# EMODnet Thematic Lot n° 1 - Bathymetry

7th Bi-monthly Report

Reporting Period: 01/01/2015 – 28/02/2015

Date: 10/03/2015

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# 1. Highlights in this reporting period

*Provide a short summary of the key achievements and/or events of interest to a wider audience within this reporting period you wish to highlight – this can be based on the indicators or any other of the reporting sections.*

- The overall compilation and integration of the new EMODnet DTM has been finalised and a new version has been published at 5th February 2015. The new DTM is a significant step forward, because there is now a full European coverage and also the resolution of the overall DTM has been increased from ¼ * ¼ arc minutes to 1/8 * 1/8 arc minutes, which corresponds to circa 230 * 230 meters. This also implicates that the sheer volume of data has increased to 1.092.115.678 data points (28.799 rows x 37.922 columns).
- The publishing of the new DTM has been combined with the launch of an upgraded Bathymetry Viewing and Downloading service. Therefore the DTM database has been successfully migrated from Oracle to PostgreSQL 9.3 RDBMS and for the GIS use is made of the latest version of GeoServer in combination with OpenLayers 3 for the user interface. Following the user evaluation report as made by the EMODnet secretariate several improvements have been implemented which make the service even more easy for use.
- The Bathymetry Viewing and Downloading service has been extended with several new layers, such as a seamless land-sea integration of Open Street Map WMS and inclusion of land topography WMS with comparable resolution as the new DTM (1/8 * 1/8 arc minutes). This gives the user a much better experience when viewing the new DTM because the land – sea transition is now smooth, while in the previous version it was more abrupt and with visible grid edges.
- The 3rd EMODnet Bathymetry Progress Meeting took place in Brest – IFREMER at 21th – 22nd January 2015 to discuss the finalisation and publishing of the new DTM and Viewer Service. Also known anomalies were discussed and a way forward for further improving the methodology and agreeing on a planning for the next DTM release by summer 2015. This planned release will then also include 3 high resolution coastal DTMs as part of the contract.
- The group of data providers has been extended with the University of Malta that has signed a subcontract to contribute to the next DTM with additional survey data sets near Malta. Further deliberations are ongoing with potential other data providers.

# 2. Meetings held since last report

*List here the meetings held since the last bi-monthly report, if relevant add short description*

*[Provide information in table - Maximum 1 page]*

| Date | Location | Topic | Short Description |
|---|---|---|---|
| 21 – 22 January 2015 | Brest, France | 3rd Project Group meeting | Meeting with rrepresentatives of all partners to discuss:<br>• Finalisation and publishing of new DTM and upgraded Viewer<br>• How to improve further the methodology<br>• Planning for next release, including HRDTMs<br>• Planning of more promotion and dissemination |
| | | | |

# 3. Work package updates

*Using the work package as a header list here the activities that occurred since the last bi-monthly report. If there was no activity to report leave the section blank.*

*[Provide information - Maximum 1/2 page per workpackage]*

## *WP0 – Project Management:*

The project coordinator has monitored, evaluated and controlled the overall progress of the project and its activities towards its objectives. Regular emails have been drafted and circulated to partners to remind them of actions and planning as well as to get information on progress and possible issues, that required solving. Project coordinator has organised the 3rd Project Group meeting which was held 21 – 22 January 2015 in Brest – France at IFREMER. Following the meeting the Coordinator has prepared and circulated a detailed Action list from the meeting to keep momentum and all informed. Bi-monthly progress report for November – December 2014 has been prepared.

## *WP1 – Data collection and metadata preparation for all marine basins:*

Further progress has been made with expanding the data collections in the CDI and SEXTANT catalogue services. The operational CDI service for EMODnet Bathymetry now contains 13265 entries from 26 data centres from 17 countries. The number of composite DTMs in the Sextant directory has stabilised at **44** Sextant entries. MARIS and IFREMER have provided support to guide partners where needed and to handle new submissions.

## *WP2 – QC/QA and producing Digital Terrain Models for the basins:*

In the previous reporting period the regional coordinators had re-produced a compiled bathymetric product for each of the regional basin areas from all the data sets contributed by the data providers, using the GLOBE software. Thereafter all regional coordinators had transfered their regional DTMs to GGSgc for overall integration into the new EMODnet DTM. In this period GGSgc has finalised the overall QA/QC and integration which was a great effort, because several steps had to be undertaken by GGSgc to take out or to smooth abrupt discontinuities, in particular in areas with considerable water depth differences between survey data and GEBCO. The final result is impressive and is now live available at the EMODnet Bathymetry website for viewing and downloading. From this and by closer inspection still a number of anomalies have been left behind. At the last Project Group meeting agreement was reached on improving the EMODnet Bathymetry methodology including further upgrading of the GLOBE software with a re-gridding module which will help to harmonise better individual survey data sets before moving to the regional integration. The new EMODnet DTM will also be integrated by GEBCO in the GEBCO 2015 DTM which will give an extra closer look at identifying remaining anomalies and at smoothing the transgression between survey based and GEBCO based

DTM cells. This will contribute to a further refining of the next EMODnet DTM release which is planned for summer 2015 as follows:

- Upgrading of GLOBE software – before end February 2015
- Review and upgrading of local survey data sets by data providers, including adding new data sets where possible, using GLOBE software – before mid April 2015
- Finalising high resolution DTMs for 3 coastal areas – before mid April 2015
- Regional integration of all data (surveys and Composite DTMs) contributions by regional coordinators – before end May 2015
- Overall integration and validation by GGSGc and MARIS of new EMODnet DTM and integrating into the portal for publishing, including integration of the 3 coastal HRDTMs – around summer 2015

## *WP3 – Integration and inclusion of the DTMs in the portal:*

GGSgc has finalised rendering the new resulting DTM to GIS layers for inclusion in the EMODnet Bathymetry Viewing and Download service. Considering the volume of data, the rendering has taken several weeks of computer time. The DTM GIS layers have been redefined and a number of extra layers has been added, such as Open Street Map WMS for land geography, a detailed topography WMS for land DEM, and inclusion of GEBCO Undersea Features WMS. Special attention has been given in the viewing to a seamless transition between land and sea, using the highly detailed OSM as coastline. The detailed topography WMS is used underneath the OSM geography to give the terrain and a smooth transition from land to sea. These actions largely improve the attraction for users and remove abrupt discontinuities in the coastal zones. It is a pure visual effect because the DTM not yet has coverage in the coastal zone.

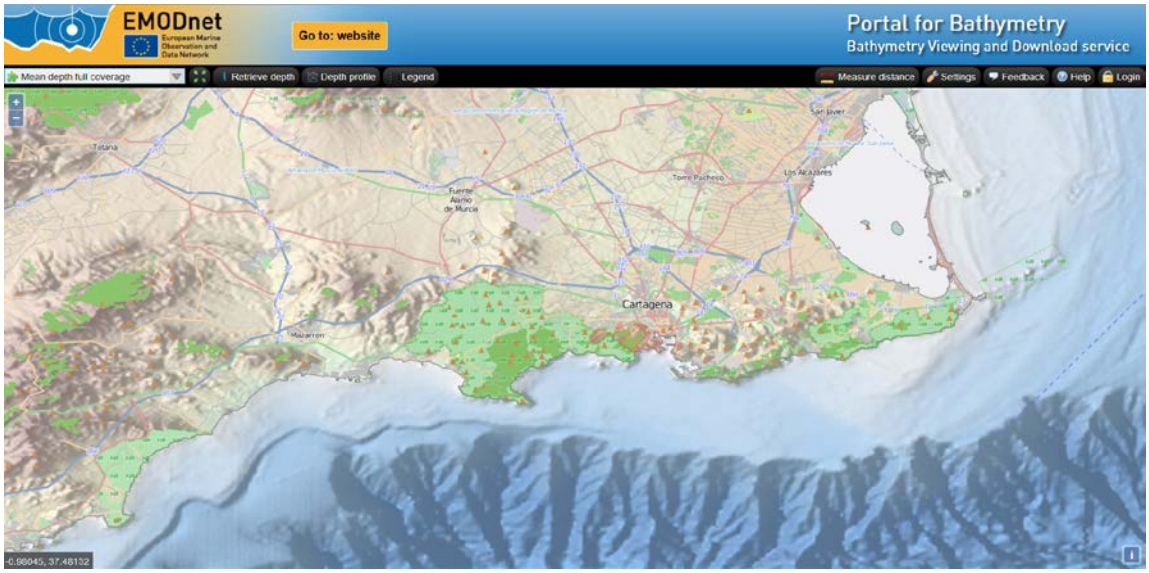


Illustration land – sea transition and topography - geography

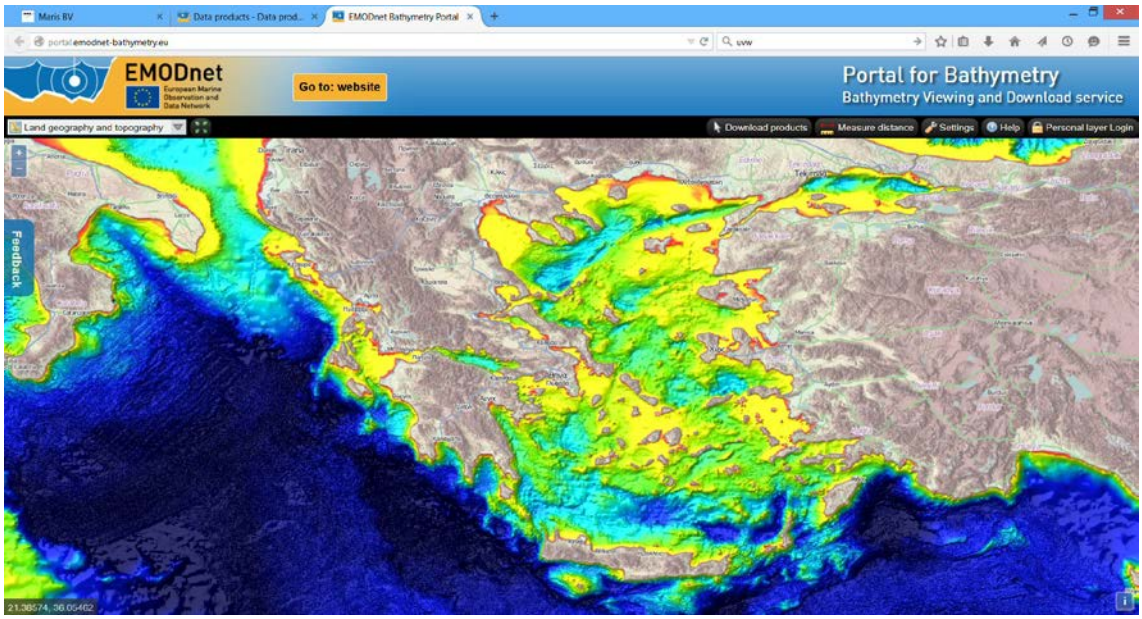


Illustration detailed bathymetry for Greek waters in rainbow style colour ramp.

The launch and publishing of the new DTM has taken place at 5th February 2015.

## *WP4 – Technical development and operation of portal:*

MARIS and GGSgc have worked further on improving the overall EMODnet Bathymetry portal and the functionality of the Bathymetry Viewing and Download service, upgrading a number of functions as already agreed in the proposal and in response to the suggestions and findings of the portal review report as received from the EMODNet Secretariate. The upgrading has been finalised by the launch of the new DTM.

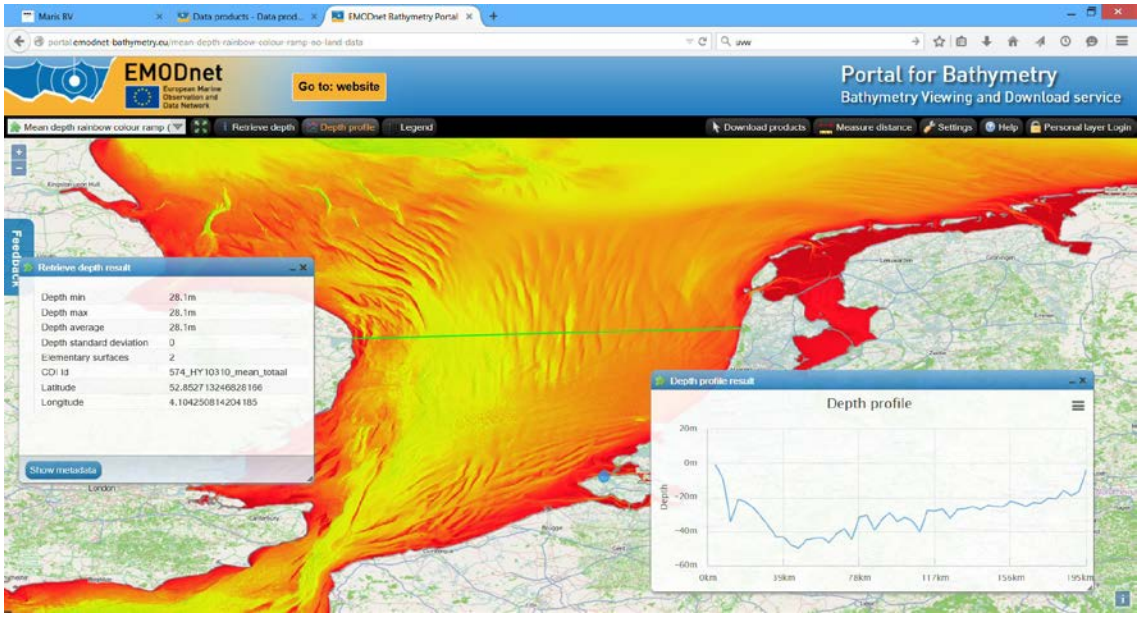

Illustration looking up waterdepth info and new depth transect function

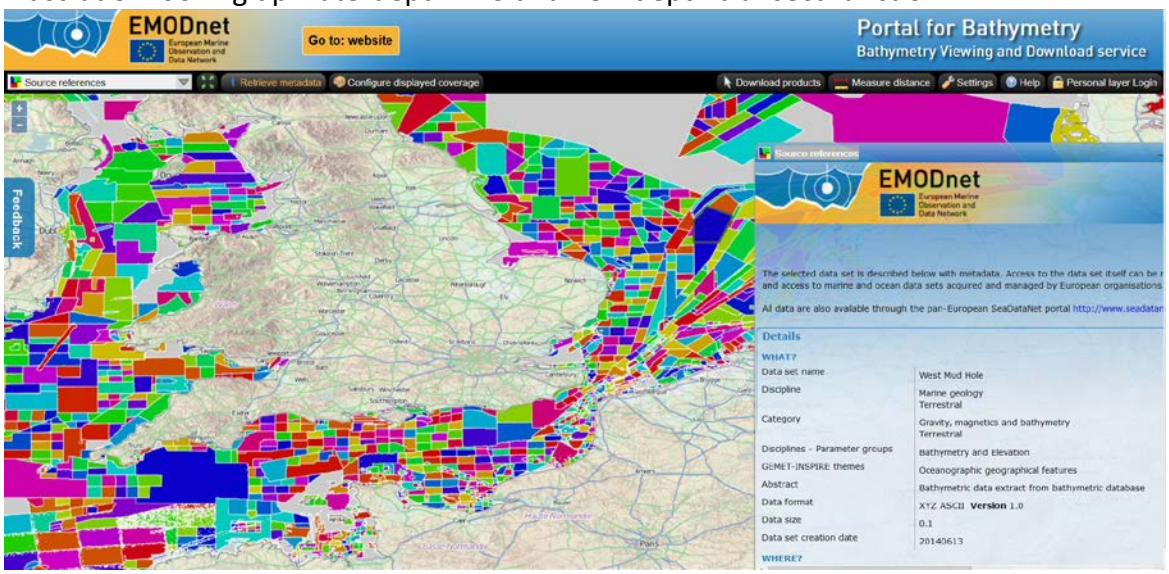


Illustration of new sources layer including CDI reference pop-up

GGSgc has migrated the Viewing service to a new open source platform and has improved for example the depth transect function, the sources layer by having polygons for every CDI and Composite DTM giving extra options for metadata query and calculating surface coverage, and the downloading of DTM tiles. All layers are now provided with Alt text help and the overall help section has been revised. The new service has been launched together with the new EMODnet DTM at 5th February 2015.

## *WP5 – Analysis and evaluation:*

Nothing to report.

# 4. Specific challenges or difficulties encountered during the reporting period

*Please list specific problems you have encountered during this period, including related to technical and data provision issues*

A real challenge has been the validation and handling of the large volume of data points for the new EMODnet DTM. The resolution is 1/8 * 1/8 arc minutes and that means 4 times as high as the previous EMODnet DTM. Together with a large area expansion for including all European seas the total volume is now 1.092.115.678 data points (28.799 rows x 37.922 columns) which required a lot of human and computertime for validating the DTM cells and rendering the different GIS layers. Note: the worldwide GEBCO contains 933.120.000 data points (21.600 rows x 43.200 columns).

Another challenge has been the merging of data from different origins, such as from surveys and GEBCO, where no surveys are available. Differences in water depths have more impact due to the higher resolution. In particular individual soundings from single beams in deeper water appear as needles of a few pixels, while in the earlier resolution these effects would have been filtered by averaging. Most have these have been filtered out in a central postprocess. Further improvements in methodology and GLOBE software have been discussed and agreed at the recent Project Group meeting. This will contribute to a further refinement of the next DTM.

# 5. User Feedback

*List any useful feedback you received on your portal, your activities or those of other EMODnet projects/activities. Also provide any suggestions you have received for EMODnet case studies and/or future products/activities/events.*

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

| Date | Name | Organization | Type of user feedback (*e.g. technical, case study etc)* | Response time to address user request |
|---|---|---|---|---|
| 15 – 1 - 2015 | Fernando Tempura | JRC | Discussion about source references layer | Answer at 26 – 1 - 2015 |

Annex 1 gives more details.

# 6. Outreach and communication activities

*Please list all the relevant communications activities or products you have developed/executed during this period (including presentations, lectures, trainings, demonstrations and development of communication materials such as brochures, videos, etc.). Relevant scientific and/or popular articles you know have been published using/referring to EMODnet should be reported under indicator 11 in Section 7.*
*[Provide information in table - Maximum 1 page]*

| Date | Media | Title | Short description and/or link to the activity |
|---|---|---|---|
| | | | |
| | | | |
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At the 3rd Project Group meeting a number of actions have been formulated for outreach and promotion. These will be given a follow-up:

- Include Sextant entry for EMODnet DTM product and including DOI + CDI refs by MARIS and IFREMER
- Prepare 3D animation ( Italian vulcanoes) needed by EMODnet Secretariate for movie
- Draft and submit an article in EOS magazine of AGU
- Press release of new DTM to Hydro International
- Arrange an article in International Innovation
- Arrange an article in Hydro International Magazine
- Arrange a paper in Computer Geoscience magazine
- Inclusion of EMODnet DTM in ESRI Global Basemap
- Inclusion of EMODnet WMS in European Atlas of the Seas
- Seek dialogue with industry via IOGP
- Promotion at Ocean Business by poster
- Presentation in GEBCO TSCOM/ SCRUM
- Seek cooperation and further involvement of IHO

# 7. Updates on Progress Indicators

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

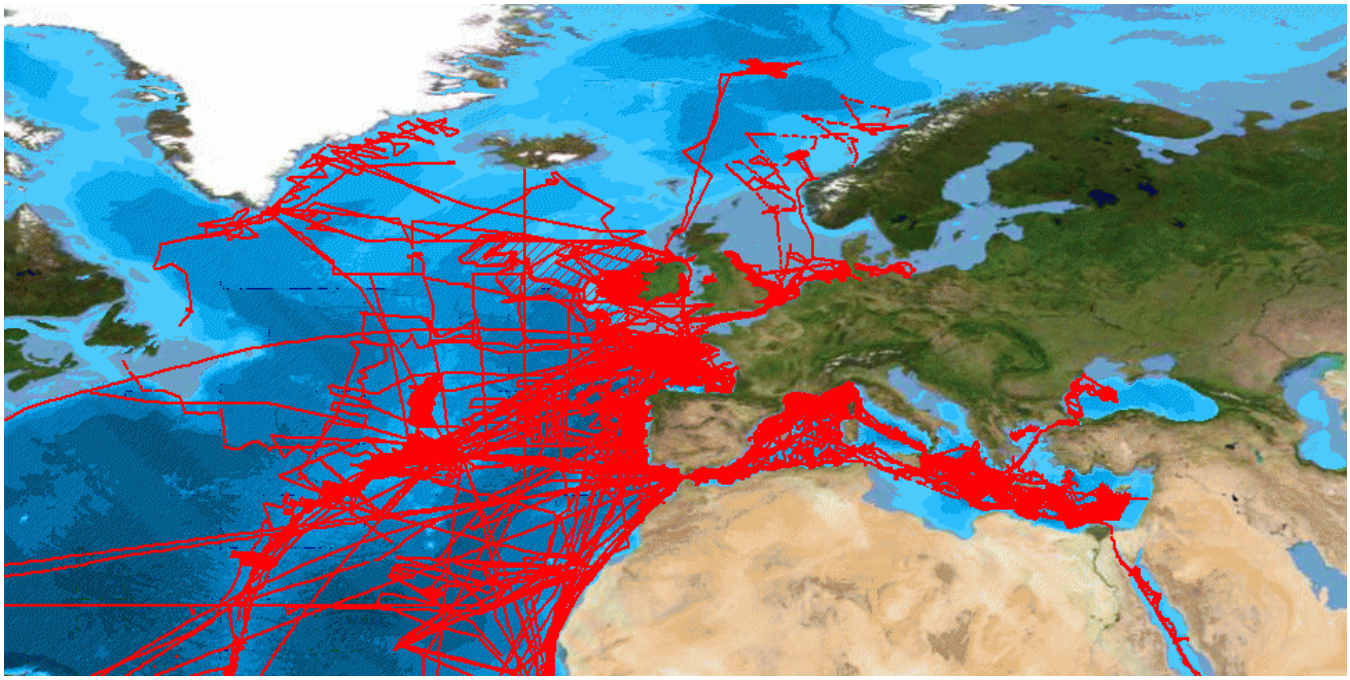
## *Indicator 1 - Volume of data made available through the portal*

The total number of CDIs for bathymetric survey data sets has increased from: **11313 to 13265**

The total in production covers the whole globe. Specifically relevant for European waters has increased from: **8194 to 10141**

Lat Long box**: N80, W-30 ; N20, E45**

Of these **576** are unrestricted, while all other require negotiation.



Regional DTMs are available at present for the following sea regions:

- the Greater North Sea, including the Kattegat and stretches of water such as Fair Isle, Cromarty, Forth, Forties,Dover, Wight, and Portland
- the English Channel and Celtic Seas
- Western Mediterranean, the Ionian Sea and the Central Mediterranean Sea
- Iberian Coast and Bay of Biscay (Atlantic Ocean)
- Adriatic Sea (Mediterranean)
- Aegean - Levantine Sea (Mediterranean).

- Madeira and Azores (Macaronesia)

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

| Data Centre | Country | No of CDIs | No restrictions | Restrictions |
|---|---|---|---|---|
| SHOM (SERVICE HYDROGRAPHIQUE ET OCEANOGRAPHIQUE DE LA MARINE) | France | 4464 | 0 | 4464 |
| OceanWise Limited | United Kingdom | 1961 | 0 | 1961 |
| Rijkswaterstaat Centrale Informatievoorziening | Netherlands | 1684 | 0 | 1684 |
| IFREMER / IDM/SISMER | France | 712 | 279 | 433 |
| IHPT, Hydrographic Institute | Portugal | 274 | 0 | 274 |
| Royal Netherlands Navy, Hydrographic Service | Netherlands | 266 | 0 | 266 |
| Geological Survey of Ireland | Ireland | 136 | 136 | 0 |
| Management Unit of North Sea and Scheldt Estuary Mathematical Models, Belgian Marine Data Centre | Belgium | 93 | 93 | 0 |
| British Oceanographic Data Centre | United Kingdom | 83 | 53 | 30 |
| Flemish Ministry of Mobility and Public Works; Agency for Maritime and Coastal Services; Coastal Division | Belgium | 78 | 0 | 78 |
| Hellenic Centre for Marine Research, Hellenic National Oceanographic Data Centre (HCMR/HNODC) | Greece | 76 | 0 | 76 |
| IEO/Spanish Oceanographic Institute | Spain | 66 | 0 | 66 |
| Institute of Marine Science (ISMAR) - Bologna | Italy | 65 | 0 | 65 |
| Hydrographic Institute of the Navy | Spain | 58 | 0 | 58 |
| NIOZ Royal Netherlands Institute for Sea Research | Netherlands | 30 | 0 | 30 |

| | | | | |
|---|---|---|---|---|
| OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale), Infrastructures Division | Italy | 23 | 0 | 23 |
| Bulgarian National Oceanographic Data Centre(BGODC), Institute of Oceanology | Bulgaria | 16 | 0 | 16 |
| German Oceanographic Datacentre (NODC) | Germany | 15 | 0 | 15 |
| OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale), Division of Oceanography | Italy | 10 | 0 | 10 |
| UNEP/GRID-Arendal | Norway | 8 | 0 | 8 |
| Marine Technology Unit. Mediterranean Marine and Environmental Research Centre | Spain | 6 | 0 | 6 |
| Jardfeingi, the Faroe Islands Earth and Energy Directorate | Faroe Islands | 5 | 0 | 5 |
| Portuguese Institute of Ocean and Atmosphere | Portugal | 4 | 0 | 4 |
| Institute of Marine Sciences. Mediterranean Marine and Environmental Research Centre (CMIMA-ICM-CSIC). Department of Marine Geology | Spain | 4 | 0 | 4 |
| SC Marine Research SRL | Romania | 2 | 0 | 2 |
| National Institute of Marine Geology and Geoecology | Romania | 2 | 0 | 2 |

These centres are government and research institutes. No industry (yet).

## *Indicator 3 - Organisations that have been approached to supply with no result, including type of data sought and reason why it has not been supplied.*

The Danish Geodata Agency was a subcontractor in the EMODnet Bathymetry bid, but so far DGA has not signed the subcontract. Therefore there is no permission (yet) to use the composite DTM data sets for the Danish waters as earlier used for the present EMODnet DTM. Negotiations have not resulted in any change of DGA's standpoint.

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

Time period 1 January 2015 – 28 February 2015:

**CDIs:**

No of CDI basket transactions: **10**
No of CDIs requested: **166**
Different users: **9**
Different data centres: **10**

**Data products – DTMs:**

Till 5th February 2015: previous release

| Tile | Downloads |
|---|---|
| Aegean-Levantine Sea | 361 |
| Greater North Sea | 379 |
| Adriatic-Ionion Sea - C.Mediterranean | 387 |
| Celtic Seas | 355 |
| Bay of Biscay - Iberian Coast | 371 |
| West Mediterranean | 365 |
| Madeira | 319 |
| Azores | 318 |
| | **2855** |

After 5th February 2015: new release with 16 equal tiles

| Tile | Downloads |
|---|---|
| B3 | 362 |
| C3 | 281 |
| D4 | 205 |
| C4 | 196 |
| B4 | 183 |
| B2 | 178 |
| C2 | 138 |
| D3 | 133 |
| A4 | 66 |
| A2 | 58 |

| | |
|---|---|
| A3 | 52 |
| D2 | 45 |
| B1 | 29 |
| C1 | 29 |
| D1 | 27 |
| A1 | 25 |

**2007**

**Formats – whole period**

| Format | Downloads |
|---|---|
| ESRI ASCII | 1507 |
| XYZ | 999 |
| GeoTiff | 1091 |
| NetCDF | 443 |
| CSV | 371 |
| SD | 207 |
| NetCDF (without GEBCO) | 99 |
| EMO | 91 |
| EMO (without GEBCO) | 54 |

**4862**

## *Indicator 5 - Organisations that have downloaded each data type*

| | |
|---|---|
| University of Sevilla | Spain |
| Intacta | Spain |
| ASCSA | Greece |
| Universidad de A Coruña | Spain |
| Swansea University | United Kingdom |
| SHOM | France |
| Autoritat Portuaria de Balears | Spain |
| Individual | Greece |
| CSIC | Spain |

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

Time period 1 January 2015 – 28 February 2015:

Bathymetry main portal:

| Month | Unique visitors | Number of visits | Pages | Hits | Bandwidth |
|---|---|---|---|---|---|
| Jan 2015 | 1,199 | 2,366 | 25,138 | 75,329 | 2.87 GB |
| Feb 2015 | 1,567 | 2,725 | 28,218 | 98,671 | 3.42 GB |

Visitors in February 2015:

**Hosts (Top 10)** - Full list - Last visit - Unresolved IP Address

| Hosts : 1,236 Known, 512 Unknown (unresolved ip) 1,567 Unique visitors | Pages | Hits | Bandwidth | Last visit |
|---|---|---|---|---|
| 84.41.108.220 | 1,202 | 1,206 | 15.45 MB | 27 Feb 2015 - 15:29 |
| unknown.shom.fr | 968 | 1,960 | 192.97 MB | 25 Feb 2015 - 09:48 |
| a83-163-127-252.adsl.xs4all.nl | 721 | 2,843 | 71.22 MB | 23 Feb 2015 - 16:43 |
| ucaip142.uca.es | 671 | 763 | 5.33 MB | 26 Feb 2015 - 08:40 |
| cable-77-221-25-240.dynamic.vinet.ba | 460 | 485 | 6.04 MB | 25 Feb 2015 - 15:36 |
| usr.s.cmcc.bo.it | 439 | 1,328 | 40.93 MB | 25 Feb 2015 - 14:13 |
| a82-95-67-170.adsl.xs4all.nl | 437 | 915 | 20.31 MB | 25 Feb 2015 - 15:23 |
| 101.red-88-21-188.staticip.rima-tde.net | 417 | 575 | 73.78 MB | 09 Feb 2015 - 21:53 |
| dica-fw.polimi.it | 401 | 500 | 4.04 MB | 13 Feb 2015 - 11:25 |
| c-24-9-157-81.hsd1.co.comcast.net | 361 | 831 | 17.98 MB | 25 Feb 2015 - 05:51 |
| Others | 22,141 | 87,265 | 2.99 GB | |

Bathymetry DTM viewer service:

| Month | Unique visitors | Pages | Hits | Bandwidth |
|---|---|---|---|---|
| Jan 2015 | 1,490 | 2,153 | 5,695 | 62.39 GB |
| Feb 2015 | 2,592 | 4,440 | 8.155 | 215.479 GB |

**Hosts**

**Top Hosts**

| | Host | Country | Hits | Visitors | Bandwidth (KB) |
|---|---|---|---|---|---|
| 1 | 199.19.249.196 | United States | 76 | 44 | 1,099,573 |
| 2 | 212-55-59-22.vinnuligt.cpe.olivant.fo | Faroe Islands | 64 | 38 | 742,597 |
| 3 | unknown.shom.fr | France | 101 | 36 | 3,310,327 |
| 4 | user.vliz.be | Belgium | 67 | 29 | 1,172,480 |
| 5 | a83-163-127-252.adsl.xs4all.nl | Netherlands | 78 | 25 | 1,367,891 |
| 6 | ns504861.ip-192-99-149.net | United States | 45 | 24 | 495 |
| 7 | 84-255-240-134.static.t-2.net | Slovenia | 24 | 20 | 97,909 |
| 8 | IP-193-33-2-113.mde.es | Spain | 35 | 16 | 826,967 |
| 9 | crawl-77.66.121.243.findxbot.com | Denmark | 46 | 16 | 213,348 |
| 10 | IP-193-33-2-114.mde.es | Spain | 42 | 15 | 538,112 |
| 11 | smtp-out.navionics.com | Italy | 121 | 15 | 5,322,058 |
| 12 | uxtwc304.brunel.ac.uk | United Kingdom | 37 | 15 | 98,052 |
| 13 | 161.54.134.253 | Sweden | 29 | 14 | 195,609 |
| 14 | 212.189.167.221 | Italy | 41 | 13 | 2,246,291 |
| 15 | a79-169-36-145.cpe.netcabo.pt | Portugal | 36 | 13 | 396 |
| 16 | 134.36.154.190 | United Kingdom | 33 | 12 | 1,562,687 |
| 17 | a82-95-67-170.adsl.xs4all.nl | Netherlands | 19 | 12 | 488,435 |
| 18 | dw3723511266.amsterdam-tc.dataweb.net | Netherlands | 23 | 11 | 70,927 |
| 19 | nat.bo.ismar.cnr.it | Italy | 34 | 11 | 718,993 |
| 20 | ginotto.mec.uniroma2.it | Italy | 33 | 11 | 1,562,687 |

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

Nothing to report.

## *Indicator 8 - List of organisations that have downloaded data from more than one portal in a given space of time e.g. 2 weeks (assumed to be for a single project).*

Nothing to report.

## *Indicator 9 - Interoperability of data of different types and from different portals*

Nothing to report.

# *Annex 1:*

**Details of users feedback and follow-up**

**From:** Fernando Tempera

**Emailaddress:** fernando.tempera@jrc.ec.europa.eu

**Feedback:** I repeat a suggestion I have made some time ago. Please make the Source Reference layer available for download. I would simply like to estimate the percentage of coverage of the dataset derived from multibeam surveys and this is not achievable with the downloadable information. For a dataset like this, documenting the survey technique should be an associate metadata layer.

**REPLY:**

**Subject:**Re: Emodnet-Hydrography Feedback form

**Date:** Mon, 26 Jan 2015 21:33:09 +0100

**From:** Dick M.A. Schaap <dick@maris.nl>

**To:** fernando.tempera@jrc.ec.europa.eu

Dear Fernando,

On short term we will release a new EMODnet DTM and as part of that we are improving also the Source References layer by giving separate overview layers for coverage by CDIs (surveys), CPRDs (composite DTMs) and GEBCO. Those layers will have polygons. See attached overview.
Some time later we will outfit these overviews also with WFS facilitating retrieving these polygons by services. The attributes will include coverage (nm2), EDMO-code data provider, and CDI / CPRD no. Whether it is multibeam or otherwise can not provided directly from the viewer but can be restored by users through the CDI service:
http://www.emodnet-bathymetry.eu/content/content.asp?menu=0030000_000000
giving all survey CDIs and then EXPORT => csv with necessary details.

Kind regards,
Dick M.A. Schaap
Coordinator EMODnet Bathymetry