



Copernicus Marine and the coastal zone monitoring & forecasting



Dr. Pierre-Yves Le Traon

Scientific Director

GEO Blue Planet EU Office/ EU4OceanObs

Mercator Ocean International

5th Symposium | Accra, Ghana | 24 – 28 October 2022



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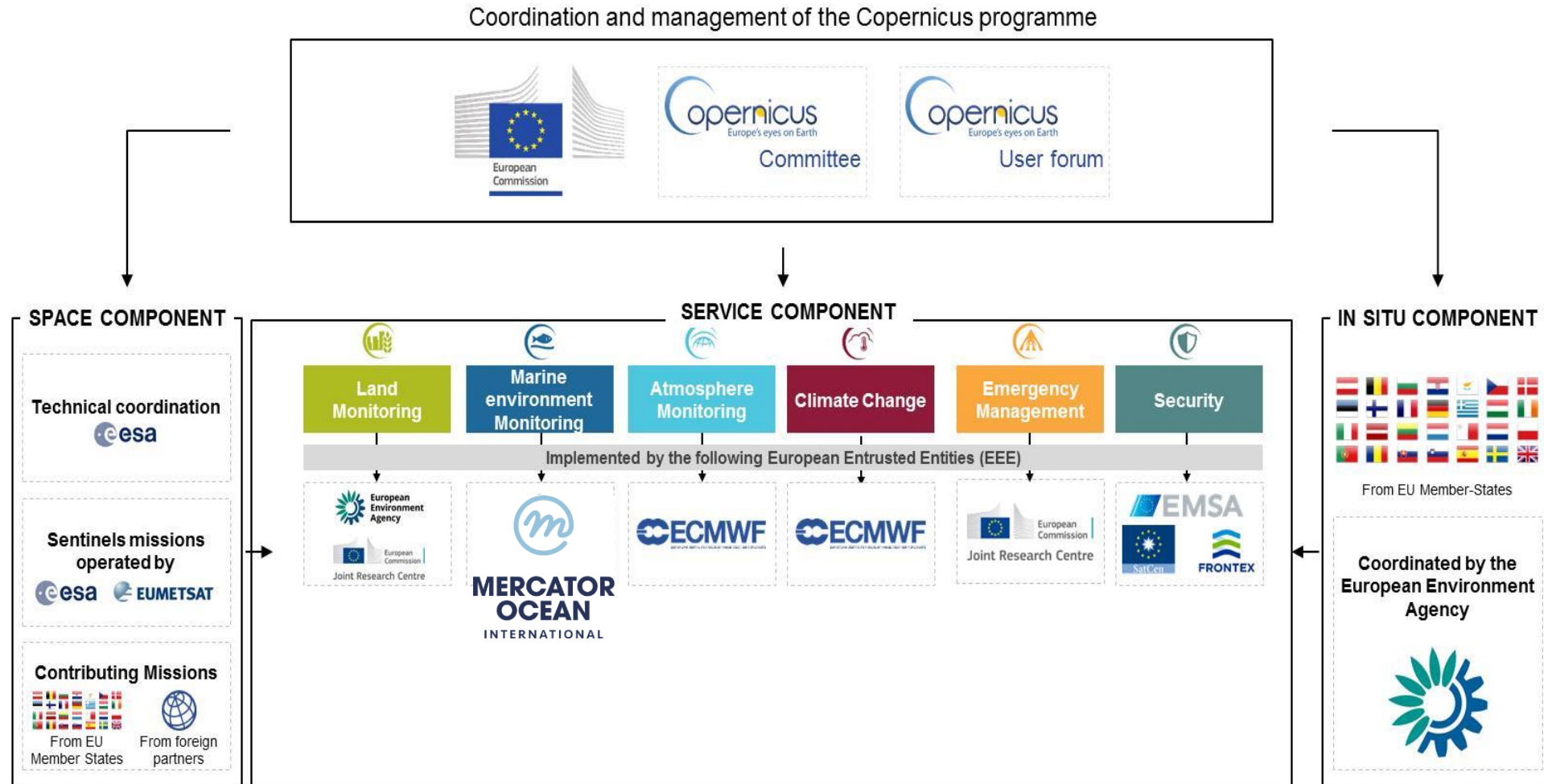


Copernicus Marine and Coastal Zone Monitoring and Forecasting

P.Y. Le Traon, Mercator Ocean International

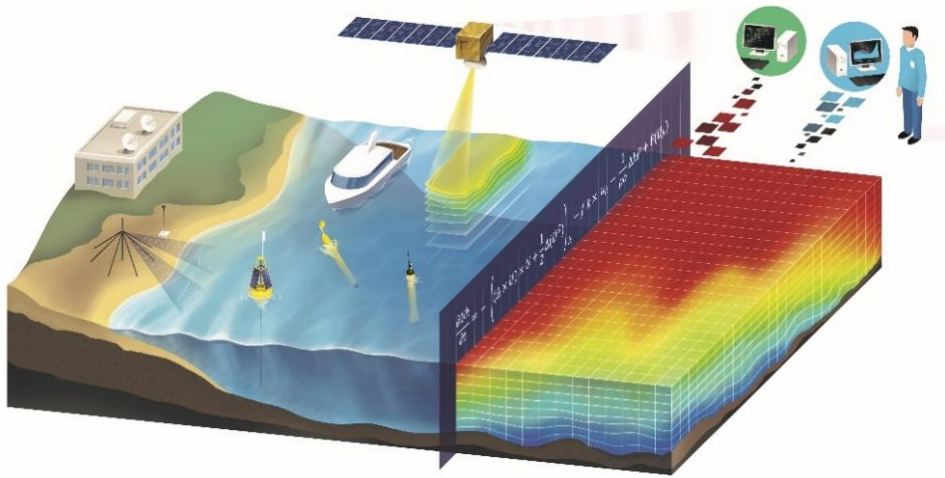


The EU Copernicus Earth Monitoring Programme



Mercator Ocean International

International Ocean Prediction Center, Toulouse, France - about 100 people



- Collaboration French institutions / Operational Oceanography (CNRS, Ifremer, IRD, Météo-France, SHOM). 1997.
- New European shareholders (Italy, Spain, UK, Norway). 2017
- Towards an intergovernmental organization by the end of 2024. Germany and Portugal to join.

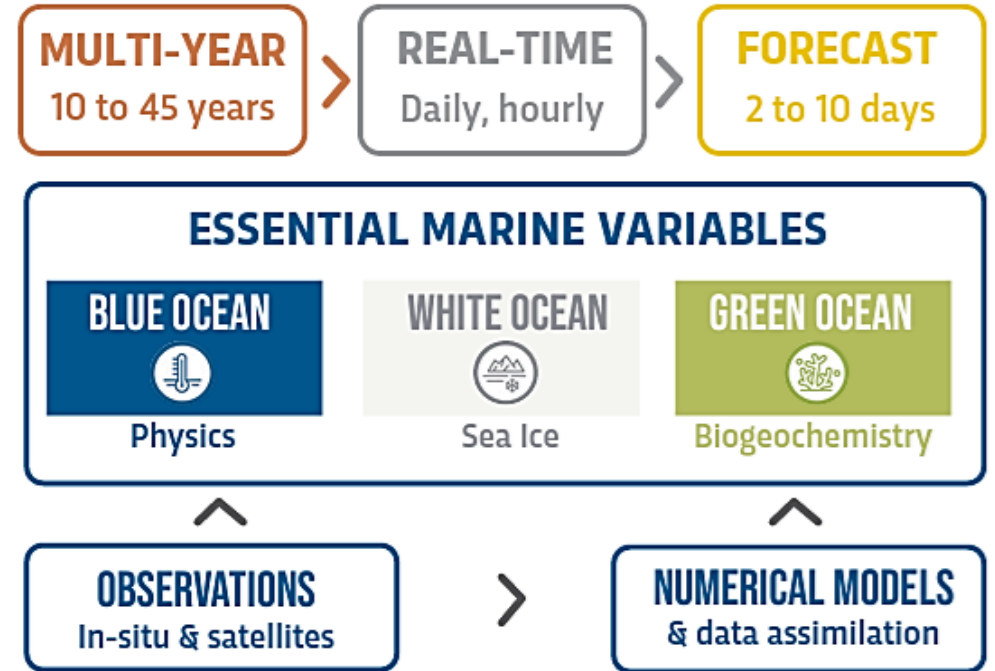
- ❑ Entrusted Entity by the EC for the implementation of the Copernicus Marine Service (2014-2021). Agreement renewed in July 2021 for 2021-2028.
- ❑ In charge for the EC of the European offices of the G7 FSOI and GEO Blue Planet. 2020.
- ❑ In charge of the development of the first EU Digital Twin Ocean. 2022
- ❑ UN Decade Collaborative Centre for Ocean Prediction. 2022.

The Copernicus Marine Service

Global and regional ocean monitoring and forecasting

COPERNICUS MARINE REGIONAL OCEAN PRODUCT DIVISIONS




- ① Global Ocean
- ② Arctic Ocean
- ③ Baltic Sea
- ④ European North West Shelf Seas
- ⑤ Iberian Biscay Ireland Seas
- ⑥ Mediterranean Sea
- ⑦ Black Sea



Access to products: marine.copernicus.eu

Implemented by [Mercator Ocean International](#) as part of the [Copernicus Programme](#)

Resources News Events Contact [REGISTER](#) English





   Services Opportunities Access Data Use Cases User Corner About

Copernicus Marine Service

Providing free and open marine data and services to enable marine policy implementation, support Blue growth and scientific innovation.

[Access Data >](#)

DATA	EXPERTISE	TRENDS	EXPLORATION
<h3>OCEAN PRODUCTS</h3> <p>A robust ocean data catalogue, to download or visualise data including hindcasts, nowcasts and forecasts.</p>	<h3>OCEAN STATE REPORT</h3> <p>Extensive annual analysis on the state of the ocean over nearly 20 years and severe/notable annual events.</p>	<h3>OCEAN MONITORING INDICATORS</h3> <p>Essential variables monitoring the health of the ocean over the past quarter of a century.</p>	<h3>OCEAN VISUALISATION</h3> <p>Dive into our 4D digital oceans through our 3 visualisation tools for beginner, intermediate and advanced users</p>

 User corner <p>All the info you need as a new or experienced user. Get trained, connect with the forum, get support and more.</p>	 Policy tools <p>Learn about EU and international maritime policies and how the Copernicus Marine Service supports them.</p>	 Services <p>See Copernicus Marine Use Cases, the blue markets we support, and the wide range of free and open support and services we provide.</p>	 User learning services <p>Find all the information you need to harness our service through workshops, trainings and online resources.</p>
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Online catalogue
Cloud based Marine
Data Store

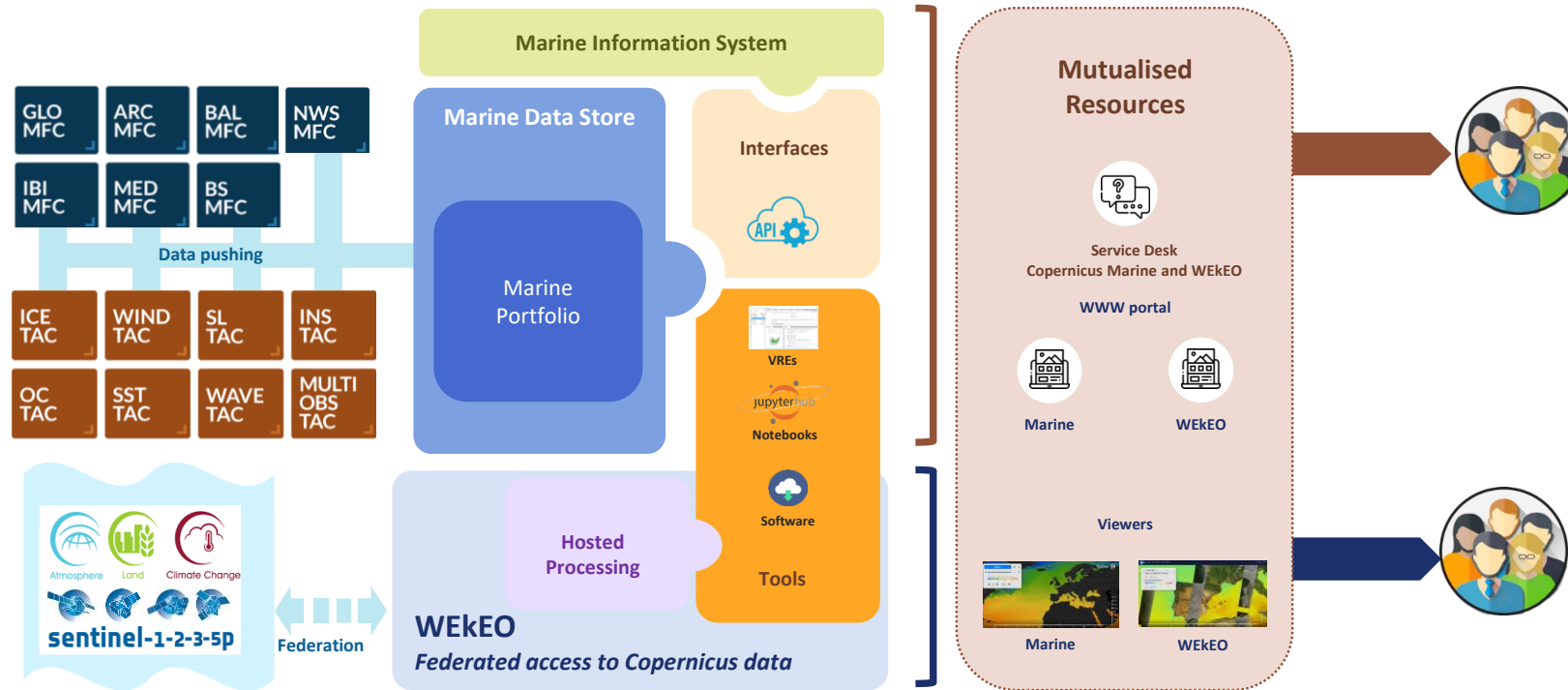
Nearly 300 documented
and scientifically
qualified products

User driven

Common format
(Netcdf)

Open and Free

Integrated cloud based platform to better service marine users and benefit from advanced digital services



Integration of WEKEO services in Copernicus Marine Services (VREs, Notebooks)

Synergy with **Digital Twin Ocean** et **Destination Earth** initiatives



Users, applications and User Uptake

*A wide range of applications (environment, society, economy)
Support to EU policies (Green Deal)*

ENVIRONMENT				SOCIETY				ECONOMY			
POLAR ENVIRONMENT MONITORING	MARINE CONSERVATION & BIODIVERSITY	OCEAN HEALTH	CLIMATE & CLIMATE ADAPTATION	POLICIES & OCEAN GOVERNANCE & MITIGATION	EDUCATION, PUBLIC HEALTH & RECREATION	SCIENCE & INNOVATION	EXTREMES, HAZARDS & SAFETY	COASTAL SERVICES	MARINE FOOD	NATURAL RESOURCES & ENERGY	TRADE & MARINE NAVIGATION
Arctic policy, MSFD, MSP, WFD, Habitat Directive, Bird Directive, Natura 2000, the Convention on Biological Diversity, WMO/UNFCCC, IPCC, the Paris agreement / global stocktake, SDG 13, 14, 15				Arctic Policy, MSFD, MSP, WFD, IOG, The Sendai Framework for Disaster Risk Reduction, SDG 1, 2, 3, 4, 5, 6, 7, 9, 11 and 16, 17				Space policy, Flood Directive, Green Deal, Energy Policy, Air Quality Directives, SDG 8, 9, 10, and 12, 17			

>45,000 subscribers
(+ 30% per year)

- 1 POLAR ENVIRONMENT MONITORING
- 2 CLIMATE & ADAPTATION
- 3 OCEAN HEALTH
- 4 MARINE CONSERVATION & BIODIVERSITY
- 5 SCIENCE & INNOVATION
- 6 POLICIES & OCEAN GOVERNANCE & MITIGATION
- 7 EDUCATION, PUBLIC HEALTH & RECREATION
- 8 EXTREMES, HAZARDS & SAFETY
- 9 MARINE FOOD
- 10 COASTAL SERVICES
- 11 TRADE & MARINE NAVIGATION
- 12 NATURAL RESOURCES & ENERGY

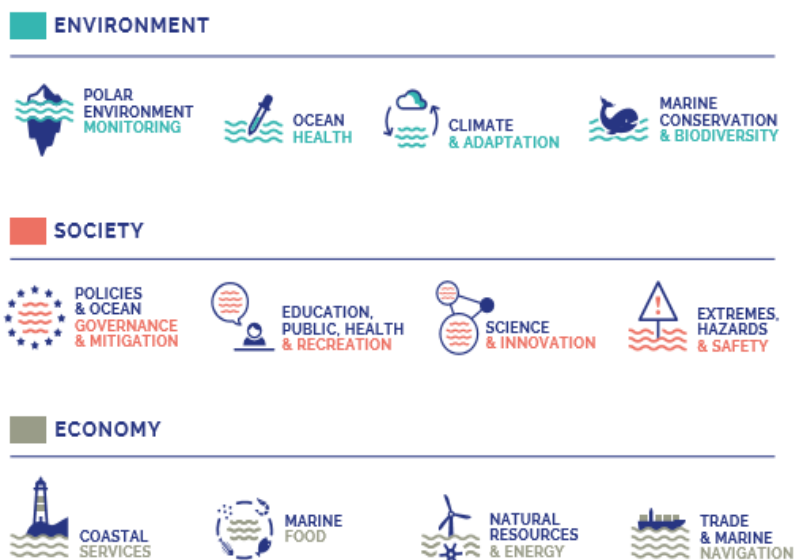


450,000 single visitors per year on the web portal in 2021

Coastal Zone Monitoring – Drivers

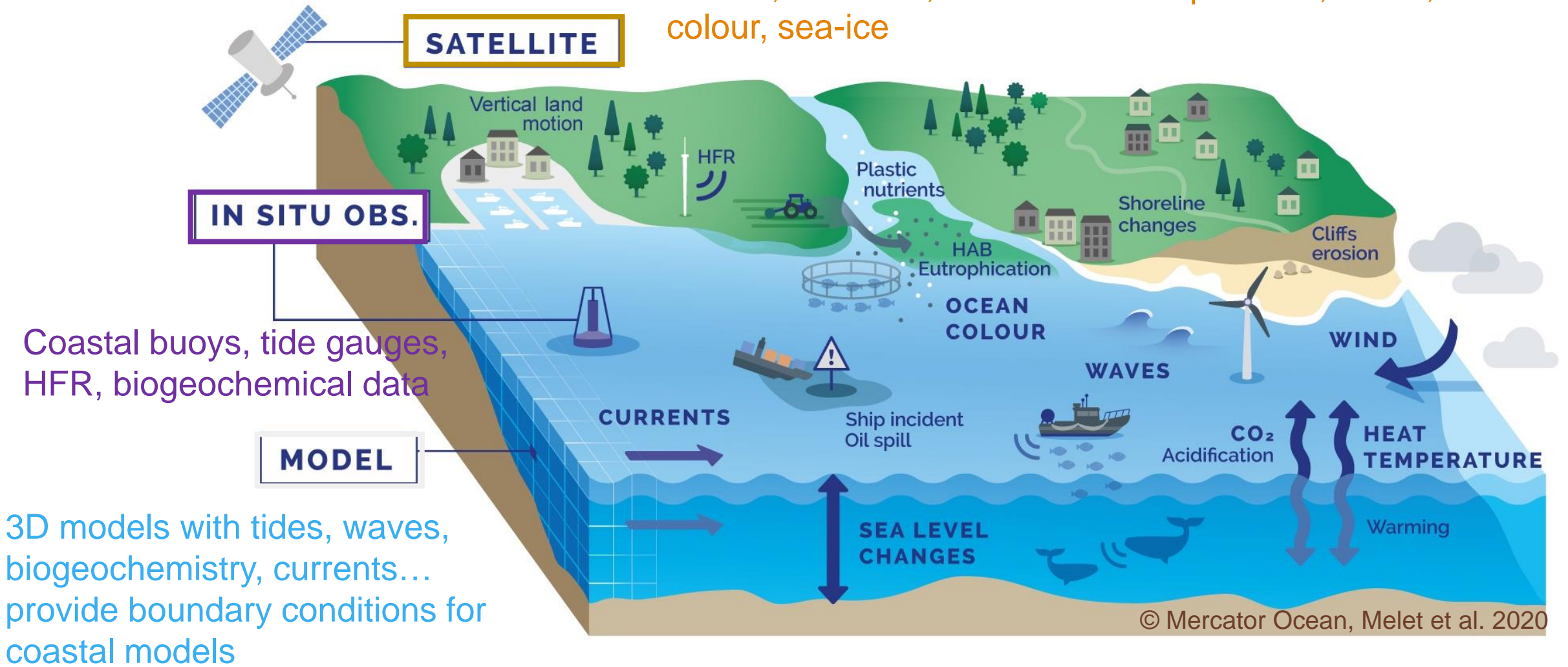
Coastal Zone :

- Tremendous social, economic & biological value but high level of pressure
- User needs for a wide range of applications
- Needs of European Policies (Green Deal, WFD, MSFD, MSP)



Coastal users : the Copernicus Marine Offer

Waves, sea level, sea surface temperature, winds, ocean colour, sea-ice



Coastal Hazards : The ECFAS project

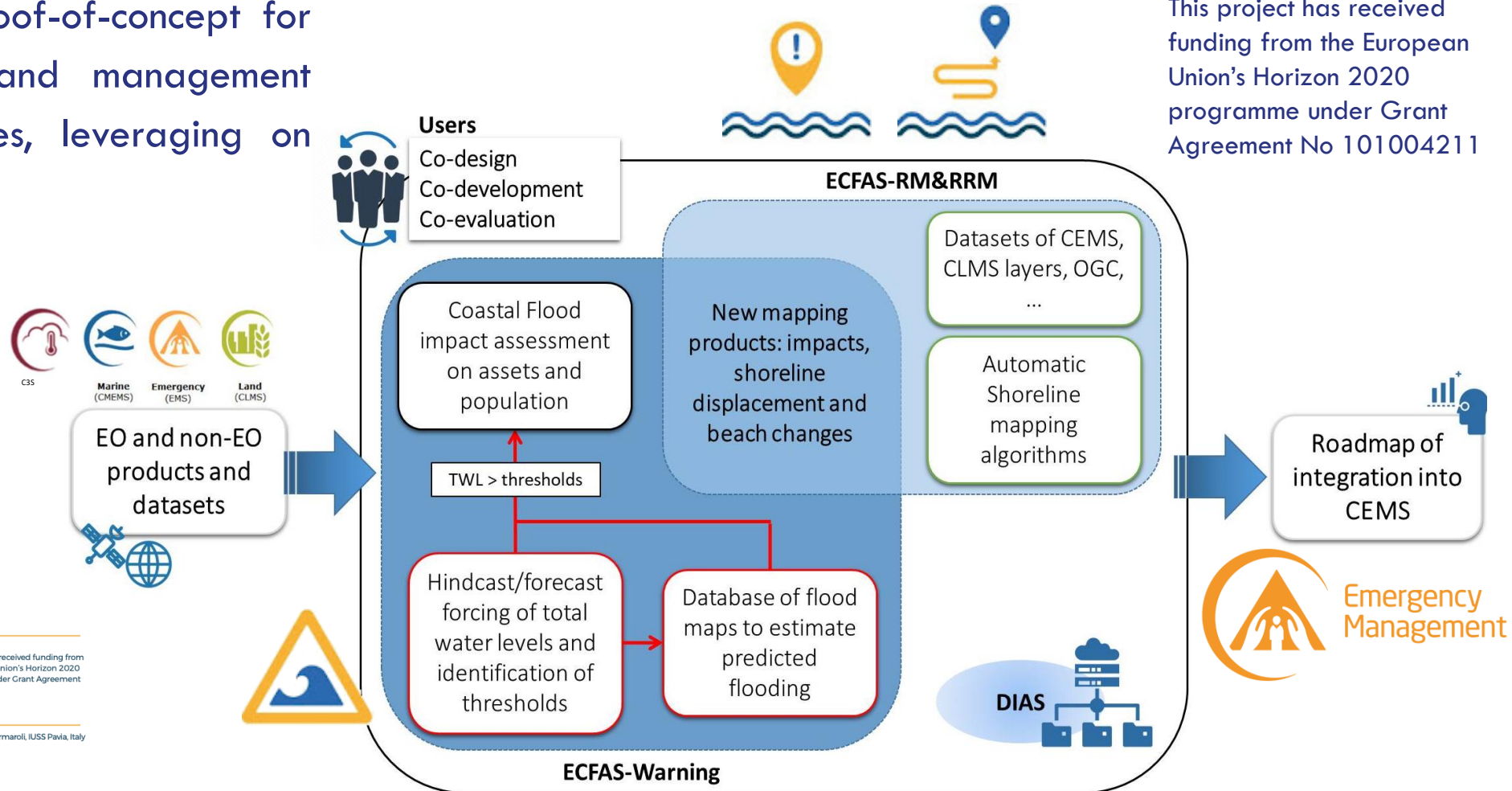
Towards a European Coastal Flood Awareness System

Objective: developing a proof-of-concept for the 1st flood forecasting and management system for EU coastal zones, leveraging on Copernicus services

Deliverable: a web platform to inform on coastal flood risk

Period: 2021-2022

This project has received funding from the European Union's Horizon 2020 programme under Grant Agreement No 101004211



CONSORTIUM



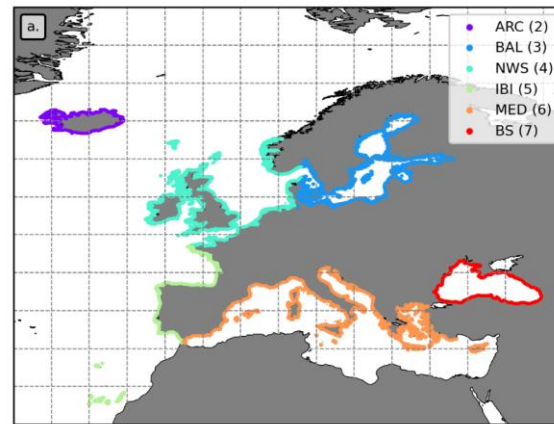
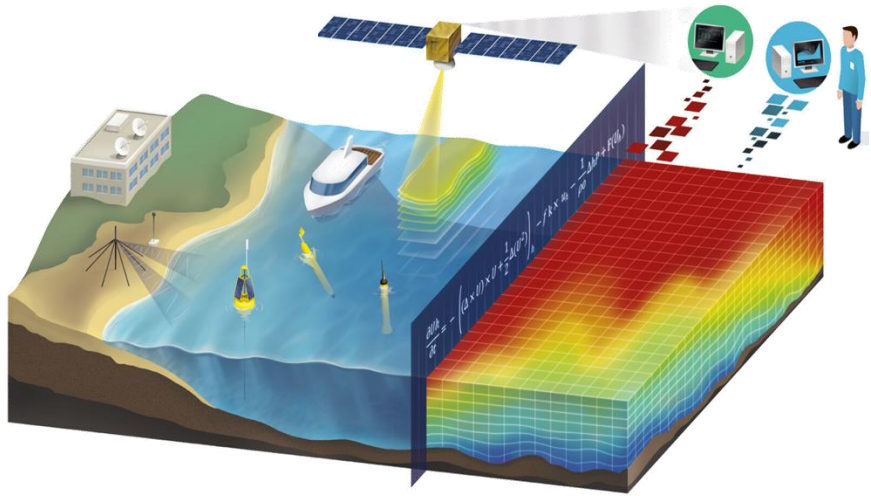
FUNDING

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ECFAS Coordinator | Dr. Clara Armadori, IUSS Pavia, Italy

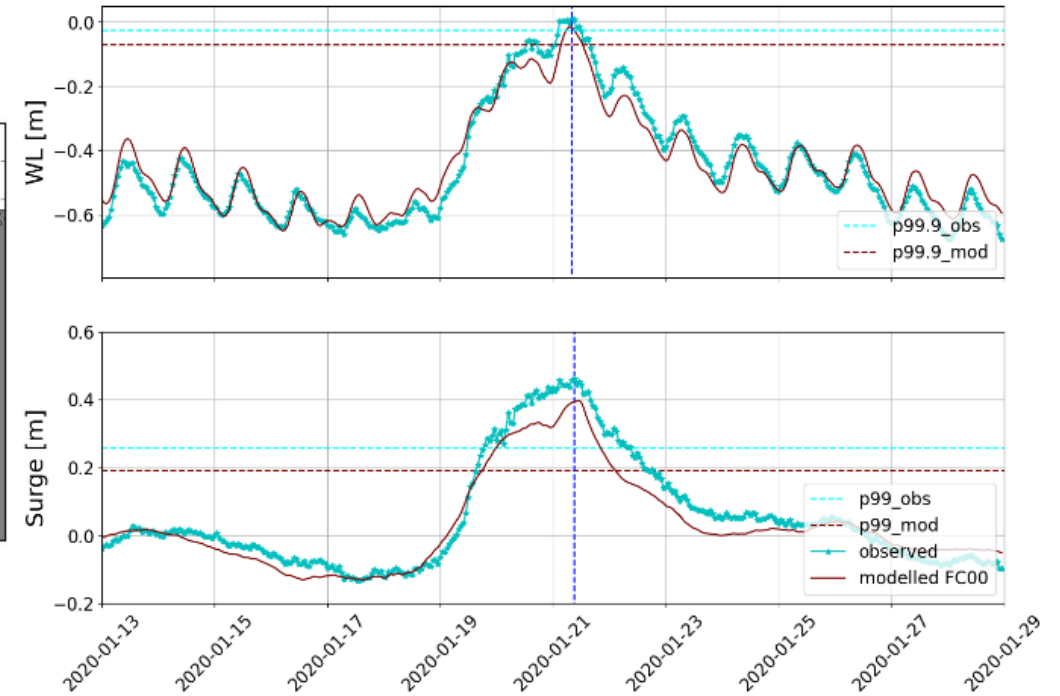
Coastal Hazards : The ECFAS project

Sea Level Forecasts from the Copernicus Marine Service



Operational & state-of-the-art 3D regional forecasting systems, network of producers, 1.5 to 4.5 km resolution, freely distributed

Storm Gloria @Valencia, Spain:
Tide gauge & Copernicus Marine model



Irazoqui et al. 2022, submitted

Dataset of 5-day forecasts of hourly total water level (TWL) along EU coasts
(incl. mean sea level, tides, storm surge, wave setup)

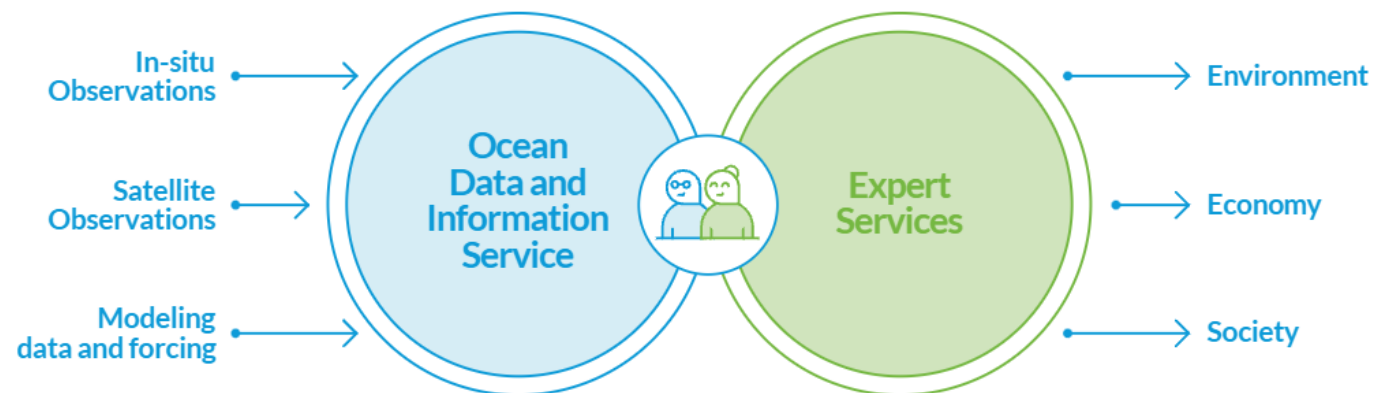
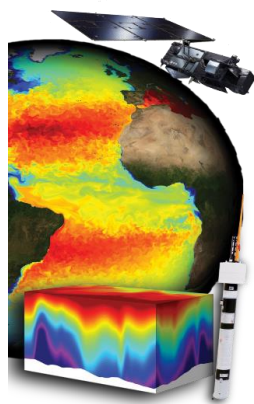
Updated daily since April 2021 - Compliant with user requirements

Copernicus Marine 2021 - 2028

Building on Copernicus Marine 1 successes for a new ambition:

A competitive Copernicus Marine based on (1) continuity, (2) enhanced information & service (3) digital integration, (4) re-enforced links with the other Copernicus services (land, climate, emergency, CO2) and EMODnet

User/policy needs, observation/science/technology advances





BLUE OCEAN

Currents, temperature, waves, sea level, ...



WHITE OCEAN

Ice coverage, velocity, concentration, Icebergs ...



GREEN OCEAN

CO2, nutrients, oxygen, primary production, ...

Copernicus Marine Service in COPERNICUS 2 :

Continuity of the Blue/White/Green Offer

+ a series of major evolutions developed depending on priorities & budget

Coastal



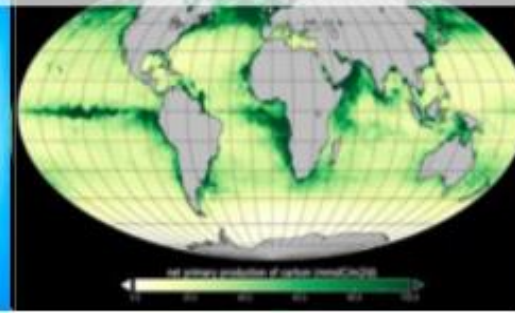
Arctic



Marine Biology



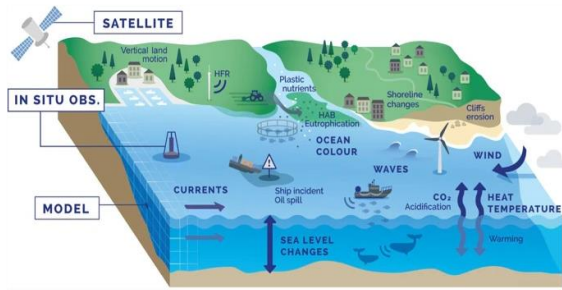
Ocean Climate



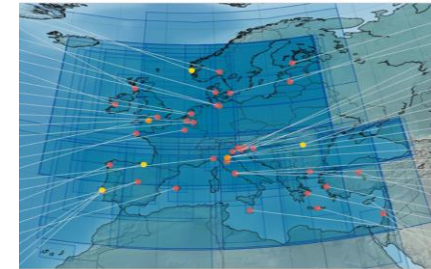
Digital services



Towards a new offer for coastal marine



Copernicus
Marine



Coastal systems



Public & private actors
for various sectors, implementation of policies...

Improved coastal zone monitoring :

- ❑ **Improved** (sea level, SST, ocean colour, winds, waves) **or new** (time evolving bathymetry) **satellite products.**
- ❑ Improved access to **in-situ data.**
- ❑ Towards standardized (freshwater, nutrients, particulate and dissolved matter) **modelled river discharges.**
- ❑ Cooperation with EMODnet, JERICO, Copernicus Emergency and Land Services.

Co-design/co-production with EU Member States:

- ❑ **Coupling** between **Copernicus Marine** and a series of **coastal models (physics and biogeochemistry)** operated by EU Member States.
- ❑ To be extended to **international partners** (e.g. GMES Africa).

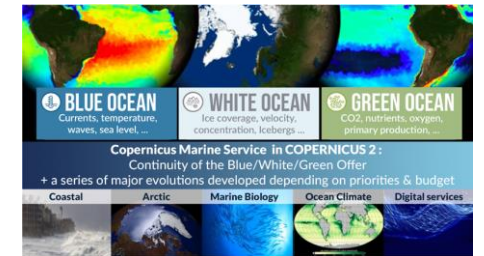
Copernicus Thematic Hub for the Coastal Zone



MOi leads the development of a **Copernicus Thematic Hub for Coastal Zones**. Collaboration with other Copernicus Services. First demonstration web portal will be launched by mid-2023, and will **include all existing coastal Copernicus data (marine, land, climate, emergency)**. It will be based on WEkEO platform.

Conclusions

- ❑ Copernicus Marine provides free&open and operational access to in-situ and satellite observations and models required for coastal hazard monitoring and forecasting.
- ❑ Improved coastal zone (marine) monitoring and forecasting is one of the top priorities for Copernicus Marine in Copernicus 2 (2021-2028):
 - Improved (sea level, SST, ocean colour, waves, winds) and new (time evolving bathymetry) coastal satellite products.
 - Improved access to coastal in-situ data.
 - Stronger / operational interfaces with coastal monitoring and forecasting systems operated by EU Member States (co-production/co-design). Re-enforced interfaces with international partners (e.g. GMES Africa).
- ❑ Copernicus Coastal Thematic Hub (marine, land, emergency, climate).





Thank You.
Medaase.
Oyiwaladon.

