



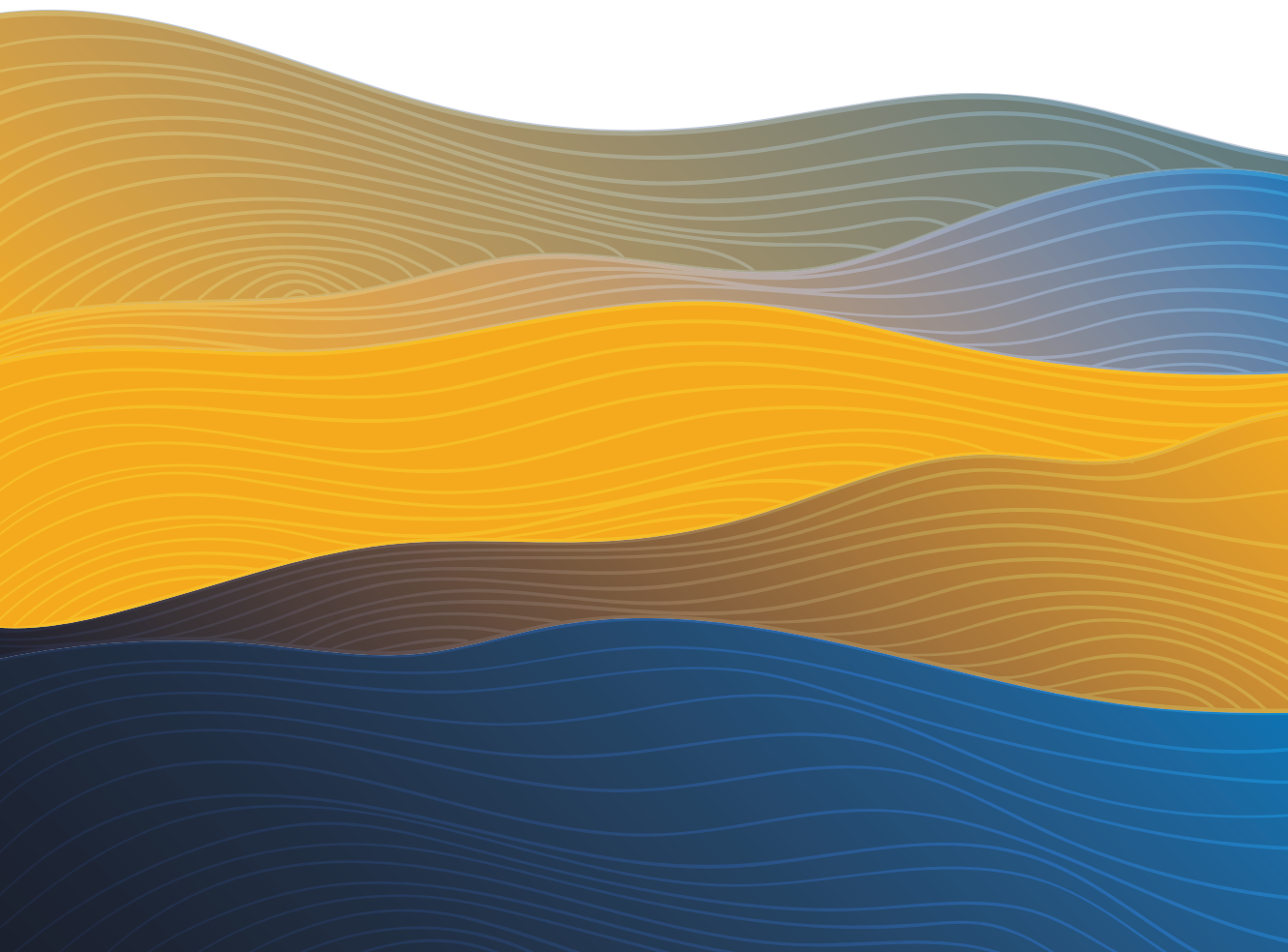
EMODnet



European Marine
Observation and
Data Network

EMODnet _____

ANNUAL REPORT 2020

A horizontal bar composed of several colored segments: yellow, green, brown, blue, green, grey, and red.

Acknowledgements _____

This Annual report is produced by the EMODnet Secretariat, with input from EMODnet thematic lot Coordinators & Trust-IT (design).

References _____

Further information on EMODnet can be found on the Maritime Forum (webgate.ec.europa.eu/maritimeforum). More detailed information on progress, together with the access to the latest data and data products can be found on the Central Portal www.emodnet.eu

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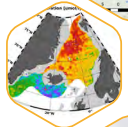
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About EMODnet

The European Marine Observation and Data Network (EMODnet) is a long-term marine data initiative funded by the European Maritime and Fisheries Fund, which, together with the Copernicus space programme and the Data Collection Framework for fisheries, implements the EU's Marine Knowledge 2020 strategy.

EMODnet connects a network of over 120 organisations supported by the EU's Integrated Maritime Policy who work together to observe the sea, process the data according to international standards and make that information freely available as interoperable data layers and data products. This 'collect once and use many times' philosophy benefits all marine data users, including policy makers, scientists, private industry and the public.

This kind of integrated marine data policy saves costs for offshore operators, while also opening up new opportunities for innovation and growth. The aim of EMODnet is to increase productivity in all tasks involving marine data, to promote innovation and to reduce uncertainty about the behaviour of the sea. This will lessen the risks associated with private and public investments in the blue economy, and facilitate more effective protection of the marine environment.

EMODnet provides easy and free access to marine data, metadata and data products and services spanning seven broad disciplinary themes: bathymetry, geology, physics, chemistry, biology, seabed habitats and human activities. Each theme is dealt with by a partnership of organisations that possesses the expertise necessary to standardise the presentation of data and create data products. To demonstrate the power of opening up Europe's wealth of marine observations and data, EMODnet turns marine data into maps, digital terrain models, time series & statistics, dynamic plots, and provides map viewers and other applications ready to support researchers, industries and policy makers to tackle grand societal challenges.



THE EUROPEAN MARINE OBSERVATION AND DATA NETWORK - AT A GLANCE

EMODnet

Over **120 organisations** assembling and making available **marine data, metadata & products**

7 Thematic areas

- Bathymetry
- Human Activities
- Physics
- Chemistry
- Biology
- Seabed Habitats
- Geology

EMODnet Timeline

- Phase I (2009-2013):**
 - Limited sea basins
 - 59 institutes
- Phase II (2013-2017):**
 - Low resolution all basins
 - 120 institutes
- Phase III (2017-2020):**
 - Multi-resolution
 - Over 150 institutes
- Beyond 2020:**
 - Further increase volume, coverage & resolution of data resources
 - All data & products made available directly via EMODnet Central Portal emodnet.eu
 - Expand the network of data providers, users and associated partners

1 Central Portal - www.emodnet.eu

Gateway to all EMODnet data resources and tools allowing users to retrieve data layers from multiple themes

1 Ingestion Portal

facilitating submission of new datasets

EMODnet Secretariat

Why EMODnet?

Every year, the EU & its Member States invest a huge amount in marine observations and data collection.

Most of this data ends up in different databases and systems scattered around Europe and is difficult to find, access, assemble and use.

EMODnet is making a difference

From raw data to real-life applications

Marine Observations → Data → Information → Knowledge → Application

EMODnet
European Marine Observation and Data Network

Who is EMODnet for?

Professionals from: **Public Sector** **Civil Society**
 Private Sector **Research Community**

Benefits

- More productivity:** Avoid costs of repeated collection of data by improving access to already existing data in compatible formats
- More innovation:** Anyone (including SMEs) can build value-added services using data from different sources
- Less uncertainty:** Better access to data improves forecasts of the behaviour of the seas, reducing costs of protecting life and property in coastal areas and offshore
- Adding value to your own data:** Sharing data with EMODnet allows your own data to be combined with data from others to generate better value-added products and information and supports the global open data movement.



Jan-Bart Calewaert
Head of the EMODnet
Secretariat

Credit: Dirk Leemans

Introduction from the Head of the EMODnet Secretariat

2020 was an extraordinary year for EMODnet – not only because of the global health crisis which has affected us all – but mostly because it marked EMODnet's first decade and the end of its third phase of development (2017-2020). Over the past 10 years, the EMODnet partnership has collectively delivered the Marine Knowledge 2020 vision objectives, producing a high-resolution multi-parametric map of European seas. Over the years, EMODnet has become a mature and operational provider of multidisciplinary marine data, data products and services fostering a diverse and expanding user base. It is now an essential tool for scientists, engineers, managers and policy-makers to generate the information necessary to improve our knowledge of the seas and to support sustainable economic growth and employment.

A quick look back

2020 saw the release of many exciting new products and datasets by EMODnet's seven thematic assembly groups. Whilst too numerous to mention all, some highlights include the new EMODnet Chemistry maps for contaminants which show the widespread, yet largely invisible, problem of contaminants in European seas while contributing to the evaluation of data quality and adequacy for environmental quality assessment. This was followed by the release of webODV, a new tool for the online exploration and extraction of EMODnet Chemistry data in a fast and easy way. The new integrated product for Blue Economy and marine operators from EMODnet Physics integrates global winds at sea level/ground and *in situ* data. It provides data for the latest 60 days from Global Forecasting System (nowcast) and *in situ* platforms.

Throughout the year, EMODnet Biology's team released new datasets, amounting to a total of 709,934 records. An example of these datasets includes 4000 occurrence records from the Irish Sea. The total number of records currently available via EMODnet Biology is now just over 25 million, which – in partnership with the European Ocean Biodiversity Information System (EurOBIS) – form a large European contribution to the global OBIS. In 2020, EMODnet Seabed Habitats published 36 new individual habitat maps from surveys and 10-point datasets from seven different European countries. And, one year after the much anticipated release of new digital vessel density maps in March 2019, EMODnet Human Activities mapped how COVID19 is affecting the Blue Economy, more specifically the fisheries sector.

The EMODnet Bathymetry's new World Base Layer Service (EBWBL1), released on June 2020, is the highest resolved bathymetric worldwide layout currently available. It provides fast and easy access to bathymetric information, enabling marine knowledge users to access high-resolution worldwide representations of seabed features from their own computer. Shortly after, EMODnet Bathymetry released the 2020 version of the EMODnet Bathymetry Digital Terrain Model, one of EMODnet's most downloaded products, with over 33.000 individual tiles downloaded in 2020.



Credit: EMODnet Bathymetry

At the same time, EMODnet Geology worked on improving many of its layers and created a new update of harmonised seabed substrate data, prepared by the end of 2020 and released in January 2021.

By providing a gateway for public and private data holders who wish to share their data but were previously unable to do so, EMODnet Data ingestion continues to be an essential strand of EMODnet's wide range of services. The EMODnet Data Ingestion process is gaining more and more momentum and reached a new milestone in September 2020, with more than 650

data submissions published on the portal. EMODnet's Central Portal provides the single entry point to all of EMODnet's thematic activities and resources, as well as news on new EMODnet data and product releases, use cases, videos and events. So it's well worth a visit. In 2020, a new section on the EMODnet Partnership for China and Europe (EMOD-PACE), available in English and Chinese, was added to the Central Portal, with support from the Flanders Marine Institute (VLIZ). The EMODnet Sea-Basin Checkpoints webpages were also repatriated under a dedicated section, together with the centralisation of use cases. In 2020, the EMODnet network published over 97 peer-reviewed papers and 53 articles in the popular press, which are listed on the EMODnet Central Portal.

The European Atlas of the Seas, an even more accessible and inclusive ocean literacy tool

EMODnet's expanding number of datasets continue to power the European Atlas of the Seas, making our network the main data provider of this important ocean literacy tool which now contains almost 300 maps. Since September 2017, the EMODnet Secretariat took on the maintenance and further development of the Atlas with the mission to further expand its content and features, as well as amplify its use, in particular towards schools and educational institutions. Exciting collaborations with Escola Azul in Portugal, the aquarium Nausicaá in France and the EU4Ocean Coalition for Ocean Literacy led to the organisation of various workshops with students and teachers to demonstrate the value of the Atlas as an educational tool, nurturing a more ocean literate society. To further improve the accessibility of this tool to all EU citizens, the EMODnet Secretariat launched, in September 2020, a fully revamped European Atlas of the Seas (version 6) which includes translated content in the 24 official EU languages, as well as a number of new features. The release of the new version was accompanied by a communication campaign with well-known public figures from around the European Union, highlighting in their own language what the ocean means to them and why you should [#ExploreYourOcean!](#) This has led to an increasing number and diversity of Atlas users with almost 13,000 monthly visits by the end of 2020, further exposing EMODnet data and products to a growing audience across Europe and the world.

Extending our network and reaching new communities

Over the years, EMODnet has developed into an open and inclusive network. Close collaboration with other key European initiatives such as the [Copernicus Marine Service](#) (CMEMS) has led to further synergy between these key long-term European marine data

services, including the cross-validation of satellite and *in situ* datasets, joint workshops and user-driven data products, and complimentary developments to further add value to the user experience. Such partnerships are continuously strengthened to optimise the synergies between ocean observation and modelling data and, to capitalise fully on the public investment in these initiatives. To recognise this, EMODnet's Annual Report 2020, includes a section dedicated to the EMODnet – Copernicus Marine Service diverse partnership activities during the year.

EMODnet's data coverage and scope are increasingly extending beyond Europe, and enhancing our international partnerships is a major focus of our work for the coming years. In February 2020, the [EMOD-PACE project](#), 'EMODnet Partnership for China and Europe' kicked off officially with a meeting at the headquarters of the European External Action Service (EC-EEAS) in Brussels. This project is a direct outcome of the EU-China Blue Partnership, signed in 2018, and aims to support EU's ocean diplomacy with China by fostering international collaboration between EMODnet and the National Marine Data and Information System (NMDIS) in China. First results of cooperation includes the bilingual EMOD-PACE EMODnet project web portal on the EMODnet Central Portal and a CMOC/China website launched at NMDIS. At the time of writing, this collaboration has been further strengthened by the signing of a Memorandum of Understanding between EMODnet and NMDIS in January 2021. This further confirms the commitment to cooperate in the marine data domain, in areas spanning strategy, research, and operation, where mutually beneficial and desirable and thereby consolidating the operational, technical and scientific collaboration which is already well underway.



But that is not all. In 2020 EMODnet partners further expanded global collaborations with other key partners such as the [International Council for the Exploration of the Sea \(ICES\)](#), the [Global Earth Observation System of Systems \(GEOSS\)](#) and the [International Oceanographic Data and Information Exchange \(IODE\)](#) of the Intergovernmental Oceanographic Commission (IOC). This includes contributions to [IODE's Ocean Data and Information System catalogue \(ODIS-cat\)](#) and the Inter-sessional Working Group on Strategy on Ocean Data and Information Stewardship (IWG-SODIS) for the United Nations (UN) Decade of Ocean Science for Sustainable Development, and acting as a

focal point and component of the European node of the developing [IOC Ocean Information Hub](#), together with European initiatives such as EurOcean. Other important collaborations have taken place at the thematic level and are reported in the thematic updates in this report, and in the section on global partnerships.

EMODnet's visibility and reach continues to grow in Europe and beyond. In 2020, EMODnet was showcased at various international meetings of the global marine and maritime community such as the International [EMSO Conference](#), regional sea-basin planning workshops hosted by IOC-UNESCO for the UN Decade of Ocean Science for Sustainable Development, the G20 Workshop on harmonised monitoring and data compilation of marine plastic litter, the [WOC Sustainable Ocean Summit](#), and the [7th European Marine Board \(EMB\) Forum: Big Data in Marine Science](#).

EMODnet also continued to strengthen dialogue and partnerships with marine and maritime businesses working across the Blue Economy, and related sectors to increase the use of EMODnet's diverse data and data products for operations at sea, and to foster further collaborations including data sharing. EMODnet also welcomed new EMODnet [Associated Partners](#) such as



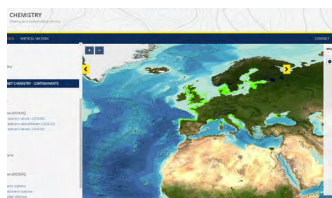
[dotOcean](#), [Raceix Ltd.](#), [Dcarbonx](#) and the [Society for Underwater Technology \(SUT\)](#).

In addition, dialogue between EMODnet and the European Commission Marine Knowledge Expert Group (MKEG) (composed mostly of industry representatives) continued with a joint session at the [4th Marine Knowledge Expert Group \(MKEG\)](#) meeting in November 2020. At the event, EMODnet thematics presented their latest developments and exchanged ideas, collecting feedback from MKEG members on EMODnet status, recommendations for future developments, and on related projects and initiatives such as the EMOD-PACE project.

1. 2020 at a glance



JANUARY 2020



Credit: EMODnet Chemistry

The year started with the release of a new product on marine contaminants by EMODnet Chemistry. These new maps show data spatial distribution and contribute to the evaluation of data quality and adequacy for environmental quality assessment. All the maps are freely accessible through OGC web services, selecting the chemical substance. Additionally, the metadata catalogue provides access to the metadata information, the description of the used methodology and the possibility to download the maps. The EMODnet Secretariat and partners also attended a number of regional sea-basin events for the UN Decade of Ocean Science for Sustainable Development including the Mediterranean Sea and Arctic Ocean, with further workshops continuing through the year.

FEBRUARY 2020



Credit: European Commission

The EMOD-PACE project, 'EMODnet Partnership for China and Europe' held its kick-off meeting on 19 February at the headquarters of the European External Action Service (EC-EEAS) in Brussels. This project aims to support EU's ocean diplomacy with China by fostering international collaboration between EMODnet and the National Marine Data and Information System (NMDIS) in China. This groundbreaking EU-China collaboration is a concrete step forward to achieve the shared objectives of the EU-China Blue Partnership - effective ocean governance for the conservation and sustainable use of the oceans and their resources. The Head of the EMODnet Secretariat, Jan-Bart

Calewaert, presented EMODnet in the session 'Cooperation for a sustainable development of the Oceans' at the EMSO Conference "preparing for the UN Decade of Ocean Science", attended by many key European marine and environmental Research Infrastructures, whilst strengthening the partnership with EMODnet for data sharing from this key research community.

MARCH 2020



In March 2020, the Directorate-General for Maritime Affairs and Fisheries (DG MARE) DG MARE released an official communication on the priorities for the next phase of EMODnet, highlighting the further improvement and expansion of the coverage of the services, the optimisation of EMODnet data according to Findability, Accessibility, Interoperability, and Reuse (FAIR-principles), and the progressive centralisation of the discovery and access to all data and data products via the EMODnet Central Portal, as a single gateway to all EMODnet resources.

APRIL 2020

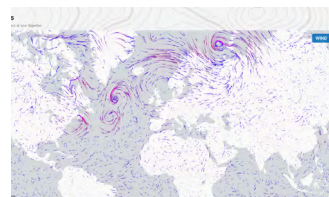


From 20-24 April 2020, the 12th EMODnet Steering Committee and 7th Technical Working Group took place online, due to the Covid-19 travel restrictions. The EC Marine Knowledge Expert Group joined for an open session, where updates across all EMODnet thematics were presented and discussed. On 22 April, the EMODnet Secretariat presented EMODnet's existing data and data products portfolio at a meeting of the Joint Programming

Initiative (JPI) Climate and Oceans Knowledge Hub on Sea Level Rise. The presentation highlighted integrated data and data products relevant for sea level rise that have been produced by the EMOD-network, in particular by EMODnet Geology and EMODnet Physics, including shore-line migration maps and both relative and absolute sea level trends and anomalies.

In April with the COVID-19 global pandemic continuing, EMODnet Human Activities mapped how COVID-19 is affecting the Blue Economy and the marine environment with focus on shipping activity and fishing.

MAY 2020



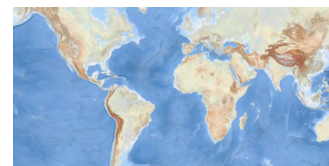
Credit: EMODnet Physics

EMODnet Physics released a new integrated product for Blue Economy and marine operators. It integrates global winds at sea level/ground and *in situ* data. The product provides the user data for the latest 60 days from the Global Forecasting System (nowcast) and *in situ* platforms.



The EMODnet Secretariat released the first video of a series of eight, illustrating the fundamental role of EMODnet in society. The EMODnet for science video explains how EMODnet can support the wider science and research community with their open access data products and services.

JUNE 2020



Credit: EMODnet Bathymetry

2020 at a glance

At the onset of summer, EMODnet Bathymetry launched its World Base Layer Service (EBWBL1) providing a fast and easy access to worldwide bathymetric information. EBWBL1 provides the highest resolved topographic and bathymetric worldwide layout currently available with land and sea integration matching the OpenStreetMap coastline representation.



The EMODnet Secretariat presented the European Atlas of the Seas at the first meeting of the EU4Ocean Platform on 18 June 2020 where 76 founding member organisations joined forces to connect for joint ocean literacy activities towards the sustainable management of the ocean, representing a diverse spectrum of marine, maritime and wider ocean literacy, education, youth and media representatives.

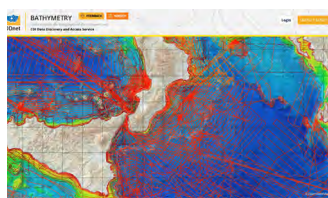


On 8 and 19 June 2020 EMODnet Biology organised a hands-on workshop on data formatting, quality control (QC) & publishing with the intention to provide training to current and future data providers on how to submit their data into the EurOBIS database and made available through the EMODnet Biology Portal, including best practice approaches to historical datasets and data archaeology.

On 16 June, EMODnet and Copernicus Marine Service co-organised with the EC a joint coastal workshop, with experts attending from EMODnet, Copernicus Marine Service, inter-DG representation and the European Environment Agency (EEA) to discuss marine data and data products and information on Coastal behavior. EMODnet Geology data on Marine Minerals were included in the Blue

Economy Report 2020 (published on 11 June 2020), jointly prepared by DG MARE and the Joint Research Centre (JRC).

JULY 2020



EMODnet Bathymetry reached a new milestone with 30,000 indexed survey datasets. The gathered survey datasets are included in the CDI Data Discovery & Access service which gives users an overview and options for requesting access to the actual data sets as managed by the connected data providers. The EMODnet Secretariat launched an online survey (July - October 2020) on the Central Portal, to collect various feedback, as preparation for EMODnet's next phase where access to all thematic data and data products will be centralised and with further expansion of the data catalogue.

AUGUST 2020

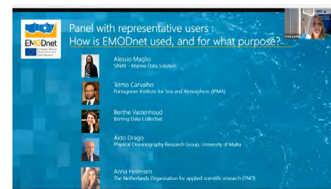


August saw the release of the initial EMOD-PACE project website in support of the EU and China Blue Partnership. It provides a gateway to the EU-China projects and related marine data, with project information and news about the deliverables. An updated EMODnet data and data product portfolio, covering all seven thematic, was published in August 2020. During the summer, it was also all hands on deck for the EMODnet Secretariat for the preparation of the 10 years celebrations of EMODnet, shooting for the 10 years-video during COVID-19, and planning the September 2020 webinar.

SEPTEMBER 2020

September was a busy and festive

month for EMODnet with the 10 years Webinar on 22 September 2020,



“EMODnet: Showcasing a decade of achievements connecting marine data to knowledge”, together with releasing a short film and a 10 years infographic. The celebration was a true highpoint in 2020 for the entire EMODnet community, celebrating three very productive development phases over the past decade. EMODnet Chemistry were selected to participate in the G20 workshop on harmonized monitoring and data compilation of marine plastic litter, contributing to discussions on the importance of a globally shared and standardised approach of data management.



In September, the European Atlas of the Seas released a fully revamped Atlas (version 6), which aimed to further improve the usability and the accessibility of this ocean literacy tool to all EU citizens. It includes professionally translated content in the 24 official EU languages, a number of new features as well as many new maps and updates. It was also the occasion to increase our communication efforts and explore synergies with other DG MARE ocean literacy activities, such as the EU4Ocean initiative.

OCTOBER 2020



On 20-21 October 2020, EMODnet co-organised the online workshop; “Marine Data to Support Aquaculture

2020 at a glance

in the North Atlantic” with the European Commission Directorates General for Maritime Affairs and Fisheries (DG MARE) and Defence, Industry and Space (DG DEFIS), the European Aquaculture Technology and Innovation Platform (EATIP) and the Copernicus Marine Service (CMEMS). More than 60 participants attended the event.

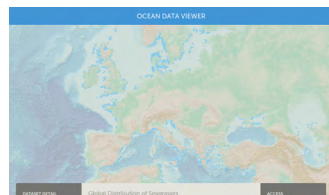


The EMODnet Secretariat presented at the 7th European Marine Board Forum: Big Data in Marine Science on 23 October 2020.



Credit: Ann-Kathrin Lescauwat, VLIZ

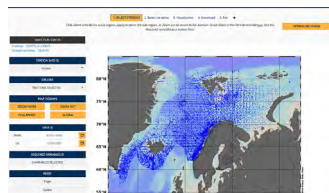
The EMODnet Secretariat received the visit of the Ambassador of Ecuador in its Oostende office, presenting EMODnet as a flagship Marine Knowledge initiative of EC DG MARE and discussing European and EMODnet's Global Strategy including expanding data coverage, international partnerships and increasing contributions of EMODnet to global initiatives.



Credit: UNEP

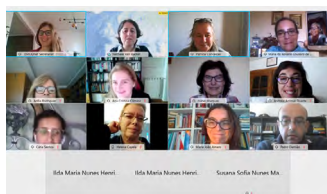
EMODnet Seabed Habitats played a key role in the update of the United Nations Environment Programme (UNEP) world seagrass distribution layer.

NOVEMBER 2020



Credit: EMODnet Chemistry

EMODnet Chemistry released their webODV, a new tool for Online Exploration and Extraction of EMODnet Chemistry Data, developed by EMODnet partner Alfred Wegener Institute, Germany. EMODnet Physics launched the Arctic Data Portal which improves the availability, quality, timeliness, and accessibility of marine *in situ* data from the Arctic region. The Portal is a joint initiative of EMODnet, Copernicus In Situ Coordination Group (INSTAC) and EuroGOOS.



The EMODnet Secretariat organized a successful workshop to present the European Atlas of the Seas to a group of 13 teachers in Portugal via Escola Azul - an educational programme of the Portuguese Ministry of the Sea. This was the first workshop in a series of four, which aim to develop relevant new exercises to be published on the Atlas' Teachers Corner. The teachers also provided feedback on their use of the Atlas and suggestions on how it can be used in classrooms and be promoted amongst teachers across Portugal. EMODnet Seabed Habitats presented a case study on using a water quality monitoring parameter to map seabed habitats across Europe at a virtual workshop on "Using Earth Observation for Water Quality Monitoring", held on 13 - 14 October 2020 and attended by over 150 delegates from 19 different countries.

DECEMBER 2020



Credit: EMODnet CENTRAL PORTAL

The EMODnet Secretariat presented at international online events such as; the global business conference, Oceanology International, the marine science communication conference COMMOCEAN 2020

and the All-Atlantic Research Forum. On a global level, the EMOD-PACE project showcased the first preliminary results of its cooperation on the official websites from both counterparts, in a bilingual setting, with a map viewer to display areas of interest, partners and first results. The EMOD-PACE CEMDnet project web-portal is embedded in the EMODnet Central Portal while a CMOC/China website was set-up as a standalone platform hosted by the National Marine Data and Information Service of China (NMDIS). The project map viewer was embedded to provide a first glimpse of the projects' geospatial data and product layers from both EMODnet and NMDIS using OGC based web services starting with a first map layer showcasing the trends of sea-level changes. The map viewer and catalogue will be further populated as the project progresses in 2021-2022.

2. One Year of EMODnet

www.emodnet.eu

2020 Key Facts

In 2020 EMODnet Central Portal reached 68,367 unique visitors, >26,000 more than the previous year. The drive towards an optimised user experience continued with the EC, DG MARE announcing in March 2020 their vision for the next phase of EMODnet. EMODnet will continue as “An essential tool for scientists, engineers, managers and policy-makers who are analysing the state and dynamics of Europe’s seas”. In the next phase, EMODnet will further build on work to date to make all data and data products findable, accessible, interoperable and reusable (FAIR), centralising not only data products but also access to all data through the Central Portal. In 2020 this process was initiated and will progressively see all the thematic portals use a common map viewer, directly available from the EMODnet Central Portal. This substantial technical exercise – coordinated by the Flanders Marine Institute (VLIZ) and the EMODnet Secretariat, in collaboration with all thematic subject matter and technical experts, will further optimise the user experience, with EMODnet Central Portal providing a “one stop shop” for *in situ* marine data.

CENTRAL PORTAL
Your gateway to marine data in Europe

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[ABOUT](#) [DATA PORTALS](#) [DATA SERVICES](#) [SOLUTIONS](#) [CHECKPOINTS](#) [NEWS & EVENTS](#) [OPEN CONFERENCE 2021](#) [ATLAS OF THE SEAS](#) [EU-CHINA](#)

Complete our survey by Friday 2 July 2021!
Help us shape future EMODnet information services [Go to the survey](#)

The EMODnet website will soon move under the europa.eu domain
[More information here](#)

Ten Years of EMODnet in Ten Minutes - watch the full movie

Map of the Week – Seabed Litter

NEWS FLASH

04 Jun 2021
The Map of the Week illustrates the issue of seabed litter and shows the percentage of litter divided in eleven categories including plastic, glass, textile and metal. [LEARN MORE](#) [ALL NEWS](#)

EMODnet Open Conference and Jamboree - Registration now open for this online event!

14 Jun 2021 to 18 Jun 2021
The second EMODnet Open Conference and jamboree will take place from 14 until 18 June 2021 fully online. Register now! [LEARN MORE](#) [ALL EVENTS](#)

EVENTS

Both from a technical and operational point of view, the EMODnet centralisation and rationalisation of discovery, visitation and access services presents a considerable challenge. Planning is therefore key to let the process run smoothly. In 2020 the first steps were taken in collaboration with all parties involved, to clarify and structure the process and draw a road map for each thematic. In Autumn 2020 work started on the centralization of EMODnet Bathymetry, with other thematics to follow in 2021 and 2022.

In addition, the EMODnet Central Portal initiated technical planning for the repatriation of the website under the Europa domain, as an official long-term initiative of the European Commission, DG MARE. This work is ongoing and will be completed by summer 2021.

WHO CAN BENEFIT FROM EMODnet?



PUBLIC SECTOR



CIVIL SOCIETY



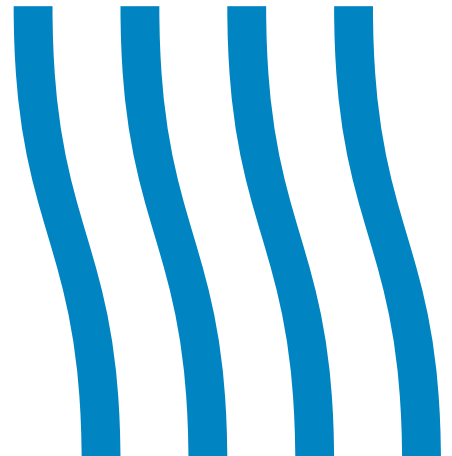
PRIVATE SECTOR



RESEARCH
COMMUNITY

BENEFITS

ACCESS THEMATIC PORTALS



2020 EMODnet Secretariat contributions to key events

This is just a sample and the full list available from reports on the EMODnet central portal <https://www.emodnet.eu/en/reports>

- POGO 21 Meeting, 21 January 2020, online meeting;
- Ocean Decade meeting, 21-23 January 2020, Venice (Italy);
- EMSO Conference, 12- 13 February 2020, Athens (Greece);
- Hack4Ocean Ideation workshop, 12 February 2020, Brussels (Belgium);
- EU Datathon Webinar, 23 March 2020, online meeting;
- E00S Steering Group meeting, 17 April 2020, online meeting;
- EMODnet-CMEMS coordination meeting, 20 April 2020, online meeting;
- JPI knowledge hub on Sea Level Rise, 22 April 2020, online meeting;
- European Marine Board webinar "Big data in marine science", 29 April 2020, online webinar;
- European Open Science Cloud (EOSC) Hub Conference, 18 May 2020, online meeting;
- PHIDIAS webinar: Boosting the use of cloud services for marine data, 4 June 2020, online webinar;
- MariMatch 2020, 2 September 2020, online meeting;
- E00S Advisory Committee, 18 September 2020, online meeting;
- EMODnet - A decade of achievements connecting marine data to knowledge, 22 September 2020, online conference;
- IODE: International data sharing workshop, 8 October 2020, online workshop;
- European Polar Board, 15 October 2020, online meeting;
- DG MARE, DG DEFIS, EATIP, CMEMS and EMODnet EATIP-Copernicus Marine-EMODnet workshop on Marine data to support aquaculture in the North Atlantic, 20-21 October 2020, online meeting;
- GEO Week 2020, 6 November 2020, online meeting;
- Oceanology International, 1-4 December 2020, online meeting;
- All-Atlantic Ocean Research Forum, 3-4 December 2020, online meeting;
- SEARICA webinar: "Managing ships effluents in the context of the Green Deal" with the support of the Blue Ports Project., 10 December, online meeting;
- SHAREMED First Capitalisation Workshop, 14-15 December 2020, online workshop.



Portal:

EMODnet Bathymetry
emodnet-bathymetry.eu

BATHYMETRY

Bathymetry describes the topography of the seabed, by measuring the distance from the sea surface to the seafloor. It provides essential information to understand the dynamics of the marine environment: the shape of the seabed can influence ocean circulation and currents, local fauna and seafloor habitats. It is also very important for hydraulic models calculating tides and waves and other derived parameters.

The EMODnet Bathymetry Portal provides access to data and data products on bathymetry (water depth), such as the EMODnet Digital Terrain Model (DTM) for all European seas, depth contours, survey tracks, best-estimate satellite derived coastlines, national baselines, and various options to view, query, and download.

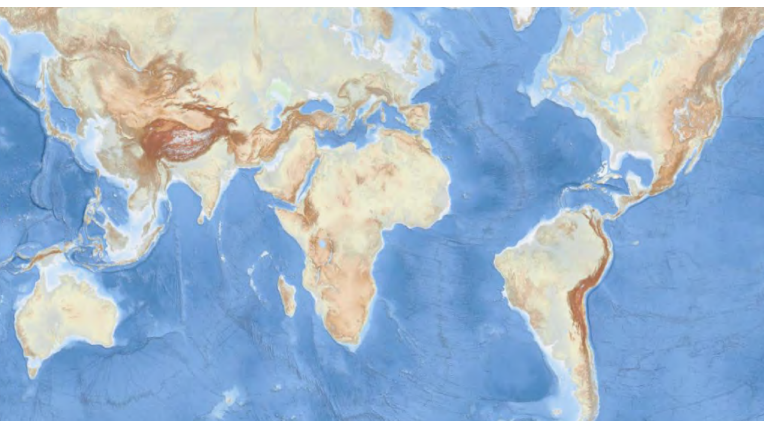
2020 Key Facts

In 2020, data providers from national hydrographic services, research institutes, and companies in Europe gathered and populated more than 30,000 survey data sets and composite Digital Terrain Models (DTMs) in the EMODnet Bathymetry catalogue services, based upon SeaDataNet.

The EMODnet DTM was prepared using a common methodology by an experienced team of bathymetry experts as a composite of more than 16,000 data sets, selected from the catalogues and processed to common standards and grid. Satellite Derived Bathymetry was also used in DTMs for coastal stretches in Spain, Italy, Greece, Cyprus, and Croatia, where *in situ* data were not available.

Currently, the EMODnet DTM is provided with a grid resolution of 1/16 arc minutes * 1/16 arc minutes and can be viewed with many layers in the Bathymetry Viewer and Download service. The 2020 DTM updates include an updated Quality Index layer, giving a quality indication by means of maps for 'age', 'vertical precision', 'horizontal precision', 'purpose', and 'combined' where by the last one results from an algorithm combining the earlier four indicators. These indicators are important for user applications.

The Bathymetry Viewer and Download service also features a High-Resolution layer, which gives access to more than 200 High-Resolution DTMs with resolution varying between 1/32 and 1/512 arc minutes, depending on local data policy of data providers.



In 2020, a new and exciting service was added to the EMODnet Bathymetry portfolio by means of the EMODnet World Base Layer Service (EBWBL) which provides a fast and easy access to worldwide bathymetric and topographic information. It is a composite of EMODnet DTM, General Bathymetric Chart of the Oceans (GEBCO) 2019, and a satellite derived DTM for land cover with a common grid and colour palette, while the coastline is based upon OpenStreetMap. The EBWBL is published as Open Geospatial Consortium

(OGC) Web Map Tile Service (WMTS) along with a demo viewer to zoom in on every detail. It is available in various projections, e.g., non-projected coordinate system, Web Mercator, Inspire-compliant projection and projections adapted to both poles. Next in 2020, the inventory and report of baseline and coastline data was updated, which now includes input as collected from 26 national authorities in Europe. It gives information available per country, the resolution, the source of the data and the institute providing/hosting the data. This can be downloaded from the portal together with shapefiles of the baselines and coastlines.

EMODnet Bathymetry is well embedded in the international bathymetry community and has continued its cooperation and synergies with GEBCO, National Oceanic and Atmospheric Administration (NOAA), International Hydrographic Organisation (IHO), Baltic Sea Hydrographic Commission (BSHC), North Sea Hydrographic Conference (NSHC), International Bathymetric Chart of the Arctic Ocean (IBCAO), and the [Seabed 2030](#) initiative. The EMODnet DTM is integrated in the GEBCO digital bathymetry product to cover European seas. In turn, GEBCO is integrated in EMODnet DTM to complete areas without survey coverage. International exchanges of data and metadata take place in the framework of the Seabed 2030 initiative whereby EMODnet Bathymetry represents the European contribution in an attempt to bring together all available bathymetric data to produce a definitive map of the world ocean floor by 2030 and make it available to all.

The EMODnet Bathymetry portal with its products and services continues to be very popular among researchers, governments, industry, university and public users. In 2020 more than 33,000 DTM tiles were downloaded by more than 3,400 unique users from circa 2,000 organisations and more than 115 countries as part of circa 12,000 transactions. Also the OGC web services (machine-to-machine) are very popular with more than 30 million OGC service requests in 2020. The variety of uses can also be derived from EMODnet Bathymetry references in research papers, journals and books, with more than 150 references in 2020 using Google Scholar.

Key data providers and users in 2020

The key data providers of EMODnet Bathymetry continue to include national hydrographic services, marine research institutes, governmental departments, and companies, the number of data providers increasing to 70 organisations in 2020. Key users of EMODnet Bathymetry are academia and research – including NOAA and the international community, governmental departments, Non-Governmental Organisations (NGOs), and a wide range of marine and offshore companies as bathymetry is a key input and base layer for many operations and projects at sea and along the coasts.

BATHYMETRY 2020 EVENTS

EMODnet Bathymetry was presented at several events, including:

- INSPIRE Conference, 10 June 2020, online conference;
- Coastal workshop: EMODnet and CMEMS, 16 June 2020, online workshop;
- Crowd Source Bathymetry Working Group, IHO, 30 June 2020 – 2 July 2020, online meeting;
- Seabed 2030 technical meeting, 28 July 2020, online workshop;
- EMODnet - A decade of achievements connecting marine data to knowledge, 22 September 2020, online conference;
- Ocean Hackathon, 10-11 October 2020, Brest France;
- NATO – EMODnet Bathymetry, 4 November 2020, online meeting;
- MERIGEO conference, 24-26 November 2020, online conference ;
- IHO – European Network working group meeting, 2 December 2020, online workshop.





Portal:
EMODnet Biology
emodnet-biology.eu

BIOLOGY

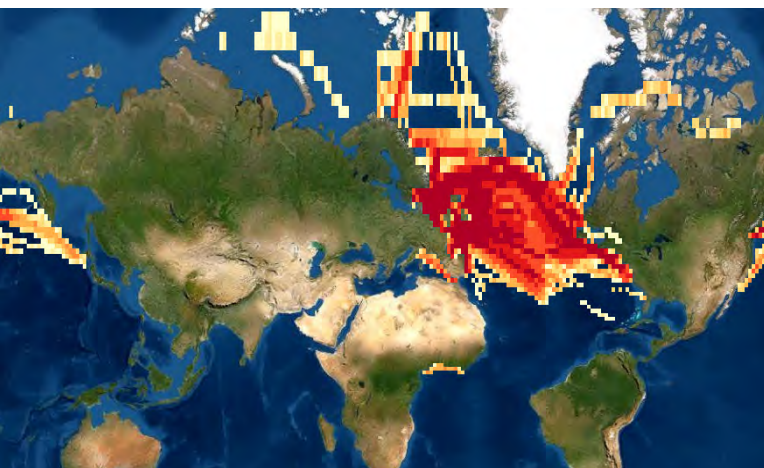
Europe's seas and oceans are home to a staggering abundance and diversity of life. More than 36,000 known species of marine plants and animals are found in Europe, and understanding their geographical distribution, abundance and seasonal, annual or decadal variation is key to detecting change in the marine ecosystem.

The EMODnet Biology Portal provides access to data and data products on species temporal and spatial occurrences, biotic measurements, and abiotic parameters.

2020 Key Facts

In 2020, the number of metadata records with freely online data increased from 920 to 1056. Due to the dynamic nature of the system, the number of occurrence records is just over 25 million. The slight decrease in this number, when compared to last year's figure of 25.5 million, is due to the update of several datasets, and in part to the update of the Continuous Plankton recorder dataset which includes over 2 million occurrence records. Data updates are important because they provide better quality data, e.g., more records at species level instead of higher taxonomic levels, more measurements or facts included, more sampling events added, etc.

In June 2020, in time for the 'Data formatting, Quality Control and Publishing' workshop that took place from 8-19 June 2020, the online course 'Contributing datasets to EMODnet Biology' was updated and made available through the [Ocean Teacher platform](#). The course was designed to be self-study and self-paced and introduced several data management concepts, including a brief introduction to DarwinCore OBIS-ENV (the standard data format used in EMODnet Biology, in collaboration with the Ocean Biodiversity Information System, OBIS and its European counterpart, EurOBIS) as well as exercises and quizzes for learners to complete as they progress through the different sections. It was an essential training for all data grant holders and continues to be available for everyone that wants to enroll.



Throughout the year, 16 data grants were selected to contribute to EMODnet Biology. They have started their work and at the time of writing have added 85 new metadata records to EMODnet Biology's catalogue. A couple of datasets were already submitted in late 2020, with the vast majority of datasets expected to be completed in 2021.

In early October a 'Transatlantic Data Product workshop' was held online, attended by various international stakeholders. Collaboration opportunities were discussed, not only at the data sharing level, but also in

other initiatives (e.g. eDNA and bar-coding) but also a joint coding sprint between the U.S. Integrated Ocean Observing System (IOOS), Canadian Integrated Ocean Observing System (CIOOS), Marine Biodiversity Observation Network (MBON) and EMODnet Biology which could seek alternative data sources to the Essential Ocean Variable-based data products.

Key data providers and users in 2020

EMODnet Biology data providers are, for the most part, partners in the consortium. These partners ensure a constant flow of standardised, interoperable and quality controlled data feeding into the system. In 2020 the contracts with 16 new data grant holders were finalised and a total of 85 new datasets (from citizen science observations to research and monitoring surveys) are expected in 2021, by the end of Phase III. In addition, EMODnet Biology also received a smaller number of ad-hoc data submissions, building on contacts established at various events where EMODnet Biology attended, via the OBIS network (e.g. datasets highlighted or forwarded by OBIS), via EuroBIS (e.g. providers submitting to EuroBIS and these data becoming part of EMODnet Biology), or via EMODnet Ingestion services (datasets being assigned to EMODnet Biology as the designated thematic lot). Due to the collection of user information (country, activity sector), EMODnet Biology notes the majority of users are in academia/research, followed by government organisations and to a lesser extent, business/consultancy and NGOs/civil society.

BIOLOGY 2020 EVENTS

EMODnet Biology was presented at several events, including:

- Advancing Data Stewardship Workshop, 28 February 2020, Oostende, Belgium;
- Open Belgium, 6 March 2020, Hasselt, Belgium;
- EMODnet-CMEMS Thematic Workshop on Coastal Issues, 16 June 2020, online;
- EMODnet - A decade of achievements connecting marine data to knowledge, 22 September 2020, online conference;
- Marine Data to support Aquaculture in the North Atlantic, 20-21 October 2020, online;
- EMB Science Webinar - Marine Citizen Science, 19 November 2020, online;
- EVOLMAR: 1st Italian conference on Marine Evolution, 23-25 November 2020, online.





Portal:
EMODnet Chemistry
emodnet-chemistry.eu

CHEMISTRY

A good understanding of seawater chemistry and its natural variability in a given region is fundamental in detecting short, medium and long-term changes in the environmental ecosystem, such as the increase of pH due to ocean acidification, influx of nitrates in run-off from agricultural fertilisers, emissions from land-based industry, oil leaks or chemical spills, as well as pollution from shipping or dredging activities.

The EMODnet Chemistry Portal provides access to data and data products on concentrations of chemicals related to eutrophication and contamination in water, sediments and biota, and marine litter.

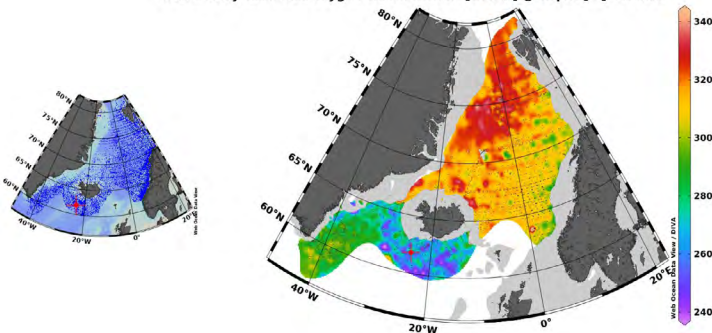
2020 Key Facts

2020 was a year of consolidation for EMODnet Chemistry. EMODnet Chemistry proceeded to create regional standardised, harmonized, validated data collections for all European seas for eutrophication and ocean acidification, contaminants, beach and seafloor litter from datasets as gathered from a wide network of connected data centres, marine research and monitoring institutes, and oceanographic data management experts.

EMODnet Chemistry data expanded the number of datasets made available through the discovery and access service with more than 1,000,000 CDI entries. The quality of the metadata and data, both for syntax as for content were checked, and improved. The user- friendliness of EMODnet Chemistry portal was also improved, in particular on its viewing and downloading services. The new [webODV](#) Data Explorer and Extractor tool, lets users explore, visualize and extract subsets of the validated data collections simply by using their web browser. Moreover, it allows researchers to do scientific analyses and prepare paper-ready graphics and subsets.

EMODnet Chemistry strengthened its role as the European data portal for Marine Litter. The first [pan-European Marine Litter Database \(MLDB\)](#), developed by EMODnet Chemistry, was endorsed for gathering all beach litter data from European Member States in the framework of the [Marine Strategy Framework Directive \(MSFD\)](#). In addition, the Marine Litter focus has been extended to macro and micro litter data from different matrices and instruments.

Water body dissolved oxygen concentration [umol/l] @ Depth [m]=500.00



EMODnet Chemistry's consolidated partnerships has led to some exciting updates;

- The MSFD Technical Group on Marine Litter used the MLDB to compute the EU beach litter quantitative Baselines and Threshold values;
- The European Environment Agency confirmed the use of EMODnet Chemistry data for three environmental indicators relating to eutrophication and contaminants;
- The Copernicus Marine Environment Monitoring Service (CMEMS) and EMODnet Chemistry set up the first joint portfolio of products in support of the MSFD implementation. The two partners are also exploring opportunities to support the aquaculture sector;
- Mercator Ocean, United Nations Department of Economic and Social Affairs (UNDESA) and SULITEST NGO, with input from EMODnet Chemistry and the EMODnet Secretariat created a community questionnaire to raise awareness on the Sustainable Development Goal 14 (Life Below Water) of the UN Agenda 2030 for Sustainable Development;
- The G20 asked EMODnet Chemistry to share its experience on Marine Litter harmonized monitoring and data compilation;
- The international Oxygen data portal and Ocean Acidification data portal received contributions from EMODnet Chemistry for their implementation;
- The National Marine Data and Information Service of China collaborated with EMODnet to strengthen international ocean data through the EMOD-PACE project.

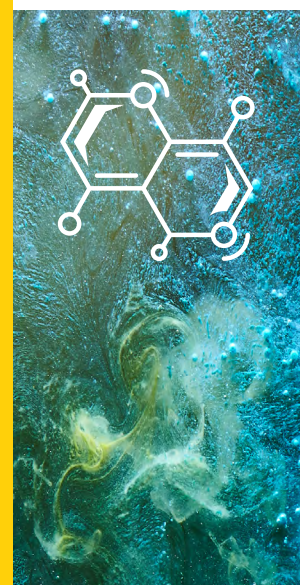
Key data providers and users in 2020

EMODnet Chemistry's key data providers are: marine research institutes, universities, environmental management and monitoring agencies, governmental departments, and NGOs. Their data are brought together and curated to common standards for formats and quality flags at national scales by the EMODnet Chemistry network of National Oceanographic Data Centres (NODC), and then made available on a European scale through the SeaDataNet infrastructure. Key users can be found in the Marine Strategy Framework Directive community, and includes European Environment Agency, EU DG Environment, EU-Joint Research Centre , International Council for the Exploration of the Sea (ICES), Regional Sea Conventions, Member States, and in the research community, studying ecosystems, marine litter dispersion, and many other research applications.

CHEMISTRY 2020 EVENTS

EMODnet Chemistry was presented at several events, including:

- UN Regional Workshop "The Mediterranean Sea We Need for the Future We Want", 21-23 January 2020, Venice (Italy);
- ENVRI week & ENVRI-FAIR annual Conference, 3-6 February 2020, Dresden (Germany);
- EMODnet Chemistry-CMEMS INSTAC meeting, 12-13 February 2020, Brussels (Belgium);
- Progress in the alignment of EMODnet and MLW systems, 20 February 2020, online meeting;
- MSFD Expert Group meeting on Contaminants (D8+D9), 30 May 2020, online meeting;
- 9th MSFD Technical Group DATA meeting, 9-10 June 2020, online meeting;
- 15th MSFD Technical Group Marine Litter meeting, 11-12 June 2020, online meeting.
- ADRION HarmoNIA Final event, 18 June 2020, online meeting;
- ADRION Thematic Cluster on Coastal and Marine Environment management activities, 18 June 2020, online meeting;
- Exclusion WFD PS from MSFD open sea assessment, 24 June 2020, online meeting;
- Bilateral meeting with Mercator Ocean on the joint MSFD portfolio, 3 July 2020, online meeting;
- Bilateral meeting organised by EEA on marine litter data, 8 July 2020, online meeting;
- G20 Workshop on harmonized monitoring and data compilation of marine plastic litter organised by the Ministry of the Environment, Japan (MOEJ), 07 September 2020, online meeting;
- Development of an on-line multiple-choice specialised module on UN SDG 14 with Mercator Ocean, UNDESA and SULITEST.org, 10 September 2020, 14 October 2020, 1 December 2020 online meetings;
- EMODnet - A decade of achievements connecting marine data to knowledge, 22 September 2020, online conference;
- Festival of Scientific Research "Trieste Next 2020", 26 September 2020, Trieste (Italy);
- The Italian HUB for the BLUEMED initiative Pilot "Towards a Healthy plastic-free Mediterranean Sea". 09 October 2020, online meeting;
- EATIP-Copernicus Marine-EMODnet workshop on Marine data to support aquaculture in the North Atlantic 20-21 October 2020, online meeting;
- Ocean oxygen data platform restricted meeting, 5-6 November 2020, online meeting.
- MonGOOS Workshop, 25 November 2020, online meeting;
- European Researchers' Night 2020, 27 November 2020, Trieste (Italy).





Portal:
EMODnet Geology
emodnet-geology.eu

GEOLOGY

The geology of Europe's seafloor is diverse, ranging from hard rock outcrops to glacial sediment layers that may reach hundreds of metres in thickness. The geological picture is further complicated by structural faults, episodic events such as earthquakes, submarine landslides and volcanic activity. Geological data is essential to support maritime spatial planning, coastline prediction, offshore installation design and environmental conservation.

The EMODnet Geology Portal provides access to data and data products on seabed substrate, seafloor geology, coastal behaviour, sediment accumulation rates, geological events and probabilities, and mineral occurrences, as well as submerged landscapes.

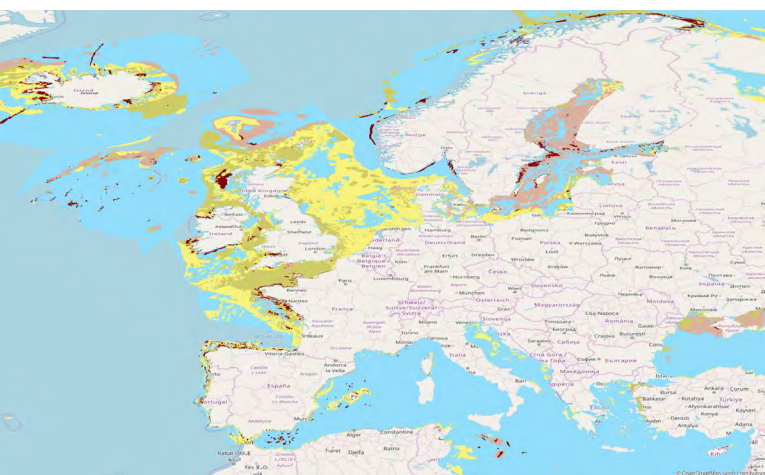
2020 Key Facts

In 2020, EMODnet Geology primarily focused on three tasks;

- preparation of the product updates planned for 2021 (Quaternary Geology, Geomorphology, Coastal Behaviour, Events and Probabilities);
- development of regional case studies focusing on high-end transnational harmonisation that isn't possible yet at a pan-European level;
- publication of EMODnet mapping progress and lessons learned in two Journal Special Issue Publications.

This led to the updating in 2020 of two key EMODnet Geology data products. First, the Marine Minerals map, updated in Autumn 2020 with new data from at least 10 EMODnet Geology partners and providing information on various critical and development minerals as well as hydrocarbons. Second, a new update of the harmonised Seabed Substrate map was made available.

The release includes a new map layer at the scale of 1:25,000 as well as updates to the layers at scales 1:50,000 and 1:100,000, using the Folk classification system of 5, 7 and 16 seabed substrate classes. These updates are



the visible results of a broad suite of mapping and dissemination activities by the EMODnet Geology consortium and its partners

For Quaternary Geology and Geomorphology (partly based on the EMODnet Bathymetry DTM), hierarchical legends were developed and implemented to develop maps for different spatial scales. Whilst end users of regional maps require as much detail as possible, end users of pan-European maps want full coverage at an aggregated level. The planned 2021 release will service both user groups. For Coastal Behaviour, the new shoreline-migration map based on field

measurements and aerial photography was prepared for release. In addition, a database was built on coastal vulnerability, in preparation of an applied map translating coastal behavior into risk run by the coastal-zone population. For events and probabilities, a full-coverage landslide-susceptibility map of European seas was prepared.

To share region-specific expertise and develop use cases for assessing the feasibility of later pan-European adoption and rollout, consortium members formed working groups on the Adriatic Sea; Atlantic Ocean (France, Spain and Portugal), Irish Sea, southern North Sea and Baltic Sea.

Much of this ongoing EMODnet Geology work was published in two EMODnet Geology special issues: Geological Society of London Special Publication 505 '[From Continental Shelf to Slope: Mapping the Oceanic Realm](#)' and the Quarterly Journal of Engineering Geology and Hydrogeology Thematic Issue: '[Mapping the Geology and Topography of the European Seas](#)'.

Key data providers and users in 2020

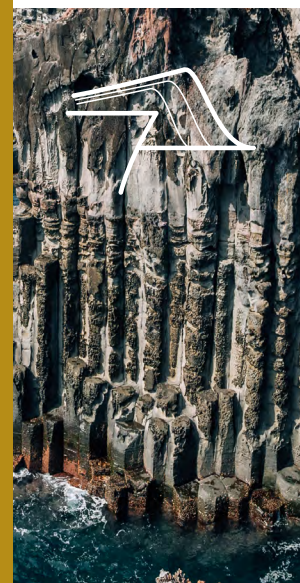
The key data providers for EMODnet Geology are partners in the project. The European national geological surveys make up the core of the EMODnet Geology consortium and these organisations are usually the national geological data centres of each participating country. Other public information on data provision is obtained through national and international network. An example of cooperation beyond the partnership concerns the marine mapping of the Caspian Sea. The Russian EMODnet Geology partner, VSEGEL, has become familiar with the practicalities of working with sister organisations from Kazakhstan, Azerbaijan, Iran and Turkmenistan. In some western-European countries, legislation is in place to structure the transfer of subsurface data to the repositories of geological surveys. This statutory development heralds a new era in public availability of marine-geological data, especially from offshore windfarms and associated infrastructure.

With respect to users, consultants and other parties active in windfarm planning and development are considered key users of EMODnet Geology data. An important challenge is soliciting feedback from these users, and tracking secondary use of the EMODnet maps. Public consultation shows that once data products are harvested, they tend to be shared and are used many times without leaving a track record.

GEOLOGY 2020 EVENTS

EMODnet Geology was presented at several events, including:

- FINMARI Researcher Day -conference, 10 March 2020, Åbo Akademi, Turku, (Finland);
- EMSO-ERIC Conference, 12- 14 February 2020, Athens (Greece);
- 63rd Annual Irish Geological Research Meeting hosted by Geological Survey Ireland, 28 February – 1 March 2020, Athlone (Ireland);
- Scientific session "Sub-aqueous mass movements: triggers, dynamics and hazards." EGU 2020, 4 May 2020, online meeting;
- Scientific session "Sub-marine geomorphology, and advances in seabed mapping and classification." EGU 2020, 6 May 2020, online meeting;
- EMODnet-CMEMS Thematic Workshop on Coastal Issues, 16 June 2020, online meeting;
- Baltic Sea Webinar, 27 August 2020, online meeting;
- EMODnet - A decade of achievements connecting marine data to knowledge, 22 September 2020, online conference;
- EMODnet Geology Project Meeting, 23-25 September 2020, online meeting.





Portal:

EMODnet Human Activities
emodnet-human-activities.eu

HUMAN ACTIVITIES

Pressure on Europe's marine space and resources is high. Continual demand for resources such as oil and gas, marine minerals and fish must be managed alongside the need to use marine space for renewable energy installations, communications cables, waste disposal sites and shipping. Additionally, societal demand for marine tourism and leisure activities, and the need to conserve marine ecosystems and habitats is leading to increased competition and conflict between different marine sectors.

The EMODnet Human Activities Portal provides access to data and data products on the intensity and spatial extent of human activities at sea.

2020 Key Facts

In April 2020, EMODnet Human Activities used their route density data to estimate the impact of COVID-19 on fishing activity. The estimations were used, amongst others, by the Scientific, Technical and Economic Committee for Fisheries (STECF) in their Annual Economic Report on the performance of the EU fishing fleet.

Next, in joint collaboration with the Data Expert Group on Maritime Spatial Planning, the EMODnet Human Activities team developed a data model for Marine Spatial Planning (MSP) that is fully compliant with the [INSPIRE directive](#). The data model is being used to ingest EU Member States' spatial plans as these are made available, to be displayed on the EMODnet Human Activities Portal in a consistent and coherent fashion.

Furthermore, entirely new datasets were made available for: fishing intensity, fishing effort, military areas, spirulina production. All these datasets are available at the EMODnet Human Activities Portal.

Key data providers and users in 2020

In 2020 EMODnet Human Activities marked an increase in the proportion of users from industry, who represent now 40% of total users. These users comprise a wide range of EU and non-EU enterprises that mostly use EMODnet Human Activities' – as well as other thematic portals' – data to identify areas that hold potential for their offshore projects. Among the most frequently reported reasons for download are; offshore wind development, cable and pipeline laying and impact of shipping on marine mammals.

HUMAN ACTIVITIES 2020 EVENTS

EMODnet Human Activities was presented at several events, including:

- EMODnet - A decade of achievements connecting marine data to knowledge, 22 September 2020, online conference;
- Meeting with the French Directorate for Marine Fisheries and Aquaculture to discuss the state of play of data collection and dissemination;
- EMODnet-CMEMS Thematic Workshop on Coastal Issues, 16 June 2020, online meeting;
- Remote meetings with the European Commission Expert Group on Maritime Spatial Planning.





Portal:
EMODnet Physics
emodnet-physics.eu

PHYSICS

Information about the physical properties of the oceans is fundamental to the understanding of natural processes: ocean currents shape the seafloor, drive the weather systems and strongly influence the distribution and health of marine species and habitats.

The EMODnet Physics portal provides access to near-real time and historical validated archived ocean physics data in as well as to a ocean physical data and data products covering: temperature of the water column, salinity of the water column, horizontal velocity of the water column, changes in sea level and sea level trends, wave height and period, wind speed and atmospheric pressure, water clarity (light attenuation), underwater sound (noise), inflow from rivers, and sea ice coverage. Provided *in situ* data products include collections of *in situ* data, reanalysis and trends from data, elaboration in space and/or time of *in situ* data and model output for a given parameter.

2020 Key Facts

EMODnet Physics contains now more than 11,000 ARGO, 14,000 drifting buoys, 3,600 moorings, 380 ships ferrybox and fishing vessels data, 2200 tagged marine mammals, 160 high frequency radar antenna, 2,500 tide gauges, 750 river water gauge stations, and more than 750,000 conductivity, temperature, and depth (CTD) measurements. In addition, EMODnet Physics makes available more than 80,000 platforms.

In 2020 EMODnet Physics continued the reorganization of their backend system infrastructure adopting ERDDAP (National Ocean and Atmospheric Administration's Environmental Research Division's Data Access Program) as the core data dissemination technology. Notably, the JCOMM Observations Coordination Group identified ERDDAP as the platform of choice for cross data centre cooperation, proving that the EMODnet Physics infrastructure development strategy is in line with (and anticipating) community needs.

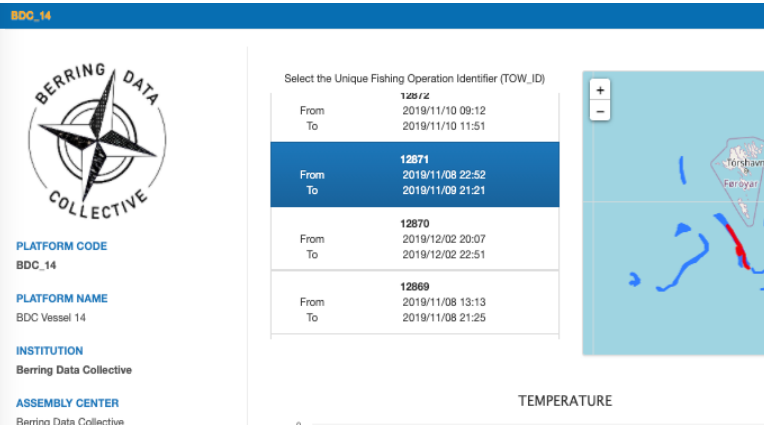
2020 was also the year in which EMODnet Physics integrated oceanic data collected by commercial fishing vessels. These platforms can collect parameters at depth and at a higher frequency than is possible with research vessels. The key process milestones were the organization of the "Fishing for Vessels" workshop in May 2020 to present the concept to stakeholders (more than 400 registrations from all over the globe), the first fishing vessel data in EMODnet Physics in June, the full integration of these data source as emerging Global Ocean Observing System (GOOS) technology under the International Center of Excellence for Coordination and Monitoring of Meteo-Oceanographic Observing Systems (OceanOPS) monitoring in December.

Other progress was made with the glider community and glider data management towards the joint definition of the OceanGlider data format that is going to be published in the first quarter of 2021. Similarly, the synergy with the High-frequency radar (HFR) task team and Istituto Hidrografico supported the integration of new monitoring areas in Portugal.

In the second quarter of 2020, EMODnet Physics added the new [Wind](#) data product that integrates global winds at sea level/ground and data. The product integrates dynamic charts presenting time series from *in situ* measurements superimposed to the forecast.

In October, the EMODnet Physics River outflow historical dataset was synchronized with Global Runoff Data Center data up to 31 December 2019 and in December 2020, the Italian Po River operational outflow station was added to EMODnet Physics River DB.

During the last quarter of 2020, EMODnet Physics products on [Sea Level](#), [Sea Surface Currents](#), [River Proxy](#); [Salinity](#) were also updated.



Key data providers and users in 2020

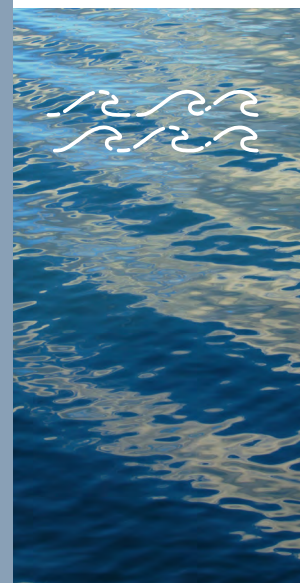
In 2020 EMODnet Physics' key data providers and users included:

- Swiss Polar Institute - Antarctic Circumnavigation Expedition (ACE): This collaboration included incorporating already-published data from Zenodo into the Physics repository. The data became available through the EMODnet Physics user-friendly map-based portal as well as adding value to the data through visualisations.
- Berring Data Collective (BDC) - Fishing Vessels: Berring Data Collective is leader of an emerging network of both science and industry lead programs collecting ocean data in collaboration with fishing vessels. The collaboration between BDC and EMODnet Physics led to the implementation of the first "[fishing for data workshop](#)" in May 2020. Since June 2020, fishing vessels data are flowing into EMODnet Physics facilitating the ingestion into other EU marine data services such as the CMEMS In Situ Thematic Centre (INS TAC) and CMEMS Monitoring and Forecasting Centers (MFC) TACs. The ingestion of the fishing vessels data also represents an EMODnet Physics milestone towards the management of new citizen scientist *in situ* data sources.
- ARPAEM - Po River outflow data: The complexity of climatic forecasts to a small spatial scale makes the forecast of the consequences on the hydrological cycle of the Po river basin in Italy still very difficult. To support its stakeholder ARPA Emilia Romagna, EMODnet Physics updated its interoperability services to facilitate data discovery and data access and these new interfaces permitted EMODnet Physics to include the Po river outflow into its river data operational product. This has increased data access for various communities, to inform important scenarios of hydro-meteo-climatic and socioeconomic events. This is also a key EMODnet Physics milestone towards the implementation of a seamless multi-resolution access to timely river outflow observations.
- Sea Level - Fast data from University of Hawaii Sea Level Center (UHSLC): In 2020 EMODnet Physics collaborated with EuroGOOS Tide Gauge Task Team and the international community on coastal sea level data from tide gauges). EMODnet Physics acted as a key partner and integrator, assisting the community to integrate and compile information on existing data networks and support, develop and promote standards to enhance the access to such data for a range of applications e.g. climate change, ocean circulation and extremes, sea level related hazards e.g. storm surges, meteotsunami and tsunami warning systems, tidal predictions and port operations. The (UHSLC) maintains one of the largest [global network of tide gauges](#) that feed the Fast Data stream. UHSLC also implements up to date standards to facilitate interoperability and data accessibility hence the collaboration between EMODnet Physics and UHSLC has been a natural and very important turning point for the sea level users.
- T-MEDnet: The [T-MedNet network](#) is devoted to spread the acquisition of long term high resolution temperature series in Mediterranean coastal waters (0-40 m) as well as to facilitate data sharing and analysis. The ingestion of high resolution temperature series from the T-MedNet initiative into EMODnet Physics is a key milestone to bridge the current gap of knowledge on temperature regimes in coastal waters (0-40 m) and to increase the temporal and spatial scales and resolutions. Support and facilitate studies on spatial and inter-annual variability in the Mediterranean coastal water column.

PHYSICS 2020 EVENTS

EMODnet Physics was presented at several events, including:

- Ocean Sciences, 15-20 February 2020, San Diego (United States);
- EMODnet - CMEMS coordination meeting, 20 April 2020, online meeting;
- Fishing for Data Workshop, 20 May 2020, online workshop;
- 15th TG NOISE, 2 June 2020, online meeting;
- EMODnet-CMEMS Thematic Workshop on Coastal Issues, 16 June 2020, online;
- EuroGOOS Tide Gauge Workshop, 1-2 July 2020, online workshop;
- EuroGOOS HFR Task Team Workshop, 7 July 2020, online workshop;
- EMODnet - A decade of achievements connecting marine data to knowledge, 22 September 2020, online conference;
- 16th TG NOISE, 6 October 2020, online meeting;
- 1st Thematic session TG Noise - Assessment framework on threshold values for continuous noise, 7 October 2020, online meeting;
- 2nd Thematic session TG Noise - Assessment framework on threshold values for continuous noise, 8 October 2020, online;
- European Polar Board Plenary, 15 October 2020, online meeting;
- Marine Data to Support Aquaculture in the North Atlantic, 20-21 October 2020, online workshop;
- 3rd Thematic session TG Noise DL 3 - Assessment framework for threshold values for continuous noise, 29 October 2020, online meeting;
- Marine Arctic Data Portal Webinar, 27 November 2020, online webinar;
- 4th Thematic session TG Noise - Assessment framework for threshold value for continuous noise, 4 December 2020, online meeting.





Portal:

EMODnet Seabed Habitats
emodnet-seabed-habitats.eu

SEABED HABITATS

Understanding the occurrence and distribution of different seafloor habitats around Europe is important for effective planning, conservation and sustainable development of the marine environment.

EMODnet Seabed Habitats Portal develops the product EUSeaMap and is the one-stop-shop for accessing seabed habitat data in Europe.

2020 Key Facts

The compilation of EMODnet's spatial data and products on European seabed habitats continued to grow in 2020, to a total of [465,105 survey sample points](#), [897 habitat maps from surveys](#) and [72 modelled maps of specific habitats](#). Moreover, EMODnet Seabed Habitats included 42 individual habitat maps from surveys made available (11 in France, 7 in Ireland, 9 in Italy, 6 in UK, 5 in Denmark, 4 in Spain), and 10 survey sample points datasets (9776 points) made available: (4 datasets in Estonia, 1 in Bulgaria, 6 in Denmark). In March 2020, nearly 30 new Web Map Service (WMS) layers were added to the interactive map from external sources. These include Composite data products from HELCOM (Habitats Directive Annex I) and National Oceanic and Atmospheric Administration (NOAA) (Undersea features) and boundaries such as MPAs, Regional sea convention boundaries and MSFD regions. While these layers are displayed seamlessly to the user, the sources are clearly marked in the layer name and the user is directed to the original source for metadata and download.

Seabed Habitats continued to develop and maintain the contents of the web portal. In July 2020, [A prominent summary of data and data products](#) made available by EMODnet Seabed Habitats was published. For each product or dataset a hyperlink provides direct access to the corresponding spatial layer in the interactive mapper. In July 2020, [A new story map](#) was published on the portal, "EMODnet Seabed Habitats - A Library of Marine Habitat Maps in European Waters". It provides guidance on products available on the site and the interactive mapper.

In July 2020, EMODnet Seabed Habitats published the [technical report](#) on its flagship data product, the broad-scale seabed habitat map, known as EUSeaMap. In November 2020, the findings of a consultation of the four Regional Sea Commissions were published in [a review of stakeholder needs for combined, harmonized data products for seabed habitats in Europe](#).



Key data providers and users in 2020

In 2020, nine data providers contributed to growing the compilation of habitat data from surveys. The top five data providers are:

- 12 maps from the French Office for Biodiversity (OFB);
- 11 maps from the Danish Nature Agency;
- 9 maps from INFOMAR programme (funded by the Irish Department of the Environment, Climate and Communications - DECC);
- 5 maps from Partenope University (Italy);
- 4 maps from the Italian Ministry of the Environment (MATTM);
- 4 maps from the Spanish Ministry of the Environment (MAPAMA);
- 4 survey sample point datasets from the Estonian Marine Institute (Tartu Ülikool Eesti mereinstituut).

In addition, 10 new use cases were added in 2020 on the web portal. The EMODnet Seabed Habitats users are very diverse and consist of; scientists, policy-makers, governments, private sector, students, etc. A key user for 2020 was the European Environment Agency (EEA) using EUSeaMap as a key data source for two pan-European spatial assessments: [Spatial Analysis of Marine Protected Area Networks in Europe's Seas III](#) (Agnesi et al, 2020) and [Multiple pressures and their combined effects in Europe's seas](#) (Korpinen et al, 2020).

Other uses of EMODnet Seabed Habitats data and data products were referenced in academic publications across the following topics

- Analyses of relative impacts of multiple human stressors in estuaries and coastal waters in the North Sea–Baltic Sea transition zone, *Science of The Total Environment* ([Andersen et al, 2020](#));
- Assessing natural capital value in marine ecosystems through an environmental accounting model: A case study in Southern Italy, *Ecological Modelling* ([Buonocore, et al., 2020](#));
- Detecting adverse effect on seabed integrity. Part 2: How much of seabed habitats are left in good environmental status by fisheries? *Ecological Indicators* ([Jac, C et al., 2020](#));
- Evaluating seabed habitat representativeness across a diverse set of marine protected areas on the Mid-Atlantic Ridge ([Milla-Figueras, D., et al., 2020](#));
- Assessment of Romanian circalittoral soft bottom benthic habitats under Danube River influence, ([Teacă, A. et al., 2020](#)).

SEABED HABITATS 2020 EVENTS

EMODnet Seabed Habitats was presented at several events, including:

- Seminar on Habitats, Museum of Natural History, 30–31 January 2020, Paris (France);
- International conference on Marine Information Systems, 06 February 2020, Esposende (Portugal);
- EcoMar Project final conference, 03 March 2020, Copenhagen (Denmark);
- EMODnet biology WP4 products Workshop, 15 June 2020, online meeting;
- EMODnet-CMEMS Thematic Workshop on Coastal Issue, 16 June 2020, online meeting;
- EMODnet - A decade of achievements connecting marine data to knowledge, 22 September 2020, online conference;
- EMODnet biology Transatlantic data products workshop, 09 October 2020, online meeting;
- Workshop Using Earth Observation for Water Quality Monitoring for the Caroline Herschel Framework Partnership Agreement for Copernicus User Uptake, 13–14 October 2020, online meeting;
- 4th meeting of the HELCOM Expert network on Benthic Habitats, 11–13 November 2020, online meeting;
- MeriGéo: French Marine GIS and remote sensing conference, 24–26 November 2020, online meeting;
- JNCC Science Talks Series, online, 10 December 2020, online meeting.





Portal:

EMODnet Data Ingestion
emodnet-data-ingestion.eu

DATA INGESTION

There are a wealth of marine data collected in Europe by public and private users, such as governmental organisations carrying out environmental monitoring, academic researchers studying the marine environment, private companies planning and building marine infrastructures, such as pipelines and wind farms, and even citizens science initiatives. In recent years, EMODnet has made huge progress in facilitating access to data from many sources. However, numerous data still remain hidden or unusable.

EMODnet's Data Ingestion Portal tackles these problems by reaching out to data holders, explaining the benefits of sharing their data and offering a support service to assist them in releasing their data for subsequent processing and quality control.

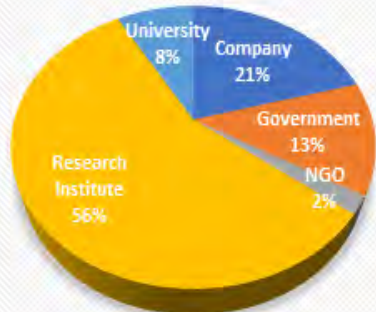
2020 Key Facts

The Data Submissions service achieved a steady increase of submissions from 638 to 853 from the start to the end of 2020. In turn, the number of completed submissions went from 565 to 721 throughout 2020, with submissions being published and made available for discovery and downloading by users via the View Submissions service. Most of these data sets are published 'as-is', however, the number of elaborated data sets went up from 207 to 315. This means that these datasets have been curated by assigned data centres from the EMODnet Ingestion network to common formats and are made available through EMODnet Thematic Portals and as input for EMODnet data products.

The network of qualified data centres collaborating through EMODnet Data Ingestion now counts 50 data centres from EU countries. These data centres are experts in marine data management for specific EMODnet data themes and are also populating European marine data management infrastructures such as SeaDataNet, EurOBIS, ICES, and others which feed into EMODnet.

Fine-tuning took place on the (semi-)automatic coupling as established in 2019 between SEANOE and EMODnet Ingestion. SEANOE, operated by IFREMER, is a SeaDataNet service, inviting European scientists to publish their scientific papers and associated data collections in return for a Digital Object Identifier (DOI) which will facilitate their wider citation. The coupling facilitates that (selected) scientific submissions from SEANOE are harvested by EMODnet Ingestion for further metadata completion, publishing 'as-is', and elaboration of datasets for inclusion and publishing in national, European and EMODnet Thematic Portals. In 2020, multiple SEANOE entries have been received from scientific teams, and further processed by their assigned data centres. The operation now runs smoothly.

NUMBER OF SUBMISSIONS PER SECTOR TYPE



EMODnet Data Ingestion not only aims at making archived marine datasets available, but this also concerns Near Real Time (NRT) and even Real Time (RT) operational oceanography data that are collected by fixed and moving platforms such as fixed stations, moorings, buoys, tide gauges, surface drifters, ferryboxes, argo floats, gliders, High Frequency (HF) radars and other platforms. Together with EMODnet Physics, in 2020 several operators of operational oceanography networks and platforms were motivated and given guidance for making

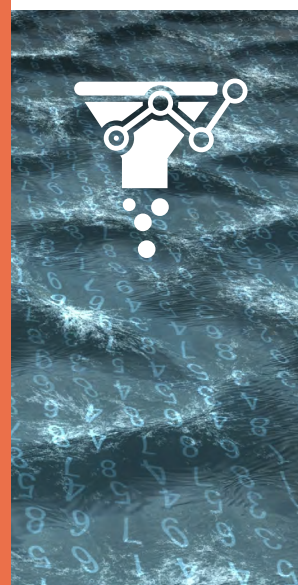
their datasets part of the European oceanography data exchange as managed by Copernicus CMEMS-INSTAC, EuroGOOS, and SeaDataNet, which are all pillars underpinning EMODnet Physics.

Moreover, a synergy was established from EMODnet Ingestion with the [H2020 Eurofleets+ project](#), concerning the European research vessel fleet, for adopting Sensor Web Enablement (SWE) standards for the transfer of events, metadata and underway data such as meteo and navigation data from Research Vessels to a data hub on shore during sailing, scientific cruises and then further to a web dashboard for publishing and open access. As part of this, the open source SeaDataNet SWE Toolkit is implemented upon recommendation and with support from EMODnet Ingestion experts.

DATA INGESTION 2020 EVENTS

EMODnet Data Ingestion was presented at several events, including:

- SEANSE project closing conference, January 2020, Rotterdam, (The Netherlands);
- Malta International Winter Course, 08-14 January 2020, La Valetta, (Malta);
- BOOS Steering Committee meeting, 17 January 2020, online meeting;
- Mediterranean - UN Decade of Ocean Science for Sustainable Development (2021-2030) conference, 21-23 January 2021, Venice, (Italy);
- Arctic ROOS meeting, 27-28 January 2020, Tromsø, (Norway);
- JERICÓ-S3 kick-off meeting, February 2020, San Sebastian (Spain);
- Ocean Sciences conference, 15-20 February 2020, San Diego (USA);
- INTERREG VA COMPASS project - Data Processes Workshop, 20 February 2020, Liverpool (United Kingdom);
- EC WG DIKE and TG-DATA meetings, March 2020, Brussels (Belgium);
- MEDIN Standards meeting, 10 March 2020, Liverpool (United Kingdom);
- EMODnet Physics annual meeting, 8 April 2020, online meeting;
- Interreg In.vi.Tra Jenues Kick-off meeting, 16 April 2020, online meeting;
- EMODnet – CMEMS coordination meeting, 20 April 2020, online meeting;
- High Frequency Radar Technical Task Team – CMEMS INSTAC – EMODnet Physics meeting, 27 April 2020, online meeting;
- Earth Observation Data for Science and Innovation in the Black Sea (EO4SIBS) Project meeting, May 2020, online meeting;
- Fishing for Data webinar, 20 May 2020, webinar;
- EMODnet Seabed Habitats 2nd project meeting, 27 May 2020, online meeting;
- Workshop Department of Marine Studies, University of Split, 27 May 2020, Split (Croatia);
- Hazrunoff project final meeting, 27 May 2020, online meeting;
- Polar Forum webinar, 28 May 2020, webinar;
- North Sea covenant between government and stakeholders, June 2020, The Hague (Netherlands);
- 15th Meeting of the MSFD Common Implementation Strategy - Technical Group on Underwater Noise (TG-Noise), 2 June 2020, online meeting;
- EU High Frequency Radara (HFR) node coordination meeting, 10 June 2020, online meeting;
- MEDIN DAC meeting, 11 June 2020, online meeting;
- Coastal workshop: EMODnet and CMEMS, 16 June 2020, online meeting;
- National Coastal Monitoring Program 2020-2022 meeting, 24 June 2020, online meeting;
- EMODnet, JCOMMOPS, CORIOLIS – Glider Data flow – tech meeting, 29 June 2020, online meeting;
- Gulf of Riga Regatta event, 30 June 2020, Ventspils (Latvia);
- IHO Crowdsourced Bathymetry Working Group, 30 June – 2 July 2020, online workshop;
- Clean Sea Mersin Project Meeting, 21 July 2020, Mersin (Turkey);
- RBINS external Web "Training on EUROfleets Principal Investigators on the use of the EMODnet DIP portal", 23 July 2020 and 28 July 2020, webinars;
- Earth Observation Data for Science and Innovation in the Black Sea (EO4SIBS) Project meeting, August 2020, online meeting;
- SeaDataCloud User Workshop, 17 September 2020, online workshop;
- Lecture to Helsinki University, the Faculty of Biological and Environmental Sciences, 21 September 2020, online lecture;
- EMODnet - A decade of achievements connecting marine data to knowledge, 22 September 2020, online conference;
- EMODnet Geology project meeting, 23 – 25 September 2020, online meeting;
- IODE International data sharing workshop, 12 October 2020, online workshop;
- EU Polar Board Plenary, 15 October 2020, remote meeting;
- SeaTech Week, 12 – 16 October 2020, online conference;
- Marine data to support aquaculture in the North Atlantic Workshop, 20-21 October 2020, online workshop;
- International Black Sea Day, 28 October 2020, online meeting;
- Black Sea 2020 Conference, 28 – 29 October 2020, online conference;
- BOOS Annual Meeting, 4 – 6 November 2020, online meeting;
- Introducing the EMODnet Arctic Data Portal, 17 November 2020, webinar;
- Arctic Data Portal Kick Off, 20 November 2020, online meeting;
- FINAL INTERNATIONAL OCEANGOV Conference, 19-20 November 2020, online conference;
- MEDIN Data Archive Centres Meeting, 24v November 2020, online meeting;
- MEDIN Joint Meeting, 26 November 2020, online meeting;
- EVOLMAR conference, 23-25 November 2020, online conference;
- World Ocean Council Sustainable Ocean Summit, 8 December 2020, online conference;
- SHAREMED First Capitalisation Workshop, 14-15 December 2020, online workshop;
- Sea and Society Day, 17 December 2020, online conference.



3. EMODnet in practice



Our users' opinion

Users are at the centre of EMODnet's strategy. EMODnet's data and data products across all seven thematic areas are now widely used across sectors including scientists, engineers, managers and policy-makers, with the data and web services crucial to the discovery and access of such data and data products by diverse communities across Europe and beyond, to enable marine and maritime stakeholders to generate the information necessary to improve our knowledge of the seas, support the Blue Economy and its sustainable management and diversification, and to provide citizens, businesses, NGOs and policy makers alike with the information to help meet the ambitious targets of the European Union's Green Deal, and to wider evidence-based decision making and policy assessments at European and global levels.

In this section, we present 4 concrete uses of EMODnet, as examples.

The full portfolio of use cases can be consulted at visit

www.emodnet.eu/en/use-cases



The first EU Marine Litter quantitative Threshold Value by using EMODnet Chemistry data

The Marine Strategy Framework Directive (MSFD, 2008/56/EC) requires European threshold values (TVs) for all descriptors to be defined. In particular, for marine litter (descriptor 10), the MSFD Technical Group on Marine Litter (TG ML) decided that coastline macro litter, commonly referred as beach litter, would be the first marine litter issue to be faced. The first [EU Marine Litter quantitative Threshold value](#) was computed using a subset of data from the pan-European Marine Litter database (MLDB), developed and maintained by EMODnet Chemistry. EMODnet Chemistry collected, standardised and validated these official monitoring data in strict cooperation with the European Commission's Joint Research Centre (JRC) and the TG ML. Common data formats, based on existing monitoring protocols and data reporting formats were used in this process. [Measurement data](#) and [Validated data collections](#) are available, along with the correspondent Data visualization products, through the EMODnet Chemistry Portal. Intermediate targets will be used by TG ML and Regional Sea Conventions (RSCs) to make a manageable pathway towards reaching the TV, as stated in the JRC technical report entitled: [A European Threshold Value and Assessment Method for Macrolitter on Coastlines](#).



PORTALS



PHYSICS

DATA
INGESTION

USE CASE SECTOR Business

EMODnet Physics & Data Ingestion supporting outdoor activity planning and eco-friendly tourism

The *in situ* data and wave nowcast products provided by EMODnet Physics and Data Ingestion are useful tools for [Outdoor Portofino](#), a company that promotes sport tourism and environmental education, to safely plan activities and promote sustainability for eco-friendly tourism. For the nature of provided services, Outdoor Portofino team is continuously looking for ocean state data and products to plan the best activities for its clients. Although *in situ* data were collected locally, they were not accessible in an easy way. EMODnet Physics and EMODnet Data Ingestion jointly approached the Portofino MEDA buoy data curator to make this valuable data shared with the community. EMODnet Physics is providing user-oriented intuitive interfaces that make it easy to find and collect ocean state nowcast information. Once ingested data was started being available from EMODnet Physics, it was accessible by a wider network of users. These data play a key role in the economic analysis and the correlation with marine weather conditions therefore helping the company governance in the growth strategy. With this joint effort, EMODnet wants to offer support in safeguarding the planet, reducing environmental impact, and educating people to an increasingly "outdoor" lifestyle.



Credit: Outdoor Portofino

Read the full use case: [Read the Use case here](#)



EMODnet Physics supporting Berring Data Collective start-up inspiration

Berring Data Collective (BDC) is a start-up dedicated to ocean observation via collaboration with fishing vessels. Fishing gears such as nets and traps make an ideal platform for compact Internet of Things (IoT) sensors. When the gears are let down to the bottom and pulled back up with fish, sensors that are along the ride collect water column profile data. When the net surface data is automatically sent onto ocean data users in near real time. Fishing for data is a cost-effective and common-sense way to collect ocean data where fishing is already taking place. However, with finite resources, where should such sensors be best placed? EMODnet Physics' data visualisation maps of different ocean observation platforms at once, all over the world. This easy visualization enabled BDC to see that instrumenting fishing would collect data where it was lacking in coastal and shelf seas.



Credit: Berring Data Collective

Read the full use case: [Read the Use case here](#)

PORTALS



CHEMISTRY

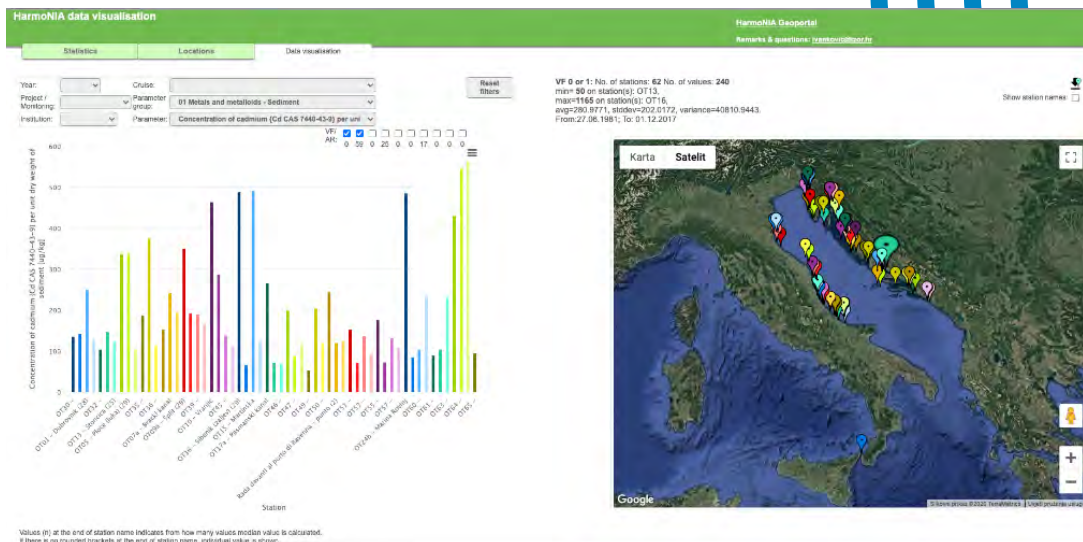
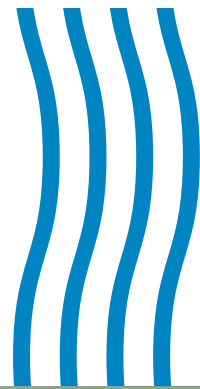
USE CASE SECTOR

Policy

EMODnet Chemistry infrastructure: the pillar of the HarmoNIA visualization tools

In the framework of the Interreg ADRION HarmoNIA - Harmonization and Networking for contaminant assessment in the Ionian and Adriatic Seas, EMODnet Chemistry implemented specific visualization tools, focused on these marine areas. These tools provide a consistent comparison between the concentrations of contaminants measured by EU and non-EU countries, and, thus, allow transnational environmental evaluation.

The HarmoNIA data visualization tools are based on the standard approach and data management system adopted by EMODnet Chemistry. The visualization products are elaborated also using the standardized, integrated data on contaminants from the EMODnet Chemistry platform.



Read the full use case: [Read the Use case here](#)





EMODnet

European Marine
Observation and
Data Network



Copernicus
Marine Service



Copernicus
Europe's eyes on Earth



Implemented by
**MERCATOR
OCEAN**
INTERNATIONAL

EMODnet and the Copernicus Marine Service

As an initiative of the European Commission Directorate General for Maritime Affairs and Fisheries (DG MARE), EMODnet has a close partnership with the [Copernicus Marine Service \(CMEMS\)](#), which is funded through the EC Directorate General for Defence, Industry and Space (DG DEFIS). Together, EMODnet and CMEMS - as two key, long-term and operational data Services of the European Union - with the Data Collection Framework for fisheries - implement the EU's Marine Knowledge 2020 strategy, and continue to work in close collaboration.

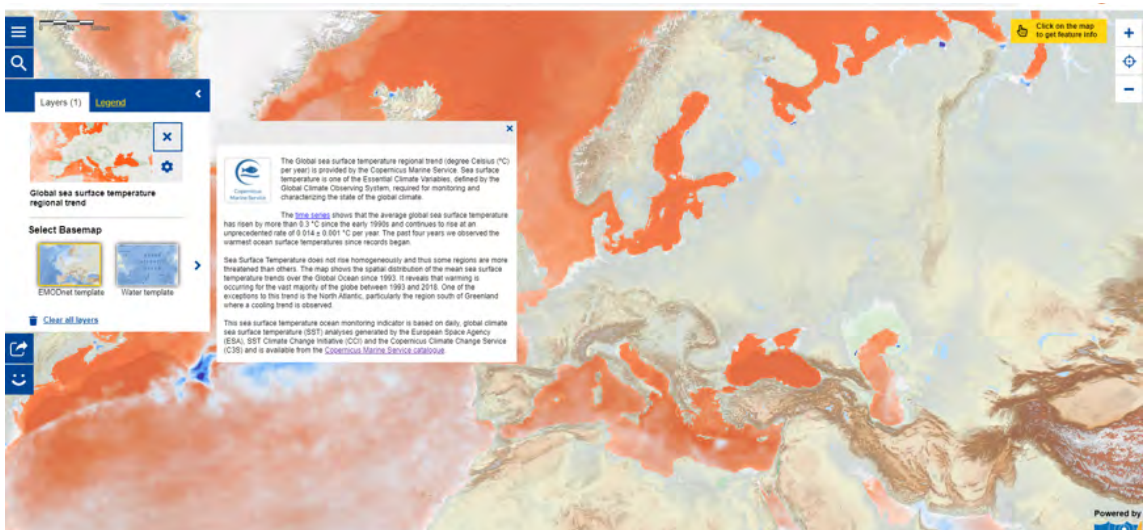
The Copernicus Marine Service (CMEMS) is one of the six services provided by the [Copernicus programme](#), the European Union's Earth Observation Programme. As the operational marine application component of Copernicus, CMEMS has a focus on information services based on Earth Observations from satellite (e.g. the sentinels), numerical models and specific *in situ* data largely from operational oceanographic platforms. CMEMS is implemented by Mercator Ocean International (MOI), for the European Union.

EMODnet and CMEMS have been collaborating at coordination and operational levels for some time, with a first memorandum of understanding (MoU) signed in 2016 between EMODnet (Secretariat and Physics) and CMEMS to closely collaborate on their respective marine activities. In particular, EMODnet Physics collaborate with the Copernicus Marine Service *in situ* thematic data assembly centre to share *in situ* Physics data, with combined datasets provided by EuroGOOS and SeaDataNet. Over the past few years, the collaboration with CMEMS has diversified and strengthened to include a further MoU between EMODnet Chemistry and CMEMS in 2019, whereby EMODnet Chemistry contribute oxygen, chlorophyll-a, and nutrients aggregated, validated and harmonized data to CMEMS INSTAC. As part of this synergy and established MoU, CMEMS INSTAC also encourage additional data providers to submit their datasets in EMODnet Chemistry. In addition, the joint EMODnet and CMEMS *in situ* Data Ingestion Process aims at collecting and ingesting the private sector marine *in situ* data and redistributing it through their respective EMODnet and CMEMS portals for the benefit of all marine user communities, including the private sector.

In 2020, EMODnet's partnership with CMEMS included a number of key activities and events. These include:

- A coordination meeting on 20 April 2020, bringing all EMODnet thematic Coordinators, Data Ingestion, Central Portal and the Secretariat together with CMEMS *in situ* thematic assembly centre (INSTAC) experts and Mercator Ocean International colleagues. These regular meetings offer an opportunity for an exchange across all areas of EMODnet and CMEMS activities, including updates on operational collaborations in *in situ* data flow, collaborative activities e.g., joint workshops, use cases, looking towards the next phase;
- A joint technical workshop on coastal issues on 16 June 2020, co-organised by EMODnet and CMEMS, together with the European Commission, and attended by EMODnet thematic and technical experts, CMEMS INSTAC and MOI, with inter-DG representation from the EC and the European Environment Agency. At the meeting, experts from both EMODnet and CMEMS presented and discussed the latest available marine data, data products and information on Coastal behaviour, with the objective to assess existing capabilities and emerging areas for collaboration across EMODnet themes and between EMODnet and CMEMS, with a regional focus. Presentations and a meeting report are available on the [EC Maritime Forum](#).
- In 2020, new data layers were added from CMEMS into the European Atlas of the Seas, a EC DG MARE communication tool administered by the EMODnet Secretariat since 2017 (see Section 6 below). Whilst the catalogue of map layers of the European Atlas of the Seas is largely powered by EMODnet (over 50%) an increasing diversity and amount of data comes from other services including the European Commission Joint research Centre, Eurostat, European Environment Agency and Copernicus.

In 2020 the EMODnet Secretariat actively explored opportunities to increase the map layers based on CMEMS data, for ingestion in the European Atlas of the Seas. Building on existing CMEMS data layers including sea surface current velocity (featured as a European Atlas of the Seas [Map of the Week](#)), and CMEMS satellite-derived chlorophyll concentrations, new data layers included CMEMS Ocean Monitoring Indicators (OMIs) including [Sea Surface Temperature \(SST\)](#) trend (see image below) and [Sea level trend](#).



CMEMS Ocean Monitoring Indicators (OMIs) including [Sea Surface Temperature \(SST\) trend](#) ingested into the European Atlas of the Seas communication tool, implemented by the EMODnet Secretariat, on behalf of the European Commission DG MARE.

- In 2020, EMODnet Chemistry and Mercator Ocean International jointly drafted a shared portfolio of data and data products from both EMODnet and CMEMS that are relevant for the EU's Marine Strategy Framework Directive (MSFD). The catalogue gathers the available marine data from diverse marine parameters from different services and sources (e.g. *in situ*, satellite, models) with the aim to Member States and Regional Sea Convention scientific experts with a fit-for-purpose support to find relevant open source data and data products, according to MSFD Descriptors. The first descriptors in the joint portfolio had a focus on eutrophication and sea floor integrity within the Baltic Sea, with the portfolio release in June 2021 and these are being extended to cover wider parameters and regions in 2021-2022;
- In 2020, EMODnet Human Activities initiated a shared EMODnet – CMEMS catalogue for the EU's Marine Spatial Planning Directive (MSPD). This builds on EMODnet experts' exchanges with the EC expert group on Marine Spatial Planning and is being further developed in 2021;
- To further streamline the communication on open source marine data for the Blue Economy, in 2020 EMODnet and CMEMS collaborated with the European Aquaculture Technology and Innovation Platform (EATIP), together with the European Commission, DG MARE and DG DEFIS for a workshop entitled "Marine data to support aquaculture in the North Atlantic". The meeting brought together Aquaculture farm operators, national authority representatives, policy makers and marine data and data service providers, to explore how existing marine data and services jointly offered by the Copernicus Marine Service and EMODnet can be used by aquaculture actors, to reduce uncertainty and risk in operations. A further workshop on the Mediterranean Sea and Black Sea was planned for March 2021.



Close collaboration with Copernicus Marine Service (CMEMS) has led to greater interoperability across services and cross-validation of satellite and *in situ* data sets, user-driven data products and complimentary developments to further add value to the user-experience. This continued partnership with CMEMS, and other key initiatives e.g. research infrastructures, data infrastructures and data management experts, organisations and networks e.g. SeaDataNet and SeaDataCloud, has been – and continues to be – crucial to move towards full interoperability and complementarity to the continued success, and evolution, of EMODnet.

4. EMODnet's expanding global partnerships

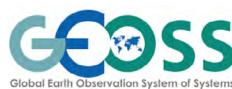
EMODnet has an ever expanding global outlook, with an increasing number of data sets available through the EMODnet services from seas and oceans beyond European waters. The international user base is also growing from Africa to China, together with increasing interest from international Blue Economy industries. EMODnet collaborates with other European and international data initiatives including the Copernicus Programme, in particular the Marine Environment Monitoring Service (Mercator Ocean International), the International Council for the Exploration of the Sea (ICES), the Global Earth Observation System of Systems (GEOSS), the International Oceanographic Data and Information Exchange (IODE) of the Intergovernmental Oceanographic Commission (IOC), and the National Marine Data and Information Service (China), through EMOD-PACE (EMODnet PARTnership for China and Europe). Partnerships are also increasingly global with EMODnet Physics providing a tailored SOOSmap interface for the Southern Ocean observing community to assemble and integrate their data in one place. EMODnet Biology, through EurOBIS, contributes 20 million data records to the international OBIS. EMODnet Bathymetry is a large European contribution to the international Seabed2030 initiative, having signed a MoU in 2019 to further strengthen collaboration.

In 2020 key highlights include:

- EMODnet kicked off 2020 by attending a number of regional workshops for the United Nations (UN) Decade of Ocean Science for Sustainable Development, including the Mediterranean Sea and Arctic Ocean workshops in January – February 2020. At these meetings, EMODnet presented the key EU efforts towards FAIR and open data, which can contribute to all UN Ocean Decade objectives and in particular provides key open services for all stakeholders to discover and access marine data and data products, contributing to realizing a truly transparent and accessible Ocean;
- EMODnet strengthened its ongoing collaboration with the Intergovernmental Oceanographic Commission (IOC) International Oceanographic Data and Information Exchange (IODE), with EMODnet being recognised as a key European marine data initiative - and committed to increase its support to the IODE programme activities. This support includes specific contributions to the Inter-sessional Working Group on Strategy on Ocean Data and Information Stewardship (IWG-SODIS) for the UN Decade of Ocean Science for Sustainable Development, and as a key focal point and component of the European node of the developing IOC Ocean information Hub, working with European initiatives including EurOcean. This is ongoing and in 2021 EMODnet will continue these efforts and will also contribute to an International Ocean Data Conference, organized by IOC-IODE in Autumn 2021;
- The EMODnet Secretariat, in collaboration with EMODnet Physics and EC DG MARE, held a meeting with the GEOSS Secretariat and the newly initiated GEO Blue Planet European Office and EU4OceanObs project. This dialogue has led to closer cooperation with GEO Blue Planet which is continuing to strengthen, with a view to include EMODnet use cases and applications for society on the GEO Blue Planet website, and to further optimize the discovery of EMODnet data and data products through the international GEOSS data portal, including collaborations with Atlantic projects e.g. H2020 iAtlantic for EMODnet to contribute to an Atlantic community data hub.

Thematic contributions to global initiatives in 2020 included:

- The development and release of the [Arctic Data Portal](#), a joint initiative of [EMODnet Physics](#), Copernicus *in situ* Coordination Group and [EuroGOOS](#) to improve the availability, quality, timeliness, and accessibility of essential marine *in situ* data from the Arctic region.
- The role of [EMODnet Bathymetry](#) as a global actor in the provision of bathymetric data was recognised by the [Seabed 2030 initiative](#), led by the [IHO-IOC GEBCO](#) under the financial sponsorships of the [Nippon Foundation](#). As an example, the first edition of the EMODnet Bathymetry World Base Layer Service released in 2020 combines gridded data from IHO-IOC GEBCO and the EMODnet Bathymetry Digital Terrain Model.
- EMODnet Chemistry contributed as a co-author to a [White Paper on Marine Litter initiated by the GEO Blue Planet](#) and the United Nations Environment Programme, and gave an invited contribution on their experience on Marine Litter harmonized monitoring and data compilation to the G20;
- EMODnet Chemistry and the EMODnet Secretariat contributed to a community initiative on raising awareness of the Sustainable Development Goal 14 (Life Below Water) of the UN Agenda 2030 for Sustainable Development led by Mercator Ocean, United Nations Department of Economic and Social Affairs (UNDESA) and SULITEST NGO.



5. EU-China collaboration: EMOD-PACE

The EMOD-PACE project 'EMODnet Partnership for China and Europe' is a concrete outcome of the Blue Partnership signed between the EU and China in 2018. This ambitious 30 month project funded by the European Union's Partnership Instrument (PI) brings together 19 European partners most of whom are actively involved in the coordination, development and operation of EMODnet services (see partner logos below).



EMOD-PACE Consortium



EMOD-PACE has a counterpart project based in China known as CEMDnet, the 'China European Union Marine Data Network Partnership', which is led by the [National Marine Data and Information Service of China \(NMDIS\)](#). These intricately connected projects focus on marine data exchange and diplomacy and mark the beginning of a new phase of strategic EU-China ocean relations in both promoting international ocean governance and supporting implementation of global commitments. This joint effort highlights the EU and China's belief that by working together and learning from each other we will advance our knowledge of our seas and shared ocean enabling more effective protection and sustainable management of our global ocean. This is mainly being achieved through the formulation and adoption of agreements which aim to make both EU and China ocean data and data products more open, and accessible. Specifically, this unique collaboration will:

- Create interoperable marine data information systems between the EU and China;
- Develop a Brokerage Service for Access to available data and data products between EMODnet and NMDIS;
- Building on the brokerage service, facilitate bilingual access to data and products currently available in European and Chinese marine data portals (EMODnet and NMDIS), as well as those developed during the project;
- Examine similarities and differences between European and Chinese ocean circulation models and reanalysis products.
- Compare European and Chinese numerical models used for seabed habitats and ecological carrying capacity by analysing the applicability of the respective models in different areas.
- Deliver data and information products for the 'Maritime Silk Route'seas on sea level changes, coastal erosion, wetland degradation and vessel traffic density.



Despite travel restrictions due to the covid-19 pandemic and the need to revert to remote online meetings, the projects have achieved a lot since the EMOD-PACE 'kick-off' in mid-February 2020. The formulation of 'Common Work Plans' which detail a series of joint activities needed to reach the project's envisaged results has been instrumental in driving progress.

The bilingual [EMOD-PACE CEMDnet project website](#) has been made available online as a subsection of the EMODnet Central Portal already hosts a map-viewer with initial data and information layers and as placeholder for the data layers under construction. It also provides access to the catalogue of products from the EMODnet Central Portal itself, and over time from NMDIS as well once web-services are in place. A physical meeting hosted by NMDIS in their offices in Tianjin, China is planned for November 2021.

6. The European Atlas of the Seas in 24 languages: even more informative and accessible!

The European Atlas of the Seas is an interactive web-map viewer available for the general public, non-expert professionals and schools. First launched in 2010 by the European Commission, Directorate-General for Maritime Affairs and Fisheries (DG MARE), it brings at-a-glance data in a comprehensive and fully visual way, while at the same time serving as a support tool for marine policy and the Blue Economy.

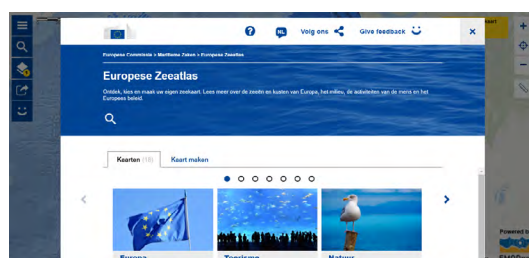
The Atlas hosts a wealth of information about Europe's marine environment and related human activities, covering topics such as nature, tourism, security, energy, passenger transport, sea bottom, sea level rise, fish consumption, and much more. The data available come primarily from the European Commission and its agencies including EMODnet, Copernicus (Marine and Land Services), Eurostat, the European Environment Agency, the Joint Research Centre, etc.

2020 was an important year for the European Atlas of the Seas with the September release of a fully revamped Atlas (version 6), which aimed to further improve the usability and the accessibility of this ocean literacy tool to all EU citizens. It includes professionally translated content in the 24 official EU languages, a number of new features as well as many new maps and updates. It was also the occasion to increase our communication efforts and explore synergies with other DG MARE ocean literacy activities, such as the EU4Ocean initiative.

www.european-atlas-of-the-seas.eu



The European Atlas of the Seas works in collaboration with the [European Ocean Literacy EU4Ocean initiative](#) e.g. see new map layer of EU4Ocean Platform members, and more.



Updated European Atlas of the Seas now translated in 24 languages i.e. see example in Dutch.

Key achievements in 2020:

- In addition to the professional translation of the Atlas in the 24 official EU languages, the Atlas version 6 comes with a number of new features, including an improved tool to customize maps for printing, a handy overview of the available maps as well as the integration of short stories highlighting interesting map layers. An interactive help module guides visitors through these new features of the Atlas.
- The release of the multilingual Atlas was accompanied by a communication campaign with well-known public figures from around the European Union, acting as ambassadors, highlighting in their own language what the ocean means to them and why you should #ExploreYourOcean! The campaign was kicked off by the EU Commissioner Virginijus Sinkevičius with a quote in Lithuanian.
- A new background map for the Atlas was made available, thanks to EMODnet Bathymetry. Users now have access to the most detailed bathymetry map available worldwide, the EMODnet World Base Layer Service. It enables visitors to view seabed features all over the world in the highest available resolution from their own device.
- A significant increase of the Atlas catalogue content underpinned its use for education. In December 2020, the Atlas catalogue contains nearly 300 map layers. Among the new maps available, we note several maps related to fishing and fisheries (from the JRC, FARNET, Copernicus Marine Service and EUROSTAT), the first EU4Ocean map on the Platform members, maps on climate change impact and deep-sea ecosystem conservation from the ATLAS project and many others. EMODnet continues to power the Atlas by providing approximately half of the datasets.
- Exciting partnerships with the Directorate General for Maritime Policy (DGPM) in Portugal, driving the project Escola Azul, the aquarium Nausicaá in France and collaborations with the EU4Ocean Coalition for Ocean Literacy and other education initiatives led to the organisation of various workshops with students and teachers to demonstrate the value of the Atlas as an education tool, nurturing a more ocean literate society.
- Communication efforts have increasingly strengthened the visibility of the Atlas. These include the participation at a dozen webinars, the development of a short animation and other promotional tools, as well as the significant increase in activity of the Atlas Twitter account with more content related to EU policies, relevant events, quizzes and, of course, the Map of the week.
- A teachers' corner with many exercises for different age groups was updated, reflecting and supporting an increased emphasis on furthering the ocean literacy and education content and use of the Atlas.
- These new developments accompanied by structured communication and outreach activities has led to an increasing number and diversity of Atlas users with almost 13k monthly visits by the end of 2020, further exposing EMODnet data and products to a growing audience across Europe and the World.

7. EMODnet 10 Years

EMODnet and a decade of progress

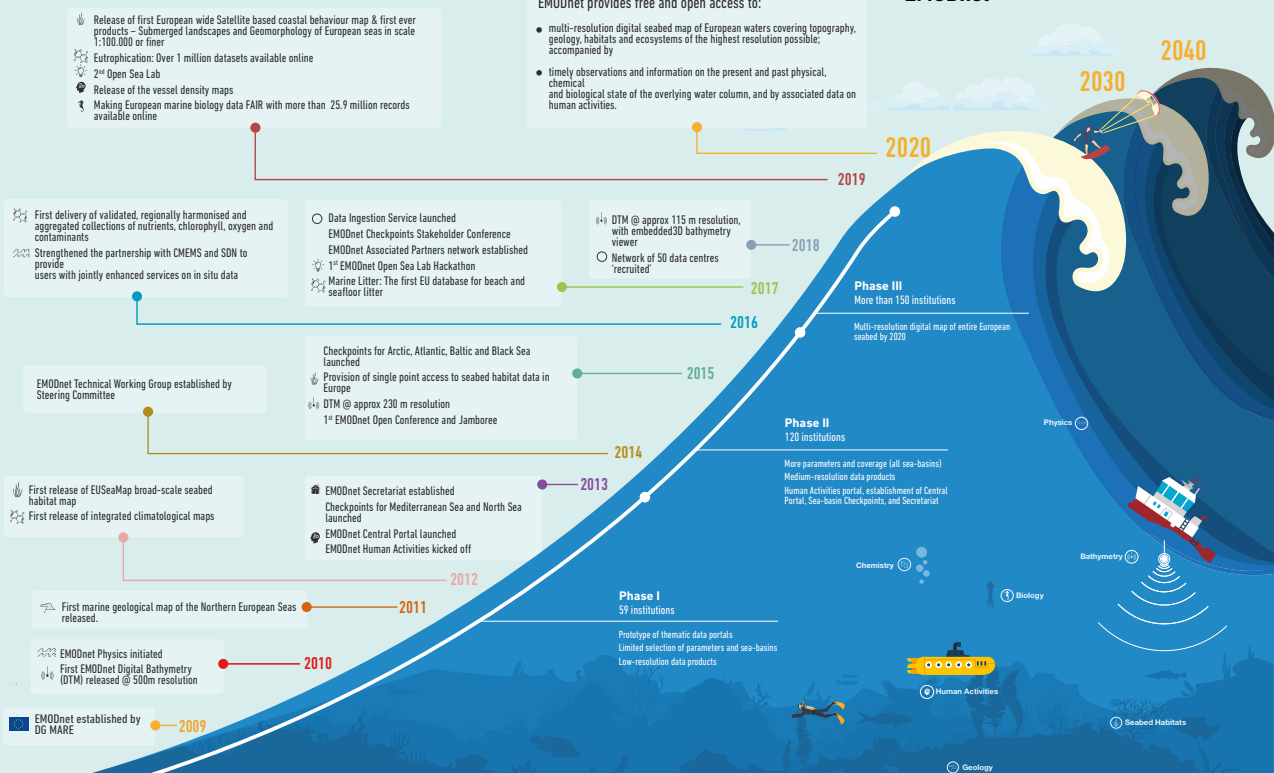
The global pandemic forced us to rethink [EMODnet's 10th anniversary celebrations](#). Whilst the EMODnet Open Conference was postponed until June 2021, a virtual gathering took place on 22 September 2020 with over 250 participants joining an online webinar hosted by the EMODnet partnership, with an impressive number of data providers, users and partners presenting testimonials on the impact of EMODnet in their work and for society.

EMODnet continues to communicate broadly using a variety of resources, and 2020 was no exception. A series of eight short films are in production, illustrating the fundamental role of EMODnet for a variety of sectors and target groups. At the time of writing, three videos are already available: [EMODnet for science](#), [EMODnet for business](#) and [EMODnet for Maritime Spatial Planning \(MSP\)](#) with others including EMODnet for Aquaculture, Tourism and Civil Society coming later in 2021.

As we move into the next phase, EMODnet will continue to evolve, to improve and provide better services for our users. We encourage you to join us on [Twitter](#) and [LinkedIn](#) as well as to subscribe to our [monthly news digest](#) to stay informed of all things EMODnet, particularly with exciting plans on the horizon like the EMODnet Open Conference and Jamboree 2021, our important gathering coming up in June 2021!



Celebrating 10 years of ocean information from EMODnet



EMODnet 10 YEARS WEBINAR

Webinar - EMODnet
A DECADE OF ACHIEVEMENTS
CONNECTING MARINE DATA TO KNOWLEDGE



22 September 2020 14:00-17:00 CEST
Register now at emodnet.eu/webinar

In 2020, EMODnet continued to celebrate a decade of operations with a [webinar](#) on 22 September 2020, hosted by the EMODnet partnership. The event brought together over 250 stakeholders from Europe and beyond, and was an opportunity to showcase EMODnet's key achievements, recognise the many and diverse partnerships, and to set the stage for the [EMODnet Open Conference](#), postponed to 14-16 June 2021 due to the COVID-19 global pandemic.

EMODnet is above all a network of people dedicating their expertise to a common goal. And so, despite being immersed in a global pandemic, the partnership even tried to make the impossible possible: [to put 10 Years of history & achievements... in a 10 minutes documentary!](#) We invite you to watch (or watch again) this short film that tracks EMODnet's journey from its launch in 2009, to where we are now and where we will go next, gathering interviews from those past and present who have been instrumental in making EMODnet what it is today! A [10-years infographic](#) was also produced to highlight the impressive achievements across the EMODnet network over the last decade (see previous page).



EMODnet thematic and technical Coordinators and experts, featured in the EMODnet 10 years documentary

8. EMODnet in Figures

In 2020 the percentages of increase in data made available by the Portals have varied as described below:

1. Percentage of increase in data made available



EMODnet Bathymetry

2019 to 2020 trend

+15,55%

Explanation for the % increase data available: There was an increase of bathymetry data sets gathered and made available as part of the generation of the new 2020 EMODnet Digital Terrain Model (DTM). The number of survey data sets went up to 30,560, an increase of 15.55%. Whilst most data concern European seas many surveys are also included from scientific cruises on the global oceans. In particular, many new data sets were added for the Baltic Sea, greater North Sea, and Arctic waters.



EMODnet Biology

2019 to 2020 trend

-5%

Explanation for the % decrease data available: The slightly negative trend is because EMODnet Biology had a number of dataset updates that contributed to the removal of obsolete records e.g., specimens identified to species level rather genus, order, family, etc. This is a normal variation and should be interpreted as an increase in the quality of the data EMODnet Biology has made available through the portal.



EMODnet Chemistry

2019 to 2020 trend

+6,5%

Explanation for the % increase data available: The number of new data sets (i.e. data series along depth or along time in the water column, in the sediment or in biota) in absolute numbers is very high. In 2020 the increase to 64,822 CDIs over the year marks an increase of 6.5% compared to 2019, despite the challenges posed by Covid-19 in 2020.



EMODnet Geology

2019 to 2020 trend

+10%

Explanation for the % increase data available: During 2020, EMODnet Geology updated data products for Seabed Substrates, Sea-floor Geology and Minerals which led to an increase in data availability.



EMODnet Human Activities

2019 to 2020 trend

+58%

Explanation for the % increase data available: The high percentage increase of 58% is due to the regular updates to existing big data sets (vessel density, route density, fish catches, fish sales, port traffic, protected areas), and to a minor extent to the addition of new data sets.



EMODnet Physics

2019 to 2020 trend

+3,58%

Explanation for the % increase data available: In 2020, EMODnet Physics achieved an overall increase average of 3% in the number of platforms providing data. Three new platform types were included: the fishing vessels sensors, the OSIS (a land based wave measurement system) and the radial component of the sea currents from High Frequency Radars.



EMODnet Seabed Habitats

2019 to 2020 trend

-72%

Explanation for the % increase data available: 70 datasets were collated in 2020, compared to >250 in 2019. 2019 was exceptional (72% increase compared to the previous year) because the collation of point data was a totally new activity. The number of datasets collated in 2020 is more in EMODnet Seabed Habitats' standards, although the Covid-19 crisis presented some challenges, including in some cases slowing down or preventing the data transformation work required.

2. Percentage year on year increase in data downloads



EMODnet Bathymetry

2019 to 2020 trend

+7,72%

Explanation Data downloads: There was a steady use of data sets and data products in 2020. In practice, most users (circa 3500 per year) are interested in browsing the EMODnet DTM and downloading DTM tiles and High-Resolution DTM files for selected areas, using the EMODnet Bathymetry Viewing & Download service. While a fraction of those users (circa 200 per year) are requesting access to underlying survey data sets, using the CDI service.



EMODnet Biology

2019 to 2020 trend

+40%

Explanation Data downloads: The large (40%) increase in data downloads may be due to COVID-19 causing a huge impact on conducting fieldwork, making EMODnet Biology users look for more pre-existing open source data to continue their work. It could also be caused by an increase in visibility of EMODnet and the Biology lot in particular, due to various promotional activities, like the 10-year event but also an increase in social media presence (Twitter).



EMODnet Chemistry

2019 to 2020 trend

+300%

Explanation Data downloads: The high increase in data downloads may be due to a number of factors, namely increased promotion, improvements to the EMODnet Chemistry thematic webpages, and the release of new products and advanced services. These factors combined mean that EMODnet Chemistry has become more visible, fit-for-use and user-friendly meaning that more users are finding their way to the products and services of EMODnet Chemistry, resulting in increased use and downloading of data and data products.



EMODnet Geology

2019 to 2020 trend

+21%

Explanation Data downloads: The increase in data downloads was attributed to Covid-19 as people were forced to work from home and had more time for research and to search for data sources. In addition, visibility of EMODnet Geology was increased through promotion at events and with data and data product updates and new releases.



EMODnet Human Activities

2019 to 2020 trend

+151%

Explanation Data downloads: EMODnet Human Activities constantly adds new data sets every year which explains partly why the total number of downloads goes up. At the end of 2019, the Portal made EMSA's route density maps available. These maps are not as popular as the EMODnet Human Activities vessel density maps, but they are quite frequently downloaded. In addition, EMODnet Human Activities is becoming more visible as a result of promotion at events and through the success of the vessel and route density maps which attracts people to visit EMODnet Human Activities resulting in more data downloads across wider data and data products.



EMODnet Physics

2019 to 2020 trend

+101%

Explanation Data downloads: EMODnet Physics recorded a high increase in the downloads from ERDDAP, which accounts for 90% of the total data downloads. The ERDDAP is facilitating a wider use and consumption of EMODnet Physics linked data, partly because downloading data from ERDDAP is much easier and faster than using a mapviewer, especially if you are interested in a large collated data set, not one single station only. The ERDDAP service was already in place by 2020 but in 2020 EMODnet Physics invested a lot of time and resources to improve the organization of the packages and add/link more sources which also improved the user experience and hence the data downloads increased. In addition, an increase in the webservices (WMS/WFS...) was recorded which may be linked to a preliminary discover of the asset (then you use ERDDAP to get data). Lastly, there was also relevant traffic generated by the central portal and the European Atlas of the Seas (about 20%).



EMODnet Seabed Habitats

2019 to 2020 trend

+789,15%

Explanation Data downloads: The dramatic increase in downloads was largely due to the newly downloadable seabed habitats points database. This database contains several thousand datasets available for download, and users are able to download the entire database. Numbers will likely stabilise in 2021. Therefore, this increase is due to infrastructural changes rather than a larger increases in new users.

3. Average annual unique visitors/portal



EMODnet Bathymetry

Unique visitors trend

-9,17%

Explanation: EMODnet Bathymetry continues to be very popular among researchers, governments, industry, universities, and public users as it provides a basemap for many applications, and also is very interesting for educational purposes. The unique visitor statistic from Bathymetry is higher than what was recorded on the EMODnet tracking system and their statistic shows a slight increase of the number of unique visitors in 2020. The Centralisation process will remove such ambiguity as all visitor metrics will be for the Central Portal. Next to visitors of the portal, there is also a great use of the OGC web services as many users have integrated the EMODnet Bathymetry base layer in their own interfaces.



EMODnet Biology

Unique visitors trend

+15,79%

Explanation: During 2020, EMODnet Biology saw an increase in the number of visitors to the portal. This could be due to a combination of different factors like the cancellation of scientific field work which led users to search for available data, increased visibility of EMODnet Biology due to, e.g. training events, training course, participation in conferences, workshops and also social media.



EMODnet Chemistry

Unique visitors trend

-2,06%

Explanation: The number of unique visitors stabilised between 2019 and 2020 to circa 19,000 on an annual basis.



EMODnet Geology

Unique visitors trend

-1,18%

Explanation: The slight decrease of unique visitors in 2020 could be caused by fewer product releases in 2020 compared to 2019.



EMODnet Human Activities

Unique visitors trend

+63,27%

Explanation: The vessel density attracted a lot of visitors to EMODnet Human Activities Portal in 2020, partly also due to the release in December 2019 of the EMSA's route density maps, which contributed to giving the EMODnet Human Activities even more visibility. Though these are less popular than EMODnet's vessel density maps, the EMSA route density maps are still one of the Portals most downloaded datasets/products. A blog-post containing a calculation to estimate the impact of COVID-19 on fishing was also well received and, most likely, generated more traffic.



EMODnet Physics

Unique visitors trend

+72,39%

Explanation: In 2020 the number of unique visitors kept increasing and EMODnet Physics recorded a new record that was facilitated by a series of EMODnet Physics organised/related web events such as the Fishing for Data Workshop and the Arctic Data Portal presentation Workshop, etc. These events collected a huge participation, as more people connected online due the COVID restrictions, and contributed to promote EMODnet Physics between more and new stakeholders.



EMODnet Seabed Habitats

Unique visitors trend

-45,42%

Explanation: The drivers behind the decrease in unique visitors in 2020 are largely unknown. A possible cause is the increased attention in brought about by the release of "EUSeaMap" broadscale product in 2019, which was not apparent in 2020 as the dataset is not due to be updated until 2021. There could have also been reduced working activities by users due to the pandemic.

EMODnet Central Portal
Input grafana Dashboard
Unique visitors trend

+49,06%

Explanation: The high increase in unique visitors to the EMODnet Central Portal are most likely a result of the high visibility of the website which was used extensively in 2020 for several communication purposes e.g., celebration of EMODnet 10 years webinar, releases of new and updated data products, EMODnet videos and EMODnet news digest. The Central Portal has also been the point of reference when communicating on social media channels such as the EMODnet Twitter and LinkedIn.

9. Budget

The figures below represent the money committed to signed contracts in thousands of Euro. All of these, except the grant for Argo floats, were implemented through procurement procedures awarded following open calls for tender.

Theme & Project	Preparatory Actions ¹	Maritime Policy Fund ²	European Maritime & Fisheries Fund ³							Grand Total (k€)
	2008-2010 (k€)	2011-2013 (k€)	2014 (k€)	2015 (k€)	2016 (k€)	2017 (k€)	2018 (k€)	2019 (k€)	2020 (k€)	
Central services		520		4,565	155	1,420	1,000	1,420		9,080
Data Ingestion				4,045			1,000			5,045
Office and Infrastructure										
Secretariat		520		520		1,420		1,420		3,880
Secretariat Support					155					155
Sea-basin Checkpoints		1,695	4,175							5,870
Arctic			906							906
Atlantic			1,590							1,590
Baltic Sea			784							784
Black Sea			895							895
Mediterranean		1,095								1,095
North Sea		600								600
Observation				4,000						4,000
Argo				4,000						4,000
Studies	230	450			52	250				982
Costs and benefits		450								450
Current status	230									230
Evaluation						250				250
Observation benefits					52					52
Thematic Groups	6,350	16,350	1,194	4,917	13,483	7,098	4,671	5,737	7,090	66,890
Bathymetry	2,175	2,000		4,917		3,720		2,800		15,612
Biology	750	1,700			1,770	1,770		1,500		7,490
Chemistry	700	4,000			2,805		1,399		2,250	11,154
Coastal mapping			1,194							1,194
Geology	925	4,200			4,500		1,770		2,420	13,815
Human Activities		2,060			1,608	1,608		1,437		6,713
Physics	1,000	1,000			1,400		950		1,050	5,400
Seabed Habitats	800	1,390			1,400		552		1,370	5,512
Grand Total (K€)	6,580	19,015	5,369	13,482	13,690	8,768	5,671	7,157	7,090	86,822

¹As defined in article 54 of Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union

²Regulation (EU) No 1255/2011 of the European Parliament and of the Council of 30 November 2011 establishing a Programme to support the further development of an Integrated Maritime Policy

³Regulation (EU) No 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund

10. EMODnet at 2021 and a vision for the future

2021 will see EMODnet further strengthening its user-oriented service, partnerships and collaborations while moving into its next phase of evolution which will start with the centralization of access to EMODnet's wealth of multidisciplinary data and information resources. EMODnet remains an open and inclusive network, both in terms of connecting people and organisations, as well as with regard to data collection, sharing and use, and that will never change.

Strengthening international partnerships

Enhancing EMODnet's international partnerships will be a major focus of our work in 2021 and beyond. With the [UN Decade of Ocean Science for Sustainable Development](#) (2021-2030) we enter a new and exciting decade for all things ocean. EMODnet is ready to take up the challenge as a mature pan-European, multi-disciplinary, operational data service, providing a trusted focal point for *in situ* observations and data products spanning bathymetry, biology, chemistry, geology, human activities, physics and seabed habitats of European seas. More than ever, EMODnet will reinforce its contribution to a more transparent and accessible ocean through its open, free and Findable, Accessible, Interoperable and Reusable (FAIR) data and data products, for research, policy, blue economy and society, increasing its coverage, and growing its diverse user base worldwide. We will jointly work with all our partners to contribute to underpinning IOC's efforts in relation to the UN Decade of Ocean Science for Sustainable Development. EMODnet has the capacity and is relevant to all Ocean Decade themes (A safe ocean; A sustainable and productive ocean; A clean ocean; A healthy and resilient ocean; A predicted ocean; and - most particularly the cross-cutting theme A transparent and accessible ocean). We will work together to meet our shared objectives and rise up to the global Ocean challenges.

In 2020, we embarked on a new EU-China collaborative project called EMOD-PACE, connecting EMODnet with the Chinese counterpart NMDIS (National Marine Data and Information System). We have also contributed to several proposals for programmes under the UN Decade of Ocean Science which calls to simplify data discovery, access and interfaces for multiple users. This is already a core goal of EMODnet, which is a key European partner in the Ocean Information Hub, a critical information and knowledge initiative in support of the UN Ocean Decade which was launched in 2020.

The next phase of EMODnet

As we move into the next phase, EMODnet will continue to evolve to improve and provide better services for our users. EMODnet will continue providing more data and products, improving quality, resolution and coverage, through a step-wise approach. New vision targets for the coming years have been set, starting with the further integration of services and web centralisation of EMODnet. With this centralisation, all EMODnet data and data products will be findable, accessible and downloadable in one place, i.e. via the EMODnet Central Portal. This task, starting in 2021 and to be finalised in 2022, will considerably simplify the access to all EMODnet resources for the users. But before that, the EMODnet Central Portal will undergo a major face-lift with its repatriation under the Europa domain, marking a clear connection between EMODnet and the EU family.

A vision for 2030

Something very exciting is on the horizon in 2021! With the slogan 'Connecting Open Data, Delivering Marine Knowledge: A Vision for 2030', the [Second EMODnet Open Conference](#)



EMODnet at 2021 and a vision for the future

(and Jamboree) will take place during the week of the 14 June 2021. It will take stock of the last decade of progress and achievements by EMODnet and look to the future to co-design its next phase to 2030 and beyond. It will be a unique opportunity for the entire EMODnet Community to recognise and further develop existing and emerging partnerships across Europe and worldwide, as well as to listen to the user community on the value of EMODnet and what can be done to further optimise the user experience. Unfortunately, due to COVID-19, this event will take place as an online Conference but remains important as a unique opportunity for the entire EMODnet Community to come together, reflect on the past decade of EMODnet and exchange ideas about its future, with sessions on EMODnet for Europe, use cases and testimonies, ties with a coordinated ocean observing community, global partnerships and initiatives, and more.

EMODnet:

A key partner for Open Data and Open Science in Europe, and beyond

Data usage and demand worldwide is growing each day. And to achieve truly Open Data and Open Science, it is crucial to have truly innovative data infrastructure services with interoperable data discovery and access. EMODnet has paved the way over the past decade and offers the most advanced, diverse and comprehensive *in situ* data sets and data products in Europe, together with data and web services that are driving a new wave of data discovery and use. Building on existing capability, EMODnet is also working with other key marine data infrastructures and horizontal e-infrastructures across Europe to explore, test and demonstrate how the federation of these infrastructures can add further value and impact to drive research and innovation. In a first step, this is being developed through the Horizon 2020 project [Blue-Cloud](#) providing web based science tools to showcase the potential of a cyber platform for “blue” data and services access, offering access to Virtual Research Environments, analytical tools and computing resources and storage. As we move forward, the EMODnet community stands ready for a new wave of connecting and further integrating European digital ocean knowledge assets building on the two main mature and operational European data services: [Copernicus Marine](#) and EMODnet, as a backbone together with key observing and data infrastructures, high performance computing facilities and AI capabilities to create a European Digital Twin Ocean Framework which will allow researchers, engineers, policy advisors, businesses and citizens alike to assess the impacts of their decisions in safe simulation environments and help to address the [EU Green Deal](#) Policy priorities.

**Connecting Open Data,
Delivering Marine Knowledge:
A Vision for 2030.**

EMODnet
European Marine
Observation and
Data Network

EMODnet Open Conference
14-16 June 2021

ONLINE EVENT

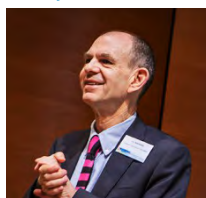
[#EMODnetConference](#)
www.emodnet.eu/en/conference2021

Thematic areas: Bathymetry, Human Activities, Biology, Seabed Habitats, Geology, Physics, Chemistry.

An EMODnet Jamboree, with partner meetings of the 7 thematic areas and data ingestion, upon invitation, will take place on 17-18 June 2021.

EMODnet Team

EMODnet Policy Officer



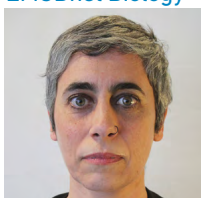
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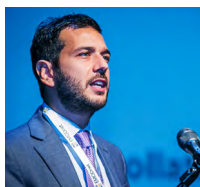
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EMODnet Seabed Habitats



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