EMODnet Secretariat

EMODnet Phase 2 – Annual Progress Report

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1 Introduction

In the first phase of the European Marine Observation and Data Network (EMODnet) from 2009 onwards, six internet portals were established. Each one provides access to marine data, metadata and data products of a specific type. In May 2012 a call for tender (MARE/2012/10) launched Phase II of the project with an aim to increase the resolution and extend EMODnet coverage to all EU waters. A number of entirely new EMODnet activities were launched at the same time, including the creation of a new portal on human activities and two sea-basin checkpoints (MARE/2012/11) to assess the observation capacity in the North Sea and the Mediterranean. Tenders for several other sea-basin checkpoints for the Arctic, Atlantic, Baltic and Black Sea have been released mid-2014 to start beginning of 2015. In addition, since September 2013 the Flanders Government is supporting the development of a central entry portal www.emodnet.eu providing access to the thematic EMODnet portals and which should, over time, allow to retrieval data from multiple portals at the same time.

To support the widening scope and growing number of partners and activities in EMODnet Phase II, the European Commission Directorate-General of Maritime Affairs and Fisheries (DG MARE) launched a tender in 2012 (MARE/2012/15) for a service contract to administer and monitor EMODnet, and the Flanders Government made office space available at the InnovOcean site in Ostend (Belgium) to host its core staff. The EMODnet Secretariat contract was awarded to Seascape Consultants Ltd in September 2013 for an initial period of two years, to provide high-level coordination and technical skills to support (i) the monitoring of EMODnet projects; (ii) the dissemination of their results, and (iii) the analysis of user feedback and statistics. The overarching aim is to develop a more effective, efficient and fit for purpose EMODnet.

This report presents an overview of the progress of the thematic portals achieved in the first year of operation of the EMODnet Secretariat, i.e. in the period from September 2013 up to August 2014. The report is largely based on the inputs provided by the EMODnet thematic lots, inter alia from available first year interim reports supplemented with updates from the Secretariat.

Without any doubt, the most important achievements in this period were

- the successful launch of all of the EMODnet phase II projects as well as the EMODnet Secretariat; and

- the establishment of a coordination framework (i.e. the EMODnet Steering Committee) and modus operandi to jointly address the EMODnet challenges as a coherent and mutually supportive partnership.

2 Progress summary

2.1 *General highlights and achievements*

- September-October 2013: **Smooth and swift installation of the Secretariat office** and staff at the InnovOcean site of Ostend.

- October 2013: EMODnet **central portal landing page (www.emodnet.eu) online**

- December 2013: Establishment of Terms of Reference with guidelines and modus operandi as **foundation of the EMODnet Steering Committee.**

- December 2013: Organisation of **1st EMODnet Steering Committee Meeting** with all EMODnet phase II coordinators, reaching agreement on harmonisation of indicators to track progress and core elements of the central portal and case studies.

- December 2013: Establishment of a high level **EMODnet Communication Plan and Strategy** as basis for coordinated and targeted activities to strengthen the visibility and dissemination of EMODnet outputs.

- December 2013: With the signing of the last EMODnet Phase II contract for the Mediterranean sea-basin checkpoint on 4 December 2013, **EMODnet Phase II successfully launched -** all thematic portals (7 in total) and one checkpoint have websites online early 2014.

- February 2014: Production of the first **EMODnet leaflet** by the Secretariat.

- February 2014: EMODnet **social media** (Twitter, LinkedIn, Facebook) launched on the central portal.

- February 2014: **Inauguration of the EMODnet Secretariat Office** in the presence of more than 100 partners and stakeholders at the InnovOcean site in Ostend (Belgium) with back-to-back meetings of Marine Observation and Data Expert Group (MODEG) and the EMODnet Steering Committee.

- May 2014: Successful contribution and representation of **EMODnet at the European Maritime Day 2014** through (i) co-organisation of a workshop on ocean observation and marine data with a presentation from the EMODnet Secretariat, and (ii) presentation of EMODnet activities at a dedicated EMODnet information booth.

- April 2014: **Publication** of a paper **in the journal 'Science'** based on research using EMODnet Biology datasets (Dornelas et al. (2014) Assemblage Time Series Reveal Biodiversity Change but Not Systematic Loss. Science 344, 296-299. DOI: 10.1126/science.1248484).

- May 2014: Development and agreement between all thematic lots to commonly use the "**EMODnet Regions map**" as a temporary solution to replace the pending EEA

Marine Strategy Framework Directive (MSFD) Regions boundaries which are currently under discussion and not yet approved for usage. This is the first major success of intensive collaboration across all thematic portals using the Steering Committee platform.

- June 2014: 2nd Steering Committee with (for the first time) representatives of all thematic and regional lots reaching agreement on the role and remit of the sea-basin checkpoints, interlinkages between the portals and emphasising the importance to engage with key stakeholders to ensure EMODnet deliverables and services are fit for purpose.

- September 2014: Meeting with EMODnet and main actors involved in MSFD data gathering and reporting, paving the way for durable interactions to foster EMODnet contributions to MSFD processes, and to consider how data collected/assembled in the framework of MSFD but not yet available through EMODnet portals could be made accessible in the future.

2.2 Specific progress and achievements of the thematic lots

- **EMODnet Bathymetry** officially started in July 2013 with 16 partners and 8 subcontractors. Since then, several new data providers have been identified and interested to become subcontractors, especially for the Black Sea region and the Eastern Mediterranean. Almost all data providers made good progress in the first year with preparing and submitting new entries for bathymetric surveys in the Common Data Index (CDI) service and composite Digital Terrain Models (DTMs) in the SEXTANT catalogue service. A first compilation of all new Regional DTMs into the overall EMODnet DTM for all European sea areas was prepared for inspection by partners by the end of August 2014. The overall result is impressive and a major step forward in comparison with the present public EMODnet DTM. The next step will investigate options for upgrading the required software and solving technical anomalies before the new DTM can be publicly released.

- Of all the thematic lots, **EMODnet Geology** was the last to officially start (on 15 October 2013) due to administrative complications. Since the start the partners have worked hard to catch up with good results, including the compilation of index maps showing available information and scale of mapping done at national level to date. The partners also were able to complete a number of substrate maps at 1:250,000 scale which were delivered to the seabed habitat mapping lot for further use. Finally, work has been ongoing behind the scenes to further develop the EMODnet Geology portal with the aim to release a completely new portal by the end of September 2014.

- **EMODnet Seabed habitats** has created and launched a new website and mapping portal (www.emodnet-seabedhabitats.eu) with a clear EMODnet branding. This integrates the modelled map produced for Biscay and the Iberian Peninsula by the

Interreg MeshAtlantic project with habitat maps from surveys collated by the MeshAtlantic and MESH projects. The group also produced a preliminary modelled map for the Adriatic Sea and for the Canary Islands.

- The first year of activity in the **EMODnet Chemistry** portal was dedicated to setting up the workflow, including the development of the conceptual model and all technical elements. Data collection and product generation focused on nutrients (PO_4, NOx, NO_3, Total Nitrogen, NH_4 and SiO_4). Data providers made good progress preparing and submitting new data entries for these nutrients in the CDI service. A robot harvester was activated to create a data buffer that allows more flexible operations and data product development. DIVA (Data-Interpolating Variational Analysis) maps were developed and available for nutrients in the five sea regions (Greater North Sea, Baltic Sea, Atlantic Sea, Mediterranean Sea and Black Sea) and examples were tested for dynamic visualizations based on the aggregated and validated data buffers.

- A consortium of 22 partners from across Europe kicked off the **EMODnet Biology** project on the 11 September 2013. Partners subsequently developed a detailed overview of the data and databases that will be made available through EMODnet Biology in this phase. A total of 702,976 records from 93 marine biological datasets are already available through the EMODnet biology data portal. EMODnet Biology also initiated the creation of the 'World Register of Introduced Marine Species (WRIMS) (http://www.marinespecies.org/introduced/) providing a global dataset of all marine, introduced, cryptic and previously considered alien species. To serve the needs of MSFD actors, project partners released a preliminary list of species indicating their potential role and importance for MSFD reporting. After validating the methodology to create the gridded abundance maps using DIVA (Data-Interpolating Variational Analysis), data products were made available for more than 40 species from the North Sea, Baltic Sea and North East Atlantic.

- The greatest achievement of **EMODnet Physics** in the first year entails the development and release of its redesigned landing page and data viewer/map (http://www.emodnet-physics.eu/Map/), which is a significant upgrade from the pilot version. As a new feature, monthly-average data products are now available via both the platform-product-page and the interoperability service. At operational level, the coordinator successfully mobilised and consolidated the EuroGOOS Regional Operational Oceanographic Systems (ROOS) as a central component of the system to improve the data flow infrastructure and make more near-real time data available through EMODnet. To strengthen the network of High-Frequency Radar infrastructures in Europe as a valuable source of additional operational oceanographic data, an EMODnet-EuroGOOS High Frequency (HF) Radar coordination Group was established. At the international level, an agreement was reached between EMODnet Physics and the IODE/ODP (International Oceanographic Data and Information Exchange / Ocean Data Portal) to enable data provided from EMODnet Physics to the ODP to be made available to the World Meteorological Organization (WMO) Information System (WIS).

- The only new thematic lot not included in EMODnet Phase I, **EMODnet Human activities,** did an excellent job catching up with the other themes. Most of the attention was on jumpstarting the data collection and building the thematic portal to be able to offer data and products as quickly as possible. The contract was signed in September 2013, and less than 9 months later, on 4 April 2014, the EMODnet Human activities thematic portal went live ([www.emodnet-humanactivities.eu)](www.emodnet-humanactivities.eu). By September 2014, 11 data themes were available for download and one more (cultural heritage) is soon to follow. With the implementation of the interactive map and of the data catalogue ("Search data" page), Human activities has become a fully-fledged geoportal.

2.3 The EMODnet sea-basin checkpoints

EMODnet Phase II introduced a completely new instrument: the EMODnet sea-basin checkpoints. These checkpoints, which serve to assess the data availability and adequacy from the perspective of pre-defined user-functions or 'challenges' at a regional scale, are launched in two steps: (i) in 2013 two three-year pilot checkpoints have been established (one for the North Sea and one for the Mediterranean); and (ii) in August 2014 a call for tender was released by DG MARE for four additional sea-basin checkpoints covering the Atlantic, the Baltic, the Black Sea and the Arctic – they are expected to start early 2015.

Since their inception, the North Sea and Mediterranean sea-basin checkpoints have actively contributed to the discussions on harmonisation of the EMODnet thematic and regional websites and data portals. Both of the checkpoints have released their first services and deliverables.

- **EMODnet North Sea Checkpoint (NSCP)** kicked-off in December 2013 and released its first concrete result by May 2014: the launch of its 'oil platform leak' service which provides 10-day predictions of the fate of an oil spill based on expected conditions. In August 2014, the NSCP released its first Data Adequacy Report with literature survey providing an overview and assessment of the existing information and data resources covering the North Sea.

- **EMODnet Mediterranean Sea Checkpoint (MSCP)** also started early December 2013 and took off with an intensive programme, launching its website online early 2014 and making available its 'oil platform leak' Bulletin service before summer 2014.

- To test the services provided by both checkpoints in response to the 'oil platform leak' challenge, DG MARE and the Secretariat triggered a response by submitting a request for assistance with a fictitious accident during Summer 2014. Because of the vacation period the NSCP response took somewhat longer than expected, but both of the checkpoints provided acceptable simulations for the fate of the oil which are currently being further evaluated.

3 Remaining key challenges of common interest

While major progress has been achieved at various levels (data uptake, access, portal development, etc.), a number of important challenges remain to be addressed by all EMODnet lots to progress further:

- **Single sign-on procedure**: To ensure users can access data as straightforwardly as possible (taking into account data access policies from data suppliers), it has been a long-term goal of EMODnet to work towards simplification of existing registration/log-in procedures operated by some portals/networks. Ultimately, the aim is to develop a system that is applicable across all portals to allow users to register once and access all available resources. Such a system would also enable the portal operators to collect valuable information about the usage of the portals (who is collecting, what, when, how and where). The issue has been discussed by some of the major networks (mainly Copernicus/MyOcean and SeaDataNet) for more than two years in the framework of the EMODnet Physics project and an operational solution is now a priority in the coming year. To help find technical solutions the EMODnet technical working group will also consider the issue in more detail in the coming year as a solution will have to be applied by all portals.

- **Maintaining realistic stakeholder expectations**: Keeping stakeholders and potential users of EMODnet involved and fully informed is a key objective in EMODnet Phase II to ensure the service becomes more user-friendly and fit for purpose. Communication is key, as one of the risks of an evolving data infrastructure is that users become frustrated when the portals do not meet their expectations, while remaining unaware of the new developments being done behind the scenes. To avoid this, all partners including the Secretariat will have to communicate much more clearly what is currently offered and what will be possible in the future – this will need to entail clear statements at the top of the main pages of the website and data portals listing current status as well as expected future deliverables.

- **Open access/licences**: The general aim of the EC Marine Knowledge 2020 initiative is to make data available free of charge and free from restrictions on use. Currently EMODnet portals differ in their approach to making data available with or without restrictions. Some portals deliberately pursue open data access while other portals provide functionality to search for data sources even though the actual data download and use may be restricted by the supplier. For example, of the 7671 CDI records available from the EMODnet Bathymetry portal in July 2014, only 327 are unrestricted. In addition, National Oceanographic Data Centres may already pre-select datasets they do not want to make available, resulting in only a subset of what is nationally available being discoverable and downloadable via EMODnet. A discussion

needs to take place at various levels to consider the policy of EMODnet and most appropriate way to achieve open access whilst accommodating supplier concerns.

- **Data ingestion**: Until now, the focus has been on assembling data from relatively well-known and easy to connect sources. To make a significant step forward, more data need to be gathered from research projects and from marine industries. The EMODnet Steering Committee, the MODEG experts and several other stakeholders have considered the matter and made recommendations that are likely to feed into a DG MARE call for tender for a data ingestion facility to be developed over the coming years. All EMODnet partner organisations and networks should support the development and implementation of such a facility as its success will have a big influence on the success of EMODnet as a whole.

- **User feedback**: To make EMODnet fit for purpose, all partners must do more to involve, seek feedback and implement recommendations from the main user communities (scientific, private and policy/governmental) (See also Section 4). There are currently two main routes for users to provide feedback and input into the development of EMODnet portals. Firstly, each portal is required to provide options for users to spontaneously provide comments or ask questions, but this is not always straightforward. Efforts should focus on establishing clear and standard feedback request options, forms and procedures on the individual portals. Preferably this would be a common automated user feedback option using a standard feedback form. Ideally, the Secretariat would receive copies of the feedback forms submitted to ensure appropriate follow up. Secondly, some portals and the EMODnet Secretariat actively seek feedback from users through dedicated stakeholder groups, dedicated meetings for users or via stakeholder surveys. Whatever the source, portals should duly consider and fully take into account all recommendations and feedbacks received from users. Where recommendations and suggestions are not implemented, clear reasons should be formulated and provided to the users and Secretariat.

- **Interoperability issues:** Development of EMODnet central portal functionality to retrieve data/products from several portals at the same time has revealed serious issues with interoperability of the data/products currently provided by the thematic portals. A rating system for service data provision based on Web Map Service (WMS) and Web Feature Service (WFS) has therefore been developed by the central portal developers at Flanders Marine Institute (VLIZ) to monitor and advance the work. Particular attention will be dedicated to accessing SEXTANT as it provides the basis for data products from both EMODnet Chemistry and Bathymetry. In addition, individual portals such as EMODnet Human activities, which rely on bringing together data from several databases, also identified interoperability issues and lack of adherence to agreed standards and the INSPIRE Directive by many data sources. Interoperability issues and progress will be regularly evaluated by the EMODnet Steering Committee.

4 User Feedback

During the current EMODnet Phase II (2013-2016), the 'pilot portals' developed as part of the so-called 'ur-EMODnet' (EMODnet Phase I from 2008-2013) are required to become fully operational. It is therefore essential that the data discovery tools and map viewers on the thematic portals are clearly visible and straightforward so that the user can fully benefit from the services provided (data, data products, metadata). Likewise, the raw data and data products should correspond to the needs of the key stakeholders and fulfil user requirements.

Most of the portals provide options for users to provide feedback (through feedback form or by email) but in the first year few questions or suggestions were reported. Most issues related to data availability or functionality of the portal and all reported feedback was acknowledge or answered in relatively short response times.

To give more weight to the voice of the users, the Secretariat decided in 2013 to establish a **dedicated user-survey and evaluation of all EMODnet portals** to be completed by the end of 2014. These user evaluations consist of a process for each portal in which a selection of users representing different communities, (including research, industry, conservation and policy/public authorities) are asked to 'explore' the portal (entry via www.emodnet.eu) and provide feedback on the service via an online questionnaire. Additional information and clarification is subsequently gathered with a follow-up phone call using a semi-structured approach. Feedback questions focus mainly on EMODnet as a data discovery service along the following themes: tools/navigation/search/products.

At the end of August 2014, three portals underwent user evaluation by the Secretariat (Bathymetry, Biology and Physics), others are currently being done (Chemistry) or will soon be initiated (Geology, Seabed habitats, Human activities). The portal coordinators of EMODnet Bathymetry, Biology and Physics have received lists of specific recommendations drawn from the user surveys and are now implementing those that are considered feasible and appropriate, in close collaboration with the Secretariat.

The overall feedback from the first surveys was positive regarding the objective of providing a marine gateway to European marine data and data products. However, three high-level recommendations can be drawn from the survey that are relevant to all EMODnet portals:

- **Intuitive and straightforward user navigation**: Users found it often difficult to find out where and how to actually get to the portal services. More should be done to make sure that access to data, metadata and data products such as maps and quality indices is as straightforward and quick as possible with the least number of 'clicks' possible. Navigation between the central portal and the data portals as well as the supporting information pages should be easy and intuitive.

- **Provide information that is relevant to users**: All reviewers highlighted the need for the portals to focus more on the users and less on the funders or generally interested

public, with regards to the nature of the information provided. Project-specific and/or historic information could be made available in a separate 'background' section but it should not clutter the information on the main pages providing access to the portal services. Focus should thus univocally be on serving the portal's prime objective: providing access to data, metadata and data products

- **Realistic expectations and opportunities**: One of the key concerns voiced by stakeholders is that the portals do not provide much information about the status of the data and products offered on the portal, nor on what can be expected in the future in terms of more data and products being made available. Hence, the overall achievement of providing access would be strengthened by clarifying the service and outlining the current status of the deliverables. This would make users realise that it is an on-going project to which they can contribute. As a result potentially interested users may be frustrated because current services do not meet their requirements (even though it may do so in the future), and/or discouraged from contributing to the development of the final product. It is therefore essential that EMODnet portals clearly communicate (i) that EMODnet is still under development indicating that contributions are welcome; (ii) about the status of the services provided (what is possible and what is not possible), and (iii) about the data, functionality and services that will be provide in the future.

After the completion of user evaluations for all portals (expected by end of 2014), the findings of the study as well as recommendations for regular user evaluations will be summarised in a short report to the EMODnet Steering Committee and published on the Maritime Forum.

5 Outreach and communication activities

Despite its enormous potential as the entry point for marine data in Europe, EMODnet is relatively unknown to stakeholders. To address this, the first year of EMODnet Phase II has seen a significant increase in outreach and communication activities. This is partly the result of the impetus given by the newly established EMODnet Secretariat which is tasked, inter alia, to strengthen the visibility of EMODnet in the wider stakeholder community through a series of dissemination products and activities (leaflets, brochures, organisation of demonstrations and dedicated events, ...). These have been reinforced by complementary outputs from thematic and regional EMODnet projects, and by individual EMODnet partner organisations that participated many events over the last year and have produced their own outreach materials including demonstrations, posters and printed materials.

The main products developed in the reporting period include:

- Establishment of a high-level EMODnet Communication Plan and Strategy by the Secretariat as basis for coordinated and targeted activities to strengthen the visibility and dissemination of EMODnet outputs (December 2013);

- Production of an EMODnet leaflet by the Secretariat to inform stakeholders and interested public (available at http://www.emodnet.eu/dissemination) (February 2014);

- Production of an EMODnet flag and poster by the Secretariat for display at European Maritime Day and future EMODnet exhibitions or event booths (May 2014);

- Production of a video loop by the Secretariat with a demonstration and general information presentation of EMODnet for screening at event displays until the EMODnet videos are completed;

- EMODnet Seabed habitats brochure: An attractive brochure to describe the achievements of EUSeaMap phase 1 and what to expect from phase 2 of the project. (September 2014) - available for download here: (http://www.emodnet-seabedhabitats.eu/PDF/426918_EU_Seamap_Exec_Summary_Phase_II_WEB_FINAL.pdf)

Other notable products currently under development are: a first generic EMODnet Brochure (release in October 2014); a second EMODnet Brochure with more detailed information (expected in September 2015) and two EMODnet videos (expected end of 2014 and mid-2015). A number of demonstrations are planned for Q3/Q4 2014 and Q1/Q2 2015.

The EMODnet Secretariat and/or thematic lots attended several external conferences and events in 2013 and 2014, including:

- **EuroGeoSurveys** exhibit at the GEO-X Conference in Geneva, Switzerland (January 2014).

- **MARES 2020**, International Conference "Marine Research Horizon 2020", Varna, Bulgaria, 17-20 September, 2013

- **IMDIS 2013**, International Conference on Marine Data and Information Systems, 23-25 September 2013, Lucca, Italy.

- **GEBCO Science Day 2013**, organised by GEBCO (General Bathymetric Chart of the Oceans) and hosted at CNR-ISMAR in Venice - Italy on 7 - 8 October 2013.

- **BS-GES 2013**, 4th Bi-annual Black Sea Scientific Conference Challenges Towards Good Environmental Status, Constanta, Romania, 28th 31th October 2013.

- **EC Healthy Oceans Productive Ecosystems (HOPE) Conference** in Brussels, 3-4 March 2014, included pitching presentations from EMODnet Biology and Chemistry (for more information see http://ec.europa.eu/environment/marine/hope-conference/conference-programme/index.htm).

- **SEAS-ERA Final Conference,** Spain, 8-9/04/2014 (See http://www.seas-era.eu for more information and registration).

- **European Maritime Day 2014,** Bremen, 19-20/05/2014, the EMODnet Secretariat and EuroGOOS organised a joint **workshop** with support from the Joint Research Centre (JRC) and the European Marine Board, focussing on key European efforts in the lifepath from marine observations and data up to information and knowledge. A short report and the presentations will be made available by the event organisers here: http://ec.europa.eu/maritimeaffairs/maritimeday/en/stakeholder-workshops.

- 2nd **summer school of the FP7 JERICO** project (Towards a joint European research infrastructure network for coastal observatories), 17 June 2014, representatives from the EMODnet Secretariat, EMODnet Physics, EMODnet Biology and several EMODnet contributing partners (SeaDataNet, ICES, MyOcean, etc.) presented core elements of the European marine data landscape at the. More information about the summer school and its outputs are available at http://publicwiki.deltares.nl/display/OET/JERICO.

- **Baltic MSP Forum,** Riga, 17-18 June 2014, EMODnet – Human activities was presented during the session "e-MSP: data needs for proper maritime planning"

6 Summary of progress indicators and user statistics

Note: Reporting on progress indicators started only in January 2014. As a result it is not possible to provide a yearly overview – this should follow after the first full year of reporting (January 2015). Below is a summary of relevant observations based on user statistics and indicators reported up to September 2014.

6.1 Supply of data, metadata and data products

6.1.1 Volume of data made available through the portal

The volume of data made available through EMODnet has significantly increased since September 2013. Many of the portals focussed considerable energy at the start of EMODnet Phase II to (i) make an inventory of potential new data suppliers; and (ii) actively pursue the inclusion or linking of identified new data sources with variable degrees of success.

Unfortunately, the type and nature of data made available differs greatly between the thematic lots, so the volume of data made available by each lot and its increase over time is not comparable. Biological data often requires a high degree of effort and expert involvement to determine samples up to species level, while physical data such as sea surface temperature measurements often requires high initial investment in technology but which then provides automated measurements, e.g. via sensors or using satellites.

A short overview of the thematic data and products added in the last year:

- From January 2014 (when indicator reporting started) until July 2014, **EMODnet Bathymetry** CDI Records for bathymetric survey data sets increased from 6380 to 7671 (unrestricted from 273 to 327). Regional Digital Terrain Models (DTMs) are available at present for 7 sea different regions (the Greater North Sea, including the Kattegat and stretches of water such as Fair Isle, Cromarty, Forth, Forties, Dover, Wight, and Portland; the English Channel and Celtic Seas; Western Mediterranean, the Ionian Sea and the central Mediterranean Sea; Iberian Coast and Bay of Biscay (Atlantic Ocean); Adriatic Sea (Mediterranean); Aegean - Levantine Sea (Mediterranean); and Madeira and Azores (Macaronesia)

- So far, **EMODnet Geology** has not yet provided us with indicator information on data and products made available but it is expected that this information will gathered once the new portal is launched (expected by the end of October 2014) which will also incorporate the ability to provide user statistics.

- **EMODnet Seabed habitats** does not make raw data available, but develops data products. The main data products made available through the portal are: (i) the

MeshAtlantic broad-scale habitat maps at a scale of 1:250,000 covering areas of around 2 million km^2 and 356,000 km^2, respectively; (ii) 273 habitat maps from surveys collated as part of the MESH and MeshAtlantic projects at a range of scales and covering a total area of around 290,000 km2; and (iii) the current broad-scale map delivery for Adriatic and Canary Islands are uploaded to the central portal. On the latter one was actually created during the reporting period, the two first one were developed prior to the current project.

- **EMODnet Chemistry** CDI Records increased from 542131 to 588103 (unrestricted from 461575 to 481440) in the period between January and July 2014.

- In total 702,976 records from 93 datasets became available through the **EMODnet Biology** data portal (from July 2013 to August 2014). Additionally, a range of data products such as maps and animations of changes in abundance of certain species over time are also available (see http://www.emodnet-biology.eu/component/photogallery/?album=4430).

- By working with the EuroGOOS Regional Operational Oceanographic Systems (ROOSs), **EMODnet Physics** was able to significantly improve the quantity and quality of near real-time data availability. When the present contract started the EMODnet Physical Parameters pilot portal was providing access to near real time data from 441 fixed platforms (mooring - MO) and 3 ferryboxes (FB); at present EMODnet Physics is providing access to 613 MO and 8 FB.

- **EMODnet Human activities** is currently providing data for 11 activities (aggregate extraction, dredging, fishery zones, hydrocarbon extraction, major ports, mariculture, ocean energy facilities, other forms of area management/designation, protected areas, waste disposal, wind farms). The data can be points, lines, polygons, related tables or records, and raster tiles/cells. More data themes are being prepared for release in the current EMODnet Phase.

6.1.2 Difficulties encountered trying to obtain data from potential suppliers

EMODnet progress indicator 3 ("*Organisations that have been approached to supply data with no result, including type of data sought and reason why it has not been supplied*") aims to identify potential barriers to obtaining data from suppliers which require further attention and potentially measures or interventions.

There have been a number of unsuccessful attempts to include data from various data suppliers in different lots. The reasons why data suppliers are unwilling or unable to provide data are not always clear (most commonly the data holders do not reply), but some of the main reasons include: commercial interests, the need for more time to identify the proper procedure and agreements to be able to share data, need for formal international agreement
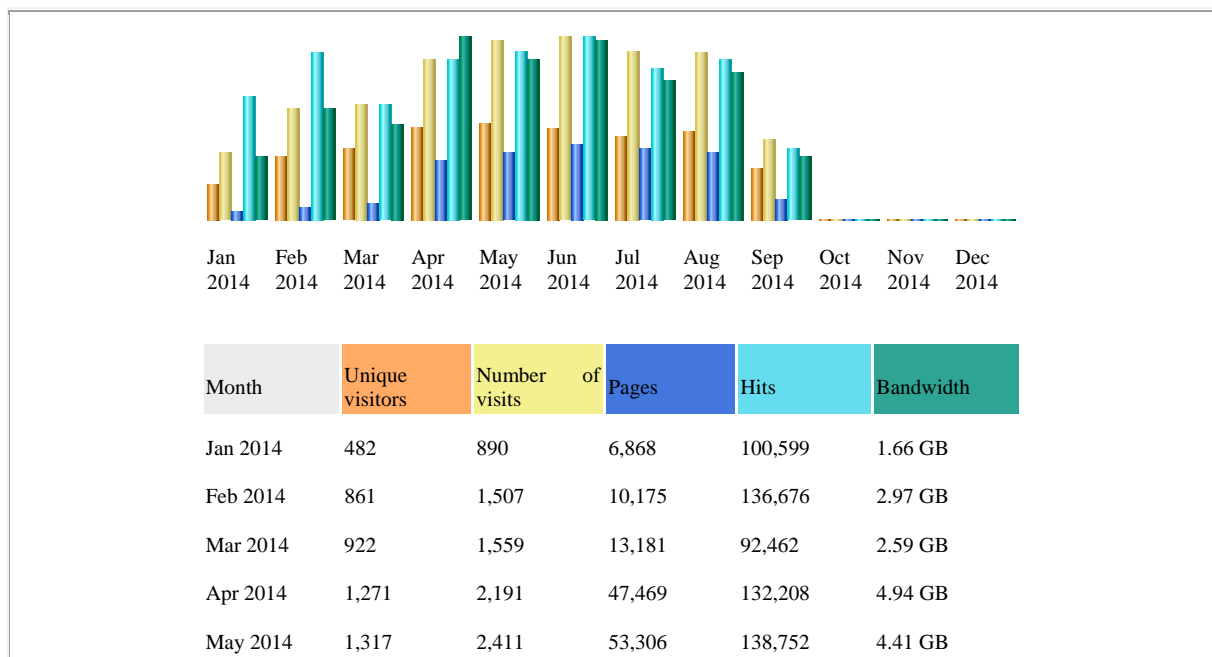
between authorized public bodies (e.g. ministries) and insufficient resources to handle the request free of charge. In cases where data was sought from external contributors, it is quite likely that the lack of cooperation may be due to the fact that these data sources are not partners of the consortium and hence receive less visibility and no financial compensation. This proved particularly problematic for EMODnet Human activities, which relies largely on external data providers.

6.2 Usage of EMODnet data, metadata and data products

6.2.1 Portal user statistics and preferred user navigation routes

The advent of the **EMODnet central portal** (www.emodnet.eu) has improved the visibility of EMODnet, and has modified user navigation routes. Previously, users often went directly to thematic portals without having an overview of what other portals were offering or how to reach the right pages. Now many users pass through the central portal first as a gateway guiding them to right portals/information and data they need which greatly simplifies their navigation. Also, before the central portal existed, users looking for general information on EMODnet starting from a search engine such as Google were directed to the thematic portals while now these users consult the central page and do not necessarily link through to a particular data portal if they don't specifically need it. In some cases this may explain part of the minor declines in visitors of specific thematic portals over the last months (e.g. EMODnet Biology) although this trend seems to be reversing, which may indicate that the central portal also starts to attract more visitors to EMODnet as a whole.

Overview with monthly history of visits to the EMODnet central portal www.emodnet.eu:

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan 2014	482	890	6,868	100,599	1.66 GB
Feb 2014	861	1,507	10,175	136,676	2.97 GB
Mar 2014	922	1,559	13,181	92,462	2.59 GB
Apr 2014	1,271	2,191	47,469	132,208	4.94 GB
May 2014	1,317	2,411	53,306	138,752	4.41 GB

Jun 2014	1,242	2,436	60,554	147,259	4.89 GB
Jul 2014	1,125	2,275	57,031	123,222	3.77 GB
Aug 2014	1,212	2,262	53,997	131,259	4.04 GB
Total	9,131	16,625	320,349	1,058,237	30.96 GB

Thematic websites also perform well but seem to be stable without significantly increasing their visitor-base over the last year. At the high end, **EMODnet Biology** attracted up to 2000 unique visitors in January 2014 with a slow decrease towards summer with 1000 visitors (probably due to the launch of the central portal), which started to move back up to 1600 in August 2014. At the lower end, **EMODnet Chemistry** attracts about 25-50 unique visitors monthly (with a peak in June 2014 of more than 160) to its main webpage while the CDI service and Ocean Browser services attract roughly 100 unique visitors per month on average. The **EMODnet Bathymetry** website attracts between 900-1000 unique visitors every month (since January 2014). The bathymetry DTM viewer service attracts up to 1200 visitors every month. EMODnet Physics was the only portal to show a steady increase from 247 to 534 visits to the map page from November 2013 to June 2014. **EMODnet Seabed habitats** reported 2,236 unique visitors for the EUSeaMap 1 mapper in the period from September 2013 to August 2014 and about 587 for the MESH mapper in the period from February through to August 2014.

EMODnet Human activities and EMODnet Geology have not yet provided use statistic information but will do so in the future as both have only recently activated the user statistic tracking function on their newly established (Human activities) and soon to be upgraded (Geology) portals.

6.2.2 Volume of data and data products downloaded from the portals

Over the period of 1 June 2013 to 31 August 2014, regional Digital Terrain Models (DTMs) have been downloaded 22428 times from the **EMODnet Bathymetry** site. The highest downloads were for the Greater North Sea followed by the Adriatic-Ionian Sea - central Mediterranean. About 1500 data products (maps) were downloaded from the from **EMODnet Seabed habitats** portal (from September 2013 to August 2014). For this period, the highest number of downloads was for the predicted habitats - North Sea and Celtic Sea (211 times). **EMODnet Biology** registered 830 data downloads between September 2013 and August 2014. This means that currently the Biology portal receives about 50 data request per month, or about 2 requests per day. In December 2013 the portal received over 300 data downloads. The other portals had no information to report. None of the portals provide an overview of monthly evolution, which will be requested for the second year of operation.

6.2.3 Organisations that have downloaded each data type

Where possible, EMODnet portals reported the type of organisation and location of origin of the data download request. Data requests were made from many different countries around the

world, notably Belgium, Germany, Greece, Spain, Ireland, France, Netherlands, Portugal and UK in Europe and US and Australia internationally. The organisations requesting data are also very diverse and numerous (e.g. seabed habitat maps were downloaded by more than 250 different organisations and institutes, many of them universities). The main organisations that request data are universities and institutes, private companies (including consultants), governmental agencies and international organisations. Detailed lists can be found in the annual reports of the respective thematic lots.

6.2.4 Use and purpose of downloaded data and products

EMODnet Bathymetry, Geology, Chemistry and Human activities did not report on this indicator. Nevertheless, the details provided by the other lots (see below) clearly shows the added value of tracking this information. Human activities and Geology will start tracking and provide this information with their new website/portal in the future. Bathymetry and Chemistry are expected to do the same.

EMODnet Seabed habitats provides a long list of reasons why users downloaded data from the MESH portal collected from the form that users fill out when downloading data. A full list is available in the interim report of the Seabed habitats project but here we provide a summary of the most frequent and notable reasons indicated:

- Various applications in academic research including student work (Masters theses, PhD, …)

- Environmental reporting and regional sea convention work (e.g. for the OSPAR website or to assist with research survey design and to contribute to ICES/OSPAR assessments)

- Internal research projects by Non-Governmental Organisations (NGOs) (e.g. creating marine habitat maps by the UK's Royal Society of Wildlife Trusts)

- Research in the framework of wide range of projects (including EC Framework Programme, Interreg and national projects)

- Analysis for optimal location of offshore activities (e.g. aquaculture sites)

- Analysis of offshore environmental sensitivities in the North Sea

- Environmental impact assessment as part of licencing requirements

- Assessment of Marine Protected Area (MPA) networks, for use by the International Council for the Exploration of the Sea (ICES) working groups

- Marine data gap analysis for the EC-funded EU BON project

- Underwater cable feasibility studies

- Educational purposes.

EMODnet Biology received information about the reason for downloading in 18 per cent of the total downloads, as follows:

- The most common purpose (43%) was for **research** (Master's thesis, PhD thesis, community structure analysis, species distribution analysis, biogeographical studies, research on species indicators)
- **Training** accounted for 24% (practice using R, summer school, training CartoDB, teaching)
- **Testing** of the system accounted for 15% of the downloads (by EMODnet biology partners, external people and by the EMODnet Secretariat),
- **Management and planning** accounted for 12% (Joint Monitoring Program, Modelling MPAs, planning monitoring surveys, subsea cable feasibility study),
- Data management and visualisation purposes made up 7% of the downloads.

EMODnet Physics reported that most of the users are using data for model assimilation and forecast, validation and reanalysis (e.g. MeteoFrance, Deltares, DLMT, DHI [commercial], and RINA – D'Appolonia [commercial]). European Maritime Safety Agency (EMSA) is working on any WFS + Web Services available (i.e. winds, waves, salinity, temperature) data for operational purpose (e.g. Search and Rescue activities). The parameters attracting the most interest are (in decreasing order): sea level; water temperature; and waves and winds.

List of acronyms and abbreviations

BODC	British Oceanographic Data Centre
CDI	Common Data Index, provides a highly detailed description of the data, answering to the questions: where, when, how and who collected the data, and how to get them. One CDI describes a data series which can be a vertical profile on a fixed location, a time series or a trajectory data set.
DG MARE	European Commission Directorate-General of Maritime Affairs and Fisheries
DIVA	Data-Interpolating Variational Analysis, is a software tool that allows to spatially interpolate (or analyse) observations on a regular grid in an optimal way.
EMODnet	European Marine Observation and Data Network
EuroGOOS	European component of the Global Ocean Observing System (GOOS)
GEBCO	General Bathymetric Chart of the Oceans
ICES	International Council for the Exploration of the Sea
IODE	International Oceanographic Data Exchange System of UNESCO's Intergovernmental Oceanographic Commission (IOC).
MODEG	Marine Observation and Data Expert Group
MPA	Marine Protected Area
MSFD	Marine Strategy Framework Directive
NGO	Non-Governmental Organisation
NODC	National Oceanographic Data Centre defined within the International Oceanographic Data Exchange (IODE) System of the UNESCO Intergovernmental Oceanographic Commission (IOC).
OceanBrowser	EMODnet data products viewing and downloading service that allows to visualize gridded fields on-line. It is based on open standards from the Open Geospatial Consortium (OGC), in particular Web Map Service (WMS) and Web Feature Service (WFS).
ODP	Ocean Data Portal
ODV	Ocean Data View, is a freely available software package that provides interactive exploration, analysis and visualization of oceanographic and other geo-referenced profiles or sequence data. ODV and NetCDF data

	file formats are used as mandatory data exchange format in SeaDataNet/EMODnet Chemistry.
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic (also known as Oslo Paris Convention)
ROOS	Regional Operational Oceanographic Systems
SDN	SeaDataNet is the pan-European infrastructure for ocean & marine data management sponsored within FP7 (grant agreement 283607, 1/10/2011-30/9/2015) linking at the moment more than 100 national oceanographic data centres and marine data centres from 35 countries riparian to all European seas.
UNESCO	United Nations Educational, Scientific and Cultural Organization
VLIZ	Flanders Marine Institute
WFS	Web Feature Service
WIS	WMO Information System
WMO	World Meteorological Organization
WMS	Web Map Service
WRIMS	World Register of Introduced Marine Species

More information:

More detailed information and the annual progress reports of each thematic lot can be found on the Maritime Forum (https://webgate.ec.europa.eu/maritimeforum/) and on the EMODnet thematic portals:

- EMODnet bathymetry – www.emodnet-bathymetry.eu
- EMODnet Geology - www.emodnet-geology.eu
- EMODnet Seabed habitat s- 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