

MAKING SENSE OF THE OCEAN: FROM OBSERVATION TO ACTIONABLE KNOWLEDGE



European contribution to the global ocean observing system

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Mercator Ocean International



PROGRAMME OF THE
EUROPEAN UNION



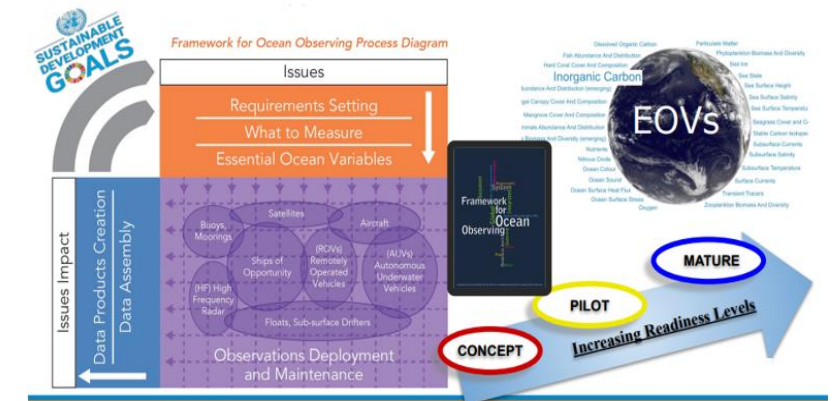
In collaboration with
the UN OD Data
Coordination Office



The global ocean observing system

DATA FOR THE
UN OCEAN DECADE
A EUROPEAN FOCUS

- ❑ GOOS International programme led by IOC
- ❑ From global to coastal observations
- ❑ From physics, biogeochemistry and biology
- ❑ Integrated system: in-situ and satellite observations and link with modelling
- ❑ In response to societal needs: climate, ocean health, ocean services, weather
- ❑ Implementation based on the concept of essential ocean variables



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EUMETSAT



MERCATOR
OCEAN
INTERNATIONAL



In collaboration with
the UN OD Data
Coordination Office

Ocean
Data Sharing

GOOS Today

84 countries

8,000+ observing platforms

13 global observing networks
(**+4** emerging)

12 active Biology and Ecosystems EOVS
observing communities

>120,000 observations per day

81 National Focal Points

14 Regional Alliances (3 Associate)

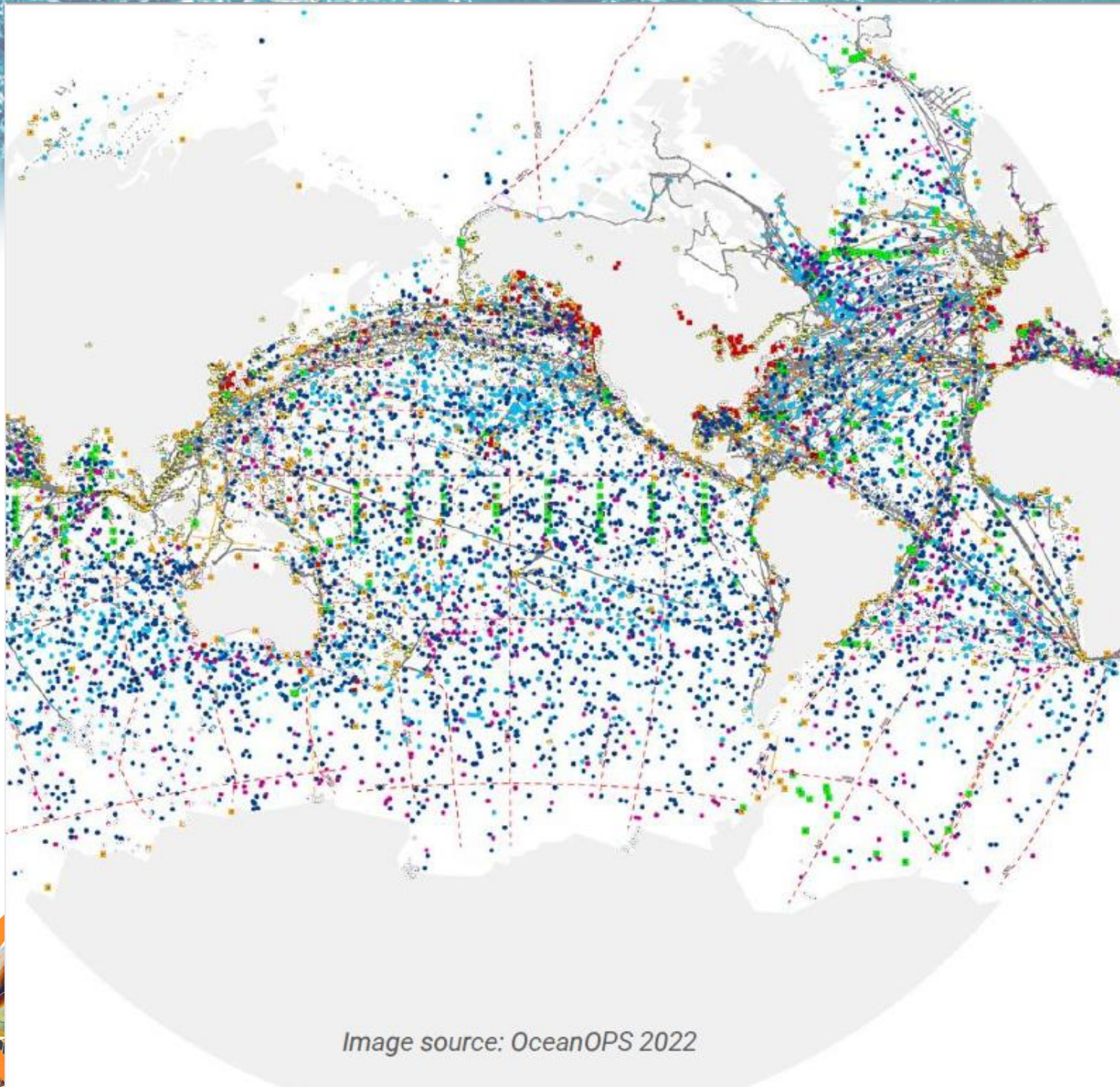
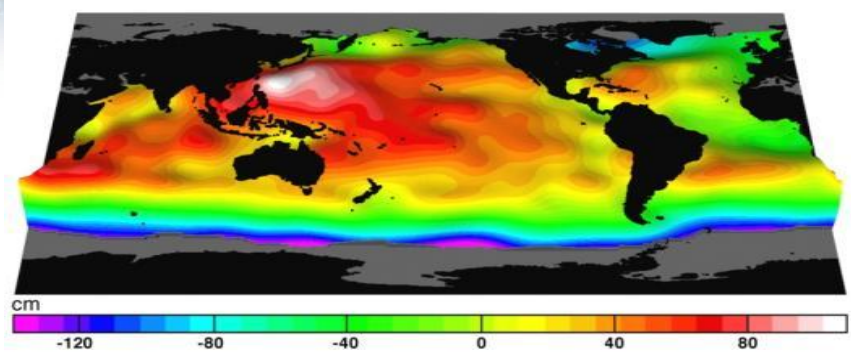
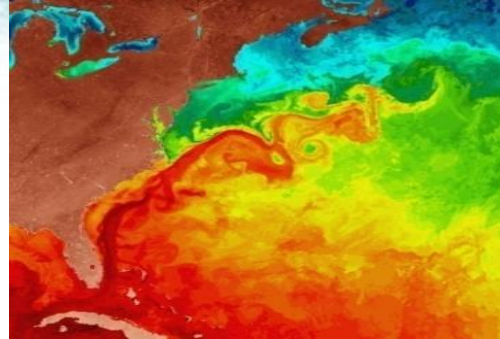


Image source: OceanOPS 2022

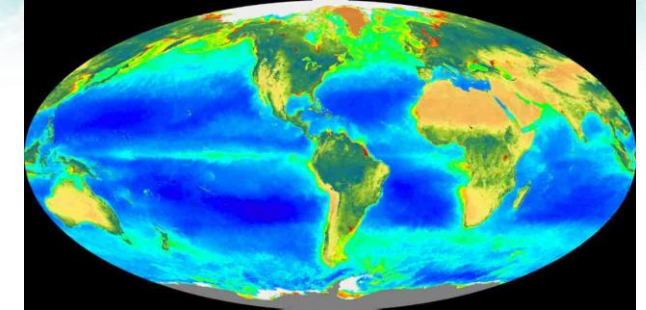
Unique role of satellites / international cooperation



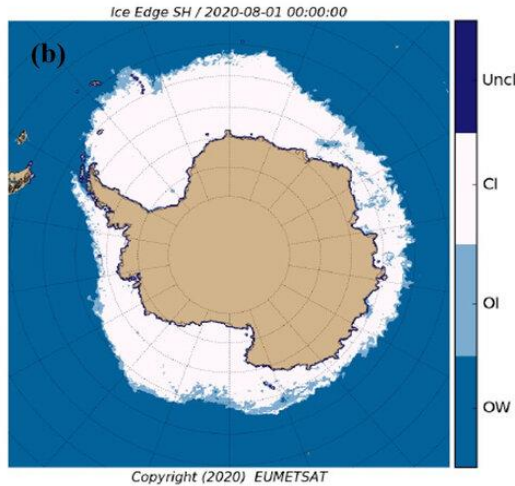
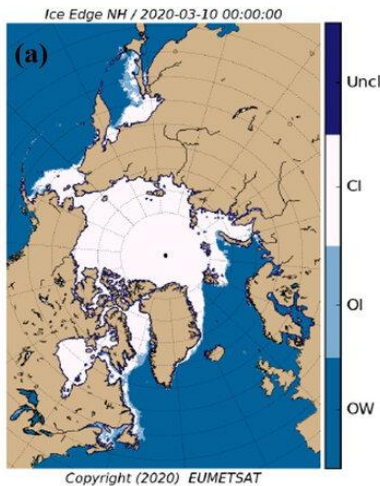
Sea level, ocean currents



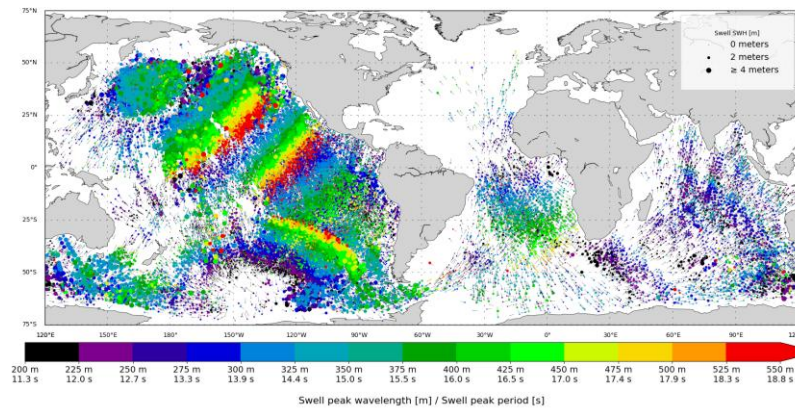
Sea Surface Temperature



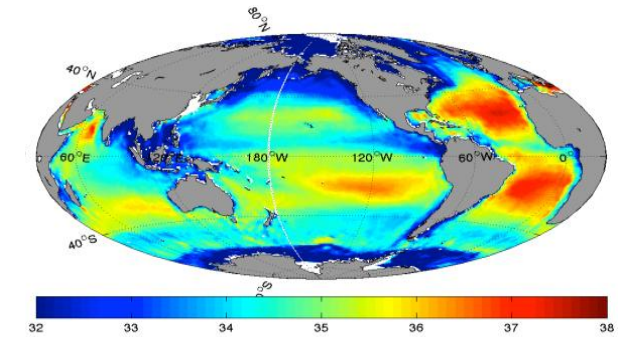
Ocean color



Sea ice



Waves and winds

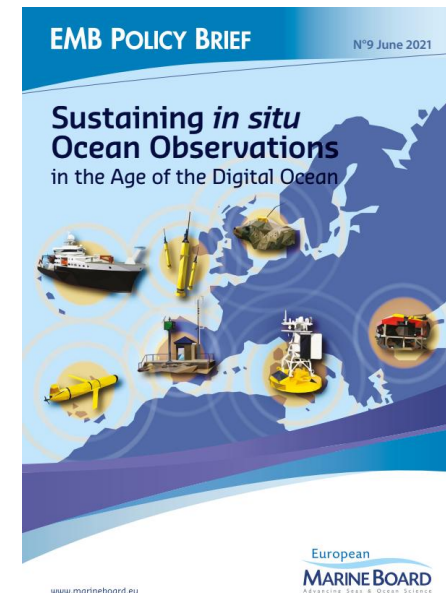
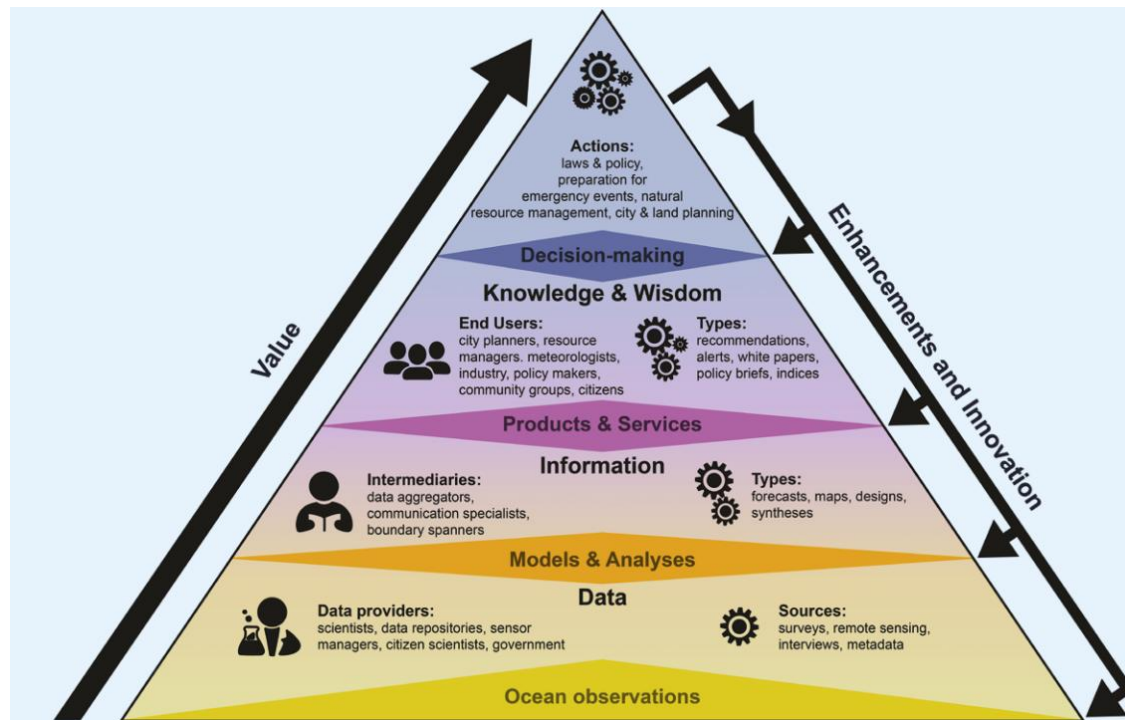


Sea Surface Salinity

#EUdata4OceanDecade

The role of models

Models: an essential link in the value chain/loop going from observations to information and action => transform sparse in situ and surface satellite observations into 4D ocean fields and forecasts at high space/time resolution



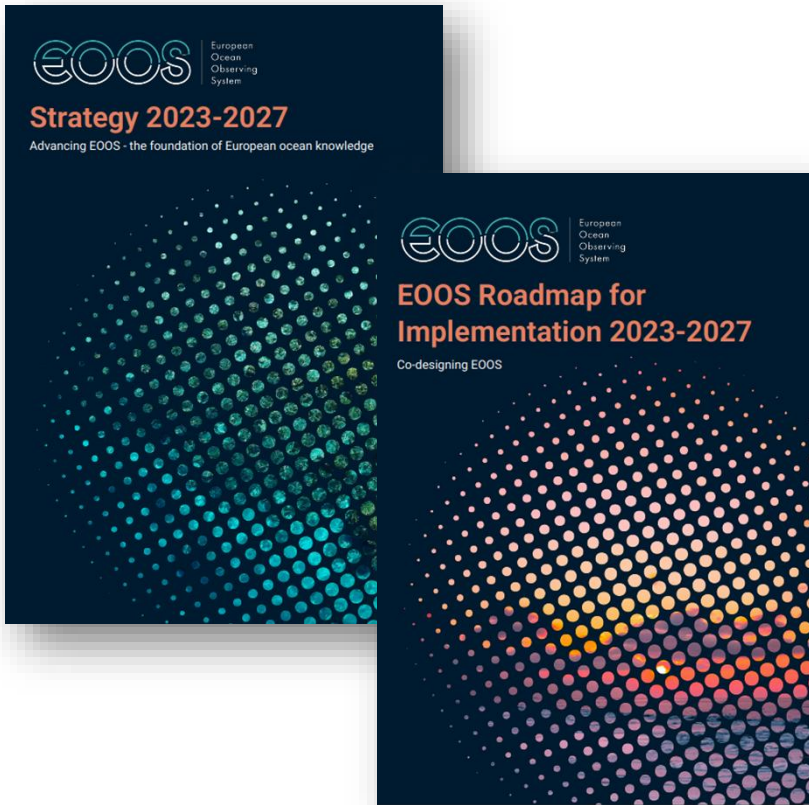
<https://www.marineboard.eu>

#EUdata4OceanDecade

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European Ocean Observing System - EOOS

The EOOS aims to enhance coordination and collaboration in Europe's ocean observing efforts



Better coordinated observing efforts



Maximise the value and benefit of ocean observations at the national, regional, European and global levels



SUSTAINED ALIGNMENT OF NATIONAL EFFORTS AND ACTIVITIES WILL STRENGTHEN THE OCEAN OBSERVATION VALUE CHAIN

I. Lips, EuroGOOS/EOOS

#EUdata4OceanDecade

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European Ocean Observing System Framework

EOOS

European
Ocean
Observing
System

A shared framework
for a shared
understanding

Communicate the
value of ocean
observing



Observations
mapped out



EUROPEAN
FRAMEWORK

WE ARE
STRONGER
TOGETHER

Engage in building EOOS
Contact us:
info@eoos-ocean.eu

EOOS

Share technology

Fit for purpose

Efficient use
of resources

Share data

SHARED VISION & STRATEGY

FOR THE EUROPEAN
OCEAN OBSERVING
SYSTEM (EOOS)

CO-CREATION TO MEET
USER NEEDS



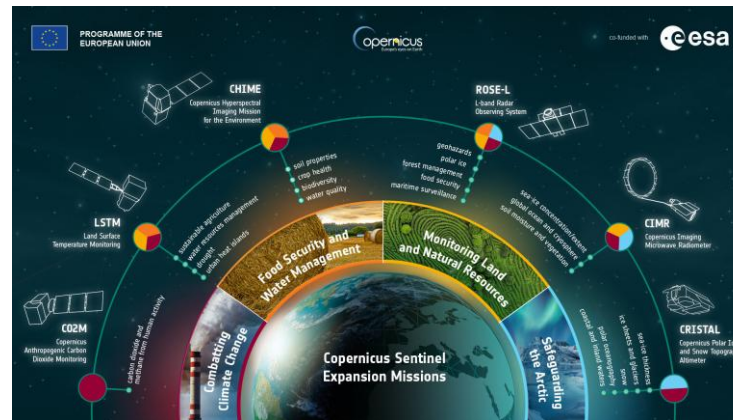
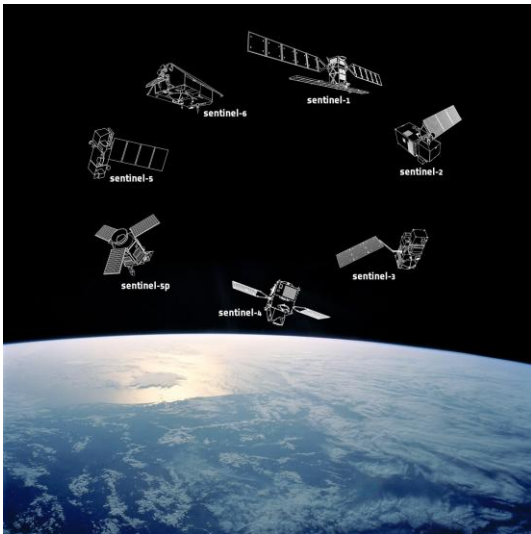
Perfect place to
COMMUNICATE NEEDS



Share
KNOWLEDGE, EXPERTISE
and scan horizon

European contribution to the Global Ocean Observing System (1/3)

- Unique contribution for satellite observations : Copernicus (Sentinel) (EU with ESA and Eumetsat), meteorological satellites (Eumetsat), national agencies



#EUdata4OceanDecade

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European contribution to the Global Ocean Observing System (2/3)

- ❑ In-situ observations
- ❑ Implementation by member states (research infrastructures, operational networks)
- ❑ Support to international coordination : GOOS observation panels, EuroGOOS (European GRA), OceanOps hosted in France
- ❑ European coordination through European research infrastructures (e.g. Euro-Argo, EMSO, JERICO, ICOS, EMBRC, EuroGOSHIP) and EuroGOOS.
- ❑ Toward an overall coordination with EOOS

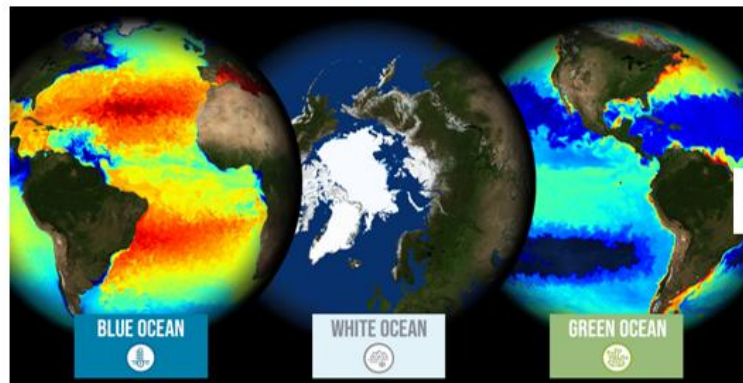


European contribution to the Global Ocean Observing System (3/3)

□ Data and Services: Emodnet, Copernicus Marine and EU DTO



Ocean Prediction



Digital Twin Ocean



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The EU Copernicus Marine Service

Global & Regional Ocean Monitoring and Forecasting

MULTI-YEAR
10 to 45 years

REAL-TIME
Daily, hourly

FORECAST
2 to 10 days

ESSENTIAL OCEAN VARIABLES

BLUE OCEAN



Physics

WHITE OCEAN



Sea Ice

GREEN OCEAN



Biogeochemistry

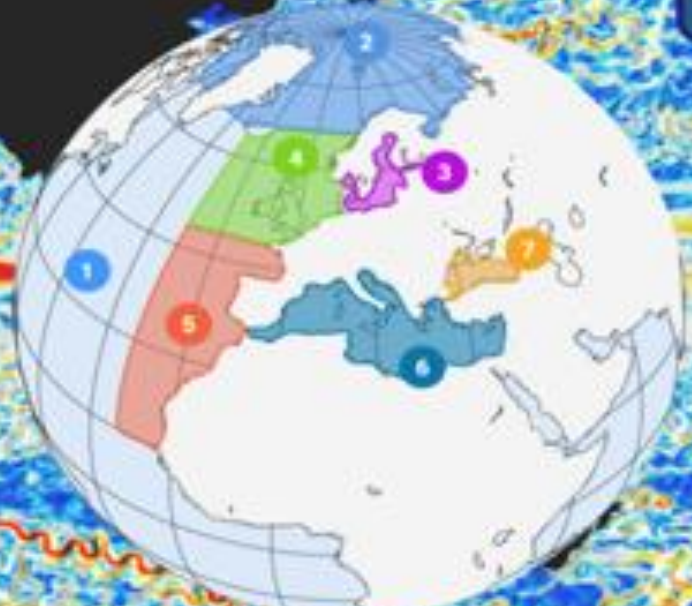
OBSERVATIONS
In-situ & Satellites

NUMERICAL MODELS
& data assimilation

marine.copernicus.eu

Free and Open



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

The role of observations in the Copernicus Marine Service

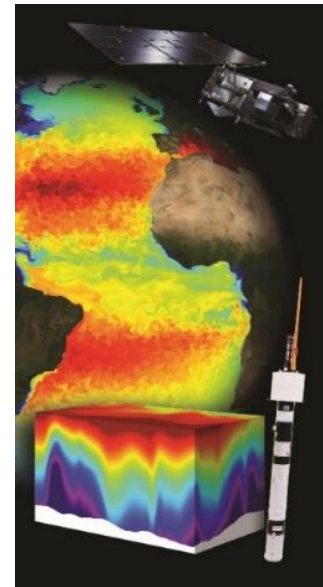
The Copernicus Marine Service is **highly dependent on** satellite (Sentinels) and in-situ observing capabilities. **Requirements, impact assessment and advocacy.**



Integration of Sentinel mission (S1, S2, S3 and S6). **Preparing for expansion missions.** Support the EC for **Sentinel NG** mission design.



Working with EEA, EuroGOOS & EOOS to **strengthen development of the global in-situ observing system.** International cooperation (GOOS) and UN Decade.



PROGRAMME OF
THE EUROPEAN UNION

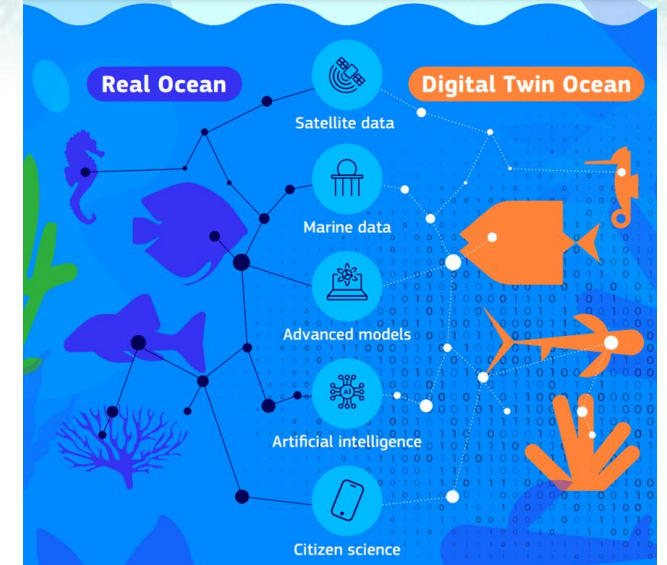


Implemented by

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Observations feeding models: the EU DTO

Digital space providing access to vast amounts of **data, models, artificial intelligence** and other tools, to allow the replication of the properties and behaviours of marine systems and their interaction



Use of **real-time and historical observation data** to represent the past and present, **initialize prediction models** and **improve models** to simulate future / what-if scenarios

Observations are the cornerstone of DTOs, serving key functions such as calibrating, optimizing (e.g., parameter estimation) and initializing models, training machine learning tools, or assessing and evaluating information provided by DTOs.

Concluding messages

World leading European marine services have been developed in Europe over the past 10 years: Copernicus Marine, Emodnet. European Digital Twin Ocean now brings together these services adding new services essential to sustainably manage the ocean and adapt to climate change (integrated and collaborative platform, tools, scenarios, user interaction).

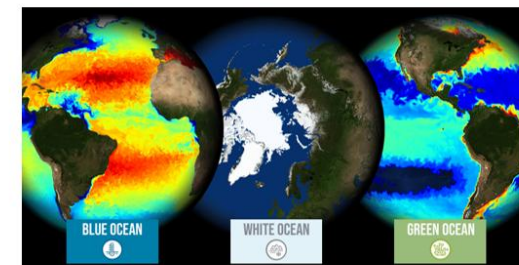
These services critically depend on observations. Risk today on the in-situ component due to strong dependency on USA. Need actions from the EC and MS to reduce these risks and develop European contributions to GOOS=> European Ocean Pact and Ocean Observing Initiative.



European
Ocean
Observing
System



Ocean Prediction



Digital Twin Ocean

