Preparatory Actions for European Marine Observation and Data Network

2nd INTERIM REPORT FOR THE PERIOD JUNE 2010 – NOVEMBER 2010

Version 1.0

Service Contract No. "MARE/2008/03 - Lot 1 Hydrography – SI2.531515"

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CONTENT:

1. INTRODUCTION

This Second Interim Report describes the activities from month 13 to month 18 of the Lot 1 – Hydrography (SI2.531515) of the Service Contract No MARE/2008/03 on the Preparatory Actions for European Marine Observation and Data Network. The contract has been signed by both the Commission and by the Contractor, Mariene Informatie Service (MARIS), 29th of May 2009.

The specific objectives of the Hydrography Lot are to:

- collate existing data from public and private organisations relating to the state of maritime basins; process them into interoperable formats which includes agreed standards, common baselines or reference conditions;
- assess their accuracy and precision and assemble them into common datasets;
- develop, test, operate and maintain a **portal** allowing public access and viewing of these data and a link to WISE-marine
- 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;
- 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.
- analyse the necessary requirements to maintain the components built up in each lot as a sustainable infrastructure
- keep the portal operational afterwards and be prepared to transfer to the Commission.

The following geographical information system layers have to be produced and made available in the hydrographic lot:

1. water depth in gridded form over whole of maritime basin on a grid of at least quarter a minute of longitude and latitude.
2. water depth in vector form with isobaths at a scale of at least one to one million.
3. depth profiles along tracklines
4. multibeam surveys along tracklines
5. coastlines
6. underwater features – wrecks, seabed obstructions etc

Thereby it is accepted that the accuracy and precision of the gridded data will vary over the basin in question. No new data should be collected specifically for the project, but the aim is to provide access to data from existing monitoring programmes. All data delivered by EMODNET should be INSPIRE compliant.

The hydrographic project deals with the following geographical regions:

- the Greater North Sea, including the Kattegat and stretches of water such as Fair Isle, Cromarty, Forth, Forties,Dover, Wight, and Portland.
- the English Channel and Celtic Seas.
- Western Mediterranean, the Ionian Sea and the Central Mediterranean Sea.

The Hydrography Lot is undertaken by a consortium of 7 partners consisting of:

- Mariene Informatie Service 'MARIS' BV (MARIS) – The Netherlands (coordinator)
- Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) – France
- ATLIS – The Netherlands
- NERC - National Oceanography Centre, Southampton (NERC-NOCS) – United Kingdom
- Institute of Oceanography (IEO) – Spain
- Geological Survey of Ireland (GSI) – Ireland
- Service Hydrographique et Océanographique de la Marine (SHOM) – France

The consortium is developing the Hydrographic Pilot on SeaDataNet standards and infrastructure and is applying the following approach:

- Develop a high-end Hydrographic portal, outfitted with a powerful spatial database, that is complemented with WMS, WFS and WCS services (OGC) to serve users and to provide layers for e.g. the other EMODNET portals, the prototype European Atlas of the Seas, and the broad-scale European Marine Habitats map;
- Involve research institutes, monitoring authorities, and HO's, in providing hydrographic data sets for producing Digital Terrain Models (DTM) with specific resolution for each geographical region, that are loaded and integrated afterwards into the portals' spatial database
- Include in the portal a metadata discovery service, by adopting the SeaDataNet CDI metadata standard, that inter alia gives clear information about the background data used for the DTM, the access restrictions and distributors; this also ensures the connection of the Hydrographic portal with the SeaDataNet portal.

In this 1st year already very good progress has been made with all planned work packages and this has resulted in an operational proto-type EMODNET Hydrographic portal which can be found at: http://www.emodnet-hydrography.eu

The Second Interim Report covers the second phase of the contract, the testing and monitoring phase, running from Month 13 to Month 18. This report will list the activities carried out, the deliverables of each work package as specified in the technical tender and any deviations from the project tender.

2. WP1: Project Management

2.1 Contract

The contract between the MARIS and the European Commission DG-MARE was signed the 29th of May 2009.

2.2 Project Meetings

- A 5th full project group meeting with all partners took place 16th – 17th June 2010 at MARIS offices in Voorburg, The Netherlands. Minutes and an action list of the meeting have been drafted by MARIS and distributed to all partners.
- A 6th full project group meeting with all partners, additional partners for the EMODNet Seabed Mapping contract extension and representatives of subcontractors took place 20th – 21st October 2010 in Villefranche sur Mer, France. The first day of the meeting was joined by representatives of CIESM to explore synergy options with the CIESM's MediMap project, that has been on-going for many years and in which many

Mediterranean institutes work on a voluntary basis to compile and publish a series of synthesis maps of the Mediterranean. A draft plan for cooperation is now under consideration. It includes engagement of CIESM in gathering additional data sets and moreover for scientific validation of the EMODNET digital bathymetry. Minutes and an action list of the meeting have been drafted by MARIS and distributed to all partners.

2.3 Progress Reports

- MARIS has prepared and submitted the extensive 1st Interim Report for the 1st year of the project for the period June 2009 - May 2010. This report has been accepted by the EU.

- MARIS has prepared and submitted the 6th Bimonthly Progress report for the period June 2010 – July 2010. This report has been accepted by the EU. Moreover MARIS has transferred to all partners their shares of the 1st annual payment.

- MARIS has prepared and submitted the 7th Bimonthly Progress report for the period August 2010 – September 2010. This report has been accepted by the EU.

2.4 Website and Extranet

The EMODNET Hydrography website can be found at:

http://www.emodnet-hydrography.eu.

It gives access to the various services and gives users background information about the EMODNet project and the applied approach and philosophy.

The website also gives access to the Extranet that gives partners and associate partners (subcontractors) an archive of all contract documents and project documents.

MARIS has updated several sections of the website to reflect the recent extension of the EMODNET Hydrography project with the EMODNET Seabed Mapping project and the establishment of associate partners. Also the 1st Annual Progress report has been included in the public portal in the 'Pilot approach' chapter so that really interested users can download it in PDF format.

2.5 Dissemination and promotion

The EMODNET Hydrography project has been presented at its start at the GEBCO Science Day and it was agreed to keep each other informed and to seek synergy in the field of metadata, vocabularies and data formats. The 2010 GEBCO Science Day meeting has been held in Callao, Peru from 11-18 September 2010 and it has been arranged by IFREMER that the 1st year progress of EMODNET Hydrography has been presented by Tony Pharao, the GEBCO chairman. It has been reported that the presentation has been well received and that GEBCO is interested in a closer cooperation, which might include adoption of the CDI metadata formats and supporting tools.

SHOM has given an EMODNet presentation at the 29th North Sea Hydrographic Commission Conference in September 2010. This presentation is available from the website.

In September 2010 MARIS has given an EMODNet presentation at the Hydrographic Service of the Netherlands to encourage the provision of metadata from the bathymetric surveys that are underlying the composite DTM that the HO has delivered earlier.

3. WP2: DATA COLLECTION AND METADATA COMPILATION

3.1 Objectives and approach of WP2

The hydrographic data concerns the following 3 geographical regions:

- the Greater North Sea, including the Kattegat and stretches of water such as Fair Isle, Cromarty, Forth, Forties,Dover, Wight, and Portland.
- the English Channel and Celtic Seas.
- Western Mediterranean, the Ionian Sea and the Central Mediterranean Sea.

The objectives of the work package WP2 are:

- To identify and gather hydrographic data sets for these regions
- To compile metadata for all hydrographic data sets in CDI format

The consortium focuses on Hydrographic Offices, Authorities and Research Institutes. In a later stage Industry might be approached once the portal has matured.

The explained access policy is as follows:

- The CDI metadata in the EMODNET pilot are public domain and freely available for all users.
- The resulting DTM data products (GIS layers) are freely available for all users as OGC WMS service and for downloading in several formats.
- The access to background data sets as detailed in the CDI data inventory and as used for the products respects the data copyrights of owners. The CDI metadata includes a value for data access restriction for every data set it manages, as well as a clear indication of the distributor. The SeaDataNet CDI shopping mechanism is fit for dealing with different access restrictions.

The overall strategy applied is to achieve good external cooperation and to gather as many data sets as possible. It is emphasized to potential suppliers, that they will stay in control of their data sets, that their data sets are to be used internally by the project partners for generating a digital bathymetry with a gridsize of .25 minute by .25 minute (ca 500 * 500 m2) and that metadata describing their data sets will be provided to users with the SeaDataNet functionality for requesting access to the actual data sets. This way, the EMODNET portal can offer to data providers an excellent shop window to reach other users in search of data and to promote their services. The implementation and cooperation can be further encouraged by making limited financial arrangements with data suppliers for preparing the appropriate metadata. For this purpose the project has a budget set aside. This approach in combination with naming data suppliers as associate partners at the website and in other promotional activities encourages potential suppliers to cooperate and contribute data sets for the EMODNET Hydrography Lot.

A subcontract has been concluded by MARIS with CNR-ISMAR (Italy) for preparing a composite DTM and metadata for the underlying surveys according to the established EMODNet Hydrography specifications for the Tyrrhenian Sea. A comparable subcontract has been concluded by MARIS with OGS RIMA (Italy) for the Ionian Sea.

3.2 Types of bathymetric data sources

An important objective of the EMODNET Hydrographic Lot is to produce a digital bathymetry for the maritime regions as a Digital Terrain Model (DTM) with a gridsize of .25 minute by .25 minute. This must be based upon available bathymetric data sources. In practice 3 types of bathymetric data sources are used:

- **Bathymetric surveys**, such as single and multibeam surveys, echosoundings and even historic leadline soundings. These data sets are most preferred as data source because of their high resolution.
- **Composite data sets**, giving a gridded bathymetry. In practice it appears that Hydrographic Offices (HO's) do not want or can not deliver primary surveys but composite data sets from the Digital Terrain Models that they maintain themselves for producing and maintaining their nautical charts following international IHO procedures.
- **GEBCO 30" gridded data.** GEBCO is used by the EMODNET project to complete area coverage in case there are no survey data or composite data sets available to the partners.

3.3 Metadata formats

3.3.1 Metadata format for survey data sets

The SeaDataNet Common Data Index (CDI) data discovery and access service provides the basis for giving overviews and access to the **high resolution survey data sets**, that are used to produce the digital bathymetry DTM for the selected maritime regions. The project aims to describe all identified bathymetric survey data by means of the ISO 19115 based CDI format, supported by the SeaDataNet Common Vocabularies. Also data providers that only deliver a composite DTM are urged to provide CDI metadata for the underlying surveys. This way users can identify all available surveys with their basic specifications and data originators and can request access to the data sets in a standard way. It is strived for open data access but in reality all data providers so far apply restrictions on data access and want to negotiate with users case by case.

3.3.2 Metadata format for composite data sets

Also a metadata format has been adopted for describing the composite DTMs that are delivered by a number of data providers. It is a subset of the CDI format, shared with the MyOcean project and can also be applied for describing the various mapping layers in all the EMODNet lots.

3.4 Progress of data and metadata gathering per maritime region

3.4.1 the Greater North Sea

In the first year good progress had been made with the North Sea region with contributions from the Hydrographic Offices of Norway, Denmark, Germany, Netherlands and Belgium. Each of them have provided a composite DTM in a number of resolutions. In the Southern North Sea hydrographic surveys were provided by SHOM (the French HO and partner). With these deliveries high resolution data sets have been gathered for generating the digital bathymetry for the Eastern part of the North Sea and the Kattegat with high quality.

However for the Western part of the North Sea and in fact the shallow waters around the United Kingdom it is quite a different story and use is made of the GEBCO 30" data set. Negotiations were opened with the UK Hydrographic Office (UKHO), the UK Maritime Coastguard Agency's (MCA) and the SeaZone company that are still ongoing**.** Their data coverage is indicated in the images below.

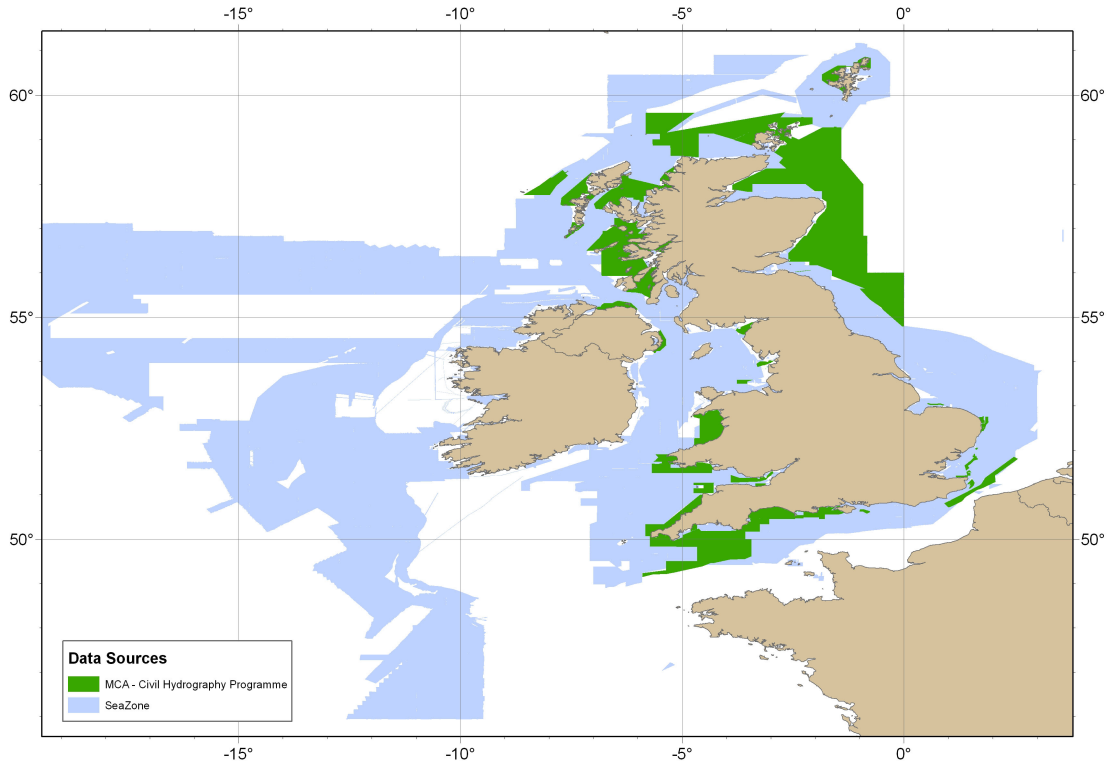


Image: UK waters data sources from MCA and SeaZone

The Maritime Coastguard Agency (MCA) performs hydrographic surveys under the "Civil Hydrography Programme (CHP)“ since 2004. The processing is done in partnership with the UKHO. The MCA’s management board is still considering the terms for releasing its bathymetric data, but the recent UK government saving measures have lead to a situation whereby MCA prefers selling the data sets. Partner NOCS is in contact with the MCA trying to persuade them to consider the EMODNet portal as a good shop window opportunity. Moreover NOCS will make an EMODNet presentation at next year’s Civil Hydrography Annual Seminar (CHAS) in February 2011. As an alternative route NOCS is contacting MEDIN, the national UK initiative, to get access to the CDI metadata of surveys and hopefully the data sets themselves. Finally there is a new Pan-Government Hydrographic Data MoU in the UK that aims at exchanging existing and future multibeam echosounder data and backscatter data between participating organisations at no cost. This might provide help for EMODNet.

SeaZone (as Metoc in 1995) began digitising paper copies of Admiralty charts, or using third-party data acquired from private producers of digital navigational products, under licence from the UKHO. It is wholly owned by UKHO from 2005, but recently taken over by HR Wallingford. They are a commercial company with which an EMODNet shop window deal was almost established a year ago. But the changes in management implicate that the negotiations had to start all over.
SHOM already has prepared CDI metadata for its surveys in the region that are included in the CDI service. Partners NOCS and GSI are underway with preparing CDI entries for their surveys and arranging connectivity to the CDI portal. NOCS works together with BODC on preparing the CDIs and will make use of the BODC configuration. GSI has recently successfully installed their CDI connection and are making progress with preparing CDIs and converting their data sets to the agreed NetCDF (CF) format.

ATLIS and MARIS are contacting the Hydrographic Offices to get improved metadata for the composite DTMs (and CDIs for underlying surveys if possible) that have been provided by

the Hydrographic Offices of Norway, Denmark, Germany, Netherlands and Belgium for the North Sea area. So far MARIS has given a presentation at the Dutch HO and also discussed matters with the Danish HO, expecting a follow-up.

Note: If the SeaZone and UKHO/MCA negotiations will lead to no result then the UK sector will be unrepresented by any data other than GEBCO and from the Geological Survey of Ireland (GSI).

3.4.2 the Channel and Celtic Sea

Except for the still missing data sets as indicated in the previous paragraph by SeaZone / UKHO for the English part of the Channel and the waters between Ireland and the UK there has been gathered already in the first year a lot of high resolution survey data from NERC cruises, SHOM, IFREMER and the extensive mapping programme of the GSI.

In the reporting period no more new data sets have been gathered. However NERC and GSI are making good progress with preparing CDI metadata for their survey data. For the SHOM and IFREMER surveys already CDI metadata had been produced and these are included in the EMODNET Hydrography CDI discovery and data access service.

3.4.3 the Western Mediterranean, the Ionian Sea and the Central Mediterranean Sea

Already in the first year good progress had been made with data gathering for the Western Mediterranean and the Central Mediterranean Sea. Also CDI metadata were produced for all SHOM and IFREMER surveys in the Mediterranean Sea.

In the reporting period activities have focused on concluding subcontracts with CNR ISMAR for an improved DTM according to EMODNet specifications for the Tyrrhenian Sea and with OGS RIMA for a comparable task for the Ionian Sea.

IEO has made progress with the outstanding action to produce metadata descriptions for each of the composite DTMs that it had provided and CDI metadata for the underlying surveys. For the CDIs it appears difficult to retrieve the tracklines for the non-IEO surveys, but IEO is getting the polygon coverages. Moreover IEO has refined and harmonised the composite DTMs. The metadata for the composite DTMs and CDIs for the surveys will be imported soon in the EMODNet services. The revised composite DTMs with their metadata descriptions will be transferred to IFREMER for inclusion in the next release of the regional DTM.

The image below gives an overview of the different data sources compiled by IEO. IEO is considering to organise an Iberian Workshop for improved engagement of Spanish data providers, also looking at the extension to the Atlantic and Gulf of Biscaye areas.

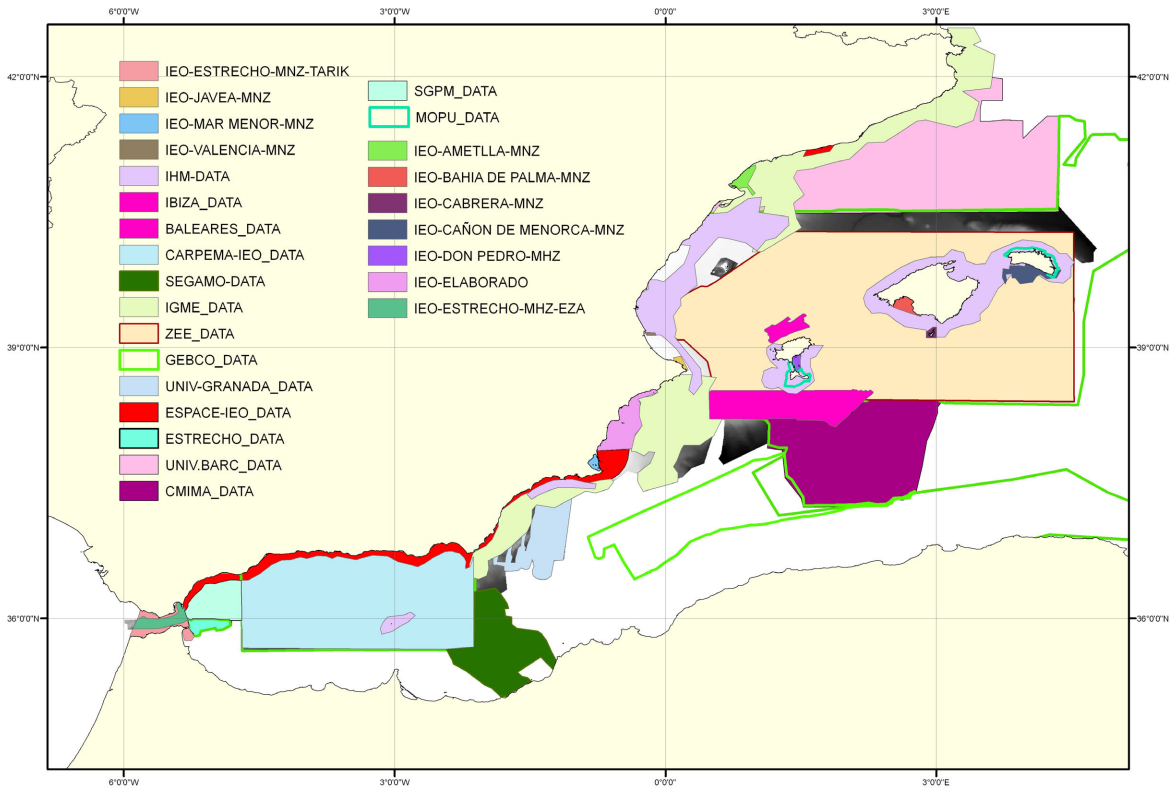


Image: Overview of Spanish data sources compiled by IEO

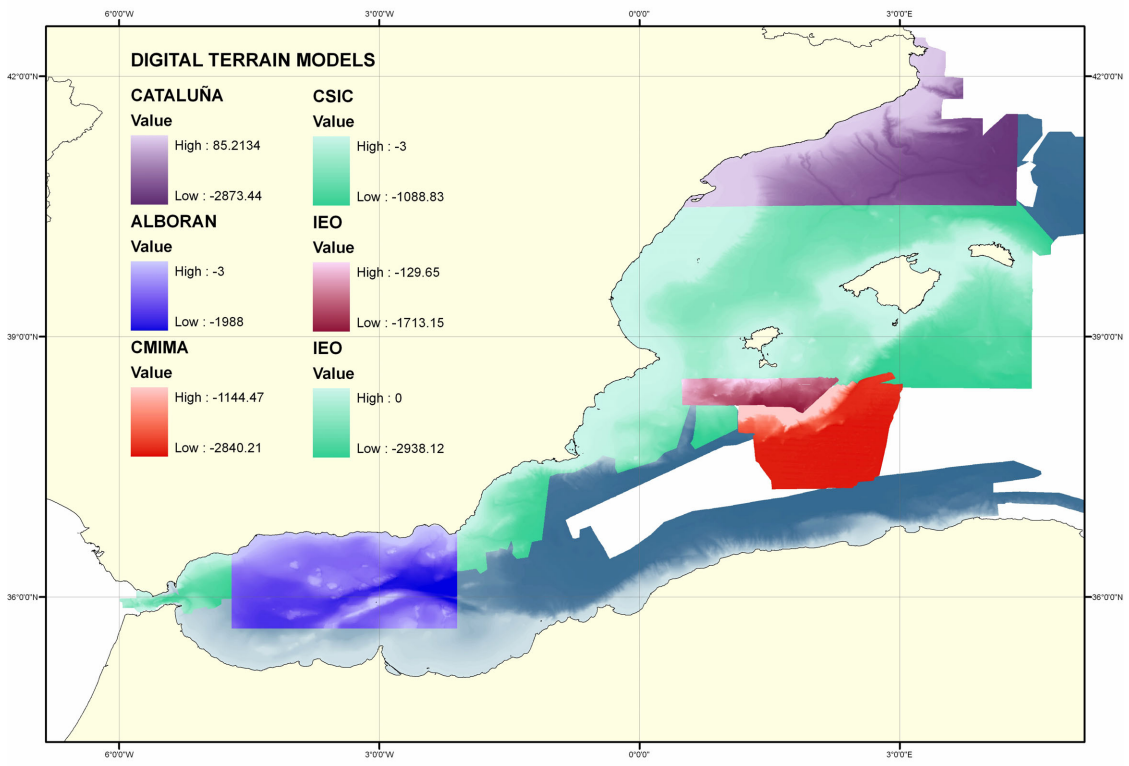


Image: Revision and improved harmonisation of composite DTMs by IEO

4. WP3: QC/QA AND PRODUCING DIGITAL TERRAIN MODELS

The objectives of WP3 are:

- To validate and to harmonise the quality of all hydrographic data sets
- To generate a Digital Terrain Model (DTMs) per region of the waterdepth
- To generate accuracy and reliability indicators

In the first year a guideline titled "Guidelines for metadata, data and DTM QA/QC, Version 1.4, April 2010, has been produced by IFREMER, SHOM, NOC and ATLIS for EMODNET Hydrography that is available from the public website. It describes how partners have to quality control data sets and how to produce the values for the grid cells of the DTM using available data sets, composite DTMs or GEBCO.

The parameters per gid cell have been chosen to allow the widest use of the DTM together with an evaluation of the accuracy of the interpolated values from observed data.

For areas covered by soundings, the depth parameters to be delivered for each DTM grid cell have been defined and agreed as follows :

- Mininum cell water depth
- Maximum cell water depth
- Average cell water depth
- Standard deviation of cell water depth
- Number of values used for interpolation of cell water depth

In addition, and to take into account the heterogeneous data sources, the following is also provided:

- Number of elementary surfaces used to compute the average cell water depth
- Average water depth smoothed by means of a spline function
- An indicator of the offsets between the average and smoothed depth (as a % of the water depth).

Furthermore each grid cell contains an identifier indicating the source material used for the computation of the water depth:

- the source dataset whose soundings are the most frequently representeded in the cell ie the Local_CDI_ID associated to the description of the dataset in the CDI discovery service
- the source composite data set used to fill the cells without soundings when this data set is better than GEBCO. This ID will allow to find the description of the composite data set
- the GEBCO reference

Later in the project additional indicators will be included for the purpose of documentation, in particular:

- the age of the youngest and oldest sounding in each grid cell, expressed by year of survey.

However, the fact that some data providers have opted for delivering composite data products which are not based on the same specifications (and in some cases on specifications not really well known) limits the possibility to give an estimate of the accuracy over the entire DTM.

Preparations are underway for the 3 maritime regions to improve the regional DTMs using additional acquired data sets, adding full parameters to each grid cell and also by improving the composite DTMs that are used for specific sub areas. Where possible, data providers are

requested to reproduce the composite DTMs for their sub area following the EMODNet specifications and methodology.

To improve the overall consistency a number of measures have been defined in the recent months:

- For partners that are interested, IFREMER is providing a free licence to the Caraibes software by which they can produce the DTM in the EMODNet way.
- IFREMER is organising a Workshop early December 2010 for interested partners to give training in the use of the Caraibes system and the EMODNet QA/QC methodology.
- IFREMER has formulated and distributed to all partners an intercalibration test case for a specific area in the Med Sea whereby IFREMER also supplied a set of survey data to be used. Partners were invited to produce a composite DTM for the test area following the agreed QA/QC methodology and to deliver the results to IFREMER for validation. This is ongoing.

4.1.5.4 Inconsistencies between data sources

The use of composite data sets of various sources may result in inconsistencies at the limits of their respective coverage as the ways data have been processed vary from one source to another. It may not be possible to correct the resulting offsets between data sources. While it is important to be able to identify these offsets and to preserve in the target DTM the results from the sources, they can introduce artificial morphologic features which can preclude the use of the DTM for several applications .

Therefore it is decided to produce also a DTM with :

- depth smoothed by means of a spline function.
- the offset related to the average water depth (%)

This approach will be applied for the new release of the regional DTMs which will be published by May 2011. This "smoothed" DTM will be available as an extra layer next to the normal DTM.

4.2 Production of 3 Regional Digital Terrain Models (DTM's) and further planning

The first year per maritime region a regional DTM has been generated following the defined principles. This was released in May 2010 folowed by a second improved release in June 2010. This version is available in the Hydrography portal at present.

ATLIS has done a thorough check of the DTM and came accross a number of small errors. Some DTM points were missing in the global DTM for the areas of GSI and NOC because of differences (GSI has applied resolution of 0,005 arc minute; NOCS has 0,0041; the agreed resolution was: 0,00416667). This is solved by ATLIS by regridding to make an even grid and secure data values for all DTM points. During this effort ATLIS also took care that for all data of the HO's of Germany, Denmark, Netherlands and Belgium statistical values have been calculated and included for all their provided data.

The next release of the overall regional DTMs is planned as follows:

- February 2011: Release of composite DTMs including parameters by all responsible partners
- March 2011: Integration and finetuning of composite DTMs into regional DTMs including parameters
- April 2011: Transfer to ATLIS for import into central DTM portal
- May 2011: Release of new versions for the maritime regions.

5. WP4: TECHNICAL DEVELOPMENT AND OPERATION OF PORTAL

The objectives of WP4 are:

- To develop and launch the EMODNET website and portal services
- To keep the website and portal services operational, including monitoring

The EMODNET Hydrography website runs at http://www.emodnet-hydrography.eu . The website is maintained via an online Content Management System. It gives background information about the project. Moreover it provides access to the developed services:

- The CDI data discovery and access service
- The Hydrography data products viewing service

The EMODNET Hydrography website provides various services and functionalities to users for viewing and downloading the hydrographic data products. The central integrated EMODNET DTM and the CDI metadatabase provide the basis databases, on which the user applications are provided. The Hydrographic viewer portal for viewing and retrieving the digital bathymetry layers is embedded in the Hydrography website via a link and extra tab / new browser window. The Hydrographic viewer portal also communicates with the CDI discovery service to submit and follow-up requests by users for possible access to the background survey data sets.

The functionality of the portal and services and their interoperability have been fine tuned in the reporting period.

The following image gives an overview of the architecture of the 3 web components that together serve the users.

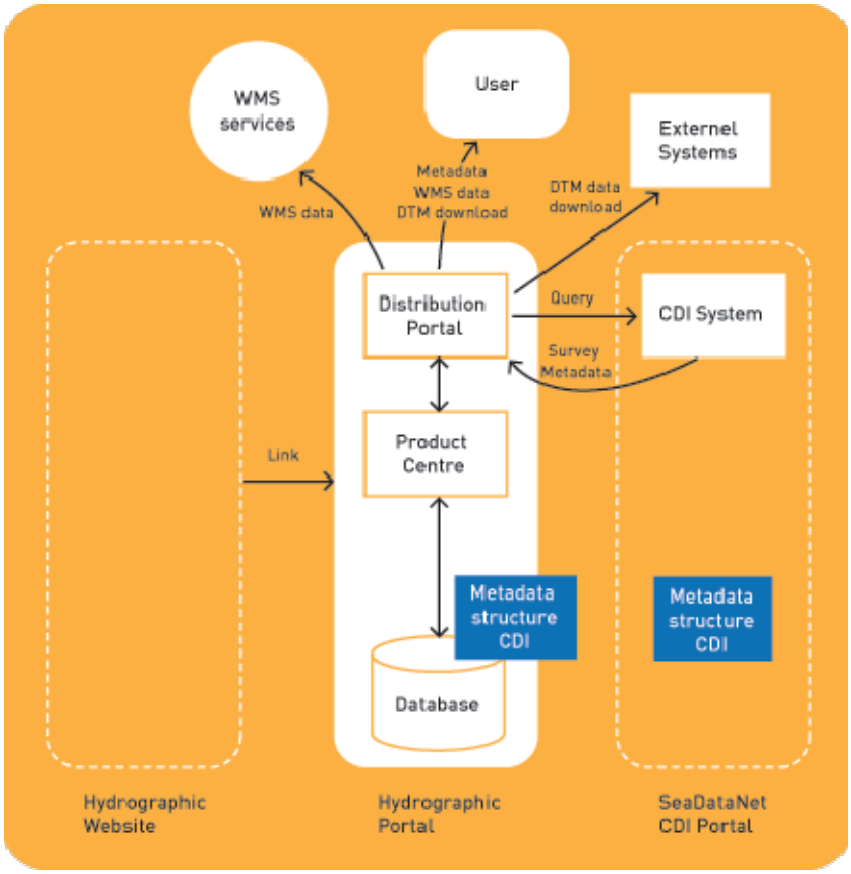
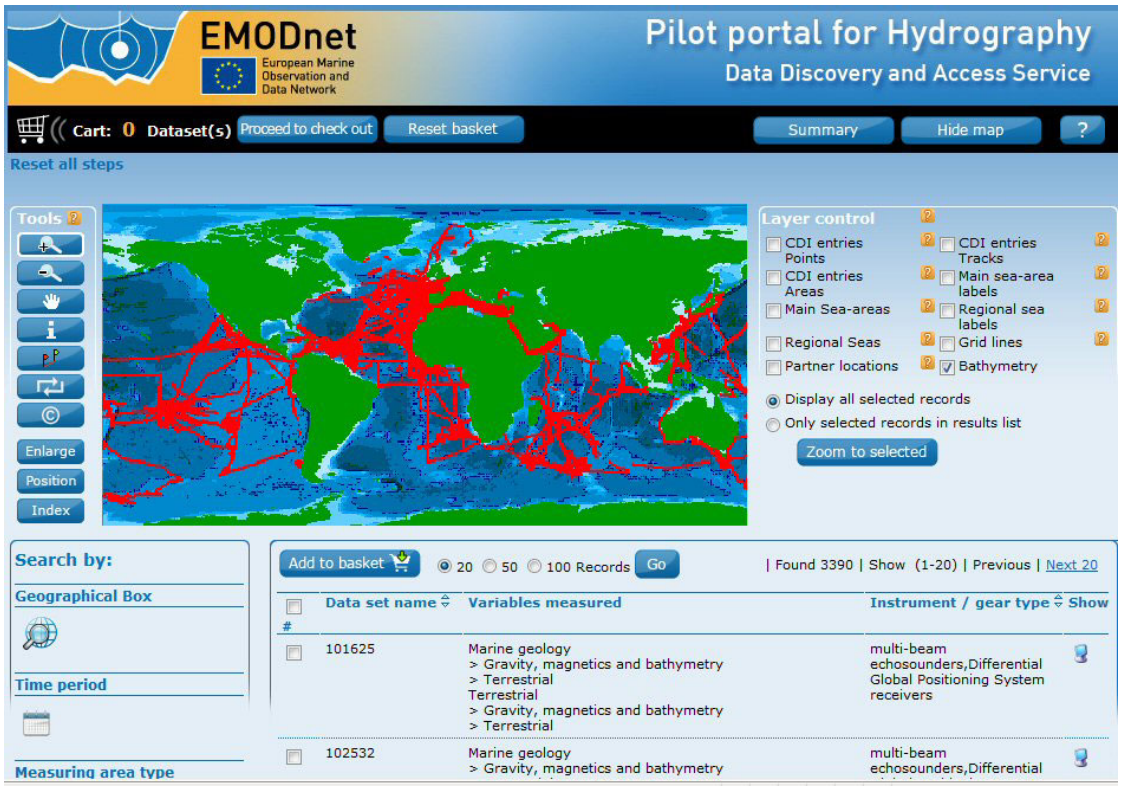
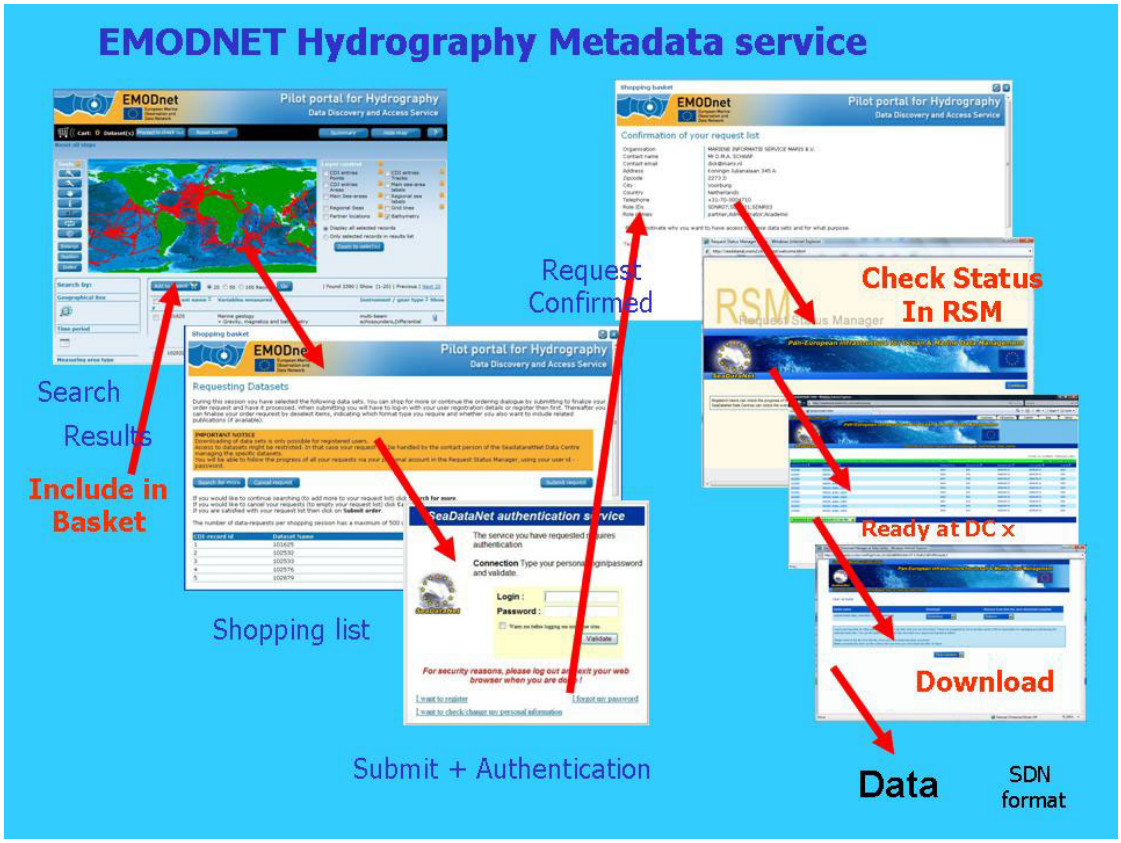


Image: Architecture of portal



Images: the CDI data discovery and access service for querying and requesting access to bathymetric surveys that are managed by distributed data providers



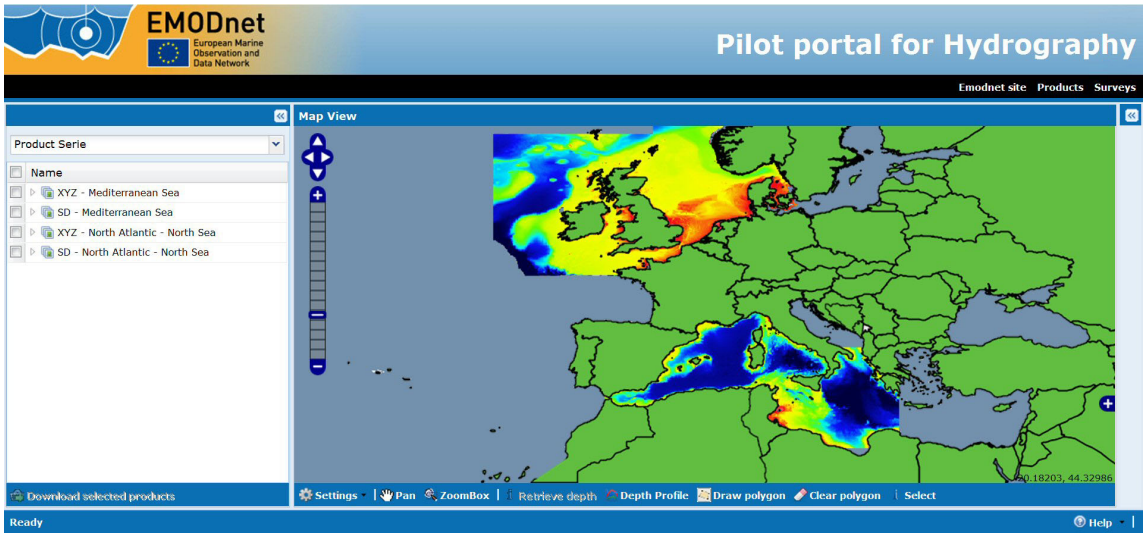


Image: Opening screen of the EMODNET Hydrography viewing service with functions for zooming, panning, making a cross section and retrieving the depth profile, setting the GIS layers, adding external WMS service layers, downloading tiles and searching metadata of surveys and composite data sets.

The actual downloading of the digital bathymetry takes place on pre-processed files, that cover specific tiles. This is done because of the size of the DTM data sets. Users are able to download DTM tiles in a number of formats. For the moment downloading is already possible in ASCII CSV and Fledermaus SD file formats. The latter can be used with the free Fledermaus software for 3-D visualising of downloaded data sets. Soon also downloading of files in ESRI ASCII, NetCDF (CF), and GeoTIFF formats will become available.

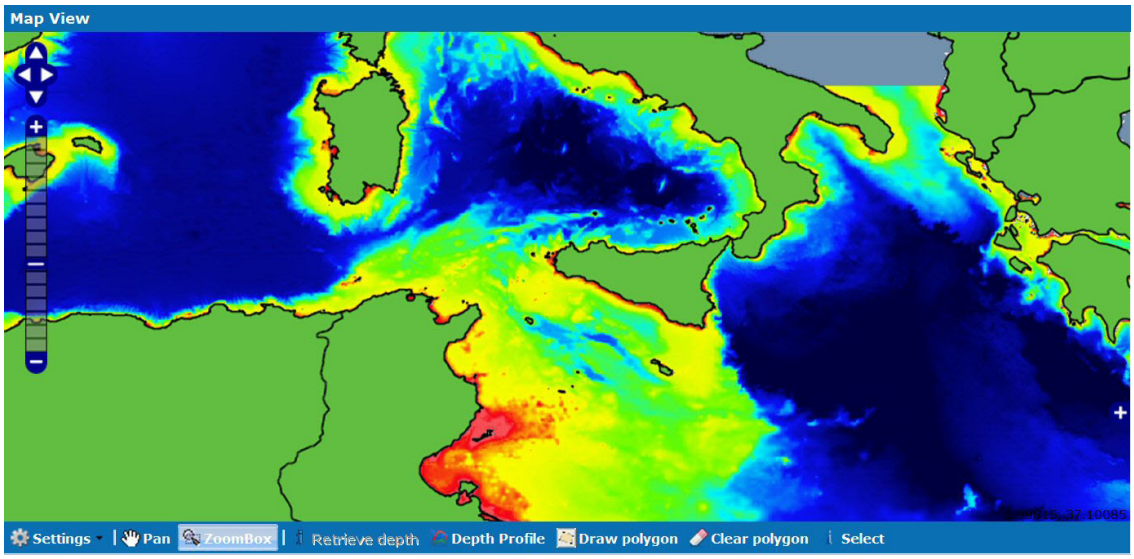


Image: Zoom in for the Mediterranean Sea

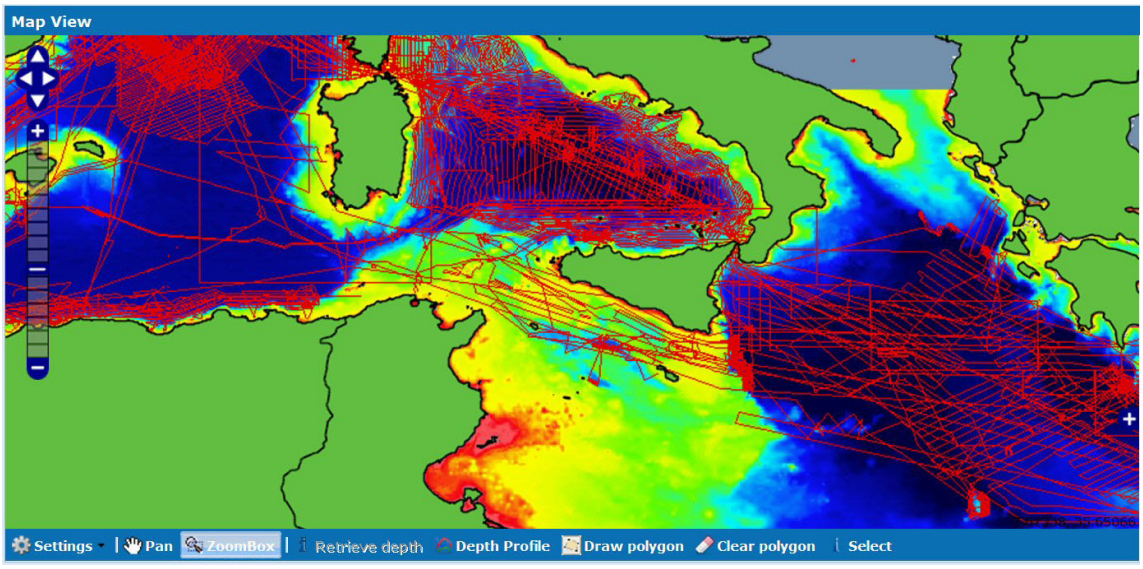


Image: Zoom in Mediterreanean Sea with overlay of CDIs of used surveys by means of WMS

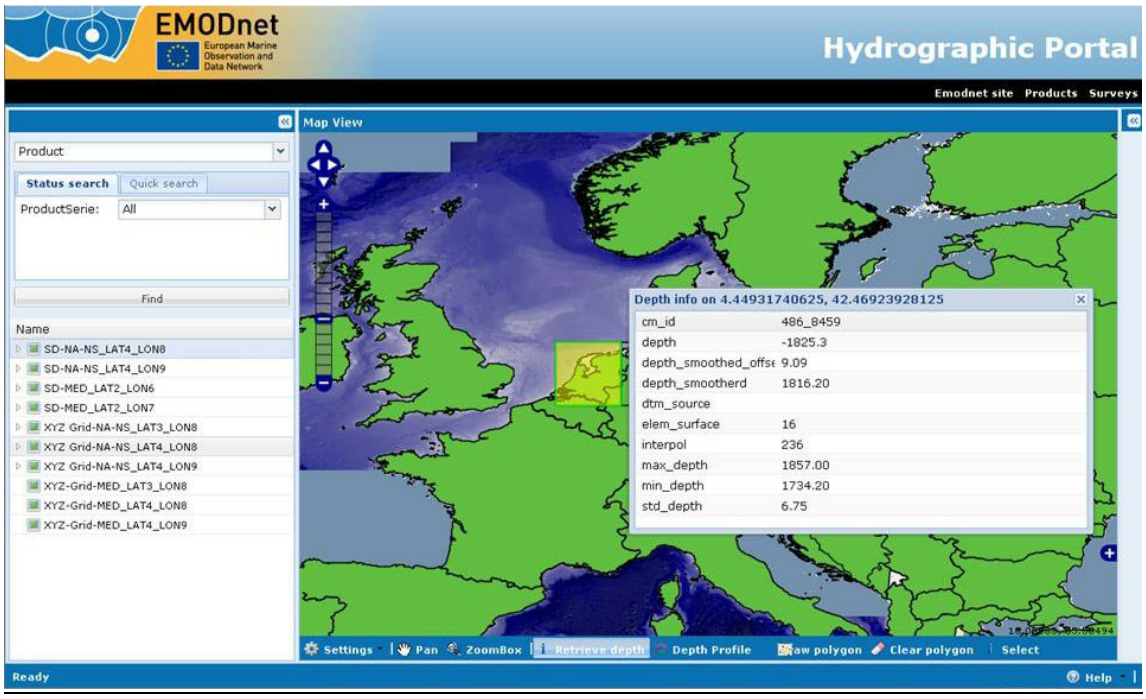


Image: Retrieve depth info parameters of a grid cell

Interoperability:

The GIS layers in the Hydrographic viewing service can be shared as OGC WMS services with other EMODNET portals and beyond (e.g. WISE-Marine, European Atlas of the Seas, SeaDataNet). Also WMS layers from other EMODNET portals can be added to the Hydrography viewer.

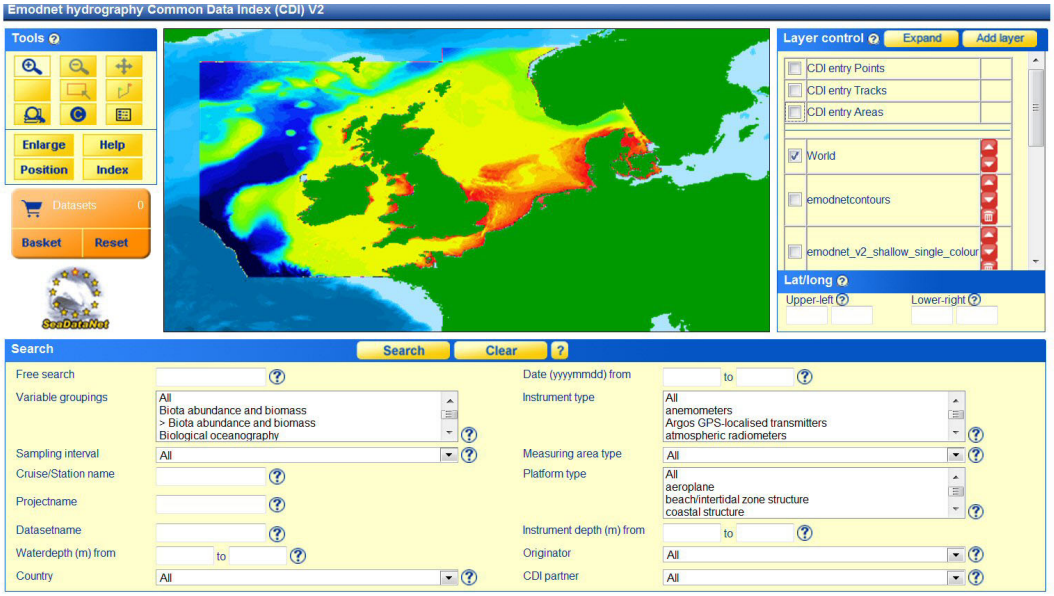


Image: Digital bathymetry added to the SeaDataNet CDI service by means of WMS

There is also a WMS service for the CDI metadata. This is illustrated in the image by importing the CDI WMS layer into the Hydrography portal.

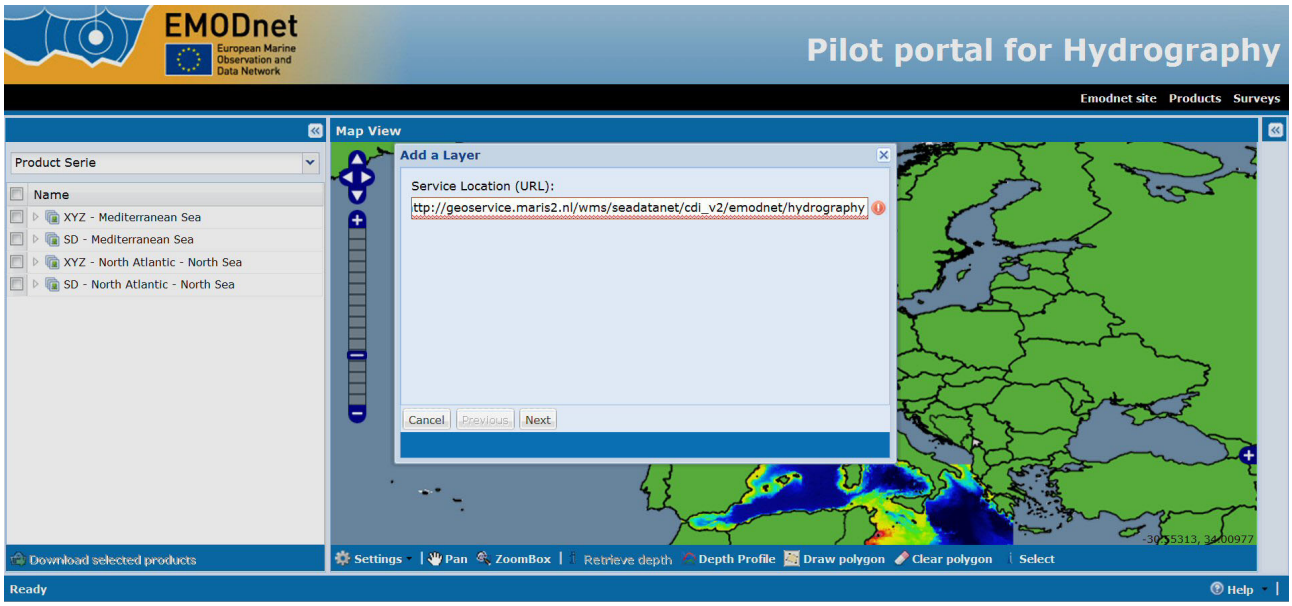


Image: importing a WMS layer into the Hydrography portal

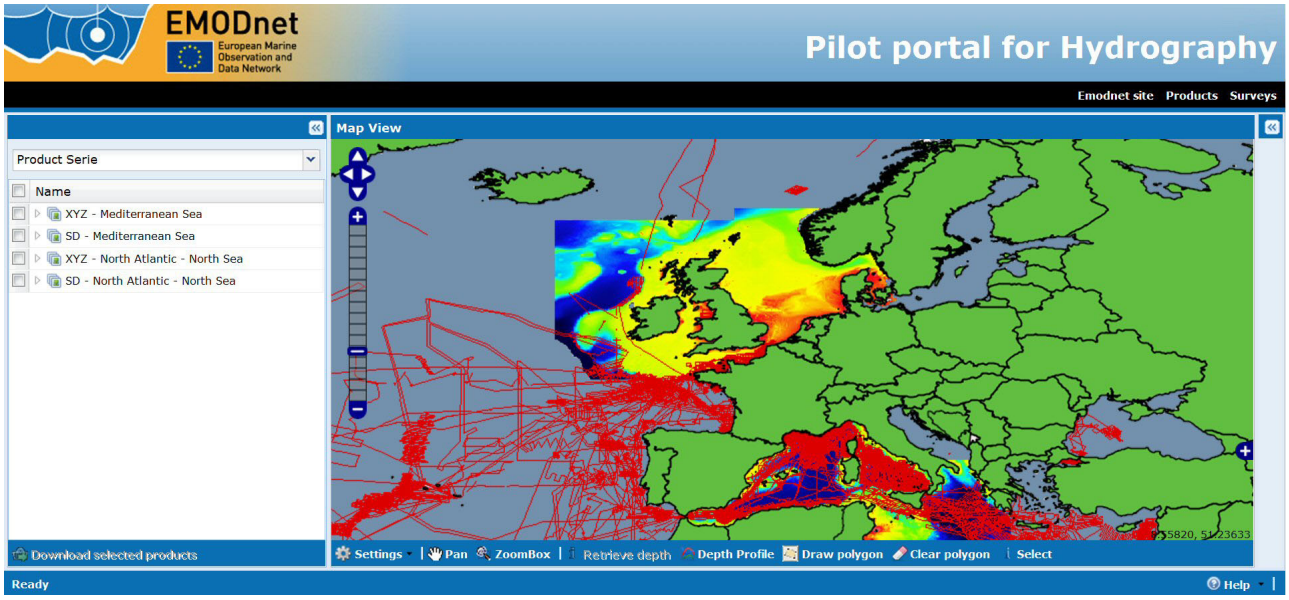


Image: CDI WMS layer imported into the Hydrography portal

Compatibility with INSPIRE

The Hydrography services are fully compliant with INSPIRE as follows:

- Discovery – Viewing – Access services for retrieving survey data sets
- All viewers based upon OGC WMS standards
- CDI Metadata profile based upon ISO 19115 standards
- Downloadable data sets and data products are available in NetCDF (CF) format

6. USER FEEDBACK

The EMODNet Hydrography website has a central contact form by which users can give feedback. So far not many people have given feedback. Also maybe because most of the activities so far have focused on the development of the portal and its services. Therefore a more prominent user feedback button will be made available. All feedback provided is sent to the EMODnet Hydrography team for their evaluation.

Project team partners have been engaged in using and testing the portal and providing their feedback for improving the services. All services are also provided with a help function to explain the extensive functionality of the services and how to use these. Most functions are easy to understand but there are also more complex functions which requires some preparation by users reading the manual.

User Statistics are registered for the EMODNet Hydrography website and CDI data discovery and access service:

Month	**Unique visitors**	**Number of visits**	**Pages**	**Hits**
Jan 2010	21	34	325	1170
Feb 2010	30	59	556	1556
Mar 2010	74	130	1033	4068
Apr 2010	87	167	1633	7672
May 2010	128	269	7768	29901
Jun 2010	138	266	4605	16771
Jul 2010	130	221	2216	8596
Aug 2010	144	221	2402	10419
Sep 2010	161	295	2865	12743
Oct 2010	181	343	4668	16147
TOTALS	**1094**	**2005**	**28071**	**109043**

Furthermore statistics are gathered for the use of the Hydrography product service for users visiting the digital bathymetry and downloading the bathymetry in tiles.

Activity by Month

Month	Hits	Page Views	Visitors	Bandwidth (KB)
Jul 2010	310	226	34	58,547
Aug 2010	745	433	40	558,282
Sep 2010	1,023	186	64	1,110,503
Oct 2010	2,738	239	82	3,474,035
Total	**4,816**	**1,084**	**220**	**5,201,368**

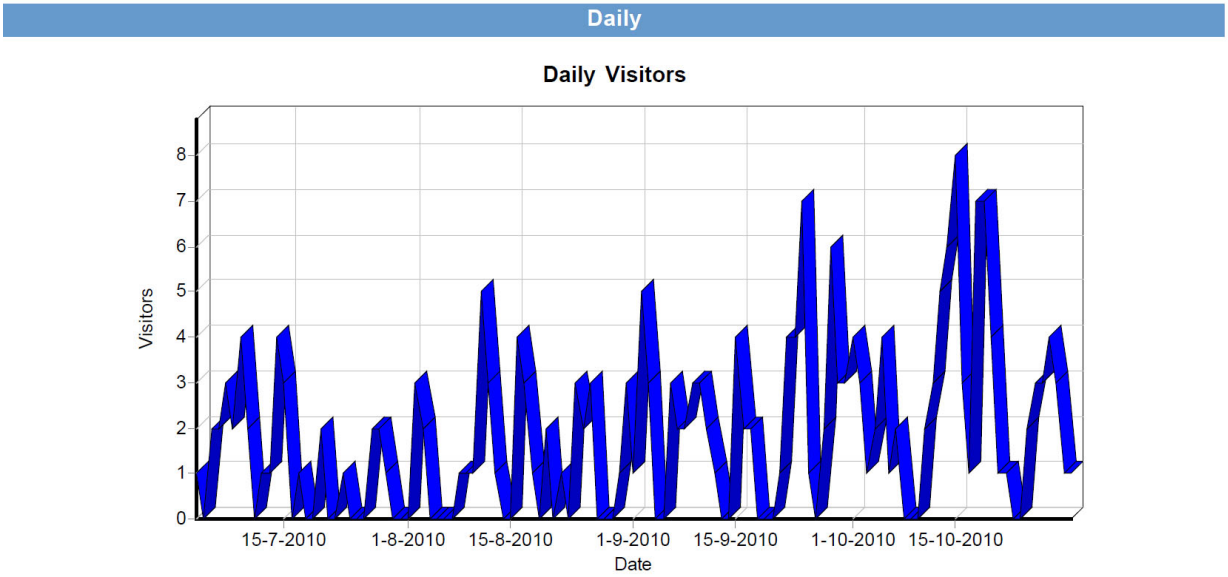


Image: Statistics of users visiting the Hydrographic Product Service

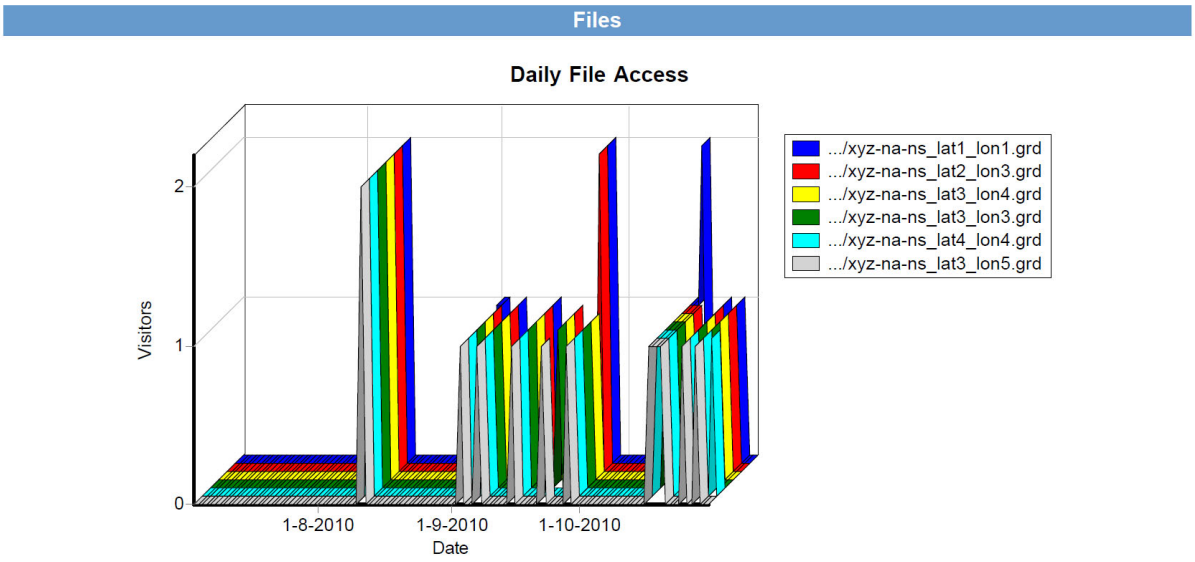


Image: Statistics of Hydrographic Product Service – data downloads

7. DEVIATIONS

There are no major deviations.

8. REFERENCES:

- Documentation: 5.00; Common Data Index (CDI); Version 1.6; Metadata Format; 10 June 2010 with XML Schema, XLS description of all XML tags and XML examples (see http://www.seadatanet.org/standards_software)
- MyOcean Product Catalogue, based upon CAMIOON (see http://www.myocean.eu.org/products-services/catalogue.html)
- Guidelines for metadata, data and DTM QA/QC, Version 1.4, April 2010, produced by IFREMER, SHOM, NOC and ATLIS for EMODNET Hydrography
- Wessel,P. and Smith, W.H.F. (1996), 'A global self-consistent, hierarchical, high-resolution shoreline database', Journal of Geophysical Research, Vol.101, No B4, p8741-8743, April 10, 1996
- The General Bathymetric Chart of the Oceans (GEBCO) (see http://www.gebco.net)