



Marine Monitoring

# Copernicus Marine Environment Monitoring Service

## EO 4 Sustainable Development



1. **What can be done with Copernicus Marine Service Information?**
2. Which set of information can be found in the catalogue? Who use ocean information?
3. How the products arrives to the catalogue?
4. How is behind the machine?



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# CORE AND DOWNSTREAM SERVICES: A WIN-WIN VALUE CHAIN FOR JOB AND GROWTH

KEY TO GROWTH and  
JOBS

MARINE/MARITIME  
END MARKETS  
(Private, Public)

DOWNSTREAM  
ACTIVITIES  
( Private/public)

Copernicus Marine  
Service  
CORE SERVICE  
FREE and RELIABLE  
RESOURCES



Innovation / Money saving / Market development  
/Competitive

Added-value and Customised Solutions to End-Users

Sustainable competitive advantage  
to public and private operators

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MARINE ENVIRONMENT MONITORING SERVICE



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**MARINE CORE  
INFORMATION,**

**A KEY DRIVER FOR  
BLUE GROWTH, IF ...**

- ☐ **THEMATIC APPROACH = Marine Knowledge**
- ☐ **REACHING SMEs = Awareness**
- ☐ **PRESCRIPTION BY INTERNATIONAL and NATIONAL LEGISLATIONS**



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# SUPPORT MESA IMPLEMENTATION IN NIGERIA

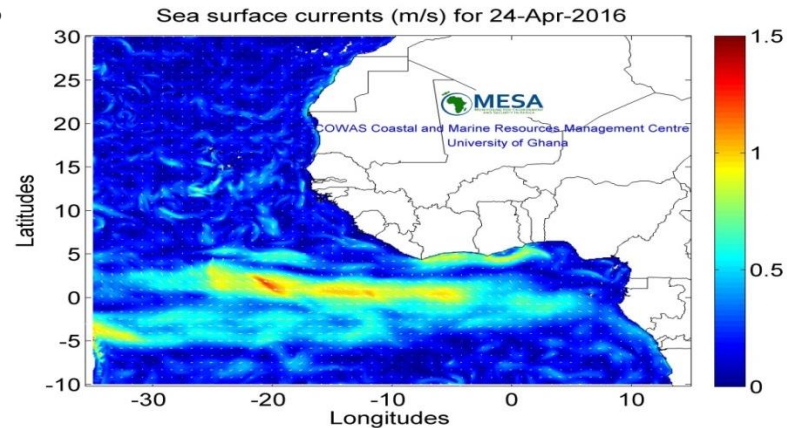
This monthly oceanographic bulletin is produced by the Nigerian Institute for Oceanography and Marine Research (NIOMR).

## Benefits for users:

- Free and sustained information provision,
- Provision of merged satellite information along with in situ information,
- Ready to use, global coverage, expertised products

## Application areas:

- Maritime transports
- Fishery industry
- Climate change resilience



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# SUPPORT TO AQUACULTURE AND FISHERIES IN THE MEDITERRANEAN SEA

## SAFI Indicators



Bathymetry for shallow waters	→ Sentinel-2
Sea Surface Temperature Fronts	→ SST
Harmful Algal Bloom Detection	→ Ocean Colour
Mussel Farming Site Selection	→ Ocean Colour, SST, met
Mussel Growth Indicators	→ Ocean Colour, SST, met
Salmon Aquaculture Site Selection	→ Ocean Colour, SST
Sea Bass/Sea Bream Aquaculture Site	→ Ocean Colour, SST, met
Small Pelagic Spawning	→ SST, met
Bivalve Maturation Indicators	→ Ocean Colour, SST, met



**Use of ocean colour and Sea Surface Temperature CMEMS data to support aquaculture and fisheries industries**

Thanks to the sustainability of CMEMS model outputs and satellite data and the very convenient all-in-one place portal for ocean data, it's allowing to launch the **SAFI service** to support Aquaculture and Fisheries industries.



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# SUPPORTING FISHING & AQUACULTURE SECTOR IN CHILE

Instituto de Fomento Pesquero (IFOP) is a public institution in Chile developed an oceanographic operational system for southern Chile that is used to better manage this ecosystem and its fishery & aquaculture activities.

Benefits for users:

- Free and sustained information provision,
- Get access to all the required information through a single access point,
- Global coverage,
- High quality information allowing realistic applied results.



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# SUPPORT TO SUSTAINABLE USE OF MARINE RESOURCES



**Chlorophyl-a,  
Sea Surface  
Temperature,  
Currents**

**CORE DATA**



**SPAWNING AREAS  
and LARVAL  
ABUNDANCES  
INDICES**

**EXPERT  
ASSESSMENT**



**TOTAL ALLOWABLE  
CATCHES (TAC) BASED  
ON ASSESSMENT  
DATA.**

**EVIDENCE-BASED  
MANAGEMENT**



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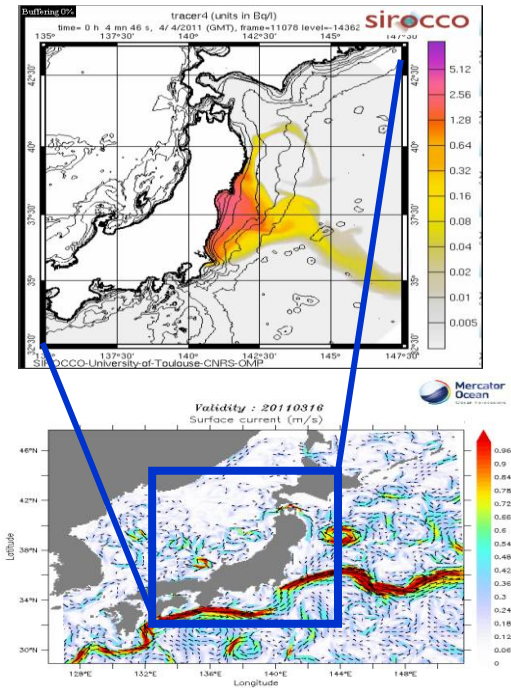
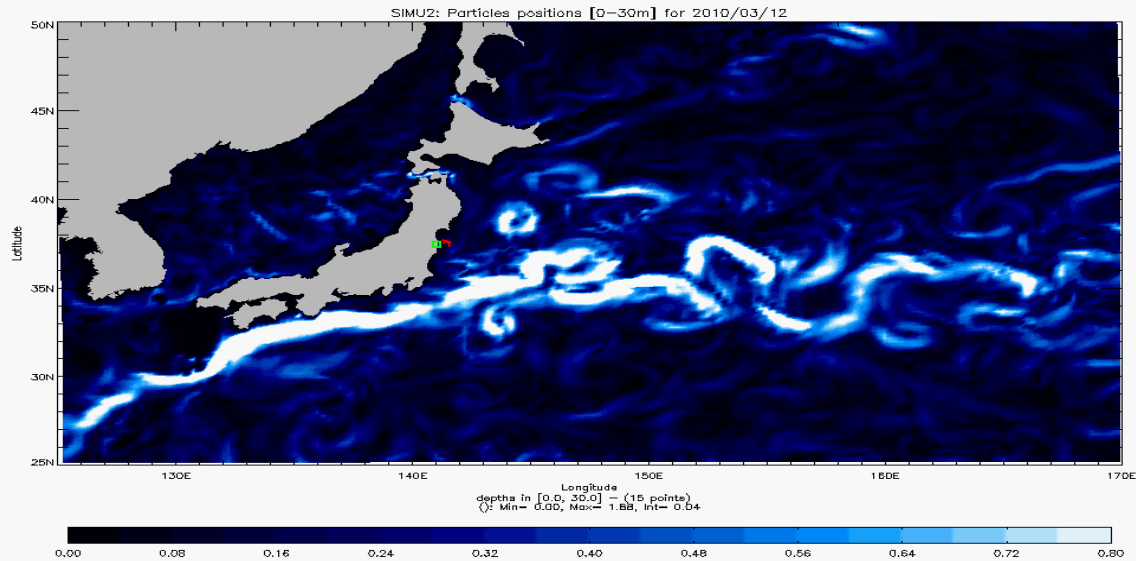




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# CONTRIBUTION TO RISK MITIGATION PLAN (FUKUSHIMA) / MARINE POLLUTION

## Immediate overview of the pollution drift



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# SUPPORT WATER QUALITY ANALYSIS

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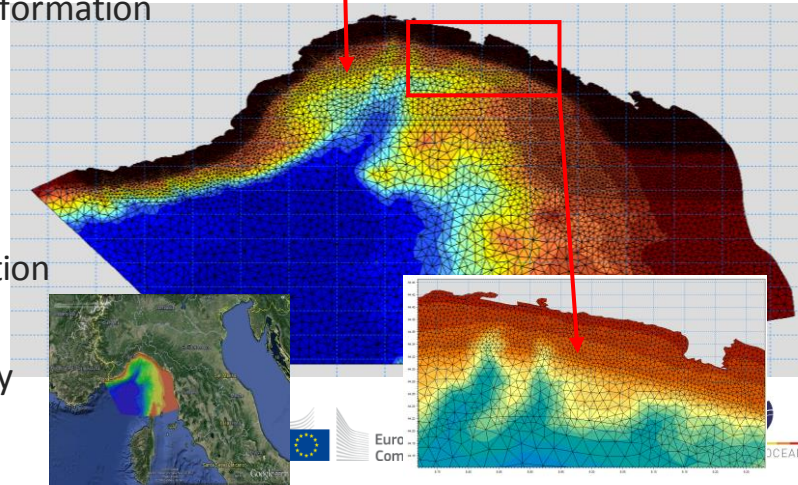
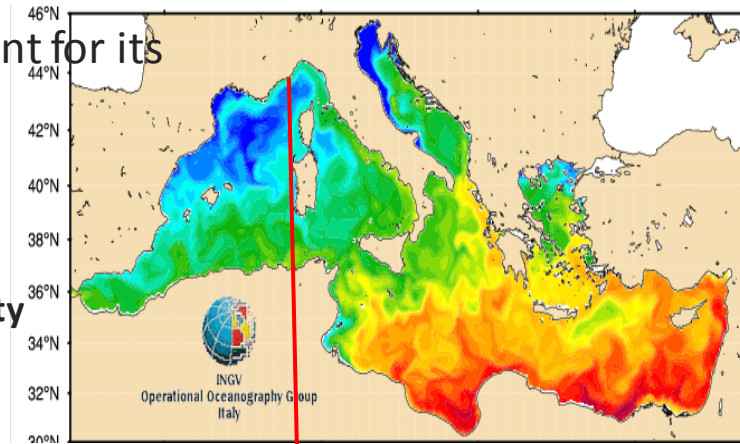
Downscaling the regional ocean dynamics to account for its  
impact in coastal and nearshore regions

SUEZ

- For the Authorities:
  - ❖ Application to coastal and **nearshore water quality** monitoring and forecasting
- For the General Public:
  - ❖ **Smartphone App** for real time water quality information

IT Regional Env Agency / DHI

- ❖ Quality of **swimming water** – Tourism
- ❖ Transport of **sediment and mud** – Ports operation
- ❖ **Oil spill** – Maritime Safety
- ❖ Operation of **Search&Rescue** – Maritime Safety

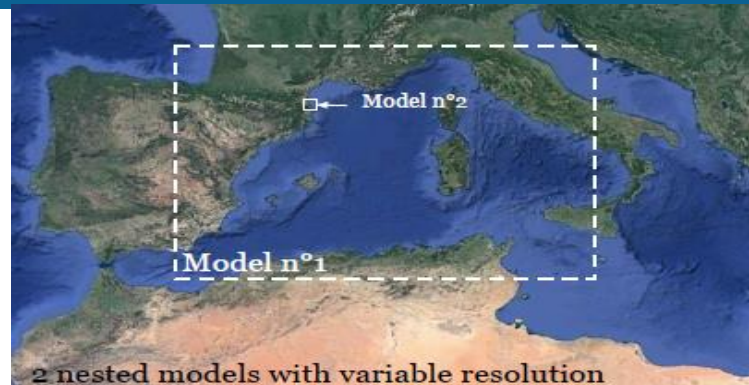




# SUPPORT FLOODING PREVENTION IN COASTAL AREAS

## ➤ CNRS et LABORATOIRE D'AEROLOGIE (France)

The French CNRS research centre in Toulouse, Laboratoire d'aérodologie at Observatoire Midi-Pyrénées, has developed a suite of downscaled models in order to better comprehend the flooding potential of the Tet river near Perpignan in Southern France.

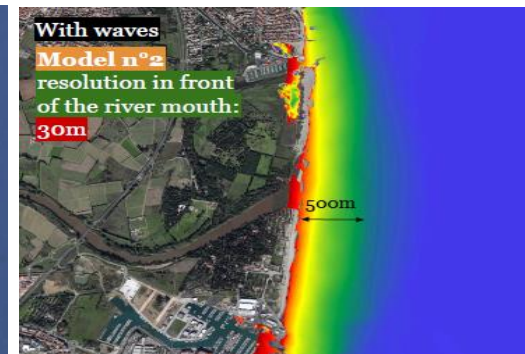
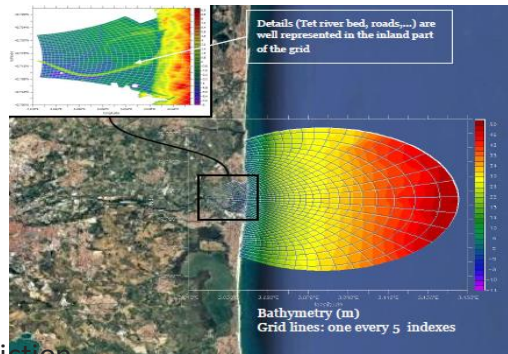


## ➤ Action modulers (Portugal)

The MOHIB Water Modelling System is an early warning system to help reduce flood risk. MOHIB is composed of a downscaling modelling suite using the Copernicus Marine Models as boundary conditions.

## ➤ REACH U (Estonia)

REACH U has developed a web application for flood prediction of Pärnu City in Estonia







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# SUPPORT MARITIME EFFICIENCY TRANSPORT SAVING FUEL / SHIPPING COMPANY

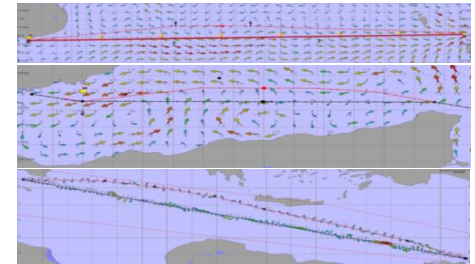
To reduce fuel consumption for ecological & economical reasons

## 3 options:

- ✓ Optimize engines, propellers, hulls...
- ✓ Improve organization...
- ✓ Take benefit of Meteorology/ Operational Oceanography (current observations and forecast)

0,4 % = Average level of savings thanks to « current routing »  
(Line Europe-China Q2 2015)

Target : To save 1% thanks « current routing » ( current forecast reliability)  
would lead to 60 000t fuel saving for the whole fleet so as 180 000t CO<sub>2</sub>.



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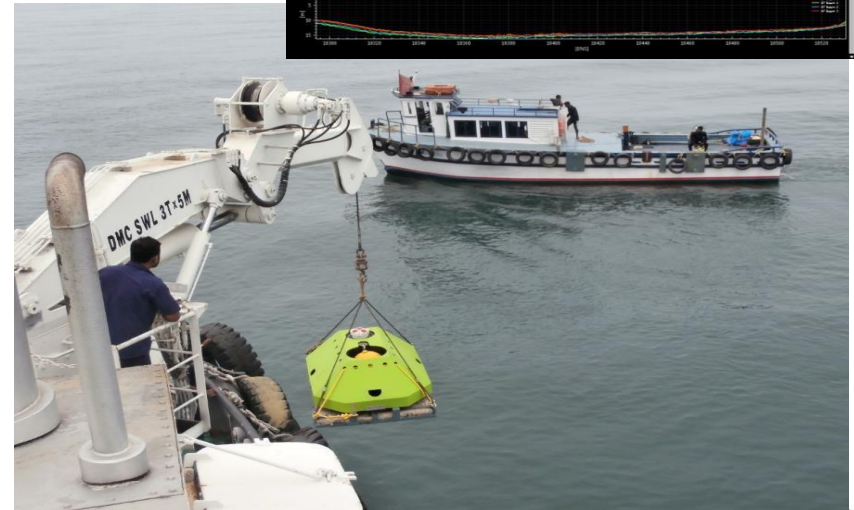
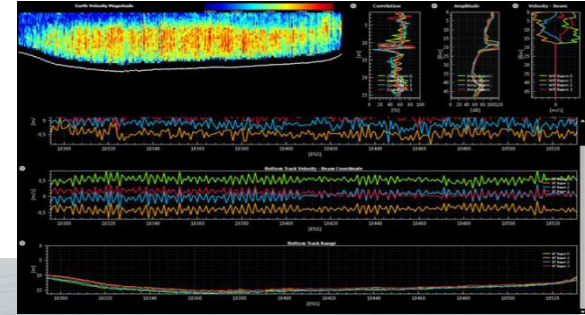
# COCHIN PORT (INDIA): ANALYSIS OF THE SILTATION PROCESSES AND FEASIBILITY STUDY FOR POSSIBLE SOLUTIONS

The port of Cochin has the largest siltation rate among Indian ports: more than 20 million m<sup>3</sup> per year

The key objective of a using numerical model is to develop trustworthy decision support tools to study hydrodynamics of all variables involved (sediments, tidal circulation, salinity etc)

Monitoring and maintenance methods are investigated as well as the implications for dredging

CMEMS contributes with Global Ocean  
Wind product



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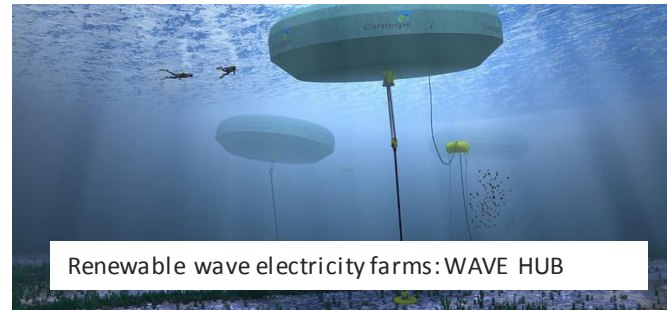


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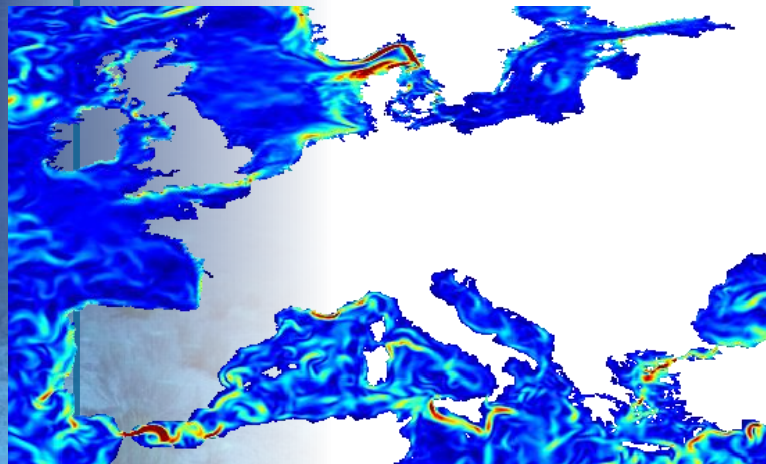
# OCEAN ENERGY: WAVE / TIDAL / CURRENTS / SALINITY/ COLD SEA WATER

OCEAN ENERGY is produced thanks to the exploitation of natural movements:

- Tidal
- Wave
- Currents
- Salinity



- Farm sitting
- Resource evaluation
- Securing operations at sea



Surface Currents Evolution during Aug-Oct 2017

2017-08-01T12:00:00.000Z





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# (USE CASES) SHOWCASING USERS AND USAGES

(<http://marine.copernicus.eu/markets/use-cases/>)



## USE CASES

See examples of how CMEMS data is used. You can also download all use cases.

Geographical Area

All

Area of benefit

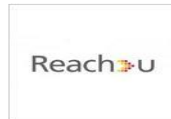
All

User typology

Business

Product in use

All



120 use cases available on line  
since September 2017=

120 downstream services  
promoted =

120 ideas of usage for prospective  
users



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( USER SUPPORT ) MORE MATERIAL AND PRESENCE



Within 20 months,  
reaching out directly  
to more than

1200 people

in 6 Member States :  
( Private & Public  
Sectors)

Belgium, Estonia, Italy,  
Malta, Norway,  
Portugal, The  
Netherlands

## ONLINE TUTORIALS

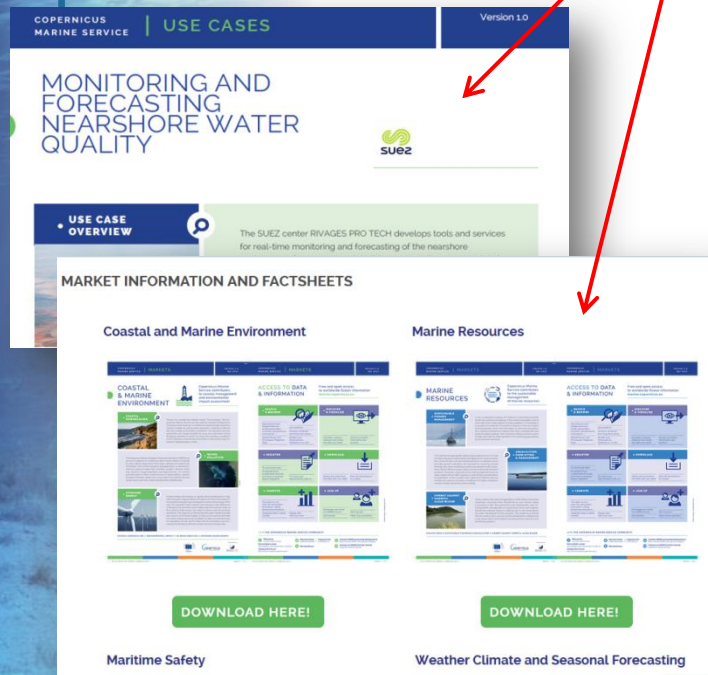
Level	Geographical Area	Subject
All levels	All	All subjects

Close to 40 online tutorials  
since July 2017

for beginners and experts ,

For users and prospective  
users

<http://marine.copernicus.eu/training/online-tutorials/>





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# OCEAN DATA, A PUBLIC GOOD

**REANALYSES**  
10 to 45 years



**REAL-TIME**  
Daily, hourly

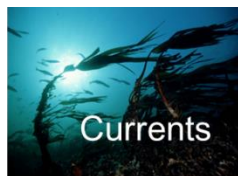


**FORECAST**  
2 to 10 days

**ESSENTIAL  
OCEAN  
VARIABLES**



- 1 Global
- 2 Arctic
- 3 Baltic
- 4 NWS
- 5 IBI
- 6 Med Sea
- 7 Black Sea



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Marine.copernicus.eu

## ACCESS TO DATA & INFORMATION

Free and open access  
to worldwide Ocean information  
[marine.copernicus.eu](https://marine.copernicus.eu)

>150 products

• SEARCH  
& BROWSE



• DISCOVER  
& VISUALISE



• REGISTER



• DOWNLOAD



• COMPUTE



• JOIN UP



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# DO YOU FEEL LOST IN THE OCEAN OF INFORMATION?

The Service desk is there to  
help you!

## DELIVERING USER SUPPORT

- ❖ **Manned support** from the service desk to answer any question related to the service
- ❖ **Real time information** (web site) *on incident, product improvement, service transition ...*
- ❖ **Customized user information** depending on product downloaded or product visualised



[CMEMS.servicedesk@mercator-ocean.fr](mailto:CMEMS.servicedesk@mercator-ocean.fr)



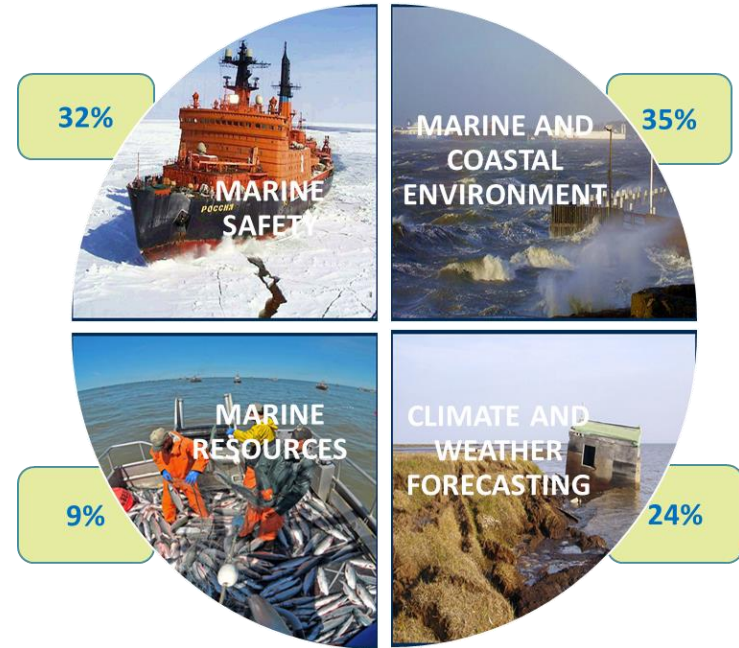
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# WHO DOES NEED MARINE KNOWLEDGE & FOR WHAT?



- 12 000 subscribers worldwide
- 2/3 are active users

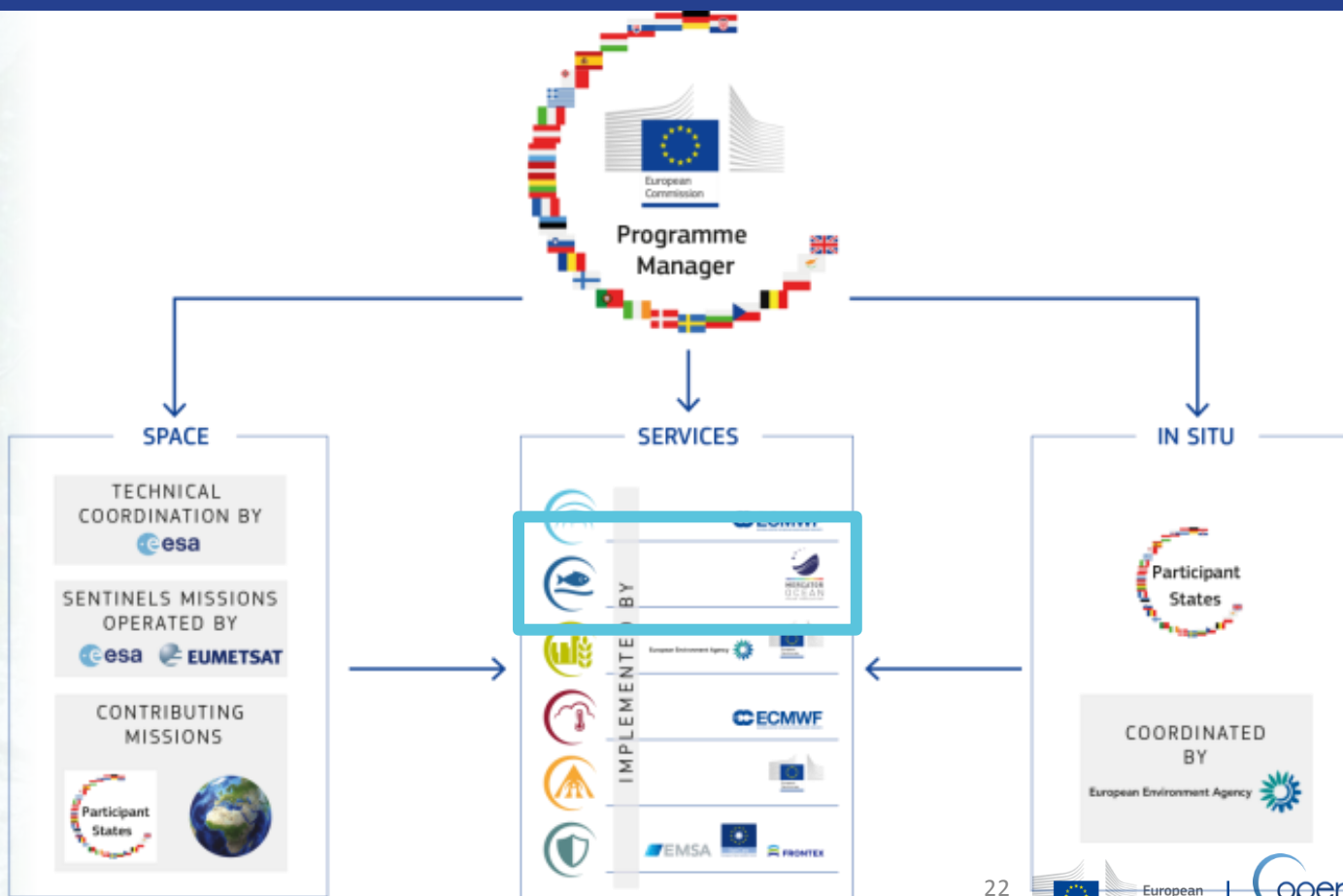


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# COPERNICUS GOVERNANCE

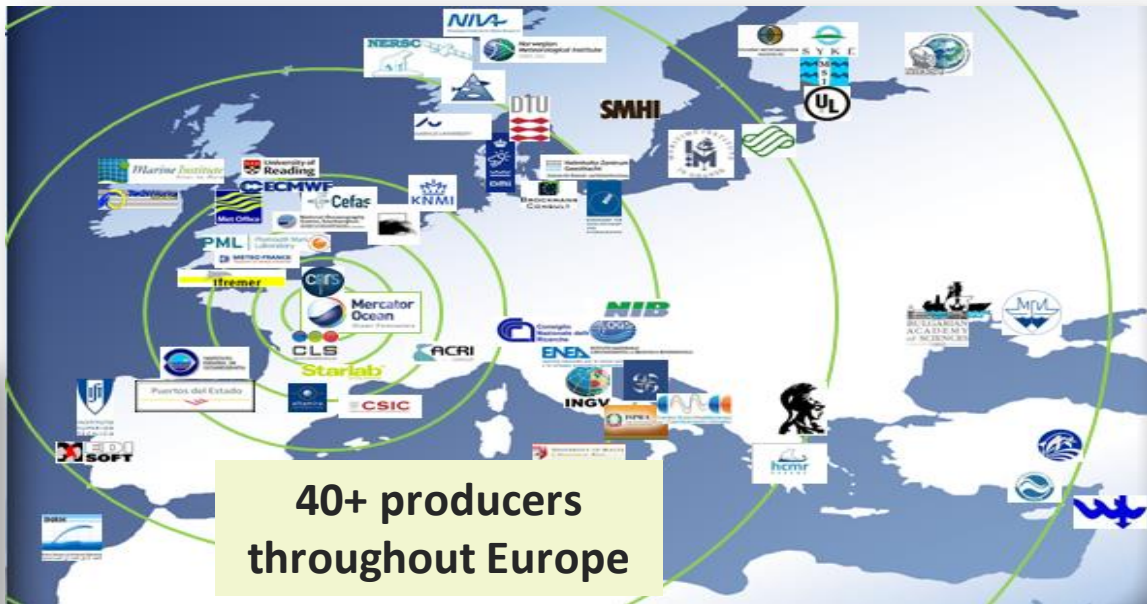






# THE EU OCEAN NETWORK

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40+ producers  
throughout Europe

- ✓ MyOcean legacy ( 2009/2015)
- ✓ Delegation agreement (2014/2021)
- ✓ To implement and operate the Copernicus Marine Service.

- ✓ A network of European data providers
- ✓ State-of-the-art scientific knowledge
- ✓ Unique products portfolio



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# PROVISION OF THE DATA: how does it work?

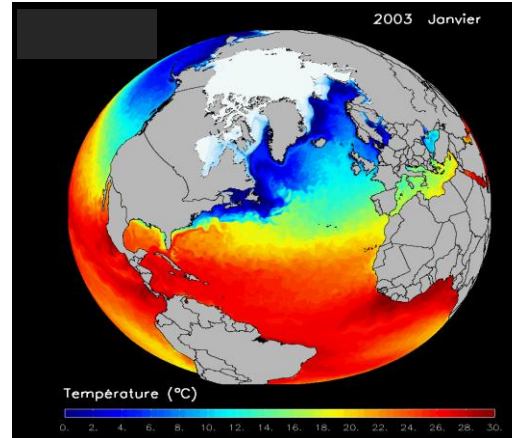
## 1. Satellite



## 2. In situ



## 3. Modelling



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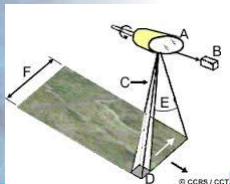
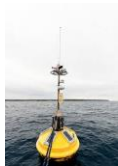


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# Portfolio Value Chain in Copernicus Programme: from Infrastructure to Services products

## INFRASTRUCTURE

SATELLITE AND INSITU RAW DATA



L1 L2

## SERVICES

SATELLITE INSITU MODELS VALUE ADDED PRODUCTS

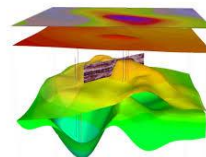
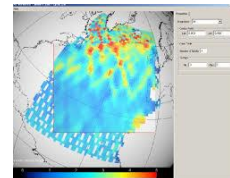


L3



L4

- Increasing Scientific Validation and Calibration
- Increasing data density (in space and time)



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# THANK YOU



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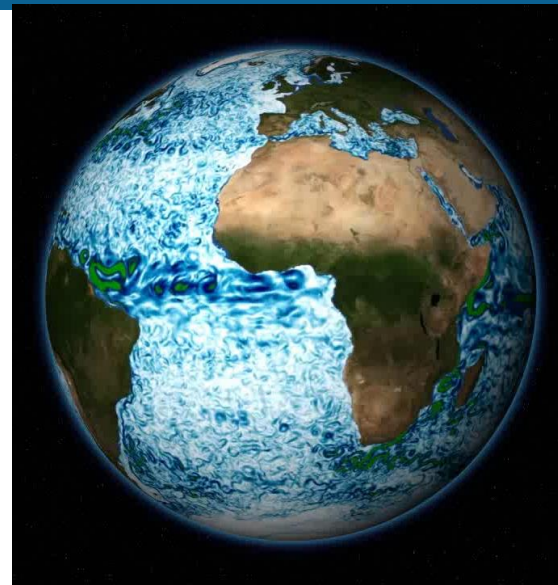
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Contact : [servicedesk.cmems@mercator-ocean.eu](mailto:servicedesk.cmems@mercator-ocean.eu)

*Knowing more about :*

*the program  
the service  
the entrusted entity*



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