

# Copernicus Marine Service



Marine Monitoring

**What CMEMS expects from  
User Uptake projects  
like CADEAU?**

Pierre Bahurel - CEO - Mercator Océan  
ISPRA Workshop, Venice, 5<sup>th</sup> June 2018



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# 1) PROGRAM

Copernicus,  
CMEMS,  
Mercator Ocean



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## 6 Copernicus services

*Monitoring the State of the  
Earth System Environment ...*



Copernicus  
Land Monitoring  
Service



Copernicus  
Marine Environment  
Monitoring Service



Copernicus Climate  
Change Service



Copernicus  
Atmosphere Monitoring  
Service



Copernicus Emergency  
Management Service

Mapping Component  
Early Warning Component



Copernicus  
Security Service



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# Copernicus Programme



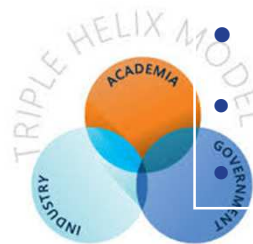


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# MERCATOR OCEAN entrusted entity for CMEMS



- CMEMS entrusted entity
- Ocean Forecasting centre
- General interest / non-for-profit
- Public shareholders
- Europeanised governance



- Worldwide service
- for gov, industry, academia with Science, Service, Partnerships





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## 2) CMEMS OFFER

Information: Data/Indicators/Reports  
Ecosystem: the EU marine community



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# CMEMS – On-line catalogue of products

marine.copernicus.eu

## OCEAN PRODUCTS

157 products

Global ocean and  
the European seas

In-situ and satellite  
observations,  
modelling products

Physical and  
biogeochemical  
variables

Long time series (25  
years), real time  
products and  
forecast

The screenshot shows the homepage of the Copernicus Marine Environment Monitoring Service (CMEMS). At the top left is the European Commission logo. The main header reads "COPERNICUS MARINE ENVIRONMENT MONITORING SERVICE" with the tagline "Providing PRODUCTS and SERVICES for all marine applications". A search bar is located on the right. Below the header is a navigation menu with categories: ABOUT US, MARKETS & BENEFITS, NEWS, SCIENCE & MONITORING, TRAINING & EDUCATION, and SERVICES PORTFOLIO. The main content area features a large banner with the text "ACCESS YOUR OCEAN INFORMATION" and a "GETTING STARTED" button. Below this are three featured sections: "OCEAN PRODUCTS" (highlighted with a green border), "OCEAN MONITORING INDICATORS", and "OCEAN STATE REPORT". The "OCEAN PRODUCTS" section includes a description: "Ocean product catalogue, to download or visualize data across more than 10 variables, including historic, current and forecasted data." and a "DATA" button. The "OCEAN MONITORING INDICATORS" section includes a description: "Essential variables monitoring the health of the ocean" and a "TRENDS" button. The "OCEAN STATE REPORT" section includes a description: "Extensive annual analysis on the state of the ocean over nearly 20 years and severe/notable annual events" and an "EXPERTISE" button. On the right side, there is a "SHORT-CUT TO SERVICES" dropdown menu with options: REGISTER NOW!, SCIENTIFIC QUALITY, ONLINE TUTORIALS, and COLLABORATIVE FORUM. Below this is a "LATEST NEWS FLASH" section with the date "2018 19 APR." and the text "CMEMS:7324-A New Service Release on 22 March 2018 - Status on updates INFORMATION" and an "ALL NEWS FLASH" button.



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# CMEMS – On-line catalogue of products

[marine.copernicus.eu](http://marine.copernicus.eu)

## OCEAN PRODUCTS

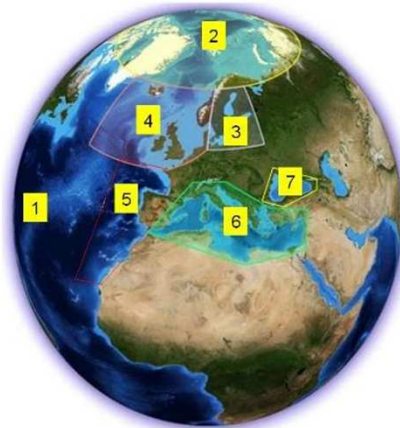
157 products

Global ocean and  
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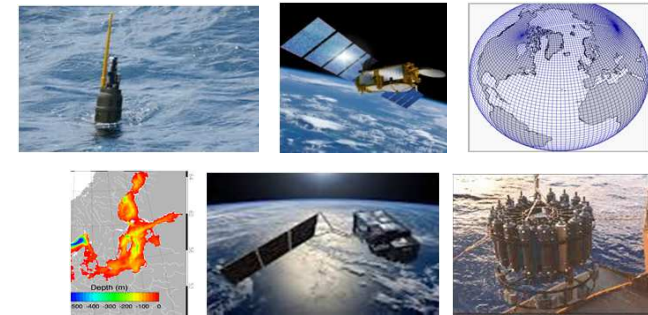
In-situ and satellite  
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Physical and  
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Long time series (25  
years), real time  
products and  
forecast



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



A central information system to search, view and download products





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# CMEMS - Ocean Monitoring Indicators

marine.copernicus.eu

## OCEAN MONITORING INDICATORS

### 3 first OMIs

Ocean Heat Content  
Sea Level  
Ice extend

Anomalies and  
trends  
Time series and  
maps  
Multi-product  
approach

**COPERNICUS  
MARINE ENVIRONMENT MONITORING SERVICE**  
Providing PRODUCTS and SERVICES for all marine applications

European Commission

ABOUT US | MARKETS & BENEFITS | NEWS | SCIENCE & MONITORING | TRAINING & EDUCATION | SERVICES PORTFOLIO

SEARCH terms OK

SHORT-CUT TO SERVICES

- REGISTER NOW!
- SCIENTIFIC QUALITY
- ONLINE TUTORIALS
- COLLABORATIVE FORUM

2018  
19  
APR.

**LATEST NEWS FLASH**  
CMEMS:7324-A  
New Service Release on 22  
March 2018 - Status on  
updates  
INFORMATION  
ALL NEWS FLASH

ACCESS YOUR OCEAN INFORMATION

GETTING STARTED →

**OCEAN PRODUCTS**  
Ocean product catalogue, to download or visualize data across more than 10 variables, including historic, current and forecasted data.  
DATA →

**OCEAN MONITORING INDICATORS**  
Essential variables monitoring the health of the ocean  
TRENDS →

**OCEAN STATE REPORT**  
Extensive annual analysis on the state of the ocean over nearly 20 years and severe/notable annual events  
EXPERTISE →



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# CMEMS - Ocean Monitoring Indicators

[marine.copernicus.eu](http://marine.copernicus.eu)

## OCEAN MONITORING INDICATORS

3 first OMIs

Ocean Heat Content  
Sea Level  
Ice extend

Anomalies and trends  
Time series and maps  
Multi-product approach

## OCEAN HEAT CONTENT

Ocean Heat Content Monitoring Indicator

Anomalies and trends  
Time series and maps

GLOBAL OCEAN



ARCTIC OCEAN



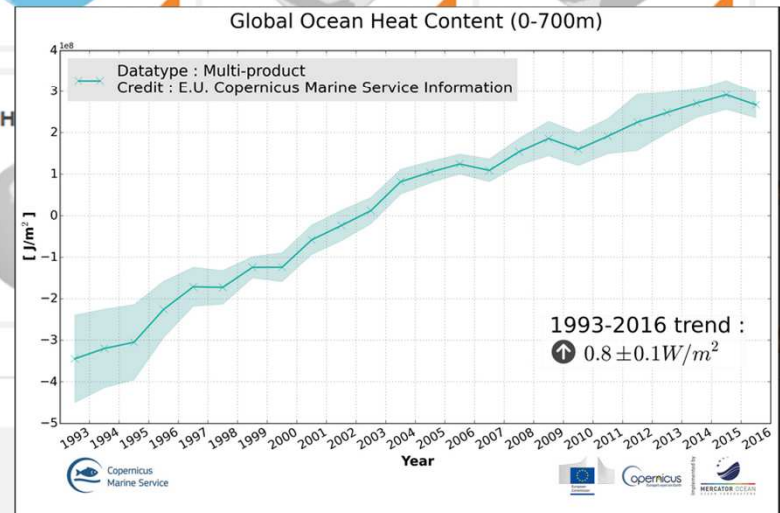
ANTARCTIC OCEAN



Multi-product approach:  
global reanalyses and  
reprocessed observations

1993-2016

NORTH



## SEA LEVEL

Sea Level Ocean Monitoring Indicator



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# CMEMS - Ocean State Report

marine.copernicus.eu

## OCEAN STATE REPORT

Focus on the role of  
the oceans in the  
Earth's climate  
system

Annual Report

80 scientific experts  
from more than 25  
institutions

Global ocean and  
European Seas

**COPERNICUS  
MARINE ENVIRONMENT MONITORING SERVICE**  
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European Commission

ABOUT US | MARKETS & BENEFITS | NEWS | SCIENCE & MONITORING | TRAINING & EDUCATION | SERVICES PORTFOLIO

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2018 19 APR.

SEARCH terms OK

SHORT-CUT TO SERVICES

REGISTER NOW! ✎

SCIENTIFIC QUALITY ✓

ONLINE TUTORIALS 🎓

COLLABORATIVE FORUM 💬

LATEST NEWS FLASH

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INFORMATION

ALL NEWS FLASH



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# CMEMS - Ocean State Report

## OCEAN STATE REPORT

Focus on the role of the oceans in the Earth's climate system

Annual Report

80 scientific experts from more than 25 institutions

Global ocean and European Seas

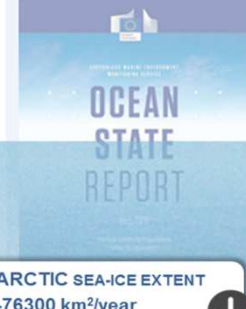
2016

Ocean State Report 2016



2017

Ocean State Report 2017 (in progress)



IMarEST Denny Medal

1993-2015 decadal trends

ARCTIC SEA-ICE EXTENT  
-76300 km<sup>2</sup>/year



ANTARCTIC SEA-ICE EXTENT  
+44900 km<sup>2</sup>/year



SEA SURFACE TEMPERATURE  
0.02 °C/year: 0.4°C total (GLOB)  
0.04 °C/year: 0.9°C total (MED)  
0.08 °C/year: 1.9°C total (BS)



TOTAL SEA LEVEL  
3.3 mm/year (GLOB)  
2.9 mm/year (MED)  
3.1 mm/year (IBI)  
2.6 mm/year (NWS)  
3.2 mm/year (BS)



THERMOSTERIC SEA LEVEL  
1.0 mm/year (GLOB)  
1.5 mm/year (MED)  
1.5 mm/year (IBI)  
1.1 mm/year (NWS)



OCEAN HEAT CONTENT  
0.6 W/m<sup>2</sup> (GLOB)  
0.8 W/m<sup>2</sup> (MED)  
0.9 W/m<sup>2</sup> (IBI)  
0.8 W/m<sup>2</sup> (NWS)





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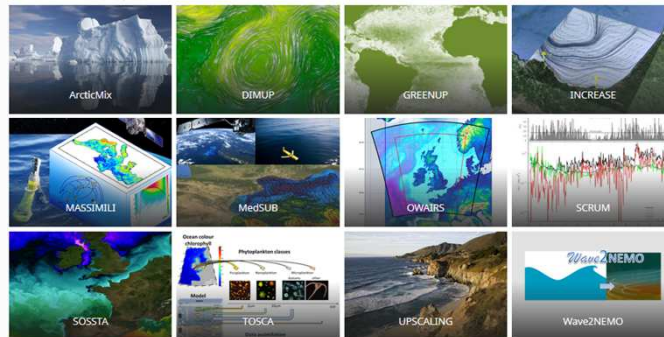
## CMEMS Service Evolution activities

### Objectives:

With the support of the CMEMS Science and Technological Advisory Committee (STAC):

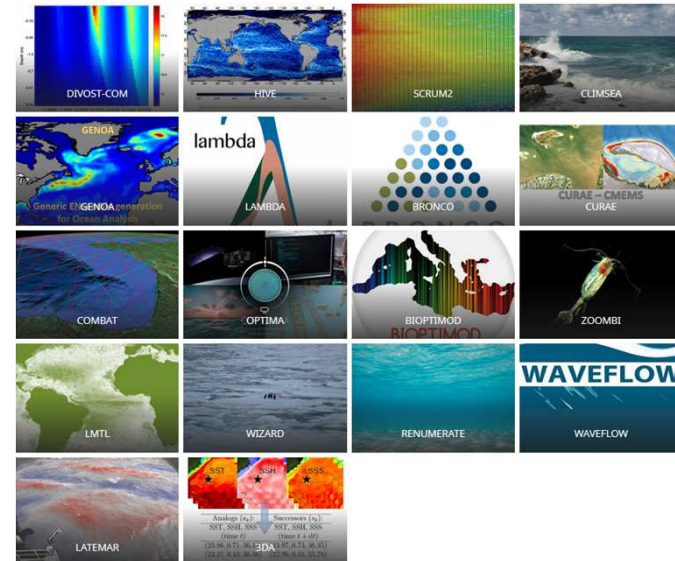
- ❑ To take into account scientific and technological advances relevant for CMEMS
- ❑ To prepare CMEMS **R&D priorities** (→ 2025 + focus on next 4 years)
- ❑ To improve CMEMS **products**

1<sup>st</sup> call (2016) - 12 R&D projects



Several projects deal with the coastal zone:  
HF radars, coupling with downstream coastal  
models, river inputs...

2<sup>nd</sup> call (2018) - 18 R&D projects





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## Ecosystem: MARINE STAKEHOLDERS IN EUROPE

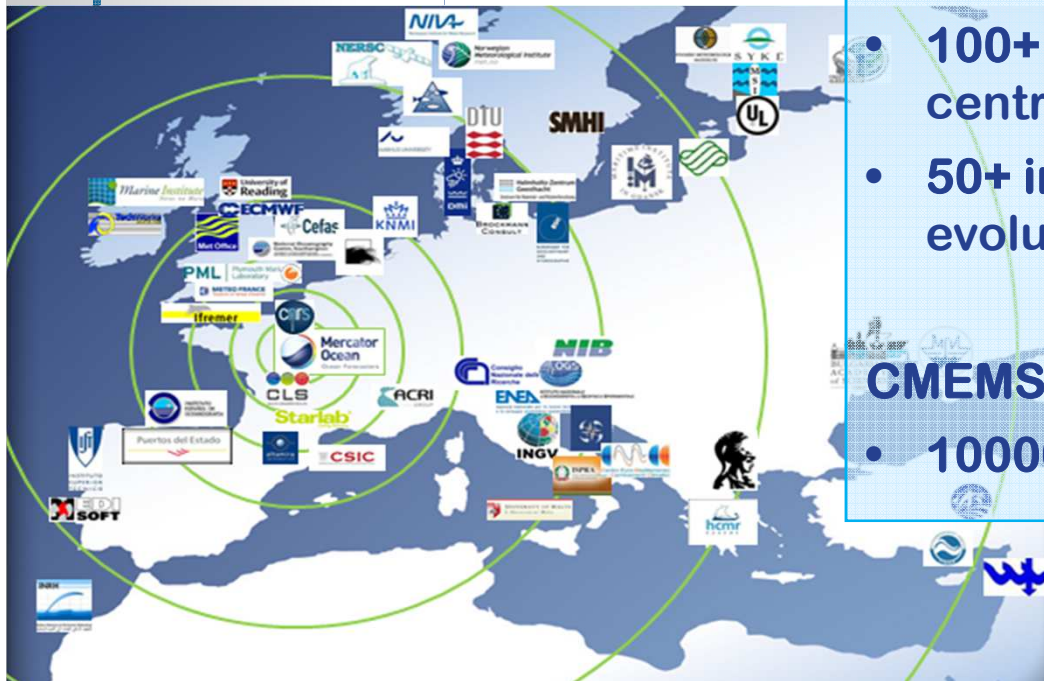
- Governmental Bodies, Operational Centres, Research Centres
- IT and space Industry, Service providers, SMEs, entrepreneurs, large companies

### CMEMS SUPPLIERS

- 100+ operational suppliers (production centres)
- 50+ innovation partners (service evolution and uptake)

### CMEMS USERS

- 10000+ subscribers, 2/3 in Europe



European  
Commission





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# 3) CMEMS DEVELOPMENT

Users and Service Uptake



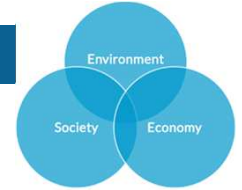
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# OCEANS: AN UNPRECEDENT GROUNDSWELL



POLICY MAKERS,  
INSTITUTIONS



BLUE GROWTH,  
BLUE ECONOMY



OCEAN LITERACY,  
ENGAGEMENT

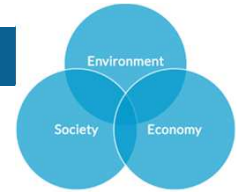






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# OCEANS: AN UNPRECEDENT GROUNDSWELL



## POLICY MAKERS, INSTITUTIONS



## BLUE GROWTH, BLUE ECONOMY



500 billions € revenue  
5 million jobs

### 2010 Worldwide:

1 500 Billions US\$ Added Value  
31 Million Direct FT jobs

### 2030 Worldwide:

3 000 Billions US\$ Added Value  
43 Million Direct FT jobs (business as usual scenario)  
+ strong performance expected from Marine Renewable Energy & Marine BioTechnology

## OCEAN LITERACY, ENGAGEMENT



G7 Oceans Youth Innovation Challenge



#I speak Blue Too.



2014 : 50 Ocean-related NGOs

2018 : 100 NGOs only against plastic pollution



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## A PIVOTAL ROLE

EVIDENCE-BASED ENVIRONMENTAL POLICIES  
INTERNATIONAL GOVERNANCE



OCEAN LITERACY



MARINE DATA FOR  
BLUE ECONOMY

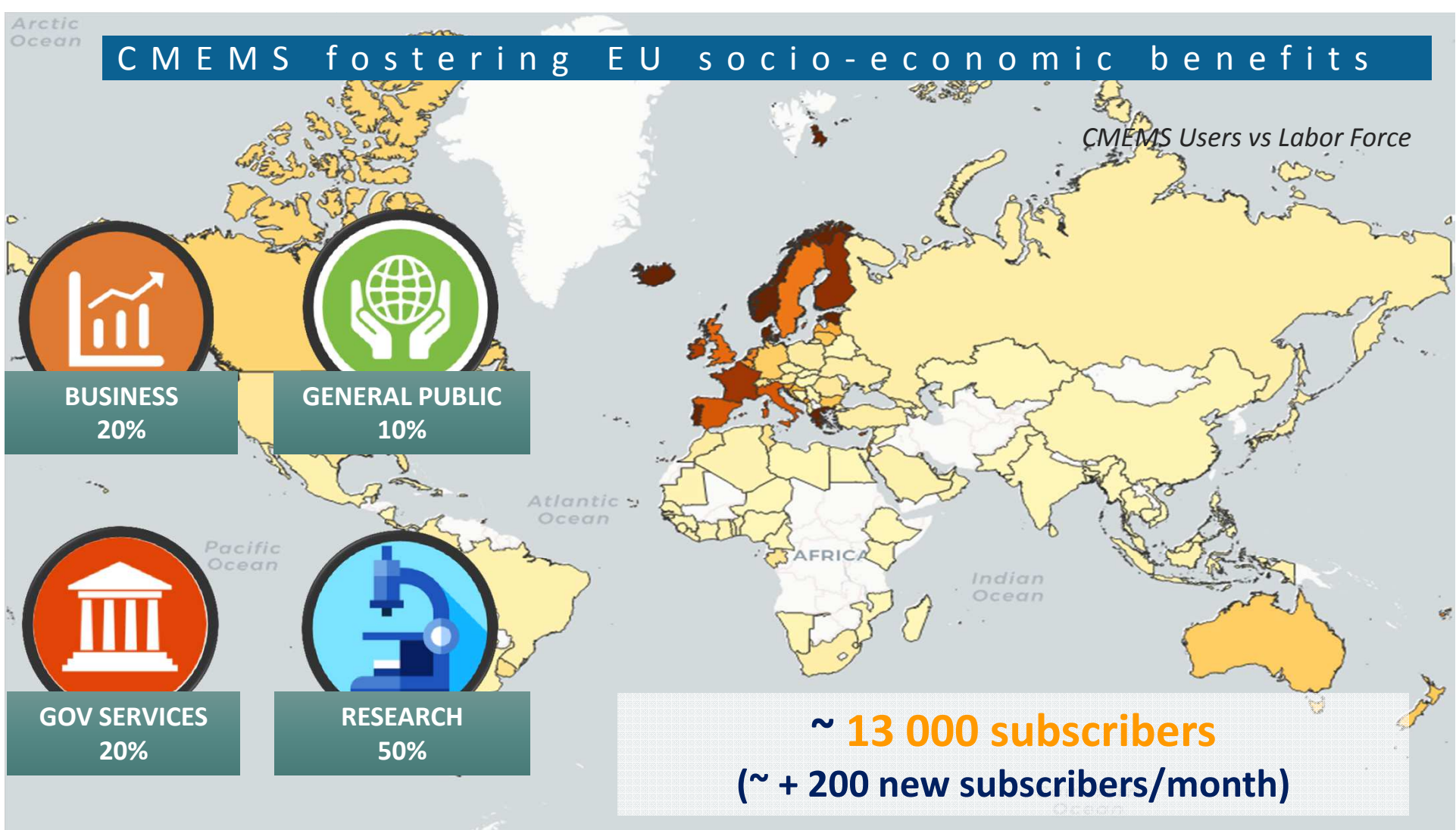


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# CMEMS fostering EU socio-economic benefits

CMEMS Users vs Labor Force



**BUSINESS**  
20%



**GENERAL PUBLIC**  
10%



**GOV SERVICES**  
20%



**RESEARCH**  
50%

**~ 13 000 subscribers**  
**(~ + 200 new subscribers/month)**



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# CMEMS - USE CASES

**135 Use Cases**  
Examples of how CMEMS data is used

**COPERNICUS MARINE ENVIRONMENT MONITORING**  
Providing PRODUCTS and SERVICES for all marine users

ABOUT US | **MARKETS & BENEFITS** | NEWS | SCIENCE & MONITORING | TRAINING & EDUCATION

MARKETS  
**USE CASES**  
SUBMIT YOUR USE CASE  
DOCUMENTATION

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marine.copernicus.eu

MARETEC | CEASELESS | ISPRA | CHLO4MSFD by AZTI

Copernicus Marine Service | **USE CASES** | Version 11

**SUPPORTING BATHING AND AQUACULTURE WATER MANAGEMENT IN THE NORTHERN ADRIATIC SEA**

**USE CASE OVERVIEW**

The Municipality of Chioggia, a coastal town close to Venice, Italy, represents both an important touristic zone and a fishing port influenced by Urban Waste Water Treatment Plant (UWWTP), the Po river and the mouths of the Venice Lagoon. In order to follow the dynamic of plumes released by the latter, ISPRA and OGS have developed a high resolution model of the Northern Adriatic Sea using the Copernicus Marine Service Mediterranean Sea reanalysis model as a boundary and initial conditions. They have performed a reanalysis simulation for the period 2006-today of the Northern Adriatic Sea, including the assimilation of UWWTP data. It allows to relate plumes released by UWWTPs and the measured quality of bathing waters. Each source of bacterial pollution is identified by a different passive tracer. An index will then be developed indicating possible bacterial pollution caused by a UWWTP on a bathing water body. It will help local administrations to better qualify bathing waters lying in their jurisdiction. It will also help many aquaculture farms and fishing port in the area. More here: <http://www.sintal.isprambiente.it/faces/public/CADEAU/index.xhtml>

**BENEFITS**



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# CMEMS User Uptake activities

**Services on Atlantic NWS:**  
1 fisheries  
2 water quality  
2 marine pollution  
1 ocean noise

**Services on Arctic Ocean:**  
2 security on coastal ice

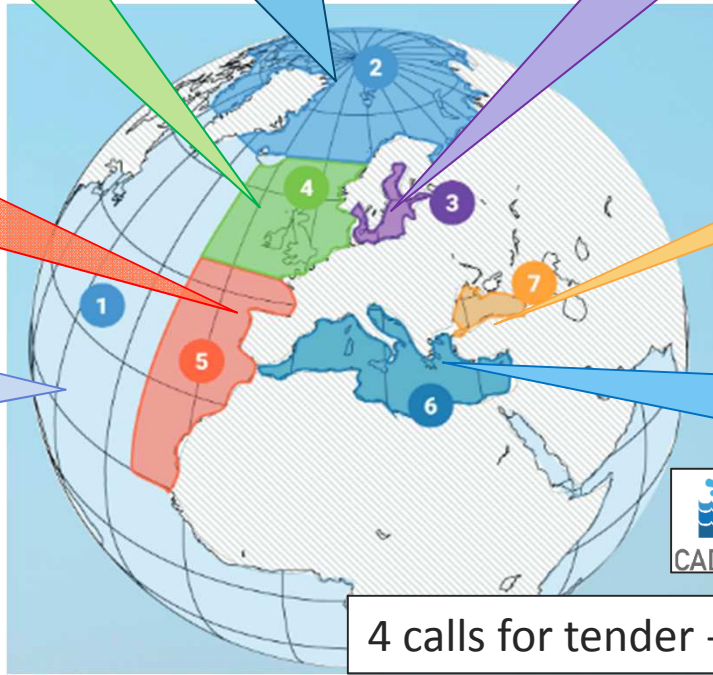
**Services on Baltic Sea:**  
1 security on coastal ice  
1 marine pollution  
1 aquaculture

**Services on Atlantic IBI:**  
3 coastal modelling  
1 water quality  
1 search and rescue  
1 wave energy

**Services on Outer regions:**  
1 tidal energy  
2 coastal modelling

**Services on Black Sea:**  
1 water quality  
1 aquaculture

**Services on Mediterranean Sea:**  
1 coastal modelling  
3 water quality  
2 aquaculture



4 calls for tender - 27 contracts

CMEMS geographical areas

## Objectives:

- To show the **integration**, the **usefulness** and the **impact** of the Copernicus Marine Service and products in the **downstream applications** carried out by the CMEMS users
- To encourage intermediate users to **develop** their own **downstream operational systems** based on **CMEMS**



European Commission





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## CMEMS User Uptake activities

### For EC, User Uptake contracts show how:

- CMEMS products are **useful**
- CMEMS **promotes** the development of EU downstream services **demonstrations** in Member States
- CMEMS **contributes** to EU Directives:
  - Water Framework Directive (WFD)
  - Maritime Strategy Framework Directive (MSFD)
  - Maritime Spatial Planning (MSP)





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## CMEMS User Uptake activities

### For User Uptake contracts, CMEMS allows:

- The **funding** to develop and promote new added value services
- The **visibility** in the European landscape
- A privileged **relationship**
- The **synergy** of 2 areas of expertise for MSFD: the marine environmental quality assessment and the applications of earth observation technologies.



European  
Commission





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# Conclusion



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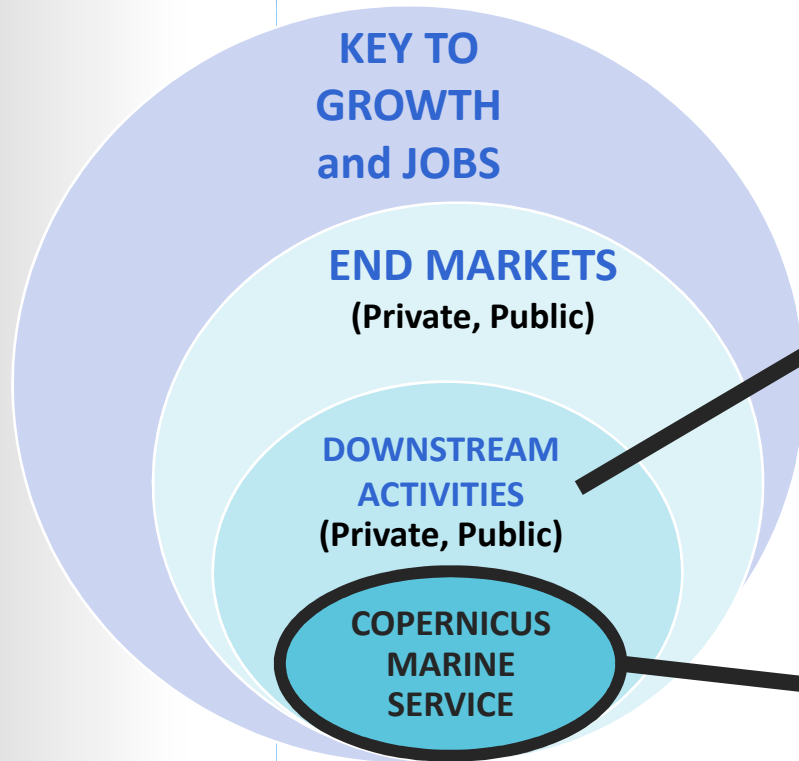


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## CONCLUSION

2 possibilities for using CMEMS

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



**ASK CMEMS USERS (value added)**

**DIRECTLY (free)**



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T h a n k   y o u

### Contacts for feedback and request

- **Web portal** [marine.copernicus.eu](http://marine.copernicus.eu)
- **Service Desk's email** [servicedesk.cmems@mercator-ocean.eu](mailto:servicedesk.cmems@mercator-ocean.eu)
- **Collaborative forum** <http://forum.marine.copernicus.eu>

the program [copernicus.eu](http://copernicus.eu)  
the service [marine.copernicus.eu](http://marine.copernicus.eu)  
the entrusted entity [mercator-ocean.eu](http://mercator-ocean.eu)



European  
Commission

