



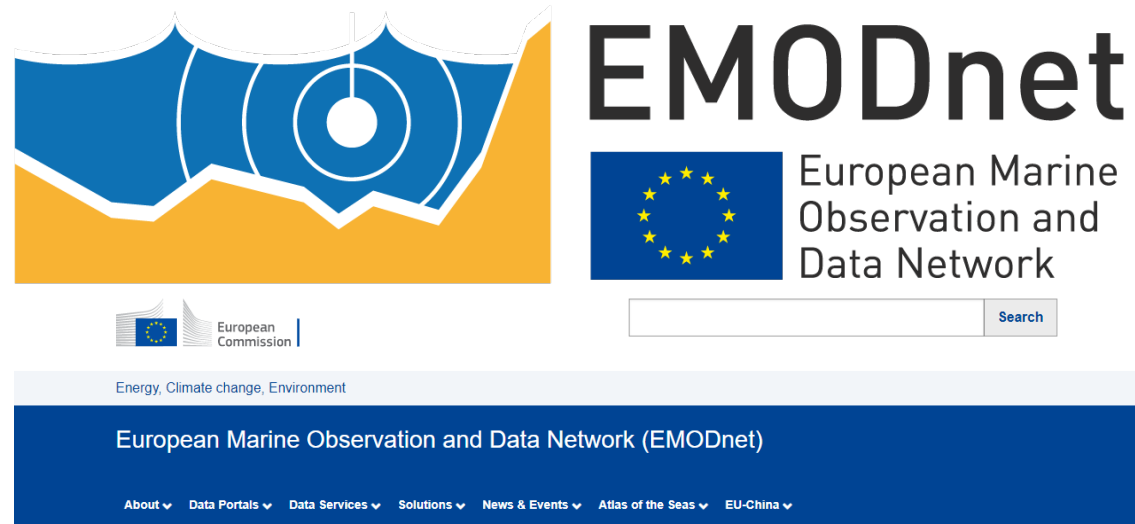
The European Marine Observation and Data Network (EMODnet): Update on status, service evolution and coastal offer and partnerships

Kate Larkin, Conor Delaney
EMODnet Secretariat

22 September 2022

EMODnet-Copernicus Marine Service coastal workshop

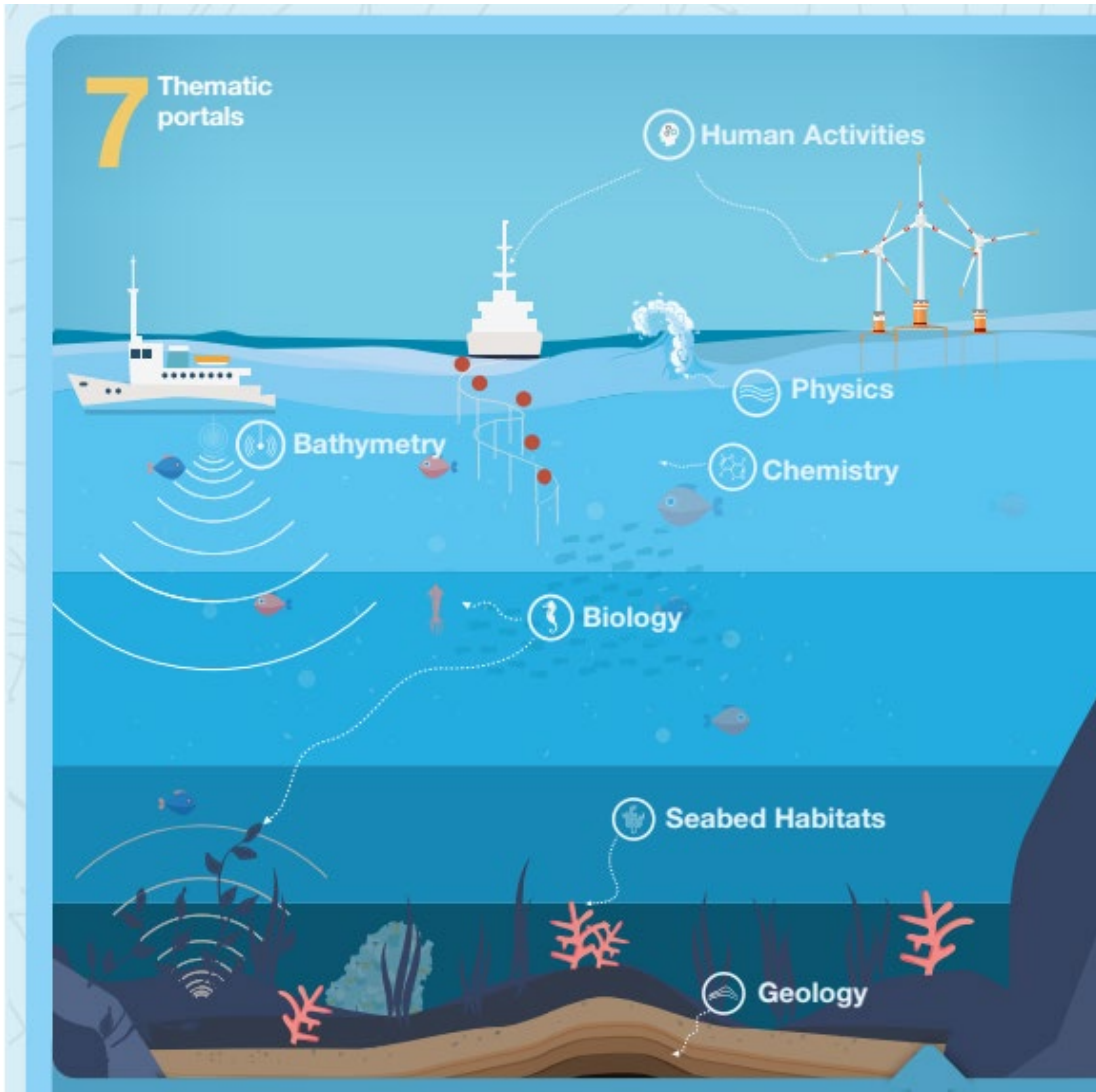
emodnet.ec.europa.eu



The European Marine Observation and Data Network (EMODnet) is:

- a **long-term *public* marine data service and marine knowledge initiative** funded by the **European Commission (DG MARE)**;
- a **European authority and regional best practice in the marine data domain**;
- a **key marine knowledge initiative which together with Copernicus Marine Service provides the back-bone for the European marine data space, a key contributor to the Global Ocean Data Ecosystem and digital commons.**

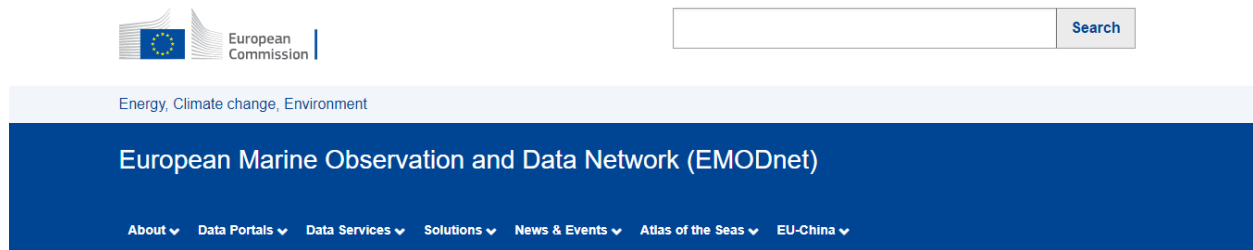
EMODnet: A trusted *in situ* marine data service, open and free for all



The **EMODnet Central Portal** offers a single, open and free entry point to all **7 EMODnet thematics**, which offer:

- Harmonised, standardized and integrated datasets** – each collated from hundreds of data providers - spanning a **large diversity of marine environmental parameters** from the ocean surface to the seabed, and data on **human activities at sea**;
- Data products** (e.g., Bathymetry Digital Terrain model);
- Extensive and harmonised coverage** across European seas and beyond.

EMODnet: Made possible by a large community of *in situ* marine data experts connecting ocean observations with data infrastructures and users for a user-driven, operational service



More than a decade of partnership, collaboration and excellence

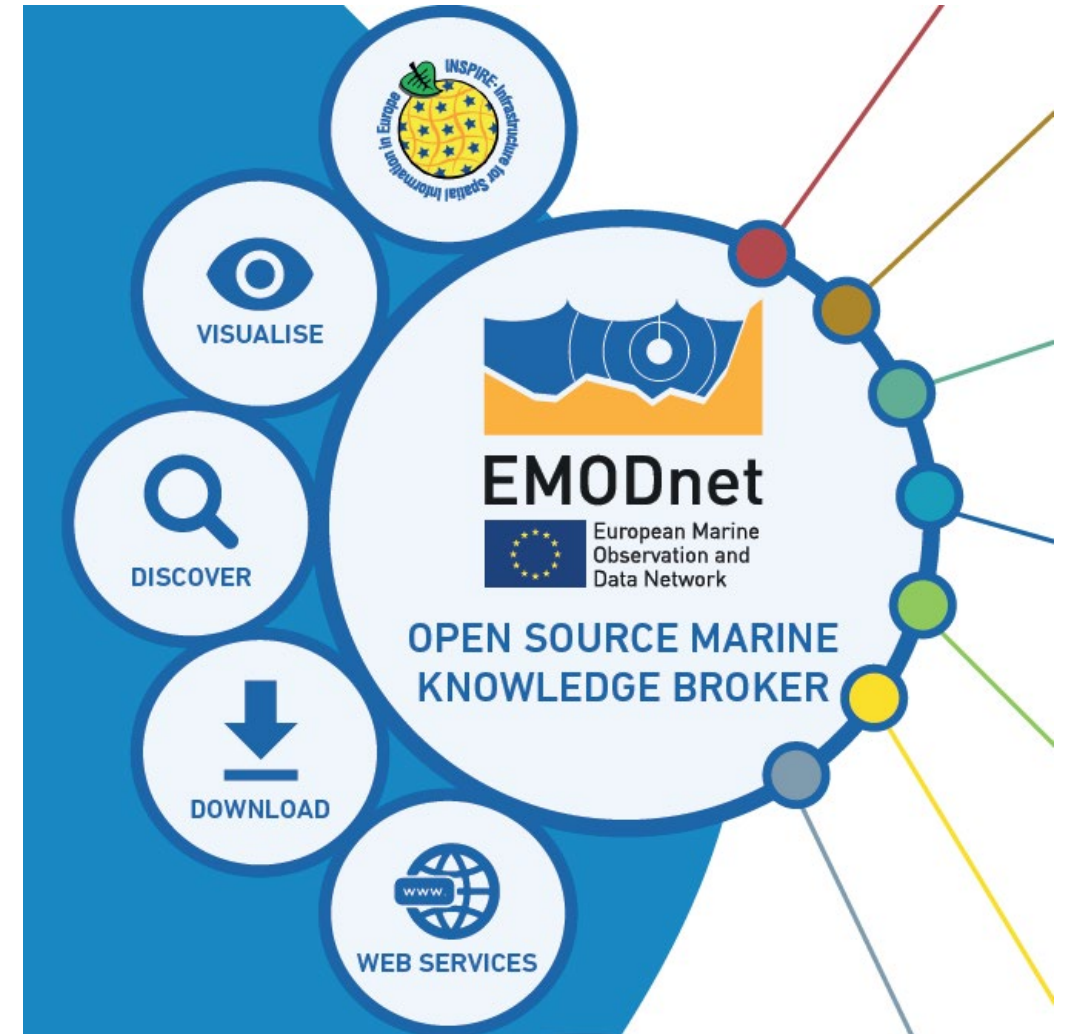
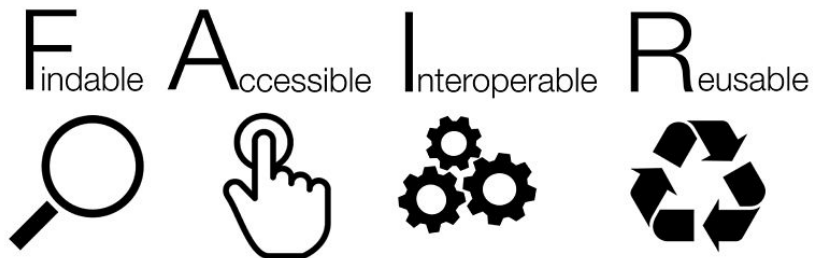


- Large network of >120 organizations and hundreds more across the wider marine data landscape of data producers, providers, users;
- Expert community of thematic and data ingestion experts specializing in data management, visualization, services for *in situ* marine domain data; Close collaboration across the Marine Knowledge Value Chain e.g., EuroGOOS, Marine data infrastructures e.g., SeaDataNet, Research Infrastructures, Copernicus Marine, ICES, User community (research, policy, industry, civil society, citizens), etc;
- A Secretariat of marine domain and data experts for coordination and cohesion (technical to science-policy, ocean observation to data services and users), monitoring progress and impact, partnerships (EU and global), communication, dissemination, ocean literacy.

EMODnet: Added value

EMODnet data standards, services and web services

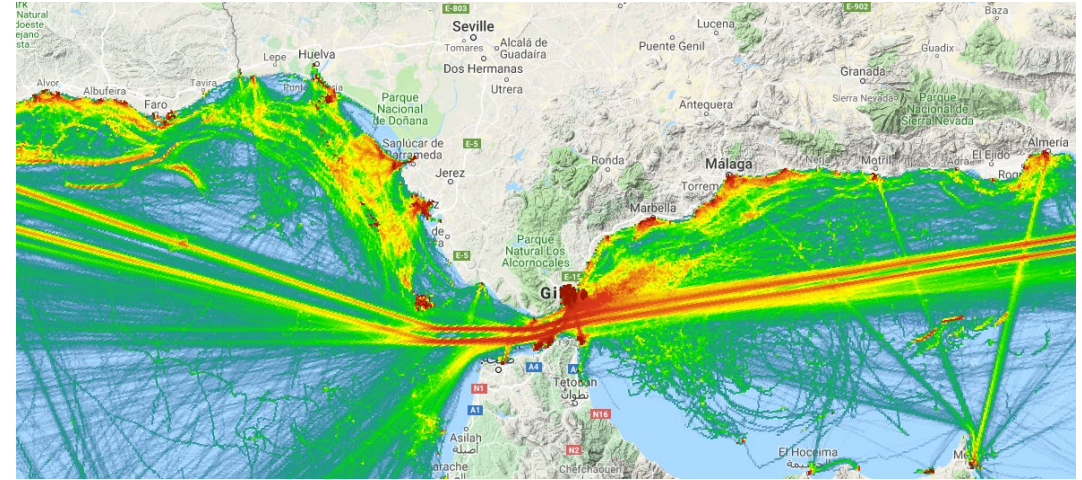
- INSPIRE and FAIR data principles
- Aggregated, harmonized multi-parameter data sets
- Searchable metadata
- Data services (maps, query)
- Integrated data products
- Web services e.g. OGC, machine-machine readability e.g. WMS, WFS, WebS



EMODnet: Added value

Collect data once, use many times.
Visualize and make data come alive.

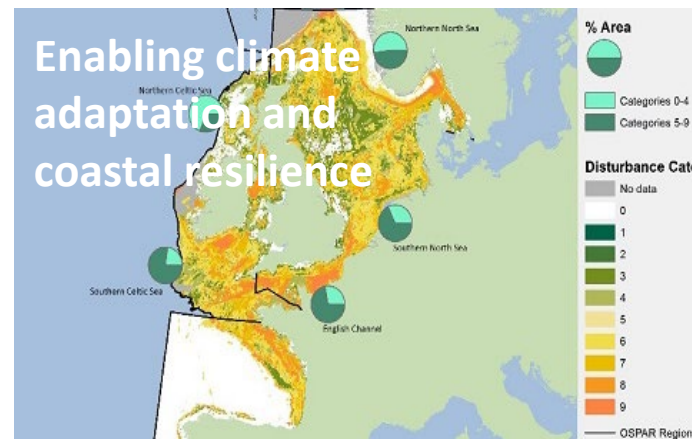
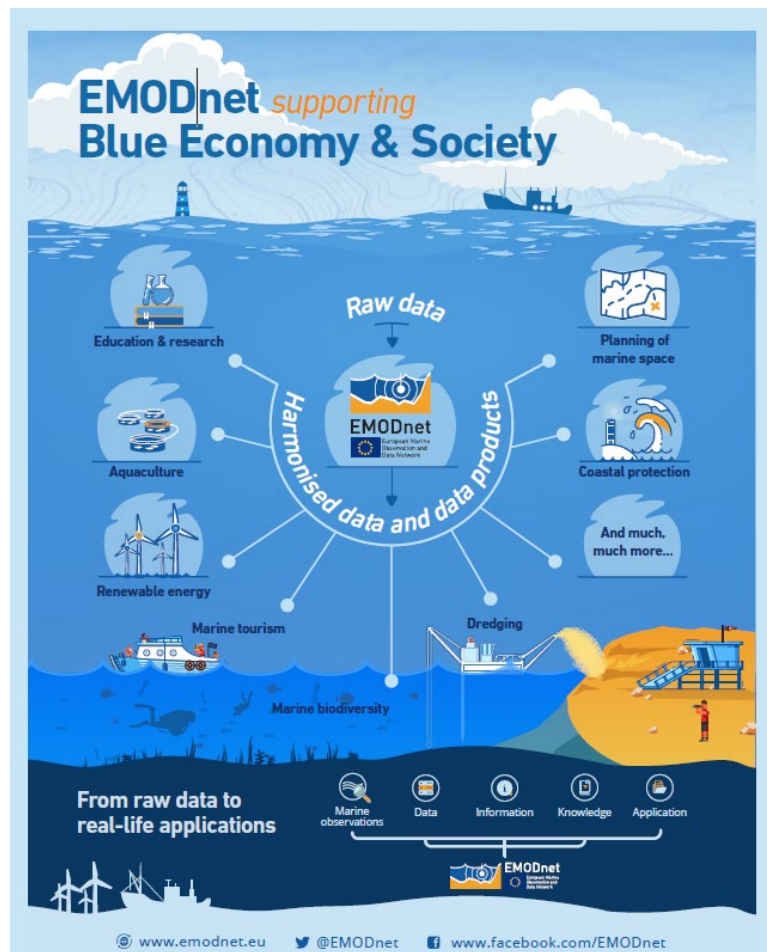
- reduce uncertainty;
- increase productivity and cost-effectiveness;
- add value and impact to your data;
- stimulate innovation.



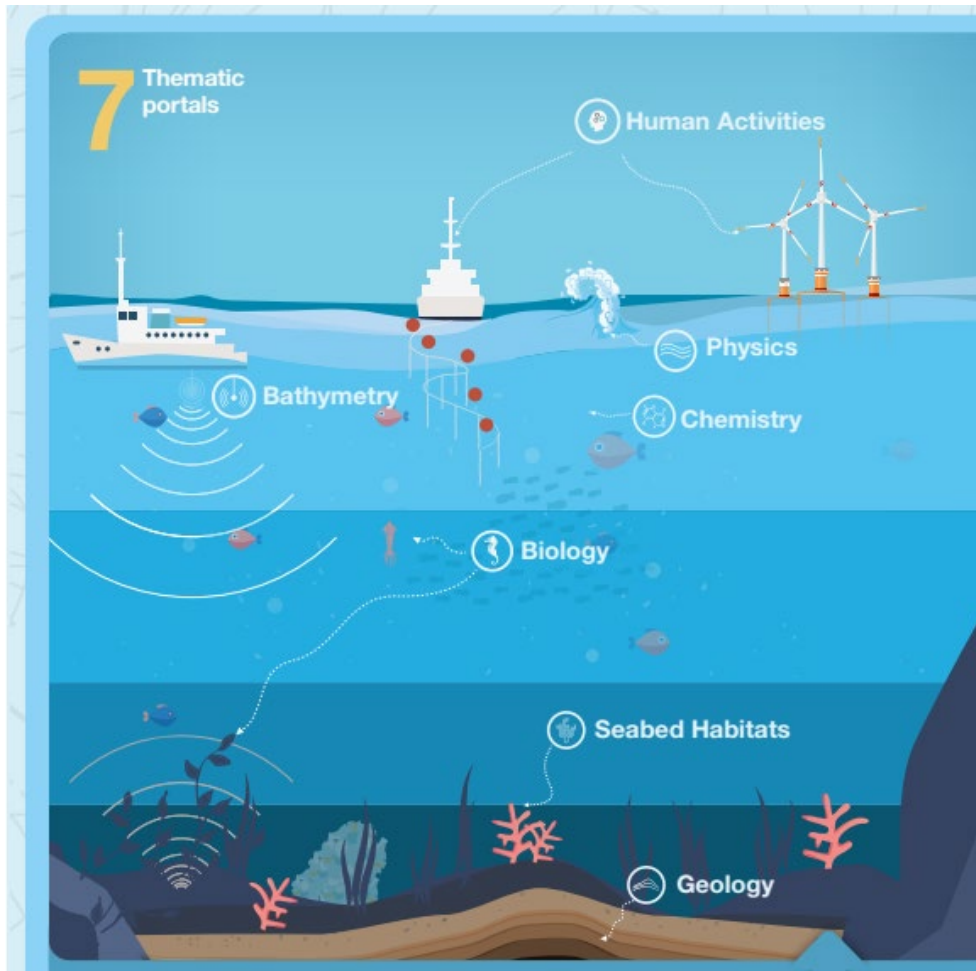
HUMAN ACTIVITIES

Vessel density by EMODnet Human Activities. The map is a grid with 1 square kilometre cells, each with a colour gradient for vessel density.

EMODnet: An operational service delivering marine data, information and knowledge for research, policy, blue economy and society



EMODnet: A key resource of in situ marine environmental and human activities data, including in the coastal region



Examples of key EMODnet Coastal data/data products:

- Coastal Behaviour (EMODnet Geology);
- Riverine inputs (EMODnet Physics)
- Coastal pollutants & marine litter (EMODnet Chemistry)
- Coastal blue economy operations, sitings and shipping/vessel transportation & Maritime Spatial Plans (EMODnet Human Activities)
- Coastal bathymetry (EMODnet Bathymetry)
- Sea Level: Absolute and Relative Trends and Anomalies (EMODnet Physics);
- Coastal biodiversity (EMODnet Biology)
- Coastal Seafloor/Benthic Habitats (EMODnet Seabed Habitats)

More to be presented and discussed by EMODnet thematic Coordinators and experts during this coastal workshop

EMODnet: A EU focal point for Marine Spatial Planning data & national plans

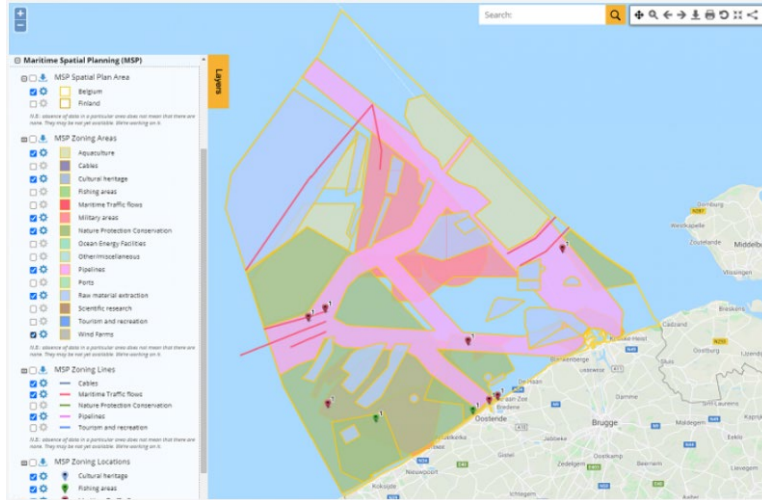
«EMODnet Human Activities is a focal point for EU Member State Marine Spatial plans and in the future this can be expanded to include MSP data products, for examples at the European level».

Joni Kaitaranta, HELCOM

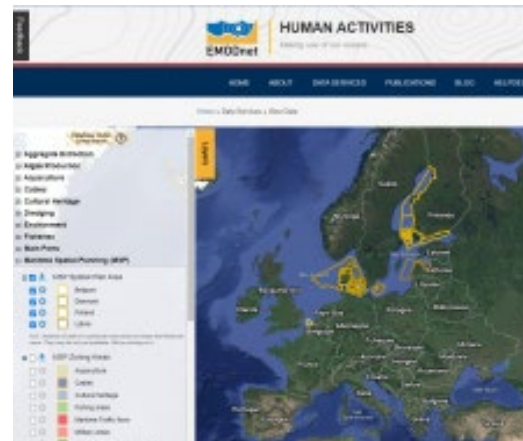


EMODnet provides a EU focal point for:

- Access to transboundary *in situ* marine environmental and human activities data, essential for MSP, as a tool to manage the use of our seas and oceans coherently and to ensure that human activities take place in an efficient, safe and sustainable way;
- European Member State/National Marine Spatial Plans through EMODnet Human Activities (Belgium, Denmark, Finland and Latvia already available, more to follow)
- EMODnet Human Activities works in close co-operation with Regional Sea Conventions, the EC JRC, Technical Group (TG) on Data for MSP towards a technical solution for harmonising EU MSP within EMODnet.



MSP Spatial Plan Area for Belgium, EMODnet Human Activities



EMODnet Human Activities Map viewer and data visualization (centralising by end 2022)

EMODnet: User testimonials

EMODnet for the Blue Economy: Offshore Renewable Energy

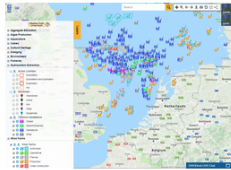
«We realise the importance of EMODnet data and data products e.g. Bathymetry, Physics in reducing uncertainty and improving offshore energy operators costs in micro siting of cables». Gerben de Boer, Van Oord, EC MKEG member



Human Activities

EMODnet wind farm and hydrocarbon extraction datasets to support the development of wind farm projects

The EMODnet Human Activities portal has become a vital tool for C2Wind, a Danish company working in the wind industry. Wind farm and hydrocarbon extraction datasets are the most commonly explored datasets, identifying locations of already existing structures. Additional datasets on occasion are surveyed to provide the full extent of human activities. This crucial information is used in the preliminary phases of projects, determining areas of interest for the development of wind farm projects.



EMODnet for marine policy

«The collaboration between EMODnet Chemistry and EC JRC has led to a common database with harmonised beach litter data from 300 beaches across Europe. This is a key contribution to enable Member States to carry out marine litter assessments for the Marine Strategy Framework Descriptor 10, and as a direct input to develop the EU Single Use Plastics Directive ».

Georg Hanke, EC JRC



Chemistry

11 May 2021

EMODnet Chemistry: a point of reference for management of marine litter data in the context of the EU Marine Strategy Framework Directive

EMODnet Chemistry provided valuable contributions to the completion of a **Joint List of Litter Categories for Marine Macro-litter Monitoring** that includes the litter types occurring in the coastal and marine environment. The list can be used to enable comparable monitoring across the European Seas and beyond, as well as across different compartments of the marine environment.

EMODnet: Use cases

Biology

Chemistry

Human Activities

Physics

Seabed Habitats

15 Jun 2021

EMODnet partners with Copernicus Marine for a joint data catalogue supporting evaluation of Good Environmental Status for the Marine Strategy Framework Directive.

A joint Copernicus Marine and EMODnet data catalogue for the Marine Strategy Framework Directive (MSFD) has been developed. It gathers all relevant marine data products from Copernicus Marine Service and EMODnet for all the MSFD descriptors (except Descriptor 4) in the Baltic Sea.

Continue reading

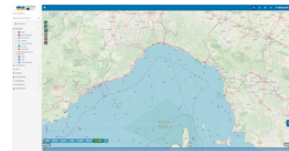


Bathymetry

Physics

EMODnet Bathymetry & Physics data supporting Sea Situational Awareness for tourist navigation

SINDBAD+, is a project co-funded by the European Commission (POR FESR 2014-2020), that aims at providing a service that can predict weather conditions and analyse its consequences on the navigation depending on the characteristics of the boat such as length, width and depth. The service targets luxury and leisure boaters. The SINDBAD partners use EMODnet Physics and EMODnet Bathymetry to initiate and validate data forecast models.



Seabed Habitats

19 Sep 2020

OSPAR intermediate assessments: evaluation the ecological status of the marine environment in the NE atlantic

Users identified the main areas where disturbance from bottom-contact fishing was predicted to cause the most significant impact to benthic marine habitats. This work fed directly into the OSPAR Intermediate Assessment (2017) with future implications towards the Marine Strategy Framework Directive assessments.

Physics

31 Jan 2022

Development of a new sea level product covering European Seas and the Global Ocean

The Euro-Mediterranean Center on Climate Change (CMCC) has developed a first version of a web application with the "Total Sea Level" variable from EMODnet Physics. This solution presents a demonstrator of end-user application and decisional support dashboard systems to support public authorities in their daily management activities.

Physics

04 Mar 2021

EMODnet-Physics a win-win cooperation with OceanOPS to improve performance monitoring for Ocean Observing Platforms, data and information systems

In close collaboration with OceanOPS, EMODnet Physics is connecting multiple data sources with the OceanOPS metadata repository thanks to the unique identification system managed by OceanOPS. This is automatically reducing the duplication issues related to multi data sources and increasing the quality of the information system developed by EMODnet Physics. At the same time, EMODnet Physics is connecting OceanOPS to networks that are not yet under its radar to continuously improve the monitoring of the Ocean Observing systems operating in the global ocean.

Bat

Improving storm surge modelling in the North Sea

Changes in coastal sea level caused by the combined effect of surface winds and air pressure have the potential to cause widespread coastal flooding, damage to infrastructure and loss of life.

The low-lying lands bordering the North Sea are particularly vulnerable as was seen most notably in the catastrophic events of 1953. It is expected that climate change will increase the frequency and severity of such events.

Biology

Seabed Habitats

31 Jan 2022

Holistic, standards-based access and interoperability for marine biodiversity data

Collaboration between EMODnet Biology, EMODnet Seabed Habitats and OBIS (Ocean Biodiversity Information System) has facilitated richer dataset publication and ensured the greatest volume of high-quality species and habitat data are available for reporting, assessments and informed decision making.



Continue reading



Part 1.
Marine habitats

EMODnet: Ongoing contributions to coastal related initiatives



JPI Oceans Sea Level Rise Knowledge Hub as:

- Presenter/participant at kick-off meeting, April 2020
- Co-Chair of Task Group on Communication and Outreach, member of the Steering Committee
- Contributor to Sea Level Rise event, Venice, October 2022 and the Assessment Report



UN Ocean Decade activity as:

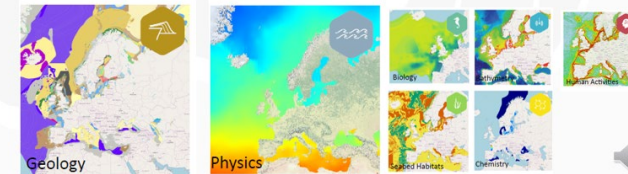
- **COAST Predict-CORE** Advisor
- **Collaborative Centre on Ocean Prediction** Advisor
- DITTO on digital Twins + TURTLE & many more

.....



What can EMODnet contribute to the European Knowledge Hub on Sea Level Rise?

- **Open & free access to integrated marine datasets & data products for knowledge-creation** for science, business and policy to:
 - reduce uncertainty through evidence-based operations & decisions;
 - increase productivity and cost-effectiveness;
 - add value and impact to data;
 - stimulate innovation.



CoastPredict - Observing and Predicting the Global Coastal Ocean

EMODnet: A key contributor to the Ocean Decade

EMODnet is relevant to all 6 Ocean Decade objectives:

- A safe **ocean**
- A sustainable and productive **ocean**.
- A transparent and accessible **ocean**.
- A clean **ocean**.
- A healthy and resilient **ocean**.
- A predicted **ocean**.

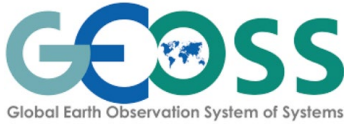
«EMODnet – a true hallmark in Marine Observations, Data and networking – is hugely important, not only for Europe, but as an example for other regions, and a valuable partner for IOC of UNESCO». Vladimir Ryabinin, Executive Secretary of the Intergovernmental Oceanographic Commission (IOC-UNESCO)



EMODnet has a key role to play – together with other marine knowledge actors across the world - to realise a truly transparent and accessible ocean whereby all nations, stakeholders and citizens have:

- **simplified access to ocean data, information and knowledge**, through user-driven interfaces and online data discovery and access services based on machine-machine communication;
- **trust in the provenance of the data** (through standardized, rich metadata) to increase the uptake and use and;
- **the capacity and knowledge to use marine data services and web-based collaborative spaces/digital ecosystems** where marine data can be utilized for solution-oriented applications and informed decisions.

EMODnet: Strengthening Partnerships for International Interoperability and Impact

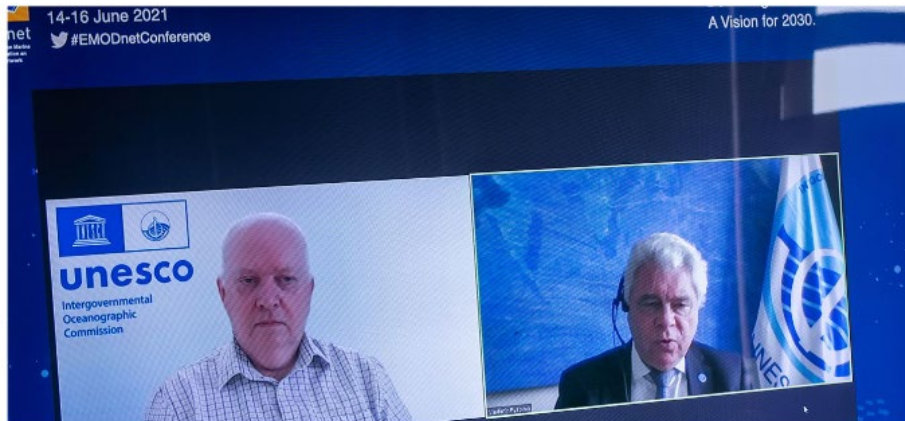


- A key partner for open data, open science, data diplomacy and digital data stewardship in Europe, and beyond;
- Interoperable data discovery and access, in collaboration with other key data services
- Further diversifying data parameters and sources (e.g. industry, citizen science)
- Extending FAIR to FAIR, CARE and TRUST



Transparency,
Responsibility,
User focus,
Sustainability and
Technology

EMODnet: A regional marine data, information and knowledge service directly contributing in diverse ways to the UN Ocean Decade



"We want global data and information systems and EMODnet's guidelines are great for community of practice. The network is also a role model for other regions."
Peter Pissierssens, IOC-IODE UNESCO

Ongoing activities

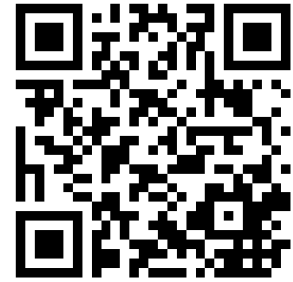
- Co-Chair of the UN Ocean Decade (OD) Data Coordination Group (EMODnet Secretariat);
- Contributor and expert to the IWG-SODIS Intersessional Working Group Strategy on Ocean Data and Information Stewardship for the UN Decade (EMODnet Coordinators);
- Multiple inputs to UN OD Actions:
 - DITTO (Digital Twins of the Ocean, Steering partner)
 - COAST PREDICT (Advisor role)
 - Ocean Best Practices (EMODnet referenced)
- Ocean Data and Information System (ODIS): All EMODnet thematic portals/central portal are registered on ODIS catalogue. Additional records will be added from the EU-China EMOD-PACE marine data project;
- IOC Ocean InfoHub Project (OIH): EMODnet is a European focal point & technical advisor to the development of ODIS architecture & interoperability with EMODnet.

EMODnet: Short-term evolution

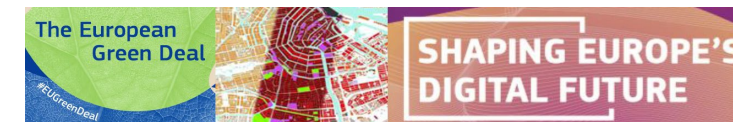
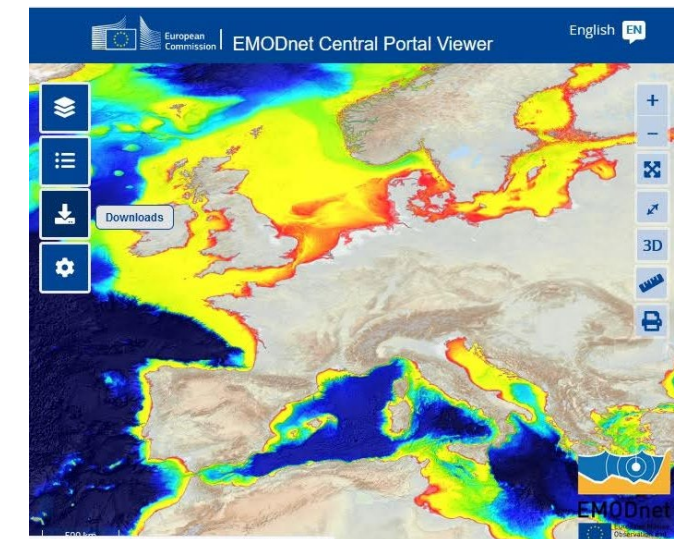
EMODnet today is a trusted EU public service for *in situ* marine data, information and knowledge, in Europe and beyond;

EMODnet new phase (by end 2022) will complete the consolidation stage to deliver a fully centralized service with:

- A simplified single entry point to all data/data products;
- A data cache approach more suited to today's data driven world towards next phase ocean data & information management;
- an enhanced data discovery service using a central metadata catalogue and machine-machine search engine;
- a central map viewer;
- interoperability across the digital (marine data) commons;



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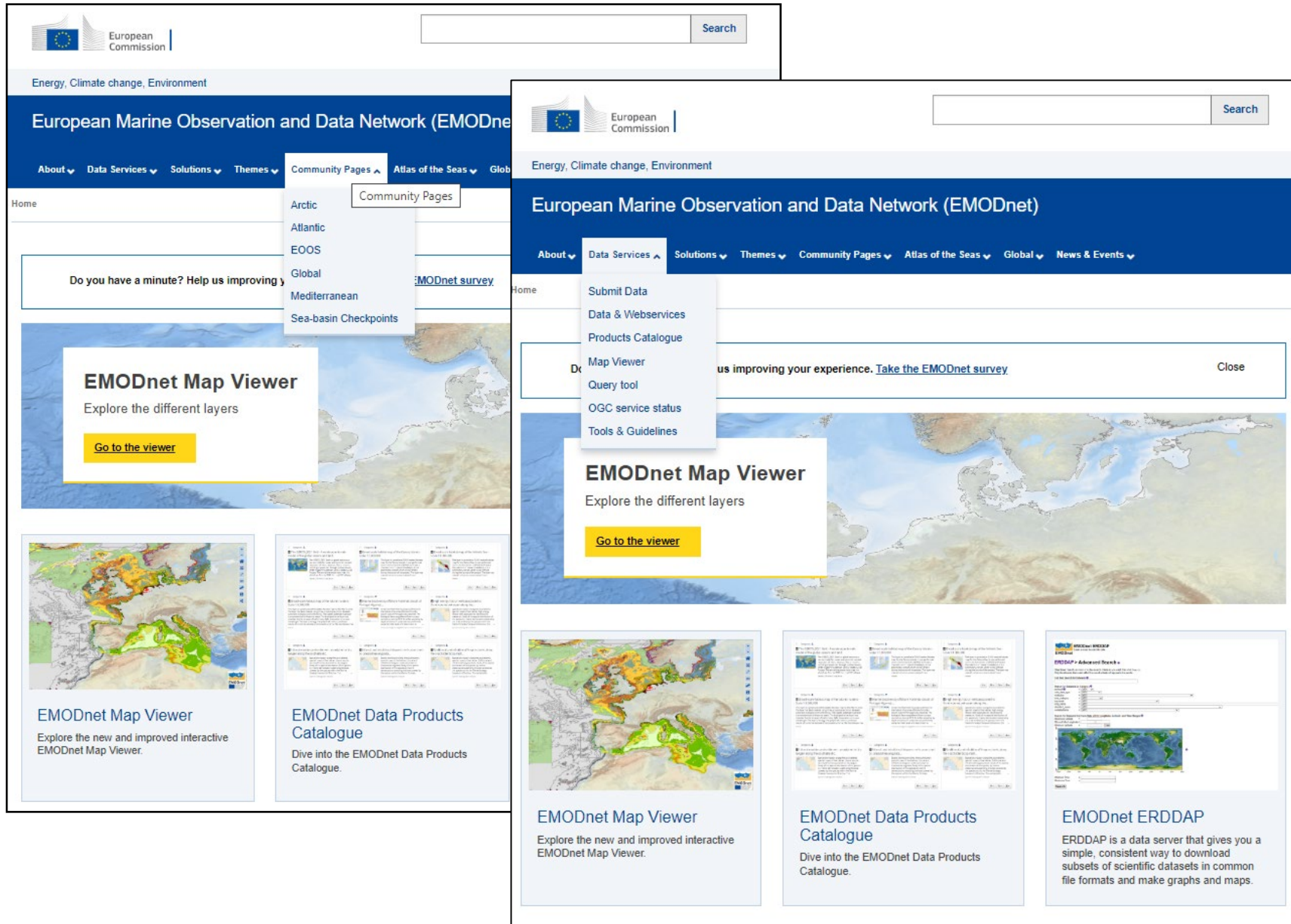


Log in EN English

Law

Ocean observation – sharing responsibility

EMODnet | One new portal to replace all thematic portals.

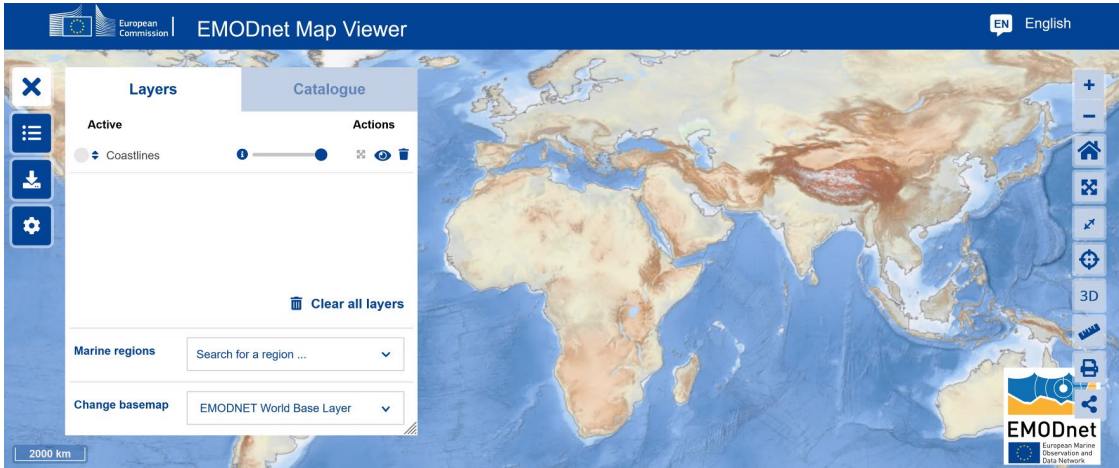
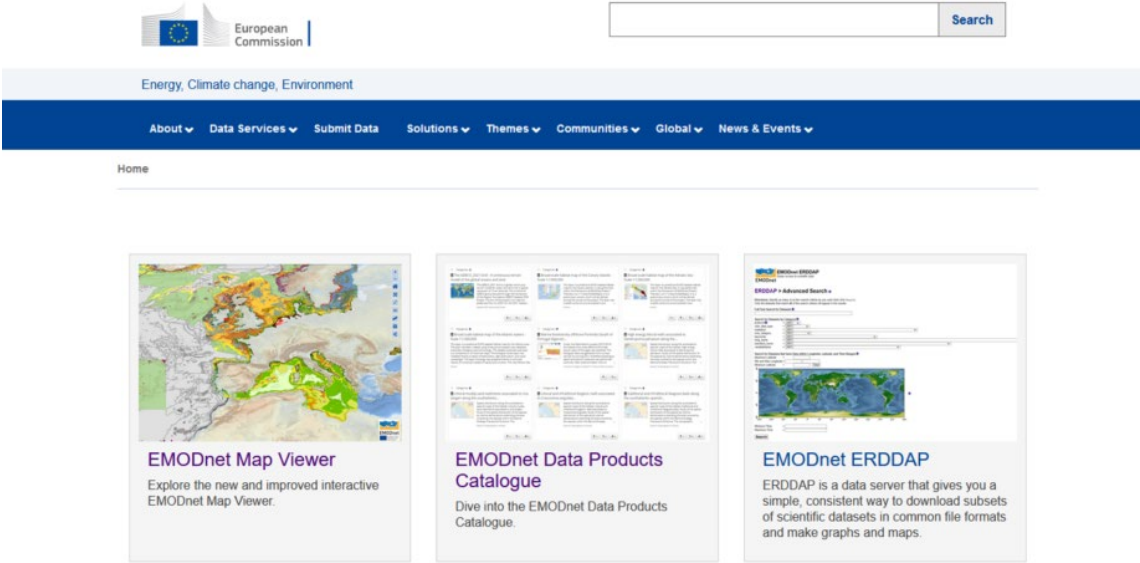
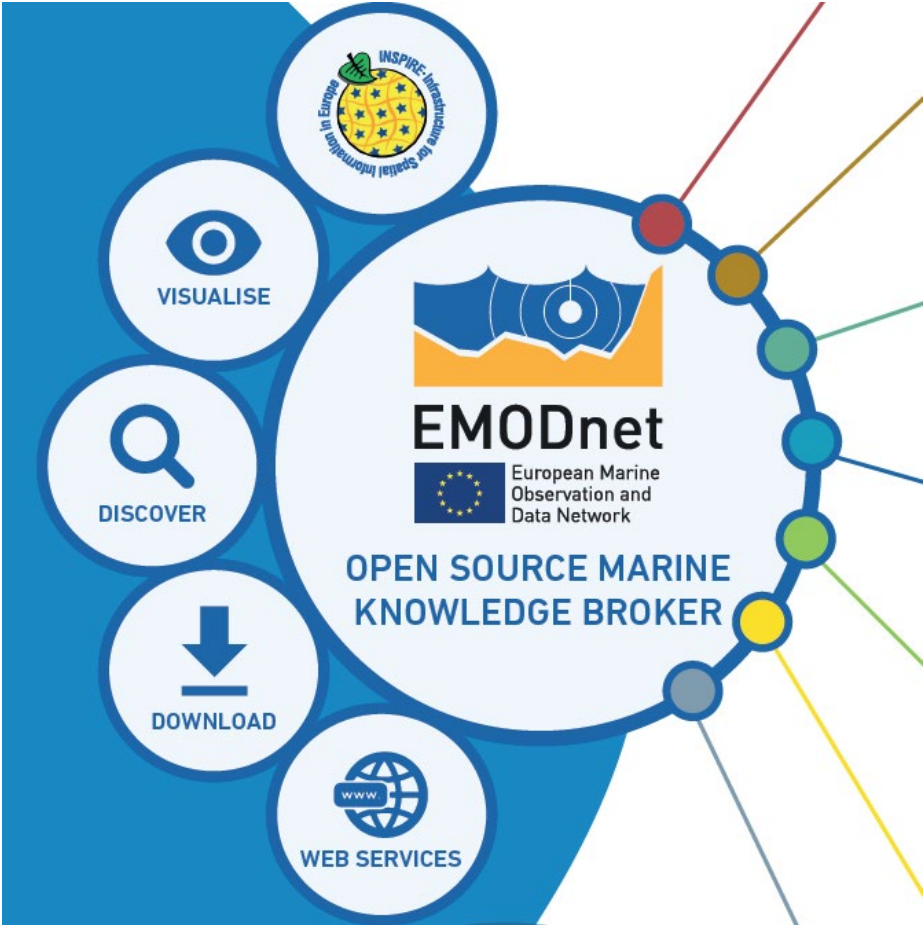


- **One web site.** The content from other portals migrated to Central Portal.
- **One catalog** containing metadata and links to all data sets and products.
- **One map viewer** covering all themes.
- **Close** EMODnet thematic portals by end of 2022.

EMODnet | One new map viewer to replace all other map viewers.

The screenshot displays the EMODnet Map Viewer interface. At the top left, the European Commission logo and the text 'EMODnet Map Viewer' are visible. The top right corner shows the language 'EN English'. The main interface is divided into a left sidebar and a central map area. The sidebar contains a 'Layers' and 'Catalogue' section with a search bar and a list of categories: Administrative units, EMODnet Bathymetry, EMODnet Biology, EMODnet Chemistry, EMODnet Geology, EMODnet Human Activities, EMODnet Physics, EMODnet Seabed Habitats, and EU-China EMOD-PACE project. Below this list is an 'Add external layers' button and a 'Marine regions' dropdown menu. The central map area shows a satellite-style map of the Mediterranean region with various data layers overlaid in different colors (green, yellow, red, blue). A 'Filter layers' dialog box is open in the bottom right corner, showing a search for 'Orcinus orca' and an 'Apply' button. The bottom left corner of the map shows a scale bar for 500 km and coordinates: -15.69950, 40.79526. The EMODnet logo is visible in the bottom right corner of the map area.

EMODnet: Continued evolution of EMODnet, to deliver a fit-for-purpose user-driven service



Screenshots from development website, 'soft launch from October 2022'

EMODnet: Short-term evolution

EMODnet new phase (by end 2022) will complete the consolidation stage to deliver a fully centralized service with:

- A simplified single entry point to all data/data products;
- A data cache approach more suited to today's data driven world towards next phase ocean data & information management;
- an enhanced data discovery service using a central metadata catalogue and machine-machine search engine;
- a central map viewer;
- interoperability across the digital (marine data) commons;

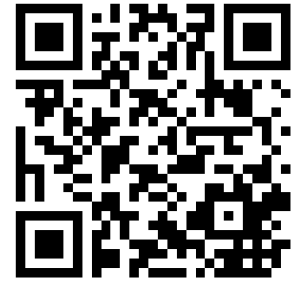
Key Partnerships (focus on selection of ongoing strategic initiatives)

- EDITO (MOi, VLIZ core infrastructure for Digital Twin Ocean);
- Supporting EC Ocean Observation Initiative & connection with EOOS;
- Contributing to EU coastal initiatives .g., JPI Oceans SLR KH
- EMOD-PACE and EMODnet for global regional partnerships;
- Co-Chair UN Ocean Decade Data Coordination Group & wider input

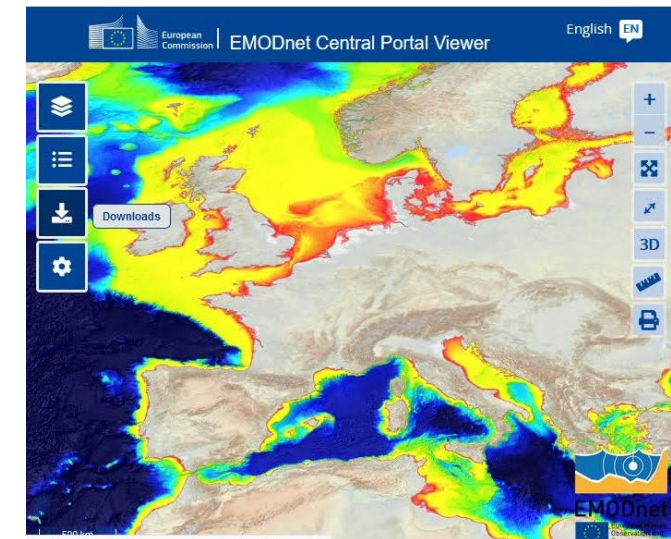


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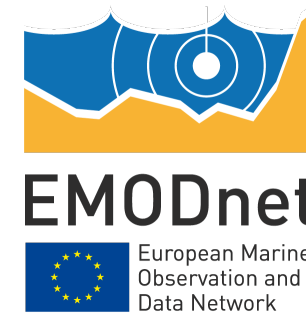
Ocean observation – sharing responsibility

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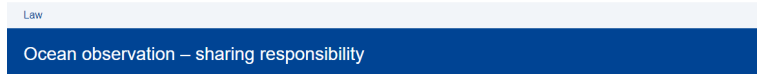
EMODnet: Mid-term evolution

EMODnet new phase (by 2023) will:

- Further **expand and diversify the EMODnet “offer”** including partnerships with citizen science, industry & regions beyond Europe;
- Further **connect with actors across the marine knowledge value chain**, including the **EU and global Ocean Observation capacity**;
- Continue to **strengthen strategic EU partnerships** e.g., with Copernicus Marine Service to ensure European marine data services are “future-fit” for the EU marine data space, the EU Green Deal Space, the Digital Twin Ocean and Destination Earth;
- **Contribute to strategic UN Ocean Decade activities** e.g., UN Ocean Decade Data Coordination Group; CoastPredict-CORE, DITTO; Collaborative Centres e.g., Ocean Prediction



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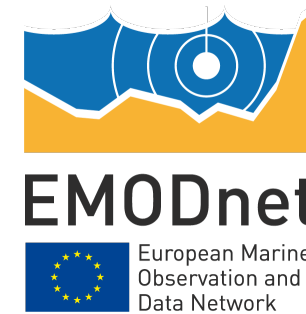
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EMODnet: Longer-term evolution

In coming decade, EMODnet by 2030 will:

- Strengthen the **implementation of the Digital Commons** within Europe and beyond;
- **Forge new collaborations worldwide** (at regional and global levels) to move towards a fully interoperability data sharing framework at Ocean Basin level e.g., the All Atlantic Data Space, and across the Global Ocean Data Ecosystem;
- **Expand its contribution to the UN Ocean Decade and its partnership with IOC-UNESCO, IODE and other actors**, including:
 - A EMODnet UN Ocean Decade Coordination Group;
 - EMODnet key recommendations and principles for supporting the Data Vision Under the UN Ocean Decade;
 - EMODnet input to UN Ocean Decade Actions, Collaborative Centres (e.g., for Ocean Prediction);
 - EMODnet leadership in Ocean Best Practices;
 - Enhance EMODnet contribution to demonstrations and training in ocean data and information stewardship;
 - Alignment and optimized tagging of EMODnet data for UN 2030 Sustainable Development Goals, Essential Ocean / Biodiversity Variables etc. **And much more!**



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United Nations
Educational, Scientific and
Cultural Organization



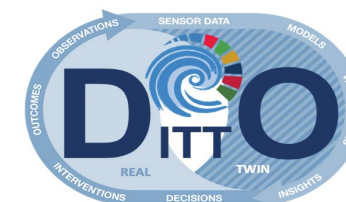
Intergovernmental
Oceanographic
Commission



2021
2030
United Nations Decade
of Ocean Science
for Sustainable Development



International
Oceanographic
Data and Information
Exchange



Digital Twins of the Ocean

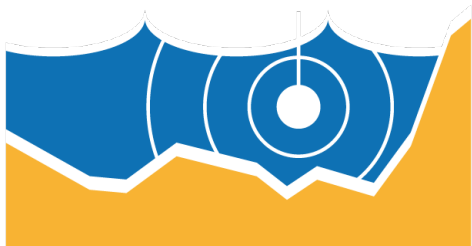


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Thank you for your attention!

- **Discover the EMODnet Central Portal** and see what EMODnet services can do for you;
- Learn more about EMOD-network of experts, user testimonials, achievements and partnerships via the EMODnet Conference 2021 recordings and resources:
<https://emodnetconference2021.eu/>
- **Connect with the online EMODnet community**
 - @EMODnet (Twitter);
 - EMODnet monthly Newsletter;
 - Ask questions and submit feedback via the EMODnet Central Portal and via online surveys
- **Contact us via the EMODnet Central Portal** to discuss data sharing, data/data product use, queries on data/web services, and to explore partnerships.



EMODnet



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