EMODnet
European Marine Observation and Data Network

EMODnet ANNUAL REPORT 2017

emodnet.eu

Disclamer

TABLE of content

An introduction from the Head of the EMODnet Secretariat

@EMODnet

Jan-Bart Calewaert
Head of the EMODnet Secretariat

2017 was an excellent year for EMODnet, as the third phase of development (2017-2020) started in sixth gear.

To further enhance EMODnet's seven thematic portals (Bathymetry, Biology, Chemistry, Geology, Human Activities, Physics, Seabed Habitats) and address data gaps, the Data Ingestion portal (www.emodnet-ingestion.eu) was established, to encourage and support data holders not yet contributing to the national or thematic data repositories, and therefore unable to share their data through EMODnet.

The EMODnet offer has also shown an increase in the number of new data products and services that have been released during this period. The coherence between the thematic portals has been further improved, also thanks to the concertation activities of the EMODnet Technical Working Group. The Central Portal (www.emodnet.eu) was revamped in styling and structure and expanded with a Map Viewer and an EMODnet Product Catalogue, while the basis was laid for a new progress monitoring system.

The successful organisation of the EMODnet Stakeholder Conference and Sea-basin Workshops Conference (14-15 February 2017, Brussels), provided all the Sea-basin Checkpoints with the opportunity to share their findings with more than 150 stakeholders and discuss recommendations on how to better meet the needs of marine data users.

Strengthening the links between EMODnet, the Marine Strategy Framework Directive (MSFD) and the Marine Spatial Planning (MSP) directive was a priority for 2017. EMODnet's role in implementing both directives was identified in numerous technical meetings and conferences together with expert groups, the regional sea conventions and the European Environment Agency. Collaboration with other significant marine data programmes has increased: in Europe with the Copernicus programme, on a global scale with the Global Bathymetric Chart of the Ocean (GEBCO) and with the Ocean Biogeographic Information System (OBIS) programme of IOC-UNESCO. Two seminars with the Chinese State Oceanic Administration have been also undertaken as part of the EU-China Blue Year.

As a result of a more active presence of EMODnet on social media and increased visibility through regular communication via the central and thematic portals, 2017 consolidated EMODnet as the reference point for the wider community of marine and maritime stakeholders. The results have been captured in a set of use cases, which can now be consulted via the Use Cases section of the EMODnet Central Portal (www.emodnet.eu/use-cases), embracing stakeholders belonging to the public and private sector, the research community and civil society.

Last but not least, EMODnet's user base continued to grow in 2017. Open Sea Lab, EMODnet's open data competition (15-17 November 2017, Antwerp), also brought new users to EMODnet and resulted in the development of new use cases. The event marked the first EMODnet hackathon and offered coders, developers, data enthusiasts, marine/maritime companies, students, and entrepreneurs the chance to play with archived and near-real time marine open data to create prize-winning, innovative applications in three thematic areas: Marine Environment, Blue Economy and Public Knowledge or Services.

This is just a snapshot of EMODnet's diverse and exciting achievements. I hope you'll enjoy learning more in the following pages of this report.

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 over 150 organisations that work together to assemble and make marine data, metadata and products available.

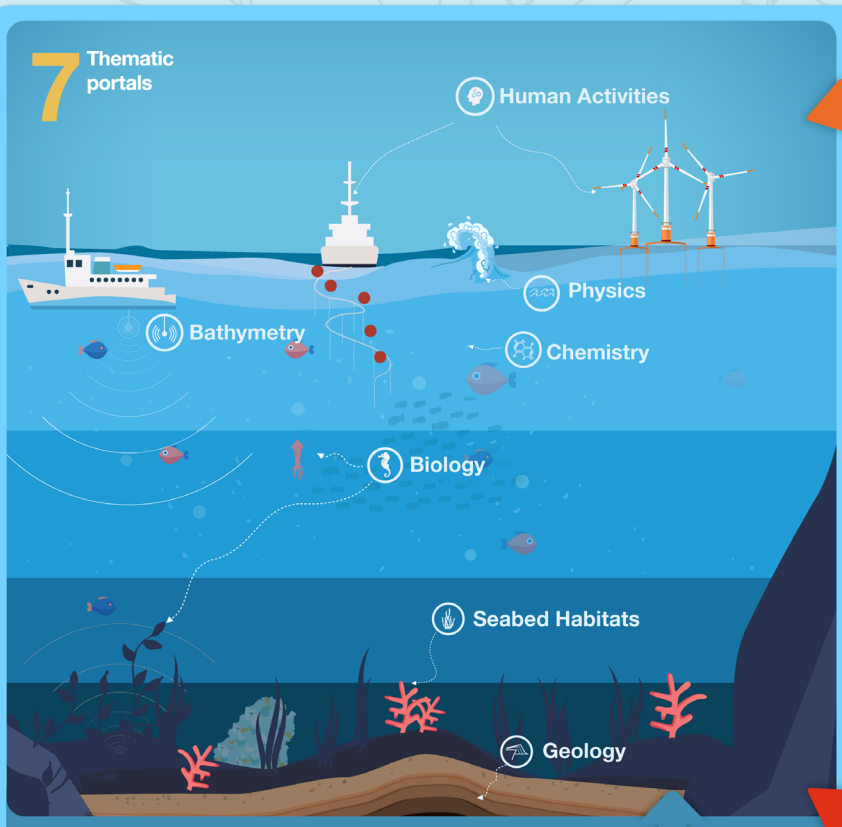
Its main purpose is to unlock fragmented and hidden marine data resources, make these available to public and private organisations and to facilitate investment in sustainable maritime activities through improved access to multidisciplinary quality-assured, standardised and harmonised marine data and data products which are interoperable and free from restrictions on use.

In its third phase of development, EMODnet is now fully operational and being used more than ever. The focus is on continuous improvement in order to further support the blue economy, ensure effective environmental management and protection, advance scientific research and contribute to societal needs, while always keeping into mind its core principle of 'collecting data once and using many times for many purposes'.

THE EUROPEAN MARINE OBSERVATION AND DATA NETWORK - AT A GLANCE

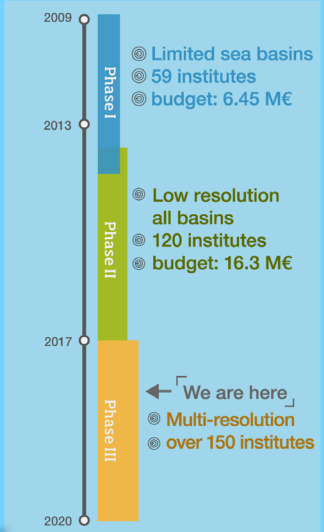
EMODnet
European Marine Observation and Data Network

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



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

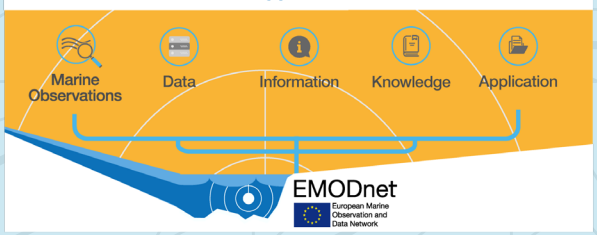
Why EMODnet?

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.

2017 IN PICTURES

JANUARY 2017

The award of contracts corresponding to EMODnet Phase III Lots 1-6 (Geology, Seabed Habitats, Physics, Chemistry, Biology and Human Activities) is communicated.

APRIL 2017

Numerous opportunities to give visibility to the EMODnet thematic portals and Checkpoints with several EMODnet talks and posters during the European Geophysical Union Assembly in Vienna.

EMODnet Chemistry specified approach for handling marine litter data, tuning and gaining support of major stakeholders such as the Technical Group on Marine Litter, the Regional Sea Conventions, DATRAS and MEDITS communities.

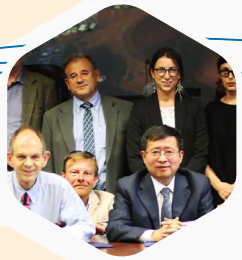
MAY 2017

Most of the EMODnet thematic portals meet in Limassol, Cyprus, in occasion of the EMODnet Data Ingestion partner meeting to identify data sets for ingestion and safe-keeping.

Successful representation of EMODnet at the European Maritime Day 2017 in Poole, UK.

EMODnet, together with the COLUMBUS project, co-organises a workshop on Blue Growth Data Challenge and Engaging with Industry.

EMODnet is part of the agenda of the North Sea Countries energy cooperation plan.



14-15 FEBRUARY 2017

The first EMODnet Stakeholder Conference and Sea-basin Workshop takes place at the Royal Flemish Academy of Belgium for Science and the Arts in Brussels, presenting the findings of the EMODnet Checkpoints to over 150 participants (The Conference Report and other materials are available at www.emodnet.eu/checkpoints/stakeholder-conference-2017).

MARCH 2017

Presentation of EMODnet to an EU-Chinese delegation in Bruges in the framework of the EU-China Blue Year. The meeting provided an opportunity to discuss the status of marine science and data in Europe and China, as well as consideration of areas for closer cooperation with China during the EU-China Blue Year and beyond.

Launch of a revamped High Resolution Seabed Mapping – HRSM/Bathymetry portal emodnet-bathymetry.eu.

Data Ingestion Portal goes live at emodnet-ingestion.eu.

JUNE 2017

2nd EMODnet Technical Working Group Meeting, with significant progress towards the consolidation of the EMODnet Central Portal Catalogue as well as the EMODnet Geoviewer.

JULY 2017

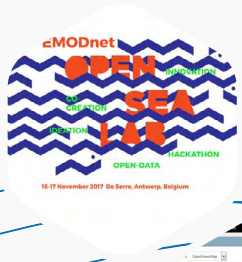
EMODnet Physics doubles the number of FerryBox platforms making data available via their portal.

EMODnet Seabed Habitats releases an update of the EMODnet Broad-Scale, Seabed Habitat Map (EUSeaMap) which includes the new MSFD benthic broad habitat types, and publishes a comprehensive report where the method behind the EUSeaMap and the calculation of the confidence layers are explained.

AUGUST 2017

Definition of an action plan to pilot the new EMODnet monitoring system.

EMODnet Chemistry contributed to the Black Sea State of Environment report of the Black Sea Commission by providing data on Nutrients and Contaminants. Also it contributed to the Mediterranean Quality Status Report 2017 (QSR2017) of UNEP-MAP (Barcelona Convention).



22 SEPTEMBER 2017

The Start-up Village in Antwerp hosts the kick-off meeting of the Open Sea Lab Competition. More than 40 entrepreneurs, scientists and data enthusiasts attended the event. Watch the webcast www.opensealab.eu/stream

Successful organisation of the 8th Steering Committee Meeting in Rome. Important steps were taken with the agreement of a more coherent visual identity and endorsement of the new improved monitoring system to assess progress and usage of all the data portals.

NOVEMBER 2017

The video "Wake up your data" describing the benefits of using the EMODnet Data Ingestion portal is released www.youtube.com/watch?v=p3vwngxyXuo&feature=youtu.be

Successful first meeting of the EMODnet Chemistry Board of MSFD experts, including Regional Sea Conventions, with focus on D5 (Eutrophication).

DECEMBER 2017

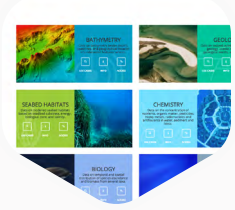
The new monitoring system and procedures for the EMODnet portals is in place.

The number of bathymetry datasets gathered has almost doubled to 26875 and number of data providers has increased from 28 to 39. Satellite Derived Bathymetry data products are added for coastal and near shore zones in the Mediterranean.

SEPTEMBER 2017

Release of the EMODnet Geoviewer (www.emodnet.eu/geoviewer) containing layers from every thematic portal and enabling their multiple visualization and combination.

First steps towards making shipping density maps available in the EMODnet Human Activities portal. A meeting is conveyed by DG MARE to explore ways of using data from AIS anti-collision systems to this purpose.



OCTOBER 2017

The new-look, user-focused EMODnet Central Portal is launched (www.emodnet.eu). The Central Portal is the hub for all the EMODnet services and information delivering the EMODnet latest news and supporting the community with an easy-to-use interface. In addition to an easier access to the portals, the revamped website offers the visitors with a complete set of use cases helping to describe the added value of EMODnet. A new "Who can benefit from EMODnet" section is present to understand how public sector, civil society, private sector and research communities can get support from EMODnet.

15-17 NOVEMBER 2017

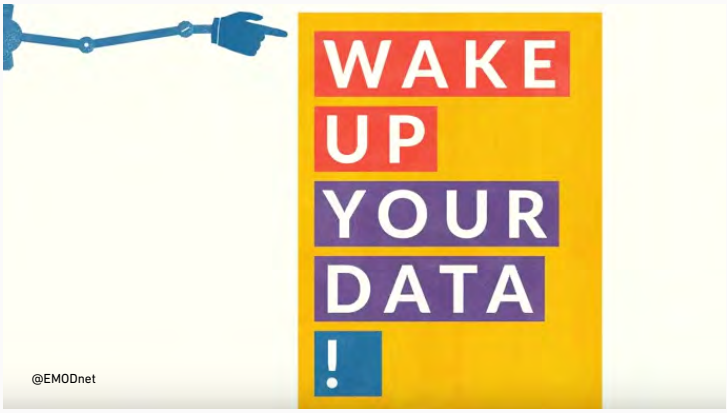
The first Open Sea Lab Competition, a three-day bootcamp & hackathon where over 50 participants from 15 countries (including Canada) competed to develop novel applications using marine open data, takes place at the Start-Up village in Antwerp, Belgium.

3. Enhancing the EMODnet offer: the Data Ingestion Portal and the new Geoviewer

3.1. Making data submission simple

Unlocking the wealth of existing marine data and observations in Europe has been the main objective of EMODnet since it was established in 2009.

Knowledge is all about data and collecting data at sea is very expensive. Therefore, we need to do more to ensure that data that has already been collected is made available to others for re-use. This is the purpose of the new EMODnet service released in March 2017: the EMODnet Data Ingestion portal (www.emodnet-ingestion.eu).



The portal has been conceived to support all European marine data holders that do not currently submit datasets to national or regional data centres on a regular basis, or who may not be familiar with the practices and standards used by the international marine data management community. Thanks to a simple and quick data submission process, the data holders are able to ensure the long-term storage and stewardship of their datasets in appropriate existing repositories (the submitted datasets are assigned to a data centre, which is responsible for their subsequent processing and

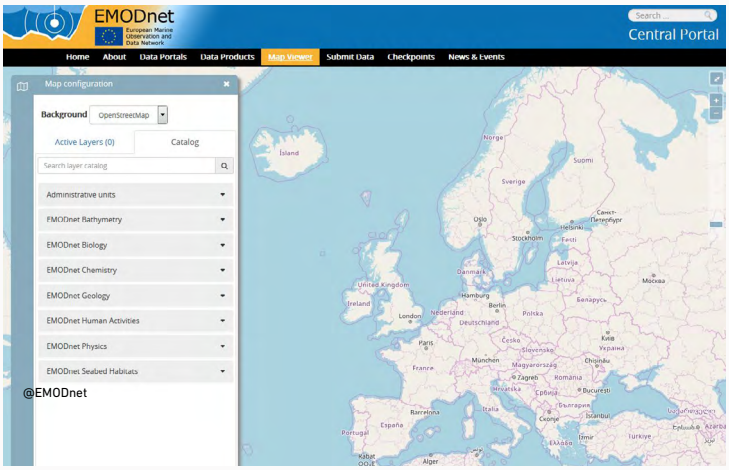
Wake up your data: use the Data Ingestion Portal

For more information watch this video
www.youtube.com/watch?v=p3vwngxyXuo&feature=youtu.be

curation, in consultation with the data holder) and to make their datasets accessible through EMODnet thematic portals (the submitted data is made available in compliance with the INSPIRE Directive).

The Data Ingestion Project not only assists those interested in submitting data, but also proactively seeks sources of data and solicits potential contributors. As part of the identification process of potential data providers, a preliminary inventory per country has been compiled, covering 26 countries and 466 potential data sources, which the project will attempt to engage. This was achieved through close cooperation and synergy within the EMODnet community involved in this identification process.

3.2. Making multidisciplinary work happen



One of the unique features of EMODnet globally is the multidisciplinary nature of the data that it aggregates and makes available. The EMODnet thematic portals create data layers and products, ranging from information on physical oceanography, to seabed habitats, to human activities. However, users increasingly desire to work across disciplines and visualise or combine these multi-thematic data layers.

This is why EMODnet has been working hard behind the scenes, to harmonise their data layers, so that users can now view and combine these diverse layers on a single interface. The new EMODnet Geoviewer (www.emodnet.eu/geoviewer) is now online and contains layers from every thematic portal. For example, perhaps you are interested in viewing the seabed substrate, or the mean water depth beneath the mariculture farms in your area? This and so much more is now possible.

4. Is Europe's marine data infrastructure fit for purpose?

"Much of the data on European seas is still not available to those who need to use it. Public and private bodies conducting stress tests on the data reported that whilst new measurements are needed in some cases and, whilst EU programmes such as EMODnet and Copernicus have made a difference, much work still remains to make current and past observations available and fit for purpose. All have encountered severe obstacles in trying to obtain and use fisheries data. Teams working in all sea basins from the Arctic to the Black Sea indicated that holders of data on catches, effort, vessel movements, discard, by-catch etc., were unable, unwilling or slow to provide these data. Other data, such as coastal erosion is also very fragmented."

These are only a few of the results of the EMODnet checkpoints, highlighted at the recent EMODnet Stakeholder Conference and Sea-basin workshops held on 14 and 15 February 2017 at the Royal Flemish Academy of Belgium for Science and Arts in Brussels.

Approximately 150 marine data experts and users attended the conference to discuss whether marine data collected via current observation and monitoring activities in Europe effectively serve the needs of users.

WHAT ARE THE EMODNET SEA-BASIN CHECKPOINTS?

The EMODnet Sea-basin Checkpoints assess the availability and fitness for purpose of marine data in different regions. By testing the data against specific end-user challenges, the checkpoints demonstrate how well the current monitoring systems and data collection frameworks provide data to meet the needs of users. In doing so, data gaps and duplications as well as significant bottlenecks are highlighted.

Six Sea-basin Checkpoints are in operation. The first two checkpoints were initiated in the Mediterranean Sea and the North Sea in 2013; with checkpoints for the Arctic, Atlantic, Baltic and Black Sea being launched in 2015.

Key outcomes

Data Gaps: absence of data versus restrictions on access

- In many cases it is difficult to distinguish if data can not be found and/or retrieved because it has never been collected or because it is hidden or locked.
- The lack of information on sediment mass balance and the difficulty in obtaining access to important data on fishing activities are major problems and should be addressed as a matter of urgency.
- There is a need to expand the coverage of the High Frequency (HF) radar network to obtain more data in Europe. In the US 70% of the coast is covered by HF radars.
- Users often have to spend a lot of resources to screen multiple datasets in order to discern whether these meet their needs. Good metadata reduces the time and effort invested in that process making them an essential component of data management.
- Data access constraints sometimes reflect commercial sensitivities: data may be of strategic interest to a company, or sharing it may raise liability issues. In some cases, specialised SMEs collect data for other companies and, as such, do not own it. There is a need to inform the private sector about the benefits of sharing data and provide incentives for them to contribute to open data repositories. EMODnet could facilitate safe keeping of data by offering to aggregate and anonymise these datasets.

A look into the future

- Marine Spatial Planning (MSP) will represent a significant challenge in the future, requiring a huge variety of data, including transboundary data and the need to combine monitoring efforts with modelling.
- There was general agreement that the Checkpoints process should be repeated with more sea-basin relevant challenges representing real user needs as the current challenges are not all equally relevant to all of the sea basins. For example, windfarm siting may be more related to the North Sea than to the Arctic.
- Sector-specific user challenges could be considered in the context of Blue Growth. Additionally, EMODnet should evaluate the possibility of organising workshops to bring together stakeholders of specific sectors, for example, focusing on data needs for aquaculture.

- In some of the challenges the lack of long-time series data hindered the ability to produce the relevant data products, for example for assessing the rate and potential impacts of climate change. This raises the question if it is better to provide low quality products and flag these as such, or not to produce the products at all if available data is insufficient or of low quality.

Moving forward with EMODnet

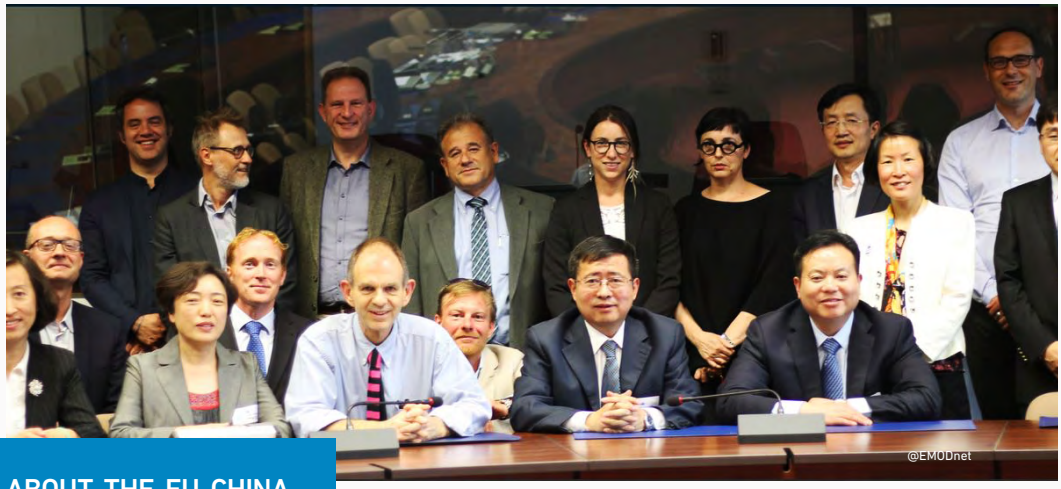
- EMODnet should develop showcases providing examples of data or products being used demonstrating clear positive impacts, as these would demonstrate the relevance of EMODnet efforts.
- The Checkpoints identified many new datasets, some of which are relevant to the EMODnet thematic portals but not yet available to them. The new EMODnet Data Ingestion Project (DIP) and associated portal could facilitate the entry of these datasets into the system. The Checkpoint coordinators were invited to work closely with the DIP to ensure the success of this ingestion process.
- A lack of information on vessel traffic was identified. This will be addressed during the next phase of EMODnet, where Vessel Monitoring System (VMS) and/or Automatic Identification System (AIS) data will be obtained through the EMODnet Human Activities portal to develop vessel traffic density maps.

The Conference provided an opportunity to showcase and discuss the results of work undertaken by the EMODnet Sea-basin Checkpoints, with respect to specific challenges such as how to select an appropriate site for an offshore windfarm, how to establish the coherence of a network of marine protected areas in a sea basin, how to forecast the impacts within the 24 hours following an oil spill, how to provide information on coastal change, eutrophication or riverine input, the impact of fisheries activity, invasive species and climate change.

Attempts to solve these issues provided valuable information as to whether the data are available and appropriate, and where future data collection efforts should focus.

The results of the EMODnet Stakeholder Conference and Sea-basin workshops are captured in the report "EMODnet Stakeholder Conference and Sea-basin workshops: Stress-testing Marine Data – Towards a European Ocean Observing System" (www.emodnet.eu/sites/emodnet.eu/files/public/EMODnet_Checkpoints_Conf_Report.pdf).

5. Collaborative EMODnet



5.1. International collaboration: the EU-China Blue Year

EMODnet partners met twice with delegations from the Chinese State Oceanic Administration in the framework of the EU-China Blue Year, in 2017. The first meeting provided both sides with an opportunity to see how the other handled marine science and data.

This helped set the agenda for a seminar where the issues were discussed in more detail. EMODnet joined experts from the EU and China's State Oceanographic Administration to compare different approaches, learn from each other and identify areas of collaboration including marine monitoring and forecasting, measuring marine litter, managing pressures on semi-enclosed seas, marine data management, marine spatial planning and the blue economy. Both sides indicated that further collaboration on these issues could make a significant contribution to international ocean governance.

ABOUT THE EU-CHINA BLUE YEAR

The EU-China Blue Year was launched in July 2016 during the 18th bilateral summit between EU and China, where representatives of the two countries came together to discuss political and economic relations, as well as global and regional issues, including the future of the seas and oceans.

5.2. Compatibility with other EU initiatives: Copernicus

Copernicus, the European Union Programme aimed at developing European information services based on satellite Earth Observation and in situ (non-space) data, like EMODnet, is built on the axiom that marine data collected using public resources should be free of charge and free from restrictions of use. Both Copernicus and EMODnet are now offering concrete products and services and software.

Hardware and data are already shared reasonably freely between the two initiatives. In September 2017, partners in both initiatives met to take stock and see what further steps would be needed. Actions agreed include the development of a common sign-on procedure, regular six-monthly meetings, and reflection as to how the services could develop in the longer term.

5.3. Standardisation efforts

The need to use recognised standards for the entire EMODnet is clear. EMODnet uses Open Geospatial Consortium (OGC) standards and is therefore compatible at a basic level with the practices adopted in other countries.

The EMODnet description of bathymetric and topographic parameters (through GEBCO, an international group of experts working on the development of a range of bathymetric data sets and data products, including gridded bathymetric data sets, a world map and Gazetteer of Undersea Feature Names) and biological ones (through the Ocean Biogeographic Information System - OBIS) are aligned with those of international partners.

EMODnet also relies on INSPIRE standards to make the data visible to users.

6. EMODnet in practice: our users' opinion

Users are at the centre of EMODnet's strategy. It is clear that the data and the products provided by EMODnet are important for many applications. If one takes bathymetry as an example: bathymetry data has become a fundamental dataset for multiple scientific disciplines, including physical oceanography, marine geology, and benthic ecology; as well as 3D-multichannel seismic information for oil- and gas exploration and bathymetric and geophysical information for the stability of platforms and planning of pipeline routes.

These represent only a few of the ways in which EMODnet data and products are fundamental to users, but to understand the impact of what is being done so far, users were asked to describe how EMODnet supports them in their daily work and life.

6.1. EMODnet supporting Blue Growth

EMODNET BATHYMETRY DATA SUPPORTING IMDC CONSULTANTS IN TACKLING WATER-RELATED ISSUES

Portal:

EMODnet Bathymetry

International Marine and Dredging Consultants (IMDC) performs numerical modelling of marine processes on a daily basis such as waves, currents, storm surges, and coastal dynamics.

Numerical modelling is one of the most important tools at their disposal to provide their clients with a detailed picture of the impacts on the water system from new infrastructure, coastal management schemes, or flood protection.

Through numerical modelling, IMDC gains a better understanding of the natural water system, and is able to forecast the effects of new and current projects, critical in the design of new coastal infrastructure. With its high resolution and quality data, so easily accessible, EMODnet has become IMDC's prime source of bathymetry data for projects in Europe.

In particular, IMDC used EMODnet Bathymetry data to perform simulations of tsunami propagation in the North Sea for a tsunami hazard assessment of a nuclear facility on the Dutch coast; to conduct a series of Front End Engineering Design (FEED) studies for a liquefied natural gas (LNG) terminal in Croatia; and to implement a hydrodynamic model for the Mediterranean Sea basin.

About IMDC

International Marine and Dredging Consultants (IMDC) is a company that provides expert advice for the sustainable management and development of natural waters for public authorities, engineering offices and contractors on a worldwide base. It offers services in several areas including dredging, offshore energy, flood risk, waterways, integrated water management, monitoring & environment, ports and offshore structures.

MEDITERRANEAN WIND WAVE MODEL (MWM)

Portal:
EMODnet Physics

Among other services DHI, a Danish international company, together with HyMOLab (University of Trieste) developed a met-ocean database aimed at providing nearly 40 years of hourly time series of wind and wave conditions for the entire Mediterranean Sea at very high spatial resolution. The database, named MWM – Mediterranean Wind Wave Model – is based on numerical models (hindcast approach) and required intensive use of all existing measurements both for calibration and continuous validation purposes.

Given the above challenges, it clearly emerged from the beginning that only the availability of a comprehensive portal of marine data such as EMODnet could deliver the required spatial and temporal homogeneity of data format / structure and ease the process of data collection for comparison purposes between observation and model data. The whole calibration / validation process of the MWM database is indeed based on a large amount of data retrieved via EMODnet.

As often it is not an easy task for a met-ocean data user to clearly understand which data have been used in the calibration / validation phase of the hindcast database, the use of EMODnet as the main source for observed marine data collection is highlighted in the description of the DHI's MWM product, as EMODnet is both a robust and well-recognized reference, which can be easily accessed and verified.

About DHI

DHI is an international firm with its headquarters in Denmark, which specialises in delivering solutions to various water challenges. Originating in an institute founded in 1964, DHI has about 30 offices throughout the world, with software development centres in Singapore and Denmark, and approximately 1100 employees.

Portal:
EMODnet Human Activities

EMODNET HUMAN ACTIVITIES FACILITATING PIPELINE ROUTE SELECTION


SHUTTERSTOCK

A pipeline is a series of connected pipes that are used to carry fluids such as oil, gas, water, or sewage. They are used for transport on land, but they can also be laid on the seabed. In the latter case, the infrastructure can be referred to as an offshore, marine, submarine or subsea pipeline.

As is often the case with human activity, pipelines can be extremely useful, while at the same time very dangerous. They convey oil or gas from subsea wells to platforms, or from platforms to shore, but there may be spills or leaks that could pose huge risks to marine ecosystems.

EMODnet Human Activities recently created a dataset on offshore pipelines. Albeit incomplete, the dataset shows the true potential of EMODnet.

When a pipeline needs to be installed, a very complex task is the pipeline route selection as it requires information on seabed topography (EMODnet Bathymetry and Geology), obstructions, debris, existing structures, other human activities, existing pipeline/cable crossing (EMODnet Human Activities).

In some cases information on water salinity, waves, and currents (EMODnet Physics) is also needed.

Prior to EMODnet, sourcing this information used to be a painful and time-consuming exercise. In-situ measurements and inspections are still needed, whereas a great part of the initial information needed to commence work is just a few clicks away, and is available for free.

6.2. EMODnet supporting marine environmental monitoring and management

Swedish Agency for Marine and Water Management

Portal:
EMODnet Bathymetry and Geology


SHUTTERSTOCK

About SwAM

SwAM is the Swedish Agency for Marine and Water Management responsible for managing the use and preventing the overuse of Sweden's marine and freshwater environments.

'SYMPHONY' AND MARINE SPATIAL PLANNING IN SWEDISH GEOLOGY

Symphony is a tool used by the Swedish Agency for Marine and Water Management (SwAM) to assess the cumulative impact of human activity in Swedish waters.

Symphony is a multicriteria decision support tool that is based on the method developed in 2008 by Ben Halpern. It works to predict areas of relatively high or low human pressure by linking pressures to ecosystem components via a 'sensitivity matrix' and using cell-based calculations in a GIS environment. This approach assessment of cumulative impacts requires knowledge of a wide range of impacts and ecosystem components. Spatial 'risk' models could be created using expert judgement. These models could certainly be improved with good knowledge of the distribution of geological substrate types.

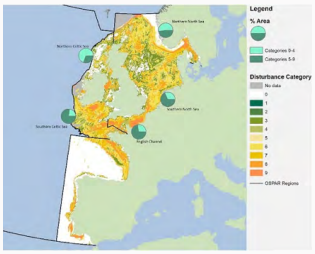
This is where the EMODnet Geology and the Bathymetry portals come into play. The EMODnet seafloor surface substrate data (and bathymetry data) for countries bordering Sweden were combined with the best available map products within Swedish waters from the Geological Survey of Sweden (SGU). Transboundary data were important as the impact does not stop at national borders. This data was collated by SGU, then modelled with various other physical data to create 'risk' maps predicting the distribution of benthic abiotic conditions. This was used to infer varying degrees of sensitivity in the Symphony tool. In addition, the data was used by SwAM consultants and SGU to model human pressures including for example anoxic sediment areas, toxin distribution, smoothing and mechanical damage due to shipping and fishing and underwater noise propagation.

The Symphony tool is currently being used by the marine planning unit at SwAM to model future scenarios and spatial policies, with a view to reducing the overall cumulative human impact in Sweden's marine environment.

OSPAR COMMISSION

EMODNET IS CRUCIAL IN ASSESSING THE EXTENT OF PHYSICAL DAMAGE TO BENTHIC HABITATS AND THE INTRODUCTION OF NON-INDIGENOUS SPECIES

The OSPAR Intermediate Assessment evaluates the status of the marine environment of the North-East Atlantic. The assessment contributes to delivery of both the OSPAR North-East Atlantic Environment Strategy (the OSPAR Strategy) and the European Union Marine Strategy Framework Directive.



EMODnet Seabed Habitats data enabled the mapping of potential disturbance to benthic habitats due to fishing in the North-East Atlantic. The authors assessed physical damage by using habitat distribution maps at EUNIS Level 3, combined with maps of fishing pressures and information on habitat sensitivities to fishing. The majority of the habitat data used in this assessment are derived from the EMODnet Seabed Habitats portal, including EMODnet broad-scale seabed habitat map (EUSeaMap) and more detailed habitat maps from survey. Furthermore, the confidence maps provided by EMODnet Seabed Habitats were used to calculate confidence in the predictions of physical disturbance.

The EMODnet Biology data, on the other hand, were used to assess the trends in new records of non-indigenous species (NIS) introductions into the OSPAR Maritime Area, to determine the effectiveness of measures aimed at reducing NIS introductions.

The EMODnet portals provided a one-stop shop for finding and downloading data, saving the authors time and effort on data collection.

The results of these studies are published on the OSPAR Intermediate Assessment 2017 portal.

Portal:

EMODnet Biology and Seabed Habitats

About OSPAR

OSPAR is the mechanism through which 15 Governments & the EU cooperate to protect the marine environment of the North-East Atlantic.

SHUTTERSTOCK

EMODNET CHEMISTRY CONTRIBUTES TO UNEP/ MAP QUALITY STATUS REPORT 2017

Portal:

EMODnet Chemistry

EMODnet Chemistry contributed to the Quality Status Report 2017 of UNEP/MAP with a Case Study on long-term variability along a trophic gradient in the North Adriatic Sea.

Data used in this case study were made available by EMODnet Chemistry, which gathers, standardises and harmonises data which are fragmented in several institutions, archived with different formats and measurement units.

Data on nutrients and chlorophyll collected since 1980 by several research and monitoring institutes were used to assess long-term evolution of eutrophication (according to Ecological Objective 5) over three decades (1980s, 1990s and 2000s) to contribute to the assessment of Good Environmental Status of marine waters as required by European directives (e.g. Water Framework Directive, Marine Strategy Framework Directive).

About UNEP/MAP

The Mediterranean Action Plan (MAP) of UNEP is the institutional framework for cooperation in addressing common challenges of marine environmental degradation.

SHUTTERSTOCK

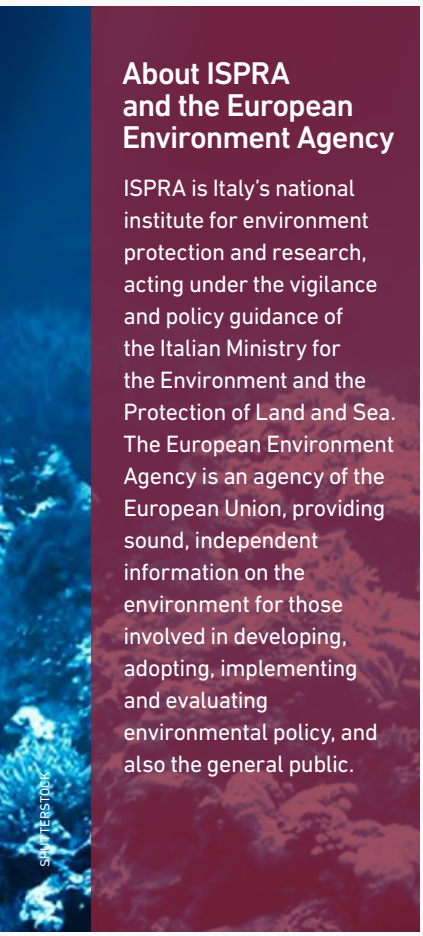
Portal:

EMODnet Seabed Habitats

APPLYING MODELLED, BROAD SCALE HABITAT MAPS IN MPA NETWORK EVALUATIONS: THE WESTERN MEDITERRANEAN SEA CASE STUDY

About ISPRA and the European Environment Agency

ISPRA is Italy's national institute for environment protection and research, acting under the vigilance and policy guidance of the Italian Ministry for the Environment and the Protection of Land and Sea. The European Environment Agency is an agency of the European Union, providing sound, independent information on the environment for those involved in developing, adopting, implementing and evaluating environmental policy, and also the general public.



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Over the past decades global, European and regional policy drivers have called on countries to establish networks of marine protected areas (MPAs) as instruments for protection of marine biodiversity. These policies also require the evaluation of the exerted protection effort against specific criteria (e.g. coverage) and targets with respect to the extension of marine biodiversity elements, such as marine habitats.

The pan-European map presenting the distribution of modelled broad scale seabed habitats (EUSeaMap v2016) made available through the EMODnet Seabed Habitats project, was crucial in the assessment recently performed by ISPRA in collaboration with the European Environment Agency to compile information on the distribution of all marine broad-scale habitats for the whole Western Mediterranean basin.

Information on the distribution of broad-scale habitats, harmonised for the whole Western Mediterranean Sea, was readily available as an EMODnet Seabed Habitats product, saving the authors time and resources. It allowed a decreasing habitat coverage trend in the MPA network as depth progresses to be identified. In particular, the analysis highlighted that in the North West Mediterranean bathyal and abyssal habitats fall below the 10% coverage target, and that the infralittoral and most circalittoral habitats reached the 10% target by 2015, while only half of the circalittoral habitats reached the 20% target by 2015.

It is extremely likely that the assessment will be repeated in the future and for different basins.

Portal:

EMODnet Seabed Habitats

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About JNCC

The Joint Nature Conservation Committee (JNCC) is the public body that advises the UK Government and devolved administrations on UK-wide and international nature conservation.

ASSESSING PROGRESS TOWARDS AN ECOLOGICALLY COHERENT MPA NETWORK IN SECRETARY OF STATE WATERS IN 2016

In 2016, the Joint Nature Conservation Committee (JNCC) was asked by the Department for Environment, Food and Rural Affairs of the UK Government (Defra) to assess the progress towards an ecological coherent network of Marine Protected Areas (MPAs), and review what is protected within the existing MPA network in Secretary of State Waters (SoS)[1]. JNCC was charged with calculating the area of each broad-scale habitat present within each biogeographic region and in SoS waters, as well as the area of each habitat that was afforded protection within existing MPAs, in order to assess the proportion of features protected.

JNCC produced a 'Combined Map' integrating data from field survey maps (mostly from the EUNIS habitat datasets collection) and the most recent version of the EMODnet Seabed Habitats broad-scale predictive habitat map available at that time. The Combined Map is a single flat layer without overlaps between habitats or component datasets, making it suitable and efficient for area calculations.

This map was also used to calculate habitat cover within MPAs where feature-level data were not available. Confidence information provided with the habitat maps by EMODnet Seabed Habitats was used to select the best available evidence, in the creation of the Combined Map. Furthermore, biological zones in SoS waters, modelled in EUSeaMap, allowed JNCC to better assess the likelihood that existing MPAs represent the marine flora and fauna of both the deeper, offshore areas of SoS waters as well as shallower, inshore waters.

This work allowed Defra to assess the progress with the designation of MPA in SoS waters up to Spring 2016. The aim of the work was to help inform Defra's planning of any further MPA designations that have been necessary to complete the network.

[1]Secretary of State waters refers to English territorial waters and UK offshore waters around England, Wales and Northern Ireland.

[2]Hannah Carr, Alice Cornthwaite, Hugh Wright and Jon Davies. Assessing progress towards an ecologically coherent MPA network in Secretary of State Waters in 2016: Methodology. JNCC, 2016

European Environment Agency

ICES AND EMODNET CHEMISTRY PROVIDING A COMPREHENSIVE EUROPEAN DATA SOURCE FOR THE EUROPEAN ENVIRONMENT AGENCY

Portal:

EMODnet Chemistry

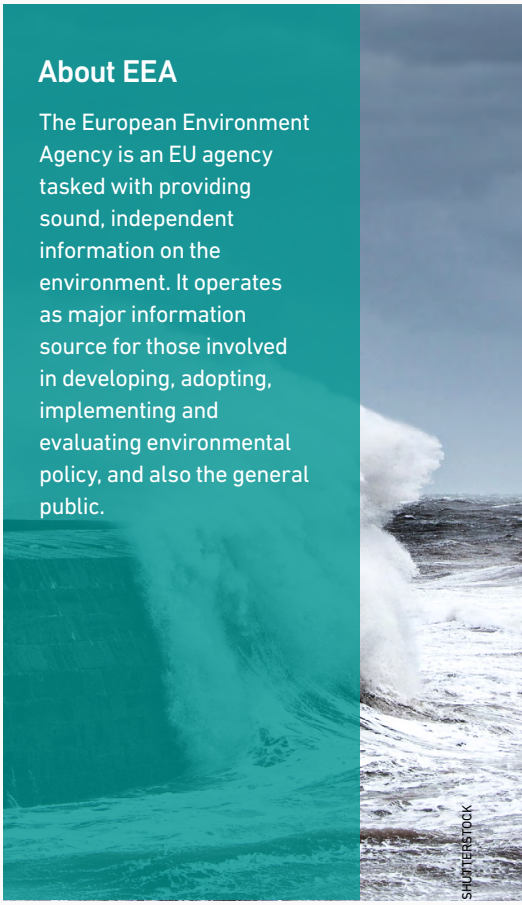
In December 2017, the European Environment Agency (EEA) decided to cancel its WISE SoE - Water quality in transitional, coastal and marine waters - annual data call. This is a voluntary call for member states (the so called EIONET partners) and is used to feed the EEA Core indicators, as well as thematic assessments under the State of the Environment reports (SoEr) for both fresh and marine waters.

The reason for cancelling, was partly driven by a lack in coverage of data resulting from the SoE data call, especially in the Mediterranean and Black Sea, but also due to EIONET and TGDATA participants lobbying for the inclusion of EMODnet as a datastream to the EEA.

Now the approach would be to use ICES and EMODnet Chemistry to provide a comprehensive European data source for EEA Marine Indicators on contaminants (Biota) and Eutrophication (Chl a, Nutrients) and a pipeline on oxygen saturation. The data will also feed the SoEr via thematic assessments. The EEA indicators will be published by mid 2018 and updated every 2 years.

About EEA

The European Environment Agency is an EU agency tasked with providing sound, independent information on the environment. It operates as major information source for those involved in developing, adopting, implementing and evaluating environmental policy, and also the general public.



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SOOS
SOUTHERN OCEAN OBSERVING SYSTEM

PROVIDING STRAIGHTFORWARD ACCESS TO CENTRALLY-CURATED CIRCUMPOLAR DATASETS AND METADATA RECORDS

Portal:
EMODnet Physics

As part of its mission, the Southern Ocean Observing System (SOOS), is working to improve access to key Southern Ocean datasets. SOOSmap, developed for SOOS by the EMODnet Physics group, is a vital part of this effort. SOOSmap provides straightforward access to centrally-curated circumpolar datasets and metadata records.

In addition to helping scientists find the data they need to answer key questions, the map interface allows research planners and programme coordinators to explore the spatial and temporal distribution of observing platforms. This knowledge will help them to identify gaps that need to be filled in the observing system. The plotting tools for the datasets allow researchers to easily and rapidly explore the data to test its suitability for their needs.

The SOOS international Project Office is working with the EMODnet Physics group and its broader scientific community to bring more datasets into the EMODnet data infrastructure. EMODnet Physics has supported SOOS by providing the data aggregating infrastructure, developing a customised portal for viewing Southern Ocean datasets, and helping with the technical aspects of bringing new data streams into the EMODnet infrastructure so that they can be included in the SOOSmap.

For SOOS, SOOSmap helps meet two key data objectives – mapping the distribution of observing platforms for planning purposes, and making Southern Ocean data more easily accessible to users. SOOS has existed for five years, but with a very small International Project Office, it therefore did not have the necessary resources to develop these tools in-house.

Leveraging the infrastructure and coding skills of EMODnet Physics has enabled SOOS to more rapidly and efficiently achieve long-term goals than otherwise possible.

About SOOS

The Southern Ocean Observing System (SOOS) is an international scientific collaboration to develop sustainable and systematic observations of the Southern Ocean environment. SOOS' mandate covers a wide range of scientific disciplines, including biology, ecology, cryospheric sciences, and chemistry, as well as physical oceanography.

Portal:

EMODnet Physics

MAKING MARINE DATA AVAILABLE TO THE GLOBAL SCIENTIFIC COMMUNITY: THE UG-MESA MARINE SERVICES CASE

About the MESA project

The Monitoring for Environment and Security in Africa (MESA) project was a continent-wide project aimed at using Earth Observation data to support African decision makers and planners in implementing national, regional and continental policies and development plans towards sustainable development and management of environmental resources.

The Coastal and Marine Resources Management Centre at the University of Ghana started a project in 14 coastal West African countries with the aim of improving the coastal and marine information management, decision-making and capacity planning of the Economic Community of West African States (ECOWAS), by enhancing access to and exploitation of relevant Earth Observation (EO) data.

Services provided under the ECOWAS Marine Thema consist of provision of daily maps of potential fishing zones (PFZs) and vessel traffic information in the sub-region to fisheries managers, and maps of ocean condition forecasts to marine operators and other interested stakeholders. Information on PFZs are provided to policy makers of beneficiary countries, enabling them to better manage their fishery resources.

Additionally, daily forecasts of ocean conditions are sent via an SMS early-warning system to artisan fishermen, which enables them to increase their efficiency, reduce their costs and above all, avoid venturing out to sea when conditions are too dangerous.

As part of the services provided, the University of Ghana deployed a wave rider buoy near the Cape Verde islands for collection of in-situ data on ocean parameters such as wave height and sea surface temperature for validation purposes.

In order to make this data available to the global scientific community, collaboration was established with EMODnet Physics to host this data on their distribution platform. The impact of this collaboration has been tremendous, as the data is made easily accessible to both African and European partner institutions, as well as other users.

Portal:

EMODnet Bathymetry and Geology

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About IGME

Founded in 1952, the Greek Institute of Geology and Mineral Exploration (IGME) – "Institouto Geologikon kai Metalleftikon Erevnon" – is supervised by the Ministry of Environment and Energy and, by legislation, is the State's technical adviser in geoscientific matters. Its fundamental aim is the geological study of the country and the exploration and evaluation of raw mineral materials and ground water resources. Emphasis is also placed on projects related to the protection of the environment and active participation is demonstrated in competitive European funded projects; IGME participates in the Hellenic Committee for Authorisation of Marine Research.

MARINE GEOLOGY MAPPING IN GREECE

The IGME (Greek Institute of Geology and Mineral Exploration) marine geology team has carried out numerous research studies, mainly in the Aegean Sea (e.g. mapping of the continental shelf, distribution and nature of seabed substrate, research for placer deposits).

Over 40 years of marine geological work a vast amount of data has been collected, including marine sediment samples and cores, shallow and medium penetration seismic profiling, bathymetry and side scan sonar data. In order for this data to be available and used by the international maritime actors, a need for standardisation and harmonisation was necessary.

The EMODnet Geology standards and guidelines proved to be a valuable tool for the design and creation of the IGME internal Marine Geology database, allowing IGME to organise and manage data and related products in a harmonised and standardised database, taking them one step closer to INSPIRE-compliancy.

Moreover, as continuous, reliable and coherent bathymetry information is required for GIS elaboration and mapping of available seabed substrate data, IGME is exploiting EMODnet bathymetry data to enable a thorough GIS elaboration of seabed substrate for several map sheets of the Aegean Sea (Zananiri et al. 2016).

Marine Institute
Foras na Mara

MEASURING SEAFLOOR INTEGRITY FOR AREAS OF IRELAND'S OFFSHORE IN SUPPORT OF MFSD REQUIREMENTS

The Irish Marine Institute provides scientific and technical support and advice to the Irish Department of Environment, Community and Local Government, which is charged with implementing the Marine Strategy Framework Directive (MSFD).

One area where scientific support is crucial is that of seafloor integrity, also an MSFD descriptor.

The EMODnet Geology substrate data has assisted the Irish Marine Institute in preparing information on seafloor integrity for areas of Ireland's offshore in support of MSFD requirements.

Additionally, the Marine Institute has used the EMODnet Geology data portal as part of their data preparations for a Marine Plan for Ireland's territorial sea and Exclusive Economic Zone (EEZ).

Portal:

EMODnet Geology

About the Irish Marine Institute

The Irish Marine Institute is the national agency for marine research and development in Ireland. The Institute provides services related to research and development that promote economic development, create employment and protect the marine environment.

SHUTTERSTOCK

SUPPORTING MARITIME SPATIAL PLANNING IN THE CELTIC SEAS

Portal:

EMODnet Bathymetry, Human Activities and Seabed Habitats

High-quality maritime spatial data and information is a key element for implementation of Maritime Spatial Planning (MSP). Access to transboundary data is particularly important. SIMCelt - Supporting Implementation of Maritime Spatial Planning in the Celtic Seas is a project focussed on promoting the development of transnational cooperation to support the implementation of the Maritime Spatial Planning Directive in the Celtic Seas.

In considering available transboundary data sets to support this work, SIMCelt identified a list of general issues encountered (see for Kato, Y., Carval, D., 2017 for details).

These include:

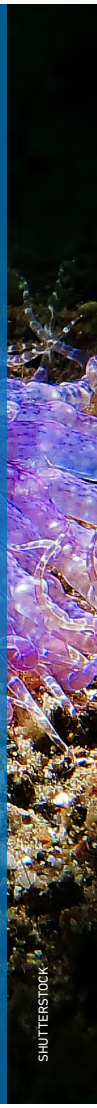
- Webservices which are an easy way to gain access, as they allow data and information to be read without having to collect or download it. These useful data formats are not as widely available.
- Data harmonisation which is probably the main concern with data for transboundary MSP.
- Consistent layers covering the whole area of interest which are indeed necessary, and very difficult to obtain where datasets from different jurisdictions have different attribute information, etc.
- Data publication progress as several important maritime spatial planning datasets are not available in an INSPIRE-compliant format
- Licensing which can become a critical issue in a cross-border context, as well as in a situation where harmonised information is shared. Many datasets have restrictive use, even for non-commercial purposes.

Considering these criteria, the SIMCelt project identified the EMODnet broad-scale seabed habitat map for Europe as the best source of data on Marine Habitats for the Celtic Seas region for the purposes of Maritime Spatial Planning. In addition, EMODnet Bathymetry and Human Activities are also highlighted as a source of information for MSP in the Celtic Seas.

About SIMCelt

SIMCelt is co-financed by the European Maritime and Fisheries Fund (EMFF) and led by University College Cork.

The project consortium comprises both planners and researchers from seven partner institutes from Ireland, France and United Kingdom.



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Portal:

EMODnet Geology

EMODNET GEOLOGY TO SUPPORT THE CLASSIFICATION OF THE PORTUGUESE AND TURKISH AREAS OF THE NATIONAL MARITIME SPACE

PSOEM is the Portuguese plan for the Land use of the National Maritime Space under the coordination of the General Directory for Maritime Resources of Portugal (DGRM). PSOEM will allow the National Administration to issue authorisations for the private use of National Maritime Space for economic purposes.

Combining the data available in the EMODnet Geology portal together with the data coming from IPMA, the Portuguese Institute for Sea and Atmosphere, DGRM produced a multi-layer GIS that enabled classification of areas of their National Maritime Space.

Along the same lines, the Institute of Marine Sciences and Technology (IMST) of Dokuz Eylul University in Izmir, Turkey used the information available through the EMODnet Geology portal to classify areas of the National Maritime Space.

About DGRM & IMST

DGRM, the General Directory for Maritime Resources of Portugal is the national counterpart for the exchange of information between the European Commission and Portugal regarding the DCF.

The Institute of Marine Sciences and Technology (IMST) of Dokuz Eylul University in Izmir, Turkey was established as an academic and research institution in 1975. The main objective of the IMST is to conduct basic and applied marine research on national and international levels in scientific, as well as private projects.

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Portal:

EMODnet Biology

About OBIS and EurOBIS

OBIS is the most comprehensive database of the world's ocean biodiversity and biogeographic data and information required to address pressing coastal and world ocean concerns. Its mission is to build and maintain a global alliance that collaborates with scientific communities to facilitate free and open access to, and application of, biodiversity and biogeographic data and information on marine life.

The European chapter of OBIS is EurOBIS, the biogeographic data system for the European Marine Observation and Data Network.

EMODNET BIOLOGY CONTRIBUTING TO MARINE GLOBAL ASSESSMENTS

The Ocean Biogeographic Information System (OBIS), run by IOC-UNESCO, is an important contributor to several international processes, such as (i) the United Nations World Ocean Assessments of the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-economic Aspects, (ii) the regional and global assessments of the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES) and the Transboundary Water Assessment of the Global Environment Facility. The Convention on Biological Diversity is also using OBIS as a key source of information for the identification of Ecologically or Biologically Significant marine Areas (or EBSAs).

OBIS is a fundamental component of this processes as it is now the world's most comprehensive database on the diversity, distribution, and abundance of life in the ocean in time and space. It is built by a collective effort of thousands of scientists and data managers employed by hundreds of institutions around the world who brought over 50 million observations of 120,000 marine species into the public domain.

The European contribution is significant with EMODnet playing a pivotal role: around 20 million of these records are provided by EMODnet Biology.

The UN General Assembly has benefitted from OBIS for its contribution to Marine Scientific Research in its recent Omnibus Resolutions on Oceans and Law of the Sea. In addition, OBIS may become an important data clearing-house platform for a new legally-binding instrument under the Law of the Sea Convention to conserve and sustainably use marine biodiversity of areas beyond national jurisdiction (BBNJ), currently under negotiation at the United Nations.

6.3. EMODnet informing Europe's citizens

GOBIERNO DE ESPAÑA MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD

Instituto Geológico y Minero de España

THE TELLURIUM CASE

The Geological Survey of Spain (IGME) has been carrying out an extensive study of the cobalt-rich ferromanganese crusts that coat several seamounts west and south of the Canary Islands since 2010. These crusts show a valuable high content in strategic and critical metals (cobalt, titanium, molybdenum, tellurium) and rare earth elements used in green technologies.

In 2016 a British oceanographic cruise aboard the RRS James Cook with the participation of the Geological Survey of Spain, travelled to one of these seamounts known as Tropic, which stands about 3000m tall. Later in April 2017, the BBC announced that "British scientists exploring an underwater mountain in the Atlantic Ocean have discovered a treasure trove of rare minerals".

The news mainly focused on tellurium, as "the deposit was estimated to hold 2,670 tonnes of tellurium or 5% of the global reserves". This press release soon caused a storm in Spanish media and especially in the Canarian press and aroused great interest due to the economic implications of the finding.

The Geological Survey of Spain was invited by the Spanish Parliament, the Canarian Government and the newspapers to report on this.

The EMODnet Geology maps, delivering comprehensive data for the marine mineral deposits, were used by IGME to contribute to the report by providing a better understanding of the distribution, abundance, structure, and genesis of these deposits, and their mineralogical and geochemical characteristics.

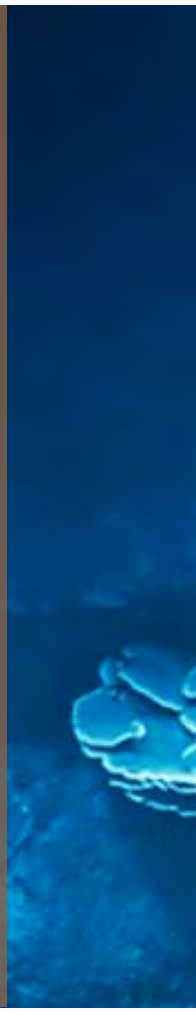
The maps are delivered through the EMODnet Geology website: www.emodnet.eu/geology.

Portal:

EMODnet Geology

About IGME

The Instituto Geológico y Minero de España (Spanish Geological Survey) (IGME) is a public Research Organisation that provides expert knowledge on all aspects of geoscience, and is the responsible for advising the Spanish government and its Autonomous Community governments on the sustainable development of its territory and resource management.



Portal:

EMODnet Bathymetry

IPS Instituto Politécnico de Setúbal
Escola Superior de Ciências Empresariais

EMODNET PORTALS TO TRAIN STUDENTS: A PRACTICAL EXAMPLE

Tanya Silveira (PhD in Coastal Geomorphology, www.linkedin.com/in/tanya-mendes-silveira-9198a7a) is a young geologist, teacher and researcher. Dr. Silveira thinks that "the EMODnet Bathymetry Portal is a great resource and tool to teach students about some concepts and get them to do simple measurements and interpretations". Dr. Silveira uses EMODnet bathymetry to train her students.

The following is an example of an exercise set by Dr. Silveira for the students of the degree course in Environmental and Marine Technology (1st year, 1st semester 2017/2018).

Goal:

1) Use and exploit the bathymetric data platform provided by the European agency EMODnet, through its web portal
2) Identify undersea reliefs and the Portuguese continental shelf
3) Make measurements and slope calculations; profiling and analyzing seabed sections
4) Prepare a group report

Procedure:

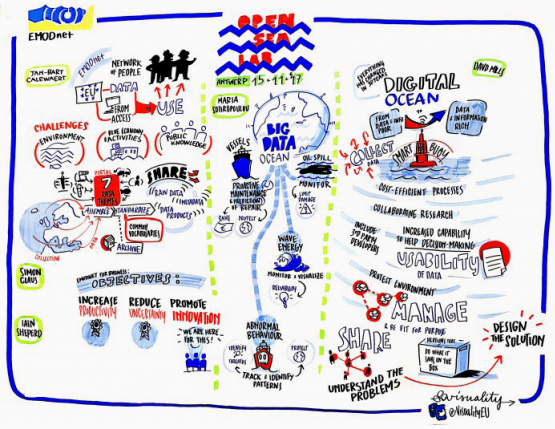
I. Exploration of EMODnet's Bathymetric Data Portal

1) Go to http://www.emodnet-bathymetry.eu
1) Select: Select Bathymetry Viewing and Downloading service
2) Explore the data platform. In the upper-left corner the menu of layers of information (layers) allows selection from a series of subjects with information about bathymetry and the seabed. The coordinates of the map location on which the cursor is located are displayed in the lower right corner.
3) With one of the information layers activated (mean depth):
4) The "retrieve depth" command allows depth information at any point in the bathymetric model to be obtained. The "depth profile" command allows line segments to be traced and displayed in the section (profile) in the form of a graph, with the distance in abscissa and the depth in ordinates. The command with the ruler icon and arrow in the upper right corner allows distances to be measured on the map.

4) Try to answer the following questions:

a. What is the maximum depth of the Strait of Gibraltar, which connects the Mediterranean Sea to the Atlantic Ocean?
b. Locate the submarine relief in the following coordinate: LONG: -13.9° LAT: 40.5°, and determine the type of morphology present:
   i. Submarine mount
   ii. Submarine mountain
   iii. Bank or plateau
   iv. Island
c. Locate the mid-Atlantic Ocean ridge near the Azores and determine, through the morphology of the axial zone, whether it has a low or high expansion rate.
d. How many submarine cannons can you identify on the Portuguese continental margin?

7. Open Sea Lab Competition



@EMODnet

Exploring the potential of marine open data was the focus of the first EMODnet Open Sea Lab: a three-day bootcamp & hackathon where teams competed to develop novel applications using marine open data.

Over 50 participants from 15 countries (including Canada), with diverse backgrounds and skill sets, came together in the stimulating environment of Antwerp's StartUp village. This was no ordinary hackathon; with organisers from EMODnet, VLIZ and imec on-hand, participants were able to avail themselves of expert-led workshops and one-to-one training to improve their data manipulation, business-modelling, user-testing and pitching skills.

The teams

The competing teams worked with great enthusiasm and determination to develop their ideas in just three days, combining data from EMODnet portals, but also from other sources such as the Copernicus Marine Environment Monitoring Service (CMEMS) and the International Council for the Exploration of the Sea (ICES).

Diverse and advanced concepts and demonstrations were

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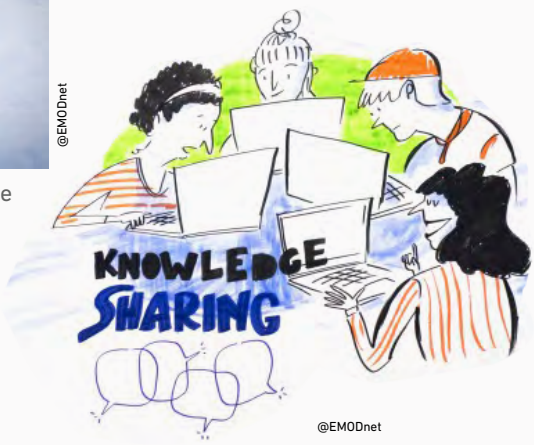
presented to the jury at the end of Day 3. The outputs ranged from tools to support fishermen, environmental managers and the windfarm sector, to marine tourism mobile



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applications for the general public. The lessons learned in this exercise were invaluable for future EMODnet developments. The application programming interface that provides machine-to-machine access to the data and data products should be accessible to users in an intuitive way and should allow data from the different thematic portals to be accessed in the same way.

See EMODnet's GitHub github.com/EMODnet/OpenSeaLab.

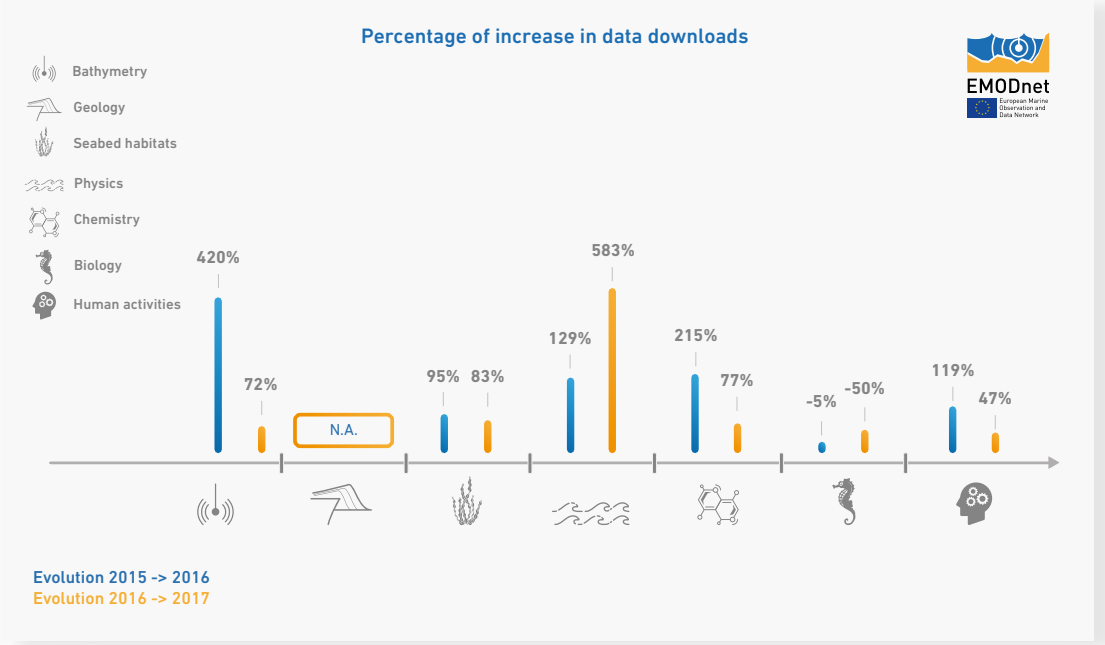
What happens next?

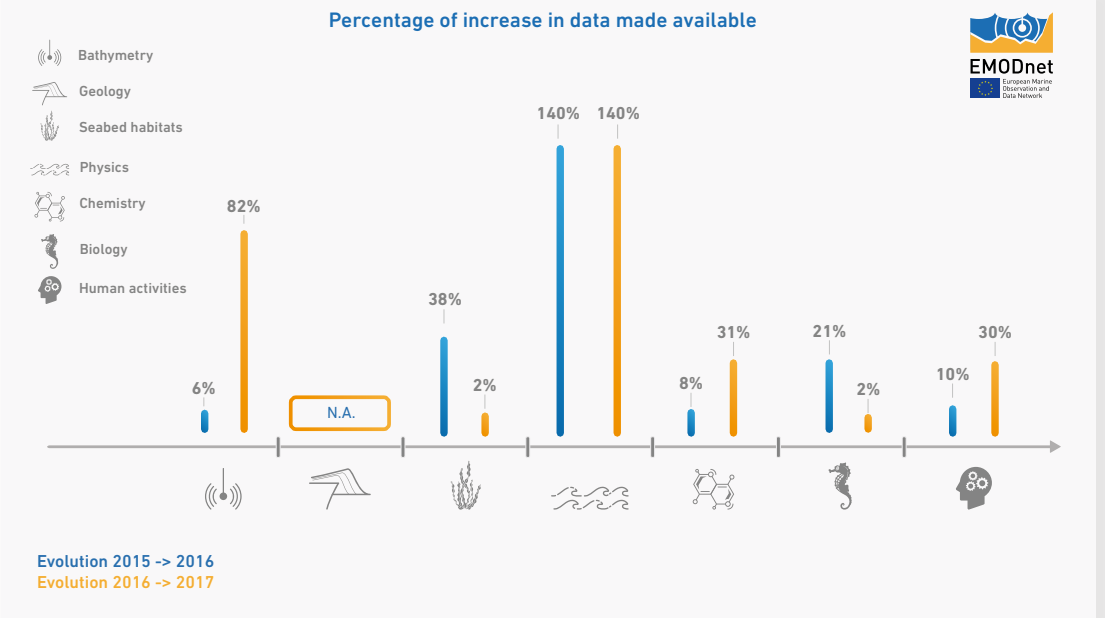
All winning teams received awards from DataCamp, and the winning team will present their products at the European Maritime Day 2018, in addition to the opportunity to further develop their concept at the CoFoundry. Five students were also given the opportunity to elaborate their ideas at the Open Summer of Code.

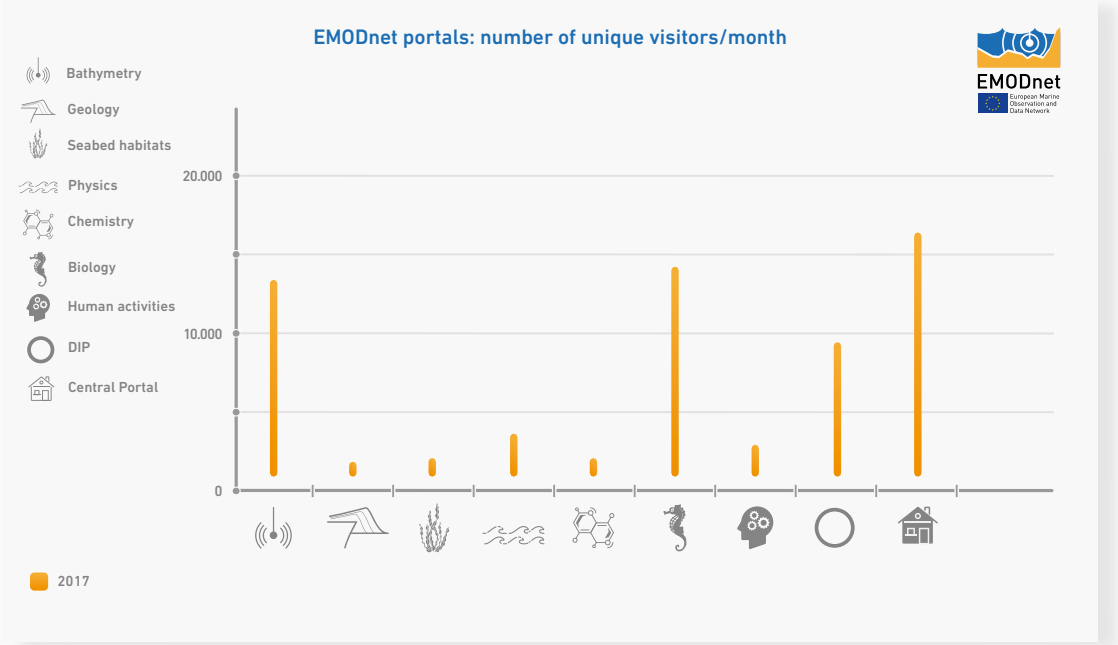
THE CO FOUNDRY · DataCamp · OPEN Summer OF CODE 2017 · European Maritime Day Burgas 2018

The full programme, including speakers presentations, can be found at www.opensealab.eu/Bootcamp.

8. EMODnet in figures






EMODnet portals: number of unique visitors/month
EMODnet
European Marine Observation and Data Network
Bathymetry
Geology
Seabed habitats
Physics
Chemistry
Biology
Human activities
DIP
Central Portal
20.000
10.000
0
2017

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. Payments are made after delivery of agreed outputs. Some projects are still ongoing. All of the completed projects have been paid in full.

	Preparatory Actions[3]	Maritime Policy Fund[4]	European Maritime and Fisheries Fund[5]				
Theme and Project	**2008-2010 (k€)**	**2011-2013 (k€)**	**2014 (k€)**	**2015 (k€)**	**2016 (k€)**	**2017 (k€)**	**Grand Total (k€)**
Central services		**520**		**4,565**	**155**	**1,420**	**6,660**
Data Ingestion				4,045			4,045
Secretariat		520		520	155	1,420	2,615
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**		**732**
Costs and benefits		450					450
Current status	230						230
Observation benefits					52		52
Thematic portals	**6,350**	**16,350**	**1,194**	**4,917**	**13,483**		**42,294**
Bathymetry	2,175	2,000		4,917			9,092
Biology	750	1,700			1,770		4,220
Chemistry	700	4,000			2,805		7,505
Coastal mapping			1,194				1,194
Geology	925	4,200			4,500		9,625
Human Activities		2,060			1,608		3,668
Seabed Habitats	800	1,390			1,400		3,590
Physics	1,000	1,000			1,400		3,400
Grand Total (K€)	**6,580**	**19,015**	**5,369**	**13,482**	**13,690**	**1,420**	**59,556**

[3]as 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

[4]Regulation (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

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

10. Building for tomorrow and beyond

The focus of the third EMODnet development phase (2017-2020) is to reach the EMODnet 2020 targets described in the Communication from the Commission "Innovation in the Blue Economy" and associated Marine Knowledge 2020 roadmap:

> *"to deliver a seamless multi-resolution digital seabed map of European waters of the highest resolution possible, covering topography, geology, habitats and ecosystems. This will be accompanied by access to timely observations and information on the present and past physical, chemical and biological state of the overlying water column, by associated data on human activities, by their impact on the sea and by oceanographic forecasts.*
>
> *All of this should be easily accessible, interoperable and free of restrictions on use. It should be nourished by a sustainable process that progressively improves its fitness for purpose and helps Member States maximise the potential of their marine observation, sampling and surveying programmes."*

But it doesn't end here. In this phase efforts need to be made to ensure a sustainable future for EMODnet post-2020, when the core data-sharing service is to be fully deployed and operational.

2018 will be a year full of challenges

- Users will always be at the centre, products will continue to be enhanced and work across the thematic activities to offer multidisciplinary ready-to-use services: the improvement of the Helpdesk service, currently available for all portals, will be one of the tools implemented to ensure this.
- Particular attention will be also devoted to monitor the performance of the services and to collect user feedback.
- EMODnet Chemistry will start developing new products related to marine litter, including beach litter, seabed litter and microliter. EMODnet Human Activities will start building a vessel density map. These are only few examples of the new data layers that will be implemented.

- EMODnet Bathymetry will release its higher resolution Digital Bathymetry (DTM) for the European seas, based upon a largely increased number of high quality survey data sets and Satellite Derived Bathymetry products. The bathymetry viewer will be expanded with powerful 3D visualisation functionality. Best-estimates of the European coastline for a range of tidal levels (Lowest Astronomical Tide - LAT, Mean Sea Level - MSL, Mean High Water - MHW) will be published.
- Particular efforts will be made to ensure maximum coherence with data delivery to and from regional sea conventions and the European Environment Agency with some emphasis on maritime spatial planning and implementation of the Marine Strategy Framework Directive.
- Internationalisation will remain a keyword for 2018 with a particular focus on interoperability with data distributed by non EU-organisations, particularly those based in countries such as Australia, China, India, Japan and the United States that operate significant ocean observation programmes. Collaboration with China's State Oceanic Administration will follow-up the EU-China Blue Year events with concrete measures for interoperability.
- An expert group on marine knowledge will begin operating with the aim of identifying how EMODnet products and services can be tuned to meet the needs of business, and how data collected by business can be used for the public good.

EMODnet team

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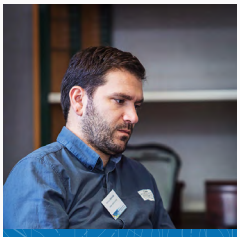
EMODnet Central Portal



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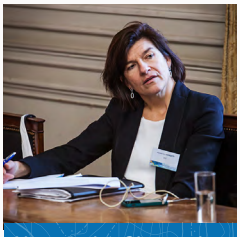

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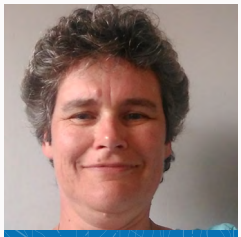

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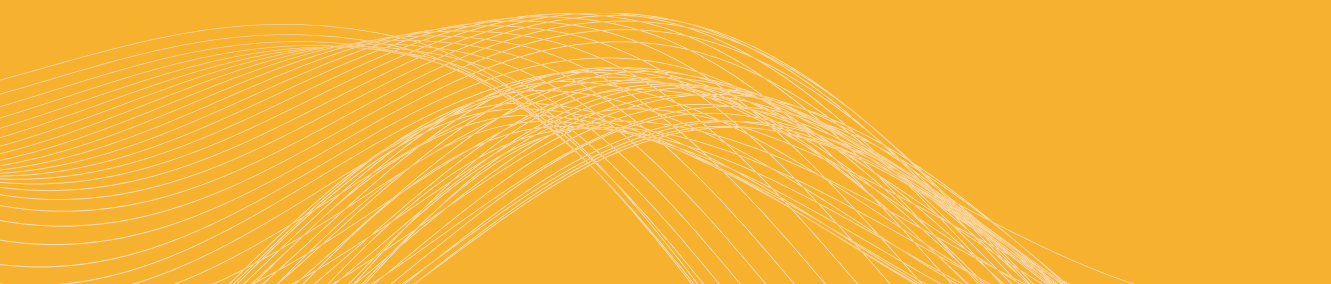
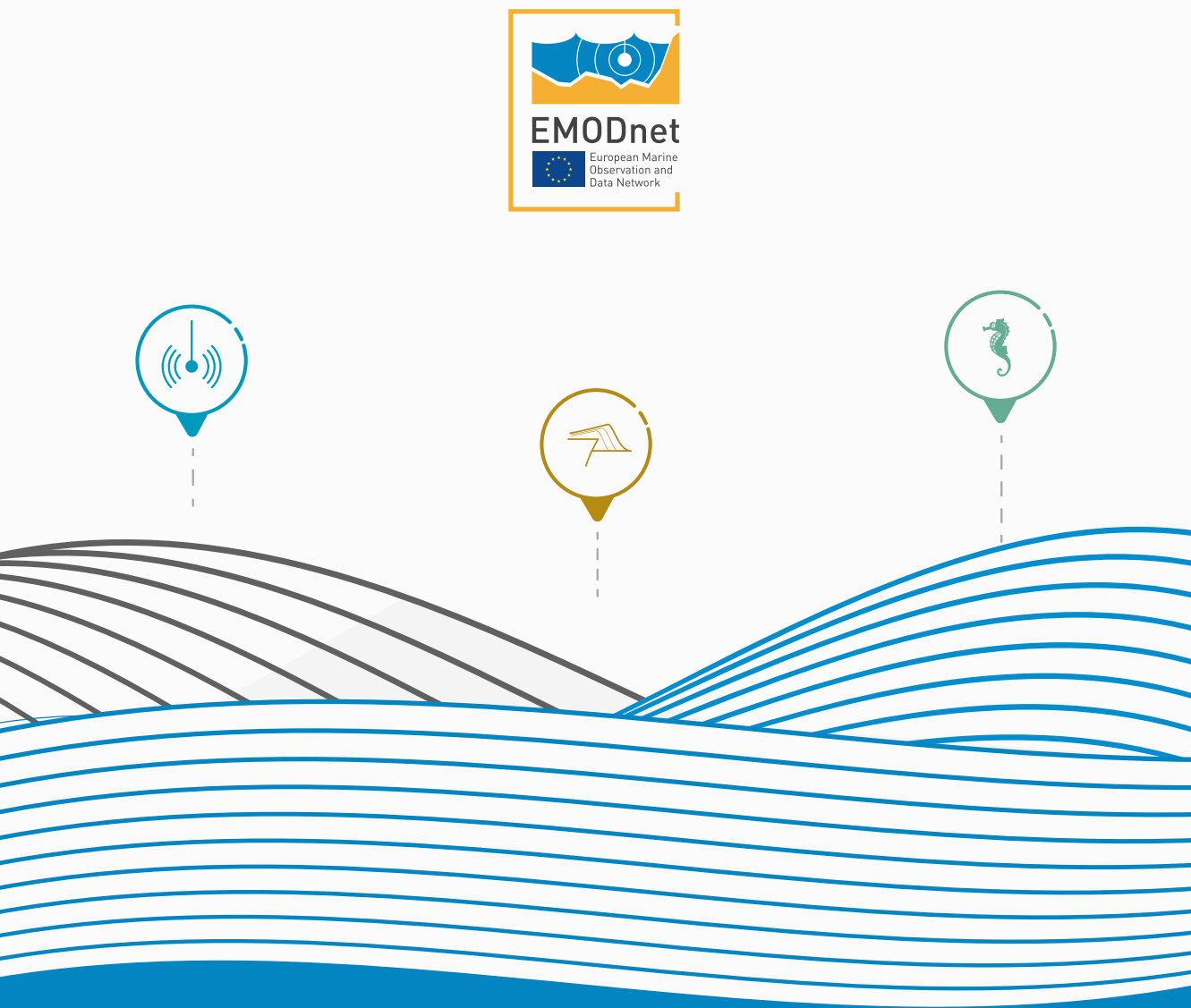


References

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



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