EMODnet Thematic Lot n° 5
BIOLOGY

EMODnet Phase 2 – Annual (interim) report

Reporting Period: 30/08/2013 – 30/08/2014

Simon Claus, Peter Herman, Dan Lear, Leen Vandepitte, Daphnis De Pooter, Klaas Deneudt, Olivier Beauchard, Francisco Hernandez, Jan Mees and all EMODnet Biology project partners

Date: 15/10/2014

1. Contents

1. Acronyms

DEVOTES: DEVelopment Of innovative Tools for understanding marine biodiversity and assessing good Environmental Status, FP 7 project

DIG: The Data and Information group (DIG) provides ICES with advice on all aspects of data management including data policy, data strategy, data quality, technical issues and user-oriented guidance

DIVA: Data-Interpolating Variational Analysis, allows the spatial interpolation of data (analysis) in an optimal way, comparable to optimal interpolation

EASIN: European Alien Species Information Network, JRC network aiming to facilitate the exploration of existing alien species information in Europe

EMODnet: European Marine Observation and Data Network

ERMS: European Register of Marine Species, an authoritative taxonomic list of species occurring in the European marine environment

ESFRI: European Strategy Forum on Research Infrastructures

EurOBIS: European Ocean Biogeographic Information System, a distributed system that allows to search multiple datasets simultaneously for biogeographic information on marine organisms in European waters

IPT: Integrated Publishing Toolkit (IPT), a free open source software tool written in Java that is used to publish and share biodiversity datasets

MSFD: Marine Strategy Framework Directive, a European instrument aiming at Good Environmental Status (GES) of the EU's marine waters by 2020

NODC: National Oceanographic Data Centre

OGC: Open Geospatial Consortium

OOPS: Operational Oceanographic Products and Services, proposal formulated by ICES to assist in the ICES advisory process

SDN: SeaDataNet, an infrastructure linking 45 national oceanographic data centres and marine data centres

WoRMS: World Register of Marine Species, an authoritative and comprehensive list of names of marine organisms, including information on synonymy. ERMS is the European component of WoRMS

WRIMS: World Register of Introduced Marine Species,

2. Highlights in this reporting period

- Publication of a detailed assessment of the data and databases that will be available through EMODnet Biology, including taxonomic and geographical coverage, temporal range and number of available distribution records, the data transfer protocol and timeline for delivering the data. A total of 702,976 records from 93 marine biological datasets became already available through the EMODnet biology data portal. Some of these datasets were collected within the framework of ongoing activities of the European Ocean Biogeographic Information System (EurOBIS).

- Creation of the 'World Register of Introduced Marine Species (WRIMS). The aim is to provide a global dataset of all marine introduced, cryptic and previously considered alien species. The data system integrates data and information from different databases and allows users to select per regional sea, lists of alien and or invasive species.

- Draft version of a list of species tagged with their role and importance within the MSFD reporting. This deliverable provides a species list for regional seas, linked to specific descriptors, criteria, classes, indicators and links to the data available for that species through the EMODnet Biology portal. Thus far this list is completed for the North East Atlantic and the Baltic Sea, and will become a functional tool to support access to data used for MSFD assessments and monitoring.

- The methodology to create the gridded abundance maps, using DIVA (Data-Interpolating Variational Analysis) has been tested and validated. Currently data products are available for more than 40 species from the North Sea, Baltic Sea and North East Atlantic. The products are currently made for different species groups, such as benthos, zoo- and phytoplankton, birds, fish and mammals.

- A detailed user- and functional analysis of the data portal proposes a new portal concept that differentiates more between data – unprocessed raw observations or measurements- and data products derived from the data. The data component should focus on its easy and intuitive downloading, while the focus of the data products component focuses on a good visualization, a better overview of existing data and a quick understanding of the data.

- Between 01-09-2013 and 27-08-2014 830 data downloads have been registered. The most common purpose (43%) was for research purposes, but users also indicated training, marine planning and data management purposes. A good example of the fit for purpose of the data portal is the recent published Science article: '*Assemblage Time Series Reveal Biodiversity Change but Not Systematic Loss*', where the authors reused several datasets retrieved from the EMODnet Biology portal to come to these conclusions (Science 18 April 2014:Vol. 344 no. 6181 pp. 296-299, DOI: 10.1126/science.1248484).

3. Summary of the work done

A consortium of 22 partners from across Europe kicked off the EMODnet Biology project the 11th of September 2013. During the first year, six work packages delivered 8 deliverables. Initially, a detailed assessment (WP3) of data and databases to be made available through the data portal was created providing links to the complete metadata descriptions at http://www.emodnet-biology.eu/. The assessment of data and databases contains an overview of the datasets, including taxonomic and geographical coverage, temporal range and number of available distribution records, the data transfer protocol and timeline for delivering the data. During the last year, 93 datasets have already been quality controlled and made available through the data portal. The work package on data archaeology (WP4) created a detailed description of all the Black Sea Datasets from the largest organizations from the Former Soviet Union countries that perform or performed research on marine biology in the Black Sea and Eastern Mediterranean. A preliminary list of identified datasets were proposed for digitization.

The activities of Work Package 2 focussed on the identification of species which are protected by EU Directives and international conventions, and also those to be used as indicators of relevant MSFD descriptors. A species list for regional seas, linked to specific descriptors, criteria, classes, indicators and links to the data available for that species through the EMODnet Biology portal is completed for the North East Atlantic and the Baltic Sea. The second part of Work Package 2 relates to the development of a harmonised list of biological traits (e.a. bodysize, bodymass, feeding type, life history strategy (longevity, fecundity)) and the identification of common traits that can be made available through the web portal and linked to the World Register of Marine Species (WoRMS). Following a highly productive workshop, work has continued to produce a hierarchical framework to give structure to the collation of trait information. A draft vocabulary has been created, and is now being updated following expert contribution. Work on one of

the priority traits - the non-indigenous status of a species - led to the creation of 'World Register of Introduced Marine Species (WRIMS)".

The work on gridded abundance data products (WP5) started by selecting a number of well-known and published cases from diverse data sources to test the methodology. The selection was based on the data availability, reference to existing literature and relevance to the project. The present state of progress in the different cases was discussed and the methodology to create the gridded abundance maps can be considered as been tested and validated. Currently data products are available for more than 40 species from the North Sea, Baltic Sea and North East Atlantic. The products are made for benthos, zoo- and phytoplankton, birds, fish and mammals. A specific spatially distributed data product relevant for MSFD Descriptor 2 - the Black Sea invasive polychaete worm *Marenzelleria* - was also made. Partners of WP5 compiled a proposal to use this methodology to create OOPS: Operational Oceanographic Products and Services, a call published by ICES. If accepted, the methodology and products on Copepod abundance would be delivered on a yearly basis to ICES and feed directly into the ICES advisory process.

A detailed user analysis and functional analysis of the current EMODnet dataportal (WP6) has been performed. The current data portal is functional, but it will be difficult to expand the current data portal with the new defined user requirements. Furthermore, a user analysis indicated that the data portal is not used to its full potential. Therefore a new concept that differentiates more between data – unprocessed raw observations or measurements- and data products derived from the data has been formulated. The data component should focus on its easy and intuitive downloading, while the focus of the data products component focuses on a good visualization, a better overview of existing data and a quick understanding of the data. The user analysis takes into account the recommendations that were made by the EMODnet Secretariat User feedback related to search and visualisation and data downloading. Furthermore, several activities has been performed to improve the interoperability with other data systems (Darwin Core-IPT, SDN, OGC).

Overview Table of deliverables, reports available at EMODnet website

Deliverable Name	WP	Status
D1.1: bimonthly progress reports	1	√
D1.6: contribute to a common database	1	√
D2.1: List of species tagged with role and importance within MSFD	2	√
D2.3: Organization of a data attributes workshop	2	√
D3.1: Assessment of data and databases	3	√
D4.1: Report on data availability and gap analyses	4	√

D4.2: Description of identified historical datasets	4	X
D5.1: Data products for three sea basins	5	√
D6.1: Portal operational	6	√

4. Challenges encountered during the reporting period

- Due to the unplanned situation in Crimea, it was impossible for the subcontractor Institute of Biology of the Southern Seas, NAS of Ukraine (IBSS) to perform its activities as foreseen. Therefore IBSS decided to withdraw from the project. Currently we are renegotiating work between partners. WP4 partner HCMR will take up the tasks and responsibilities of the IBSS.

5. Allocation of project resources

Tasks	**Percent of total budget spent**
Project management	3,1 %
Identification and collection of species, species attributes and species indicator information	4,9 %
Data access to marine biological data	10,4 %
Data archaeology and rescue	2 %
Creation of gridded abundance data products	5,86 %
Technical development	3 %
Organisation scientific workshops and meetings	2,7 %
Total	**31,96%**

6. Meetings held since last report

Date	Location	Topic	Short Description
11-12 September 2013	VLIZ, Oostende, Belgium	Kick Off Meeting	General meeting, with 39 people, representing 23 institutes
16-17 December, 2013	JPI, Brussels, Belgium	EMODnet Steering Committee Meeting	Overview EMODnet biology activities at steering committee meeting
23-24 January 2014	Yerzeke, Netherlands (NIOZ)	WP 5 Workshop	Technical workshop on the creation of data products
12- 13 February 2014	Paris, France (Ifremer)	EMODNET Biology: Species Traits Vocabulary Workshop (WP2)	The aim of the workshop was to progress the development of a unified vocabulary for species traits information, and to ensure engagement with the scientific community.
2 March 2014	Oostende, ILVO	WP 3	Meeting with ILVO on data transfer to EMODnet
26-27 May 2014	Ispra, Italy	WP2	Meeting with EASIN to discuss collaborations on species traits, more specifically related to alien species
4-5 June 2014	CNR, Rome	EMODnet Steering Committee Meeting	Overview EMODnet biology activities at steering committee

			meeting
11 June 2014	NIOZ, Yerzeke	WP5 Meeting	Discuss progress regarding WP5 (Gridded abundance products)
26 June 2014	Oostende, VLIZ	WP3 Meeting	Meeting with ILVO on data transfer to EMODnet

7. Work package updates

WP1: Project Management

Simon Claus (VLIZ) + MBA, NIOZ

General coordination and financial management

o *Contract*

The contract between VLIZ and the EU was signed on August 30, 2013. A bank guarantee was obtained in due time, and the pre-financing sum (30% of the total amount) was transferred from the European Commission to VLIZ on October 30, 2013.

o *Consortium agreements and payments*

A consortium agreement between VLIZ and 18 project partners to define the terms and conditions under which the Project partners shall cooperate in order to perform the Project was composed and sent out on November, 19, 2013 to all project partners. The document was signed by the 19 project partner representatives on 01 March 2014. Four additional subcontracts were composed of which three were accepted and signed in 2013. The subcontractors to the EMODnet Biology project are IMAR - Institute of Marine Research, represented by Centre of IMAR of the University of the Azores, the Institute of Meteorology and Water Management – National Research Institute, Poland and Auckland UniServices Limited, representing the University of Auckland.

The prefinancing sum of 30%, according to the consortium agreement was transferred to all partners and 30% of the total amount of each subcontract was also transferred to the three subcontractors.

o *Organisation project meetings and workshops*

The EMODNET biology project kicked off in Oostende from 11-12 September 2013. 39 people, representing 23 institutes joined the 2-day meeting. During the meeting all the WPs were presented and during two break-out sessions the WP partners discussed the activities and deliverables for year one. A clear timeline for 2013-2014 was set up. During this meeting, it was also decided that the year one meeting will be organized in week 38 of 2014 at the Institute of Marine Research,

University of the Azores, Horta, Portugal. The minutes of the meeting can be downloaded from the website at: http://bio.emodnet.eu/documents/func-startdown/101/ and all presentations can be found at: http://www.emodnet-biology.eu/documents/Meetings/Kick-off-meeting-EMODnet-2-%28September-2013%29/.

During the first year of the project, two workshops were organised. The workshops were organised within the framework of WP2, Species traits and WP5, Data products. These very focussed meetings discussed in detail specific aspects of the project. The discussions took place between project partners, but also several external experts were invited and attended the workshops. Information and links to the EMODnet Biology workshops can be found at http://www.emodnet-biology.eu/project/workshops.

o *Risks and contingency plan*

Due to the unplanned situation in Crimea, it was impossible for the subcontractor Institute of Biology of the Southern Seas, NAS of Ukraine (IBSS) to perform its activities as foreseen. Therefore IBSS decided to withdraw from the project. Currently we are renegotiating work between partners. Most probably WP4 partner HCMR will take up the tasks and responsibilities of the IBSS.

External communication and cooperation

The EMODnet Biology project coordinator participated in the First and the Second Steering Board meeting, organised by the EMODnet Secretariat on 12/2013 and 06/2014. During these meetings an overview of the activities of the project was presented. EMODnet Biology participated in the MODEG meeting and the official opening of the EMODnet Secretariat 02/2014. All presentations of EMODnet Biology that were given during these meetings are available at http://www.emodnet-biology.eu/documents/Presentations-and-outreach/

Furthermore, the EMODnet biology project was also presented during high level policy events such as the HOPE conference and specific meetings related the marine data management like JRC European Alien Species Information Network (EASIN) and the ICES Data and Information Group (DIG) working group.

One collaboration agreements between EMODnet Biology and DEVOTES was signed, one collaboration agreement between EMODnet Biology and EASIN is

under review. Both agreements have as objective an intensified collaboration between EMODnet and other initiatives.

- Agreement of collaboration between AZTI-Tecnalia, as coordinator of FP7 DEVOTES project and Vlaams Instituut voor de Zee, as coordinator of EMODnet Biology. The agreement has as main objective the collaboration between DEVOTES project and EMODNet Biology, in order to share datasets and tools, for common interests. Both parties have the interest in developing indicators, products, tools and tests (e.g. using DEVOTool) for the Marine Strategy Framework Directive, as required in the DEVOTES and the EMODNET Biology projects. As far as possible, analyses will be undertaken in joint workshops and homework, producing joint papers and products in some cases.

- Agreement between The Joint Research Centre of the European Commission and Vlaams Instituut voor de Zee, as coordinator of EMODnet Biology. The general objective of this agreement is to contribute more effectively to understanding and resolving scientific issues in the field of biologic invasions within the context of the EASIN and to ensure that the outcomes generated under this Collaboration Agreement are utilized in ways most likely to benefit the public.

Reporting & Deliverables

- D1.1 bimonthly progress reports will be posted on the project website indicating meetings held, difficulties encountered, and inventories of data made available

  During the first year of the project 5 progress reports were compiled and submitted to the secretariat. The first progress report, from 30/08/2013 till 31/12/2013; from 2014 onwards a bimonthly progress report was submitted. All report also include a section on the new data resources that are available through the data portals. They are available at http://www.emodnet-biology.eu/documents/EMODnet-Biology-II/Progress-reporting/

- D1.6 contribute to a common database of data owners for entry point portal

  A contact list of all Biology project partners was sent to the secretariat on June, 2014. This list contained 47 email addresses.

WP2: Identification and collection of species, species attributes and species indicator information

Dan Lear (MBA) + University Auckland, IFREMER, ICES, SAHFOS, GBIF, MARUM, VLIZ

The activities of Work Package 2 are split between two activities, WT 2.1 focusses on the identification of species which are protected by EU Directives and international conventions, and also those to be used as indicators of relevant MSFD descriptors. The focus of the activity to date has been on the MSFD element of this work as the Pan-European Species directories Infrastructure (PESI) project (http://www.eu-nomen.eu/portal/search.php?search=adv) already contains much of this information for other legislation, including; CITES, Habitats Directive, Birds Directive, OSPAR, and IUCN

However, identification of species that will comprise indicators or components of indicators for the MSFD is a large and complex task in itself. The MSFD has 11 descriptors, however only the biodiversity descriptors together with commercial fish and non-indigenous species are relevant to EMODNET Biology. Thus the descriptors being addressed in this task are:

- Descriptor 1: biological diversity;
- Descriptor 2: Non –indigenous species;
- Descriptor 3: Population of commercial fish and shellfish;
- Descriptor 4: Elements of marine food webs, and
- Descriptor 6: Sea floor integrity.

Of these the most emphasis initially was on descriptors 1, 4 and 6, but the relevant parties have now been identified and contacted for descriptors 2 and 3 as well. Work began by gathering information at a Regional Seas scale i.e. identifying species that were linked to indicators that were agreed between member states through a regional process via the regional seas commissions. Initially the OSPAR list of common and candidate indicators was used to devise a framework for gathering this information. Work was required (and is still ongoing) to resolve

group indicators to species level. For example some indicators concern seabirds, and only after correspondence with the COBAM lead has information been gained on exactly which seabird species this concerns. The resulting template was then sent to VLIZ (early November) for comment, and modified following suggested improvements.

Concurrently, contact has been made with the MSFD leads in the other regional seas commissions to 1) identify at what stage in the process they are at and 2) ask for lists of agreed indicators. HELCOM were quick to send their HELCOM Core Indicators report, UNEP-MAP have sent a draft decision document outlining their approach but indicators will not be agreed until 2015, while efforts to contact the Black Sea Commission have been unsuccessful to date. This likely reflects the stages each regional sea is at in terms of the MSFD indicator process.

It is important to also mention that each member state selected indicators and submitted these to the European Commission in July 2012. Many of these indicators have not been adopted at the regional level but are still valid and will be used by the member state to assess good environmental status within their EEZ. A parallel process has been ongoing to collate member state indicators, and to date only the UK indicators have been included. However, it became apparent in mid-October that the indicators from all member states, along with other nationally developed indicators had been collated by the EU FP7 DEVOTES project. In order to formalize the cooperation, an agreement of collaboration between AZTI-Tecnalia, as coordinator of FP7 DEVOTES project and Vlaams Instituut voor de Zee, as coordinator of EMODnet Biology was signed. The agreement made it possible to access the DEVOTool database, providing information on a wide range of indicators. The Devotool is a database providing an extensive overview of indicators that have been produced to support the MSFD. The database also gives information on the biological species that are targeted by the different indicators. The Devotool database was used as supporting information tool to achieve the deliverables 2.1, List of species tagged with role and importance within MSFD reporting.

The second part of Work Package 2 relates to the development of a harmonised list of biological traits and the identification of common traits that can be made available through the EMODnet Biology web portal and linked to the World Register of Marine Species (WoRMS). Following a highly productive meeting at the project kick-off meeting in Oostende, work has continued to produce a hierarchical

framework to give structure to the collation of trait information. In parallel with this development, a paper is in preparation identifying the core traits that can be considered common, and applicable to a broad range of taxa (D2.4).

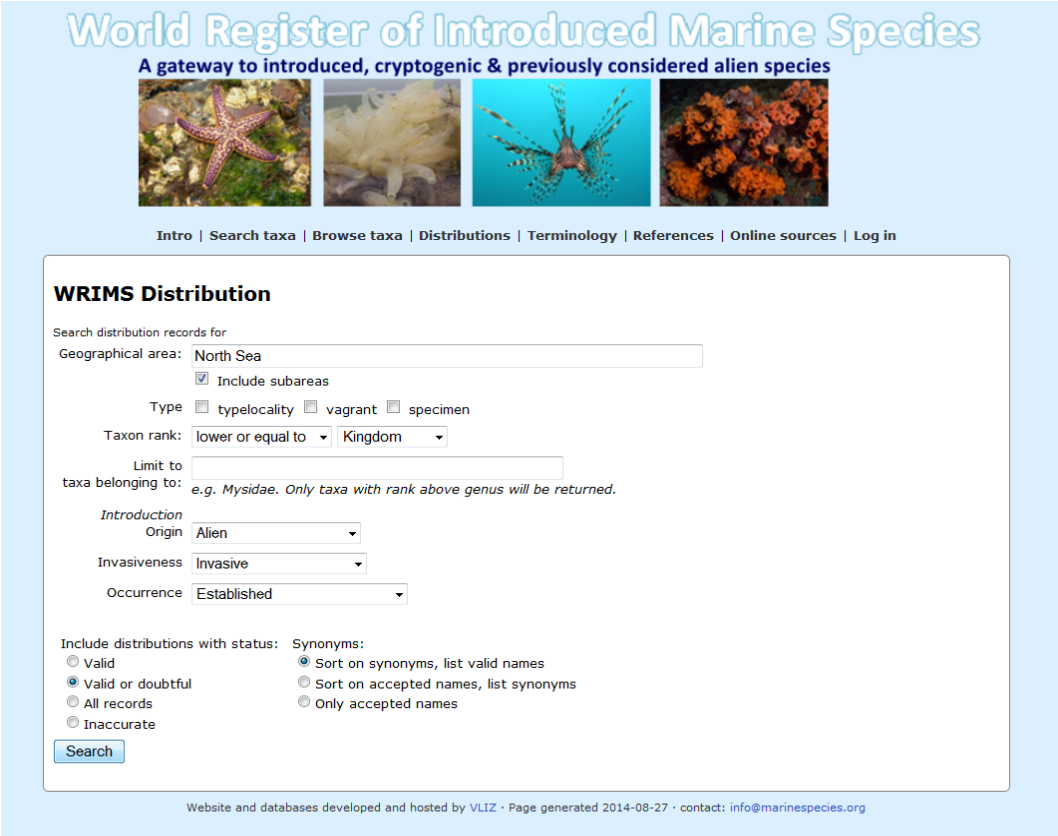
Trait class	Categories	Numerical
Taxonomic	Phylum to Genus	Not applicable
Environment	Marine, Brackish, Freshwater, Terrestrial, Pelagic, Benthic	
Body size	--	Maximum body length in mm excluding limbs, spines, setae of an individual Maximum total body weight of individual
Depth	Intertidal, Subtidal (subdivision required for the pelagic community), Deep-sea (>500 m)	Deepest and shallowest depth recorded in (1) literature and (2) in OBIS
Mobility	Sessile, Mobile	
Body support	Exoskeleton, Endoskeleton, Cell wall, Calcareous (aragonite, calcite), Gelatinous, Chitinous, Silicious, Phosphate, Hydrostatic	
Diet	Carnivore, herbivore, omnivore, parasite, detrivore, phototrophic, chemoautotroph	Isotopic signature (tbd)
Reproduction	Sexual, Asexual	

Priority traits as identified during the data attributes workshop

The development of the hierarchy and the prioritisation of which traits to collate information was the focus of a workshop held in February 2014 (D2.3). The workshop also ensured engagement with other initiatives including ESFRI Lifewatch, WoRMS, GBIF and the Encyclopaedia of Life.

A draft vocabulary has been created, and is now being updated following expert contribution. The use of Semantic MediaWiki is proposed for the development of the vocabulary. The Wiki format provides a platform for discussion as the trait groups, terms and related definitions evolve. The semantic extension allows terms to be related, and the resulting vocabulary to be published in a standard, open formats such as Simple Knowledge Organisation System (SKOS) or Resource Description Framework (RDF).

As invasive species pose a potentially major threat to the marine environment and its ecological integrity, it was considered as one of the priority attributes. This trait is also relevant related to the MSFD descriptor 2: 'Non –indigenous species'. This led to the creation of 'World Register of Introduced Marine Species (WRIMS) available at http://www.marinespecies.org/introduced/ (not yet officially released, still in test-phase). The aim is to provide a global dataset of all marine introduced, cryptic and previously considered alien species. The data system integrates data and information from online databases such as Delivering Alien Invasive Species Inventories for Europe (DAISIE), the Global Invasive Species Database (GISD), the European Alien Species Information Network (EASIN), the Information system on aquatic non-indigenous and cryptogenic species (AquaNIS), the National Exotic Marine and Estuarine Species Information System (NEMESIS). The data system allows users to select per regional sea, lists of alien and or invasive species. An agreement is set up with EASIN, JRC to cooperate more effectively to understanding and resolving scientific issues in the field of biologic invasions.



Search interface of the World Register of Introduced Marine Species. The user can search for all alien and/ invasive species of a specific regional sea

Reporting & Deliverables

- D2.1 List of species tagged with role and importance within MSFD reporting and the linked descriptor for inclusion in ERMS/WoRMS (M6).

  The deliverable provides a species list for regional seas, linked to specific descriptors, criteria, classes, indicators and links to the data available for that species through the EMODnet Biology portal. Thus far this list is completed for the North East Atlantic and the Baltic Sea. For the Mediterranean and the Black Sea the indictor development progress has not yet reached the stage in which it is possible to resolve the indicators to species level. An updated version of the matrix will be published in September 2014. The draft report and species matrix is available at:

  http://www.emodnet-biology.eu/documents/EMODnet-Biology-II/Deliverables-EMODnet-Biology-II/Deliverable-2.1-List-of-species-tagged-

with-role-and-importance-within-MSFD-reporting-and-the-linked-descriptor-for-inclusion-in-ERMS-WoRMS/

- D2.3: Organization of a data attributes workshop to discuss a standardized vocabulary and prioritize the biological attribute and trait information, in collaboration with WoRMS taxonomic editors (M6).

  On February 12th & 13th, the Marine Biological Association of the United Kingdom (MBA) organised a 2 day workshop at the Ifremer Offices in Paris, France attended by 24 experts from 16 organisations from around the globe. The aim of the workshop was to progress the development of a unified vocabulary for species traits information, and to ensure engagement with the scientific community. The workshop involved participation from key individuals and organisations who are active in the development and application of biological traits and related analyses.

  http://www.emodnet-biology.eu/documents/EMODnet-Biology-II/Deliverables-EMODnet-Biology-II/Deliverable-2.3-Organization-of-a-data-attributes-workshop-to-discuss-a-standardized-vocabulary-and-prioritize-the-biological-attribute-and-trait-information/

WP3: Data access to marine biological data

Leen Vandepitte (VLIZ)+ SAHFOS, ICES, SMHI, MBA, IEO, Aarhus Univ, OGS, IMR, IFREMER, ILVO, Deltares, IMARES, IMAR, IMGW

The general objective for WP3 is to provide data and metadata on surveys in the water column and on the seabed from the different groups of marine species (phytoplankton, zooplankton, macro-algae, benthos, angiosperms, birds, reptiles, fish and mammals).

The specific objectives of this work package are:

- Analyse and assess in-depth the usability and fitness for purpose of the different data and databases that will contribute to the project
- Decide on the optimal mechanisms for linkage with the EMODnet portal, making maximal use of existing systems
- Format the data and perform taxonomic and data standardizations to allow interoperability with the EMODnet Biology Portal
- Determine the suitability of the data for the creation of the data products and validate the produced data products.

The first objective corresponds to deliverable D3.1: assessment of data and databases, which was due in Month 6 of the project. The work on this already started during the EMODnet Biology II kick-off meeting, where the initial overview of datasets that would contribute to EMODnet Biology II was fine-tuned. All partners were requested to give an updated overview of their datasets, including geographical coverage, temporal range and number of available distribution records. In addition, each partner was asked to document the data transfer protocol that would be used to make the data accessible through the portal, which resulted in the following overview:

Data transfer protocol	**# partners**
IPT	5
SeaDataNet format	3
OGC (WFS)	2
Own web services	2

Combination of protocols	4

Through the inventory, an additional 129 datasets were identified, of which the majority is already described in the metadata catalogue (http://www.emodnet-biology.eu/data-catalog), and all of which will become accessible through the Portal:

Group	**# datasets**	**# records**
Viruses	1	*Not given*
Heterotrophic prokaryotes	3	*Not given*
Benthos	16	1.721.621
Phytoplankton	30	348.212
Zooplankton	38	267.958
Angiosperms	2	1845
Macro-algae	3	317.209
Birds	2	26.051
Mammals	1	369
Reptiles	1	7
Fish	10	467.687

For about 2.3 million distribution records, no indication was given to which group or groups the records belong. A similar analysis will be done once the data are accessible through the EMODnet Biology Portal, and will then provide an updated view. For an overview of the new data that will become accessible through the Portal – organised per partner – we refer to the report on D 3.1.

Based on the chosen data transfer protocol, partners were contacted on an individual basis, to discuss the details on data transfer and a tentative time-line.

Keeping in mind the discussions during the kick-off meeting, the aim is to make as much data as possible available within the first 18 months of the project, as other WPs depend on this.

The majority of the partners will be using the IPT (Integrated Publishing Toolkit), to publish their biological data. IPT is used to publish and share biodiversity datasets and is specifically designed for interoperability: it enables the publishing of content in databases, Microsoft Excel spreadsheets, or text files using open standards namely the Darwin Core.

Partners have been offered the possibility to either set up their own IPT, or make use of an IPT hosted by VLIZ. In the last months, there has been extensive communication through email and physical meetings with these partners to get accustomed to using IPT and the Darwin Core data format that goes with it. The first datasets through IPT will be made available within the Portal in September. Making data available from the different partners and keeping track of updated data will be an ongoing task during the project.

Some partners are currently testing the SeaDataNet data format, which was developed last year. As soon as the test-phase is done, the data exchange with EMODnet Biology will commence. It is estimated that the first data through this mechanism will become available end 2014, early 2015.

Once the data are available through IPT or any of the other data exchange mechanisms, taxonomic and data standardizations will be performed, allowing the interoperability within the EMODnet Biology Portal. Once this has been done, quality control procedures can run on all the data and the results of these can help to determine the suitability of the data in the creation of data products.

Deliverables

D3.1: Assessment of data and databases, including list of datasets that will be used for creation of products (M6)

This deliverables gives a detailed description of the datasets that will be made available through the data portal, and provides links to the complete metadata descriptions, available at the EMODnet data portal. The document contains an overview of the datasets, including geographical coverage, temporal range and number of available distribution records, the data transfer protocol and timeline for delivering the data.

http://www.emodnet-biology.eu/documents/EMODnet-Biology-II/Deliverables-EMODnet-Biology-II/Deliverable-3.1.-Assessment-of-data-and-databases-including-a-list-of-datasets-that-will-be-used-for-the-creation-of-data-products/

WP4: Data archaeology and rescue

IBSS + HCMR, GBIF, VLIZ

The overall objective of the work package is to fill the spatial and temporal gaps in EMODnet data availability by implementing data archaeology and rescue activities. This is a two-part process of first identifying and locating data and then performing the steps required to merge them into a digital database, which further will be distributed through EurOBIS, and the EMODnet data portal. The work focussed on the Black Sea and Eastern Mediterranean Seas, but will not be limited to this region. There were three main tasks identified in the WP:

- To identify historical data that are at risk of being lost and mobilize the human resources for their archaeology and rescue.
- To run a framework of small grants for their digitization, standardization and quality control.
- To propose a mechanism for the networking of the supporting community to ensure continuous inflow of datasets in the future.

During the first year, this WP performed a gap analyses and inventory of historical data that are at risk of being lost at the Black Sea and Eastern Mediterranean region. The preliminary results of this analysis are available in the draft deliverable D4.1: Report on data availability and gap analyses for the Black Sea.

The first objectives and the associated ongoing activities included:

- Temporal gap analyses are being performed, based on the data available in EMODnet/EurOBIS, that were rescued and digitized during the first phase of the project as part of the small data grant initiative (2009-2013). Currently 87 datasets that contain Black Sea Biological data are available through the EMODnet portal, representing 264,723 records that are quality controlled (taxonomic, temporal, geographic QC).
- A search was conducted in the archives of the marine biology centres and institutes in order to locate the potential resources either in paper or electronic format. (mainly IBSS).
- To identify historical data that are at risk of being lost and mobilize the human resources for their archaeology and rescue. Marine biologists and

other potential data holders in the region will be contacted in order to provide the relevant information.

The first two activities within the first objective were performed as planned. However IBSS, leading the activity experienced several unplanned difficulties on contacting relevant regional partners, mainly due to the unplanned regional situation. As the result of the Crimea and Sevastopol annexation all Ukrainian state institutes stopped working on these territories. IBSS is now not belonging to the National Academy of Sciences of Ukraine and was also not included into any Russian scientific structure. For the moment institute exists independently and financed by the local Sevastopol authorities. Therefore, a detailed description of the identified historical datasets, deliverable D4.2 could not be delivered in time. Now that it was decided that another partner will lead the activities of WP4, the deliverables D4.2 will be shifted to year two (M18). Furthermore, the activities and deliverables of WP4 will be reviewed and if necessary adapted according to the absence of the expertise of IBSS and the expertise of the new workpackage leader.

Reporting & Deliverables

D4.1: Report on data availability and gap analyses for the Black Sea M9

The preliminary version of this deliverable is available and contains a detailed description of all the Black Sea Datasets accessible through the EMODnet Biology Portal, the largest organizations from the Former Soviet Union countries that perform or performed research on marine biology in the Black Sea and Eastern Mediterranean and a preliminary list of identified datasets that were proposed for digitization at IBSS. Priority was given to IBSS which is the largest and oldest marine biological research organization in the Black Sea region.

http://www.emodnet-biology.eu/documents/EMODnet-Biology-II/Deliverables-EMODnet-Biology-II/Deliverable-4.1-Report-on-data-availability-and-gap-analyses-for-the-Black-Sea/

D4.2: Description of identified historical datasets M12

Due to the unplanned regional situation and changes of WP leading partner, we propose to shift this deliverable to M24, and the content could slightly modify based on the expertise of the new WP lead.

WP5: Creation of gridded abundance data products

Peter Herman (NIOZ)+ ULg, VLIZ, SAHFOS, ICES, MBA, MARUM

The objective of WP5 is to produce a set of gridded map layers showing the average abundance of at least three species per species group for different time windows (seasonal, annual or multi-annual as appropriate) using geospatial modelling. The spatial modelling tool used to calculate the gridded abundance maps is based on DIVA. DIVA (Data-Interpolating Variational Analysis) is a tool to create gridded data sets from discrete point measurements of the ocean. The interpolation is based on a given correlation length scale and signal-to-noise ratio of the observations.

Methodology testing and validation

It was decided to select a number of well-known and published cases from diverse data sources to test the methodology. The selection was based on data availability, reference to existing literature and relevance to the project.

The availability of zeroes (i.e. explicit knowledge of the sites where a species was looked for but was absent) is essential for the gridding procedure using DIVA. Since most databases only record presences, the reconstruction of zeroes is a requirement for the mapping. A list of datasets for which zeroes can be reconstructed in a consistent way must be made before gridding can be automated with EMODnet biological data. It will be used to determine further goals for the (semi-)automatic data gridding to be applied to many biological data.

DIVA was originally devised for gridding based on quantitative data, such as concentrations or abundance density. However, many biological data are only available as presence/absence data. The DIVA methodology has been extended to produce maps of probability of occurrence using p/a data. It has been tried with *Amphiura filiformis* (benthic brittle star) data in the North Sea, and with *Marenzelleria* (benthic worm) data in Danish waters.

DIVA output was compared with standard geostatistical models, for the case of *Amphiura filiformis* in the North Sea (Fig. 1). In general, the outputs are very well comparable. The correlation length used in DIVA seems to be a bit smaller than that chosen in the kriging algorithm. As a consequence, the DIVA interpolation follows the data somewhat more closely. Based on the underlying mathematics,

the good correspondence between the methods is not a surprise because the approaches are closely related. The advantage of DIVA for marine applications, in comparison with standard geospatial methods, is its ability to interpolate consistently in an intricate domain. There is no extrapolation across islands, the shortest distance between two points is always reconstructed through the water. This desirable feature comes at a price, since the calculation load of DIVA is generally higher than that of standard methods. For relatively smooth basins like the North Sea, the feature does not result in big differences in results, but when downscaling to smaller domains, e.g. around the Danish islands, it could be very important. A second advantage of DIVA over other methods is the possibility to take into account physical characteristics of the water mass, e.g. dominant currents that cause a stronger correlation along the streamlines than across. Biological data are generally too sparse to make profitable use of this feature, but it is important in the chemical and physical lots of EMODNET. Consistency of approach across lots is important and also justifies the choice for DIVA in the biological lot. In the coming year, WP5 will investigate the comparison of methods further in a comparative approach between DIVA, kriging and MaxEnt species distribution modelling, choosing domains for the test where the approaches are expected to differ. This will help in clarifying the choices to be made in future.

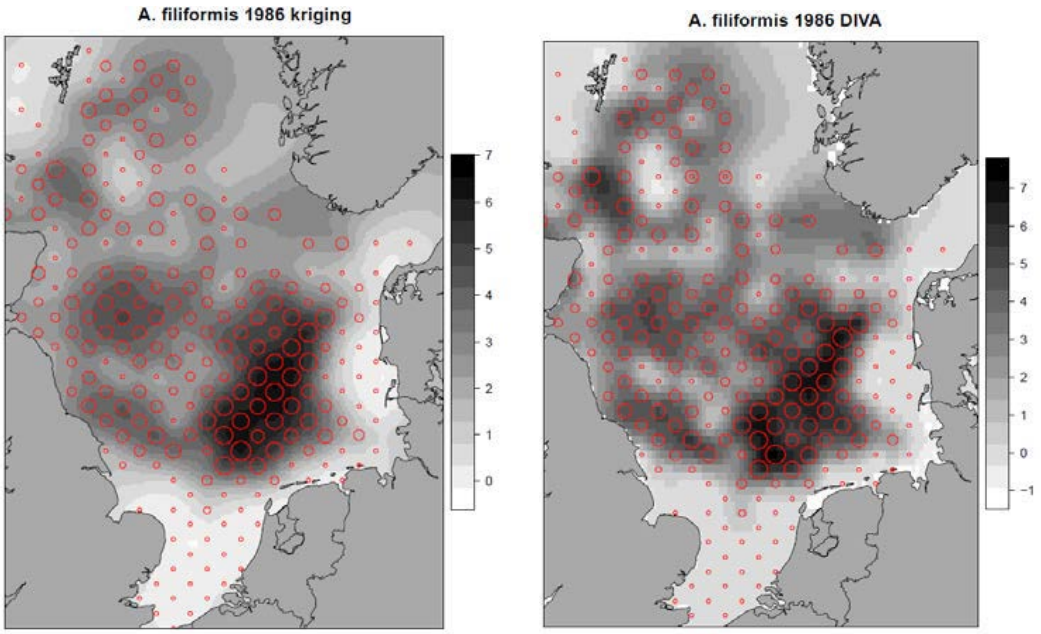


Fig. 1: Density (natural logarithm scale) of A. filiformis in the 1986 North Sea Benthos Survey (ref). Size of marks proportional to observed density. Shades of gray produced by (right) DIVA interpolation and (left) ordinary kriging.

The incorporation of environmental information into the gridding procedure was also tested using the case of *Amphiura filiformis*. The occurrence of this species was found to be strongly depth-dependent, with occurrences only recorded between depths of 30 to 150 m in the available EMODNET data sets. We produced a mask based on depth maps as a binary map (suitable vs. non-suitable habitat), and reduced the flow of information across boundaries on the mask. This improved the prediction (gridded) maps considerably, since the algorithm no longer predicts non-zero abundances in unsuitable habitats. While the methodological test was successful, it was remarked that routine application is very difficult, since an appropriate statistical model should be set up for every species, and in many cases this will not be as simple as the depth-based model in the test case.

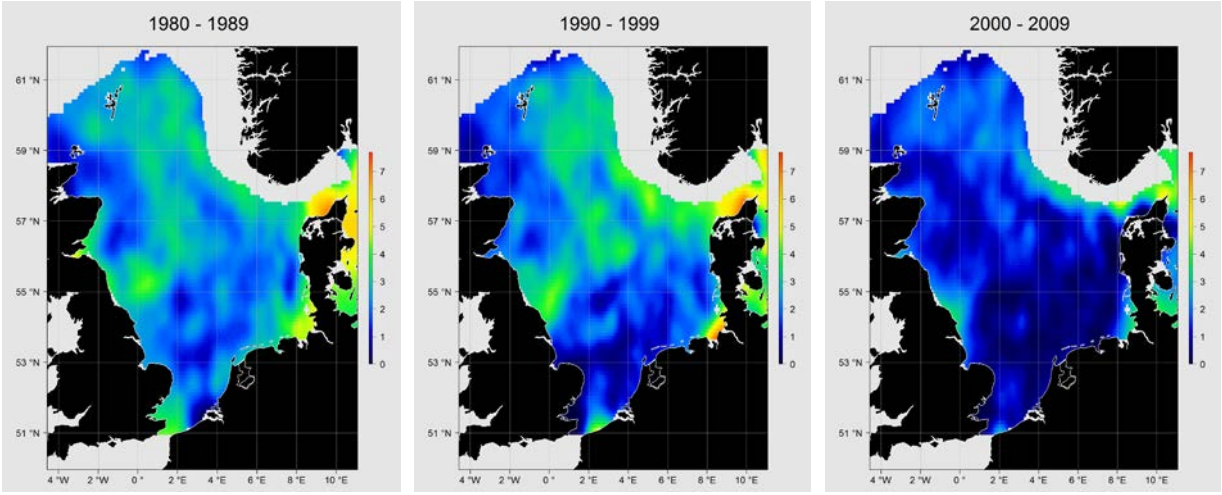
Special attention was devoted to the gridding of coastal species, which can be assumed not to occur in deeper offshore waters. We approached the problem as a specific case of the use of environmental data, with the production of a depth-based mask preventing false absence predictions outside the coastal strip.

For the representation of time dynamics in data sets allowing this, it was decided to produce gridded maps for sliding time windows, e.g. combining years 1-4 in one gridded map, years 2-5 in the next etc., so that relatively smooth animated GIF presentations can be produced that show the essential change over time. For some species (e.g. birds) the data were split in seasons first, because occurrence and behaviour is strongly season-dependent. It is often more informative to see an animation of all winter occurrences, than one of yearly averaged occurrences.

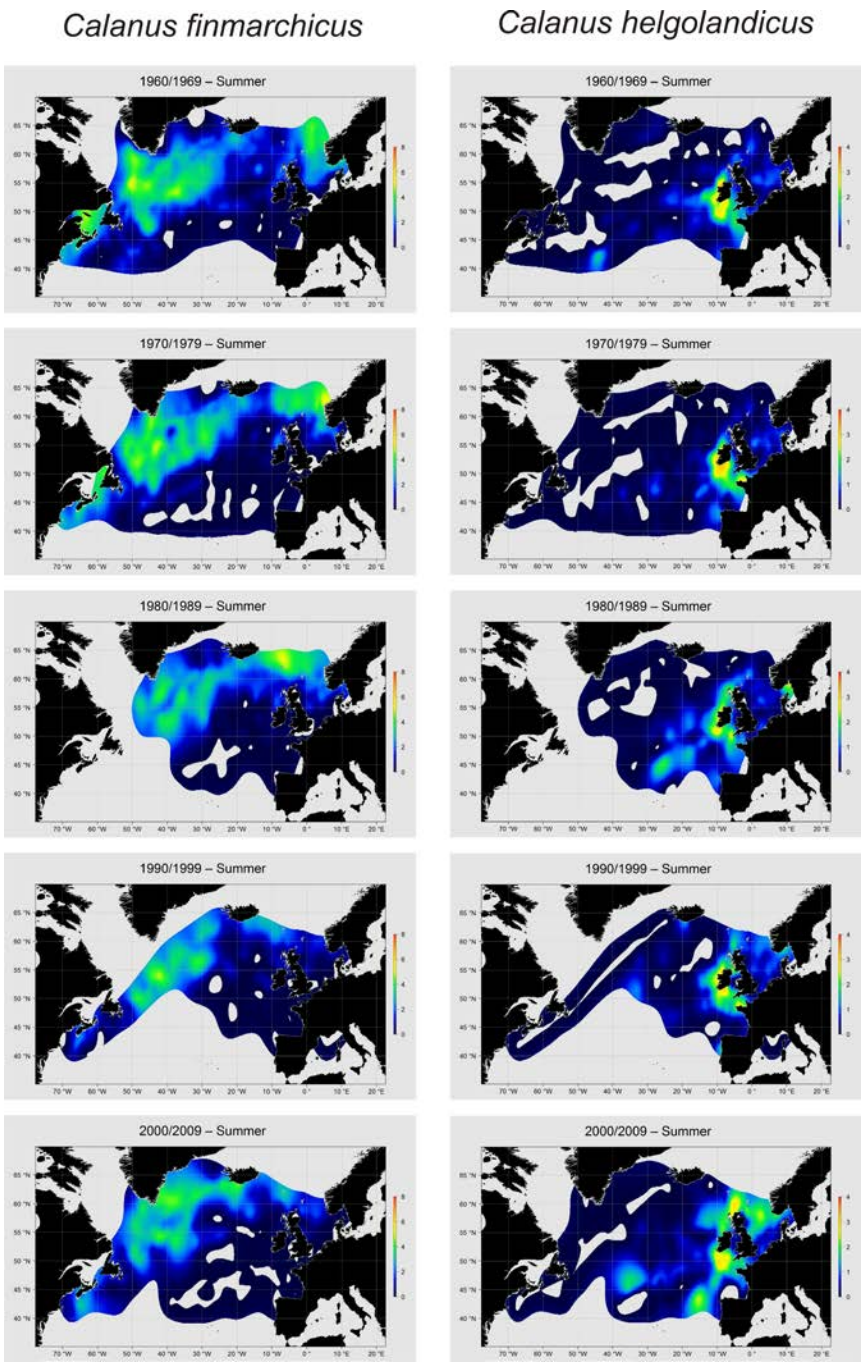
More information on the methodology is published as a workshop report.

Production of a set of gridded map layers d showing the average abundance of different species per species group

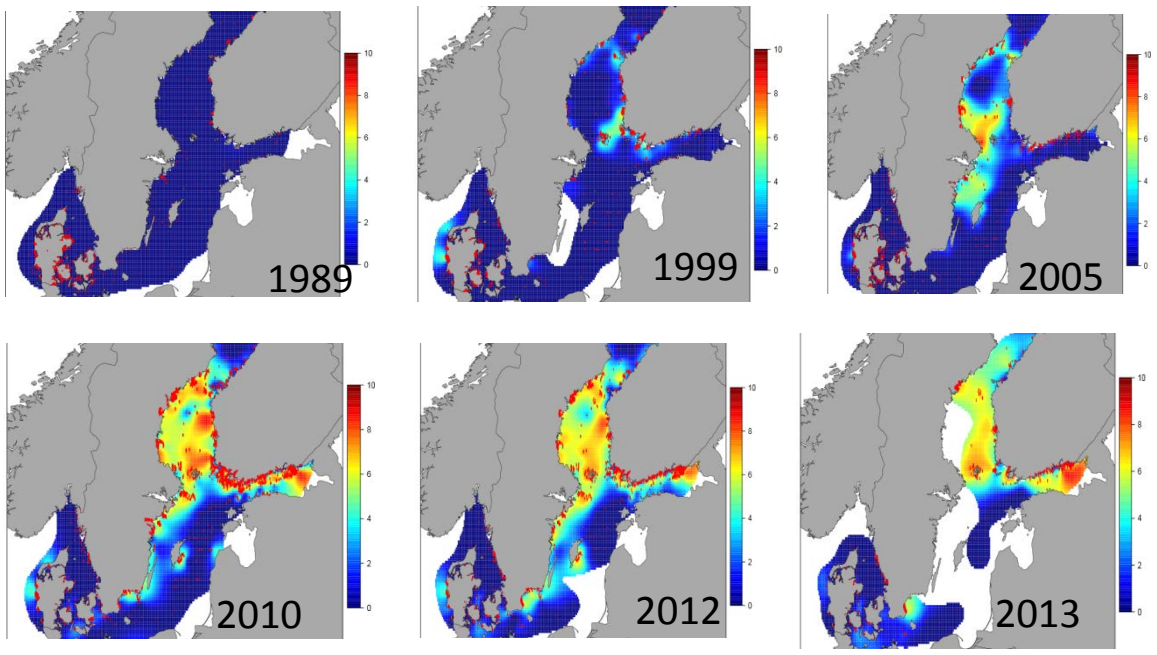
A complete overview of the different data products calculated, the sea basin, the period, number of time slices, if they are calculated per season and the data source is available as Annex I. A few examples of data products are listed below.



Cod (*Gadus morhua*) stocks in the North Sea. We gridded the data from the ICES IBTS (International Bottom Trawl Survey – ln(x+1)-transformed number of fish counted per haul) fish surveys for sliding time windows of ten years. Together these maps were combined in an animation showing the temporal evolution of the stock. Here we show three snapshots (per decade) illustrating the dramatic decrease of the cod stock in the North Sea.



***Calanus* species (zooplankton) in the North Atlantic**. Shifts in the spatial distribution of these two species have been well documented in the literature (e.g. Beaugrand *et al.*, 2002, Science 1692:296). We used the original SAHFOS abundance data to grid the density of both species per season and for sliding time windows of 10 years. The figure gives some snapshots (summer distributions per decade) from this series. It can clearly be seen how both species shift their distribution to the north, leading to a considerable species shift in the North Sea as one of the consequences.



Spatially distributed data products relevant for MSFD Descriptor 2: *Marenzelleria.* The invasive *Marenzelleria spp.* polychaetes have established to the entire area of the Baltic Sea. We combined data form three national benthic monitoring programs (Denmark, Sweden and Finland), to create sliding time windows (3 years, centred on the year indicated in the maps) gridded abundance maps for the last three decades. The maps indicate separate invasion events in the Baltic Sea, with higher abundance in the Northern part of the Baltic. These maps are very interesting within the framework of the MSFD, where 'Abundance and distribution of *Marenzelleria* species in the Baltic Sea' is considered as a key indicator for descriptor, 2, criteria 2.1.

Deliverables

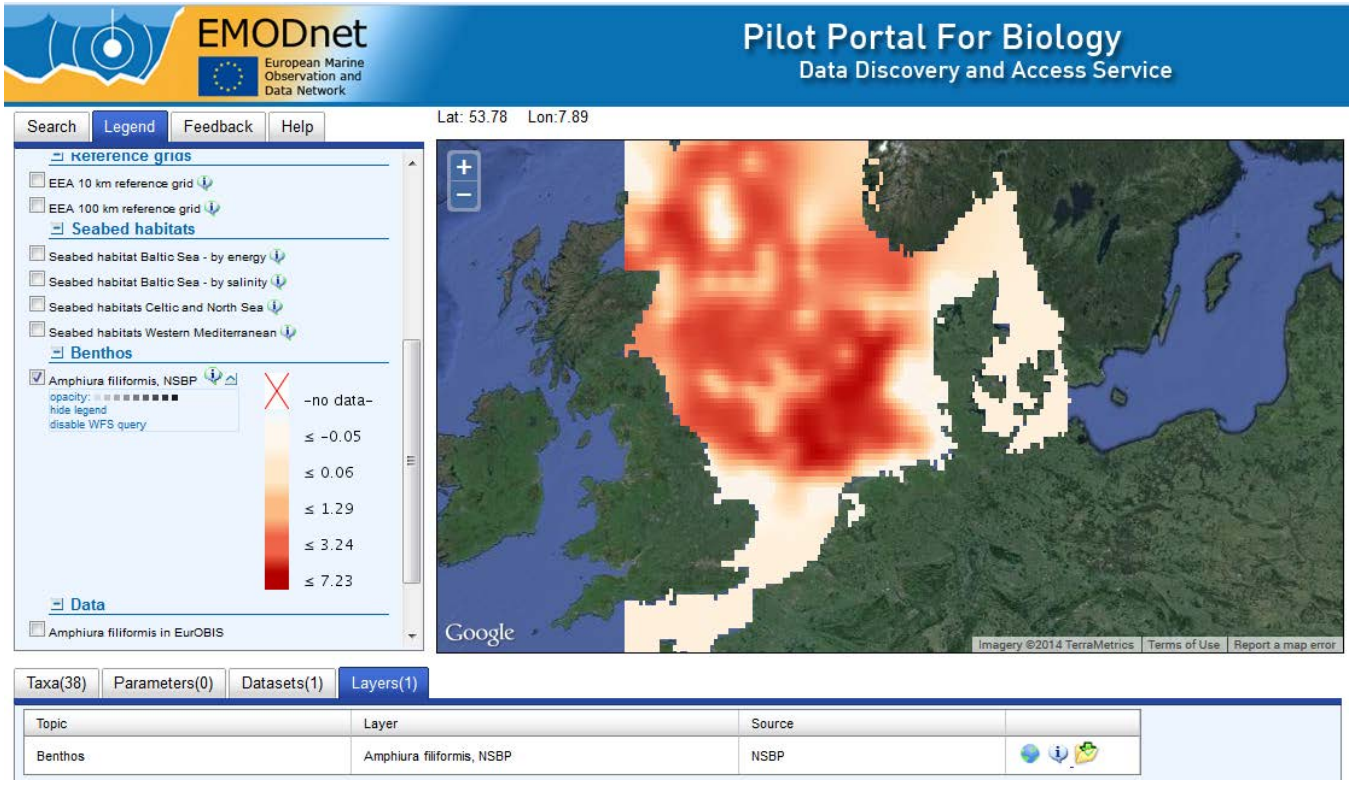
D5.1: Data products for three sea basins (M12)

Currently data products are available for more than 40 species from the North Sea, Baltic Sea and North East Atlantic. The products are made for benthos, zoo- and phytoplankton, birds, fish and mammals. A specific spatially distributed data product relevant for MSFD Descriptor 2 has been created. All data products are currently available on an ftp site for exchange of data and programs. All scripts used for pre- and post-processing are also be stored on this ftp server ftp://ftp.vliz.be/ (emodnet_bio/ WP5div4). The dataproducts are also visualised at the EMODnet Portal.

WP6: Technical update EMODnet Biology portal & link to other portals

Klaas Deneudt (VLIZ)+ MARIS, ULg

The objectives of WP6 is to develop and maintain the EMODnet biological portal and portal services and to make the data, metadata and data products that are created and mobilized during the project available through the biological portal. We built further upon the data portal that was developed during the pilot project of EMODnet biology, but performed activities to improve the interoperability with other data systems, and improve the functionality of the data portal. Furthermore, the URL of the data portal was relocated to http://www.emodnet-biology.eu/portal/, using a similar base URL as the other EMODnet thematic lots.



EMODnet biology data portal, visualizing the gridded abundance (ln(x+1) data transformation) of the brittle star, Amphiura filiformis in the North Sea.

Improved interoperability of the EMODnet Biology portal

The portal is able to handle different data protocols for handling marine biological data by implementing different data standards. The portal gives access to different data, metadata and data products and, depending on the database system and database technology used, different possibilities of linking with the EMODnet portal are set up to provide access to different data and metadata.

The Darwin Core standard is intended to facilitate the sharing of information about biological diversity by providing reference definitions, examples, and commentaries. The Darwin Core is primarily based on taxa, their occurrence in nature as documented by observations, specimens, samples, and related information. The international Darwin Core standard on data exchange – in this case the Darwin Core, is the data format behind the IPT exchange mechanism and therefore allows to make the data easily available through EurOBIS and the EMODnet data portal. To make the EurOBIS database structure more compatible with DarwinCore, several additions were made to the general EurOBIS data scheme:

- Addition of the fields EventID, SamplingEffort, SamplingProtocol, OccurrenceID and VerbatimPositionDetail to the main table.

- Addition of a new table “MeasurementsOrFacts”, completely conform the corresponding DarwinCore table. This additional generic table “MeasurementsOrFacts” will allow EurOBIS – and thus EMODnet – to capture biological measurements and related abiotic data such as e.g. length- and weight information of taxa, stomach content data or the sediment-composition at the time of sampling, which was previously not possible. MeasurementsOrFacts is the category of information pertaining to measurements, facts, characteristics, or assertions about a resource (instance of data record, such as Occurrence, Taxon). The extension includes terms measurementID, measurementType, measurementValue, measurementAccuracy, measurementUnit, measurementDeterminedDate, measurementDeterminedBy, measurementMethod, measurementRemarks. MeasurementType, measurementUnit and measurementMethod will be standardized to allow common searches of measurements across datasets and taxa.

A specific data format enabling National Oceanographic Data Centers (NODC’s) to make biological data accessible using the SeaDataNet infrastructure has been set up. The format is a general and higher level format without necessarily containing all specifics of each data type, but rather focusing on common information elements for marine biological data. At the same time the format is sufficiently flexible/extendable to be applicable for at least part of the variety of biological

data NODC's are managing and it is possible to derive OBIS or Darwin Core compatible datasets from the format. The data format has been published as the Seadatanet Deliverable D8.4b.

In parallel, we are communicating with the partners who will make use of their own web services or are using WFS services to deliver data. In each case, the available data are looked at in great detail and a mapping between the available data and the Darwin Core Scheme is made allowing to capture as much data and information as possible.

Improved functionality of the EMODnet Biology Portal

In the first year a detailed user analysis and functional analysis of the current EMODnet dataportal has been performed. The user analysis provides an analysis of the use of the current EMODnet data portal and reports on the new user requirements of the EMODnet Data Portals. The identification of the different user-requirements feeds into the functional analysis of the Data Portals. The functional analysis is reported in detail in 'Functional analysis of the Data Portal' where the objective is to create a new data portal for the EMODnet project. The current data portal is functional, but it will be difficult to expand the current data portal with the new defined user requirements. Furthermore, a user analysis indicated that the data portal is not used to its full potential. Therefore a new concept that differentiates more between data – unprocessed raw observations or measurements- and data products derived from the data has been formulated. The data component should focus on its easy and intuitive downloading, while the focus of the data products component focuses on a good visualization, a better overview of existing data and a quick understanding of the data. Based on both documents, the technical implementation of the new data portal will start in the second year. The user analysis and functional analysis are available at (username: emodnet - password: up2load):

- http://www.emodnet-biology.eu/documents/Restricted/Functional-analysis-data-portal/
- http://www.emodnet-biology.eu/documents/Restricted/User-analysis-data-portal/

Deliverables

D6.1 Portal operational (Month 12): The EMODnet data portal is operational and available at http://www.emodnet-biology.eu/portal/. The functional analysis of the a new, improved version of the data portal has been performed.

8. User Feedback

Provide a complete record of feedback received from user (formal and informal) on your portal, your activities or those of other EMODnet projects/activities. Also provide any suggestions you have received for EMODnet case studies and/or future products/activities/events.

[Provide information in table - attach the documentation/full user feedback to the report]

Date	Organization	Type of user feedback (*e.g. technical, case study etc)*	Response time to address user request
13 May 2014	EMDODnet Secretariat User feedback	Detailed user feedback report form the EMODnet Secretariat regarding search and visualization, data download, documentaiton, QA/QC issues	The simple requests were directly implemented on the EMODnet Biology Website, including an updated manual, change of order, page with deliverbales. The requested functional adaptations, such as improved geographic selection, qc selection, and improved performance were included in the user and functional analysis of the update of the portal.
19-20 February 2014	Finnish Environmental agency	Request for cooperation, data provision to EMOdnet biology	The monitoring data of Marenzellaria was sent to EMODnet.
9 May 2014	BONUS	Possible collaboration with EMODnet Biology	Ongoing
June 2014	ICES	Provide EMODnet gridded abundance data products based on monitoring data from the CPR dataset as Operational Oceanographic Products (OOP) to ICES	Under consideration by ICES

9. Outreach and communication activities

Please list all the relevant communications activities or products you have developed/executed during this period (including presentations, lectures, trainings, demonstrations and development of communication materials such as brochures, videos, etc.). Relevant scientific and/or popular articles you know have been published using/referring to EMODnet should be reported under indicator 11 in Section 7.
[Provide information in table - Maximum 2 pages]

Date	Media	Title	Short description and/or link to the activity
17-20 September 2013	Oral presentation	Status EMODnet biology	The EMODnet Biology project was presented at the MARES 2020 Meeting in Varna, Bulgaria.
10 January 2014	Oral presentation	EMODnet biology project	Presentation at Innovocean site (VLIZ, IODE-IOC-Marine Board) about EMODnet biology
19-20 February 2014	Oral presentation	Status EMODnet biology	Presentation of EMODnet biology at MODEG meeting
04 March 2014	Oral presentation	EMODnet Biology	Speed-pitching presentation at high level HOPE conference http://ec.europa.eu/environment/marine/hope-conference/pdf/SP2.%20EMODNet%20Biology%20Claus.pdf
07 March	Oral presentation and demonstration	EMODnet	At VLIZ Young Scientists Day, short presentation and demonstration on EMODnet central portal
09 May 2014	Presentation	BONUS-EMODnet Meeting	Meeting with EMODnet Secretariat and BONUS, presenting the activities of EMODnet Biology
13 May 2014	Presentation	Capturing fossil information in the Aphia database	In framework of a WoRMS related workshop, the EMODnet activities on species traits were explained, including how the WoRMS editor community could contribute to the documentation of species traits through the planned traits portal.
26 May	Presentation	Alien	Presentation on all VLIZ activities related to alien

2014		Species @ VLIZ	species, including the activities of EMODnet WP2, where the documentation of alien species is part of the species traits activities. Data products of WP5 were briefly mentioned to show the possibilities of these products
26-28 May 2014	Presentation	WG DIG Meeting	Presentation on EMODnet and EMODnet Biology at yearly DIG (Data and Information Group) Meeting. Explore opportunities to organize EMDODnet Biology Year three meeting back to back with ICES Annual Science conference (2015).
3 June 2014	Presentation	QC, SDM and data products.	Short overview of WP5 data products at LifeWatch Technical workshop. High quality species observation data (OBIS QC), species distribution modeling pipeline and expected applications and data products.
14-20 June 2014	Presentation and training	JERICO summer school	Presentation and exercise on marine biological data given in joint session with ICES datacentre

10. Updates on Progress Indicators

Using the indicator as a header list the metrics collated and the time interval. If there was no activity to report leave the section under the indicator header blank.

Indicator 1 - Volume of data made available through the portal

In total 702,976 records from 93 datasets became available through the EMODnet biology data portal. Out of these 93 datasets 54 were added within the framework of ongoing EurOBIS activities. The complete list is attached as annex II

Indicator 2 - - Organisations supplying each type of data based on (formal) sharing agreements and broken down into country and organisation type (e.g. government, industry, science).

Data provider institute	Country
Katholieke Universiteit Leuven; Departement Biologie; Afdeling Dierenecologie en -systematiek; Laboratorium voor Aquatische Ecologie	Belgium
Koninklijk Belgisch Instituut voor Natuurwetenschappen; Departement Beheer van het Mariene Ecosysteem; Beheerseenheid Mathematisch Model Noordzee en Schelde-estuarium; Oostende	Belgium
Koninklijk Belgisch Instituut voor Natuurwetenschappen; Operationele Directie Taxonomie en Fylogenie; Afdeling Malacologie	Belgium
Universiteit Gent; Faculteit Bio-ingenieurswetenschappen; Vakgroep Toegepaste ecologie en milieubiologie; Laboratorium voor Milieutoxicologie en aquatische ecologie; Onderzoeksgroep voor Milieutoxicologie	Belgium
Universiteit Gent; Faculteit Wetenschappen; Vakgroep Biologie; Onderzoeksgroep Mariene Biologie	Belgium
Vlaamse overheid; Beleidsdomein Leefmilieu, Natuur en Energie; Instituut voor Natuur- en Bosonderzoek	Belgium
National Institute of Oceanography and Fisheries	Egypt

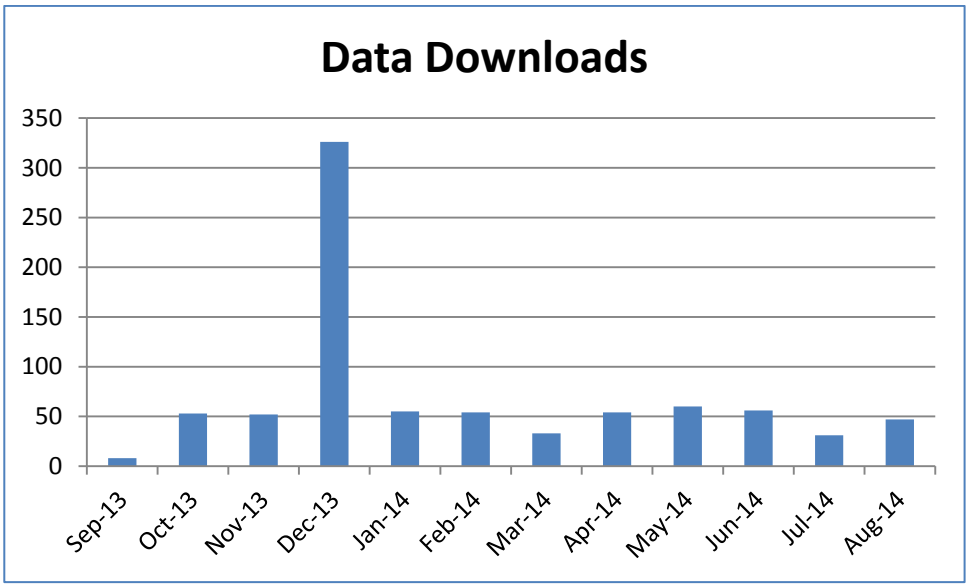
EcoOcéan Institut	France
National Natural History Museum Paris; Service du Patrimoine naturel	France
GEO-Tag der Artenvielfalt	Germany
Democritus University of Thrace; Department of Primary Education	Greece
Hellenic Centre for Marine Research	Greece
The Irish Whale and Dolphin Group	Ireland
University of Pisa	Italy
University of Pisa; Department of Biology; Islameta Group	Italy
Koninklijk Nederlands Instituut voor Onderzoek der Zee	Netherlands
Netherlands Centre for Biodiversity Naturalis; National Museum of Natural History - Naturalis	Netherlands
Reptielen Amfibieën Vissen Onderzoek Nederland	Netherlands
Universiteit van Amsterdam; Faculteit der Natuurwetenschappen, Wiskunde en Informatica; Zoologisch Museum Amsterdam	Netherlands
Norwegian Institute for Nature Research	Norway
Consejo Superior de Investigaciones Científicas; Institute of Marine Sciences	Spain
Spanish Ministry of Economy and Competiveness; Centro Oceanográfico de Cadiz	Spain
Spanish Ministry of Economy and Competiveness; Instituto Español de Oceanografía; Centro Oceanográfico de Málaga	Spain
Swedish Museum of Natural History	Sweden
Clyde River Foundation	UK
Marine Biological Association of the UK	UK
National Biodiversity Data Centre	UK
National Biodiversity Network Trust (NBN)	UK
Natural Resources Wales	UK
Porcupine Marine Natural History Society	UK
Seasearch	UK
National Academy of Sciences of Ukraine; Institute of Biology of the Southern Seas	Ukraine
ECOCEAN USA	USA

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.

Date	Organization	Type of user feedback (*e.g. technical, case study etc)*	Response time to address user request
19-20 February 2014	ASCOBAMS	Possible collaboration with EMODnet, on exchange of marine mammal data for the Mediterranean Sea	Ongoing
03 March 2014	Center for Marine Research, Ruđer Bošković in Zagreb (Croatia)	Data provision to EMOdnet biology	Ongoing

Indicator 4 - Volume of each type of data and of each data product downloaded from the portal

Between 01-09-2013 and 27-08-2014 **830 data downloads have been registered**. In 614 cases, the user requested to download a complete dataset, available at the data portal. A dataset represent a collection of data, following the same sampling methodology and implying the same policy. This can be the result of one cruise, but can also be a combination of cruises or sampling events, as part of a time series. In 170 cases, the user performed a taxonomic query on multiple datasets. Furthermore 46 data layers were also downloaded. We can thus say, that currently we receive **about 50 data request per month, or about 2 requests per day**. In December 2013 the portal received over 300 data downloads.



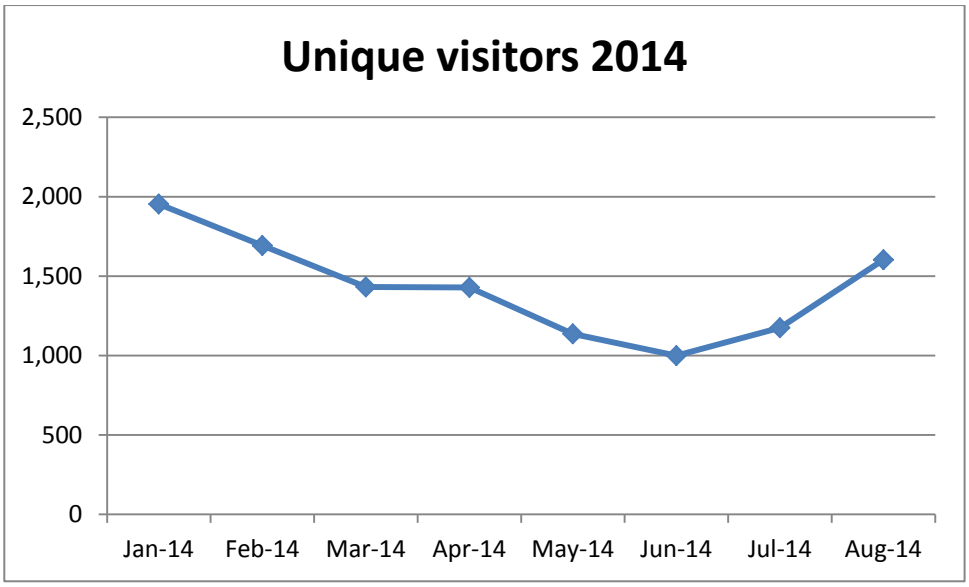
Indicator 5: Organisations that have downloaded each data type

Most requests come from **Belgium, Germany, Greece, Netherlands, Portugal and UK**. The organisations that request data are **mainly universities** (i.e. University of Massachusetts Dartmouth, Universidad Rey Juan Carlos, University College Cork, University of Alicante, , University of Gothenburg, University of Hawaii, University of Liverpool, University of Rostock, University of Southampton, Heriot-Watt University…), **private companies and consultants** (i.e. Ramboll) and **governmental agencies and international organisations** (OSPAR, JNCC, British Antarctic Survey, Bonn Agreement, ICES, INBO, IEO…).

Indicator 6: Using user statistics to determine the main pages utilised and to identify preferred user navigations routes

Month	*Unique visitors*	*Hits*	*Number of visits*	*Pages*	*Bandwidth*

Jan-14	*1,954*	*103,080*	*3,065*	*61,361*	*1.74 GB*
Feb-14	*1,693*	*95,482*	*2,920*	*54,864*	*1.81 GB*
Mar-14	*1,432*	*71,811*	*2,699*	*48,654*	*1.89 GB*
Apr-14	*1,429*	*32,717*	*2,618*	*23,283*	*1016.41 MB*
May-14	*1,137*	*31,280*	*2,195*	*19,325*	*1.02 GB*
Jun-14	*1,000*	*20,607*	*1,906*	*9,392*	*1.05 GB*
Jul-14	*1,175*	*28,623*	*3,216*	*15,584*	*1.90 GB*
Aug-14	*1,603*	*42,072*	*3,212*	*28,684*	*1.92 GB*



We can provide only comparable web statistics for 2014. We see that we had a drop in unique visitors, for the months of May and June. However we observe a new increase in users from July onwards. So far it is difficult to find a good explanation for this trend.

***A unique visitor** is a person or computer (host) that has made at least 1 hit on 1 page of your web site during the current period (a month). If this user makes several visits during this period, it is counted only once. Visitors are tracked by IP address, so if multiple users are accessing your site from the same IP (such as a home or office network), they will be counted as a single unique visitor.*

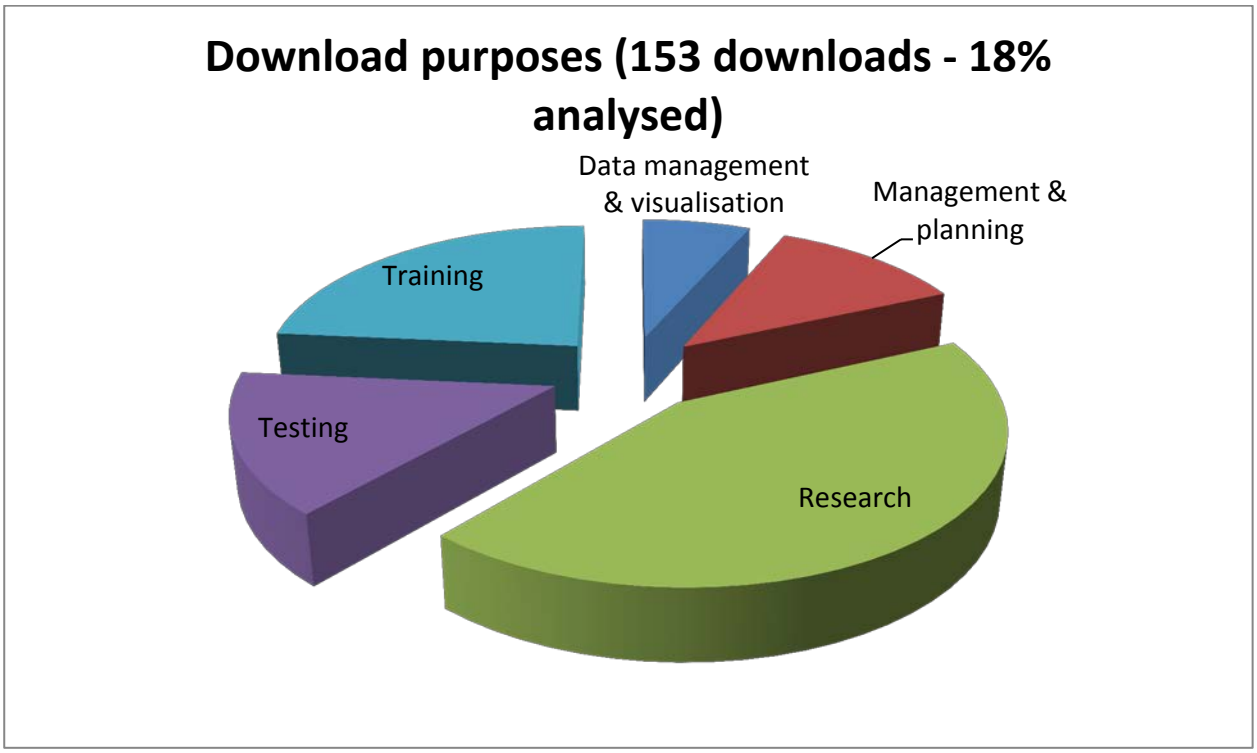
***Hits**: Any files requested from the server (including files that are "Pages") except those that match the config parameter.*

Number of visits *made by all visitors.: Think "session" here, say a unique IP accesses a page, and then requests three other pages within an hour. All of the "pages" are included in the visit, therefore you should expect multiple pages per visit and multiple visits per unique visitor (assuming that some of the unique IPs are logged with more than an hour between requests).*

Pages*: The number of "pages" viewed by visitors. Pages are usually HTML, PHP or ASP files, not images or other files requested as a result of loading a "Page" (like js,css... files).*

Bandwidth:Total number of bytes for pages, images and files downloaded by web browsing.

Indicator 7: List of what the downloaded data has been used for (divided into categories e.g. Government planning, pollution assessment and (commercial) environmental assessment, etc.)



Between 01-09-2013 and 27-08-2014 830 data downloads have been performed. For 153 data downloads we, received the purpose of download (18 percent). We created 5 main categories to group the download purposes. **The most common purpose (43%) was for research** (Master's thesis, PHD thesis, Analysis of community structure Analysis on species distribution, biogeographical studies, research on species indicators), **training** (practice using R, summer school, training CartoDB, teaching) counted for 24%, **testing** of the system, by EMODnet biology partners, external people and by the secretariat, counted for 15% of the downloads, **Management and planning** (Joint Monitoring Program , Modeling MPAs, Planning monitoring surveys, Subsea cable feasibility study) counted for 12%, while **data management and visualisation** purposes was good for 7% of the downloads.

11. Additional User Statistics

There are no additional user statistics.

12. Annex I: List of available data products

species	species group	Sea Basin	Period	# time slices	Data source	Seasonal
Marenzelleria	benthos	Baltic	1987-2013	24	SMHI, SYKE, Aarhus University	No
Abra prismatica	benthos	North Sea	1986	1	NSBS	No
Amphiura filiformis	benthos	North Sea	1986	1	NSBS	No
Bathyporeia elegans	benthos	North Sea	1986	1	NSBS	No
Chaetozone setosa	benthos	North Sea	1986	1	NSBS	No
Echinocardium cordcordatum	benthos	North Sea	1986	1	NSBS	No
Goniada maculata	benthos	North Sea	1986	1	NSBS	No
Harpinia antennaria	benthos	North Sea	1986	1	NSBS	No
Lunatia poliana	benthos	North Sea	1986	1	NSBS	No
Mysella bidentata	benthos	North Sea	1986	1	NSBS	No
Nephtys hombergii	benthos	North Sea	1986	1	NSBS	No
Nephtys longosetosa	benthos	North Sea	1986	1	NSBS	No
Ophelia borealis	benthos	North Sea	1986	1	NSBS	No
Ophiura albida	benthos	North Sea	1986	1	NSBS	No
Owenia fusiformis	benthos	North Sea	1986	1	NSBS	No
Scoloplos armiger	benthos	North Sea	1986	1	NSBS	No
Spiophanes bombyx	benthos	North Sea	1986	1	NSBS	No
Spio filicornis	benthos	North Sea	1986	1	NSBS	No
Spiophanes kroyeri	benthos	North Sea	1986	1	NSBS	No

Calanus finmarchicus	zooplankton	Atlantic, North Sea	1958-2012	184	SAHFOS	yes
Calanus helgolandicus	zooplankton	Atlantic, North Sea	1958-2012	184	SAHFOS	yes
Total diatoms	phytoplankton	Atlantic, North Sea	1958-2012	184	SAHFOS	yes
Total dinoflagellates	phytoplankton	Atlantic, North Sea	1958-2012	184	SAHFOS	yes
Gadus morhua	fish	North Sea	1965-2012	39	ICES	No
Clupea harengus	fish	North Sea	1965-2012		ICES	no
Engraulis encrasicolus	fish	North Sea	1965-2012		ICES	no
Sandeel	fish	North Sea	1965-2012		ICES	no
Scomber scombrus	fish	North Sea	1965-2012		ICES	No
Sprattus sprattus	fish	North Sea	1965-2012		ICES	no
Alca torda	birds	North Sea	1980-2010	92	JNCC	yes
Fulmarus	birds	North Sea	1980-2010	92	JNCC	yes
Larus argentatus	birds	North Sea	1980-2010	88	JNCC	yes
Morus	birds	North Sea	1980-2010	92	JNCC	yes
Rissa tridactyla	birds	North Sea	1980-2010	92	JNCC	yes
Somateria mollissima	birds	North Sea	1980-2010	92	JNCC	yes
Stercorarius	birds	North Sea	1980-2010	91	JNCC	yes
Thalasseus sandvicensis	birds	North Sea	1980-2010	92	JNCC	yes
Phocoena phocoena	mammals	North Sea	1980-2010	92	JNCC	yes
Seal	mammals	North Sea	1980-2010	92	JNCC	yes
Whale	mammals	North Sea	1980-2010	23	JNCC	No
Dolphin	mammals	North Sea	1980-2010	22	JNCC	No

13. Annex II: List of new data sets available at the data portal

Dataset title	Number of records
Twaite Shad (Alosa fallax) distribution for Scotland, historical to present	367
Colección de referencia de otolitos, Instituto de Ciencias del Mar-CSIC	2874
Monthly variation in the macrozoobenthic community structure in Laki Lagoon (Evros Delta, N. Aegean Sea)	123
Monthly variation in the macrozoobenthic community structure in Monolimni Lagoon (Evros Delta, N. Aegean Sea)	314
Spatial distribution of the macrobenthic fauna in Laki Lagoon (Evros Delta, N. Aegean Sea)	35
Wildbook for Whale Sharks	3607
Cetacean sightings in the north western mediterranean Sea by écoOcéan Institut and partners 1994-2011	2159
Tauchen und Meer	24
Tauchen und Meer 02	21
Environmental impact assessment of oil pollution accident in Gialova lagoon and Navarino Bay	1312
Survey dataset on Pomatoschistus minutus (Pallas, 1770) and other gobies at the Belgian Coast, Oosterschelde, Westerschelde and at nuclear plants near Doel & Borssele	974
Chemical analysis of PAK's, Organotin, PCB's, PBDE's and organochlorine pesticides as possible endocrine disruptors in Scheldt estuary	7
BEWREMABI dataset: Belgian Shipwreck - hotspots for Marine Biodiversity: Macrofauna on shipwrecks	3439
Spatial distribution in sediment characteristics and benthic activity on the northwestern Black Sea shelf: macrobenthos	1036
RISC and ALERT Marine Non-Native Species (Chinese Mitten Crab, Wakame and Carpet	181

Sea Squirt) Records	
Phytoplankton data from the Black Sea collected on R/V Professor Vodyanitskij in November 1991 (pv35)	2298
Phytoplankton samples collected near Sochi, Black Sea, in 1974-1975 (sochi_1974-1975)	2034
Phytoplankton data of Sevastopol Bay of the Black Sea during 1972	3906
Phytoplankton data collected in the Black Sea along the Tuapse transect in August 1951	771
Phytoplankton data collected in the Black Sea in February 1957	550
Phytoplankton data collected during R/V Issledovatel cruise in September 1948	630
Phytoplankton data collected during a cruise in the Black Sea in May 1957	677
Zoobenthos data from different sources (collected and extracted from literature), personal archive of G.V. Murina (IBSS)	629
Phytoplankton data collected during cruise 25 of R/V Skif (January 1990) in the Indian sector of the Southern Ocean	488
Phytoplankton data collected during cruise 24 of R/V Skif (February - March 1989) in the Indian sector of the Southern Ocean	2414
Phytoplankton data collected during Second Ukrainian Antarctic Expedition (March-April 1998) on board of R/V Krenkel	2345
Microzooplankton data (Tintinnida) collected during First Ukrainian Antarctic Expedition (March-April 1997) on board of R/V Krenkel	165
Microzooplankton data (Tintinnida) collected during 7-th Ukrainian Antarctic Expedition (March, 2002) on board of R/V Horizont (Bransfield Strait)	526
Phytoplankton data collected during cruise 43 (February - April 1989) of R/V Dmitriy Mendeleev	186
Phytoplankton data collected during cruise 38 (December 1986 - April 1987) on board of R/V Dmitriy Mendeleev	5535
Phytoplankton data collected during cruise 37 (second joint Soviet-American expedition) of R/V Akademik Korolev (July 1984) in the Bering Sea	3049
Phytoplankton data collected during cruise 22 of R/V Fiolent (December 1987 – April 1988) in the Indian sector of the Southern Ocean	3072
Phytoplankton data collected during First Ukrainian Antarctic Expedition (March 1997) on board of R/V Krenkel in Bransfield strait and region of Ukrainian Antarctic Station	787

Phytoplankton data collected near Yalta, Black Sea, in June 1950	989
Phytoplankton data collected during cruises on the R/V Knipovich in 1948 and 1950	1132
Phytoplankton data collected in deep waters of the halistatic region of the Black Sea in September 1948	808
Phytoplankton data from the Sukhumi region, Black Sea, collected in November 1948	418
Phytoplankton data collected during R/V Issledovatel cruise in October 1948	716
Zooplankton collected in the Black Sea during Cruise 5 in February 1957	957
Zooplankton collected in the Black Sea along the Yalta-Batumi transect in February 1951	1230
Zooplankton collected in the Northwestern Black Sea in 1952	2846
Zooplankton data collected during cruises on the R/V Knipovich in April 1950	774
Benthos collected in the Azov Sea during several expeditions in 1934-1935	1258
Zooplankton collected in the Mediterranean Sea in 1959 on board the R/V Akademik S. Vavilov.	3333
Benthos collected in the Azov Sea in 1935 on board the R/V N. Danilevskiy	1829
Phytoplankton data collected in the NW Black Sea along the Tarkhankut transect in April 1952	658
Phytoplankton collected in the Mediterranean Sea in 1959 on board the R/V Akademik S. Vavilov	1006
ESAS cetacean sightings from 1980 to 2003	3045
NPWS Seal Database	1210
RECORD Cetacean data up to current day	250
IOW Natural History & Archaeological Society Marine Invertebrate Records 1853- 2011	1262
Rare marine fishes taken in Irish waters from 1786 to 2008	1134
Syllidae, Magelonidae and Maldanidae from the Northwestern Coast of Egypt	40
Polychaete Study in Northeastern Mediterranean Coast of Egypt	182
Syllidae (Polychaeta) from the North Mediterranean Coast of Egypt	9
Polychaeta from the Eastern Harbour of Alexandria	12

Inventaire National du Patrimoine Naturel : Observations d'hippocampes et syngnathes de France métropolitaine: Programme Hippo-ATLAS	190
Inventaire National du Patrimoine Naturel : Données des campagnes de Suivi Aérien de la Mégafaune Marine (SAMM) de France métropolitaine	16568
Inventaire National du Patrimoine Naturel : Données Benthos du Réseau des Stations et Observatoires Marins	8760
Marine Intertidal Phase 1 species dataset from the Countryside Council for Wales 1996-2005	38998
Marine records from Skomer Marine Nature Reserve (MNR) Marine Monitoring Programme	15597
Marine data from Natural Resources Wales (NRW) Technical Support (Research & Monitoring) Contracts, Wales	139641
Marine Sightings & Miscellaneous species records from Natural resources Wales (NRW), 2008 onwards	9
Naturalis National Natural History Museum (NL) – Invertebrate specimens from marine expeditions	939
SEAPOP NINA	282975
Marine flora and fauna records from the North-east Atlantic	3526
RAVON (NL) - Fish observations extracted from Redeke (1907)	1654
RAVON (NL) - Fish observations extracted from Hoek (1888) and Hoek (1897)	1287
Marine species distributions in Irish coastal waters	31232
Colección de Crustáceos Decápodos y Estomatópodos del Centro Oceanográfico de Cádiz: CCDE-IEOCD	370
Colección de Fauna Marina del Centro Oceanográfico de Málaga (I.E.O.): CFM_IEOMA	453
Porpoises (NRM)	371
Irish Marine Turtle Database	1016
Metabolism, reproduction and moulting as endpoints to study endocrine disruption of Neomysis integer	2
Characterisation of the habitat of the Flemish banks, the maritime country banks and of the hinder banks on the basis of the hyper benthos communities	1155
Macrobenthos: temporal patterns for BCS stations 115b and 330	204

TROPHOS/PODO-I work-database II	3692
The hyperbenthos of subtidal sandbanks on the Belgian Continental Shelf: habitats and indicator species	894
Dispersal of pelagic organisms of the Belgian Continental Shelf	999
Hyperbenthic communities of the North Sea	4040
INRAM benthic fauna monitoring	1102
Ecological hyperbenthic data of the Scheldt estuary: historical data (1988-2001)	37801
Ecological hyperbenthic data of the Scheldt estuary: ENDIS-RISKS data (2002-2005)	1808
BEWREMABI dataset: Belgian Shipwreck - hotspots for Marine Biodiversity: Meiofauna	222
BEWREMABI dataset: Belgian Shipwreck - hotspots for Marine Biodiversity: Macrofauna in vicinity of shipwrecks	342
Spatial and temporal epibenthos and hyperbenthos variations at the Belgian Continental Shelf monitoring stations	463
Trophic interactions at the sediment-water interface: effect of beam-trawling on Lanice and associated fauna - partly Westbanks	402
Epi- and hyperbenthic communities of Belgian sandy beaches	4285
Zoological Museum Amsterdam, University of Amsterdam (NL) – Benthos monitoring of the North Sea_ research database	29691
Loggerheads in the Adriatic Sea	51
AdriaWatch project	93
Juvenile loggerheads from Lampedusa Island, Italy	21
Linking pelagic food web and its top predators: bird and prey fish sampling - Westbanks	490
Total	**702, 976**