EMODnet Thematic Lot n° 0 – High Resolution Seabed Mapping (HRSM)

EMODnet Phase III

1st Trimonthly Report

Reporting Period: 20/12/2016 – 31/03/2017

Date: 03/04/2017

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Contents

1. Highlights in this reporting period

- The contract was awarded by EASME to the EMODnet High Resolution Seabed Mapping (HRSM) Consortium and signed by both parties on the 20/12/2016.

- The Technical Core Group, composed of the Project Coordinator (Shom), Technical Coordinator (MARIS) and Work package leaders, met 26 – 27 January 2017 to prepare for the coming project kick-off meeting with all project members and to discuss possible updating of the methodology, technology and production processes as used in the previous EMODnet Bathymetry project considering the new scope of the HRSM contract.

- All the HRSM consortium members gathered for the HRSM kick-off meeting 19 – 22 March 2017, where objectives, actions and commitments of all members were discussed. At the kick-off meeting also all members have been trained with the software (Mikado, Sextant, Globe) used in the project for the production of metadata, pre-processing of bathymetric data sets, and production of regional DTMs.

- The EMODnet Bathymetry portal has been upgraded with a modern and responsive design and the contents has been updated to reflect the scope of the new HRSM project. The upgraded portal has been launched at 27 March 2017 at the existing domain www.emodnet-bathymetry.eu to ensure continuity.

2. Meetings held since last report

Date	Location	Topic	Short Description
13/01/2017	Brussels, Belgium	Kick-off meeting EC - HRSM consortium	Mutual presentations from DG-MARE, EASME and Coordinators of the HRSM consortium of the objectives and contractual terms of the contract. (Minutes of the meeting are available at the extranet)
26/01/2017 and 27/01/2017	Paris, France	HRSM Technical Core Group meeting	Session with work package leaders and coordinators intended to initiate actions and to prepare the plenary meeting (Project Kick-off and Training session, see below). (Minutes of the meeting are available at the extranet)
14/02/2017 and 15/02/2017	Brussels, Belgium	EMODnet Steering Committee	Meeting held by the EMODnet secretariate. Objectives and status of the HRSM contract were presented. (Minutes of the meeting are available at the EMODnet Secretariate).
19/03/2017	Venice, Italy	HRSM Steering Committee	Session with Work Packages leaders and Coordinators discussing internal organization and procedure, International relations and closely related projects. (Minutes of the meeting are being drafted).
19/03/2017 to 22/03/2017	Venice, Italy	Project Kick off	Plenary session with representatives of all the members of the HRSM consortium. (Minutes of the meeting are being drafted).
21/03/2017 to 22/03/2017	Venice, Italy	Training Session	Software training held by IFREMER for all the members involved in the metadata, data and DTM production.

3. Work package updates

WP0 – Project Management

The HRSM project, successor to the EMODnet Bathymetry project, has been awarded by EASME on 24 November 2016 to the EMODnet HRSM consortium, and signed by both parties on the 20 December 2016 after arranging requested evidences. The Kick-off meeting between coordinators (Shom and MARIS) of the consortium, EASME and DG-MARE took place in Brussels on 13 January 2017, where scope of the technical tender, deliverables, administrative and financial maters have been acknoweledged by all the parties. Partners and subcontractors composing the consortium have been informed of the success of the tender, while a draft consortium agreement (for full partners) and subcontractor agreement (for subcontractors) have been prepared and proposed for validation and signature. The Technical Core Group, composed of Coordinators and Work package leaders, met 26 – 27 January 2017 to prepare for the coming project kick-off meeting with all project members and to discuss possible updating of the methodology, technology and production processes as used in the previous EMODnet Bathymetry project considering the new scope of the HRSM contract. Minutes and action list of the meeting have been prepared and included in the extranet for sharing with all project members. Invitation, agenda and logistics for the kick-off meeting with all project members have been arranged. The HRSM kick-off meeting took place 19 – 22 March 2017 with presentations of Coordinators, WP leaders, Regional DTM leaders and specific experts to introduce and discuss the workplan and expected actions. All presentations have been included in the extranet while minutes and list of actions are being drafted. At the kick-off meeting also all members have been trained with the software (Mikado, Sextant, Globe) used in the project for the production of metadata, pre-processing of bathymetric data sets, and production of regional DTMs. The training was undertaken to refresh capabilities of existing members and to introduce the methodology and software tools to new members.

WP1 – Bathymetric data collection and metadata compilation for all maritime basins

During the Venice kick-off meeting, all the partners holding bathymetric data have presented their contribution for the present contract, along with potential new datasets that will be added. They have been instructed and trained in the software tools and services made available by the project and to be used for the production of metadata (Mikado), pre-processing of their data sets (GLOBE) and production of regional DTMs (GLOBE). Prior to the kick-off meeting the GLOBE software has been updated to suit the updated methodology for pre-processing bathymetric survey data sets. See also WP2. All data providers are now tasked to get more familiar with the software tools and services and

to start the process of preparing their datasets and related metadata entries for the CDI and Sextant catalogue services.

WP2 – QA-QC, data processing and producing Digital Terrain Models for the basins

The global methodology remains similar to the one applied in the previous EMODnet Bathymetry phase. However at the kick-off meeting the Workpackage leader has introduced improvements of the methodology that are needed to incorporate elements related to the higher resolution, refining the quality indicator and the extent towards higher latitudes (Arctic waters). Following this brainstorming session a small group headed by the Workpackage leader are now working on updating the methodology. The results of this work will lead to a new version of the production documentation on short term which then might require also some updating of the software tools which are used for WP1 activities. Possible updated software should be made available to the consortium during the second trimester of 2017 in order not to delay WP1 activities for populating the CDI and Sextant catalogue services with new and revised data entries.

WP3 – Integration and inclusion of the DTMs into the portal

Integration of the regional basin DTMs that will ultimately generate the overall DTM has also been discussed during a brainstorming session at the kick-off meeting. The related production methodology using GLOBE will also be reviewed in WP2. This software updating, mainly dedicated to capabilities deicated to regional basin coordinators, will take place towards the end of the year.

WP4 – Technical Development & Operation of portal, tools and services:

A new EMODnet Bathymetry portal has been launched at the existing domain www.emodnet-bathymetry.eu on 27 March 2017. The contents has been updated to reflect the scope and challenges of new High resolution Seabed Mapping (HRSM) phase and its extended consortium compared to the previous EMODnet Bathymetry phase. The design and layout of the portal have been upgraded to provide a modern look and include responsive design for dynamic support of the portal on multiple platforms. Further work is planned for upgrading the various services (CDI and Sextant catalogue services and the Bathymetry Viewing and Download service) to fit the new look & feel and to include responsive design. Also developments of extra functionality have started, especially with respect to browser embedded 3D visualisation of the EMODnet DTM. Also actions have been initiated to prepare for the future integration of the newly planned HRSM gridded DTM in the Bathymetry Viewing and Download service considering higher resolution, increasing numbers of metadata entries, multiple resolutions, and expanding download options. Moreover the analysis for the cloud computing pilot at the Datarmor computing center has started.

WP5 – Coastlines, legal baselines and vertical reference levels:

The approach for this Workpackage for determining coastlines and intertidal zones, as detailed in the tender proposal, is based primarily on the intersection of bathymetric DTM and topographic DEM with modeled tidal levels. The results of this approach will then be reviewed by national partners. Tests with existing data from selected partners will be undertaken to fine tune this methodology. Validation, comparison techniques and techniques to fill gaps using satellite data will also be developed. This approach has been thoroughly discussed with all partners during the kick-off meeting. The Workpackage leader prompted all the data producers to provide topographic/bathymetric data at the best resolution available for coastal areas (as deliverables of WP1). Considering legal baselines, each data contributor has been asked to provide national sources of information (file or preferably web service). The result of the workpackage for this part will provide an inventory of existing baselines without attempting to resolve existing legal disputes as this is out of scope and capability of EMODnet.

WP6 – Outreach, helpdesk and evaluation

Thanks to the success of the previous EMODnet Bathymetry phase there is lot of interest and lots of users for the portal. The new HRSM project benefits from this for its outreaching activities which promote both the EMODnet Bathymetry DTM results along side with the new challenges and ongoing activities of the High Resolution Seabed Mapping (HRSM) Consortium. Chapter 6 gives a list of participations of consortium members in conferences, papers and other outreaching activities. User questions received and answered through the helpdesk are detailed in chapter 5 and Annex 1.

Moreover, benefiting from the previous EMODnet Bathymetry activities, EMODnet HRSM is well engaged in multiple active international collaborations (International Hydrographic Organisation (IHO), General Bathymetric Chart of the Ocean (GEBCO), US National Oceanographic and Atmospheric Agency (NOAA) through the Atlanctic Ocean Research Aliance (AORA)). This has been expanded with cooperation with the International Bathymetric Chart of the Arctic Ocean (IBCAO) as part of the HRSM approach for the arctic waters. Finally during the kick-off meeting, members of the consortium, with relations to other EMODnet thematic consortia (i.e. Habitat mapping and Geology) have been appointed to ensure strong relationships at the technical level.

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

Nothing to report.

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.

Note: because of contingency in reporting feedback is included since the final report of EMODnet Bathymetry (end August 2016)

Date	Name	Organization	Type of user feedback (*e.g. technical, case study etc)*	Response time to address user request
2016-09-05	Ayfer Karli	?	Question about registration	Two days later
2016-09-15	Pierre MENSAN	EDF	Question about vertical reference levels	Six days later
2017-02-08	Marie Windstein	Aix-Marseille Université, France	Problem with downloading DTM tiles	Same day
2017-02-14	Julian Krönert	?	Problem with downloading DTM tiles	Next day
2017-03-08	Ögmundur Erlendsson	ISOR, Iceland	Question about wrecks	Two days later
2017-03-23	Marco Guerrini	UCC, Ireland	Question about WCS service	One day later
2017-03-27	Marco Guerrini	UCC, Ireland	Question about MSL – LAT conversions	Same day

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 9 in Section 7.

Note: because of contingency in reporting feedback is included since the final report of EMODnet Bathymetry (end August 2016)

Date	Media	Title	Short description and/or link to the activity
2016-10-04	Presentation at INMARTECH 2016, Bergen-Norway	SeaDataNet – EMODnet - building a pan-European infrastructure for marine and ocean data and data products + Importance of standards	Web link : Presentation by MARIS
2016-11-23	Article at IFREMER website	A la découverte du relief marin européen grâce à EMODnet Bathymetry	Web link : Article by IFREMER
2016-12-15	Presentation at AGU 2016, San Francisco - USA	EMODnet Bathymetry - building and providing a high resolution digital bathymetry for European seas	Web link : Presentation by MARIS
2017-03-01	Press release at Hydro International website	*UK Input into EMODnet Phase 3 High Resolution Seabed Mapping Project*	Web link : Press release by OceanWise
2017-03-08	Presentation at 7th ODIP II Workshop, Hobart - Australia	EMODnet – Bathymetry	Web link : Presentation by MARIS
2017-03-08	Article in EOS magazine	Airline Flight Paths over the Unmapped Ocean	Web link : Article by Shom together with NOAA

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.

Note: because of contingency in reporting feedback is included since the final report of EMODnet Bathymetry (end August 2016)

Indicator 1 - Volume of data made available through the portal

The total number of CDIs for bathymetric survey data sets has increased from **14791 to 14857.**

The total in production covers the whole globe. Specifically relevant for European waters has increased to: **11572.**

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

Of these **932** are unrestricted, while all other require negotiation.
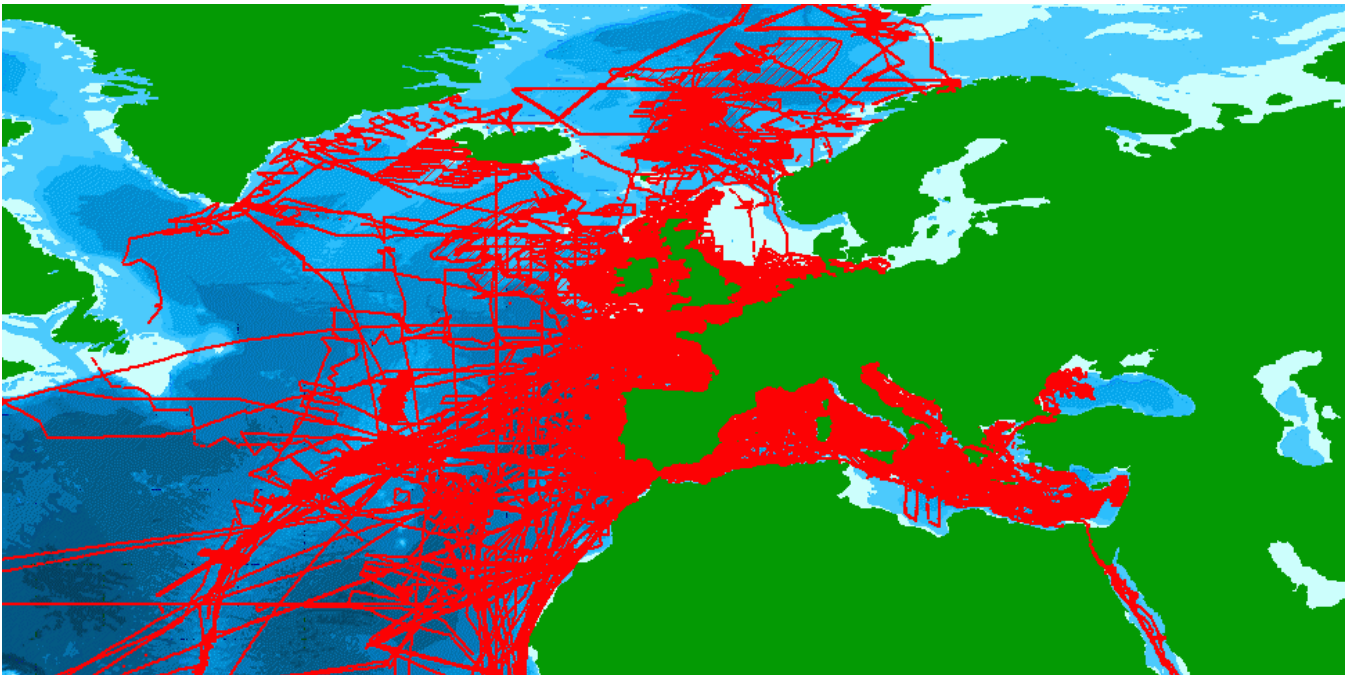
The EMODnet DTM covers all European sea regions.

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	France	4651	0	4651
Rijkswaterstaat Centrale Informatievoorziening	Netherlands	2165	0	2165
OceanWise Limited	United Kingdom	2066	0	2066
IFREMER / IDM / SISMER - Scientific Information Systems for the SEA	France	729	292	437
Royal Netherlands Navy, Hydrographic Service	Netherlands	313	0	313
IHPT, Hydrographic Institute	Portugal	275	0	275
German Oceanographic Datacentre (NODC)	Germany	256	256	0
Flemish Ministry of Mobility and Public Works; Agency for Maritime and Coastal Services; Coastal Division	Belgium	248	0	248
Geological Survey of Ireland	Ireland	223	223	0
British Oceanographic Data Centre	United Kingdom	100	68	32
Management Unit of North Sea and Scheldt Estuary Mathematical Models, Belgian Marine Data Centre	Belgium	93	93	0
Hellenic Centre for Marine Research, Hellenic National Oceanographic Data Centre (HCMR/HNODC)	Greece	76	0	76

CNR, Institute of Marine Science (ISMAR) - Bologna	Italy	73	0	73
IEO/Spanish Oceanographic Institute	Spain	66	0	66
Hydrographic Institute of the Navy	Spain	58	0	58
Portuguese Institute of Ocean and Atmosphere	Portugal	54	0	54
NIOZ Royal Netherlands Institute for Sea Research	Netherlands	30	0	30
OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale), Infrastructures Division	Italy	24	0	24
Bulgarian National Oceanographic Data Centre(BGODC), Institute of Oceanology	Bulgaria	20	0	20
OGS (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale), Division of Oceanography	Italy	10	0	10
GRID-Arendal	Norway	10	0	10
National Institute of Marine Geology and Geoecology	Romania	9	0	9
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
Institute of Marine Sciences. Mediterranean Marine and Environmental Research Centre (CMIMA-ICM-CSIC). Department of Marine Geology	Spain	5	0	5
International Ocean Institute - Malta Operational Centre (University Of Malta) / Physical Oceanography Unit	Malta	4	0	4
SC Marine Research SRL	Romania	3	0	3

Totals		11572	932	10640

Most centres are government and research institutes. Industry parties are: OceanWise and SC Marine Research SRL.

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.

Nothing to report.

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

Time period 1 September 2016 – 31 March 2017:

CDIs:

No of CDI basket transactions: **19**
No of CDIs requested: **8002**
Different users: **17**
Different data centres: **27**

Data products – DTMs:

Tile	Downloads
Area of interest	16075
B3	1944
C3	1656
B2	1003
C4	962
B4	942
C2	931
D4	920
D3	712
A4	422
A3	324
D2	281
C1	256
A2	229
D1	195
B1	178
A1	172
Total	27202

This also includes the WCS service by which users can draw and download their own 'area of interest'.

Formats

Format	Downloads
ESRI ASCII	12716
32 bit float GeoTiff	3963
GeoTiff	3497
RGB GeoTiff	2677
XYZ	1820
NetCDF	1225
EMO	589
SD	455
EMO (without GEBCO data)	260
Total	**27202**

Indicator 5 - Organisations that have downloaded each data type

organisation	country
Arpacal	Italy
GEOMAR	Germany
Boskalis	Netherlands
private	United Kingdom
Universidad de Santiago de Compostela	Spain
Movistar	Spain
Marine Biological Association	United Kingdom
private	Spain
JO	United States
L-3 Communications	United States
IUEM	France
Iceland GeoSurvey	Iceland
BBE	United Kingdom
NGA	United States
DEME Group	Belgium
TURSIOPS	Spain
Private	Greece

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

Time period 1 September 2016 – 31 March 2017:

Bathymetry main portal:

Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Sep-16	2,745	4,204	24,454	87,309	3.32 GB
Oct-16	3,653	5,231	29,209	105,047	3.45 GB
Nov-16	6,253	7,843	35,362	111,113	3.40 GB
Dec-16	7,642	9,872	45,334	112,210	3.81 GB
Jan-17	9,040	11,446	43,137	117,990	5.12 GB
Feb-17	5,991	7,692	48,989	127,782	4.78 GB
Mar-17	7,395	9,451	44,866	138,578	5.22 GB

Visitors in March 2017:

Hosts (Top 10) - Full list - Last visit - Unresolved IP Address	Pages	Hits	Bandwidth	Last visit
Hosts : 4,291 Known, 3,437 Unknown (unresolved ip) 7,395 Unique visitors				
ec2-52-3-105-23.compute-1.amazonaws.com	3,182	3,457	50.26 MB	31 Mar 2017 - 23:06
a83-163-127-252.adsl.xs4all.nl	2,416	7,511	517.76 MB	31 Mar 2017 - 05:56
unknown.shom.fr	1,196	2,431	70.22 MB	31 Mar 2017 - 13:22
150.178.42.5	1,114	3,527	125.34 MB	29 Mar 2017 - 11:34
cable-77-221-24-113.dynamic.vinet.ba	1,004	1,004	16.23 MB	24 Mar 2017 - 15:19
64.241.197.104.bc.googleusercontent.com	674	839	15.91 MB	13 Mar 2017 - 21:52
ec2-52-3-127-144.compute-1.amazonaws.com	472	495	6.40 MB	27 Mar 2017 - 06:55
41.224.56.242	468	713	5.66 MB	24 Mar 2017 - 08:05
86.105.147.192	374	629	6.83 MB	06 Mar 2017 - 18:53
server.geoecomar.ro	370	693	9.65 MB	09 Mar 2017 - 14:02
Others	33,596	117,279	4.41 GB	

Bathymetry DTM viewer service:

Month	Unique visitors	Pages	Hits	Bandwidth
September 2016	3120	13144	17856	110.45 Gb
October 2016	3926	12571	18362	149.60 Gb
November 2016	3872	13896	20318	269.47 Gb
December 2016	3800	17719	23131	94.05 Gb
January 2017	3631	16263	21612	131.62 Gb
February 2017	4391	10079	16298	161.01 Gb
March 2017	4666	11181	17537	149.75 Gb

Hosts

Top Hosts

	Host	Country	Hits	Visitors	Bandwidth (KB)
1	60.red-192-148-213.customer.static.ccgg.telefonica.net	Spain	46,937	1,220	337,592
2	ec2-52-3-105-23.compute-1.amazonaws.com	United States	809	405	4,477
3	lpr83-2-78-239-25-91.fbx.proxad.net	France	333	278	1,616
4	u-152-61-128-50.xr.usgs.gov	United States	1,127	161	8,213
5	ec2-52-3-127-144.compute-1.amazonaws.com	United States	264	155	1,398
6	ip-192-169-243-214.ip.secureserver.net	United States	937	134	169
7	ip-166-62-120-219.ip.secureserver.net	United States	936	134	168
8	unknown.shom.fr	France	172	114	6,237,591
9	google-proxy-66-249-93-38.google.com	United States	96	92	576
10	static.kpn.net	Netherlands	214	90	4,399,961
11	google-proxy-66-249-93-40.google.com	United States	93	88	556
12	google-proxy-66-249-93-35.google.com	United States	87	82	545
13	9.red-212-170-218.customer.static.ccgg.telefonica.net	Spain	145	81	477,158
14	a83-163-127-252.adsl.xs4all.nl	Netherlands	148	71	72,634
15	fw1.marum.de	Germany	134	68	3,523,437
16	bolegweb.geof.unizg.hr	Croatia	122	61	1,035
17	91.236.215.6	Netherlands	103	57	1,808,647
18	user.vliz.be	Belgium	115	52	3,400,394
19	proxy.dam.intra.cea.fr	France	84	50	5,334,214
20	gate1pos.ath.hcmr.gr	Greece	58	50	149,497
21	nat-service.aws.kontera.com	United States	182	46	928
22	google-proxy-66-249-93-134.google.com	United States	46	44	234
23	195.251.37.187	Greece	90	43	1,558,942
24	112.144.108.93.rev.vodafone.pt	Portugal	175	43	272,377
25	Nautilus.MathStat.Dal.Ca	Canada	300	43	54
26	static-5-51-41-68.ftth.abo.bbox.fr	France	251	42	1,220
27	nat.bo.ismar.cnr.it	Italy	69	42	1,868,968
28	17-142-150-32.applebot.apple.com	United States	81	40	427
29	mail.rvpetro.ru	Russian Federation	42	39	107,526
30	no-reverse-dns-configured.com	Netherlands	68	38	1,231
31	enterprisesearch.siteimprove.com	Denmark	38	38	638
32	relay-fibre.actimar.fr	France	62	37	1,918,233
33	134.245.212.163	Germany	39	37	194
34	silex-87.upc.es	Spain	83	37	2,870,114
35	193.146.141.174	Spain	65	37	2,430,653
36	a83-162-208-60.adsl.xs4all.nl	Netherlands	90	37	1,276,482
37	webdefence.cluster-x.websense.net	Netherlands	81	36	354,436
38	copelandia.univpm.it	Italy	104	36	2,529,133
39	c-acf3e555.018-108-73746f1.cust.bredbandsbolaget.se	Sweden	64	33	308
40	ppp-94-68-206-3.home.otenet.gr	Greece	75	33	362
41	mx.sz-infra.si	Slovenia	66	32	1,109
42	195.251.37.190	Greece	58	32	1,143,774
43	webdefence-pool-01.cluster-a.forcepoint.net	United Kingdom	99	32	11,315,853
44	oer-proxy.isq.pt	Portugal	42	31	2,189,201

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.)

There is no registration for what purpose users are using the downloaded survey datasets and the downloaded DTM tiles. However generally speaking bathymetry is an important parameter for many applications. Detailed and accurate mapping of the seabed and shallow sub-seabed environment is important for a large number of research, policy, and commercial groups. In particular, the acquisition of swath bathymetry data has become a fundamental dataset for multiple scientific disciplines including physical oceanography, marine geology, and benthic ecology. High-resolution bathymetry data provides an opportunity to characterize the processes which formed and actively govern the physical seabed environment, as well as to provide the necessary boundary conditions for numerical modellers to investigate both active (e.g. oceanographic) and past (e.g. glacial) environmental phenomena. The bathymetry data are also highly complementary to seismic and high-resolution sub-bottom profiler data, together providing a 3-D characterization of the shallow sub-seabed environment.

Bathymetry is also an important parameter next to geological and geophysical parameters for companies involved in the planning and construction of offshore windmill farms which need high resolution geophysical and soil information for calculating the stability of the sea bed conditions. The dredging industry needs high resolution bathymetric, geophysical and soil information of the seabed for quantity and quality of the resources and the presence of obstacles in the sea bed for i.e. deepening and widening of shipping routes, beach nourishment and coastal extensions. The oil- and gas industry needs, besides 3D-multichannel seismics for oil- and gas exploration, bathymetric and geophysical information for the stability of platforms and planning of pipeline routes. Companies involved with ecological issues for the determination of habitats in the offshore, need images collected with side scan sonar and multibeam for morphological and characterization of the sea bed.

Indicator 8 – List of web-services made available and user organisations connected through these web-services

Web services concern the Bathymetry Viewing and Downloading service: the OGC compliant web services comprise various layers and their URLs are advertised in the HELP section of the Viewing Service and also at the main portal. The web services concern WMS, WFS, WMTS and WCS and are applied by various users. These services are very popular with more than 146.000 users in the 7 months as can be seen from its statistics in the tables below.

Page Views	
Total Page Views	17,942,899
Average Page Views per Day	84,636
Average Page Views per Visitor	122.13
Visitors	
Total Visitors	146,913
Average Visitors per Day	692
Total Unique IPs	17,743

The total number of pageviews is more than 17.9 million, but these is somewhat misleading as a full page can be composed of multiple views. The top visiting countries and sites are indicated below.

Most Active Countries
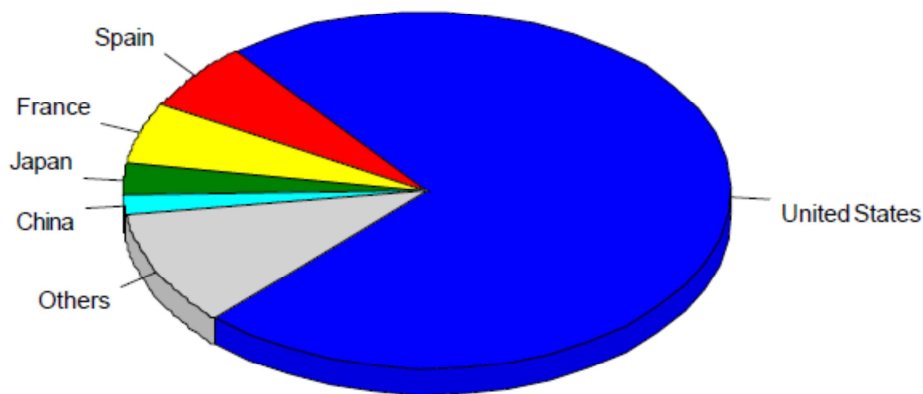
	Hosts				

Top Hosts

|	Host	Country	Hits	Visitors	Bandwidth (KB)
1	54.240.157.14	United States	931,884	1,067	19,938,702
2	52.57.254.111	United States	44,533	1,025	816,129
3	52.57.254.109	United States	45,929	1,023	849,709
4	52.57.254.112	United States	50,156	1,009	874,695
5	52.57.254.170	United States	49,486	997	862,202
6	52.57.254.0	United States	41,027	996	734,920
7	54.239.166.80	United States	709,089	976	16,720,104
8	52.57.254.177	United States	45,928	951	830,707
9	52.57.254.17	United States	41,121	867	769,010
10	130.206.32.66	Spain	342,371	833	6,239,165
11	52.57.254.120	United States	37,772	813	667,293
12	52.57.254.119	United States	37,817	810	685,699
13	52.57.254.101	United States	37,452	807	672,360
14	52.57.254.167	United States	35,672	807	669,354
15	52.57.254.10	United States	36,100	805	653,797
16	52.57.254.171	United States	36,258	804	651,648
17	52.57.254.114	United States	38,076	803	708,994
18	52.57.254.104	United States	34,720	803	633,578
19	52.57.254.113	United States	37,312	801	690,504
20	52.57.254.169	United States	33,478	799	619,950
21	52.57.254.249	United States	41,518	798	759,563
22	52.57.254.168	United States	41,440	796	691,961
23	52.57.254.103	United States	36,775	795	648,123
24	52.57.254.97	United States	36,626	794	667,472
25	52.57.254.117	United States	39,106	794	703,865
26	52.57.254.115	United States	38,302	789	697,577
27	52.57.254.125	United States	37,136	788	688,242
28	52.57.254.110	United States	38,608	785	623,420
29	52.57.254.121	United States	43,304	784	719,877
30	52.57.254.118	United States	41,884	783	757,243
31	52.57.254.108	United States	38,913	783	732,709
32	52.57.254.122	United States	36,945	781	664,574
33	52.57.254.11	United States	40,139	779	727,817
34	52.57.254.173	United States	34,069	778	631,885
35	52.57.254.138	United States	38,602	777	713,262
36	52.57.254.107	United States	43,621	772	773,101
37	52.57.254.116	United States	37,649	769	623,922
38	52.57.254.106	United States	37,177	767	624,842
39	52.57.254.61	United States	39,074	767	735,826
40	54.239.183.6	United States	471,084	749	10,201,260
41	52.57.254.105	United States	36,636	738	697,317
42	52.57.254.175	United States	34,996	735	637,707
43	52.57.254.176	United States	32,763	707	540,433
44	54.240.150.3	United States	337,428	680	8,047,333

Indicator 9 – List of publications referencing to EMODnet Bathymetry

The following references to EMODnet Bathymetry can be found using Google Scholar on the 28/03/2017. References are given for accepted papers and edited books from 01/01/2017 onwards.

January 2017	Continental Shelf Research (Peer reviewed article)	Authigenic carbonate mounds from active methane seeps on the southern Aquitaine Shelf (Bay of Biscay, France): Evidence for anaerobic oxidation of biogenic methane and submarine groundwater discharge during formation	http://www.sciencedirect.com/science/article/pii/S0278434316301273
February 2017	Quaternary Science Reviews (Peer reviewed article)	Sea-level rise and potential drowning of the Italian coastal plains: Flooding risk scenarios for 2100	http://www.sciencedirect.com/science/article/pii/S0277379116307430
February 2017	Marine Ornithology (Peer reviewed article)	Status and diet of the European Shag (Mediterranean subspecies) Phalacrocorax Aristitelis desmarestii in the Libyan sea (South Crete) during the breeding season	http://www.marineornithology.org/PDF/45_1/45_1_1-9.pdf
February 2017	Biogeochemistry (Peer reviewed article)	Predicting the standing stock of organic carbon in surface sediments of the North–West European continental shelf	http://link.springer.com/article/10.1007/s10533-017-0310-4
March 2017	Earth Science Reviews (Peer reviewed article)	The configuration, sensitivity and rapid retreat of the Late Weichselian Icelandic ice sheet	http://www.sciencedirect.com/science/article/pii/S001282521630246X
March 2017	Book	Morphodynamics of Mediterranean Mixed Sand and Gravel Coasts	
March 2017	Earth and Planetary Science Letters (Peer reviewed article)	Active tectonics of the Calabrian subduction revealed by new multi-beam bathymetric data and high-resolution seismic profiles in the Ionian Sea (Central Mediterranean)	http://www.sciencedirect.com/science/article/pii/S0012821X16307336
March 2017	EOS Earth & Space Science News (Peer reviewed opinion	Airline Flight Paths over the Unmapped Ocean	https://eos.org/opinions/airline-flight-paths-over-the-unmapped-ocean

	article)		
April 2017	Information Systems (peer reviewed article)	A survey of official online sources of high-quality free-of-charge geospatial data for maritime geographic information systems applications	http://www.sciencedirect.com/science/article/pii/S0306437916304185
April 2017	Palaeogeography, Palaeoclimatology, Palaeoecology (Peer reviewed article)	Fish otoliths in superficial sediments of the Mediterranean Sea	http://www.sciencedirect.com/science/article/pii/S0031018216305156
April 2017	Ocean Dynamics (Peer reviewed article)	Numerical modeling of space-time wave extremes using WAVEWATCH III	http://link.springer.com/article/10.1007/s10236-016-1025-0
2017	Book	Atlas of Bedforms in the Western Mediterranean	DOI 10.1007/978-3-319-33940-5

Annex 1: Feedback from and to users

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Subject: Re: Emodnet-Hydrography Feedback form
Date: Wed, 7 Sep 2016 14:15:37 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To: ayferilbay@gmail.com

Dear Ayfer,

Most probably you tried to register for the Personal Layer in the EMODnet Bathymetry Viewing and Download Service at: http://portal.emodnet-bathymetry.eu/ .

The Personal Layer function is temporarily not active (as mentioned in the HELP section). However for browsing and downloading the Bathymetry DTMs it is not necessary that you register, because these are all public services.

Should you require access to the underlying bathymetric survey data, then you will have to make use of the CDI Data Discovery and Access service. And this will require you to register as a SeaDataNet user as is explained at the related webpages. See: http://www.emodnet-bathymetry.eu/content/content.asp?menu=0030000_000000

This should work.

Kind regards
Dick M.A. Schaap
Coordinator EMODnet Bathymetry

On 9/5/2016 13:31, noreply@maris.nl wrote:

Name:	Ayfer Karli
Emailaddress:	ayferilbay@gmail.com
Feedback:	Dear Sir/Madam, Although I registrated to your website properly, I could not log in to the data network. When I tried, I got a warning stating that the "temporary disabled, please chack back later". Could you please help me to solve this problem. I am looking forward to hearing from you soon. Best regards, Ayfer Karlı İlbay

Subject: Re: Emodnet-Hydrography Feedback form
Date: Wed, 21 Sep 2016 12:45:55 +0200
From: Dick M.A. Schaap <dick@maris.nl>
To: marine.devienne@edf-en.com

Dear Pierre,

In EMODnet Bathymetry we have input data from Hydrographic Offices (HOs) and also from research institutes. Data from HOs are globally referenced to a LAT measured at a local tide station (generally from harbours). For the other sources it is not 100% the same case. It happens that it is assumed that

Mean Sea Level and Lat are the same for water depths greater than 200 m and in most parts of the Mediterranean sea, because of minimum tides.Moreover for deep areas the impact of the tide precision generally will fall well below the level of variability of the morphology of the seafloor per grid cell and thus the precision of the given waterdepth.
Vorf bathyelli or other tide level surface are held nationally and might be used in the future.
Hope this helps.

Kind regards
Dick M.A. Schaap
Coordinator

On 9/15/2016 16:23, noreply@maris.nl wrote:

Name:	Pierre MENSAN
Emailaddress:	marine.devienne@edf-en.com
Feedback:	Hello, I would like to know which LAT your are talking about for the metering of the bathymetry. Is it based on a VORF or on a specific point ? Thanks

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Subject: Re: EMODnet question
Date: Tue, 14 Feb 2017 10:09:14 +0100
From: Marie Windstein <marie.windstein@gmail.com>
To: George Spoelstra <george@ggsgc.eu>
CC: Dick Schaap <dick@maris.nl>

Hi George,
Thank you for getting back to me. Yes it is the EMODnet tile B2. I tried downloading different formats and in the end the ASCII files worked so that's good.
Thank you so much for getting back to me.

Regards,

Marie Windstein

Aix-Marseille Université, France
M.Sc in Oceanography candidate, 2017
Marine Biology & Ecology Program

Wed, Feb 8, 2017 at 7:31 PM, George Spoelstra <george@ggsgc.eu> wrote:

Hi Marie,
Can you be more specific what it was you downloaded. The GEBCO basemap is not downloadable so I assume you tried to download EMODnet tile B2 but I need to know in which format in order to

understand your problem.
Thanks

George

Van: <noreply@maris.nl>
Datum: 14 februari 2017 15:49:42 CET
Aan: <dick@maris.nl>
Onderwerp: Emodnet-Hydrography Feedback form
Antwoord aan: <rotlotzinn@gmail.com>

Name:	Julian
Emailaddress:	rotlotzinn@gmail.com
Feedback:	Hi EMODnet team, great data source you built! Unfortunately when I select "download products", I don't see the tiles and consequently cannot download them. Downloading is also not working when selecting an area of interest. (I know the standard functionality from a second computer) Do you have any hint if some of my settings/programmes might influence the usability of your side? Best regards Julian

Subject: EMODnet issue
Date: Wed, 15 Feb 2017 10:09:26 +0100
From: George Spoelstra <george@ggsgc.eu>
Organization: GGS geo consultancy BV
To: rotlotzinn@gmail.com
CC: 'Dick Schaap' <dick@maris.nl>

Hi Julian,
Can you provide me some details on the configuration you are working on. OS, browser, behind firewall or not etc. That will help us better understand what could cause your problem.

Thanks

George

From: Hans <rotlotzinn@googlemail.com>
Date: 23 February 2017 at 16:55:38 GMT+1
To: George Spoelstra <george@ggsgc.eu>
Subject: Re: EMODnet issue

Hi George,
thanks for your quick response!
I checked again and now can download your bathymetry data with my second computer as well.
Thanks for the great data you provide!

Best regards
Julian Krönert

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Subject: Re: Emodnet-Hydrography Feedback form
Date: Fri, 10 Mar 2017 13:11:07 +0100
From: Dick M.A. Schaap <dick@maris.nl>
To: ogmundur.erlendsson@isor.is
Dear Ogmundur,
I am sorry, but the wrecks layer is not available for download. It is provided to us via OceanWise. If you are interested, you might contact them: richard.farren@oceanwise.eu
Regards
Dick M.A. Schaap
Technical Coordinator

On 3/8/2017 22:56, noreply@maris.nl wrote:

Name:	Ögmundur Erlendsson
Emailaddress:	ogmundur.erlendsson@isor.is
Feedback:	Is it not possible to download the Wrecks information ?

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Subject:	Emodnet-Hydrography Feedback form
Date:	Thu, 23 Mar 2017 11:45:24 +0100
From:	noreply@maris.nl
Reply-To:	marco.guerrini@ucc.ie
To:	dick@maris.nl
Name:	Marco Guerrini
Emailaddress:	marco.guerrini@ucc.ie
Feedback:	Dear Sir/Madame, I am trying to use the functionality :"Download area of interest" -> "Download as ESRI ASCII file". It seems not to work. Could you please advise on this? Thank you, Marco
Subject:	EMODnet question
Date:	Fri, 24 Mar 2017 11:14:23 +0100
From:	George Spoelstra <george@ggsgc.eu>
Organization:	GGS geo consultancy BV
To:	marco.guerrini@ucc.ie
CC:	'Dick Schaap' <dick@maris.nl>

Hi Marco,
Thanks for your feedback on using the EMODnet portal. The most likely cause of this problem is that you try to select a too large area. For larger areas it is better to download the pre-generated products

(use the download products button). If you do wish to download an area of interest try starting with a small area just to see if it works for you. This way we can exclude potential problems with firewalls and browser compatibility. Let me know if it worked for you.
Thanks

George

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Subject:	RE: EMODnet question
Date:	Mon, 27 Mar 2017 16:13:46 +0200
From:	George Spoelstra <george@ggsgc.eu>
Organization:	GGS geo consultancy BV
To:	'Guerrini, Marco' <marco.guerrini@ucc.ie>
CC:	'Dick Schaap' <dick@maris.nl>, 'Martin Verlaan' <Martin.Verlaan@deltares.nl>

Hi Marco,
Good to hear that you managed to download the data that you were looking for. EMODnet at the moment has no functionality for the vertical reference adjustments that you need but this likely to come in the (near) future. For now I advise you to contact Martin Verlaan from Deltares in the Netherlands (in the cc). He is the WP leader for this topic. I expect he can help you with a global model for adjusting your data.

Thanks
George

From: Guerrini, Marco [mailto:marco.guerrini@ucc.ie]
Sent: Monday, March 27, 2017 11:31 AM
To: George Spoelstra <george@ggsgc.eu>
Cc: 'Dick Schaap' <dick@maris.nl>
Subject: RE: EMODnet question

Hi George,
Thank you very much for your quick reply. It is very much appreciated. I managed to download the B3 dataset using the pre-generated products. I read from the "Guidelines for metadata, data and DTM QA/QC" document that the vertical datum from different sources had been adjusted to LAT. Do EMODnet have a functionality/model to convert between vertical datums? More specifically I am looking for a bathymetry dataset with resprct to MSL for an area that cover the Irish sea (i.e. sea in between Ireland and the UK).

Thanks in advance,
Kind Regards,
Marco