Copernicus Marine Service

Copernicus Marine data for climate-smart MSP

Françoise MEYER

Mercator Ocean International

PROGRAMME OF THE EUROPEAN UNION

Copernicus Europe's eyes on Earth

Copernicus Marine Service

Implemented by MERCATOR OCEAN INTERNATIONAL

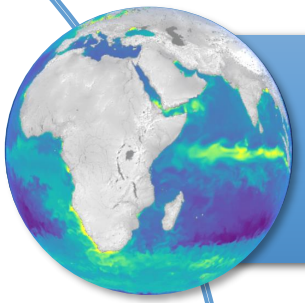
3 core missions

Multinational governance

Delegated entity of the European Union

Public interest mission

International partners network



DESCRIBES THE OCEAN ENVIRONMENT

- Global public service for **ocean data, information and knowledge**

PROVIDES OCEAN SERVICES & CAPACITIES

- Capacity sharing and cooperation through **a global ocean prediction network**

SUPPORTS OCEAN PROGRAMMES & POLICIES

- **Ocean intelligence** and policy-support services to States, EU, UN…

EU & UN mandates

Multinational governance

Delegated entity of the European Union

Public interest mission

Digital oceanography, operational

International partners network

Copernicus Marine Service

Copernicus WEkEO

Thematic Hubs

EU4OceanObs

Ocean Prediction

EDITO
European Digital Twin Ocean

EU & UN mandates

Multinational governance

Delegated entity of the European Union

Public interest mission

Digital oceanography, operational

International partners network

Copernicus Marine Service

Copernicus WEkEO

Thematic Hubs

EU4OceanObs

Ocean Prediction

EDITO
European Digital Twin Ocean

Copernicus Marine Service

Copernicus: Europe's Earth Observation Programme

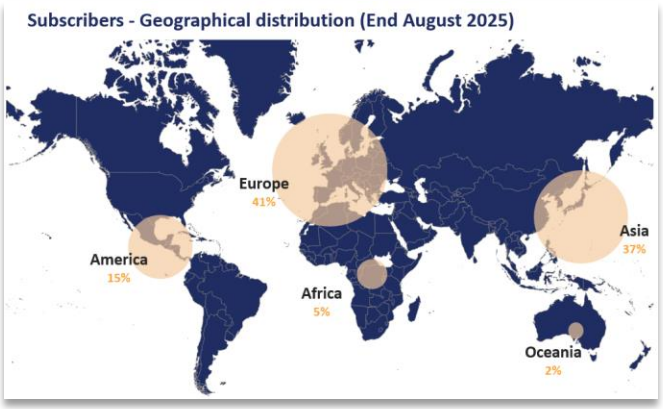
European Commission

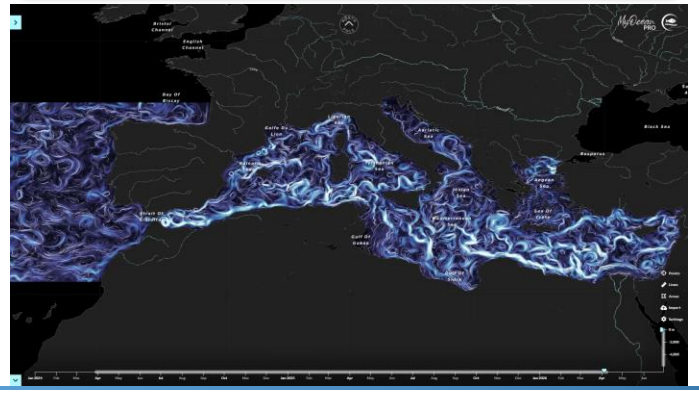
Ocean services & capacities

Pan-European network of 200 partners entities

Serving a global community of > 1,500,000 yearly users, *among which 115 000 subscribers*

Supporting a sustainable Blue Economy and Ocean knowledge





Copernicus
Marine Service

Copernicus Marine data

Supporting MSP with operational data

PROGRAMME OF
THE EUROPEAN UNION

opernicus
Europe's eyes on Earth

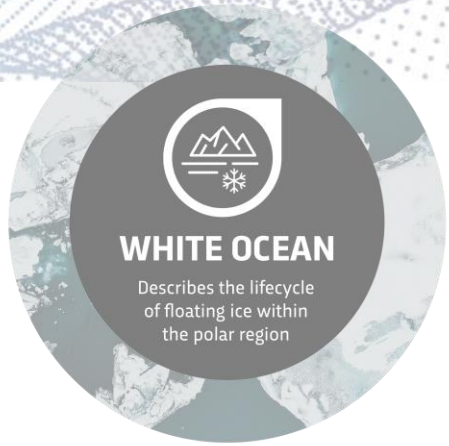
Copernicus
Marine Service

Implemented by
MERCATOR
OCEAN
INTERNATIONAL

Copernicus Marine Service

Data Portfolio

Providing marine data and services to enable marine policy implementation, blue growth and scientific innovation



Open & free

Scientifically qualified

User driven

BLUE MARKETS

- App & Downstream Services
- 300 Use Cases

VISUALISATION TOOLS

- Free Data Access

USER SUPPORT

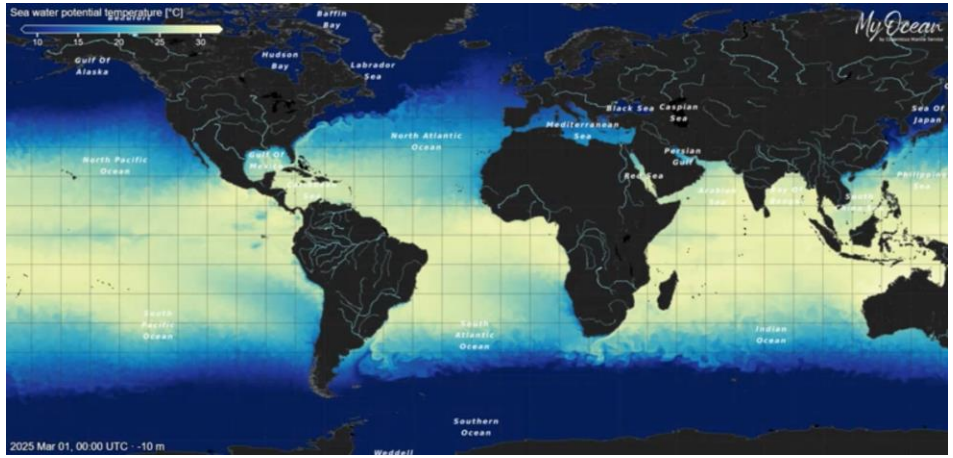
- Assistance & Training

OCEAN STATE REPORT

- Annual Reference Report

300 PRODUCTS

110+K USERS



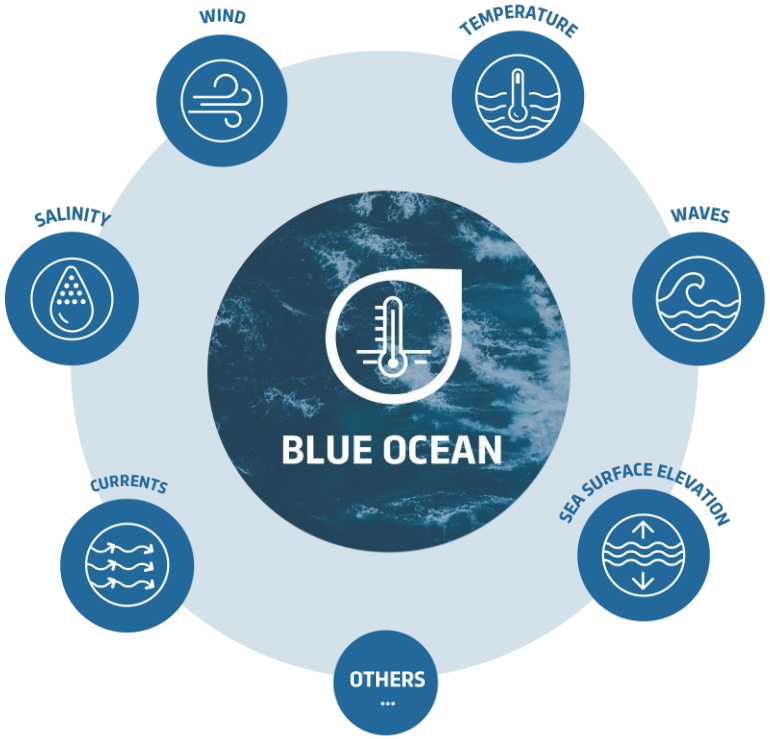
- Global Ocean
- Baltic Sea
- Black Sea
- Mediterranean Sea
- Arctic Ocean
- European North West Shelf Seas
- Iberian Biscay Ireland Seas

SATELLITE DATA | MODEL DATA | IN SITU DATA

MULTI-YEAR | NEAR-REAL-TIME | FORECAST

Copernicus Marine Service

Data Portfolio



DATA SOURCES

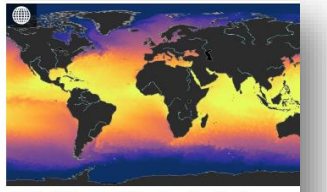
SATELLITE DATA | MODEL DATA | IN SITU DATA

PROGRAMME OF THE EUROPEAN UNION
Copernicus Europe's eyes on Earth
implemented by MERCATOR OCEAN INTERNATIONAL

Use case of operational data for MSP

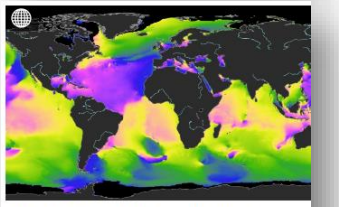
Project - BIODIVER COAST II
Modelling and monitoring in support of biodiversity restoration and oyster aquaculture in Galway Bay, Ireland

PRODUCTS



Global Ocean Physics Analysis and Forecast

GLOBAL_ANALYSISFORECAST_P... 001_024
Models
Global, 0.083° × 0.083° × 50 levels
1 Jan 2019 to 12 Oct 2024, hourly, daily,...
Temperature, salinity, sea surface height, velocity, mixed layer thickness, wave, sea ice...

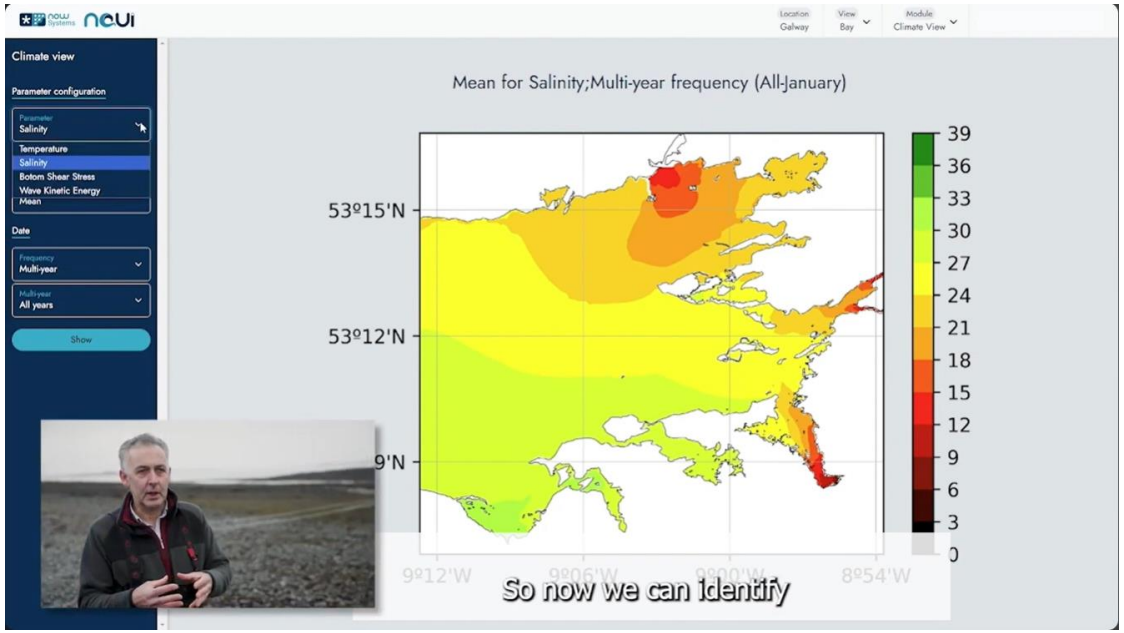


Global Ocean Waves Analysis and Forecast

GLOBAL_ANALYSISFORECAST_W... 001_027
Models
Global, 0.083° × 0.083°
1 Oct 2021 to 11 Oct 2024, hourly
Velocity, wave

SERVICE

MAPPING MARINE CONDITIONS



BENEFITS

- Determination of the distribution of suitable habitat for native oyster
- Information for monitoring

Low salinity warning system to inform oyster farmers

PROGRAMME OF THE EUROPEAN UNION

implemented by MERCATOR OCEAN INTERNATIONAL

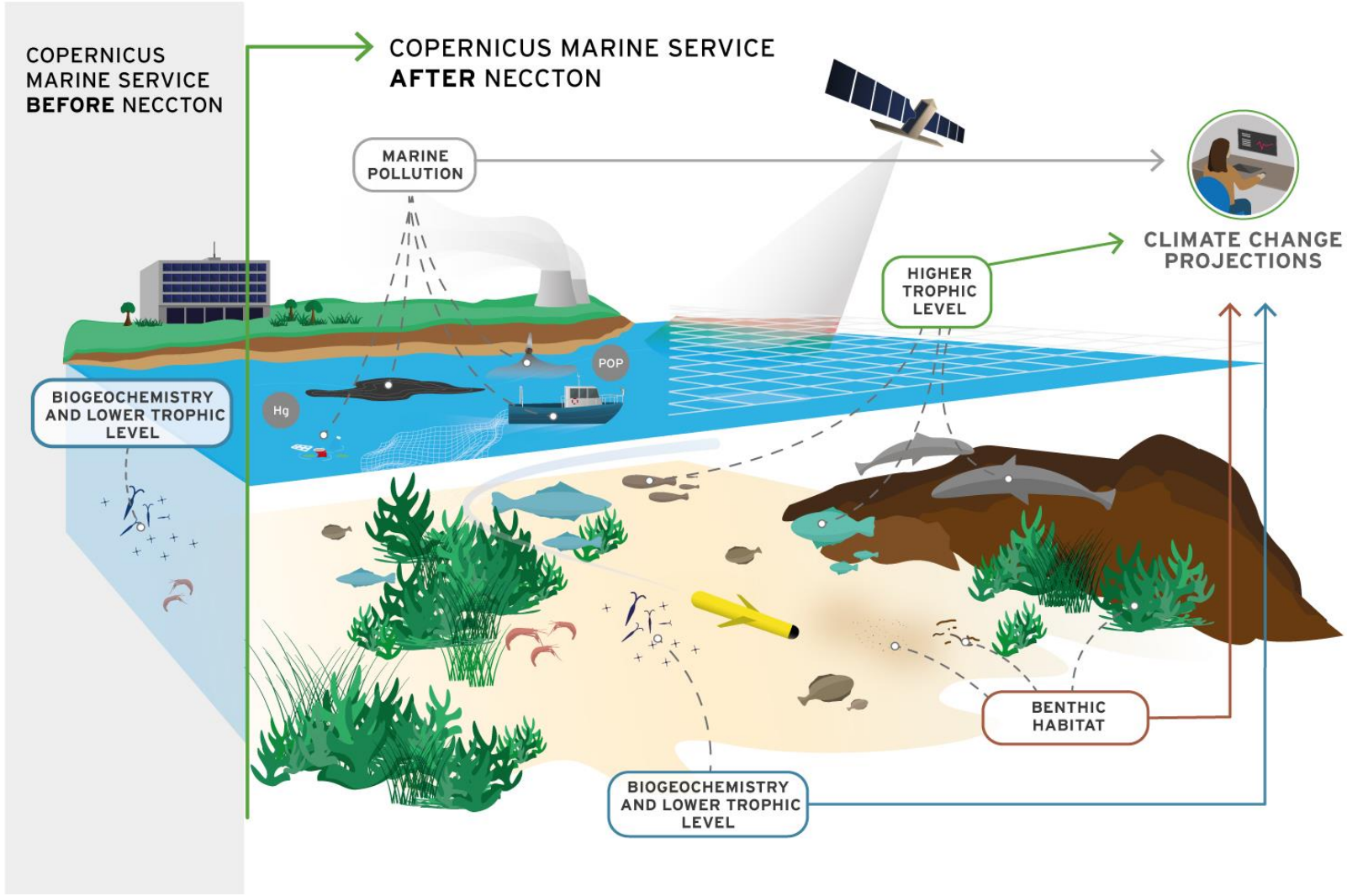
Copernicus Marine Service

An evolving Service

NECCTON

NEW COPERNICUS CAPABILITY FOR TROPHIC OCEAN NETWORKS

New Copernicus Capability for Trophic Ocean Networks — is a Horizon Europe Project that strengthens the Copernicus Marine Service with **new and improved ecosystem data and models** to support biodiversity conservation, fisheries management, pollution, benthic habitats, and ocean policy.

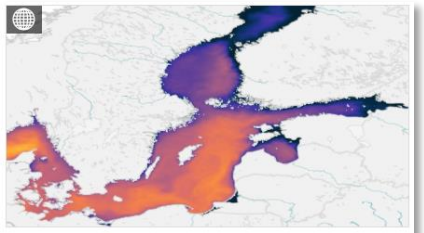


PROGRAMME OF THE EUROPEAN UNION
Copernicus Europe's eyes on Earth
implemented by MERCATOR OCEAN INTERNATIONAL

NECCTON Species Occurrence Maps: Supporting Baltic Sea MSP

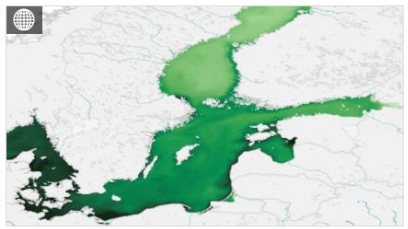
Example output of the Protect Baltic project

PRODUCTS



Baltic Sea Physics Reanalysis

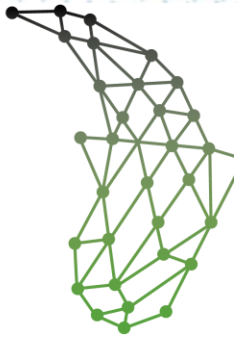
BALTICSEA_MULTIYEAR_PHY_003_011
Models
Baltic, 2 × 2 km × 56 levels
1 Jan 1993 to 31 Dec 2024, daily, monthly, yearly
Temperature, salinity, sea surface height, velocity, mixed layer thickness, sea ice



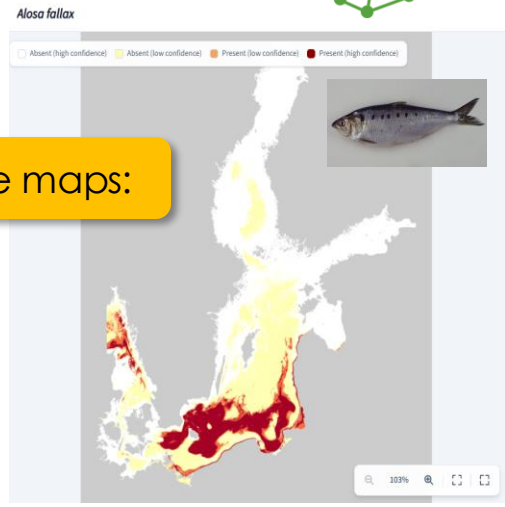
Baltic Sea Biogeochemistry Reanalysis

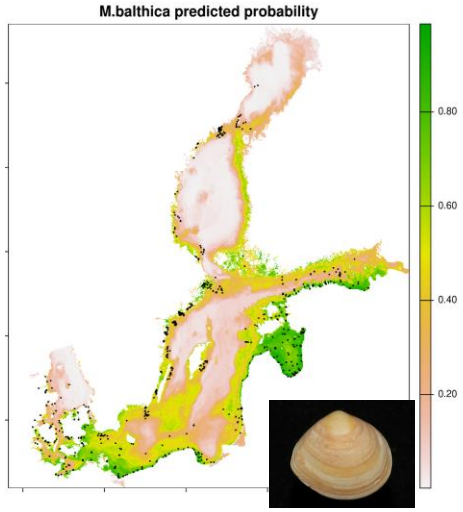
BALTICSEA_MULTIYEAR_BGC_003_012
Models
Baltic, 2 × 2 km × 56 levels
1 Jan 1993 to 31 Dec 2024, daily, monthly, yearly
Plankton, nutrients, oxygen, carbonate system, optics

NEW DATA & MODELS



Key species occurrence maps:





Biomarkers
+
Environmental data

Supporting decision

- Protecting biodiversity,
- Maintaining ecosystem functions,
- Enabling sustainable use of the Baltic Sea.

Copernicus
Marine Service

Ocean Monitoring Indicators

Supporting coastal needs with trends information

PROGRAMME OF
THE EUROPEAN UNION

opernicus
Europe's eyes on Earth

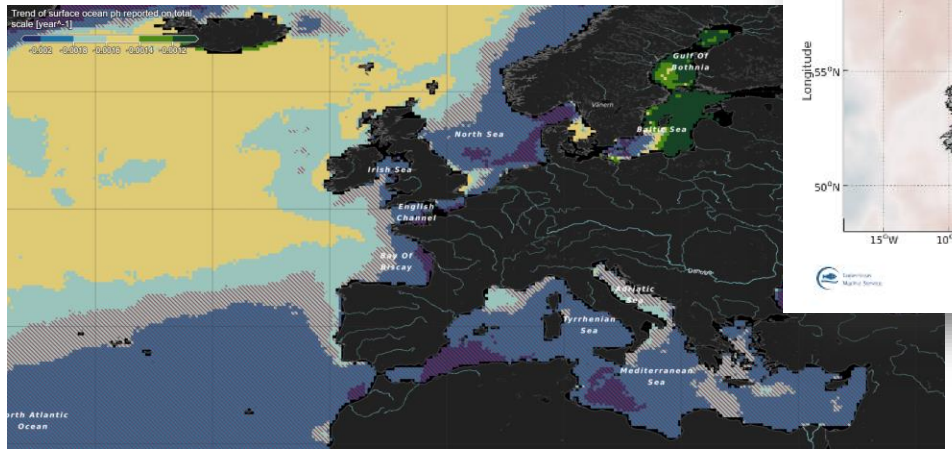
Copernicus
Marine Service

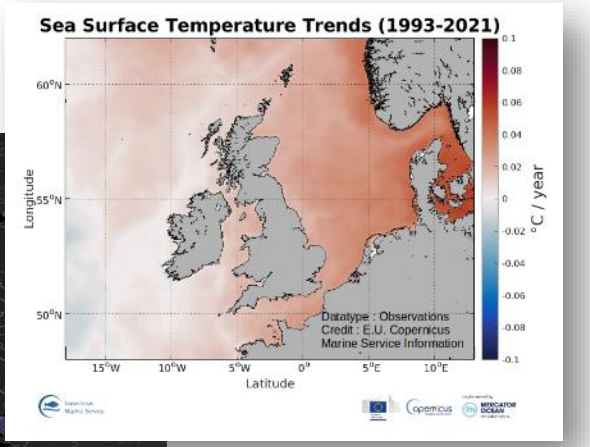
Implemented by
MERCATOR
OCEAN
INTERNATIONAL

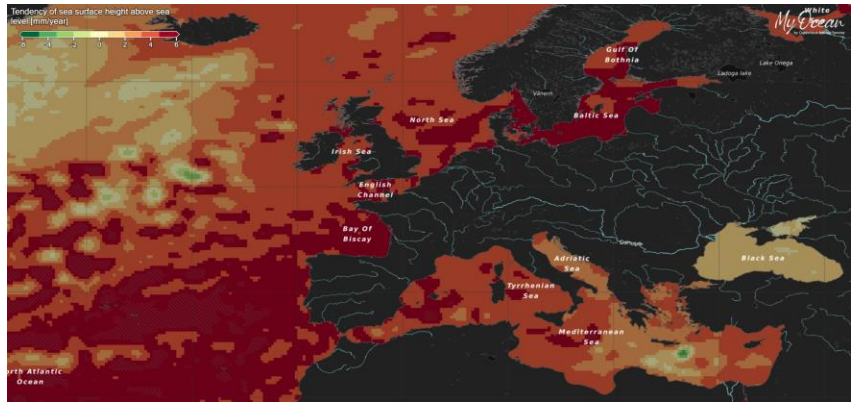
Ocean Monitoring Indicators (OMIs)

- Long-term trends and extremes of ocean state over the last decades in a changing climate
- Peer-reviewed indicators, standardized and reliable ensuring consistency across regions over time
- Address ocean warming, ocean acidification, sea level rise and more…
- Support climate adaptation strategies, sustainable blue economy, maritime spatial planning, decision-making

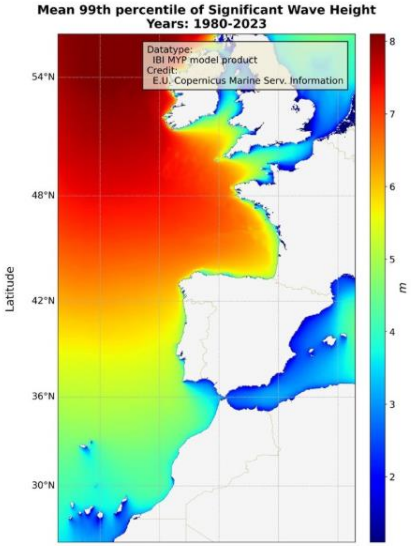
Ocean acidification trend







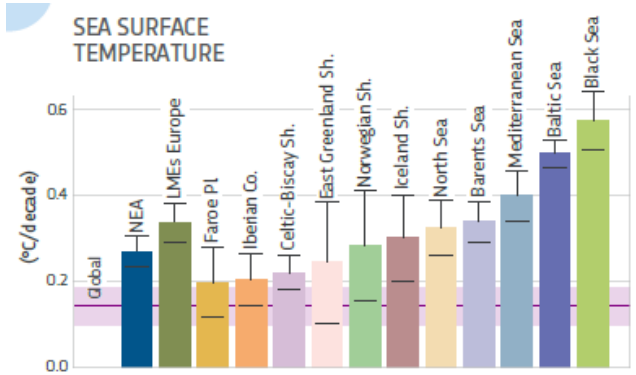
Sea surface height tendency



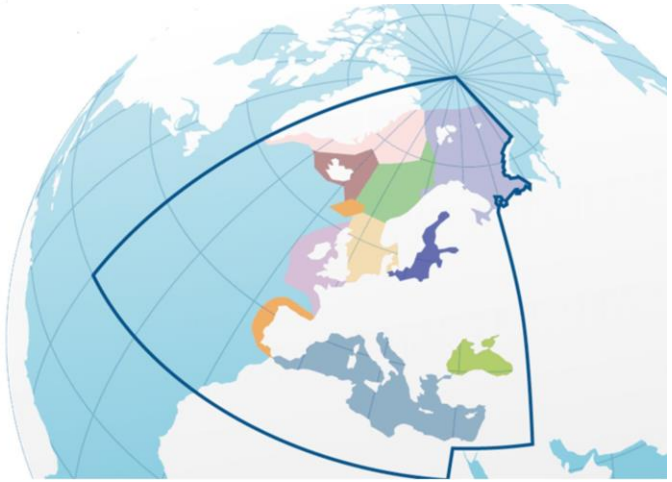
Extreme of waves

Peer reviewed indicators

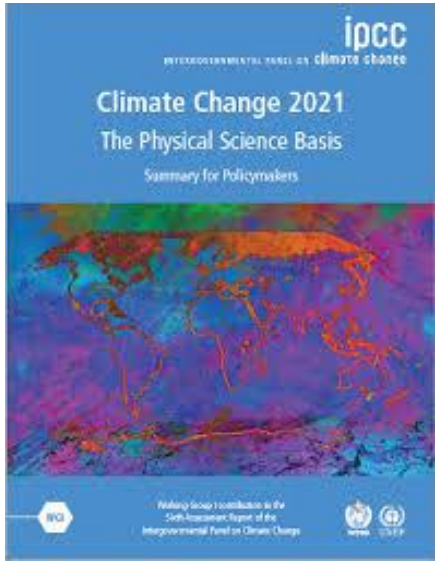
Reference Report of the European Union



ABOVE: Ocean change is not uniform. Semi-enclosed basins such as the Black, Baltic and Mediterranean Seas are warming far more rapidly due to limited exchange with the open ocean. Adapted from: von Schuckmann et al., 2025. Copernicus Ocean State Report 9



IPCC AR6



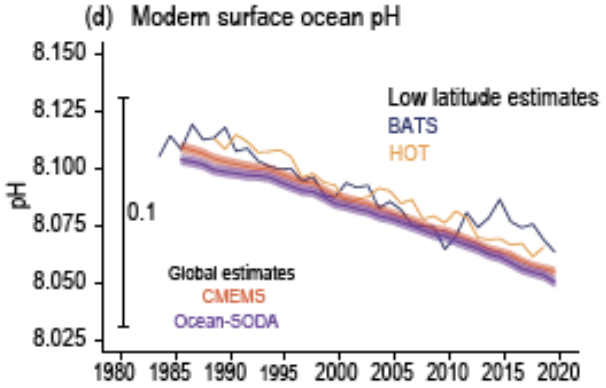
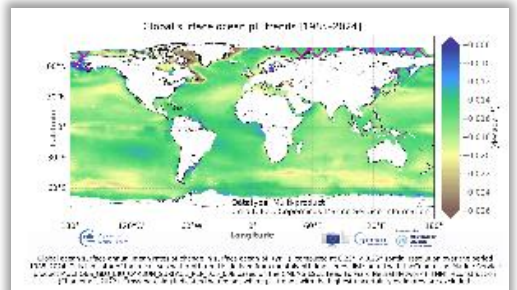


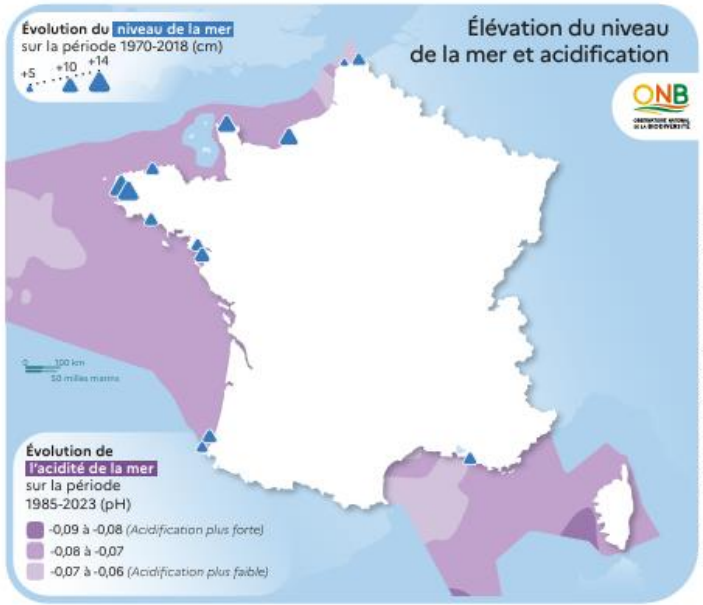
Figure 2.29 | Low-latitude surface ocean pH over the last 65 million years (65 Myr). (a) Low-latitude (30°N–30°S) surface ocean pH over the last 65 Myr

From OMI PH trend map



Global ocean acidification - mean sea water pH trend map from Multi-...

GLOBAL_OMI_HEALTH_carbon_ph_trend
In-situ
Global
Since 1 Jan 1985, multi-yearly
Carbonate system



Copernicus Marine Service

Ocean Monitoring Indicators (OMIs)

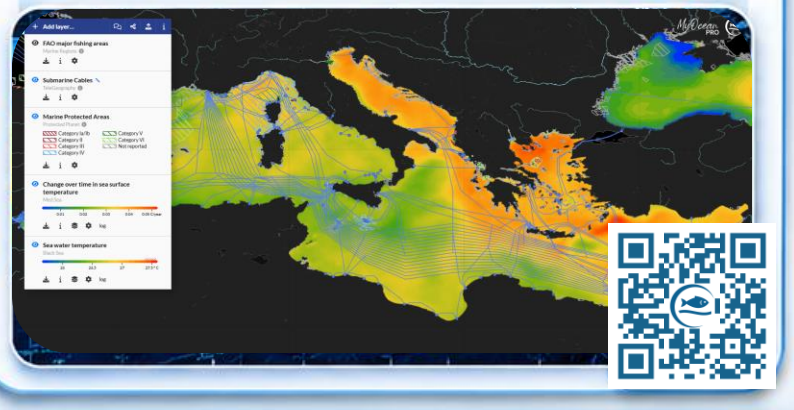
Ocean Climate

OMIs

- Sea Surface Temperature trends
- Sea Level trends

Supports action

- Climate trends
- Long-term marine changes
- Coastal flood risk



Ocean Variability and Extremes

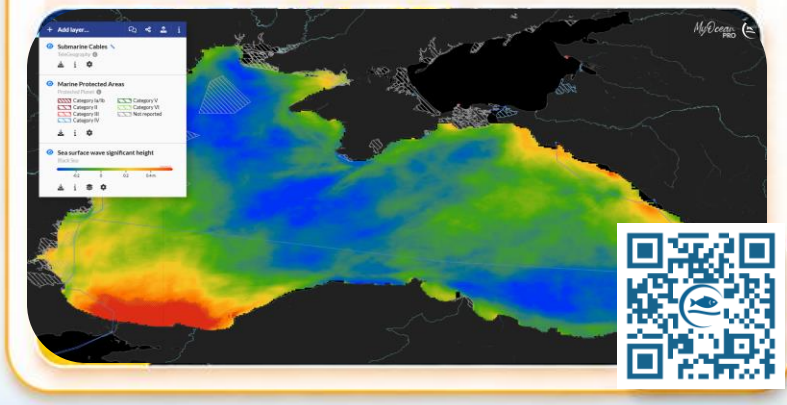
OMIs

- Sea Surface Temperature trends
- Sea Level trends
- Waves mean and extreme trends

Supports action

- Offshore risks
- Storms & flooding
- Coastal hazard management

Renewable energy



Ocean Health

OMIs

- Chlorophyll-a concentration trends
- Seawater pH trends

Supports action

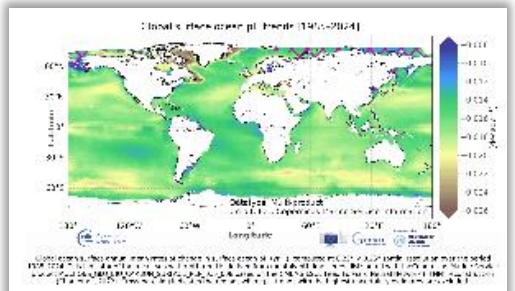
- Ecosystem assessment
- Fisheries planning
- Marine protected area design

- Aquaculture

PROGRAMME OF THE EUROPEAN UNION
Copernicus Europe's eyes on Earth
implemented by MERCATOR OCEAN INTERNATIONAL

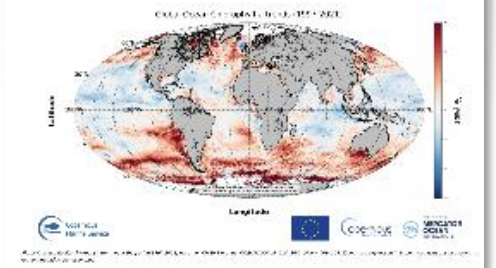
Copernicus Marine Service

Marine data in MyOcean pro



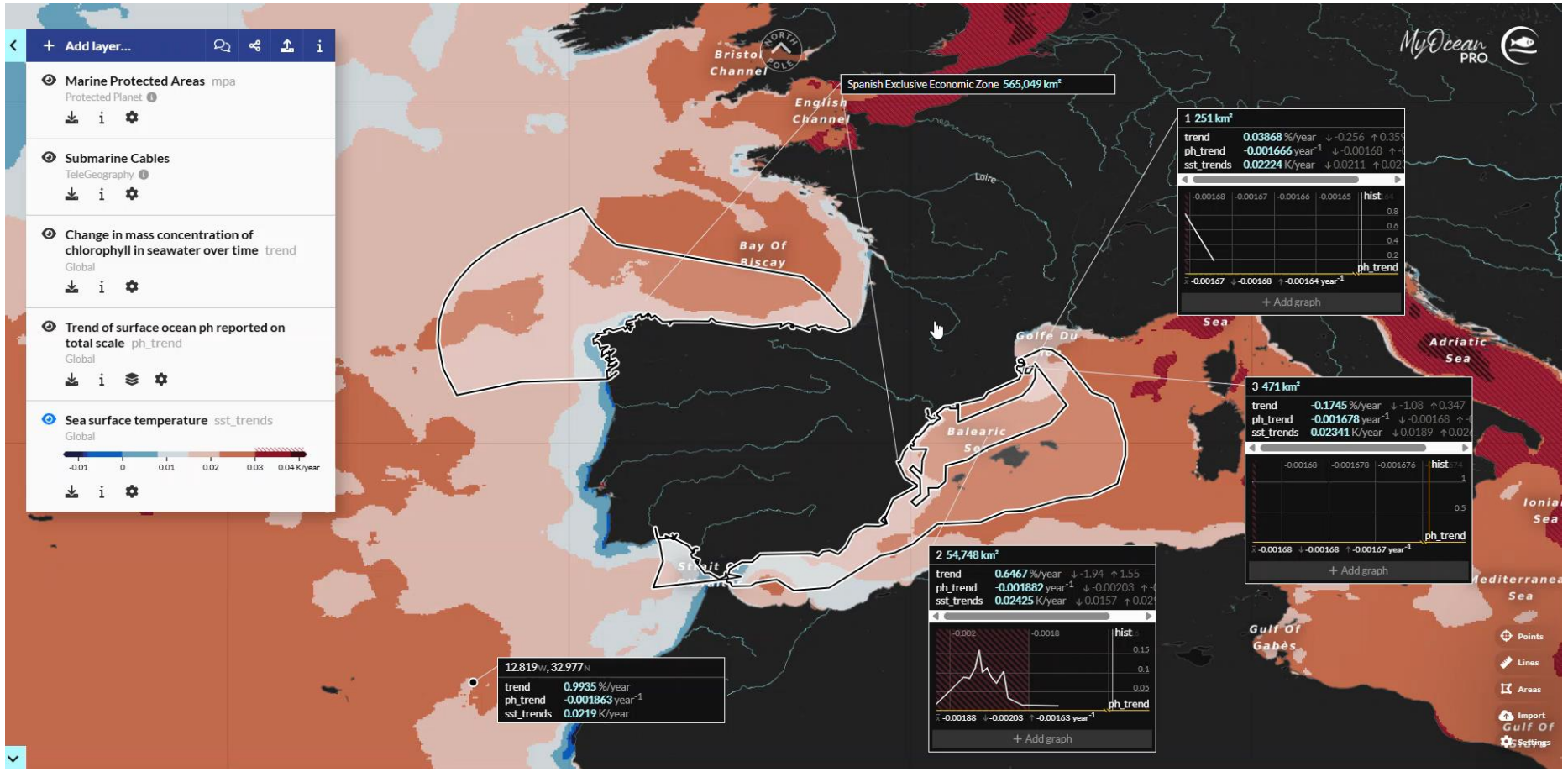
Global ocean acidification - mean sea water pH trend map from Multi-...

GLOBAL_OMI_HEALTH_carbon_ph_trend
In-situ
Global
Since 1 Jan 1985, multi-yearly
Carbonate system



Global Ocean Chlorophyll-a trend map from Observations Reprocessing

OMI_HEALTH_CHL_GLOBAL_OCEANC... R_trend
Satellite (L4)
Global, 4 × 4 km
Since 4 Sep 1997
Plankton



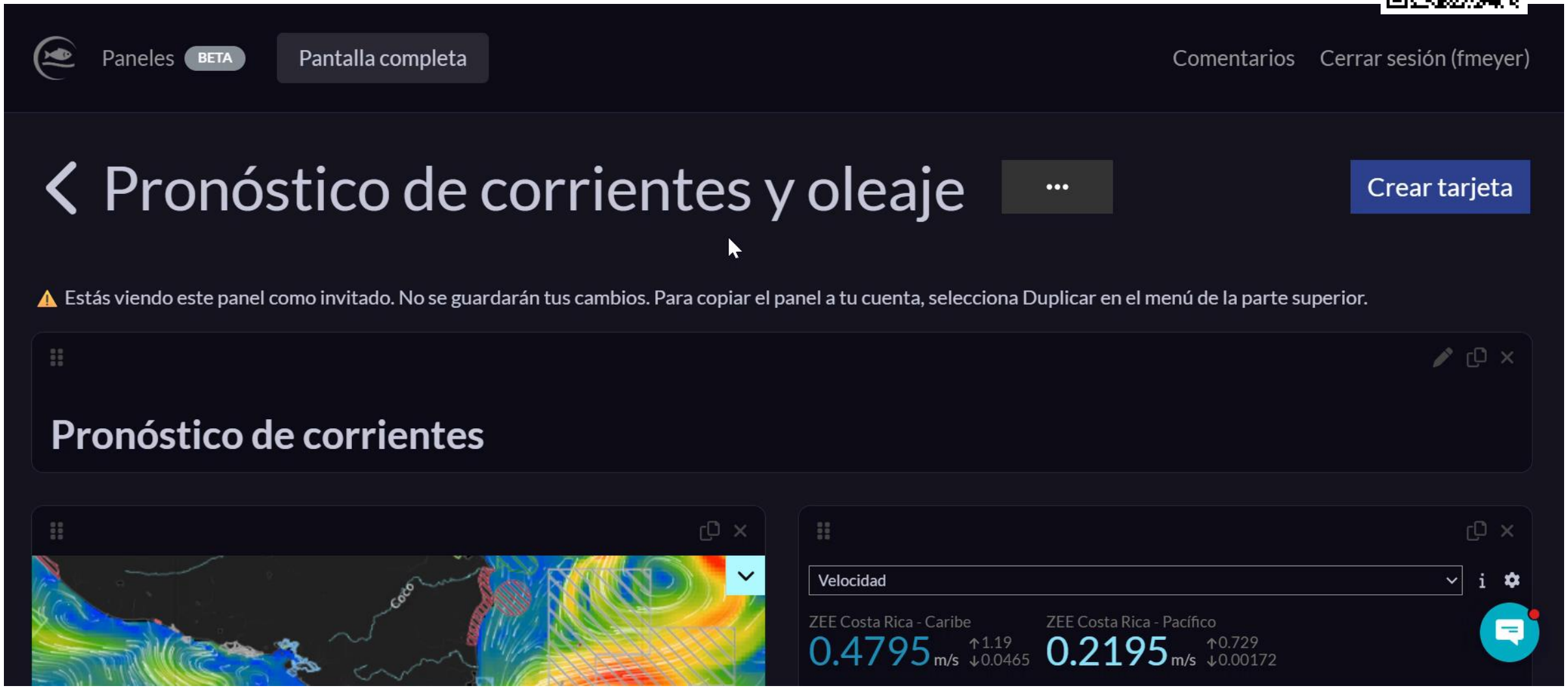
PROGRAMME OF THE EUROPEAN UNION

Copernicus Europe's eyes on Earth

implemented by MERCATOR OCEAN INTERNATIONAL

Copernicus Marine Service

Creating your own dashboard



PROGRAMME OF THE EUROPEAN UNION
Copernicus Europe's eyes on Earth
implemented by MERCATOR OCEAN INTERNATIONAL

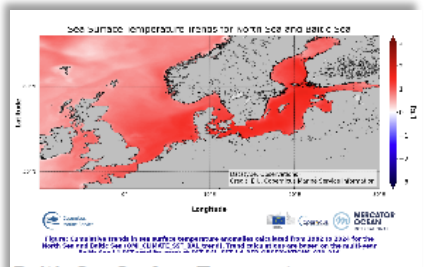
Marine data in QGIS

Copernicus Marine Service

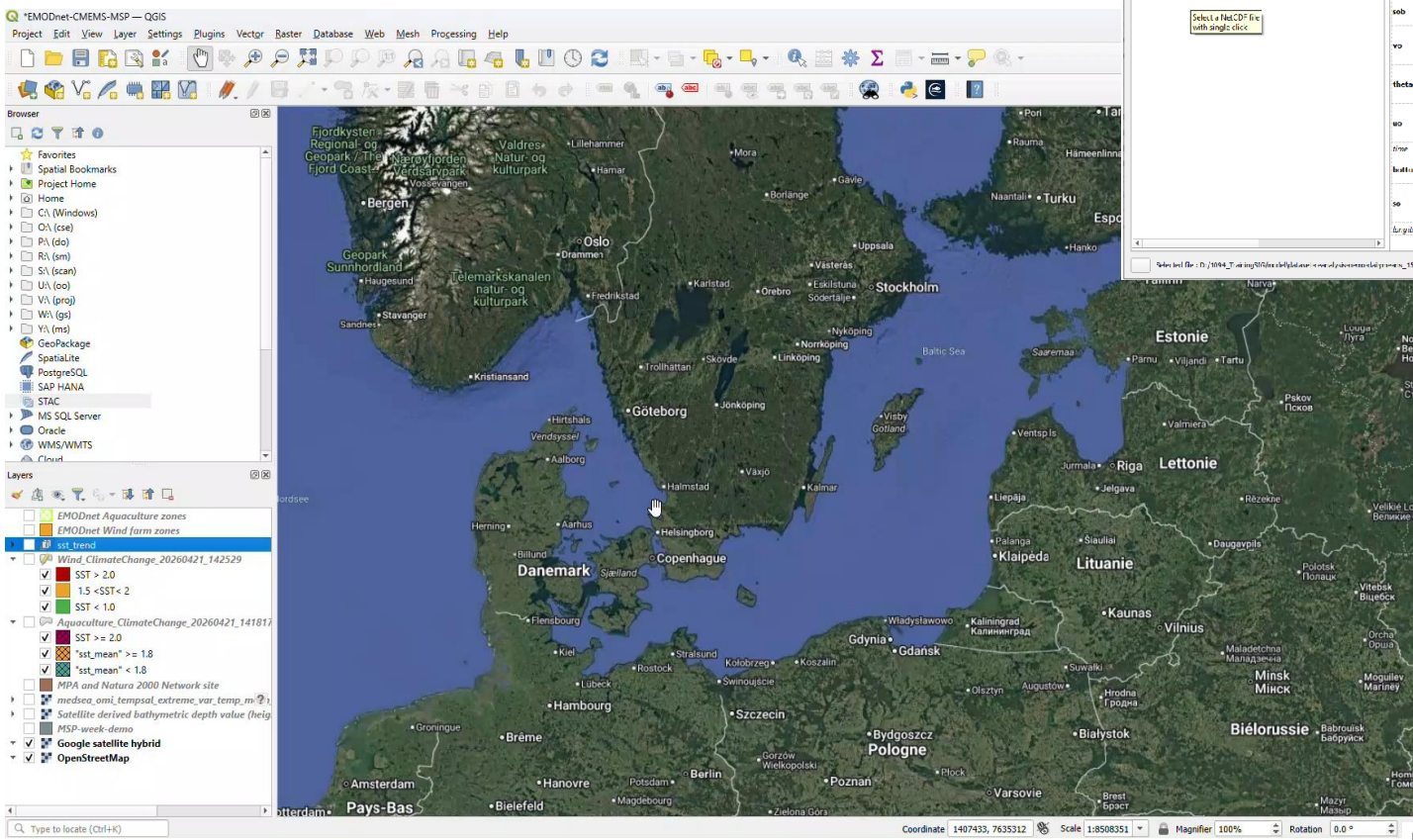
Data

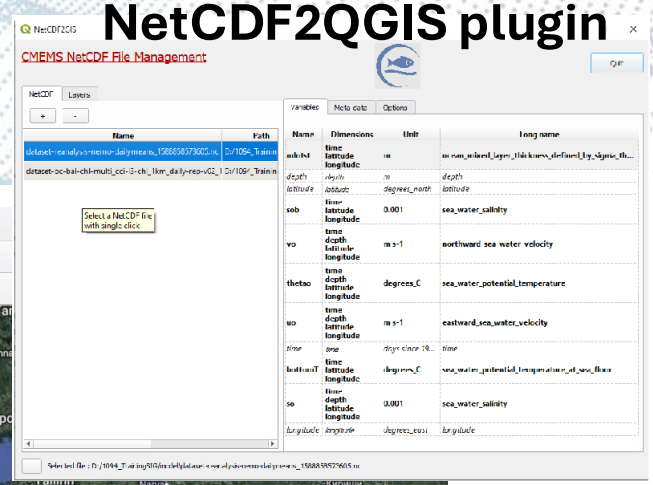
EMODnet

Human activities
Wind farm + Aquaculture
zoning vector layer



SST trend 1991 to 2020
raster layer





NetCDF2QGIS plugin

Tutorial available for the Black Sea
Integrating Climate Indicators into Maritime Spatial Planning: A Black Sea Case Study

PROGRAMME OF THE EUROPEAN UNION
Copernicus Europe's eyes on Earth
implemented by MERCATOR OCEAN INTERNATIONAL

EDITO

Copernicus Marine Service

EMODnet

European Digital Twin Ocean

Converging data sources and tools

Co-authors: A. Arnaud, M. Tonani, J. Gasperi, Q. Gaudel, C. Cherques (MOi), L. Tyberghein, A. Shaikh, F. Leclercq, C. Delvenne, S. Fooks (VLIZ), J. Calewaert, J.Vera, C. Delaney, I. Gillespie, A. Karampourouni, P. Torrez (SSBE)

supported by

Funded by the European Union

This work is funded by the European Union under grant agreement no. 101227771. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

MERCATOR OCEAN INTERNATIONAL

VLIZ

seascape BELGIUM

EDITO is the core infrastructure platform of the European Digital Twin Ocean.

Our mission is to make ocean knowledge available to all.

EDITO
European Digital Twin Ocean

What can you do with EDITO?

Explore

Explore Data

Understand the ocean like never before.

Create

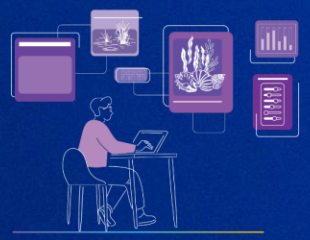
Build Digital Twins & Applications

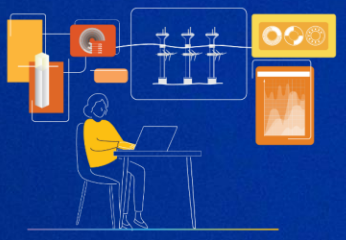
Develop APPs and “what-if” scenarios to understand trade-offs towards desirable ocean futures.

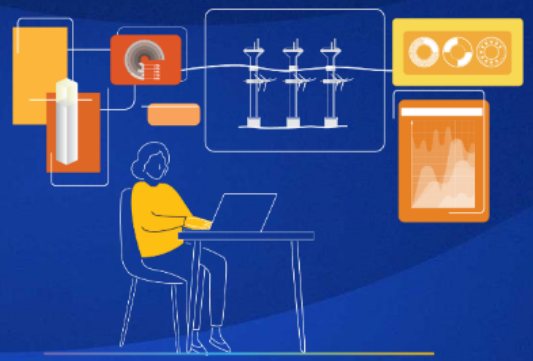
Contribute

Transform Knowledge Into Action

Add your data and services to EDITO to increase your reach and collaborate to protect biodiversity, stop pollution, and support a blue economy.



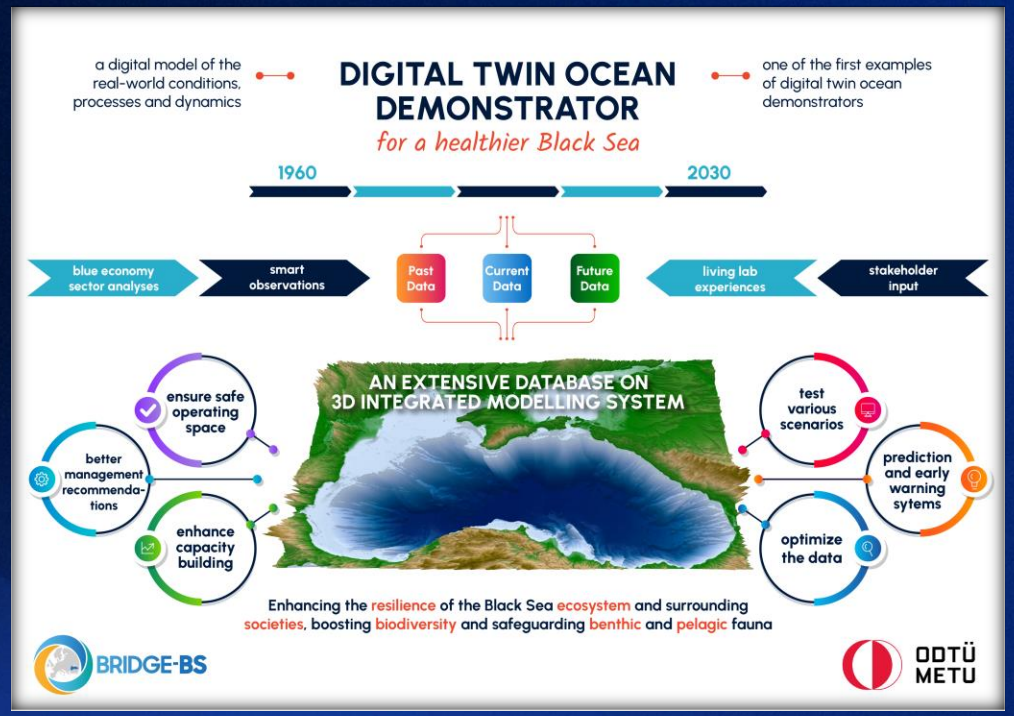


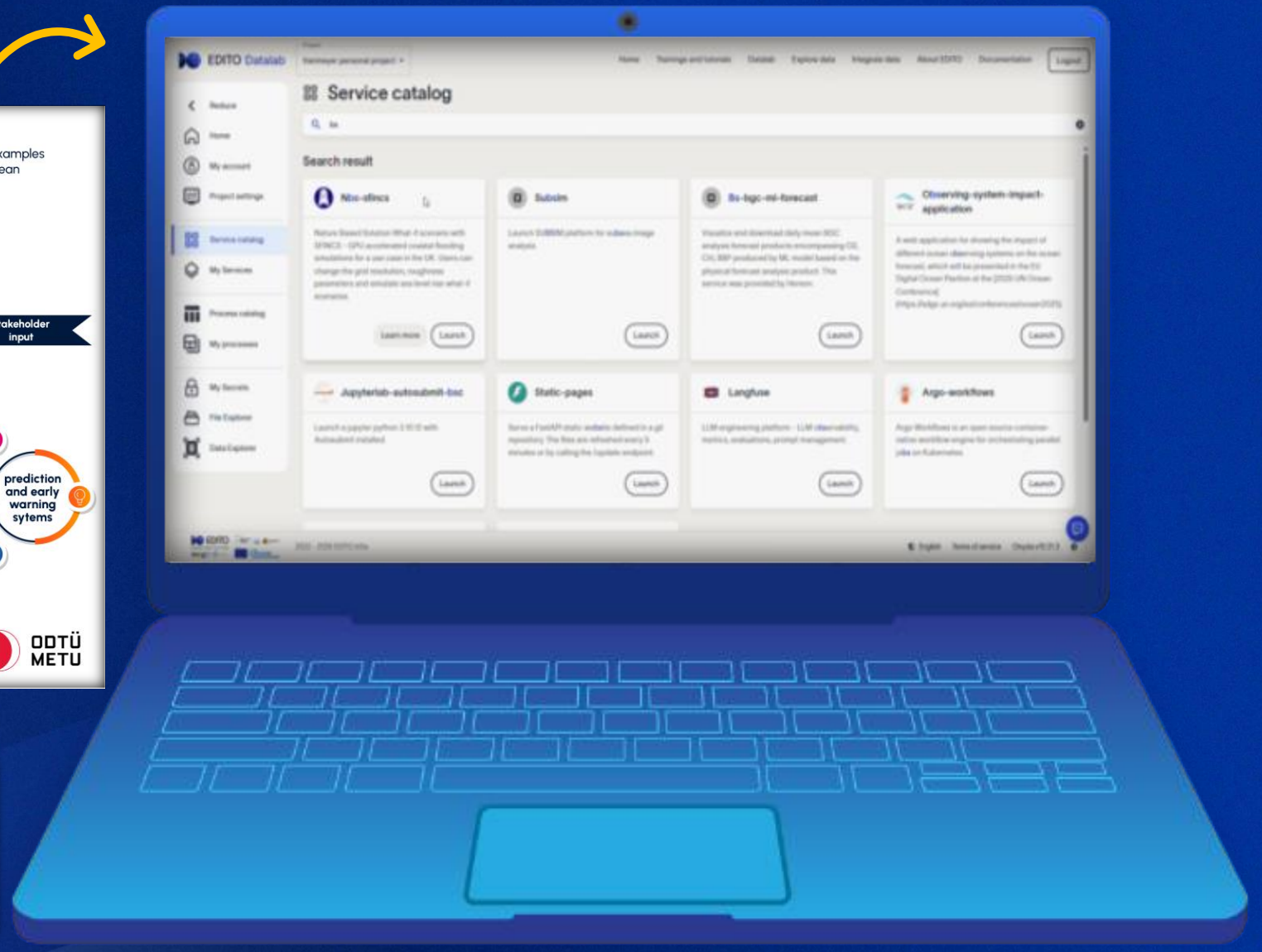



EDITO Platform
PLASTIC POLLUTION
MOI
COASTAL EROSION
MOI-Geomatys-Hereon
TURTLE DRIFT V2
MOI-Geomatys
SARGASSUM DRIFT
MOI
NAVIGATION
Amphitrite
OCEAN SITUATION
MOI-Lobelia
OBSERVING SYSTEMS
MOI-APSL
24 897
COASTAL RISK
MOI-Geomatys
TUNA
MOI

What-if scenarios: *the example of the Black Sea BRIDGE DTO*

EDITO European Digital Twin Ocean





Example: how multiple **human activities and climate drivers cumulatively impact** the Black Sea ecosystem

EDITO
European Digital Twin Ocean

EDITO is open to you
See what you can achieve today!

ACCESS THE EDITO PLATFORM

datalab.dive.edito.eu

Be part of the growing

European Digital Twin Ocean

Community

1 Join EDITO

2 Login DataLab

3 Ask for resources

Tell us what you need

The Copernicus Marine Service is always evolving with your needs at heart

LET US KNOW WHAT WE CAN DO FOR THE MSP COMMUNITY !

2 – 3 questions survey
Less than 5 minutes