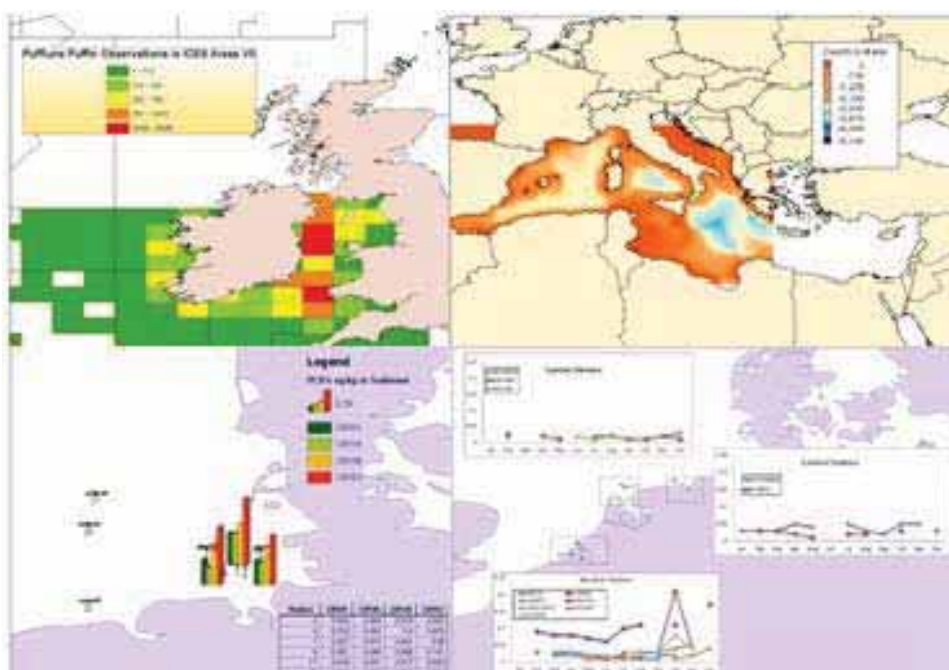

European Commission

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

Draft Final Report



by

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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, 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, to provide 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

The approach that was taken towards completing the tasks was to consider 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 products and data, and a second group of users who would be more interested in the products and might be interested in knowing some of the details of the data used to compile these.

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 to the users a good understanding of:

1. the scope of EMODNET;
2. the data coverage of 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 what aspects of the portals fulfilled these essential components. Section 2 on User Friendliness proves the results of these experiences.

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 determine 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 moment for information purposes only. In assessing the quality of the data in the portal, the completeness of the metadata was examined, as well as if there is information on the quality of the data and how the information on quality 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, the level of ease on providing feedback on the portal was documented.

To gather stakeholder opinions on the portals, a short questionnaire survey for each portal (except for Chemistry portal) was developed (see Annex 1: Questionnaire form). The Chemistry portal contractors have 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, National Government Agencies, Individuals, National NGOs, International NGOs, 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 portal. This is 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 (geographical information system, statistical analysis package) and perform simple processing tasks that would highlight any particular challenges arising and relating to accessibility and useability. Specific tasks were outlined with respect to the individual portals and are detailed in sections 3.2, 4.2, 5.2, 6.2 and 7.2.

For the exercise a range of applications were used to manipulate the data and 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. Where it was possible to illustrate key issues a screen shot has been taken and presented.

1.2.3 Task Three

The terms of reference call for an assessment of how well the five portals have overcome legal obstacles to data sharing identified in “legal aspects of marine environmental data”. 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 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 Directive¹ and the PSI Directive². 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 right³.

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.⁴ 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.

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

¹ Directive 2003/4/EC of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC.

² Directive 2003/98/EC of 17 November 2003 on the re-use of public sector information.

³ European Community Directive 96/9/EC of 11 March 1996 on the legal protection of databases.

⁴ 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.

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 is 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.

2 Findings

In order to make the findings more accessible the results for each task will be presented by portal, providing an overview of the accessibility and useability of the portals in turn.

3 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/>

3.1 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 pilot 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 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 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 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 3.1.2).

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 3.1.3). Also, there is no 'back' button or other internal navigation in the data catalogue, which can make it difficult to do multiple searches or see the results from an earlier search once a record has been selected

The EMODNET Biological data portal is built on the European Ocean Biogeographic Information System (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 was intuitive to use, but a guide was also available on the 'Help' tab.

3.1.1 Understanding of Scope of EMODNET

The Biology portal homepage briefly describes purpose of EMODNET and aims of the preparatory actions in a series of bullet points. It includes link to 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 agenda and presentations and 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.

3.1.2 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.

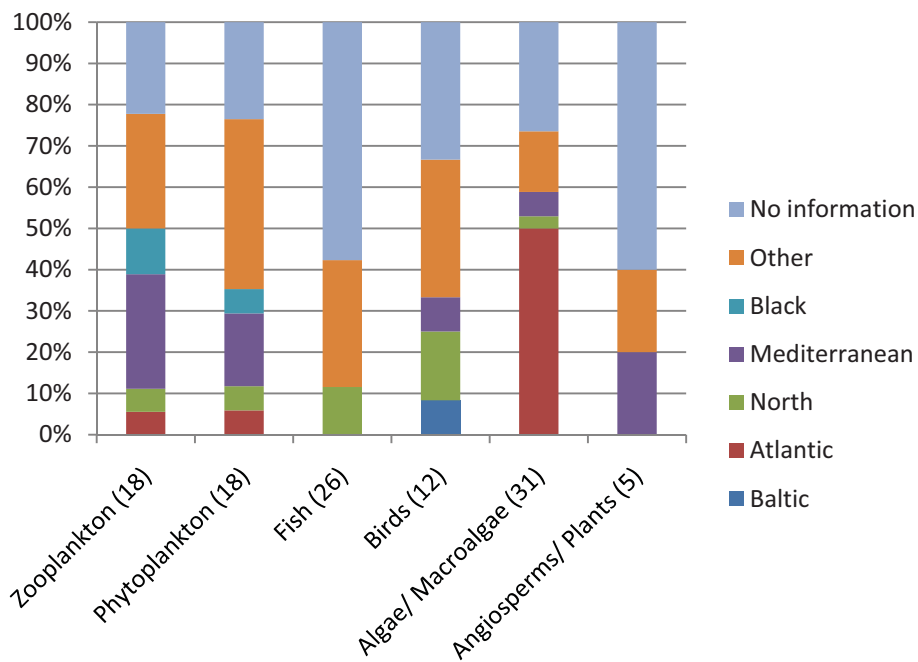


Figure 1: Proportion of geographic coverage of selected themes in Biology data catalogue

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).

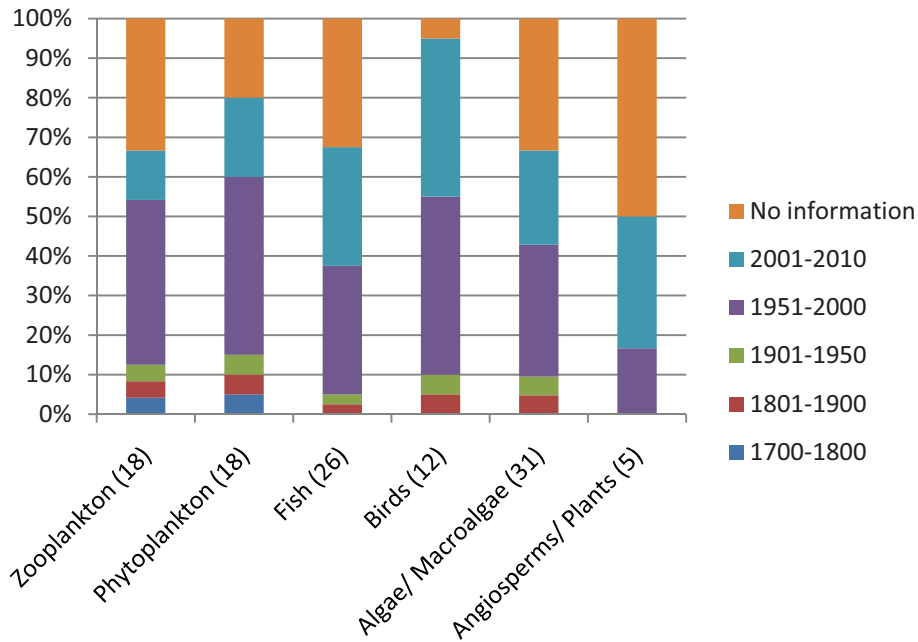


Figure 2: Proportion of temporal coverage of selected themes in Biology data catalogue

Note: number in brackets indicates number of datasets examined

There was not a way to search the catalogue for only the unrestricted datasets (or 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).

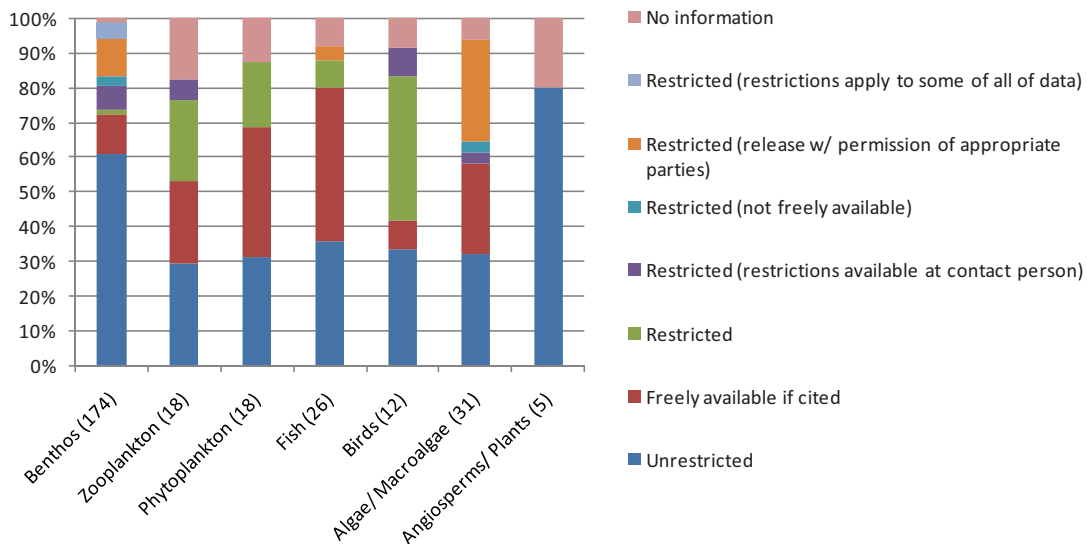


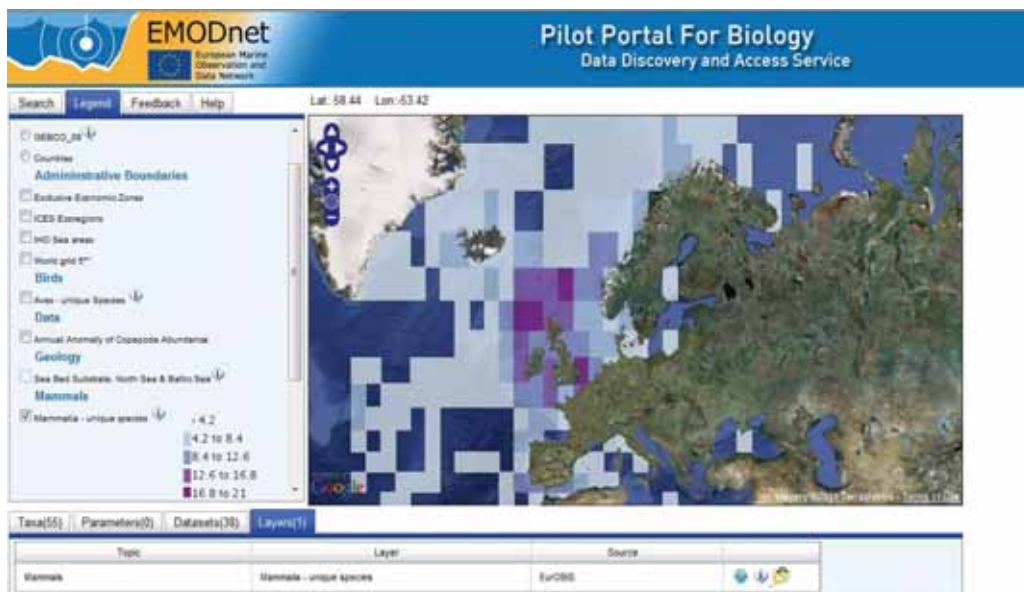
Figure 3: Proportion of access restrictions for selected themes in Biology data catalogue

Note: number in brackets indicates number of datasets examined

3.1.3 Quality of data in 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: Data identifies when the resource was examined or re-examined and approved or amended		
Status	Completed: Production of the data has been completed		
Point of contact			
Individual name	Bart Vanhoose	Delivery point	Wandelaarlaan 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/en/observatory/ema
Descriptive keywords			
Text category code	EMODnet , Mammals , Unique Species (Theme)		
Extent			
Geographic bounding box			
	West bound longitude	North bound latitude	East bound longitude
	-45.0	50.0	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 EuroGIS data (September 2009) [CC-BY-NC-SA] Servizi: http://paa.vliz.be/SD/generator/wms?SDS/VCE=34453.3		
View in Google Earth	Number of unique species of mammals on a 3x3 Degree grid for the European Marine Waters, based on EuroGIS data (September 2009)		
Data quality info			
Metadata			
File identifier	820f7473-9464-4391-84bc-ca2120452962		
Language	English		
Character set	UTF8, 8-bit variable size UCS Transfer Format, based on ISO/IEC 10646		
Character set	UTF8, 8-bit variable size UCS Transfer Format, based on ISO/IEC 10646		
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	Wandelaarlaan 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/en/observatory/ema

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

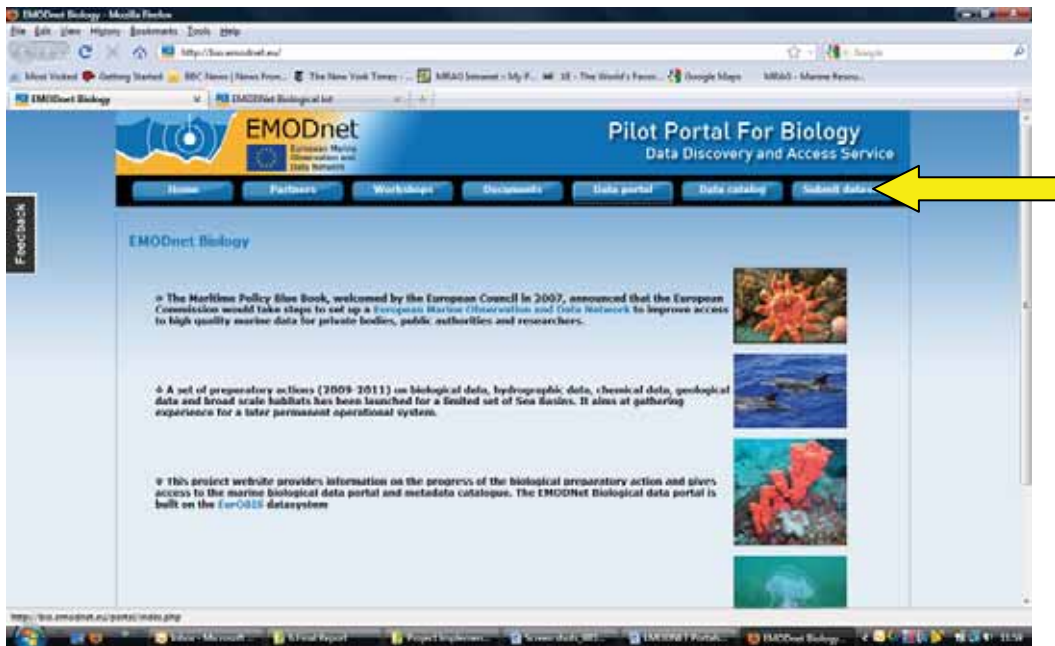
It is also possible to access information about individual points by clicking on the map at any point. This brings up the point value (in this case for number of mammal species) at that point (Screenshot 4).

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

3.1.4 How to download data

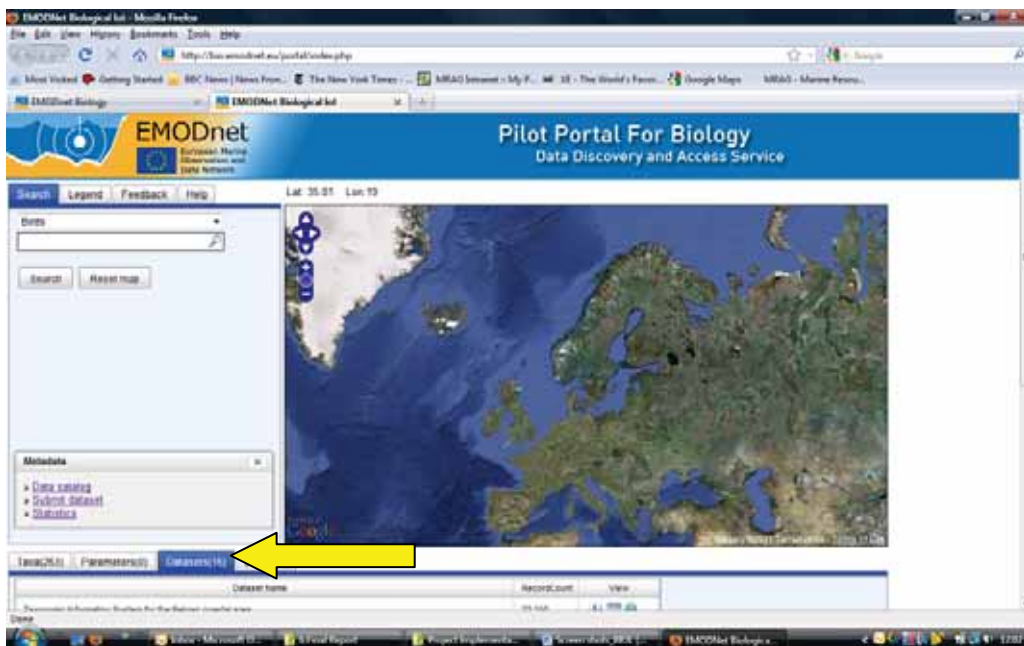
To download data from the portal it is possible to either select a dataset from the catalogue (or then open it in the map) or to select a dataset from the map list.

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).



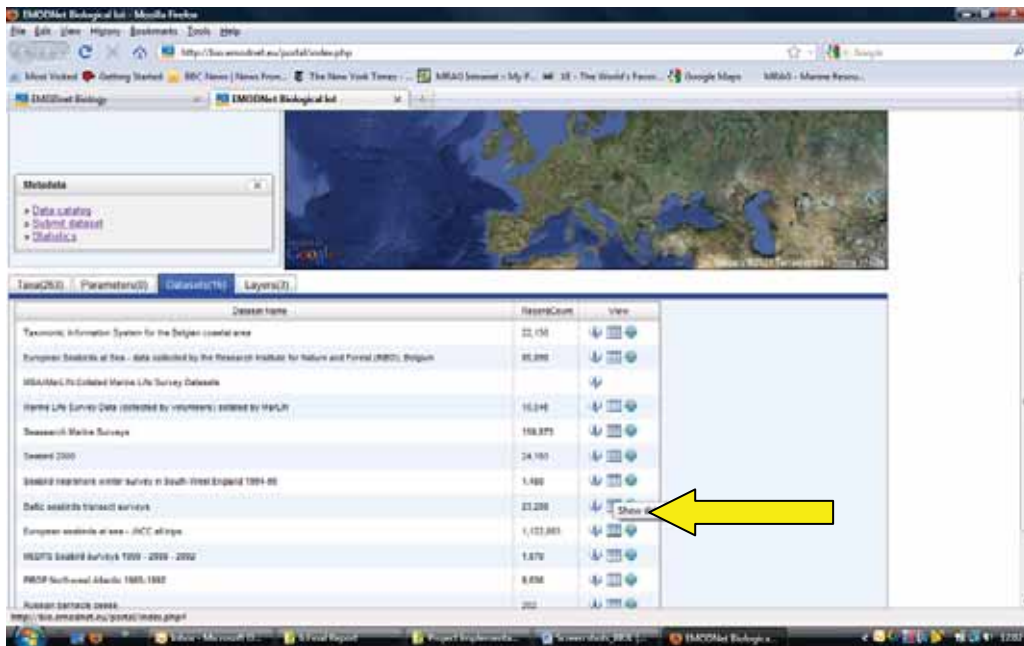
Screenshot 5 Accessing data from the Biology Portal

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).



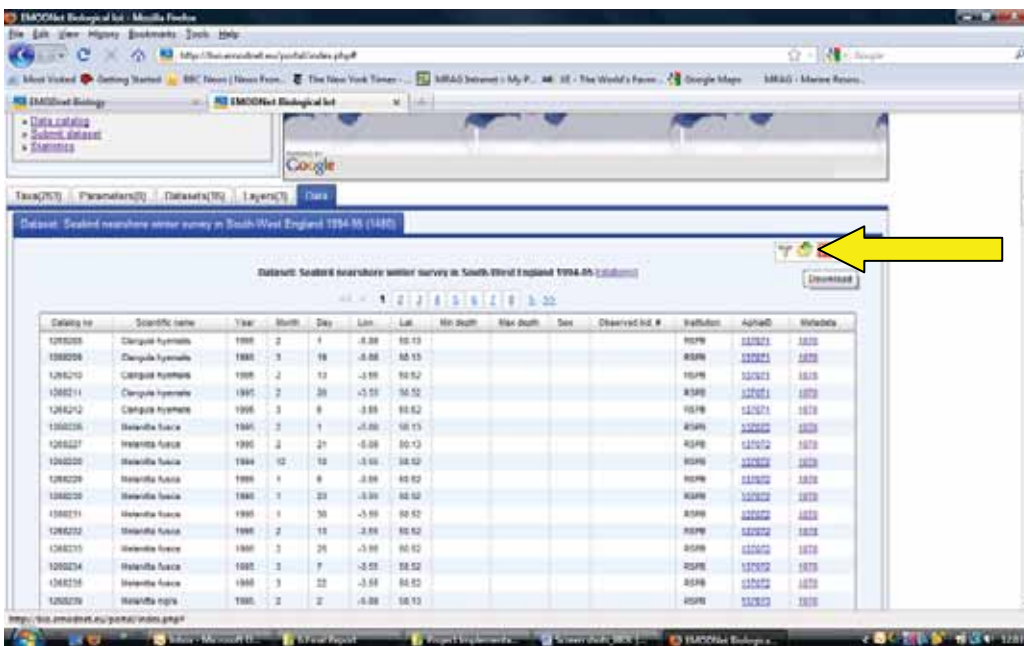
Screenshot 6 Revealing list of available data sets related to selection

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.



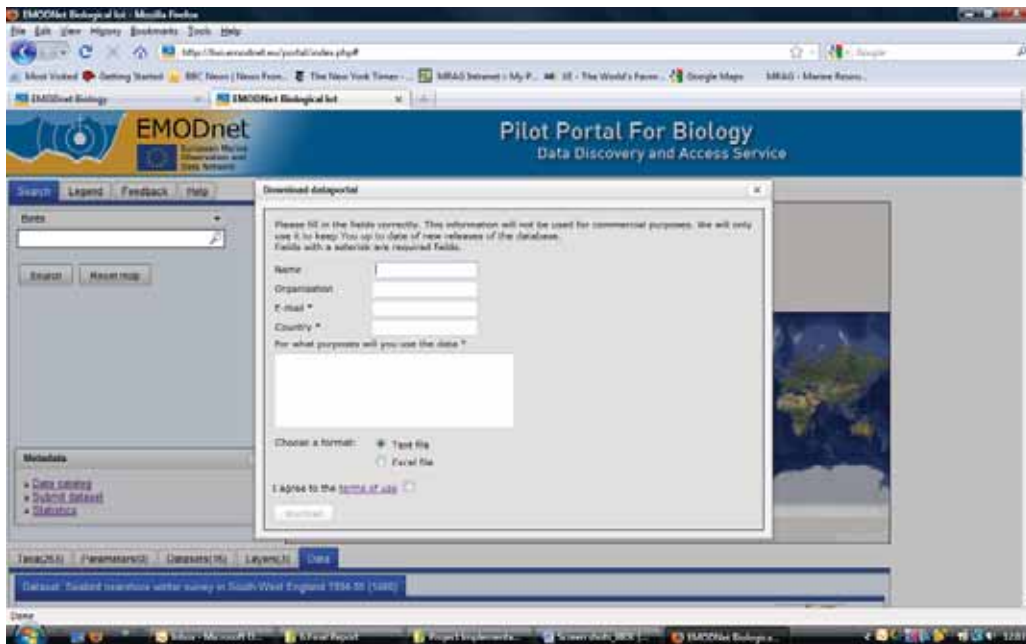
Screenshot 7 Information available about the individual data sets

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.



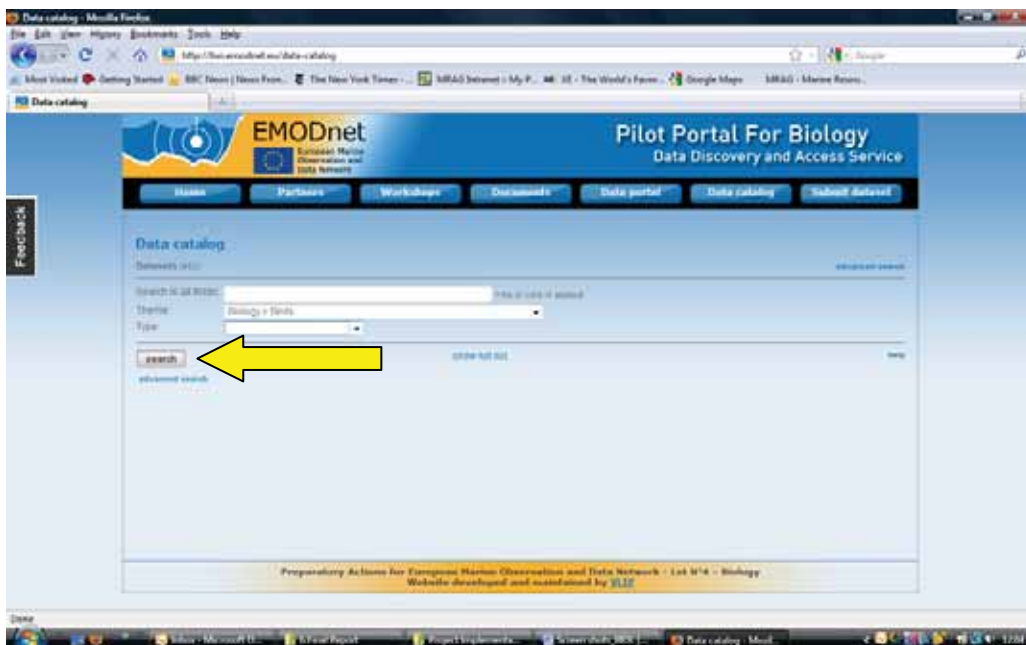
Screenshot 8 Step to download selected data sets

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).



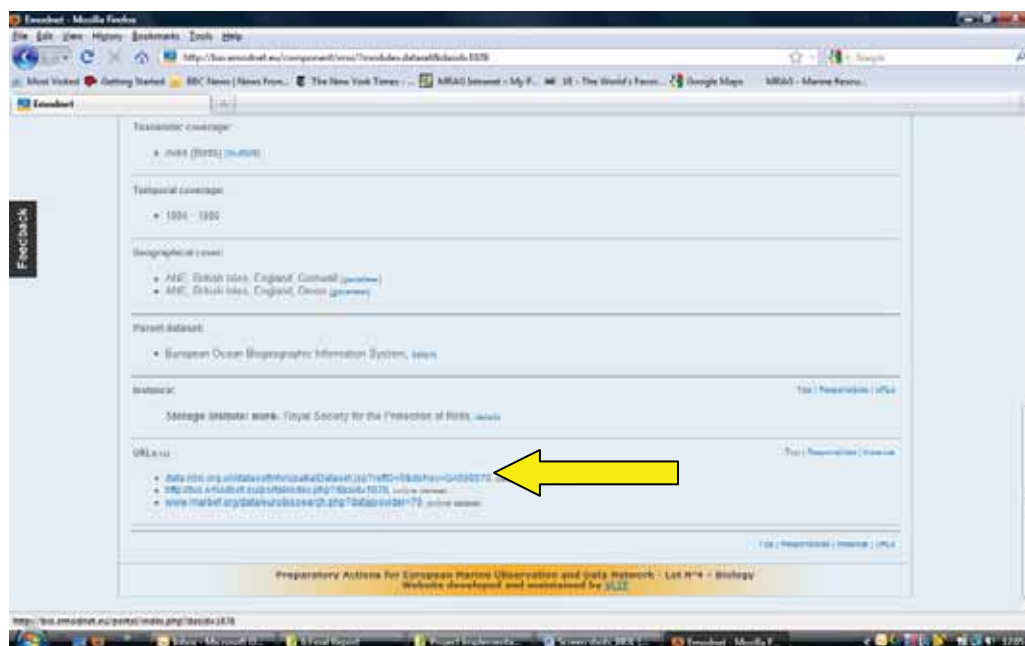
Screenshot 10 Accessing data files via the data catalogue search function

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.

3.1.5 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.

3.1.6 Results of questionnaire

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. 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 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 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 Biology portal

User	Comment
1	May become a good product, once the available data 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.

3.2 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.

3.2.1 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 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 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 now 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 was 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 International Hydrological Organisation (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*) which both have large numbers of records reported on the portal 34,868 and 197,767 respectively. Initially selecting the data was straight forward as described in section **Error! Reference source not found..** However it was not possible to filter the records using the filter tool in the web site as the filter would accept the criteria submitted, but the number of record would remain 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 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 sources, and when clicking on the metadata link next to the record (<http://bio.emodnet.eu/component/imis/?module=dataset&david=1986>) it appeared that the record had access constraints upon it and should 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 Searwater. The whole data set had to be downloaded as either a text file or a 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 year, as that data was not available for the majority of the records.

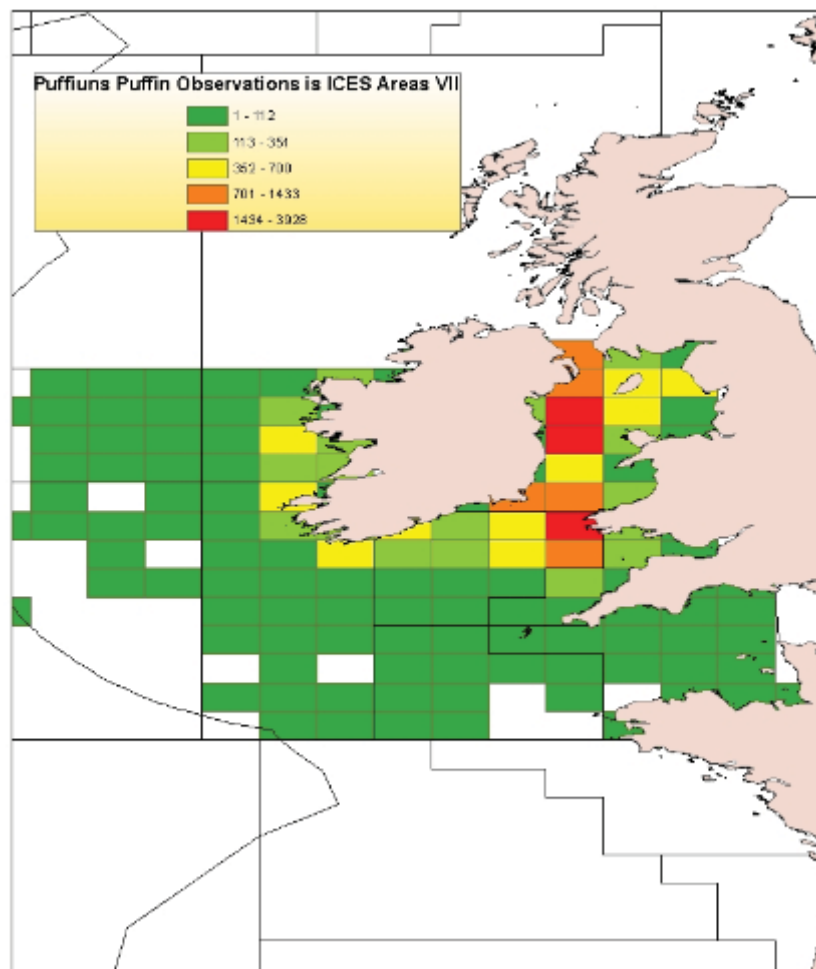


Figure 4 Map of the observations of the Manx shearwater (*Puffinus puffinus*) within the ICES Area VII sea area developed using data downloaded from the Biology portal (see text for details).

The data for Manx shearwater (*Puffinus Puffinus*) was downloaded as a excel file and imported into and Access database to filter the recorded, and the table was connected to the GIS application. The positions of the bird observations were plotted, and then using the GIS application a the number of observations in each ICES statistical square was counted, and displayed in the map shown in Figure 4.

3.2.2 Response to queries in completing Task Two

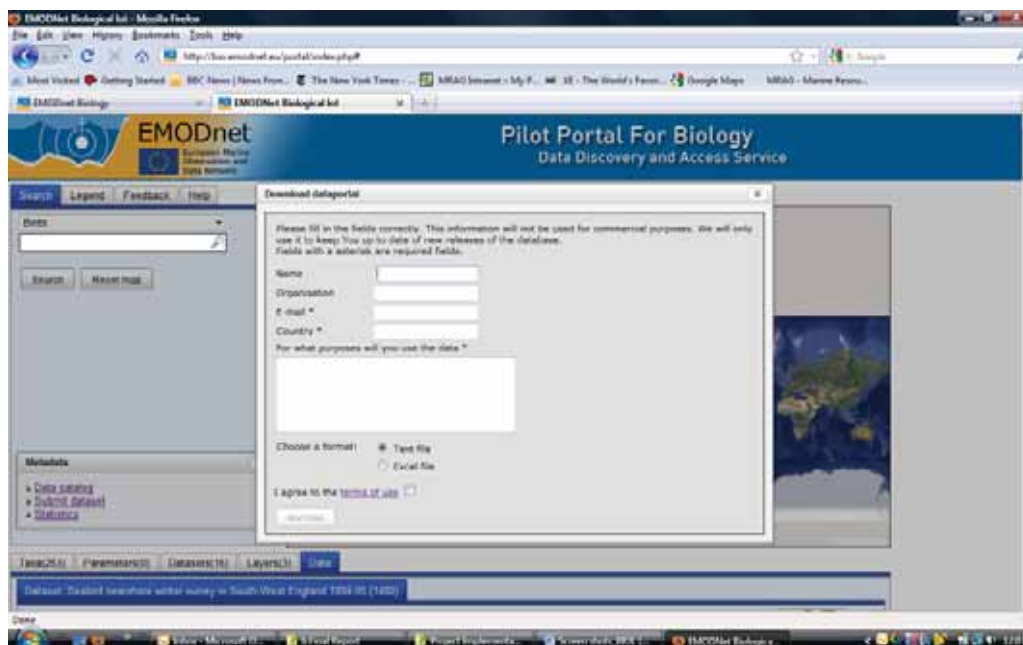
The response to a query about obtaining data for the Atlantic Iberian Coast was dealt with quickly. Not only was an explanation provided as to the scale of the areas within the maps but also instructions for calculating the number of records manually and a calculation of the number of records based on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

3.3 Task Three

3.3.1 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 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.

3.3.2 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.

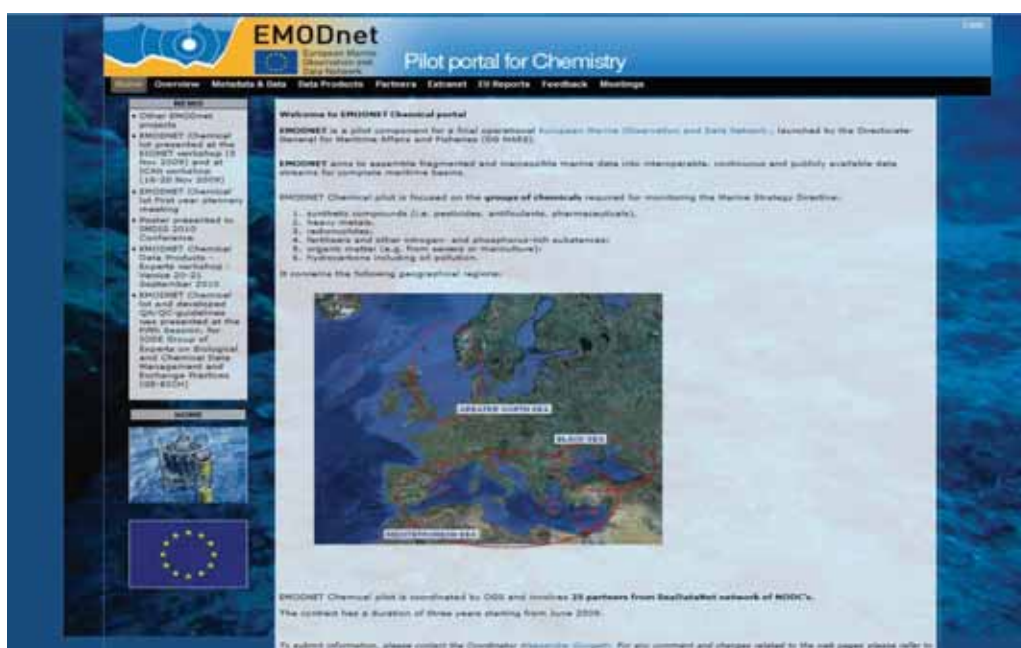
In addition to the data available on the EMODNET Biology Portal other data is available under EuroBIS and this is described, using metadata, in the data-catalogue. Individual requests for the use of such data are referred back to the relevant data owners.

4 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/>

4.1 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 main 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 sections 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 Biology 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 you can display the metadata record in XML, add the data to your 'shopping basket' or print the metadata record.

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 view 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 size 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 portals, 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.

4.1.1 Understanding of Scope of EMODNET

The main page presents the aims of EMODNET and a link to EMODNET page on the DG MARE website. It sets down the specific aims of the pilot for chemistry and has a map showing geographical regions 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 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.

4.1.2 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. Therefore, geographic gaps exist for the rest of the European seas.

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

- 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);
- hydrocarbons including oil pollution.

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).

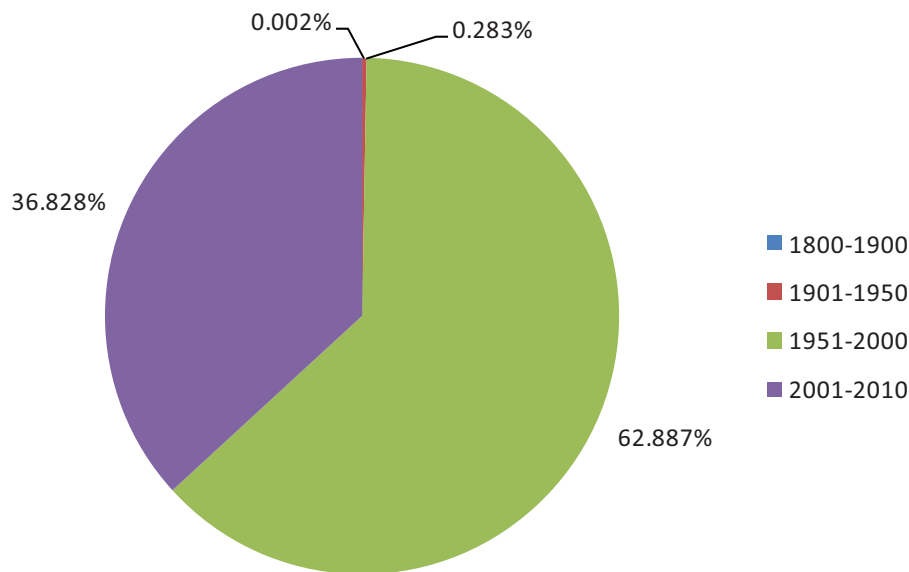


Figure 5: Proportion of Hydrography data in Data Discovery and Access service by time period

The navigation within the Data Discovery and Access service allows the user to go back to 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, 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, where 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).

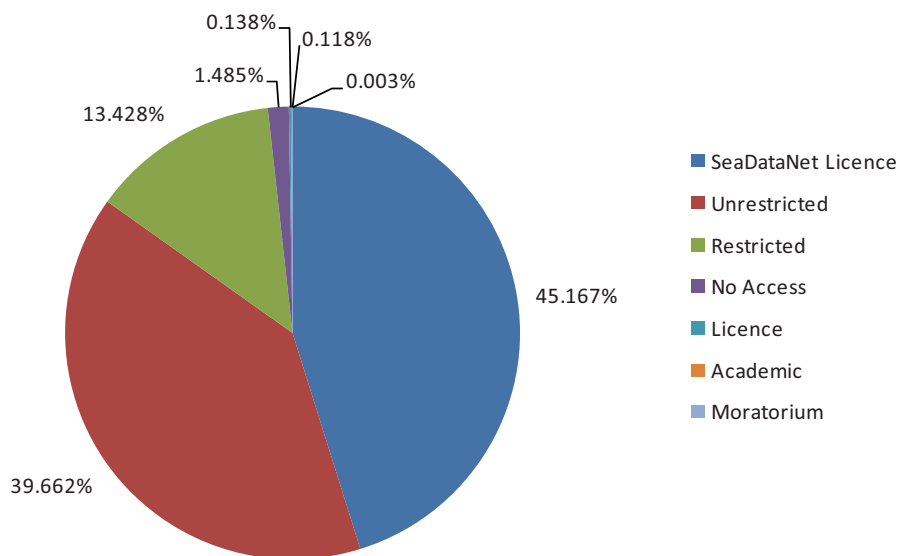
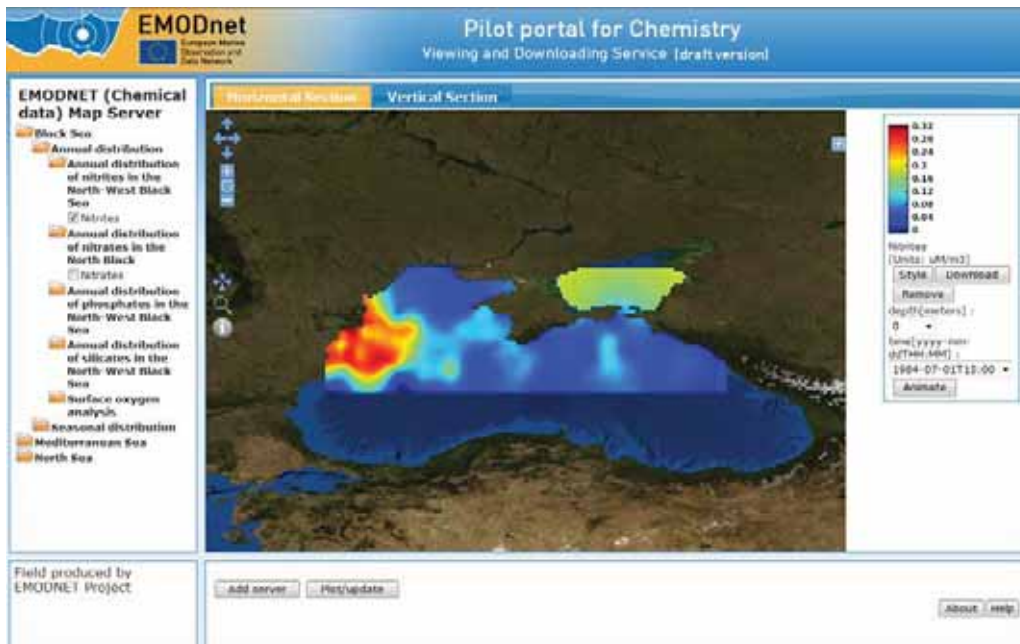


Figure 6: Proportion of access restrictions in Chemistry portal

4.1.3 Quality of data in portal

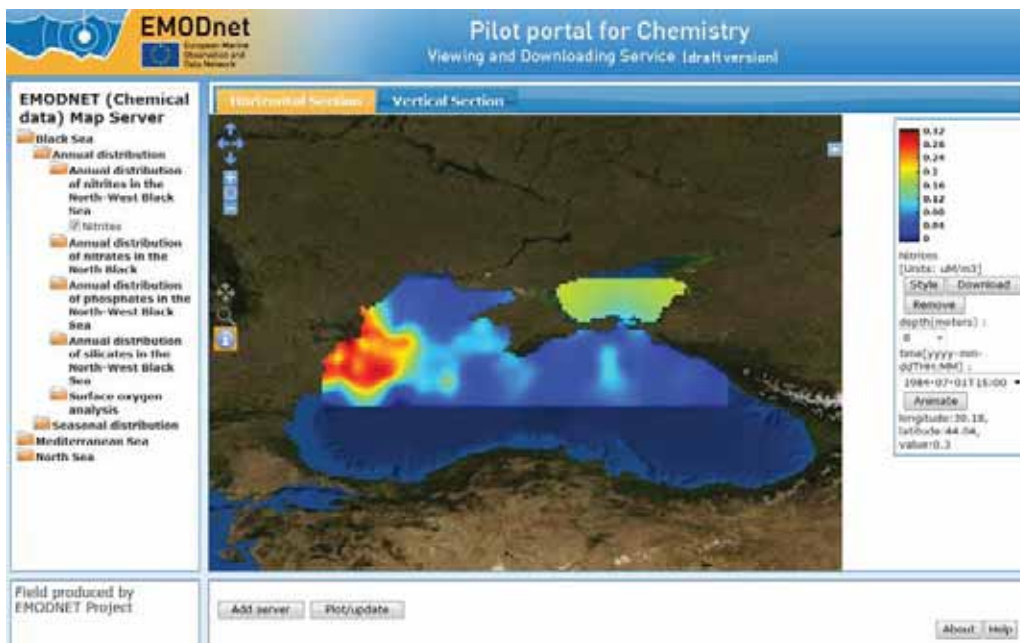
Clicking on the 'Data products' tag triggers a pop up with the disclaimer – "The system is operating but we are working for the data quality checking (draft version - these results have not been validated by the regional experts)". This pop-up has to be closed manually, so it is difficult to miss.

Click on the label 'The **EMODNET Data Products Viewing and Downloading Service**, based on OGC standards is available here' to bring 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, phosphates in the North West, silicates in the North West 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).

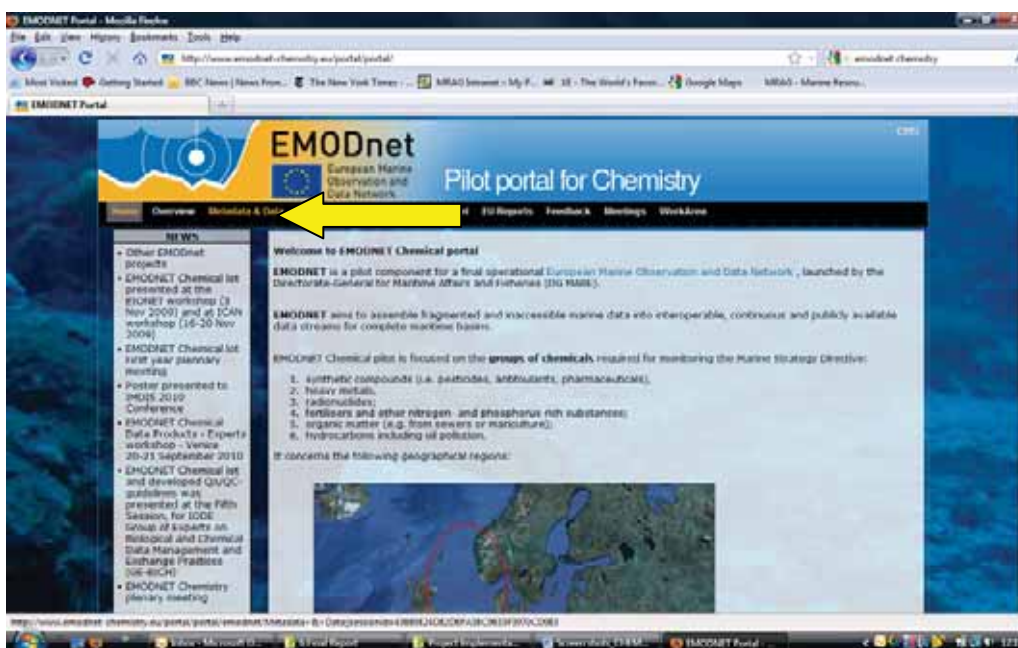


Screenshot 18 Information available about data points on the map (see text for details)

4.1.4 How to download data

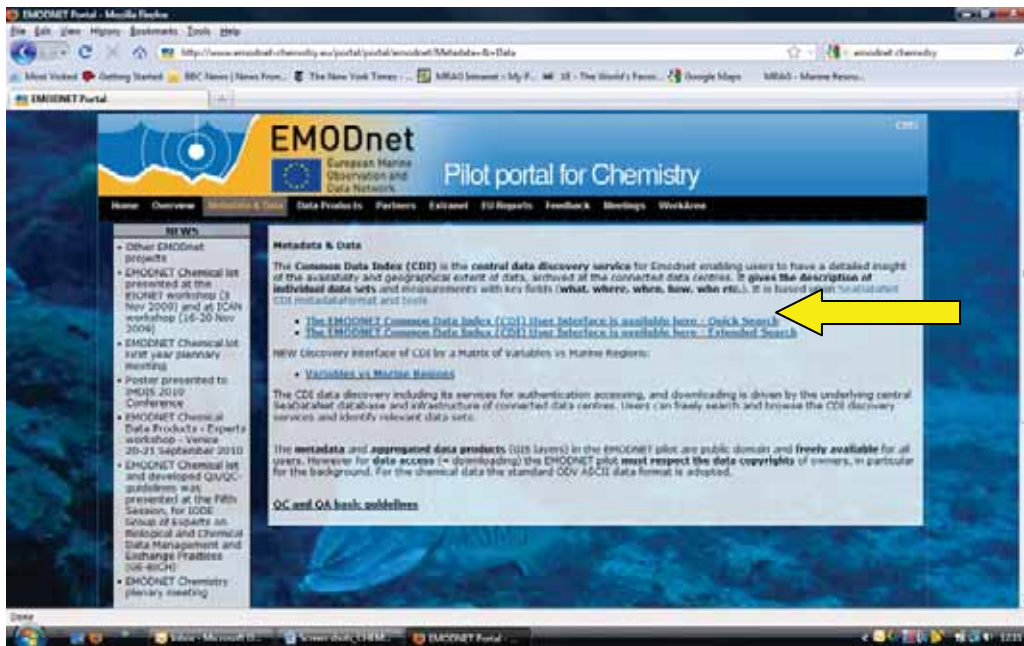
From catalogue it is possible to display the metadata record in xml, add the data to a 'shopping basket' or, alternatively, print the metadata record.

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, click on 'Metadata & Data' (Screenshot 19).



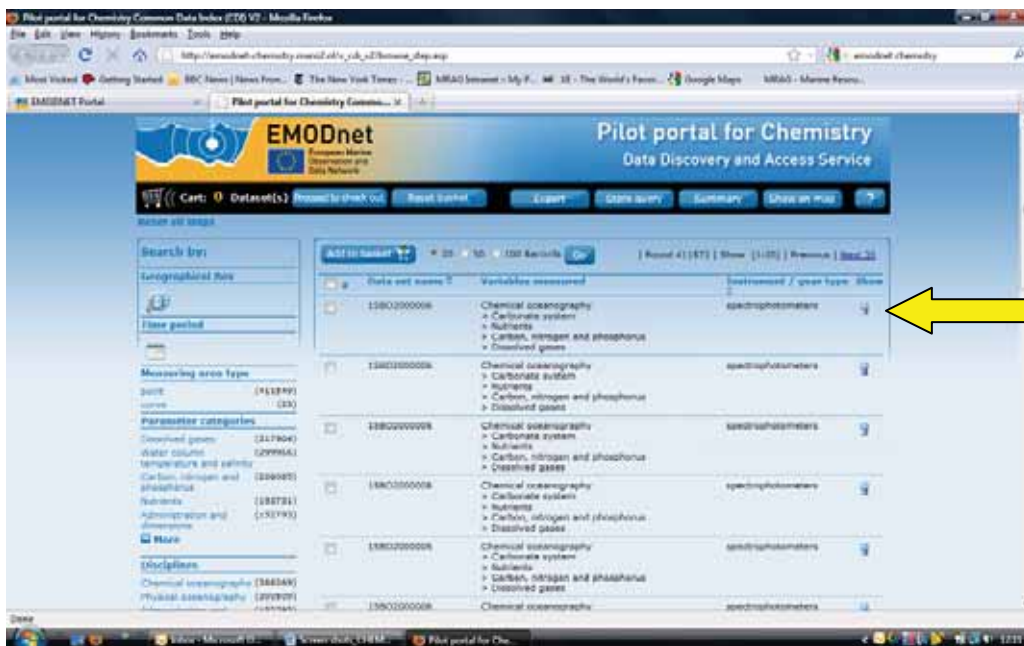
Screenshot 19 Accessing the metadata and data from the Chemistry portal homepage

There are two search options – a 'quick search' and an 'extended' search (Screenshot 20). For simple searches use 'Quick Search.'



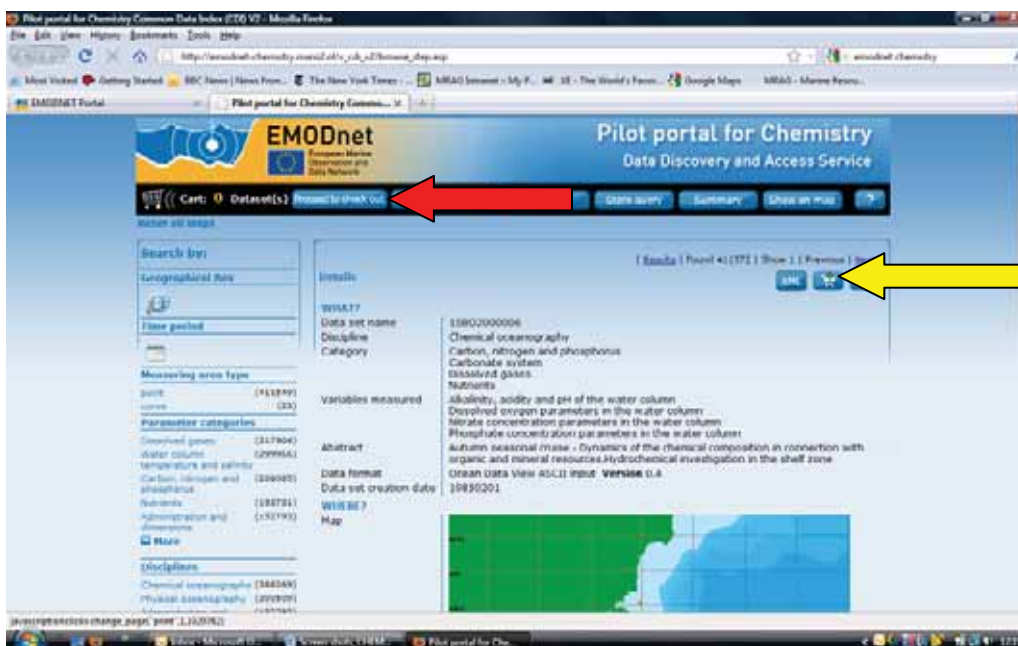
Screenshot 20 Data search options

This opens the 'Data Discovery and Access Service'. 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).

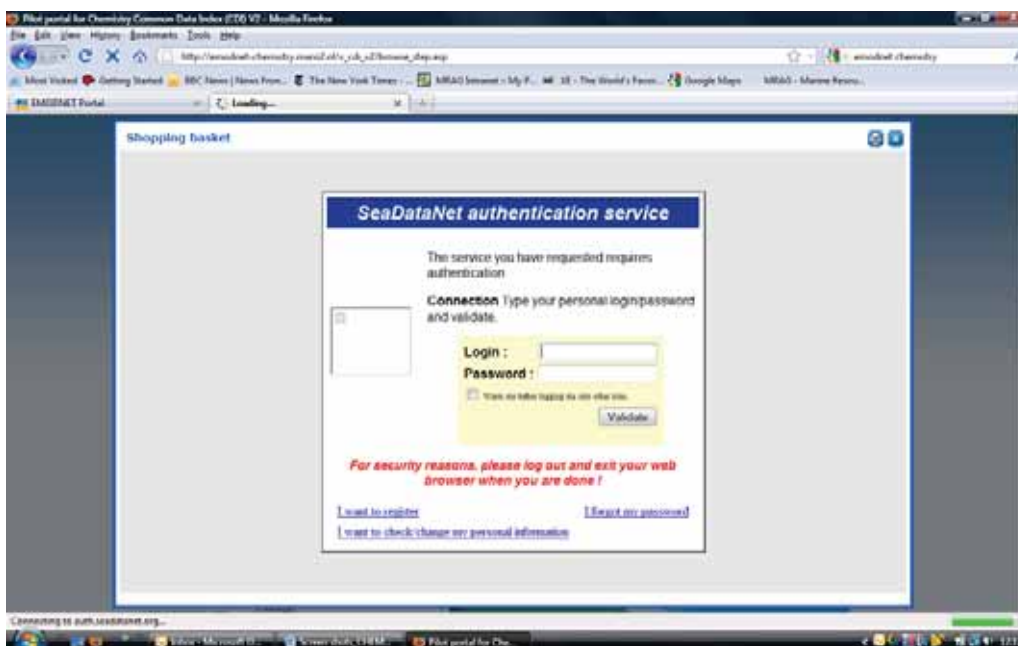


Screenshot 22 'Checking out' data sets from the Chemistry portal

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).

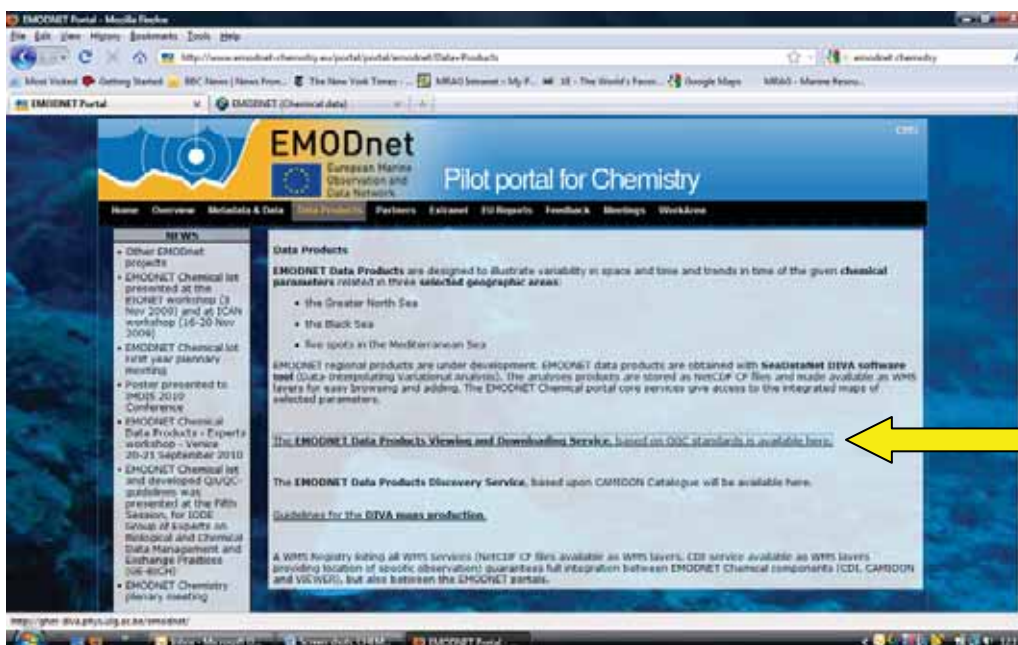


Screenshot 23 Information screen providing details of the requirements for downloading data from the Chemistry portal



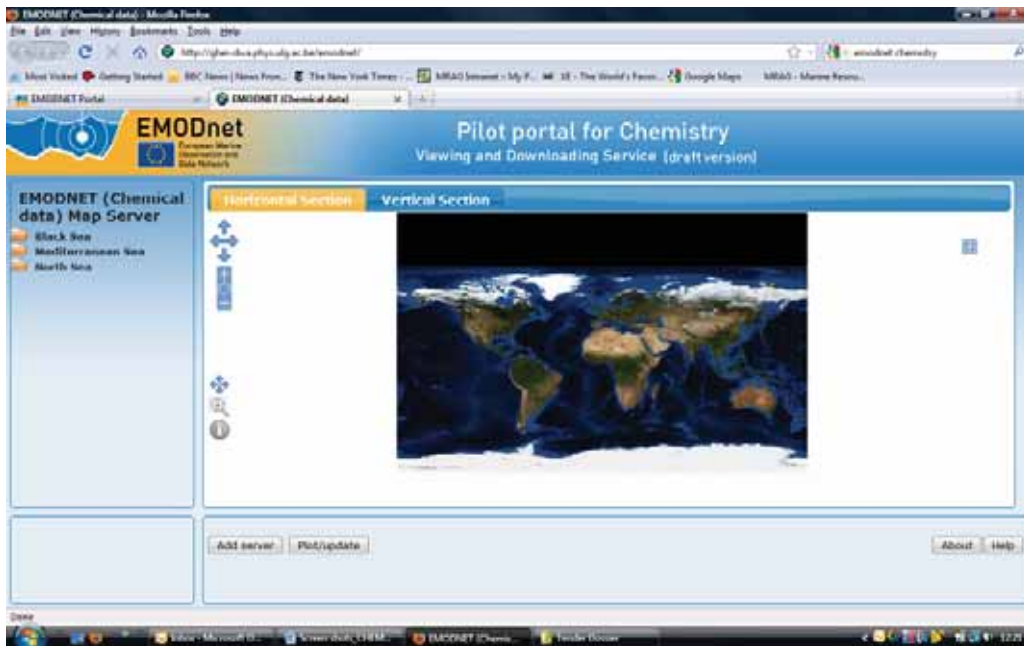
Screenshot 24 Link to the SeaDataNet authentication service used for registration

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).



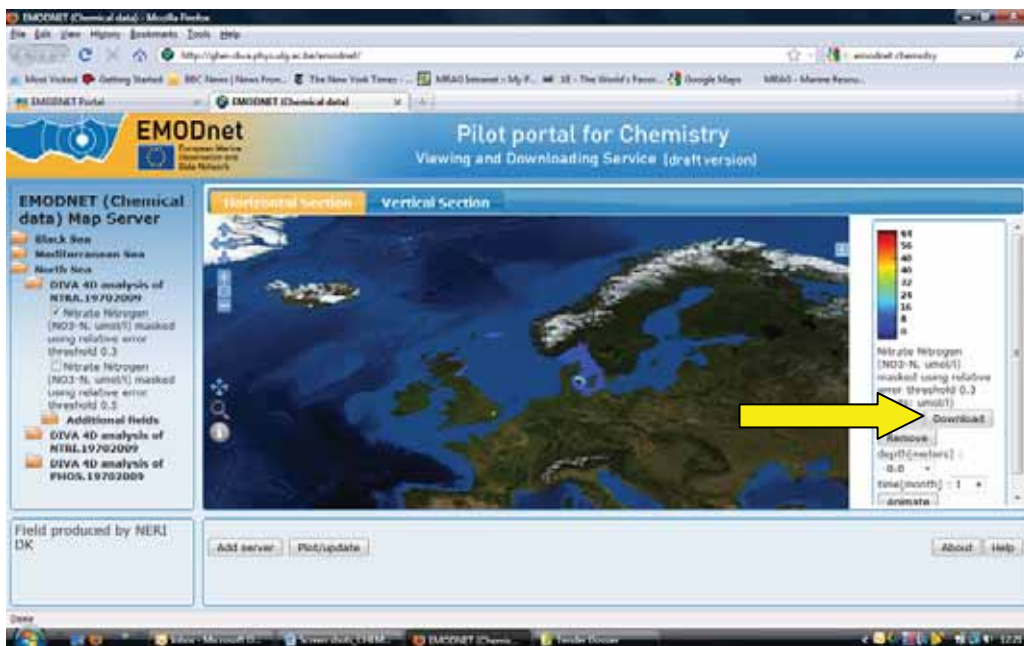
Screenshot 25 Accessing data products from the Chemistry portal via the viewing and downloading service

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.



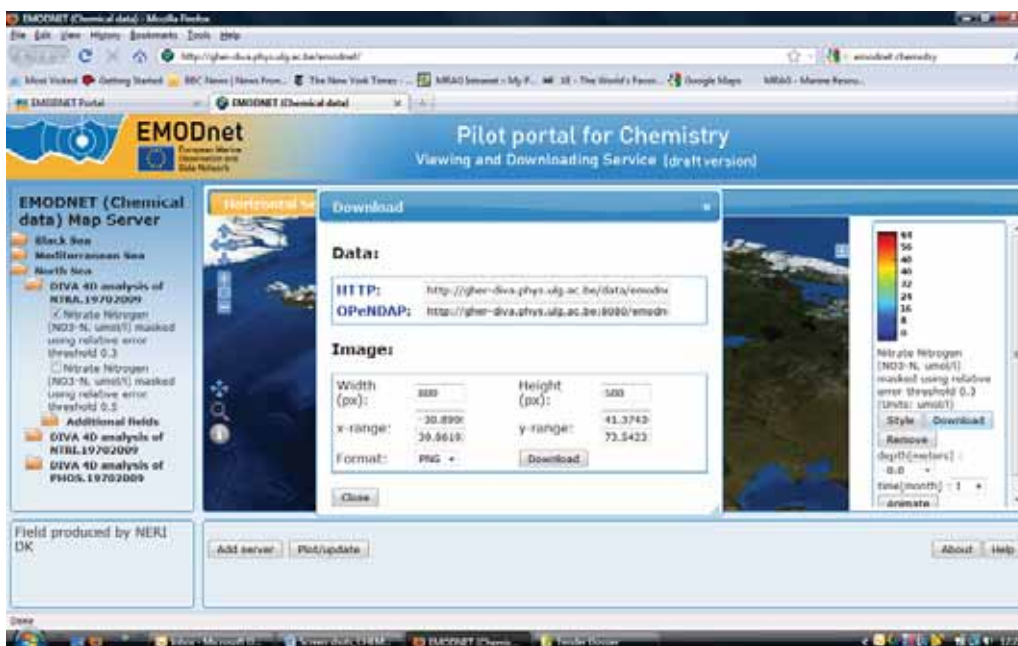
Screenshot 26 Screen used to select data products from data portal

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 generated confirming data product download

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

4.1.5 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).

4.1.6 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 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 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

4.2 Task Two

The task specified in the ToRs was to download data of 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 should be prepared. In addition, a map of annual average levels along coastline for one particular year should also be generated.

4.2.1 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 data base 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.

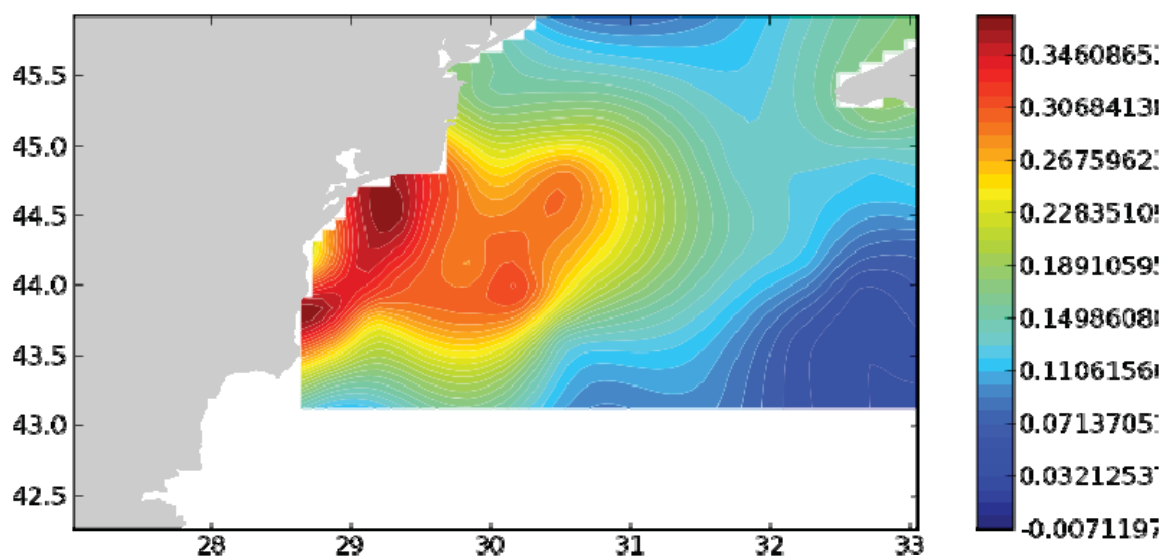
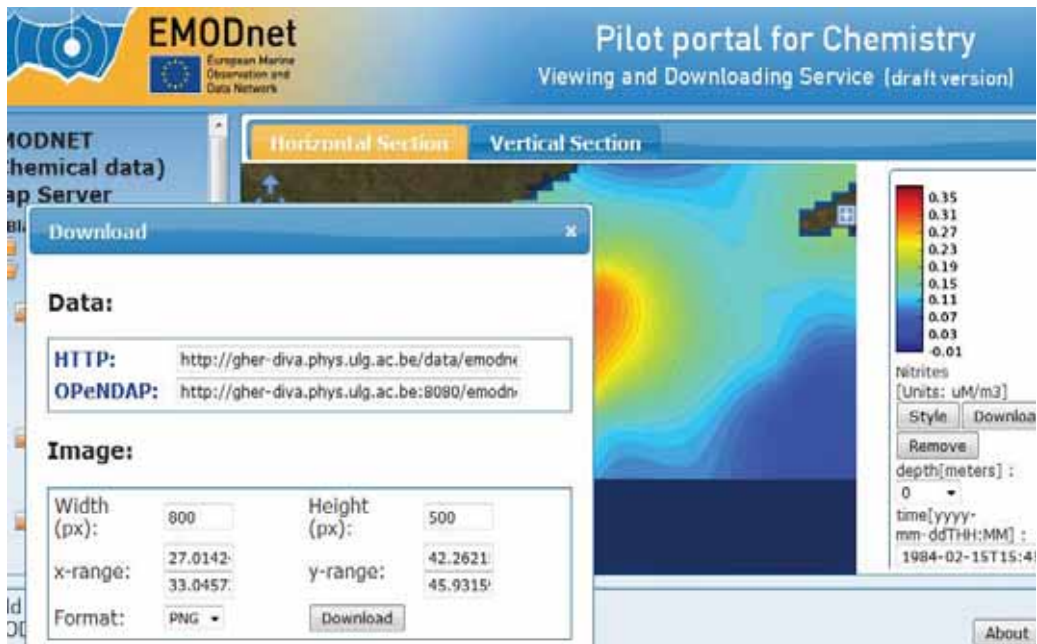


Figure 7: Distribution of nitrites in the North-West Black Sea on 15th Feb 1984 (Units: $\mu\text{M}/\text{m}^3$)

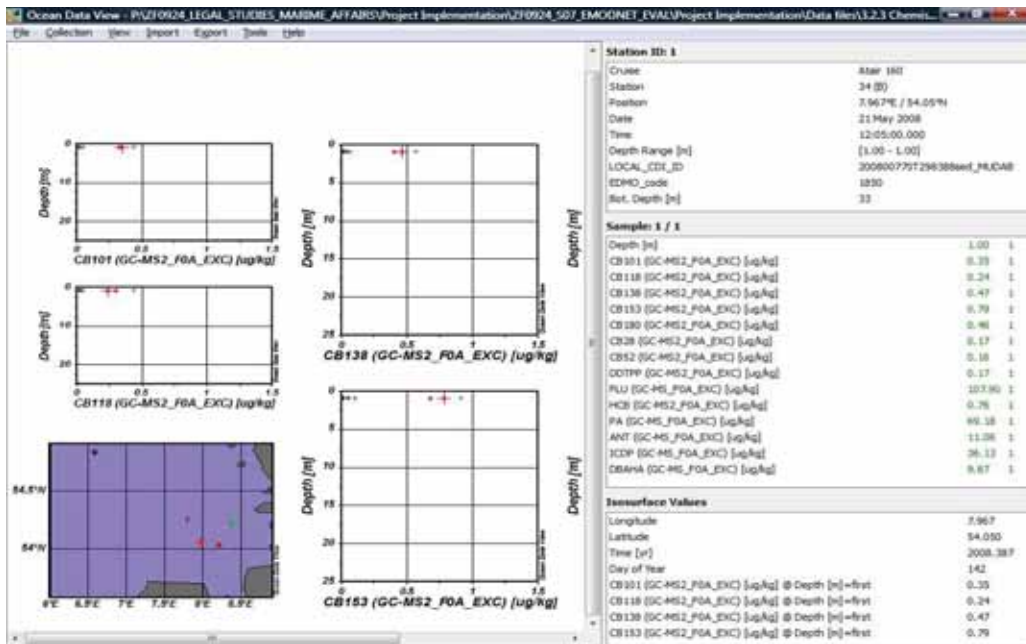
It is also possible to download the data that is used to produce the maps in the data products section of the portal; this is through the provision of a URL that is displayed in the same window that the image can be downloaded. A Screen capture is shown in Screenshot 29.



Screenshot 29 Screen capture of downloading data product

Individual data sets or collections of datasets may also be downloading 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, the process of accessing the data is described in section above. If the data requested is unrestricted then it is almost immediately available for downloading in a zip file, that will contain the datasets in the Ascii text format that is used by the Ocean Data View software (That 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 are downloaded quickest way to view the data in the files was using 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

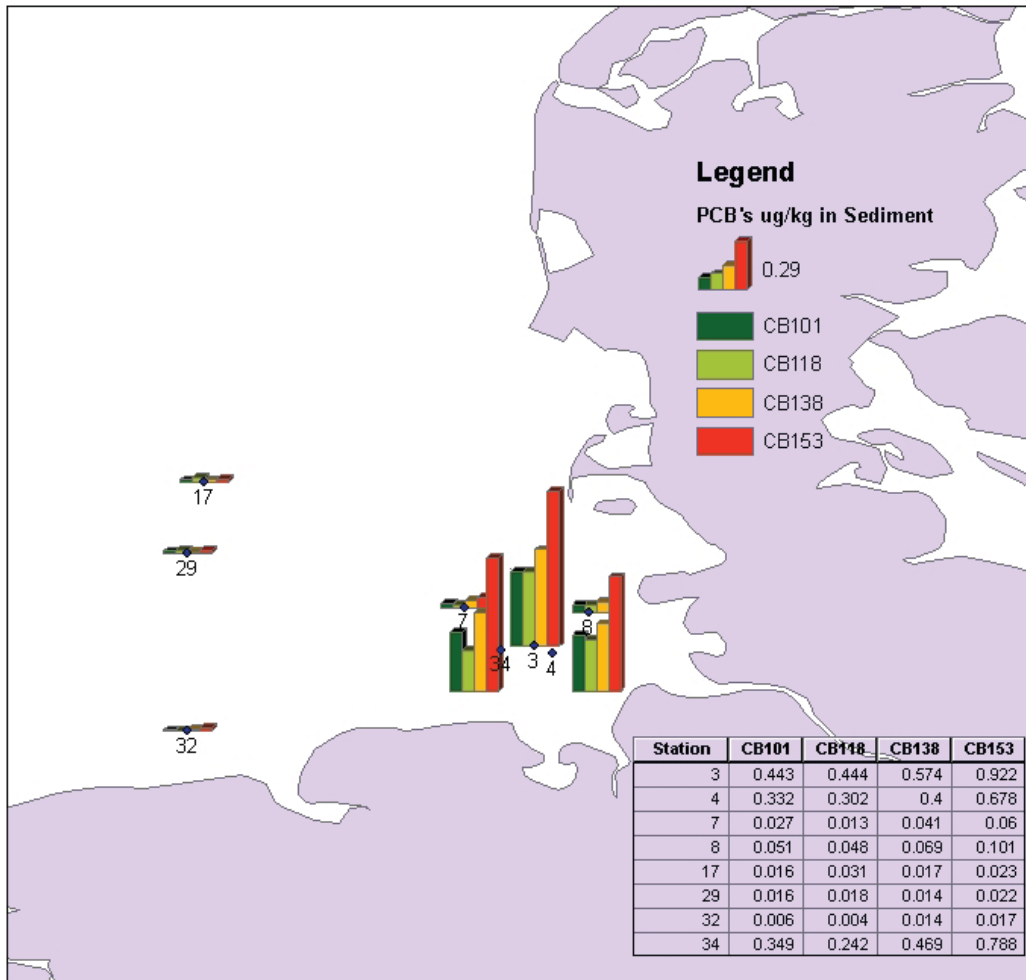


Figure 8 PCB's concentrations in sediment collected of the German coast in May 2008

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 also includes a feature to save a search as a bookmark, this 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. The data was downloaded. The downloaded text files were opened directly in a spreadsheet from which the spatial, temporal, and chemical variables including the SeaDataNet Quality flag (Cadmium and total Nitrogen were chosen) 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.

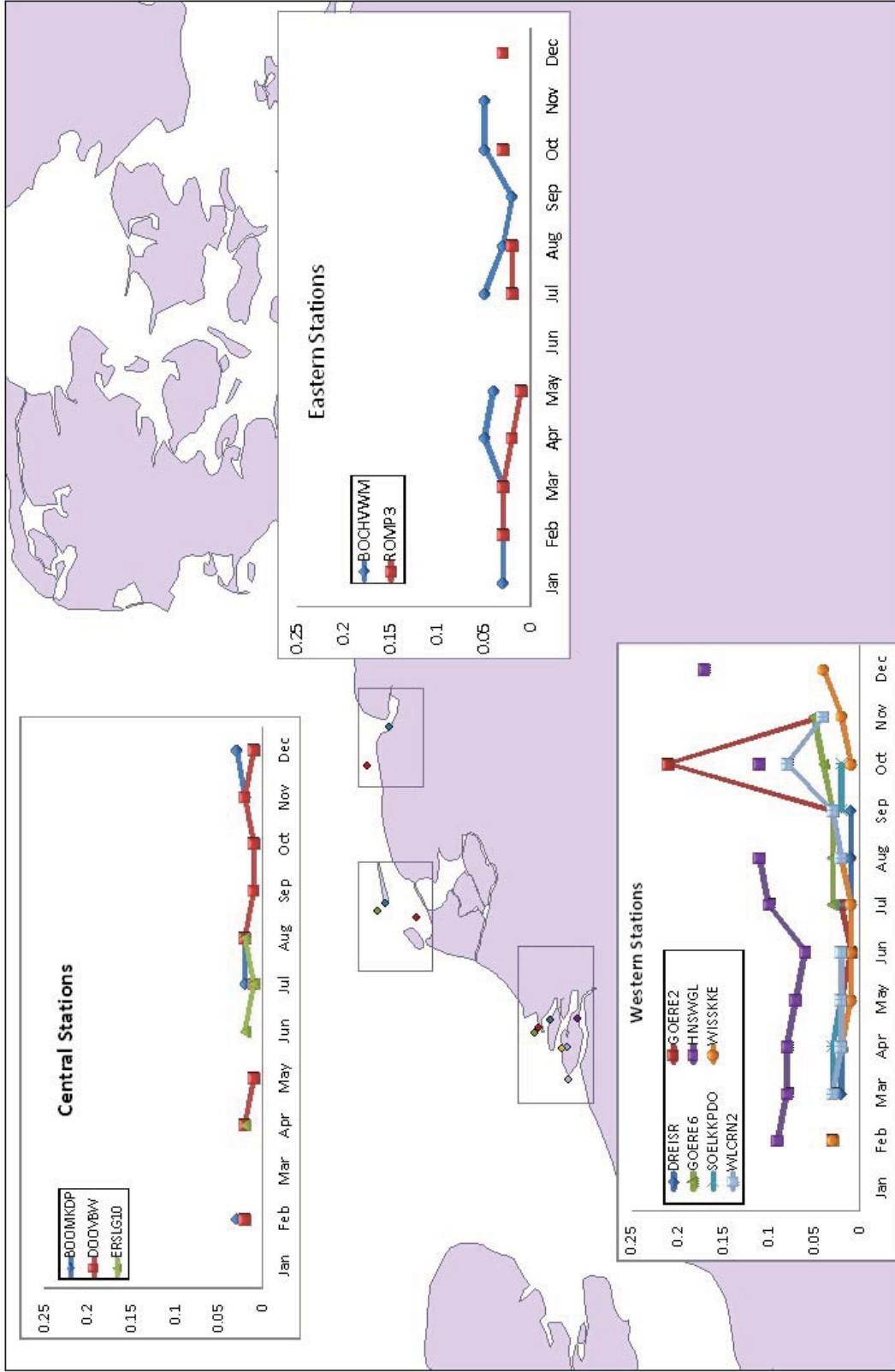


Figure 9 Maximum Concentration of cadmium {Cd} per unit volume of the water column [nmol/l] of the coast of the Netherlands 2007

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

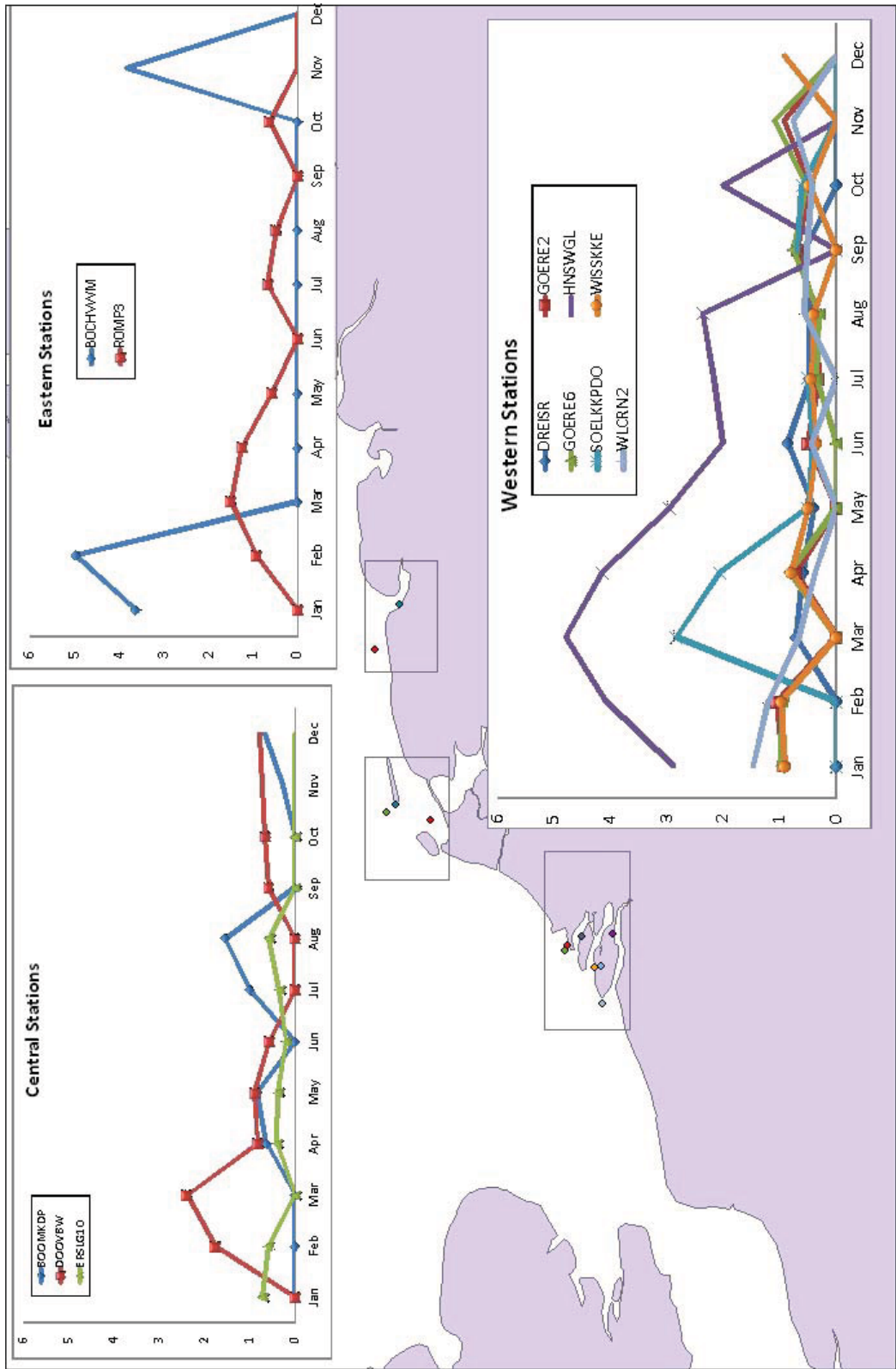


Figure 10 Maximum Concentration of nitrogen (total) per unit volume of the water column [umol/l] of the coast of the Netherlands 2007

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

4.3 Task Three

4.3.1 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 4.1.4), having selected the dataset to download it is next necessary. 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 6.1 of the SeaDataNet Data Policy.

4.3.2 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.

5 Hydrography Portal

The hydrography portal has been developed by members of the existing SeaDataNet consortium together with other organisations from marine science, the hydrographic survey community, and industry. It 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/>

5.1 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 Hydrography pilot 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:

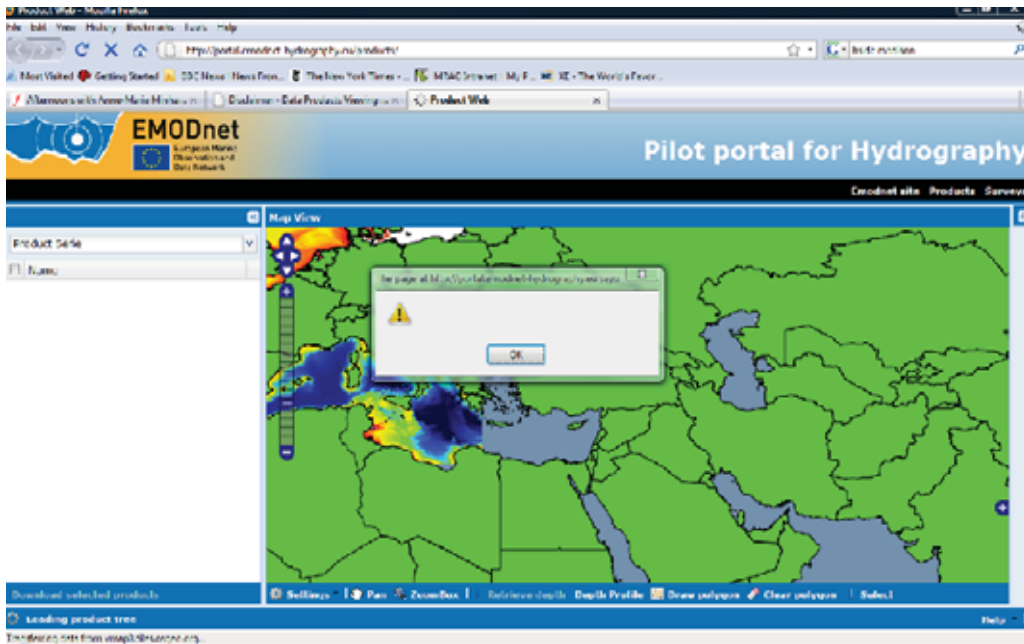
'The EMODNET Gridded Bathymetry is not to be used for navigation or for any other purpose relating to safety at sea.

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 on 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.

5.1.1 Understanding of 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.

5.1.2 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 (DTM). 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).

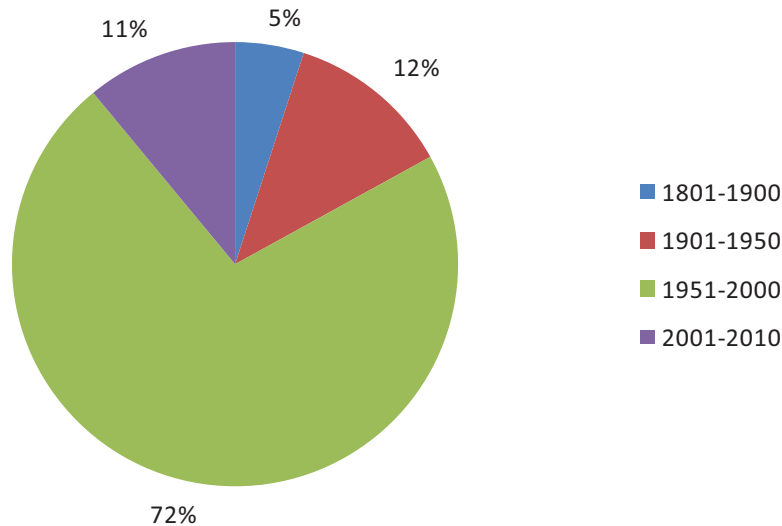


Figure 11: Proportion of Hydrography data in Data Discovery and Access service by time period

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.

5.1.3 Quality of data in portal

For each region where 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 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

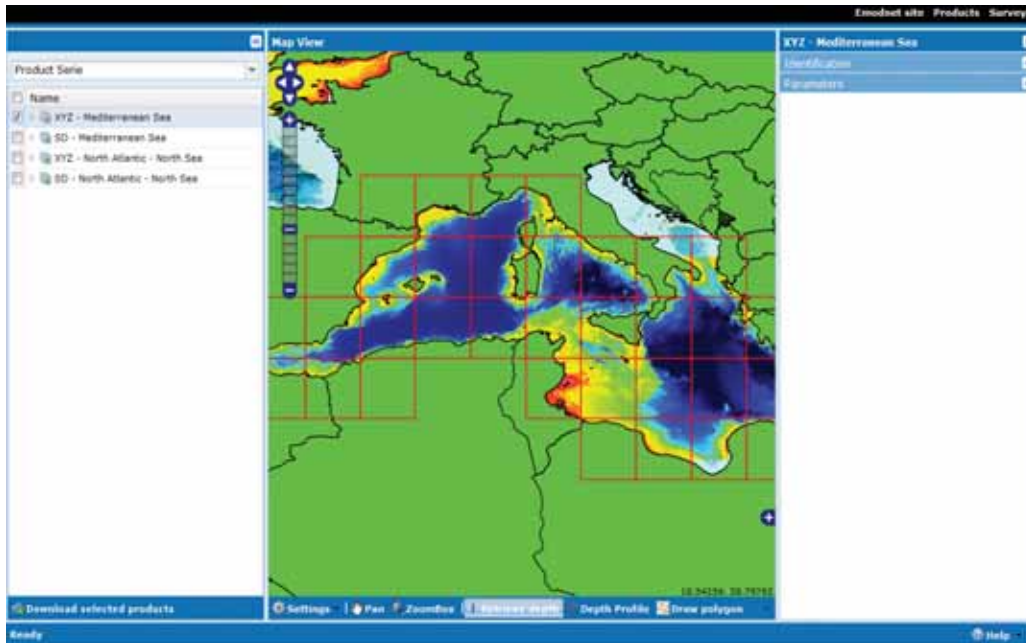
Providing these guidelines on the website was very useful.

As part of the assessment the metadata associated with the user interface was 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.

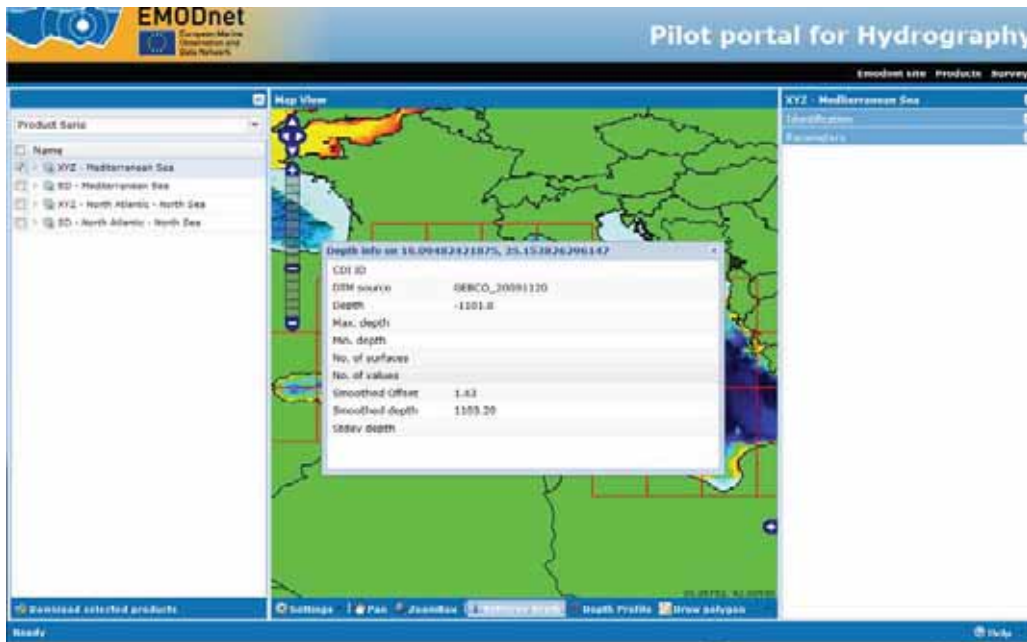
The information contained in the grid is believed to be trustworthy. However its accuracy and completeness cannot be guaranteed. Whilst every effort has been made to ensure its reliability within the limits of present knowledge, no responsibility can be accepted by those involved in its compilation or 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 the area of the Mediterranean Sea.



Screenshot 33 Bathymetric map for 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

5.1.4 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 that users are 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).



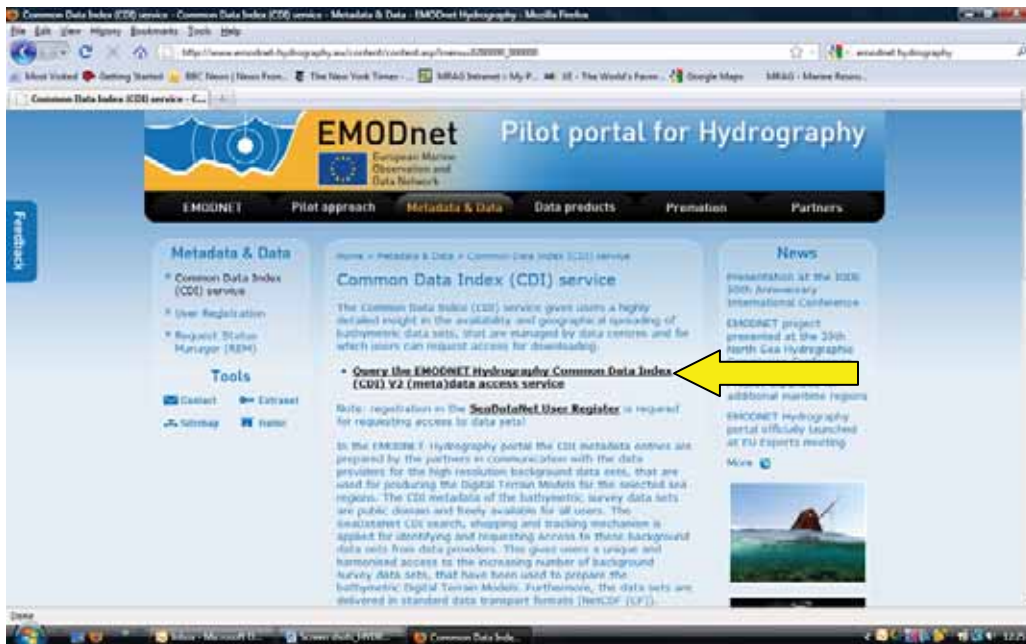
Screenshot 35 Accessing hydrography data products from the home page

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



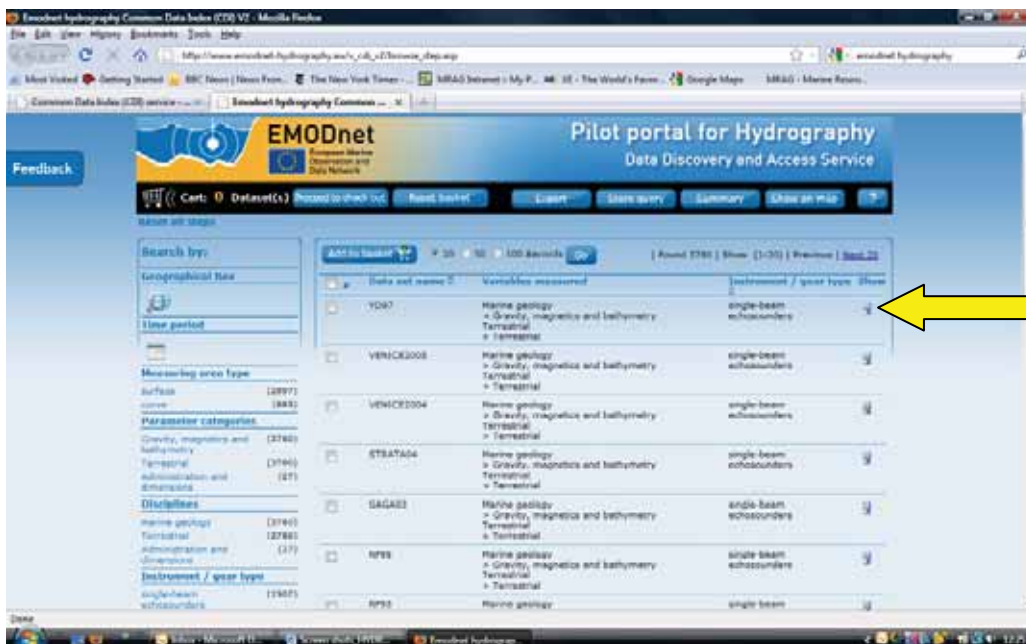
Screenshot 36 Accessing the hydrography common data index

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

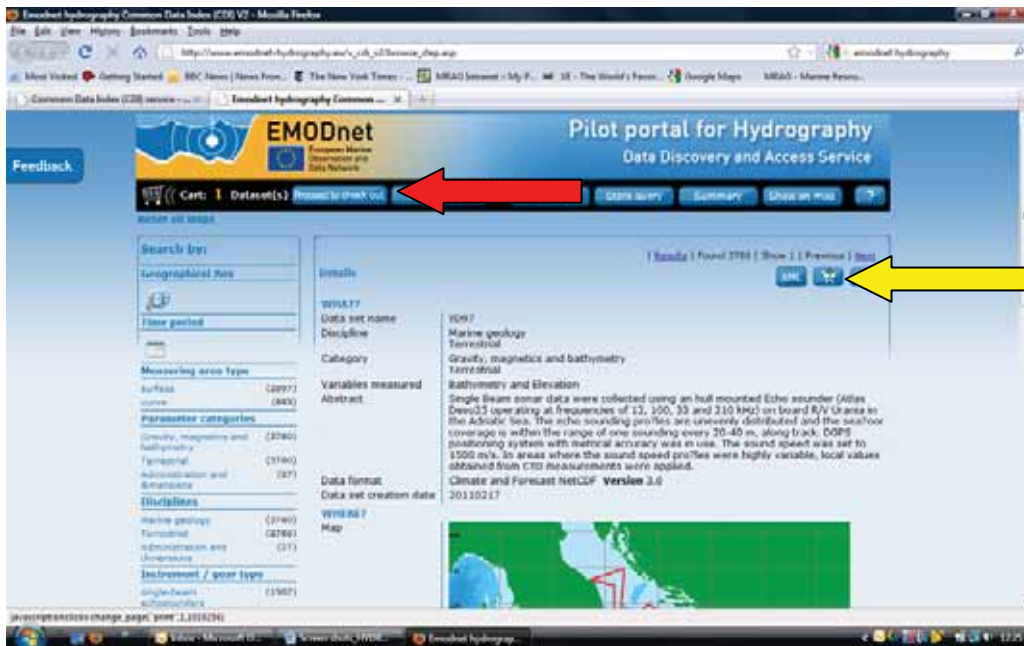


Screenshot 37 Querying the common data index

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



Screenshot 38 Adding data sets to a virtual shopping basket



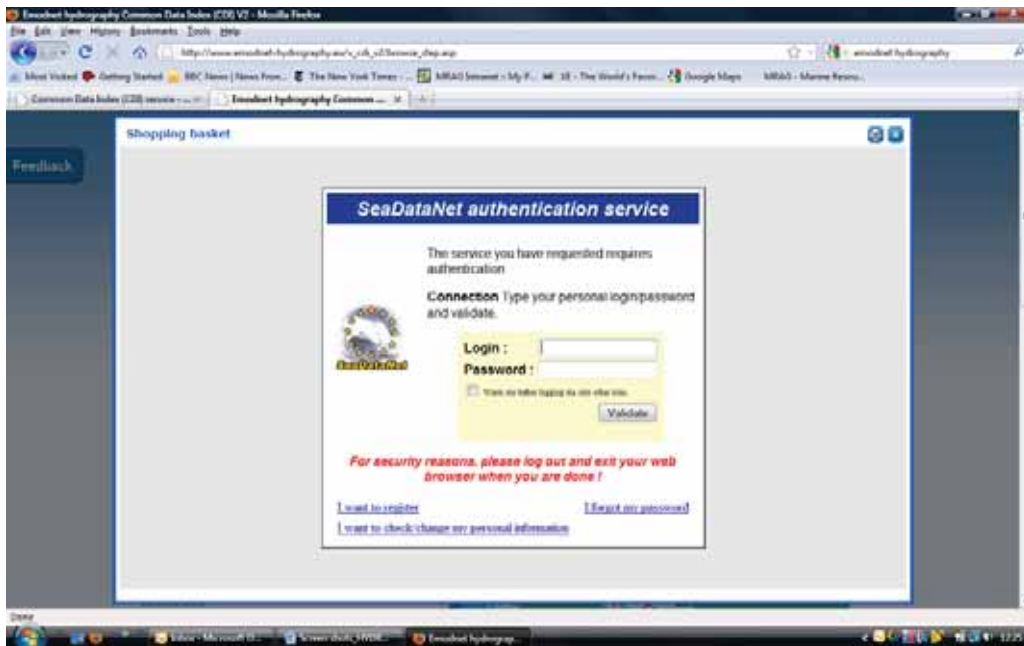
Screenshot 39 'Checking out' data sets from the hydrography portal

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 in to conclude the transaction. Having pressed the Press '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 Link to the SeaDataNet authentication service

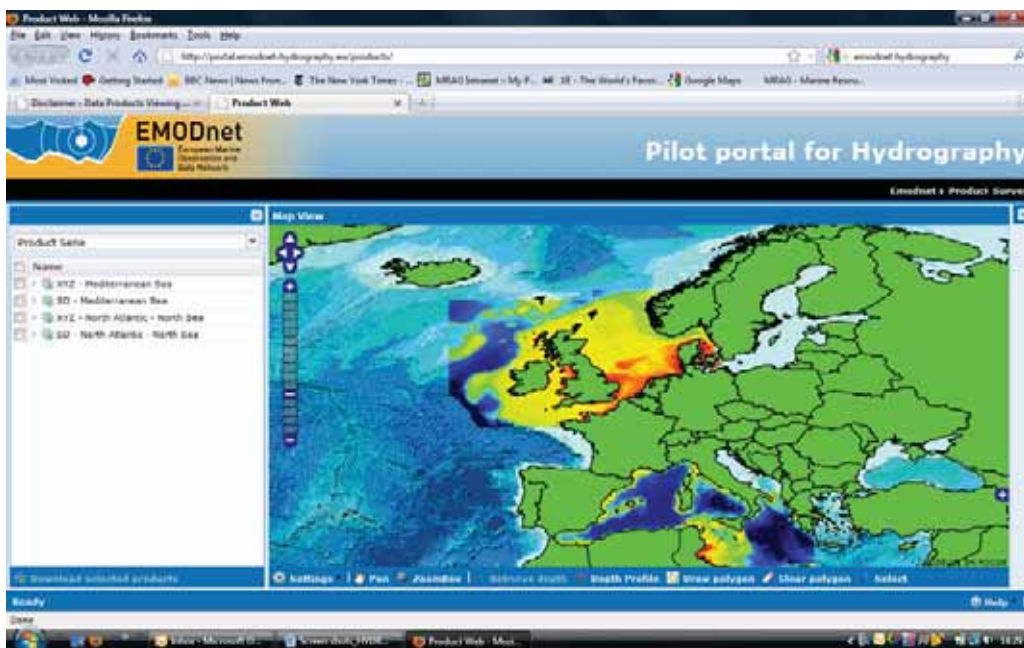
An alternative means of accessing the data is through the data products (Screenshot 42-44). These can be accessed through the tab as follows:



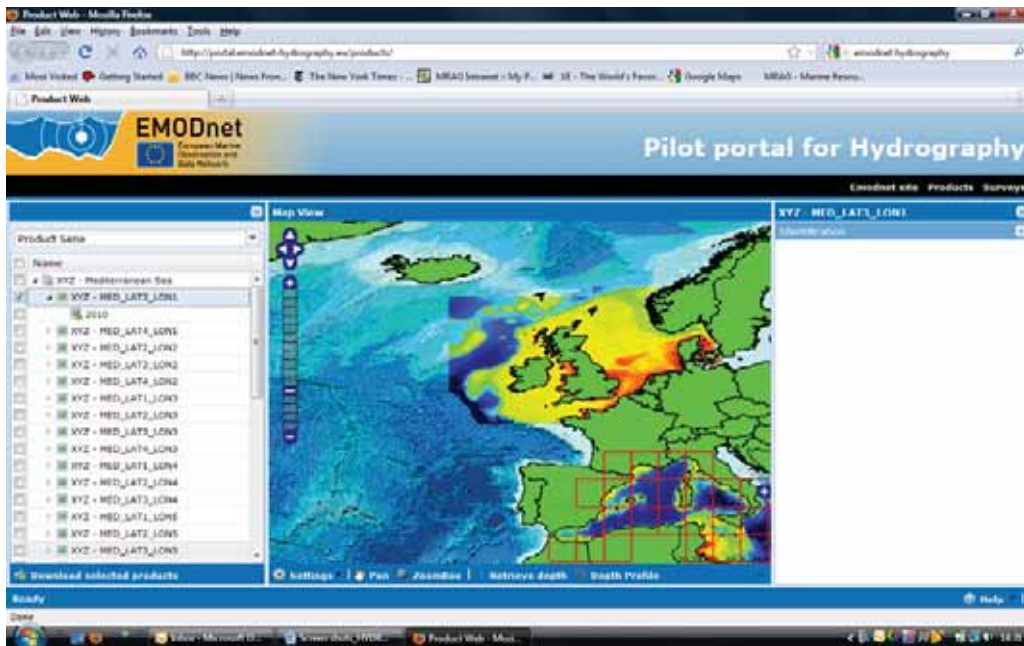
Screenshot 42 Accessing the hydrography data products from the home page



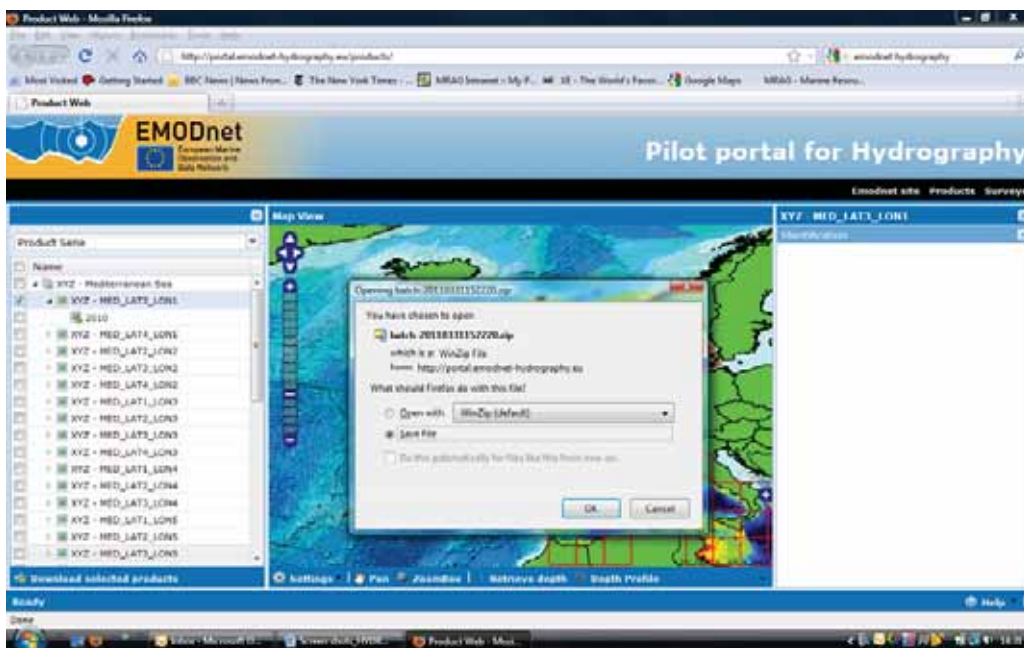
Screenshot 43 Disclaimer regarding the use of the hydrography data products



Screenshot 44 Bathymetric maps available through the hydrography portal



Screenshot 45 Selecting data sets from the data products



Screenshot 46 Downloading hydrographic data sets

5.1.5 How to provide feedback

On the main website, there is a blue tab on the left side of the page- when you click the 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.

5.1.6 Questionnaire responses

No survey responses were received for the Hydrography portal.

5.2 Task Two

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

5.2.1 Accessing data

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

Data can be downloaded for a basin (we selected Mediterranean as XYZ format) and is 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 this time is the depth by location. Data for number of observations and the standard deviation of the depth is not currently available so it is 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 and 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 and a single table in an Access database with 9541139 rows. The Import method can be saved in Access to save time import the files. The table in access was then connected to the MapInfo GIS applications, 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.

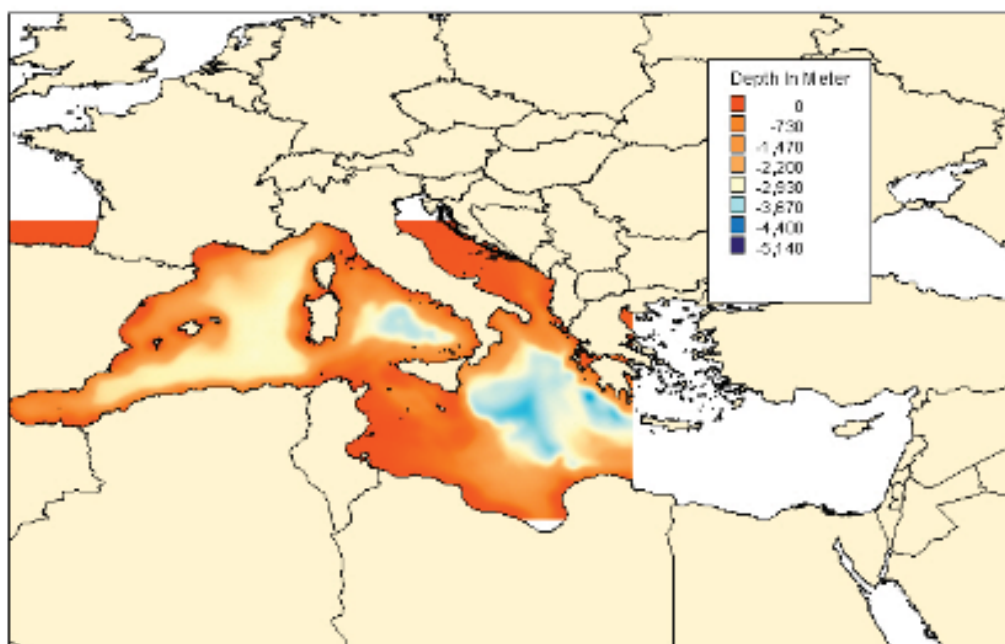


Figure 12 Map showing bathymetry and coastline for the Western Mediterranean developed from data files from the Hydrology portal (see text for details).

5.2.2 Response to queries

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

5.3 Task Three

5.3.1 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 tab or alternatively through the data products tab. Having registered each user is then required to log in to conclude the transaction. Having pressed the Press '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.

5.3.2 IPR issues from the provider perspective

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

6 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>

6.1 Task One

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



Screenshot 47 Main page for Geology pilot portal (accessed 02/03/2011)

The 'Metadata Catalogue' option on the One-Geology web 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 One-Geology portal. Categories for 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 One-Geology 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 (the terrestrial 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 One-Geology portal to change languages – with choices 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.

Attributes on selected points																
✖ Emodnet Substrate map * (0.73,57.22)										📍 country_null country_null						
OBJECTID	Shape	CODE	C_Grain	Reclassif	Method	Sample_n	D_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			281,91004672187	33,23
124	NULL	GB	Folk	P, S	Reclassification on the grounds of samples	0		<	1. Mud to sandy mud	No	No	Yes			189,317443487084	28,19
125	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 One-Geology portal.

6.1.1 Understanding of Scope of EMODNET

Although the portal homepage does describe purpose of EMODNET and role of Geology portal, there are no links to 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.

6.1.2 Data coverage of the portal

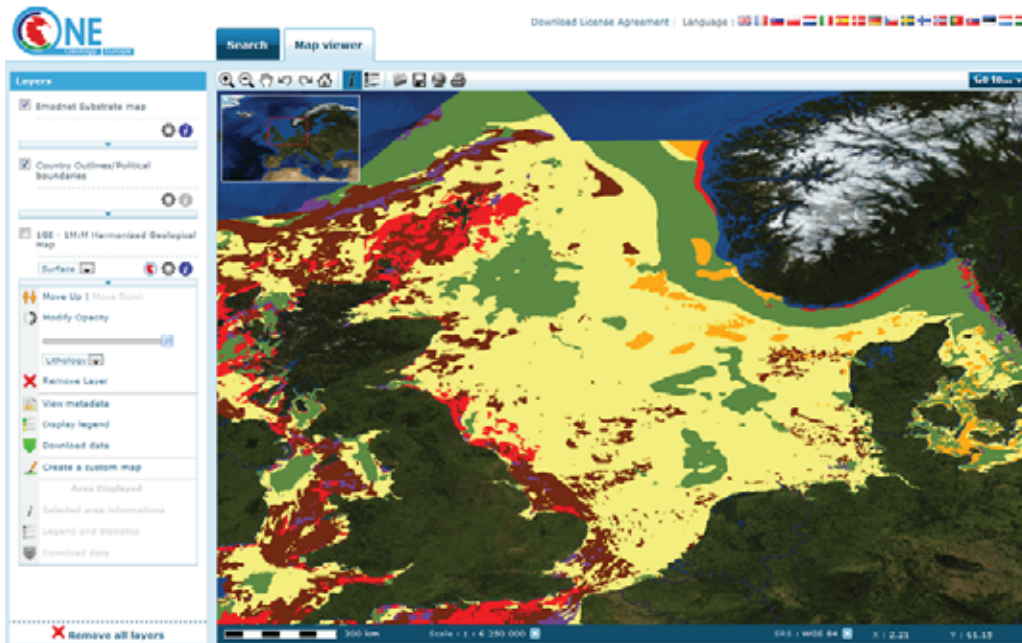
Clicking on this brings up an EMODNET substrate map of the Baltic Sea, Greater North Sea and Celtic Seas at 1:1000000 scale collated from more than 200 separate sea-bed substrate maps. This draft version was produced on 30 August 2010, but the project will continue to July 2012 and more changes might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

6.1.3 Quality of data in portal

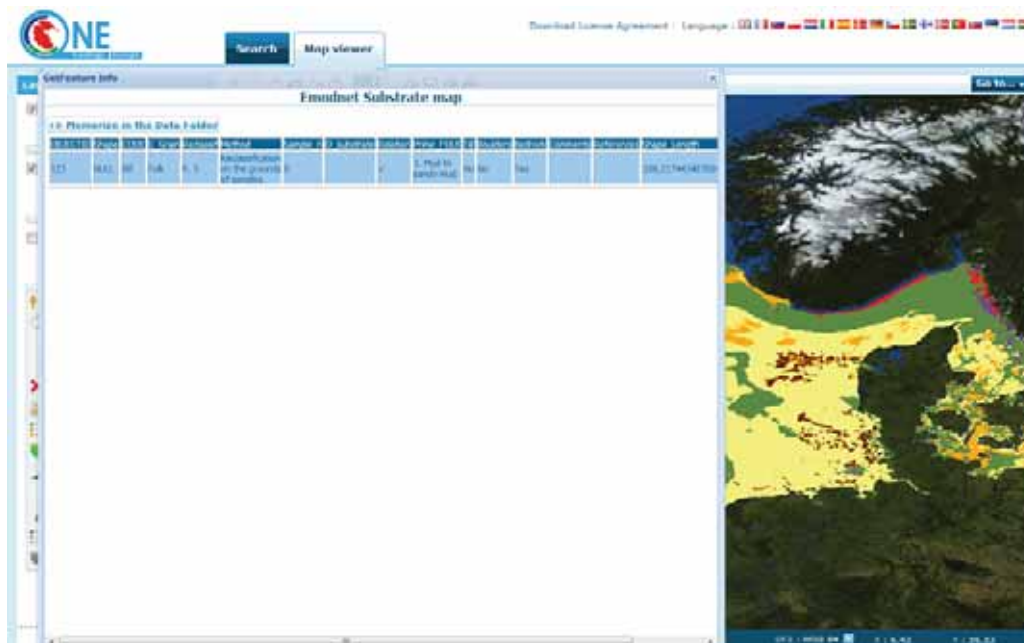
The 'Access constraints' field in the metadata for the EMODNET substrate map, indicates that the dataset was compiled from background information that may have been compiled at a more detailed scale. The map therefore gives an overview of the marine regions in question and is not suitable for local or 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' portal where the EMODNET maps can be accessed and added to the terrestrial maps (Screenshot 48).



Screenshot 48 EMODNET maps available through the OneGeology 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

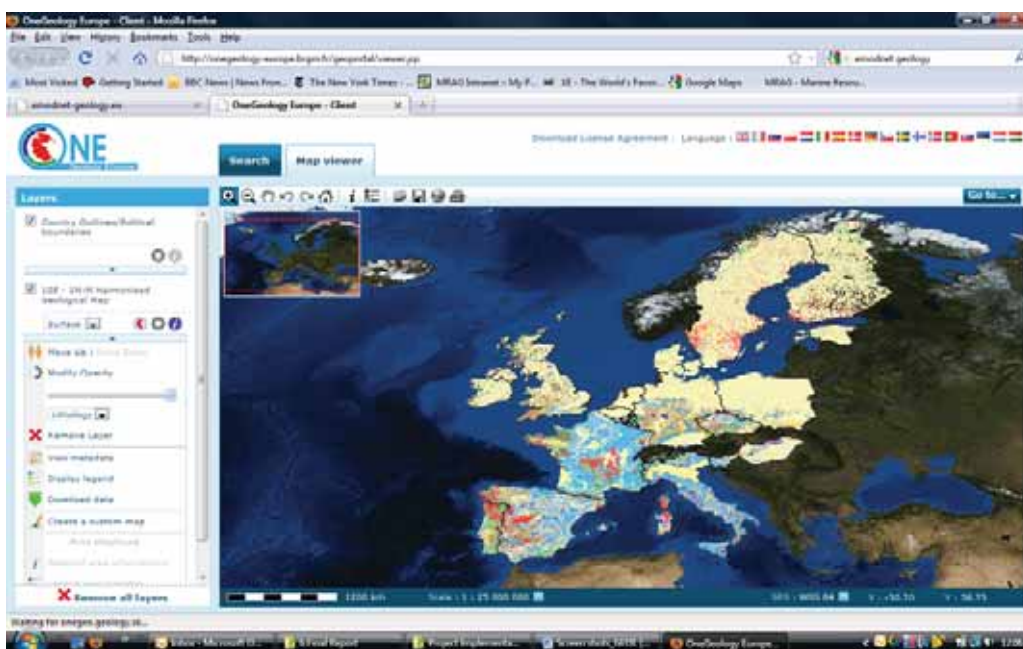
6.1.4 How to download data

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).

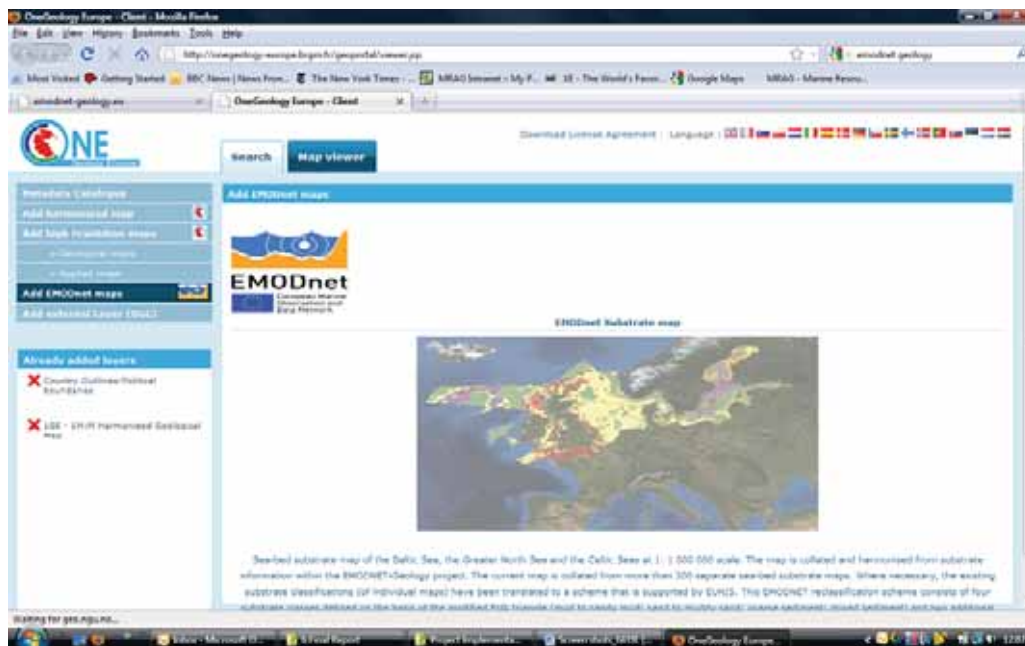


Screenshot 50 Details of EMODNET and the Geology Portal on the portal pages



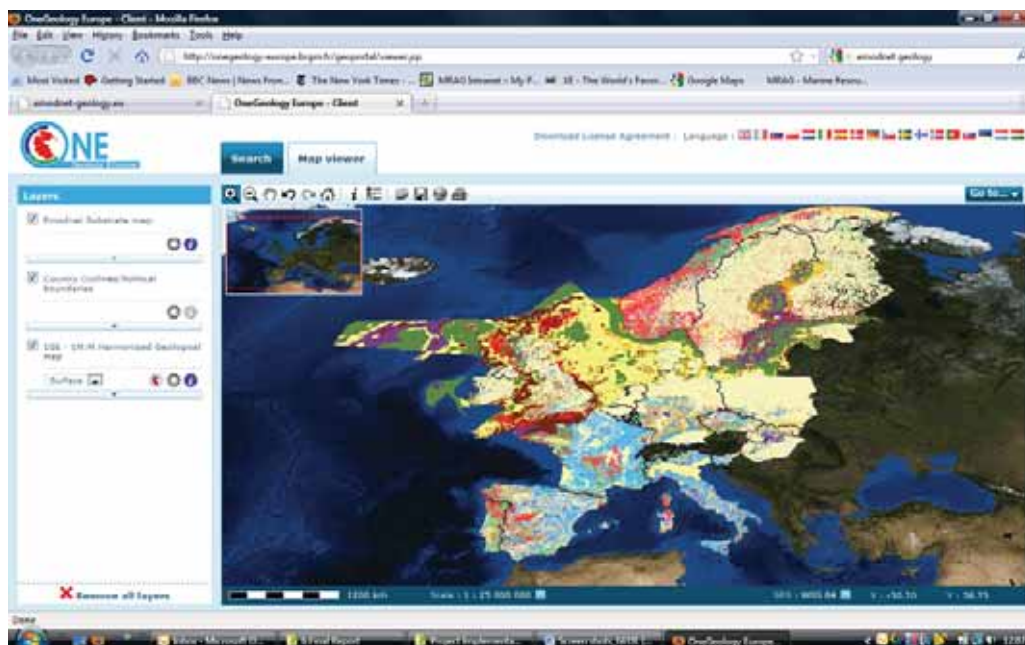
Screenshot 51 The OneGeology portal showing the terrestrial geology maps available

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.



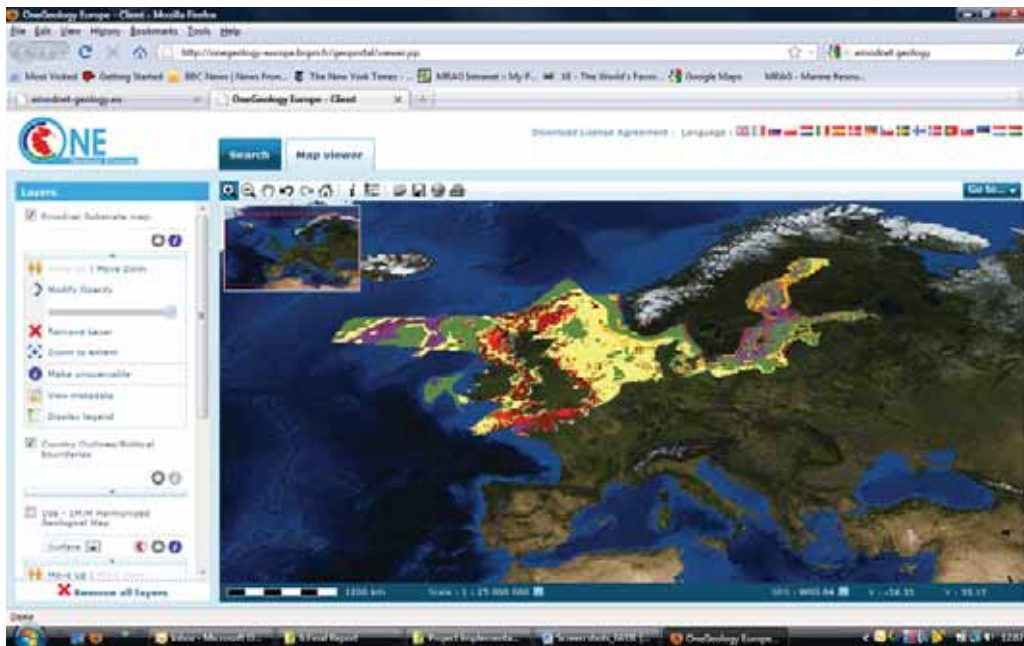
Screenshot 52 Adding EMODNET maps to the terrestrial maps

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 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).

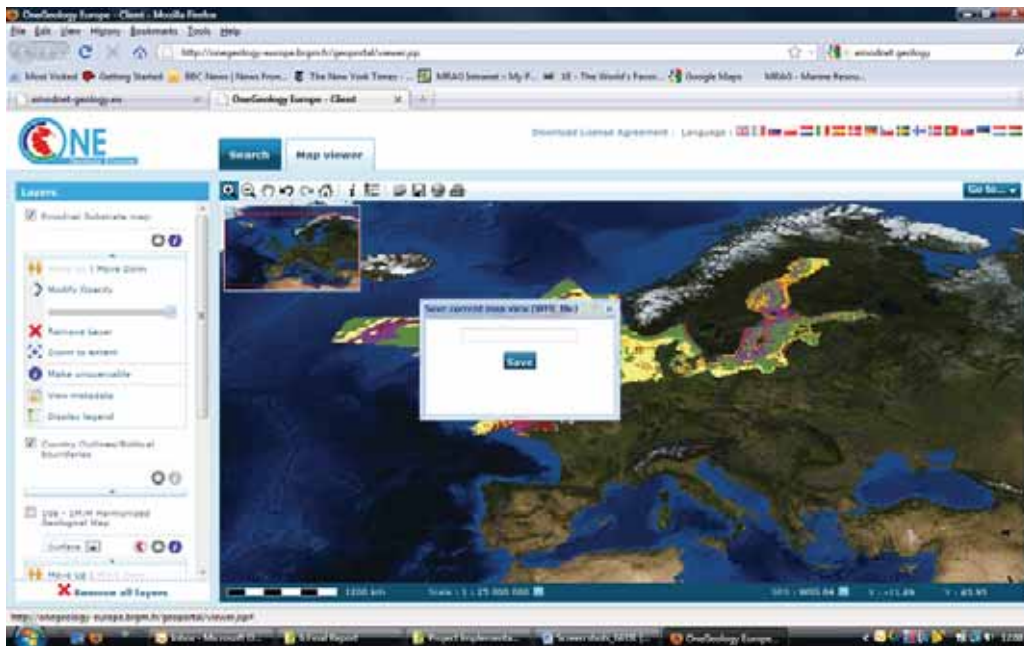


Screenshot 54 OneGeology portal showing only marine geology maps

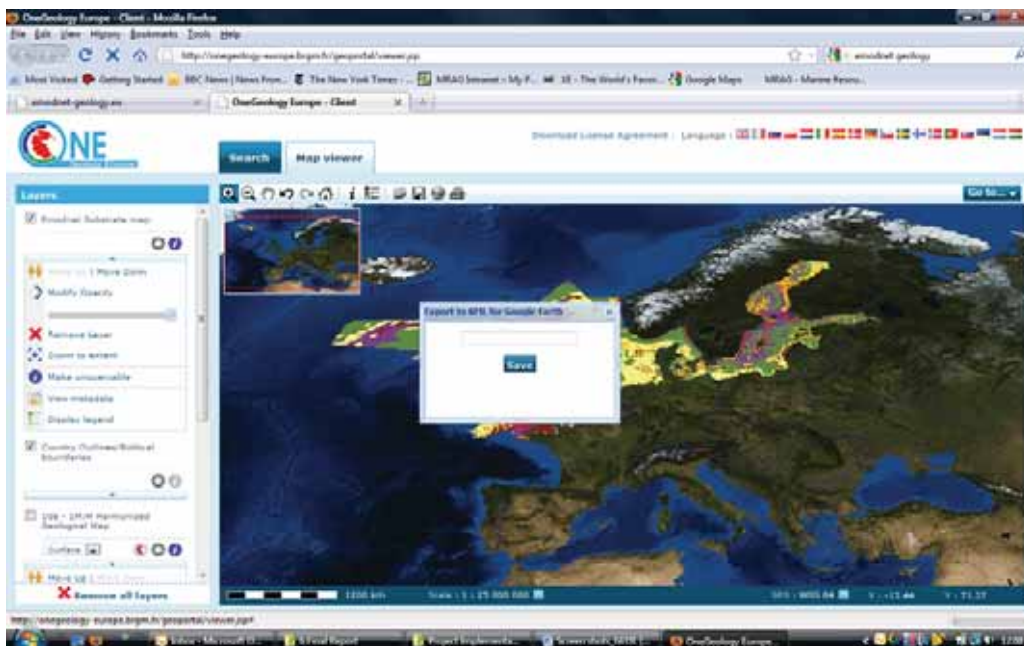
Next the EMODNET box should be expanded to display the legend the relevant substrate map. This image can be manipulated, saved and exported to GoogleEarth but that is all (screenshots 55-57).



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

6.1.5 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 geology project (Alan Stevenson at BGS).

There are no options to provide feedback from the One-Geology portal site.

6.1.6 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 to request that they 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 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 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.

6.2 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 prepare a map of sediments and a map of underlying strata.

6.2.1 Accessing data

It is not entirely straightforward to access the seabed data through the OneGeology 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 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.

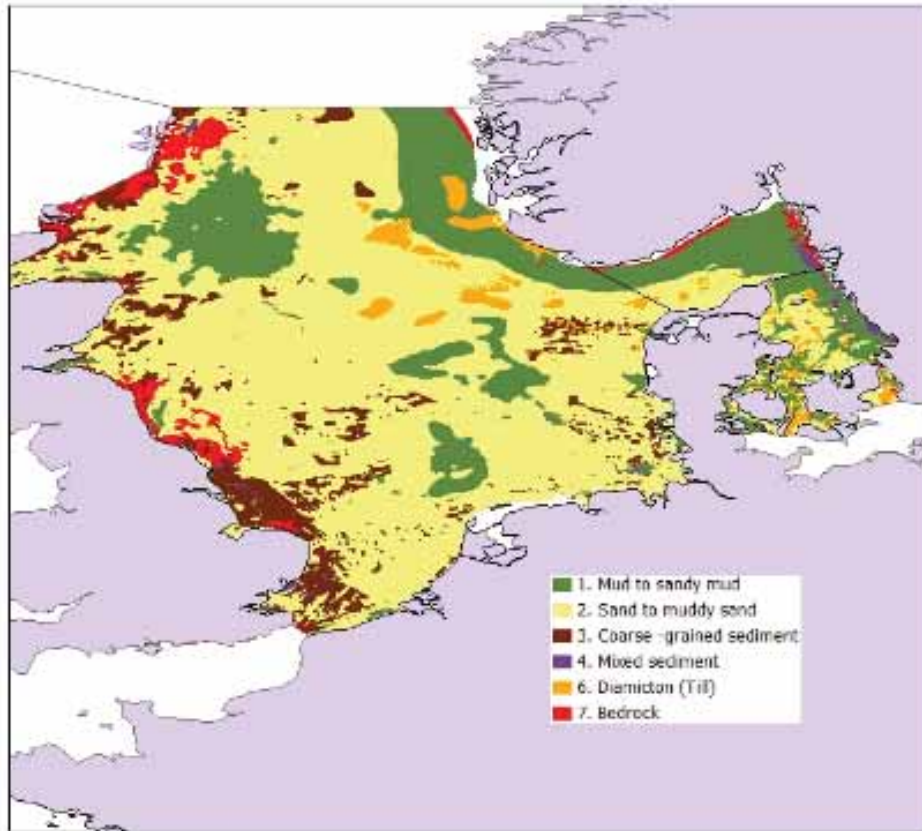


Figure 14 Map based on EMODNET layers showing marine sediments in the North Sea downloaded from the OneGeology portal.

6.2.2 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, this would not be possible as the data would never be made available to a third party by the partners.

6.3 Task Three

6.3.1 IPR issues from the user perspective

As described in section 6.1.4 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 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 meta-data is contained in the meta-data folder which can be accessed by clicking on the tab 'view metadata'. Among other matters the meta-data 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 the 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 constraint 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.

6.3.2 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.

7 Physical Habitats Portal

The Physical Habitats Portal is operated by a consortium of seven partners from five countries, led by the UK JNCC. The Physical Habitats portal website is available at: <http://www.jncc.gov.uk/EUSeaMap/>; <http://www.jncc.gov.uk/page-5040>.

7.1 Task One

The main page for Physical Habitats is hosted on the JNCC website under EUSeaMap – Mapping European Seabed habitats. This is different than 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 Habitats pilot 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 MSFD 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 for ‘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.’

7.1.1 Understanding of 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.

7.1.2 Data coverage of the portal

The coverage for this pilot 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

7.1.3 Quality of data in 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.’*

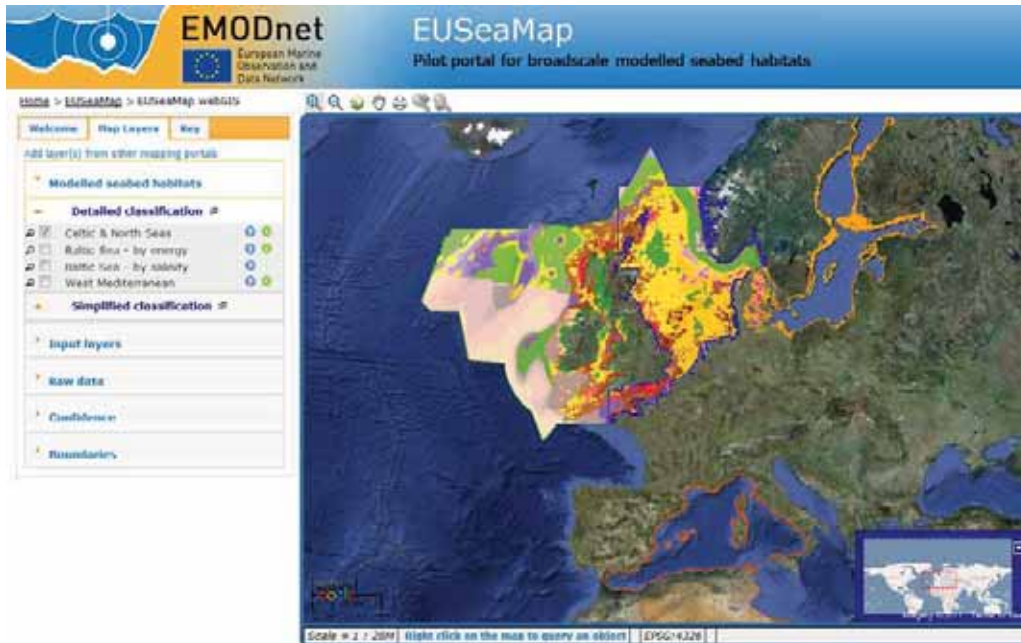
Under ‘Confidence in data sources’:

‘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*

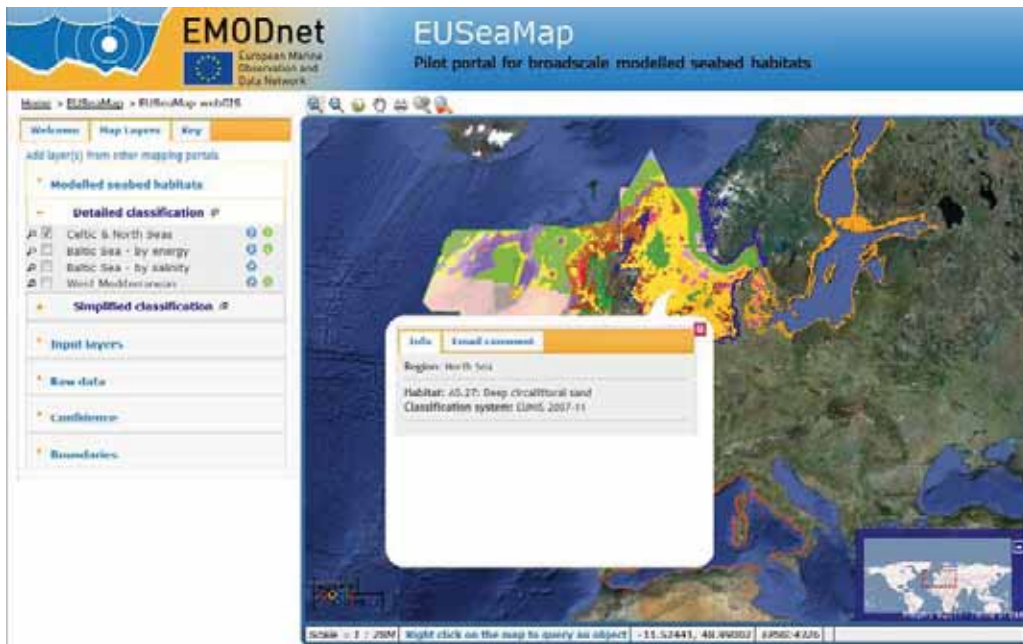
modified, in liaison with the EMODnet Geology project and applied to EUSeaMap substrate layers.'

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). No record of the Latitude or Longitude is provided in this summary.



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.

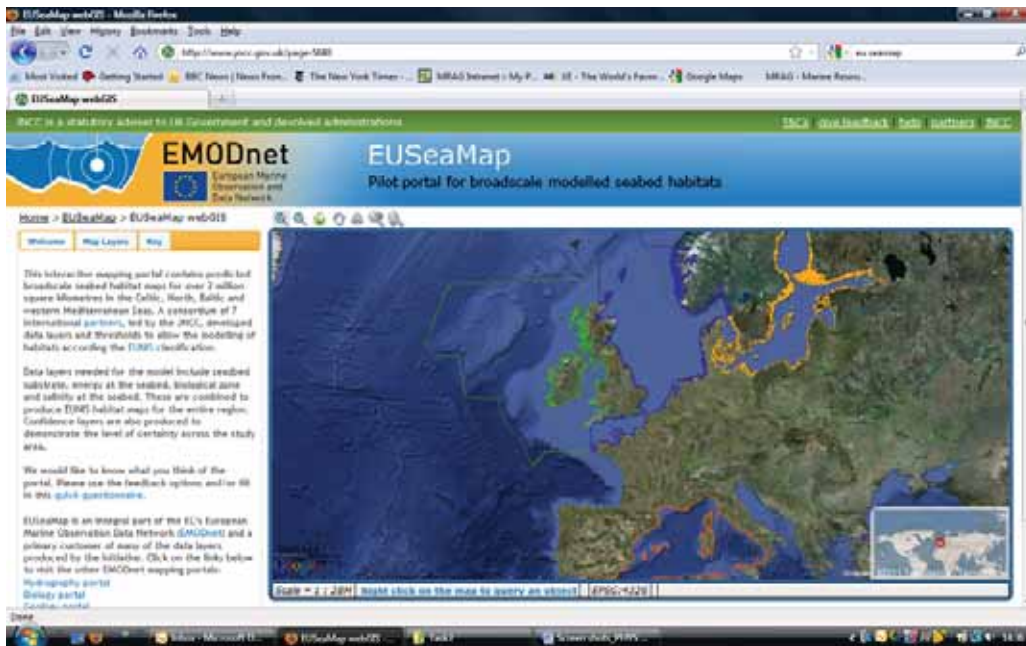
7.1.4 How to download data

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



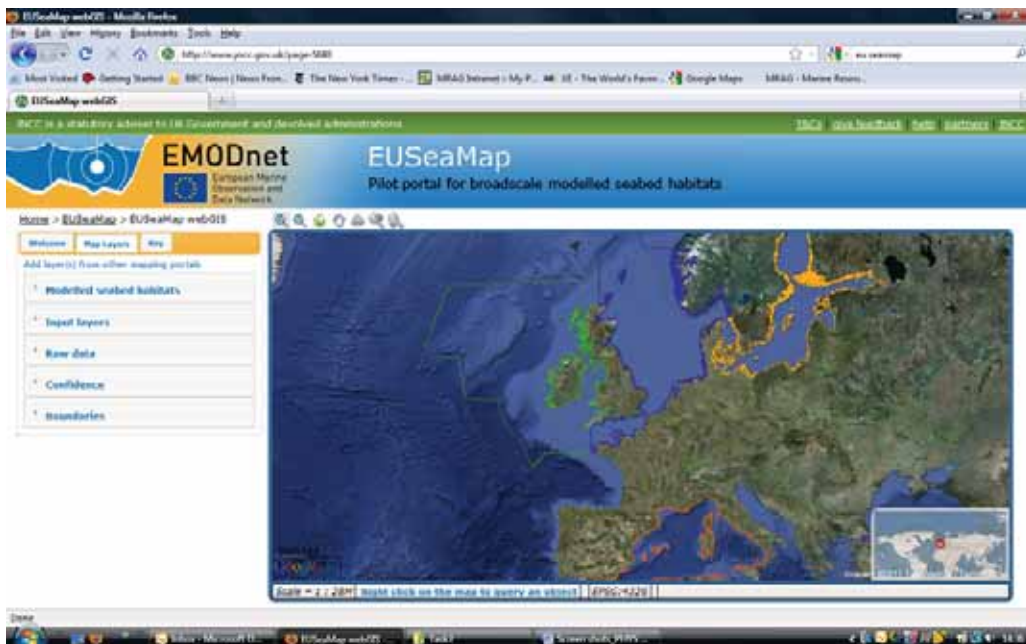
Screenshot 61 Locating the interactive map on the Physical Habitats homepage

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



Screenshot 62 The Physical Habitats mapping portal

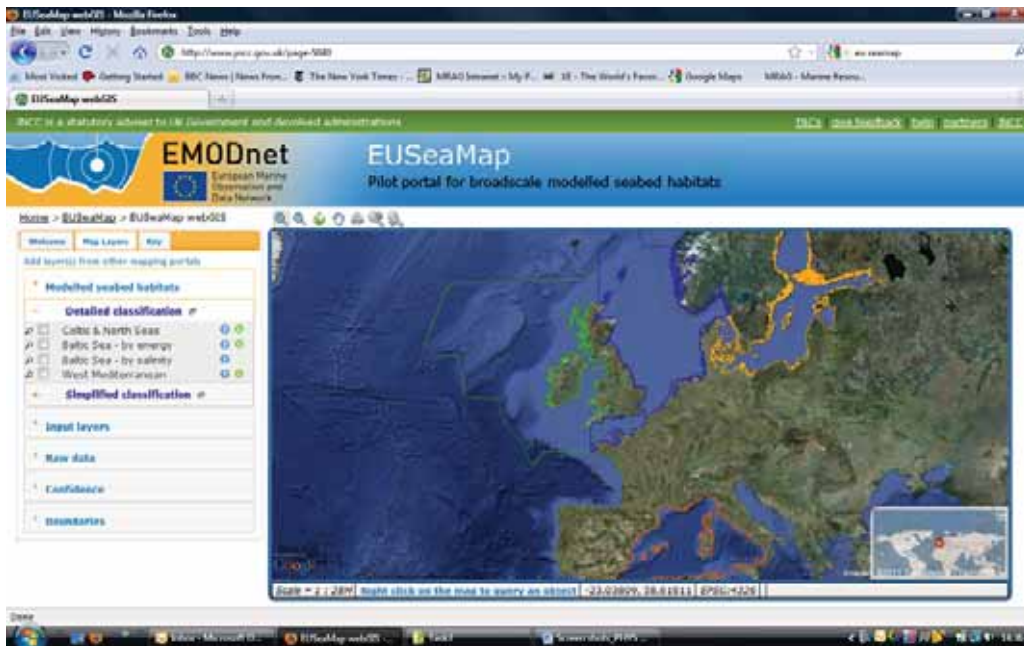
From here it is necessary to select 'map layers' from the taps on the left hand side (Screenshot 63).



Screenshot 63 Selecting layers for within the mapping portal

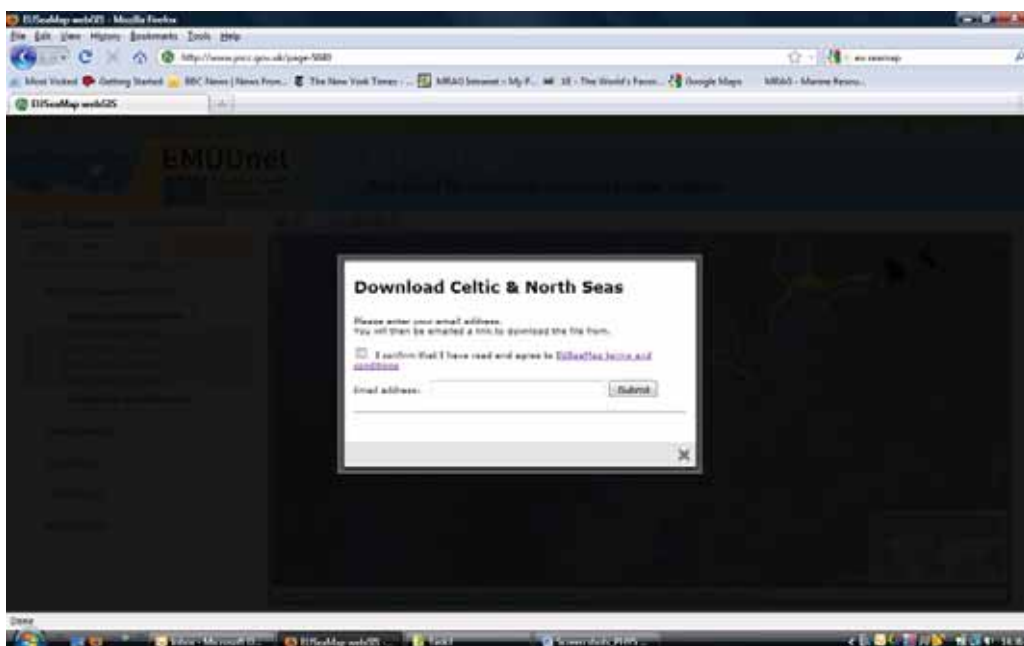
Clicking on 'Raw data' and then bathymetry takes the user back to the hydrography portal.

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've read the EUSeaMap terms and conditions and to provide your email address.

7.1.5 How to provide feedback

The main page has a link to ‘Give feedback’ – taking 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.

7.1.6 Questionnaire response

Two users filled in the questionnaire survey on the user-friendliness of the Physical Habitats portals. 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 student at University 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 they had used. Both users provided some open-ended feedback on the portal (Table 14).

Table 12: Survey responses on user-friendliness of 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 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 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.

7.2 Task Two

From the ToRs 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.

7.2.1 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 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 a 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 Basins considered (North Sea, Baltic and Mediterranean) there was some manipulation of the data that 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 Sea 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 outline in yellow⁵

The data in the shape files intermingles between the IHO sea areas, If the calculation of area had performed on the shape files as they were provided , the Baltic sea would be missing some of habitats' that were in 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 corresponded to the correct IHO sea area and the calculations were performed on the adjusted shape files. The red eclipse in Screenshot 66Error! Reference source not found. highlights an area were the same habitat is recorded in both shape files.

Compiling the data using a pivot table in Excel to provide a summary of the areas by habitat 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.

⁵ 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).

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

7.2.2 Response to queries

Queries were submitted by email and the portal was able to respond quickly to 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.

7.3 Task Three

7.3.1 IPR issues from the user perspective

As described above it is necessary to request the data on this portal, in the form of modelled seabed habitats, 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 section 2. This provides, in 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 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 terms and conditions do not apply but at the very least the presence of two separate sets of conditions is misleading.

7.3.2 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.

8 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.

8.1 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. When request for help were made to the portal when using them to complete a task the response was always quick and helpful. 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. questions were and Most of the tasks were straight forward to achieve and tools and data products within the portal made completing the tasks much easier they would of otherwise been,

Of all of the portals the one that had the greatest functionality were the Chemistry and Hydrography portals, which had several different method 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 which was found to be a useful feature to provide additional reference to 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 clear if the data sets had any restriction upon them, and at this point is was possible to refine the request for just unrestricted data sets. The progress of request was simple to follow, and the maintenance of a history of request also helped managing the data that had been downloaded from the portals.

The Chemistry, Hydrography and biology portals all provided access to data sets in addition Chemistry and Hydrography also had data products. The physical habitats and geology portals only had data products. The restriction of most of the data sets in the Hydrography portal meant that the data product was principle resource used on the site.

The chemistry and biology portals where the two portals from which it was possible to retrieve datasets from. The dataset in the biology are amalgamated, this meant that less steps were required to use the data, however there are inconstancies in the data (e.g. missing dates in the birds data) which may reduce the usefulness of the data overall.

The chemistry datasets are closer to the original data sets, this means that there is a lot of detail is potentially available in the datasets. 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 get the data required. However when correct dataset is identified it is more likely to be comprehensive, and may be more useful as a result

8.2 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 is felt would not justify such a system.

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 which sets out any applicable restrictions on the use of the data. The main restrictions among 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.

8.3 Recommendations

8.3.1 Recommendations - Biology

- 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
- The issue of precisely which data policy applies is somewhat complex

8.3.2 Recommendations - Chemistry

- Include information on how quality-checking is undertaken

The site uses a shopping cart system for data files and downloading. This is possibly a system that could be adopted more widely.

- One issue that may require further examination is to precise who the parties are to each individual licence agreement. This is not very clearly specified and might make it difficult for the consortium to apply the licence conditions in the future.

8.3.3 Recommendations - Hydrography

- Break up long pages of text with headings or use section breaks and links at top (e.g. 'EMODNET' page)
- One issue that may require further examination is to precise who the parties are to each individual licence agreement. This is not very clearly specified and might make it difficult for the consortium to apply the licence conditions in the future.

8.3.4 Recommendations - Geology

- Make marine data more prominent on website (or directions on how to get to it) as many may not know that EMODNET refers to marine data
- Provide link to DG MARE site pages with EMODNET for more information
- 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
- The issue of the enforceability of the licence conditions should be evaluated in terms of the precise procedure for their incorporation into the licence.
- It would also be appropriate to re-visit the issue of the identify of the licensor.

8.3.5 Recommendations – Physical habitats

- Separate data catalogue?
- Main page similar to other EMODNET portals?
- Make key more ‘user friendly’?
- There is an apparent contradiction between the application ‘terms and conditions’ and the ‘conditions of use’ which is potentially misleading

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	Balguerias, 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

