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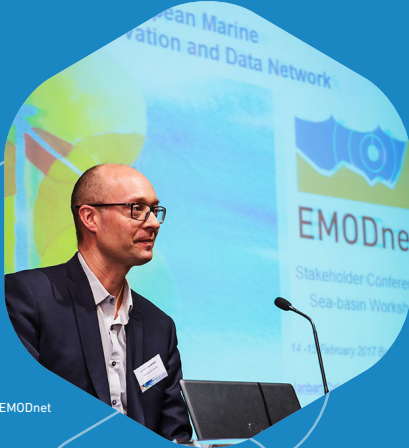
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@EMODnet

Jan-Bart Calewaert
Head of the EMODnet
Secretariat

Introduction from the Head of the EMODnet Secretariat

2018 was a very productive year for EMODnet, with numerous achievements during the first full year of the third phase of development (2017-2020).

Seven thematic portals fully operational, and expanding!

EMODnet's seven thematic portals became fully operational, making an increasing number of datasets and products available to a growing range of users. The Data Ingestion Portal, established in 2017, became an essential component of the wide range of services offered by EMODnet, providing a gateway to simplify and facilitate the sharing of data by public and private data holders. The EMODnet Central Portal also continued to develop as an information hub with a growing range of data services covering all EMODnet themes.

In 2018, a new data and data product portfolio was released to provide EMODnet users a clear and concise overview of the data and products offered by the seven thematic portals.

EMODnet Timeline



Impressive achievements of 2018 included the release of the upgraded version of the EMODnet Bathymetry Digital Terrain Model (DTM) for the European Seas, which now offers a higher resolution (up to circa 115*115m) thanks to the inclusion of both *in situ* and satellite derived data, powerful 3D visualization functionality and extended coverage of Europe's seas. In addition, the launch of the Atlas of Marine Life, a new and innovative showcase of key marine biology data products, including tools, methods and spatial maps, has significantly advanced the visualization of marine biological data.

2018 also saw progress towards the release of the first version of the harmonised map of seabed substrate data on a 1:100 000 scale with confidence estimates by the EMODnet Geology portal, the first pan-European Marine Litter database and abundance maps for beach and sea floor litter by EMODnet Chemistry and pan-European vessel density maps by EMODnet Human Activities.





THE CENTRAL PORTAL
www.emodnet.eu



BATHYMETRY



HUMAN ACTIVITIES



PHYSICS



GEOLOGY



CHEMISTRY



BIOLOGY



SEABED HABITATS

EMODnet boosting the European Atlas of the Seas

The EMODnet Secretariat also put a lot of energy and enthusiasm into the revamp of the European Atlas of the Seas. This tool, first launched in 2010 by the European Commission, Directorate-General for Maritime Affairs and Fisheries (DG MARE), is a tool for the general public, teachers and non-expert professionals to create and explore sea maps, with the mission to raise awareness about Europe's seas and coasts in the context of the EU's integrated maritime policy, which aims to coordinate across marine policies.

In 2018, the Atlas developed significantly and now offers over 200 map layers, based on data originating primarily from the European Commission and its agencies (Eurostat, the European Environment Agency, the Joint Research Centre, Copernicus, etc.) and from the European Marine Observation and Data Network (EMODnet).



EMODnet for business

Also in 2018, the European Commission organised two meetings of the Marine Knowledge Expert Group (MKEG), with support from the EMODnet Secretariat, to ensure that its marine knowledge programmes, such as EMODnet, better meet the needs of users, particularly in support of the blue economy. These meetings helped EMODnet gain a deeper understanding of the industry needs and requirements for marine data and how to make it more user and service-oriented. One of the recommendations of the MKEG was translated into an 'EMODnet for business campaign' to communicate specifically to the private sector and strengthen EMODnet's ties with stakeholder organisations and businesses. This involved a tour of European maritime associations, clusters and networks, based in Brussels, to better understand the needs of business, discuss opportunities for industry to share marine data on the open access EMODnet portals, as well as to present the benefits for businesses to easily access data from many sources and high quality data products such as maps. In addition, the EMODnet Secretariat and many of the EMODnet partner organisations participated in a number of business-oriented events such as Oceanology International in London (United Kingdom) in March 2018, and wider stakeholder events such as the 4th GEO Blue Planet Symposium in July 2018 in Toulouse (France). Finally, an EMODnet for business leaflet "Get value from ocean data" was produced in May 2018.

A growing network

We are very excited to inform that EMODnet is a diverse, vibrant and continuously growing network. In the course of 2018, EMODnet welcomed eight new Associated Partners! These are: Esgemar in Spain, Gamma Consulting in Georgia, SeaTopic in France, SOCIB - the Balearic Islands Coastal Ocean Observing and Forecasting System in Spain, HR Wallingford in the UK, MeteOcean research - a group of the University of Genoa in Italy, Envision Mapping in the UK, and RPS Ocean Science.



ESGEMAR, S.A.
ESTUDIOS GEOLÓGICOS MARINOS



SeaTopic
from expertise to operation



ENVISION
MAPPING



HR Wallingford
Working with water



MeteOcean
www.dicca.unige.it/meteocean meteoocean@dicca.unige.it

How can ocean observing and monitoring impact society? The E00S Conference 2018

The EMODnet partnership and community are dedicated to strengthen the connections along the entire Marine Knowledge value chain and overcome existing barriers and bottlenecks - from data collection to providing data, products and services to users. In this vain, the EMODnet Secretariat took

the lead in the organisation of the European Ocean Observing System (EOOS) Conference 2018 together with the Secretariats of the European Marine Board and EuroGOOS, and the overall support of DG MARE. Held in November 2018 at The Egg in Brussels, the event gathered over 300 participants to discuss the future of ocean observation, monitoring and data collection efforts in Europe, underlining the inherent value of these activities for society. The main outputs of the discussion were transformed in a tangible Call To Action for European countries and EU decision makers to assess what is currently being carried out under their responsibility in terms of ocean observation and monitoring in order to prioritise strategic planning and coordination efforts. A full Conference report was also published summarizing all discussions (eooseconference2018.eu/conference-report).

2018 also marked the end of the EMODnet Sea-basin Checkpoints, which had all completed their 'data stress tests'. Their findings were summarised in a Checkpoints report and were presented at the EOOS Conference (bit.ly/2Ft8r2A).



EOOS Conference 2018: group picture

An underwater photograph showing a large school of small fish swimming in the upper half of the frame. Below them, a rocky seabed is visible, covered in some marine life. Sunlight rays penetrate the water from the top left, creating a blue and green color palette.

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 150 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. It has been estimated that this kind of integrated marine data policy will save off-shore operators at least one billion Euro per year, as well as opening up new opportunities for innovation and growth.

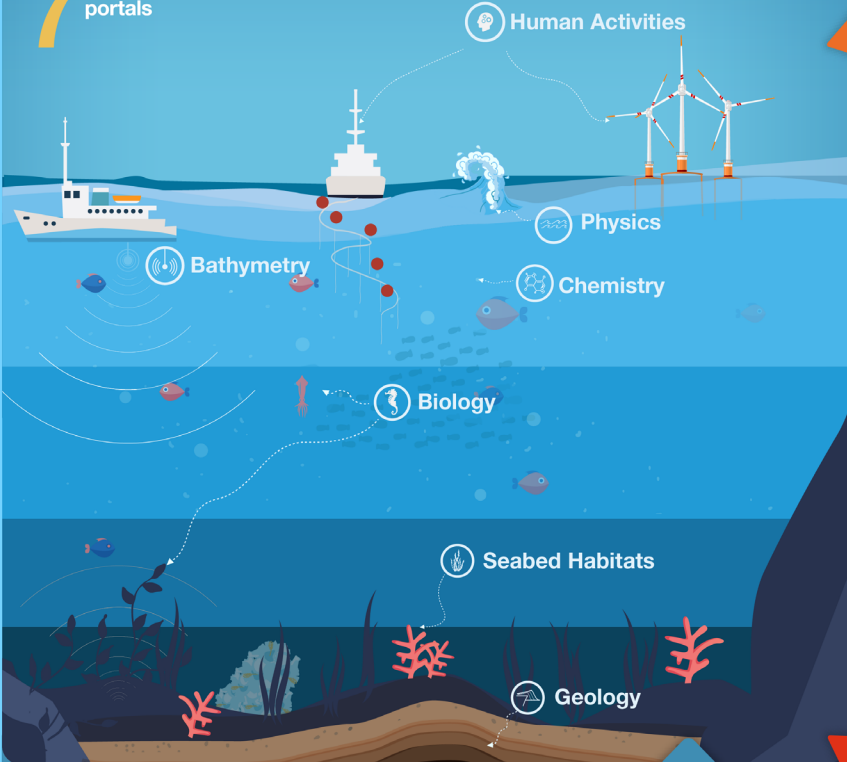
The aim of EMODnet is to increase productivity in all tasks involving marine data, to promote innovation and to reduce uncertainty about the behavior of the sea. This will lessen the risks associated with private and public investments in the blue economy, and facilitate more effective protection of 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 possess the expertise necessary to standardise the presentation of data and create data products.

EMODnet turns marine data into maps, digital terrain models, time series & statistics, dynamic plots, map viewers and other applications ready to support researchers, industries and policy makers to tackle grand societal challenges.

Over **150 organisations** assembling and making available
marine data, metadata & products

7 Thematic portals

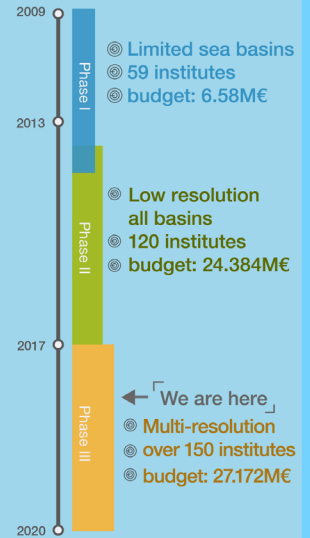


6 Sea-basin Checkpoints

- ARCTIC
- ATLANTIC
- BALTIC
- BLACK SEA
- MED SEA
- NORTH SEA

Checking the fitness for purpose of marine data in European sea basins

EMODnet Timeline



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?

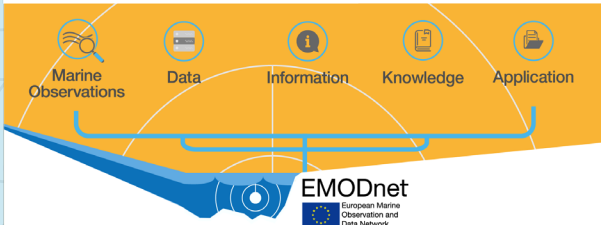
Every year, EU & its Member States invest 1.4 billion euro in marine observations and data collection.

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



Who is EMODnet for?

Professionals from: Public Sector Civil Society
 Private Sector Research Community

Benefits

- Increased productivity:** Avoid costs of repeated collection of data by improving access to already existing data in compatible formats
- Stimulation of innovation:** Anyone (including SMEs) can build value-added services using data from different sources
- Reduction of 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.

2018

AT A GLANCE

JANUARY 2018

EMODnet Physics Temperature and Salinity climatologies data product is updated with enhanced features to explore the products developed by the SeaDataNet partners.

EMODnet Human Activities launches a new dataset on underwater pipelines.

FEBRUARY 2018

EMODnet Chemistry develops a use case on mapping data and metadata formats with INSPIRE data models for "Nutrients concentrations in water" as a contribution to the European Environment Agency (EEA) recommendations for Accessing data and information according to the Marine Strategy Framework Directive (MSFD).

EMODnet Physics launches the new Sensor Observation Service - Sensor Web Enablement (SOS SWE) data product: a tool to allow users to check if OGC SOS services can be used to ingest real time data and trigger the near real-time (NRT) data ingestion process.

APRIL 2018

EMODnet Chemistry delivers validated, regionally harmonised and aggregated collections of nutrients, chlorophyll, oxygen and contaminants data to the European Environment Agency (EEA).

MARCH 2018

First release of EMODnet Chemistry litter data maps.

An updated version of the EMODnet Physics River run-off data product is made available: the product links more than 130 operational river outflow stations, and more than 300 historical monthly *in situ* trends.

The first version of the harmonised seabed substrate map on a 1:100 000 scale with confidence estimates is published in the EMODnet Geology portal.

The EMODnet Seabed Habitats composite data product of habitat points for European seas is published.

Successful representation of EMODnet at Oceanology International, 13-15 March 2018, London (UK) with several talks and a large exhibition booth.

MAY 2018

EMODnet Seabed Habitats portal publishes additional 257 habitat maps from across Europe.

EMODnet contributes to the European Maritime Day, 31 May - 1 June 2018, Burgas, Bulgaria.

EMODnet Physics updates the Sea Level data product by integrating more than 400 European tide gauge stations, the 290 Global Sea Level Observing System (GLOSS) core network, and more than 1,300 Permanent Service for Mean Sea Level (PSMSL).

AUGUST 2018

EMODnet Physics Temperature and Salinity datasets are extended with more than 130,800 probes (1990-2017).

JUNE 2018

Launch of the revamped European Atlas of the Seas powered by EMODnet with new features, an improved design and more content.

EMODnet Physics releases a new data product: Total Suspended Matter for the European Seas (2002-2016).

EMODnet Exhibition booth at SEAFUTURE 2018, 19-22 June, La Spezia, Italy. The event brought together over 2,000 maritime and marine operators, with a focus on navy and sea security operators.

JULY 2018

EMODnet Secretariat attends 4th GEO Blue Planet Symposium on 4-6 July in Toulouse, France.

SEPTEMBER 2018

The new EMODnet Digital Terrain Model (DTM) is released with higher resolution of 1/16 * 1/16 arc minutes (circa 115 * 115 m²) and for all European seas including part of the Arctic Ocean and Barents Sea.

Iain Shepherd, Senior Expert at DG MARE, visits from China where he discusses collaboration between EMODnet & the National Marine Data & Information Service in Tianjin (China).

EMODnet Chemistry's viewing service displays 6-years DIVA concentration maps of oxygen and nutrients and digital objects identifiers (DOIs) are assigned for citation.

EMODnet Geology presentation screened on Albanian TV.

EMODnet Student team participates to the Open Summer of Code 2018, in Brussels, Belgium, to build a useful application from the vast array of open data available in EMODnet to explore marine data via a clear map interface.

The transformation of EMODnet nutrients data to INSPIRE data models is presented at the INSPIRE Conference, 18-21 September 2018, Antwerp, Belgium.

OCTOBER 2018

The EMODnet for business marketing campaign dedicated to the importance of open marine data and how it supports blue growth and industry is launched.

EMODnet Biology releases an online tool to allow the data providers to independently evaluate their datasets and make the appropriate corrections before their data is harvested in EMODnet Biology.

EMODnet Ingestion reaches a first major milestone with 200 data submissions from research, government, industry and NGOs completed for publishing. Moreover already 40 of these data sets have been elaborated for inclusion in EMODnet portals.

NOVEMBER 2018

The EMODnet Secretariat and Flanders Marine Institute (VLIZ) launch the EMODnet "Data and data product portfolio".

The new EMODnet Physics data product Impulsive Noise Event Registry covering 2015 -2017 is published.

The full set of EMODnet Chemistry Marine Litter maps are presented to the Marine Strategy Framework Directive (MSFD) Board of Experts for their evaluation, further revision and possible endorsement.

EMODnet Human Activities releases a new dataset on macroalgae and microalgae production facilities in Europe.

The EMODnet Secretariat leads the organisation of the European Ocean Observing Systems (EOOS) Conference, 21-23 November 2018, Brussels, Belgium, in close collaboration with the Secretariats of the European Marine Board and EuroGOOS, with the support of DG MARE, with numerous opportunities to give visibility to the EMODnet thematic portals in posters sessions, booths and talks.

DECEMBER 2018

EMODnet Biology launches the Atlas of European Marine Life: data and data products structured around the biological Essential Ocean Variables (EOVs) facilitating global interoperability and contributing to the aims of UN Sustainable Development Goal 14, the relevant Aichi Biodiversity Targets of the Convention on Biological Diversity.

EMODnet Chemistry, jointly with the Joint Research Centre of the European Commission, publishes the "Marine litter database: Lessons learned in compiling the first pan-European beach litter database", a technical report that provides information on the data management strategy and methodology applied to deliver a single database able to handle marine litter data at European scale (bit.ly/2XKB4yK).

EMODnet Chemistry provides harmonized, aggregated and validated data collections of contaminants in biota to the European Environment Agency (EEA) in customised format, taking into consideration the remarks obtained on the first release.

EMODnet Bathymetry releases four new data products: 1) layer with digital Satellite Derived Coastlines for the Lowest Astronomical Tide (LAT), the Mean Sea Level (MSL) and the Mean High Water (MHW) tidal reference levels; 2) layer with High Resolution hotspots; 3) layer with Digital Terrain Model Quality Indicators; 4) inventory of national baselines and coastlines.

2. One year of EMODnet

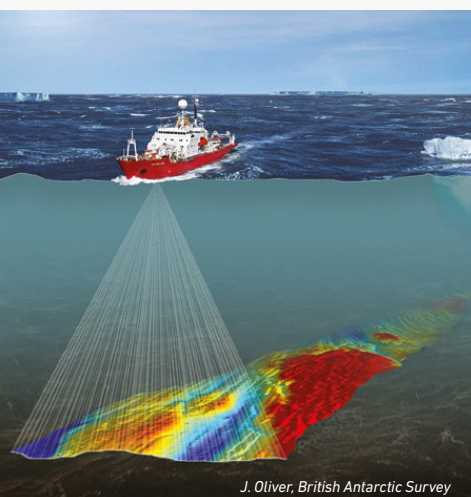
2.1 EMODnet Thematic Portals



Portal:

EMODnet Bathymetry

emodnet-bathymetry.eu



J. Oliver, British Antarctic Survey

2.1.1 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.

The EMODnet Bathymetry Portal provides access to data and data products on bathymetry (water depth), depth contours, survey tracks and geographical location of underwater features such as wrecks for all European sea-basins.

2018 key facts

The number of survey datasets included has more than doubled compared to 2017. In March 2018, the number of indexed survey datasets is over 27,000, available from 39 data centres from 18 European countries and originating from 241 organisations.

In September 2018, the new EMODnet Digital Terrain Model (DTM) was released with grid resolution improved from $1/8 * 1/8$ to $1/16 * 1/16$ arc minutes (circa $115 * 115 \text{ m}^2$) and for all European seas including part of the Arctic Ocean and Barents Sea. Based upon circa 9,400 *in situ* datasets and 18 Satellite Derived Bathymetry data products for coastal stretches of Spain and Greece, the new DTM contains approximately 12.3 billion grid nodes. The DTM can be freely viewed, also in 3D, downloaded (by 64 tiles), and shared by OGC web services. The download facility is frequently used (> 3500 transactions with circa 1,700 users in Oct - Nov 2018). The software source for building the 3D model is made available via GitHub.

In December 2018, four new data products were released: 1) a layer with digital Satellite Derived Coastlines for the Lowest Astronomical Tide (LAT), the Mean Sea Level (MSL) and the Mean High Water (MHW) tidal reference levels; 2) a layer with High Resolution hotspots, consisting of a collection of circa 200 even higher resolution composite DTMs for selected areas. Their resolution varies between $1/32$ and $1/512$ arc minutes, depending on the local data policy of data providers; 3) a layer with Digital Terrain Model Quality Indicators for vertical and horizontal precision, survey age, purpose of the survey, and combined quality; 4) an inventory of national baselines and coastlines collected from 21 national authorities.

In 2018, EMODnet Bathymetry consolidated synergies with the International Hydrographic Organization (IHO), the General Bathymetric

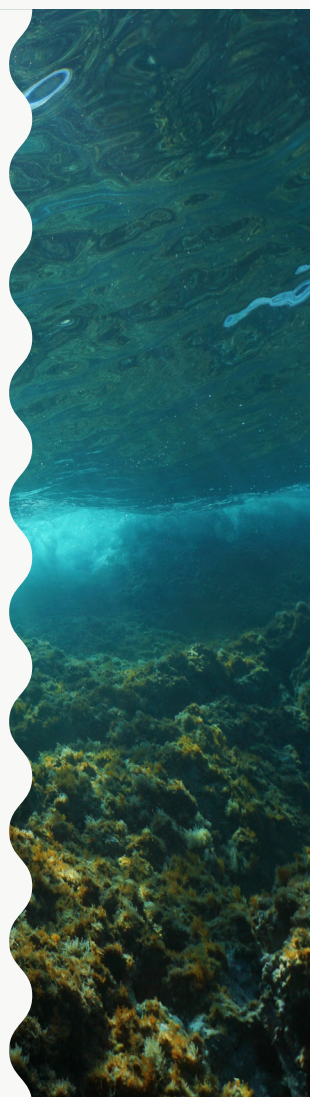


Chart of the Oceans (GEBCO), the International Bathymetric Chart of the Arctic Ocean (IBCAO), the North Sea Hydrographic Conference (NSHC), the Baltic Sea Hydrographic Commission (BSHC), the Seabed 2030 project, the National Oceanic and Atmospheric Administration (NOAA) as part of the Atlantic Ocean Research Alliance (AORA), INSPIRE, and SeaDataNet.

BATHYMETRY 2018 ROADSHOWS

EMODnet Bathymetry was presented at several events including:

- Oceanology International, 13-15 March, London, United Kingdom
- MERIGEO conference, 20-22 March, Aix-en-Provence, France
- Satellite Derived Bathymetry (SDB) Day, 7 June, Herrsching, Germany
- First International Hydrographic Remote sensing Workshop, 20 September, Ottawa, Canada
- JONSMOD conference, 17-19 October, Florence, Italy
- 9th IHO-EU Network Working Group, 21 November, Brussels, Belgium
- International conference on Marine Data and Information System (IMDIS), 7 November, Barcelona, Spain
- GEBCO map the gaps conference, 14 November, Canberra, Australia
- Nippon Foundation-GEBCO Seabed 2030 Project regional mapping meeting for Atlantic and Indian Oceans, 14 November, New York, USA
- AGU Fall Meeting, 10-14 December, Washington, USA





Portal:

EMODnet Biology
emodnet-biology.eu



2.1.2 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.

2018 key facts

Since January 2018, new associated data partners contributed to EMODnet Biology to cover spatial, temporal and taxonomic data gaps. The new associated data partners cover all the European sea-basins: Bulgarian Academy of Sciences; Odessa National I.I. Mechnikov University; CoNISMA – Local Research Unit of Lecce; Tallinn University of Technology; Agri-Food and Biosciences Institute; Roscoff Marine Station, France; Universidad de Cantabria; Norwegian Institute for Water Research; Royal Belgian Institute of Natural Sciences. Together, they contributed with over 50 new datasets.

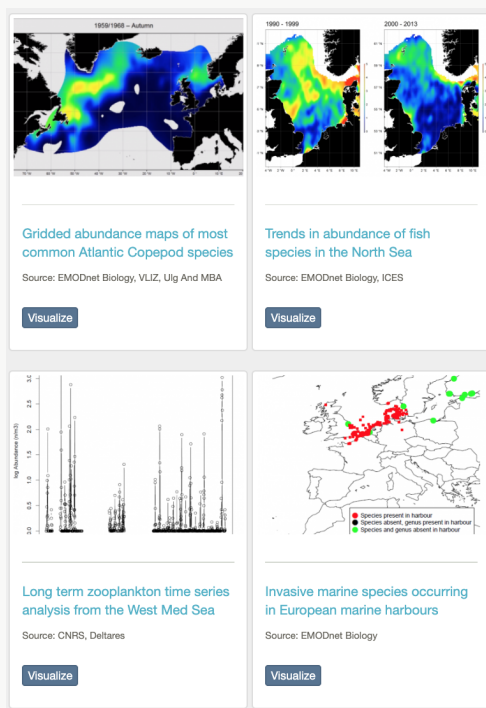
In October 2018, an online course was published on how to contribute data to EMODnet Biology. The course is available at the International Oceanographic Data and Information Exchange (IODE) Ocean Teacher platform under a self-enrolment configuration and gives a comprehensive explanation on EMODnet Biology and the European Node of the international Ocean Biogeographic Information System (EuroBIS) data format. It guides the user through all the necessary processing steps, from dataset description to publishing and quality checking. The new associated data partners used this course before data delivery was initiated. An online Quality Control (QC) tool was launched together with this course, which provides feedback on the quality and compliance of the data with the Darwin Core standards. This tool is now being used actively by the associated data partners. As a result, the time invested in communication to get the datasets ready has decreased significantly.

Based on requirements from the growing EMODnet, EuroBIS, WoRMS and LifeWatch community to manage data deriving from novel biological sensors and datasets that combine biological, physical and chemical measurement, an extended data scheme and new standard has been proposed. The new scheme builds on the Darwin Core Archive (DwC-A) standard and on practices adopted by the Global Biodiversity Information Facility (GBIF). It consists of a DwC Event Core in combination with a DwC Occurrence Extension and a proposed enhancement to the DwC MeasurementOrFact Extension. This new structure enables the linkage of measurements or facts - quantitative and qualitative properties - to both sampling events and species occurrences, and includes additional



fields for property standardization. Therefore, a major update on the data scheme of the geospatial infrastructure of EMODnet Biology has been made.

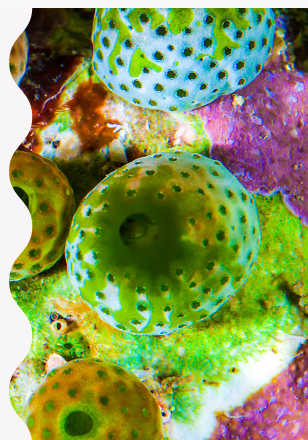
In December 2018, the Atlas of Marine Life was published on the EMODnet Biology's website. The EMODnet Atlas of Marine Life provides a combination of tools, models and spatial maps that allow marine biological data to be visualised. The Atlas gives an overview of the marine birds, mammals, reptiles, fish, benthos, algae and plankton that occur in European marine waters. It uses species observation data to create biological data products that show changes in species, communities and functional traits over time. The products within the Atlas are structured around the Essential Ocean Variables for Biodiversity (EOV). The gridded products are made available for download as netcdf files and as an OGC-compliant service. For each data product, a documentation file that explains the methodology and the code to generate the product and reproduce the workflow is available on Github.



BIOLOGY 2018 ROADSHOWS

EMODnet Biology was presented at several events including:

- Towards the Atlas of Marine Life: EMODnet data product workshop, 8-10 October, Oostende, Belgium
- 53rd European Marine Biology Symposium, organized in Ostend by the Flanders Marine Institute (VLIZ) and LifeWatch Belgium





Portal:

EMODnet Chemistry
emodnet-chemistry.eu

2.1.3 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.

2018 key facts

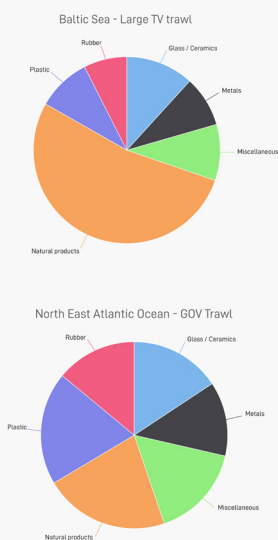
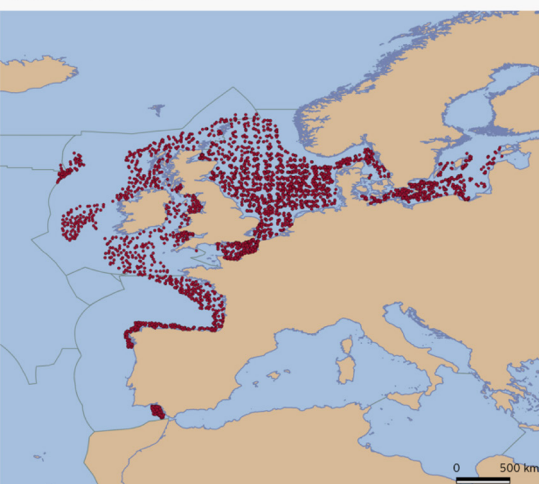
In March 2018, EMODnet Chemistry released the first preliminary partial maps for seafloor litter and for beach litter on a European scale. These have a partial coverage and were generated thanks to the synergy with OSPAR, the Baltic Marine Environment Protection Commission (HELCOM), the European Environment Agency (EEA), DeFishGear, ICES DATRAS, MEDITS, facilitated by the MSFD Technical Group on Marine Litter and the Joint Research Center (JRC). Density maps for two “metacategories”, namely fishing gear and single use plastics, are computed aggregating the data per MSFD regions and years. Data are provided by different sampling devices (gear types) and are not directly comparable between them. For the same gear type, data are normalized in items/km² in order to improve the comparison through years, reducing the effect of differences in sampling efforts along time, as suggested in recent publications (e.g. Schulz, Marcus, et al. “OSPAR standard method and software for statistical analysis of beach litter data.” Marine pollution bulletin 122.1-2 (2017): 166-175).

In September 2018, EMODnet Chemistry presented the use case of INSPIRE data models to map EMODnet nutrients data, adopting and adapting the SeaDataCloud solution.



EMODnet seafloor litter data
 MSFD region aggregated distribution of litter categories (2011-2017)*

*Different sampling devices were used in the two basins. GOV trawl gear type is the most diffused in the North East Atlantic Ocean



In December 2018 EMODnet Chemistry, in collaboration with the Joint Research Centre of the European Commission, published the “Marine litter database, Lessons learned in compiling the first pan-European beach litter database”: a technical report that provides information to EU Member States on data quality and data management in support of the MSFD and other European policies in determining baselines and thresholds, implementing monitoring programmes and planning measures against marine litter.



The European Environment Agency (EEA) announced that the Water Information System for Europe (WISE) data collection flow for Marine Waters is suspended, to officially adopt the EMODnet Chemistry and ICES systems to perform the data collection of nutrient and contaminants in Europe.

CHEMISTRY 2018 ROADSHOWS

EMODnet Chemistry was presented at several events including:

- SeaDataCloud - EMODnet Chemistry - CMEMS strategic meeting, 18 January, Paris, France
- EUDAT Conference "Putting the EOSC vision into practice", 22-25 January, Porto, Portugal
- MSFD Technical Group DATA, 12-13 February, Brussels, Belgium
- MSFD board of experts for EMODnet Chemistry: Contaminants online workshop, 16 March
- MEDITS Coordination Meeting, 18 April, Split, Croatia
- HarmonIA (Harmonization and Networking for contaminant assessment in the Ionian and Adriatic Seas) stakeholder workshop, 20 April, Athens, Greece
- EMODnet Day – Italia: Marine data for the industry and the private sector towards sustainable development, 8 June, Trieste, Italy
- 11th meeting of the MSFD TG Marine Litter & MSFD Baselines meeting, 28 June, Larnaka, Cyprus
- INSPIRE Conference, 18-21 September, Antwerp, Belgium
- IMDIS, 5-7 November, Barcelona, Spain





Portal:

EMODnet Geology

emodnet-geology.eu

2.1.4 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.

2018 key facts

The EMODnet Geology Service Catalogue was enriched with new services and an EMODnet Geology presentation was featured on Albanian TV.

In March 2018, the first version of the harmonised map of seabed substrate data on a 1:100 000 scale with confidence estimates was made available on the EMODnet Geology portal. The substrate classes are defined on the basis of the modified Folk triangle: mud to muddy sand, sand, coarse substrate, mixed sediment, rock and boulders.

38 new shapefiles (9 of landslides, 4 of volcanic centres, 6 of tectonics, 4 of tsunamis, 8 of non-volcanic fluid emissions, 7 of earthquakes) from 18 partners undergo the harmonization phase to be displayed as digital maps on the EMODnet Geology Portal.

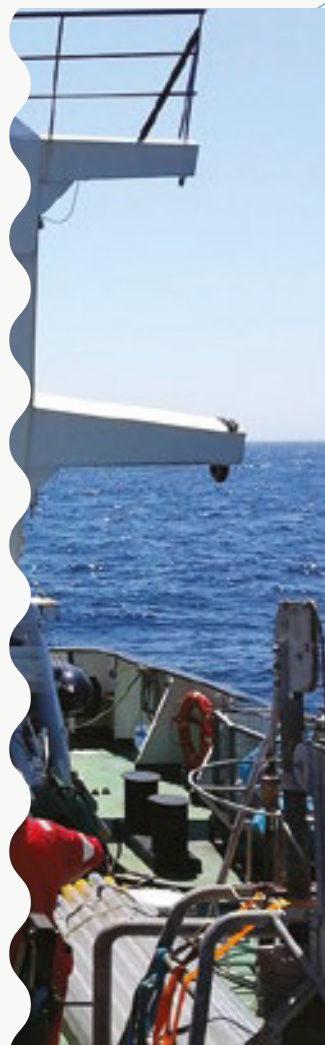
Tests of mathematical models to set a susceptibility analysis for European submerged landslides are performed.



GEOLOGY 2018 ROADSHOWS

EMODnet Geology was presented at several events including:

- Bi-annual meeting Ocean Science, 12-16 February, Portland, Oregon
- General Assembly of the Commission of the Geological Map of the World (UNESCO), 22-23 February, Paris, France
- GeoERA kick off meeting, 3-6 July, Brussels, Belgium
- Resources for Future generations Conference, 16-21 June, Vancouver, Canada
- Italian Geological Society Congress, 12-14 September, Catania, Italy
- IEEE Metrology for the Sea Conference, 8-10 October, Bari, Italy
- International Scientific Forum "Gulf of Finland - natural dynamics and anthropogenic impact", 17-18 October, St. Petersburg, Russia
- INFOMAR seminar, 7-9 November, Cork, Ireland
- AGU Fall Meeting, 10-15 December, Washington DC, USA



Photograph - Offshore on the Belgian Vessel supplied under Copyright Permit CP19/096 British Geological Survey © UKRI 2019. All Rights Reserved' photograph taken by BGS, Heather Stewart, Source to BGS Photographic Collection <http://geoscenic.bgs.ac.uk/asset-bank/action/viewHome>



Portal:

Human Activities

emodnet-humanactivities.eu

2.1.5 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.

2018 key facts

An entirely new dataset on underwater pipelines was released in January 2018. The release filled a gap in the Human Activities database, due to lack of information on pipelines. The dataset is not complete, but it is an important first step towards better coverage.

In February 2018, EMODnet Human Activities purchased a set of terrestrial and satellite Automatic Identification System (AIS) data for the year 2017. AIS messages are ships' positions received by coastal and satellite receivers, and form the basis for vessel density maps.

In a continuous effort to strengthen the dialogue with regional organizations, EMODnet Human Activities was presented to the Black Sea Commission at a meeting which took place in October 2018. A structured form of cooperation on data exchange was formally discussed.

In November 2018, another new dataset was released. This time it was the turn of algae production facilities. The dataset stems from a joint initiative carried out by EMODnet Human Activities, the JRC and the producers themselves. The JRC collected the data and sent it via the Data Ingestion portal.

EMODnet Human Activities provides the basis for the Vessel Density Maps. The EMODnet Vessel density map will provide graphical representation of shipping volume and routes in European waters and will be available free of charge for viewing, downloading, processing and use from the EMODnet Human Activities portal.



HUMAN ACTIVITIES 2018 ROADSHOWS

EMODnet Human Activities was presented at several events including:

- European Maritime Day, 30 May - 1 June, Burgas, Bulgaria
- EMODnet Day – Italia: Marine data for the industry and the private sector towards sustainable development, 8 June, Trieste, Italy
- ISMS (VI International Symposium on Marine Sciences) 2018, 21-22 June, Vigo, Spain
- 4th GEO Blue Planet Symposium, 4-6 July, Toulouse, France
- Workshop on big data organised by the NATO/CMRE, 9-10 May, La Spezia, Italy
- Aquaculture Advisory Council meeting, 17 October, Brussels, Belgium
- Marine Bioeconomy Forum, 1st Stakeholder Event, 7 December, Amsterdam, the Netherlands





Portal:

Physics

emodnet-physics.eu

2.1.6 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 data and data products on salinity, temperature, waves, currents, sea level, light attenuation, winds, underwater noise, river, water conductivity, atmosphere and optical properties.

2018 key facts

2018 was entirely dedicated to improve the EMODnet Physics Data Products and to release new ones. In particular:

The Temperature and Salinity climatologies data product was updated with enhanced features to explore the products developed by the SeaDataNet partners. In addition, the datasets are extended with more than 130,800 probes (1990-2017);

The new Sensor Observation Service - Sensor Web Enablement (SOS SWE) data product was launched: a tool to allow users to check if OGC SOS services can be used to ingest real time data and trigger the near real-time data ingestion process;

An updated version of the EMODnet Physics River run-off data product was made available: the product links more than 130 operational river outflow stations, and more than 300 historical monthly *in situ* trends;

The Sea Level Data product was updated by integrating more than 400 European tide gauge stations, the 290 Global Sea Level Observing System (GLOSS) core network, and more than 1,300 Permanent Service for Mean Sea Level (PSMSL). EMODnet Physics is offering one of the widest *in situ* data collections for sea-level data. The product integrates absolute sea level based on the SONEL product;

The Total Suspended Matter for the European Seas (2002-2016) data product was released;

The new Impulsive Noise Event Registry data product covering 2015-2017 is published. The registry reports pulse days per block ($1/3^\circ \times 1/6^\circ$ ICES extended grid). Data is supplied by contracting parties to OSPAR (North East Atlantic), HELCOM (Baltic Sea), and Barcelona and ACCOBAMS (Mediterranean Sea, Black Sea).



Enrique Vidal for ICT SOCIB



PHYSICS 2018 ROADSHOWS

EMODnet Physics was presented at several events including:

- EMODnet Physics, EMODnet Data Ingestion and EuroGOOS joint Workshop, 13 February, Galway, Ireland
- EGU ESSI 1.1, 9-10 April, Vienna, Austria
- EMODnet Day – Italia: Marine data for the industry and the private sector towards sustainable development, 6 June, Trieste, Italy
- Glider Workshop - “Connecting Glider Data Flows In Europe and beyond”, 18-20 September, Genoa, Italy
- HFR workshop, 22-24 October, Bilbao, Spain
- The Mediterranean Operational Network for the Global Ocean Observing System (MONGOOS) workshop, 4-6 December, Genoa, Italy
- 8th MARTECH (MARine TECHNOlogy) workshop, 10-11 December, Porto, Portugal





Portal:

Seabed Habitats

emodnet.eu/seabed-habitats

2.1.7 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.

The EMODnet Seabed Habitats Portal provides access to data and data products on seabed habitats and surveys, environmental variables and seabed habitat models.

2018 key facts

The EMODnet Seabed Habitats composite data product of habitat points for European seas was published. The data product collates the data from a variety of sources from ground-truthing surveys in European waters, then this is conformed and standardised into the portal's Darwin-core compliant schema.

The new EMODnet Seabed Habitats website was launched in May 2018.

The EMODnet Seabed Habitats mapping portal was transferred over to GeoServer in May 2018 allowing for Web Feature Services (WFS) and Web Coverage Services (WCS) in addition to Web Mapping Services (WMS).

257 additional habitat maps from across Europe were published on the EMODnet Seabed Habitats portal in May 2018.

About 285,000 habitat data points were collated from across Europe and will be published via the portal in 2019.



SEABED HABITAT 2018 ROADSHOWS

EMODnet Seabed Habitats was presented at several events including:

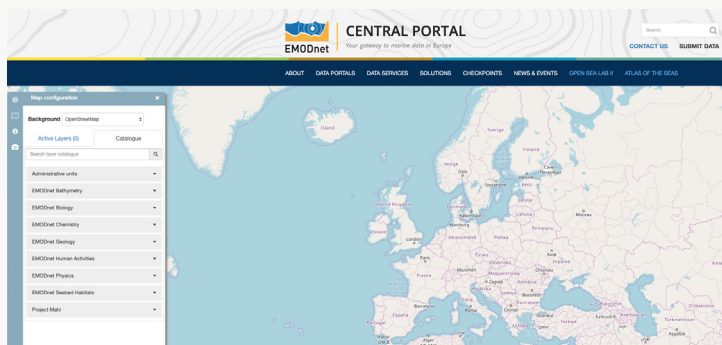
- Nordic Geological Winter Meeting, 10-12 January, Copenhagen, Denmark
- merIGéo, 20-22 March, Aix-en-Provence, France
- GeoHab, 7-11 May, Santa Barbara, USA
- ICES Working Group on Marine Habitat Mapping, 22-24 May, Hamburg, Germany
- 12th Panhellenic Symposium of Oceanography and Fisheries, 30 May - 3 June, Corfu, Greece
- 49th Congress of the Italian Society of Marine Biology, 4-8 June, Cesenatico, Italy
- EMODnet Day – Italia: Marine data for the industry and the private sector towards sustainable development, 8 June, Trieste, Italy
- OSPAR Intersessional Correspondence Group on Coordination of Biodiversity Assessment and Monitoring, 13 June, Santander, Spain
- Beyond the Coast, 26-27 June, Hull, UK
- Black Sea 2018 International Conference, 10-12 October, Varna, Bulgaria
- IMDIS conference, 5-7 November, Barcelona, Spain
- INFOMAR annual seminar, 8-9 November, Cork, Ireland



2.2 EMODnet Central Portal

emodnet.eu

The EMODnet Central Portal is the gateway to all the EMODnet thematic portals and related data products and services. Supported by the Flanders Government, the Central Portal gives access to data provided by all the thematic portals and allows the retrieval of data layers from multiple portals at the same time.



EMODnet GeoViewer

2018 key facts

The EMODnet Central Portal was enriched with the "New European Atlas of the Seas".

The Central Portal's Map Viewer tool was enhanced with new functionalities: sub-theme grouping, styling of attribute table (GetFeatureInfo) of internal and external layers and zoom-to-layer functionality.

The data and data product portfolio was published.

The offer of data products increases: over 45 new layers were made available in the GeoViewer.

The new preliminary version of the Query Tool was endorsed by the Marine Knowledge Expert Group in September 2018 and released in December 2018.

2.3 EMODnet Data Ingestion Portal

emodnet-ingestion.eu

There is 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 status of and fluctuations in the marine environment, private companies 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.

2018 key facts

The Data Submissions service achieved a steady increase of the number of submissions from 93 in early 2018 to 351 at the end of 2018. The number of completed submissions increased from 55 to 263, which were published and available for discovery and downloading by users via the View Submissions service, launched on the portal in October 2017.

The network of qualified data centres was expanded to include 49 data centres from EU countries and for the different EMODnet themes. These data centres were assigned to complete and elaborate submissions received.

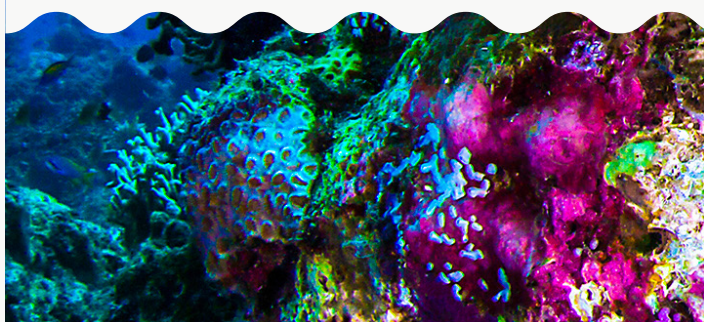
The portal section on ingesting operational oceanography was updated in accordance with Copernicus CMEMS-INSTAC, EuroGOOS and EMODnet Physics. As a result, the CMEMS-INSTAC portal also promotes using the EMODnet Ingestion service at its Submit data section.

The technical set-up of the Sensor Web Enablement (SWE) pilot of EMODnet Ingestion and EMODnet Physics concerning real time oceanographic monitoring systems, allowing direct standardised access to selected data types from selected monitoring instruments, has been finalised. The (N) RT oceanographic data streams from a number of operators can be discovered and viewed through a Pilot Viewing Service which is hosted at the EMODnet Physics portal and advertised at the EMODnet Ingestion portal.

DATA INGESTION PORTAL 2018 ROADSHOWS

The EMODnet Data Ingestion Portal was presented at several events including:

- Dedicated workshops were held for observing communities in February in Ireland, in April in Poland, in September in Italy, in October in Spain to promote the uptake of the SWE tool and standard
- Oceanology International, 13 - 15 March, London, United Kingdom
- JERICO-NEXT Summer School, 11 - 13 July, La Valetta, Malta
- National events in Lisbon – Portugal in June, in Varna – Bulgaria and Rome – Italy in September
- North Sea Days 2018 conference, 4 – 5 October, Texel, The Netherlands
- International Conference on Marine Data and Information Systems (IMDIS) 2018, 5 - 7 November, Barcelona, Spain
- 8th MARTECH (MARine TECHnology) workshop, 10-11 December, Porto, Portugal



2.4 EMODnet Sea-basin Checkpoints

EMODnet is not only about providing access to data. It is also about assessing how fit for purpose the observation networks, surveying strategies and data access are in six regional European sea-basins. EMODnet is also concerned with data quality, and what quality thresholds are necessary to satisfy multiple user needs.

Initiated in 2013, the EMODnet Sea-basin Checkpoint data stress test was the first of its kind to adopt a user perspective, setting challenges simulating real-life applications e.g. tracking an oil spill to assess if the current ocean observation monitoring data were fit to meet the needs of users.

2018 marked the end of the EMODnet Sea-basin Checkpoints as they completed their 'data stress tests' generating a wealth of insights on the adequacy of the current marine data collection and management landscape in Europe. Their findings have been summarised in a Checkpoints Report and were presented at the European Ocean Observing System (EOOS) Conference in November 2018 in Brussels (bit.ly/2RCGWZ1).



Concluding considerations and recommendations of the EMODnet Sea-basin Checkpoints

The EMODnet Checkpoint concept is unique and innovative as it incorporates the user perspective. It could become a permanent service for the assessment of the monitoring systems in place, ideally carried out every 3-5 years.

The Checkpoint service would benefit from a greater involvement and feedback from stakeholders in the definition of the challenges, including industry, the general public, or public authorities, in particular in connection with Directives like the Marine Strategy Framework Directive (MSFD) or the Maritime Spatial Planning Directive (MSPD).

Some of the emerged data gaps due to an insufficient sampling coverage (temporal or spatial) can be filled in by a better partnership with the satellite and modelling community. In other cases, modelling or satellite data are not an option and more intense monitoring for larger areas is just not affordable. The suggestion is to focus on a certain number of variables which are considered more important, or on representative Essential Ocean Variables (EOV), and concentrate monitoring efforts in these in order to have a longer time series with a better spatial coverage and resolution.

Many biological variables would also benefit from a better standardisation of parameters and a more systematic approach to monitoring between nations.

When assessing the fitness for use of a dataset, the time dimension (how long it takes to actually employ the dataset) is also extremely relevant.



In this sense, accurate, complete metadata can be key in informing users about the characteristics of the dataset, and hence help them discern if it is worth downloading it or not. The use of ISO and INSPIRE-standards, together with common vocabulary lists such as those from SeaDataNet, is advised. Likewise, to avoid confusion when finding the same dataset in different databases, the use of digital objects identifiers (DOIs) to unequivocally identify a dataset can be a solution.

To obtain products such as those proposed in the stress tests (or challenges) covering the whole sea-basins, collaboration with non-EU countries is fundamental. This is particularly important in the Arctic (Russia), for the Mediterranean (north African countries), and the Black Sea. This sea-basin scale view would also benefit from an even tighter collaboration with other international organisations such as the International Council for the Exploration of the Sea (ICES), the Barcelona Convention, the Black Sea Commission, the OSPAR Commission and the Baltic Marine Environment Protection Commission (HELCOM).

The Sea-basin Checkpoint assessment framework could be repeated periodically (e.g. a 3-5 year cycle) and turn into a “Checkpoint service” to regularly assess Europe’s capability to deliver marine data for societal benefit, with the inclusion of new challenges and the development of new products depending on needs (blue growth, climate, environmental policies).



3. EMODnet for business campaign

The economic turnover of activities related to oceans, seas and coastal areas, the so-called blue economy, is estimated at € 566 billion and creates jobs for nearly 3.5 million people, according to the 2018 EU Blue Economy report prepared by the Directorate-General for Maritime Affairs and Fisheries (European Commission).

Unlocking the wealth of open marine data resources, EMODnet is central to the EU's efforts to support sustainable blue growth. Through its seven thematic portals EMODnet creates new opportunities for innovation, increases the ability to take sound business decisions based on high-quality information, and improves the ability to forecast the behaviour of the sea, thereby reducing risks of offshore and coastal operations and investments.

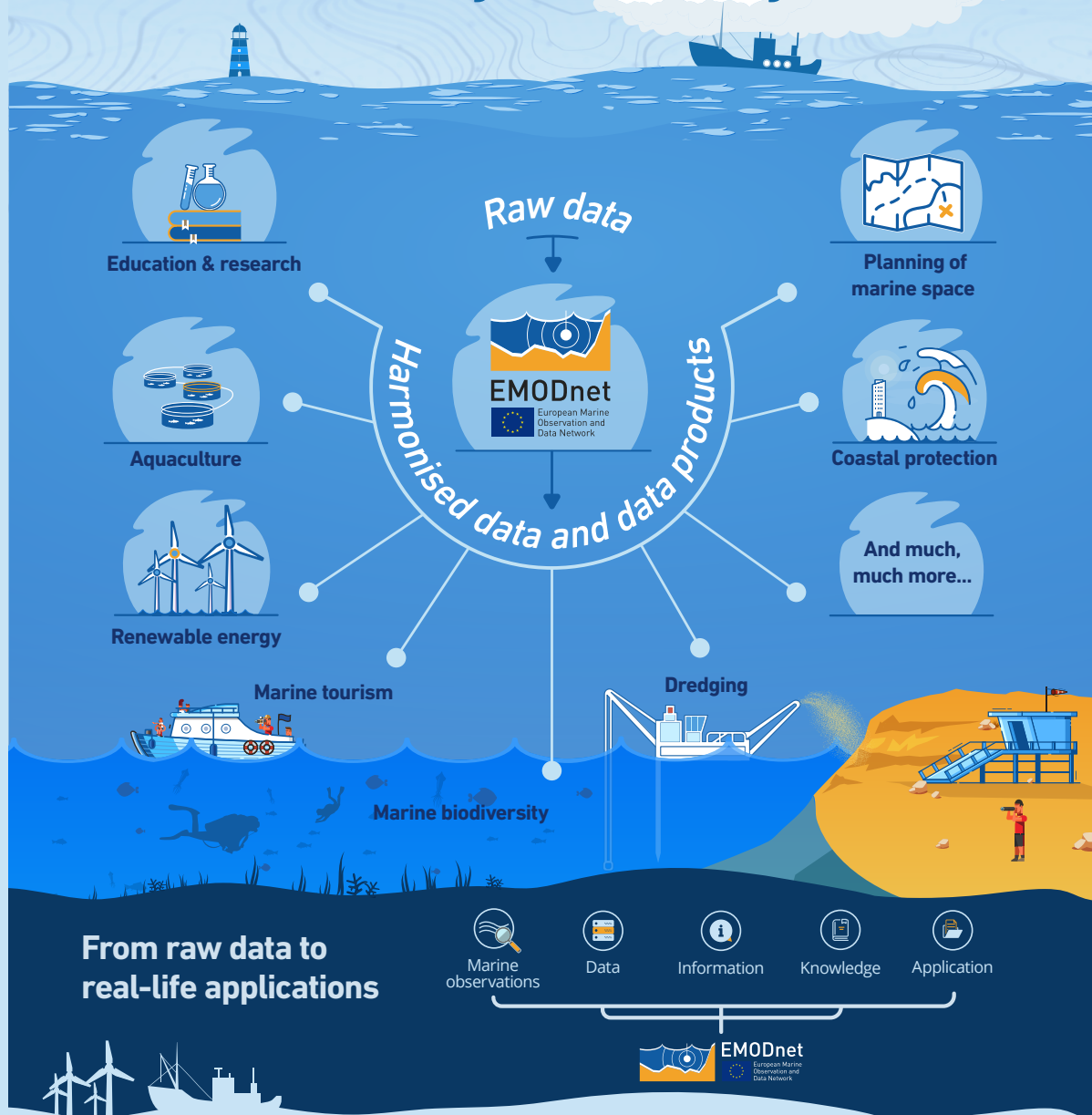
With the combined effort of its 150 partners, EMODnet concretely helps offshore and coastal businesses reduce their costs and provides opportunities for SMEs and consultancies to widen their range of products and services offered by providing easy access to existing marine data and generating better information to plan and implement business activities.

For these reasons, in October 2018, EMODnet launched the EMODnet for business campaign, a full month dedicated to the importance of open marine data and how it supports blue growth and the associated industry.

A tour of European maritime associations, clusters and networks in Brussels was also carried out by the EMODnet Secretariat throughout the year with organisations such as the European Dredging Association (EDA), the International Association of Oil and Gas Producers (IOGP), SEA Europe, the Cruise Lines International Association (CLIA) Europe, WindEurope, the European Digital SME Alliance, the European Algae Biomass Association (EABA), Ocean Energy Europe and the Aquaculture Advisory Council. These meetings were held to better understand the needs of business, to present the EMODnet offer and to discuss opportunities of collaboration for industry such as sharing marine data on the open access EMODnet portals.



EMODnet *supporting* Blue Economy & Society



www.emodnet.eu

[@EMODnet](https://twitter.com/EMODnet)

www.facebook.com/EMODnet



The European Marine Observation and Data Network (EMODnet) is financed by the European Union under Regulation (EU) No 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund.

Throughout the EMODnet for business campaign a set of business-related use cases were selected, along with a new EMODnet for business leaflet “Get value from ocean data” (emodnet.eu/emodnet-business-brochure).

Use case



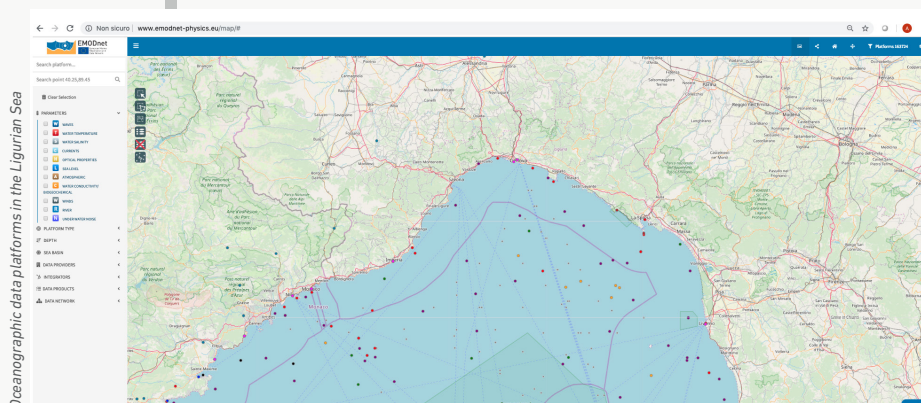
Portals:

Bathymetry, Physics

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

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

bit.ly/2FzoUCm



Use case



Portal:

Physics

Validation of SAR satellite based information products (wave height) and combination with EMODnet station data (Significant Wave Height)

With data from the EMODnet Physics portal, the German Remote Sensing Data Center (DFD) is validating the wave parameter of significant wave height H_S (which is derived from satellite imagery e.g. from Sentinel-1) at DFD's ground station in Neustrelitz. Currently, the validation chain for SAR derived wind and wave products based on the EMODnet measurement station network is being developed. First results show the benefit for the service validation in general.

bit.ly/2Xu9mKd

Use case



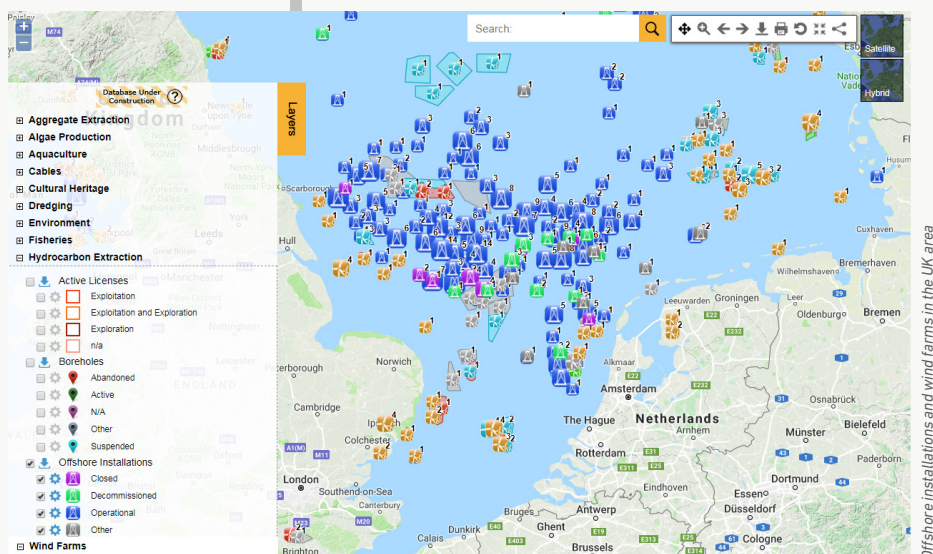
Portal:

Human Activities

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

The EMODnet Human Activities portal has become a vital tool for C2Wind, a Danish company working in the wind industry. Wind farm and hydrocarbon extraction datasets are the most commonly explored datasets that identify the location of existing structures. Additional datasets are surveyed in this instance to give a complete picture of human activities. This crucial information is used in the preliminary phases of projects, determining areas of interest for the development of wind farm projects.

bit.ly/2FwXxsv



Offshore installations and wind farms in the UK area

Use case



Portal:

Physics

Capitalising on EMODnet Radar Data for Water Dispersion Studies

Leveraging on the EMODnet radar data, PM_TEN, an Italian, technology-transfer company active in the Environmental Physics field, has released a new service for its customers (as part of an environmental impact assessment package) which uses EMODnet radar data to integrate the output of numerical circulation models and provide a solid and validated input to oil spill models.

bit.ly/2xepTDM

Use case



Portals:

Human Activities,
Bathymetry, Seabed
Habitats

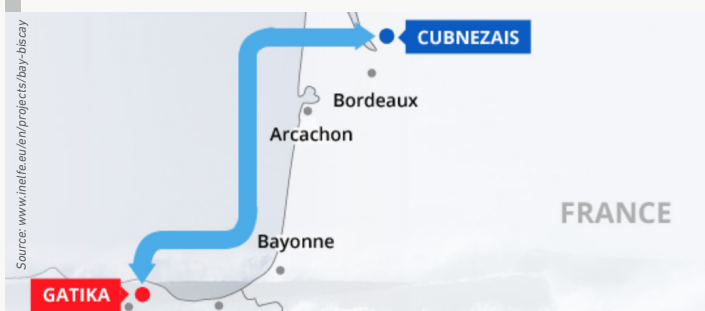
EMODnet plays a role in building the first submarine electricity interconnection between Spain and France

Biosfera XXI is a small Spanish private company that has been using EMODnet data since 2016, mainly for its marine projects and in particular, the environmental impact assessment project entitled “The electricity interconnection across the Biscay Gulf”. The Biscay Gulf project aims to build the first submarine electricity interconnection between Gatika (near Bilbao, Spain) and Cubnezais (near Bordeaux, France).

The company uses EMODnet data on a daily basis, downloading datasets which allow them to separate the locations of cable installation from areas of human activity, the basis of the Biscay Gulf project.

bit.ly/2xbLZX1

bit.ly/2XwagWA



The submarine electricity interconnection between Spain and France

Use case



Portal:

Human Activities

Supporting sustainable fisheries management practices and the recovery of fish stocks through EMODnet

HeraSpace, a multi-award winning, British startup, used EMODnet Human Activities as a data source to feed their neural machine-learning algorithm, designed within the European Space Agency Business Centre in Madrid. This forms the basis of their unique fish tracking distribution system. The aim is to avoid vessels fishing in vulnerable or restricted areas, by detecting their coordinates and excluding them from the predictions. The tools seek to empower fishermen to locate the most profitable and sustainable fishing grounds, so as to optimise their operative budgets.

bit.ly/2REU2Fm

Use case



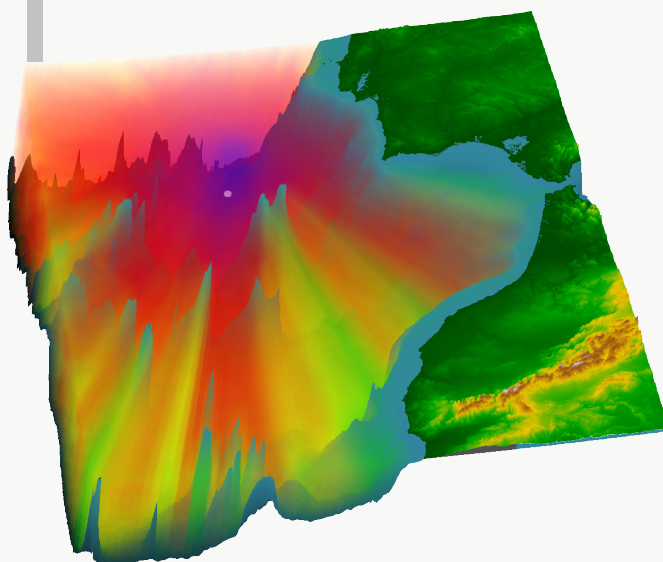
Portals:

Bathymetry, Geology

Centralised public access to high quality bathymetry and sediment data assists SMEs in consultancy work, outreach and service development

The availability of both depth data and geology data from one centralised point of contact (EMODnet) enabled Irwin Carr Consulting, an SME which provides specialist services ranging from environmental noise, air quality, building acoustics and underwater noise, to be competitive and have efficient turn-around times on marine projects that otherwise would be delayed by prohibitively costly marine mapping work prior to impact assessments.

bit.ly/2xbMeBp



Single sound source off the coast of Portugal and Morocco. Exaggerated bathymetry to show "sonic shadows" (quiet zones) behind undersea mountains



4. EMODnet boosting the European Atlas of the Seas

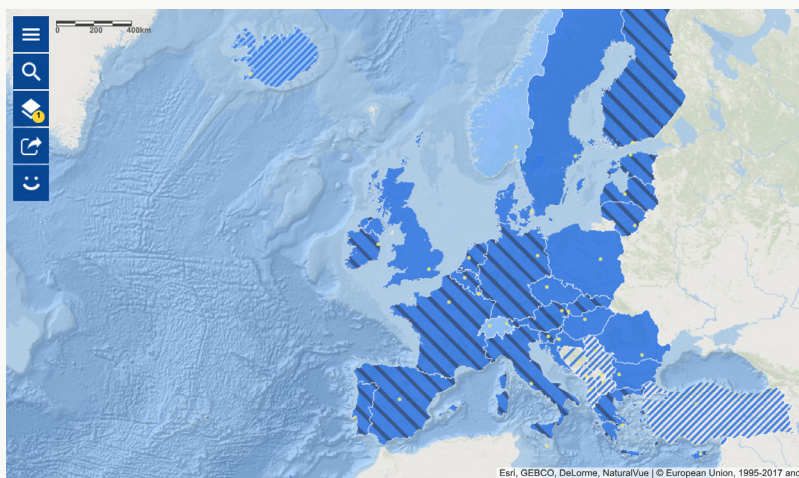
The European Atlas of the Seas is an interactive web-based tool available for the general public, non-expert professionals and schools. First launched in 2010 by the European Commission, Directorate-General for Maritime Affairs and Fisheries (DG MARE), it brings at-a-glance data in a comprehensive and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

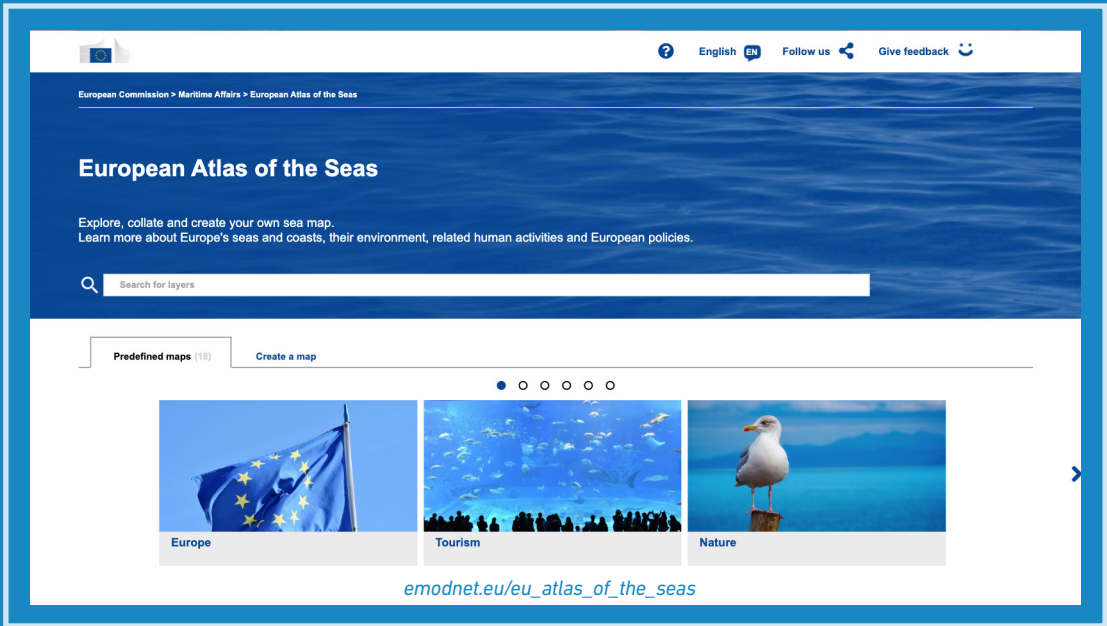
The Atlas hosts a wealth of information about Europe's marine environment and related human activities, covering topics such as nature, tourism, security, energy, passenger transport, sea bottom, sea level rise, fish consumption, and much more. Users now have access to an enriched catalogue of more than 200 map layers.

The data provided is based on the collection and management of European marine observation, originating primarily from the European Commission and its agencies (Eurostat, the European Environment Agency, the Joint Research Centre, Copernicus, etc.) and from the European Marine Observation and Data Network (EMODnet).

Since September 2017, the EMODnet Secretariat has taken over the management of the Atlas with a mission to further expand the range of services and features and improve the interface, functionality and content. The brand-new version of the Atlas was released in June 2018 with many new features, and an interface more adapted to users.

At the end of 2018, the EMODnet Secretariat established a partnership with Nausicaá, the biggest aquarium in Europe, to promote and further develop the Atlas as a strong and must-have educational tool.





5. EMODnet supporting research & policy makers

During 2018, the EMODnet portals also continued supporting research and policy makers as described in the following use cases:

Use case



Portal: Seabed Habitat

Field: Policy Makers

The contribution of EMODnet Seabed Habitats in reporting on the 2011-2016 HELCOM 'State of the Baltic Sea'

Undertaking a regional cumulative impact assessment requires a vast amount of spatial data. Additionally, datasets must be available in a harmonized and comparable format to allow for a smooth yet robust analysis to be conducted. EUSeaMap v2016 was a key data source for defining ecosystem components in reporting on the 2011-2016 HELCOM 'State of the Baltic Sea'.

bit.ly/2X6iSUB

Use case



Portal: Physics

Field: Policy Makers

Monitoring of global, *in situ*, real-time oceanographic data traffic and quality

Fisheries and Oceans Canada is a department of the Government of Canada. Its core business consists in managing Canada's fisheries and safeguarding its waters. The EMODnet Physics Portal map viewer allows the Fisheries and Oceans department of the Government of Canada to quickly view where a platform is located and which platforms are located next to it. It proves helpful in identifying duplicate platforms and associating their multiple identifiers when in doubt. The data view also provides a convenient way to validate results from decoders and identify where an error may have occurred.

bit.ly/2XBVehU

Use case



Portal: Chemistry

Field: Policy Makers

EMODnet Chemistry contributed to EC IMPACT ASSESSMENT (Reducing Marine Litter: action on single use plastics and fishing gear)

EMODnet Chemistry supports the analysis of EU baselines. EMODnet Chemistry contributed to the Commission Staff Working Document IMPACT ASSESSMENT (Reducing Marine Litter: action on single use plastics and fishing gear), SWD(2018) 254 final, with an analysis of plastics distribution coming from 2 “metacategories”, namely fishing gear and single use plastics. The study used the ICES DATRAS available data aggregated for MSFD regions and years.

The European Environment Agency (EEA) also officially announced that WISE data flow for Marine Waters has been suspended, to adopt EMODnet Chemistry and ICES systems in its place for the collection of EU data in nutrients and contaminants.

bit.ly/2xc37Mv



Use case



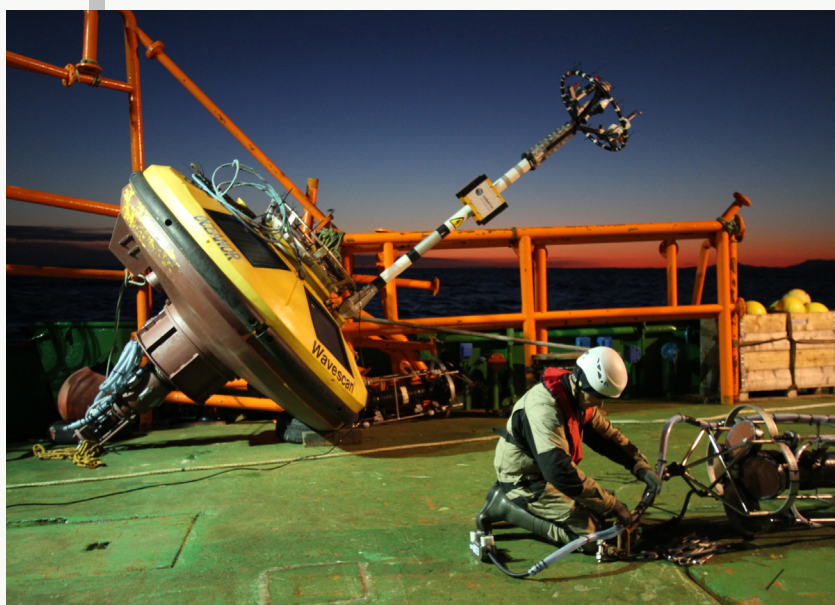
Portal: Seabed Habitat

Field: Policy Makers

Making the establishment of regional oceanography systems easy: the Basque case

The challenge of the EuskOOS operational oceanography system of the Basque coast is to disseminate the marine data collected from the Basque Country making them part of global efforts. Instead of building the system from scratch, EuskOOS decided to reuse the widget made available by EMODnet Physics, and in particular the data products and the map sharing service to build its regional operational oceanography system. EuskOOS is also now one of the EMODnet contributors, providing data from the coastal observation system for integration in the European Marine Observation and Data Network.

bit.ly/2FtiK6A



Use case



Portal: Bathymetry,
Geology,
Human Activities,
Seabed Habitats

Field: Research

Seagrass detection in the Mediterranean: a supervised learning approach

In a recent research paper (Effrosynidis et al., 2018), the Democritus University of Thrace (DUTH) aggregated CMEMS and EMODnet data to investigate the influence of environmental conditions on the presence or absence and distribution of seagrass species throughout the Mediterranean Sea. The results suggest that the main environmental parameters affecting the distribution of seagrass at family and genera level are the winter (mainly December) chlorophyll-a and salinity levels, the autumn phosphate concentrations and bathymetry, expressing changes in temperature, pressure and light availability.

bit.ly/2Xu9Sb7

Use case



Portal: Physics

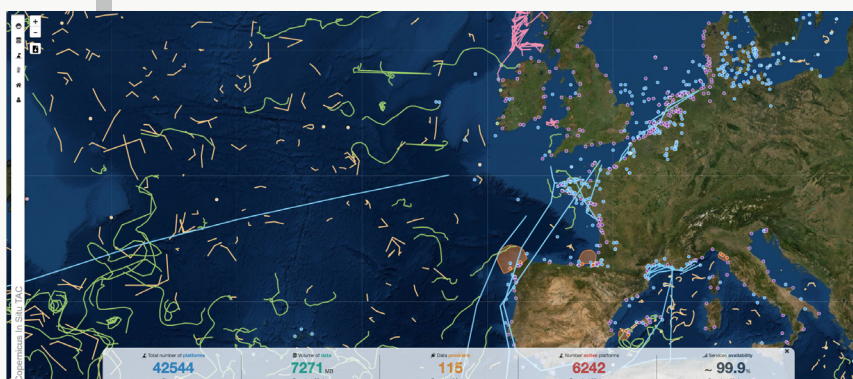
Field: Research

EMODnet Physics enhances the services of Copernicus Marine Environment Monitoring Service (CMEMS)

EMODnet Physics has developed a user-friendly interface for the Copernicus Marine Environment Monitoring Service (CMEMS) In Situ Thematic Assembly Centre to improve the viewing service developed for outreach and promotion activities. In addition, the EMODnet Physics river service will enhance CMEMS by assisting with the validation of watershed models and quality control, thus improving their forecast services.

bit.ly/2Fx5fmk

bit.ly/2YfuEIO



6.

E00S Conference 2018

In EMODnet Phase III the Secretariat Workplan includes providing support to connect Europe's capability in Ocean Observing. In 2018, the EMODnet Secretariat, in collaboration with the European Marine Board and EuroGOOS Secretariats, set up an events Advisory Committee of ocean observing and marine monitoring stakeholders to co-organize a large Conference.

The first E00S Conference took place in Brussels from 21 to 23 November 2018, building on three years of community action to strengthen coordination of Europe's capability in ocean observation, monitoring and data collection. More than 300 stakeholders gathered for 2.5 days to connect diverse observing and monitoring communities and those who rely upon their outputs and services. Participants included data collectors, data assemblers and users gathered in Brussels to take stock of existing capacity, identify future priorities and co-design solutions for how to get there. This built upon a number of community activities over the past few years to develop a framework, strategy and common vision to strengthen Europe's coordination across existing ocean observing, monitoring and data collection initiatives.

The conference report, Call to Action, speakers' presentations, video and pictures are available on E00SConference2018.eu

The Conference showed that Europe's ocean observation capability is strong. Both European countries and the EU have already invested significantly in ocean observation infrastructure, technology development and data management initiatives. Further, thanks to a collective European effort to share marine data, good progress has been made in European initiatives such as the European Marine Observation and Data Network (EMODnet) and Copernicus, and in particular over the last decade to ensure that more data from ocean observations and marine monitoring are openly available for multiple use. This helps improve our knowledge of the ocean, inform policy, create new opportunities for innovation and business development, improve productivity and reduce risks. However, the various ocean observation communities remain disconnected and there is no overall process for determining which observations are essential for achieving blue economy and societal objectives. The difficulty in setting up a more fit-for-purpose European observation system is not only a question of funding, but also one of organisation. The European Ocean Observing Conference 2018 also highlighted the value of dialogue and connecting existing and emerging communities to improve collaboration and coordination, share and add value to existing efforts and to value ocean observations as a "public utility", as is the case for meteorological data, that benefits all of society. To make this happen, the time has come to collaborate and move from concepts to concrete actions.



The EMODnet network was well represented at the meeting, with a strong presence of the EMODnet Secretariat as lead organisers, and presentations by Steve Gibson (Joint Nature Conservation Committee, UK; EMODnet Seabed Habitats Lead), Jun She (Danish Meteorological Institute; EMODnet Baltic Sea-basin Checkpoint lead) and Quillon Harpham (HR Wallingford, EMODnet Associated partner). The Conference also had a global context with presentations including from U.S., Canada and China.

In addition to plenary presentations and panel discussions, a series of breakout sessions were organized to engage all participants, promote cross-sector dialogue, identify common areas of interest, share best practice and identify solutions. These were led by 36 stakeholders attending the Conference to ensure community buy-in and diversity of discussions. Six themes were discussed: Economic and societal value of marine observing and monitoring, European ocean observation gaps and requirements, Sharing observing and monitoring efforts across stakeholders to Regional ecosystem monitoring and observation efforts, Future trends in a global context and Integrated ocean observing platforms.

Driven by a broad range of observing communities and stakeholders that rely on ocean data and information, the Conference delivered a Call to Action. This communicates the inherent value of ocean observing and monitoring for society and welcomes the efforts undertaken to date to strengthen the coordination framework of ocean observing in Europe. An open and inclusive process is now imperative to move forward. It calls on European countries and the EU to examine what is currently being done under their responsibility and to prioritize strategic planning and coordination efforts, working together towards a more concerted, fit for purpose and cost-effective European ocean observation capability. The Call to Action is being communicated to national, regional and European ocean observation, monitoring and data management actors, coordinators and funders.

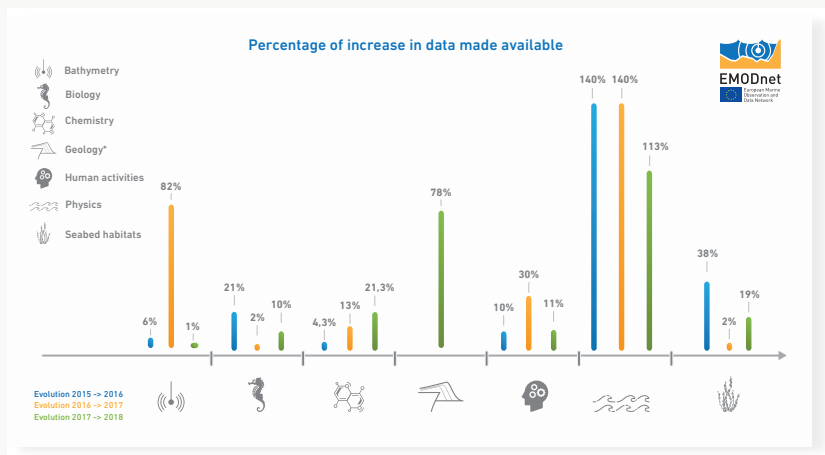
Karmenu Vella (EC, Commissioner for DG MARE) gave the closing address, recognising the Call to Action and the specific call for European organisations, including the European Commission to take further action to coordinate and streamline efforts in ocean observation, in combination with funds from national sources.

Karmenu Vella
EC, Commissioner for DG MARE

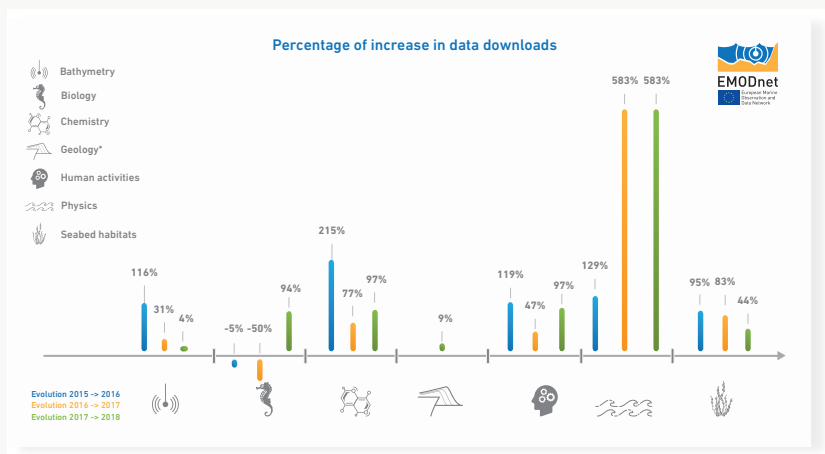


If we want to build solid, fact-based policy and harness our society for today's and tomorrow's challenges, we need to make sure that ocean observations continue [...] cross-sector international collaboration is a must and coordination and sharing is a Commission priority.

7. EMODnet in figures

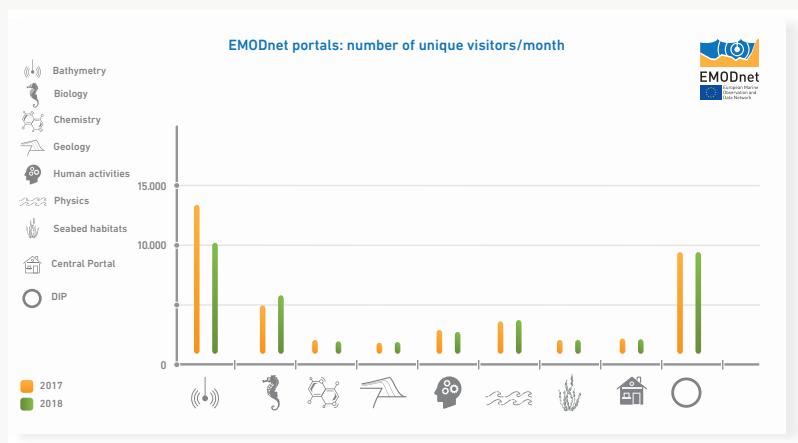


The amount of data made available by the EMODnet portals has increased every year, but the growth rate varies group wise (i.e. among the portals) as well as time wise. The variations in percentages are due to among others variations in data availability and in number of operational data providing platforms (EMODnet Physics), the availability of real time data (EMODnet Physics), or simply a plateau in the data left to be discovered. Moreover, in the case of EMODnet Human activities, a reduction in the amount of data made available may also be due to the cancellation and or decommissioning of certain projects.



Apart from EMODnet Biology, the amount of data downloaded by users increased in all thematic groups throughout the years. EMODnet Biology launched the download toolbox in 2017, a tool that allowed users to query data at the occurrence record level applying several filters simultaneously. This was achieved with the implementation of different improvements in the database, which have increased the interoperability of the data. Both the user-friendliness of the tool and changes in the database and tracking system explain the increase in downloads experienced after 2017. The outstanding value in EMODnet Physics is due to the fact that it also includes web service requests. Releases of new datasets and their promotion, as well as improvements in the data download services, all contributed to increases in the downloading of data.

*No statistics are available before 2017 for EMODnet Geology.



As the graph illustrates, almost all of the portals have a constant number of unique visitors per month, demonstrating a consolidated community of users. EMODnet Bathymetry, Data Ingestion, Biology and Physics are the most popular portals which can be attributed to the nature of the data and tools available that both interest a wider community (the slight decrease in Bathymetry was due to a malfunction affecting the monitoring system for a couple of months). Please note that statistics for 2016 are not available as the Matomo tracking system was implemented in 2017.

8. 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.

| | Preparatory Actions ¹ | Maritime Policy Fund ² | European Maritime and Fisheries Fund ³ | | | | | |
|------------------------------|----------------------------------|-----------------------------------|---|---------------|---------------|--------------|------------------------|------------------|
| Theme and Project | 2008-2010 (k€) | 2011-2013 (k€) | 2014 (k€) | 2015 (k€) | 2016 (k€) | 2017 (k€) | 2018 ⁴ (k€) | Grand Total (k€) |
| Central services | | 520 | | 4,565 | 155 | 1,420 | 1,000 | 7,660 |
| Data Ingestion | | | | 4,045 | | | 1,000 | 5,045 |
| Office and Infrastructure | | | | | | | | |
| Secretariat | | 520 | | 520 | | 1,420 | | 2,460 |
| 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 | 4,672 | 54,064 |
| Bathymetry | 2,175 | 2,000 | | 4,917 | | 3,720 | | 12,812 |
| Biology | 750 | 1,700 | | | 1,770 | 1,770 | | 5,990 |
| Chemistry | 700 | 4,000 | | | 2,805 | | 1,400 | 8,905 |
| Coastal mapping | | | 1,194 | | | | | 1,194 |
| Geology | 925 | 4,200 | | | 4,500 | | 1,770 | 11,395 |
| Human Activities | | 2,060 | | | 1,608 | 1,608 | | 5,276 |
| Physics | 1,000 | 1,000 | | | 1,400 | | 950 | 4,350 |
| Seabed Habitats | 800 | 1,390 | | | 1,400 | | 552 | 4,142 |
| Grand Total (K€) | 6,580 | 19,015 | 5,369 | 13,482 | 13,690 | 8,768 | 5,672 | 72,575 |

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

⁴Amount budgeted in the 2018 work programme for the implementation of the EMFF. Contracts financed from this budget will be signed in the course of 2019



9. Building for tomorrow and beyond

2019 focus and new opportunities

2019 will be a year marked by the release of highly anticipated new data products and major updates of existing ones, including the marine litter and vessel density map. There are great expectations in the EMODnet network for the release of these new products!

In March 2017, EMODnet Human Activities was mandated to create vessel density maps of EU waters showing the average number of vessels of a certain type (cargo, passenger, fishing etc.) in a given period within a grid cell. Vessel density maps are by far the most requested GIS data product by EMODnet Human Activities users, according to a survey carried out in 2016. EMODnet Human Activities is hard at work on this topic.

Increasing concentrations of plastic in our environment are a growing threat to ecosystems and human health. Plastic has been detected in nearly all marine life – from whales to molluscs. In order to fight this threat, there have been calls in international fora such as G7, G20 and the United Nations to bring the many measurements and observations together to create a complete picture. Europe is now leading the way. Authorities and the wider society now have a new tool to help track, map and identify where litter ends up in our seas and oceans and check how it is affecting ocean health. EMODnet Chemistry took the challenge and is working to release litter maps to show, among others, the spatial and temporal distribution of beach and seafloor litter based on official monitoring surveys and wider sampling efforts across European countries (bit.ly/2XKB4yK). The types of litter will be also identified, from plastics to glass, wood and metal, and from fishing related items to land-based products such as cigarettes.

In 2019 more emphasis will be put on engagement with users and stakeholders and technical coordination among the portals, with a focus on improving the interoperability, to make EMODnet more fit for purpose and increase its use at national, regional, European and global levels.

The engagement with the private sector will also be one of the main drivers behind the EMODnet strategy as well as the engagement of citizens enhancing the European Atlas of the Seas' range of services and features, and amplify the visibility of this valuable resource.

More attention will also be dedicated to improving the interaction and exchange of information between the different EMODnet projects and collaborators.

Meet EMODnet

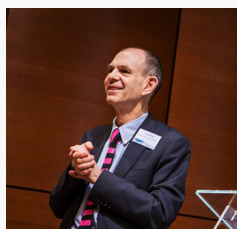
In 2019, one of the major highlights for EMODnet will be the second EMODnet Open Sea Lab (OSLII) hackathon (4-6 September 2019, Ghent, Belgium). During three days, teams will compete and bring their expertise to develop innovative solutions and applications to address blue society challenges using EMODnet, Copernicus Marine and ICES resources. Developers of the EMODnet portals will provide hands-on support to the participants and will allow to stress test the system, gaining valuable feedback on how EMODnet could improve its data portals and services for users. OSLII follows the exciting first edition in Antwerp in November 2017.



The 2nd EMODnet Open Conference and Jamboree taking place in 2020 is also under preparation. This event will bring together all partner organisations and major stakeholders to take stock of where EMODnet is and discuss the sustainable future of the network beyond 2020.

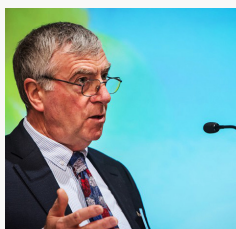
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Chair of the EMODnet Steering Committee



Phil Weaver

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EMODnet Biology



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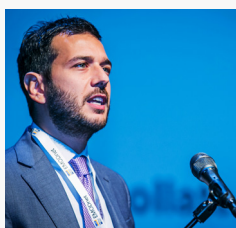
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EMODnet Human Activities



Alessandro Pititto

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EMODnet Physics



Antonio Novellino

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EMODnet Seabed Habitats



Amy Ridgeway

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Arctic Checkpoint



Belinda Kater

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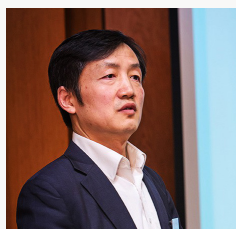
Atlantic Checkpoint



Jacques Populus

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Baltic Checkpoint



Jun She

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Black Sea
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Atanas Palazov

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www.emodnet-mediterranean.eu
North Sea
Checkpoint

Quillon Harpham

www.emodnet.eu/northsea/home

Coastal Mapping



Gaël Morvan

www.emodnet.eu/coastal-mapping

Argo Floats



Sylvie Pouliquen

www.euro-argo.eu

EMODnet publications

In 2018, EMODnet has produced over 30 publications now included in scientific journals and some examples are reported below:

| | Portal |
|--|-----------|
| Benson, A.; Appeltans, W.; Bajona, L.; Bosch, B.; Cowley, P.D.; De Pooter, D.; Desmet, P.; Harcourt, R.; Hoenner, X.; Pye, J.; Van de Putte, A.; Walsh, P.; Woodward, B. (2018). Outcomes of the International Oceanographic Data and Information Exchange Ocean Biogeographic Information System OBIS-Event-Data Workshop on Animal Tagging and Tracking. Biodiversity Information Science and Standards 2: e25728. hdl.handle.net/10.3897/biss.2.25728 | Biology |
| Bird, C.; Darling, K.F.; Russell, A.D.; Fehrenbacher, J.S.; Davis, C.V.; Free, A.; Ngwenya, B.T. (2018). 16S rRNA gene metabarcoding and TEM reveals different ecological strategies within the genus <i>Neogloboquadrina</i> (planktonic foraminifer). PLoS One 13(1): e0191653. hdl.handle.net/10.1371/journal.pone.0191653 | Biology |
| Chiba, S.; Batten, S.; Martin, C.S.; Ivory, S.J.; Miloslavich, P.; Weatherdon, L. (2018). Zooplankton monitoring to contribute towards addressing global biodiversity conservation challenges. J. Plankton Res. 40(5): 509-518. hdl.handle.net/10.1093/plankt/fby030 | Biology |
| Coro, G.; Vilas, L.G.; Magliozzi, C.; Ellenbroek, A.; Scarponi, P.; Pagano, P. (2018). Forecasting the ongoing invasion of <i>Lagocephalus sceleratus</i> in the Mediterranean Sea. Ecol. Model. 371: 37-49. hdl.handle.net/10.1016/j.ecolmodel.2018.01.007 | Biology |
| Long-term changes of hydrological and chemical regime including water pollution indices for the Black Sea North-Western part coastal regions. Bollettino di Geofisica teorica ed applicate, vol. 59, SUPPL. 1, IMDIS 2018 International Conference on Marine Data and Information Systems | Chemistry |
| Enlarging the EMODnet Chemistry focus with the EU marine litter data challenge, Bollettino di Geofisica teorica ed applicate, vol. 59, SUPPL. 1, IMDIS 2018 International Conference on Marine Data and Information Systems | Chemistry |
| Eutrophication and contaminants Black Sea data management in the framework of EMODnet Chemistry, Bollettino di Geofisica teorica ed applicate, vol. 59, SUPPL. 1, IMDIS 2018 International Conference on Marine Data and Information Systems | Chemistry |
| The SeaDataCloud Virtual Research Environment: researching the sea from the cloud, Bollettino di Geofisica teorica ed applicate, vol. 59, SUPPL. 1, IMDIS 2018 International Conference on Marine Data and Information Systems | Chemistry |



| | Portal |
|--|------------------|
| Prof. Phil Gibbard, Scots Polar Institute, University of Cambridge: used EMODnet geology data for his research on the Bristol Channel. | Geology |
| Sung-Jin Cho, Hee-Jung Choi, Recent Trends and Their Implications of Marine Activities Mapping for Marine Spatial Planning, Journal of the Korean Society for Marine Environment and Energy - Vol. 21, No. 4 | Human Activities |
| C Ferreira, et al. Wave Climate Definition on Modeling Morphological Changes in Figueira da Foz Coastal System (W Portugal), Journal of Coastal Research: Special Issue 85 - Proceedings of the 15th International Coastal Symposium: pp. 1256 – 1260. | Physics |
| Novellino A. et al EMODnet Physics: a horizontal platform serving blue growth Bollettino di Geofisica Teorica ed Applicata Vol. 59 | Physics |
| F. Murray, et al., Data challenges and opportunities for environmental management of North Sea oil and gas decommissioning in an era of blue growth, Marine Policy, Volume 97, November 2018, Pages 130-138 | Physics |



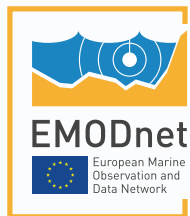


References

Detailed information and each thematic lot annual progress report can be found on the Maritime Forum (webgate.ec.europa.eu/maritimeforum/) and on the EMODnet Central Portal (www.emodnet.eu)

EMODnet Thematic Portals and Sea-basin Checkpoint Portals:

- ▶ EMODnet Bathymetry - www.emodnet-bathymetry.eu
- ▶ EMODnet Geology - www.emodnet-geology.eu
- ▶ EMODnet Seabed Habitats - www.emodnet-seabedhabitats.eu
- ▶ EMODnet Chemistry - www.emodnet-chemistry.eu
- ▶ EMODnet Biology - www.emodnet-biology.eu
- ▶ EMODnet Physics - www.emodnet-physics.eu
- ▶ EMODnet Human Activities - www.emodnet-humanactivities.eu
- ▶ EMODnet Data Ingestion Portal - www.emodnet-ingestion.eu
- ▶ Arctic Checkpoint - www.emodnet-arctic.eu
- ▶ Atlantic Checkpoint - www.emodnet-atlantic.eu
- ▶ Baltic Checkpoint - www.emodnet-baltic.eu
- ▶ Black Sea Checkpoint - www.emodnet-blacksea.eu
- ▶ MedSea Checkpoint - www.emodnet-mediterranean.eu
- ▶ North Sea Checkpoint - www.emodnet.eu/northsea/home



www.emodnet.eu



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The European Marine Observation and Data Network (EMODnet) is financed by the European Union under Regulation (EU) No 508/2014 of the European Parliament and of the Council of 15 May 2014 on the European Maritime and Fisheries Fund.