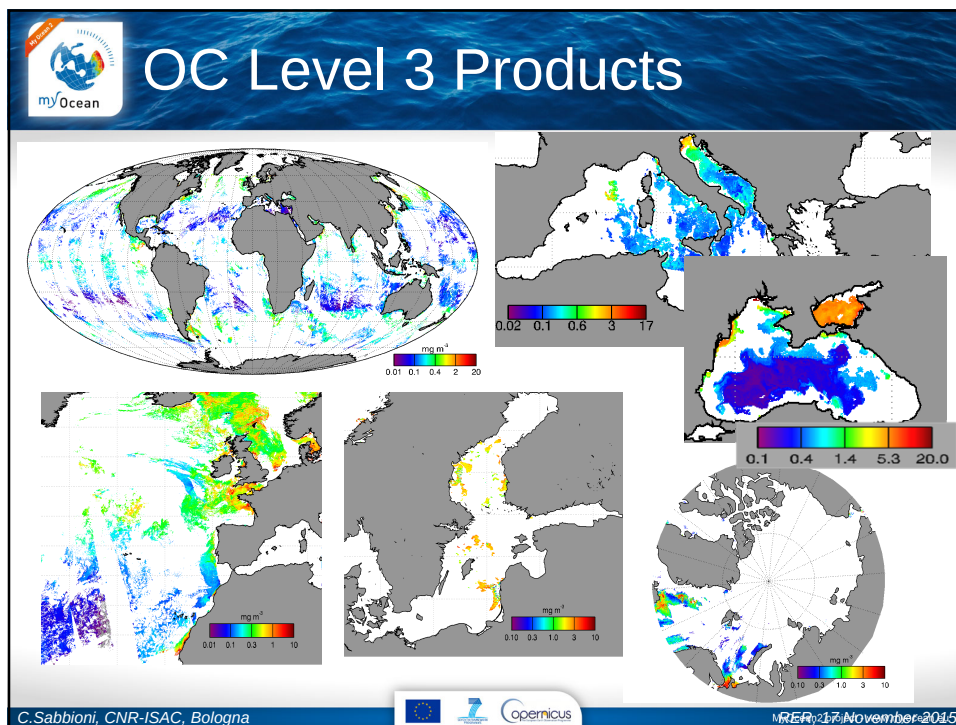
4 additional products with respect to the Mercator call will be delivered to ensure service continuity

NRT: products within few hours, **NRT replaced by consolidated product** within few days

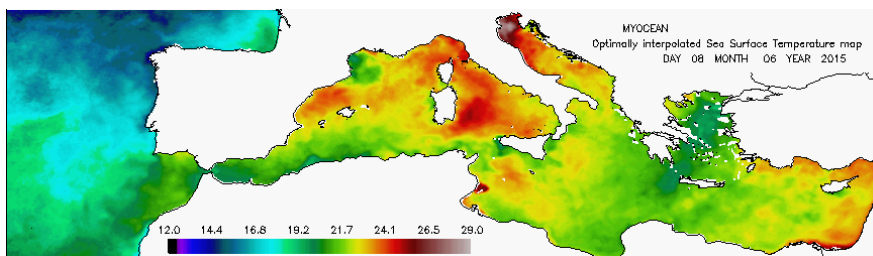
REP: consistent re-processed time series from 1997 to the 2012

L3: daily composite products; **L4** analysis (no data gaps)

Product quality information available for all products based on MYO metrics



Sea Surface Temperature Products: multi sensors dataset



CMS Product No.	Product Description	MyOcean product name
P3	Mediterranean Sea High Resolution and Ultra High Resolution Sea Surface Temperature Analysis	SST_MED_SST_L4_NRT_OBSERVATIONS_010_004 (res: 5 km e 1 Km)
P5	Mediterranean Sea - High Resolution and Ultra High Resolution L3S Sea Surface Temperature	SST_MED_SST_L3S_NRT_OBSERVATIONS_010_012 (res: 5 km e 1 Km)
P7	Mediterranean Sea - High Resolution L4 Sea Surface Temperature Reprocessed (1981-2012) update annually	SST_MED_SST_L4_REP_OBSERVATIONS_010_021 (res: 5 km e 1 Km)

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POSSIBILI SETTORI DI APPLICAZIONE



Safety of navigation



Coastal protection and erosion



Search and Rescue



Pollution emergencies



Climate Change



Protection&management marine ecosystems



Off-shore activities



Military activities



Renewable energies



Fishery&acquacolture



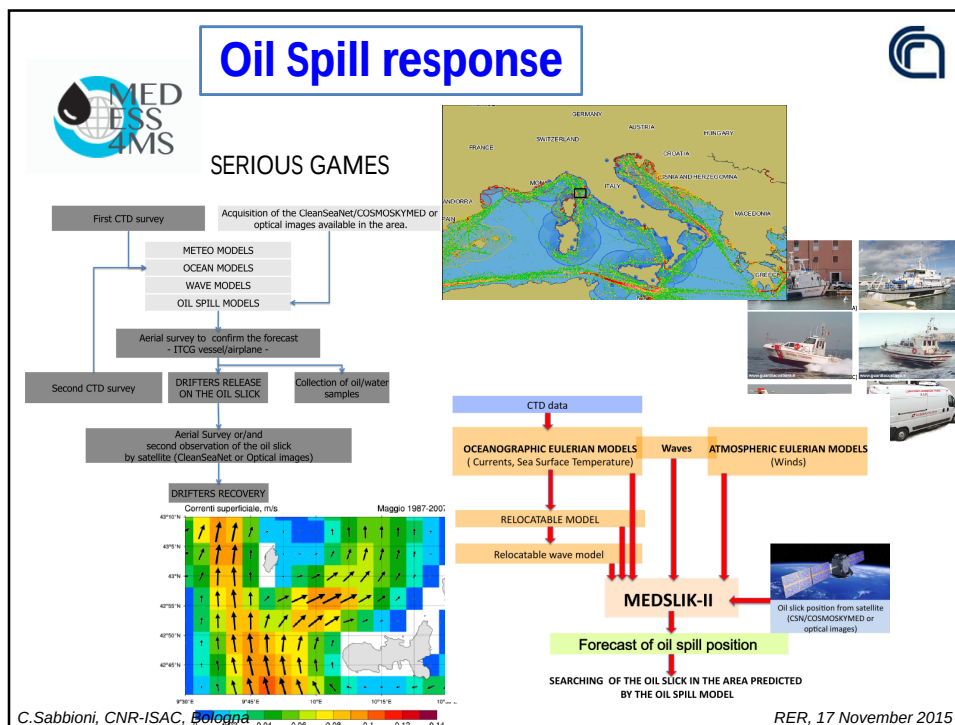
Tourism



Harbours

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Downstream services from MyOcean: situational sea awareness services

- TESSA Project: Situational Sea Awareness technology develops multi-channel services, customized for general public and special users

Web Portal...

Tablet...

Smartphone...

Currents, waves and winds forecasted in the area

Implied blue economy sectors : IT companies, transport, tourism

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