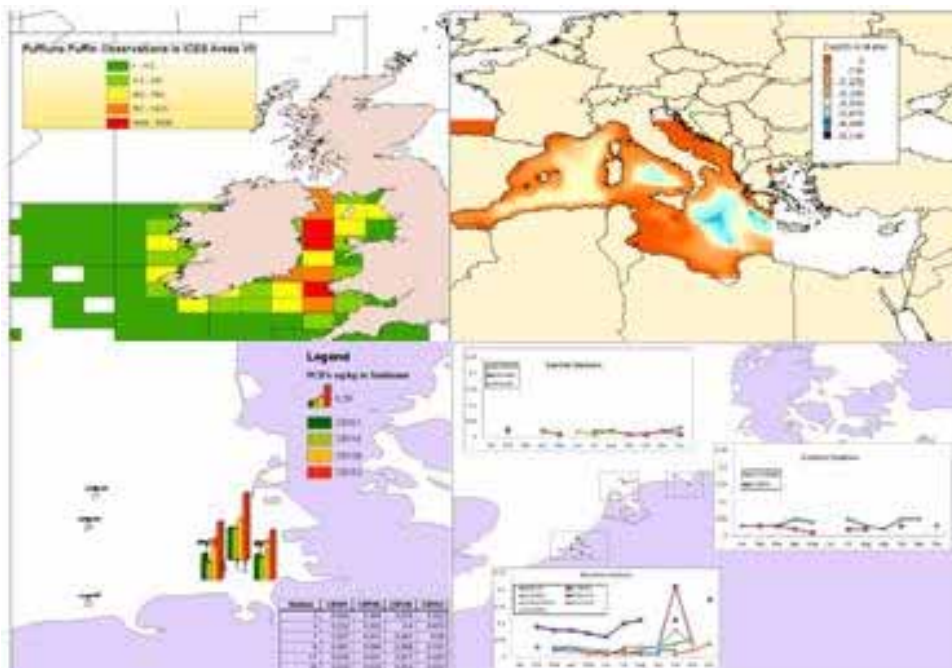

European Commission

**STUDY ON INTERIM EVALUATION OF EUROPEAN MARINE
OBSERVATION AND DATA NETWORK**

Final Report



by



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the Sea*



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Acronyms

CDI	Common Data Index
CSV	comma-separated values (file type)
DTM	digital terrain model
EGB	EMODNET Gridded Bathymetry
EMODNET	European Marine Observation and Data Network
EU	European Union
EUNIS	European Nature Information System
EurOBIS	European Ocean Biogeographic Information System
GIS	geographic information system
ICES	International Council for the Exploration of the Sea
IHO	International Hydrographic Organisation
IPR	intellectual property rights
JNCC	Joint Nature Conservation Committee (UK)
LME	large marine ecosystem
MarBEF	Marine Biodiversity and Ecosystem Functioning EU Network of Excellence
MESH	Mapping European Seabed Habitats
NGO	non-governmental organisation
NODC	National Oceanographic Data Centres
ODV	Ocean Data View
QA	quality assurance
QC	quality control
RSM	Request Status Manager
SDN	Sea Data Net
ToR	Terms of Reference
WISE	Water Information System for Europe
WMS	web map service

Glossary

data catalogue	A systematic list of data sets.
data products	Datasets that are validated and synthesized to facilitate the use of the data.
data record	A collection of related, often adjacent items of data, treated as a unit.
database	An organized collection of related data.
dataset	An identifiable collection of data.
distribution	Geographical distribution of occurrence of a feature (such as species) aggregated by grid, region, administrative unit or other analytical unit.
licence	A contractual arrangement whereby a person grants permission to another person to use the data in respect of which the data owner holds the IPR.
measurement	Determination of the size or magnitude of something.
measurement point/stations	Point locations at which measurements or samples were taken.
metadata	A set of data that describes and gives information about other data.
observation	Discrete period of time during which something is measured or watched.
parameters	Keywords that identifies a phenomenon or groups of phenomena in a dataset.
Portal	A website that presents information on a topic from diverse sources in a unified way.

1 Introduction

1.1 Background

Large quantities of data relating to the marine environment are collected and stored all over Europe for a wide variety of purposes and by a variety of public and private entities.

Such data, which record a wide range of natural and human-activity in and around the oceans, are a key pre-requisite for effective strategic decision-making on maritime policy. At the same time, these data, and the research they relate to, have a major role in promoting the development of economic activities relating to the maritime sector and the creation of new industrial products and services.

In order to improve access to marine environmental data, the European Commission has proposed the establishment of a European Marine Observation and Data Network (EMODNET) that will ensure that marine environmental data is compiled in a comprehensive and compatible system and made accessible as a tool for better governance, the expansion of value-added services and sustainable development.

In support of the preparatory actions of the EU's Integrated Maritime Policy a set of projects were launched in 2008 and 2009 with the aim of assembling fragmented and inaccessible marine data into interoperable, contiguous and publicly available data streams for complete maritime basins. The specific objectives for these projects were to:

- a) collate existing data from public and private organisations relating to the state of maritime basins; processing them into interoperable formats featuring agreed standards, common baselines and reference conditions; assessing their accuracy and precision and assembling them into common datasets;
- b) develop, test, operate and maintain a portal allowing public access and viewing of these data and a link to WISE-marine;
- c) monitor and report on the effectiveness of the system in meeting the needs of users in terms of ease of use, quality of information and fitness for purpose of the products delivered;
- d) analyse what further steps need to be taken to improve the accuracy, precision, coverage and ease of use of the data, including a scheme for sustainable quality assurance and control of the data delivered to the system, both in this preparatory action and in the future larger system;
- e) analyse the necessary requirements to maintain the components built up in each lot as a sustainable infrastructure; and
- f) keep the portal operational afterwards and be prepared to transfer to the Commission.

Each of the five portals is concerned with a different aspect of marine environmental data: chemistry, hydrography, biology, geology and physical habitats. Each portal is operated by a different thematic group. The thematic groups have been tasked by the European Commission with gathering relevant marine measurements within at least two sea-basins and providing each

measurement with comparable descriptors or metadata such as time and place of measurement and quality of measurement. These data are then processed into contiguous data layers over the whole sea basin. In addition maps are being prepared indicating where there are observations, where there are observations but the observations are not available and where the observations are missing.

This report provides an interim evaluation of the progress against these objectives in terms of three key tasks:

- a) to assess the user-friendliness of the portals;
- b) to gauge the re-usability of the data; and
- c) to determine how well the portals have overcome the legal obstacles to data sharing identified in the study “Legal Aspects of Marine Environmental Data” (FISH/2006/09).

1.2 Approach and methodology

In our approach to Tasks One and Two we assumed that the portals might have more than one type of user. This was most relevant for Task One where we sought to consider the portals from the perspective of both technical users, who could be expected to be more familiar with the data and might be interested in using and manipulating the data products as well as the data, and a second group of users who would be more interested in the data products but who might be interested in knowing something about the data used to compile them.

1.2.1 Task One

For Task One, we were asked to assess the user friendliness of the individual EMODNET portals. Specifically, we were required to address whether the portals deliver a good understanding to users of:

1. the scope of EMODNET;
2. the data coverage of the portal;
3. the quality of data in the portal;
4. how to download data from the portal;
5. how to provide feedback.

To do this, we first examined the content and functionality of the portals and recorded our experiences in order to determine which aspects of the portals fulfilled these essential criteria. Our findings are set out in Section 2 (User Friendliness).

First, a general overview of each portal is provided. Assessing delivery to the users of a good understanding of the scope of EMODNET was evaluated by examining the main text content in the portal. The data coverage was analysed by trying to determining if there were any temporal or spatial gaps in the data available through the portal. An indication is given of the total number of datasets in the portal at the time the study was carried out for information purposes only. In assessing the quality of the data in the portal, we examined the completeness of the metadata. We also examined whether or not there is any information on the quality of the data and how such information, if any, is expressed. In assessing how to download data, the steps taken to download

the data were examined together with requirements for registration or licenses in the portal. Finally, we documented how easy it was to provide feedback on the portal.

To gather stakeholder opinions on the portals, a short questionnaire survey for each portal (except for the chemistry portal) was developed (see Annex 1: Questionnaire form). The chemistry portal contractors had already developed and launched their own questionnaires for users, one for users trying to access data and the other for users trying to access the data products. They kindly allowed us to use the responses from these surveys in this assessment.

Once the questionnaire was developed, each portal contractor was requested to provide a link to it on their websites. Concurrently, an analysis of different types of stakeholders was undertaken by us to develop a contact register that could be used to distribute the links to the portals and accompanying questionnaires. The contacts are from a variety of coastal Member States represent a range of stakeholder types, including: national companies, national universities, government agencies, individuals, national non-government organisations (NGOs), international NGOs, the secretariats of international conventions/agreements, international companies and the European Commission. The contact register is available in Annex 2: Contact register for questionnaire distribution.

1.2.2 Task Two

For Task Two the requirement was to assess the re-usability of the portals. This was primarily to gauge how accessible the portals might be to the first category of user, i.e. those more familiar with the data and wishing to access, manipulate and use the data to develop new products. To assess this aspect it would be necessary to download data, import them into data management systems (such as a geographical information system, or a statistical analysis package) and perform simple processing tasks that would highlight any particular challenges arising and relating to accessibility and usability. Specific tasks were outlined with respect to the individual portals and are detailed in sections 2.2, 3.2, 4.2, 5.2 and 6.2.

For this exercise a range of applications were used to manipulate the data and to create products from the data, including Microsoft Offices Excel and Access applications, the ArcGIS and Mapinfo GIS applications, and for the chemistry portal the Ocean Data View software. A record was kept of the key issues encountered and of the experiences of accessing restricted data sets and of contacting the portal support. Screen shots have been included to illustrate certain key issues.

1.2.3 Task Three

The terms of reference (ToR) called for an assessment of how well the five portals have overcome legal obstacles to data sharing identified in an earlier Study prepared under the same Lot 2 Framework Contract and entitled 'Legal aspects of marine environmental data'¹. For the purposes of this Study it is understood that the term data sharing' should refer to the use and re-use of marine environmental data.

Two key points to note in terms of the analysis that follows are that: (a) the data and map layers will be freely available; and (b) the groups operating the portals are in most cases not the owners of the

¹ Available on the DG MARE website at http://ec.europa.eu/maritimeaffairs/study_lamed_en.html

data. As noted in 'Legal aspects of marine environmental data', marine environmental data of the type that can be accessed through the portals is subject to two separate bodies of law with distinct and sometimes opposing objectives.

One body of law seeks to promote access to environmental data and the re-use of data held by public sector bodies including environmental data. These include the Access to Environmental Information Directive² and the PSI Directive³. The other body of law seeks to encourage innovation by recognising the rights of creators of intellectual property through the grant of intellectual property rights (IPR). Put another way the first body of law seeks to promote flows of environmental data, while the second body of law may have the effect of constraining such flows.

The focus of this Study is on the second body of law, in other words, the law relating to IPR. This is because the instruments that promote *inter alia* access to environmental information and the re-use of public sector information operate in parallel to IPR, at both EC and Member State level. More specifically these instruments cross refer to IPR and take account of the IPR regime but without fundamentally altering it.

The IPR regime is relevant because the notion of "intellectual property" is sufficiently broad to include data of the types that can be accessed through the portals. Consequently copyright restrictions regarding further reproduction and distribution may still apply to such data. Moreover databases, which term is broadly defined, can also benefit from copyright protection as well as a specific *sui generis* database right⁴.

An owner of IPR, like the owner of any other type of asset, is basically free to determine whether or not the data may be used or re-used by a third party and, if so, the conditions that may govern such use or re-use.⁵ The overall effect is that the right to use and re-use marine environmental data of the type that can be accessed through the portals will depend on the particular data policy of the owner of the data (or more precisely the owner of IPR in the data) who, to further complicate matters, may be a person other than the actual holder of the data. The key point to note about the EMODNET portals is that the portal operators will in most cases not be the owners of the data. In a sense that is the whole purpose of the portal approach.

Where a data holder decides to make data available to third parties, their relevant data policies will generally recommend or impose the use of a formal contractual licence agreement to control the release and further use of the data. A licence to use data, like many other types of contract, can be created in a number of different ways ranging from a standard contract to which applicants can adhere (e.g. a click-licence for data that are made accessible on the internet), or may be (to a certain extent) open for negotiation on an individual basis.

² Directive 2003/4/EC of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC.

³ Directive 2003/98/EC of 17 November 2003 on the re-use of public sector information.

⁴ European Community Directive 96/9/EC of 11 March 1996 on the legal protection of databases.

⁵ Public sector data holders must ensure that their data policies are consistent with the PSI Directive in terms of the re-use but only in those cases where those policies permit re-use: the directive does not make re-use mandatory.

Such licences invariably contain conditions relating to such matters as liability, the proper use of the data, the purposes for which the data may be used (e.g. that the data may not be used for commercial purposes), confidentiality and the data owner's IPR in the data. Moreover and particularly but not exclusively in the case of data to be used for commercial purposes, licences may address the issue of payment for the use of the data.

In terms of the portals, therefore, the basic task was to assess how the approach of the portals to the IPR of the owners of the data to which they provide access in terms of the use and re-use of those data. This was undertaken through telephone interviews with each consortium and a legal analysis of the websites themselves together with any linked data policies.

1.2.4 Layout of this report

As to its layout this report is set out in seven parts including this introduction. In order to make the findings more accessible the findings for each task are presented portal by portal, providing an overview of the accessibility and usability of the portals in turn as well as their respective approaches to IPR issues. Conclusions and recommendations are made in Part Seven.

2 Biology portal

The biology portal has been developed by a consortium led by the Flanders Marine Institute/Vlaams Instituut voor de Zee (VLIZ). The biology portal website is available at: <http://bio.EMODnet.eu/>

2.1 Task One

The portal is easy to navigate and tab headings make selecting appropriate tabs easy to do (Screenshot 1). The main sections examined in more detail in this section are the 'Data portal' and 'Data catalogue'.



Screenshot 1 Main page for biology portal (Accessed 02/03/2011)

The 'Data catalogue' provides both simple and advanced search options. The simple search options include a free text search for all fields, a drop down selection by 'theme' (e.g. 'Benthos', 'Birds' etc.) and a drop down selection by type (e.g. 'Monitoring', 'Data collection', 'Museum collection' etc.).

However, it was noted that the themes listed in the data catalogue do not exactly match those listed in the data portal, e.g. 'Angiosperms' in the data portal is 'Plants' in data catalogue and 'Algae' is 'Macroalgae'. Also, there are more themes in the data catalogue than in the data portal.

The advanced search option has the same three fields as the simple search option plus controlled vocabulary or free text options for the following fields: thesaurus term, taxonomic term, other term and geographical term. Searching is also possible by title, institute, person, word in abstract, and availability (available or not available through the European Ocean Biographic Information System (EurOBIS)). In addition there is a drop down option of before/is/after for a beginning and an end date.

It was useful to have a number of search options available, but there were some problems when using the controlled vocabulary options for geographical terms (see section 2.1.2).

The results of the search are displayed as a list of dataset names with links. There are 20 displayed on the page, but there is also an option to display all records at once ('show full list'). Clicking on the 'details' link next to the dataset name brings up the record details. This includes a section including type, status, access constraint, version, size reference, citation, abstract, habitat, theme and keywords. In addition, the following fields are provided:

- description;
- institute/individuals responsible for the dataset;
- temporal cover including periodicity;
- geographic cover using the controlled vocabulary and coordinates parameters;
- parent datasets with links;
- instances (medium, storage institute etc) including the archived URL;
- related publications; and
- URLs to the online datasets.

It would have been useful to include a description of the metadata (e.g. what does 'status' mean?, see section 2.1.3). Also, there is no 'back' button or other internal navigation in the data catalogue, which can make it difficult to do multiple searches or to see the results from an earlier search once a record has been selected.

The biology portal is built on EurOBIS. Within the catalogue record, URLs are provided for online datasets. Clicking on the link to <http://bio.EMODnet/eu> opens the EurOBIS data portal viewer with this dataset in place. Users can view other layers and download the dataset from the data portal viewer.

It is also possible to search for other datasets in the data portal viewer itself (rather than go through the catalogue). There is a search tab containing a simple search (theme and then search by species name (scientific/common), and the ontology will list possible matches. Results are listed at the bottom of the page by taxa, parameters, datasets and layers. Information on taxa can be presented as a map, downloaded or it is possible to list information on taxa. Similarly, it is possible to map or download data on biological parameters; map, download or list information on datasets (the information links to the data catalogue metadata); or map or list more information on GIS layers. This portal was intuitive to use, but a guide was also available on the 'Help' tab.

2.1.1 Understanding of the scope of EMODNET

The biology portal homepage briefly describes purpose of EMODNET and the aims of the preparatory actions in a series of bullet points. It includes link to the EMODNET website, where more information can be obtained. A 'Workshops' page on the site provides links to the Biological Data Products workshop held 25-26 Feb 2010, including the agenda, presentations and the workshop report. The 'Documents' page includes the contracts and tender, letters of support, meetings, progress report and workshop documentation, all of which can be used to find more information on EMODNET.

2.1.2 Data coverage of the portal

A total of 485 datasets covering nine thematic areas were catalogued as of 1 March 2011, of which 291 (60%) were available on the EurOBIS mapping tool (Table 1).

Table 1: Biological datasets by theme

Theme	Number of datasets	Number of datasets available on EurOBIS
Benthos	218	174
Zooplankton	56	18
Phytoplankton	58	18
Fish	60	26
Birds	16	12
Reptiles	8	6
Algae	44	31
Pigments	19	1
Angiosperms	6	5
TOTAL	485	291

The data catalogue was used to get an idea of the geographic coverage of selected datasets. The advanced search tool was used to find records available on EurOBIS by theme. For the largest dataset, benthos, we attempted to find the number of datasets in the Baltic using the controlled vocabulary option for Baltic in the 'Geographical term' search box. 'ANE, Baltic' was selected and returned only one result. However, when the term 'Baltic' was typed in the free text search, ten results were returned. Some of these also had 'ANE, Baltic' in the 'Geographic cover' metadata field and some did not have anything in this field. This presents problems when users want to find a dataset in this way.

In order to find out what the metadata field for 'Geographic cover' contained in some of the other thematic datasets, each record was viewed. This method was not used for the aforementioned Benthos theme as it was simply too large. Figure 1 shows the proportion of geographic coverage of some of these themes. Most either had no information or terms other than the main European seas. The 'Other' terms included: World Waters, Southern Ocean, France, Ireland, European Continental Shelf, English Channel etc.

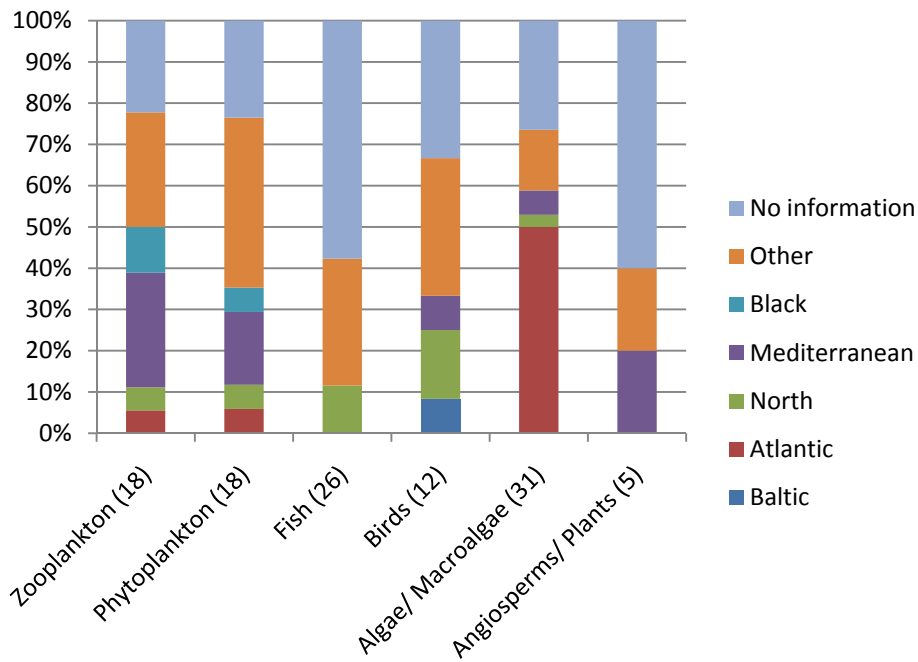


Figure 1: Proportion of geographic coverage of selected themes in the biology data catalogue

Note: number in brackets indicates number of datasets examined

The temporal coverage of datasets was also difficult to determine. For example, again using the benthos dataset, the advanced search and selected after 01/YYYY and before 01/YYYY. The number of datasets this resulted in was put in the table. However, the number of results retrieved when searching this way does not match the number of available datasets. Namely, there are some that were not retrieved using this search method.

For some of the other themes, the records were examined individually and tallied for pre-determined time brackets (e.g. 1901-1950, 1951-2000 etc). Using this method, it was clear that most of the datasets are from 1951-present. However, a high proportion of them did not provide any temporal information (Figure 2).

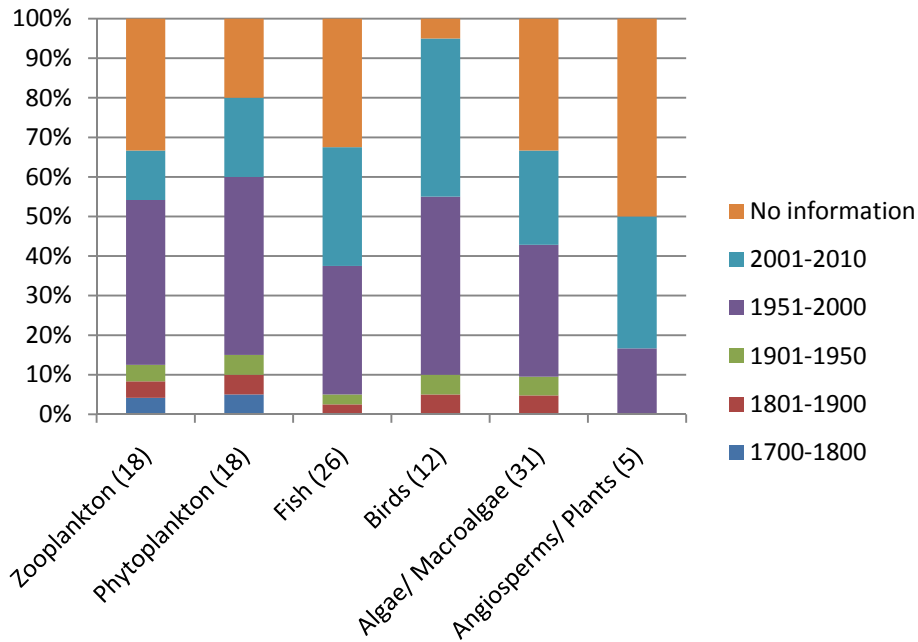


Figure 2: Proportion of temporal coverage of selected themes in the biology data catalogue

Note: number in brackets indicates number of datasets examined

The portal does not provide a mechanism to search the catalogue only for the unrestricted datasets (or for datasets by license type), so individual records were viewed to tally the access restrictions for selected thematic datasets. Most of the data was unrestricted or freely available if cited (Figure 3).

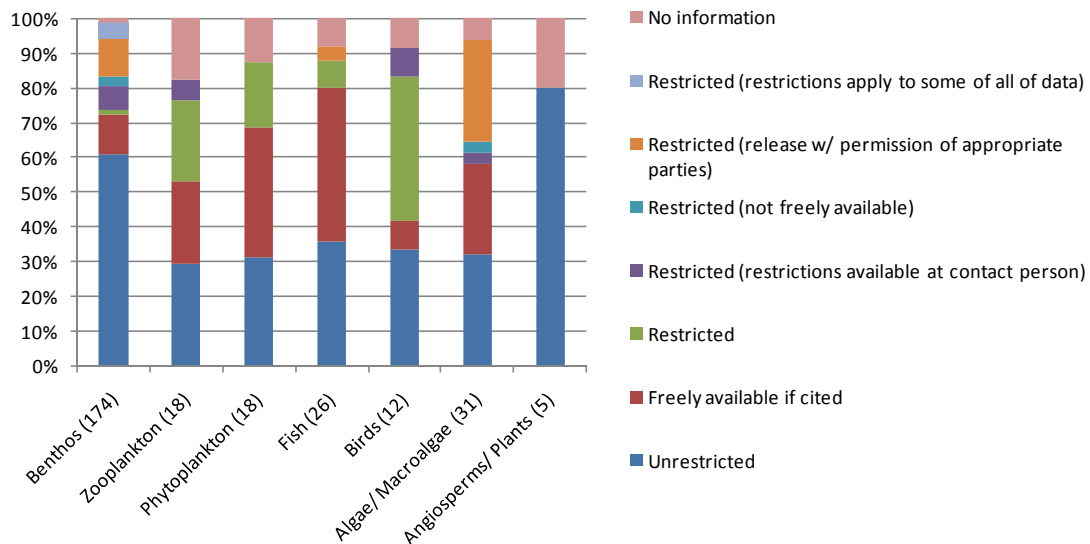


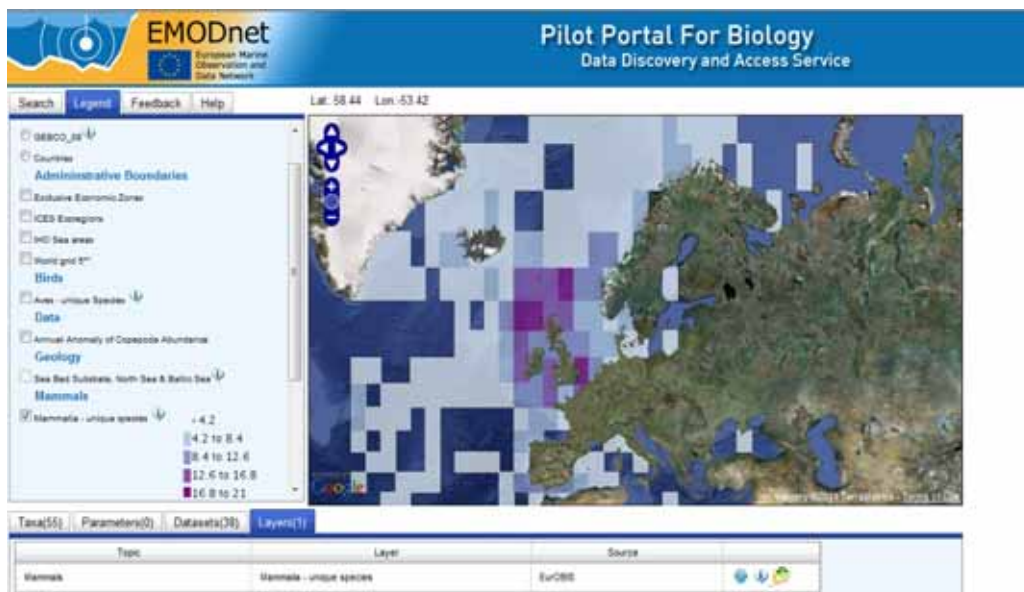
Figure 3: Proportion of access restrictions for selected themes in the biology data catalogue

Note: number in brackets indicates number of datasets examined

2.1.3 Quality of data in the portal

It is not immediately clear how data in the portal is quality checked. Some of the records have a status of 'completed' and others say 'In progress', but it is not clear whether this relates to quality control checking or not.

Each dataset does contain metadata on ownership and version control including version, type, responsible persons and their contact information. Within the portal there is an interactive 'Data Discovery and Access Service' accessible from the home page that provides access to both the data and the prepared layers. This provided an opportunity to assess how metadata is presented to users through the interface. For the purpose of this exercise we selected 'mammals' in the search term option. This provides access to one layer that can be presented in the mapping interface (Screenshot 2) and brings up the legend panel.



Screenshot 2 Layer generated presenting the recorded number of mammal species as a map

Clicking on the information icon brings up fairly comprehensive details related to how the layer was created (Screenshot 3), including details of the metadata author, when the dataset was last modified and the source of the data.

Date	2010-12-01T00:21:06		
Date type	Revision: Date identifies when the resource was examined or re-examined and improved or amended		
Status	Completed: Production of the data has been completed		
Point of contact			
Individual name	Bart Vanhoose	Delivery point	Wandelaarstraat 7
Organization name	Flanders Marine Institute (VLIZ)	City	Oostende
Position name	Application developer	Administrative area	West-Flanders
Role	Point of contact: Party who can be contacted for acquiring knowledge about or acquisition of the resource	Postal code	8400
		Country	Belgium
		Online resource	http://www.vliz.be/02/assessres/eng
Descriptive keywords			
Thematic category code	EMODnet - Mammals - Unique Species (Theme)		
Topic category code	Oceans		
Extent			
Geographic bounding box:			
	West bound longitude	North bound latitude	East bound longitude
	-45.0	90.0	72.0
		South bound latitude	
		24.0	
Distribution info			
Transfer options			
Interactive Map	Number of unique species of mammals on a 3x3 degree grid for the European Marine Waters, based on EuroBIO data (September 2009) [DOI: 10.26907/1469-4984-4381-6ac6-ca2126f52810]		
View in Google Earth	Number of unique species of mammals on a 3x3 degree grid for the European Marine Waters, based on EuroBIO data (September 2009)		
Data quality info			
Metadata			
File identifier	920f7473-9464-4381-6ac6-ca2126f52810		
Language	English		
Character set	UTF8, 8 bit variable size UCS Transfer Format, based on ISO/IEC 10646		
Hierarchy level	Dataset: Information applies to the dataset		
Date stamp	2010-12-01T00:21:06		
Metadata standard name	ISO 19115:2003/19139		
Metadata standard version	1.0		
Metadata author			
Individual name	Bart Vanhoose	Delivery point	Wandelaarstraat 7
Organization name	Flanders Marine Institute (VLIZ)	City	Oostende
Position name	Application developer	Administrative area	West-Flanders
Role	Point of contact: Party who can be contacted for acquiring knowledge about or acquisition of the resource	Postal code	8400
		Country	Belgium
		Online resource	http://www.vliz.be/02/assessres/eng

Screenshot 3 Information available about the generated layer using the query button

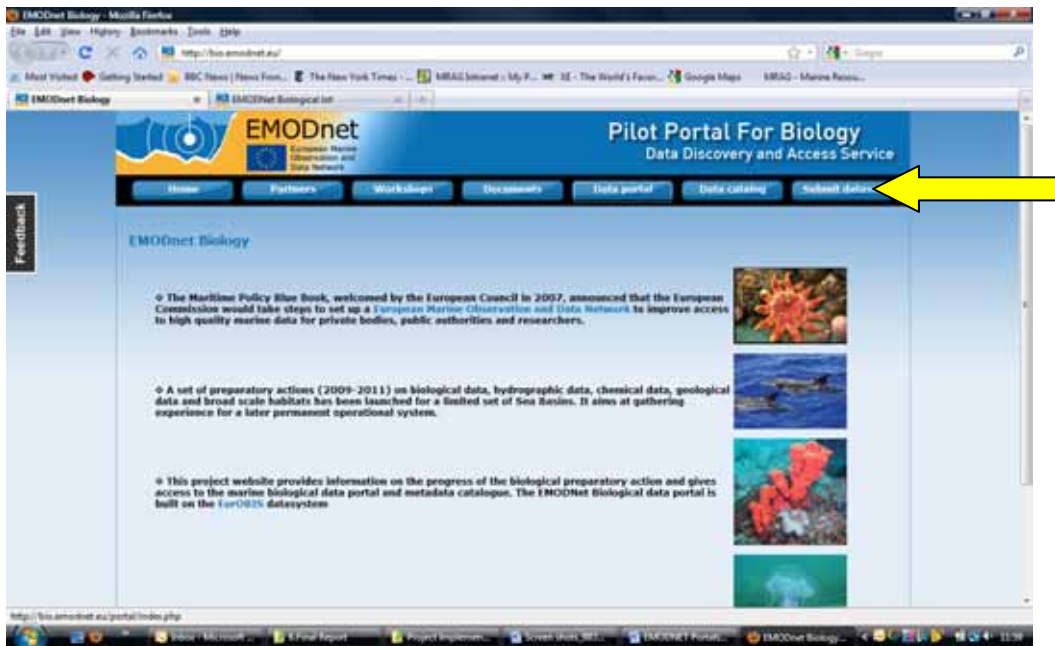
It is also possible to access information about individual points by clicking on the map at any point. This brings up the point value (in this case for number of mammal species) at that point (Screenshot 4).

Screenshot 4 Information available about an individual point on the map.

2.1.4 How to download data

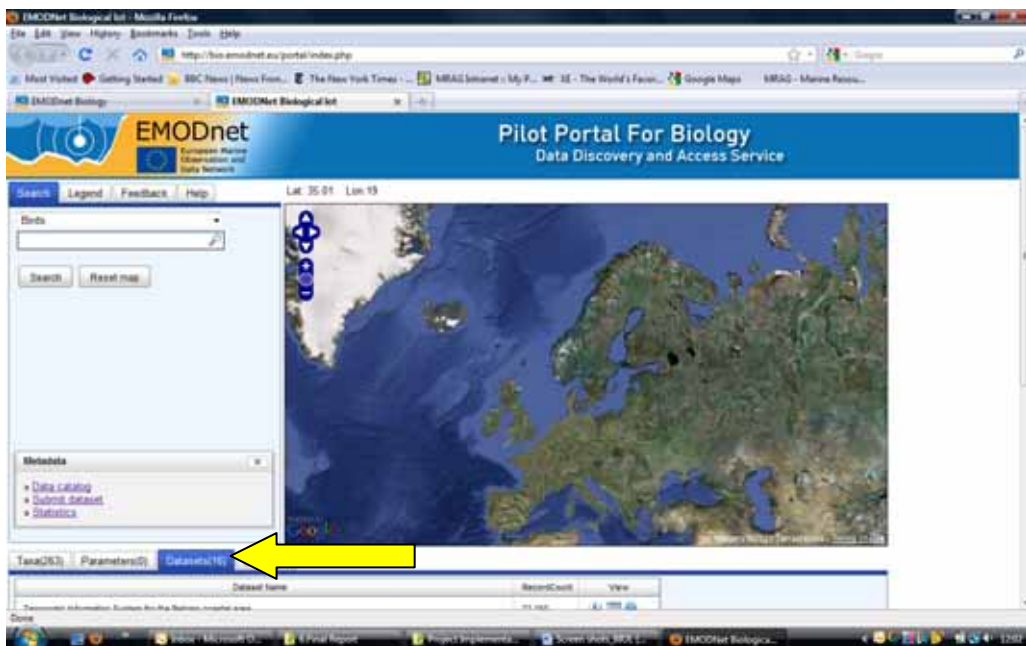
To download data from the portal it is possible to either select a dataset from the catalogue (or then open it in the map) or to select a dataset from the map list.

To access data via the data portal, it is necessary to first click on the data portal tab on the main page (see arrow in Screenshot 5).



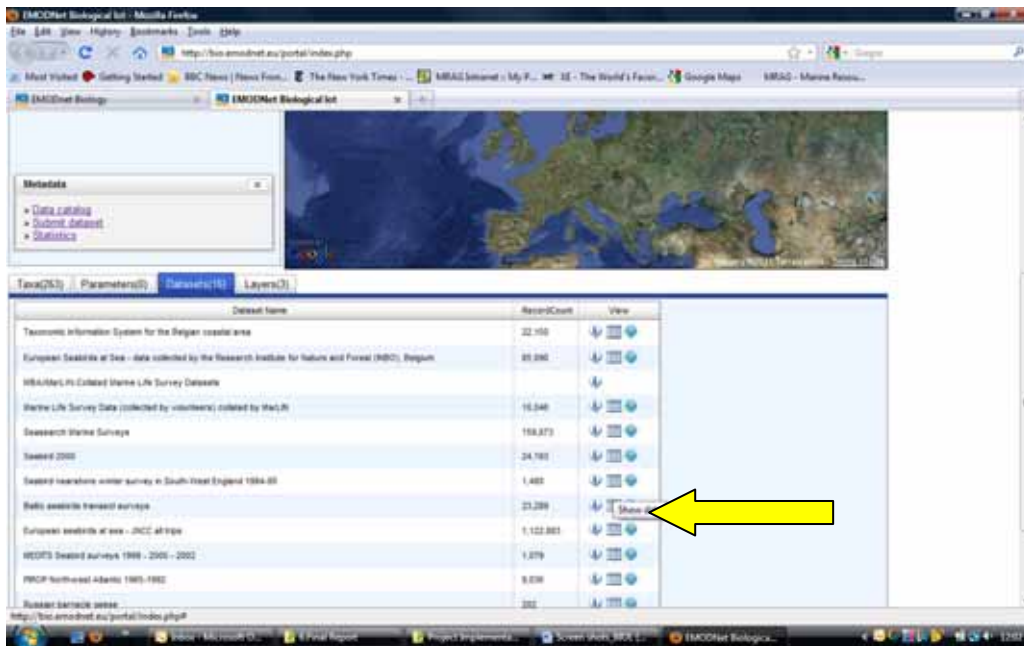
Screenshot 5 Accessing data from the biology Portal

Taking, for example, the category 'birds' it is then necessary to click on search and clicking on the tab at the bottom will reveal the list of data sets (see arrow in Screenshot 6).



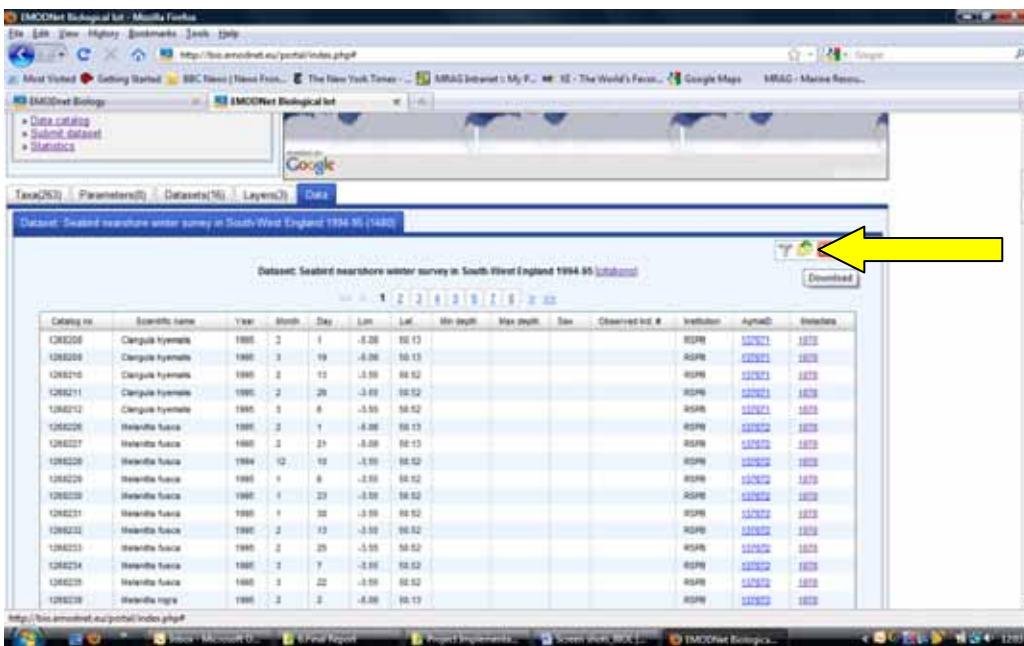
Screenshot 6 Revealing list of available data sets related to selection

Clicking on the table icon (see arrow in Screenshot 7) shows more information about the data sets. A new tab (Data) opens. It is next necessary to click on this tab to see the data. There are three options in the upper right hand corner: to filter the data; to download the data; or to close the dataset.



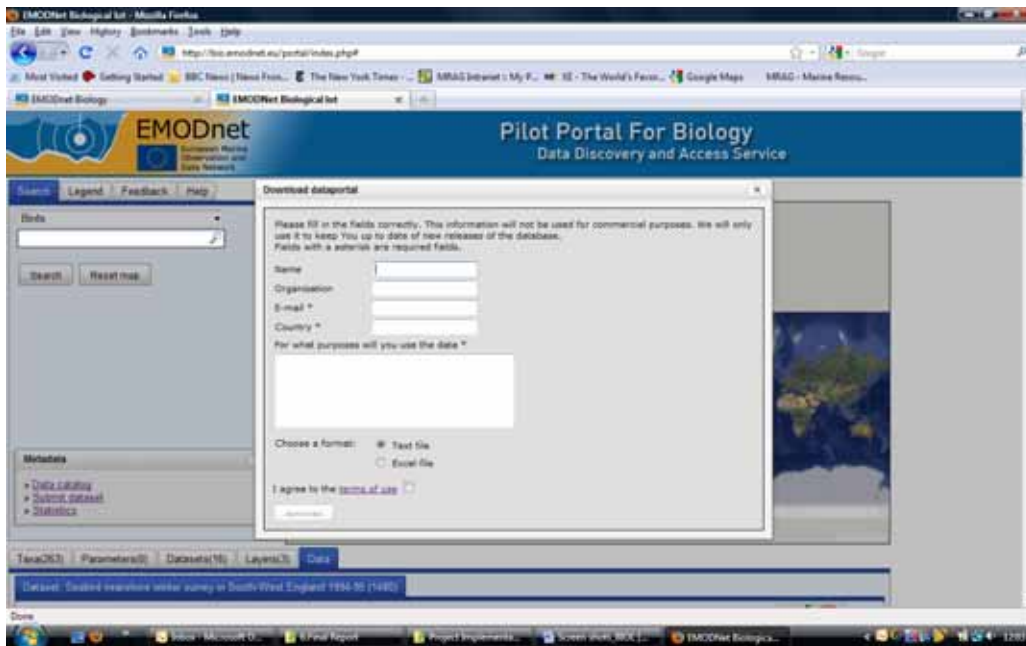
Screenshot 7 Information available about the individual data sets

To download data it is necessary to click on the folder with the green arrow above the box (see arrow in Screenshot 8) 'download' in the top right hand corner.



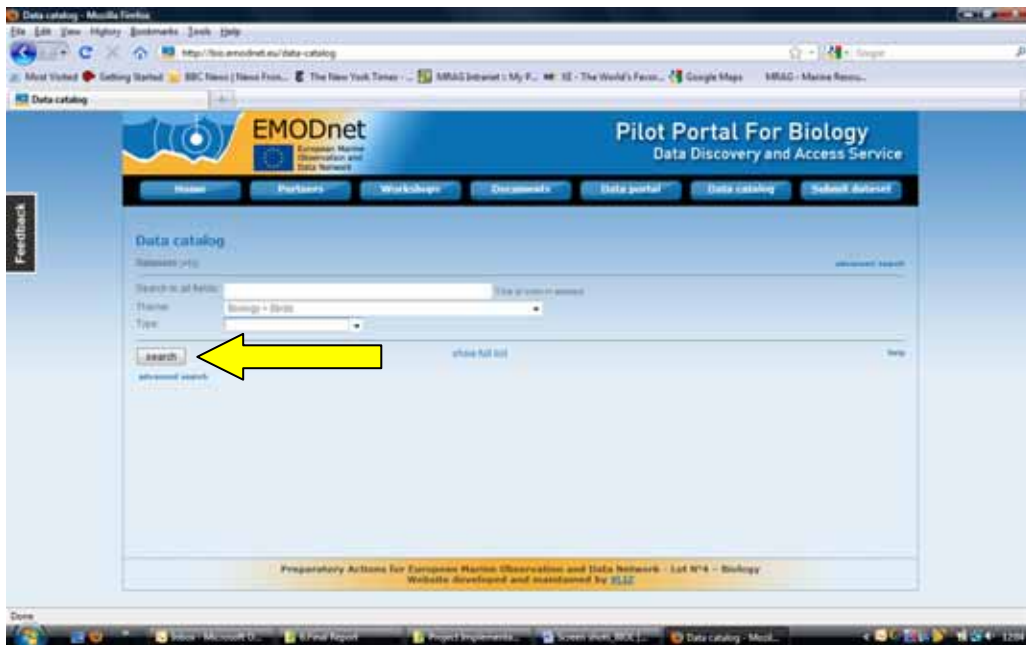
Screenshot 8 Step to download selected data sets

This opens the following box (Screenshot 9) from which the data request is to be submitted.



Screenshot 9 Data request form generated by the biology portal

There is an alternative way to access the data via the 'data catalogue'. From the main page it is possible to click on 'data catalogue'. Select a 'theme' from the drop-down list (e.g. Biology-Birds) and then click 'Search' (see arrow in Screenshot 10).



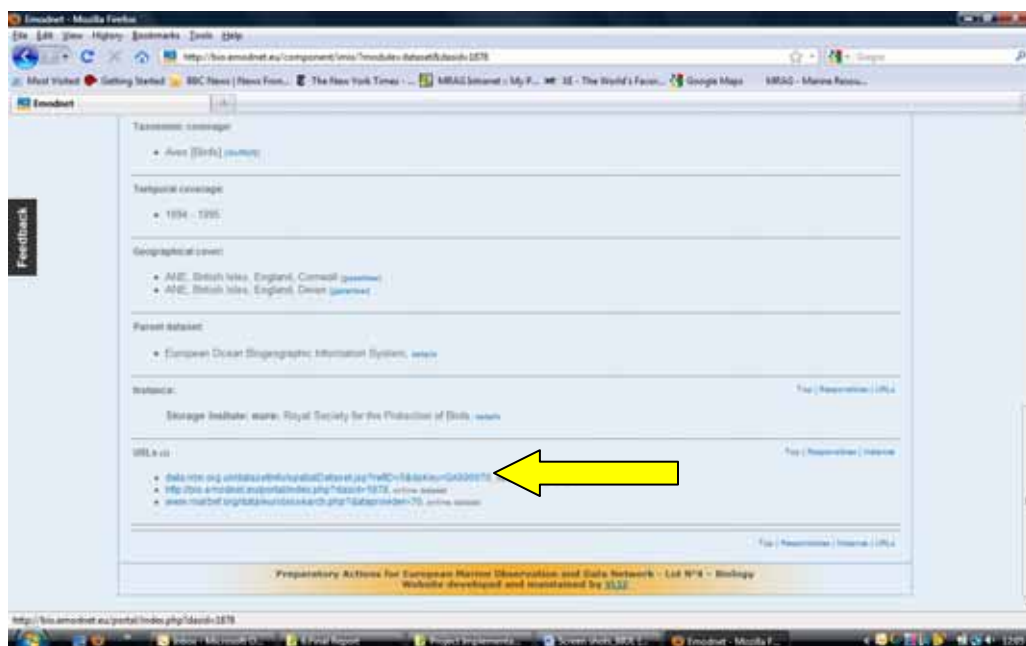
Screenshot 10 Accessing data files via the data catalogue search function

This will display a list of results. Click the 'details' link next to the dataset name for the metadata to be displayed (Screenshot 11).



Screenshot 11 The ‘details’ link that generates details of the metadata when clicked

Once the metadata is displayed, it is necessary to scroll down to see the URLs and click on the ‘emodnet.eu’ link (Screenshot 12).



Screenshot 12 Link to data provided from the metadata page

It is necessary to agree to the terms of use and to provide name, organisation, email, country, and purpose for use of data before proceeding.

2.1.5 How to provide feedback

There is a ‘Feedback’ tab on the main website to provide feedback. When this is clicked the tab a feedback form pops out. Users can provide name, email and feedback. It relates to the site in general rather than a specific product.

There is a tab to provide feedback on the data portal itself. It does not relate to specific products, but is rather a general feedback form.

In the catalogue, within individual records, there is a link to 'report an error in this record'. The link opens email and provides an email address.

Under the 'Help' tab on the data portal, there is a contact email address for problems or questions. A user manual is also available here.

2.1.6 Questionnaire responses

Four users filled in the questionnaire survey on the user-friendliness of the biology portal. All four responses were the result of the email circulated to individuals asking them to look at the portal and then to fill in the survey. The responses provided some additional perspective, but firm conclusions cannot be drawn. Overall, most respondents had a good impression of the site and easily found the data. Mixed responses were received on whether the portal fulfilled requirements, was intuitive to use and whether data was comprehensive (Table 2). Three of the four users found at least some 'errors' when using the portal; their comments on these can be found in

Table 3.

Only two users responded to the question how the portal compares to others they have used – one said ‘Better’ and the other ‘About the same’. A field was provided for any other comments. Two users provided comments (Table 4).

Table 2: Survey responses on user-friendliness of the biology portal

User	Portal fulfilled requirements	Good first impression	Portal intuitive to use	Instructions were useful	Data easy to find	Data was comprehensive
1	Disagree strongly	Neutral	Agree	Neutral	Agree strongly	Disagree strongly
2	Agree	Agree	Neutral	Neutral	Agree	Agree
3	Neutral	Agree	Agree	Neutral	Neutral	Neutral
4	No response	Agree	Disagree	Neutral	Agree	No response

Table 3: Survey responses on whether errors encountered when using the biology portal

User	Encountered errors	Comment
1	Many	Numerous data do not refer to EU waters(e.g. Antarctic)
2	None	n/a
3	Some	Not all layers would draw on the map, e.g. salinity and velocity (is that current by the way?). I tested viewing a couple of fish datasets and I got the message first that data was loading and then there was a data error - so the data tables were not accessible
4	Some	Slow performance for additional physical layers like salinity.

Table 4: Open ended comments from survey responses on the biology portal

User	Comment
1	May become a good product, once the available date is gathered. Until now, remains very poor and misleading in my field of interest (birds).
2	No comment provided
3	No comment provided
4	I think that this kind of portal is something new. I won't say better or worse than other portals. Question 4 and 5 should offer more possibilities than just good or bad.

2.2 Task Two

According to the ToR, the task in relation to the biology portal was to download data on species from the portal and use this to determine for the North Sea and the Atlantic Iberian Coast the number of records of each family of species – phytoplankton, zooplankton, angiosperms, macro-algae, invertebrate bottom fauna, bird communities, sea mammals and reptiles.

2.2.1 Accessing the data

In terms of the task required, this was largely possible through the web interface that was able to provide a summary (number of species and number of records) for the basins from a GIS layer available in the portal. Clicking the 'Statistics' link in the metadata box (below the search) adds the statistics GIS layer to the map. Clicking on the map in a regional sea polygon then generates the statistics on the number of species and the number of records for that polygon.

For areas other than the International Hydrographic Organization (IHO) Sea Areas, it is possible to get the information but the process is more laborious. Using the search function the theme has to be selected. This brings up all the data sets for the theme by taxa. It is possible to check whether there is a record within the region of interest using the map (globe symbol in the display option). This process is made easier by the possibility to overlay different administrative boundaries, including IHO Sea Areas, world grid and International Council for the Exploration of the Sea (ICES) ecoregions.

Even if this step is not taken to quickly exclude data sets, relevant data sets should be opened by clicking on the spreadsheet symbol. With the data set open, it is possible to use the filter function (funnel symbol) and filter by position or date. In this case we could enter a lat/long quadrangle through the web interface and calculate the number of records that relate to this area. However, to provide a summary this has to be applied to each data set individually and summed.

In relation to the North Sea the task was fairly straightforward. However, calculating the number of records for the Atlantic Iberian Coast proved more difficult. It is possible to get numbers for the Atlantic but the Atlantic Iberian Coast is not a separate area in the biological database. The reason that has been given for this is that the portal uses the IHO Seas Areas map as a baseline for calculating the number of observations and number of species per sea. To complete the task for the Atlantic Iberian Coast required manually entering the min and max lat and long for the area against each species and keeping a tally for the number of records. Table 5 below shows the summary of the number of records.

Table 5 The number of records for each family of species for North Sea and Atlantic (from interface) and from within the Atlantic Iberian Coast (using the coordinates for the boundaries of the Iberian Coast LME from VLIZ).

	Phytoplankton	Zooplankton	Angiosperma	Macro-algae	Invert. Benthos	Birds	Sea mammals	Reptiles
North Sea	112556	94724	34376	31171	536068	501474	15720	97
Atlantic coast	143020	144057	48513	47893	120640	287679	39486	2723
Iberian coast	14803	8855	6861	6437	3949	85	10799	315

An additional task that required data to be downloaded was completed. The task was to retrieve the data for two bird species for ICES Areas VII and plot observations. The bird species were Manx Shearwater (*Puffinus puffinus*) and the Common Guillemot (*Uria aalge*), both of which have large numbers of records on the portal (34,868 and 197,767 respectively). Selecting the data was straightforward, as described in section 2.1.4. However, it was not possible to filter the records using the filter tool in the website. The filter accepted the criteria submitted, but the number of records returned remained the same. It is possible to download the data that is displayed on the portal by clicking on the download icon, and filling in a simple form as shown in Screenshot 13.

Download dataportal

Please fill in the fields correctly. This information will not be used for commercial purposes. We will only use it to keep You up to date of new releases of the database.
Fields with a asterisk are required fields.

Name

Organisation

E-mail *

Country *

For what purposes will you use the data *

Choose a format: Text file
 Excel file

I agree to the [terms of use](#)

Screenshot 13 Form generated by the biology portal when attempting to download data

It was possible to download the entire data set for the Manx Shearwater, however when attempting to do the same for the Common Guillemot data a 'http 500 internal server error' was returned.

When viewing the data on the portal a link is provided to display the citations for using the data on the portal. When using the link for the Manx Shearwater data on the relevant citation was provided (The Census of Marine Life field project MAR-ECO, 2003-2010. www.mar-eco.no). However, the data that was returned came from more than one source, and when clicking on the metadata link next to the record (<http://bio.emodnet.eu/component/imis/?module=dataset&daside=1986>) it appeared that the record had access constraints upon it and could not be used without obtaining written consent

For this additional task of creating plots of bird observations, it was only possible to retrieve data for the Manx Shearwater. The whole data set had to be downloaded as either a text file or an Excel spreadsheet. Once that data was downloaded it could be filtered using the functionality of the spreadsheet application or the GIS application once the data was added and the points provided were plotted. However, for the Manx Shearwater dataset it was not possible to filter most of the records by date or even by year, as that data was not available for the majority of the records.

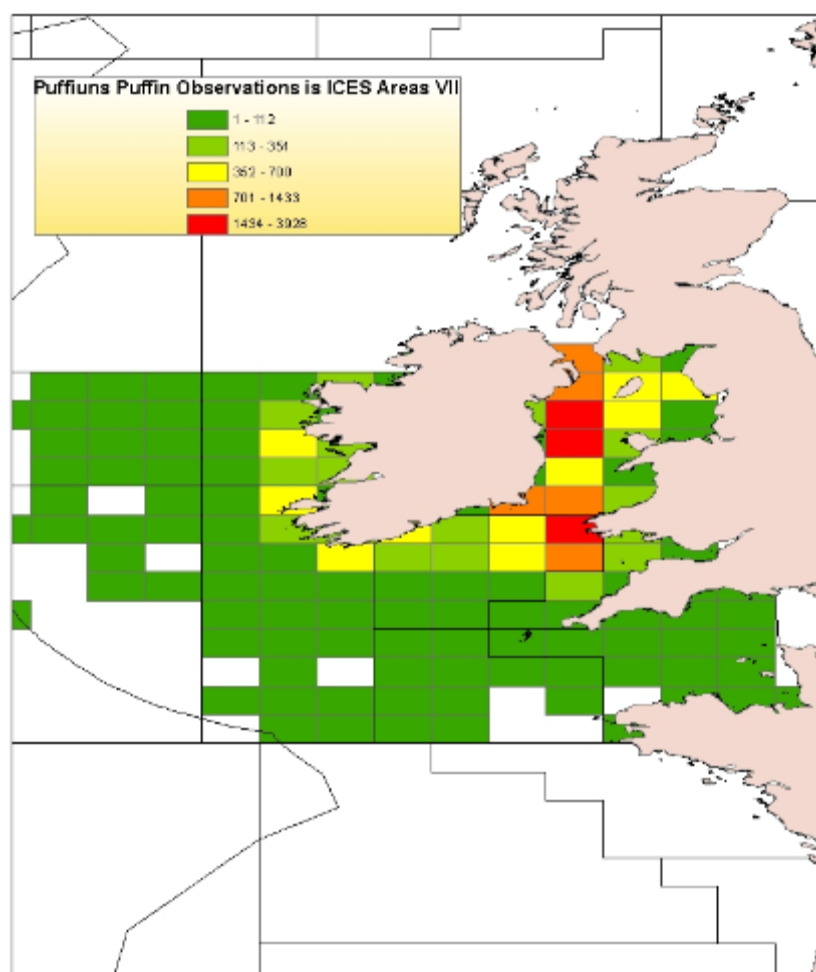


Figure 4 Map of the observations of the Manx Shearwater (*Puffinus puffinus*) within the ICES Area VII sea area developed using data downloaded from the biology portal (see text for details).

The data for Manx Shearwater was downloaded as an Excel file and imported into an Access database to filter the records, and the table was connected to the GIS application. The positions of the bird observations were plotted, and then using the GIS application the number of observations in each ICES statistical square was counted, and displayed in the map shown in Figure 4.

2.2.2 Response to queries in completing Task Two

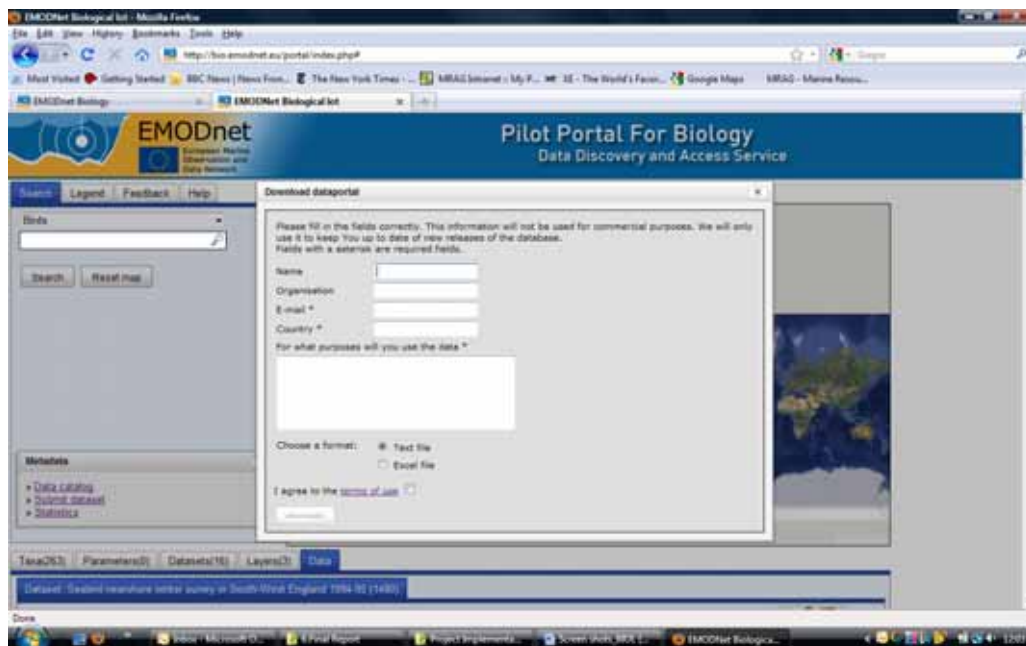
The response to a query about obtaining data for the Atlantic Iberian Coast was dealt with quickly. Not only was an explanation provided as to the scale of the areas within the maps, but instructions were also provided for calculating the number of records manually and a calculation of the number of records based on the polygon for the Iberian Coast large marine ecosystem (LME).

2.3 Task Three

2.3.1 IPR issues from the user perspective

IPR issues have obviously been taken into account in terms of the design of the portal and the manner in which data can be accessed.

As described above before data can be downloaded from the portal it is necessary to agree to the terms of use and to provide name, organisation, email, country, and purpose for use of data before proceeding.



Screenshot 14 Data download registration pop-up on the biology portal

Clicking on the Terms of Use reveals the following text.

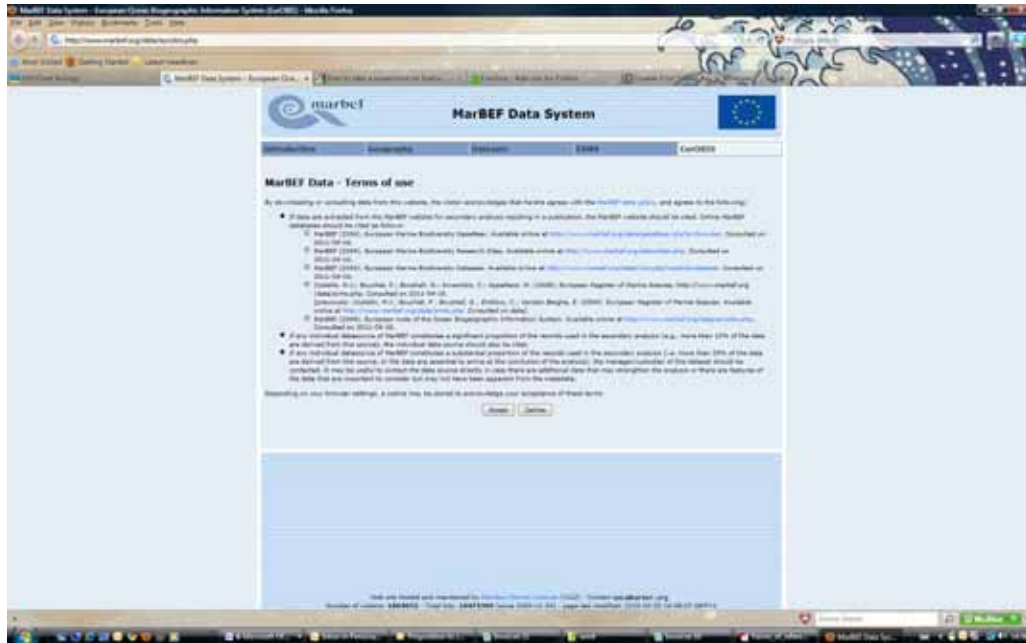
If data are extracted from the EMODNET Data Portal for secondary analysis resulting in a publication, the appropriate source should be cited:

- *Online raw data (background data) should be cited as follows: EurOBIS Data. European node of the Ocean Biogeographic Information System. Available online at <http://www.eurobis.org> Consulted on 2011-01-18.*
 - *If any individual datasource of EurOBIS constitutes a significant proportion of the records used in the secondary analysis (e.g., more than 10% of the data are derived from this source), the individual data source should also be cited.*
 - *If any individual datasource of EurOBIS constitutes a substantial proportion of the records used in the secondary analysis (i.e. more than 25% of the data are derived from this source, or the data are essential to arrive at the conclusion of the analysis), the manager/custodian of this dataset should be contacted. It may be useful to contact the data source directly in case there are additional data that may strengthen the analysis or there are features of the data that are important to consider but may not have been apparent from the metadata.*
- *Online data products and GIS maps (foreground data) should be cited as follows: EMODNET Biological Data Products. Available online at <http://bio.emodnet.eu> Consulted on 2011-01-18.*

The data may not be redistributed without the permission of the appropriate data owners. If data are extracted from the EMODNET Data Portal for redistribution, please contact us at bio@emodnet.eu

As can be seen a distinction is made between two types of data: online raw data and online data products and GIS maps.

As regards the raw data there is link to <http://www.eurobis.org>. Clicking on that link opens the following page, which sets out the MarBEF Data –Terms of use (Screenshot 15).



Screenshot 15 MarBEF Terms of use page

Clicking on the link to the MarBEF data policy opens a pdf document which sets out the policy which states as provides as follows:

The first guiding principle within the MarBEF network is the principle of free and open access to data in a partnership approach. This is in line with data policy of other major organisations like the Intergovernmental Oceanographic Commission (IOC), with the Conference statement of the Ocean Biodiversity Informatics conference held in Hamburg, 29/11-1/12/2004, and with Paragraph II.34 of Annex II - General Conditions of the MarBEF contract.

A second guiding principle is that the scientist or team generating the data should have an opportunity to have first publication of the data, and analysis based on them. This will normally imply a moratorium period, in which the originator of the data or data steward will have privileged or exclusive access to the data. The start of the moratorium period is the time that data was produced (e.g. laboratory analysis, species identifications), not when the samples were taken. The moratorium period is two years for scientific data, but can be longer for long time series.

Last but not least, the data policy of the originator of the data will take precedence over data policy of MarBEF. MarBEF does not claim ownership of the data, only the participating institutes/organisations and/or the funder of the data collection will do this. Providers may decide to withdraw their data from the MarBEF portal if they wish.

In other words, the policy basically provides for the free and open access to the data subject to the possibility that the originator of the data is to have an opportunity to publish the data and any analysis based thereon through a moratorium period. Finally though the MarBEF data policy makes it clear that MarBEF does not claim to own the data and that the data policy of the originator of the data (the first owner as it were) will have priority over the MarBEF policy such that the data owner can withdraw the data from the MarBEF portal at will.

The net effect is that the data is basically freely available but may not be freely re-distributed. The

main other restriction in terms of how the data can be used relates to the issue of citation. Detailed instructions in this regard are set out on the eurobis website which sets out the MarBEF Data terms of use.

The main conclusion is that the portal needs a uniform, simplified and comprehensive set of user terms instead of the current approach of linking to the Eurobis and MarBEF terms (for raw data) and to Emodnet.eu (for online data products). The same is actually true for most of the portals linking to other (already existing) terms and policies on related websites.

The portal, through the use of the MarBEF terms does however do a relatively good job in terms of in explaining the distinction between the data owners (data originator) and the data publisher (= portal).

2.3.2 IPR issues from the provider perspective

Much of the species observation data on the portal derives from the EurOBIS Project and much of that was in turn collected in the context of the MarBEF Program. The data policy of the biology portal basically continues the same data policies of these earlier projects namely that the data should in principle be freely available, although not re-distributed, and that if a large amount of the data is to be cited the data owner should be contacted in order to agree on how it is to be cited. Moreover there is the possibility of subjecting certain data to a moratorium.

The data on the portal comes from a range of partners and networks apart from the consortium members. These partners represent different networks and communities that have access to biological data. Not all, of them, however are part of EurOBIS. Nevertheless they are asked whether they are willing to share the data on the basis of the EurOBIS and MarBEF data policies and their agreement is recorded, although not in the form of formal licence agreements. These agreements are assumed to be legally binding although there is not a standard contract.

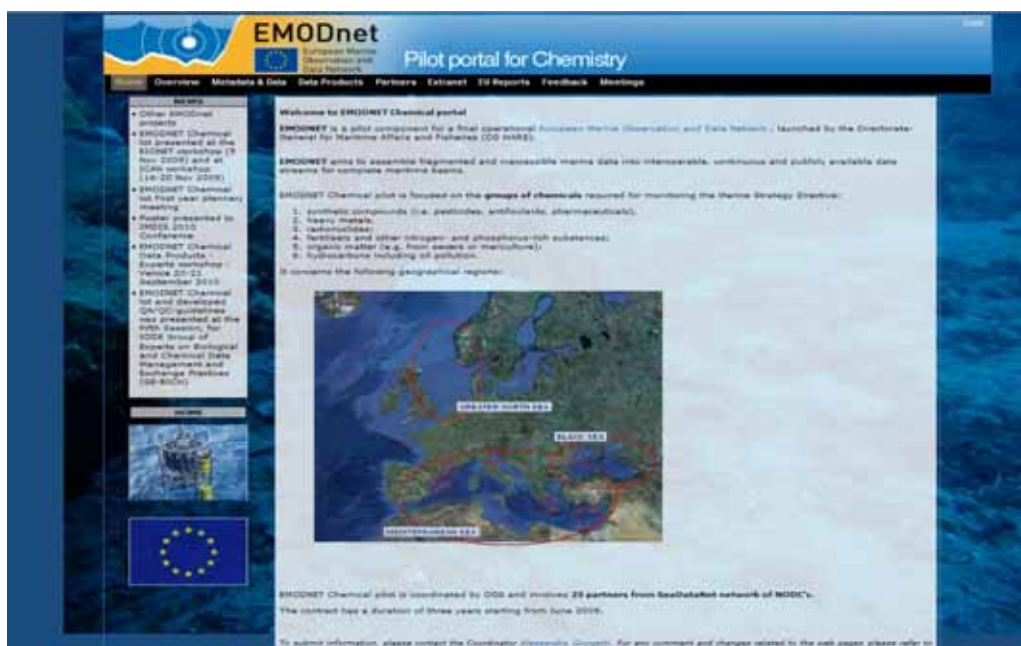
In addition to the data available on the EMODNET biology portal other data is available under EurOBIS and this is described, using metadata, in the data-catalogue. Individual requests for the use of such data are referred back to the relevant data owners.

3 Chemistry portal

The chemistry portal has been set up by a consortium of research organisations led by the Istituto Nazionale di Oceanografia e di Geofisica Sperimentale from Italy. The chemistry portal website is available at: <http://www.EMODnet-chemistry.eu/portal/portal/>

3.1 Task One

The chemistry portal site is easy to navigate and laid out in a logical way. The main page has a map that shows the geographical regions that are covered in the portal and information on the groups of chemicals that the pilot is focused on (Screenshot 16). There is box on the left side for 'News' items. The main pages examined in more detail in this section are the 'Metadata & Data' and 'Data Products'. The tabs at the top of the page are: Home, Overview, Metadata & Data, Data Products, Partners, Extranet, EU Reports, Feedback, Meetings and Work Area. The heading 'EU Reports' is somewhat misleading as this page contains reports on the portal made to the EU rather than EU reports about the portal.



Screenshot 16 Main page for the chemistry pilot portal (Accessed 02/03/2011)

The 'Metadata & Data' tab provides information on the Common Data Index (CDI) and a link to the CDI metadata format and tools. However, this was an out-of-date link that led to an error message on the SeaDataNet page.

The main CDI metadata categories are 'what?', 'where?', 'when?', 'how?', 'who?', 'how?'. From the catalogue the metadata record can be displayed in XML, added to the 'shopping basket' or printed.

Clicking on the 'Data Products' tab brings up a page with a link to the 'EMODNET Data Products Viewing and Downloading Service'. There is also a link to the guidelines for the DIVA maps production. Clicking the link to the portal brings up the viewing and downloading service (draft version). From here the type of product to be viewed can be selected from options listed by

geographic area. 'Black Sea', 'Mediterranean Sea' and 'North Sea' are the current options. Once the data you want is selected (by ticking a box), the map shows the information. Tabs at the top of the viewing service allow you to view the information either by horizontal section or vertical section. A box on the right side allows you to set a plotting style, download the image created (and provides static links to the information), remove the layer selected, select data by depth or time, and animate the map.

The 'Help' function in the data viewer provided a link to 'Ocean Browser description' that provided basic usage information, icons, how to add files and a contact for feedback. This was not a step-by-step manual, but did provide some useful information on selecting information to display.

From the Data Discovery and Access Survey pages, there are links to CDI Help (version 2) providing information on the interface, searching CDI entries and ordering the datasets for both the simple and extended searches.

3.1.1 Understanding of the scope of EMODNET

The main page presents the aims of EMODNET and a link to the EMODNET page on the DG MARE website. It sets down the specific aims of the pilot for chemistry and has a map showing the geographical regions that it focuses on. The main page also has a 'News' section with some quick links to topics that might be of interest (other EMODNET projects, presentations/meetings/posters etc).

There is a separate 'Overview' tab with more detailed information on the setting up of EMODNET as a whole, including the context and other pilot projects. There are also links to descriptions on the organisation of the chemical pilot project, approach, and specific objectives and activities.

The tab 'EU reports' contains the progress reports from the project sent to the EU. This tab heading was less clear as the name could imply that the reports are from the EU rather than for them.

The 'Meetings' tab contained meeting reports and presentations from meetings related to this pilot project.

3.1.2 Data coverage of the portal

This pilot portal currently contains data for three selected geographic regions: Greater North Sea, Black Sea and five spots in the Mediterranean.

The data also focuses specifically on the groups of chemicals required for monitoring the Marine Strategy Framework Directive⁶:

- synthetic compounds (i.e. pesticides, antifoulants, pharmaceuticals);
- heavy metals;
- radionuclides;
- fertilisers and other nitrogen- and phosphorus-rich substances;
- organic matter (e.g. from sewers or mariculture); and
- hydrocarbons including oil pollution.

⁶ Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy.

The 'Data Discovery and Access Service' is a catalogue containing 402,732 records (1/3/2011). There are separate links for 'quick search' and 'extended search'.

The project partners have also created an analysis of the matrix variables vs. marine regions, available from a link on the 'Metadata & Data' tab. From this it is possible to get a general idea of where data is available or lacking. Using this, it appears that the North Sea has the most coverage by variable.

The simple search facility was used to determine the temporal coverage of the datasets. About 63% of the data is from 1951-2000 (Figure 5).

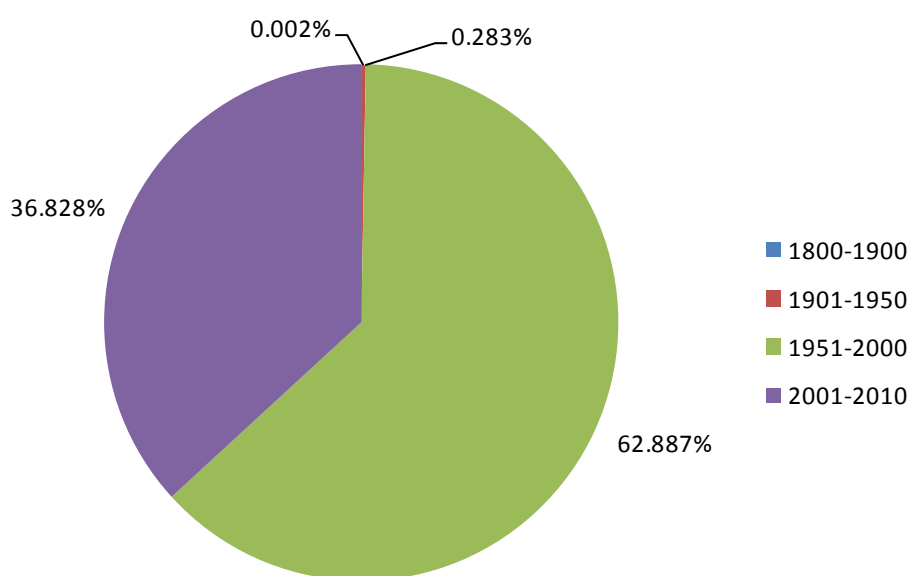


Figure 5: Proportion of chemistry data in 'Data Discovery and Access Service' by time period

The navigation within the 'Data Discovery and Access Service' allows the user to go back to the list or to see current/previous/next dataset. It is also easy to 'reset all steps' and go back to the full set of data for searching. In addition, there is the option to save a search and return to it in order to run the same query. A query can also be refined to reduce the number of results. However, when clicking on the 'refine' button it appears that a totally new search has been started, although this is not in fact the case.

It is also possible to do a geographical search using a map, on which a rectangle can be drawn to show datasets. Datasets can also be browsed using links to groups of datasets catalogued in areas such as parameter categories (e.g. dissolved gases, nutrients etc.), disciplines (e.g. chemical oceanography, administration and dimensions etc.), instrument/gear type (CTD, discrete water samplers etc.), CDI-Partner, Country and Data holding centre.

Within selected datasets (or for all of them), a summary of query results can be generated containing number of datasets per data holding centre, originator, category, variable, instrument/type, year and data access restriction.

Most of the data access restrictions required a SeaDataNet license (45%) and another 40% were Unrestricted (Figure 6).

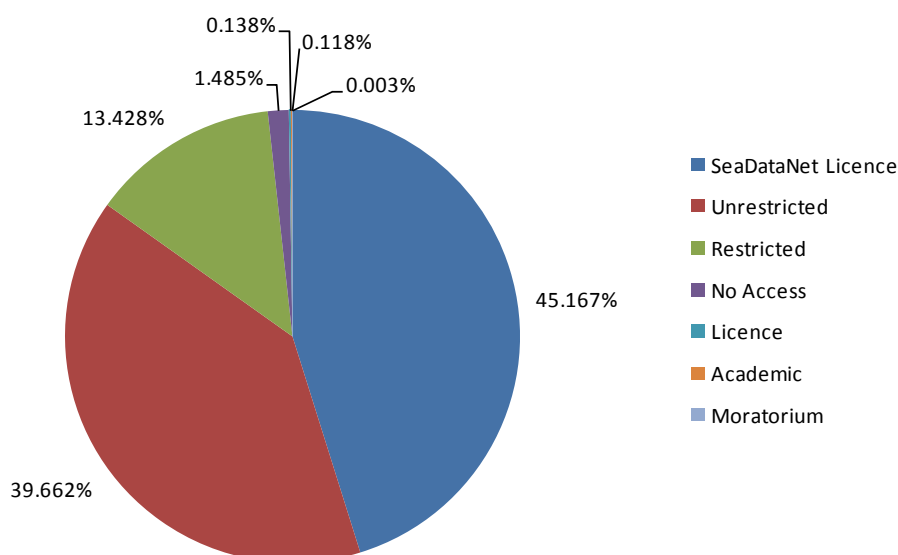
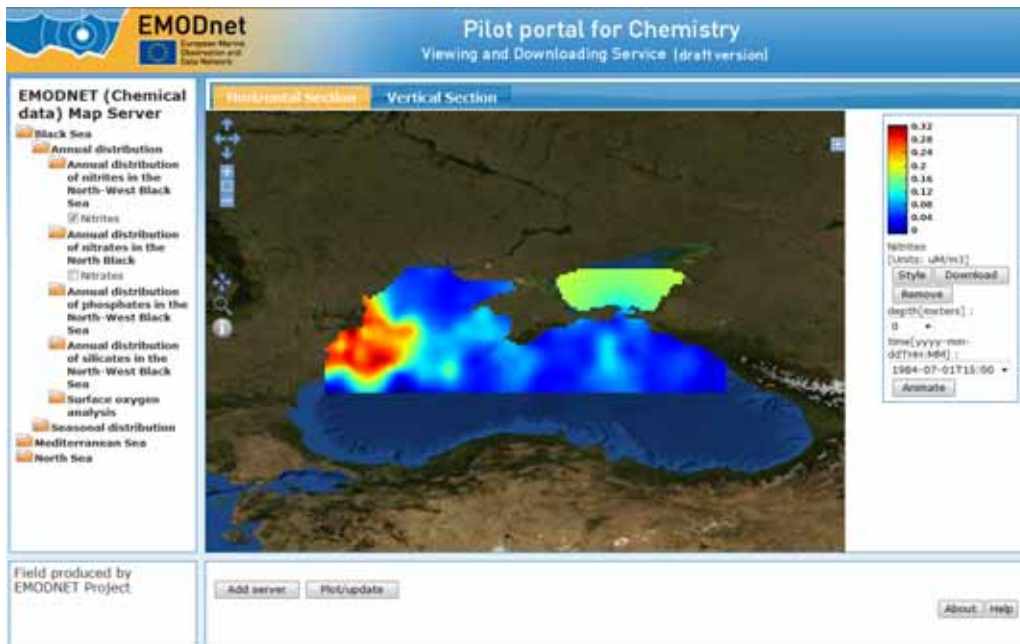


Figure 6: Proportion of access restrictions in the chemistry portal

3.1.3 Quality of data in the portal

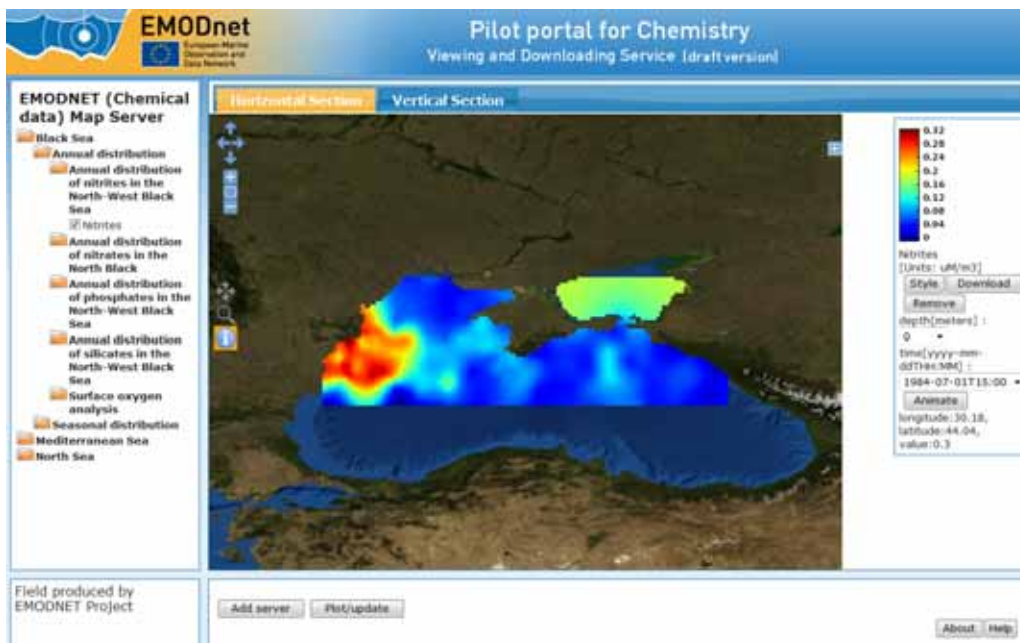
Clicking on the 'Data products' tag triggers a pop up with the disclaimer: "The system is operating but we are working for the data quality checking (draft version - these results have not been validated by the regional experts)". This pop-up has to be closed manually, so it is difficult to miss.

Clicking on the label 'EMODNET Data Products Viewing and Downloading Service', based on OGC standards is available here' brings up a map server window which allows the selection of the regions of the Black Sea, Mediterranean and North Sea. For the purposes of the exercise to check the extent of metadata in the user interface, the Black Sea and 'Annual distribution' were selected ('Seasonal distribution' was also an option). This opened up further options based on data for nitrites in the North West Black Sea, nitrates in the North Black Sea, phosphates in the North West Black Sea, silicates in the North West Black Sea and surface oxygen analysis. The following map was generated by selecting the first of these options (Screenshot 17).



Screenshot 17 Map showing the distribution of nitrites in the Black Sea generated from the chemistry portal

The interface provides further options including the option to be able to change the depth layer for the readings. Information about each of the data points is currently limited. Clicking on the information button and highlighting a point on the map provided only the latitude, longitude and parameter value at that point (see Screenshot 18).

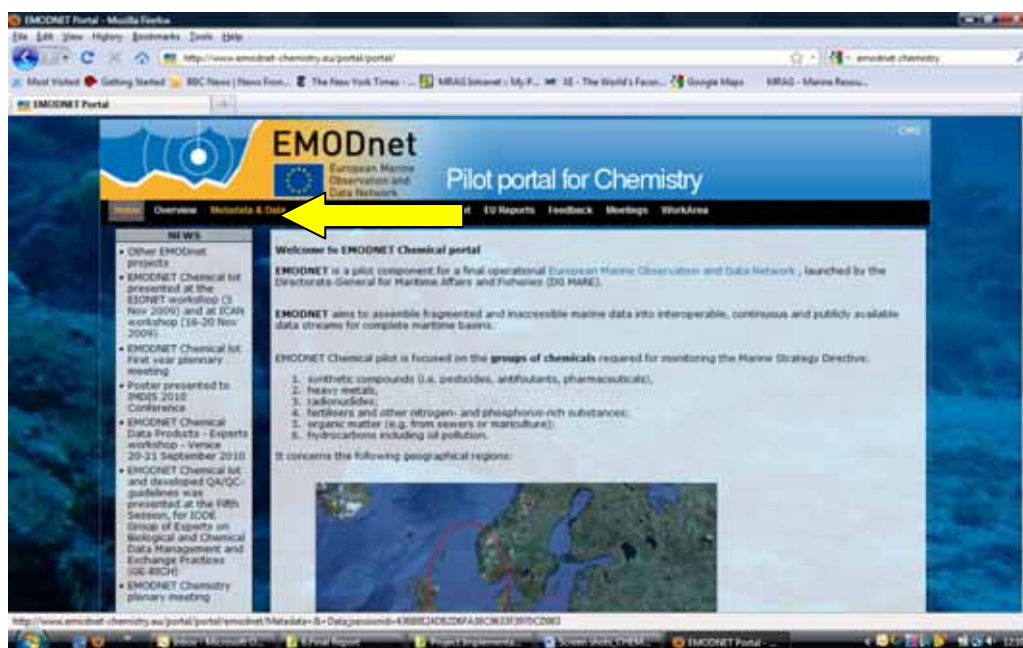


Screenshot 18 Information available about data points on the map (see text for details)

3.1.4 How to download data

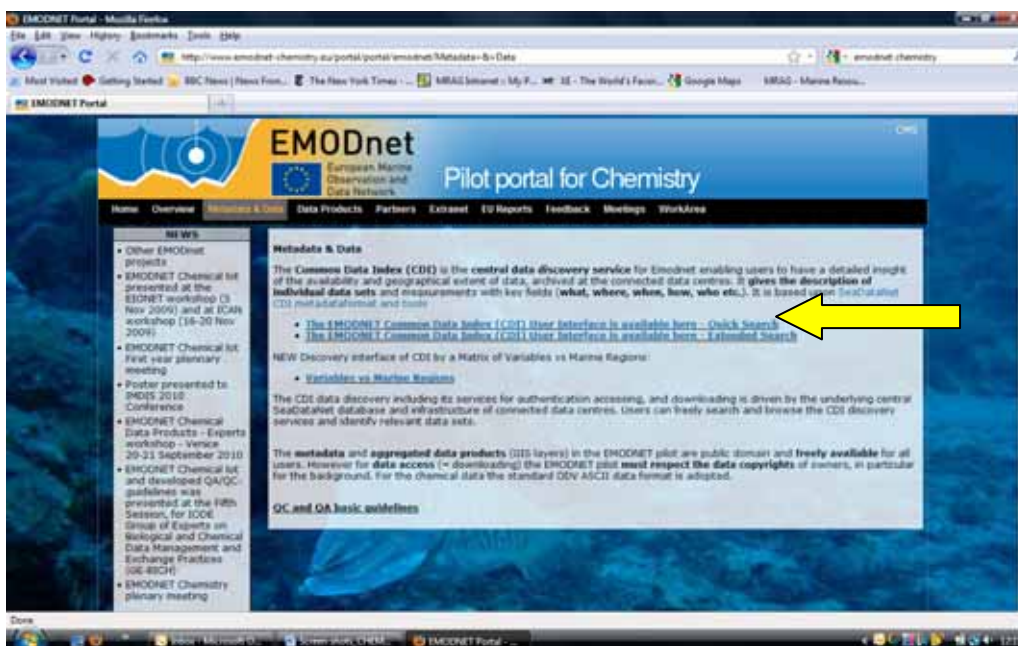
From the catalogue it is possible to display the metadata record in xml, to add the data to a 'shopping basket' or, alternatively, to print the metadata record.

There are two basic means of identifying which data is available on the portal and thereafter accessing the data: through the 'Metadata and Data' tab or alternatively through the 'Data Products' tab. The procedure using the 'Metadata and Data' tab is as follows. From the main page, it is first necessary to click on 'Metadata & Data' (Screenshot 19).



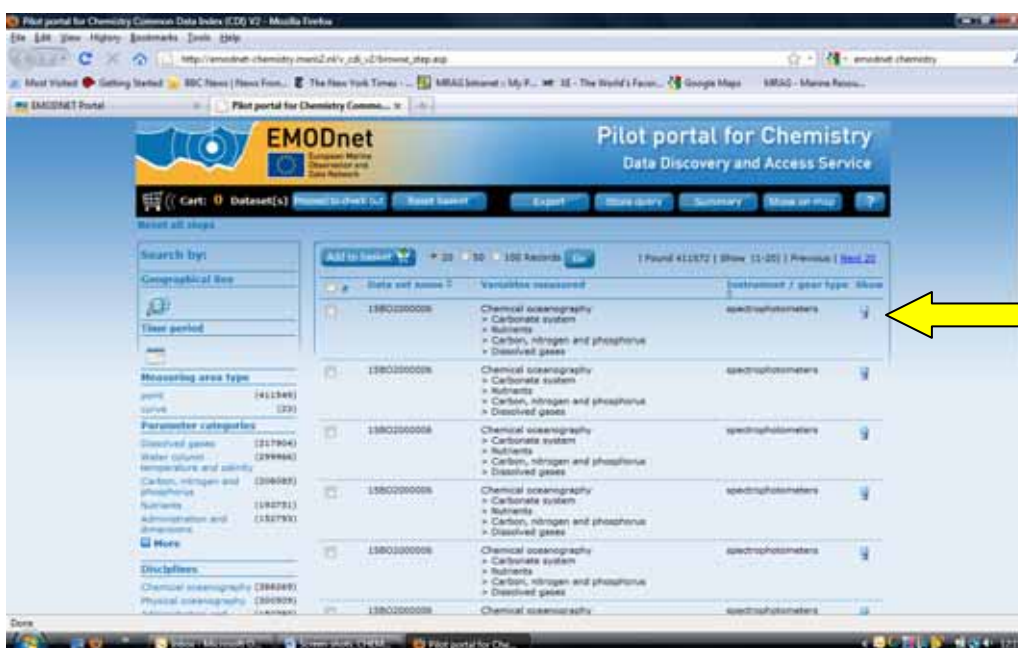
Screenshot 19 Accessing the metadata and data from the chemistry portal homepage

There are two search options – a 'Quick Search' and an 'Extended Search' (Screenshot 20). The 'Quick Search' option can be used for simple searches.



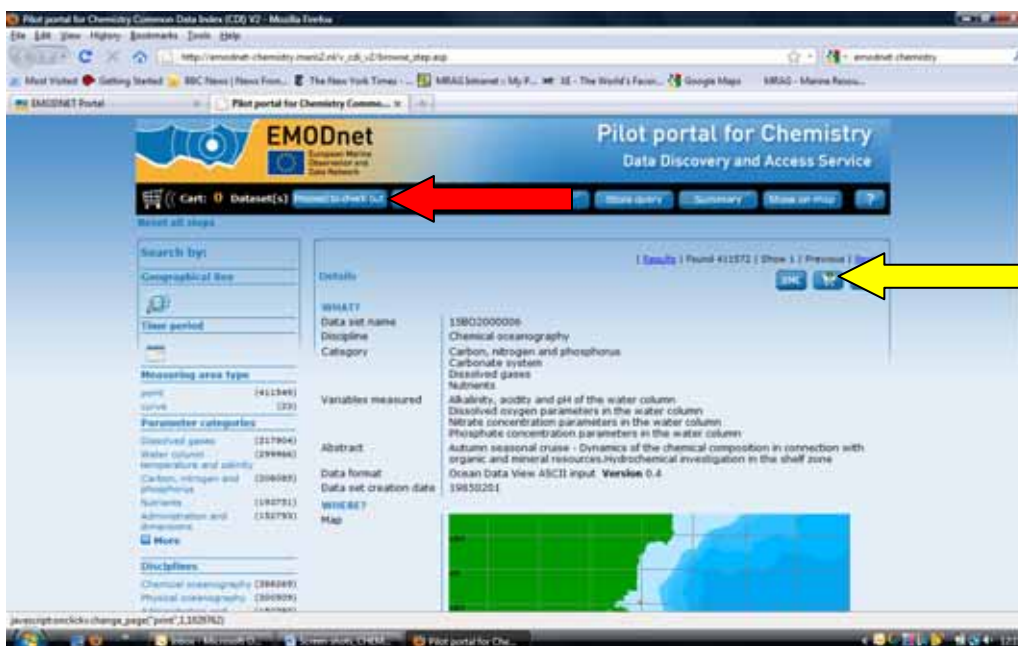
Screenshot 20 Data search options

Clicking on 'Quick Search' opens the 'Data Discovery and Access Service' page. After filtering results to get the required dataset, click the monitor icon 'show' (yellow arrow in Screenshot 21).



Screenshot 21 Accessing the metadata information

This brings up the metadata. There is a shopping basket icon (yellow arrow in Screenshot 22). Click this to put the data in your shopping basket. Then click 'Proceed to checkout' (red arrow in Screenshot 22).

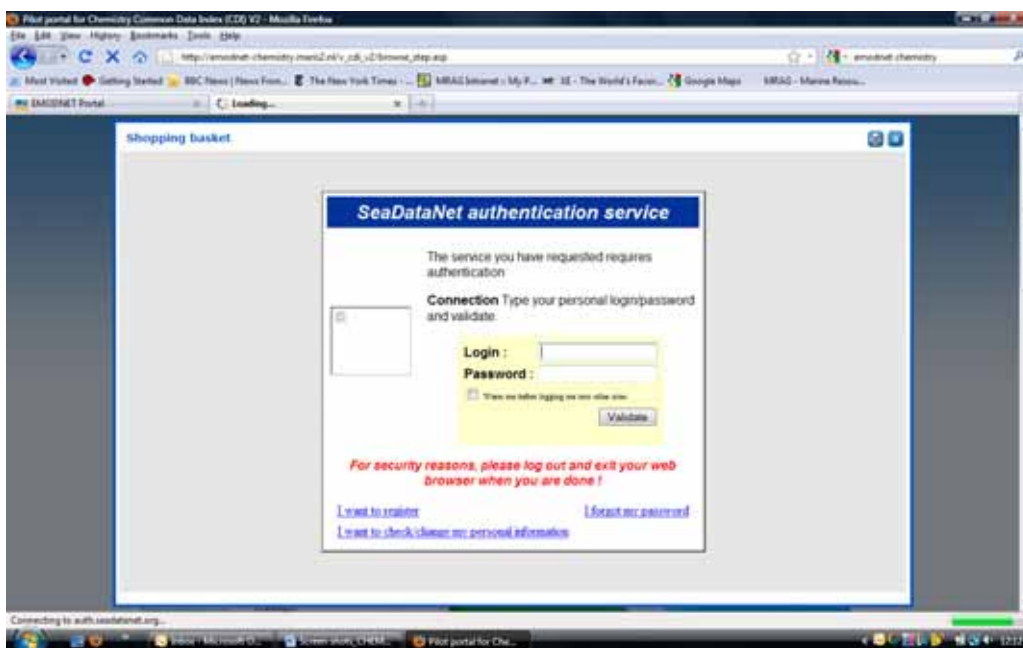


Screenshot 22 'Checking out' data sets from the chemistry portal

This process brings up an information screen that provides details of the registration required to download data (Screenshot 23). Proceeding with the download process brings up a page (Screenshot 24) for submitting a SeaDataNet authentication (required to download data).

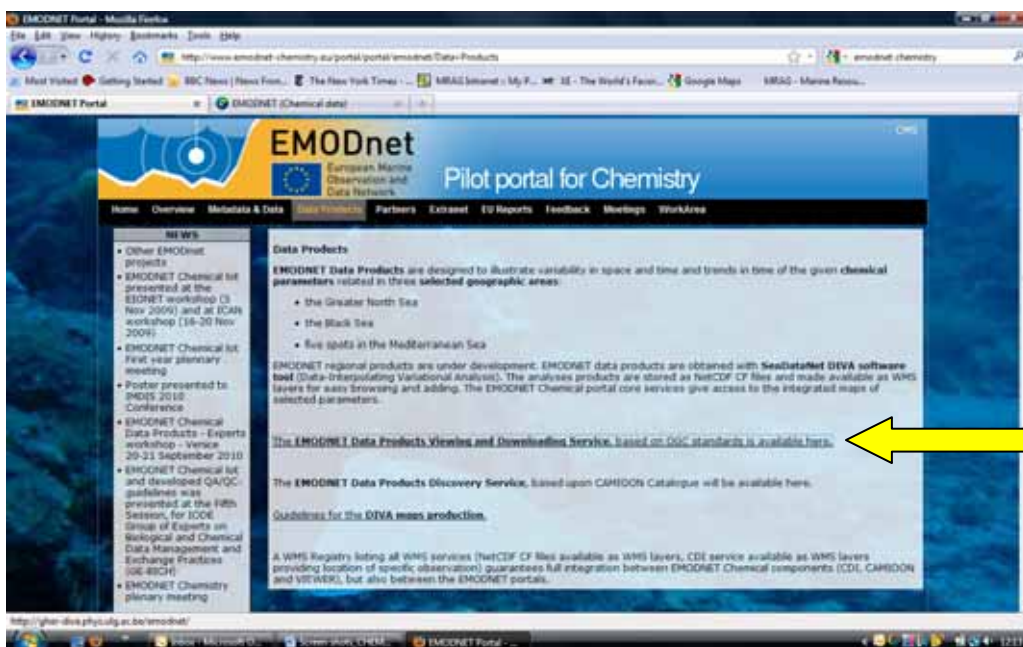


Screenshot 23 Information screen providing details of the requirements for downloading data from the chemistry portal



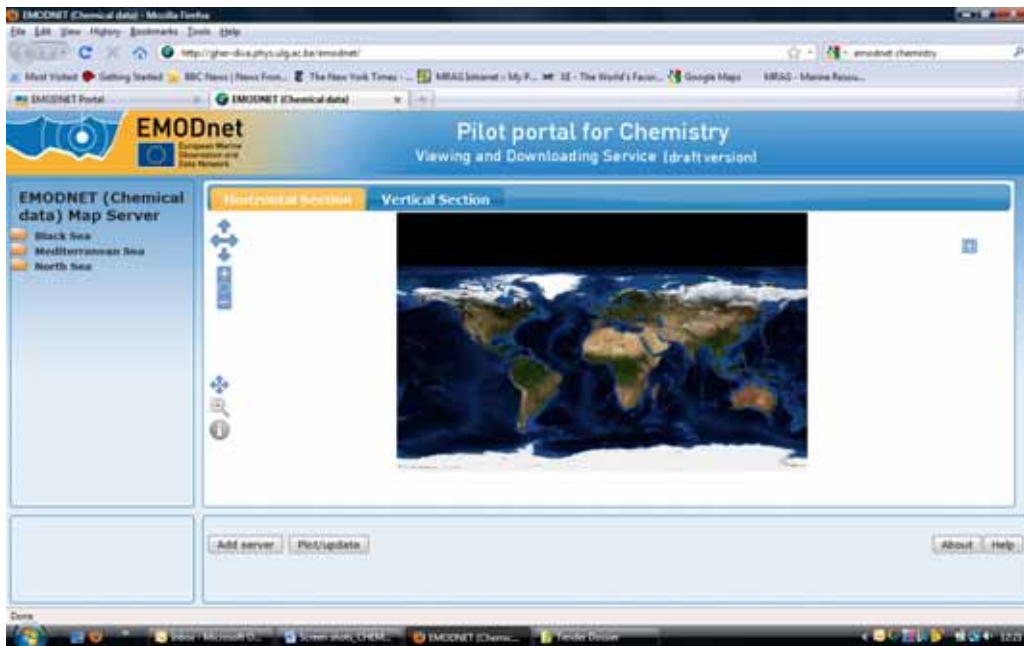
Screenshot 24 Link to the SeaDataNet authentication service used for registration

The procedure using the 'Data Products' tab is as follows. From the main page, click on the 'Data Products' tab. Then click on 'EMODNET Data Products Viewing and Downloading Service' (yellow arrow in Screenshot 25).



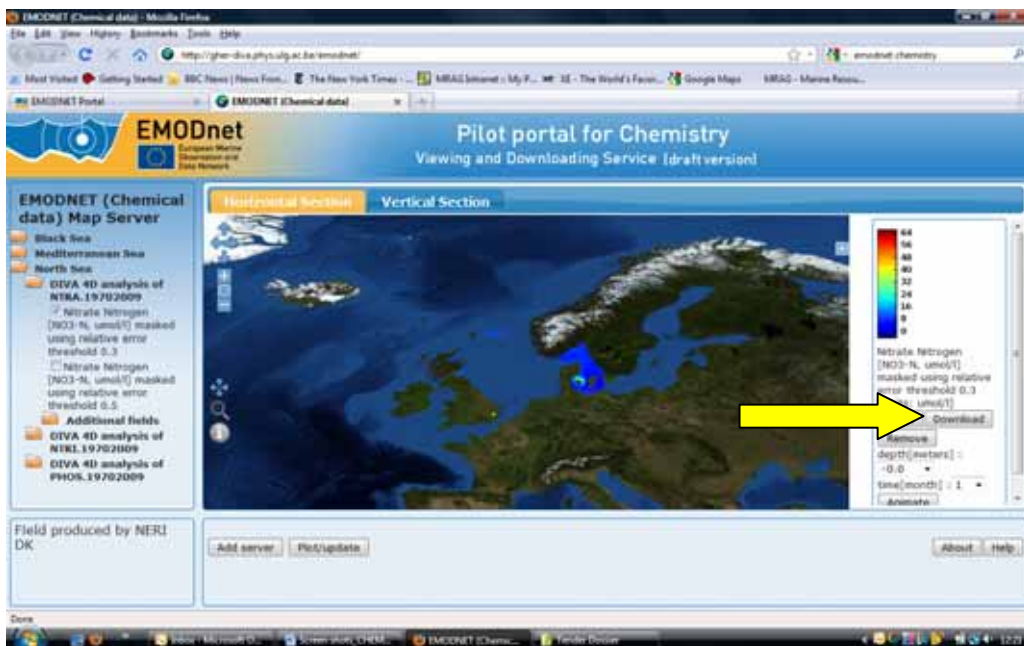
Screenshot 25 Accessing data products from the chemistry portal via the viewing and downloading service

This opens up the data portal (Screenshot 26). From here, click on the folder to expand a selection and drill down to a data layer.



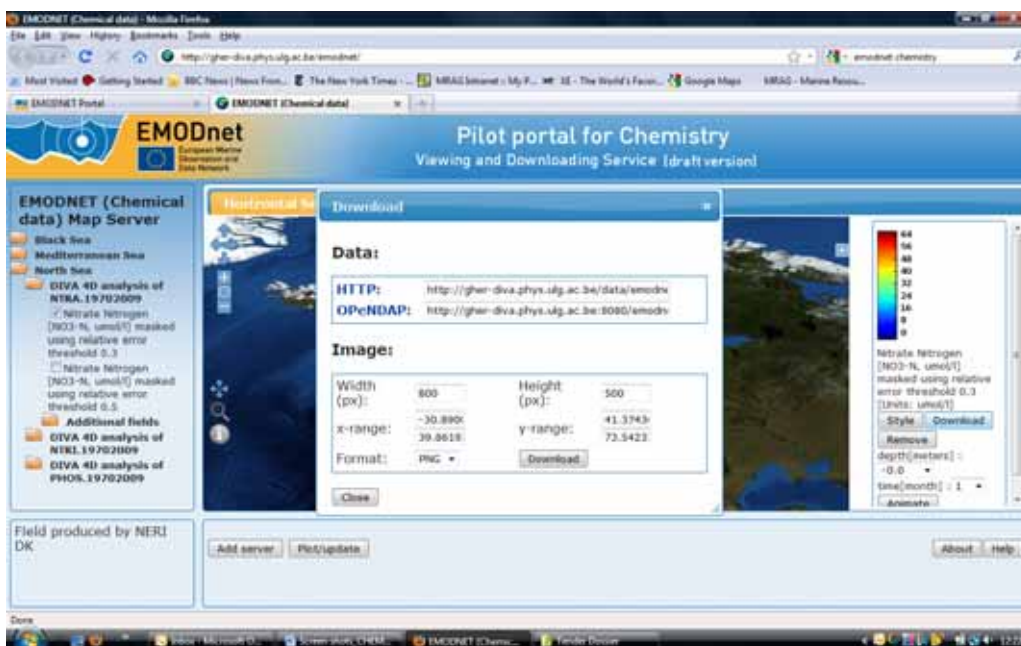
Screenshot 26 Screen used to select data products from the data page

Tick the box next to the data product to select it. It will display on the map. Zoom and use tools to select area to download. Click the 'Download' button (yellow arrow in Screenshot 27).



Screenshot 27 Selecting and downloading chemistry data products

A pop-up box will appear (Screenshot 28). Click 'Download' to proceed.



Screenshot 28 Pop-up box confirming data product download

Unlike the data sets, there is no requirement to register or be authenticated in order to download data products.

3.1.5 How to provide feedback

There is a 'Feedback' tab on the main webpage. Specific feedback should be sent to an email address (mecha@bodc.ac.uk). There are also links to two short questionnaires on discovering, ordering and using data from the project (developed by the pilot portal group rather than MRAG).

3.1.6 Questionnaire responses

As described in Section 1.2, the chemistry portal contractors provided us with responses to results from two questionnaires that they developed and launched themselves (one for users trying to access data and the other for users trying to access data products). These questions (and therefore the results) from these surveys are therefore slightly different for the chemistry portal than for the others.

Three users responded to the questionnaire. All found the CDI interface easy to use, with good response times (Table 6). The search criteria were found to range from sufficient to good. All three respondents found data suitable to their needs, received the data within a reasonable time scale, felt that the license conditions were reasonable and received data in the format they required. With regards to the quality control applied to the data, two of the three users felt that the quality control applied to the data was only 'partially' clearly stated. Two of three found the quality control was sufficient for their purposes (Table 7). All three respondents felt that the data received could be used for measuring ecosystem health 'in part'.

Table 6: Survey responses on use of the CDI interface for searching data

User	Ease of use	Speed of response	Search criteria	Suggestions for improvement
1	Good	Good	Sufficient	It's a bit confusing to lump together sampling methods and methods of measurements (instruments). It wasn't intuitive to search for e.g. alkalinity data under "generic bottle sampler"
2	Very good	Good	Good	Map function is very slow, I couldn't get it to load properly.
3	Good	Sufficient	Sufficient	No response

Table 7: Survey responses on quality control applied to the data

User	Quality control clearly stated	Quality control sufficient for purpose
1	Yes	Yes
2	Partially	no response
3	Partially	Yes

Two users responded to the questionnaire for users trying to access the data products. Both found the ease of use and help support to be 'good' or 'very good'. User 1 found the speed of response 'sufficient', while user 2 found it 'very good' (Table 8). Both users found that products only partially give an accurate representation of contaminant status in a chosen area and some information available to show how products were developed. More information for specific areas or parameters was not thought to be needed by User 1 (no response from User 2) (Table 9). User 1 thought the products were sufficient to provide assessments of ecosystem health, while User2 thought some products were sufficient.

Table 8: Survey responses on data product portal characteristics

User	Ease of use	Speed of response	Help support
1	Good	Sufficient	Good
2	Very good	Very good	Good

Table 9: Survey responses on data product portal suggested improvements

User	Products give accurate representation of contaminant status in chosen area	Sufficient information available to show how products were developed	Specific areas where more information should be provided	Specific parameters for which more data should be provided	Products sufficient to provide assessments of ecosystem health
1	Partially	Some	No	No	Yes
2	Partially	Some	no response	no response	Some

3.2 Task Two

The task specified in the ToR was to download data relating to two pollutants in the water column and one in the sediment in one sea basin. Using this data timeplots of measurements of these pollutants showing seasonal dependence were to be prepared. In addition, a map of annual average levels along coastline for one particular year was also to be generated.

3.2.1 Accessing the data

The interface provides options for a quick or extended search of the database and in both instances the interface includes a map and a range of different parameters on which the database can be searched. The map allows a limited area to be selected using a box selection tool or, alternatively, the data can be selected by country. It does not seem possible to restrict the search by basin, sea area, LME or ecozone at this point. The search returns the data sets that include the selected parameters within the box of interest. The metadata for the data set can be reviewed and this includes a map that displays the sampling site and information on the restriction. There does not appear to be an option to search only unrestricted/restricted/all data.

To access any data set the user must register with Seadata.net to create an account that will enable downloading (handled by IFREMER). Within the registration form that is provided, the user is required to indicate the organisation and role. Registration is an automatic process generating a user name and password. Within the Seadata.net system the registration details are sent to the national

Seadata.net data centre and they are responsible for confirming registration. Depending on the volume of traffic and availability of the contact person, this can take some time.

Once confirmed, it is possible to add data sets to the basket and submit a request to download. When this is done it generates an email that provides a summary of the data sets that have been requested and a link to a Requests Status Manager webpage to which the user must log on to access the status. For unrestricted data this may be available when logged on and is straightforward.

For restricted sets these can be held 'pending' as a request is sent to the owner of the data set for them to approve on the basis of the registration details provided. Given that they have contact details, they can get in touch if they feel they need more information. Unrestricted data was available through this system when tested and we applied for a restricted set (21/3) of chemical data for the North Sea from a Netherlands owner and are still awaiting approval.

The data products can be viewed directly on the portal, after selecting a data product such as Seasonal distribution of nitrites in the North-West Black Sea, it is possible to change the view of the data in the portal by zooming or panning, the resulting images can then be directly downloaded from the portal an example is given in Figure 7.

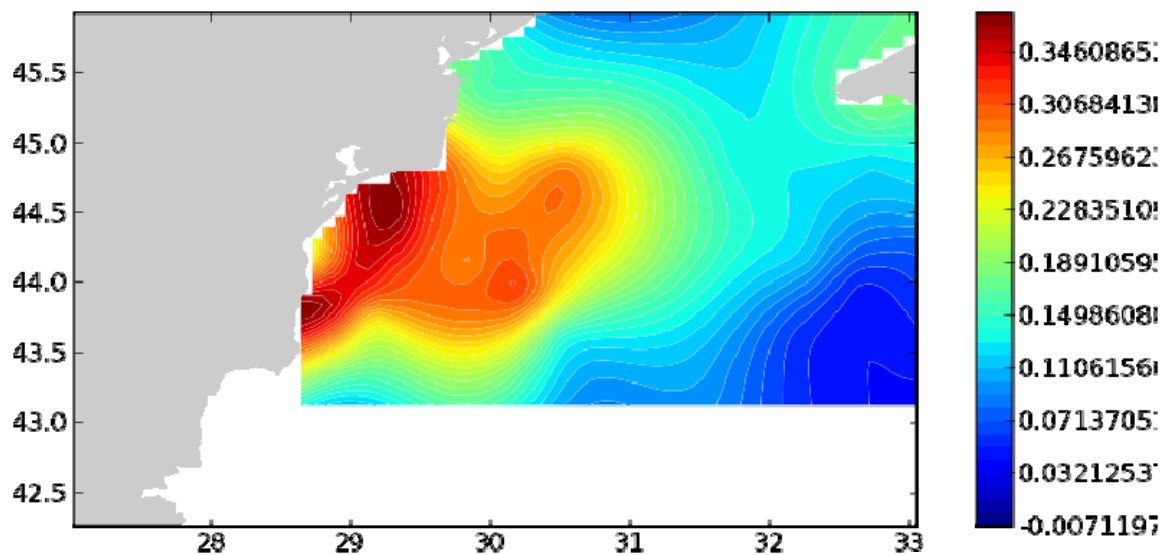
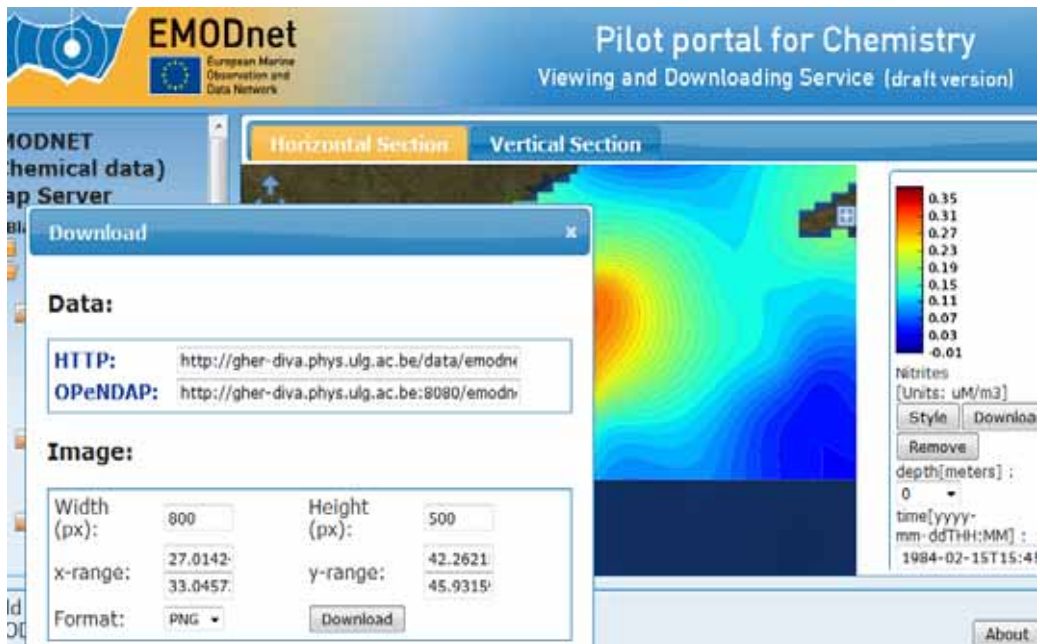


Figure 7: Distribution of nitrites in the North-West Black Sea on 15th Feb 1984 (Units: $\mu\text{M}/\text{m}^3$)

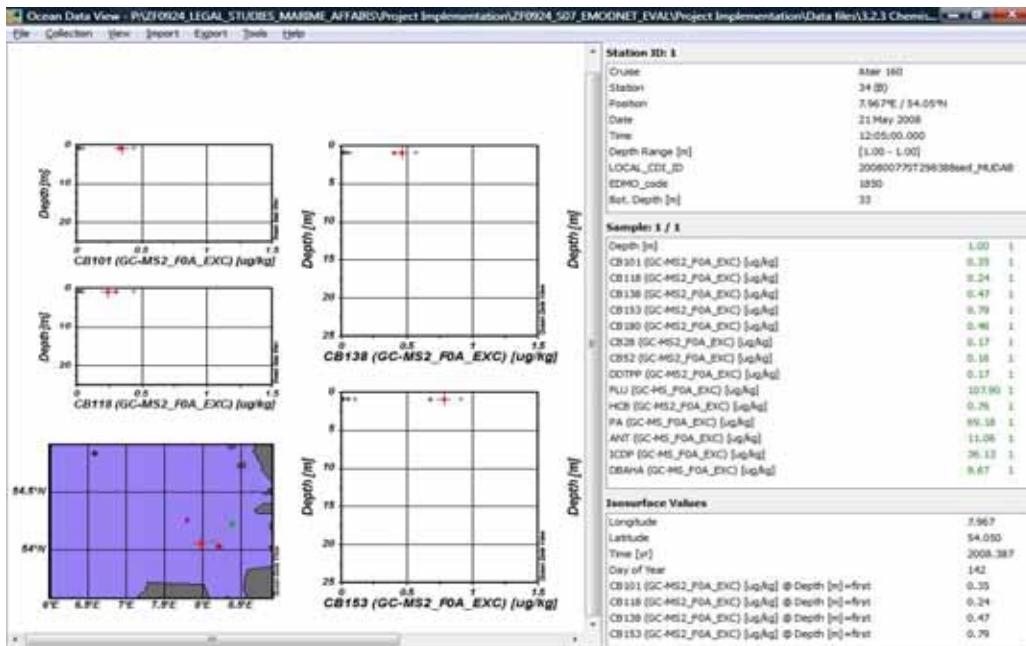
It is also possible to download the data that is used to produce the maps in the data products section of the portal; this is through the provision of a URL that is displayed in the same window that the image can be downloaded. A Screen capture is shown in Screenshot 29.



Screenshot 29 Screen capture of data product download

Individual data sets or collections of datasets may also be downloaded from the chemistry portal. These can be identified either through metadata searches, or using a GIS search function. When a dataset of interested has been identified through the search functions it can be added into a basket, as described in section 3.1.4. If the data requested is 'unrestricted' then it is almost immediately available for downloading in a Zip file containing the datasets in the Ascii text format that is used by the Ocean Data View software (which has its own licence requirements), but is accessible and easily viewed by any software that can open text files, including spreadsheet applications. The Zip file also contains a CSV file that has a selection of the metadata for each of the data sets that is very useful for managing the datasets once downloaded.

Once the dataset has been downloaded the quickest way to view the data in the files was to use the Ocean Data View software, which allows multiple files to be imported using the SDN spreadsheet option from the import menu. Screenshot 30 is from Ocean Data View of the sediment data downloaded for Task Two.



Screenshot 30 Sediment data in Ocean Data View

The data can also be exported from Ocean Data View. For the sediment data the 'export to odv spreadsheet' option was used to export the data that is shown in Screenshot 30 to a text file that can be opened in a spreadsheet application as a tab delimited file. The data in a spreadsheet file can be opened by a GIS application and using the application the data points can be mapped, as shown in Figure 8

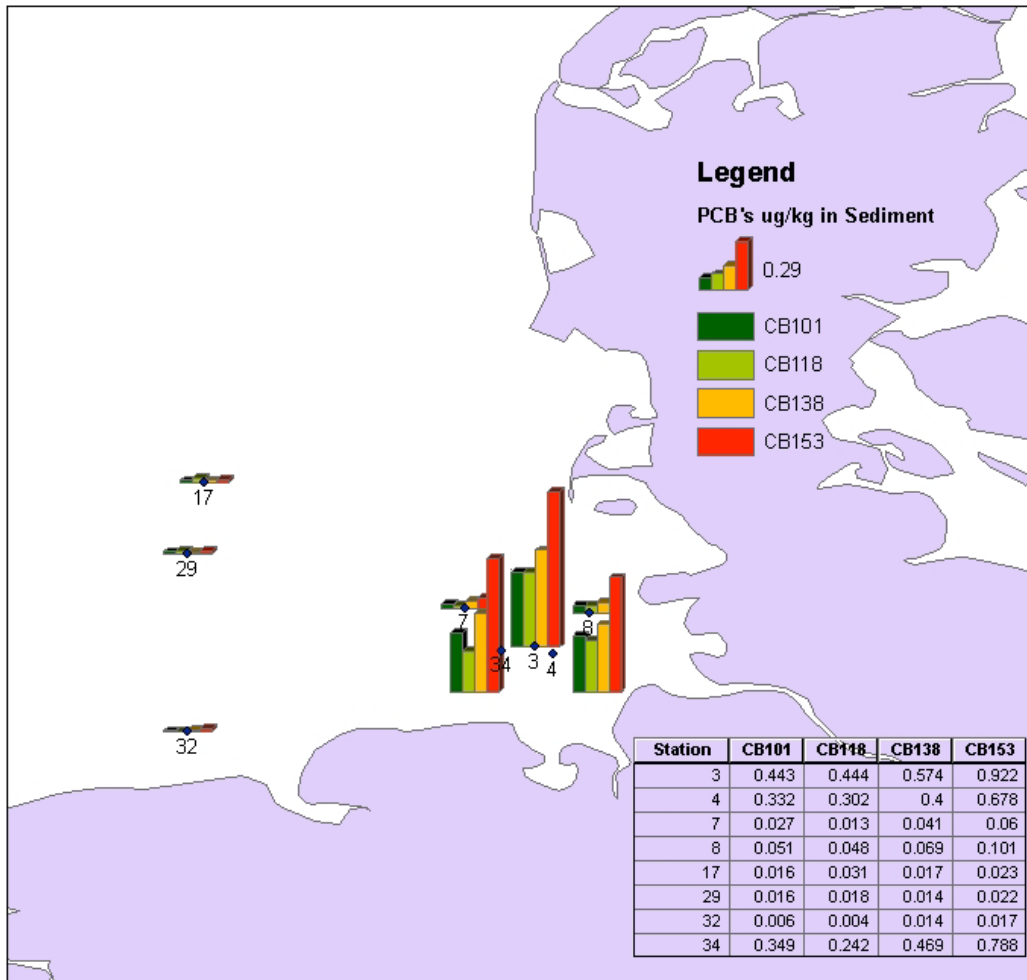


Figure 8 PCB concentrations in sediment collected off the German coast in May 2008

Source:(Data set 20080077sed_MUDAB from the German Federal Maritime and Hydrographic Agency, http://emodnet-chemistry.maris2.nl/v_cdi_v2/search.asp?bookmark=355)

The portal has a feature allowing users to save a search as a bookmark, which enables others to access the same data that was used in an analysis.

Data for a pollutant in the water column was identified using the 'Search Matrix of Chemicals vs Regions' on the portal, and then further refining the search by country and date. Cadmium and Nitrogen were the chosen pollutants. The data was downloaded and then the downloaded text files were opened directly in a spreadsheet from which the spatial, temporal and chemical variables, including the SeaDataNet Quality flag, were selected and compiled into a single spreadsheet. Once the spreadsheet was completed, the spatial information was summarised on one worksheet to provide a list of stations for a GIS application, and a pivot table and charts was used to produce time plots of the pollutants maximum concentration recorded in a month. The stations were plotted in a GIS and the charts were imported into the GIS to show the variation in concentrations over time along the coast, the result can be seen in Figure 9 and Figure 10.

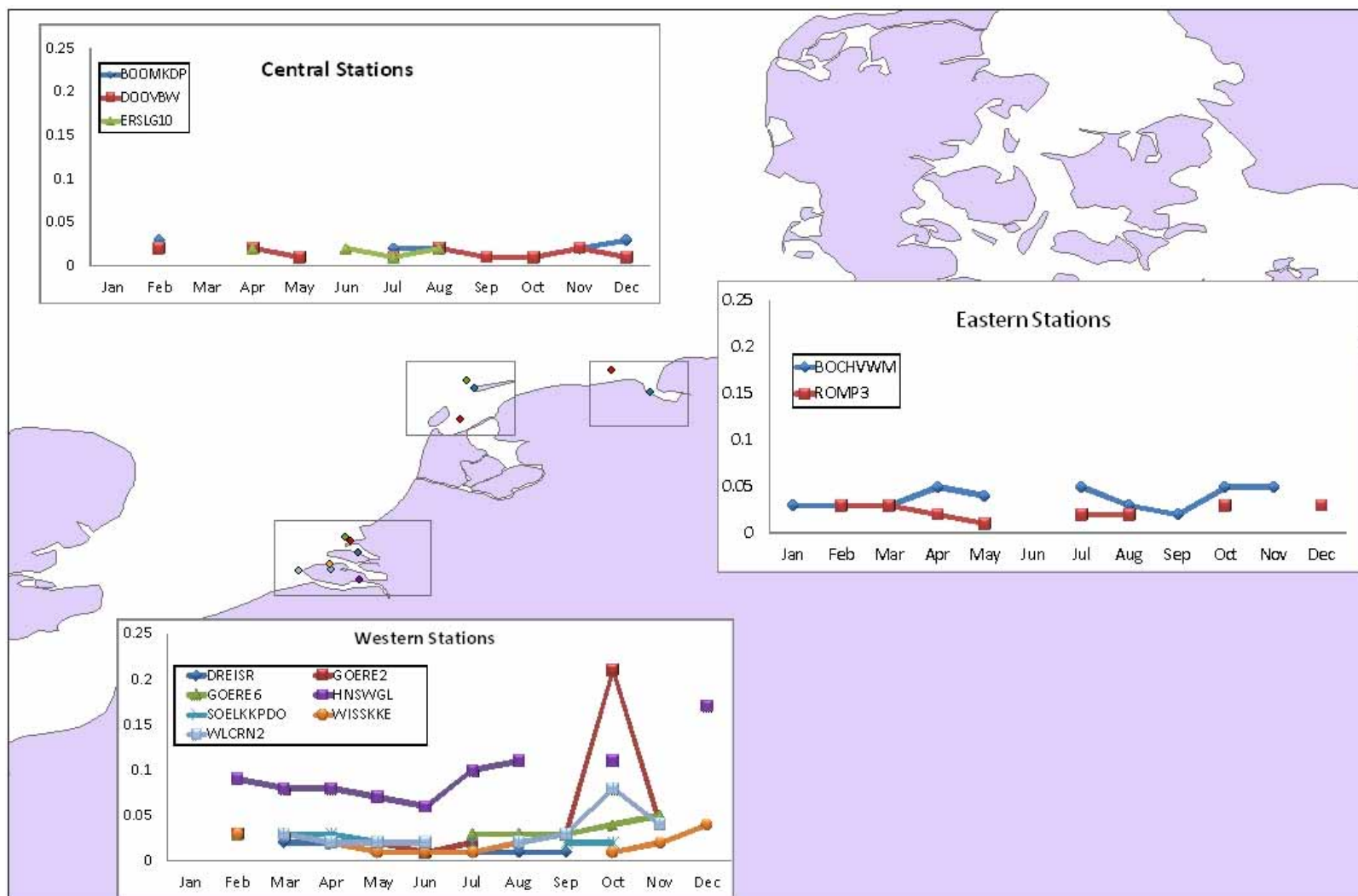


Figure 9 Maximum Concentration of cadmium {Cd} per unit volume of the water column [nmol/l] of the coast of the Netherlands 2007

Source (Rijkswaterstaat Waterdienst, http://emodnet-chemistry.maris2.nl/v_cdi_v2/search.asp?bookmark=363)

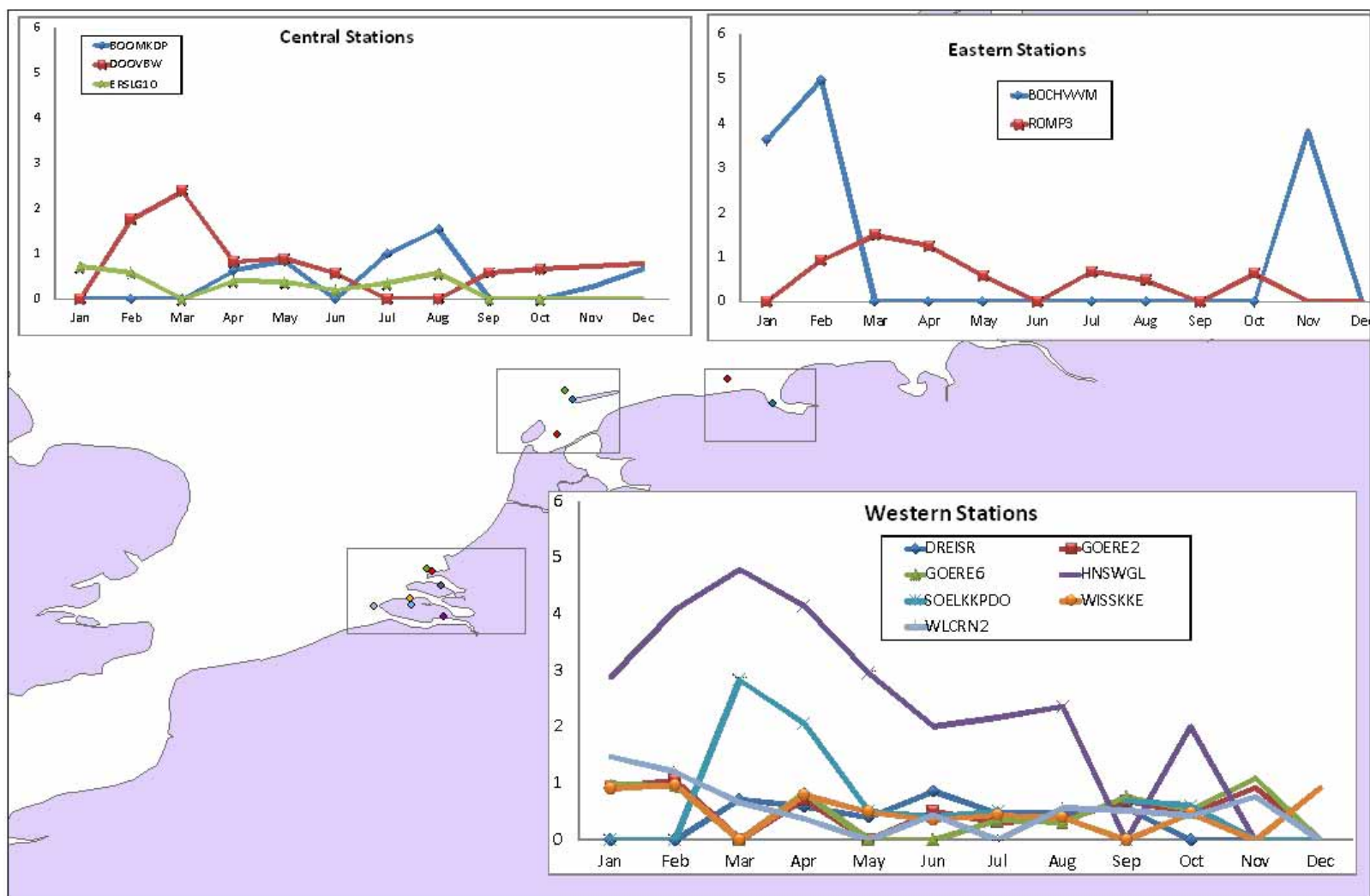


Figure 10 Maximum Concentration of nitrogen (total) per unit volume of the water column [umol/l] off the coast of the Netherlands 2007

Source (Rijkswaterstaat Waterdienst, http://emodnet-chemistry.maris2.nl/v_cdi_v2/search.asp?bookmark=363)

3.3 Task Three

3.3.1 IPR issues from the user perspective

The chemistry portal makes use of a rather sophisticated mechanism for granting access to data which makes use of a 'shopping cart' system that is operated in accordance with the SeaDataNet Data Policy. Seadata.net is a partnership of major European institutes and marine data centres.

As described above (in section 3.1.4), having selected the dataset to download it is next necessary to authenticate the data request and in order to that it is first necessary to register. This is done by clicking on the 'I want to register' link (on Screen Shot 22). This leads the applicant to the Seadata.net website in order to create an account.

The first step though is to agree to the SeaDataNet licence which provides as follows:

User license Agreement for use of Database

The SeaDataNet Consortium and its suppliers own all intellectual property rights in the database. By using, copying or distributing all or any portion of the data, the user accepts the terms and conditions of this agreement, INCLUDING, IN PARTICULAR THE LIMITATIONS ON:; USE CONTAINED IN SECTION 1, 2, 4 & 6; LIABILITY IN SECTION 3; TRANSFERABILITY IN SECTION 5; WARRANTY AND FEEDBACK IN SECTION 7. AS USER YOU AGREE THAT THIS AGREEMENT IS ENFORCEABLE LIKE ANY WRITTEN NEGOTIATED AGREEMENT SIGNED BY YOU. THIS AGREEMENT IS ENFORCEABLE AGAINST YOU AND ANY LEGAL ENTITY THAT OBTAINED THE DATA AND ON WHOSE BEHALF IT IS USED. IF YOU DO NOT AGREE, DO NOT USE THE DATABASE

Definitions

For the purpose of this licence:

1 "Database" means sets of marine observations, collected from various sea cruises and observation systems, aggregated, standardised and disseminated in unified formats by one or more archiving centre of the SeaDataNet Consortium;

2 "Intellectual Property Rights" means all patents, claims in patents, trademarks, service marks, registered designs, applications for any of the foregoing and the right to apply for any of the foregoing in any part of the world, copyright, database rights, design rights, inventions, confidential information (including without limitation know-how) and all other similar or equivalent rights, whether registrable or not, subsisting in any country in the world;

3 "Licence Agreement" means this agreement including any Annex or Schedule to it;

The Licence

1. The Licensor grants to the Licensee a non-exclusive and non-transferable licence to retrieve and use data sets and products from the SeaDatatnet service in accordance with this licence.

2. Retrieval, by electronic download, and the use of Data Sets is free of charge, unless otherwise stipulated.

3. Regardless of whether the data are quality controlled or not, SeaDataNet and the data source do not accept any liability for the correctness and/or appropriate interpretation of the data. Interpretation should follow scientific rules and is always the user's responsibility. Correct and appropriate data interpretation is solely the responsibility of data users.
4. Users must acknowledge data sources. It is not ethical to publish data without proper attribution or co-authorship. Any person making substantial use of data must communicate with the data source prior to publication, and should possibly consider the data source(s) for co-authorship of published results.
5. Data Users should not give to third parties any SeaDataNet data or product without prior consent from the source Data Centre.
6. Data Users must respect any and all restrictions on the use or reproduction of data. The use or reproduction of data for commercial purpose might require prior written permission from the data source.
7. Users are requested to inform SeaDataNet of any problems encountered with SeaDataNet-provided data. A timely and easy-to-use feedback procedure is available (sdn-userdesk@seadatanet.org), aimed at correcting data at the data source. This feedback will increase the quality of the data.

Having agreed to the licence an applicant must register providing details of name, address, country etc as well as details of their 'activity type' and 'legal status'. Under the heading 'activity type' a drop down box offers four options 'REC –Research', 'EDU – Education', 'IND – Industry' and 'OTH – Other'. The heading 'legal status' also opens a drop down box, this time with eight possible choices as follows: 'GOV – Governmental', 'INO – International Organisation', 'EUB – European Body', 'PUC – Public Commercial Organisation', 'PRC – Private Commercial Organisation including Consultant', 'EEI – European Interest Group', 'PNP – Private Organisation Non Profit', 'PRI – Private Individual'.

Each application is determined by the relevant national oceanographic data centre (NODC) in the case of European applicants or by the French research organisation IFREMER in the case of applicants from a country that does not have a relevant NODC.

The specification of the relevant role (by reference to the activity type and the legal status) is a key part of this process. The roles are validated through a decision matrix which determines any applicable access restrictions. By signing up for a licence the applicant essentially agrees to that role and thus related restrictions.

Thereafter applications for data sets are determined by reference to the 'role' of the applicant in accordance with the published SeaDataNet Data Policy which is available for download in pdf form at the following website:

<http://www.seadatanet.org/content/download/3899/29604/version/2/file/SeaDataNet+Data+Policy+.pdf>

The data policy specifies eight roles namely 'Administrator', 'Public', 'Academic research', 'Commercial', 'National and Local Government', 'Pan-National Government', 'Partner' and 'Cruise Summary Report Contributor'.

The SeaDataNet Data Policy states that it aims to 'strike a balance between the rights of investigators and the need for widespread access through the free and unrestricted sharing and exchange of SeaDataNet data, meta-data and data products. The final goal of this policy is to serve the scientific community, public organisations, and environmental agencies, and to facilitate the production of advice and status reports by stating the conditions for data submission, access and use'.

Section 4.1 of the Data Policy provides that while meta-data are freely accessible without any condition 2) data and products require:

- a) registration;
- b) acceptance of additional conditions that may be requested by the different nodes of the distributed database. The access rights are granted according to the "role" of the user; and
- c) acceptance of an user licence.

Once registration is completed the next step is to submit a request to download the data in the shopping basket. This generates an email that provides a summary of the data sets that have been requested and a link to a Requests Status Manager webpage to which the user must log on to access the status of the data request. For unrestricted data this may be available when logged on and access is straightforward.

Data requests are determined in accordance with any restrictions imposed on the use of the data in accordance with Paragraph 4.1 of the SeaDataNet Data Policy.

The User License Agreement (which users first have to accept) is copied from the 'overarching' SeaDataNet Data Policy. This is confusing, especially with regard to the identity of the licensor. By cutting the licence conditions from the SeaDataNet Data Policy, the definitions are missing in the Agreement and only become clear upon reading the SeaDataNet Data Policy itself. As a consequence, the User License Agreement uses terms like "Licensee" or "Licensor" or "Data Centre" or 'Data Users' as pre-defined terms but with the related definitions missing. One can assume that the 'Licensee' will be the user who is retrieving the data, but it is less clear who will be the 'Licensor' (is it the consortium or the data supplier)? Who are the actual parties to the 'User License Agreement' (in other words, who will be able to enforce the agreement in case of misuse of data)? This clearly needs to be clarified and better aligned (e.g. in one uniform and comprehensive set of terms and conditions).

3.3.2 IPR issues from the provider perspective

The individual NODCs which handle data requests are not allowed to ask for details of the applicant who remains anonymous. Instead data requests are determined entirely by reference to the role of the applicant.

Individual NODCs may hold or manage data from more than 100 national institutes. Each of these institutes has an agreement with the relevant NODC as to how the data may be distributed. A key feature of this approach is that the restrictions on the use of data are agreed in advance. For

example part of the data maybe made freely available, part of the data may be subject to a moratorium and part of the data may be released on the basis of a data licence. This is set out in Section 5.1 of the SeaDataNet Data Policy which provides: ‘...The data source must precisely specify any access restrictions that it wishes SeaDataNet to uphold. Some cases that call for restrictions include data which is protected by law and data submitted during a prescribed period of exclusive use’.

It is however up to each NODC as to how it formal agrees the policy applicable to a particular data set with the relevant owner. Some NODCs apparently have standard formal agreements while others do not.

Because an NODC is always the licensor and in principle the request is made by an applicant to her/his national NODC the law applicable to a given licence will prima facie be the law of that NODC. What is not so clear from the portal though is the identity of the licensor, i.e. the relevant NODC.

4 Hydrography portal

The hydrography portal was developed by members of the existing SeaDataNet consortium together with other organisations from marine science, the hydrographic survey community, and industry. The consortium includes : MARIS – NL (Management, DM and IT expertise), IFREMER – FR (Research institute), ATLAS – NL (IT expertise, DM hydrography) , IEO – ES (Research institute), NERC-NOCS – UK (Research institute), GSI – IE (HO – Ireland) and SHOM – FR (HO – France).

Associate partners are ISMAR-CNR –IT and OGS (Research Institutes) and UNEP-GRID Arendal – NO (International Organisation). In addition data provider agreements have been concluded with hydrographic offices from Germany, Norway, Denmark, Netherlands and Belgium. The hydrography portal website is available at: <http://www.EMODnet-hydrography.eu/>

4.1 Task One

The hydrography portal site is laid out very logically and was easy to navigate. The main page has some background on EMODNET and the hydrography portal as well as ‘News’ box on right side of page and ‘Tools’ on left side. The latter contains quick links to contact, extranet, sitemap and homepage. The tabs at the top of the page are: EMODNET, Pilot approach, Metadata & Data, Data products, Promotion, Partners (Screenshot 31).



Screenshot 31 Main page for the hydrography portal (accessed 02/03/2011)

The ‘Metadata & Data’ page describes the Common Data Index (CDI) and provides a link to the CDI for Bathymetric datasets. The CDI is a metadata service developed under the SeaDataNet infrastructure and uses the categories ‘what? where? when? how? who? how?’.

The ‘Metadata & Data’ page also contains the following statement:

'In the EMODNET-Hydrography portal the CDI metadata entries are prepared by the partners in communication with the data providers for the high resolution background data sets, that are used for producing the Digital Terrain Models for the selected sea regions. The Digital Terrain Model data products (GIS layers with moderate resolution) are freely available to users for viewing, sharing and downloading. This is done through a [high-end portal service](#) for data products, supporting OGC services and in compliance with INSPIRE.'

Links are provided in the left-hand box for CDI service (providing more detail on CDI), User Registration and Request Status Manger.

From the catalogue the user can display the metadata record in XML, add the data to a 'shopping basket' or print the metadata record

The 'Data products' page provides a link to the EMODNET Hydrography Data Products Viewing Service for public access, viewing and downloading of the bathymetric data products.

Clicking on the link to the viewing service a disclaimer pops up stating:

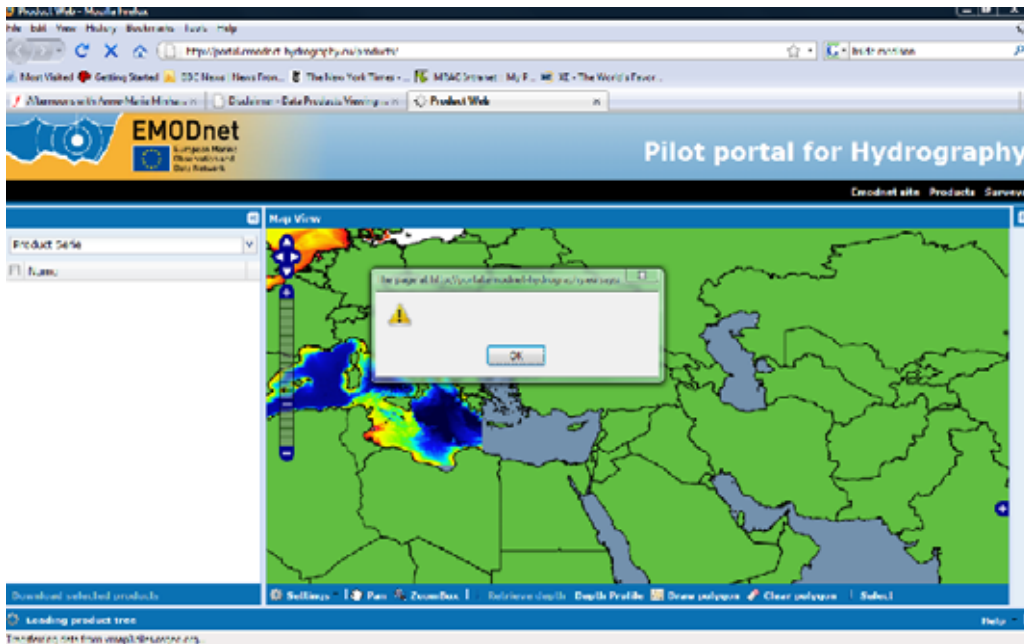
'The EMODNET Gridded Bathymetry is not to be used for navigation or for any other purpose relating to safety at sea.

This first draft of the EGB has been created at a resolution of 0.25 arc-minutes using the best available bathymetry from a variety of sources using a variety of methods. The data coverage is still incomplete and some data were collected several years ago, however as new data and other extant datasets are made available, the gaps will be filled and the grid updated.

The information contained in the grid is believed to be trustworthy. However its accuracy and completeness cannot be guaranteed. Whilst every effort has been made to ensure its reliability within the limits of present knowledge, no responsibility can be accepted by those involved in its compilation or publication for any consequential loss or damage arising from its use.'

The user must click 'I Accept' to continue to viewer.

When using Mozilla Firefox as an Internet browser, the portal viewer first loaded a blank Error message appeared (Screenshot 32). However, after clicking 'OK' on the pop-up box, the portal loaded fine. This error message did not appear when using Internet Explorer.



Screenshot 32 Error message in the hydrography portal viewer

In the portal viewer, it is possible to select products by series and on the right side expandable boxes appear that contain identification and parameters for that dataset. Selected products can be downloaded directly from the website. It is also possible to retrieve depth for a data point or a depth profile for a wider area.

The data portal has a user help box in the lower right hand corner. This provides information on what the portal provides, using the portal, using the map, products, surveys, advanced features, future features and known issues and further questions. The further questions heading provides a link to the feedback form.

4.1.1 Understanding of the scope of EMODNET

There is quite a bit of information available on this portal site on EMODNET. The homepage has some general background on EMODNET and the portal itself. A link at the bottom of the page directs users to another page on this website (it is also possible to get to this page using the navigation at the top of the page – clicking on EMODNET). This page contains a lot of text on EMODNET, and breaking up the block of text with some headings might make it more digestible. A link at the bottom of this page takes the user to the EMODNET page on the DG MARE website. Additional information is also provided through links in a box on the left hand side of page: Areas definition, Roadmap, Design principles.

The ‘Pilot Approach’ tab contains more information on the purpose behind the pilot portals – including who collects hydrographic data and the approach being adopted for implementation of this pilot portal. It has additional links in the left-hand box on the workplan, objectives and progress.

The ‘Promotion’ tab contains a link to a poster presented at IMDIS and a letter from the EU asking for cooperation from possible data providers.

4.1.2 Data coverage of the portal

Selecting the 'data products' tab on the home page of the portal provides access to a Hydrography Data Products Viewing Service. The viewing service provides public access, viewing and downloading of products in the form of digital terrain models. The digital terrain model (DTM) data product is provided for Atlantic Ocean (Channel, Celtic Seas, Western Approaches), North Sea and Kattegat, Western and Central Mediterranean and Ionian Sea. DTM is also underway for the Iberian Coast/Bay of Biscay, Adriatic Sea and Aegean-Leventine Sea.

A link from the 'Metadata & Data' tab on the main site takes you to the 'EMODNET Hydrography Common Data Index (CDI) V2 (meta)data access service' (or 'Data Discovery and Access Service' as it appears when the new window opens). The set up of this catalogue is very similar to the 'Data Discovery and Access Service' used by the chemistry portal, which is beneficial for users of more than one portal type. In the Hydrography catalogue, there are 3,432 datasets relating to gravity, magnetic and bathymetry (parameter category).

As with the Chemistry Data Discovery and Access Service, the hydrography portal's version has navigation that allows you to go back to list or see current/previous/next dataset. It is also easy to 'reset all steps' and go back to full set of data for searching. In addition, it is possible to save your search so that you can come back and run the same query.

A geographical search using a map is possible, where users can draw a rectangle to show datasets. Alternatively, users can browse for datasets using links to groups of datasets catalogued in areas such as parameter categories (e.g. dissolved gases, nutrients etc.), disciplines (e.g. chemical oceanography, administration and dimensions etc.), instrument/gear type (CTD, discrete water samplers etc.), CDI-Partner, Country and Data holding centre.

Within selected datasets (or all of them), users can generate a summary of query results containing number of datasets per data holding centre, originator, category, variable, instrument/type, year and data access restriction.

Most of the datasets are from the period 1951-present (Figure 11).

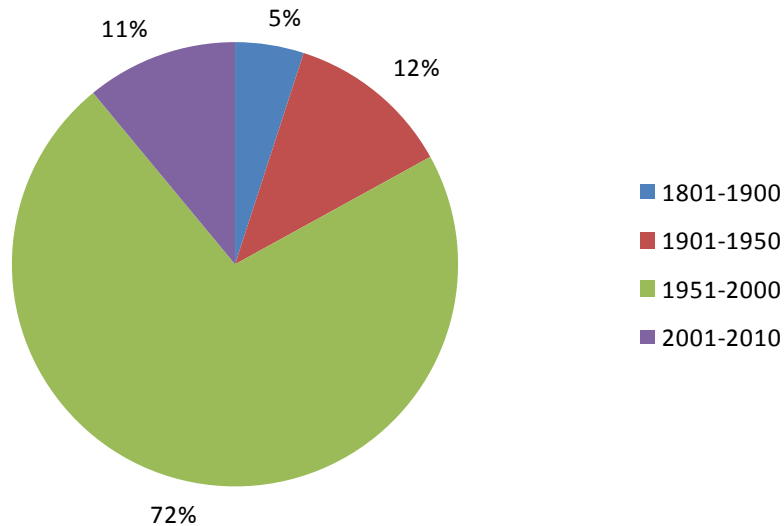


Figure 11: Proportion of hydrography data in the ‘Data Discovery and Access Service’ by time period

Unlike in the chemistry portal’s ‘Data Discovery and Access Service’, there was often more than one access restriction assigned to a dataset. Most of the datasets were restricted (99%), and many also had a distribution cost charge (82%) and/or license (83%). Only 1% of datasets required a SeaDataNet license.

4.1.3 Quality of data in the portal

For each region in respect of which data has been provided, the datasets are collated from organisations and then processed and quality controlled. A link from the ‘Data products’ tab provides more information on the quality assurance/quality assessment (QA/QC) process and DTM specifications.

From the QA/QC page, it is possible to download a Word document containing the ‘Guidelines for metadata, data and DTM QA/QC’. This includes rules on QA/QC for the data product including (but not limited to):

- all compiled datasets for the DTM must be described in CDI of the SeaDataNet infrastructure;
- supplied composite data product must be documented according to the supplied template;
- the identification of the positioning system and its class of precision is mandatory. This must be recorded in the “Instrument” field of CDI;
- for survey data with well established planimetric position accuracy but with positioning system not communicated (e.g. HO data), the accuracy is recorded ...(Solution in discussion with EMODNET and GeoSeas partners);

- survey data with an accuracy (at 2drms) worse than 500m will have an impact on the quality of the results and will not be integrated when data with better position accuracy exist;
- recording the horizontal accuracy (2 sigmas) of DATA positions in dataset in ABSTRACT is recommended. It is mandatory when budget error is carried out while positioning system are not available;
- start and end date and time of data in data set are mandatory and must be recorded in CDI.

In addition, there are the following items (not rules) in the guidelines:

- with regards to the datasets:
 - those with poor documentation related to processing traceability will be checked for peaks and bias before transmission to the data integrator;
 - For the same reason as (above), internal consistency will be checked either using automatic comparison at the intersection of track lines or by visual checks (eg. MBES data);
 - Identification of major anomalies will be carried by comparing soundings of data sets with a spline surface computed with all selected datasets. If offsets greater than 1% of the water depth are observed, source must be analysed to re-evaluate the quality of the source in function of the information available. Doubtful data must be rejected and DTM reprocessed.
- With regards to QC for DTM, a general description is given to identify anomalies and one or more the following might be used depending on the quality and consistency of the data sources which are not known:
 - visual expertise;
 - comparison with external soundings;
 - comparison with all the soundings;
 - comparison with logal kirgged DTM;
 - comparison at overlapping level of regional EMODNET DTM.

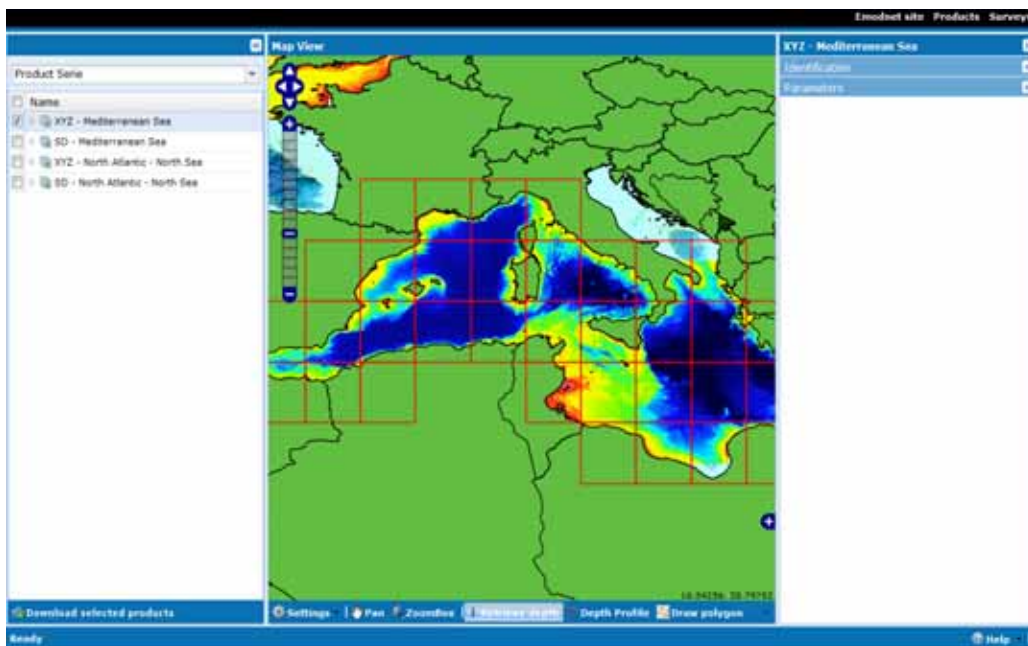
Providing these guidelines on the website was very useful.

As part of the assessment, the metadata associated with the user interface were examined. Following the link to the viewing service provides an option to open the 'Products Viewing and Downloading Service'. Clicking on this option triggers a disclaimer entitled 'EMODNET Gridded Bathymetry (EGB)' that sets out some of the limitations with the current data coverage and potential uses of the data products. This reads: 'The EMODNET Gridded Bathymetry is not to be used for navigation or for any other purpose relating to safety at sea'.

This first draft of the EGB has been created at a resolution of 0.25 arc-minutes using the best available bathymetry from a variety of sources using a variety of methods. The data coverage is still incomplete and some data were collected several years ago, however as new data and other extant datasets are made available, the gaps will be filled and the grid updated.

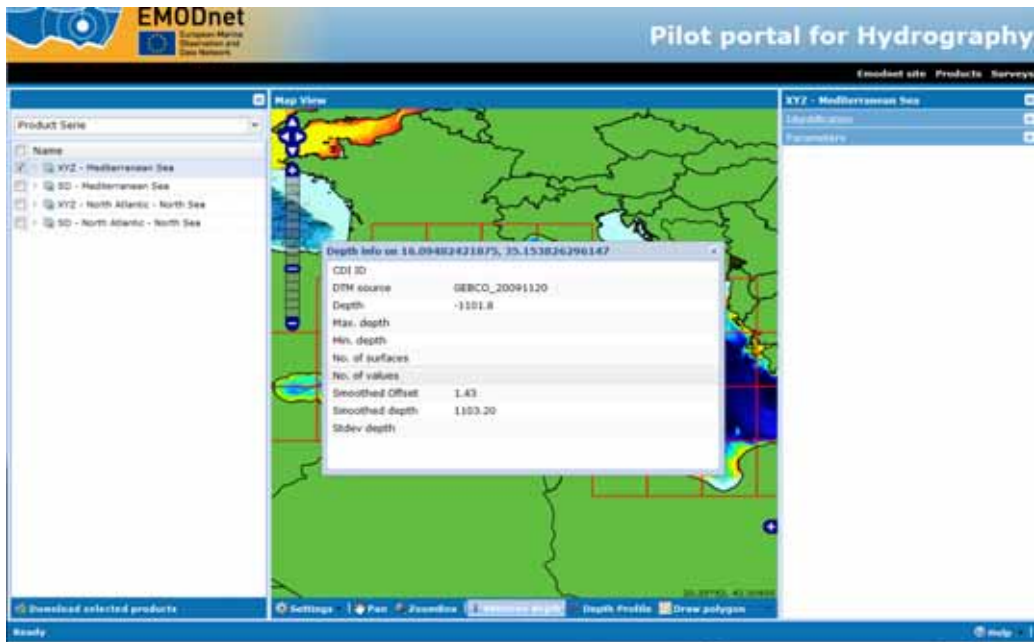
The information contained in the grid is believed to be trustworthy. However its accuracy and completeness cannot be guaranteed. Whilst every effort has been made to ensure its reliability within the limits of present knowledge, no responsibility can be accepted by those involved in its compilation or publication for any consequential loss or damage arising from its use’.

Accepting these terms launches a new window containing the DTMs. Screenshot 33 shows a close up of an areas in the Mediterranean Sea.



Screenshot 33 Bathymetric map of the Mediterranean Sea available through the hydrography portal

Highlighting the ‘retrieve depth’ tab at the bottom of the page allows the user to click on a point on the map to obtain available information about the depth at that point (see Screenshot 34).



Screenshot 34 Example of the information available about individual data points

4.1.4 How to download data

All users can query and browse in the CDI directory. However, submitting requests for data access via the shopping basket requires users to be registered in the SeaDataNet central user register, thereby agreeing with the overall SeaDataNet User Licence. All data requests are forwarded automatically from the EMODNET hydrography portal to the relevant data centres. This process is controlled via the Request Status Manager (RSM) service at the portal, which communicates with the data centres.

To access the data through the metadata approach it is necessary to click on the tab 'Metadata & Data' (Screenshot 35).



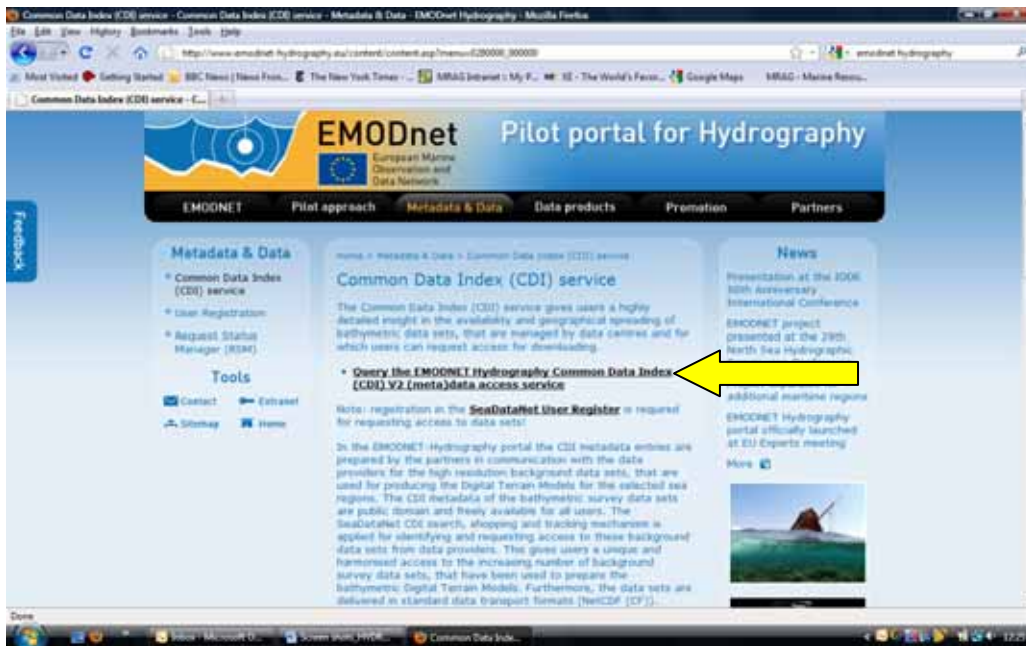
Screenshot 35 Accessing hydrography data products from the home page

Within the page on 'Metadata and Data' follow the link for the Common Data Index (yellow arrow in Screenshot 36).



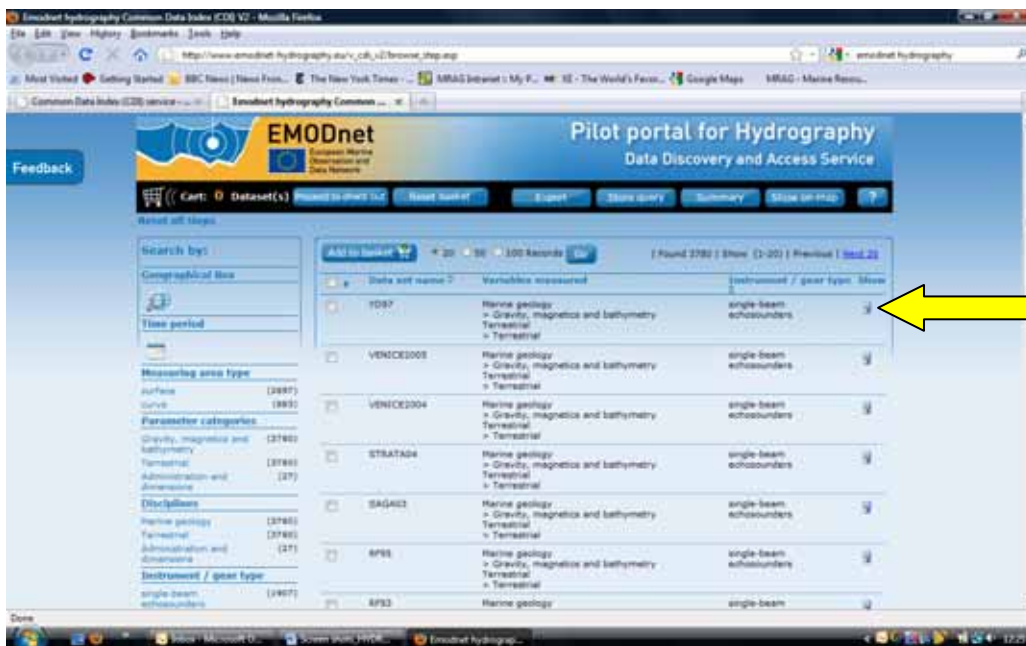
Screenshot 36 Accessing the hydrography common data index

Then click on 'Query the EMODNET Hydrography CDI' (yellow arrow in Screenshot 37).

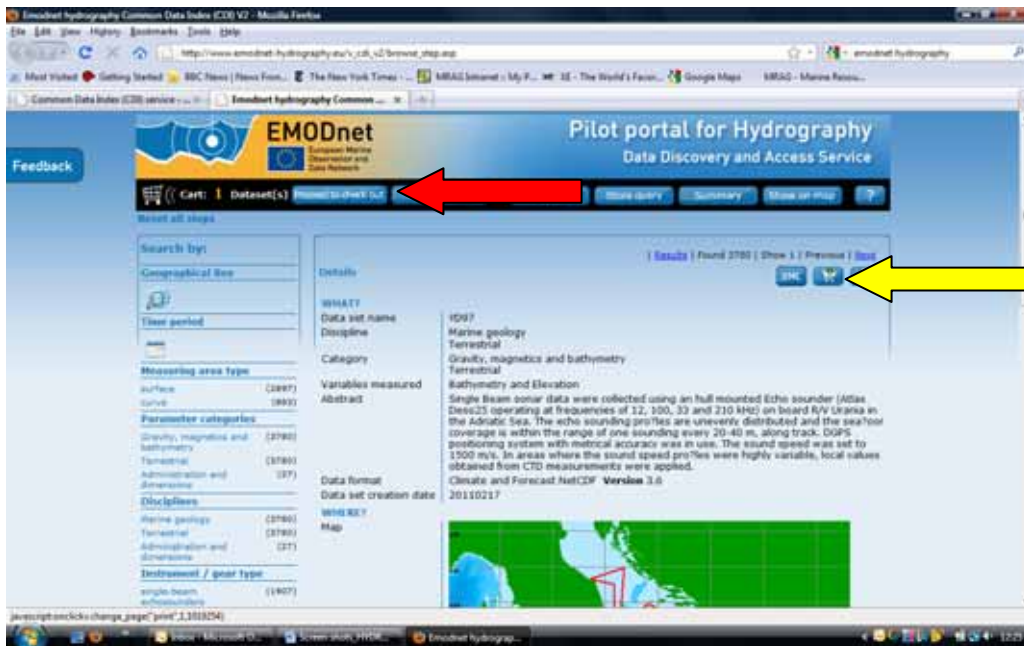


Screenshot 37 Querying the common data index

As with the chemistry portal, click the 'show' icon to view the metadata and add dataset to a shopping basket (yellow arrow in Screenshot 38 and Screenshot 39).



Screenshot 38 Adding data sets to a virtual shopping basket



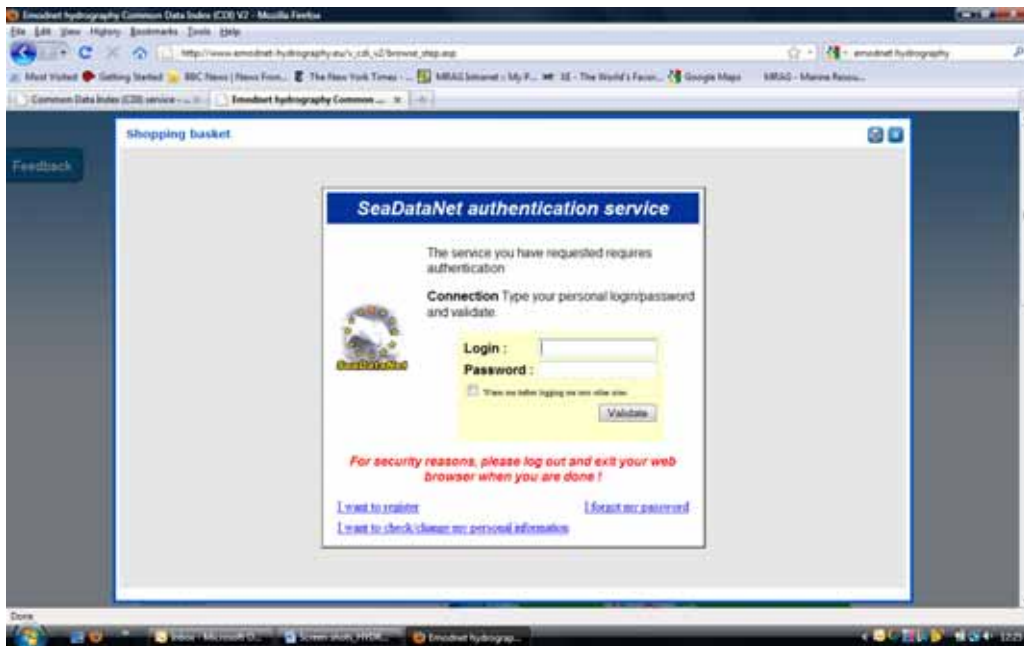
Screenshot 39 'Checking out' data sets from the hydrography portal

To check out you have to be registered and then you submit the request (Screenshot 40).



Screenshot 40 Registering and requesting the selected hydrography data set

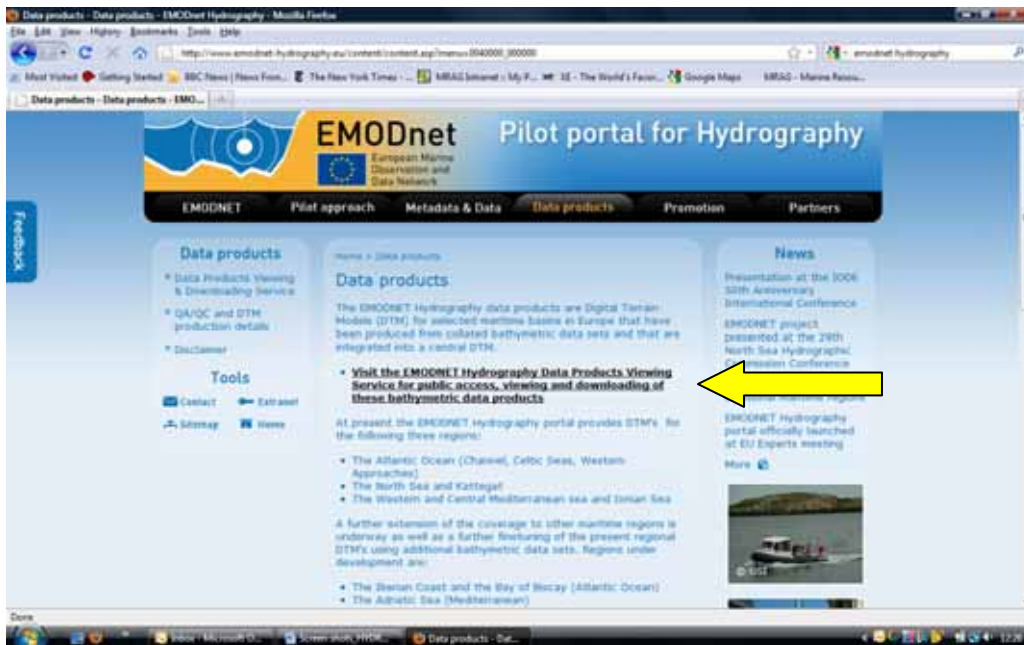
Having registered, each user is then required to log on in order to conclude the transaction. Having pressed the tab 'Submit request' to go to the next step it is then necessary to log in to the site through the SeaDataNet authentication service (Screenshot 41).



Screenshot 41 Link to the SeaDataNet authentication service

An alternative means of accessing the data is through the data products (Screenshot 42-44). These can be accessed through the 'Data products' tab as follows.

First click on the 'visit the EMODnet Hydrography Data Products Viewing Service' (yellow arrow in Screenshot 42). Then click on 'Visit the Data Products Viewing & Downloading Service'.



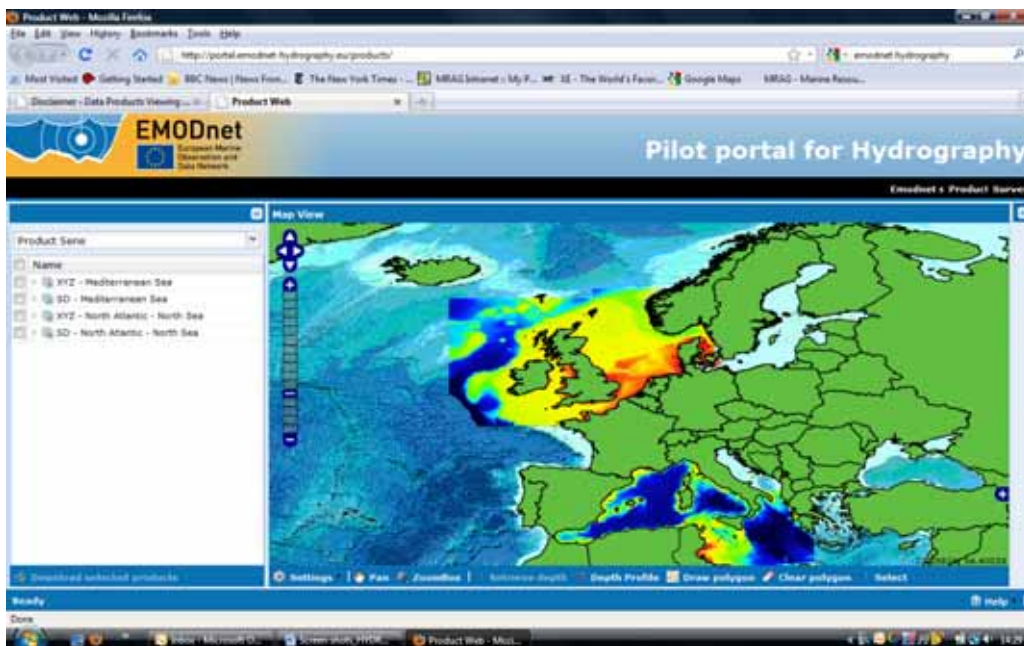
Screenshot 42 Accessing the hydrography data products from the home page

You must read and accept a disclaimer that the EGB is not to be used for navigating or any other purposes relating to safety at sea (Screenshot 43).

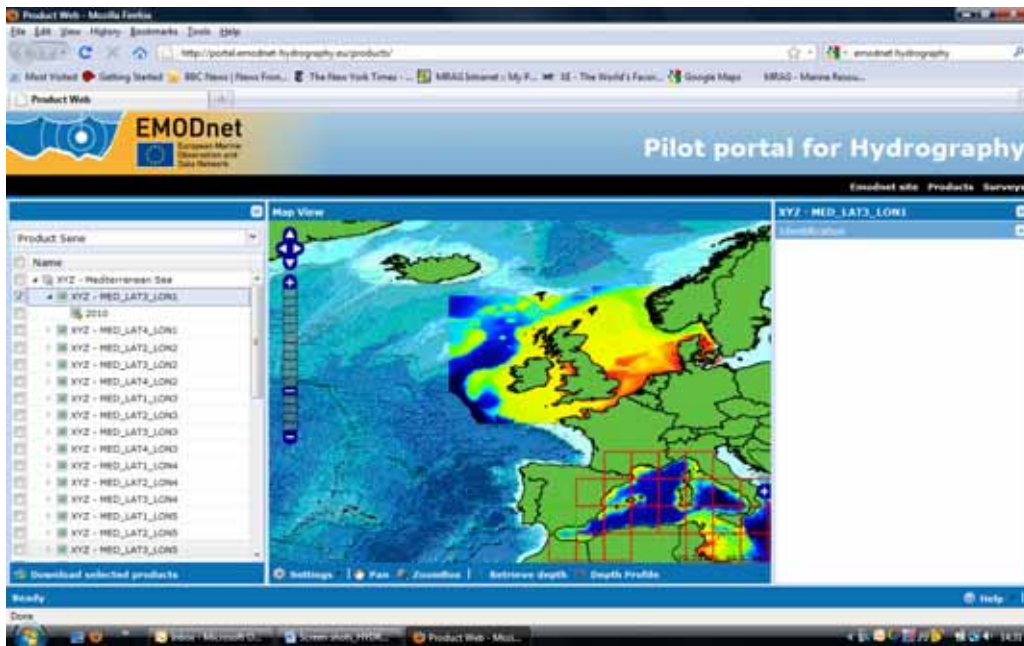


Screenshot 43 Disclaimer regarding the use of the hydrography data products

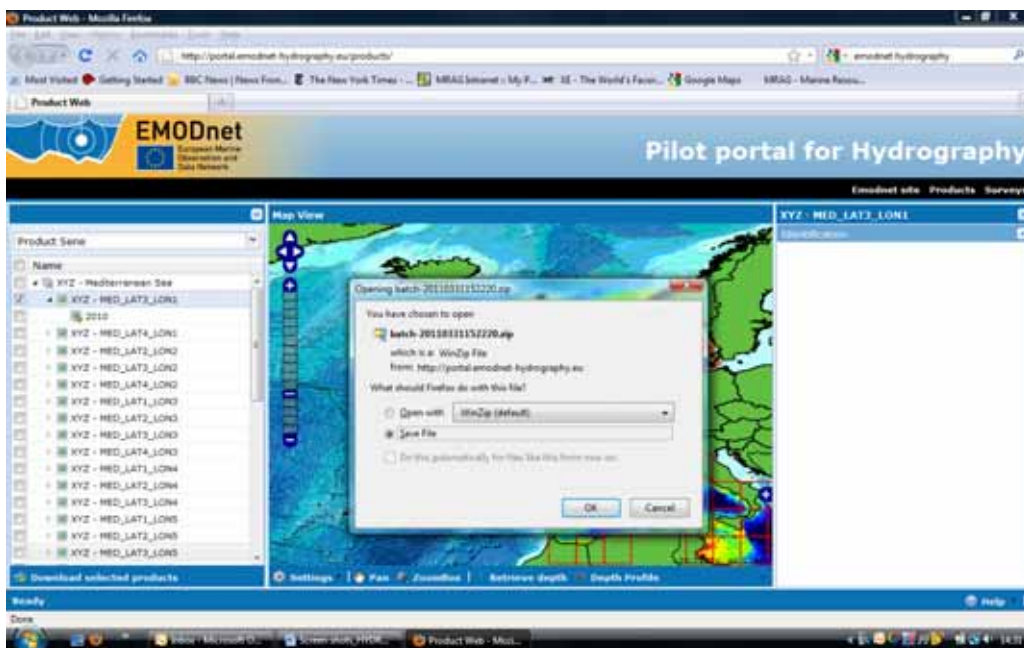
The bathymetric maps available are displayed on the portal (Screenshot 44). Tick the box to expand a selection to show specific data sets (Screenshot 45) and click on dataset to save (Screenshot 46).



Screenshot 44 Bathymetric maps available through the hydrography portal



Screenshot 45 Selecting data sets from the data products



Screenshot 46 Downloading hydrographic data sets

4.1.5 How to provide feedback

On the home page, there is a blue tab on the left side of the page. When a user clicks this tab it expands to a box where you can enter your name, email and feedback. This is also where the link is to the user-friendliness survey.

4.1.6 Questionnaire responses

No survey responses were received for the hydrography portal.

4.2 Task Two

The requirements for this task were to download bathymetry and coastline data from one sea-basin and to prepare a map of coastline and bathymetry. Using the data, a further map was to be prepared showing confidence levels in bathymetry.

4.2.1 Accessing data

The bathymetric representations for the North Sea & North Atlantic and the Mediterranean were straightforward to see on the map. Highlighting 'retrieve depth' allows data for individual points to be displayed on screen, including minimum, maximum and mean depth plus number of observations and standard deviation as well as details of the kind of observations (survey, composite DTM or Gebco) that were used to generate the data.

Data can be downloaded for a basin (we selected the Mediterranean as XYZ format) and saved as a Zip file containing individual files. At this stage bathymetric data (mean depths) for these basins can be downloaded as XYZ or SD files. The data available at the time of the study is the depth by location. Data for the number of observations and the standard deviation of the depth was not available at the time of the study, so it was not possible at present to determine the confidence interval for the bathymetry. With regard to manipulating the data it should be noted that currently the North Sea & North Atlantic are provided as a single basin. A total of 34 zip files were downloaded for the Mediterranean, the text files were extracted, and then imported into a single table in an Access database with 9541139 rows. Some of the repetitive aspects of the Import method can be saved in Access to save time when importing additional files. The table in Access was then connected to the MapInfo GIS application, and, using the create Grid Surface Map tool, a raster layer of the bathymetry was created. The resulting map of the bathymetry and coastline for the Western Mediterranean is shown in Figure 12.

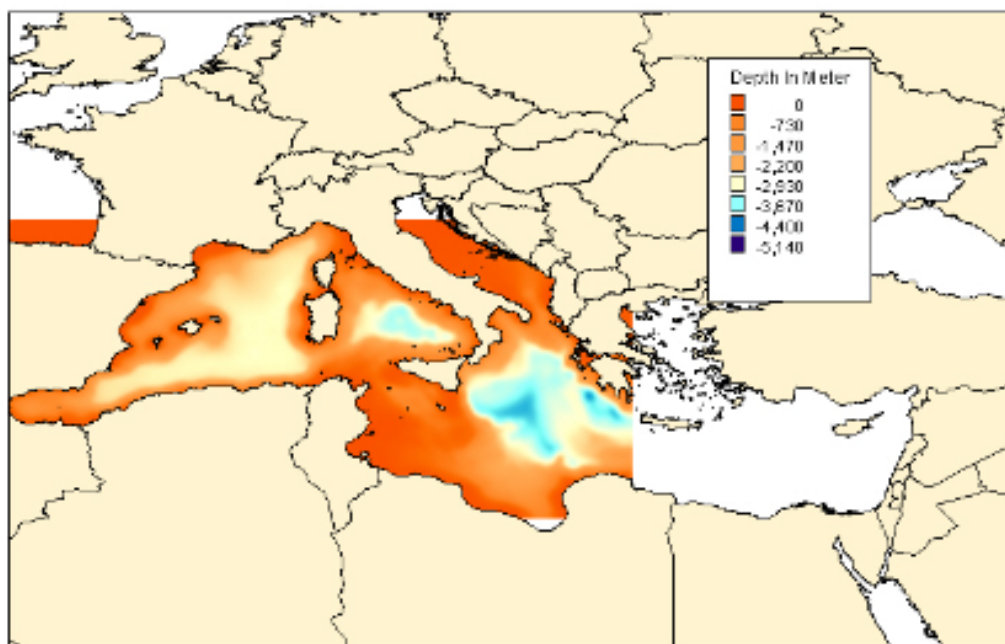


Figure 12 Map showing bathymetry and coastline for the Western Mediterranean developed from data files from the hydrology portal (see text for details).

4.2.2 Response to queries

Queries are dealt with via an interface on the portal into which queries can be entered. Feedback on the site and what was available was provided together with what would be provided in the future as well as an indication as to when it was expected to be available.

4.3 Task Three

4.3.1 IPR issues from the user perspective

The approach of the hydrography portal in terms of IP restrictions is basically identical to the chemistry portal in that data requests are dealt with in accordance with the SeaDataNet Data Policy through the SeaDataNet lock and key system.

Again there are two basic means of identifying which data is available, through the 'Metadata' and 'Data' tabs or alternatively through the 'Data Products' tab. Having registered each user is then required to log in to conclude the transaction. After pressing 'Submit request' to go to the next step it is then necessary to log in to the site through the SeaDataNet authentication service.

When going to view the data and access the data sets the user is presented with a screen that states:

The EMODNET Gridded Bathymetry is not to be used for navigation or for any other purpose relating to safety at sea.

This first draft of the EGB has been created at a resolution of 0.25 arc-minutes using the best available bathymetry from a variety of sources using a variety of methods. The data coverage is still

incomplete and some data were collected several years ago, however as new data and other extant datasets are made available, the gaps will be filled and the grid updated.

The information contained in the grid is believed to be trustworthy. However its accuracy and completeness cannot be guaranteed. Whilst every effort has been made to ensure its reliability within the limits of present knowledge, no responsibility can be accepted by those involved in its compilation or publication for any consequential loss or damage arising from its use

The user must then click on the 'I accept' button before proceeding.

Otherwise the basic approach to the acquiring data from this portal in terms of IPR is identical to the Chemistry Portal: following registration and the allocation of a role, individual data requests are determined in accordance with the SeaDataNet Data Policy, the role of the applicant and any restrictions imposed by the data owner.

The same comments therefore apply in terms of the need to clarify and better align the User Licence Agreement with the SeaDataNet Data Policy in one uniform and comprehensive set of terms and conditions.

4.3.2 IPR issues from the provider perspective

The same arrangements apply for the Hydrography Portal as for the Chemistry Portal.

5 Geology portal

The geology portal has been developed by a team of 14 partners comprising the geological surveys of Finland, Latvia, Lithuania, Estonia, Poland, Germany, Denmark, Norway, Sweden, Netherlands, Belgium, France, Ireland and UK. All of the partners are members of EuroGeoSurveys Marine Geology Expert Group. The consortium is co-ordinated by NERC/BGS of the UK and the geology portal website is available at <http://www.EMODnet-geology.eu>

5.1 Task One

There are not currently very many options on the home page of the geology portal, just a link to geology and other EMODNET portals, a link to the user-friendliness survey (under 'News') and a contact for more information (Screenshot 47).



Screenshot 47 Home page of the geology portal (accessed 02/03/2011)

The 'Metadata Catalogue' option on the OneGeology-Europe Portal was searched for 'marine geology' (from a drop down list of terms in 'Keywords') but it did not produce any results. It was not clear if the other categories (e.g. GEology, Hydrogeology etc) contained marine geological data.

The metadata from the EMODNET substrate map product is viewable on the OneGeology-Europe Portal. Categories of metadata include: Server, online resource, layer name, abstract, access constraints, descriptive keywords (empty), extent, legend, contact (empty).

A note on the page before loading the EMODNET Substrate map states:

'This EMODNET reclassification scheme consists of four substrate classes defined on the basis of the modified Folk triangle (mud to sandy mud; sand to muddy sand; coarse sediment; mixed sediment) and two additional substrate classes (diamicton, rock).'

As the OneGeology-Europe Portal was originally developed to show terrestrial geology, it was not immediately clear when following link from the EMODNET geology portal how to get to the marine data (terrestrial data was what appeared on the map). Navigating around the portal, however, revealed that when you go to the search tab, a 'Metadata catalogue' box appears on the left side of the page that allows you to 'Add EMODNET maps'. Users already familiar with EMODNET might find this intuitive, but other users might not be aware of EMODNET in relation to marine data and the word 'marine' somewhere would assist.

There is an option on the OneGeology-Europe Portal to change languages – with a choice of 18 European languages.

You can also select an 'i' button on the top of the map viewer to show 'attributes on selected points' and view this in a new tab (Data folder). An example of this is shown in Figure 13.

OBJECTID	Shape	CODE	C_Grain	Reclassif	Method	Sample_n	O_substrate	Relation	Prime_FOLK	Till	Boulders	Bedrock	Comments	References	Shape_Length	Shap
120	NULL	GB			0	0		0	2. Sand to muddy sand	No	No	No			281,91084672187	33,23
124	NULL	GB	Folk	P, S	Reclassification on the grounds of samples	0		<	1. Mud to sandy mud	No	No	Yes			189,217443487084	28,19
126	NULL	GB	Folk	P, S	Reclassification on the grounds of samples	0		<	3. Coarse sediment	No	No	Yes			199,554981945306	6,552

Figure 13 Example of 'Attributes for Selected points' (accessed 02/03/2011)

There was not any readily available guidance or help on the EMODNET geology homepage or the OneGeology-Europe Portal.

5.1.1 Understanding of the scope of EMODNET

Although the portal homepage does describe purpose of EMODNET and the role of geology portal, there are no links to the DG MARE EMODNET page for more information or any documents relating to this specific portal (progress reports/workshops/presentations etc). Links are provided to three of the other pilot portals: hydrography, chemistry and biology.

5.1.2 Data coverage of the portal

The draft EMODNET substrate map of the Baltic Sea, Greater North Sea and Celtic Seas at 1:1000000 scale is collated from more than 200 separate sea-bed substrate maps. This draft version was produced on 30 August 2010, but the project will continue to July 2012 and more changes might be made.

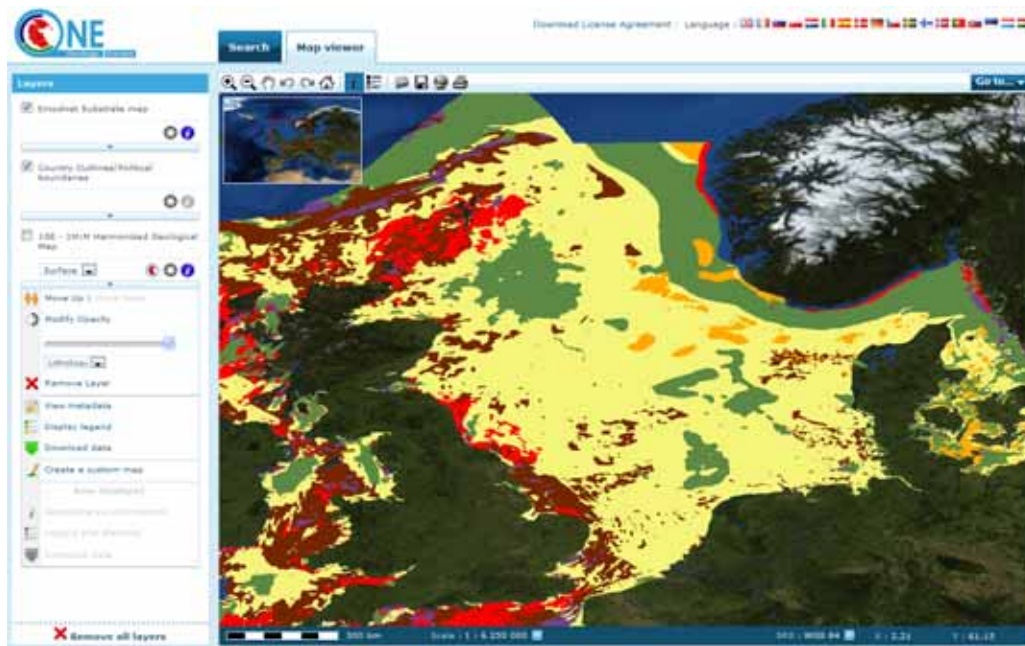
The portal provides the map as a data product, but the background data is not downloadable from this portal. It is possible to localise the map by country or coordinates and then save or download a map view. There is also an option to export to KML for Google Earth.

5.1.3 Quality of data in the portal

The 'Access constraints' field in the metadata for the EMODNET substrate map, indicates that the dataset was compiled from background information that may have been compiled at a more detailed scale. The map therefore gives an overview of the marine regions in question and is not

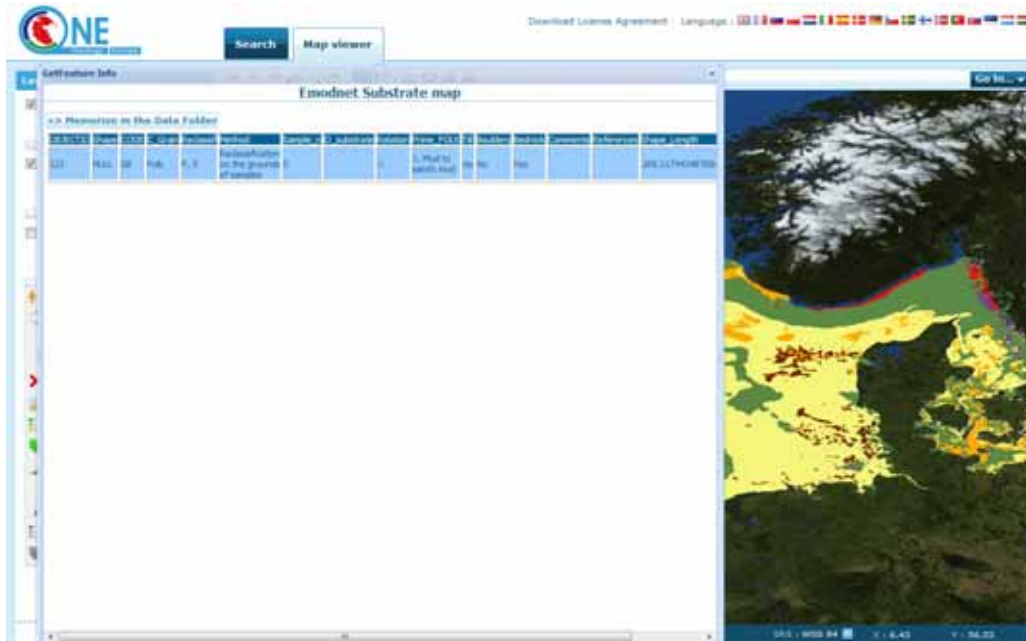
suitable for local or regional scale analysis. The EMODNET-Geology partners (the IPR holders) give no warranty, condition or representation as to the quality, accuracy or completeness of the data, information, or service, or its suitability for any use or purpose. All implied conditions relating to the quality or suitability of the information, and all liabilities arising from the supply of the information (including any liability arising in negligence) are excluded to the fullest extent permitted by law.

Access is through the OneGeology-Europe Portal from which the EMODNET maps can be accessed and added to the terrestrial maps (Screenshot 48).



Screenshot 48 EMODNET maps available through the OneGeology-Europe Portal

Selecting the information tab at the top of the map allows details of individual points to be displayed as a Table. This includes the details of the sediment and substrate at that point together with the method used to determine this (Screenshot 49).



Screenshot 49 Details of the individual data points in the data product

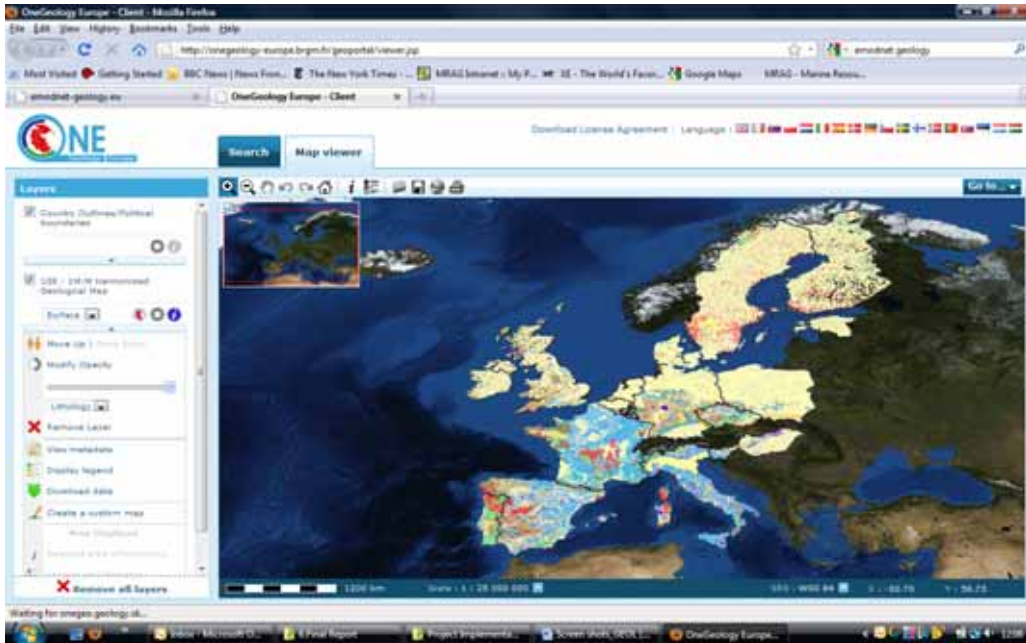
5.1.4 How to download data

It was not possible to download the background data from the portal. There is an option to save the current map view (you can limit the map by coordinates or country), export KML to Google Earth or print the map.

To access or export the map from the pilot portal it is first necessary to go to the OneGeology-Europe Portal, which as its name implies has a wider scope also being concerned with terrestrial geology (Screenshot 50 and Screenshot 51).

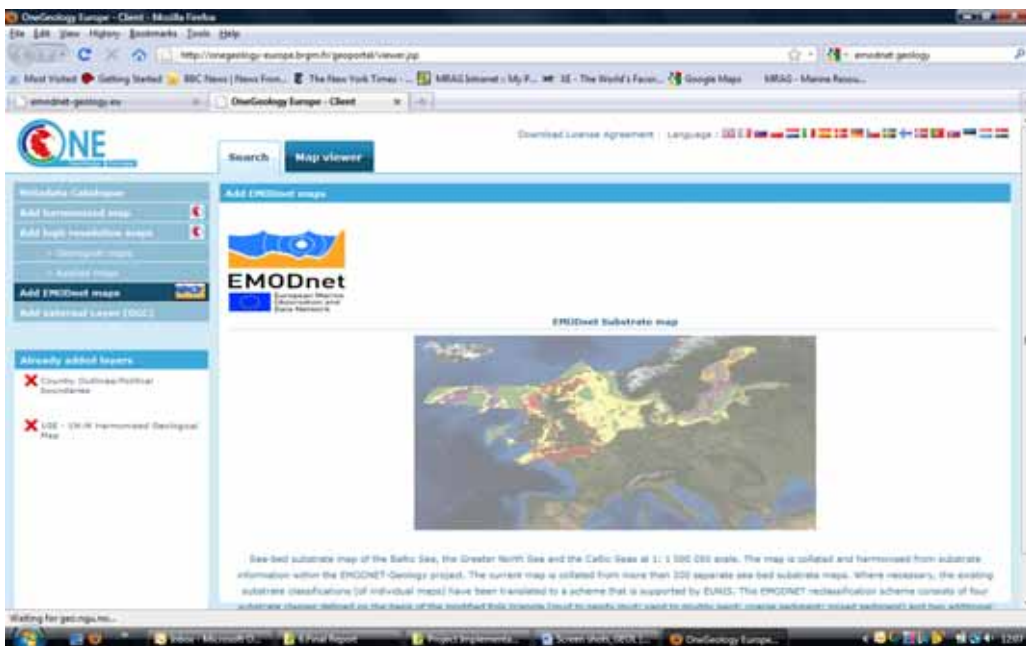


Screenshot 50 Details of EMODNET and the geology portal



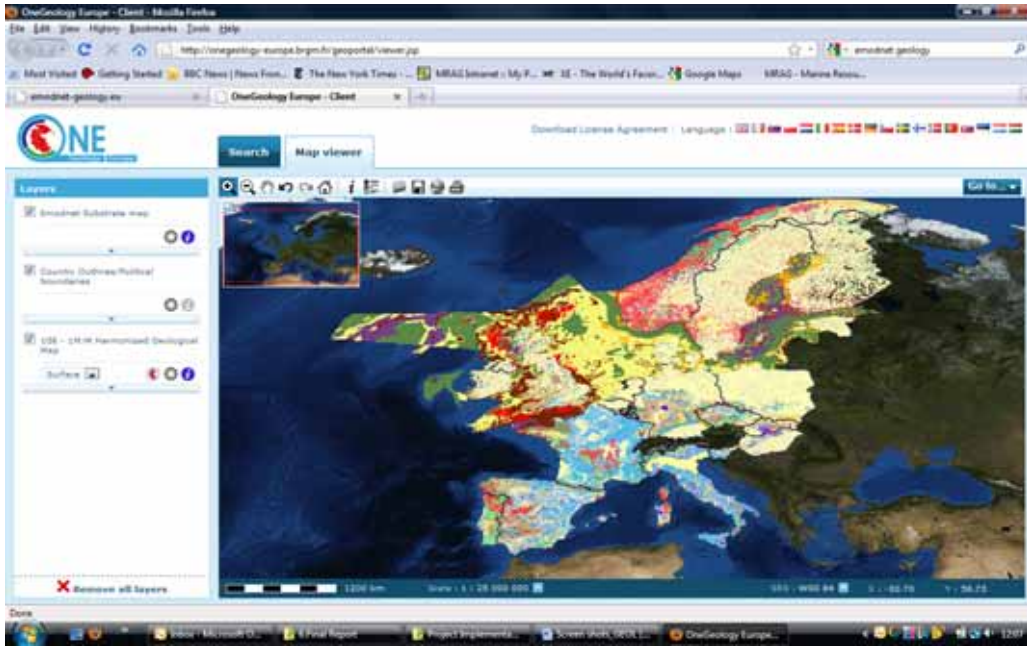
Screenshot 51 The OneGeology-Europe Portal showing the terrestrial geology maps available

Having selected the language it is next necessary to go to the green box on the bottom left hand side of the screen and to click on access to geoportal. This leads to the map shown above.



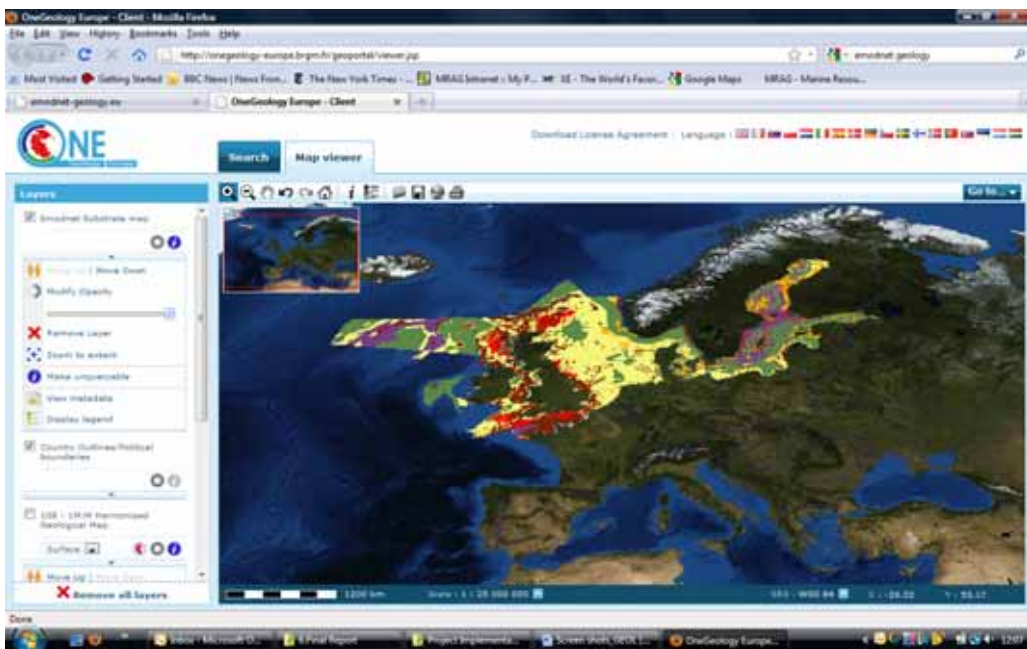
Screenshot 52 Adding EMODNET maps to the terrestrial maps

From here it is necessary to click on 'Add EMODNET maps' and to click on the map (Screenshot 52 and Screenshot 53).



Screenshot 53 OneGeology-Europe data products showing marine and terrestrial geology

From here you can click on the tabs on the left hand side to remove the land elements as follows (Screenshot 54).

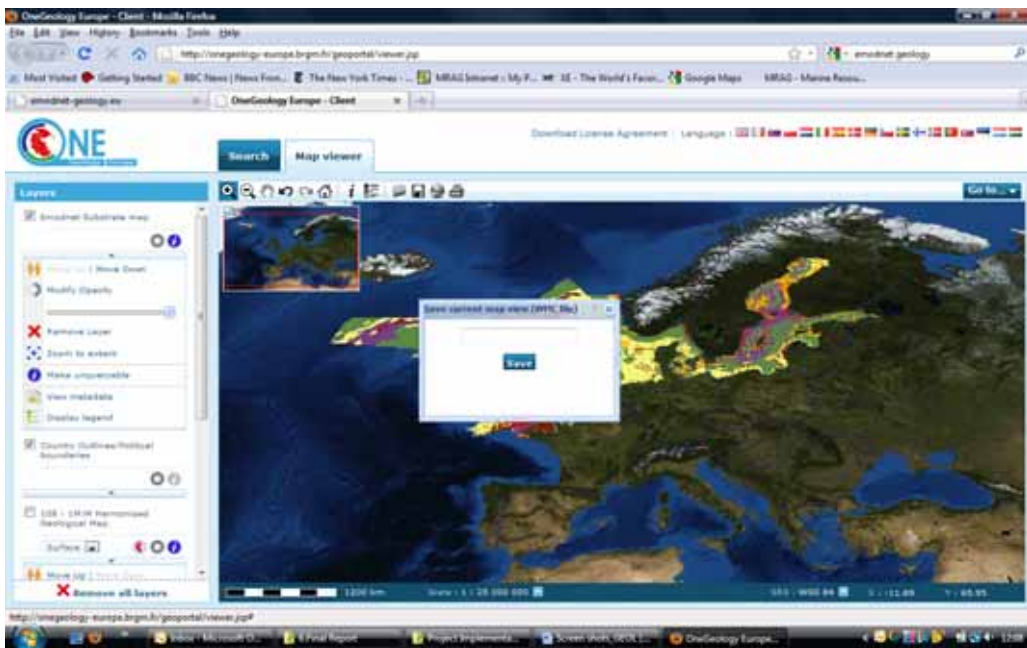


Screenshot 54 OneGeology-Europe Portal showing only marine geology maps

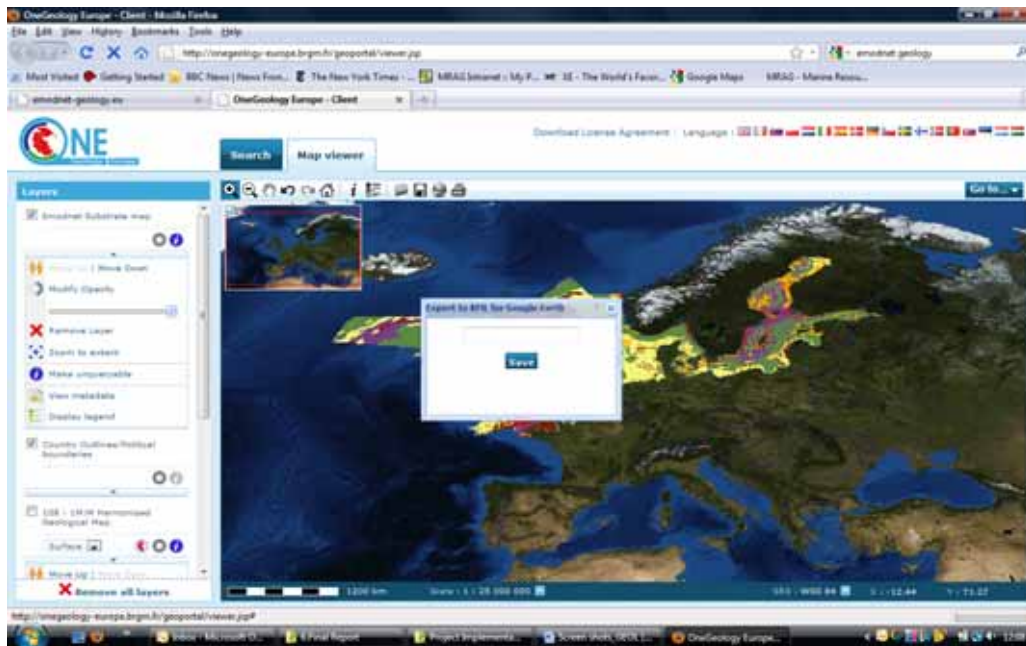
Next the EMODNET box should be expanded to display the legend the relevant substrate map. This image can then be manipulated, saved and exported to Google Earth (screenshots 55-57).



Screenshot 55 Details of the marine geology maps metadata



Screenshot 56 Option to save the marine geology map



Screenshot 57 Option to export the marine data map to Google Earth

5.1.5 How to provide feedback

There is a link on the main portal homepage to the user-friendliness survey (as 'News'). There is also a link to contact for more information on the geology project (Alan Stevenson at BGS).

There are no options to provide feedback from the OneGeology-Europe Portal site.

5.1.6 Questionnaire responses

Only one user filled in the questionnaire survey on the user-friendliness of the geology portal. This response was the result of the email circulated to individuals requesting them to look at the portal and then fill in the survey (see Annex 1). This user found that although they had a good first impression of the portal, it did not fulfil their requirements, instructions were not useful, and data was not easy to find or access (Table 10).

The user did not respond to the queries on whether any errors were encountered when using this portal. When asked how this portal compared to others they may have used, this user found that the portal was 'about the same'. Open-ended comments from this user on the portal can be found in Table 11.

Table 10: Survey responses on user-friendliness of the geology portal

User	Portal fulfilled requirements	Good first impression	Portal intuitive to use	Instructions were useful	Data easy to find	Data was easy to access
1	Disagree	Agree	Neutral	Disagree	Disagree strongly	Disagree

Table 11: Open ended comments from survey responses on the geology portal

User	Comment
1	1. Even in this development era, I suggest you prominently display a link to a data display example customized to show off your marine content. At first glance, it wasn't totally obvious that OneGeology-Europe Portal was where you need to click for EMODNET Geology resources. 2. You're missing an opportunity with your images. They're compelling images, but if you link them to pages that tell the story of your mission you will be more effective in gaining support. 3. One opportunity for raising awareness would be to display a harmonized age map, including both terrestrial and marine areas.

5.2 Task Two

For Task Two the requirement was to download data of marine sediments and underlying strata for one sea-basin and, using this data, to prepare a map of sediments and a map of underlying strata.

5.2.1 Accessing data

It is not entirely straightforward to access the seabed data through the OneGeology-Europe Portal as this requires the user to use the search function and metadata catalogue to add the EMODNET maps. Once loaded, a sediment map is currently available that covers the North Sea, Celtic Sea and Baltic combined. It is possible to download the sediment map and to save this and export to Google Earth for a basin or specified area. The map shown below of the marine sediments in the North Sea was created in this way. However, this action is not yet possible for the underlying strata. It is also not possible at this stage to download the data and recreate the map.

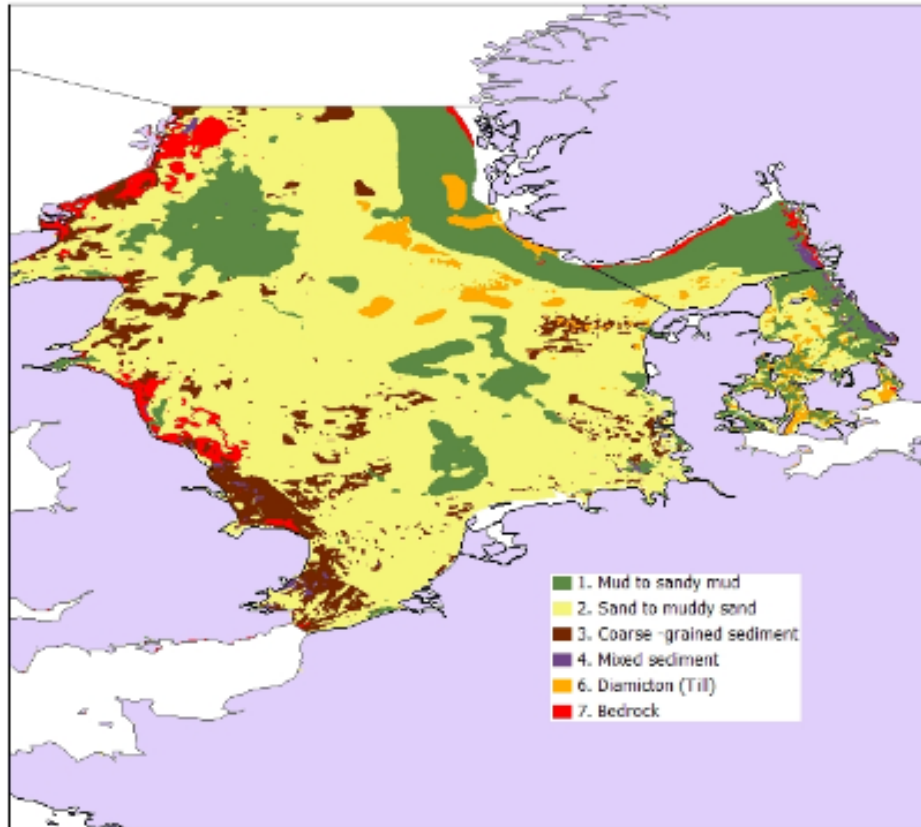


Figure 14 Map based on EMODNET layers showing marine sediments in the North Sea downloaded from the OneGeology-Europe Portal.

5.2.2 Response to queries

Queries could be made through the portal via an email link. The response to a query about the availability of the data was rapid and comprehensive. The respondent confirmed that it was possible at present to download the sediment map and use this as an image file. Because confidence maps can only be created from the underlying data (i.e. samples, acoustic and seismic survey lines), it would not be possible to create a confidence map as the data would never be made available to a third party by the partners.

5.3 Task Three

5.3.1 IPR issues from the user perspective

As described in section 5.1.4 the main product of the portal is a substrate map that can be download and exported to map viewing software such as Google Earth. It is not possible to download seabed data via the portal and OneGeology-Europe web site and it was made clear that this data (samples, acoustic and seismic survey lines) this would not be made available to a third party by the owners of the data.

Nevertheless the map itself is essentially a pictorial representation of data using colours and spaces instead of numbers. Moreover it is possible to click on a portion of the map in order to learn what a particular colour represents. In other words meta-data describes the map information.

The metadata is contained in the meta-data folder which can be accessed by clicking on the tab 'view metadata'. Among other matters the metadata folder contains a section on access constraints. The first part is somewhat technical although it does contain a disclaimer to the effect that the map is 'not suitable for local or regional scale analysis'. It then goes on to provide:

"Copyright: European Community represented by the European Commission. The holders of the intellectual property rights (IPR) to the data, which existed prior to the Contract being entered into, are the EMODNET-Geology partners."

The meaning here is not entirely clear. Presumably the intention is to assert the IPR of the EU in the map while clarifying that the IPR in the data used to create the map remain with the consortium members. In this case though, and given that it is possible only to download the map and not the individual data sets that make up the layers of the map the question then arises as to the relevance of licence agreement provided for on the site.

This is accessed from a link at the head of the page, 'Download Licence Agreement'. Clicking on the link leads to the licence agreement which states as follows:

OneGeology-Europe

Conditions for downloading of ~1:1 million scale surface and bedrock geological map data

Allowed use

The ~1:1 million scale data is available for download in GeoSciML and ESRI ShapeFile formats from the OneGeology-Europe portal free of charge, without any restrictions, for any legitimate use, including public, private and commercial use.

IPR

Any and all Intellectual Property Rights in the ~1:1 million scale geological data provided by the rightholders through the OneGeology-Europe portal are and shall remain the exclusive property of their respective rightholder (which will normally be the national geological survey organisation).

Any form of use and/or reproduction must be accompanied by the following acknowledgement:

"Used and/or reproduced with the permission of the geological survey organisation rightholders who comprised the OneGeology-Europe project*. All Rights Reserved."

*([List of all the Geological Surveys participating](#))

Liability

Use of any data, information, or service supplied by the geological survey organisations who comprised the OneGeology-Europe project is at the user's own risk. Rightholders give no warranty, condition or representation as to the quality, accuracy or completeness of the data, information, or service, or its suitability for any use or purpose. All implied conditions relating to the quality or suitability of the data, information, or service and all liabilities arising from the supply of the data, service, or information (including any liability arising in negligence) are excluded to the fullest extent permitted by law.

Applicable Law

Any dispute arising that cannot be solved by negotiation is to be handled as a dispute under the law of the country in which the respective rightholder has its principal place of business.

The main obligation as far as the user of the downloaded data (i.e. a map) is concerned is the requirement that the source be acknowledged. Otherwise there are no restrictions as to the purpose for which the data can be legitimately used, including 'public, private and commercial use'. What illegitimate use might be is not defined.

The first point to note in the context of the enforceability of this licence agreement is that because it is not necessary to first open the relevant link and to agree to its conditions (by clicking on a 'yes' button for example) it may be hard for the data owners to prove that there is any fact any agreement between them and the data user. Given that the use of the data is largely unrestricted and the only rights that the data holders seek to assert relate to an acknowledgement of the source the potential harm may be considered slight. But on the other hand there is little point in seeking to impose conditions if they cannot be enforced.

The second point is that, as with the other portals, it is not entirely clear with whom the data user is contracting. Is the contract with the consortium or with the individual owner of the IPR? Who in particular is the 'respective right holder'? The agreement states that this is 'normally' the national geological survey organisation but what does 'normally' mean and how does this provision relate to the sea-bed map? Presumably the data holder is the national geological survey organisation of the State within whose jurisdiction the relevant sea-bed area lies because it forms part of the territorial sea or continental shelf of that State. But this provision is not very clear.

And then the question arises as to the issue of acknowledgement. Is the intention that the user of the map should acknowledge the permission of the geological survey organisation right holders who comprised the OneGeology-Europe Project as per the licence agreement or the EU as the holder of the IPR in the map? This too is not clear.

The situation no doubt arises because the EMODNET portal is based around the existing OneGeology-Europe Portal which links marine geology with terrestrial geology.

5.3.2 IPR issues from the provider perspective

According to the consortium IPR issues have been addressed as follows. The data is provided by the 14 organisations that make up the consortium, with each partner being responsible for the

preparation and periodic updating of a different layer. The different layers are held on the respective servers of the various organisations (the geological surveys) involved.

Data provided by third parties to compile the map is used with the permission of the data owners for this purpose. In the case of government organisations, such as the UK Hydrographic Office, such agreements are usually recorded in the form of a memorandum of understanding.

6 Physical habitats portal

The physical habitats portal is operated by a consortium of seven partners from five countries, led by the UK Joint Nature Conservation Committee (JNCC). The physical habitats portal website is available at: <http://www.jncc.gov.uk/EUSeaMap/>; <http://www.jncc.gov.uk/page-5040>.

6.1 Task One

The main page for the physical habitats portal is hosted on the JNCC website under 'EUSeaMap – Mapping European Seabed habitats'. This is different to the other portals, which all used the EMODNET banner (Screenshot 58). However, the banner is used on the mapping portal itself, which you enter by clicking the link from the main page.



Screenshot 58 Main page for the physical habitats portal (accessed 02/03/2011)


Within the page text, there are embedded links to a report on the EUSeaMap project, to a description of the Marine Strategy Framework Directive hosted on the JNCC site and to the main EMODNET site hosted by DG MARE. In the section headed 'Interactive Map', there are links to the mapping portal, guidance on using the site and the feedback survey.

The Objectives of the EU SeaMap are also provided in bullet-point format. A small 'Find out more' section at the end contains links to the following:

- EUSeaMap partners;
- UKSeaMap;
- MESH project website;
- MESH Atlantic;
- BALANCE project website;

- EUNIS habitat classification system.

Other links on this page (in banners, right-hand navigation) are for other areas/projects on the JNCC site.

There does not seem to be a separate data catalogue as such, but there are metadata associated with the options in the mapping portal. If you click on the  button next to the layer you are interested in, a pop-up window opens containing information on the layer. This information includes: abstract, spatial reference system, data published, keywords, geographic bounding box, spatial extent of dataset, resolution, conditions on usage, frequency of update and contact. There is also a link to give feedback.

The mapping portal is reached through a link on the main page. It opens with a map and three tabs in a box to the left of it – ‘Welcome’, ‘Map Layers’ and ‘Key’. The ‘Welcome’ tab gives some background information on EMODNET. The ‘Map Layers’ tab allows you to add layers to the map from other mapping portals. The options are: ‘Modelled seabed habitats’, ‘Input layers’, ‘Raw data’, ‘Confidence’, and ‘Boundaries’.

On the mapping portal page, there is a link in the top-right corner to the tab ‘Help’ which takes you to a guide: EUSeaMap Interactive Map Help. This guide provides information on the EUSeaMap and Interactive Map (webGIS), using the map tools, general layout information, tab information, information for Web Map Service (WMS) clients, technical issues with the interactive map and contact details.

The help guidance also states:

*‘Using the EUSeaMap Interactive Map it is also possible to view layers from other Interactive Maps, such as the EMODnet portals for geology, chemistry, biology and hydrography. This is achieved by clicking on the **Add layer(s) from other mapping portals** link at the top of the Layers tab.*

*Portals can be chosen from the drop-down list, or if a Web Map Service (WMS) address is known, using the **Custom...** option. If the WMS server has arranged layers in groups, the **Use layer groupings** tick-box may be ticked to view the layers in a simpler format.*

Layers will appear in a new folder below the permanent layer folders. Sliding bars beside the layer names allow the layer transparency to be changed.’

6.1.1 Understanding of the scope of EMODNET

There is little information provided on the scope of EMODNET, namely that EUSeaMap is an integral part of it and a primary customer of many of the new data layers that are being produced by the initiative. There is a link to the EMODNET site hosted by DG MARE.

The mapping portal itself has a brief sentence on EMODNET and links to the other pilot portals and the main DG MARE site.

6.1.2 Data coverage of the portal

The coverage for this portal includes the Celtic Sea, North Sea, Baltic Sea and western Mediterranean Sea. There are thus data gaps for the Northeast Atlantic not covered (e.g. Bay of Biscay etc), central and eastern Mediterranean and Black Seas.

Data layers include seabed substrate, energy at seabed, biological zone and salinity at the seabed – they are combined to produce European Nature Information System (EUNIS) habitat maps for the selected regions.

All of the metadata for layers on the map had the following ‘Conditions of use’:

‘Data is freely available for research or commercial use providing that the originators are acknowledged in any publications produce.’

When you select a layer to download a pop up appears that requires you to tick a box that you have read the Terms and Conditions.

Layers with an option to download include:

- Detailed classification:
 - Celtic & North Seas;
 - Baltic Sea-by energy;
 - West Mediterranean.
- Raw data:
 - WMed, Celtic & North Seas.

6.1.3 Quality of data in the portal

The EU SeaMap portal has a layer for ‘Confidence’. Expanding this section provides two options – ‘Confidence in boundaries’ and ‘Confidence in data sources’. By clicking on the information button to view information on these layers the following abstracts are provided:

Under ‘Confidence in Boundaries’:

‘Confidence in Biological Zones’, ‘Confidence in Boundaries between Energy Classes’, ‘Confidence in Boundaries between Salinity Classes’:

*‘In addition to assessing input layers to the model, fuzzy thresholds are a useful tool in describing and quantifying uncertainties occurring near the boundaries between each **biological zone** (all regions), **energy class** (Baltic Sea only) and **salinity class** (Baltic Sea only). These scores are combined through multiplication and give a good visual indication of certainty at or near the boundaries of the final output seabed habitat types.’*

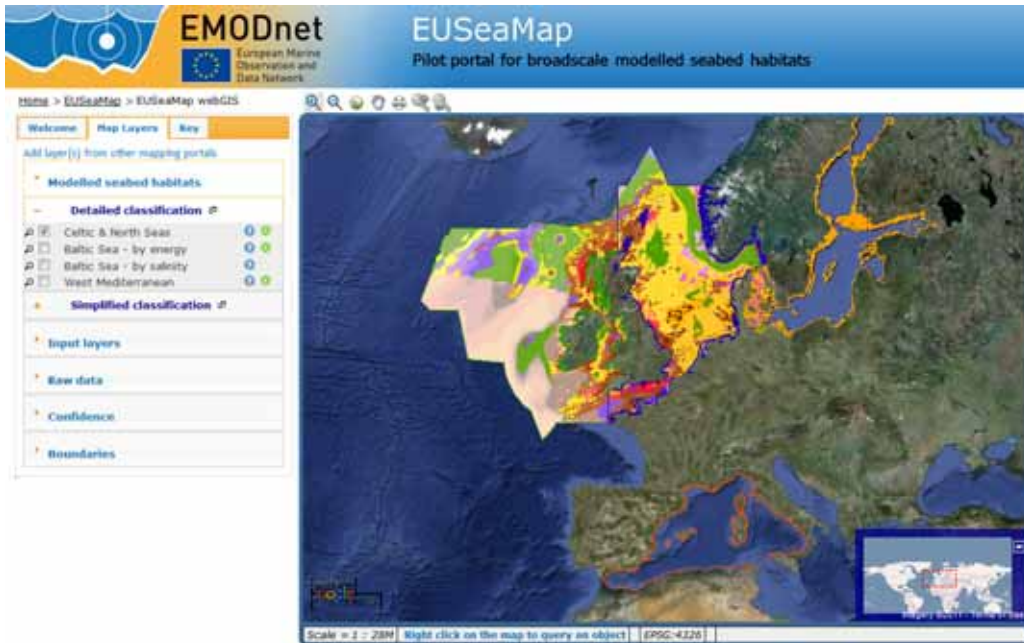
Under ‘Confidence in data sources’:

‘Confidence in Substrate Data’ and ‘Confidence in Bathymetry Data’:

*‘It is important that the confidence maps can show which datasets require improvements in future, and where. This was achieved by assessing the confidence value of two key layers, namely **substrate** and **bathymetry**. The MESH confidence assessment tool was slightly*

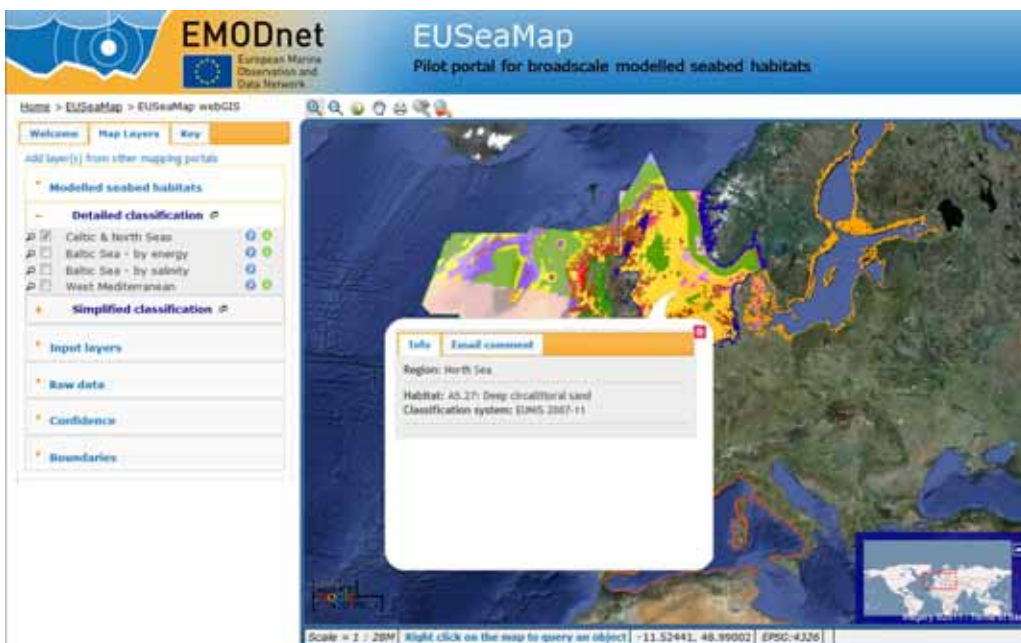
modified, in liaison with the EMODnet Geology project and applied to EUSeaMap substrate layers.'

It was also possible to examine the available metadata in the layers presented in the mapping portal. For this exercise, we selected Celtic and North Sea areas from the 'detailed classification' map layers options (Screenshot 59).



Screenshot 59 Selecting the Celtic and North Sea regions

As the screen shot above shows, it is possible to query the map by right clicking on any features of interest. Doing so brings up a pop-up that provides details of the habitat classification and description for the specific point (Screenshot 60).

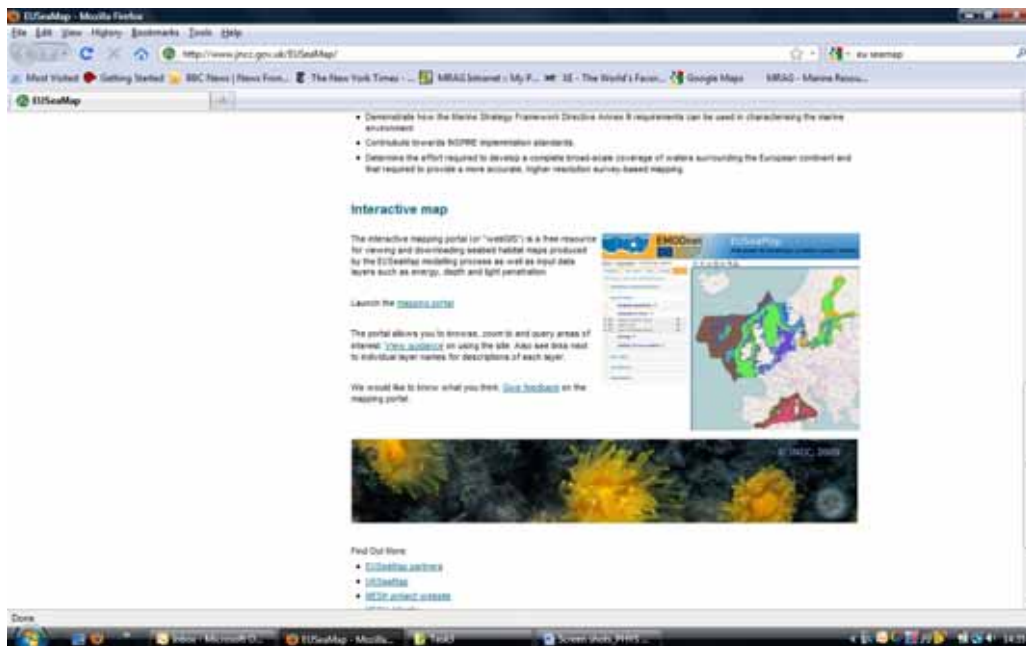


Screenshot 60 Pop up providing information about individual points on the habitats map

In relation to the data downloaded from the physical habitats portal for the Task Two Exercise and used to generate the table below, the data sheets contained information about salinity, energy level, EUNIS Level categories and descriptions, area and location descriptions and model codes. No details are provided for the specific underlying data sets.

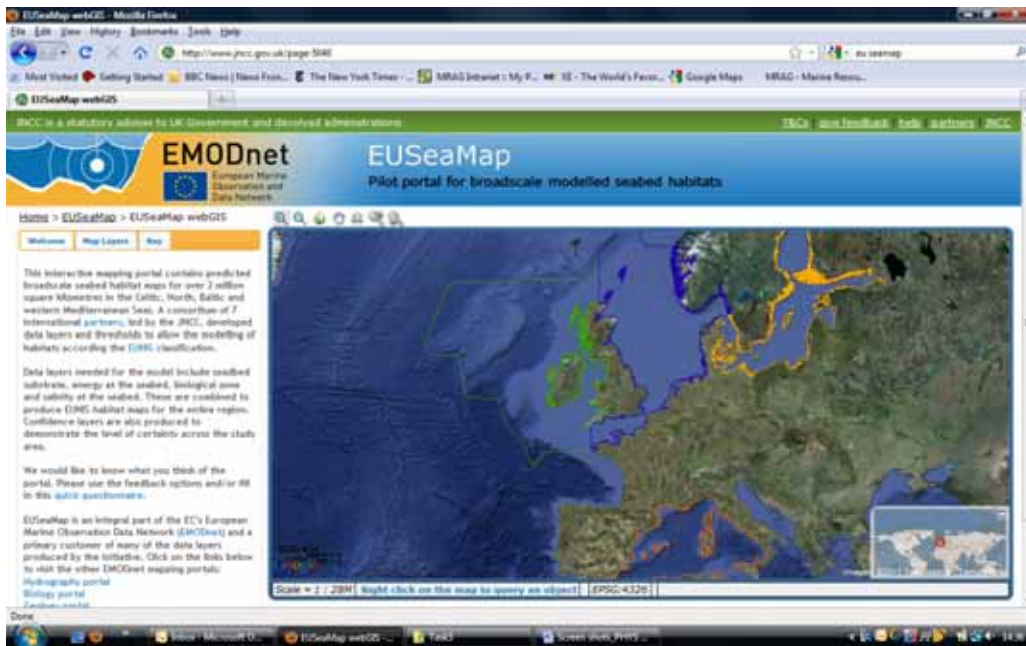
6.1.4 How to download data

Having opened the portal on the JNCC website it is then necessary to scroll down to the interactive map (Screenshot 61).



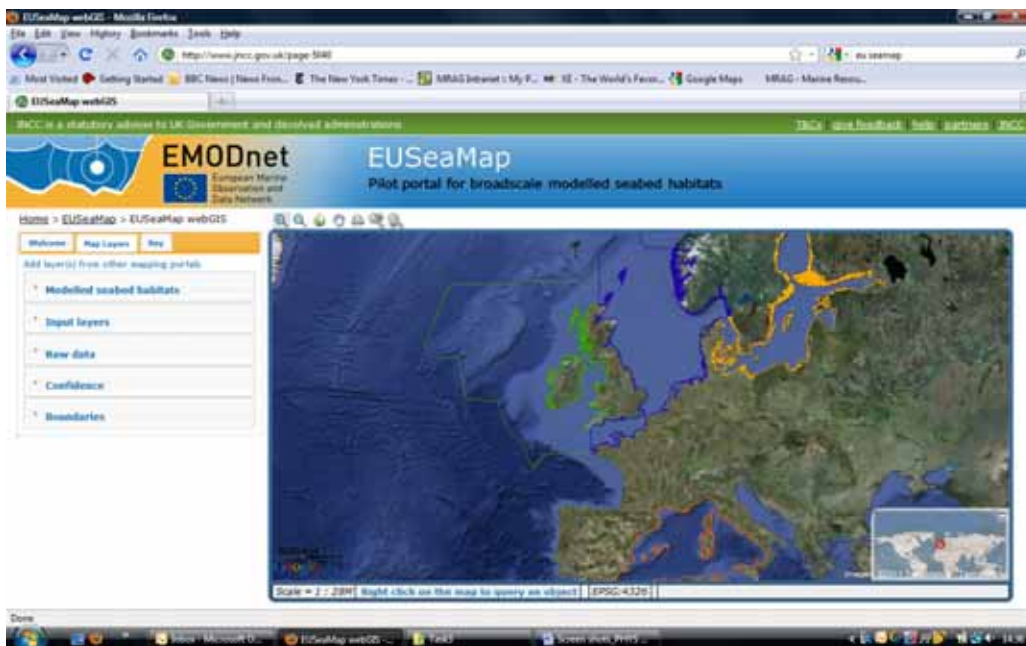
Screenshot 61 Locating the interactive map on the physical habitats portal homepage

Clicking on the link launches the mapping portal (Screenshot 61):



Screenshot 62 The physical habitats mapping portal

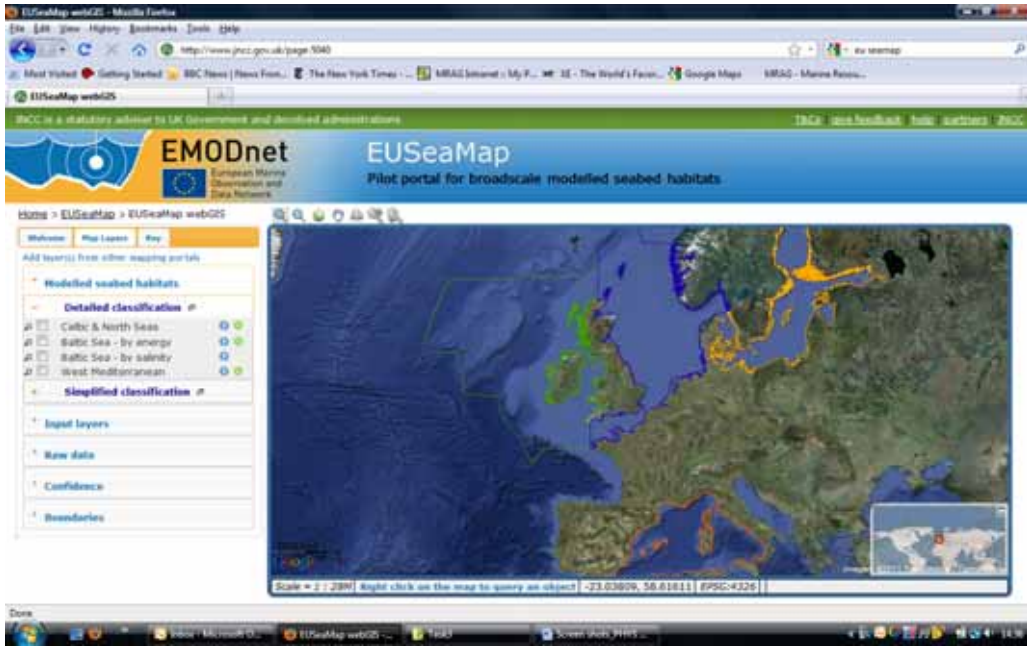
From here it is necessary to select 'map layers' from the taps on the left hand side (Screenshot 63).



Screenshot 63 Selecting layers within the mapping portal

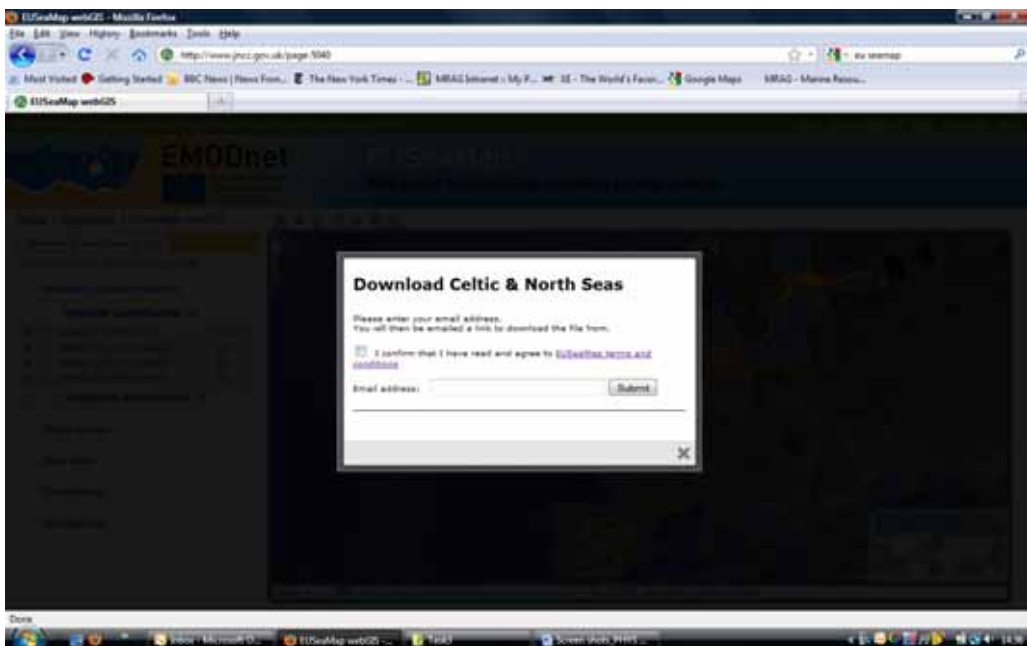
Clicking on 'Raw data' and then 'bathymetry' takes the user back to the hydrography portal.

As regards modeled sea bed habitats, to take the example of the Celtic and North Sea it is necessary to click on the green button as follows (Screenshot 64):




Screenshot 64 Obtaining map data through the interactive portal

It is then necessary to submit the data request having first agreed to the EU SeaMap terms and conditions (Screenshot 65).



Screenshot 65 Pop-up in the interactive portal about terms and conditions for data downloading

Next to datasets in the mapping portal available for download is the following symbol: 

If you click this, a pop-up appears asking you to tick a box confirming you have read the EUSeaMap terms and conditions and to provide your email address.

6.1.5 How to provide feedback

The main page has a link to ‘Give feedback’ which takes users to the EMODNET user-friendliness questionnaire. There are also links to this questionnaire from the mapping portal – both on the ‘Welcome’ tab and in the top right hand corner.

On the pop-up metadata information associated with specific data layers, there is also a ‘give feedback’ link at the bottom of the box. This links to a form where users can provide their name, email address and comments. It is not clear whether this information remains linked to that specific data layer or not.

6.1.6 Questionnaire response

Two users filled in the questionnaire survey on the user-friendliness of the physical habitats portal. The responses provided some additional perspectives, but firm conclusions cannot be drawn from just two users. Both seemed to have browsed to the portal on their own and filled in the survey rather than having completed it in response to our email request. User 1 was formerly responsible for habitat mapping in the Arabian Gulf and User 2 is a university student studying marine biology.

Both users agreed that the data in the portal was comprehensive. User 1 found the portal intuitive to use and the data easy to find, while User 2 did not (Table 12).

User 2 encountered some errors when using the site. The layers switched off when scrolling or zooming in/out on the map (Table 13).

When asked how this portal compared to others they may have used, User 1 found that the portal was ‘about the same’ as other portals. Both users provided some open-ended feedback on the portal (Table 14).

Table 12: Survey responses on the user-friendliness of the physical habitats portal

User	Portal fulfilled requirements	Good first impression	Portal intuitive to use	Instructions were useful	Data easy to find	Data was easy to access	Data was comprehensive	Data was in convenient format
1	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
2	Neutral	Neutral	Disagree	Neutral	Disagree	Neutral	Agree	Neutral

Table 13: Survey responses on whether errors encountered when using the physical habitats portal

User	Encountered errors	Comment
1	None	n/a
2	Some	Layers switched off after I scrolled around the map or zoomed in/out and so had to re-select and start again.

Table 14: Open ended comments from survey responses on the physical habitats portal

User	Comment
1	Hi, I was a research scientist mapping marine habitats in the Arabian Gulf and Red Sea 1994-99 using Landsat imagery and Arc/Info. Any chance to be involved in the research?
2	The key needs to become more user friendly.

6.2 Task Two

From the ToR the specified task was to download data on physical habitats from portal and construct a table comparing the percentages of each sea-basin covered by each habitat at levels 2 and 3.

6.2.1 Accessing data

The interactive mapping portal provides an entry point to the data sets. Within the portal, the EUSeaMap regions cover the Celtic, North, Baltic and western Mediterranean Seas. Within the portal the Celtic and North Sea areas appear to be connected and this may be a legacy from the fact that they were covered under the Mapping European Seabed Habitats (MESH) project and for consistency and comparability were included but not separated. Right clicking on the maps generates information about the habitat type and classification for the particular point. There were useful links within the site to both the background report of the development of the habitat maps and to the other portals. It was not entirely clear from the interface which boundaries or polygons were being used for the map or how the simplified and detailed data related to the EUNIS classifications. While the information was available in the background materials it was not entirely clear from the first look at the interface.

Data can be directly downloaded as a zipped file from the portal. This is achieved by clicking on the modelled seabed habitats (detailed classification) and then on the green arrows to download. The data files that can currently be downloaded in this way are the Celtic and North Seas (combined); Baltic Sea (by energy) and the West Mediterranean.

The zip file contains an ESRI shape file and its associated files that can be opened directly in ArcGIS or imported into Mapinfo. To complete the task, the shape needed to be projected into the ETRS-

1989-LAEA projection. This was done using a tool within ArcGIS. Once the file had been projected, another tool in ArcGIS was used to calculate the areas in the shape file. The tool creates another layer which has a new shape file and its associated dbf file that contains the attribute data of the shape file, including the calculated area. The dbf file could be open directly in excel for further analysis.

For each of the sea basins considered (North Sea, Baltic and Mediterranean) some manipulation of the data was required before the percentages could be calculated. For example, to calculate the percentages of habitat types by basins it was necessary to separate the North and Celtic seas.

The situation in the Baltic was more complex because there were some overlapping areas (see Screenshot 66 below).



Screenshot 66 Map showing land mass (green) and the waters of the North Sea including Skaggeiak and Kattegat (blue) and Baltic Sea (red) sea areas. The IHO sea areas are outlined in yellow.⁷

The data in the shape files intermingles between the IHO sea areas. If the calculation of area had been performed from the shape files as they were provided, the Baltic Sea would be missing some of habitats as they were included the North Sea data (shown in blue within the Baltic area), and included some habitats that are in Kattegat and Skaggeiak (shown in red). The shape files were therefore clipped to correspond to the correct IHO sea areas and the calculations were performed on the adjusted shape files. The red eclipse in Screenshot 66 highlights an area where the same habitat is recorded in both shape files.

⁷ Information contained here has been derived from EUSeaMap Consortium webGIS data (www.jncc.gov.uk/page-5040) which is made available under the pilot project for the European Marine Observation Data Network (EMODnet), funded by the European Commission's Directorate-General for Maritime Affairs and Fisheries (DG MARE).

Data was compiled in Excel using a pivot table to provide a summary of the areas by habitat, and this identified a number of blanks. It was not entirely clear if there might be duplication due to the calculation of areas using salinity and energy.

From the Excel pivot tables it was possible to construct a table that showed the habitat coverage in each basin (see Table 15 below).

Table 15 Table created from the Physical Habitats data showing percentage cover in each basin

LEVEL 3 Substrate type	% coverage		
	North Sea	Baltic	Mediterranean
A3.1	0.084		
A3.2	0.137	0.002	
A3.3	0.008		
A4.1	0.088		
A4.2	0.848	0.001	0.271
A4.3	0.865		
A5.1	9.240		0.087
A5.2	61.698	0.083	1.155
A5.3	12.244	0.744	3.804
A5.4	0.761	0.020	9.343
A5.5			0.566
A6.1	0.124		0.394
A6.2			0.273
A6.3			1.095
A6.4			1.714
A6.3 or A6.4	0.472		
A6.5	7.180		81.188
AC.1	0.014	1.219	
AC.2	0.276	4.983	
AD.1	0.027	0.900	
AD.2	0.441	3.997	
AD.3	0.281	2.691	
AD.4	0.046	2.395	
AE.1	0.003	1.305	
AE.2	0.005	8.549	
AF.1	0.000	2.632	
AF.2	0.007	8.635	
AF.3	0.028	20.131	
AF.4	0.002	17.681	
AG.1		0.167	
AG.2		0.310	
AH.1		0.171	
AH.2		0.441	
AH.3		17.940	
AH.4		4.605	
Deep circalittoral mixed hard sediments	0.914	0.003	
Deep circalittoral seabed	0.506	0.000	
High energy circalittoral mixed hard sediments	0.019		
High energy circalittoral seabed	0.224		
High energy infralittoral mixed hard sediments	0.169	0.001	
High energy infralittoral seabed	0.639	0.000	
Low energy circalittoral mixed hard sediments	0.187	0.050	
Low energy circalittoral seabed	0.089	0.000	
Low energy infralittoral mixed hard sediments	0.141	0.198	
Low energy infralittoral seabed	0.045	0.000	
Moderate energy circalittoral mixed hard sediments	0.617	0.000	
Moderate energy circalittoral seabed	0.193		
Moderate energy infralittoral mixed hard sediments	0.389	0.032	
Moderate energy infralittoral seabed	0.129		
Upper bathyal seabed	0.004		
Upper slope coarse sediment	0.000		
Upper slope mixed hard sediments	0.541		
Upper slope seabed	0.314		
(blank)	0.000	0.113	0.109

6.2.2 Response to queries

Queries were submitted by email and responses were received quickly on queries about the sea areas, the relationship between simplified and detailed and the EUNIS classifications and the different ways that the Baltic model was generated. The responses were comprehensive and pointed us to the report for more detail on how the habitats were generated and the issues that were encountered and addressed in doing so. The respondent also followed up with a phone call to describe how the data files can be manipulated to generate summary statistics.

6.3 Task Three

6.3.1 IPR issues from the user perspective

As described above it is necessary to request the modelled seabed habitats data on this portal by clicking on the green download button next to each detailed classification.

Clicking on the green button opens a new window in which the person requesting the data must fill in their email address having first ticked a box to confirm that they have read and agreed to the EUSeaMap terms and conditions. The effect of doing so is to incorporate these terms and conditions into the licence agreement. Clicking on words 'EUSeaMap terms and conditions' opens a lengthy pdf document that sets out the terms and conditions for use and Privacy Policy of the EUSeaMap webGIS.

In terms of IPR the key section of this document is paragraph 2. This provides, in sub-paragraph 1, that all material, data and information on the website are protected by copyright, database rights and other IPR and that access and use of any of the 'material, data and/or information' made available on the site is subject to the terms and conditions.

Paragraph 2 states that the material, data and/or information accessed from the portal may be subject to Specific Terms of Access imposed on its use by the 'Data Owner' which is the EUSeaMap Consortium unless otherwise indicated in the metadata of specific layers. The members of the EUSeaMap Consortium are subsequently described in paragraph 8.

Paragraph 3 provides that the material, data and/or information to which the Data Owners allow access on the website can be viewed for private use or in the ordinary course of business subject to the terms and conditions. However pursuant to paragraph 4 the contribution of the EUSeaMap Project must be acknowledged in any derived information product of publication in the following format:

Information contained here has been derived from EUSeaMap Consortium webGIS data (www.jncc.gov.uk/page-5040) which is made available under the pilot project for the European Marine Observation Data Network (EMODnet), funded by the European Commission's Directorate-General for Maritime Affairs and Fisheries (DG MARE).

In addition though the user is asked to refer to the metadata of each data layer that is used these may have different acknowledgment requirements.

Paragraph 5 stipulates that where specific use or reference to a particular data layers is made the use must acknowledge the Data Owner, the EUSeaMap Consortium unless otherwise stated in the metadata of specific layers.

Paragraph 6 states:

You may not make any financial profit from use of the material, data and/or information on this website or from any products you derive without first obtaining written permission from the EUSeaMap Consortium and the relevant Data Owner.

Finally paragraph 7 states that the material, data and/or information may not be republished wholesale or exploited for commercial or academic research purposes without the written permission of the EUSeaMap Consortium or, where different, the relevant Data Owner. The contact details for a dataset are provided within the metadata of the relevant dataset while paragraph 8 states that any information product or publication that is made which contains any part of the material, data and/or information made available on the website must contain the following statement:

The Data Owner and EUSeaMap consortium accept no liability for the use of this data or for any further analysis or interpretation of the data.

However although these terms and conditions effectively form part of the licence agreement, the portal has the potential to be slightly misleading in that the all of the metadata for the layers on the map that are available for download have the following 'Conditions of use':

Data is freely available for research or commercial use providing that the originators are acknowledged in any publications produced

These conditions are clearly less restrictive than those set out in the EUSeaMap web GIS terms and conditions. On the other hand, though, a user of the website might legitimately believe that these 'conditions of use' are in fact the EUSeaMap terms and conditions when indicating approval to the latter. The moral of the story is of course, as always, to read any linked document before 'clicking' to indicate agreement. From a legal perspective it would be difficult for a user to argue that the more restrictive EUSeaMap web GIS terms and conditions do not apply but at the very least the presence of two separate sets of conditions is misleading.

In conclusion although this portal contains the most sophisticated 'terms and conditions' document found on any of the portals, the EUSeaMap web GIS terms and conditions are really more to be considered as a set of *website* terms of use rather than as a 'data policy' for the re-use of data available on the website. The data policy itself is embedded into those terms.

6.3.2 IPR Issues from the provider perspective

The data that is used to prepare the map comes from the seven partners who form the consortium, along with a number of sub-contractors. Data is provided by the consortium members in accordance with a memorandum of understanding. This also specifies that any data supplied to the portal is available to be used in accordance with the objectives of EMODNET. Consequently the data that are being used are not subject to restrictions.

As regards the input data relating to hydrography and geology, some which is provided from the other EMODNET partners, agreements have been reached for the data to be used for the map accessed through the portal.

7 Conclusions and Recommendations

The portals have been set up by different consortia of research organisations and consequently, with the exception of the chemistry and hydrography portals, they do not share a common approach. Many of them, such as the biology portal and the geology portal, were or are based on existing projects.

7.1 Tasks One and Two

All of the portals were found to be intuitive to use and where help was needed it was usually available within the site. Requests for help when using the portals to complete specific tasks received quick and useful responses. Where problems did arise it was often down to the quality or completeness of the metadata data rather than the technical function of the portals themselves. Most of the tasks were straightforward to achieve and tools and data products within the portals made completing the tasks much easier they would of otherwise have been.

The chemistry and hydrography portals had the greatest functionality, with several different methods of searching for data that were intuitive and simple to use. The searches could also be refined to filter results from initial searches, although this functionally was less intuitive than other features on the site. Searches could also be saved: this was found to be a useful feature in providing additional references for the data used for Task Two.

The shopping basket system also made managing the data that was requested and downloaded simple. When making the initial request through the system it was immediately clear whether or not the data sets were subject to any restrictions, and at this point it was possible to refine the request to, for example, focus on unrestricted data sets. It was easy to follow the progress of requests and the maintenance of a history of requests also helped managing the data that had been downloaded from the portals.

The chemistry, hydrography and biology portals all provided access to both data sets and data products. The physical habitats and geology portals only had data products. The restrictions on most of the data sets in the hydrography portal meant that data products were the principal resource used on that site.

It was moreover possible to retrieve datasets from the chemistry and biology portals. The datasets in the biology portal are presented as either complete datasets or amalgamated by taxa, meaning that fewer steps were required to use the data. However, when completing the tasks required for this study inconsistencies in the data were found (e.g. missing dates in the birds data) which may reduce the usefulness of the data overall. However, overall less than 10% of records have missing date records.

The chemistry datasets are closer to the original data sets, meaning that a lot of detail is potentially available. As the data in the dataset is generally quite complex it and can only be viewed data once the file has been downloaded, it may take several attempts to obtain the data required. However when the correct dataset is identified it is more likely to be comprehensive, and may be more useful as a result.

Because of the differences between the portals, and the fact that they do not share a common approach, it is hard to make direct comparisons. Nevertheless we have summarised our findings in a comparative matrix in Table 16.

Table 16 Matrix comparing portals

Portal	Good first impression	Portal intuitive to use	Instructions were useful	Data easy to find	Portal had advanced features and functions	Data was easy to access	Data was comprehensive	Data was in convenient format
Biology	***	**	***	**	**	***	**	***
chemistry	***	***	***	***	***	**	***	***
Geology	**	**	*	*	**	**	**	**
Hydrography	***	***	***	***	***	**	***	***
Physical habitats	**	**	***	**	**	***	**	***

The categories in the matrix are based on the questionnaire, with an additional column to describe where the portal was found to have advanced features and functions that could be used by the user. The ratings were assigned by authors of the Study. Each portal is given a rating of one to three stars with three stars indicating our opinion of the best performing portal in that category.

7.2 Task Three

Analysis of the portals, as well as the telephone interviews with representatives from the consortia responsible for the development of the portals, shows IPR issues have clearly been taken into account in terms of the design and operation of the portals.

As described above the approach to IPR varies from portal to portal just as the layout of the portals and the mechanisms for accessing to the data does ranging from the rather sophisticated 'shopping cart' systems on the chemistry and hydrography portals, with a prior registration procedure, to simpler 'click licences' on for example the physical habitats portal. In part this reflects the different approaches of the portal to the types of data available. For example the physical habitats portal has a relatively low number of data products which it may be felt would not justify such a system. Nevertheless in general terms the shopping cart system on the chemistry and hydrography portals is possibly a system that could be adopted more widely within the future development of EMODNET.

Another reason why the portals take different approaches to IPR, though, relates to the fact that they build on earlier data sharing projects and mechanisms and many cases have adopted previously existing data policies.

Three of the portals are subject to a formal data policy: the SeaDataNet Data Policy in the case of the chemistry and hydrography portals and the MarBEF Data Policy in the case of the biology portal. However even though there is no link to a formal data policy as such access to the data on the physical habitats portal and the geology portal are subject to conditions.

Access to all of the data is on the basis of a contractual licence that sets out any applicable restrictions on the use of the data. The main obligation imposed by all of the portals relate to the issue of acknowledgement of the source of the data. Where there are more substantive restrictions on access to or use of the data provisions are made for this. Generally speaking the mechanisms for the conclusion of the licence agreements and the incorporation of licence conditions appear to work satisfactorily.

One issue that is not clear on all of the portals though is the question of the precise identity of the licensor. Is it the entire consortium, for example? Another issue that is not always addressed is the law applicable to the relevant licence agreements.

In terms of the rights of the consortia to provide the data through the portals both the design of the portals themselves as well as the interviews with representatives show that IPR considerations have been taken into account in terms of obtaining the permission of data owners to provide data through the portals. We have not of course seen the specific data use agreements though.

A number of the portals contain disclaimers of liability in terms of the use of the data.

Finally, what is not entirely clear are the rights of the EU in terms of IPR, presumably because the portals are still at a pilot stage even though they are distributing real data that is subject to genuine IPR.

In conclusion, two main issues arise in relation to Task Three. First there is the apparent lack of uniformity in the approach of IPR and use/re-use policies of the various portals as 'data publishers' (what are the applicable terms and conditions and how do these license & use terms become incorporated in agreements with users?). The second issue relates to the apparent lack of clarity on the identity of the licensor (who actually becomes a party to the agreement with the user): is it the portal operator or the data supplier? And who will be able to enforce the agreement against any infringements?

Feedback from the consortia suggests that these issues have not proved problematic so far. But in a sense, that is beside the point. The full implications will only become clear if and when the licensors (whoever they may be) seek to enforce the licence conditions against a person who seeks to use data downloaded from one of the portals otherwise than in accordance with the relevant data policy/licence conditions. The first question that a court will ask is who is entitled to enforce the licence (ie who is the licensor)? The second question is: what exactly are the licence conditions that apply? If clear answers cannot be provided to these questions then litigation is not likely to be successful.

Both issues also require clear and uniform 'back-office' arrangements with the data suppliers of the various portals. This should take away the potential legal uncertainty around the use of the portal data for both data suppliers and applicants/users.

There is finally one additional issue that the consortia operating the portals will need to address and that is the collection and processing of personal data provided by data users. Some portals (e.g. biology, chemistry) require users to provide personal data such as their name, e-mail address, etc. in order to register. The processing of personal data is subject to very specific information obligations based on the EU Data Protection Directive⁸. This is why most websites have a separate privacy policy or statement. However, except for the physical habitats portal (the EUSeaMap webGIS terms contains a data protection/privacy section), none of the portals seems to have any specific policy relating to this issue. For example the biology portal registration pop-up only indicates that the data will be used to keep users up-to-date of new releases of the database and not for commercial purposes, which is insufficient in terms of information to be provided.

7.3 Recommendations

7.3.1 Recommendations - biology portal

- Provide information on what terms in metadata mean (e.g. 'status').
- Review metadata and use IHO sea areas (or other) to standardise geographical areas.
- Review metadata to make temporal ranges more searchable.
- Review terminology – several common names for one species etc.
- Review thematic areas – macroalgae/algae etc.
- Make information on quality checking of data available on the website.
- Introduce a uniform, simplified and comprehensive set of user terms instead of the current approach of linking to the Eurobis and MarBEF terms (for raw data) and to Emodnet.eu (for online data products).
- In terms of licensing arrangements, clarify the identity of the licensor/licensors.
- Address the issue of the collection and processing of personal data.

7.3.2 Recommendations – chemistry portal

- Include information on how quality-checking is undertaken.
- In terms of the licensing arrangements, clarify the identity of the licensor/licensors.
- Clarify and align the provisions of the data policy and the licence agreement into one uniform and comprehensive set of terms and conditions.
- Address the issue of the collection and processing of personal data.

⁸ Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data. A fuller discussion on the issue of personal data, albeit in a slightly different context, is contained in section 6.2 of the Study 'Legal aspects of marine surveillance data' which is available on the DG MARE website at http://ec.europa.eu/maritimeaffairs/study_monitoring_en.html.

7.3.3 Recommendations - hydrography portal

- Break up long pages of text with headings or use section breaks and links at top (e.g. 'EMODNET' page)
- In terms of the licensing arrangements, clarify the identity of the licensor/licensors.
- Clarify and align the provisions of the data policy and the licence agreement into one uniform and comprehensive set of terms and conditions.
- Address the issue of the collection and processing of personal data.

7.3.4 Recommendations - geology portal

- Make marine data more prominent on website (or directions on how to get to it) as users may not know that EMODNET refers to marine data.
- Provide a link to the DG MARE EMODNET web site pages.
- Adding guidance/help on how to use the portal would be useful.
- Once data becomes available, include metadata in same portal as terrestrial geological data and make it clear how to search catalogue to just retrieve the marine datasets, also linkable from the portal homepage (with EMODNET banner) rather than just 1GE.
- In terms of the licensing arrangements, clarify the identity of the licensor/licensors.
- Clarify and align the provisions of the data policy and the licence agreement into one uniform and comprehensive set of terms and conditions.
- Address the issue of the collection and processing of personal data.

7.3.5 Recommendations – physical habitats

- A Separate searchable data catalogue would give the site the same general functions of all the portals
- Main page under its own EMODNET URL and uses similar layout to other EMODNET portals
- In terms of the licensing arrangements, clarify the identity of the licensor/licensors.
- Clarify and align the provisions of the data policy and the licence agreement into one uniform and comprehensive set of terms and conditions.

Annex 1: Questionnaire form

EMODnet Portal user friendliness

A brief questionnaire to help assess the user friendliness of the EMODnet Portal
 Thank you for taking the time to complete this brief questionnaire. It should not take longer than a couple of minutes. Most of the questions are in the form of statements that you are asked to agree or disagree with. If you don't think a statement is applicable to you please select the No Answer option.

There are 8 questions in this survey

About the portal

1 What was the purpose of your visit to the portal?

Please write your answer here:

2 Experience using the portal

Please choose the appropriate response for each item:

	Agree strongly	Agree	Neutral	Disagree	Disagree strongly
The portal fulfilled your requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You had a good first impression of the portal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The portal was intuitive to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructions were useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The data was easy to find	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The data was easy to access	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The data was comprehensive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The data was in a convenient format	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3 Did you encounter any errors using the portal?

Please choose **only one** of the following:

- None
- Some
- Many

Make a comment on your choice here:

You can provide more details in the comment box

4 Did you leave any feedback on the portal?

Please choose **only one** of the following:

- None
- Positive
- Negative

5 Did you get a response?

Only answer this question if the following conditions are met:

Answer was 'Positive' or 'Negative' at question '4 [4]' (Did you leave any feedback on the portal?)

Please choose **only one** of the following:

- None
- Satisfactory
- Unsatisfactory

Satisfactory (e.g. response was received in a timely manner and was found helpful) Unsatisfactory (e.g. response was received after a delay, or was not found to be helpful)

6 How does this portal compare to others you may have used?

Please choose **only one** of the following:

- Better
 Worse
 About the same

Better may be faster/more user-friendly/comprehensive. Worse may be difficult to use/lacking information/incomplete.

7 Please could you provide names and Urls of other portals

Only answer this question if the following conditions are met:

- Answer was 'Better' or 'Worse' at question '6 [5]' (How does this portal compare to others you may have used?)

Please write your answer here:

8 Any other comments?

Please write your answer here:

Thank you for taking the time to complete the questionnaire.
Please submit by 04.01.2012 – 00:00

Submit your survey.
Thank you for completing this survey.

Annex 2: Contact register for questionnaire distribution

Country	Name (Last, First)	Organisation Name
Belgium	Alvera, Aida	GHER-ULG
Belgium	Hostens, Kristian	ILVO Vlaanderen
Belgium	Scory, Serge	Belgian National Oceanographic Data Centre (BMDC)
Belgium	Stienen, Eric	INBO
Belgium	Vanaverbeke, Jan	Universiteit Gent
Belgium	Verreet, Gert	LNE Vlaanderen
Bulgaria	Palazov, Atanas	IO-BAS
Bulgaria	Stanchev, Hristo	IO-BAS
Bulgaria	Vasilev, Atanas	IO-BAS
Cyprus	Ierides, Michael (Dr)	Cyprus Marine Environment Protection Association
Cyprus	Yordamli, Artemis (Dr)	Cyprus Conservation Foundation
Cyprus	Zodiatis, George (Dr)	Oceanography Centre Cyprus
Denmark	Ærtebjerg, Gunni	Dept of Marine Ecology, Aarhus University
Denmark	Havnø, Karsten	DHI
Denmark	Havsteen, Charlotte	Danish Marine Safety Administration
Estonia	Lilleleht, Vilju (Dr)	EPMÜ Zooloogia ja Botaanika Instituut
Europe	Bacconnais-Rosez, Audrey	OSPAR
Europe	Carbonnière, Aurélien	European Science Foundation, Marine Board
Europe	Pyhälä, Minna	Helcom
Europe	Velikova, Violeta	Black Sea Commission
Finland	Olsonen, Riitta	FIMR
Finland	Poutanen, Eeva-Liisa	Ministry of Environment of Finland
France	Bachelet, Guy	Universite Bordeaux 1; Station Marine d'Arcachon; Laboratoire d'Océanographie Biologique
France	Fabri, Marie-Claire	Ifremer DEEP/LEP
France	Gerardin, Nicolas	Mediterranean Protected Areas Network
France	Huguet, Antoine	Ifremer
France	Kloareg, Bernard	Station biologique de Roscoff
France	Roscher, Sabine	Natural History Museum - Paris
France	Yésou, Pierre	ONCFS
Germany	Colijn, Franciscus	GKSS Research Centre; Institute for Coastal Research
Germany	Dittert, Nicholas	University of Bremen
Germany	Narberhaus, Ingo (Dr)	Federal Agency for Nature Conservation
Global	Remsen, David	GBIF
Global	Shaw, John	Mainstream Renewable Power
Global	Wood, Louisa	UNEP-WCMC
Greece	Arvanitidis, Christos	HCMR
Greece	Blanc, Javier Pineda	International Centre for Coastal Resources Research
Greece	Ioannidis, Yannis	University of Athens

Int	Morris, Chris	International Petroleum Industrial Environmental Conservation Association
Int.	Jensen, Hans	ICES
Int/Norway	Beaudoin, Yannick	UNEP/GRID Arendal
Ireland	Cave, Rachel (Dr)	NUI Galway
Ireland	O'Grady, Eoin	Marine Institute
Ireland	O'Kelly, Charlotte	TechWorks Marine
Ireland	Sutton, Gerry	CMRC
Isle of Man	Shammon, Theresa	Isle of Man Government Laboratory
Italy	Bulleri, Fabio	Universita di Pisa
Italy	Di Natale, Antonio	Acquario di Genova
Italy	Giorgetti, Alessandra	Istituto Nazionale di Oceanografia e di Geofisica Sperimentale
Italy	Nicola Baccetti	Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA)
Latvia	Aigars, Juris	Latvian Institute of Aquatic Ecology
Latvia	Boikova, Elmira (Dr)	Institute of Biology, University of Latvia
Lithuania	Didziulis, Viktoras	CORPI
Lithuania	Šinkūnas, Petras (Dr)	Institute of Geology and Geography
Malta	Borg, John J	Natural History Museum - Malta
Malta	Drago, Aldo	University of Malta
Netherlands	Hummel, Herman	Netherlands Institute of Ecology
Netherlands	Leopold, Mardik (Dr)	Wageningen IMARES
Poland	Stepnowski, Andrzej	Gdansk University of Technology, Department of Geoinformatics
Poland	Wichorowski, Marcin	Institute of Oceanology PAS
Portugal	Brandao, Filipe	EMEPC
Romania	Psegalinschi, Iuliana	Ovidius University of Constanta
Romania	Rodica, Sirbu	Ovidius University of Constanta
Romania	Zaharia, Tania	National Inst for Marine Research and Dev ' Grigore Antipa'
Slovenia	Malacic, Vlado	National Institute of Biology
Spain	Arcos, Pep	SEO
Spain	Balguerías, Eduardo (Dr)	IEO
Spain	Bode, Antonio	Ministerio de Educacion y Ciencia; IEO
Sweden	Abrahamsson, Katarina	Sven Loven Centre for marine Sciences, University of Gothenburg
Sweden	Ejdung, Gunilla	Swedish Environment Protection Agency
Sweden	Ericson, Per (Prof)	Swedish Museum of Natural History
Sweden	Fors, Jenny	WWF- Sweden
Sweden	Hagström, Åke	University of Kalmar
Sweden	Hansson, Johan Lars	SMHI
Sweden	Kadin, Martina	Stockholm Resilience Centre, Stockholm University
Sweden	Loman, Goran	Vattenfall Wind Power
Sweden	Nyberg, Johan	Geological Survey of Sweden
UK	Ashworth, Jen	Natural England

UK	Boxshall, Geoff	Natural History Museum
UK	Boyd, Ian (Prof)	Sea Mammal Research Unit (somewhat NERC funded)
UK	Burkill, Peter (Dr)	SAHFOS
UK	Cotton, David	Marine Data and Information Partnership
UK	Cowling, Mike	Crown Estate
UK	Coyle, Michael	Natural England
UK	Cunningham, Carey	Marine Scotland
UK	Delany, Jane	Dove Marine Laboratory, University of Newcastle
UK	Dunn, Euan	RSPB
UK	Dunn, Tim	JNCC
UK	Emmerson, Richard	Defra
UK	Fernandez-Bilbao, Amalia	Scott Wilson
UK	Furse, Glynis	UK Hydrographic Office
UK	Gatliff, Robert	British Geological Survey (NERC funded)
UK	Gontarek, Steve	Scottish Association for Marine Science (SAMS)
UK	Groom, Steve	Plymouth Marine Laboratory
UK	Hydes, David (Dr)	NOC Southampton
UK	Kaiser, Michel (Prof)	University of Bangor, School of Ocean Sciences
UK	Kershaw, Peter	CEFAS
UK	Lear, Daniel	Marine Biological Association of the UK
UK	Limpenny, Dave	CEFAS
UK	Martin, Corinne	Canterbury Christ Church University
UK	Martin, Corinne	Canterbury Christ Church University
UK	Pinnegar, John	CEFAS
UK	Plater, Andy (Dr)	University of Liverpool, Dept of Geography
UK	Proudfoot, Roger	Environment Agency
UK	Purdie, Duncan (Dr)	NOC Southampton
UK	Russel, Marie (Dr)	Marine Scotland
UK	Spillard, Rob	Marine & Coastguard Agency
UK	Thompson, Paul (Prof)	University of Aberdeen Lighthouse Field Station
UK	Townend, Ian (Prof)	HR Wallingford
UK	Walmsley, Simon (Dr)	WWF UK
UK	Wrigley, Mark	Crown Estate

Annex 3: Comments on Draft report

Portal	Comment	Response
<p>Chemistry (OGS NODC)</p>	<p>As Italian NODC we would like to make a comment about the assessment from MRAG.</p> <p>Specifically here we are talking about things written in the 4.3.2 section of the document (at page 49). In our opinion in the assessment there is not a clear understanding about the SeaDataNet infrastructure adopted by the Emodnet Chemical Lot.</p> <p>About the sentence "The individual NODCs which handle data requests are not allowed to ask for details of the applicant who remains anonymous. Instead data requests are determined entirely by reference to the role of the applicant.". In our opinion it's not correct that the details of the applicant remains anonymous because the "role" of the applicant is given from the NODC depending on the identity of the applicant at the moment of the registration in the SeaDataNet users group.</p> <p>About the management of the data policy a general comment is that: the data accessibility is defined by the data originators, that fixes a Data Access Restriction Policy to each dataset. When the data are included in the SeaDataNet system, the NODC gives access to a requested dataset following the prefixed Restriction Policy. The NODC is just a node of the system that plays a intermediary role.</p> <p>Finally, we kindly ask to correct the figure description for Screenshot 16 (page 28) and Figure 5 (page 30).</p>	<p>What was meant here is that we understand an individual NODCs handling data requests do not have personal details in the form of personal data that identifies the person making the request as such requests are dealt with by reference to the role of the applicant. Personal details are only provided to the relevant NODC during the initial registration.</p> <p>The captions have been fixed.</p>

<p>Biology</p> <p>(Neil Holdsworth)</p>	<p>3.1.2 Data coverage of the portal</p> <p>- The report notes in a couple of places the difference between the number of datasets in the portal and the number available in EurOBIS (for mapping), the report hasn't offered an explanation of the difference. Which leaves me to question whether that's a fault of the portal that it needs to explain why there is this difference.</p> <p>Table 1: Biological datasets by theme</p> <p>- Although not critical from our standpoint i just don't know what this table shows as there's no reference to any measure of the number before/after Emodnet</p> <p>Figure 1: Proportion of geographic coverage of selected themes in Biology data catalogue</p> <p>- Not sure if this is particularly useful. When i think of geographical coverage i'm looking at the distribution of points withing a given area (to show representativeness) rather than the no. Of measurements over a basin. In terms of evaluating the success of the portal in providing data this would be a better measure of success/failure.</p> <p>3.1.3 Quality of data in portal</p> <p>I think we need to think about a 2 stage Quality statement in the portal:</p> <p>1) the checks that are specifically made against the submitted datasets i.e. land checks at VLIZ</p> <p>2) the checks at data source or by data aggegrator which will be impossible to document but could at least be stated that data in the portal has undergone some form of quality evaluation before being made available?</p>	<p>Section 3.1 makes several references to what EurOBIS is and how it relates to the biology portal.</p> <p>The purpose is just to give an indication of the number of data sets in order to provide some context.</p>

	<p>3.1.4 How to download data</p> <p>Was it necessary for the report to provide a step-by step guide to downloading from the portal???</p> <p>3.1.6 Results of questionnaire</p> <p>I think the report should state that 4 responses isn't very many to base any recommendations or a conclusive statement about the portal from.</p> <p>3.2.1 Accessing the data</p> <p>I think the analysis is too superficial here.</p> <p>To be critical of our own product: This is not a real test. Although this sounds ok, it doesn't really fulfil the requirement to download data(sets) but really an aggregated version of it and it could be frustrating for the end user who may expect to be getting all fields for a measurement but in reality they get something more generic.</p> <p>Of course the idea is to increase the fields available in EMD BIO and i think this should be picked up in this report</p>	<p>Additional provisos on the interpretation of these questionnaire has been added</p> <p>We followed the Task in the TOR and then added our own that required more analysis.</p>
<p>Biology (Simon Claus)</p>	<p>Here are a few comments on the report.</p> <p>In general, I'm missing sometimes the distinction between real issues and details.</p> <p>I believe it is hard to draw conclusions based on the low user feedback for the different portals. This is regrettable, taking into account the number of people that were contacted.</p>	<p>Additional provisos on the interpretation of these questionnaire has been added</p>

	<p>The recommendations state that the biology portal include only data and no data products. This is not true. The system allows integration of data and data products, and there are some available through the portal.</p>	<p>This has been changed</p>
<p>Geology (Vallius Henry)</p>	<p>Sorry, I am a little late with my answer. Anyway I do not have any specific comments as the report mainly is O.K. Still it irritates me a little bit when data is been asked from the geology lot as many of the map layers are products of interpretation of data existing as hard copy maps. If those maps can be considered as data, then they could perhaps be made available as pdf:s if it is possible for the data provider. Otherwise it is in many cases virtually impossible to trace the original data of many decades old maps.</p>	<p>The comment is not directly related to the report</p>
<p>Chemistry (Alessandra Giorgetti)</p>	<p>I would like to thank MRAG and EU itself for the useful and constructive comments given to the chemistry portal. As a reply, we tried to enrich our portal with the following points: 1. in the Home page we highlighted the link to DG mare and added in the news the link to the European Atlas of the Seas, we made marine data more prominent on the text, we changed the heading 'EU Reports' to 'Reports made to the EU' and finally we will add a Help/Site map link, 2. in the Overview section we divided the text from 'EMODNET Chemical pilot adopted SeaDataNet approach' into 'EMODNET Chemical pilot adopted SeaDataNet approach' and 'Mutual benefits', 3. in the Metadata & Data we updated the link to SeaDataNet CDI metadataformat and tools, we added the link to SeaDataNet Data policy and User licence and to the (L081) SeaDataNet Data Access Restriction Policies and we added information on how quality-checking is undertaken, 4. in the Partners and Meetings we added a bottom to go back to the top of the page. Finally, a general comment related to the data policy and to the role of the NODCs has been posted in the Forum.</p>	<p>These comment are not directly relate to the report</p>

<p>General comments</p> <p>Neil Holdsworth</p>	<p>What i'm missing from this report is:</p> <ul style="list-style-type: none"> a) Some sense of context and summary, in terms of the numbers/graphs/descriptions of access to data etc. I had no overall message about the specific portals success in achieving their goals. b) No cross-referencing, comparisons etc. I would have expected some summary tables or matrices that summarized the approach across portals, which ones had better success than others and why. While you can't compare numbers of measurements for 2 different portals (which is really the only metric they provide), it would have been appropriate to rate the ease of access to data etc. so the different portals could perhaps learn from each other. c) By structuring the report the way it is, it is possible for the pilot project partners to focus only on their portal when looking at critical feedback. 	<p>The executive summary should provide a summary and an overview.</p> <p>A matrix has been added to the conclusion section</p> <p>The executive summary has been structured by task rather than portal. The main report was structured by portal as the tasks one and two were closely related.</p>
<p>General comments</p> <p>(Volodymyr Myroshnyc henko)</p>	<p>The report provides good description of portal capabilities, however in "Conclusion and recommendations" a kind of summary/comparison table(s) is needed, with respect to such issues as portals functionality, coverage, performance, data accessibility, types of data available for download, easy navigation etc. (ref. to the questionnaire)</p> <ul style="list-style-type: none"> ☐ Hydrography Portal, section 5.1.4: there is impression that the description of "how to download data" is unfinished, because it is not clear what user will get at the end. I advice to describe here in what formats user will get data and data products (rather than do it in 5.2). ☐ The same for 7.1.4 ☐ Recommendations - Chemistry & 	<p>A matrix has been added to the conclusion section</p>

	<p>Hydrography. Referring to “we applied for a restricted set (21/3) of chemical data for the North Sea from a Netherlands owner and are still awaiting approval” at p. 41 perhaps it is necessary to recommend developing a special procedure for speeding-up the process of approval/disapproval of data request.</p> <p>☐ There are quite a lot mistyping errors in chapter 8 (pdf file). Some fragments: “themselves. questions were and Most of the tasks”; “The chemistry and biology portals where the two portals from which it was possible to retrieve datasets from.</p>	<p>An extra paragraph has been added</p> <p>An extra paragraph has been added</p> <p>This is a point for the operates of the portal.</p> <p>These have been addressed</p>
	<p>The review is generally positive with respect to the Physical Habitats portal, and the comments are welcomed. I have gone through and noted small criticisms (summarised in italics or quoted) which I would like to respond to.</p> <p>Section 7.1 Task One (Pg 79)</p> <p><i>No separate data catalogue, just metadata</i></p> <p>As I mentioned in the progress meeting yesterday, our portal currently does not have any searchable metadata catalogue. This is due to us being dependent on the CAMIOON metadata registry/system being finalised. Until then we have simply used UK MEDIN metadata standards to ensure the layers are INSPIRE compliant in that respect and made the metadata available to view per layer within the portal and as part of the downloads too. Once CAMIOON is finalised we will make changes to this area of functionality (searchable metadata linked to SeaDataNet), but in the meantime, as the MRAG report also notes, our project is quite different to the others in that the focus was on developing and making available relatively few data products, rather than facilitating access to original datasets. For this reason end-users are not disadvantaged significantly as result of this.</p>	

	<p>Section 7.1.1 (Pg 79)</p> <p><i>Little info on scope of EMODnet</i></p> <p>We will look at expanding the general notes on EMODnet.</p> <p>Section 7.1.3 Quality of data in portal (Pg 81)</p> <p><i>No lat/long returned on map queries</i></p> <p>The lat/long does appear, but it is in the lower part of the portal viewer rather than the query box. We could look at changing this but given the information is there for the user, I'm not sure how useful this could be.</p> <p>Section 7.1.1 Quality of data in portal (Pg 81)</p> <p><i>No details on 'specific underlying data'</i></p> <p>I think this is referring to there being no immediately available info on all of the attribute fields of habitat map. This is a good point and will to amend the metadata for the final habitat layers.</p> <p>Section 7.1.4 How to download data</p> <p><i>Process for downloading [potentially cumbersome]</i></p>	<p>This has been removed</p>
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This section didn't contain a criticism as such but it highlighted to me the potentially cumbersome process for the user if they want to download multiple layers. In fact we already recognised this and have been working on a multiple download area to facilitate this process for users. The area will also include other products (e.g. Final report and executive summary).

Section 7.1.6 Questionnaire response (Table 12)

User comments – Intuitive to use 1 Yes, 1 NO

With feedback from only two users in this regard, each having contrasting opinions on this point, it is difficult to know where any efforts need to be focused. We will of course bear this in mind and seek out opinion on an *ad hoc* basis. With the webGIS developments (for searchable metadata) still to be made later in the maintenance phase we could make some changes if needed.

Section 7.1.6 Questionnaire response (Table 14)

“Key needs to be more user friendly”

Similar to my previous comment, we have only this 1 instance of such a comment. Having looked again at the key, I am unable to see how the key could be made more user friendly. Unfortunately it's not a very constructive comment from the user, but we will consider it further and would be open to further suggestions.

	<p>Section 7.2.1 Accessing Data (Pg 86)</p> <p><i>“There were useful links within the site to both the background report of the development of the habitat maps and to the other portals. It was not entirely clear from the interface which boundaries or polygons were being used for the map or how the simplified and detailed data related to the EUNIS classifications. While the information was available in the background materials it was not entirely clear from the first look at the interface.”</i></p> <p>As I mentioned in the progress meeting, my overall feeling from reading the review, and general feedback, is that our documentation is considered to be good, but there could be some “quick reference” items we could add to improve users understanding of the products. Our executive summary that we are producing will be useful in this regard, but we have a couple of ideas for smaller crib sheets we might add.</p> <p><i>Overlapping areas in Kattegat</i></p> <p>These are an artefact from post-modelling clipping and we will look into removing them. We will be trying to unify the Baltic and North-Celtic models for our planned rerun and this should take care of them.</p> <p>Section 7.3.1 IPR Issues from the user perspective (Pg 91)</p> <p><i>There is an apparent contradiction between the application ‘terms and conditions’ and the ‘conditions of use’ which is potentially misleading.</i></p> <p>We will rectify to ensure the two tally closer with each other.</p> <p>Section 8.2 Task 3</p>	<p>Have added addition provisos on drawing conclusions from small response</p> <p>Have added addition provisos on drawing conclusions from small response</p>
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	<p><i>“One issue that is not clear on all of the portals though is the question of the precise identity of the licensor. Is it the entire consortium for example? Another issue that is not always addressed is the law applicable to the relevant licence agreements.</i></p> <p><i>In terms of the rights of the consortia to provide the data through the portals both the design of the portals themselves as well as the interviews with representatives show that IPR considerations have been taken into account in terms of obtaining the permission of data owners to provide data through the portals. We have not of course seen the specific data use agreements though.</i></p> <p><i>A number of the portals contain disclaimers of liability in terms of the use of the data.</i></p> <p><i>Finally, what is not entirely clear are the rights of the EU in terms of IPR, presumably because the portals are still at a pilot stage even though they are distributing real data that is subject to genuine IPR. “</i></p> <p>I think this was the part of the assessment that we (all portals) needed the most in terms of recommendations that come out of this review (it is furthest from our respective areas of expertise). Whilst all the portals seem to have taken sensible approaches to IPR, etc. they are multiple and diverse between the portals. Perhaps future developments of EMODnet could benefit from greater guidance and clarity from the EC on these matters.</p>	
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